

SECTION 11

SYSTEM TESTING

DOCUMENTATION

RADIO COMMUNICATIONS SYSTEM

DECEMBER 21, 2016



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SYSTEM TESTING DOCUMENTATION

PRELIMINARY FACTORY AND FINAL ACCEPTANCE TEST PLAN

11.1 WIDE AREA TRUNKING FDMA/TDMA MIXED SITES

11.1.1 Talkgroup Call

1. DESCRIPTION

The Talkgroup is the primary level of organization for communications on a trunked radio system. Radios with Talkgroup call capability will be able to communicate with other members of the same Talkgroup. This provides the effect of a private channel down to the Talkgroup level.

This test will demonstrate that a Talkgroup transmission initiated by a radio user will only be heard by system users, which have, the same Talkgroup selected. As with other types of calls, Talkgroup calls can take place from anywhere in the system.

SETUP

RADIO-1 - SITE 1 - TALKGROUP 1
RADIO-2 - SITE 2 - TALKGROUP 1
RADIO-3 - SITE 1 - TALKGROUP 2
RADIO-4 - SITE 2 - TALKGROUP 2

VERSION #1.040

2. TEST

- Step 1. Initiate a Wide Area Call with RADIO-1 in TALKGROUP 1.
- Step 2. Observe that only RADIO-2 will be able to monitor and respond to the call.
- Step 3. Initiate a Wide Area Call with RADIO-3 in TALKGROUP 2.
- Step 4. Observe that only RADIO-4 will be able to monitor and respond the call.

Pass____ Fail____



Wide Area Trunking FDMA/TDMA Mixed Sites

11.1.2 Continuous Assignment Updating

1. DESCRIPTION

When a talkgroup is assigned a voice channel, the site controller continues to transmit the channel assignment on the control channel for the duration of the talkgroup call. Radios coming into use on the system are automatically sent to voice channels with conversations in progress involving their selected talkgroups.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
RADIO-3 - TALKGROUP 1

VERSION #1.010

2. TEST

- Step 1. Turn OFF RADIO-1.
- Step 2. Initiate a Talkgroup Call using RADIO-2 and verify RADIO-3 hears the audio.
- Step 3. While the Talkgroup Call is in progress, turn ON RADIO-1.
- Step 4. Observe RADIO-1, which was just brought back into service, joins the Talkgroup Call already in progress.
- Step 5. End the talkgroup call.
- Step 6. Switch RADIO-1 to another talkgroup.
- Step 7. Initiate a Talkgroup Call from RADIO-2 to RADIO-3.
- Step 8. While the Talkgroup Call is in progress, set RADIO-1 back to TALKGROUP 1.
- Step 9. Observe that RADIO-1 joins the Talkgroup Call already in progress.

Pass____ **Fail**____



Wide Area Trunking FDMA/TDMA Mixed Sites

11.1.3 Call Alert

1. DESCRIPTION

Call Alert is a tone page that allows a user to selectively alert another radio unit. The initiating radio will receive notification from the trunked system as to whether or not the page was received by the target radio. Units receiving a Call Alert will sound an alert tone. As with other types of calls, Call Alerts can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 2
RADIO-3 - TALKGROUP 3

VERSION #1.010

2. TEST

- Step 1. Using RADIO-1, press the page button.
- Step 2. Enter the unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored
- Step 3. Press the PTT to initiate the call alert. Verify that the RADIO-1 user receives audible indication that the Call Alert was sent.
- Step 4. Verify that RADIO-2 user receives an audible indication of an incoming Call Alert was sent but RADIO-3 does not.
- Step 5. Verify RADIO-1 gets an audible indication that the Call Alert was successfully received at the target radio.
- Step 6. Turn off RADIO-2. Send a Call Alert from RADIO-1 to RADIO-2.
- Step 7. Verify that the RADIO-1 user receives audible indication that the Call Alert was sent.
- Step 8. Verify RADIO-1 receives a "No Acknowledgement" indication that the Call Alert was not received at the target radio.

Pass____ Fail____



Wide Area Trunking FDMA/TDMA Mixed Sites

11.1.4 Private Call

1. DESCRIPTION

Private Call is a selective calling feature that allows a radio user to carry on one-to-one conversation that is only heard by the 2 parties involved. Subscriber units receiving a private call will sound an alert tone. As with other types of calls, Private Calls can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
RADIO-3 - TALKGROUP 1

VERSION #1.020

2. TEST

- Step 1. Using RADIO-1, press the Private Call (Call) button.
- Step 2. Enter the unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored.
- Step 3. Press the PTT to initiate the Private Call.
- Step 4. Verify that RADIO-2 hears tones and the display indicates that a Private Call has been received, but RADIO-3 receives no indications.
- Step 5. Answer the call at RADIO-2 by pressing the Private Call (Call)/Respond button. If RADIO-2 has a display, verify it shows the ID number or Alias of the calling unit.
- Step 6. Press the PTT switch on RADIO-2 and respond to the Private Call. Note that if you do not press the Private Call button before pressing PTT, your audio will be heard by all members of the talkgroup, and not just by the radio initiating the Private Call.
- Step 7. Verify that RADIO-2 can communicate with RADIO-1.
- Step 8. Verify that RADIO-3 does not monitor the Private Call.
- Step 9. End the Private Call by pressing the "home" key and return to normal talkgroup operation.

Pass____ Fail____

Wide Area Trunking FDMA/TDMA Mixed Sites

11.1.5 Multigroup Call in Wait Mode

1. DESCRIPTION

This trunking feature allows an equipped radio user to transmit an announcement to several different talkgroups simultaneously. The multigroup (ATG) call can be flagged for Wait Mode in the Provisioning Manager (PM) database forcing all attached talkgroups to finish calls in progress before the trunked system will process the multigroup call. The system does not permit inactive, attached talkgroups to initiate Talkgroup Calls during the "wait" timeframe. As with other types of calls, multigroup calls can take place from anywhere in the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 2
RADIO-3 - RANDOM (Not part of MG)
RADIO-4 - ATG 1

* TALKGROUP 1 and TALKGROUP 2 are members of ATG 1.

* RANDOM is any talkgroup not a member of ATG 1.

* Multigroups are set up through both the Provisioning Manager (PM) and the Subscriber Programming software.

VERSION #1.020

2. TEST

- Step 1. Verify ATG 1 is set for the Wait mode.
- Step 2. Using RADIO-1, initiate a call on TALKGROUP 1.
- Step 3. While RADIO-1 is keyed, attempt to initiate a multigroup call using RADIO-4 on ATG 1. Verify RADIO-4 receives a busy tone because one of the talkgroups attached to ATG 1 is involved in a Talkgroup Call.
- Step 4. Key RADIO-2 and verify that a busy tone is received because the ATG 1 call is in queue.
- Step 5. Dekey RADIO-1 and verify RADIO-4 receives a callback.
- Step 6. Key RADIO-4 and verify both RADIO-1 and RADIO-2 hear the multigroup call while RADIO-3 does not unmute.

Pass____ Fail____



Wide Area Trunking FDMA/TDMA Mixed Sites

11.1.6 Audio Interrupt / Interrupt Never Mode

1. DESCRIPTION

A radio PTT request may be received for a group already active and currently being sourced by another radio unit. The talkgroup can be flagged to either allow or disallow the new PTT. If allowed, the latest PTT request will be granted and become the source of the call.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
RADIO-3 - TALKGROUP 1

VERSION #1.020

2. TEST

- Step 1. Verify TALKGROUP 1's template is set up as Audio Interrupt Never.
- Step 2. Using RADIO-1, initiate a call on TALKGROUP 1.
- Step 3. Verify both RADIO-2 and RADIO-3 monitor the audio.
- Step 4. Using RADIO-3, initiate a call on TALKGROUP 1.
- Step 5. Verify that RADIO-3 receives a reject and that RADIO-2 continues to listen to RADIO-1.
- Step 6. Dekey both Radios.

Pass____ Fail____

11.1.7 Dynamic FDMA/TDMA Emergency Alarm and Call with Top of Queue - FDMA call in queue

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel if the FDMA/TDMA mode of the call can be supported by the available resource. Otherwise, the first call in the queue that can use the available resource gets assigned. An Emergency Call can be set to either Top of Queue or Ruthless Preemption operation. To accomplish this, an Emergency Alarm and Call will be initiated from a subscriber which will be received by a subscriber affiliated at any site of any zone in the system. In this case, the first available resource CANNOT support the emergency call mode.

NOTE: If the subscriber does not have the Display option, the Emergency ID will not be displayed. All radios and talkgroups should start with default priorities. Default is 10. SITE 1 must be TDMA capable.

SETUP

RADIO-1 (TDMA) - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 (TDMA) - TALKGROUP 2
RADIO-2 - SITE - SITE 1
RADIO-3 (TDMA) - TALKGROUP 3
RADIO-3 - SITE - SITE 1
RADIO-4 (TDMA) - TALKGROUP 4
RADIO-4 SITE - SITE 1
RADIO-8 (FDMA-only) - TALKGROUP 1
RADIO-8 - SITE - SITE 1
Note: TALKGROUP 1, TALKGROUP 2, TALKGROUP 3 and TALKGROUP 4 are programmed for "Dynamic".

2. TEST

- Step 1. Verify the emergency type for TALKGROUP 1's template must be set up as Top of Queue.
- Step 2. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.
- Step 3. Initiate a call with both RADIO-2 and RADIO-4 and hold the PTT switches until instructed to release.
- Step 4. Key RADIO-3 and verify the radio receives a busy tone. Release the PTT switch on RADIO-3.
- Step 5. Using RADIO-1 send an Emergency Call by pressing the emergency switch and then the PTT switch. Observe that RADIO-1 cannot transmit due to the voice channel being busy.
- Step 6. Release the PTT switch on RADIO-2. Observe that RADIO-3 receives the call back before RADIO-1 and is able to proceed with the call because the available channel resource is already busy with one TDMA call and can only support another TDMA call.
- Step 7. Dekey RADIO-4 and RADIO-3.
- Step 8. Observe that RADIO-1 receives the callback and is able to proceed with the call.
- Step 9. Observe that the display on RADIO-8 denotes an emergency and the unit ID of RADIO-1.
- Step 10. Dekey RADIO-1 and exit the Emergency mode by holding down the Emergency button on RADIO-1 until an alert tone sounds. Verify RADIO-1 returns to normal operation.

Pass ____ Fail ____

11.2 SITE TRUNKING FDMA/TDMA MIXED SITES

11.2.1 Site Trunking Indication

1. DESCRIPTION

When a remote site loses its link or does not have a link to the Zone Controller, the affected site will enter "Site Trunking" mode of operation. Radios locked onto this site will be serviced locally within this site's coverage area.

NOTE: If the subscriber does not have the Display option, the "Site Trunking" indication will not be displayed.

SETUP

RADIO-1 - TALKGROUP 1

RADIO-1 - SITE - SITE 1

RADIO-2 - TALKGROUP 2

RADIO-2 - SITE - SITE 1

Lock the subscribers to SITE 1 if more than one site exists on the system.

