



# Unity™

*XG-100  
Full-Spectrum  
Multiband Radio*



## Full-Spectrum Multiband Radio Designed for Every Day Use

### Unprecedented Connectivity

- **Full-Spectrum Multiband** Interoperability
- Enables inter-agency **interoperability** across all public safety bands

### Built-In Advanced Capability

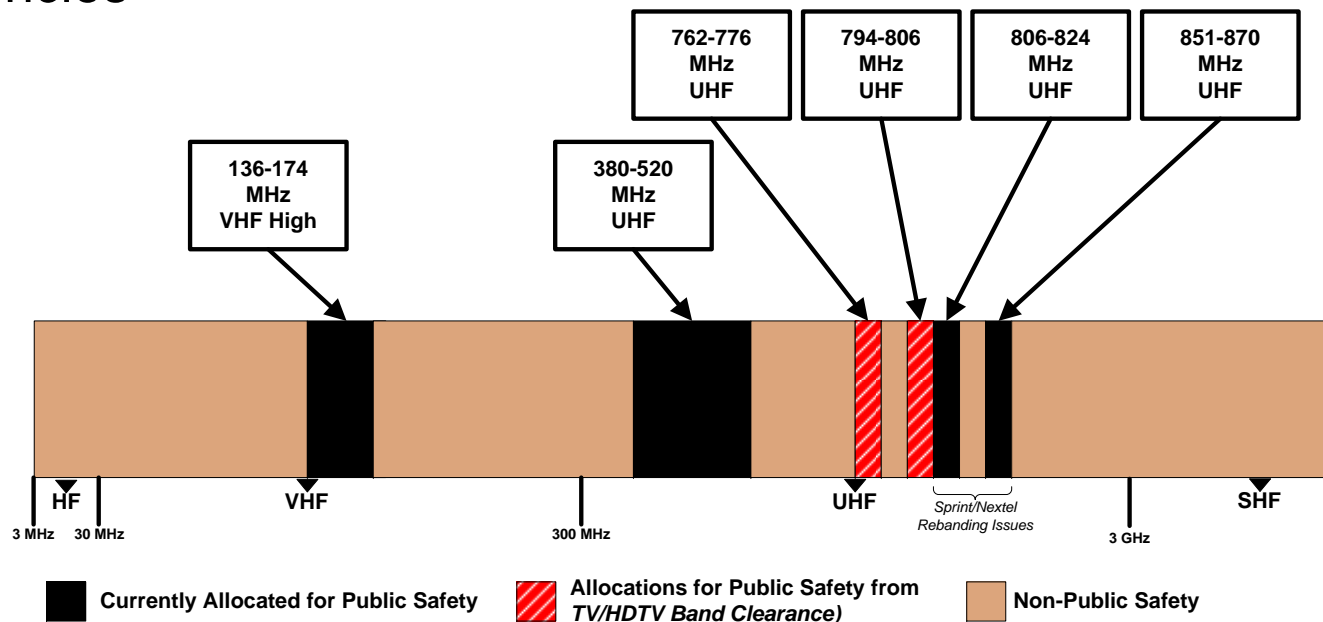
- **GPS** Receiver for Situational Awareness
- **Noise Suppression**
- **Bluetooth®**

### Reliability

- 3 Year Standard Warranty
- MIL-STD **Rugged and Immersible**
- **Software Defined** Architecture



- Most radios are “single-banded”, covering only one part of the public safety frequency spectrum
- XG-100P Full-Spectrum Multiband Radio covers all portable bands in one radio, enabling interoperability with responders from other agencies

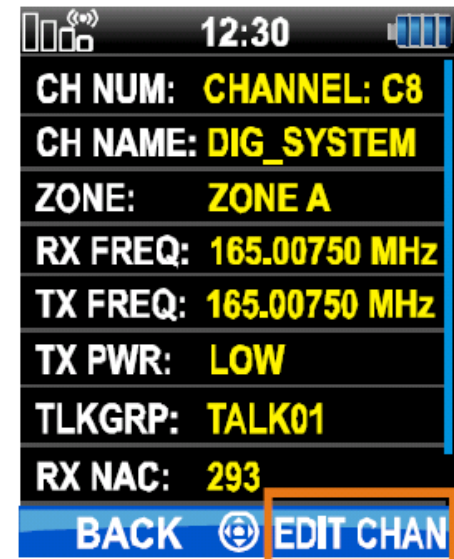


- Maximized Transmit Power to Meet Coverage Demands
  - 6 Watts in VHF, 5 Watts in UHF, 3 Watts in 700/800 MHz
  
- Operable on Digital P25 Conventional and Trunking Systems
  - **TIA-102** (P25 Phase 1 standard) Compliant
  - 12.5 kHz Channel Spacing (FDMA)
  - **SW Upgradable to P25 Phase 2**
    - 6.25 kHz Effective Channel Spacing (2-slot TDMA)
  
