

COMPLIANCE WORLDWIDE INC. TEST REPORT 102-23RF

In Accordance with the Requirements of
Federal Communications Commission CFR Title 47 Part 2.1093:2025
Radio Frequency Exposure Evaluation: Portable Devices
Innovation, Science and Economic Development Canada
RSS-102, Issue 6
Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus

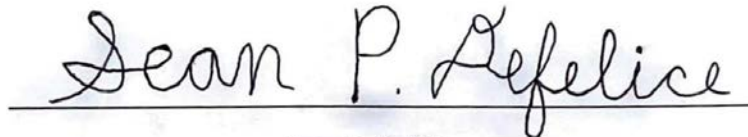
Issued to
ShotTracker, Inc.
7220 W Frontage Road
Merriam, KS 66203

for the
2.0 Tag, Model S2P2
with BLE and UWB Radios

FCC ID: 2AC4B-S2P2
IC: 12327A-S2P2

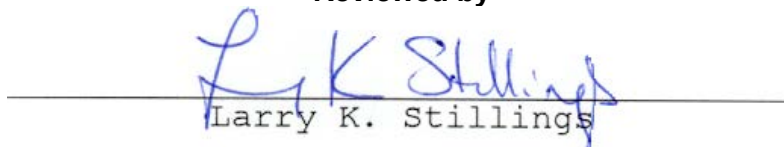
Report Issued on August 5, 2026

Tested by



Sean P. Defelice

Reviewed by



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1. Scope

This test report certifies that the ShotTracker 2.0 Tag model S2P2, as tested, meets the FCC Part 2.1093 requirements and the ISSED RSS-102, Issue 6 Section 6.1 requirements exempting the device from a SAR Evaluation and ISSED RSS-102, Issue 6, Section 8 for total exposure. This exemption is applicable for portable device applications including handheld "extremities" and body worn.

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. Measurement Uncertainty will not be applied to any of the measurement / testing results in this test report to determine pass/fail criteria per the Decision Rule as defined in ISO/IEC Guide 17025-2017 Clause 3.7.

2. Product Details

2.1. Manufacturer:	ShotTracker
2.2. Model Number:	S2P2
2.3. Serial Numbers:	33523, 34386
2.4. Description:	The S2P2 sends and receives ultra wideband (UWB) transmissions so that player wearing the tag can be accurately located and tracked by other nearby UWB sensors. The S2P2 also has a Bluetooth Low Energy (BLE) transceiver that operates in the 2.402 to 2.48 GHz frequency band for provisioning, configuration and maintenance purposes.
2.5. Power Source:	3.7 VDC via Battery
2.6. Hardware Revision:	Rev A
2.7. Software Revision:	N/A
2.8. Modulation Types:	Gaussian frequency shift keying. Pulse modulation, frequency hopping.
2.9. Operating Frequencies:	2402 to 2480 MHz (BLE), 3.5, 4, 4.5 or 6.5 GHz (UWB)
2.10. EMC Modifications:	None

3. Product Configuration

3.1. EUT Hardware

Manufacturer	Model/Part # / Options	Serial Numbers	Input Volts	Freq (Hz)	Description/Function
ShotTracker	S2P2	33523, 34386	3.7	DC	Tracking Tag

3.2. Support Equipment

Manufacturer	Model /Part # / Options	Serial Number	Input Voltage	Freq (Hz)	Description/Function
Lenovo	ThinkPad T440P	PB-031DX9	120	60	For controlling the board

3. Product Configuration (continued)

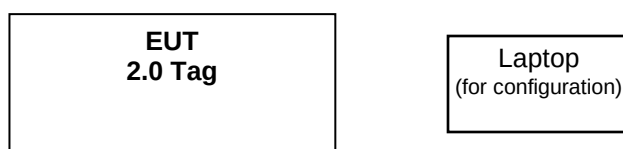
3.3. Cables

Cable Type	Length	Shield	From	To / Function
None				

3.4. Operational Characteristics & Software

The EUT is configured to operate on one of the three Bluetooth channels, 2402, 2440 or 2480 MHz. For the UWB it was configured for operation on Channels 1, 2, 3 or 5.

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
Spectrum Analyzer, 2 Hz to 26.5 GHz ¹	Rohde & Schwarz	FSW26	102057	7/19/2027	3 Years
Spectrum Analyzer, 9 kHz to 40 GHz ³	Rohde & Schwarz	FSV40	100899	6/27/2026	2 Years
Dbl Ridged Guide Antenna 1- 18 GHz	ETS-Lindgren	3117	00143292	5/11/2027	5 Years
Dbl Ridged Guide Antenna 1 - 18 GHz	ETS-Lindgren	3117	00227631	4/21/2027	5 Years
Preamplifier, 1 GHz to 26.5 GHz	Hewlett Packard	8449B	3008A01323	3/5/2027	3 Years
Preamplifier 2 to 12 GHz	JCA	JCA48-4111B1	7087S	9/28/2027	3 Years
Digital Barometer	Control Company	4195	ID236	3/15/2027	3 Years
Barometric Pressure/Humidity & Temp Datalogger	Extech Instruments	SD700	Q590483	4/4/2027	3 Years

¹ FSW26 Firmware revision: V4.71 SP1, Date installed: 11/16/2020

³ FSV40 Firmware revision: V2.30 SP4, Date installed: 05/04/2016

Previous V4.61, installed 08/11/2020.

