Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: CB70
FCC ID: JOYCB70

In accordance with FCC Part 22 Subpart H
Class II Permissive Change

Japan

Add value.
Inspire trust.

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Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Japan Ltd. document control rules.

EXECUTIVE SUMMARY - Result: Complied
A sample(s) of this product was tested and the result above was confirmed in accordance with FCC Part 22 Subpart H.

ilac-MRA A2LA ACCREDITED Certificate #3686.03

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Japan

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1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-21049-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 22 Subpart H

1.3 Test methods

KDB 971168 D01 Power Meas License Digital Systems v03r01
ANSI/TIA/EIA 603-E-2016
ANSI C63.26-2015

1.4 Deviation from standards

None

1.5 List of applied test(s) of the EUT

Test item section	Test item	Condition	Result	Remark
2.1046	Conducted Output Power	Conducted	PASS	*1
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: Refer to RF Exposure Report (Test Report_SAR)

1.6 Test information

None

1.7 Test set up

Table-top

1.8 Test period

26-May-2021 - 31-May-2021

Japan

2 Equipment Under Test

All information in this chapter was provided by the applicant.

2.1 EUT information

Applicant	KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment Under Test (EUT)	Mobile Phone
Model number	CB70
Serial number	358607100022540, 358607100022557
Trade name	Kyocera
Number of sample(s)	2
EUT condition	Pre-Production
Power rating	Battery: DC 3.85 V
Size	(W) 71.0 × (D) 159.0 × (H) 8.9 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20˚C to 60˚C
Hardware version	-
Software version	7.092HA
Firmware version	Not applicable
RF Specification	
Frequency of Operation	Up Link WCDMA Band V: 826.4-846.6 MHz Down Link WCDMA Band V: 871.4-891.6 MHz
Modulation type	WCDMA Band V: QPSK, 16QAM
Emission designator	WCDMA Band V: 4M18F9W
Effective Radiated Power (E.R.P.)	WCDMA Band V: 0.2239 W (23.5 dBm)
Antenna type	Internal antenna
Antenna gain	WCDMA Band V: -1.7 dBi

Japan

2.2 Modification to the EUT

The table below details modifications made to the EUT during the test project.

Modification State	Description of Modification	Modification fitted by	Date of Modification
Model: CB70, Serial Number: 358607100022540, 358607100022557			
0	As supplied by the applicant	Not Applicable	Not Applicable

2.3 Variation of family model(s)

2.3.1 List of family model(s)

Not applicable

2.3.2 Reason for selection of EUT

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 electric field strength of spurious radiation was measured in the previous worst case.
The worst emission last time was on the X axis (all bands).

Japan

3 Configuration of Equipment

Numbers assigned to equipment on the diagram in “3.2 System configuration” correspond to the list in “3.1 Equipment used”.
This test configuration is based on the manufacture’s instruction.
Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

3.1 Equipment used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Mobile Phone	KYOCERA	CB70	358607100022540, 358607100022557	JOYCB70	EUT

3.2 System configuration

1. Mobile Phone (EUT)

4 Test Result

4.1 Effective Radiated Power

4.1.1 Measurement procedure

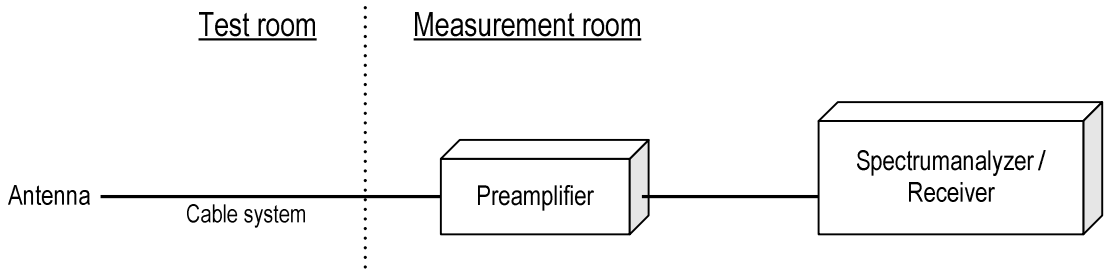
[FCC 22.913(a)]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1 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 1 MHz
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



Japan

4.1.2 Calculation method

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

Example:
Limit @ 836.6 MHz : 38.4 dBm
Ant. Input = 33.3 dBm Cable loss = 0.7 dB Ant. Gain = -10.7 dBd
Result = 33.3 - 0.7 + (-10.7) = 21.9 dBm
Margin = 38.45 – 21.9= 16.55 dB

4.1.3 Limit

7 W (38.45 dBm)

4.1.4 Test data

Date : 26-May-2021
Temperature : 20.1 [˚C]
Humidity : 51.1 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Chiaki Kanno

