

# TEST REPORT

|                                                                                                                                                                                 |                                                                                                                                                          |                                                               |  |
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| <br><b>CTK Co., Ltd.</b><br><small>The Power Leader of Global Regulatory Certification</small> | <b>CTK Co., Ltd.</b><br>(Ho-dong) 113, Yejik-ro, Cheoin-gu, Yongin-shi<br>Gyeonggi-do KOREA, REPUBLIC OF<br>Tel: +82-31-339-9970<br>Fax: +82-31-624-9501 | REPORT No.:<br><b>CTK-2017-01716</b><br>Page (1) / (19) pages |  |
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## 1. Applicant

- Name .....: Hanwha Techwin Co., Ltd.
- Address .....: Hanwha Techwin R&D center, 6 Pangyo-ro 319Beon-gil,  
Bundang-gu, Seongnam-si, Gyeonggi-do, 13488 KOREA
- **Date of Receipt**.....: 2017-08-03

## 2. Manufacturer

- Name .....: HANWHA TECHWIN (TIANJIN) CO.,LTD.
- Address .....: No.11 Weiliu Rd, Micro-Electronic Industrial  
Park, TEDA, Tianjin, 300385, People's Republic of China

3. **Use of Report**.....: Quality control

4. **Test sample / Model**.....: CCTV CAMERA / HCO-6080R\* (\*N:NT/P:PAL)

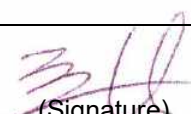
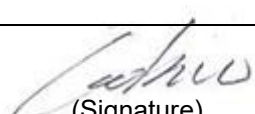
5. **Date(s) of test** .....: 2017-08-11 to 2017-08-12

6. **Test Standard (Method) used**....: KS C IEC 60529:2006

7. **Testing Environment** .....: Temperature: (25.0 ± 10.0) °C, Humidity: (50 ± 25) %R.H.,  
Air Pressure: (99.0 ± 2) kPa

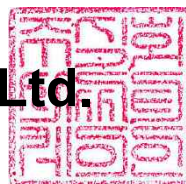
8. **Results** .....: Reference test results

The results shown in this test report refer only to the sample(s) tested unless otherwise stated.  
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|          |                                                                                                                                  |                                                                                                                                          |
|----------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Approval | Tested by:<br>WonHyeon. Choi. <br>(Signature) | Technical Manager:<br>KwangWon Lee, <br>(Signature) |
|----------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|

