
TEST REPORT

In support of the Application for Grant of Equipment Authorisation of the
Symbol Technologies Portable Data Terminal, PDT8056

FCC ID: H9PPDT8056 & H9PPDT8037

March 2003

Equipment: PDT8056

FCC ID: H9PPDT8056 & H9PPDT8037

Specification: 47 CFR 2 & 47 CFR 24

Applicant: Symbol Technologies Inc
One Symbol Plaza
NY11742
United States

Manufacturer: As above

Manufacturer's Representative: Mr Marco Belli

Approved by: 

C GOULD
Chief Engineer

Dated: 21st March 2003

Start of Test: 6^h March 2003

Completion of Test: 13th March 2003

Report Distribution: Symbol Technologies Mr M Belli Copy No. 1
BABT Copy No's. 2 & 3
Copy No:

ENGINEERING STATEMENT

I ATTEST: the measurements shown in this report were made in accordance with the procedures indicated, and that the emissions from this equipment were found to be within the applicable limits. I assume full responsibility for the accuracy and completeness of these measurements. On the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 2, and Part 24 of the FCC Rules under normal use and maintenance.



Chris Gould
Chief Engineer

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Subclause	Parameter to be measured
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INTRODUCTION

The information contained within this report is intended to show verification of compliance of the Symbol Technologies PDT8056 to the requirements of 47 CFR 2 and 47 CFR 24.

PDT8056

The PDT8056 is a Portable Data Terminal, which offers Triband GSM/GPRS and 2.4GHz Wireless LAN (11Mbps DSSS) connectivity.

The terminal utilizes the Motorola G18 GSM/GPRS module which is approved to FCC Part 24. The FCC Identifier of the module is IHDT6AC1, the date of the FCC Grant was 8th January 2000.

Also installed is the Symbol Compact Flash LA-4137 Wireless LAN radio card which is approved to FCC Part15. The FCC Identifier of the module is H9PLA4137P, the date of the FCC grant was 21st March 2002.

This report covers limited testing on the PDT8056 to cover the integration of the Motorola GSM/GPRS radio module.

PDT8037

The PDT8037 is a “sub equip” of the PDT8056. The PDT8037 is a Portable Data Terminal which offers Triband GSM/GPRS connectivity, in this model the Symbol Compact Flash RLAN radio card is NOT installed.

Photographs of the unit are contained within this report.

No testing was performed on this unit.

LOCATION OF TESTING

TUV Engineer, Mike Timberlake and Phil Harrison, conducted all testing at the premises of TUV Product Service, Segensworth Road, Fareham, Hampshire, PO15 5RH. Radiated Emissions measurements were performed in a 3 metre Anechoic Chamber. A complete site description is on file with the FCC Laboratory Division, Registration Number: 90987. See Annex A.

TEST EQUIPMENT AND ANCILLARIES USED FOR TEST

No	Instrument/Ancillary	Type	Manufacturer	EMC No.
1	EMI Receiver	Rhode & Schwartz	ESIB 40	2917
2	Turntable and Controller	HD Gmbh	HD 050	-
3	Antenna Mast	EMCO	2070	-
4	Antenna Mast Controller	EMCO	2090	-
5	Screened Room 5	-	-	2533
6	Pre-Amplifier, (8-18GHz)	Avantek	AWT-18036	1081
7	Pre-Amp (1-8GHz)	Miteq	AMF-3D-001080-18-13P	2457
8	Horn (1-18GHz)	EMCO	3115	2397
9	Signal Generator	Hewlett Packard	8673B	2551
10	Test Receiver	Rohde & Schwarz	ESIB40	2917
11	Pre-Amplifier, (18-26GHz)	Avantek	AMT-26177-33	2072
12	Horn (18 – 26GHz)	Flann	2024-20	1396
13	High Pass Filter	RLC	F-100-4000-5-R	4468
14	Microwave Co-axial Adaptor	Flann	20093SF40	2917

Table 1

**TEST EQUIPMENT AND ANCILLARIES USED FOR TEST** (Continued)**Note(s)**

- 1) All items are calibrated annually except where labelled T/U (Traceability Unscheduled). These items are calibrated within the test configurations using calibrated equipment.
- 2) Throughout the test report the test equipment used for each test is referenced using the number indicated in the table above.