VERSION #1.010

2. TEST

- Step 1. Place SITE 1 into the Site Trunking mode.
- Step 2. Verify that RADIO-1 and RADIO-2 are displaying the "Site Trunking" indication.
- Step 3. Return the site to Wide Area Trunking unless the next test requires Site Trunking.

Pass ____ Fail ____

Site Trunking FDMA/TDMA Mixed Sites

11.2.2 Talkgroup Call

1. DESCRIPTION

When a site goes into Site Trunking, radios with Talkgroup Call capability will be able to communicate with other members of the same talkgroup at that same site. Members of the same talkgroup at other sites will not be able to monitor those conversations.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 2
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 2

Note: All Radios should be "Site Locked"

VERSION #1.010

2. TEST

- Step 1. Place SITE 1 into the Site Trunking mode.
- Step 2. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1 at SITE 1.
- Step 3. Observe that only RADIO-2 will be able to monitor and respond to the call. Note that RADIO-3 and RADIO-4 are not able this monitor the call since the site is not in wide area operation.
- Step 4. Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 1 at SITE 2.
- Step 5. Observe that only RADIO-4 will be able to monitor and respond to the call.

Pass ____ Fail ____



Site Trunking FDMA/TDMA Mixed Sites

11.2.3 Call Alert

1. DESCRIPTION

Call Alert is a tone page that allows a user to selectively alert another radio unit. When a site is in Site Trunking, Radios at the site will only be able to Call Alert other radios at the same site. The initiating radio will receive notification from the trunked system as to whether or not the page was received by the target radio.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1

Note: All Radios should be "Site Locked"

VERSION #1.010

2. TEST

- Step 1. Place SITE 1 into the Site Trunking mode.
- Step 2. Using RADIO-1, press the page button.
- Step 3. Enter the Unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored.
- Step 4. Press the PTT to initiate the Call Alert.
- Step 5. Verify that RADIO-2 received the Call Alert.
- Step 6. Exit the Call Alert mode and return to normal talkgroup mode.
- Step 7. Return the site to Wide Area Trunking unless the next test requires Site Trunking.

Pass____ Fail____

Site Trunking FDMA/TDMA Mixed Sites

11.2.4 Private Call

1. DESCRIPTION

Private Call is a selective calling feature that allows a dispatcher or radio user to carry on one-to-one conversation that is only heard by the 2 parties involved. When a site is in Site Trunking, Radios at the site will only be able to Private Call other radios at the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 1

Note: All Radios should be "Site Locked"

VERSION #1.020

2. TEST

- Step 1. Place SITE 1 into the Site Trunking mode.
- Step 2. Using RADIO-1, press the Private Call button.
- Step 3. Enter the Unit ID of RADIO-2 with the keypad, or scroll to the location where this ID is stored.
- Step 4. Press the PTT to initiate the call.
- Step 5. Verify that at RADIO-2 only tones are heard and the display indicates that a call has been received.
- Step 6. Answer the call at RADIO-2 by pressing the Private Call/Respond button. Verify its display shows the ID number or alias of the calling unit.
- Step 7. Press the PTT switch on RADIO-2 and respond to the call. Note that if you do not press the Private Call button before pressing PTT, your audio will be heard by all members of the talkgroup, and not by the radio initiating the Private Call.
- Step 8. Verify only RADIO-1 hears the audio from RADIO-2.
- Step 9. End the Private Call. Return the site to Wide Area Trunking unless the next test requires Site Trunking.

Pass____ Fail____



Site Trunking FDMA/TDMA Mixed Sites

11.2.5 Continuous Assignment Updating

1. DESCRIPTION

When a talkgroup is assigned a voice channel, the site controller continues to transmit the channel assignment on the control channel for the duration of the Talkgroup Call. Radios coming into use on the system are automatically sent to voice channels with conversations in progress involving their selected talkgroups.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 1

Note: All Radios should be "Site Locked"

VERSION #1.010

2. TEST

- Step 1. Place SITE 1 into the Site Trunking mode.
- Step 2. Turn OFF RADIO-1.
- Step 3. Initiate a Talkgroup Call using RADIO-2.
- Step 4. While the Talkgroup Call is in progress, turn on RADIO-1.
- Step 5. Observe that RADIO-1, which was just brought back into service, joins the Talkgroup Call already in progress.
- Step 6. Release the PTT of RADIO-2. Switch RADIO-1 to TALKGROUP 2.
- Step 7. Initiate a Talkgroup Call using RADIO-2.
- Step 8. While the Talkgroup Call is in progress, turn RADIO-1 back to TALKGROUP 1.
- Step 9. Observe that RADIO-1, which was just set back to TALKGROUP 1, joins the Talkgroup Call already in progress.
- Step 10. Return the site to Wide Area Trunking unless the next test requires Site Trunking.

Pass ____ **Fail** ____

Site Trunking FDMA/TDMA Mixed Sites

11.2.6 Dynamic FDMA/TDMA Emergency Alarm and Call

1. DESCRIPTION

Users in life threatening situations can use the Emergency button on the radio to immediately send a signal to the dispatcher and be assigned the next available voice channel if the FDMA/TDMA mode of the call can be supported by the available resource. Otherwise, the first call in the queue that can be supported by the available resources is assigned. To demonstrate this, an Emergency Alarm and Call will be initiated from a subscriber which will be received by a subscriber affiliated at any site of any zone in the system. In this case, the first available resource CANNOT support the FDMA call mode.

Note: In Site Trunking, the mode of all calls is dynamically determined by the Site Controller and Emergency Call operation is always Top of Queue. If the subscriber does not have the Display option, the Emergency ID will not be displayed.

SETUP

RADIO-1 (TDMA) - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-3 (TDMA) - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 (TDMA) - TALKGROUP 3
RADIO-4 - SITE - SITE 1
RADIO-5 (TDMA) - TALKGROUP 4
RADIO-5 SITE - SITE 1
RADIO-8 (FDMA-only) - TALKGROUP 1
RADIO-8 - SITE - SITE 1

Note: All Radios should be "Site Locked"

VERSION #1.010

2. TEST

- Step 1. Place SITE 1 into the Site Trunking mode. Simulate a busy system by disabling all channels at SITE 1 with the exception of the control channel and one voice channel.
- Step 2. Initiate calls with both RADIO-3 and RADIO-5 and keep these calls in progress until instructed to release.
- Step 3. Key RADIO-4 and verify the radio receives a busy tone.
- Step 4. Using RADIO-1 send an Emergency Call by pressing the emergency switch and then the PTT switch.
- Step 5. Observe that RADIO-1 cannot transmit due to the voice channel being busy. End the call on RADIO-3.
- Step 6. Observe that RADIO-4 receives the call back before RADIO-1 and is able to proceed with the call because the available channel resource can only support a TDMA call.
- Step 7. Dekey RADIO-5 and RADIO-4. Observe that RADIO-1 receives the callback and is able to proceed with the call.
- Step 8. Observe that the display on RADIO-8 denotes an emergency and the unit ID or alias of RADIO-1.
- Step 9. Dekey RADIO-1 and end the Emergency Call by holding down the Emergency button on RADIO-1 until an alert tone sounds. Verify RADIO-1 returns to normal operation.
- Step 10. Return the site to Wide Area Trunking unless the next test requires Site Trunking.

Pass ____ Fail ____



11.3 MCC 7100/7500 TRUNKED RESOURCES

11.3.1 Instant Transmit

1. DESCRIPTION

The instant transmit switch provides immediate operator access to a channel, independent of its select status (selected or unselected). It provides priority over other dispatcher transmit bars or optional footswitches.

SETUP

RADIO-1 - TALKGROUP 1
CONSOLE-1 – TALKGROUP 1 (Selected),
TALKGROUP 2 (Unselect mode)

VERSION #1.010

2. TEST

- Step 1. Using CONSOLE-1, press the Instant Transmit button on TALKGROUP 1.
- Step 2. Verify that the Transmit indicator is lit.
- Step 3. Verify RADIO-1 can monitor and respond to the call on TALKGROUP 1.
- Step 4. On RADIO-1 change to TALKGROUP 2.
- Step 5. Using CONSOLE-1, press the Instant Transmit button on the TALKGROUP 2 radio resource.
- Step 6. Verify RADIO-1 can monitor and respond to the call on TALKGROUP 2.

Pass ____ Fail ____

MCC 7100/7500 Trunked Resources

11.3.2 Talkgroup Selection and Call

1. DESCRIPTION

The Talkgroup Call is the primary level of organization for communications on a trunked radio system. Dispatchers with Talkgroup Call capability will be able to communicate with other members of the same talkgroup. This provides the effect of an assigned channel down to the talkgroup level. When a Talkgroup Call is initiated from a subscriber unit, the call is indicated on each dispatch operator position that has a channel control resource associated with the unit's channel/talkgroup.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 2
RADIO-3 - TALKGROUP 1
RADIO-4 - TALKGROUP 2
CONSOLE-1 - TALKGROUP 1
CONSOLE-2 - TALKGROUP 2

VERSION #1.010

2. TEST

- Step 1. Initiate a wide area call from CONSOLE-1 on TALKGROUP 1.
- Step 2. Observe that RADIO-1 and RADIO-3 will be able to monitor the call. Dekey the console and have either radio respond to the call.
- Step 3. Observe that all consoles with TALKGROUP 1 can monitor both sides of the conversation.
- Step 4. Initiate a wide area call from CONSOLE-2 on TALKGROUP 2.
- Step 5. Observe that RADIO-2 and RADIO-4 will be able to monitor the call. Dekey the console and have either radio respond to the call.
- Step 6. Observe that all consoles with TALKGROUP 2 can monitor both sides of the conversation.

Pass_____ Fail_____



MCC 7100/7500 Trunked Resources

11.3.3 Emergency Alarm and Call Display Description

1. DESCRIPTION

Users in life threatening situations can use the emergency button on the radio to send an audible alarm and a visual alarm signal to a console operator in order to request immediate system access to a voice channel for an emergency call. An emergency alarm begins after the radio user presses the radio's emergency button. Pressing the emergency button places the radio in "emergency mode". To begin an emergency call, the radio user must press the radio's PTT button while in "emergency mode." The assigned voice channel will be dedicated to the emergency caller's talkgroup for an extended period of time, equal to the Message Hang Time plus the Emergency Hang Time. As with other call types, emergency calls can operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
CONSOLE-1 - TALKGROUP 1
CONSOLE-2 - TALKGROUP 1

VERSION #1.010

2. TEST

- Step 1. Initiate an Emergency Alarm from RADIO-1.
- Step 2. Observe the Emergency from RADIO-1 is received at CONSOLE-1 for TALKGROUP 1.
- Step 3. Acknowledge the Emergency at the operator position. Verify CONSOLE-2 receives notification that the call has been acknowledged.
- Step 4. Initiate a call with RADIO-1 to initiate an Emergency call.
- Step 5. Observe CONSOLE-1 and CONSOLE-2 can monitor RADIO-1
- Step 6. Clear the Emergency from CONSOLE-1 on TALKGROUP 1.
- Step 7. End the Emergency Alarm from RADIO-1.

