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SUBJECT: Early Release Coverage Requirements Addendum No.2
700/800 MHz Trunked Radio & Communication System for the Information Technology
Department

REFERENCE: Request for Proposal No.: S29-T22459

TO: All Prospective Proposers

This Early Release Coverage Requirements Addendum is issued for the following reasons:

• **The following questions and City of Houston responses are as follows:**

1. Please let us know the expectation of coverage on Rice University's campus, TSU's campus, Etc.... The U of H campus has specific buildings but the others do not. Do you want coverage in the basements, all buildings, etc?

Answer: These university campuses are within the 20db coverage area. The City has not identified them as requiring any additional levels of coverage.

2. Does the City desire a system design to include a geographically separated " Hot Standby" Network Switch? This would allow for not only redundancy, but network route diversity as well.

Answer: The City will likely require that the design include a redundant hot standby and geographically separated network switch to support the proposed system.

3. Since the City of Houston will be investing nearly \$150MM in a new system, should the recent developments in P25 Phase II be required of the RFP?

Answer: The City is interested in developing a robust system that will provide a long and useful life to maximize the City's financial investment in the system. The City wants to avoid costly upgrades early in the life of the new system. The recent developments in the P25 Standards process will be reviewed by the City.

4. Does the City think text messaging on the end user equipment should be in the RFP as a requirement?

Answer: Features and functions such as text messaging are being reviewed based on business requirements of the users. These requirements will be identified in the full version of the RFP.

5. Would the City like to have a VTAC solution for in building coverage thus eliminating the expense of a BDA?

Answer: The City has identified a baseline coverage requirement that must be provided by the system infrastructure. Any other reasonable tools that a vendor may have available to help extend portable radio coverage above and beyond the baseline will be of interest and should be discussed in your upcoming proposal.

6. No radio system can guarantee >95% indoor coverage everywhere in the mandatory buildings and large campus areas without identifying the required testing methodologies. Definitions are needed such as the number and distribution of test points in sublevels, elevators, and multiple floors. Can the City provide the proposed/suggested mandatory indoor testing method so we may survey the mandatory buildings?

Answer: It is the City's intent to test the system utilizing test procedures that represent real-world system operation. Coverage testing in buildings will likely involve entering the building of interest and making actual test calls through the radio system. A statistically valid number of test calls will be conducted throughout the building. The test team will record all test results. All testing will also be recorded on the system's logging recorders.

In multi-story buildings, testing will be conducted on a sufficient number of floors to determine whether the required level of coverage has been provided. Test locations will be randomly distributed throughout each tested floor. The number of test locations will vary by building size. The number of test floors will vary based on building size.

The City has no interest in prolonging testing beyond a point that clearly demonstrates that the required performance level has been verified properly.

In the event that the building fails the coverage test, a determination of building loss will be made. The City recognizes that in-building signal measurement testing can be time consuming and costly. The City will consider the use of calibrated attenuated radios to repeat a failed in-building coverage test outdoors around the perimeter of the building with calibrated radios having 10 dB, 20 dB, or 30 dB of additional attenuation. More detail on this topic will be available in the final RFP.

7. Would the City consider an outdoor test simulating a 20 to 30dB loss inside the buildings?

Answer: Refer to Answer no. 6.

8. Can the City provide a contact person, as soon as practical, to gain access to each mandatory building and identification of authorized locations for Antennas, BDA equipment near an electrical outlet, and cable risers?

Answer: While the City of Houston can't grant you permission to test the buildings, we have created an introduction building access letter that can be presented to the building owner(s)/ property manager(s) explaining the need and providing them a contact name and number at the City for reference. The prospective proposer(s) will need to identify the name and title of the individual that will be test lead and present during all building testing, as this information will be included in each letter. The letter must be carried at all times during the building testing phase. Personnel sent to measure building loss must have proper photo identification with them at all times. It is highly recommended that the prospective proposer(s) contact the building owner(s)/property manager(s) in advance to seek building access requirements and schedule a time and date that is more convenient for the building owner(s)/property manager(s) to allow for testing to occur.

This Building Access Letter can be requested by contacting Douglas Moore of the Strategic Purchasing Division at douglas.moore2@cityofhouston.net please provide your contact information such as Lead Tester Name, Title, Company Name, Address, Telephone Number and E-mail Address.

****Note: In the event that any of the locations identified require additional security and/or Police escort(s) in order to conduct the test, each prospective proposer may arrange to hire an Off Duty City of Houston Police Officer for this purpose. Please contact 713-308-1215.***

9. *Coverage Acceptance Testing:* Although in Section 1.1.1 the RFP states “All references to coverage reliability. For example, the phrase “95% coverage” indicates that 95% of the bounded area described shall exhibit the specified coverage resulting in a DAQ 3.4 at least 95% of the time” clarification is required in Section 1.6 regarding Coverage Testing throughout the bounded service areas.