Date : 27-May-2021
Temperature : 21.2 [˚C]
Humidity : 53.4 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Chiaki Kanno

[WCDMA Band V]

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	-13.5	30.5	0.8	-6.7	23.1	38.45	15.4
H	836.6	-14.2	30.4	0.8	-6.7	22.9	38.45	15.5
H	846.6	-13.3	31.0	0.8	-6.7	23.5	38.45	14.9

Japan

4.2 Occupied Bandwidth

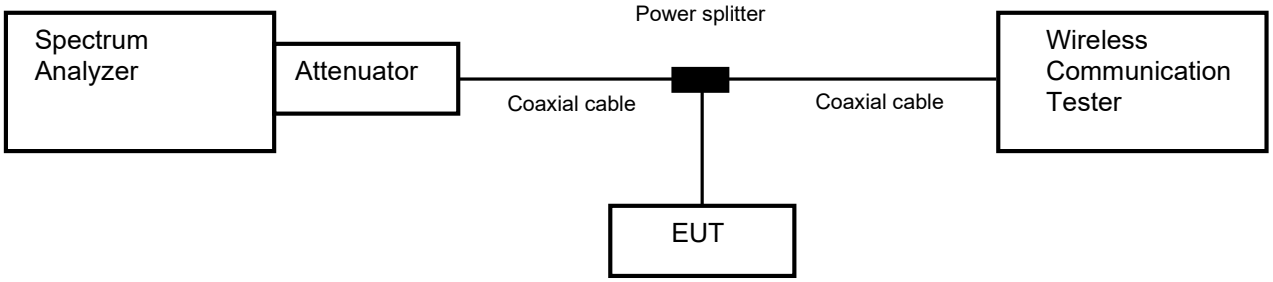
4.2.1 Measurement procedure

[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



4.2.2 Limit

None

Japan

4.2.3 Measurement result

Date : 28-May-2021
Temperature : 22.9 [˚C]
Humidity : 52.3 [%]
Test place : Shielded room No.4

Test engineer : Chiaki Kanno

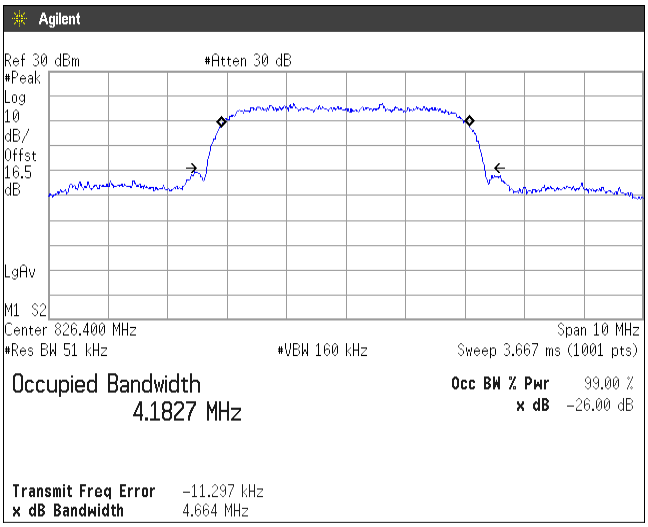
Band	Channel	Frequency (MHz)	Test Result (kHz)
WCDMA Band V	4132	826.4	4182.7
	4183	836.6	4157.1
	4233	846.6	4156.9

Japan

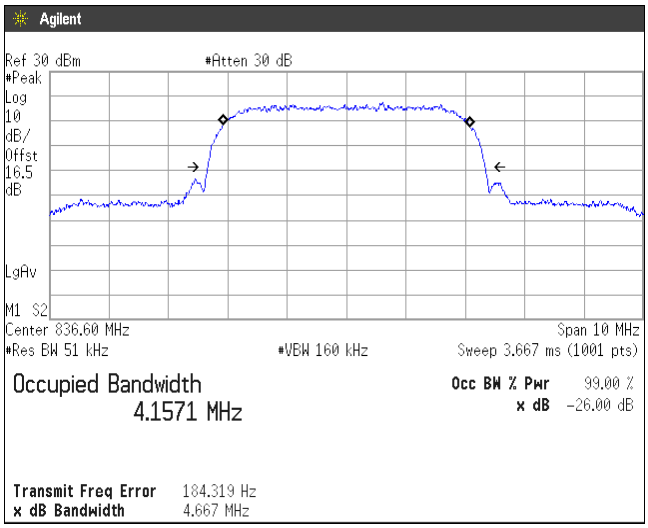
4.2.4 Trace data

[WCDMA Band V]

