

Report on the RF Testing of:

KYOCERA Corporation
Mobile Phone, Model: EB1157
FCC ID: JOYEB1157

In accordance with FCC Part 15 Subpart C
(15.209)

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



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Document Number: JPD-TR-23077-0

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Hiroaki Suzuki	Deputy Manager of RF Group	Approved Signatory	2023.08.18

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EXECUTIVE SUMMARY - Result: Complied

A sample(s) of this product was tested and the result above was confirmed in accordance with FCC Part 15 Subpart C (15.209).



Certificate #3686.03

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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

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1 Summary of Test

1.1 Modification history of the test report

Document Number	Modification History	Issue Date
JPD-TR-23077-0	First Issue	Refer to the cover page

1.2 Standards

CFR47 FCC Part 15 Subpart C (15.209)

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	Radiated	PASS	-
15.209 RSS-Gen 8.9	Transmitter Radiated Spurious Emissions	Radiated	PASS	-
15.207 RSS-Gen 8.8	AC Power Line Conducted Emissions	Conducted	PASS	-

1.6 Test information

None

1.7 Test set up

Table-top

1.8 Test period

24-June-2023 - 4-August-2023

2 Equipment Under Test

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	EB1157
Serial number	358018240001032
Trade name	Kyocera
Number of sample(s)	1
EUT condition	Pre-Production
Power rating	Battery: DC 3.87 V
Size	(W) 75 mm × (D) 14.6 mm × (H) 154 mm
Environment	Indoor and Outdoor use
Terminal limitation	-20 °C to 60 °C
Hardware version	Pre-Production
Software version	0.130RI
Firmware version	Not applicable
RF Specification	
Frequency range	110-205kHz
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: EB1157, Serial Number: 358018240001032			
0	As supplied by the applicant	Not Applicable	Not Applicable



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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

[Normal Operation]

- i) EUT is setup on the wireless charger.

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”.

Cabling and setup(s) were taken into consideration and test data was taken under worse case condition.

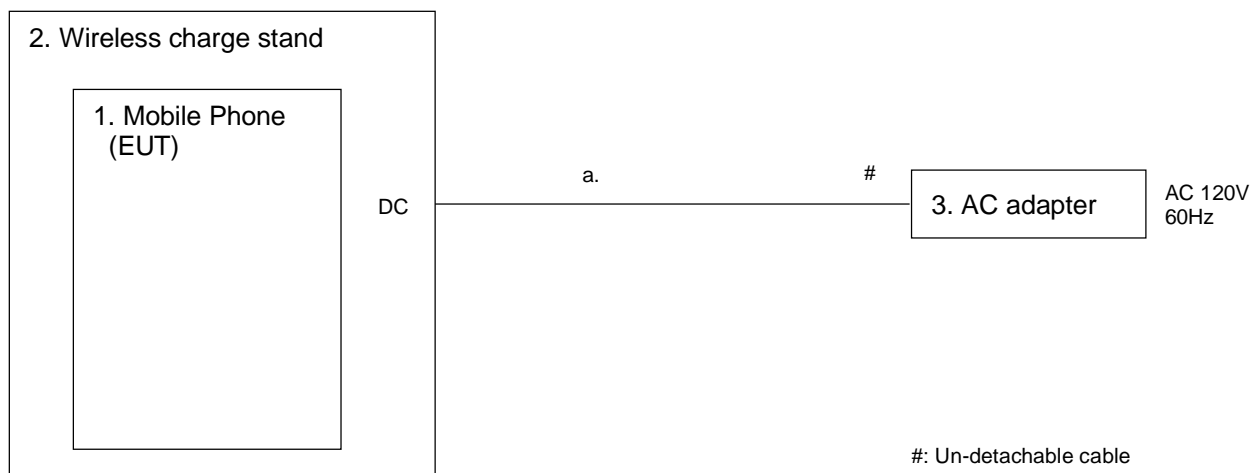
3.1 Equipment used

No.	Equipment	Company	Model No.	Serial No.	FCC ID/DoC	Comment
1	Mobile Phone	KYOCERA	EB1157	358018240001032	JOYEB1157	EUT
2	Wireless charger	KDDI	R08P003W	LJ8MD7554	N/A	-
3	AC Adapter	KDDI	S024AMT1200200	N/A	N/A	-

