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DATE: 22 April 2014

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

Test Report According to EN 301 489-1; EN 301-489-3; EN 301 489-7; EN 301 489-19

for

Pointer Telocation Ltd.

Equipment under test:

Cellocator Cello

CELLO-CANiQ P/N CT7800130-000; CELLO-IQ P/N CT7800122-000*

Written by: _____
Y. Raz, Documentation

Approved by: _____
I. Siboni, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

*See customer's Declaration on Page 4.

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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: +972-73-262-2344
Manufacturer's Representative:	Itamar Gohary
Equipment Under Test (E.U.T):	Cellocator Cello
Equipment Model No.:	CELLO-CANiQ P/N CT7800130-000; CELLO-IQ P/N CT7800122-000*
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	07.04.2014
Start of Test:	07.04.2014
End of Test:	07.04.2014
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

May 04, 2014

To whom it may concern,

Differences between Pointer Telocation Cellocator units

Introduction

Cellocator– is a family of a full featured GSM\UMTS\GNSS end units for fleet management, anti-theft and Driver Behavior applications.
The family comprises from Cello and CR-300 variants.

The Firmware

The firmware of Cellocator family devices has several variants: **Cello-CANiQ ,Cello CANiQ(3G),Cello-IQ,CR300\B** all based on the same codebase with differences according to different applications the device intended for.
The CR300\B are targeting mainly the fleet management applications and anti-theft application and containing same features as E-mark certified CR200\B with additional support for driver authentication. The Cello IQ has additional features for Driver Behavior application and Cello CANiQ has additional support of CAN BUS triggering application.

The below table contain all feature differences between Cellocator variants.

List of main features:

	CR-300	CR-300B	Cello-IQ	Cello CANiQ
Online tracking	Time, Distance, Roaming and speed dependency	Time, Distance, Roaming and speed dependency	Time, Distance, Roaming and speed dependency	Time, Distance, Roaming and speed dependency
Driver authentication	√	√	√	√
Driver dependent immobilizatio n	√	√	√	√
MDT Support	**X**	**X**	√	√
Sensors types	Discrete	Discrete	Discrete, Analog Frequency	Discrete, Analog Frequency

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Output response type	Permanent, Pulse, PWM, time limited, nested	Permanent, Pulse, PWM, time limited, nested	Permanent, Pulse, PWM, time limited, nested	Permanent, Pulse, PWM, time limited, nested
Jamming detection	√	√	√	√
Geo-Fence support	100 zones	100 zones	100 zones	100 zones
Battery support	X	√	√	√
Roaming management	50 operators	50 operators	50 operators	50 operators
Hands Free Support	X	X	√	√
Built Car Alarm logic	X	X	X	X
CAN BUS triggering	X	X	X	√
Accelerometer based Ignition sense			√	√
Crash Notification			√	√
EDR	X	X	√	√
Maneuvers	X	X	√	√
E-Call	X	X	√	√

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The Hardware

The Cellocator family hardware variants are identical from functional point of view.

CR300 as successor of CR200:

CR200\B (P\N CT7701000-000\CT7701100-000) are E-mark certified variants approval number: E13-10R -03 12558.
Due to obsolescence of its GPS chipset engine (SirfIII) Pointer moved to new GPS platform (SirfIV) and produced new successor's variants named by new name CR300\B .

The only differences between the E-mark Certified CR200\B and its Successor CR300\B are:

1. GPS chipset change from SirfIII to Sirf IV including layout change in the GPS section
2. Change its cellular Telit modem from GE864 v2 Automotive to GE864 V2- both modems are pin to pin compatible. The changes supported by the Notified Body opinion considered to be similar without testing necessity.
3. CR300\B utilized the same PCB and all of the CR200\B PCBA bill of material with the follow additional and should be considered as parent module:
   - Dallas one wire connection.(CR300E use output instead)
   - Additional discrete input.

All other PCBA components remain the same as the certified CR200\B including:

Protection input circuit, DC\DC, Mirco-Processor, Antenna, Inputs and Outputs circuits, charger, battery, enclosure, connectors etc.

Cello CANiQ – this product is the similar as approved Cello F\R\IQ members but have additional support of CAN bus connectivity, new GNSS system and uSD connectivity.
This product come in 3 modems Variants all based on Telit 910 approved Platform:

- Telit UE910-EUR- this is a 3G cellular modem support European bands only:900/1800/2100 assembled on Cellocator Cello-CANiQ (3G) CT7800150-000
- Telit UE910-NAR- this is a 3G cellular modem support US bands only:850/1900 assembled on Cellocator Cello-CANiQ (3G) CT7800140-000
- Telit GE910-v3- this is a 2G cellular modem support all bands:850/900/1800/1900- Assembled on Cellocator Cello-CANiQ CT7800130-000 and Cellocator Cello-IQ CT7800122-000

All modems are pin to pin compatible and placed on same PCB.

