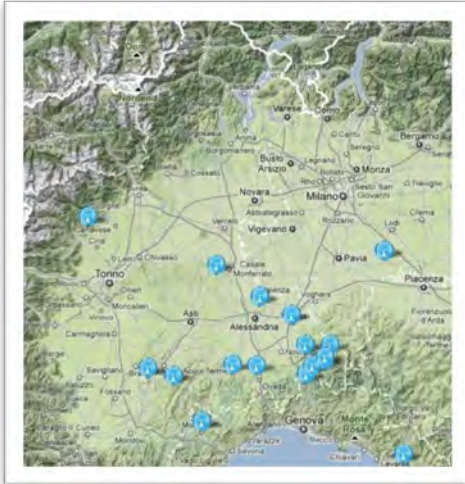




Wireless equipment in
radiofrequency domain.



Giomar



Privately owned towers in North Italy:

- 13 existing.
- 7 under construction.

Markets:

- TV and Radio broadcasting.

- Mobile telephony.
- Wireless broadband.
- Public administration and security.



Leading provider of time-critical, high performance printed circuit board solutions for:

- Broadcast equipment manufacturers.
- Medical instrumentation field.
- RF instruments and sensors.
- RF pallet for any application up to 30GHz.



Geritel

The company



Born in the 1985 as microwave TV link manufacturer, it gave support for first Italian microwave networks.

Short case history:



- First microwave network building from Milan to Sicily (more than 1100km in various hops) and from Florence to Sardinia.



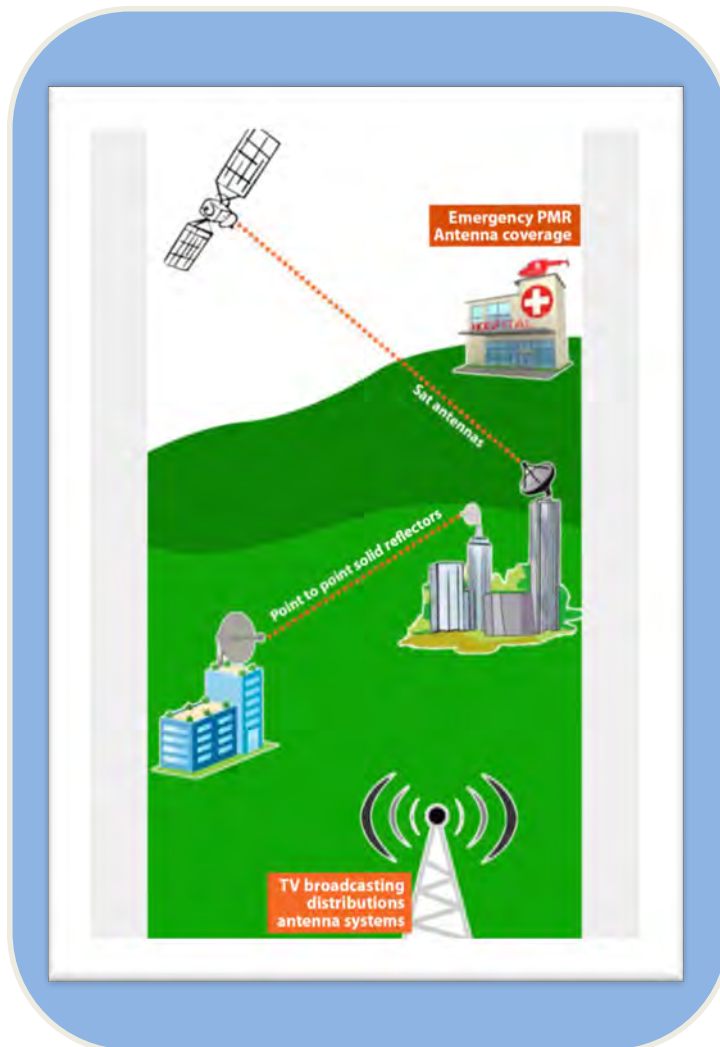
- First Tele-Ippica network building, later become 1st Italian player for betting on horse races.



- First motorway network building in FM isofrequency for French Cofiroute national operator (107,7MHz);



- Design, geographical surveys and installation of towers, houses and mw radio link network of TMC, Telemontecarlo in North-West Italy.



- IP solutions for microwave networks.
- FM and TV exciters and antennas.
- Masts and towers supply with shelter outdoors installations for new transmission places.
- Tetra and special frequencies antennas for particular fields.



- Turn-key solutions for TV or FM broadcast network.
- Link budget simulation for terrestrial radio-link.
- Design and coverage broadcast area.
- Special customized antennas.
- High specialized manpower for installation, service and maintenance activities.



