



MEASUREMENT REPORT

FCC PART 15.209

FCC ID: 2ATJC-95560A

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

Product: WIRELESS CHARGER

Model No.: Wireless Charging Without 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
2109RSU065-U1	Rev. 01	Initial Report	01-27-2022	Valid

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1.4. Product Information

Product Name	WIRELESS CHARGER
Model No.	Wireless Charging Without NFC
Brand Name	Aptiv
Test Device S/N	A003135530-001
Working Frequency	127.7kHz
Modulation Type	FSK
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.	

2. TEST FIGURATION

2.1. Test Mode

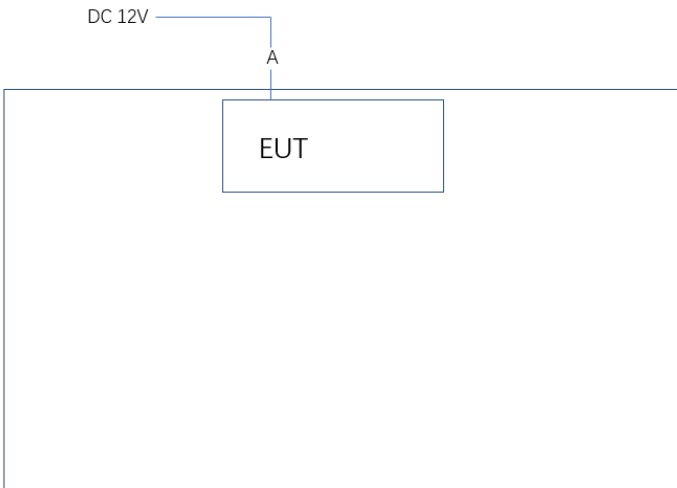
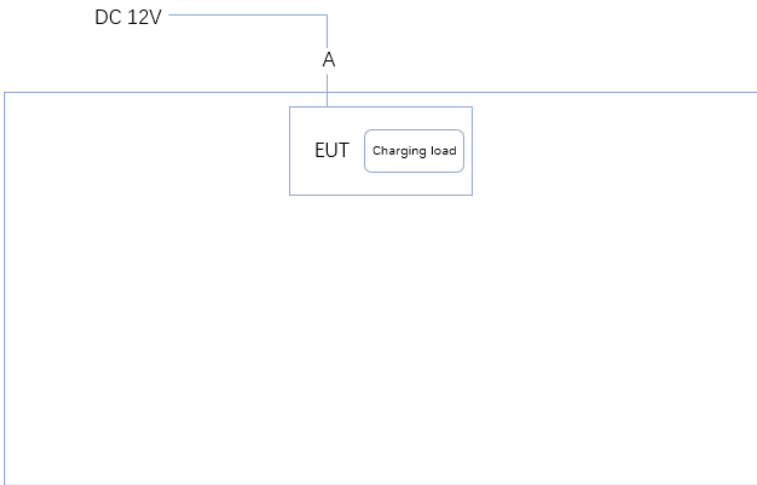
Test Mode
Mode 1: Standby Mode
Mode 2: Charging the Load

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	
	
Signal Cable Type	Signal 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
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Emission Measurement
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 ($\mu\text{V/m}$).		

