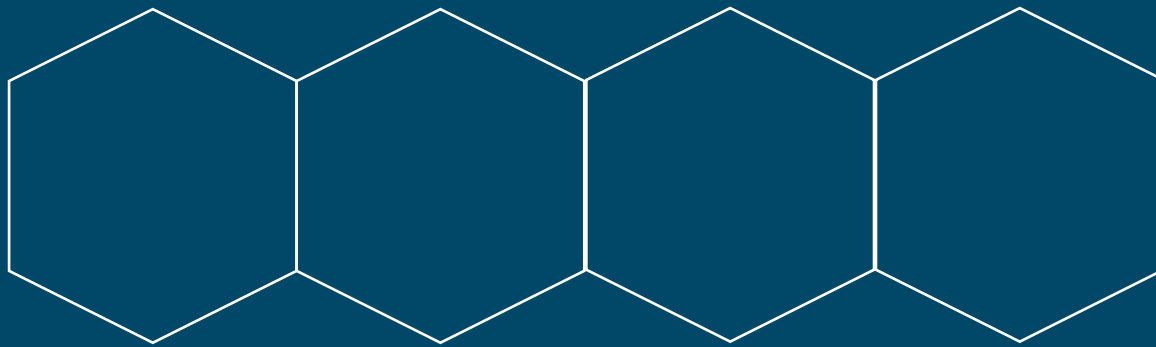


Elenos Group World Broadcast



ELENOS



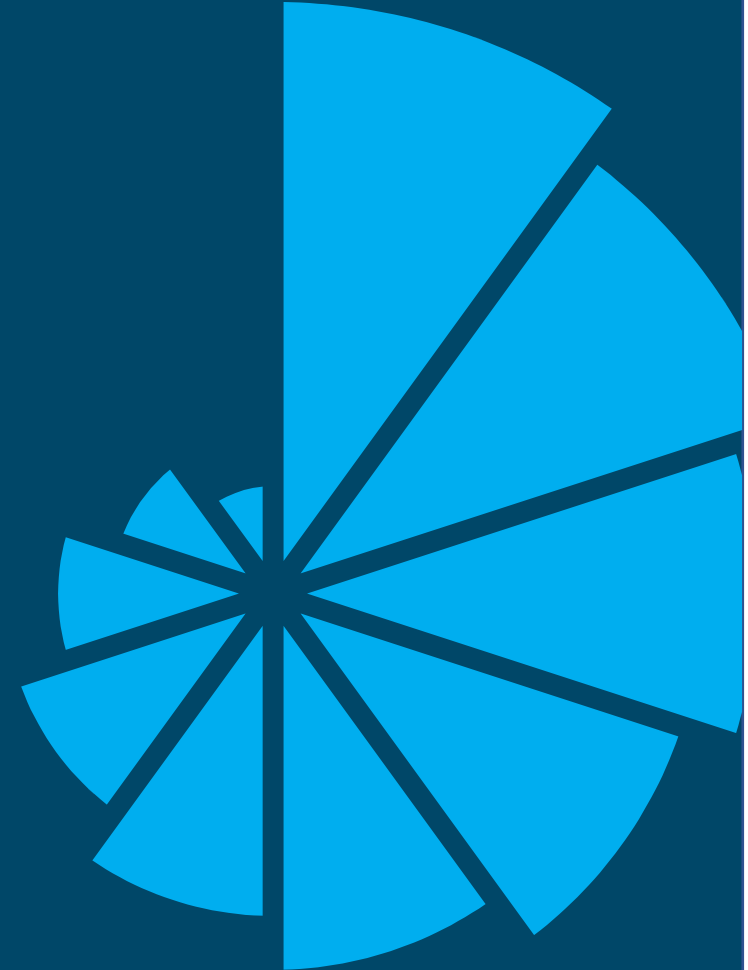
itelco

PRO



TELEVISION

Introducing Antennas, Coverage Predicting and Planning





elenos group
DEDICATED RELIABLE CREATIVE



Elenos Group - History

Elenos was founded in **1977** in Ferrara, Italy

- Focused on providing a wide range of FM Transmitters, featuring the most compact and efficient products on the market
(First in the world to provide a 10KW FM in 4U only)

Itelco Broadcast began in **1962** in Orvieto, Italy

- Specialized in digital modulation and high-power liquid-cooled systems
(Supplier of CERN for High-power amplifier involved on the Large Hadron Collider)

BE was established in Quincy, Illinois in **1959**,

- Broadcast Electronics has an illustrious history that has played an influential role in many radio milestones
BE offers a wide range of high quality radio broadcast products, including automation software, transmitters for AM, FM and HD Radio and Marti Electronics.

PROTELEVISION TECNOLOGIES established in Denmark, over 50 years of experience,

- Broadcast formerly Philips TV & Test Equipment, is a leading designer and manufacturer of advanced future-proof modulation solutions for Digital TV and Radio standards (DVB-T/T2, ISDB-T, DAB+, ATSC 1.0 and ATSC 3.0) represented worldwide in more than 50 countries with over 30,000 installed units in daily operation.



Today

The mission of the **Elenos group**, by utilizing its state-of-the-art production capabilities and international sales network, is to provide consumers with the best radio and TV broadcasting experience for all global modulation standards.

With over 90 years of experience in the field, the Elenos group has developed technologies for Network applications, Digital and Analog TV / FM Radio Systems, scientific RF applications and remote software control and management.

The Elenos group is an ideal partner in helping develop your networks for your next digital migration.

ELENOS



PRO  **TELEVISION**



60.000 Installations

130 Countries

90 Years of Experience

More than 20 Centers of **EXCELLENCE**

- **Radiocomm**
- **LEGA Ltd**
- **Clyde Broadcast Products Ltd**
- **Broadcast Partners**
- **FPG SERVIS s.r.o.**
- **Nagyfrekvencia Kft**
- **RTV-TEC**
- **Roussillon FM**
- **SiteMaster LDA**
- **Matel Elettronica Snc**
- **RS Telekomunikasyon**
- **Athenas Comunicaciòn y Logistica SL**
- **Shanghai Yi Hui Nuo Broadcast**
- **PT. Solitech multi-media & broadcast sol.**
- **Vtek Engineering Ltd**
- **Headway High Tech**
- **BTSi**
- **Broadcast Solution International Ltd**
- **Cakrawala Gemilang**
- **Ponto de Apoio Tecnico**
- **Eletronico LTDA**
- **Vec Srl**

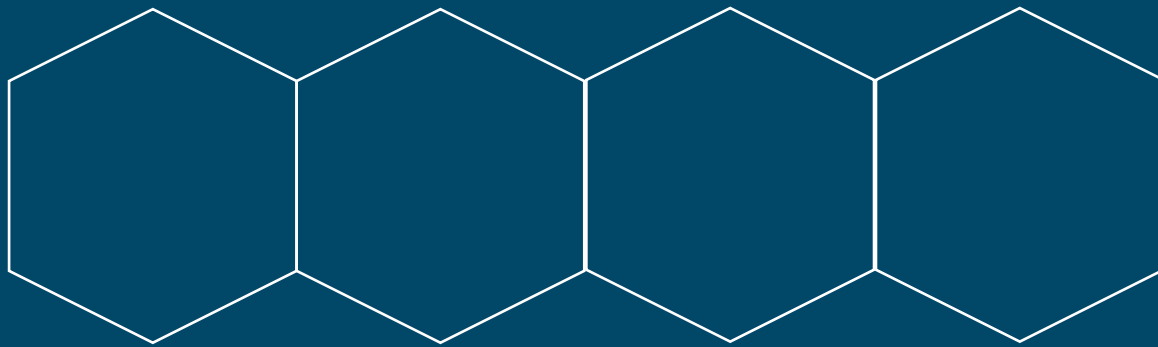


Some of our customers in ASIA

- Audio Visual communicators Inc.
- Allawan Enginneering
- Aliw Broadcasting
- Baganian Broadcastind Corp
- Brigada News FM
- Brigada Mass Media Corp
- Cristian Music Power
- Capitol Broadcasting Center
- DXKB 89,1
- DXJM FM
- DJIB 96,1 FM Municipality Pamploma
- Efren Tenizo
- First United Broadcasting
- UM Broadcasting Network
- Insular Broadcasting
- Radio Mindanao
- Southern Broadcasting Network
- Primax Broadcating
- Radio Corporation Philippines
- Ramil Uy
- RMC Broadcast Corporation
- RT Broadcast Specialists



Elenos Group
World Broadcast



ELENOS



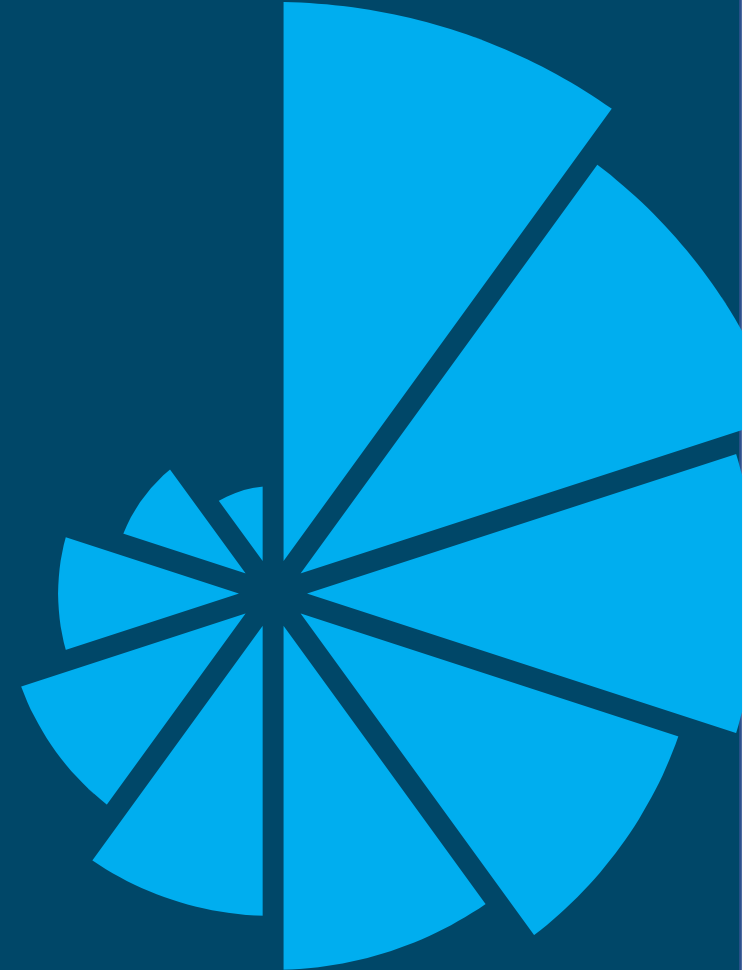
itelco

PRO



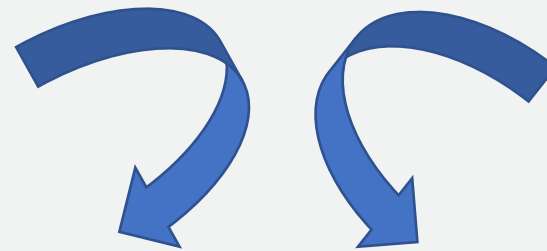
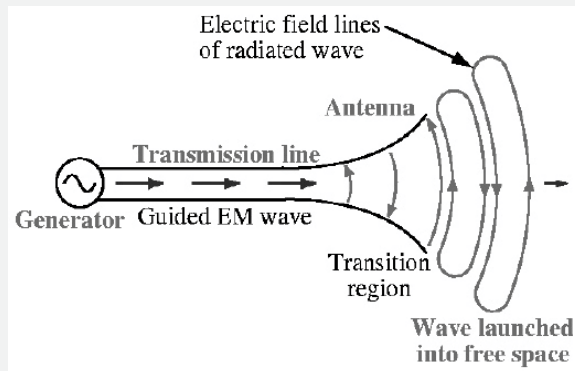
TELEVISION

Turnkey Project Capability



Antenna Theory

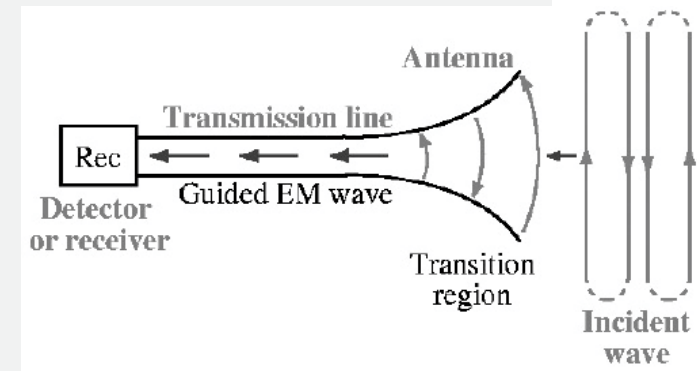
A **transmitting antenna** converts the energy that arrives from the cable into energy that is radiated in free space



It is important that the antenna redistributes the energy in the most efficient way



A **receiving antenna** converts the intercepted signal into energy that is propagated along the cable.



