An Update on HPEM standards and the Work of IEC SC 77C in 2018

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Abstract— This paper provides an update on standardization in the fields of High Altitude Electromagnetic Pulse (HEMP) and Intentional Electromagnetic Interference (IEMI) phenomena. In recent years standards pertaining to High Power Electromagnetic (HPEM) environments, protection design and test methods have become increasingly important. This paper will provide an update on some recent developments in HPEM standards.

Keywords-component; *HPEM, IEMI and HEMP*

I. INTRODUCTION

Work on the improvement of standardization for HPEM phenomena is becoming increasingly important as society begins to recognize how heavily it relies on electronics-based technologies. Indeed legislators in the US have begun to recognize the threat from HPEM environments [1] and require infrastructure providers to take action to address it. HPEM standards have been developed to provide consistent and often simplified guidance pertaining to three key areas: environment definition; immunity test methods; and protection design.

This paper will highlight some recent developments in these areas of HPEM standardization with particular reference to the work of the International Electrotechnical Commission (IEC) Sub-Committee 77C [2].

II. DISCUSSION

A. IEC SC 77C Scope of Work

The Scope of Work of IEC SC 77C is presently under review as there is interest in including information on Geomagnetically Induced Current (GIC) environments and protection.

GIC is produced by intense solar activity and some types of geomagnetic disturbance are similar to the E3 component of HEMP. A formal definition of the GIC environment is required and it is anticipated that this could be included in a new edition of IEC 61000-2-10.

Figure 1 shows an estimation of regions of observed geomagnetic field disturbance conditions (delta B) in March 1989 over the northern hemisphere [3]. The GIC produced by this storm caused collapse of the electricity grid in Quebec province, Canada.

B. IEMI Test Methods

Generating the IEMI test environment is often a significant challenge but the IEC has provided a report which acts as a directory of HPEM simulators [5].

Work is currently underway in IEC SC 77C to produce a test method specifically for mesoband and hyperband type disturbances [6].

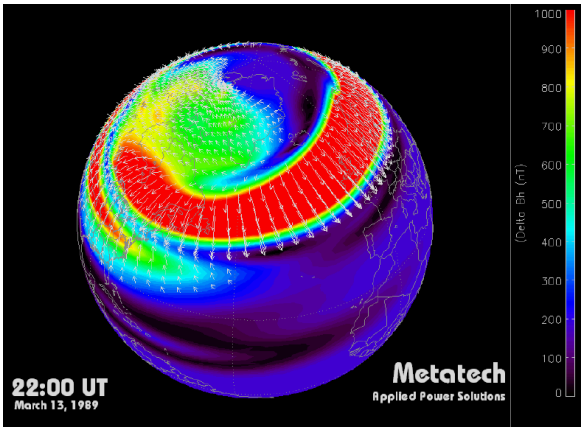

Figure 1. Estimate of one geomagnetic storm-produced disturbances during 1989.

C. HEMP and IEMI Protection Specification

Recently a guide to the application of HEMP and IEMI protection for a new build or an existing facility has been developed [7]. The paper will provide details of this and other important new developments in HPEM standardization.

REFERENCES

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