RADIO TEST REPORT

Test Report No.: 13720501H-D-R2

Customer	**Sound Devices, LLC**
Description of EUT	**Digital Wireless Microphone Transmitter**
Model Number of EUT	**A20-MINI**
FCC ID	**2AKLX-9295W**
Test Regulation	**FCC Part 74**
Test Result	**Complied (Refer to SECTION 3)**
Issue Date	**October 20, 2022**
Remarks	**-**

Representative test engineer	**Approved by**
Keiya Ido Engineer	Tsubasa Takayama Leader

CERTIFICATE 5107.02

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- The information provided from the customer for this report is identified in Section 1.
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REVISION HISTORY

Original Test Report No.: 13720501H-D

This report is a revised version of 13720501H-R1. 13720501H-R1 is replaced with this report.

Revision	Test Report No.	Date	Page Revised Contents
- (Original)	13720501H-D	August 19, 2022	-
1	13720501H-D-R1	September 16, 2022	SECTION 5: Field strength of spurious radiation -Correction of below sentence. 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 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 accordance to KDB 206256 and ANSI C 63.26, and the test was made at the position that has the maximum noise. The confirm also includes compliance in the vertical axis (i.e. Y axis) as specified in EN 300422. A test data showing the highest emission levels as worst position are reported in this report.
1	13720501H-D-R1	September 16, 2022	APPENDIX 3: Photographs of test setup -Addition of setup photo for Y/ Z Axis.
2	13720501H-D-R2	October 20, 2022	SECTION 2: Equipment under test (EUT) 2.1 : Identification of EUT -Correction of Test Date June 1 to July 22, 2022→June 1 to October 20, 2022
2	13720501H-D-R2	October 20, 2022	SECTION 3,2: Procedures and results SECTION 4: Operation of EUT during testing *The details of Operating mode(s) SECTION 6: Antenna Terminal Tests APPENDIX 1: Test data -Addition of Frequency Stability test information and test data.

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	Sound Devices, LLC
Address	PO Box 576, E7556 State Rd 23 and 33, Reedsburg, WI, 53959, US
Telephone Number	+1 608 524 0625
Contact Person	Lee Stone of Audio Ltd (E-mail: lee stone@audioltd.com)

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 Microphone Transmitter
Model Number	A20-MINI
Serial Number	Refer to SECTION 4.2
Condition	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	No Modification by the test lab
Receipt Date	May 14, 2022 (for Antenna Terminal Conducted test) June 30 and July 20, 2022(for Radiated Emission test)
Test Date	June 1 to October 20, 2022

General Specification

Rating	DC 3.7 V to 4.5 V
Operating temperature	-10 deg. C to 38 deg. C

Radio Specification (Radio microphone) *1)

Radio type	Transmitter
Modulation type	COFDM
Emission designator	200KG2E
Necessary bandwidth	200 kHz
Channel spacing	400 kHz
Frequency of operation	941.600 MHz to 951.900 MHz 952.950 MHz to 956.150 MHz 956.550 MHz to 959.750 MHz 1435.100 MHz to 1524.900 MHz
RF power	2 mW, 10 mW, 20 mW, 40 mW
Antenna gain	2.14 dBi

Radio Specification (Bluetooth Low Energy)

Equipment Type	Transceiver
Frequency of Operation	2402 MHz to 2480MHz
Type of Modulation	GFSK
Antenna Gain	1.8 dBi

*1) This test report applies for Radio microphone part (941.600 MHz to 951.900 MHz, 952.950 MHz to 956.150 MHz, 956.550 MHz to 959.750 MHz and 1435.100 MHz to 1524.900 MHz).

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	FCC Part 74
Title	FCC 47CFR Part74 EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER PROGRAM DISTRIBUTIONAL SERVICES

* 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	**FCC:** Section 15.207	N/A	N/A	*1)
RF power output	FCC: Section 2.1046	FCC: Section 74.861 (d) (1)	See data.	Complied a)	Conducted
Occupied Bandwidth	FCC: Section 2.1049	FCC: Section 74.861 (c)	See data.	Complied b)	Conducted
Spurious emissions at antenna terminals	EN 300 422-1 V 1.4.2 Clause 8.4	FCC: KDB 206256 D01 Section III (c)	See data.	N/A	*2)
Emission Mask	EN 300 422-1 V 1.4.2 Clause 8.3	FCC: KDB 206256 D01 Section III (c)	See data.	Complied c)	Conducted
Field strength of spurious radiation	EN 300 422-1 V 1.4.2 Clause 8.4	FCC: KDB 206256 D01 Section III (c)	0.4 dB 845.18 MHz, Horizontal/ 844.80 MHz, Horizontal	Complied d)	Radiated
Frequency stability	FCC: Section 2.1055	FCC: Section 74.861 (e) (4)	See data.	Complied e)	Conducted

Note: UL Japan, Inc.'s EMI Work Procedures: Work Instructions-ULID-003591 and Work Instructions-ULID-003593.
* In case any questions arise about test procedure, KDB 206256 D01 Wireless Microphones v02 and ANSI C63.26: 2015 are also referred.

*1) The test is not applicable since the EUT operates in RF mode only by battery and not by USB power supply.
*2) Based on KDB inquiry (Tracking Number: 505113), Transmitter unwanted emission test was conducted only Radiated.

a) Refer to APPENDIX 1 (data of RF power output)
b) Refer to APPENDIX 1 (data of Occupied Bandwidth)
c) Refer to APPENDIX 1 (data of Emission Mask)
d) Refer to APPENDIX 1 (data of Field strength of spurious radiation)
e) Refer to APPENDIX 1 (data of Frequency stability)

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.

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
Occupied bandwidth (Span 1 MHz)	0.96 %
Emission mask	1.9 dB
Frequency stability	0.01541 ppm
Spurious emissions at antenna terminals	2.3 dB

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	-	-

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: 20 mW	Typ. 20 mW
Transmitting (Tx), Power setting: 40 mW	Typ. 40 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, 20 mW, 40 mW Software: RealTerm: Serial Capture program 2.0.0.69 (Date: 2021.04.01 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 except 2mW, 10mW, 20mW and 40mW settings.	

*The details of Operating mode(s) (1/2)

Test Item	Tested frequency	Power setting	Modulation	Remarks
RF power output	941.600 MHz (Low) 946.750 MHz (Mid) 951.900 MHz (High)	2 mW, 10 mW, 20 mW 40 mW	Digital modulation (PN9 data packet)	-
	952.950 MHz (Low) 954.550 MHz (Mid) 956.150 MHz (High)	2 mW, 10 mW, 20 mW 40 mW		
	956.550 MHz (Low) 958.150 MHz (Mid) 959.750 MHz (High)	2 mW, 10 mW, 20 mW 40 mW		
	1435.100 MHz (Low) 1480.000 MHz (Mid) 1524.900 MHz (High)	2 mW, 10 mW, 20 mW 40 mW		
Occupied Bandwidth	941.600 MHz (Low) 946.750 MHz (Mid) 951.900 MHz (High)	40 mW	Digital modulation (PN9 data packet)	-
	952.950 MHz (Low) 954.550 MHz (Mid) 956.150 MHz (High)			
	956.550 MHz (Low) 958.150 MHz (Mid) 959.750 MHz (High)			
	1435.100 MHz (Low) 1480.000 MHz (Mid) 1524.900 MHz (High)			

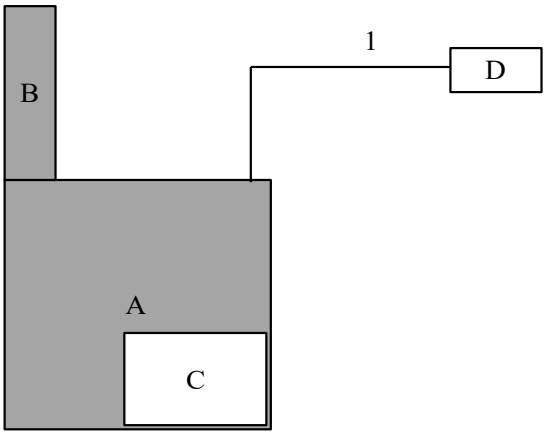
*The details of Operating mode(s) (2/2)

Test Item	Tested frequency		Power setting	Modulation	Remarks
Emission Mask	941.600 MHz 946.750 MHz 951.900 MHz	(Low) (Mid) (High)	2 mW 40 mW	Digital modulation (PN9 data packet)	-
	952.950 MHz 954.550 MHz 956.150 MHz	(Low) (Mid) (High)	2 mW 40 mW		
	956.550 MHz 958.150 MHz 959.750 MHz	(Low) (Mid) (High)	2 mW 40 mW		
	1435.100 MHz 1480.000 MHz 1524.900 MHz	(Low) (Mid) (High)	2 mW 40 mW		
Field strength of spurious radiation	941.600 MHz 946.750 MHz 951.900 MHz	(Low) (Mid) (High)	40 mW	Digital modulation (PN9 data packet)	-
	952.950 MHz 954.550 MHz 956.150 MHz	(Low) (Mid) (High)	40 mW		
	956.550 MHz 958.150 MHz 959.750 MHz	(Low) (Mid) (High)	40 mW		
	1435.100 MHz 1480.000 MHz 1524.900 MHz	(Low) (Mid) (High)	40 mW		
Frequency stability	946.750 MHz	(Mid)	40 mW	No modulation	*1)
	954.550 MHz	(Mid)			
	958.150 MHz	(Mid)			
	1480.000 MHz	(Mid)			

*The isolator of RF filter circuit is consisted of passive component. It does not contain non-linear component. Therefore the test was performed on lowest, near middle and highest frequency that was chosen from available frequency band.
*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

【Radiated Emission test】



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

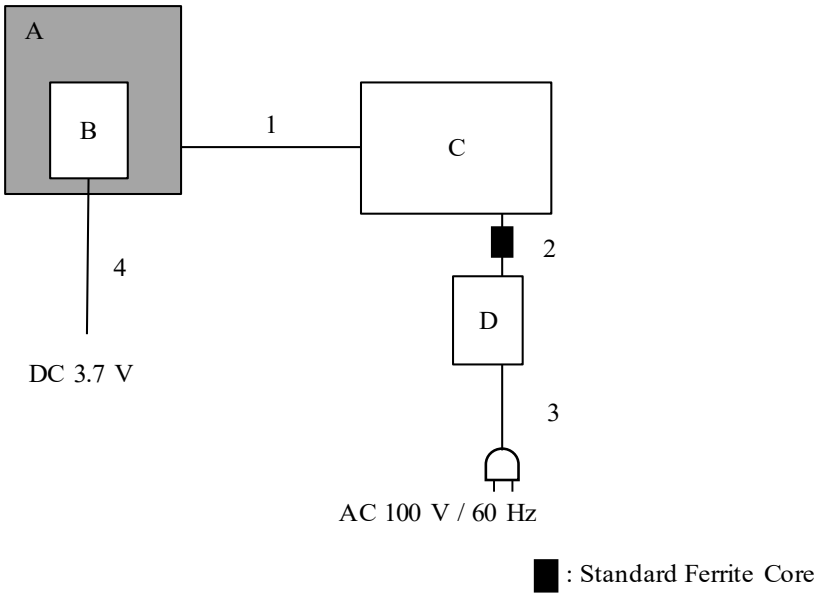
Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Digital Wireless Microphone Transmitter	A20-MINI	GF9922068004	Sound Devices, LLC	EUT
B	Whip Antenna 941MHz to 1015 MHz	#5	-	Sound Devices, LLC	EUT
	1350 MHz to 1525 MHz	#7	-		
C	Battery	NP-BX1	3852248	DuraPro	-
D	Lavalier Microphone Black	VT 506	-	Voice Technologies	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Signal Cable	1.5	Unshielded	Unshielded	-

【Antenna Terminal Conducted test】



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Digital Wireless Microphone Transmitter	A20-MINI	GF9922068004	Sound Devices, LLC	EUT
B	Battery	NP-BX1	3852248	DuraPro	-
C	Laptop PC	X1 Carbon	R9-OH8TU 15/9	LENOVO	-
D	AC Adapter	ADLX45NCC2A	8SSA10E75794C1SG 59R0GHF	LENOVO	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	1.3	Shielded	Shielded	-
2	DC Cable	1.0	Unshielded	Unshielded	-
3	AC Cable	1.0	Unshielded	Unshielded	-
4	DC Cable	0.8	Unshielded	Unshielded	-

SECTION 5: Field strength of spurious radiation

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.

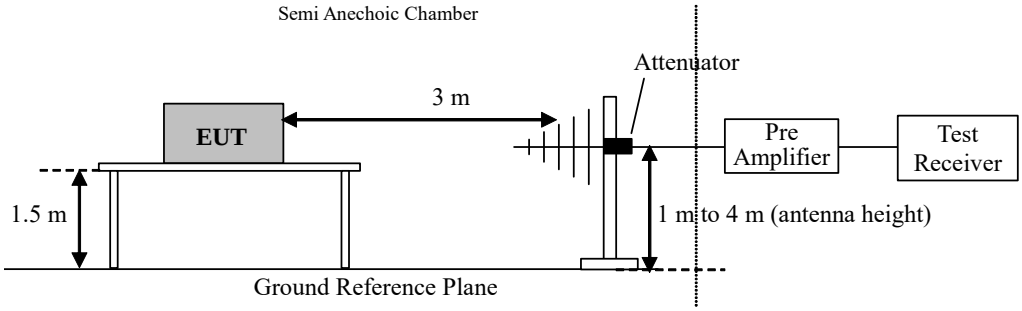
3) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 2).
For the usage of the Antenna (Horn Antenna) except for the Half wave dipole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

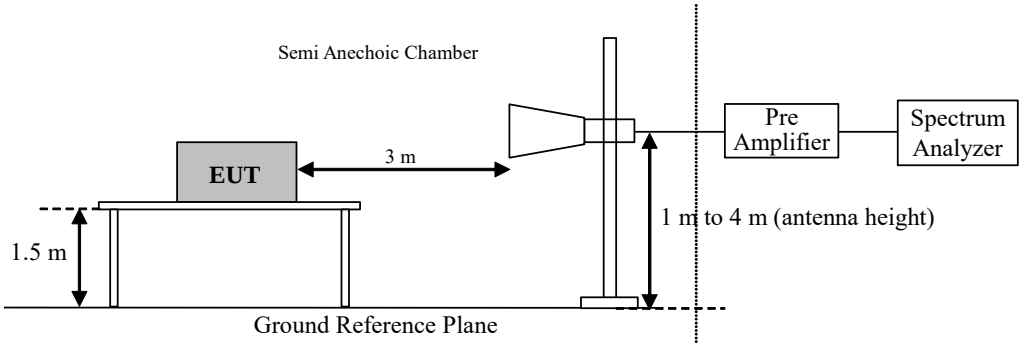
Frequency	25 MHz to 30 MHz	30 MHz to 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer		
Detector	RMS Average		
IF Bandwidth	RBW: 10 kHz VBW: 30 kHz	RBW: 100 kHz VBW: 300 kHz	RBW: 1 MHz VBW: 3 MHz
Test Distance	3 m		

Figure 2: Test Setup

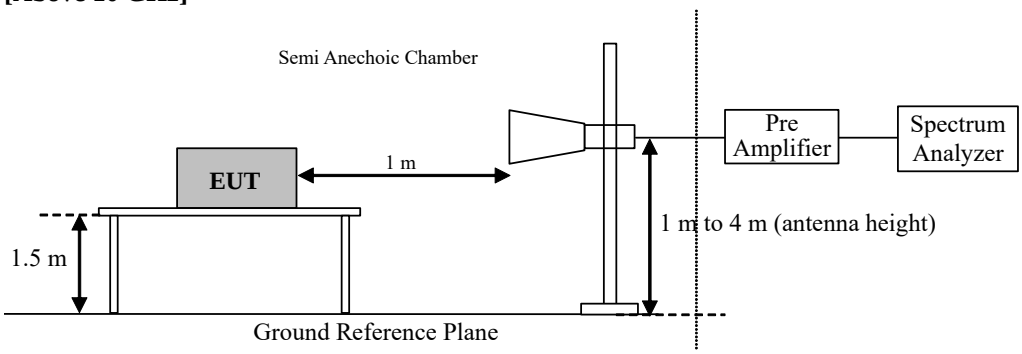
[25 MHz to 1 GHz]



[1 GHz to 10 GHz]



[Above 10 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 accordance to KDB 206256 and ANSI C 63.26, and the test was made at the position that has the maximum noise.
The confirm also includes compliance in the vertical axis (i.e. Y axis) as specified in EN 300422.
A test data showing the highest emission levels as worst position are reported in this report.

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

Measurement range : 25 MHz to 18 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Antenna Terminal 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 power output	-	-	-	Auto	Average	-	Power Meter (Sensor: 50 MHz BW)
Occupied Bandwidth	Enough width to display emission skirts	1 to 5% of Occupied bandwidth	Three times of RBW	Auto	Peak *1)	Max Hold *1)	Spectrum Analyzer
Frequency stability	-	-	-	-	-	-	Spectrum Analyzer
*1) The measurement was performed with Peak and Max Hold.							

[Side band spectrum measurement (Emission mask)]
The tests were made with below setting connected to the antenna port.

Test procedure
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.
Step 1: Measure the "Carrier Power" with the spectrum analyzer setup:
- Center Frequency = fc
- Span = Zero span
- Detector = RMS
- Trace Mode = Average
- RBW&VBW = 5 x B
- Sweep time ≥ 2 s

Step 2: Measure the "Maximum Relative Level (dBc) at Specified Carrier Offsets" with the following spectrum analyzer setup:
- Center Frequency = fc
- Span ≥ 5 x B
- Detector = RMS
- Trace Mode = Peak Hold
- RBW&VBW = 1 kHz
- Sweep time ≥ 2 s

Step 3: Measure the "transmitter wide band noise floor":
- Start Frequency = fc + 1,75B and fc - 1 MHz
- Stop Frequency = fc + 1 MHz and fc - 1,75 B
- Detector = RMS
- Trace Mode = Average
- RBW&VBW = 1 kHz
- Sweep time ≥ 2 s

[Frequency stability]
The power supply set to 100 % nominal setting, raise EUT operating temperature to 50 deg. C.
Record the frequency of the EUT.
Repeat measurements at each 10 deg. C decrement to -30 deg. C.

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 additional test was performed at maximum and minimum (end point) operating Voltage.

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

RF Output Power

Test place Ise EMC Lab. No.8 Measurement Room
Date June 1, 2022
Temperature / Humidity 25 deg. C / 40 % RH
Engineer Hiroki Numata
Mode Tx

Power Setting	Channel	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Average [Conducted] [dBm]	[mW]	Limit [Conducted] [mW]	Margin [dB]	Remarks
2 mW	Low ch	941.600	-7.61	0.29	9.92	2.60	1.820	1000	27.40	-
	Mid ch	946.750	-7.69	0.29	9.92	2.52	1.786	1000	27.48	-
	High ch	951.900	-7.64	0.29	9.92	2.57	1.807	1000	27.43	-
10 mW	Low ch	941.600	-0.83	0.29	9.92	9.38	8.670	1000	20.62	-
	Mid ch	946.750	-0.76	0.29	9.92	9.45	8.810	1000	20.55	-
	High ch	951.900	-0.81	0.29	9.92	9.40	8.710	1000	20.60	-
20 mW	Low ch	941.600	2.34	0.29	9.92	12.55	17.99	1000	17.45	-
	Mid ch	946.750	2.24	0.29	9.92	12.45	17.58	1000	17.55	-
	High ch	951.900	2.39	0.29	9.92	12.60	18.20	1000	17.40	-
40 mW	Low ch	941.600	5.25	0.29	9.92	15.46	35.16	1000	14.54	-
	Mid ch	946.750	5.37	0.29	9.92	15.58	36.14	1000	14.42	-
	High ch	951.900	5.09	0.29	9.92	15.30	33.88	1000	14.70	-

Calculation formula:

Result = Reading + Cable Loss + Atten. Loss

RF Output Power

Test place	Ise EMC Lab. No.8 Measurement Room
Date	June 1, 2022
Temperature / Humidity	25 deg. C / 40 % RH
Engineer	Hiroki Numata
Mode	Tx

Power Setting	Channel	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Average [Conducted] [dBm]	[mW]	Limit [Conducted] [mW]	Margin [dB]	Remarks
2 mW	Low ch	952.950	-7.89	0.29	9.92	2.32	1.706	1000	27.68	-
	Mid ch	954.550	-7.72	0.29	9.92	2.49	1.774	1000	27.51	-
	High ch	956.150	-7.61	0.29	9.92	2.60	1.820	1000	27.40	-
10 mW	Low ch	952.950	-0.91	0.29	9.92	9.30	8.511	1000	20.70	-
	Mid ch	954.550	-0.97	0.29	9.92	9.24	8.395	1000	20.76	-
	High ch	956.150	-0.84	0.29	9.92	9.37	8.650	1000	20.63	-
20 mW	Low ch	952.950	2.23	0.29	9.92	12.44	17.54	1000	17.56	-
	Mid ch	954.550	2.45	0.29	9.92	12.66	18.45	1000	17.34	-
	High ch	956.150	2.36	0.29	9.92	12.57	18.07	1000	17.43	-
40 mW	Low ch	952.950	5.07	0.29	9.92	15.28	33.73	1000	14.72	-
	Mid ch	954.550	5.33	0.29	9.92	15.54	35.81	1000	14.46	-
	High ch	956.150	5.12	0.29	9.92	15.33	34.12	1000	14.67	-

Calculation formula:

Result = Reading + Cable Loss + Atten. Loss

RF Output Power

Test place	Ise EMC Lab. No.8 Measurement Room
Date	June 1, 2022
Temperature / Humidity	25 deg. C / 40 % RH
Engineer	Hiroki Numata
Mode	Tx

Power Setting	Channel	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Average [Conducted] [dBm]	[mW]	Limit [Conducted] [mW]	Margin [dB]	Remarks
2 mW	Low ch	956.550	-7.71	0.29	9.92	2.50	1.778	1000	27.50	-
	Mid ch	958.150	-7.60	0.29	9.92	2.61	1.824	1000	27.39	-
	High ch	959.750	-7.72	0.29	9.92	2.49	1.774	1000	27.51	-
10 mW	Low ch	956.550	-0.93	0.29	9.92	9.28	8.472	1000	20.72	-
	Mid ch	958.150	-0.92	0.29	9.92	9.29	8.492	1000	20.71	-
	High ch	959.750	-0.97	0.29	9.92	9.24	8.395	1000	20.76	-
20 mW	Low ch	956.550	2.54	0.29	9.92	12.75	18.84	1000	17.25	-
	Mid ch	958.150	2.42	0.29	9.92	12.63	18.32	1000	17.37	-
	High ch	959.750	2.46	0.29	9.92	12.67	18.49	1000	17.33	-
40 mW	Low ch	956.550	5.04	0.29	9.92	15.25	33.50	1000	14.75	-
	Mid ch	958.150	5.18	0.29	9.92	15.39	34.59	1000	14.61	-
	High ch	959.750	5.02	0.29	9.92	15.23	33.34	1000	14.77	-

Calculation formula:

Result = Reading + Cable Loss + Atten. Loss

RF Output Power

Test place	Ise EMC Lab. No.8 Measurement Room
Date	June 1, 2022
Temperature / Humidity	25 deg. C / 40 % RH
Engineer	Hiroki Numata
Mode	Tx

Power Setting	Channel	Freq. [MHz]	Reading Average [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result Average [Conducted] [dBm]	[mW]	Limit [Conducted] [mW]	Margin [dB]	Remarks
2 mW	Low ch	1435.100	-8.83	1.05	10.04	2.26	1.683	250	21.72	-
	Mid ch	1480.000	-9.09	1.07	10.04	2.02	1.592	250	21.96	-
	High ch	1524.900	-9.73	1.09	10.04	1.40	1.380	250	22.58	-
10 mW	Low ch	1435.100	-1.93	1.05	10.04	9.16	8.241	250	14.82	-
	Mid ch	1480.000	-1.90	1.07	10.04	9.21	8.337	250	14.77	-
	High ch	1524.900	-1.90	1.09	10.04	9.23	8.375	250	14.75	-
20 mW	Low ch	1435.100	1.08	1.05	10.04	12.17	16.48	250	11.81	-
	Mid ch	1480.000	1.24	1.07	10.04	12.35	17.18	250	11.63	-
	High ch	1524.900	1.26	1.09	10.04	12.39	17.34	250	11.59	-
40 mW	Low ch	1435.100	3.95	1.05	10.04	15.04	31.92	250	8.94	-
	Mid ch	1480.000	4.04	1.07	10.04	15.15	32.73	250	8.83	-
	High ch	1524.900	4.01	1.09	10.04	15.14	32.66	250	8.84	-

