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## **REPORT ON**

Limited FCC CFR 47: Parts 15 and 24 Testing in support of an  
Application for Permissive Change to Grant of Equipment Authorisation  
of an Intermec 700C and RFID

FCC ID: EHASMC46 & EHARFID915PCC-6

Report No OR613256/02 Issue 2

December 2004

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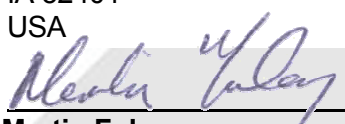
Report No OR613256/02 Issue 2

November 2004

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**DATED**

23<sup>rd</sup> December 2004

**DISTRIBUTION**

Intermec Technologies Corporation  
BABT

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**ENGINEERING STATEMENT**

The measurements shown in this report were made in accordance with the procedures described on test pages.  
All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47:  
Parts 15 and 24. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

  
J Holcombe

  
G Lawler



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## **SECTION 1**

### **REPORT SUMMARY**

Limited FCC CFR 47: Parts 15 and 24 Testing in support of an Application for Permissive Change to Grant of Equipment Authorisation of an Intermec 700C and RFID

Report OR613256-02 Issue 2 replaces OR613256-02 Issue 1. The FCC ID for the RFID was incorrect in the previous report.

**1.1 STATUS**

|                                      |                                                                                                                                                                                                                      |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EQUIPMENT UNDER TEST                 | Intermec 700C and RFID                                                                                                                                                                                               |
| OBJECTIVE                            | To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.                                                                                                         |
| NAME AND ADDRESS OF CLIENT           | Intermec Technologies Corporation                                                                                                                                                                                    |
| TYPE NUMBER                          | Intermec 700C and RFID                                                                                                                                                                                               |
| PART NUMBER                          | Intermec 700C and RFID                                                                                                                                                                                               |
| SERIAL NUMBER                        | 700C: 18190400035<br>RFID: Unserialised                                                                                                                                                                              |
| HARDWARE VERSION                     | 700C: 701A<br>RFID: V1.0                                                                                                                                                                                             |
| DECLARED VARIANTS                    | None                                                                                                                                                                                                                 |
| TEST SPECIFICATION<br>/ISSUE / DATE  | FCC CFR 47: Part 15, Subparts B and C, August 2002<br>FCC CFR 47: Part 24, Subpart E, January 2001                                                                                                                   |
| NUMBER OF ITEMS TESTED               | One                                                                                                                                                                                                                  |
| SECURITY CLASSIFICATION OF EUT       | Commercial In Confidence                                                                                                                                                                                             |
| INCOMING RELEASE<br>DATE             | Declaration of Build Status<br>17 November 2004                                                                                                                                                                      |
| DISPOSAL<br>REFERENCE NUMBER<br>DATE | Held pending disposal<br>Not Applicable<br>Not Applicable                                                                                                                                                            |
| ORDER NUMBER<br>DATE                 | EMEA                                                                                                                                                                                                                 |
| START OF TEST                        | 9 <sup>th</sup> November 2004                                                                                                                                                                                        |
| FINISH OF TEST                       | 11 <sup>th</sup> November 2004                                                                                                                                                                                       |
| RELATED DOCUMENTS                    | ANSI C63.4 2001. Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. FCC Public Notice document (DA 00-705 released 30 March 2000) |



## **1.2 INTRODUCTION**

The information contained within this report is intended to show limited verification of compliance of the Intermec 700C and RFID to the requirements of FCC Specification Parts 15 and 24.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Intermec Technologies Corporation.



