

# **Low Voltage Directive Test Report**

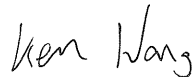


**VIVOTEK INC.**

**Network Camera**

**Model IP8160**



**敦吉檢測科技股份有限公司  
AUDIX Technology Corporation**

<b>TEST REPORT</b>	
<b>IEC 60950-1/ EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013</b>	
<b>Information technology equipment – Safety –</b>	
<b>Part 1: General requirements</b>	
Report Reference No .....	<AL105064-01>
Projected by (+ signature).....	Ken Wang 
Approved by (+ signature) .....	Allen Kao 
Date of issue .....	February 8, 2017
Total number of pages .....	Total 12 pages
Testing Laboratory.....	AUDIX TECHNOLOGY CORPORATION.
Address .....	7FL., NO.8, LANE 120, NEI-HU RD., SEC.1, TAIPEI, TAIWAN. R.O.C.
Applicant's name .....	VIVOTEK INC.
Address .....	6F, NO.192, LIEN-CHENG RD., CHUNG-HO , NEW TAIPEI CITY, 235, TAIWAN, R.O.C.
Manufacturer .....	VIVOTEK INC.
Address .....	6F, NO.192, LIEN-CHENG RD., CHUNG-HO , NEW TAIPEI CITY, 235, TAIWAN, R.O.C.
<b>Test specification:</b>	
Standard.....	<input checked="" type="checkbox"/> IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 <input checked="" type="checkbox"/> EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013
Test procedure .....	Low Voltage Directive
Non-standard test method .....	N/A
Test item description .....	Network Camera
Trade Mark .....	
Manufacturer .....	Same as applicant
Model/Type reference .....	IP8160
Ratings .....	37-57 Vdc, 0.15-0.10 A (for PoE)

**List of Attachments (including a total number of pages in each attachment):**

Annex A: Photos

Annex B: List of used measuring instruments

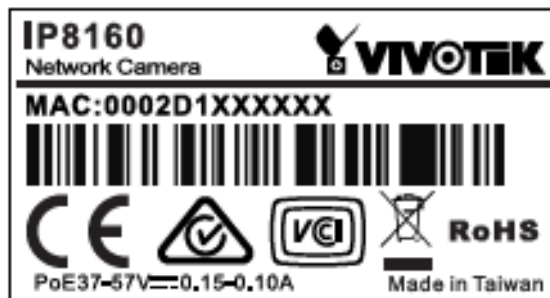
**Summary of testing:**

<p>1.6 Power interface. 1.7 Marking and instructions. 2.2 SELV circuits. 2.5 Limited power sources. 4.2 Mechanical strength. 4.5 Thermal requirements. 5.2 Electric strength 5.3 Abnormal operating and fault conditions.</p>	<p>All tests as described in Test Case and Measurement Sections were performed at the laboratory described on page 1.</p>
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**Report Summary**

The product was investigated and complies with the requirements of IEC 60950-1:2005 (Second Edition) + Am 1:2009 + Am 2:2013 / EN 60950-1:2006/A11:2009/A1:2010/A12:2011/A2:2013 (which includes CENELEC COMMON MODIFICATIONS for EN standards differences).

**Copy of marking plate:**



<b>Test item particulars..... :</b>	
<b>Equipment mobility.....:</b>	<input checked="" type="checkbox"/> movable <input type="checkbox"/> hand-held <input type="checkbox"/> transportable <input type="checkbox"/> stationary <input type="checkbox"/> for building-in <input type="checkbox"/> direct plug-in
<b>Connection to the mains.....:</b>	<input type="checkbox"/> pluggable equipment <input type="checkbox"/> type A <input type="checkbox"/> type B <input type="checkbox"/> permanent connection <input type="checkbox"/> detachable power supply cord <input type="checkbox"/> non-detachable power supply cord <input checked="" type="checkbox"/> not directly connected to the mains
<b>Operating condition.....:</b>	<input checked="" type="checkbox"/> continuous <input type="checkbox"/> rated operating / resting time:
<b>Access location .....</b>	<input checked="" type="checkbox"/> operator accessible <input type="checkbox"/> restricted access location
<b>Over voltage category (OVC) .....</b>	<input type="checkbox"/> OVC I <input type="checkbox"/> OVC II <input type="checkbox"/> OVC III <input type="checkbox"/> OVC IV <input checked="" type="checkbox"/> other: not directly connected to the mains
<b>Mains supply tolerance (%) or absolute mains supply values .....</b>	N/A
<b>Tested for IT power systems .....</b>	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
<b>IT testing, phase-phase voltage (V) .....</b>	N/A
<b>Class of equipment .....</b>	<input type="checkbox"/> Class I <input type="checkbox"/> Class II <input checked="" type="checkbox"/> Class III <input type="checkbox"/> Not classified
<b>Considered current rating of protective device as part of the building installation (A) .....</b>	N/A
<b>Pollution degree (PD) .....</b>	<input type="checkbox"/> PD 1 <input checked="" type="checkbox"/> PD 2 <input type="checkbox"/> PD 3
<b>IP protection class .....</b>	IPX0
<b>Altitude during operation (m) .....</b>	Up to 2000 m
<b>Altitude of test laboratory (m) .....</b>	Up to 2000 m
<b>Mass of equipment (kg) .....</b>	approx. 0.17 kg with base stand base stand 0.06 kg
<b>Possible test case verdicts:</b>	
- test case does not apply to the test object.....:	N/A (N/A)
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
<b>Testing..... :</b>	
<b>Date of receipt of test item .....</b>	2017-01-11
<b>Date (s) of performance of tests .....</b>	2017-01-16 to 2017-01-19
<b>General remarks:</b>	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report.	
<b>Throughout this report a <input type="checkbox"/> comma / <input checked="" type="checkbox"/> point is used as the decimal separator.</b> The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.	
<b>Name and address of factory (ies) .....</b>	
VIVOTEK INC. 5F, No.168, Lien-Cheng Rd., Chung-Ho, New Taipei City, 235, Taiwan, R.O.C.	

**General product information:**

The original report no. AL105064 was issued on 2016-12-15 to include the following changes/additions

Description of change(s):

1. Add one model: IP8160
2. Add rating 37-57 Vdc, 0.15-0.10 A (for PoE)
3. Add PoE Board

The model is difference as follows:

Model	Rating	PoE Box
IP8160-W	5Vdc, 1.6A (for Adapter)	No

**Additional information**

The product was submitted and tested for use at the maximum ambient temperature (T<sub>ma</sub>) permitted by the manufacturer's specification of: 40 °C.



The following circuit locations (with circuit/ schematic designation) were investigated as a limited power source (LPS): SD card slot

All interconnection to the equipment is for indoor location, and therefore PoE network interconnected to the equipment is considered as SELV.