Pass ____ Fail ____

MCC 7100/7500 Trunked Resources

11.3.4 Multigroup Call

1. DESCRIPTION

This trunking feature allows an equipped console operator position to transmit an announcement to several different talkgroups simultaneously. As with Talkgroup Calls, multigroup calls operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 2
RADIO-3 - RANDOM
CONSOLE-1 - ATG 1

Note: TALKGROUP 1 and TALKGROUP 2 are members of ATG 1. RANDOM is any talkgroup not a member of ATG 1.

VERSION #1.010

2. TEST

- Step 1. Using CONSOLE-1, select the ATG 1 resource.
- Step 2. Initiate the Multigroup Call from CONSOLE-1.
- Step 3. Observe that RADIO-1 and RADIO-2 receive the Multigroup Call.
- Step 4. Verify that RADIO-3 does not receive the Multigroup Call because it is not a member of ATG 1.
- Step 5. Answer the Multigroup Call using RADIO-1 and observe CONSOLE-1 receives the response.
- Step 6. Verify that if the call is answered within the repeater hang time, the console will receive the call on the ATG 1 resource tile, otherwise the console will receive the call on the TALKGROUP 1 tile.
- Step 7. Verify that if the call is answered within the repeater hang time, RADIO-2 will monitor the call.

Pass____ Fail____



MCC 7100/7500 Trunked Resources

11.3.5 Multi-Select Operation

1. DESCRIPTION

Multi-Select (Msel) allows the console operator to group a number of channels/talkgroups together such that when the general transmit bar is depressed, all of the multi-selected channels/talkgroups will transmit at the same time with the same information. Multi-Select is one way communication call. If a radio user responds to a Multi-Select call the talkgroup the user is affiliated to will be the only one to hear the call. There is no super-group formed, so radio communication is still at the single talkgroup level. Multi-Select is utilized to send an APB to several channels/talkgroups. A Multi-Select has a limit of twenty (20) trunking/conventional resources

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 2
CONSOLE-1 - TALKGROUP 1, TALKGROUP 2

VERSION #1.010

2. TEST

- Step 1. From CONSOLE-1, create an Msel group with TALKGROUP 1 and TALKGROUP 2.
- Step 2. Transmit on the Msel using the Msel instant transmit button.
- Step 3. Verify that RADIO-1 and RADIO-2 hear the call.
- Step 4. Initiate a call with RADIO-1.
- Step 5. Verify the call is heard on CONSOLE-1 but not on RADIO-2.
- Step 6. Initiate a call with RADIO-2.
- Step 7. Verify the call is heard on CONSOLE-1 but not on RADIO-1.
- Step 8. On CONSOLE-1 dissolve the Msel.

Pass ____ Fail ____

MCC 7100/7500 Trunked Resources

11.3.6 Talkgroup Patch

1. DESCRIPTION

Talkgroup Patch allows a dispatcher to merge several talkgroups together on one voice channel to participate in a single conversation. This can be used for situations involving two or more talkgroups that need to communicate with each other. Using the Patch feature, the console operator can talk and listen to all of the selected talkgroups grouped; in addition, the members of the individual talkgroups can also talk or listen to members of other talkgroups. Patched talkgroups can communicate with the console dispatcher and other members of different talkgroups because of the "supergroup" nature of the Patch feature.

NOTE : If "secure" and "clear" resources are patched together, one repeater for each mode may be assigned per site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 2
RADIO-3 - TALKGROUP 1
RADIO-4 - TALKGROUP 2
CONSOLE-1 - TALKGROUP 1 and TALKGROUP 2

Note: All 4 Radios must have the same home zone.

VERSION #1.010

2. TEST

- Step 1. Using CONSOLE-1 create a patch between TALKGROUP 1 and TALKGROUP 2.
- Step 2. Initiate a patch call from CONSOLE-1.
- Step 3. Verify RADIO-1, RADIO-2, RADIO-3, and RADIO-4 can monitor the call.
- Step 4. Initiate several calls between the radios and verify successful communication.
- Step 5. Dissolve the patch created in step 1.

Pass____ Fail____



MCC 7100/7500 Trunked Resources

11.3.7 Alert Tones - Talkgroup

1. DESCRIPTION

Pre-defined alert tones can be transmitted on the selected Radio Resource to subscribers which can alert members of a channel / talkgroup to a particular event or signify to radio users special instructions are to follow. The Console has the ability to send an Alert-Tone signal on selected conventional or talkgroup resources.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
CONSOLE-1 - TALKGROUP 1

VERSION #1.040

2. TEST

- Step 1. Select TALKGROUP 1 on CONSOLE-1.
- Step 2. Select Alert Tone 1 and depress the Alert Tone button.
- Step 3. Verify that RADIO-1 and RADIO-2 hear Alert Tone 1.
- Step 4. Repeat Steps 2-3 for Alert Tone 2 and 3.

Pass____ Fail____

MCC 7100/7500 Trunked Resources

11.3.8 Call Alert

1. DESCRIPTION

Call Alert Page allows a subscriber/dispatcher to selectively alert another radio unit. The initiating subscriber/console will receive notification as to whether or not the call alert was received. Units receiving a Call Alert will sound an alert tone and show a visual alert indication. The display will also show the individual ID of the initiating subscriber/console unit.

SETUP

RADIO-1 - TALKGROUP 1
CONSOLE-1 - TALKGROUP 1

VERSION #1.030

2. TEST

- Step 1. Using CONSOLE-1, select the call alert button in the "Private Call" resource window.
- Step 2. Enter the ID of RADIO-1 and send the call alert to RADIO-1.
- Step 3. Verify that RADIO-1 receives the alert and that the ID or alias of the console is shown.
- Step 4. Turn off RADIO-1.
- Step 5. Using CONSOLE-1, send the call alert to RADIO-1 again.
- Step 6. Verify that after trying to page RADIO-1, the console displays "Can not send call alert - target not found" in the summary/status list.

Pass____ Fail____



MCC 7100/7500 Trunked Resources

11.3.9 Console Initiated Private Call to Subscriber

1. DESCRIPTION

Private Conversation is a selective calling feature which allows a dispatcher or radio user to carry on one-to-one conversation that is heard only by the two parties involved. Subscriber units receiving a private call will sound an alert tone. As with other call types, Private Calls operate across sites as well as within the same site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
CONSOLE-1 - TALKGROUP 1

VERSION #1.020

2. TEST

- Step 1. Using CONSOLE-1, select the "PRIVATE-CALL" tile and click the Private Call function.
- Step 2. Select the unit to be Private Called, in this case RADIO-1. (or select the numeric keypad and enter the Unit ID to be Private Called.)
- Step 3. Click the Send button.
- Step 4. Answer the Private Call with RADIO-1 and respond to the console.
- Step 5. Verify RADIO-2 does not hear the private conversation.
- Step 6. After completing the Private Call, return to the normal talkgroup mode.

Pass____ Fail____

MCC 7100/7500 Trunked Resources

11.3.10 Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of transmitted audio on an assigned voice channel resource. The Console Position has the capability to take control of an assigned voice channel for a talkgroup call so that the operator's audio overrides any subscriber audio. Console priority is a feature that enables dispatchers to gain immediate access to an assigned voice channel so that a central point of audio control exists.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1
CONSOLE-1 - TALKGROUP 1

VERSION #1.020

2. TEST

- Step 1. Initiate a Talkgroup call from RADIO-1 on TALKGROUP 1. Keep this call in progress until the test has completed.
- Step 2. Observe that RADIO-2 receives the call.
- Step 3. While the call is in progress, key up CONSOLE-1 on TALKGROUP 1.
- Step 4. Observe that RADIO-2 is now receiving audio from CONSOLE-1 on TALKGROUP 1.
- Step 5. De-key CONSOLE-1.
- Step 6. Verify RADIO-2 now receives RADIO-1 audio.
- Step 7. End the TALKGROUP 1 call from RADIO-1.

Pass_____ Fail_____



MCC 7100/7500 Trunked Resources

11.3.11 Activity Log

1. DESCRIPTION

The Console activity log will show all traffic for the resource assigned to that console to include the time, radio alias, TG, PTT ID and Emergency Call.

The dispatcher has the capability of selecting a logged call within in the "Activity Log Window" for instant transmit on the corresponding logged resource.

This activity log can be logged to a text file for archival purposes.

Note: The log file in the ops will only be seen if you first check Log Activity in Elite Admin application then in folder options uncheck hide hidden system files. The location will be c:\Program Data\MCC7500\MessageMonitorLogs.

SETUP

RADIO-1 – TALKGROUP 1
RADIO-2 – TALKGROUP 2
RADIO-3 – TALKGROUP 3
RADIO-4 – TALKGROUP 4
CONSOLE-1 – TALKGROUP 1, TALKGROUP 2,
TALKGROUP 3, TALKGROUP 4

VERSION #1.020

2. TEST

- Step 1. On CONSOLE-1 select the "Show Activity Log" button on the tool bar to open the Activity Log Window.
- Step 2. Initiate calls on RADIO-1, RADIO-2, RADIO-3 and RADIO-4 to log call information and verify calls are displayed in the activity log window.
- Step 3. Select a logged call in the Activity Log Window and verify that the Channel Control Window (CCW) at the top of the Activity log window changes to the corresponding resource. Verify the dispatcher is capable of responding via the instant transmit button.
- Step 4. Open the text file created by the Activity Log and verify call traffic has been archived to the document file.

Pass____ Fail____

11.4 MCC 7100/7500 CONVENTIONAL RESOURCES

11.4.1 Console Priority

1. DESCRIPTION

Console Operator Positions have ultimate control of transmitted audio on an assigned resource. The Console Position has the capability to take control of an assigned voice channel for a channel/talkgroup call so that the operator's audio overrides any subscriber audio. Console priority is a feature that enables dispatchers to gain immediate access to an assigned voice channel so that a central point of audio control exists.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1

RADIO-2 - CONVENTIONAL CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.040

2. TEST

- Step 1. Initiate a call from RADIO-1 on CONVENTIONAL CHANNEL 1. Keep this call in progress until the test has completed.
- Step 2. Observe that RADIO-2 receives the call.
- Step 3. While the call is in progress, key up CONSOLE-1 on CONVENTIONAL CHANNEL 1.
- Step 4. Observe that RADIO-2 is now receiving audio from CONSOLE-1 on CONVENTIONAL CHANNEL 1
- Step 5. De-key CONSOLE-1.
- Step 6. Verify RADIO-2 now receives RADIO-1 audio.
- Step 7. End the CONVENTIONAL CHANNEL 1 call from RADIO-1.

Pass_____ Fail_____



MCC 7100/7500 Conventional Resources

11.4.2 Alert Tones - Conventional Channel

1. DESCRIPTION

Pre-defined alert tones can be transmitted on the selected Radio Resource to subscribers which can alert members of a channel / talkgroup to a particular event or signify to radio users special instructions are to follow. The Console has the ability to send an Alert-Tone signal on selected conventional or talkgroup resources.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1
CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.030

2. TEST

- Step 1. Select CONVENTIONAL CHANNEL 1 on CONSOLE-1.
- Step 2. Select Alert Tone 1 and depress the Alert Tone button.
- Step 3. Verify that RADIO-1 and RADIO-2 hear Alert Tone 1.
- Step 4. Repeat Steps 2-3 for Alert Tone 2 and 3.

