DATA PACKAGE INFORMATION SHEET

Applicant Information	Name / Address:	TIP N/A

Product Information	Standard:	IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013
	CCNs:	
	Product:	Base transceiver station
	Models:	Connect-1 GSM BTS

Test Location Information	Tests Conducted By**:	Sign	Abraham Alganes
	** When all tests are conducted by one person, the printed name can be inserted here; otherwise, the name of the person conducting the test shall be entered on each page containing data (printed name only, signature not required).		
	Authorized Signatory or TCP Reviewer:	Sign Print Date	
	UL WTDP / WMT Witness:	Sign Print	

Reviewed & Accepted By	Qualified Project Handler:	Sign	Paul Pham Paul Pham/ Handler

LIST OF TESTS

Special Instructions - Unless specified otherwise in the individual Methods, the tests shall be conducted under the following ambient conditions. Confirmation of these conditions shall be recorded at the time the test is conducted.

Standard	Ambient Temperature, ℃	Relative Humidity, %	Barometric Pressure, mBar
	±	±	±
60065	25 ± 10	Max 75	Not specified
60601-1	+10 to +40	30 to 75	700 to 1060 hPA
60950	Not specified	Not specified	Not specified
60950-1	Not specified	Not specified	Not specified
61010-1	+15 to +35	Max 75	75 to 106 kPa
61215	Not specified	Not specified	Not specified
61646	Not specified	Not specified	Not specified
61730	Not specified	Not specified	Not specified

RISK ANALYSIS RELATED TO TESTING PERFORMANCE:

The following types of risks have been identified. Take necessary precautions. This list is not all inclusive.

[] Electric shock	**[]** Radiation
[] Energy related hazards	**[]** Chemical hazards
[x] Fire	**[]** Noise
[x] Heat related hazards	**[]** Vibration
[x] Mechanical	**[]** Other (Specify)__

Witness Test Data Program (WTDP) Information:

Environment:

Accommodations and Environmental conditions, including proper power source meet the requirements of the test standard or UL default criteria (ISO/IEC 17025 Clause 5.3.1, 5.3.2. 5.3.3, 5.3.4) **[ ]**Yes **[ ]**No **[ ]**N/A

Personnel:

Lab Management shall authorize personnel to operate particular types of equipment used in testing. (ISO/IEC 17025 5.2.5) **[ ]**Yes **[ ]**No

Equipment:

Testing is being conducted within the test equipment calibration dates. (See Test Instrument Information Page and ISO/IEC 17025 5.5.1, 5.5.2, 5.5.4, 5.5.5, 5.5.8) **[ ]**Yes **[ ]**No

Calibrations for testing equipment is traceable to SI Units. Refer to 00-OP-C0032 (Calibration Certificate Analysis. (ISO/IEC 17025 5.6.2.2) **[ ]**Yes **[ ]**No

Critical Consumables:

Critical consumables are compliant with test standard requirements. (ISO/IEC 17025 Clause 4.6) **[ ]**Yes **[ ]**No **[ ]**N/A

Sample Identification:

Identification of items to be tested has been made (e.g. model no., Serial No., etc.) (See Test Sample Identification page and ISO/IEC 17025 Clause 5.8.2) **[ ]**Yes **[ ]**No

Summary:

The test facility [was] [was not] deemed to have the environment and capabilities necessary to perform the tests included in this data package.

[ ] The CAS Staff as indicated below, (a competent L1, L2 or L3 in a similar CCN/Standard for a similar test method) was utilized to conduct the witnessing of tests on behalf of the project handler. (Please complete the table below to document the rationale and approval.)

Name of UL Staff conducting WTDP	CCN/Standard to be witnessed	Test(s) to be witnessed	L1, L2 or L3 Competency	Similar CCN/Standard Competency	L3 Reviewer Approval & Date (Similar CCN/Standard)

[ ] The Field Services Staff Member, as indicated below, (with a competent program competency as authorized by the FOM) was informed and utilized to conduct the witnessing of tests on behalf of the project handler. (Please complete the table below to document the information and approval.)

Name of UL Staff conducting WTDP	CCN/Standard to be witnessed	Test(s) to be witnessed	FOM Approver (name)	L3 Reviewer Approval & Date (Similar CCN/Standard)

TEST SAMPLE IDENTIFICATION

The table below is to provide correlation of sample numbers to specific product related information. Refer to this table when a test identifies a test sample by "Sample No." only.

Sample Number	Sample Card Number	Date Received	Manufacturer, Product Identification and Ratings
1	910768	2017-11-06	Facebook, Base transceiver station, model Connect-1 GSM BTS, 16-24 Vdc, 3A 48 Vdc PoE, 1.5A (provided from external power source) Tested with submitted power supply by the Applicant - Mean Wells power supply P/N GST120A48-P1M; output 48 Vdc, 2.5A ; 120W max
Sampling Procedure (if used) :			

TO BE COMPLETED BY STAFF CONDUCTING THE TESTING:

TEST LOCATION:	
[X]UL or Affiliate	[]WTDP []CTDP []TPTDP []TCP []PPP []WMT []TMP []SMT
Company Name	UL LLC
Address	47173 Benicia St. Fremont, CA 94538-7366 USA

[ ] LINK(s) TO OTHER UL LOCATIONS WHERE ADDITIONAL TEST DATA/OBSERVATIONS ARE STORED:

Link to separate data files for a test can be inserted here. The link must be a server that is accessible to UL staff, that provides for backup, required retention periods and a path, including file name that does not change and result in a broken link. Not applicable to DAP.

Test Name	Full Link to Location

TEST INSTRUMENTS REFERENCE LIST

[X]UL test equipment information is recorded on Meter Use ~~in UL's Laboratory Project Management (LPM) database~~.

Instr. Code	Instrument I.D.	Instrument Type	Range Used Or ***	Make and Model **	Calibration Date	
					Last	Due
	See Meter Use in Aurora					
	Tissue Paper CC# 639					
	Cheesecloth CC# 494					

"Chamber setting(s) [was] [were] monitored to ensure that the setting(s) [was] [were] stable throughout the test time frame. Any deviations from the setting(s) are noted below.