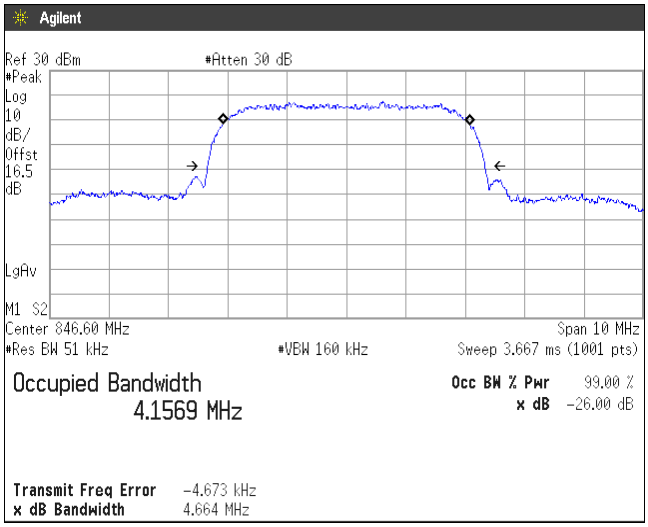
Channel: 4132



Channel: 4183



Channel: 4233



Japan

4.3 Band Edge Spurious and Harmonic at Antenna Terminals

4.3.1 Measurement procedure

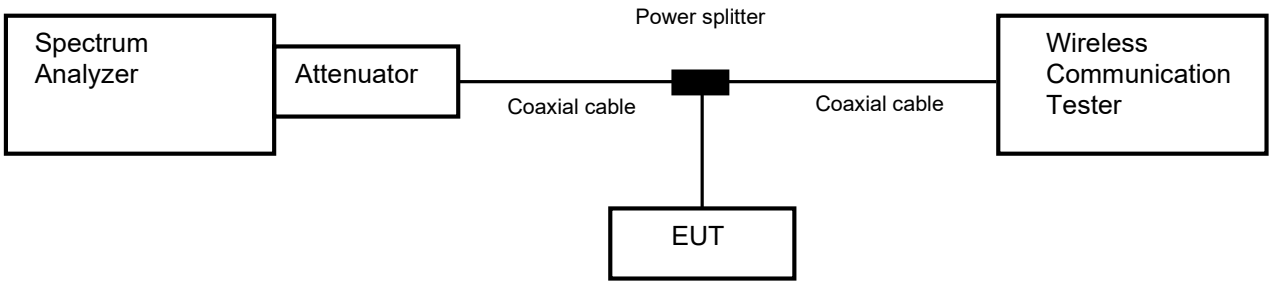
[FCC 22.917(a), 2.1051]

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



4.3.2 Limit

-13 dB or less

Japan

4.3.3 Measurement result

Date : 28-May-2021
Temperature : 22.9 [˚C]
Humidity : 52.3 [%]
Test place : Shielded room No.4

