Japan

TEST REPORT

Report number : JPD-TR-18130-0
Issue date : November 29, 2018

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

FCC Part 22 Subpart H

The test results are traceable to the international or national standards.

Applicant	:	Japan Radio Co., Ltd.
Equipment under test (EUT)	:	IT Controller for mini excavators
Model number	:	JRN-330K
FCC ID	:	CKEJRN-330K

Date of test : June 12, 13, 19, 20, 2018
Test place : TÜV SÜD Zacta Ltd. Yonezawa Testing Center
5-4149-7, Hachimanpara, Yonezawa-shi,
Yamagata, 992-1128 Japan
Phone: +81-238-28-2881 Fax: +81-238-28-2888
Test results : Complied

The results in this report are applicable only to the equipment tested.
This report shall not be re-produced except in full without the written approval of TÜV SÜD Japan Ltd.
This test report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, ILAC-MRA, or any agency of the federal government.

Tested by : Taiki Watanabe
Taiki Watanabe

Approved by : Hiro Suzuki
Hiroaki Suzuki
Deputy Manager of RF Group

NVLAP TESTING
NVLAP LAB CODE 200306-0

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to FCC Part 22 Subpart H.

1.2 Standards

CFR47 FCC Part 22 Subpart H

1.2.1 Test Methods

KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA-603-D-2010

1.2.2 Deviation from standards

None

1.3 List of applied test to the EUT

Test items Section	Test items	Condition	Result
2.1046	Conducted Output Power	Conducted	PASS
22.913(a)	Effective Radiated Power	Radiated	PASS
22.917(a) 2.1049	Occupied Bandwidth	Conducted	PASS
22.917(a) 2.1051	Band Edge Spurious and Harmonic at Antenna Terminal	Conducted	PASS
22.917(a) 2.1053	Radiated emissions and Harmonic Emissions	Radiated	PASS
22.355 2.1055	Frequency Stability	Conducted	PASS

1.3.1 Test set up

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1.4 Modification to the EUT by laboratory

None

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2. Equipment Under Test

2.1 General Description of equipment

EUT is the IT Controller for mini excavators.

2.2 EUT information

Applicant	:	Japan Radio Co., Ltd. 21-11, Mure 6-Chome, Mitaka-shi, Tokyo 181-0002, Japan Phone : +81-26-214-0267 Fax: +81-26-214-5779
Equipment under test	:	IT Controller for mini excavators
Trade name	:	JRC
Model number	:	JRN-330K
Serial number	:	000000000073
EUT condition	:	Prototype
Power ratings	:	DC 10-32V
Size	:	(W) 110 × (D) 50 × (H) 25 mm (excluding the protuberance)
Environment	:	Indoor and Outdoor use
Terminal limitation	:	-30˚C to 70˚C
RF Specification		
Frequency of Operation	:	Up Link WCDMA Band V: 826.4-846.6MHz Down Link WCDMA Band V: 871.4-891.6MHz
Modulation type	:	WCDMA Band V: QPSK, 16QAM
Emission designator	:	WCDMA Band V: 4M13F9W
Effective Radiated Power (E.R.P.)	:	WCDMA Band V: 0.101W (20.03dBm)
Antenna type	:	Internal antenna
Antenna gain	:	WCDMA Band V: -2.2dBi

Japan

2.3 Variation of the family model(s)

Not applicable

2.4 Description of Test mode

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Band	Channel	Frequency [MHz]
WCDMA Band V	4132	826.4
	4183	836.6
	4233	846.6

The field strength of spurious emissions was measured at each position of all three axis X, Y and Z to compare the level, and the maximum noise.
The worst emission was found in Z axis and the worst case recorded.

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3. Configuration of equipment

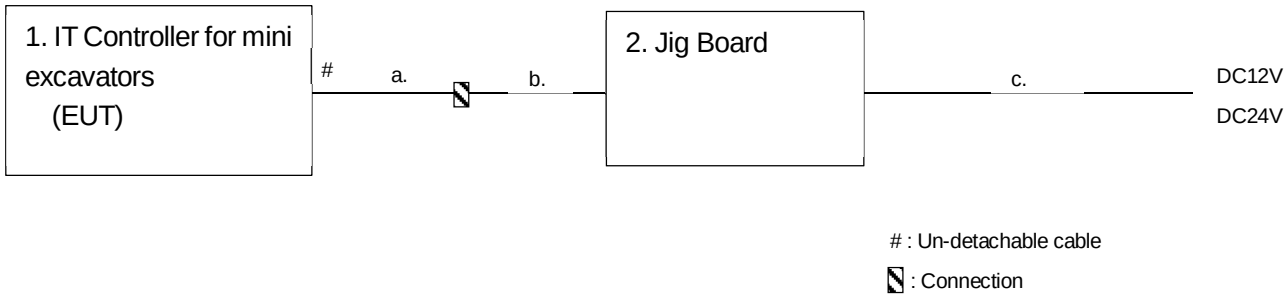
3.1 Equipment(s) used

No.	Equipment	Company	Model No.	Serial No.	FCC ID / DoC	Comment
1	IT Controller for mini excavators	JRC	JRN-330K	000000000073	CKEJRN-330K	EUT
2	Jig Board	JRC	JRN-330K-JIG	N/A	-	-

3.2 Cable(s) used

No.	Cable	Length[m]	Shield	Comment
a	I/F Cable	0.2	No	Accessory
b	I/F Cable	2.0	No	-
c	DC cable	1.0	No	

3.3 System configuration



Note1: Numbers assigned to equipment or cables on this diagram correspond to the list in "3.1 Equipment(s) used" and "3.2 Cable(s) used".

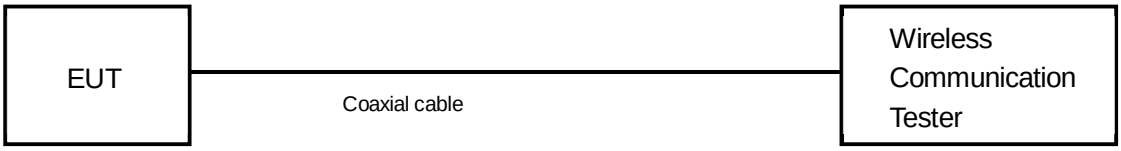
Japan

4. Conducted Output Power

4.1 Measurement procedure [FCC 2.1046]

The conducted output power was measured with a wireless communication tester connected to the antenna terminal. The wireless communication tester parameters were set to produce the maximum power from the EUT.

- Test configuration



4.2 Measurement result

Date : June 19, 2018
Temperature : 25.7 [˚C]
Humidity : 46.8 [%]
Test place : Shielded room No.4

Test engineer : Taiki Watanabe

[WCDMA Band V (DC12V)]

3GPP Release Version	Mode		Sub-Test	Power [dBm]			MPR	Bc	ßd	Bc/ßd
	Channel			4132	4183	4233				
	Frequency [MHz]			826.4	836.6	846.6				
99	W-CDMA	RMC	-	22.56	22.62	22.96	-	-	-	-
		AMR		-	-	-				
5	HSDPA (Cellular)		1	21.66	21.6	21.6	0	2/15	15/15	2/15
5			2	19.58	19.32	19.43	0	12/15	15/15	12/15
5			3	19.35	19.31	19.35	0.5	15/15	8/15	15/8
5			4	19.19	19.07	19.33	0.5	15/15	4/15	15/4
6	HSUPA		1	21.3	21.13	20.42	0	11/15	15/15	11/15
6			2	20.17	20.28	20.48	2	6/15	15/15	6/15
6			3	20.59	20.47	20.82	1	15/15	9/15	15/9
6			4	20.92	20.83	20.64	2	2/15	15/15	2/15
6			5	22.26	22.16	22.23	0	15/15	15/15	15/15

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[WCDMA Band V (DC24V)]

3GPP Release Version	Mode		Sub-Test	Power [dBm]			MPR	Bc	ßd	Bc/ßd
	Channel			4132	4183	4233				
	Frequency [MHz]			826.4	836.6	846.6				
99	W-CDMA	RMC	-	22.65	22.67	22.91	-	-	-	-
		AMR		-	-	-				
5	HSDPA (Cellular)		1	20.82	20.98	20.81	0	2/15	15/15	2/15
5			2	19.45	19.41	19.38	0	12/15	15/15	12/15
5			3	19.24	19.25	19.3	0.5	15/15	8/15	15/8
5			4	19.15	19.1	19.29	0.5	15/15	4/15	15/4
6	HSUPA		1	21.36	21.42	21.33	0	11/15	15/15	11/15
6			2	20.3	20.28	20.68	2	6/15	15/15	6/15
6			3	20.52	20.63	20.96	1	15/15	9/15	15/9
6			4	20.78	20.74	20.97	2	2/15	15/15	2/15
6			5	22.42	22.45	22.48	0	15/15	15/15	15/15

