Seattle Fire Department
220 3rd Avenue S
Seattle, WA 98104-2608
Email: SFD_FMO_SystemsTesting@seattle.gov

SYSTEM TEST REPORT

Please contact the PSERN project at DAS-PSERN@kingcounty.gov to arrange to borrow radios. PSERN does not participate in annual testing, no uplink appt is required. https://psern.org/confidential-resources

Distributed Antenna Systems (DAS)		STATUS		
☐ Annual Test	☐ Deficiency Repair Report	☐ Red	☐ Yellow	☐ White

Occupancy Information

Building Name:	Building Address:
Contact Name:	Contact Phone:
Contact Address:	Contact Email:
Central Station Monitoring: ☐ Yes ☐ No	Monitoring Required: ☐ Yes ☐ No
Monitoring Company Name:	Monitoring Company Phone:

DAS Inventory (M-mandatory)

Update inventory information below. For commissioning: All fields are mandatory. For annual test: enter any missing values using results from the current annual test, otherwise do not change commissioning values. Upload grid square diagrams and other information using upload feature at end of inventory. After leaving this page, you will not be able to edit inventory, except by creating a new report.

System Make:				
System Model:				
Design Firm of Record:				
Electrical Permit Application Date:				
Electrical Permit Number:				
Location of System in Building:				
Applicable Code & Year (e.g. IFC 2021):				
Is this a shared system (shared with cellular phone carriers and/or internal radios?)	☐ Yes	☐ No		
Is this a fiber/active or a coax/passive system?	☐ Active	☐ Passive		
PSERN Retune Completed?	☐ Yes	☐ No		
Grid square testing diagram and results uploaded to TCE?	☐ Yes			
Diagram(s) uploaded to TCE showing location of BDA/DAS control equipment, amplifiers, signal boosters, backup battery systems, and any outdoor antennas, and a wiring schematic.	☐ Yes			
Antenna Type:				
ERP to Donor Site (dBm):				

Testing shall be done using a PSERN public safety radio held at face level and placed in transmit mode, transmitting within 3' of the antenna predicted to have the lowest loss to the BDA (based on distance from the BDA equipment). The output power of the BDA shall than be measured with a calibrated power meter or spectrum analyzer. Using the measured power, and the estimated feedline loss plus antenna gain, shall be used to calculate the Estimated Radiated Power (ERP).

Antenna Gain (dBd):		
Antenna Coordinates (NAD83):		
Antenna Azimuth (degrees true) (DAS vendor may select the antenna unless directed to a specific antenna by the PSERN Operator):		
Uplink Gain Setting:	Gain Setting:	db
	Power:	dbm
Downlink Gain Setting:	Gain Setting:	db
	Power:	dbm

Signal Level Received at Donor Site (-dBm):

The signal level received at the donor site shall be measured by the PSERN Project - see the DAS vendor information at https://psern.org/confidential-resources. You will also borrow radios from PSERN for your testing. A test signal shall be generated from a public safety radio held at face level and placed in transmit mode, transmitting within 3' of the antenna predicted to have the lowest loss to the BDA (based on distance from the BDA equipment).

Signal Level Received from Donor Site (-dBm):
Measure active control channel, w/20 KHz resolution bandwidth, at the jumper that connects to the DAS head-end donor port.

Channelized Donor Site Name (to be selected by the DAS vendor unless directed by the PSERN project to a specific donor site):

Channelized or Broadband (Note: new broadband systems are not accepted on PSERN): ☐ Channelized ☐ Broadband

List of Critical Areas in Building (for coverage testing requirements). Critical areas from NFPA 1225 and the Fire Code are: the fire command center(s), the fire pump room(s), interior exit stairways, exit passageways, elevator lobbies, standpipe cabinet:

Attach grid square diagrams, and diagram of location of equipment and devices.

Testing Company Information (All Fields Mandatory)

Company Name: Address:	Phone: Emergency Phone: Email:

Technician/Tester Information (All Fields Mandatory)

Technician Name:
Technician FCC Certification/GROL#:
Technician performing testing has received approved certification and manufacturer training or other approved equivalent: ☐ Yes ☐ No
Specify certification/certificate and year:

Testing Equipment (All Fields Mandatory)

Spectrum analyzer make/model**:
Spectrum analyzer calibration date:
Calibration performed by firm (qualified firm name):
*** Use of a calibrated spectrum analyzer, with a current calibration, is required for this testing.*

Test Information (Mandatory)

Date of Test:

The items on the checklists below shall be inspected and tested. This list does not constitute all of the required inspecting and testing requirements for BDA/DAS. Refer to the CURRENT FIRE CODE AND REFERENCED NFPA STANDARD and the MANUFACTURER'S INSTRUCTIONS for weekly, monthly, and/or quarterly inspecting and testing requirements.

