## CLAIMS

1 – A device for detecting and localizing in a confined manner one or more radio devices which might be present in an enclosed or semi-open area of prohibition, characterized in that it comprises at least the following elements:

at least one linear aerial comprising several orifices Oi designed to allow the capture of signals emitted by prohibited radio devices then their transmission via the linear aerial to one or more receiving devices connected to the linear aerial via a connector, the one or more receiving devices being adapted to process the signals sensed by the linear aerial in order to detect the presence of prohibited devices in said area and to reject the detections of authorized devices outside of said area, and in that each of the one or more receiving devices comprises at least two detection thresholds $Seuil_{j,f}$ and $Seuil'_{j,f}$, the value of the threshold $Seuil_{j,f}$ is adapted so that the value of the power received $P(r,l)_{j,f}$ at the device for detecting is such that the ratio $P(r,l)_{j,f}/N_{j,f}$ is higher than the detection threshold $Seuil_{j,f}$ for carriers employed by transmitters of the prohibited devices considered at the points M(r,l) inside of the area of prohibition, with

$10.\log_{10}(P_{0,j,f})-C(r_0)-P'.(l-l_0)-10.\log_{10}(r/r_0)-10.\log_{10}(N_{j,f}) \geq 10.\log_{10}(Seuil_{j,f})+\eta$ where

. r, l, are the radial and linear coordinates of a point M,

. $l_0$ denotes a reference linear distance,

. $r_0$ denotes a reference radial distance to the linear element,

. P' denotes the rate of the linear losses along the radiating aerial starting from the distance $l_0$,

. $-C(r_0)$ denotes the coupling losses in the band $B_{j,f}$ at the reference radial distance,

. $N_{j,f}$ denotes the receiver noise in the band $B_{j,f}$,

. $P_{0,j,f}$ denotes the power radiated at the point M(r,l) in the band $B_{j,f}$,

. $Seuil_{j,f}$ represents the sensitivity threshold of the receiving device in the band $B_{j,f}$, adjusted in order to obtain the confinement of the detection,

η represents a safety margin taking into account the additional attenuations of the signal when it propagates from the prohibited devices to the aerial, and

the value of the threshold $Seuil'_{j,f}$ is such that:

$10.\log_{10}(P_{S,j,f}) - 20.\log_{10}(R) - 10.\log_{10}(N_{j,f}) \leq 10.\log_{10}(Seuil'_{,j,f}) - \eta'$ where

. R is the distance from the point M, outside of the area of prohibition, to the phase center of the linear aerial,

. $P_{S,j,f}$ denotes the power radiated at the point M(R) by the authorized devices outside of the area of prohibition, in the band $B_{j,f}$,

. $Seuil'_{,j,f}$ represents a non-detection threshold of the receiving device in the band $B_{j,f}$, adjusted according to the gain of the linear element in order to obtain the confinement of the detection to the area of prohibition,

η' represents a safety margin taking into account excesses of power at transmission.

2 – The device as claimed in claim 1, characterized in that it comprises a first receiving device disposed at a first end of the linear aerial and a second receiving device disposed at a second end of the linear aerial, the first and the second receiving device being synchronized by means of a module in order to receive the same signal to be detected at the two ends of the linear aerial.

3 – The device as claimed in claim 2, characterized in that the module comprises a module for estimating localization:

- based on the values of amplitudes $A_1$, $A_2$ measured on the signals received on each receiving device, and/or
- based on the measured ratio $(A_1/A_2)$ of these amplitudes after propagation, and/or
- based on the propagation times $\tau_1$, $\tau_2$ measured on the signals received on each receiving device, and/or based on the measured difference $(\tau_1-\tau_2)$ of these propagation times, and/or

- based on the measured propagation phases $\varphi_1$, $\varphi_2$ of the signals received on each receiving device, and/or based on the measured difference $(\varphi_1-\varphi_2)$ of these propagation phases.

4 – The device as claimed in one of the preceding claims, characterized in that at least one of the one or more receiving devices is a generic wideband receiver.

