COMMUNICATION BUILDING TEST PLANS

1. DEVICE NAMING COORDINATION

1.1. The System Integrator shall coordinate with the TMC/ROC to identify the device names for each device.

1.2. The System Integrator shall then send a request to TOTS to identify the network name, IP address, and any pertinent configuration information.

2. EXPLANATION – STANDALONE (SALT) TESTING

2.1. The System Integrator shall work with the DEVICE VENDOR (if required by the testing form) and complete the NDOT specified SALT tests (non-network) on each unit of equipment after installation.

2.2. Conduct SALT testing on each unit of equipment as outlined on the NDOT provided testing form.

2.3. The System Integrator shall coordinate through the Resident Engineer and the Construction Crew to have an appropriate NDOT representative present for the onsite inspection.

2.4. The System Integrator shall submit the DEVICE vendor commissioning documents with the SALT testing to the Engineer for review and approval.

2.5. Supply a bucket truck and operator, or suitable equivalent equipment necessary to carry out procedures as required by the testing documents, at no direct payment.

COMMUNICATION BUILDING SALT PROCEDURE

TEST #	SALT TEST PROCEDURE	EXPECTED RESULT	PASS / FAIL
Communication Building Name:		**IP Address:**	**GPS:**
TOTS Network Name:		**Associated Cabinet Name:**	
Purpose and General Verification			
System Integrator: *This SALT tests the proper construction of a fully furnished and operable Communication Building. The system integrator will use necessary equipment to perform this test. Using the manufacture's guidelines and other reference material, the integrator will be able to verify the Communication Building is fully furnished and operable.* ***General Verification****: For each test below, complete the Communication Building SALT Matrix, circling the "Pass" or "Fail" in the appropriate cell. Only indicate a "Pass" on this form if the entire matrix column related to the tested function passes for EACH Communication Building being tested.*			
Communication Building Information			
1.	Verify Communication Building Information state permit label. Obtain required State certificates: 1. Department of Business & Industry, Manufactured Housing Division (NRS 489 & 461)	Permit #: _____ License # (1): _____	Pass / Fail
Structure Verification			
2.	Verify Communication Building meets internal and external dimensions and features.	Communication Building meets specified internal and external dimensions and features as specified on the plans.	Pass / Fail
3.	Verify power supply energizes all internal and external outlets which include but is not limited to the power distribution panel, disconnect switches, transfer switches, and Appleton external generator port plug, or equivalent.	Internal and external outlets are energized.	Pass / Fail
4.	Verify all labeling are appropriate and neatly managed throughout the building.	Labels are appropriate and neatly managed.	Pass / Fail
5.	Verify all cabling is labeled with the to/from on each end and at any major transition point and is neatly managed throughout the cabinet.	All premise or inside plant cables originating and ending in the cabinet are properly terminated and labeled. Labeling material rated for Outside Plant (OSP) use. Cables are neatly managed using adjustable hook-and-loop fastener straps.	Pass / Fail
6.	Verify wiring is labeled and neatly managed throughout the building.	Wiring is labeled and neatly managed throughout the building.	Pass / Fail

TEST #	SALT TEST PROCEDURE	EXPECTED RESULT	PASS / FAIL
7.	Verify building is bonded to external ground system.	Building is bonded to external ground system.	Pass / Fail
8.	Verify all exothermic weld bonds are properly welded.	Exothermic weld bonds are verified for proper adhesion. All welds are inspected by NDOT prior to burial of grounding system.	Pass / Fail
9.	Using a meter, verify the building is properly bonded to earth ground.	Meter reading of 5 Ohms or less.	Pass / Fail
10.	Verify emergency release button is operational.	When pressed, the emergency release button opens the door.	Pass / Fail
Equipment Verification			
11.	Verify racks (equipment, relay, server, etc.) are properly secured.	Racks (equipment, relay, server, etc.) are properly secured. Bolts have been torqued to manufacturer's recommendations.	Pass / Fail
12.	Verify racks are properly grounded to earth ground.	Meter reading of 5 Ohms or less. Ground lugs or grounding points are present on the racks.	Pass / Fail
13.	Verify functionality of alarms and controls.	Any specified alarm and control equipment in the plans are operationally verified.	Pass / Fail
14.	Verify external and internal lighting system is operational.	External and internal lights turn on when light switch is on. External and internal lights turn off when light switch is off.	Pass / Fail
15.	Verify HVAC system is operational.	HVAC system responds to changes from a temperature change.	Pass / Fail
16.	Verify outlets are properly installed, wired, and functional.	Outlets provide power and pass polarity testing.	Pass / Fail
17.	Verify the power supply/battery backup system operates per the manufacturer's requirements.	The power supply/battery backup system operates per the manufacturer's requirements.	Pass / Fail
18.	If applicable, verify generator backup system is operational.	Generator backup system is functional and proper transfer of backup power to building.	Pass / Fail / N/A

