



MEASUREMENT REPORT

FCC PART 15.209

FCC ID: 2ATJC-95560ANFC

Applicant: Aptiv Electrical Centers (Shanghai) Co.,Ltd

Product: WIRELESS CHARGER

Model No.: Wireless Charging With NFC

Brand Name: Aptiv

FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)

FCC Rule Part(s): Part15 Subpart C (Section 15.209)

Test Procedure(s): ANSI C63.10-2013

Test Date: October 12 ~ December 30, 2021

Reviewed By:

Vincent Yu

Approved By:

Robin Wu



The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2109RSU066-U1	Rev. 01	Initial Report	01-29-2022	Valid

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1. GENERAL INFORMATION

1.1. Applicant

Aptiv Electrical Centers (Shanghai) Co.,Ltd

Zone A, Building 7, No.60, Yuanguo Road, Anting Town, Jiading District, Shanghai, China

1.2. Manufacturer

Aptiv Electrical Centers (Shanghai) Co.,Ltd

Zone A, Building 7, No.60, Yuanguo Road, Anting Town, Jiading District, Shanghai, 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 FCC: CN1166 VCCI: ☐ R-20025 ☐ R-20141 ☐ G-20034 ☐ G-20134 ☐ C-20020 ☐ C-20103 ☐ T-20020 ☐ 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 FCC: CN1284
	CNAS: L10551 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	WIRELESS CHARGER
Model No.	Wireless Charging With NFC
Brand Name	Aptiv
Test Device S/N	A003135528-001
Wireless Charging Specification	127.7kHz
NFC Specification	13.56MHz
Power Type	DC 12V
Output Power	10W MAX
Remark: 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

Working Frequency	127.7kHz
Channel Number	1
Modulation Type	FSK
Antenna Type	Coil Antenna

2. TEST FIGURATION

2.1. Test Mode

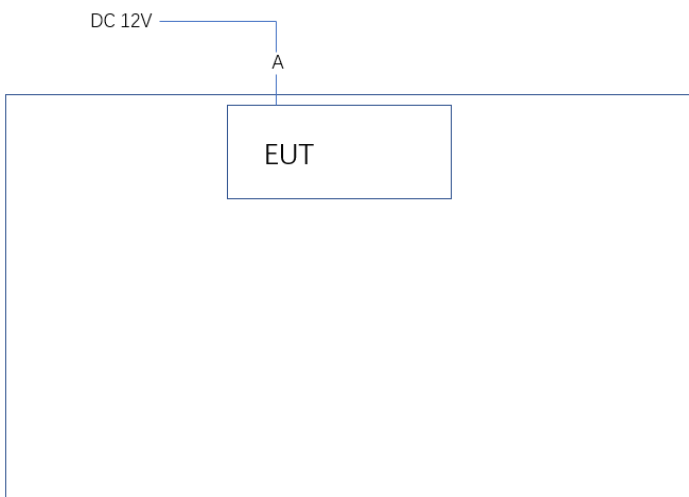
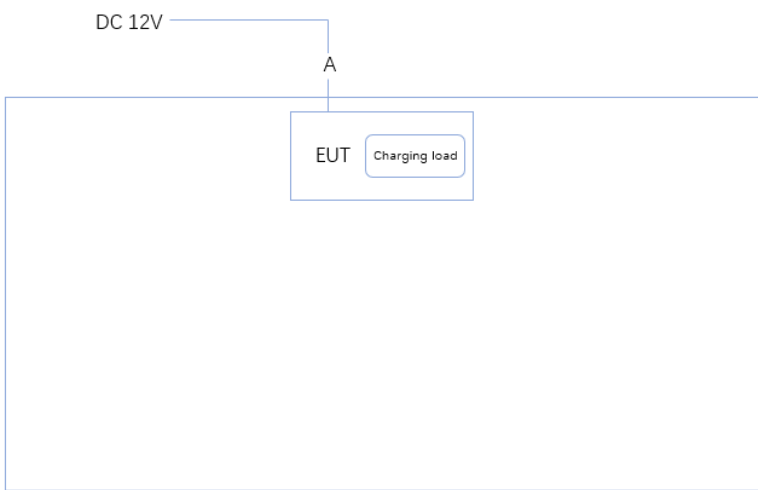
Test Mode
Mode 1: Standby Mode
Mode 2: Communicate with Charging Load

Note 1: The charging load is provided by the manufacturer and it can make the EUT to work at the maximum output power.

