

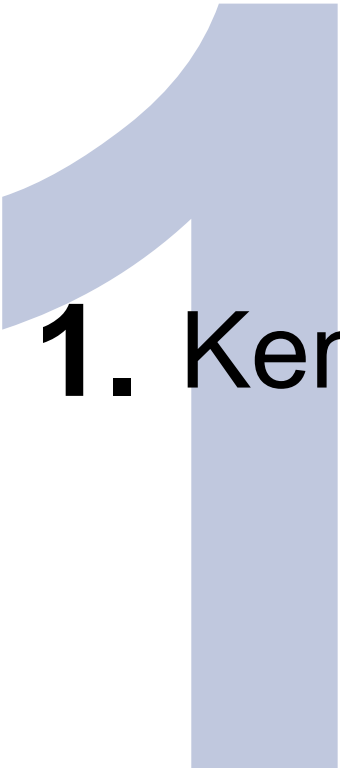
KDM: Istanbul – June 2019

# DMR Trunking Systems

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Stephen EDWARDS

# Agenda

1. Kenwood DMR Trunking Overview
2. Kenwood DMR Tier III Trunking
3. Kenwood DMR-S Trunking
4. Kenwood DMR Tier III Terminals
5. Applications
6. Summary

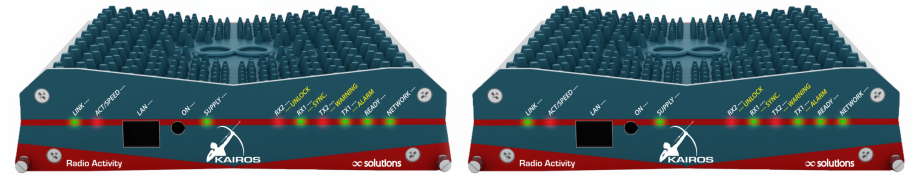


# 1. Kenwood DMR Trunking Overview

# Kenwood DMR Trunking type

## ◆ Kenwood DMR Tier III Trunking

\* ETSI Compliant Trunking



## ◆ Kenwood DMR-S Trunking

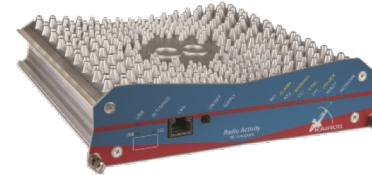
\* Proprietary Trunking



# Kenwood DMR Trunking Components

## ◆ Repeater Kairos

- ◆ Kairos KA-160 / KA-450 / KA-900



## ◆ Mid Tier NX-3000

- ◆ Portable NX-3200/3300/3400/3220/3320/3420
- ◆ Mobile NX-3720/3820/3920/
  - ◆ FPU / FW Version 2.00 ~



## ◆ High Tier NX-5000

- ◆ Portable NX-5200/5300/5400
- ◆ Mobile NX-5700/5800/5900
  - ◆ FPU / FW Version 3.00 ~





## **2. Kenwood DMR Tier III Trunking**

# Kenwood DMR Tier III Trunking Overview

## ◆ System features:

- ❑ DMR Tier III standard features (ETSI TS 102 361-4 V1.9.2;)
- ❑ Interoperability with third party manufacturers;
- ❑ Dedicated Control Channel
- ❑ Number of Sites: Unlimited
- ❑ Number of Channels per site: Up to 400

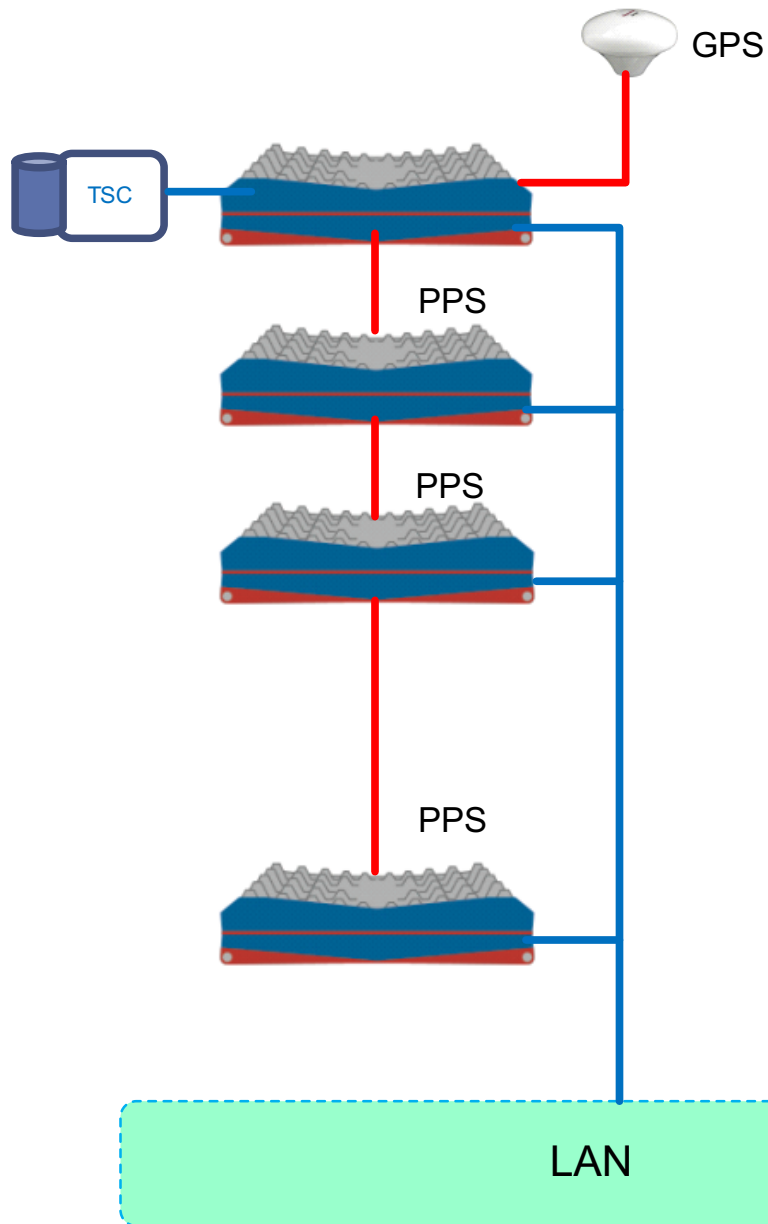
# Kenwood DMR Tier III Trunking Overview

## ◆ Subscriber features:

- ❑ Group Call
- ❑ Individual Call (FOACSU/OACSU)
- ❑ Broadcast Call
- ❑ Telephone Call
- ❑ Status Call
- ❑ Short Data Call
- ❑ Emergency Call
- ❑ Emergency Alarm
- ❑ Encryption Call
- ❑ Power Save
- ❑ Authentication
- ❑ Remoter Stun/Revive/Kill (Decode Only)
- ❑ Remote Monitor
- ❑ Group Subscription
- ❑ GPS
- ❑ Dialling (Fleet Dialling Plan)
- ❑ Control Channel Hunt
- ❑ OAA (Over-the-Air-Alias)
- ❑ Emergency Status
- ❑ Group ID Scan/Single Zone Scan
- ❑ Alternate Zone-Channel
- ❑ Radio Check
- ❑ Long Data Call
- ❑ External PTT (Direct Channel)



# Kenwood DMR Tier III Trunking - Single Site Configuration

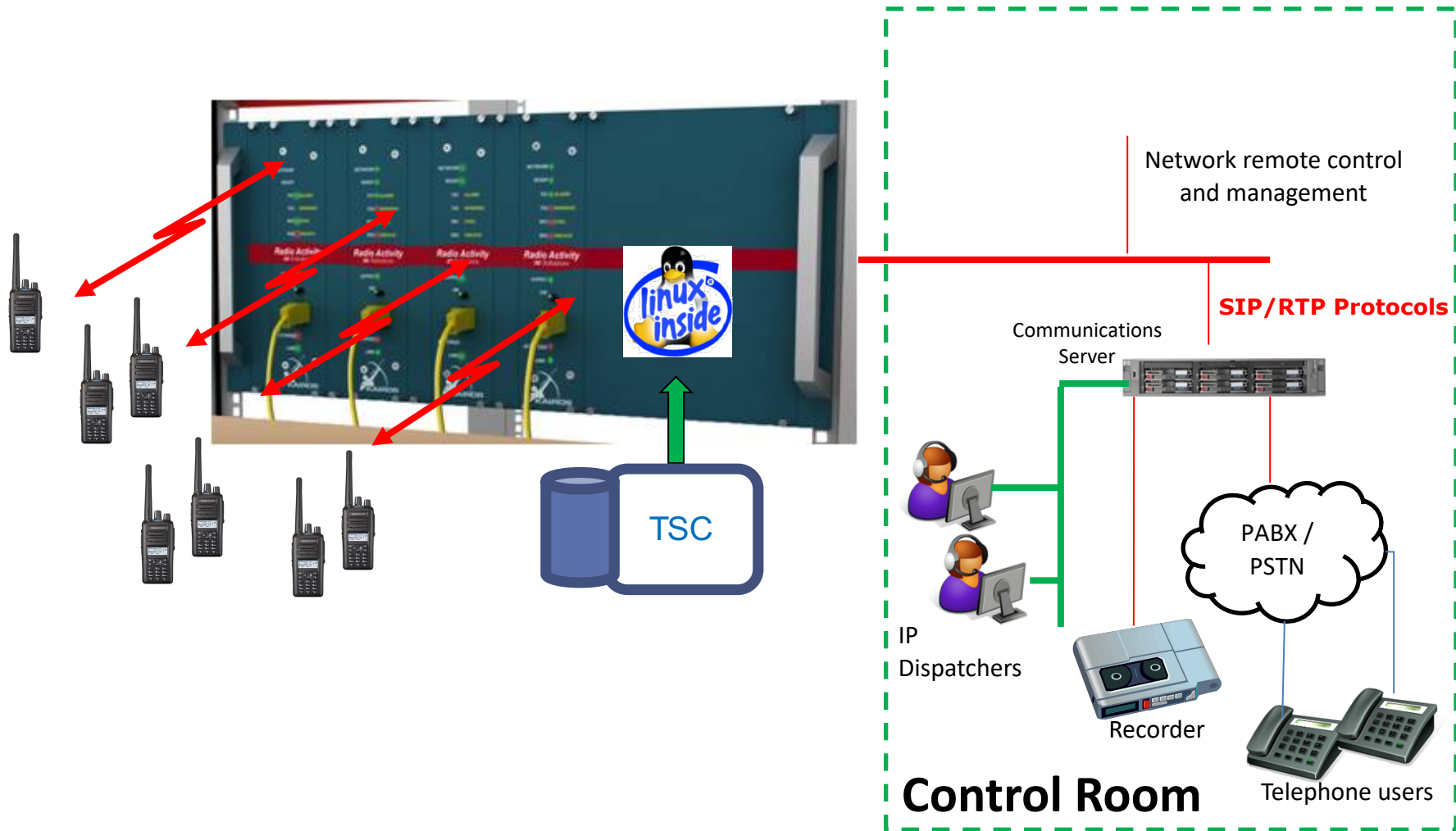


- ◆ KAIROS Repeaters;
- ◆ KA-VOC-2;
- ◆ Flat Cable;
- ◆ KAIROS Manager;
- ◆ KAIROS Web;
- ◆ KAIROS Network Management System (KA NMS)

