




DATE: 2 February 2021


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:
Fleet Management Device
CR400B LTE**

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):	Fleet Management Device
Equipment Model No.:	CR400B LTE
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	November 23, 2020
Start of Test:	November 23, 2020
End of Test:	November 23, 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 LTE cellular module manufactured by Telit Communications S.p.A, model no. ME910C1-WW. (See EU Type Examination Certificate on following page).
2. Accordingly, as agreed upon with the customer, only spurious emissions testing was performed.



Annex I to EU-Type Examination Certificate No. 63836RNB.001

TECHNICAL DOCUMENTATION:

Held at: Telit Communications S.p.A.
Address: Via Stazione di Prosecco
5/B, I-34010 Sgonico (Trieste) Italy
Technical Documentation Ref.: 30529TCF00151A Rev.0

TECHNICAL FEATURES AND CHARACTERISTICS:

Operation modes: GPRS⁽¹⁾, EDGE⁽¹⁾
LTE CAT-M1, LTE CAT-NB1

Operating frequency bands: GNSS
GPRS⁽¹⁾/EDGE⁽¹⁾: E-GSM 900, DCS 1800, EDGE 900; EDGE 1800
LTE: FDD1⁽²⁾, FDD 3, FDD 8, FDD 20, FDD 28⁽²⁾
GNSS: GPS L1
Galileo E1
GLONASS G1
BDS B1I

Modulations: GMSK, 8PSK, QPSK, 16QAM, $\pi/2$ BPSK, $\pi/4$ QPSK
Data rates (maximum): Uplink: 375 kbps, Downlink: 300 kbps
Output power (Rated): E-GSM 900⁽¹⁾: Class 4, DCS 1800⁽¹⁾: Class 1
EDGE 900⁽¹⁾: Class E2, EDGE 1800⁽¹⁾: Class E2
LTE CAT-M1: Class 3; LTE CAT-NB1: Class 3
3.1 VDC to 4.5 VDC (Nominal: 3.8 VDC)

Voltage range: -10 °C to 55 °C
Temperature range:
Antenna: External antenna. Impedance: 50 ohm
Intended use: GPRS⁽¹⁾/EDGE⁽¹⁾/LTE CAT-M1/NB1 module for IoT applications

CONFORMITY DETAILS:

Essential requirements	Specifications / Standards	Reference documents
Article 3.1(a): Electrical safety	EN 62368-1:2014 + AC:2015 + AC:2017 + A11:2017	64317RSE.002
Article 3.1(a): EMF exposure	EN 62311:2008	57538RAN.001 56663RAN.002A1
Article 3.1(b): EMC	Draft EN 301 489-1 V2.2.0 Draft EN 301 489-19 V2.1.0 Draft EN 301 489-52 V1.1.0	56663REM.004A1 1860153R-RFCEP23V00 1860156R-RFCEP01V00 2528ERM.001
Article 3.2: Radio spectrum use	EN 301 511 V12.5.1 EN 301 908-1 V11.1.1 Draft EN 301 908-13 V13.0.1 EN 303 413 V1.1.1	56663REM.005A1 56663REM.006A1 56663REM.007A1 56663RMV.001A1 1820125R-001 Ver. 02 SZEM1803001756CF 1860156R-HPCEP11V00 1860156R-HPCEP11V00-A 1860154R-002.03 1860153R-RFCEP55V00 MDE_DEKRA_1804_01 EG/2019/40008 EG/2018/30023D 60864RMV.004



REMARKS AND COMMENTS:

⁽¹⁾ Not applicable for ME910C1-P1 device.

⁽²⁾ Not applicable for ME910C1-E2 device.

Device tested with a reference antenna (Type n° T-AT314; $\lambda/4$ monopole) with maximum gain of 2.14 dBi. The use of different antennas may affect the compliance; if the manufacturer is in doubt about the compliance then the equipment with the new antennas must be assessed to demonstrate compliance with the essential requirements of the Directive 2014/53/EU. It should be noted that assessment does not necessarily lead to testing.

SW evolution of the devices, as described in the "Equipment Details" chapter, has been analysed and has no impact on the compliance with essential requirements of the devices.

These devices have been evaluated on a test jig. These radio modules are for professional installation only. When installing these radio modules permanently into a host product to create new radio equipment device; the manufacturer responsible for placing the final radio product on the market in the EU must assess if the combination of this radio module and the host product complies with the essential requirements of the RE Directive 2014/53/EU.

Host devices integrating these devices will need to be evaluated according to the essential requirements of Directive 2014/53/EU following the guidelines provided in the document "REDCA Technical Guidance Note 01 on the RED compliance requirements for a Radio Equipment often referred to as Radio Module and the Final Radio Equipment Product that integrates a Radio Module". This Technical Guidance Note may be accessed in RED Compliance Association website or may be obtained by contacting with DEKRA Testing and Certification, S.A.U. Notified Body at certification.rcb.es@dekra.com.

The devices also operate in other non EU frequency bands. This operation has not been evaluated in this opinion.

