

# ANS PPA-2 — Multi-Domain Adaptive Electromagnetic Defense Composite

*Hardened to take the pulse — from the slowest surge to the highest microwave.*

One adaptive composite skin doing what no fielded material does together: hardens across the whole EM threat band — triple-EMP (E1–E3) + high-power-microwave / directed-energy — re-tunes in milliseconds, harvests the incoming attack energy into stored power for its own electronics, and self-repairs at a low  $\sim 80$  °C thermal trigger.

The supplement that hardened the parent: triple-EMP in one layer, HPM-window hardening, threat-energy harvesting, and an anti-coupling sovereign layer — **protected spectrum  $\sim 1$  MHz to  $\sim 10$  THz.**

**NO NDA REQUIRED TO READ THIS PAGE · ENABLING MATERIAL ARCHITECTURE & PROCESS DETAIL AVAILABLE UNDER MUTUAL NDA**

 Filed IP fact

 **Engineered design target** — projected from published, lab-validated building blocks (constituents at TRL 4–6); integrated-system test is the next step

## ① TRIPLE-EMP, SINGLE LAYER

- ▶ **E1** (fast nuclear flash): **1 MHz–1 GHz**,  $\sim 2.5$  ns rise, peak  $\geq 50$  kV/m. **E2**: lightning-class (1  $\mu$ s–1 s). **E3**: geomagnetic, down to  $\sim 1$  MHz.

*Dissipates fast E1 nuclear-flash AND slow E3 geomagnetic surge — full triple-EMP coverage in one layer.*

- ▶ **Protected spectrum:  $\sim 1$  MHz –  $\sim 10$  THz** electromagnetically, plus an optical sub-band.

*Shields a continuous  $\sim 1$  MHz–10 THz window plus an optical sub-band — whole-spectrum threat coverage.*

## ② HPM HARDENING & ENERGY HARVEST

- ▶ **HPM atmospheric-window hardening:  $\geq 60$  dB** shielding at each of **22 / 35 / 94 / 140 / 220 GHz** (design target).

*Absorbs high-power-microwave / directed energy —  $\geq 60$  dB at the 22/35/94/140/220 GHz atmospheric windows.*

- ▶ **Threat-energy harvesting:** converts incident threat-field power into **stored electricity** for the skin's own protective electronics (defensive only).

*Harvests incident threat-field power into stored electricity for the skin's own protective electronics (defensive only).*

## ③ ADAPTIVE RESPONSE

- ▶ **Re-tunes in  $\sim 10$  ms** (down to  $\leq 1$  ms in fast-mode);  **$\sim 100$  ms** predictive (ML) retune that anticipates the threat (design targets).

*Adapts the shield in  $\sim 10$  ms ( $\leq 1$  ms fast-mode), with  $\sim 100$  ms ML-predictive retune that pre-positions before impact.*

## ④ SOVEREIGN LAYER & STATUS

- ▶ **Anti-coupling "sovereign layer" + bioelectric anomaly detection** — defensive sensing only.

*Suppresses back-door EM coupling and flags hostile pulses via bioelectric anomaly sensing — defensive sensing only.*

- ▶ **IP — U.S. provisional FILED:** Application **#64/081,373**, filed **3 Jun 2026**; supplements parent #64/020,126.

*Hardening provisional on file — supplements parent #64/020,126, priority date secured.*

- ▶ **Defensive scoping:** passive / responsive protective skin only — no offensive EM, no biological-targeting function (negative limitations in every independent claim).

*Passive/responsive protective skin — no offensive EM, no bio-targeting; negative limitations in every independent claim.*

**WHAT PPA-2 ADDS** — PPA-2 is the supplement that hardened the ANS parent into a full multi-domain defense skin: triple-EMP coverage in one layer, high-power-microwave hardening across the key bands, harvesting of the threat's own energy, sub-millisecond adaptive re-tuning, and an anti-coupling sovereign layer with defensive-only bioelectric sensing — protecting  $\sim 1$  MHz to  $\sim 10$  THz. IP filed and inventor-owned — one of **four filed applications** in the ANS portfolio (#64/020,126 · #64/081,373 · #64/086,584 · #64/087,652).

**Enabling material architecture & process detail available under mutual NDA.** This page states *what* the material is engineered to do, with numbers, thresholds, and threat windows. It deliberately does *not* disclose the formulations, layer-stack recipes, mixing ratios, or process parameters — the proprietary *how*.

**Non-proprietary technical overview** — no NDA required to read this page. Material scoped as a passive / responsive defensive protective skin (no offensive EM function). Figures labeled as targets are engineered design targets projected from published, lab-validated constituent materials (TRL 4–6); integrated-system performance is not yet bench-tested; validation is the objective.