Previous V2.30 SP1, installed 10/22/2014.

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:	3/20/2023, 3/21/2023,
Test Engineer:	Sean Defelice
Site Temperature (°C):	24
Relative Humidity (%RH):	40
Frequency Range:	9 kHz to 1 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)
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 and FCC Part 15.519 Subpart F: Ultra-Wideband operation.

The measurement procedures in this report are in accordance with ANSI C63.10-2020: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices. FCC OET Publication Number KDB 558074 D01 v05r02, Guidance for Performing Compliance Measurements on Digital Transmission Systems (DTS), Frequency Hopping Spread Spectrum Systems, and Hybrid System Devices Operating Under §15.247, dated April 2, 2019 ISSED RSS-247 Digital Transmission Systems (DTSS), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices, Issue 4 and ISSED RSS-220, Issue 1 Devices Using Ultra-Wideband (UWB) Technology, were referenced for the test procedures used to generate the data in this report. All references to these publications refer to these versions and dates detailed in this paragraph.

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.

In addition, ISSED RSS-102, Issue 6, (December 15, 2023) are referenced for the testing and requirements detailed in this report.

5. Choice of Equipment for Test Suits

5.1 Choice of Model

This test report is based on the test samples supplied by the manufacturer and are reported by the manufacturer to be equivalent to the production units.

5.2 Presentation

This test sample was tested 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. Frequencies of 2402, 2440 and 2480 MHz were chosen for testing.

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

For the UWB radio Channel 5 at 6.5 GHz and Channel 9 at 8 GHz were tested.

5.4 Mode of Operation (BLE)

Modulation type : GFSK

Payload pattern : PRBS9

Payload Length : 37 bytes

5.5 EUT Position for Emissions Measurements

During all radiated emissions measurement testing, the product was mounted on a polystyrene form to facilitate rotating the device through three orthogonal axes, as required by ANSI C63.10, section 5.10.1, for a handheld or body worn device.

6. Measurement Data (continued)

6.1. Maximum Conducted Output Power (FCC 15.247 (b)(3), ISED RSS-247 5.4 d)

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 ANSI C63.10:2020 Clause 11.9.1.1

Test Notes: 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 8.3.1.1 based on the measured DTS bandwidth.

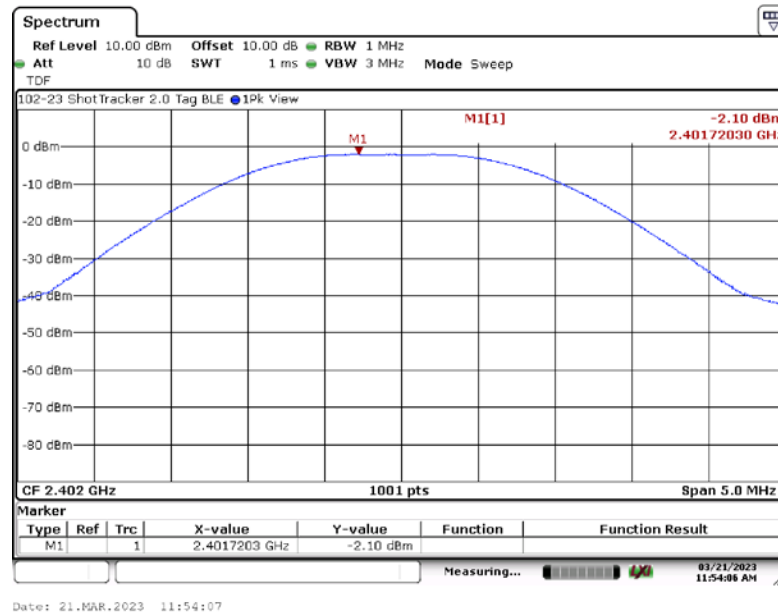
Results: The device under test meets the required maximum peak conducted output power level of 1 Watt (30 dBm).

