COMPLIANCE WORLDWIDE INC.
TEST REPORT 124-24RF

In Accordance with the Requirements of

Federal Communications Commission CFR Title 47 Part 2.1093
Radio Frequency Exposure Evaluation

Issued to

Probes Unlimited, Inc.
836 W 8th Street
Lansdale, PA 19446

for the

Wireless Meat Probe
Model TT-MP-23092601
2.4 GHz Bluetooth Low Energy Radio

FCC ID: 2BG32-TTMP1

Report Issued on April 19, 2024

Tested by

Sean P. Defelice

Sean P. Defelice

Reviewed by

Larry K. Stillings

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1. Scope

This test report certifies that the Probes Unlimited Wireless Meat Probe Model TT-MP-23092601 as tested, meets the FCC Part 2.1093 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: Probes Unlimited Inc
2.2. Model Number: TT-MP-23092601
2.3. Serial Number: 3A8363
2.4. Description: The TT-Wireless Meat Probe is a wireless meat thermometer used to monitor meat cooking process. It transmits temperature readings from multiple sensors through BLE as a beacon. Typically used in barbeque/grills/smokers, the stainless-steel portion is inserted into meat and the transmitted data is used by the BLE receiver to monitor the internal temperature while cooking and control and alert when cooking is done.
2.5. Power Source: 0.8 mAH Li-Ion Battery
2.6. Hardware Revision: Rev 2
2.7. Software Version: V2.3.2
2.8. Modulation Type: Pulsed GFSK
2.9. Operating Frequency: 2402 to 2480 MHz Nominal
2.10. EMC Modifications: None

3. Product Configuration

3.1. Operational Characteristics & Software

Hardware Setup:

After charging the device is configured to transmit on the three advertising channels. The test sample provided was configured to “beacon” approximately every 500 mS.

3.2. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Number	Volts	Freq (Hz)	Description/Function
Probes Unlimited	TT-MP-23092601	3A8363	3	DC	Wireless Meat Probe with BLE Beacon

3.3. Support Equipment

Manufacturer	Model/Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
None					

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3. Product Configuration (continued)

3.4. Equipment Cables

Cable Type	Length	Shield	From	To
None				

3.5. Block Diagram

4. Measurements Parameters

4.1. Measurement Equipment and Software Used to Perform Test

Device	Manufacturer	Model No.	Serial No.	Cal Due	Interval
EMI Test Receiver, 9kHz - 7GHz [1]	Rohde & Schwarz	ESR7	101156	10/26/2024	3 Years
EMI Test Receiver, 10 Hz - 7GHz [1]	Rohde & Schwarz	ESR7	101770	7/23/2024	3 Years
EMI Test Receiver, 9 kHz – 26.5 GHz[1]	Rohde & Schwarz	ESR26	101693	6/26/2024	1 Year
Spectrum Analyzer, 2 Hz to 26.5 GHz[2]	Rohde & Schwarz	FSW26	102057	6/24/2024	3 Years
Spectrum Analyzer, 9 kHz to 40 GHz[3]	Rohde & Schwarz	FSV40	100899	8/12/2024	4 Years
Spectrum Analyzer 10 Hz – 40 GHz[4]	Rohde & Schwarz	FSVR40	100909	9/18/2024	4 Years
Biconilog Antenna, 30 MHz - 2 GHz	Sunol Sciences	JB1	A050913	7/1/2024	3 Years
Digital Barometer	Control Company	4195	ID236	3/15/2025	1 Year
Barometric Pressure/Humidity & Temp Datalogger	Extech Instruments	SD700	Q590483	4/4/2025	1 Year

[1] ESR7/26 Firmware revision: V3.48 SP3, Date installed: 09/30/2020 Previous V3.48 SP2, installed 07/23/2020.
[2] FSW26 Firmware revision: V4.71 SP1, Date installed: 11/16/2020 Previous V4.61, installed 08/11/2020.
[3] FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016 Previous V2.30 SP1, installed 10/22/2014.
[4] FSVR40 Firmware revision: V2.23 SP1, Date installed: 08/19/2016 Previous V2.23, installed 10/22/2014.

