RF MEASUREMENT REPORT

FCC ID:	2ALS8-SS0005
Applicant:	Ninebot (Changzhou) Tech Co., Ltd.
Product:	ninebot smart dashboard
Model No.:	WF-200
FCC Classification:	Part 15 Low Power Transmitter Below 1705 kHz (DCD)
FCC Rule Part(s):	Part15 Subpart C (Section 15.209)
Result:	Complies
Receive Date:	2023-01-04
Test Date:	2023-01-14

Reviewed By: Vincent Yu

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2301RSU007-U2	V01	Initial Report	2023-01-30	Valid

CONTENTS

1. General Information

1.1. Applicant

Ninebot (Changzhou) Tech Co., Ltd.

16F-17F, Block A, Building 3, Changwu Mid Road 18#, Wujin Dist., Changzhou, Jiangsu, China

1.2. Manufacturer

Ninebot (Changzhou) Tech Co., Ltd.

16F-17F, Block A, Building 3, Changwu Mid Road 18#, Wujin Dist., Changzhou, Jiangsu, China

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	ninebot smart dashboard
Model No.	WF-200
EUT Identification No.	20230104Sample#11
NFC Specification	13.56MHz
WPT Specification	115 ~ 145kHz
Power Supply	18VDC / 1.5A
Output	15W (Max)
Operating Temp.	0 ~ 40°C
Note: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

WPT Specification	115 ~ 145kHz
Modulation	ASK
Antenna Type	Coil Antenna

2. Test Configuration

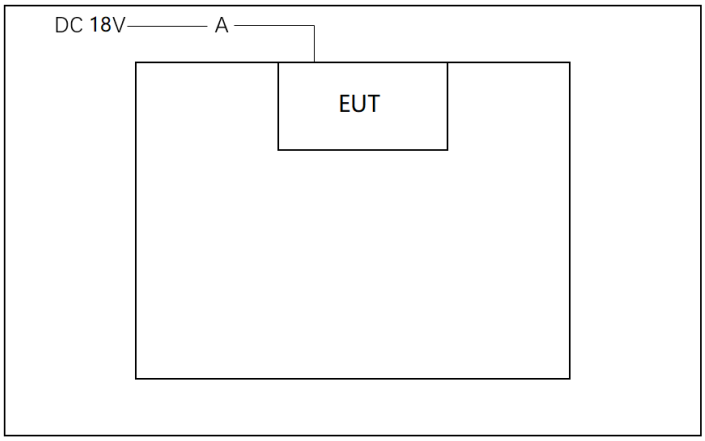
2.1. Test Mode

Mode 1: Standby Mode
Mode 2: Charge the Load
Mode 3: Charge the iPhone

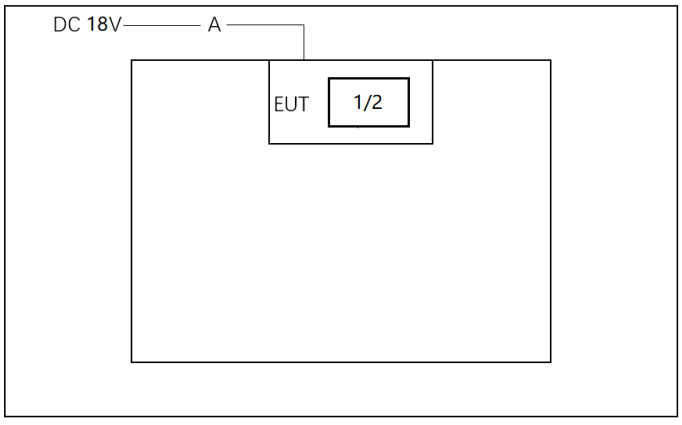
2.2. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Mode 1



Mode 2 & Mode 3



Cable Type		Cable Spec.	Length
A	Power Cable	Non-Shielded	>10.0m
Product		**Manufacturer**	**Model No.**
1	Charging Load	YBZ	N/A
2	iPhone	Apple	iPhone 13

2.3. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.209
- ANSI C63.10-2013

2.4. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~ 75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument Name	Manufacturer	Model No.	Asset No.	Cali. Interval	Cal. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2023-04-21	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-12-28	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802	2.03C	RE Antenna & Turntable

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~6GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~6GHz: 4.91dB

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.215 (c)	20dB Bandwidth	Radiated	Pass
15.209	General Field Strength Limits		Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	N/A

Note:

1. For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
2. “N/A” means not applicable.

6.2. 20dB Bandwidth Measurement

6.2.1. Test Limit

N/A

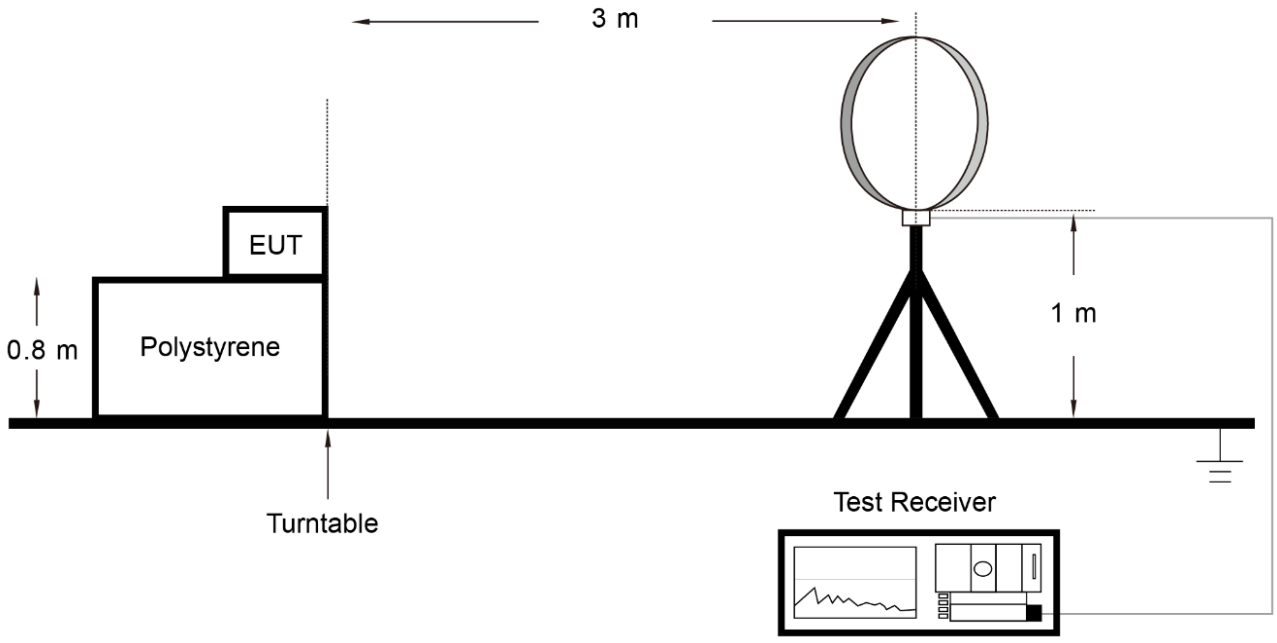
6.2.2. Test Procedure

ANSI C63.10:2013 Clause 6.9.2

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 20dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 20. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. The span range shall be between two times and five times the OBW
3. Set RBW = 1% ~ 5% of the OBW
4. VBW ≥ 3 × RBW
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. Allow the trace to stabilize.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.1.

6.3. General Field Strength Measurement

6.3.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.3.2. Test Procedure

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

6.3.3. Test Setting

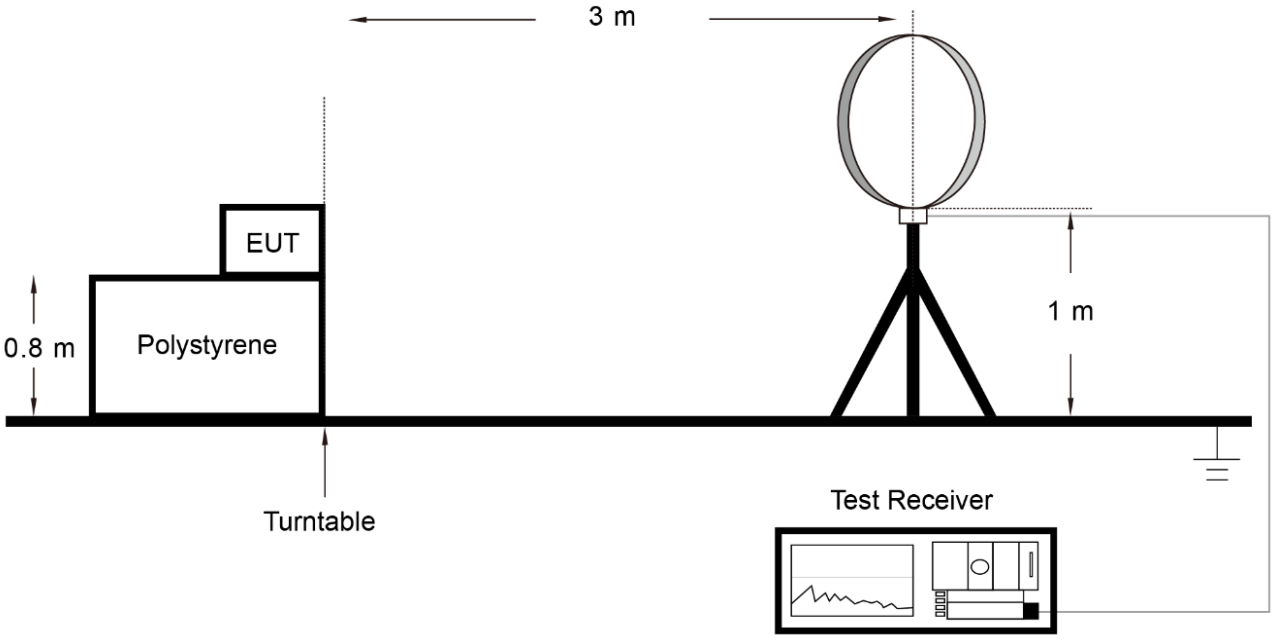
Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz

Peak Measurements below 30MHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = Peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

6.3.4. Test Setup



6.3.5. Test Result

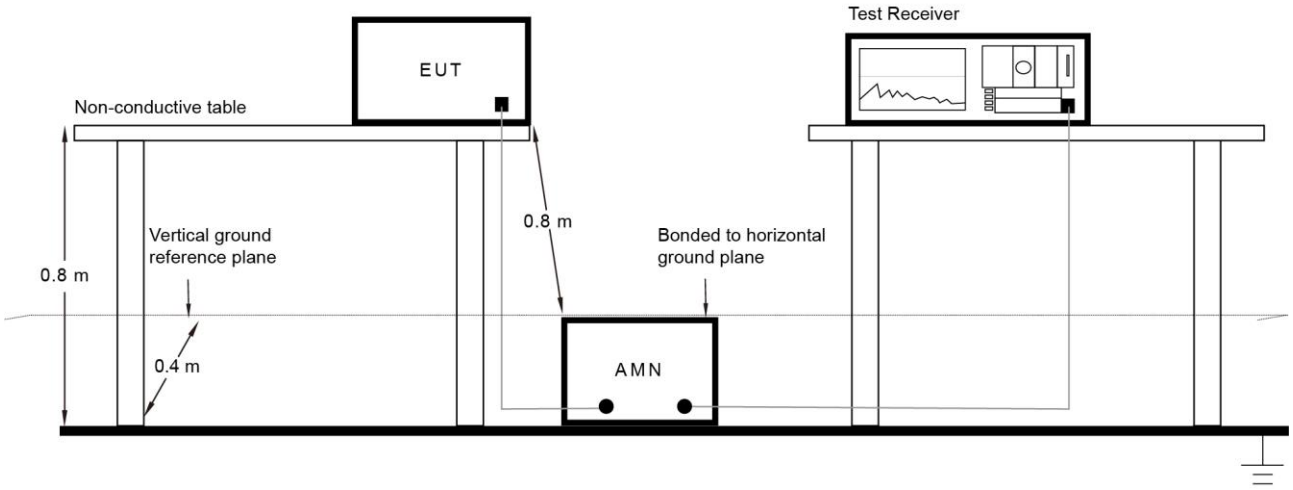
Refer to Appendix A.2.

6.4. AC Conducted Emissions Measurement

6.4.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.4.2. Test Setup



6.4.3. Test Result

Refer to Appendix A.3.

Appendix A - Test Result

A.1 20dB Bandwidth Test Result

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Date	2023-01-14		

Test Mode	20dB Bandwidth (Hz)
Mode 1	59
Mode 2	25
Mode 3	26

20dB Bandwidth	
Mode 1	Mode 2
	
Mode 3	
	

Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW.

