UL TEST REPORT AND PROCEDURE

Standard:	UL 62368-1, 3rd Ed, 2021-10-22 (Audio/video, information and communication technology equipment Part 1: Safety requirements) CAN/CSA C22.2 No. 62368-1:19, 3rd Ed, 2021-10-22 (Audio/video, information and communication technology equipment Part 1: Safety requirements)
Certification Type:	Listing
CCN:	AZOT, AZOT7 (Audio/video, Information and Communication Technology Equipment)
Complementary CCN:	N/A
Product:	THERMAL NETWORK CAMERA
Model:	TNM-C4940TD, TNM-C4950TD, TNM-C4960TD, TNM-C4940TDR, TNM-C4942TDR, TNM-C4952TD, TNM-C4962TD
Rating:	PoE (53 Vdc), 0.48 A or 12 Vdc, 1.8 A (for models TNM-C4940TD, TNM-C4940TDR, TNM-C4942TDR) PoE (53 Vdc), 0.45 A or 12 Vdc, 1.63 A (for models TNM-C4950TD, TNM-C4960TD, TNM-C4952TD, TNM-C4962TD)
Applicant Name and Address:	HANWHA VISION CO LTD 6, PANGYO-RO 319BEON-GIL, BUNDANG-GU SEONGNAM-SI GYEONGGI-DO 13488 KOREA

This is to certify that representative samples of the products covered by this Test Report have been investigated in accordance with the above referenced Standards. The products have been found to comply with the requirements covering the category and the products are judged to be eligible for Follow-Up Service under the indicated Test Procedure. The manufacturer is authorized to use the UL Mark on such products which comply with this Test Report and any other applicable requirements of UL LLC ('UL') in accordance with the Follow-Up Service Agreement. Only those products which properly bear the UL Mark are considered as being covered by UL's Follow-Up Service under the indicated Test Procedure.

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Prepared By: Sohyun Lee / Project Handler Reviewed By: Seungtae Kim / Reviewer

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Supporting Documentation

The following documents located at the beginning of this Procedure supplement the requirements of this Test Report:

A. Authorization - The Authorization page may include additional Factory Identification Code markings.

B. Generic Inspection Instructions -

i. Part AC details important information which may be applicable to products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of this Test Report.

ii. Part AE details any requirements which may be applicable to all products covered by this Procedure. Products described in this Test Report must comply with any applicable items listed unless otherwise stated in the body of each Test Report.

iii. Part AF details the requirements for the UL Certification Mark which is not controlled by the technical standard used to investigate these products. Products are permitted to bear only the Certification Mark(s) corresponding to the countries for which it is certified, as indicated in each Test Report.

Product Description

THERMAL NETWORK CAMERA has been designed for OUTDOOR or INDOOR use and integrated a hole for mount.

It is a commercial equipment supplied from PoE (Power over Ethernet) or 12 Vdc and installed by service personnel.

Model Differences

TNM-C4940TD is basic model.

TNM-C4950TD, TNM-C4960TD are identical to basic model except model designation, ratings, no IR LED and lens specification.

TNM-C4940TDR, TNM-C4942TDR are identical to basic model except model designation and SW.

TNM-C4952TD, TNM-C4962TD are identical to basic model except model designation, ratings, no IR LED, lens specification and SW.

Test Item Particulars

Product group	:	end product
Classification of use by	:	Instructed person
Supply Connection	:	not mains connected: ES1
Supply tolerance	:	None
Supply connection – type	:	PoE (Power over Ethernet) or 12 Vdc
Considered current rating of protective device	:	N/A
Equipment mobility	:	wall/ceiling-mounted
Over voltage category (OVC)	:	OVC I
Class of equipment	:	Class III
Special installation location	:	N/A
Pollution degree (PD)	:	PD 2
Manufacturer's specified Tma (°C)	:	60 Outdoor: minimum -50
IP protection class	:	IP 66, 67
Power systems	:	not AC mains
Altitude during operation (m)	:	2000 m or less

Altitude of test laboratory (m) ..... : 2000 m or less
Mass of equipment (kg) ..... : 4.81

Technical Considerations

- The product was submitted and evaluated for use at the maximum ambient temperature (Tma) permitted by the manufacturer's specification of : 60 °C
- The product is intended for use on the following power systems : No direct connection
- Considered current rating of protective device as part of the building installation (A) : N/A
- Mains supply tolerance (%) or absolute mains supply : No direct connection
- The Risk Group of a lamp or lamp system (including LEDs) is : RG 1
- The following are available from the Applicant upon request : Installation (Safety) Instructions / Manual
- The outdoor equipment/enclosure was evaluated for use in an ambient range of : -40 °C to 60 °C

Additional Information

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- Maximum Normal Load: Continuous operation with USB 0.5 A load and IR LED.
(The heater operates at a specific temperature.)

