Policy Brief: Governing Electromagnetic Disruption, Neurological Integrity, and the Peaceful Uses of the Spectrum

Executive Summary

Contemporary military operations demonstrate an escalating systemic reliance on the electromagnetic spectrum (EMS), transforming it into a primary arena of strategic competition and multidomain confrontation. The continuous evolution of electronic warfare (EW), high-power microwave (HPM) systems, and directed energy weapons (DEWs) has expanded the threat landscape beyond the disruption of physical telecommunications, radar networks, and microelectronics. Recent technological convergences have brought forward a concerning frontier: the deliberate application of modulated and pulsed electromagnetic emissions to induce biological, vestibulocochlear, and neurocognitive harm in human targets.

Despite the profound humanitarian, strategic, and ethical dimensions of bio-electromagnetic manipulation, the multilateral security architecture exhibits substantial normative and regulatory gaps. Current arms control instruments, such as the Convention on Certain Conventional Weapons (CCW), contain no dedicated protocols addressing non-optical directed energy weapons; the Biological and Chemical Weapons Conventions (BWC and CWC) do not govern purely physical energy vectors; and international spectrum governance under the International Telecommunication Union (ITU) is constrained by broad sovereign exemptions for military radio installations under Article 48 of the ITU Constitution. At the same time, the biophysical principles governing pulsed radiofrequency (RF) fields are central to legitimate, non-invasive therapeutic innovations, such as pulsed radiofrequency neuromodulation for severe neuropathic disorders. This policy brief provides an analytical and diplomatic input for the United Nations Institute for Disarmament Research (UNIDIR) Innovations Dialogue 2026 (#ID26) on "Electromagnetic disruption, peace and security," convened on 11 November 2026 at the Geneva Graduate Institute. It articulates a multilateral framework designed to establish binding prohibitions against the manipulation of electromagnetic pulses to inflict neurological or cognitive harm, while safeguarding and promoting the unhindered use of electromagnetic technologies for peaceful biomedical and socio-economic development.