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4. Measurements Parameters (continued)

4.2. Software Used to Perform Test

Manufacturer	Software Description	Title or Model #	Rev.	Report Sections
Compliance Worldwide	Test Report Generation Software	Test Report Generator	1.0	Used to process conducted emissions data

4.3 Measurement & Equipment Setup

Test Dates:	3/25/2024
Test Engineer:	Sean Defelice
Site Temperature (°C):	21
Relative Humidity (%RH):	33
Frequency Range:	30 kHz to 25 GHz
Measurement Distance:	3 Meters and 1 Meter
EMI Receiver IF Bandwidth:	200 Hz (30 kHz – 150 kHz) 9 kHz (150 kHz – 30 MHz) 120 kHz (30 MHz – 1 GHz) 1 MHz (>1 GHz)
EMI Receiver Avg Bandwidth:	≥ 3 * RBW or IF(BW)
Detector Functions:	Peak, Quasi-Peak and Average

4.4 Test Procedure

Test measurements were made in accordance FCC Part 15.247: Operation within the bands 902 - 928 MHz, 2400 - 2483.5 MHz, 5725 - 5850 MHz, and 24.0 - 24.25 GHz.

The measurement procedures in this report are in accordance with ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. FCC OET Publication Number KDB 558074 D01 Meas Guidance v05r02, Guidance for Compliance Measurements on Digital Transmission System, Frequency Hopping Spread Spectrum System, and Hybrid System Devices Operating Under Section §15.247 of the rules, dated April 2, 2019, was also referenced for the test procedures used to generate the data in this report. All references to FCC OET publication number 558074 refer to this version of the publication.

In addition, FCC KDB 447498 D01 General RF Exposure Guidance v06, October 23, 2015 are referenced for the testing and requirements detailed in this report.

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5. Choice of Equipment for Test Suits

5.1 Choice of Model

This test report is based on the one test sample supplied by the manufacturer. These units are reported by the manufacturer to be equivalent to the production units.

5.2 Presentation

The test samples were tested complete with all required ancillary equipment. Refer to Section 3 of this report for product equipment configuration.

5.3 Choice of Operating Frequencies

The EUT, as tested, operates on 40 channels, from channels 0 to 39 in the 2.4 GHz band.

In accordance with ANSI C63.10-2013, section 5.6, and FCC Part 15.31 (m), the choice of operating frequencies selected for the testing detailed in this report are as follows:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
37	2402	9	2422	18	2442	28	2462
0	2404	10	2424	19	2444	29	2464
1	2406	38	2426	20	2446	30	2466
2	2408	11	2428	21	2448	31	2468
3	2410	12	2430	22	2450	32	2470
4	2412	13	2432	23	2452	33	2472
5	2414	14	2434	24	2454	34	2474
6	2416	15	2436	25	2456	35	2476
7	2418	16	2438	26	2458	36	2478
8	2420	17	2440	27	2460	39	2480

5.4 Mode of Operation

Modulation type : GFSK
Pulsed BLE Beacon.

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6. Measurement Data (continued)

6.1. Maximum Peak Conducted Output Power (15.247 (b) (3)

Requirement: The maximum peak conducted output power of the intentional radiator shall not exceed the following: For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt (+30 dBm).

