



RADIO TEST REPORT

Test Report No. : 11717813H-B-R1

Applicant : Sony Corporation
Type of Equipment : UHF SYNTHESIZED TRANSMITTER
Model No. : UTX-B03
FCC ID : AK8UTXB03A
Test regulation : FCC Part 74: 2014
Test Result : Complied

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2. The results in this report apply only to the sample tested.
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4. The test results in this report are traceable to the national or international standards.
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6. This test report covers Radio technical requirements. It does not cover administrative issues such as Manual or non-Radio test related Requirements. (if applicable)
7. This report is a revised version of 11717813H-B-R1.

Date of test: May 12 to July 5, 2017

Representative test engineer:

T. Matsui

Tomoki Matsui
Engineer
Consumer Technology Division

Approved by:

T. Takayama

Tsubasa Takayama
Engineer
Consumer Technology Division



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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 : Youhei Hisano

***Remarks**

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

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

2.1 Identification of E.U.T.

Type of Equipment : UHF SYNTHESIZED TRANSMITTER
Model No. : UTX-B03
Serial No. : Refer to 4.2 in this report.
Rating : DC 3 V (BATT), DC 5 V (USB)
Receipt Date of Sample : May 7, 2017(for Radiated Emission test)
June 7, 2017(for Antenna Terminal Conducted test)
Country of Manufacture : Korea
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No Modification by the test lab

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2.2 Product Description

Model No: UTX-B03 (referred to as the EUT in this report) is the UHF SYNTHESIZED TRANSMITTER.

General Specification

Clock frequency(ies) in the system : 26 MHz

Radio Specification

Radio type : Transmitter
Modulation type : Frequency modulation
Emission designator : 116KF3E
Necessary bandwidth : 116 kHz = 2 M + 2 D
where M: Maximum modulation frequency = 18 kHz
D: Peak deviation = 40 kHz
Channel spacing : 125kHz
Frequency of operation : 941.625 MHz to 951.875 MHz
953.000 MHz to 956.125 MHz
956.625 MHz to 959.625 MHz
Clock frequency(ies) : PLL: 19.2 MHz (TCXO)
RF power : High: 30 mW, Low: 5 mW
Antenna type : 1/4 Lambda Monopole antenna
Antenna gain : Less than 1.25 dBi
Power Supply (radio part input) : DC 3.3 V, DC 5.5 V
AF Specification : 40 Hz - 18000 Hz, Maximum input: - 28dBV (MIC level, ATT 0dB)

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part 74: 2014
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

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	RF Output Power	FCC section 2.1046	FCC section 74.861(d)(1),	Conducted	N/A	-	Complied
2	Modulation Characteristics	FCC section 2.1047(a) and (b)(a)	FCC section 74.861(e)(3)	Conducted	N/A	-	Complied
3	Occupied Bandwidth	FCC section 2.1049	FCC section 74.861(e)(5)	Conducted	N/A	-	Complied
4	Spurious Emission at Antenna Terminals	FCC section 2.1051	FCC section 74.861(e)(6)	Conducted	N/A	-	Complied
5	Necessary bandwidth	FCC Part.74.861 (d)(4)(i)	FCC section 74.861(e)(7)	Conducted	N/A	-	Complied
6	Field Strength of Spurious Emission	FCC section 2.1053	FCC section 74.861(e)(6)	Radiated	N/A	24.0 dB 2824.88 MHz, Vertical	Complied
7	Frequency Stability	FCC section 2.1055	FCC section 74.861(e)(4)	Conducted	N/A	-	Complied

Note: UL Japan, Inc.'s EMI Work Test Procedure 13-EM-W0420.

This EUT does not have receiving part. Therefore Receiver Spurious Emission test was not performed.

* In case any questions arise about test procedure, ANSI/TIA-603-E (2016) is also referred.

Supplied Voltage Information

This EUT provides stable voltage (DC3.3V, DC5.5V) constantly to RF Part regardless of input voltage.

Antenna Information

The antenna is not removable from the EUT

3.3 Addition to standard

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

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3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95 % using a coverage factor $k = 2$.
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Substitution measurement (EUT height: 1.5 m, Distance: 3 m)	
Frequency range	Uncertainty (+/-)
25 MHz - 200 MHz	5.6 dB
200 MHz - 1000 MHz	4.2 dB
1 GHz - 12.75 GHz	4.6 dB

Antenna terminal test	Uncertainty (+/-)
Radiated RF output power	4.2 dB
Occupied Channel bandwidth	0.96%
Antenna terminal conducted emission	2.1 dB
RF frequency	1.14×10^{-9}
Audio Output power	0.2 dB
Maximum frequency deviation (300 Hz to 6 kHz)	3.75%
Maximum frequency deviation (6 kHz to 25 kHz)	0.4 dB

Radiated emission test (3m)

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

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3.5 Test Location

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Test site	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms	Maximum measurement distance
No.1 semi-anechoic chamber	2973C-1	19.2 x 11.2 x 7.7	7.0 x 6.0	No.1 Power source room	10 m
No.2 semi-anechoic chamber	2973C-2	7.5 x 5.8 x 5.2	4.0 x 4.0	-	3 m
No.3 semi-anechoic chamber	2973C-3	12.0 x 8.5 x 5.9	6.8 x 5.75	No.3 Preparation room	3 m
No.3 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.4 semi-anechoic chamber	2973C-4	12.0 x 8.5 x 5.9	6.8 x 5.75	No.4 Preparation room	3 m
No.4 shielded room	-	4.0 x 6.0 x 2.7	N/A	-	-
No.5 semi-anechoic chamber	-	6.0 x 6.0 x 3.9	6.0 x 6.0	-	-
No.6 shielded room	-	4.0 x 4.5 x 2.7	4.0 x 4.5	-	-
No.6 measurement room	-	4.75 x 5.4 x 3.0	4.75 x 4.15	-	-
No.7 shielded room	-	4.7 x 7.5 x 2.7	4.7 x 7.5	-	-
No.8 measurement room	-	3.1 x 5.0 x 2.7	N/A	-	-
No.9 measurement room	-	8.8 x 4.6 x 2.8	2.4 x 2.4	-	-
No.11 measurement room	-	6.2 x 4.7 x 3.0	4.8 x 4.6	-	-

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

3.6 Data of Radio, Test instruments, and Test set up

Refer to APPENDIX.

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

4.1 Operating Mode(s)

Mode	Remarks
Transmitting (Tx), Low power	Typ. 5mW
Transmitting (Tx), High power	Typ. 30mW
*Transmitting duty was 100% on all tests.	
*Power of the EUT was set by the software as follows; Power settings: Low (5mW), High (30mW) Software: Version T.009 *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 without High or Low settings.	

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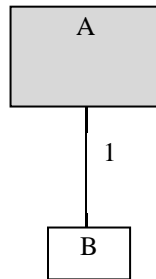
*The details of Operating mode(s)

Test Item	Tested frequency	Power setting	Modulation	Remarks
RF power output	941.625 MHz (Low) 950.500 MHz (Mid) 959.625 MHz (High)	Low power High power	None (No modulation)	
Modulation Characteristics	950.500 MHz (Mid)	Low power High power	See data.	*3)
Occupied Bandwidth	941.625 MHz (Low) 950.500 MHz (Mid) 951.875 MHz (Mid) 953.000 MHz (Mid) 956.125 MHz (Mid) 956.625 MHz (Mid) 959.625 MHz (High)	Low power High power	-26.2 dBV, 2500 Hz, Sine wave *1)	*4)
Spurious emissions at antenna terminals	941.625 MHz (Low) 950.500 MHz (Mid) 959.625 MHz (High)	Low power High power	-26.2 dBV, 2500 Hz, Sine wave *1)	
Necessary bandwidth	941.625 MHz (Low) 950.500 MHz (Mid) 951.875 MHz (Mid) 953.000 MHz (Mid) 956.125 MHz (Mid) 956.625 MHz (Mid) 959.625 MHz (High)	Low power High power	See data.	
Field strength of spurious radiation	941.625 MHz (Low) 950.500 MHz (Mid) 951.875 MHz (Mid) 953.000 MHz (Mid) 956.125 MHz (Mid) 956.625 MHz (Mid) 959.625 MHz (High)	Low power High power	None, -26.2 dBV, 2500 Hz, Sine wave *2)	
Frequency stability	950.500 MHz (Mid)	High power	None (No modulation)	*5)
<p>*1) When modulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.</p> <p>*2) As for side band spectrum measurements, EUT was modulated same as note *1).</p> <p>*3) There is no difference in audio part on each channel. Therefore the test was performed on Mid channel as a representative.</p> <p>*4) The tests were performed at both edges of allocated bands.</p> <p>*5) There is no difference in frequency generating method on each channel. Therefore the test was performed on Mid channel as a representative.</p>				

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4.2 Configuration and peripherals



* Setup was taken into consideration and test data was taken under worse case conditions.

Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	UHF SYNTHESIZED TRANSMITTER	UTX-B03	7	Sony Corporation	EUT
B	Microphone	-	-	Sony Corporation	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	Microphone Cable	1.2	Shielded	Shielded	-

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SECTION 5: Field strength of spurious radiation

Test Procedure

- 1) EUT was placed on a platform of nominal size, 1.0m by 1.5m, raised 0.8m 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 3m. The measuring antenna height was varied between 1 to 4m 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. Spurious emissions were observed with enough time according to the test standard.

- 2) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 0.8m as the EUT. The frequency below 1GHz of the Substitution Antenna was used the Half wave dipole Antenna, which was tuned the measured frequency in 1). The frequency above 1GHz 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 4m 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	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
IF Bandwidth	RMS Average: 120kHz BW	RMS Average: RBW: 1MHz/VBW: 3MHz

*120kHz was selected for IF Bandwidth below 1GHz.

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

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

[Side band spectrum measurement]

- 1) Center frequency of the spectrum analyzer was set to the assigned transmitter frequency. Span was set to 500% of necessary bandwidth. Transmit the EUT, and the level of the unmodulated carrier was set to a full scale reference level. This is the 0dB reference for the measurement.
- 2) The EUT was modulated with 2500Hz sine wave at an input level 16dB greater than that necessary to produce 50% of rated system deviation.
- 3) The resulting spectrum analyzer plot of the emission level was recorded.

Measurement range : 30 MHz-10 GHz
Test data : APPENDIX
Test result : Pass

SECTION 6: Modulation Characteristics

Deviation versus Audio input level and Audio Frequency

Test Procedure

The frequency deviations were measured when input level and frequency were varied. It was measured with Radio-communication Service Monitor.

Audio input level	-80dBV to -20dBV, 5dB step
Audio frequency	40Hz, 100Hz, 300Hz, 500Hz, 700Hz, 1kHz, 3kHz, 5kHz, 7kHz, 10kHz, 15kHz, 18kHz

Audio Frequency Response

Test Procedure

The audio input level was measured when frequency deviation indicates 50% modulation which measured with Radio communication Service Monitor.

Audio frequency	40Hz, 70Hz, 100Hz, 300Hz, 500Hz, 700Hz, 1kHz, 3kHz, 5kHz, 7kHz, 10kHz, 15kHz, 18kHz
-----------------	---

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

Test data : APPENDIX
Test result : Pass

SECTION 7: Antenna terminal tests, Occupied Bandwidth and Frequency stability

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 Peak *1)	-	Power Meter (Sensor: 50MHz BW)
Occupied Bandwidth	Enough width to display emission skirts	1 to 5% of Anticipated OBW	Three times of RBW	Auto	Peak *2)	Max Hold *2)	Spectrum Analyzer
Conducted Spurious Emission	9 kHz -150 kHz	200 Hz	620 Hz	Auto	Peak	Max Hold	Spectrum Analyzer *3)
	150 kHz – 30 MHz	10 kHz	30 kHz				
	30 MHz – 1 GHz	100 kHz	300 kHz				
	Above 1 GHz	1 MHz	3 MHz				
Frequency stability	-	-	-	-	-	-	Frequency Counter

*1) Reference data

*2) The measurement was performed with Peak and Max Hold since the modulation method was FM.

*3) In the frequency range below 30MHz, RBW was narrowed to separate the noise contents. Then, wide-band noise near the limit was checked separately, however the noise was not detected as shown in the chart.

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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SECTION 8 : Necessary bandwidth

Test procedure

In accordance with section 8.3 of ETSI EN 300 422-1, a weighted noise source through a weighting filter based on ITU-R Recommendation BS.559-2 was applied to the audio input of transmitter.

The transmitter RF output spectrums were measured at each channel using a receiving antenna and a spectrum analyzer with settings specified in the section 8.3.1 of ETSI EN 300 422-1. The input level of both white noise and filter to EUT was -18.5dBV according to the following result.

	lim-8dB	lim	lim+12dB	Difference of Demodulation level lim-8dB and lim+12dB	White noise +Filter input level
EUT input level	-36 dBV	-28 dBV	-16 dBV		-16 dBV
Demodulation level	-34.45 dBV	-	-28.62 dBV	5.83 dB < 10 dB	
"lim" means "audio limiting threshold" declared by manufacturer.					

Test data

APPENDIX.

Test result

Pass

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APPENDIX 1: Data of EMI test

RF power output

Test place Ise EMC Lab. No.6 Measurement Room
Report No. 11717813H
Date 06/07/2017
Temperature/ Humidity 24 deg. C / 53% RH
Engineer Tomoki Matsui
Mode Tx

Power Setting	Channel	Freq. [MHz]	Reading		Cable Loss [dB]	Atten. Loss [dB]	Result				Limit		Margin [dB]
			Average [dBm]	Peak * [dBm]			Average		Peak *		[mW]	[dBm]	
Low Power	Low	941.625	6.90	6.92	0.36	0.00	7.26	5.32	7.28	5.35	1000	30	22.74
	Mid	950.500	6.85	6.87	0.36	0.00	7.21	5.26	7.23	5.28	1000	30	22.79
	High	959.625	6.65	6.67	0.36	0.00	7.01	5.02	7.03	5.05	1000	30	22.99
High Power	Low	941.625	14.77	14.80	0.36	0.00	15.13	32.58	15.16	32.81	1000	30	14.87
	Mid	950.500	14.75	14.79	0.36	0.00	15.11	32.43	15.15	32.73	1000	30	14.89
	High	959.625	14.78	14.82	0.36	0.00	15.14	32.66	15.18	32.96	1000	30	14.86

Calculation formula:

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

* Reference data

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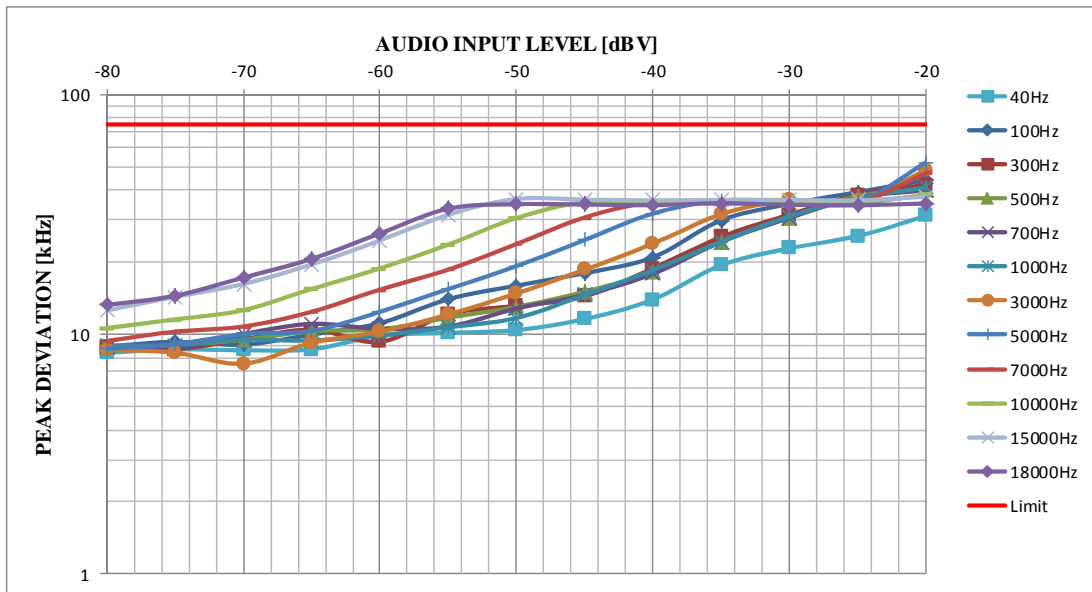
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Modulation Characteristics
[Deviation versus Audio input level and Audio Frequency]