Different characteristics or physical properties of the antenna determine the good functioning of this process of conversion

The Elenos Group

More than single transmitter

Transmitter system N+1 / 1+1

Has the capability to design complete turnkey projects

This means integration of:

Headend Planning

Towers, Facilities and Foundations

Antenna Installation and Field Verification



Today we talk about... TV Antennas



Panels



Log Periodic

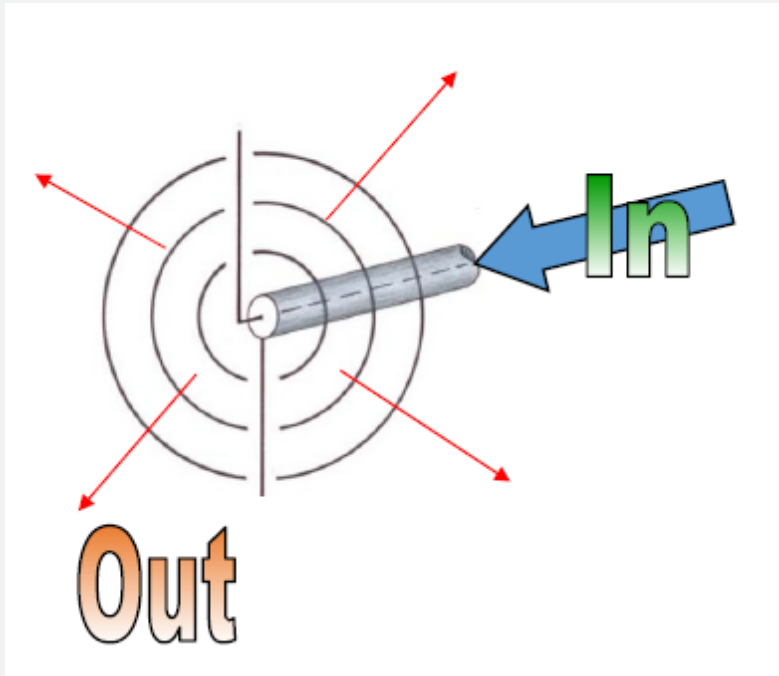


Turnstile



Antenna Theory

What's an antenna?



An antenna is a transducer, it's a device that converts one form of energy into another

Fundamental equation:

$$f = \frac{c}{\lambda}$$

Where:

c is the speed of light

f is the frequency

λ is the wavelength

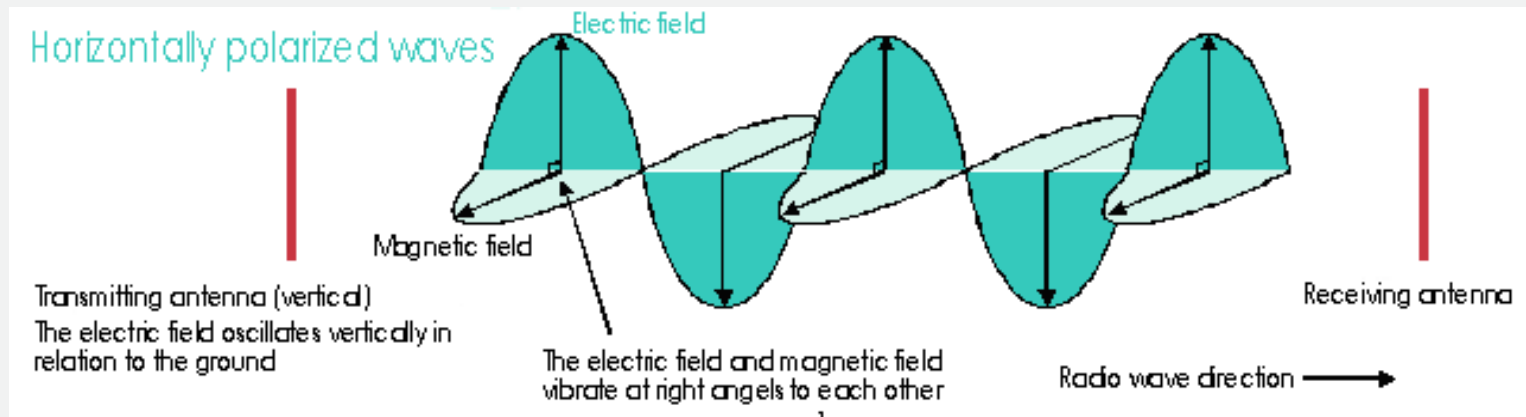
Consequently, frequency has an inverse relationship to the wavelength

As soon as the frequency increases, the dimensions of the antenna must be reduced further.

The final dimension of the antenna is therefore determined from the working frequency.

Antenna Theory - Broadcasting Polarization

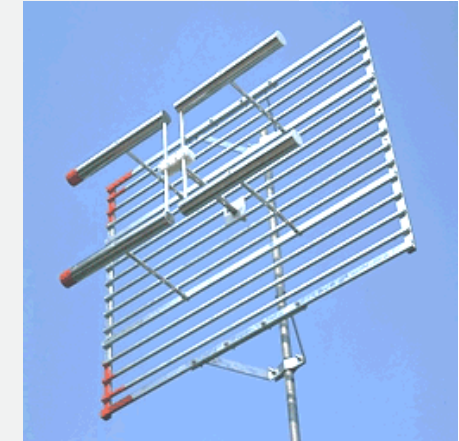
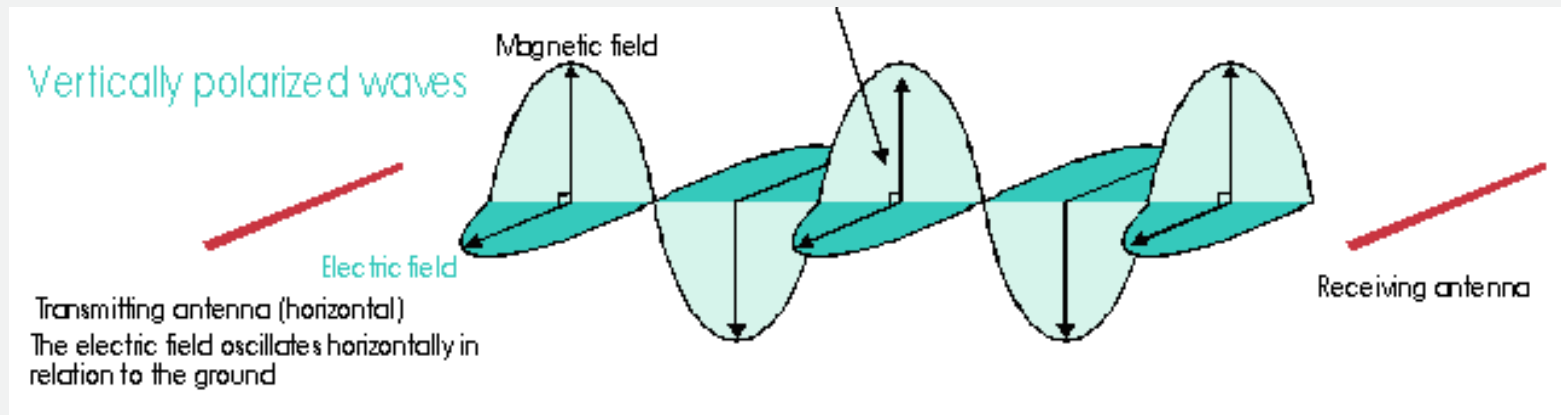
VERTICAL



Vertical polarization is the most used in FM broadcasting transmissions since it is preferable to radiate - or to receive - the signal in all directions. It also guarantees a slight immunity to the suburban or country environment.

Antenna Theory - Broadcasting Polarization

HORIZONTAL



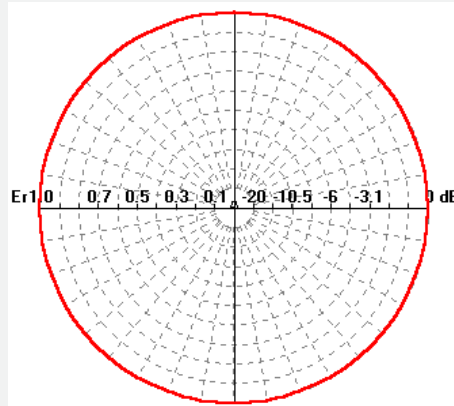
A signal having a horizontal polarization is more suitable to be received by antennas installed in fixed places.

Generally, it is less affected by interferences than vertical polarization. Normally, a horizontally polarized signal is less affected by building and mountain reflections and offers a stronger resistance to noise interference.

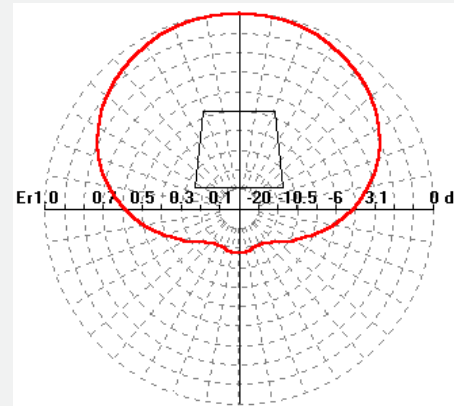
Antenna Theory - Types

The basic antenna, might have different gains according to its particular radiation pattern.

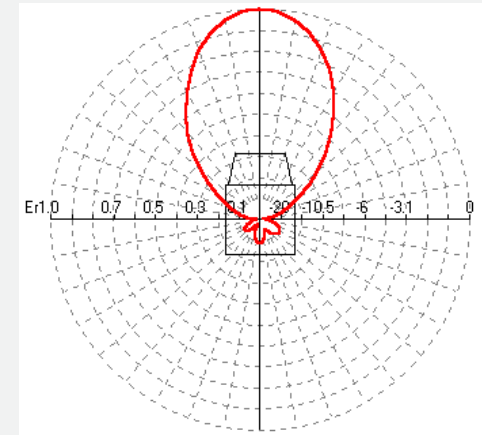
Omni-directional



Semi-directional



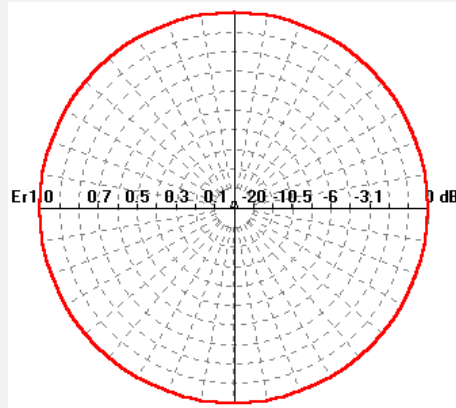
Directional



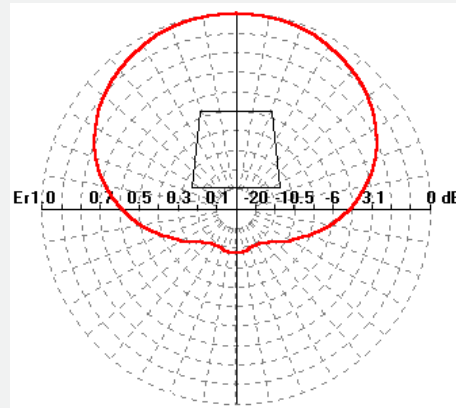
Antenna Theory - Types

The basic antenna, might have different gains according to its particular radiation pattern.

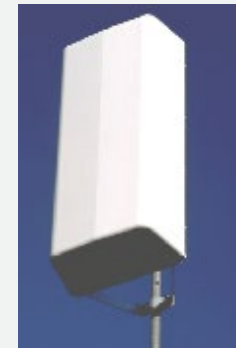
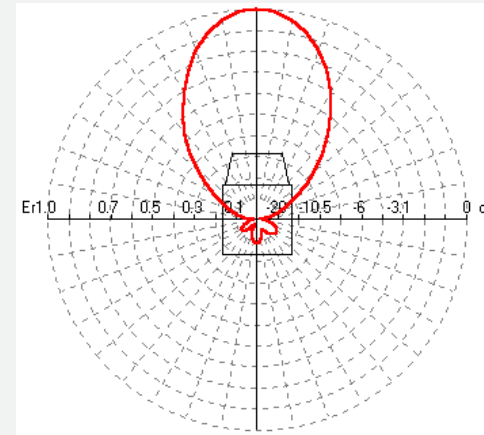
Omni-directional



Semi-directional



Directional



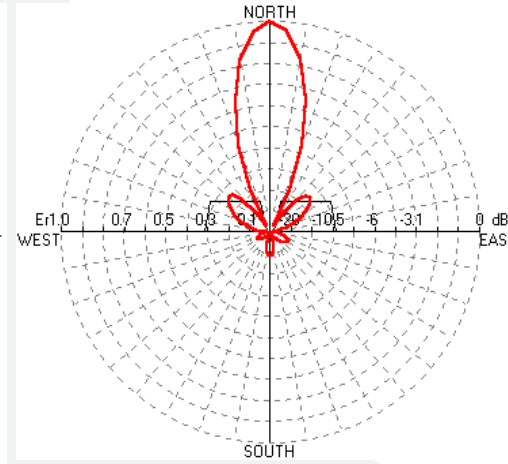
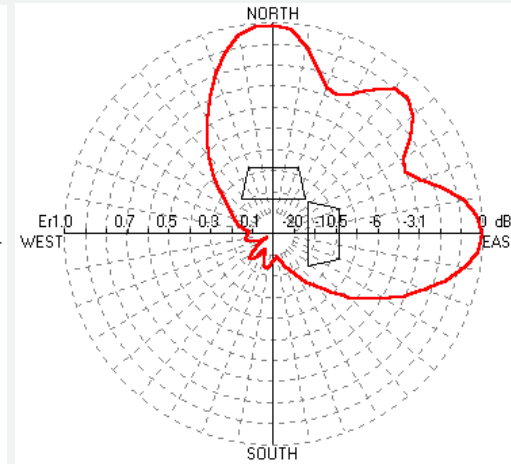
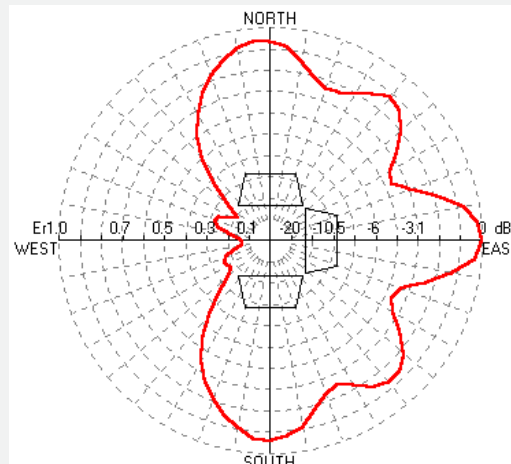
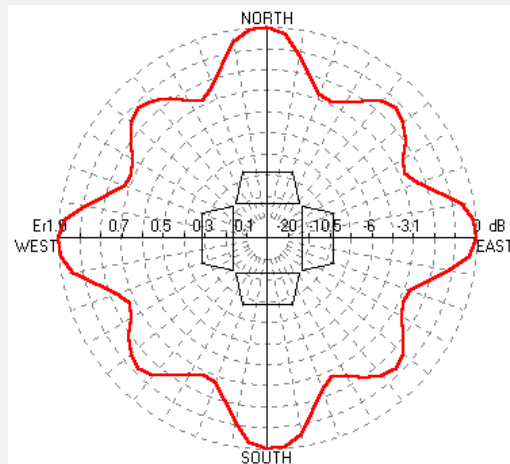
Antenna Theory – Broadcasting ARRAY

Choosing the horizontal amplitude of the antenna diagram

Depending upon transmitter position you have to define horizontal aperture of your antenna system. Basically your system may be directive, if transmitting point is , for example, over a mountain or omnidirectional (if your transmitter is over a building into a town).