Clause	Requirement + Test	Result - Remark	Verdict
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1.5	<b>Components</b>		P
1.5.1	General	See below.	P
	Comply with IEC 60950-1 or relevant component standard	See appended table 1.5.1.	P
1.5.2	Evaluation and testing of components	Components certified to IEC standards and/or their harmonized standards, are used within their ratings and are checked for correct application. Non-certified components are checked for correct application, used within their ratings, tested as part of the equipment and subjected to applicable tests of the component standard. Components, which no relevant IEC-Standard exists, are used within their ratings and are tested under the conditions occurring in the equipment.	P
1.5.5	Interconnecting cables	Interconnecting cables comply with the relevant requirements of this standard.	P

1.6	<b>Power interface</b>		P
1.6.1	AC power distribution systems	Equipment is not directly connected to the mains supply.	N/A
1.6.2	Input current	See appended table 1.6.2.	P

1.7	<b>Marking and instructions</b>		P
1.7.1	Power rating and identification markings	The power rating marking is provided and is readily visible in operator access area.	P
1.7.1.1	Power rating marking	See below.	P
	Multiple mains supply connections .....	Equipment is not directly connected to the mains supply.	N/A
	Rated voltage(s) or voltage range(s) (V) .....	PoE 37-57 Vdc	—
	Symbol for nature of supply, for d.c. only .....	The DC symbol is marked  complies with IEC 60417-5031.	P
	Rated frequency or rated frequency range (Hz) .....		—
	Rated current (mA or A) .....	0.15-0.10 A	P
1.7.1.2	Identification markings	See below.	P
	Manufacturer's name or trade-mark or identification mark .....		—

Clause	Requirement + Test	Result - Remark	Verdict
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	Model identification or type reference .....	IP8160	—
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<b>2.2</b>	<b>SELV circuits</b>		<b>P</b>
2.2.1	General requirements	Only SELV circuit inside the equipment.	P
2.2.2	Voltages under normal conditions (V) .....	The equipment is supplied from SELV circuit and no generation of hazardous voltage is possible under normal operating conditions.	P
2.2.3	Voltages under fault conditions (V) .....	No generation of hazardous voltage is possible under fault conditions.	P
2.2.4	Connection of SELV circuits to other circuits .....	SELV circuits are only connected to other SELV circuits.	P

<b>2.5</b>	<b>Limited power sources</b>		<b>P</b>
	a) Inherently limited output		N/A
	b) Impedance limited output		N/A
	c) Regulating network or IC current limiter, limits output under normal operating and single fault condition	SD card slot is limited by regulating network.	P
	Use of integrated circuit (IC) current limiters		N/A
	d) Overcurrent protective device limited output	No such parts used.	N/A
	Max. output voltage (V), max. output current (A), max. apparent power (VA) .....	See appended table 2.5.	—
	Current rating of overcurrent protective device (A) .:		N/A

<b>3</b>	<b>WIRING, CONNECTIONS AND SUPPLY</b>		<b>P</b>
<b>3.1</b>	<b>General</b>		<b>P</b>
3.1.1	Current rating and overcurrent protection	Adequate cross sectional areas.	P
3.1.2	Protection against mechanical damage	Wireways are smooth and free from edges. Wires are adequately fixed to prevent excessive strain on wire and terminals and avoiding damage to the insulation of the conductors.	P
3.1.3	Securing of internal wiring	Internal wiring is secured against excessive strain, loosening of terminals and damage to the conductor insulation.	P

Clause	Requirement + Test	Result - Remark	Verdict
3.1.4	Insulation of conductors	Insulation on internal conductors is considered to be of adequate quality and suitable for the application and the working voltage involved.	P
3.1.5	Beads and ceramic insulators	No beads or similar ceramic insulators on conductors.	N/A
3.1.6	Screws for electrical contact pressure	No such screws.	N/A
3.1.7	Insulating materials in electrical connections	No electrical contact pressure.	N/A
3.1.8	Self-tapping and spaced thread screws	No contact pressure through insulating material.	N/A
3.1.9	Termination of conductors	No such device used in equipment.	N/A
	10 N pull test		N/A
3.1.10	Sleeving on wiring	No sleeving used as supplementary insulation.	N/A

<b>3.5</b>	<b>Interconnection of equipment</b>		P
3.5.1	General requirements	See below.	P
3.5.2	Types of interconnection circuits .....	Interconnection circuits are SELV.	P
3.5.3	ELV circuits as interconnection circuits	No ELV interconnections.	N/A
3.5.4	Data ports for additional equipment	The SELV circuit of data ports is supplied by a limited power source that complies with clause 2.5.	P

<b>4</b>	<b>PHYSICAL REQUIREMENTS</b>		P
<b>4.1</b>	<b>Stability</b>		P
	Angle of 10°	The mass of unit < 7 kg.	N/A
	Test force (N) .....	The unit is not floor-standing.	N/A

<b>4.2</b>	<b>Mechanical strength</b>		P
4.2.1	General	No parts with hazards voltage or energy hazard inside equipment. Testing is considered not necessary.	N/A
	Rack-mounted equipment.	Equipment not intended for rack-mounted.	N/A
4.2.2	Steady force test, 10 N		N/A
4.2.3	Steady force test, 30 N	No such internal enclosure.	N/A
4.2.4	Steady force test, 250 N		N/A
4.2.5	Impact test		N/A

Clause	Requirement + Test	Result - Remark	Verdict
	Fall test		N/A
	Swing test		N/A
4.2.6	Drop test; height (mm) .....		N/A
4.2.7	Stress relief test		N/A
4.2.8	Cathode ray tubes	CRT not used in the equipment.	N/A
	Picture tube separately certified .....		N/A
4.2.9	High pressure lamps	No high pressure lamps in the equipment.	N/A
4.2.10	Wall or ceiling mounted equipment; force (N) .....	50 N.	P
<b>4.5</b>	<b>Thermal requirements</b>		<b>P</b>
4.5.1	General	No exceeding temperature.	P
4.5.2	Temperature tests	See appended table 4.5.	P
	Normal load condition per Annex L .....	Operated in the most unfavorable way of operation given in the operating instructions until steady conditions established.	—
4.5.3	Temperature limits for materials	See appended table 4.5.	P
4.5.4	Touch temperature limits	See appended table 4.5.	P
4.5.5	Resistance to abnormal heat .....		N/A
<b>4.6</b>	<b>Openings in enclosures</b>		<b>P</b>
4.6.1	Top and side openings	See appended table 4.6.1, 4.6.2.	P
	Dimensions (mm) .....		—
4.6.2	Bottoms of fire enclosures	No openings	N/A
	Construction of the bottom, dimensions (mm) .....		—
4.6.3	Doors or covers in fire enclosures	No door or cover.	N/A
4.6.4	Openings in transportable equipment		N/A
4.6.4.1	Constructional design measures		N/A
	Dimensions (mm) .....		—
4.6.4.2	Evaluation measures for larger openings		N/A
4.6.4.3	Use of metallized parts	No such construction.	P
4.6.5	Adhesives for constructional purposes	No barrier secured by adhesive inside enclosure.	N/A
	Conditioning temperature (°C), time (weeks) .....		—
<b>4.7</b>	<b>Resistance to fire</b>		<b>P</b>
4.7.1	Reducing the risk of ignition and spread of flame		N/A

Clause	Requirement + Test	Result - Remark	Verdict
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	Method 1, selection and application of components wiring and materials		N/A
	Method 2, application of all of simulated fault condition tests		N/A
4.7.2	Conditions for a fire enclosure	See below.	P
4.7.2.1	Parts requiring a fire enclosure		N/A
4.7.2.2	Parts not requiring a fire enclosure	No fire enclosure required.	P
4.7.3	Materials		P
4.7.3.1	General	Components and materials have adequate flammability classification. See appended table 1.5.1.	P
4.7.3.2	Materials for fire enclosures	No fire enclosure required.	N/A
4.7.3.3	Materials for components and other parts outside fire enclosures	No parts outside the fire enclosure.	P
4.7.3.4	Materials for components and other parts inside fire enclosures	The material is made of V-2 or HF-2 or better material.	P
4.7.3.5	Materials for air filter assemblies	No air filter provided.	N/A
4.7.3.6	Materials used in high-voltage components	No parts exceeding 4kV.	N/A

