

TO WHOM IT MAY CONCERN

Bosch Security Systems  
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The Netherlands

**Product Test Report**

ST-VS 2016-E-099

**Product**

F.01U.321.914	DDH-3532-200N00	DIVAR hybrid 3000 16AN/16IP
F.01U.321.915	DDN-3532-200N00	DIVAR network 3000 32IP
F.01U.321.916	DDN-3532-200N16	DIVAR network 3000 32IP 16PoE
F.01U.321.917	DDN-2516-200N00	DIVAR network 2000 16IP
F.01U.321.918	DDN-2516-200N08	DIVAR network 2000 16IP 8PoE
F.01U.321.919	DDN-2516-200N16	DIVAR network 2000 16IP 16PoE
F.01U.321.920	DRH-5532-400N00	DIVAR hybrid 5000 16AN/16IP
F.01U.321.921	DRN-5532-400N00	DIVAR network 5000 32IP
F.01U.321.922	DRN-5532-400N16	DIVAR network 5000 32IP 16PoE
F.01U.329.367	DDH-3532-212N00	Recorder 16-ch IP/16-ch AN 1x2TB
F.01U.329.368	DDH-3532-112D00	Recorder 16-ch IP/16-ch AN 1x2TB DVD
F.01U.329.369	DRH-5532-414N00	Recorder 16ch IP/16ch AN 1.5U 1x4TB
F.01U.329.370	DRH-5532-214D00	Recorder 16ch IP/16ch AN 1.5U 1x4TB DVD
F.01U.343.101	DRH-5532-226D00	Recorder 16ch IP/16ch AN 1.5U 2x6TB DVD
F.01U.329.371	DDN-3532-212N00	Recorder 32ch 1x2TB
F.01U.329.372	DDN-3532-112D00	Recorder 32ch 1x2TB DVD
F.01U.329.373	DDN-3532-212N16	Recorder 32ch 1x2TB 16PoE
F.01U.329.382	DDN-3532-112D16	Recorder 32ch 1x2TB 16PoE DVD
F.01U.329.383	DRN-5532-414N00	Recorder 32ch 1.5U 1x4TB
F.01U.329.384	DRN-5532-214D00	Recorder 32ch 1.5U 1x4TB DVD
F.01U.329.385	DRN-5532-414N16	Recorder 32ch 1.5U 1x4TB 16PoE
F.01U.329.386	DRN-5532-214D16	Recorder 32ch 1.5U 1x4TB 16PoE DVD
F.01U.329.387	DDN-2516-212N00	Recorder 16ch 1x2TB
F.01U.329.388	DDN-2516-112D00	Recorder 16ch 1x2TB DVD
F.01U.329.389	DDN-2516-212N08	Recorder 16ch 1x2TB 8PoE
F.01U.329.390	DDN-2516-112D08	Recorder 16ch 1x2TB 8PoE DVD
F.01U.329.391	DDN-2508-200N08	Recorder 8ch w/o HDD 8PoE
F.01U.329.392	DDN-2508-212N08	Recorder 8ch 1x2TB 8PoE
F.01U.329.393	DDN-2508-112D08	Recorder 8ch 1x2TB 8PoE DVD
F.01U.329.394	DDN-2516-212N16	Recorder 16ch 1x2TB 16PoE
F.01U.329.395	DDN-2516-112D16	Recorder 16ch 1x2TB 16PoE DVD

**The above mentioned Bosch Security Systems products have been tested in accordance and were found to comply with the tests listed below which were conducted during the development phase of the product.**

### EMC approvals

Directive or standard	Description
<b>EMC EU, 2014/30/EU (EMCD)</b>	
EN 55032:2012 /AC:2013 Class B	Electromagnetic compatibility of multimedia equipment - Emission Requirements
EN 55024 : 2010	Information technology equipment - Immunity characteristics - Limits and methods of measurement
EN 50130-4:2011	Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder, hold up, CCTV, access control and social alarm systems
EN 61000-3-2:2014	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)
EN 61000-3-3:2013	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current $\leq 16$ A per phase and not subject to conditional connection
EN 50121-4:2006 /AC:2008	Railway applications - Electromagnetic compatibility - Part 4: Emission and immunity of the signalling and telecommunications apparatus
EN 61000-4-5:2014	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test.  Installation class 3 applied to all input, output and supply wiring. $\pm 0.5$ , 1, and 2 kV common mode (line-to-ground), $\pm 0.5$ , and 1 kV differential mode (line-to-line).
<b>EMC US</b>	
CFR 47 FCC part 15, Class B ANSI C63.4 (2014)	Code of Federal Regulations, Radio Frequency Devices, Unintentional Radiators. Radiated Emission based on verification procedure.
<b>EMC Australia</b>	
AS/NZS CISPR 32:2013	Electromagnetic compatibility of multimedia equipment - Emission requirements. Compliance via EN 55032:2012

### Safety approvals

Directive or standard	Description
<b>Safety EU, 2014/35/EU (LVD)</b>	
EN 60950-1:2006 /A11:2009 /A1:2010 /A12:2011 /A2:2013	Information technology equipment - Safety - Part 1: General requirements.
<b>Safety USA + Canada</b>	
UL 60950-1, 2nd Ed., 2014-10-14 CAN/CSA C22.2 No. 60950-1-07, 2nd Edition, 2014-10	Information technology equipment - Safety – Part 1: General requirements.

