



RADIO TEST REPORT

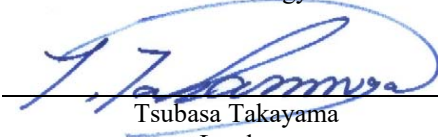
Test Report No. : 13425536H-B-R1

Applicant : Sony Corporation
Type of EUT : Digital Wireless Transmitter
Model Number of EUT : DWT-B30 /90
FCC ID : AK8DWTB3090
Test regulation : FCC Part 74: 2018
Test Result : Complied (Refer to SECTION 3.2)

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by the A2LA accreditation body.
6. This test report covers Radio technical requirements.
It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. The all test items in this test report are conducted by UL Japan, Inc. Ise EMC Lab.
8. The opinions and the interpretations to the result of the description in this report are outside scopes where UL Japan has been accredited.
9. The information provided from the customer for this report is identified in Section 1.
10. This report is a revised version of 13425536H-B. 13425536H-B is replaced with this report.

Date of test: August 03 to September 30, 2020

Representative test engineer: 
Junya Okuno
Engineer
Consumer Technology Division

Approved by: 
Tsubasa Takayama
Leader
Consumer Technology Division



CERTIFICATE 5107.02

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

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REVISION HISTORY

Original Test Report No.: 13425536H-B

Revision	Test report No.	Date	Page revised	Contents																																																																																																																								
- (Original)	13425536H-B	September 10, 2020	-	-																																																																																																																								
1	13425536H-B-R1	September 30, 2020	P 1	Correction of Date of test. August 03 to 19, 2020 →August 03 to September 30, 2020																																																																																																																								
1	13425536H-B-R1	September 30, 2020	corresponding page	Deletion of Modulation Characteristics, Occupied Bandwidth, Frequency stability																																																																																																																								
1	13425536H-B-R1	September 30, 2020	P 8	Correction of Worst margin for Conducted Emission in Section 3.2. : Procedures and results 18.87 dB 0.58035 MHz, AV, L→ 20.69 dB 0.60050 MHz, AV, L																																																																																																																								
1	13425536H-B-R1	September 30, 2020	P 8	Correction of specification in Section 3.2. : Procedures and results -Spurious emissions at antenna terminals FCC: Section 74.861 (e) (6)→ FCC: Section 74.861 (d) (4) (ii) -Emission mask FCC: Section 74.861 (d) (4)→ FCC: Section 74.861 (d) (4) (ii) -Field strength of spurious radiation FCC: Section 74.861 (e) (6)→ FCC: Section 74.861 (d) (4) (ii)																																																																																																																								
1	13425536H-B-R1	September 30, 2020	P 18, 19	Replacement of conducted emission test data in APPENDIX 1: Test data																																																																																																																								
1	13425536H-B-R1	September 30, 2020	P 21	Correction of Result, Limit and Margin in APPENDIX 1: Test data (Spurious emissions at antenna terminals) <table><tr><th>Result</th><th>Limit</th><th>Margin</th></tr><tr><th>[dBm]</th><th>[dBm]</th><th>[dB]</th></tr><tr><td>-80.00</td><td>-13</td><td>67.00</td></tr><tr><td>-75.02</td><td>-13</td><td>62.02</td></tr><tr><td>-54.32</td><td>-13</td><td>41.32</td></tr><tr><td>-45.83</td><td>-13</td><td>32.83</td></tr><tr><td>-55.36</td><td>-13</td><td>42.36</td></tr><tr><td>-54.27</td><td>-13</td><td>41.27</td></tr><tr><td>-79.40</td><td>-13</td><td>66.40</td></tr><tr><td>-75.03</td><td>-13</td><td>62.03</td></tr><tr><td>-54.41</td><td>-13</td><td>41.41</td></tr><tr><td>-45.82</td><td>-13</td><td>32.82</td></tr><tr><td>-56.65</td><td>-13</td><td>43.65</td></tr><tr><td>-53.89</td><td>-13</td><td>40.89</td></tr><tr><td>-79.42</td><td>-13</td><td>66.42</td></tr><tr><td>-74.97</td><td>-13</td><td>61.97</td></tr><tr><td>-54.21</td><td>-13</td><td>41.21</td></tr><tr><td>-46.11</td><td>-13</td><td>33.11</td></tr><tr><td>-56.31</td><td>-13</td><td>43.31</td></tr><tr><td>-53.72</td><td>-13</td><td>40.72</td></tr></table> → <table><tr><th>Result</th><th>Limit</th><th>Margin</th></tr><tr><th>[dBm]</th><th>[dBm]</th><th>[dB]</th></tr><tr><td>-80.00</td><td>-</td><td>-</td></tr><tr><td>-75.02</td><td>-</td><td>-</td></tr><tr><td>-54.32</td><td>-30</td><td>24.32</td></tr><tr><td>-45.83</td><td>-30</td><td>15.83</td></tr><tr><td>-55.36</td><td>-30</td><td>25.36</td></tr><tr><td>-54.27</td><td>-30</td><td>24.27</td></tr><tr><td>-79.40</td><td>-</td><td>-</td></tr><tr><td>-75.03</td><td>-</td><td>-</td></tr><tr><td>-54.41</td><td>-30</td><td>24.41</td></tr><tr><td>-45.82</td><td>-30</td><td>15.82</td></tr><tr><td>-56.65</td><td>-30</td><td>26.65</td></tr><tr><td>-53.89</td><td>-30</td><td>23.89</td></tr><tr><td>-79.42</td><td>-</td><td>-</td></tr><tr><td>-74.97</td><td>-</td><td>-</td></tr><tr><td>-54.21</td><td>-30</td><td>24.21</td></tr><tr><td>-46.11</td><td>-30</td><td>16.11</td></tr><tr><td>-56.31</td><td>-30</td><td>26.31</td></tr><tr><td>-53.72</td><td>-30</td><td>23.72</td></tr></table>	Result	Limit	Margin	[dBm]	[dBm]	[dB]	-80.00	-13	67.00	-75.02	-13	62.02	-54.32	-13	41.32	-45.83	-13	32.83	-55.36	-13	42.36	-54.27	-13	41.27	-79.40	-13	66.40	-75.03	-13	62.03	-54.41	-13	41.41	-45.82	-13	32.82	-56.65	-13	43.65	-53.89	-13	40.89	-79.42	-13	66.42	-74.97	-13	61.97	-54.21	-13	41.21	-46.11	-13	33.11	-56.31	-13	43.31	-53.72	-13	40.72	Result	Limit	Margin	[dBm]	[dBm]	[dB]	-80.00	-	-	-75.02	-	-	-54.32	-30	24.32	-45.83	-30	15.83	-55.36	-30	25.36	-54.27	-30	24.27	-79.40	-	-	-75.03	-	-	-54.41	-30	24.41	-45.82	-30	15.82	-56.65	-30	26.65	-53.89	-30	23.89	-79.42	-	-	-74.97	-	-	-54.21	-30	24.21	-46.11	-30	16.11	-56.31	-30	26.31	-53.72	-30	23.72
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Reference: Abbreviations (Including words undescribed in this report)

A2LA	The American Association for Laboratory Accreditation	NS	No signal detect.
AC	Alternating Current	NSA	Normalized Site Attenuation
AFH	Adaptive Frequency Hopping	NVLAP	National Voluntary Laboratory Accreditation Program
AM	Amplitude Modulation	OBW	Occupied Band Width
Amp, AMP	Amplifier	OFDM	Orthogonal Frequency Division Multiplexing
ANSI	American National Standards Institute	P/M	Power meter
Ant, ANT	Antenna	PCB	Printed Circuit Board
AP	Access Point	PER	Packet Error Rate
Atten., ATT	Attenuator	PHY	Physical Layer
AV	Average	PK	Peak
BPSK	Binary Phase-Shift Keying	PN	Pseudo random Noise
BR	Bluetooth Basic Rate	PRBS	Pseudo-Random Bit Sequence
BT	Bluetooth	PSD	Power Spectral Density
BT LE	Bluetooth Low Energy	QAM	Quadrature Amplitude Modulation
BW	BandWidth	QP	Quasi-Peak
Cal Int	Calibration Interval	QPSK	Quadri-Phase Shift Keying
CCK	Complementary Code Keying	RBW	Resolution Band Width
Ch., CH	Channel	RDS	Radio Data System
CISPR	Comite International Special des Perturbations Radioelectriques	RE	Radio Equipment
CW	Continuous Wave	RF	Radio Frequency
DBPSK	Differential BPSK	RMS	Root Mean Square
DC	Direct Current	RSS	Radio Standards Specifications
DFS	Dynamic Frequency Selection	Rx	Receiving
DQPSK	Differential QPSK	SA, S/A	Spectrum Analyzer
DSSS	Direct Sequence Spread Spectrum	SG	Signal Generator
EDR	Enhanced Data Rate	SVSWR	Site-Voltage Standing Wave Ratio
EIRP, e.i.r.p.	Equivalent Isotropically Radiated Power	TR	Test Receiver
EMC	ElectroMagnetic Compatibility	Tx	Transmitting
EMI	ElectroMagnetic Interference	VBW	Video BandWidth
EN	European Norm	Vert.	Vertical
ERP, e.r.p.	Effective Radiated Power	WLAN	Wireless LAN
EU	European Union		
EUT	Equipment Under Test		
Fac.	Factor		
FCC	Federal Communications Commission		
FHSS	Frequency Hopping Spread Spectrum		
FM	Frequency Modulation		
Freq.	Frequency		
GFSK	Gaussian Frequency-Shift Keying		
GNSS	Global Navigation Satellite System		
GPS	Global Positioning System		
Hori.	Horizontal		
ICES	Interference-Causing Equipment Standard		
IEC	International Electrotechnical Commission		
IEEE	Institute of Electrical and Electronics Engineers		
IF	Intermediate Frequency		
ILAC	International Laboratory Accreditation Conference		
ISED	Innovation, Science and Economic Development Canada		
ISO	International Organization for Standardization		
JAB	Japan Accreditation Board		
LAN	Local Area Network		
LIMS	Laboratory Information Management System		
MCS	Modulation and Coding Scheme		
MRA	Mutual Recognition Arrangement		
NIST	National Institute of Standards and Technology		

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CONTENTS	PAGE
SECTION 1: Customer information.....	5
SECTION 2: Equipment under test (EUT).....	5
SECTION 3: Test specification, procedures & results.....	7
SECTION 4: Operation of EUT during testing.....	11
SECTION 5: Conducted Emission.....	14
SECTION 6: Field strength of spurious radiation	15
SECTION 7: Antenna Terminal Tests	17
APPENDIX 1: Test data	18
Conducted Emission	18
RF Output Power	20
Spurious emissions at antenna terminals.....	21
Emission Mask.....	27
Field strength of spurious radiation.....	39
APPENDIX 2: Test instruments	43
APPENDIX 3: Photographs of test setup	45
Conducted Emission	45
Radiated Spurious Emission	46
Worst Case Position	47
RF Output Power / Spurious emissions at antenna terminals / Emission Mask.....	48

SECTION 1: Customer information

Company Name	:	Sony Global Manufacturing & Operations Corporation
Address	:	8-4 Shiomi Kisarazu-shi, Chiba, 292-0834 Japan
Telephone Number	:	+81-438-37-4704
Contact Person	:	Masayuki Sakakura

***Remarks**

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

The information provided from the customer is as follows;

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

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

SECTION 2: Equipment under test (EUT)

2.1 Identification of EU

Type	:	Digital Wireless Transmitter
Model Number	:	DWT-B30 /90
Serial Number	:	Refer to SECTION 4.2
Rating	:	DC 3.0 V (Battery (2 x AA Batteries)), DC 5.0 V (USB)
Receipt Date	:	August 3, 2020
Country of Mass-production	:	Japan
Condition	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Modification	:	No Modification by the test lab.

2.2 Product Description

Model: DWT-B30 /90 (referred to as the EUT in this report) is a Digital Wireless Transmitter.

Radio Specification

Clock frequency(ies) in the system	:	X400	8 MHz
		X202	12.288 MHz
		X2000	16 MHz
		X801 (TCXO)	19.2 MHz
		IC600	480 kHz - 720 kHz
		IC601	1250 kHz - 1500 kHz
		IC202	600 kHz - 1000 kHz
		IC702	1000 kHz - 1600 kHz
		IC721	1536 kHz
		VCO802 (VCO: change by a transmission frequency)	941.625 MHz to 951.875 MHz
			953.125 MHz to 956.125 MHz
			956.625 MHz to 959.625 MHz

Radio Specification (Radio microphone part)

Radio type	:	Transmitter
Modulation type	:	$\pi/4$ shift QPSK
Emission designator	:	192KG1D, 192KG1E
Channel spacing	:	25 kHz
Frequency of operation	:	941.625 MHz to 951.875 MHz
		953.125 MHz to 956.125 MHz
		956.625 MHz to 959.625 MHz
RF power	:	25 mW / 10 mW / 2 mW
Antenna type	:	$\lambda/4$ flexible wire
Antenna gain	:	2.14 dBi max
Power Supply (radio part input)	:	DC 2.8 V, DC 3.1 V, DC 5.2 V
AF Specification	:	20 Hz - 22000 Hz, Maximum input: -22 dBu (MIC level, ATT 0 dB)
Operating temperature	:	0 deg. C to 50 deg. C

Radio Specification (RF remote part)

Radio Type	:	Transceiver
Modulation type	:	DSSS
Frequency of Operation	:	2405 MHz to 2475 MHz
Channel spacing	:	5 MHz
Method of frequency generation	:	Synthesizer
Power Supply (radio part input)	:	DC 2.8 V
Antenna Type	:	Chip antenna
Antenna Gain	:	-1.0 dBi max
Operating temperature	:	0 deg. C to 50 deg. C

*This test report applies to Radio microphone part.