Calculation formula:

Result = Reading + Cable Loss + Atten. Loss

Occupied Bandwidth

Test place Ise EMC Lab. No.8 Measurement Room
Date June 2, 2022
Temperature/ Humidity 24 deg. C / 42 % RH
Engineer Hiroki Numata
Mode Tx

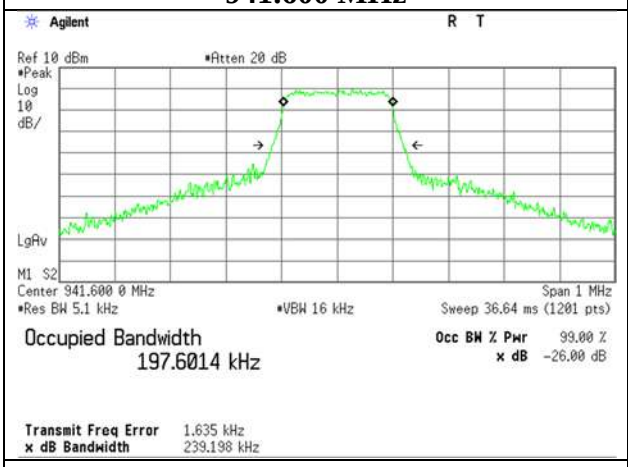
Power Setting	Channel	Frequency [MHz]	Bandwidth [kHz]	Frequency Error [Hz]	Result Bandedge [MHz]	Limit Bandedge [MHz]
40mW	Low	941.600	197.6014	1635.000	941.5028	> 941.500
40mW	Mid	946.750	197.3679	1789.000	946.8505	< 952.000
40mW	High	951.900	194.8397	1218.000	951.9986	< 952.000
40mW	Low	952.950	197.0610	1644.000	952.8531	> 952.850
40mW	Mid	954.550	197.0449	1571.000	954.6501	< 956.250
40mW	High	956.150	197.1185	1255.000	956.2498	< 956.250
40mW	Low	956.550	197.2815	1853.000	956.4532	> 956.450
40mW	Mid	958.150	197.1098	1410.000	958.2500	< 959.850
40mW	High	959.750	195.5172	1718.000	959.8495	< 959.850
40mW	Low	1435.100	186.8665	1686.000	1435.0083	> 1435.000
40mW	Mid	1480.000	186.4017	2034.000	1480.0952	< 1525.000
40mW	High	1524.900	185.9894	1976.000	1524.9950	< 1525.000

Occupied Bandwidth

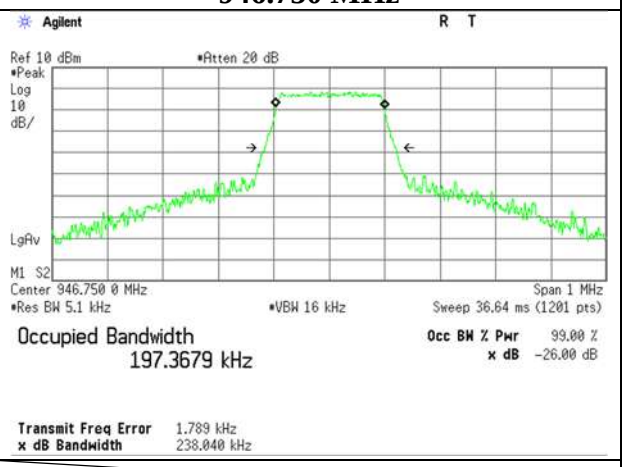
Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx (941.600 MHz to 952.000 MHz)

Power setting: 40 mW

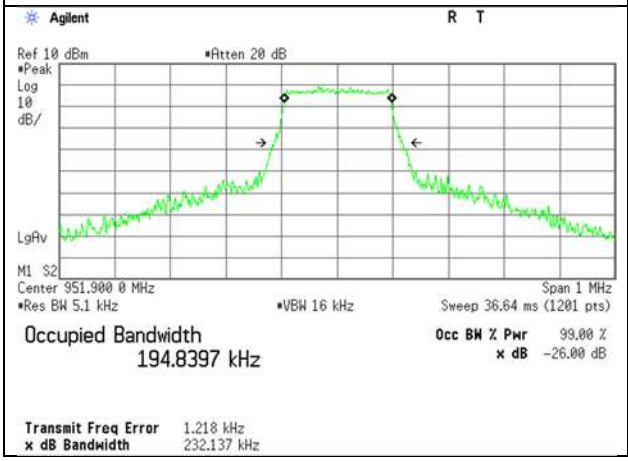
941.600 MHz



946.750 MHz



951.900 MHz

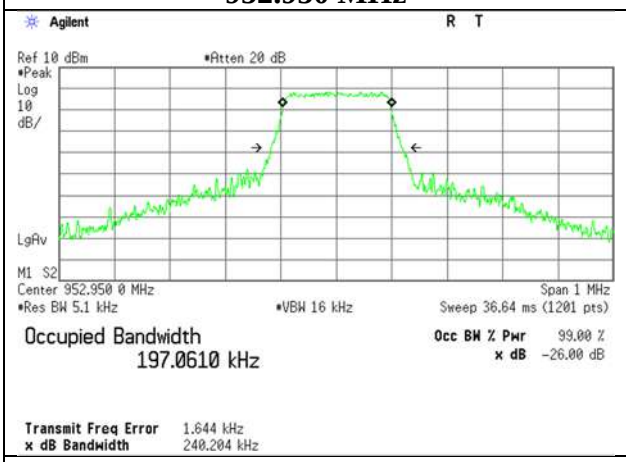


Occupied Bandwidth

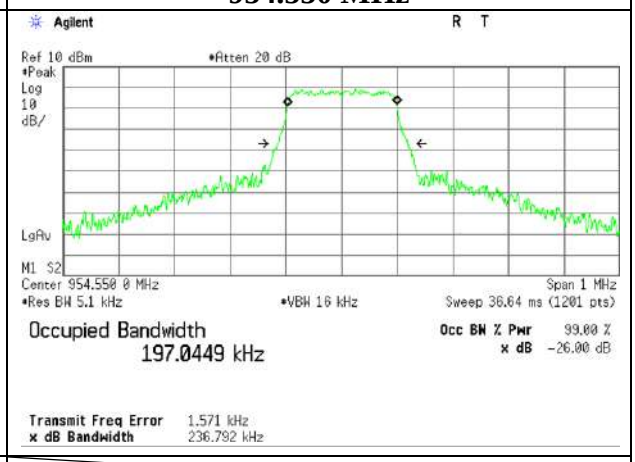
Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx (952.950 MHz to 956.150 MHz)

Power setting: 40 mW

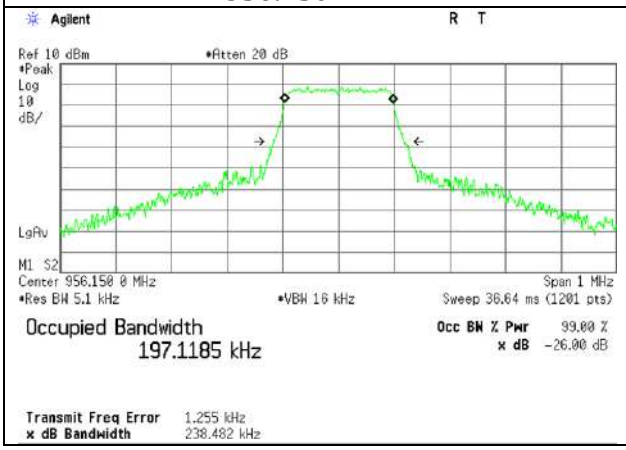
952.950 MHz



954.550 MHz



956.150 MHz

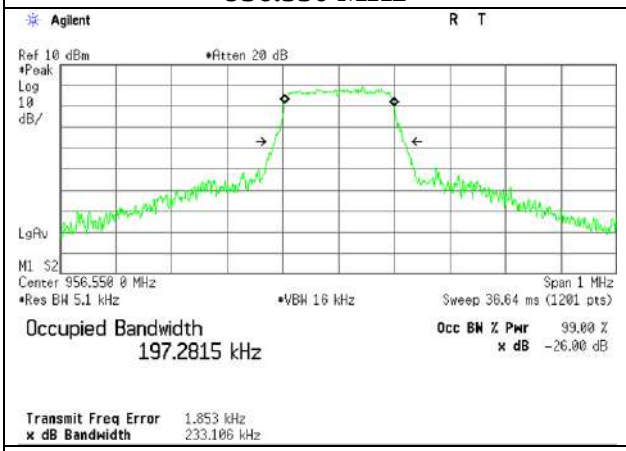


Occupied Bandwidth

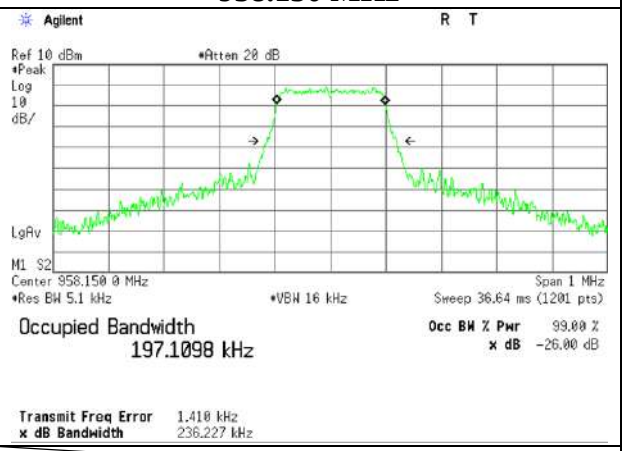
Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx (956.550 MHz to 959.750 MHz)

Power setting: 40 mW

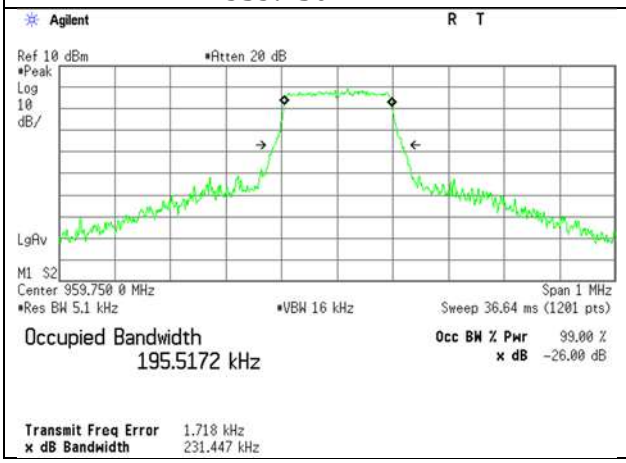
956.550 MHz



958.150 MHz



959.750 MHz

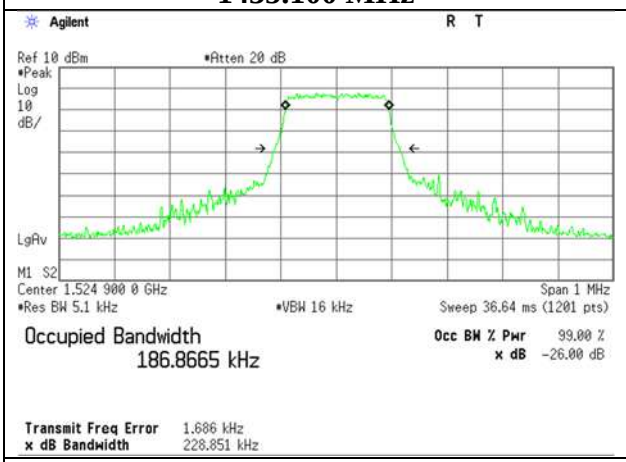


Occupied Bandwidth

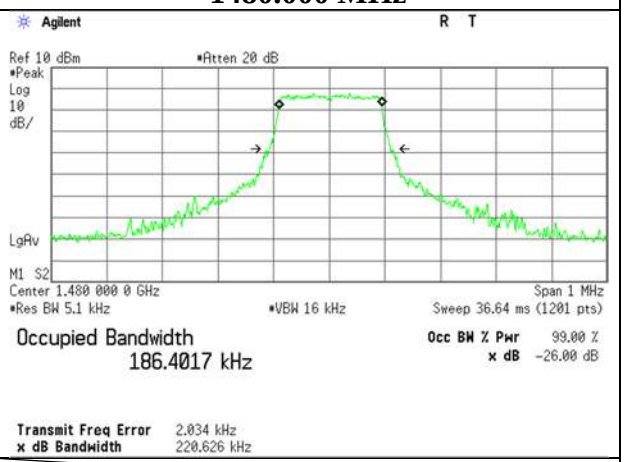
Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx (1435.10 MHz to 1524.900 MHz)

Power setting: 40 mW

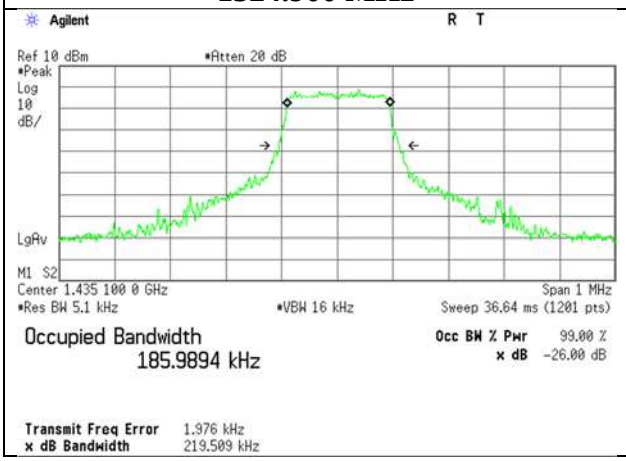
1435.100 MHz



1480.000 MHz

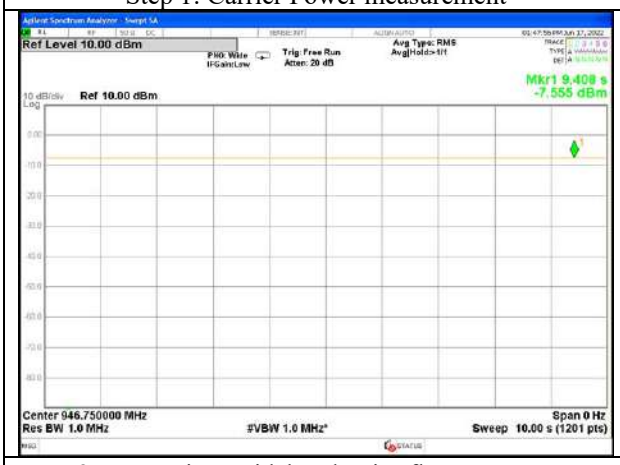
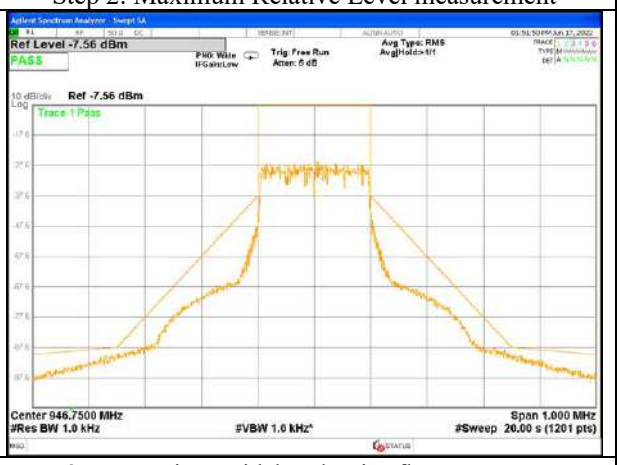


1524.900 MHz



Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 941.600 MHz, 2 mW

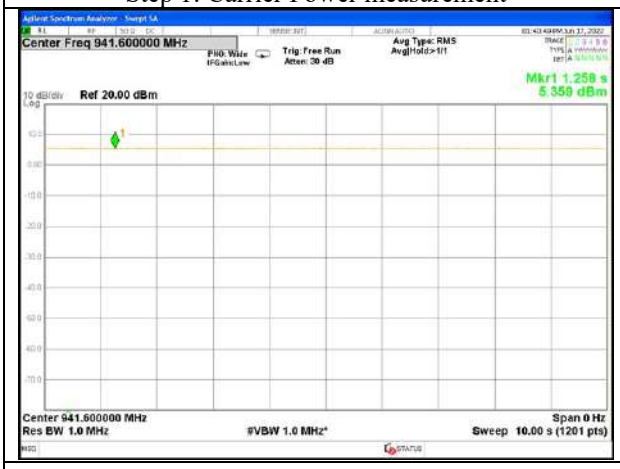
Tx 941.600 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)

Emission Mask

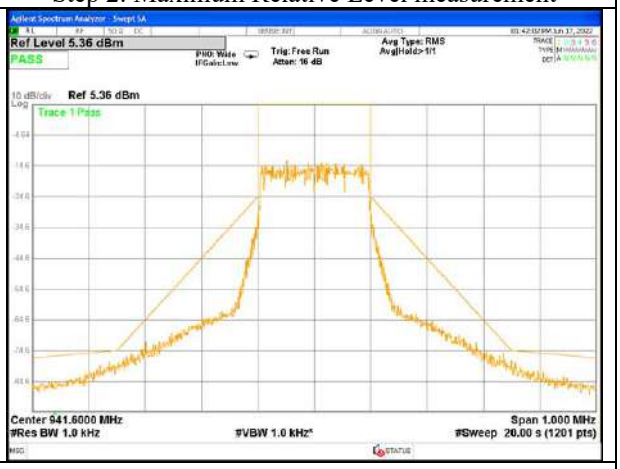
Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 941.600 MHz, 40 mW

Tx 941.600 MHz, Power setting: 40 mW

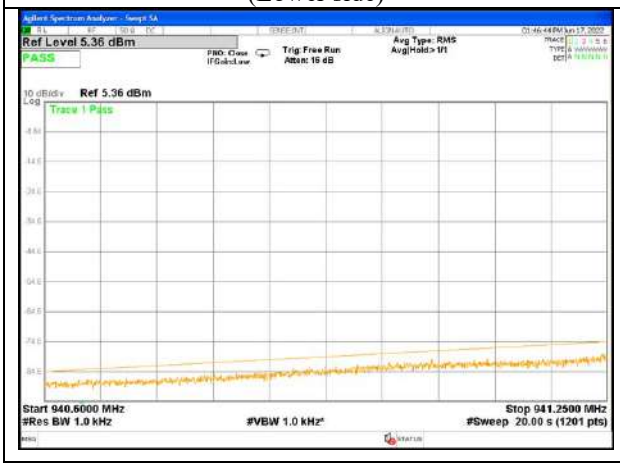
Step 1: Carrier Power measurement



Step 2: Maximum Relative Level measurement



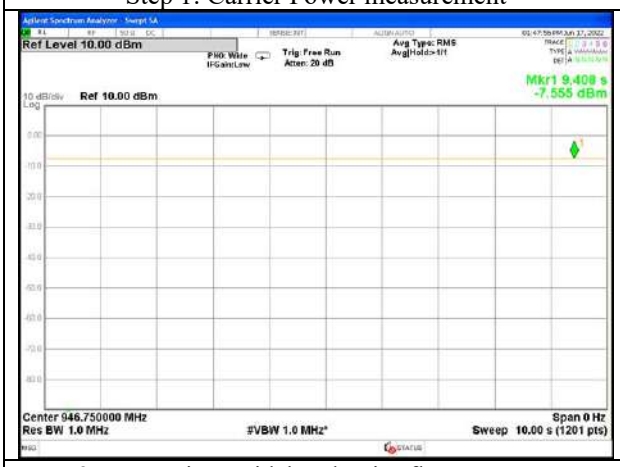
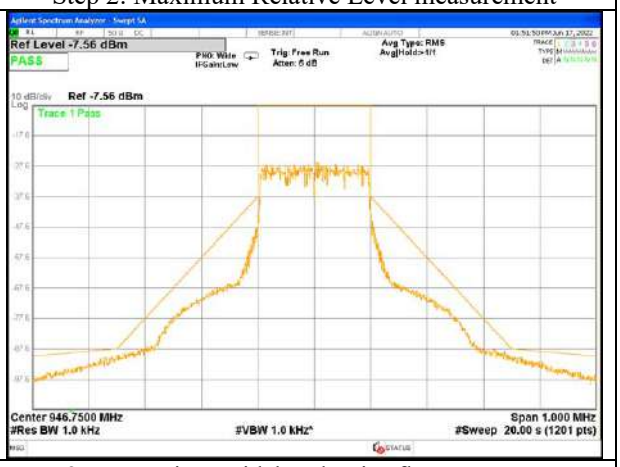
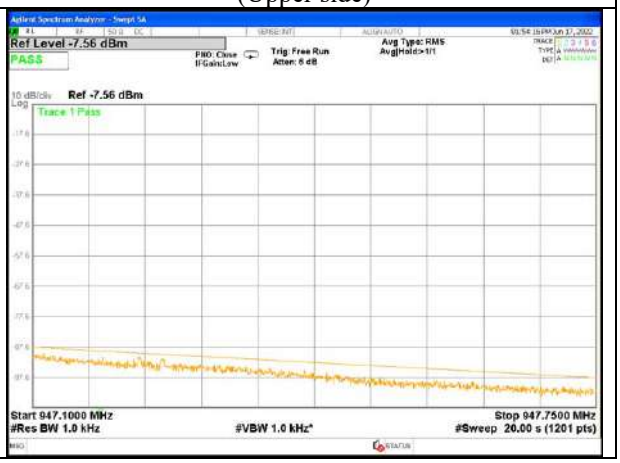
Step 3: Transmitter wideband noise floor measurement (Lower side)



Step 3: Transmitter wideband noise floor measurement (Upper side)

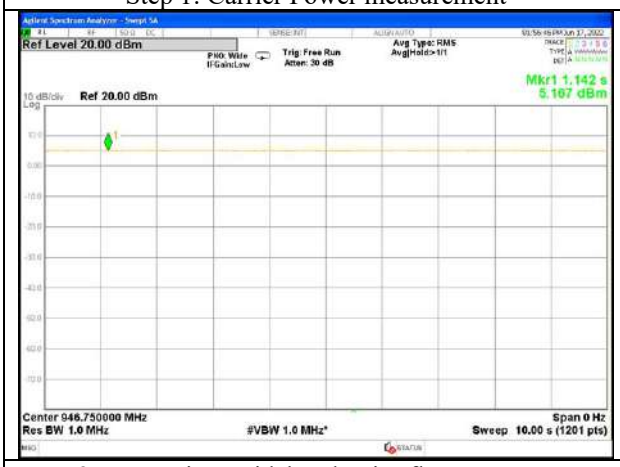
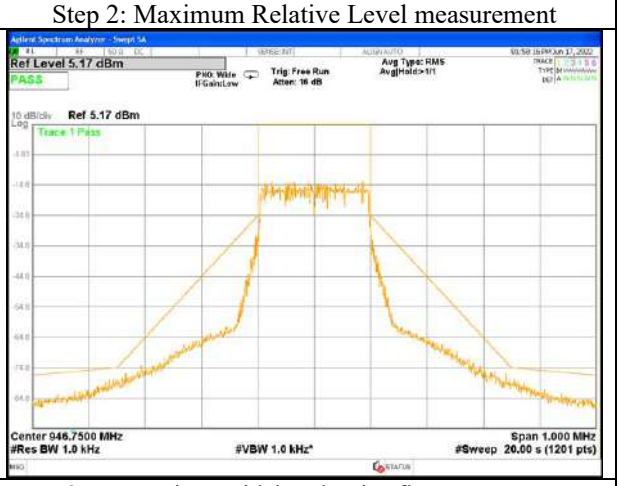
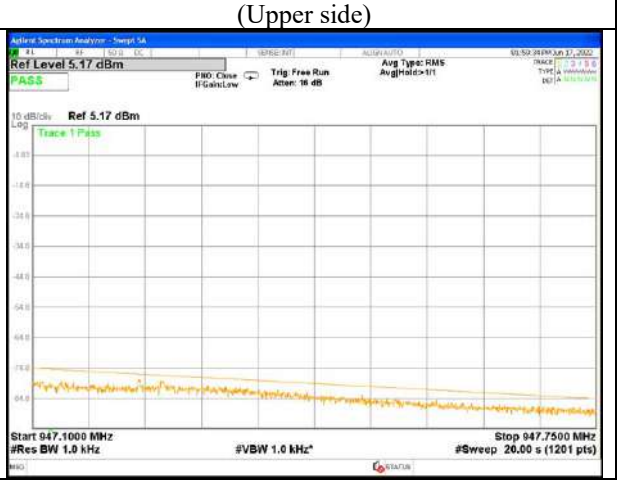
Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 946.750 MHz, 2 mW

