Prüfbericht-Nr.: *Test report no.:*	CN222T6K 001	**Auftrags-Nr.:** *Order no.*:	244363848	Seite 1 von 56 *Page 1 of **56***
Kunden-Referenz-Nr.: *Client reference no.:*	2362101	**Auftragsdatum:** *Order date:*	2021-09-27	
Auftraggeber: *Client:*	**Zhejiang Huaxiao Technology Co., Ltd.** 1st to 3rd floor,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China			
Prüfgegenstand: *Test item:*	Smoke Alarm			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	DHI-HY-SA20A, DHI-HY-SA20B,SA20A-A,SA20A-B,SA20A-C,DHI-HY-SA2TA,BF1S,SA2TA-A, DHI-HY-SA21A-W2, SA21A-433-A, SA21A-433-B, DHI-HY-SA21A-W2(868),SA21A-868-A, SA21A-868-B, DHI-HY-SA2FA, WF1S, SA2FA-A, SA2FA-B			
Auftrags-Inhalt: *Order content*:	TÜV Rheinland CE_CPR			
Prüfgrundlage: *Test specification:*	EN 14604:2005 EN 14604:2005+AC:2008			

Wareneingangsdatum: *Date of sample receipt:*	2021.10.20
Prüfmuster-Nr.: *Test sample no:*	A003186277-001 to 026
Prüfzeitraum: *Testing period:*	2021.10.28 - 2022.01.25
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shanghai) Co., Ltd.
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shanghai) Co., Ltd.
Prüfergebnis*: *Test result*:*	Pass

geprüft von: *reviewed by:*
Chen yuzhang
Signed by: Yuzhang Chen

Datum: *Date:* 2022-02-16

Stellung / *Position:* Project Engineer

genehmigt von: *authorized by:*
Signed by: Hao zheng

Ausstelldatum: *Issue date:* 2022-02-16

Stellung / *Position:* Reviewer

Sonstiges / *Other:*
This report consist of:
1. This cover page
2. Attachment 1: Equipment list.
3. Attachment 2: Photo of Documentation

Zustand des Prüfgegenstandes bei Anlieferung: Prüfmuster vollständig und unbeschädigt
Condition of the test item at delivery: *Test item complete and undamaged*

* Legende:	1 = sehr gut	2 = gut	3 = befriedigend	4 = ausreichend	5 = mangelhaft
	P(ass) = entspricht o.g. Prüfgrundlage(n)		F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*1 = very good*	*2 = good*	*3 = satisfactory*	*4 = sufficient*	*5 = poor*
	P(ass) = passed a.m. test specification(s)		*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

TEST REPORT
EN 14604
Smoke alarm device

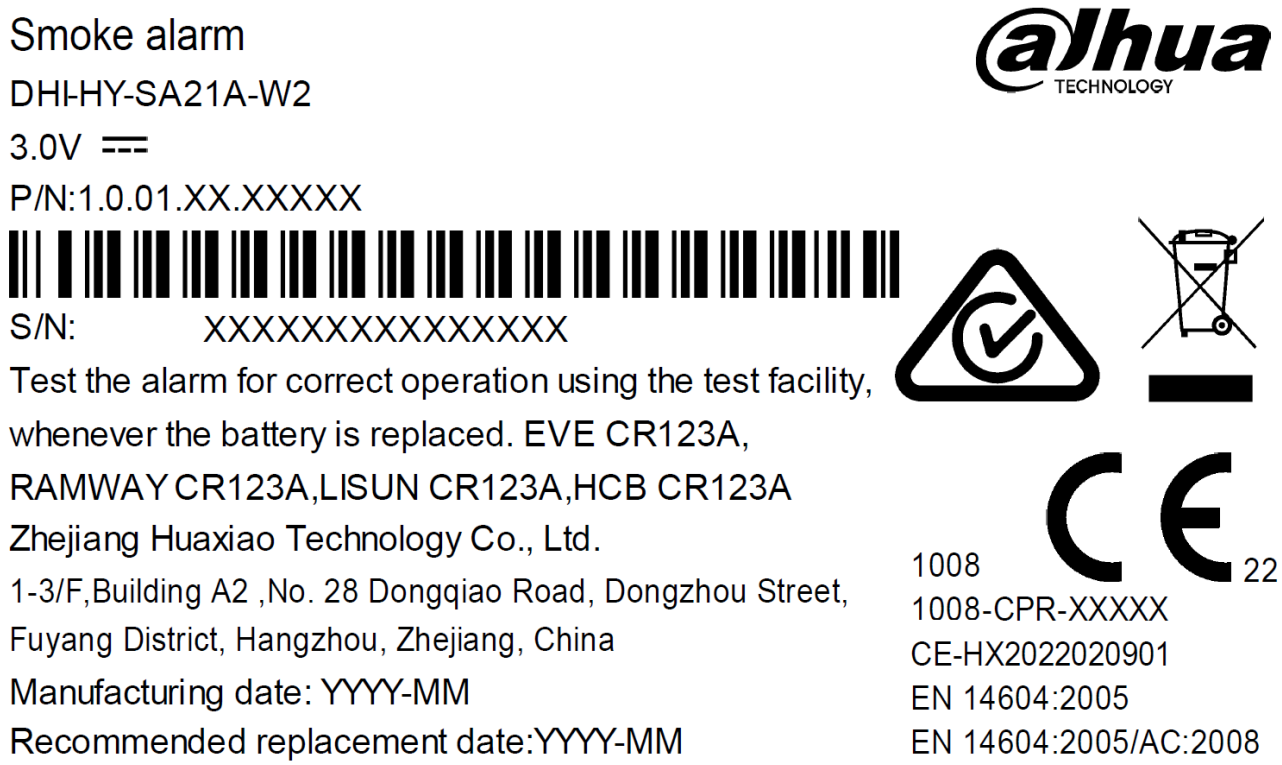
Report Reference No...... :	**CN222T6K 001**
Date of issue..... :	See cover page
Total number of pages ..... :	See cover page
Testing Laboratory..... :	**TÜV Rheinland (Shanghai) Co., Ltd.**
Address ..... :	No.177, Lane 777, West Guangzhong Road, Zhabei District, Shanghai 200072, P. R. China
Applicant's name..... :	**Zhejiang Huaxiao Technology Co., Ltd.**
Address ..... :	1st to 3rd floor,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China
Test specification:	
Standard..... :	EN 14604:2005 EN 14604/AC:2008
Test procedure ..... :	Type test
Non-standard test method..... :	N/A
Test Report Form No...... :	EN14604_A
Test Report Form(s) Originator. ..... :	TÜV Rheinland
Master TRF ..... :	Dated 2016-03
Test item description ..... :	**Smoke Alarm**
Trade Mark..... :	See page 11
Manufacturer ..... :	Same as applicant
Address ..... :	Same as applicant
Model/Type reference..... :	DHI-HY-SA20A, DHI-HY-SA20B,SA20A-A,SA20A-B,SA20A-C, DHI-HY-SA2TA,BF1S,SA2TA-A, DHI-HY-SA21A-W2, SA21A-433-A, SA21A-433-B, DHI-HY-SA21A-W2(868), SA21A-868-A, SA21A-868-B, DHI-HY-SA2FA, WF1S, SA2FA-A, SA2F B
Ratings ..... :	DC 3.0V

Summary of testing:

21 pics of Model DHI-HY-SA20A were submitted to laboratory for test plan;
2 pics of Model DHI-HY-SA20A were selected for tests of Clause 5.16
1 pics of Model DHI-HY-SA21A-433 were selected for tests of Clause 5.10;
1 pics of Model DHI-HY-SA21A-W2(868) were selected for tests of Clause 5.10;
1 pics of Model DHI-HY-SA2FA were selected for tests of Clause 5.10;
1 pics of Model DHI-HY-SA2TA were selected for tests of Clause 5.10;

Tests performed (name of test and test clause):	**Testing location:**
All test items. Model DHI-HY-SA20A was selected to perform all the test as above, representing others models.	● All test except for 5.8 Cold(operational): **Hangzhou EVERFINE Test and Calibration Technology Co., Ltd** #669 Binkang RD, Binjiang Hi-Tech Zone,Hangzhou, China ● For 5.8 Cold(operational): **Shanghai Institute of Quality Inspection and Technical Research Test Report** No.900 Jiangyue Rd, Shanghai

Copy of marking plate:



Smoke alarm

DHI-HY-SA20A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

1008 CE 22

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

DHI-HY-SA21A-W2(868)

3.0V ⎓

P/N:1.0.01.XX.XXXXX

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

1008 CE 22

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

WF1S

3.0V ⎓

P/N:1.0.01.XX.XXXXX

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 1008 22

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

BF1S

3.0V ⎓

P/N:1.0.01.XX.XXXXX

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 1008 22

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

DHI-HY-SA20A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

DHI-HY-SA20B

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA20A-A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

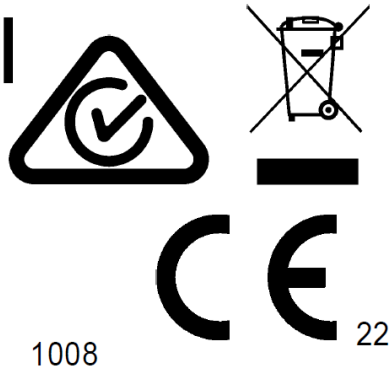
Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM



CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

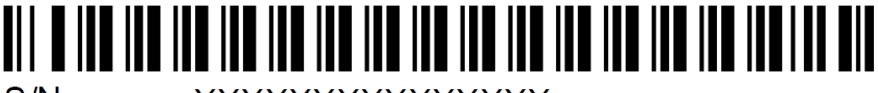
SA20A-B

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home



S/N: XXXXXXXXXXXXXXX

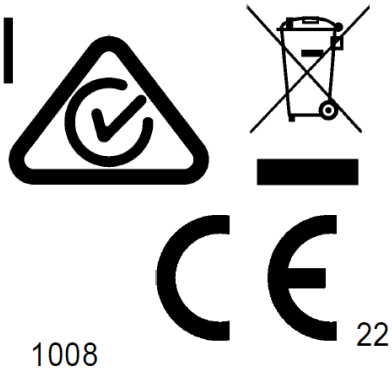
Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM



CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA20A-C

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

DHI-HY-SA2TA

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA2TA-A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

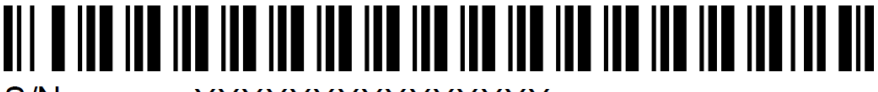
SA21A-433-A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home



S/N: XXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA21A-433-B

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA21A-868-A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA21A-868-B

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

DHI-HY-SA2FA

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA2FA-A

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Smoke alarm

SA2FA-B

3.0V ⎓

P/N:1.0.01.XX.XXXXX

WISUALARM

www.wisualarm.com/en/home

S/N: XXXXXXXXXXXXXXX

Test the alarm for correct operation using the test facility, whenever the battery is replaced. EVE CR123A, RAMWAY CR123A,LISUN CR123A,HCB CR123A

Zhejiang Huaxiao Technology Co., Ltd.

