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DATE: 10 June 2014

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

Test Report According to ICES-003, Issue 5

for

Pointer Telocation Ltd.

Equipment under test:

Cellocator Cello

Cello-CANiQ (3G) P/N CT78000140-000

Written by: _____
R. Pinchuck, Documentation

Approved by: _____
A. Sharabi, 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 Israel Tel: +972-3-572-3111 Fax: +972-3-572-3100
Manufacturer's Representative:	Itamar Gohary
Equipment Under Test (E.U.T):	Cellocator Cello
Equipment Model No.:	Cello-CANiQ (3G) P/N CT78000140-000
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	30.03.2014
Start of Test:	31.03.2014
End of Test:	31.03.2014
Test Laboratory Location:	I.T.L (Product Testing) Ltd. Kfar Bin Nun, ISRAEL 99780
Test Specifications:	See Section 2

1.2 Abbreviations and Symbols

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

AC	alternating current
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
EMC	electromagnetic compatibility
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
QP	quasi-peak
PC	personal computer
RF	radio frequency
RE	radiated emission
sec	second
V	volt

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.), Registration No. 90715.
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 4025B-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	**ICES-003, Issue 5; 2012**	*Spectrum Management and Telecommunications Policy Interference-Causing Equipment Standard Digital Apparatus*
2.2	**CAN/CSA-CEI/IEC CISPR 22: 10**	*Information technology equipment — Radio disturbance characteristics — Limits and methods of measurement*
2.3	**ANSI C63.4-2003**	*American National Standards for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.*

3. Test Site Description

3.1 Location

The Electromagnetic Compatibility Test Facility of I.T.L. (PRODUCT TESTING) LTD. is located at Kfar Bin Nun, Israel 99780 (FCC Registration No. 90715)

Telephone: + 972-8-9797799, Fax: + 972-8-9797702

3.2 Shielded Room

A Modular Shielded Room, Type S81, manufactured by Rayproof, consisting of a Main Room and a Control Room.

The dimensions of the Main Room are: length: 7.4 m, width: 4.35 m, height: 3.75 m.

The dimensions of the Control Room are: length: 3.12 m, width: 2.5 m, height: 2.5 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 both shielded rooms are filtered.

3.3 Open Test Site

Consists of 3 meter and 10 meter ranges, using a 7x14 meter solid metal ground plane, a remote controlled turntable and an antenna mast. The turntable and the tested equipment that is placed on it are environment protected. All the power, control and signal lines are routed under the ground plane.

3.4 Antenna Mast

Type AAM-4/A, manufactured by Antenna Research Associates (ARA). The antenna position and polarization are remotely controlled via Fiber Optical Link using ARA Dual Controller Type ACU-2/5, and pressurized air.

The antenna position is adjustable between 1-4 meters.

3.5 Turntable

Type ART-1001/4, manufactured by ARA. The position of the turntable is remotely controlled via a Fibre Optic Link, using ARA Dual Controller Type ACU-2/5. The turntable is mounted in a pit and its surface is flush with the Open Site Ground Plane.

3.6 EMI Receiver

Type HP8542E, including HP85420E R.F. filter manufactured by Hewlett-Packard, being in full compliance with CISPR 16 requirements.

3.7 Test Equipment

See details in Section 6.

4. Summary of Test Results

Test	Results
Radiated Emissions ICES-003, Issue 5; 2012, Class B	The E.U.T met the performance requirements of the specification. The margin between the emission level and the specification limit was 13.7 dB in the worst case at the frequency of 37.4 MHz, horizontal polarization.

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

The Cello-CANiQ addresses the mid and high-end segments of fleet management products for various advanced applications concerned with vehicle, driver and logistics management.

The Cello-CANiQ allows connectivity with various vehicle environment interfaces, including standard CANBUS and OBD interfaces, driver Identification, serial communication interfaces with 3rd party devices, discrete, analog and frequency measurement ports, voice channel, DTCO and others. All these interfaces are developed and configured for maximum flexibility in data aggregation, filtering, processing and reporting in a way which enables development of future applicative add-ons.