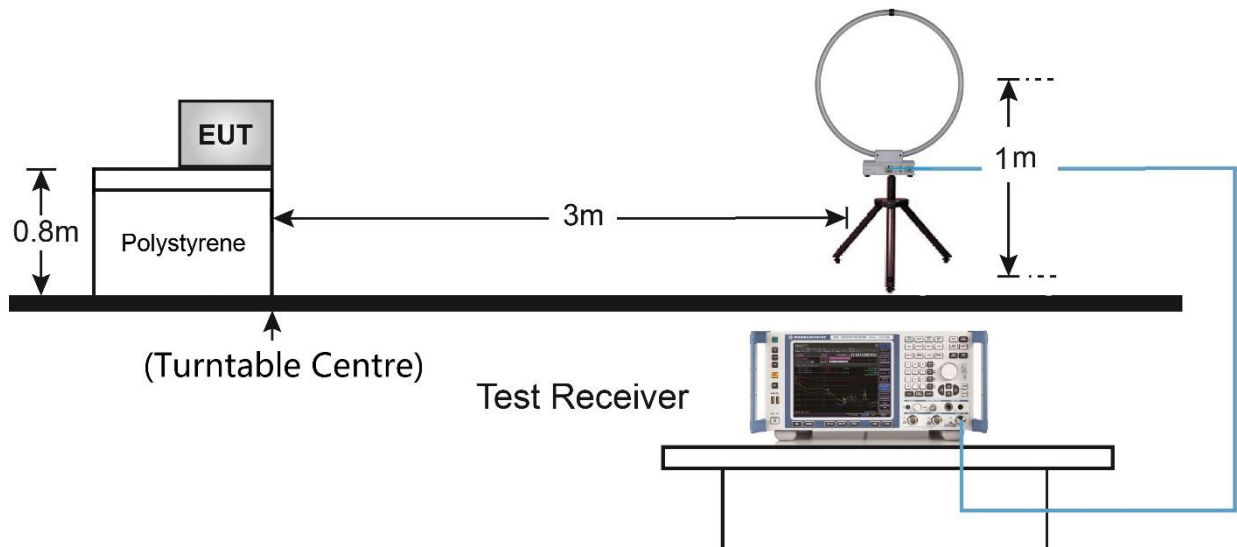
6.2.2. Test Procedure Used

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

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

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	73.3	19.6	92.9	105.5	-12.6	QP	Face On
0.128	68.4	19.6	88.0	105.5	-17.5	QP	Face Off
Radiated Spurious Emission							
0.013	30.4	20.0	50.4	125.3	-74.9	Peak	Face On
0.019	39.5	20.0	59.5	122.0	-62.5	Peak	Face On
0.038	25.9	20.0	45.9	116.0	-70.1	Peak	Face On
0.063	25.6	19.5	45.1	111.6	-66.5	Peak	Face On
0.098	44.7	19.6	64.3	107.8	-43.5	Peak	Face On
0.14	36.9	19.6	56.5	104.7	-48.2	QP	Face On
0.019	40.2	20.0	60.2	122.0	-61.8	Peak	Face Off
0.024	36.3	20.0	56.3	120.0	-63.7	Peak	Face Off
0.038	24.0	20.0	44.0	116.0	-72.0	Peak	Face Off
0.062	17.9	19.5	37.4	111.7	-74.3	Peak	Face Off
0.098	38.7	19.6	58.3	107.8	-49.5	Peak	Face Off
0.14	32.1	19.6	51.7	104.7	-53.0	QP	Face Off
0.18	40.7	19.7	60.4	102.5	-42.1	Peak	Face On
0.389	42.0	20.0	62.0	95.8	-33.8	Peak	Face On
0.643	21.1	19.7	40.8	71.4	-30.6	Peak	Face On
3.374	9.8	20.2	30.0	69.5	-39.5	Peak	Face On
9.254	10.6	20.1	30.7	69.5	-38.8	Peak	Face On
16.732	9.2	21.0	30.2	69.5	-39.3	Peak	Face On
0.18	38.2	19.7	57.9	102.5	-44.6	Peak	Face Off
0.389	37.7	20.0	57.7	95.8	-38.1	Peak	Face Off
0.643	19.0	19.7	38.7	71.4	-32.7	Peak	Face Off
1.672	12.6	20.3	32.9	63.2	-30.3	Peak	Face Off
11.478	18.1	20.3	38.4	69.5	-31.1	Peak	Face Off
13.717	19.6	20.8	40.4	69.5	-29.1	Peak	Face Off
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)							

