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DATE: 25 February 2013

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

CE EMC Test Report

(R&TTE Directive)

for

Pointer Telocation Ltd.

Equipment under test:

Asset Tracking Device

CelloTrack3G Power P/N GT9740001-000, CelloTrack3G LighterP/N GT9740005-000*;
CelloTrack3G IP67 P/N GT9740012-000*;
CelloTrack3G Power 6M P/N GT9740021-000*;CelloTrack3G 6M P/N GT9740022-000*;
CelloTrack3G Lighter 6M P/N GT9740023-000*;
CelloTrack3G XT P/N GT9740025-000*; CelloTrack3G Power XT P/N GT9740026-000*

* See customer's declaration on page 5.

Written by: _____
Y. Raz, Documentation

Approved by: _____
D. Yadidi, Test Engineer

Approved by: _____
I. Raz, EMC Laboratory Manager

TABLE OF CONTENTS

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):	Asset Tracking Device
Equipment Model No.:	CelloTrack3G Power P/N GT9740001-000, CelloTrack3G Lighter P/N GT9740005-000*; CelloTrack3G IP67 P/N GT9740012-000*; CelloTrack3G Power 6M P/N GT9740021-000*; CelloTrack3G 6M P/N GT9740022-000*; CelloTrack3G Lighter 6M P/N GT9740023-000*; CelloTrack3G XT P/N GT9740025-000*; CelloTrack3G Power XT P/N GT9740026-000*
Equipment Serial No.:	Not designated
Date of Receipt of E.U.T:	05.12.2012
Start of Test:	05.12.2012
End of Test:	10.12.2012
Test Laboratory Location:	I.T.L (Product Testing) Ltd. 1 Batsheva St., Lod ISRAEL 71100
Test Specifications:	See Section 2

* See customer's declaration on following page.

POINTER

Cellocator Division
Pointer Telocation Ltd.

Date: 26 December 2012

Declaration

I hereby declare that the **CelloTrack3G Power P/N GT9740001-000** is a full configuration model. The below model's:

Product Name:	*Part Number:*
CelloTrack3G Lighter	GT9740005-000
CelloTrack3G IP67	GT9740012-000
CelloTrack3G Power 6M	GT9740021-000
CelloTrack3G 6M	GT9740022-000
CelloTrack3G XT	GT9740025-000
Cellotrack3G Power XT)	GT9740026-000

differs from the **CelloTrack3G Power P/N GT9740001-000** only by diffrent Internal battery type\removal of battery charger components\External Harness connection. Please relate to all models (from an EMC/Radio point of view) as the same product.

Thank you,
Signature: _____

Pointer Telocation

Itamar Gohary
Certification Manager
Pointer Telocation Ltd.

Pointer Telocation Ltd. 14 Hamelacha St., Rosh Ha'ayin 48091, Israel • Tel: 972-3-5723111 • Fax: 972-3-5723100 • www.pointer.com

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 Federal Communications Commission (FCC) (U.S.A.), Registration No. 861911.
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-3006, R-2729, T-1877, G-245.
5. Industry Canada (Canada), File No. IC 6183.
6. TUV Product Services, England, ASLLAS No. 97201.

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 V1.4.1: 2002**	*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 40 GHz*
2.4	**EN 55022: 2006 + Amendment A1: 2007**	*Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment.*
2.5	**EN 61000-4-2: 2009**	*Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques; Section 2: Electrostatic discharge immunity test: Basic EMC publication.*
2.6	**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.*
2.7	**EN 61000-4-4: 2004 + Amendment A1: 2010**	*Electromagnetic compatibility (EMC), Part 4. Testing and measurement techniques; Electrical fast transient /burst immunity test, Basic EMC Publication.*
2.8	**EN 61000-4-6: 2009**	*Electromagnetic Compatibility (EMC), Part 4: Testing and Measurement Techniques; Section 6: Conducted disturbances induced by radio-frequency fields.*

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, 71100 Israel.
Telephone: +972-8-9153100
Fax: +972-8-9153101

3.2 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.