**The RF remote module (Model number: RM-215) already certified as FCC ID: AK8RM215.

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 74: 2018

Title : FCC 47CFR Part74
EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER
PROGRAM DISTRIBUTIONAL SERVICES

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

** The EUT complies with FCC Part 15 subpart B under even activate of co-located transmitter module FCC ID: AK8RM215.

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	20.69 dB 0.60050 MHz, AV, L	Complied a)	Conducted
RF power output	FCC: Section 2.1046	FCC: Section 74.861 (d) (1)	See data.	Complied b)	Conducted
Spurious emissions at antenna terminals	EN 300 422-1 V 1.4.2 Clause 8.4	FCC: Section 74.861 (d) (4) (ii)	See data.	Complied d)	Conducted
Emission mask	EN 300 422-1 V 1.4.2 Clause 8.3	FCC: Section 74.861 (d) (4) (ii)	See data.	Complied e)	Conducted
Field strength of spurious radiation	EN 300 422-1 V 1.4.2 Clause 8.4	FCC: Section 74.861 (d) (4) (ii)	12.9 dB 811.01 MHz, Horizontal	Complied f)	Radiated
Note: UL Japan, Inc.'s EMI Work Procedures No. 13-EM-W0420 and 13-EM-W0422. This EUT does not have receiving part. Therefore Receiver Spurious Emission test was not performed. a) Refer to APPENDIX 1 (data of Conducted Emission) b) Refer to APPENDIX 1 (data of RF power output) d) Refer to APPENDIX 1 (data of Spurious emissions at antenna terminals) e) Refer to APPENDIX 1 (data of Emission mask) f) Refer to APPENDIX 1 (data of Field strength of spurious radiation) Symbols: Complied The data of this test item has enough margin, more than the measurement uncertainty. Complied# The data of this test item meets the limits unless the measurement uncertainty is taken into consideration.					

* In case any questions arise about test procedure, KDB 206256 D01 Wireless Microphones v02 and ANSI C63.26: 2015 are also referred.

Supplied Voltage Information

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

3.3 Addition to standard

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

3.4 Uncertainty

There is no applicable rule of uncertainty in this applied standard. Therefore, the results are derived depending on whether or not laboratory uncertainty is applied.

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k=2$.
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Spurious Emission (EUT height: 1.5m)	dB
Mesurment Distance 3m	
•25 MHz - 200 MHz	5.6
•200 MHz - 1000 MHz	4.0
•1 GHz - 12.75 GHz	4.6

Antenna terminal test	Uncertainty (+/-)
RF output power	1.3 dB
Occupied bandwidth	
Span 1 MHz	0.96%
Emission mask	1.9 dB
Frequency stability	0.0154 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: 199967 / ISED Lab Company Number: 2973C

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Test site	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.5 measurement room	6.4 x 6.4 x 3.0	6.4 x 6.4	-	-
No.6 shielded room	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	3.1 x 5.0 x 2.7	3.1 x 5.0	-	-
No.9 measurement room	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Test data, Test instruments, and Test set up

Refer to APPENDIX.

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SECTION 4: Operation of EUT during testing

4.1 Operating Mode(s)

Mode	Remarks
Transmitting (Tx), Power setting: 2 mW	Typ. 2 mW
Transmitting (Tx), Power setting: 10 mW	Typ. 10 mW
Transmitting (Tx), Power setting: 25 mW	Typ. 25 mW
*Transmitting duty was 100% on all tests.	
*Power of the EUT was set by the software as follows; Software setting: Low (2 mW), Middle (10 mW), High (25 mW) Software: Ver.1.03B (Date: 2020.6.25, Storage location: EUT memory)	
*This setting of software is the worst case.	
Any conditions under the normal use do not exceed the condition of setting.	

*The details of Operating mode(s)

Test Item	Tested frequency	Power setting	Modulation	Remarks
Conducted Emission	941.625 MHz (Low) 954.625 MHz (Mid) 959.625 MHz (High)	25 mW	Digital modulation (PN9 data packet)	-
RF power output	941.625 MHz (Low Band (Low)) 951.875 MHz (Low Band (High)) 953.125 MHz (Mid Band (Low)) 956.125 MHz (Mid Band (High)) 956.625 MHz (High Band (Low)) 959.625 MHz (High Band (High))	2 mW, 10 mW, 25 mW	Digital modulation (PN9 data packet)	-
Spurious emissions at antenna terminals	941.625 MHz (Low) 954.625 MHz (Mid) 959.625 MHz (High)	25 mW	Digital modulation (PN9 data packet)	-
Emission Mask	941.625 MHz (Low Band (Low)) 951.875 MHz (Low Band (High)) 953.125 MHz (Mid Band (Low)) 956.125 MHz (Mid Band (High)) 956.625 MHz (High Band (Low)) 959.625 MHz (High Band (High))	2 mW 25 mW	Digital modulation (PN9 data packet)	-
Field strength of spurious radiation	941.625 MHz (Low) 954.625 MHz (Mid) 959.625 MHz (High)	25 mW	Digital modulation (PN9 data packet)	-

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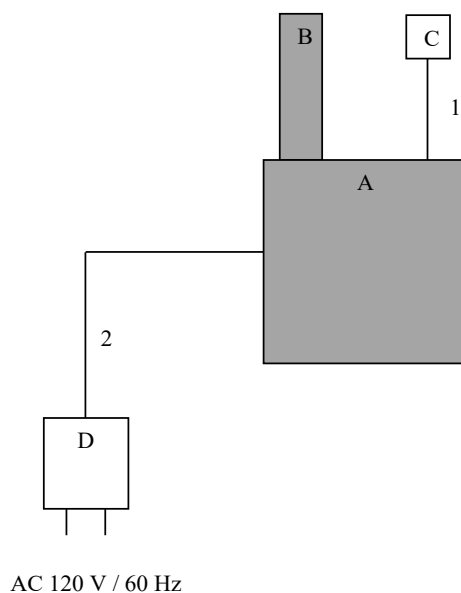
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4.2 Configuration and peripherals

【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 Transmitter	DWT-B30 /90	13	Sony Corporation	EUT
B	Antenna	1-009-887-11	1001	Musashidenshi co.,ltd	EUT
C	Lavalier Microphone	ECM-77BC	-	Sony Corporation	-
D	AC Adapter	A1357	W010A051	Apple	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	MIC Cable	1.25	Shielded	Shielded	-
2	USB Cable	1.50	Shielded	Shielded	-

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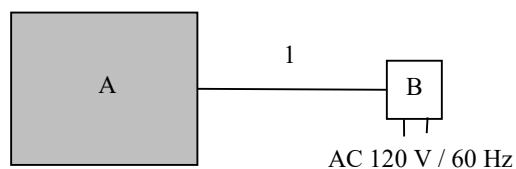
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【Antenna Terminal Conducted test】



* 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 Transmitter	DWT-B30 /90	000008	Sony Corporation	EUT
B	AC Adaptor	ACA-IP52BK	J04-0256268	SANWA Supply	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	2.0	Shielded	Shielded	-

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SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a urethane platform of nominal size, 1.0 m by 1.5 m, raised 0.8 m above the conducting ground plane. The rear of tabletop was located 40 cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80 cm from a Line Impedance Stabilization Network (LISN) / Artificial mains Network (AMN) and excess AC cable was bundled in center.

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

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

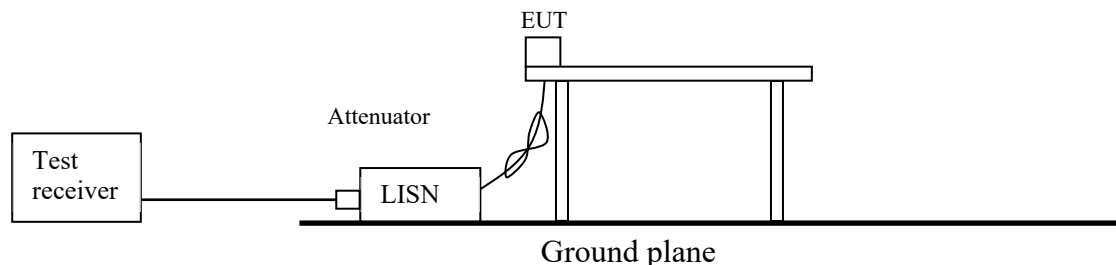
The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber. The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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

Figure 1: Test Setup



SECTION 6: Field strength of spurious radiation

Test Procedure

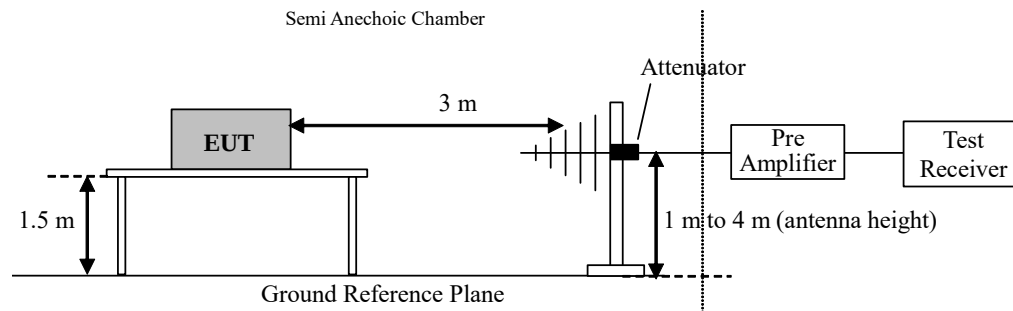
- 1) EUT was placed on a platform of nominal size, 0.5 m by 0.5 m, raised 1.5 m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength has been measured in semi anechoic chamber at a 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 (2.15dBi) 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

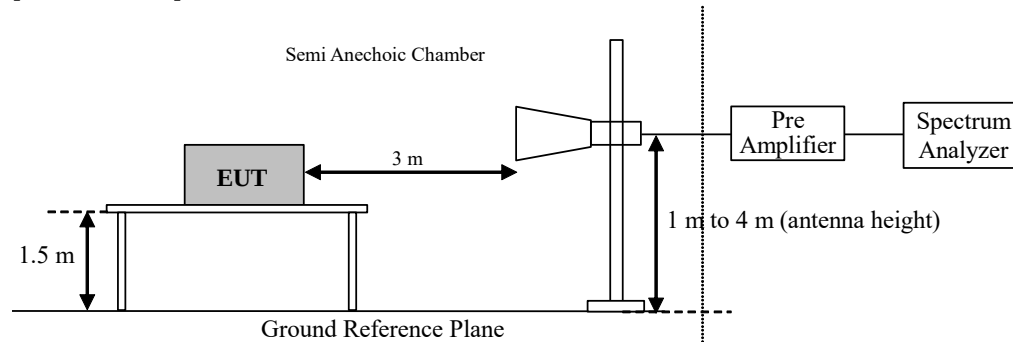
Frequency	25 MHz to 30 MHz	30 MHz to 1 GHz	Above 1 GHz
Instrument used	Spectrum Analyzer		
Detector	RMS Average		
IF Bandwidth	RBW: 10 kHz VBW: 30 kHz	RBW: 100 kHz VBW: 300 kHz	RBW: 1 MHz VBW: 3 MHz
Test Distance	3 m		

Figure 2: Test Setup

[25 MHz - 1 GHz]



[Above 1 GHz]



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

-EUT has 2 kinds of power supply conditions (USB power Supply/ Battery power Supply), the test was performed with the worst case which was confirmed in pre-check.

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

Measurement range	: 25 MHz - 10 GHz
Test data	: APPENDIX
Test result	: Pass

SECTION 7: 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)
Spurious emissions at antenna terminals *2)	9 kHz to 150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer
	150 kHz to 30 MHz	10 kHz	30 kHz				
	30 MHz to 1 GHz	100 kHz	300 kHz				
	Above 1 GHz	1 MHz	3 MHz				
*1) The measurement was performed with Peak and Max Hold. (Worst-case measurement) *2) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was low enough as shown in the chart. (9 kHz - 150 kHz: RBW = 200 Hz, 150 kHz - 30 MHz: RBW = 9.1 kHz).							

[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

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

Test data : APPENDIX

Test result : Pass

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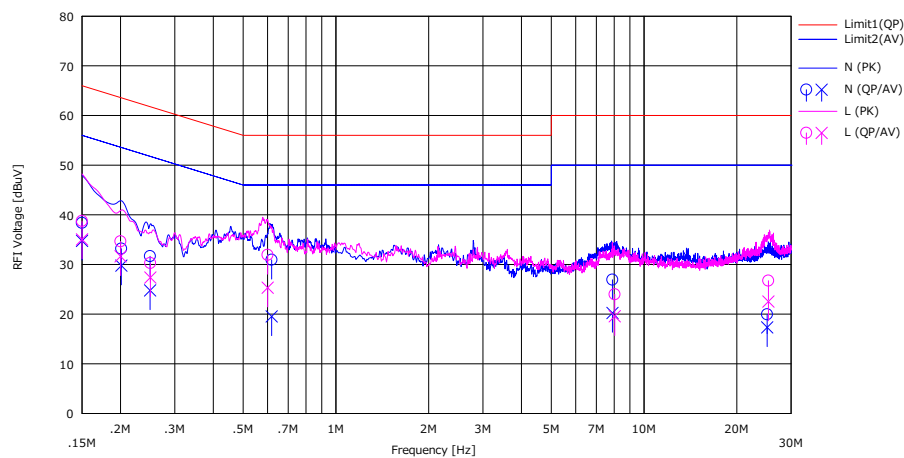
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APPENDIX 1: Test data

Conducted Emission

Report No. 13425536H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date September 30, 2020
Temperature / Humidity 22 deg. C / 54 % RH
Engineer Hiroyuki Furutaka
Mode Tx 941.625 MHz

Limit : FCC_Part 15 Subpart C(15.207)



No.	Freq. [MHz]	Reading		LISN	LOSS	Results		Limit		Margin		Phase	Comment
		(QP) [dBuV]	(AV) [dBuV]			(QP) [dBuV]	(AV) [dBuV]	(QP) [dBuV]	(AV) [dBuV]	(QP) [dB]	(AV) [dB]		
1	0.15000	25.00	21.40	0.16	13.20	38.36	34.76	66.00	56.00	27.64	21.24	N	
2	0.20123	19.80	16.40	0.16	13.21	33.17	29.77	63.60	53.60	30.43	23.83	N	
3	0.24945	18.30	11.40	0.16	13.21	31.67	24.77	61.80	51.80	30.13	27.03	N	
4	0.61906	17.50	6.10	0.17	13.26	30.93	19.53	56.00	46.00	25.07	26.47	N	
5	7.89840	12.60	5.90	0.69	13.63	26.92	20.22	60.00	50.00	33.08	29.78	N	
6	25.09330	2.70	0.10	3.20	14.03	19.93	17.33	60.00	50.00	40.07	32.67	N	
7	0.15000	25.40	21.70	0.14	13.20	38.74	35.04	66.00	56.00	27.26	20.96	L	
8	0.20015	21.30	18.30	0.13	13.21	34.64	31.64	63.60	53.60	28.96	21.96	L	
9	0.25000	16.90	14.00	0.14	13.22	30.26	27.36	61.80	51.80	31.54	24.44	L	
10	0.60050	18.50	11.90	0.15	13.26	31.91	25.31	56.00	46.00	24.09	20.69	L	
11	8.03380	9.60	5.20	0.73	13.63	23.96	19.56	60.00	50.00	36.04	30.44	L	
12	25.33100	9.40	5.20	3.29	14.04	26.73	22.53	60.00	50.00	33.27	27.47	L	