Tx 946.750 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 946.750 MHz, 40 mW

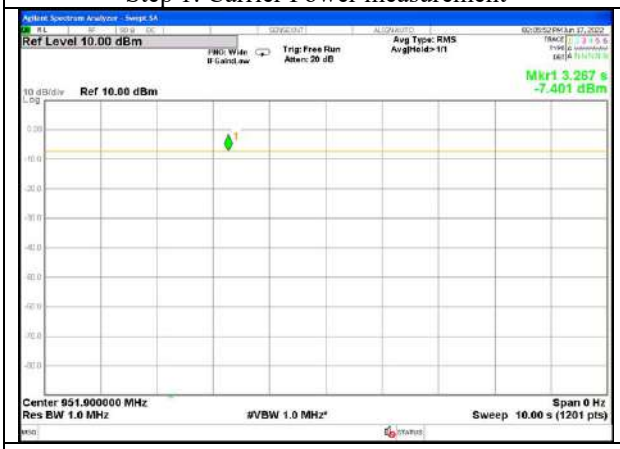
Tx 946.750 MHz, Power setting: 40 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

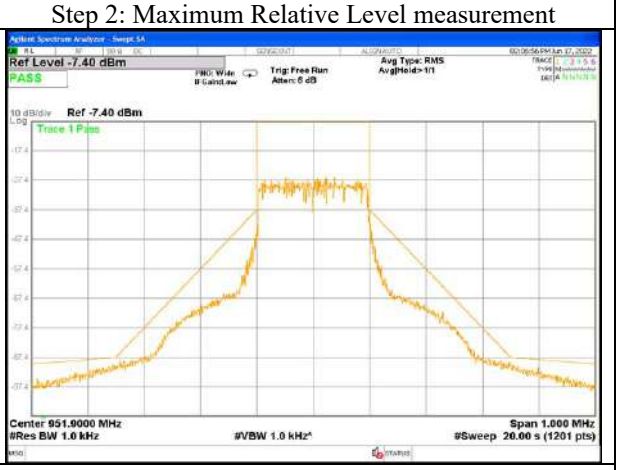
Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 951.900 MHz, 2 mW

Tx 951.900 MHz, Power setting: 2 mW

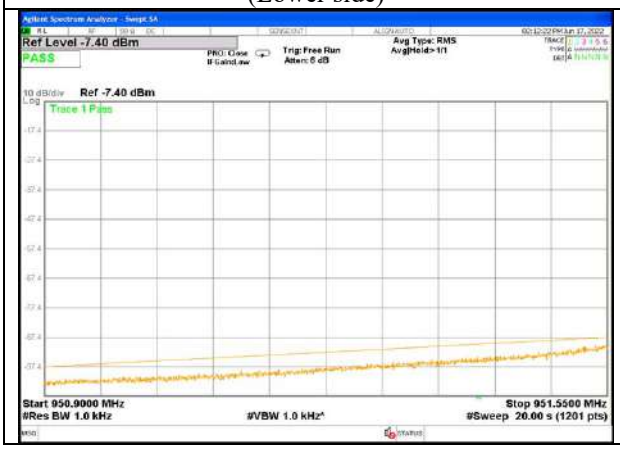
Step 1: Carrier Power measurement



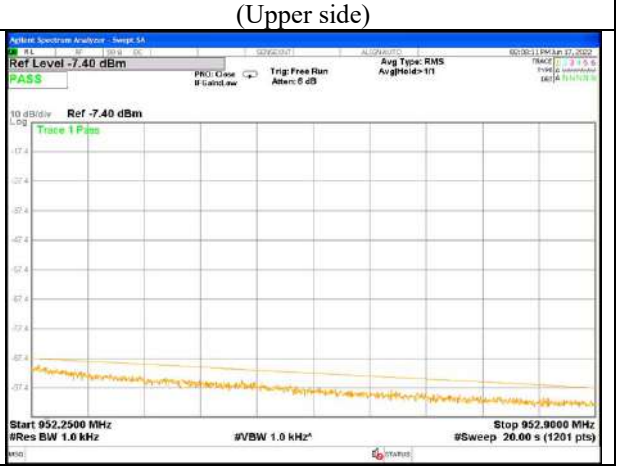
Step 2: Maximum Relative Level measurement



Step 3: Transmitter wideband noise floor measurement (Lower side)

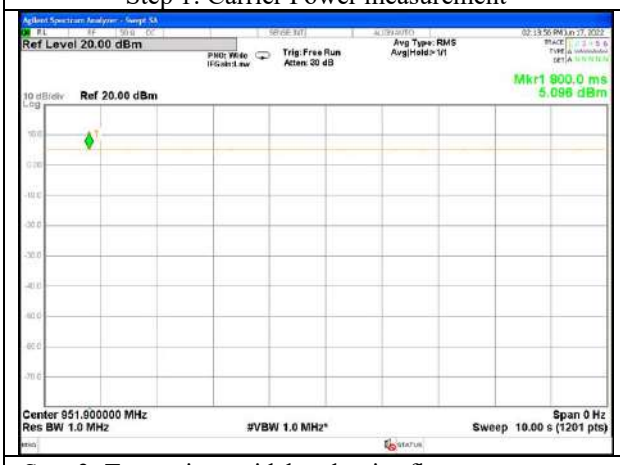
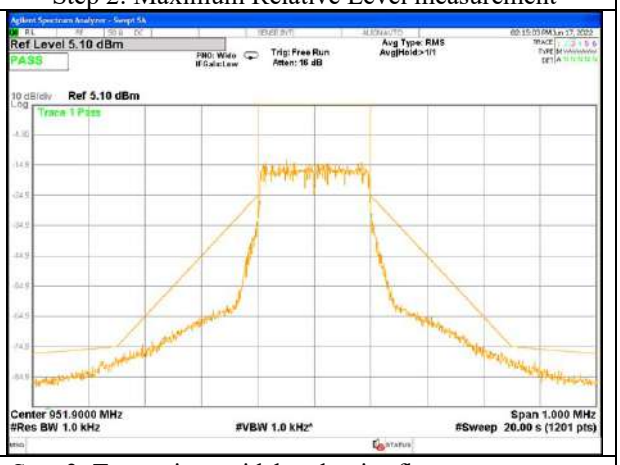
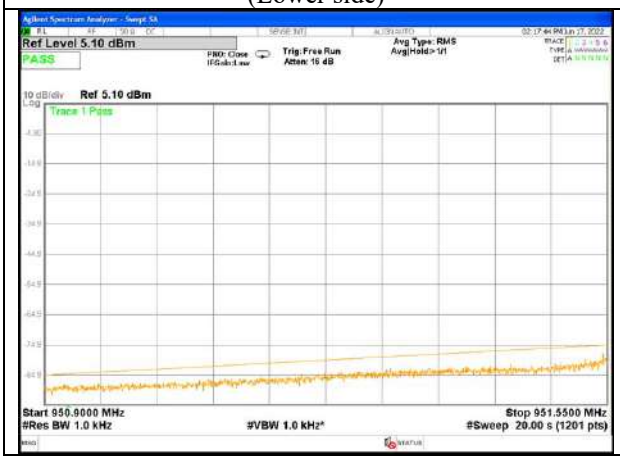
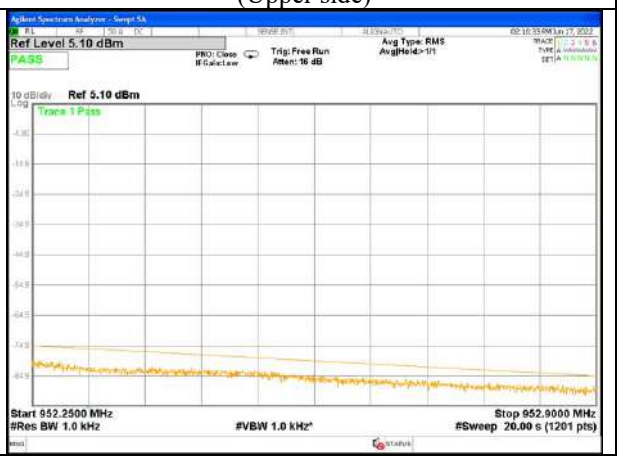


Step 3: Transmitter wideband noise floor measurement (Upper side)



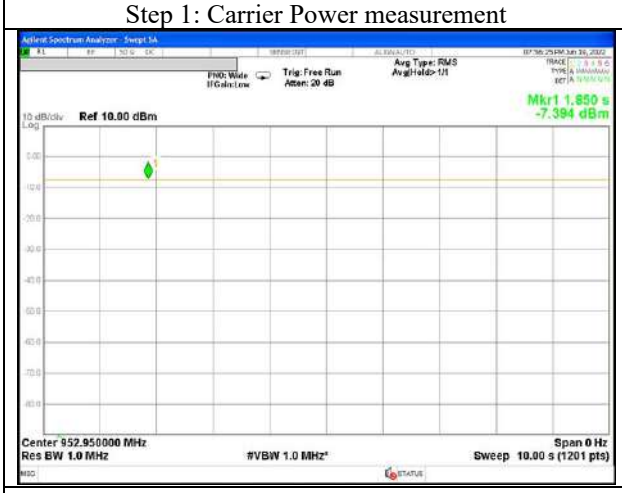
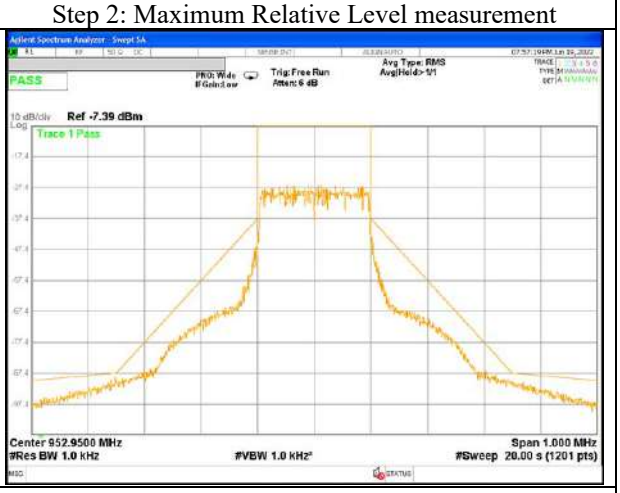
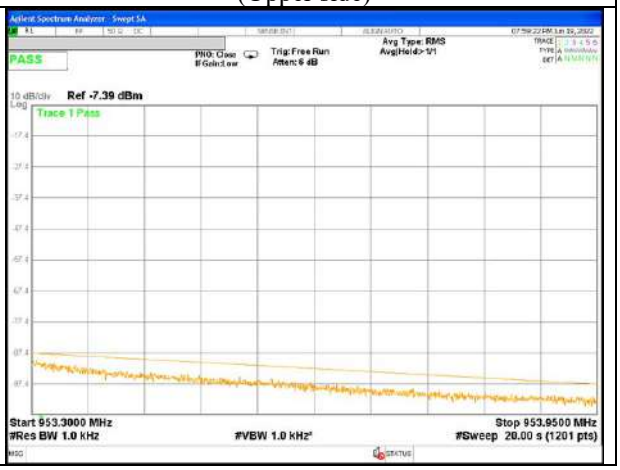
Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 951.900 MHz, 40 mW

Tx 951.900 MHz, Power setting: 40 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 952.950 MHz, 2 mW

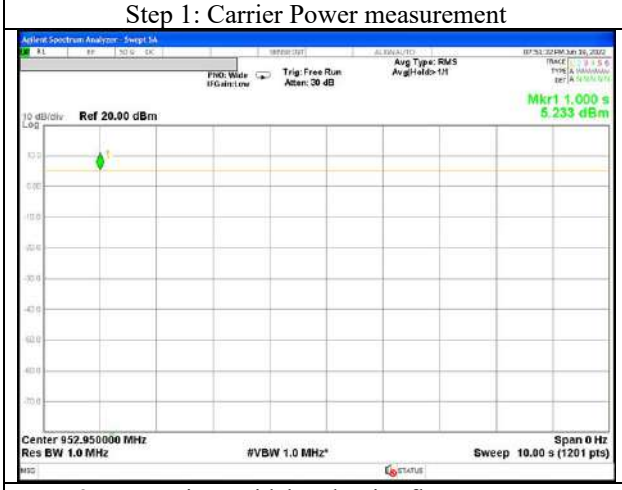
Tx 952.950 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

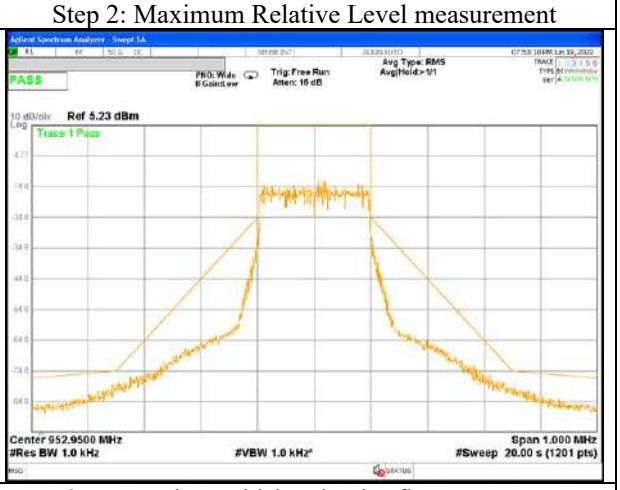
Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 952.950 MHz, 40 mW

Tx 952.950 MHz, Power setting: 40 mW

Step 1: Carrier Power measurement



Step 2: Maximum Relative Level measurement

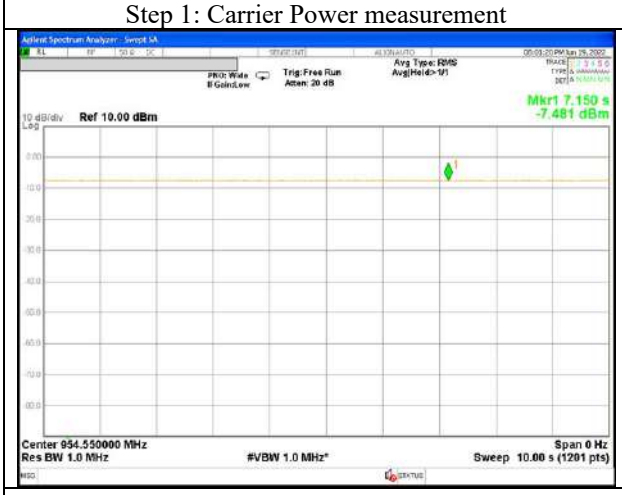
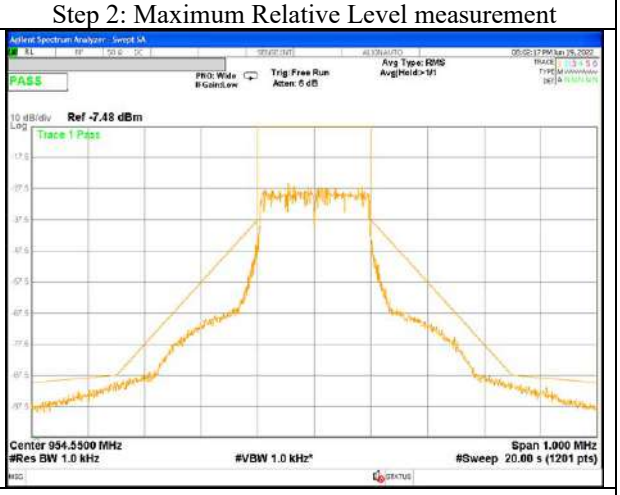
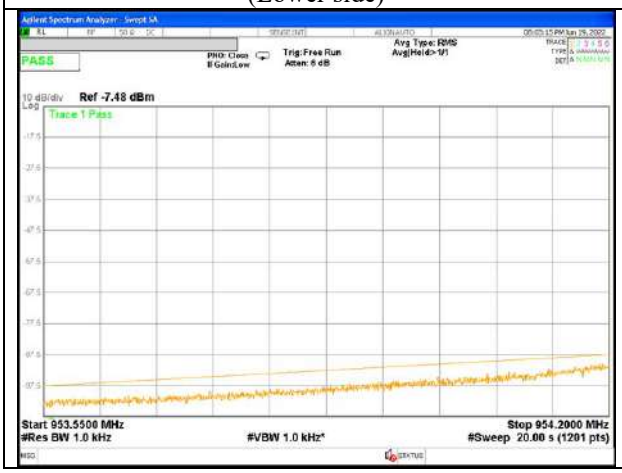
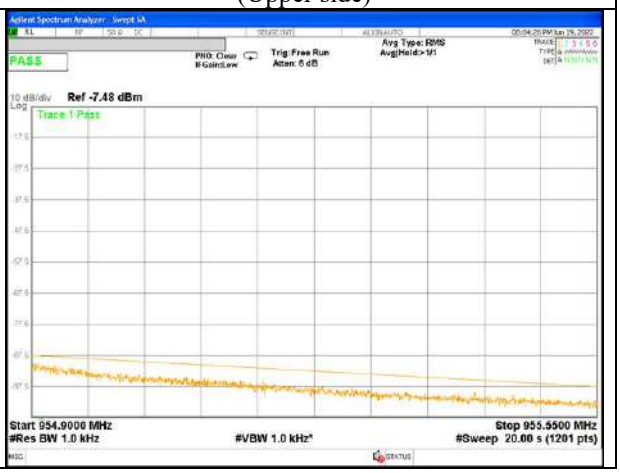


Step 3: Transmitter wideband noise floor measurement (Lower side)

Step 3: Transmitter wideband noise floor measurement (Upper side)

Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 954.550 MHz, 2 mW

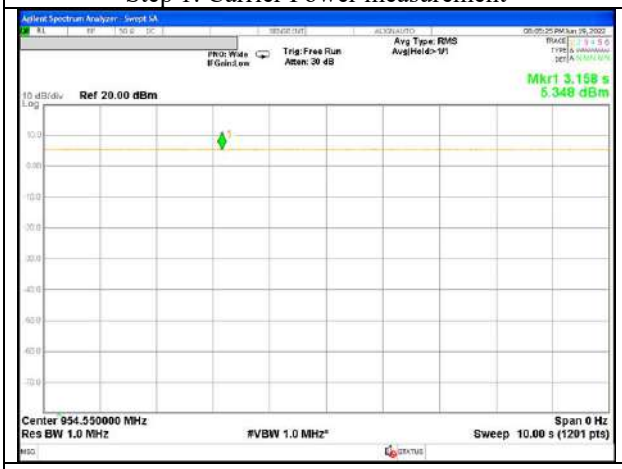
Tx 954.550 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

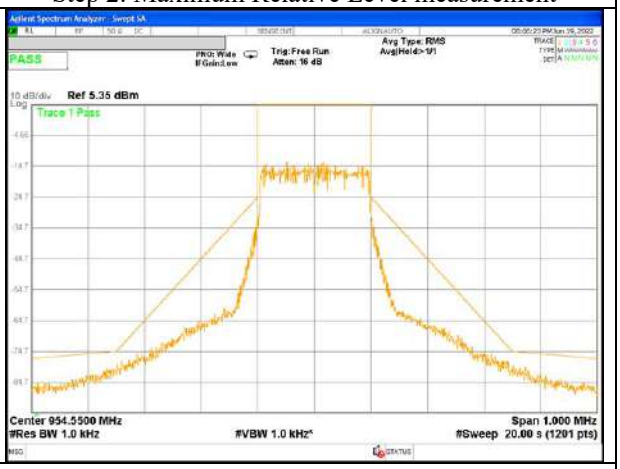
Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 954.550 MHz, 40 mW

Tx 954.550 MHz, Power setting: 40 mW

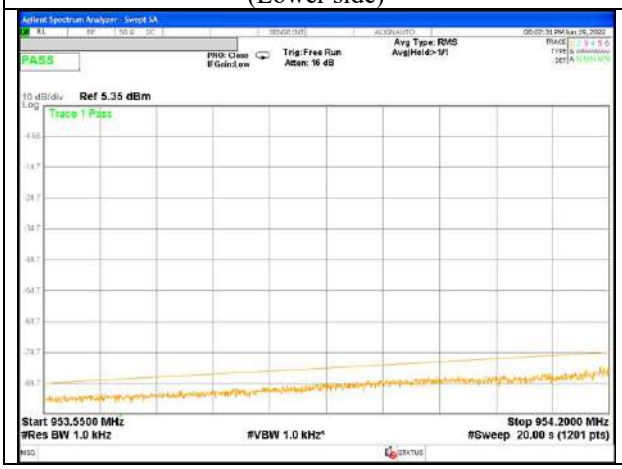
Step 1: Carrier Power measurement



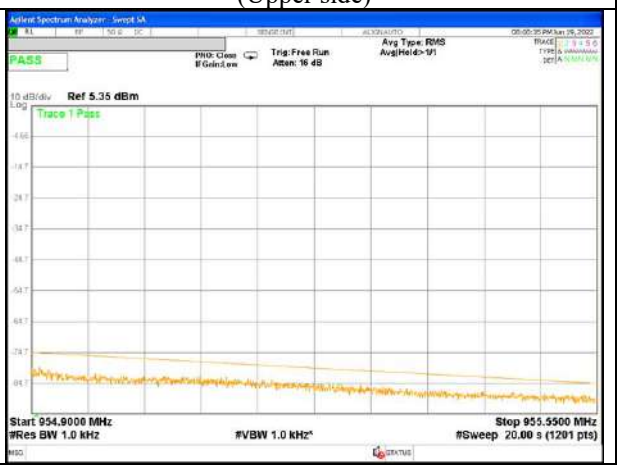
Step 2: Maximum Relative Level measurement



Step 3: Transmitter wideband noise floor measurement (Lower side)

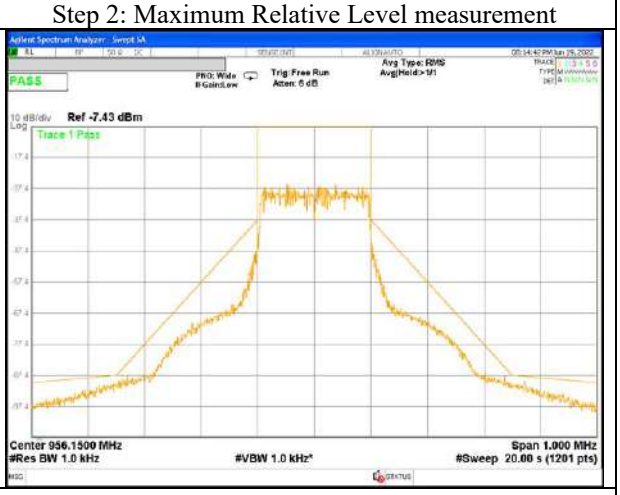
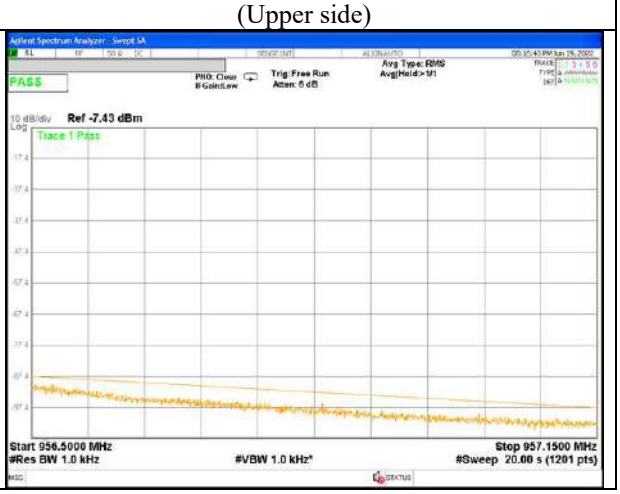