About Microwave solutions



- High-capacity microwave IP radio-link for backhaul connections, in licensed band from 6 to 38GHz.
- Microwave IP radio-link for unlicensed band 17GHz (some EU countries), 5 and 24GHz.
- Point-to-multipoint equipment and antennas for ISP networks (CPE, BTS).
- Low cost antennas for end-user applications and installations.
- High quality antennas for providers and network managers.
- Accessories and equipment for technicians and installation activities.



High capacity IP radiolink

DragonWave partner of Geritel:

Microwave IP radiolink for point-to-point high capacity connections:

- license band frequency range.
- High data capacity with bandwidth accelerator and header compressor.
- Modulation adaptive to reduce fading issues.
- Wide channel bandwidth following ETSI and FCC rules.
- Remote management network (GUI, Telnet, etc).
- High level of power out than other competitors.
- Different setup 1+0, 1+1 HSBY, 2+0, 2+0 and XPIC.
- Good cost-effective solution suitable for new and/or existing mw networks with old standard.
- Full ODU for a no-footprint installation.





Enhanced & Enhanced MC

DragonWave Enhanced family products:

Full outdoor, zero footprint, IP solution for backhaul or end terminal wireless link.

Standard solution: Harmony Enhanced

- 6L to 38GHz frequency.
- modulation up to 2048QAM with ACM.
- Channel spacing up to 56MHz.
- up to 1Gbps in 1+0 setup (2Gbps 2+0).
- XPIC.
- Power out adaptive up to +29dBm.

Dual carrier solution: Harmony Enhanced MC

- 6L to 38GHz frequency.
- modulation up to 4096QAM with ACM.
- Channel spacing up to 112MHz.
- up to 2Gbps in 1+0 setup (4Gbps 2+0)
- XPIC.
- Power out adaptive up to +29dBm or high power optinal +35dBm.





Hybrid switch mw

DragonWave partner of Geritel:

Hybrid switch optional to increase the Ethernet port up to 16 input.

Three versions available:

- First mile.
- Hub 800 switching router.
- Hub 800 protection switching router.

First Mile 200



Hub 800



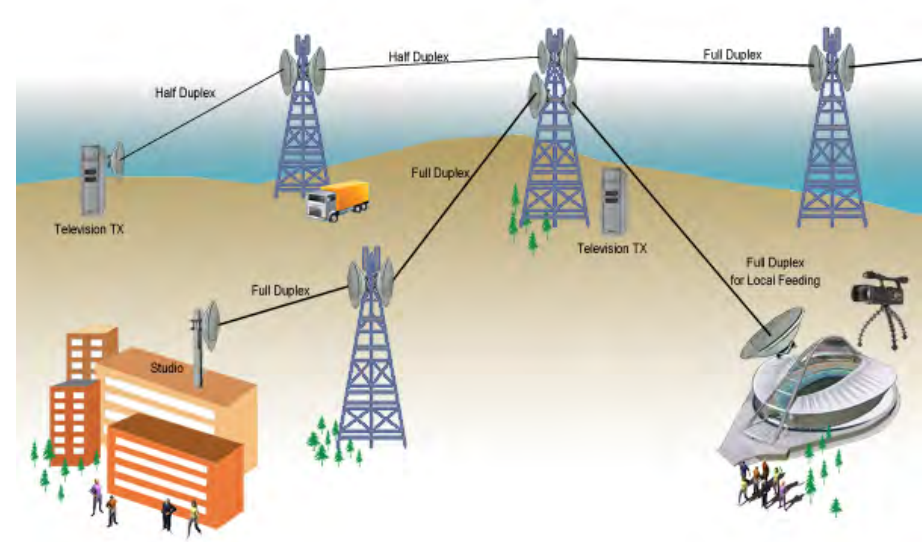
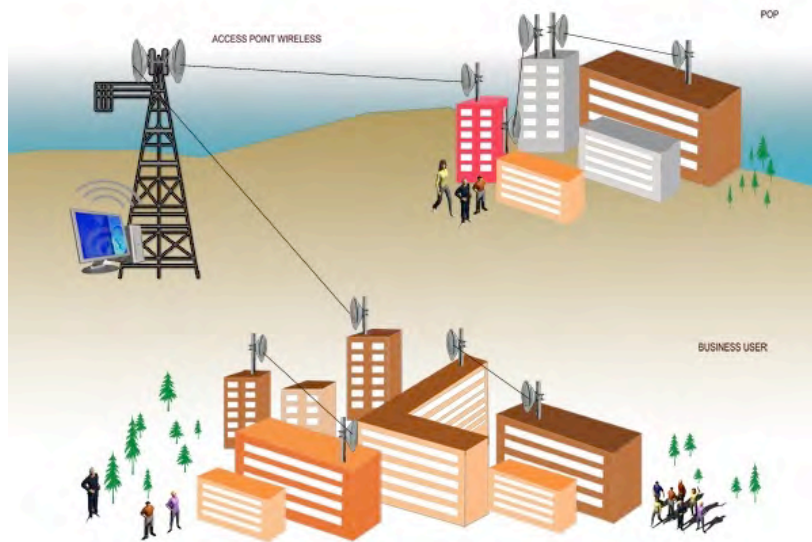
Hub 800 Protection