Pass____ Fail____

MCC 7100/7500 Conventional Resources

11.4.3 Activity Log - Conventional

1. DESCRIPTION

The MCC7100/7500 Console activity log will show all traffic for the resource assigned to that console to include the time, radio alias, Channel, PTT ID and Emergency Call.

The dispatcher has the capability of selecting a logged call within in the "Activity Log Window" for instant transmit on the corresponding logged resource.

This activity log can be logged to a text file for archival purposes.

Note: The log file in the ops will only be seen if you first check Log Activity in Elite Admin application then in folder options uncheck hide hidden system files. The location will be c:\Program Data\MCC7500\MessageMonitorLogs.

SETUP

RADIO-1 – CONVENTIONAL CHANNEL 1
RADIO-2 – CONVENTIONAL CHANNEL 2
RADIO-3 – CONVENTIONAL CHANNEL 3
RADIO-4 – CONVENTIONAL CHANNEL 4

CONSOLE-1 – CONVENTIONAL CHANNEL 1,
CONVENTIONAL CHANNEL 2, CONVENTIONAL
CHANNEL 3, CONVENTIONAL CHANNEL 4

VERSION #1.060

2. TEST

- Step 1. On CONSOLE-1 select the "Show Activity Log" button on the tool bar to open the Activity Log Window.
- Step 2. Initiate calls on RADIO-1, RADIO-2, RADIO-3 and RADIO-4 to log call information and verify calls are displayed in the activity log window.
- Step 3. Select a logged call in the Activity Log Window and verify that the Channel Control Window (CCW) at the top of the Activity log window changes to the corresponding resource. Verify the dispatcher is capable of responding via the instant transmit button.
- Step 4. Open the text file created by the Activity Log and verify call traffic has been archived to the document file.

Pass ____ Fail ____



MCC 7100/7500 Conventional Resources

11.4.4 ID Stacking

1. DESCRIPTION

During normal call operation radio IDs are displayed in the resource window for a particular resource. These IDs are saved in a "Stack" and can be viewed to determine which radios made the previous calls. The stack size can be up to 10 IDs. This test is applicable to the Digital Conventional feature.

SETUP

RADIO-1 - CONVENTIONAL CHANNEL 1
RADIO-2 - CONVENTIONAL CHANNEL 1
RADIO-3 - CONVENTIONAL CHANNEL 1

CONSOLE-1 - CONVENTIONAL CHANNEL 1

VERSION #1.020

2. TEST

- Step 1. At CONSOLE-1 view the CONVENTIONAL CHANNEL 1 Resource Window.
- Step 2. Initiate calls from RADIO-1, RADIO-2 then RADIO-3 on CONVENTIONAL CHANNEL 1.
- Step 3. Scroll through the stack to see that the radio IDs are displayed in the order received.
- Step 4. Repeat steps 1-3 for a sample of the remaining OPs as needed.

Pass_____ Fail_____

11.5 MKM 7000 CONSOLE ALIAS MANAGER (CAM)

11.5.1 Alias Display When Using the MKM 7000

1. DESCRIPTION

This test will demonstrate that a Provisioning Manager (PM) defined alias still works on incoming calls when MKM 7000 solution is installed, although the locally defined ones take precedence, i.e. centrally defined ones will only be used if there is no locally defined alias for the radio that is making an incoming call.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-2 - TALKGROUP 1

CONSOLE-1 - TALKGROUP 1

A standalone or cohab'ed MKM 7000 server is connected and communicating normally with an MCC 7100/7500 Console.

CONSOLE-1 user is configured to use local alias service.

VERSION #1.030

2. TEST

- Step 1. Log into MKM 7000 GUI and configure an alias for RADIO-1.
- Step 2. Verify that RADIO-2 does not have any alias defined in MKM 7000.
- Step 3. Verify both RADIO-1 and RADIO-2 have their own PM defined aliases. Also verify the PM defined alias for RADIO-1 is different from the one defined by MKM 7000.
- Step 4. Key up RADIO-1 and verify that its locally defined alias shows up on CONSOLE-1, not the PM defined alias.
- Step 5. Key up RADIO-2 and verify that its PM defined alias shows up.

Pass _____ Fail _____



MKM 7000 Console Alias Manager (CAM)

11.5.2 Create a new Subscriber Unit ID to Subscriber Unit Alias Mapping - Trunking

1. DESCRIPTION

This test will demonstrate the capability to create a Subscriber Unit (SU) alias for an SU ID via the MKM 7000 GUI and have it show up on MCC 7100/7500 Console automatically.

The test will work on either a trunked or conventional system. This test will also demonstrate the capability to monitor connection status between MKM 7000 and MCC 7100/7500 Console.

SETUP

A standalone (not cohab) MKM 7000 server is connected and communicating normally with CONSOLE-1.
RADIO-1 - TALKGROUP 1

CONSOLE-1 - TALKGROUP 1
CONSOLE-1 user is configured to use the local alias service.

VERSION #1.040

2. TEST

- Step 1. CONSOLE-1 user logs into the MCC 7100/7500 console and verifies that the consoles synchronization status with Localized Aliasing is OK, as indicated by a green check mark on the "status screen".
- Step 2. Local Alias Admin logs into MKM 7000 GUI, verify under Connected Consoles tab that the MCC 7100/7500 console is connected to MKM7000.
- Step 3. Create a new SU ID that matches RADIO-1 to be used for this test.
- Step 4. Create a new SU Alias for the SU ID (new mapping between SU ID and SU Alias).
- Step 5. Submit the change.
- Step 6. Wait (up to) 30 seconds, initiate a call using RADIO-1 ON TALKGROUP 1, verify the defined SU Alias shows up on CONSOLE-1's TALKGROUP 1 resource.

Pass ____ Fail ____

MKM 7000 Console Alias Manager (CAM)

11.5.3 Fault Management of MKM 7000 and MCC 7100/7500 Link

1. DESCRIPTION

This test will demonstrate that the link status between MKM 7000 and MCC 7100/7500 is monitored and fault managed by the Unified Event Manager (UEM).

This test will also demonstrate that the MKM 7000 and MCC 7100/7500 both monitor the link status between them.

SETUP

A standalone (not cohabed) MKM 7000 server is connected and communicating normally with an MCC 7100/7500 Console.

The console user is configured to use local alias service.

VERSION #1.050

2. TEST

- Step 1. The console user logs into CONSOLE-1 and verifies that MCC 7100/7500's synchronization status with MKM 7000 server is OK, as indicated by a green check mark on the "system status" screen.
- Step 2. Log into the MKM 7000 GUI and verify the connection to MCC 7100/7500 is up and running under Connected Consoles tab.
- Step 3. Unplug the connection cable between MKM 7000 and MCC 7100/7500 and verify that the UEM shows link failure between MKM 7000 and MCC 7100/7500. Also verify the change of link status shows up on MKM 7000 GUI's Connected Consoles tab and MCC 7100/7500's "system status" screen.
- Step 4. Restore the connection cable between MKM 7000 and MCC 7100/7500 and verify that the UEM shows link failure between MKM 7000 and MCC 7100/7500 has recovered. Also verify the change of link status shows up on MKM 7000 GUI's Connected Consoles tab and MCC 7100/7500's "system status" screen.
- Step 5. Log the console user out of CONSOLE-1 and verify that UEM shows link status is now "unconfigured user logout".

Pass____ Fail____



11.6 FAULT MANAGEMENT

11.6.1 Unified Event Manager - Base Views

1. DESCRIPTION

The Unified Event Manager (UEM) in its base configuration provides a number of views. The purpose of this test is to demonstrate the key views available from the UEM.

The Physical Summary and Detail View (Physical Map) and Service Summary and Detail View (Service Map) in previous releases are deprecated and are replaced by the Zone Map. Custom views can be saved and retrieved by other NM Client users.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.010

2. TEST

- Step 1. Alarms View: In the navigation pane expand Fault Management and select Alarms. The view displays active alarms for managed resources, displaying impacted managed resources and specific objects on the managed resource along with selected alarm properties.
- Step 2. Alarm View Search: Customize the Active Alarms display by selecting the View option from the menu bar, then select Search. Perform a Managed Resource search for channels, site controllers and routers by entering "Contains" and ch, sc, and z00 respectively in the search fields to perform the three separate searches. For each of the three searches a filtered alarm view is

displayed that contains alarms for the appropriate device in the search.

- Step 3. Network Events View: In the navigation pane expand Fault Management and select Network Events. The view displays recent events reported for managed resources, displaying impacted managed resources and specific object on the managed resource along with selected event properties. Alarming events are base for creating alarm objects.
- Step 4. Physical Summary View: In the navigation pane expand Zone Views and Physical, then select Physical Summary View. The Physical Summary View provides an aggregated alarm severity status of the devices located at all subnets in the Zone.
- Step 5. Service Summary View: In the navigation pane expand Zone Views and Service, then select Service Summary View. The Service Summary View provides a quick summary of the service status of sites in a Zone, including access to Channel status.
- Step 6. Zone Map: In the navigation pane, expand Zone Views and select Zone Map. The Zone Map view provides an aggregated alarm severity status of the devices located at discovered sites in the Zone.
- Step 7. Network Database: In the navigation pane select Network Database. The Network Database displays a list of all discovered Managed Resources and Sites. The display includes properties of each resource as well as overall severity of all objects and/or sub resources

Pass ____ Fail ____

Fault Management

11.6.2 Station Power Amp Failure Reports to the Unified Event Manager (UEM)

1. DESCRIPTION

This test will demonstrate that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

A station will be keyed while the output is unloaded to simulate a power amp failure. The failures will be monitored on the UEM.

Note: For safety, either power down the station or TX Inhibit it before disconnecting or re-connecting the dummy load to prevent accidental keying of the station.

Note: This test should be done on a site with more than 2 channels. Failsoft will occur if the test is done on a 2 channel site.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 2
RADIO-2 - SITE - SITE 1
NMclient01 - UEM session up and running.

* All Radios should be "Site Locked"

VERSION #1.020

2. TEST

- Step 1. Verify that the power amp of the station to be tested has no active alarms against it.
- Step 2. Disconnect the dummy load/antenna from the station.
- Step 3. Make several talkgroup calls using RADIO-1 until the test station has been keyed.
- Step 4. Observe that an alarm indicating a Power Amp failure appears on the UEM alarms view. For SmartX sites you will need to look at event view to see cause of alarm.
- Step 5. Reconnect the dummy load/antenna disconnected in Step 3.
- Step 6. In approximately 5 minutes, observe the changes to the alarm on the UEM, indicating the module is restored to service.

Pass____ Fail____



Fault Management

11.6.3 Core Router Failure Reports to the Unified Event Manager

1. DESCRIPTION

This test will demonstrate that the Unified Event Manager (UEM) alarms view is able to capture information about various failures at the system and zone level.

A Core Router/Gateway will be powered off to simulate a failure. The system health will be monitored on UEM.

NOTE: Powering a combine Core/Exit Router/Gateway down will affect both the Core and Exit routing functions.