BLE Channel	Frequency	Maximum Peak Conducted Output Power	Peak Limit	Margin	Result
	(MHz)	(dBm)	(dBm)	(dB)	
37	2402	-2.10	30	-32.10	Compliant
17	2440	-2.60	30	-32.60	Compliant
39	2480	-2.93	30	-32.93	Compliant

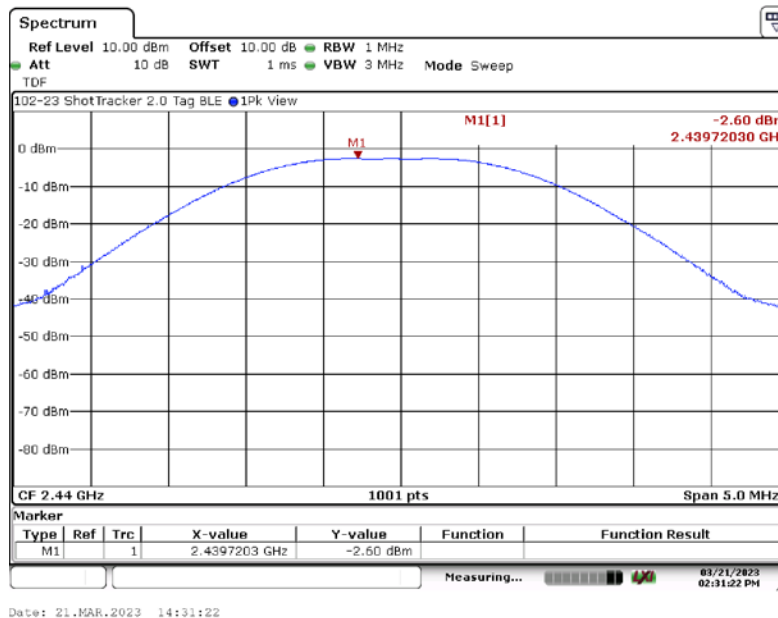
6. Measurement Data (continued)

6.1. Maximum Conducted Output Power (FCC 15.247 (b)(3), ISED RSS-247 5.4 d)

6.1.1. Low Channel – 37, 2402 MHz



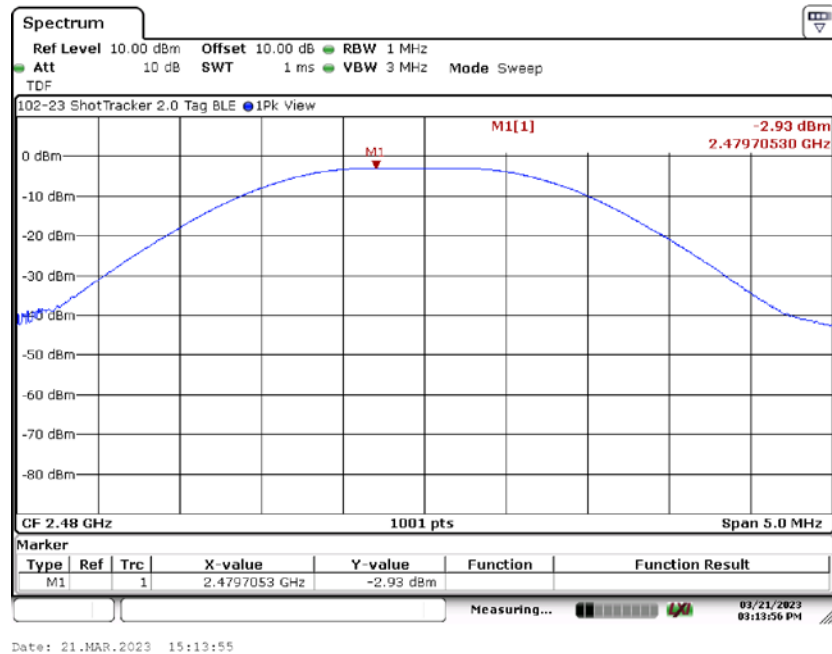
6.1.2. Middle Channel – 17, 2440 MHz



6. Measurement Data (continued)

6.1. Maximum Conducted Output Power (FCC 15.247 (b)(3), ISED RSS-247 5.4 d)

6.1.3. High Channel – 39, 2480 MHz



6. Measurement Data (continued)

6.2. Duty Cycle (FCC OET publication number 558074)

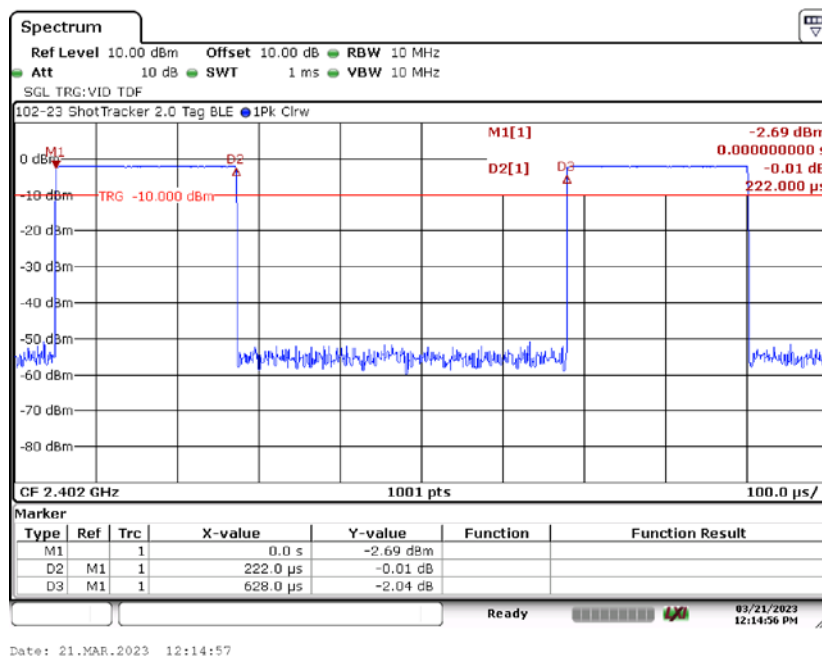
Requirement: Preferably, all measurements of maximum conducted (average) output power will be performed with the EUT transmitting continuously (i.e., with a duty cycle of greater than or equal to 98%).