3.3 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.

3.4 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.

3.5 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.

3.6 EMI Receiver:

Type 1066.301, manufactured by Rhode & Schwarz, being in full compliance with CISPR 16 requirements.

3.7 E.U.T. Support:

Table mounted E.U.T.s are supported during testing on 80 cm high all-wooden tables (no metal nails or screws).

3.8 Test Equipment:

See details in Section 6.

4. Summary of Test Results

Test	Results
Conducted Emissions From DC Mains EN 55022: 2006 Class **B** + Amendment A1: 2007	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, 24.8 dB for the positive line at 3.25 MHz and 35.9 dB at 1.35 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.
EFT/B EN 61000-4-4: 2004 + Amendment A1: 2010 1kV DC Power lines	The E.U.T met the performance requirements of the specification.
Conducted Disturbances (0.15-80 MHz) EN 61000-4-6: 2009 3 VRMS, 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 CelloTrack family is comprised of a small, standalone tracking device intended for mobile assets and assets having limited access to power or without a power supply at all.

The capabilities provided by the CelloTrack family can greatly reduce an enterprise's financial losses incurred as a result of the often difficult task of successfully tracking equipment such as trailers, containers and trains.

CelloTrack supports tracking, communication, GPS location-based features and maintenance capabilities similar to the compact family and supports also the following additional features:

Durability and long life, making it ideal for tracking trailers, trains, containers, high-value assets, and more.

Stand-alone tracking device. May be installed without a power supply.

An internal long-life 13.6 AHr rechargeable Li-Polymer battery providing up to three years of autonomous operation without recharging (subject to the rate of transmission).

Advanced power management algorithms preserving battery power and extending battery life period.

Highly durable IP67 weatherproof casing that houses all components – battery, GSM module and GPS module.

A 3D accelerometer that detects movement of assets and enables different transmission rates for a moving asset and a standing asset.

A programmable (ON/OFF/Test/Panic) push button, charging and communication capabilities, a tamper switch to detect tampering and two monitoring LEDs.

Almost instant assembly and removal.

Minimal maintenance.

The CelloTrack family includes the following units:

CelloTrack (regular).

CelloTrack Power.

CelloTrack Lighter.

CelloTrack IP67 6M.

CelloTrack Power 6M.

CelloTrack Lighter 6M.

CelloTrack XT.

CelloTrack XT Power.

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			X				
ESD Simulator	SCHAFFNER	NSG 435	174-002-001(ZI)	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			X		
Signal Generator	HP	8657A	2849U01094		X			X		
BulkF Current Probe	FCC	F-120-9	105					X		
CDN	FCC	FCC-801-M3-16A	9962					X		
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							X
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 **IEC 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	-2	-3
ISN	T3SEQ	ISN T8-Cat 6	28749					
LISN	EMCO	3810/2BR	1297	X				
Transient Limiter	HP	11947A	3107A03041	X				
Current Probe	FCC	F51	163					
EMI Receiver	Rohde & Schwarz	ESCI7	100724	X				
EMI Receiver	Rohde & Schwarz	1066.301	100120					
Receiver RF Filter Section	HP	85460A	3650A00365					
RF Amplifier	HP	8447F	3113A06386					
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				X	X
AC Power Source	EM Test	ACS 500	1101/01				X	X

7. E.U.T. Performance Verification

7.1 Mode of Operation

The E.U.T. was fully operative and transmitted in a high rate of one transmission per 4 seconds to Pointer servers

