



COMPLIANCE WORLDWIDE INC. TEST REPORT 242-22RF

In Accordance with the Requirements of

FCC PART 2.1093 Radio Frequency Exposure Evaluation: Portable Devices ISED RSS-102, Issue 5 + Amendment 1:2021 Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus

Issued to

Wiser Systems, Inc. 819 W Hargett St Raleigh, NC 27603 (919) 551-5566

For the Handheld Tag Models: TAGV1.2, TAGV1.2W

FCC ID: 2AGZM-B01017 IC: 25948-B01017

Report Issued on December 22, 2022

Tested by Sean P. Defelice

Reviewed by

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1. Scope

This test report certifies that the Wiser Systems Handheld Tag as tested, meets the FCC Part 2.1093 and ISED RSS-102 requirements exempting the device from a SAR Evaluation. The scope of this test report is limited to the test sample provided by the client, only in as much as that sample represents other production units. If any significant changes are made to the unit, the changes shall be evaluated and a retest may be required.

2. Product Details

2.1. Manufacturer:	Wiser Systems, Inc.
2.2. Model Numbers:	TAGV1.2, TAGV1.2W
2.3. Serial Numbers:	8004
2.4. Description:	RRLT Locator System leverages new advances in Ultra-Wideband technology to deliver low cost/high accuracy, real-time localization.
2.5. Power Source:	3.0 VDC (CR2032 Lithium)
2.6. Hardware Revision:	N/A
2.7. Software Revision:	N/A
2.8. Modulation Type:	Pulse Modulation, Frequency Hopping
2.9. Operating Frequencies:	4 GHz Center Frequency Nominal (Channel 2 – 500 MHz BW), 4 GHz Center Frequency Nominal (Channel 4 – 900 MHz BW), 6.5 GHz Center Frequency Nominal (Channel 5 – 500 MHz BW)
2.10. EMC Modifications:	None

3. Product Configuration

3.1 Operational Characteristics & Software

Hardware Setup:

Connect the Wiser USB Dongle to a laptop computer via USB. Place a battery into the handheld tag.

Using the software tool configure the USB dongle to control the tag to transmit on Channels 2, 4 or 5 (16M or 64M PRF) using a data rates of 6.8 Mbps. The devices also support a data rate of 110 kbps.

3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Model/Part # / Options Serial Number		Freq (Hz)	Description/Function	
Wiser Systems	TAGV1.2	8004	3.0	DC	Handheld Tag	

3.3. EUT Cables/Transducers

Cable Type	Length	Shield	From	То
None				

3.4. Support Equipment

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
Wiser Systems	USB Dongle	n/a	5.0	DC	For setting up the DUT operation.
Dell	XPS 13 – L321X	41647808737	120	60	For controlling the USB Dongle





3. Product Configuration (cont.)

3.5. Test Setup Diagram



3.6. EUT Orientation Diagram

In addition, the measurements were performed with the device in three orthogonal positions in accordance with ANSI C63.10-2013, sections 5.10.1, 6.3.1, Figure 8 and Annex H. The three orthogonal axes were defined as follows:







4. Measurements Parameters

4.1. Measurement Equipment Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
Spectrum Analyzer, 2 Hz to 26.5 GHz ²	Rohde & Schwarz	FSW26	102057	6/24/2023	2 Years
Dbl Ridged Guide Antenna 1- 18 GHz	ETS-Lindgren	3117	00143292	5/11/2024	2 Years
Dbl Ridged Guide Antenna 1- 18 GHz	ETS-Lindgren	3117	00227631	4/21/2024	2 Years
Preamplifier 2 to 12 GHz	JCA	JCA48- 4111B1	7087S	3/31/2023	1 Year
Barometric Pressure/Humidity & Temp Datalogger	Extech Instruments	SD700	Q590483	10/14/2023	2 Years

¹ ESR7Firmware revision: V3.48 SP3, Date installed: 09/30/2020P² FSW26Firmware revision: V4.71 SP1, Date installed: 11/16/2020P³ FSV40Firmware revision: V2.30 SP4, Date installed: 05/04/2016P

⁴ FSVR40 Firmware revision: V2.23 SP1, Date installed: 08/19/2016

Previous V3.48 SP2, installed 07/23/2020. Previous V4.61, installed 08/11/2020. Previous V2.30 SP1, installed 10/22/2014. Previous V2.23, installed 10/22/2014.

4.2. Measurement & Equipment Setup

Test Dates:	7/12/2022, 7/13/2022, 7/14/2022, 7/15/2022, 7/18/2022, 8/23/2022,
Test Engineers:	Sean Defelice
Normal Site Temperature (15 - 35°C):	21.6
Relative Humidity (20 -75%RH):	35
Frequency Range:	3.5 to 4.5 GHz, 3 to 5 GHz, 6 to 7 GHz
Measurement Distance:	3 Meters
EMI Receiver IF Bandwidth:	1 MHz - Above 1 GHz
EMI Receiver Avg Bandwidth:	≥ 3 * RBW or IF(BW)
Detector Function:	Peak





4. Measurements Parameters (continued)

4.3. Measurement Procedure

Test measurements were made in accordance FCC Part 15.519 Subpart F, and ISED RSS-220.