1-3/F,Building A2 ,No. 28 Dongqiao Road, Dongzhou Street, Fuyang District, Hangzhou, Zhejiang, China

Manufacturing date: YYYY-MM

Recommended replacement date:YYYY-MM

CE 22

1008

1008-CPR-XXXXX

CE-HX2022020901

EN 14604:2005

EN 14604:2005/AC:2008

Test item particulars ..... :	
Classification of installation and use ..... :	For household application
Supply Connection..... :	Battery compartment)
Inter-connectable..... :	No
Detection mode ..... :	Optical
Possible test case verdicts:	
- test case does not apply to the test object..... :	N/A
- test case does not tested ..... :	N/T
- test object does meet the requirement ..... :	P(Pass)
- test object does not meet the requirement ..... :	F(Fail)
Testing ..... :	
Date of receipt of test item ..... :	See cover page
Date (s) of performance of tests ..... :	See cover page

General remarks:

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.

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

General product information:

1.These products are photoelectric type smoke alarm devices.

2.Products are powered by replaceable battery, DC 3.0V providing with at least 10 years operating life.

3.Type differences: see below

Application Product model	Alternative Customer Model	Description
DHI-HY-SA20A	-	Basic model
	SA20A-A, SA20A-B, SA20A-C，DHI-HY-SA20B	Same structure as DHI-HY-SA20A
DHI-HY-SA2TA	-	Add Bluetooth module basis of DHI-HY-SA20A
	BF1S	Same structure as DHI-HY-SA2TA
	SA2TA-A	Same structure as DHI-HY-SA2TA
DHI-HY-SA21A-W2	-	Add 433 Wireless module basis of DHI-HY-SA20A
	SA21A-433-A, SA21A-433-B	Same structure as DHI-HY-SA21A-W2
DHI-HY-SA21A-W2(868)	-	Add 868 Wireless module basis of DHI-HY-SA20A
	SA21A-868-A, SA21A-868-B	Same structure as DHI-HY-SA21A-W2(868)
DHI-HY-SA2FA	-	Add WIFI(2.4G) Wireless module basis of DHI-HY-SA20A
	SA2FA-A, SA2FA-B	Same structure as DHI-HY-SA2FA
	WF1S	Same structure as DHI-HY-SA2FA

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
4	**General requirements**		**P**
4.1	Compliance		P
	The smoke alarm shall be verified by visual inspection or engineering assessment, shall be tested as described in Clause 5.		P
	For smoke alarms which a manufacturer claims are suitable for leisure accommodation vehicles, the tests in Annex L shall be applied.	Not suitable for leisure accommodation vehicles	N/A
4.2	Individual alarm indicator (optional)		P
	Alarm indicators, if fitted, shall be red and shall be separate from the mains-on indicator.	Red indicator light with flash	P
4.3	Mains-on indicator		N/A
	A smoke alarm intended to be connected to the AC mains shall be provided with a continuous mains on indicator to indicate energization of the unit. This indicator shall be coloured green and shall be separate from any other indicators.		N/A
	If more than one light-emitting indicator is provided on the smoke alarm, the mains-on indicator shall be green, an alarm indicator shall be red, and a fault indicator shall be amber or yellow.		N/A
4.4	Connection of external ancillary devices	No such device	N/A
	External ancillary devices shall not prevent the correct operation of the smoke alarm when open- or short-circuit of these connections occur.		N/A
4.5	Means of calibration		P
	The manufacturer's means of calibration shall not be readily adjustable, on site, after manufacture.	Not adjustable by user	P
4.6	User replaceable components		P
	Except for batteries or fuses, a smoke alarm shall have no user replaceable or serviceable components.	No replaceable components	P
4.7	Normal power source		P
	Internal or external to the smoke alarm housing.	Power Source is internal	P
	Where the power source is internal to the smoke alarm, the source shall meet the following requirements.		P
	Operating the smoke alarm for at least one year's life	Batteries can operate more one year.	P
	A distinctive audible fault signal shall be given before a battery is incapable of operating for alarm purposes.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	The smoke alarm shall be capable of producing an alarm signal for at least 4 min at the battery voltage at which a fault signal is normally obtained or 30 days of fault signal operation.		P
	The internal power source shall be replaceable by the user unless its operating life in the smoke alarm is 10 years or greater.		P
4.8	Standby power source	Without standby power source	N/A
4.8.1	General		N/A
	For smoke alarms intended for connection to an external power supply, for which an integral backup/ standby power facility is provided, the following requirements shall apply:		N/A
	a) primary cell battery back-up power supply shall be capable of meeting the requirements of 4.15;		N/A
	b) rechargeable back-up power sources shall be capable of supplying the quiescent load of the smoke alarm for a minimum period of 72 h followed by an alarm signal as specified in 5.17 for at least 4 min in the event of fire, or in the absence of a fire, a fault warning for at least 24 h.		N/A
4.8.2	Monitoring of back-up power source		N/A
	The back-up power source shall be monitored by the smoke alarm for faults (low back-up, open circuit and short circuit).		N/A
4.9	Electrical safety requirements		P
	The apparatus shall be designed and constructed so as to present no danger, either in normal use or under fault conditions, as determined by the tests and requirements in 5.24.		P
4.10	Routine test facility		P
	A routine test facility shall be provided on all smoke alarms to simulate either mechanically or electrically the presence of smoke in the sensing assembly.		P
4.11	Terminals for external conductors	Without external terminals	N/A
	If intended to have external connections, shall provide for the connection of conductors by means of screws, nuts or equally effective devices.		N/A
	For mainspowered smoke alarms which utilize a "flying lead"–type connector, the connector shall be regarded as a conductor. If terminals are provided, they shall allow the connection of conductors having nominal cross-sectional areas of 0,4 mm2 - 1,5 mm2.		N/A

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	Flying lead type connectors shall be subjected to a pull test, such that when the connector is subjected to a pull of 20 N without jerks for 1 min in any direction allowed by the design, the connector does not become detached.		N/A
4.12	Smoke alarm signals		P
	In a smoke alarm which employs one or more non-fire alarm features the following operation shall be obtained:		P
	a) the smoke alarm fire alarm signal shall take precedence over any other signal even when such other signal is initiated first.		P
	b) distinctive signals shall be obtained between a smoke alarm's fire alarm and other non-fire alarm functions. Use of a common sounder is permitted if distinctive signals are obtained. If an audible fault signal is provided it shall be distinctive from all alarm signals but may be common to all functions employed.		P
4.13	Battery removal indication		P
	The removal of any user-replaceable battery used to power, or provide back-up power, for the smoke detection circuit/sounder, from a battery or mains powered d.c. backed smoke alarm, shall result in a visual, mechanical or audible warning that the battery has been removed. The visual warning shall not depend upon a power source.	After remove the battery, the product will has mechanical warning.	P
4.14	Battery connections		P
	Lead or terminal connections to batteries shall be identified with the proper polarity (plus or minus). The polarity may be indicated on the unit adjacent to the battery terminals or leads.		P
	Any leads connecting the terminal connectors of batteries in smoke alarms to the smoke alarm circuit board shall be provided with strain relieving devices adjacent to both battery terminal connectors and the smoke alarm circuit board so that when the leads are subjected to a pull of 20 N without jerks for 1 min in any direction allowed by the design, the pull is not transmitted to the joints between the leads and the battery terminal connectors or between the leads and the smoke alarm circuit board.		P
4.15	Battery capacity		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	The batteries supplied with or specified for use in smoke alarms shall be capable of supplying the quiescent load of the smoke alarm together with the additional load resulting from a routine weekly 10 s test, for at least 1 year before the battery fault warning is given. At the point when the battery fault warning commences, the batteries shall have sufficient capacity to give an alarm signal as specified in 5.17 for at least 4 min in the event of fire, or in the absence of fire a battery fault warning for at least 30 days.	It can work normally for above 1 years	P
	In the absence of suitable test procedures to verify battery capacity, data concerning the smoke alarm loads and the battery characteristics shall be used to indicate that the above requirement can be met.		P
4.16	Protection against the ingress of foreign bodies		P
	The smoke alarm shall be so designed that a sphere of diameter (1,3 ± 0,05) mm cannot pass into the sensor chamber(s).	Checked by 1.3mm gauge	P
4.17	Additional requirements for software controlled smoke alarms		P
4.17.1	General		P
	For smoke alarms, which rely on software control in order to fulfil the requirements of this document, the requirements of 4.17.2, 4.17.3 and 4.17.4 shall be met.		P
4.17.2	Software documentation		P
4.17.2.1	The documentation shall be in sufficient detail for the design to be inspected for compliance with this document and shall include at least the following:		P
	a) a functional description of the main program flow (e.g. as a flow diagram or structogram) including: 1) a brief description of the modules and the functions that they perform; 2) the way in which the modules interact; 3) the overall hierarchy of the program; 4) the way in which the software interacts with the hardware of the smoke alarms; 5) the way in which the modules are called, including any interrupt processing.		P
	b) a description of which areas of memory are used for the various purposes (e.g. the program, site specific data and running data);		P
	c) a designation, by which the software and its version can be uniquely identified.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
4.17.2.2	The manufacturer shall have available detailed design documentation, which only needs to be provided if required by the testing authority. It shall comprise at least the following:		N/A
	a) an overview of the whole system configuration, including all software and hardware components;		N/A
	b) a description of each module of the program, containing at least: 1) the name of the module; 2) a description of the tasks performed; 3) a description of the interfaces, including the type of data transfer, the valid data range and the checking for valid data.		N/A
	c) full source code listings, as hard copy or in machine-readable form (e.g. ASCII-code), including all global and local variables, constants and labels used, and sufficient comment for the program flow to be recognized;		N/A
	d) details of any software tools used in the design and implementation phase (e.g. CASE-tools, compilers).		N/A
4.17.3	Software design		P
	In order to ensure the reliability of the smoke alarm, the following requirements for software design shall apply:		P
	a) the software shall have a modular structure;		P
	b) the design of the interfaces for manually and automatically generated data shall not permit invalid data to cause errors in the program operation;		P
	c) the software shall be designed to avoid the occurrence of deadlock of the program flow.		P
4.17.4	The storage of programs and data		P
	The program necessary to comply with this document and any preset data, such as manufacturer's settings, shall be held in non-volatile memory.		P
	Site-specific data shall be held in memory which will retain data for at least two weeks without power from the mains or any replaceable battery, unless provision is made for the automatic renewal of such data, following loss of power, within 1 h of power being restored.		P
4.18	Inter-connectable smoke alarms		N/A
	If a means of connecting a number of smoke alarms to give a general alarm signal is provided the following shall apply (see 5.19).		N/A