Application scenario:

- 1) Broadcasting distribution.
- 2) Internet wireless provider WISP
- 3) Telecom backhauling
- 4) Private enterprises
- 5) Municipal
- 6) Healthcare

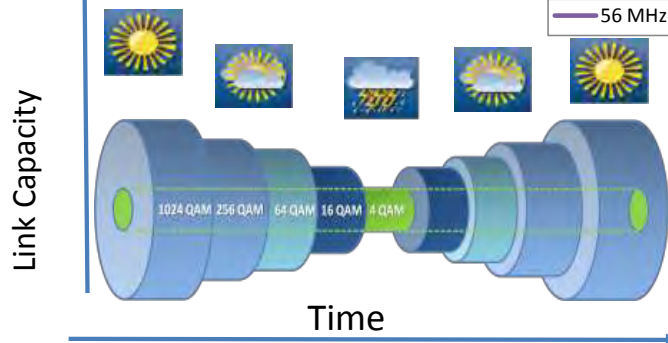
- 7) Utilities
- 8) Oil and Gas field
- 9) Security network



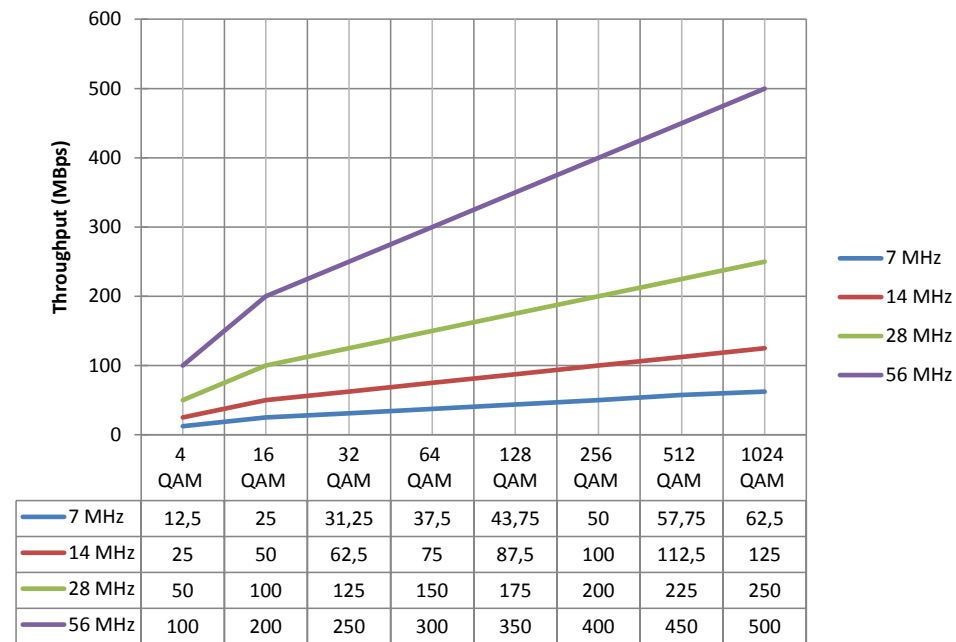
AUTOMATIC ADAPTIVE MODULATION

Refers to the automatic modulation adjustment to prevent fading impairments.

Under critical conditions the radio system automatically changes modulation so that low priority traffic can be dropped but Real-time applications will continue to run uninterrupted.



Throughput Vs Modulation



FULL programmable Modem
A wide range of modulation schemes

From 4 Qam to **1024 QAM**
FIXED AND ADAPTIVE



High Performance parabolic reflectors

Products:

Parabolic reflector with side profile, adsorber, flat radome and feed:

- Diameter from 0,3 to 3,0m;
- Frequency range from 4,5 to 26GHz.

Applications:

Suitable for microwave point-to-point-link for telecom operators, wireless internet providers, TV radiolinks, security networks.





Standard parabolic reflectors & TVRO

Products:

Standard dishes in spun aluminum from 0,6 to 3m size:

- Feeds working from 800MHz to 26GHz of frequencies.
- Polarization feeds linear both circular single and double for link in space or frequency diversity mode.

