~~PATENT~~ CLAIMS

1. An amplification system, connected to a modem ~~(101)~~ delivering a signal to be amplified, comprising~~said system having~~:

- at least one amplification device ~~(102)~~ in which an amplification gain is variable,
- at least one first determination device ~~(103)~~ for determination of a first difference between an amplified signal and said signal to be amplified,
- at least one second determination device ~~(104)~~ for determination of said variable gain,

wherein~~said system being characterized in that~~ said second determination device ~~(104)~~ is capable of the determination of said variable gain on the basis of said signal to be amplified, said amplified signal and said first difference;

said second device having:

- at least one third determination device ~~(201)~~ for determination of a model, comprising a delay and a gain, of a~~the~~ perturbation of the first difference by the amplification device by means of a correlation between said signal to be amplified and said amplified signal,
- at least one fourth determination device ~~(202)~~ for determination of perturbations of the first difference that are caused by said amplification device, on the basis of said model and said signal to be amplified,
- at least one fifth determination device ~~(203)~~ for determination of a second difference between said first difference and said perturbations, and
- a controller ~~(204)~~ that is capable of determining said variable gain on the basis of said second difference.

2. The~~A~~ amplification system of~~according to~~ Claim 1, having at least one extraction device ~~(301)~~, for extraction of said amplified signal to said first determination device, wherein said extraction device comprises~~ing~~:

- a directional coupler ~~(302)~~ that is used to recover a~~the~~ signal transmitted on a wire connecting said amplification device and an antenna,
- at least one device ~~(303)~~ for regulating the gain of the recovered signal,

- a mixer ~~(304)~~ for mixing the recovered signal that has had its gain regulated with a sinusoidal signal, and
- a plurality of filters ~~(305)~~ for filtering the mixed signal, said filters comprising at least one fixed-bandwidth analogue filter that is used for anti-aliasing and/or anti-jamming and at least one switchable digital filter for the bandwidth that varies as a function of a bandwidth of said signal to be amplified and/or of a disparity between a frequency of said signal to be amplified and a frequency of said perturbations, and

~~moreover~~ said third device is suited furthermore to the determination of a model of the perturbation of the first difference by said amplification device and said extraction device.

3. The Aamplification system of~~according to~~ Claim 1 ~~or 2~~, wherein~~in which~~ said first determination device ~~(103)~~ is connected directly to said modem ~~(101)~~.

4. The Aamplification system ~~according to one~~ of Claims 1 ~~to 3~~, wherein~~in which~~ said controller ~~(204)~~ is a PID controller.

5. The Aamplification system ~~according to one~~ of Claims 1 ~~to 4~~, wherein~~in which~~ said second determination device ~~(104)~~ has a conversion table ~~(501)~~ relating a power of a~~said~~ signal to be transmitted to said amplification gain.

6. A Mmethod for using the amplification system ~~according to one~~ of Claims 1 ~~to 5~~, wherein the method comprises~~having~~ the ~~following~~ successive steps of:

- a step ~~(601)~~ of configuration of the gain of said amplification device, said step of configuration being carried out when said signal to be amplified has zero power,
- a step ~~(602)~~ of increase of the amplification gain of the amplification device, in an initialization phase, during which said signal to be amplified does not have any useful data,

- a step ~~(604)~~ of deactivation of ~~the~~ regulation of the gain, said step of deactivation being carried out when the signal to be amplified has useful data.

7. The ~~M~~method of~~according to~~ Claim 6, further~~more~~ comprising~~having~~ a step ~~(603)~~ of regulation of the amplification gain of the amplification device, said step ~~(603)~~ of regulation of the amplification gain being carried out after said step ~~(602)~~ of increase of the amplification gain, moreover said step of regulation ~~(603)~~ being carried out on the basis of a setpoint.

8. The ~~M~~method of~~according to~~ Claim 6 ~~or 7~~, in which said step of configuration ~~(601)~~ is suited to the implementation of the relationship:

$$\frac{Pout_max}{} = Pout_mean_MODEM_setpoint + Modulation_crest_factor$$

where~~;~~

- *Pout_max* represents the maximum output power in dB,
- *Pout_mean_MODEM_setpoint* represents the mean power in dB of the signal that said modem ~~(101)~~ will transmit, and
- *Modulation_crest_factor* represents the modulation crest factor in dB of the signal that will be transmitted by said modem ~~(101)~~,

and in which the step of configuration ~~(601)~~ is suited to configuring said amplification device ~~(102)~~ so as to be able to transmit a maximum output power of *Pout_max*.

9. The ~~M~~method of~~according to one of~~ Claims ~~6 to 8~~, wherein~~in which~~ said step of increase of the amplification gain ~~(602)~~ is implemented:

- by means of a conversion table ~~(501)~~ relating a power of a~~said~~ signal to be transmitted to said amplification gain when the power of said signal to be amplified is lower than a threshold; and
- by means of said controller ~~(204)~~ when the power of said signal to be amplified is higher than said threshold.