

NORFOLK SOUTHERN CORP. COMMUNICATIONS REPAIR FACILITY RADIO SHOP

Roanoke, VA

May 22, 2023

JEM locomotive radio deck was received on Thursday May 18, 2023, at radio shop, Roanoke VA, for inspection and testing the next morning.

The JEM radio deck was noted to have manufacturer serial number QCM0511044, and NS engraving ID, JM13173. There was no physical damage noted, beyond normal age-related cosmetic wear and tear. There was no water damage, nor corrosion noted on any connectors.

All connectors were attached, and 72VDC power was applied to power connector of radio (nominal locomotive voltage). Unit powered up normally and passed self-test with a short tone (“beep”) heard on external speaker. AAR radio channel was noted to be tuned to 065 for both receiver and transmitter, which corresponds to 161.085 MHz. Volume level was noted to be set at 10 out of 20 (nominal). It was verified that the receiver cannot be completely muted by lowering the volume control to 1 of 20. Squelch level setting cannot be verified, as this always reverts to a setting of 2 (on a scale of 0 to 10).

A receive signal was generated from test equipment into the RF/antenna connector, and receiver was verified to receive a 1000 Hz tone at 0.22 microvolts (or -120 dBm). This level replicates the lowest level signal that can be expected to be received by the unit under normal conditions in the field. Receive audio could be heard loudly and clearly on the 1. external speaker on the radio head, on the 2. conductor panel, and the 3. handset earpiece (these 3 items are test pieces on the radio workbench).

Upon verifying normal receiver and audio operation, the push to talk button was keyed on the radio head to note that the transmitter keyed up and produced 44.5 watts of RF power into the test set. 43 to 45 watts is nominal for this model transmitter. The frequency error of the transmit signal was noted to be within 360 Hertz of the dial frequency (within FCC specs).

The transmitter faithfully reproduces audio tones from DTMF buttons on head and conductor panel, as well as voice audio from internal microphone and external handset (at a narrow band level of 1.5 to 2.0 kHz, FCC specification).

All the above tests were accomplished using a test radio head, as we did not receive the actual radio control head until May 22, 2023. The radio deck (JM13173) was allowed to run throughout

the weekend to increase the likelihood of spotting any intermittent faults if present. No intermittent faults were seen. On Monday morning at 7:30 AM the unit was powered down, and the original locomotive control head was connected to the deck under test. Upon reapplying power to the unit, control head display was bright/visible, and still indicated AAR channel 065 for both receiver and transmitter. Speaker volume was loud and clear. The NS engraving/ID for the control head was RCH16987.

Both radio deck and radio control head operated within manufacturer and FCC specifications, and no faults were noted to either unit.