# Kenwood DMR Tier III Trunking - Single Site Configuration

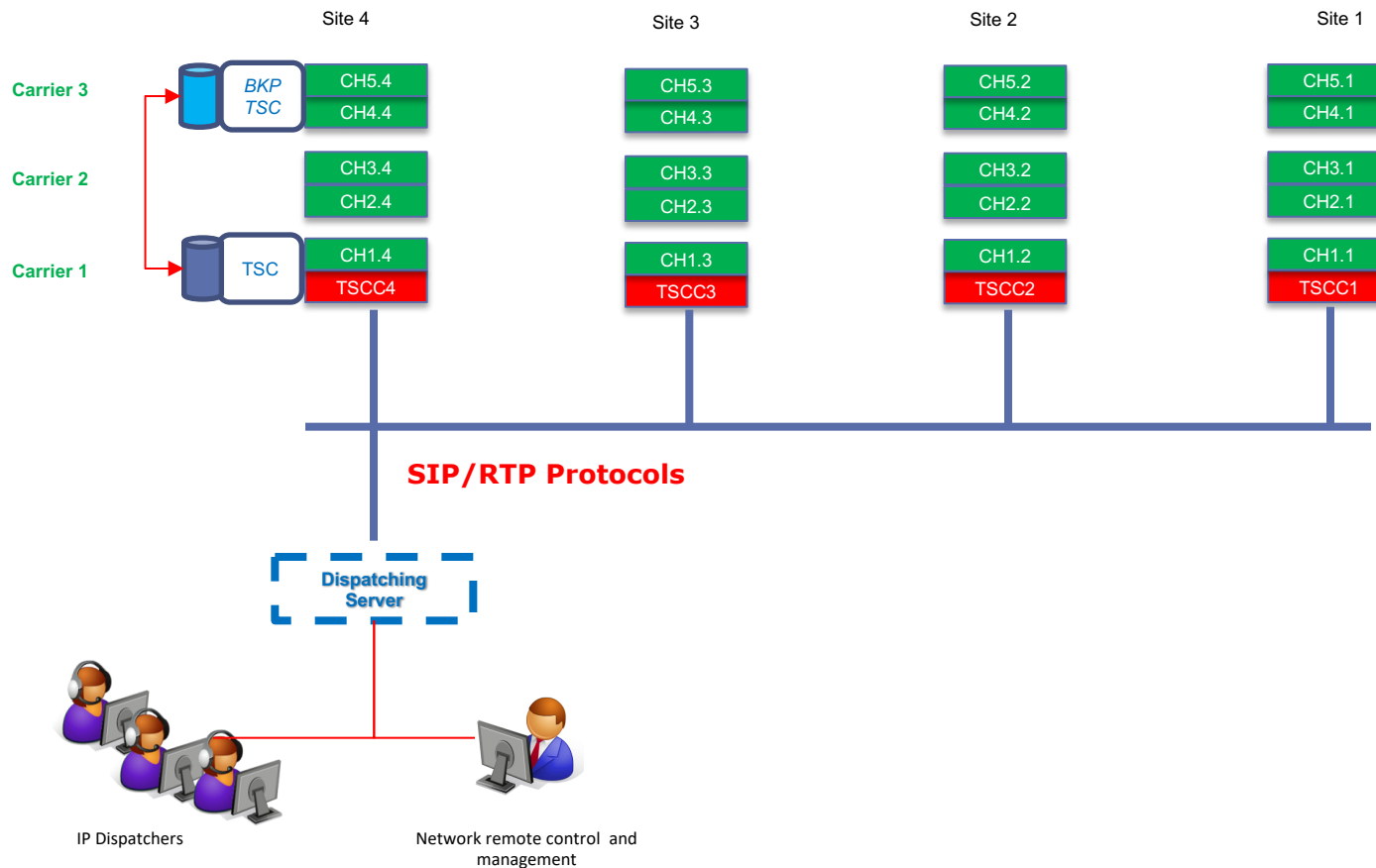
- ◆ **KAIROS Repeater:** One physical channel can be used for two channels of logical channels.
- ◆ **KA-VOC-2:** This is DMR Vocoder. It's better installed on the KAIROS main unit for the future maintenance.
- ◆ **Flat Cable:** Used for Synchronization between KAIROS located in the same site.
- ◆ **KAIROS Manager:** Software for Windows PC. KAIROS frequency setting, Color Code setting, Tier II/III switching, writing of Tier III Controller firmware, Tier III setting (part), etc.
- ◆ **KAIROS Web:** Connect to the Web Server in KAIROS using Browser, set the dedicated IP address of the Trunking Site Controller (TSC), start TSC, etc. Firefox is required as a browser.
- ◆ **KAIROS Network Management System (KA NMS):** Use Browser to connect to Tier III Controller in KAIROS and make detailed settings for Tier III. Firefox is required as a browser.

# Kenwood DMR Tier III Trunking - Single Site Configuration



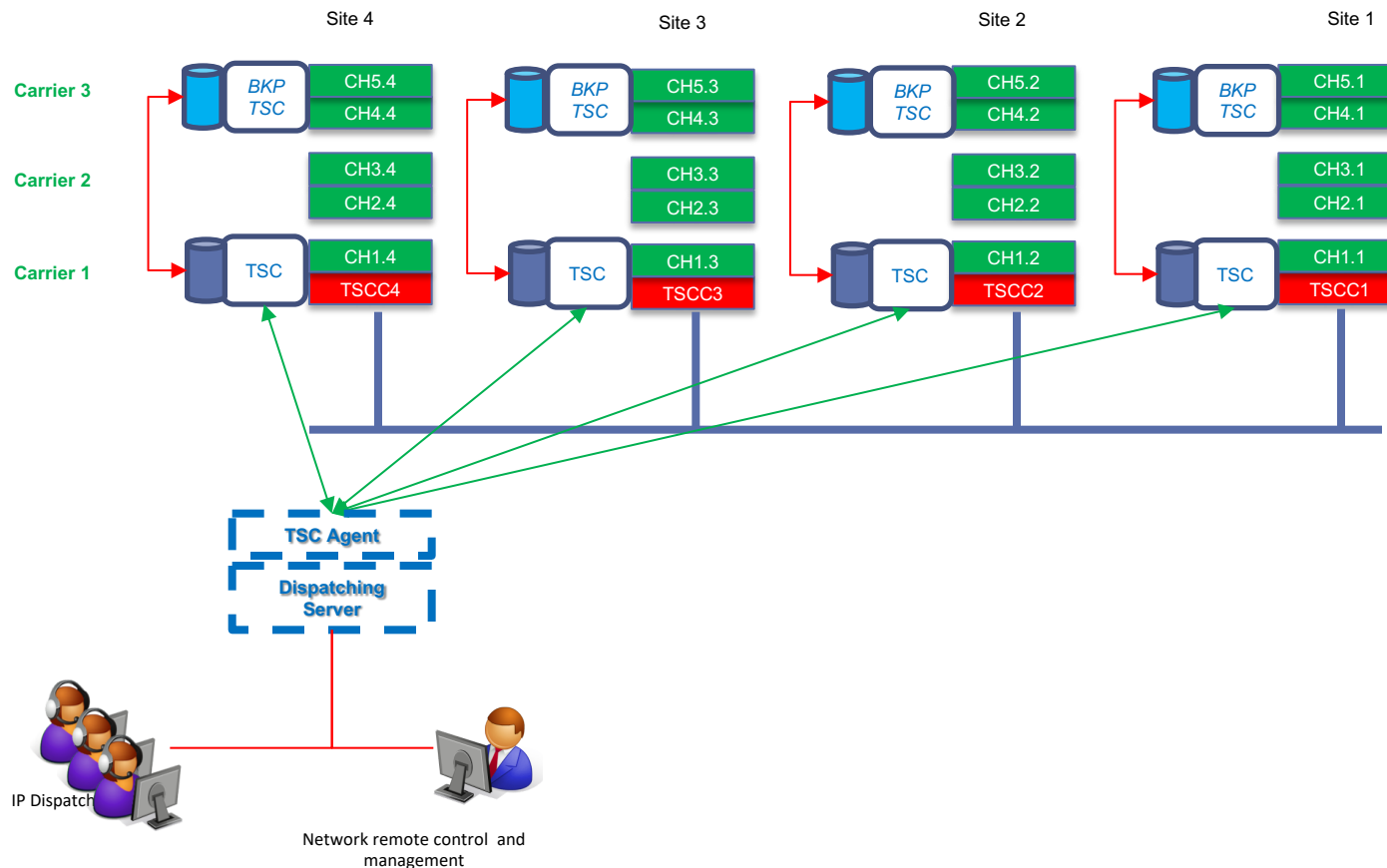
# DMR Tier III Trunking – Multisite Multifrequency (Centralised)

- ◆ Centralised Built-in DMR Tier III Controller
- ◆ The network has a main System Controller (TSC) and the backup replica (BKP TSC)
- ◆ Cost effective solution with minimum IP bandwidth requirements



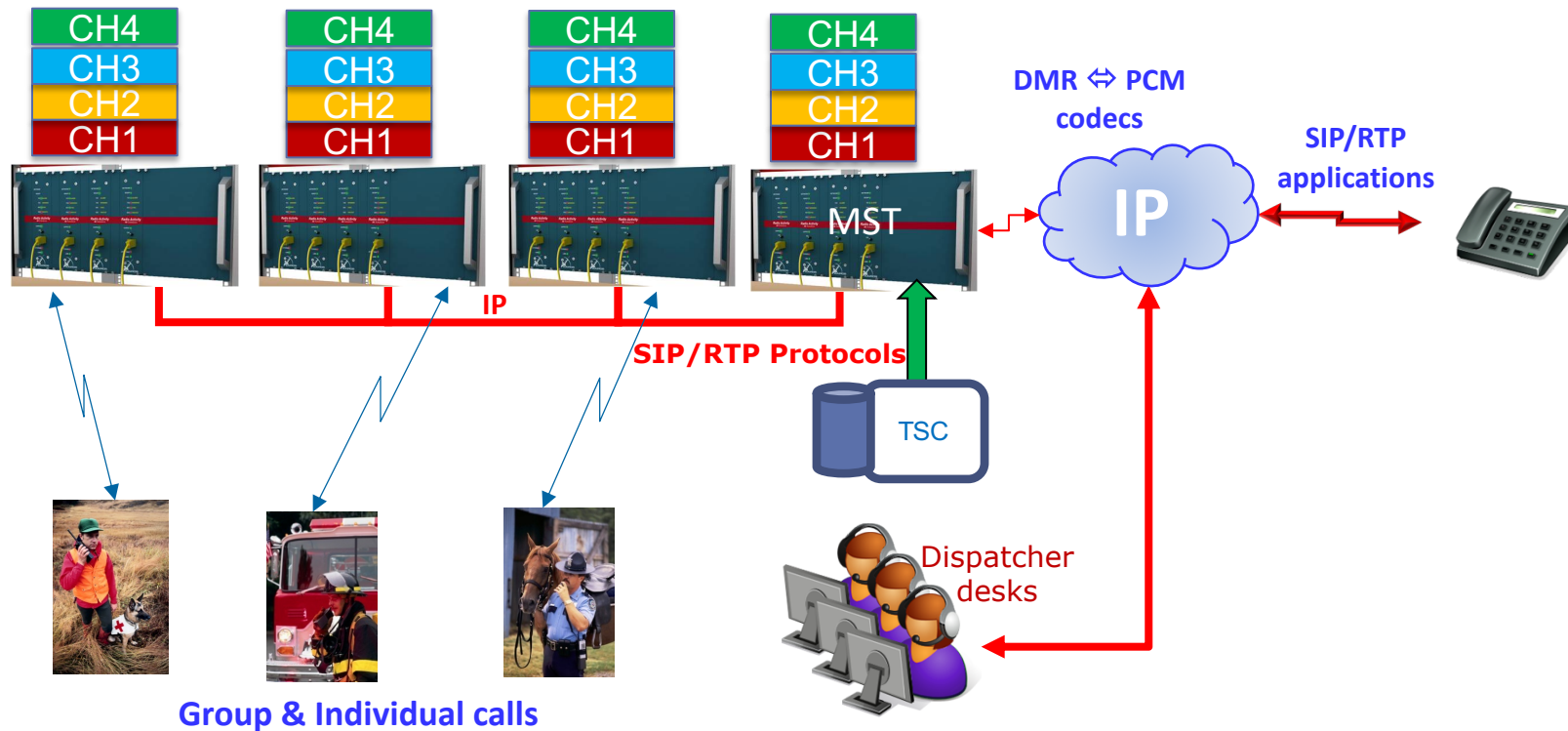
# DMR Tier III Trunking – Multisite Multifrequency (Distributed)