Date	Test	Instrument Code	Time period of deviation	Setting(s)

** Information to be recorded when tests are conducted at a non-UL facility.
*** Refer to specific data sheet for individual scale used.

END PRODUCT REFERENCE PAGE

Equipment/Model		Connect-1 GSM BTS,
Electrical Ratings	Voltage [ ]Vac [X]Vdc	Refer to page 4
	Current [X]A [ ]mA	Refer to page 4
	Frequency, Hz	Refer to page 4
	Power, Watts	--
	Phase	--

Card Cage Capacity	# of Cards	# of Empty Slots
N/A	N/A	N/A
Additional Load(s) for Unused card slots		

CPU	Type	Frequency
N/A	N/A	N/A

GPU	Type	
N/A	N/A	N/A

Unit Configuration	One unit with full configuration

Maximum Normal Load	See page 7

Scanning Frequency	Horizontal (KHz)	Vertical (Hz)

Maximum Operating Temperature Tma (°C) 55	Weight (Kg) 8.2 kg (without mounting bracket)

Cheesecloth - sc 1.2.13.15:	Bleached cotton cloth approx. 40 g/m^2
Tissue paper or Wrapping Tissue, sc 1.2.13.16:	Soft and strong, lightweight wrapping paper of grammage generally between 12 g/m^2 and 30 g/m^2.

GENERAL GUIDELINES

The EUT can be powered by:

1. From 48 Vdc PoE from host equipment.
2. From 16-24 Vdc of external power supply.
3. From 12 Vdc of internal battery pack (mains power failure mode)

Follow the following instructions:

SETUP:
1) Connect DC P.S. (19VDC brick) with custom DC connector (16-24VDC required) , or PoE (48V)
2) Connect LAN cable to laptop
3) Connect SMA cable to Ant 1 to “power analyzer” or 50 ohm terminator.
4) Connect SMA cable to Ant 2 to “power analyzer” or 50 ohm terminator.
5) Turn on laptop and enter password “ 123 “ at desktop signin
6) Open terminal session with username “oc” and password “123” (Desktop password also)
7) Open “terminal” (PuTTY) and verify LAN configuration is: SSH, load OC, or type 192.168.1.30
--- Laptop is set to proper IP already.

TRANSMIT POWER TESTING (Emissions and RF power measurements)
The following commands can be used to change channels and set power for **RF test output**
--- Use for EMI emissions, RF power tests, and Safety test

Maximum power (30dBm): **use one of the following commands:**

1) Bottom (ARFCN 1) (935.2 MHz); Enter: “ **./transmission.sh.gmsk maxpower bottom** “
2) Middle (ARFCN 63) (947.6 MHz); Enter: “ **./transmission.sh.gmsk maxpower middle** “
3) Bottom (ARFCN 124) (959.8 MHz); Enter: “ **./transmission.sh.gmsk maxpower top** “

Note: This script it will start transmitting on both Antenna 1 and Antenna 2 port
Note: Stopping RF test using the following command: “ **./transmission.sh s s** “

MNL: Disconnect LAN cable to laptop and connect a POE Load to POE port B (PSE)

Tested by: Abraham Alganes (signature) Tested by: (print) Test date: 2017-11-14

Sample # : 1 Instrument Code / Range:

1.6.2 - INPUT TEST: SINGLE-PHASE

METHOD

The unit was connected to a variable voltage as indicated and then operated normally under the conditions noted below. The input current and average power were measured.

[X] RESULTS

1.6.2	TABLE: Electrical data (in normal conditions)					
U (V)/Hz	I (A)	Irated (A)	P (W)	Fuse #	Ifuse (A)	Condition/status
16 Vdc	2.82	3	45.16	--	---	Powered by external power source
24 Vdc	1.92	3	45.98	--	---	Powered by external power source
48 Vdc POE	0.95	1.5	46.06	--	---	Powered by external POE power source

Supplementary information:

The steady state input current [~~did~~] [did not] exceed the rated current at the rated voltage by more than 10 percent under maximum normal load.

Lab Ambient: 22.74℃ / 48.02%RH / 1020.0mBar

Comments:

Tested by: _____ Tested by: _____ Test date: _____
signature print

Sample # : _____ Instrument Code / Range: _____

NOTES TO LAB:

1. In each case, the readings are taken when the input current has stabilized. If the current varies during the normal operating cycle, the steady-state current is taken as the mean indication of the value, measured on a recording r.m.s. ammeter, during a representative period.

NOTES TO ENGINEER:

1. If input current measurements are to be taken during a representative period, please describe the representative period as part of the maximum normal load/operating condition.

2. Frequency should be noted in the "U(V)" column with the supply voltage.

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

2.5 - LIMITED POWER SOURCE MEASUREMENTS

[X] METHOD - Without An Overcurrent Protection Device -

A sample of the [power supply] [transformer, Model __ Connect-1 GSM BTS _____] [Operator Accessible Connector] was connected to _____ [V ac, _____ Hz] [48 V dc POE]. After each of the following output measurements, the values were compared with the Table 2B.

A. The open circuit voltage (U_{oc}), with all load circuits disconnected.

B. The output current (I_{sc}) after [ ] 5 [X] 60 seconds of operation with the load adjusted to maintain the I_{sc} current limit (maximum I_{sc} per Table 2B is 8.0 A or 150/U_{oc}, as applicable. See Notes to Lab.) Output circuits other than the circuit under test were unloaded during the I_{sc} measurements.

C. The maximum output Volt-Ampere (VA), after [ ] 5 [X] 60 seconds of operation with the load adjusted to maintain the VA limit (maximum VA per Table 2B is 100. (See Notes to Lab.) Output circuits other than the circuit under test were unloaded during the VA measurement.

(Note for A, B, C above: For product designs that require a small load in order to operate, the minimal load may be applied in order to measure the maximum output. The load used should be documented under “Comments.”)

The measurements and testing conducted were to confirm:

[ ] the output is inherently limited in accordance with Table 2B

[X] a linear or non-linear impedance limits the output in compliance with Table 2B.

[ ] If a regulating network limited the output in compliance with Table 2B under normal operating conditions, then measurements (A), (B), and (C) were repeated under single fault conditions. The faults were placed in any part of the regulating network, including power supply pulse width modulation circuitry.