<b>5.2</b>	<b>Electric strength</b>		P
5.2.1	General	See appended table 5.2.	P
5.2.2	Test procedure		P

<b>5.3</b>	<b>Abnormal operating and fault conditions</b>		P
5.3.1	Protection against overload and abnormal operation		N/A
5.3.2	Motors		N/A
5.3.3	Transformers		N/A
5.3.4	Functional insulation .....	Complies with c).	P
5.3.5	Electromechanical components	No electromechanical components in secondary circuits.	N/A
5.3.6	Audio amplifiers in ITE .....		N/A
5.3.7	Simulation of faults	See appended table 5.3.	P
5.3.8	Unattended equipment	No thermostats, temperature limiters or thermal cut-outs.	N/A
5.3.9	Compliance criteria for abnormal operating and fault conditions	See below.	P
5.3.9.1	During the tests	No fire or molten metal occurred and no deformation of enclosure during the tests.	P
5.3.9.2	After the tests		N/A

1.5.1 TABLE: List of critical components					P
Object/part No.	Manufacturer/ trademark	Type/model	Technical data	Standard (Edition / year)	Mark(s) of conformity <sup>1)</sup>
PoE Box					
Plastic Enclosure	Teijin Limited Resin And Plastic	TN-7000(v)	V-1 min. thick: 1.2 mm min.	UL 94	UL
PCB	Interchangeable	Interchangeable	V-1 min., 105 °C min.	UL 796	UL
PoE Transformer (T1)	Interchangeable	Interchangeable	105 °C min.	--	--
<b>Supplementary information:</b>					

1.6.2 TABLE: Electrical data (in normal conditions)						P
U (V)	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
37 Vdc	0.10	0.15	3.70	--	--	Maximum normal load
57 Vdc	0.06	0.10	3.82	--	--	Maximum normal load
Supplementary information:						
1) Maximum normal load was defined as follows: - the equipment normal operated continuously; - deposit the file to the SD card;						

2.2 TABLE: Evaluation of voltage limiting components in SELV circuits				P
Component (measured between)		max. voltage (V) (normal operation)		Voltage Limiting Components
		V peak	V d.c.	
T1 pin7,8 to pin5, 6 (GND)		17.1	--	--
Fault test performed on voltage limiting components		Voltage measured (V) in SELV circuits (V peak or V d.c.)		
Supplementary information:				

2.5 TABLE: Limited power sources						P
Circuit output tested:						
Note: Measured Uoc (V) with all load circuits disconnected:						
Components	Sample No.	Uoc (V)	I <sub>sc</sub> (A)		VA	
			Meas.	Limit	Meas.	Limit
Micro (J2) Pin4	Normal	3.27	2.5	8	5.98	100
Micro (J2) Pin1, 2, 3, 7, 8, 9	Normal	2.27	--	8	--	100
Micro (J2) Other pin	Normal	0	--	8	--	100

Micro (J2) U8 pin7-8	Short	4.98	3.1	8	10.0	100
Supplementary information:						

4.5	TABLE: Thermal requirements						P
	Supply voltage (V).....:	37 Vdc		57 Vdc		—	
	Ambient T <sub>min</sub> (°C).....:	See below		See below		—	
	Ambient T <sub>max</sub> (°C).....:	See below		See below		—	
Maximum measured temperature T of part/at.....:		T (°C)				Allowed T <sub>max</sub> (°C)	
PCB near T1 (PoE board)		74.1		75.1		105	
T1 body (PoE Board)		71.5		71.7		105	
Plastic enclosure inside (PoE board)		53.1		52.7		--	
Plastic enclosure outside (PoE board)		49.9		49.2		95	
PCB near U12 (Camera board)		75.0		74.2		105	
PCB near U24 (Camera board)		73.0		72.1		105	
PCB near U2 (IR LED board)		69.3		68.6		105	
Plastic enclosure inside		53.1		51.8		--	
Plastic enclosure outside		49.1		47.8		95	
Ambient		40.0 (20.7)		40.0 (20.9)		--	
Temperature T of winding.....:	t <sub>1</sub> (°C)	R <sub>1</sub> (Ω)	t <sub>2</sub> (°C)	R <sub>2</sub> (Ω)	T (°C)	Allowed T <sub>max</sub> (°C)	Insulation class

Supplementary information:

- 1) The temperatures were measured under worst case normal mode defined in 1.2.2.1 and as described in 1.6.2 at voltages as described in above.
- 2) Unit specified with maximum of 40 °C ambient temperature and all temperatures were calculated for a maximum ambient temperature of 40 °C.
- 3) During the test, all openings are blocked.

4.6.1, 4.6.2	Table: Enclosure opening measurements		P
Location	Size (mm)	Comments	
Rear side	Each opening measured diameter 1.0 mm max.	Numerous circular openings provided.	
Supplementary information:			

5.2	TABLE: Electric strength tests, impulse tests and voltage surge tests			P
Test voltage applied between:	Voltage shape (AC, DC, impulse, surge)	Test voltage (V)	Breakdown Yes / No	
T1 input to output	AC	1500V	No	
Supplementary information:				

5.3		TABLE: Fault condition tests					P
		Ambient temperature (°C) .....			25 °C, if nothing else specified.		--
		Power source for EUT: Manufacturer, model/type, output rating .....			See appended table 1.5.1 for details.		--
Component No.	Fault	Supply voltage (V)	Test time	Fuse #	Fuse current (A)	Observation	
Openings	Blocked	37 / 57 Vdc	1.7 hrs	--	--	NC, NT, unit normal operation. See appended table 4.5.	
R92	Short	57Vdc	7.6 hrs	--	--	BT1 overcharge, NC, NT, no hazard. BT1= 54.6 °C, Ambient= 22.1 °C.	
R92	Short	57Vdc	1.8 hrs	--	--	BT1 over discharge, NC, NT, no hazard. BT1= 22.7 °C, Ambient= 22.2 °C.	
D3	Short	57Vdc	7.3 hrs	--	--	BT1 overcharge, NC, NT, no hazard. BT1= 56.1 °C, Ambient= 23.4 °C.	
D3	Short	57Vdc	1.5 hrs	--	--	BT1 over discharge, NC, NT, no hazard. BT1= 23.0 °C, Ambient= 21.6 °C.	
BT1	Short	57Vdc	10 mins	--	--	NC, NT, unit normal operation, no hazard.	
<p>Supplementary information:</p> <p>Results Key:</p> <p>IP = Internal protection operated Component indicated).</p> <p>CT = Constant temperatures were obtained.</p> <p>TW = Transformer winding opened.</p> <p>CD = Components damaged (damaged components indicated).</p> <p>NB = No indication of dielectric breakdown.</p> <p>YB = Dielectric breakdown (time and location indicated).</p> <p>NC = Cheesecloth remained intact.</p> <p>YC = Cheesecloth charred or flamed.</p> <p>NT = Tissue paper remained intact.</p> <p>YT = Tissue paper charred or flamed.</p>							