Cello IQ-This product use same PCB as Cello CANiQ (GE910v3) with less components assembly (No CAN bus connectivity and no uSD connectivity). Cello CANiQ should be considered as "Parent" product of Cello IQ.

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The Part numbers

Pointer P/N	Product	Modem	Battery	Connector	Description
CT7800130-000	Cello-CANiQ	Telit GE910v3	Li-Ion 1000mAh	20 pin	Fully featured GPRS/GNSS End unit for fleet management ,Driver Behavior&CAN BUS triggering
CT7800140-000	Cello-CANiQ (3G)	Telit UE910-NAR	Li-Ion 1000mAh	20 pin	Fully featured UMTS/GNSS End unit for fleet management ,Driver Behavior&CAN BUS triggering
CT7800150-000	Cello-CANiQ (3G)	Telit UE910-EUR	Li-Ion 1000mAh	20 pin	Fully featured UMTS/GNSS End unit for fleet management ,Driver Behavior&CAN BUS triggering
CT7800122-000	Cello-IQ	Telit GE910v3-2G	Li-Ion 1000mAh	20 pin	Fully featured GPRS/GPS End unit for fleet management &Driver Behavior
CT7801010-000	CR300	Telit GE864 V2	x	10 pin	Budget GPRS/GPS End unit for fleet management and anti-theft
CT7801110-000	CR300B	Telit GE864 V2	Li-Ion 440mAh	10 pin	Budget GPRS/GPS End unit for fleet management and anti-theft
CT7801011-000	CR300	Telit GE864 V2	x	10 pin	Budget GPRS/GPS End unit for fleet management and anti-theft-Black Enclosure
CT7801111-000	CR300B	Telit GE864 V2	Li-Ion 440mAh	10 pin	Budget GPRS/GPS End unit for fleet management and anti-theft-Black Enclosure
CT7801100-000	CR300E	Telit GE864 V2	x	10 pin	Budget GPRS/GPS End unit for fleet management and anti-theft

The Pin-out

CR300 Variants-

CR300\B preserve same connector as certified CR200\B with additional supports of pin 5 & 10

10 pin Connector Pin-out		
Pin #	CR300\B	CR300E
1	Power Input-Car power	""
2	OC Output -LED	""
3	OC Output -Lights	""
4	Input-Ignition	""
5	Input-Door	""
6	Power Input-GND	""
7	TTL Output-Serial-TX	""
8	TTL Input-Serial-RX	""
9	Input-Shock sensor	""
10	One wire connection-Dallas one wire	GP output

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CELLO Variants-

20 pin Connector Pin-out		
Pin #	Cello IQ	Cello CANiQ
1	Output-Debug	""
2	Power Input-Car power	""
3	Power Input-PGND	""
4	Input-Ignition	""
5	Input-GPIO1	CAN-Low
6	OC Output -LED	""
7	OC Output -Ext-STD-IMB	""
8	OC Output -Siren	D8-RX
9	Output -Audio-Out	""
10	Input-Audio-In	""
11	Input-GPIO2	CAN-High
12	Output-Serial-TX	""
13	Input-Serial-RX	""
14	Input-Doors	""
15	Input-Shock sensor	""
16	Input-Emergency sensor	""
17	OC Output -Ext-spec-IMB	""
18	OC Output -Lights	""
19	Power Input-GND	""
20	In-Out: Dallas single-wire	""

Igor Rogov,
Vice President, Research and Development
Pointer Telocation Ltd.

IGOR ROGOV
05 -05- 2014
VP R&D

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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	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 Israel Ministry of the Environment (Israel), Registration No. 1104/01.
3. The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) (Japan), Registration Numbers: C-3006, R-2729, T-1877, G-245.
4. Industry Canada (Canada), File No. IC 6183.

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 301 489-1 V1.9.2: 2011**	*Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part1: Common technical requirements*
2.3	**EN 301 489-3 V1.6.1: 2013**	*Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 3: Specific conditions for Short-Range Devices (SRD) operating on frequencies between 9 kHz and 246 GHz*
2.4	**EN 301 489-7 V1.3.1: 2005**	*Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 7: Specific conditions for mobile and portable radio and ancillary equipment of digital cellular radio telecommunications systems (GSM and DCS)*
2.5	**EN 301 489-19 V1.2.1: 2002**	*Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 19: Specific conditions for Receive Only Mobile Earth Stations (ROMES) operating in the 1,5 GHz band providing data communications*
2.6	**EN 55022: 2006 + Amendment A1: 2007**	*Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.*
2.7	**EN 61000-4-2: 2009**	*Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques; Section 2: Electrostatic discharge immunity test: Basic EMC publication.*
2.8	**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.

