Test Report: DHP-1UT-B-48

3200~12800W 1U Distributed Power/Charger System

■ DESIGN VERIFY TEST

Output Function Test
Input Function Test
Control Function Test

■ SAFETY & E.M.C. TEST

Safety Test
E.M.C. Test

■ RELIABILITY TEST

ENVIRONMENT TEST

■ DESIGN VERIFY TEST

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	MAX. OUTPUT CURRENT	268A	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	268A
2	MAX. OUTPUT POWER	12864W	I/P: 230 VAC O/P:FULL LOAD Ta:25℃	12864W

INPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	INPUT VOLTAGE RANGE	90VAC~264VAC 127VDC~400VDC	(1) I/P:TESTING O/P:FULL LOAD (2) I/P:DC TESTING(L:+ N:-) O/P: FULL / 50% LOAD (3) I/P:DC TESTING(L:- N:+) O/P: FULL / 50% LOAD (PLEASE CHECK DERATING CURVE) Ta:25℃	(1)168Vac~264Vac/FULL LOAD 85Vac~264Vac/50%LOAD (2)242Vdc~400Vdc/FULL LOAD 108Vdc~400Vdc/50% LOAD (3) 242Vdc~400Vdc/FULL LOAD 107Vdc~400Vdc/50% LOAD
			I/P: LOW-LINE-3V=87 V HIGH-LINE+15%=300 V O/P:FULL/MIN LOAD (PLEASE CHECK DERATING CURVE) ON: 30 Sec OFF: 30 Sec 10MIN (POWER ON/OFF NO DAMAGE)	TEST:OK
2	INPUT FREQUENCY RANGE	47HZ ~63 HZ NO DAMAGE	I/P:180 VAC ~264 VAC O/P:FULL~MIN LOAD Ta:25℃	TEST: OK
3	INPUT CURRENT (Typ.) per RECTIFIER	230V/ 17 A	I/P： 230 VAC O/P：FULL LOAD Ta：25℃	I =15.19 A/ 230VAC
4	LEAKAGE CURRENT per RECTIFIER	<2 mA / 230 VAC	I/P： 230 VAC O/P：Min LOAD Ta：25℃	L-FG： 1.02 mA N-FG： 1.01 mA

CONTROL FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	AUXILIARY POWER (AUX)	Auxiliary voltage output, 10.8~13.2V, referenced to GND-AUX (pin7). The maximum load current is 0.8A. This output has the built-in "Oring diodes" and is not controlled by “Remote ON-OFF”. Auxiliary voltage output,4.5~5.5V, referance to GND_AUX(pin7).The maximum load current is 0.3A. The output has the built-in "Oring diodes" and is not controlled by the *Remote ON/OFF* control. I/P: 230 VAC O/P:FULL LOAD Ta:25℃		

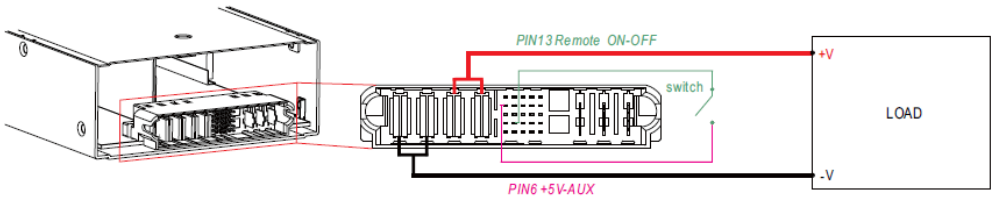
Test Result：

AUX	TOLERANCE	RIPPLE	TEST RESULT
12V / 0.8A	10.8~13.2 V	450mVp-p	11.7V 0.8A 254 mVp-p

		5V/0.3A	4.5~5.5V	150 mVp-p	4.71V/0.3A 117 mVp-p

2 REMOTE ON/OFF CONTROL

The power supply can be turned ON/OFF individually or along with other units by using the "Remote ON-OFF" function.



