

Report No.:SHCR230700145405

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# TEST REPORT

**Application No.:** SHCR2307001454AT

FCC ID: 2AH25T6810 IC: 22621-T6810

Applicant: Shanghai Sunmi Technology Co., Ltd.

**Address of Applicant:** Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China

Manufacturer: Shanghai Sunmi Technology Co., Ltd.

**Address of Manufacturer:** Room 505, No.388, Song Hu Road, Yang Pu District, Shanghai, China

**Equipment Under Test (EUT):** 

**EUT Name:** Smart POS system

Model No.: 2001-100 HVIN: 2001-100 Trade Mark: **TOSHIBA** 

47 CFR Part 15, Subpart C 15.225 Standard(s):

RSS-210 Issue 10 Amendment (April 2020)

RSS-Gen Issue 5 Amendment 2 (February 2021)

2023-06-07 **Date of Receipt:** 

**Date of Test:** 2023-06-26 to 2023-07-18

Date of Issue: 2023-07-18

Test Result: Pass\*

Parlam Zhan Laboratory Manager

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<sup>\*</sup> In the configuration tested, the EUT complied with the standards specified above.



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	Revision Record								
Version	Description	Date	Remark						
00	Change model name, trade mark and color	2023-07-18	Based on KSCR221000185705						

Authorized for issue by:			
	hichael Nil		
	Micheal Niu / Project Engineer	-	
	Parlam Zhan		
	Parlam Zhan / Reviewer	-	



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#### 2 **Test Summary**

Radio Spectrum Matter Part								
Item	FCC Requirement	IC Requirement	Method	Result				
Radiated Emissions(9kHz- 30MHz)	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 Amendment (April 2020)	ANSI C63.10 (2013) Section 6.4&6.5	Pass				
Radiated Emissions(30MHz- 1GHz)	47 CFR Part 15, Subpart C 15.225	RSS-210 Issue 10 Amendment (April 2020)	ANSI C63.10 (2013) Section 6.4&6.5	Pass				

Note: This report based on report KSCR221000185705, just changing the model name, trade mark and color. The new model 2001-100 added alternative screen, battery compared with original SKU1(HVIN: T6810H). Considering the differences, only Radiated Emissions(9kHz-30MHz) and Radiated Emissions(30MHz-1GHz) were tested in this report, other test data please refer to original report.



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## **General Information**

#### 4.1 Details of E.U.T.

 Details of E.o.1.					
Power supply:	DC 5V 1A; DC 5V 2A				
Adapter information:	Adapter 1:  Model: TPA-46B050100UU Input: 100-240V~ 50/60Hz 0.2A Output: 5.0V 1.0A Adapter 2: Model: TPA-23A050200UU01 Input: 100-240V~ 50/60Hz 0.3A Output: 5.0V 2.0A Adapter 3: Model No.: UC11US PRI: 100-240V~50/60Hz 0.2A SEC: 5.0V 1.0A 5.0W				
Battery information:	Model 1: TMPA 1ICP6/59/63 Nominal Voltage: 3.8V Limited Charge Voltage: 4.35V Rated Capacity: 2900mAh Model 2: TMPC 1ICP6/59/63 Nominal Voltage: 3.8V Limited Charge Voltage: 4.35V Rated Capacity: 2900mAh				
Operation Frequency:	13.56MHz				
Channel Number:	1				
Modulation Type:	ASK				
Antenna Type:	Loop Antenna				
SN:	PC17D37R10018				
Firmware version:	V1.0.0				

4.2 Description of Support Units

Description	Manufacturer	Model No.	Serial No.			
The EUT has been tested as an independent unit.						



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## 4.3 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4 x 10 <sup>-8</sup>
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	DE Dadieted Dower	5.2dB (Below 1GHz)
0	RF Radiated Power	5.9dB (Above 1GHz)
		4.2dB (Below 30MHz)
9	Dedicted Sourious Emission Test	4.5dB (30MHz-1GHz)
9	Radiated Spurious Emission Test	5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.



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### 4.4 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. E&E Lab 588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China

Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

No tests were sub-contracted.

Note:

- 1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).
- 2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

## 4.5 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### A2LA (Certificate No. 6332.01)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the American Association for Laboratory Accreditation(A2LA).