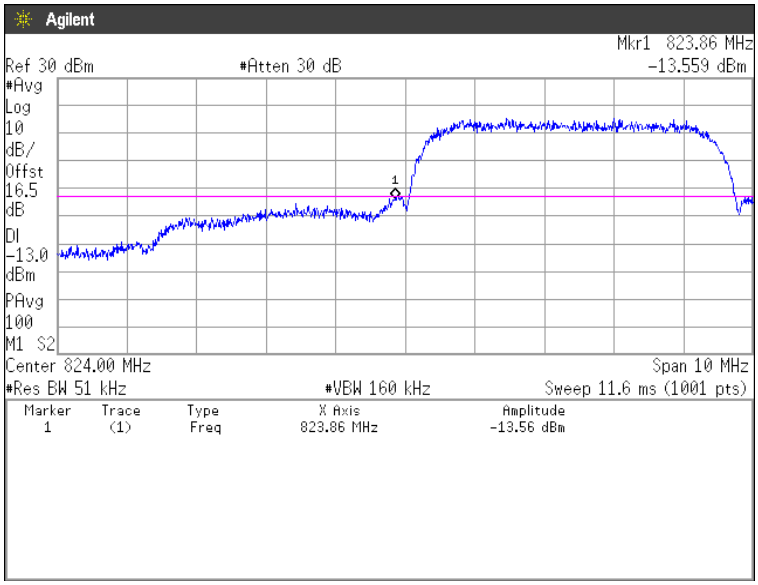
Test engineer : Chiaki Kanno

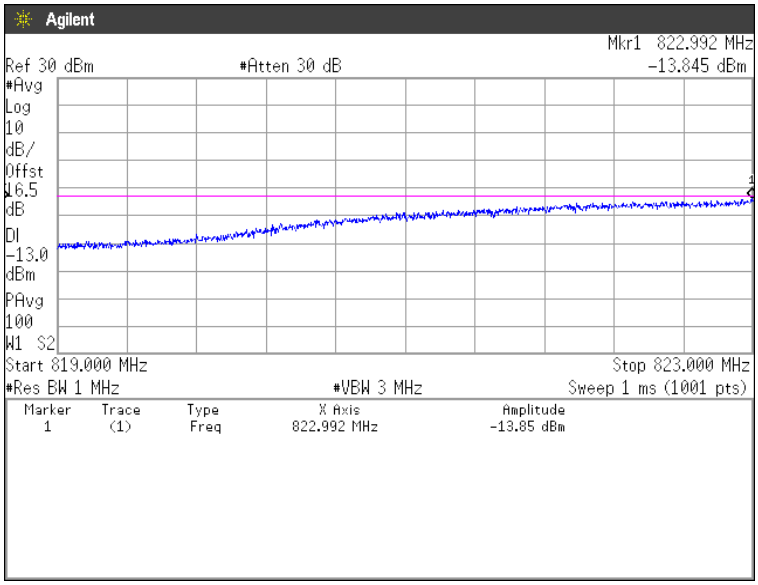
Band	Channel	Frequency [MHz]	Limit [dB]	Results	
WCDMA Band V	4132	826.4	-13.0	See the trace data	PASS
	4183	836.6	-13.0	See the trace data	PASS
	4233	846.6	-13.0	See the trace data	PASS

Japan

4.3.4 Trace data

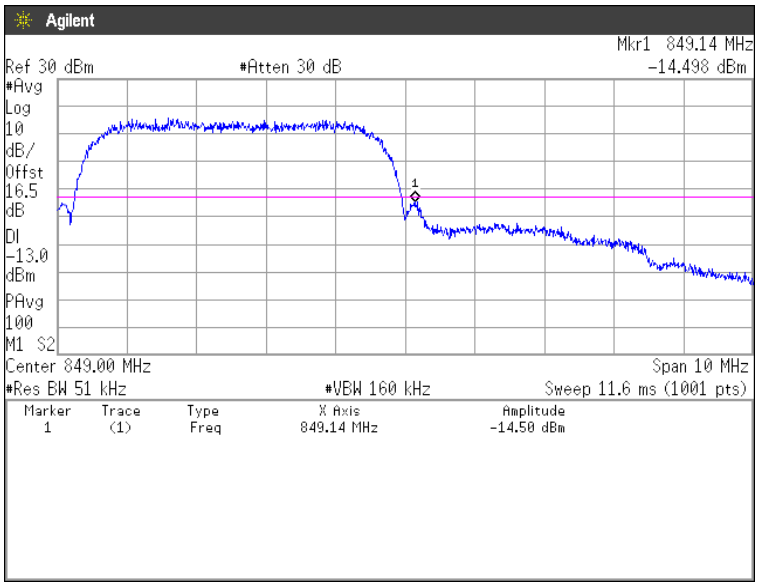
[WCDMA Band V]
(Band Edge)
Channel: 4132

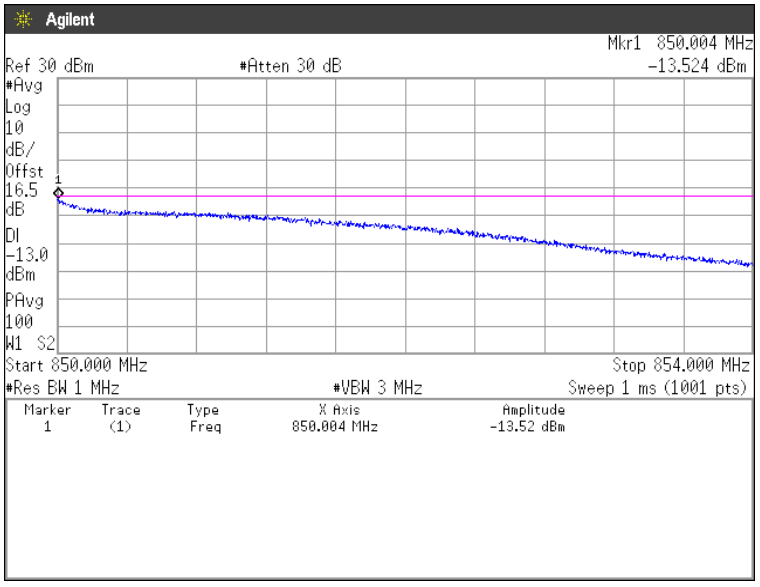




Japan

Channel: 4233

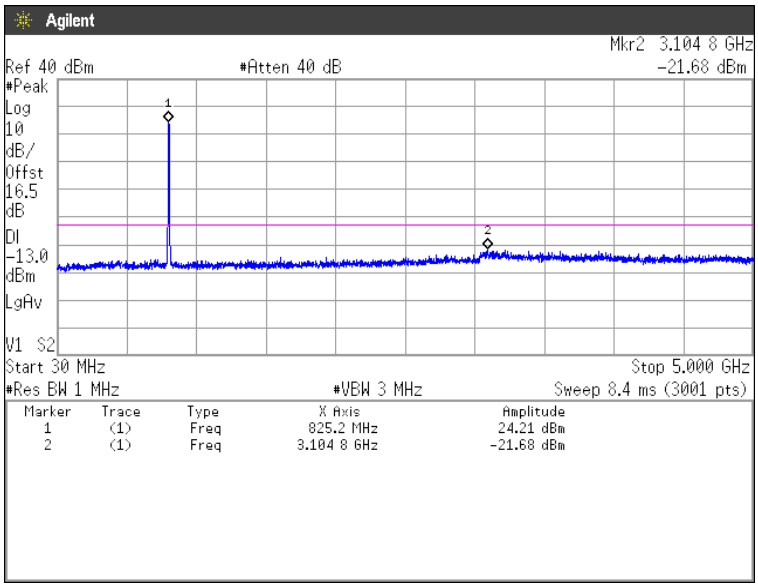




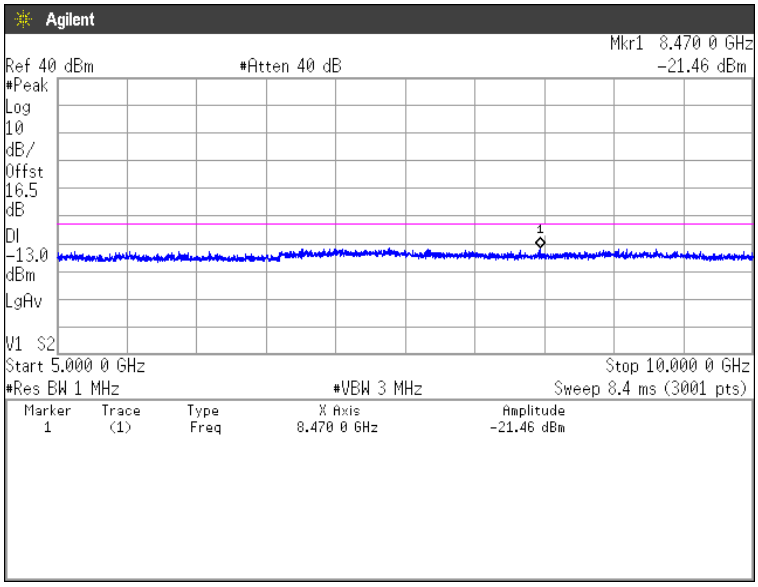
Japan

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

Channel: 4132
30MHz-5GHz

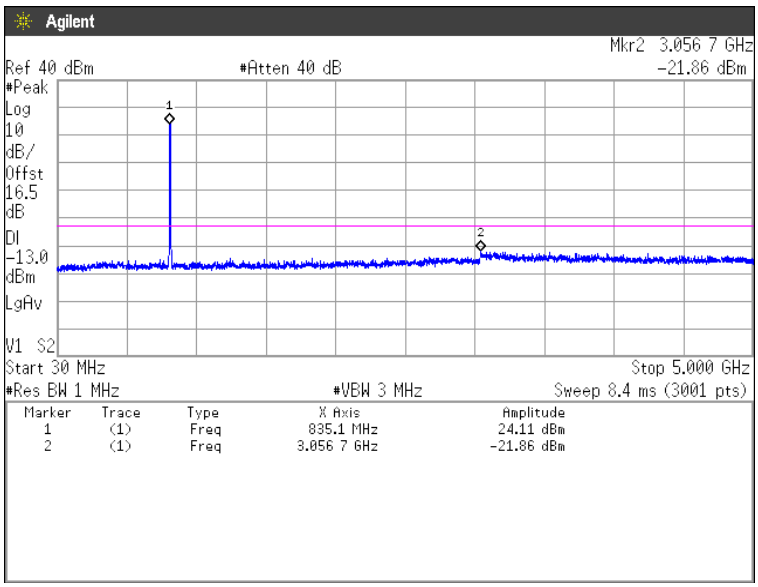


5GHz-10GHz

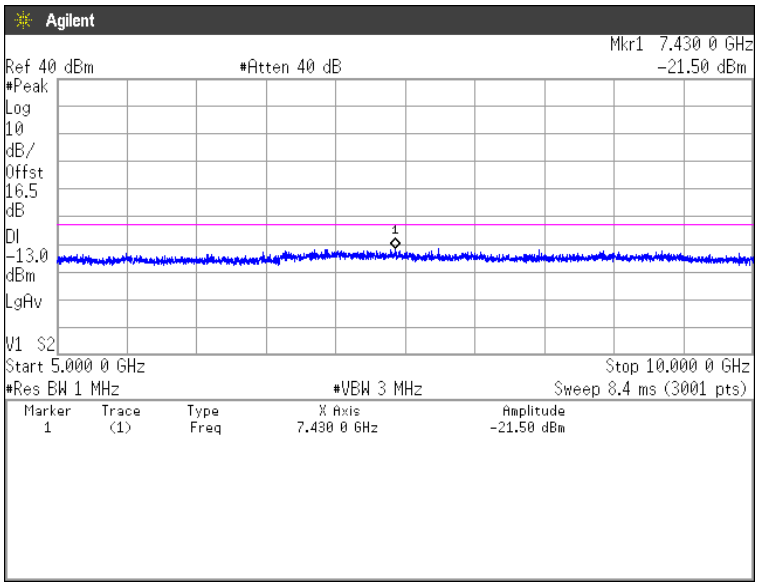


Japan

Channel: 4183
30MHz-5GHz

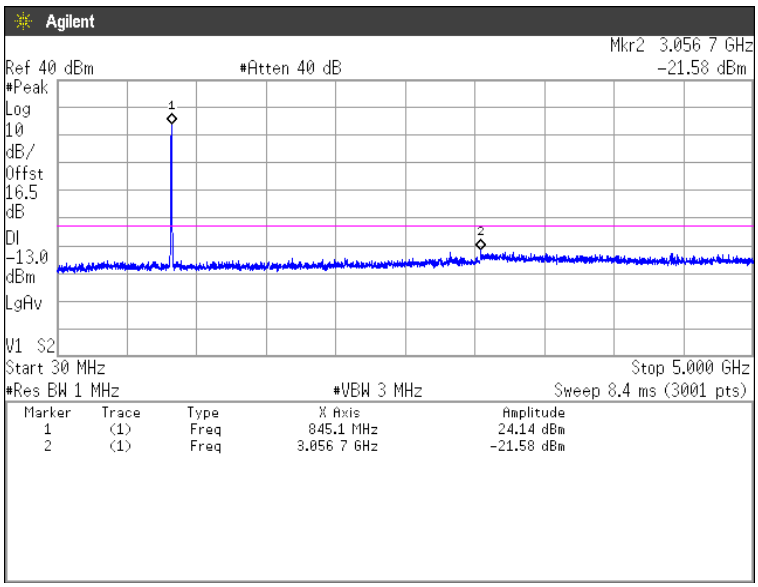


5GHz-10GHz

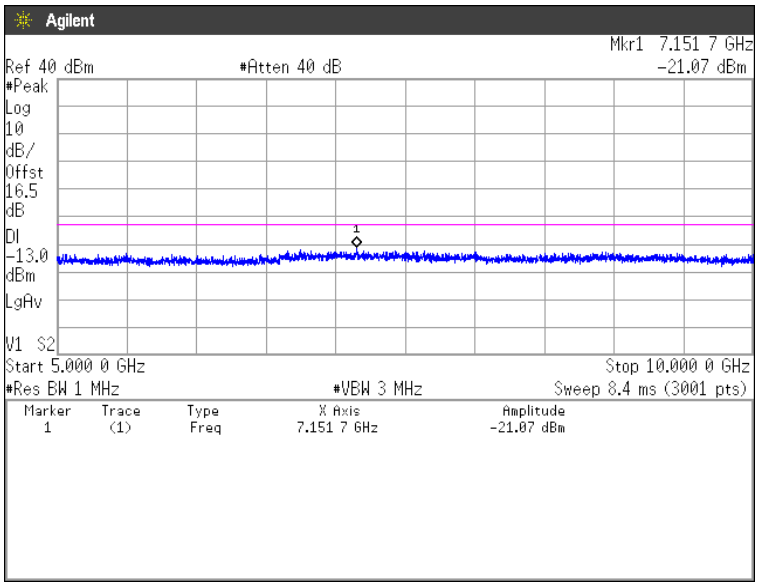


Japan

Channel: 4233
30MHz-5GHz



5GHz-10GHz



Japan

4.4 Radiated Emissions and Harmonic Emissions

4.4.1 Measurement procedure

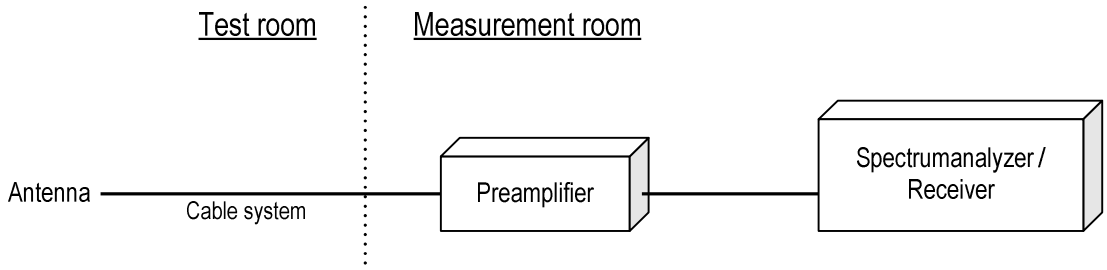
[FCC 22.917(a), 2.1053]

