SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

MECHANICAL ENGINEERING DIVISION

January 24, 2017

Mr. Richard Morales, Jr.
IT Manager, Radio Services
City of San Antonio
Work: 210-207-7022
richard.morales@sanantonio.gov

Subject: *Revised* SwRI® Quote 18-05-10-17-051a, "MIL-STD-810 and IEC60529 Testing of a Handheld Radio and Lapel Microphone"

Dear Mr. Morales:
Thank you for your interest in testing services at Southwest Research Institute (SwRI). SwRI is one of the largest independent, nonprofit, research and development organizations in the world with nearly 3,000 employees. SwRI was founded in 1947 to help clients from both industry and government solve scientific and technological problems. The engineering staff at SwRI provides technical evaluations and assistance, test design and tailoring, and standardized testing to a variety of national (ANSI/ASTM), military (MIL-STD), European (ETS) and international (IEC/ISO) standards.

General Information

In response to the inquiry received from the City of San Antonio and follow-up clarification, this letter constitutes a quote for environmental testing of a Handheld Radio and Lapel Microphone. Testing will be conducted in accordance with MIL-STD-810G and IEC 60529 (Edition 2.2). All testing will be performed in accordance with the latest revisions of the referenced test specification in use at the time testing commences unless otherwise specified. *Note: This quote is being revised to clarify the quantity of samples and/or test runs included in the cost estimate.*

Test Witness

City of San Antonio personnel are permitted to witness the testing onsite at SwRI; however, all visiting personnel must sign a release upon entry to the laboratory, and are required to abide by SwRI safety policies including the use of appropriate and available PPE. City of San Antonio personnel are not permitted to take photographs during testing of any items or facilities except your specific test article. Due to the nature of the testing performed at SwRI, we must have advance notice if any of the visitors planning to be onsite are not U.S. citizens or permanent residents.

Quality Assurance

The Structural Engineering Department at SwRI operates under a certified ISO 9001:2015 Quality Management System. While this quote does not include any witnessing by QA personnel, additional quality assurance can be provided by the SwRI Institute Quality Systems (IQS) Department if required. The SwRI IQS Department is an independent organizational element of the Institute and reports to the Office of the President of SwRI.

Assumptions

- SwRI will utilize monitoring and measurement equipment with NIST-traceable calibration.
- SwRI will maintain MIL-STD-810 tolerances on temperature and humidity.
- SwRI assumes that all pre- and post-test functional testing will consist of verifying that the radio/mic are operational, and will not involve quantification of acoustic output or quality of transmitted or received signals.
- Temperature Shock testing will involve six transitions – 3 each from cold-to-hot and hot-to-cold.

Cost Estimate

The costs for performing the requested testing are summarized in Table 1 and includes SwRI setup. Any additional retesting due to test item failure is not included, and will be addressed immediately with the City of San Antonio personnel in terms of cost and schedule impact.

This testing has not yet been scheduled. The schedule for testing and delivery of the final report will be negotiated and agreed upon by SwRI and City of San Antonio personnel should this program be awarded.

The testing in Table 1 has been estimated on a per-run basis. With the exception of the explosive atmosphere test (which must be performed on an individual sample), up to five radio/mic samples could be accommodated in a single test run. SwRI understands, however, that the various models of radios being evaluated by the City of San Antonio may not be available simultaneously to support concurrent testing. If additional test runs are necessary based on sample availability, SwRI will work with the City of San Antonio to minimize the additional cost to the extent possible based on time lag between sample availability and test order.

Table 1: Summary of Testing

METHOD	DESCRIPTION	PROCEDURE	DURATION	COST
All	Test Plan	All	2 weeks	$3,000
501.6	High Temperature	PI, PII/Climate A2	7 days	$7,000
502.6	Low Temperature	PI, PII/Climate C1	2 days	$2,000
503.6	Temperature Shock	P1 (C)	2 days	$2,500
505.6	Solar Radiation (240 hours)	PI/Cat A1	10 days	$8,750
506.6	Blowing Rain	PI	1 day	$2,250
507.6	Humidity	PII	11 days	$11,000
509.6	Salt Fog	PII	4 days	$2,800
510.6	Blowing Dust and Sand	PI, PII	4 days	$6,500
511.5	Explosive Atmosphere	PI	2 days	$7,000
514.7	Vibration	PI/Cat. 4 & PII/Cat. 5	2 days	$6,000
516.7	Shock (Drop)	PIV	1 day	$1,000
IEC60529	Wire Access Probe (1.0 mm) Test	12.2	½ day	$300
	Dust Test	13.4 & 13.6	2 days	$6,500
	Continuous Immersion	14.2.8	1 day	$1,850
--	Report / Project Management		2 weeks	$3,500
	Total Cost in USD:			**$71,950**

Final Reporting

The deliverable for this program will be the final test report, which will be provided in electronic (PDF) format following the conclusion of all testing. The final report will include photographs, test data, results, listing of test equipment, procedure details, and copies of laboratory data logs. The report will be delivered via email to City of San Antonio personnel within two weeks of the completion of all testing, assuming all information necessary to complete the report has been received.