Between Remote ON-OFF and +5V-AUX	Power Supply Status
Switch Short	ON
Switch Open	OFF

I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃

Test Result：

Between ON/OFF and +5V-AUX	Power Supply Status
SW SHORT	ON
SW OPEN	OFF

3 REMOTE SENSE

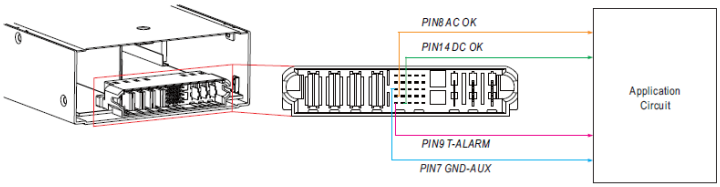
S+ / S-
0.3V~0.5V
Compensate voltage drop on the load wiring up to 0.5V.

I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃

0.3V~0.5V

4 ALARM SIGNAL

※ There are 3 alarm signals, DC-OK, AC-OK and T-ALARM, in TTL signal form, on CN1. These signals are isolated from output. The maximum sink current is 10mA.



DC-OK signal	Power Supply Mode Status	Charger Mode Status
"High" > 3.5~5.5V	Vout ≦ 77%±5%	Vout ≦ 66%±5%
"Low" < -0.5~0.5V	Vout ≧ 80%±5%	Vout ≧ 67%±5%

AC-OK signal	Power Supply and Charger Mode Status
"High" > 3.5~5.5V	Input voltage ≧ 87Vrms
"Low" < -0.5~0.5V	Input voltage ≦ 75Vrms

T-ALARM signal	Power Supply and Charger Mode Status
"High" > 3.5~5.5V	OFF(OTP or Fan Fail)
"Low" < -0.5~0.5V	ON(Normal Work)

1. DC OK SIGNAL

For power supply mode

High (3.5 ~ 5.5V) : When the Vout≦ 77%±5%.

Low (-0.5 ~ 0.5V) : When the Vout≧ 80%±5%.

The maximum sourcing current is 10mA and only for output.

For charger mode

High (3.5 ~ 5.5V) : When the Vout≦ 66%±5%.

Low (-0.5 ~ 0.5V) : When the Vout≧ 67%±5%. The maximum sourcing current is 10mA and only for output.

DC OK is associated with battery low protection.

I/P: 230 VAC
O/P:FULL LOAD

Ta:25℃

Test Result：

Vout	DC OK SIGNAL
Vout≦ 72%	4.92V
Vout≧ 85%	0.0087v

2. T-ALARM

High (3.5 ~ 5.5V) : When the internal temperature exceeds the limit of temperature alarm, or when Fan fails.

Low (-0.5 ~ 0.5V) : When the internal temperature is normal, and when Fan works normally.

The maximum sourcing current is 10mA and only for output

I/P: 230 VAC

O/P:FULL LOAD

Ta:25℃

Test Result：

P.SU STATUS	Vo	T-ALARM SPEC	T-ALARM TEST
NORMAL	100%±2%	-0.5 ~0.5V	-0.0975V
OTP	0V	3.5~5.5V	5.003V
FAN LOCK	0V	3.5~5.5V	5.003V

3. AC OK

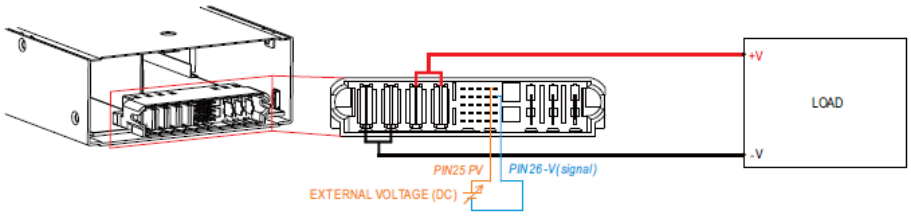
The maximum sourcing current is 10mA and only for output.

Low (-0.5 ~ 0.5V) : When the input voltage is≦ 75Vrms.