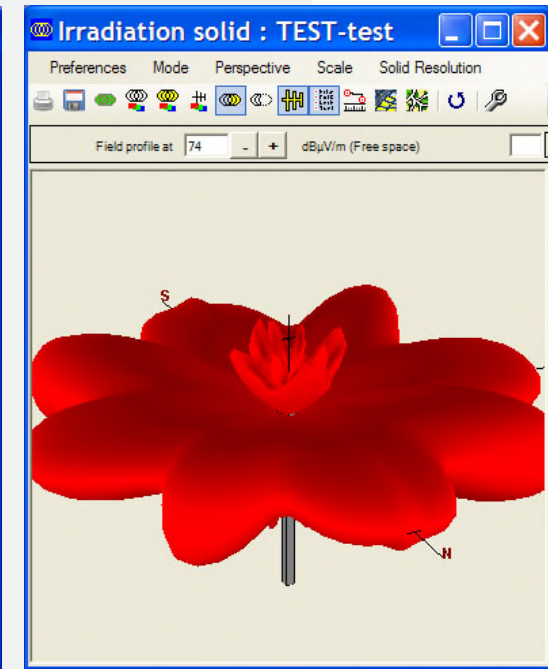
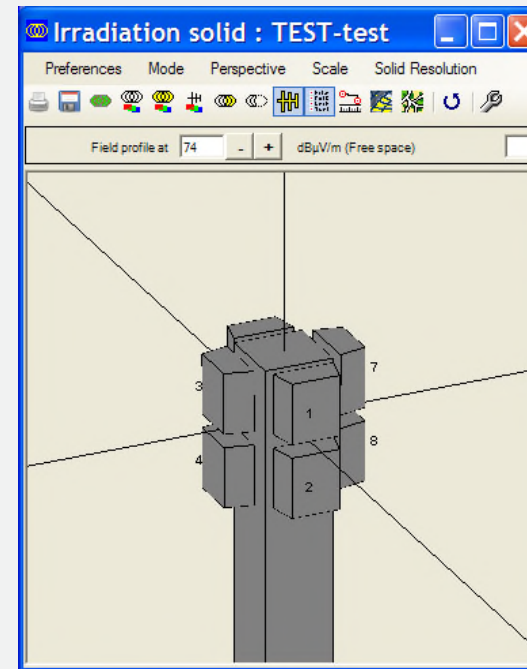
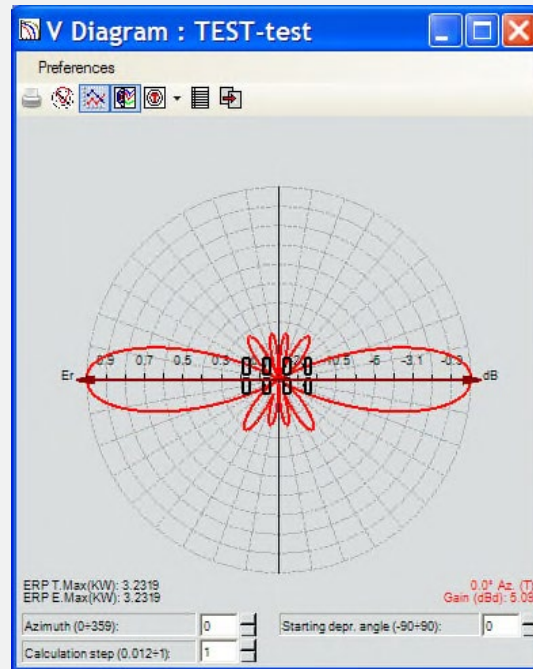
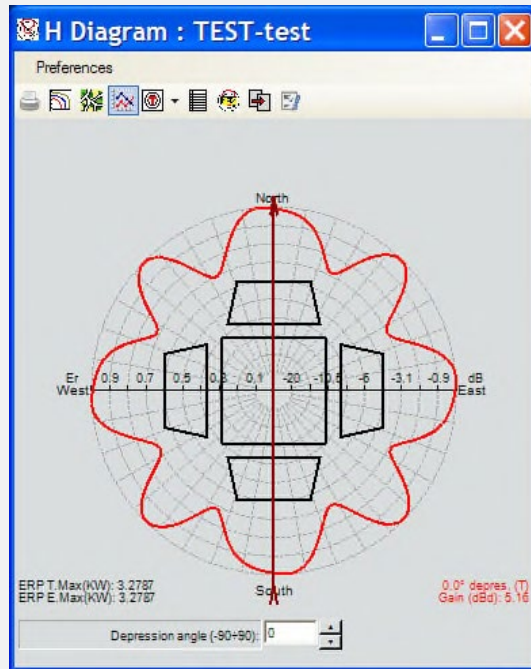
By means of same antenna, in different configuration, you can reach several configuration

Using directional antennas installed in many stacks and bays, it is possible to create systems with different radiation characteristics ...



Antenna Theory – Broadcasting ARRAY

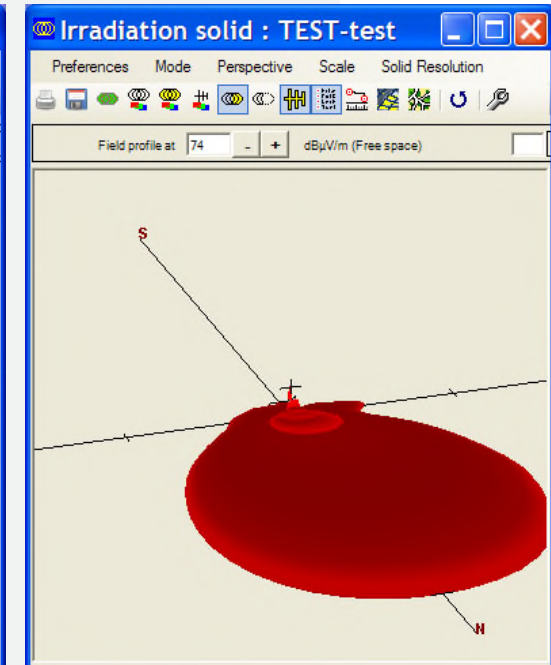
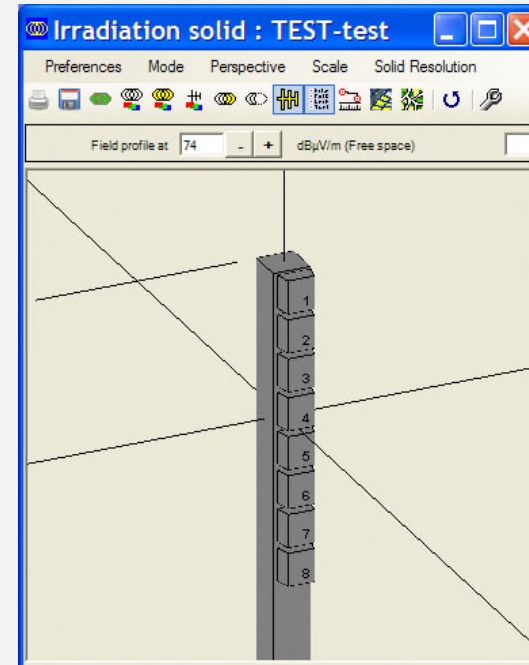
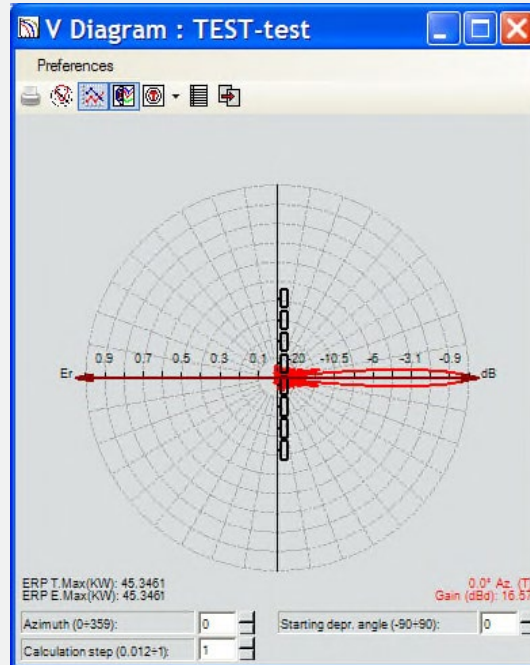
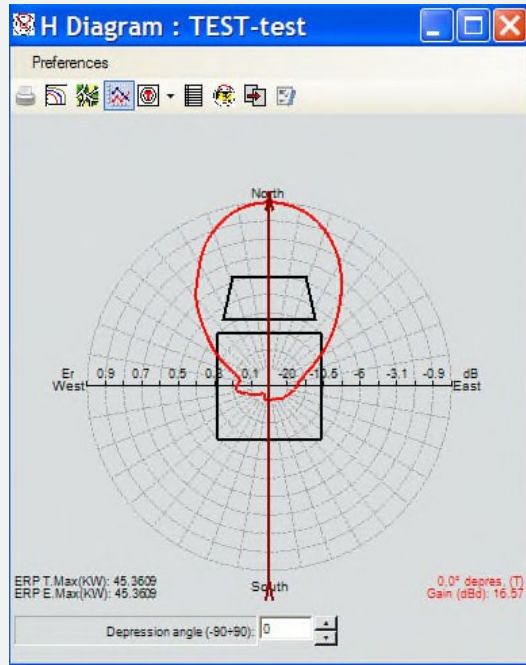
Choosing the horizontal amplitude of the antenna diagram



Omnidirectional Antenna system two bays configuration (4+4 antennas)
Antenna System Gain = 5 dBd gain (3 kW ERP)

Antenna Theory – Broadcasting ARRAY

Choosing the horizontal amplitude of the antenna diagram

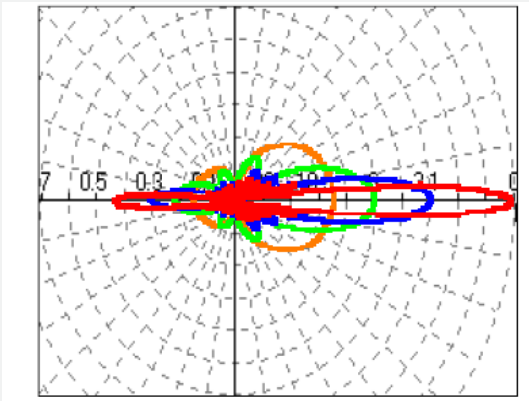


Directional Antenna system 8 antennas in 1 direction
Antenna System Gain = 17 dBd gain (140 kW ERP)

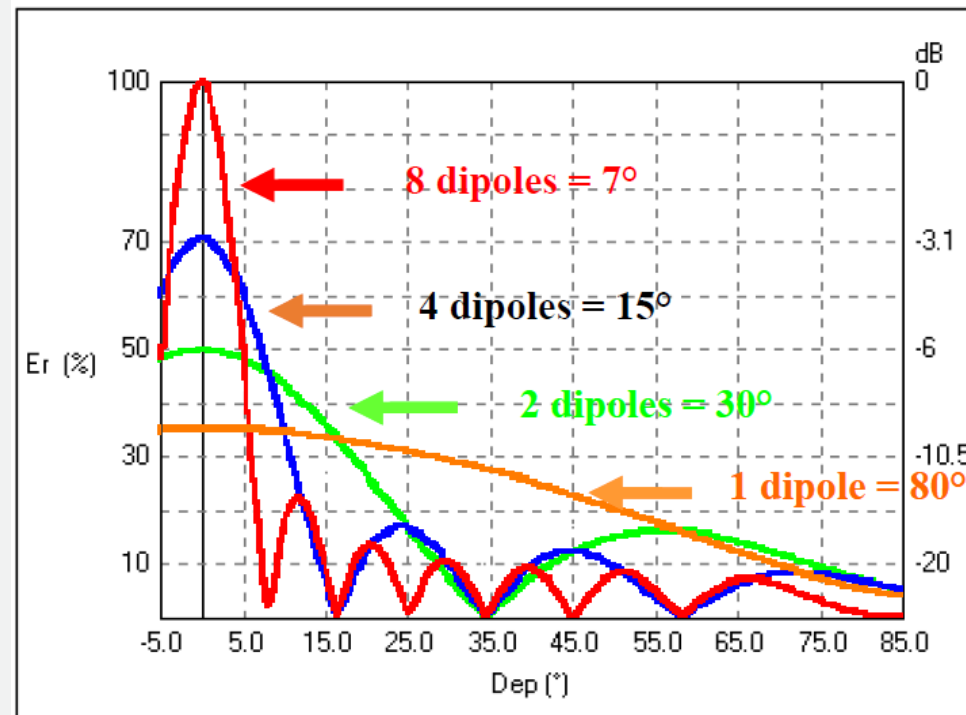
Antenna Theory – Broadcasting ARRAY

Choosing the vertical amplitude of the antenna diagram

Vertical sections are generally represented on a Cartesian graph, rather than a polar one:



Vertical sections plotted on a polar graph

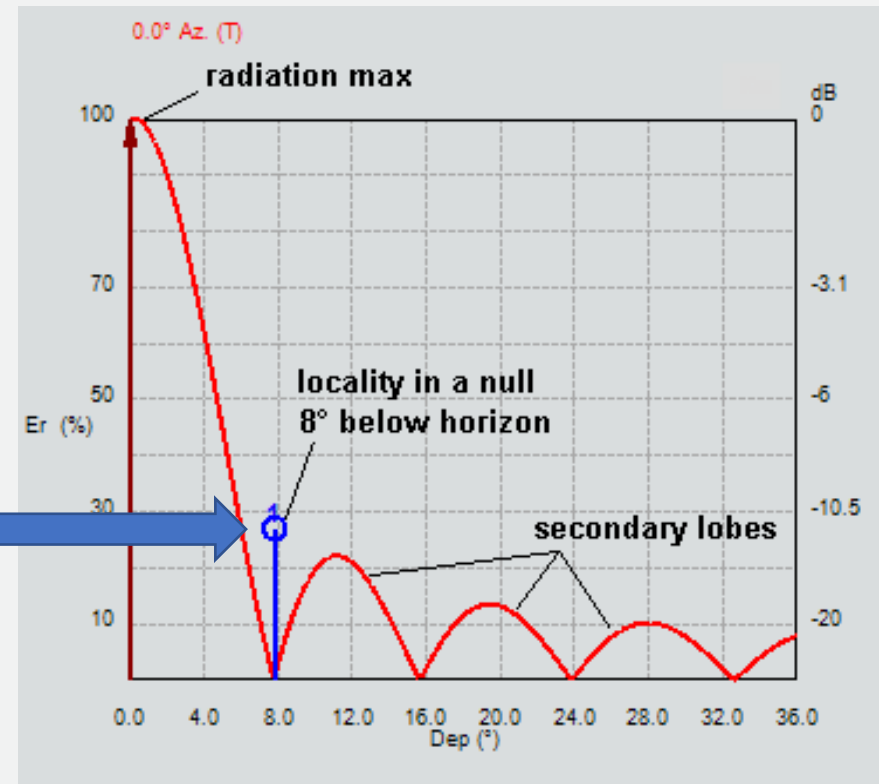


Vertical sections on a Cartesian graphic from -5° to +85°

Antenna Theory – Broadcasting ARRAY

Choosing the vertical amplitude of the antenna diagram

Area coverage
problem



Vertical Diagram optimization: Null filling & Electrical Tilt

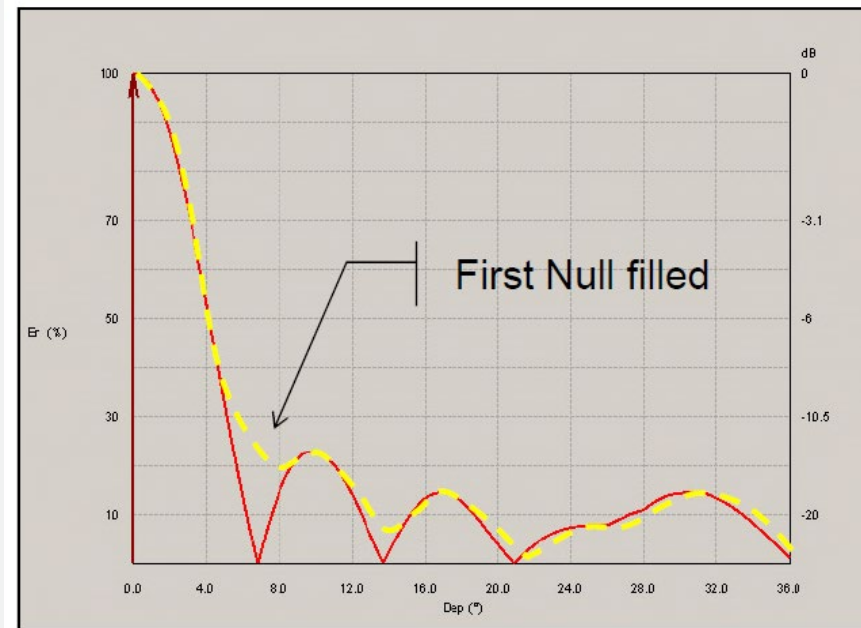


Antenna Theory – Broadcasting ARRAY

Vertical Diagram optimization: Null filling & Electrical Tilt

Secondary lobes can be modeled according to the Tchebyscheff polynomials or changing the feeding magnitude of the antenna system.

Null filling is usually made by appropriate variations of the relative **phases of each antenna**. The combination of phases should be calculated in order to avoid a null vector in the vectorial sum. This can be easily done by changing the lengths of the feeding cables.

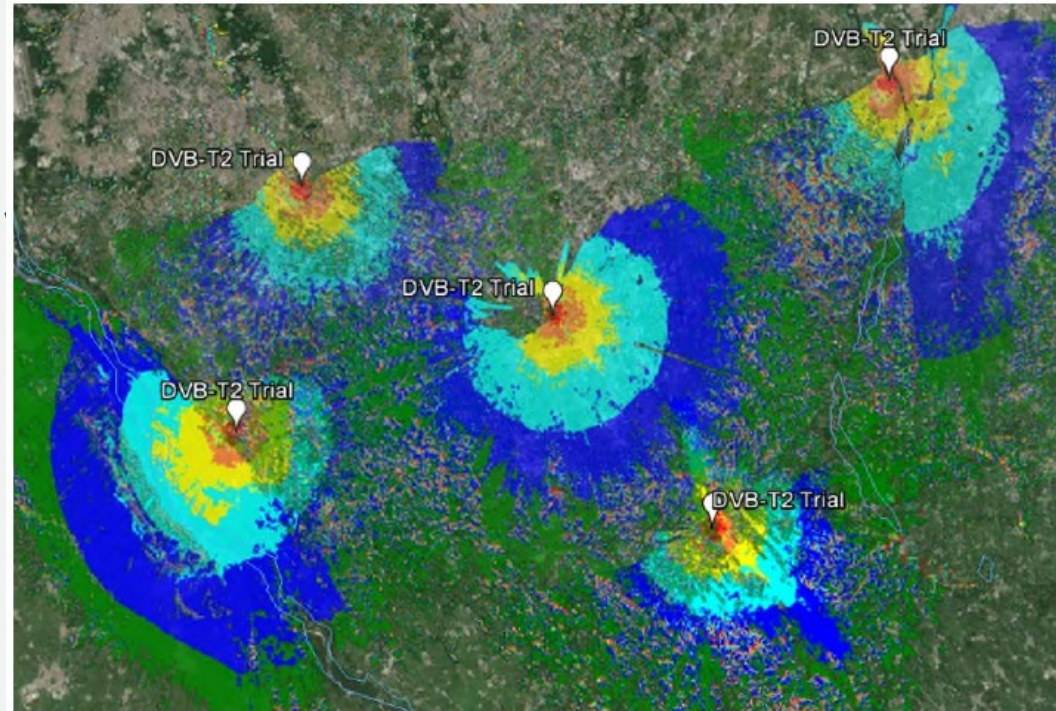


Antenna Theory – Broadcasting ARRAY

We have to pay special attention to the SFN digital coverage

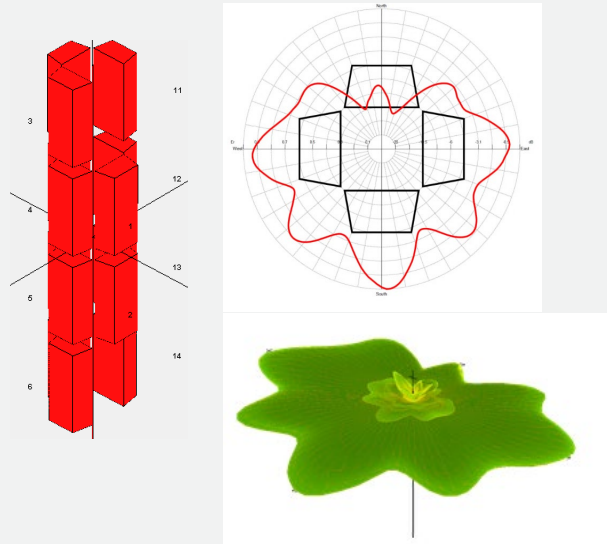
Digital transmission give us a big advantages in spectrum frequency exploitation. Digital transmission allows adjacent and coadjacent channel transmission. It doesn't need both-sides channel guard... BUT,

Special attention has to be made during the digital propagation coverage design to avoid too many overlapping areas and To achieve reasonable field intensity. To do this we use a professional software tool to to simulate the propagation, let us see what is it...

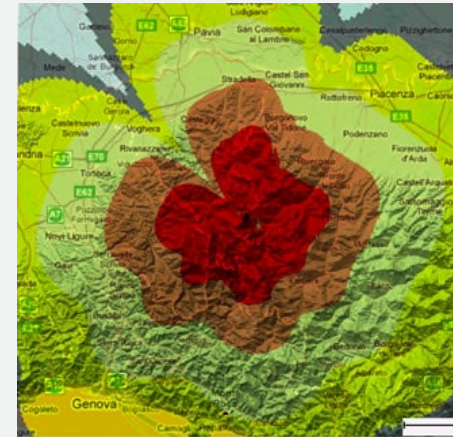


ALL IN ONE SOFTWARE “EMLAB from ALDENA”

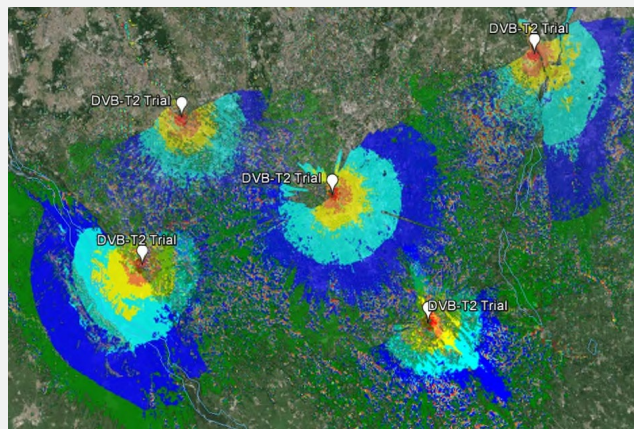
Antenna design



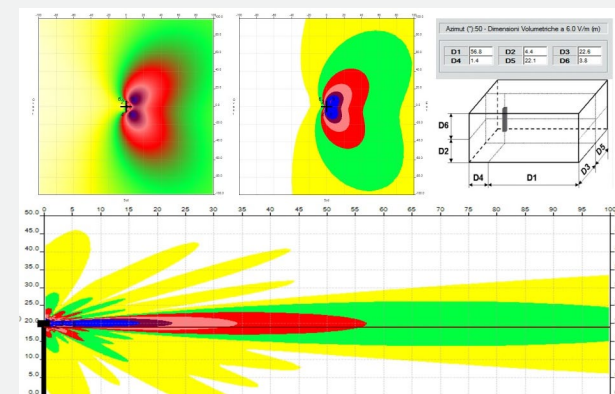
Coverage calculation



Network Planning



EM Health Safety
(NIR)



