



Title:	P25 Failure and Fallback Operating Procedures	SOP No:	ITS-RADIO-012
Revision:	1.0	Effective Date:	August 1, 2014
Owner:	Manager Radio Services	Department:	IT Solutions

## **Failure and Fallback Operating Procedures**

### **1 Purpose**

Define standard operating procedures during failure and fallback modes of operation including specific response protocol to differing severity levels for administrators, technicians, dispatchers, end users and external customers.

### **2 Scope**

This policy applies to internal and external agencies that operate on the CFW P25 radio network for primary radio communications.

### **3 References**

None.

### **4 Conditions for Exemption**

Exceptions to the policy must be approved by the Senior Manager over Radio Services.

### **5 Justification**

Documented and implemented operating procedures during backup modes of operation provide clearly defined guidelines that must be complied with during unexpected system failures, scenarios that limit or disrupt communications, and system maintenance or upgrades.

### **6 Failure and Fallback Modes of Operation Rules**

The following section describes types of failure modes specific to the City of Fort Worth P25 network and their fallback modes of operation. Alarms on the CFW P25 radio network are continuously detected and monitored by Motorola's Network Monitoring Operation Center (NMO). The System Manager also periodically reviews CFW alarms on the Universal Event Manager (UEM). Alarm monitoring and response is dependent on the specific agency's Customer Support Plan with Motorola.

The CFW recommends that all agencies develop preplanned and fully documented standard operating procedures (SOP) for failure and fallback modes that are specific to their implementation and operation. Disaster Recovery Plans (DRP) should also be developed and



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communicated. SOP's and DRP's should be regularly exercised so end users, administrators, dispatchers and system managers understand their responsibilities in these scenarios to minimize the impact to communications and functionality when they occur.

The failure modes describe in this section are categorized by the City of Fort Worth's priority levels rather than Motorola severity levels. The specific severity level and response plan for each external agency will be dependent on their Customer Support Plan with Motorola. Priority levels can be escalated and elevated by the City of Fort Worth should a failure scenario require a more immediate response plan than that defined by the original failure.

### **6.1 Wide Area Simulcast Failsoft – CFW Priority Level 0 Failure**

#### **Failure Scenarios:**

The failure conditions below result in the CFW P25 network entering wide area simulcast failsoft.

- The CFW system will enter wide area simulcast failsoft in a catastrophic loss of the entire Eagle Mountain site resulting in loss of the master and prime simulcast site for Layer 1. As a result, Layer 1 will cease to operate. Once Layer 2 and Dispatch reestablish connection to the DSR Backup in Irving, wide area communications will resume. However, Layer 1 will remain disabled until Eagle Mountain is restored.
- Wide Area Simulcast Failsoft would also occur in the unlikely event that both the active and redundant prime simulcast controllers or prime site routers failed in either simulcast cell Layer 1 or Layer 2. The failed layer will cease to operate. In this case, capacity will be limited on the active simulcast layer which did not experience the failure.

#### **Fallback Mode of Operation:**

In Simulcast Failsoft mode, consoles will dispatch via control stations on the active layer. Subscribers must initiate a manual mode change to revert to backup talkgroups on the active layer to maintain site trunking and dispatch communications. Since radio system traffic will increase on the active layer in this limited mode of operation, communications should be limited to critical and sensitive.

External users equipped with backup talkgroups on the active layer may also revert to site trunking. Otherwise, interoperability mutual aid channels must be utilized as designated in the [Fort Worth Interoperable Communications Plan](#).



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Once connection to the DSR backup is established for Dispatch and Layer 2, wide area trunking communications will resume with limited capacity until Layer 1 is restored at Eagle Mountain.

### **Response Time**

Response is provided continuously. As a priority 0 major system failure, response time is 7x24x365 within one hour from receipt of notification.

However, a complete site failure of Eagle Mountain will require a more detailed longer term response plan that will be developed and communicated to all affected agencies..

## **6.2 Simulcast Site Trunking – CFW Priority Level 0 Failure**

### **Failure Description:**

Site Trunking will occur in the unlikely event that both the active and redundant master site zone controllers; enterprise switches or core routers fail at Eagle Mountain. In this scenario, both simulcast Layer 1 and Layer 2 as well as dispatch will revert to site trunking until connection to the DSR backup in Irving is established.

### **Fallback Mode of Operation:**

In site trunking mode, consoles must dispatch via control stations. CFW subscribers will continue operations on either Layer 1 or Layer 2 but will not be able to communicate wide area between layers or with dispatch until connection is established to the DSR backup in Irving.