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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
Conducted Emissions From DC Lines EN 55022: 2006 + Amendment A1: 2007, Class **B**	The E.U.T met the performance requirements of the specification. The margin between the emission levels and the specification limit is, in the worst case, 11.2 dB for the positive line at 3.18 MHz and 12.2 dB at 3.11 MHz for the negative line.
ESD EN 61000-4-2: 2009 Air Discharge, 8kV Contact Discharge, 4kV	The E.U.T met the performance requirements of the specification.
Radiated Immunity EN 61000-4-3: 2006 + Amendments A1: 2008; A2: 2010 (80-1000; 1400-2700 MHz) 3 V/m, 80% A.M. by 1kHz	The E.U.T met the performance requirements of the specification.

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 CE approved modem, manufactured by Telit, with CE modular approval.

6. List of Test Equipment

6.1 Immunity Tests

Equipment indicated below by an "X" used in **Tests IEC 61000-4:-2,-3,-4,-5,-6,-8,-11.**

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	Manuf.	Model	Serial No.	Used in Test IEC 61000-4:						
				-2	-3	-4	-5	-6	-8	-11
Transient Generator	KeyTek	CEMASTER	9612436							
Transient Generator	EM Test	EFT 500 F1	1198-01							
ESD Simulator	Schaffner	NSG 435	174-002-001(Z1)	X						
Isotropic Field Probe	AR	EP-2080	23190		X					
RF Amplifier	AR	100W1000M1	19842		X					
Isotropic Field Monitor	AR	FM-2000	19719		X					
Biconilog Antenna	EMCO	3142B	1078		X					
Horn Antenna	A.H. systems	SAS 200/571	199		X					
RF Amplifier	OPHIR	5303081	1002		X					
RF Amplifier	IFI	SMX100	1194-4537		X					
RF Amplifier	IFI	M100	M612-0208		X					
Signal Generator	HP	8657A	2849U01094		X					
BulkF Current Probe	FCC	F-120-9	105							
CDN	FCC	FCC-801-M3-16A	9962							
Transient Wave- form Monitor	CDI	TWM-100	3233							
Phase Control Amplifier	CDI	PCA-1000	3217							
Single Phase Isolated Backfilter	CDI	CDI-1kVA	3221							
Surge Generator	CDI	CDI-1000i	3153							
1.2/50; 8/20usec AC Surge Unit	KeyTek	E551	9512398							
Surge Generator	EM TEST	UCS 500-M	1198-45							
AC Power Source	EM TEST	UCS 500-M	1198-45							
Current Generator	FCC	F-1000-4-8-125A	9838							
Magnetic Loop	FCC	F-1000-4-8/9/10-L-1M	9836							

6.1 Emission Tests

The equipment indicated below by an "X" was used for testing Conducted Emission Power Lines(**CEP**), Conducted Emission Telecom(**CET**), 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 Tests**				
				CEP	CET	RE	EN 61000-3	
							-2	-3
ISN	T3SEQ	ISN T8-Cat 6	28749					
ISN	T3SEQ	ISN T800	27986					
LISN	Fischer	FCC-LISN-2A	127	X				
Transient Limiter	HP	11947A	3107A03041	X				
Current Probe	FCC	F51	163					
EMI Receiver	Rohde & Schwarz	ESCI7	100724	X				
EMI Receiver	Rohde & Schwarz	ESIB7	100120					
RF Amplifier	HP	83006A	3104A00589					
RF Amplifier	MITEQ	50-8P	AFSX4					
EMC Analyzer	HP	HP8593	3536A00120					
Biconilog Antenna	EMCO	3142B	1250					
Horn Antenna	ETS	3115	6142					
Antenna Mast	ETS	2070-2	9608-1497					
Turntable	ETS	2087	-					
Mast & Table Controller	ETS/EMCO	2090	9608-1456					
Power Analysis System	EM Test	DPA 500	0501/09					
AC Power Source	EM Test	ACS 500	1101/01					

7. E.U.T. Performance Verification

7.1 Mode of Operation

The E.U.T. transmitted every 4 seconds in the cellular band. The GPS was operated but received no signal due to building interference. GPS operation was monitored. The E.U.T. was operated from 12 VDC.