Note 2: Charging load is provided by the manufacturer.

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.

Connection Diagram - Mode 1	
	
Connection Diagram - Mode 2	
	
Cable Type	Cable Description
A Power Cable	Non-Shielded, 1.5m

2.3. Test Environment Condition

Ambient Temperature	15°C ~ 35°C
Relative Humidity	20%RH ~ 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 unit is **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. TEST EQUIPMENT CALIBRATION DATE

Radiated Emissions (WZ-AC1)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2022/01/04
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2022/06/24
EXA Signal Analyzer	Keysight	N9020A	MRTSUE06106	1 year	2022/04/13
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022/10/28
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2022/08/05
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06597	1 year	2022/12/01
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2022/06/28
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2022/04/29

Software	Version	Function
EMI Software	V3	EMI Test Software

5. 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 $k = 2$.

Conducted Emission	
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$):	
9kHz~150kHz: 3.74dB	
150kHz~30MHz: 3.44dB	
Radiated Emission	
The maximum measurement uncertainty is evaluated as:	
Horizontal:	30MHz~300MHz: 5.04dB
	300MHz~1GHz: 4.95dB
	1GHz~40GHz: 6.40dB
Vertical:	30MHz~300MHz: 5.24dB
	300MHz~1GHz: 6.03dB
	1GHz~40GHz: 6.40dB

6. TEST RESULT

6.1. Summary

FCC Part Section (s)	Test Description	Test Condition	Test Result
15.209	General Field Strength Limits	Radiated	Pass
15.215(c)	20dB Spectrum Bandwidth		Pass

Note: The radiation measurements are performed in X, Y, Z axis positioning. Only the worst case is shown in the report.

6.2. General Radiated Emission

6.2.1. Test Limit

FCC Part 15.209 Limit		
Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3
Note 1: The lower limit shall apply at the transition frequency. Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system. Note 3: E field strength (dB$\mu\text{V/m}$) = 20 log E field strength ($\mu\text{V/m}$).		

6.2.2. Test Procedure Used

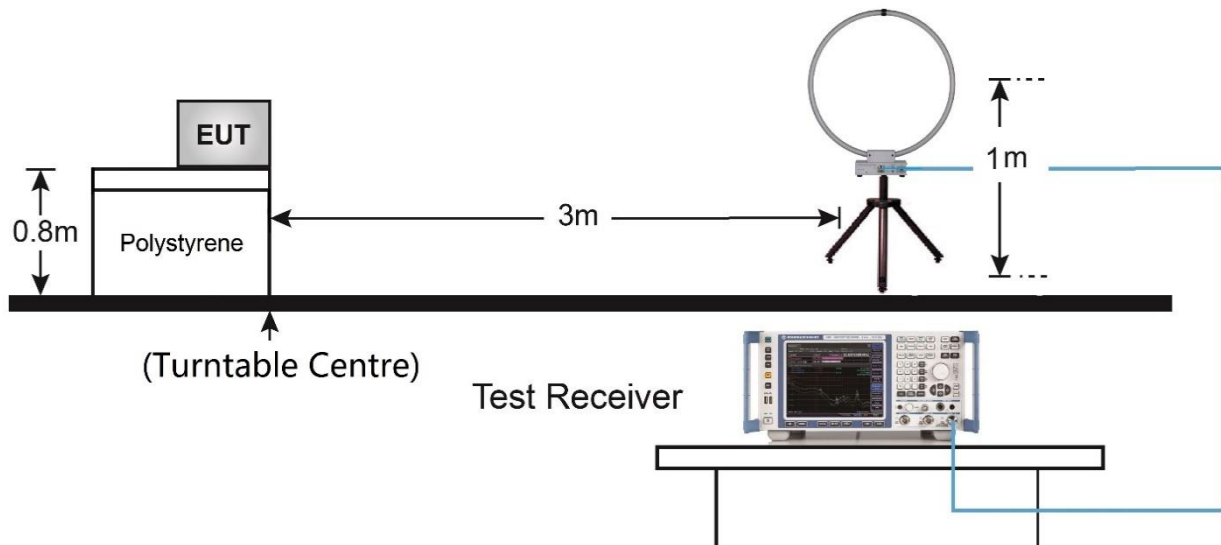
ANSI C63.10:2013 - Section 6.3 (General Requirements)

