Motorola R5 Handheld Radio

Testing Report

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1. Objective

The primary purpose of this session was to assess the Motorola R5 handheld radios operating in analog mode. It was assessed to determine whether the Motorola R5 radios meet the operational and technical criteria required for inclusion in the UN Security Communications Standards. The R5 series are set to replace the legacy DP2000 series, which is being phased out by the manufacturer. Accordingly, this evaluation focused on validating the R5's operational readiness, backward compatibility, and consistent performance in analog communications assuring a seamless transition for ongoing and future deployments.

2. Motorola R5 Features

The Motorola MOTOTRBO R5 is the latest generation of professional handheld two-way radios designed for mission-critical and industrial communications. It offers enhanced audio clarity, rugged construction, and a modern ergonomic design. The R5 supports both analog UN standards using SEL-5 tone signaling (CCIR 20ms) and digital DMR modes, making it suitable for operations transitioning from legacy systems. It features improved battery life and adaptive audio.

The R5 device comes in two versions

- LKP (Limited Keypad)
- NKP (No Keypad)

Specification:

- Dimensions (h x w x d):   122 x 56 x 35 mm
- High Power Output: 5 W (VHF), 4 W (UHF)
- Low Power Output: 1 W
- Channel Capacity   256 (LKP), 64 (NKP)
- Weight: 285 g (LKP), 269 g (NKP)
- Battery capacity: 2200 mAH (STANDARD)

3. Test Setup

- **Location:** WFP FITTEST workshop, Dubai
- **Devices:**
  - Handhelds: R5 NKP & LKP models, DP4801(Network controller)
  - Repeater: ICOM FR5100
- **Frequencies:**
  - TX: 156.125 MHz
  - RX: 161.125 MHz
  - TPL: 141.3 kHz

Special thanks to Danimex for facilitating this evaluation by sending the devices to the WFP office in Dubai for testing.

TESTS PERFORMED

Test type	Description	Result Summary	Remarks
Audio Quality (Tx/Rx)	Subjective testing with headset and built-in mic/speaker	Excellent clarity, minimal distortion even at max volume	
SEL-5 features	Decoding: Stun, Un-stun, Silent Interrogate. Coding: Caller ID & Emergency signal.	Both R5 NKP and LKP radios successfully transmitted and decoded SEL-5 signaling in full compliance with UN communication standards.	Tests are done in both duplex and simplex mode. DP4801 was used as a network controller radio.

4. Observations

Below are some key observations,

A. The Motorola R5 two-way radio features a dedicated orange button, designed for emergency situations compared to the DP2000 series where a side button was configured as an emergency button.

B. The R5 series radios required a firmware update to codeplug version **25.22.05** or later to enable emergency activation via long press of the dedicated button, and deactivation through a short press.

C. Based on the spec sheet, the R5 series radio shows a noticeable upgrade in battery life over the DP2000 series — jumping from around **11.5 hours to 16 hours**[1] of operation (Analog mode). That's more than **30%** improvement, thanks to a higher-capacity **2200 mAh** battery compared to the DP2000's **2100 mAh** standard pack.

D. The R5 series uses a unique battery design that is not interchangeable with other Motorola models. Batteries from the discontinued DP2000 series or the current R7 series are not compatible with the R5 radios. Only batteries specifically designed for the R5 series can be used, which should be considered when planning for fleet upgrades and spare part provisioning.

E. The R5 series radios demonstrate enhanced receiver sensitivity compared to the DP2000 series, with a threshold improvement from **0.22 μV to 0.16 μV**. This means they can pick up weaker signals more reliably, which is especially beneficial in low-signal environments or across extended coverage areas.

F. While both R5 NKP and LKP models meet operational requirements for analog and SEL-5 signaling, their design restricts them to Normal User roles only due to the lack of a full keypad limiting direct input capabilities.

G. Conclusion

Following a comprehensive evaluation, both R5 NKP and LKP radio models have successfully met the functional and operational requirements necessary to replace the aging DP2000 series within the UN communications framework. Their compliance with analog mode standards, SEL 5 signalling capabilities as well as their improved battery life and enhanced receiver sensitivity, position them as reliable and field-ready alternatives.

Given their performance and compatibility, the R5 series is recommended for standardization within the UN radio portfolio, specifically for normal user roles. To support seamless deployment and consistent configuration, the standard codeplug has been validated and will be included in the {TESS+} restricted Library.

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[1] Typical battery life, 5/5/90 (5% transmitting, 5% receiving, and 90% standby time) profile at maximum transmitter power with GNSS disabled. Actual observed runtimes may vary.