# Annex A

## Photos

Overall View



Overall View



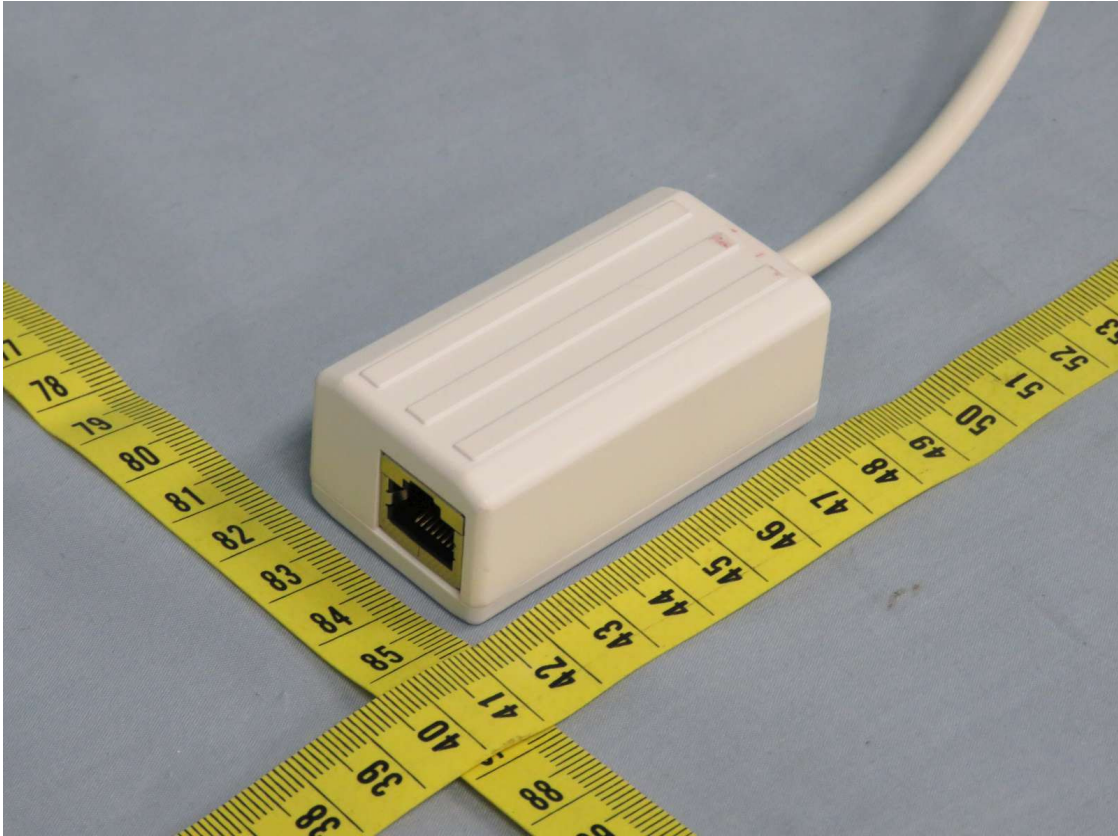
Overall View - Base Stand



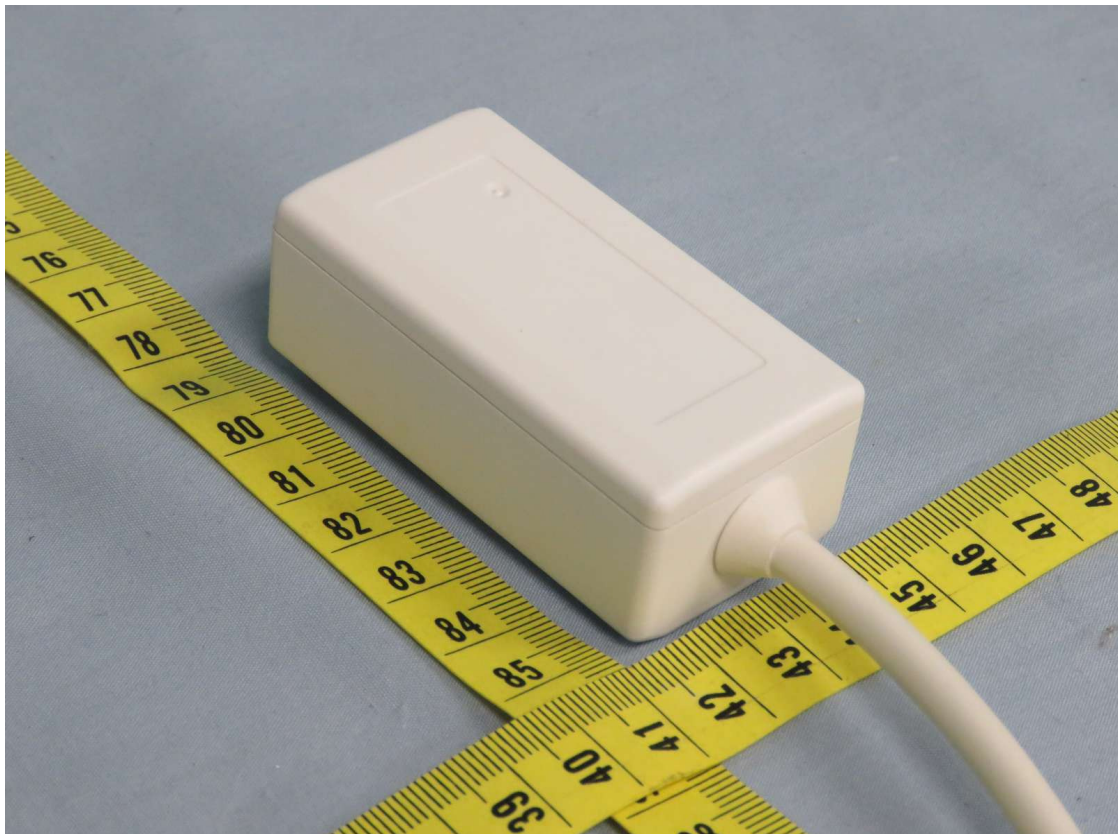
Overall View - Base Stand



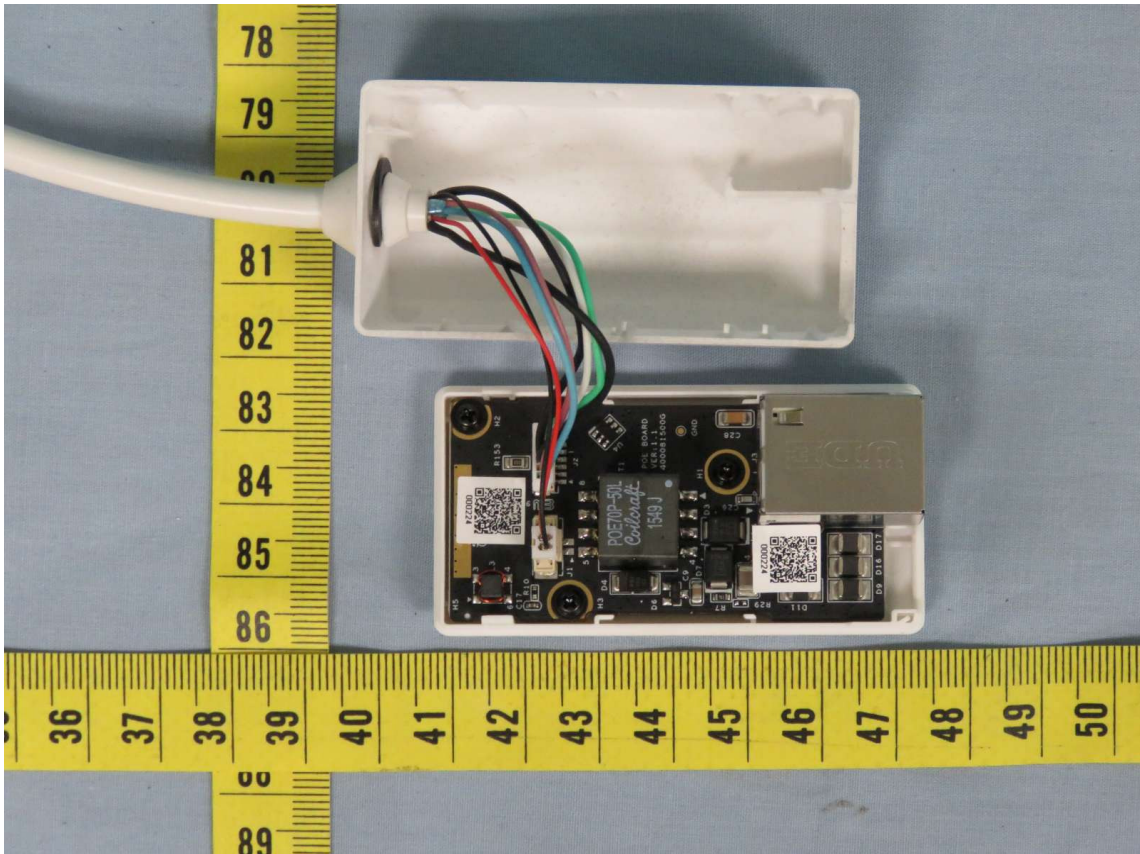
Overall View –PoE Box



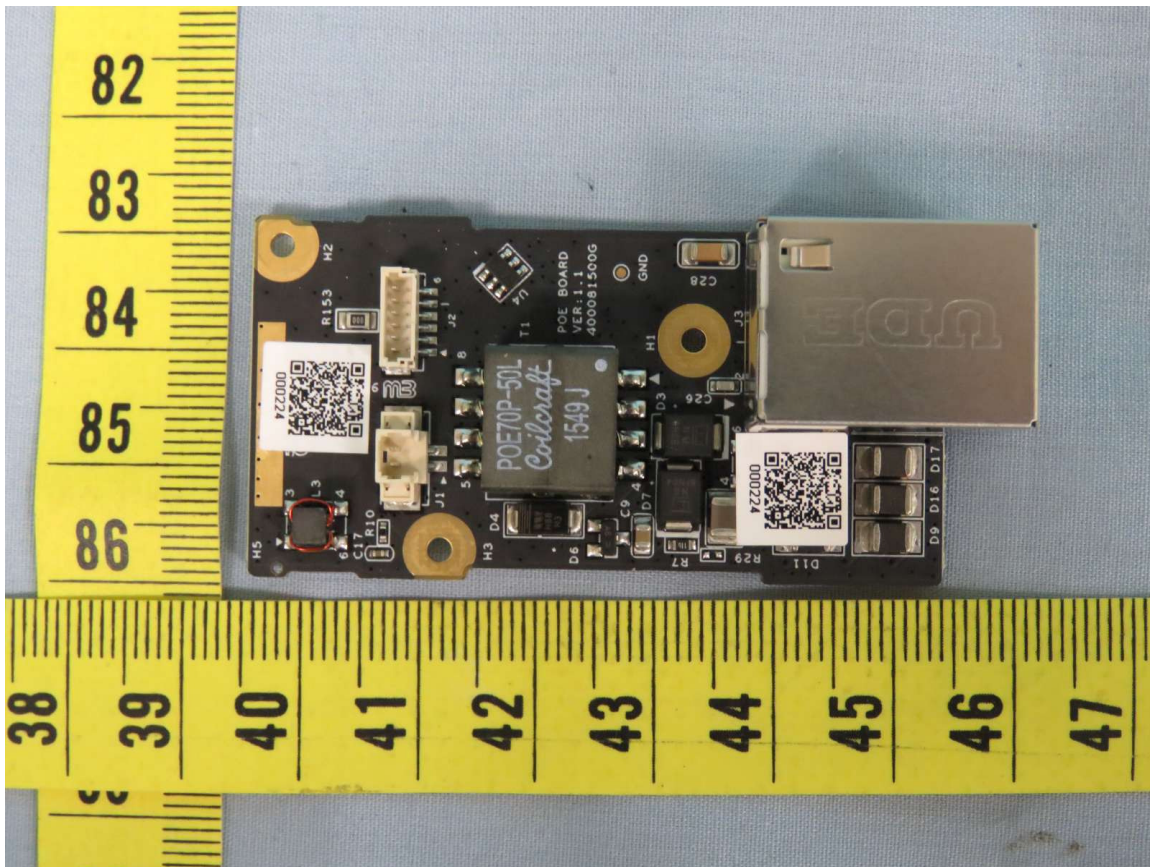
Overall View – PoE Box



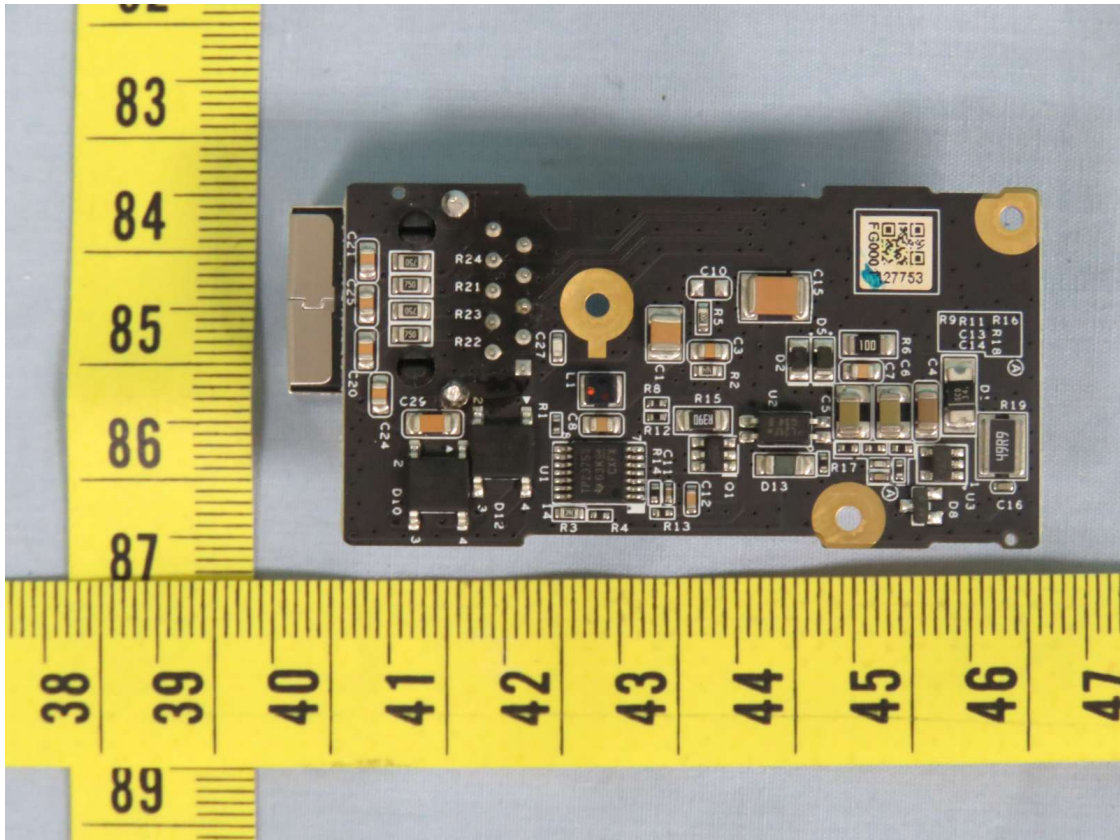
Internal View –PoE Box



Top View of PoE Board



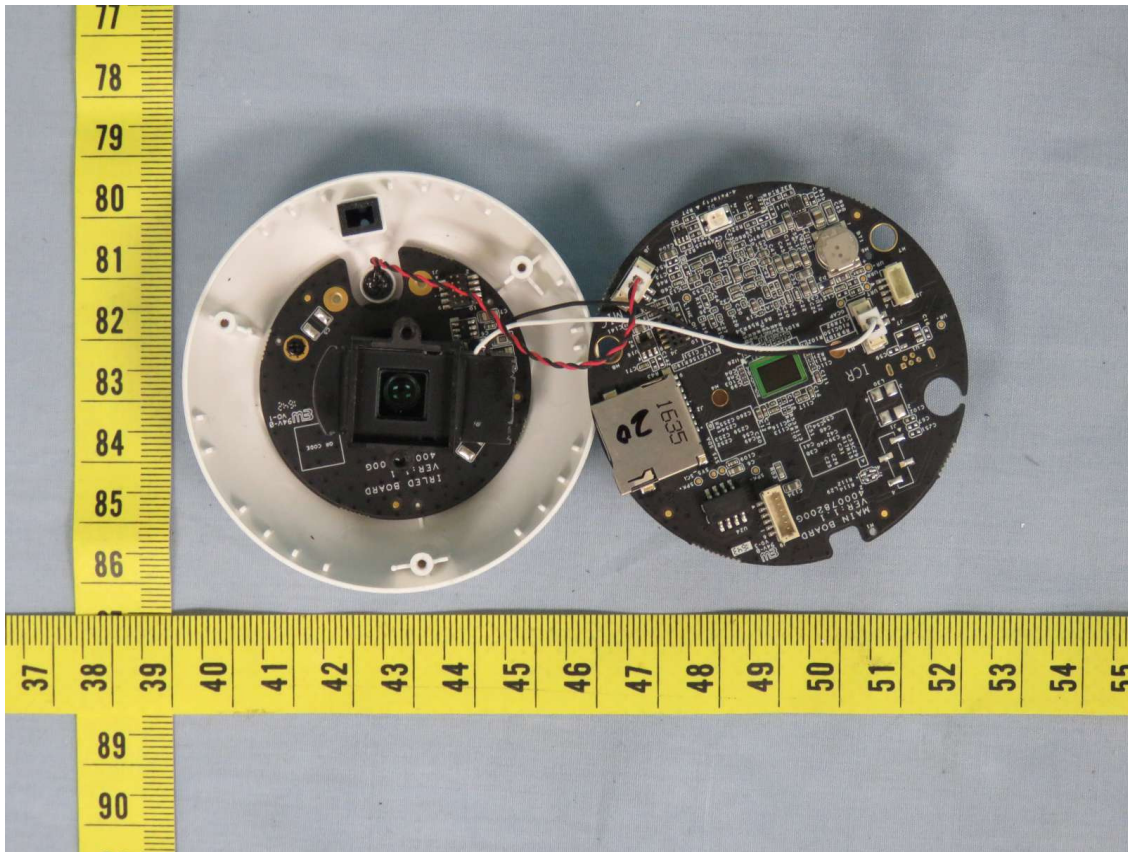
Bottom View of PoE Board



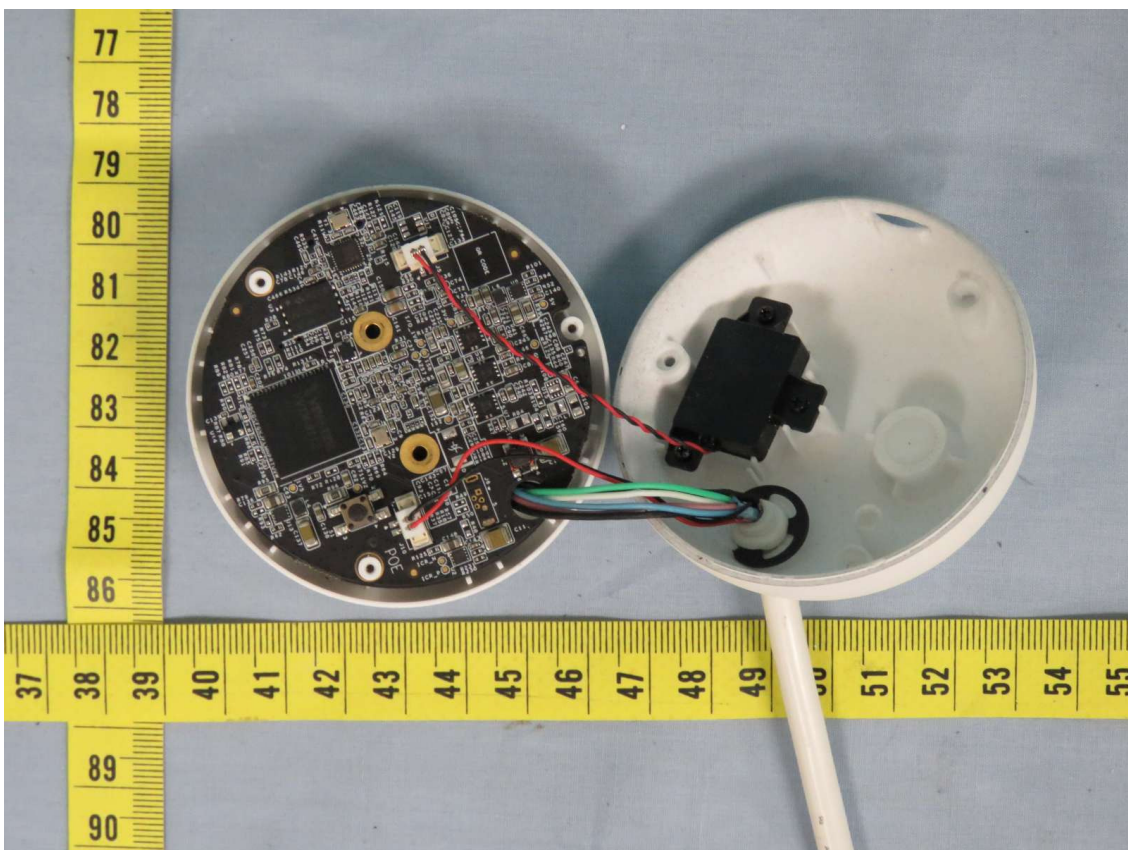
I/O View



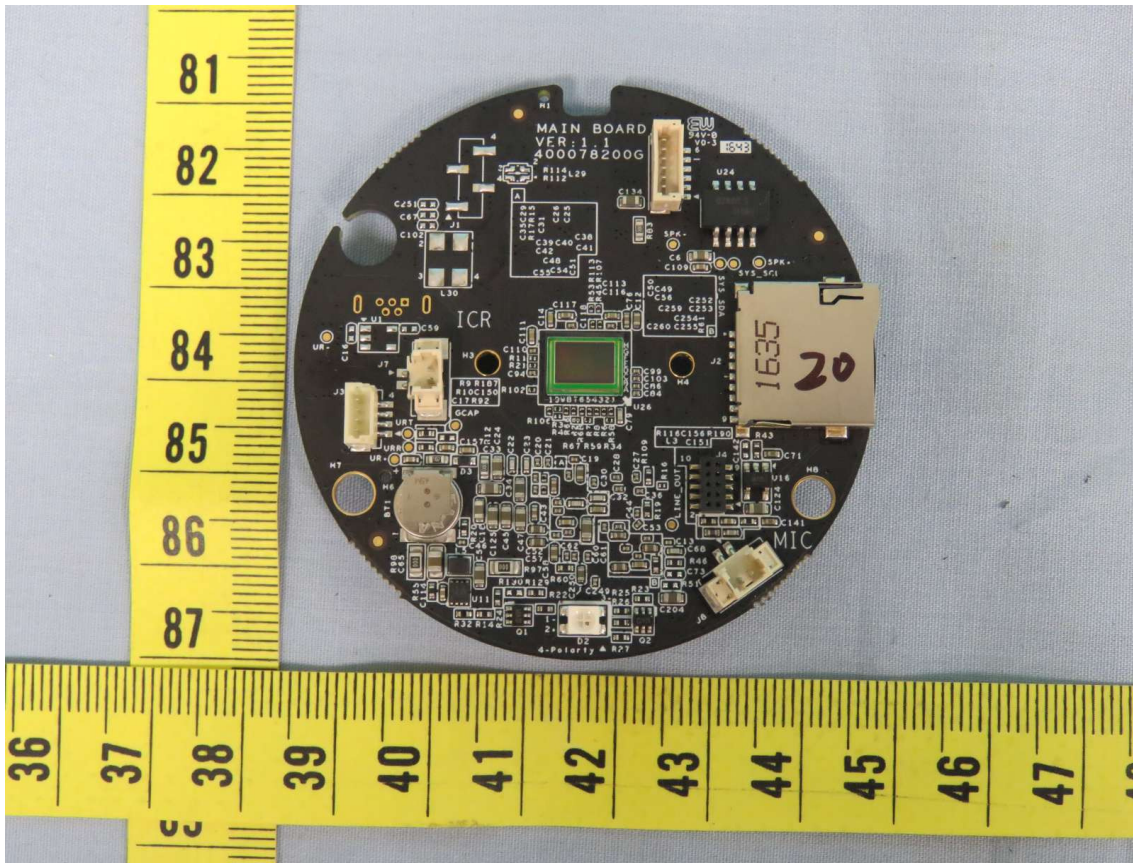
Internal View



