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**DATE: 26 May 2016**

# I.T.L. (PRODUCT TESTING) LTD.

# CE Radio Test Report

# (R&TTE Directive)

**for**

## Pointer Telocation Ltd.

### Equipment under test:

### Asset Tracking Device

**CelloTrack3G Power P/N GT9740001-000, CelloTrack3G LighterP/N GT9740005-000*;**
**CelloTrack3G IP67 P/N GT9740012-000*;**
**CelloTrack3G Power 6M P/N GT9740021-000*;CelloTrack3G 6M P/N GT9740022-000*;**
**CelloTrack3G Lighter 6M P/N GT9740023-000*;**
**CelloTrack3G XT P/N GT9740025-000*; CelloTrack3G Power XT P/N GT9740026-000***

* See customer's declaration on page 4.

Written by: _____
D. Shidlowsky, Documentation

Approved by: _____
I. Siboni, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

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# 1. General Information

## *1.1 Administrative Information*

| | |
|---|---|
| Manufacturer: | Pointer Telocation Ltd. |
| Manufacturer's Address: | 14 Hamelacha St., Rosh Ha'ayin,48091<br>Israel<br>Tel: +972-3-572-3111<br>Fax: +972-3-572-3100 |
| Manufacturer's Representative: | Itamar Gohary |
| Equipment Under Test (E.U.T): | Asset Tracking Device |
| Equipment Model No.: | CelloTrack3G Power P/N GT9740001-000,<br>CelloTrack3G Lighter P/N GT9740005-000*;<br>CelloTrack3G IP67 P/N GT9740012-000*;<br>CelloTrack3G Power 6M P/N GT9740021-000*;<br>CelloTrack3G 6M P/N GT9740022-000*;<br>CelloTrack3G Lighter 6M P/N GT9740023-000*;<br>CelloTrack3G XT P/N GT9740025-000*;<br>CelloTrack3G Power XT P/N GT9740026-000* |
| Equipment Serial No.: | Not designated |
| Date of Receipt of E.U.T: | 02.01.13 |
| Start of Test: | 02.01.13 |
| End of Test: | 03.01.13 |
| Test Laboratory Location: | I.T.L (Product Testing) Ltd.<br>1 Batsheva St.,<br>Lod<br>ISRAEL 71100 |
| Test Specifications: | See Section 2 |

* See customer's declaration on following page.

POINTER

Cellocator Division
Pointer Telocation Ltd.

**Date: 26 December 2012**

# Declaration

I hereby declare that the **CelloTrack3G Power P/N GT9740001-000** is a full configuration model. The below model's:

| *Product Name:* | *Part Number:* |
|---|---|
| CelloTrack3G Lighter | GT9740005-000 |
| CelloTrack3G IP67 | GT9740012-000 |
| CelloTrack3G Power 6M | GT9740021-000 |
| CelloTrack3G 6M | GT9740022-000 |
| CelloTrack3G XT | GT9740025-000 |
| Cellotrack3G Power XT) | GT9740026-000 |

differs from the **CelloTrack3G Power P/N GT9740001-000** only by diffrent Internal battery type\removal of battery charger components\External Harness connection. Please relate to all models (from an EMC/Radio point of view) as the same product.

**Thank you,**
**Signature:** _____

Pointer Telocation

**Itamar Gohary**
**Certification Manager**
**Pointer Telocation Ltd.**

Pointer Telocation Ltd. 14 Hamelacha St., Rosh Ha'ayin 48091, Israel • Tel: 972-3-5723111 • Fax: 972-3-5723100 • www.pointer.com

