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REPORT ON

Limited FCC CFR 47: Parts 15, 22 and 24 Testing in support of an
Application for Grant of Equipment Authorisation
of an Intermec 700C with MC-46 GSM/GPRS Module

Report No OR613256/01 Issue 1 FCC ID: EHASMC46 December 2004

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REPORT ON	Limited FCC CFR 47: Parts 15, 22 and 24 Testing in support of an Application for Grant of Equipment Authorisation of an Intermec 700C with MC-46 GSM/GPRS Module FCC ID: EHASMC46 Report No OR613256/01 Issue 1 December 2004
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APPROVED BY	**C Gould** UKAS Signatory
DATED	3rd December 2004
DISTRIBUTION	Intermec — Copy 1 BABT — Copy 2 Copy No

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, 22 and 24. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

J Holcombe T Guy D Hairsnape G Lawler

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SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Parts 15, 22 and 24 Testing in support of an
Application for Grant of Equipment Authorisation
of an Intermec 700C with MC-46 GSM/GPRS Module

1.1 STATUS

EQUIPMENT UNDER TEST	Intermec 700C
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 550 2nd Steet SE Cedar Rapids IA 52401, USA
TYPE NUMBER	Intermec 700C
PART NUMBER	Intermec 700C
SERIAL NUMBER	1819040035
HARDWARE VERSION	701A
DECLARED VARIANTS	None
TEST SPECIFICATION / ISSUE / DATE	FCC CFR 47: Part 15, Subparts B and C, August 2002 FCC CFR 47: Part 22, Subpart H, January 2001 FCC CFR 47: Part 24, Subpart D, January 2001
NUMBER OF ITEMS TESTED	One
SECURITY CLASSIFICATION OF EUT	Commercial In Confidence
INCOMING RELEASE DATE	Declaration of Build Status
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 Technologies Corporation 700C to the requirements of FCC Specification Parts 15, 22 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	Siemens MC46		
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.

1.3 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	15.207	Conducted Emissions on Power Lines	Pass	
3.1	22.913	Effective Radiated Power	Pass	
3.2	22.917	Radiated Emissions	Pass	
4.1	24.232	Maximum Peak Output Power	Pass	
4.2	24.238	Radiated Emissions	Pass	

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Intermec 700C, which offers Tri-Band GSM/GPRS 850/1800/1900 connectivity.

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 – GSM 850 Mode 1

GSM 850MHz
Transmitting on the following channels and frequencies;
Channel 128: 824.2MHz
Channel 189: 836.4MHz
Channel 251: 848.8MHz

1.4.3.2 Test Configuration – GSM 1900 Mode 2

GSM 1900MHz
Bottom Channel 512: 1850.2MHz
Middle Channel 661: 1880.0MHz
Top Channel 810: 1909.8MHz

1.5 TEST CONDITIONS

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

For all tests, the Intermec 700C was powered by its own internal battery.

1.6 DEVIATIONS FROM THE STANDARD

Not Applicable

1.7 MODIFICATION RECORD

The table below details modifications made to the EUT during the test programme and applies to all configurations. All testing was performed with the EUT in Modification State 0 unless otherwise stated in Section 1.3 and on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	N/A	N/A

SECTION 2

TEST DETAILS

Limited FCC CFR 47: Part 15 Testing in support of an
Application for Grant of Equipment Authorisation
of an Intermec 700C with MC-46 GSM/GPRS Module

2.1 CONDUCTED EMISSIONS ON POWER LINES

2.1.2 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.207

2.1.2 Equipment Under Test

Intermec 700C with MC-46 GSM/GPRS Module

2.1.3 Date of Test

11th 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 5.1.

2.1.5 Test Procedure

Test performed in accordance with ANSI C63.4.

Conducted Emission Measurements were undertaken within the semi-anechoic chamber. Emissions were measured on the Live and Neutral Lines in turn.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines are presented in the tables that follow.

The EUT was powered from a 120V, 60Hz supply.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart C, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

EUT Tx on Bottom Channel (1850MHz) – Live Line

Measurements were made with the EUT in GSM 1900 Mode 2.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1504	43.1	66.0	25.1	56.0
0.1628	40.4	65.3	23.0	55.3
0.2106	51.3	63.2	42.0	53.2
0.2810	43.2	60.8	35.1	50.8
0.3511	39.6	58.9	35.1	48.9
2.6692	36.5	56.0	31.4	46.0

The margin between the specification requirements and all other emissions were 25.0dB or more below the specified Quasi-Peak limit and 32.3dB or more below the Average limit.

EUT Tx on Bottom Channel (1850MHz) – Neutral Line

Measurements were made with the EUT in GSM 1900 Mode 2.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2105	51.7	63.2	42.8	53.2
0.2806	44.3	60.8	37.7	50.8
0.3511	41.5	58.9	37.9	48.9
2.4588	35.1	56.0	29.6	46.0
2.6692	38.1	56.0	33.5	46.0
3.0205	37.7	56.0	32.1	46.0

The margin between the specification requirements and all other emissions were 20.7dB or more below the specified Quasi-peak limit and 16.3dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results - continued

EUT Tx on Middle Channel (1880MHz) – Live Line

Measurements were made with the EUT in GSM 1900 Mode 2.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1508	42.9	66.0	24.7	56.0
0.1616	40.6	65.3	23.0	55.3
0.2107	51.1	63.2	41.8	53.2
0.2808	43.3	60.8	35.2	50.8
0.3514	39.6	58.9	34.9	48.9
2.6694	36.5	56.0	31.4	46.0

The margin between the specification requirements and all other emissions were 24.8dB or more below the specified Quasi-Peak limit and 41.8dB or more below the Average limit.

