ABSTRACT

This Triangle Unidirectional Tricula Antenna is designed and implemented with two purposes:

1. To make very wideband unidirectional antenna available, in order can be used by several operators jointly to economize tower and area.
2. To prove the hypothesis from first advisor's which is told antenna is matching device between propagation space and radio transmission lines.

Specification that must be fulfilled is: working frequency 0.3 GHz – 3.0 GHz in VSWR $\leq$ 1.5 with 50Ω unbalance; gain $\geq$ 2.14 dBi, unidirectional pattern, and with linear polarization. This antenna must be built with parallel twin conductor, and with triangle transformator to be used in air or vacuum; use England triangular type balun to produce wideband frequency.

With parallel twin strip principle, constructions—material composition and each dimension—are obtained, they are: total antenna length (L) = 11cm, the antenna length is matched for each 1cm, ε_r = 6.3168 (Mica), ε_r = 5.5920 (Glass), ε_r = 4.8019 (Computer Cork), ε_r = 3.8796 (FR2 Epoxy), ε_r = 2.9492 (A4 70gr + Glue), ε_r = 2.1418 (Buffalo Paper), ε_r = 1.6281 (A4 70gr), ε_r = 1.3126 (Cake Carton), ε_r = 1.1296 (Styrofoam), ε_r = 1.0309 (air), ε_r = 1 (air); use parallel silver strip with width (w) 3.44mm x length (l) 130mm, space (s) 20mm (chosen). Triangle England balun is built from copper with 90^o angle, height (s) = 20mm, and with 50Ω unbalance terminal impedance.

From measurement of these specifications in IT Telkom yard, some results are obtained, they are: VSWR = 1.49 with operation frequency from 1.152 GHz – 2.979 GHz at unbalance 50Ω terminal, gain = 8.261 dBi at 1.8 GHz and gain = 8.538 dBi at 2.4 GHz, with unidirectional radiation pattern, and with ellipse polarization.

From the specification experiment above, a conclusion can be drawn that the hypothesis has been proved and for the greater part of the specification from this antenna had been completed. Only the lower frequency and the polarization is out of plan. For the improvement of the experiment result to complete specification, construction of space without echo is suggested to be done for IT Telkom because the experiment result will be better if the experiment is done in space without echo. To get linear polarization, pencil beam antenna as experiment antenna is suggested. To set the operational frequency from 0.3 GHz – 3.0 GHz make the space (s) = 20mm = triangular height = dielectric width are matched to be 50mm are suggested. Coupling between strip and its monotriangular also is matched to be capacitive coupling.

Keyword: England triangular, triangular transformer