3.2 Cable(s) used

No.	Equipment	Length[m]	Shield	Connector	Comment
a	DC cable	1.5	Yes	Metal	-

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 RBW is set to 1% to 3% of the 99% bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

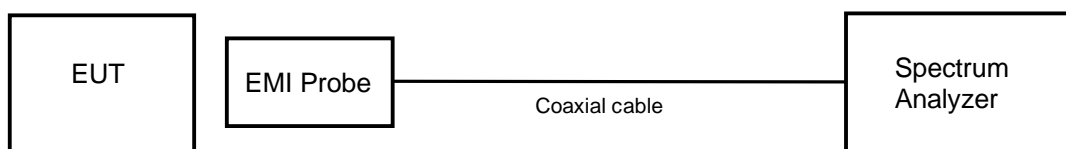
The spectrum analyzer is set to;

- RBW=300Hz, VBW=1kHz, Span=10kHz, Sweep=auto

The test mode of EUT is as follows.

- Normal Operation

- Test configuration



4.1.2 Limit

None

4.1.3 Measurement result

Date : 4-Aug-2023

Temperature : 23.3 [°C]

Humidity : 49.4 [%]

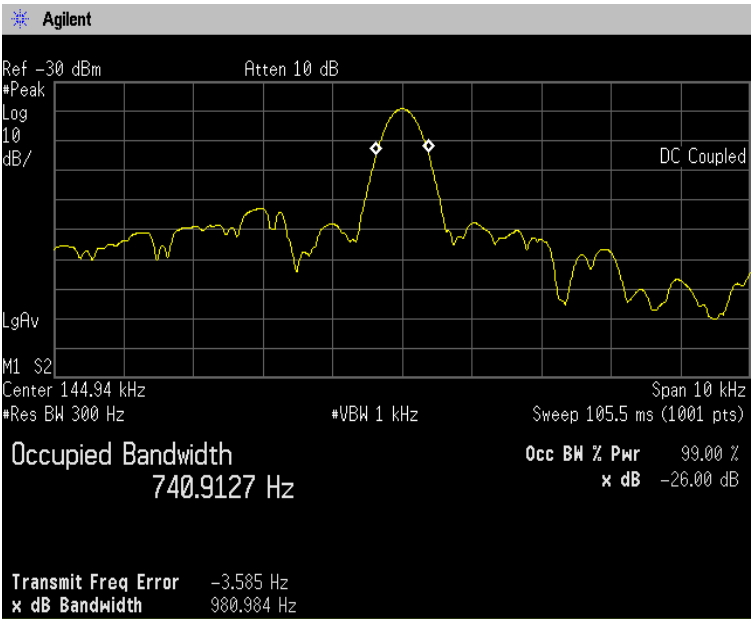
Test place : Shielded room No.4

Test engineer :

Kazunori Saito

Frequency (kHz)	Occupied Bandwidth (kHz)
144.94	0.7409127

4.1.4 Trace data



4.2 Radiated Emissions

4.2.1 Measurement procedure

[FCC 15.209, RSS-Gen 8.9]

Test was applied by following conditions.