Test place	Ise EMC Lab. No.11 measurement room
Report No.	11717813H
Date	06/09/2017
Temperature/ Humidity	23 deg. C / 41 % RH
Engineer	Koji Yamamoto
Mode	Tx 950.500 MHz (High Power)

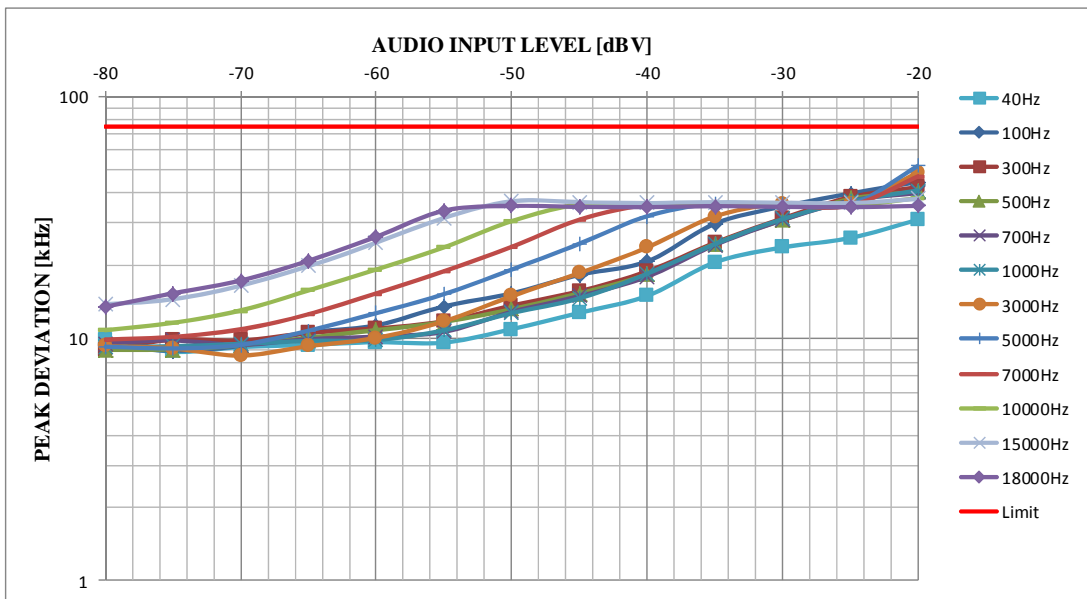
AF Level [dBV]	AF Frequency [Hz] / Peak Deviation [kHz]												Limit [kHz]
	40	100	300	500	700	1000	3000	5000	7000	10000	15000	18000	
-80	8.383	8.902	8.822	8.822	8.822	8.982	8.623	8.703	9.381	10.619	12.575	13.253	75
-75	8.663	9.301	8.663	8.982	8.743	9.022	8.383	9.102	10.259	11.537	14.331	14.491	75
-70	8.583	9.062	9.541	9.501	10.020	9.501	7.545	10.020	10.778	12.615	16.208	17.245	75
-65	8.663	9.980	10.459	10.299	11.058	9.421	9.222	10.339	12.415	15.449	19.561	20.639	75
-60	9.860	11.138	9.301	10.499	10.539	9.900	10.259	12.415	15.369	18.842	24.631	26.347	75
-55	10.140	14.012	12.136	11.737	10.778	10.699	12.096	15.449	18.603	23.673	31.497	33.413	75
-50	10.419	15.968	13.134	13.014	12.814	11.697	14.810	19.241	23.792	30.539	36.647	34.890	75
-45	11.577	18.004	14.411	15.050	14.611	14.611	18.603	24.750	30.738	35.609	36.447	34.770	75
-40	13.972	20.958	18.842	18.204	17.884	18.523	23.872	31.896	35.609	35.369	36.207	34.571	75
-35	19.441	29.900	25.469	24.311	24.311	24.311	31.697	36.128	35.689	35.609	36.327	35.209	75
-30	22.834	34.970	31.577	30.738	30.619	31.058	36.207	35.808	35.489	35.489	36.327	34.651	75
-25	25.709	39.162	38.124	37.685	37.166	36.966	35.808	35.609	35.489	35.289	36.207	34.571	75
-20	31.178	44.032	42.036	40.239	39.920	40.958	48.463	52.136	46.986	38.243	37.485	35.090	75



Modulation Characteristics
[Deviation versus Audio input level and Audio Frequency]

Test place	Ise EMC Lab. No.11 measurement room
Report No.	11717813H
Date	06/09/2017
Temperature/ Humidity	23 deg. C / 41 % RH
Engineer	Koji Yamamoto
Mode	Tx 950.500 MHz (Low Power)

AF Level [dBV]	AF Frequency [Hz] / Peak Deviation [kHz]												Limit [kHz]
	40	100	300	500	700	1000	3000	5000	7000	10000	15000	18000	
-80	9.860	9.421	8.942	8.982	9.541	9.222	9.301	9.261	9.900	10.818	13.852	13.533	75
-75	8.822	8.902	9.900	9.022	9.820	9.301	9.102	9.102	10.180	11.617	14.531	15.369	75
-70	9.222	9.341	9.820	9.381	9.421	9.501	8.503	9.421	10.898	13.054	16.527	17.365	75
-65	9.421	10.579	10.539	10.100	9.940	9.780	9.301	10.778	12.615	15.808	19.920	20.958	75
-60	9.661	11.337	11.018	10.818	10.180	9.860	10.060	12.735	15.369	19.281	24.870	26.347	75
-55	9.621	13.573	11.776	11.697	10.659	10.818	11.776	15.249	18.962	23.792	31.497	33.732	75
-50	10.938	15.369	13.693	13.253	12.894	12.735	14.970	19.281	23.912	30.539	36.886	35.289	75
-45	12.774	18.323	15.689	15.369	14.970	14.651	18.643	24.631	30.978	35.728	36.567	34.970	75
-40	15.010	20.838	18.962	18.443	18.004	18.523	23.792	32.016	35.609	35.409	36.247	34.890	75
-35	20.639	29.820	24.870	24.631	24.351	24.551	31.936	36.128	35.808	35.609	36.567	35.209	75
-30	23.792	35.090	31.377	30.858	30.858	31.178	36.128	35.808	35.489	35.409	36.367	34.970	75
-25	26.028	39.720	38.363	37.724	37.086	36.886	35.808	35.728	35.409	35.409	36.247	34.890	75
-20	30.978	44.351	42.235	40.359	39.920	40.878	48.583	51.736	46.786	38.044	37.724	35.289	75

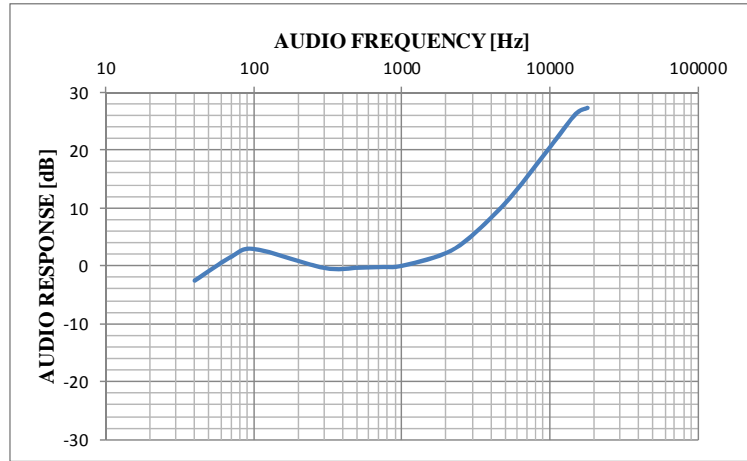


Modulation Characteristics
[Audio Frequency Response]

Test place	Ise EMC Lab. No.11 measurement room
Report No.	11717813H
Date	06/09/2017
Temperature/ Humidity	23 deg. C / 41 % RH
Engineer	Koji Yamamoto
Mode	Tx 950.500 MHz

[Power Setting: High]

AF Frequency [Hz]	AF Level [mV]	AF Response [dB]
40	17.02	-2.54
70	10.67	1.52
100	9.06	2.94
300	13.25	-0.36
500	13.19	-0.32
700	13.01	-0.20
1000	12.71	0.00
2000	9.85	2.21
3000	6.92	5.28
5000	3.67	10.79
7000	2.18	15.31
10000	1.21	20.43
15000	0.62	26.24
18000	0.55	27.28

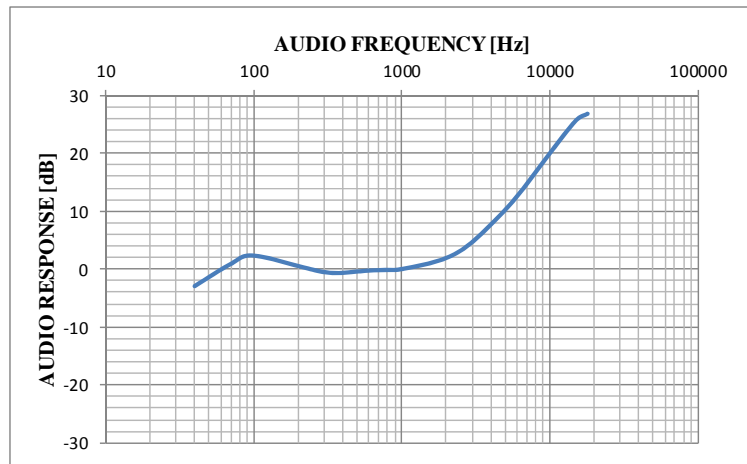


Calculation formula:

$$AF \text{ Response} = 20 * \log(AF \text{ Level of 1kHz} / AF \text{ level})$$

[Power Setting: Low]

AF Frequency [Hz]	AF Level [mV]	AF Response [dB]
40	16.88	-2.93
70	10.88	0.89
100	9.19	2.35
300	12.79	-0.52
500	12.63	-0.41
700	12.25	-0.14
1000	12.05	0.00
2000	9.67	1.91
3000	7.01	4.71
5000	3.72	10.21
7000	2.22	14.69
10000	1.21	19.96
15000	0.63	25.63
18000	0.55	26.81



Calculation formula:

$$AF \text{ Response} = 20 * \log(AF \text{ Level of 1kHz} / AF \text{ level})$$

Occupied Bandwidth

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11717813H
Date 07/05/2017
Temperature/ Humidity 25 deg. C / 57% RH
Engineer Takumi Shimada
Mode Tx

Power Setting	Freq. [MHz]	99% Occupied Bandwidth [kHz]	Limit [kHz]	Margin [kHz]
Low Power	941.625	74.1814	200	125.8186
	950.500	75.3975	200	124.6025
	951.875	75.5117	200	124.4883
	953.000	75.6320	200	124.3680
	956.125	74.9371	200	125.0629
	956.625	74.9667	200	125.0333
	959.625	75.4486	200	124.5514
High Power	941.625	74.1529	200	125.8471
	950.500	75.3853	200	124.6147
	951.875	75.5016	200	124.4984
	953.000	75.6410	200	124.3590
	956.125	74.9640	200	125.0360
	956.625	74.9780	200	125.0220
	959.625	75.4376	200	124.5624

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Ise EMC Lab.

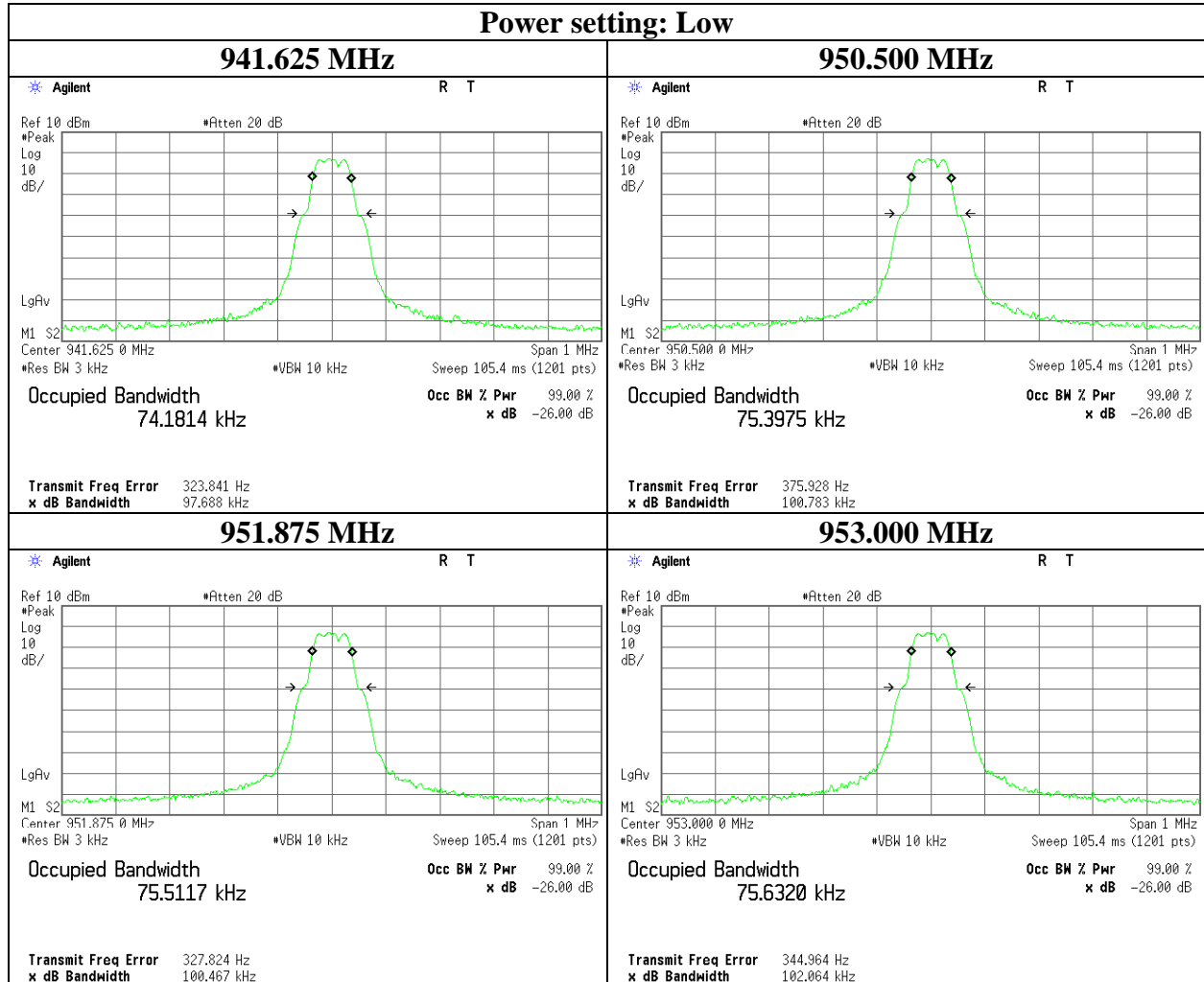
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx

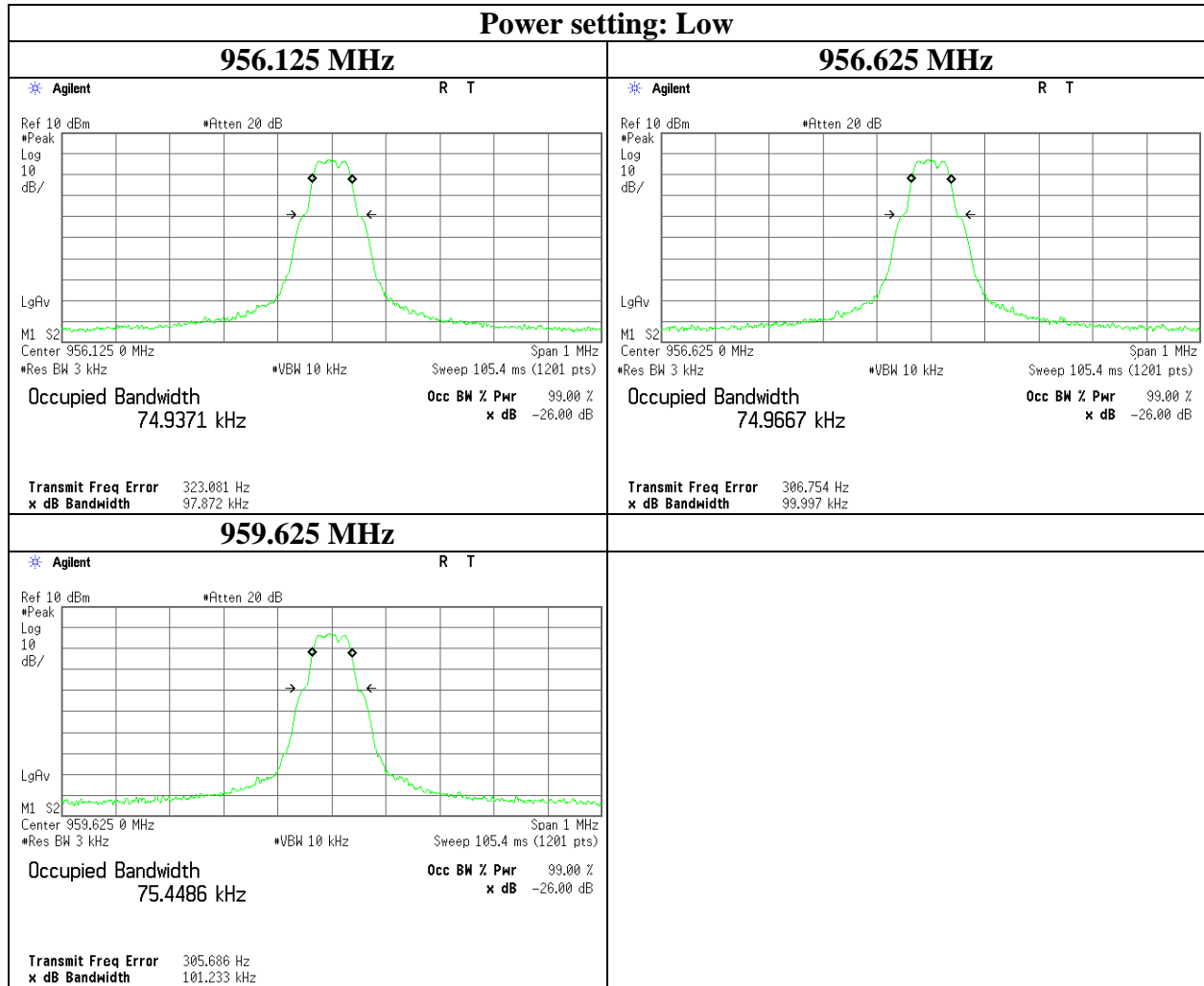


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Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx



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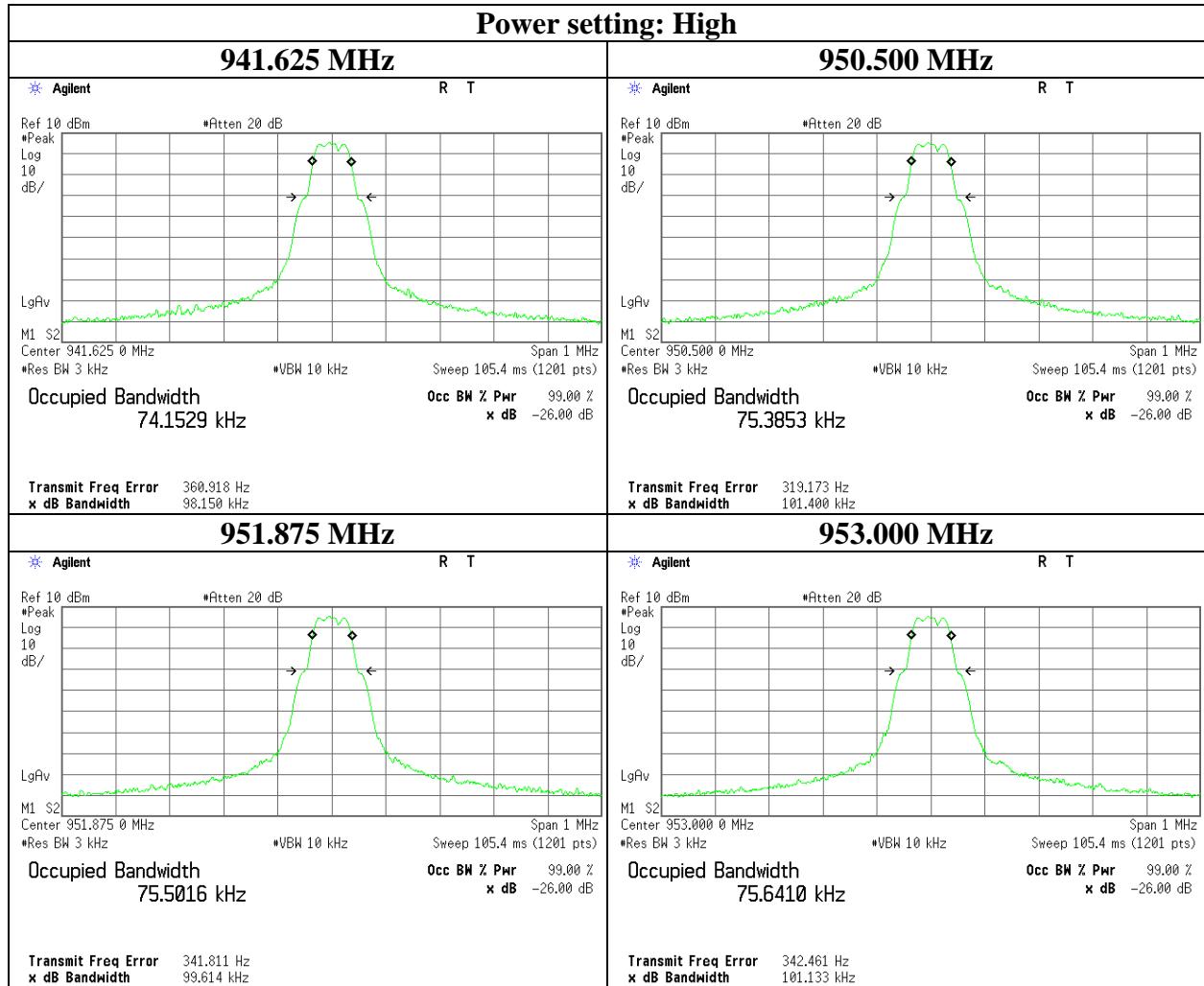
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Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx

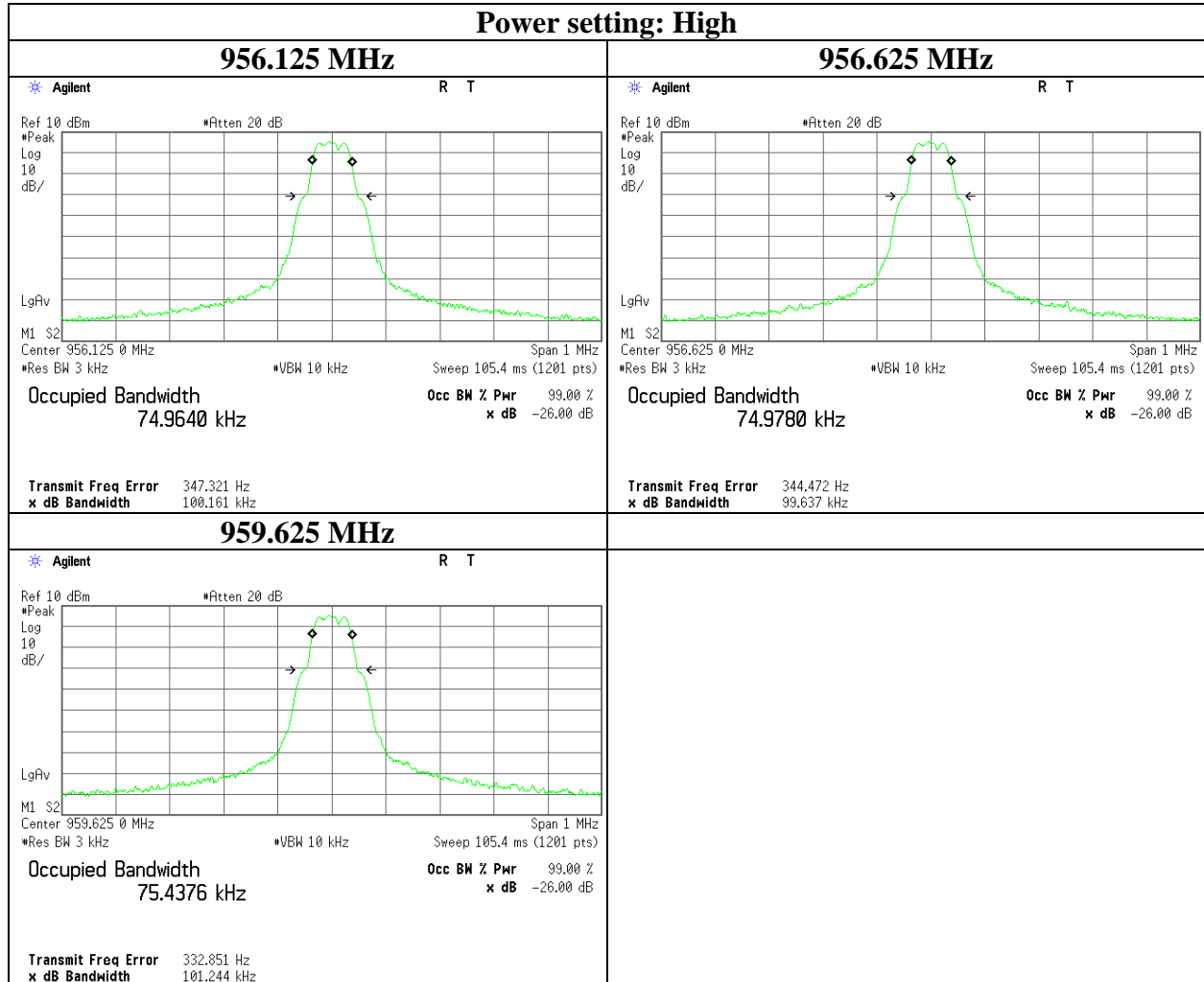


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Occupied Bandwidth

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx



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Spurious emissions at antenna terminals

Test place Ise EMC Lab. No.11 Measurement Room
Report No. 11717813H
Date 07/05/2017
Temperature/ Humidity 25 deg. C / 57% RH
Engineer Takumi Shimada
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]					
Low	Low	941.625	0.00994	-89.07	0.01	9.82	-79.24	-13	66.24
			0.2	-80.51	0.00	9.84	-70.67	-13	57.67
			3153	-58.34	1.03	10.01	-47.30	-13	34.30
			8004	-56.69	1.64	10.01	-45.04	-13	32.04
	Mid	950.500	0.01394	-88.07	0.00	9.82	-78.25	-13	65.25
			0.896	-80.81	0.01	9.84	-70.96	-13	57.96
			3097	-58.49	1.02	10.01	-47.46	-13	34.46
	High	959.625	0.01029	-89.16	0.01	9.82	-79.33	-13	66.33
			0.399	-78.97	0.01	9.84	-69.12	-13	56.12
			3143	-58.78	1.03	10.01	-47.74	-13	34.74
			7292	-58.23	1.57	10.04	-46.62	-13	33.62
	High	Low	941.625	0.01135	-89.57	0.01	9.82	-79.74	-13
0.324				-80.51	0.01	9.84	-70.66	-13	57.66
3080				-58.26	1.02	10.01	-47.23	-13	34.23
7762				-58.30	1.62	10.02	-46.66	-13	33.66
Mid		950.500	0.01182	-89.29	0.01	9.82	-79.46	-13	66.46
			0.175	-80.34	0.00	9.84	-70.50	-13	57.50
			3073	-58.96	1.02	10.01	-47.93	-13	34.93
High		959.625	0.00924	-89.33	0.01	9.82	-79.50	-13	66.50
			0.921	-81.13	0.01	9.84	-71.28	-13	58.28
			3150	-58.22	1.03	10.01	-47.18	-13	34.18
			7008	-58.28	1.54	10.06	-46.68	-13	33.68

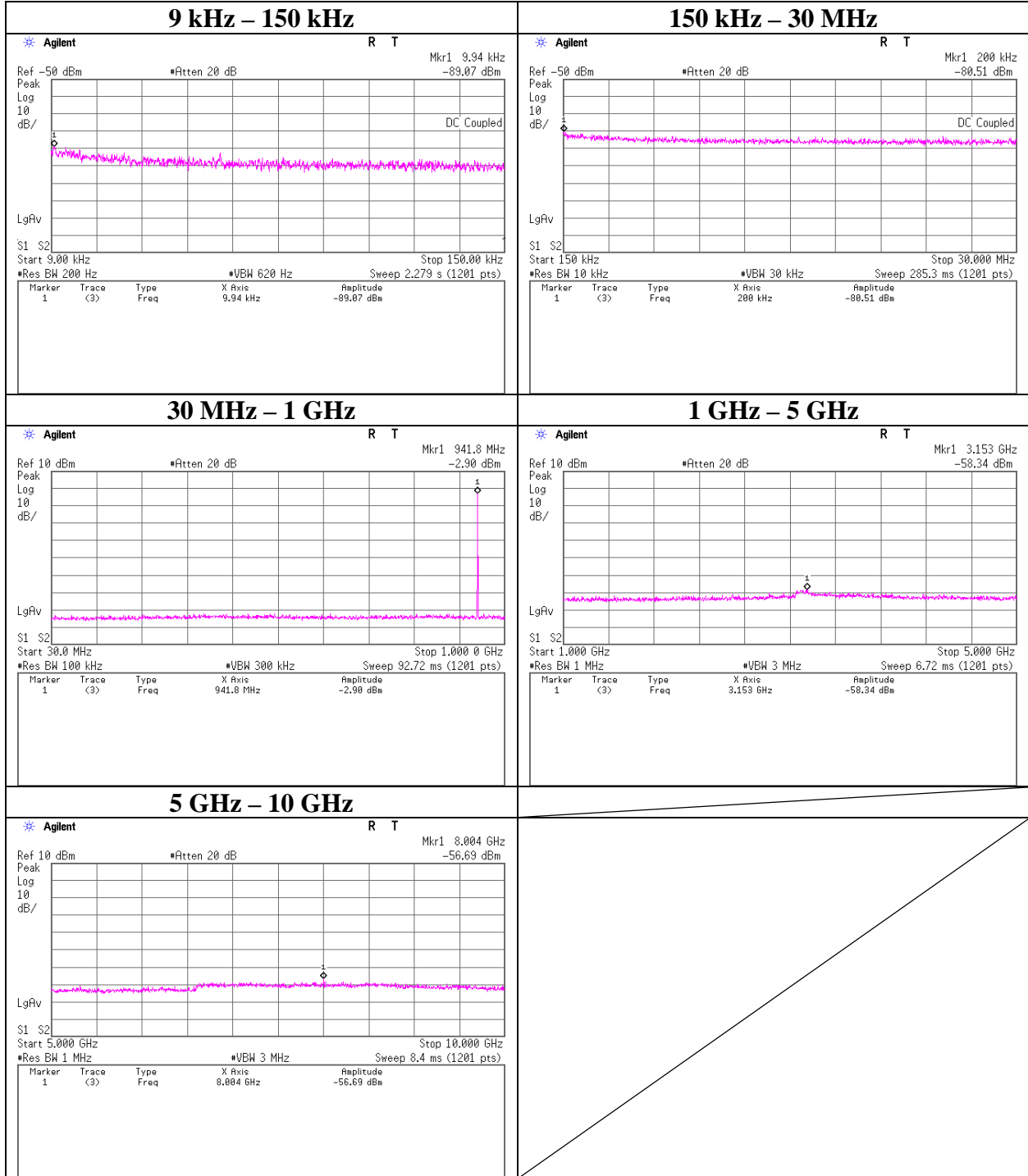
Calculation formula:

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

$$\text{Limit} = \text{mean output power in dBm} - (43 + 10 \log_{10}(\text{mean output power in watts})) \text{ dB} = -13 \text{ dBm}$$

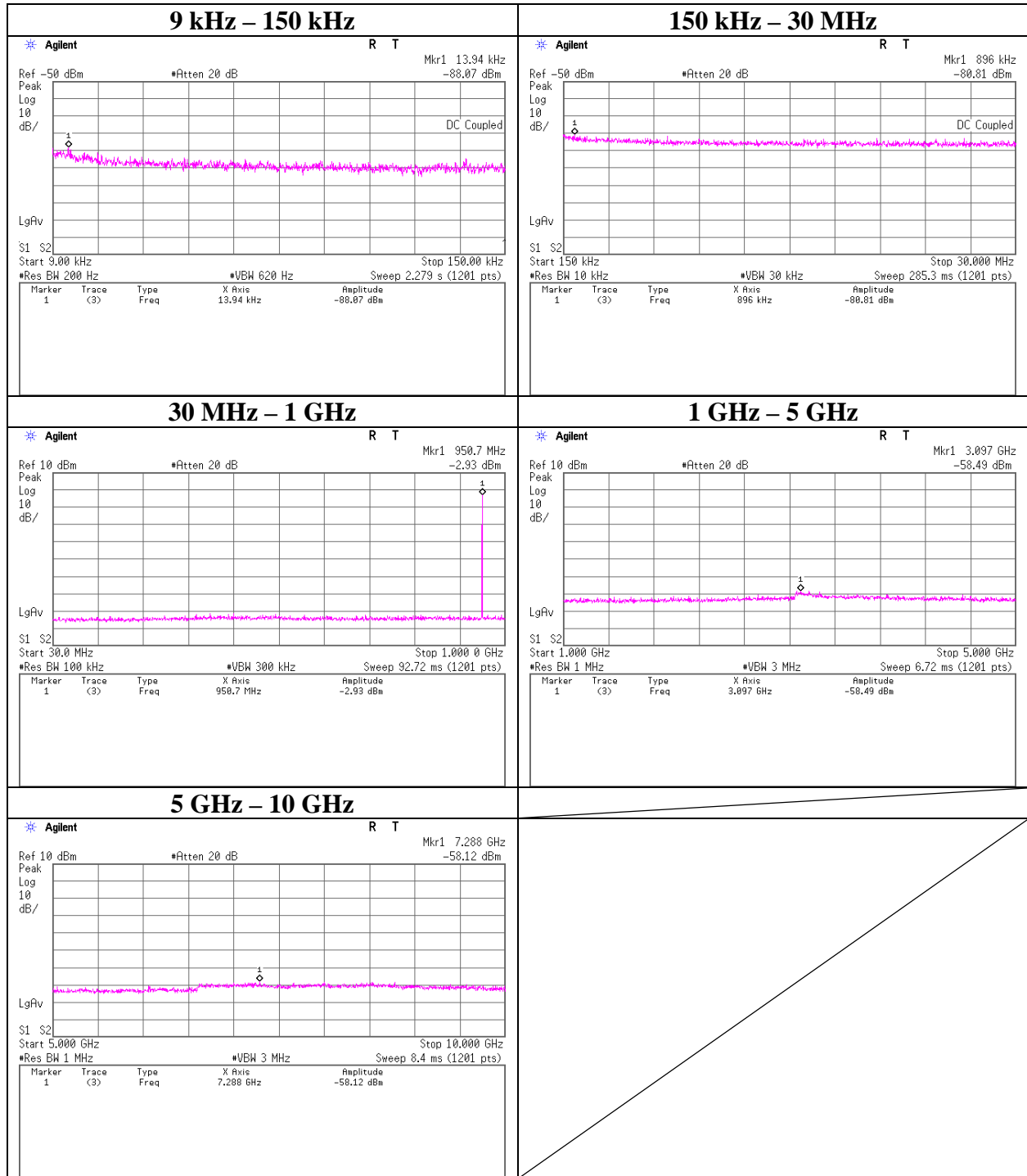
Spurious emissions at antenna terminals

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 11717813H
 Date : 07/05/2017
 Temperature/ Humidity : 25 deg. C / 57% RH
 Engineer : Takumi Shimada
 Mode : Tx 941.625MHz, Power setting : Low



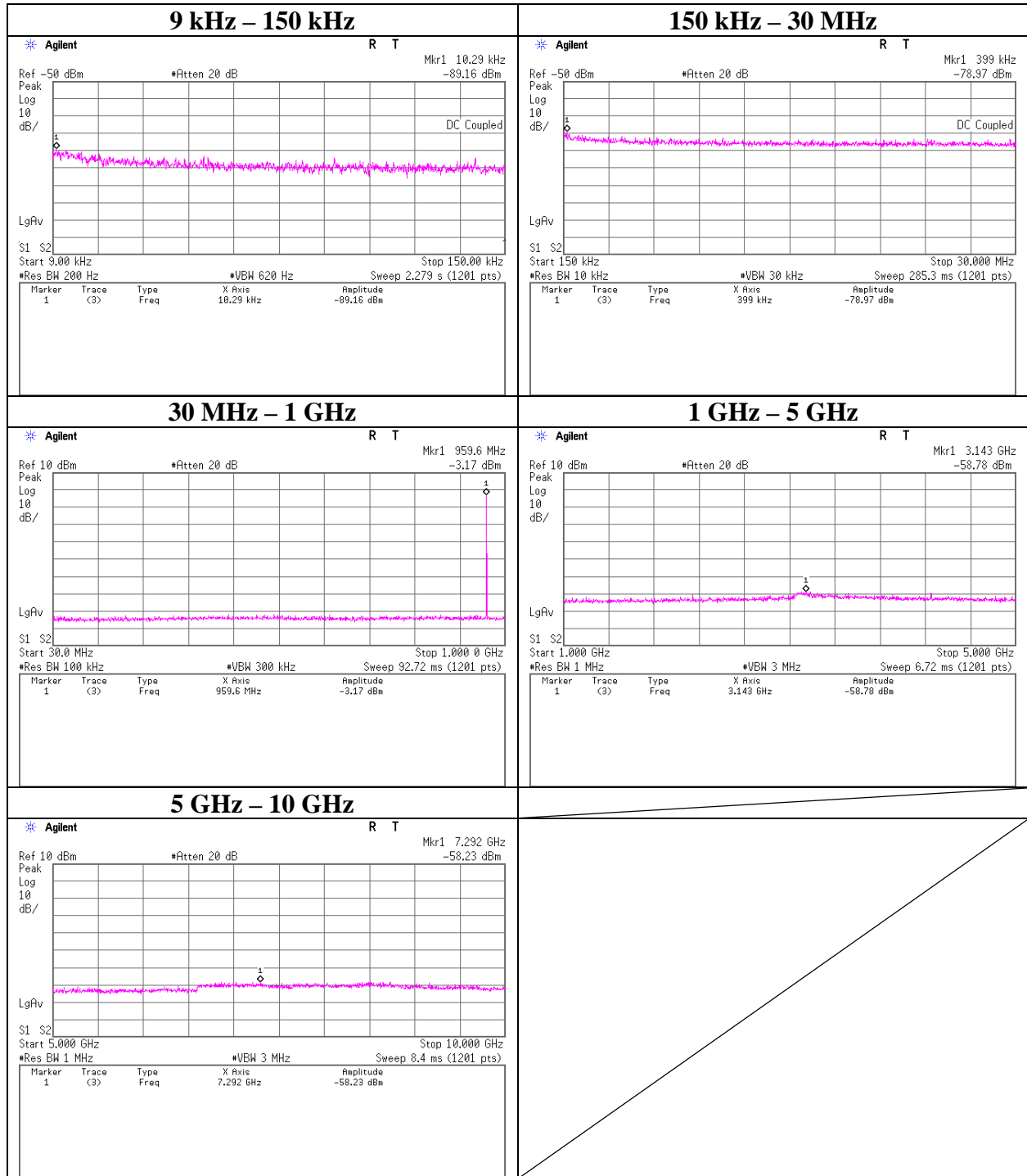
Spurious emissions at antenna terminals

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 11717813H
 Date : 07/05/2017
 Temperature/ Humidity : 25 deg. C / 57% RH
 Engineer : Takumi Shimada
 Mode : Tx 950.500MHz, Power setting : Low



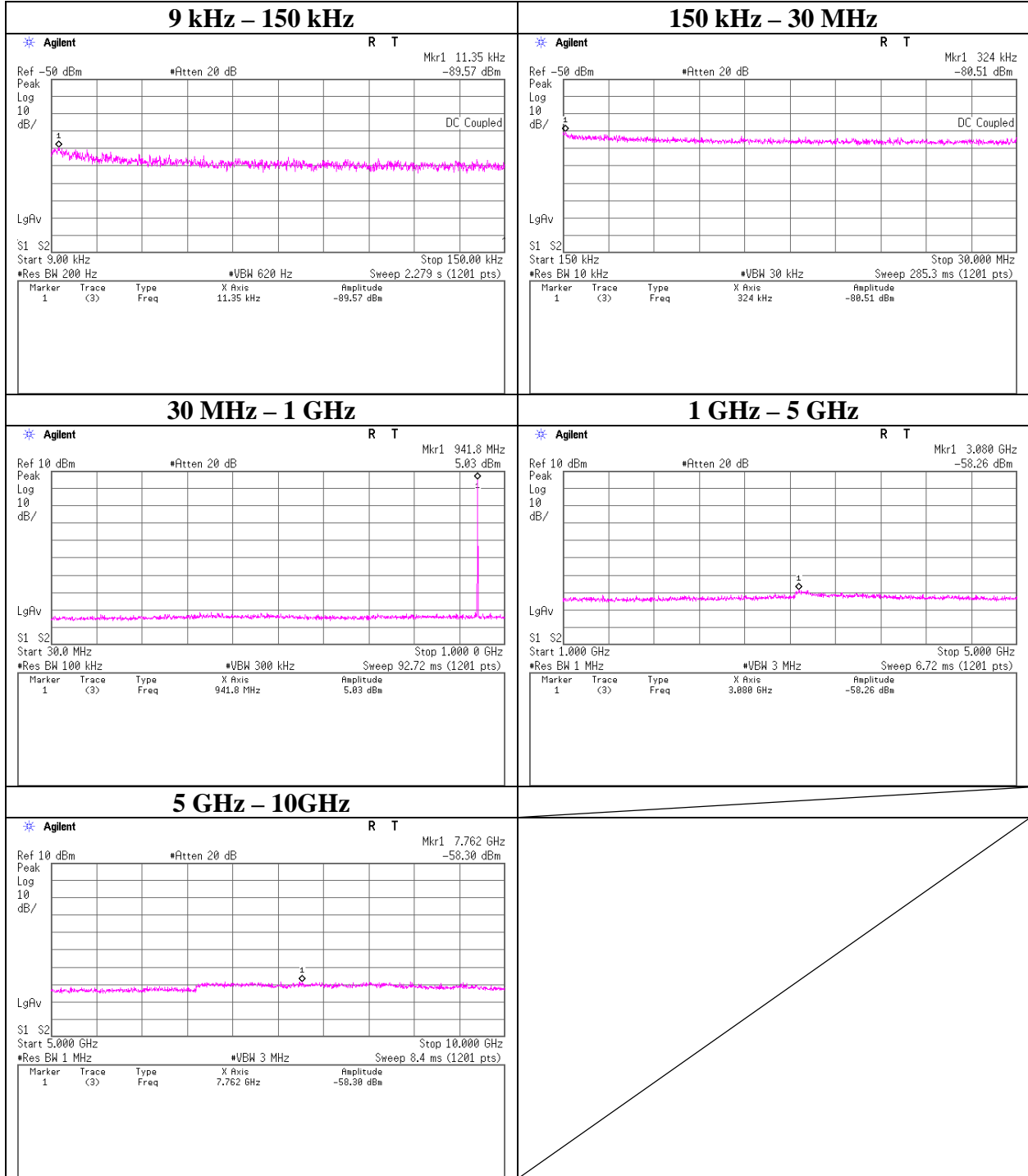
Spurious emissions at antenna terminals

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx 959.625MHz, Power setting : Low



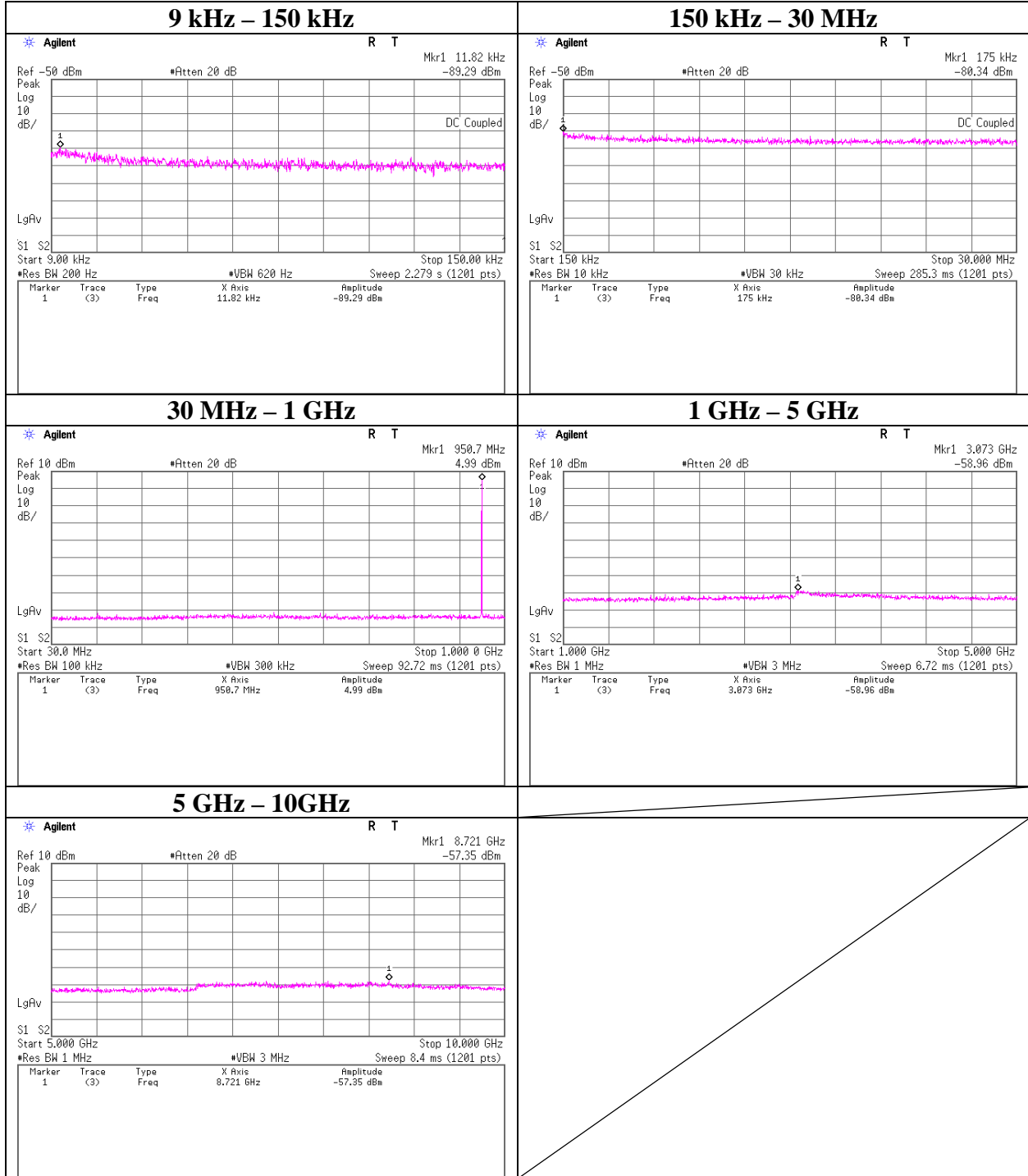
Spurious emissions at antenna terminals

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx 941.625MHz, Power setting : High



