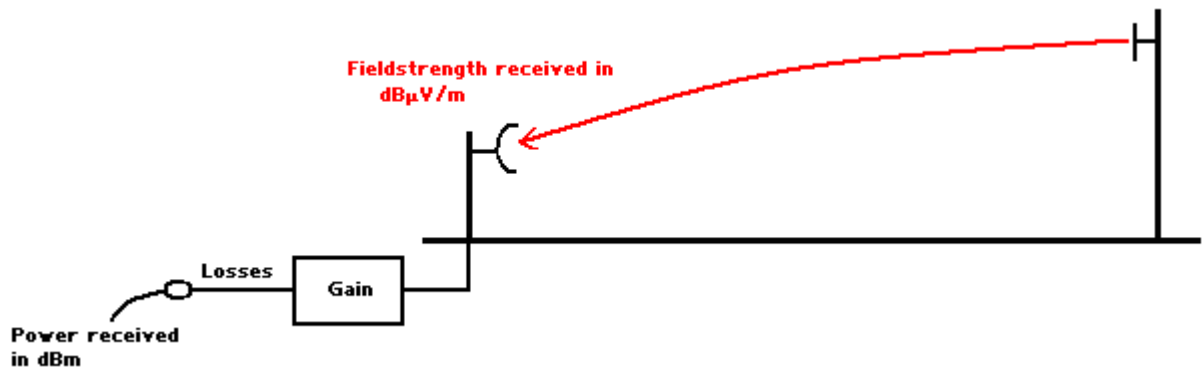


**Field Strength Received (dB $\mu$ V/m)  
and  
Power Received (dBm) in ICS Telecom**

## 1 – General considerations

In ICS Telecom, there are two ways to consider what is received from a transmitter:

- the Field Strength Received, in dB $\mu$ V/m;
- the Power Received, in dBm.



### 1.1 Field strength in dB $\mu$ V/m

The dB $\mu$ V/m is the field intensity unit, defined in decibels above one microvolt/meter (also written dBu).

The Field Strength Received (FSR) in dB $\mu$ V/m is calculated at the edge of the antenna, and it does not consider the receiver's parameters. This measure can be used to describe service areas involving different equipments, technologies, frequency bands...

### 1.2 Power received in dBm

The dBm is a power level unit, expressed in dB above one milliwatt.

The Power Received (PR) in dBm takes into consideration the receiving antenna characteristics. Therefore, a value received in dBm is only valid for one frequency and a particular receiving antenna gain used for the prediction.

The relationship between the values expressed in dBm and dB $\mu$ V/m is given by the frequency and the receiver's parameters according to the following formulas :

From dBm to dBu:

$$FSR= Z+PR-20*\log_{10}(300/f)+20*\log_{10}(2*\pi*\sqrt{73/ohms))-GP+loss$$

From dBu to dBm:

$$PR= FSR+20*\log_{10}(300/f)-20*\log_{10}(2*\pi*\sqrt{73/ohms))+GP-loss-Z$$

With:

GP=G-2.15+Reference antenna gain.

G=Receiving antenna gain in dB.

Reference antenna gain :

Short vertical=4.8dB.

Half wave=2.15dB.

Isotropic=0dB.

Z is referring to the impedance :

For a 50 $\Omega$  impedance, Z= 107dB.

For a 75 $\Omega$  impedance, Z=108.75dB.

FSR=Field Strength Received in dB $\mu$ V/m.

