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DATE: 1 December 2020

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

Test Report According to EN 301 908-1 V13.1.1 (2019) EN 301 908-13 V13.1.1 (2019)

for

Pointer Telocation

Equipment under test:

Asset Tracking Device

Cellotrack Power LTE EU

Tested by: _____
M. Zohar

Approved by: _____
D. Shidlowsky

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1. General Information

1.1 Administrative Information

Manufacturer:	Pointer Telocation
Manufacturer's Address:	14 Hamelacha, PO Box 11473 Roash Haain, Israel Tel: +972 73 2622320
Manufacturer's Representative:	Igor Rogov
Equipment Under Test (E.U.T):	Asset Tracking Device
Equipment Model No.:	Cellotrack Power LTE EU
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	November 08, 2020
Start of Test:	November 08, 2020
End of Test:	November 08, 2020
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod, 7120101 Israel
Test Specifications:	EN 301 908-1 V13.1.1 (2019) EN 301 908-13 V13.1.1 (2019) (See *Note below)

Note:

1. The E.U.T. contains a CE approved 4G wireless module manufactured by Gemalto/Cinterion, model no. ELS61-ER2. (See Declaration of Conformity on following page).
2. Accordingly, as agreed upon with the customer, only spurious emissions testing was performed.

DECLARATION OF CONFORMITY

We, Gemalto M2M GmbH
Werinherstr. 81
81541 Munich
Germany

Declare under our sole responsibility that the Cinterion Wireless Module:

Model	SW	HW
ELS61-E R2	02.000	B2.3

to which this declaration relates, are in conformity with the following standards and/or other normative documents, by specific reference to the essential requirements of Radio Equipment Directive 2014/53/EU:

Health and Safety:	**EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013** **EN 62311:2008**
EMC:	**draft EN 301 489-1:v2.2.0; draft EN 301 489-52:v1.1.0**
RF spectrum efficiency:	**EN 301 511:v12.5.1; EN 301 908-1:v11.1.1;** **EN 301 908-2:v11.1.2; EN 301 908-13:v11.1.2**

We herby declare that all essential radio test suites have been carried out and that the above named products are in conformity to all the essential requirements of Radio Equipment Directive 2014/53/EU.

Follow notified body assessment has been applied:

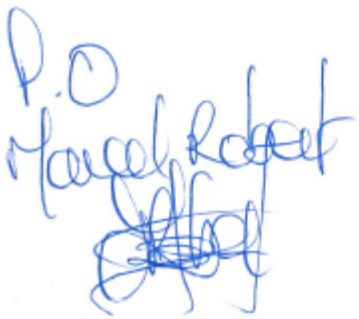
American Certification Body, Inc. (ACB)
Notified body number: 1588
Suite C110, McLean, VA 22101, USAI
EU Type Examination Certificate: ATCB022025

The technical documentation relevant to the above equipment will be held at:

Gemalto M2M GmbH
Portfolio Development
Siemensdamm 50
13629 Berlin
Germany

Stephanie Reimert
Head of Portfolio Development

Berlin, 12 December 2017



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
CBW	channel bandwidth
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.), FCC Designation Number IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. Department of Innovation, Science and Economic Development (ISED) Canada, CAB identifier: IL1002

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	**EN 301 908-1 V13.1.1 (2019)**	*IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 1: Introduction and common requirements*
2.2	**EN 301 908-13 V13.1.1 (2019)**	*IMT cellular networks; Harmonised Standard for access to radio spectrum; Part 13: Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE)*

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 ESCI7, manufactured by Rohde & Schwarz, 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 150 cm high all plastic table.

3.9 Test Equipment

See details in Section 6.

4. Summary of Test Results

Test	Results
Radiated Emissions (UE) EN 301 908-1 V13.1.1 (2019) Sections 4.2.2, 5.3.1	The E.U.T met the performance requirements of the specification. **Traffic Mode**: The margin between the spurious emission level and the specification limit is 9.0 dB in the worst case at the frequency of 1450.0MHz, vertical polarization **Idle Mode**: No emissions were detected above the spectrum analyzer noise level which is at least 6dB margin below the limit.