PRE-TEST CHECKS

Take precautions necessary to avoid preventable alarms.

1	If a monitored fire alarm system is present in the building, the Central Station Monitoring Service was notified that DAS testing is occurring and will be generating supervisory signals.	☐ Yes	☐ No	☐ N/A

GENERAL - RECORDKEEPING

2	The following documents from the installation/acceptance testing are stored in emergency responder radio system enclosure and/or the building engineer's office. If original documents are no longer available, items a and b shall be re-created and stored:			
a.	Grid diagram for each floor, showing test signal strengths in each floor, and indicating location of each critical area. Include information on location of fire-resistance-rated pathways.	☐ Yes	☐ No	
b.	A diagram showing location of BDA/DAS control equipment, amplifiers, signal boosters, backup battery systems, and any outdoor antennas, and a wiring schematic.	☐ Yes	☐ No	
c.	Copies of manufacturer specification sheets for all BDA/DAS systems components, including amplifiers, signal boosters, antennas, coax, couplers, splitters, combiners, and other passive components.	☐ Yes	☐ No	☐ N/A
d.	Data sheets for the backup battery and charging system (if utilized), and include calculations to ensure the backup power requirements are met.	☐ Yes	☐ No	
e.	A copy of the completed Rebroadcast Agreement with PSERN is available in the emergency responder radio system enclosure.	☐ Yes	☐ No	
f.	Certification letter stating that the BDA/DAS system has been installed per code and was complete/fully functional at time of install.	☐ Yes	☐ No	☐ N/A

DAS SPECIFICATIONS/PERFORMANCE DURING CURRENT TEST

Antenna Type:

ERP to Donor Site (dBm): *Testing shall be done using a PSERN public safety radio held at face level and placed in transmit mode, transmitting within 3' of the antenna predicted to have the lowest loss to the BDA (based on distance from the BDA equipment). The output power of the BDA shall then be measured with a calibrated power meter or spectrum analyzer. Using the measured power, and the estimated feedline loss plus antenna gain, shall be used to calculate the Estimated Radiated Power (ERP).*			
Antenna Gain (dBd):			
Antenna Coordinates (NAD83):			
Antenna Azimuth (degrees true) (DAS vendor may select the antenna unless directed to a specific antenna by the PSERN project):			
Uplink Gain Setting:	Gain Setting:		db
	Power:		dbm
Downlink Gain Setting:	Gain Setting:		db
	Power:		dbm
Signal Level Received at Donor Site (-dBm): *ONLY REQUIRED AT TIME OF COMMISSIONING, NOT REQUIRED FOR ANNUAL TESTING. The signal level received at the donor site shall be measured by the PSERN Project - see the DAS vendor information at https://psern.org/confidential-resources. You will also borrow radios from PSERN for your testing. A test signal shall be generated from a public safety radio held at face level and placed in transmit mode, transmitting within 3' of the antenna predicted to have the lowest loss to the BDA (based on distance from the BDA equipment).*			
Signal Level Received from Donor Site (-dBm): *Measure active control channel, w/20 KHz resolution bandwidth, at the jumper that connects to the DAS head-end donor port.*			
Channelized Donor Site Name (to be selected by the DAS vendor unless directed by the PSERN project to a specific donor site):			
Channelized or Broadband:	☐ Channelized	☐ Broadband	