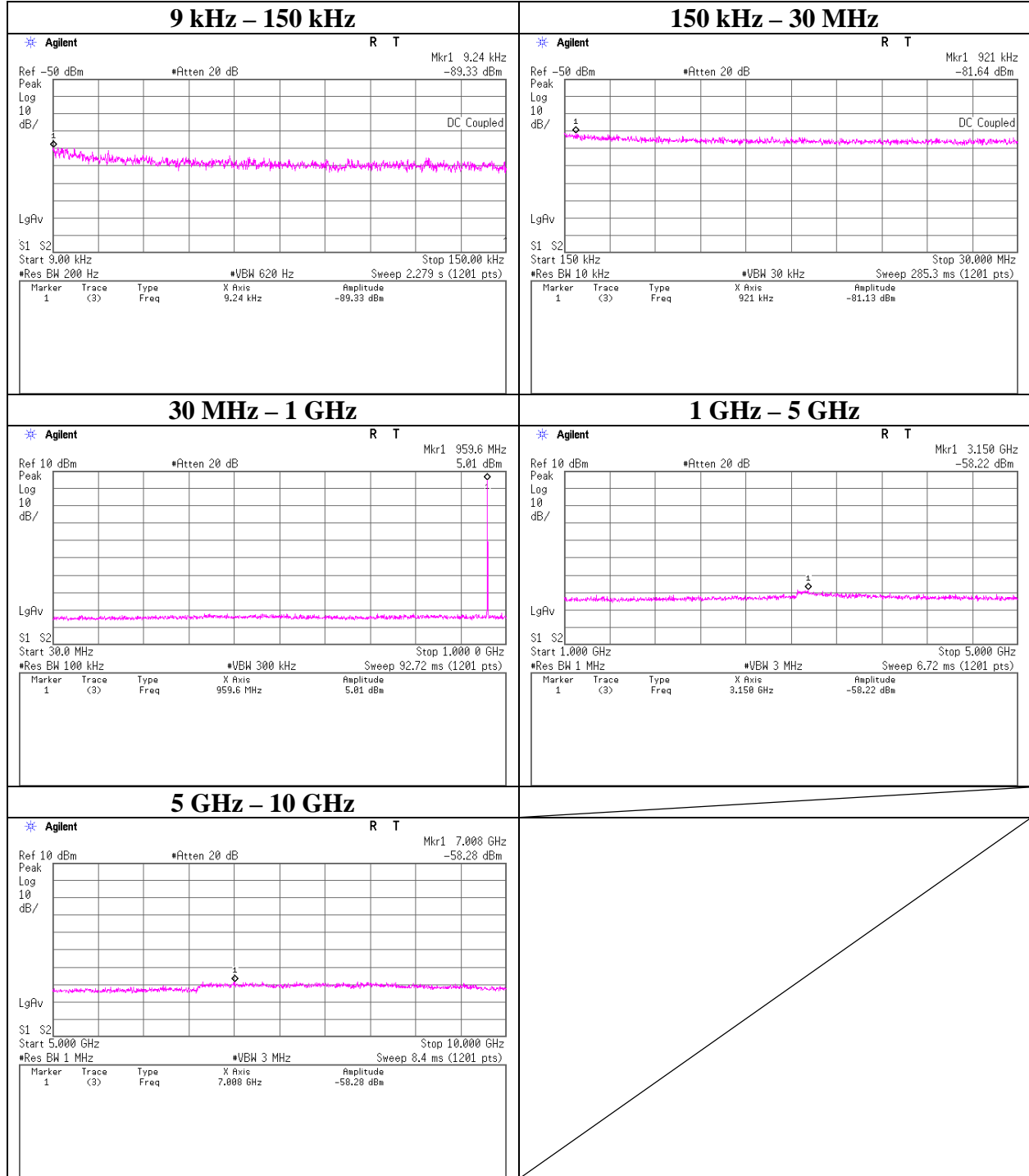
Spurious emissions at antenna terminals

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx 950.500MHz, Power setting : High



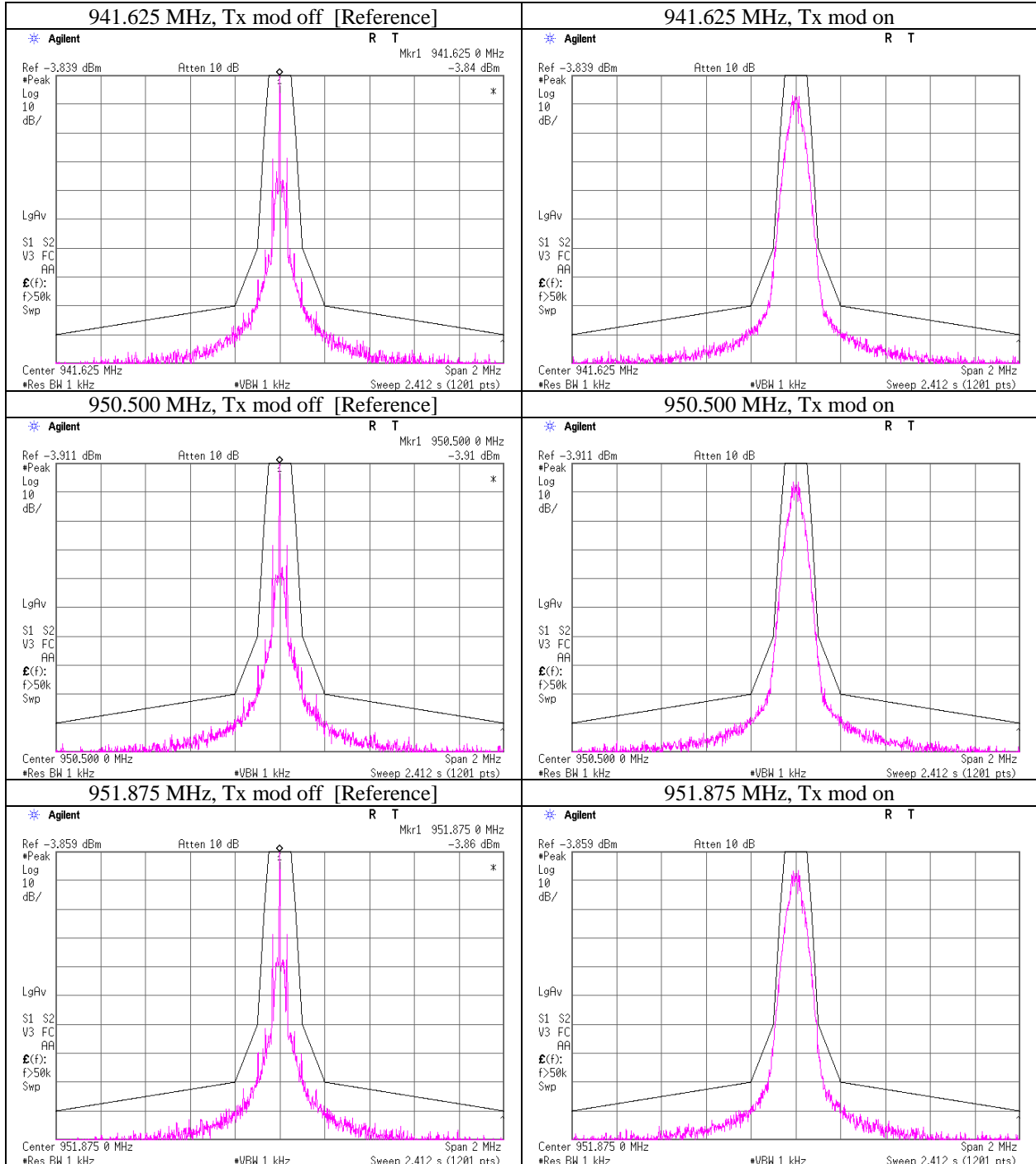
Spurious emissions at antenna terminals

Test place	Ise EMC Lab. No.11 Measurement Room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	25 deg. C / 57% RH
Engineer	Takumi Shimada
Mode	Tx 959.625MHz, Power setting : High



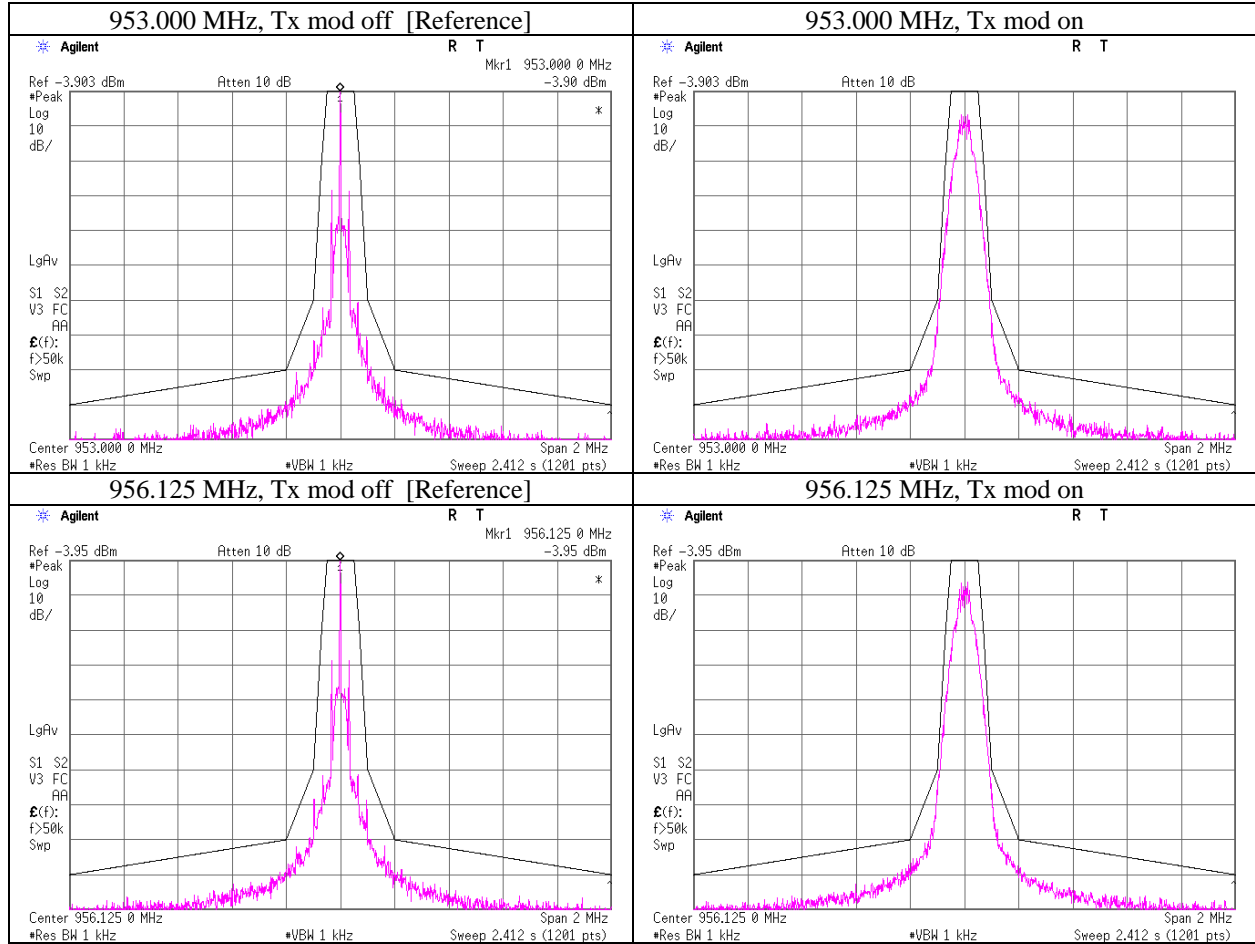
Necessary bandwidth

Test place	Ise EMC Lab. No.5 measurement room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	22 deg. C / 58 % RH
Engineer	Koji Yamamoto
Mode	Transmitting mode (Low Power)



Necessary bandwidth

Test place	Ise EMC Lab. No.5 measurement room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	22 deg. C / 58 % RH
Engineer	Koji Yamamoto
Mode	Transmitting mode (Low Power)



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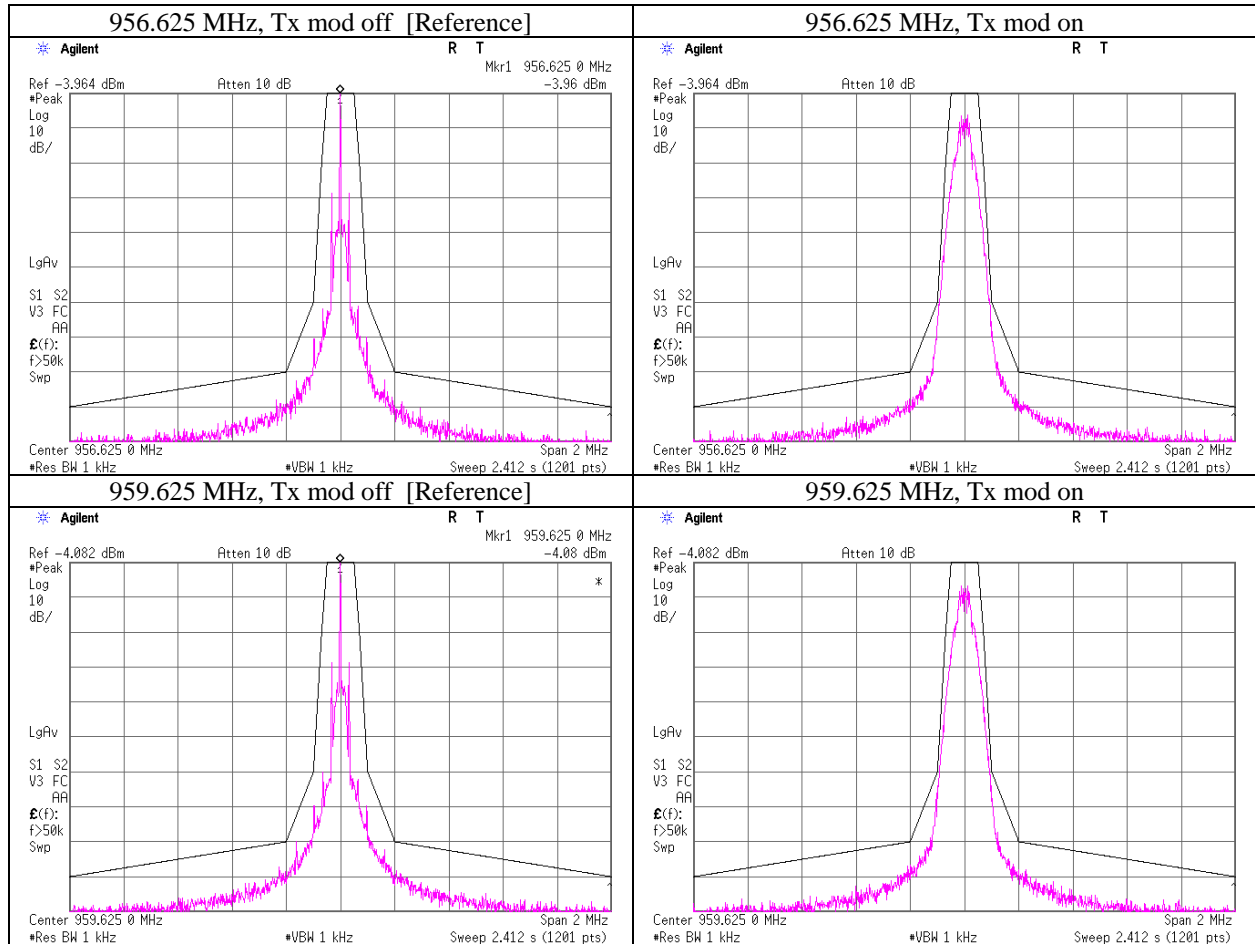
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

