

## Report on the RF Testing of:

KYOCERA Corporation  
Mobile Phone, Model: EB1073  
FCC ID: JOYEB1073

## In accordance with FCC Part 15 Subpart C (15.225)

Prepared for: KYOCERA Corporation  
Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku  
Yokohama-shi, Kanagawa, Japan  
Phone: +81-45-943-6253 Fax: +81-45-943-6314



Japan

**Add value.  
Inspire trust.**

## COMMERCIAL-IN-CONFIDENCE

Document Number: JPD-TR-21188-0

### SIGNATURE

NAME	JOB TITLE	RESPONSIBLE FOR	ISSUE DATE
Hiroaki Suzuki	Deputy Manager of RF Group	Approved Signatory	2021.10.20

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 of this product was tested and the result above was confirmed in accordance with FCC Part 15 Subpart C (15.225).



Certificate #3686.03

### DISCLAIMER AND COPYRIGHT

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.

Client provided data, for which TÜV SÜD Japan Ltd. take no responsibility, which can affect validity of results within this report is clearly identified.

### ACCREDITATION

This test report must not be used by the client to claim product certification, approval, or endorsement by A2LA or any agency of the U.S. Government.

TÜV SÜD Japan Ltd.  
Yonezawa Testing Center  
5-4149-7 Hachimanpara,  
Yonezawa-shi, Yamagata,  
992-1128 Japan

Phone: +81 (0) 238 28 2881  
[www.tuvsud.com/ja-jp](http://www.tuvsud.com/ja-jp)

## Contents

<b>1</b>	<b>Summary of Test .....</b>	<b>3</b>
1.1	Modification history of the test report.....	3
1.2	Standards .....	3
1.3	Test methods.....	3
1.4	Deviation from standards.....	3
1.5	List of applied test(s) of the EUT .....	3
1.6	Test information .....	3
1.7	Test set up.....	3
1.8	Test period.....	3
<b>2</b>	<b>Equipment Under Test .....</b>	<b>4</b>
All information in this chapter was provided by the applicant. ....		4
2.1	EUT information.....	4
2.2	Modification to the EUT .....	4
2.3	Variation of family model(s).....	5
2.4	Operating mode.....	5
2.5	Operating flow .....	5
<b>3</b>	<b>Configuration of Equipment .....</b>	<b>6</b>
3.1	Equipment used.....	6
3.2	Cable(s) used .....	6
3.3	System configuration .....	6
<b>4</b>	<b>Test Result .....</b>	<b>7</b>
4.1	Occupied Bandwidth.....	7
4.2	Operation within the band 13.110-14.010MHz .....	9
4.3	Radiated Emissions.....	13
4.4	Frequency Tolerance.....	17
4.5	AC Power Line Conducted Emissions.....	19
<b>5</b>	<b>Antenna requirement .....</b>	<b>23</b>
<b>6</b>	<b>Measurement Uncertainty.....</b>	<b>24</b>
<b>7</b>	<b>Laboratory Information .....</b>	<b>25</b>
<b>Appendix A. Test Equipment.....</b>		<b>26</b>

## 1 Summary of Test

### 1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-21188-0	First Issue	Refer to the cover page

### 1.2 Standards

CFR47 FCC Part 15 Subpart C (15.225)

### 1.3 Test methods

ANSI C63.10-2013

### 1.4 Deviation from standards

None

### 1.5 List of applied test(s) of the EUT

Test item section	Test item	Condition	Result	Remark
2.1049 RSS-Gen 6.7	Occupied Bandwidth	Conducted	PASS	-
15.209 15.225 (a)(b)(c)(d)	Operation within the band 13.110-14.010MHz	Radiated	PASS	-
15.209 15.225 (d)	Transmitter Radiated Spurious Emissions	Radiated	PASS	-
15.225 (e)	Frequency Tolerance	Conducted	PASS	-
15.207	AC Power Line Conducted Emissions	Conducted	PASS	-

### 1.6 Test information

None

### 1.7 Test set up

Table-top

### 1.8 Test period

27-August-2021 - 8-October-2021

## 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	EB1073
Serial number	352886910002746
Trade name	Kyocera
Number of sample(s)	1
EUT condition	Pre-Production
Power rating	Battery: DC 3.87 V
Size	(W) 69.0 mm × (D) 13.7 mm × (H) 123.0 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20 °C to 60 °C
Hardware version	DMT
Software version	V0.101PO
Firmware version	Not applicable
RF Specification	
Frequency range	13.56MHz
Modulation method	ASK
Antenna type	Loop antenna

### 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: EB1073, Serial Number: 352886910002746			
0	As supplied by the applicant	Not Applicable	Not Applicable



Japan

## **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 Operating mode**

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.

Pre-scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports.

## **2.5 Operating flow**

[Tx mode]

- i) NFC test program setup to the Software
- ii) Start test mode

### 3 Configuration of Equipment

Numbers assigned to equipment on the diagram in “3.3 System configuration” correspond to the list in “3.1 Equipment used” and “3.2 Cable(s) 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	EB1073	352886910002746	JOYEB1073	EUT
2	AC Adapter	KDDI	0602PQA	N/A	N/A	*

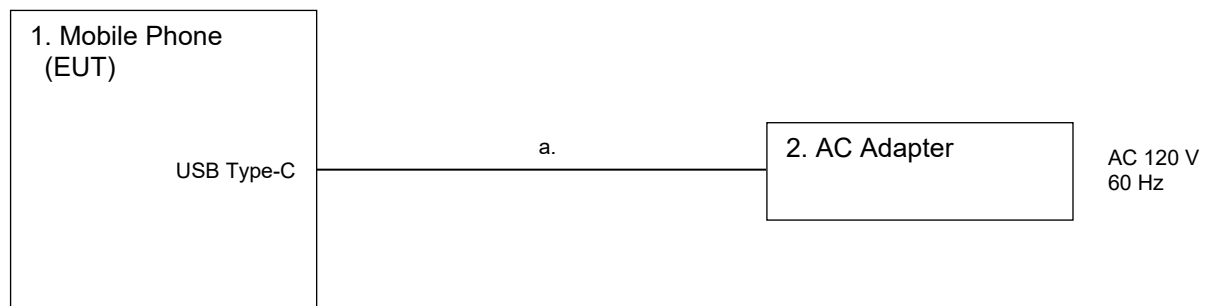
\*:AC power line Conducted Emission Test.

