



*Press release*

*For immediate publication*

[Short version]

## **ADFA 2 – Precise and reliable automatic localization of signals between 10 MHz and 8 GHz**

**Pfullingen, Germany, January 14, 2020** – With the ADFA 2, Narda Safety Test Solutions present their second automatic direction finding antenna. The RF measurement specialists have increased the frequency range in this automatic DF antenna by more than three times. When connected to Narda's powerful real time receiver, the SignalShark, this now means that it can precisely and reliably localize signals between 10 MHz and 8 GHz (ADFA 1: 200 MHz – 2.7 GHz). Just like its smaller “brother”, the ADFA 2 delivers extraordinarily stable measurement results in seconds – it is insensitive to reflections. Its wide frequency range means that direction finding at low and high frequencies is covered equally. Compact and universal, it is unique in the market in combining an extremely broad spectrum with the minimum outlay of equipment. This makes the ADFA 2 particularly interesting for use by mobile network providers and regulatory authorities, as well as for military applications.

For applications on the move, the ADFA 2 is easily attached and detached from a car roof with the aid of its magnetic base. A single cable links it to the SignalShark. It delivers precise results with the highest accuracy even without the vehicle correction tables that are usually required. Whilst still on the move, the measurement technician can superimpose a heatmap on a stored map on the SignalShark display as well as view the found direction. The powerful localization software in the device automatically indicates where the interference source is most likely to be located. No additional PC or assistance is required for this.

The heart of the ADFA 2 is an array of nine antenna elements (dipoles) arranged on a flat plane with a central omnidirectional reference antenna, which allows the measurement technician to observe the signal spectrum during direction finding. The principle of automatic direction finding using single channel receivers is based on the phase difference between the antenna elements. The nine dipoles are here measured against the central reference antenna. The greater the distances between them and thus the detected phase difference, the more reliable the bearings. As a result of the extended frequency range at both ends of the scale there is a new lower plane for the range from 10 to 200 MHz and an upper one for the range from 2.7 to 8 GHz. While the external diameter of only 480 millimeters is unchanged, these additional planes mean that the ADFA 2 weighs 6.5 kg, which is just 1 kg more than the ADFA 1 (200 MHz – 2.7 GHz).

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[Long version]

## **ADFA 2 – Precise and reliable automatic localization of signals between 10 MHz and 8 GHz**

**Pfullingen, Germany, January 14, 2020** – With the ADFA 2, Narda Safety Test Solutions now present a further development of their automatic direction finding antenna that was completely redesigned just a year ago. The engineers at RG measurement technology specialist Narda have more than tripled the operational frequency range of the DF antenna with this latest device. When connected to Narda's powerful real time receiver, the SignalShark, this now means that it can precisely and reliably localize signals between 10 MHz and 8 GHz (ADFA 1: 200 MHz – 2.7 GHz). Just like its smaller “brother”, the ADFA 2 delivers extraordinarily stable measurement results in seconds – it is insensitive to reflections. Its wide frequency range means that direction finding at low and high frequencies is covered equally. The SignalShark/ADFA 2 system does not require a separate PC, either. Extraordinarily compact and therefore universally suitable for both mobile and stationary use, it is unique in the market in combining an extremely broad spectrum with the minimum outlay of equipment. This makes the ADFA 2 particularly interesting for use by mobile network providers and regulatory authorities, as well as for military applications.

### **SignalShark/ADFA 2 in practical use**

One major task performed by regulatory authorities is to monitor the frequency bands assigned to the various network providers within the country for any interference and to keep them free from unauthorized transmissions. Whenever the regulator receives notification of a problem, the combination SignalShark/ADFA 2 is ideal for the measurement technician assigned to determine the situation and find out where the interference is coming from to be fully equipped for all circumstances. There is no need to work out which combinations of antenna and receiver might be required and load them into the vehicle because this setup always provides the right equipment with the minimum of outlay. Once the building where the interferer is located has been found, the same receiver can continue to be used to cover the last few meters, with only the antenna being changed to a handheld antenna that also covers all the necessary frequency ranges. Inside the building, the handheld direction finder is used to determine the actual floor and room in the building where the signal source is located.

Whilst still in the moving vehicle during a localization mission, the measurement technician can superimpose a heatmap on a stored map on the SignalShark display and also view the simple display of the found direction. The powerful localization software in the device automatically indicates where the interference source is most likely to be located once the user has set the measurement parameters on the device. The result is in real time and no external laptop is needed. In this context, automatically means that no assistant is required in order to operate the receiver while direction finding on the move.