Revision: SR# 5808800.1466086
Update Applicant Name to Hanwha Vision Co Ltd

4791048908
- Add model name; TNM-C4940TDR, TNM-C4942TDR

4791995722
- [CCL] Change part from Front Lens cover (Plastic) to WINDOW- FRONT (Plastic) type PC-6715VT(f1)(a) made by CHI MEI CORPORATION.
- [CCL] Add technical data Transformer (T8); 41 uH.
- [CCL] Add type name Opto-coupler (LS1); LTV-816 (Type: LTV-816S-G)
- [CCL] Delete Internal wiring, Connectors and Receptacles (Secondary circuits).
- [CCL] Change Gasket (between Front cover and Top cover, between Bottom cover and Top cover, between SD cover and Bottom cover, between Back box Top and Bottom cover) type O-VMQ-40-BK made by Y&K.
- Conduct Y.5.3 - WATER SPRAY TEST.

4792026323
No test of THERMAL NETWORK CAMERA, models: TNM-C4940TD, TNM-C4950TD, TNM-C4960TD, TNM-C4940TDR, TNM-C4942TDR were considered necessary because of below updates under engineer consideration.
- Add new models, TNM-C4952TD, TNM-C4962TD.
- Add ratings for new models.
- Update of model differences.

Additional Standards

The product fulfills the requirements of: N/A

Markings and Instructions

Clause Title	Marking or Instruction Details

Equipment identification marking – Manufacturer identification	Listee’s or Recognized Company’s name, Trade Name, Trademark or File Number
Equipment identification marking – model identification	Model Number
Equipment rating marking – ratings	Input Ratings (voltage, frequency/dc, current/power) Output Ratings (voltage, frequency/dc, current/power)
Outdoor enclosure type	Type 3, 3X, 3S, 3SX, 4, 4X, 6, 6P, "Raintight", "Rainproof", "Watertight", "Corrosion Resistant", "Dusttight" Enclosure
Hard Copy	A. IMPORTANT B. Please check 'Manuals' from out website, before connecting to the supply. C. Company website URL (https://www.~~)
Website Manual - 1	This product is intended to be supplied by a Listed Power Supply Unit marked “Class 2” or “LPS” or “PS2” and rated from PoE (53 Vdc), 0.48 A or 12 Vdc, 1.8 A (for model TNM-C4940TD) and PoE (53 Vdc), 0.45 A or 12 Vdc, 1.63 A (for model TNM-C4950TD, TNM-C4960TD).
Website Manual - 2	The wired LAN hub providing power over the Ethernet (PoE) in accordance with IEEE 802.3.at shall be a UL Listed device with the output evaluated as a Limited Power Source as defined in UL60950-1 or PS2 as defined in UL62368-1.
Special Instructions to UL Representative N/A	

BD1.0	TABLE: Production-Line Testing Requirements					
BD1.1	**Electric Strength Test Special Constructions – Refer to Generic Inspection Instructions, Part AC for further information.**					
Model	Component	Removable parts	Test probe location	Test V rms	Test V dc	Test Time, s
N/A	N/A	N/A	N/A	N/A	N/A	N/A
BD1.2	**Earthing Continuity Test Exemptions – This test is not required for the following models:**					
	All models					
BD1.3	**Electric Strength Test Exemptions – This test is not required for the following models:**					
	All models					
BD1.4	**Electric Strength Test Component Exemptions – The following solid-state components may be disconnected from the remainder of the circuitry during the performance of this test.**					
	All models					

BE1.0	Sample and Test Specifics for Follow-Up Tests at UL				
Model	Component	Material	Test	Sample (s)	Test Specifics
N/A	N/A	N/A	N/A	N/A	N/A

4.1.2	**TABLE: List of critical components**					**Pass**
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Product Category CCN(s)	Mark(s) of conformity	Supplement ID
WINDOW- FRONT (Plastic)	CHI MEI CORPORATION	PC-6715VT(f1)(a)	Min. 1.5 mm thickness, rated Min. V-0, 125 deg. C.	QMFZ2	UL (E56070)	
Enclosure (Metal)	Interchangeable	Interchangeable	Aluminium, Min. 2.5 mm thickness, see enclosure for dimension.	-	Tested in equipment	
External deco cover (Plastic)	LG CHEM LTD	LI996(&)	Min. 2.0 mm thickness, rated Min. V-0, 50 deg. C.	QMFZ2	UL (E67171)	
Mounting Bracket (Metal)	Interchangeable	Interchangeable	Aluminium, Min. 2.5 mm thickness, Approximate 117.4 by 166.2 by 10.0 mm,	-	-	
Internal Plastic Part Materials	LOTTE CHEMICAL CORPORATION	HN-1068(+)(f1)	Min. 1.5 mm thickness, rated Min. V-0, 130 deg. C.	QMFZ2	UL (E115797)	
Heater resister (26 EA, R1 to R26)	Interchangeable	Interchangeable	5.6 ohm 0.25 W each	-	Tested in equipment	
Transformer (T8)	SHENZHEN GROUP-TEK ELECTRONICS TECHNOLOGY CO LTD	PDT25125SR	130 deg. C, 41 uH, see enclosure for more detail.	-	Tested in equipment	
Line Filter (T7)	TNC CO.,LTD	CV320070SB	7.0 mH, 130 deg. C, See enclosure for more detail.	-	Tested in equipment	
Opto-coupler (LS1)	LITE-ON TECHNOLOGY CORP	LTV-816 (Type: LTV-816S-G)	Isolation Voltage: 5300. Max. Operation Temperature: 110 deg. C.	FPQU2	UL (E113898)	