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

The CelloTrack product line is designed for advanced asset tracking and remote monitoring, featuring enhanced functionality with full fleet management capabilities, robustness and ease of installation, suitable for a wide variety of asset management applications.

The CelloTrack product line is available in two variants – a standalone version and a power version, which includes extended battery life and the ability to connect external sensors via two configurable GPIOs. Models are suitable for 2G, 3G and 4G (LTE) cellular communication technologies.

6. List of Test Equipment

6.1 Emission Tests

The equipment listed below were used for testing Spurious Radiated Emissions, EN 301 908-1 V13.1.1 (2019), Sections 4.2.2, 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.
EMI Receiver	R&S	ESCI7	100724
Spectrum Analyzer	HP	8564E	3442A00275
EMI Receiver	HP	8542E	3906A00276
RF Filter Section	HP	85420E	3705A00248
EMI Test Receiver	R&S	ESN	835420/008
Spectrum Analyzer	HP	8593EM	3536A00120ADI
Biconical Antenna	EMCO	3110B	9912-3337
Log Periodic Antenna	EMCO	3146	9505-4081
1G-18GHz Horn Antenna	ETS	3115	29845
Low Noise Amplifier	Narda	DBS-0411N313	13
Low Noise Amplifier	Sophia Wireless	LNA28-B	232
Semi Anechoic Civil Chamber	ETS	S81	SL 11643
Signal Generator	Wiltron	6747B	278007

7. Mode of Operation

1. The E.U.T contains a CE certified 4G cellular module.
2. Evaluation was performed with the E.U.T. in typical operation orientation.
3. The evaluation was performed in 2 modes (traffic mode and idle mode) and in one represented frequency: 725MHz using base station as auxiliary equipment.

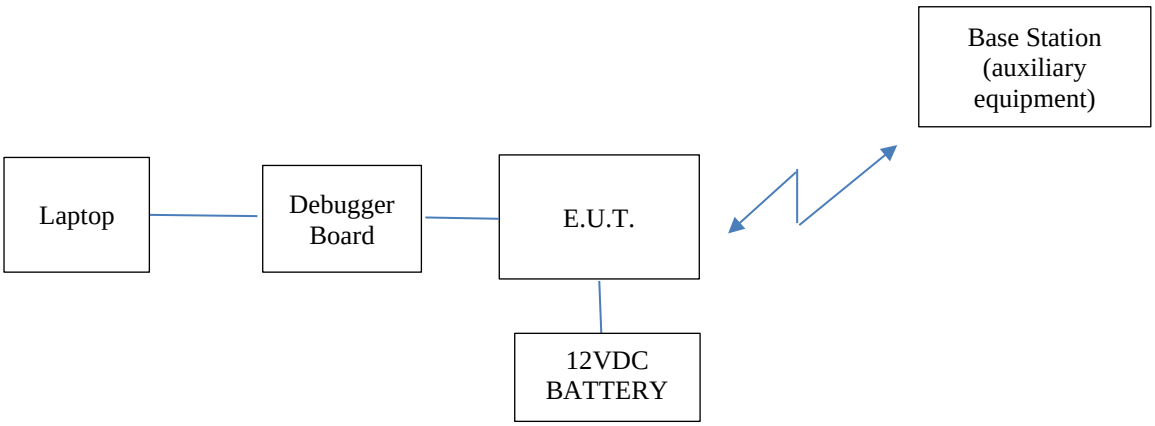


Figure 1. Test Set-up

8. Radiated Emissions (UE)

8.1 Test Specification

EN 301 908-1 V13.1.1: 2019, sections 4.2.2, 5.3.1

8.2 Test Procedure

(Temperature (20°C)/ Humidity (58%RH))

The test was performed in the cellular frequency bands.

The test was performed in the frequency band 30.0MHz –12.75GHz.

