Operation no. of operation texts and work units or standard texts and flat rates:

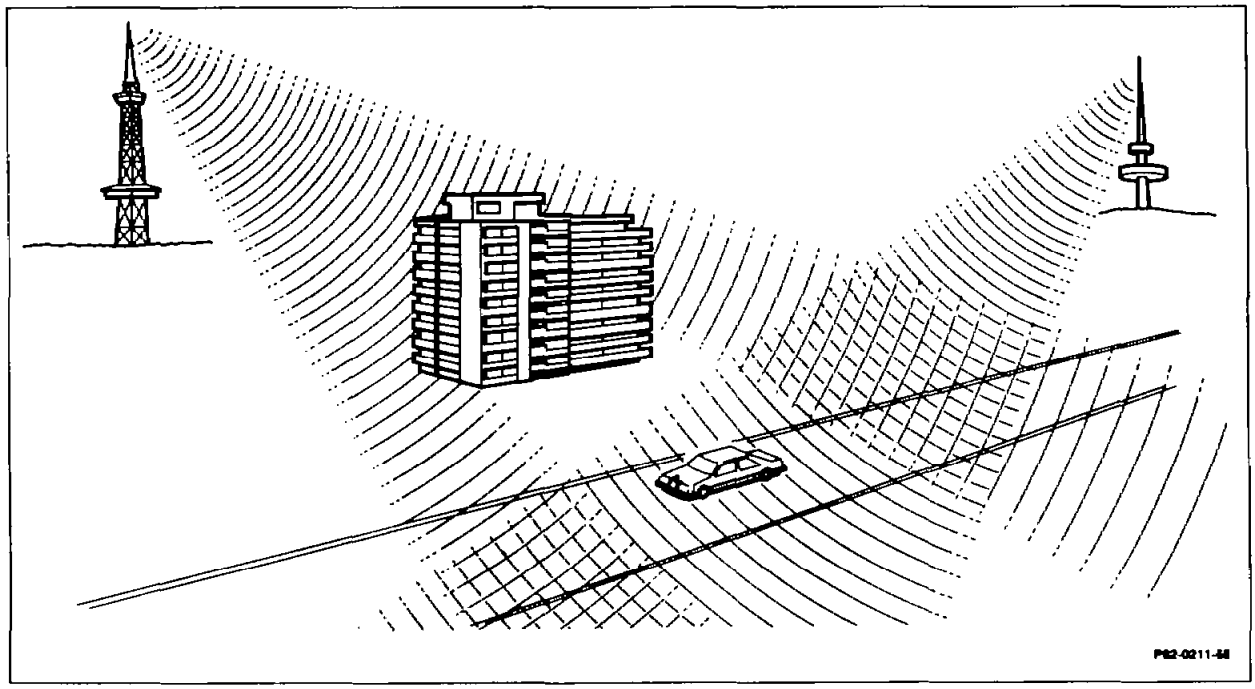
A. VHF and VHF stereo reception in moving vehicles

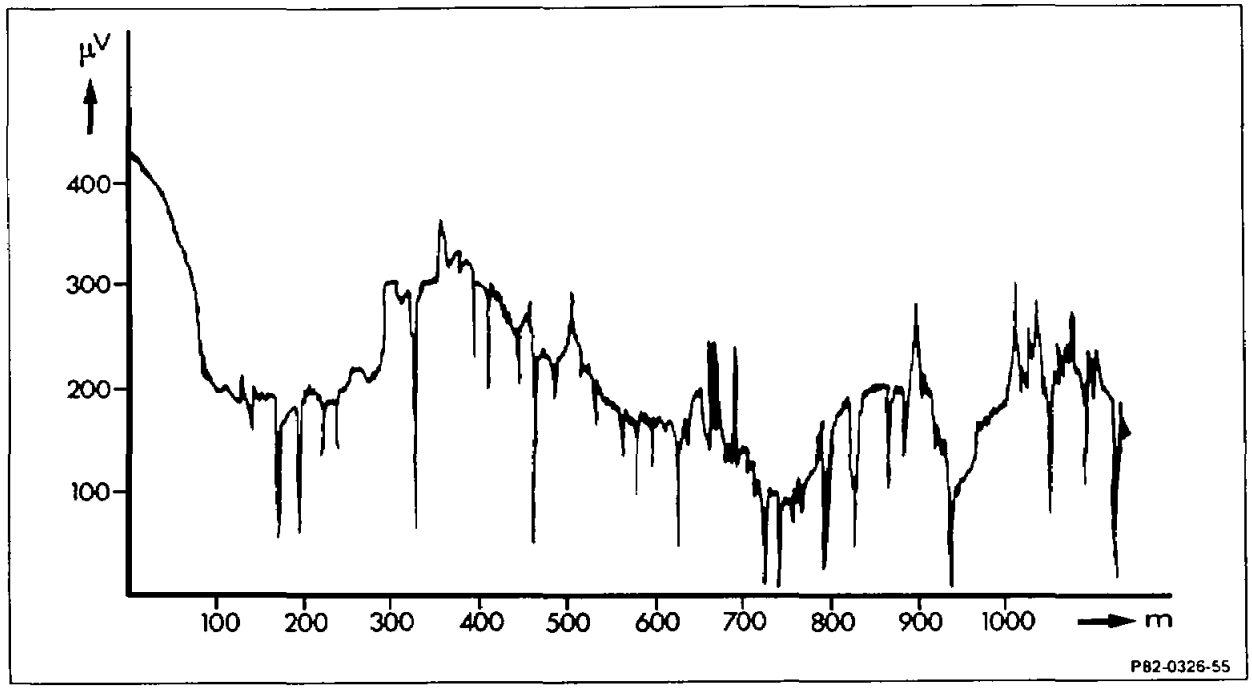
Since the introduction of stereo radio systems in cars, complaints have occasionally been received regarding stereo reception. Such interference is not due – as is assumed in practically all cases – to a fault in the vehicle or in the radio set or reception system, but is attributable to the peculiarities of very high frequency reception.