The Cello-CANiQ provides modular and scalable HW options (“peripherals ready” such as SD card, DTCO D8 connectivity and multiple communication technology support) as well as a highly flexible and configurable infrastructure for easy programming of the requested triggering, reaction and messaging scheme as a function of complex array of inputs received from the vehicle bus.

The Cello-CANiQ lays the infrastructure for the provisioning of field engineering services and professional services aimed at solving customer needs or market problems in short time and minimum resources.

The Cello-CANiQ supports DIRECT connectivity to vehicle data buses supporting J1939 or ISO-15765 via OBDII connector. HW form and fit are not changed and the enclosure and connectors look similar to other Cello family devices. Nevertheless, this product features a few important enhancements and improvements, such as HW compatibility with 3G modems, GPS & Glonass Hybrid positioning engine and other infrastructure changes and enablers, as described in the following sections.

The E.U.T. includes a GSM modem with FCC and IC modular approval.

6. List of Test Equipment

6.1 Emission Tests

The equipment indicated below by an "X" was used for testing Conducted Emission (**CE**), Radiated Emission (**RE**), and **EN 61000-3-2;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.	Used in Test			
				CE	RE	-2	-3
Dipole Antenna Set	CDI	A100	597				
Signal Generator	Marconi	2022D	119196015				
LISN	Fischer	FCC-LISN-2A	127				
LISN	Fischer	FCC-LISN-2A	128				
Spectrum Analyzer	HP	8591E	3414U01226				
RF Amplifier	HP	8447F	3113A04961				
Close Field Probe	HP	HP11941A	2807A03046				
Close Field Probe	HP	HP11940A	2650A04587				
EMI Receiver	HP	85422E	3906A00276		X		
Receiver RF Filter Section	HP	85420E	3705A00248		X		
Antenna - Biconical	ARA	BCD-235/B	1041		X		
Antenna - Log Periodic	ARA	LPD-2010/A	1038		X		
Antenna Mast	ARA	AAM-4A			X		
Turntable	ARA	ART-1001/4			X		
Mast & Table Controller	ARA	ACU-2/5	1001		X		
Power Analysis System	Xitron	2503A	2005				
AC Power Source	Behlman	ACP					

7. E.U.T. Performance Verification

7.1 Mode of Operation

The E.U.T. was operated in regular operation mode. Power supply was supplied 12 VDC.

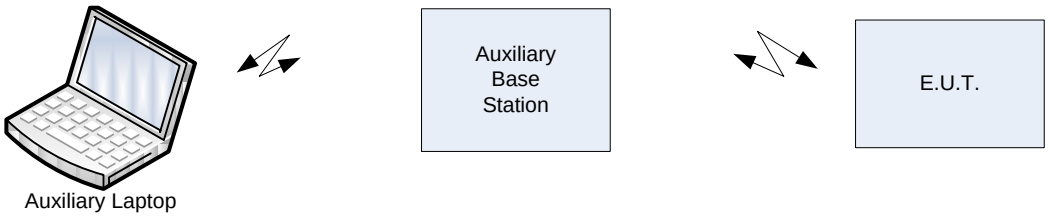


Figure 1. Test Set-up

8. Radiated Emission

8.1 Test Specification

30-1000 MHz, ICES-003, Issue 5; 2012, CLASS B

8.2 Test Procedure

The E.U.T operation mode and test set-up are as described in section 7.1.

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, 0.8 meters above the ground. The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission. The configuration tested is shown in *Figure 3. Radiated Emission Test*.

The frequency range 30-1000 MHz was scanned, and the list of the highest emissions was verified and updated accordingly.

The emissions were measured using a computerized EMI receiver complying to CISPR 16 requirements. The specification limits and applicable correction factors are loaded to the receiver via a 3.5" floppy disk.

