SECRET

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An Analysis of the Data Pertaining to the Russian SABERU Agent Radio Set

REFERENCE: (a) "Supplement to Field Report on the SABERU" (SECU 53-050) dated 19 November 1953

(b) [redacted]

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The following is a word description of the Russian SABERU agent radio set. The material for this description was obtained from reference (a) and a prior evaluation on an older model of the same equipment, reference (b). No apparent differences were noted between these two evaluations.

1. Receiver Characteristics

The set makes use of three pentode tubes when in the "receive" position. The antenna is capacitively coupled to a broad band r.f. amplifier. The output of this first stage is fed into a pentode regenerative detector. After detection the audio signal is amplified by the third stage, bringing the signal to a sufficient level to power a head set. All of these circuits are conventional except the detector. The control of regeneration, when using a pentode tube, is usually accomplished by varying the screen grid voltage. In this detector a variable plate bypass capacitor is used to control regeneration. This method of control is generally used with a triode tube.

2. Transmitter Characteristics

When transmitting, the broad band r.f. amplifier serves as a Hartley or regenerative crystal oscillator and the audio output stage functions as an r.f. power amplifier. The filament supply to the regenerative detector is removed.

The antenna tuning network is link-coupled to the final amplifier tank coil and consists of a variometer in series with the antenna terminal. The variometer is used to electrically resonate the antenna at the operating frequency.

From a study of page one of the data book it was noted that one of two counterpoise terminals is used. One termination connects a 25 uuf capacitor in series with the counterpoise and the other connects directly to the cold end of the link. Above approximately 3800 kcs the 25 uuf capacitor is placed in series with the counterpoise, and below this frequency it is directly connected to the link.

The reason for this arrangement is probably due to the fact that above 3800 kcs the antenna exhibits more capacity than the variometer can resonate. This 25 uuf capacitor in series reduces the total capacity of the antenna to a value within the effective range of the variometer. Below 3800 kcs the effective capacity of the antenna is probably within the range of the variometer. The above reasoning will hold true provided the length of the antenna and counterpoise is that specified in the data book.

3. Antenna Characteristics

One possible explanation for using an antenna of the type proposed for use with this set is probably due to a desire for transmitting a wave at a low angle of radiation for long range communications.

A perfectly vertical antenna radiates most of the transmitted energy at an angle of zero degrees. An antenna of the type proposed will probably radiate most of the energy at some angle from zero degrees. Where poor ground conductivity exists a large percentage of energy may be radiated in the direction of the counterpoise.

When using an antenna with a counterpoise the conductivity of the earth has less effect on the antenna impedance. Because of this the performance of an antenna and counterpoise system can probably be predicted to a better degree of accuracy than with an antenna not using a counterpoise. As a result the antenna loading system could be designed within closer limits as the network would not have to match all ranges of impedance.

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