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5. Effective Radiated Power

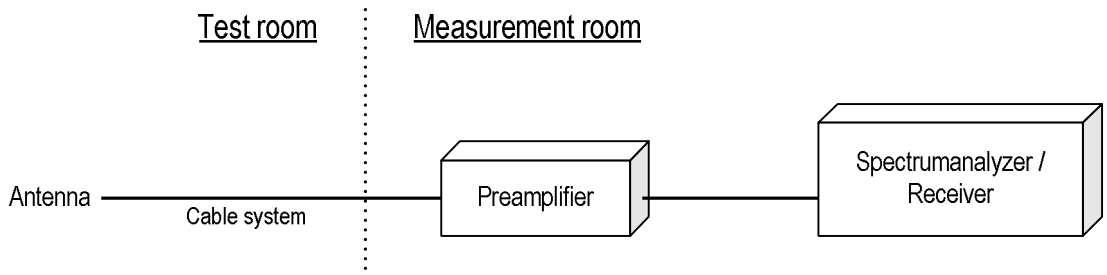
5.1 Measurement procedure [FCC 22.913(a)]

<Step 1>
The EUT and support equipment are placed on a 0.6 meter x 0.6 meter surface, 0.8 meter height styrene foam table. Radiated emission measurements are performed at 3 meter distance with the broadband antenna (Log periodic antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission.
The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission.

<Step 2>
The substitution antenna is replaced by the transmitter antenna (EUT).
The frequency of the signal generator is adjusted to the measurement frequency.
Level of the signal generator is adjusted to the level that is obtained from step 1, and record the emission level of signal generator.

The spectrum analyzer is set to;
a) Span = 1.5 times the OBW
b) RBW = 1-5% of the expected OBW, not to exceed 1MHz
c) VBW ≥ 3 x RBW
d) Number of sweep points ≥ 2 x span / RBW
e) Sweep time = auto-couple
f) Detector = RMS (power averaging)
g) If the EUT can be configured to transmit continuously (i.e., burst duty cycle ≥ 98%), then set the trigger to free run.
h) If the EUT cannot be configured to transmit continuously (i.e., burst duty cycle < 98 %), then use a sweep trigger with the level set to enable triggering only on full power bursts and configure the EUT to transmit at full power for the entire duration of each sweep. Ensure that the sweep time is less than or equal to the transmission burst duration.
i) Trace average at least 100 traces in power averaging (i.e., RMS) mode.
j) Compute the power by integrating the spectrum across the OBW of the signal using the instrument's band power measurement function, with the band limits set equal to the OBW band edges. If the instrument does not have a band power function, then sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

- Test configuration



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5.2 Calculation method

Result(ERP) = Ant. Input - Cable loss + Antenna Gain
Margin = Limit – Result (ERP)

Example:
Limit @ 836.6MHz : 38.45dBm
Ant. Input = 33.3dBm Cable loss = 0.7dB Ant. Gain = -10.7dBd
Result = 33.3 - 0.7 + (-10.7) = 21.9dBm
Margin = 38.45 – 21.9= 16.55dB

5.3 Limit

7 W (38.45dBm)

Japan

5.4 Test data

Date	:	June 12, 2018			
Temperature	:	22.6 [˚C]			
Humidity	:	59.6 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Taiki Watanabe

Date	:	June 13, 2018			
Temperature	:	21.9 [˚C]			
Humidity	:	50.6 [%]	Test engineer	:	
Test place	:	3m Semi-anechoic chamber			Taiki Watanabe

[WCDMA Band V (DC12V)]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	826.4	-19.10	23.41	0.75	-6.63	16.03	38.45	22.42
H	836.6	-18.80	24.54	0.76	-6.58	17.20	38.45	21.25
H	846.6	-17.30	25.98	0.76	-6.54	18.68	38.45	19.77

[WCDMA Band V (DC24V)]

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBd]	Result [dBm]	Limit [dBm]	Margin [dB]
H	826.4	-15.20	27.41	0.75	-6.63	20.03	38.45	18.42
H	836.6	-16.50	27.04	0.76	-6.58	19.70	38.45	18.75
H	846.6	-16.60	26.58	0.76	-6.54	19.28	38.45	19.17

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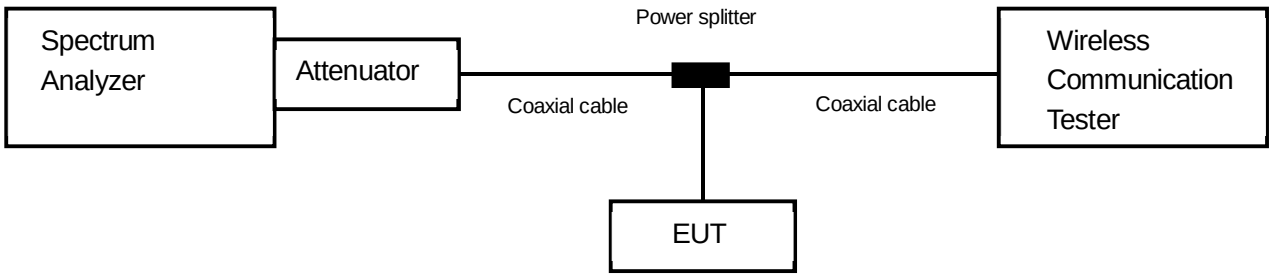
6. Occupied Bandwidth

6.1 Measurement procedure [FCC 22.917(a), 2.1049]

The Occupied bandwidth was measured with a spectrum analyzer connected to the antenna terminal.
The spectrum analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth.

The spectrum analyzer is set to;
a) RBW = 1-5% of the expected OBW & VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple

- Test configuration



6.2 Limit

None

6.3 Measurement result

Date : June 19, 2018
Temperature : 25.7 [˚C]
Humidity : 46.8 [%]
Test place : Shielded room No.4
Test engineer : Taiki Watanabe

Band	Channel	Frequency [MHz]	Test Result [MHz)
WCDMA Band V (DC12V)	4132	826.4	4.1240
	4183	836.6	4.1273
	4233	846.6	4.1263
WCDMA Band V (DC24V)	4132	826.4	4.1334
	4183	836.6	4.1242
	4233	846.6	4.1203

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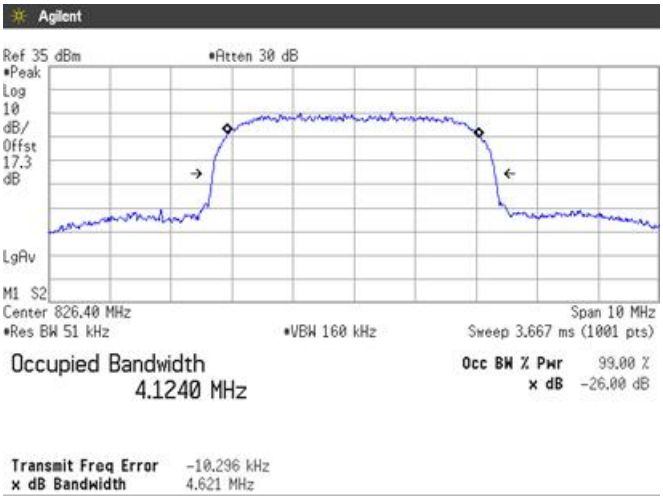
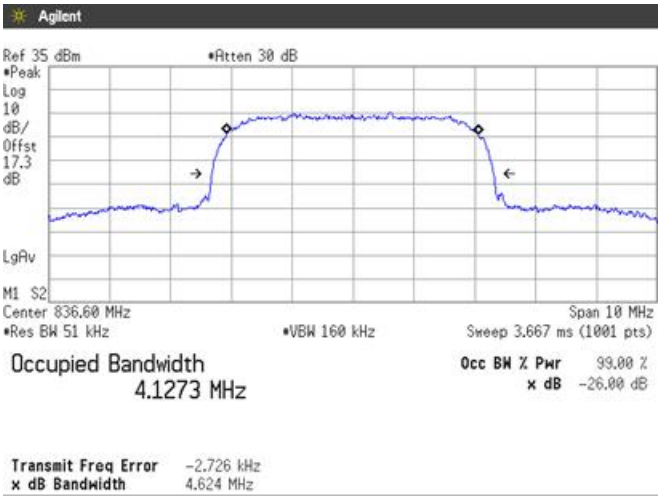
6.4 Trace data

[WCDMA Band V (DC12V)]