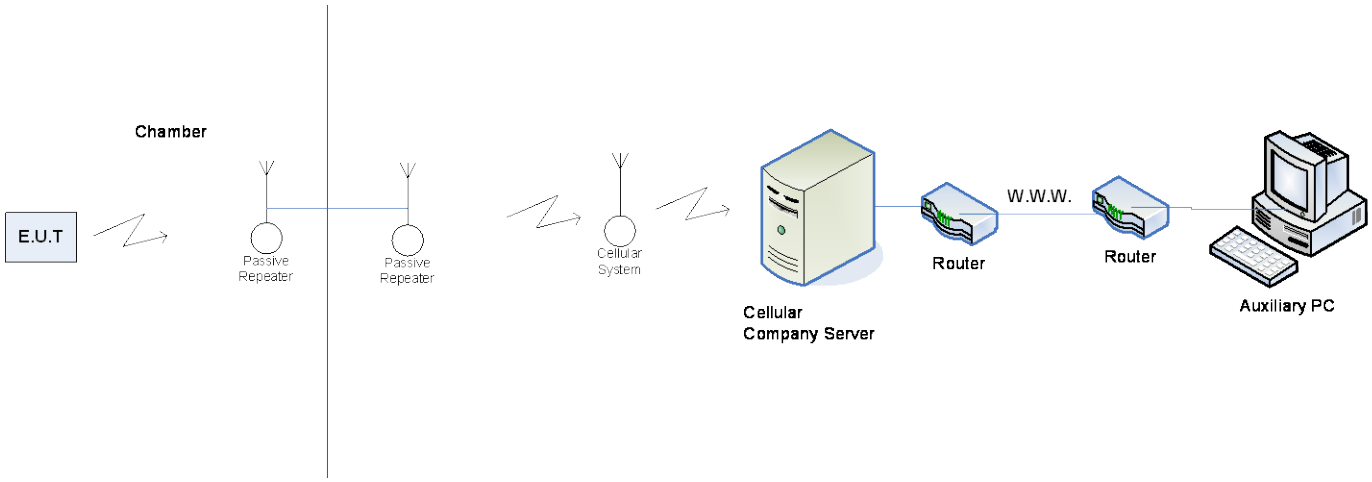

Figure 1. Test Set-up

7.2 Monitoring of E.U.T.

1. The External LED blinking indicating that the equipment is safe and works well was observed.
2. Anticipate in unit's event message coming from Pointer servers by using Laptop computer for monitoring.

7.3 Definition of Failure

1. LED stops blinking.
2. No transmission coming from the unit for long period of time(above 5 minutes).

8. Conducted Emission From DC Mains

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 from 12 V DC via 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the DC lines. The LISN's were 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 12. Conducted Emission From DC Mains Test*.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying to CISPR 16 requirements. The specification limits are loaded to the receiver via a 3.5" floppy disk 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, 24.8 dB for the positive line at 3.25 MHz and 35.9 dB at 1.35 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	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
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	170 kHz	18.72	-46.24
2	Average	170 kHz	13.97	-40.98
1	Quasi Peak	602 kHz	13.10	-42.89
2	Average	730 kHz	10.16	-35.83
1	Quasi Peak	850 kHz	18.64	-37.35
2	Average	850 kHz	11.68	-34.31
1	Quasi Peak	1.346 MHz	19.70	-36.29
2	Average	1.346 MHz	11.81	-34.18
2	Average	3.246 MHz	4.85	-41.14
1	Quasi Peak	3.25 MHz	31.23	-24.76
2	Average	4.154 MHz	5.42	-40.57
1	Quasi Peak	4.31 MHz	9.78	-46.21
1	Quasi Peak	10.278 MHz	10.31	-49.69
2	Average	16.77 MHz	5.96	-44.03
1	Quasi Peak	23.646 MHz	11.04	-48.95
2	Average	29.686 MHz	7.36	-42.63

Date: 5.DEC.2012 11:31:18

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	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