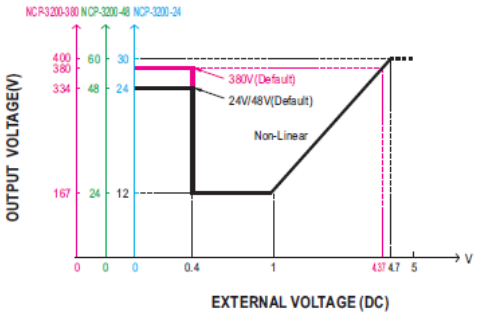
High (3.5 ~ 5.5V) : When the input voltage is≧ 87Vrms .

Vout	AC OK SIGNAL
AC ≧ 87Vrms	4.9612V
AC ≦ 75Vrms	0.0081v

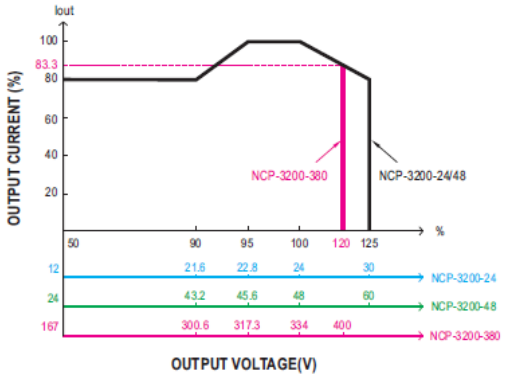
5	OUTPUT VOLTAGE PROGRAMMABLE(PV)	※ In addition to the adjustment via the built-in potentiometer, the output voltage can be trimmed to 50~125%(24/48V models) or 50~120%(380V model) of the nominal voltage by applying EXTERNAL VOLTAGE.



◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.



◎ For power supply mode
◎ The 100% output voltage is 24/48/334V.



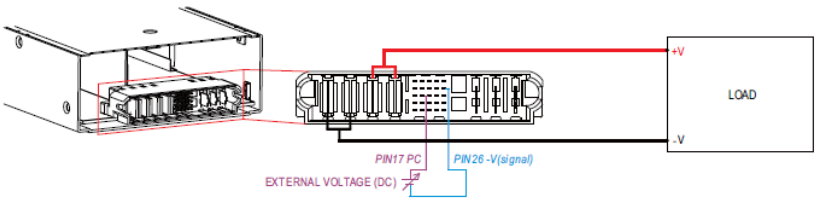
◎ The rated current should change with the Output Voltage Programming accordingly.
◎ The 100% output current is 133/67/9.6A.
◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.

I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃
TEST RESULT：

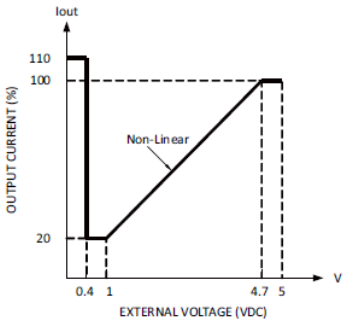
PV / MODEL	<0.3V	1V	3.479V	4.7V	5V
SPEC	48V±5%	24V±5%	48V±5%	60V±5%	60V±5%
Vout	48.167V	23.89V	48.29V	60.5 V	61.76V

6 Constant Current Level Programming

※ The constant current level can be trimmed to 20~100% of the rated current by applying EXTERNAL VOLTAGE.
※ If setting output current to a much lower level, as output status turns to constant current mode, it might cause higher current ripple under such condition.



◎ For Remote Sense / Local Sense, please refer to "Voltage Drop Compensation" section.
◎ Output will shut down after O/P voltage is below < 80% of Vset for 5 sec, re-power on to recover.



◎ The 100% output current is 133/67/9.6A.
◎ Notice the output power do not over rated power (max.)