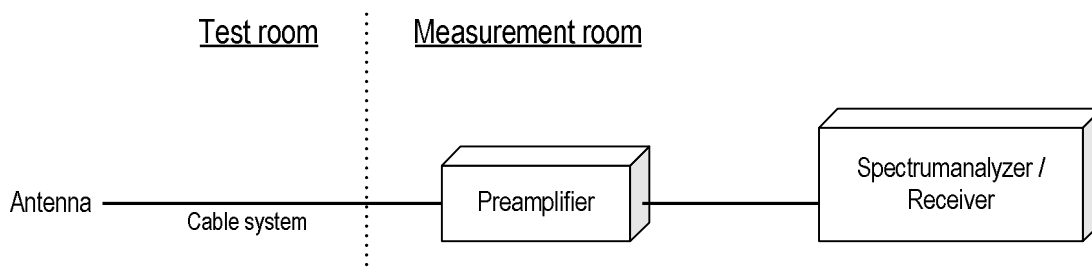
Test method	: ANSI C63.10
Frequency range	: 9kHz to 30MHz
Test place	: 3m Semi-anechoic chamber
EUT was placed on	: Styrofoam table / (W)1.0m × (D)1.0m × (H)0.8m
Antenna distance	: 3m

Test receiver setting

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

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



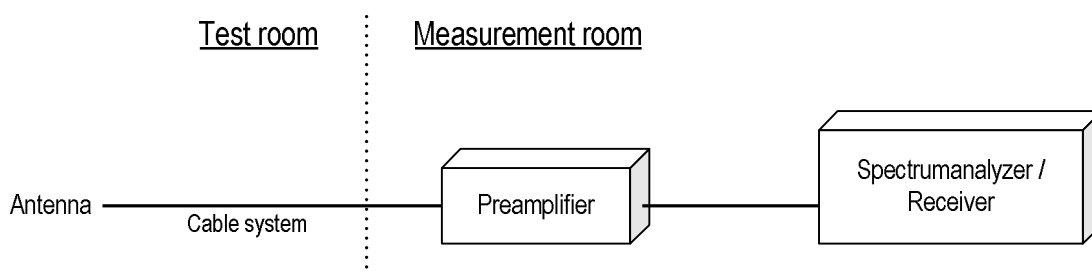
Test was applied by following conditions.

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



4.2.2 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

4.2.3 Limit

Frequency [MHz]	Field strength		Distance [m]
	[uV/m]	[dBuV/m]	
0.009-0.490	2400 / F [kHz]	20logE [uV/m]	300
0.490-1.705	24000 / F [kHz]	20logE [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] = 20log Emission [uV/m]
3. Measurements were corrected to 300m using $40\log (3/300) = -80.0\text{dB}$
Measurements were corrected to 30m using $40\log (3/30) = -40.0\text{dB}$

4.2.4 Test data

Date : 24-June-2023

Temperature : 23.1 [°C]

Humidity : 68.4 [%]

Test place : 3m Semi-anechoic chamber

Test engineer :