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

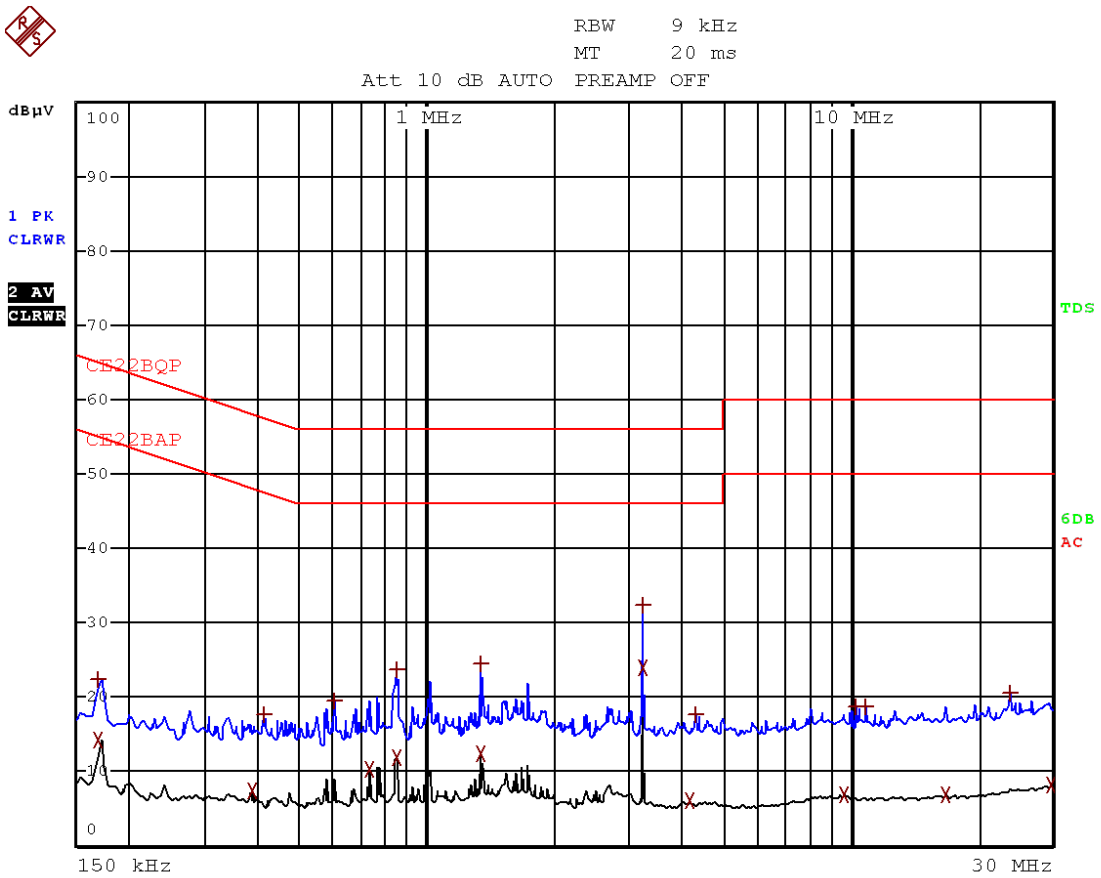

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Figure 3. Detectors: Quasi-peak, Average

Conducted Emission

E.U.T Description	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
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	170 kHz	16.54	-48.41
2	Average	170 kHz	12.04	-42.91
2	Average	730 kHz	8.27	-37.72
2	Average	846 kHz	9.56	-36.43
1	Quasi Peak	1.014 MHz	12.46	-43.54
1	Quasi Peak	1.342 MHz	16.90	-39.09
2	Average	1.346 MHz	10.13	-35.86
1	Quasi Peak	2.634 MHz	10.21	-45.78
2	Average	2.694 MHz	6.16	-39.83
2	Average	4.146 MHz	4.76	-41.23
1	Quasi Peak	4.598 MHz	9.99	-46.00
2	Average	8.346 MHz	5.86	-44.13
1	Quasi Peak	8.518 MHz	10.43	-49.56
2	Average	29.738 MHz	7.33	-42.66
1	Quasi Peak	29.826 MHz	12.03	-47.96

