New VHF Transmitting Antennas for Digital Radio







The DAB digital radio standard exists since the mid-1990s, implementing the COFDM multi-carrier modulation process in a similar way to DVB-T. This enables the transmission of a larger number of radio programmes and supplementary data in addition to having outstanding noise-free and distortion-free sound quality.

Transmitting is also fundamentally possible with a significantly lower transmission power than with FM radio.

In 2011 the German public and private broadcasters and MediaBroadcast, a network operator, took the decision to boost digital radio in Germany with private radio organisers in the boat as well.

The DAB+ transmission standard was specified that enabled significantly more programme capacity per frequency block by using progressive

MPEG-4/HE-AAC v2 encoding technology. In the meantime the complete VHF band III was also available for digital radio transmission.

Together with the higher transmitted power of up to 10 kW ERP this meant more programmes with distinctly improved coverage. For the first time, one multiplex with private radio programmes was transmitted across Germany, and in the spring of 2011, 27 stations for DAB+ were put into operation in the metropolitan areas within a short space of time. While some stations were able to use their existing antennas, 15 locations needed new ones. Within just four months following the order, KATHREIN handed over the new antennas as turnkey projects (delivery and installation) to the customers.

Primary requirements for the new antennas are

- Broadband characteristic of horizontal radiation pattern and matching (VSWR) over the complete VHF band III
- High power rate (five to seven VHF transmitters with up to 2 kW each)
- Individual radiators and system solutions for a wide variety of installation situations

The KATHREIN Broadcast department has developed a wide range of new antennas in good time for the large number of application versions. These include VHF dipoles, reflector antenna systems and antenna systems for special applications, for example for GRP cylinders, top-mount installations and large mast dimensions.

VHF Broadband Dipole Antennas



- Vertical polarization
- Quasi-omnidirectional HRP, dependent on mast
- High power capacity
- Material of radiator: Hot-dip galvanized steel
- Quick setup, simple installation



VHF DAB+ "Raichberg" transmitting antenna

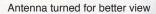


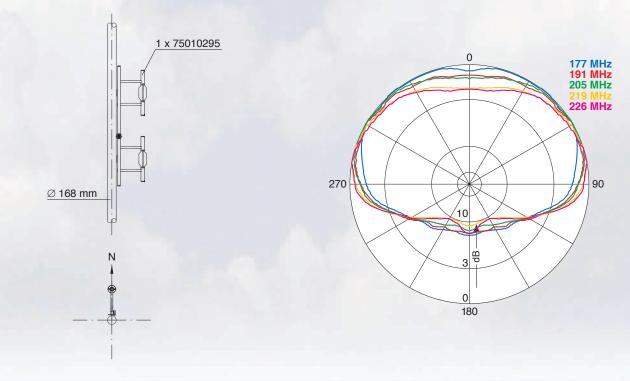
of masts



For side-mounting to masts

For mounting at the top of masts	75010290	75010291	75010292
For side-mounting to masts	75010295	75010296	75010297
Input	7-16 female	7/8" EIA flange	15/8" EIA flange
Max. power	2 kW	3 kW	5 kW
Frequency range	174 – 240 MHz		
VSWR	< 1.2		
Gain (at mid-band)	5.0 dBd		



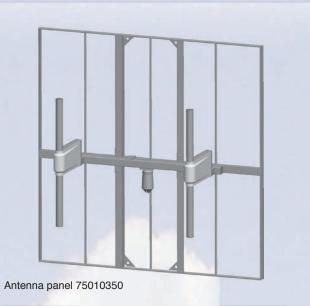


VHF Broadband Panel Antennas



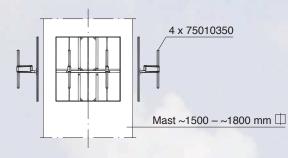
- Vertical polarization
- Excellent omnidirectional HRP (dents < 3 dB) or customized HRP
- Particularly suitable for square or round masts
- Material of radiator and reflector: Hot-dip galvanized steel
- Building block for classic panel antenna systems

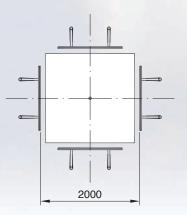


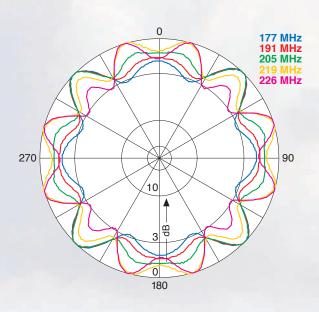


Order No.	75010350	75010351	75010352
Input	7-16 female	7/8" EIA flange	13-30 female
Max. power Frequency range	2 kW 3 kW 4 kW 174 – 240 MHz		
VSWR	174 – 230 MHz: < 1.15 230 – 240 MHz: < 1.2		
Gain	8 dBd (at mid-band)		

VHF DAB+ "Heidelberg" transmitting antenna







Installation example of a panel antenna system with 75010350 antenna to square mast

