

KENWOOD DMR Portfolio Overview & Product Comparison

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JVCKENWOOD released DMR capable subscribers and repeaters in the US market starting in 2015. Since that time, the product offerings have continued to expand to better satisfy the need of our customers. This expansion will continue to meet the evolving requirements of today's busy world and technology improvements. This bulletin will provide an overview of the KENWOOD DMR subscriber, repeater and systems offerings.

Subscriber Comparison

Model Name - Portable	TK-D240V / -D340U No Display	NX-3220 / -3320 w/ Display	NX-3220 / -3320 w/o Display	NX-3200 / -3300 w/ Display	NX-3200 / -3300 w/o Display	NX-5200 / -5300 Display
Features						
General						
Frequency Band / Band Splits	VHF-136-174 MHz UHF-450-520 / 400-470 MHz	VHF-136-174 MHz UHF-400-520 MHz	VHF-136-174 MHz UHF-400-520 MHz	VHF-136-174 MHz UHF-400-520 MHz	VHF-136-174 MHz UHF-400-520 MHz	VHF-136-174 MHz UHF-450-520 / 380-470 MHz
Number of Channels	32 ch / 2 zone	260 ch / 128 zone (1000ch. Opt)	64 ch / 4 zone	512 ch / 128 zone (1000ch. Opt)	64 ch / 4 zone	1024 ch / 128 zones (4000Ch OPT)
LCD	-	Multi-line Full Dot Monochrome 14 Character	-	Multi-line Full Dot Monochrome 14 Character	-	Multi-line Full Color 14 Character
Accessory Connector	Two-Pin	Two-Pin	Two-Pin	Universal	Universal	Universal
Keypad (Front panel)	-	Full or 4+ D-Pad	-	Full or 4+ D-Pad	-	Full or 4+ D-Pad
Built in GPS	-	Y	Y	Y	Y	Y
Bluetooth	-	Y	Y	Y	Y	Y
Digital						
Protocol	DMR	NXDN / DMR	NXDN / DMR	NXDN / DMR	NXDN / DMR	NXDN / DMR / P25
Vocoder	AMBE+2	AMBE+2	AMBE+2	AMBE+2	AMBE+2	AMBE+2
Encryption	-	Y (NXDN / DMR - DES/AES/15-BIT; ARC4 - DMR ONLY)	Y (NXDN / DMR - DES/AES/15-BIT; ARC4 - DMR ONLY)	Y (NXDN / DMR - DES/AES/15-BIT; ARC4 - DMR ONLY)	Y (NXDN / DMR - DES/AES/15-BIT; ARC4 - DMR ONLY)	Y (NXDN - DES/AES/15- BIT) (P25 - DES/AES)
DMR Support						
Direct Mode	Y	Y	Y	Y	Y	Y
Repeater Operation - Tier 2	Y/Y	Y/Y	Y/Y	Y/Y	Y/Y	Y/Y
Multi-Site - Manual Roaming	-	Y	Y	Y	Y	Y
Multi-Site - Site Roaming	-	Y	Y	Y	Y	Y
DMR Auto Slot Select	-	Y	Y	Y	Y	Y

KENWOOD offers a range of portables to best suit the customer's needs and budget. Multiple DMR features are available, giving the end-user the multi-slot advantage over analog.

KENWOOD DMR Portfolio

Overview & Product Comparison - Page 2

Subscriber Comparison, continued

Model Name - Mobile	TK-D740V / -D840U	NX-3720HG / -3820HG	NX-5700 / -5800
Features			
General			
Frequency Band / Band Splits	VHF-136-174 MHz UHF-450-520 / 400-470 MHz	VHF-136-174 MHz UHF-400-470 / 450- 520 MHz	VHF-136-174 MHz UHF-450-520 / 380-470 MHz
Number of Channels	32 ch / 2 zone	512 ch / 128 zone (1000ch. Opt)	1024 ch / 128 zones (4000Ch OPT)
LCD	2 Digit	Multi-line Full Dot Monochrome 14 Character	Multi-line Full Color 14 Character
Built in GPS	-	Y	Y
Bluetooth	-	Y	Y
Digital			
Protocol	DMR	NXDN / DMR	NXDN / DMR / P25
Vocoder	AMBE+2	AMBE+2	AMBE+2
Encryption	Y	Y (NXDN /DMR - DES/AES/15-BIT; ARC4 - DMR ONLY)	Y (NXDN /DMR - DES/AES/15-BIT; ARC4 - DMR ONLY)
DMR Support			
Direct Mode	Y	Y	Y
Repeater Operation - Tier 2	Y	Y	Y
Multi-Site - Manual Roaming	Y	Y	Y
Multi-Site - Site Roaming	-	Y	Y
DMR Auto Slot Select	-	Y	Y