EUT Tx on Middle Channel (1880MHz) – Neutral Line

Measurements were made with the EUT in GSM 1900 Mode 2.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2105	51.4	63.2	42.5	53.2
0.2806	44.1	60.8	37.6	50.8
0.3511	41.5	58.9	37.8	48.9
2.4588	37.1	56.0	33.8	46.0
2.6692	34.8	56.0	32.3	46.0
3.0205	37.5	56.0	33.3	46.0

The margin between the specification requirements and all other emissions were 21.0dB or more below the specified Quasi-peak limit and 42.5dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart C, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

EUT Tx on Top Channel (1910MHz) – Live Line

Measurements were made with the EUT in GSM 1900 Mode 2.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2106	51.3	63.2	42.5	53.2
0.2809	43.9	60.8	37.6	50.8
0.3512	41.3	58.9	37.9	48.9
0.7024	35.0	56.0	32.7	46.0
2.5988	37.6	56.0	33.2	46.0
2.6694	38.2	56.0	33.6	46.0

The margin between the specification requirements and all other emissions were 18.2dB or more below the specified Quasi-Peak limit and 13.4dB or more below the Average limit.

EUT Tx on Top Channel (1910MHz) – Neutral Line

Measurements were made with the EUT in GSM 1900 Mode 2.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2106	51.7	63.2	42.7	53.2
0.2809	44.2	60.8	37.7	50.8
0.3512	41.5	58.9	37.8	48.9
2.5288	36.4	56.0	31.5	46.0
2.6692	38.1	56.0	33.5	46.0
3.0905	37.2	56.0	32.1	46.0

The margin between the specification requirements and all other emissions were 19.4dB or more below the specified Quasi-peak limit and 14.3dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart C, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

EUT Tx on Bottom Channel (824.2MHz) – Live Line

Measurements were made with the EUT in GSM 850 Mode 1.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1502	44.3	66.0	26.6	56.0
0.2106	50.7	63.2	40.6	53.2
0.2809	43.8	60.8	35.1	50.8
0.3513	39.8	58.9	34.5	48.9
2.8809	35.9	56.0	29.1	46.0
24.872	38.3	60.0	31.4	50.0

The margin between the specification requirements and all other emissions were 21.7dB or more below the specified Quasi-Peak limit and 40.6dB or more below the Average limit.

EUT Tx on Bottom Channel (824.2MHz) – Neutral Line

Measurements were made with the EUT in GSM 850 Mode 1.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1500	44.5	66.0	44.5	56.0
0.2106	50.9	63.2	50.9	53.2
0.2808	44.3	60.8	44.3	50.8
0.3511	41.8	58.9	41.8	48.9
2.5294	40.2	56.0	32.2	46.0
4.8457	38.8	56.0	23.8	46.0

The margin between the specification requirements and all other emissions were 21.4dB or more below the specified Quasi-peak limit and 29.5dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results - continued

EUT Tx on Middle Channel (836.4MHz) – Live Line

Measurements were made with the EUT in GSM 850 Mode 1.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2109	51.6	63.2	42.0	53.2
0.2811	43.5	60.8	35.4	50.8
0.3513	39.5	58.9	34.7	48.9
2.8113	37.6	56.0	30.7	46.0
2.9514	38.8	56.0	29.8	46.0
24.705	27.7	60.0	19.2	50.0

The margin between the specification requirements and all other emissions were 32.3dB or more below the specified Quasi-Peak limit and 30.8dB or more below the Average limit.

EUT Tx on Middle Channel (836.4MHz) – Neutral Line

Measurements were made with the EUT in GSM 850 Mode 1.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2108	52.5	63.2	44.3	53.2
0.2810	45.5	60.8	38.7	50.8
0.3513	41.2	58.9	35.4	48.9
2.5298	40.3	56.0	33.8	46.0
2.6702	40.8	56.0	35.3	46.0
4.8966	29.3	56.0	-	-

The margin between the specification requirements and all other emissions were 26.5dB or more below the specified Quasi-peak limit and 13.4dB or more below the specified Average limit.

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results - continued

EUT Tx on Top Channel (848.4MHz) – Live Line

Measurements were made with the EUT in GSM 850 Mode 1.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.1500	48.3	66.0	30.0	56.0
0.2107	55.7	63.2	46.1	53.2
0.2808	47.6	60.8	37.0	50.8
0.3512	42.3	58.9	35.5	48.9
2.8097	39.0	56.0	32.8	46.0
3.0912	38.1	56.0	30.8	46.0

The margin between the specification requirements and all other emissions were 17.7dB or more below the specified Quasi-Peak limit and 25.8dB or more below the Average limit.

EUT Tx on Top Channel (848.9MHz) – Neutral Line

Measurements were made with the EUT in GSM 850 Mode 1.