[ ] An integrated circuit (IC) current limiter, limits the output in compliance with Table 2B, both with and without a simulated single fault (see 1.4.14) in the IC current limiter (open circuit or short circuit). [ ] A single fault between the input and output [ ] was [ ] was not conducted because the IC current limiter [ ] meets [ ] does not meet the test program as given in Annex CC;

Tested by: _____ Tested by: _____ Test date: _____
signature print

Sample # : _____ Instrument Code / Range: _____

2.5 - LIMITED POWER SOURCE MEASUREMENTS (con't)

[ ] METHOD - With an Overcurrent Protection Device -

A sample of the [power supply] [transformer, ,_____] [Operator Accessible Connector] was connected to _____ [V ac, _____ Hz] [V dc]. After each of the following output measurements, the values were compared with the appropriate tables:

A. The open circuit voltage (U_{oc}), with all load circuits disconnected.

B. The output current (I_{sc}) after 60 seconds of operation with the load adjusted to maintain the I_{sc} current limit ($1000/U_{oc}$), and with all overcurrent protective devices simultaneously bypassed. Output circuits other than the circuit under test were unloaded during the I_{sc} measurements. Values from Table 2C in parentheses are maximum values. Test measurement may exceed these values.

C. The maximum output Volt-Ampere (VA) with all overcurrent protective devices simultaneously bypassed, after 60 seconds of operation with the load adjusted to maintain the VA limit (250 VA). Output circuits other than the circuit under test were unloaded during the VA measurement. Values from Table 2C in parentheses are maximum values. Test measurement may exceed these values.

(Note for A, B, C above: For product designs that require a small load order to operate, the minimal load may be applied in order to measure the maximum output. The load used should be documented under "Comments.")

RESULTS

Test Voltage: ____ [Vac, ___ Hz] [___ Vdc]

[ ] Measurement of Isc and S made 5 s after application of the load if protection is inherently limited or by an electronic circuit.

2.5	TABLE: Limited power sources					
Circuit output tested:						
Note: Measured Uoc (V) with all load circuits disconnected:						
Components	Sample No.	Uoc (V)	I_{sc} (A) – (5s)		S (VA) (5s)	
			Meas.	Limit	Meas.	Limit
Supplementary information:						
Sc=Short circuit, Oc=Open circuit						

Tested by: Abraham Alganes (signature) Tested by: _____ (print) Test date: 2017-11-16

Sample # : 1 Instrument Code / Range: _____

2.5 - LIMITED POWER SOURCE MEASUREMENTS (con't)

Test Voltage: ____ [Vac, ___ Hz] [48 Vdc POE]

[X] Measurement of Isc and S made 60 s after application of the load if protection is by an overcurrent protective device, a positive temperature coefficient device.

2.5	TABLE: Limited power sources					
Circuit output tested: POE port B (PSE)						
Note: Measured Uoc (V) with all load circuits disconnected:						
Components	Sample No.	Uoc (V)	I_{sc} (A) (60s)		S (VA) (60s)	
			Meas.	Limit	Meas.	Limit
POE port B (PSE)	1	46.54	0.6125	2.15	27.490	100
Supplementary information: BEL FUSE INC.; PTC P/N 0ZCF0100AF2A Rated 60Vdc, Ihold: 1A, Itrip: 2A						
Sc=Short circuit, Oc=Open circuit						

[X] [The following] [~~All~~] output(s) complied with the limited power source requirements:

_____PSE port_____

Comments:

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

NOTES TO LAB:

1. If a protective device or fixed impedance (fuse, thermistor, etc.) is employed to limit the current in the circuit, the designation of the device should be noted. If the circuit is signal only (no current available), then the output should be identified as such. If dc voltage and current are available but a protective device cannot be located, contact the engineer.

2. Technician is to specify how long after the load was applied the measurement was taken e.g., 60s for circuit protected by PTC.

NOTES TO ENGINEER:

1. If voltage and current are available which meet the limits of Limited Power Source Circuits, but there is no protective device in the circuit, then fault testing of regulating network is required as indicated in the above test method. Faulting of Non-UL Recognized Integrated Circuits which limit dc voltage and current outputs (i.e.: regulator) are required to be conducted. Faults of Integrated Circuits that provide signal only outputs are not required to be conducted.

2. Identify to lab if regulator is used in combination with PTC.

3. Review supply voltage (sub-clause 1.3.3) and supply voltage for tests (sub-clause 1.4.5) requirements to determine the maximum input test voltage.

4. Short circuit current (Isc) and maximum VA (S) measurements are to be taken at either 5 s or 60s after the application of the load. Engineer needs to specify at what time the measurement is to be taken based on the circuit design.

5. Engineer is to specify the “Limit” for each output.

6. The following abbreviations may be used to indicate fault conditions: Sc=Short circuit, Oc=Open circuit

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

4.3.8 - BATTERY TESTS

METHOD

The following [ ] battery cell [X] battery pack:

[X] rechargeable battery [ ] cell [X] pack
[ ] non-rechargeable battery [ ] cell [ ] pack
[ ] consumer grade, non-rechargeable (select one of the following): [ ] carbon-zinc [ ] alkaline

were subjected to the test detailed below.

The unit was connected to _____ [V ac, _____ Hz]] [48 Vdc POE] and operated at maximum normal load. The following conditions were imposed one at a time.

[X] A. **Overcharging of a rechargeable battery (pack or cell):** The battery was charged while briefly subjected to the simulation of any SINGLE FAULT CONDITION that was likely to occur in the charging circuit and that results in overcharging of the battery. To minimize testing time, the failure was chosen that causes the worst-case overcharging condition. The battery was then charged fora single period of 7h with the simulated failure in place.

[ ] B. **Unintentional charging of a non-rechargeable battery (pack or cell).** The battery was charged while briefly subjected to the simulation of any single component failure that was likely to occur in the charging circuit and that would result in unintentional charging of the battery. To minimize testing time, the failure was chosen that causes the highest charging current. The battery was then charged for a single period of 7 h with that simulated failure in place.