#### 3.2 Cable(s) used

No.	Equipment	Length[m]	Shield	Connector	Comment
a	USB cable (for AC Adapter)	1.5	No	Plastic	*

\*:AC power line Conducted Emission Test.

#### 3.3 System configuration



## 4 Test Result

### 4.1 Occupied Bandwidth

#### 4.1.1 Measurement procedure

##### [FCC 2.1049, RSS-Gen 6.7]

The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to approach 1% of the selected span or less than 1%. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

The spectrum analyzer is set to;

- RBW=1kHz, VBW=3kHz, Span=100kHz, Sweep=auto, Detector=Peak, Trace mode = max hold.

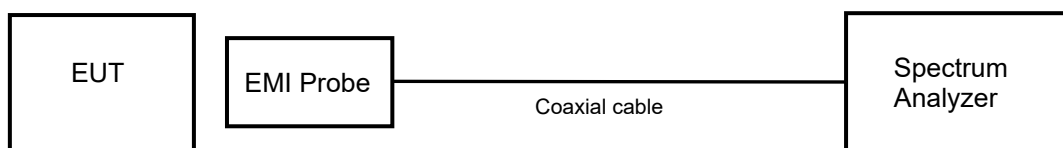
The EUT was set to operate with following conditions.

- 13.56MHz

The test mode of EUT is as follows.

- Transmit mode

- Test configuration



#### 4.1.2 Limit

None

#### 4.1.3 Measurement result

Date : 8-September-2021  
 Temperature : 22.3 [°C]  
 Humidity : 46.9 [%]  
 Test place : Shielded room No.3

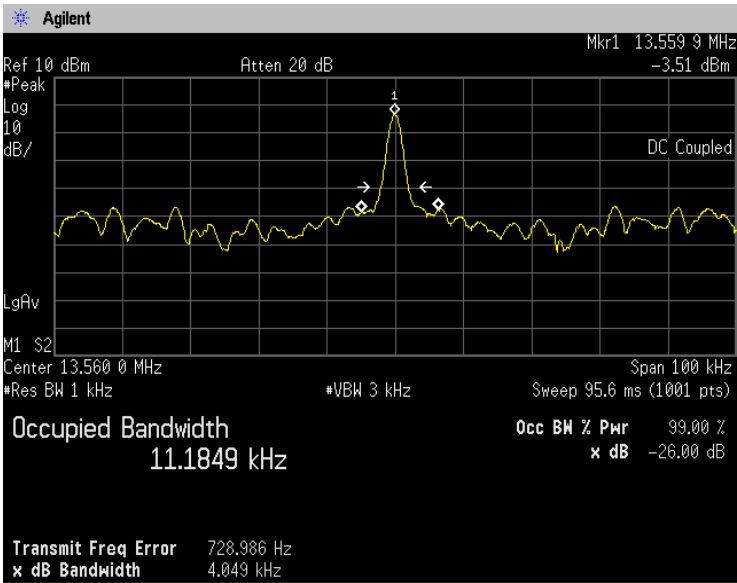
Test engineer : Kazunori Saito

Frequency (MHz)	Occupied Bandwidth (kHz)
13.5599	11.1849



Japan

4.1.4 Trace data





## 4.2 Operation within the band 13.110-14.010MHz

### 4.2.1 Measurement procedure

#### [FCC 15.209, 15.225 (a)(b)(c)(d)]

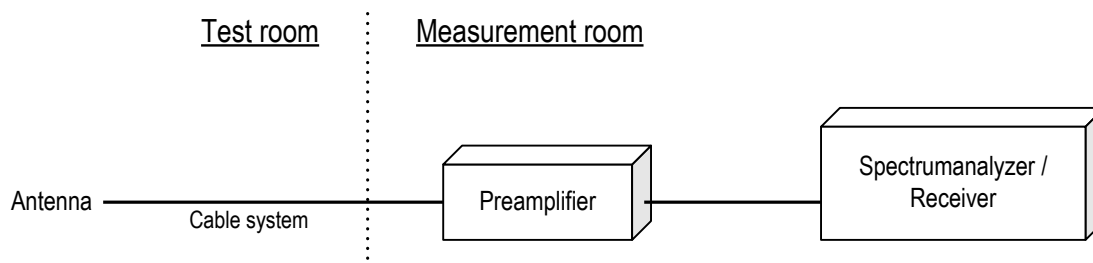
Test was applied by following conditions.

Test method	: ANSI C63.10
Frequency range	: 13.110MHz to 14.010MHz
Test place	: 3m Semi-anechoic chamber
EUT was placed on	: Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m
Antenna distance	: 3m

Test receiver setting	
- Detector	: Quasi-peak
- Bandwidth	: 9kHz

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Then, emission measurements frequency range 13.110MHz to 14.010MHz were performed with test receiver in above setting. The turntable and the Loop antenna are rotated by 360 degrees and stopped at azimuth of producing the maximum emission. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition.

#### - Test configuration



### 4.2.2 Calculation method

Emission level = Reading + (Ant. factor + Cable system loss – Amp. Gain)

Margin = Limit – Emission level

#### 4.2.3 Limit

- (a) The field strength of any emissions within the band 13.553-13.567MHz shall not exceed 15,848uV/m at 30m.
- (b) Within the band 13.410-13.553MHz and 13.567-13.710MHz, the field strength of any emissions shall not exceed 334uV/m at 30m.
- (c) Within the band 13.110-13.410MHz and 13.710-14.010MHz, the field strength of any emissions shall not exceed 106uV/m at 30m.
- (d) The field strength of any emissions appearing outside of the 13.110-14.010MHz and shall not exceed the general radiated emission limits in FCC 15.209.