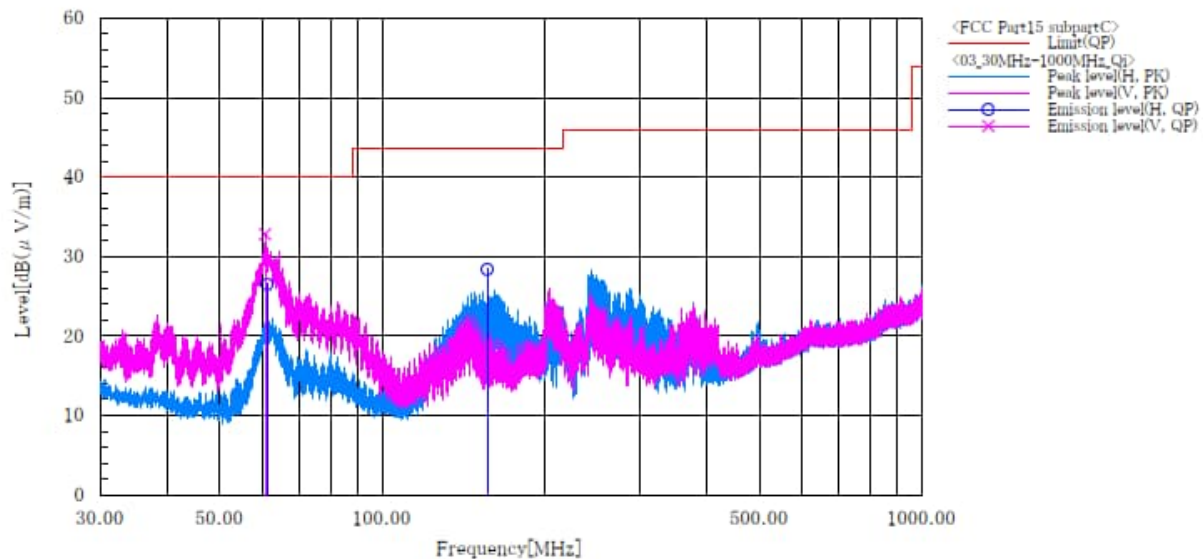
Chiaki Kanno**[9kHz to 30MHz]**

Frequency (MHz)	Reading [dBuV] At 3m	c.f [dB(1/m)]	Result [dBuV/m] At 3m	Result [dBuV/m] At 300/30m	Limit [dBuV/m] At 300/30m	Margin (dB)	Result
0.023	12.8	26.5	39.3	-40.7	40.4	81.1	PASS
0.043	17.8	25.8	43.6	-36.4	34.9	71.3	PASS
0.151	66.0	-7.1	58.9	-21.1	24.0	45.1	PASS
0.290	62.9	-7.1	55.8	-24.2	18.4	42.6	PASS
0.434	55.7	-7.1	48.6	-31.4	14.9	46.3	PASS
0.580	51.8	-7.1	44.7	4.7	32.3	27.6	PASS

[30MHz to 1000MHz]

Company name : KYOCERA Corporation
 EUT : Mobile Phone
 Model No. : EB1157
 Serial No. : N/A
 Test mode : Qi Charge mode

Sheet No. : 03
 Standard : FCC Part15 subpart C
 Operator : C.Kanno
 Temp.Hum.Atm : 23.1[°C] 68.4[%]
 Note1 :

**Final Result**

No.	Frequency	Pol	Reading	c. f	Result	Limit	Margin	Height	Angle	Remark
	[MHz]		QP		QP	QP	QP			
			[dB(μV)]	[dB(1/m)]	[dB(μV/m)]	[dB(μV/m)]	[dB]	[cm]	[deg]	
1	60.615	V	49.6	-16.8	32.8	40.0	7.2	100.0	336.0	
2	61.138	H	43.3	-16.8	26.5	40.0	13.5	300.0	79.0	
3	156.255	H	41.4	-13.0	28.4	43.5	15.1	198.0	105.0	

4.3 AC Power Line Conducted Emissions

4.3.1 Measurement procedure

[FCC 15.207, RSS-Gen 8.8]

Test was applied by following conditions.

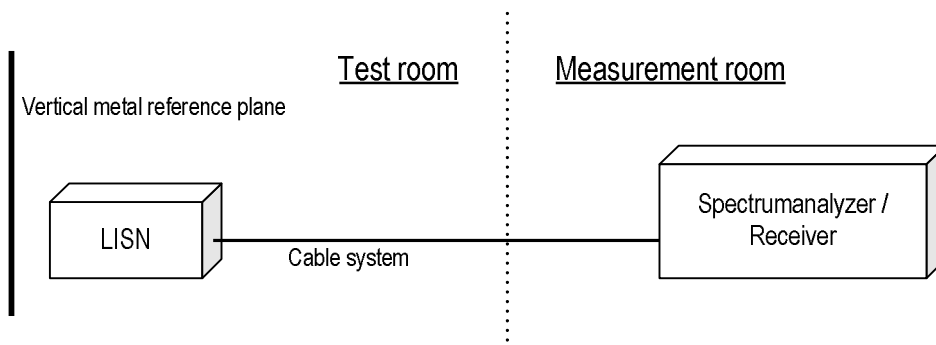
Test method	: ANSI C63.10
Frequency range	: 0.15 MHz to 30 MHz
Test place	: 3 m Semi-anechoic chamber
EUT was placed on	: FRP table / (W)2.0 m × (D)1.0 m × (H)0.8 m
Vertical Metal Reference Plane	: (W)2.0 m × (H)2.0 m 0.4 m away from EUT
Test receiver setting	
- Detector	: Quasi-peak, Average
- Bandwidth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