The test methods used to generate the data is this test report is in accordance with ANSI C63.10:2013, American National Standard for Testing Unlicensed Wireless Devices.

4.4. Measurement Uncertainty

The following uncertainties are expressed for an expansion/coverage factor of K=2.

RF Frequency (out of band)	± 1x10 ⁻⁸
Radiated Emission of Transmitter to 100 GHz	± 4.55 dB
Radiated Emission of Receiver	± 4.55 dB
Temperature	± 0.91° C
Humidity	± 5%





5. Measurement Data

5.1. 99% Emission Bandwidth (RSS-GEN 6.7)

- Requirement: The occupied bandwidth shall be reported for all equipment in addition to the specified bandwidth required in the applicable RSSs RSS-Gen, Section 6.7.
- Test Note: The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the actual occupied / x dB bandwidth and the video bandwidth (VBW) shall not be smaller than three times the RBW value. Video averaging is not permitted.

The detector of the spectrum analyzer shall be set to "Sample". However, a peak, or peak hold, may be used in place of the sampling detector since this usually produces a wider bandwidth than the actual bandwidth (worst-case measurement). Use of a peak hold (or "Max Hold") may be necessary to determine the occupied / x dB bandwidth if the device is not transmitting continuously.





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5.1. 99% Emission Bandwidth (RSS-GEN 6.7)

5.1.2 Plot of 99% Emission Bandwidth (CH2, 6.8 Mbps, 64M PRF)



5.1.3 Plot of 99% Emission Bandwidth (CH4, 6.8 Mbps, 16M PRF)



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5.1. 99% Emission Bandwidth (RSS-GEN 6.7)

5.1.4 Plot of 99% Emission Bandwidth (CH4, 6.8 Mbps, 64M PRF)



5.1.5 Plot of 99% Emission Bandwidth (CH5, 6.8 Mbps, 16M PRF)

242-22 Wiser Ha	ndheld UWB T	ag New Desigr	1						
MultiView	Spectrum								
	- Ref Level 95.0	0 dBuV/m	= RE	W 10 MHz					
Spectrum 🖕	Att	O dB SW	T 1.01 ms 🖷 VE	W 40 MHz Mo	de Sweep				
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60. dBuV/m									
55 dBuV/m									
50 dBµV/m									
			1001 at		10				Casa 1.0 CUla
CF 0.3 GHZ			1001 pt	8	10				Span 1.0 GHz
Type Ref	Trc	X-Value		Y-Value		Function		Function R	esult
M1	1	6.509 GH	Iz 87	.68 dBµV/m	Occ Bw		89	5.106 825	D34 MHz
11 T2	1	6.048776 Gł	HZ HZ	73.34 dBµV/m 73.83 dBuV/m	Occ Bw Cel	ntroid a Offeet		6.4963	29/343 GHz 556 54 MHz
14		0.9-0000 0	14	75.05 dbpv/m	OCC DW HIE	ing on act		-5.070	 12.07.2022
							measuring		16:19:31
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5.1. 99% Emission Bandwidth (RSS-GEN 6.7)

5.1.6 Plot of 99% Emission Bandwidth (CH5, 6.8 Mbps, 64M PRF)



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5.2. Band Power based on 99% Occupied Bandwidth

5.2.1 Band Power CH2 16M PRF 8.08 dBm



5.2.2 Band Power CH2 64M PRF 7.14 dBm







5.2. Band Power based on 99% Occupied Bandwidth

5.2.3 Band Power CH4 16M PRF 9.52 dBm



5.2.4 Band Power CH4 64M PRF 9.73 dBm







5.2. Band Power based on 99% Occupied Bandwidth

5.2.5 Band Power CH5 16M PRF 7.67 dBm



5.2.6 Band Power CH5 64M PRF 6.82 dBm







5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2)

- Requirement: When the field strength or envelope power is not constant or it is in pulses, and an average detector is specified to be used, the value of field strength or power shall be determined by averaging over one complete pulse train during which the field strength or power is at its maximum value, including blanking intervals within the pulse train, provided that the pulse train does not exceed 0.1 seconds. In cases where the pulse train exceeds 0.1 seconds, the average value of field strength or output power shall be determined during a 0.1 seconds interval during which the field strength or power is at its maximum value.
- Procedure: The duty cycle correction was determined using the information provided in ANSI C63.10-2013, Section 7.5: Procedure for determining the average value of pulsed emissions.

Note: This is the maximum duty cycle allowed by the operational software/firmware for the device.

