



**DATE: 19 March 2019**

# **I.T.L. (PRODUCT TESTING) LTD. FCC/IC Radio Test Report**

**for**

**Pointer Telocation**

**Equipment under test:**

**Asset Tracking Device**

**CelloTrack 10Y LTE C1 NA**

**P/N: GC9773000**

Tested by: \_\_\_\_\_

M. Zohar

Approved by: \_\_\_\_\_

D. Shidlowsky

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This report relates only to items tested.



**Measurement/Technical Report for**  
**Pointer Telocation**  
**Asset Tracking Device**  
**CelloTrack 10Y LTE C1 NA**

**FCC ID: 2AG69CTLL**  
**IC: 9975A-CTLL**

This report concerns:      Original Grant:  
                                         Class II change: X  
                                         Class I change:

Equipment type:              FCC – Digital Transmission System  
                                         IC – Low Power Device (2400-2483.5MHz)

Limits used:                    47CFR Part 22, 24, 27

Measurement procedure used is ANSI C63.10 2013

Substitution Method used as in ANSI/TIA-603-D: 2010.

|                                                                             |                                                                  |
|-----------------------------------------------------------------------------|------------------------------------------------------------------|
| Application for Certification                                               | Applicant for this device:                                       |
| prepared by:                                                                | (different from "prepared by")                                   |
| R. Pinchuck                                                                 | Igor Rogov                                                       |
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# 1. General Information

## 1.1 Administrative Information

|                                |                                                                           |
|--------------------------------|---------------------------------------------------------------------------|
| Manufacturer:                  | Pointer Telocation                                                        |
| Manufacturer's Address:        | 14 Hamelacha, PO Box 11473<br>Roash Haain, Israel<br>Tel: +972 73 2622320 |
| Manufacturer's Representative: | Igor Rogov                                                                |
| Equipment Under Test (E.U.T):  | Asset Tracking Device                                                     |
| PMN:                           | CelloTrack 10Y LTE C1 NA                                                  |
| Equipment Serial No.:          | 2310289                                                                   |
| HVIN:                          | 3000                                                                      |
| Date of Receipt of E.U.T:      | February 03, 2019                                                         |
| Start of Test:                 | February 05, 2019                                                         |
| End of Test:                   | February 06, 2019                                                         |
| Test Laboratory Location:      | I.T.L (Product Testing) Ltd.<br>1 Batsheva St,<br>Lod,<br>Israel 7116002  |
| Test Specifications:           | FCC Part 22, 24, 27                                                       |

## **1.2 List of Accreditations**

The EMC laboratory of I.T.L. is accredited by/registered with the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation Number is IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025A-1, IC 4025A-2.

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

### **1.3 Product Description**

The CelloTrack 10Y is an asset tracking device with up to 10 years of operational lifetime, using a non-rechargeable battery, including wireless sensor connectivity (with the MultiSenses). The CelloTrack 10Y is ideal for long term remote applications, requiring minimum or no maintenance at all. Suitable for application with extreme operating temperatures in which charging and performance are challenging.

### **1.4 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10 2013 and ANSI/TIA-603-D: 2010. Radiated testing was performed at an antenna to EUT distance of 3 meters.

### **1.5 Test Facility**

Both conducted and radiated emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

### **1.6 Measurement Uncertainty**

#### **Conducted Emission**

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)  
0.15 – 30 MHz:  
Expanded Uncertainty (95% Confidence, K=2):  
± 3.44 dB

#### **Radiated Emission**

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)  
for open site:  
30-1000MHz:  
Expanded Uncertainty (95% Confidence, K=2):  
± 4.96 dB

