



# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: SF51 Barcode reader

To: FCC Part 15.247(b)(1) & Industry Canada RSS-210 A8.4(2)

**Test Report Serial No:**  
RFI-RPT-RP85074JD07A

**This Test Report Is Issued Under The Authority  
Of Chris Guy, Head of Global Approvals:**

pp *I. M. Watch*

<b>Checked By:</b>	Ian Watch
<b>Signature:</b>	<i>I. M. Watch</i>
<b>Date of Issue:</b>	26 March 2012

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## **1. Customer Information**

<b>Company Name:</b>	Intermec Scanner Technology Center
<b>Address:</b>	Immeuble "Les Allées du Lac" Rue du Lac Boite Postale 38147 31681 Labège Cedex France

## 2. Summary of Testing

### 2.1. General Information

<b>Specification Reference:</b>	47CFR15.247
<b>Specification Title:</b>	Code of Federal Regulations Volume 47 (Telecommunications) 2011: Part 15 Subpart C (Intentional Radiators) - Section 15.247
<b>Specification Reference:</b>	RSS-210 Issue 8 December 2010
<b>Specification Title:</b>	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment.
<b>Site Registration:</b>	FCC: 209735; Industry Canada: 3245B-2
<b>Location of Testing:</b>	RFI Global Services Ltd, Wade Road, Basingstoke, Hampshire, RG24 8AH.
<b>Test Date:</b>	08 March 2012

### 2.2. Summary of Test Results

FCC Reference (47CFR)	IC Reference	Measurement	Result
Part 15.247(b)(1)	RSS-Gen 4.8 RSS-210 A8.4(2)	Transmitter Maximum Peak Output Power	✓
<b>Key to Results</b>			
✓ = Complied			✗ = Did not comply

### 2.3. Methods and Procedures

<b>Reference:</b>	ANSI C63.4 (2009)
<b>Title:</b>	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
<b>Reference:</b>	ANSI C63.10 (2009)
<b>Title:</b>	American National Standard for Testing Unlicensed Wireless Devices

### 2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

### **3. Equipment Under Test (EUT)**

#### **3.1. Identification of Equipment Under Test (EUT)**

<b>Brand Name:</b>	INTERMEC
<b>Model Name or Number:</b>	SF51
<b>Serial Number:</b>	29211144611
<b>Hardware Version Number:</b>	076016-000
<b>Software Version Number:</b>	2.0.5.1

#### **3.2. Description of EUT**

The equipment under test was a Barcode reader containing a Bluetooth module and integral antenna. Contains FCC ID: EHA-BTM312 and Industry Canada Certification No. 1223A-BTM312.

#### **3.3. Modifications Incorporated in the EUT**

No modifications were applied to the EUT during testing.

#### **3.4. Additional Information Related to Testing**

<b>Tested Technology:</b>	Bluetooth		
<b>Power Supply Requirement:</b>	Nominal	3.3V	
<b>Type of Unit:</b>	Transceiver		
<b>Channel Spacing:</b>	1 MHz		
<b>Mode:</b>	Basic Rate	Enhanced Data Rate	
<b>Modulation:</b>	GFSK	$\pi/4$ -DQPSK	8DQPSK
<b>Packet Type: (Maximum Payload)</b>	DH5	2DH5	3DH5
<b>Data Rate (Mbit/s):</b>	1	2	3
<b>Maximum Conducted Output Power:</b>	9.9 dBm		
<b>Antenna Gain</b>	2.0 dBi		
<b>Transmit Frequency Range:</b>	2402 MHz to 2480 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	0	2402
	Middle	39	2441
	Top	78	2480

### **3.5. Support Equipment**

The following support equipment was used to exercise the EUT during testing:

<b>Description:</b>	Charging cradle
<b>Brand Name:</b>	INTERMEC
<b>Model Name or Number:</b>	SF51 charger
<b>Serial Number:</b>	Not marked or stated

<b>Description:</b>	Power supply
<b>Brand Name:</b>	INTERMEC
<b>Model Name or Number:</b>	AE26
<b>Serial Number:</b>	Not marked or stated

## **4. Operation and Monitoring of the EUT during Testing**

### **4.1. Operating Modes**

The EUT was tested in the following operating mode(s):

- Continuously transmitting at maximum power on bottom, middle and top channels as required.