- ◆ Distributed Built-in DMR Tier III Controller
- ◆ Each site has got its Controller (TSC) and the backup replica (BKP TSC)
- ◆ Robust architecture without a “single point of failure”



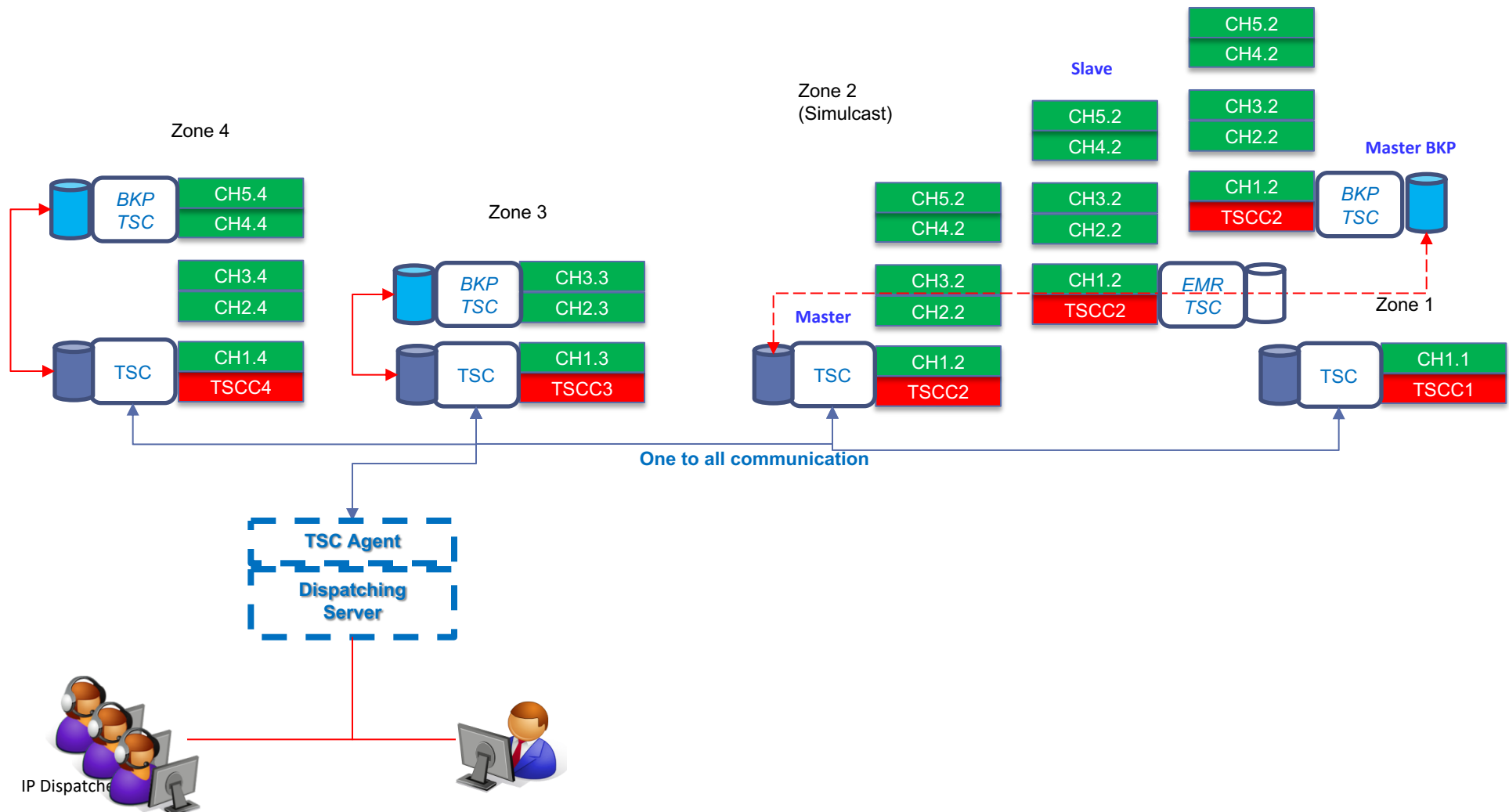
# Kenwood DMR Tier III Trunking – Multisite Simulcast Configuration

- ◆ Built-in DMR Tier III Controller
- ◆ Simulcast
- ◆ Automatic and “click-less” roaming and handover ;



# Kenwood DMR TIER III Multisite Simulcast and Multifrequency

## ◆ TIER III with Distributed Built-in Controller Mixed Zones simulcast/multifrequency





# **3. Kenwood DMR-S Trunking**



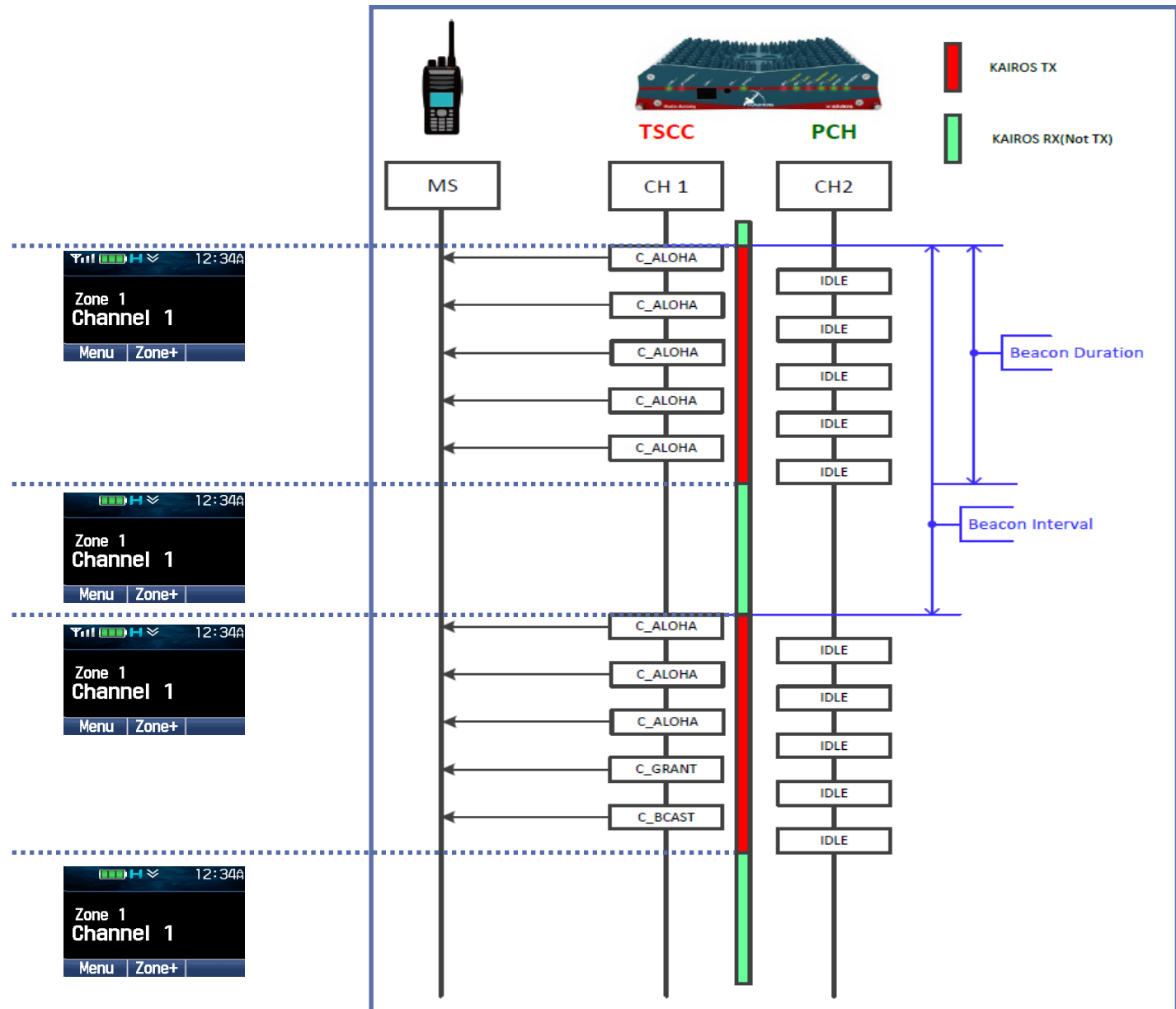
# Kenwood DMR-S Trunking Overview

## ◆ System features:

- ❑ Cost effective DMR trunking solution;
- ❑ Based on DMR Tier III standard features;
- ❑ JVCKENWOOD proprietary;
- ❑ KENWOOD subscriber only (Restricted registration for other manufacture radio);
- ❑ Number of Sites: Up to 15;
- ❑ Number of Channels per site: Up to 8 repeaters (1CCH & 15 Payload Channel);
- ❑ Control channel intermittent transmission (Transmit Beacon)

# Kenwood DMR-S Trunking Overview

## ◆ System features:



# Kenwood DMR S-Trunking Overview

## ◆ Subscriber features:

- ❑ Group Call
- ❑ Individual Call (FOACSU/OACSU)
- ❑ Broadcast Call
- ❑ Telephone Call
- ❑ Status Call
- ❑ Short Data Call
- ❑ Emergency Call
- ❑ Emergency Alarm
- ❑ Encryption Call (AES/DES/Scrambler)
- ❑ Emergency Status
- ❑ Group ID Scan/Single Zone Scan
- ❑ Radio Check
- ❑ Authentication
- ❑ Remoter Stun/Revive/Kill (Decode Only)
- ❑ Remote Monitor
- ❑ Group Subscription
- ❑ GPS
- ❑ Dialing (Fleet Dialing Plan)
- ❑ Control Channel Hunt
- ❑ OAA (Over-the-Air-Alias)
- ❑ Long Data Call
- ❑ External PTT (Direct Channel)
- ❑ Call Interrupt



# 4. Kenwood DMR Tier III / DMR-S Terminals

# Kenwood DMR Tier III / DMR-S Terminals

## ◆ Features NX-5000

- Portable NX-5200/5300/5400
- Mobile NX-5700/5800/5900
- \* NX-5700H does not support DMR mode.