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] = 20log Emission [uV/m]
3. Measurements were corrected to 30m using  $40\log(3/30) = -40.0\text{dB}$

#### 4.2.4 Test data

Date : 27-August-2021

Temperature : 22.1 [°C]

Humidity : 69.3 [%]

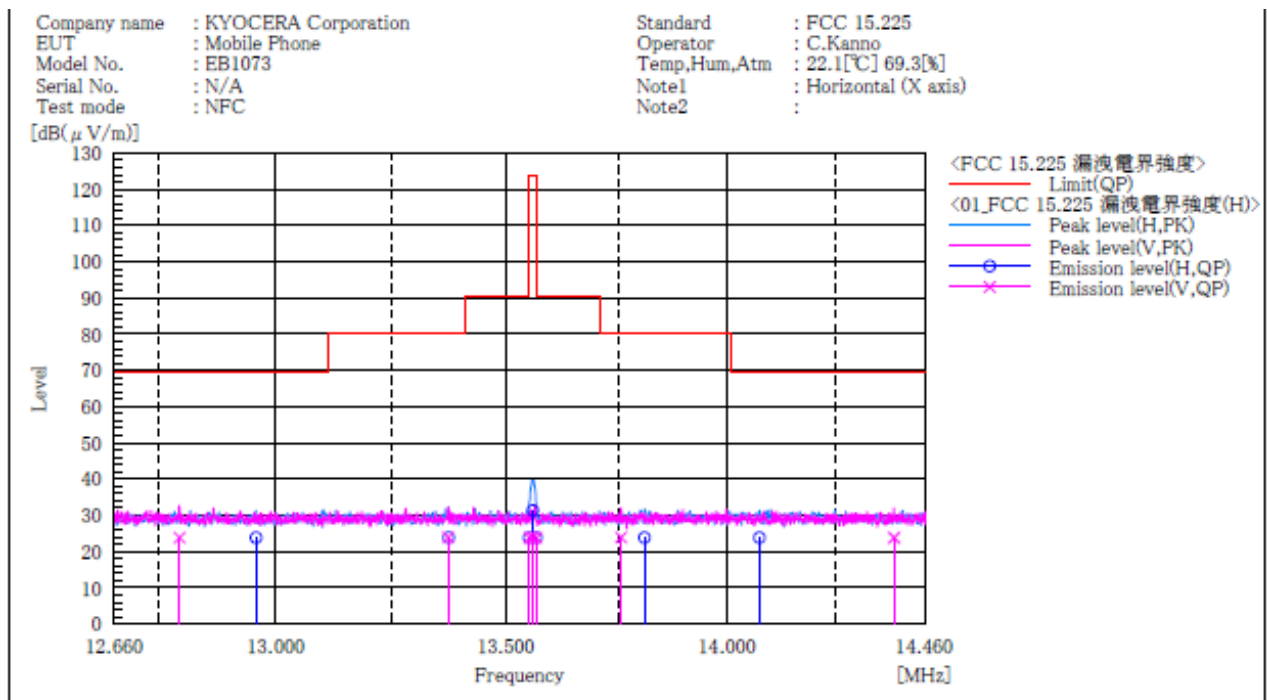
Test place : 3m Semi-anechoic chamber

Test engineer :

Chiaki Kanno

Frequency range (MHz)	Frequency (MHz)	Level		Limit (dBuV/m)	Margin (dB)	Result
		Measured at 3m (dBuV/m)	Measured at 30m (dBuV/m)			
13.553-13.567	13.560	38.5	-1.5	84.0	85.5	PASS
13.41-13.553	13.552	25.4	-14.6	50.5	65.1	PASS
13.567-13.71	13.568	25.3	-14.7	50.5	65.2	PASS
13.11-13.41	13.373	23.9	-16.1	40.5	56.6	PASS
13.71-14.01	13.758	23.9	-16.1	40.5	56.6	PASS
12.66-13.11	12.776	23.8	-16.2	29.5	45.7	PASS
14.01-14.46	14.173	23.8	-16.2	29.5	45.7	PASS

## 4.2.5 Trace data

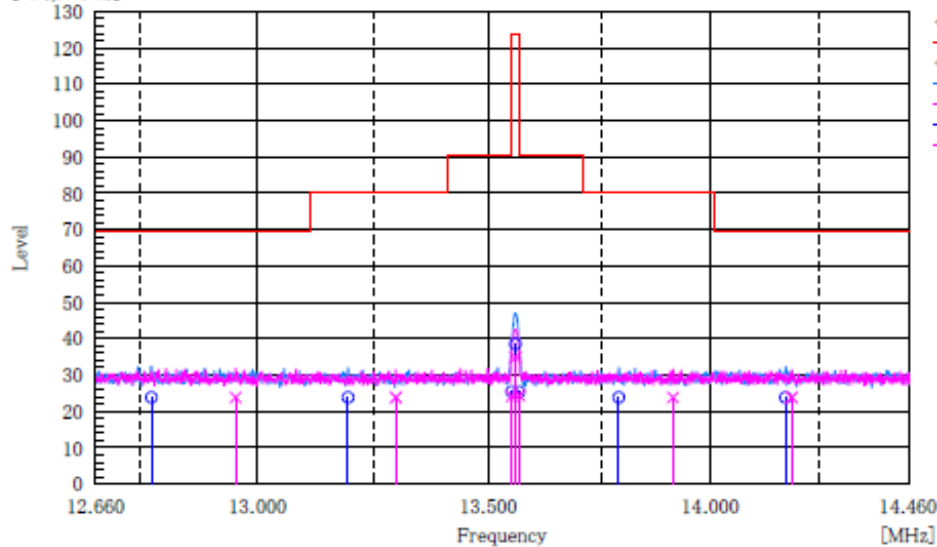


## Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]	Remark
1	13.560	V	30.2	-6.4	23.8	124.0	100.2	100.0	0.0	
2	13.552	V	30.2	-6.4	23.8	90.5	66.7	100.0	0.0	
3	13.568	V	30.2	-6.4	23.8	90.5	66.7	100.0	0.0	
4	13.373	V	30.3	-6.4	23.9	80.5	56.6	100.0	159.0	
5	13.758	V	30.3	-6.4	23.9	80.5	56.6	100.0	250.0	
6	12.796	V	30.2	-6.4	23.8	69.5	45.7	100.0	104.0	
7	14.388	V	30.2	-6.4	23.8	69.5	45.7	100.0	98.0	
8	13.560	H	37.7	-6.4	31.3	124.0	92.7	100.0	229.0	
9	13.552	H	30.2	-6.4	23.8	90.5	66.7	100.0	229.0	
10	13.568	H	30.2	-6.4	23.8	90.5	66.7	100.0	229.0	
11	13.374	H	30.2	-6.4	23.8	80.5	56.7	100.0	223.0	
12	13.811	H	30.2	-6.4	23.8	80.5	56.7	100.0	304.0	
13	12.958	H	30.2	-6.4	23.8	69.5	45.7	100.0	115.0	
14	14.074	H	30.2	-6.4	23.8	69.5	45.7	100.0	224.0	