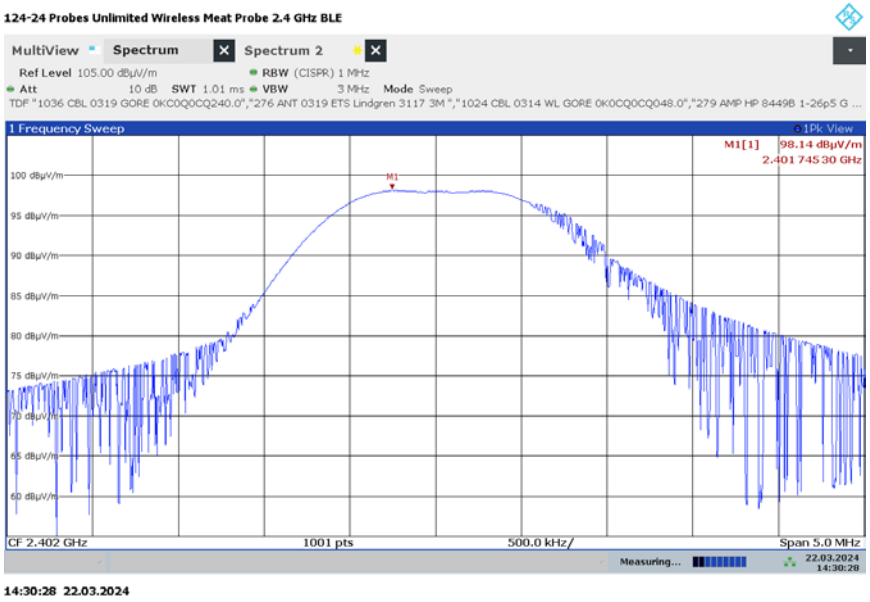
Procedure: This test was performed in accordance with the procedure detailed in FCC OET publication number KDB 558074, Section 9.1.1.

Test Note: A spectrum analyzer resolution bandwidth of 1 MHz and a video bandwidth of 3 MHz were used to meet the requirements of FCC OET publication number 558074, Section 9.1.1 and the measured product DTS bandwidth. Field Strength was converted at 3 meters using 95.2.

Results: The device under test meets the required maximum peak conducted output power level of 1 Watt (30 dBm).

Channel	Frequency	Maximum Peak Radiated Output Power	Maximum Peak Radiated Output Power	Maximum Peak Radiated Output Power	Peak Limit	Margin	Result
	(MHz)	(dBµV/m)	(mW)	(dBm)	(dBm)	(dB)	
37	2402	98.14	1.968	2.94	30.00	-27.06	Compliant
38	2426	98.19	1.991	2.99	30.00	-27.01	Compliant
39	2480	97.13	1.560	1.93	30.00	-28.07	Compliant