4.3.2 Calculation method

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

Margin = Limit – Emission level

Example:

Limit @ 6.770 MHz : 60.0 dB μ V(Quasi-peak)

: 50.0 dB μ V(Average)

(Quasi peak) Reading = 41.2 dB μ V c.f = 10.3 dB

Emission level = 41.2 + 10.3 = 51.5 dB μ V

Margin = 60.0 – 51.5 = 8.5 dB

(Average) Reading = 35.0 dB μ V c.f = 10.3 dB

Emission level = 35.0 + 10.3 = 45.3 dB μ V

Margin = 50.0 – 45.3 = 4.7 dB

4.3.3 Limit

Frequency [MHz]	Limit	
	QP [dB μ V]	AV [dB μ 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.

4.3.4 Measurement result

Date : 30-June-2023

Temperature : 23.5 [°C]

Humidity : 62.2 [%]

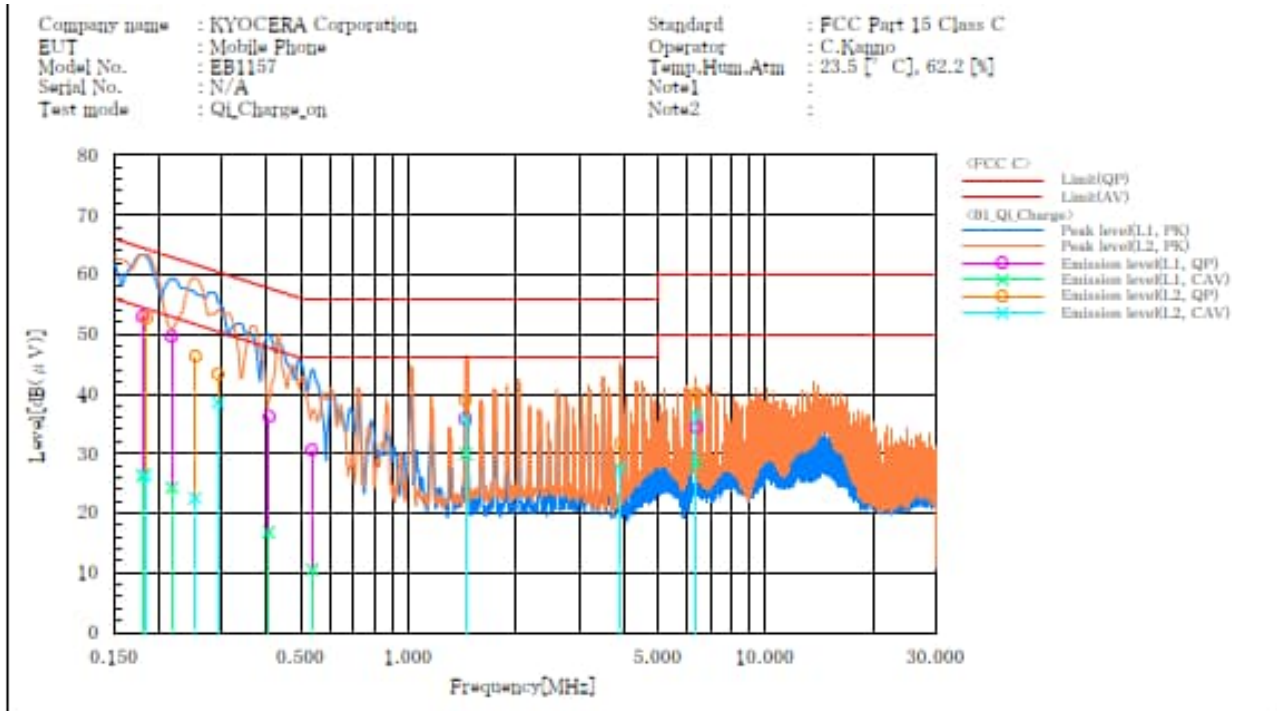
Test place : 3m Semi-anechoic chamber

Test engineer :