Company name : KYOCERA Corporation  
 EUT : Mobile Phone  
 Model No. : EB1073  
 Serial No. : N/A  
 Test mode : NFC

Standard : FCC 15.225  
 Operator : C.Kanno  
 Temp,Hum,Atm : 22.1[°C] 69.3[%]  
 Note1 : Vertical (Z axis)  
 Note2 :

[dB( $\mu$ V/m)]

<FCC 15.225 漏洩電界強度>  
 Limit(QP)  
 <02\_FCC 15.225 漏洩電界強度(V)>  
 Peak level(H,PK)  
 Peak level(V,PK)  
 Emission level(H,QP)  
 Emission level(V,QP)

## Final Result

No.	Frequency [MHz]	(P)	Reading QP [dB( $\mu$ V)]	c.f [dB(1/m)]	Result QP [dB( $\mu$ V/m)]	Limit QP [dB( $\mu$ V/m)]	Margin QP [dB]	Height [cm]	Angle [°]	Remark
1	13.560	V	41.3	-6.4	34.9	124.0	89.1	100.0	261.0	
2	13.552	V	30.6	-6.4	24.2	90.5	66.3	100.0	261.0	
3	13.568	V	30.7	-6.4	24.3	90.5	66.2	100.0	261.0	
4	13.297	V	30.2	-6.4	23.8	80.5	56.7	100.0	244.0	
5	13.914	V	30.2	-6.4	23.8	80.5	56.7	100.0	45.0	
6	12.953	V	30.2	-6.4	23.8	69.5	45.7	100.0	2.0	
7	14.187	V	30.2	-6.4	23.8	69.5	45.7	100.0	309.0	
8	13.560	H	44.9	-6.4	38.5	124.0	85.5	100.0	186.0	
9	13.552	H	31.8	-6.4	25.4	90.5	65.1	100.0	186.0	
10	13.568	H	31.7	-6.4	25.3	90.5	65.2	100.0	186.0	
11	13.194	H	30.2	-6.4	23.8	80.5	56.7	100.0	90.0	
12	13.791	H	30.2	-6.4	23.8	80.5	56.7	100.0	215.0	
13	12.776	H	30.2	-6.4	23.8	69.5	45.7	100.0	0.0	
14	14.173	H	30.2	-6.4	23.8	69.5	45.7	100.0	355.0	

## 4.3 Radiated Emissions

### 4.3.1 Measurement procedure

#### [FCC 15.209, 15.225 (d)]

Test was applied by following conditions.

Test method	: ANSI C63.10
Frequency range	: 9kHz to 30MHz
Test place	: 3m Semi-anechoic chamber
EUT was placed on	: Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m
Antenna distance	: 3m

#### Test receiver setting

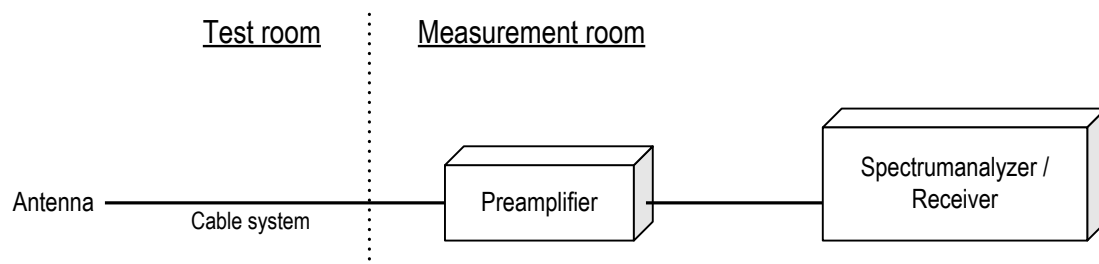
- Detector	: Average (9kHz-90kHz, 110kHz-490kHz), Quasi-peak
- Bandwidth	: 200Hz, 9kHz

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open area test site.

Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field based on KDB 937606.

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Then, emission measurements up to 30MHz were performed with test receiver in above setting. The turntable and the Loop antenna are rotated by 360 degrees and stopped at azimuth of producing the maximum emission. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition.

#### - Test configuration



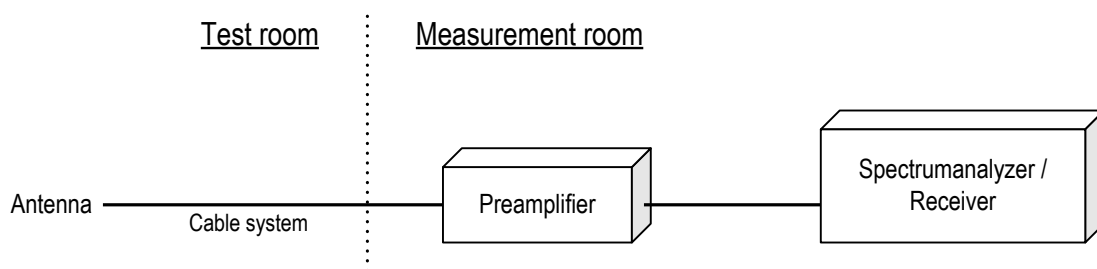
Test was applied by following conditions.

Test method	: ANSI C63.10
Frequency range	: 30MHz to 1000MHz
Test place	: 3m Semi-anechoic chamber
EUT was placed on	: Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m
Antenna distance	: 3m

Test receiver setting	
- Detector	: Quasi-peak
- Bandwidth	: 120kHz

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Then, emission measurements up to 1000MHz were performed with test receiver in above setting. In order to find the maximum emissions, antenna is adjusted between 1m and 4m in height and varied its polarization (horizontal and vertical), and EUT azimuth was also varied by rotating turntable 0 to 360 degrees. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition.

