

## Information Note on Intrinsic Safety and the Approvals held for the m-Comm System

The equipment is essentially designated for temporary deployment in rescue or confined space working situations, both above and below ground, where the atmosphere may potentially be hazardous in terms of its flammability. As such, the equipment holds certificates of intrinsic safety for above ground and mining applications in UK/Europe (collectively covered by CENELEC standards including BS EN 50020), the United States (UL 913) and Canada (CSA C22.2 No. 157-92). The US Mine Safety and Health Administration (MSHA) has approved the equipment for use in US coal mines (MSHA ACRI2001- 30 CFR Part 18, Part 23 Approval).

The nature of certification involves assessment of the design control of incensive risks associated with the use of the apparatus under normal and fault conditions, such that the likelihood of an ignition mechanism is sensibly negligible. The same approvals processes also require rigorous standards of labelling be applied to each component of the system. This labelling provides warnings concerning the principal hazards associated with a flammable atmosphere, for example the replacement or recharging of batteries, together with the identification of gas, vapour and flammable dust Classes/Divisions/Groupings against which the apparatus has been assessed and may be used.

There are various national Codes of Practice concerning the assessment, selection and installation of equipment intended for use in flammable atmospheres. These Codes include the following examples:

Section 500 of US National Electrical Code ANSI/NFPA 70-1987  
Part 4 of British Standard BS5345  
Parts 10 and 14 of British Standard BS EN 60079

Users are advised to contact the appropriate National Body responsible for certification for advice on local approval requirements and conditions of use.

### UK IS Certification Approvals

The IS Certification and Mines Inspectorate Approvals for the *m-Comm* system have been granted by the UK Health and Safety Executive, Electrical Equipment Certification Service, Buxton (EECS) and the UK Mines Inspectorate, Bootle. The system has been designed and certified in accordance with CENELEC standards EN500 14 - EN 500 20. The ambient operating temperature range for which the equipment is certified is -20°C to 40°C. The equipment is supplied in compliance with the following IS certificates and approvals:

*m-Comm Handheld Transceiver Unit*  
EEx ia I (H2)/IIC T4  
Baseefa No. Ex 97D2128X/2  
MECS Cert. No. 97D7127X/2  
HSE (M) Appr. No. EAWR20(SIG)236



*m-Comm Base Station Transceiver Unit*

EEx ia I /IIA T1

Baseefa No. Ex 97D2145/2X

MECS Cert. No. 97D7126/2X

HSE (M) Appr. No. EAWR20(SIG)237

The UK Notified Body used currently by RMT is Sira Certification Services.

It is a legal requirement that all users are informed of the following specific safety points:

1. The batteries, for both handheld and base units, must only be charged (in the case of the rechargeable version) or replaced (in the case of the alkaline battery version) in safe areas. Replace the alkaline batteries only with Duracell or Panasonic type batteries. The charger units must not be operated or batteries changed where there is a possibility of a flammable gas, vapour, mist or dust being present. The rechargeable battery charger(s) shall not supply in excess of 0.66A, 100 volts peak and shall have a maximum fault level current of 300A.
2. The earpiece used with the handheld unit must only be of the approved form supplied by RMT, and which bears the appropriate stainless steel certification label.

The apparatus gas group and temperature class for the handset (both rechargeable and primary battery versions) are certified for an atmosphere containing hydrogen. Whilst the gas group and temperature class cover a wide range of flammable materials, checks should be made that the certification is appropriate to the hazardous atmosphere where use is intended. The handsets must not be used in atmospheres containing carbon disulphide or ethyl nitrate. The base unit, which would normally be deployed in safe areas, is restricted to atmospheres containing methane and propane. The base unit must not be used in any location where the atmosphere composition is unknown.

### **Notes on European Certification Developments**

The following notes provide additional information on developments in IS certification and related approvals in the European Union.

Within the European Union, the ATEX Directive (Explosive Atmospheres and Gassy Mines Directive) 94/9/EC came into effect on a voluntary basis on the 1st March 1996, with mandatory effect from 1st July 2003. From 1st July 2003, it is necessary for all products sold in the European Union market to comply with the ATEX Directive. RMT is progressing an application for ATEX certification. In order to comply with the Directive, products submitted for intrinsic safety certification in the United Kingdom are assessed against the requirements of the ATEX Directive, brief details of which are given here.