[ ] C. **Reverse charging of rechargeable battery (pack or cell).** The battery was reverse charged while briefly subjected to the simulation of any single component failure that was likely to occur in the charging circuit and that would result in reverse charging of the battery. To minimize testing time, the failure was chosen that causes the highest reverse charging current. The battery was then reverse charged for a single period of 7 h with that simulated failure in place.

[X] D. **Excessive discharging rate for any battery (pack or cell).** The battery was subjected to rapid discharge by open-circuiting or short-circuiting any current-limiting or voltage-limiting components in the load circuit of the battery under test.

Tested by: Abraham Alganes (signature) Tested by: (print) Test date: 2017-11-20 / 22

Sample # : 1 Instrument Code / Range:

4.3.8 - BATTERY TESTS (con't)

RESULTS

Test Voltage: _____ [V ac, _____ Hz]] [48 V dc POE]

	TABLE: Batteries	
The tests of 4.3.8 are applicable only when appropriate battery data is not available		
Is it possible to install the battery in a reverse polarity position?		

	Non-rechargeable batteries			Rechargeable batteries					
	Discharging		Un-intentional charging	Charging		Discharging		Reversed charging	
	Meas. current	Manuf. Specs.		Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.	Meas. current	Manuf. Specs.
Max. current during normal condition	N/A	N/A	N/A	1.2 A	6.0A	2.5A	6.0A	N/A	N/A
Max. A during fault condition 1	N/A	N/A	N/A	2.7 A	6.0A	N/A	N/A	N/A	N/A
Max. A during fault condition 2	N/A	N/A	N/A	N/A	N/A	4.2A	6.0A	N/A	N/A

Test results:		Verdict
- Chemical leaks	No	Pass
- Explosion of the battery	No	Pass
- Emission of flame or expulsion of molten metal	No	Pass
- Electric strength tests of equipment after completion of tests	No	Pass

Supplementary information: Condition Fault 2 Discharging: Fault was changed to loading the battery with 4.2A (maximum it can be loaded with) because short circuit of the battery only delivers 0.25A max. Test lasted for 40 minutes.[ADA 2017-11-22]

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

4.3.8 - BATTERY TESTS (con't)

Compliance Statements:

1. There were no chemical leaks due to cracking, rupturing or bursting of the battery jacket, if such leakage could adversely affect required insulation.

2 There was no spillage of liquid from any pressure relief device in the battery, unless such spillage was contained by the equipment without risk of damage to the insulation or harm to the user.

3. The battery did not explode resulting in injury to a user

4. Emission of flame or expulsion of molten metal were not accessible/seen on the outside of the equipment enclosure.

[X] A. **Overcharging of a rechargeable battery (pack or cell)**, at the conclusion of the ___ hour test at the maximum charging voltage available from the charger, indicate the results per compliant statement:

1. [Pass] [Fail]
~~2. [Pass] [Fail]~~
~~3. [Pass] [Fail]~~
~~4. [Pass] [Fail]~~

[ ] B. **Unintentional charging of a non-rechargeable battery (pack or cell)** at the conclusion of the ___ hour test, , indicate the results per compliant statement:

1. [Pass] [Fail]
2. [Pass] [Fail]
3. [Pass] [Fail]
4. [Pass] [Fail]

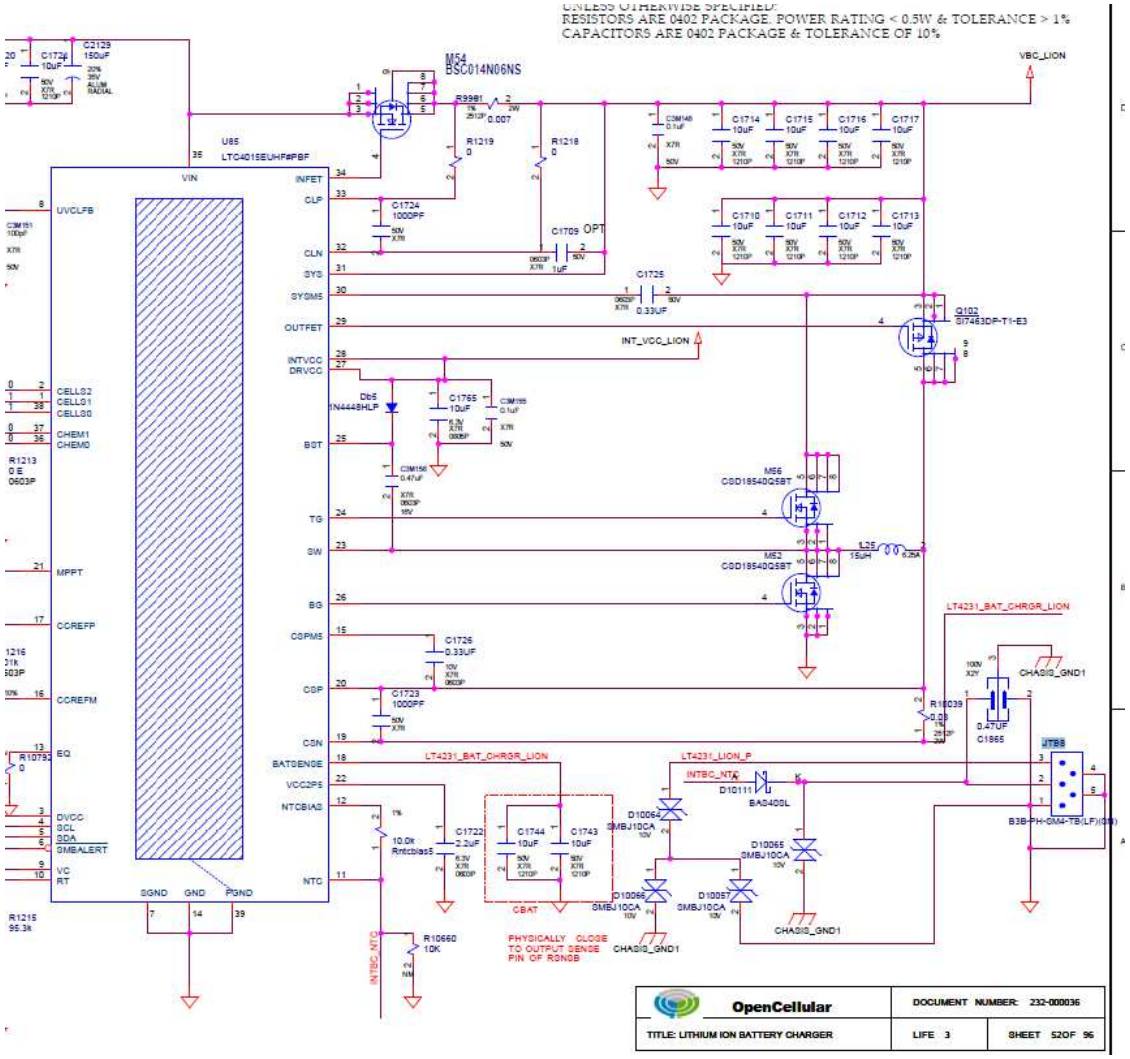
[ ] C. **Reverse charging of rechargeable battery (pack or cell)** at the conclusion of the ___ hour test, indicate the results per compliant statement:

1. [Pass] [Fail]
2. [Pass] [Fail]
3. [Pass] [Fail]
4. [Pass] [Fail]

[X] D. **Excessive discharging rate for any battery (pack or cell)** at the conclusion of the ___ hour test, indicate the results per compliant statement:

1. [Pass] [Fail]
~~2. [Pass] [Fail]~~
~~3. [Pass] [Fail]~~
~~4. [Pass] [Fail]~~

Fault condition	Fault
1 (Overcharge)	Short pin 3 of battery connector to pin 35 of U85
2 (Excessive discharging)	Short and Overload output terminals of battery pack (See comments in page 15)



Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

4.5.1, 1.4.12, 1.4.13 - HEATING TEST

METHOD

The sample was connected to a source of supply, as noted below, and operated until temperatures became stable. Temperatures were measured using the thermocouple method. [ ] Rise in temperature of windings of motors and transformers were additionally determined by the change-of-resistance method.

[ ] Before starting the Heating Test, each special non-detachable power supply cord connection was pulled with a force of 5 N for one minute. During the Heating Test, the temperature of its connections were recorded. (Maximum 85℃ per 3.3.2.)

The sample operated under normal load as follows:

[X] Continuous operation

[ ] Rated intermittent operation of _____ on _____ off

[ ] Rated short-time operation of _____ .

[X] The test conditions were as follows: MNL – see page 7

[ ] Product contains an audio amplifier.

[ ] The apparatus is operated in such a way as to deliver one-eighth of the NON-CLIPPED OUTPUT POWER to the RATED LOAD IMPEDANCE using the standard signal described in 4.1.6 with the tone controls set to their mid position. Where the NON-CLIPPED OUTPUT POWER cannot be obtained using the standard signal, one eighth of the maximum attainable output power is taken.

[ ] As an alternative, where the amplifier function is not adversely affected, a sine wave of 1 kHz or where applicable, another frequency corresponding to the geometric mean of the upper and lower –3 dB response points of the relevant part of the apparatus may be used to supply each channel.

[ ] If the result of a measurement performed with a sine wave does not comply with this standard, the measurement with PINK NOISE is decisive. When determining whether a part or output TERMINAL contact is HAZARDOUS LIVE according to 9.1.1.1 and 11.1, the apparatus shall be operated with a sinusoidal input test signal of 1 kHz or where applicable, another frequency corresponding to the geometric mean of the upper and lower –3 dB response points of the relevant amplifier part of the apparatus, sufficient in amplitude for the apparatus to deliver the NON-CLIPPED OUTPUT POWER into its RATED LOAD IMPEDANCE. Open-circuit output voltage is determined after the load is removed.

Tma 55℃.

Tested by: Abraham Alganes (signature) Tested by: (print) Test date: 2017-11-14

Sample # : 1 Instrument Code / Range:

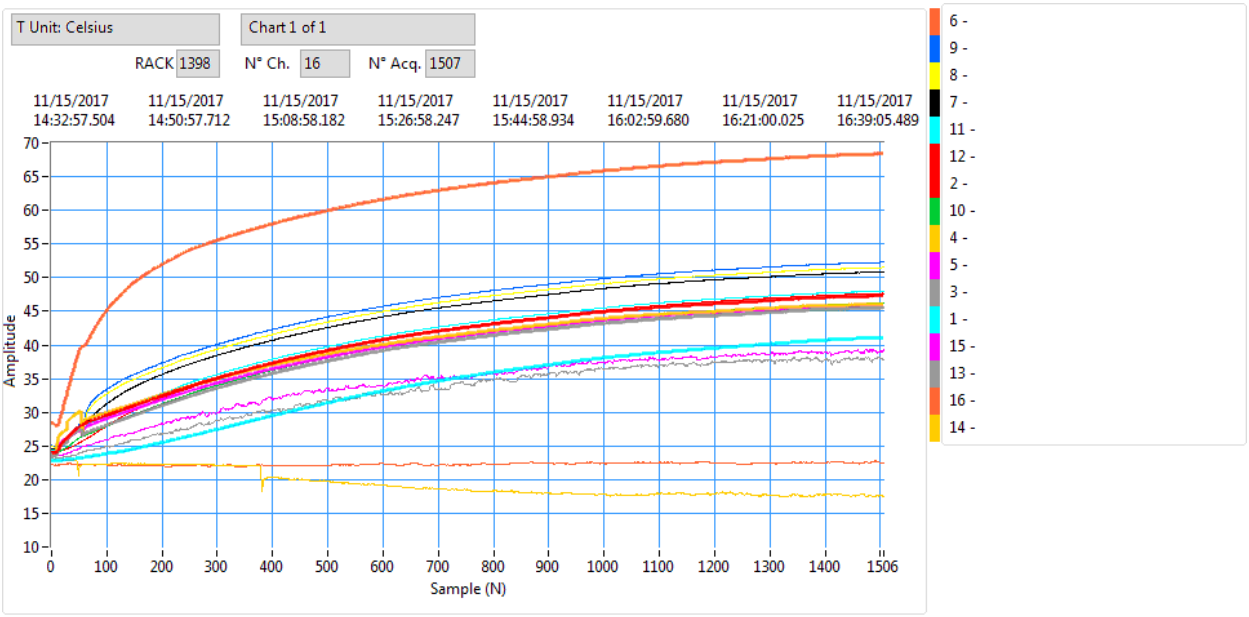
4.5.1, 1.4.12, 1.4.13 - HEATING TEST (con't)