Shipping

Shipping costs of all equipment **to and from** SwRI shall be the responsibility of the City of San Antonio. All equipment should be addressed to:

Southwest Research Institute
Attn: Jenny Ferren
Building 231 Highbay
9503 W. Commerce
San Antonio, Texas 78227

This pre-proposal is submitted as a guide and merely represents our estimated time and/or price to perform the services based upon our general understanding of the program and your needs at this time. The estimated time and price as set forth herein are subject to change. This pre-proposal shall not constitute an offer for services and is intended for discussion purposes only. Should your organization decide to have SwRI conduct this program, SwRI will prepare a formal proposal which will include a statement of work and contract for services. **Alternatively, your organization may submit a purchase order in response to this pre-proposal, which will serve to initiate the contract process.** For administrative purposes only, the contractual period of performance for this effort shall be 12 months beyond the date the PO is received. This quote is valid for 120 days.

Thank you for the opportunity to submit this quote for testing services. SwRI is fully committed to performing your testing to your satisfaction. If you have any questions concerning this quote, feel free to contact me directly at (210) 522-2329, by FAX at (210) 522-3042, or by E-Mail at jferren@swri.org.

Sincerely,

Jenny Ferren, Manager
Structural Dynamics and Product Assurance

SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

MECHANICAL ENGINEERING DIVISION

January 27, 2017

Mr. Richard Morales, Jr.
IT Manager, Radio Services
City of San Antonio
Work: 210-207-7022
richard.morales@sanantonio.gov

Subject: SwRI® Quote 18-05-10-17-063, "Explosive Atmosphere and Vibration Testing of a Handheld Radio and Lapel Microphone"

Dear Mr. Morales:
Thank you for your interest in testing services at Southwest Research Institute (SwRI). SwRI is one of the largest independent, nonprofit, research and development organizations in the world with nearly 3,000 employees. SwRI was founded in 1947 to help clients from both industry and government solve scientific and technological problems. The engineering staff at SwRI provides technical evaluations and assistance, test design and tailoring, and standardized testing to a variety of national (ANSI/ASTM), military (MIL-STD), European (ETS) and international (IEC/ISO) standards.

General Information

In response to the inquiry received from the City of San Antonio and follow-up clarification, this letter constitutes a fixed-price quote for environmental testing of a Handheld Radio and Lapel Microphone. Testing will be conducted in accordance with selected tests from MIL-STD-810G. All testing will be performed in accordance with the latest revisions of the referenced test specification in use at the time testing commences unless otherwise specified.

Test Witness

City of San Antonio personnel are permitted to witness the testing onsite at SwRI; however, all visiting personnel must sign a release upon entry to the laboratory, and are required to abide by SwRI safety policies including the use of appropriate and available PPE. City of San Antonio personnel are not permitted to take photographs during testing of any items or facilities except your specific test article. Due to the nature of the testing performed at SwRI, we must have advance notice if any of the visitors planning to be onsite are not U.S. citizens or permanent residents.

Quality Assurance

The Structural Engineering Department at SwRI operates under a certified ISO 9001:2015 Quality Management System. While this quote does not include any witnessing by QA personnel, additional quality assurance can be provided by the SwRI Institute Quality Systems (IQS) Department if required. The SwRI IQS Department is an independent organizational element of the Institute and reports to the Office of the President of SwRI.

Assumptions

- SwRI will utilize monitoring and measurement equipment with NIST-traceable calibration.
- SwRI will maintain MIL-STD-810 tolerances on temperature and humidity.
- SwRI assumes that all pre- and post-test functional testing will consist of verifying that the radio/mic are operational, and will not involve quantification of acoustic output or quality of transmitted or received signals.
- Explosive atmosphere testing will be performed with the test article in a vacuum chamber in a fuel vapor environment. The radio and mic will each be keyed while in the fuel vapor environment, but no voice transmission will be involved. The test is normally performed at an

equivalent altitude of 40kft, but will be conducted at 14kft at the request of the City of San Antonio. Testing will be conducted at the maximum specified operating temperature, +60°C.