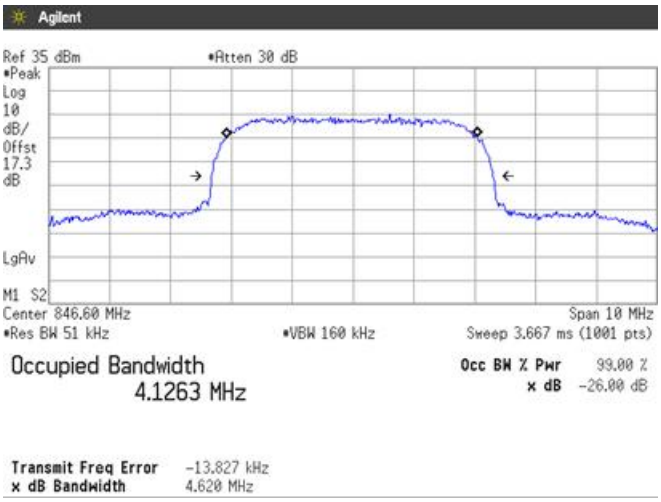
Channel: 4132



Channel: 4183



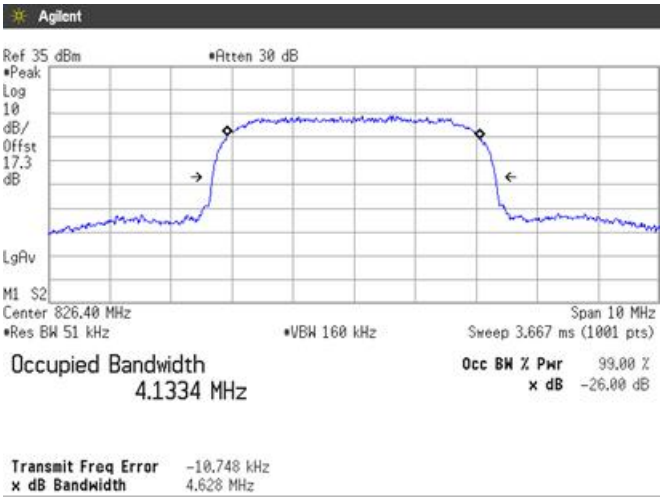
Channel: 4233



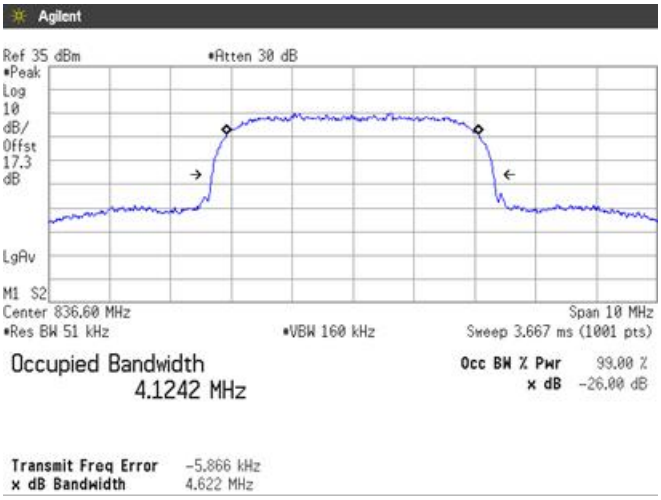
Japan

[WCDMA Band V (DC24V)]

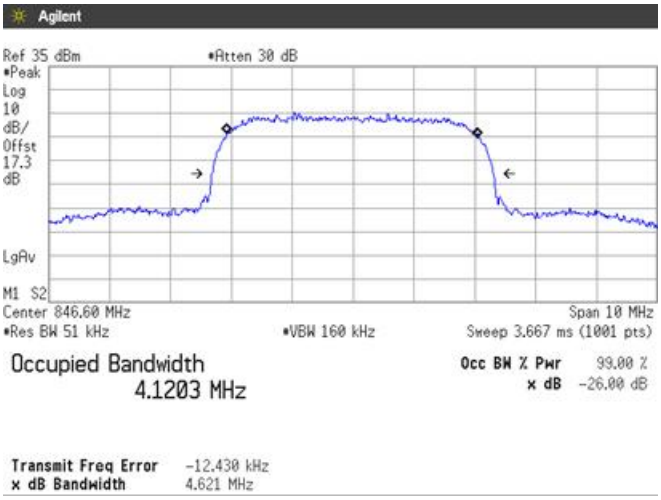
Channel: 4132



Channel: 4183



Channel: 4233



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7. Band Edge Spurious and Harmonic at Antenna Terminals

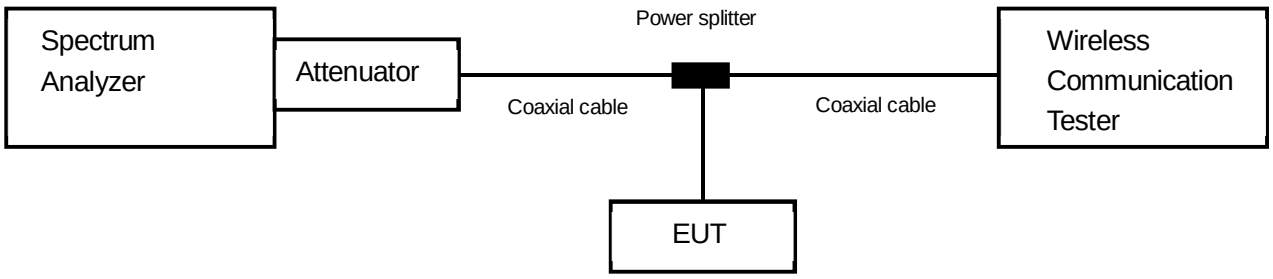
7.1 Measurement procedure [FCC 22.917(a), 2.1051]

The band edge spurious and harmonic was measured with a spectrum analyzer connected to the antenna terminal.

The spectrum analyzer is set to;
<Band Edge>
a) Span was set large enough so as to capture all out of band emissions near the band edge
b) RBW ≥ 1% of the emission bandwidth or 2% of the emission bandwidth
c) VBW ≥ 3 x RBW
d) Detector = RMS
e) Trace mode = Max hold
f) Sweep time = auto-couple
g) Number of sweep point ≥ 2 x span / RBW

<Spurious Emissions>
a) RBW = 1MHz & VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple
e) Number of sweep point ≥ 2 x span / RBW

- Test configuration



7.2 Limit

-13dB or less

Japan

7.3 Measurement result

Date : June 19, 2018
Temperature : 25.7 [˚C]
Humidity : 46.8 [%] Test engineer :
Test place : Shielded room No.4 Taiki Watanabe

Band	Channel	Frequency [MHz]	Limit [dB]	Results	
WCDMA Band V	4132	826.4	-13.0	See the trace data	PASS
	4183	836.6	-13.0	See the trace data	PASS
	4233	846.6	-13.0	See the trace data	PASS

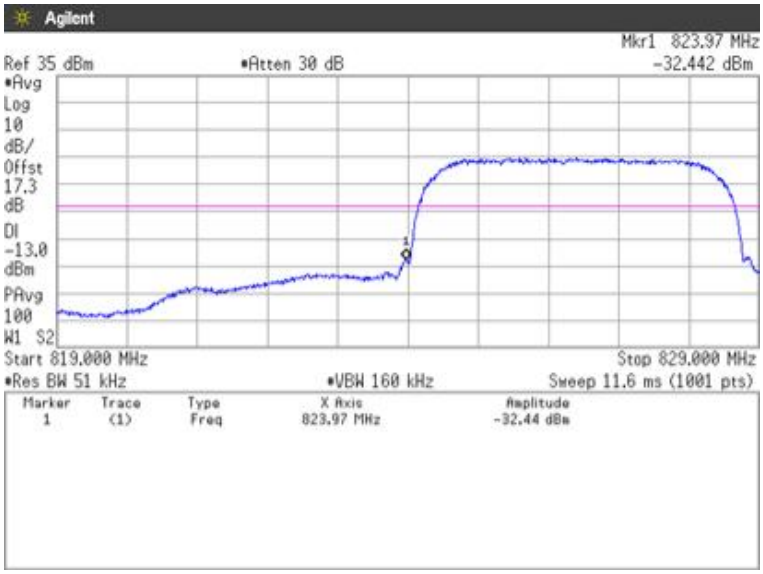
Japan

7.4 Trace data

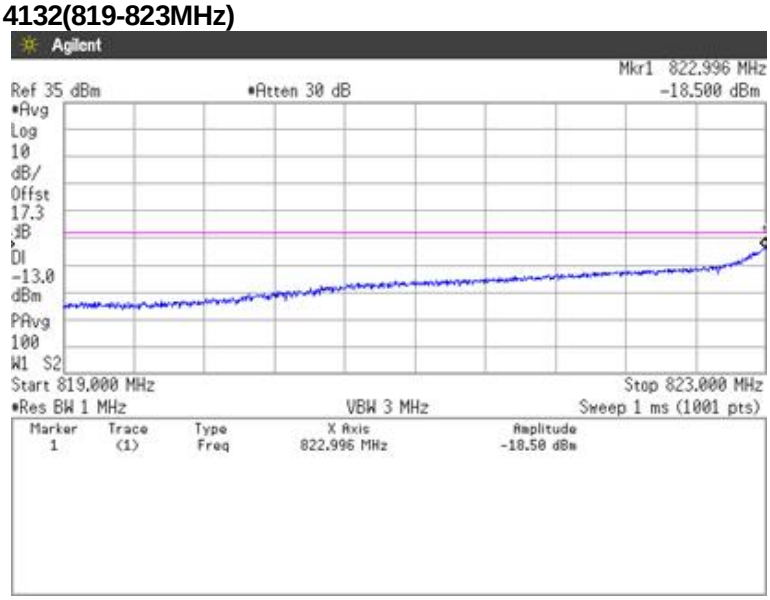
[WCDMA Band V (DC12V)]