It is mandatory to inform DEKRA Testing and Certification, S.A.U. in writing about any change in the approved equipment identified in this certificate, which could affect the conformity of the apparatus with the essential requirements or the conditions of validity of this certificate.

This certificate supersedes and replaces existing certificate 60864RNB.001A1.



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
db μ V	decibel referred to one microvolt
db μ 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.), 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
<p>Radiated Emissions (UE) EN 301 908-1 V13.1.1 (2019) Sections 4.2.2, 5.3.1</p>	<p>The E.U.T met the performance requirements of the specification.</p> <p>Traffic Mode: The margin between the spurious emission level and the specification limit is 6.2 dB in the worst case at the frequency of 1674.0MHz, vertical polarization.</p>



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

The Cellocator CR-400 is Cellocator's 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 endure improved compliance with vehicle security requirements.



6. List of Test Equipment

6.1 Emission Tests

The equipment indicated 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 9002 and 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 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: 837.0MHz using base station as auxiliary equipment.

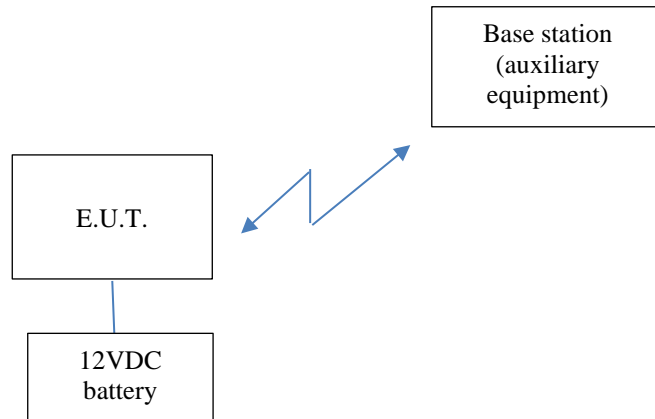


Figure 1. Test Set-up

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:

$E.R.P = \text{Signal Generator Level (dBm)} - \text{Cable Loss (dB)} + \text{Substitution Antenna Gain (dBd)}$.



8.3 Test Limit

Frequency	Minimum requirement (e.r.p.)/ reference bandwidth idle mode	Minimum requirement (e.r.p.)/ reference bandwidth traffic mode
$30 \text{ MHz} \leq f < 1\,000 \text{ MHz}$	-57 dBm/100 kHz	-36 dBm/100 kHz
$1 \text{ GHz} \leq f < 12,75 \text{ GHz}$	-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 6.2 dB in the worst case at the frequency of 1674.0MHz, 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)	(dB μ V/m)	(H/V)	(dBm)	(dB)	(dBd)	(dBm)	(dBm)	(dB)
837.0	1674.0	62.0	V	-40.6	0.5	4.9	-36.2	-30.0	-6.2
	1674.0	53.4(N.L)	H	-49.8	0.5	4.9	-45.4	-30.0	-15.4

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

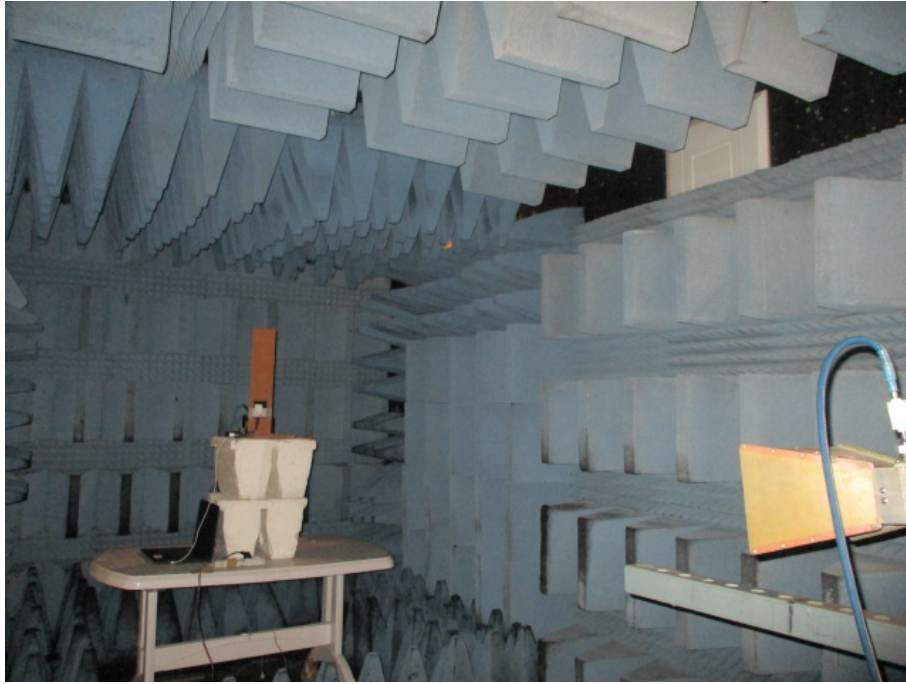


Figure 3 Spurious Emission Test, 1000-12,750MHz



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



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

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

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**

FREQUENCY	AFE	FREQUENCY	AFE
(GHz)	(dB/m)	(GHz)	(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