

Motorola Test Results

Rowan County, NC

Portable Subscriber Radio Test Plan

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Prepared By:



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TEST OBJECTIVES:

1. Evaluate the subjective quality of digital radio transmissions in various operational use scenarios, including wearing self-contained breathing apparatus (SCBA) or working near or with loud equipment

EQUIPMENT AND PERSONNEL REQUIRED:

1. Rowan testers trained in the use/operation of portable radios
2. Portable radios under evaluation
3. SCBA with personal alert safety system (PASS) alarm
4. Two fire trucks
5. Gasoline powered chainsaw
6. Portable generator w/electric ventilation fan
7. Rowan portable radio evaluation team

TEST PARAMETERS:

1. Test subjects will both use portable radios under evaluation
2. Test subjects will be separated so that they are unable to hear each other without the use of the radio
3. Transmitting user will be outside and will initiate communications and read scripted test phrases
4. Facilitator separates receiving radio user from the transmitting user. Receiving user will not have the test phrase script
5. Receiving user will retransmit test phrase script to the sender
6. Receiving user will evaluate audio quality and speech intelligibility
7. Radios will be configured to operate on the Rowan/Salsbuty P25 system

TEST SCENARIOS:

- A. P25 digital without and with SCBA
- B. P25 digital with SCBA and voice amp
- C. P25 digital with SCBA using Bluetooth connectivity
- D. P25 digital with SCBA and PASS alarm activated
- E. P25 digital with operator standing in simulated rain
- F. P25 digital with operator standing between two fire trucks at high idle
- G. P25 digital adding gasoline powered chainsaw to item F.
- H. P25 digital adding portable generator w/ventilation fan added to item G

CHANNELS/TALKGROUPS:

List Talkgroups



TEST OBJECTIVES:

1. Evaluate the durability of the portable radios under various environmental conditions

EQUIPMENT AND PERSONNEL REQUIRED:

1. Rowan testers trained in the use/operation of portable radios
2. Portable radios under evaluation
3. Speaker Microphone
4. Bucket of water
5. Tape Measure
6. Steel Wool
7. Bunker gear (jacket with radio pocket & gloves)
8. Oven at 350 degrees Fahrenheit
9. Timer
10. Rowan portable radio evaluation team

TEST PARAMETERS:

1. Test subjects will both use portable radios under evaluation
2. Test subjects will be separated so that they are unable to hear each other without the use of the radio
3. Transmitting user will be outside and will initiate communications and read scripted test phrases
4. Facilitator separates receiving radio user from the transmitting user. Receiving user will not have the test phrase script
5. Receiving user will retransmit test phrase script to the sender
6. Receiving user will evaluate audio quality and speech intelligibility
7. Radios will be configured to operate on the Rowan/Salsbuty P25 system

TEST SCENARIOS:

- A. Portable radio immersed in bucket of water for 5 minutes
- B. Portable radio dropped from five feet on each side and antenna
- C. Portable radio display tested for scratch resistance
- D. Portable radio tested for operability while rolling on the ground
- E. Portable radio immersed in bucket of water for 5 minutes after durability test
- F. Portable radio in oven at 350 degrees for ten minutes
- G. Portable radio immersed in bucket of water for 5 minutes after oven test

CHANNELS/TALKGROUPS:

List Talkgroups



TEST OBJECTIVES:

1. Evaluate the radio compatibility with system security, failsoft and GPS/AVL features

EQUIPMENT AND PERSONNEL REQUIRED:

1. Rowan testers trained in the use/operation of portable radios
2. Portable radios under evaluation
3. System Manager Terminal
4. Portable radio programming software and cables
5. Encryption fill device

TEST PARAMETERS:

1. Test radios will be appropriately programmed by vendor
2. Test radios will be configured to operate on the Rowan/Salisbury P25 system
3. System will be placed into failsoft to test radios

TEST SCENARIOS:

- A. P25 Link Layer Authentication
- B. P25 digital clear/encrypted talkgroup call
- C. GPS location
- D. Failsoft

CHANNELS/TALKGROUPS:

List talkgroups:



TEST ID 1A: P25 Clear & Encrypted Call

TEST PROCEDURE:

1. Vendor to properly configure test radios with talkgroup configured for clear and encrypted mode
2. Test requires minimum of two radios
3. Select clear talkgroup on test radios
3. Place talkgroup call from radio 1
4. Verify radio 2 and 3 receives call from radio 1
5. Retrun call from radios 2 and 3 to radio 1
6. Select encryption for talkgroup on radios 1 and 2 (radio 3 remains on same talkgroup in clear mode)
7. Place encrypted talkgroup call from radio 1
8. Verify radio 2 receives talkgroup call and radio 3 does not.
9. Return call from radio 2, verify radio 3 does not pass audio

EVALUATION (Clear talkgroup call):

Radios 2 and 3 received talkgroup call from radio 1 and were able to talkback

	Yes
	No

EVALUATION (Encrypted talkgroup call):

Radio 2 received encrypted talkgroup call from radio 1 and radio 3 did not. Radio 2 was able to talkback to radio 1

