

KAIROS / S-Trunking

Release Note

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1. Release Information

This document describes S-Trunking that Radio Activity KAIROS supports.

1.1. Overview

1.1.1. What's S-Trunking

S-Trunking is JVCKENWOOD proprietary DMR-based TDMA Trunking system.

Presently, we support DMR Tier III Trunking, and it's a centralized trunked relay system that has exclusive control channel (FB8)*. In this system, each site has a Trunking Station Control Channel (TSCC) which transmits continuously. Therefore, it can provide large-scale and stably communication service to a Subscriber Unit (SU). However, DMR Tier III Trunking doesn't conform shared channel (FB6)* licenses for private carriers, a user shares frequencies with another user/agencies, because a site's TSCC exclusively occupies a frequency.

JVCKENWOOD newly supports S-Trunking to conform shared channel licenses environment. In order to conform it, a TSCC is basically transmitted intermittently, please refer the following table and figure. So, our customer can deploy trunked systems under private carrier licenses.

Table: System specification

	S-Trunking	DMR Tier III Trunking
Specifications	JVCKENWOOD proprietary	ETSI TS 102 361-4
TSCC transmission	intermittently	continuously

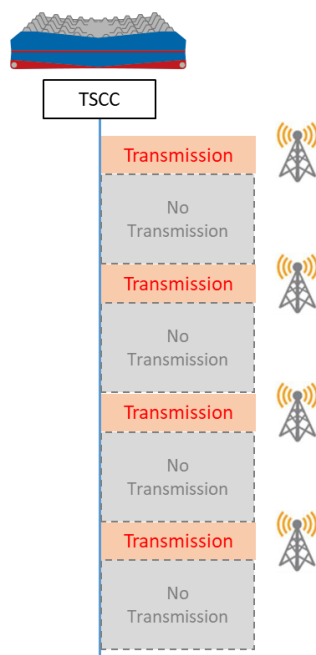


Figure: S-Trunking site

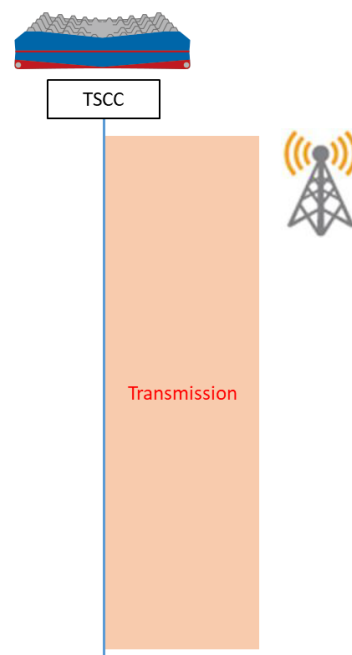


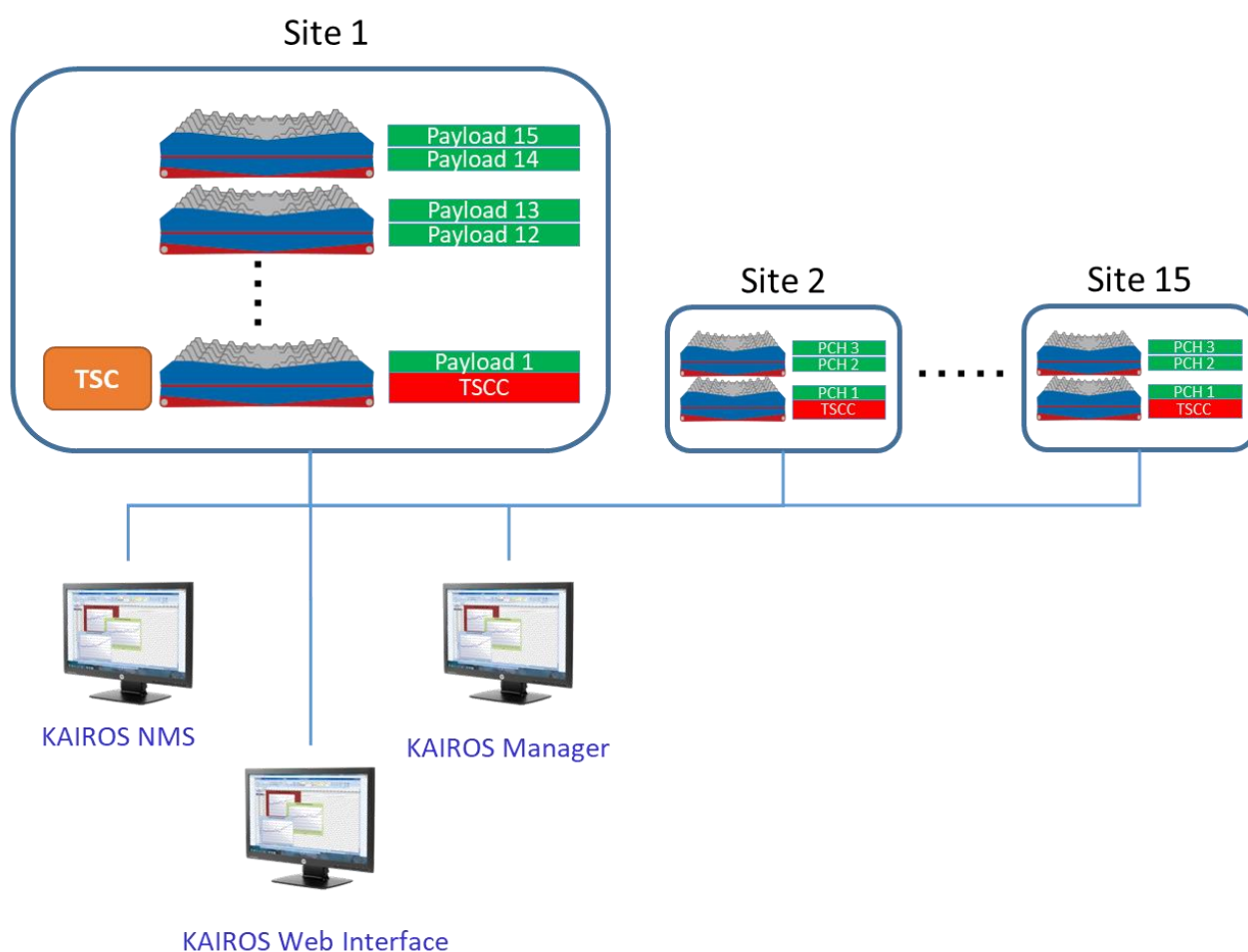
Figure: DMR Tier III Trunking site

Note:

Shared channel (FB6) and Exclusive control channel (FB8) are Station Class Codes defined by the FCC of United States. The code describes the purpose for which a particular station is used.

A system consists of certain number of Payload channels and a TSCC, and it scales up to 15 sites and 8 repeaters (1 TSCC and 15 Payload) for each site.

A TSCC is intermittently in transmission and it is controlled by Trunking System Controller (TSC) which manages an access from SU (Subscriber Unit) and allocates a Payload channel as appropriate.



- **KAIROS Manager:** It is a software for frequency setting, color code setting and TSC software writing, etc.
- **KAIROS Web Interface:** Connect to Web Server in KAIROS by a web browser to set up dedicated IP address of TSC and start TSC, etc.
- **KAIROS NMS (Network Management System):** Connect to TSC in KAIROS by a web browser to make detail setting of S-Trunking.

Note: Firefox is recommended as a web browser.

