



RT041-08-101420-4A - DM / CHB

TECHNICAL REPORT

Equipment under test:

WORKABOUT PRO (7527C)
+ WA9005 + BT + RA2041 + RA3030
+ RFID Module HF-AM1-G2
FCC ID: GM3HFAM1G2

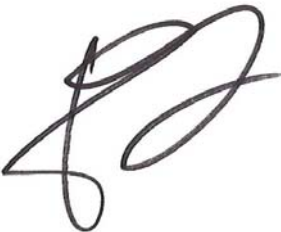
Company:

PSION TEKLOGIX

Diffusion: Mr PORTE

(Company: PSION TEKLOGIX)

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NAME OF THE EQUIPMENT UNDER TEST (E.U.T.) : WORKABOUT PRO (7527C) + WA9005 +
BT + RA2041 + RA3030 +
RFID Module HF-AM1-G2

Serial number : None

Part number : None

Software Version : None

MANUFACTURER'S NAME : PSION TEKLOGIX

APPLICANT'S ADDRESS:

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Responsible : Mr PORTE

DATE(S) OF STUDY : May, the 29th of 2008

EXPERT'S NAME : Olivier HEYER

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1. INTRODUCTION

This document submits the results of Maximum Permissible Exposure (MPE) calculations performed on the equipment **WORKABOUT PRO (7527C) + WA9005 + BT + RA2041 + RA3030 + RFID Module HF-AM1-G2**

2. REFERENCE DOCUMENT(S)

Radio test report	R041-08-101420-4A Ed.2 from EMITECH Grand Sud Laboratory
OET Bulletin 65 (Aug 1997)	Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
FCC Part 1	Practice and procedure
RSS 210 Issue 7	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

3. EQUIPMENT UNDER TEST CONFIGURATION

<u>Product description:</u>	FCC ID: GM3HFAM1G2 Utilization: RFID TAG reader Antenna type: Incorporated antenna Antenna gain: Unknown Operating frequency range: 13.56 MHz (Rfid); 2402MHz (Bluetooth); 2437MHz (Wifi); 836.4MHz (GSM); 1860MHz (GSM) Power source: 5 Vdc (stand alone) or mains voltage (with docking) Power level and frequency range are not user adjustable
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4. RADIATED MEASUREMENTS

These results come from EMITECH Grand Sud radio test report R041-08-101420-4A Ed.1.
Please find below carrier radiated field strength (detail in test report):

Measuring distance: 3 m on Open Area Test Site

Wifi radiated field strength:

Frequency (MHz)	Polarization	Measure (dB μ V/m)
2437.00	Vertical	100.28
2437.00	Horizontal	99.29

Bluetooth radiated field strength:

Frequency (MHz)	Polarization	Measure (dB μ V/m)
2402.00	Vertical	91.74
2402.00	Horizontal	88.48

GSM850 radiated field strength (ERP):

Frequency (MHz)	Polarization	Field strength (dBm)
836.40	Vertical	28.84
836.40	Horizontal	22.70

GSM1900 radiated field strength (EIRP):

Frequency (MHz)	Polarization	Field strength (dBm)
1860.00	Vertical	17.87
1860.00	Horizontal	21.63

5. MAXIMUM PERMISSIBLE EXPOSURE CALCULATIONS

Equipment Under Test is always held farther than 20 cm from the body. Then we have estimate the power density at this distance using OET Bulletin 65 (Aug 1997).

For Wifi and Bluetooth: $S = \frac{E^2}{3770}$ (1) of OET65

For GSM850: $S = \frac{1.64ERP}{1000\pi R^2}$ (5) and (6) of OET65

For GSM 1900: $S = \frac{EIRP}{1000\pi R^2}$ (6) of OET65

With S = power density (mW/cm²)
 E = electric field strength (V/m)
 ERP = effective radiated power (W)
 EIRP = equivalent isotropically radiated power (W)

When E is measured at 3m, level in dB μ V/m must be increased by 23.52 dB when it is considered as far electric field ("plane wave" conditions) to be estimated at 20cm.

For information 1/d² propagation law results are specified (47.04 dB is then added)

6. MAXIMUM PERMISSIBLE EXPOSURE LIMITS

The limit for MPE estimation is (general population / uncontrolled exposure):

Frequency (MHz)	Limit for MPE (Power density in mW/cm ²)
836.40	0.5576
1860.00	1
2402.00	1
2437.00	1

Combination of MPE must show that $\sum (MPE/limit)$ is < 1

7. MAXIMUM PERMISSIBLE EXPOSURE ESTIMATION

Using equations in §5, we can find following results:

Wifi:

Frequency (MHz)	Polarization	MPE Calculation (mW/cm ²)	Limit (mW/cm ²)
2437.00	Vertical	$6.36 \cdot 10^{-4}$	1
2437.00	Horizontal	$5.07 \cdot 10^{-4}$	1

For information using $1/d^2$ propagation

Frequency (MHz)	Polarization	MPE Calculation (mW/cm ²)	Limit (mW/cm ²)
2437.00	Vertical	0.14	1
2437.00	Horizontal	0.11	1

Bluetooth:

Frequency (MHz)	Polarization	MPE Calculation (mW/cm ²)	Limit (mW/cm ²)
2402.00	Vertical	$8.90 \cdot 10^{-5}$	1
2402.00	Horizontal	$4.20 \cdot 10^{-5}$	1

For information using $1/d^2$ propagation

Frequency (MHz)	Polarization	MPE Calculation (mW/cm ²)	Limit (mW/cm ²)
2402.00	Vertical	0.02	1
2402.00	Horizontal	0.01	1

GSM850:

Frequency (MHz)	Polarization	MPE Calculation (mW/cm ²)	Limit (mW/cm ²)
836.40	Vertical	$10.00 \cdot 10^{-3}$	0.5576
836.40	Horizontal	$2.43 \cdot 10^{-3}$	0.5576

GSM1900:

Frequency (MHz)	Polarization	MPE Calculation (mW/cm ²)	Limit (mW/cm ²)
1860.00	Vertical	$4.88 \cdot 10^{-4}$	1
1860.00	Horizontal	$1.16 \cdot 10^{-3}$	1

Maximum permissive exposure compared to limits

Polarization	Σ MPE / Limit	Limit
Vertical	$1.91 \cdot 10^{-2}$	1
Horizontal	$6.07 \cdot 10^{-3}$	1

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