(Band Edge)

Channel: 4132

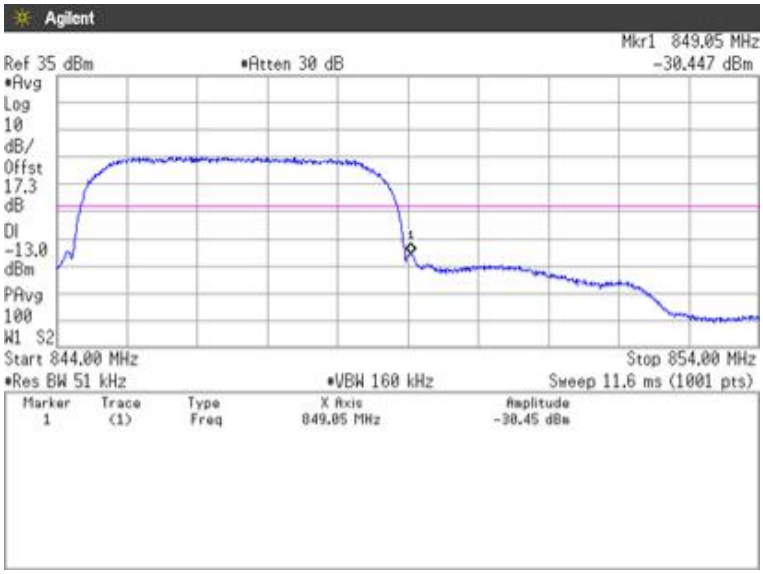


Channel: 4132(819-823MHz)

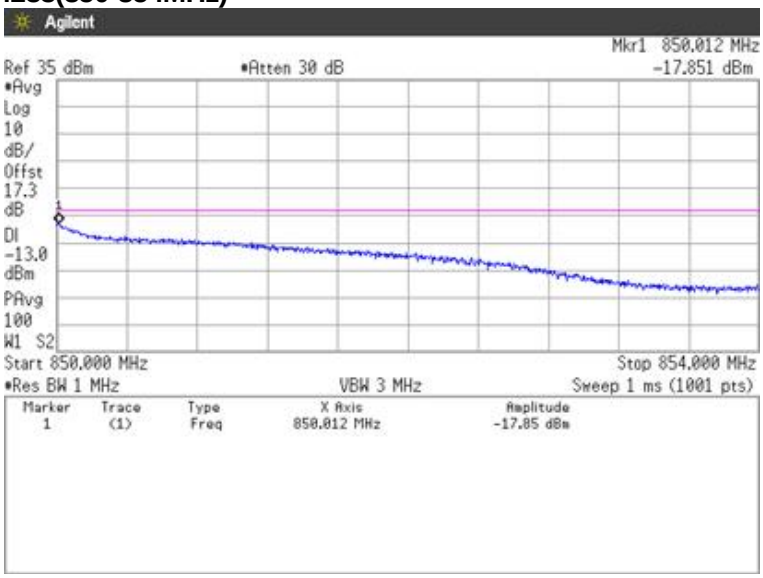


Japan

Channel: 4233



Channel: 4233(850-854MHz)



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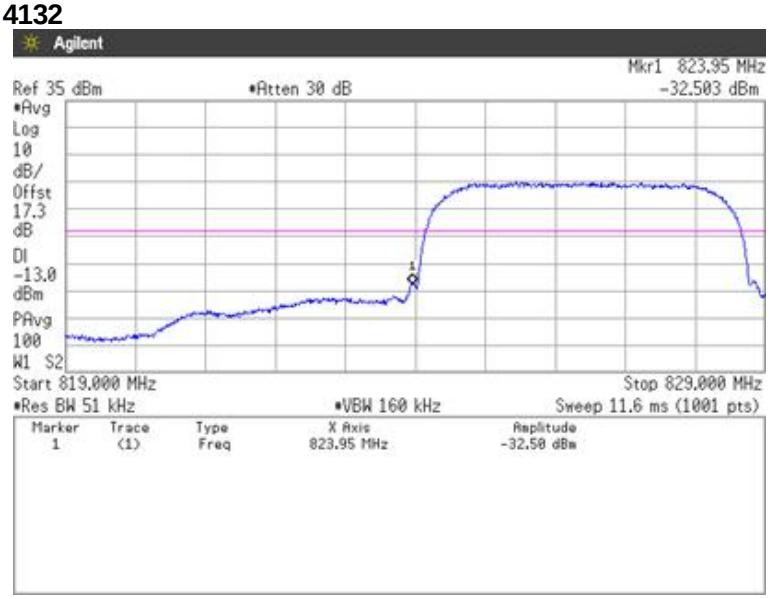
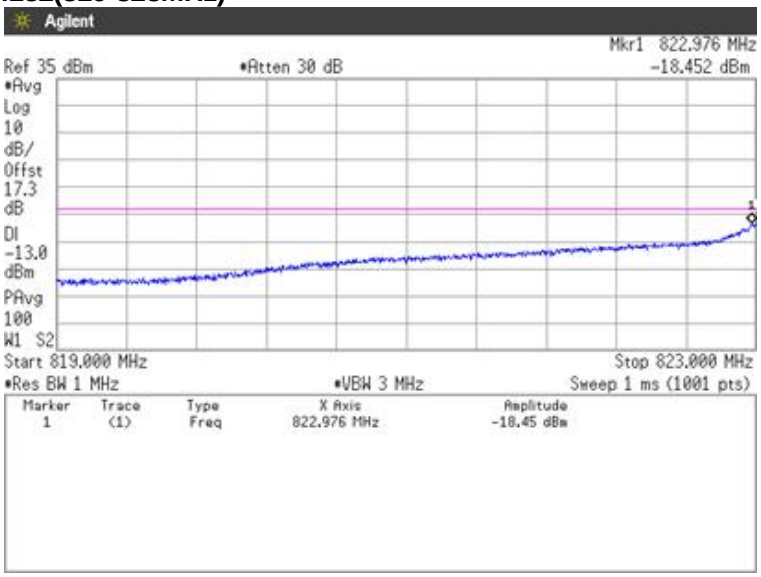
[WCDMA Band V (DC24V)]
(Band Edge)

Channel: 4132



Channel: 4132(819-823MHz)