#### - Test configuration



#### 4.3.2 Calculation method

[9kHz to 150kHz]

Emission level = Reading + (Ant. factor + Cable system loss)

Margin = Limit – Emission level

[150kHz to 1000MHz]

Emission level = Reading + (Ant. factor + Cable system loss – Amp. Gain)

Margin = Limit – Emission level

#### 4.3.3 Limit

Frequency [MHz]	Field strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009-0.490	$2400 / F$ [kHz]	$20\log E$ [uV/m]	300
0.490-1.705	$24000 / F$ [kHz]	$20\log E$ [uV/m]	30
1.705-30	30	29.5	30
30-88	100	40.0	3
88-216	150	43.5	3
216-960	200	46.0	3
Above 960	500	54.0	3

Note:

1. The lower limit shall apply at the transition frequencies.
2. Emission level [dBuV/m] =  $20\log$  Emission [uV/m]
3. Measurements were corrected to 300m using  $40\log (3/300) = -80.0\text{dB}$   
Measurements were corrected to 30m using  $40\log (3/30) = -40.0\text{dB}$

#### 4.3.4 Test data

Date : 27-August-2021

Temperature : 22.1 [°C]

Humidity : 69.3 [%]

Test place : 3m Semi-anechoic chamber

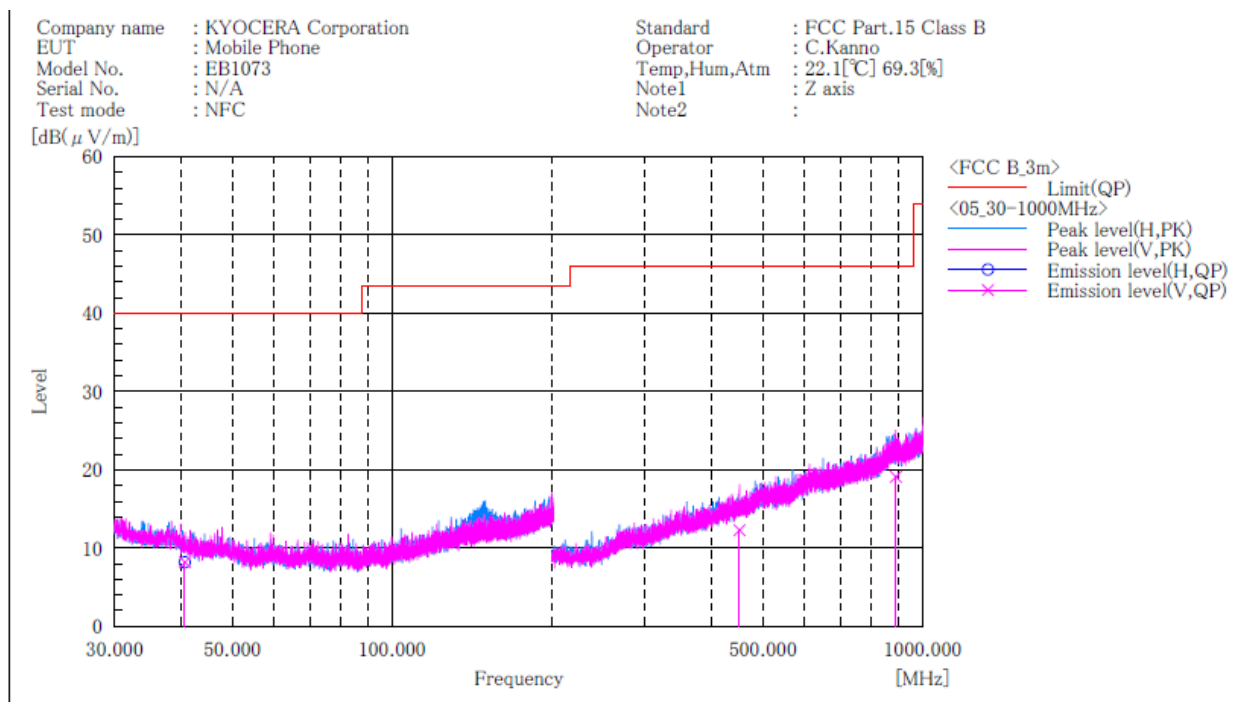
Test engineer :

Chiaki Kanno

#### [9kHz to 30MHz]

Frequency (MHz)	Reading [dBuV] At 3m	c.f [dB(1/m)]	Result [dBuV/m] At 3m	Result [dBuV/m] At 30m	Limit [dBuV/m] At 30m	Margin (dB)	Result
27.12	28.9	-5.2	23.7	-16.3	29.5	45.8	PASS

#### [30MHz to 1000MHz]



#### Final Result

No.	Frequency (P) [MHz]	Reading QP [dB(μV)]	c.f [dB(1/m)]	Result QP [dB(μV/m)]	Limit QP [dB(μV/m)]	Margin QP [dB]	Height [cm]	Angle [°]	Remark
1	40.680 H	23.0	-14.8	8.2	40.0	31.8	100.0	0.0	
2	40.680 V	23.0	-14.8	8.2	40.0	31.8	100.0	0.0	
3	451.389 V	22.4	-10.1	12.3	46.0	33.7	150.0	114.0	
4	889.729 V	21.8	-2.7	19.1	46.0	26.9	200.0	0.0	



#### 4.4 Frequency Tolerance

##### 4.4.1 Measurement procedure

###### [FCC 15.205 (e)]

The EUT was placed of an inside of a 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 center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channels center frequency was recorded.

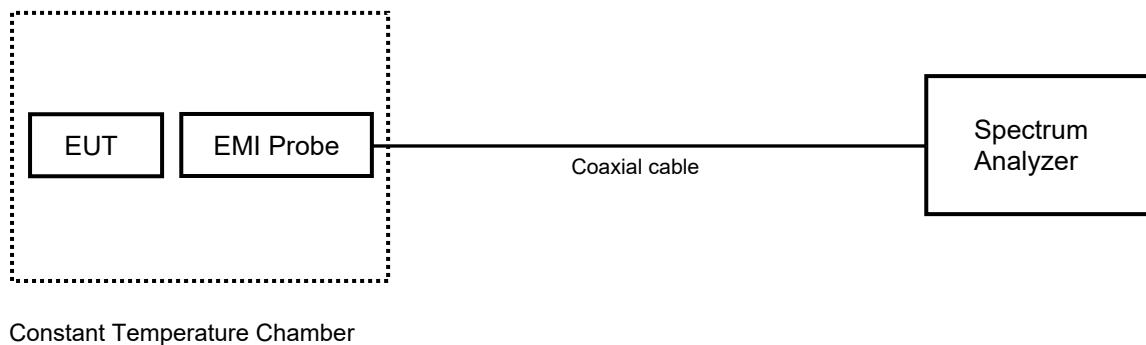
The EUT was set to operate with following conditions.