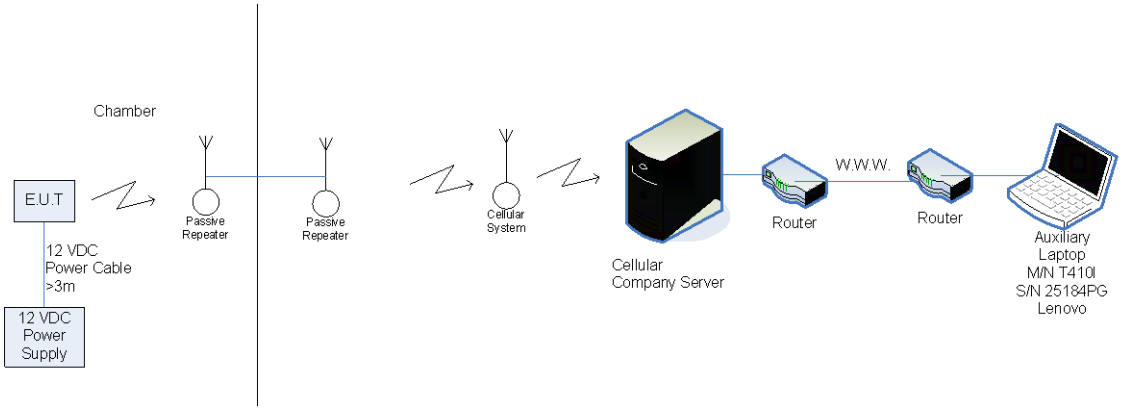
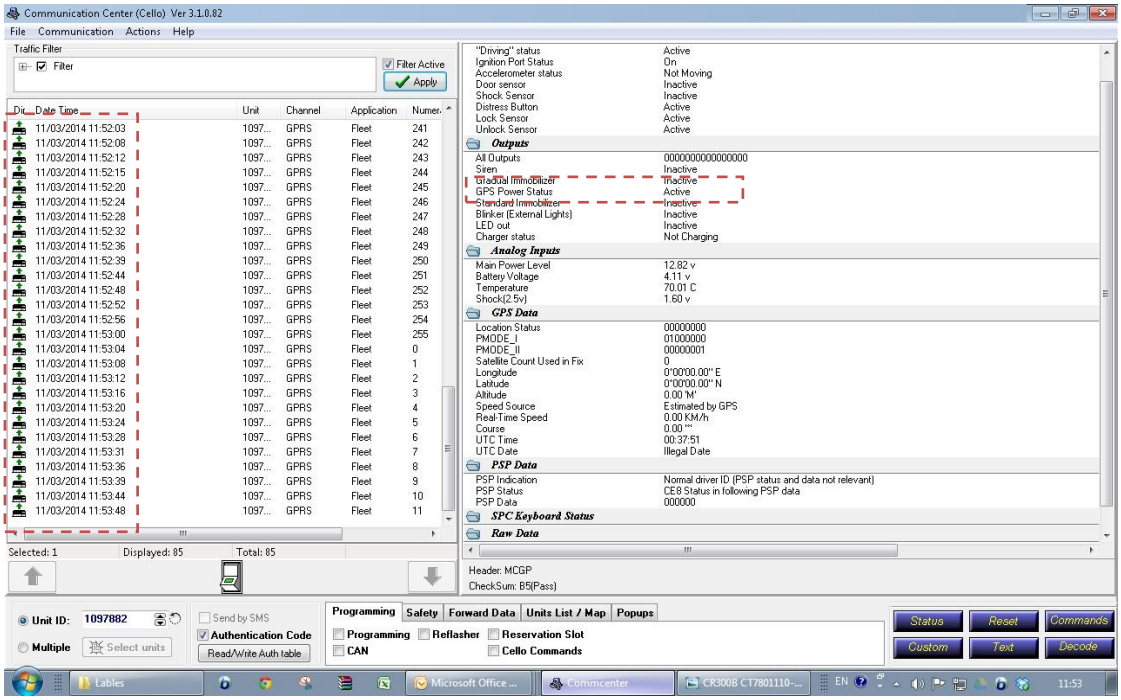


Figure 1. Test Set-up

7.1 Monitoring of E.U.T.

The transmission of the EUT every 4 seconds and the GPS status was monitoring observed on the auxiliary laptop display.



7.2 Definition of Failure

7.2.1. Loss of DATA.

7.2.2. Any change in the GPS status.

8. Conducted Emission From DC Lines

8.1 Test Specification

0.15-30 MHz, EN 55022: 2006 + Amendment A1: 2007, CLASS B

8.2 Test Procedure

The E.U.T operation mode and test set-up are as described in Section 7.1. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room (see Section 3), with the E.U.T (table-top) placed on a 0.4 meter high wooden table. Floor-standing E.U.T. was placed on the horizontal ground plane.

The E.U.T was powered via 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the positive and negative lines. The LISN was grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T

The center of the E.U.T.'s DC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

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 the photograph, *Figure 10. Conducted Emission From DC Lines Test*.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are pre-loaded to the receiver and are displayed on the receiver's spectrum display.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

8.3 Test Results

The E.U.T complies with the EN 55022: 2006 + Amendment A1: 2007, Class B specification requirements.