Step 3: Transmitter wideband noise floor measurement (Upper side)



Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 956.150 MHz, 2 mW

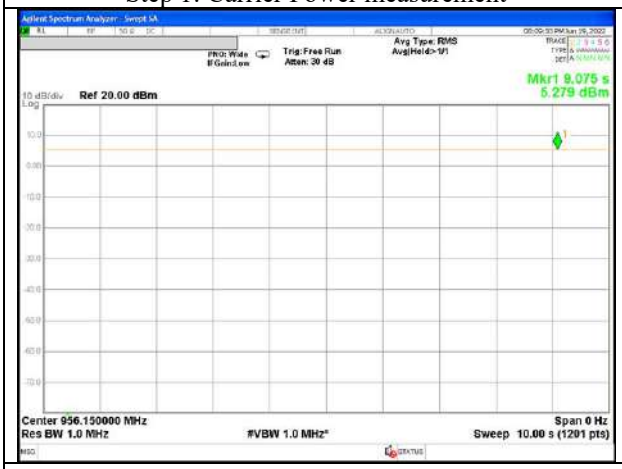
Tx 956.150 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

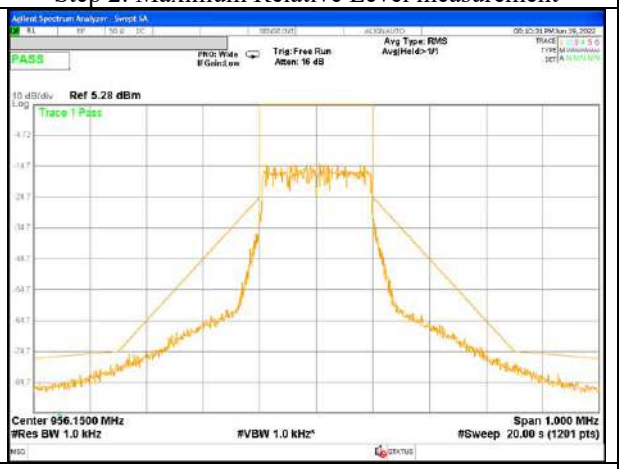
Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 956.150 MHz, 40 mW

Tx 956.150 MHz, Power setting: 40 mW

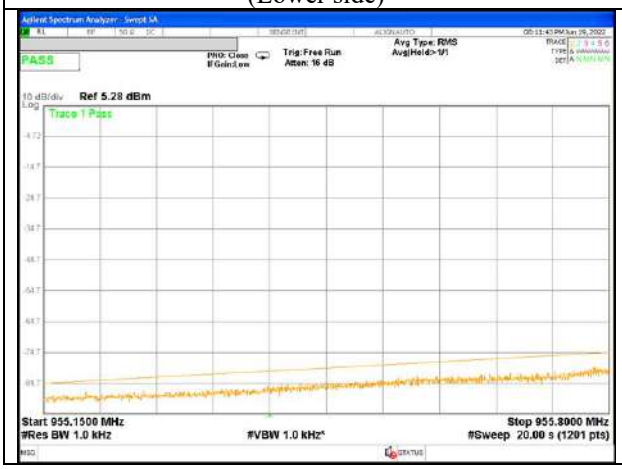
Step 1: Carrier Power measurement



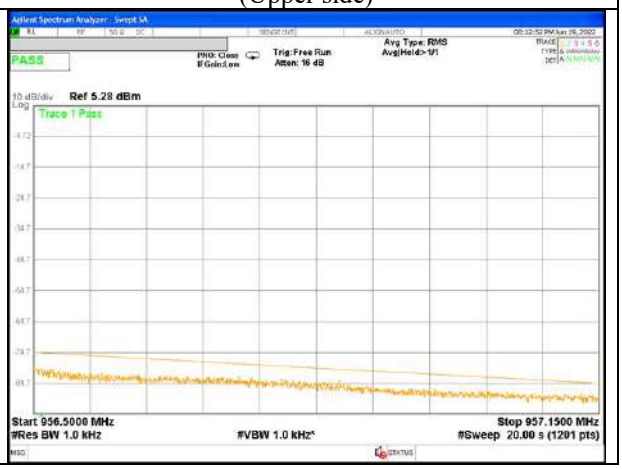
Step 2: Maximum Relative Level measurement



Step 3: Transmitter wideband noise floor measurement (Lower side)

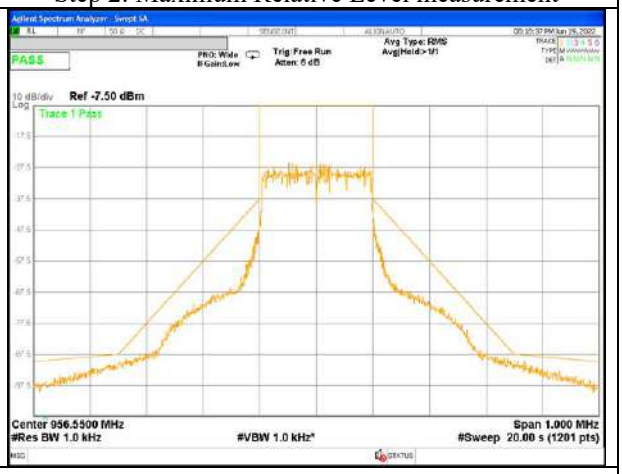
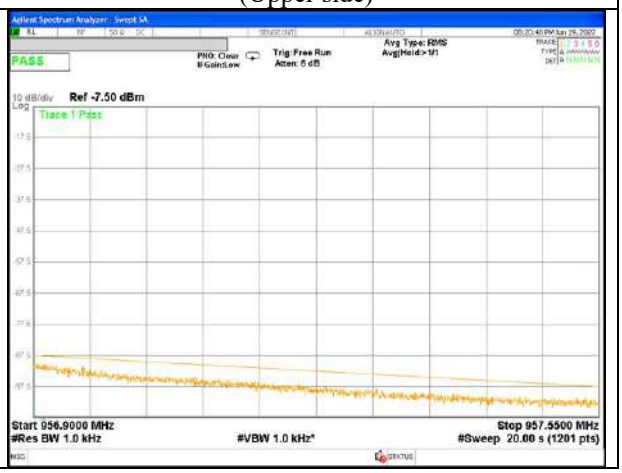


Step 3: Transmitter wideband noise floor measurement (Upper side)



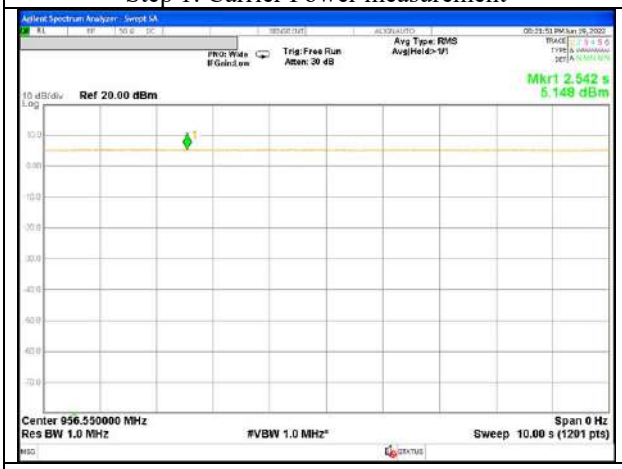
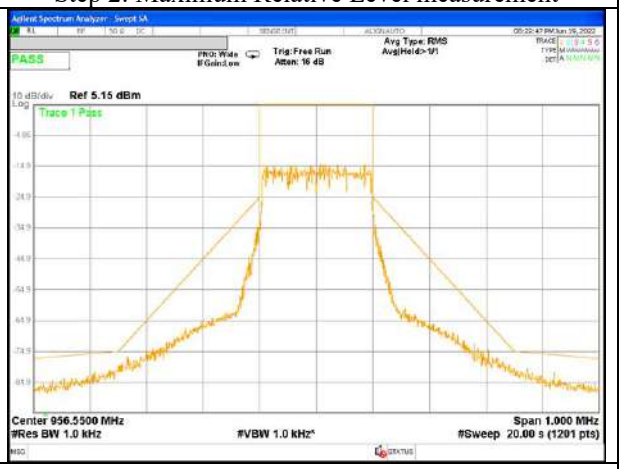
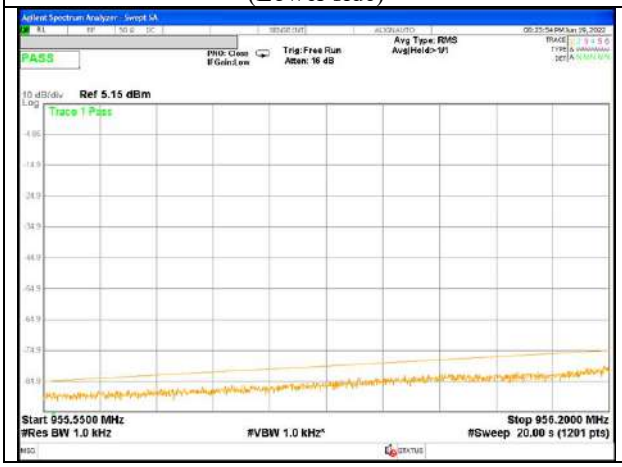
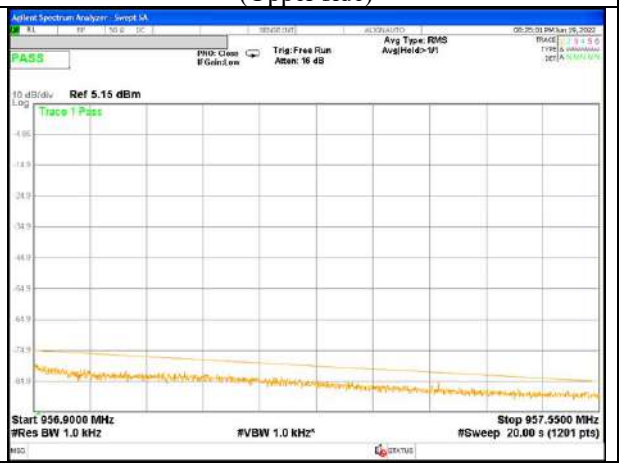
Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 956.550 MHz, 2 mW

Tx 956.550 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

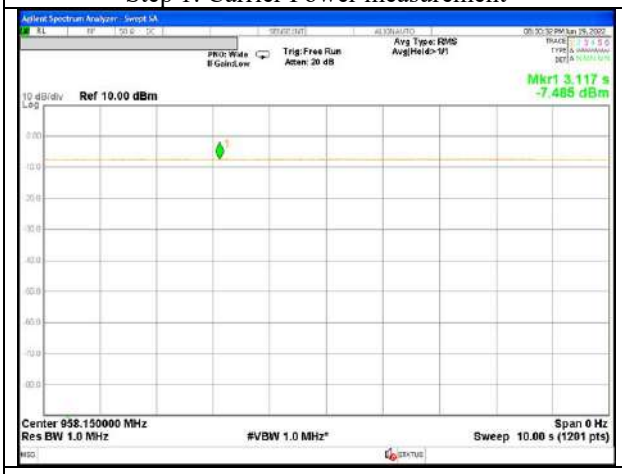
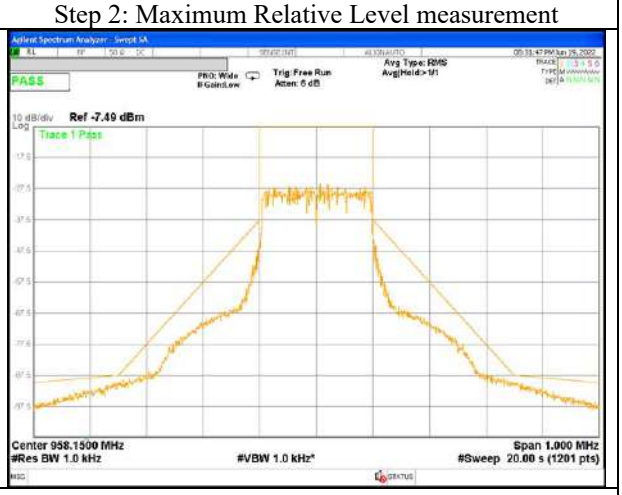
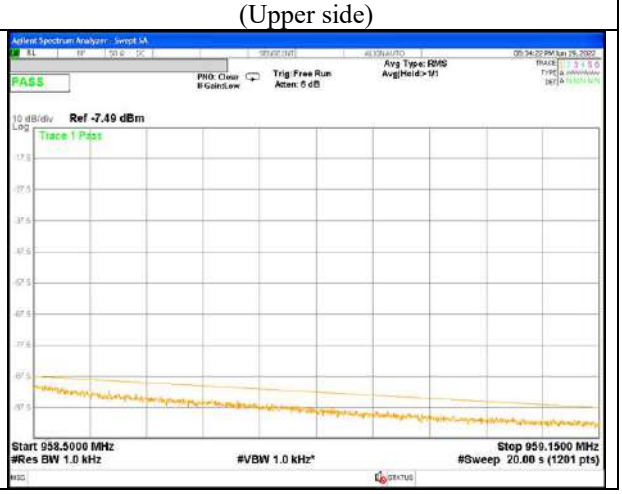
Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 956.550 MHz, 40 mW

Tx 956.550 MHz, Power setting: 40 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 958.150 MHz, 2 mW

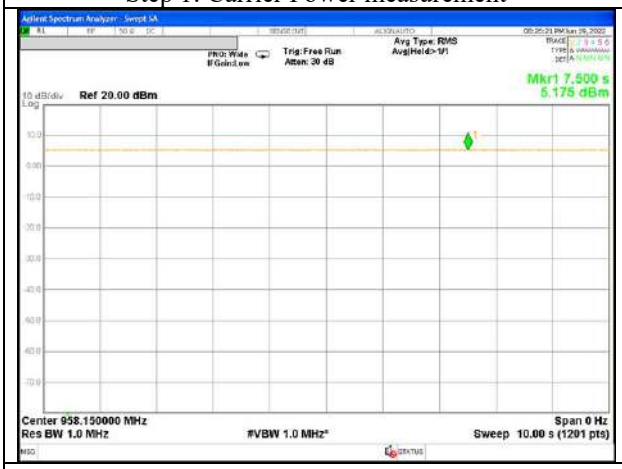
Tx 958.150 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

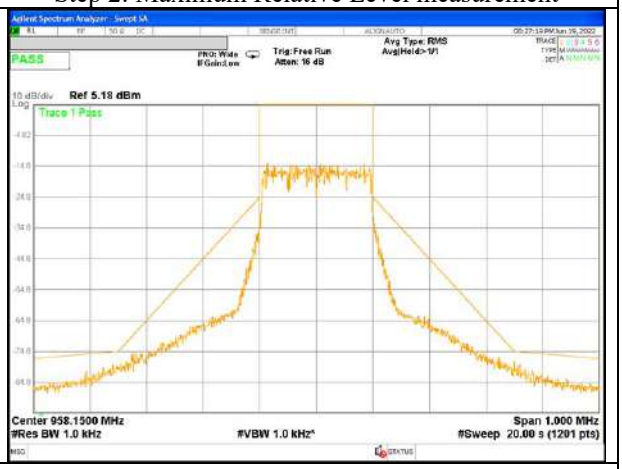
Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 958.150 MHz, 40 mW

Tx 958.150 MHz, Power setting: 40 mW

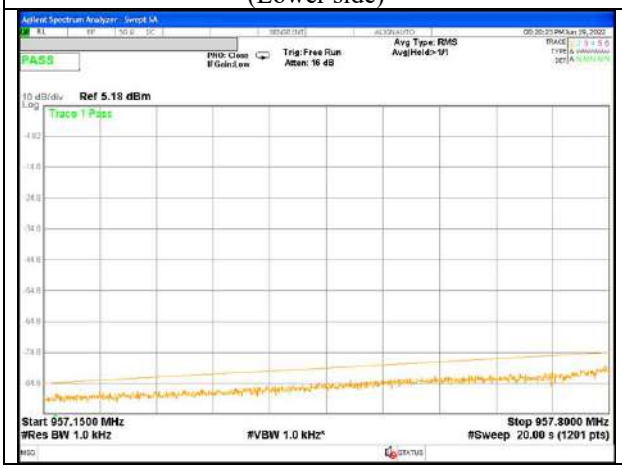
Step 1: Carrier Power measurement



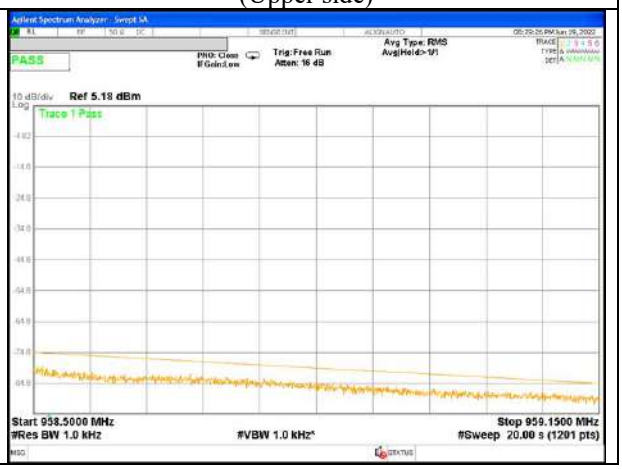
Step 2: Maximum Relative Level measurement



Step 3: Transmitter wideband noise floor measurement (Lower side)

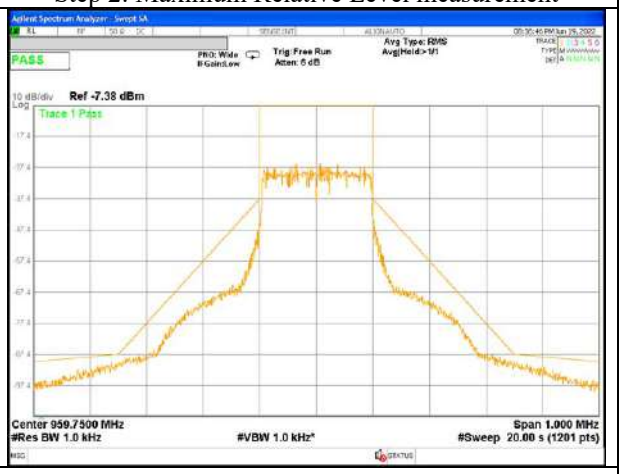
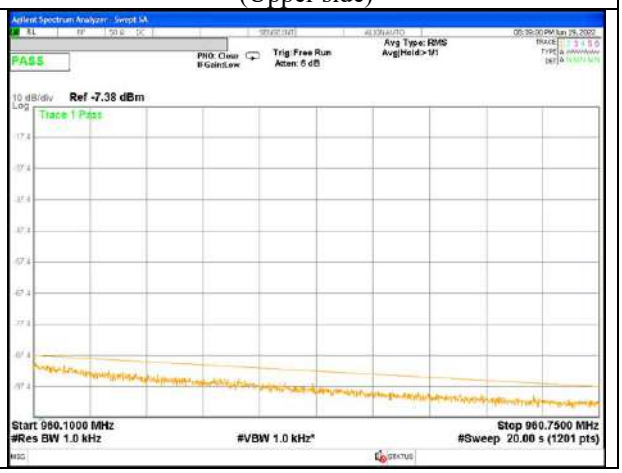


Step 3: Transmitter wideband noise floor measurement (Upper side)



Emission Mask

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 959.750 MHz, 2 mW

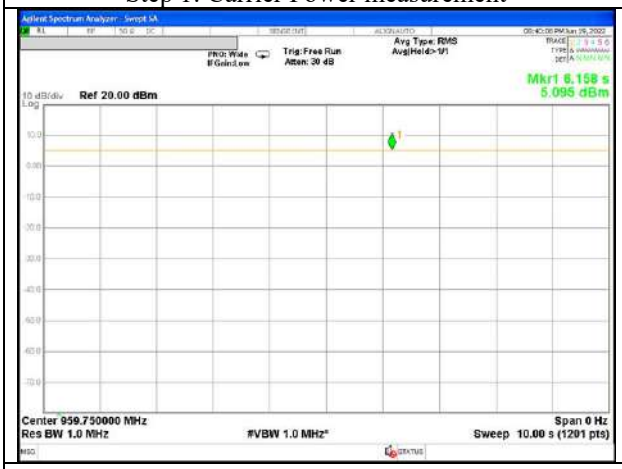
Tx 959.750 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

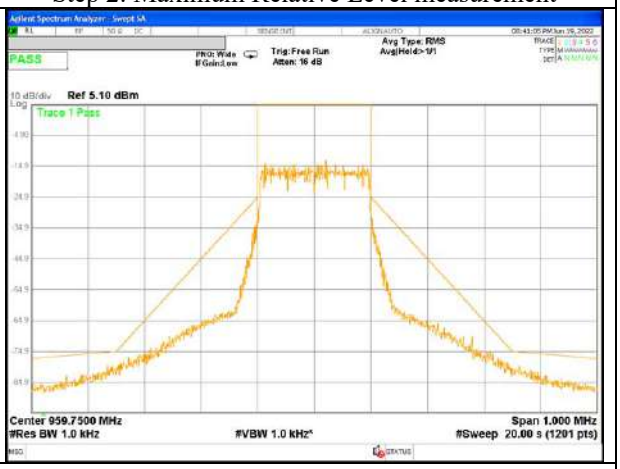
Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature/ Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 959.750 MHz, 40 mW

Tx 959.750 MHz, Power setting: 40 mW

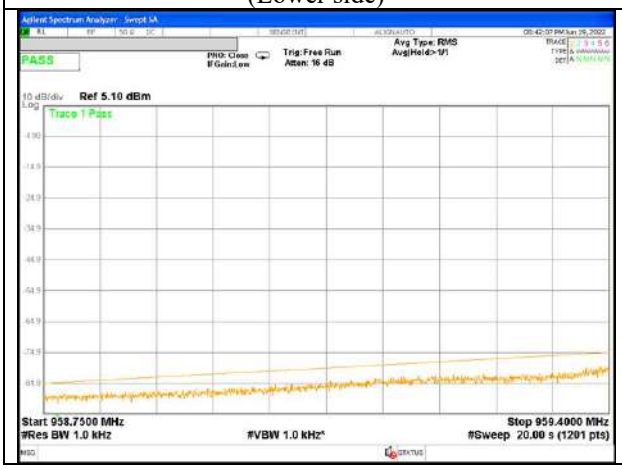
Step 1: Carrier Power measurement



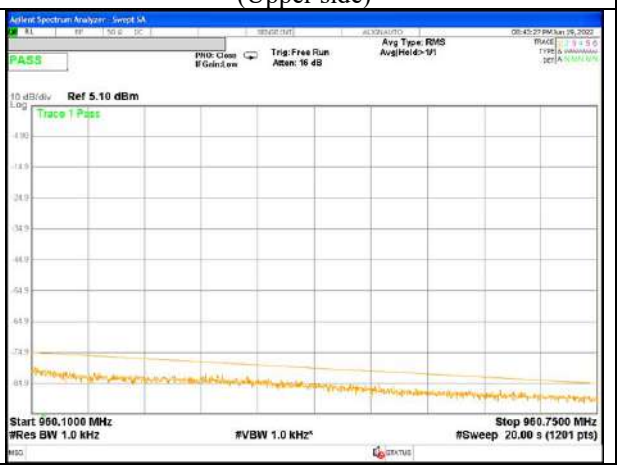
Step 2: Maximum Relative Level measurement



Step 3: Transmitter wideband noise floor measurement (Lower side)