Chiaki Kanno

4.3.5 Test data

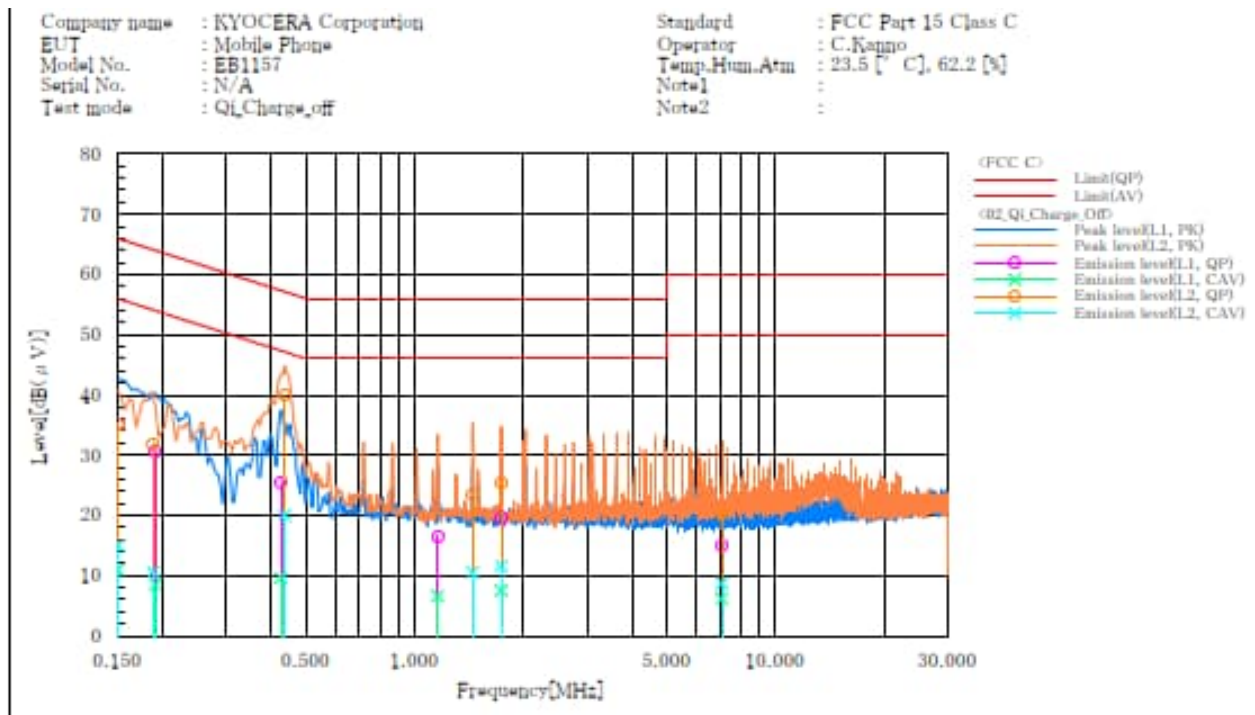
[Charge ON]



Final Result

— L1 —										
No.	Frequency	Reading QP [dB(μV)]	Reading CAV [dB(μV)]	c. f	Result QP [dB(μV)]	Result CAV [dB(μV)]	Limit QP [dB(μV)]	Limit AV [dB(μV)]	Margin QP [dB]	Margin CAV [dB]
1	0.180	42.4	15.8	10.5	52.9	26.3	64.5	54.5	11.6	28.2
2	0.218	39.2	13.9	10.4	49.6	24.3	62.9	52.9	13.3	28.6
3	0.406	25.8	6.5	10.3	36.1	10.8	57.7	47.7	21.6	30.9
4	0.538	20.2	0.2	10.3	30.5	10.5	50.0	40.0	25.5	35.5
5	1.446	25.4	19.6	10.4	35.8	30.0	50.0	40.0	20.2	16.0
6	6.376	23.6	17.6	10.8	34.4	28.4	60.0	50.0	25.6	21.6

— L2 —											
No.	Frequency	Heading QP	Reading CAV	c. f	Result QP	Result CAV	Limit QP	Limit AV	Margin QP	Margin CAV	
	[MHz]	[dB(μV)]	[dB(μV)]	[dB]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB(μV)]	[dB]	[dB]	
1	0.184	42.3	16.0	10.4	52.7	26.4	64.3	54.3	11.6	27.9	
2	0.252	35.9	12.1	10.4	46.3	22.5	61.7	51.7	15.4	29.2	
3	0.293	33.0	28.3	10.3	43.3	38.6	60.4	50.4	17.1	11.8	
4	1.446	28.6	25.3	10.4	39.0	35.7	50.0	40.0	17.0	10.3	
5	3.911	21.1	16.9	10.6	31.7	27.5	50.0	40.0	24.3	18.5	
6	6.376	29.2	25.7	10.8	40.1	36.5	60.0	50.0	19.9	13.5	

[Charge OFF]

Final Result

— L1 —

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	24.7	0.4	10.5	35.2	10.9	66.0	56.0	30.8	45.1
2	0.191	20.2	-1.9	10.4	30.6	8.5	64.0	54.0	33.4	45.5
3	0.425	15.2	-0.7	10.3	25.5	9.6	57.3	47.3	31.8	37.7
4	1.156	6.1	-3.8	10.4	16.5	6.6	56.0	46.0	29.5	39.4
5	1.737	9.2	-2.9	10.4	19.6	7.5	56.0	46.0	36.4	38.5
6	7.099	4.1	-4.8	10.9	15.0	6.1	60.0	50.0	45.0	43.9

— L2 —

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	24.7	4.5	10.5	35.2	15.0	66.0	56.0	30.8	41.0
2	0.188	21.4	0.2	10.4	31.8	10.6	64.1	54.1	32.3	43.5
3	0.436	29.7	9.8	10.3	40.0	20.1	57.1	47.1	17.1	27.0
4	1.446	13.0	0.1	10.4	23.4	10.5	56.0	46.0	32.6	35.5
5	1.737	15.0	1.2	10.4	25.4	11.6	56.0	46.0	30.6	34.4
6	7.099	9.4	-2.2	10.9	20.3	8.7	60.0	50.0	39.7	41.3



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5 Antenna requirement

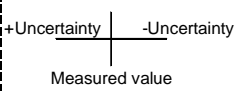

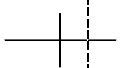
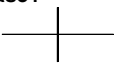
According to FCC section 15.203, an intentional radiator shall be designed to ensure that no antenna other than furnished by the responsible party shall be used with the device. The antenna is a special antenna mounted inside of the EUT. Therefore, the EUT complies with the antenna requirement of FCC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

6 Measurement Uncertainty

The reported measurement uncertainty is based on a value obtained by multiplying standard uncertainty by coverage factor of $k=2$, and a level of confidence becomes 95 %.

3m Semi Anechoic Chamber	
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 (9 kHz – 30 MHz)	± 3.8 dB
Radiated emission (30 MHz – 1000 MHz)	± 5.4 dB
Radiated emission (1 GHz – 6 GHz)	± 4.6 dB
Radiated emission (6 GHz – 18 GHz)	± 4.7 dB
Radiated emission (18 GHz – 40 GHz)	± 6.4 dB
Radio Frequency	$\pm 1.3 \times 10^{-8}$
RF power, conducted	± 0.7 dB
Adjacent channel power	± 1.5 dB
Temperature	± 0.6 °C
Humidity	± 1.2 %
Voltage (DC)	± 0.4 %
Voltage (AC, <10kHz)	± 0.2 %

Measurement uncertainty of not listed immunity tests is considered to suffice because requirements of relevant standards are met.