2017-09-14

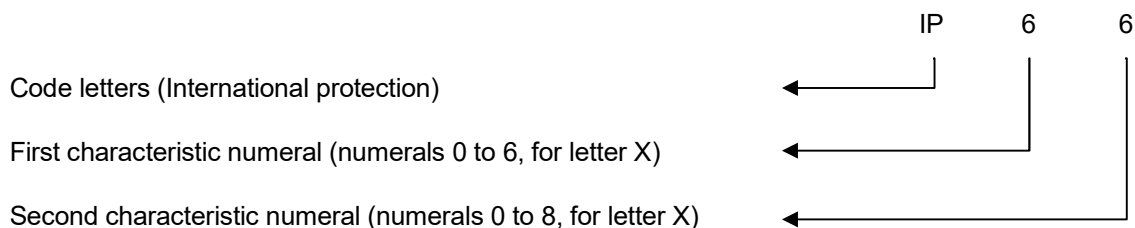
**CTK Co., Ltd.**



## 1. Degrees of protection provided by enclosures (IP code)

### 1.1 Test standard: KS C IEC 60529:2006

### 1.2 Arrangement of the IP code



#### 1.2.1 Degree of protection against access to hazardous parts indicated by the first characteristic numeral

| First characteristic numeral | Degree of protection                                                                                                                                                                          | Application              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 0                            | Non-protected                                                                                                                                                                                 | <input type="checkbox"/> |
| 1                            | Protected against access to hazardous parts with the back of a hand.<br>The access probe, sphere of 50 mmØ, shall have adequate clearance from hazardous parts.<br>Test force: 50 N ± 10 %    | <input type="checkbox"/> |
| 2                            | Protected against access to hazardous parts with a finger.<br>The jointed test finger of 12 mmØ, 80 mm length, shall have adequate clearance from hazardous parts.<br>Test force: 10 N ± 10 % | <input type="checkbox"/> |
| 3                            | Protected against access to hazardous parts with a tool.<br>The access probe of 2.5 mmØ, shall not penetrate.<br>Test force: 3 N ± 10 %                                                       | <input type="checkbox"/> |
| 4                            | Protected against access to hazardous parts with a wire.<br>The access probe of 1.0 mmØ, shall not penetrate.<br>Test force: 1 N ± 10 %                                                       | <input type="checkbox"/> |
| 5                            | Protected against access to hazardous parts with a wire.<br>The access probe of 1.0 mmØ, shall not penetrate.<br>Test force: 1 N ± 10 %                                                       | <input type="checkbox"/> |

|                                                                                                                                                                                 |                                                                                                                                                          |                                                               |  |
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| First characteristic numeral | Degree of protection                                                                                                                    | Application                         |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 6                            | Protected against access to hazardous parts with a wire.<br>The access probe of 1.0 mmØ, shall not penetrate.<br>Test force: 1 N ± 10 % | <input checked="" type="checkbox"/> |

NOTE In the case of the first characteristic numerals 3, 4, 5 and 6, protection against access to hazardous parts is satisfied if adequate clearance is kept. The adequate clearance should be specified by the relevant product committee in accordance with 12.3. Due to the simultaneous requirement specified in table 2, the definition "shall not penetrate" is given in table 1.

### 1.2.2 Degree of protection against solid foreign objects indicated by the first characteristic numeral

| First characteristic numeral | Degree of protection                                                                                                                                                                                                                                                                                                                                                                                                                                            | Application              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 0                            | Non-protected                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <input type="checkbox"/> |
| 1                            | Protected against solid foreign objects of 50 mmØ and greater.<br>The object probe, sphere of 50 mmØ, shall not fully penetrate <sup>1)</sup> .<br>Test force: 50 N ± 10 %                                                                                                                                                                                                                                                                                      | <input type="checkbox"/> |
| 2                            | Protected against solid foreign objects of 12.5 mmØ and greater.<br>The object probe, sphere of 12.5 mmØ, shall not fully penetrate <sup>1)</sup> .<br>Test force: 30 N ± 10 %                                                                                                                                                                                                                                                                                  | <input type="checkbox"/> |
| 3                            | Protected against solid foreign objects of 2.5 mmØ and greater.<br>The object probe, sphere of 2.5 mmØ, shall not penetrate at all <sup>1)</sup> .<br>Test force: 3 N ± 10 %                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> |
| 4                            | Protected against solid foreign objects of 1.0 mmØ and greater.<br>The object probe, sphere of 1.0 mmØ, shall not penetrate at all <sup>1)</sup> .<br>Test force: 1 N ± 10 %                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> |
| 5                            | Dust Testing Equipment<br>Whether reductions in pressure below the atmospheric pressure are present or not, ingress of dust is not totally preventive, but dust shall not penetrate in a quantity to interfere with satisfactory operation of the apparatus or to impair safety.<br>(Talcum powder have to go through the measured sieve by Φ 50 um wire that are spacing 75 um in squared, per volume and union Talcum powder have to be 2 kg/m <sup>3</sup> ) | —                        |