- 13.56MHz

The test mode of EUT is as follows.

- Transmit mode

- Test configuration



##### 4.4.2 Limit

The Frequency tolerance of the carrier signal shall be maintained within +/- 0.01% over a temperature variation of -30 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

#### 4.4.3 Test data

Date : 8-September-2021  
 Temperature : 22.3 [°C]  
 Humidity : 46.9 [%]  
 Test place : Shielded room No.3

Test engineer : Kazunori Saito

Reference Frequency: EUT Channel 13.56MHz at 20°C											
Limit: $\pm 0.01\% = \pm 100\text{ppm} = \pm 0.135603\text{MHz}$											
Power Supply	Temperature	Measurements Frequency (startup)	Frequency Tolerance (startup)	Measurements Frequency (2mins)	Frequency Tolerance (2mins)	Measurements Frequency (5mins)	Frequency Tolerance (5mins)	Measurements Frequency (10mins)	Frequency Tolerance (10mins)	Limit	Result
[V]	[°C]	[MHz]	[ppm]	[MHz]	[ppm]	[MHz]	[ppm]	[MHz]	[ppm]	[ppm]	
3.87	50	13.559941	-4.351	13.559933	-4.941	13.559939	-4.499	13.559941	-4.351	$\pm 100$	PASS
	40	13.559925	-5.531	13.559925	-5.531	13.559933	-4.941	13.559933	-4.941		
	30	13.559943	-4.204	13.559927	-5.383	13.559935	-4.794	13.559925	-5.531		
	20	13.560000	-	13.559950	-3.687	13.559947	-3.909	13.559954	-3.392		
	10	13.559995	-0.369	13.559998	-0.147	13.559989	-0.811	13.559984	-1.180		
	0	13.560050	3.687	13.560042	3.097	13.560035	2.581	13.560022	1.622		
	-10	13.560051	3.761	13.560044	3.245	13.560049	3.614	13.560034	2.515		
	-20	13.560057	4.204	13.560051	3.761	13.560064	4.720	13.560066	4.867		
	-30	13.560061	4.499	13.560059	4.351	13.560072	5.310	13.560061	4.499		
3.29	20	13.559998	-0.147	13.559981	-1.401	13.559971	-2.139	13.559965	-2.581		
4.45	20	13.559936	-4.720	13.559933	-4.941	13.559936	-4.720	13.559949	-3.761		

Note. Frequency Tolerance (ppm) = (Measurements Frequency (MHz) – Reference Frequency (MHz)) / Reference Frequency (MHz) x 1000000

The primary power supply voltage rating of this EUT is 85% to 115%

## 4.5 AC Power Line Conducted Emissions

### 4.5.1 Measurement procedure

#### [FCC 15.207]

Test was applied by following conditions.

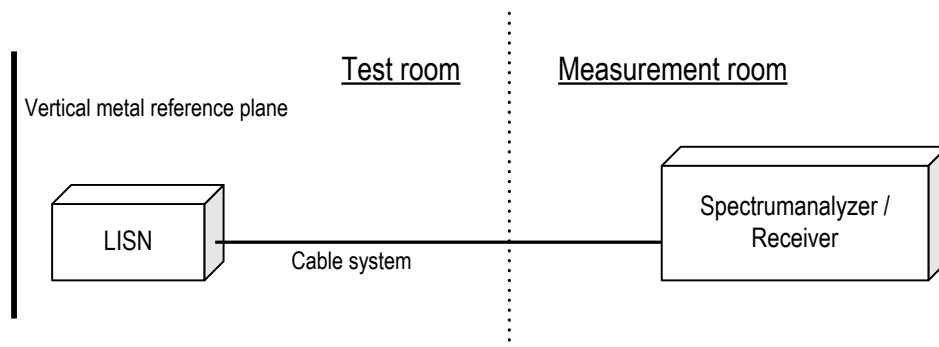
Test method	: ANSI C63.10
Frequency range	: 0.15 MHz to 30 MHz
Test place	: 3 m Semi-anechoic chamber
EUT was placed on	: FRP table / (W)2.0 m × (D)1.0 m × (H)0.8 m
Vertical Metal Reference Plane	: (W)2.0 m × (H)2.0 m 0.4 m away from EUT
Test receiver setting	
- Detector	: Quasi-peak, Average
- Bandwidth	: 9 kHz

EUT and peripherals are connected to 50Ω/50μH Line Impedance Stabilization Network (LISN) which are connected to reference ground plane, and are placed 80cm away from EUT. Excess of AC power cable is bundled in center.

LISN for peripheral is terminated in 50Ω.

EUT operating mode is selected to emit the maximum noise. Overall frequency range is investigated with spectrum analyzer using peak detector. Maximum emission configuration is determined by manipulating the EUT, peripherals, interconnecting cables. Then, emission measurements are performed with test receiver in above setting to each current-carrying conductor of the mains port. Sufficient time for EUT, peripherals and test equipment is provided in order for them to warm up to their normal operating condition. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits.