### **4.2. Configuration and Peripherals**

The EUT was tested in the following configuration(s):

- The EUT was placed into Bluetooth test mode following instruction supplied by the Customer. Barcodes were scanned by the EUT. This enabled Bluetooth test mode and allowed selection of the required channel, modulation type and data rates.

## **5. Measurements, Examinations and Derived Results**

### **5.1. General Comments**

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

## **5.2. Test Results**

### **5.2.1. Transmitter Maximum Peak Output Power**

#### **Test Summary:**

Test Engineer:	Andrew Edwards	Test Date:	08 March 2012
Test Sample Serial No:	29211144611		

FCC Part:	15.247(b)(1)
Test Method Used:	As detailed in ANSI C63.10 Section 6.10.1 and Sections 6.3 and 6.6 referencing ANSI C63.4 (see note below)

#### **Environmental Conditions:**

Temperature (°C):	23
Relative Humidity (%):	21

#### **Results: DH5**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	6.5	30.0	23.5	Complied
Middle	9.9	30.0	20.1	Complied
Top	8.1	30.0	21.9	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	6.5	2.0	8.5	36.0	27.5	Complied
Middle	9.9	2.0	11.9	36.0	24.1	Complied
Top	8.1	2.0	10.1	36.0	25.9	Complied

**Transmitter Maximum Peak Output Power (continued)****Results: 2DH5**

Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	6.1	21.0	14.9	Complied
Middle	8.8	21.0	12.2	Complied
Top	7.1	21.0	13.9	Complied

Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	6.1	2.0	8.1	27.0	18.9	Complied
Middle	8.8	2.0	10.8	27.0	16.2	Complied
Top	7.1	2.0	9.1	27.0	17.9	Complied

**Results: 3DH5**

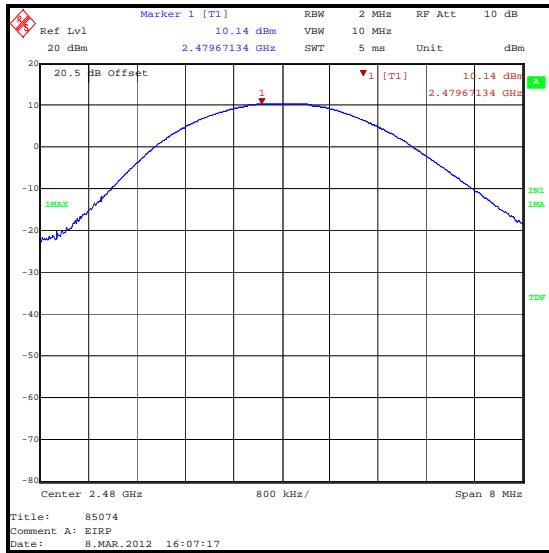
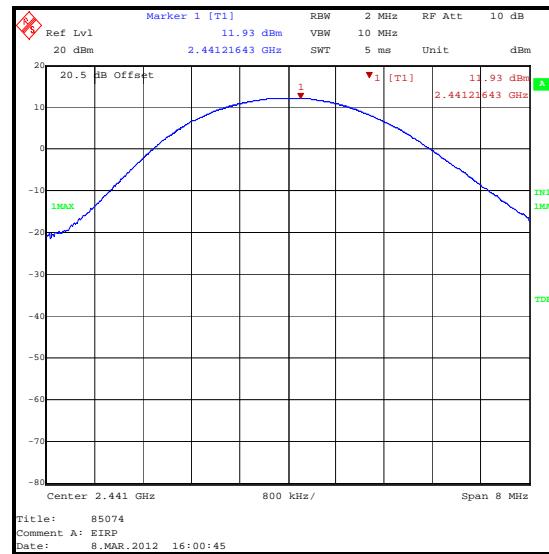
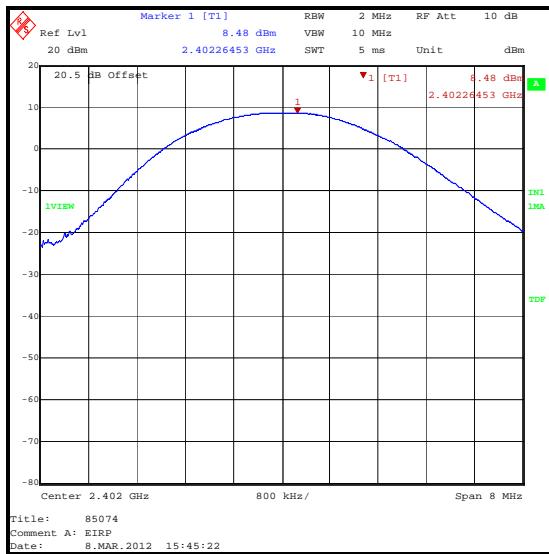
Channel	Conducted Peak Power (dBm)	Conducted Peak Power Limit (dBm)	Margin (dB)	Result
Bottom	6.7	21.0	14.3	Complied
Middle	9.4	21.0	11.6	Complied
Top	7.9	21.0	13.1	Complied