Applications:

- Class I and II terrestrial microwave links.
- Point-to-multipoint links.
- TVRO for satellite communications in different band (L, X, C, Ku, Ka).





Feed horn for prime focus reflectors

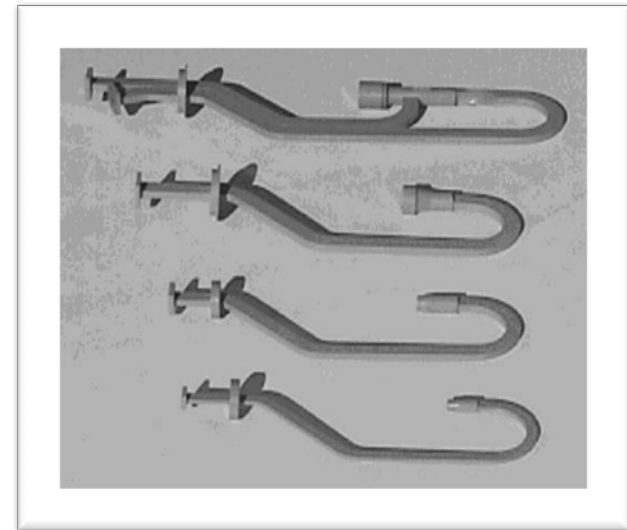
Products:

Prime focus and cassegrain feeds for different frequencies and with different electrical response.

Applications:

Suitable in application for terrestrial or sat links and mountable for:

- Geritel prime focus dishes;
- Replacing other feeds in third company dishes.



Products:

Aerodynamic fiberglass radome for covering standard parabolic dishes.

Applications:

- High mountain installations;
- Windy places;
- Corrosive environments.

Very low attenuation and homogeneous thickness of fiberglass.

Customized external painting.

Suitable for internal air heater in extreme cold places.



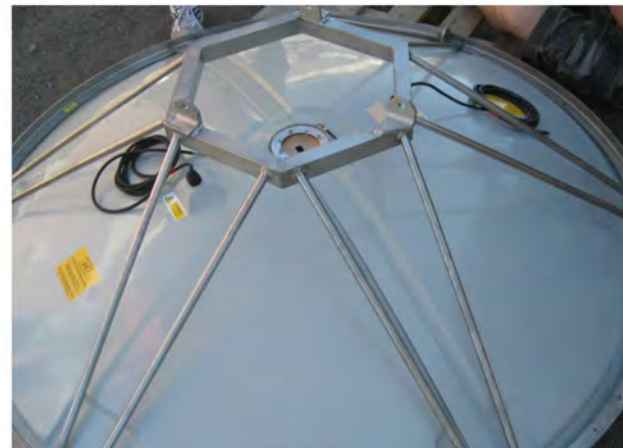
Products:

Heating systems for antenna with outdoor or indoor mounting:

- little air-heater fixed internally the radome;
- electrical resistors mounted on the back side of the dish.

Applications:

- Extreme cold installations.
- Snow and Ice deposit.





Waveguide accessories and spare parts

Geritel know-how and machine tools allow to manufacture more parts in the domain of waveguide and rigid transmission line for RF applications.

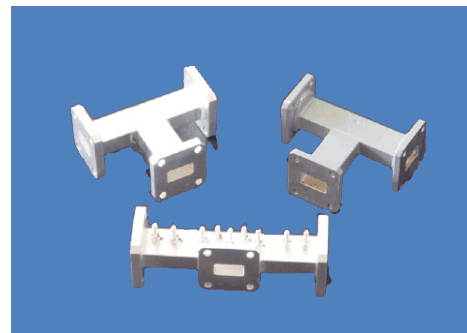
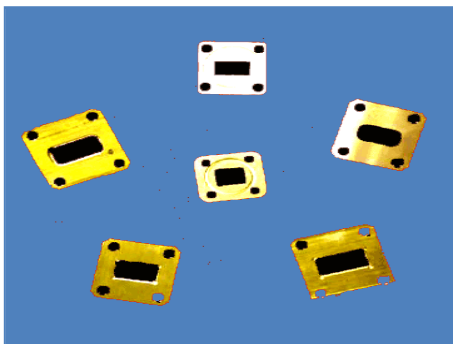


Products:

Flexible wave guide, rigid line connections, twist and H&E plane bends.

Applications:

Suitable for technicians in outdoor installation activities of antennas and mw links. Useful for rack microwave link assembling.