MAIN FEATURES

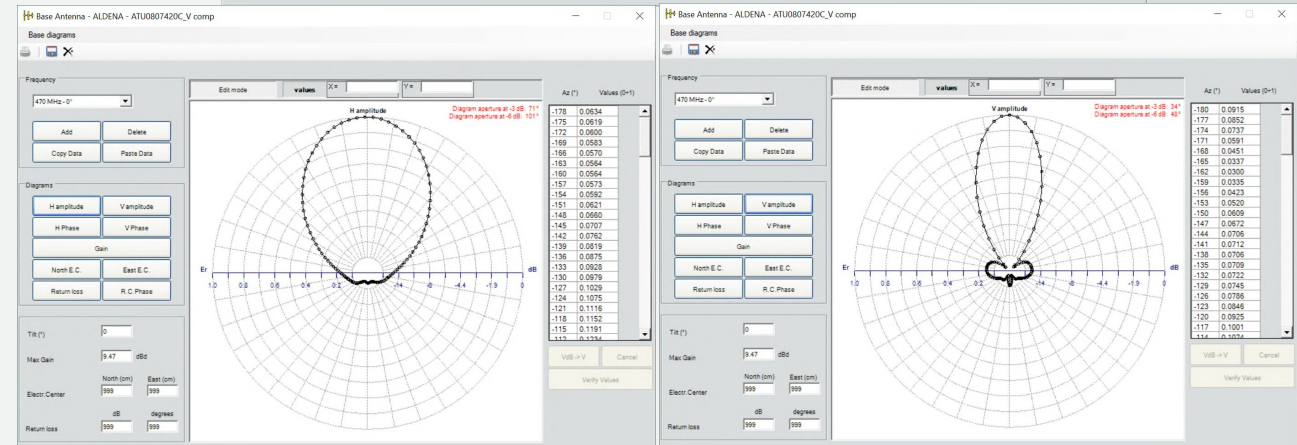
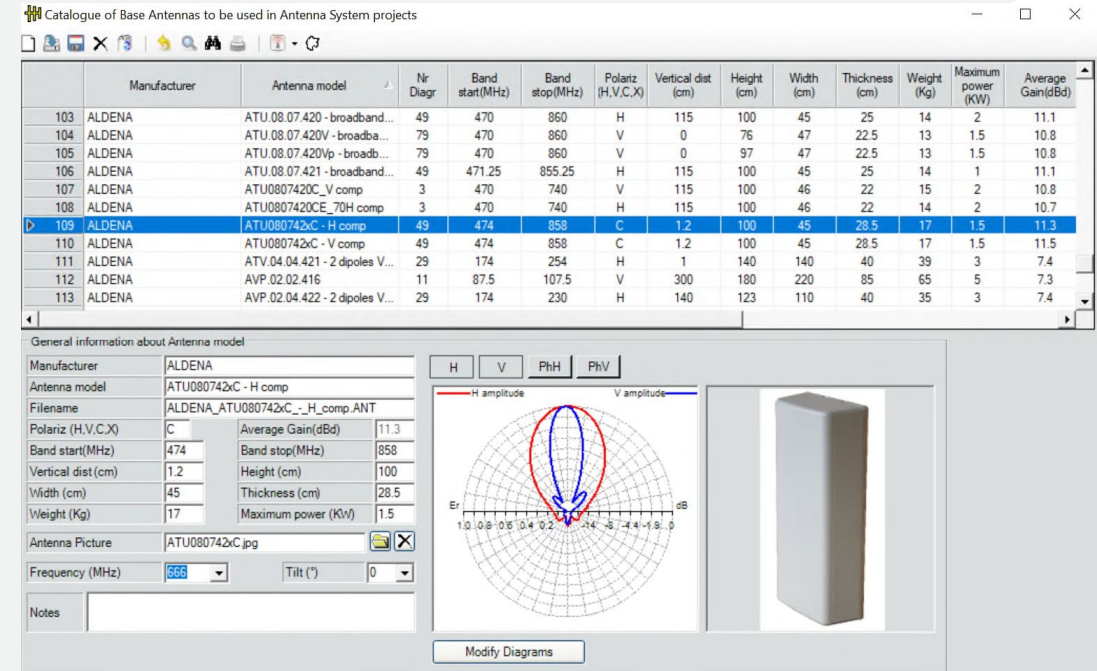
ANTENNA LIBRARY

More than 1500 different elementary antennas form different antenna manufacture.

*Upgradable by the user or by ALDENA staff.
Create and import new antennas manually
or using MSI/TXT files*

For each antenna, it's possible to add different data:

- Frequencies
- H/V amplitude diagrams
- H/V phase diagrams
- Gain



MAIN FEATURES

ANTENNA DESIGN

(Array design & optimization)

Base Antenna selection from ANTENNA LIBRARY
(yagi, panels, log periodic, ...)

Geometry Definition

(Mechanical position : offset, vertical distance)

Electrical Data Definition

(phases and power at each single antenna)

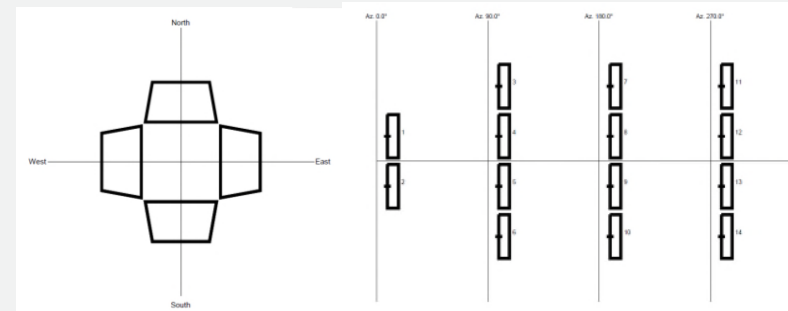
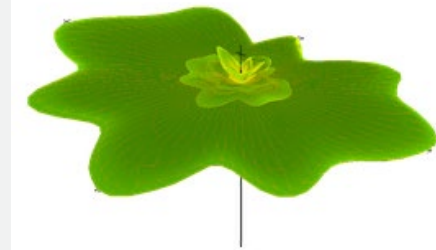
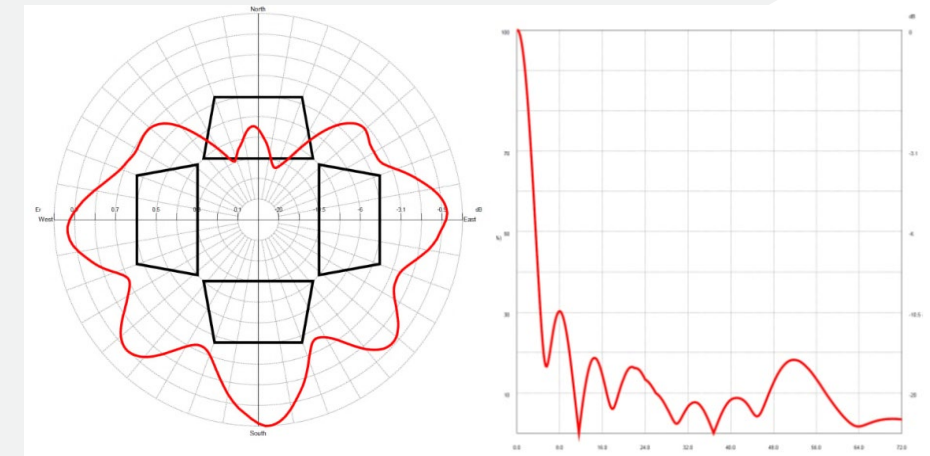
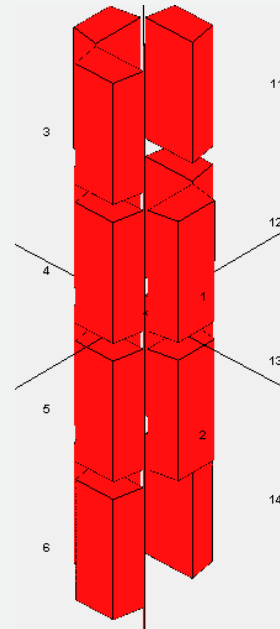
Automatic optimization utilities for:

- **H Diagram**

Electrical Tilt, Null creation in specific direction

- **V Elevation Diagram**

Null filling



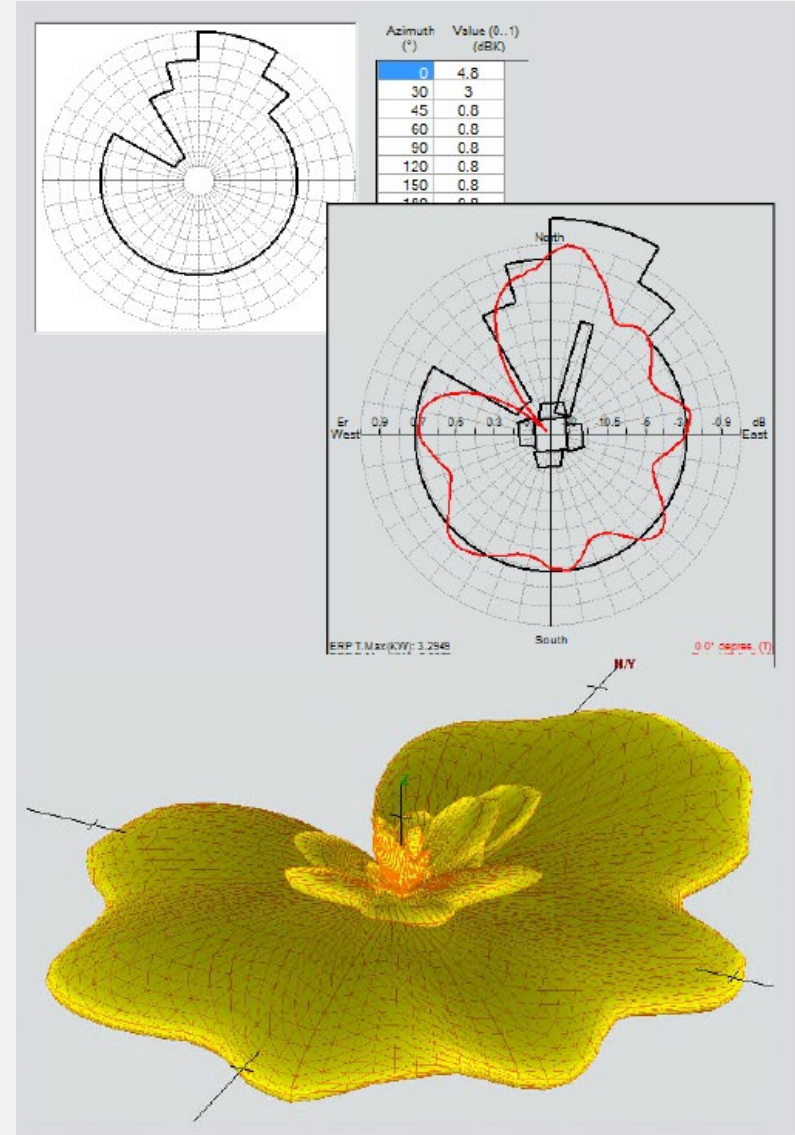
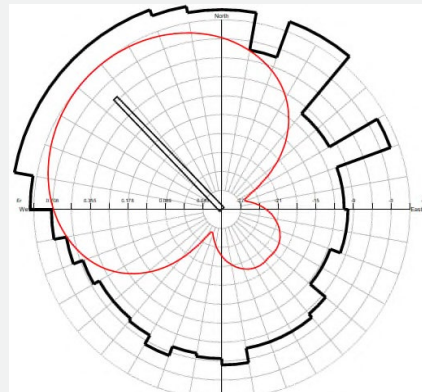
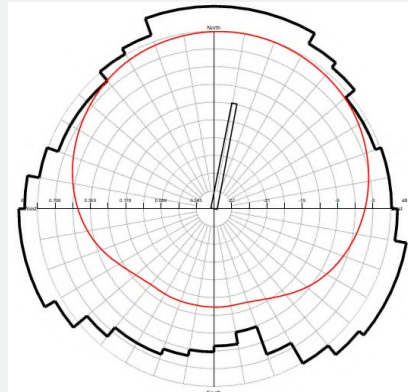
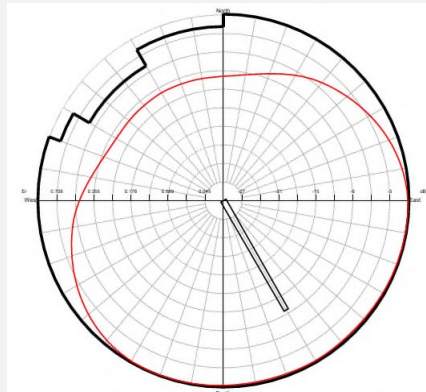
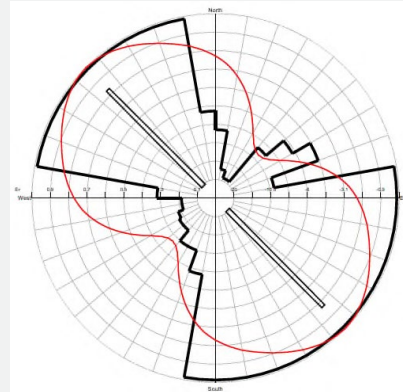
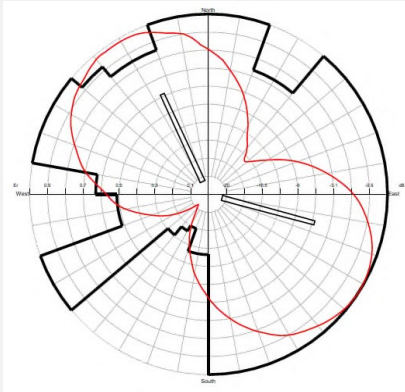
MAIN FEATURES

ANTENNA DESIGN

(Array design & optimization)