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

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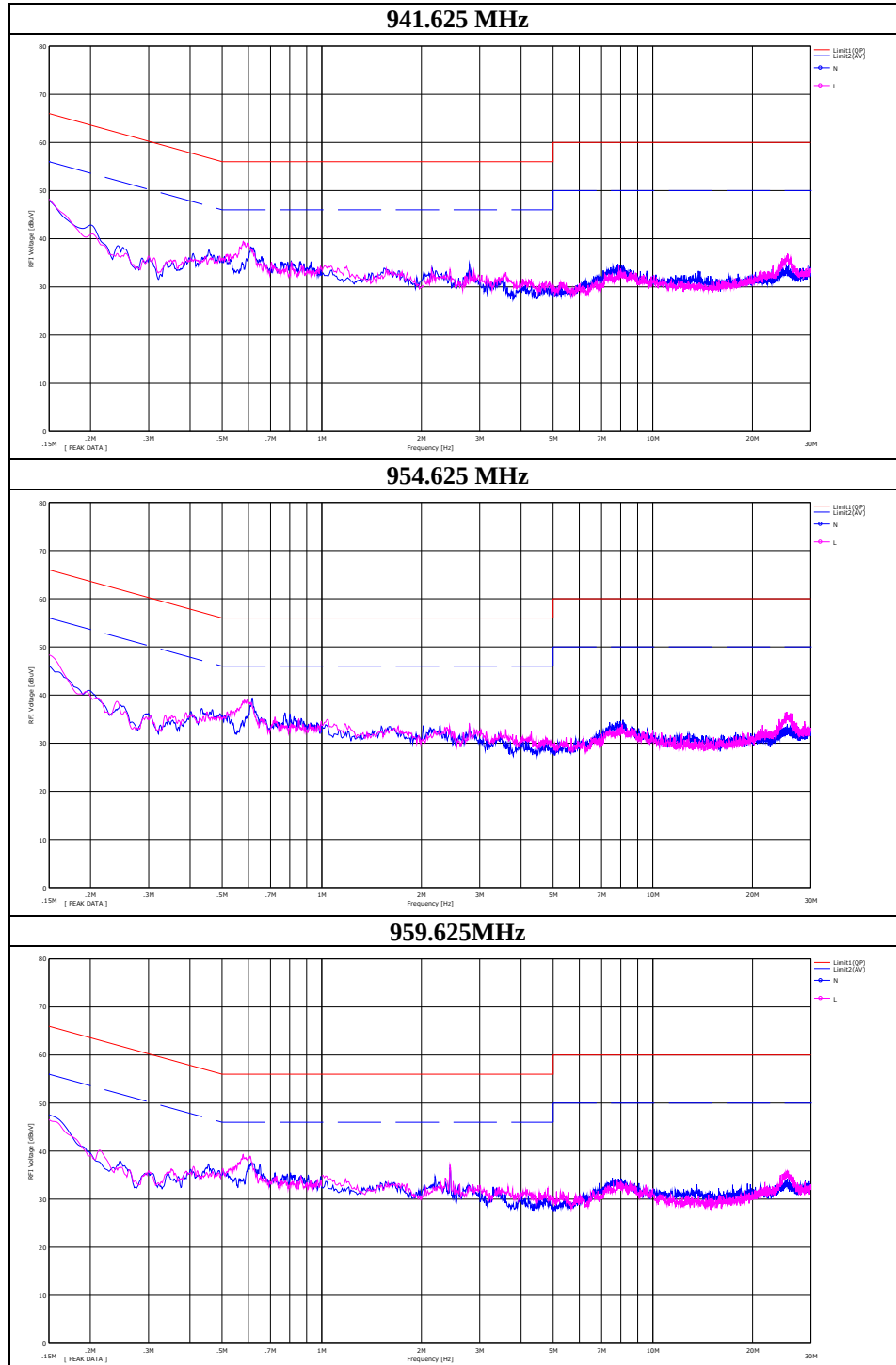
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Conducted Emission

Report No. 13425536H
Test place Ise EMC Lab. No.4 Semi Anechoic Chamber
Date September 30, 2020
Temperature / Humidity 22 deg. C / 54 % RH
Engineer Hiroyuki Furutaka
Mode Tx



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RF Output Power

Report No. 12244303H
Test place Ise EMC Lab. No.8 Measurement Room
Date August 03, 2020
Temperature/ Humidity 24 deg. C / 61 % RH
Engineer Hiroyuki Furutaka
Mode Tx

Power Setting	Channel	Freq.	Reading	Cable	Atten.	Result		Limit	Margin	Remarks
		[MHz]	Average [dBm]	Loss [dB]	Loss [dB]	Average [Conducted]		[Conducted] [mW]	[dB]	
2 mW	Low Band(Low)	941.625	-6.84	0.00	9.93	3.09	2.037	1000	26.91	
	Low Band(High)	951.875	-6.83	0.00	9.93	3.10	2.042	1000	26.90	
	Mid Band(Low)	953.125	-6.72	0.00	9.93	3.21	2.094	1000	26.79	
	Mid Band(High)	956.125	-6.68	0.00	9.93	3.25	2.113	1000	26.75	
	High Band(Low)	956.625	-6.77	0.00	9.93	3.16	2.070	1000	26.84	
	High Band(High)	959.625	-6.77	0.00	9.93	3.16	2.070	1000	26.84	
10 mW	Low Band(Low)	941.625	-2.00	0.00	9.93	7.93	6.209	1000	22.07	
	Low Band(High)	951.875	-2.04	0.00	9.93	7.89	6.152	1000	22.11	
	Mid Band(Low)	953.125	-2.07	0.00	9.93	7.86	6.109	1000	22.14	
	Mid Band(High)	956.125	-2.02	0.00	9.93	7.91	6.180	1000	22.09	
	High Band(Low)	956.625	-2.08	0.00	9.93	7.85	6.095	1000	22.15	
	High Band(High)	959.625	-2.09	0.00	9.93	7.84	6.081	1000	22.16	
25 mW	Low Band(Low)	941.625	3.88	0.00	9.93	13.81	24.044	1000	16.19	
	Low Band(High)	951.875	3.80	0.00	9.93	13.73	23.605	1000	16.27	
	Mid Band(Low)	953.125	3.80	0.00	9.93	13.73	23.605	1000	16.27	
	Mid Band(High)	956.125	3.85	0.00	9.93	13.78	23.878	1000	16.22	
	High Band(Low)	956.625	3.83	0.00	9.93	13.76	23.768	1000	16.24	
	High Band(High)	959.625	3.81	0.00	9.93	13.74	23.659	1000	16.26	

Calculation formula:

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

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

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Spurious emissions at antenna terminals

Report No. 12244303H
Test place Ise EMC Lab. No.8 Measurement Room
Date August 04, 2020
Temperature/ Humidity 23 deg. C / 66 % RH
Engineer Hiroyuki Furutaka
Mode Tx

Power Setting	Channel	Tested Freq. [MHz]	Reading		Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]	Limit [dBm]	Margin [dB]
			Freq. [MHz]	Level [dBm]					
25 mW	Low	941.625	0.12803	-89.85	0.00	9.85	-80.00	-	-
			0.15	-84.87	0.00	9.85	-75.02	-	-
			1067	-64.92	0.54	10.06	-54.32	-30	24.32
			1883	-56.62	0.71	10.08	-45.83	-30	15.83
			2823	-66.34	0.88	10.10	-55.36	-30	25.36
			7092	-65.92	1.44	10.21	-54.27	-30	24.27
	Mid	954.625	0.12803	-89.25	0.00	9.85	-79.40	-	-
			0.623	-84.89	0.01	9.85	-75.03	-	-
			1070	-65.01	0.54	10.06	-54.41	-30	24.41
			1910	-56.62	0.72	10.08	-45.82	-30	15.82
			2863	-67.64	0.89	10.10	-56.65	-30	26.65
			7096	-65.54	1.44	10.21	-53.89	-30	23.89
	High	959.625	0.12803	-89.27	0.00	9.85	-79.42	-	-
			0.15	-84.82	0.00	9.85	-74.97	-	-
			1063	-64.81	0.54	10.06	-54.21	-30	24.21
			1920	-56.91	0.72	10.08	-46.11	-30	16.11
			2880	-67.30	0.89	10.10	-56.31	-30	26.31
			7025	-65.36	1.43	10.21	-53.72	-30	23.72

Calculation formula:

$$\text{Result} = \text{Reading} + \text{Cable Loss} + \text{Attenuator Loss}$$

Limits apply Table 3 in Section 8.4.3 of EN 300 422-1.

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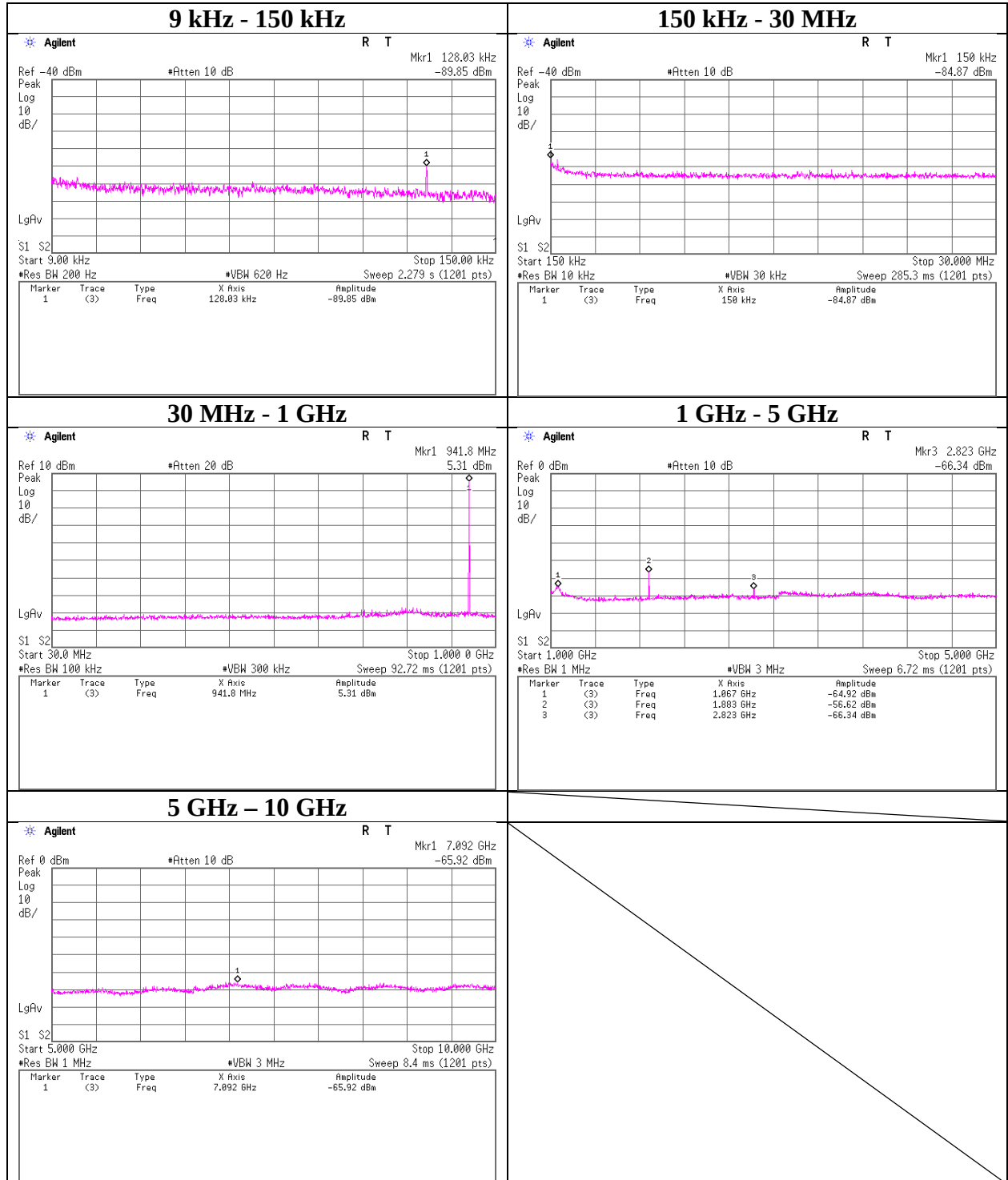
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Spurious emissions at antenna terminals

Report No. 12244303H
Test place Ise EMC Lab. No.8 Measurement Room
Date August 04, 2020
Temperature/ Humidity 23 deg. C / 66 % RH
Engineer Hiroyuki Furutaka
Mode Tx 941.625 MHz, 25 mW



