DATE: 08 March 2015

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

Test Report According to 300 440-1 V1.6.1 (2010) 300 440-2 V1.4.1 (2010)

for

Pointer Telocation Ltd.

Equipment under test:

Asset Tracking Device

CelloTrack Power 3Y P/N GT976001-000, CelloTrack 3Y P/N GT9760012-000*; CelloTrack XT P/N GT9760025-000*; CelloTrack 8M P/N GT9760022-000*; CelloTrack Power XT P/N GT9760026-000*; CelloTrack Power 8M P/N GT9760021-000*

*See customer's Declaration on page 5

Tested by: _____
I. Siboni

Approved by: _____
D. Shidlowsky

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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 Israel Tel: +972-3-572-3111 Fax: +972-3-572-3100
Manufacturer's Representative:	Itamar Gohary
Equipment Under Test (E.U.T):	Asset Tracking Device
Equipment Model No.:	CelloTrack Power 3Y P/N GT976001-000; CelloTrack 3Y P/N GT9760012-000*; CelloTrack XT P/N GT9760025-000*; CelloTrack 8M P/N GT9760022-000*; CelloTrack Power XT P/N GT9760026-000*; CelloTrack Power 8M P/N GT9760021-000*
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	05.03.2015
Start of Test:	05.03.2015
End of Test:	05.03.2015
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod ISRAEL 7120101
Test Specifications:	See Section 2

* See customer's Declaration on following page.

POINTER

Cellocator Division
Pointer Telocation Ltd.

Date: 24 July 2014

Declaration

I hereby declare that the **CelloTrack Power 3Y GT9760001-000** is a full configuration model. The below model's:

Product Name:	*Part Number:*
GT9760012-000	CelloTrack 3Y
GT9760025-000	CelloTrack XT
GT9760022-000	CelloTrack 8M
GT9760026-000	CelloTrack Power XT
GT9760021-000	CelloTrack Power 8M

differs from the **CelloTrack Power 3Y GT9760001-000** 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 Ltd.

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	Hewlett 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.), FCC Designation Number US1004.
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-1350, R-1285.
5. Industry Canada (Canada), IC File No.: 46405-4025; Site No. IC 4025A-1.

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 300 440-2 V1.4.1 (2010-08)**	*Electromagnetic compatibility and Radio spectrum Matters (ERM); Short range devices; Radio equipment to be used in the 1 GHz to 40 GHz frequency range; Part 2: Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive*
2.3	**EN 300 440-1 V1.6.1 (2010-08)**	*Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive*

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, 7120101 Israel.

Telephone: +972-8-9153100

Fax: +972-8-9153101

3.2 Shielded Room

A Modular Shielded Room, Type 20 SpaceSaver, manufactured by ETS, consisting of a Main Room and a Control Room.

The dimensions of the Main Room are: length: 7.0 m, width: 3.0 m, height: 3.0 m.

The shielding performance is:

magnetic field: 60 dB at 10 kHz rising linearly to 100 dB at 100 kHz,

electric field: better than 110 dB between 50 MHz and 1 GHz,

plane wave: 110 dB between 50 MHz and 1 GHz.

All the power lines entering the shielded room are filtered.

3.3 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.

3.4 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.

3.5 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.

3.6 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.

3.7 EMI Receiver:

Type ESIB7, manufactured by Rohde & Schwarz, being in full compliance with CISPR 16 requirements.

3.8 E.U.T. Support:

Table mounted E.U.T.s are supported during testing on 80 cm high all plastic table.

3.9 Test Equipment:

See details in Section 6.

4. Summary of Test Results

Test	Results
Receiver Spurious Emission EN 300 440-2 V1.4.1: 2010 Section 5.4.3 EN 300 440-1 V1.6.1:2010 Section 8.3	The E.U.T met the performance requirements of the specification.

5. 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 3Y;
CelloTrack XT;
CelloTrack 8M;
CelloTrack Power 3Y;
CelloTrack Power XT;
CelloTrack Power 8M.

6. List of Test Equipment

6.1 Radio Tests

The equipment indicated below by an "X" was used for testing according to EN 300 440-1 V1.6.1:2010, Section 8.3

Test equipment calibration is in accordance with ITL Q.A. Procedure PM 110 "Calibration Control Procedure", which complies with ISO 9002 and ISO/IEC Guide 17025.

Instrument	Manufacturer	Model	Serial No.
Horn Antenna	ETS	3115	6142
Horn Antenna	ARA	SWH-28	1007
Spectrum Analyzer	HP	8592L	3826A01204
Biconilog Antenna	EMCO	3142B	1078
Receiver	R&S	ESIB7	100120
Low Noise Amplifier	DBS MICROWAVE	LNA-DBS-0411N313	013
Low Noise Amplifier	Sophia Wireless	LNA 28-B	232
Antenna Mast	ETS	2070-2	9608-1497
Turntable	ETS	2087	-
Mast & Table Controller	ETS/EMCO	2090	9608-1456

7. E.U.T. Mode of Operation

The GPS was operating in receiver mode.

