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Pre – Compliance EMC Test Report 29-04-02

Report compiled by E.A.Tranter of S.S.P. Aras RBH Security Ltd

1. Equipment Under Test – Integra 32 (IRC2000)

1.1 Description of E.U.T.

The **Integra 32** is a microprocessor based board level product designed and manufactured by RBH Ltd based in Canada. The system tested comprised of a single microprocessor based controller board. The controller board was mounted in a sheet metal fabricated, hinge lidded enclosure containing a mains powered 12 VDC 1.25 A linear Standby Power Supply, supplying DC power to the Integra 32 and a proximity reader, The enclosure and power supply were designed in the U.K. The enclosure is manufactured in Canada and the power supply, enclosure and Integra 32 board are assembled and tested in the UK.

2. Test Configuration

All tests were carried out with two Integra 32, as described in 1.1, interconnected to each other, via an RS485 bus operating at 9600 baud, interconnection being via four wire (2 x pairs) shielded cable. The Integra 32 communicated to a PC, which contained the Operating System, via an RS232 interface. During the tests detailed in Table 1, system operation was monitored by regularly reading proximity cards via an AWD Proximity Card Reader, this operation was monitored by the PC recording successful/unsuccessful card reads and insodoing exercising the Integra 32 controller, The reader was located outside the screened room for emissions tests, as this Reader has been independently tested as compliant with ETS 300 330 Radio Equipment and Systems, Short Range Devices. The Integra 32 system tested was a typical, configuration and the time allotted did not allow for all input and output configurations to be tested during the tests described. **It must be noted that the results of these tests only apply to this combination of hardware as the design specifications for the Enclosure and 12VDC Standby Power Supply are based on previous, successful EMC testing.**

2.1 Test Site – DB Technology Ltd. Tests were carried out on **13-09-01**. Emission and RF Immunity testing being conducted in a semi anechoic screened room in accordance with the specifications detailed in table 1

Table 1

Tests Performed	Specification	Results
Radiated Emissions	EN50081-1	Pass, see report
Conducted Emissions	EN50081-1	Pass
RF Field Immunity	EN50082-2	Pass
Conducted Immunity	EN61000-4-6	Pass
Mains Surge Tests	EN50082-2	Pass
Electrical transients	EN61000-4-4	Pass
ESD	EN61000-6-2	Pass
Harmonics	EN61000-3-2	Pass

3. Results

3.1. Radiated Emissions – The E.U.T as detailed in para 2.1 were scanned for RF emissions With the system configured as described in para 2.

Cables entering or leaving the enclosures act as aerials and will therefore pick up a broad spectrum of RF noise generated by the Integra 32. To counter this it was necessary to suppress the RF noise which would otherwise have caused the E.U.T. to exceed the Permitted emission levels. Therefore **all** cables that entered or left the enclosures did so via RF Suppressor modules, the installation method for these modules being described in Section 5 of this report. By using this RF suppression method, this test configuration was able to just meet the required pre-compliance emissions criteria.

As can be seen from Table 1, the remainder of the EMC tests carried out on the E.U.T were found to be satisfactory

4. Conclusions.

In general the equipment operated satisfactorily when subjected to the range of immunity tests detailed in Table 1. However Radiated Emissions from the Integra 32 system initially exceeded the allowable levels for **pre compliance** testing. Note these levels must be 10 dB down from the allowable limits when using the pre compliance test method, which is carried out in an anechoic screened room, as they are lower than would be obtained when carrying out the actual compliance test defined in the standard which requires these emissions to be measured using the more sensitive Open Area Test Site method. The Radiated Emissions tests were carried out for various combinations of screen cable earthing and fitting of the RF Suppressor Modules. Only by earthing the screens of the RS232, RS485 and Reader cables in conjunction with fitting an RF Suppressor Module to each of these cables at the enclosures entry / exit points did the E.U.T.'s emission levels marginally pass the specification, as can be seen from the attached Radiated Emission plots.

Based on the results obtained from these pre-compliance tests and with the provisions that a) **The RF suppression procedures specified in section 5 are strictly adhered to** and b) due to the marginal RF Emissions results and the fact that there have been changes in board hardware and software since these tests were carried out, the RF Emissions test should be repeated. On this basis it is a reasonable to self certify the Integra 32 equipment, in the configuration defined, as compliant with the requirements of the EMC Directive and therefore a CE mark can be applied to the equipment. It should be noted that any other changes to the Hardware and or Software of the tested configuration that could affect its EMC performance would require the new configuration to be re-submitted for full EMC approval testing.

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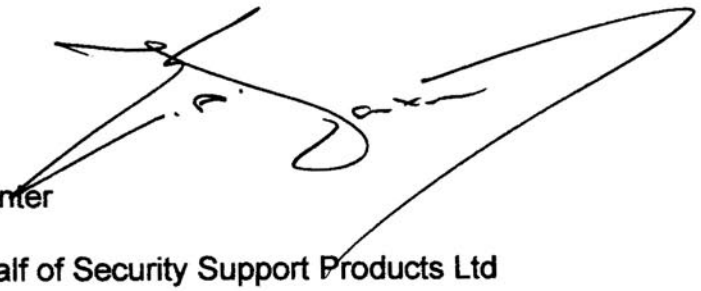
5. Installation Procedures.

As referred to in para 3.1 all cables entering and or leaving the Enclosure must do so via an RF Suppressor Module (RFSM). Specifically these cables will include Mains Input, RS223, RS485, Reader and DC power connections.

The RFDM consists of a printed circuit board onto which is mounted a Ferrite Tube Suppressor, a cable screen earth point and an isolating capacitor and link, this link is either left in or cut. Table 1, RF Suppressor Fitting details the case/cable combinations require the link to be in or out (cut). The RFSM's are to be fitted to the M4 x 10 earthing stud adjacent to the selected 20mm cable gland knockouts that are positioned around the enclosure sides



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On behalf of Security Support Products Ltd

Integra 32 (IRC2000), RF Suppression Module Fitting

For this equipment to comply with the EMC Directive all cables entering or leaving the Integra 32 enclosure must do so via an RF Suppression Module (RFSM) The cables used for RS232, RS485 and Reader connections MUST include a screen, preferably braided type. RFSM's are fitted with a wire link option which is either left as delivered or cut to remove in accordance with Table 1 as follows;

Table 1 - RFSM Link Options

Enclosure	RS232 cable	RS485 cable	Reader cable
Master	Out (Cut)	In	In
Slave	N/A	Out (Cut)	In

Screened Cable Preparation

1) Strip back and remove the outer insulation, sufficient to enable at least 2 x turns to be made through the ferrite tube.

2) Strip back the screen foil and drain wire/s to the point where the outer insulation has been stripped, discard the foil Where braided sceen has been used, unravel back to the outer insulation point cut the braid back leaving only just sufficient to connect to the earth bonding pint on the module.

3) Fit the module to the M4 case stud via a case earthing stud as shown below and bring the cable through its adjacent knockout/gland. Note that the cable must ONLY enter or leave the enclosure by the shortest possible route, therefore do **not** pass wires through a suppressor ferrite that have entered the case via a non adjacent knockout.

4) Loop the prepared cable wires through the ferrite's apature twice as shown in the diagram bellow.

5) Wrap the Drain wire / wire Braid around the M4 screw on the RFSM and tighten.

RFSM Schematic