Test Site	WZ-AC1	Test Engineer	Tommy Tang
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	80.3	17.2	97.5	105.5	-8.0	Peak	Face On
0.128	75.0	17.2	92.2	105.5	-13.3	Peak	Face Off
Radiated Spurious Emission							
0.019	31.2	19.4	50.6	122.0	-71.4	Peak	Face On
0.032	32.7	18.1	50.9	117.5	-66.6	Peak	Face On
0.036	37.2	17.7	54.9	116.5	-61.6	Peak	Face On
0.043	43.1	17.4	60.5	114.9	-54.4	QP	Face On
0.082	39.8	17.2	57.0	109.3	-52.3	Peak	Face On
0.085	36.8	17.2	54.0	109.0	-55.0	QP	Face On
0.019	32.4	19.4	51.7	122.0	-70.3	Peak	Face Off
0.024	31.1	18.9	50.0	120.0	-70.0	Peak	Face Off
0.043	32.1	17.4	49.5	114.9	-65.4	QP	Face Off
0.047	29.8	17.4	47.1	114.2	-67.0	Peak	Face Off
0.082	34.6	17.2	51.8	109.3	-57.5	Peak	Face Off
0.085	36.4	17.2	53.7	109.0	-55.4	Peak	Face Off
0.165	37.5	17.2	54.6	103.2	-48.6	Peak	Face On
0.374	43.9	17.2	61.1	96.1	-35.0	QP	Face On
0.628	38.2	17.4	55.6	71.7	-16.1	QP	Face On
0.881	36.4	17.5	53.9	68.7	-14.8	Peak	Face On
1.15	28.9	17.5	46.4	66.4	-20.0	Peak	Face On
12.523	25.1	17.1	42.2	69.5	-27.3	Peak	Face On
0.165	32.1	17.2	49.2	103.2	-54.0	Peak	Face Off
0.374	38.7	17.2	55.9	96.1	-40.2	QP	Face Off
0.628	34.2	17.4	51.6	71.7	-20.1	Peak	Face Off
0.881	30.5	17.5	48.0	68.7	-20.8	Peak	Face Off
1.15	23.2	17.5	40.8	66.4	-25.7	Peak	Face Off
12.523	36.6	17.1	53.7	69.5	-15.8	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