KENWOOD mobiles provide VHF and UHF coverage for DMR, as well as analog. Like the portables, several of these subscriber units offer support for other digital protocols giving the customer instant interoperability.

KENWOOD DMR Portfolio

Overview & Product Comparison - Page 3

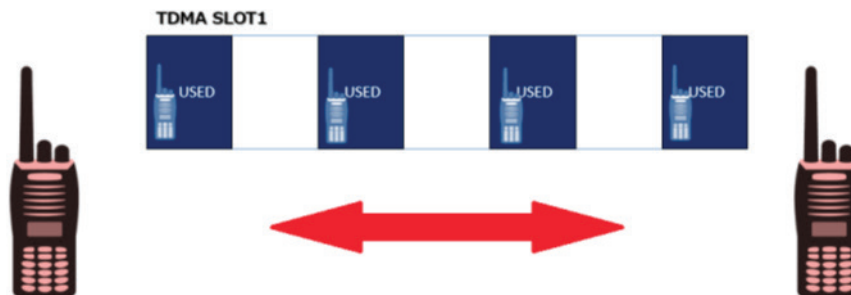
DMR Support

KENWOOD continues to expand the DMR portfolio feature sets discussed below.

Direct Mode or Simplex – this feature allows direct communications between two subscribers when a repeater is not available or not needed. The DMR Standard supports two (2) Direct Modes, Single Slot and Dual Slot.

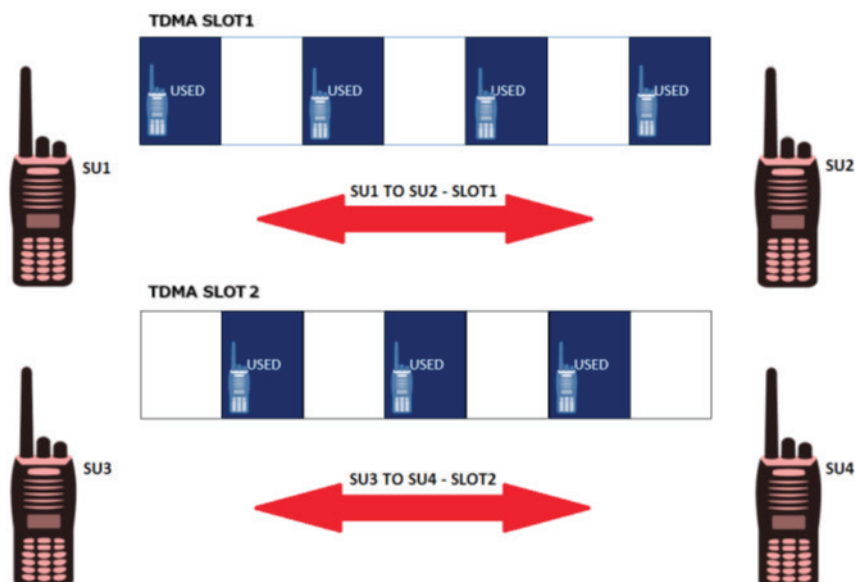
Single Slot

Single slot uses Slot #1 allowing communication between two parties. The channel cannot be shared with other users as can be done using a repeater on the other time slot.



Dual Slot

Dual slot allows the usage of both Slot #1 and Slot #2 on a simplex channel. This allows multiple users to share the channel without interference. One set of users can use one slot, while another uses the other.