### Environmental approvals

Directive or standard	Description
RoHS EU, 2011/65/EU EN 50581:2012	Restriction of the use of certain hazardous substances (RoHS)
WEEE EU, 2012/19/EU	Waste Electrical and Electronic Equipment (WEEE)
Packaging EU, 94/62/EC (amended by 2004/12/EC)	Packaging and packaging waste
N2580-1 (Bosch standard)	Central directive Bosch-Norm N 2580-1: "Prohibition and declaration of substances" Bosch-Norm N 2580-1 regulates prohibited substances and those rated declarable in materials, and it is part of the requirements for materials.
N33 6 (Bosch standard)	Design for Environment (DfE): Design and manufacturing rules

### Management system

Directive or standard	Description
ISO 9001:2008	Quality management systems -- Requirements <u>Scope:</u> Development, production, installation and sales.
ISO 14001:2004 /AC:2009	Environmental management systems -- Requirements with guidance for use <u>Scope:</u> Development, Production, Sales and After Sales.

### Reliability tests

Accordinging: EN 50130-5:2011 Alarm systems Part 5: Environmental test methods  
Class I, Indoor but restricted to residential/office environment

Test specification	Description
Dry heat (operational) (EN 60068-2-2:2007)	Temperature +40°C, Duration 16 hours.
Cold (operational) (EN 60068-2-1:2007)	Temperature 5°C, Duration 16 hours. <i>Bosch tested more severe at temperature 0°C</i>
Damp heat, steady state (operational) (EN 60068-2-78:2001)	Temperature 40°C, Relative Humidity 93%, Duration 4 days.
Damp heat, steady state (endurance) (EN 60068-2-78:2001)	Temperature 40°C, Relative Humidity 93%, Duration 21 days.
Shock (operational) (EN 60068-2-27:2009)	Halve sine wave pulse, duration 6ms, 3 pulses per direction, 6 directions.
Impact (operational) (EN 60068-2-75:1997 Test Ehb)	Impact energy 0.5Joule, 3 impacts per point (Similar to EN 62262 IK04 rating)
Vibration, sinusoidal (operational) (EN 60068-2-6:2008)	Frequency range 10-150 Hz, 5 ms <sup>2</sup> , 3 axes, sweep rate 1 octave x min <sup>-1</sup> , 1 sweep cycles per axis functional mode.
Vibration, sinusoidal (endurance) (EN 60068-2-6:2008)	Frequency range 10-150 Hz, 10 m/s <sup>2</sup> , 3 axes, sweep rate 1 octave x min <sup>-1</sup> , 20 sweep cycles per axis.
Dust tightness (endurance) (EN 60529:1991 A1:2000)	Duration 8h (Similar to EN 60529 IP5X or IP6X)

### Additional reliability tests

Activity	Description
MTBF (Mean Time Between Failures)	<p>&gt; 300.000 h MTBF calculation of used components(According Telcordia SR-332 i03 2011, Prediction Method Method I Case 3, Environment Temperature 35 °C (95°F), Environment condition GF(Ground fixed, controlled, <math>\pi E=1</math>), Quality Factor Level II ( <math>\pi Q = 1</math>))</p> <p>Note: MTBF calculations are excluding Hard Disks and DVD-writer</p> <p>&gt; 157.000 h Based on current field performance of predecessor products including Hard Disks and DVD-writer</p>
Additional surge tests according IEC 61000-4-5:2014 Lightning / surge protection	<p>The test is applied to the next connections: Video input, Audio input, Video spot output, Video CVBS output, Bidirectional talk input, Audio output, RS232 port, Alarm input/alarm output/RS485 port, power input (12VDC or 230VAC) and network port using UTP cable.</p> <p>And with the test severity ' Installation class 3': <math>\pm 0.5, 1, \text{ and } 2 \text{ kV}</math> common mode (line-to-ground) <math>\pm 0.5, \text{ and } 1 \text{ Kv}</math> differential mode (line-to-line)</p>
ALT	<p>Reliability test in which a moderate number of products are stressed at elevated, but non-destructive stress levels for a longer period of time.</p> <p>Temperature cycling <math>-15^{\circ}\text{C}</math> to <math>+65^{\circ}\text{C}</math> (<math>15^{\circ}\text{C} / \text{min}</math>)</p>
HALT	<p>Full HALT overstress test to fail according the Qualmark HALT guideline: Cold Step Stress Test, Hot Step Stress test, Rapid Thermal Stress Test, Random Vibration Stress Test, Combined Vibration/Rapid Thermal Stress Test.</p> <p>Defined operating limits: <math>-30^{\circ}\text{C}</math> to <math>+70^{\circ}\text{C}</math> and vibration level 30 Grms.</p>
Decorative surface test	<p>25 rubbings by hand on text + labels and Bosch logo / print with a piece of wool felt soaked with liquids. The used liquids are boiling point spirit <math>100\text{-}140^{\circ}\text{C}</math> and Ethanol 96 % with 5% methanol</p>
Temperature of hot spots on components	<p>Measured with an infrared scanner and thermocouples at room temperature (<math>20 \pm 5^{\circ}\text{C}</math>).</p>
Noise	<p>&lt; 45 dBA at 1m from front in sound free environment. Ambient temperature <math>20 \pm 5^{\circ}\text{C}</math> and maximum system load.</p>
HDD release in the product application	<p>HDD release of functional compatibility and the mechanical construction. Special attention to HDD mounting construction and mechanical vibration and interference of mutual HDD's and temperature. See Operation manual for list of release HDDs.</p>
Vibration test of product in packaging	<p>Product in packaging including all accessories and manuals. Test frequency: 7 Hz Displacement: 5.3 mm (= 1.05g) 30 min each side, 3 directions</p>
Transport drop test	<p>Product in packaging including all accessories and manuals. This test is executed after the vibration test on the same models Total 7 drops Drop height depending of the weight of the DVR</p>
Dynamic compression test of package	<p>Product in packaging including all accessories and manuals. Package shall be in visible good condition and product shall be conform specification.</p>

Data subject to change without notice.  
Eindhoven, August 2017