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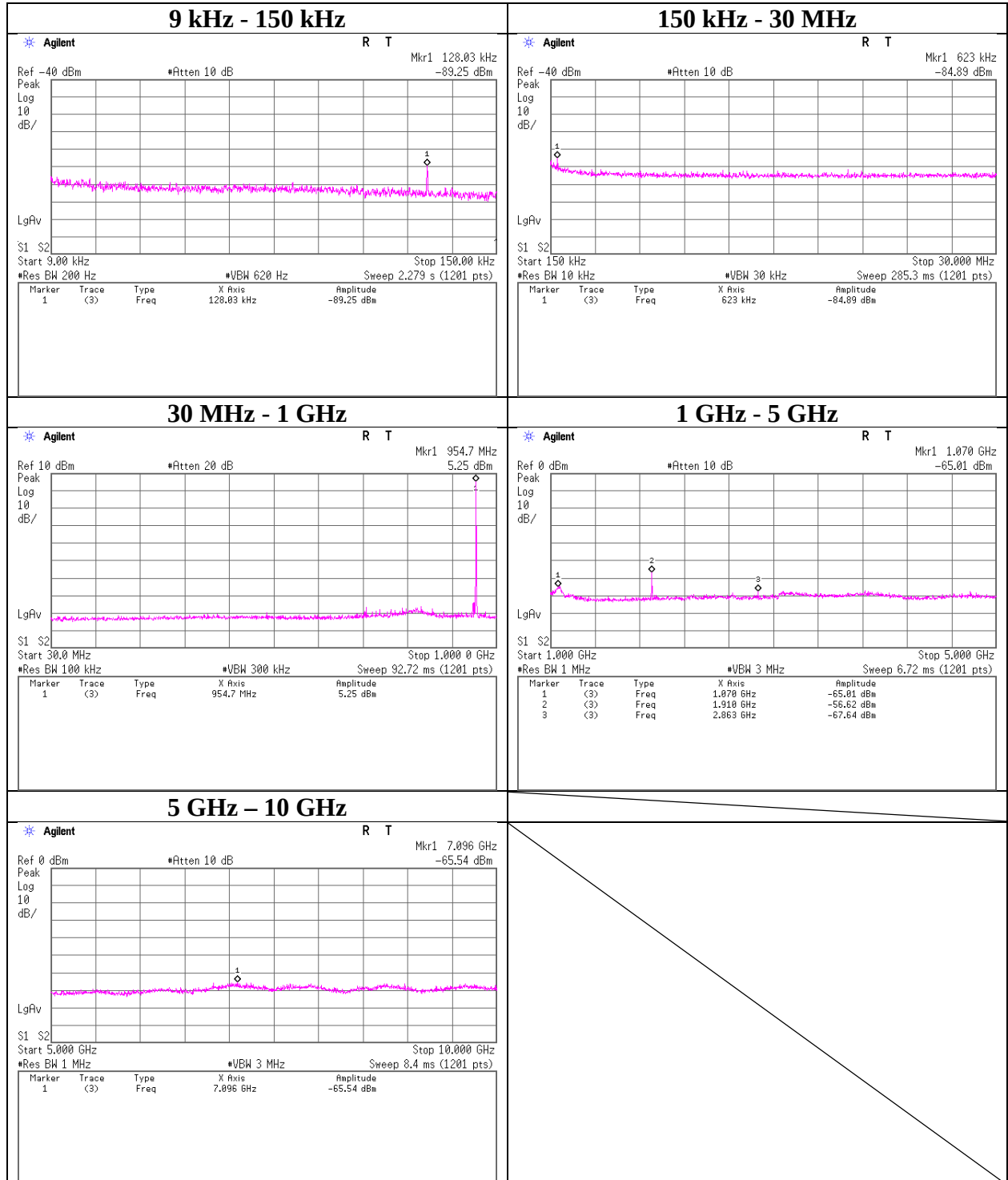
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Spurious emissions at antenna terminals

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Date August 04, 2020
Temperature/ Humidity 23 deg. C / 66 % RH
Engineer Hiroyuki Furutaka
Mode Tx 954.625 MHz, 25 mW



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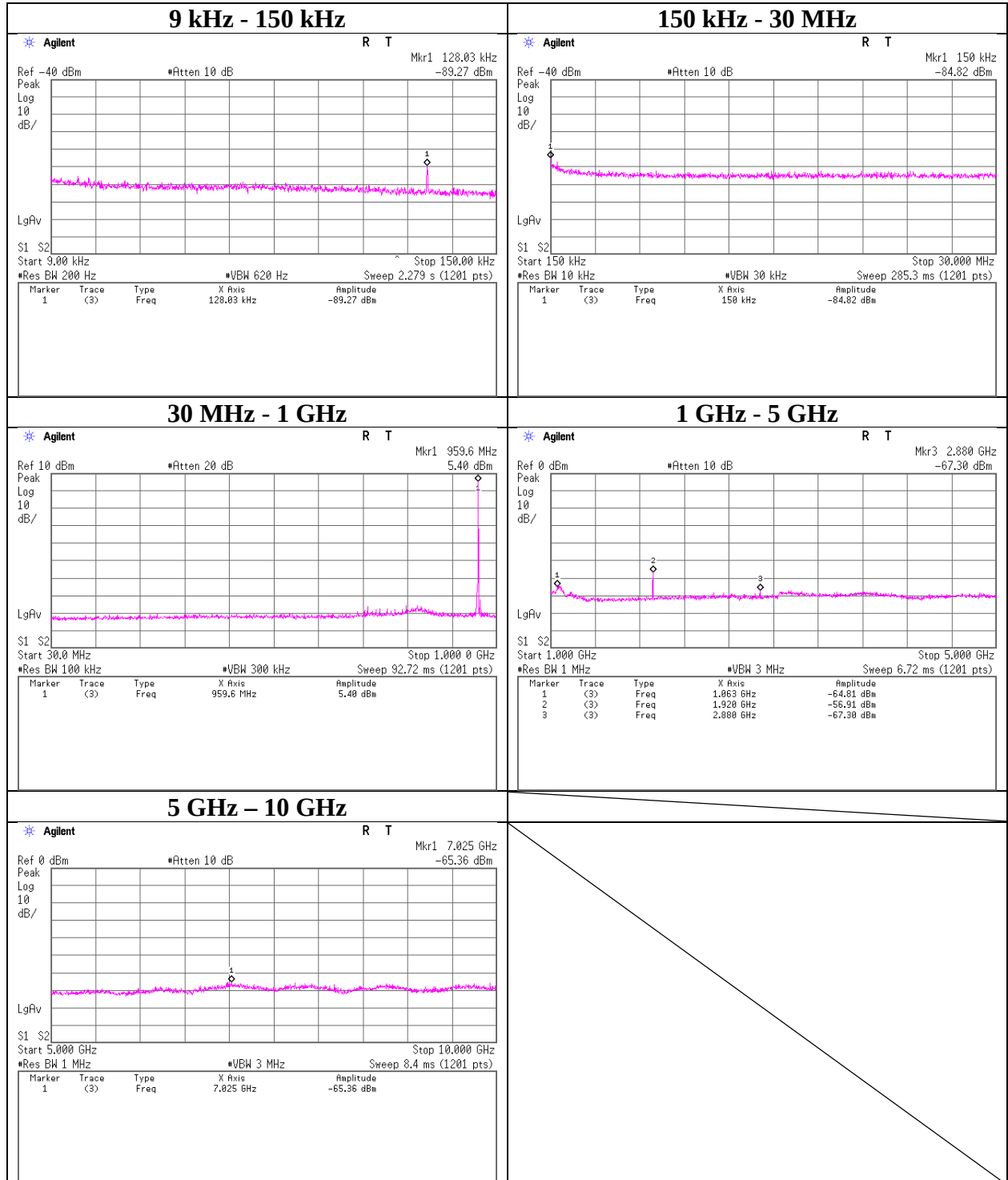
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Spurious emissions at antenna terminals

Report No. 12244303H
Test place Ise EMC Lab. No.8 Measurement Room
Date August 04, 2020
Temperature/ Humidity 23 deg. C / 66 % RH
Engineer Hiroyuki Furutaka
Mode Tx 959.625 MHz, 25 mW



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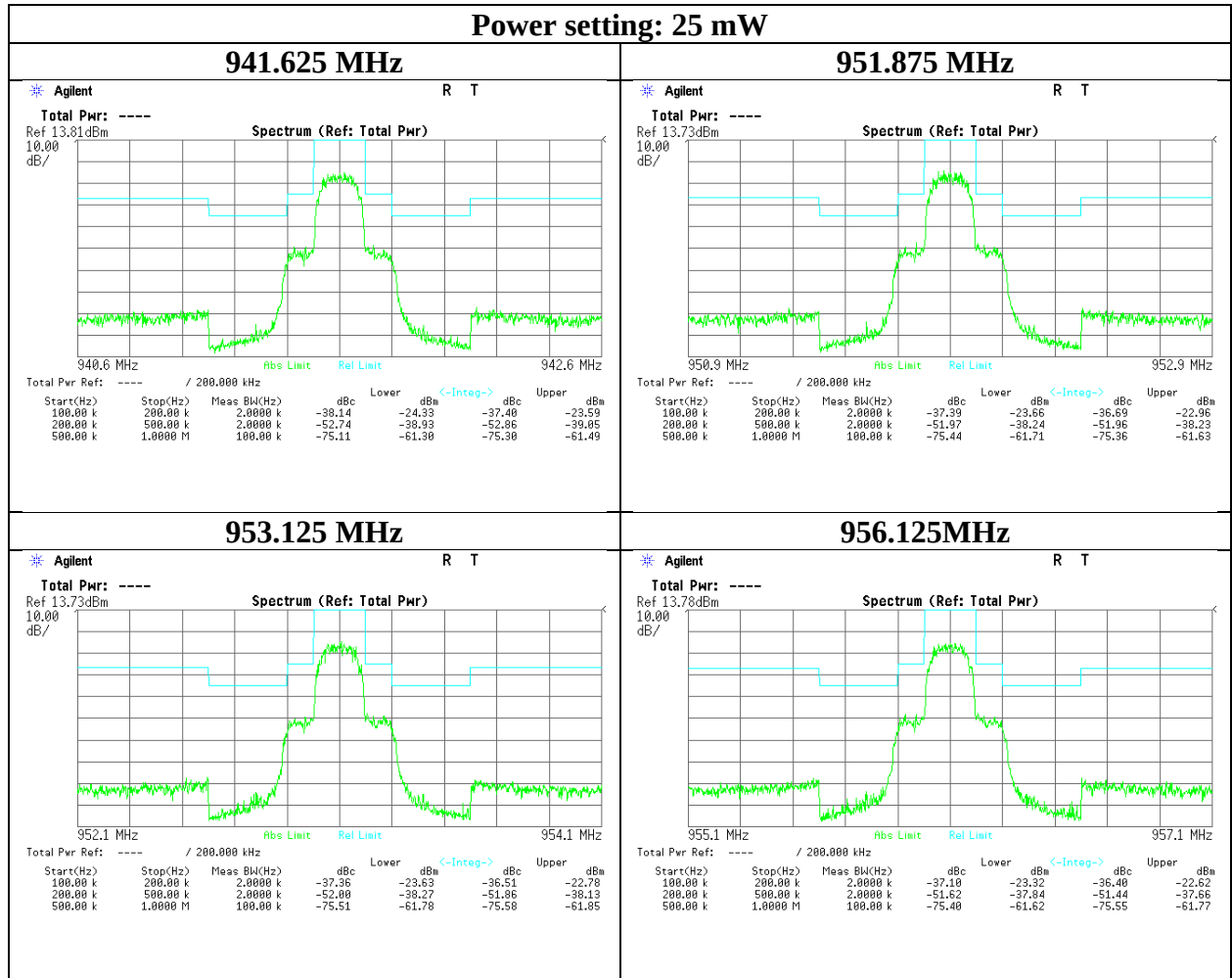
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Spurious emissions at antenna terminals

[Side band spectrum measurement]

Report No. 12244303H
Test place Ise EMC Lab. No.8 Measurement Room
Date August 04, 2020
Temperature/ Humidity 23 deg. C / 66 % RH
Engineer Hiroyuki Furutaka
Mode Tx

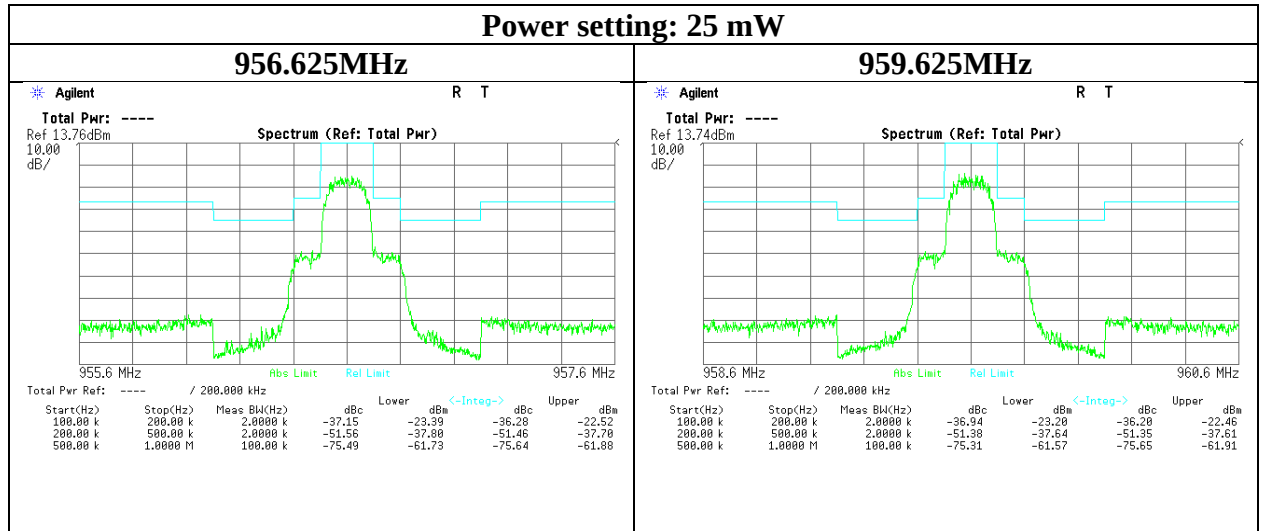


0 dB reference level was set to each RF power output result.