The category of equipment associated with the *m-Comm* system is Category 1 and Category M1, as follows:

Category 1: (for non-mining use)

Equipment which is:

- intended for use in areas in which explosive atmospheres caused by mixtures of air and gases, vapours, mists or dusts are present continuously or for long periods of time
- capable of providing a very high level of protection against the ignition of an explosive atmosphere even in the event of rare incidents and malfunctions relating to the equipment
- characterised by means of protection which will either:
  - provide an independent second means of protection in the event that the first means should fail, or
  - assure the requisite level protection in the event of two faults occurring independently of each other.

Category M1: (for mining use)

Equipment which is:

- intended for use in mines endangered by firedamp and/or coal dust
- required to remain functional with an explosive atmosphere present
- capable of providing a very high level of protection against the ignition of an explosive atmosphere even in the event of rare incidents and malfunctions relating to the equipment
- characterised by means of protection which will either:
  - provide an independent second means of protection in the event that the first means should fail, or
  - assure the requisite level protection in the event of two faults occurring independently of each other.

Categories 1 and M1 are intended for high risk areas, where an explosive atmosphere is present for long periods and where, for mining equipment, the equipment is intended to remain energised.

The conformity assessment requirements of the ATEX Directive for Category 1 and M1 protective systems are; EC Type Examination plus either (a) Production Quality Assurance or (b) Product Verification, defined as follows:

EC Type Examination - the examination, including testing and inspection where appropriate, of a product design and sample by a Notified Body for conformity with either harmonised European Standards or the essential requirements or a combination of the two.

Product Quality Assurance - the assessment and periodic auditing (including inspection or testing of production samples where appropriate) by a Notified Body of the manufacturer's quality system for compliance with ISO 9002.  
Product Verification - the inspection and/or testing of each production item by a Notified Body for conformity with the type which was subjected to EC Type Examination.

For products that are sold or put into service within the European Union there is also a requirement for CE marking. The assessment of fitness for use of the product and proof of Due Diligence places a responsibility on the manufacturer regarding compliance with the EMC Directive 89/336/EEC as amended by



Directive 92/31/EEC. This came into effect in European Union Member States on 1st January 1996. The manufacturer must carry out a hazard analysis to determine whether the product falls within the scope of the EMC Directive, which places a liability for product safety concerning both emissions and immunity-susceptibility criteria. Where EMC Directive product-specific standards are not implemented, generic standards are applied. Generic electromagnetic compatibility standards for the industrial environment include:

Generic emission standard EN 50081-2:1993  
Generic immunity standard EN 50082-2:1995

Current EMC Directive radio product standards are not considered relevant to the *m-Comm* product, viz. ETS 300 279/A1:1997, Private Land Mobile Radio (PMR) EMC Standard. In terms of emissions, the *m-Comm* apparatus, utilising low frequency inductive communication principles, is electromagnetically benign. There is negligible radiated energy and the equipment has also been designed to have low susceptibility to electromagnetic disturbance.

**US and Canadian IS Certification Approvals (Changes pending - contact RMT)  
UL 913, Fifth Edition  
CAN/CSA C22.2 No. 157-92 (R1997)**

The system has been tested by Intertek Testing Services NA Inc., 24 Groton Avenue, Cortland, NY 13045-2014, USA and an authorisation has been granted for the certified products to carry the ETL mark, with the Listing Report Number 9900128.

The product covered by the Listing Report consists of the *m-Comm* Handheld Transceiver and Base Transceiver which are certified for use in the following:

*m-Comm* Handheld Transceiver  
Class I, Division 1, Groups A, B, C, D  
Class II, Division 1, Group E, F, G  
Class III, Division 1  
*m-Comm* Base Transceiver  
Class I, Division 1, Group D  
Class II, Division 1, Group E, F, G  
Class III, Division 1.

The Handheld Transceiver is either powered by a primary battery (Duracell 9Volt, MN 1604 or Eveready Energizer type 522) or a secondary/rechargeable battery (Varta 8/VH860F6). The Base Transceiver is powered by a secondary/rechargeable battery (RS 293-6018, 12 Volts, 700 mAh or Varta 10/VH1000AA).

