

TO WHOM IT MAY CONCERN

Bosch Security Systems
Torenallee 49
5617 BA Eindhoven
The Netherlands

Product Test Report

BT-SC 2018-E-054

Products

| | |
|-------------|-------------------------------------|
| NDE-4502-A | Fixed dome 2MP 3-10mm auto IP66 |
| NDE-4502-AL | Fixed dome 2MP 3-10mm auto IP66 |
| NDE-5503-A | Fixed dome 5MP HDR 3-10mm auto IP66 |
| NDE-5503-AL | Fixed dome 5MP HDR 3-10mm auto IP66 |

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

EMC approvals

| EMC EU | Description |
|---|---|
| EN 55032: 2015 / AC: 2016 EN 55024: 2010+ A1: 2015 | Information Technology Equipment- Radio disturbance characteristics Limits and Methods of measurement. Class B |
| EN 50130-4: 2011+ A1: 2014 | Alarm systems - Part 4: Electromagnetic compatibility - Product family standard: Immunity requirements for components of fire, intruder and social alarm systems. |
| EN 50121-4: 2016 | Railway applications – Electromagnetic compatibility – Part 4: Emission and immunity of signaling and telecommunications apparatus. |
| EN 61000-3-2: 2014 | Mains harmonics Part 3-2: Limits - Limits for harmonic current emissions |
| EN 61000-3-3:2013 | Voltage fluctuations Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems. |
| EMC US | |
| CFR 47 FCC part 15 Class B | Code of Federal Regulations, Radio Frequency Devices, Unintentional Radiators. Radiated Emission based on verification procedure. |
| EMC Australia | |
| AS/NZS CISPR 32 equal to CISPR 32 | Product market with BOSCH supplier code N663. |
| EMC Japan | |
| VCCI: VCCI-CISPR 32: 2016 | EMC certification for Japan. |
| EMC India | |
| BIS: IS 13252 (Part 1):2010 | EMC certification for India. |

Safety approvals

| Safety EU | |
|--|---|
| EN 62368-1:2014 + A11:2017 | Audio/video, Information and Communication technology equipment - Part 1: Safety requirements |
| EN 60950-22: 2017 | Information technology equipment - Safety - Part 22: Equipment installed outdoors. |
| EN 62471: 2008 (Only for IR version) | Eye Safety |
| Safety USA + Canada | |
| UL 62368-1 CAN/CSA-C22.2 No. 62368-1-14 | Audio/video, Information and Communication technology equipment - Part 1: Safety requirements |
| CSA/UL 60950-22 CAN/CSA-C22.2 No. 60950-22-07 | Information technology equipment - Safety - Part 22: Equipment installed outdoors. |

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 2014/12/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 Scope: Development, Production, Installation and Sales. |
| ISO 14001:2004 /AC:2009 | Environmental management systems – Requirements with guidance for use Scope: Development, Production, Sales and After Sales. |

Reliability tests

| EN50130-5:2011 Alarm systems Part 5: Environmental test methods | Class IV, fixed equipment, outdoor in general |
|--|---|
| Dry heat (Operational) (EN 60068-2-2:2007) | Temperature +70°C, Duration 16 hours. |
| Dry heat (Endurance) (EN 60068-2-2:2007) | Temperature +70°C, Duration 21 days. |
| Cold operation (Operational) (EN 60068-2-1:2007) | Temperature -25°C, Duration 16 hours. <i>Bosch tested more severe at temperature -40°C.</i> |
| Damp heat, steady state (Endurance) (EN 60068-2-78:2012) | Temperature +40°C, Relative Humidity 93%, duration 21 days. |
| Damp heat, cyclic (Operational) (EN 60068-2-30:2005) | Temperature +25°C to +55°C, Relative Humidity 93%, 2 cycles. <i>Bosch tested more severe for 6 cycles.</i> |
| Damp heat, cyclic (Endurance) (EN 60068-2-30:2005) | Temperature +25°C to +55°C, Relative Humidity 93%, 6 cycles. |
| Water ingress (Operational) (EN 60068-2-18:2001) | Test procedure Ra1.1 or Rb1.2, 10min (Similar EN60529 IPX4). <i>Bosch tested more severe for class IPx6 by mounting on a board.</i> |
| Salt mist, cyclic (Endurance) (EN 60068-2-52:1996) | Temperature +15°C to +35°C, Relative Humidity 93%, 4 cycles, Duration 28 days. |
| Shock (Operational) (EN 60068-2-27:2009) | Halve sine wave pulse, duration 6ms, 3 pulses per direction, 6 directions. <i>Bosch tested with acceleration of $\pm 1000 \text{ m/s}^2$.</i> |
| Impact (Operational) (EN 60068-2-75:2014) | Impact energy 1.0 Joule , 3 impacts per point (Similar to EN 62262 IK06 rating). <i>Bosch tested more severe for IK10 rating.</i> |
| Vibration sinusoidal (Operational) (EN 60068-2-6:2008) | Frequency Range 10~150Hz, 5 m/s ² , 3 axes, Sweep rate 1 octave/min, 1 sweep/axis. <i>Bosch tested with acceleration of 10m/s² and in operational mode.</i> |
| Vibration sinusoidal (Endurance) (EN 60068-2-6:2008) | Frequency Range 10~150Hz, 10 m/s ² , 3 axes, Sweep rate 1 octave/min, 20 sweep/axis. |
| Dust tightness (Endurance) (EN 60529:1991 A1:2000) | Duration 8h (similar to EN 60529 IP5X). <i>Bosch tested more severe for IP6X rating.</i> |

Additional Reliability tests

| Environmental test methods | Specific Test description |
|--|---|
| MTBF calculation of used components | Based on: Siemens SN 29500, or FIT figures manufacturer. Theoretical MTBF is about 800.000 h. |
| HALT (Highly Accelerating Life Test) | Overstress test to Fail, Operational, Lower Of Limitation = -40°C, High Of Limitation = +80°C, Vibration OL > 50Grms Combined Environment Stress: Temperature -40°C to +80°C, with 4 to 25 Grms for each cycle. |
| Cold start test | At ambient temperature -40°C. |
| Transport tests acc. AV18-Q0681 ISTA-2A: 2011 | |
| 1. Conditioning | Pre-conditioning: Temp. +25°C, 43%RH, Duration 6 hours. Conditioning: Temp. +38°C, 85%RH, Duration 72 hours. Temp. +60°C, 30%RH, Duration 6 hours. |
| 2. Compression | Top to Bottom, Apply and Hold, Duration 60min. Calculated test load = 972 lbs |
| 3. First vibration test | Frequency 232CPM, Duration 62 min. ; Number of Impact (cycle): 14200 cycles |
| 4. Drop test after 1 st vibration test | Height depending of weight of product. Drop height (inch): 32; drop times: 10 |
| 5. Second vibration test | Frequency 232CPM, Duration 62 min. ; Number of Impact (cycle): 14200 cycles |

Data subject to change without notice.
Eindhoven, September 2019.