ACTIVE COMPONENTS				
3	Signal booster is within a NEMA 4 or IP66 or equivalent enclosure. *Only select N/A if system was installed prior to the adoption of the 2009 edition of the local Fire Code.	☐ Yes	☐ No	☐ N/A*
4	Battery is within a NEMA 3R or IP65 or equivalent enclosure (or NEMA 4 or IP66 for systems installed under the 2009-2015 code). * Only select N/A if system was installed prior to the adoption of the 2009 edition of the local Fire Code.	☐ Yes	☐ No	☐ N/A*
5	Equipment is FCC certified. If no, list corrections required:	☐ Yes	☐ No	
6	Signage at Fire Alarm Panel "This building is equipped with an Emergency Responder Radio Coverage System. Control equipment located in room ____" and signage on or adjacent to the door of the room containing the main system components stating: "Emergency Responder Radio Coverage System Equipment".	☐ Yes	☐ No	
7	DAS is communicating with same donor site as identified at time of commissioning or communicating with approved donor site as documented in writing by Radio System Operator or Authority Having Jurisdiction.	☐ Yes	☐ No	
8	DAS signal strength received from donor site at the input to the BDA meets original installation values plus or minus 2 db. See inventory section for commissioning values or if not available, from most recent annual test (see inventory section of this report). If no prior values are available, then the values from current test must be added to the inventory section, then select N/A for this question.	☐ Yes	☐ No	☐ N/A
9	Uplink amplifier gain matches gain at commissioning plus or minus 2 db. See inventory section for commissioning values or if not available, from most recent annual test (see inventory section of this report). If no prior values are available, then the values from current test must be added to the inventory section, then select N/A for this question.	☐ Yes	☐ No	☐ N/A

10	Downlink amplifier gain matches gain values recorded at commissioning plus or minus 2 db. See inventory section for commissioning values or if not available, from most recent annual test (see inventory section of this report). If no prior values are available, then the values from current test must be added to the inventory section, then select N/A for this question.	☐ Yes	☐ No	☐ N/A
11	Antenna azimuth (bearing) matches commissioning azimuth plus or minus 5 degrees. See inventory section for commissioning values or if not available, from most recent annual test (see inventory section of this report). If no prior values are available, then the values from current test must be added to the inventory section, then select N/A for this question.	☐ Yes	☐ No	☐ N/A
12	Active components checked to verify operation within manufacturer's specifications:			
	a. Equipment alarm log checked for recurring or substantial alarms and addressed as per manufacturer's recommendations.	☐ Yes	☐ No	
	b. Isolation testing performed and measured system isolation is at least 20 db above the total downlink and the total uplink gain (whichever is greater) between least isolated DAS antenna and the donor antenna.	☐ Yes	☐ No	

DISTRIBUTION SYSTEM AND COVERAGE – OPTION 1: STANDARD TEST

13a	Perform in-building coverage test/grid test using a calibrated spectrum analyzer: Signal strength remains stronger than (less negative than) -95 dBm for 95% of grids on each floor in non-critical areas (for a 20 grid square test, this means that at least 19 of the grids must pass for the floor to pass). If no, location(s) of failed grids:	☐ Yes	☐ No
13b	The list of critical areas to be provided coverage in this building is complete (list is stored and can be edited in the prior inventory portion of this report).	☐ Yes	☐ No
13c	Critical areas are provided with 99% floor area radio coverage with coverage stronger than -95 dBm. If no, location(s) of critical areas that do not meet threshold:	☐ Yes	☐ No

Critical areas from NFPA 1225 and the Fire Code are: the fire command center(s), the fire pump room(s), interior exit stairways, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas required by the fire code official.

13d	Perform functional (talk-back) testing in each critical area using one radio in the building and one radio outside the building – radios function sufficiently for communications with a DAQ of 3 or higher? If no, location(s) of non-acceptable communications:	☐ Yes	☐ No
13e	Perform functional (talk-back) testing between each critical area in the building to fire command center, or if no command center, fire alarm control panel – radios function sufficiently for communications with a DAQ of 3 or higher? If no, location(s) of non-acceptable communications:	☐ Yes	☐ No

DISTRIBUTION SYSTEM AND COVERAGE – OPTION 2: ALTERNATIVE IN-BUILDING COVERAGE TEST
This section may be utilized in lieu of Option 1 (13a-e) only when the full grid square test documentation from the acceptance test and most recent previous annual test results are available.

14a	Perform alternative in-building coverage test/grid test in non-critical areas. Signal strength shall be tested using a spectrum analyzer. For floor plate with standard 20 grid squares, test 3 grids per floor, those grids having the poorest performance in the acceptance test or in subsequent annual testing, when annual testing has previously occurred. Failure of 1 grid is 95% pass rate and acceptable. Failure of more than 1 grid (signal strength weaker than -95 dBm) on a floor indicates failure of the in-building coverage test for the building. Is test passed? If no, location(s) of failed grids:	☐ Yes	☐ No
14b	Signal strength shall be tested for one grid for each serving antenna, if not already tested in 14a. Is test passed? If no, location(s) of failed grids:	☐ Yes	☐ No

