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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BABT

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Report No OR613256/02 Issue 2

November 2004

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DATED 23rd December 2004

DISTRIBUTION

Intermec Technologies Corporation	Copy 1
BABT	Copy 2
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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

CONTENTS

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 RFID: Unserialised
HARDWARE VERSION	700C: 701A RFID: V1.0
DECLARED VARIANTS	None
TEST SPECIFICATION /ISSUE / DATE	FCC CFR 47: Part 15, Subparts B and C, August 2002 FCC CFR 47: Part 24, Subpart E, January 2001
NUMBER OF ITEMS TESTED	One
SECURITY CLASSIFICATION OF EUT	Commercial In Confidence
INCOMING RELEASE DATE	Declaration of Build Status 17 November 2004
DISPOSAL REFERENCE NUMBER DATE	Held pending disposal Not Applicable Not Applicable
ORDER NUMBER DATE	EMEA
START OF TEST	9th November 2004
FINISH OF TEST	11th 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

MANUFACTURER	Intermec Technologies Corporation		
COUNTRY OF ORIGIN	Singapore		
TYPE	700C		
PART NUMBER	700C		
SERIAL NUMBER	18190400035		
HARDWARE VERSION	701A		
FCC ID	EHASMC46		
INDUSTRY CANADA ID	1223A-SMC46		
RADIO MODULES INTEGRATED	MC-46 GSM/GPRS Tri-Band Module		
TECHNICAL DESCRIPTION	The unit supplied for testing is a Intermec 700C Mobile Computer, which offers Tri-Band GSM/GPRS 850/1800/1900 connectivity.		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Lithium Ion Battery Pack		
MANUFACTURER	Intermec Technologies		
COUNTRY OF ORIGIN	USA		
TYPE	Lithium Ion		
PART NUMBER	318-013-002		
VOLTAGE	7.2V		
UK AGENT	Intermec Technologies Corporation		
RADIO MODULES			
MANUFACTURING DESCRIPTION	GPRS/GSM Tri-Band Radio Module		
MANUFACTURER	Siemens AG		
COUNTRY OF ORIGIN	Germany		
TYPE	MC46		
POWER	3.2 – 4.5V		
TRANSMITTER OPERATING RANGE	824-849 / 1710-1785 / 1900-1910		
TRANSMITTER POWER	2W (GSM850) 1W (GSM1800/1900)		
RECEIVER OPERATING RANGE	869-894 / 1805-1880 / 1930-1990		
INTERMEDIATE FREQUENCIES	Receiver: 0; Transmitter: 80MHz		
EMISSION DESIGNATOR	GXW		
DHSS/FHSS/COMBINED	GSM		
FCC ID	QIPMC46		
INDUSTRY CANADA ID	267W-MC46		
ANCILLARIES			
MANUFACTURING DESCRIPTION			
MANUFACTURER			
TYPE			
PART NUMBER			
SERIAL NUMBER			
HARDWARE VERSION			
COUNTRY OF ORIGIN			
UK AGENT			

Signature Scott Holub

Date 17 November 2004
D of B S Serial No 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	Intermec		
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 Scott Holub

Date 17 November 2004

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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

10th 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 MHz	Res BW Hz	Vid BW Hz	Ant Pol V/H	Ant Hgt cm	EUT Azm Deg	Raw PEAK dBµV	Cable loss / Amp gain dB	Antenna Factor dB	Result Peak 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 Polarisation	Height	Azimuth	Peak Field Strength
MHz	H/V	cm	deg	dBµV/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
Section 2.1					
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	Avanteck	AWT-180	F13365 8452	1081	26/06/2005
Signal Amplifier	Avanteck	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 under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Thomas W Phillips
Electronics Engineer