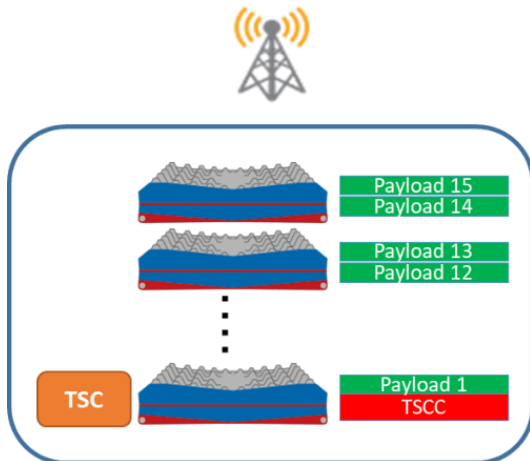
1.1.2. Features of KAIROS S-Trunking

- KAIROS S-Trunking supports a larger Traffic Capacity with enhanced call function, security, and provides comfortable communication for easier user operation than the DMR Tier II Conventional system.
- Multiple applications run on the reliable Linux OS in KAIROS.
- Since KAIROS can install Trunking System Controller (TSC) to itself as software, there is no need to separately prepare an industrial server for TSC.
- KAIROS can simplify the system configuration in a site, the number of equipment is small, power consumption is low, and heat generation can be suppressed. It also improves reliability in case of failure.
- 16 million types of Unit ID and Group ID are possible.
- The KAIROS S-Trunking Network structure is based on the Distributed controller structure. This architecture reduces processing load on each cell, reduces the required IP bandwidth, and speeds up the communication channel allocation process.
- Migration from DMR Tier II to S-Trunking is easy. KAIROS currently in use on DMR Tier II can be changed to S-Trunking.
- KAIROS conduct carrier sense before transmitting, and it can restrict the transmission to avoid interference with another user/agencies under shared licenses environment.

1.2. Supported Network Model

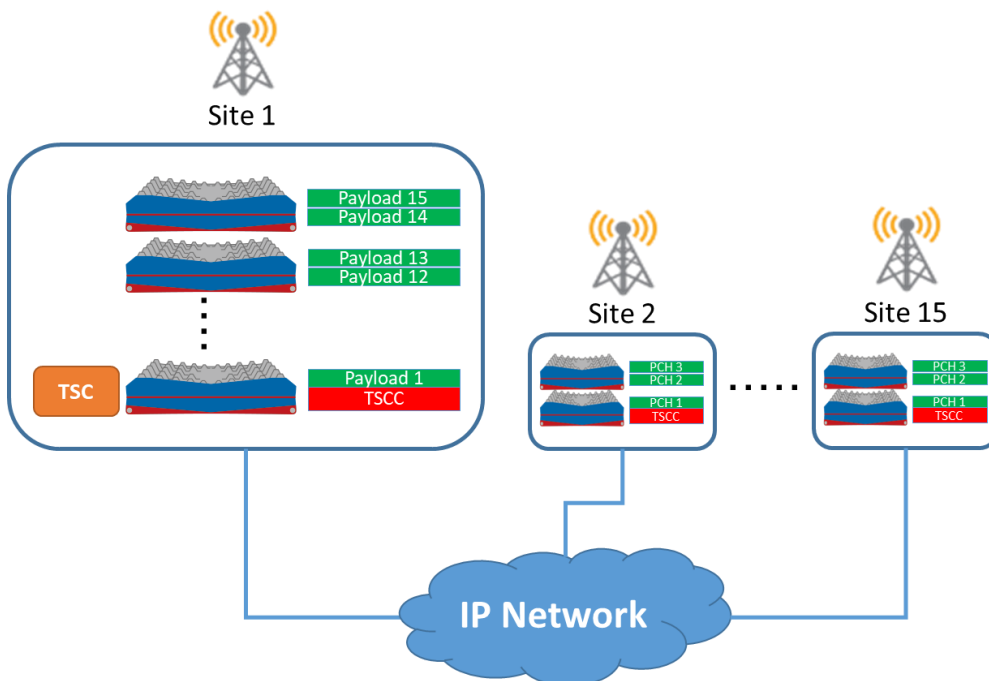
1.2.1. Single Site Trunking

This is most basic S-Trunking site which is suitable when traffic is high in a small area. When Traffic is high, it's available to increase the site's Payload channel. The limited size is up to 8 KAIROS (1 TSCC and 15 Payload).