SETUP

NMclient01 - UEM session up and running.

VERSION #1.040

2. TEST

- Step 1. Verify that the Router/Gateway to be tested displays without failures (normal) on UEM. The core router is contained in the specific subnet that it is physically collocated with in the network.
- Step 2. Power down the Router/Gateway.
- Step 3. Observe that an alarm indicating a Router/Gateway failure appears on the UEM alarms view.
- Step 4. Restore power to the Router/Gateway.
- Step 5. Observe the changes to the alarm in UEM, indicating the Router/Gateway is enabling.
- Step 6. Observe that alarm view updates in the UEM, indicating the Router/Gateway has recovered and is enabled.

Pass____ Fail____

11.7 SYSTEM RELIABILITY FEATURES

11.7.1 Base Station Identification

1. DESCRIPTION

This test will demonstrate that the repeater(s) programmed for Base Station Identification (BSI) operation at every site broadcasts the FCC BSI at predefined intervals (usually 30 minutes). To accomplish this, a service monitor will be set up to monitor the BSI channel of a random site and note that the Base Station Identification is heard.

SETUP

A service monitor will be required to perform this test.

Note: A properly configured subscriber can be used to monitor the frequency for the BSI tones in place of a service monitor.

VERSION #1.030

2. TEST

- Step 1. Choose one site to test for Base Station Identification (BSI).
- Step 2. Setup the service monitor or subscriber to receive the frequency of the BSI channel for the particular site.
- Step 3. Monitor the service monitor until the Base Station Identification is broadcast. Verify that the BSI tones are heard on the monitored frequency.

Pass ____ Fail ____



System Reliability Features

11.7.2 Multiple Control Channels

1. DESCRIPTION

A maximum of four channels are eligible for assignment as control channel at each site. In the event that the assigned control channel fails at any remote site, the Zone Controller automatically selects one of the other control capable channels as the active control channel for that site. A Control Channel Preference Level can be used to rank the control capable channels where 1 is the highest ranking and 4 the lowest.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1
RADIO-3 - TALKGROUP 2
RADIO-3 - SITE - SITE 1
RADIO-4 - TALKGROUP 2
RADIO-4 - SITE - SITE 1

VERSION #1.020

2. TEST

- Step 1. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.
- Step 2. Observe that only RADIO-2 will be able to monitor and respond to the call.
- Step 3. Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 2.
- Step 4. Observe that only RADIO-4 will be able to monitor and respond to the call.
- Step 5. Power off the control channel at SITE 1.
- Step 6. Observe that the control channel rotates to the next available channel capable of acting as a control channel.
- Step 7. Initiate a Talkgroup Call with RADIO-1 on TALKGROUP 1.
- Step 8. Observe that only RADIO-2 will be able to monitor and respond to the call.
- Step 9. Initiate a Talkgroup Call with RADIO-3 on TALKGROUP 2.
- Step 10. Observe that only RADIO-4 will be able to monitor and respond to the call. Power up the channel previously powered off to return the system to normal operation.

Pass____ Fail____

System Reliability Features

11.7.3 Transmitter Power Failure Shutdown

1. DESCRIPTION

The repeaters can detect a loss or decrease in transmitter output power of all trunked repeaters connected to it. Each trunked repeater contains an internal wattmeter element. Once the forward power has decreased past the threshold set, the repeater instructs the Zone Controller to take the channel out of service. If reflected power increases past the threshold set, the repeater will also instruct the Zone Controller to take the channel out of service. Once the station threshold has been exceeded and the station taken out of service a 5 minute timer will start. At the timer expiration a transmitter test will start to perform a self check on the station. This self check lasts for 20 seconds. If the station passes the self check it will be placed back into service.

Note: This test should be done on a site with more than 2 channels. Failsoft will occur if the test is done on a 2 channel site.

SETUP

RADIO-1 - TALKGROUP 1

VERSION #1.010

2. TEST

- Step 1. Select a channel to disconnect the transmit antenna connection to the trunked repeater. (This will cause a high VSWR condition)
- Step 2. Key RADIO-1 so that the selected channel is assigned, and verify that the channel disables due to an alarm condition. Verify that this alarm is reported at the Unified Event Manager (UEM).
- Step 3. Wait 30 seconds after the failure then restore the transmit antenna connection to the trunked repeater.
- Step 4. Using the station LEDs, verify that the time it takes from the corrected connection to the station being placed back in service is within 5 minutes.
- Step 5. Verify the Unified Event Manager (UEM) also reports the station being back in service.

Pass____ Fail____



System Reliability Features

11.7.4 Redundant Site Controller Switching - Automatic Switchover

1. DESCRIPTION

The Site Controller subsystem uses two Site Controllers in a redundant configuration. The backup Site Controller is made active either upon the loss of communication to the active Site Controller or upon a user initiated command from the Site Control Manager.

This test will demonstrate that on the loss of the active site controller the standby controller will become active and carry on the site operations.

SETUP

RADIO-1 – TALKGROUP 1
RADIO-1 – SITE – SITE 1
RADIO-2 – TALKGROUP 1
RADIO-2 – SITE – SITE 1
RADIO-3 – TALKGROUP 1
RADIO-3 – SITE – SITE 1

All Radios should be "Site Locked".

VERSION #1.020

2. TEST

- Step 1. Verify both Site Controllers are available and in the "Normal" state.
- Step 2. Power off the active Site Controller (or in the ESS configuration connect to the Active Site controller using CSS and perform a "reset") and verify the backup becomes the new active Site Controller (note events in the event viewer).
- Step 3. Key RADIO-1 and verify that RADIO-2 and RADIO-3 hear the audio.
- Step 4. End the call from RADIO-1.
- Step 5. Power up the Site Controller (if it was powered off). Verify the Site Controller returns to the normal state.

Pass____ Fail____

System Reliability Features

11.7.5 Redundant Zone Controller Switching/Automatic Switchover

1. DESCRIPTION

In a non-DSR configuration the Zone Controller subsystem uses two Zone Controllers in a redundant configuration. The backup Zone Controller is made active either upon the loss of the active ZC or upon a user command from the Unified Network Configurator (UNC). In a DSR configuration there are 4 Zone Controllers in a redundant configuration. Any one of the 4 could be active to keep the Zone Sites in Wide Area Trunking. If using the Dynamic Resilience Zone configuration the Unified Event Manager will report the Zone Controller switchover in both Unified Event Managers (UEM).

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - Site3 (Site3 should be in another Zone if applicable.)

* The Zone Controllers should be successfully synchronized before performing this procedure.

VERSION #1.030

2. TEST

- Step 1. Verify the state of the current Zone Controllers is Active or Standby in the Unified Network Configurator (UNC). (There will be 2 Zone Controllers in single Zone or 4 in the case of DSR zones.)
- Step 2. Reset the active Zone Controller application via the Unified Event Manager (UEM) diagnostic.
- Step 3. Verify using UNC, UEM and ZoneWatch (if applicable) that the standby Zone Controller becomes active and brings all sites back wide. Wait for the Radios to settle out the site affiliations.
- Step 4. Key RADIO-1 and verify that RADIO-2 and RADIO-3 hear the audio.
- Step 5. End the call from RADIO-1.
- Step 6. Verify that Zone Controller that was reset comes back up to a "Standby" state.

Pass ____ Fail ____



11.8 SYSTEM MANAGEMENT TESTS

11.8.1 ZoneWatch

1. DESCRIPTION

ZoneWatch is an administration tool for monitoring radio traffic on a system. A system manager can use ZoneWatch to analyze traffic patterns for load distribution and troubleshoot radio and site problems. ZoneWatch is used to view current radio traffic activity for the system. This activity is displayed in graphical format, color-coded for easy identification of the type of activity occurring on the system.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2
RADIO-3 - TALKGROUP 1
RADIO-3 - SITE - SITE 3
RADIO-4 - TALKGROUP 1
RADIO-4 - SITE - SITE 4

VERSION #1.010

2. TEST

- Step 1. Verify that ZoneWatch has been configured for the Grid and Multi Site Scroll windows to display system activity.
- Step 2. From the PC Application Launcher, select a zone folder.
- Step 3. From within that zone, select ZoneWatch.
- Step 4. Select the appropriate profile to be able to view the channel usage on the system.
- Step 5. Initiate several calls with the radios and observe that the appropriate channel usage information is displayed.

Pass ____ Fail ____

System Management Tests

11.8.2 Configuration Management - Access Permissions

1. DESCRIPTION

In ASTRO releases the Radio System Infrastructure management is done in the Unified Network Configurator (UNC) application. The Unified Network Configurator Wizard (UNCW) also helps to configure the system by having a User interface into the system configuration.

Configuration parameters such as Individual and Talkgroup Default Access Permission, and Site Access Denial Type can be manipulated from these applications.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.030

2. TEST

- Step 1. Delete the database record for RADIO-1 from the Provisioning Manager so that the system does not have any knowledge of RADIO-1. And distribute the configuration from the Provisioning Manager (i.e. invoke Distribute Configuration Changes operation).
- Step 2. Verify the "Individual Default Access Permission" flag is set to "NO". If changes are made, approve the job in Voyence, then Publish Infrastructure Data from the Unified Network Configuration Wizard (UNCW).
- Step 3. Initiate a call from RADIO-1 on TALKGROUP 1. Verify that the Radio System rejects the RADIO-1 call request because RADIO-1 has not been defined in the Radio User database.
- Step 4. Change the Individual Default Access Permission flag to YES. After approving the job in Voyence, Publish Infrastructure Data from the UNCW.
- Step 5. Initiate a call from RADIO-1. Verify that the system permits the RADIO-1 call request because the system grants radio access using default settings.
- Step 6. From the Provisioning Manager, configure the RADIO-1 records that was automatically created as a result of the radio's PTT. And distribute the configuration from the Provisioning Manager (i.e. invoke Distribute Configuration Changes operation).
- Step 7. Reset the "Individual Default Access Permission" flag to NO. After approving the job in Voyence, Publish Infrastructure Data from the UNCW.
- Step 8. Initiate a call from RADIO-1. Verify that the Radio System permits the RADIO-1 call request because RADIO-1 is now a valid user.

Pass ____ Fail ____



System Management Tests

11.8.3 Configuration Management - General Timeout Parameters

1. DESCRIPTION

System and call timeout parameters such as Private Call Ring, Group Call Service Timeout, Private Call Hang Time, Emergency Call Hang time, Maximum Group Call Duration and Maximum Private Call Duration can also be manipulated from the Unified Network Configurator (UNC) Wizard.

For this test the Private Call Duration will be limited to one minute. The call will change to transmission trunked after the one minute timer expires at which time the hang timers will come into play. Once the users have discontinued using the system for the Private Call long enough for the hang timers to expire the system will end the call.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 1

VERSION #1.010

2. TEST

- Step 1. Initiate a TALKGROUP 1 call from RADIO-1. Verify that the Radio System permits the RADIO-1 call request.
- Step 2. In the manager, configure the "Maximum Private Call Duration" to 1 minute and apply.
- Step 3. Initiate a Private Call from RADIO-1 to RADIO-2. Continue to converse back and forth using RADIO-1 and RADIO-2,
- Step 4. Verify that after one minute elapses, the system will transmission trunk the Private Call because the maximum call duration has been exceeded. Once the hang time timer has expired the call will be terminated.
- Step 5. Reset the Private Call Maximum Call Duration setting to be 10 minutes (default).