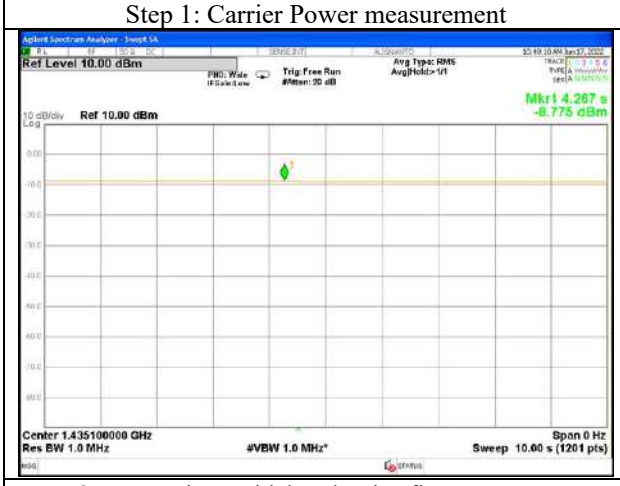
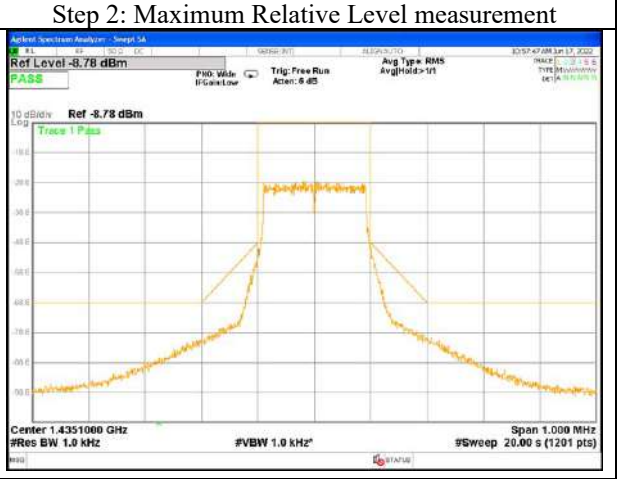
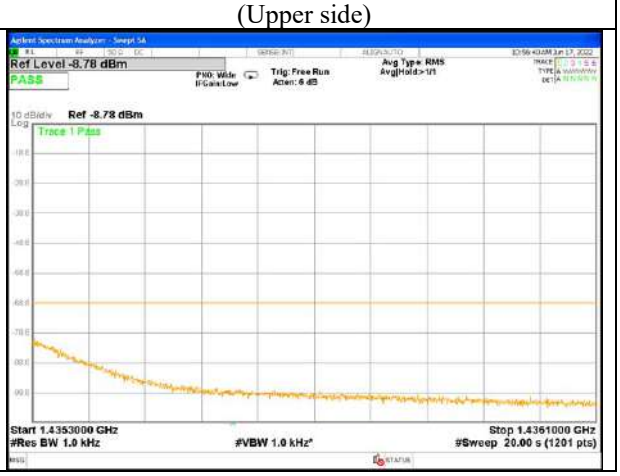


Step 3: Transmitter wideband noise floor measurement (Upper side)



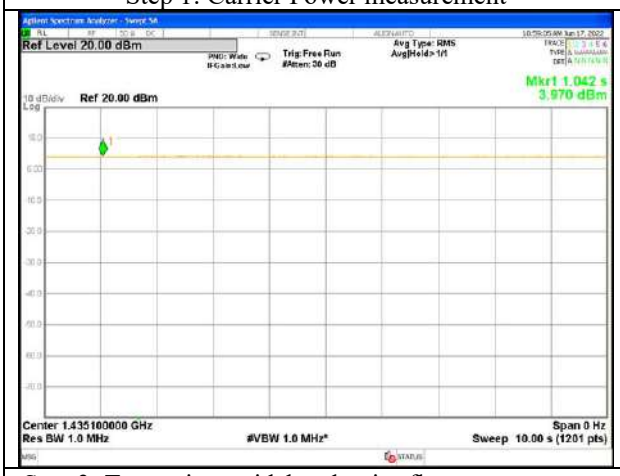
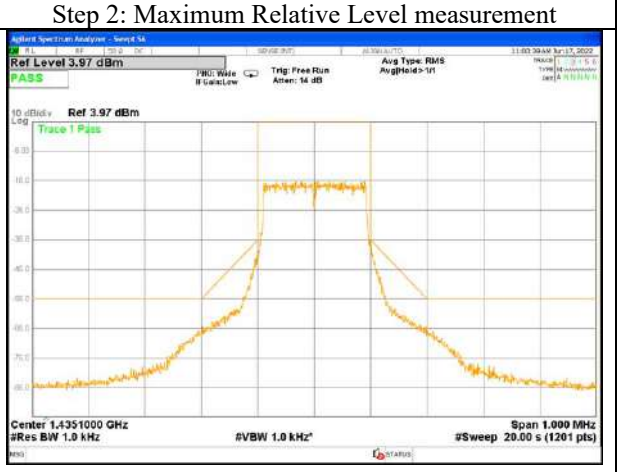
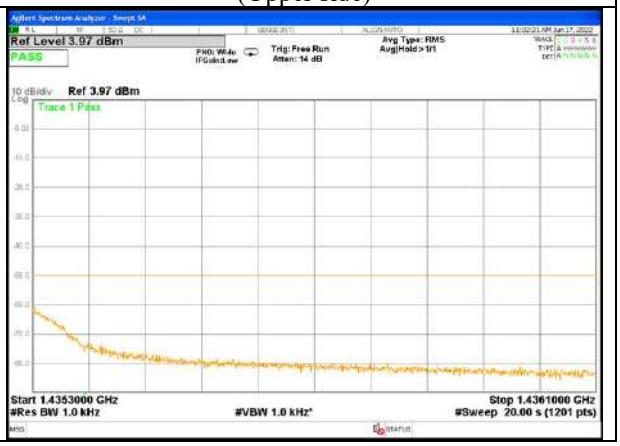
Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 1435.1 MHz, 2 mW

Tx 1435.1 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

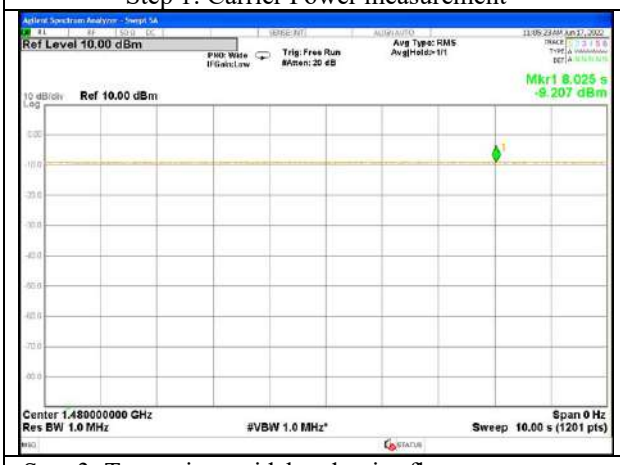
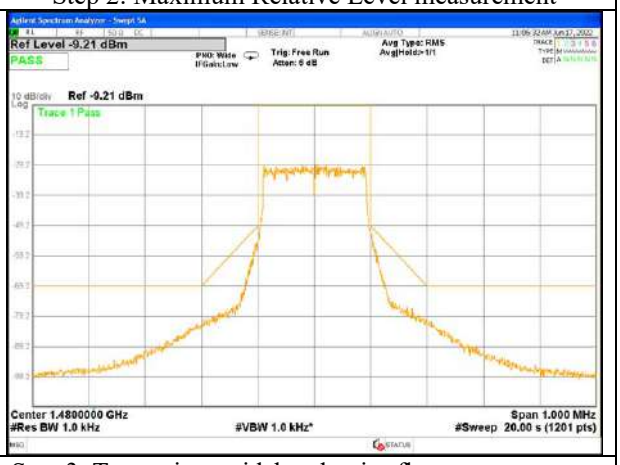
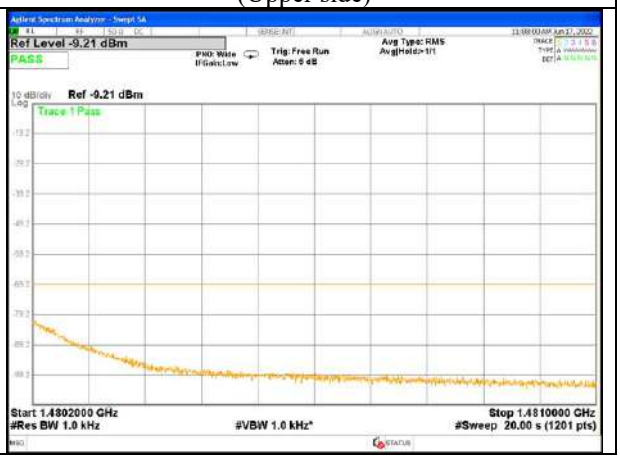
Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 1435.1 MHz, 40 mW

Tx 1435.1 MHz, Power setting: 40 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

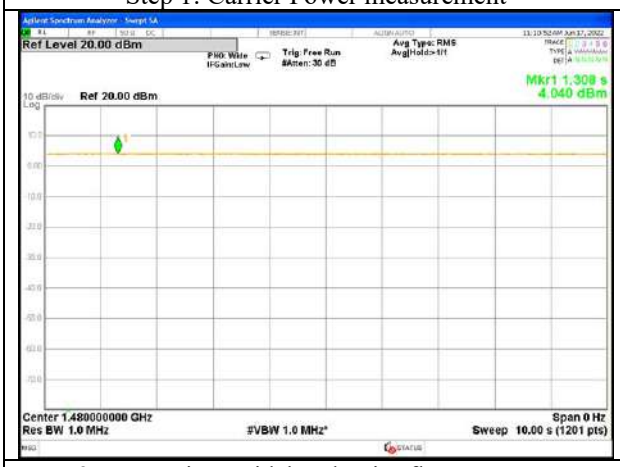
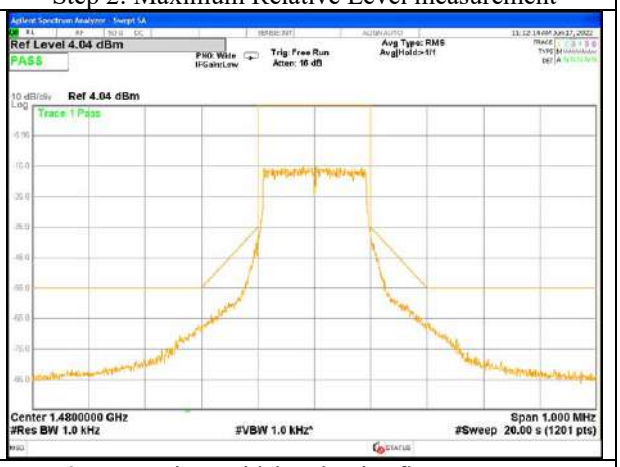
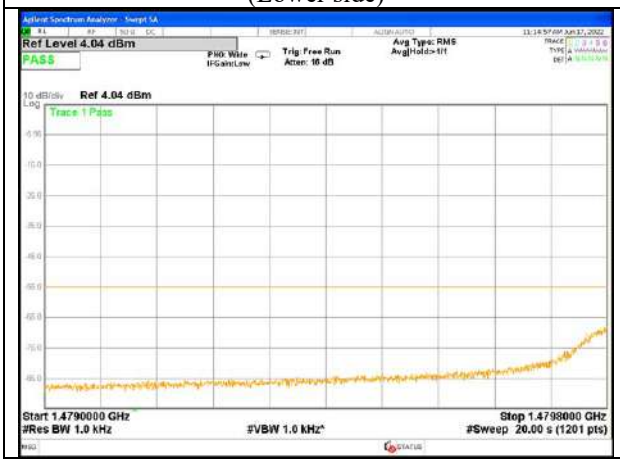
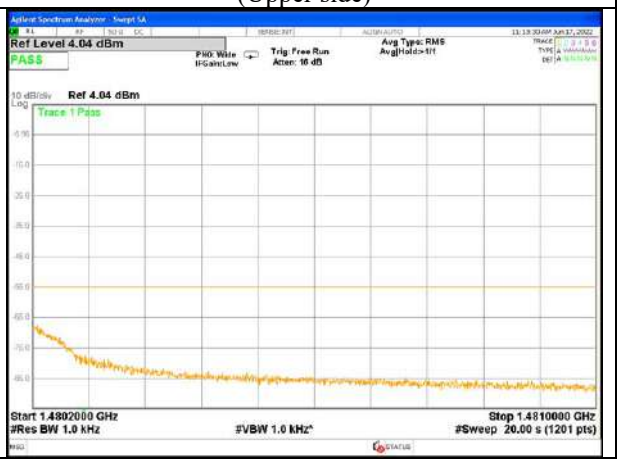
Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 1480 MHz, 2 mW

Tx 1480 MHz, Power setting: 2 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 1480 MHz, 40 mW

Tx 1480 MHz, Power setting: 40 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)
	

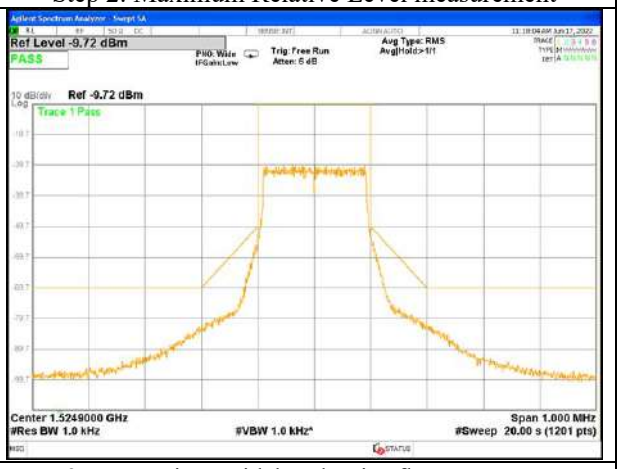
Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 1524.9 MHz, 2 mW

Tx 1524.9 MHz, Power setting: 2 mW

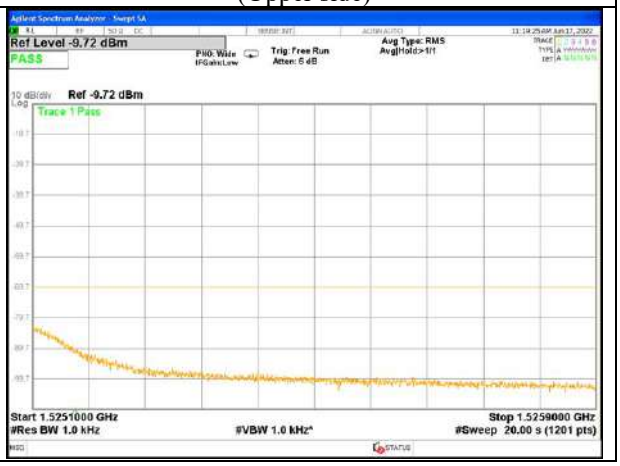
Step 1: Carrier Power measurement

Step 2: Maximum Relative Level measurement



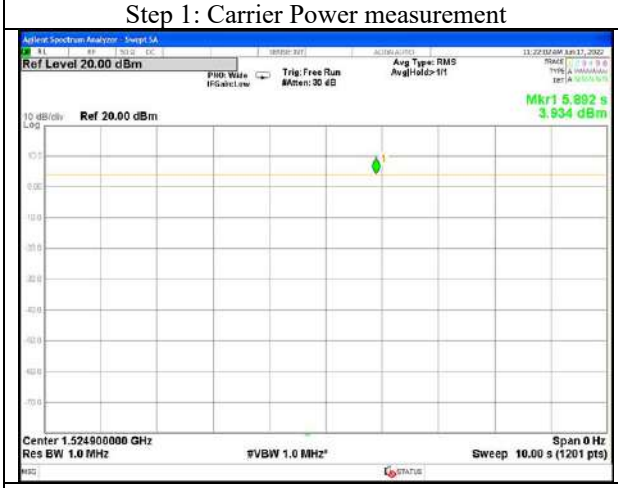
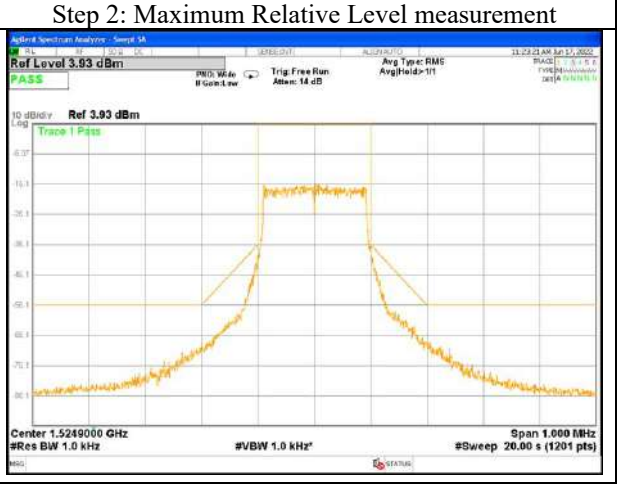
Step 3: Transmitter wideband noise floor measurement (Lower side)

Step 3: Transmitter wideband noise floor measurement (Upper side)



Emission Mask

Test place	Ise EMC Lab. No.2 Measurement Room
Date	June 17, 2022
Temperature/ Humidity	22 deg. C / 57 % RH
Engineer	Keiya Ido
Mode	Tx 1524.9 MHz, 40 mW

Tx 1524.9 MHz, Power setting: 40 mW	
Step 1: Carrier Power measurement	Step 2: Maximum Relative Level measurement
	
Step 3: Transmitter wideband noise floor measurement (Lower side)	Step 3: Transmitter wideband noise floor measurement (Upper side)

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 5, 2022	July 7, 2022
Temperature / Humidity	23 deg. C / 54 % RH	24 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 941.600 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal Rx Ant. Height	Horizontal Turn Table	Vertical Rx Ant. Height	Vertical Turn Table	Remarks
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.86	28.7	28.3	-55.7	-51.6	2.8	-8.1	-68.7	-64.6	-54.0	14.7	10.6	166	163	100	136	
497.73	34.6	34.1	-46.6	-45.9	4.5	-8.1	-61.4	-60.7	-54.0	7.4	6.7	182	93	140	158	
546.97	31.6	33.5	-49.7	-46.7	4.8	-8.1	-64.7	-61.7	-54.0	10.7	7.7	100	268	124	331	
752.82	33.2	31.6	-43.3	-45.8	5.7	-7.7	-58.8	-61.3	-54.0	4.8	7.3	100	59	131	46	
845.18	36.0	33.5	-38.2	-38.4	6.0	-8.1	-54.4	-54.6	-54.0	***0.4***	0.6	100	303	106	110	
950.00	39.9	39.4	-31.3	-29.7	6.5	-8.7	-48.6	-47.0	-36.0	12.6	11.0	126	267	143	344	
1169.00	48.3	57.3	-67.5	-52.3	2.6	6.3	-66.0	-50.7	-30.0	36.0	20.7	102	21	194	120	
1883.20	46.1	54.3	-70.5	-57.3	3.3	10.2	-65.8	-52.6	-30.0	35.8	22.6	103	146	100	117	
2824.80	50.6	50.5	-54.5	-55.1	4.0	11.1	-49.6	-50.2	-30.0	19.6	20.2	104	193	156	296	
3766.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4708.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5649.60	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6591.20	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7532.80	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8474.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9416.00	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MH
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 4, 2022	July 7, 2022
Temperature / Humidity	21 deg. C / 70 % RH	24 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 946.750 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.80	30.7	28.7	-50.0	-50.1	2.8	-8.1	-63.0	-63.1	-54.0	9.0	9.1	242	344	100	17	
497.73	34.4	34.8	-49.8	-44.6	4.5	-8.1	-64.6	-59.4	-54.0	10.6	5.4	100	123	132	91	
546.76	31.4	34.1	-49.7	-43.6	4.8	-8.1	-64.7	-58.6	-54.0	10.7	4.6	102	268	122	137	
745.75	30.7	31.2	-46.6	-42.7	5.6	-7.7	-62.1	-58.2	-54.0	8.1	4.2	222	286	100	295	
845.17	35.2	33.9	-38.5	-38.7	6.0	-8.1	-54.7	-54.9	-54.0	***0.7***	0.9	102	314	119	86	
955.29	40.9	40.7	-30.1	-27.1	6.5	-8.8	-47.5	-44.5	-36.0	11.5	8.5	100	135	100	349	
1169.00	49.1	57.2	-66.7	-52.4	2.6	6.3	-65.2	-50.9	-30.0	35.2	20.9	135	196	148	2	
1893.50	52.0	49.9	-57.6	-61.7	3.3	10.2	-52.9	-57.0	-30.0	22.9	27.0	100	119	144	243	
2840.25	54.1	55.0	-50.9	-50.6	4.1	11.1	-46.0	-45.7	-30.0	16.0	15.7	141	1	142	288	
3787.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4733.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5680.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6627.25	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7574.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8520.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9467.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 M
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 4, 2022	July 7, 2022
Temperature / Humidity	23 deg. C / 54 % RH	24 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 951.900 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.98	33.0	32.2	-47.6	-46.6	2.8	-8.1	-60.7	-59.7	-54.0	6.7	5.7	162	306	162	288	
497.32	32.3	32.2	-51.9	-47.2	4.5	-8.1	-66.8	-62.0	-54.0	12.8	8.0	100	116	236	351	
546.65	38.5	34.9	-42.5	-42.8	4.8	-8.1	-57.5	-57.8	-54.0	3.5	3.8	100	286	112	111	
752.74	33.7	31.6	-43.6	-42.3	5.7	-7.7	-59.2	-57.9	-54.0	5.2	3.9	117	277	100	316	
844.51	35.3	32.7	-38.4	-39.9	6.0	-8.1	-54.7	-56.1	-54.0	***0.7***	2.1	138	312	103	113	
960.40	40.5	40.0	-30.1	-28.0	6.5	-8.8	-47.6	-45.5	-36.0	11.6	9.5	208	293	100	12	
1169.00	50.4	56.7	-65.5	-52.9	2.6	6.3	-63.9	-51.3	-30.0	33.9	21.3	100	216	148	4	
1903.80	51.8	48.4	-57.8	-63.2	3.3	10.2	-53.1	-58.5	-30.0	23.1	28.5	100	112	155	226	
2855.70	52.2	54.6	-52.9	-51.0	4.1	11.1	-48.0	-46.1	-30.0	18.0	16.1	103	175	149	105	
3807.60	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4759.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5711.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6663.30	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7615.20	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8567.10	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9519.00	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz /
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 6, 2022	July 7, 2022
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 952.950 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.86	27.4	28.0	-57.0	-51.9	2.8	-8.1	-70.0	-64.9	-54.0	16.0	10.9	164	140	100	150	
501.79	30.7	36.9	-50.4	-43.1	4.6	-8.1	-65.3	-58.0	-54.0	11.3	4.0	100	270	124	72	
547.16	31.4	32.9	-49.9	-47.3	4.8	-8.1	-64.9	-62.3	-54.0	10.9	8.3	100	292	121	141	
752.82	30.7	30.0	-45.8	-47.3	5.7	-7.7	-61.3	-62.8	-54.0	7.3	8.8	224	298	100	252	
851.80	35.0	33.9	-39.2	-38.7	6.1	-8.1	-55.5	-55.0	-54.0	1.5	***1.0***	138	297	107	145	
960.97	41.1	41.0	-30.1	-28.1	6.5	-8.8	-47.6	-45.6	-36.0	11.6	9.6	213	299	120	152	
1169.00	50.9	56.3	-65.0	-53.3	2.6	6.3	-63.4	-51.7	-30.0	33.4	21.7	100	209	113	30	
1905.90	50.1	53.0	-59.5	-58.6	3.3	10.2	-54.8	-53.9	-30.0	24.8	23.9	100	120	100	241	
2858.85	48.9	54.2	-56.1	-51.4	4.1	11.1	-51.2	-46.5	-30.0	21.2	16.5	145	175	100	317	
3811.80	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4764.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5717.70	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6670.65	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7623.60	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8576.55	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9529.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MH
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 6, 2022	July 7, 2022
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 954.550 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.86	27.2	27.9	-57.1	-52.0	2.8	-8.1	-70.1	-65.0	-54.0	16.1	11.0	154	149	176	305	
497.00	34.3	33.5	-46.8	-46.5	4.5	-8.1	-61.6	-61.3	-54.0	7.6	7.3	100	81	127	85	
552.30	35.3	30.4	-46.0	-49.8	4.8	-8.1	-61.0	-64.8	-54.0	7.0	10.8	100	73	121	106	
745.80	31.3	29.7	-45.2	-47.6	5.6	-7.7	-60.7	-63.1	-54.0	6.7	9.1	116	91	100	252	
851.80	35.1	34.0	-39.0	-38.6	6.1	-8.1	-55.3	-54.9	-54.0	1.3	***0.9***	100	250	106	141	
962.98	40.6	41.3	-30.6	-27.8	6.5	-8.8	-48.1	-45.3	-36.0	12.1	9.3	128	278	101	37	
1169.00	50.7	57.4	-65.1	-52.1	2.6	6.3	-63.6	-50.6	-30.0	33.6	20.6	101	91	148	349	
1909.10	48.6	54.2	-61.0	-53.4	3.3	10.2	-56.3	-48.7	-30.0	26.3	18.7	100	117	100	247	
2863.65	52.1	53.9	-54.2	-52.0	4.1	11.1	-49.3	-47.1	-30.0	19.3	17.1	156	19	154	293	
3818.20	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4772.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5727.30	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6681.85	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7636.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8590.95	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9545.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz /
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 6, 2022	July 7, 2022
Temperature / Humidity	24 deg. C / 65 % RH	24 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 956.150 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.86	28.8	27.1	-55.5	-52.8	2.8	-8.1	-68.5	-65.8	-54.0	14.5	11.8	151	34	177	174	
497.22	32.2	31.8	-48.9	-48.2	4.5	-8.1	-63.7	-63.0	-54.0	9.7	9.0	100	74	100	155	
552.30	36.6	31.4	-44.7	-48.8	4.8	-8.1	-59.7	-63.8	-54.0	5.7	9.8	100	65	185	87	
745.80	32.0	31.1	-44.5	-46.3	5.6	-7.7	-60.0	-61.8	-54.0	6.0	7.8	115	98	100	91	
851.80	35.7	34.4	-38.4	-38.2	6.1	-8.1	-54.7	-54.5	-54.0	0.7	***0.5***	100	250	113	42	
964.68	39.5	40.4	-31.7	-28.7	6.5	-8.8	-49.2	-46.2	-36.0	13.2	10.2	123	253	100	107	
1169.00	50.5	57.0	-65.3	-52.6	2.6	6.3	-63.7	-51.0	-30.0	33.7	21.0	100	194	145	354	
1912.30	49.9	54.6	-60.3	-53.0	3.3	10.2	-55.6	-48.3	-30.0	25.6	18.3	100	119	100	133	
2868.45	52.3	53.8	-54.1	-52.1	4.1	11.1	-49.2	-47.2	-30.0	19.2	17.2	116	19	168	290	
3824.60	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4780.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5736.90	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6693.05	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7649.20	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8605.35	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9561.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz /
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 6, 2022	July 8, 2022
Temperature / Humidity	24 deg. C / 65 % RH	22 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 956.550 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.98	29.1	31.4	-55.2	-48.5	2.8	-8.1	-68.2	-61.5	-54.0	14.2	7.5	159	194	100	352	
497.20	33.2	30.7	-48.0	-49.3	4.5	-8.1	-62.8	-64.1	-54.0	8.8	10.1	100	258	100	347	
546.89	38.4	32.7	-42.8	-47.5	4.8	-8.1	-57.8	-62.5	-54.0	3.8	8.5	100	231	129	208	
742.91	30.2	29.7	-46.3	-47.6	5.6	-7.7	-61.8	-63.1	-54.0	7.8	9.1	116	75	170	16	
844.81	35.1	32.4	-39.1	-40.2	6.0	-8.1	-55.3	-56.4	-54.0	***1.3***	2.4	100	242	115	27	
965.30	41.7	38.1	-29.5	-30.9	6.5	-8.8	-47.0	-48.4	-36.0	11.0	12.4	123	277	100	335	
1169.00	52.4	56.0	-58.9	-53.5	2.6	6.3	-57.4	-52.0	-30.0	27.4	22.0	100	174	175	285	
1913.10	49.3	52.2	-62.8	-58.7	3.3	10.2	-58.1	-54.0	-30.0	28.1	24.0	100	22	101	225	
2869.65	51.8	55.1	-54.0	-50.2	4.1	11.1	-49.1	-45.3	-30.0	19.1	15.3	103	175	100	279	
3826.20	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4782.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5739.30	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6695.85	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7652.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8608.95	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9565.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MH
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 6, 2022	July 8, 2022
Temperature / Humidity	24 deg. C / 65 % RH	22 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 958.150 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.86	28.4	28.5	-55.9	-51.4	2.8	-8.1	-68.9	-64.4	-54.0	14.9	10.4	161	225	167	167	
496.81	31.1	30.6	-50.0	-49.4	4.5	-8.1	-64.8	-64.2	-54.0	10.8	10.2	100	256	119	154	
547.01	36.6	32.8	-44.6	-47.4	4.8	-8.1	-59.6	-62.4	-54.0	5.6	8.4	100	245	121	312	
745.16	32.0	29.9	-44.5	-47.4	5.6	-7.7	-60.0	-62.9	-54.0	6.0	8.9	114	100	126	66	
844.80	35.9	32.2	-38.2	-40.4	6.0	-8.1	-54.4	-56.6	-54.0	***0.4***	2.6	105	249	109	11	
966.89	39.1	38.7	-32.1	-30.3	6.5	-8.9	-49.6	-47.8	-36.0	13.6	11.8	174	97	100	339	
1169.00	52.5	56.1	-58.8	-53.4	2.6	6.3	-57.3	-51.9	-30.0	27.3	21.9	103	173	173	286	
1916.30	50.0	52.9	-62.2	-58.0	3.3	10.2	-57.5	-53.3	-30.0	27.5	23.3	100	20	100	226	
2874.45	50.8	54.4	-55.1	-50.9	4.1	11.1	-50.2	-46.0	-30.0	20.2	16.0	103	184	177	105	
3832.60	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4790.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5748.90	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6707.05	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7665.20	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8623.35	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9581.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	July 6, 2022	July 8, 2022
Temperature / Humidity	24 deg. C / 65 % RH	22 deg. C / 55 % RH
Engineer	Keiya Ido	Keiya Ido
	(25 MHz to 1000 MHz)	(Above 1 GHz)
Mode	Tx 959.750 MHz, 40 mW	

