

EMP

Electromagnetic Pulse

KARS

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Foreword

- Opinions vary considerable
- Controversial Topic
- Many Variables
- Possible TEOTWAWKI event



What is EMP ?

Intense broadband burst of electromagnetic energy

Categories

- Natural – solar events, lightning, local meteor ionization
- Man-made (military) – nuclear and non-nuclear

Massive gamma rays

Massive voltage surges

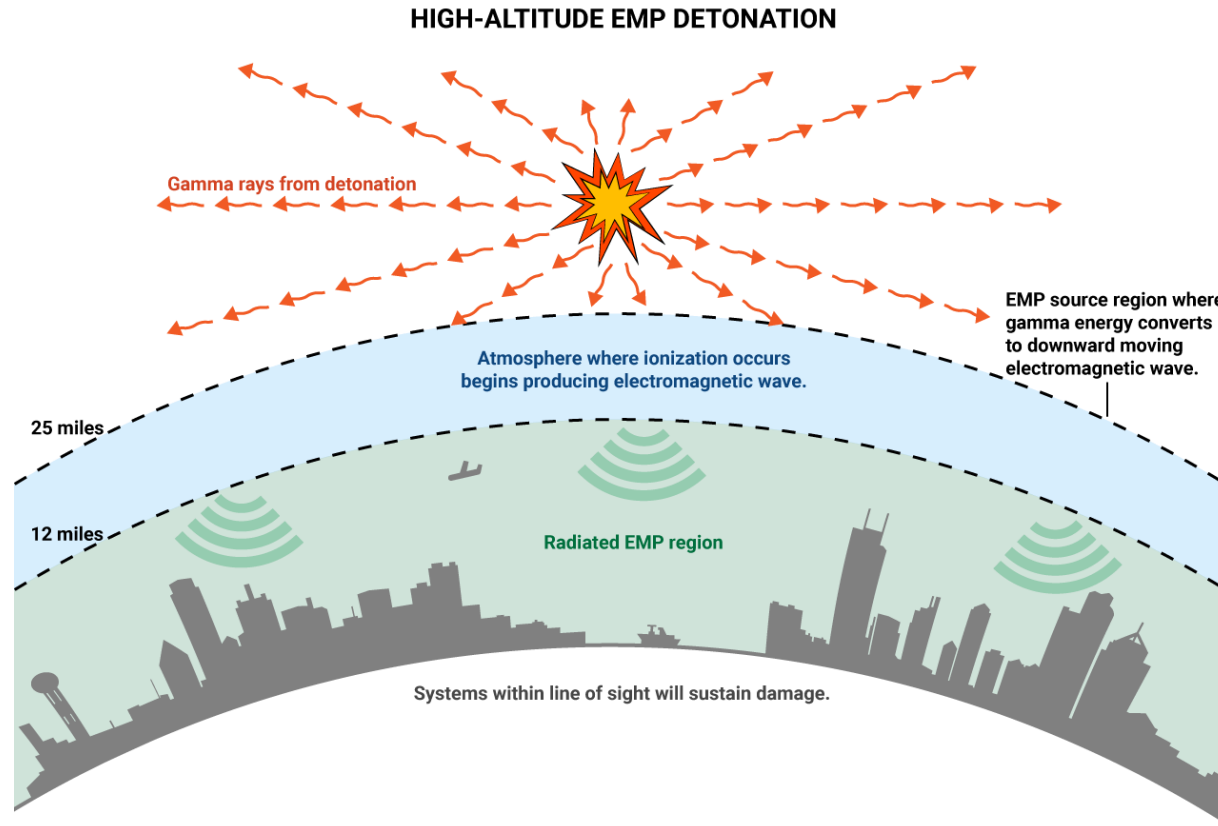
Massive amperage surges

Massive ionization, cascading electrons

Massive surge of changing magnetic and electric fields

Massive RF energy surges

Physics of EMP Weapon

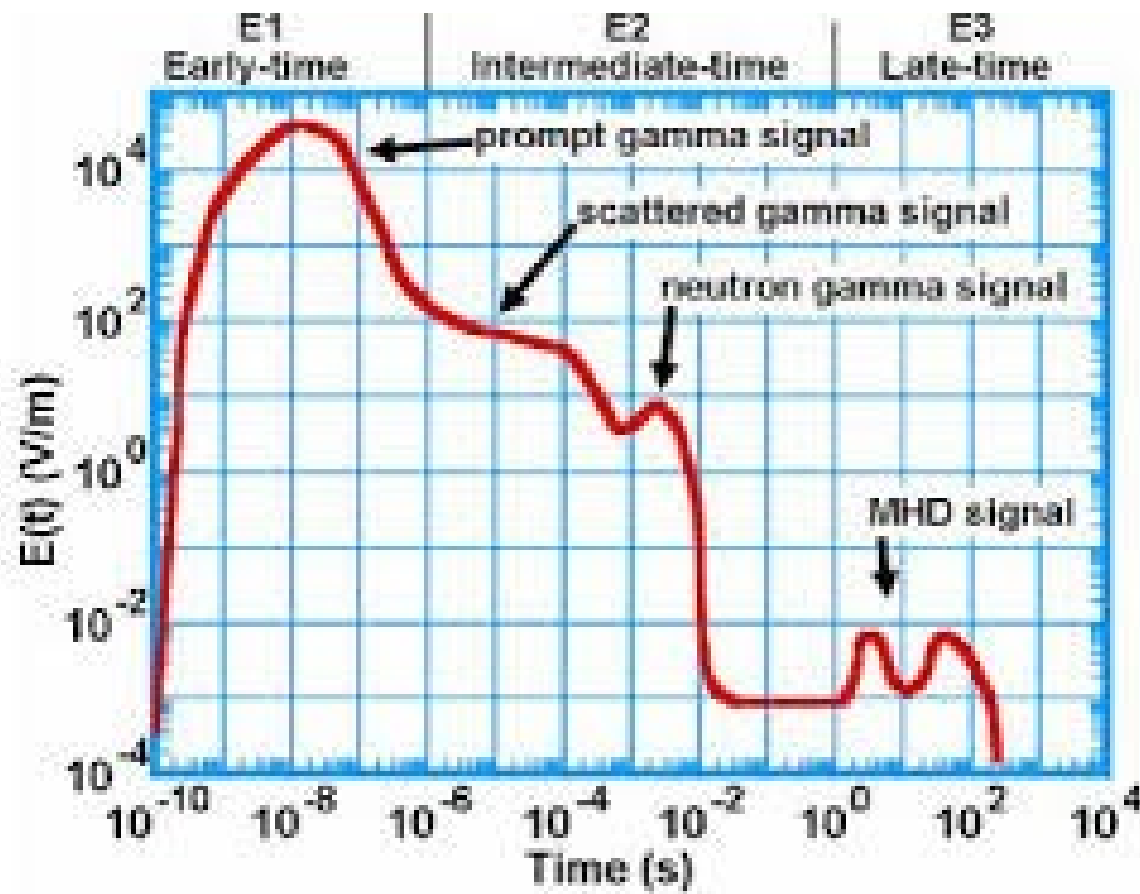


Starfish Prime Event

- 1962, Pacific Ocean
- 250 mile high nuclear explosion, 1.4 megaton
- Impact exceeded expectations & predictions
- Damage to electronics in Hawaii 900 miles away



Three stages



Impacts

- High Voltage
- High Amperage induced currents
- Semiconductors & chips
- Any device with a computers or electronic controller circuits
- Power lines induced currents
- Ham radio HF antennas designed to resonate at frequencies below 100 MHz, and therefore efficiently harvest EMP RF energy
- Minimal injury to humans, animals, and plants

Significant I.T.W.As and variables

- Type of EMP
- Distance (elevation and horizontal)
- Composition of device