The margin between the emission levels and the specification limit is, in the worst case, 11.2 dB for the positive line at 3.18 MHz and 12.2 dB at 3.11 MHz for the negative line.

The details of the highest emissions are given in *Figure 2* to *Figure 5*.

Conducted Emission

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification: EN 55022: 2006 + Amendment A1: 2007, Class **B**
Lead: Positive
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	178 kHz	51.27	-13.30
2	Average	178 kHz	24.45	-30.12
1	Quasi Peak	358 kHz	43.36	-15.41
2	Average	390 kHz	11.93	-36.13
1	Quasi Peak	474 kHz	38.05	-18.38
2	Average	474 kHz	19.85	-26.59
1	Quasi Peak	750 kHz	32.57	-23.42
2	Average	1.046 MHz	23.13	-22.86
1	Quasi Peak	1.538 MHz	34.44	-21.55
2	Average	1.538 MHz	25.96	-20.03
1	Quasi Peak	3.15 MHz	42.30	-13.70
2	Average	3.178 MHz	34.77	-11.22
1	Quasi Peak	4.21 MHz	27.26	-28.73
2	Average	4.21 MHz	20.30	-25.69
1	Quasi Peak	7.066 MHz	20.89	-39.10
2	Average	8.954 MHz	15.79	-34.21
1	Quasi Peak	11.15 MHz	17.11	-42.89
2	Average	17.434 MHz	16.76	-33.23
1	Quasi Peak	20.674 MHz	22.26	-37.73
2	Average	22.126 MHz	25.78	-24.21

Date: 7.APR.2014 10:30:42

Figure 2. Detectors: Quasi-peak, Average

Note: DELTA LIMIT refer 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.

Conducted Emission

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification:	EN 55022: 2006 + Amendment A1: 2007, Class **B**
Lead:	Positive
Detectors:	Quasi-peak, Average

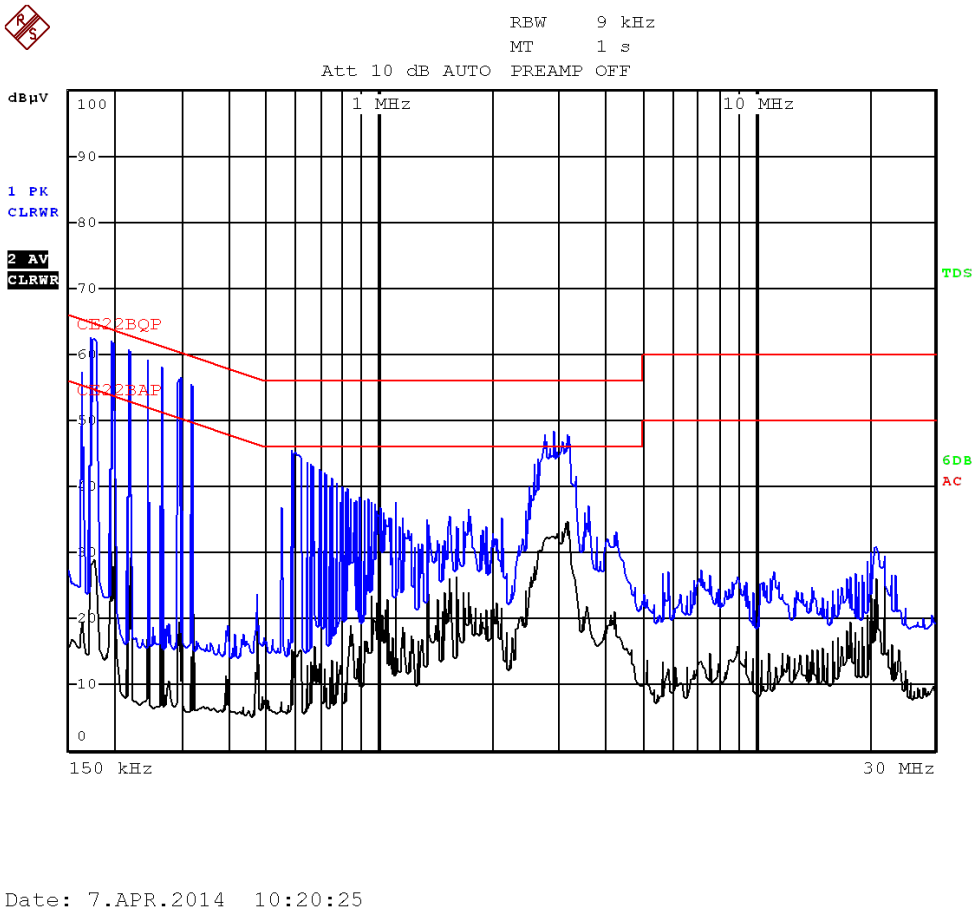


Figure 3. Detectors: Quasi-peak, Average

Conducted Emission

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification: EN 55022: 2006 + Amendment A1: 2007, Class **B**
Lead: Negative
Detectors: Quasi-peak, Average

