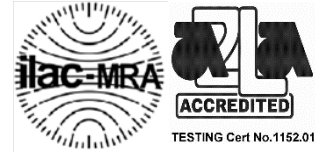




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**DATE: 24 August 2021**

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

**Test Report According to**

**EN 301 489-1;  
Draft EN 301 489-52**

for

**Pointer Telocation Inc.**

**Equipment under test:**

**Cellocator**

**CR400B LTE**

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

  
M. Zohar

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

  
D. Shidlow

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# 1. General Information

## 1.1 Administrative Information

Manufacturer:	Pointer Telocation Inc.
Manufacturer's Address:	Hamelacha 14, Rosh Ha'ain Israel Tel: +972-3-572 3111 Fax: +972-3-571 9698
Manufacturer's Representative:	Refael Yakobov
Equipment Under Test (E.U.T):	Cellocator
Equipment Model No.:	CR400B LTE
Equipment Serial No.:	1797227
Date of Receipt of E.U.T:	April 4, 2021
Start of Test:	April 4, 2021
End of Test:	April 4, 2021
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod 7120101 ISRAEL
Test Specifications:	EN 301 489-1 V2.2.3: 2019, Draft EN 301 489-52 V1.1.0 (2016-11)

Note: Both conducted emissions and conducted RF immunity tests were not performed as the DC power cable is <3m long.



## 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
AMN	Artificial Mains Network
ARA	Antenna Research Associates
Aux	auxiliary
Avg	average
CDN	coupling-decoupling network
cm	centimeter
dB	decibel
dBm	decibel referred to one milliwatt
dB $\mu$ V	decibel referred to one microvolt
dB $\mu$ V/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.), Designation No. IL1005.
3. The Israel Ministry of Environmental Protection, Registration No. 1104/01.
4. Innovation, Science and Economic Development (ISED) Canada; CAB Identifier: IL1002; ISED File# 4025A.
5. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-20025, T-20028, R-12729, G-20068.

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 Standards

- 2.1 **EN 301 489-1 V2.2.3: 2019** *Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised Standard for Electromagnetic Compatibility*
- 2.2 **Draft EN 301 489-52 V2.1.1: 2019** *Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for Cellular Communication Mobile and portable (UE) radio and ancillary equipment; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU*
- 2.7 **EN 61000-4-3: 2006 + Amendments A1: 2008; A2: 2010** *Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques; Section 3: Radiated, radio frequency, electromagnetic field immunity test.*

## 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 8542E, manufactured by HP, being in full compliance with CISPR 16-1-1 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
<b>Radiated Immunity</b> EN 61000-4-3: 2006 + Amendments A1: 2008; A2: 2010 (80-6000 MHz) 3 V/m, 80% A.M. by 1kHz	Passed

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

The Cellocator CR-400 is a next-generation fleet and security management device, and is based on the LTE Cat M1 network with 2G fallback.

The CR-400 is a high quality, yet cost-effective and easy to install device, with built-in BLE connectivity and LED indicators. It is equipped with a large rechargeable backup battery (1000mAh) and includes basic driver behavior capabilities and built-in motion sensors, that enable movement and towing detection to ensure improved compliance with vehicle security requirements.



Figure 1. The E.U.T

### EUT and Support Equipment Used During Tests

Use*	Product Type	Manufacturer	Model	Comments
EUT	Fleet and security management device	Pointer Telocation ltd	CR400B LTE	
AE	Cellular Base station	R&S	CMW500	
<b>Note*: Use abbreviations:</b> EUT - Equipment Under Test AE - Auxiliary/Associated Equipment				



**Description of Interface Cables for Testing:**

Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
711-00412/D	no	1.2	no		

**Input/ Output Ports:**

Port No.	Name	Type*	Cable Max. >3m	Cable Shielded	Comments
0	Enclosure	N/E	-	-	none
1	Mains	DC	-	-	

Supplementary information:

\*Note: DC = DC Power Port N/E = Non-Electrical

**EUT Internal Operating Frequencies (Clock):**

Frequency (MHz)	Description
16 XTAL	TCXO crystal
1800	4G cellular transmission

**Power Interface**

Mode No.	Voltage (VDC)	Current (A)	Power (W)	Frequency (DC/AC-Hz)	Phases (No.)	Comments
Rated	9-32	0.37				
1	12.0					

Supplementary information:



## 6. List of Test Equipment

### 6.1 Immunity Tests

Equipment indicated below by an "X" was used in the following IEC 61000-4 tests: -3.

Test equipment calibration is in accordance with I.T.L.'s Q.A. Procedure PM 110, "Calibration Control Procedure", which complies with ISO/IEC Guide 17025.