## 1.2 Abbreviations and Symbols

The following abbreviations and symbols are applicable to this test report:

| | |
|---|---|
| A/m | ampere per meter |
| AC | alternating current |
| AM | amplitude modulation |
| ARA | Antenna Research Associates |
| Aux | auxiliary |
| Avg | average |
| CDN | coupling-decoupling network |
| cm | centimeter |
| dB | decibel |
| dBm | decibel referred to one milliwatt |
| dbµV | decibel referred to one microvolt |
| dbµV/m | decibel referred to one microvolt per meter |
| DC | direct current |
| EFT/B | electrical fast transient/burst |
| EMC | electromagnetic compatibility |
| ESD | electrostatic discharge |
| E.U.T. | equipment under test |
| GHz | gigahertz |
| HP | Hewlitt Packard |
| Hz | Hertz |
| kHz | kilohertz |
| kV | kilovolt |
| LED | light emitting diode |
| LISN | line impedance stabilization network |
| m | meter |
| mHn | millihenry |
| MHz | megahertz |
| msec | millisecond |
| N/A | not applicable |
| per | period |
| QP | quasi-peak |
| PC | personal computer |
| RF | radio frequency |
| RE | radiated emission |
| sec | second |
| V | volt |
| V/m | volt per meter |
| VRMS | volts root mean square |

### *1.3 List of Accreditations*

The EMC laboratory of I.T.L. is accredited by 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.), Designation No. IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-3006, R-2729, T-1877, G-245.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No's. IC 4025A-1, 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.

# 2. Applicable Documents

| | | |
|---|---|---|
| 2.1 | **R&TTE Directive: 1999** | *DIRECTIVE 1999/5/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity* |
| 2.2 | **EN 301 908-1 V5.2.1 (2011-05)** | *IMT cellular networks; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive; Part 1: Introduction and common requirements* |

# 3. Test Site Description

## 3.1 Location:

The Electromagnetic Compatibility Test Facility of I.T.L. (Product testing) Ltd. Is located at
Telrad Industrial Park, Lod, 71100 Israel.
Telephone: +972-8-9153100
Fax: +972-8-9153101

## 3.2 Open Site:

The OATS is located on a one floor-building roof. The OATS consists of 3 meter and 10 meter ranges, using a 21.5m X 8.5m solid metal ground plane, a remote controlled turntable and an antenna mast.

## 3.3 Ground Plane:

The ground plane is made from steel plates, which are welded continuously together. The Ground plane is lies and welded on welded steel construction with vias to allow for water drainage.
All the power, control, and signal lines to the turntable and the 3 m and 10m antenna mast outlets are routed in shielded conduits under the plane to the control building.

## 3.4 Antenna Mast:

ETS model 2070-2. The antenna position and polarization are remote controlled via Fiber Optical Link using ETS/EMCO Dual Controller Type 2090. The antenna position is adjustable between 1-4 meters. Pressurized air is used to power changing the polarity of the antenna.

## 3.5 Turntable:

ETS model 2087 series. The position of the turntable is remote-controlled via Fiber Optic Link, using ETS/EMCO Dual Controller Type 2090. The turntable is mounted in a pit and its surface is flush with the Open Site Ground Plane. Brushes near the periphery of the turntable ensure good conductive connection to the ground plane. The Turntable maximum load is 1250 Kg.

## 3.6 EMI Receiver:

Type 1066.301, manufactured by Rhode & Schwarz, being in full compliance with CISPR 16 requirements.

## 3.7 E.U.T. Support:

Table mounted E.U.T.s are supported during testing on 80 cm high all-wooden tables (no metal nails or screws).

## 3.8 Test Equipment:

See details in Section 6.

4.

# 5. Summary of Test Results

| Test | Results |
|---|---|
| **Spurious Emissions**<br>EN 301 908-1 V5.2.1 (2011)<br>Sections 4.2.2.2, 5.3.1 | The E.U.T met the performance requirements of the specification.<br><br>The margin between the spurious emission level and the specification limit is 7.97 dB in the worst case at the frequency of 3465.70 MHz, horizontal polarization. |

# 6. Equipment Under Test (E.U.T.) Description

The CelloTrack family is comprised of a small, standalone tracking device intended for mobile assets and assets having limited access to power or without a power supply at all.