- Firmware Version 3.00
- FPU Version 3.00

- Radio Feature License
  - KWD-5300CV (DMR Conventional must be activated in advance)
  - KWD-5301TR



# Kenwood DMR Tier III / DMR-S Terminals

## ◆ Features NX-3000

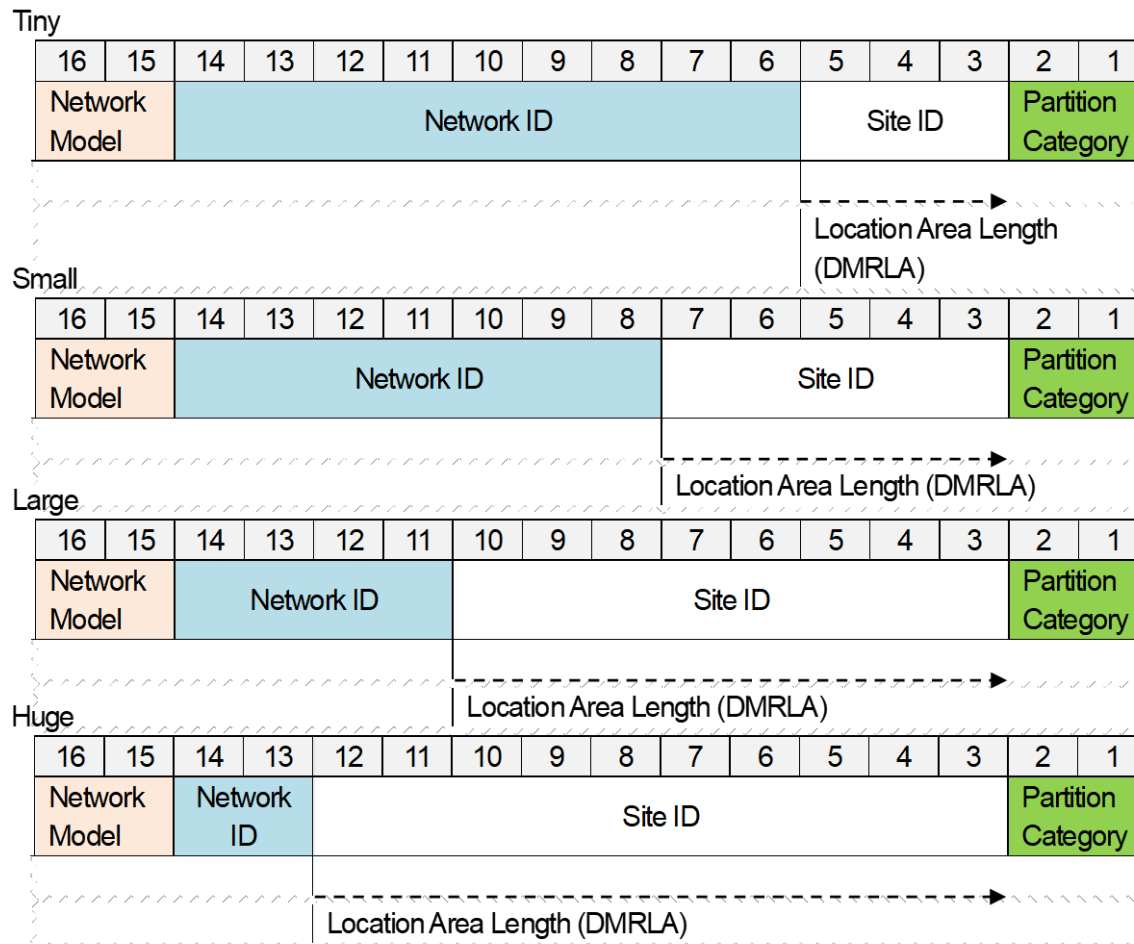
- ▣ Portable NX-3200/3300/3400/3220/3320/3420
- ▣ Mobile NX-3720/3820/3920/
- ▣ Firmware Version 2.00
- ▣ FPU Version 2.00
- ▣ Radio Feature License
  - KWD-3302TR



# Kenwood DMR Tier III System code

## ◆ System Code

- ◆ DMR Tier III Trunking system has an unique System Code ( 16 bit) based on Network Model, Network ID, Site ID and Partition Category.



# Kenwood DMR Tier III System code

## ◆ System Code

- ◆ DMR Tier III Trunking system has an unique System Code ( 16 bit) based on Network Model, Network ID, Site ID and Partition Category.

[KPG-D1]

DMR Network - Network Information

[Top](#)

|                              |                     |   |   |              |           |
|------------------------------|---------------------|---|---|--------------|-----------|
| Network Number               | 1                   | ↑ | ↓ | Network Name | JKUK_Demo |
| Network Model                | Small               |   |   |              |           |
| Network ID                   | 10                  | ↑ | ↓ |              |           |
| Location Area Length (DMRLA) | 5                   | ↑ | ↓ |              |           |
| Location Area ID             | 0                   | ↑ | ↓ |              |           |
| Location Site ID             | 0                   | ↑ | ↓ |              |           |
| Site ID                      | 0                   |   |   |              |           |
| Coverage Type                | Intra-Network       |   |   |              |           |
| System Code (bin)            | 01 0001010 00000 xx |   |   |              |           |
| Lowest Frequency Number      | 1                   | ↑ | ↓ |              |           |
| Highest Frequency Number     | 4094                | ↑ | ↓ |              |           |

[KPG-D3]

System

|   |                     |
|---|---------------------|
| Network Model                               | Small               |
| Network ID                                  | 10                  |
| Location Area Length (DMRLA)                | 5                   |
| Location Area ID                            | 0                   |
| Location Site ID                            | 0                   |
| Site ID                                     | 0                   |
| Coverage Type                               | Intra-Network       |
| System Code (bin)                           | 01 0001010 00000 xx |
| Lowest Frequency Number                     | 1                   |
| Highest Frequency Number                    | 4094                |
| <input type="checkbox"/> Group Subscription |                     |



# Kenwood DMR Tier III Trunking Plan

## ◆ Trunking plan

- ◆ DMR Tier III Trunking plan Fixed (MPT style) or Flexible (NXDN style)

[KPG-D1]

DMR Network - Trunked Channel Plan

[Top](#)

Plan Number

Plan Type

Base Receive Frequency [MHz]

Base Transmit Frequency [MHz]

Step [kHz]

[KPG-D3]

Channel Plan

DMR Trunked Channel Plan

Plan Number

Plan Type

Base RX Frequency [MHz]

Base TX Frequency [MHz]

Step [kHz]

# Kenwood DMR Tier III Trunking Fleet Dialing

- ◆ Full Dialling (Fleet Dialling Plan) is a function to make a voice call and data transmission using dialling code.
- ◆ Dialling code is compliant with ETSI TS 102 361-4 Annex E.

[KPG-D3]

Dialling Codes

☒ PABX Call  
☒ PSTN Call  
☒ All Call  
☒ Priority Call  
☒ Emergency Call  
☒ Broadcast Call  
☒ Status Call  
☒ Short Data Call  
☐ Interfleet Individual Call  
☐ Interfleet Group Call  
☐ Interprefix Individual Call  
☐ Interprefix Group Call

Range of Individual Number

899

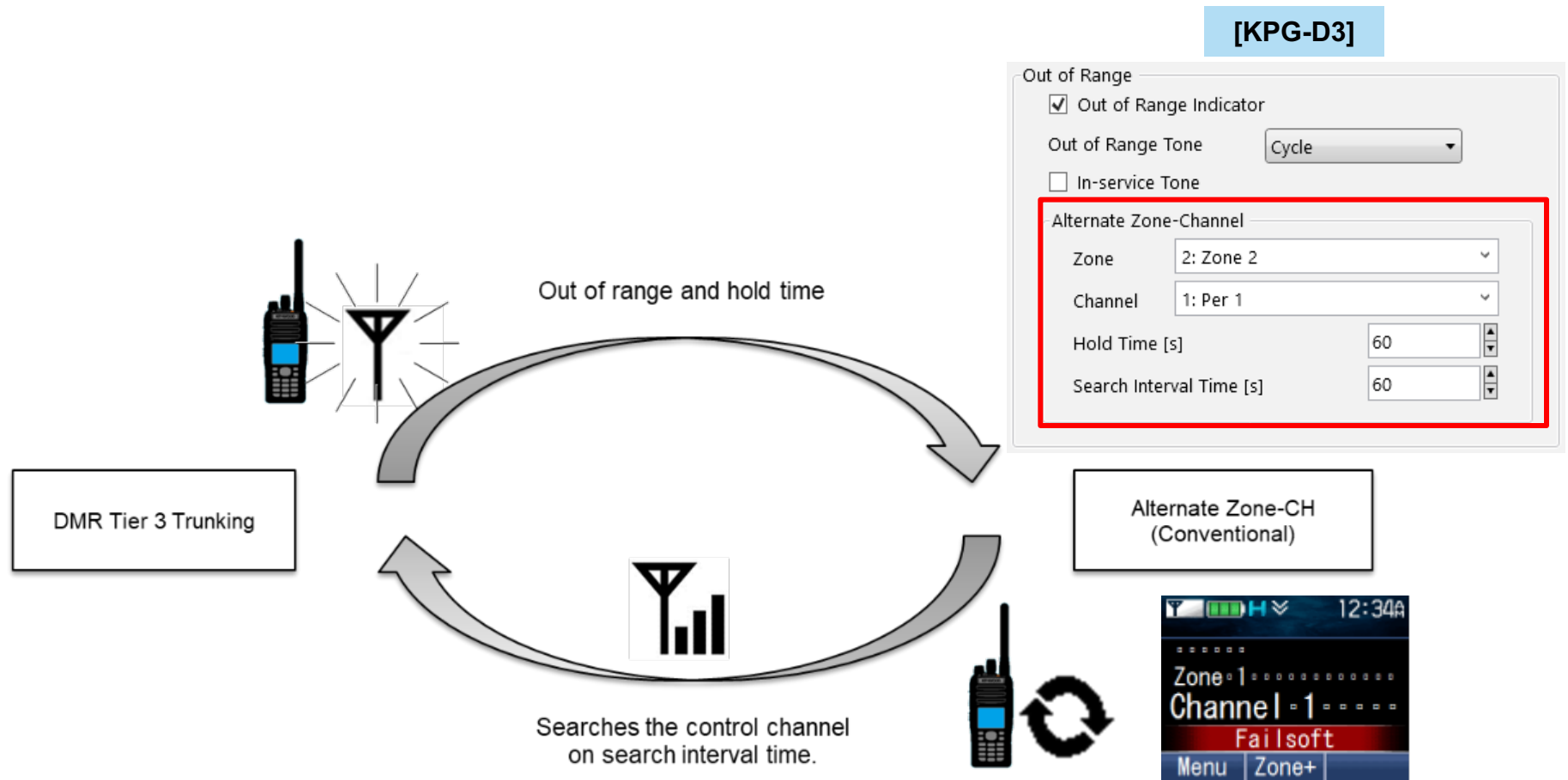
Range of Group Number

999

|   | Normal Call      | High Priority Call | Emergency Call |
|---|------------------|--------------------|----------------|
| Individual Call<br>nn... = 8 digit (NP+FIN+IN)<br>nn... = 5 digit (FIN+IN)<br>nn... = 3 digit (IN)  | nn...            | *8*nn...           | *9*nn...       |
| Group Call<br>nn... = 8 digits (NP+FGN+GN)<br>nn... = 5 digits (FGN+GN)<br>nn... = 3 digits (GN)  | nn...            | *8*nn...           | *9*nn...       |
| Broadcast Call<br>nn... = 8 digits (NP+FGN+GN)<br>nn... = 5 digits (FGN+GN)<br>nn... = 3 digits (GN)  | *11*nn...        | *11*8*nn...        | *11*9*nn...    |
|   |                  | *8*11*nn...        | *9*11*nn...    |
| All Call<br>Destination is ALLMSID(FFFFFF)  | *1987            | *1981              | *1982          |
| PSTN Call<br>nn... = 4 to 32 digits   | 01nn...          | *8*01nn...         | *9*01nn...     |
| PABX Call<br>nn... = 4 to 32 digits   | 02nn...          | *8*02nn...         | *9*02nn...     |
| Status Call<br>ss = 00~99 (Status Number)<br>nn... = 8 digits (NP+FIN/FGN+IN/GN)<br>nn... = 5 digits (FIN/FGN+IN/GN)<br>nn... = 3 digits (IN/GN)                    | *0ss*nn...       |                    |                |
| Short Data Call<br>nn... = 8 digits (NP+FIN/FGN+IN/GN)<br>nn... = 5 digits (FIN/FGN+IN/GN)<br>nn... = 3 digits (IN/GN)<br>dddd... = Max. 489 digits (Short Message) | *2*nn...*dddd... |                    |                |