In the interim period, external users equipped with backup talkgroups on the active layer may also revert to site trunking. Otherwise, interoperability mutual aid channels must be utilized as designated in the Fort Worth Interoperable Communications Plan.

### **Response Time:**

Response is provided continuously. As a priority level 0 major system failure, response time is 7x24x365 within one hour from receipt of notification.

## **6.3 Loss of Channels – CFW Priority Level 0 Failure**

### **Failure Description:**

The failure scenarios described below result in a loss of channels and possibly reduced coverage and capacity. Failures resulting in loss of up to 25% of channels is a CFW priority level 2. Failures resulting in loss of greater than 25% channels is a CFW priority level 0.



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- Failure of a simulcast prime or remote site ethernet switch will result in the loss of all channels connected to the failed switch and result in limited capacity on the affected simulcast layer.
- Complete failure of a simulcast remote site will result in reduced coverage on both simulcast layers at that location.

**Fallback Mode of Operation:**

A failure of a simulcast prime or remote site ethernet switch will disable all associated channels on the affected simulcast layer. System traffic will increase in this mode of operation and communications should be limited to critical and sensitive. The system will remain in wide area simulcast trunking mode with limited channel capacity.

For remote site ethernet switch failures, the affected simulcast layer may be configured to remove the remote site with failed ethernet switch but this option would reduce coverage.

Simulcast remote sites that are completely unavailable will subsequently reduce coverage on the system until restored.

**Response Time:**

Response is provided continuously. As a priority level 0 major system failure, response time is 7x24x365 within one hour from receipt of notification.

***6.4 Reduced Function – CFW Priority Level 2 Failure***

**Failure Description:**

The failures described below result in a loss of function, features or service on a limited basis.

- Loss of both primary and redundant simulcast remote site routers will result in a loss of network management; reporting and software download capability at that location only.
- Failure of a single base station or comparator at a simulcast site will result in the channel being removed from operation on the affected simulcast layer. However, the system will remain in Simulcast trunking mode.



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**Fallback Mode of Operation:**

The system will remain in wide area simulcast trunking with reduced functionality as described in the failure description. Failure of a channel also results in slightly reduced capacity on the affected simulcast layer.

**Response Time**

A priority level 2 defined as significant system impairment. Response time for dispatch service is within four hours from receipt of notification 8x5 on standard business days. System problems are monitored.

***6.5 Dispatch Console Failures – CFW Priority Levels 0 and 1 (see below)***

**Failure Description:**

The failures below result in a loss of function, features or service on a limited basis at dispatch console sites.

- Failure of a single dispatch operator position results in it being unavailable for dispatch functions is considered a CFW priority level 1.
- Failure of one of the dispatch console site ethernet switches results in a loss of all dispatch operator positions associated with the failed switch which is a CFW priority level 0.
- Failure of a both dispatch console site routers result in the loss of connectivity to the Eagle Mountain master site which is a CFW priority level 0.

**Fallback Mode of Operation:**

Each of the dispatch console failures described above result in the loss of dispatch operator position use and/or functionality. Dispatchers must revert to fallback control stations for wireless dispatch capability or relocate to a functional dispatch position until the failure is resolved.

**Response Time**

Response is provided continuously. As a priority level 0 or 1 major system failure, response time is 7x24x365 within one hour from receipt of notification.



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## **6.6 Standard Operating Procedures for Failures**

### **Failure Description:**

Whether the cause of a failure is known or unexplained, users must be familiar with standard protocol to ensure continued operations, interoperability and mission critical communications. Each agency operating on the CFW P25 radio network should refer to their individual SOP for fallback modes of operation and disaster recovery plans as well as the interoperability plan.

### **Fallback Mode of Operation:**

Subscribers – Radios that receive an “out of range tone” on their mobiles or portables should immediately revert to their backup mode of operation as established by their individual departments and agencies and as dictated in the Fort Worth Interoperable Communications Plan.

Consoles – Consoles that receive a failure indication on their dispatch operator positions should revert to fallback control stations as dictated by their individual departments and agencies policies.

## **7 Supporting Documentation**

Each external agency’s specific executed ILA Agreement with the City of Fort Worth.

Each external agency’s specific Customer Support Plan with Motorola outlines the maintenance services and response times available for various failure scenarios.

[Fort Worth Interoperable Communications Plan.](#)



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### ***Version Control***

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1.0	8/1/2014	Original version	Abinta Khan