A.2 General Field Strength Test Result

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Date	2023-01-14	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level@3m (dBμV/m)	Final Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
Fundamental Radiated Emission							
0.140	71.014	17.380	88.395	8.395	24.682	-16.287	Coaxial
0.140	66.276	17.380	83.657	3.657	24.682	-21.025	Coplanar
Radiated Spurious Emission							
0.019	31.151	20.103	51.254	-28.746	42.029	-70.775	Coaxial
0.103	26.732	17.386	44.117	-35.883	27.347	-63.230	Coaxial
0.553	38.957	17.606	56.563	16.563	32.750	-16.187	Coaxial
0.702	36.392	17.666	54.058	14.058	30.677	-16.619	Coaxial
0.024	30.351	19.513	49.864	-30.136	40.000	-70.136	Coplanar
0.102	24.034	17.385	41.419	-38.581	27.432	-66.013	Coplanar
0.702	31.962	17.666	49.628	9.628	30.677	-21.049	Coplanar
0.986	26.257	17.683	43.940	3.940	27.727	-23.787	Coplanar

Note:

1. Measure Level@3m (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
   Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
2. **For the frequency within 0.009MHz ~ 0.49MHz, D = 300m:**
   Final Measure Level = Measure Level@3m – 40*log (D/3)
   For the frequency within 0.49MHz ~ 30MHz, D = 30m:
   Final Measure Level = Measure Level@3m – 40*log (D/3)
3. All measurements were recorded using an EMI test receiver employing a peak detector.

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Date	2023-01-14	Test Mode	Mode 2

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level@3m (dBμV/m)	Final Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
Fundamental Radiated Emission							
0.145	73.572	17.378	90.951	10.951	24.377	-13.426	Coaxial
0.145	68.822	17.378	86.201	6.201	24.377	-18.176	Coplanar
Radiated Spurious Emission							
0.072	32.707	17.437	50.144	-29.856	30.458	-60.314	Coaxial
0.075	32.952	17.431	50.383	-29.617	30.103	-59.720	Coaxial
0.717	38.149	17.666	55.815	15.815	30.494	-14.679	Coaxial
1.016	34.573	17.680	52.253	12.253	27.466	-15.213	Coaxial
0.019	32.520	20.103	52.623	-27.377	42.029	-69.406	Coplanar
0.075	28.393	17.431	45.824	-34.176	30.103	-64.279	Coplanar
0.717	33.460	17.666	51.126	11.126	30.494	-19.368	Coplanar
1.016	30.085	17.680	47.765	7.765	27.466	-19.701	Coplanar

Note:

1. Measure Level@3m (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

   Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

2. **For the frequency within 0.009MHz ~ 0.49MHz, D = 300m:**

   Final Measure Level = Measure Level@3m – 40*log (D/3)

   For the frequency within 0.49MHz ~ 30MHz, D = 30m:

   Final Measure Level = Measure Level@3m – 40*log (D/3)

3. All measurements were recorded using an EMI test receiver employing a peak detector.

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Date	2023-01-14	Test Mode	Mode 3

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level@3m (dBμV/m)	Final Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Polarization
Fundamental Radiated Emission							
0.128	62.230	17.386	79.616	-0.384	25.460	-25.844	Coaxial
0.128	55.877	17.386	73.263	-6.737	25.460	-32.197	Coplanar
Radiated Spurious Emission							
0.063	23.216	17.503	40.719	-39.281	31.617	-70.898	Coaxial
0.102	25.142	17.385	42.527	-37.473	27.432	-64.905	Coaxial
0.254	40.367	17.391	57.758	-22.242	19.508	-41.750	Coaxial
0.643	23.567	17.645	41.213	1.213	31.440	-30.227	Coaxial
0.896	25.427	17.685	43.112	3.112	28.558	-25.446	Coaxial
0.101	22.405	17.385	39.790	-40.210	27.518	-67.728	Coplanar
0.254	35.658	17.391	53.049	-26.951	19.508	-46.459	Coplanar
0.389	27.660	17.481	45.141	-34.859	15.805	-50.664	Coplanar
0.896	20.456	17.685	38.141	-1.859	28.558	-30.417	Coplanar
4.478	14.762	17.689	32.451	-7.549	29.542	-37.091	Coplanar

Note:

1. Measure Level@3m (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
   Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
2. **For the frequency within 0.009MHz ~ 0.49MHz, D = 300m:**
   Final Measure Level = Measure Level@3m – 40*log (D/3)
   For the frequency within 0.49MHz ~ 30MHz, D = 30m:
   Final Measure Level = Measure Level@3m – 40*log (D/3)
3. All measurements were recorded using an EMI test receiver employing a peak detector.

A.3 AC Conducted Emissions Test Result

This device is powered by external DC source, so the item is not applicable.

Appendix B - Test Setup Photograph

Refer to “2301RSU007-UT” file.

Appendix C - EUT Photograph

Refer to “2301RSU007-UE” file.

The End