Channel Frequency	Time On	Time per Period	Duty Cycle (DC)	Maximum Peak Power	Duty Cycle Correction (10 log(DC))	Average (Po	Conducted wer
	Ton	T _{on} + T _{off}					
(MHz)	(mS)	(mS)	T _{on} /(T _{on} + T _{off})	(dBm)	dB	dBm	mW
4.000	0.17355	30.9725	0.00560	8.08	-22.52	-14.44	0.0360
4.000	0.17685	30.99	0.00571	7.14	-22.44	-15.30	0.0295
4.000	0.17360	30.955	0.00561	9.52	-22.51	-12.99	0.0502
4.000	0.17675	30.9725	0.00571	9.73	-22.44	-12.71	0.0536
6.500	0.17385	30.99	0.00561	7.67	-22.51	-14.84	0.0328
6.500	0.17685	30.99	0.00571	6.82	-22.44	-15.62	0.0274





5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2) (continued) 5.3.1. Ton CH2 16M PRF



5.3.2. T_{off}, CH2 16M PRF







5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2) (continued) 5.3.3. Ton CH2 64M PRF



5.3.4. T_{off}, CH2 64M PRF







5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2) (continued) 5.3.5. Ton CH4 16M PRF



5.3.6. Toff, CH4 16M PRF



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5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2) (continued) 5.3.7. Ton CH4 64M PRF



5.3.8. T_{off}, CH4 64M PRF



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5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2) (continued) 5.3.9. Ton CH5 16M PRF



5.3.10. Toff, CH5 16M PRF



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5.3. Duty Cycle Correction Factor (FCC Part 15.35(c), RSS-GEN 8.2) (continued) 5.3.11. T_{on} CH5 64M PRF



5.3.12. T_{off}, CH5 64M PRF







5.4. Public Exposure to Radio Frequency Energy Levels (2.1093)

5.4.1. 2.1093 Requirements

Requirement: Portable devices are subject to radio frequency radiation exposure requirements. For purposes of this section, a portable device is defined as a transmitting device designed to be used so that the radiating structure(s) of the device is/are within 20 centimeters of the body of the user.

Time-averaging provisions of the MPE guidelines identified in § 1.1310 of

this chapter may not be used in determining typical exposure levels for portable devices intended for use by consumers, such as hand-held cellular telephones, that are considered to operate in general population/uncontrolled environments as defined above. However, "source-based" time-averaging based on an inherent property or duty-cycle of a device is allowed.

Evaluation of compliance with the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for portable devices having single RF sources with more than an available maximum time-averaged power of 1 mW.

The 1-mW exemption is independent of service type and covers the full range of 100 kHz to 100 GHz, but it may not be used in conjunction with other exemption criteria or in devices with higherpower transmitters operating in the same time-averaging period.

Frequency	PRF	Ton	Ton+Toff	DC Ton/(Ton+Toff)	Peak Power	Duty Cycle Correction = 10 Log(DC)	Average Power	Average Power
MHz		ms	ms		dBm	dB	dBm	mW
4.000	16M	0.17355	30.9725	0.00560	8.08	-22.52	-14.44	0.0360
4.000	64M	0.17685	30.99	0.00571	7.14	-22.44	-15.30	0.0295
4.000	16M	0.17360	30.955	0.00561	9.52	-22.51	-12.99	0.0502
4.000	64M	0.17675	30.9725	0.00571	9.73	-22.44	-12.71	0.0536
6.500	16M	0.17385	30.99	0.00561	7.67	-22.51	-14.84	0.0328
6.500	64M	0.17685	30.99	0.00571	6.82	-22.44	-15.62	0.0274

Duty cycle values from Section 5.3 and Power levels from Section 5.2

Conclusion: The device under test meets the exclusion requirement detailed in FCC OET 447498 D01, dated October 23, 2015 Clause 4.3.1 (a).





5.5. Radio Frequency Exposure of Radiocommunication Apparatus (RSS-102, Notice 2021-DRS0005)

5.5.1 RF Exposure for devices that operate above 6 GHz

Requirement: ISED respect to Notice 2021-DRS0005: Introduction of an interim exemption limit for routine localized power density evaluations of transmitters operating in the 6 – 30 GHz frequency range.

Duty Cycle DC Peak Average Average PRF Frequency Ton+Toff Ton Correction = Ton/(Ton+Toff) Power Power Power 10 Log(DC) mW MHz dBm dB dBm ms ms 4.000 0.17355 30.9725 0.00560 -22.52 -14.44 0.0360 16M 8.08 4.000 0.17685 30.99 0.00571 -15.30 0.0295 64M 7.14 -22.44 4.000 16M 0.17360 30.955 0.00561 9.52 -22.51 -12.99 0.0502 4.000 64M 0.17675 30.9725 0.00571 9.73 -22.44 -12.71 0.0536 6.500 16M 0.17385 30.99 0.00561 7.67 -22.51 -14.84 0.0328 6.500 64M 0.17685 30.99 0.00571 6.82 -22.44 -15.62 0.0274

Duty cycle values from Section 5.3 and Power levels from Section 5.2

Conclusion: The device under test meets the exclusion requirement of 1 mW detailed in Notice 2021-DRS0005.

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