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Abstract The bimaterial composed of two 1D piezoelectric hexagonal quasicrystals having a crack along the material interface is considered. Mixed mode phonon and phason remote loading resulting from the plane strain conditions at infinity are applied. The phonon field represents the lattice vibrations similar to crystals while the phason field depicts the quasi-periodic rearrangement of atoms inherent for quasicrystals. Because in the framework of the open crack model the electromechanical fields have an oscillating singularity at the crack tips, therefore, the artificial contact zone model is considered. Introducing the artificial contact zone at the right crack tip the problem is reduced to a combination of combined Dirichlet—Riemann and Hilbert boundary value problems. These problems are solved analytically for any length of the artificial contact zone. Clear analytical expressions for phonon and phason mechanical parameters are derived. The real contact zone is obtained from the satisfaction of the additional conditions that lead to the transcendental equations with respect to the relative contact zone length. After solving these equations, the stress intensity factors and the energy release rates are found analytically.