I/P: 230 VAC
O/P:FULL LOAD
Ta:25℃
TEST RESULT：

PC / MODEL	<0.3V	1V	2.388V	4.7V	5V
SPEC	110%±10%	20%±10%	50%±10%	100%±10%	100%±10%
Iout	107.46%	19.25%	49.1%	98.51%	100%

6 CURRENT SHARING

Maximum 10 rack shelfs in parallel
CURRENT SHARING TOLERANCE <±10%
I/P： 230 VAC
O/P：90%/50% LOAD
Ta：25℃
TEST RESULT：

NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD	NO	50% LOAD	90% LOAD
0	33.25	59.75	10	33.00	59.50	20	33.25	60.00	30	33.00	59.75
1	33.00	59.50	11	33.00	59.75	21	33.25	59.75	31	33.00	59.50
2	33.00	60.00	12	33.00	59.75	22	33.25	59.75	32	33.00	59.75
3	33.00	59.75	13	33.25	59.75	23	33.00	59.50	33	33.00	59.75
4	33.00	59.50	14	33.00	59.75	24	33.00	59.50	34	33.25	59.75
5	33.00	59.75	15	33.00	59.50	25	33.00	59.50	35	33.00	59.75
6	33.00	60.00	16	33.00	59.75	26	33.25	59.75	36	33.00	59.50
7	33.00	59.75	17	33.00	59.75	27	33.25	59.75	37	33.25	59.50
8	33.00	59.75	18	33.25	59.75	28	33.00	59.50	38	33.00	59.75
9	33.25	59.75	19	33.00	59.75	29	33.00	59.75	39	33.00	59.75

Unit : A

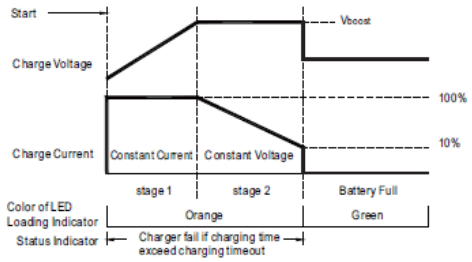
CHARGER MODE

OUTPUT FUNCTION TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	BOOST CHARGE VOLTAGE	57.6V±0.48V	I/P：230 VAC O/P：CV MODE Ta：25℃	57.56 V
2	FLOAT CHARGE VOLTAGE	55.2V±0.48V	I/P：230 VAC O/P：CV MODE Ta：25℃	55.16V
3	OUTPUT CURRENT	220A±3%	I/P：230 VAC O/P：CV MODE Ta：25℃	222A
4	Charging Curve			PASS
5	Front Panel LED Indicators			

※ By default, the unit operates in power supply mode, and it can be configured to charger mode by PMBus, CANBus or SBP-001.
※ By factory default, this charger performs the default curve which can be programmed via PMBus and CANBus.
※ To accommodate the parameters of the charging curve, SBP-001, the smart battery charging programmer designed by MEAN WELL, and a personal computer are needed. Please contact MEAN WELL for details.

※ 2 stage charging curve



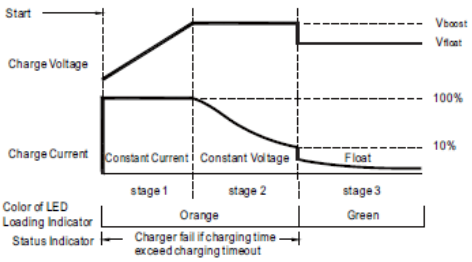
State	NCP-3200-24	NCP-3200-48
Constant Current	110A	55A
Vboost	28.8V	57.6V

◎ Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).

◎ Embedded 2 stage charging curves

MODEL	Description	CC(default)	Vboost
24V	Default, programmable	110A	28.8
	Pre-defined, gel battery		28
	Pre-defined, flooded battery		28.4
	Pre-defined, AGM battery		29
48V	Default, programmable	55A	57.6
	Pre-defined, gel battery		56
	Pre-defined, flooded battery		56.8
	Pre-defined, AGM battery		58

※ 3 stage charging curve (default)



State	NCP-3200-24	NCP-3200-48
Constant Current	110A	55A
Vboost	28.8V	57.6V
Vfloat	27.6V	55.2V

◎ Suitable for lead-acid batteries (flooded, Gel and AGM) and Li-ion batteries (lithium iron and lithium manganese).