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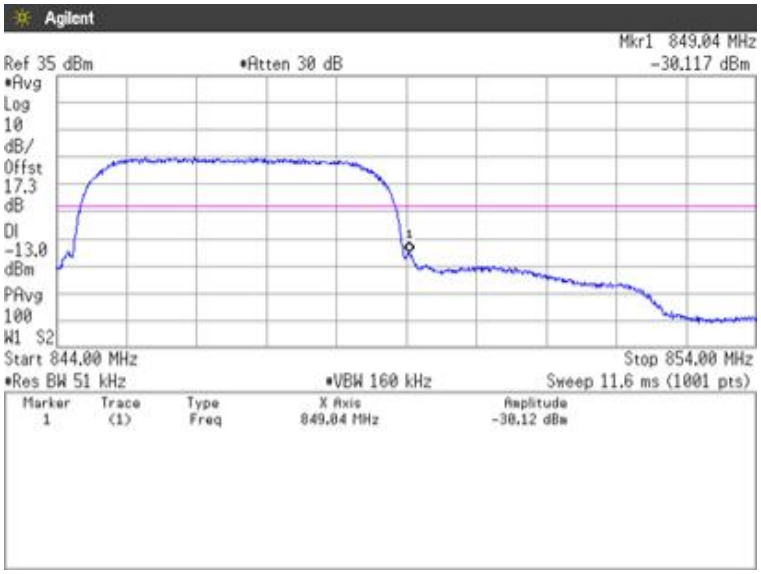
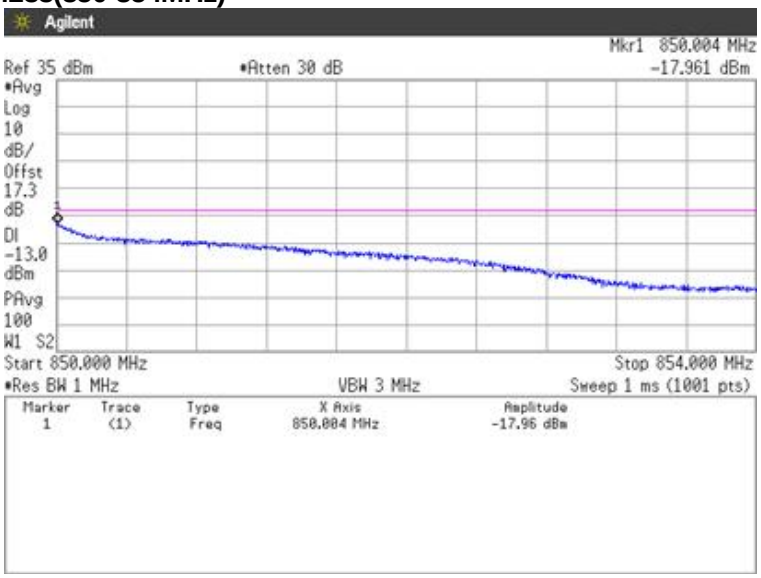
Channel: 4233



Channel: 4233(850-854MHz)



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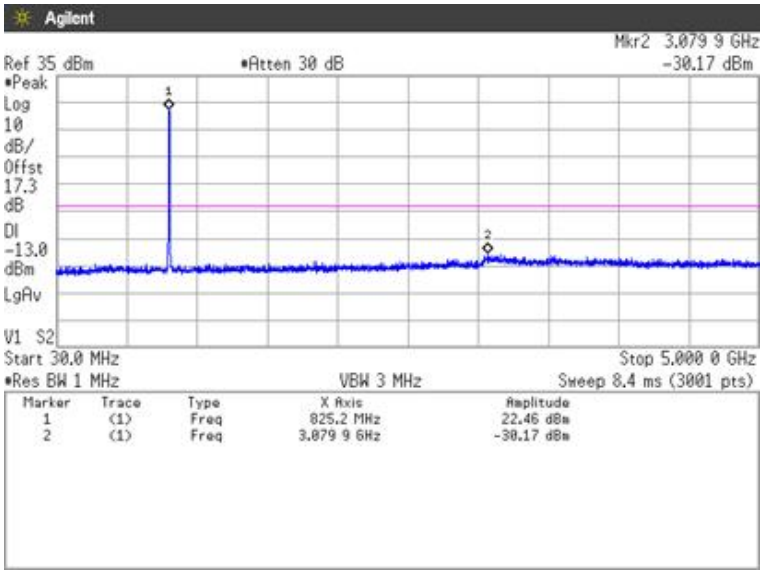
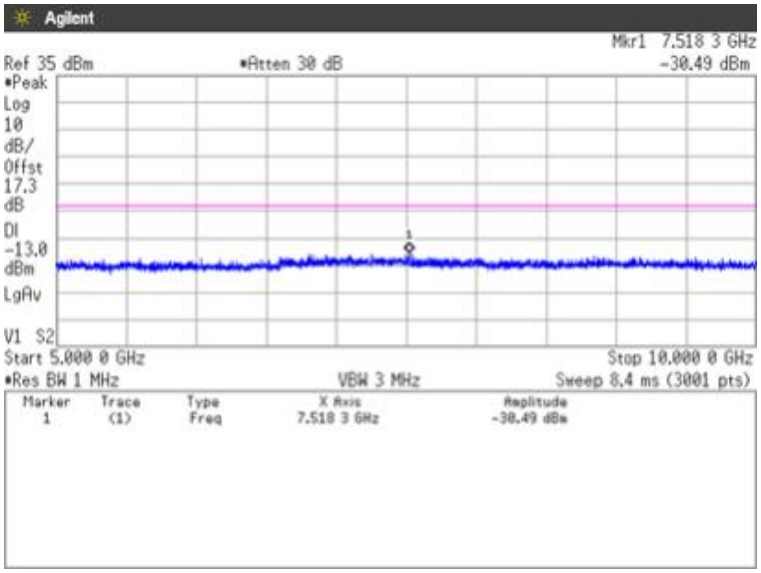
(Spurious Emissions)
Note: Conducted spurious test was measured in the worst case of conducted output power.

[WCDMA Band V (DC12V)]
Channel: 4132
30MHz-5GHz



5GHz-10GHz



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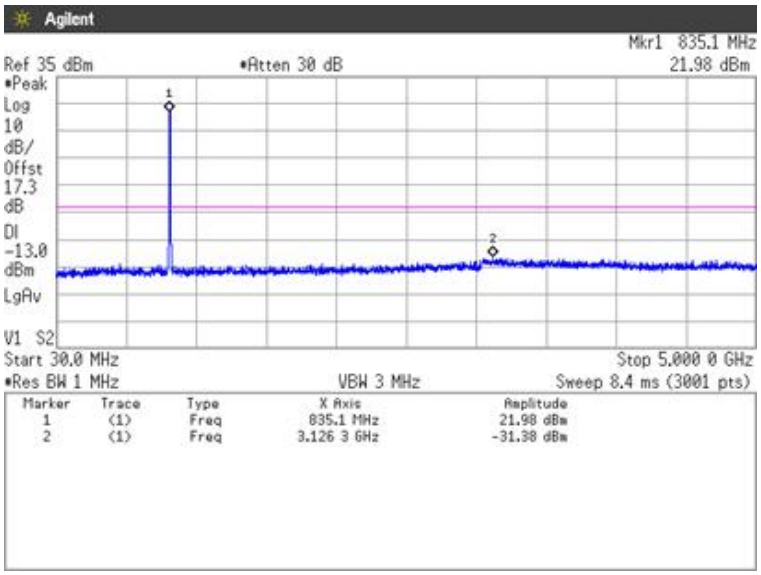
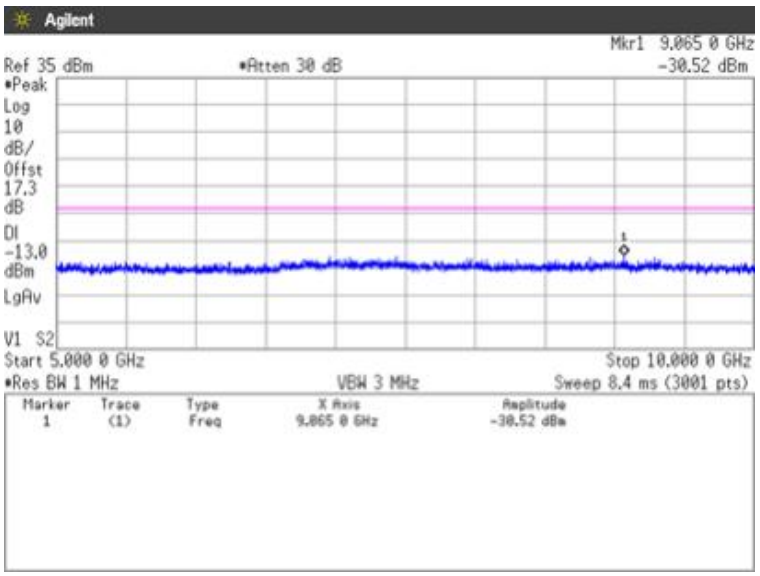
Channel: 4183
30MHz-5GHz