RESULTS

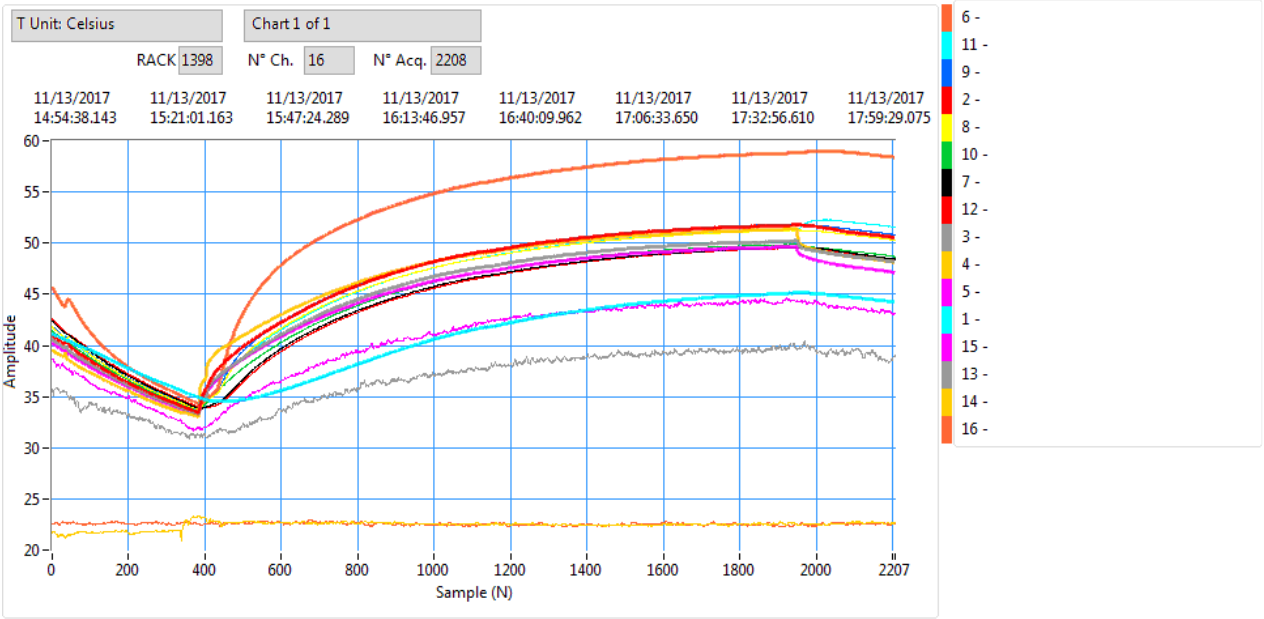
4.5	TABLE: Thermal requirements						
	Supply voltage (V) .....:	24 Vdc Power adapter	48 Vdc PoE	12 Vdc Internal battery	--	--	—
	Ambient T_{min} (°C) .....:						—
	Ambient T_{max} (°C) .....:						—
Maximum measured temperature T of part/at::		T (°C)					Allowed T_{max} (°C)
1. Body of battery pack		45.2	41.1		--	--	100
2. PWB near GSM chip		51.8	47.4		--	--	105
3. PWB near J4 connector		50.3	45.6		--	--	105
4. PWB near U2400		51.5	46.1		--	--	105
5. PWB near U1500		49.7	45.9		--	--	105
6. PWB near T3		59.0	68.4		--	--	105
7. PWB near D10074		49.6	50.9		--	--	105
8. PWB near Q96		51.3	51.5		--	--	105
9. PWB near Q95		51.9	52.3		--	--	105
10. PWB near J113		49.9	46.2		--	--	105
11. PWB near L34		52.3	48.0		--	--	105
12. PWB near D10072		49.5	47.7		--	--	105
13. Enclosure Hotspot (Metallic by battery)		40.4	38.2		--	--	90
14. Enclosure Hotpost (Plastic)		23.4	22.9		--	--	95
15. Enclosure Hotspot (Metallic, side)		44.6	39.3		--	--	90
16. Ambient		22.9	22.8				

Lab Ambient: 22.74℃ / 48.02%RH / 1020.0mBar

48V PoE



24Vdc



[X] Temperature Stability [was][~~was not~~] confirmed before recording maximum temperatures for each test.

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

4.5.1, 1.4.12, 1.4.13 - HEATING TEST (con't)

RESULTS

[ ] Change of Resistance section:

Temperature T of winding:	t_1 (℃)	R_1 (Ω)	t_2 (℃)	R_2 (Ω)	T (℃)	Allowed T_{max} (℃)	Insulation class

Supplementary information:

[X] Maximum Normal Load Information: **See page 7**

[X] T_{ma}: ____55℃

[ ] Before starting the Heating Test, each special non-detachable power supply cord connection was pulled with a force of 5 N for one minute. During the Heating Test, the temperature of its connections were recorded. (Maximum 85℃ per 3.3.2.)

[ ] During the test, a limiting or temperature regulating device [did] [did not] function.

[ ] As a result of applying the 5 N force to each special non-detachable power supply cord connection, the connection [did] [did not] break away or slip out of its securement means.

[ ] During the test, the sealing compound [did] [did not] soften or melt.

Temperature Stabilization. Identify method used for temperature stabilization:

[X] Thermal equilibrium is considered to exist if the temperature rise does not exceed 3 K in 30 min.

[ ] If the measured temperature is at least 10 % less than the specified temperature limit, thermal equilibrium is considered to exist if the temperature rise does not exceed 1 K in 5 min.

[ ] Other: [Describe method used] _____

Comments:

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

4.5.1, 1.4.12, 1.4.13 - HEATING TEST (con't)

NOTES TO LAB:
.

1. For change-of-resistance method, it is recommended that the resistance of windings at the end of the test be determined by taking resistance measurements as soon as possible after switching off, and then at short intervals so that a curve of resistance against time can be plotted for ascertaining the resistance at the instant of switching off.