ERP Authority Limitation management

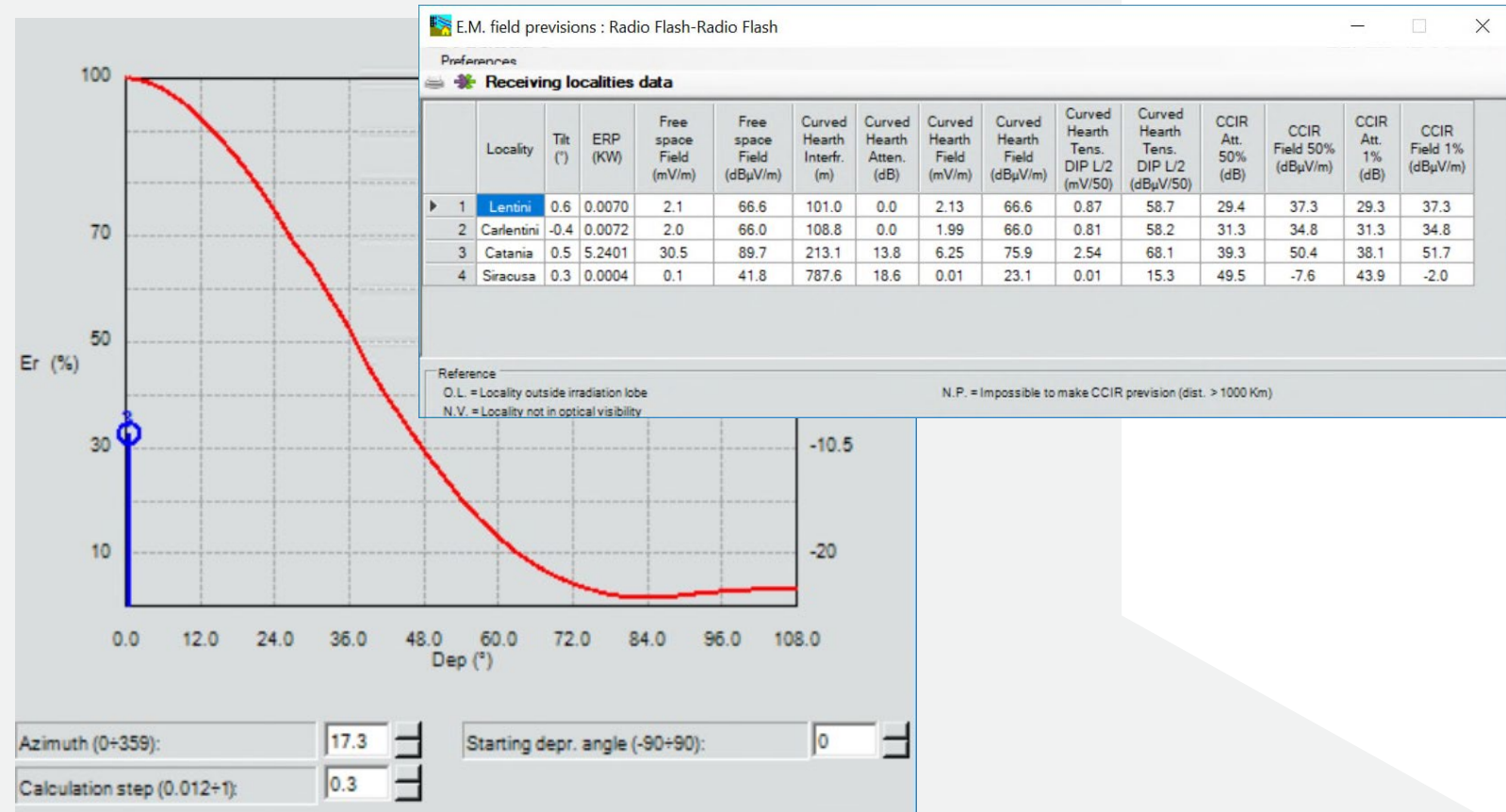
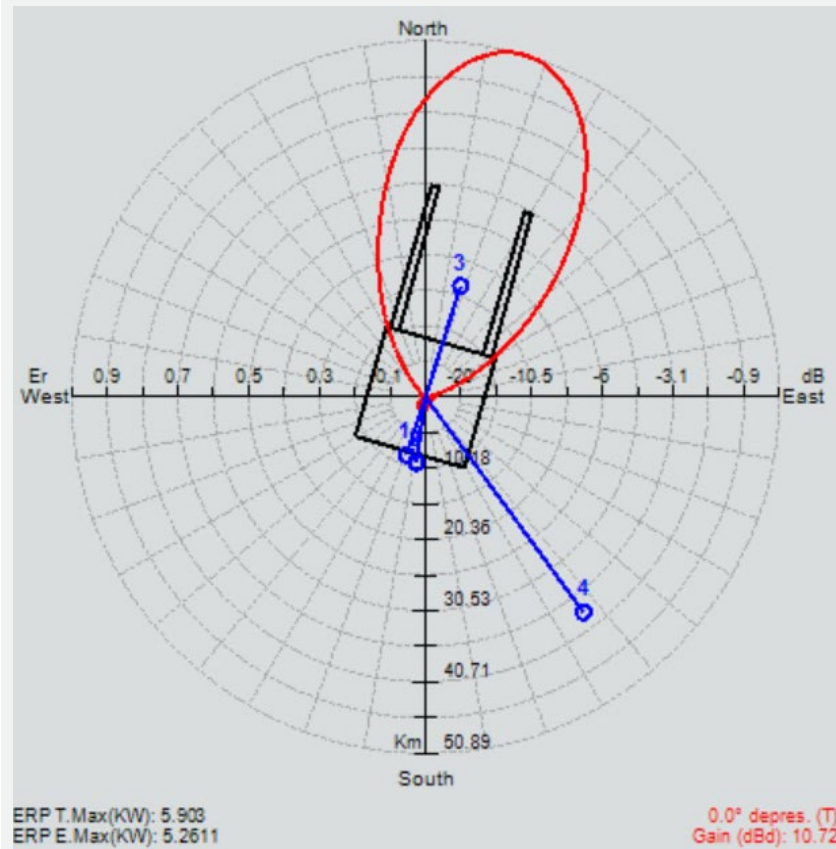
- import & overlap



MAIN FEATURES

ANTENNA DESIGN (Array design & optimization)

Check points – target area management (View & EM Field prevision)



MAIN FEATURES

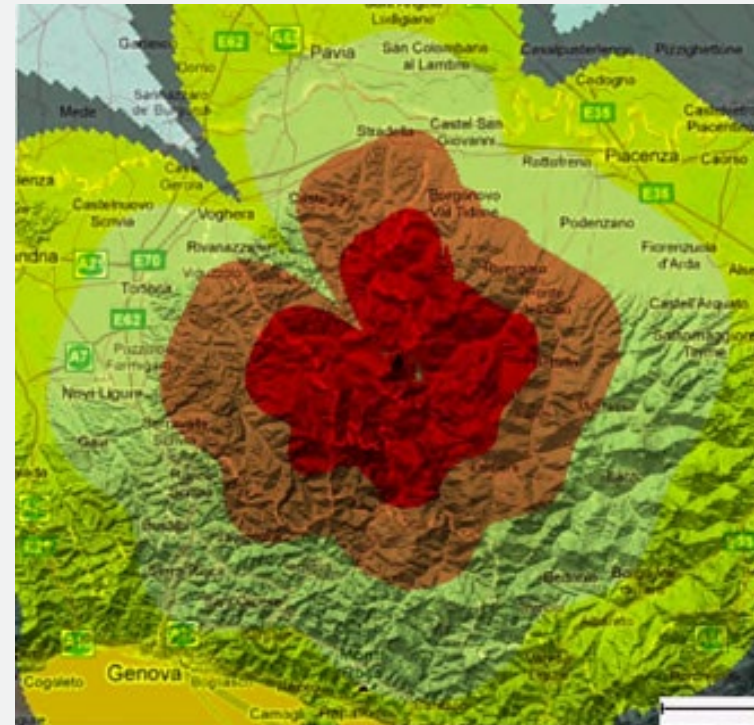
COVERAGE AREA

*«Country» DTM included
“Standard” (45mt) o “High definition”*



CLUTTER

*Different propagation model use
(ITU-R 1546, ITU-R 1812, ...)*

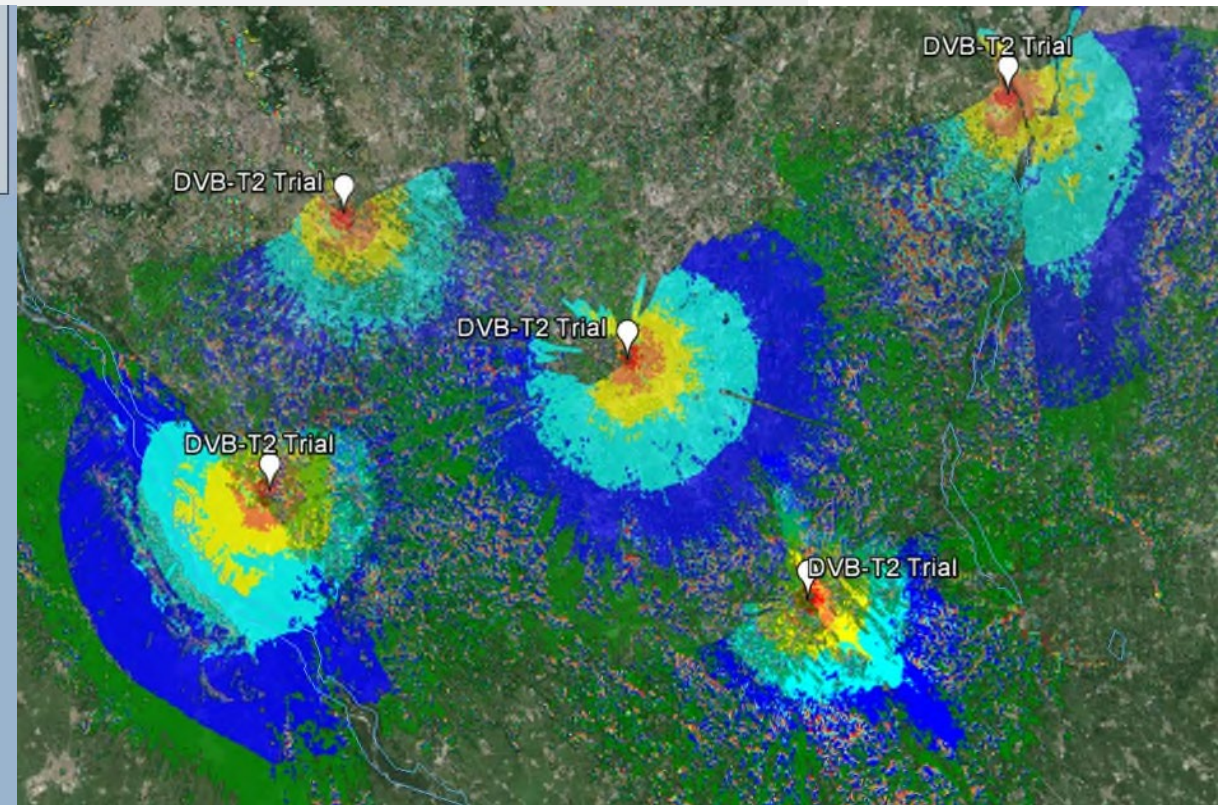
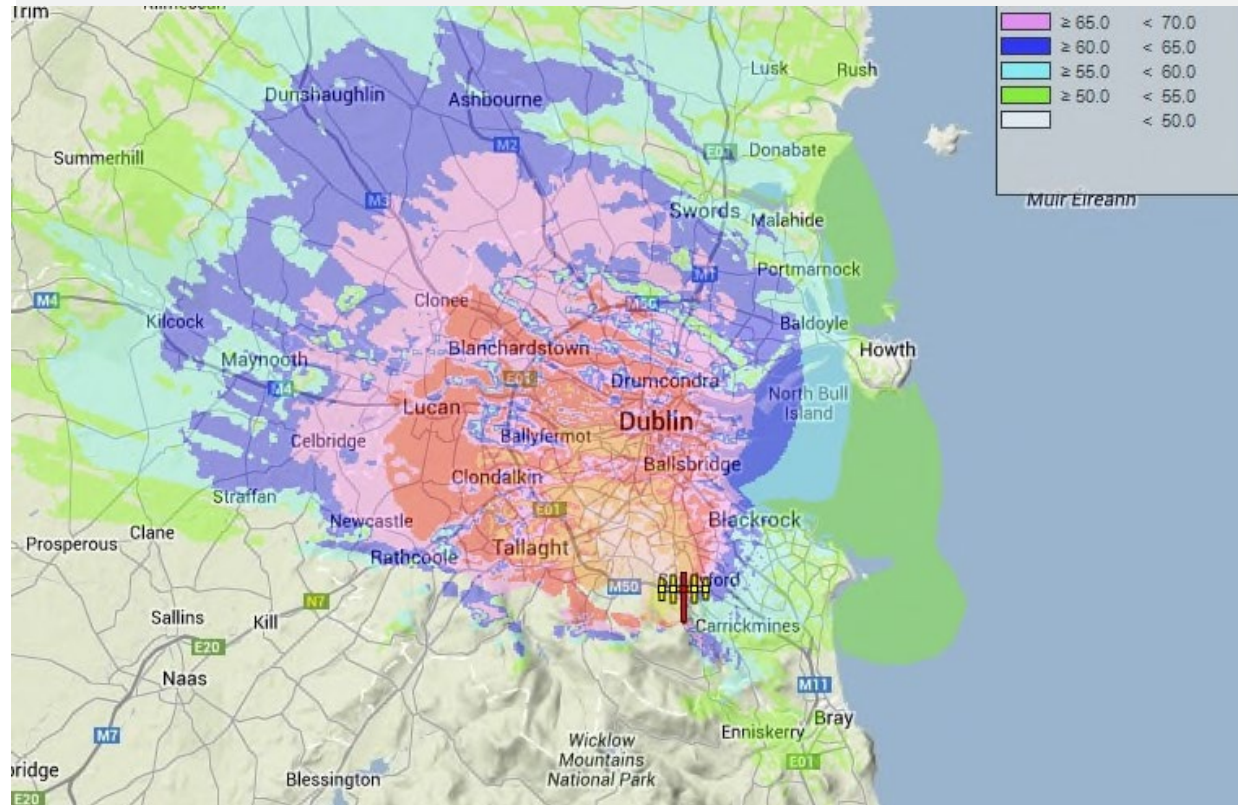