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
198.86	28.6	28.3	-55.8	-51.6	2.8	-8.1	-68.8	-64.6	-54.0	14.8	10.6	170	213	100	194	
496.81	33.1	34.5	-48.1	-45.5	4.5	-8.1	-62.9	-60.3	-54.0	8.9	6.3	100	83	150	286	
547.01	33.5	29.6	-47.8	-50.6	4.8	-8.1	-62.8	-65.6	-54.0	8.8	11.6	100	75	131	265	
745.16	32.4	30.9	-44.1	-46.4	5.6	-7.7	-59.6	-61.9	-54.0	5.6	7.9	217	56	116	70	
844.80	35.5	32.1	-38.7	-40.5	6.0	-8.1	-54.9	-56.7	-54.0	***0.9***	2.7	100	228	112	44	
967.95	40.4	39.5	-30.8	-29.6	6.5	-8.9	-48.3	-47.1	-36.0	12.3	11.1	208	69	101	111	
1169.00	51.9	56.3	-59.4	-53.2	2.6	6.3	-57.9	-51.7	-30.0	27.9	21.7	100	175	174	285	
1919.50	49.6	52.2	-62.5	-58.7	3.3	10.2	-57.8	-54.0	-30.0	27.8	24.0	100	21	104	229	
2879.25	50.8	54.1	-55.1	-51.2	4.1	11.1	-50.2	-46.3	-30.0	20.2	16.3	103	182	135	73	
3839.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4798.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
5758.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6718.25	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7678.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8637.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9597.50	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MH
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	July 20, 2022	July 20, 2022	June 21, 2022	July 22, 2022
Temperature / Humidity	20 deg. C / 51 % RH	21 deg. C / 60 % RH	21 deg. C / 56 % RH	23 deg. C / 67 % RH
Engineer	Junki Nagatomi	Sayaka Hara	Nachi Konegawa	Nachi Konegawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(25 MHz to 1000 MHz)	(1 GHz to 10 GHz)
Mode	Tx 1435.1 MHz, 40 mW			

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
831.83	35.9	NS	-48.7	-	5.0	-8.0	-63.8	-	-54.0	9.8	-	150	352	-	-	
855.46	NS	35.1	-	-46.2	5.1	-8.1	-	-61.6	-54.0	-	7.6	-	-	118	210	
1119.61	65.4	67.8	-42.1	-40.7	2.5	6.1	-40.7	-39.3	-30.0	10.7	9.3	147	85	132	72	
2870.20	51.7	47.4	-52.6	-57.0	4.1	10.9	-47.9	-52.3	-30.0	17.9	22.3	130	34	116	343	
4305.30	46.1	43.8	-58.1	-60.7	5.1	12.3	-53.0	-55.5	-30.0	23.0	25.5	132	95	145	30	
5740.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7175.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8610.60	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
10045.70	48.0	45.7	-48.5	-55.0	8.0	11.3	-47.4	-53.9	-30.0	17.4	23.9	131	193	172	131	
11480.80	55.7	57.3	-39.5	-36.1	8.6	11.1	-39.1	-35.7	-30.0	9.1	***5.7***	172	167	121	54	
12915.90	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
14351.00	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	July 20, 2022	July 20, 2022	June 21, 2022	July 22, 2022
Temperature / Humidity	20 deg. C / 51 % RH	21 deg. C / 60 % RH	21 deg. C / 56 % RH	23 deg. C / 67 % RH
Engineer	Junki Nagatomi (1 GHz to 10 GHz)	Sayaka Hara (10 GHz to 18 GHz)	Nachi Konegawa (25 MHz to 1000 MHz)	Nachi Konegawa (1 GHz to 10 GHz)
Mode	Tx 1480 MHz, 40 mW			

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
841.13	NS	34.5	-	-46.8	5.0	-8.0	-	-62.0	-54.0	-	8.0	-	-	150	213	
848.84	37.0	NS	-47.6	-	5.1	-8.1	-62.9	-	-54.0	8.9	-	143	353	-	-	
1119.61	67.4	67.9	-40.1	-40.6	2.5	6.1	-38.7	-39.1	-30.0	8.7	9.1	120	78	128	72	
2960.00	59.0	60.3	-44.2	-43.7	4.1	11.2	-39.2	-38.8	-30.0	9.2	8.8	104	52	113	17	
4440.00	58.2	59.0	-41.3	-41.3	5.1	12.4	-36.3	-36.3	-30.0	6.3	6.3	124	97	175	62	
5920.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7400.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8880.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
10360.00	47.7	48.8	-50.0	-49.3	8.1	11.3	-49.0	-48.3	-30.0	19.0	18.3	133	127	131	155	
11840.00	56.6	56.5	-36.7	-36.8	8.7	12.5	-35.1	-35.2	-30.0	***5.1***	5.2	152	164	126	46	
13320.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
14800.00	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)
*Emissions were investigated up to the 10th harmonic of the fundamental.

Field strength of spurious radiation

Test place	Ise EMC Lab.			
Semi Anechoic Chamber	No.3	No.3	No.3	No.3
Date	July 20, 2022	July 20, 2022	June 21, 2022	July 22, 2022
Temperature / Humidity	20 deg. C / 51 % RH	21 deg. C / 60 % RH	21 deg. C / 56 % RH	23 deg. C / 67 % RH
Engineer	Junki Nagatomi	Sayaka Hara	Nachi Konegawa	Nachi Konegawa
	(1 GHz to 10 GHz)	(10 GHz to 18 GHz)	(25 MHz to 1000 MHz)	(1 GHz to 10 GHz)
Mode	Tx 1524.9 MHz, 40 mW			

Frequency	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss	Tx Ant. Gain	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
												Rx Ant. Height	Turn Table	Rx Ant. Height	Turn Table	
[MHz]	Hori.	Vert.	Hori.	Vert.	[dB]	[dBi]	Hori.	Vert.		Hori.	Vert.	[cm]	[deg.]	[cm]	[deg.]	
848.45	36.9	NS	-47.7	-	5.1	-8.1	-63.0	-	-54.0	9.0	-	150	4	-	-	
849.02	NS	34.1	-	-47.2	5.1	-8.1	-	-62.5	-54.0	-	8.5	-	-	150	125	
1119.61	66.0	68.5	-41.4	-40.0	2.5	6.1	-40.0	-38.6	-30.0	10.0	8.6	147	97	132	68	
3049.80	52.0	56.4	-52.8	-47.8	4.2	11.4	-47.7	-42.8	-30.0	17.7	12.8	135	295	135	295	
4574.70	56.1	57.2	-43.0	-42.2	5.2	12.4	-38.0	-37.2	-30.0	8.0	7.2	104	106	159	145	
6099.60	45.0	NS	-56.0	-	6.1	13.4	-50.9	-	-30.0	20.9	-	122	13	-	-	
7624.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9149.40	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
10674.30	46.9	48.3	-51.0	-50.0	8.3	11.4	-50.0	-49.0	-30.0	20.0	19.0	127	206	127	330	
12199.20	56.0	56.9	-37.0	-36.4	8.9	12.8	-35.3	-34.7	-30.0	5.3	***4.7***	150	176	117	53	
13724.10	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
15249.00	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 - the tenth harmonic)
Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - the tenth harmonic)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20 dB).
NS : No signal detect.
Detector : 25 MHz to 30 MHz: Spectrum Analyzer RMS Average (RBW: 10 kHz / VBW: 30 kHz)
30 MHz to 1 GHz: Spectrum Analyzer RMS Average (RBW: 100 kHz / VBW: 300 kHz), Above 1 GHz: Spectrum Analyzer RMS Average (RBW: 1 MHz / VBW: 3 MHz)
*Emissions were investigated up to the 10th harmonic of the fundamental.

Frequency Stability

Test place	Ise EMC Lab. No.6 Measurement Room
Date	June 19, 2022
Temperature / Humidity	22 deg. C / 55 % RH
Engineer	Nachi Konegawa
Mode	Tx 946.750 MHz, 40 mW

Varying Temperature

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
55	3.70	946.750	0.002157	0.00023	0.005	
50	3.70	946.750	0.002102	0.00022	0.005	
40	3.70	946.750	0.001707	0.00018	0.005	
30	3.70	946.750	0.001585	0.00017	0.005	
20	3.70	946.750	0.001630	0.00017	0.005	
10	3.70	946.750	0.001753	0.00019	0.005	
0	3.70	946.750	0.002833	0.00030	0.005	
-10	3.70	946.750	0.003536	0.00037	0.005	
-20	3.70	946.750	0.004746	0.00050	0.005	
-30	3.70	946.750	0.005318	0.00056	0.005	

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

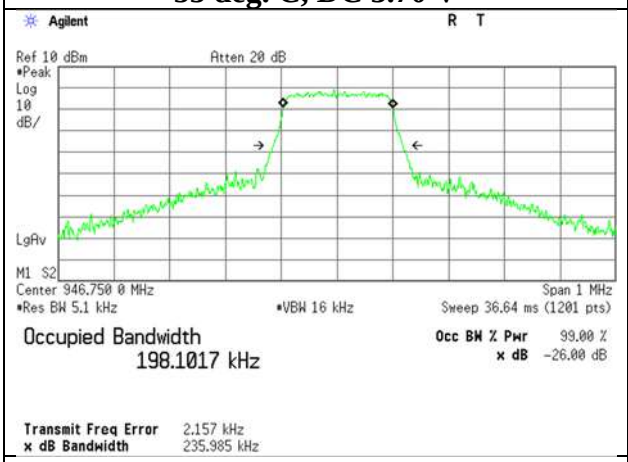
Varying Supply Voltage

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
20	3.70	946.750	0.001630	0.00017	0.005	Nominal
20	3.15	946.750	0.001465	0.00015	0.005	Norminal (-15%) Minimum operating Voltage
20	4.26	946.750	0.001564	0.00017	0.005	Norminal (+15%)
20	4.80	946.750	0.001377	0.00015	0.005	Maximum operating Voltage

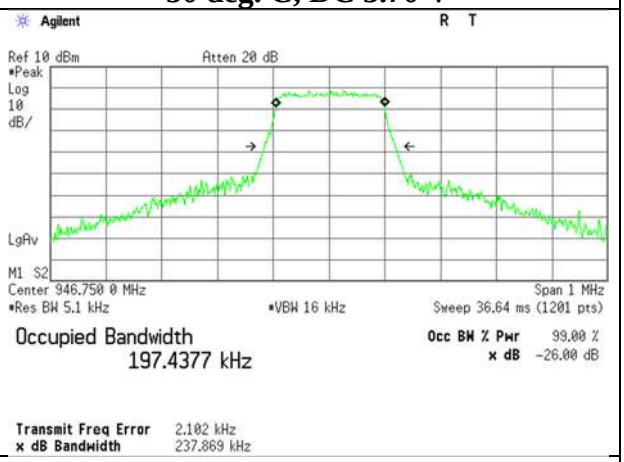
Result [%] = Frequency error / Tested frequency * 100

Frequency Stability

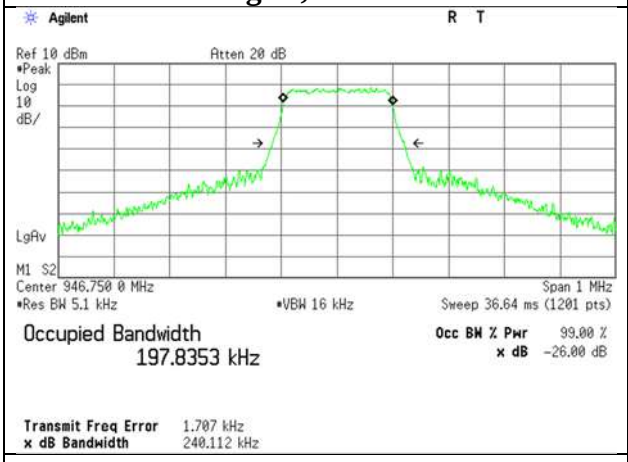
55 deg. C, DC 3.70 V



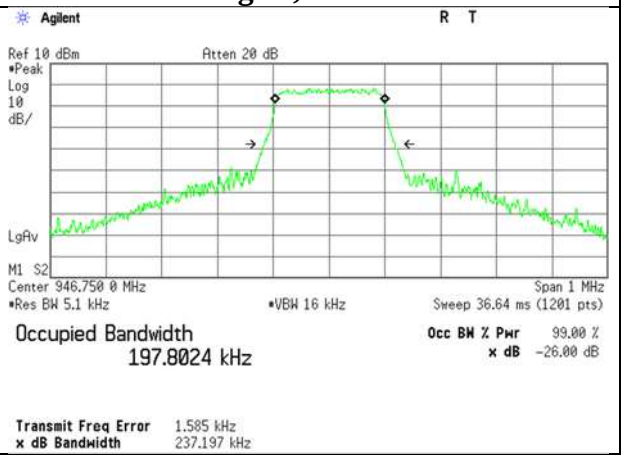
50 deg. C, DC 3.70 V



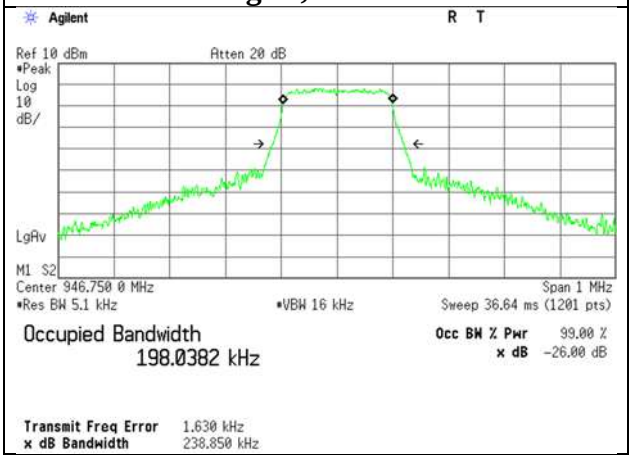
40 deg. C, DC 3.70 V



30 deg. C, DC 3.70 V

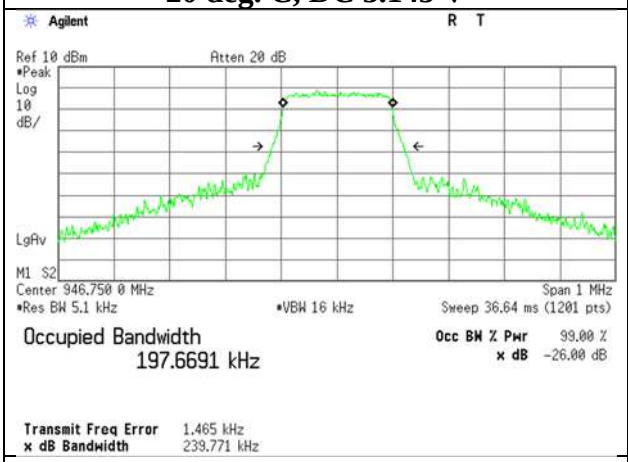


20 deg. C, DC 3.70 V

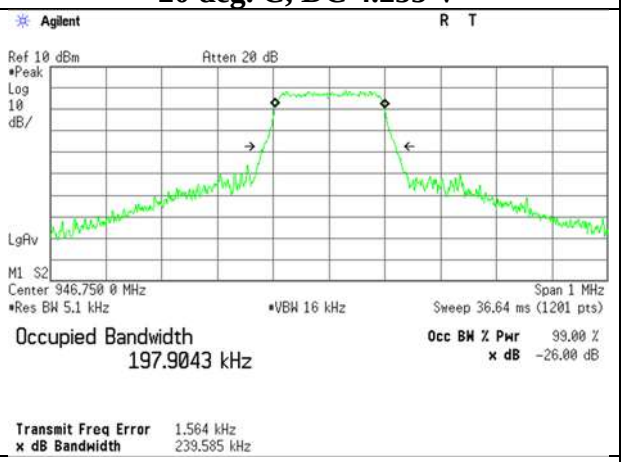


Frequency Stability

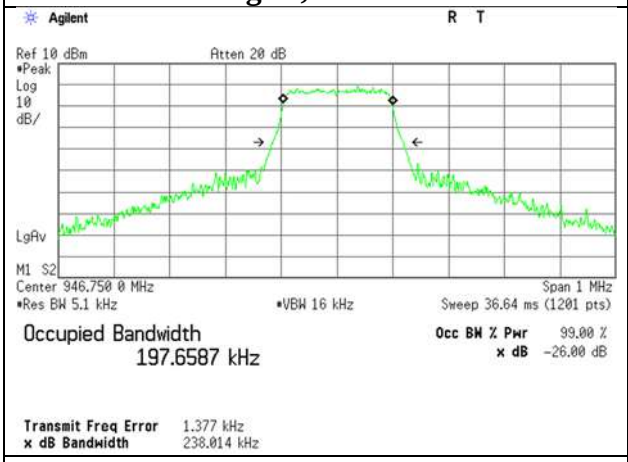
20 deg. C, DC 3.145 V



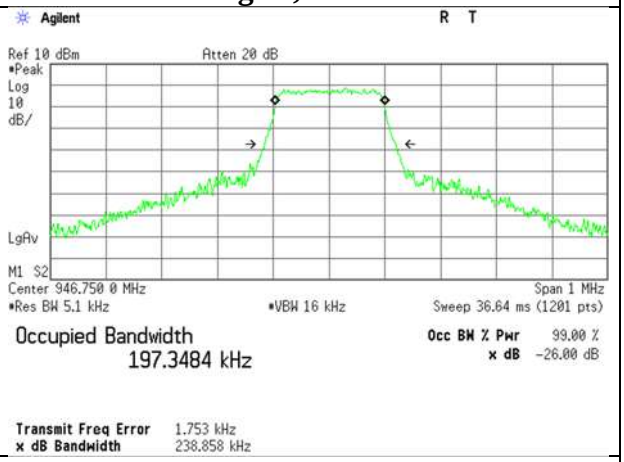
20 deg. C, DC 4.255 V



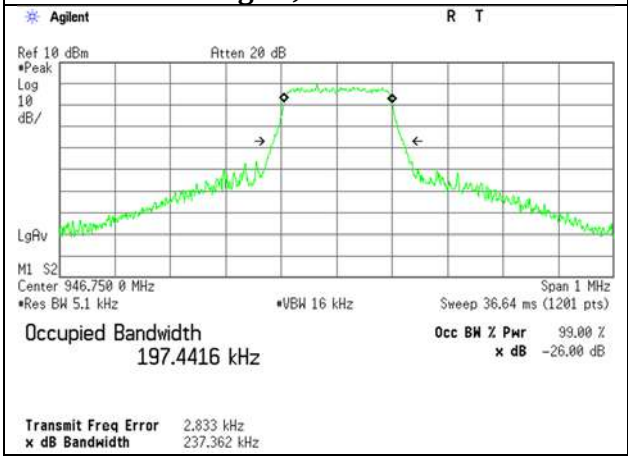
20 deg. C, DC 4.80 V



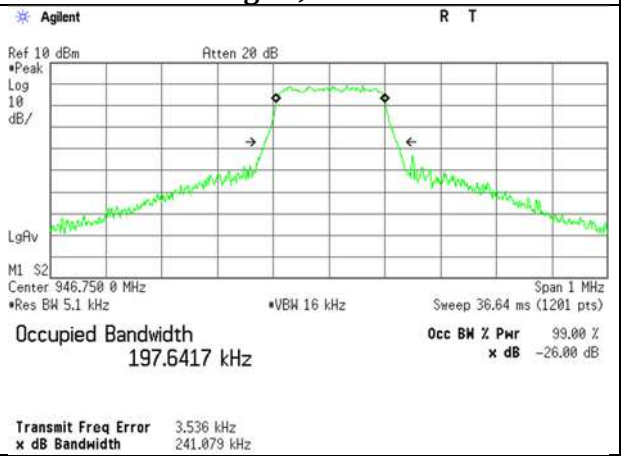
10 deg. C, DC 3.60 V



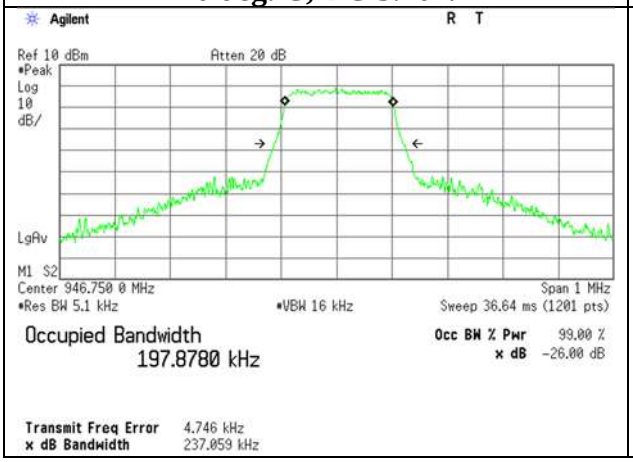
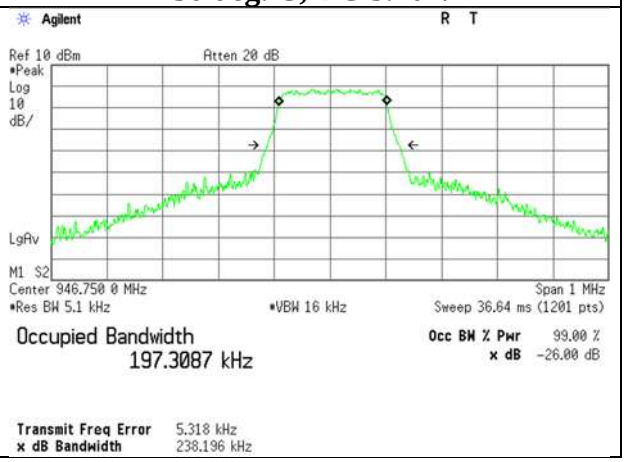
0 deg. C, DC 3.70 V