For 30.0MHz-1000.0MHz range:

A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site, and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground at a distance of 3 meters from test antenna.

RBW was set to 100 kHz.

The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.

The frequency range 30.0MHz-1000.0 MHz was scanned.

For 1000.0Hz-12,750.0MHz range:

The E.U.T was placed in the chamber and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 1.5 meters above the ground at a distance of 3 meters from test antenna.

RBW was set to 1000 kHz.

The readings were maximized by adjusting the turntable azimuth between 0-360° and the antenna polarization.

The frequency range 1000.0 MHz-12,750.0Hz was scanned.

For all the tests RMS detector was used.

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 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.

The spurious emission was calculated as follows:

E.R.P = Signal Generator Level (dBm) – Cable Loss (dB) + Substitution Antenna Gain (dBd).

8.3 Test Limit

Frequency	Minimum requirement (e.r.p.)/ reference bandwidth idle mode	Minimum requirement (e.r.p.)/ reference bandwidth traffic mode
30 MHz ≤ f < 1 000 MHz	-57 dBm/100 kHz	-36 dBm/100 kHz
1 GHz ≤ f < 12,75 GHz	-47 dBm/1 MHz	-30 dBm/1 MHz

8.4 Test Results

The E.U.T met the requirements of EN 301 908-1 V13.1.1: 2019, Sections 4.2.2, 5.3.1.

Traffic Mode: The margin between the spurious emission level and the specification limit is 9.0 dB in the worst case at the frequency of 1450.0MHz, vertical polarization

Additional details are given in *Figure 2*.

Idle Mode: No emissions were detected above the spectrum analyzer noise level which is at least 6dB margin below the limit.

Radiated Emissions (UE)

Specification: EN 301 908-1 V13.1.1: 2019, sections 4.2.2, 5.3.1

Operating Frequency	Frequency	Field strength	Pol.	Generator Output Power	Cable Loss	Antenna Gain	ERP	Limit	Margin
(MHz)	(MHz)	(dBµV/m)	(H/V)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)	(dB)
725.0	1450.0	56.1	V	-43.4	0.5	4.9	-39.0	-30.0	-9.0
	1450.0	53.4(N.L)	H	-45.4	0.5	4.9	-41.0	-30.0	-11.0

Figure 2. 4G mode Spurious Emissions Traffic Mode

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 Test, 1000-12,750MHz

10. APPENDIX A - CORRECTION FACTORS

10.1 Correction factors for RF OATS Cable 35m ITL #1911

Frequency (MHz)	loss (dB)
30.0	1.3
50.0	1.7
100.0	2.6
200.0	3.7
300.0	4.7
400.0	5.5
500.0	6.3
600.0	7.0
700.0	7.6
800.0	8.4
900.0	9.0
1000.0	9.6

10.2 Correction Factors for RF Cable for Anechoic Chamber ITL #1840

FREQ (MHz)	LOSS (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*

10.3 Correction Factors for Active Loop Antenna ITL # 1075

F(MHz)	AF(dB/m)
0.01	18.4
0.02	14.3
0.03	13.3
0.05	11.7
0.1	11.4
0.2	11.2
0.3	11.2
0.5	11.2
0.7	11.2
1	11.4
2	11.5
3	11.5
4	11.4
5	11.3
6	11.1
7	11.1
8	11.1
9	11
10	11
20	10
30	8

10.4 Correction Factors for Biconical Antenna ITL #1356, EMCO 3110B 9912-3337

Frequency [MHz]	AF [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

10.5 Correction Factors for Log Periodic Antenna ITL # 1349, EMCO 3146 s/n 9505-4081

Frequency [MHz]	AF [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

10.6 Correction Factors for Double – Ridged Waveguide Horn

ANTENNA 3 meter range;

ITL # 1352, ETS 3115 s/n 29845

FREQUENCY (GHz)	AFE (dB/m)	FREQUENCY (GHz)	AFE (dB/m)
0.75	25.0	9.5	38.0
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