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

ANSI C63.10:2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

6.2.3. Test Setup

Below 30MHz Test Setup:



6.2.4. Test Result

Test Site	WZ-AC1	Test Engineer	Tommy Tang
Test Mode	Mode 1	Test Date	2021/10/12

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	73.4	19.6	93.0	105.5	-12.5	QP	Face On
0.128	68.3	19.6	87.9	105.5	-17.6	QP	Face Off
Radiated Spurious Emission							
0.013	31.0	20.0	51.0	125.3	-74.3	Peak	Face On
0.019	41.2	20.0	61.2	122.0	-60.8	Peak	Face On
0.024	38.6	20.0	58.6	120.0	-61.4	Peak	Face On
0.063	25.2	19.5	44.7	111.6	-66.9	Peak	Face On
0.099	43.4	19.6	63.0	107.7	-44.7	Peak	Face On
0.14	37.0	19.6	56.6	104.7	-48.1	QP	Face On
0.012	29.4	20.0	49.4	126.0	-76.6	Peak	Face Off
0.019	43.6	20.0	63.6	122.0	-58.4	Peak	Face Off
0.024	40.2	20.0	60.2	120.0	-59.8	Peak	Face Off
0.038	22.9	20.0	42.9	116.0	-73.1	Peak	Face Off
0.1	40.1	19.6	59.7	107.6	-47.9	Peak	Face Off
0.14	32.2	19.6	51.8	104.7	-52.9	QP	Face Off
0.15	34.0	19.6	53.6	104.1	-50.5	Peak	Face On
0.18	27.0	19.7	46.7	102.5	-55.8	Peak	Face On
0.21	27.6	19.9	47.5	101.2	-53.7	Peak	Face On
0.389	43.2	20.0	63.2	95.8	-32.6	Peak	Face On
0.643	20.5	19.7	40.2	71.4	-31.2	Peak	Face On
1.075	13.4	20.6	34.0	67.0	-33.0	Peak	Face On
0.15	25.4	19.6	45.0	104.1	-59.1	Peak	Face Off
0.21	25.7	19.9	45.6	101.2	-55.6	Peak	Face Off
0.389	37.6	20.0	57.6	95.8	-38.2	Peak	Face Off
0.643	17.8	19.7	37.5	71.4	-33.9	Peak	Face Off
0.851	14.1	20.0	34.1	69.0	-34.9	Peak	Face Off
0.971	13.2	20.5	33.7	67.9	-34.2	Peak	Face Off
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)							

Test Site	WZ-AC1	Test Engineer	Charles Zhang
Test Mode	Mode 2	Test Date	2021/12/30