- Shielding



Some mitigations related to Ham Radio

- Physical disconnect power and antenna when not in use
- Faraday Cage Enclosures (grounded or not)
- Conventional Lightning Protections including GDT
- Spare communications equipment, sealed up, shielded
- Surge Suppressors on AC power source
- Uninterrupted Power Source devices
- Solar and battery back-up power systems
- Antique or low tech communication devices

Notes:

1. Military EMP event would also require personal Survival Measures
2. Very strong EMP can overpower many of the above listed mitigations



Protective Enclosures in dB

	Static Bag	Ammo Can	Garbage Can	Static bag inside taped Garbage Can
1 MHz	40	>50	>50	>50
10 MHz	19	>50	>50	>50
100 MHz	15	26	>50	>50
250 MHz	17	21	>50	>50
1000 MHz (Gig)	18	28	20	>50

Notes: Remember dB are logarithmic , Source Bradley, table 4-9

Additional Information

- A.T. Bradley, *Disaster Preparedness for EMP Attacks and Solar Storms*
- Dennis Bodson W4PWF, QST, 1986, series of four articles, *EMP and the Radio Amateur*, 15 mitigations
- *Protecting Your Radio Equipment from EMP* (local Harris County ARES website)
- eHam.net, D Garner K4YRK, *EMP a Real Threat to Hams and the USA*
- Fiction novels, *One Second After* (W Forstchen), *One Day After* (W Forstchen), and *Lights Out* (David Crawford)
- YouTube dozens of Prepper demonstrations