KENWOOD DMR Portfolio

Overview & Product Comparison - Page 4

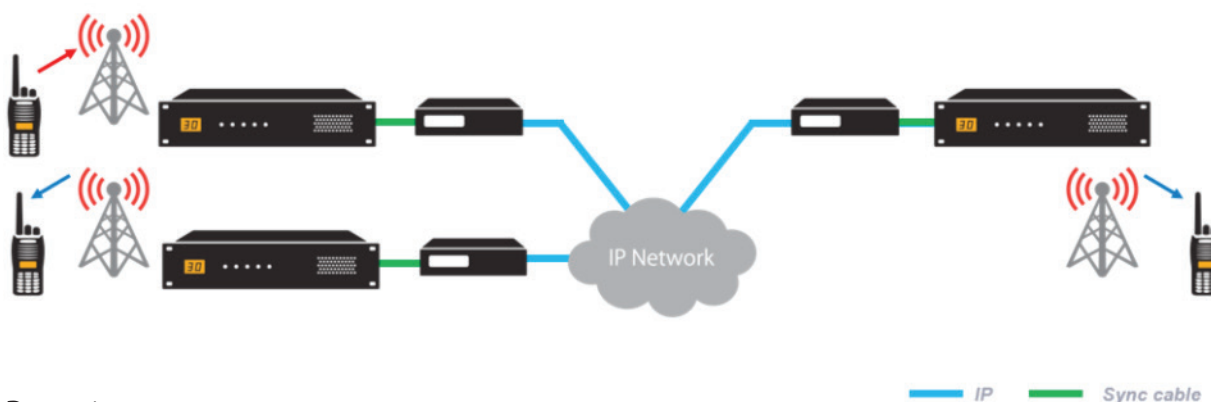
DMR Support, continued

DMR Tier 2 Repeater Operation – like analog and NXDN®, KENWOOD has TDMA repeaters at VHF and UHF to support the DMR user. These repeaters adhere to the DMR Standard that sets the requirements for the operation of a single site repeater that is capable of supporting two time slots. The following are the DMR repeaters available from KENWOOD.

Model Name - Repeater	TKR-D710K	TKR-D810K	TKR-D810K2
Features			
General			
Frequency Band / Band Splits	VHF-136-174 MHz	UHF-450- 520 MHz	UHF-400-470 MHz
Number of Channels	30	30	30
LCD Display	2 Digit	2 Digit	2 Digit
RF Power Output	5 - 50 Watts	5 - 40 Watts	5 - 40 Watts
Operational Modes	Analog FM / DMR	Analog FM / DMR	Analog FM / DMR
DMR Support			
Repeater Operation - Tier 2	Y	Y	Y
Multi-Site - (requires KTI-5)	Y	Y	Y
AIS Console (requires KTI-5)	Y	Y	Y



DMR Site Roaming – KENWOOD offers the ability to network repeaters and the subscribers to roam between them. The subscribers may operate using manual roaming where the user changes channels or auto roam using site beacons with roaming based on RSSI. Site roaming features are unique to each manufacturer, although compatibility does exist.



Manual Roaming

Requires that each channel be programmed into the subscriber unit for the user to select when needed. Programming is no different than programming for single-site repeater operation

Automatic Roaming

The subscriber is programmed for site roaming and each repeater is programmed in the same zone. Upon hearing sites beacon, the subscriber will monitor each site and measure the site RSSI. If the RSSI is higher than the current site, the radio will automatically roam to that site.

KENWOOD DMR Portfolio

Overview & Product Comparison - Page 5

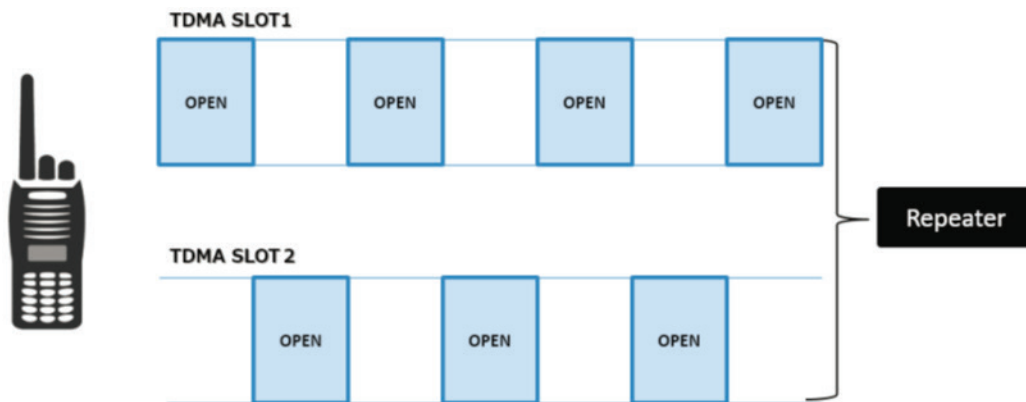
DMR Support, continued

DMR Auto Slot Select (DASS) – DASS provides ‘trunking-like’ operation on DMR Tier 2 conventional repeaters by allowing the subscriber radio to select an unused time slot when their operational slot is busy. This occurs without user intervention.

