INTERNATIONAL ELECTROTECHNICAL COMMISSION SYSTEM FOR CERTIFICATION TO STANDARDS RELATING TO EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES (IECEx SYSTEM)

TITLE: Proposal from PTB to Application of IEC 60079-11 to Mobile devices such as Tablet PC and Smartphones

Circulated to: ExTAG – IECEx Testing and Assessment Group

INTRODUCTION

This document contains a proposal from PTB to discuss the application of IEC 60079-11 to Mobile devices such as Tablet PC and Smartphones at the 2016 IECEx ExTAG Meeting in Umhlanga, South Africa.

ExTAG Members are asked to consider the PTB proposal and be ready for discussion at the meeting.

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Questions to the IECEx ExTAG according to mobile electronic equipment

Introduction

The demand for mobile devices like Tablet PC and Smartphones with EPL Gb and Db is growing in industry. Some manufacturers and ExTLs are of the opinion that the standards should be altered because the standards are not matching for that kind of products.

The standards are interpreted by manufacturers and ExTLs in different approaches, therefore in some cases the products do not meet the requirements of IEC 60079-11.

Discussion points to ExTAG

1. **Application of IEC 60079-0 and ff**

   Is it permitted according to IEC 60079-0 and ff to allow relaxations other than explicitly stated in the standards for portable equipment?

2. **Application of IEC 60079-11**

   Explosion-proof smartphones or Tablet PCs with EPL Gb and Db usually are constructed as intrinsically safe equipment acc. to IEC 60079-11. The manufacturer is obliged to take measures, amongst others, that the surface temperature of components (actually mostly ICs) are not exceeding the specified limits, also under fault and worst case conditions, which have to be taken into account. It has to be considered that the energy stored in the battery (e.g. Li-Ion batteries) can be dissipated, so that the temperature limit for small components (200 ºC for temperature class T4) may be exceeded.

   For surface temperature classification, failure of any semiconductor device to a condition where it dissipates maximum power shall be taken into account. IEC 60079-11, clause 7.6, states the requirements to failure of components, connections and separations. It is required in section d) that semiconductor devices to be considered to fail to short circuit or to open circuit and to the state to which they can be driven by failure of other components.

   Instead of application of clause 7.6 an FMEA (Failure Mode Effect Analysis) was performed by a manufacturer. This would be a new and unusual approach for Intrinsic Safety and is not intended in the actual standard. It was reported that such an approach was discussed in the maintenance team for IEC 60079-11 and was not supported due to the high complexity of modern integrated circuits and other reasons.

At the moment it is very difficult to define the state of the art for mobile electronic equipment. The standards should possibly reflect the special needs for this kind of products. Therefore IEC TC 31 intends to install an advisory group for portable equipment.

What is the opinion of the experts of IECEx ExTAG?

Braunschweig, 16th August, 2016