Necessary bandwidth

Test place	Ise EMC Lab. No.5 measurement room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	22 deg. C / 58 % RH
Engineer	Koji Yamamoto
Mode	Transmitting mode (Low Power)



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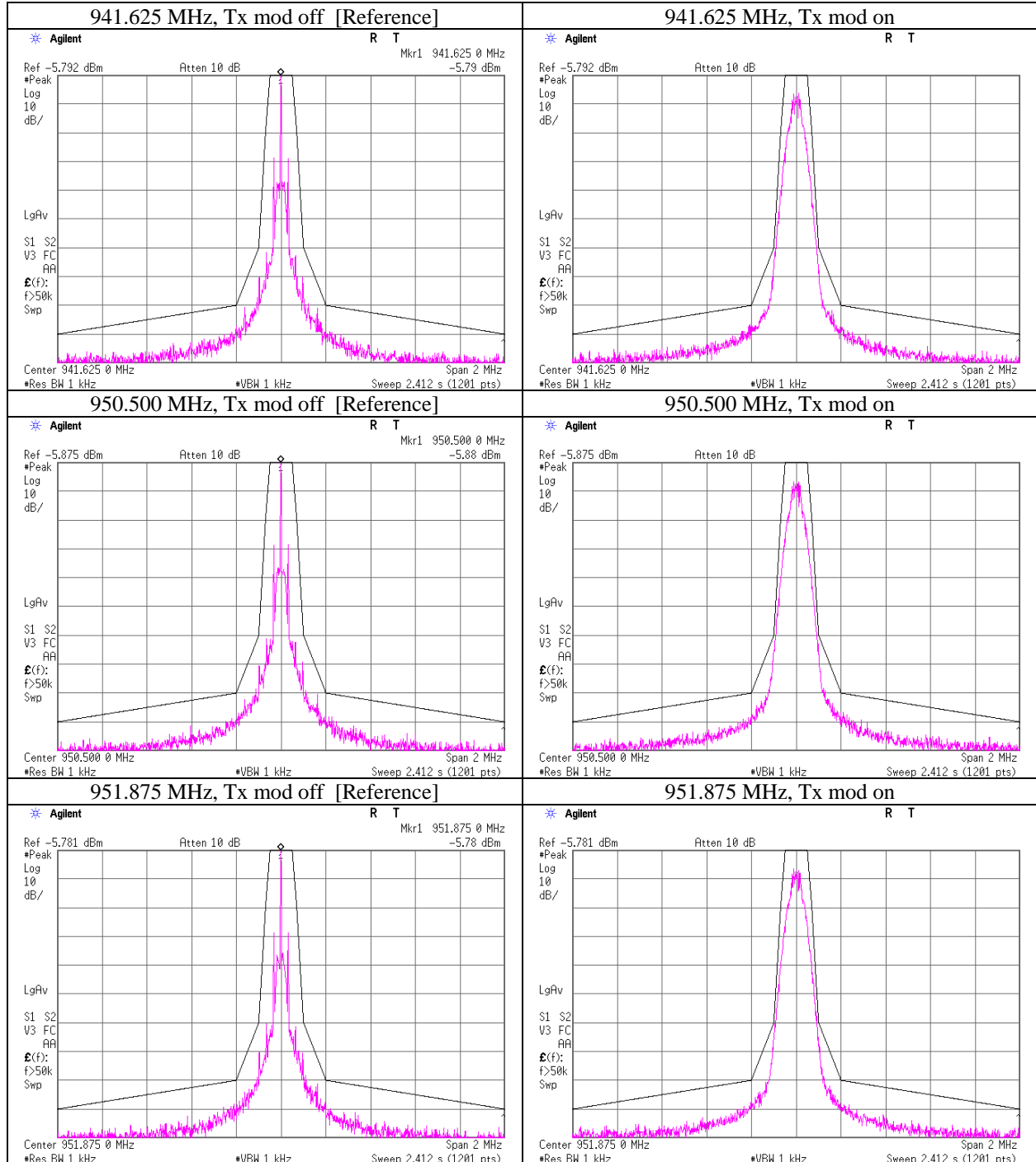
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Telephone : +81 596 24 8999

Facsimile : +81 596 24 8124

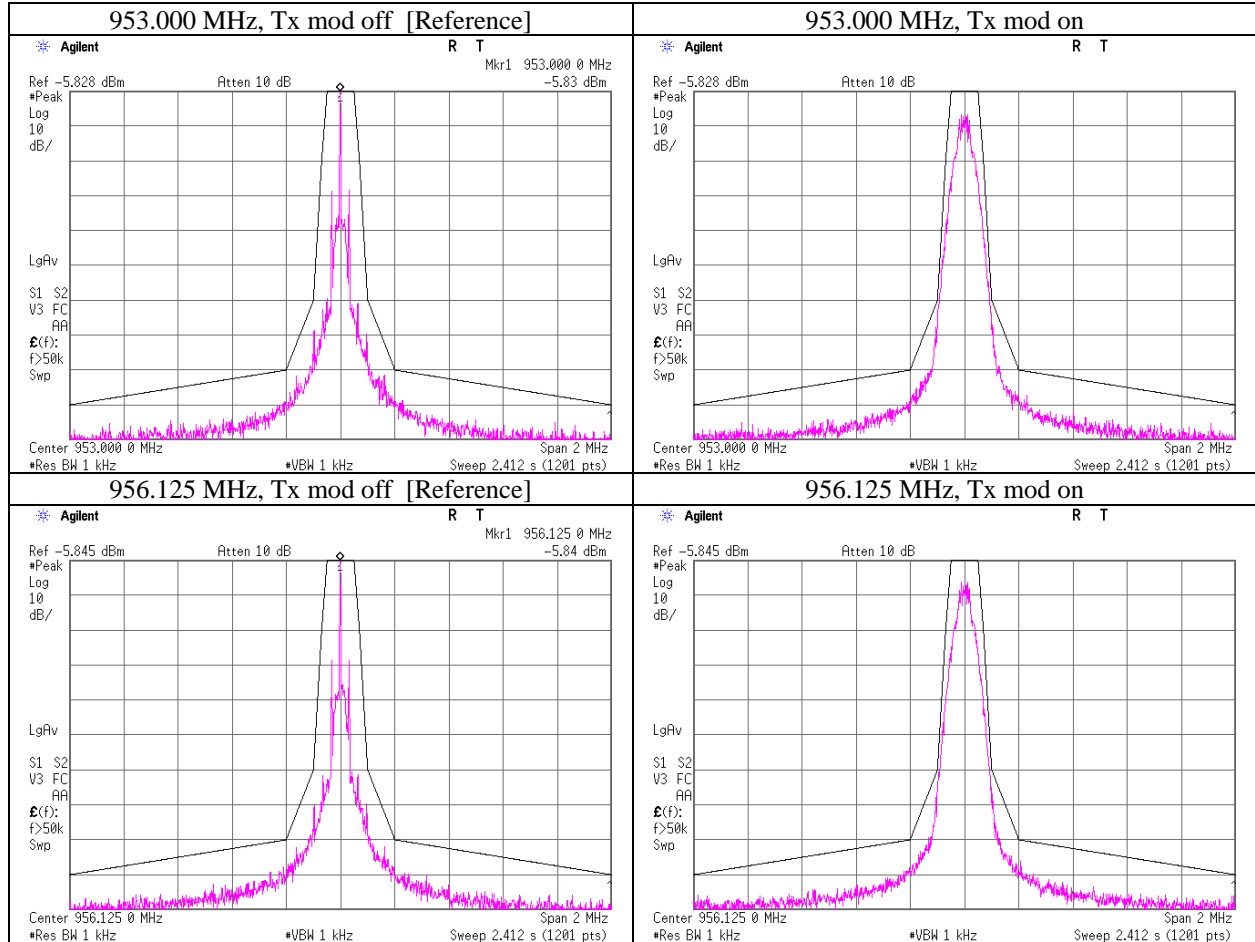
Necessary bandwidth

Test place	Ise EMC Lab. No.5 measurement room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	22 deg. C / 58 % RH
Engineer	Koji Yamamoto
Mode	Transmitting mode (High Power)



Necessary bandwidth

Test place	Ise EMC Lab. No.5 measurement room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	22 deg. C / 58 % RH
Engineer	Koji Yamamoto
Mode	Transmitting mode (High Power)

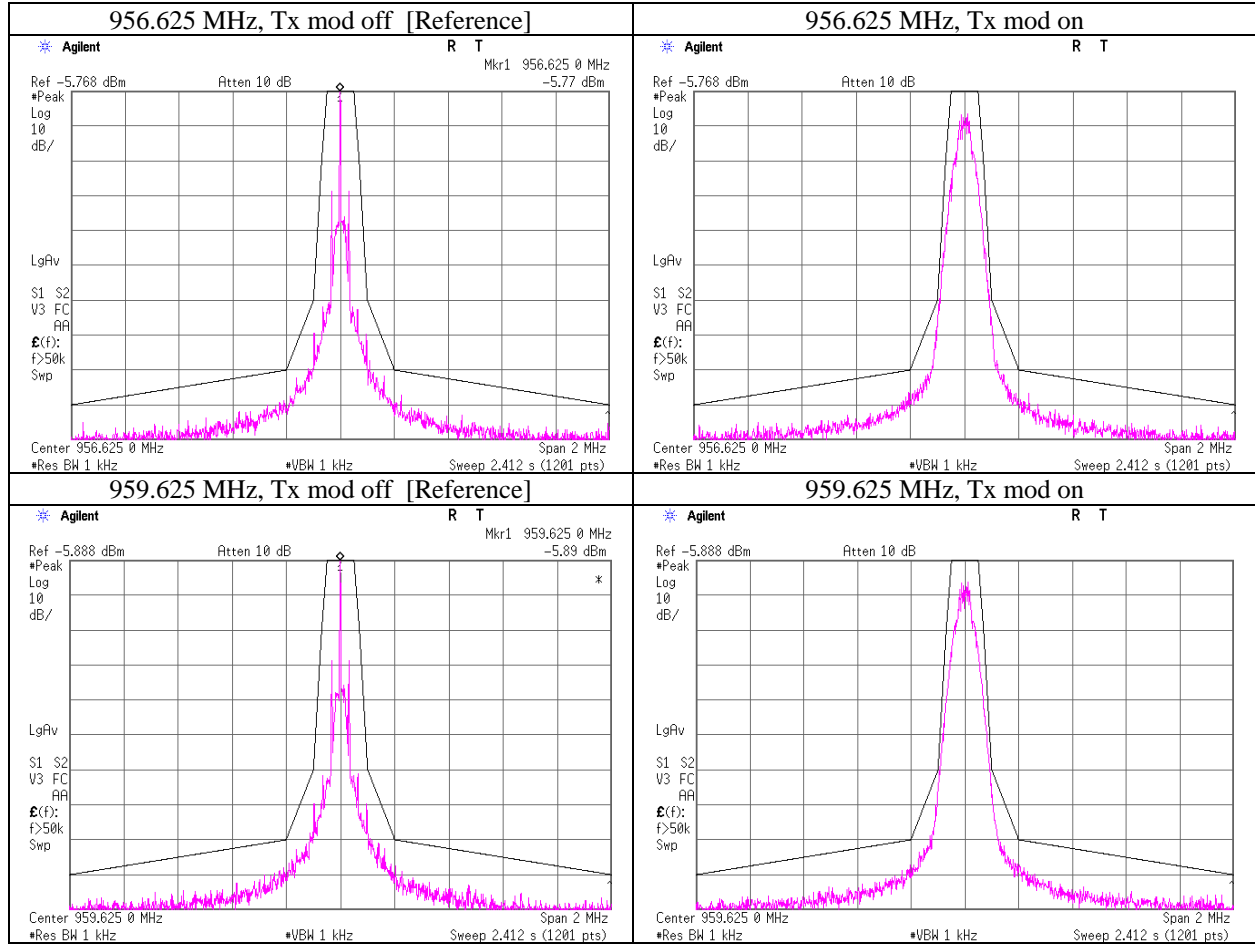


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Necessary bandwidth

Test place	Ise EMC Lab. No.5 measurement room
Report No.	11717813H
Date	07/05/2017
Temperature/ Humidity	22 deg. C / 58 % RH
Engineer	Koji Yamamoto
Mode	Transmitting mode (High Power)



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Field strength of spurious radiation

Report No. 11717813H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2 No.2
Date 05/12/2017 Day 05/12/2017 Night
Temperature / Humidity 24 deg. C / 51% RH 23 deg. C / 46% RH
Engineer Tomoki Matsui Shuichi Ohyama
(Below 1GHz) (Above 1GHz)
Mode Tx 941.625 MHz

[Power setting: Low]

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
	1883.25	56.1	54.0	-56.9				-62.2	3.6		10.6	0.0	-52.1	-57.4	-13.0	39.1		44.4	107
2824.88	56.4	56.8	-50.0	-48.3	4.4	11.1	0.0	-45.5	-43.8	-13.0	32.5	30.8	100	245	100	96			
3766.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
4708.13	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
5649.75	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
6591.38	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
7533.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
8474.63	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
9416.25	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-10GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-10GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz Test Receiver RMS (RW: 120kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)
Limit = mean output power in dBm - (43+10log10 (mean output power in watts)) dB = -13dBm

[Power setting: High]

Frequency [MHz]	Rx SA/TR Reading [dBuV]		Tx SG Reading [dBm]		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks		
	HOR	VER	HOR	VER				HOR	VER		HOR	VER	HOR	VER	Rx Ant. Height [cm]	Turn Table [deg.]		Rx Ant. Height [cm]	Turn Table [deg.]
	1883.25	50.8	49.0	-62.2				-67.2	3.6		10.6	0.0	-57.4	-62.4	-13.0	44.4		49.4	147
2824.88	61.7	63.6	-44.7	-41.5	4.4	11.1	0.0	-40.2	-37.0	-13.0	27.2	24.0	133	249	100	98			
3766.50	49.8	48.8	-57.5	-61.1	5.1	11.9	0.0	-52.9	-56.5	-13.0	39.9	43.5	100	153	100	0			
4708.13	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
5649.75	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
6591.38	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
7533.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
8474.63	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			
9416.25	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-			

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-10GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-10GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz Test Receiver RMS (RW: 120kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)
Limit = mean output power in dBm - (43+10log10 (mean output power in watts)) dB = -13dBm

Field strength of spurious radiation

Report No. 11717813H
Test place Ise EMC Lab.
Semi Anechoic Chamber No.2 No.2
Date 05/12/2017 Day 05/12/2017 Night
Temperature / Humidity 24 deg. C / 51% RH 23 deg. C / 46% RH
Engineer Tomoki Matsui Shuichi Ohyama
(Below 1GHz) (Above 1GHz)
Mode Tx 950.500 MHz

[Power setting: Low]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result		Limit (ERP) [dBm]	Margin		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]					(ERP) [dBm]			[dB]		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	HOR	VER	HOR	VER				HOR	VER		HOR	VER					
1901.00	53.2	53.4	-58.0	-61.6	3.6	10.7	0.0	-53.0	-56.6	-13.0	40.0	43.6	105	150	163	122	
2851.50	59.1	56.0	-47.4	-49.5	4.4	11.1	0.0	-42.9	-45.0	-13.0	29.9	32.0	158	66	106	96	
3802.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
4752.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
5703.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
6653.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
7604.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
8554.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
9505.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-10GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-10GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz Test Receiver RMS (RW: 120kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)
Limit = mean output power in dBm - (43+10log10 (mean output power in watts)) dB = -13dBm