Where the understanding of the classification of hazardous locations is as follows:

Class I

Locations where there is a danger of explosion due to the presence of a flammable gas or vapour.

Class II

Locations where there is a danger of explosion due to the presence of a flammable dust.

Class III

Location where there is a danger of explosion or flash fire due to presence of flammable fibres or flyings.

With Divisions for each Class:

Division 1

Locations where an explosive mixture of gas, vapour, dust, fibres or flyings, and air may exist under normal operating conditions.

Division 2

Locations where an explosive mixture of gas, vapour, dust, fibres or flyings, and air can exist under abnormal conditions.

Classes I and II Groups:

Class I

Group A: Acetylene

Group B: Butadiene, Hydrogen, Ethylene Oxide, Propylene Oxide

Group C: Acetaldehyde, Ethylene, Cyclopropane, Ether Vapours, UDMH,

Unsymmetrical

Group D: Acetone, Ammonia, Benzene, Butane, Butyl Alcohol, Butyl Acetate, Ethane, Ethyl Acetate, Ethylene Dichloride, Gasoline, Heptane, Hexanes, Isoprene, Methane, Methanol, Ketones, Propanol, Petroleum, Octanes, Pentanes, Propane, Ethanol Propylene, Styrene, Toluene, Vinyl Acetate, Vinyl Chloride, Xylenes

Class II

Group E: Metal Dust includes Aluminium, Commercial Alloys and Magnesium

Group F: Carbon Black, Coal, Charcoal, Coke Dust

Group G: Flour, Starch, Grain Dust

Class III - No Groups

In terms of electromagnetic emission limits, the *m-Comm* system is not an intentional radiator as defined in Federal Regulations FCC CFR 47, Part 15, Subpart C (relating to tunnel radio systems). Where the apparatus is electromagnetically benign in emission terms, it is not considered necessary to participate in the FCC Notification programme. The Federal Communications Commission has no identified technical requirements for EMC susceptibility testing. Parties responsible for equipment compliance are, however, advised to consider susceptibility to interference, and include any necessary warning notes on possible performance degradation due to interference in the product documentation. Permitted transmissions at frequencies which relate to the *m-Comm* system operation should be at a low level in the United States, being primarily assigned to maritime communications.



## **US Mine Safety and Health Administration (MSHA ACRI2001- 30 CFR Part 18)**

Approval has been granted by the US Mine Safety and Health Administration for use of the apparatus in US coal mines as a mine rescue communication system in compliance with MSHA ACRI2001-30 CFR Part 18, Part 23 and 30 CFR Section 49.6(a)(8).

The approval number is 9B-222-0. Primary battery and rechargeable battery version handsets are approved. The conditions of use specified by MSHA are as follows:

- The base and handheld transceiver units containing rechargeable batteries are to be charged in fresh air only.
- Handheld and base transceiver units containing user-replaceable batteries are to be changed in fresh air and powered by Duracell Type MN1604 or Eveready Type 522 alkaline primary batteries only.
- Base transceiver units are approved for use only with plug-in fist microphone part number FMD1.
- Handheld transceiver units are approved for use only with plug-in earpiece part number EPD1.
- The base and handheld transceiver units should not be coupled to blasting circuits.

### **Risk Assessment**

A risk assessment has been carried out on the use of the apparatus in coal mines. The risk assessment and associated recommendations for safe working are given in the *Operator's Manual*, available as a downloadable ".pdf" file from this site. In particular, note is made of the precautions necessary when operating this equipment in the vicinity of electro-explosive devices (EEDs), otherwise known as detonators. These precautions apply to any communications system able to inductively or radiatively transfer energy.



**CAUTIONARY NOTE CONCERNING THE ACCURACY AND CURRENT STATUS  
OF THE INFORMATION GIVEN IN THIS NOTE**

Whilst every endeavour has been made to ensure that the information given in this note is accurate, this document should not be regarded as a definitive statement or explanation of the intrinsic safety approvals or other approvals held or pending concerning the *m-Comm* system. **For current information on the approvals held or pending, and to obtain copies of approval documents, please contact the following:**

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