Pass____ Fail____

System Management Tests

11.8.4 Configuration Management - Subscriber Capabilities

1. DESCRIPTION

The Provisioning Manager (PM) controls the parameters for all radio users and dispatchers on the system. Within the Subscriber section, the Radio User Configuration Window enables the network manager to tailor SmartZone subscribers' capabilities. Multigroup, Secure, Call Alert, Private Call, and Telephone Interconnect are some of the features that can be enabled or disabled. The features that could be unique to the particular user are configured directly in the Radio User Configuration Window. The features that could be configured the same for a group of users are placed into records called profiles. The network manager references the profile which contains the desired setup for these features from the Radio User Configuration Window.

Note - A profile must already exist to be referenced through the Radio Configuration Window but can be modified later if needed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

* Flag both radios to be capable of Call Alert, Private Call, and Dispatch Calls.

* Set the "User Enabled" flag to YES for both RADIO-1 and RADIO-2.

VERSION #1.010

2. TEST

- Step 1. Initiate a Call Alert (PAGE) from RADIO-1 to RADIO-2. Verify that RADIO-2 receives the Call Alert.
- Step 2. Change the Call Alert Enabled flag to NO for RADIO-1 via the PM.
- Step 3. Initiate a Call Alert from RADIO-2 to RADIO-1. Verify that RADIO-2 receives a reject when attempting to Call Alert RADIO-1.
- Step 4. Change the Call Alert Enabled flag back to YES for RADIO-1 via the PM.
- Step 5. Initiate a Call Alert from RADIO-2 to RADIO-1. Verify that RADIO-1 now receives the Call Alert.
- Step 6. Initiate a Private Call (CALL) from RADIO-1 to RADIO-2. Verify that RADIO-2 receives the Private Call.
- Step 7. Change the Private Call Enabled flag to NO for RADIO-1 via the PM.
- Step 8. Initiate a Private Call from RADIO-2 to RADIO-1. Verify that RADIO-2 receives a reject when attempting to Private Call RADIO-1.
- Step 9. Change the Private Call Enabled flag back to YES for RADIO-1 via the PM.
- Step 10. Initiate a Private Call from RADIO-2 to RADIO-1. Verify that RADIO-1 now receives the Private Call.

Pass ____ Fail ____



System Management Tests

11.8.5 Configuration Management - Talkgroup Capabilities

1. DESCRIPTION

The Provision Manager (PM) controls the parameters for all radio users and dispatchers on the system.

Within the Subscriber section, the Talkgroup Configuration Window enables the network manager to tailor SmartZone Talkgroup Capabilities. Emergency, Secure and Priority Monitor are some of the features that can be enabled or disabled. The features that could be unique to the particular user are configured directly in the Talkgroup Configuration Window. The features that could be configured the same for a group of users are placed into records called profiles. The network manager references the profile which contains the desired setup for these features from the Talkgroup Configuration Window.

NOTE: A profile must already exist to be referenced through the Talkgroup Configuration Window but can be modified later if needed.

SETUP

RADIO-1 - TALKGROUP 1
RADIO-1 - SITE - SITE 1
RADIO-2 - TALKGROUP 1
RADIO-2 - SITE - SITE 2

* Set the "Talkgroup Enabled" flag to YES for TALKGROUP 1 in the PM.

VERSION #1.030

2. TEST

- Step 1. Initiate a call from RADIO-1 on TALKGROUP 1. Verify that RADIO-2 hears the RADIO-1 audio.
- Step 2. Change the Talkgroup Enabled flag to NO for TALKGROUP 1 via the PM.
- Step 3. Initiate a call from RADIO-1 or RADIO-2 on TALKGROUP 1. Verify that neither radio can initiate a call because of the change in status of the Group Enabled Flag of TALKGROUP 1.
- Step 4. Initiate an Emergency call from RADIO-1. Verify that both the console (if present) and RADIO-2 can hear the transmission.
- Step 5. Dekey RADIO-1.
- Step 6. Change the Talkgroup Enabled flag back to YES for TALKGROUP 1 via the PM.
- Step 7. Initiate a call from RADIO-1 on TALKGROUP 1. Verify that both the console (if present) and RADIO-2 hear RADIO-1.

Pass____ Fail____

System Management Tests

11.8.6 Unified Event Manager - User Actions Create Audit Trails

1. DESCRIPTION

One of the functions of the Unified Event Manager (UEM) that can be managed under Security Management is the User activity log, also called Audit Trails, containing:

- Operations invoked by the user.
- The name of the user who invoked the operation.
- Data and time of invocation.
- Target device/object on which the operation was invoked.
- The status of the operation.
- The category of invoked operation.

This test will demonstrate that Unified Event Manager (UEM) user actions are logged by the system. These audit items log the history of activity for a period of up to 1 year.

Note: The audit log is part of the UEM database. A database restore or reload of the UEM may affect the audit log history.

SETUP

NMclient 01 - UEM client session active.

(Note: If the Authentication Audit Log has been cleared there will only be the event to clear the log.)

VERSION #1.050

2. TEST

- Step 1. On a UEM client session, select Administration from the menu bar and then System Administration. The Administration Menu window opens up.
- Step 2. In the System Administration window, click on Audit Trails.
- Step 3. Verify the Audit Log is displayed. The following information is displayed for each entry: User Name, Operation, Audit Time, Severity, Category, and Audited Object. User actions recorded include: Authentication, Logout, Discovery, Synchronization, Device Deletion, Command, Telnet, and Manage/Unmanage.

Pass____ Fail____



System Management Tests

11.8.7 License Manager – Session Force Release

1. DESCRIPTION

Under certain scenarios, active sessions may need to be released. If this need occurs, the sessions can be released from the License Manager through use of the Force Release functionality.

In addition to releasing the sessions from the Session tab in the License Manager, the licenses can be managed by left clicking on a license with active sessions under the Licenses tab.

Note: Once a user session is released, and if there are additional licenses available, the session for the license that was released can be renewed and will remain active. In addition, the releasing of licenses is only permitted for users belonging to the licadmin group.

SETUP

A user session that can be terminated is needed to run this test.

VERSION #1.010

2. TEST

- Step 1. Start the License Manager application in the zone that is applicable for the target session.
- Step 2. Under <Sessions> on the top bar on the License Manager application, you can view the sessions that are currently active in the system.
- Step 3. Choose one of the active sessions to release.
- Step 4. For the session to be released, select <Release> on the right side of the screen.
- Step 5. When the Force Release window appears, select <Yes>.
- Step 6. After the Force Release window disappears, refresh the screen.
- Step 7. Demonstrate that the released license is no longer listed as an active session under the License Manager.

Pass ____ Fail ____

System Management Tests

11.8.8 License Manager – View and Export Licenses

1. DESCRIPTION

The License Manager is used to manage Capacity, Feature, Session, and Trial licenses in the system. The License Manager provides a consolidated view of software licenses in the system.

The License Manager runs on a Zone basis. The system level licenses are contained in the License Manager in the zone that is colocated with the system servers (Eg. UCS) (typically zone 1).

SETUP

No specific setup is required for this test.

VERSION #1.020

2. TEST

- Step 1. Start the License Manager application
- Step 2. Under <Capacity Licenses>, you can view the capacity usage in the system (ex: Trunked Radio User). Note the Purchased Quantity and Used Quantity.
- Step 3. Under <Feature Licenses>, you can view which features have been purchased on the system (ex: Provisioning Manager Interface).
- Step 4. Under <Session Licenses>, you can view the session licenses in the system (ex: Zone Watch). Note the Purchased Quantity and Used Quantity.
- Step 5. Under <Licenses> on the top bar on the License Manager application, you can view the licenses applicable for this system.
- Step 6. Select <Export> in the upper right hand corner of the License Manager application.
- Step 7. When the selector window appears, select <Save> to save the exported file.
- Step 8. Once the file is saved, it can be opened and viewed (ex: Excel) and verify that the exported license file matches the licenses as specified in the License Manager.

Pass ____ Fail ____



11.9 SIGNOFF CERTIFICATE

By their signatures below, the following witnesses certify they have observed the system Acceptance Test Procedures.

Signatures

WITNESS: _____ Date: _____

Please Print Name: _____

Initials: _____

Please Print Title: _____

WITNESS: _____ Date: _____

Please Print Name: _____

Initials: _____

Please Print Title: _____

WITNESS: _____ Date: _____

Please Print Name: _____

Initials: _____

Please Print Title: _____

11.10 COVERAGE ACCEPTANCE TESTING

11.10.1 Overview

This Coverage Acceptance Test Plan (CATP) is designed to verify that the voice radio system implemented by Motorola for MERA/Marin County meets or exceeds the required reliability as shown on Motorola's maps. The CATP defines the coverage testing method and procedure, the coverage acceptance criterion, the test documentation, and the responsibilities of both Motorola and MERA/Marin County.

Coverage Acceptance Testing is based upon a coverage prediction that accurately represents the implemented infrastructure and parameters that are consistent with the contract agreements.

Subsequent sections define the coverage acceptance test configuration(s) and test criteria.

11.10.2 CATP Definitions

Several definitions are needed to accurately describe the coverage acceptance test method and criteria. Where cited, these terms or methods are defined in TIA TSB-88.1-D¹ or TSB-88.3-D².

11.10.2.1 Defined Test Area

The defined test area is the geographical area in which communications will be provided that meet or exceed the specified Channel Performance Criterion (CPC) at the specified reliability for the specified equipment configuration(s). The defined test area(s) are listed in Table 11-2 Coverage Acceptance Test Summary.

For some defined test areas (identified in Table 11-2 Coverage Acceptance Test Summary), the coverage reliability commitment is only on-roads. The roads included in the on-road commitment are defined by the US Census Bureau TIGER streets that are accessible by 2-wheel drive vehicles.

For coverage testing, each defined test area will be divided into a grid pattern by Motorola to produce at least the number of uniformly sized test locations (or tiles) required by the Estimate of Proportions formula. [TSB-88.3-D, §5.2.1, equation 2] The minimum number of test tiles required varies, from a hundred to many thousands, depending on the size of the defined test area, desired confidence in results, type of coverage test, and the predicted versus required reliability.

11.10.2.2 Channel Performance Criterion (CPC)

The CPC is the specified minimum design performance level in a faded channel. [TSB-88.1-D, §5.2] For this system, the CPC is the Delivered Audio Quality (DAQ) as stated in Table 11-2 Coverage Acceptance Test Summary. The DAQ definitions are provided in Table 11-1 [TSB-88.1-D, §5.4.2, Table 3].

¹ *Wireless Communications Systems --- Performance in Noise- and Interference-Limited Situations --- Part 1: Recommended Methods for Technology Independent Performance Modeling* Technical Service Bulletin TSB-88.1-D, Telecommunications Industry Association (TIA), Arlington VA, 2012.