- FM exciters and power amplifiers for modular solutions of power.
- TV analogue / digital exciters and powers amplifiers for any digital standard.
- VHF band I and III antenna systems.
- UHF band IV and V antenna array for analog and digital trasmissions (DVB-T/T2, ISDB-T, ecc).
- Omnidirectional antennas for 360° coverage patterns.
- MMDS equipment with transmitter and sectorial antennas for KU band.
- LPDA and horn antennas for special customized broadcast projects.
- Mobile TV radiolink @different frequencies.





TV Exciters and Power Amplifiers

Standards

- DVB-T2: EN 302 755, TS 102 831, TS 102 773 (T2-MI)
- T2-Lite: DVB-T2 specification, 1.3.1 Annex 1
- DVB-T: EN 300 744, TS 101 191
- PAL: ITU-R BT.470-7, ITU-R BT.1700, ITU-R BT.1701-1
- NICAM Audio: EN 300 163 V1.2.1 (NICAM 728)
- SDI: SMPTE 259M-C, ITU-R BT.601-4, ITU-R BT.656-4



Exciter up to +20dBm power out

	DVB-T/T2/H ISDB-Tb CMMB DTMB	ATSC	ATV
UHF-AMP150	150 Wrms	200Wrms	500Wps
UHF-AMP300	300 Wrms	400Wrms	1000Wps
UHF-AMP500	500 Wrms	700Wrms	1500Wps



Power amplifier up to 500Wrms



GFM-30	30 W compact mono FM exciter, stability 2 ppm, step 10 kHz, 1 HE rack unit
GFM-50	50 W compact mono FM exciter, stability 2 ppm, step 10 kHz, 1 HE rack unit
GFM-100	100 W professional stereo Exciter μ P controlled, 10– 100 W RF power, LCD display, stability 1 ppm, step 10 kHz, 7 different memories settings remotely and locally selectable, 1 U cabinet
GFM-300	300 W professional stereo Exciter μ P controlled, 20 – 300 W RF power, LCD display, stability 1 ppm, step 10 kHz, 7 different memories settings remotely and locally selectable, 2 U cabinet
GFM-500	500 W professional stereo Exciter μ P controlled, 50 – 500 W RF power, LCD display, stability 1 ppm, step 10 kHz, 7 different memories settings remotely and locally selectable, 2 U cabinet



Network planning tools

Geritel is a leading provider of **radio network planning, design, optimisation and coordination tools**. Geritel portfolio of network planning tools covers the complete frequency range and all technologies:

Broadcast

Analogue Television.

Analogue Radio (FM, LF / MF, HF).

Digital TV: DVB-T, DVB-T2, ATSC, ISDB-T, DTMB, CMMB.

Digital Radio: T-DAB, DAB+, DRM, DRM+.

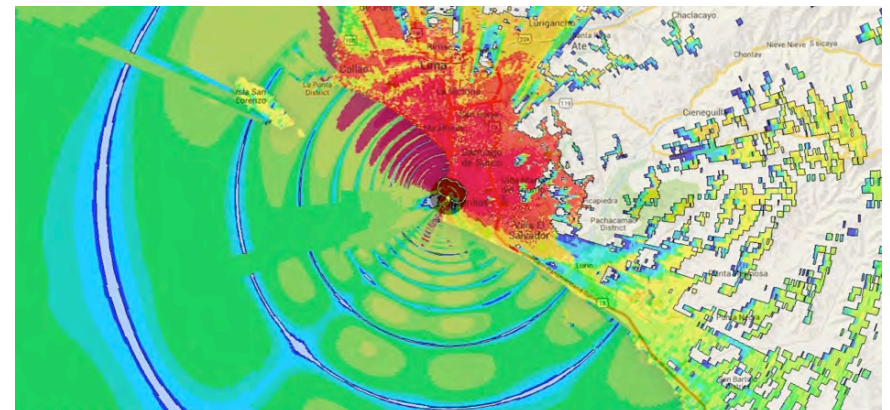
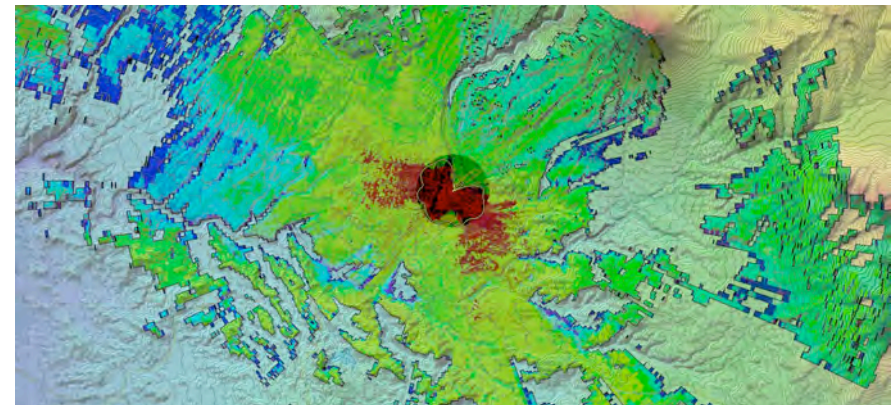
Mobile TV

DVB-H, T-DMB, CMMD.