Emission Frequency (MHz)	Quasi-Peak Level (dBµV)	Quasi-Peak Limit (dBµV)	Average Level (dBµV)	Average Limit (dBµV)
0.2107	53.8	63.2	45.6	53.2
0.2811	45.7	60.8	36.5	50.8
2.5291	40.4	56.0	36.6	46.0
2.8104	40.8	56.0	35.6	46.0
3.5830	34.7	56.0	30.1	46.0
4.7068	38.4	56.0	-	-

The margin between the specification requirements and all other emissions were 21.1dB or more below the specified Quasi-peak limit and 15.8dB or more below the specified Average limit.

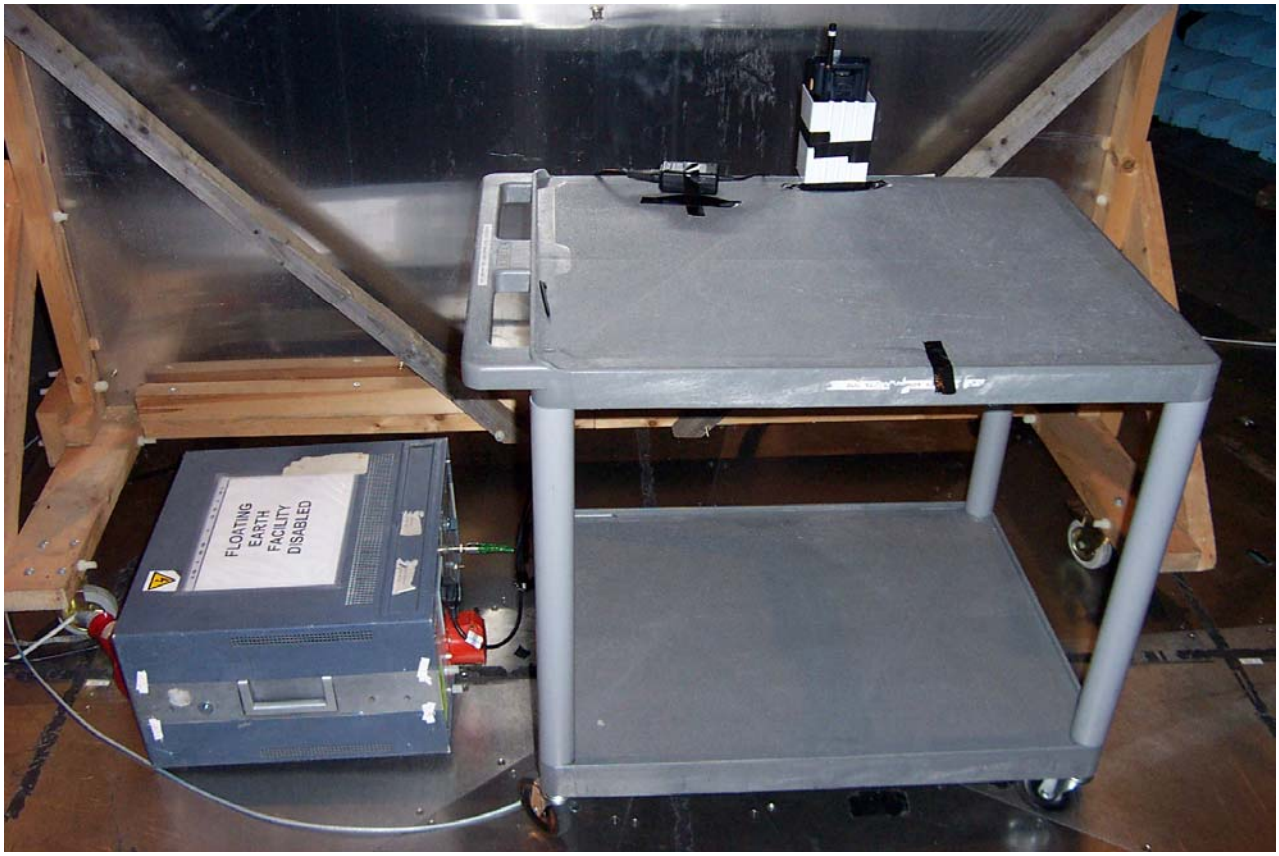
2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.7 Set Up Photographs

Conducted Emissions Set Up Photograph

2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.7 Set Up Photographs - continued



Conducted Emissions Set Up Photograph

SECTION 3

TEST DETAILS

Limited FCC CFR 47: Part 22 Testing in support of an
Application for Grant of Equipment Authorisation
of an Intermec 700C with MC-46 GSM/GPRS Module

3.1 EFFECTIVE RADIATED POWER

3.1.1 Specification Reference

FCC CFR 47: Part 22 Subpart H, Section 22.913

3.1.2 Equipment Under Test

Intermec 700C

3.1.3 Date of Test

11th November 2004

3.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 3.1” within the Test Equipment Used table shown in Section 5.1.

3.1.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, who’s input signal the antenna was adjusted until the received level matched that of the previously detected emission.

3.1 EFFECTIVE RADIATED POWER - continued

3.1.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 22 Subpart H, Section 22.913 for Effective Radiated Power.

Measurements were made with the EUT in GSM 850 Mode 1.