[Power setting: High]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result		Limit (ERP) [dBm]	Margin		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]					(ERP) [dBm]			[dB]		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	HOR	VER	HOR	VER				HOR	VER		HOR	VER					
1901.00	53.4	49.5	-57.8	-65.5	3.6	10.7	0.0	-52.8	-60.5	-13.0	39.8	47.5	100	169	100	120	
2851.50	61.2	59.6	-45.3	-45.9	4.4	11.1	0.0	-40.8	-41.4	-13.0	27.8	28.4	100	46	100	96	
3802.00	50.2	49.3	-56.9	-59.0	5.1	11.9	0.0	-52.3	-54.4	-13.0	39.3	41.4	119	214	133	0	
4752.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
5703.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
6653.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
7604.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
8554.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
9505.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	

Calculation Result = SG Reading - Tx Cable Loss + Tx Antenna Gain - Tx Antenna Attenuator Loss -2.15
Rx-ANTENNA : Biconical Antenna(30M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-10GHz)
Tx-ANTENNA : 120MHz tuned Dipole Antenna(30M-120MHz), Dipole Antenna(120M-1000MHz), Horn Antenna(1G-10GHz)
Other frequency noises omitted in this report were not seen or had enough margin (more than 20dB).
NS : No signal detect.
Detector : Below 1GHz Test Receiver RMS (RW: 120kHz)
Above 1GHz: Spectrum Analyzer RMS Average(RBW:1MHz/VBW:3MHz)
Limit = mean output power in dBm - (43+10log10 (mean output power in watts)) dB = -13dBm

Field strength of spurious radiation

Report No.	11717813H	
Test place	Ise EMC Lab.	
Semi Anechoic Chamber	No.2	No.2
Date	05/12/2017 Day	05/12/2017 Night
Temperature / Humidity	24 deg. C / 51% RH	23 deg. C / 46% RH
Engineer	Tomoki Matsui (Below 1 GHz)	Shuichi Ohyama (Above 1 GHz)
Mode	Tx 959.625 MHz	

[Power setting: Low]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]					(ERP)			[dB]		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	HOR	VER	HOR	VER	HOR	VER	HOR	VER	HOR	VER	HOR	VER	HOR	VER			
1919.25	54.0	52.7	-54.5	-60.2	3.6	10.8	0.0	-49.4	-55.1	-13.0	36.4	42.1	107	145	126	121	
2878.88	59.2	56.5	-46.9	-49.6	4.4	11.1	0.0	-42.4	-45.1	-13.0	29.4	32.1	155	71	100	258	
3838.50	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
4798.13	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
5757.75	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
6717.38	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
7677.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
8636.63	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
9596.25	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	

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

Rx-ANTENNA : Biconical Antenna(30M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-10GHz)

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

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

NS : No signal detect.

Detector : Below 1GHz Test Receiver RMS (RW: 120kHz)

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

Limit = mean output power in dBm - (43+10log10 (mean output power in watts)) dB = -13dBm

[Power setting: High]

Frequency [MHz]	Rx SA/TR		Tx SG		Tx Cable Loss [dB]	Tx Ant. Gain [dBi]	Tx Ant. Atten. Loss [dB]	Result (ERP) [dBm]		Limit (ERP) [dBm]	Margin [dB]		Horizontal		Vertical		Remarks
	Reading [dBuV]		Reading [dBm]					(ERP)			[dB]		Rx Ant. Height [cm]	Turn Table [deg.]	Rx Ant. Height [cm]	Turn Table [deg.]	
	HOR	VER	HOR	VER	HOR	VER	HOR	VER	HOR	VER	HOR	VER	HOR	VER			
1919.25	60.6	53.2	-47.9	-59.7	3.6	10.8	0.0	-42.8	-54.6	-13.0	29.8	41.6	100	171	100	347	
2878.88	63.9	58.3	-42.2	-47.8	4.4	11.1	0.0	-37.7	-43.3	-13.0	24.7	30.3	155	70	100	94	
3838.50	50.5	49.4	-56.3	-59.2	5.2	12.0	0.0	-51.6	-54.5	-13.0	38.6	41.5	100	222	132	46	
4798.13	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
5757.75	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
6717.38	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
7677.00	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
8636.63	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	
9596.25	NS	NS	-	-	-	-	-	-	-	-13.0	-	-	-	-	-	-	

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

Rx-ANTENNA : Biconical Antenna(30M-200MHz), Logperiodic Antenna(200M-1000MHz), Horn Antenna(1G-10GHz)

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

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

NS : No signal detect.

Detector : Below 1GHz Test Receiver RMS (RW: 120kHz)

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

Limit = mean output power in dBm - (43+10log10 (mean output power in watts)) dB = -13dBm

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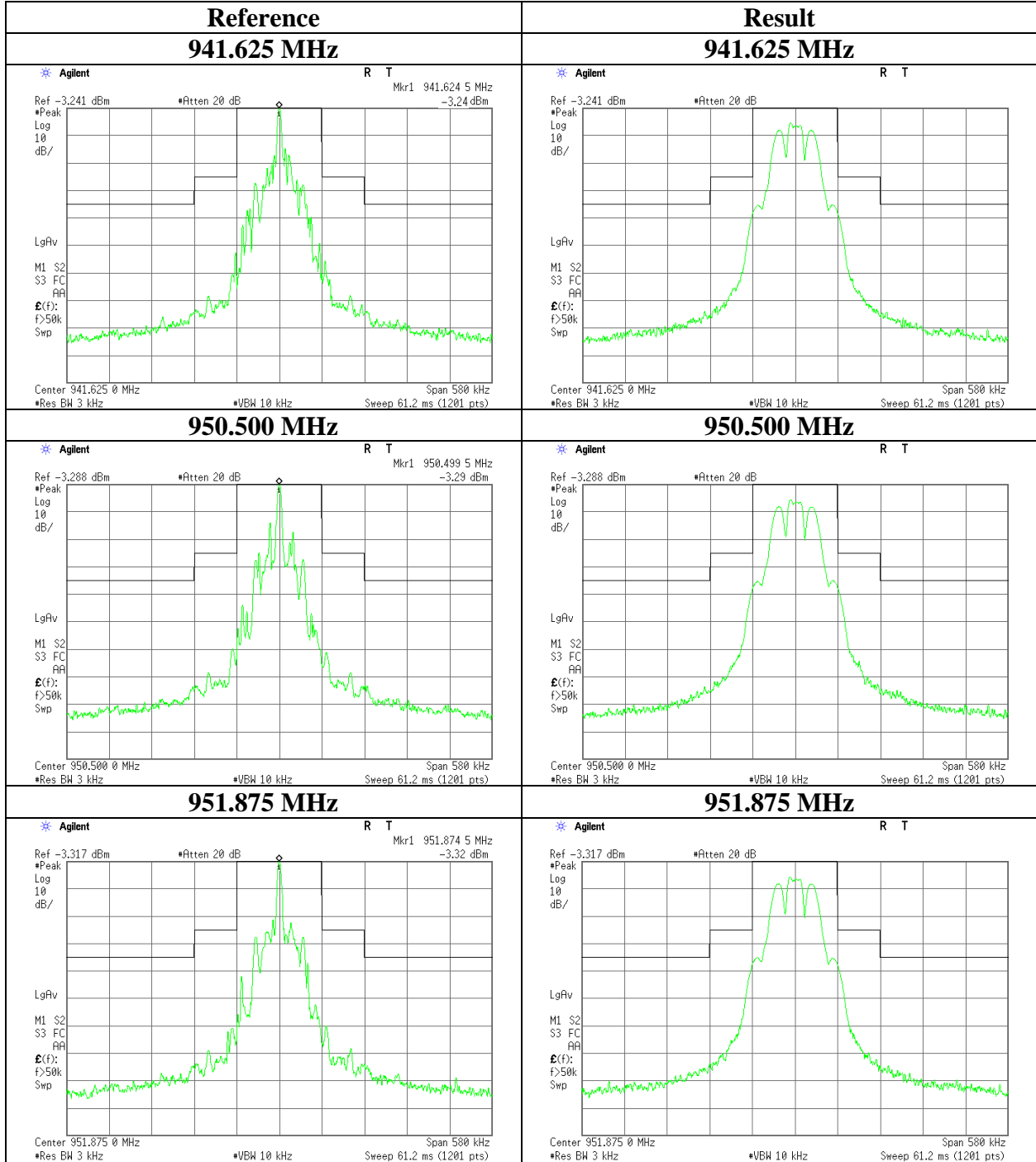
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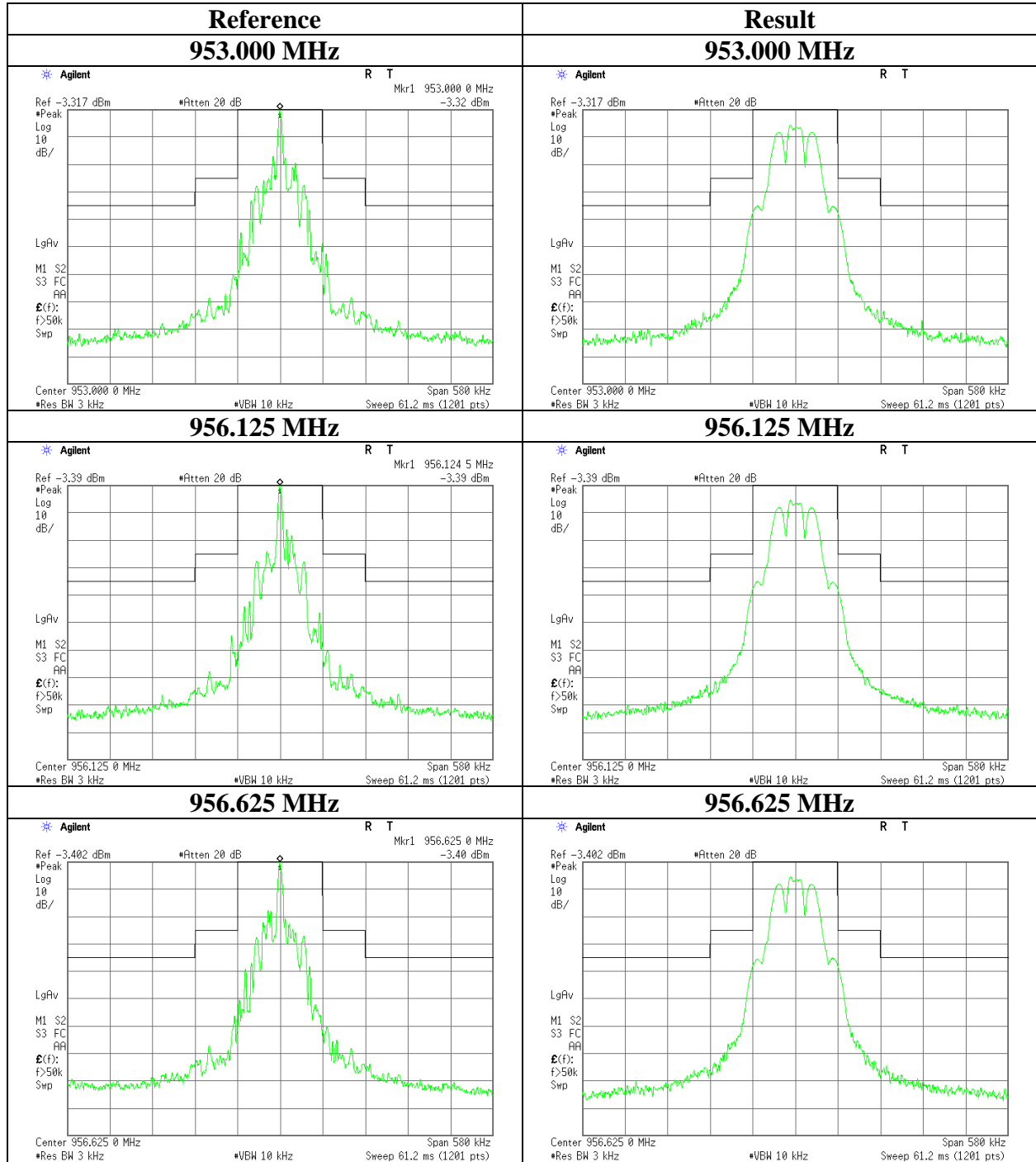
Field strength of spurious radiation [Side band spectrum measurement]

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 11717813H
 Date : 07/05/2017
 Temperature/ Humidity : 25 deg. C / 57% RH
 Engineer : Takumi Shimada
 Mode : Tx Power Setting : Low



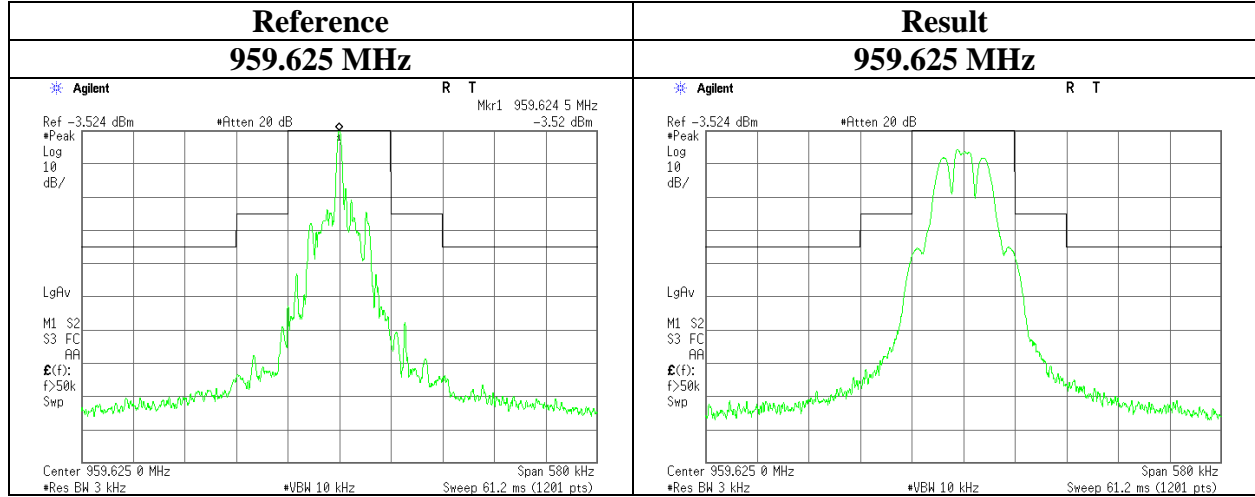
Field strength of spurious radiation [Side band spectrum measurement]

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Field strength of spurious radiation [Side band spectrum measurement]

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 Mode : Tx Power Setting : Low

