

City and County of San Francisco, Department of Technology, Radio Shop

2019 ERRCS / DAS / BDA Requirements (v1.4)

1.0 Bi-Directional Amplifier (BDA)/Signal Booster equipment technical requirements:

- 1.1 BDA shall be an FCC Class A “Channelized” signal booster
- 1.2 BDA shall be registered with FCC as a “Class B” signal booster
(This is an FCC requirement, because in our current CCSF filter scheme, the filters exceed 75kHz)
- 1.3 BDA shall be fully compatible with both P25 Phase 1 and Phase 2 (TDMA) signals
- 1.4 BDA shall be capable of supporting all CCSF 700 MHz and 800 MHz frequencies/channels
- 1.5 BDA shall have a minimum of 24 filters
- 1.6 BDA filters shall be capable of filter bandwidths of: 12.5kHz, 100 kHz and 150 kHz
- 1.7 BDA shall provide uplink squelch capability
- 1.8 BDA shall have a network port capable of being remotely accessed through a web browser

2.0 Donor Antenna equipment technical requirements:

- 2.1 Donor antenna shall be a directional antenna.
- 2.2 Donor antenna horizontal and vertical beam width shall be: Equal to or less than 35 degrees
- 2.3 Donor antenna front-to-back ratio shall be: Equal to or greater than 27dB
(A narrow/sharp beam/panel type antenna is highly recommended as donor antenna)
- 2.4 Donor antenna shall be at least 4 feet above the roof floor or parapet, whichever is higher.
- 2.5 Donor antenna distance from the edge of the roof or parapet shall not exceed 12 feet, or the antenna half-power (-3dB) point (only if the base height exceeds 4 feet), whichever is greater.
- 2.6 Donor site(s) must be selected that transmit all necessary CCSF 700 MHz and 800 MHz channels/frequencies. If a site that transmits both 700 and 800 MHz channels cannot be used, 2 donor antennas and other equipment will be required, with approval of CCSF Radio Shop.

3.0 DAS testing measurables technical requirements:

- 3.1 Donor Site measurements:
 - 3.1.1 Donor site uplink Rx level at donor site shall be: Equal to or greater than -95dBm
 - 3.1.2 Donor site uplink Rx level at donor site shall be: Less than -70dBm
 - 3.1.3 Donor site uplink Rx noise floor contribution shall be: < -130dBm, estimated
- 3.2 BDA measurements:
 - 3.2.1 Uplink noise floor transmitted by BDA shall be: Less than (-130dBm + *path loss*)
Example: If path loss= 80dB, then: -130 + 80 = -50dBm max uplink noise floor from BDA