INSTRUMENTATION USED FOR EXERCISING THE EUT

Instrument	Manufacturer	Type No	INV No
GSM Test Set	Hewlett Packard	8922M	3803

Table 2

**DESCRIPTION OF EQUIPMENT UNDER TEST**

The PDT8056 is a handheld computer terminal with a tri band GSM/GPRS radio module used for inventory control purposes.

The equipment under test is made up of the following component parts.

Module	Vendor	Kit Number	Serial Number
Portable Data Terminal	Symbol Technologies Inc	PDT8056	ALP65919

Table 3

LIST OF PERFORMED MEASUREMENTS USING THE CONFIGURATION IN TABLE 3

- i) Power Output
- ii) Radiated Emissions



Test Case	Radiated Emissions
Test Date	11 th March 2003
Rule Parts	24.238

SYSTEM CONFIGURATION DURING EMC TESTING

The Symbol PDT8056 with GSM/GPRS Radio Module was powered by its own internal battery.

A communication link was established between the EUT and a Digital Radiocommunications Test Set.

TEST PROCEDURE

Testing to the requirements of FCC Part 24, Section 24.238, Emission Limits, was carried out on the Measurement Test Facility detailed in Annex A.

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 Table 4.

A preliminary profile of the Radiated Electric Field Emissions was obtained by operating the Equipment Under Test (EUT) on a remotely controlled turntable within a semi-anechoic chamber; measurements were taken at a 3m distance. 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, a search was made in the frequency range 30MHz to 20GHz. The list of worst case emissions was then confirmed or updated using the FCC listed semi-anechoic chamber. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth. Emissions levels were then formally measured using a peak detector. The details of the worst case emissions were then recorded and are presented in Tables 5 and 6.

The test was performed in accordance with ANSI C63.4.

All measurements made at 3m.



Test Case Radiated Emissions (continued)
 Test Date 11th March 2003
 Rule Parts 24.238

TEST RESULTS

The measurements of transmitter power, (P), on top and bottom channels are detailed in Table 4 below.

Freq MHz	Res BW Hz	Vid BW Hz	Ant Pol V/H	Ant Hgt cm	EUT Arc Deg	Raw PEAK dBμV	Cable loss / Amp gain dB	Antenna Factor dB	Result Peak dBμV/m
Tx Channel 512									
1850.000	1M	3M	V	207	160	91.1	1.5	27.4	120.0
1850.400	1M	3M	H	145	162	96.5	1.5	27.4	125.4
Tx Channel 810									
1909.600	1M	3M	V	168	139	92.2	1.5	27.4	121.1
1909.570	1M	3M	H	184	171	98.2	1.5	27.4	127.1

Table 4

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

As the manufacturer's declared power is 1W the spurious limit is $43 + 10\log(1) = 43\text{dB}$ down on the carrier.

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

Bottom channel 512: $125.4\text{dB}\mu\text{V/m} - 43\text{dB} = 82.4\text{dB}\mu\text{V/m}$

Top channel 810: $127.1\text{dB}\mu\text{V/m} - 43\text{dB} = 84.1\text{dB}\mu\text{V/m}$

These limits have been used to determine Pass or Fail for the harmonics measured and detailed in Tables 5 and 6.



Test Case Radiated Emissions (continued)

Test Date 13th March 2003

Rule Parts 24.238

Tx Channel 512

Freq MHz	Res BW Hz	Vid BW Hz	Ant Pol V/H	Ant Hgt cm	EUT Arc Deg	Raw PEAK dBμV	Cable loss / Amp gain dB	Antenna Factor dB	Result Peak dBμV/m	Pass / Fail
3.7005	1M	3M	H	140	190	43.94	+3.08	32.60	79.62	Pass
5.5500	1M	3M	V	169	124	59.60	-30.90	35.20	63.90	Pass
7.4008	1M	3M	V	102	153	48.40	-31.10	38.30	55.60	Pass
9.2510	1M	3M	H	161	130	52.40	-30.10	39.30	61.60	Pass
11.1010	1M	3M	H	131	270	49.60	-32.10	38.70	56.20	Pass