Operation is enabled in the subscriber unit by setting the slot select to “AUTO” instead of Slot #1 or Slot #2. If one time slot is busy with traffic with different units, the user’s subscriber will automatically select the open slot for transmit. When the user transmits on the open slot, the receiving subscribers will join the transmitting radio on the slot.

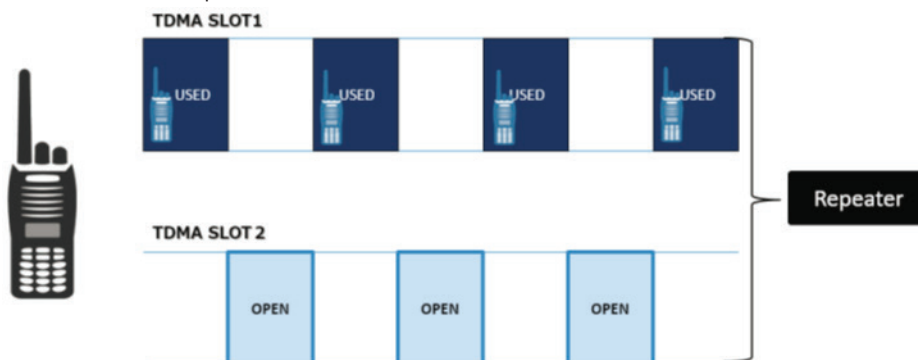
How It Works

DASS works on a single repeater only. It operates as if both TDMA slots are a 2-channel trunk system, providing “virtual trunking operation.”



While technically a conventional system, it effectively utilizes the Open Slot as if it were a trunked traffic channel.

1. Subscriber User presses PTT

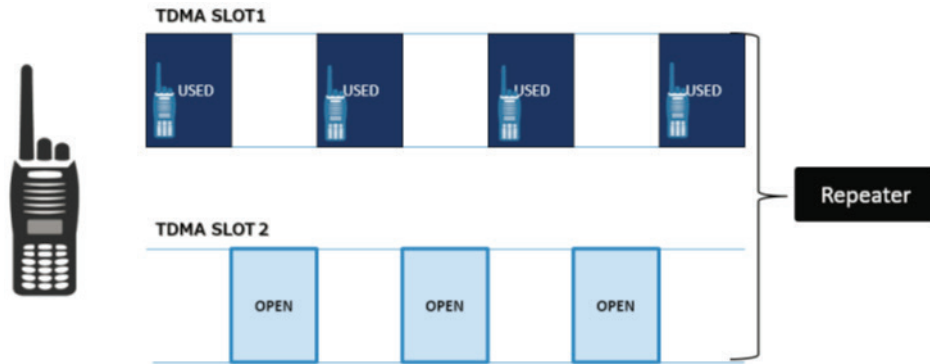


KENWOOD DMR Portfolio

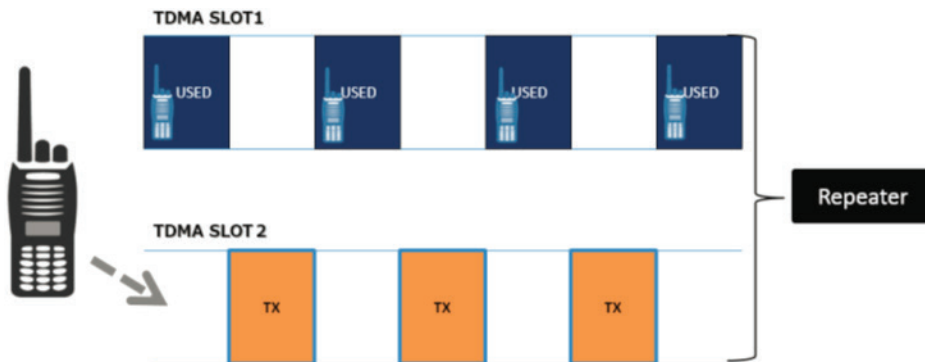
Overview & Product Comparison - Page 6

DMR Support, continued

2. Subscriber searches for open slot



3. And transmits



This automatic selection of the slot provides the highest probability of effective radio communication. Since DASS is Group Call-centric, there are other call types with higher priority. These call types are Remote Stun / Revive / Kill, Emergency Call / Alarm, Individual Call, Paging Call, and All Call.