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

Verification of the E.U.T emissions was based on the following methods:

Turning the E.U.T on and off.
Using a frequency span less than 10 MHz.
Observation of the signal level during turntable rotation. Background noise is not affected by the rotation of the E.U.T.

The emissions were measured at a distance of 3 meters.

8.3 Test Results

The E.U.T met the requirements of the ICES-003, Issue 5; 2012, Class B specification.

The margin between the emission level and the specification limit is 13.7dB in the worst case at the frequency of 37.4MHz, horizontal polarization.

The details of the highest emissions are given in *Figure 2*.

Radiated Emission

E.U.T Description	Cellocator Cello
Type	Cello-CANiQ (3G) P/N CT78000140-000
Serial Number:	Not designated

Specification: ICES-003, Issue 5; 2012, Class B

Antenna Polarization: Horizontal/Vertical
Antenna: 3 meters distance

Frequency range: 30 MHz to 1000 MHz
Detectors: Peak, Quasi-peak

Frequency	Peak Amp	QP Amp	Antenna Polarization:		Limit	Margin
(MHz)	dBµV/m	dBµV/m	Hor.	Ver.	dBµV/m	(dB)
37.4	26.5	21.9		X	40.0	-18.1
39.7	28.2	25.9		X	40.0	-14.1
42.9	31.6	23.8		X	40.0	-16.2
37.4	29.8	26.3	X		40.0	-13.7
39.7	26.2	21.5	X		40.0	-18.5
42.9	30.0	24.5	X		40.0	-15.5

Figure 2. Radiated Emission. Antenna Polarization: HORIZONTAL/VERTICAL Detectors: Peak, Quasi-peak

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. Radiated Emission Test

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

Test	Test Engineer Name	Signature	Date
Radiated Emissions	A. Sharabi		26.06.14

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 LOG PERIODIC ANTENNA Type LPD 2010/A at 3 and 10 meter ranges.

Distance of 3 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.1
250.0	10.2
300.0	12.5
400.0	15.4
500.0	16.1
600.0	19.2
700.0	19.4
800.0	19.9
900.0	21.2
1000.0	23.5

Distance of 10 meters

FREQUENCY (MHz)	AFE (dB/m)
200.0	9.0
250.0	10.1
300.0	11.8
400.0	15.3
500.0	15.6
600.0	18.7
700.0	19.1
800.0	20.2
900.0	21.1
1000.0	23.2

NOTES:

1. *Antenna serial number is 1038.*
2. *The above lists are located in file number 38M3O.ANT for a 3 meter range, and file number 38M100.ANT for a 10 meter range.*
3. *The files mentioned above are located on the disk marked "Radiated Emission Test EMI Receiver".*

11.3 Correction factors for BICONICAL ANTENNA Type BCD-235/B, at 3 meter range

FREQUENCY (MHz)	AFE (dB/m)
20.0	19.4
30.0	14.8
40.0	11.9
50.0	10.2
60.0	9.1
70.0	8.5
80.0	8.9
90.0	9.6
100.0	10.3
110.0	11.0
120.0	11.5
130.0	11.7
140.0	12.1
150.0	12.6
160.0	12.8
170.0	13.0
180.0	13.5
190.0	14.0
200.0	14.8
210.0	15.3
220.0	15.8
230.0	16.2
240.0	16.6
250.0	17.6
260.0	18.2
270.0	18.4
280.0	18.7
290.0	19.2
300.0	19.9
310	20.7
320	21.9
330	23.4
340	25.1
350	27.0

NOTES:

1. Antenna serial number is 1041.

2. The above list is located in file 19BC10M1.ANT on the disk marked "Radiated Emissions Tests EMI Receiver".

12. APPENDIX B - MEASUREMENT UNCERTAINTY

12.1Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site 30-1000MHz:

Expanded Uncertainty (95% Confidence, K=2):

± 4.96 dB

13. Appendix C – ICES-003 Instructions

- **Label**

Prepare Label

- Design an ICES-003 compliance label that will be affixed to all units marketed.