Procedure: Duty cycle measurements were made according to the procedure detailed FCC OET publication number 558074, Section 6(b).

Results: Duty cycle measurements are listed in the following table.

Channel	Frequency	Time High	Time per Period	Duty Cycle	
	(MHz)	(mS)	(mS)	(Numeric)	(%)
37	2402	0.222	0.628	0.35	35.35
17	2440	0.222	0.628	0.35	35.35
39	2480	0.222	0.628	0.35	35.35

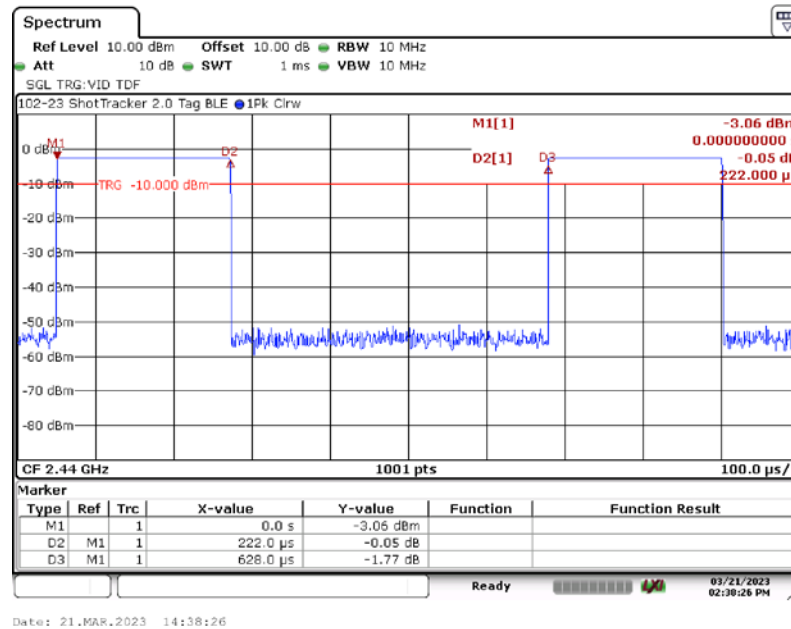
6.2.1. Low Channel – 37, 2402 MHz



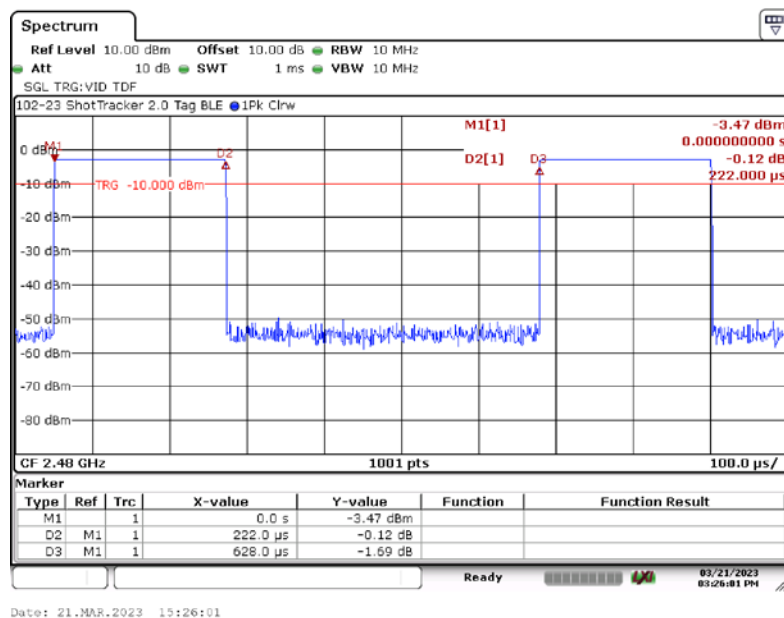
6. Measurement Data (continued)

