Annex 1

Assumptions used to calculate the distance *d*

The assumptions used are as follows:

a) typical pilot channel e.i.r.p. = 47 dBm, considering,
   - Pilot channel power = 33 dBm;
   - Cable losses = 3 dB;
   - Aerial gain = 17 dBi.

b) Level of poor/acceptable reception [8]: -105 dBm;

c) Maximum acceptable propagation loss (a-b) = 152 dB;

d) "Log-distance " Propagation model:

$$PL_{dB} = PL(d_0)_{dB} + 10 \times n \times log\left(\frac{d}{d_0}\right)$$

e) The propagation losses at the reference distance d_0 are calculated using the free space propagation model:

$$PL(d_0)_{dB} = 32.4 + 20 \times log_{10}(2100) + 20 \times log_{10}(d_0), \text{ e}$$

$$d_0 = \frac{2 \times D^2}{\lambda}$$

It is assumed that:

D = 1 m (approximate size of the antenna), and

λ = 0.14 m (frequency = 2100 MHz).

f) n = 3.5, a value considered to characterize the propagation losses in a rural/suburban environment.

([8]) Measurement of quality of service (see http://www.anacom.pt/render.jsp?contentId=1126918)

Given the identification of the maximum number of parishes (480), the distance *d* obtained is 5.2 km (corresponding to a received signal level of -104.7 dBm, as close to the poor/acceptable reception threshold).