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	65.8	17.2	83.0	105.5	-22.5	Peak	Face On
0.128	55.8	17.2	73.0	105.5	-32.5	Peak	Face Off
Radiated Spurious Emission							
0.01	30.6	20.3	50.9	127.6	-76.7	Peak	Face On
0.019	30.5	19.4	49.9	122.0	-72.1	Peak	Face On
0.024	26.0	18.9	44.9	120.0	-75.1	Peak	Face On
0.063	26.0	17.3	43.3	111.6	-68.3	Peak	Face On
0.078	25.2	17.2	42.4	109.8	-67.4	Peak	Face On
0.09	24.0	17.2	41.2	108.5	-67.3	Peak	Face On
0.011	29.3	20.2	49.5	126.8	-77.3	Peak	Face Off
0.019	31.5	19.4	50.9	122.0	-71.1	Peak	Face Off
0.024	31.7	18.9	50.6	120.0	-69.4	Peak	Face Off
0.042	21.1	17.4	38.5	115.1	-76.6	Peak	Face Off
0.062	20.5	17.3	37.8	111.7	-73.9	Peak	Face Off
0.078	18.8	17.2	36.0	109.8	-73.8	Peak	Face Off
0.269	32.7	17.2	49.9	99.0	-49.1	Peak	Face On
0.374	37.3	17.2	54.5	96.1	-41.6	QP	Face On
0.508	21.1	17.3	38.4	73.5	-35.1	Peak	Face On
0.628	28.4	17.4	45.8	71.7	-25.9	Peak	Face On
0.881	28.0	17.5	45.5	68.7	-23.2	Peak	Face On
1.15	23.4	17.5	40.9	66.4	-25.5	Peak	Face On
0.269	28.3	17.2	45.5	99.0	-53.5	Peak	Face Off
0.374	33.5	17.2	50.7	96.1	-45.4	Peak	Face Off
0.553	18.4	17.3	35.7	72.8	-37.1	Peak	Face Off
0.628	23.8	17.4	41.2	71.7	-30.5	Peak	Face Off
0.881	22.5	17.5	40.0	68.7	-28.7	Peak	Face Off
1.15	17.9	17.5	35.4	66.4	-31.0	Peak	Face Off
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)							

6.3. 20dB Spectrum Bandwidth Measurement

6.3.1. Test Limit

N/A

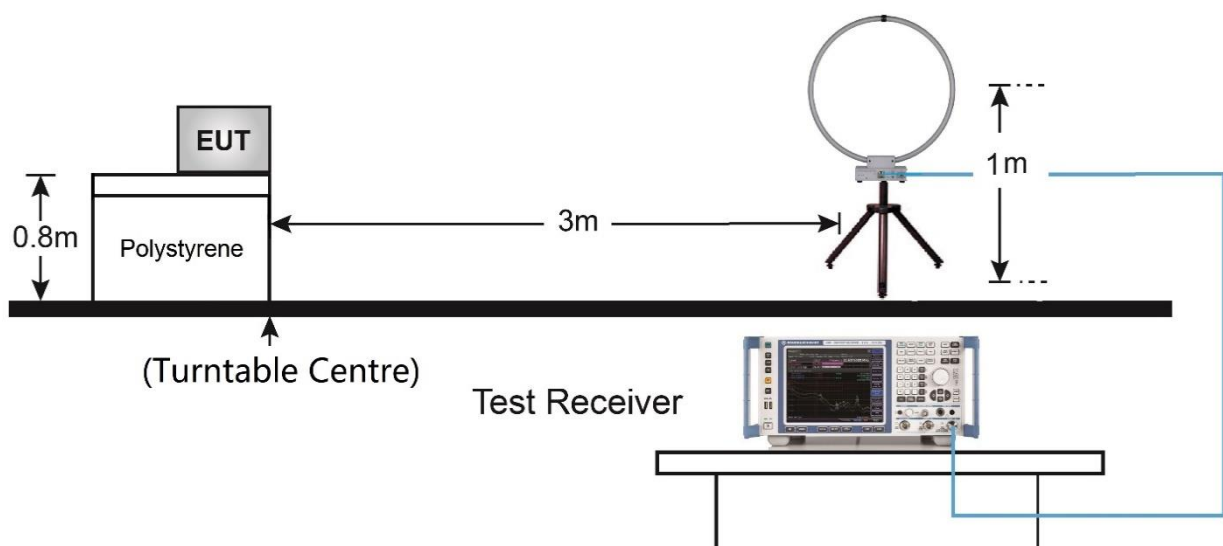
6.3.2. Test Procedure Used

ANSI C63.10:2013 Clause 6.9.2

6.3.3. 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. Set the spectrum span range to overlap the nominal center frequency
3. Set $RBW = 1\% \sim 5\%$ of the OBW
4. $VBW \geq 3 \times RBW$
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. Allow the trace to stabilize.