◎ Embedded 3 stage charging curves

MODEL	Description	CC(default)	Vboost	Vfloat
24V	Default, programmable	110A	28.8	27.6
	Pre-defined, gel battery		28	27.2
	Pre-defined, flooded battery		28.4	26.8
	Pre-defined, AGM battery		29	27
48V	Default, programmable	55A	57.6	55.2
	Pre-defined, gel battery		56	54.4
	Pre-defined, flooded battery		56.8	53.6
	Pre-defined, AGM battery		58	54

◎ For charger system

LED	Description
Green	Float (stage 3)
Orange	Charging (stage 1 or stage 2)
Red	The LED will present a constant red light when the abnormal status (OTP, OLP, fan fail and charging timeout) arises.
Red (Flashing)	The LED will flash with the red light when the internal temperature reaches 60℃; under this condition, the unit still operates normally without entering OTP. (In the meantime, an alarm signal will be sent out through the PMBus/CANBus interface.)

■ SAFETY & E.M.C. TEST

SAFETY TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	WITHSTAND VOLTAGE	I/P-O/P: 3KVAC/min I/P-FG : 2KVAC/min O/P-FG:1.5KVDC/min	I/P-O/P: 3.6 KVAC/min I/P-FG: 2.4 KVAC/min O/P-FG:1.8KVDC/min Ta:25℃	I/P-O/P: 15.16mA I/P-FG: 13.89mA O/P-FG: 0.002 m A NO DAMAGE
2	ISOLATION RESISTANCE	I/P-O/P:500VDC>100MΩ I/P-FG: 500VDC>100MΩ O/P-FG:500VDC>100MΩ	I/P-O/P: 500 VDC I/P-FG: 500 VDC O/P-FG: 500 VDC Ta:25℃	I/P-O/P: 2.36GΩ I/P-FG: 3.29GΩ O/P-FG: 5.41GΩ NO DAMAGE
3	GROUNDING CONTINUITY	FG(PE) TO CHASSIS OR TRACE < 100 mΩ	40A / 2min Ta:25℃	25mΩ

E.M.C TEST

NO	TEST ITEM	SPECIFICATION	TEST CONDITION	RESULT
1	HARMONIC	EN61000-3-2 CLASS A	I/P:230VAC/50HZ O/P:100% LOAD Ta:25℃	PASS
2	CONDUCTION	EN55022 CLASS B	I/P： 230 VAC (50HZ) O/P：FULL/50% LOAD Ta：25℃	PASS Test by certified Lab
3	RADIATION	EN55022 CLASS A	I/P： 230 VAC (50HZ) O/P：FULL LOAD Ta：25℃	PASS Test by certified Lab
4	E.S.D	EN61000-4-2 INDUSTRY AIR：8KV / Contact：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
5	E.F.T	EN61000-4-4 INDUSTRY INPUT： 2KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
6	SURGE	IEC61000-6-2 INDUSTRY L-N ：2KV L,N-PE：4KV	I/P： 230 VAC/50HZ O/P：FULL LOAD Ta：25℃	CRITERIA A
7	Test by certified Lab & Test Report Prepare Any contradictions of the test results, please refer to the latest EMC test report.			

■ RELIABILITY TEST

<table>
<tr><th>NO</th><th>TEST ITEM</th><th>SPECIFICATION</th><th>TEST CONDITION</th><th>RESULT</th></tr>
<tr><td>1</td><td>TEMPERATURE RISE TEST</td><td colspan="3">MODEL : DHP-1UT-B-24
1. ROOM AMBIENT BURN-IN : 1 HRS
I/P : 230VAC O/P : FULL LOAD Ta= 25 ℃
2. HIGH AMBIENT BURN-IN : 1 HRS
I/P : 230VAC O/P : FULL LOAD Ta= 50 ℃</td></tr>
<tr><td>2</td><td>OVER LOAD BURN-IN TEST</td><td>NO DAMAGE
1 HOUR (MIN)</td><td>I/P : 230 VAC
O/P : 110%LOAD
Ta : 25℃</td><td>TEST : OK</td></tr>
</table>