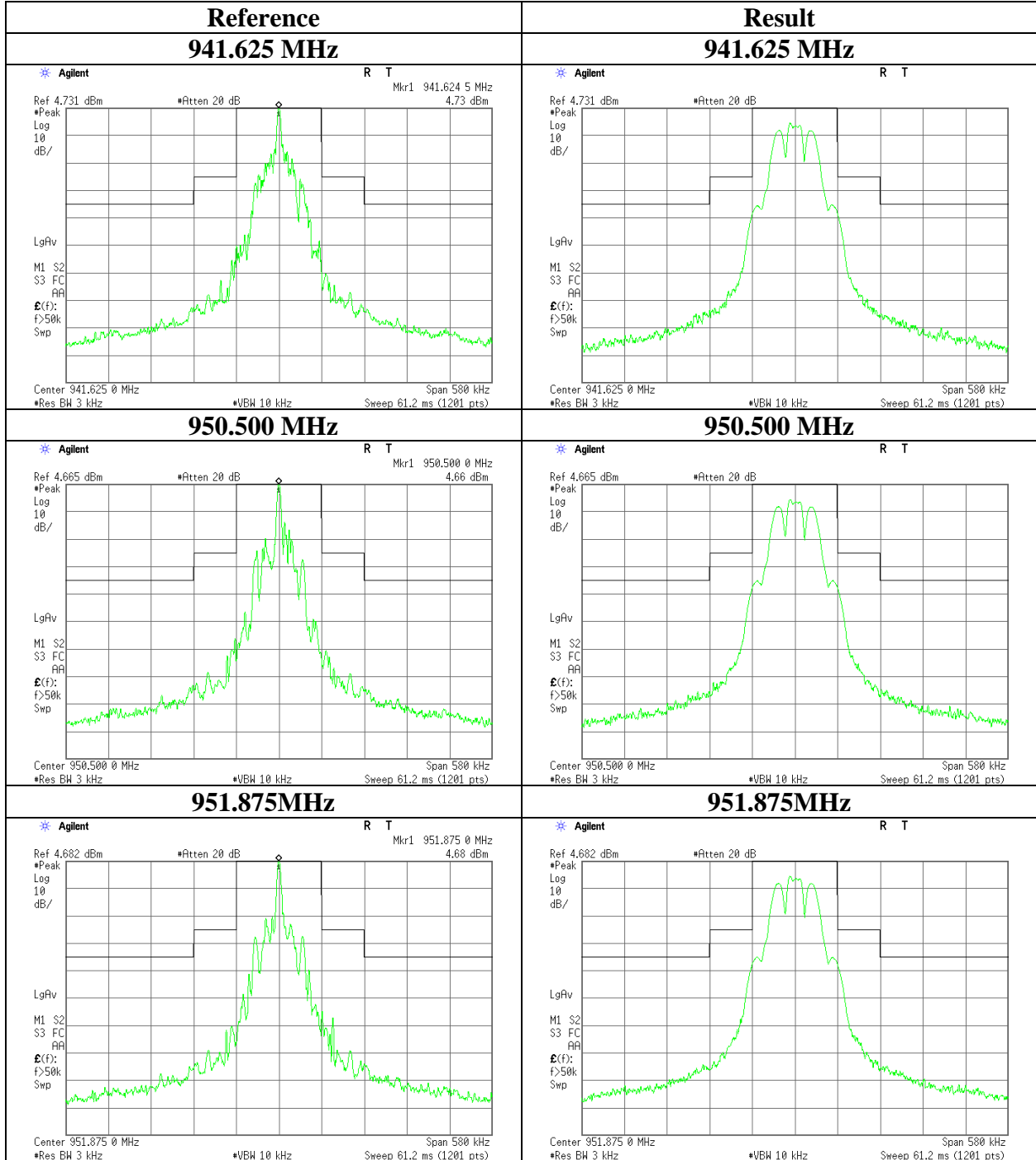


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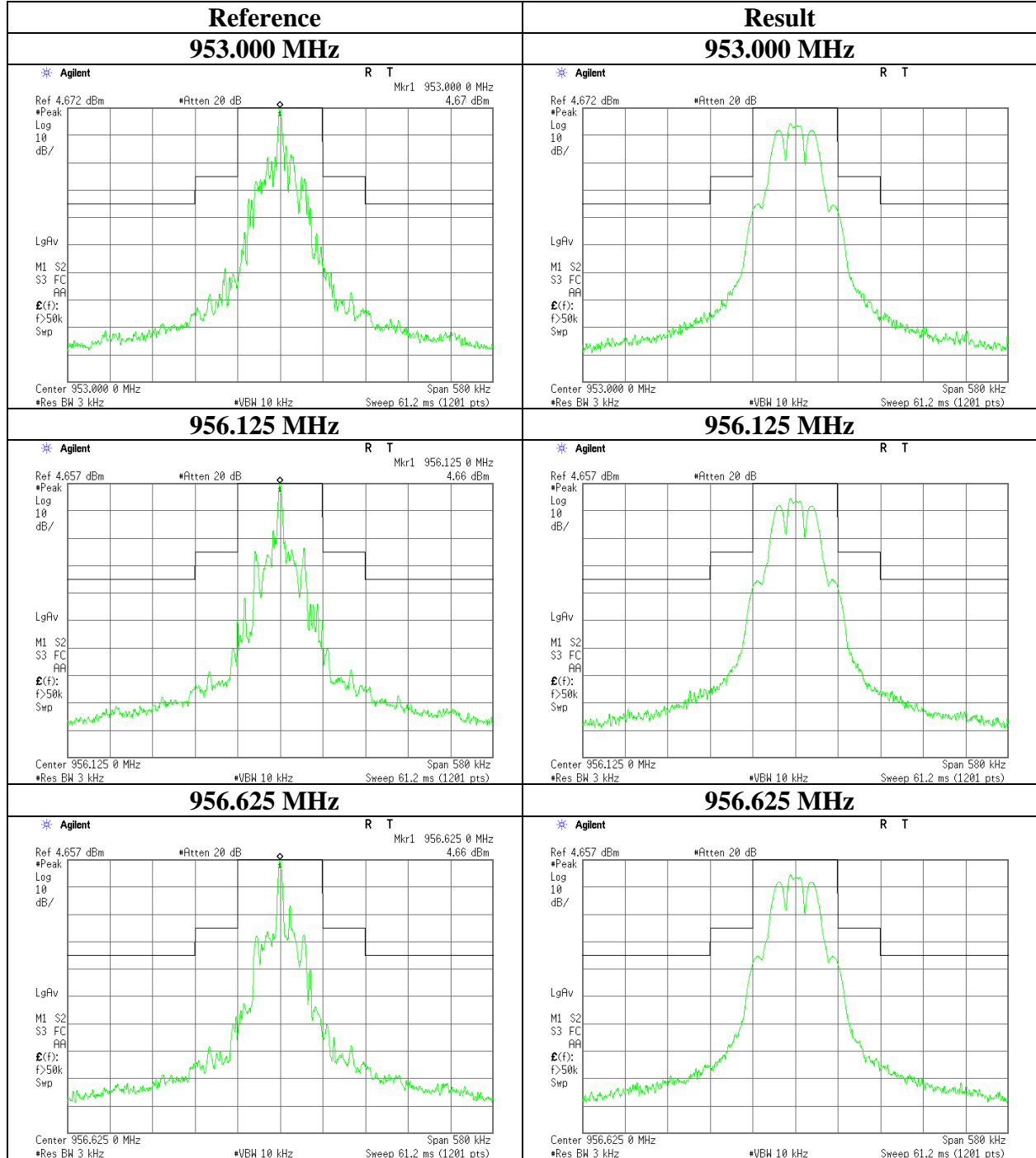
Field strength of spurious radiation [Side band spectrum measurement]

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 11717813H
 Date : 07/05/2017
 Temperature/ Humidity : 25 deg. C / 57% RH
 Engineer : Takumi Shimada
 Mode : Tx Power Setting : High



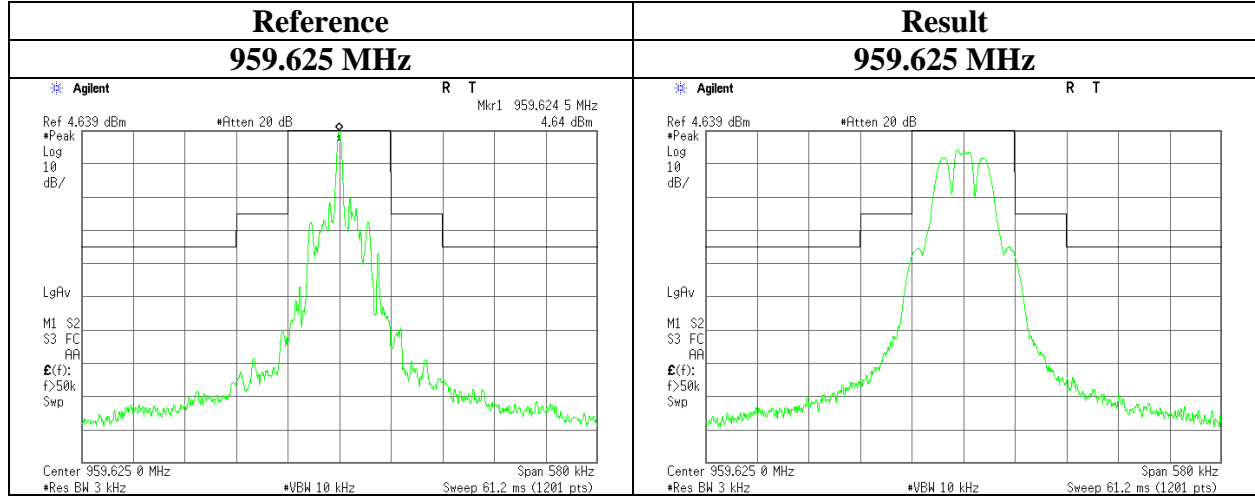
Field strength of spurious radiation [Side band spectrum measurement]

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 11717813H
 Date : 07/05/2017
 Temperature/ Humidity : 25 deg. C / 57% RH
 Engineer : Takumi Shimada
 Mode : Tx Power Setting : High



Field strength of spurious radiation [Side band spectrum measurement]

Test place : Ise EMC Lab. No.11 Measurement Room
 Report No. : 11717813H
 Date : 07/05/2017
 Temperature/ Humidity : 25 deg. C / 57% RH
 Engineer : Takumi Shimada
 Mode : Tx Power Setting : High



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Frequency stability

Test place	Ise EMC Lab. No.6 measurement room
Report No.	11717813H
Date	06/08/2017
Temperature/ Humidity	22 deg. C / 45 % RH
Engineer	Koji Yamamoto
Mode	Tx 950.500 MHz

Varying Temperature

Test condition		Tested frequency [MHz]	Measured frequency [MHz]	Frequency error [MHz]	Result [%]	Limit [+/- %]	Remarks
Temp. [deg. C]	Voltage [V]						
50	3.00	950.500	950.499691	-0.000309	-0.00003	0.005	
40	3.00	950.500	950.499708	-0.000292	-0.00003	0.005	
30	3.00	950.500	950.499758	-0.000242	-0.00003	0.005	
20	3.00	950.500	950.499900	-0.000100	-0.00001	0.005	
10	3.00	950.500	950.499715	-0.000285	-0.00003	0.005	
0	3.00	950.500	950.499698	-0.000302	-0.00003	0.005	
-10	3.00	950.500	950.499862	-0.000138	-0.00001	0.005	
-20	3.00	950.500	950.499972	-0.000028	0.00000	0.005	
-30	3.00	950.500	950.500217	0.000217	0.00002	0.005	

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

Varying Supply Voltage

Test condition		Tested frequency [MHz]	Measured frequency [MHz]	Frequency error [MHz]	Result [%]	Limit [+/- %]	Remarks
Temp. [deg. C]	Voltage [V]						
20	5.00	950.500	950.499802	-0.000198	-0.00002	0.005	USB Power (nominal)
20	4.25	950.500	950.499796	-0.000204	-0.00002	0.005	USB Power (-15 %)
20	5.75	950.500	950.499710	-0.000290	-0.00003	0.005	USB Power (+15 %)
20	3.00	950.500	950.499900	-0.000100	-0.00001	0.005	Battery Power
20	1.96	950.500	950.499681	-0.000319	-0.00003	0.005	Battery End Point

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

APPENDIX 2: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MOS-14	Thermo-Hygrometer	Custom	CTH-201	1401	RE/AT	2017/01/20 * 12
MCH-04	Temperature and Humidity Chamber	Tabai Espec	PL-2KP	14015723	RE	2016/08/30 * 12
MFC-01	Microwave Counter	Advantest	R5373	120100309	RE/AT	2016/06/01 * 12 *1)
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE	2016/08/02 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE	2016/12/13 * 12
MJM-14	Measure	KOMELON	KMC-36	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-04	Spectrum Analyzer	Agilent	E4448A	US44300523	RE	2016/11/10 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE	2016/10/21 * 12
MBA-08	Biconical Antenna	Schwarzbeck	VHA9103B	08031	RE	2016/09/29 * 12
MLA-21	Logperiodic Antenna (200-1000MHz)	Schwarzbeck	VUSLP9111B	911B-190	RE	2017/01/05 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2017/02/24 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2016/11/28 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2016/09/13 * 12
MMM-01	Digital Tester	Fluke	FLUKE 26-3	78030611	RE	2016/08/23 * 12
YTSSG03	Signal Generator	Rohde & Schwarz	SMT02	51400043	RE	2016/08/23 * 12
MCC-125	Coaxial Cable	UL Japan	-	-	RE	2016/07/19 * 12
MDA-03	Dipole Antenna	Schwarzbeck	UHAP	991	RE	2016/10/17 * 12
MHA-06	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	254	RE	2017/02/24 * 12
MCC-216	Microwave Cable	Junkosha	MWX221	1604S253(1 m) / 1608S087(5 m)	RE	2016/08/29 * 12
MPA-10	Pre Amplifier	Agilent	8449B	3008A02142	RE	2017/01/16 * 12
MHF-27	High Pass Filter (1.1-10GHz)	TOKYO KEIKI	TF219CD1	1001	RE	2017/01/16 * 12
MSG-16	Signal Generator	Rohde & Schwarz	SMR40	100137	RE	2016/06/29 * 12 *1)
MCC-130	Microwave Cable (1-30GHz)	HUBER+SUHNER	SF103/11PC3.5-31/11PC3.5-31/8.0m	54308/3	RE	2017/01/16 * 12
MHA-30	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	1611	RE	2016/09/29 * 12
MPM-09	Power Meter	Anritsu	ML2495A	6K00003348	AT	2016/10/17 * 12
MPSE-12	Power sensor	Anritsu	MA2411B	011598	AT	2016/10/17 * 12
MCC-208	Microwave Cable	RS Components	R-132G7210200CD	-	AT	2017/02/03 * 12
MCH-07	Temperature Chamber	ESPEC CORP.	SU-241	92013843	AT	2016/07/27 * 12
MMM-12	DIGITAL HiTESTER	Hioki	3805	060500120	AT	2017/02/15 * 12
MSA-13	Spectrum Analyzer	Agilent	E4440A	MY46185823	AT	2016/06/17 * 12 *1)
MOS-17	Thermo-Hygrometer	Custom	CTH-180	1701	AT	2017/01/20 * 12
MMM-09	DIGITAL HiTESTER	Hioki	3805	051201195	AT	2017/01/12 * 12
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	AT	2016/08/17 * 12
MHT-08	Audio Analyzer (with Bluetooth Tester)	AudioPrecision	APx525	APX2-270709	AT	2016/11/30 * 12
MJG-54	ITU-R BS, 559-2 Colored Noise Filter	UL Japan	-	-	AT	Pre Check
MJG-55	Video Amplifier	UNITEK ELECTROBICS INC.	UTK-200	0505001	AT	Pre Check
MCC-173	Microwave Cable	Junkosha	MWX221	1409S496	AT	2017/03/13 * 12
MAT-21	Attenuator(20dB) (above1GHz)	HIROSE ELECTRIC CO.,LTD.	AT-120	901247	AT	2016/12/14 * 12
MAT-57	Attenuator(10dB)	Suhner	6810.19.A	-	AT	2016/12/15 * 12
MCC-206	Microwave Cable	RS Components	R-132G7210200CD	-	AT	2017/02/03 * 12
MAT-22	Attenuator(10dB) 1-18GHz	Orient Microwave	BX10-0476-00	-	AT	2017/03/21 * 12
MRENT-130	Spectrum Analyzer	Agilent	E4440A	MY46187750	AT	2017/06/20 * 12
MOS-19	Thermo-Hygrometer	Custom	CTH-201	0001	AT	2016/12/13 * 12
MFG-04	Function Generator	Agilent	33612A	MY53400159	AT	2017/01/19 * 12
MAT-10	Attenuator(10dB)	Weinschel Corp	2	BL1173	AT	2016/11/28 * 12
MCC-64	Coaxial Cable	UL Japan	-	-	AT	2017/03/24 * 12

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

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The expiration date of the calibration is the end of the expired month.
All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or international standards.

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

Test Item: **RE: Radiated Emission**
 AT: Antenna Terminal Conducted test