
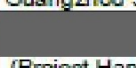

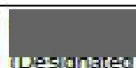


TEST REPORT ANSI/CAN/UL 9540A:2019 Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems on Module Level	
Report Number	64.280.20.60400.01
Date of issue	2021-12-04
Total number of pages	34 pages
Name of Testing Laboratory preparing the Report	TÜV SÜD New Energy Testing (Guangdong) Co., Ltd.
Applicant's name	Huawei Technologies Co., Ltd.
Address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, 518129 Shenzhen, PEOPLE'S REPUBLIC OF CHINA
Test specification:	
Standard	ANSI/CAN/UL 9540A:2019
Test procedure	Test report
Non-standard test method	N/A
Test Report Form No.	ANSI/CAN/UL 9540A:2019 Rev 0
Test Report Form(s) Originator	TUV SUD Product Service
Master TRF	Dated 2021-01-01
<p>This test report is based on the content of the standard (see above). The test report considered selected clauses of the a.m. standard(s) and experience gained with product testing. It was prepared by TÜV SÜD Product Service.</p> <p>TÜV SÜD Group takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.</p>	
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Test item description	Rechargeable Lithium Ion Module (Energy Storage Module)	
Trade Mark	 HUAWEI	
Manufacturer	Same as the applicant	
Model/Type reference	ESM51320AS1	
Ratings	51.2Vd.c., 320Ah	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):		
Testing Laboratory	TÜV SÜD New Energy Testing (Guangdong) Co., Ltd.	
Testing location/ address	North-1/F, 2/F & Unit 301-3/F, TÜV SÜD Testing Center, D1, No. 63 Chuangqi Road, Shilou Town, Panyu District, Guangzhou 511447, China	
Tested by (name, function, signature)	 (Project Handler)	
Approved by (name, function, signature)	 (Designated Reviewer)	
Summary of testing:		
Summary of module level testing:		
Module model number	ESM51320AS1	
Nominal voltage and rated capacity	51.2Vd.c., 320Ah	
Number of cells in module and module configuration	16S	
Whether UL 1973 compliant	No	
Module voltage corresponding to the tested SOC	55.10V	
Method used to initiate thermal runaway	Heating the cell with externally applied flexible film heaters that cover two wider side surfaces of the cell	
Thermal runaway of other cells within module:	Yes (cell 3 and cell 11, see Attachment 1)	
Heat release rate versus time data	see Attachment 7 and Attachment 9	
Peak smoke release rate and total smoke release data	see Attachment 8 and Attachment 9	
Flammable gas generation and composition data	see Table 2 and Attachment 6	
Observation(s) of flying debris:	No	
Observation(s) of explosive discharge of gas:	No	
Observation(s) of sparks, electrical arcs or other electrical events:	No	
Locations and visual estimations of flame	No	
Re-ignitions	N/A (no fire during test)	
Performance - module level test:		
a) Thermal runaway is contained by module design; and	Yes	
b) Cell vent gas is nonflammable as determined by the cell level test.	No	