- Backwards Interoperability with Analog FM Systems
  - **TIA-603** (Analog-FM standard) Compliant
  - Operable on 25 kHz and 12.5 kHz channels

- **Scan continuously** across all:
  - **Frequency bands**
  - Voice modes
  - Encryption types
- **Mission Files**
  - Activate from front panel
  - 1250 channels in each mission file
  - 1 active / **10 total stored**
  - Load via USB or **Bluetooth®**



- Encryption
  - FIPS-140-2 Certified (planned)
  - Algorithms: AES, DES-OFB
  - Key storage capacity of 100 keys
  - P25 OTAR Key Fill
- Front Panel Programming
  - Direct frequency entry
  - In-field channel modification





- Built on Extensive **User Research**
  - Field Trials of Multiband Technology
  - Participation in Interoperability Exercises
  - User Shadowing
  - Contextual Interviews
- SWaP-C Design Focuses
  - Making Multiband Easy to Use
  - Meet Stringent Public Safety RF Req'ts
  - Voice Quality
  - Size and Weight
  - Affordable cost
  - High Battery Life
  - Technical Innovation







- Internal **GPS Receiver** for Situational Awareness in the Field
  - User position sent and received over-the-air
  - Rapid response for emergencies
  - Not dependent on accessories
  - Programmable trigger
    - PTT
    - Periodic
  - Memory capacity to support color street level mapping (future)
- Secure **Bluetooth®** Wireless Technology
  - Secure Wireless Connections
  - Audio Accessories
  - Wireless Radio Programming



- Noise Cancellation
  - Automatic suppression of background noise
  - Intelligible voice transmission in high noise environments
  - Dual-microphones
    - Located on front and back of radio
  - Advanced signal processing
    - Used for both analog or digital voice
    - Implemented in concert with IMBE vocoder to prevent noise errors with voice encoding Algorithm
- ***Demo video of the Noise Canceller operation is at the end of this presentation***



## Transmitter

Typical Performance	Full-Spectrum Multiband
Frequency Range (MHz):	136-174 (VHF), 380-520 (UHF), 762-870 (700/800)
Rated RF Power Trunked (W):	VHF: 1-6, UHF: 1-5, 700/800: 0.5-3
Rated RF Power Talkaround (W):	VHF: 1-6, UHF: 1-5, 700/800: 0.5-3
Frequency Stability (-30 to +60°C) (ppm):	±0.5
Modulation Limiting (kHz):	2.5, 4, 5 (FM)
Audio Response (dB):	+1/-3
Spurious and Harmonics (dBc):	-70, FCC Part 90
FM Hum and Noise @ 25 kHz (dB):	VHF: -51, UHF: -54, 700/800: -50
FM Hum and Noise @ 12.5 kHz (dB):	VHF: -45, UHF: -47, 700/800: -44
Audio Distortion (%):	<1.25
P25 Modulation Fidelity (%):	<1.00
P25 Adjacent Channel Power (dBc):	>67
Emission Designators:	16K0F3E, 11K0F3E, 8K4F1E, 8K4F1D, 12K00G1E, 12K00G1D, 14K0F3E