Section 8.1 of TIA TSB88-B provides two different test acceptance definitions

(1) Validated Service Area Reliability (or Validated CPC Service Area Reliability) wherein all test tiles within within a service area boundary are tested to determine compliance with the CPC criterion.

- The entire bounded service area shall be tested and 95% of the service area will equal or exceed a CPC of DAQ3.4

(2) Covered Area Reliability (or CPC Covered Area Reliability) wherein only those test tiles within a service area boundary that are predicted to meet or exceed the CPC criterion are tested.

- Only the predicted DAQ3.4 coverage within the bounded service area will be tested and 95% of the predicted coverage area will equal or exceed a CPC of DAQ3.4

Recommend that the RFP clearly specify which coverage acceptance requirement vendors must comply with consistent with the coverage design specification in Section 1.1.1

Answer: The RFP defines a required coverage area. It will not be acceptable to guarantee 95% of the proposed coverage area depicted in your coverage maps. That approach does not meet the City’s requirements and will be evaluated accordingly.

10. *RFP Pre-Release, Section 1.1.2, Page 3-Trunk vs Roof Mounted Mobile Antenna:* Proposer understands the City’s desire to utilize low silhouette “blade type” radio antennas mounted on the trunk lid of its police vehicles. However, the trunk lid antenna location impacts coverage predictions, guarantees testing.

- a. Locating the mobile antenna on the trunk lid generates uncertainties in all of the coverage predictions due to unknown propagation losses resulting from the orientation of the antenna with respect the RF site providing coverage. Best possible propagation when the vehicle is moving directly away from the RF site with an obstructed path between the antenna and the RF site. Worst possible propagation (vehicle blockage and losses) when the vehicle is moving directly towards the RF site. Varying levels of propagation and obstruction losses when the vehicle is moving at any other orientation to/from the RF site.
- b. These uncertainties are compounded by the fact that they will differ for each make and model of the vehicle on which the antenna is mounted.
- c. If Coverage predictions are impacted so to are resultant coverage guarantees and testing.

Recommend, as discussed in Section 8.7.6 of TSB-88-B, that coverage predictions, coverage guarantees and coverage acceptance testing be based upon the mobile antenna mounted in the center of a test vehicle's roof with no other equipment mounted on the roof.

- Specifying this roof mounted location will provide a consistent location for all coverage predictions and guarantees and will likewise provide a consistent location for coverage verification testing of the guaranteed coverage
- Specifying this roof mounted location will also allow apples-to-apples comparison of coverage provided by different vendors.

In addition to coverage predictions and testing as discussed above, coverage characterization measurements and sample voice quality testing can be performed with the mobile blade antenna mounted on the trunk of the vehicle.

Answer: Specifying this roof mounted location may provide a consistent location for all coverage predictions and guarantees but it does not reflect the way the City operates its vehicles. Designing the system based on clean center mounted antennas, would result in degraded coverage performance in real world conditions.

That said, the proposed system should have excellent mobile coverage as a result of the stringent portable coverage requirements. The City prefers to base coverage guarantees on actual conditions. The City will consider establishing a standard vehicle with a trunk mount location to help standardize the vehicle antenna location situation.

11. *Mobile Voice Quality Testing:* The RFP specifies two separate mobile voice quality tests throughout the same entire service area.

- Mobile voice quality, stationary
- Mobile voice quality, moving at up to 80 mph

Recommend that the RFP specify a single service area wide mobile voice quality test, either stationary or moving at 80 mph, which the City/RCC determines is the worst case.

- As discussed in Trunk vs Roof Mounted Mobile Antenna recommendation, the RFP could specify a separate characterization or sample voice quality test with the blade antenna mounted on the trunk for informational purposes.

Answer: Mobile testing will be conducted with the vehicle moving and stationary as indicated in the RFP.

12. *Signal Strength and BER:* The RFP specifies both signal strength and BER measurements as coverage test requirements in addition to mobile, portable outdoor, and portable indoor voice quality testing.

Recommend that these continue to be performed but for informational purposes only and to set a reference baseline of the installed and accepted system.

Answer: Signal strength and BER correlate to DAQ and reliability. Proposers shall be required to identify the minimum signal strength and BER needed to provide the required levels of radio coverage performance for the proposed radios. In simulcast systems it is possible to have ample signal strength and poor BER. As part of coverage testing, automated signal strength and BER measurements will be required. The results of those tests will be compared with the thresholds identified by the vendor for the proposed system.