DMR Auto Slot Select offers an extension to the basic DMR Tier 2 conventional repeater operation. It is a valuable feature that provides more effective radio communications for users in applications with limited spectrum resources or communications funding.

Note: The DASS feature is only supported on a repeater at a single site. Multiple site DASS roaming is not available since this is a subscriber-based feature. KAS-20 does not currently support DASS.

KENWOOD DMR Portfolio

Overview & Product Comparison - Page 7

DMR Compatibility - Basic Standards Requirement

JVCKENWOOD, as part of basic standards requirements, has tested interoperability with competitor radios. This was done with the MOTOTRBO™ DP4801e and Hytera PD685 for the following operational parameters. The data below shows what is required for full interoperability, those that are partially inoperable and those where no compatibility is required.

Full Interoperability

- Group Call*
- Private Call*
- Individual Call with ACK*
- All-Call*
- Talk Around
- Dual Slot Direct Mode
- Call Alert**
- Lone Worker
- Radio Check**
- Radio Enable / Disable**
- Remote Monitor**
- PTT-ID and Aliasing
- Enhanced Encryption
- Short Data Message**
- Emergency**
- Emergency Alarm**

Not Compatible

- Broadcast Call
- Unaddressed Call
- Call Interruption
- GPS

* IOP test mandatory item

** IOP test optional item

KENWOOD DMR Portfolio

Overview & Product Comparison - Page 8

DMR Compatibility - Operational Specifics

Digital Conventional (Repeater Mode)

Operation Mode	Interoperability	Comments
Group Call	Yes	Disable Call Interrupt Decode to communicate w/ Motorola
Individual Call	Yes	Disable Call Interrupt Decode to communicate w/ Motorola
Individual Call w/ Ack	Yes	
Broadcast Call	No	Only between KENWOOD subscribers w/ Intra and Intersite
All Call	Yes	Disable Call Interrupt Decode to communicate w/ Motorola
Unaddressed Call	No	Unaddressed call, Slot #1 / Color Code Only, not supported by Motorola and Hytera; Group is required for interoperability
Call Alert	Yes	Alert / Tone will differ between subscribers
Emergency / Emergency Alarm	Yes	
Lone Worker	Yes	Motorola / Hytera do not have Lone Worker Status; uses Emergency Alarm
Radio Check	Yes	
Radio Stun/Revive	Yes	Radio Enable / Disable feature
Remote Monitor	Yes	
PTT-ID Alias	Yes	
Enhanced Encryption	Yes	In case of use of Motorola repeater, Privacy Type "Enhanced" setting must be enabled in CPS for KENWOOD subscribers to decrypt Voice / Data.
Call Interruption	No	Disable Call Interrupt when operating with Motorola
Short Data Message (SDM)	Yes	Must use DMR standard setting; will function with Hytera compressed IP
GPS	No	
Talk Around	Yes	

KENWOOD DMR Portfolio

Overview & Product Comparison - Page 9

DMR Compatibility - Operational Specifics

Digital Conventional - Direct Mode (Simplex)

Operation Mode	Interoperability	Comments
Dual Slot Direct	Yes	Default in KENWOOD radios; disable check box for Single Slot Direct
Single Slot Direct	Yes	Referred to as original direct mode; uses single slot. Default setting in competitors radios.

Note:

Motorola – Dual Capacity Direct Mode must be enabled in CPS. It sets to the Talk-Around operation to the same frequency. The KENWOOD subscriber must be enabled for Dual Slot Direct Mode.

Hytera – TDMA Direct Mode will be active if the TX and RX frequencies are the same. It will function with a KENWOOD subscriber in Talk-Around mode regardless of the Dual Slot Direct Mode setting.

KENWOOD – The Dual Slot Direct Mode may be enabled on a direct channel or a repeater configured for talk-around. Dual Slot Model should be properly select to insure interoperability with Motorola subscribers.