### FCC (Designation Number: CN1301)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

### • ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 8617A

### VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

### 4.6 Deviation from Standards

### **Abnormalities from Standard Conditions**

None



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### **Equipment List** 5

Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Conducted Test	aiiaiaotai Gi	IIIOGOI IIO		Jui Duit	Ja: Dac Date
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Spectrum Analyzer	Keysight	N9020B	SHEM241-1	2022-12-20	2023-12-19
Spectrum Analyzer	Agilent	N9020A	SHEM181-1	2022-08-02	2023-08-01
Signal Generator	R&S	SMR20	SHEM006-1	2022-08-02	2023-08-01
Signal Generator	Agilent	N5182A	SHEM182-1	2022-08-02	2023-08-01
Communication Tester	R&S	CMW270	SHEM183-1	2023-06-01	2024-05-31
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Power Sensor	Keysight	U2021XA * 4	SHEM184-1	2022-08-02	2023-08-01
Splitter	Anritsu	MA1612A	SHEM185-1	/	/
Coupler	e-meca	803-S-1	SHEM186-1	/	/
High-low Temp Cabinet	Suzhou Zhihe	TL-40	SHEM087-1	2022-11-08	2024-11-07
AC Power Stabilizer	APC	KDF-31020T-V0-F0	SHEM216-1	2022-11-08	2024-11-07
DC Power Supply	MCH	MCH-303A	SHEM210-1	2022-12-20	2023-12-19
	IVICH		3HEIVIZ 10-1		
Conducted test Cable	/ Tananand	RF01~RF04	/ SHEM184-1	2022-12-20	2023-12-19
Switcher	Tonscend	JS0806	SHEM184-1	2022-08-02	2023-08-01
Test software	Tonscend	JS Tonscend BT/WIFI System Version: 2.		/	/
Coaxial Cable	TST		SHEM263-1	2022-08-02	2023-08-01
Test software	TST	TST PASS	Version: 2.0	/	/
RF Radiated Test					
EMI test Receiver	R&S	ESU40	SHEM051-1	2022-12-20	2023-12-19
Spectrum Analyzer	R&S	FSP-30	SHEM002-1	2022-12-20	2023-12-19
Communication Tester	R&S	CMW500	SHEM268-1	2023-06-01	2024-05-31
Loop Antenna (9kHz-30MHz)	Schwarzbeck	FMZB1519	SHEM135-1	2022-12-20	2023-12-19
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM048-1	2021-09-11	2023-09-10
Antenna (25MHz-2GHz)	Schwarzbeck	VULB9168	SHEM202-1	2022-05-07	2024-05-06
Horn Antenna (1-18GHz)	Schwarzbeck	HF906	SHEM009-1	2022-08-11	2024-08-10
Horn Antenna (1-18GHz)	Schwarzbeck	BBHA9120D	SHEM050-1	2021-09-18	2023-09-17
Horn Antenna (14-40GHz)	Schwarzbeck	BBHA 9170	SHEM049-1	2021-09-18	2023-09-17
Pre-Amplifier	HP	8447D	SHEM236-1	2022-08-02	2023-08-01
High-amplifier (14-40GHz)	Schwarzbeck	10001	SHEM049-2	2022-12-20	2023-12-19
Band Filter	LORCH	9BRX-875/X150	SHEM156-1	/	/
Band Filter	LORCH	13BRX-1950/X500	SHEM083-2	/	/
Band Filter	LORCH	5BRX-2400/X200	SHEM155-1	/	/
Band Filter	LORCH	5BRX-5500/X1000	SHEM157-2	/	/
High pass Filter	Wainwright	WHK3.0/18G	SHEM157-1	/	/
High pass Filter	Wainwright	WHKS1700	SHEM157-3	/	/
Semi/Fully Anechoic	ST	11*6*6M	SHEM078-2	2021-05-25	2024-05-24
RE test Cable	/	RE01, RE02, RE06	/	2023-01-07	2024-01-06
Test software	ESE	E3	Version: 6.111221a	/	/



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## 6 Radio Spectrum Matter Test Results

## 6.1 Radiated Emissions (30MHz-1GHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Limit:

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands above 1000 MHz. Radiated emission limits in these three bands (9-90kHz,110-490kHz and Above 1GHz) are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

### 6.1.1 E.U.T. Operation

Operating Environment:

Temperature: 23.5 °C Humidity: 50.5 % RH Atmospheric Pressure: 1010 mbar

### 6.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	07	TX mode with modulation



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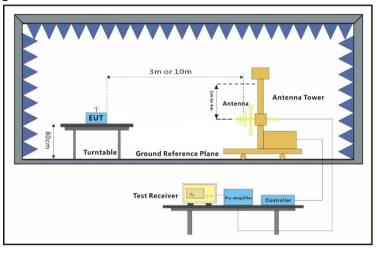
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### 6.1.3 Test Setup Diagram



### 6.1.4 Measurement Procedure and Data

a. The EUT was placed on the top of a rotating table 0.8 meters above the ground for below 1GHz at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement. d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. g. The radiation measurements are performed in X, Y, Z axis positioning. And found the X axis positioning which it is worse case, only the test worst case mode is recorded in the report. Remark: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor



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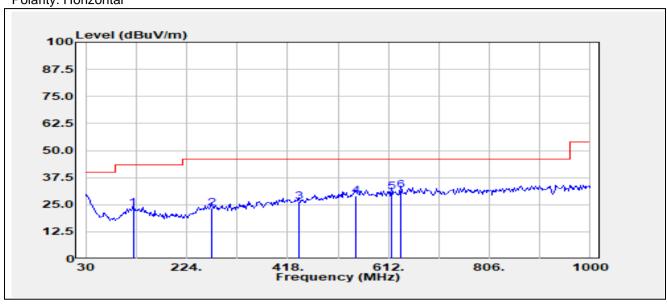
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Polarity: Horizontal



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	121.180	3.79	19.44	23.23	43.50	20.27	QP
2	272.500	3.12	20.23	23.35	46.00	22.65	QP
3	441.280	2.44	24.02	26.46	46.00	19.54	QP
4	549.920	1.79	27.27	29.06	46.00	16.94	QP
5	617.820	3.65	27.24	30.89	46.00	15.11	QP
6	635.280	3.95	27.74	31.69	46.00	14.31	QP



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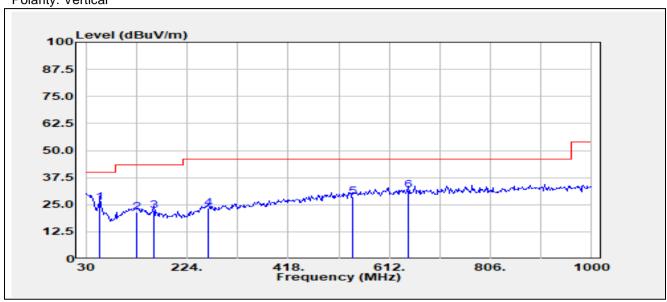
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Polarity: Vertical



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	57.160	10.58	15.51	26.09	40.00	13.91	QP
2	127.000	1.99	19.50	21.49	43.50	22.01	QP
3	159.980	4.96	17.49	22.45	43.50	21.05	QP
4	264.740	2.43	20.94	23.37	46.00	22.63	QP
5	542.160	2.00	26.66	28.66	46.00	17.34	QP
6	648.860	3.81	27.76	31.57	46.00	14.43	QP



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### 6.2 Radiated Emissions (9kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.225(d) & 15.209

Test Method: ANSI C63.10 (2013) Section 6.4&6.5

Limit:

Frequency(MHz)	Field strength (microvolts/meter)	Limit Detector		Measurement Distance (meters)	
0.009-0.490	2400/F(kHz)	-	-	300	
0.490-1.705	24000/F(kHz)	-	-	30	
1.705-30	30	-	-	30	

### **Below 30MHz**

If field strength is measured at only a single point, then that point shall be at the radial from the EUT that produces the maximum emission at the frequency being measured, as described in 5.4. If that point is closer to the EUT than  $\lambda/2\pi$  and the limit distance is greater than  $\lambda/2\pi$ , the measurement shall be extrapolated to the limit distance by conservatively presuming that the field strength decreases at a 40 dB/decade of distance rate to the  $\lambda/2\pi$  distance, and at a 20 dB/decade of distance rate beyond  $\lambda/2\pi$ . This shall be accomplished using Equation (2):

$$FS_{(10m)} = FS_{(30/300m)} + 40log\{d_{(near field)}/d_{(10m)}\} + 20log\{d_{(30/300m)}/d_{(near field)}\}$$
(2)

If the single point measured is at a distance greater than  $\lambda/2\pi$ , then extrapolation to the limit distance shall be calculated using Equation (3):

$$FS_{(10m)} = FS_{(30/300m)} + 20log\{d_{(30/300m)}/d_{(10m)}\}$$
(3)

If both the single point and the limit distance are equal to or closer to the EUT than  $\lambda/2\pi$ , then extrapolation to the limit distance shall be calculated using Equation (4):

$$FS_{(10m)} = FS_{(30/300m)} + 40log\{d_{(30/300m)}/d_{(10m)}\}$$
(4)

Remark:

 $d_{near field} = 47.77 / f_{MHz}$ 

where f<sub>MHz</sub> is the frequency of the emission being measured in MHz.

### Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor - Preamplifier Factor



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$$FS_{\text{limit}} = FS_{\text{max}} - 40 \log \left( \frac{d_{\text{limit}}}{d_{\text{measure}}} \right)$$

where

 $FS_{limit}$  is the calculation of field strength at the limit distance, expressed in dB $\mu$ V/m

FS<sub>max</sub> is the measured field strength, expressed in dBμV/m  $d_{\text{measure}}$  is the distance of the measurement point from the EUT is the reference distance or the distance of the  $\lambda/2\pi$  point

### 6.2.1 E.U.T. Operation

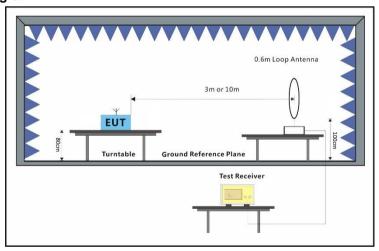
Operating Environment:

Temperature: 23.5 °C Humidity: 50.5 % RH Atmospheric Pressure: 1010 mbar

6.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description			
Final test	07	TX mode with modulation			

### 6.2.3 Test Setup Diagram



### 6.2.4 Measurement Procedure and Data

For testing performed with the loop antenna, the center of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT. During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane. Only the worst position of vertical was shown in the report.



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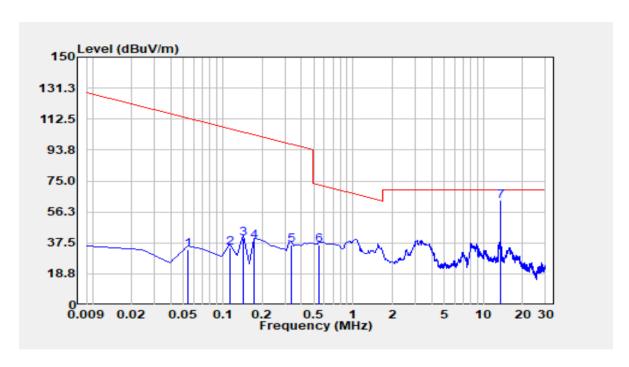
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Polarity:Coaxial



Item	Freq.	Read Level	Correct Factor	Result Level@3m	Result Level@SPEC	Limit Line@SPEC	Over Limit	Detector
(Mark)	(MHz)	(dBµV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.054	19.01	14.44	33.45	-46.55	32.95	-79.5	QP
2	0.114	20.06	14.46	34.52	-45.48	26.46	-71.94	QP
3	0.144	25.83	14.45	40.28	-39.72	24.43	-64.15	QP
4	0.174	23.94	14.44	38.38	-41.62	22.79	-64.41	QP
5	0.339	21.90	14.43	36.32	-43.68	17.00	-60.68	QP
6	0.549	21.86	14.45	36.31	-3.69	32.82	-36.51	QP
7	13.560	48.81	13.96	62.78	22.78	84.00	-61.22	Peak



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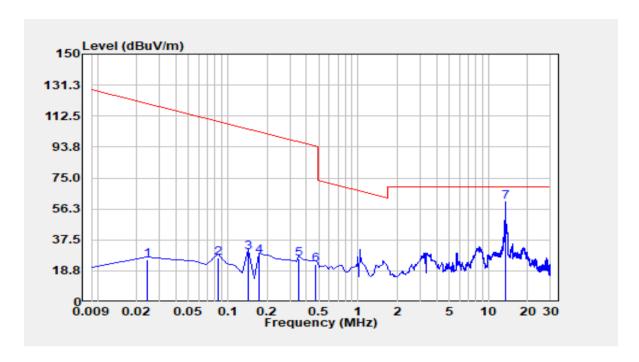
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### Polarity:Coplanar



Item	Freq.	Read Level	Correct Factor	Result Level@3m	Result Level@SPEC	Limit Line@SPEC	Over Limit	Detector
(Mark)	(MHz)	(dBµV)	(dB/m)	(dBuV/m)	(dBuV/m)	(dBuV/m)	(dB)	
1	0.024	10.66	14.70	25.36	-54.64	39.99	-94.63	QP
2	0.084	12.22	14.44	26.66	-53.34	29.11	-82.45	QP
3	0.144	15.34	14.45	29.78	-50.22	24.43	-74.65	QP
4	0.174	13.13	14.44	27.57	-52.43	22.79	-75.22	QP
5	0.354	11.52	14.42	25.94	-54.06	16.62	-70.68	QP
6	0.474	8.36	14.43	22.80	-57.2	14.09	-71.29	QP
7	13.560	46.65	13.96	60.61	20.61	84	-63.39	Peak



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#### **Test Setup Photo** 7

Refer to Appendix - Test Setup Photo for SHCR2307001454AT

#### **EUT Constructional Details (EUT Photos)** 8

Refer to Appendix - Photographs of EUT Constructional Details for SHCR2307001454AT

End of the Report -



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