- Vibration testing will be performed with multiple units (***up to five***) representing various typical carrying methods including belt clip-to-pocket, belt clip-to-belt, and carrying case. The estimated cost assumes that all samples will be tested simultaneously. If functional testing is performed during vibration testing, it will be limited to keying of the microphone.
- No specialized fixturing is included for vibration testing. SwRI expects the pocket, belt, and carrying case will be secured to existing bookend style fixtures or other appropriate means of attaching the test items to the shaker.
- The City of San Antonio shall provide the test articles with belt clips, as well as the jacket(s) or portions of jacket(s) to which the belt clip will be attached. If the belts are part of the standard issue uniform, those should also be provided to ensure that the mounting method during vibration is truly representative of in-use conditions.

Cost Estimate

The costs for performing the requested testing are summarized in Table 1 and include SwRI setup. Any additional retesting due to test item failure is not included, and will be addressed immediately with the City of San Antonio personnel in terms of cost and schedule impact.

This testing has not yet been scheduled. The schedule for testing and delivery of the final report will be negotiated and agreed upon by SwRI and City of San Antonio personnel should this program be awarded.

Table 1: Summary of Testing

METHOD	DESCRIPTION	PROCEDURE	DURATION	COST
511.6	Explosive Atmosphere	Proc. I @ 14kft	2 days	$4,500
514.7	Vibration	Proc. I – Uniaxial test	2 days	$6,000
		Proc. II – Orbital test		
--	Report / Project Management	--	1 week	$1,650
	Total Cost in USD:			**$12,150**

Final Reporting

The deliverable for this program will be the final test report, which will be provided in electronic (PDF) format following the conclusion of all testing. The final report will comply with requirements addressed in Annex A, Task 406 of MIL-STD-810G, and will include photographs, test data, results, listing of test equipment, procedure details, and copies of laboratory data logs. The report will be delivered via email to City of San Antonio personnel within one week of the completion of all testing, assuming all information necessary to complete the report has been received.

Shipping

Shipping costs of all equipment **to and from** SwRI shall be the responsibility of the City of San Antonio. All equipment should be addressed to:

Southwest Research Institute
Attn: Jenny Ferren
Building 231 Highbay
9503 W. Commerce
San Antonio, Texas 78227

This pre-proposal is submitted as a guide and merely represents our estimated time and/or price to perform the services based upon our general understanding of the program and your needs at this time. The estimated time and price as set forth herein are subject to change. This pre-proposal shall not constitute an offer for services and is intended for discussion purposes only. Should your organization

decide to have SwRI conduct this program, SwRI will prepare a formal proposal which will include a statement of work and contract for services. **Alternatively, your organization may submit a purchase order in response to this pre-proposal, which will serve to initiate the contract process.** For administrative purposes only, the contractual period of performance for this effort will be 12 months beyond the date the PO is received. This quote is valid for 120 days.

Thank you for the opportunity to submit this quote for testing services. SwRI is fully committed to performing your testing to your satisfaction. If you have any questions concerning this quote, feel free to contact me directly at (210) 522-2329, by FAX at (210) 522-3042, or by E-Mail at jferren@swri.org.

Sincerely,

Jenny Ferren, Manager
Structural Dynamics and Product Assurance

SOUTHWEST RESEARCH INSTITUTE®

6220 CULEBRA ROAD 78238-5166 • P.O. DRAWER 28510 78228-0510 • SAN ANTONIO, TEXAS, USA • (210) 684-5111 • WWW.SWRI.ORG

MECHANICAL ENGINEERING DIVISION

January 27, 2017

Mr. Richard Morales, Jr.
IT Manager, Radio Services
City of San Antonio
Work: 210-207-7022
richard.morales@sanantonio.gov

Subject: *Revised* SwRI® Quote 18-05-10-17-053b, "High Temperature Validation Testing of Portable Radio and Lapel Microphone Systems

Dear Mr. Morales:
Thank you for your continued interest in testing services at Southwest Research Institute (SwRI). SwRI is one of the largest independent, nonprofit, research and development organizations in the world with nearly 3,000 employees. SwRI was founded in 1947 to help clients from both industry and government solve scientific and technological problems. The engineering staff at SwRI provides technical evaluations and assistance, test design and tailoring, and standardized testing to a variety of national (ANSI/ASTM), military (MIL-STD), European (ETS) and international (IEC/ISO) standards.

