



7. Voice Encryption	X
8. Digital Signaling	X
9. Sel-Call Decode	X
10. Trunking	X
11. Conventional	X
12. Digital Voice	X
13. X2-TDMA	X

**III. Models and Descriptions:**

<b>Model</b>	<b>Description</b>
a) H51KDF9PW6AN	136-174 MHz (VHF), 1-5.5W, M2 Limited Keypad
b) H51KDH9PW7AN	136-174MHz (VHF), 1-5.5W, M3 Full Keypad

List of models offered to NAG

<b>Sales Model Number</b>	<b>Regional Super Tanapa</b>	<b>Name Plate</b>	<b>Description</b>
H51KDF9PW6AN	MUD2603	APX4000	APX4000 136-174MHz 5.5W M2 Limited Keypad
H51KDH9PW7AN	MUD2601	APX4000	APX4000 136-174MHz 5.5W M3 Full Keypad

Operational Description

This transmitter is primarily intended for use within a hand-held portable radio.

The radio contains a frequency generation unit based on a phase-locked loop that operates in accordance with the fractional N mechanism. The radio micro-controller programs the operational frequency of the loop. A 16.8MHz reference oscillator, stable to 0.8 parts per million over temperature extremes, sets the transmitted frequency stability of the radio.

The analog audio input to the radio via the radio microphone is first digitized and then processed by the radio digital signal processor (DSP) which performs functions such as pre-emphasis (for analog), modulation limiting and low-pass filtering. The DSP functions to ensure that the modulated signal conforms to the modulation designators applicable to radio operation. Modulation of the transmitted signal is achieved via direct coupling of the modulation signal to the low-pass filter of the phase-locked loop and by manipulating the fractional N divider values in accordance to a digitized version of the modulation signal.

The transmitter application conforms to the following modulation designators which covers both voice and data applications:

- 11K0F3E (Analog Voice, 12.5kHz channel) FCC Rule Part 90.210
- 8K10F1E (Digital Voice, 12.5kHz channel) FCC Rule Part 90.210
- 8K10F1D (Digital Data, 12.5kHz channel) FCC Rule Part 90.210
- 8K10F1W (Digital TDMA, 12.5kHz channel) FCC Rule Part 90.210e
- 16K0F3E (Analog Voice, 25kHz channel) FCC Rule Part 80 and RSS 119 (Canada)
- 20K0F1E (Digital Voice with Encryption, 20kHz channel) FCC Rule Part 80 and RSS 119 (Canada)

Transmitted signal power levels are achieved with the implementation of amplifier gain stages in series that amplify

the output of the frequency generation unit to rated power levels in accordance to the radio operating specifications. A power control loop within the radio ensures that the transmitted signal conforms to rated power specifications. Radios are tuned and tested for transmitted power with the tuning of a set voltage. The finalized set voltage that sets the appropriate power level is stored in the radio microcontroller memory. The power control loop also works to ensure transient response functionality of the radio transmitter. A harmonic suppression circuit is also included prior to the radio output to suppress unwanted harmonics from the transmitter gain stages.

Operation ranges for the transmitter are as listed below (for both voice and data):

- Radio to Radio
- Radio to Repeater
- Radio to Wide Area Repeater (Vote Scan)
- Smart/Net (LE)
- Smart/Zone (SE and LE)
- OmniLink (X-Zone)