# Kenwood DMR Tier III Trunking Zone Alternate

## ◆ Alternante Zone – Channel



# 5

## 5. Applications

# Kairos Applications – Remote Control Capabilities

## Remote Control Protocols:

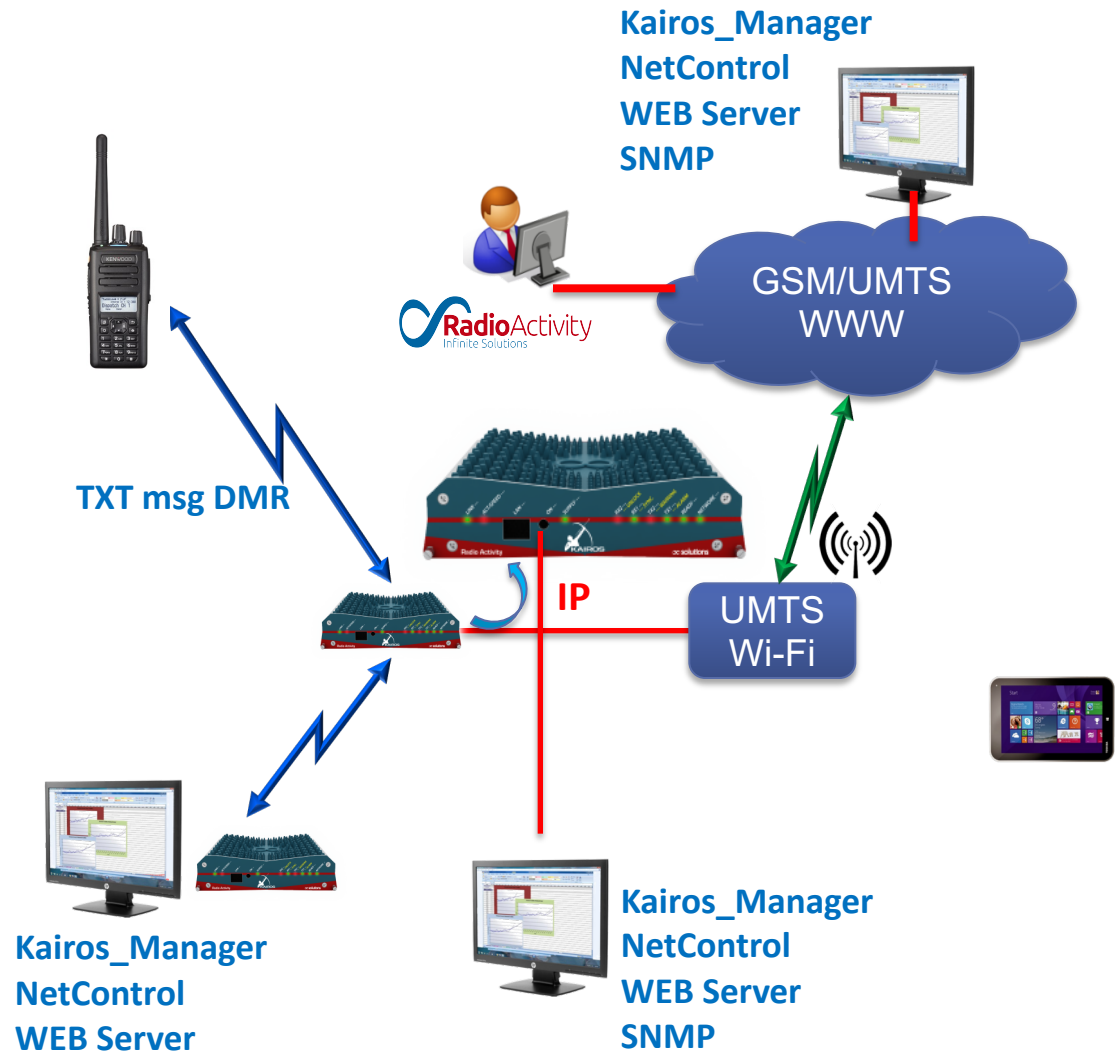
- ◆ Proprietary IP based protocols;
- ◆ HTML to internal WEB server;
- ◆ DMR over an RF access.
- ◆ SNMP;

## Remote Control:

- ◆ Direct IP connection;
- ◆ 3G/GSM access point;
- ◆ Via RF link using another KAIROS;
- ◆ From a terminal using a TXT msg.

## Remote Control Applications:

- ◆ **Kairos\_Manager** setup tools;
- ◆ **NetControl** system survey;
- ◆ **WEB server**;
- ◆ **SNMP Server**.



# Application – Kairos Manager (Setup Tools)

- ◆ Single device access;
- ◆ All setup parameters available;
- ◆ Direct opening from DMR\_NetControl;
- ◆ Very detailed operation;
- ◆ IP and/or RF connection;
- ◆ Proprietary protocol;
- ◆ Windows/Linux.



## KAIROS\_Manager

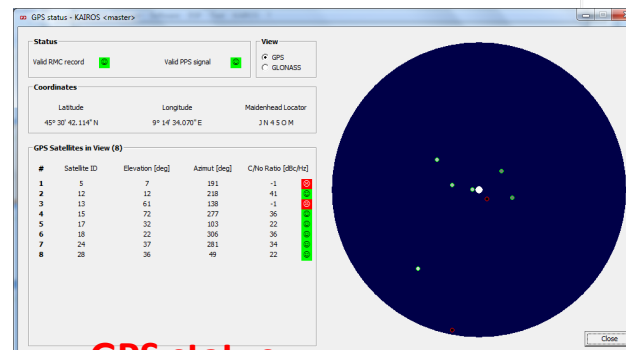
KAIROS equipments remote control

Version 1.6.0

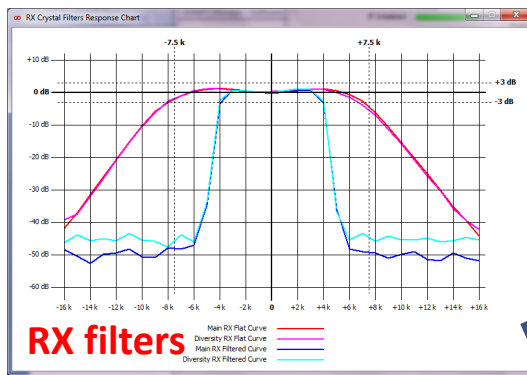
Copyright: © 2014-2015 Radio Activity srl

Radio Activity srl

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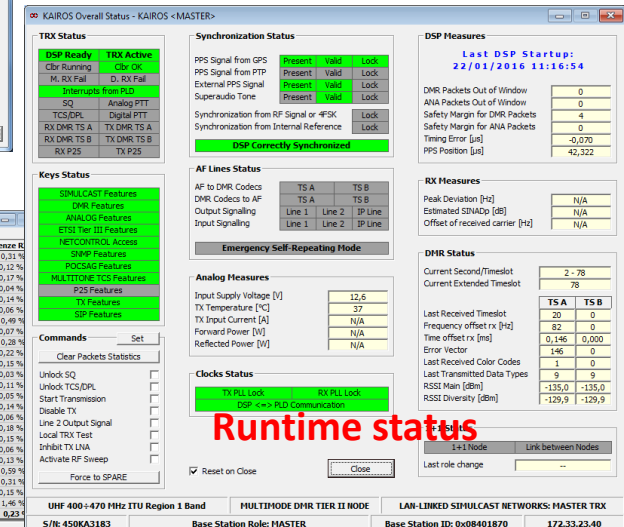
GPS status



RX filters

| Date/Ort UTC             | Impegno Rate   | Impegno RX        | Interferenza RX  |
|--------------------------|----------------|-------------------|------------------|
| 2016-01-21 10:00 - 10:59 | 0,0 s - 0,00 % | 249,5 s - 9,71 %  | 11,2 s - 0,31 %  |
| 2016-01-21 11:00 - 11:59 | 0,0 s - 0,00 % | 118,1 s - 3,28 %  | 4,4 s - 0,12 %   |
| 2016-01-21 12:00 - 12:59 | 0,0 s - 0,00 % | 120,6 s - 3,60 %  | 6,1 s - 0,17 %   |
| 2016-01-21 13:00 - 13:59 | 0,0 s - 0,00 % | 18,5 s - 0,51 %   | 1,6 s - 0,04 %   |
| 2016-01-21 14:00 - 14:59 | 0,0 s - 0,00 % | 95,8 s - 2,66 %   | 5,0 s - 0,14 %   |
| 2016-01-21 15:00 - 15:59 | 0,0 s - 0,00 % | 44,6 s - 1,24 %   | 2,1 s - 0,06 %   |
| 2016-01-21 16:00 - 16:59 | 0,0 s - 0,00 % | 118,5 s - 3,29 %  | 17,6 s - 0,49 %  |
| 2016-01-21 17:00 - 17:59 | 0,0 s - 0,00 % | 44,0 s - 1,22 %   | 2,4 s - 0,07 %   |
| 2016-01-21 18:00 - 18:59 | 0,0 s - 0,00 % | 358,2 s - 9,95 %  | 10,1 s - 0,28 %  |
| 2016-01-21 19:00 - 19:59 | 0,0 s - 0,00 % | 118,5 s - 3,29 %  | 7,8 s - 0,22 %   |
| 2016-01-21 20:00 - 20:59 | 0,0 s - 0,00 % | 38,6 s - 1,03 %   | 5,4 s - 0,15 %   |
| 2016-01-21 21:00 - 21:59 | 0,0 s - 0,00 % | 13,8 s - 0,38 %   | 0,9 s - 0,03 %   |
| 2016-01-21 22:00 - 22:59 | 0,0 s - 0,00 % | 65,3 s - 1,81 %   | 4,0 s - 0,11 %   |
| 2016-01-21 23:00 - 23:59 | 0,0 s - 0,00 % | 25,3 s - 0,70 %   | 1,7 s - 0,05 %   |
| 2016-01-22 00:00 - 00:59 | 0,0 s - 0,00 % | 162,3 s - 4,51 %  | 5,0 s - 0,14 %   |
| 2016-01-22 01:00 - 01:59 | 0,0 s - 0,00 % | 37,3 s - 1,04 %   | 2,0 s - 0,06 %   |
| 2016-01-22 02:00 - 02:59 | 0,0 s - 0,00 % | 207,4 s - 5,28 %  | 6,6 s - 0,18 %   |
| 2016-01-22 03:00 - 03:59 | 0,0 s - 0,00 % | 132,5 s - 4,23 %  | 5,5 s - 0,15 %   |
| 2016-01-22 04:00 - 04:59 | 0,0 s - 0,00 % | 637,4 s - 17,71 % | 21,4 s - 0,59 %  |
| 2016-01-22 05:00 - 05:59 | 0,0 s - 0,00 % | 180,9 s - 5,03 %  | 11,5 s - 0,31 %  |
| 2016-01-22 06:00 - 06:59 | 0,0 s - 0,00 % | 130,5 s - 3,63 %  | 5,5 s - 0,15 %   |
| 2016-01-22 07:00 - 07:59 | 0,0 s - 0,00 % | 46,5 s - 1,29 %   | 52,5 s - 1,46 %  |
| 2016-01-22 08:00 - 08:59 | 0,0 s - 0,00 % | 346,7 s - 4,01 %  | 196,7 s - 0,23 % |