NO	Position	ROOM AMBIENT Ta= 25 ℃	HIGH AMBIENT Ta= 50 ℃
1	BD1	71.3	81.9
2	D7	66.7	86.6
3	D8	61.7	83.3
4	T3	42.8	60.9
5	U900	52.5	67.9
6	Q900	63.8	88.6
7	Q902	54.3	77.9
8	C6	43.4	60.4
9	U902	57.0	77.7
10	Q1	67.3	82.6
11	Q3	55.4	81.0
12	T1	91.6	96.3
13	T2	88.4	89.2
14	T301	50.3	61.9
15	U71	58.0	66.7
16	U201	52.5	70.4
17	C112	69.6	85.7
18	C121	70.4	80.1
19	Q401	85.7	92.3
20	Q411	80.3	108.4
21	Q101	75.7	85.9
22	Q108	69.6	83.0
23	U110	73.3	85.6
24	RT90	38.3	63.9
25	U903	39.2	54.0
26	U501	62.4	74.6
27	RG76	75.1	90.3
28	L1	55.9	67.5
29	L3	94.6	97.7
30	LF2	59.8	68.5

3	LOW TEMPERATURE TURN ON TEST	TURN ON AFTER 2 HOUR	I/P : 264VAC/180VAC O/P : 80 %LOAD Ta= -35 ℃	TEST : OK
4	HIGH HUMIDITY HIGH TEMPERATURE HIGH VOLTAGE TURN ON TEST	AFTER 12 HOURS IN CHAMBER ON CONTROL 50 ℃/95 %R.H NO DAMAGE	I/P : 272 VAC O/P : FULL LOAD Ta= 50℃ HUMIDITY= 95 %R.H	TEST : OK
5	TEMPERATURE COEFFICIENT	± 0.03 %/℃(0~50℃)	I/P : 230 VAC O/P : FULL LOAD	± 0.015 %/℃(0~50℃)
6	STORAGE TEMPERATURE TEST	-40~85℃	1. Thermal shock Temperature : -45℃~ +90℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 10 CYCLE 5. Input/Output condition : STATIC	
7	THERMAL SHOCK TEST	-20~50℃	1. Thermal shock Temperature : -25℃~ +55℃ 2. Temperature change rate : 25℃ / MIN 3. Dwell time low and high temperature : 30 MIN/EACH 4. Total test cycle : 16 CYCLE 5. Input/Output condition : 15cycle:230V/ FULL LOAD AC ON 3sec/AC OFF 1sec TEST 1cycle:230V/ FULL LOAD Burn In Test	
8	VIBRATION TEST	10 ~ 500Hz, 2G 10min./1cycle, 60min. each along X, Y, Z axes	1 Carton & 1 Set (1) Waveform : Sine Wave (2) Frequency : 10~500Hz (3) Sweep Time : 10min/sweep cycle (4) Acceleration : 3G (5) Test Time : 180min in each axis (X.Y.Z) (6) Ta : 25℃	
9	CAPACITOR LIFE CYCLE	SUPPOSE C121 IS THE MOST CRITICAL COMPONENT (1) I/P : 230VAC O/P : FULL LOAD Ta= 25 ℃ LIFE TIME (2) I/P : 230VAC O/P : FULL LOAD Ta= 50 ℃ LIFE TIME (3) I/P : 230VAC O/P : 75% LOAD Ta= 50 ℃ LIFE TIME (4) I/P : 230VAC O/P : 50% LOAD Ta= 50 ℃ LIFE TIME		(1) 65469.7HRS (2) 19873.2HRS (3) 64152.9HRS (4) 190032.2HRS
10	MTBF	Conducted by Parts Stress Analysis Prediction 3698.9K hrs min. Telcordia SR-332 (Bellcore) ; 818.3K hrs min. MIL-HDBK-217F (25℃)		
11	Ongoing Reliability Test	I/P : 230VAC O/P : FULL LOAD TA=50℃ Demonstration Mean Time Between Failure : 50,000 hours		

TEST RESULT	TESTER	REVIEW	APPROVAL
PASS	DANIEL GAO	SANFORD SU	VINCENT TSENG

2020.10.1 TAG-QA-009