	Yes
	No

TEST ID 1B: P25 Link Layer Authentication

TEST PROCEDURE:

1. Ensure test radios are configured for LLA
2. Turn off test radios
3. Configure system to require LLA for test radios
4. Turn on test radios
5. Confirm/verify that test radios properly authenticated with the system
6. Remove authentication from test radio.
7. Power cycle radios
8. Confirm/Verify that radios were declined authentication to the system

EVALUATION:

Test radios properly authenticated with system

	Yes
	No



EVALUATION:

Test radios not properly configured were declined system authentication

	Yes
	No

TEST ID 1C: P25 GPS Location

TEST PROCEDURE:

1. Ensure test radios are properly configed to send GPS location
2. Verify test radio has GPS lock and has sent GPS coordinates
3. Verify system received GPS coordianates

EVALUATION:

System properly received GPS coordinates from test radio

	Yes
	No

TEST ID 1D: System Failsoft

TEST PROCEDURE:

1. Ensure radios 1 and 2 are configured with like failsoft frequencies
2. Ensure radio 3 is configured with seperate failsfot frequency than radios 1 and 2
3. Place system into failsoft
4. Verify failsoft tone is heard from radios 1,2 and 3
5. Place a call between radios 1 and 2
6. Verify radios 1 and 2 can communicate and radio 3 does not hear audio

EVALUATION:

Radio 1, 2 and 3 pass failsoft tone

	Yes
	No

EVALUATION:

Radio 1 and 2 can communicate, radio 3 does not hear conversation

	Yes
	No



TEST ID 2A: P25 Digital

TEST PROCEDURE:

1. Test phrases communicated in P25 Digital without SCBA
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time
3. Receiving user will retransmit it to the sender

TEST PHRASES:

1. The birch canoe slid on the smooth planks.
2. Glue the sheet to the dark blue background.
3. It's easy to tell the depth of a well.

EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable
	Unacceptable

Sending user will identify whether the receiving user accurately repeated the test phrases:

Test Phrase 1

	Yes
	No

Test Phrase 2

	Yes
	No

Test Phrase 3

	Yes
	No

TEST ID 2B: P25 Digital with SCBA

TEST PROCEDURE:

1. Test phrases communicated in digital with SCBA
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time (3 transmissions)
3. Receiving user will retransmit it to the sender one at a time (3 transmissions)

TEST PHRASES:

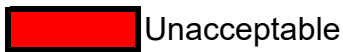
1. These days a chicken leg is a rare dish.
2. Rice is often served in round bowls.
3. The juice of lemons makes fine punch.

EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable





Sending user will identify whether the receiving user accurately repeated the test phrases:



~~TEST ID 2C: P25 Digital W/SCBA & BLUETOOTH~~

TEST PROCEDURE:

1. Test phrases communicated in P25 Digital w/ SCBA & Bluetooth
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time
3. Receiving user will retransmit it to the sender

TEST PHRASES:

1. The box was thrown beside the parked truck.
2. The hogs were fed chopped corn and garbage.
3. Four hours of steady work faced us.

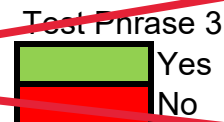
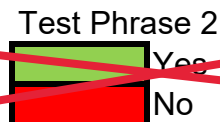
EVALUATION:

~~Receiving user~~ will rate the quality of the received transmissions as either:



Test not conducted. SCBA bluetooth not available

Sending user will identify whether the receiving user accurately repeated the test phrases:



TEST ID 2D: Digital W/SCBA & PASS Alarm

TEST PROCEDURE:

1. Test phrases communicated in digital with SCBA & Pass alarm activated
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time (3 transmissions)
3. Receiving user will retransmit it to the sender one at a time (3 transmissions)

TEST PHRASES:

1. The boy was there when the sun rose.
2. A rod is used to catch pink salmon.



3. The source of the huge river is the clear spring.


EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable
	Unacceptable

Sending user will identify whether the receiving user accurately repeated the test phrases:

Test Phrase 1	
	Yes
	No

Test Phrase 2	
	Yes
	No

Test Phrase 3	
	Yes
	No

TEST ID 2E: P25 Digital - Simulated Rain

TEST PROCEDURE:

1. Test phrases communicated in P25 Digital with operator standing in Simulated Rain
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time
3. Receiving user will retransmit it to the sender

TEST PHRASES:

1. Kick the ball straight and follow through.
2. Help the woman get back to her feet.
3. A pot of tea helps to pass the evening.


EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable
	Unacceptable

Sending user will identify whether the receiving user accurately repeated the test phrases:

Test Phrase 1	
	Yes
	No

Test Phrase 2	
	Yes
	No

Test Phrase 3	
	Yes
	No

TEST ID 2F: P25 Digital - Two Fire Trucks

TEST PROCEDURE:



1. Test phrases communicated in P25 Digital with operator standing between two fire trucks at high idle
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time (3 transmissions)

TEST PHRASES:

1. Smoky fires lack flame and heat.
2. The soft cushion broke the man's fall.
3. The salt breeze came across from the sea.

EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable
	Unacceptable

Sending user will identify whether the receiving user accurately repeated the test phrases:


Test Phrase 1

	Yes
	No

Test Phrase 2

	Yes
	No

Test Phrase 3

	Yes
	No

TEST ID 2G: P25 Digital - Fire Trucks & Chainsaw

TEST PROCEDURE:

1. Test phrases communicated in P25 Digital with operator standing in Simulated Rain
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time
3. Receiving user will retransmit it to the sender

TEST PHRASES:

1. The swan dive was far short of perfect.
2. The beauty of the view stunned the young boy.
3. Two blue fish swam in the tank.

EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable
	Unacceptable

Sending user will identify whether the receiving user accurately repeated the test phrases:



Test Phrase 1

	Yes
	No

Test Phrase 2

	Yes
	No

Test Phrase 3

	Yes
	No

TEST ID 2H: P25 Digital -Two Fire Trucks, Chainsaw & Fan

TEST PROCEDURE:

1. Test phrases communicated in P25 Digital with operator standing between two fire trucks at high idle
2. Transmitting user will be outside and will initiate communications and read scripted test phrases one at a time (3 transmissions)

TEST PHRASES:

1. The small pup gnawed a hole in the sock.
2. The fish twisted and turned on the bent hook.
3. Press the pants and sew a button on the vest.

EVALUATION:

Receiving user will rate the quality of the received transmissions as either:

	Good
	Usable
	Unacceptable

Sending user will identify whether the receiving user accurately repeated the test phrases:

Test Phrase 1

	Yes
	No

Test Phrase 2

	Yes
	No

Test Phrase 3

	Yes
	No



TEST ID 3A: Water Immersion

TEST PROCEDURE:

1. Verify test radio is operational
2. Fill 5 gallon bucket with water
3. Set timer for 5 minutes
4. Place radio in bucket of water (turned on)
5. Start 5 minute timer
6. After 5 minutes have expired removed radio from water, shake off excess water
7. Verify radio is operational and passes/receives audio

EVALUATION:

Radio operational after immersed in water for 5 minutes?

	Yes
	No

TEST ID 3B: Drop Test

TEST PROCEDURE:

1. Verify test radio is operational, leave radio powered on
2. Measure height of 5 feet using tape measure
3. Perform the following for a total of six drops
3. Drop radio by holding antenna in attempt to drop radio on bottom (single drop)
4. Attempt to drop radio on each of the four sides (four drops)
5. Drop radio with antenna on bottom in attempt to land on antenna tip (single drop)

EVALUATION:

Radio operational after six drops?

	Yes
	No

Radio condition?

	Good
	Fair
	Poor



TEST ID 3C: Display Scratch Resistance

TEST PROCEDURE:

1. Confirm portable radio display is not scratched
2. Secure steel wool on flat surface
3. Place portable on top of steel wool with display facing down
4. While holding radio by antenna attempt to slide radio back and forth 20 times
5. Observe display for scratches or absence of scratches

Utilized wire brush for test

EVALUATION:

Portable display condition



TEST ID 3D: Portable Usability Rolling On Ground

TEST PROCEDURE:

1. Connect speaker microphone to portable radio
2. Confirm portable radio is operational
3. Place radio in bunker gear jacket radio pocket
4. Using speaker microphone subject rolling on ground will transmit test call
5. Test call receiving radio will verify test call and respond
6. Test subject will attempt to initiate an emergency by pressing the portable's emergency button and initiating an emergency call.

EVALUATION:

Receiving user was able to hear subject rolling on ground's test call



Emergency button successfully pressed and emergency call sent?



TEST ID 3E: Water Immersion (2nd Test)

TEST PROCEDURE:

1. Verify test radio is operational
2. Fill 5 gallon bucket with water
3. Set timer for 5 minutes
4. Place radio in bucket of water (turned on)
5. Start 5 minute timer
6. After 5 minutes have expired removed radio from water, shake off excess water
7. Verify radio is operational and passes/receives audio

EVALUATION:

Radio operational after immersed in water for 5 minutes?

☒

Yes

No

TEST ID 3F: High Temperature

TEST PROCEDURE:

1. Verify test radio is operational
2. Preheat oven to 350 degrees
3. Set timer for 10 minutes
4. Place radio in oven
5. Start 10 minute timer
6. After 10 minutes have expired removed radio from oven (using gloves)
7. Verify radio is operational and passes/receives audio

EVALUATION:

Radio operational after high temperature test?

☒

Yes

No



TEST ID 3G: Water Immersion (3rd Test)

TEST PROCEDURE:

1. Verify test radio is operational
2. Fill 5 gallon bucket with water
3. Set timer for 5 minutes
4. Place radio in bucket of water (turned on)
5. Start 5 minute timer
6. After 5 minutes have expired removed radio from water, shake off excess water
7. Verify radio is operational and passes/receives audio

EVALUATION:

Radio operational after immersed in water for 5 minutes?

<input checked="checked" type="checkbox"/>
<input type="checkbox"/>

Yes

No

At end of day radio displayed a "hardware board missing" error

