CELLULAR TELEPHONE MODEM TEST PROCEDURE

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, if applicable, 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.

CELLULAR TELEPHONE MODEM (MODEM) SALT PROCEDURE

TEST #	SALT TEST PROCEDURE	EXPECTED RESULT	PASS / FAIL
Modem Name:		**IP Address:**	**GPS:**
TOTS Network Name:		**Associated Cabinet Name:**	
Purpose and General Verification			
System Integrator: *This SALT tests the proper installation of a functional Modem. The system integrator will use a laptop to perform this test. Using the manufacture's software, the integrator will be able to verify the modem is operational.* ***General Verification****: For each test below, complete the modem 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 Modem being tested.*			
modem Information			
1.	Verify modem Information using the manufacturer software or device label.	**Manufacturer: _____** **Model: _____** **Serial Number: _____** **Firmware Version: _____**	Pass / Fail
2.	Manufacturer's commissioning of modem equipment.	Manufacturer confirmation of full operation of all modem -associated equipment.	Pass / Fail
Equipment Verification			
3.	Verify modem is securely mounted in cabinet/rack.	Modem is securely mounted in cabinet/rack.	Pass / Fail
4.	Using a meter, verify the system is properly bonded to earth ground.	Meter reading of 5 Ohms or less.	Pass / Fail
5.	Verify power supply energizes the system.	System is energized.	Pass / Fail
6.	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
7.	Verify modem is accessible via User Interface (UI).	Modem accessible via User Interface (UI).	Pass / Fail
8.	Verify modem operations locally via User Interface (UI).	Modem turns on/off via User Interface (UI).	Pass / Fail
Verification of Settings			

9.	Verify Communication Settings are set to appropriate values per the IP plan.	**IP: _____** **MASK: _____** **GATEWAY: _____** **UDP/TCP PORT: _____**	Pass / Fail

Signatures

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

Integrator Signature	
NDOT 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 Cellular Telephone Modem is defined as:

3.5.1. Any failure of the equipment associated with the PRIMARY FUNCTION of the Cellular Telephone Modem.

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.

CELLULAR TELEPHONE MODEM (MODEM) SST PROCEDURE

TEST #	SST TEST PROCEDURE	EXPECTED RESULT	PASS / FAIL

Modem Name:		**IP Address:**		**GPS:**	
TOTS Network Name:		**Associated Cabinet Name:**			

Purpose and General Verification

System Integrator: *This SST tests the proper installation of a functional Modem. The system integrator will use an Operator Workstation at the TMC/ROC to perform this test.*

General Verification*: For each test below, complete the modem 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 Modem being tested.*

System Modem Information

1.	Verify network connectivity by issuing a ping test to the modem	Modem responds to the ping test.	Pass / Fail
2.	Verify access to the modem via SSH, or if applicable, the manufacturer's device cloud manager.	Modem is accessible via SSH, or if applicable, the manufacturer's device cloud manager.	Pass / Fail
3.	Verify the modem has a configuration file.	Modem has a valid configuration file.	Pass / Fail
4.	Verify modem is configured correctly by issuing a ping test to all end-devices connected to switch.	End-devices are responding to the ping requests	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 Signature					