1 GHz to 6 GHz  
Expanded Uncertainty (95% Confidence, K=2):  
±5.19 dB

>6 GHz  
Expanded Uncertainty (95% Confidence, K=2):  
±5.51 dB

## 2. System Test Configuration

### 2.1 Justification

1. The E.U.T. was originally FCC certified on 07/02/2018 under FCC ID: 2AG69CTLL and IC certified on 7/24/2018 under IC: 9975A-CTLL.
2. The E.U.T contains 2 transceivers: a BLE, as certified above, and a 4G cellular approved module LTE/WCDMA module, manufactured by Gemalto M2M GmbH, model Cinterion ELS61-US, FCC ID: QIPELS61-US, IC: 7830A-ELS61US.
3. The manufacturer wishes to replace the above Gemalto 4G cellular module with the following LTE/WCDMA 4G module, also manufactured by Gemalto M2M GmbH, model Cinterion ELS61-USA, FCC ID: QIPELS61-USA, IC: 7830A-ELS61USA. See customer's Declaration of Change on following page.
4. A C2PC is requested based on this change. Intermodulation Radiated testing was performed and RF exposure was calculated.
5. The E.U.T. met the requirements of a C2PC.
6. Testing was performed with simultaneous transmission at maximum power and at the following frequencies:  
For BLE: 2402.0MHz  
For 4G cellular: 1910.0MHz
7. Testing was performed in 3 orthogonal orientations to find the "worst case" radiation which was determined to be the X axis.
8. The E.U.T. was evaluated while battery operated (3.6 Vdc).

### 2.2 EUT Exercise Software

No exercise software was needed in order to achieve compliance.

### 2.3 Special Accessories

No special accessories were needed in order to achieve compliance.

### 2.4 Equipment Modifications

No modifications were necessary in order to achieve compliance.

### 2.5 Configuration of Tested System

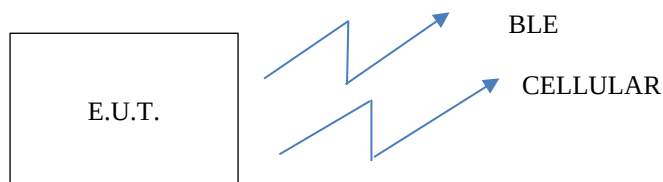


Figure 1. Radiated Test Set-Up

**POINTER**

## C2PC Declaration

Date: March, 3 2019

1. The E.U.T. was originally FCC certified on 07/02/2018 under FCC ID: 2AG69CTL and IC certified on 7/24/2018 under IC: 9975A-CTLL.
2. The E.U.T contains 2 transceivers: a BLE, as certified above, and a 4G cellular approved module LTE/WCDMA module, manufactured by Gemalto M2M GmbH, model Cinterion ELS61-US, FCC ID: QIPELS61-US, IC: 7830A-ELS61US.
3. Pointer Telocation has replaced the above Gemalto 4G cellular module with the following LTE/WCDMA module, also manufactured by Gemalto M2M GmbH, model Cinterion ELS61-USA, FCC ID: QIPELS61-USA, IC: 7830A-ELS61USA.

Based on the above change, Pointer Telocation requests a C2PC.

Thank you,

Igor Rogov, VP R&D,  
Pointer Telocation

IGOR ROGOV  
04-03-2019  
VP R&D

### 3. Test Set-Up Photos



**Figure 2. Intermodulated Radiated Emission Test**

## 4. Intermodulation Radiated

### 4.1 Test Procedure

(Temperature (24°C)/ Humidity (49%RH))

The test method was based on ANSI/TIA-603-D: 2010, Section 2.2.12 Unwanted Emissions: Radiated Spurious.

The E.U.T was tested inside the shielded room at a distance of 3 meters and the E.U.T was placed on a non-metallic table, 1.5 meters above the ground. The frequency range 1.0GHz -18.0GHz was scanned. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization. The emissions were measured at a distance of 3 meters.

The E.U.T. was replaced by a substitution antenna (dipole 30MHz-1GHz, Horn Antenna above 1GHz) driven by a signal generator. The height was readjusted for maximum reading. The signal generator level was adjusted to obtain the same reading on the EMI receiver as in step (a).

The signals observed in step (a) were converted to radiated power using:

$$P_d(\text{dBm}) = P_g(\text{dBm}) - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dBd)}$$

$P_d$  = Dipole equivalent power (result).

$P_g$  = Signal generator output level.

A Peak detector was used for this test.

The table on the following page describes only results with the highest radiation.

### 4.2 Test Limit

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 * \log (P)$  dB, yielding -13dBm.