5 – The device as claimed in one of the preceding claims, characterized in that the receiving device is composed of an assembly of dedicated receivers, having specifically adapted filtering and thresholding amplification modules, whose input signals come from a switch (7) connected to the linear aerial.

6 – The device as claimed in one of the preceding claims, characterized in that the receiving device comprises filtering modules selective in frequency and adapted to excise the received signal.

7 – The device as claimed in one of the preceding claims, characterized in that it comprises a means designed to couple the signals at the output of two different linear aerials and to inject the resulting signal into a single receiving device.

8 – The device as claimed in one of the preceding claims, characterized in that it comprises a system of baffles designed to locally optimize the confinement of the signal.

9 – The device as claimed in claim 8, characterized in that the system of baffles comprises grids for the passage of electrical cables with reversed mounting, or nettings with various meshes and geometries.

10 – A method for detecting and localizing in a confined manner one or more radio devices present in an enclosed or semi-open prohibited area, characterized in that it comprises at least the following steps:

- use a linear aerial comprising several orifices Oi designed to allow the passage of the signals emitted by the one or more radio devices via the linear aerial to a receiving device connected to the linear aerial,
- process the received signals in order to detect the presence of unauthorized devices within said area and to reject the detections of authorized devices outside of said area.

11 – The method as claimed in claim 10, characterized in that it uses a first threshold $Seuil_{j,f}$ such that:

$10.\log_{10}(P_{0,j,f})-C(r_0)-P'.(l-l_0)-10.\log_{10}(r/r_0)-10.\log_{10}(N_{j,f}) \geq 10.\log_{10}(Seuil_{j,f})+\eta$ where

. r, l, are the radial and linear coordinates of a point M,

. $l_0$ denotes a reference linear distance,

. $r_0$ denotes a reference radial distance to the linear element,

. P' denotes the rate of the linear losses along the radiating aerial starting from the distance $l_0$,

. $-C(r_0)$ denotes the coupling losses in the band $B_{j,f}$ at the reference radial distance,

. $N_{j,f}$ denotes the receiver noise in the band $B_{j,f}$,

. $P_{0,j,f}$ denotes the power radiated at the point M(r,l) in the band $B_{j,f}$,

. $Seuil_{j,f}$ represents the sensitivity threshold of the receiving device in the band $B_{j,f}$, adjusted in order to obtain the confinement of the detection,

$\eta$ represents a certain safety margin for taking into account additional attenuations of the signal when it propagates from the unauthorized devices to the aerial, and

a second rejection threshold $Seuil'_{j,f}$ such that

$10.\log_{10}(P_{S,j,f}) - 20.\log_{10}(R) - 10.\log_{10}(N_{j,f}) \leq 10.\log_{10}(Seuil'_{,j,f}) - \eta'$ where

. R is the distance from the point M (outside of the area of prohibition) to the phase center of the linear aerial,

. $P_{S,j,f}$ denotes the power radiated at the point M(R) by the authorized devices outside of the area of prohibition, in the band $B_{j,f}$,

. $Seuil'_{,j,f}$ represents a non-detection threshold of the receiving device in the band $B_{j,f}$, adjusted according to the gain of the linear element in order to obtain the confinement of the detection,

η' represents a safety margin taking into account excesses of radiated power at transmission.

12 – The method as claimed in claim 11 characterized in that the threshold levels for detection $Seuil_{j,f}$ and rejection $Seuil'_{j,f}$ are determined by taking into account one or more of the following parameters:

- the measurements of the levels of marker, control and traffic signals coming from transmitters (9, 10, 11, 12) present in external networks and capable of entering into communication with the unauthorized devices,
- the rate P' of linear losses within the linear aerial,
- the coupling losses $C(r_0)$ of the linear aerial,
- margins η intended to compensate for the additional attenuations of various natures which may affect a scrambling signal J when it propagates from the linear aerial to the device to be scrambled,
- margins η' intended to compensate for the excesses of radiated power at transmission.