<Step 1>
The EUT and support equipment are placed on a 1 meter x 1 meter surface, 0.8 meter height (Below 1GHz) or 0.6 meter x 0.6 meter surface, 1.5 meter height (Above 1GHz) 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

4.4.2 Calculation method

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

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

4.4.3 Limit

-13 dBm or less

4.4.4 Test data

Date : 26-May-2021
Temperature : 20.1 [˚C]
Humidity : 51.1 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Chiaki Kanno

Date : 27-May-2021
Temperature : 21.2 [˚C]
Humidity : 53.4 [%] Test engineer :
Test place : 3m Semi-anechoic chamber Chiaki Kanno

[WCDMA Band V]
(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	1652.8	-55.4	-56.8	1.1	8.0	-49.8	-13.0	36.8

(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	1673.2	-55.6	-56.6	1.1	8.0	-49.7	-13.0	36.7

(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	1693.2	-55.3	-56.4	1.1	7.9	-49.6	-13.0	36.6

Japan

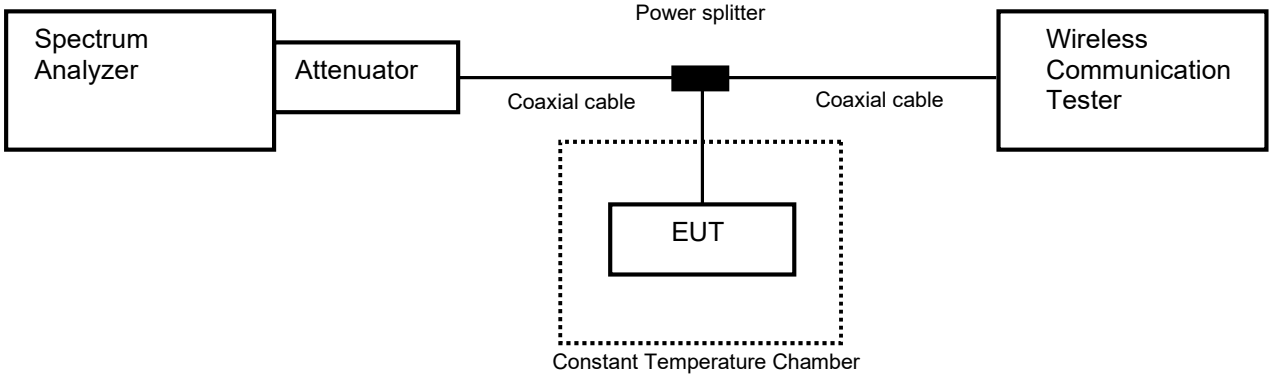
4.5 Frequency Stability

4.5.1 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



4.5.2 Limit

±2.5 ppm

Japan

4.5.3 Measurement result

Date : 31-May-2021
Temperature : 19.0 [˚C]
Humidity : 50.8 [%]
Test place : Shielded room No.4

Test engineer : Chiaki Kanno

[WCDMA Band V]
(Channel: 4183)

Limit: ±0.00025% = ±2.5 ppm					
Power Supply [V]	**Temperature [ºC]**	**Measurements Frequency [Hz]**	**Frequency Tolerance [ppm]**	**Limit [ppm]**	**Result**
3.85	25(Ref.)	836,599,983	0.00000	±2.5	Pass
	50	836,599,985	0.00249	±2.5	Pass
	40	836,599,987	0.00475	±2.5	Pass
	30	836,599,984	0.00173	±2.5	Pass
	20	836,599,987	0.00528	±2.5	Pass
	10	836,599,986	0.00397	±2.5	Pass
	0	836,599,988	0.00656	±2.5	Pass
	-10	836,599,987	0.00531	±2.5	Pass
	-20	836,599,985	0.00324	±2.5	Pass
	-30	836,599,985	0.00228	±2.5	Pass
3.47	25	836,599,986	0.00440	±2.5	Pass
4.24	25	836,599,983	0.00016	±2.5	Pass

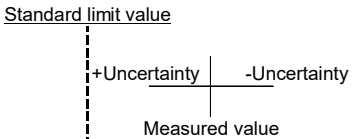
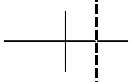
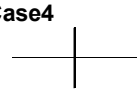
Calculation:
Frequency Tolerance (ppm) = Measurements Frequency (Hz) – Reference Frequency (Hz) / Reference Frequency (Hz) x 1000000

Japan

5 Measurement Uncertainty

Expanded uncertainties stated are calculated with a coverage Factor k=2.
Please note that these results are not taken into account when measurement uncertainty considerations contained in ETSI TR 100 028 Parts 1 and 2 determining compliance or non-compliance with test result.