### 4.3 Test Results

JUDGEMENT: Passed

## Intermodulation Radiated

| Freq.  | Pol.  | Maximum<br>Peak Level | Signal<br>Generator RF<br>Output | Cable<br>Loss | Antenna<br>Gain | ERP<br>Level | Limit | Margin |
|--------|-------|-----------------------|----------------------------------|---------------|-----------------|--------------|-------|--------|
| (MHz)  | (V/H) | (dBμV/m)              | (dBm)                            | (dB)          | (dBd)           | (dBm)        | (dBm) | (dB)   |
| 926.0  | V     | 46.2                  | -55.4                            | 0.5           | 5.0             | -50.9        | -13.0 | -37.9  |
|        | H     | 47.0                  | -53.0                            | 0.5           | 5.0             | -48.5        | -13.0 | -35.5  |
| 1418.0 | V     | 47.7                  | -51.4                            | 0.5           | 4.9             | -47.0        | -13.0 | -34.0  |
|        | H     | 48.1                  | -51.0                            | 0.5           | 4.9             | -46.6        | -13.0 | -33.6  |
| 2894.0 | V     | 56.0                  | -48.6                            | 1.0           | 7.9             | -41.7        | -13.0 | -28.7  |
|        | H     | 55.7                  | -48.5                            | 1.0           | 7.9             | -41.6        | -13.0 | -28.6  |
| 3386.0 | V     | 53.1                  | -51.6                            | 1.0           | 7.9             | -44.7        | -13.0 | -31.7  |
|        | H     | 53.3                  | -51.5                            | 1.0           | 7.9             | -44.6        | -13.0 | -31.6  |
| 3878.0 | V     | 56.8                  | -48.0                            | 1.0           | 7.4             | -41.6        | -13.0 | -28.6  |
|        | H     | 57.2                  | -48.0                            | 1.0           | 7.4             | -41.6        | -13.0 | -28.6  |
| 4370.0 | V     | 56.4                  | -49.0                            | 1.0           | 7.4             | -42.6        | -13.0 | -29.6  |
|        | H     | 56.2                  | -49.0                            | 1.0           | 7.4             | -42.6        | -13.0 | -29.6  |

Figure 3 Intermodulation Radiated Results

#### 4.4 Test Instrumentation Used; Radiated Measurements Intermodulation

| Instrument                  | Manufacturer | Model  | Serial Number | Calibration           |                      |
|-----------------------------|--------------|--------|---------------|-----------------------|----------------------|
|                             |              |        |               | Last Calibration Date | Next Calibration Due |
| EMI Receiver                | HP           | 85422E | 3906A00276    | February 19, 2018     | February 28, 2019    |
| RF Filter Section           | HP           | 85420E | 3705A00248    | February 19, 2018     | February 28, 2019    |
| EMI Receiver                | R&S          | ESCI7  | 100724        | February 19, 2018     | February 28, 2019    |
| Spectrum Analyzer           | HP           | 8593EM | 3536A00120ADI | February 20, 2018     | February 28, 2019    |
| Antenna Biconical           | EMCO         | 3110B  | 9912-3337     | May 31, 2018          | May 31, 2019         |
| Antenna Log Periodic        | EMCO         | 3146   | 9505-4081     | May 31, 2018          | May 31, 2019         |
| Horn Antenna 1G-18G         | ETS          | 3115   | 29845         | May 31, 2018          | May 31, 2021         |
| Signal Generator            | WILTRON      | 6747B  | 278007        | February 20, 2018     | February 20, 2019    |
| Signal Generator            | HP           | 8648C  | 3623A04126    | February 19, 2018     | February 28, 2019    |
| Semi Anechoic Civil Chamber | ETS          | S81    | SL 11643      | NCR                   | NCR                  |
| Antenna Mast                | ETS          | 2070-2 | -             | NCR                   | NCR                  |
| Turntable                   | ETS          | 2087   | -             | NCR                   | NCR                  |
| Mast & Table Controller     | ETS/EMCO     | 2090   | 9608-1456     | NCR                   | NCR                  |

Figure 4 Test Equipment Used



## 5. Antenna Information/Gain

BLE Chip, 1.72 dBi max

Cellular GSM, 2.15 dBi

## 6. RF Exposure/Safety

The typical placement of the E.U.T. is on a container. The typical distance between the E.U.T. and the user is at least 20cm.

Calculation of Maximum Permissible Exposure (MPE)  
Based on Section 1.1310 Requirements

(a) FCC limits for 1.5GHz-100GHz is:  $1 \frac{mW}{cm^2}$

Using table 1 of Section 1.1310 limit for general population/uncontrolled exposures, the above level is an average over 30 minutes.