### 1.2.1 DECLARATION OF BUILD STATUS

|                                    |                                                                                                                              |  |  |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------|--|--|
| <b>MANUFACTURER</b>                | Intermec Technologies Corporation                                                                                            |  |  |
| <b>COUNTRY OF ORIGIN</b>           | Singapore                                                                                                                    |  |  |
| <b>TYPE</b>                        | 700C                                                                                                                         |  |  |
| <b>PART NUMBER</b>                 | 700C                                                                                                                         |  |  |
| <b>SERIAL NUMBER</b>               | 18190400035                                                                                                                  |  |  |
| <b>HARDWARE VERSION</b>            | 701A                                                                                                                         |  |  |
| <b>FCC ID</b>                      | EHASM46                                                                                                                      |  |  |
| <b>INDUSTRY CANADA ID</b>          | 1223A-SMC46                                                                                                                  |  |  |
| <b>RADIO MODULES INTEGRATED</b>    | MC-46 GSM/GPRS Tri-Band Module                                                                                               |  |  |
| <b>TECHNICAL DESCRIPTION</b>       | The unit supplied for testing is a Intermec 700C Mobile Computer, which offers Tri-Band GSM/GPRS 850/1800/1900 connectivity. |  |  |
| <b>BATTERY/POWER SUPPLY</b>        |                                                                                                                              |  |  |
| <b>MANUFACTURING DESCRIPTION</b>   | Lithium Ion Battery Pack                                                                                                     |  |  |
| <b>MANUFACTURER</b>                | Intermec Technologies                                                                                                        |  |  |
| <b>COUNTRY OF ORIGIN</b>           | USA                                                                                                                          |  |  |
| <b>TYPE</b>                        | Lithium Ion                                                                                                                  |  |  |
| <b>PART NUMBER</b>                 | 318-013-002                                                                                                                  |  |  |
| <b>VOLTAGE</b>                     | 7.2V                                                                                                                         |  |  |
| <b>UK AGENT</b>                    | Intermec Technologies Corporation                                                                                            |  |  |
| <b>RADIO MODULES</b>               |                                                                                                                              |  |  |
| <b>MANUFACTURING DESCRIPTION</b>   | GPRS/GSM Tri-Band Radio Module                                                                                               |  |  |
| <b>MANUFACTURER</b>                | Siemens AG                                                                                                                   |  |  |
| <b>COUNTRY OF ORIGIN</b>           | Germany                                                                                                                      |  |  |
| <b>TYPE</b>                        | MC46                                                                                                                         |  |  |
| <b>POWER</b>                       | 3.2 – 4.5V                                                                                                                   |  |  |
| <b>TRANSMITTER OPERATING RANGE</b> | 824-849 / 1710-1785 / 1900-1910                                                                                              |  |  |
| <b>TRANSMITTER POWER</b>           | 2W (GSM850)<br>1W (GSM1800/1900)                                                                                             |  |  |
| <b>RECEIVER OPERATING RANGE</b>    | 869-894 / 1805-1880 / 1930-1990                                                                                              |  |  |
| <b>INTERMEDIATE FREQUENCIES</b>    | Receiver: 0; Transmitter: 80MHz                                                                                              |  |  |
| <b>EMISSION DESIGNATOR</b>         | GXW                                                                                                                          |  |  |
| <b>DHSS/FHSS/COMBINED</b>          | GSM                                                                                                                          |  |  |
| <b>FCC ID</b>                      | QIPMC46                                                                                                                      |  |  |
| <b>INDUSTRY CANADA ID</b>          | 267W-MC46                                                                                                                    |  |  |
| <b>ANCILLARIES</b>                 |                                                                                                                              |  |  |
| <b>MANUFACTURING DESCRIPTION</b>   |                                                                                                                              |  |  |
| <b>MANUFACTURER</b>                |                                                                                                                              |  |  |
| <b>TYPE</b>                        |                                                                                                                              |  |  |
| <b>PART NUMBER</b>                 |                                                                                                                              |  |  |
| <b>SERIAL NUMBER</b>               |                                                                                                                              |  |  |
| <b>HARDWARE VERSION</b>            |                                                                                                                              |  |  |
| <b>COUNTRY OF ORIGIN</b>           |                                                                                                                              |  |  |
| <b>UK AGENT</b>                    |                                                                                                                              |  |  |

Signature

Scott Holub

Date  
D of B S Serial No17 November 2004  
OR613256

The unit used for the internal photographs in this report was not the EUT, but was supplied as an identical unit for photographs only. It is declared as being the same build status as the EUT.

BABT formally certifies that the manufacturer's declaration as reproduced in this report, is a true and accurate record of the original received from the applicant.