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	a) The audible alarm signal shall be emitted by all of the interconnecting smoke alarms when the smoke is detected by any one or more of them. If the smoke alarms are provided with an alarm silence facility, initiation of the alarm silence period of one of the smoke alarms shall not prevent the audible alarm signal being emitted by that smoke alarm when the smoke is detected by any of the other alarms.		N/A
	b) The interconnection of the maximum number of smoke alarms allowed by the manufacturer shall not have a significant effect on the sensitivity of the smoke alarms nor their ability to meet the battery capacity or sound output requirements (see 4.15 and 5.17).		N/A
	c) For battery-operated smoke alarms, open or short-circuits of the interconnecting leads either shall not prevent the smoke alarms from functioning individually or shall result in an alarm condition or fault warning.		N/A
4.19	Marking and data		P
4.19.1	Smoke alarm marking		P
	Each alarm shall be indelibly marked with the following:		P
	a) the number and date of this document, i.e. EN 14604:2005;	EN 14604:2005+AC:2008	P
	b) the name or trade mark and address of the manufacturer or supplier;	See copy of marking plate	P
	c) the date of manufacture, or the batch number;	See copy of marking plate	P
	d) the manufacturer's recommended date for replacement, subject to normal, regular maintenance;	See copy of marking plate	P
	e) smoke alarms incorporating user replaceable batteries: the type or numbers of batteries recommended by the manufacturer and an instruction to the user "Test the alarm for correct operation using the test facility, whenever the battery is replaced"; which shall be visible during the operation of changing the batteries;	See copy of marking plate	P
	f) smoke alarms incorporating non-replaceable batteries: the warning "WARNING — Battery not replaceable — See instruction manual" which shall be visible during normal use.	See copy of marking plate	N/A
	The marking cannot be removed when rubbed lightly with a piece of cloth soaked with petroleum spirit and then water.		P
4.19.2	Packaging marking		N/A

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	The point-of-sale carton, in which a smoke alarm employing a radionuclide is packaged, shall be permanently marked on the exterior with the trefoil symbol, name of radionuclide, and activity.		N/A
4.19.3	Data	See user manual.	P
	Information supplied on or with smoke alarms shall include instructions on siting, installation and maintenance.		P
	The information provided with smoke alarms incorporating user-replaceable batteries shall include specific guidance on changing the batteries.		P
	For smoke alarms incorporating non-replaceable batteries, information shall be given on the action to be taken if a battery fault warning is emitted.		N/A
	Information for inter-connectable smoke alarms shall state the maximum number that may be interconnected. Details of suitable cables shall also be given.		N/A
	Information for smoke alarms intended for connection to mains supplies shall include a warning that draws attention to the hazards associated with mains voltages and recommends that the smoke alarm, together with any associated supply and interconnect wiring, be installed in accordance with appropriate national electrical installation regulations.		N/A
	If it is claimed that the smoke alarm is also suitable for use in leisure accommodation vehicles (LAVs) this shall be clearly stated in the information supplied on or with the smoke alarm.		N/A

5	**Tests**		**P**
5.1	General		P
5.1.1	Atmospheric conditions for tests		P
	The testing shall be carried out after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as follows: a)temperature 15 °C to 35 °C; b) relative humidity 25 % to 75 %; c) air pressure 86 kPa to 106 kPa. If variations in these parameters have a significant effect on a measurement, then such variations shall be kept to a minimum during a series of measurement carried out as part of one test on one specimen.		P
5.1.2	Operating conditions for tests		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	If a test method requires a specimen to be operational, then the specimen shall be connected to, or provided with, a suitable power source with characteristics as required by the manufacturer's data. Unless otherwise specified in the test method, the power source parameters applied to the specimen shall be set within the manufacturer's specified range(s) and shall remain substantially constant throughout the tests. The value chosen for each parameter shall normally be the nominal value, or the mean of the specified range.		P
5.1.3	Mounting arrangements		P
	The specimen shall be mounted by its normal means of attachment in accordance with the manufacturer's instructions. If these instructions describe more than one method of mounting then the method considered to be most unfavourable shall be chosen for each test.		P
5.1.4	Tolerances		P
	If a specific tolerance or limit is not specified in a requirement or test procedure, a tolerance of ± 5 % shall be applied.		P
5.1.5	Measurement of response threshold value		P
	The specimen shall be installed in the smoke tunnel, described in Annex A, in its normal operating position, by its normal means of attachment.		P
	The air velocity in the proximity of the specimen shall be (0,2 ± 0,04) ms-1 during the measurement.		P
	The air temperature in the tunnel shall be (23 ± 5) °C and shall not vary by more than 5 °C for all the measurements on a particular smoke alarm type.		P
	The specimen shall be connected to its power source as described in 5.1.2, and shall be allowed to stabilize for at least 15 min, unless otherwise specified by the manufacturer.		P
5.1.6	Provision for tests		P
	The following shall be provided for testing compliance:		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	a) 27 specimens;	23 pics of Model DHI-HY-SA20A were submitted to laboratory for test plan; 1 pics of Model DHI-HY-SA21A-433; 1 pics of Model DHI-HY-SA21A-W2(868); 1 pics of Model DHI-HY-SA2FA; 1 pics of Model DHI-HY-SA2TA;	P
	b) data required in 4.19.		P
5.1.7	Test schedule		P
	The smoke alarms shall be numbered as specified in 5.4.2. The tests on each smoke alarm indicated in Table 1 shall be carried out in the order in which they are listed.		P
5.2	Repeatability	See appended table	P
5.2.1	Object		-
	To show that the smoke alarm has stable behaviour with respect to its sensitivity even after a number of alarm conditions.		P
5.2.2	Test procedure		P
	The response threshold value of the specimen to be tested shall be measured as described in 5.1.5 six times with same direction of air flow.		P
	The maximum response threshold value shall be designated y_{max} or m_{max}, the minimum value shall be designated y_{min} or m_{min}.		P
5.2.3	Requirements		P
	The ratio of the response threshold values y_{max}:y_{min} *or* m_{max}:m_{min} shall be not greater than 1,6.		P
	The lower response threshold value y_{min} shall be not less than 0,2 or m_{min} shall be not less than 0,05 dB m-1.		P
5.3	Directional dependence	See appended table	P
5.3.1	Object		-
	To show that the sensitivity of the smoke alarm is not unduly dependent on the direction of airflow around the smoke alarm.		P
5.3.2	Test procedure		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	The response threshold value of the specimen to be tested shall be measured eight times as described in 5.1.5 with the specimen being rotated 45° about its vertical axis between each measurement, so that the measurements are taken for eight different orientations relative to the direction of air flow.		P
	The maximum response threshold value shall be designated y_{max} or m_{max}, the minimum value shall be designated y_{min} or m_{min}.		P
5.3.3	Requirements		P
	The ratio of the response threshold values y_{max}:y_{min} or m_{max}:m_{min} shall not be greater than 1,6.		P
	The lower response threshold value y_{min} shall not be less than 0,2 or m_{min} shall not be less than 0,05 dB m-1.		P
5.4	Initial sensitivity	See appended table	P
5.4.1	Object		-
	To establish the sensitivity of each smoke alarm prior to testing. This will be used as a baseline for the following tests.		P
5.4.2	Test procedure		P
	Measure the response threshold value of the specimens as described in 5.1.5. Number the smoke alarms in order of sensitivity, number 1 having the lowest response threshold and number 20 the highest response threshold.		P
	The maximum response threshold value shall be designated ymax or mmax and the minimum value shall be designated ymin or mmin. The mean of these response threshold values shall be calculated and shall be designated as y_{avg} or m_{avg} .		P
5.4.3	Requirements		P
	The following relationships shall hold y_{max}: y_{avg} or m_{max}: m_{avg} ≤ 1,33 and y_{avg} :y_{min} or m_{avg} :m_{min} ≤ 1,5.		P
5.5	Air movement	See appended table	P
5.5.1	Object		-
	To show that the sensitivity of the smoke alarm is not unduly affected by the rate of the air flow, and that it is not unduly prone to false alarms in draughts or in short gusts.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
5.5.2	Test procedure		P
	The response threshold value of the specimen to be tested is measured as described in 5.1.5 in the most and least sensitive orientations, and shall be appropriately designated y(0,2)max and y(0,2)min or m(0,2)max and m(0,2)min.		P
	These measurements shall then be repeated but with an air velocity in the proximity of the smoke alarm of (1 ± 0,2) ms-1. The response threshold values in these tests shall be designated y(1,0)max and y(1,0)min or m(1,0)max and m(1,0)min.		P
	For ionization chamber alarms only, the specimen to be tested shall then be subjected, in its most sensitive orientation, to an aerosol-free air flow at a velocity of (5 ± 0,5) ms-1 for a period of 5 min.		P
5.5.3	Requirements		P
	One of the following relationship shall hold: a) $0{,}625 \leqslant \frac{y_{(0,2)\max.} + y_{(0,2)\min.}}{y_{(1,0)\max.} + y_{(1,0)\min.}} \leqslant 1{,}6$ or b) $0{,}625 \leqslant \frac{m_{(0,2)\max.} + m_{(0,2)\min.}}{m_{(1,0)\max.} + m_{(1,0)\min.}} \leqslant 1{,}6$		P
	The alarm shall emit neither a fault signal nor an alarm signal during the test with aerosol free air.		P
5.6	Dazzling	See appended table	P
5.6.1	Object		-
	To show that the sensitivity of the smoke alarm is not unduly influenced by the close proximity of artificial light sources. This test is only applied to smoke alarms using scattered light or transmitted light as ionization chamber smoke alarms are considered unlikely to be influenced.		P
5.6.2	Test procedure		P
	The response threshold value is measured as described in 5.1.5.		P
	The four lamps are switched simultaneously ON for 10 s and then OFF for 10 s, ten times.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	Then switched ON again and after at least 1 min the response threshold value is measured as described in 5.1.5, with the lamps ON		P
5.6.3	Requirements		P
	During the periods when the switching sequences are being conducted and when the lamps are all on for at least 1 min, the specimen shall emit neither an alarm nor fault signal.		P
	For each orientation, the ratio of the response threshold mmax:mmin shall not be greater than 1,6.		P
5.7	Dry heat	See appended table	P
5.7.1	Object		-
	To demonstrate the ability of the smoke alarm to function correctly at high ambient temperatures, which may occur for short periods in the service environment.		P
5.7.2	Test procedure		P
	Installed in the smoke tunnel described in Annex A, air temperature 23 ± 5 °C, connected to its power source as described in 5.1.2.		P
	The air temperature in the tunnel shall then be increased to (55 ± 2) °C, at a rate not exceeding 1 °C min-1, and maintained at this temperature for 2 h.		P
	The response threshold value shall then be measured as described in 5.1.5 but with the temperature at (55 ± 2) °C.		P
5.7.3	Requirements		P
	No alarm or fault signals during test		P
	The ratio of the response threshold values ymax:ymin or mmax:mmin shall not be greater than 1,6.		P
5.8	Cold (operational)	See appended table	P
5.8.1	Object		-
	To demonstrate the ability of the smoke alarm to function correctly at low ambient temperatures, which may occur for short periods in the service environment.		P
5.8.2	Test procedure		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	Installed in the smoke tunnel described in Annex A, air temperature 23 ± 5 °C, connected to its power source as described in 5.1.2.		P
	The air temperature in the tunnel shall then be decreased to (0 ± 2) °C, at a rate not exceeding 1 °Cmin-1, and maintained at this temperature for 2 h.		P
	The response threshold value shall then be measured as described in 5.1.5 but with the temperature at (0 ± 2) °C.		P
5.8.3	Requirements		P
	No alarm or fault signals during test		P
	The ratio of the response threshold values ymax:ymin or mmax:mmin shall not be greater than 1,6.		P
5.9	Damp heat (operational)	See appended table	P
5.9.1	Object		-
	To demonstrate the ability of the smoke alarm to function correctly after exposure to high relative humidity (without condensation) and temperature, which may occur for short periods in the service environment.		P
5.9.2	Test procedure		P
	The specimen to be tested shall be exposed to an initial air temperature of (40 ± 2) °C, and a relative humidity of less than 45 %.		P
	After 2 h, the relative humidity is to be increased to (93 ± 3) % over a period of 1 h. This temperature and humidity shall be maintained for a period of 4 days.		P
5.9.3	Requirements		P
	No alarm or fault signals during test		P
	The ratio of the response threshold values *y*max:*y*min or *m*max:*m*min shall not be greater than 1,6.		P
5.10	Sulphur dioxide (SO2) corrosion	See appended table	P
5.10.1	Object	Specimen No.6, No.7, No.22, No.23 No.24, No.25	-