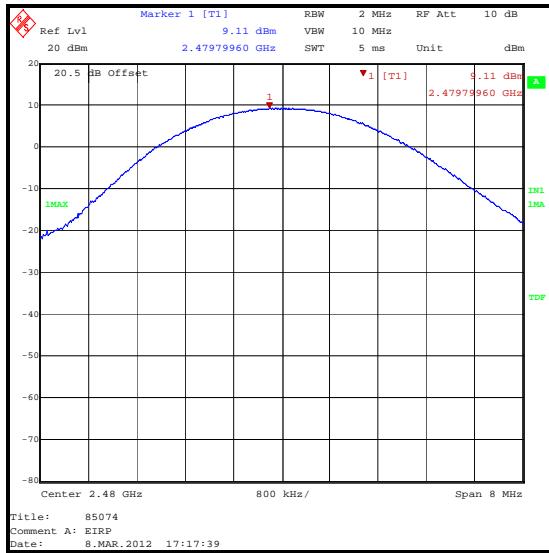
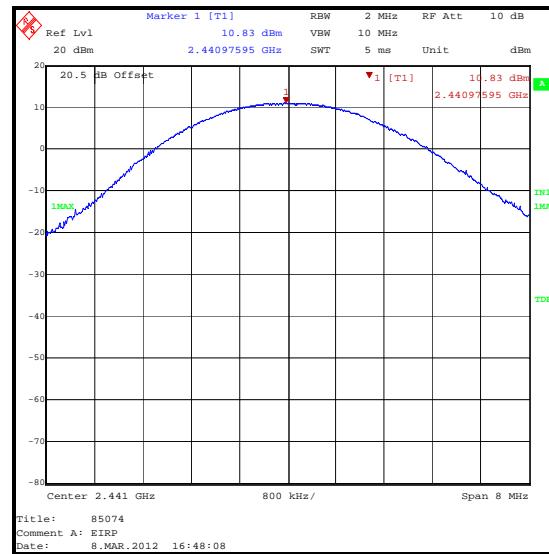
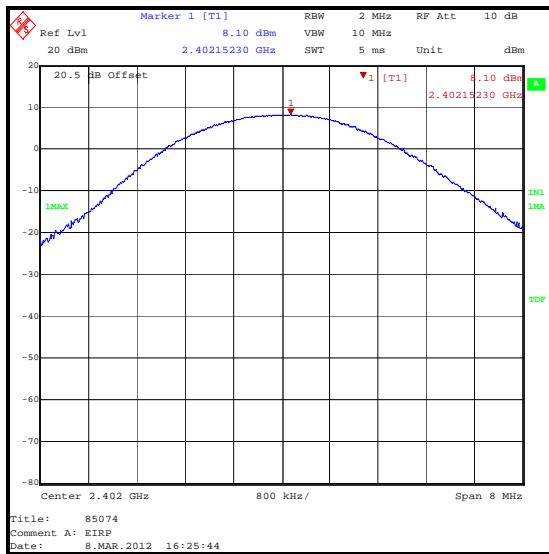
Channel	Conducted Peak Power (dBm)	Declared Antenna Gain (dBi)	EIRP (dBm)	De Facto EIRP Limit (dBm)	Margin (dB)	Result
Bottom	6.7	2.0	8.7	27.0	18.3	Complied
Middle	9.4	2.0	11.4	27.0	15.6	Complied
Top	7.9	2.0	9.9	27.0	19.1	Complied