The capabilities provided by the CelloTrack family can greatly reduce an enterprise's financial losses incurred as a result of the often difficult task of successfully tracking equipment such as trailers, containers and trains.

CelloTrack supports tracking, communication, GPS location-based features and maintenance capabilities similar to the compact family and supports also the following additional features:

- Durability and long life, making it ideal for tracking trailers, trains, containers, high-value assets, and more.
- Stand-alone tracking device. May be installed without a power supply.
- An internal long-life 13.6 AHr rechargeable Li-Polymer battery providing up to three years of autonomous operation without recharging (subject to the rate of transmission).
- Advanced power management algorithms preserving battery power and extending battery life period.
- Highly durable IP67 weatherproof casing that houses all components – battery, GSM module and GPS module.
- A 3D accelerometer that detects movement of assets and enables different transmission rates for a moving asset and a standing asset.
- A programmable (ON/OFF/Test/Panic) push button, charging and communication capabilities, a tamper switch to detect tampering and two monitoring LEDs.
- Almost instant assembly and removal.
- Minimal maintenance.

The CelloTrack family includes the following units:

- CelloTrack (regular).
- CelloTrack Power.
- CelloTrack Lighter.
- CelloTrack IP67 6M.
- CelloTrack Power 6M.
- CelloTrack Lighter 6M.
- CelloTrack XT.
- CelloTrack XT Power.

# 7. List of Test Equipment

## *7.1 Emission Tests*

The equipment indicated below by an "X" was used for testing Spurious Radiated Emissions, EN 301 908-1 V5.2.1: 2011, Section 5.3.1.

Test equipment calibration is in accordance with ITL Q.A. Procedure PM 110 "Calibration Control Procedure", which complies with ISO/IEC Guide 17025.

| Instrument | Manufacturer | Model | Serial No. | Used in Test |
|---|---|---|---|---|
| Dipole Antenna Set | CDI | A100 | 597 | X |
| Spectrum Analyzer | HP | 8592L | 3826A01204 | X |
| Spectrum Analyzer | HP | 8591E | 3414U01226 | X |
| Receiver | Rohde & Schwarz | 1066.301 | 100120 | X |
| Biconilog Antenna | EMCO | 3142B | 1250 | X |
| Horn Antenna | ETS | 3115 | 6142 | X |
| Antenna Mast | ETS | 2070-2 | 9608-1497 | X |
| Turntable | ETS | 2087 | - | X |
| Mast & Table Controller | ETS/EMCO | 2090 | 9608-1456 | X |

# 8. Mode of Operation

The E.U.T. was operated, transmitting to, and receiving information from the operator, through the GSM module. The operator sent and received the information via the auxiliary laptop.

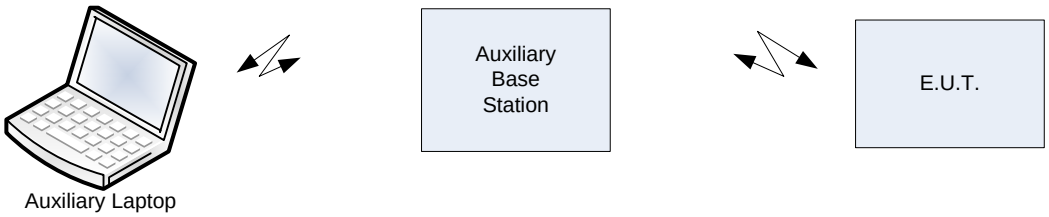


**Figure 1. Test Set-up**

# 9. Radiated Emissions

## 9.1 Test Specification

EN 301 908-1 V5.2.1: 2011, Clause 4.2.2, 5.3.1

## 9.2 Test Procedure

The test was performed in the frequency bands EGSM 900 and DCS 1800

The E.U.T. was operated as described in Section 7.