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	To demonstrate the ability of the smoke alarm to withstand the corrosive effects of sulphur dioxide as an atmospheric pollutant.		P
5.10.2	Test procedure		P
5.10.2.1	Reference		-
	The test apparatus and procedure shall be as described in EN 60068-2-42:2003, except that the conditioning shall be as described below.		P
5.10.2.2	State of the specimen during conditioning		P
	The specimen shall be mounted as described in 5.1.3. It shall not be supplied with power during the conditioning, but it shall have untinned copper wires, of the appropriate diameter, connected to sufficient terminals to allow the final measurement to be made, without making further connections to the specimen.		P
5.10.2.3	Conditioning		P
	The following conditioning shall be applied: Temperature (25 ± 2) °C; Relative humidity (93 ± 3) %; SO2 concentration (25 ± 5) ppm (by volume) Duration 4 days.		P
5.10.2.4	Final measurements		P
	Immediately after the conditioning, the specimen shall be subjected to a drying period of 16 h at 40 °C, ≤ 50 % RH, followed by a recovery period of 1 h to 2 h at the standard laboratory conditions. After this recovery period, the response threshold value shall be measured as described in 5.1.5.		P
5.10.3	Requirements		P
	The ratio of the response threshold values ymax:ymin or mmax:mmin shall not be greater than 1,6.		P
5.11	Impact		P
5.11.1	Object		-
	To demonstrate the immunity of the smoke alarm to mechanical impacts upon its surface, which it may sustain in the normal shipping, installation and service environment, and which it can reasonably be expected to withstand.		P
5.11.2	Test procedure		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
5.11.2.1	Apparatus		P
	The test apparatus shall consist of a swinging hammer incorporating a rectangular-section aluminium alloy head (aluminium alloy AlCu4SiMg complying with EN 573-4, solution treated and precipitation treated condition) with the plane impact face chamfered to an angle of 60° to the horizontal, when in the striking position (i.e. when the hammer shaft is vertical). The hammer head shall be (50 ± 2,5) mm high, (76 ± 3,8) mm wide and (80 ± 4) mm long at mid height as shown in Figure E.1. A suitable apparatus is described in Annex E.	See appended table	P
5.11.2.2	State of the specimen during conditioning		P
	The specimen shall be rigidly mounted to the apparatus by its normal mounting means and shall be positioned so that it is struck by the upper half of the impact face when the hammer is in the vertical position.		P
	The specimen shall be connected to its power source as described in 5.1.2.		P
5.11.2.3	Conditioning		P
	The following conditioning shall be applied: Impact energy (1,9 ± 0,1) J; Hammer velocity (1,5 ± 0,13) ms-1; Number of impacts 1.		P
5.11.2.4	Measurements during conditioning		P
	The specimen shall be monitored during the conditioning and for a further 2 min after the impact to detect any alarm or fault signals.		P
5.11.2.5	Final measurements		P
	After the conditioning the response threshold value shall be measured as described in 5.1.5.		P
5.11.3	Requirements		P
	No alarm or fault signals shall be given during the conditioning or the additional 2 min.		P
	The impact shall not detach the alarm from its base, or the base from the mounting. The cover of the smoke alarm shall not unscrew or open.		P
	The ratio of the response threshold values y_{max}:y_{min} or m_{max}:m_{min} shall not be greater than 1,6.		P
5.12	Vibration (operational)	See appended table	P
5.12.1	Object		-

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	To demonstrate the immunity of the smoke alarm to vibration at levels considered appropriate to the normal service environment.		P
5.12.2	Test procedure		P
5.12.2.1	Reference		P
	The test apparatus and procedure shall be as described in EN 60068-2-6:1995 and as described below.		P
5.12.2.2	State of the specimen during conditioning		P
	The specimen shall be mounted on a rigid fixture as described in 5.1.3 and shall be connected to its power source as described in 5.1.2.		P
	The vibration shall be applied in each of three mutually perpendicular axes, in turn. The specimen shall be mounted so that one of the three axes is perpendicular to its normal mounting plane.		P
5.12.2.3	Conditioning		P
	The following conditioning shall be applied: Frequency range (10 to 150) Hz; Acceleration amplitude 5 m s-2 (≈ 0,5 gn); Number of axes 3; Sweep rate 1 octave min-1; Number of sweep cycles 1 per axis.		P
5.12.2.4	Measurements during conditioning		P
	The specimen shall be monitored during the conditioning period to detect any alarm or fault signals.		P
5.12.2.5	Final measurements		P
	After the conditioning the specimen is to be inspected visually for mechanical damage both internally and externally. The response threshold value shall be measured as described in 5.1.5.		P
5.12.3	Requirements		P
	No alarm or fault signals shall be given during the conditioning. No mechanical damage, either internally or externally, shall result. The lid of the smoke alarm shall not unscrew or open.		P
	The ratio of the response threshold values *y*max:*y*min or *m*max:*m*min shall not be greater than 1,6.		P
5.13	Vibration (endurance)	See appended table	P
5.13.1	Object		-

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	To demonstrate the ability of the smoke alarm to withstand the long term effects of vibration at levels appropriate to the shipping, installation and service environment.		P
5.13.2	Reference		P
	The test apparatus and procedure shall be as described in EN 60068-2-6:1995 and as described below.		P
5.13.2.1	State of the specimen during conditioning		P
	The specimen shall be mounted on a rigid fixture as described in 5.1.3, but shall not be supplied with power during conditioning.		P
	The vibration shall be applied in each of three mutually perpendicular axes, in turn. The specimen shall be mounted so that one of the three axes is perpendicular to its normal mounting axis.		P
5.13.2.2	Conditioning		P
	The following conditioning shall be applied: Frequency range (10 to 150) Hz; Acceleration amplitude 10 m s-2 (1,0 gn); Number of axes 3; Sweep rate 1 octave min-1; Number of sweep cycles 20 per axis.		P
5.13.2.3	Final measurements		P
	The response threshold value shall be measured as described in 5.1.5		P
5.13.3	Requirements		P
	The ratio of the response threshold values y_{max}:y_{min} or m_{max}:m_{min} shall not be greater than 1,6.		P
5.14	Electromagnetic Compatibility (EMC), immunity tests (operational)	See appended table	P
	The following EMC immunity tests shall be carried out, as described in EN 50130-4:1995:		P
	a) mains supply voltage dips and short interruptions;		N/A
	b) electrostatic discharge;		P
	c) radiated electromagnetic fields;		P
	d) conducted disturbances induced by electromagnetic fields;		N/A
	e) fast transient bursts;		N/A

