

## ELECTROMAGNETIC PULSE (EMP)

The silent killer of most electronic and electrical system

How an electromagnetic pulse (EMP) from an unlikely source can destroy your Electrical/Electronic Equipment

### Lightning is not a stranger to most people.

To protect all electrical/electronic equipment, most people with some knowledge on electrical will know instinctively that they need surge arrestor (MOV) and a very low impedance grounding to divert all surge energy to the earth, but there is a hidden killer known as electromagnetic pulse (EMP) which is able to slip through even with a well-protected surge system.

### What is Electromagnetic Pulse (EMP) and how it was created.

Over the year millions of lightning strikes hit every day and an estimated of more than 40 times per second globally, if we include those which is cloud to cloud lightning the figure will be much higher because the percentage compare to lightning flash and cloud to cloud is 85% against 5%.

As of today there is no clear write out regarding the problem created by **EMP** and therefore let us take a closer look at what we are facing and how to prevent it.

### What is Electromagnetic Pulse (EMP) ?



Figure 1:

In this Figure we could see that the energy build up in the thunder cloud and there is another energy build up within the ground to match.

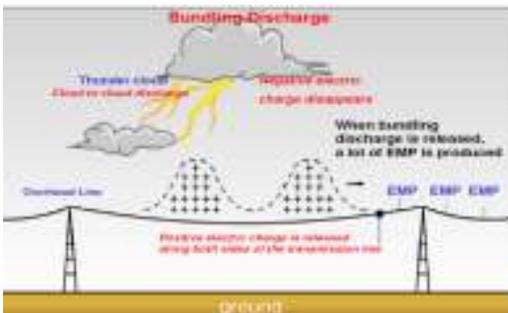
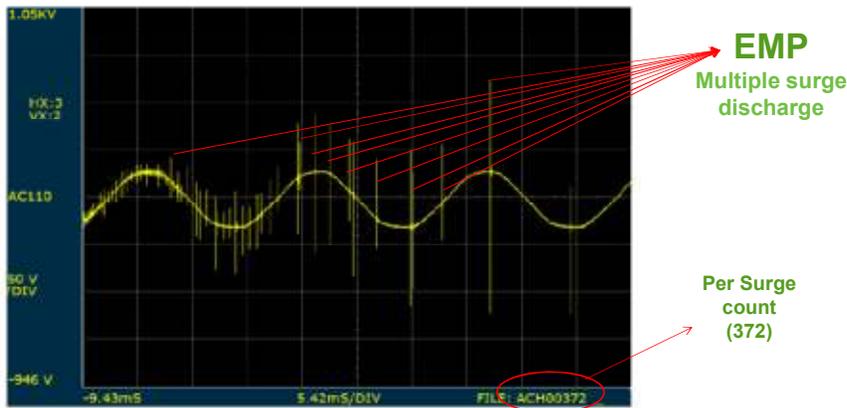


Figure 2:

In this Figure we could see that the buildup energy within the thunder cloud was release to a much closes positive electric charge, and therefore the extra energy build up in the ground was release due to the discharge in the cloud also and EMP is created.

### Bundling discharge cause EMP on AC power



As per above we can confirm that EMP can be created by lightning, but at such low energy (nano second speed) what can it do and how it kill the electrical/electronic equipment?

Although this hidden energy only generating below < 20KVA, but it come as an multiple wave each and every wave will reduce the live spend of the component which is operating within the equipment, and this is why there is always argument on why there is no lightning during an clear blue sky but the equipment was reported to be faulty due to over voltage.



Out Door System  
Problematic Site, fault reported  
around Bi-monthly



Initial install  
R=0 / Y=0 / B=0



3 Month later  
R=892 / Y=29855 / B=599

Typical site having EMP problem, total surge (>15KVA) recorded to be around 10K hit every month.