- ·The label must include the compliance statement below.

Example of Label:

This Class (*) digital apparatus complies with Canadian ICES-003. Cet appareil numérique de la classe (*) est conforme à la norme NMB-003 du Canada.

* Insert her either “A” or “B”, whichever is applicable.

Note: The English or French wording can be used. It is the responsibility of the manufacturer or importer to determine whether the notice should appear in English, French or both languages, based upon the intended market, company marketing policies, and any other applicable provincial or federal regulations.
The label may also be combined with the label required by the FCC.

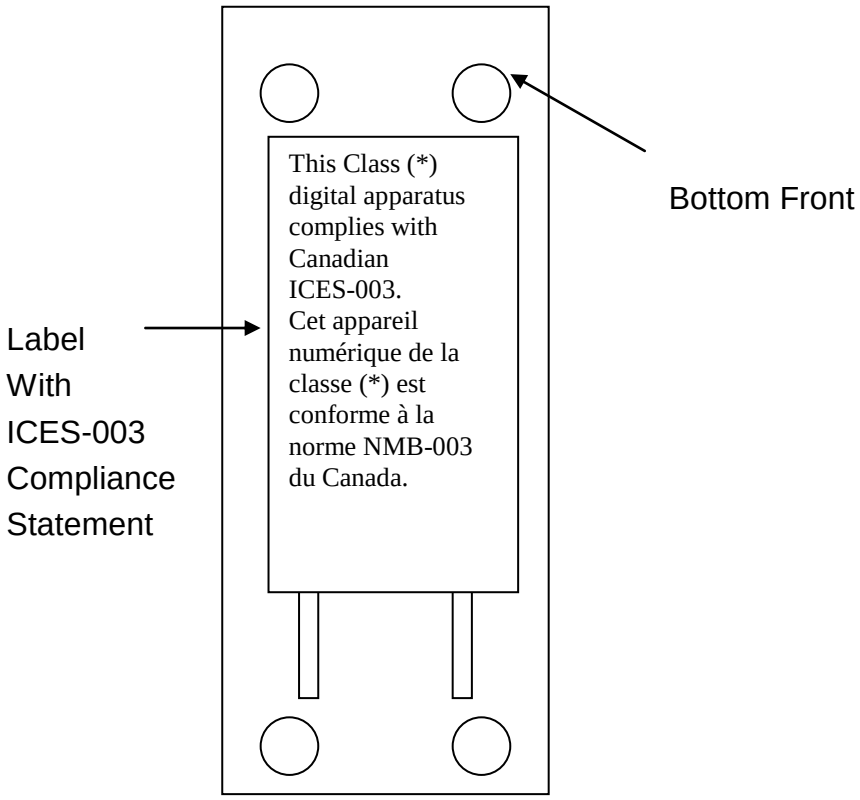
Small Products:

If the product is too small for a label containing the statement above, the information paragraph required must be placed in a prominent location in the instruction manual.

- **Label**

The compliance statement above be placed in a “conspicuous location on the device.”

Example of Product with Label:



- **ICES-003 Compliance Statement**

ICES-003 Compliance Statement in User's Manual

This Class (*) digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe (*) est conforme à la norme NMB-003 du Canada.

* Insert her either "A" or "B", whichever is applicable.

This statement needs to be placed in the user manual **only** if the product is too small for a label.

- **ICES-003 Procedural requirements**

A record of the measurements and results, showing the date that the measurements were completed (test report), shall be retained by the manufacturer or importer for a period of at least five years from the date shown in the record (date of completion of tests) and made available for examination on the request of the Minister.

A written notice indicating compliance must accompany each unit of digital apparatus to the end user. The notice shall be in the form of a label that is affixed to the apparatus.

Where because of insufficient space or other constraints it is not feasible to affix a label to the apparatus, the notice may be in the form of a statement included in the user's manual.