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	f) slow high-energy voltage surges.		N/A
	The required operating condition shall be as described in 5.1.2.		P
5.15	Fire sensitivity		P
5.15.1	Object		-
	To demonstrate the ability of the smoke alarm to respond to a broad spectrum of smoke types as required for general application in fire detection systems for residences.		P
5.15.2	Test procedure		P
5.15.2.1	General		P
	The fire sensitivity tests shall be conducted in a room as shown in Annex F.		P
	The specimens shall be subjected to the four test fires TF2 to TF5. The type, quantity and arrangement of the fuel and the method of combustion are described in Annexes G to J, for each test fire, along with the end of test condition and the required profile curve limits.		P
	In order to be a valid test fire, the development of the fire shall be such that the profile curves of m against y, and m against time, fall within the specified limits, up to the time when all of the specimens have generated an alarm signal, or the end of test condition is reached, whichever is the earlier.		P
	If these conditions are not met then the test is invalid and shall be repeated. It is permissible, and may be necessary, to adjust the quantity and arrangement of the fuel to obtain valid test fires.		P
5.15.2.2	Mounting of the specimens		P
	For smoke alarms intended for wall mounting only, the four specimens shall be mounted within 0,5 m of the middle of the long walls as shown in Annex F with specimens 18 and 19 at the least distance below the ceiling, and specimens 17 and 20 at the greatest distance below the ceiling, consistent with the manufacturer's instructions.	Intended for ceiling mounting or wall mounting	N/A
	For smoke alarms intended for either ceiling or wall mounting, specimens 17 and 18 shall be mounted on the ceiling within the designated area and specimens 19 and 20 shall be mounted on the walls as described above.	Mounting as intended	P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	Each specimen shall be connected to its power source as described in 5.1.2, and shall be allowed to stabilize in its quiescent condition before the start of each test fire.		P
5.15.2.3	Initial conditions		P
	Before each test fire the room shall be ventilated with clean air until it is free from smoke, and so that the conditions listed below can be obtained.		P
	The ventilation system shall then be switched off and all doors, windows and other openings shall be closed. The air in the room shall then be allowed to stabilize, and the following conditions shall be obtained before the test is started: Temperature T = (23 ± 5) °C1) ; Air movement: negligible y = 0,05; m = 0,02 dB m-1.		P
5.15.2.4	Recording of the fire parameters and response values		P
	During each test fire the fire parameters shown in Table 2 shall be recorded against the time from the start of the test. Each parameter shall be recorded continuously or at least once per second.		P
	The alarm signal given by the specimen shall be taken as the indication that an alarm has responded to the test fire.		P
5.15.3	Requirements		P
	All four specimens shall generate an alarm signal, in each test fire, before the specified end of test condition is reached.		P
5.16	Battery fault warning		P
5.16.1	Object		-
	To demonstrate that a smoke alarm will give an audible fault warning before an increase in the internal resistance or decrease in the terminal voltage of the battery prevents correct operation.		P
5.16.2	Test procedure		P
5.16.2.1	Connect the alarm as shown in Figure 1 and apply the tests described in 5.16.2.2 to 5.16.2.5.		P
5.16.2.2	With the series resistor R set to zero and the supply voltage V set to the rated battery voltage VR, measure the response threshold of the alarm in accordance with 5.1.5.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
5.16.2.3	With the series resistor R set to zero, decrease the supply voltage V in stages of 0,1 volts at intervals of at least 1 min, until the fault warning is given. Record the supply voltage at which the fault warning is given as VE and measure the response threshold of the alarm in accordance with 5.1.5.		P
5.16.2.4	With the supply voltage V set at VR, increase the resistance of the series resistor R from zero in increments of 1 Ω at intervals of at least 1 min until the fault warning is given. Record the resistance of the series resistor at which the fault warning is given as RA and measure the response threshold of the alarm in accordance with 5.1.5.		P
5.16.2.5	Repeat the procedure described in 5.16.2.4 with the supply voltage V set at 0,75 (VR –VE) + VE, 0,5 (VR – VE) + VE, and 0,25 (VR – VE) + VE in turn, and record the resistances of the series resisto at which the fault warning is given as RB, Rc and RD, respectively.	See appended table	P
5.16.3	Requirements		P
	The ratio of the response thresholds measured in 5.16.2.3, 5.16.2.4 or 5.16.2.5 to the response threshold measured in 5.16.2.2 shall be not less than 0,625 and not greater than 1,6.		P
5.17	Sound output		P
5.17.1	Object		-
	To demonstrate that the smoke alarm is capable of providing an adequate sound output.		P
5.17.2	Method of test		P
	At least two samples shall be tested.	Specimen 1 Specimen 15	P
	Units intended additionally for multiple-station interconnection shall be tested in that configuration with the maximum line resistance and maximum number of networked alarms, and the sound output measured on the smoke alarm subject to an abnormal smoke condition.		P
	Battery powered (or equivalent) smoke alarms shall be tested with the battery depleted to a point just above or at the battery fault warning level.		P
	The smoke alarm shall be mounted on a mounting board as described in EN 54-3. The sound level shall be measured 3 m from the smoke alarm either directly in front of the smoke alarm or at an angle specified by the manufacturer within 45° of this.		P
	A sound level meter conforming to EN 61672-1:2003, class 2 or better shall be used.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	The measurement shall be made in a free field condition to minimize the effects of reflected sound energy. The ambient noise level shall be at least 10 dB (A) below the measured level produced by the alarm.	See appended table	P
5.17.3	Requirements		P
	For battery operated alarms, the sound output shall be at least 85 dB(A) at 3 m after 1 min of alarm operation.		P
	and at least 82 dB(A) after 4 min of alarm operation		P
	For mains powered alarms, the sound output shall be at least 85 dB(A) at 3 m after 4 min of alarm operation.		N/A
	For both battery operated and main powered alarms, the maximum sound output shall be 110 dB(A) at 3 m after 1 min of alarm operation.		N/A
	The maximum nominal frequency shall not exceed 3,5 kHz.	< 3,5KHz;	P
5.18	Sounder durability		P
5.18.1	Object		-
	To demonstrate the ability of the smoke alarm's sounder to operate as intended after prolonged operation.		P
5.18.2	Test procedure		P
	Connect the specimen to its power source as described in 5.1.2. Battery operated smoke alarms shall use a stabilized supply adjusted to the specified voltage.		P
	Operate the specimen for 8 h of alternate 5-minute periods of energization and de-energization in the standby and alarm conditions.		P
	After the conditioning, the sound output of the smoke alarm shall be measured as specified in 5.17.	See appended table	P
5.18.3	Requirements		P
	The specimen shall meet the sound output requirements as specified in 5.17.		P
5.19	Inter-connectable smoke alarms		N/A
5.19.1	Object		-
	To demonstrate correct functioning of inter-connectable smoke alarms.		N/A

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
5.19.2	Test procedure		N/A
5.19.2.1	Connect the alarm under test with the maximum number of smoke alarms allowed in the manufacturer's instructions (see 4.19).		N/A
5.19.2.2	With the smoke alarms interconnected in accordance with 5.19.2.1, measure the response threshold of the alarm under test in accordance with 5.1.5.		N/A
5.19.2.3	For battery-operated smoke alarms repeat the test in 5.19.2.2 with the interconnecting leads short circuited.		N/A
5.19.2.4	With smoke alarms interconnected in accordance with 5.19.2.1, repeat the sound output test in 5.17 on one of the smoke alarms. During this test ensure that the other interconnected smoke alarms are sufficiently screened or distanced so that their audible alarm signals do not influence the measurement.		N/A
5.19.2.5	For battery-operated smoke alarms repeat the test in 5.19.2.4 with interconnecting leads short-circuited.		N/A
5.19.2.6	Reassess the battery capacity requirements taking into account the load introduced by interconnecting the maximum permitted number of smoke alarms.		N/A
5.19.3	Requirements		N/A
5.19.3.1	All the interconnected smoke alarms shall give an audible alarm signal within 1 min when tested in accordance with 5.19.2.1.		N/A
5.19.3.2	The ratio(s) of the response thresholds measured in accordance with 5.19.2.2 and, for battery operated smoke alarms the response thresholds measured in accordance with 5.19.2.3, to the response threshold measured for the same specimen in accordance with 5.4 shall be between 0,625 and 1,6.		N/A
5.19.3.3	The sound output shall be at least 85 dB(A) when measured in accordance with 5.19.2.4 and, for battery-operated smoke alarms, when measured in accordance with 5.19.2.5.		N/A
5.19.3.4	The assessment in 5.19.2.6 shall indicate that the battery capacity requirements specified in 4.15 can still be met.		N/A
5.20	Alarm silence facility (optional)	See appended table	P
5.20.1	Object		P
	If means of temporarily disabling or desensitising a smoke alarm are provided the following shall apply.		P
	a) The initiation of the alarm silence period shall require the operation of a manual control on the smoke alarm.		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	b) Operation of the alarm silence control shall desensitise the smoke alarm for at least 5 min. The sensitivity of the smoke alarm shall be restored within 15 min of operation of the alarm silence control. If the alarm silence period is adjustable it shall not be possible to set it to less than 5 min or to more than 15 min.		P
	c) Continuous operation of the alarm silence control shall not lead to the smoke alarm being desensitised for more than 15 min without an audible warning being given.		P
5.20.2	Test requirement		P
5.20.2.1	Generate smoke in accordance with 5.1.5, in the smoke tunnel specified in Annex A, with an air velocity of (0,2 ± 0,04) m s-1 and an air temperature of (22 ± 5) °C, but increase the smoke density to three times the response threshold recorded for alarm number 16 (m16 or y16), when tested in accordance with 5.3.2. Using alarm number 16, with a supply voltage corresponding to that of a new battery, operate the alarm silence control, immediately insert the alarm into the smoke-filled smoke tunnel and maintain the smoke density between three and four times m16 or y16 for at least 15 min.		P
5.20.2.2	Repeat the test in 5.20.2.1 but with a supply voltage of VE, as determined in 5.16.2.3.		P
5.20.2.3	With the supply voltage corresponding to that of a new battery, put alarm number 16 into the alarm silence condition by the operation of the alarm silence control. Measure the response threshold as described in 5.1.5 but with the smoke generation commencing (15 ±0,25) min after the operation of the alarm silence control.		P
5.20.2.4	Repeat the test described in 5.20.2.3 but with a supply voltage of VE, as determined in 5.16.2.3.		P
5.20.2.5	Repeat the test in 5.20.2.3 but, after operating the alarm silence control, hold the control on continuously for the remainder of the test.		P
5.20.3	Requirements		P
5.20.3.1	When tested in accordance with 5.20.2.1 and 5.20.2.2, the alarm shall not emit an alarm signal during the first 5 min after the alarm silence control is operated.		P
5.20.3.2	The ratio of the response thresholds measured in accordance with 5.20.2.3 and 5.20.2.4 to the response threshold recorded for alarm number 16 when tested in accordance with 5.4 shall be not less than 0,625 and not greater than 1,6.		P
5.20.3.3	When tested in accordance with 5.20.2.5 either:		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	a) within 15 min of the initial operation of the alarm silence control the alarm shall emit an audible signal (alarm or battery fault warning) for as long as the control is held on; or		P
	b) the ratio of the response threshold measured during the test to the response threshold recorded for the same alarm when tested in accordance with 5.4 shall be not less than 0,625 and not greater than 1,6.		P
5.21	Variation in supply voltage	See appended table	P
5.21.1	Object		-
	To show that, within the specified range(s) of the supply voltage, the sensitivity of the smoke alarm is not unduly dependent on these parameters.		P
5.21.2	Test procedure		P
	The response threshold value of the specimen to be tested shall be measured as described in 5.1.5, under the extremes of the specified supply conditions (e.g. maximum and minimum voltage).		P
	For self-contained smoke alarms intended for operation from mains supplies, the alarm shall be tested with supply voltages of 0,85 times the lower limit and 1,1 times the upper limit of the nominal supply voltage range specified in the manufacturer's requirements.		P
	If the smoke alarm is provided with a rechargeable battery, sufficient time shall be allowed for the battery voltage to stabilize before the response threshold is measured.		P
	For self-contained battery operated smoke alarms, the tests shall be carried out with a supply voltage corresponding to that of a new battery, and also at the fault voltage (VE) as determined in 5.16.2.3. A smoke alarm with a standby battery (or equivalent) is also to be tested but with the primary supply disconnected.		P
	For smoke alarms intended to operate from any external supply other than mains, the manufacturer shall specify a maximum and minimum voltage. Tests shall be conducted at the maximum and minimum voltage.		P
5.21.3	Requirements		P
	The ratio of the response threshold values ymax : ymin or mmax : mmin shall not be greater than 1,6.		P
	The lower response threshold value ymin shall not be less than 0,2 or mmin shall not be less than 0,05 dB m-1.		P
5.22	Battery reversal	See appended table	P
5.22.1	Object		-