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	226 kHz	50.22	-12.36
2	Average	238 kHz	16.00	-36.16
1	Quasi Peak	262 kHz	46.85	-14.51
2	Average	294 kHz	13.29	-37.11
1	Quasi Peak	558 kHz	37.94	-18.05
2	Average	558 kHz	8.86	-37.14
1	Quasi Peak	738 kHz	32.71	-23.28
2	Average	1.046 MHz	22.39	-23.61
1	Quasi Peak	1.534 MHz	33.68	-22.32
2	Average	1.614 MHz	26.30	-19.69
2	Average	3.114 MHz	33.80	-12.20
1	Quasi Peak	3.178 MHz	42.72	-13.27
2	Average	4.21 MHz	19.93	-26.06
1	Quasi Peak	4.346 MHz	22.16	-33.83
1	Quasi Peak	7.062 MHz	19.25	-40.74
2	Average	8.954 MHz	15.83	-34.16
1	Quasi Peak	11.362 MHz	20.13	-39.86
2	Average	11.778 MHz	13.90	-36.09
1	Quasi Peak	22.126 MHz	26.12	-33.87
2	Average	22.126 MHz	24.52	-25.47

Date: 7.APR.2014 10:25:32

Figure 4. Detectors: Quasi-peak, Average

Note: DELTA LIMIT refer 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.

Conducted Emission

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification:	EN 55022: 2006 + Amendment A1: 2007, Class **B**
Lead:	Negative
Detectors:	Quasi-peak, Average

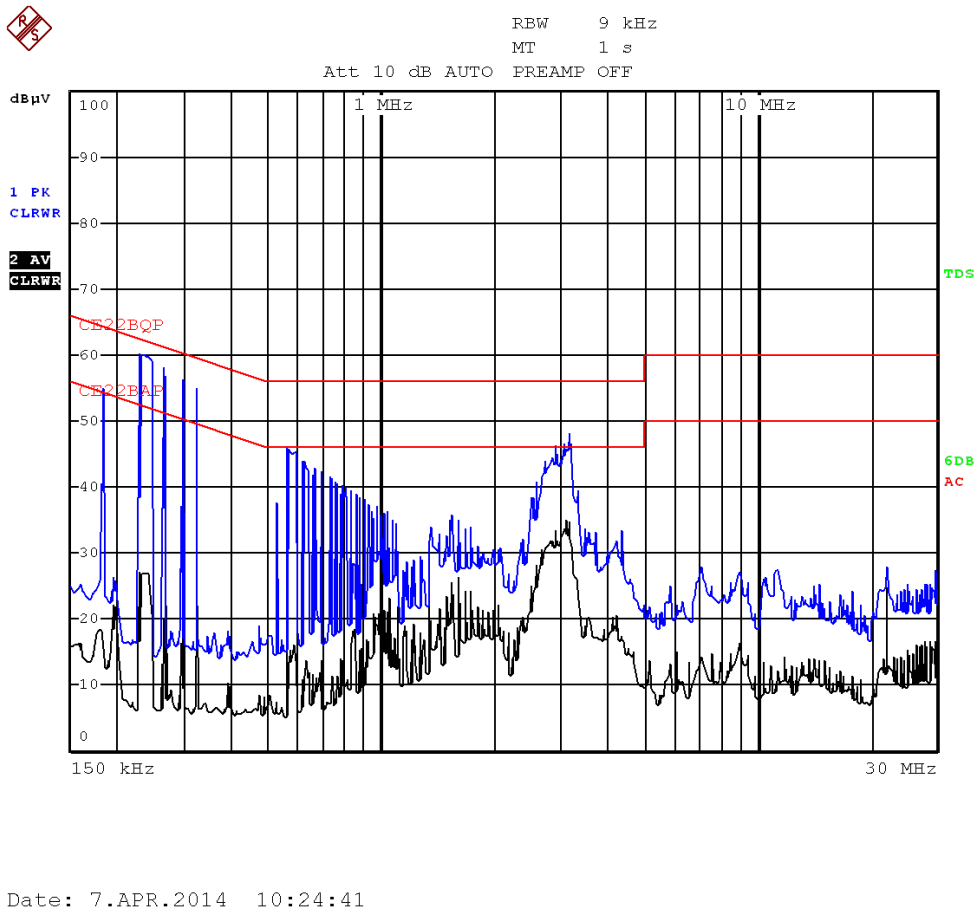


Figure 5 Detectors: Quasi-peak, Average

9. Immunity to Electrostatic Discharge

9.1 Test Specification

EN 61000-4-2: 2009

9.2 Test Procedure

In the case of tabletop equipment, the E.U.T. was set up on a wooden table 0.8m high on an insulating support 0.5 mm thick above the reference ground plane. In the case of floor-standing equipment, the EUT and cables were set up on an insulating support 0.1m above the reference plane. The test setup is illustrated in the photograph, *Figure 11. Immunity to Electrostatic Discharge Test.*

Photographs in *Figure 6* to *Figure 8* show the locations of test points.

