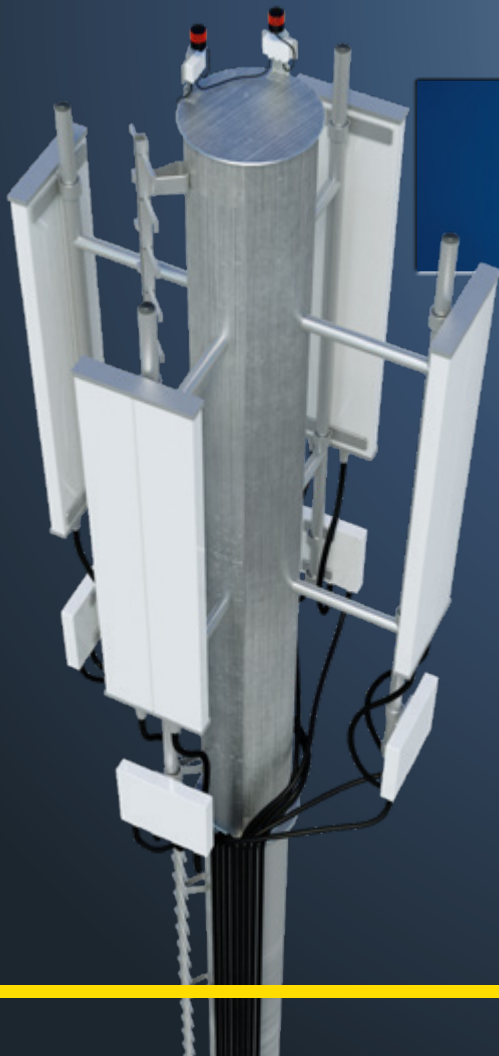




# CITEL

■■■ Reliability in Surge Protection ■■■

## Surge Protection *for* Wireless Infrastructure



# CITEL, the global solutions provider



Since 1937, Citel has been an innovator in the field of Surge Protection.

Today, Citel is a global leader in the development of reliable and adapted Surge Mitigation Solutions for critical applications.

- Over 1 Billion Lines Protected
- Local support in over 200 countries
- High Current R&D Laboratories at your disposal

Citel is unique as a manufacturer of Surge Protective Components (SPC's), Surge Protective Devices (SPD's) and coordinated protection systems.

## THREAT

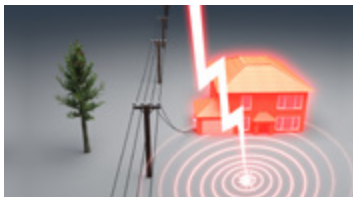
### \$26B in losses due to Power Surges

Today's increased reliance on very sensitive electronics and processes make surge protection an important discussion topic in order to avoid catastrophic business losses. The Insurance Institute for Business & Home Safety study found that \$26 billion dollars was lost due to non-lightning power surges. In addition, there are about 25 million lightning strikes in the US each year that cause between \$650M to \$1B in losses according to the Insurance Information Institute, State Farm®.

1. Direct Strike



2. Earth Potential rise



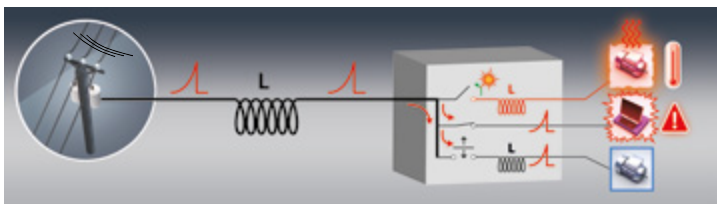
3. Strike on overhead lines



4. Coupling



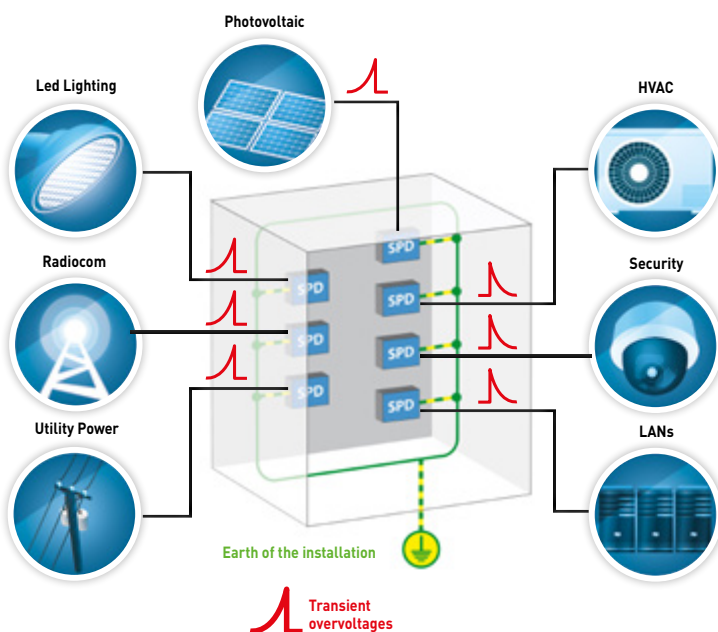
5. Switching



## SOLUTION

### Global Surge Mitigation Concept

Our philosophy is simple – determine your risk and evaluate every line (power or signal) for vulnerabilities. We call this the “box” concept. It works equally well for a single piece of equipment or an entire facility. Once you have determined your “boxes”, it is simple to develop a coordinated protection scheme to eliminate all threats from lightning and switching surges.