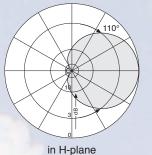
VHF Broadband Log.-Per. Antenna



- Vertical or horizontal polarization
- Directional HRP
- Low wind load
- Material of radiator: Hot-dip galvanized steel
- Ideal for transmission along highways, railways or to small towns
- Suitable also as component for systems with orthogonal/mixed polarization

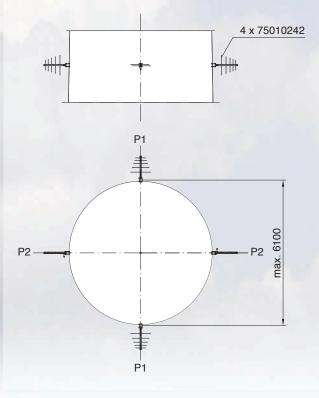


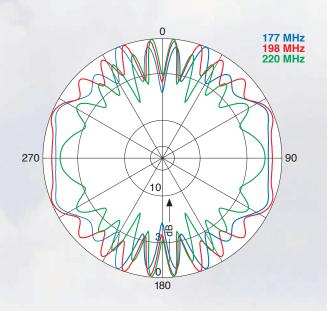
Radiation Patterns (at mid-band)





Order No.	75010242
Input	7-16 female
Max. power	2 kW
Frequency range	174 – 240 MHz
VSWR	< 1.25
Gain (at mid-band)	5 dBd





Installation example of an orthogonal polarized antenna system to an extremely large mast diameter

VHF Broadband Antennas for Top-mount

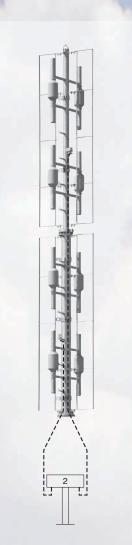


- Vertical polarization
- Omnidirectional Horizontal Radiation Pattern
- High power capacity
- Material of radiator, support tube and isolation grids: Hot-dip-galvanized steel
- Two elements may be stacked for higher gain:
 Consists of types 16911184 (lower half) and
 - 75010365...368 (upper half), power splitter and cabling.
 - Half antenna operation is possible.

Order No.	75010365	75010366	75010367	75010368
Input	7-16 f	7/8″ EIA	13-30 f	15/8" EIA
Max. power	2 kW	3 kW	5 kW	8 kW
Frequency range	174 – 240 MHz			
VSWR	< 1.2			
Gain	4.5 dBd (at mid-band)			

Order No.	75919999	75920058	75919936
Splitter input	15/8″ EIA	15/8″ EIA	31/8″ EIA
Max. power	4 kW	8 kW	16 kW
Frequency range	174 – 240 MHz		
VSWR	< 1.2		
Gain	7.5 dBd (at mid-band)		





Omnidirectional transmitting antenna for top-mount installation Type 75010365

Antenna system consisting of 75010368, lower section 16911184, internal cabling and splitter

Solutions for Special Applications



For example: VHF broadband antennas for installation in GRP cylinders with D = 1.6 m are customer-specific solutions that in individual cases have to be designed under consideration of the existing GRP cylinder, the climbing ladder, the free vertical aperture and the required radiation pattern. For the DAB+ project in Germany, Kathrein developed and supplied several antennas of this type as well as modifying existing narrow-band antennas at low cost for broadband DAB+ use.



VHF DAB+ transmitting antenna in "Saarbrücken" GRP cylinder

Outlook

In addition to the benefits of radio distribution via digital radio as described above, DAB+ also offers further important advantages, mainly for network operators. These include less bandwidth requirements and primarily also the lower transmitting power compared to FM radio. The savings in terms of electrical energy also mean that distribution of radio programmes via DAB+ is highly attractive. Because a large number of FM receivers are still in use, a longer time period for parallel operation of FM and DAB radio will be needed though. Digital radio is progressing forward with confidence. Programmes transmitted via DAB/DAB+ are highly popular in Europe, predominantly in Scandinavia, Great Britain, Switzerland and Germany. It is a pleasing fact that suitable radios can be selected from well over 300 receivers on the World DAB pages on the internet.

http://www.worlddab.org/products_manufacturers

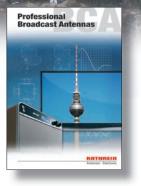
In the Asian/Oceanian regions mainly Australia, Taiwan and Hong Kong drive forward digital radio according to the DAB/DAB+ standard.

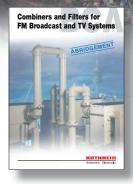
Digital radio in the coming years will thus continue to spread, and Kathrein is fully prepared for this with its newly developed antenna solutions.

References for KATHREIN DAB / DAB+ / DMB-Antennas in following countries:

Belgium England Lithuania Taiwan Canada Hong Kong Turkey Norway Turkmenistan China Hungary Qatar Denmark Ireland Zambia Singapore Finland Netherlands Sweden Germany Latvia Switzerland

In addition to the products and solutions shown in this brochure, Kathrein's portfolio includes a full range of broadcast antennas and accessories for FM, TV, DAB and DTV. Please contact us for further information or see our current broadcast catalogues:







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The CD-ROM includes all printed catalogues