For these reasons, we have included these explanatory notes to assist in assessing complaints and in avoiding pointless attempts at locating faults.

Field intensity conditions

As a result of the peculiarity of very high frequency waves of propagating in a straight line, it is theoretically only possible to receive a signal in a direct line between transmitter and receiver. In practical terms, however, the very high frequency waves approximately follow the Earth's curvature, while at the same time being refracted or reflected by structures of all types and by ground elevations. The consequence of this is that field intensity distortions occur which are caused by shadowing of the transmitter. Whereas uniform field intensity conditions can be assumed for stationary installations, these fluctuate constantly with varying intensity in a moving vehicle.





The field intensity diagram shows the pattern of such a field intensity. In a city, for example, signal differences up to a ratio of 1:1000 may occur within a few meters.

The different field intensity conditions are of particular significance for stereo reception because the frequency band required in this case is three times greater than for model reception.

It is clear from this that the frequency band which contributes to "noise" in stereo reception is also three times larger than for mono reception. In practice, therefore, the field intensity required for interference-free (noise-free) stereo reception is approximately ten times greater.

In areas with poor field intensity conditions, interference to stereo reception, e. g. as a result of shadowing, may occur much more easily than with mono reception. It is also possible that a station which the driver has just set suddenly "disappears". The cause of such interference is not a defect or fault in the receiver, but is due to reception conditions.

Reflection

Reflection, which can be considered to be the most frequent kind of interference to reception, can be caused by interference noises and reception distortion. These occur when a direct and a reflected signal of a station are received simultaneously. The signals received on the set station frequency are then a mixed product and may be phase-shifted as a result of the differences in propagation delay, with the result that distortions of the RF signal occur, which are clearly audible. This process, as it occurs only under quite particular circumstances, is usually very short but pronounced in terms of its acoustic perception and may be clearly reproduced when passing slowly along reflection sections. The signals are superposed and in some cases cancel each other out.

Other interference

The car's antenna not only picks up transmitter signals but also interference signals which may be caused by sources of interference outside of the vehicle, or by the car itself. If the interference suppression on the car is not in proper order, a wanted signal which is too weak may also promote interference.

If the signal voltage at the receiver input is a multiple of the interference voltage, the interference in the VHF range is completely suppressed. By contrast, if the interference voltage is approximately of the same magnitude as the signal voltage or even higher, which may be the case, for example, if the radio is tuned to a weak station, then interference suppression is particularly pronounced. There is no technical remedy to counter such interference. The driver must then select a different station.

B. Interference in radio caused by short-time sources of interference

The effort required for effectively suppressing short-time sources of interference, e. g. turnsignal system, solenoid valves, electrically adjustable outside rear-view mirrors, windscreen washer pump, bears no relation to the achievable effect and is therefore not taken into account in factory-implemented interference suppression measures. In response to any complaint regarding interference from such ancillary components, it can be pointed out that this occurs anyway only where increased attention to the traffic situation is called for, so that any impairment of radio reception is not an unacceptable factor for this brief period.

Subsequent interference suppression is possible in isolated cases. Such work is very time-consuming, however, and can only be performed at the customer's expense.

C. Technical data on radio with standard or active bass speaker system

Component	Power output	Frequency	Resistance	Dia.
Radio, receiver/amplifier (A2, A2/3)	2×25 W 4×15 W [1]	30–15 000 Hz	3 Ω	–
Speaker in left or right instrument panel (H4/9, H4/10)	2×25 W	70–15 000 Hz	6 Ω 4 Ω [1]	120 mm
Speaker in left or right door (H4/5, H4/6) active bass	2×40 W	40–100 Hz	2 Ω	160 mm
Speaker in left or right rear door (H4/3, H4/4) T-model	2×25 W	80–15 000 Hz	6 Ω 4 Ω [1]	100 mm
Left or right rear speaker (H4/7, H4/8) coupe, sedan	2×25 W	60–15 000 Hz	6 Ω 4 Ω [1]	140 mm

[1] Radio with four output stages (as of approx. 09/93)

D. Technical data on radio with sound system

Component	Power output	Frequency	Resistance	Dia.
Radio, receiver/amplifier (A2, A2/4)	2×25 W 4×15 W [1]	30–15 000 Hz	3 Ω	–
Speaker in left or right instrument panel (H4/9, H4/10)	2×40 W	600–15 000 Hz	6 Ω	120 mm
Speaker in left or right door (H4/5, H4/6)	2×40 W	40–600 Hz	2 Ω	160 mm
Speaker in left or right rear door (H4/7, H4/8)	2×40 W	50–20 000 Hz	2 Ω	140 mm
Sound system amplifier N40/3	4×30 W (2 amps 2 x 30 W each)	20–20 000 Hz	min 1 Ω	–

[1] Radio with four output stages (as of approx. 09/93)