Spurious emissions at antenna terminals

[Side band spectrum measurement]

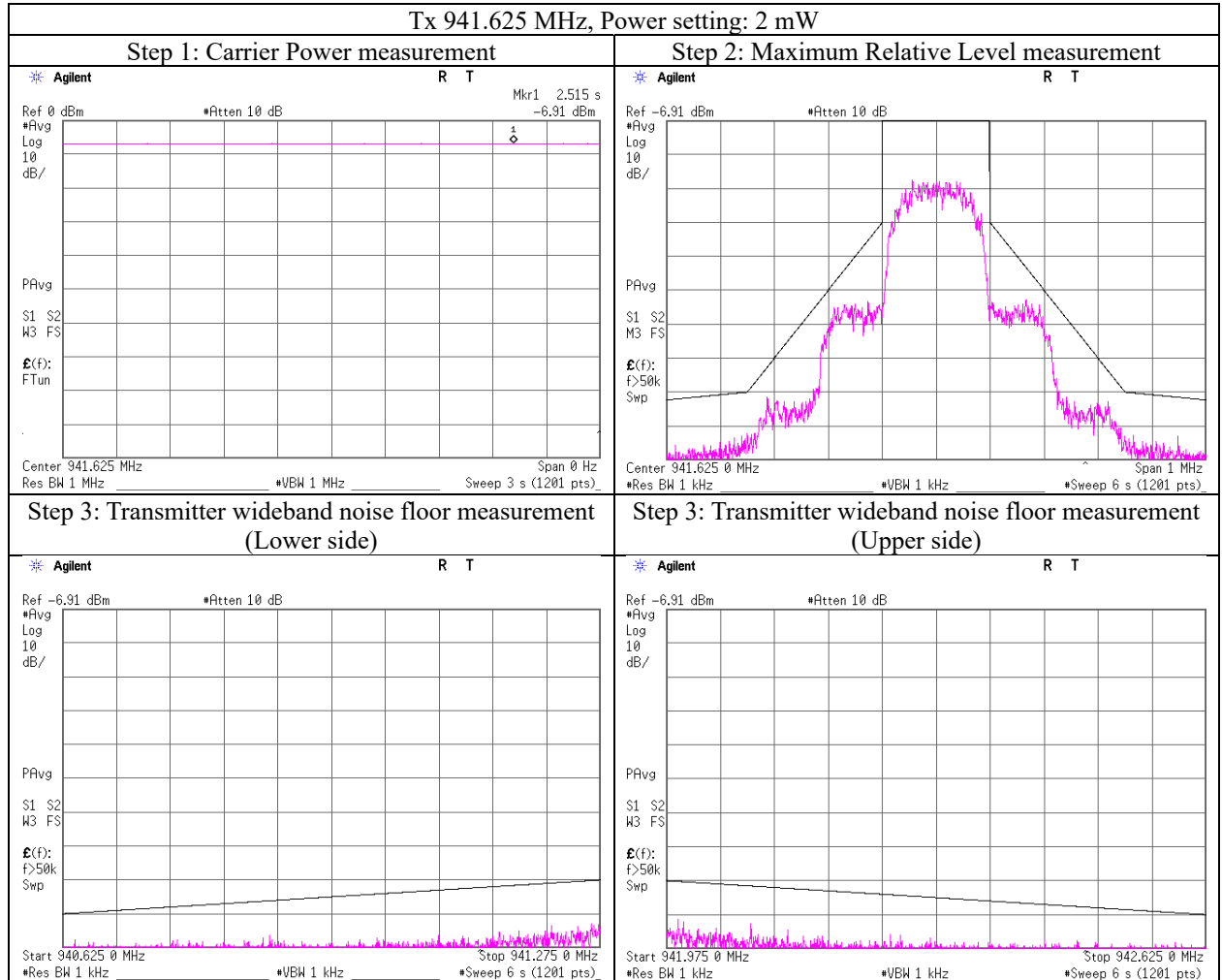
Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



0dB reference level was set to each RF power output result.

Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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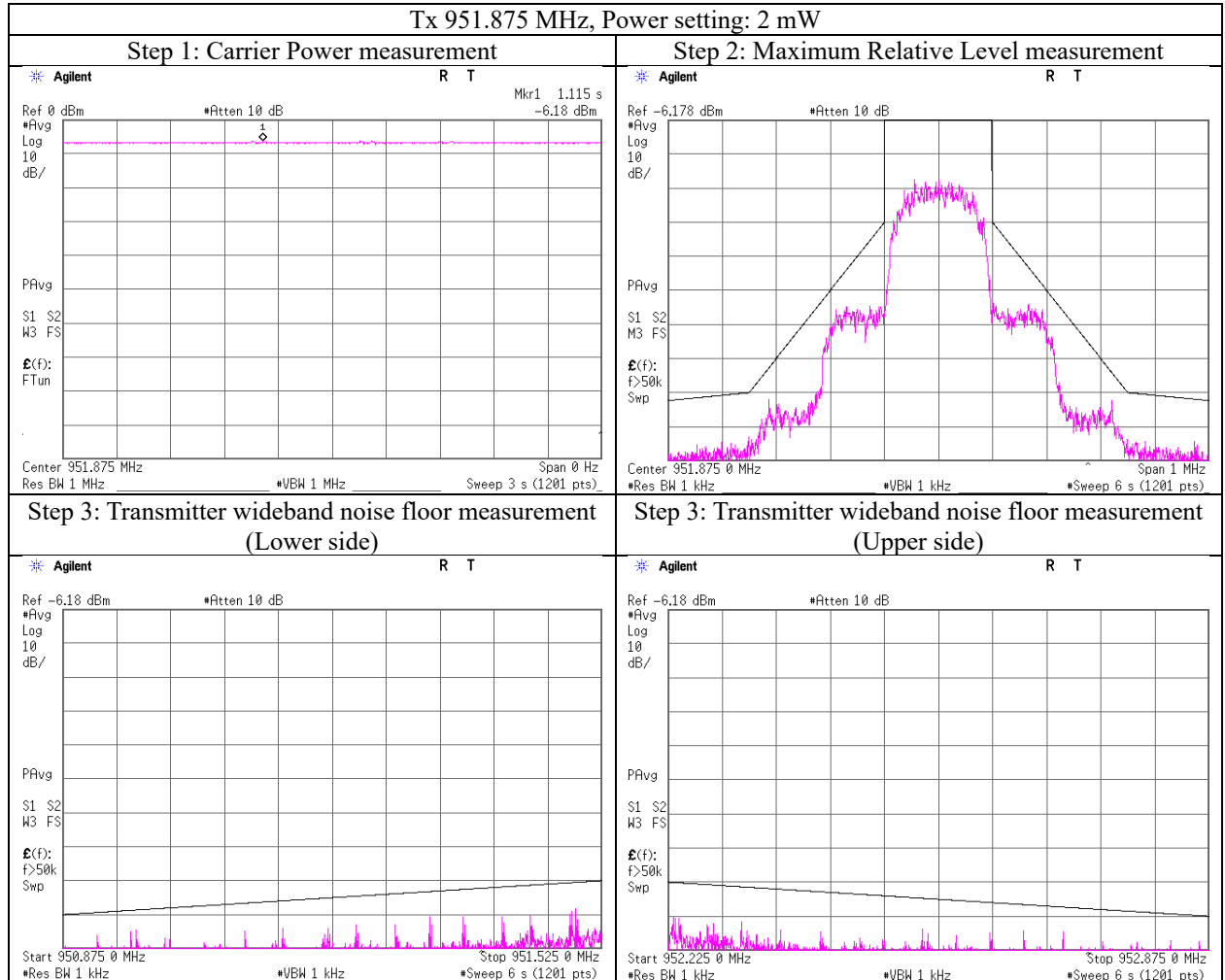
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Emission Mask

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Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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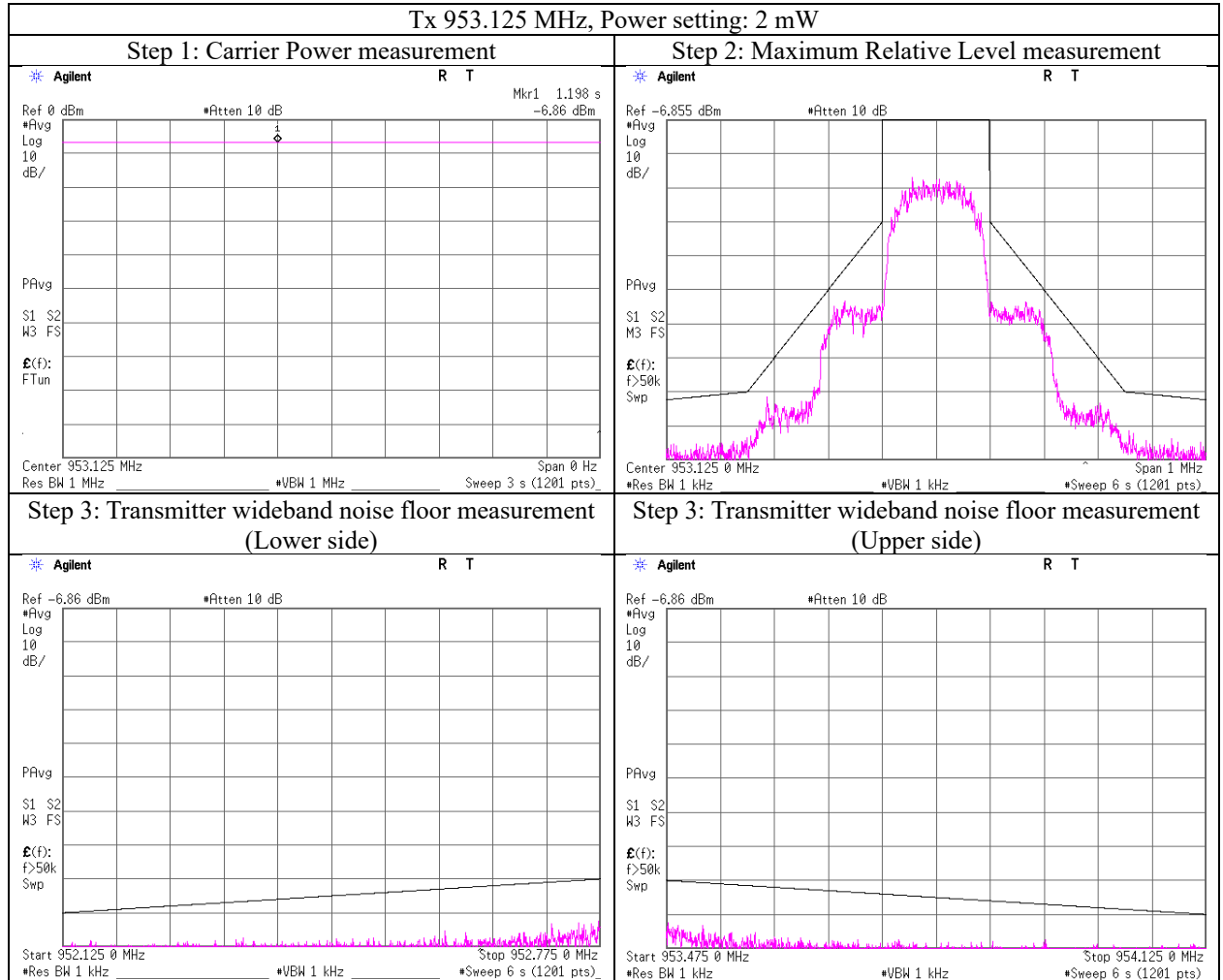
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Emission Mask