#### - Test configuration



#### 4.5.2 Calculation method

Emission level = Reading + (LISN. Factor + Cable system loss)

Margin = Limit – Emission level

Example:

Limit @ 6.770 MHz: 60.0 dB $\mu$ V(Quasi-peak)

: 50.0 dB $\mu$ V(Average)

(Quasi peak) Reading = 41.2 dB $\mu$ V c.f = 10.3 dB

Emission level = 41.2 + 10.3 = 51.5 dB $\mu$ V

Margin = 60.0 – 51.5 = 8.5 dB

(Average) Reading = 35.0 dB $\mu$ V c.f = 10.3 dB

Emission level = 35.0 + 10.3 = 45.3 dB $\mu$ V

Margin = 50.0 – 45.3 = 4.7 dB

#### 4.5.3 Limit

Frequency [MHz]	Limit	
	QP [dB $\mu$ V]	AV [dB $\mu$ V]
0.15-0.5	66-56*	56-46*
0.5-5	56	46
5-30	60	50

\*: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

#### 4.5.4 Measurement result

Date : 8-October-2021

Temperature : 21.6 [°C]

Humidity : 62.3 [%]

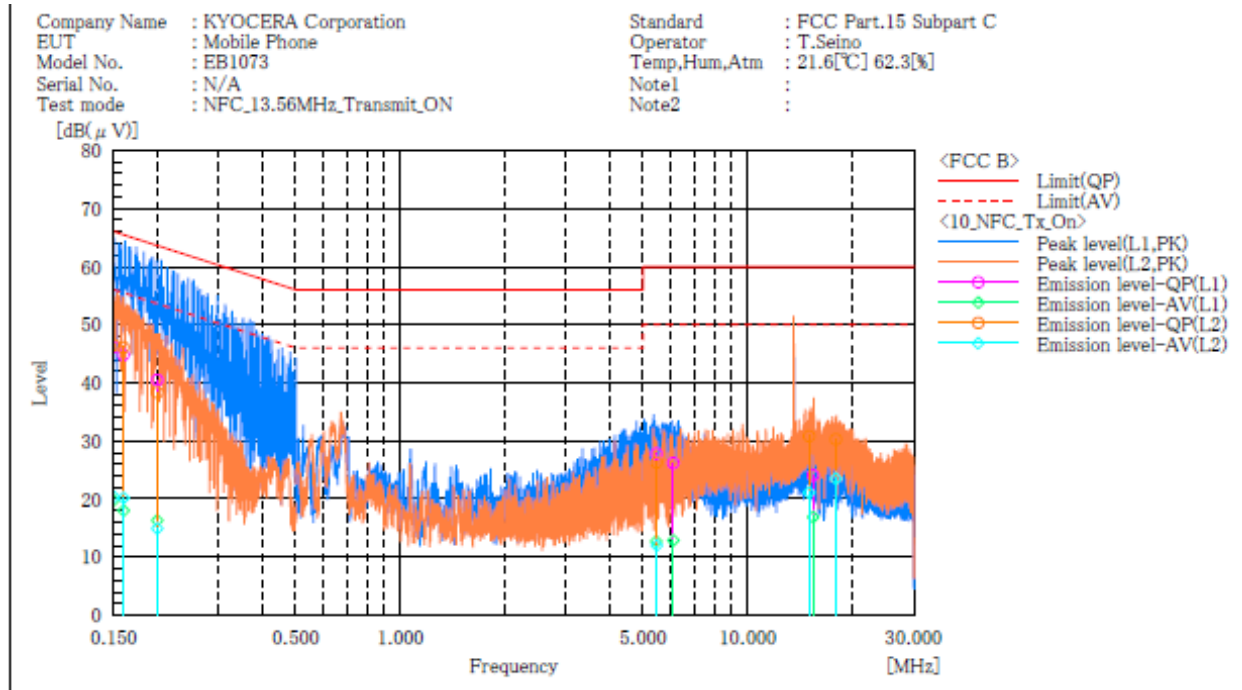
Test place : 3m Semi-anechoic chamber

Test engineer :

Tadahiro Seino

## 4.5.5 Test data

## [Transmit ON]



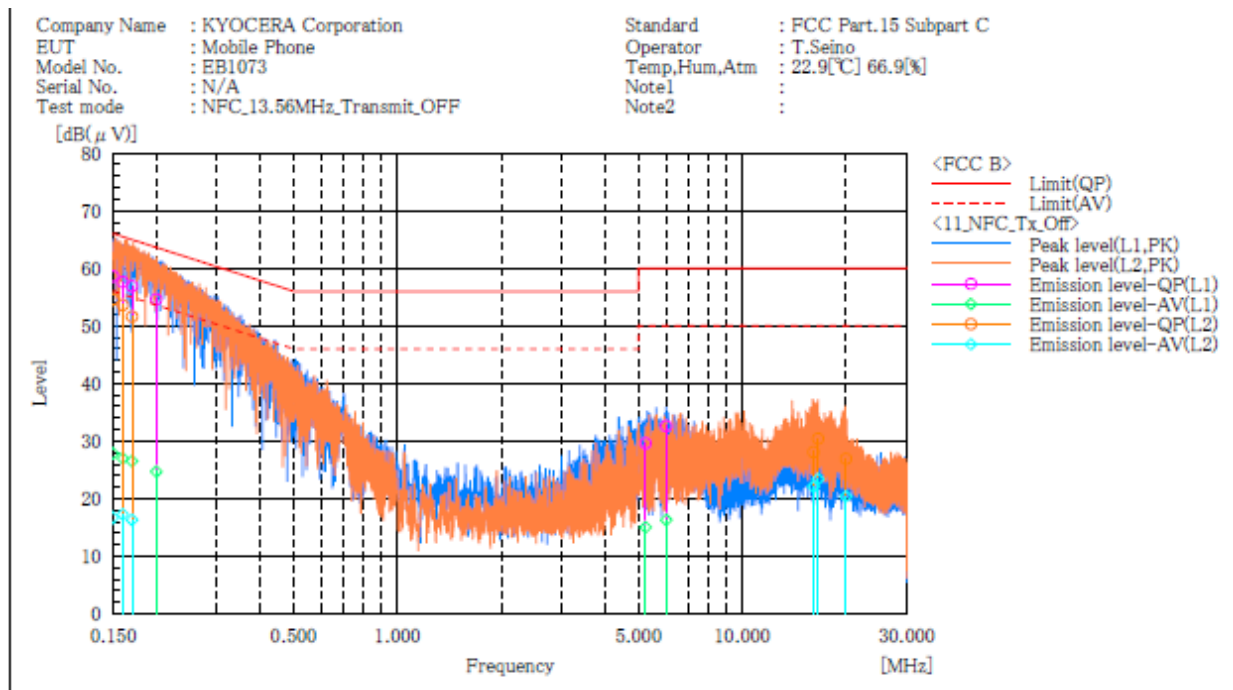
## Final Result

## --- L1 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.150	35.6	9.2	10.6	46.2	19.8	66.0	56.0	19.8	36.2
2	0.160	34.3	7.5	10.5	44.8	18.0	65.5	55.5	20.7	37.5
3	0.200	30.0	5.8	10.5	40.5	16.3	63.6	53.6	23.1	37.3
4	5.454	17.1	2.0	10.7	27.8	12.7	60.0	50.0	32.2	37.3
5	6.100	15.4	2.1	10.8	26.2	12.9	60.0	50.0	33.8	37.1
6	15.408	12.4	5.2	11.7	24.1	16.9	60.0	50.0	35.9	33.1