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	To demonstrate the ability of the smoke alarm to function properly after being misconnected with respect to polarity.		P
5.22.2	Test procedure		P
	Any user-replaceable batteries shall be fitted with reversed polarity for 10 s to 15 s, if it is possible to establish the reversed connection with the intended battery type, without causing mechanical damage to the smoke alarm.		P
	Following the reverse polarity conditioning, the specimen shall be connected to its power source as described in 5.1.2 and its response threshold value measured as in 5.1.5.		P
	Apply a voltage to the alarm of VE as determined in 5.16.2 minus 5 %.		P
	Of the two response threshold values for the specimen in this test and the initial sensitivity test, the greater shall be designated y_{max} or m_{max} and the lesser y_{min} or m_{min}.		P
5.22.3	Requirements		P
	The ratio of the response threshold values ymax:ymin or mmax:mmin shall not be greater than 1,6. When voltage VE minus 5 % is applied, the battery fault warning shall be given.		P
5.23	Back-up power source	Without back-up battery	N/A
5.23.1	Object		N/A
	To demonstrate that the back-up power source is correctly monitored.		N/A
5.23.2	Test procedure		N/A
5.23.2.1	Low back-up		N/A
	The test procedure set out in 5.16 shall be used to simulate the depletion of the back-up power source to the point where a low back-up warning is given.		N/A
5.23.2.2	Open circuit		N/A
	The back-up power supply shall be disconnected or removed as appropriate and mains power applied to the unit.		N/A
5.23.2.3	Short-circuit		N/A
	The back-up power supply shall be disconnected and replaced with a short-circuit between the backup terminals and the mains power applied to the unit.		N/A
5.23.3	Requirements		N/A

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	When tested as described in 5.23.2.1, a low back-up signal shall be obtained both with mains power to the unit and without mains power to the unit.		N/A
	When tested as described in 5.23.2.2, the smoke alarm shall give an audible warning.		N/A
	When tested as described in 5.23.2.3, the smoke alarm shall give an audible warning.		N/A
5.24	Electrical safety	See appended table	P
5.24.1	Marking	Specimen No.21	P
	The apparatus shall be marked in accordance with EN 60065:2002, Clause 5.		P
	For class I apparatus, the following information shall be given close to the mains input terminals: **"WARNING — THIS APPARATUS MUST BE EARTHED"**		P
	If live parts are made accessible when a cover is removed or opened, a warning shall be displayed which is visible before the cover is removed or opened.		P
5.24.2	Heating under normal operating conditions		P
	The apparatus shall conform to the requirements of EN 60065:2002, Clause 7.		P
5.24.3	Shock hazard under normal operating conditions		P
	The apparatus shall conform to the requirements of EN 60065:2002, Clauses 8 and 9 when mounted in any orientation on a vertical surface and when mounted on the underside of a horizontal surface.		P
5.24.4	Insulation requirements		P
	Supply > 34 V (peak or d.c.), shall conform to the requirements of EN 60065:2002, except clause 10.1		P
5.24.5	Fault conditions		N/A
	The apparatus shall conform to the requirements of EN 60065:2002, Clause 11.		N/A
5.24.6	Mechanical strength		P
	The apparatus shall conform to the requirements of EN 60065:2002, Clause 12 disregarding 12.1.1 of that standard.		P
5.24.7	Clearances and creepage distances		P
	The apparatus shall conform to the requirements of EN 60065:2002, Clause 13.		P
5.24.8	Components		P

EN 14604			
Clause	Requirement - Test	Result - Remark	Verdict
	Resistors, capacitors, inductors and transformers, the short-circuiting or disconnecting of which would cause an infringement of the requirements for operation under fault conditions, in respect of overheating, fire or shock hazard, shall conform to the relevant requirements of EN 60065:2002, Clause 14.		P
	Protective devices, switches, safety interlocks, voltage setting devices and the housing arrangements for batteries shall conform to the relevant requirements of EN 60065:2002, Clause 14.		P
	The power, voltage and current ratings, as appropriate, of all components shall be suitable for the application in which they are used.		P
	Conformity shall be checked by circuit measurement, analysis of the circuit design, measurements on the components in question and by inspection, as appropriate.		P
5.24.9	Protection against the start and spread of fire		P
	The apparatus shall conform to the requirements of EN 60065:2002, Clause 20.		P
5.24.10	Parts connected to the supply mains		P
	The apparatus shall comply with the requirements of Clause 13 of EN 60065:2002.		P
5.24.11	Wiring connections		P
	The apparatus shall comply with the requirements of 3.1, 3.2, 3.3 and 3.4 of EN 60950-1:2001.		P
	In these sub-clauses, reference to 2.9 and 5.1 shall be read as references to 9.3.5 and Clause 7 respectively of EN 60065:2002.		P
5.24.12	Resistance to the effects of heat and fire		P
	The apparatus shall comply with the requirements of EN 60950-1:2001, 4.7, 4.7.1, 4.7.2, and 4.7.3		P

Annex L	**Alarms suitable for installation in leisure accommodation vehicles (LAVs)**		**N/A**

Table 4.15	Battery Capacity					
	EVE CR123A(Min. capacity)					
	Battery capacity (mA/H)	Standby Current (μA)	Alarm current (mA)	Fault warning current (μA)	Fault warning current (μA)	Battery life （year）
Specimen No.21	1400	12	9	6	120	10.5
Specimen No.22	1400	25	11	7.8	80	5.09
Specimen No.23	1400	24	13	8	80	5.00
Specimen No.24	1400	34	32.3	15	128	3.25
Specimen No.25	1400	24	11.2	8	83	5.29
Result	Battery life is about 3.25 year					
Observation	☒ Pass (Battery could work at least 1 year before the battery fault warning is given) ☐ Fail					

TABLE 5.2	**Repeatability**						**P**
Model	DHI-HY-SA20A						
Specimen No. 20	Mes.	a	b	c	d	e	f
	☒m(dB/m) ☐ y	0,340	0,326	0,322	0,310	0,316	0,310
	Result	☒m_{min} = (0,310)dB/m; m_{max} = (0,340)dB/m; m_{max} / m_{min}= (1,10) ☐y_{min} = ( ); y_{max} = ( ); y_{max} / y_{min} = ( )					
	Observation	☒ Pass (m_{min} > 0,05 dB/m or y_{min} > 0,02 and m_{max} / m_{min} < 1,6 or y_{max} / y_{min} < 1,6) ☐ Fail					

TABLE 5.3	**Directional dependence**								**P**
Model	DHI-HY-SA20A								
Specimen No. 20	Orient. (°)	0	45	90	135	180	225	270	315
	☒m(dB/m) ☐ y	0,313	0,286	0,294	0,297	0,295	0,297	0,289	0,290

	Result	☒m_{min} = (0,286)dB/m; m_{max} = (0,313)dB/m; m_{max} / m_{min}= (1,09) ☐y_{min} = ( ); y_{max} = ( ); y_{max} / y_{min} = ( ) 45° is the most sensitive orientation. 90° is the least sensitive orientation.
	Observation	☒ Pass (m_{min} > 0,05 dB/m or y_{min} > 0,02 and m_{max} / m_{min} < 1,6 or y_{max} / y_{min} < 1,6) ☐ Fail

TABLE 5.4	**Initial sensitivity**									**P**
Model	DHI-HY-SA20A									
0°	Specimen No.	1	2	3	4	5	6	7	8	9	10
	☒m(dB/m) ☐ y	0,296	0,326	0,290	0,297	0,299	0,315	0,277	0,288	0,283	0,252
	Specimen No.	11	12	13	14	15	16	17	18	19	20
	☒m(dB/m) ☐ y	0,285	0,278	0,240	0,260	0,287	0,294	0,276	0,319	0,276	0,287
	Result	☒m_{avg} = (0,286); m_{max} / m_{avg}= (1,14) ; m_{avg} / m_{min}= (1,19) ☐y_{avg} = ( ); y_{max} / y_{avg}= ( ) ; y_{avg} / y_{min}= ( )									
	Observation	☒ Pass (m_{max} / m_{avg} ≤ 1,33, m_{avg} / m_{min} ≤ 1,5) ☐ Fail									

TABLE 5.5	**Air movement**				**P**
Model	DHI-HY-SA20A				
	0°		45°		—
Specimen No. 10	☒ m_{max} (0,2) ☐ y_{max} (0,2)	0,292	☒ m_{min} (0,2) ☐ y_{min} (0,2)	0,285	—
	☒ m_{max} (1,0) ☐ y_{max} (1,0)	0,207	☒ m_{min} (1,0) ☐ y_{min} (1,0)	0,221	—
	(m_{max} (0,2)+ m_{min} (0,2) / (m_{max} (1,0)+ m_{min} (1,0) =1,35				
	Observation	0,625 ≤ {(m_{max} (0,2)+ m_{min} (0,2)} / {(m_{max} (1)+ m_{min} (1)} ≤ 1,6 or 0,625 ≤ {(y_{max} (0,2)+ y_{min} (0,2)} / {(y_{max} (1)+ y_{min} (1)} ≤ 1,6			

TABLE 5.6	**Dazzling**	**P**
Model	DHI-HY-SA20A	

Specimen No. 2	At the least sensitive orientation 0°	0,188 dB/m	Rotate 90° orientation	0,080 dB/m
	Response threshold value before condition	0,252 dB/m	Response threshold value before condition (Rotate 90°orientation)	0,200 dB/m
	mmax / mmin = (1,34)		mmax / mmin = (1,01)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or no false alarm nor fault singal) ☐ Fail		

TABLE 5.7	**Dry Heat**		**P**
Model	DHI-HY-SA20A		
Specimen No. 3	55 +/- 2℃, 2h	Initial sensitivity	
	☒m(dB/m) ☐ y	☒m(dB/m) ☐ y	
	☒max. (0,398) ☐min.	☐max. ☒min. (0,260)	
	Result	m_{max} / m_{min} = (1,53)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.8	**Cold (operational)**		**P**
Model	DHI-HY-SA20A		
Specimen No. 4	0 ± 2℃, 2h	Initial sensitivity	
	☒m(dB/m) ☐ y	☒m(dB/m) ☐ y	
	☐max. ☒min. (0,159)	☒max. (0,188) ☐min.	
	Result	m_{max} / m_{min} = (1,18)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.9	**Damp Heat (operational)**		**P**
Model	DHI-HY-SA20A		
Specimen No. 5	40 ± 2℃, (93± 3)%, 96h	Initial sensitivity	