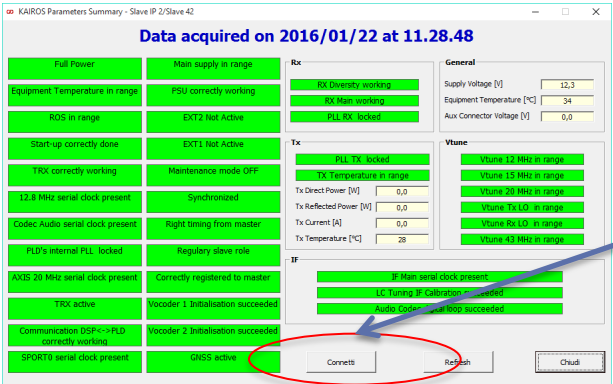
Statistics



Runtime status

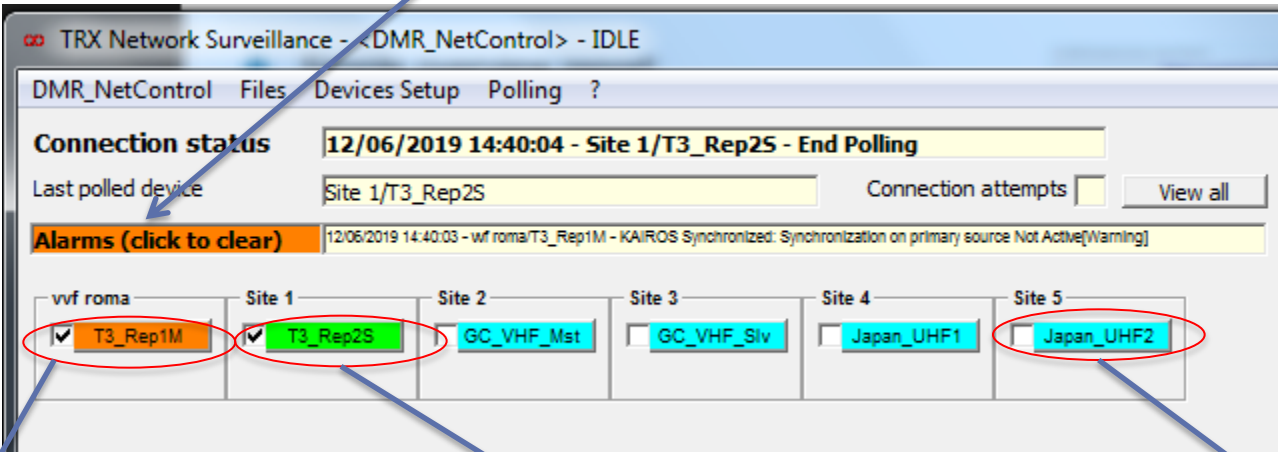
# Application – NetControl System (Survey Tools)

- ◆ Simple overview report;
- ◆ IP and/or RF connection;
- ◆ Polling mode;
- ◆ Proprietary protocol.



Click to open KAIROS\_Manager

Alarms/warning detail



Warning advice

All parameters ok

Excluded from polling

# Application – Network Management Software (NMS)

## ◆ Settings and Monitoring Software;

The screenshot displays the RadioActivity NMS interface. The top navigation bar includes 'Status', 'Monitor', 'Settings', and 'Service'. Below this, there are filters for 'Carrier only', 'Site only', 'Zone only', and 'See all'. The main content area shows a hierarchical view of the network structure for 'ISTANBUL'. Under 'OFFICE', there are two carriers: 'CARRIER1' and 'CARRIER2'. 'CARRIER1' is further divided into 'MST UHF' and 'SLV UHF'. The 'MST UHF' section shows 'CC Ts A' with details: Role: MASTER, IP Addr.: 172.16.0.75, Network: AVRASYA, and 3 portables. The 'SLV UHF' section shows 'SLV UHF' with details: Role: MASTER, IP Addr.: 172.16.0.76, Network: AVRASYA. The left sidebar contains a menu with 'Network', 'Base Station', 'Mobile Station', 'Audio Call', 'Comm. Terminal', 'Mobile Positioning', and 'Logout'. At the bottom left, there are flags for the UK, Italy, France, Germany, and Spain, followed by the version 'TIER III v. 1.0.1.0' and IP addresses for HW and TS. A 'Controls' button is at the bottom left, and a close button 'X' is at the bottom right.

**RadioActivity**  
Infinite Solutions

**Status** **Monitor** **Settings** **Service**

Carrier only Site only Zone only See all

**ISTANBUL**

**OFFICE**

**CARRIER1**

**MST UHF**

**CC Ts A**  
Role: MASTER  
IP Addr.: 172.16.0.75  
Network: AVRASYA  
3 portables

**CARRIER2**

**SLV UHF**

Role: MASTER  
IP Addr.: 172.16.0.76  
Network: AVRASYA

**Network**  
Base Station  
Mobile Station  
Audio Call  
Comm. Terminal  
Mobile Positioning  
Logout

UK Italy France Germany Spain

**TIER III v. 1.0.1.0**  
IP HW 172.16.0.75  
IP TS 172.16.0.100

**Controls**



# Application – Network Management Software (NMS)

## ◆ Monitoring tools;

The screenshot displays the NMS interface with the following components:

- Top Navigation:** Buttons for "Carrier only", "Site only", "Zone only", and "See all".
- Main Area:** A tree view showing the network hierarchy: OFFICE, ISTANBUL, CARRIER1, and CARRIER2. Under CARRIER1, there is a terminal "CC Ts A" (MST UHF) and under CARRIER2, there is a terminal "SLV UHF".
- Details of MST UHF:** A detailed view of the terminal "CC Ts A" showing the following information:

| Parameter       | Value          |
|-----------------|----------------|
| Bs Role         | Master         |
| IP Address      | 172.16.0.75    |
| Network         | AVRASYA        |
| Zone            | ISTANBUL       |
| site            | OFFICE         |
| Carrier         | CARRIER1       |
| Rx Freq.        | 416.575000 MHz |
| Tx Freq.        | 426.575000 MHz |
| Last ACK Time   | 14:41:44       |
| Ts A            | TSCC par A+B   |
| Ts B            | payload        |
| Base station ID | 151175840      |
| Partition       | AB             |
- Details of SLV UHF:** A detailed view of the terminal "SLV UHF" showing the following information:

| Parameter       | Value          |
|-----------------|----------------|
| Bs Role         | Master         |
| IP Address      | 172.16.0.76    |
| Network         | AVRASYA        |
| Zone            | ISTANBUL       |
| site            | OFFICE         |
| Carrier         | CARRIER2       |
| Rx Freq.        | 416.625000 MHz |
| Tx Freq.        | 426.625000 MHz |
| Last ACK Time   | 14:42:02       |
| Ts A            | payload        |
| Ts B            | payload        |
| Base station ID | 151175872      |
- Terminals on Base Station MST UHF:** A list of terminals on the base station "MST UHF".

| Parameter         | Value     |
|-------------------|-----------|
| Name              | Unit 1001 |
| DMR Id            | 1001      |
| BS Id             | 151175840 |
| Config. Id        | 9         |
| Last Registration | 14:22:49  |
| Last Call         | none      |
| Last ACK          | 14:22:55  |
| Last GPS ACK      | 14:33:05  |
| GPS latitude      | 41.04097  |
| GPS longitude     | 28.986948 |
| GPS speed         | 0         |
| GPS direction     | 0         |
| Active groups     | 101       |
- Terminals on Base Station Unit 1002:** A list of terminals on the base station "Unit 1002".

| Parameter         | Value     |
|-------------------|-----------|
| Name              | Unit 1002 |
| DMR Id            | 1002      |
| BS Id             | 151175840 |
| Config. Id        | 10        |
| Last Registration | 13:31:41  |
| Last Call         | 14:41:43  |
| Last ACK          | 14:41:43  |
| Last GPS ACK      | 14:33:50  |
| GPS latitude      | 41.04083  |
| GPS longitude     | 28.98682  |
| GPS speed         | 0         |
| GPS direction     | 0         |
| Active groups     | 101       |
- Terminals on Base Station Unit 1003:** A list of terminals on the base station "Unit 1003".

| Parameter         | Value     |
|-------------------|-----------|
| Name              | Unit 1003 |
| DMR Id            | 1003      |
| BS Id             | 151175840 |
| Config. Id        | 11        |
| Last Registration | 13:40:11  |
| Last Call         | 13:50:40  |
| Last ACK          | 14:40:47  |
| Last GPS ACK      | none      |
| GPS latitude      | 0         |
| GPS longitude     | 0         |
| GPS speed         | 0         |
| GPS direction     | 0         |
| Active groups     | 101       |