A preliminary measurement to identify spurious emissions except for the fundamental and harmonics was performed inside the shielded room. The E.U.T. was tested transmitting and receiving through a passive repeater in two bands EGSM900 and DCS1800. None of the spurious emissions detected were generated by the non-radio part of the unit. The E.U.T. was then transferred to the OATS.

Scanning the frequency range of 30 MHz to 4 GHz was performed. The spurious signals were recorded.

The EMI receiver was operated with 120 kHz resolution bandwidth and 300kHz video bandwidth.

The E.U.T. was replaced by the substitution antenna and a signal generator.

The signal generator was adjusted to the same level at the substitution antenna as the level measured with the E.U.T. This level was recorded.

The above tests were performed in both horizontal and vertical polarizations.

The maximum signal generator levels were recorded as the test results.

## 9.3 Test Results

The E.U.T met the requirements of EN 301 908-1 V5.2.1: 2011, Clause 4.2.2, 5.3.1.

The margin between the spurious emission level and the specification limit is 7.97 dB in the worst case at the frequency of 3465.70 MHz, horizontal polarization.

# Radiated Emissions

| | |
|---|---|
| E.U.T Description | Asset Tracking Device |
| Type | CelloTrack3G Power P/N GT9740001-000 |
| Serial Number: | Not designated |

Specification: EN 301 908-1 V5.2.1: 2011, Clause 4.2.2, 5.3.1

| Frequency | E | Antenna Pol. | Power Output Generator | Cable Loss | Antenna Gain | EIRP | Spec. | Margin |
|---|---|---|---|---|---|---|---|---|
| (MHz) | (dBµV/m) | (H/V) | (dBm) | (dB) | (dBi) | (dBm) | (dBm) | (dB) |
| 3465.70 | 41.1 | H | -56.72 | 10.2 | 9.8 | -54.97 | -47.0 | -7.97 |
| 3465.70 | 41.0 | V | -56.42 | 10.2 | 8.7 | -55.77 | -47.0 | -8.77 |

**Figure 2. Spurious Emissions Horizontal/Vertical Polarity**

*Note:*

*Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.*

# 10. Set Up Photograph

**Figure 3 Spurious Emission Test**

# 11. Signatures of the E.U.T's Test Engineers

| Test | Test Engineer Name | Signature |
|---|---|---|
| Spurious Emission | I. Siboni |  |

# 12. APPENDIX A - CORRECTION FACTORS

## *12.1 Correction factors for CABLE*

**from EMI receiver to test antenna at 3 meter range.**

| FRQ | S.G. | REF | A AMP | |
|---|---|---|---|---|
| 10K | -30 | -29.8 | -30.2 | 0.4 |
| 15K | -30 | -29.5 | -29.7 | 0.2 |
| 20K | -30 | -29.7 | -29.9 | 0.2 |
| 30K | -30 | -29.6 | -29.9 | 0.3 |
| 50K | -30 | -29.7 | -30.0 | 0.3 |
| 75K | -30 | -29.7 | -30.0 | 0.3 |
| 100K | -30 | -29.8 | -30.0 | 0.2 |
| 150K | -30 | -29.8 | -30.0 | 0.2 |
| 200K | -30 | -29.9 | -30.2 | 0.3 |
| 500K | -30 | -29.9 | -30.3 | 0.4 |
| 1M | -30 | -30.1 | -30.5 | 0.4 |
| 1.5M | -30 | -30.1 | -30.6 | 0.5 |
| 2M | -30 | -30.2 | -30.7 | 0.5 |
| 5M | -30 | -30.3 | -30.9 | 0.6 |
| 10M | -30 | -30.2 | -31.0 | 0.8 |
| 15M | -30 | -30.2 | -31.1 | 0.9 |
| 20M | -30 | -30.5 | -31.3 | 0.8 |