Judge	Measured value and standard limit value	
PASS	<div> <div>Standard limit value</div> <div> <div>Case1</div>  </div> </div> <p>Even if it takes uncertainty into consideration, a standard limit value is fulfilled.</p>	
	<div> <div>Case2</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>	
FAIL	<div> <div>Case3</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>Case4</div>  </div> <p>Even if it takes uncertainty into consideration, a standard limit value isn't fulfilled.</p>	



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	30-Sep-2023	05-Sep-2022
Microwave cable	Junkosha Inc.	MWX221/1m	N/A(S400)	31-Mar-2024	16-Mar-2023
EMI Probe	ANRITSU	MA2601C	N/A(1753)	30-Nov-2023	08-Nov-2022

Radiated emission

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESW44	103171	30-Sep-2023	20-Sep-2022
Preamplifier	SONOMA	310	372170	30-Sep-2023	15-Sep-2022
Loop antenna	ROHDE&SCHWARZ	HFH2-Z2	100515	30-Apr-2024	21-Apr-2023
Attenuator	TDC	TAT-43B-06	N/A(S209)	31-Jul-2024	20-Jul-2023
Biconical antenna	Schwarzbeck	VHBB9124/BBA9106	1145	31-Jul-2024	14-Jul-2023
Log periodic antenna	Schwarzbeck	VUSLP9111B	346	30-Nov-2023	16-Nov-2022
Attenuator	TOYO Connector	NA-PJ-6/6dB	N/A(S541)	30-Sep-2023	28-Sep-2022
Attenuator	TAMAGAWA.ELEC	CFA-10/3dB	N/A(S503)	31-Jul-2024	20-Jul-2023
Microwave cable	HUBER+SUHNER	SUCOFLEX104/9m	800690/4	31-Oct-2023	26-Oct-2022
		SUCOFLEX104/1m	my24610/4	31-Dec-2023	19-Dec-2022
		SUCOFLEX104/9m	2001099/4	31-Dec-2023	22-Dec-2022
		SUCOFLEX104/1m	MY32976/4	31-Dec-2023	22-Dec-2022
		SUCOFLEX104/2m	SN MY28404/4	31-Dec-2023	19-Dec-2022
		SUCOFLEX104/7m	41625/6	31-Dec-2023	22-Dec-2022
PC	DELL	OPTIPLEX9010	00186-228-073-851	N/A	N/A
Software	TOYO Technica	ES10/RE-AJ	Ver.2023.01.001	N/A	N/A
3m Semi an-echoic Chamber	TOKIN	N/A	N/A(9002-NSA)	31-May-2024	28-May-2023

Conducted emission at mains port

Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
EMI Receiver	ROHDE&SCHWARZ	ESW44	103171	30-Sep-2023	20-Sep-2022
Attenuator	HUBER+SUHNER	6810.01.A	N/A (S411)	31-Dec-2023	20-Dec-2022
Line impedance stabilization network	Kyoritsu Electrical Works, Ltd.	TNW-407F2	12-17-110-2	30-Jun-2024	22-Jun-2023
Microwave cable	HUBER+SUHNER	SUCOFLEX104/5m	MY33601/4	31-Dec-2023	19-Dec-2022
Microwave cable	HUBER+SUHNER	SUCOFLEX104/2m	MY37268/4	31-Oct-2023	27-Oct-2022
Coaxial cable	HUBER+SUHNER	RG214/U/10m	N/A (S194)	31-Dec-2023	22-Dec-2022
PC	DELL	OPTIPLEX9010	00186-228-073-851	N/A	N/A
Software	TOYO Technica	ES10/RE-AJ	Ver.2023.01.001	N/A	N/A

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