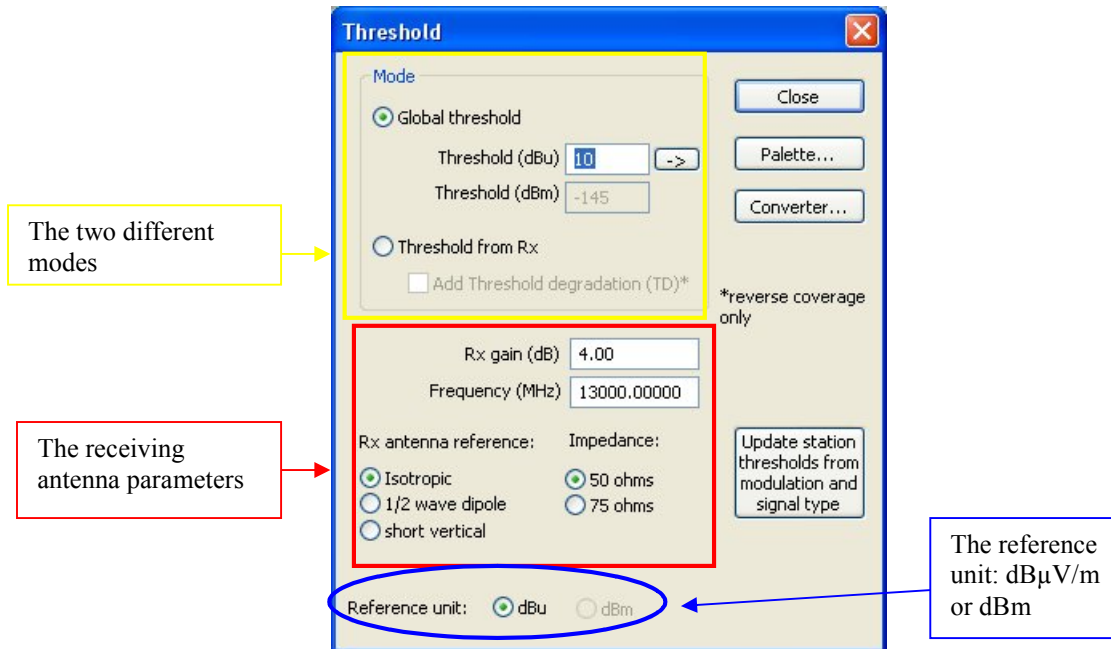
f=frequency in MHz.

loss=Rx losses en dB.

PR=Power received in dBm.

## 2 – Set the parameters in ICS Telecom

To access to the reference unit parameters, open the threshold box:



In ICS Telecom, the threshold can be set in two different ways:

- With the "Global threshold" option, the user defines one threshold value which is the same for any receiver. In this mode, only dB $\mu$ V/m unit is available.
- With the "Threshold from Rx" option, the user defines one specific threshold value for each receiver. In this mode, dB $\mu$ V/m and dBm units are available.

A receiver can be:

- Any point on the map.

Set the threshold value in the "coverage threshold" field in the "Advanced" tab of the station parameters:

Coverage threshold (dBuV/m)\*  | Coverage threshold (dBm)\*

- A station:

Set the threshold value in the "Rx threshold" field in the "Advanced" tab of the station parameters:

Rx threshold (dBuV/m)\*  | Rx threshold (dBm)\*

- A subscriber:

Set the threshold value in the "Rx threshold" field in the "Advanced" tab of the station parameters:

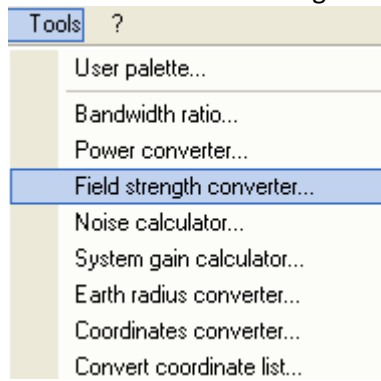
Threshold (dBuV/m)  | Threshold (dBm)

The "Global Threshold" mode is better suitable when only one sensitivity has to be considered within the network.

The "Threshold from Rx" mode is to be set when several sensitivities according to different receivers are to be considered inside the network.

### 3 – Field strength converter tool

To help with conversions, open the field strength converter tool.  
Go to Tools => Field strength converter:



This window then appears:

