AGTC_V2.xlsx
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About

The *AGTC_V2.xlsx* has been written in MS Excel, French vers. 14.0.7173.5000 (32 bits), win 7. An Excel 97 - 2003 version is also available (extension *xls*).
In the following text, we only use the extension *xlsx* but refer to both MS Excel 97-2003 *.xls* and MS Excel 2007 onwards *.xlsx* files.

Decimal Separator

Using individual regional settings holds the challenge of engaging varying decimal separators, "." or ",". When opening the files with an English version of MS Excel/Windows, the commas will be automatically replaced by dots.

Rotation Matrixes

AGTC_V2.xlsx work sheet needs rotation matrixes. There is one matrix by value of alpha (the antenna tilting angle) and one file by matrix. Alpha runs from 0 to 90 deg. with a step of 1 degree.

The formats of these files are *x.xlsx* where "*x*" runs from alpha equaling 0 to 9 and *xx.xlsx* *w*here "*xx*" runs from alpha equaling 10 to 90. The 91 files are zipped into the file *matrixes_xlsx_V2-0.zip*. This file must be unzipped in the same directory as the directory of *AGTC_V2.xlsx*.

In Excel, open the matrix files you need.
Always open the file *0.xlsx*: the explanation will be given below in the paragraph "***Very important!***".

Strong recommendation

Open *AGTC_V2.xlsx*.
As the calculations may take a long time according to the processor(s) of your machine, it is strongly recommended to choose a <u>manual</u> calculation mode. In the Excel **File**, **Options**, **Formulas**, **Calculation options**, **Workbook Calculation**, click **Manual**.

Setting antenna tilting angle / alpha, T_Sky, T_Earth

The cells that can be edited are:
    M2, the alpha angle (antenna tilting angle) in degrees,
    K8, the Sky Temperature in K,
    L8, the Earth Temperature in K,
    B5 to B65345, which hold the 65,341 values of the FF Table Tot dB for a step size
    of 1 degree.

The rest of the work sheet is protected.
In case you wish to edit any other cells: the password is just <Return>.

Be very careful: there are no validity checks on your entries!
The first 4 lines are locked with the Freeze Panes command.

Press <F9> to recalculate.
On the right side of the Status bar situated at the bottom of screen, you will see **Calculating: (x Processor(s)): y%**".
During this calculation, don't click or manipulate anything in the work sheet; especially, don't use the vertical and horizontal scroll bars otherwise the calculation process will restart at its very beginning!

Very important!

The "Local" Average Gain is casted to cell Q10 and is computed for each alpha value. Due to the matrix generation principle, this average gain holds a specific value for each value of alpha.

But T_loss is calculated using the real Average Gain, at alpha = 0 degrees. Therefore you must always start a session of *AGTC_V2.xlsx* with alpha = 0 degrees. ***When the calculation has ended, you have to enter manually the value of Q10 into M4.***
And you must never change the value of M4 for as long as working with the same Far Field values.

If this gain is > 0.999, the T_Loss (cells N22 or L30) is set to 0 K in order to prevent it from falling into a small negative absolute temperature due to the step 1 degree sampling rate.

"Local Average Gain" is the average gain computed for the given angle alpha, whereas the common Average Gain is computed at alpha = 0 degrees.

Cells Q16 and Q17 must be strictly equal.
If they are it is a kind of validation.

How to feed an FFTab file into this MS Excel

Use the *azel_V1-02.bas* program. It asks you the FFTab file name and the Tot_dB decimal separator ("mark") you need for your PC: a "dot" or a "comma". Just enter your choice.

The program generates a *.txt* file where each line contains only 1 data: a Tot_dB value.
These lines are sorted in the right way:
  - Azimuth increasing (from 0 to 360 deg.),
  - Elevation decreasing (from +90 to -90 deg.).

Open this *.txt* file in Excel, copy cells A1 to A65341 into cells B5 to B65345 of *AGTC_V2.xlsx*. End your data entry as described above (for instance: by pressing <Ctrl>+<Return>).

Remember: there are no validity checks on these entries ...

If for any reason the Tot_dB decimal separator is not the right one, do the correction as a whole with the classical <Ctrl>+F shortcut.

Specific Notes on entered numbers and computed results

Don't forget:
- to load the needed matrixes (*0.xlsx* included),
- to configure the calculation mode in **Manual**,
- to do the protocol fixing the Average Gain (alpha = 0 deg).

Then proceed by entering the user specific data for the analysis:
M2 = alpha, K8 = T_Sky, L8 = T_Earth

Confirm your entries pressing on <Return>.

The results are casted to the dedicated cells as:
  Q10:   Local Average Gain (/) = numerical
  R10:   Local Average Gain (dB)
  N14:   max Gain (dBi)

  J30:   alpha (deg.)
  K30:   T_pattern (K)
  L30:   T_loss (K)
  M30:   T_total (K)
  N30:   G/T (dB)

  K10: total Sky   area (zone)
  L10: total Earth area (zone)
  N10: total   area (zone)