CITEL provides a wide range of surge protectors adapted to every network: **AC power, DC power, Telecom, Data and Coaxial**.

# COMMON WIRELESS INFRASTRUCTURE APPLICATIONS

The electronic equipment deployed to build out wireless networks is extremely susceptible to the destruction caused by lightning strikes and other sources of electrical surges. It is important to properly protect this sensitive electronic equipment with surge protection.

## Conventional Cell Towers



TYPICALLY COAXIAL SYSTEMS

- Coaxial protection at top of tower and base station.
- Protection in base station on incoming AC.

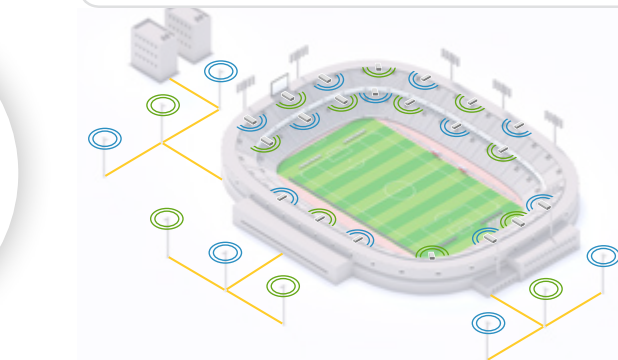
## Remote Radio Head Cell Towers



TYPICALLY FIBER AND -48VDC POWER

- DC Protection of Remote Radio Heads on tower.
- Protection in base station on DC side and incoming AC.

## Distributed Antenna Systems (DAS)



SPATIALLY SEPARATED ANTENNA NODES CONNECTED TO A COMMON TRANSPORT MEDIUM

- Coaxial protection
- Protection of Remote Radio Heads.
- Protection in base station on DC side and incoming AC.
- Ethernet protection

## Small Cells-5G



TYPICALLY FIBER AND AC / DC POWER

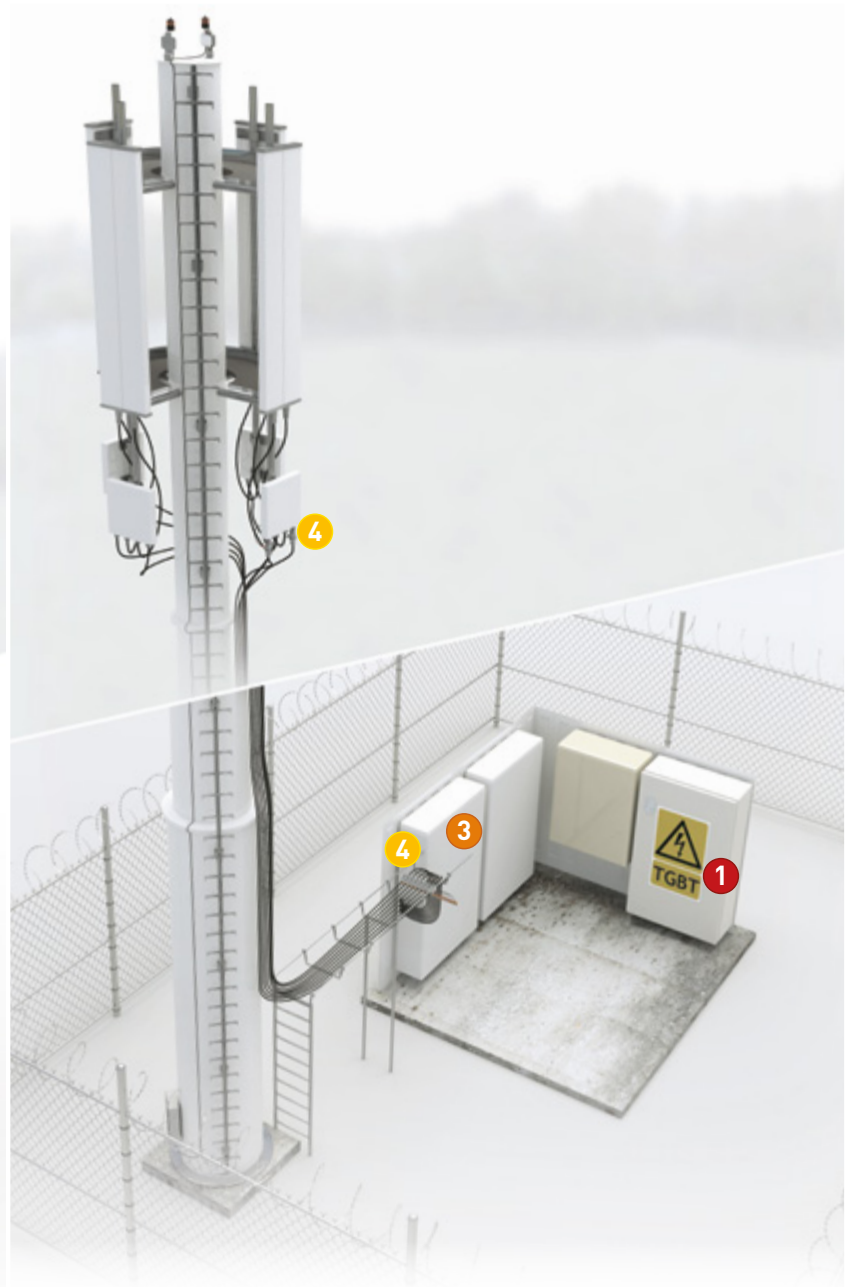
- AC or DC Protection of Remote Radio Heads.
- Protection at incoming AC panel.
- POE Protection