9.2.1 Air Discharge

Potentials of 2, 4 and 8 kV were applied near each applicable test point. At places where discharge occurred, the potential was applied twenty times; ten times negative and ten times positive. The E.U.T.'s performance during the test was verified as detailed in Section 7.

9.2.2 Contact Discharge

Potentials of 2 and 4 kV were applied to each applicable test point. In places where discharge occurred, the potential was then applied twenty times; ten negative and ten positive discharges. The E.U.T.'s performance during the test was verified as detailed in Section 7.

9.2.3 Indirect Discharge (vertical and horizontal coupling plane)

Potentials of 2 and 4 kV were applied to the center of the vertical edge of the coupling plane at a distance of 0.1 meters from the outer casing of the E.U.T. to each applicable test point.

The potential was applied 10 times for each polarity, to each location of the coupling plane. All four faces of the E.U.T. were completely illuminated.

An ESD of the same characteristics as for the vertical coupling plane was applied to the horizontal coupling plane, at each side of the E.U.T., at a distance of 0.1 meter from it's outer casing.

Additional details are shown in Figure 5 of EN 61000-4-2: 2009.

The E.U.T.'s performance during the test was verified as detailed in Section 7.

9.3 Test Results

The E.U.T met the requirements of specification EN 61000-4-2: 2009.*

*__Anomaly__: During application of Air Discharge on the units, the communication between the cellular modem and the auxiliary PC was interrupted returned to normal after the cessation of the disturbances. The GPS was not affected. The E.U.T. continued to log data.

Immunity to Electrostatic Discharge

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification: EN 61000-4-2: 2009

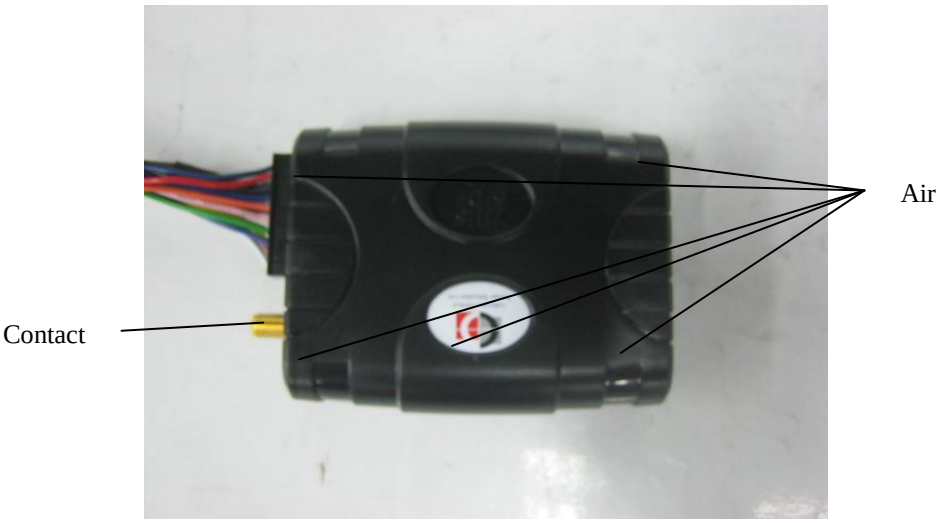


Figure 6. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification: EN 61000-4-2: 2009