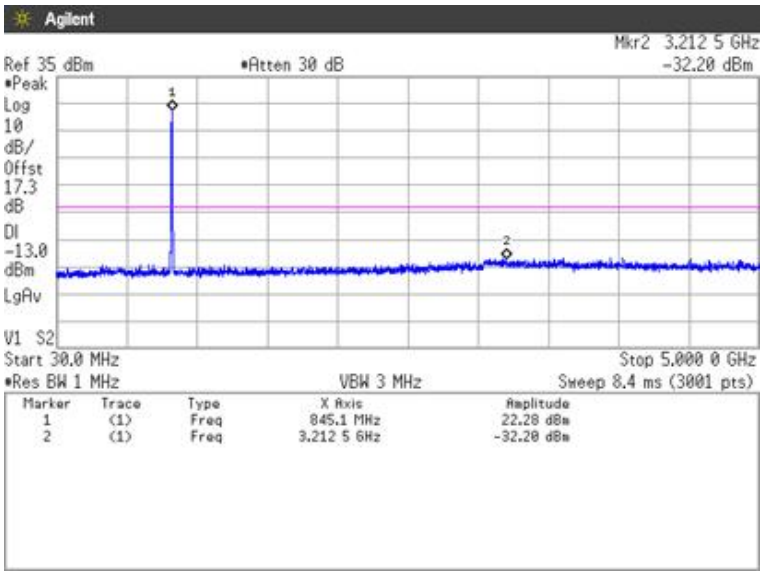


5GHz-10GHz

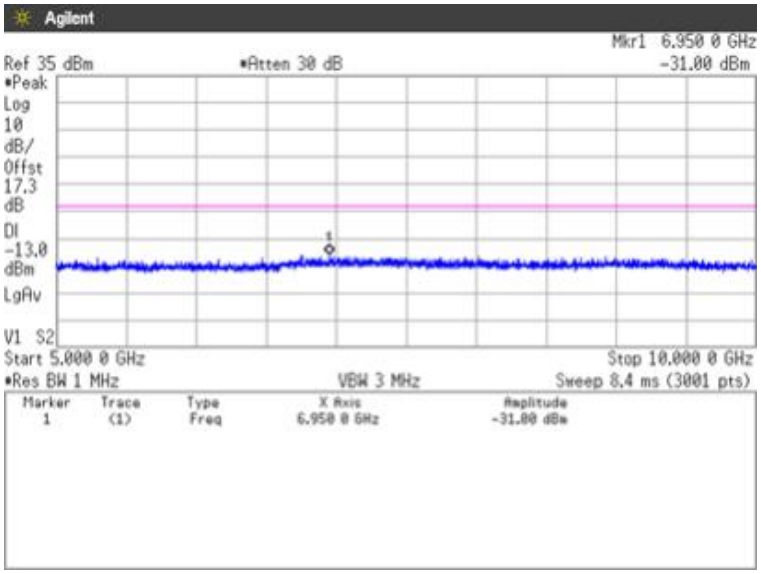


Japan

Channel: 4233
30MHz-5GHz



5GHz-10GHz



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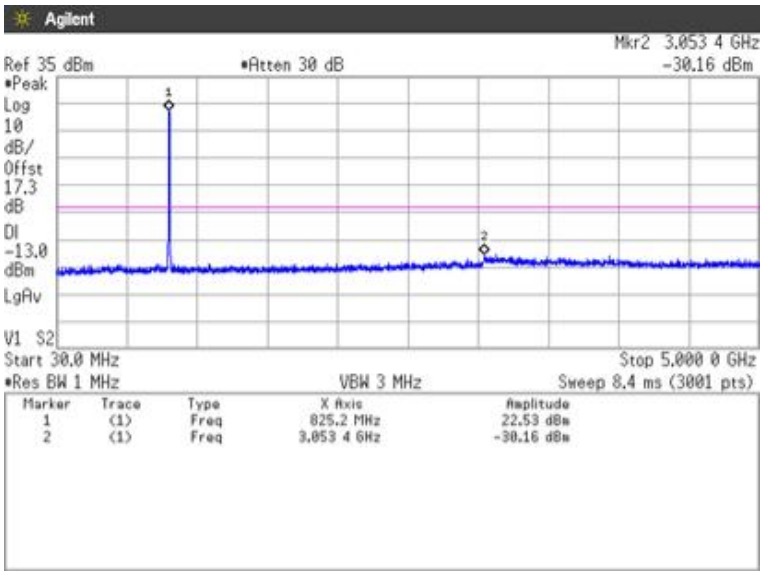
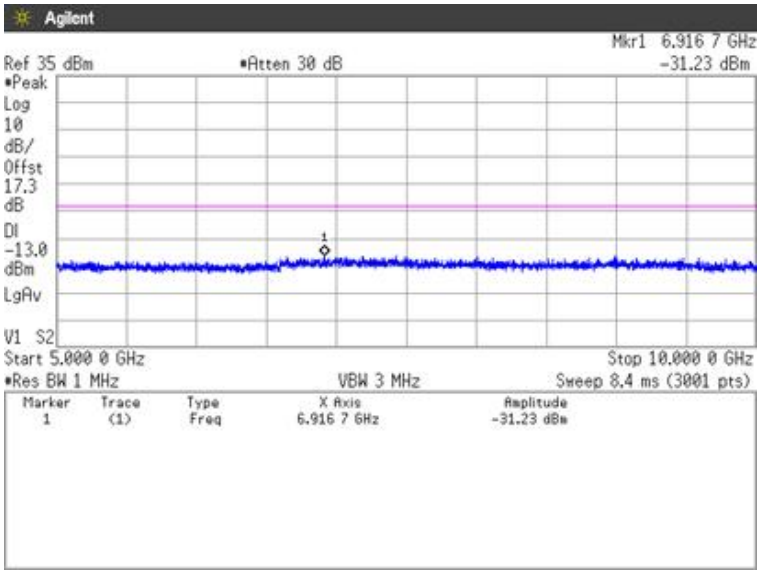
[WCDMA Band V (DC24V)]
Channel: 4132
30MHz-5GHz