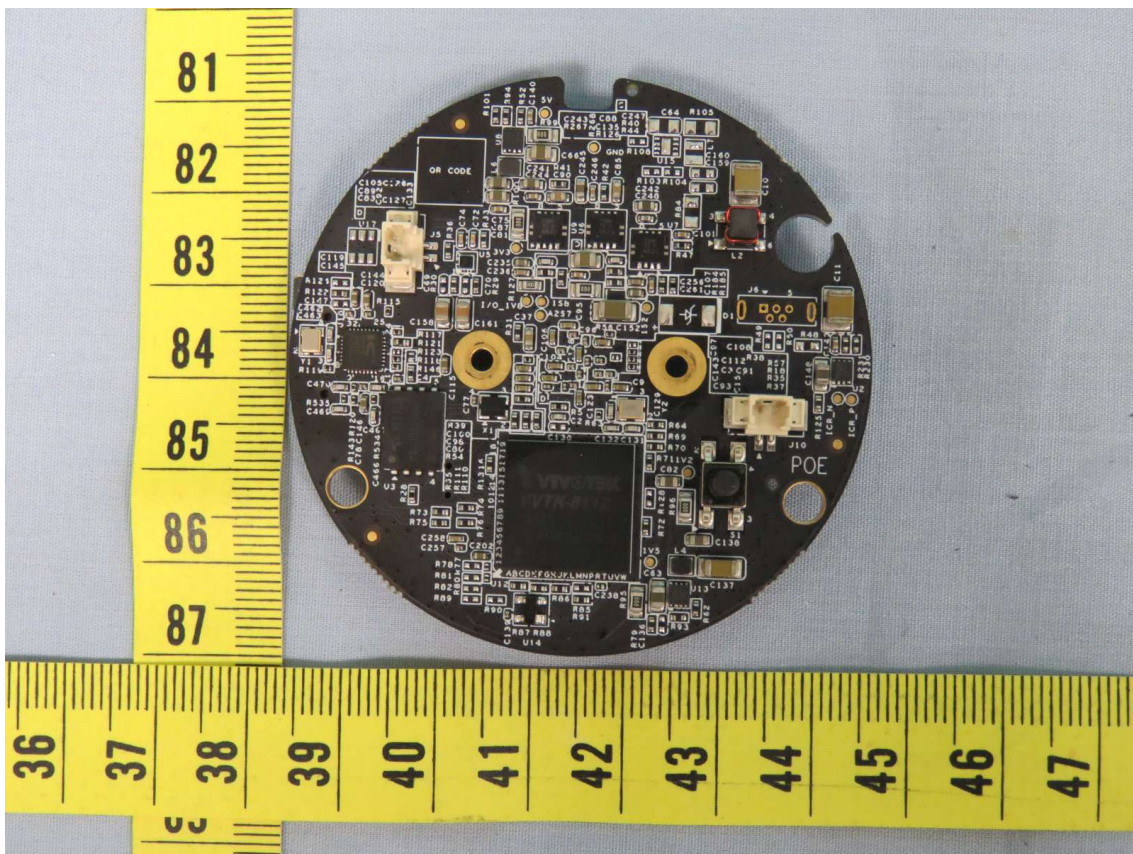
Internal View



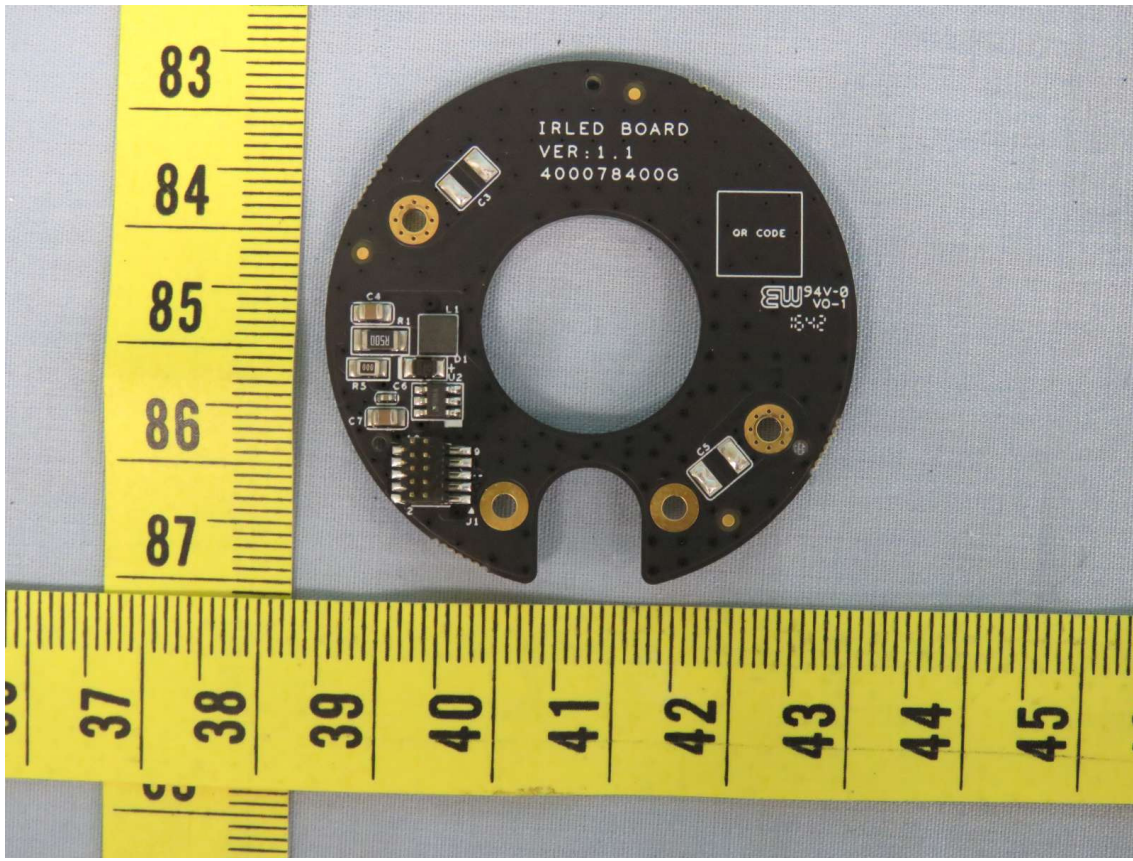
Top View of Main Board



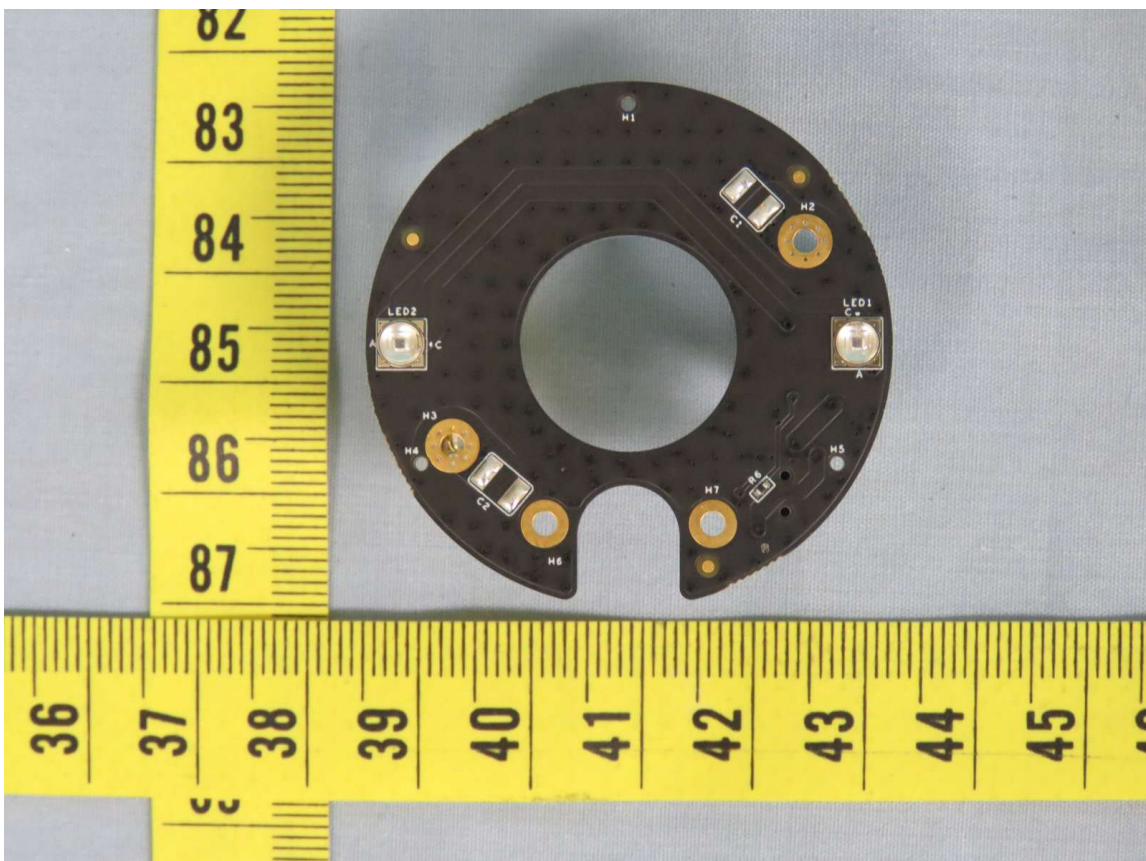
Bottom View of Main Board



Top View of IR LED Board



Bottom View of IR LED Board



# Annex B

## List of Used Measuring Instruments

## Instruments List

NO.	Device	Range (Cal. Point) / <State>	Brand	Model No.:	Next Cal. Date	Cal. Date	Last Cal. Date	Cal. House
D03	Digital Phosphor Oscilloscope	Vertical Gain:(5mV-10V)<CH2 / Volt/Div, 1KHz,AC,1MΩ> Sweep Timebase:5ns-5s<Time/Div> AC Voltage(RMS):1,2,5,10(1,2,5,10)<50,60,1KHz/CH2> AC Voltage (1/1000.