1.2.2. Multisite Trunking

Multisite can be installed when it is necessary to cover a Wide Area. Each site needs to connect with a stable IP network. When Traffic is high, it's available to increase the site's Payload channel. The system size is up to 15 sites and 8 KAIROS (1 TSCC and 15 Payload) for each site.



1.3. Features Compalison

Features		S-Trunking System	DMR Tier III Trunking System
System			
Limited size	Sites for the entire system	Network Model Tiny: 7 Small: 15 Large: 15 Huge: 15	Network Model Tiny: 7 Small: 31 Large: 255 Huge: 1023
	Channels per site	8 KAIROS (16 slots)	TBD
	GPS capacity per site	300	1000
Simulcast		N/A	✓
Fixed Channel Plan		✓	✓
Trunking Type (Message/Transmission/Quasi-Transmission)		✓	✓
Call Type – Destination			
Group Call		✓	✓
Individual Call (OACSU/FOACSU)		✓	✓
Broadcast Call		✓	✓
All Call		✓	✓
Call Type – Status			
Status Message		✓	✓
Emergency Status Message		✓	✓
Radio Check (Status Polling)		✓	✓
Call Type – Unified Data Transport			
Short Data Message		✓	✓
GPS Data Message		✓	✓
GPS Data Polling		✓	✓
Call Type – Packet Data Call			
Long Data Message		✓	✓
Transparent		✓	✓
OTAP (Over-the-Air Programming)		✓	✓
Call Type – Other			
Priority Call		✓	✓
Emergency Call		✓	✓
Emergency Alarm		✓	✓
Stun/Revive		✓	✓
Kill		✓	✓
Remote Monitor (Ambient Listening)		✓	✓
Transmit Interrupt		✓	✓

Call Cancellation	✓	✓
Late Entry	✓	✓
Trunking Features		
Registration	✓	✓
Power Save	N/A (*1)	✓
Authentication	✓	✓
Group Subscription	✓	✓
De-registration	✓	✓
Adjacent Site Information	✓	✓
Other		
Continuous Wave Identification (CW ID)	✓	✓
Cross Busy (Carrier Sense)	✓	N/A

Note:

- *1 In case of S-Trunking system, a SU (Subscriber Unit) executes "Power Save" feature on a stand-alone.

1.4. License Activation

When operating S-Trunking system, it is necessary to activate licenses for KAIROS.

Figure: KAIROS Web Interface

Current keys status:	
DMR licence	is activated for LIFETIME
Analog licence	is activated for LIFETIME
Tier 3 licence	is activated for LIFETIME
Net Control licence	is activated for LIFETIME
SNMP licence	is activated for LIFETIME
POCSAG licence	is activated for LIFETIME
MTCS licence	is activated for LIFETIME
Simulcast licence	is activated for LIFETIME
P25 licence	is activated for LIFETIME
TX licence	is activated for LIFETIME
SIP licence	is activated for LIFETIME
Amateur Radio Features licence	has EXPIRED
Raw Port licence	has EXPIRED
Audio from web licence	is activated for LIFETIME
VVF Features licence	has EXPIRED
S-Trunking licence	has EXPIRED
1+1 redundancy licence	is activated for LIFETIME
Multi-Site Trunking licence	has EXPIRED
TSC licence	has EXPIRED
Number 19 licence	has EXPIRED
Number 20 licence	has EXPIRED
Number 21 licence	has EXPIRED
Number 22 licence	has EXPIRED
Number 23 licence	has EXPIRED
Number 24 licence	has EXPIRED
Number 25 licence	has EXPIRED
Number 26 licence	has EXPIRED
Number 27 licence	has EXPIRED
Number 28 licence	has EXPIRED
Number 29 licence	has EXPIRED
Number 30 licence	has EXPIRED
Region	World Wide

**The screen was taken when the product was still under development. The actual product may look different.*

➤ Mandatory licenses

Following is required for each KAIROS.

DMR license

S-Trunking license

Following is required for KAIROS which is installed TSC.

TSC (Trunking System Controller) license

➤ Optional licenses

Following is required for each KAIROS to operate in multisite system.

Multi-Site license