General Information

In response to the inquiry received from the City of San Antonio and follow-up clarification, this letter constitutes a quote for environmental testing of portable radio systems used in Fire and EMS operations for the City of San Antonio. Testing will be conducted in accordance with the SwRI revision to the SAFD Validation Test Procedure, dated January 11, 2017. *Note: This quote is being revised to clarify the quantity of samples and/or test runs included in the cost estimate.*

Test Witness

City of San Antonio personnel are permitted to witness the testing onsite at SwRI; however, all visiting personnel must sign a release upon entry to the laboratory, and are required to abide by SwRI safety policies including the use of appropriate and available PPE. City of San Antonio personnel are not permitted to take photographs during testing of any items or facilities except your specific test article. Due to the nature of the testing performed at SwRI, we must have advance notice if any of the visitors planning to be onsite are not U.S. citizens or permanent residents.

Quality Assurance

The Structural Engineering Department at SwRI operates under a certified ISO 9001:2015 Quality Management System. While this quote does not include any witnessing by QA personnel, additional quality assurance can be provided by the SwRI Institute Quality Systems (IQS) Department if required. The SwRI IQS Department is an independent organizational element of the Institute and reports to the Office of the President of SwRI.

Assumptions

- SwRI will utilize monitoring and measurement equipment with NIST-traceable calibration.
- SwRI will maintain ML-STD-810 tolerances on temperature and humidity.

Cost Estimate

The costs for performing the requested testing are summarized in Table 1 and include SwRI setup. Any additional retesting due to test item failure is not included, and will be addressed immediately with the City of San Antonio personnel in terms of cost and schedule impact.

The testing in Table 1 has been estimated on a per-day basis. Up to three radio/mic samples can be accommodated within the timeframe included. SwRI understands that the various models of radios being evaluated by the City of San Antonio may not be available simultaneously, but will honor the estimated costs for three samples provided no more than two test runs are required. If radios are tested on completely separate occasions, additional costs will be needed as reflected in the table below. SwRI does, however, assume that all samples tested will be included in a single report.

Table 1: Summary of Testing

CLASS	DESCRIPTION	DURATION	COST
--	Pre-Test Immersion Testing	½ day	$850
	Pre-Test Audio Test		
II & III	Dry High Temperature	2 days	$2,000
	High Temperature with Rapid Cooling		
	Wet to High Temperature		
--	Post-Test Immersion Testing	½ day	$850
	Post-Test Audio Test		
	Report / Project Management	≤2 weeks	$2,280
	Total Cost in USD:		$5,980
	Total Cost in USD for two test runs:		**$11,960**

This testing has not yet been scheduled. The schedule for testing and delivery of the final report will be negotiated and agreed upon by SwRI and City of San Antonio personnel should this program be awarded.

Final Reporting

The deliverable for this program will be the final test report, which will be provided in electronic (PDF) format following the conclusion of all testing. The final report will include photographs, test data, results, listing of test equipment, procedure details, and copies of laboratory data logs. The report will be delivered via email to City of San Antonio personnel within 2 weeks of the completion of all testing, assuming all information necessary to complete the report has been received.

Shipping

Shipping costs of all equipment **to and from** SwRI shall be the responsibility of the City of San Antonio. All equipment should be addressed to:

Southwest Research Institute
Attn: Jenny Ferren
Building 231 Highbay
9503 W. Commerce
San Antonio, Texas 78227

This pre-proposal is submitted as a guide and merely represents our estimated time and/or price to perform the services based upon our general understanding of the program and your needs at this time. The estimated time and price as set forth herein are subject to change. This pre-proposal shall not constitute an offer for services and is intended for discussion purposes only. Should your organization decide to have SwRI conduct this program, SwRI will prepare a formal proposal which will include a statement of work and contract for services. **Alternatively, your organization may submit a purchase order in response to this pre-proposal, which will serve to initiate the contract process.** For

administrative purposes only, the contractual period of performance for this effort shall be 12 months beyond the date the PO is received. This quote is valid for 120 days.

Thank you for the opportunity to submit this quote for testing services. SwRI is fully committed to performing your testing to your satisfaction. If you have any questions concerning this quote, feel free to contact me directly at (210) 522-2329, by FAX at (210) 522-3042, or by E-Mail at jferren@swri.org.

Sincerely,

Jenny Ferren, Manager
Structural Dynamics and Product Assurance