6.1.1. Low Channel – 37, 2402 MHz



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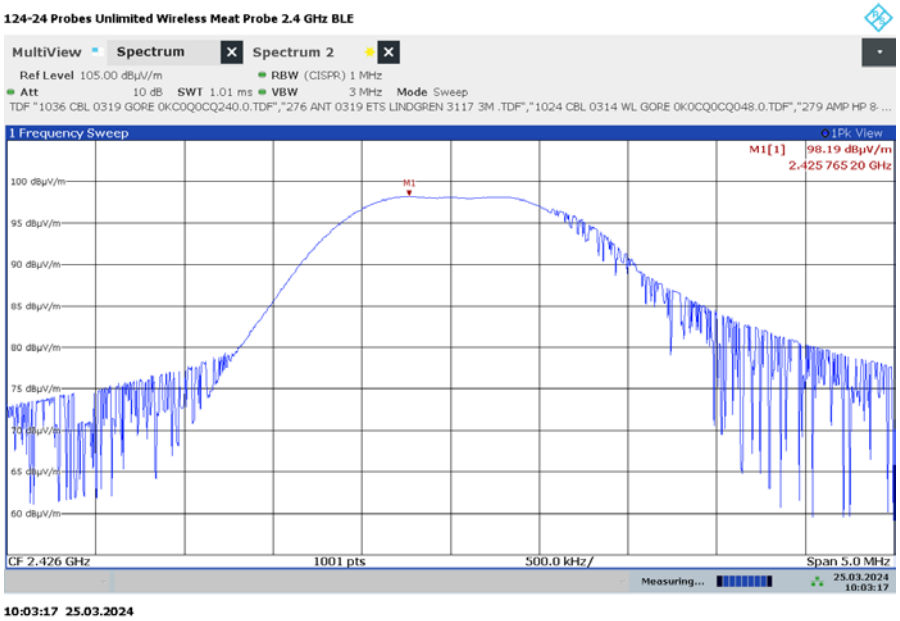
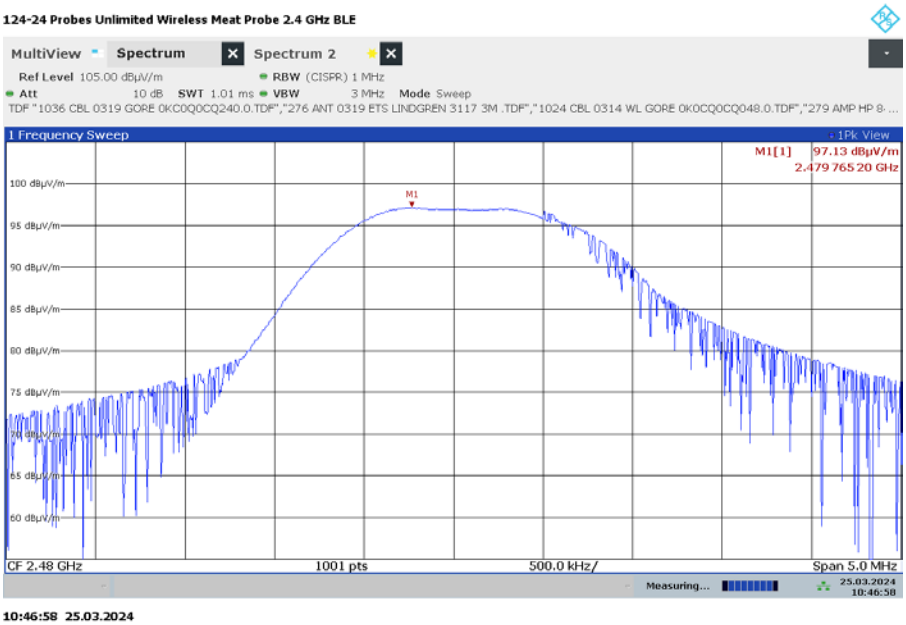
6. Measurement Data

6.1. Maximum Peak Conducted Output Power (continued)

6.1.2. Middle Channel – 38, 2426 MHz



6.1.3. High Channel – 39, 2480 MHz



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6. Measurement Data (continued)

6.2. Public Exposure to Radio Frequency Energy Levels (FCC Part 2.1093)

6.2.1. 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.

For a 1-g SAR, the test exclusion result must be ≤ 3.0.

For a 10-g SAR, the test exclusion result must be ≤ 7.5.

Test Notes: The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by the following formula:

$$\text{SAR Test Exclusion} = \frac{P_{MAX}}{d_{MIN}} \times \sqrt{f_{(GHz)}} \quad (1)$$

P_{MAX}	mW	Maximum power of channel, including tune-up tolerance
d_{MIN}	mm	Minimum test separation distance, mm (≤ 50 mm)
$f_{(GHz)}$	GHz	$f_{(GHz)}$ is the RF channel transmit frequency in GHz (>100 MHz and <6 GHz)

These are the peak powers of the device. The time averaged based power is significantly smaller in terms of microwatts based on the device's short transmission time of 330 µS per advertising channel.

Channel:		**37**	**38**	**39**	
Input[1]:	P_{MAX}	1.968	1.991	1.560	**mW**
	d_{MIN}[2]	5.00	5.00	5.00	**mm**
	$f_{(GHz)}$	2.402	2.426	2.480	**GHz**
Test Exclusion:		**0.61**	**0.62**	**0.49**	
Body-Worn Limit Exemption:		**3.0**	**3.0**	**3.0**	
Extremity Limit Exemption		**7.5**	**7.5**	**7.5**	
Result:		**Compliant**	**Compliant**	**Compliant**	

[1] Taken from column 4 of the table in Section 6.1 of this test report.

[2] When the minimum test separation distance is < 5 mm, a distance of 5 mm according to KDB 447498, 4.1 f) is applied to determine SAR test exclusion.

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

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