Date: 5.DEC.2012 11:37:22

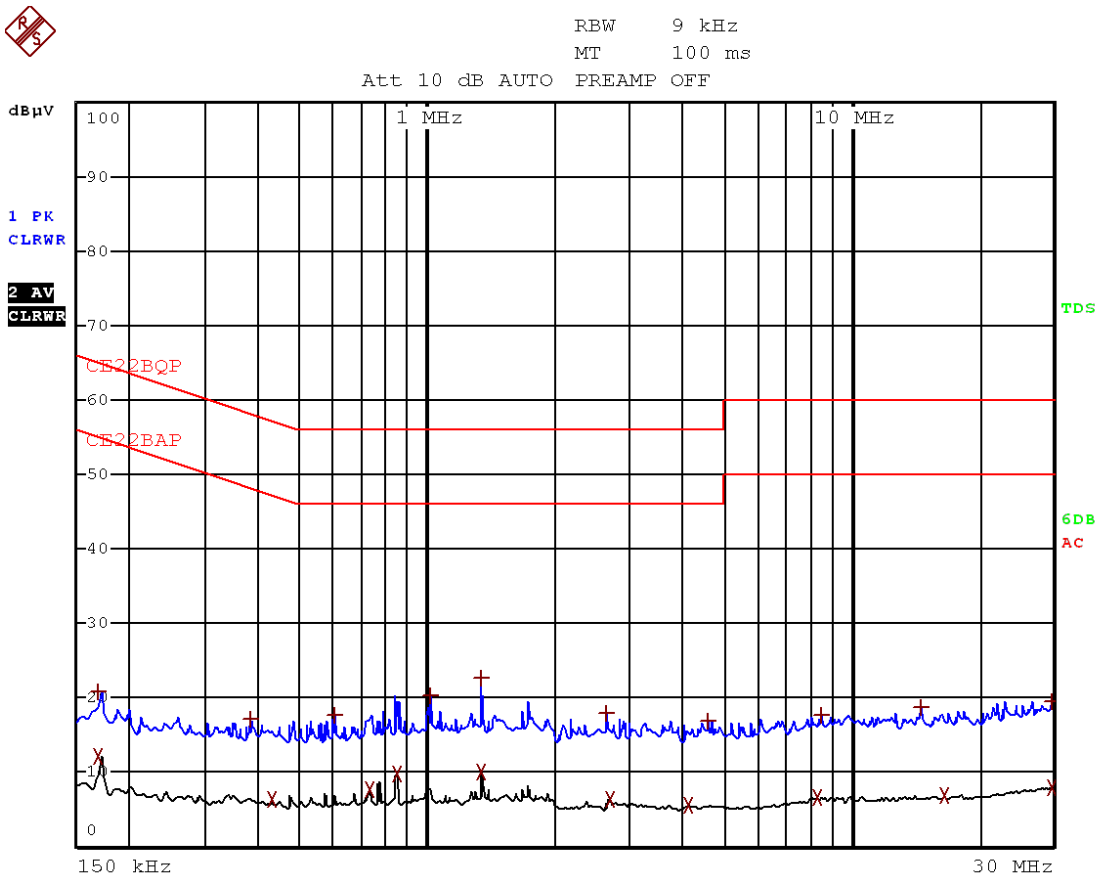
Figure 4. Detectors: Quasi-peak, Average

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	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

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



Date: 5.DEC.2012 11:35:56

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 13. 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.