(b) The power density produced by the E.U.T. is

$$S = \frac{P_t G_t}{4\pi R^2}$$

$P_t$ - Transmitted Peak Power

$G_t$ - Antenna Gain

$R$ - Distance from Transmitter (using 20cm worst case)

### **For cellular transmitter:**

Conducted power (worst case) – 0.22W + 10% = 242mW

Antenna gain 2.15dBi = 1.64059 numeric

$$S_1 = 242 \times 1.64 / 4\pi(400) = 0.079 \text{ mw/cm}^2$$

### **For 2.4GHz transmitter:**

Conducted power (worst case) – 6.5dbm = 4.47mW

Antenna gain 1.72dBi = 1.49numeric

$$S_2 = 4.47 \times 1.49 / 4\pi(400) = 0.001 \text{ mw/cm}^2$$

### **Co-located RF exposure**

$$S_1 + S_2 = 0.079 + 0.001 = 0.08 \text{ mw/cm}^2$$

All are below the FCC/IC limit

## 7. APPENDIX A - CORRECTION FACTORS

### 7.1 Correction factor for RF CABLE for Semi Anechoic Chamber

ITL # 1841

| FREQ<br>(MHz) | LOSS<br>(dB) |
|---------------|--------------|
| 1000.0        | 1.5          |
| 2000.0        | 2.1          |
| 3000.0        | 2.7          |
| 4000.0        | 3.1          |
| 5000.0        | 3.5          |
| 6000.0        | 4.1          |
| 7000.0        | 4.6          |
| 8000.0        | 4.9          |
| 9000.0        | 5.7          |
| 10000.0       | 5.7          |
| 11000.0       | 6.1          |
| 12000.0       | 6.1          |
| 13000.0       | 6.2          |
| 14000.0       | 6.7          |
| 15000.0       | 7.4          |
| 16000.0       | 7.5          |
| 17000.0       | 7.9          |
| 18000.0       | 8.1          |
| 19000.0       | 8.8          |
| 20000.0       | 9.1          |

**NOTES:**

1. The cable is manufactured by Commscope
2. The cable type is 0623 WBC-400, serial # G020132 and 10m long

## 7.2 Correction factors for biconical antenna – ITL # 1356

**Model: EMCO 3110B**

**Serial No.: 9912-3337**

| Frequency | ITL 1356 AF |
|-----------|-------------|
| [MHz]     | [dB/m]      |
| 30        | 13.00       |
| 35        | 10.89       |
| 40        | 10.59       |
| 45        | 10.63       |
| 50        | 10.12       |
| 60        | 9.26        |
| 70        | 7.74        |
| 80        | 6.63        |
| 90        | 8.23        |
| 100       | 11.12       |
| 120       | 13.16       |
| 140       | 13.07       |
| 160       | 14.80       |
| 180       | 16.95       |
| 200       | 17.17       |



### 7.3 Correction factors for log periodic antenna – ITL # 1349

**Model: EMCO 3146**

**Serial No.: 9505-4081**

| Frequency | ITL 1349 AF |
|-----------|-------------|
| [MHz]     | [dB/m]      |
| 200       | 11.58       |
| 250       | 12.04       |
| 300       | 14.76       |
| 400       | 15.55       |
| 500       | 17.85       |
| 600       | 18.66       |
| 700       | 20.87       |
| 800       | 21.15       |
| 900       | 22.32       |
| 1000      | 24.22       |

#### 7.4 Correction factors for Horn ANTENNA

#### Double –Ridged Waveguide

Model: 3115

Serial number:29845

3 meter range; ITL # 1352

| FREQUENCY | AFE    | FREQUENCY | AFE    |
|-----------|--------|-----------|--------|
| (GHz)     | (dB/m) | (GHz)     | (dB/m) |
| 0.75      | 25     | 9.5       | 38     |
| 1.0       | 23.5   | 10.0      | 38.5   |
| 1.5       | 26.0   | 10.5      | 38.5   |
| 2.0       | 29.0   | 11.0      | 38.5   |
| 2.5       | 27.5   | 11.5      | 38.5   |
| 3.0       | 30.0   | 12.0      | 38.0   |
| 3.5       | 31.5   | 12.5      | 38.5   |
| 4.0       | 32.5   | 13.0      | 40.0   |
| 4.5       | 32.5   | 13.5      | 41.0   |
| 5.0       | 33.0   | 14.0      | 40.0   |
| 5.5       | 35.0   | 14.5      | 39.0   |
| 6.0       | 36.5   | 15.0      | 38.0   |
| 6.5       | 36.5   | 15.5      | 37.5   |
| 7.0       | 37.5   | 16.0      | 37.5   |
| 7.5       | 37.5   | 16.5      | 39.0   |
| 8.0       | 37.5   | 17.0      | 40.0   |
| 8.5       | 38.0   | 17.5      | 42.0   |
| 9.0       | 37.5   | 18.0      | 42.5   |