Telecommunications

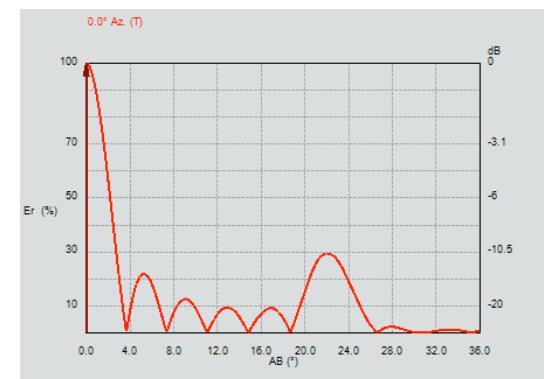
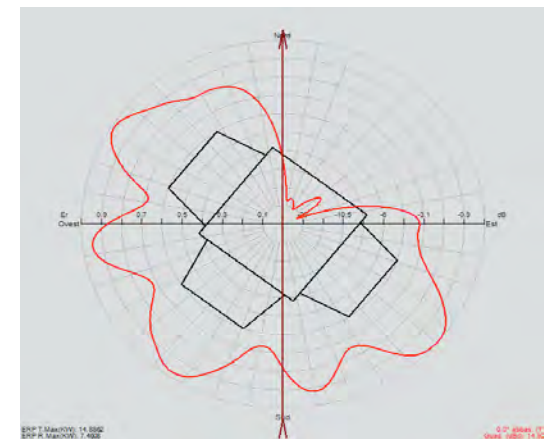
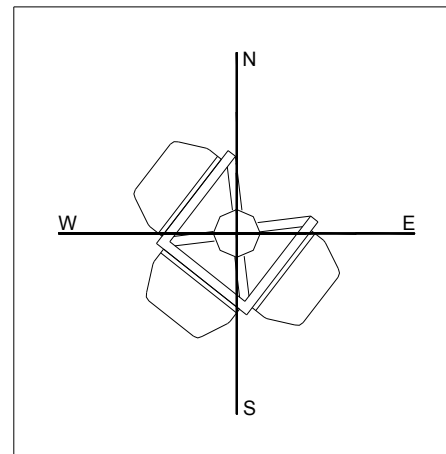
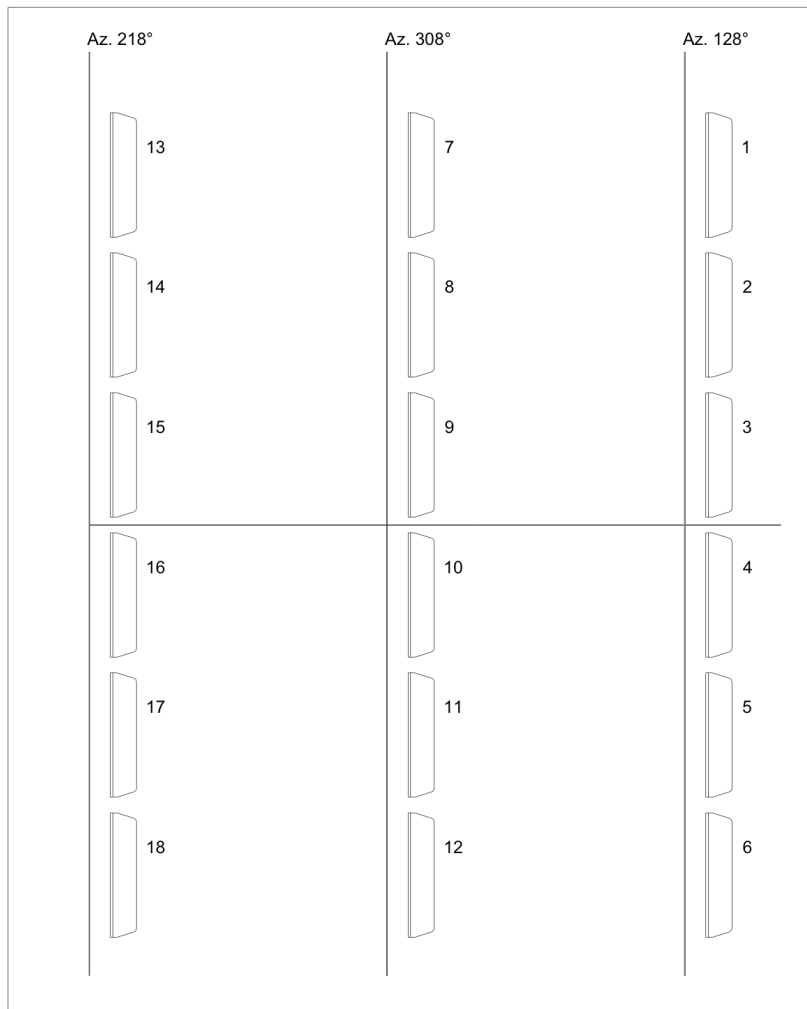
Mobile: GSM, UMTS, TETRA, TETRAPOL, LTE.

