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A computational study of the electric field strength of radio transmissions in selected areas of the Rathnapura district

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Radio wave signals in many areas of the Rathnapra district were observed to be weak. This is due to the presence of mountains between transmitters and reception points which obstructs completely or weakens the signals reaching the receiver. In this study, an attempt was made to identify the shadow areas where no waves were received and to compute signal strengths where a significant signal was received from a given transmitter in a selected area of the Rathnapura district.

Shadow areas were identified when obstructions such as mountains were present in the line of sight path between the transmitter and the receiver. In areas where radio signals were present, the interference between the direct wave, its ground reflection and knife edge diffraction from the tallest obstacle in the line of sight path was taken as the total electric field.

A good agreement was seen in the computed shadow areas and the areas where no radio signals were observed in the field strength measurements carried out by the Sri Lanka Broadcasting Corporation in 1997 for the Yatiyanthota and Radella transmissions. Where measurable signals were present, the measured and computed signal strengths were different. This was possible since atmospheric absorption, reflections from mountains among other effects were not considered in the computations. This type of computational studies is useful in planning and operation of radio communication systems in order to optimise radio coverage and cost.

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