A. N. Cheeran, and P. C. Pandey, Dichotic presentation to overcome the effect of increased
spectral masking and frequency dependent hearing threshold shifts in persons with bilateral

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Abstract - A binaural dichotic presentation scheme for reducing the effects of increased
spectral masking in persons with bilateral sensorineural loss, using spectral splitting with
complementary comb filters based on auditory critical bands, has been earlier reported
[Cheeran et al., J. Acoust. Soc. Am. 110, 2705 (2001)]. The 256-coefficient linear phase FIR
filters designed using frequency sampling technique had transition crossovers adjusted
within -6 to -4 dB for perceptual balance, and had 78 -117 Hz transition, 1dB passband
ripple, and 30 dB stopband attenuation. We evaluated the scheme by conducting listening
tests on 5 normal hearing subjects with simulated loss, using a closed set identification of 12
vowel-consonant-vowel syllables. Based on significant improvement, further tests were
conducted on 5 hearing-impaired persons with moderate bilateral sensorineural loss.
Significant improvement in response time, recognition scores, and transmission of
consonantal features, particularly place and duration, was obtained, indicating reduction
in the effect of spectral masking. In order to partly compensate for frequency dependent
hearing threshold shifts, a pair of filters with the frequency response adjusted within a 6dB
range, based on the audiogram for the corresponding ear, was cascaded with the comb
filters. These filters resulted in additional improvement, particularly for persons with
relatively uniform loss.