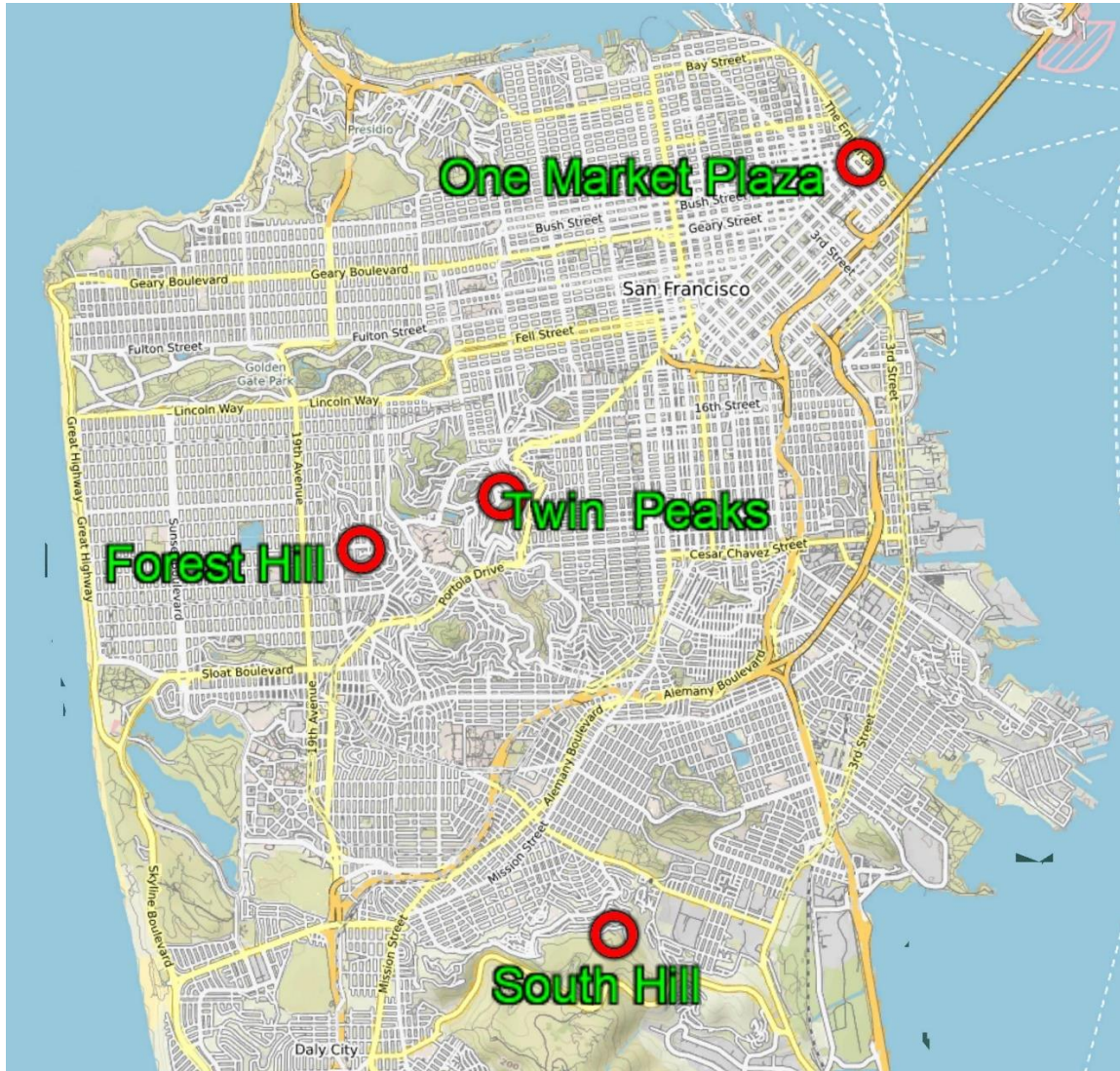
4.0 BDA settings:

- 4.1 BDA Maximum uplink and downlink gain settings shall be 20dB less than Donor-DAS isolation (i.e. Donor-to-DAS antenna isolation = 98dB. Then, max gain settings allowed = 98-20 = **78dB**)
- 4.2 BDA filters shall be programmed with only 1 CCSF frequency/channel per filter
- 4.3 BDA filters shall be programmed as directed in the “CERS 2.0 Filter Scheme” (see page 3)
- 4.4 ALL CCSF channels/frequencies shall be programmed into the BDA and enabled
- 4.5 BDA uplink and downlink squelch settings shall be at least +5 dB above noise floor

5.0 Vendor testing & installation:

- 5.1 All equipment shall be installed per all applicable Manufacturer’s requirements, including grounding, environmental conditions, signal input levels shall not be exceeded, etc.
- 5.2 CCSF Radio Shop may provide P25 radios for testing purposes upon request
- 5.3 Vendors shall not power on, enable, re-enable or “put back in service”, any ERRCS (BDA), even for testing or installation purposes, without first notifying: **System Watch @ 415-558-3884**

CCSF PUBLIC SAFETY RADIO DONOR SITE MAP



Note: Map indicates Radio Donor Sites with BOTH 700 and 800 MHz frequencies

700 & 800 MHz Sites (Only ONE donor antenna needed):	Latitude	Longitude	Station Power (dBm)	Tx ERP (dBm)	Tx Antenna Elevation (Est)
Twin Peaks (NOTE: This is NOT Sutro Tower):	37.7545°	-122.4467°	42.01	47.71	954'
One Market Plaza:	37.7932°	-122.3945°	41.09	48.39	586'
Forrest Hill:	37.7485°	-122.4673°	42.48	48.18	808'
South Hill:	37.7041°	-122.4303°	42.89	48.89	750'
800 MHz ONLY Sites (will require 2 nd donor antennas for 700 MHz sites):					
Clay Jones:	37.7931°	-122.4142°	42	48.6	572'
Bernal Heights:	37.7431°	-122.4149°	43.01	47.61	485'
Fort Miley:	37.7826°	-122.5073°	44.01	48.21	400'
SFSU:	37.7236°	-122.4766°	43.01	45.91	230'

NOTE: All GPS coordinates are approximated. Antenna heights also approximated.

