

1. Could you simply explain the principle of how a NLJD locator work?

The locator device transmits a harmonic signal at a frequency F . If there are only linear objects or media on the signal propagation path, then these linear objects reflect the transmitted signal in different directions. The reflected signal has the same frequency F and can be received and analyzed. So, in this case, we can speak about classic radar.

But if transmitted signal hits an object with non-linear properties, then inside the non-linear object will appear signals at harmonic frequencies ($2F$ $3F$). These harmonics signals can also be received. The presence of signals from these harmonics indicates the presence of a nonlinear object in the radiation zone.

Of course, the linear reflected signal (at the frequency F) is also present, but it does not important for the NLJD purposes.

2. What are examples of linear objects?

Linear objects are all dielectrics (air, water, wood, plastic, concrete, stone, etc.) as well as all conductors - metals.

3. And what objects have non-linear properties?

First of all, these are all kinds of semiconductor components - and this is the main effect that NLJDs use. Secondly, non-linear properties also have objects containing a metal-oxide metal contacts (that is, rusty metals) - these are false alarm objects.

4. And what objects with non-linear properties give more second or third harmonics?

Objects of the first type (electronics), as a rule, give more second harmonics at a frequency of $2F$. Objects of the second type (rusty metals) give more response at a frequency of $3F$ (third harmonics). It depends on different types of non-linearity. As a result, it is possible to detect semiconductor components and distinguish them from rusty metals objects.

5. The level of non-linear conversion is a very small, isn't it?

Yes, the level of non-linear conversion is a very small. The power of the $2F$ and $3F$ harmonics is much less than the power of the emitted signal. Their ratio is about ten to the seventeenth degree.

6. Why is the price of the locator expensive?

A non-linear detector must have a high power, absolutely pure emitted signal and a very sensitive receiver. Another problem: the locator is an electronic device - and the locator must not detect itself. It leads to the locator very high requirements in terms of its EMC (electromagnetic compatibility). So we can say that the locator is a high technological device - and it must be expensive.

7. What are the applications of the locator?

The most common area of application is the protection and searching for illegal listening and communication devices in offices or on person. In this case the objects are phones, bugs etc, and of course such devices can be detected both in the ON (powered) state and in the completely OFF state and without a power source at all.

Secondly, there is another application in anti-terrorism and military area. The locators can detect improvised explosive devices that use an electronic detonation module. This module is exactly detected by the nonlinear locator.

Another separate area of an application is the detection of phones and SIM cards in prisons.

8. Why is the searching of SIM cards become the comparison test for locators?

It is clear that the SIM card is a small and therefore difficult to detect especially in prisons condition. As a rule, an ordinary user does not need to look for a SIM card in the office or on person etc. But now, the SIM card has become a suitable test object for comparing locators. Most SIM cards have approximately similar characteristics, because they are made on the same technology. And that is why different models of NLJD locators are now compared by the detection range of a SIM card. You can find a lot of videos on the Internet.

9. What kind of non-linear locators I can find on the market now?

What parameters I need to pay attention to?

The main parameter is the operating frequency. On the one hand, the higher the frequency is, than the better detection of small objects with high-frequency components (such as trackers, mini bugs, etc.). But with increasing frequency signals attenuate more strongly in various materials (wood, brick, concrete). We know models with frequencies 900Mhz, 2.4GHz, 3.6 GHz. The first locators 50 years ago were made on the 900Mhz, and now such models are mainly used for detecting targets in a wet grass, underground and in brick or concrete walls. 2.4GHz is the most popular frequency - it allows you to effectively detect modern bugs. There are models for 3.6Ghz - these are not common

models, they have very long detection range, but they have very narrow beam (so his detection zone have a radius from 5 cm to 2-3 meters) and attenuations of signal in walls or interior items is too much.

The next parameter is transmitted power. It seems to be clear here - the more power is the better. But, there are legal limits allowed for power and frequency in order to avoid disturbing operation of communicating services and, moreover, not to cause danger for the operator. In Europe this is regulated by the standard. So, many locators on the market cannot be used without a special license in the EU.

Next parameter is Sensitivity - here, everything is simple. The actual achievable value is approximately -140dBm. It is important to add here that there are locators with only the second harmonic receiver (which is useful for electronics detection) and there are locators with the both the second and the third harmonics receiver to compare them and understand what kind of object you found (electronics or rusty metals). And here we must understand that this rule is not absolutely true- there are often exceptions.

And finally, there are various additional parameters - listening to the received signal, the spectrum of the received signal, combining several operating frequencies in one device, and so on. Many of them are useful, but some are just confusing of the operator and are made only for marketing.

10. Have NLJD locators the selection of distance?

All NLJD locators have no selection of distance, i.e., the operator has no information about the distance to the target. And cannot differ between a strong target on a big distance and a close weak target. Moreover, if the signal from a strong object (TV, or a WIFI router) is present, the operator cannot see a small signal from a weak bug or a camera. That is why super sensitivity for NLJD is absolutely not needed - because everywhere operator will see some signal.

11. What are the advantages of your locator?

We decided to develop a locator with the price of about 3000 EUR and with good characteristics, suitable for effective detection. And we hope that this price affords people an opportunity to buy a NLJD locator.

2.4GHz frequency is the most convenient. The Power and Sensitivity are 0.1 Watt and -140 dBm respectively. It provides good detection performance and also complies with the limits for unlicensed sale and use. The detection range of the SIM card is about 10cm. The distance of typical targets detection is about 30-50 cm. This allows operator to search effectively.

The dimensions are small, and the weight is light. Also, there is a changeable stick with a typical photo mount, and standard Li batteries. So, the user can buy and replace these parts themselves if necessary. In summary, we would like to suggest you the first inexpensive affordable device with good characteristics and a very good price-quality ratio on the market.