Fuse (F1)	LITTELFUSE INC	449*	Rated 125 V, 2.5 A	-	UL (E10480)	
Lithium Battery (BAT1)	SEIKO INSTRUMENTS INC MICRO-ENERGY DIV	ML414H	Lithium (Coin), Rechargeable, Max 3.4Vdc, Maximum charging current 300mA	BBCV2	UL (MH15628)	
USB protect IC (U1)	TEXAS INSTRUMENTS INCORPORATED	TPD3S014	Rated 4.5-5.5 Vdc, 0.5 A, Current limit: 1.01 A	QVGS2	UL (E169910)	
Thermal Pad	KOMOTECH CO LTD	KGP-1(a)	Min. 0.2 mm thickness, rated V-0, 150 deg. C	QMFZ2	UL (E245303)	
Gasket - between Front cover and Top cover	Y&K	O-VMQ-40-BK	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
Gasket - between Bottom cover and Top cover	Y&K	O-VMQ-40-BK	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
Gasket - between SD cover and Bottom cover	Y&K	O-VMQ-40-BK	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
Gasket - between Back box Top and Bottom cover	Y&K	O-VMQ-40-BK	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
Gasket - between Back box and cable (Left hole)	Namyang Vina	C-VMQ-60-GR	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
Gasket - between Back box and cable (Right hole)	Namyang Vina	C-VMQ-60-GR	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
Gasket - between Bottom cover and cable	Namyang Vina	C-VMQ-30-BK	Gasket Test was conducted under E158873-A6034	-	Tested in equipment	
FPWB	Interchangeable	Interchangeable	Min V-2 or VTM-2, 80 deg. C.	QMFZ2 or QMTS2 or ZPXK2 or ZPMV2	UL	

PWB	HANNSTAR BOARD CORP	MV-1	Min. V-1, 130 deg. C.	ZPMV2	UL (E89382)	
PWB – Alternate	Interchangeable	Interchangeable	Min. V-0, 130 deg.C	ZPMV2	UL	
Outdoor Label	Interchangeable	Interchangeable	Max Temp 60 deg. C, Min Temp -50 deg. C	PGDQ2 or PGJL2	UL	
IR LED (3EA, LD1, LD2, LD3)	OSRAM	SFH4718A	VF=2.2Vdc (max)	-	Tested in equipment	
IR LED (3EA, LD4, LD5, LD6)	LITEON	LTE-R38386L-YE5-SS	VF=2.5Vdc (max)	-	Tested in equipment	

Enclosures

Type	Supplement Id	Description
Photographs	03-01	External View - 1
Photographs	03-02	External View - 2
Photographs	03-03	Internal View - 1
Photographs	03-04	Internal View - 2
Photographs	03-05	Sensor Module - 1
Photographs	03-06	Sensor Module - 2
Photographs	03-07	IR LED Board
Photographs	03-08	Heater Board
Photographs	03-09	IR DETECTOR Lens
Photographs	03-10	Interface Board Top
Photographs	03-11	Interface Board Bottom
Photographs	03-12	Power Board Top
Photographs	03-13	Power Board Bottom
Photographs	03-14	NUC Board Top
Photographs	03-15	NUC Board Bottom
Photographs	03-16	Back Box Board
Photographs	03-17	Connector Board Top
Photographs	03-18	Connector Board Bottom
Photographs	03-19	External Cover Plastic
Photographs	03-20	Internal Plastic
Diagrams	04-01	Diagram
Manuals	06-01	Manual
Miscellaneous	07-01	Dual language safety labeling CRD
Miscellaneous	07-02	Transformer (T8) Specification
Miscellaneous	07-03	Line Filter (T7) Specifiation
Miscellaneous	07-04	Label
Miscellaneous	07-05	Label (RG1)
Miscellaneous	07-06	Label