	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. (0,289) ☐min.		☐max. ☒min. (0,276)
	Result	m_{max} / m_{min} = (1,05)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.10	**Sulphur dioxide (SO2) corrosion**		**P**
Specimen No. 6	After		Before
DHI-HY-SA20A	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. (0,298) ☐min.		☐max. ☒min. (0,277)
	Result	m_{max} / m_{min} = (1,08)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	
Specimen No.7	After		Before
DHI-HY-SA20A	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. (0,310) ☐min.		☐max. ☒min. (0,278)
	Result	m_{max} / m_{min} = (1,12)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.10	**Sulphur dioxide (SO2) corrosion**		**P**
Specimen No.22	After		Before
DHI-HY-SA21A-433	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☐max. ☒min. (0,298)		☒max. (0,301) ☐min.
	Result	m_{max} / m_{min} = (1,08)	

	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	
Specimen No.23	After		Before
DHI-HY-SA21A-433	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. ☐min. (0,271)		☐max. (0,299) ☒min.
	Result	m_{max} / m_{min} = (1,10)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.10	**Sulphur dioxide (SO2) corrosion**		**P**
Specimen No. 24	After		Before
DHI-HY-SA2FA	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. ☐min. (0,291)		☐max. (0,322) ☒min.
	Result	m_{max} / m_{min} = (1,11)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	
Specimen No.25	After		Before
DHI-HY-SA2TA	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☐max. ☒min. (0,275)		☒max. (0,303) ☐min.
	Result	m_{max} / m_{min} = (1,10)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.11	**Impact**		**P**
Model	DHI-HY-SA20A		
Specimen	After test: Impact energy (1,9 ± 0,1) J; 1 time		Before test:

No. 8	☒m (dB/m) ☐ y		☒m (dB/m) ☐ y
	☒max. (0,291) ☐min.		☐max. ☒min. (0,283)
	Result	m_{max} / m_{min} = (1,03)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.12	**Vibration (operational)**		**P**
Model	DHI-HY-SA20A		
Specimen No. 9	After test: (10 to 150) Hz; 5 m s^{-2}; 3 axes		Before test:
	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. (0,313) ☐min.		☐max. ☒min. (0,285)
	Result	m_{max} / m_{min} = (1,10)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.13	**Vibration (endurance)**		**P**
Model	DHI-HY-SA20A		
Specimen No. 9	After test: (10 to 150) Hz; 10 m s^{-2}; 3 axes		Before test:
	☒m(dB/m) ☐ y		☒m(dB/m) ☐ y
	☒max. (0,313) ☐min.		☐max. ☒min. (0,285)
	Result	m_{max} / m_{min} = (1,10)	
	Observation	☒ Pass (m_{max} / m_{min} ≤ 1,6 or false alarm nor fault singal) ☐ Fail	

TABLE 5.14	**Electromagnetic Compatibility (EMC), immunity tests (operational)**		**P**
Model	DHI-HY-SA20A		**P**
	Electrostatic discharge		
Specimen	After test:	Before test:	

No. 10	☒m (dB/m) ☐ y		☒m (dB/m) ☐ y
	☐max. ☒min.(0.272)		☒max.(0.287) ☐min.
	Result	m_{max} / m_{min} = (1.06)	
	Observation	☒Pass (m_{max} / m_{min}≤1,6) ☐Fail	
Specimen No. 2	**Conducted disturbances induced by electromagnetic fields**		**P**
	After test:		Before test:
	☒m (dB/m) ☐ y		☒m (dB/m) ☐ y
	☒max.(0.263) ☐min.		☐max. ☒min.(0.252)
	Result	m_{max} / m_{min} =(1.04)	
	Observation	☒Pass (m_{max} / m_{min}≤1,6) ☐Fail	

TABLE 5.15	**Fire Sensitivity**				**P**
Type of flame	DHI-HY-SA20A Specimen No. 17；No. 18；No. 19；No. 20				-
TF2	Sample No.	ΔT(℃)	m (dB m^{-1})	y	**P**
	17	1.08	0.57	0.43	
	18	1.08	0.74	0.44	
	19	1.01	0.84	0.68	
	20	1.02	0.91	0.85	
Remarks: When the alarm responding, m less than 2 dB m^{-1}					
TF3	Sample No.	ΔT(℃)	m (dB m^{-1})	y	**P**
	17	0.97	0.31	0.71	
	18	0.97	0.19	1.09	
	19	0.97	0.24	1.02	
	20	0.76	0.66	2.05	
Remarks: When the alarm responding, m less than 2 dB m^{-1}					
TF4	Sample No.	ΔT(℃)	m (dB m^{-1})	Y	**P**

	17	1.48	0.39	1.92	
	18	1.32	0.36	1.96	
	19	3.35	0.82	2.83	
	20	4.01	0.92	3.39	
Remarks: When the alarm responding, y less than 6.					
TF5	Sample No.	ΔT(℃)	m (dB m^{-1})	Y	**P**
	17	10.95	0.58	3.49	
	18	10.69	0.54	3.39	
	19	9.46	0.55	3.01	
	20	9.46	0.57	3.00	
Remarks: When the alarm responding, y less than 6.					

TABLE 5.16	**Battery fault warning**			**P**
Model	DHI-HY-SA20A			
Specimen No.	Nominal Battery voltage (VR)	Resist setting (Ω)	m (V_R) or y (V_R)	
26	3,0V	0	A=(0,248)dB/m	
27	3,0V	0	B=(0,255)dB/m	
Specimen No.	Low battery voltage (VE)	Resist setting (Ω)	m (V_R) or y (V_R)	Result (W)
26	2,6V	0	(0.246)dB/m	m/A=(0.99)
27	2,6V	0	(0.262)dB/m	m/B=(1.03)
Specimen No.	Nominal Battery voltage (V_R)	Impedance: R_A (Ω)	m (V_R) or y (V_R)	
26	3,0V	4	(0.252)dB/m	m/A=(1.02)
27	3,0V	4	(0.258)dB/m	m/B=(1.01)
Specimen No.	0,75(VR-VE)+VE	Impedance: R_B (Ω)	m (V_R) or y (V_R)	
26	2,7V	4	(0.255)dB/m	m/A=(1.03)
27	2,7V	4	(0.252)dB/m	m/B=(0.99)
Specimen No.	0,5(VR-VE)+VE	Impedance: R_C (Ω)	m (V_R) or y (V_R)	
26	2,8V	3	(0.249)dB/m	m/A=(1.00)
27	2,8V	4	(0.253)dB/m	m/B=(0.99)
Specimen No.	0,25(V_R-V_E)+V_E	Impedance:R_D (Ω)	m (V_R) or y (V_R)	

26	2,9V	1	(0.248)dB/m	m/A=(1.00)
27	2,9V	1	(0.249)dB/m	m/B=(0.98)
	Observation	☒ Pass (0,625 ≤ W ≤ 1,6)	☐ Fail	

TABLE 5.17	**Sound output**					**P**
Model	DHI-HY-SA20A					
	Low Battery voltage (VE)	Sound level after 1 min.		Sound level after 4 min.		
Specimen No. 1	2,6V	88,09 dB(A)	☒ Pass(≥ 85dB(A)) ☐ Fail	87.85 dB(A) 3150Hz	☒ Pass(≥ 82dB(A)) ☐ Fail	
Specimen No. 15	2,6V	89,92 dB(A)	☒ Pass(≥ 85dB(A)) ☐ Fail	89.77 dB(A) 3150Hz	☒ Pass(≥ 82dB(A)) ☐ Fail	

TABLE 5.18	**Sound durability**					**P**
Model	DHI-HY-SA20A					
Specimen No. 15	Sound level before test	Sound level after 1 min.		Sound level after 4 min.		
	2,6V	88.43 dB(A)	☒ Pass(≥ 85dB(A)) ☐ Fail	89,6 dB(A)	☒ Pass(≥ 82dB(A)) ☐ Fail	

TABLE 5.20	**Alarm silence facility**					**P**
Model	DHI-HY-SA20A					
Specimen No.16	Supply voltage	Silence time	After silence	Initial sensitivity	Ratio	☒Pass ☐Fail
	3.0V	12min06s	0.304 dB/m	0.297 dB/m	1.02	☒Pass ☐Fail
	2.6V	12min13s	0.313 dB/m	0.297 dB/m	1.05	☒Pass ☐Fail
	3.0V	-	0.462 dB/m （keep silence）	0.297 dB/m	1.56	☒Pass ☐Fail

TABLE 5.21	**Variation in supply voltage**			**P**
Model	DHI-HY-SA20A			
Specimen No. 2	Supply voltage (V)	m (dB/m) or y	Result	
	High: 3,0	☒m:0,262 (dB/m) ☐ y	y_{max} / y_{min} or m_{max} / m_{min}= 1,04	
		☒max. ☐min.		
	Low: 2,6	☒m:0,252 (dB/m) ☐ y		
		☐max. ☒min.		
	Observation	☒ Pass (y_{max} / y_{min} or m_{max} / m_{min} ≤1,6 and y_{min} ≥0,2 or m_{min} ≥ 0,5 dB/m) ☐ Fail		

TABLE 5.22	**Battery reversal**		**P**
Model	DHI-HY-SA20A		
Specimen No. 16	After test:	Before test:	
	☒m: 0,284 (dB/m) ☐ y	☒m: 0,297 (dB/m) ☐ y	
	☐max. ☒min.	☒max. ☐min.	
	Result	m_{max} / m_{min} = (1,05)	
	Observation	☒ Pass (m_{max} / m_{min} ≤1,6 and when voltage *V*E minus 5 % is applied, the battery fault warning shall be given.) ☐ Fail	

TABLE 5.24	**EN 60065:2002 10.4: Dielectric Strength(TNV circuit)**	**P**
Test voltage applied between:	Test potential applied (V)	Breakdown / flashover (Yes/No)
Battery connectionand Non-metallic enclosure	500Va.c.	No
Supplementary information: above test performed immediately after the humidity test according to 10.2.		

TABLE 5.24	**EN 60065:2002 10.4: Insulation Resistance Measurements(TNV circuit)**	**P**
Insulation resistance R between:	R (MΩ)	Required R (MΩ)
Battery connection +and-	>100	4
Battery connectionand Non-metallic enclosure	>100	4
Supplementary information: above test performed immediately after the humidity test according to 10.2.		

TABLE 5.24	EN 60065:2002 13: Clearance And Creepage Distance Measurements(TNV circuit)				P
Rated supply voltage:	3V	Pollution degree:	2	Material Group:	IIIb
2 N force on internal parts applied:			No hazards occurred.		P
30 N force on outside of conductive enclosure applied:			-		-

clearance and creepage distance at/of:	Working voltage (V)		Clearance (mm)		Creepage (mm)	
	U peak	U r.m.s.	Required	Measured	required	Measured
The battery +and- pins on PCB	<10	<10	0.2	0.7	0.4	0.7

Supplementary information:

B = basic insulation, R = reinforced insulation.