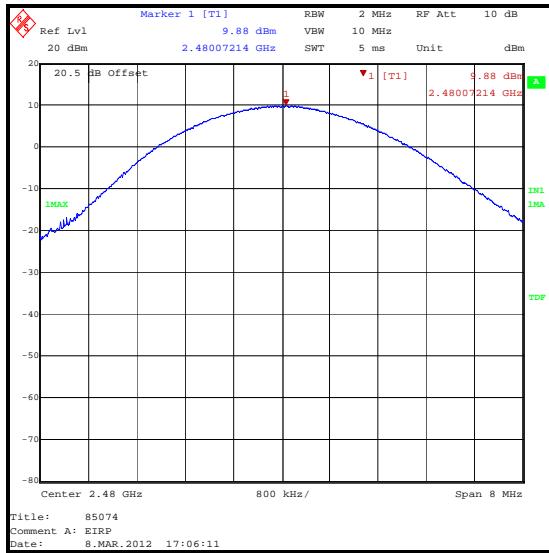
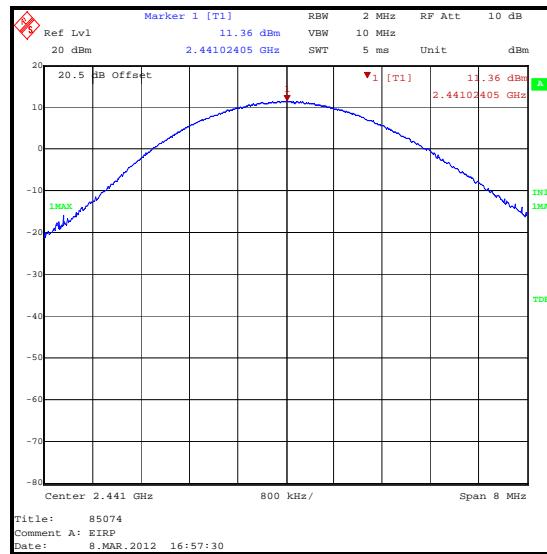
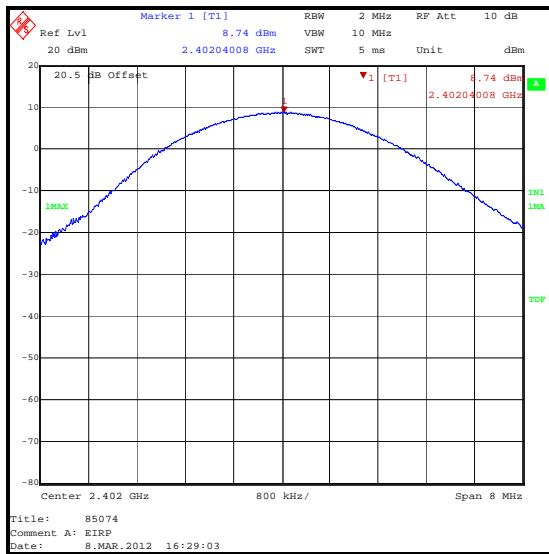
**Note(s):**

1. Tests were performed using a combination of the conducted test method described in ANSI C63.10 Section 6.10.1 and the test methods for radiated emissions measurements described in Sections 6.3 and 6.6. The reason for this being that the measurements were performed radiated as the EUT has an integral antenna and does have not an external antenna port.
2. EIRP was measured and the conducted power calculated by subtracting the antenna gain.

$$\text{Conducted Power} = \text{EIRP (dBm)} - \text{Antenna Gain (dBi)}$$

**Transmitter Maximum Peak Output Power (continued)****Results: DH5**

**Transmitter Maximum Peak Output Power (continued)****Results: 2DH5**

**Transmitter Maximum Peak Output Power (continued)****Results: 3DH5**

## **6. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Radiated Maximum Peak Output Power	2.4 GHz to 2.4835 GHz	95%	±2.94 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

## **Appendix 1. Test Equipment Used**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (months)
A1393	Attenuator	Huber & Suhner	757456	6820.17.B	08 Jul 2012	12
A1534	Pre Amplifier	Hewlett Packard	8449B	3008A00405	09 Oct 2012	12
A1818	Antenna	EMCO	3115	00075692	09 Oct 2012	12
K0002	3m RSE Chamber	Rainford EMC	N/A	N/A	09 Oct 2012	12
M1124	Spectrum Analyser	Rohde & Schwarz	ESI26	100046K	29 Jun 2012	12

**NB** In accordance with UKAS requirements all the measurement equipment is on a calibration schedule.