   The value of the temperature rise of a winding is calculated from the formula:

   $dT = [(R_2 - R_1) [(234.5 + t_1)/R1]] - [(t_2 - t_1)]$ for a copper winding

   $dT = [(R_2 - R_1) [(225 + t_1)/R_1]] - [(t_2 - t_1)]$ for an aluminum winding

   where:

   dT is the temperature rise (℃)
   R_1 is the resistance of the winding at the beginning of the test (Ω)
   R_2 is the resistance of the winding at the end of the test (Ω)
   t_1 is the room temperature at the beginning of the test (℃)
   t_2 is the room temperature at the end of the test (℃)

   At the beginning of the test, the windings are at room temperature.

2. If fan speed/operation changes during continuous operation of the equipment, please contact the engineer.

3. Temperature Stabilization: IEC/UL/CSA 60950-1 does not specify a single method for determining temperature stabilization. The laboratory technician needs to identify the method used to determine temperature stabilization. If the engineer did not specify a specific method, below are some examples on what may be used. Please identify method used in the “Temperature Stabilization” section under RESULTs:

   [ ] Thermal equilibrium is considered to exist if the temperature rise does not exceed 3 K in 30 min.

   [ ] If the measured temperature is at least 10 % less than the specified temperature limit, thermal equilibrium is considered to exist if the temperature rise does not exceed 1 K in 5 min.

   [ ] Other: [Describe method used]
   _____

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

4.5.1, 1.4.12, 1.4.13 - HEATING TEST (con't)

NOTES TO ENGINEER

1. All temperature measurements should take into account the parameters defined (also in sub-clause 1.4.12.1) below:

   T is the temperature given of the part measured under the prescribed test condition
   Tmax is the maximum temperature specified for compliance with the test
   Tamb1 (t_1) - is the ambient temperature at the beginning of the test. Used for Change of resistance method.
   Tamb2 (t_2) – is the ambient temperature at the end of the test.
   Tma is the maximum ambient temperature permitted by the manufacturer's specification

2. Temperature Dependent Equipment - per Sub-clause 1.4.12.2 for Temperature Dependent Equipment, the temperature measurement is made at the least favorable ambient temperature within the manufacturer's specified operating range: T shall not exceed Tmax.

3. Non-Temperature Dependent Equipment – per sub-clause 1.4.12.3, the method described in sub-clause 1.4.12.2 (above) may be used or alternatively, testing may be performed at any value of Tamb within the manufacturer's specified operating range provided: T shall not exceed (Tmax + Tamb - Tma).

Tested by: _____ (signature) Tested by: _____ (print) Test date: _____

Sample # : _____ Instrument Code / Range: _____

5.3.7 - OVERLOAD OF OPERATOR ACCESSIBLE CONNECTOR TEST

METHOD

The sample was covered with one layer of cheesecloth and placed on a pinewood board covered with one layer of tissue paper. The sample had a complete enclosure.

The sample was connected to _____ [V ac, _____ Hz] [48 V dc POE].

[ ] The voltage potential was measured on the connector pins. Circuits that measured 0 V were not tested.

[ ] The power output (pins) circuit(s), which exceeded LPS limits per in sub-clause 2.5 testing, were subjected to this test for at least one hour. The non-LPS output was loaded to draw the maximum current.

[X] The power output (pins) circuit(s), which operate at or below LPS limits per sub-clause 2.5 testing, were subjected to this test for at least one hour. The output was loaded to draw the maximum current.

[ ] Internal SELV connectors accessible to an operator were subject to this test for at least one hour. They were loaded to draw the maximum available current.

The maximum available current was considered to be the lower of (1) the short-circuit current, (2) that current just below the trip point of any overcurrent or over temperature protective device, or (3) that current that was just below the point at which the power supply circuitry limited the output current. The trip point of overcurrent protective devices was considered to be 110 percent of their current rating.

If the circuit was interrupted by the opening of an unreliable component, the test was repeated twice (three times total) using new components as necessary. If a wire or printed wiring board trace in the primary circuit opened, the gap was electrically shorted and the test continued until ultimate results occurred.

[ ] If a trace in a secondary circuit designed to intentionally open in a repeatable manner operated during the test, the test was repeated two time (three times total).

If after one hour there was no indication of an abnormal condition, but it appeared possible that a condition of risk would result, the test was continued for 7 hours.

[ ] At the end of the test, an Electric Strength (ES) potential was applied as indicated below for one minute.

	Location		Potential Used (V)	
	From	To	[ ] ac	[ ] dc
A				
B				

Tested by: _____ Tested by: _____ Test date: _____
signature print

Sample # : _____ Instrument Code / Range: _____

5.3.7 - OVERLOAD OF OPERATOR ACCESSIBLE CONNECTOR TEST (CON'T)

The following key and corresponding comments may be used to describe the final results.

Comments Key:

NB - No indication of dielectric breakdown
YB - Dielectric breakdown (indicate time and location)
NC - Cheesecloth remained intact
YC - Cheesecloth charred or flamed
NT - Tissue paper remained intact
YT - Tissue paper charred or flamed
Other - Please explain.

Tested by: Abraham Alganes (signature) Tested by: (print) Test date: 2017-11-15

Sample # : 1 Instrument Code / Range:

5.3.7 - OVERLOAD OF OPERATOR ACCESSIBLE CONNECTOR TEST (con't)

RESULTS

Test Voltage: ____ [Vac, ___ Hz] [48 Vdc POE]

Connector	Pin #s	Open Circuit Voltage (V)	Maximum Available Current (mA)	Length of Test	Comments
POE port B (PSE)	POE + to POE-	47.5	0.219	1h:47m	NC,NT.

Lab Ambient: 22.34℃ / 49.93%RH / 1011.1mBar

NOTES TO LAB:

1. For individual connector pins, if the open-circuit voltage and maximum available current are within 10 percent of each other, the circuits are considered redundant and only one circuit requires testing.

NOTES TO ENGINEER:

1. Consideration should be given to measuring transformer temperatures during the tests in Subclause 5.3.9.

2. Engineering judgment may be used in determining when an overload test is needed on an output operating within LPS limits.

