

Response: Vast will manage the engineering of each sector through the management tool provided by Telrad so that the required 25 MB/s, 10 MB/s and 4 MB/s percentages are maintained so that customers will receive speeds at peak usage.

3-7. What is the network topology?

Response: The network topology is fixed wireless broadband from vertical assets to a customer's home. From the vertical assets to the network, primary backhaul is provided by fiber optic ring and backed up with a redundant point-to-point microwave. [REDACTED]

3-8. What is the expected number of customers on a tower?

Response: The engineering design assumes a maximum of 40 customers per sector (20 MHz). If there are 4 sectors on a tower then 160 total customers. Additional radios can be added to a tower to increase capacity.

3-9. What is the transport capacity back to the central office? Through what technology?

Response: Backhaul will be provided using our existing fiber optic network, with a redundant backhaul using licensed gigabit digital point-to-point microwave.

3-10. How is the signal affected by weather?

Response: Radio signals below 6GHz are not affected by weather. Above 10GHz, rain fading becomes a significant RF design consideration. The Vast Broadband system operates between 3.55 - 3.7 GHz, and therefore is not affected by weather.

3-11. What is the line of sight for customers and is signal strength dependent on line of sight?

Response: Line-of-sight (LOS) offers higher signal strength to the customer. However, LTE systems operate inherently non-line-of-sight (NLOS), with 2.5 billion subscribers enjoying its NLOS capabilities.

3-12. Do customers need an external antenna? What is the cost of the antenna?

Response: Yes an antenna is required but is part of the CPE provided by Vast. There is no separate cost for the antenna and is part of the monthly service and CPE cost.

3-13. How will the service work over hills?

Response: RF travels over hills by the electromagnetic property known as diffraction.

3-14. What will be the density of the towers?

Response: Total Service Area is 2,200 Sq.Mi., giving a density of 275 Sq.Mi/Tower

3-15. What will be the reasonable expectation for speed most of the time for a customer near the tower? At the peak hour of the day?

Response: Vast will provide the service levels offered of 25/10/4 as specified in the ACAM application.

3-16. What will be the reasonable expectation for speed most of the time for a customer in the mid-range distance away from the tower? At the peak hour of the day?

Response: See response to 3-15

3-17. What will be the reasonable expectation for speed most of the time for a customer far from the tower? At the peak hour of the day?

Response: 4Mbps at cell edge.

3-18. What will be the performance characteristics?

Response: 25Mbps/10Mbps/4Mbps, See Coverage Plot (Confidential Exhibit A)

3-19. How much overlap will there be between towers? Provide a map depicting tower with coverage circles in order to demonstrate overlap.

Response: See Coverage Plots (Confidential Exhibit A)

3-20. Provide additional propagation study information.



3-21. **What technical experience does Clarity have on staff regarding the building, operating and maintaining of a wireless telecommunications network?**

Response: Vast has employed throughout 2017 consultants and consulting engineers for the spectrum acquisition, vendor selection, engineering designs and other implementation services. Vast technical employees have assisted throughout the design phase. In addition, Telrad (the selected vendor) will provide implementation services and training throughout the deployment. Vast has also toured and visited a Telrad deployment near Grand Forks, ND.

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