@RMS): 1000V<47-63Hz/CH2>	Yokogawa	DL1620	2017/4/24	2016/4/25	2015/4/27	E.T.C
E06	Hybrid Recorder	Temperature Linearly: J Type: (10-300°C)<CH1-20>	Yokogawa	DR130	2017/12/8	2016/12/9	2015/12/10	E.T.C.
E08	Hybrid Recorder	Temperature Linearly: J Type: (10-300°C)<CH1-20>	Yokogawa	DR130	2017/6/23	2016/6/24	2015/6/26	E.T.C.
J01	Withstanding Voltage Tester	AC Volt(KV): 5(1, 3, 5) / <50-60Hz> DC Volt(KV): 5(1, 3, 5) AC Cut-off Current(mA): (1,10,100) / <50-60Hz> DC Cut-off Current(mA): (1, 5, 10) Timer:(60s)	Kikusui	TOS-8750	2017/1/20	2016/1/21	2015/1/7	UL
N11-CH2	Electronic Load	DC Volt(V): (1, 5, 10, 20, 30, 40, 50, 60, 70, 80) DC Current(A): (1, 3, 6, 15, 30, 60)	Chroma	6312A	2017/10/18	2016/10/19	.....	E.T.C.
O01	DC Power Supply	DC Volt(V): (1, 5, 10, 20, 50, 80) DC Current(A): (1, 2, 5, 10, 20, 30, 35)	Chroma	6230K-80	2017/10/13	2016/10/24	2015/10/12	E.T.C.
V06	True rms. Multimeter	DC Volt(V): (100m, 1, 10, 100, 1000) AC Volt(V): (100m, 1, 10, 100, 1000) <50/60Hz> DC Current(A): (100μ, 1000μ, 10m, 100m, 1, 10) AC Current(A): (100μ, 1000μ, 10m, 100m, 1, 10) <50/60Hz> Resis.(Ω): (100, 1k, 10k, 100k,1M,10M) Freq.(Hz): (50, 60, 1000, 100k) Capacitance(F):(1n, 0.01μ, 0.1μ, 1μ)	Fluke	87III	2017/9/20	2016/9/21	2015/9/25	Tai Yi
W35	Elec-Counting Scale	Weight(kg): (0.2 - 150)	Yuang Tong	SKWII	2017/11/16	2016/11/17	2015/11/19	UL
X02	LED Number Clock	Time Deviation: 4.7ppm / <32768Hz>	HoTai	A129	2017/10/3	2016/10/4	2015/9/16	E.T.C
X03	Timer	Time Deviation:(+0.5ppm)<32768.0Hz>	Casio	HS-3	2017/11/17	2016/11/18	2015/11/6	E.T.C
Exp.1	n-Hexane (正己烷) (SHELF LIFE:20180331)	Merck	1.04367.1000	it is permitted to use a reagent grade hexane with a minimum of 85 % as n-hexane.	----	----	----	----

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