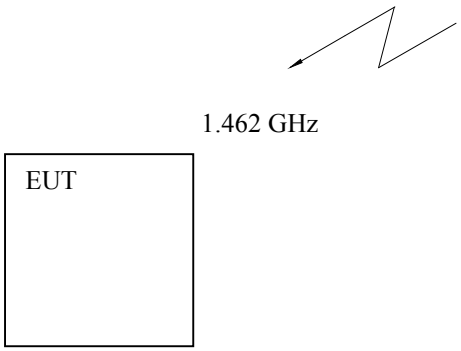


Figure 1. Test Setup

8. Receiver Spurious Emissions

8.1 Test Specification

EN 300 440-2 V1.4.1: 2010, Section 5.4.3
EN 300 440-1 V1.6.1: 2010, Section 8.3

8.2 Test Procedure

The test was performed in the frequency band 30MHz –15GHz.

The E.U.T. was placed on a non-conductive support, 1.5m above the ground plane.

At each emission frequency, the E.U.T. was rotated 360° in the horizontal plane until the maximum, level was measured and the height of the test antenna was also adjusted for maximum level.

The E.U.T. was replaced by a substitution antenna (*). The substitution antenna was driven by a signal generator operating in C.W. Mode. The height of the test antenna was adjusted for maximum level.

The EMI receiver was operated with 100 kHz resolution bandwidth and 300 kHz video bandwidth below 1GHz, and 1MHz above 1GHz.

The input signal of the substitution antenna was adjusted to the level that produced a receiver reading equal to the level noted while the spurious emissions of the E.U.T. were measured.

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

The transmitter was set to the lowest operating frequency and to the highest operating frequency. These settings also apply to standby mode where applicable.

The spurious emission was calculated as follows:

Signal Generator Level (dBm) – Cable Loss (dB) + Substitution Antenna

Gain (dB).

The test set-up utilized for this specification is shown in the photograph, Figure 22 Spurious Emission (Transmitter) Test.

* A dipole antenna was used for frequencies up to 1 GHz and a horn antenna was used for frequencies above 1 GHz.

8.3 Test Results

The E.U.T met the requirements of EN 300 440-2 V1.4.1: 2010, Section 5.4.3 and EN 300 440-1 V1.6.1: 2010, Section 8.3.

Additional information of the results is given in *Figure 2*.

Receiver Spurious Emissions (Radiated)

E.U.T Description	Asset Tracking Device
Type	CelloTrack Power 3Y P/N GT976001-000
Serial Number:	Not designated

Specification: EN 300 440-2 V1.4.1: 2010, Section 5.4.3;
EN 300 440-1 V1.6.1: 2010, Section 8.3

Antenna Distance: 3 meters Operating Frequency: Center

Frequency (MHz)	E (dBµV/m)	Antenna Pol. (H/V)	Power Output Generator (dBm)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Spec. (dBm)	Margin (dB)
36.4	27.7	V	-67.61	0.7	1.35	-64.81	-57.0	-7.81
38.5	29.7	V	-65.61	0.7	1.35	-62.81	-57.0	-5.81
40.5	30.1	V	-65.79	0.8	1.69	-62.75	-57.0	-5.75
36.4	28.3	H	-67.01	0.7	1.35	-64.21	-57.0	-7.21
38.5	27.1	H	-68.21	0.7	1.35	-65.41	-57.0	-8.41
40.5	31.6	H	-64.29	0.8	1.69	-61.25	-57.0	-4.25

Figure 2. Receiver Spurious Emissions

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.

9. Set Up Photographs

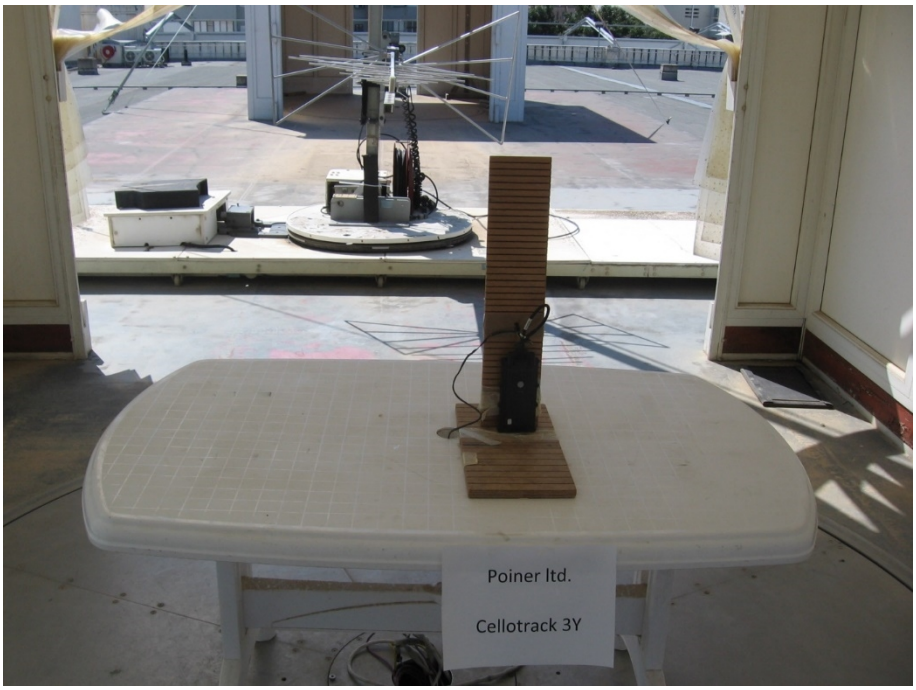
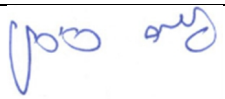