If a signal level of -99 dBm is needed for a particular type of coverage, signal measurement testing will help identify whether or not the system is providing that level of performance. If a 2% BER is needed to meet coverage requirements, the BER test will help determine whether the system is delivering that level of performance including signal synchronization.

If such information is provided “for informational purposes only” it is of little value to the City if a dispute arises regarding whether or not the system has passed the coverage test

13. *Portable Indoor Testing of Random 30, 20 and 10Db Buildings:* The RFP specifies voice quality testing within a randomly selected building within each grid, with a maximum loss for each building defined as 30 dB, 20 dB or 10 dB based on which boundary the grid is located within.

Recommend that this requirement be changed to perform a simulated portable indoor random building test within each grid using an attenuated portable radio, with the level of attenuation, i.e. 30 dB, 20 dB or 10 dB, dependent on within which boundary the grid is located.

Answer: Refer to answer no. 6

14. *RFP Pre-Release, Section 1.1.1, Page 3 – No Two Adjacent Grid Test Failures:* Proposer understands the City's desire that failed points shall not be unique to any one vicinity. However, the test requirement that **“it will not be acceptable to provide a design where two or more adjacent failed grids exist”** results in a coverage design requirement > 99% that is inconsistent with the 95% coverage design specification found elsewhere throughout the RFP, and is both impractical and unaffordable.

- The RFP has specified ½-mile test grids; 0.25 square miles in size
- 2 adjacent grids that fail coverage constitute a 0.5 square mile area of contiguous non-coverage.
- Houston has an area of 601 square miles, and Harris County has an area of 1778 square miles.
- To require that no 2 adjacent grids fail and to ensure that these 2 failed grids are not **“unique to any one vicinity”** of the service area, would require a design that guarantees > 99.9% coverage

$$(601-0.5)/601 = 99.92\%$$

$$(1778-0.5)/1778 = 99.97\%$$

Request deletion of the requirement **“It will not be acceptable to provide a design where two or more adjacent failed grids exist”**.

Answer: The vendor information above assumes that one and only one grid out of the 601 square miles fails, resulting in a 99.92% reliability factor. The percent calculation is a bit flawed in the sense that the calculation looks at only one failed grid, therefore the statement “...would require a design that guarantees >99.9%” coverage is not accurate. That is not what the Early Release Coverage Section called for.

With a half-mile grid size at 601 square miles, there are approximately 2,400 grids. At 95% passage, about 120 can fail. The intent of the adjacent grid requirement was to limit the number of failed grids that can occur in any one part of the coverage area to minimize the likelihood that a significant cluster of failed grids occurs in one area, particularly in a high activity area.

The City understands that fringe areas are the most likely places for grids to fail and wants to avoid having a large area fail, only to be addressed by the City later after system acceptance. Using the same logic provided by the vendor above, if all 120 half-mile grid failures were able to be clustered, there could be a 30 square mile dead or failed area somewhere within the City. While that is stretching the point somewhat, it does point out the need to limit clustered failures.

Allowing for four adjacent grids to fail means that there could potentially be thirty different one square mile failed areas throughout the City. The original intent was to limit adjacent grid failures to no more than two adjacent grids.

15. Proposer understands the City's desire to provide the in-building coverage from the radio infrastructure. However in order to properly design a radio system that will provide in building coverage we must be able to perform signal strength measurements inside and outside of each required building.

A. Who will be our point of contact to give us access to each building? How soon can we start this process?

B. If Bi-Directional Amplifiers (BDA) are required in private buildings has the City received permission from the building owners to install the equipment?

C. Can the City identify the locations of available fiber if fiber BDAs are needed?

Answer: A1. Please see answer for question #8.

A2. Start as soon as possible

B. No.

C. No.

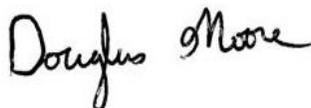
Please find four attachments detailing updated coverage requirements for the Texas Medical Center area and tunnels. The attachments are:

1. Contour map showing additional 30dB coverage area.
2. Tunnel map for Ground level of the medical center tunnel system.
3. Tunnel map for level B-1 of the medical center tunnel system.
4. Tunnel map for level B-2 of the medical center tunnel system.

When issued, Addendums shall be used to assist all Prospective Proposer(s) in researching and generating information that can be used to assist them and expedite the amount of time needed to respond to the Request for Proposal after it has been released. It is the responsibility of the Proposer(s) to ensure that it has obtained all such Addendum(s).

If you have any questions or if further clarification is needed regarding the Early Release Coverage Requirements, please contact me.

Sincerely,



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END OF ADDENDUM NO. 2