Instrument	Manuf.	Model	Serial No.	Used in Test
				IEC 61000-4: -3
Isotropic Field Probe	AR	FP-2000	19419	X
Isotropic Field Monitor	AR	FM-2000	19719	X
Biconilog Antenna	EMCO	3142B	1078	X
Horn Antenna	EMCO	3115	29845	X
RF Amplifier	AR	100W1000M1	19842	X
RF Amplifier	Microwave Power Equipment Inc.	PA-47-0-800/6000	0002	X
Signal Generator	HP	8657A	3430U2142	X
Signal Generator	HP	8648C	3623A04126	X

## 7. E.U.T. Performance Verification

### 7.1 Mode of Operation

The unit is configured to transmit in high-Power TX continuously, in front of CMW500 Base station.

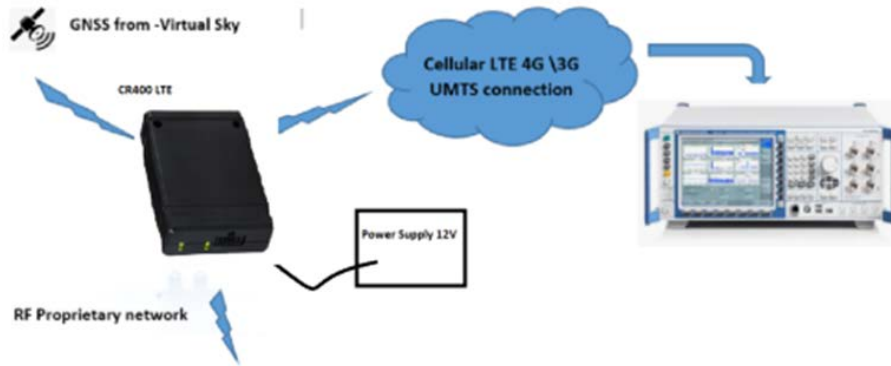


Figure 2. Test Set-up

### 7.2 Monitoring of E.U.T.

Using CMW500 base station to monitor transmission.

### 7.3 Definition of Failure

No connection to base station

## 8. Immunity to Radiated Field

### 8.1 Test Specification

EN 61000-4-3: 2006 + Amendments A1: 2008; A2: 2010

### 8.2 Test Procedure

The E.U.T. was subjected to a field of 3V/m, amplitude modulated 80% by a 1kHz sinusoidal signal.

The Radiated Field was applied in vertical and horizontal polarization using Biconilog Periodical antenna in the frequency range of 80-1000 and horn antennas in the frequency range of 1000 – 6000 MHz.

The Radiated Field was calibrated and tested for uniformity in accordance with Section 6.2 of IEC 61000-4-3.

The calibration values for the driver signal generator were based on the data given in I.T.L. "Radiated Immunity Calibration Test Report" No. PM-112R-IMM.

The frequency was swept using discrete increments having a value less than 1% of the fundamental frequency.

The performance of the E.U.T. was verified during the test as described in Section 7.

The test setup is illustrated in the photographs, Figure 4. Immunity to Radiated Field Test Below 1 GHz to Figure 5. Immunity to Radiated Field Test Above 1 GHz.

#### **Note: Opinion and Interpretation:**

The most sensitive surface of the E.U.T. was fully tested.

The most sensitive E.U.T. surface was determined as follows:

A preliminary radiated emission test in the frequency range

80-1000 MHz was performed inside the semi-anechoic chamber using an E-field probe and spectrum analyzer. The surface having the maximum radiation level was selected as the most sensitive surface.

### 8.3 Test Results

The E.U.T. passed the Radiated Immunity Tests as required by specifications:

EN 61000-4-3: 2006 + Amendments A1: 2008; A2: 2010.

For additional information see Figure 3.



## Radiated Immunity

E.U.T Description    Cellocator  
Type                    CR400B LTE  
Serial Number:        1797227

Specification: EN 61000-4-3: 2006 + A1: 2008, A2: 2010, 80-6000 MHz Amplitude Modulation: 80% AM by 1 kHz				
Frequency (MHz)		Antenna Polarity	Specification (V/m)	PASS / FAIL
<u>From</u>	<u>To</u>			
80	6000	Horizontal	3.0	Pass
80	6000	Vertical	3.0	Pass

**Figure 3. Immunity to Radiated Field**

## 9. Set Up Photographs



Figure 4. Immunity to Radiated Field Test Below 1 GHz



Figure 5. Immunity to Radiated Field Test Above 1 GHz





## 10. APPENDIX B - MEASUREMENT UNCERTAINTY

<b>Test Method</b>	<b>Expanded Uncertainty (95% Confidence K=2)</b>
Radiated Immunity (EN/IEC 61000-4-3)	± 2.2 dB