² *Wireless Communications Systems --- Performance in Noise- and Interference-Limited Situations --- Part 3: Recommended Methods for Technology Independent Performance Verification*, Technical Service Bulletin TSB-88.3-D, Telecommunications Industry Association (TIA), Arlington VA, 2013.

Table 11-1: DAQ Definitions

DAQ	Subjective Performance Description
1	Unusable, speech present but unreadable.
2	Understandable with considerable effort. Frequent repetition due to noise/distortion.
3	Speech understandable with slight effort. Occasional repetition required due to noise/distortion.
3.4	Speech understandable with repetition only rarely required. Some noise/distortion.
4	Speech easily understood. Occasional noise/distortion.
4.5	Speech easily understood. Infrequent noise/distortion.
5	Speech easily understood.

The CPC pass/fail criterion is the faded performance threshold, plus any adjustments for antenna performance, external noise, and in-building or in-vehicle losses. [TSB-88.1-D, §5.4.2, Figure 5] The faded performance threshold for the specified CPC is determined using the receiver’s static reference sensitivity adjusted by the projected CPC parameters for the applicable Modulation Type and DAQ as listed in the current version of TSB-88.1, Annex A, Table A-1. For coverage testing of digital voice radio systems, the faded performance threshold is the applicable Bit Error Rate (BER) from the projected CPC parameters.

11.10.2.3 Reliability

The Service Area reliability is the percentage of locations within the defined test area that are predicted to meet or exceed the specified CPC. The Motorola map(s) indicate the Service Area(s) within which this system is predicted to provide at least the reliability of meeting or exceeding the CPC as stated in Table 11-2 Coverage Acceptance Test Summary.

After all accessible tiles in the defined test area have been tested, the Service Area reliability will be determined by dividing the number of tiles tested that meet or exceed the CPC pass/fail criterion by the total number of tiles tested. [TSB-88.3-D, §5.1, equation 1]

11.10.2.4 Direction(s) of Test

The direction(s) of test in Table 11-2 Coverage Acceptance Test Summary defines the direction(s) which will be tested for coverage acceptance. Outbound (also called forward link, downlink, or talk-out) is the path from the fixed equipment outward to the mobile or portable radios. Inbound (also called reverse link, uplink, or talk-in) is the path from the mobile or portable radios inward to the fixed equipment. Outbound and Inbound independently means each direction will be evaluated as a separate independent test.

11.10.2.5 Equipment Configurations

This section defines the equipment configurations and infrastructure design parameters upon which the coverage guarantee and the coverage acceptance test are based. The equipment configurations are defined in Table 11-2 Coverage Acceptance Test Summary, and include user equipment, outdoor/in-building definition, defined test area, number of test tiles, reliability, CPC, CPC pass/fail, and direction(s) of test. The infrastructure design parameters are defined in Table 11-3 Infrastructure Design Parameters, and include site names, site locations, and antenna system parameters. If the implemented system equipment configuration and/or infrastructure design parameters vary from these configurations and/or parameters, a revised coverage map will be used to define the test configuration and potential areas from which test tiles will be included in the revised coverage acceptance test.

Coverage testing will be conducted with equipment installed per the configurations in Table 11-2 Coverage Acceptance Test Summary, and with the antennas in unobstructed locations that are not adjacent to other large objects or metallic items which would distort the antenna patterns.

Table 11-2: MERA/Marin County Coverage Acceptance Test Summary

User Equipment	Outdoor / In-Building	Defined Test Area	Number of Test Tiles	Service Area Reliability	CPC	CPC Pass/Fail	Direction(s) of Test
700MHz P25 TDMA Simulcast							
APX Portable with half-wave flex whip antenna in swivel case with remote speaker microphone for transmit and receive	Outdoor	Marin County (On-Roads Only)	1505 (0.5 mile tiles)	88.80% Outbound. 73.89% Inbound	DAQ-3.4	2.4% BER Outbound. 2.6% BER Inbound	Outbound and Inbound Independently
APX Portable with half-wave flex whip antenna in swivel case with remote speaker microphone for transmit and receive	Outdoor w/ 18 dB Attenuation for Building Loss	Urban Areas (On-Roads Only)	323 (0.5 mile tiles)	72.51% Outbound. 57.39% Inbound	DAQ-3.4	2.4% BER Outbound. 2.6% BER Inbound	Outbound and Inbound Independently
APX Portable with half-wave flex whip antenna in swivel case with remote speaker microphone for transmit and receive	Outdoor	Marin County (On-Roads Only)	1505 (0.5 mile tiles)	88.80% Outbound. 73.89% Inbound	DAQ-3.4	Subjective DAQ	Outbound and Inbound Independently
APX Portable with half-wave flex whip antenna in swivel case with remote speaker microphone for transmit and receive	Outdoor w/ 18 dB Attenuation for Building Loss	Urban Areas (On-Roads Only)	323 (0.5 mile tiles)	72.51% Outbound. 57.39% Inbound	DAQ-3.4	Subjective DAQ	Outbound and Inbound Independently
APX Portable with half-wave flex whip antenna in swivel case with remote speaker microphone for transmit and receive	Outdoor	Marin County (On-Roads Only)	1505 (0.5 mile tiles)	Information Only	DAQ-3.4	SSI provided for informational purposes	Outbound and Inbound Independently
APX Portable with half-wave flex whip antenna in swivel case with remote speaker microphone for transmit and receive	Outdoor w/ 18 dB Attenuation for Building Loss	Urban Areas (On-Roads Only)	323 (0.5 mile tiles)	Information Only	DAQ-3.4	SSI provided for informational purposes	Outbound and Inbound Independently

Table 11-3: MERA/Marin County Infrastructure Design Parameters

Site Name	Latitude	Longitude	Transmit Antenna System		Receive Antenna System		
			Mount Height	Antenna Model	Mount Height	Antenna Model	External Noise assumed (relative to KToB)
East Simulcast Cell							
San Pedro	37.99019444	-122.5005278	65 ft	Sinclair SC476-HF1LDF(D06-E5749)	100 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Big Rock	38.05908333	-122.6038611	55 ft	Sinclair SC476-HF1LDF(D06-E5749)	100 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
OTA Broadcasting	38.149917	-122.593028	20 ft	Sinclair SC476-HF1LDF(D06-E5749)	30 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Mt. Barnabe	38.02713889	-122.7163889	30 ft	Sinclair SC476-HF1LDF(D06-E5749)	70 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Mt. Tamaplais	37.92888889	-122.5875	20 ft	Sinclair SC476-HF1LDF(D10-E5749)	40 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Dollar Hill	37.980261	-122.529311	25 ft	Sinclair SC476-HF1LDF(D06-E5749)	60 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Wolfback Ridge	37.85103333	-122.4984167	40 ft	Sinclair SC476-HF1LDF(D06-E5749)	60 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Simulcast Cell 2							
Stewart Pt	37.930365	-122.720172	30 ft	Sinclair SC476-HF1LDF(D06-E5749)	45 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Pt Reyes	38.08002778	-122.8672222	8 ft	Sinclair SC476-HF1LDF(D06-E5749)	17 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Tomales	38.260861	-122.903667	60 ft	Sinclair SC476-HF1LDF(D06-E5749)	80 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Marshall	38.1858	-122.83	40 ft	Sinclair SC476-HF1LDF(D10-E5749)	60 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB
Muir Beach	37.86335	-122.5854	40 ft	Sinclair SC476-HF1LDF(D06-E5749)	60 ft	Sinclair SC479-HF1LDF(D06-E5765)	0 dB

11.10.2.6 CPC Pass/Fail Criterion for a Test Tile

For each equipment configuration, the CPC pass/fail criterion for a test tile is stated in Table 11-2 Coverage Acceptance Test Summary. Each equipment configuration will have only one CPC pass/fail criterion for a test tile.

To measure BER, the coverage test will be performed with the appropriate attenuator value installed in the test radio antenna line, to establish an equivalent signal level performance for each equipment configuration.

Coverage for the portable outdoor equipment configurations will be verified for acceptance by attenuation of the test radio for BER tests. The attenuation will be the difference between the test radio’s antenna system and the additional loss used in Motorola’s coverage prediction to account for portable antenna performance . The attenuator values are provided in Table 11-4.

This provides a method of verifying that the radio system provides the required BER for the specified CPC for each of the defined equipment configurations.

Below are the attenuator values required to evaluate each equipment configuration. The methodology to determine the attenuator value is demonstrated in TSB-88.1-D §5.4.2, Figure 5. The attenuator value includes the proper values for the equipment configuration requirement plus adjustments for the

test equipment setup. Should the test equipment setup losses (e.g. cable length) vary, an adjustment to the attenuator value may be required to represent the required equipment configuration accurately.

Table 11-4: Attenuator Values To Evaluate Each Equipment Configuration

User Equipment Configuration and Outdoor / In-Building	Attenuator Value
Portable Outdoors	[portable antenna loss]
Portable [In 18 dB Building]	[portable antenna loss] + 18dB

11.10.2.7 Required Number of Test Tiles in the Defined Test Area

The method used to test coverage is a statistical sampling of the defined test area to verify that the CPC is met or exceeded at the required reliability for each of the defined equipment configurations. It is impossible to verify every point within a defined test area, because there are infinite points; therefore, coverage reliability will be verified by sampling a statistically significant number of randomly selected locations, quasi-uniformly distributed throughout the defined test area. There is one test sample per test tile, where a sample consists of multiple sub-samples.

Coverage acceptance testing will be performed in the defined test area as indicated on Motorola-provided maps. To verify that the reliability requirement is met, the defined test area indicated on Motorola’s maps will be divided into uniformly sized test tiles, with at least the number of test tiles indicated in Table 11-2 Coverage Acceptance Test Summary. The number of test tiles indicated in Table 11-2 is at least the minimum required by the Estimate of Proportions formula as stated in section 1.2.1 (Defined Test Area) of this document.

Per TSB-88.3-D, the stated minimum outdoor tile size is 100 by 100 wavelengths; however, the minimum *practical* test tile size is typically about 400 by 400 meters (about 0.25 by 0.25 miles). The minimum practical tile size for any system is determined by the distance traveled at the speed of the test vehicle while sampling, GPS error margin, and availability of road access within very small test tiles. A related consideration is the time, resources, and cost involved in testing very large numbers of very small tiles. For a given defined test area, all test tiles must be of equal size. The maximum test tile size is 2 by 2 km (1.24 by 1.24 miles) [TSB-88.3-D, §5.5.1]. In some wide-area systems, this constraint on maximum tile size may dictate a greater number of test tiles than the minimum number required by the Estimate of Proportions formula.

No acceptance testing will be performed in locations outside the defined test area as indicated on the Motorola-provided maps. Motorola and MERA/Marin County may agree to perform “information only” tests in locations outside the defined test area; however, these “information only” test results will not be used for coverage acceptance. Any “information only” test locations must be defined before starting the test. If the added locations require significant additional time and resources to test, a change order will be required and Motorola may charge MERA/Marin County on a time-and-materials basis.