	2019 CCSF CERS 2.0 / 700 MHz Filter Scheme		New Filter Scheme	Lower Filter Limit (MHz)	Filter BW (kHz)	Upper Filter Limit (MHz)
CERS 2.0	806.12500	851.12500	F1	851.07500	100	851.17500
	806.25000	851.25000	F2	851.20000	100	851.30000
	806.40000	851.40000	F3	851.35000	100	851.45000
	806.61250	851.61250	F4	851.56250	100	851.66250
	806.81250	851.81250	F5	851.73750	150	851.88750
	807.06250	852.06250	F6	852.01250	100	852.11250
	807.21250	852.21250	F7	852.13750	150	852.28750
	807.38750	852.38750	F8	852.33750	100	852.43750
	807.67500	852.67500	F9	852.62500	100	852.72500
	807.86250	852.86250	F10	852.81250	100	852.91250
	808.08750	853.08750	F11	853.03750	100	853.13750
	808.25000	853.25000	F12	853.20000	100	853.30000
	808.43750	853.43750	F13	853.38750	100	853.48750
	808.65000	853.65000	F14	853.60000	100	853.70000
	808.78750	853.78750	F15	853.73750	100	853.83750
	808.88750	853.88750	F16	853.83750	100	853.93750
	811.23750	856.23750	F17	856.18750	100	856.28750
	812.23750	857.23750	F18	857.18750	100	857.28750
700 MHz Int-Op	799.26875	769.26875	F19	769.21875	100	769.31875
	799.53125	769.53125	F20	769.48125	100	769.58125
	799.84375	769.84375	F21	769.79375	100	769.89375
	800.10625	770.10625	F22	770.05625	100	770.15625
	801.13125	771.13125	F23	771.08125	100	771.18125
	803.68125	773.68125	F24	773.63125	100	773.73125

BDA Management Form

This form is to be filled out for all new Bi-Directional Amplification (BDA) Systems in the City and County of San Francisco the rebroadcast public safety frequencies. Please fill it out and return to either **System Watch at 1011 Turk St, SF 94102 (415 558-3884)** or emailed to **radio@sfgov.org**

If ANY field is not filled out, the form will be returned until ALL necessary fields are completed

Inspection requested for 2020 CCSF ERRCS Requirements? (YES / NO)
If NO, this install will need to pass re-inspection by 3/31/2020, or else it will be shut down and building owner will be in violation of fire code.

Contact Information

Installing Vendor	
Installing Vendor Phone Number(s)	
Requestor Name (First, Last)	
Requestor Phone Number	
Email	
Date of System Commissioning	

Building Information

BDA Address	
BDA Floor #	
BDA Room #	
Building Height	
Building Contact Name	
Building Contact Phone Number	
BDA Maintenance Name	
BDA Maintenance Phone Number	

Additional Information Needed for Access

Who will meet with inspector? Contact info? Etc.

BDA Information

BDA Manufacturer	
BDA Model	
BDA Serial Number	
FCC Booster ID (From FCC Registration)	
Number of filters allowed (700 / 800)	
Uplink Squelch? (Y/N)	
BDA Highest Gain Setting Used (dB):	
External attenuators (700 UL / 700 DL / 800 UL / 800 DL)	

Donor Antenna Information

Donor Antenna Type (yagi, omni, panel, etc)	
Donor Antenna Manufacturer	
Donor Antenna Model	
Donor Antenna Gain (dB)	
Donor Antenna Beamwidth - Horizontal / Vertical (<35 / <35)	
Donor Antenna ERP (W)	
Donor Antenna Front-to-Back Ratio (>27 dB)	
Donor Antenna Location (specific, where on roof, side of bldg, etc)	
Donor Antenna Azimuth	
CCSF Donor Site Selected (See CCSF Donor Site Map)	
Donor Antenna Height Above roof edge/parapet (ft.)	
Donor Antenna Distance from roof edge/parapet (ft.)	
Indoor Antenna Architecture	
Indoor Antenna Quantity	
Cellular Collocated? (Y/N)	

DAS Information

(please supply any information you can on the building DAS)

Installation Technicians Notes

Peak Control Channel Signal Input at donor antenna (dBm):	
Peak Output Signal level from BDA to donor antenna (dBm):	
Uplink Noise Floor output to donor antenna (dBm):	
Isolation between donor and indoor coverage antennas (dBm):	
Asset # in ServiceNow (CCSF only):	