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Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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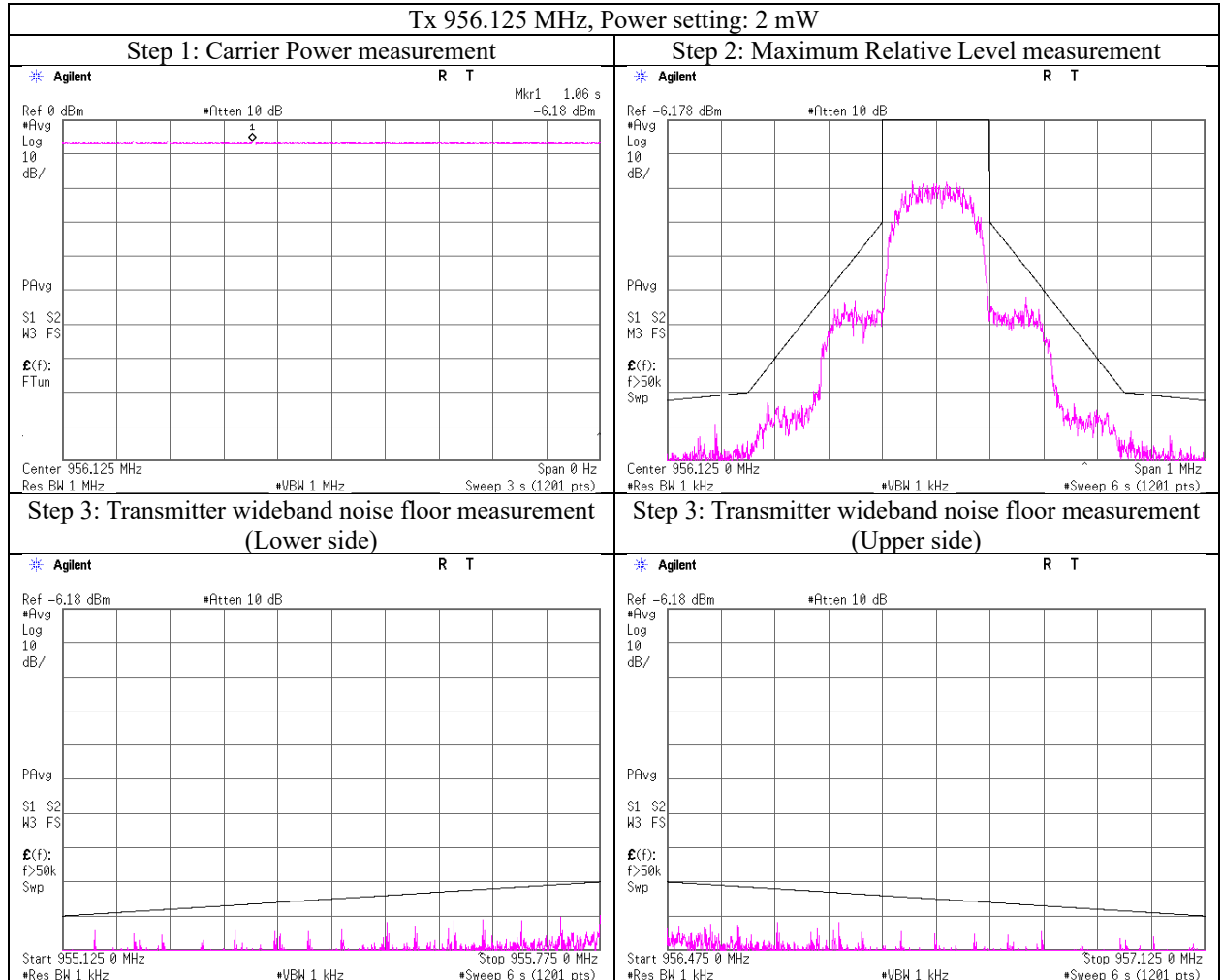
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Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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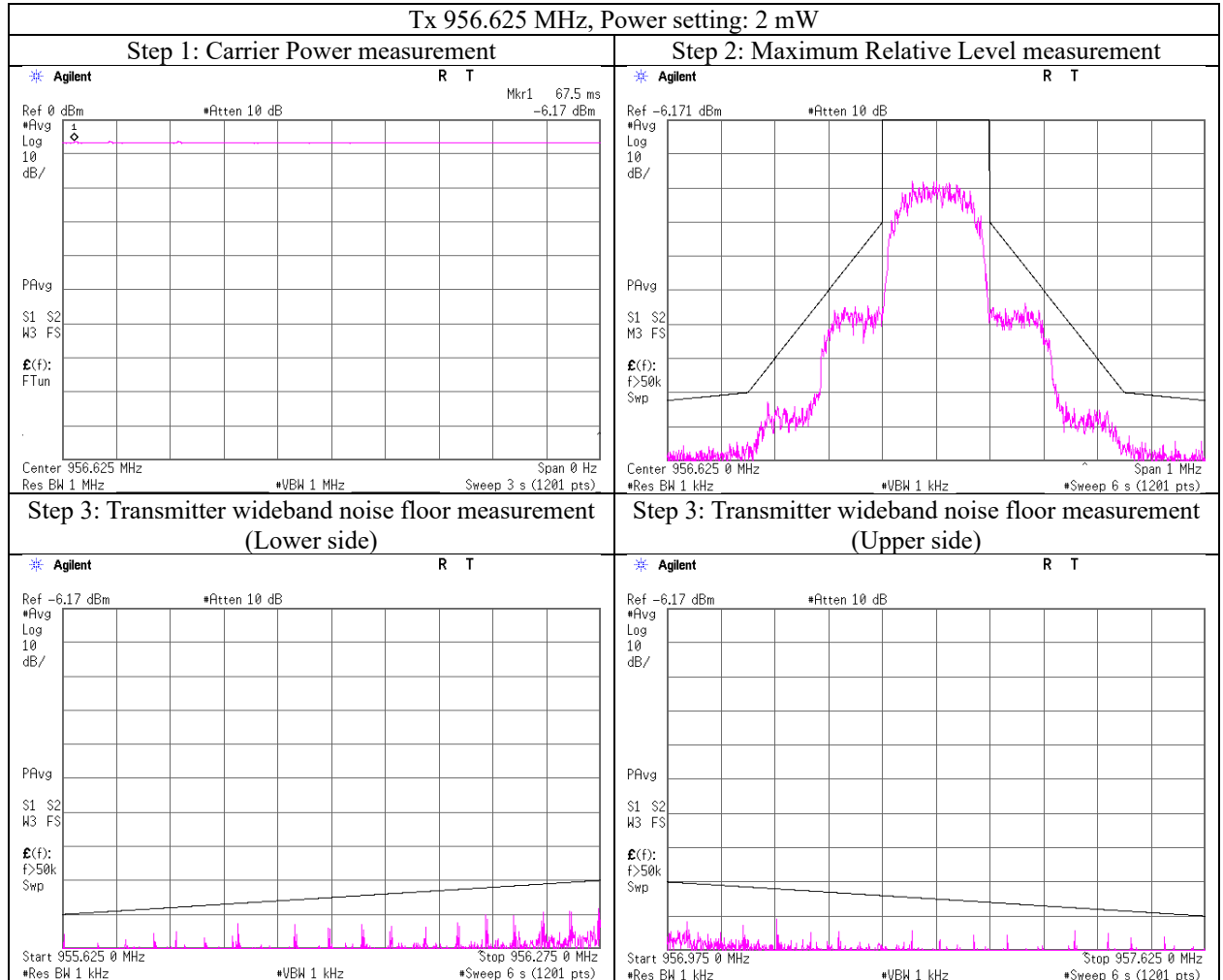
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Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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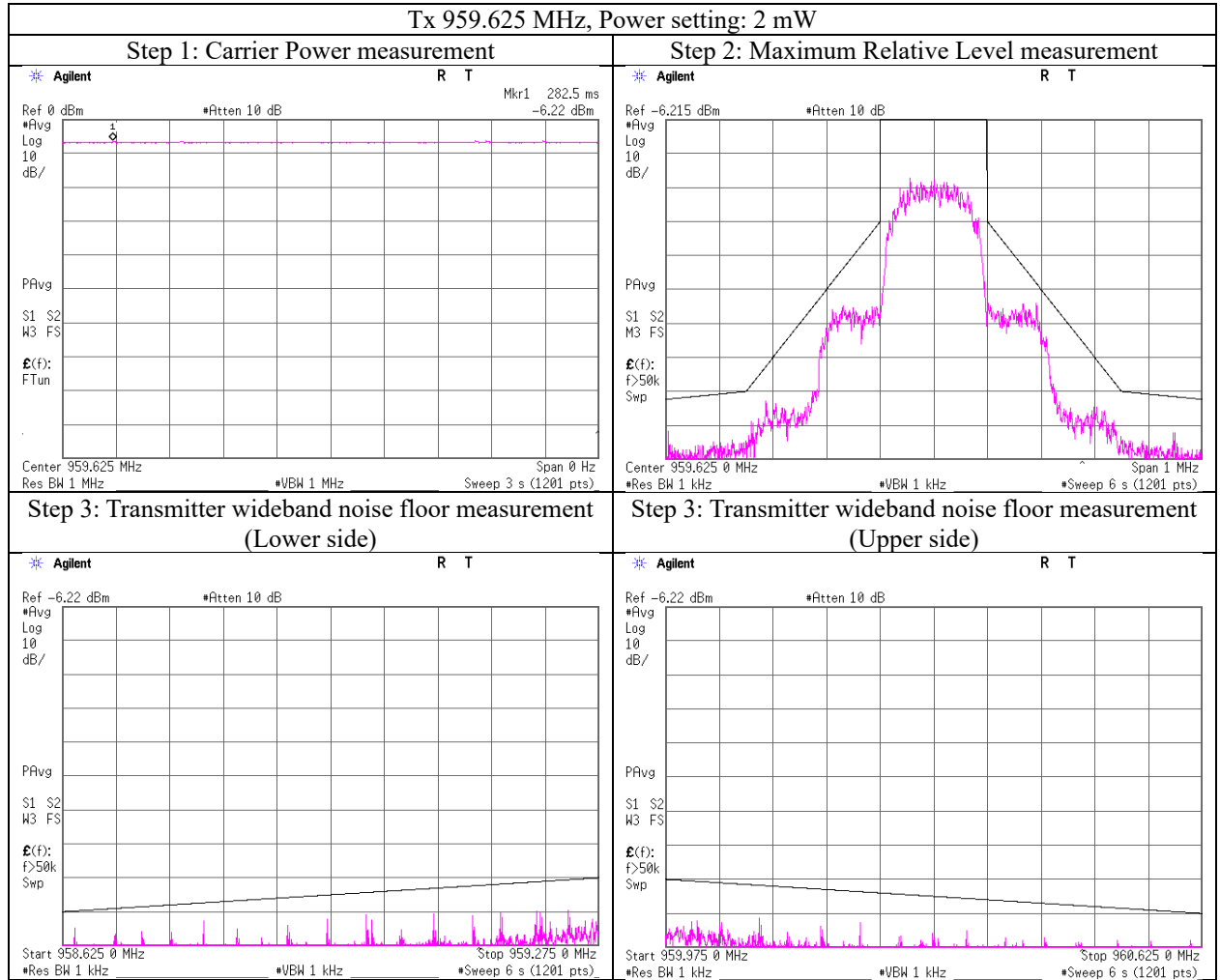
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Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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Ise EMC Lab.

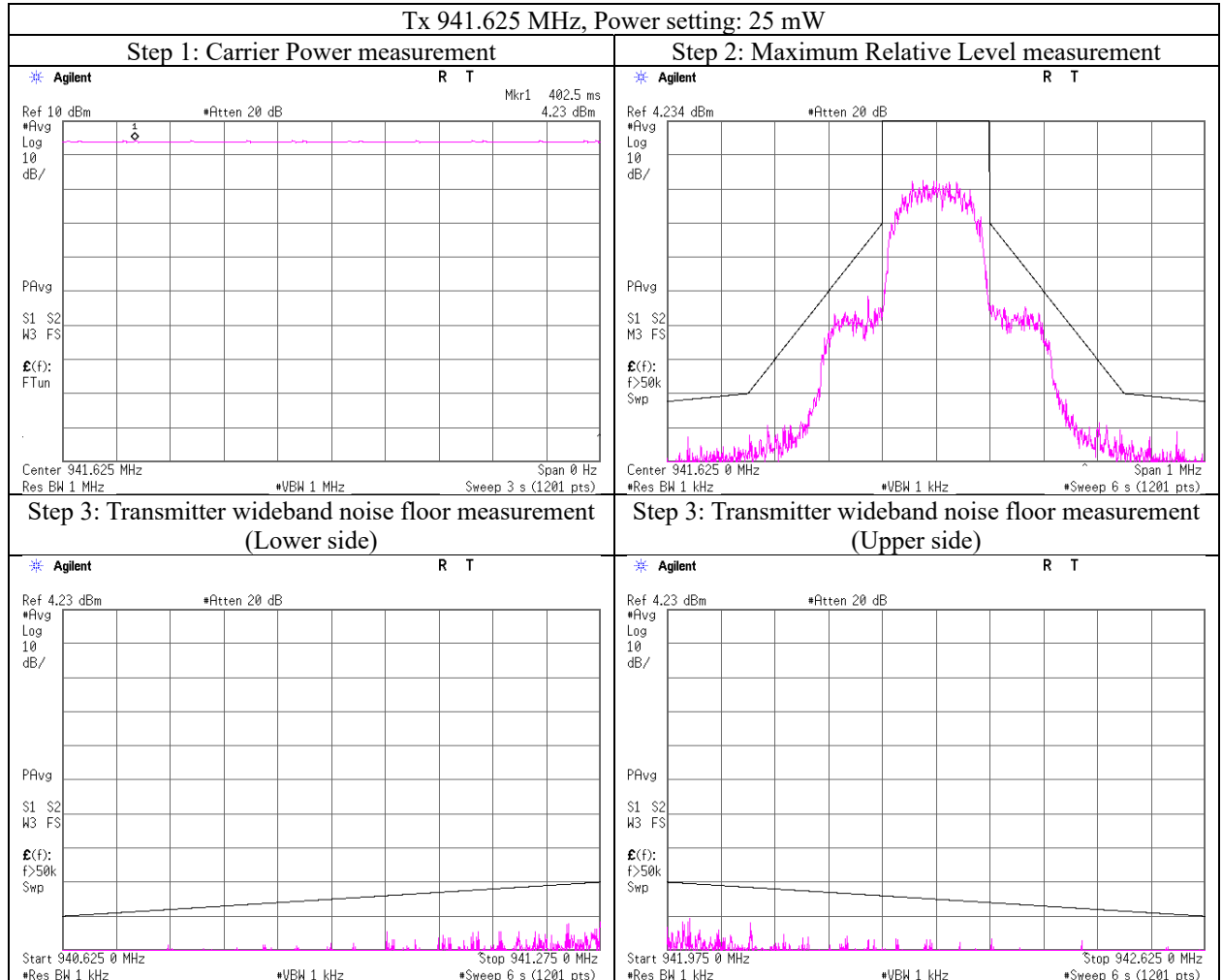
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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Ise EMC Lab.

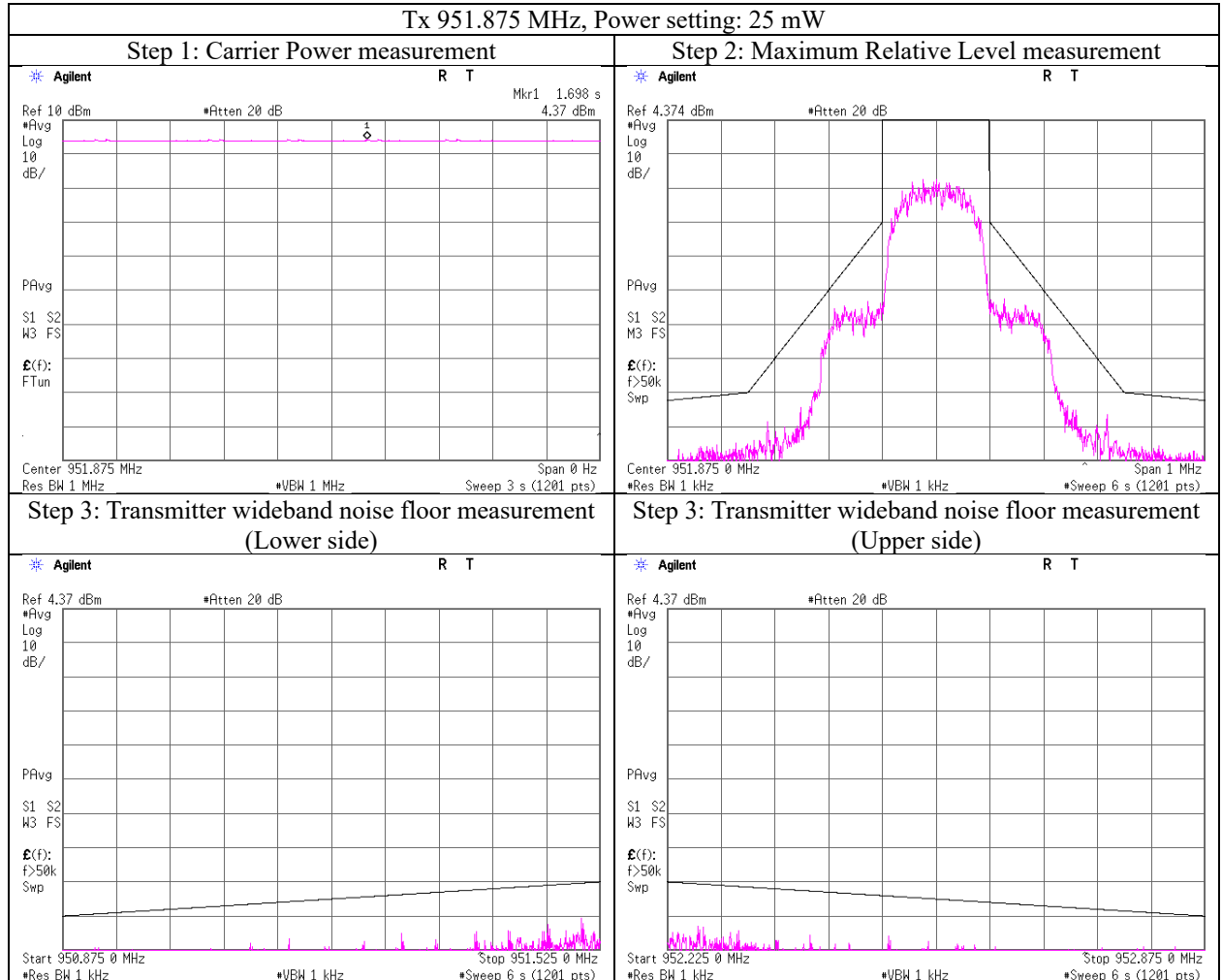
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Facsimile : +81 596 24 8124

Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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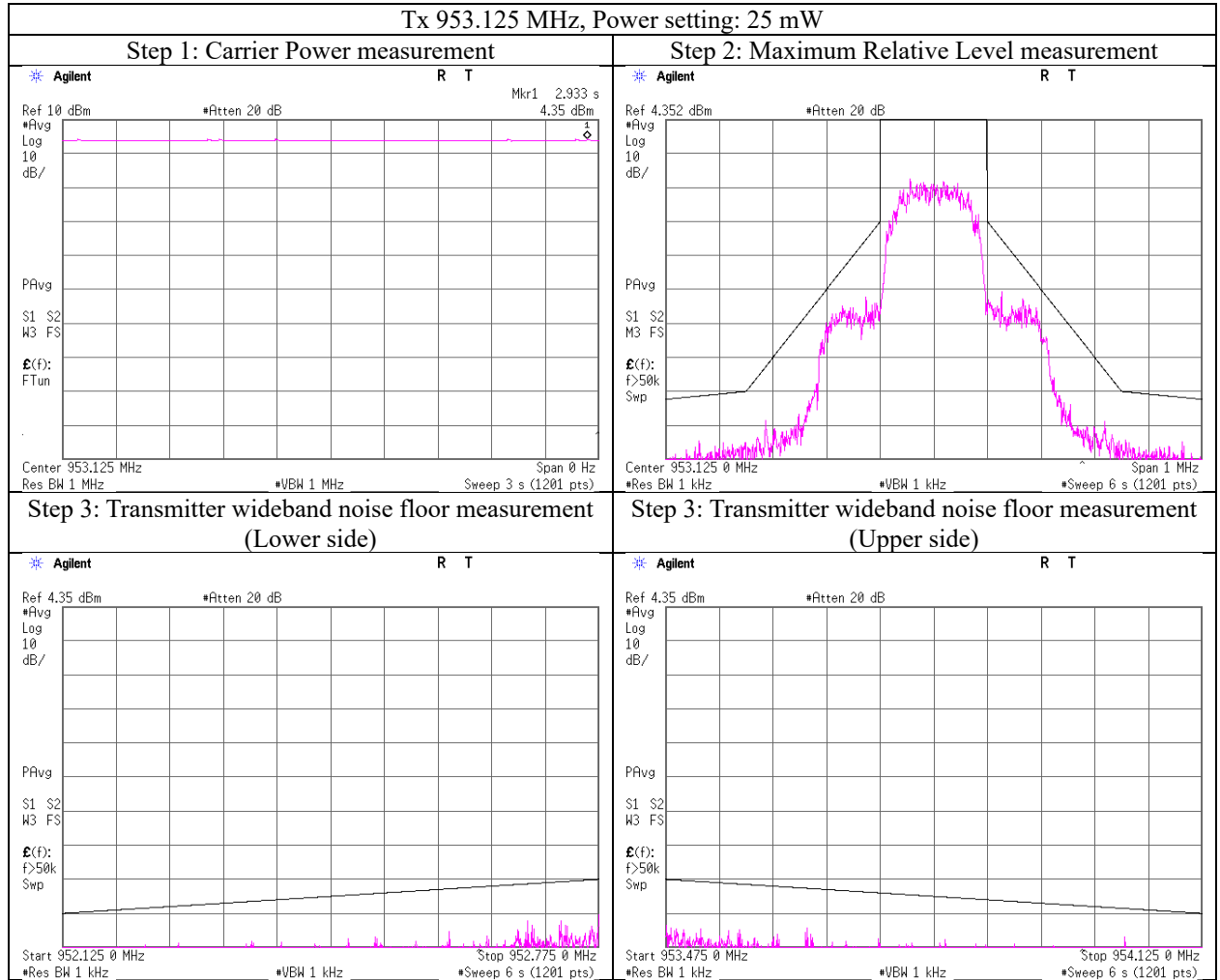
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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Ise EMC Lab.

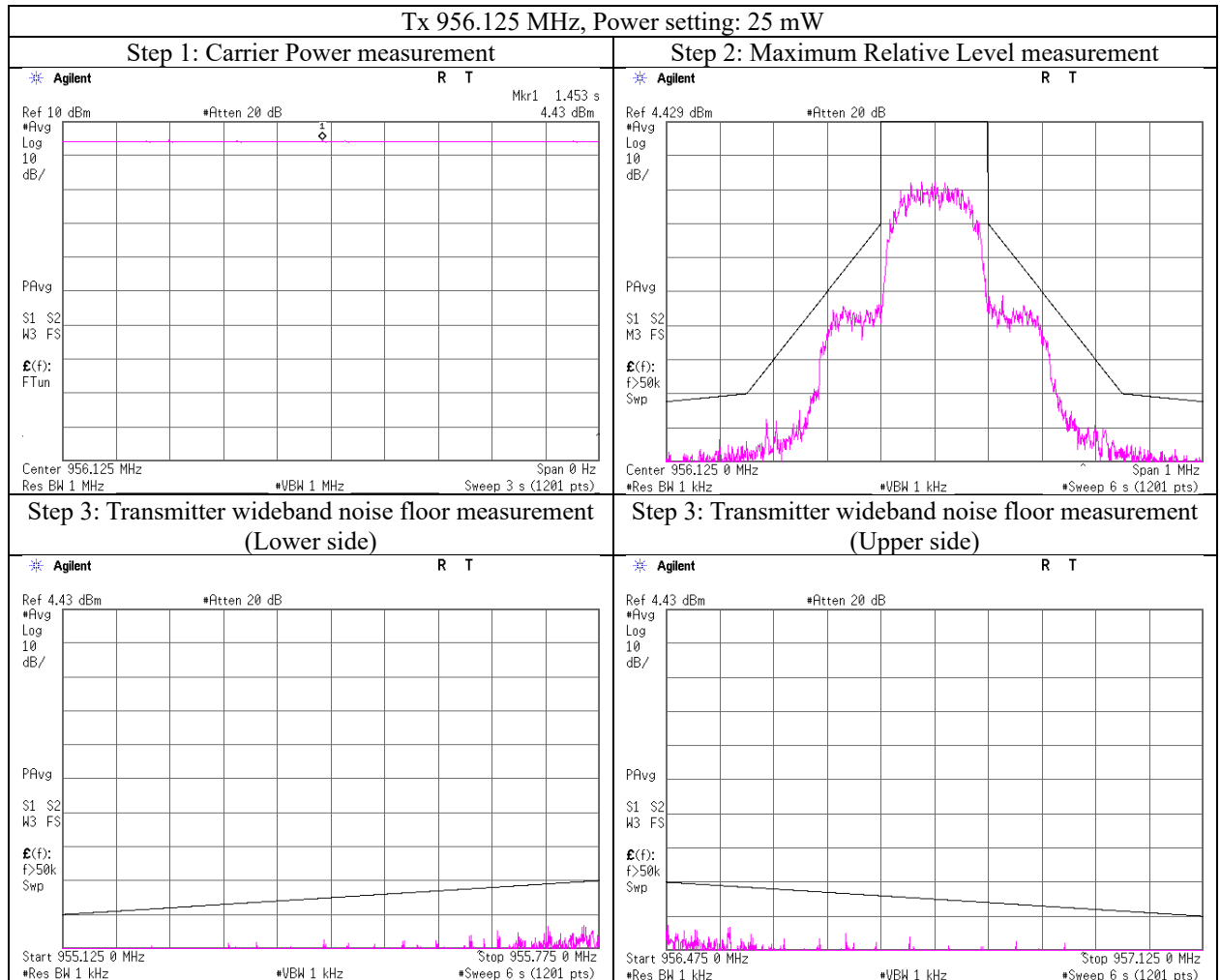
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Emission Mask

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Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



UL Japan, Inc.

Ise EMC Lab.

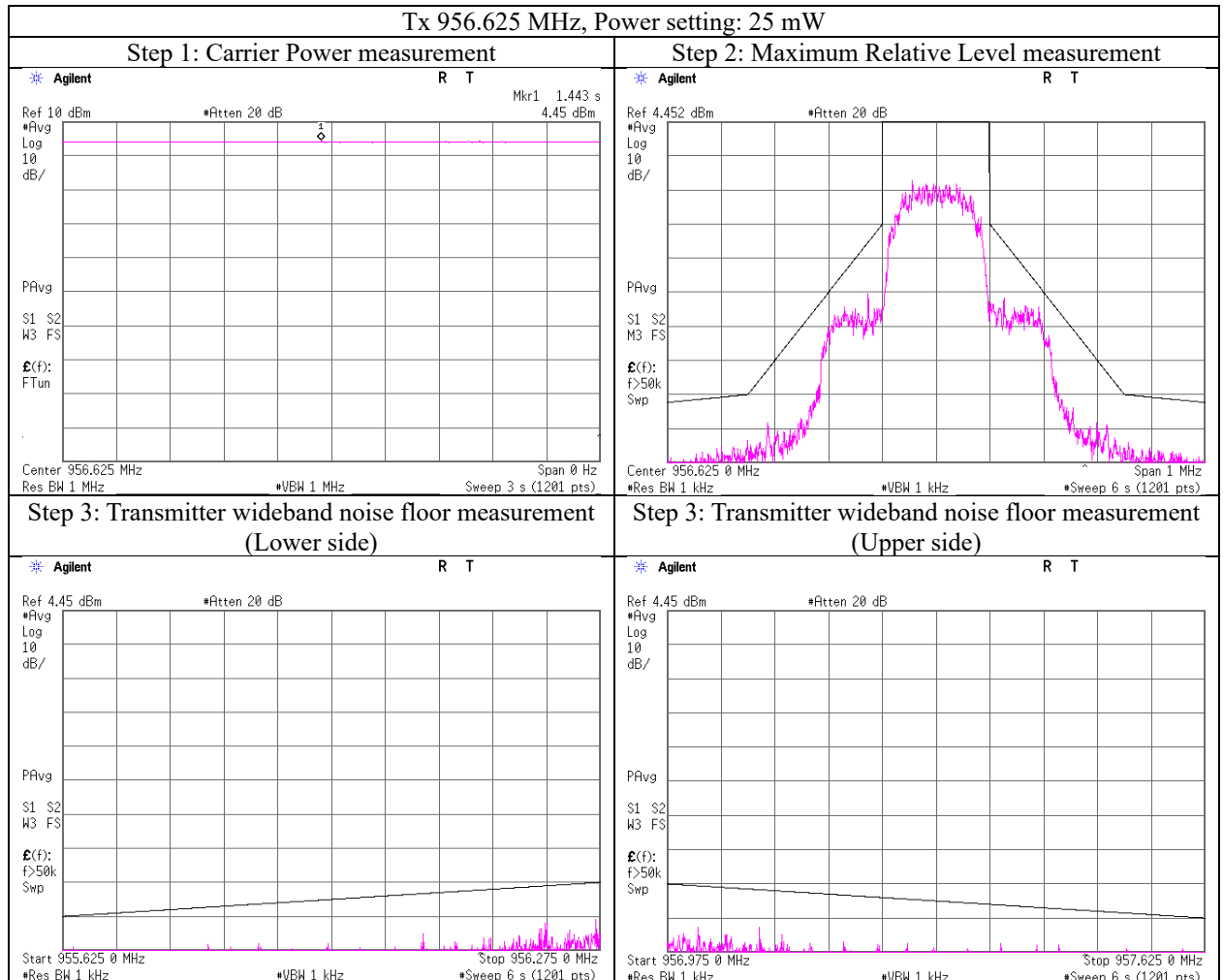
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Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



UL Japan, Inc.

Ise EMC Lab.

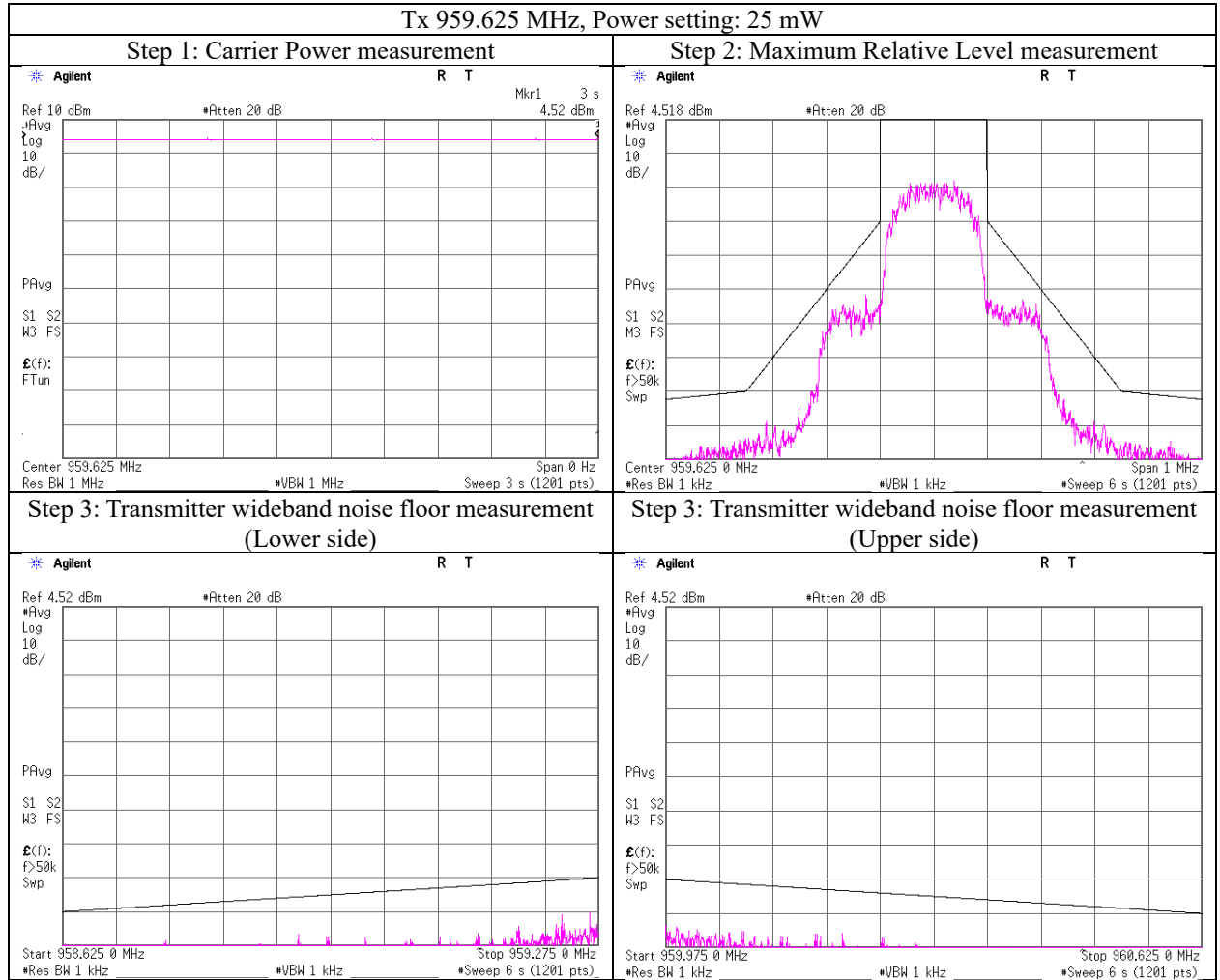
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Emission Mask