11.10.2.8 Accessibility to Test Tiles

Prior to testing, Motorola and MERA/Marin County will plan the route for the test vehicle(s) through the defined test area, to ensure that at least the minimum required number of tiles is tested. While planning the route (if possible) or during the test, Motorola and MERA/Marin County will identify any test tiles that are inaccessible for the coverage test (due to lack of roads, restricted land, etc.). Inaccessible tiles will be eliminated from the acceptance test calculation. [TSB-88.3-D, §5.5.4]

If elimination of inaccessible test tiles results in less than a statistically significant number of test tiles or substantially alters the defined test area, Motorola reserves the right to adjust the committed reliability based on the reduced number of accessible test tiles within the altered test area and the Estimate of Proportions formula. [TSB-88.3-D, §5.2.1, equation 2]

11.10.2.9 Random Selection of a Test Location in Each Tile

This CATP provides an objective method of randomly selecting and tracking test locations using Motorola's VoyagerSM coverage testing tool. The method has direct correlation with Motorola's coverage prediction methodology.

Using Voyager, the actual test location within each test tile will be randomly selected by the test vehicle crossing into the tile at an arbitrary point, with an arbitrary speed and direction. If the selected test location is in a shielded area such as a tunnel or underground parking garage, the data from that test location must be eliminated and a replacement test location must be used.

11.10.2.10 CPC Measurements in Each Tile

For Outbound and Inbound BER testing, complementary timing profiles will be used by Voyager and the Voyager Fixed Network application, VFNE-2, to interleave the inbound and outbound testing. VFNE-2 will be used to gather inbound test statistics. The mobile application, Voyager, will gather outbound test statistics and will send an inbound test pattern to VFNE-2.

11.10.3 Responsibilities and Preparation

This section identifies the responsibilities of MERA/Marin County and Motorola regarding requirements for equipment, personnel, and time during the coverage test.

MERA/Marin County will provide the following for the duration of the coverage test:

- At least one test vehicle(s) that is representative of the vehicles to be installed with radios, and will provide the driver(s).
- Exclusive use of the test channels required by Motorola during the test.
- Motorola will provide the following for the duration of the coverage test:
 - At least one Motorola Voyager coverage testing tool.
 - One or more computers equipped with Motorola VFNE-2 software, and connected to the radio network for collecting inbound signal statistics.
 - A timing profile to allow the test radio to transmit and receive at regular intervals will be established to facilitate automatic inbound and outbound BER statistics gathering.

As required, Motorola will provide a receiver signal strength calibration file for the test radio(s) used with the Voyager coverage testing tool.

Before starting the test, MERA/Marin County and Motorola will agree upon the time frame for Motorola's submission of a report containing the coverage test results.

11.10.4 CATP Procedures

A coverage acceptance test will be performed using Motorola's Voyager tool to randomly select test locations, and to manage BER data collection.

Voyager consists of the following:

- A voice test radio connected to an antenna installed in a representative location on the test vehicle. The test radio will monitor transmissions from the fixed network radio site(s).
- A Global Positioning System (GPS) receiver, which will provide the computer with the location and speed of the test vehicle.
- A laptop computer with Voyager software and a mapping database, which includes highways and local streets.
- A computer with the Voyager Fixed Network (VFNE-2) application, connected to the system network to retrieve inbound BER statistics and to initiate the outbound test pattern.

The procedure for the objective BER coverage test will be as follows:

- The Voyager tool will be installed in a test vehicle, which will be driven over a route planned to cover the accessible tiles within the defined test area.
- During the coverage test, the laptop computer screen will display the vehicle's location on a map of the defined test area overlaid with the grid of test tiles. Voyager will automatically initiate outbound measurements and inbound transmissions based on the defined timing profile. The computer will provide a visual indication that a measurement has been completed. Voyager will manage the coverage test data collection, and will store the outbound measurements for each tested tile for later analysis. Voyager will use the information collected by the VFNE-2 fixed end application for the inbound tests. Voyager will use its merge and export feature to match the inbound measurements to a test tile and display the BER statistics.
- For TDMA System Inbound/Outbound BER/SSI Coverage Testing, one channel is required. The TDMA inbound and outbound test will use a 1031Hz test pattern. A single TDMA channel can be used for both the inbound and outbound testing. The TDMA base stations must be put into test mode to gather inbound signal strength and BER information and to transmit the outbound test pattern. The outbound test will send the 1031 Hz pattern on both TDMA logical channel 0 and 1 at the same time. The inbound test from the mobile can use either TDMA logical channel 0 or TDMA logical channel 1. The Voyager Fixed Network (VFNE-2) application will connect to the system test port to establish an IP session to each base station to gather inbound signal statistics and initiate the outbound signal. The outbound test pattern, once initiated, will send a continuous 0.153 test pattern over the air to allow the radio in the Voyager test vehicle to gather signal statistics whenever a test is initiated.

11.10.5 CATP Documentation and Coverage Acceptance

During the coverage acceptance test, Voyager generates computer files that include the raw test data. A copy of this data will be provided to MERA/Marin County at the conclusion of the coverage test. Motorola will process this data to produce a map detailing the coverage test results, and to determine whether the coverage test was passed for each user equipment configuration.

The coverage acceptance criterion for a user equipment configuration will be that the voice radio system implemented by Motorola for MERA/Marin County meets or exceeds the reliability stated in Table 11-2 Coverage Acceptance Test Summary for that user equipment configuration. The system coverage acceptance criterion will be the successful passing of each of the user equipment configurations defined in Table 11-2 Coverage Acceptance Test Summary.

Motorola reserves the right to review any test tiles that fail. If a coverage test, or a portion thereof, is suspected by Motorola to have failed due to external interference, those tiles suspected of being affected by an interferer may be re-tested. If the test tiles re-tested are confirmed to have failed due to



interference or external noise, those test tiles will be excluded from all acceptance calculations and Motorola will work with MERA/Marin County to identify potential solutions to the interference issues.

Motorola will conduct this Coverage Acceptance Test only once. If any portion of the test is determined to be affected by proven equipment malfunctions or failures, Motorola will repeat the portion of the test affected by the equipment malfunction or failure. MERA/Marin County will have the option to accept the coverage at any time prior to completion of the coverage test or documentation process.

Motorola will submit to MERA/Marin County a report detailing the coverage test results. This report will include a document, which is to be signed by both MERA/Marin County and Motorola, indicating the test was performed in accordance with this CATP and the results of the test indicate the acceptance or non-acceptance of the coverage portion of the system.

11.11 30-DAY OPERATION TEST

11.11.1 30-Day Operational Burn-In Period

The 30-day Operational Burn-In test is designed to demonstrate the successful operation of the system over a period of time. The 30-day standalone test requires the P25 system to operate within the required parameters of the final system design without failure as described below. This test includes all infrastructure equipment installed and/or programmed prior to the beginning of the test. This test shall run for 30 days without a major failure, as identified below. The final details of the test and the methodology of the test shall be defined during the Detailed Design Review and shall include the following:

- Evaluation Period.
- Major Operational Fault Defined.
- Operational Fault Identification Procedure.
- Operational Fault Testing Procedure.
- Test Restart for Operational Fault Repair.
- Successful Completion of the 30 Day Period Test.

Motorola with the help of the Marin County personnel shall document all communications outages or degradation to communications quality whether or not they are attributable to work or materials provided by Motorola. Documentation shall include but is not limited to:

- Test start and stop dates and times.
- Explanations for the outages or degradation and all corrective action.

A copy of the document shall be provided to the County on a weekly basis during the test, and the completed original document shall be provided to the County upon completion of the 30-day test. Final system acceptance of the P25 system follows the successful completion of the test.

Test Methodology of Testing

The test methodology for the 30-day functional burn in testing is described in the following sections.

Evaluation Period

The evaluation period for the P25 System shall begin at 8:00 AM on the test day decided during the Detailed Design Review, and shall run for a duration of 30 calendar days (excluding scheduled down time or maintenance). If at any time during the 30-day test period, the County feels that the system



has met all requirements, and is operating to the County's complete satisfaction the test can be terminated and can proceed to the Final Project Acceptance phase.

Major Operational Fault Defined

A major operational failure is defined as the following:

- Any failure which causes a loss of 20% or more in capacity or coverage (Any failure resulting in the loss of one entire trunked site or 2 or more simulcast channels at all sites.)
- Any failure which causes a loss of simulcast capability for more than 1 minute.
- Any failure which causes the loss of the primary core.
- Any failure that causes the loss of 10% or more of the consoles.
- Any failure that causes 20% of the repeaters to fail at any one site.
- Concurrent failure of two or more switches and/or routers.
- Corruption of any system database.

All of the above faults will be considered major operational faults provided they are a failure of Motorola provided equipment and not the Marin County provided equipment or networks such as any existing T1, microwave, fiber or MPLS systems.

The following failures are not considered major operational faults and shall not be charged against the 30-day test:

- Failure of any single component that does not create a major operational fault as defined above. For example, the failure of a redundant core component.
- Marin County provided subsystems.
- Marin County provided microwave or fiber links
- Marin County provided software.
- Communication outages or degradation to communications quality that are not attributable to the work performed or the materials provided by Motorola.
- A site/simulcast cell in Site Trunking operation for 1 minute or less does not constitute a complete failure of a simulcast cell or site.

Operational Fault Identification Procedure

If the County perceives a fault, the County has the responsibility for notifying Motorola within 12 hours of the fault. The County shall track and summarize all problem reports related to the System and with Motorola personnel determine if the fault is caused solely by the Motorola equipment. Motorola will then repair the fault at no charge to the County. Motorola will use the Operational Fault Testing Procedure, described below, to determine the nature of the perceived fault.

Operational Fault Testing Procedure

Motorola will use proven troubleshooting and test equipment procedures as well as experienced personnel to verify the fault. Motorola will use the same equipment and procedures that were used to complete the testing and optimization of the system to verify the fault. Successful verification of the fault, as defined by the Major Operational Fault criteria, will result in the implementation of the repairs to correct the Operational Fault.

Test Restart for Operational Fault Repair

In the event of a major operational fault, the existing 30-day evaluation period will terminate. Motorola shall repair any verified Operational Fault. If a repair can't be made immediately, the County will be notified of the scheduled repair time. Upon successful implementation of the repairs, Motorola shall notify the County. The County, in conjunction with Motorola, shall test the repairs to

ensure full operations of the system. At the completion of the operational test, the 30-day test shall resume upon the following calendar day.

In the event of a catastrophic system failure, the respective Program Managers of Motorola and the County will negotiate the point at which the Acceptance Testing will resume.

If failures that are not considered major operational faults occur, the test shall be suspended until such time as the problem is corrected. The test shall then resume from the time it was suspended. The duration of the test suspension shall not count as part of the 30-day test.

Except as expressly listed, any other defect is not an operational fault or Motorola's responsibility. For example, everything beyond the Motorola defined demarcation points is the responsibility of the County. Other Motorola components that may fail during the evaluation period will be repaired under warranty at no charge to the County, but shall not be an operational fault.

Successful Completion of the 30 Day Period

At the successful completion of the 30 day Operational Period, as defined by the Key Performance Indicators, the test will be deemed successful and the Final System Acceptance shall be granted.