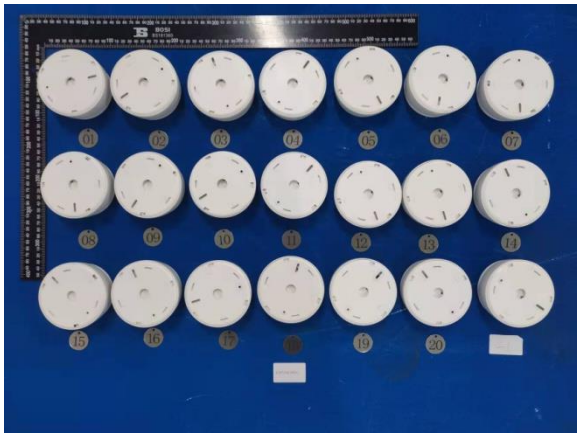
2N applied on all component and Internal wire.

Core of transformer considered as secondary

TABLE 5.24	EN 60065:2002 14: Critical components information				P
Object / part No.	Manufacturer/ trademark	Type / model	Technical data	Standard	Mark(s) of conformity[1)]
Enclosure、Top cover、Button cover、Bracket	WANHUA CHEMICAL GROUP CO LTD	A1107(f1)	V-2	IEC 60695-11-10	UL E351523
	NINGBO LG YONGXING CHEMICAL CO LTD	HI-121H	HB40	IEC 60695-11-10	UL E203955
	interchangeable	interchangeable	V-2	IEC 60695-11-10	UL E351523
	Interchangeable	interchangeable	HB40	IEC 60695-11-10	UL E203955
Smoke chamber	Kumho-Sunny LG Chem Ltd	ABS HFA700	V0 Min. thickness:0.8mm 80℃	IEC 60695-11-10	UL E254819
PCB	Shenzhen Mankun Electronics Co Ltd	MK-D	94V-0	UL 796	UL E248237
	Shenzhen Xunjiexing Technology Co Ltd	JX01	94V-0	UL 796	UL E305654
	Interchangeable	Interchangeable	94V-0	UL 796	UL E342828
	Interchangeable	Interchangeable	94V-0	UL 796	UL E305654
Lithium Battery	Huizhou EVE Energy Co., Ltd.	CR123A	Nominal Voltage :3.0V Nominal Capacity: 1400~1500mAh	UL1642	UL MH28717

	HCB BATTERY CO., LTD.		DC 3.0V, 1500mAh	IEC 60086-4:2014	JPTUV-112743
	Wuhan Lixing(Torch) Power Source Co., Ltd.		DC 3.0V,1500mAh	UL1642	UL MH26236
	GUANGXI RAMWAY NEW ENERGY CORP LTD		DC 3.0V,1600mAh	UL1642	UL MH48851
BUZZER	Universal(Changzhou) Electronic Co. Ltd.	FGT-35G-2.9A1WC75	Resonant Impedance (MAX):350Ω	-	Test with appliance
IR Emitter	Shanghai jiyao electronics co.,LTD	L30022BC-4.3-Q-1-NC-151	Dominate Wavelength: 465nm~470nm Luminous Intensity: 3685mcd~7190mcd Viewing Angle:23Deg	-	Test with appliance
	Shanghai jiyao electronics co.,LTD	L30042NC-4.5-V-191	Peak Wavelength: 945nm Viewing Angle:10Deg	-	Test with appliance
IR Receiver	Shanghai jiyao electronics co.,LTD	L30025PDUC-4.3-252	Rang of Spectral: 350nm~1150nm Reverse Light Current:20uA	-	Test with appliance
IC	STM32L051K8U6	Stmicroelectronics	1 to 25 MHz crystal oscillator 64k Flash 8k RAM	-	Test with appliance
WIFI Wireless module(used for DHI-HY-SA2FA)	Sichuan AI-Link Technology Co.,Ltd.	WF-H861L-RTA1	2.412~2.484GHz	-	Test with appliance
433 Wireless module(for DHI-HY-SA21A-W2)	Silicon Labs	SI4438-C2A-GM	425MHz~525MHz	-	Test with appliance
868 Wireless module(for DHI-HY-SA21A-W2(868))	Silicon Labs	SI4463-C2A-GMR	142MHz~1050MHz	-	Test with appliance
Bluetooth module(used for DHI-HY-SA2TA)	Telink Semiconductor	TLSR8258F512ET32	2380MHz~2500MHz	-	Test with appliance

Attachment 1: Photos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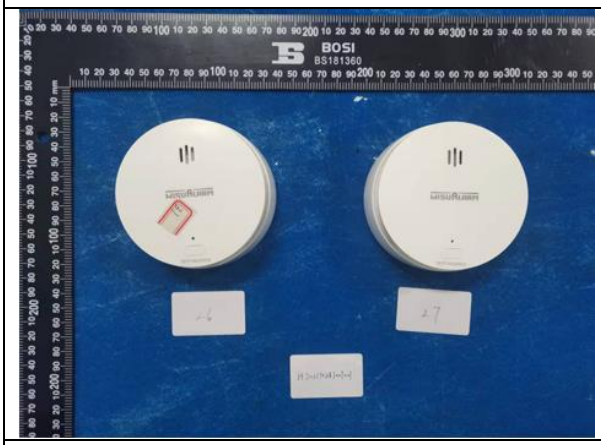
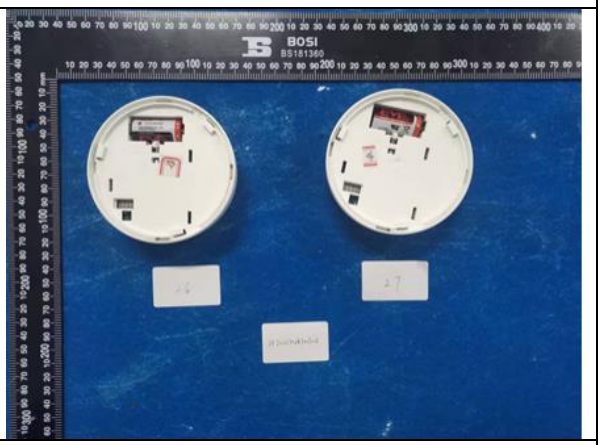
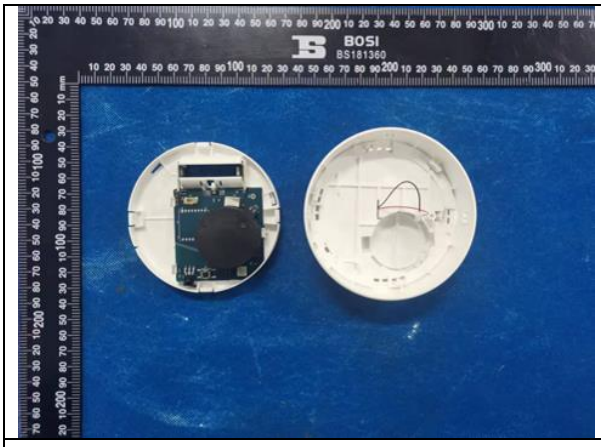
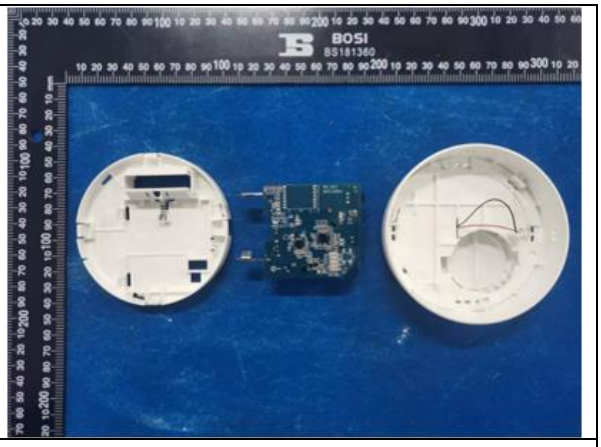
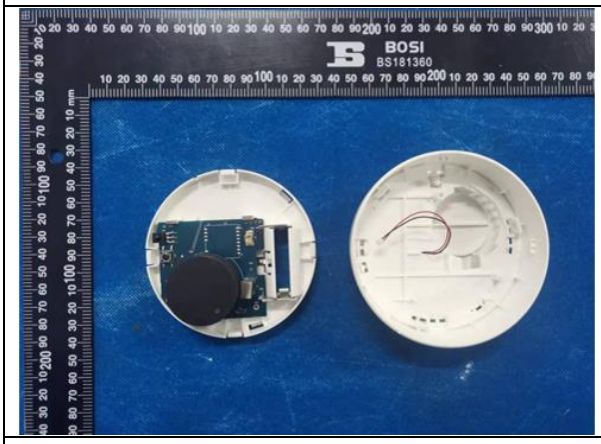
Sample Photo-Obverse	Sample Photo-Reverse
	
Sample Photo-Obverse	Sample Photo-Reverse

	
Model: DHI-HY-SA20A	Model: DHI-HY-SA20A
	
Model: DHI-HY-SA20A-For clause5.16	Model: DHI-HY-SA20A- For clause5.16

Attachment 2: Measurement and Test Equipment List

Description	MTE Type	model Internal ID	Next Calibration Date
☒ Smoke and heat detector test tunnels	AWT2000	HZ-H-001	2023.01.14
☒ Ionic smoke concentration meter	MIC EC-912-10	HZ-H-005	2022.03.03
☒ Optical smoke densitometer	AML-F	HZ-H-006	2022.09.23
☒ DC resistor	ZX99	HZ-H-014	2022.08.22
☒ Digital DC power supply	WY3020	YJ-J-206	2022.06.03
☒ Sulfer dioxide corrosion test chamber	LSO2	YJ-J-167	2022.09.24
☒ Vibration and shock system	DC-2200-26	YJ-J-166	2023.01.09
☒ Electrostatic DischargeGenerator	EMS61000-2A	YJ-H-943	2022.03.18
☒ Signal Generator	SMY01	YJ-A-372	2022.03.15
☒ Power Amplifier	BSA1001-150/ 125D	YJ-D-276	2022.03.17
☒ Power Sensor 1	NRP-Z91	YJ-D-368	2022.03.15
☒ Power Sensor 2	NRP-Z91	YJ-D-369	2022.03.15
☒ Transmitting Antenna	STLP 9128D	YJ-D-372	2022.03.25
☒ Radio Frequency Switch	RSC-1-2	YJ-D-373	2022.03.18
☒ Semi-anechoic chamber	SAC-3	YJ-D-380	2023.04.12