-10 deg. C, DC 3.70 V



Frequency Stability

-20 deg. C, DC 3.70 V	-30 deg. C, DC 3.70 V
	

Frequency Stability

Test place	Ise EMC Lab. No.11 Measurement Room
Date	October 20, 2022
Temperature / Humidity	20 deg. C / 51 % RH
Engineer	Keiya Ido
Mode	Tx 954.550 MHz, 40 mW

Varying Temperature

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
55	3.70	954.550	0.001441	0.00015	0.005	
50	3.70	954.550	0.001634	0.00017	0.005	
40	3.70	954.550	0.001431	0.00015	0.005	
30	3.70	954.550	0.001313	0.00014	0.005	
20	3.70	954.550	0.001408	0.00015	0.005	
10	3.70	954.550	0.001928	0.00020	0.005	
0	3.70	954.550	0.002150	0.00023	0.005	
-10	3.70	954.550	0.003383	0.00035	0.005	
-20	3.70	954.550	0.004802	0.00050	0.005	
-30	3.70	954.550	0.005126	0.00054	0.005	

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

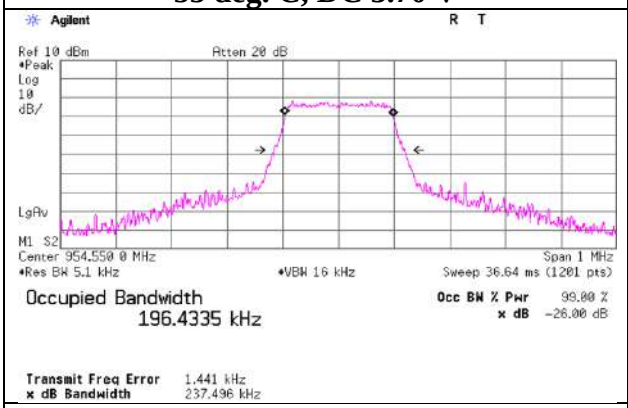
Varying Supply Voltage

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
20	3.70	954.550	0.001408	0.00015	0.005	Nominal
20	3.15	954.550	0.001147	0.00012	0.005	Norminal (-15%) Minimum operating Voltage
20	4.26	954.550	0.001603	0.00017	0.005	Norminal (+15%)
20	4.80	954.550	0.001441	0.00015	0.005	Maximum operating Voltage

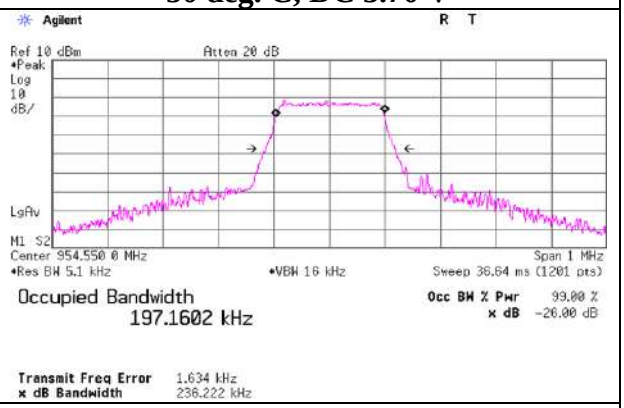
Result [%] = Frequency error / Tested frequency * 100

Frequency Stability

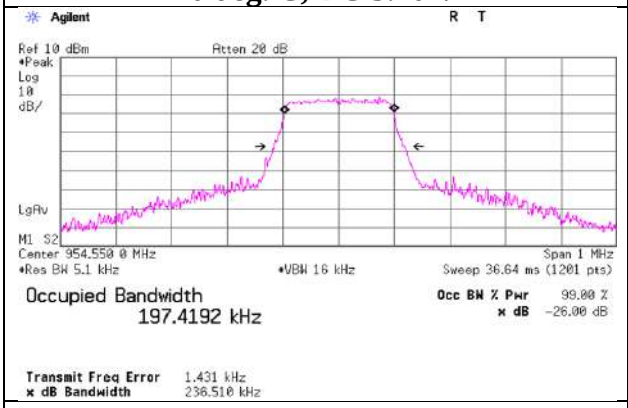
55 deg. C, DC 3.70 V



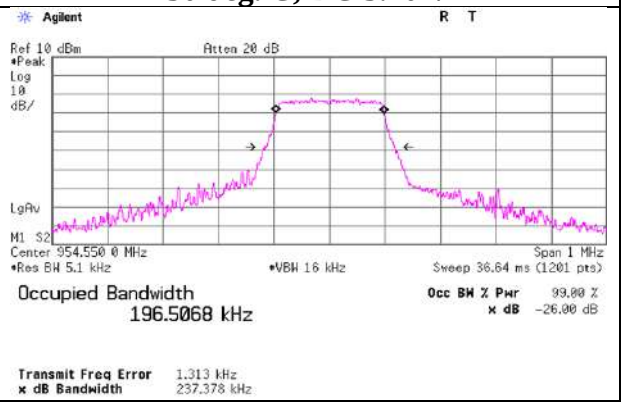
50 deg. C, DC 3.70 V



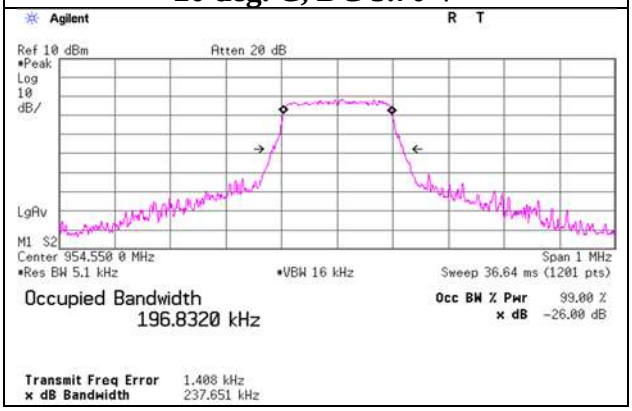
40 deg. C, DC 3.70 V



30 deg. C, DC 3.70 V

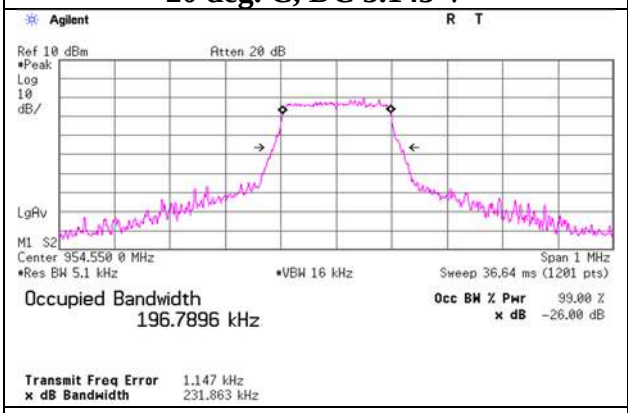


20 deg. C, DC 3.70 V

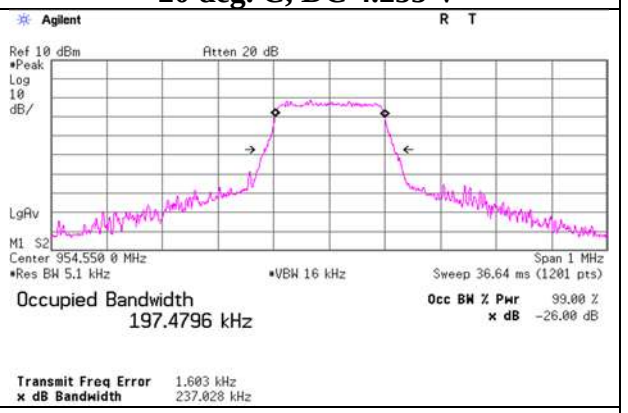


Frequency Stability

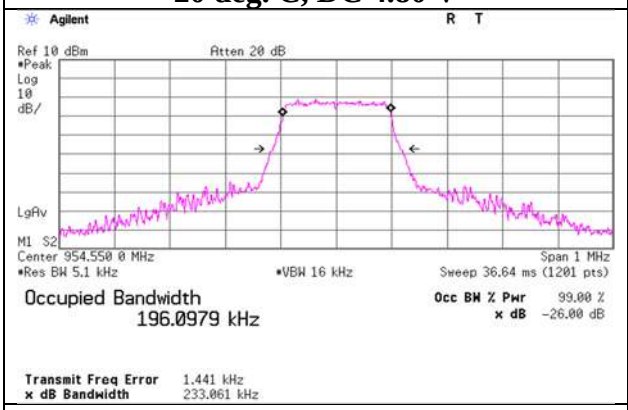
20 deg. C, DC 3.145 V



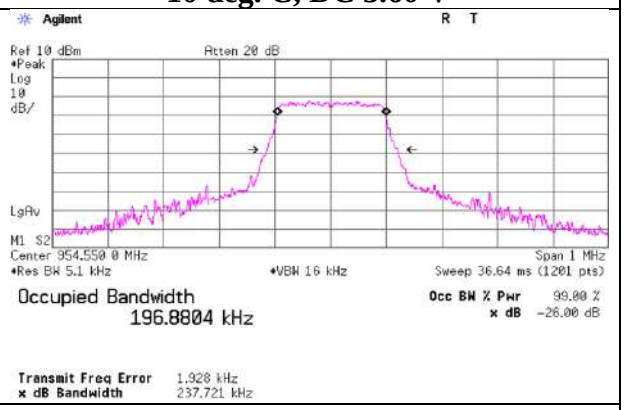
20 deg. C, DC 4.255 V



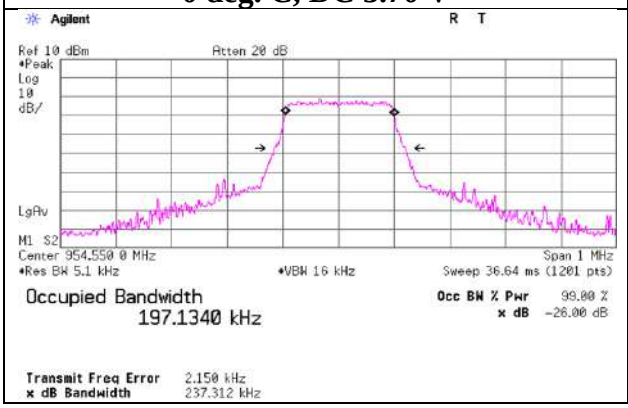
20 deg. C, DC 4.80 V



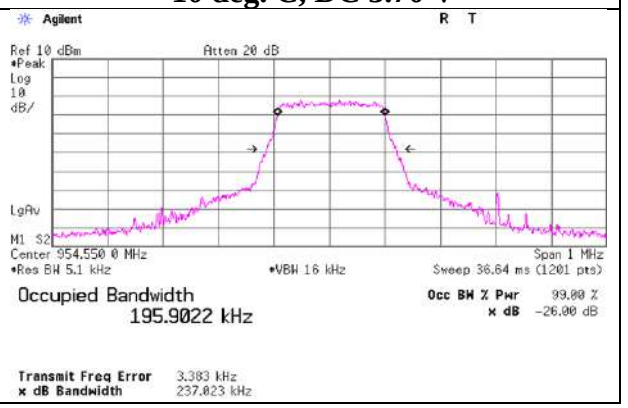
10 deg. C, DC 3.60 V



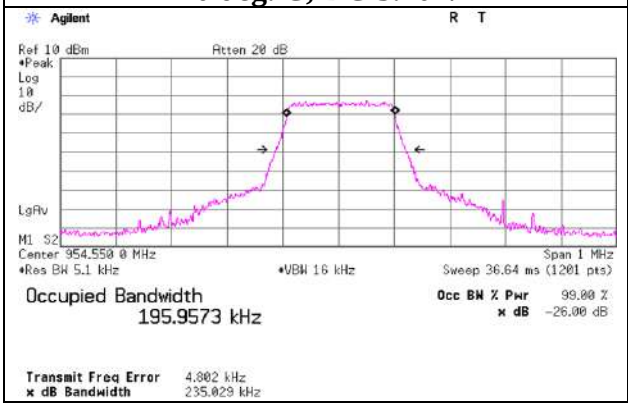
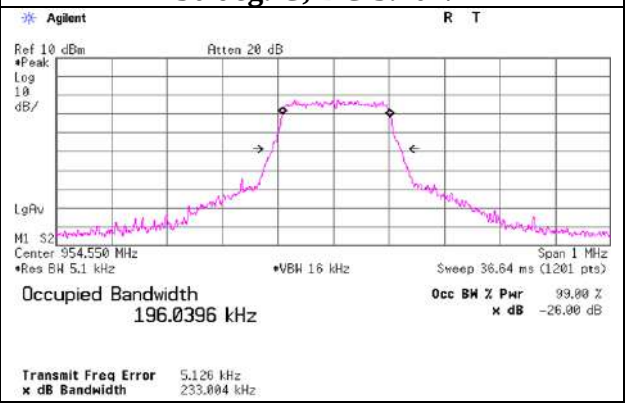
0 deg. C, DC 3.70 V



-10 deg. C, DC 3.70 V



Frequency Stability

-20 deg. C, DC 3.70 V	-30 deg. C, DC 3.70 V
	

Frequency Stability

Test place	Ise EMC Lab. No.11 Measurement Room
Date	October 20, 2022
Temperature / Humidity	20 deg. C / 51 % RH
Engineer	Keiya Ido
Mode	Tx 958.15 MHz, 40 mW

Varying Temperature

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
55	3.70	956.425	0.001327	0.00014	0.005	
50	3.70	956.425	0.001901	0.00020	0.005	
40	3.70	956.425	0.001495	0.00016	0.005	
30	3.70	956.425	0.001323	0.00014	0.005	
20	3.70	956.425	0.001512	0.00016	0.005	
10	3.70	956.425	0.001369	0.00014	0.005	
0	3.70	956.425	0.001932	0.00020	0.005	
-10	3.70	956.425	0.003234	0.00034	0.005	
-20	3.70	956.425	0.004146	0.00043	0.005	
-30	3.70	956.425	0.004738	0.00050	0.005	

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

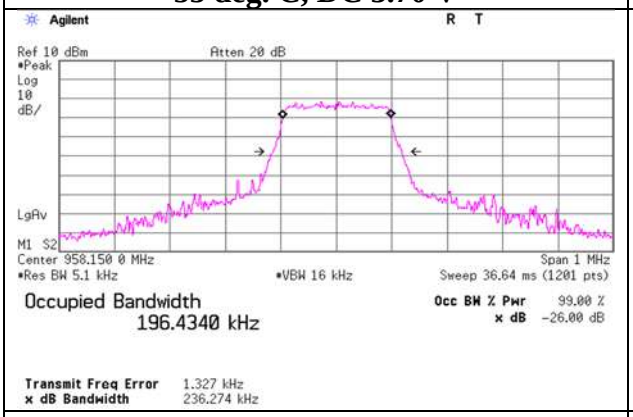
Varying Supply Voltage

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
20	3.70	958.150	0.001512	0.00016	0.005	Nominal
20	3.15	958.150	0.001371	0.00014	0.005	Norminal (-15%) Minimum operating Voltage
20	4.26	958.150	0.001125	0.00012	0.005	Norminal (+15%)
20	4.80	958.150	0.001433	0.00015	0.005	Maximum operating Voltage

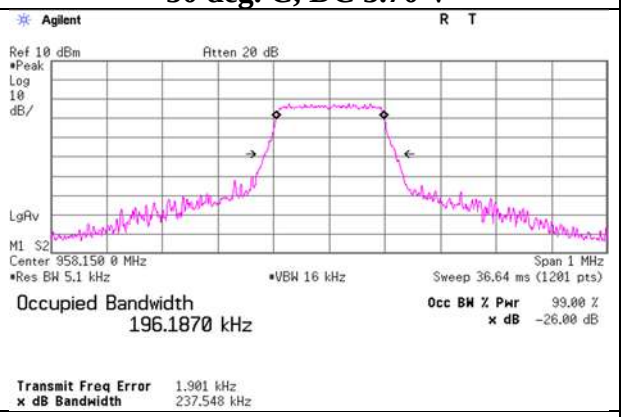
Result [%] = Frequency error / Tested frequency * 100