Frequency (MHz)	Raw Result (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dB)	Result ERP (dBm)	Result ERP (mW)
824.70	-1.0	25.7	6.2	31.9	1548.0
835.50	-0.1	26.8	6.4	33.2	2089.0
848.31	-0.9	25.8	6.5	32.3	1698.0

3.1 EFFECTIVE RADIATED POWER - continued

3.1.7 Set Up Photograph

Effective Radiated Power Set Up Photograph

3.2 RADIATED EMISSIONS

3.2.1 Equipment Reference

FCC CFR 47: Part 22 Subpart H, Section 22.917

3.2.2 Equipment Under Test

Intermec 700C

3.2.3 Date of Test

10th November 2004

3.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 3.2” within the Test Equipment Used table shown in Section 5.1.

3.2.5 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 – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 9GHz were then formally measured using Peak and Average Detectors, as appropriate.

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

3.2 RADIATED EMISSIONS - continued

3.2.6 Test Results

The measurements of transmitter power, (P), on top, middle 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 128									
824.18	1M	1M	V	120	175	N/A	N/A	N/A	130.5
Tx Channel 189									
836.40	1M	1M	V	114	181	N/A	N/A	N/A	131.1
Tx Channel 251									
848.85	1M	1M	V	113	164	N/A	N/A	N/A	131.5

The limit for spurious emissions in accordance with FCC 47CFR 22.913 is 43 + 10Log(P) down on the carrier where P is the power in Watts.

The manufacturer's declared power is 2W. The spurious limit is 43 +10Log(P) = dB down on the carrier. The Levels obtained were using a measured power level from the ERP result in section 3.1 of this report.

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

Bottom Channel 128: 130.5dBµV/m – 44.9dB = 85.6dBµV/m

Middle Channel 189: 131.1dBµV/m – 46.2dB = 84.9dBµV/m

Top Channel 251: 131.5dBµV/m – 45.3dB = 86.2dBµV/m

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following tables.

<u>Abbreviation for Table</u>

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

3.2 RADIATED EMISSIONS - continued

3.2.6 Test Results - continued

30MHz – 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917 for Radiated Emissions (30MHz – 1GHz).

In all 3 channels no emissions other than the carrier frequency were detected within 35dB of the limit. No formal measurements were made.

3.2 RADIATED EMISSIONS - continued

3.2.6 Test Results - continued

1GHz – 9GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917 for Radiated Emissions (1GHz – 9GHz).

EUT Tx on Bottom Channel (824.20MHz)

Measurements were made with the EUT in GSM 850MHz Mode 1.

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Limit
MHz	H/V	cm	deg	dBµV/m	
4121.0	V	100	28	58.9	85.6
6953.8	H	100	355	60.5	85.6
7231.0	H	100	358	60.2	85.6
8241.5	H	103	360	65.9	85.6

EUT Tx on Middle Channel (836.40MHz)

Measurements were made with the EUT in GSM 850MHz Mode 1.

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Limit
MHz	H/V	cm	deg	dBµV/m	
4181.0	V	109	28	60.1	84.9
5018.0	V	100	83	55.5	84.9
6956.0	H	100	0	64.0	84.9
7329.0	H	100	360	60.1	84.9
8363.7	H	101	360	61.0	84.9

3.2 RADIATED EMISSIONS - continued

3.2.6 Test Results - continued

1GHz – 9GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 22, Subpart H, 22.917 for Radiated Emissions (1GHz – 9GHz).

EUT Tx on Top Channel (848.85MHz)

Measurements were made with the EUT in GSM 850MHz Mode 1.