Report No.	12244303H
Test place	Ise EMC Lab. No.8 Measurement Room
Date	August 04, 2020
Temperature/ Humidity	23 deg. C / 66 % RH
Engineer	Hiroyuki Furutaka
Mode	Tx



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Field strength of spurious radiation

Report No. 13425536H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.4
Date August 5, 2020 August 6, 2020
Temperature / Humidity 23 deg. C / 65 % RH 25 deg. C / 65 % RH
Engineer Junya Okuno Junya Okuno
(1 GHz - 10 GHz) (25 MHz - 1000 MHz)
Mode Tx 941.625 MHz

[Power setting: 25 mW]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx	Tx	Result		Limit	Margin		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]		Cable Loss [dB]	Ant. Gain [dBi]	(ERP) [dBm]		(ERP) [dBm]	(dB)		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.					
811.01	35.1	31.9	-51.4	-52.6	4.9	-8.7	-67.1	-68.3	-54.0	13.1	14.3	100	4	152	78	
1883.25	41.8	38.7	-64.0	-68.7	3.8	10.2	-59.7	-64.4	-30.0	29.7	34.4	100	150	129	224	
2824.88	51.9	49.9	-49.2	-50.3	4.8	11.0	-45.1	-46.2	-30.0	15.1	16.2	145	144	116	177	
3766.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
4708.13	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
5649.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
6591.38	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
7533.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
8474.63	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
9416.25	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 - 10 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 10 GHz)

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

Report No.	13425536H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.4
Date	August 5, 2020	August 6, 2020
Temperature / Humidity	23 deg. C / 65 % RH	25 deg. C / 65 % RH
Engineer	Junya Okuno	Junya Okuno
	(1 GHz - 10 GHz)	(25 MHz - 1000 MHz)
Mode	Tx 954.625 MHz	

[Power setting: 25 mW]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]				(ERP) [dBm]			(ERP) [dB]		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.					
811.01	35.3	32.0	-51.3	-52.5	4.9	-8.7	-66.9	-68.2	-54.0	12.9	14.2	100	3	150	79	
1909.25	41.2	38.2	-63.2	-68.8	3.8	10.2	-59.0	-64.6	-30.0	29.0	34.6	164	147	202	19	
2863.88	52.7	50.9	-48.2	-50.2	4.8	11.0	-44.1	-46.1	-30.0	14.1	16.1	156	36	106	11	
3818.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
4773.13	33.6	NS	-63.5	-	6.4	12.4	-59.6	-	-30.0	29.6	-	127	50	-	-	
5727.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
6682.38	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
7637.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
8591.63	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	
9546.25	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 - 10 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 10 GHz)

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

Report No.	13425536H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.4
Date	August 5, 2020	August 6, 2020
Temperature / Humidity	23 deg. C / 65 % RH	25 deg. C / 65 % RH
Engineer	Junya Okuno	Junya Okuno
	(1 GHz - 10 GHz)	(25 MHz - 1000 MHz)
Mode	Tx 959.625 MHz	

[Power setting: 25 mW]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx	Tx	Result		Limit	Margin		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]		Cable Loss [dB]	Ant. Gain [dBi]	(ERP) [dBm]		(ERP) [dBm]	(dB)		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	Hori.	Vert.	Hori.	Vert.			Hori.	Vert.		Hori.	Vert.					
811.01	35.0	31.9	-51.5	-52.6	4.9	-8.7	-67.2	-68.3	-54.0	13.2	14.3	100	5	151	78	
1919.25	39.7	37.6	-65.3	-68.4	3.9	10.2	-61.1	-64.2	-30.0	31.1	34.2	100	216	116	0	
2878.88	53.2	51.3	-47.6	-50.2	4.8	11.0	-43.6	-46.2	-30.0	13.6	16.2	102	148	106	25	
3838.50	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
4798.13	31.6	NS	-67.4	-	6.4	12.4	-63.6	-	-30.0	33.6	-	204	62	-	-	-
5757.75	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
6717.38	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
7677.00	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
8636.63	NS	NS	-	-	-	-	-	-	-30.0	-	-	-	-	-	-	-
9596.25	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 - 10 GHz)

Tx-ANTENNA : 120 MHz tuned Dipole Antenna(30 MHz - 120 MHz), Dipole Antenna(120 MHz - 1000 MHz), Horn Antenna(1 GHz - 10 GHz)

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.

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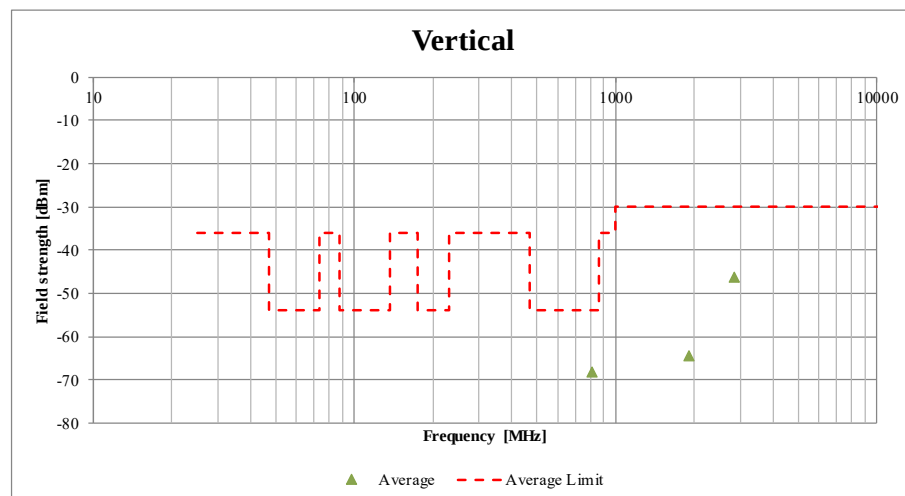
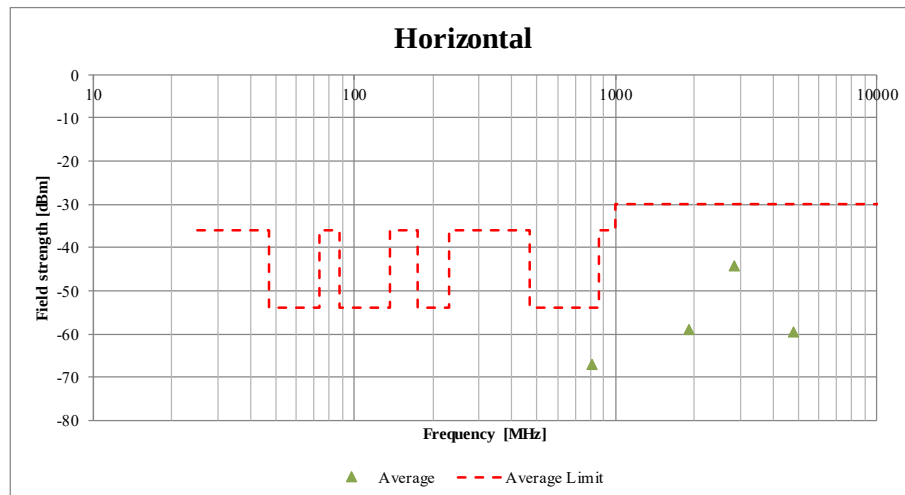
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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Field strength of spurious radiation
(Plot data, Worst case)

Report No.	13425536H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.4	No.4
Date	August 5, 2020	August 6, 2020
Temperature / Humidity	23 deg. C / 65 % RH	25 deg. C / 65 % RH
Engineer	Junya Okuno	Junya Okuno
	(1 GHz - 10 GHz)	(25 MHz - 1000 MHz)
Mode	Tx 954.625 MHz	



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

APPENDIX 2: Test instruments

Test equipment (1/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
AT	MCC-245	197220	Microwave cable	HUBER+SUNER	SF126E/11PC35/11 PC35/2000MM	537003/126E	2020/03/23	12
AT	MAT-20	141173	Attenuator(10dB)(above 1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-110	-	2019/12/09	12
AT	MAT-10	141156	Attenuator(10dB)	Weinschel Corp	2	BL1173	2019/11/07	12
AT	MCC-38	141395	Coaxial Cable	UL Japan	-	-	2019/11/12	12
AT	MSA-04	141885	Spectrum Analyzer	Keysight Technologies Inc	E4448A	US44300523	2019/11/21	12
AT	MPM-12	141809	Power Meter	ANRITSU	ML2495A	825002	2020/05/07	12
AT	MPSE-17	141830	Power sensor	ANRITSU	MA2411B	738285	2020/05/07	12
AT	MOS-28	141567	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0008	2020/01/07	12
AT	MMM-17	141557	DIGITAL HiTESTER	Hioki	3805	70900530	2020/01/06	12
RE	MAEC-04	142011	AC4_Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2020/05/25	24
RE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	2020/01/07	12
RE	MMM-10	141545	DIGITAL HiTESTER	Hioki	3805	51201148	2020/01/06	12
RE	MJM-26	142227	Measure	KOMELON	KMC-36	-	-	-
RE	COTS- MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
RE	MHA-21	141508	Horn Antenna 1-18GHz	Schwarzbeck Mess - Elektronik	BBHA9120D	557	2020/05/22	12
RE	MPA-12	141581	MicroWave System Amplifier	Keysight Technologies Inc	83017A	650	2019/10/16	12
RE	MCC-246	199563	Microwave Cable	HUBER+SUNER	SF126E/11PC35/11 PC35/1000M,5000 M	537061/126E / 537072/126E	2020/06/11	12
RE	MHF-27	141297	High Pass Filter(1.1- 10GHz)	TOKYO KEIKI	TF219CD1	1001	2020/01/09	12
RE	MHF-03	141402	High pass Filter 1.4- 5.0GHz	Mini-Circuit	VHF-1320	10411	2020/08/06	12
RE	MHF-04	141403	High Pass Filter 1.22- 4.60GHz	Mini-Circuit	VHF-1200	10435	2020/08/06	12
RE	MCC-130	141409	Microwave Cable(1- 30GHz)	Huber+Suhner	SF103/11PC3.5- 31/11PC3.5- 31/8.0m	54308/3	2020/01/06	12
RE	MHA-30	141514	Horn Antenna 1-18GHz	Schwarzbeck Mess - Elektronik	BBHA9120D	01611	2020/05/22	12
RE	MSG-20	158264	Signal Generator	Keysight Technologies Inc	N5182A	MY50142539	2019/09/06	12
RE	MAT-34	141331	Attenuator(6dB)	TME	UFA-01	-	2020/02/05	12
RE	MBA-05	141425	Biconical Antenna	Schwarzbeck Mess - Elektronik	VHA9103+BBA910 6	1302	2019/08/24	12
RE	MCC-50	141397	Coaxial Cable	UL Japan	-	-	2020/03/24	12
RE	MLA-23	141267	Logperiodic Antenna(200- 1000MHz)	Schwarzbeck Mess - Elektronik	VUSLP9111B	9111B-192	2019/08/24	12
RE	MPA-14	141583	Pre Amplifier	SONOMA INSTRUMENT	310	260833	2020/02/18	12
RE	YTSSG03	141967	Signal Generator	Rohde & Schwarz	SMT02	51400043	2020/08/05	12
RE	MDA-03	141454	Dipole Antenna	Schwarzbeck Mess - Elektronik	UHAP	991	2019/11/18	12
RE	MCC-127	141220	Coaxial Cable	UL Japan	-	-	2020/07/27	12
RE	MRENT- 130	141855	Spectrum Analyzer	Keysight Technologies Inc	E4440A	MY46187750	2019/11/19	12

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Test equipment(2/2)

Test Item	Local ID	LIMS ID	Description	Manufacturer	Model	Serial	Last Calibration Date	Cal Int
CE	MAEC-04	142011	AC4 Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	2020/05/25	24
CE	MOS-15	141562	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	0010	2020/01/07	12
CE	MMM-10	141545	DIGITAL HiTESTER	Hioki	3805	51201148	2020/01/06	12
CE	MJM-26	142227	Measure	KOMELON	KMC-36	-	-	-
CE	COTS-MEMI-02	178648	EMI measurement program	TSJ (Techno Science Japan)	TEPTO-DV	-	-	-
CE	MLS-24	141358	LISN(AMN)	Schwarzbeck Mess - Elektronik	NSLK8127	8127-730	2020/07/22	12
CE	MAT-67	141248	Attenuator	JFW Industries, Inc.	50FP-013H2 N	-	2019/12/02	12
CE	MCC-113	141217	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W/SFM141/421-010/sucoform141-PE/RFM-E121(SW)	-/04178	2020/06/18	12
CE	MTR-10	141951	EMI Test Receiver	Rohde & Schwarz	ESR26	101408	2020/03/10	12
AT	MOS-14	141561	Thermo-Hygrometer	CUSTOM. Inc	CTH-201	1401	2020/01/07	12
AT	MMM-12	141547	DIGITAL HiTESTER	Hioki	3805	60500120	2020/02/03	12
AT	MCH-04	141429	Temperature and Humidity Chamber	ESPEC	PL-2KP	14015723	2020/08/24	12
AT	MCC-64	141327	Coaxial Cable	UL Japan	-	-	2020/02/04	12
AT	MAT-99	148899	Attenuator	Pasternack	PE7047-3	1002332	2019/10/09	12
AT	MFC-01	141498	Microwave Counter	ADVANTEST	R5373	120100309	2020/06/17	12

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

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

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

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

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

UL Japan, Inc.

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