## --- L2 Phase ---

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.150	35.9	9.8	10.6	46.5	20.4	66.0	56.0	19.5	35.6
2	0.160	35.5	9.6	10.6	46.1	20.2	65.5	55.5	19.4	35.3
3	0.200	27.8	4.4	10.5	38.3	14.9	63.6	53.6	25.3	38.7
4	5.460	15.5	1.2	10.8	26.3	12.0	60.0	50.0	33.7	38.0
5	15.001	19.1	9.4	11.7	30.8	21.1	60.0	50.0	29.2	28.9
6	17.910	18.4	11.6	11.9	30.3	23.5	60.0	50.0	29.7	26.5

**[Transmit OFF]****Final Result****— L1 Phase —**

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.150	48.0	17.2	10.6	58.6	27.8	66.0	56.0	7.4	28.2
2	0.160	47.1	16.5	10.5	57.6	27.0	65.5	55.5	7.9	28.5
3	0.170	46.4	16.0	10.5	56.9	26.5	65.0	55.0	8.1	28.5
4	0.200	44.1	14.2	10.5	54.6	24.7	63.6	53.6	9.0	28.9
5	5.245	18.9	4.3	10.7	29.6	15.0	60.0	50.0	30.4	35.0
6	6.014	21.8	5.5	10.8	32.6	16.3	60.0	50.0	27.4	33.7

**— L2 Phase —**

No.	Frequency [MHz]	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c.f [dB]	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.150	44.0	6.1	10.6	54.6	16.7	66.0	56.0	11.4	39.3
2	0.160	43.0	6.7	10.6	53.6	17.3	65.5	55.5	11.9	38.2
3	0.170	41.0	5.7	10.6	51.6	16.3	65.0	55.0	13.4	38.7
4	16.066	16.3	10.3	11.8	28.1	22.1	60.0	50.0	31.9	27.9
5	16.578	18.6	11.6	11.8	30.4	23.4	60.0	50.0	29.6	26.6
6	19.966	14.9	8.4	12.0	26.9	20.4	60.0	50.0	33.1	29.6



Japan

## **5 Antenna requirement**

According to FCC section 15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device. The antenna is a special antenna mounted inside of the EUT. Therefore, the EUT complies with the antenna requirement of FCC section 15.203.

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

Judge	Measured value and standard limit value	
PASS	<div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Even if it takes uncertainty into consideration, a standard limit value is fulfilled.</p> </div> </div>	
	<div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Although measured value is in a standard limit value, a limit value won't be fulfilled if uncertainty is taken into consideration.</p> </div> </div>	
FAIL	<div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Although measured value exceeds a standard limit value, a limit value will be fulfilled if uncertainty is taken into consideration.</p> </div> </div>	
	<div> <div> <div>Standard limit value</div> <div> <div>+Uncertainty</div> <div>-Uncertainty</div> </div> <div>Measured value</div> </div> <div> <p>Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.</p> </div> </div>	







Japan

## 7 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

**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: A-0166

## 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
				30-Sep-2022	20-Sep-2021
Attenuator	Weinschel	56-10	J4993	31-Dec-2021	14-Dec-2020
Power meter	ROHDE&SCHWARZ	NRP2	103269	31-Mar-2022	10-Mar-2021
Power sensor	ROHDE&SCHWARZ	NRP-Z81	102467	31-Mar-2022	10-Mar-2021

### 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	E4447A	MY46180188	31-Mar-2022	11-Mar-2021
Spectrum analyzer	Agilent Technologies	E4440A	US40420937	31-Dec-2021	11-Dec-2020
Spectrum analyzer	ROHDE&SCHWARZ	FSV40	101731	30-Jun-2022	08-Jun-2021
Preamplifier	SONOMA	310	372170	30-Sep-2021	29-Sep-2020
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	100515	30-Apr-2022	27-Apr-2021
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-2022	20-Jul-2021
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	00052315	31-Mar-2022	30-Mar-2021
Attenuator	HUBER+SUHNER	6803.17.B	N/A(2340)	31-Dec-2021	15-Dec-2020
Double ridged guide antenna	A.H.Systems Inc.	SAS-574	469	30-Sep-2021	02-Sep-2020
Preamplifier	TSJ	MLA-1840-B03-35	1240332	30-Sep-2021	02-Sep-2020
Band rejection filter	Micro-Tronics	BRC50702	G433	30-Sep-2021	29-Sep-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-2022	20-May-2021
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-SVSWR)	31-May-2022	20-May-2021

### Conducted emission at mains port

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESCI	100765	30-Sep-2021	28-Sep-2020
Attenuator	HUBER+SUHNER	6810.01.A	N/A (S411)	31-Dec-2021	15-Dec-2020
Line impedance stabilization network	Kyoritsu Electrical Works, Ltd.	TNW-407F2	12-17-110-2	30-Jun-2022	17-Jun-2021
Coaxial cable	FUJIKURA	5D-2W/4m	N/A (S350)	31-Dec-2021	15-Dec-2020
Coaxial cable	FUJIKURA	5D-2W/1m	N/A (S193)	31-Dec-2021	15-Dec-2020
Coaxial cable	HUBER+SUHNER	RG214/U/10m	N/A (S194)	31-Dec-2021	15-Dec-2020
PC	DELL	DIMENSION	75465BX	N/A	N/A
Software	TOYO Corporation	EP5/CE-AJ	0611193/V5.4.11	N/A	N/A

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