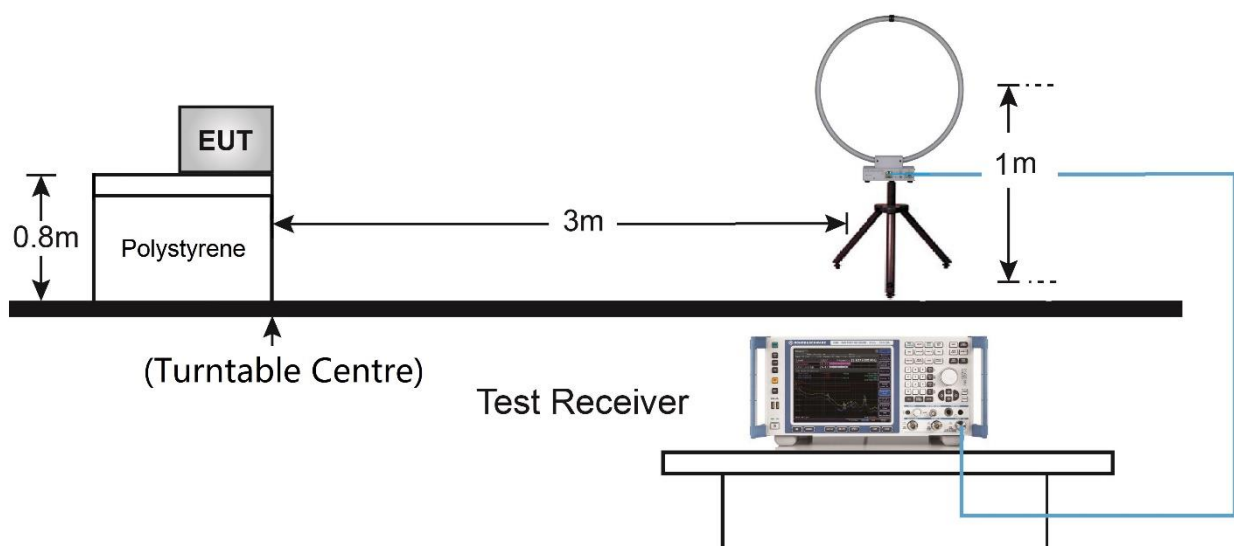
6.3.2. Test Procedure Used

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.