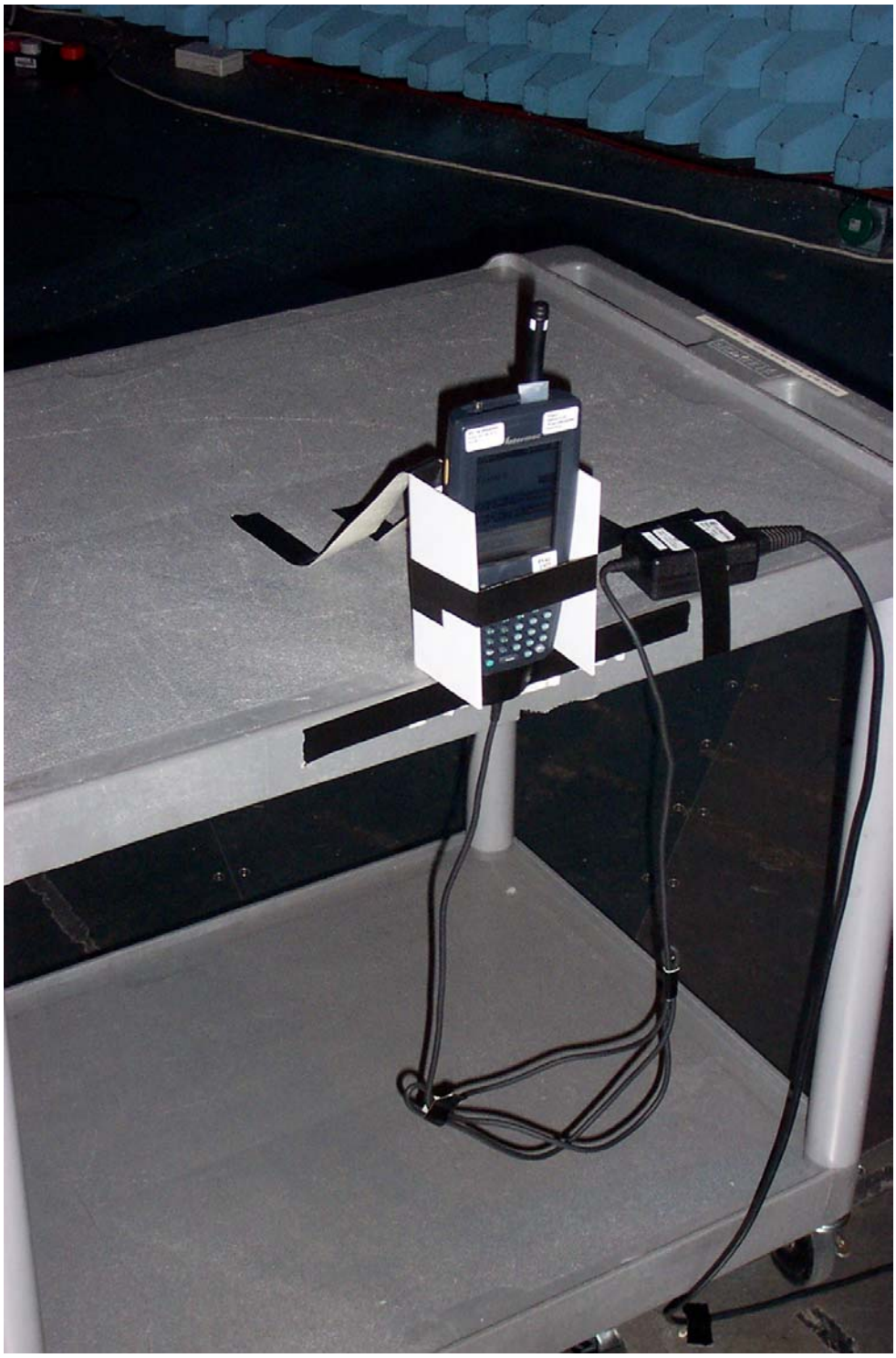
Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Limit
MHz	H/V	cm	deg	dBµV/m	
4243.0	V	112	38	63.1	86.2
5092.2	V	100	81	57.7	86.2
6957.0	H	100	0	59.5	86.2
7429.0	H	100	360	62.8	86.2

ABBREVIATIONS FOR ABOVE TABLES

H Horizontal Polarisation V Vertical Polarisation

3.2 RADIATED EMISSIONS - continued

3.2.7 Set Up Photograph



Radiated Emissions Set Up Photograph

SECTION 4

TEST DETAILS

Limited FCC CFR 47: Part 24 Testing in support of an
Application for Grant of Equipment Authorisation
of an Intermec 700C with MC-46 GSM/GPRS Module

4.1 MAXIMUM PEAK OUTPUT POWER

4.1.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.232

4.1.2 Equipment Under Test

Intermec 700C

4.1.3 Date of Test

9th November 2004

4.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 4.1” within the Test Equipment Used table shown in Section 5.1.

4.1.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

The Maximum Peak Output Power was made using the Radiated method.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, who’s input signal the antenna was adjusted until the received level matched that of the previously detected emission

4.1 MAXIMUM PEAK OUTPUT POWER - continued

4.1.6 Test Results

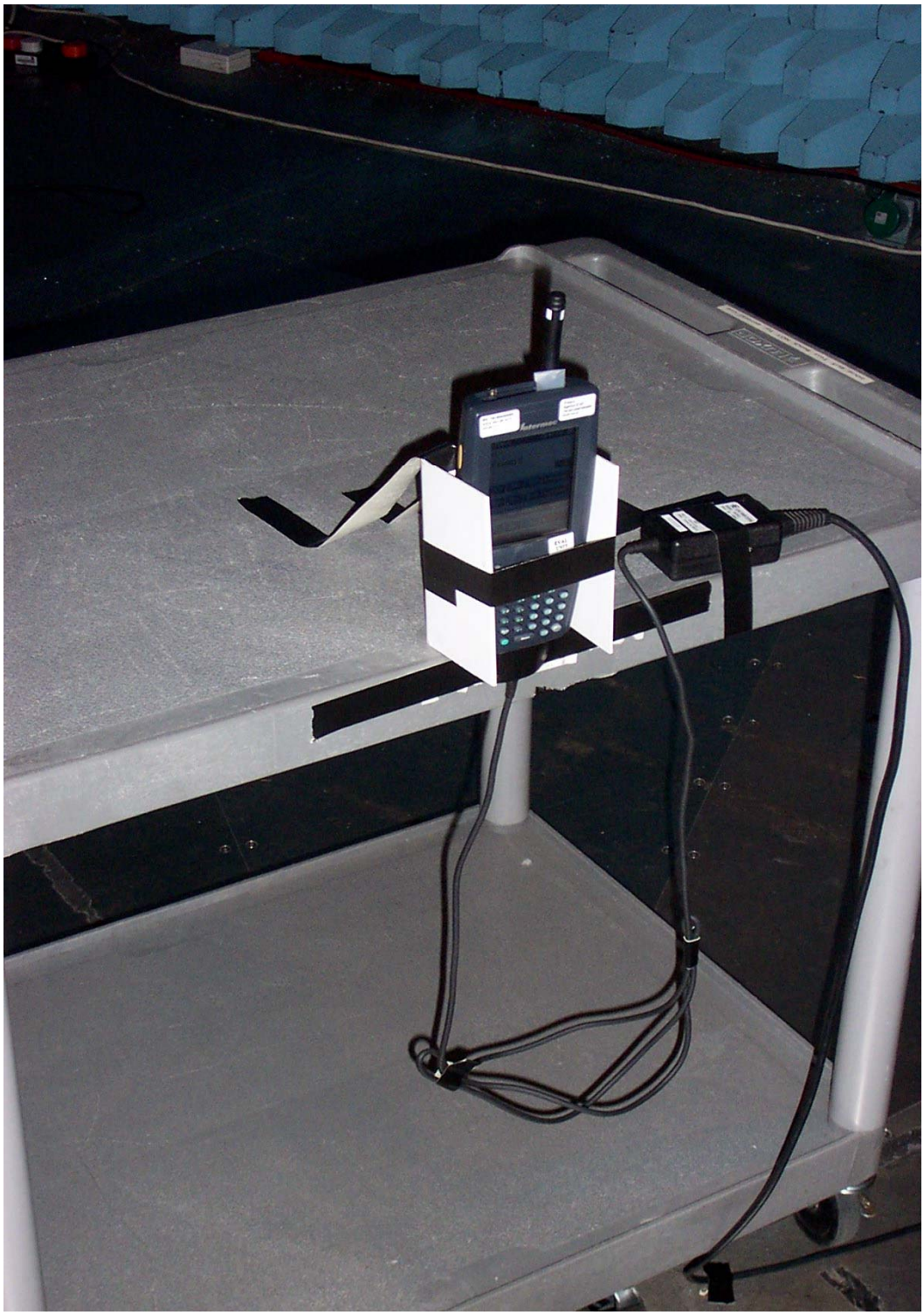
Measurements were made with the EUT in GSM 1900MHz Mode 2.