Advanced reports (population) – Export results



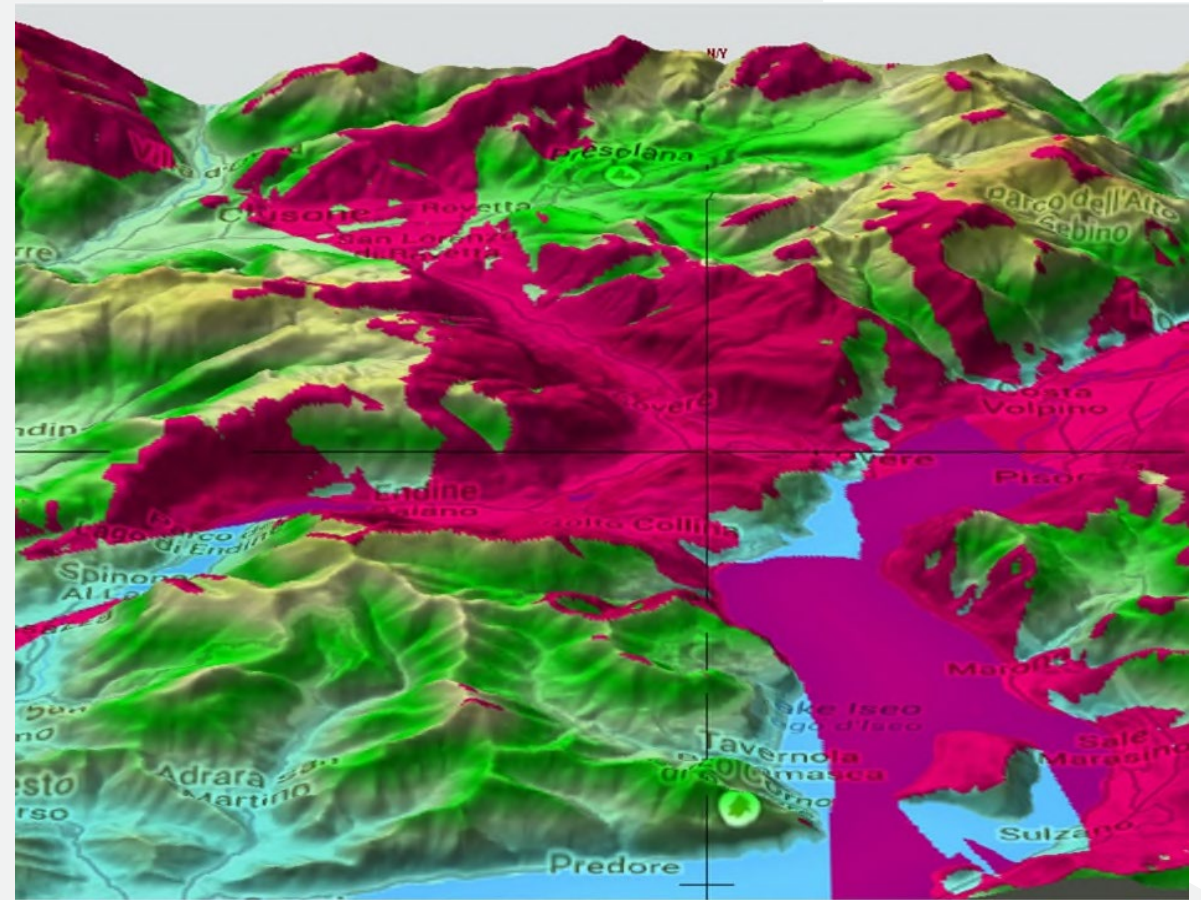
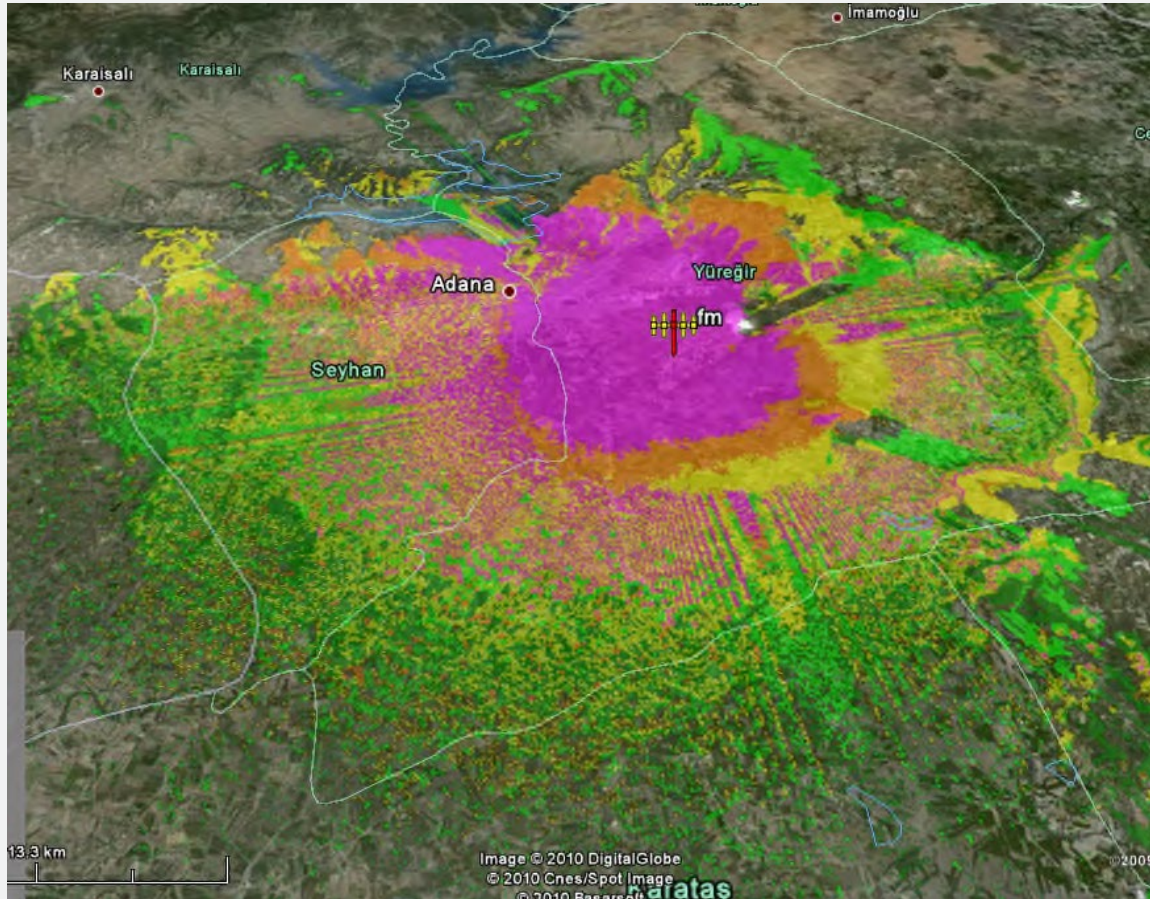
MAIN FEATURES