Immunity to Electrostatic Discharge

E.U.T Description	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

Specification: EN 61000-4-2: 2009

AIR:

Figure 6. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

Specification: EN 61000-4-2: 2009

Contact:

AIR:

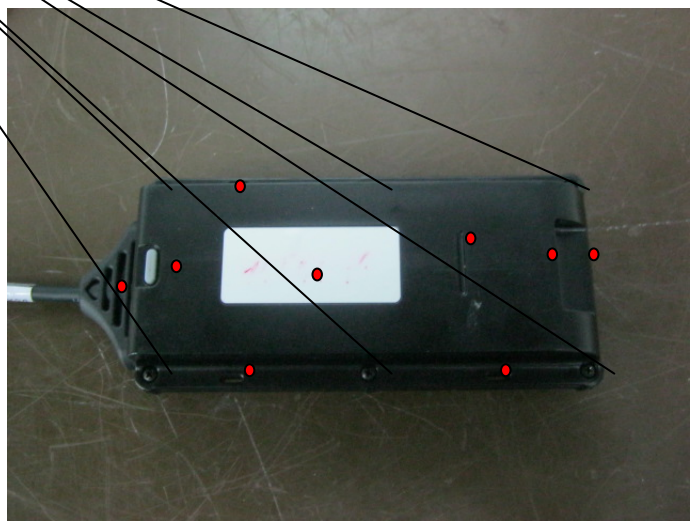


Figure 7. ESD Test Points

Immunity to Electrostatic Discharge

E.U.T Description	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

Specification: EN 61000-4-2: 2009

AIR:

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 14. 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	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
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. Immunity to Electrical Fast Transient / Burst

11.1 Test Specification

EN 61000-4-4: 2004 + Amendment A1: 2010

11.2 Test Procedure

The E.U.T. was placed 0.1 m above a reference ground plane.

The EFT/B generator was placed on, and grounded to, this ground plane. See the photograph, *Figure 15. Immunity to Electrical Fast Transient / Burst Test*.

A test signal having the waveform described in *Figure 16. Transient Waveforms* was applied to the DC lines of the E.U.T mains input, at a distance of 1 meter from the E.U.T. The test signal voltage was 1 kV and it was applied for 1 minute to each line, in negative and positive polarities.

The same test signal was applied to the signal lines, control and DC lines (as applicable), that are connected to the E.U.T. The voltage level was 0.5 kV in this case

Applicable signal and control lines should have a length greater than 3m.

11.3 Test Results

The E.U.T. passed the immunity to electrical fast transients / bursts requirements as detailed by specification EN 61000-4-4: 2004 + Amendment A1: 2010.

Additional details are given in *Figure 10.*

Electrical Fast Transient / Burst

E.U.T Description	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

Specification: EN 61000-4-4: 2004 + Amendment A1: 2010

[x] Positive Polarity **[x] Negative Polarity**

TEST POINT	PASS / FAIL	ANOMALY	SPECIFICATION (kV)	THRESHOLD (kV)
Positive	Pass	No anomaly	1.0	
Negative	Pass	No anomaly	1.0	

Figure 10. Immunity to Electrical Fast Transient / Burst

12. Immunity to Conducted Disturbances

12.1 Test Specification

EN 61000-4-6: 2009

12.2 Test Procedure

The E.U.T. was subjected to conducted disturbances in the frequency range 0.15 - 80 MHz, 3 VRMS, 1kHz, 80% AM modulation.

The disturbance signal was applied to the DC power lines using a Coupling Decoupling Network (CDN) or RF Current Injection Probe for Signal Lines.

The driver signal generator levels used are based on calibration that was performed in accordance with Section 6.4 and Annex A of EN61000-4-6, I.T.L. Procedures PM-111-CDN/M and PM-111-C.P. 105.

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 18. Conducted Disturbances.*

12.3 Test Results

The E.U.T. passed the Conducted Disturbances immunity tests as required by specification EN 61000-4-6: 2009.

Additional details are given in *Figure 11*.