# Application – Network Management Software (NMS)

## ◆ Communications ;

### Initiate call

From **Dispatcher** ▼

with DMR ID **31**

to **Dispatcher** ▼

with DMR ID **2**

Queue priority: ☒ normal call ☐ priority 1 ☐ priority 2 ☐ high priority

☐ Emergency ☐ Ambient Listening Service ☐ Open Voice Call ☐

Broadcast Call ☐ All call

Audio Priority: **High Priority** ▼

**FOACSU** ▼

**Start call**

### Send Short Data Message

Source DMR id: **Individual** ▼ **31**

Destination DMR id: **Group** ▼ **2**

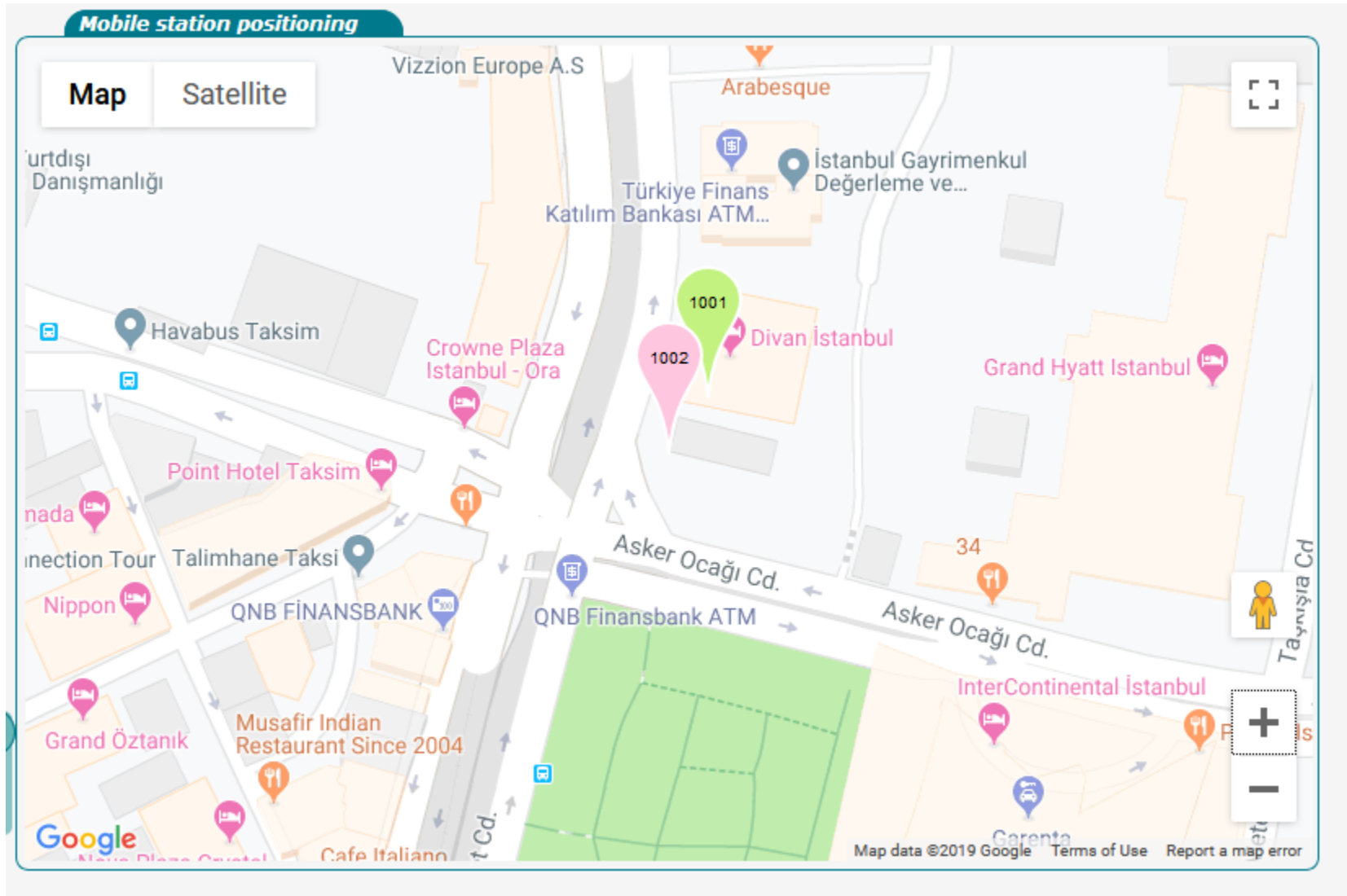
Message: **hello world**

Format: **Unicode 16 bit** ▼

**Send**

# Application – Network Management Software (NMS)

## ◆ Mobile Positioning;



# Applications – IP Gateway

## ◆ Features

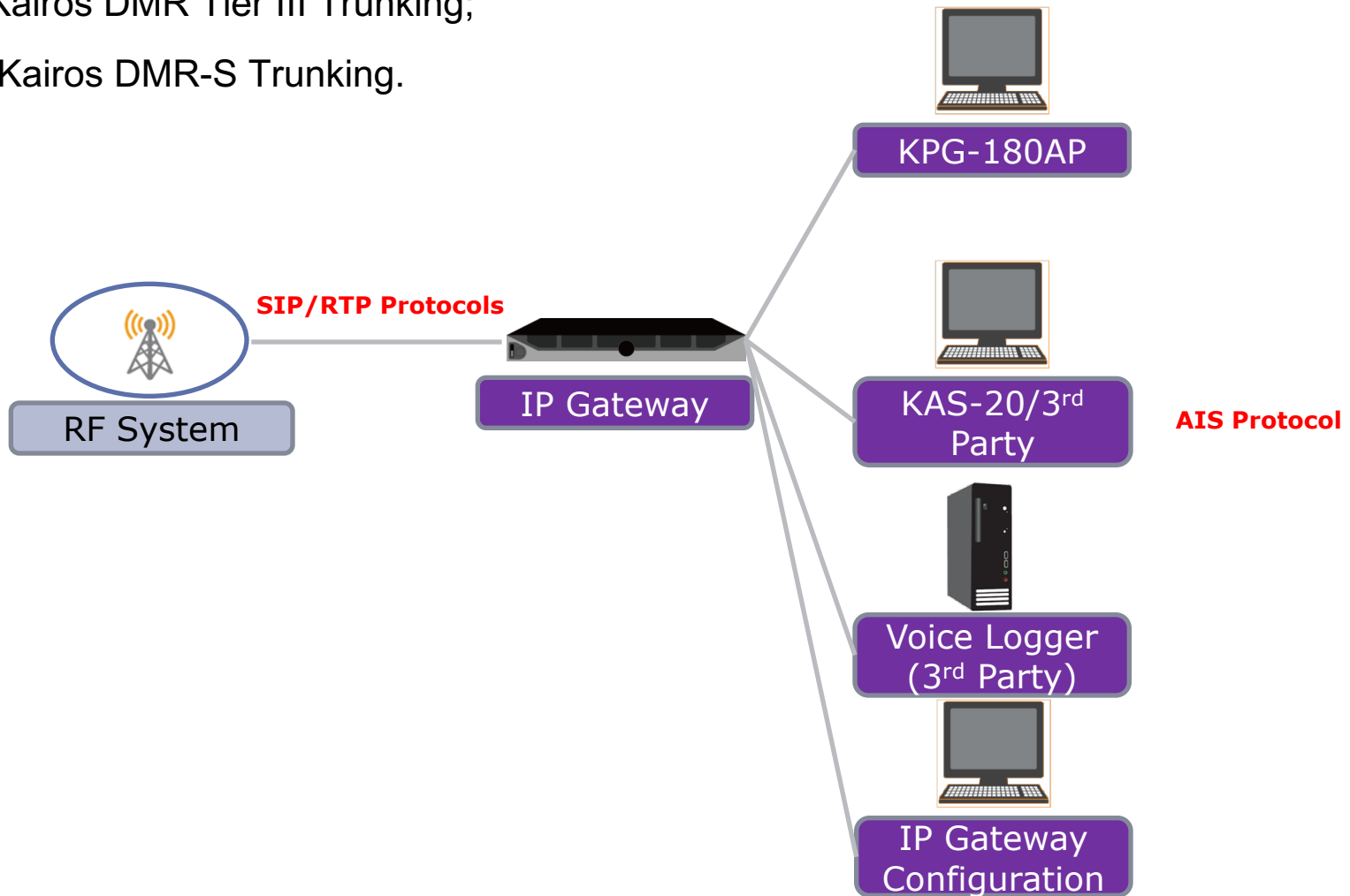
- ❑ Supports DMR KAIROS System
- ❑ Dell Server & Linux Based System
- ❑ Programming/Firmware Update/Backup & Restore by Web Browser
- ❑ Available 3<sup>rd</sup> Party Interface for Console - AIS(Application Interface Specification)
- ❑ Available 3<sup>rd</sup> Party Interface for Voice Logger – VLI (Voice Logging Interface)
  
- ❑ Console Connection & GID per Console
- ❑ Voice Logger Connection
- ❑ Communication Log record size (Server HDD size)



# Applications – IP Gateway

## ◆ RF Systems:

- Kairos DMR Tier III Trunking;
- Kairos DMR-S Trunking.



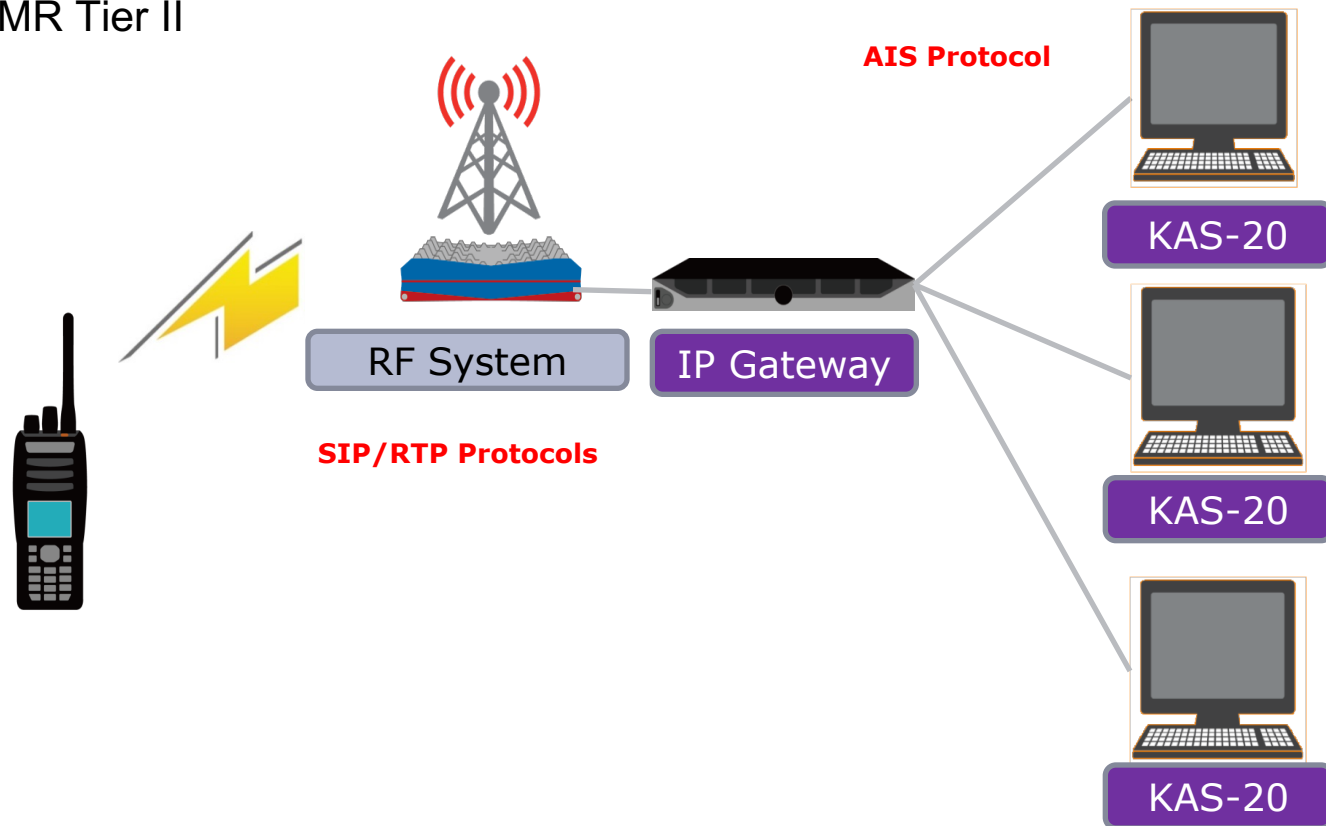
## ◆ Features

- ▣ Supports KAIROS DMR Tier III Trunking;
  - ▣ Supports KAIROS DMR-S Trunking;
  - ▣ DMR Tier II Conventional
- 
- ▣ Support IP Interface connection via IP Gateway;
  - ▣ Existing applications require just DMR Trunk License Upgrade

