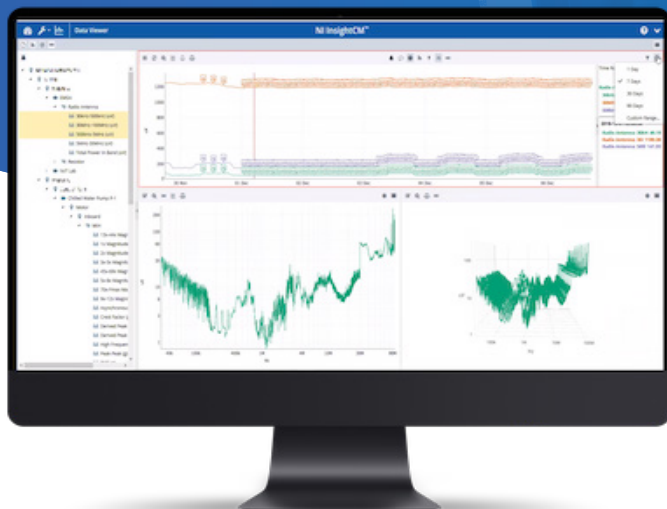




## THE POWER OF INNOVATION

The EMI Monitoring system offers visualization of the spectrum bands and total power bands through National Instruments' InsightCM™ tool. Each system includes one license for InsightCM™. To the left is an example of a screenshot measuring data over time.



## ELECTRO-MAGNETIC INTERFERENCE (EMI) MONITORING

The EMI system monitors abnormalities from energized, high voltage assets. It looks for patterns/signatures in RF spectrum from 30 kHz to 100 MHz to indicate potential failures along the generator, transformer, and the IsoPhase Bus. For generators, the EMI Monitoring system is typically configured to monitoring five (5) RF bands that are indicative of components. Alarms levels are set when power levels within a band exceed a threshold; the thresholds may be configured by the user. The intent is to maximize the detection of EM emissions as a power in spectrum and in total power in band function. The conditions associated with EM emissions detected by the system include:

- **Arcing**
- **Coronal Discharges**
- **Gap Discharges**
- **Partial Discharges**
- **Sparking**

The EMI Monitoring system offers a cost-effective alternative to traditional methods of failure detection. When compared with traditional methods, Cutsforth™ EMI Monitoring offers the following benefits:

- Lower Costs
- Multiple Component Measurements within a single system. For example, measure stator and end-windings and Isophase Bus with a single system rather than multiple systems using invasive couplers and probes
- Holistic view of generator and auxiliary equipment health in one application
- Non-invasive installation, no outage required.



**Radio Frequency Current Transformer (RFCT) installed on the Frame Ground; usually coupled around the Generator to Neutral Ground connection.**

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See More @ [Cutsforth.com/EMI](https://cutsforth.com/EMI)

For more information, contact us:

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# TECHNICAL SPECIFICATIONS



Cutsforth™ has created an automated assessment classification algorithm. The tool automatically categorizes time domain waveforms. Each frequency range is associated with certain failure modes. The system can alert key personnel when EMI increases. Tables are trendable and these features are available in the EMSA platform (example screenshots shown below). This computerized system means that analysis no longer needs to be done manually.

## GENERATORS:

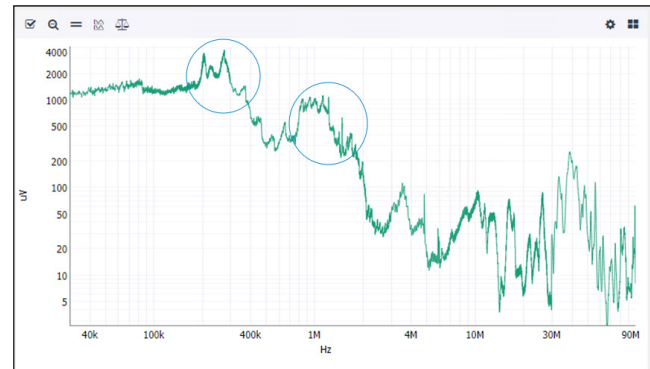
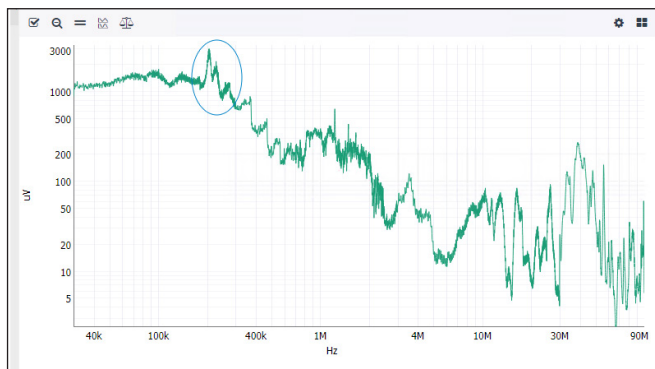
- **Band 1:** Exciter and Collector (typically set 30kHz to 500kHz)
- **Band 2:** Stator Core and Slots area (typically set 500kHz to 5 MHz)
- **Band 3:** End Windings (typically set 5 MHz to 30 MHz)
- **Band 4:** Isophase Bus or other connections (typically set 30 MHz to 100 MHz)
- **Band 5:** Total Power Band to compare generator noise to overall system noise

## TRANSFORMERS:

- Single Total Power Band: Compares total power of the Transformer with the total power of the Generator

Thresholds are User Defined and set in Microvolts (uV). Typically, 3 levels are used.

- Below 1000 uV—no issues present
- Between 1000 uV and 10,000 uV—growing issue that demands observation
- Above 10,000 uV—remedial action required



Close up of a Power Spectrum before an event (figure to the left), and during an event (figure to the right). Notice the added spikes occurring during this event.

The Assessment Tables show numbers before (table above) and during (table below) an event. Several frequency ranges show sharp increases.

Using the Assessment Table plant personnel are able to identify and resolve failure modes associated with the increased values.

Range	Noise	Corona	Tone	Discharge	Arcing	RMS
30kHz-500kHz	0.5443	0.3224	0.5109	0.5896	0.1732	735.9084
500kHz-5MHz	0.7516	0.0612	0.0539	0.7886	0.0172	80.3582
5MHz-30MHz	0.9208	0.0248	0.0559	0.8459	0.0218	11.1553
30MHz-100MHz	0.9910	0.0076	0.0000	0.3124	0.0106	7.1241
<hr/>						
Range	Noise	Corona	Tone	Discharge	Arcing	RMS
30kHz-500kHz	0.6428	0.6377	0.3018	0.6826	0.3475	1095.7615
500kHz-5MHz	0.9352	0.6084	0.1161	0.8347	0.3945	253.9154
5MHz-30MHz	0.9252	0.0257	0.1300	0.8631	0.1388	11.4877
30MHz-100MHz	0.9898	0.0107	0.0082	0.3058	0.0118	7.3244