## Receiver

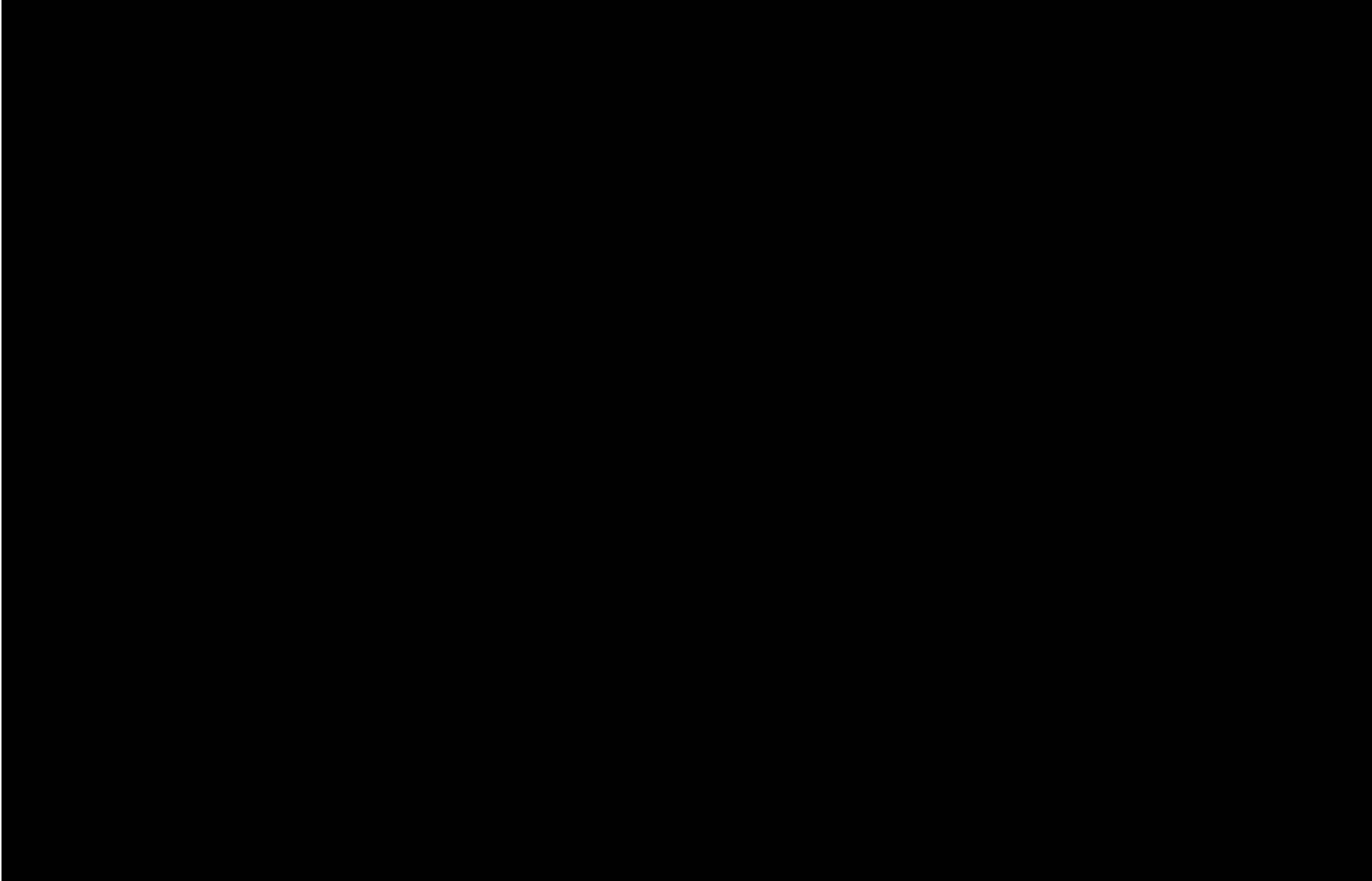
Typical Performance	Full-Spectrum Multiband
Frequency Range (MHz):	136-174 (VHF), 380-520 (UHF), 762-870 (700/800)
Channel Spacing (kHz):	12.5, 25
Sensitivity (12 dB SINAD) (dBm):	VHF: -118.5, UHF: -120.3, 700/800: -118.3
P25 Reference Sensitivity (5% BER) (dBm):	VHF: -119.7, UHF: -120.9, 700/800: -119.3
Adjacent Channel Rejection @ 25 kHz (dB):	VHF: 75, UHF: 70, 700/800: 70
P25 Adjacent Channel Rejection @ 12.5 kHz (dB):	VHF: 64.7, UHF: 60, 700/800: 60
Intermodulation (dB):	VHF: 72.5, UHF: 73.6, 700/800: 74
Spurious and Image Rejection (dB):	VHF: 70, UHF: 75, 700/800: 70
FM Hum and Noise @ 25 kHz (dB):	VHF: -53, UHF: -47, 700/800: -47
FM Hum and Noise @ 12.5 kHz (dB):	VHF: -51, UHF: -41, 700/800: -41
Rated/Max. Audio Output (mW):	500/1200
Audio Distortion:	<1.25% @ rated power

- Three Year Standard Radio Warranty
- MIL-STD-810F Rugged and Submersible
  - Built to the same standards as Harris military radios
  - Tested to military standards for water submersibility
- Software-Defined Radio Architecture
  - Capable of supporting future changes to digital standards
    - Software-only upgrade for P25 Phase II
  - Able to address customer driven requirements after delivery

- Certifications
  - RF Performance: FCC/NTIA Certified
  - P25: TIA-102/603 Compliant
  - Security: NIST FIPS-140 Certified (cert pending)
  - Environmental: MIL-STD-810F

MIL-STD-810F		
Parameter	Method	Proc./Cat.
Low Pressure (Altitude)	500.4	I, II
High Temperature	501.4	I, II
Low Temperature	502.4	I, II
Temperature Shock	503.4	I
Solar Radiation	505.4	I/Cat A1
Rain	506.4	I
Humidity	507.4	-
Salt Fog	509.4	-
Sand and Dust	510.4	I, II
Immersion	512.4	I
Vibration	514.5	I/Cat4, I/Cat 24
Shock	516.5	I, IV, VI

# *Unity Noise Cancellation Demonstration*





## *Questions?*

- Note: Send an e-mail to [Richard.Taylor@Harris.com](mailto:Richard.Taylor@Harris.com) for copies of this presentation