### 1.2.1 DECLARATION OF BUILD STATUS

|                             |                                                                                                                                    |  |  |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------|--|--|
| MANUFACTURER                | Intermec Technologies Corporation                                                                                                  |  |  |
| COUNTRY OF ORIGIN           | USA                                                                                                                                |  |  |
| TYPE                        | IP3                                                                                                                                |  |  |
| PART NUMBER                 | IP3                                                                                                                                |  |  |
| SERIAL NUMBER               | Unserialised                                                                                                                       |  |  |
| HARDWARE VERSION            | V1.0                                                                                                                               |  |  |
| FCC ID                      | EHARFID915PCC-6                                                                                                                    |  |  |
| INDUSTRY CANADA ID          | 1223A-RFIDPCC6                                                                                                                     |  |  |
| RADIO MODULES INTEGRATED    | IM3                                                                                                                                |  |  |
| TECHNICAL DESCRIPTION       | The unit supplied for testing is a Intermec IP3 RFID scan handle, which attaches to and is controlled by the 700C Mobile Computer. |  |  |
| BATTERY/POWER SUPPLY        |                                                                                                                                    |  |  |
| MANUFACTURING DESCRIPTION   | Lithium Ion Battery Pack                                                                                                           |  |  |
| MANUFACTURER                | Intermec Technologies                                                                                                              |  |  |
| COUNTRY OF ORIGIN           | USA                                                                                                                                |  |  |
| TYPE                        | Lithium Ion                                                                                                                        |  |  |
| PART NUMBER                 | 318-014-001                                                                                                                        |  |  |
| VOLTAGE                     | 3.6V                                                                                                                               |  |  |
| UK AGENT                    | Intermec Technologies Corporation                                                                                                  |  |  |
| RADIO MODULES               |                                                                                                                                    |  |  |
| MANUFACTURING DESCRIPTION   | 915 MHz RFID PC Card                                                                                                               |  |  |
| MANUFACTURER                | <u>Intermec</u>                                                                                                                    |  |  |
| COUNTRY OF ORIGIN           | USA                                                                                                                                |  |  |
| TYPE                        | IM3                                                                                                                                |  |  |
| POWER                       | 2.8 – 4.1V                                                                                                                         |  |  |
| TRANSMITTER OPERATING RANGE | 902-928 MHz                                                                                                                        |  |  |
| TRANSMITTER POWER           | 1W                                                                                                                                 |  |  |
| RECEIVER OPERATING RANGE    | 902-928 MHz                                                                                                                        |  |  |
| INTERMEDIATE FREQUENCIES    | Receiver = 0    Transmitter = 0                                                                                                    |  |  |
| EMISSION DESIGNATOR         | 375K K1D                                                                                                                           |  |  |
| DHSS/FHSS/COMBINED          | FHSS                                                                                                                               |  |  |
| FCC ID                      | EHARFID915PCC-6                                                                                                                    |  |  |
| INDUSTRY CANADA ID          | 1223A-RFIDPCC6                                                                                                                     |  |  |
| ANCILLARIES                 |                                                                                                                                    |  |  |
| MANUFACTURING DESCRIPTION   |                                                                                                                                    |  |  |
| MANUFACTURER                |                                                                                                                                    |  |  |
| TYPE                        |                                                                                                                                    |  |  |
| PART NUMBER                 |                                                                                                                                    |  |  |
| SERIAL NUMBER               |                                                                                                                                    |  |  |
| HARDWARE VERSION            |                                                                                                                                    |  |  |
| COUNTRY OF ORIGIN           |                                                                                                                                    |  |  |
| UK AGENT                    |                                                                                                                                    |  |  |

**Signature**

**Date**  
**D of B S Serial No**

Scott Holub  
17 November 2004  
OR613256

The unit used for the internal photographs in this report was not the EUT, but was supplied as an identical unit for photographs only. It is declared as being the same build status as the EUT.

BABT formally certifies that the manufacturer's declaration as reproduced in this report, is a true and accurate record of the original received from the applicant.



### 1.3 BRIEF SUMMARY OF RESULTS

A brief summary of the tests carried out is shown below.

| Test | Spec Clause   | Test Description   | Result | Levels/Comments |
|------|---------------|--------------------|--------|-----------------|
| 2.1  | 15.247/24.238 | Radiated Emissions | Pass   |                 |



## **1.4 PRODUCT INFORMATION**

### **1.4.1 Technical Description**

The Equipment Under Test (EUT) was an Intermec 700C, which offers Tri-Band GSM/GPRS 850/1800/1900 connectivity, and an RFID handle which incorporates a short range device.

The terminal utilizes the approved Siemens AG MC46 GSM/GPRS 850/1800/1900 Module. FCC ID numbers are detailed in Section 1.2.1 "Declaration of Build Status".