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# SURGE PROTECTION LOCATION EXAMPLE



## Location/Description/Model

- |                             |   |             |
|-----------------------------|---|-------------|
| AC Surge Protector - Type 1 | 1 | MS200       |
| AC Surge Protector - Type 2 | 2 | M50         |
| Ethernet Surge Protector    | 3 | MJ8         |
| RF Coaxial Surge Protector  | 4 | PRC822S     |
| DC Power Surge Protector    | 5 | DS230S-48DC |



# RECOMMENDED PRODUCTS (TECHNICAL CHARACTERISTICS)

## AC and DC Power SPDs



Product Family	DS240	DS70US	M50	MS200
Protection Type	12V to 350V DC Power	AC Power	AC Power	AC Power
Location	Before Remote Radio Head	Incoming AC Panel	Incoming AC Panel	Incoming AC Panel
Maximum Surge Rating - I <sub>max</sub>	20kA to 40kA (8/20μs) per module	75kA (8/20μs) per module	50kA (8/20μs) per phase	220kA (8/20μs) per phase
Nominal Surge Rating - I <sub>n</sub> (UL 1449)	10kA to 20kA (8/20μs)	20kA (8/20μs)	20kA (8/20μs)	20kA (8/20μs)
Features	Din Rail mount, Remote contacts, Replaceable modules	Din Rail mount, Remote contacts, Replaceable modules	LED Indication, audible alarm	LED Indication, audible alarm, remote contacts, surge counter
Approvals	UL 1449 4th Ed. Type 4 Recognized	UL 1449 4th Ed. Open-Type 1 Listed	UL 1449 4th Ed. Type 1/2 Listed	UL 1449 4th Ed. Type 1 Listed

## Ethernet & POE Power Range



Product Family	MJ8	RAK, PCH	CRMJ8, CGMJ8, CMJ8
Protection Type	Indoor Ethernet	Indoor Rackmount Ethernet	Outdoor Pole or Wall Mount Ethernet
Max Surge rating	16kA	Up to 16kA	16kA
Voltage	Up to 60Vdc	Up to 240Vdc	Up to 60Vdc
Main Features	Din Rail mounting, RJ45 Shielded Connectors, Gigabit Ethernet Speed, POE mode A and B	Protection for up to 32 ports, Gigabit Ethernet speed, POE mode A and B	RJ45 Shielded Connectors, Gigabit Ethernet Speed, POE mode A and B, Up to IP67 rating, Pole mount kit
Approvals	UL497B Listed		

## Coaxial SPDs



Product Family	P8AX	PRC	CXP
Protection Type	Gas Discharge Tube - DC Pass	Quarter Wave Filter - DC Block	Hybrid - DC Block
Max Surge rating	20kA	10kA	20kA
Frequency Range	DC to 6GHz	450MHz to 5.8GHz	125 to 1000MHz
RF Power	Up to 780W	Up to 1500W	Up to 190W
Main features	Connectors: N, F, BNC, TNC, 7/16, SMA, etc, Bi-directional, Replaceable GDT	Connectors: N, F, BNC, TNC, 7/16, SMA, etc, Bi-directional	Connectors: N, F, BNC,
Approvals	UL497E Listed		

## Custom Rail and Enclosure Assemblies Available



For additional applications and products contact your local CITELE sales rep.



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