Frequency Stability

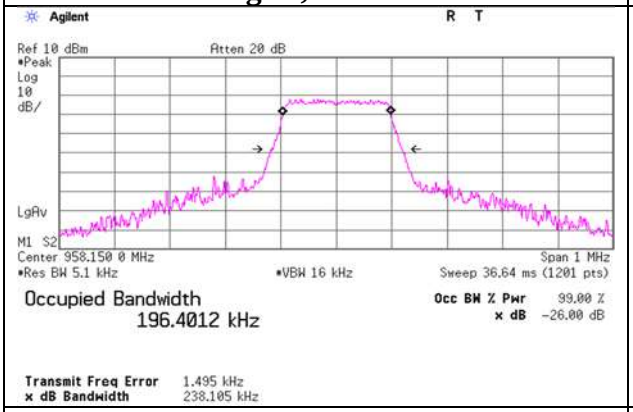
55 deg. C, DC 3.70 V



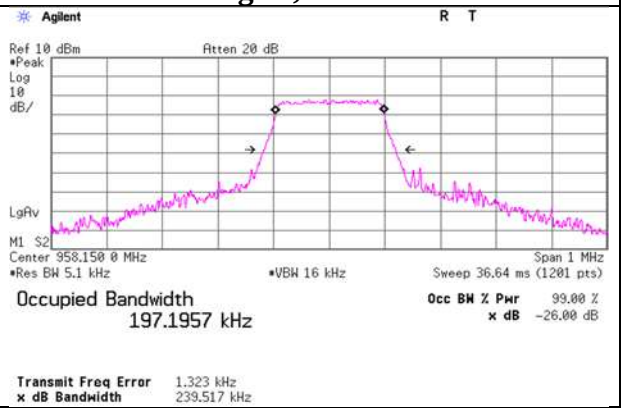
50 deg. C, DC 3.70 V



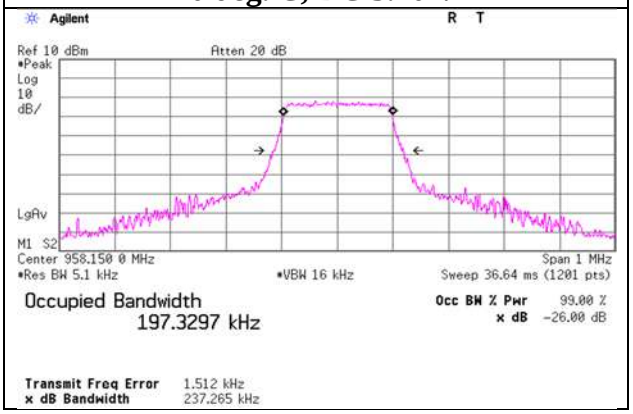
40 deg. C, DC 3.70 V



30 deg. C, DC 3.70 V

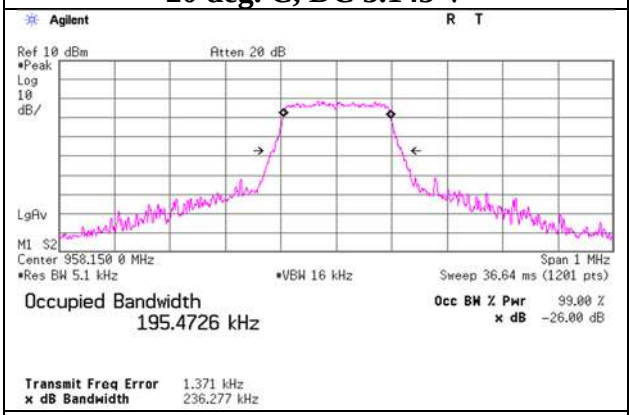


20 deg. C, DC 3.70 V

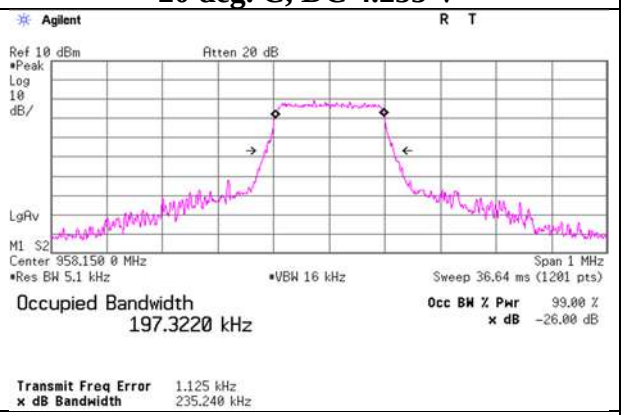


Frequency Stability

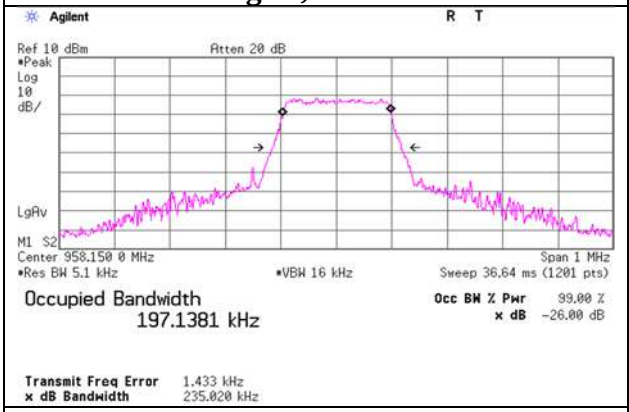
20 deg. C, DC 3.145 V



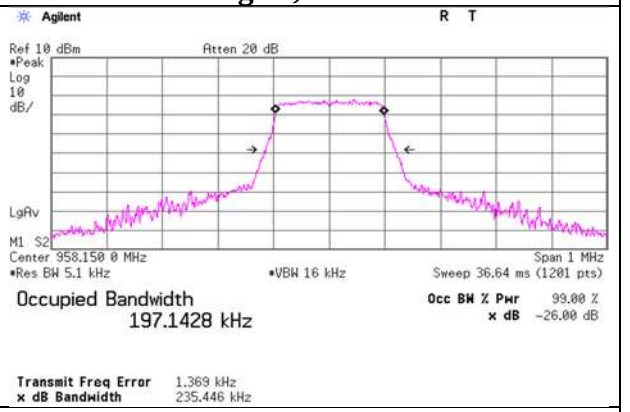
20 deg. C, DC 4.255 V



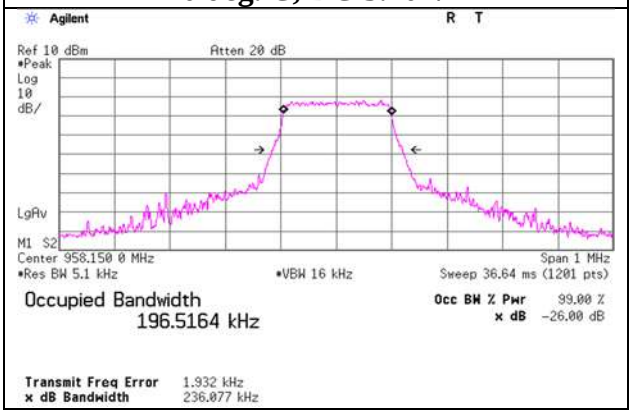
20 deg. C, DC 4.80 V



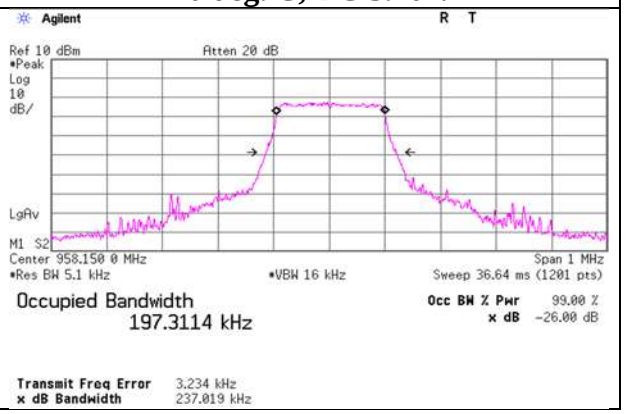
10 deg. C, DC 3.70 V



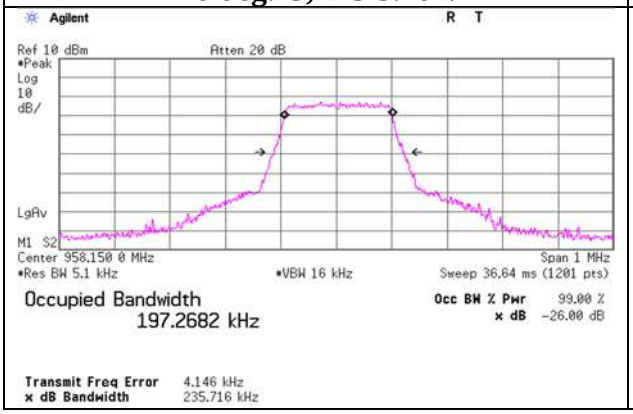
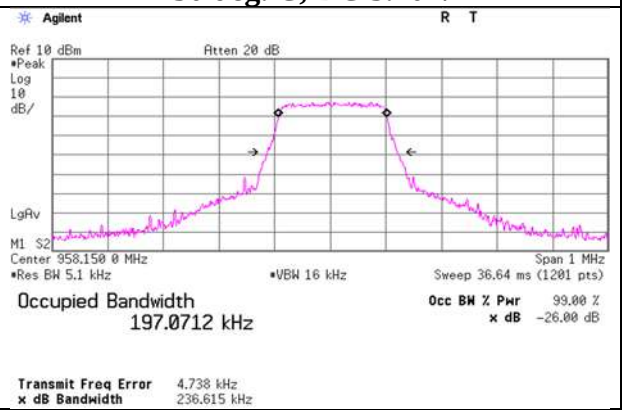
0 deg. C, DC 3.70 V



-10 deg. C, DC 3.70 V



Frequency Stability

-20 deg. C, DC 3.70 V	-30 deg. C, DC 3.70 V
	

Frequency Stability

Test place	Ise EMC Lab. No.11 Measurement Room
Date	October 20, 2022
Temperature / Humidity	20 deg. C / 51 % RH
Engineer	Keiya Ido
Mode	Tx 1480 MHz, 40 mW

Varying Temperature

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
55	3.70	1480.000	0.001639	0.00011	0.005	
50	3.70	1480.000	0.001776	0.00012	0.005	
40	3.70	1480.000	0.001894	0.00013	0.005	
30	3.70	1480.000	0.001353	0.00009	0.005	
20	3.70	1480.000	0.001039	0.00007	0.005	
10	3.70	1480.000	0.001678	0.00011	0.005	
0	3.70	1480.000	0.002569	0.00017	0.005	
-10	3.70	1480.000	0.004147	0.00028	0.005	
-20	3.70	1480.000	0.005723	0.00039	0.005	
-30	3.70	1480.000	0.007058	0.00048	0.005	

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

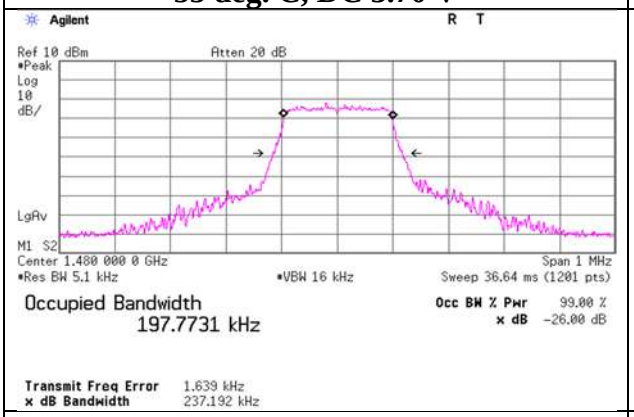
Varying Supply Voltage

Test condition		Tested	Frequency	Result	Limit	Remarks
Temp. [deg. C]	Voltage [V]	frequency [MHz]	error [MHz]	[%]	[+/- %]	
20	3.70	1480.000	0.001039	0.00007	0.005	Nominal
20	3.15	1480.000	0.001197	0.00008	0.005	Norminal (-15%) Minimum operating Voltage
20	4.26	1480.000	0.001097	0.00007	0.005	Norminal (+15%)
20	4.80	1480.000	0.001204	0.00008	0.005	Maximum operating Voltage

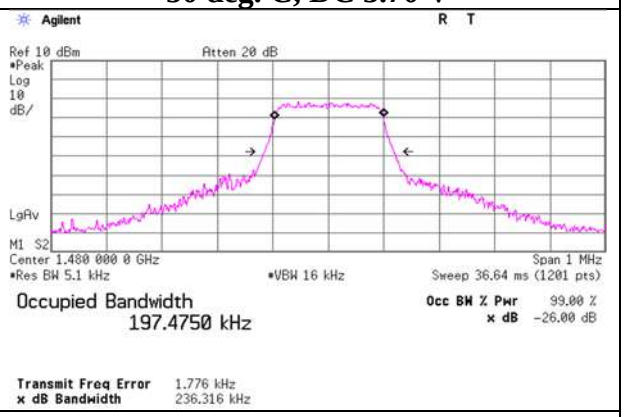
Result [%] = Frequency error / Tested frequency * 100

Frequency Stability

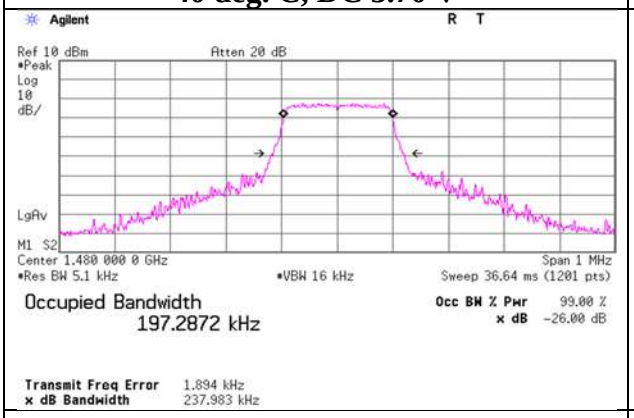
55 deg. C, DC 3.70 V



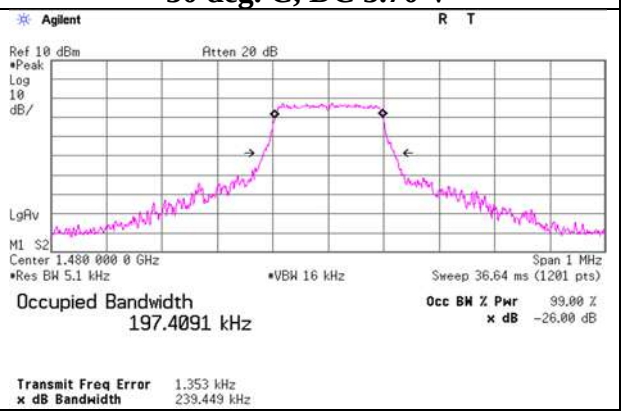
50 deg. C, DC 3.70 V



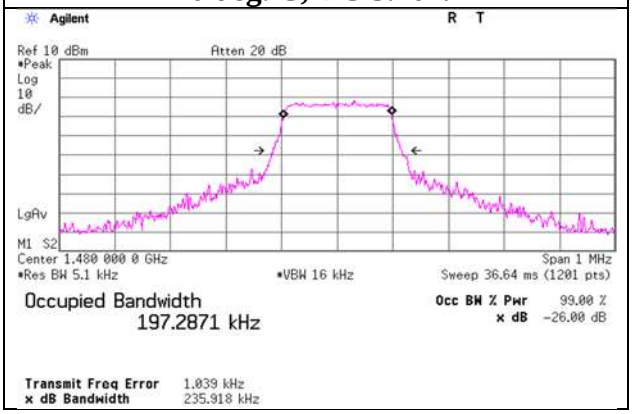
40 deg. C, DC 3.70 V



30 deg. C, DC 3.70 V

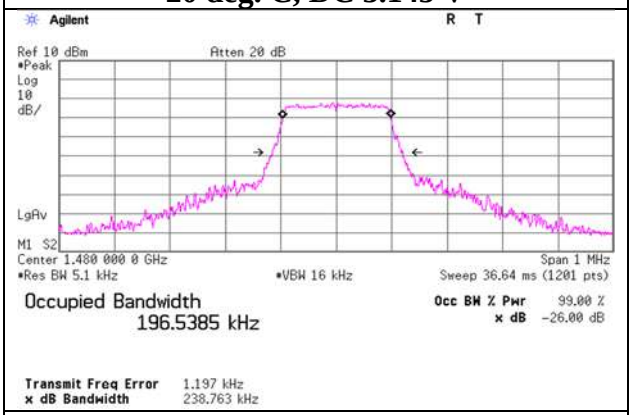


20 deg. C, DC 3.70 V

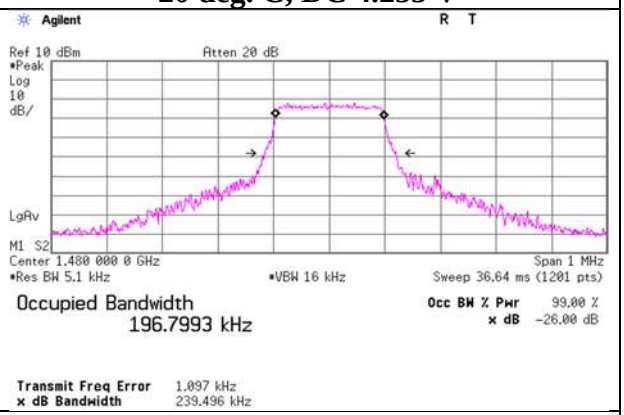


Frequency Stability

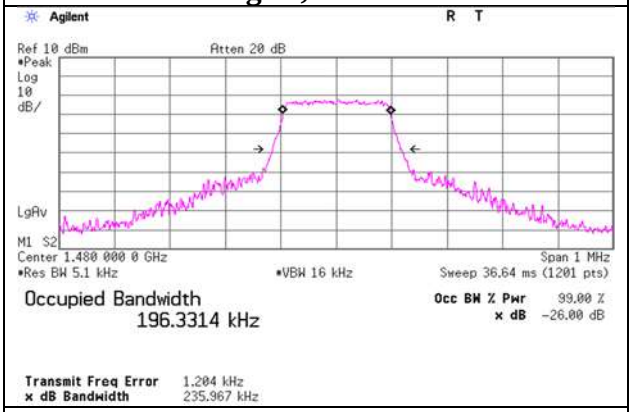
20 deg. C, DC 3.145 V



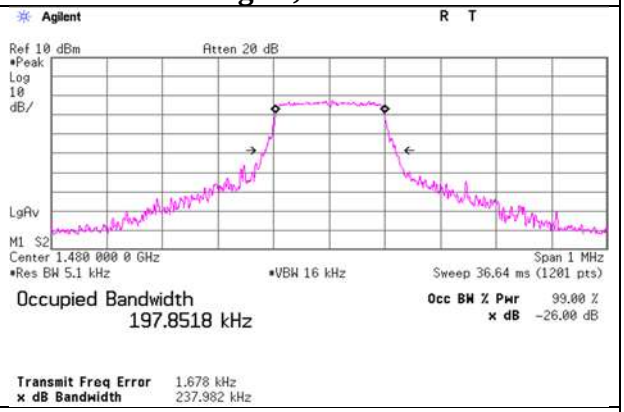
20 deg. C, DC 4.255 V



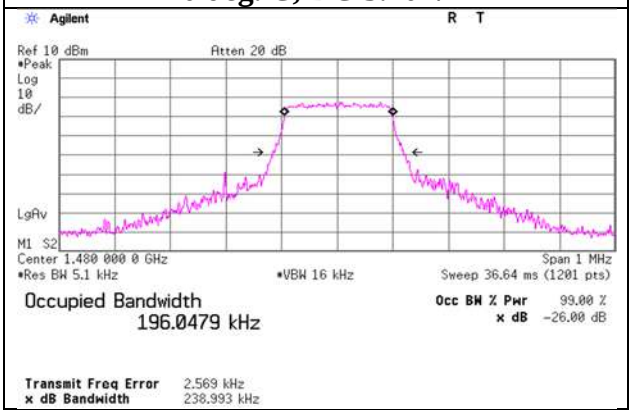
20 deg. C, DC 4.80 V



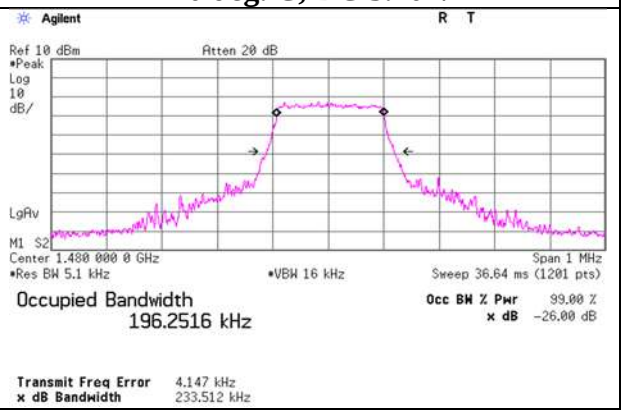
10 deg. C, DC 3.70 V



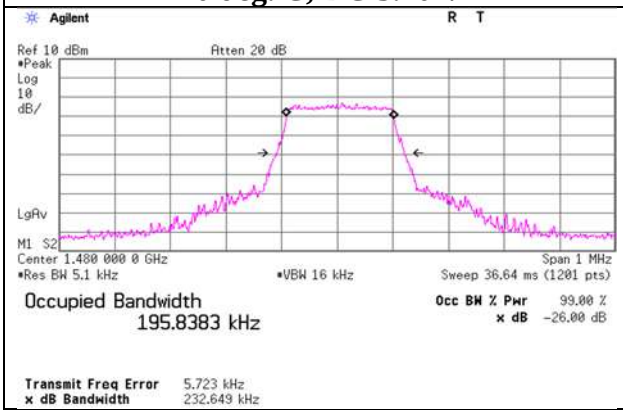
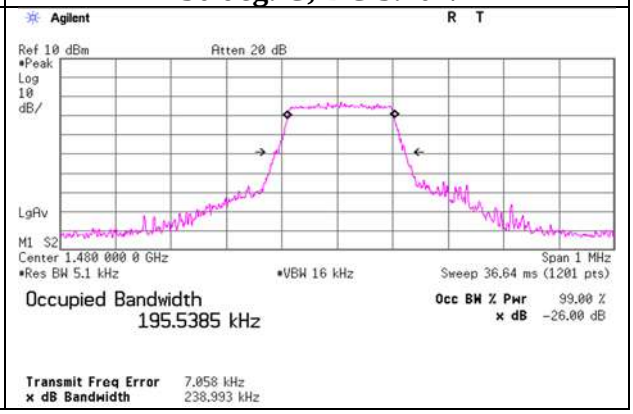
0 deg. C, DC 3.70 V



-10 deg. C, DC 3.70 V



Frequency Stability

-20 deg. C, DC 3.70 V	-30 deg. C, DC 3.70 V
	

APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MAT-10	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/09/2021	12
AT	MAT-58	141334	Attenuator(10dB)	Suhner	6810.19.A	-	12/08/2021	12
AT	MCC-138	141410	Microwave cable	Huber+Suhner	SUCOFLEX 102	37953/2	09/30/2021	12
AT	MCC-38	141395	Coaxial Cable	UL Japan	-	-	11/19/2021	12
AT	MCC-67	141329	Microwave Cable 1G-40GHz	Suhner	SUCOFLEX102	28635/2	04/01/2022	12
AT	MCH-05	141440	Temperature and Humidity Chamber	Espec	PL-1KP	14019569	04/24/2022	12
AT	MMM-01	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/10/2021	12
AT	MMM-17	141557	DIGIITAL HiTESTER	HIOKI E.E. CORPORATION	3805	70900530	01/16/2022	12
AT	MMM-18	141558	Digital Tester(TRUE RMS MULTIMETER)	Fluke Corporation	115	17930030	05/17/2022	12
AT	MOS-14	141561	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1401	01/10/2022	12
AT	MOS-28	141567	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0008	01/10/2022	12
AT	MOS-41	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	12/19/2021	12
AT	MPM-13	141810	Power Meter	Anritsu Corporation	ML2495A	824014	12/22/2021	12
AT	MPSE-18	141832	Power sensor	Anritsu Corporation	MA2411B	738174	12/22/2021	12
AT	MSA-14	141901	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY48250080	01/10/2022	12
AT	MSA-16	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	01/07/2022	12
AT	MSA-17	141904	Spectrum Analyzer	Keysight Technologies Inc	N9030A	US51350215	09/30/2021	12
AT	MCH-06	141430	Temperature and Humidity Chamber	Espec	PL-1KT	14007630	04/24/2022	12
AT	MCC-240	195231	Microwave Cable	Huber+Suhner	SF102D/11PC24/11PC24/1000mm	537062/126E	02/22/2022	12
AT	MAT-17	141171	Attenuator(20dB)_DC-1GHz_N	Weinschel Corp	MODEL 1	BG0143	12/23/2021	12
AT	MAT-86	141366	Attenuator	Weinschel Associates	WA56-20	56200213	05/01/2022	12
RE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MAEC-02	142004	AC2_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	05/30/2022	24
RE	MAEC-03	142008	AC3_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	05/23/2022	24
RE	MAT-10	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	11/09/2021	12
RE	MAT-112	220646	Attenuator	Huber+Suhner	6806_N-50-1	-	06/07/2022	12
RE	MAT-95	142314	Attenuator	Pasternack Enterprises	PE7390-6	D/C 1504	06/13/2022	12
RE	MBA-08	141427	Biconical Antenna	Schwarzbeck Mess-Elektronik OHG	VHA9103B+BBA9106	08031	07/10/2021	12
RE	MBF-08	141272	Band Pass Filter	M-City	BPF1800-01	UL0003	06/10/2022	12
RE	MBF-09	141273	Band Pass Filter	M-City	BPF4250-01	UL0004	06/10/2022	12
RE	MCC-12	141317	Coaxial Cable	UL Japan	-	-	09/06/2021	12
RE	MCC-126	141318	Coaxial Cable	UL Japan	-	-	07/09/2022	12
RE	MCC-125	141219	Coaxial Cable	UL Japan	-	-	07/09/2022	12
RE	MCC-216	141392	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 537073/126E(5 m)	-	-
RE	MCC-231	177964	Microwave Cable	Junkosha INC.	MMX221	1901S329(1m)/1902S579(5m)	03/15/2022	12
RE	MCC-258	214065	Microwave cable	Huber+Suhner	SF-126E/11PC35/11PC35/10000	550489/126E	01/18/2022	12
RE	MCC-51	141323	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

Test equipment (2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
RE	MHA-20	141507	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	258	11/09/2021	12
RE	MHA-30	141514	Horn Antenna 1-18GHz	Schwarzbeck Mess-Elektronik OHG	BBHA9120D	01611	06/22/2022	12
RE	MHF-03	141402	High pass Filter 1.4-5.0GHz	Mini-Circuits	VHF-1320	10411	08/18/2021	12
RE	MHF-04	141403	High Pass Filter 1.22-4.60GHz	Mini-Circuits	VHF-1200	10435	08/18/2021	12
RE	MHF-25	141232	High Pass Filter 3.5-18.0GHz	UL Japan	HPF SELECTOR	001	09/30/2021	12
RE	MHF-27	141297	High Pass Filter (1.1-10GHz)	TOKYO KEIKI	TF219CD1	1001	01/23/2022	12
RE	MJM-16	142183	Measure	KOMELON	KMC-36	-	-	-
RE	MJM-27	142228	Measure	KOMELON	KMC-36	-	-	-
RE	MLA-21	141265	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-190	07/10/2021	12
RE	MLA-22	141266	Logperiodic Antenna (200-1000MHz)	Schwarzbeck Mess-Elektronik OHG	VUSLP9111B	9111B-191	08/21/2021	12
RE	MMM-01	141542	Digital Tester	Fluke Corporation	FLUKE 26-3	78030611	08/10/2021	12
RE	MMM-08	141532	DIGITAL HiTESTER	HIOKI E.E. CORPORATION	3805	51201197	01/16/2022	12
RE	MOS-13	141554	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1301	01/10/2022	12
RE	MOS-41	192300	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0013	12/19/2021	12
RE	MPA-10	141579	Pre Amplifier	Keysight Technologies Inc	8449B	3008A02142	02/22/2022	12
RE	MPA-11	141580	MicroWave System Amplifier	Keysight Technologies Inc	83017A	MY39500779	03/17/2022	12
RE	MPA-13	141582	Pre Amplifier	SONOMA INSTRUMENT	310	260834	02/25/2022	12
RE	MPA-24	141594	Pre Amplifier	Keysight Technologies Inc	8447D	2944A10150	02/25/2022	12
RE	MSA-16	141903	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46186390	01/07/2022	12
RE	MSA-22	141978	Spectrum Analyzer	Keysight Technologies Inc	E4448A	MY46180899	03/24/2022	12
RE	MSG-12	141892	Signal Generator	Keysight Technologies Inc	E8257D	US49280311	11/22/2021	12
RE	YTSSG03	141967	Signal Generator	Rohde & Schwarz	SMT02	51400043	08/18/2021	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: **AT: Antenna Terminal Conducted test**
RE: Radiated Emission test (Field strength of spurious radiation)