

IMPROVEMENT OF
H-F POINT-TO-POINT COMMUNICATION ANTENNAS
FOR USE IN DOMESTIC CIRCUIT



by

DANAI LEKHYANANDA

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THESIS

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.....
Dean of the Graduate School

Thesis Committee..... *P. Pattaboujse* Chairman

..... *S. Kovatana*

..... *Aporn Kengphol*

.....

Thesis Supervisor..... *S. Kovatana*

Date..... *27 April 1966*

ABSTRACT

The new effective and economic way of setting up the double dipole antenna with reflectors for use in domestic point-to-point communication circuit for 24 hour service is presented. The whole antenna set consists of two sets of dipole antenna with reflector, one for day frequency operation and the other for night frequency operation. Both dipole antennas are connected in parallel to a single coaxial transmission line. The whole antenna set possesses constant input impedance at 48 ohms, gain over dipole at about 4.5 db, front-to-back ratio at about 2.3 for both day and night frequencies. The wave angles are at 30° and 50° for day and night frequency respectively. The VSWR's are less than 1.5 : 1 for both frequencies. The guide diagram of the whole antenna set with all dimensions in term of wavelengths, is also presented which enable one to apply any set of day and night frequency to this antenna directly. Also, the typical design of the LPD with frequency range 3 to 10 Mc for use in domestic circuit is presented. A step by step procedure in designing is described which enables one to design independently. The modelling method and the proper frequency selection for HF radio communication in domestic point-to-point circuit for 24 hour service are studied. The accumulated facts are presented which assist in the above designs.

บทคัดย่อ



เสนอวิธีใหม่ที่ได้ผลดีและประหยัดในการใช้สายอากาศแบบ double doublet ประกอบกับ reflector เพื่อการติดต่อระหว่างจุดในวงจรมายในประเทศตลอด 24 ชั่วโมง สายอากาศชนิดนี้ประกอบด้วยสายอากาศแบบ dipole และ reflector รวม 2 ชุด ชุดหนึ่งใช้สำหรับการติดต่อเวลากลางวัน และอีกชุดหนึ่งสำหรับการติดต่อเวลากลางคืน สายอากาศแบบ dipole ทั้งคู่ต่อกันอย่างขนาน ป้อนโคบายส่งแบบ coaxial สายเคเบิล สายอากาศชุดนี้มีค่า input impedance คงที่ที่ 48 ohms มี gain over dipole 4.5 db, มี front-to-back ratio 2-3 ที่ความถี่ทั้งสองคือ day และ night frequency, ค่า wave angle สำหรับ day frequency คือ 30° และสำหรับ night frequency คือ 50° ค่า VSWR ที่ความถี่ทั้งสองน้อยกว่า 1.5 : 1, guide diagram ของสายอากาศอันมีขนาดความยาวทั้งหมดอยู่ใน term ของความยาวช่วงคลื่น ก็มีประกอบไว้ให้เพื่อนำมาใช้กับค่า day และ night frequency ใด ๆ ใดทันที พร้อมทั้งก็ได้เสนอการออกแบบสายอากาศแบบ log periodic dipole ที่มีความถี่อยู่ในย่าน 3 ถึง 10 MC สำหรับใช้ในวงจรมายในประเทศด้วยวิธีการออกแบบแต่ละขั้นตอน ก็ได้อธิบายไว้ซึ่งทำให้ง่ายแก่ผู้ที่จะนำไปออกแบบต่อไป การศึกษาวิธีการบ่อส่วน และวิธีเลือกความถี่ในย่าน HF เพื่อใช้ติดต่อทางวิทยุระหว่างจุดในวงจรมายในประเทศตลอด 24 ชั่วโมง ก็ได้รวบรวมข้อมูลต่าง ๆ นำมาใช้ในการทดลองและออกแบบดังกล่าว.

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