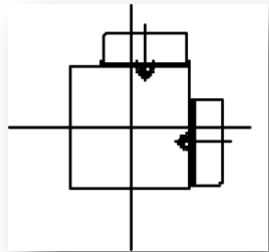
Microwave: SDH, PDH, FWA, WLL, LMDS, WiMAX.



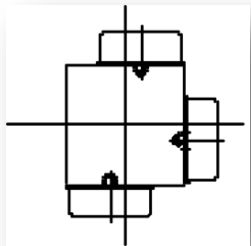
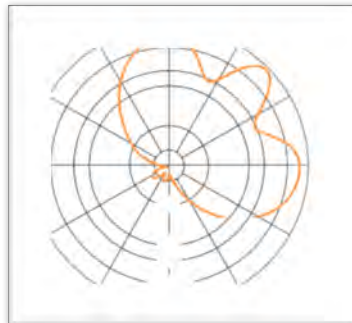
Network planning tools - 2

Typical sample are the UHF systems for DVB-T2 television broadcasting. They are designed by our sw and later produced and assembled by the in-house mechanical workshop.

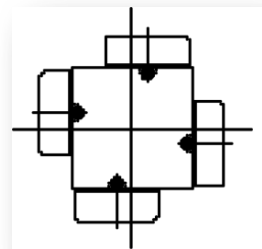
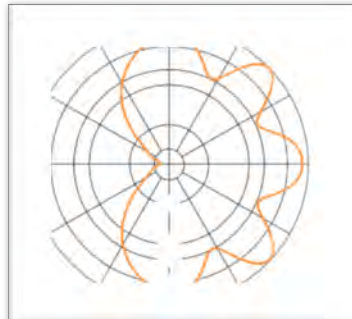




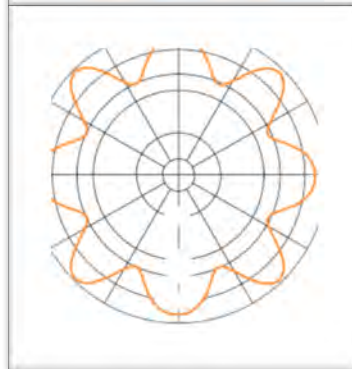
System of 2
panels UHF AM2



System of 3
panels UHF AM2



System of 4
panels UHF AM2



Example of tower
system with 4 faces
and 2 bay

Antennas compatible also with DVB-T, ISDB-T, ATSC.



FM radio broadcasting array

GERITEL - FM Broadband dipole	
Frequency range	88 – 108 MHz
Polarisation:	Vertical
Gain	3,2 dBi
VSWR	≤ 1,2
Impedance	50 Ω
Connector suitable	N-f; DIN 7/16"; EIA 7/8"
Input Power max (dep.by connector)	4 kW
Dimensions	1600 x 800 x 100 mm
Weight	6 kg

GLG01 88108 – technical specification

Bay	Dipole	Gain [dB]	Weight [kg]	Height [m]
1	2	5	25	4
1	4	8	50	9
1	6	9,8	74	13
1	8	11	94	18
1	12	12,8	155	29

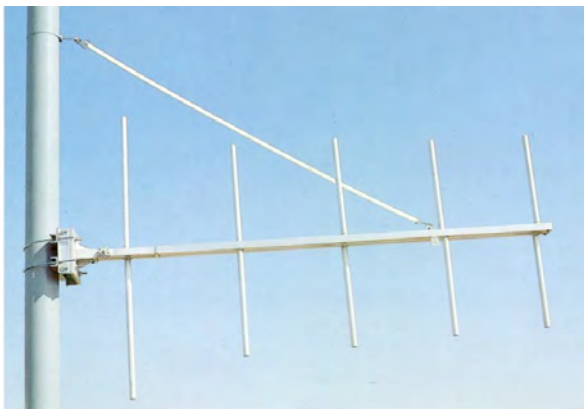
Antenna systems configuration with Geritel Dipoles

Product:

- Standard production of **omnidirectional antennas**, from 5 to 17GHz.
- **Horn antennas** for field measuring from 5 to 18GHz.
- **Log-periodic antenna** up to 3GHz;
- **Yagi antennas** for VHF ranges;
- **Dipoles with panels** for VHF and UHF band.
- **Omni dipoles** for FM band.