14c	The list of critical areas to be provided coverage in this building is complete (list is stored with inventory information above). If not correct, modify inventory list and once correct, select Yes.	☐ Yes	☐ No	
	Critical areas from NFPA 1225 and the Fire Code are: the fire command center(s), the fire pump room(s), interior exit stairways, exit passageways, elevator lobbies, standpipe cabinets, sprinkler sectional valve locations, and other areas required by the fire code official.			
14d	Perform alternative in-building coverage test/grid test in critical areas: Signal strength shall be tested using a spectrum analyzer in all critical areas identified in the original acceptance test. In-building coverage for critical areas shall be considered acceptable when 99% of critical areas have signal strength stronger than -95 dBm). If no, location(s) of critical areas that do not meet threshold:	☐ Yes	☐ No	
14e	Perform functional (talk-back) testing between a radio in the fire command center and a radio at a location outside the building – radios function sufficiently for communication with a DAQ of 3 or higher. If no, location(s) of non-acceptable communications:	☐ Yes	☐ No	
14f	Perform functional (talk-back) testing between a radio at the fire alarm control panel and a radio at each landing in each stairwell – radios function sufficiently for communication with a DAQ of 3 or higher. If no, location(s) of non-acceptable communications:	☐ Yes	☐ No	
BATTERIES/SECONDARY POWER				
15	Backup batteries and secondary power supply tested under load for one hour and meet requirements.	☐ Yes	☐ No	
ALARM PANEL MONITORING				
16	If a fire alarm system is present in the building, the fire alarm system is supervising the DAS including donor antenna function, active RF emitting device failure, and power supply. Separate annunciation is not required at fire alarm panel, if a secondary panel at the DAS separately indicates these conditions. *Only select N/A if system was installed prior to the adoption of the 2009 edition of the local Fire Code, or if the building is not required by code to have a fire alarm system.	☐ Yes	☐ No	☐ N/A*
17	If a fire alarm system is present in the building, the communications link between the fire alarm system and the in-building emergency responder communications enhancement system is monitored for integrity and the monitoring is operating correctly.	☐ Yes	☐ No	
18	For buildings without a fire alarm system, a dedicated monitoring panel annunciates supervisory and trouble signals for the signal booster system and power supply(ies) and sounds an audible signal at a constantly attended location. *Select N/A only if the building has a fire alarm system and information was provided in questions 16, 17, and 19 regarding the alarm system.	☐ Yes	☐ No	☐ N/A*
FINAL CHECKS				
19	If building includes a fire alarm system, inform alarm monitoring company that testing is complete and return fire alarm service to normal functioning if other precautions were taken during testing.	☐ Yes	☐ No	☐ N/A
SIGNATURES AND REPORTING				
20	A current red, yellow or white tag was placed on the system indicating the system's status and test date consistent with my inspection today. For projects in Seattle, see also SFD Administrative Rule 9.02.	☐ Yes	☐ No	
	The color of the tag is: "Red (Impaired/Not Functioning)" "Yellow (Deficiencies Noted)" "White (System Normal)"	☐ Red	☐ Yellow	☐ White
21	A record of the inspection and maintenance along with an updated grid diagram of each floor showing tested strengths in each grid square and each critical area shall be provided to the building owner and included with the documentation maintained in the DAS enclosure or building engineer's office.	☐ Yes	☐ No	
22	I will provide a copy of the confidence test report to the owner.	☐ Yes	☐ No	

23	I will submit this test report within seven days of the date of the test to the fire department through TCE.	☐ Yes	☐ No

By accepting this statement, I, the certified technician shown on this form, certify that this fire protection system(s) has been properly inspected for functional operation in accordance with the current Fire Code (FC) used by the department that has jurisdiction and NFPA Standards adopted by the FC for this system. Any deficiencies found are noted in the report and have been reported to the building Owner/Manager for corrective action. I also certify that the report indicates the correct field inspection/repair date, and I have placed an accurate red, yellow, or white tag on the system indicating its status consistent with my inspection today and SFD Administrative Rule 9.02. By accepting this statement, I further attest that I am properly certified by the City of Seattle (and State of Washington if required for the work) to perform the work documented in this report or exempt from those requirements. Finally, by accepting this statement I attest that the contractor on whose behalf this report is submitted holds the appropriate Washington State licenses should any be required for the work documented in this report.

☐ I accept.	☐ I am authorized to submit this report for the certified technician who has accepted this statement.	(Initials of Employee)

SIGNATURE (OPTIONAL)

Signature of Technician

Signature of Building Representative

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To submit reports to SFD, use the online forms at www.thecomplianceengine.com.