Test item	Measurement uncertainty
Conducted emission, AMN (9 kHz – 150 kHz)	±3.7 dB
Conducted emission, AMN (150 kHz – 30 MHz)	±3.3 dB
Radiated emission (9kHz – 30 MHz)	±3.2 dB
Radiated emission (30 MHz – 1000 MHz)	±5.3 dB
Radiated emission (1 GHz – 6 GHz)	±4.8 dB
Radiated emission (6 GHz – 18 GHz)	±4.5 dB
Radiated emission (18 GHz – 40 GHz)	±6.4 dB
Radio Frequency	±1.4 * 10^{-8}
RF power, conducted	±0.8 dB
Adjacent channel power	±2.4 dB
Temperature	±0.6 °C
Humidity	±1.2 %
Voltage (DC)	±0.4 %
Voltage (AC, <10kHz)	±0.2 %

Judge	Measured value and standard limit value
PASS	**Case1**  Even if it takes uncertainty into consideration, a standard limit value is fulfilled.
	Case2  Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.
FAIL	**Case3**  Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.
	Case4  Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.

Japan

6 Laboratory Information

Testing was performed and the report was issued at:

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

Accreditation and Registration
A2LA
Certificate #3686.03

VLAC
Accreditation No.: VLAC-013

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

Innovation, Science and Economic Development Canada
ISED#: 4224A

VCCI Council

Registration number	Expiration date
A-0166	03-July-2021

Appendix A. Test Equipment

Antenna port conducted test

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
Spectrum analyzer	Agilent Technologies	E4440A	US44302655	31-Aug-2021	20-Aug-2020
Attenuator	Weinschel	56-10	J4993	31-Dec-2021	14-Dec-2020
Microwave cable	HUBER+SUHNER	SUCOFLEX 104/1m	199120/4	31-Dec-2021	14-Dec-2020
Power divider	Anritsu	K240C	2021109	31-Dec-2021	17-Dec-2020
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	31-Oct-2021	21-oct-2020
Temperature and humidity chamber	ESPEC	PL1KP	14007261	30-Sep-2021	02-Sep-2020

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	30-Sep-2021	28-Sep-2020
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	31-Dec-2021	11-Dec-2020
Spectrum analyzer	ROHDE&SCHWARZ	FSV40	101731	30-Jun-2021	22-Jun-2020
Preamplifier	SONOMA	310	372170	30-Sep-2021	29-Sep-2020
Biconical antenna	Schwarzbeck	VHBB9124/BBA9106	1333	31-Dec-2021	15-Dec-2020
Log periodic antenna	Schwarzbeck	VUSLP9111B	345	31-Oct-2021	19-Oct-2020
Attenuator	TOYO Connector	NA-PJ-6/6dB	N/A(S541)	30-Sep-2021	29-Sep-2020
Attenuator	TAMAGAWA.ELEC	CFA-10/3dB	N/A(S503)	31-Jul-2021	20-Jul-2020
Preamplifier	TSJ	MLA-100M18-B02-40	1929118	31-Dec-2021	15-Dec-2020
Attenuator	AEROFLEX	26A-10	081217-08	31-Dec-2021	14-Dec-2020
Double ridged guide antenna	ETS LINDGREN	3117	00224193	31-Mar-2022	30-Mar-2021
Attenuator	HUBER+SUHNER	6803.17.B	N/A(2340)	31-Dec-2021	15-Dec-2020
Notch Filter	Micro-Tronics	BRM50706	003	31-Jul-2021	21-Jul-2020
Signal generator	ROHDE&SCHWARZ	SMB100A	177525	31-Dec-2021	23-Dec-2020
RF power amplifier	R&K	CGA020M602-2633R	B40240	31-May-2021	15-May-2020
Microwave cable	HUBER+SUHNER	SUCOFELX102/2m	31648	31-Mar-2022	10-Mar-2021
Dipole antenna	Schwarzbeck	UHAP	994	31-Aug-2021	06-Aug-2020
Double ridged guide antenna	ETS LINDGREN	3117	00218815	31-Dec-2021	07-Dec-2020
Wideband Radio Frequency Tester	ROHDE&SCHWARZ	CMW500	126079	31-Oct-2021	21-Oct-2020
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	MY30037/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/1m	my24610/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/8m	SN MY30033/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104	MY32976/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/1.5m	SN MY28404/4	31-Dec-2021	15-Dec-2020
		SUCOFLEX104/7m	41625/6	31-Dec-2021	15-Dec-2020
PC	DELL	DIMENSION E521	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/RE-AJ	0611193/V6.0.140	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)	31-May-2021	29-May-2020
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	31-May-2021	28-May-2020

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