The EUT met the requirements of FCC Part 24, Section 24.232, Power and Antenna Height Limits.

Frequency (MHz)	Raw Result (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dB)	Result ERP (dBm)	Result ERP (mW)
1850.1	-12.8	22.3	8.9	31.2	1318.0
1880.0	-13.6	22.2	8.9	31.1	1288.0
1909.0	-14.8	22.0	8.9	30.9	1230.0

4.1 MAXIMUM PEAK OUTPUT POWER - continued

4.1.7 Set Up Photograph



Maximum Peak Output Power Set Up Photograph

4.2 RADIATED EMISSIONS

4.2.1 Specification Reference

FCC CFR 47: Part 24 Subpart E, Section 24.238

4.2.2 Equipment Under Test

Intermec 700C

4.2.3 Date of Test

10th November 2004

4.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 4.2” within the Test Equipment Used table shown in Section 5.1.

4.2.5 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 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 – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 20GHz were then formally measured using Peak and Average Detectors, as appropriate.

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

4.2 RADIATED EMISSIONS - continued

4.2.6 Test Results

Measurements were made with the EUT in GSM 1900MHz Mode 2.

The measurements of transmitter power, (P), on top, middle 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 Azi Deg	Raw PEAK dBµV	Cable loss dB	Antenna Factor dB	Result Peak dBµV/m
Tx Channel 512									
1850.1	1M	1M	V	100	330	94.2	6.7	26.7	127.6
Tx Channel 661									
1880.0	1M	1M	V	100	360	93.4	6.7	27.0	127.1
Tx Channel 810									
1909.0	1M	1M	V	100	330	92.4	6.7	27.1	126.2

The limit for spurious emissions in accordance with FCC 47 CFR 24.238 is 43 + 10Log(P) down on the carrier where P is the power in Watts.

The manufacturer's declared power is 1W. The spurious limit is 43 +10Log(P) = dB down on the carrier. The Levels obtained were using a measured power level from the ERP result in section 4.1 of this report.

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

Bottom channel 512: 127.1dBµV/m – 45dB = 82.8dBµV/m

Middle channel 661: 127.1dBµV/m –44.2dB = 82.9dBµV/m

Top channel 810: 126.2dBµV/m –43.9dB = 82.3dBµV/m

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in the following tables.

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

4.2 RADIATED EMISSIONS - continued

4.2.6 Test Results - continued

30MHz – 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC Part 24.238 for Radiated Emissions (1G – 20G).

In all 3 channels no emissions were detected within 35dB of the limit. No formal measurements were made.

4.2 RADIATED EMISSIONS - continued

4.2.6 Test Results - continued

1GHz – 20GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC Part 24.238 for Radiated Emissions (30MHz – 1GHz).

EUT Tx on Bottom Channel (1850.1MHz)

Measurements were made with the EUT in GSM 1900MHz Mode 2.

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Limit
MHz	H/V	Cm	deg	dBµV/m	
5551.0	H	100	062	63.0	82.8
7401.0	H	100	006	65.3	82.8
7721.0	H	100	357	57.6	82.8
9251.0	V	100	328	64.1	82.8
11102.0	V	112	011	69.9	82.8
12951.0	H	100	301	64.0	82.8
14802.0	H	151	354	66.7	82.8
16652.0	H	100	009	60.9	82.8

EUT Tx on Middle Channel (1880.0MHz)

Measurements were made with the EUT in GSM 1900MHz Mode 2.