CTK-D151-06 (Rev.0) 60529 TRF

|                                                                                                                                                                                 |                                                                                                                                                          |                                                               |  |
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### 1.2.3 Degrees of protection against water indicated by the second characteristic numeral

| Second characteristic numeral | Degrees of protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Application              |
|-------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 0                             | Non-protected                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <input type="checkbox"/> |
| 1                             | Water that drops verticality has to be harmless<br>Drip box Fig.3, Enclosure on turntable<br>Water flow rate: 1 mm/min<br>Speed of Rotating platform: 1 r/min<br>Eccentricity: Approximately 100 mm<br>Duration of test: 10 min                                                                                                                                                                                                                                                                                                                  | <input type="checkbox"/> |
| 2                             | When outskirts of the product have been tilted by 15° Water that drops verticality has to be harmless.<br>Drip box Fig.3, Enclosure in 4 fixed positions of 15° tilt<br>Water flow rate: 3 mm/min<br>Duration of test: 2.5 min for each position of tilt                                                                                                                                                                                                                                                                                         | <input type="checkbox"/> |
| 3                             | Vertical line of water that moves by $\pm 60^\circ$ and its drops has to be harmless<br><input type="checkbox"/> Oscillating tube Fig.4, Spray $\pm 60^\circ$ from vertical, Distance max. 200 mm<br>Water flow rate: each of watering pit 0.07 l/min $\pm 5\%$ per hole<br>Duration of test: 10 min<br><input type="checkbox"/> spray nozzle Fig. 5, Spray $\pm 60^\circ$ from vertical<br>Water flow rate: 10 l/min $\pm 5\%$<br>Duration of test: 1 min/m <sup>2</sup> at least 5 min: <b>min</b>                                             | <input type="checkbox"/> |
| 4                             | The product must not be harmed in any direction even splashing water.<br>As for numeral 3, Spray $\pm 180^\circ$ from vertical<br><input type="checkbox"/> Oscillating tube Fig.4, Spray $\pm 180^\circ$ from vertical, Distance max. 200 mm<br>Water flow rate: each of watering pit 0.07 l/min $\pm 5\%$ per hole<br>Duration of test: 10 min<br><input type="checkbox"/> spray nozzle Fig. 5, Spray $\pm 180^\circ$ from vertical<br>Water flow rate: 10 l/min $\pm 5\%$<br>Duration of test: 1 min/m <sup>2</sup> at least 5 min: <b>min</b> | <input type="checkbox"/> |

|                                                                                                                                                                                 |                                                                                                                                                          |                                                               |  |
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| Second characteristic numeral | Degrees of protection                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Application                         |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 5                             | <p>The product must not be harmed in any direction even a single jet water.</p> <p>Water jet hose nozzle Fig.6, Nozzle 6.3 mm diameter</p> <p>Water flow rate: 12.5 l/min <math>\pm</math> 5 %</p> <p>Distance: 2.5 m to 3 m:           <b>m</b></p> <p>Duration of test: 1 min/m<sup>2</sup> at least 3 min :           <b>min</b></p>                                                                                                                                                                 | <input type="checkbox"/>            |
| 6                             | <p>The product must not be harmed in any direction even strong jet water.</p> <p>Water jet hose nozzle Fig.6, Nozzle 12.5 mm diameter</p> <p>Water flow rate: 100 l/min <math>\pm</math> 5 %</p> <p>Distance: 2.5 m to 3 m: <b>3 m</b></p> <p>Duration of test: 1 min/m<sup>2</sup> at least 3 min: <b>3 min</b></p>                                                                                                                                                                                    | <input checked="" type="checkbox"/> |
| 7                             | <p>Sink the product in the water by the Pressure and Time according to regulation and the product must not be harmed.</p> <p>Immersion tank water-level on enclosure with:</p> <p><input type="checkbox"/> height equal to or greater than 850 mm: the highest point of enclosures located 0.15 m below the surface of the water</p> <p><input type="checkbox"/> height less than 850 mm: the lowest point of enclosures located 1 m below the surface of the water</p> <p>Duration of test: 30 min</p> | <input type="checkbox"/>            |
| 8                             | <p>Unless there is a relevant product standard, the test conditions are subject to agreement between manufacturer and user, but they shall be more severe than those prescribed in IP X7 and they shall take account of the condition that the enclosure will be continuously immersed in actual use.</p> <p>the lowest point of enclosures located below the surface of the water:</p> <p style="text-align: center;"><b>m</b></p> <p>Duration of test:           <b>min</b></p>                       | <input type="checkbox"/>            |

|                                                                                                                                                                                 |                                                                                                                                                          |                                                               |  |
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### 1.3 Test Result

| IP code | Remark                                        |
|---------|-----------------------------------------------|
| IP 6X   | No penetration of probe<br>No ingress of dust |
| IP X6   | No ingress of water.                          |

※ The results shown in this test report refer only to the sample(s) tested unless otherwise stated

|                                                                                                                                                                       |                                                                                                                                                                     |                                                                 |  |
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**List of test equipment used:**

| Instr. No. | Instrument type                | Model                                                        | Make     | Serial            | Used                                |
|------------|--------------------------------|--------------------------------------------------------------|----------|-------------------|-------------------------------------|
| S3-T11     | Sphere 50 mm diameter          | IEC60529 IP1X                                                | Kingpo   | KP-TP001          | <input type="checkbox"/>            |
| S1-J10     | Jointed test finger            | TFP-01                                                       | ED&D     | S1-J10            | <input type="checkbox"/>            |
| S1-J14     | Test rod (2.5 mm)              | TRP-01                                                       | ED&D     | S1-J14            | <input type="checkbox"/>            |
| S1-J15     | Test wire (1.0 mm)             | TRP-02                                                       | ED&D     | S1-J15            | <input checked="" type="checkbox"/> |
| S1-X01     | Push Pull Gage                 | FB30K                                                        | Imada    | 83805             | <input checked="" type="checkbox"/> |
| S3-IP8     | Dust Chamber                   | IEC60529 IP 5X6X                                             | Kingpo   | TX0010            | <input checked="" type="checkbox"/> |
| S3-IP17    | Big Dust Chamber               | BR-TL-3F                                                     | Kingpo   | S3-IP17           | <input type="checkbox"/>            |
| S3-IP1     | Drip Box                       | IEC 60529 Drip Box,<br>IPX1/ IPX2                            | Kingpo   | -                 | <input type="checkbox"/>            |
| S1-J19-1   | ANGLE METER                    | AM-01                                                        | ED&D     | CTK-IN-<br>S1-154 | <input type="checkbox"/>            |
| S3-IP3     | Oscillating Tube               | IEC 60529 oscillating tube,<br>with rotate table, IPX3/ IPX4 | Kingpo   | -                 | <input type="checkbox"/>            |
| S3-IP4     | Spray Nozzle                   | IEC 60529 Spray Nozzle,<br>IPX3/ IPX4                        | Kingpo   | -                 | <input type="checkbox"/>            |
| S3-IP5     | Hose Nozzle (6.3 mm)           | IPX5                                                         | Kingpo   | ZH13388           | <input type="checkbox"/>            |
| S3-IP6     | Hose Nozzle (12.5 mm)          | IPX6                                                         | Kingpo   | ZH13388           | <input checked="" type="checkbox"/> |
| S3-IP7     | Immersion tank                 | Cage for IPX7                                                | Kingpo   | -                 | <input type="checkbox"/>            |
| S1-E19     | Electronics Load               | EUL-75JL                                                     | Fujitsu  | 00373             | <input type="checkbox"/>            |
| S1-P10     | Digital Power Meter            | WT210                                                        | Yokogawa | 96F302605         | <input type="checkbox"/>            |
| S1-W02     | Withstanding voltage<br>tester | TOS5051                                                      | KIKUSUI  | 14050357          | <input type="checkbox"/>            |
| S1-SW2     | Stop Watch                     | NONE                                                         | Casio    | 612Q1R-1          | <input checked="" type="checkbox"/> |
| S1-H05     | Aneroid Barometer              | BAROMEX                                                      | SATO     | 84682             | <input checked="" type="checkbox"/> |
| S1-H06     | Hygro Thermograph              | ST-50M                                                       | SEKONIC  | HE51-<br>000147   | <input checked="" type="checkbox"/> |