Immunity to Conducted Disturbances

E.U.T Description	Asset Tracking Device
Type	CelloTrack3G Power P/N GT9740001-000
Serial Number:	Not designated

Specification: EN 61000-4-6: 2009
Tested at 1 kHz 80% AM Modulation

Using CDN Network

TEST POINT	PASS / FAIL	ANOMALY	SPECIFICATION (VRMS)	THRESHOLD (kV)
DC Power Port (Positive, Negative)	Pass	No anomaly	3	

Figure 11. Immunity to Conducted Disturbances

13. Set Up Photographs

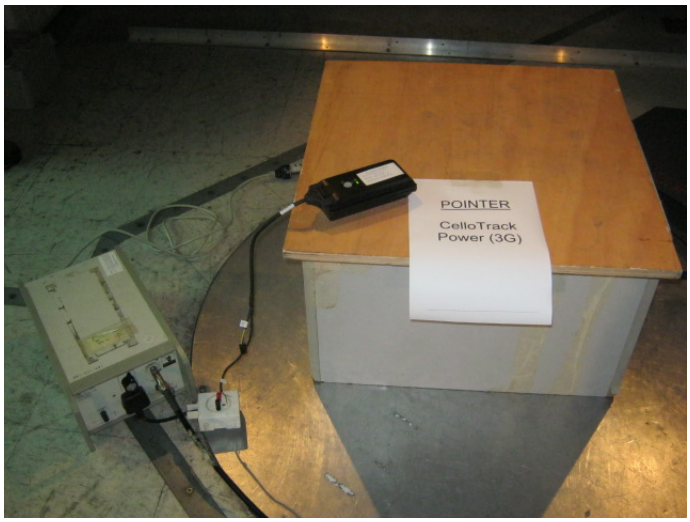


Figure 12. Conducted Emission From DC Mains Test

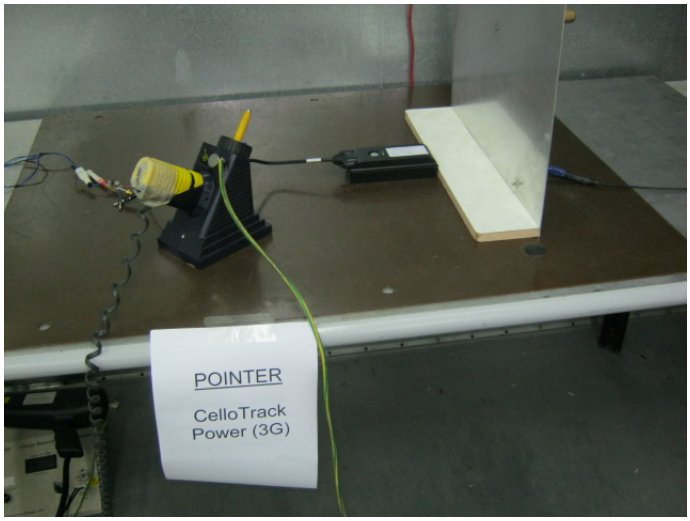


Figure 13. Immunity to Electrostatic Discharge Test

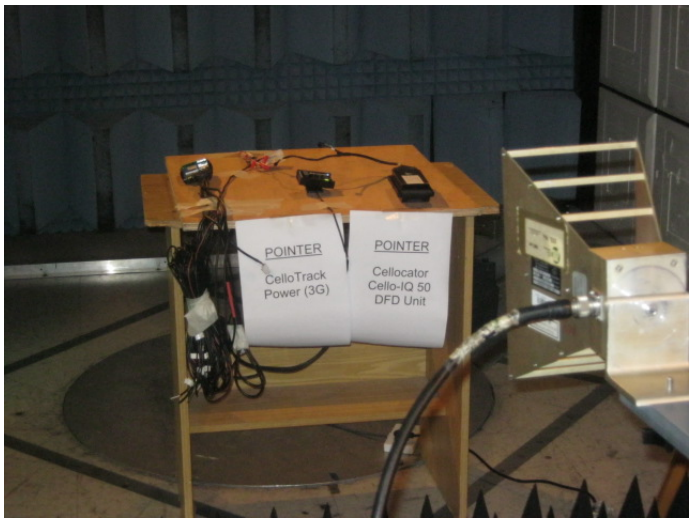