### **1.4.2 Modes of Operation**

Modes of operation of the EUT during testing were as follows:

Applicable testing was carried out with the EUT transmitting at maximum power or receiving as detailed in Section 1.5.3.

### **1.4.3 Test Configuration**

#### **1.4.3.1 Test Configuration – RFID Mode**

RFID and GSM1900

Transmitting Simultaneously on the following frequencies;

| RFID      | GSM1900   | Test Mode |
|-----------|-----------|-----------|
| 902.65MHz | 1909.8MHz | 1         |
| 927.5MHz  | 1850.2MHz | 2         |

## **1.5 TEST CONDITIONS**

The EUT was set-up simulating a typical user installation on the Alternative Open Field Test Site identified in Appendices A and tested in accordance with the applicable specification.

For all tests, the Intermec 700C was powered by an AC/DC power adapter and the RFID was powered by its own internal battery.

## **1.6 DEVIATIONS FROM THE STANDARD**

Not Applicable

## **1.7 MODIFICATION RECORD**

Not Applicable



## **SECTION 2**

### **TEST DETAILS**

Limited FCC CFR 47: Parts 15 and 24 Testing in support of an Application for Permissive Change to Grant of Equipment Authorisation of an Intermec 700C and RFID



## **2.1 RADIATED EMISSIONS**

### **2.1.1 Specification Reference**

FCC CFR 47: Part 15 Subpart C, Section 15.209  
FCC CFR 47: Part 15 Subpart C, Section 15.247  
FCC CFR 47: Part 24 Subpart E, Section 24.238

### **2.1.2 Equipment Under Test**

Intermec 700 C and RFID

### **2.1.3 Date of Test**

10<sup>th</sup> November 2004

### **2.1.4 Test Equipment Used**

The major items of test equipment used for the above tests are identified as “Section 2.1” within the Test Equipment Used table shown in Section 3.1.

### **2.1.5 Test Procedure**

Test Performed in accordance with ANSI C63.4.

In order to determine the Radiated Emission Limits, measurements of transmitter power (P) were first carried out on the top, middle and bottom channels using a peak detector, and the results are shown in the following table.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under Alternative Open Site conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 20GHz were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.



## 2.1 RADIATED EMISSIONS – continued

### 2.1.6 Test Results

The measurements of transmitter power on top and bottom channels are detailed in the table below.

| Freq<br>MHz   | Res<br>BW<br>Hz | Vid<br>BW<br>Hz | Ant<br>Pol<br>V/H | Ant<br>Hgt<br>cm | EUT<br>Azm<br>Deg | Raw<br>PEAK<br>dBμV | Cable loss /<br>Amp gain<br>dB | Antenna<br>Factor<br>dB | Result<br>Peak<br>dBμV/m |
|---------------|-----------------|-----------------|-------------------|------------------|-------------------|---------------------|--------------------------------|-------------------------|--------------------------|
| Tx Channel 7  |                 |                 |                   |                  |                   |                     |                                |                         |                          |
| 902.6         | 1M              | 1M              | V                 | 100              | 005               | N/A                 | N/A                            | N/A                     | 129.7                    |
| Tx Channel 73 |                 |                 |                   |                  |                   |                     |                                |                         |                          |
| 927.4         | 1M              | 1M              | V                 | 100              | 000               | N/A                 | N/A                            | N/A                     | 127.7                    |

The limit for spurious emissions in accordance with FCC 47CFR 15.247 is 20db down on the carrier where carrier is measured in dBμV/m (equating to the least stringent limit).

Using the results obtained on the two channels the following limits were calculated:

Bottom Channel 7: 129.7dBμV/m – 20dB = 109.7dBμV/m

Top Channel 777: 127.7dBμV/m – 20dB = 107.7dBμV/m

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following table. These were determined to be the least stringent limit to be applied for dual transmitters.

#### Abbreviation for Table

|         |                      |
|---------|----------------------|
| Res BW  | Resolution Bandwidth |
| Vid BW  | Video Bandwidth      |
| Ant Pol | Antenna Polarisation |
| Ant Hgt | Antenna Height       |
| Azm     | Azimuth              |
| V       | Vertical             |
| H       | Horizontal           |



## 2.1 RADIATED EMISSIONS - continued

### 2.1.6 Test Results - continued

#### **30MHz – 20GHz Frequency Range**

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C Section 15.209, FCC CFR 47: Part 15 Subpart C Section 15.247 and FCC CFR 47: Part 24, Subpart E, 24.238 for Radiated Emissions (30MHz – 20GHz).