Figure 3 Spurious Emission (Rx) Test

10. Signatures of the E.U.T's Test Engineers

Test	Test Engineer Name	Signature	Date
Receiver Spurious Emission	I. Siboni		11.03.15

11. APPENDIX A - CORRECTION FACTORS

11.1 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.3
20.0	0.6
30.0	0.8
40.0	0.9
50.0	1.1
60.0	1.2
70.0	1.3
80.0	1.4
90.0	1.6
100.0	1.7
150.0	2.0
200.0	2.3
250.0	2.7
300.0	3.1
350.0	3.4
400.0	3.7
450.0	4.0
500.0	4.3
600.0	4.7
700.0	5.3
800.0	5.9
900.0	6.3
1000.0	6.7

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	7.3
1400.0	7.8
1600.0	8.4
1800.0	9.1
2000.0	9.9
2300.0	11.2
2600.0	12.2
2900.0	13.0

NOTES:

1. *The cable type is RG-214.*
2. *The overall length of the cable is 27 meters.*
3. *The above data is located in file 27MO3MO.CBL on the disk marked "Radiated Emission Tests EMI Receiver".*

11.2 Correction factors for CABLE

from EMI receiver to test antenna at 3 meter range.

FREQUENCY (GHz)	CORRECTION FACTOR (dB)
1.0	1.2
2.0	1.6
3.0	2.0
4.0	2.4
5.0	3.0
6.0	3.4
7.0	3.8
8.0	4.2
9.0	4.6
10.0	5.0
12.0	5.8

NOTES:

1. The cable type is RG-8.

2. The overall length of the cable is 10 meters.

11.3 Correction factors for CABLE

from EMI receiver to test antenna

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
10.0	0.2
20.0	0.2
30.0	0.2
40.0	0.2
50.0	0.3
60.0	0.4
70.0	0.4
80.0	0.4
90.0	0.5
100.0	0.5
150.0	0.6
200.0	0.6
250.0	0.7
300.0	0.8
350.0	0.9
400.0	1.0
450.0	1.1
500.0	1.2
600.0	1.3
700.0	1.4
800.0	1.4
900.0	1.5
1000.0	1.5

FREQUENCY (MHz)	CORRECTION FACTOR (dB)
1200.0	1.6
1400.0	1.8
1600.0	2.1
1800.0	2.2
2000.0	2.3
2300.0	2.8
2600.0	2.7
2900.0	3.1

NOTES:

1. The cable type is RG-214.

2. The overall length of the cable is 5.5 meters.

11.4 Correction Factors for Double-Ridged Waveguide Horn

Model: 3115
at 1 meter range.

FREQUENCY (GHz)	ANTENNA FACTOR (dB 1/m)
1.0	25.0
2.0	28.0
3.0	29.0
4.0	33.0
5.0	34.0
6.0	34.9
7.0	36.0
8.0	37.0
9.0	38.0
10.0	39.5
11.0	39.0
12.0	39.5
13.0	40.0
14.0	42.0
15.0	39.8
16.0	38.5
17.0	41.0
18.0	46.5

FREQUENCY (GHz)	ANTENNA Gain (dB)
1.0	5.5
2.0	8.5
3.0	9.0
4.0	9.5
5.0	10.0
6.0	11.0
7.0	10.5
8.0	11.0
9.0	11.5
10.0	12.0
11.0	12.5
12.0	13.0
13.0	12.5
14.0	12.0
15.0	14.0
16.0	15.9
17.0	14.0
18.0	8.5

12. APPENDIX B - MEASUREMENT UNCERTAINTY

Occupied Channel Bandwidth	**7.7*10.$^{-8}$ up to 2.9 GHz and 1.2*10.-7 from 2.9GHz to 12.75GHz.**
RF output power, conducted	**± 25.53% or ±0.99dB, Up to 2.9GHz and ± 26.91% or ±1.03dB from 2.9GHz to 12.75GH**
Power Spectral Density, conducted	**± 25.53% or ±0.99dB, Up to 2.9GHz and ± 26.91% or ±1.03dB from 2.9GHz to 12.75GH**
Unwanted Emissions, conducted	**± 25.53% or ±0.99dB, Up to 2.9GHz and ± 26.91% or ±1.03dB from 2.9GHz to 12.75GH**
All emissions, radiated	**±4.58dB Up to 2.9GHz, and ±2.92dB from 2.9GHz to 12.75GHz**
Duty Cycle	**± 25.53% or ±0.99dB, Up to 2.9GHz and ± 26.91% or ±1.03dB from 2.9GHz to 12.75GH**