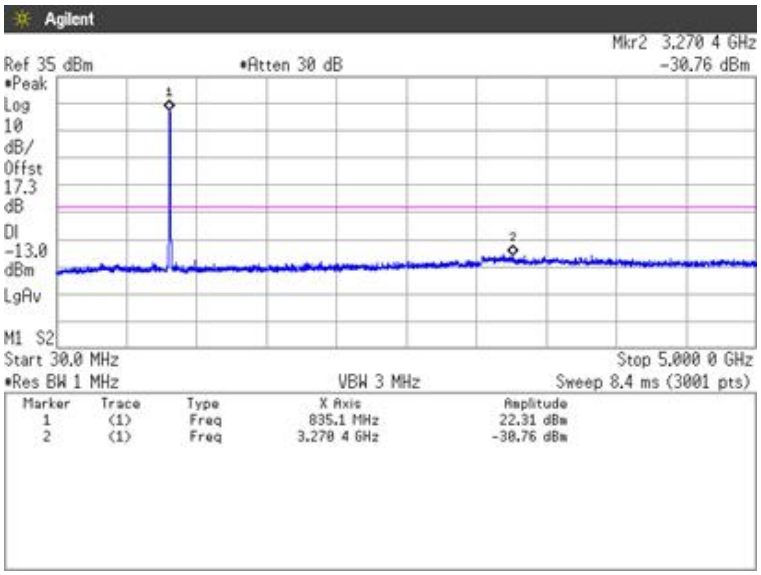


5GHz-10GHz

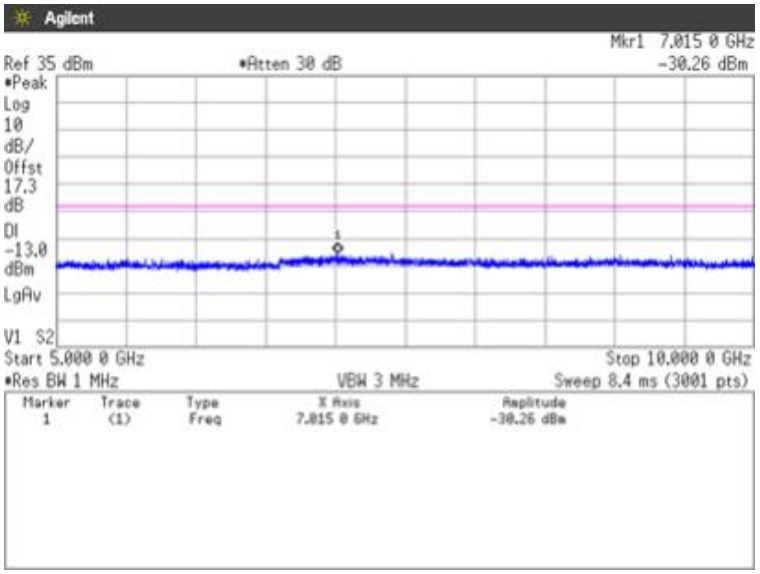


Japan

Channel: 4183
30MHz-5GHz

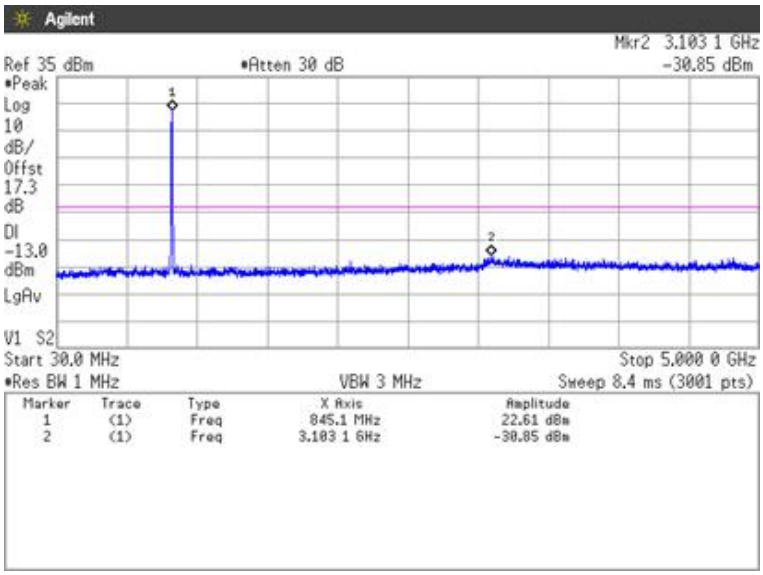


5GHz-10GHz

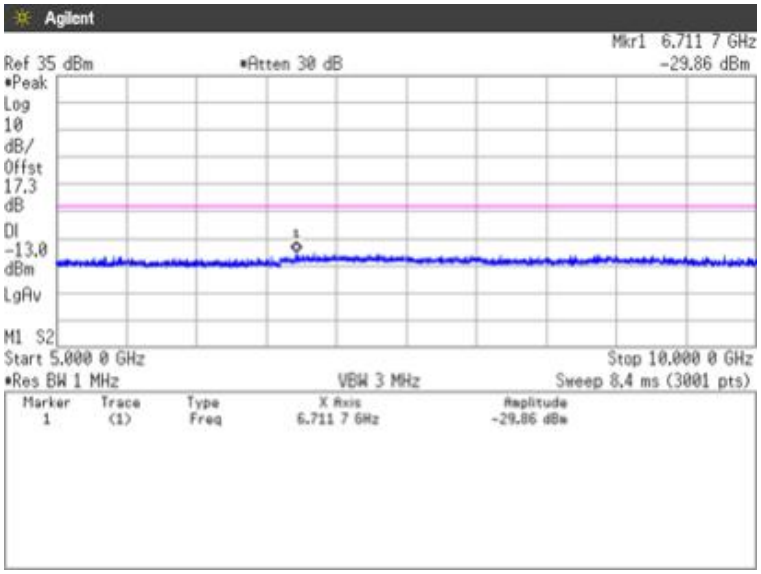


Japan

Channel: 4233
30MHz-5GHz



5GHz-10GHz



Japan

8. Radiated Emissions and Harmonic Emissions

8.1 Measurement procedure [FCC 22.917(a), 2.1053]

<Step 1>

The EUT and support equipment are placed on a 0.6 meter x 0.6 meter surface, 0.8 meter height styrene foam table. Radiated emission measurements are performed at 3 meter distance with the broadband antenna (Biconical antenna, Log periodic antenna and double ridged guide antenna). The antenna is positioned both the horizontal and vertical planes of polarization and height is varied 1 to 4 meters and stopped at height producing the maximum emission.

The bandwidth of the spectrum analyzer is set to 1MHz. The turntable is rotated by 360 degrees and stopped at azimuth of producing the maximum emission. The frequency is investigated up to 20GHz.

<Step 2>

The substitution antenna is replaced by the transmitter antenna (EUT).

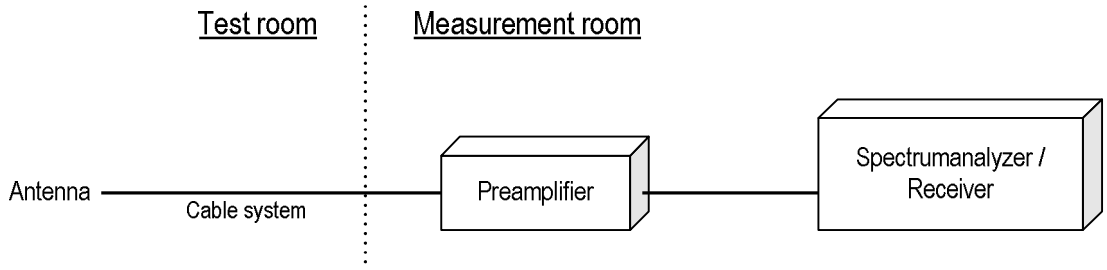
The frequency of the signal generator is adjusted to the measurement frequency.

Level of the signal generator is adjusted to the level that is obtained from step 1, and record the emission level of signal generator.

The spectrum analyzer is set to;

a) RBW = 100kHz for below 1GHz and 1MHz for above 1GHz / VBW ≥ 3 x RBW
b) Detector = Peak
c) Trace mode = Max hold
d) Sweep time = auto-couple

- Test configuration



Japan

8.2 Calculation method

Result(EIRP) = Ant. Input - Cable loss + Antenna Gain
Margin = Limit – Result (EIRP)

Example:
Limit @ 1648.4MHz : -13.0dBm
Ant. Input = -56.4dBm Cable loss = 1.0dB Ant. Gain = 6.9dBd
Result = -56.4 - 1.0 + 6.9 = -50.6dBm
Margin = -13.0 - (-50.6) = 37.6dB

8.3 Limit

-13dBm or less

Japan

8.4 Test data

Date : June 12, 2018
Temperature : 22.6 [˚C]
Humidity : 59.6 [%] Test engineer : Taiki Watanabe
Test place : 3m Semi-anechoic chamber

Date : June 13, 2018
Temperature : 21.9 [˚C]
Humidity : 50.6 [%] Test engineer : Taiki Watanabe
Test place : 3m Semi-anechoic chamber

[WCDMA Band V (DC12V)]
Channel: 4132

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	254.6	-49.9	-42.5	0.4	-6.0	-48.9	-13.0	35.9
H	1650.4	-45.2	-42.7	1.1	10.8	-33.0	-13.0	20.0
V	1650.2	-49.4	-48.8	1.1	10.8	-39.1	-13.0	26.1

Channel: 4183

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	253.6	-50.0	-42.6	0.4	-6.0	-49.0	-13.0	36.0
H	1671.8	-48.6	-47.2	1.1	10.6	-37.7	-13.0	24.7
V	1671.8	-50.3	-49.0	1.1	10.6	-39.5	-13.0	26.5

Channel: 4233

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	253.6	-50.1	-42.7	0.4	-6.0	-49.1	-13.0	36.1
H	1691.4	-47.7	-45.3	1.1	10.5	-35.9	-13.0	22.9
V	1691.4	-47.7	-45.1	1.1	10.5	-35.7	-13.0	22.7

Japan

[WCDMA Band V (DC24V)]

Channel: 4132

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	252.5	-51.6	-44.2	0.4	-6.0	-50.6	-13.0	37.6
H	1650.3	-37.7	-34.3	1.1	10.8	-24.6	-13.0	11.6
V	1650.3	-42.6	-39.7	1.1	10.8	-30.0	-13.0	17.0

Channel: 4183

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	253.6	-53.3	-45.9	0.4	-6.0	-52.3	-13.0	39.3
H	1671.6	-40.9	-37.3	1.1	10.6	-27.8	-13.0	14.8
V	1671.3	-43.9	-40.8	1.1	10.6	-31.3	-13.0	18.3

Channel: 4233

H/V	Frequency [MHz]	S.A Reading [dBm]	Ant. Input [dBm]	Cable loss [dB]	Ant.Gain [dBi]	Result [dBm]	Limit [dBm]	Margin [dB]
H	251.5	-53.2	-45.8	0.4	-5.9	-52.2	-13.0	39.2
H	1691.6	-44.7	-41.6	1.1	10.5	-32.2	-13.0	19.2
V	1691.6	-46.9	-44.3	1.1	10.5	-34.9	-13.0	21.9

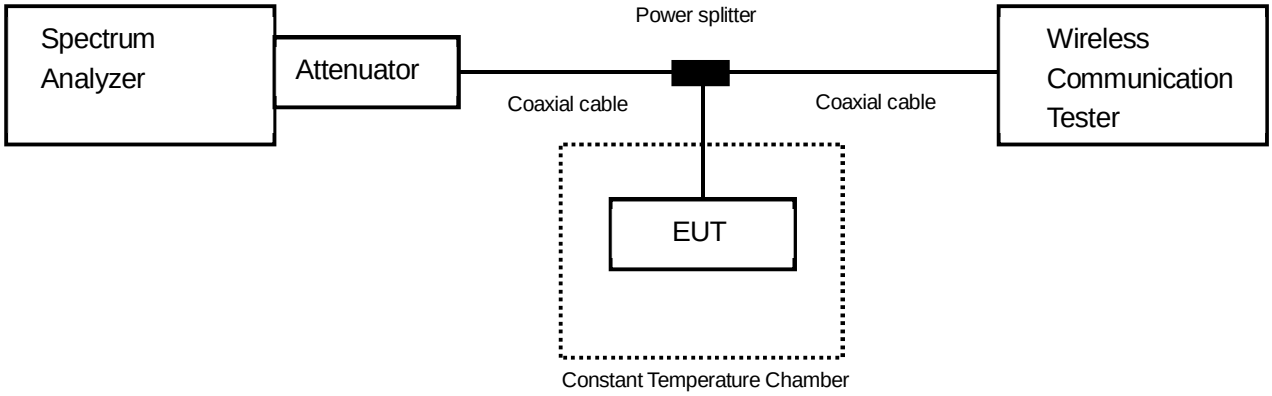
Japan

9. Frequency Stability

9.1 Measurement procedure [FCC 22.355, 2.1055]

The EUT was placed of an inside of an constant temperature chamber as the temperature in the chamber was varied between -30˚C and +50˚C. The temperature was incremented by 10˚C intervals and the unit was allowed to stabilize at each measurement. The frequency drift was measured with the normal Temperature and voltage tolerance and it is presented as the ppm unit.