Tested by: Abraham Alganes (signature) Tested by: _____ (print) Test date: 2017-11-17

Sample # : 1 Instrument Code / Range: _____

PART 22, 9.1, ANNEX B – WATER SPRAY TEST

METHOD

A sample of the test enclosure was subjected to a water spray from an apparatus consisting of three spray heads mounted in a water supply pipe rack (see [X] Figs. B.1 and B.2 [ ] Figs. 30.1 and 30.2 of UL 50 for details). The enclosure was set up as in a normal installation. The enclosure was positioned in the focal area of the spray heads so that the greatest quantity of water was likely to enter the enclosure. The water pressure was maintained at 5 psi (34.5 kPa) at each spray head. The enclosure was exposed to a uniform water spray over the entire surface of the enclosure for 1 h.

[X] The test was repeated on the _____ [~~side~~][sides] of the enclosure. The enclosure was exposed to the water spray for 1 h on each side. The various vertical surfaces of the enclosure were tested separately or collectively. A uniform spray was simultaneously applied to

A. the roof surfaces, from nozzles located at a proper height; and

B. the floor outside the enclosure for a distance of approx 3 ft in front of the surface under that with the enclosure located at its normal height above the floor level.

[ ] The conduit connection - without pipe compound - was tightened to a torque value as specified in Table 45.1 of UL 50.

RESULTS

[X] The outdoor enclosure [had][~~had no~~] water inside.

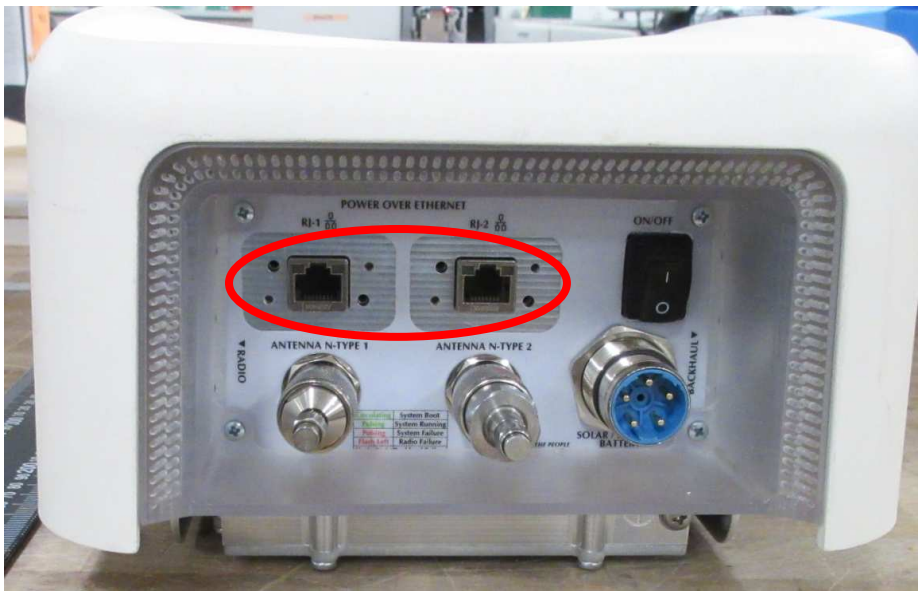
[ ] The outdoor equipment [had][had no] water inside, [ ] and the water did not:
[ ] deposit on insulation where it could lead to tracking along the creepage distance.
[ ] deposit on bare live parts or wiring, or on windings not designed to operated when wet.
[ ] enter any supply wiring space.

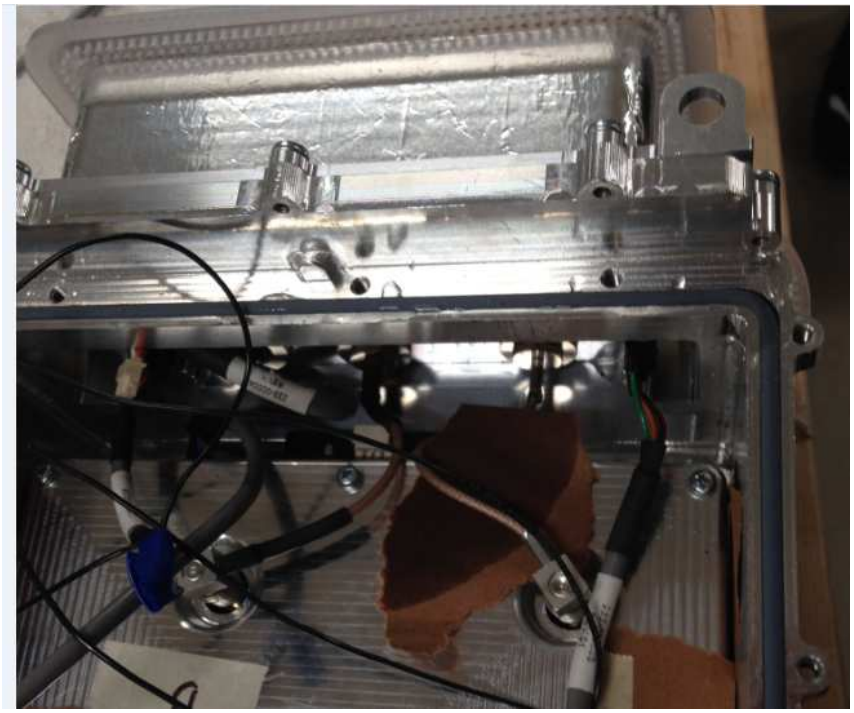
[ ] The Type [3][3R][3S] enclosure [had][had no] water inside.

[ ] The Type 3R enclosure [had][had no] significant accumulation of water within the enclosure and [had][had no] water within the enclosure at a level higher than any area intended for live parts.

[ ] The Type 3R enclosure [had][had no] significant accumulation of water within the enclosure and [had][had no] water within the enclosure such that it was visible on live parts, insulating material or mechanism parts. Also, water [entered][did not enter] any space above live parts in which wiring may be present under any proper installation conditions.

Instrument No. _____





The product is not provided with outdoor bushing for the Ethernet RJ45 connectors. Water entered inside by the holes around the RJ 45 connectors.

Suitable components shall be considered in the end-use application.