| FRQ | S.G. | REF | A | |
|---|---|---|---|---|
| | | | AMP | |
| 50M | -30 | -30.5 | -31.7 | 1.2 |
| 100M | -30 | -30.5 | -32.2 | 0.7 |
| 150M | -30 | -30.4 | -32.5 | 2.1 |
| 200M | -30 | -30.5 | -32.8 | 2.3 |
| 300M | -30 | -30.4 | -33.3 | 2.9 |
| 500M | -30 | -30.5 | -34.3 | 3.8 |
| 750M | -30 | -30.7 | -35.3 | 4.8 |
| 1G | -30 | -30.9 | -36.3 | 5.4 |
| 1.5G | -15 | -15.7 | -22.4 | 6.7 |
| 2G | -15 | -15.9 | -24.9 | 9.0 |
| 2.5G | -15 | -16.3 | -25.7 | 9.4 |
| 3G | -15 | -16.5 | -26.4 | 9.9 |
| 3.5G | -15 | -16.7 | -26.9 | 10.2 |
| 4G | -15 | -16.3 | -27.5 | 11.2 |
| 4.5G | -15 | -16.6 | -28.7 | 12.1 |
| 5G | -15 | -16.8 | -29.9 | 13.1 |
| 5.5G | -15 | -17.6 | -31.1 | 13.5 |
| 6G | -15 | -17.2 | -31.7 | 14.5 |

*NOTES:*

*1. The cable type is SPUMA400 RF-11N(X2)and 39m long*

*2. The cable is manufactured by Huber + Suhner*

## *12.2 Correction factors for Bilog ANTENNA*

**Model: 3142**
***Antenna serial number: 1250***
**3 meter range**

| FREQUENCY (MHz) | AFE (dB/m) | FREQUENCY (MHz) | AFE (dB/m) |
|---|---|---|---|
| 30 | 18.4 | 1100 | 25 |
| 40 | 13.7 | 1200 | 24.9 |
| 50 | 9.9 | 1300 | 26 |
| 60 | 8.1 | 1400 | 26.1 |
| 70 | 7.4 | 1500 | 27.1 |
| 80 | 7.2 | 1600 | 27.2 |
| 90 | 7.5 | 1700 | 28.3 |
| 100 | 8.5 | 1800 | 28.1 |
| 120 | 7.8 | 1900 | 28.5 |
| 140 | 8.5 | 2000 | 28.9 |
| 160 | 10.8 | | |
| 180 | 10.4 | | |
| 200 | 10.5 | | |
| 250 | 12.7 | | |
| 300 | 14.3 | | |
| 400 | 17 | | |
| 500 | 18.6 | | |
| 600 | 19.6 | | |
| 700 | 21.1 | | |
| 800 | 21.4 | | |
| 900 | 23.5 | | |
| 1000 | 24.3 | | |

### *12.3 Correction factors for Horn ANTENNA*

**Model: 3115**
***Antenna serial number: 6142***
**3 meter range**

| FREQUENCY (MHz) | Antenna Factor (dB/m) | FREQUENCY (MHz) | Antenna Factor (dB/m) |
|---|---|---|---|
| 1000 | 23.9 | 10500 | 38.4 |
| 1500 | 25.4 | 11000 | 38.5 |
| 2000 | 27.3 | 11500 | 39.4 |
| 2500 | 28.5 | 12000 | 39.2 |
| 3000 | 30.4 | 12500 | 39.4 |
| 3500 | 31.6 | 13000 | 40.7 |
| 4000 | 33 | 14000 | 42.1 |
| 4500 | 32.7 | 15000 | 40.1 |
| 5000 | 34.1 | 16000 | 38.2 |
| 5500 | 34.5 | 17000 | 41.7 |
| 6000 | 34.9 | 17500 | 45.7 |
| 6500 | 35.1 | 18000 | 47.7 |
| 7000 | 35.9 | | |
| 7500 | 37.5 | | |
| 8000 | 37.6 | | |
| 8500 | 38.3 | | |
| 9000 | 38.5 | | |
| 9500 | 38.1 | | |
| 10000 | 38.6 | | |