#### **EUT Tx in Test Mode 1**

Measurements were made with the EUT in RFID 902.6MHz and GSM 1900 1909.0MHz Mode 1. As no emissions other than those previously detected and measured could be found (other than RFID carrier) no formal measurements were made.

#### **EUT Tx in Test Mode 2**

Measurements were made with the EUT in RFID 927.5MHz and GSM 1900 1805.0MHz Mode 2. Other than those emissions stated below and RFID carrier, no other emissions other than those previously detected and measured could be found.

| Frequency | Antenna<br>Polarisation | Height | Azimuth | Peak Field<br>Strength |
|-----------|-------------------------|--------|---------|------------------------|
| MHz       | H/V                     | cm     | deg     | dB $\mu$ V/m           |
| 304.8     | V                       | 121    | 016     | 75.0                   |
| 304.8     | H                       | 100    | 260     | 80.0                   |
| 622.1     | V                       | 100    | 353     | 78.2                   |



## 2.1 RADIATED EMISSIONS - continued

### 2.1.7 Set Up Photograph



Radiated Emissions Set Up Photograph



### **SECTION 3**

#### **TEST EQUIPMENT USED**



### 3.1 TEST EQUIPMENT USED

| Instrument         | Manufacturer    | Type No | Serial No   | EMC No | Cal. Due Date |
|--------------------|-----------------|---------|-------------|--------|---------------|
| <b>Section 2.1</b> |                 |         |             |        |               |
| Spectrum Analyser  | Hewlett Packard | 8542E   | 3617A00165  | 2286   | 18/05/2005    |
| Bilog Antenna      | Schaffner       | CBL6143 | 5101        | 2965   | 12/09/2005    |
| Low Noise Amp      | Miteq Corp      | AMF-3d- | UNK         | 2457   | TU            |
| SolidState Amp     | Avantek         | AWT-180 | F13365 8452 | 1081   | 26/06/2005    |
| Signal Amplifier   | Avantek         | AMT-261 | 6669        | 2072   | 25/06/2005    |
| Emco 3115 DRG      | Emco            | 3115    | 97015079    | 2397   | 07/07/2005    |
| Emi Test Receiver  | Rohde & Schwarz | ESIB26  | 100212      | 2988   | 08/04/2005    |



### 3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

| Test Discipline                          | Frequency / Parameter   | MU     |
|------------------------------------------|-------------------------|--------|
| Radiated Emissions, Bilog Antenna, AOATS | 30MHz to 1GHz Amplitude | 5.1dB* |
| Radiated Emissions, Horn Antenna, AOATS  | 1GHz to 40GHz Amplitude | 6.3dB* |

Worst case error for both Time and Frequency measurement 12 parts in  $10^6$ .

\* In accordance with CISPR 16-4



## **SECTION 4**

### **EUT PHOTOGRAPHS**



#### 4.1 EUT PHOTOGRAPHS



Front View



#### 4.1 EUT PHOTOGRAPHS



Rear View



#### 4.1 EUT PHOTOGRAPHS



Separate Items



## **SECTION 5**

### **ACCREDITATION, DISCLAIMERS AND COPYRIGHT**



## 5.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA  
(Not UKAS Accredited).

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## **APPENDIX A**

### **TITCHFIELD FCC SITE COMPLIANCE LETTER**



**FEDERAL COMMUNICATIONS COMMISSION**

**Laboratory Division  
7435 Oakland Mills Road  
Columbia, MD 21046**

October 18, 2002

Registration Number: 90987

TUV Product Service Ltd  
Segensworth Road  
Titchfield  
Fareham, Hampshire, PO15 5RH  
United Kingdom  
Attention: Kevan Adsetts

Re: Measurement facility located at Titchfield  
Anechoic chamber (3 meters) and 3 & 10 meter OATS  
Date of Listing: October 18, 2002

Gentlemen:

Your request for registration of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC rules. The information has, therefore, been placed on file and the name of your organization added to the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website [www.fcc.gov](http://www.fcc.gov) under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Thomas W Phillips  
Electronics Engineer