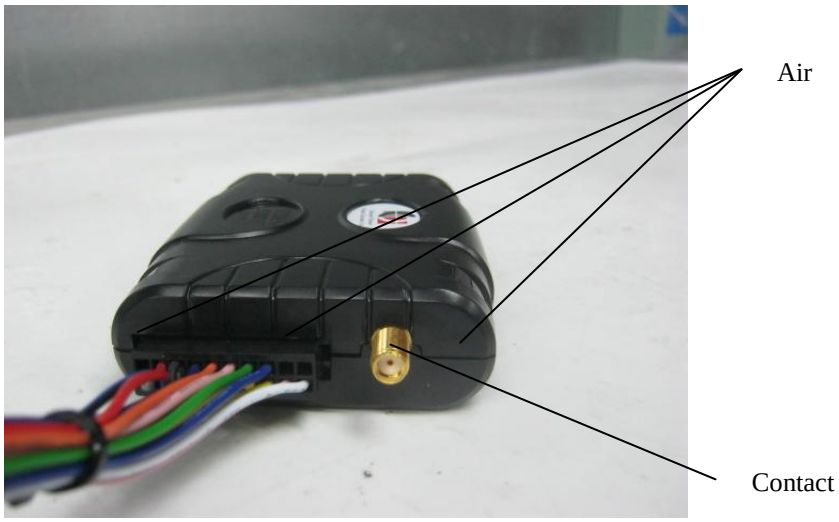


Figure 7. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification: EN 61000-4-2: 2009

Figure 8. ESD Test Points

10. Immunity to Radiated Field

10.1 Test Specification

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

10.2 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 1400 – 2700 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 photograph, *Figure 12. Immunity to Radiated Field Test*.

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.

10.3 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 9*.

Radiated Immunity

E.U.T Description	Cellocator Cello
Type	CELLO-CANiQ P/N CT7800130-000
Serial Number:	Not designated

Specification: EN 61000-4-3: 2006 + Amendments A1: 2008; A2: 2010
80-1000; 1400-2700 MHz

Amplitude Modulation: 80% AM by 1 kHz

Frequency (MHz)		Antenna Polarity	Specification (V/m)	PASS / FAIL	Immunity Threshold (V/m)
From	To				
80	1000	Horizontal	3.0	Pass	
80	1000	Vertical	3.0	Pass	
1400	2700	Horizontal	3.0	Pass	
1400	2700	Vertical	3.0	Pass	

Figure 9. Immunity to Radiated Field

11. Set Up Photographs

Figure 10. Conducted Emission From DC Lines Test

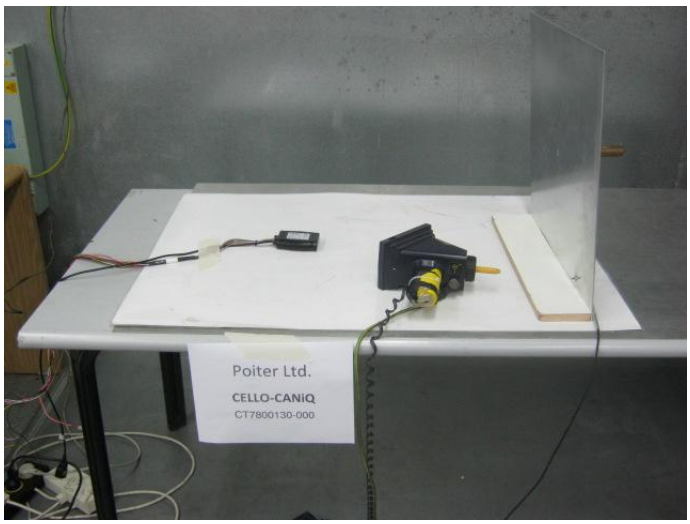


Figure 11. Immunity to Electrostatic Discharge Test

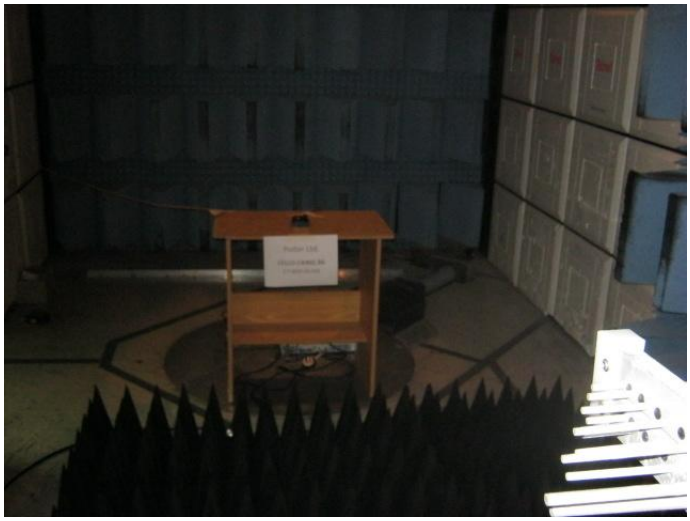


Figure 12. Immunity to Radiated Field Test

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

Test	Test Engineer Name	Signature	Date
Conducted Emissions From DC Lines	I. Siboni		27.04.14
ESD	I. Siboni		27.04.14
Radiated Immunity	I. Siboni		27.04.14

13. APPENDIX B - MEASUREMENT UNCERTAINTY

13.1 Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) 0.15 – 30 MHz:

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

± 3.44 dB