# Applications – KAS-20

## ◆ RF Systems:

- Kairos DMR Tier III Trunking;
- Kairos DMR-S Trunking.
- Kairos DMR Tier II



# Applications – KAS-20 Main Features

## ◆ Voice & Data Call

- Group Call
- Individual Call
- Encryption (Scrambler/Enhanced)
- All Call/Broadcast Call
- Emergency Call Receive
- Call Interruption
- Over-the-Air Alias (OAA)
- Text Message
- Status Message
- Emergency Status Receive
- Emergency Alarm Receive

## ◆ Remote Control

- Radio Check
- Radio Stun/Kill/Revive
- Radio Monitor

## ◆ GPS

- Voice with GPS Report
- GPS Data
  
- Patch Group
- Voice Recorder



# Applications – OTAP

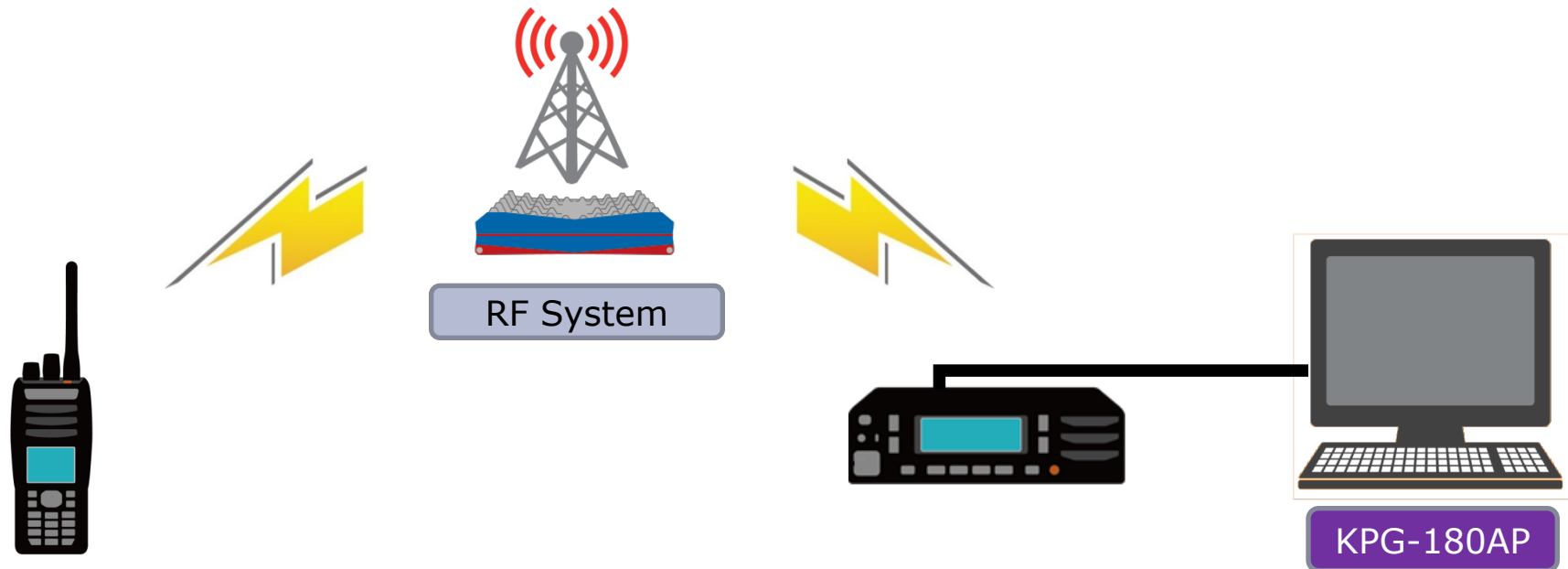
## ◆ Features

- ❑ Supports KAIROS DMR Tier III Trunking;
- ❑ Support DMR Protocol
- ❑ Support KAIROS Repeater
- ❑ Support IP interface connection for KAIROS repeater & IP Gateway
- ❑ Support Serial interface connection for NX-5000 & NX-3000 Series
- ❑ Editable DMR Tier III Authentication Key
- ❑ Selectable OTAP Data DES Encryption by DMR IP connection (Up to 4 Keys);
- ❑ The existing KPG-180AP will work automatically with DMR once updating the application.

# Applications – OTAP Serial Interface

## ◆ RF Systems:

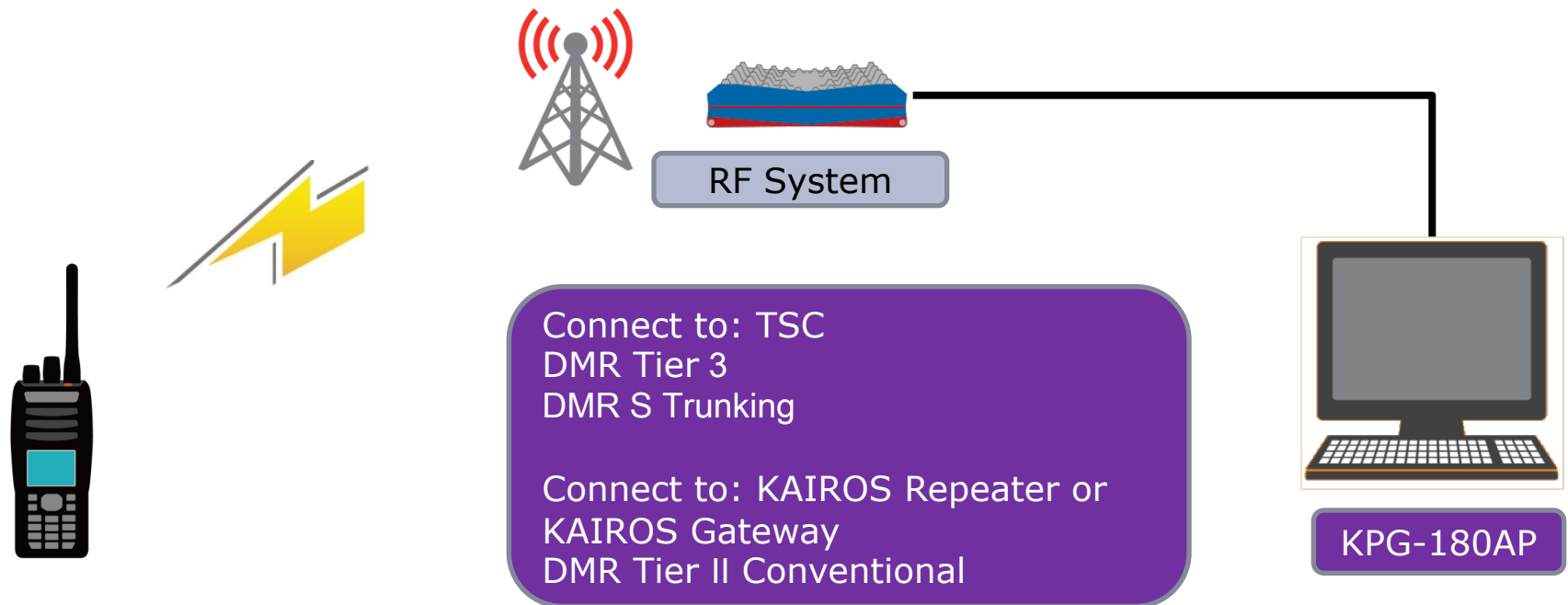
- ❑ Kairos DMR Tier III Trunking;
- ❑ Kairos DMR-S Trunking.
- ❑ Kairos DMR Tier II



# Applications – OTAP IP Interface

## ◆ RF Systems:

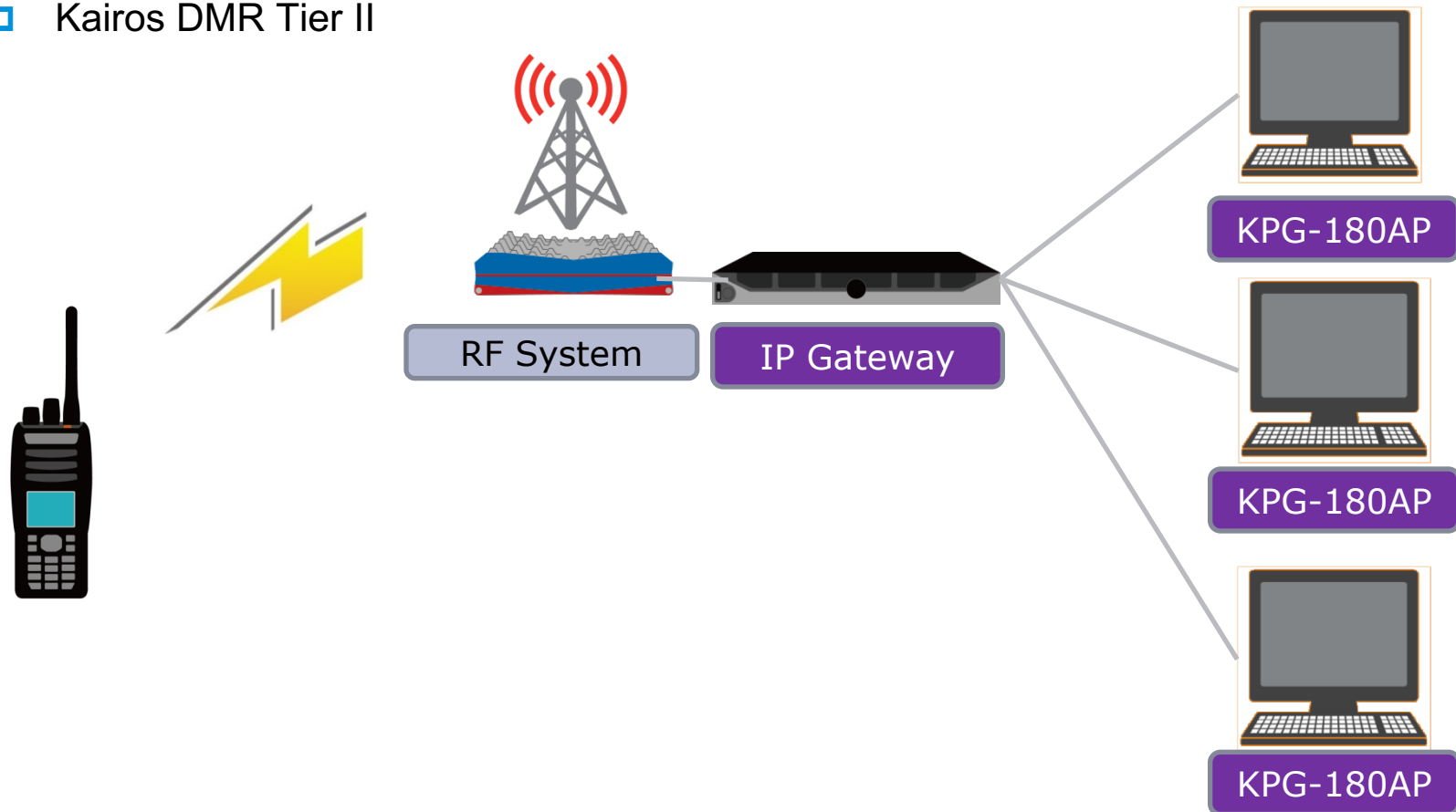
- Kairos DMR Tier III Trunking;
- Kairos DMR-S Trunking.
- Kairos DMR Tier II



# Applications – OTAP IP Interface (Gateway)

## ◆ RF Systems:

- Kairos DMR Tier III Trunking;
- Kairos DMR-S Trunking.
- Kairos DMR Tier II



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