Signatures

DATE	AGENCY/FIRM	PERFORMED BY (Print Name) (Integrator)	INTL	AGENCY/FIRM	WITNESSED BY (Print Name) (NDOT)	INTL

Integrator Signature						
NDOT RE Signature						
NDOT TOTS Signature						

3. EXPLANATION - SUBSYSTEM (SST) TESTING

3.1. At the beginning of the SST phase, the System Integrator shall submit, in PDF format and original signed hard copies of the certified SALT results for approval by the Engineer.

3.2. The Engineer shall approve all SALT testing prior to the System Integrator starting the SST testing.

3.3. Conduct SST testing in accordance with NDOT's testing documentation for all field and related equipment once the system has been interconnected to form a complete subsystem (i.e. Network connectivity).

3.4. The SST test shall demonstrate connectivity to all field equipment utilizing NDOT's current freeway management system (FMS).

3.5. The SST test consists of a 45-day period of operations without major failure of equipment. The Resident Engineer can require the SST be restarted if any major failure occurs. A major failure for the Communication Building is defined as:

3.5.1. Any failure of the equipment associated with the PRIMARY FUNCTION of the Communication Building.

3.6. Demonstrate that the total system (hardware, firmware, software, materials, and construction) are properly installed, free from problems, exhibits stable and reliable performance, and meets project requirements.

3.7. Once per week, the System Integrator shall demonstrate that all system functions tested in the SST are operational and meets requirements.

3.8. The System Integrator shall coordinate through the Resident Engineer and the Construction Crew to have an appropriate NDOT representative present for the onsite inspection.

3.9. The System Integrator must provide proof that each device has been tested each week for the duration of the testing period witnessed by an NDOT representative.

3.10. The testing time must be scheduled a minimum of one week prior and coordinated and approved by the Resident Engineer and the Construction Crew.

COMMUNICATION BUILDING SST PROCEDURE

TEST #	SST TEST PROCEDURE	EXPECTED RESULT	PASS / FAIL

Communication Building Name:		**IP Address:**		**GPS:**	
TOTS Network Name:		**Associated Cabinet Name:**			

Purpose and General Verification

System Integrator: *This SST tests the proper installation of a fully furnished and operable Communication Building. The system integrator will use an Operator Workstation at the TMC/ROC to perform this test.*

General Verification*: For each test below, complete the Communication Building SST Matrix, circling the "Pass" or "Fail" in the appropriate cell. Only indicate a "Pass" on this form if the entire matrix column related to the tested function passes for EACH Communication Building being tested.*

System Communication Building Information

1.	Verify CCure system is operational and communicates properly with the TMC/ROC.	CCure system functionality is verified with District TMC/ROC.	Pass / Fail
2.	Verify power supply/battery backup system communicates properly with the TMC/ROC.	Power supply/battery backup system functionality is verified with District TMC/ROC.	Pass / Fail
3.	Verify environmental site monitoring sensors are operational and communicates properly with TMC/ROC.	Environmental site monitoring sensors are triggered when an environmental threshold occurs over/under the limit.	Pass / Fail

Signatures

SST DAY	DATE	PERFORMED BY (Print Name) (Integrator)	INTL	WITNESSED BY (Print Name) (NDOT)	INTL
1					
8					
15					
22					
29					
36					
45					

Integrator Signature	
NDOT RE Signature	
NDOT TOTS Signature	