6.3.4. Test Setup



6.3.5. Test Result

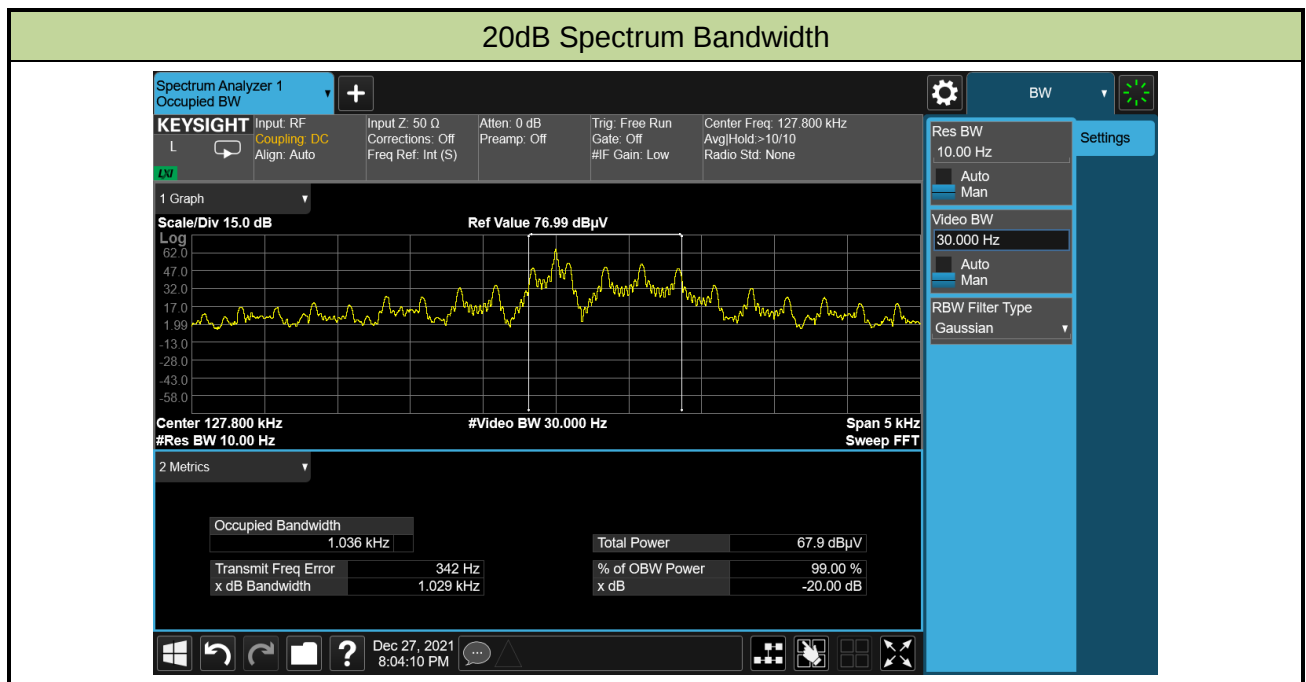
Test Site	WZ-AC1	Test Engineer	Tommy Tang
Test Mode	Mode 1	Test Date	2021/10/14

Frequency	20dB Spectrum Bandwidth (Hz)
127.8kHz	70



Test Site	WZ-AC1	Test Engineer	Tommy Tang
Test Mode	Mode 2	Test Date	2021/12/27

Frequency	20dB Spectrum Bandwidth (kHz)
128kHz	1.029



7. CONCLUSION

The data collected relate only the item(s) tested and show that the unit is compliance with Part 15C of the FCC rules.

The End

Appendix A - Test Setup Photograph

Refer to “2109RSU066-UT” file.

Appendix B - EUT Photograph

Refer to “2109RSU066-UE” file.