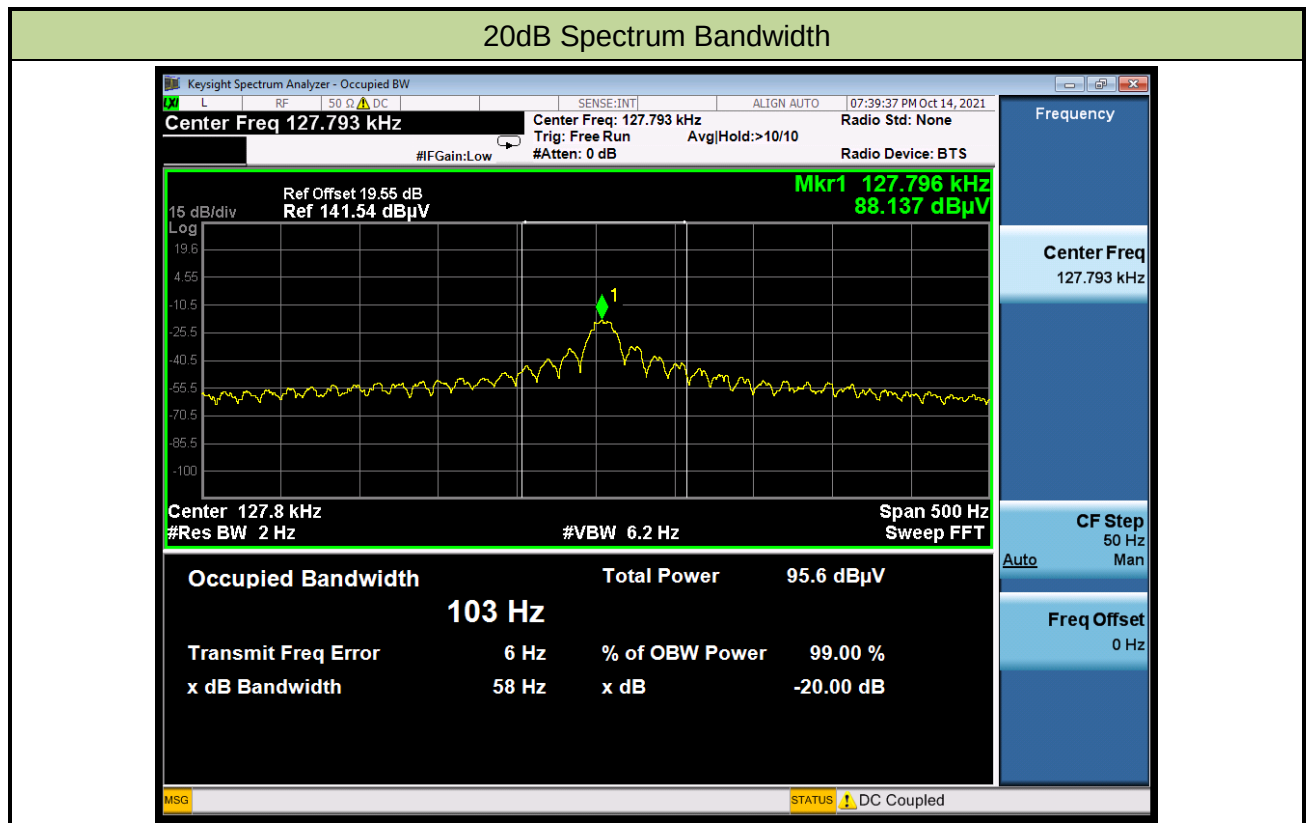
6.3.4. Test Setup



6.3.5. Test Result

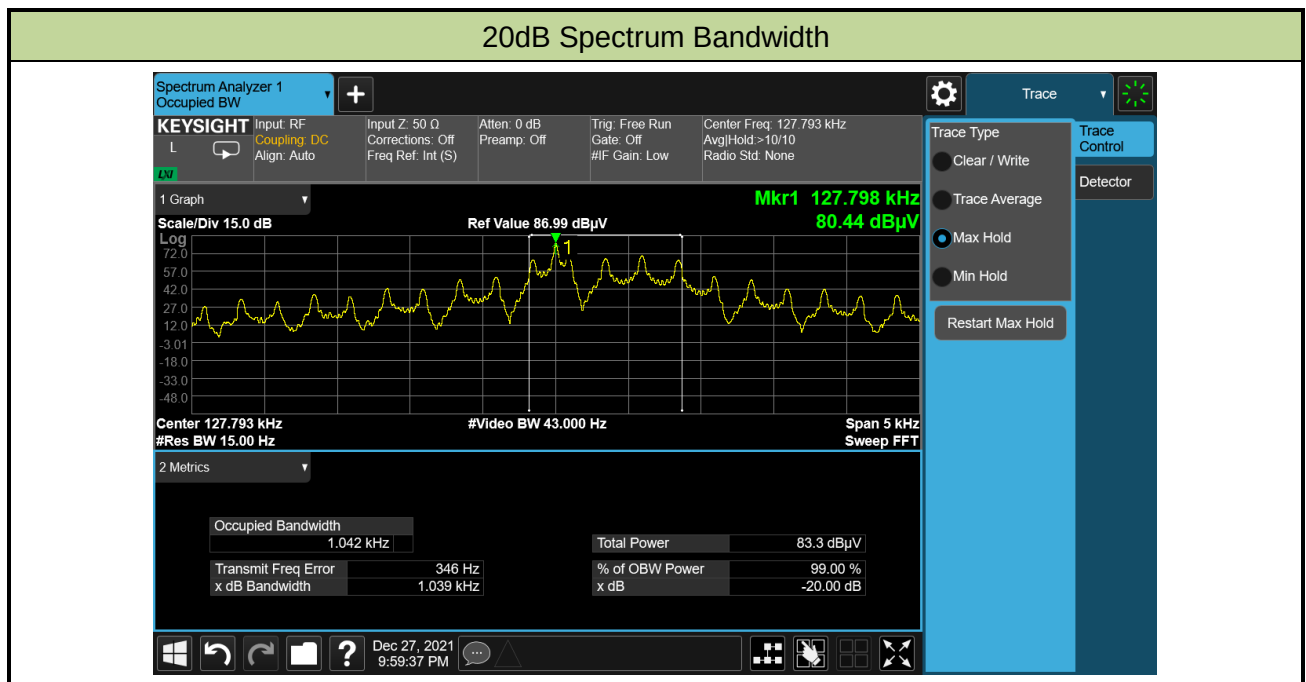
Test Site	WZ-AC1	Test Engineer	Tommy Tang
Test Mode	Mode 1	Test Date	2021/10/14

Frequency (kHz)	20dB Spectrum Bandwidth (Hz)
127.8	58



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

Frequency (kHz)	20dB Spectrum Bandwidth (kHz)
127.8	1.039



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 “2109RSU065-UT” file.

Appendix B - EUT Photograph

Refer to “2109RSU065-UE” file.