COVERAGE AREA



MAIN FEATURES

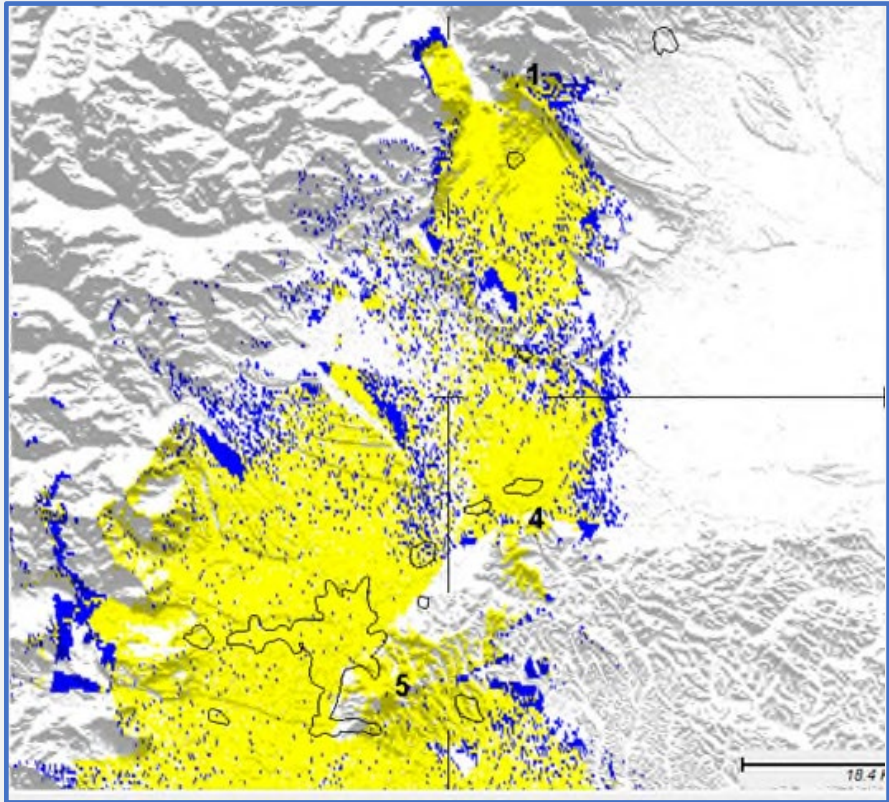
COVERAGE AREA



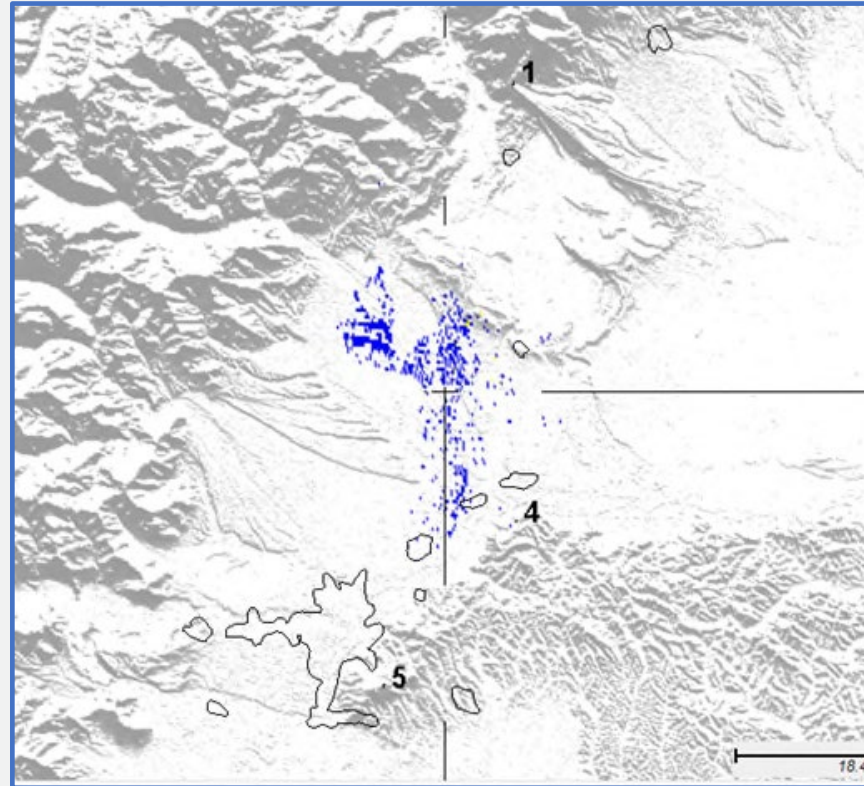
MAIN FEATURES

SFN COVERAGE AREA

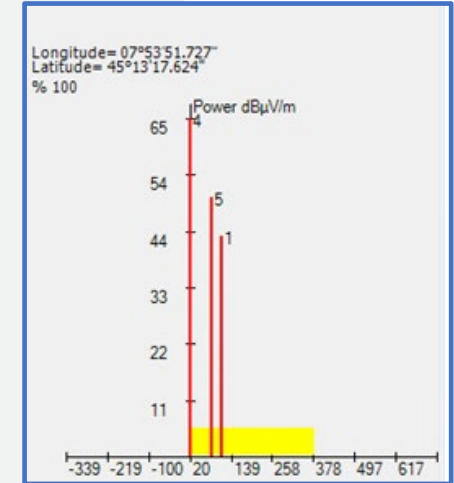
AREA COVERAGE DTV



SELF-INTERFERENCE DTV



REAL -TIME ANALISYS



AUTOMATIC FEATURES FOR ERP TX / DELAY TX optimization



MAIN FEATURES

Field Strength Exposure – EM Health safety

«Respect Volume» calculation

Horizontal & vertical sections

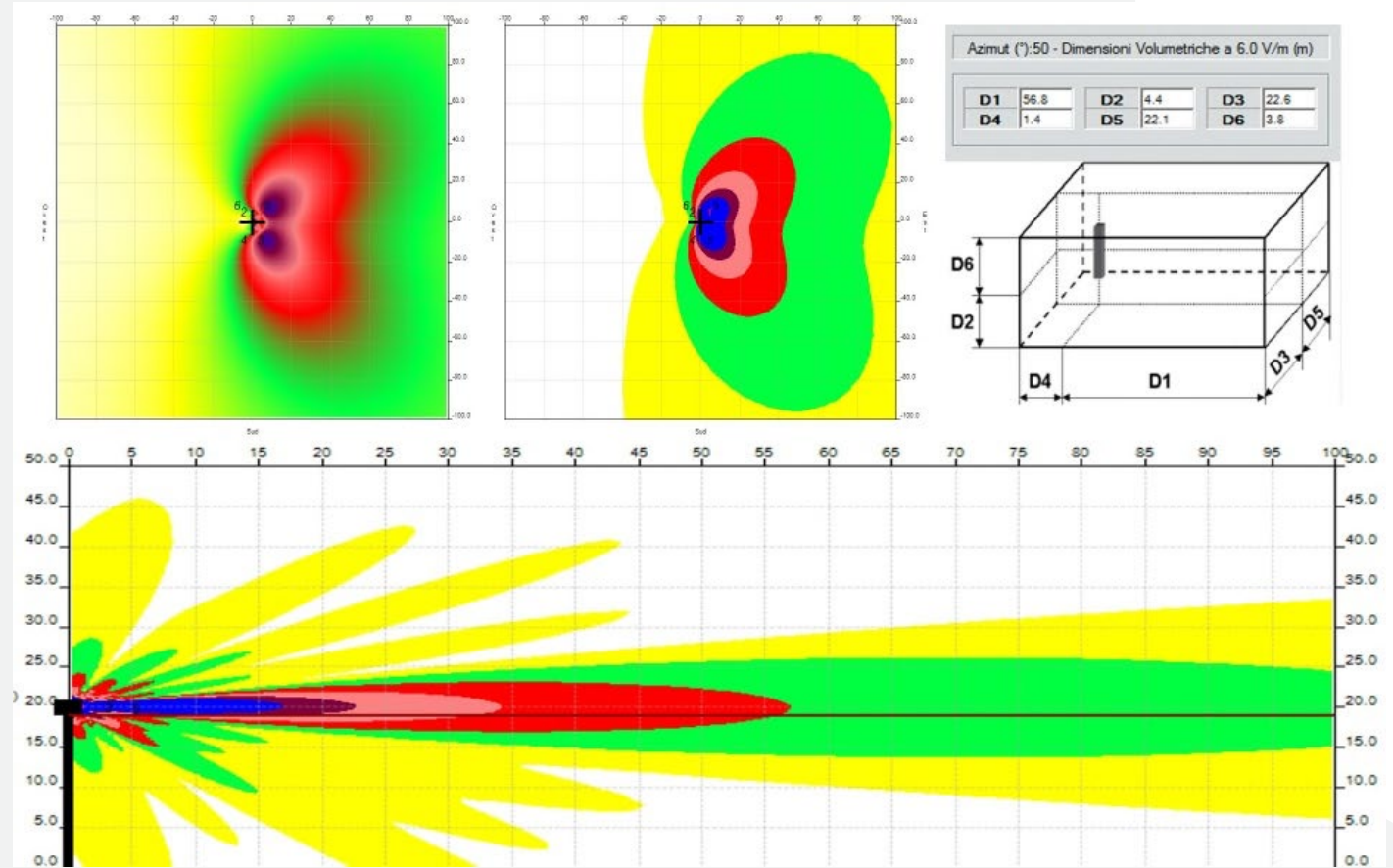
Check point management

Advanced 3D urban view

Additional features for mobile operators

- TILTSCAN

- Power reductions



MAIN FEATURES

Field Strength Exposure – EM Health safety

«Respect Volume» calculation

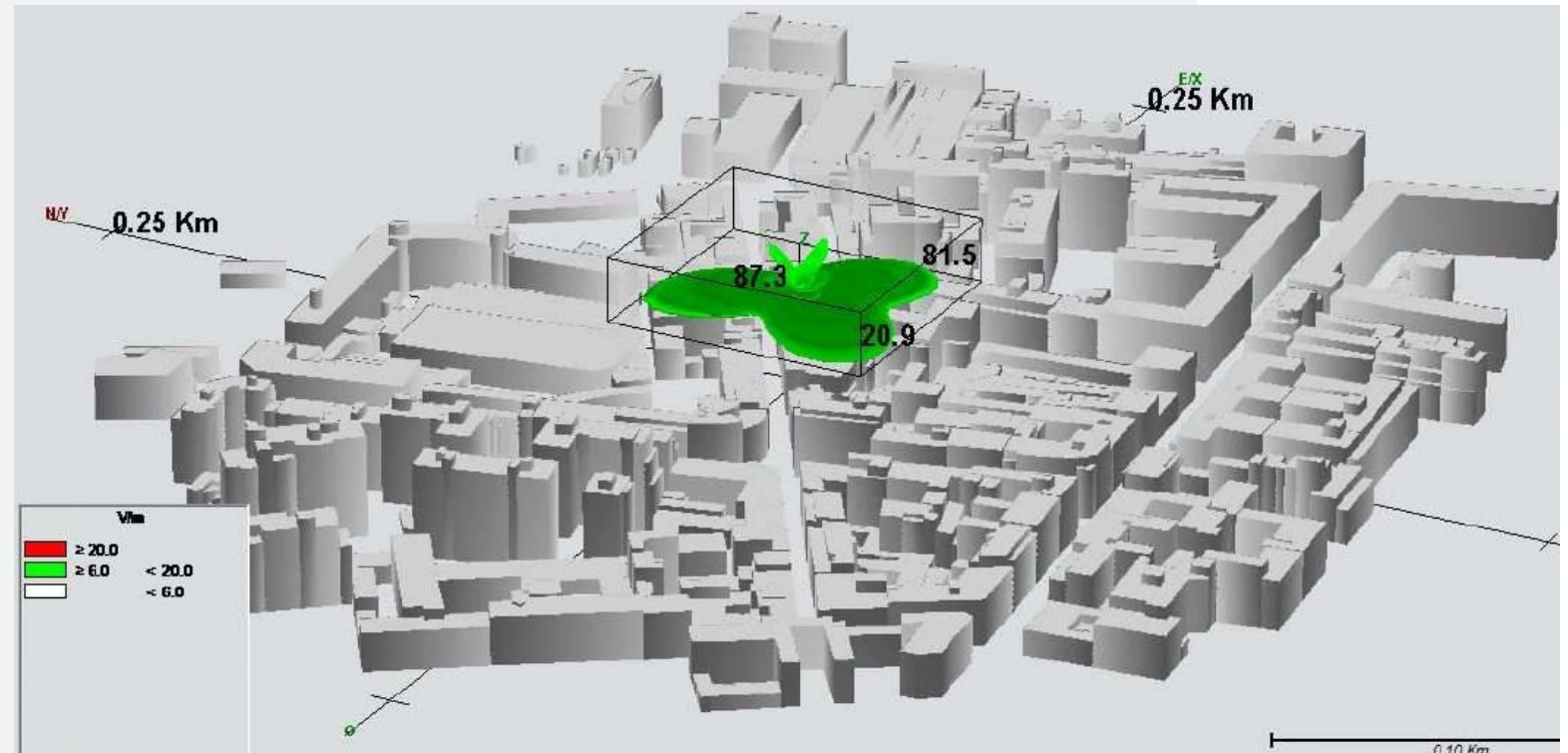
Horizontal & vertical sections

Check point management

Advanced 3D urban view

Additional features for mobile operators

- **TILTSCAN**
- **Power reductions**



MAIN FEATURES

Field Strength Exposure – EM Health safety

«Respect Volume» calculation

Horizontal & vertical sections

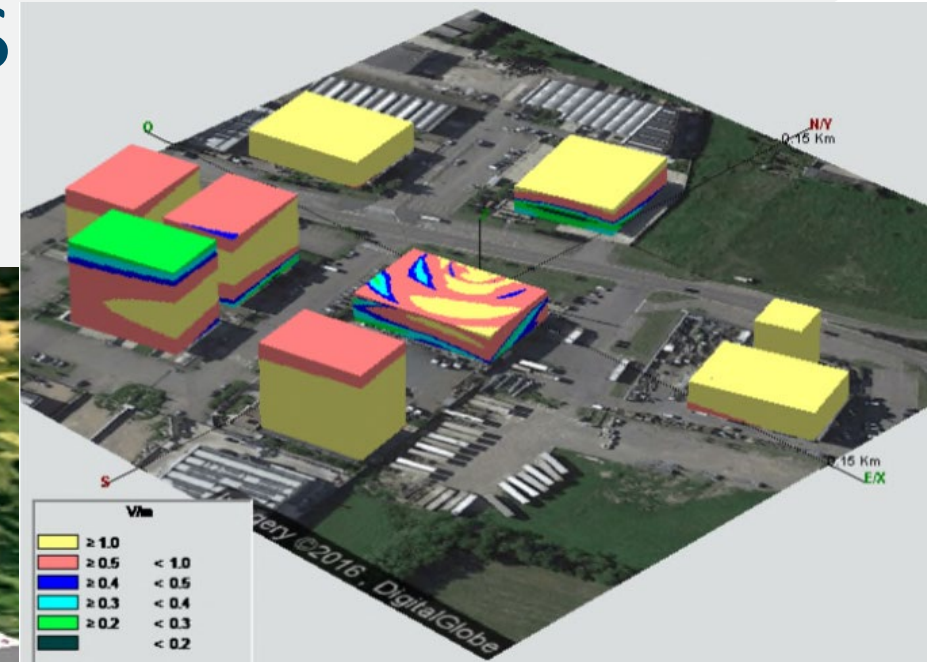
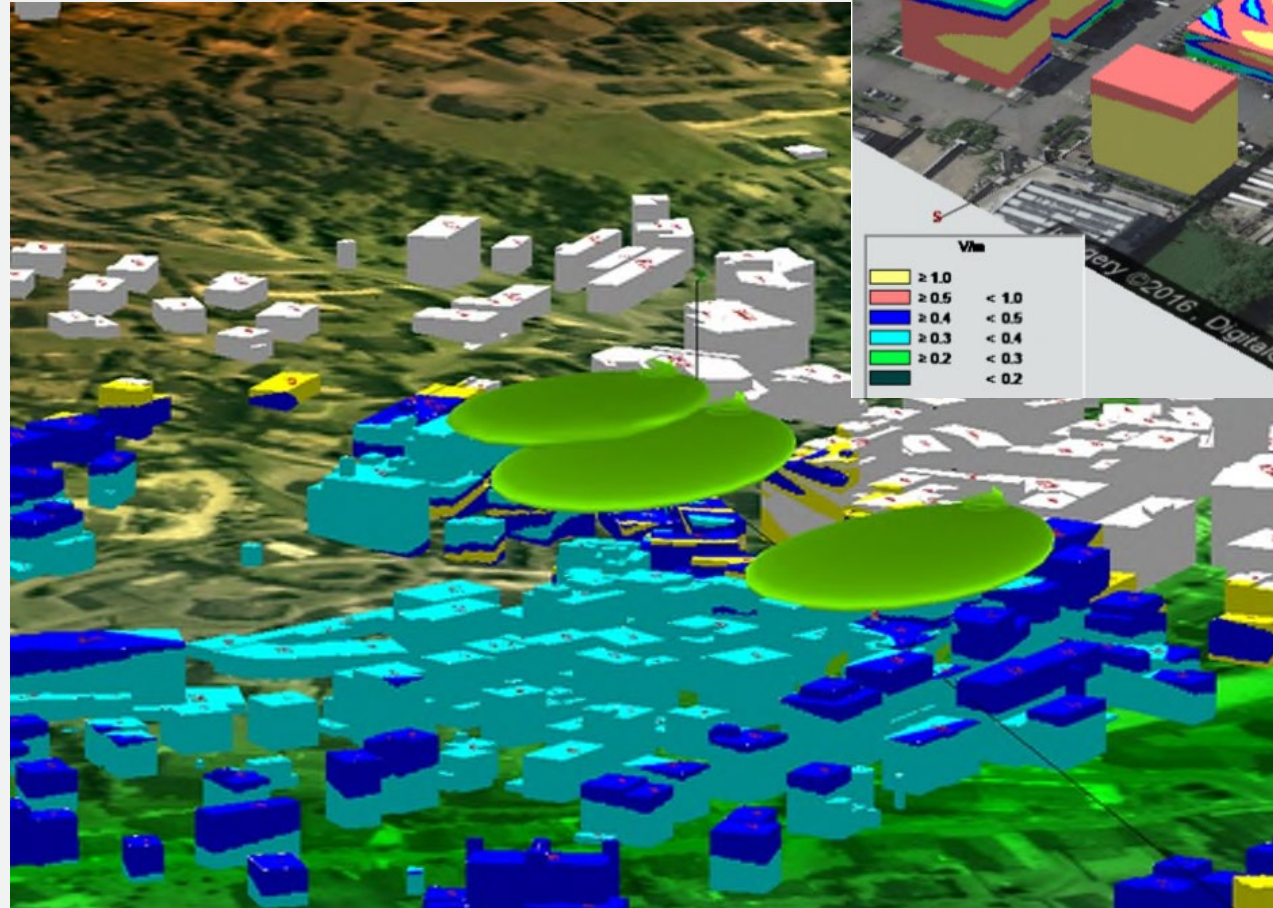
Check point management

Advanced 3D urban view

Additional features for mobile operators

- *TILTSCAN*

- *Power reductions*



Our network of dealers are supported by
our field engineering team World - Wide.



Thank You and mail us for info



Radio & TV
Broadcast Equipment
and solutions Worldwide

Elenos Confidential



Transmitters and Service Solutions

ELENOS

Elenos
Headquarters:

44028 Via Amendola 9 - Poggio Renatico FE
Italy Telephone +39 0532 82 99 65 -
Fax +39 0532 82 91 77

www.elenos.com - info@elenos.com



Broadcast Electronics
Headquarters:

4100 North 24th Street Quincy, IL 62305
Phone: (217)-224-9600
Fax: (217)-224-9607

www.be.22hbg.com - bdcast@bdcast.com



Itelco
Headquarters:

05018 Via Dell'Innovazione 2 - Orvieto TR
Italy Telephone +39 0763 96 03 00 -
Fax +39 0763 34 18 10

www.itelco.tv/ - info@itelco-electrosys.com



PRO TELEVISION

ProTelevision
Headquarters:

Valhøjs Allé 176, 1st floor - DK-2610 Rødovre
- Denmark Telephone: [+45 44700000](tel:+4544700000)

www.protelevision.com - sales@ProTelevision.com