Maximum Signal Output Level for Wide Band Amplifiers

The output level (measured in dBµV) of an active element is defined as the sum of the signal input level (also measured in dBµV) and the gain (dB). Should this output level exceed the specified maximum, a phenomena know as "intermodulation" is observed, lowering the output signal quality. Whilst intermodulation is present in all active devices and never completely eliminated, its effects are unperceivable below the amplifier's max output level.

In order to calculate the max output level for each amplifier in an analogue terrestrial TV installation and ensure that the signal is not visibly affected by intermodulation, two factors must be taken into account – the number of channels being distributed and the number of amplifiers connected in cascade.

	Number of Channels													
Amplifiers in Cascade	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	0,0	-2,3	-3,6	-4,5	-5,2	-5,8	-6,3	-6,8	-7,2	-7,5	-7,8	-8,1	-8,4	-8,6
2	-3,0	-5,3	-6,6	-7,5	-8,3	-8,8	-9,3	-9,8	-10,2	-10,5	-10,8	-11,1	-11,4	-11,6
3	-4,8	-7,0	-8,3	-9,3	-10,0	-10,6	-11,1	-11,5	-11,9	-12,3	-12,6	-12,9	-13,1	-13,4
4	-6,0	-8,3	-9,6	-10,5	-11,3	-11,9	-12,4	-12,8	-13,2	-13,5	-13,8	-14,1	-14,4	-14,6
5	-7,0	-9,2	-10,6	-11,5	-12,2	-12,8	-13,3	-13,8	-14,1	-14,5	-14,8	-15,1	-15,3	-15,6

	Number of Channels													
Amplifiers in Cascade	20	25	30	35	40	45	50	55	60	65	70	75	80	90
1	-9,6	-10,4	-11,0	-11,5	-11,9	-12,3	-12,7	-13,0	-13,3	-13,5	-13,8	-14,0	-14,2	-14,6
2	-12,6	-13,4	-14,0	-14,5	-14,9	-15,3	-15,7	-16,0	-16,3	-16,6	-16,8	-17,0	-17,2	-17,6
3	-14,4	-15,1	-15,7	-16,3	-16,7	-17,1	-17,4	-17,8	-18,1	-18,3	-18,6	-18,8	-19,0	-19,4
4	-15,6	-16,4	-17,0	-17,5	-18,0	-18,3	-18,7	-19,0	-19,3	-19,6	-19,8	-20,0	-20,3	-20,6
5	-16,6	-17,3	-18,0	-18,5	-18,9	-19,3	-19,7	-20,0	-20,3	-20,5	-20,8	-21,0	-21,2	-21,6

Example :

An installation distributing 12 analogue channels has 3 amplifiers connected in cascade, one of which has an output level of 121 dBµV. The reduction of the output level is 12.6dB

Therefore the output levels for each amplifier should be adjusted as follows:

Output level = 121 dBµV – 12.6 dB = 108,4 dBµV

Wide Band Amplifiers for analogue and digital terrestrial TV signal:

When using a wide band amplified for digital and analogue signals simultaneously, the digital signal levels should be **between 10dB and 20dB** below the analogue signal.
In cases such as these, digital channels should not be taken into account when calculating the required output level reduction.

Should the digital signal level fall between **20dB and 30dB** below the analogue level, the use of additional channel amplifiers should be considered to reduce the difference.

It is not recommended that digital channels with signal strength **30dB or mor**e below the analogue signal be distributed in an installation of wide band amplifiers.