Applications:

- **FM radiostations, TV broadcasters, MMDS networks, wi-fi coverage areas, public and healthy networks.**





Experience:

Italian TV recent switch-off activities:

- 2009 Trentino region.
- 2010 Lombardia region.
- 2011 Veneto, Piemonte regions.
- 2012 Marche, Umbria e Sicilia regions.

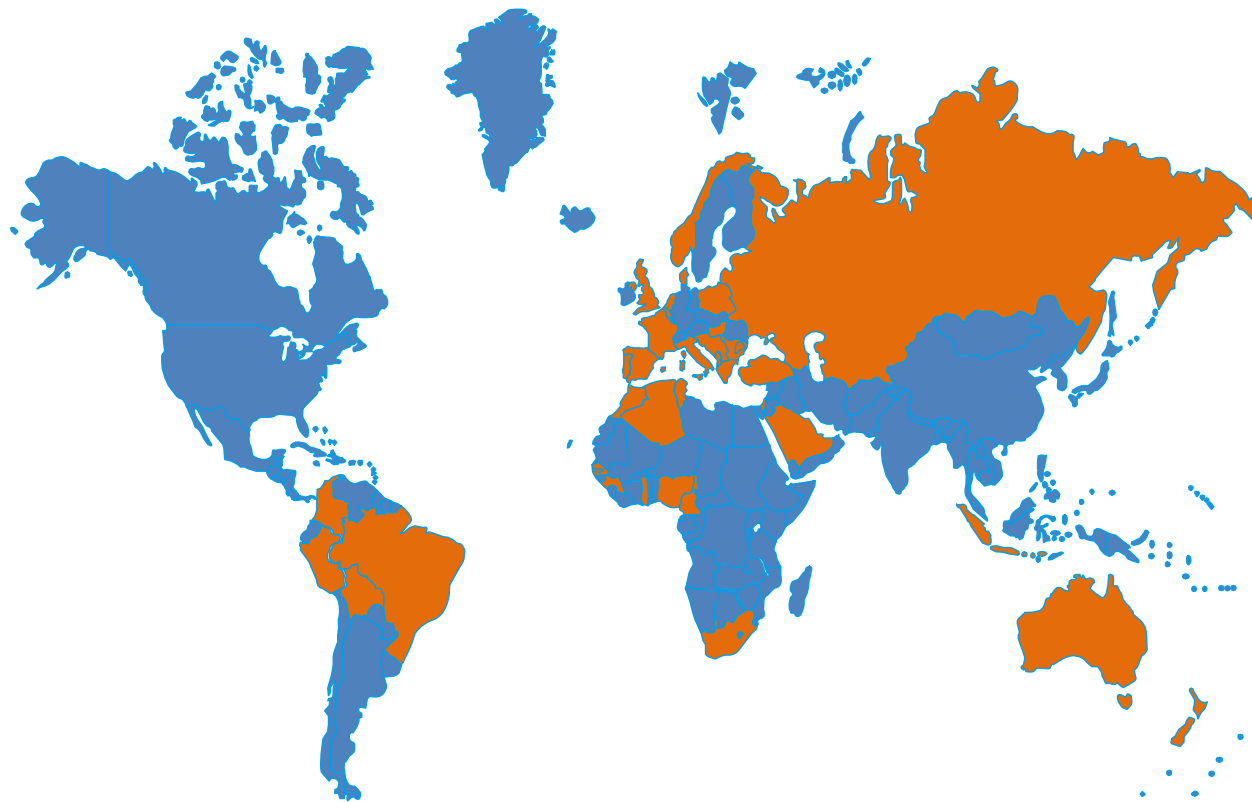
Actual proposal offered:

- ① Replacing of TV equipment on-site.
- ② Installation and acceptance check for new DVB-T signals.
- ③ Installation and pointing of new mw links.
- ④ Indoor restyling of electrical and RF plants.
- ⑤ installations of carpentry parts.
- ⑥ Mounting of radiant antenna systems.
- ⑦ Final check and tests.



Our market

Where you can find our antennas and equipment.



Geritel field of business.

- National TV and FM Broadcasters;
- Enterprises and system integrators;
- Telecom operators;
- Wireless broadband providers;
- Oil and Gas industries;
- Public services and their networks.
- Safety and healthy department.



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Thank you!