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Limit
MHz	H/V	cm	deg	dBµV/m	
5640.0	H	102	306	64.5	82.9
7520.0	H	100	002	68.1	82.9
9400.0	V	100	037	68.6	82.9
11250.0	V	100	014	75.0	82.9
13160.0	H	100	042	62.3	82.9
15040.0	H	149	355	65.3	82.9

4.2 **RADIATED EMISSIONS** – continued

EUT Tx on Top Channel (1909.8MHz)

Measurements were made with the EUT in GSM 1900MHz Mode 2.

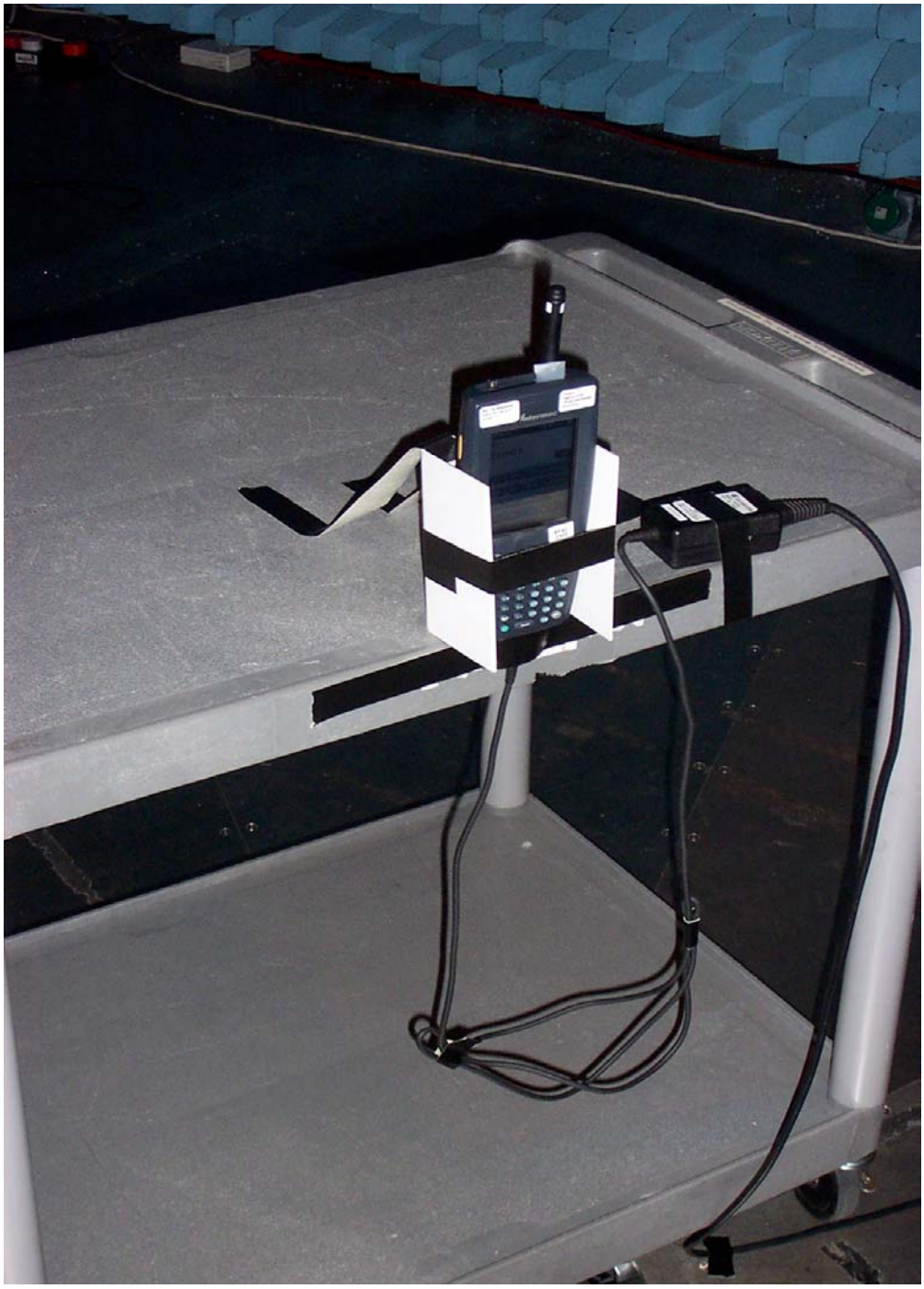
Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Limit
MHz	H/V	cm	deg	DBµV/m	
5729.0	H	100	075	68.2	82.3
7639.0	H	100	006	69.0	82.3
9549.0	V	178	004	74.9	82.3
11459.0	H	100	303	75.7	82.3
13368.0	H	100	037	63.3	82.3
15277.0	V	106	034	68.0	82.3