6.12. Duty Cycle (continued)

6.2.2. Middle Channel – 17, 2440 MHz



6.2.3. High Channel – 39, 2480 MHz



6. Measurement Data (continued)

6.3. Peak Emissions in a 50 MHz Bandwidth (15.519 (e), 15.521 (g))

6.3.1 Plot of Peak Power at 3 Meters – Channel 1

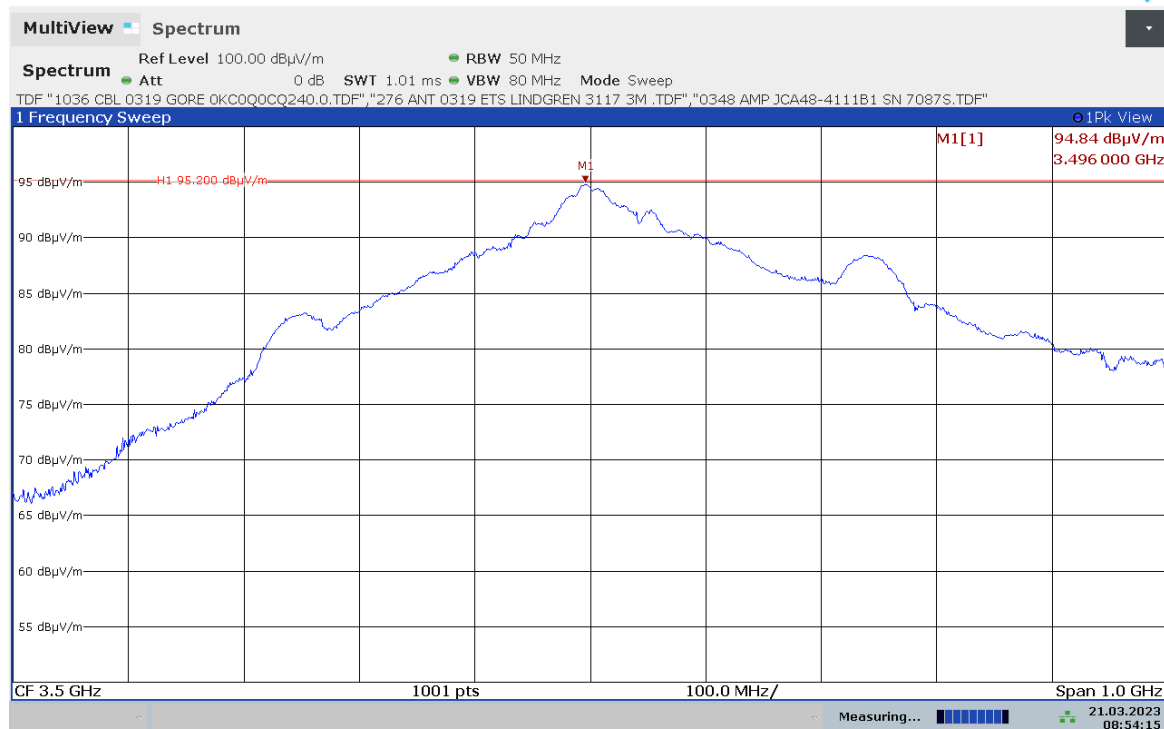
Frequency (GHz)	Amplitude ¹	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBμV/m)	(dBμV/m)	(dB)	H/V	cm	Deg	
3.496	94.84	95.30	-0.46	V	163	356	Compliant

Notes: ¹ Antenna Factor (AF), Cable Factor (CF) and External Preamplifier Gain (PAG) have been entered into the analyzer as transducer factors.

$$\text{EIRP (dBm)} = E_{\text{meas}} (\text{dB}\mu\text{V/m}) - 95.3, \text{ Equation 33 from ANSI C63.10:2020}$$

Frequency (GHz)	Amplitude ¹ (dBm)	Limit (dBm)	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	EIRP	EIRP	(dB)	H/V	cm	Deg	
3.496	-0.46	0.00	-0.46	V	163	356	Compliant

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6. Measurement Data (continued)

6.3. Peak Emissions in a 50 MHz Bandwidth (15.519 (e), 15.521 (g) continued)

6.3.2 Plot of Peak Power at 3 Meters – Channel 2

Frequency (GHz)	Amplitude ¹	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBμV/m)	(dBμV/m)	(dB)	H/V	cm	Deg	
4.2368	93.45	95.30	-1.85	V	182	2	Compliant

Notes: ¹ Antenna Factor (AF), Cable Factor (CF) and External Preamplifier Gain (PAG) have been entered into the analyzer as transducer factors.

$EIRP (dBm) = E_{meas} (dBμV/m) - 95.3$, Equation 33 from ANSI C63.10:2020

Frequency (GHz)	Amplitude ¹ (dBm)	Limit (dBm)	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	EIRP	EIRP	(dB)	H/V	cm	Deg	
4.2368	-1.85	0.00	-1.85	V	182	2	Compliant

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6. Measurement Data (continued)

6.3. Peak Emissions in a 50 MHz Bandwidth (15.519 (e), 15.521 (g) continued)

6.3.3 Plot of Peak Power at 3 Meters – Channel 3

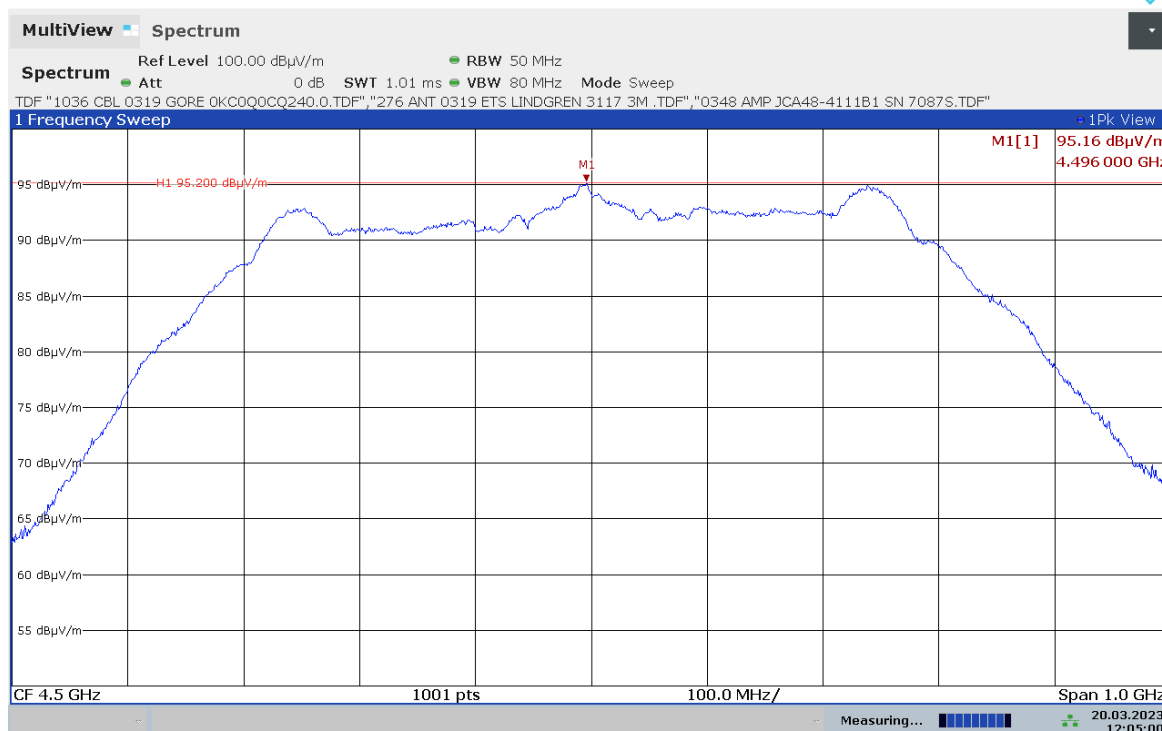
Frequency (GHz)	Amplitude ¹	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBμV/m)	(dBμV/m)	(dB)	H/V	cm	Deg	
4.496	95.16	95.30	-0.14	V	154	3	Compliant

Notes: ¹ Antenna Factor (AF), Cable Factor (CF) and External Preamplifier Gain (PAG) have been entered into the analyzer as transducer factors.

EIRP (dBm) = E_{meas} (dBμV/m) – 95.3, Equation 33 from ANSI C63.10:2020

Frequency (GHz)	Amplitude ¹ (dBm)	Limit (dBm)	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	EIRP	EIRP	(dB)	H/V	cm	Deg	
4.496	-0.14	0.00	-0.14	V	154	3	Compliant

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6. Measurement Data (continued)