Figure 14. Immunity to Radiated Field Test

Figure 15. Immunity to Electrical Fast Transient / Burst Test

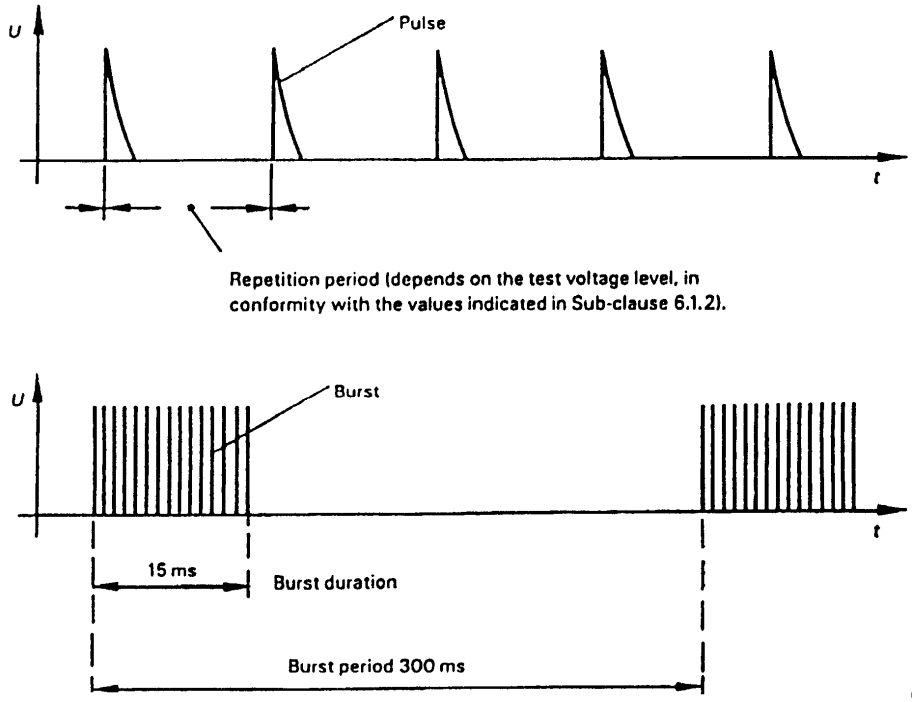


Figure 16. Transient Waveforms

Figure 17. Open Circuit Waveform (1.2 x 50μs double exponential)

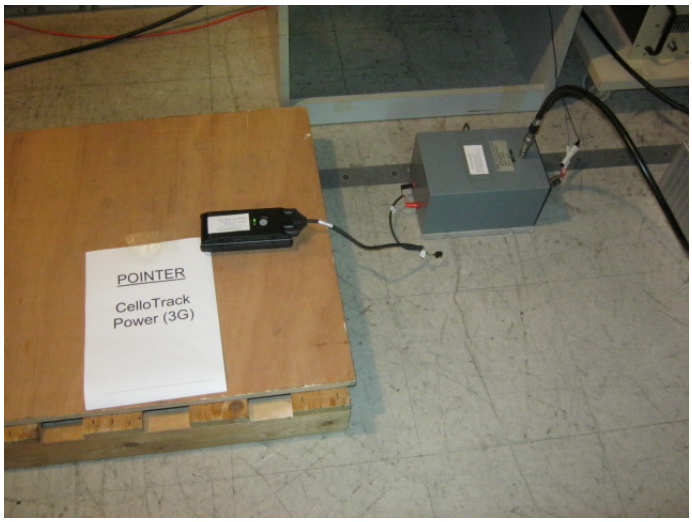


Figure 18. Conducted Disturbances

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

Test	Test Engineer Name	Signature	Date
Conducted Emissions From DC Mains	D. Yadidi		30.12.12
ESD	D. Yadidi		30.12.12
Radiated Immunity	D. Yadidi		30.12.12
EFT/B	D. Yadidi		30.12.12
Conducted Disturbances	D. Yadidi		30.12.12

15. APPENDIX B - MEASUREMENT UNCERTAINTY

15.1 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