For mobile applications in general, the ADFA 2 can be easily attached to or detached from a vehicle roof thanks to its magnetic base. Only one connecting cable links the antenna to the SignalShark. There is therefore no need to drill holes in the vehicle bodywork in order to attach the antenna. This is a great advantage, particularly if the task involves the use of a rental vehicle. Regardless of the make of vehicle, Narda's new automatic DF antenna delivers precise measurement results with the highest accuracy without the need for the otherwise necessary vehicle correction tables.

Military signals are generally transmitted over long distances, so they often make use of correspondingly low frequencies in order to achieve the desired long ranges. The extended range of the ADFA 2 in the low frequency band also covers this application.

### **Automatic direction finding and localization with single channel receivers**

The secret of automatic localization of interference signals lies in the statistical probability. In an urban setting, where there are many reflections from buildings, the probability of a hit increases with the precision and number of bearings that indicate a particular direction. Narda has tweaked and optimized both these parameters during the development of the ADFA 2. The precision and extreme stability of the bearing results from the automatic DF antenna is due to its large aperture combined with the use of a reference element and the sophisticated processing of the bearing results by the SignalShark software. The measurement speed also plays a major part. The chance of getting a perfect bearing or so-called line of sight when passing by a row of buildings, for example, naturally increases with the speed of the measurement. The more results that point in a given direction or to a particular location, the more stable the end result will be.

The principle of automatic direction finding using single channel receivers is based on the phase difference between the antenna elements. The nine dipole elements are arranged in a circle and are measured against a central reference element. The diameter (aperture) of the circle mainly determines the accuracy of the bearing. Single channel systems, that is systems with just one analyzer, can only make fully automatic, reliable and extremely precise bearing measurements in conjunction with a sophisticated array of antennas, phase shifters, and complex evaluation algorithms. A complete bearing cycle takes a mere 1.2 milliseconds and achieves a typical accuracy of up to 1° RMS.

### **Two new internal planes**

The ADFA 2 comprises an array of nine antenna elements (dipoles) arranged on a flat plane with a central omnidirectional reference antenna just like the ADFA 1. The reference antenna provides the advantage that the measurement technician can observe the broadband spectrum at the same time as direction finding. The ADFA 2 has two additional planes: a lower plane with two orthogonally crossed coils for the frequency range from 10 to 200 MHz, and an upper plane with a further nine dipoles for frequencies between 2.7 and 8 GHz. Compared with



the ADFA 1, the external diameter of only 480 millimeters is the same, and the two additional internal planes mean that the ADFA 2 weighs just 1 kg more, at 6.5 kg.

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This text and press images can also be found at  
[www.narda-sts.com](http://www.narda-sts.com) under: Company > Press

[01 Narda STS ADFA 2\_191212.jpg]



**Image 1: For mobile applications, the ADFA 2 is simply attached to the vehicle roof using its magnetic base and connected to the SignalShark inside the vehicle. If the measuring technician needs to enter a building to trace the final few meters to the source, a handheld antenna is used to localize the target.**

[02 Narda STS ADFA 2\_191212.jpg]



**Image 2: The heart of the ADFA 2 is a plane with nine antenna elements (dipoles) with a central omnidirectional reference antenna. For the frequency range extension at both ends of the spectrum, there are two additional planes: a lower plane for the frequency range from 10 to 200 MHz, and an upper one for the frequency range from 2.7 up to 8 GHz.**

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Safety Test Solutions

**Narda** is a leading supplier of measuring equipment for RF Test & Measurement, EMF Safety and EMC. The RF Test & Measurement range includes analyzers and devices for the measurement and identification of RF sources. The EMF Safety product spectrum covers broadband and frequency-selective measuring devices, and EMF monitors for wide area coverage as well as personal safety monitors that can be worn on the body. The EMC sector offers instruments for determining the electromagnetic compatibility of devices under the PMM brand name. The range of services provided includes servicing, calibration, and training programs. The company operates a management system that complies with ISO 9001/2008 and ISO/IEC 17025.

Narda has development and production facilities in Pfullingen / Germany and Cisano / Italy, and has its own representative in Beijing / China. A worldwide network of representatives guarantees closeness to customers.

Narda is part of **L3Harris Technologies**.

**For more information, contact:**

**Texterei Jungmann**

[Press contact]

Thomas Jungmann

Bahnhofstr. 42

D-88239 Wangen im Allgäu

Tel.: +49 - 7522 / 9899-850

E-Mail: [info@texterei-jungmann.de](mailto:info@texterei-jungmann.de)

<http://texterei-jungmann.de>

**Narda Safety Test Solutions GmbH**

Sandwiesenstr. 7

D-72793 Pfullingen

Tel.: +49 - 7121 / 97 32 - 0

Fax: +49 - 7121 / 97 32 - 790

E-Mail: [info.narda-de@L3Harris.com](mailto:info.narda-de@L3Harris.com)

[www.narda-sts.com](http://www.narda-sts.com)

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