6.3. Peak Emissions in a 50 MHz Bandwidth (15.519 (e), 15.521 (g), RSS-220 5.3.1 (g))

6.3.4 Plot of Peak Power at 3 Meters – Channel 5

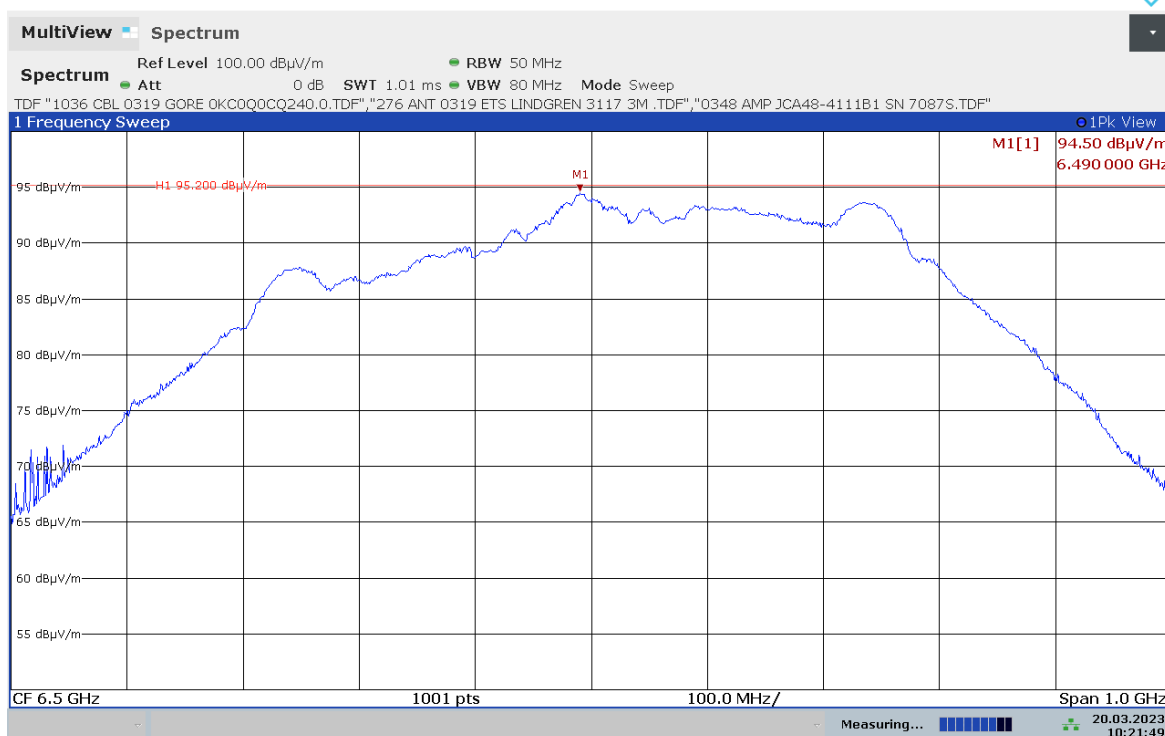
Frequency (GHz)	Amplitude ¹	Limit	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	(dBμV/m)	(dBμV/m)	(dB)	H/V	cm	Deg	
6.490	94.50	95.30	-0.80	V	161	9	Compliant

Notes: ¹ Antenna Factor (AF), Cable Factor (CF) and External Preamplifier Gain (PAG) have been entered into the analyzer as transducer factors.

$$\text{EIRP (dBm)} = \text{E}_{\text{meas}} (\text{dB}\mu\text{V/m}) - 95.3, \text{ Equation 33 from ANSI C63.10:2020}$$

Frequency (GHz)	Amplitude ¹ (dBm)	Limit (dBm)	Margin	Ant Polarity	Ant Height	Turntable Azimuth	Result
	EIRP	EIRP	(dB)	H/V	cm	Deg	
6.490	-0.80	0.00	-0.80	V	161	9	Compliant

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6. Measurement Data (continued)

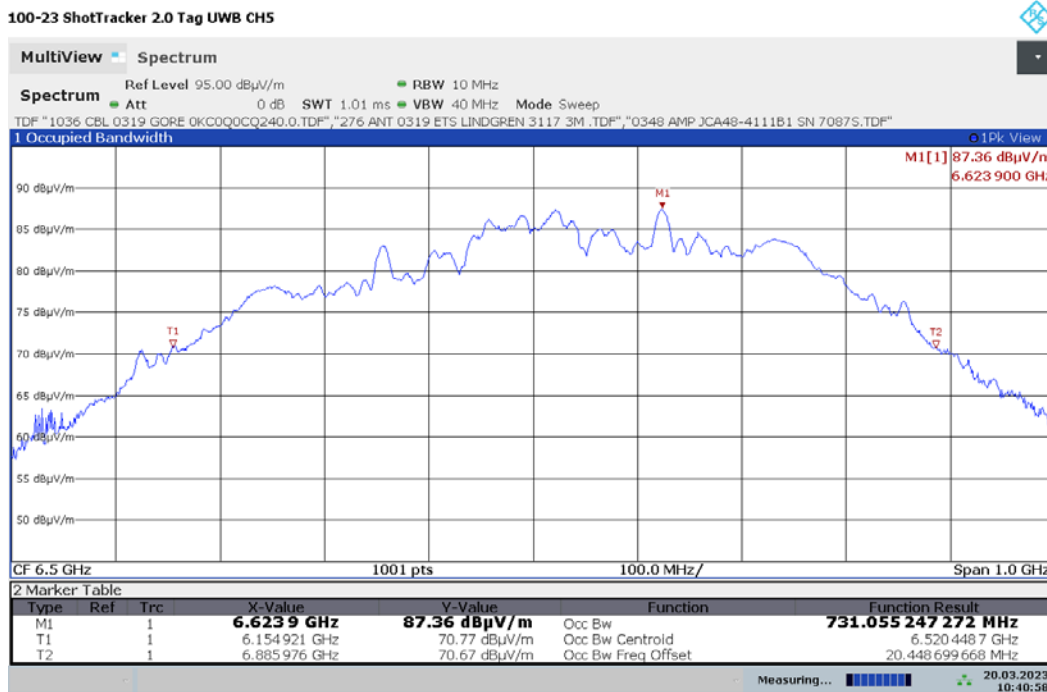
6.4. 99% Emission Bandwidth (RSS-GEN 6.7)

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.

6.4.1 Plot of 99% Emission Bandwidth, Channel 5



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Note: Demonstrating the UWB signal operates entirely above 6 GHz.

6. Measurement Data (continued)

6.5. Public Exposure to Radio Frequency Energy Levels (FCC Part 2.1093:2025)

6.5.1. 2.1093 Requirements

Requirement: For purposes of this section, the definitions in § 1.1307(b)(2) of this chapter shall apply. A portable device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) is/are within 20 centimeters of the body of the user.

The following formula shall only be used in conjunction with portable devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 0.5 centimeters to 20 centimeters and frequencies from 0.3 GHz to 6 GHz.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Frequency (GHz)	SQRT (f)	ERP _{20cm} * SQRT(f)	60 / (ERP _{20cm} * SQRT(f))	x = -log10	(0.5/20cm) ^x	Pth (mW)	ShotTracker	
							2.0 Tag	
							(mW)	dBm
2.402	1.550	4742.506	0.0127	1.898	0.001	2.79	0.617	-2.10
2.440	1.562	4779.873	0.0126	1.901	0.001	2.75	0.550	-2.60
2.480	1.575	4818.893	0.0125	1.905	0.001	2.72	0.509	-2.93

Conclusion: Compliant - The device under test meets the Pth (mW) exclusion requirement of 47 CFR 2.1093 (c)(1).

6. Measurement Data (continued)

6.5. Public Exposure to Radio Frequency Energy Levels (FCC Part 2.1093:2024)

6.5.1. 2.1093 Requirements continued

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.

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.

Channel	Frequency	Peak Field Strength	Distance	Antenna Gain ¹	Measured Output Power	Output Power Limit	Result
	(GHz)	(dBμV/m)	(m)	(dBi)	(mW)	(mW)	
1	3.496	94.84	3.0	0.000	0.914	1	Compliant
2	4.237	93.45	3.0	0.000	0.664	1	Compliant
3	4.496	95.16	3.0	0.000	0.984	1	Compliant
5	6.490	94.50	3.0	0.000	0.846	1	Compliant

Note: Antenna gain is included as part of the radiated measurement.

Maximum Output power is at 4.496 GHz is 0.984 mW

Note: The UWB radio can only transmit on one channel at a time. The BLE and UWB Radios do not operate simultaneously.

Result: Compliant, the device has a peak power of less than 1 mW, the maximum timed average power is significantly less.

6. Measurement Data (continued)

6.6. Radio Frequency (RF) Exposure of Radiocommunication Apparatus (RSS-102, Issue 6)

6.6.1. RSS-102 Issue 6 Requirements

Requirement: Devices operating at or below the applicable output power levels (adjusted for tune-up tolerance) specified in Table 11, based on the separation distance, are exempt from SAR evaluation. The separation distance, defined as the distance between the user and/or bystander and the antenna and/or radiating element of the device or the outer surface of the device, shall be less than or equal to 20 cm for these exemption limits to apply.

When the operating frequency of the device is between two frequencies located in Table 11, linear interpolation shall be applied for the applicable separation distance. If the separation distance of the device is between two distances located in Table 11, linear interpolation may be applied for the applicable frequency.

Table Frequency (MHz)	Table Limit ≤ 5mm (mW)
1900.00	6.00
2450.00	3.00
3500.00	2.00

Frequency	Separation Distance	Maximum Power	RSS-102 Limit	Result
MHz	mm	mW	mW	
2402	≤5	0.62	3.26	Compliant
2440	≤5	0.55	3.05	Compliant
2480	≤5	0.51	2.97	Compliant

¹ Taken from the peak power of this report and converted to mW

Note: The BLE and UWB Radios do not operate simultaneously.

Result: Compliant, the device meets the exemption limits from Table 11 of RSS-102, Issue 6 at less than or equal to 5mm separation.

6. Measurement Data (continued)**6.6. Radio Frequency (RF) Exposure of Radiocommunication Apparatus (RSS-102, Issue 6)****6.6.1. RSS-102 Issue 6 Requirements (continued)**

Requirement: Section 6.5: A transmitter producing emissions in the 6 GHz - 30 GHz frequency range (i.e. where the occupied bandwidth (99% emission bandwidth) is fully contained within this range) is exempt from routine IPD evaluation if the output power (adjusted for tune-up tolerance) is less than or equal to 1 mW (0 dBm).

Channel	Frequency	Maximum Peak Power	RSS-102 Limit	Result
	MHz	mW	mW	
5	6490	0.846	1.00	Compliant

Note: The UWB radio can only transmit on one channel at a time. The BLE and UWB Radios do not operate simultaneously.

Result: Compliant, the device meets the exemption limit using the devices peak power which is less than 1 mW. The RMS time averaged power is significantly less.