ABBREVIATIONS FOR ABOVE TABLES

H Horizontal Polarisation V Vertical Polarisation

4.2 RADIATED EMISSIONS - continued

4.2.7 Set Up Photograph



Radiated Emissions Set Up Photograph

SECTION 5

TEST EQUIPMENT USED

5.1 TEST EQUIPMENT USED

Instrument	Manufacturer	Type No	Serial No	EMC / INV	Cal. Due Date
Section 2.1					
Test Receiver	Rohde & Schwarz	ESH3	872742/002	1020	24/09/2005
Screened Room 5	Siemens	EAC5430	NA	2533	TU
Artificial Mains LISN	Rohde & Schwarz	ESH2-Z5	879675-022	1915	28/04/2005
Transient Limiter	Hewlett Packard	11947A	3107A01837	2271	19/08/2005
Section 3.1					
Spectrum Analyser	Hewlett Packard	8542E	3617A00165	2286	18/05/2005
Screened Room 5	Siemens	EAC5430	NA	2533	TU
Bilog Antenna	Schaffner	CBL6143	5101	2965	12/09/2005
Bilog Antenna	Schaffner	CBL6143	5064	2860	28/04/2005
Bilog Antenna	Schaffner	CBL6143	5064	2860	28/04/2005
Section 3.2					
Spectrum Analyser	Hewlett Packard	8542E	3617A00165	2286	18/05/2005
Bilog Antenna	Schaffner	CBL6143	5101	2965	12/09/2005
Screened Room 5	Siemens	EAC5430	NA	2533	TU
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
Section 4.1					
Emi Test Receiver	Rohde & Schwarz	ESIB26	100212	2988	08/04/2005
Emco 3115 DRG	Emco	3115	97015079	2397	07/07/2005
Emco 3115 DRG	Emco	3115	96964848	2297	07/07/2005
Screened Room 5	Siemens	EAC5430	NA	2533	TU
Section 4.2					
Spectrum Analyser	Hewlett Packard	8542E	3617A00165	2286	18/05/2005
Bilog Antenna	Schaffner	CBL6143	5101	2965	12/09/2005
Screened Room 5	Siemens	EAC5430	NA	2533	TU
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
Lna 18-40GHz	Narda	NARDA	002	2936	28/04/2005
Drg Horn Antenna	Link Microtek Ltd	AM180HA	2007	2945	24/06/2005
Emco 3115 DRG	Emco	3115	97015079	2397	07/07/2005
Emi Test Receiver	Rohde & Schwarz	ESIB26	100212	2988	08/04/2005

5.2 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*
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*

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

* In accordance with CISPR 16-4

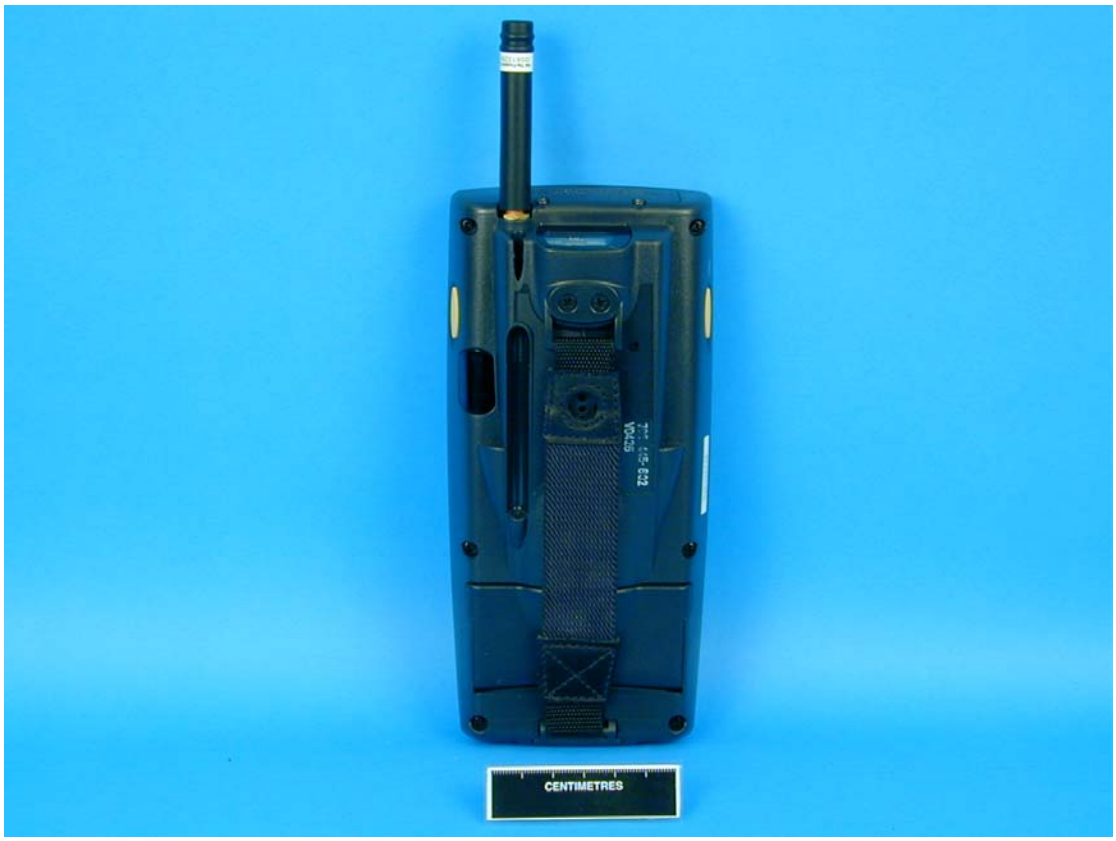
SECTION 6

EUT PHOTOGRAPHS

6.1.1 EUT PHOTOGRAPHS

700C Front View

6.1.2 EUT PHOTOGRAPHS



700 C Rear View

SECTION 7

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

7.1 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

Thomas W Phillips
Electronics Engineer