## 2. APPENDIX

### 2.1 Product Photographs

< Photo 1 > Product External view

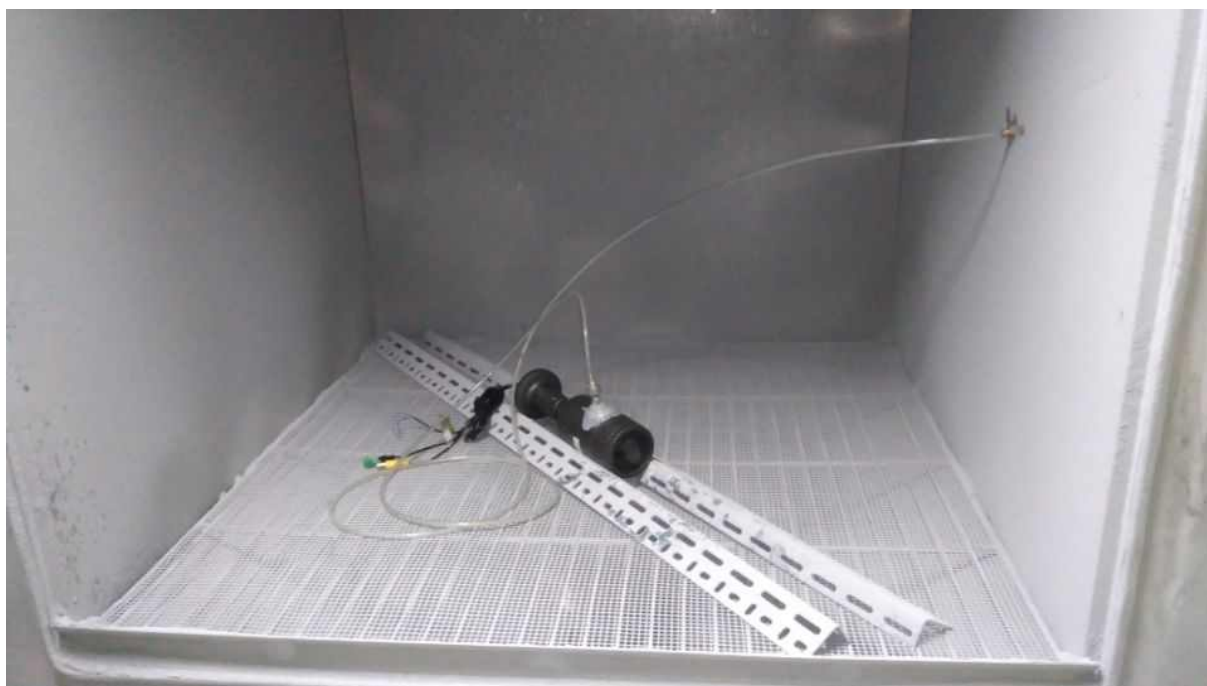


< Photo 2 > Product External view



## 2.2 Test Setup Photos and Configuration

< Photo 3 > The first characteristic numeral test



< Photo 4 > The second characteristic numeral test



## 2.3 Product internal photographs after test

< Photo 5 > The first characteristic numeral test



< Photo 6 >



< Photo 7 >



< Photo 8 >



< Photo 9 >



< Photo 10 >



< Photo 11 > The second characteristic numeral test



< Photo 12 >



< Photo 13 >



< Photo 14 >



< Photo 15 >



< Photo 16 >



## 2.4 Product Appearance

Enclosure Dimensions [Unit: mm]