- Test configuration



9.2 Limit

±2.5ppm

Japan

9.3 Measurement result

Date : June 20, 2018
Temperature : 25.2 [˚C]
Humidity : 45.6 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Taiki Watanabe

[WCDMA Band V (DC12V)]
Channel: 4183

Limit: ±0.00025% = ±2.5ppm					
Power Supply [V]	**Temperature [ºC]**	**Measurements Frequency [Hz]**	**Frequency Tolerance [ppm]**	**Limit [ppm]**	**Result**
12.00	25(Ref.)	836,600,016	0.00000	±2.5	Pass
	50	836,599,986	-0.03688	±2.5	Pass
	40	836,599,989	-0.03281	±2.5	Pass
	30	836,600,014	-0.00256	±2.5	Pass
	20	836,600,015	-0.00188	±2.5	Pass
	10	836,600,018	0.00235	±2.5	Pass
	0	836,600,013	-0.00412	±2.5	Pass
	-10	836,599,985	-0.03784	±2.5	Pass
	-20	836,600,015	-0.00165	±2.5	Pass
	-30	836,599,990	-0.03215	±2.5	Pass
10.20	25	836,599,982	-0.04135	±2.5	Pass
13.80	25	836,599,979	-0.04481	±2.5	Pass

[WCDMA Band V (DC24V)]
Channel: 4183

Limit: ±0.00025% = ±2.5ppm					
Power Supply [V]	**Temperature [ºC]**	**Measurements Frequency [Hz]**	**Frequency Tolerance [ppm]**	**Limit [ppm]**	**Result**
24.00	25(Ref.)	836,599,986	0.00000	±2.5	Pass
	50	836,599,986	0.00057	±2.5	Pass
	40	836,600,019	0.04025	±2.5	Pass
	30	836,600,012	0.03154	±2.5	Pass
	20	836,600,006	0.02410	±2.5	Pass
	10	836,600,011	0.03054	±2.5	Pass
	0	836,600,013	0.03223	±2.5	Pass
	-10	836,599,983	-0.00268	±2.5	Pass
	-20	836,599,993	0.00896	±2.5	Pass
	-30	836,600,017	0.03757	±2.5	Pass
20.40	25	836,600,012	0.03163	±2.5	Pass
27.60	25	836,600,014	0.03365	±2.5	Pass

Calculation;

Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

Japan

10. Uncertainty of measurement

Expanded uncertainties stated are calculated with a coverage Factor k=2.
Please note that these results are not taken into account when determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission, AMN (9kHz – 150kHz)	±3.8dB
Conducted emission, AMN (150kHz – 30MHz)	±3.3dB
Radiated emission (9kHz – 30MHz)	±3.0dB
Radiated emission (30MHz – 1000MHz)	±4.7dB
Radiated emission (1GHz – 6GHz)	±4.9dB
Radiated emission (6GHz – 26GHz)	±5.2dB

Japan

11. Laboratory Information

1. Location

Testing done by September 30th, 2018 was performed at:
Name: TÜV SÜD Zacta Ltd. Yonezawa Testing Center
Address: 5-4149-7, Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan
Phone: +81-238-28-2881
Fax: +81-238-28-2888

Testing done after October 1st, 2018 was performed and the test report was issued at:
Name: TÜV SÜD Japan Ltd. Yonezawa Testing Center
Address: 5-4149-7, Hachimanpara, Yonezawa-shi, Yamagata, 992-1128 Japan
Phone: +81-238-28-2881
Fax: +81-238-28-2888

2. Accreditation and Registration

1) VLAC
Accreditation No.: VLAC-013

2) NVLAP
LAB CODE: 200306-0

3) BSMI
Laboratory Code: SL2-IN-E-6018, SL2-A1-E-6018

4) Industry Canada

Site number	Facility	Expiration date
4224A-4	3m Semi-anechoic chamber	2017-12-03
4224A-5	10m Semi-anechoic chamber No.1	2017-12-03
4224A-6	10m Semi-anechoic chamber No.2	2019-12-14

5) VCCI Council

Registration number	Expiration date
A-0166	2019-07-03

Japan

Appendix A. Test equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	Oct. 31, 2018	Oct. 19, 2017
Attenuator	Weinschel	56-10	J4993	Dec. 31, 2018	Dec. 4, 2017
Micro wave cable	HUBER SUNER	Sucoflex 102/2m	31648	Mar. 31, 2019	Mar. 22, 2018
Micro wave cable	HUBER SUNER	Sucoflex 102/2m	MY3385/2	Mar. 31, 2019	Mar. 1, 2018
Power divider	Keysight	11636B	MY51359874	Jan. 31, 2019	Jan. 17, 2018
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	Oct. 31, 2018	Oct. 13, 2017
Temperature and humidity chamber	ESPEC	PL1KP	14007261	Dec. 31, 2018	Dec. 20, 2017

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	Sep. 30, 2018	Sep. 13, 2017
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	Oct. 31, 2018	Oct. 19, 2017
Preamplifier	SONOMA	310	372170	Sep. 30, 2018	Sep. 12, 2017
Biconical antenna	Schwarzbeck	VHA9103/BBA9106	2155	Jul. 31, 2018	Jul. 18, 2017
Log periodic antenna	Schwarzbeck	UHALP9108A	0560	Jul. 31, 2018	Jul. 18, 2017
Attenuator	TME	CFA-01NPJ-6	N/A(S275)	Jan. 31, 2019	Jan. 18, 2018
Attenuator	TME	CFA-01NPJ-3	N/A(S272)	Jan. 31, 2019	Jan. 18, 2018
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	Jan. 31, 2019	Jan. 18, 2018
Attenuator	AEROFLEX	26A-10	081217-08	Jan. 31, 2019	Jan. 18, 2018
Double ridged guide antenna	ETS LINDGREN	3117	00052315	Mar. 31, 2019	Mar. 14, 2018
Attenuator	Agilent Technologies	8491B	MY39268633	Mar. 31, 2019	Mar. 14, 2018
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	Aug. 31, 2018	Aug. 8, 2017
Preamplifier	TSJ	MLA-1840-B03-35	1240332	Aug. 31, 2018	Aug. 8, 2017
Notch Filter	Micro-Tronics	BRM50706	003	Jul. 31, 2018	Jul. 20, 2017
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	Jul. 31, 2018	Jul. 12, 2017
RF power amplifier	R&K	CGA020M602-2633R	B40240	May 31, 2019	May 17, 2018
Microwave cable	HUBER+SUHNER	SUCOFELX102/2m	31648	Mar. 31, 2019	Mar. 1, 2018
Dipole antenna	Schwarzbeck	VHAP	1021	Aug. 31, 2018	Aug. 2, 2017
Dipole antenna	Schwarzbeck	UHAP	993	Aug. 31, 2018	Aug. 2, 2017
Double ridged guide antenna	EMCO	3115	00058532	Jan. 31, 2019	Jan. 18, 2018
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	Oct. 31, 2018	Oct. 13, 2017
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	MY30037/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/1m	my24610/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/8m	SN MY30031/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/1.5m	MY32976/4	Jan. 31, 2019	Jan. 18, 2018
		SUCOFLEX104/1.5m	MY19309/4	Jan. 31, 2019	Jan. 19, 2018
		SUCOFLEX104/7m	41625/6	Jan. 31, 2019	Jan. 19, 2018
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V5.6.0	N/A	N/A
Absorber	RIKEN	PFP30	N/A	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-NSA)	May 31, 2019	May 21, 2018
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	May 31, 2019	May 22, 2018

*: The calibrations of the above equipment are traceable to NIST or equivalent standards of the reference organizations.