Table 5

Tx Channel 810

Freq MHz	Res BW Hz	Vid BW Hz	Ant Pol V/H	Ant Hgt cm	EUT Arc Deg	Raw PEAK dBμV	Cable loss / Amp gain dB	Antenna Factor dB	Result Peak dBμV/m	Pass / Fail
3.8195	1M	3M	H	125	242	46.09	+3.08	32.60	81.77	Pass
5.7290	1M	3M	H	100	210	34.82	+3.77	35.20	73.79	Pass
7.6391	1M	3M	H	100	121	53.90	-31.10	38.30	61.10	Pass
9.5490	1M	3M	H	100	100	51.40	-31.90	39.30	58.80	Pass
11.4580	1M	3M	H	128	180	51.30	-31.10	39.60	59.80	Pass

Table 6

ABBREVIATIONS FOR ABOVE TABLE

ERP Effective Radiated Power
H Horizontal Polarisation

V Vertical Polarisation

Procedure Test Performed in accordance with ANSI C63.4.



TEST SETUP PHOTOGRAPH

The photograph below shows the EUT configuration during Radiated Emission testing.



Radiated Emissions Set Up



PHOTOGRAPHS OF THE SYMBOL PDT8056



PDT8056
Front



PDT8056
Rear



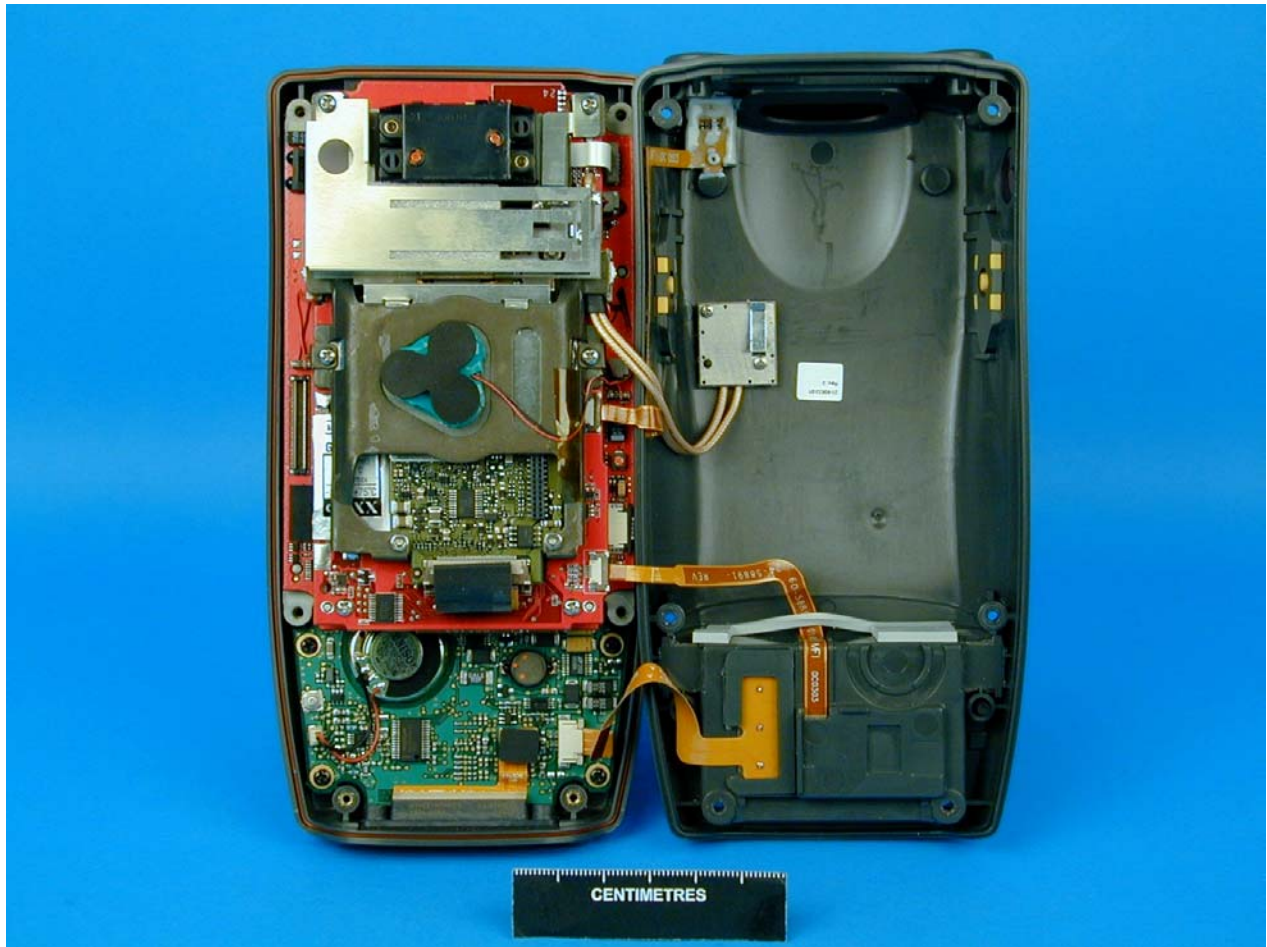
PDT8056
Side/End



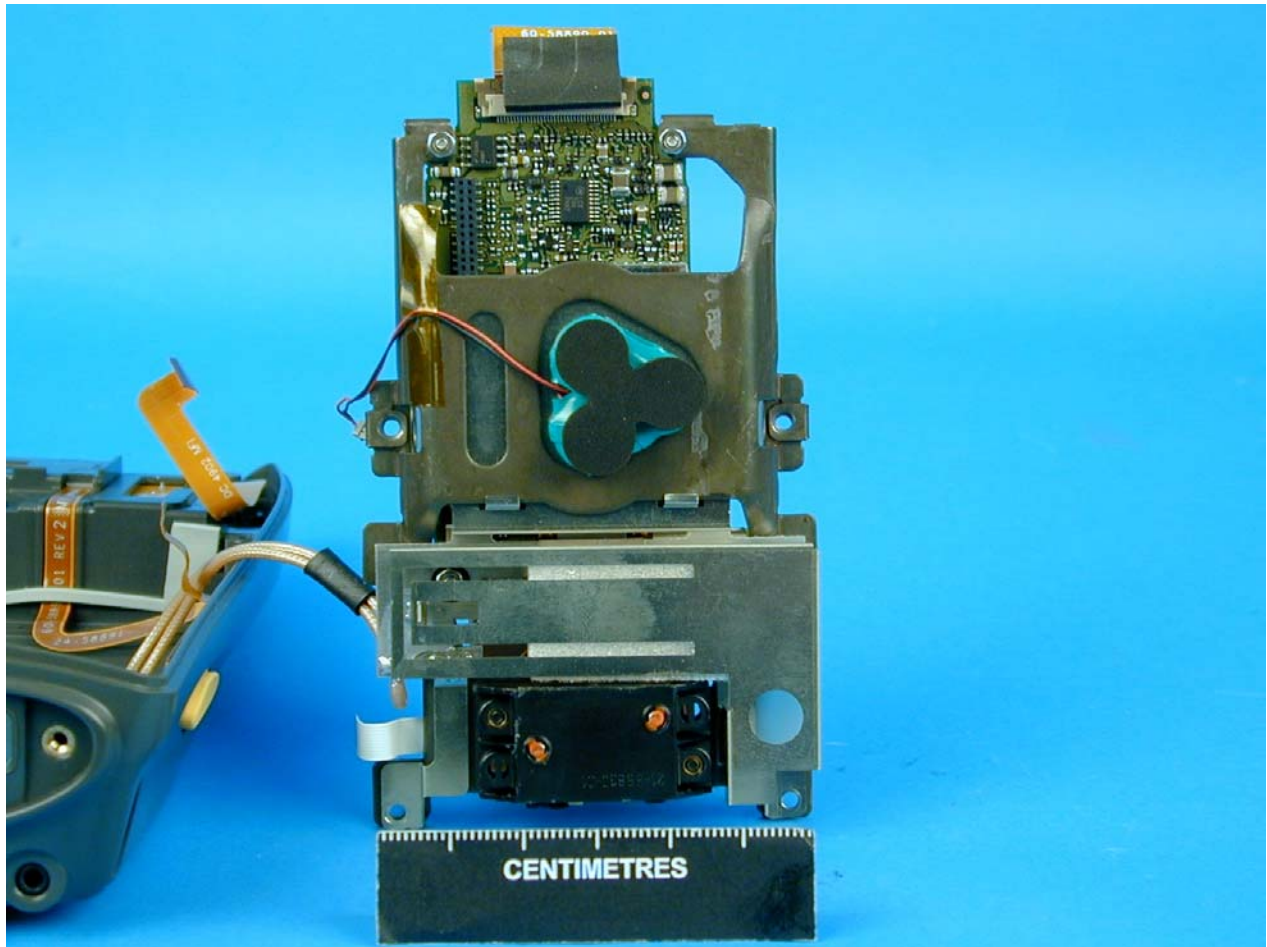
PDT8056
Side/Top



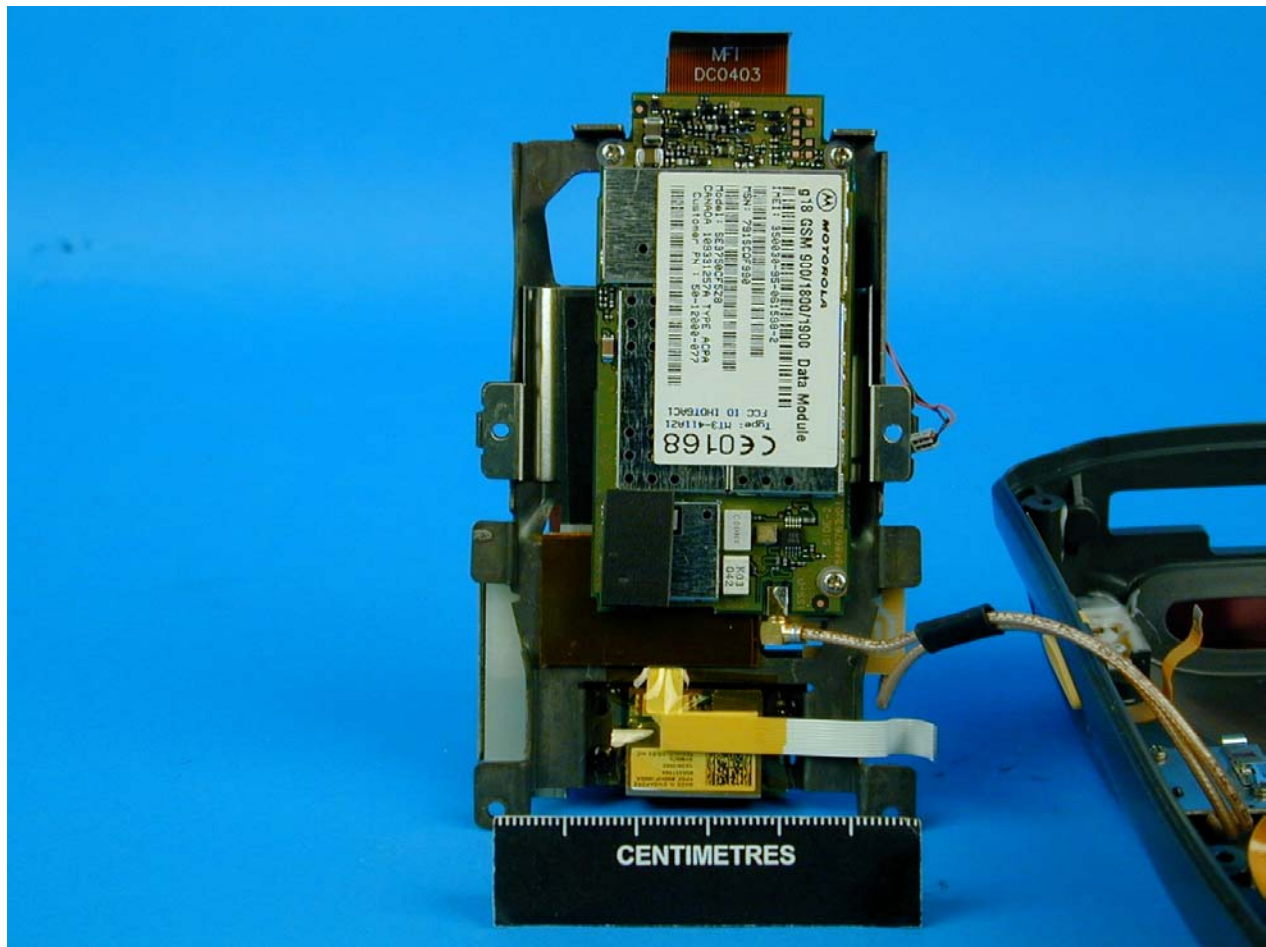
PDT8056
Rear (battery removed)



PDT8056
Internal 1



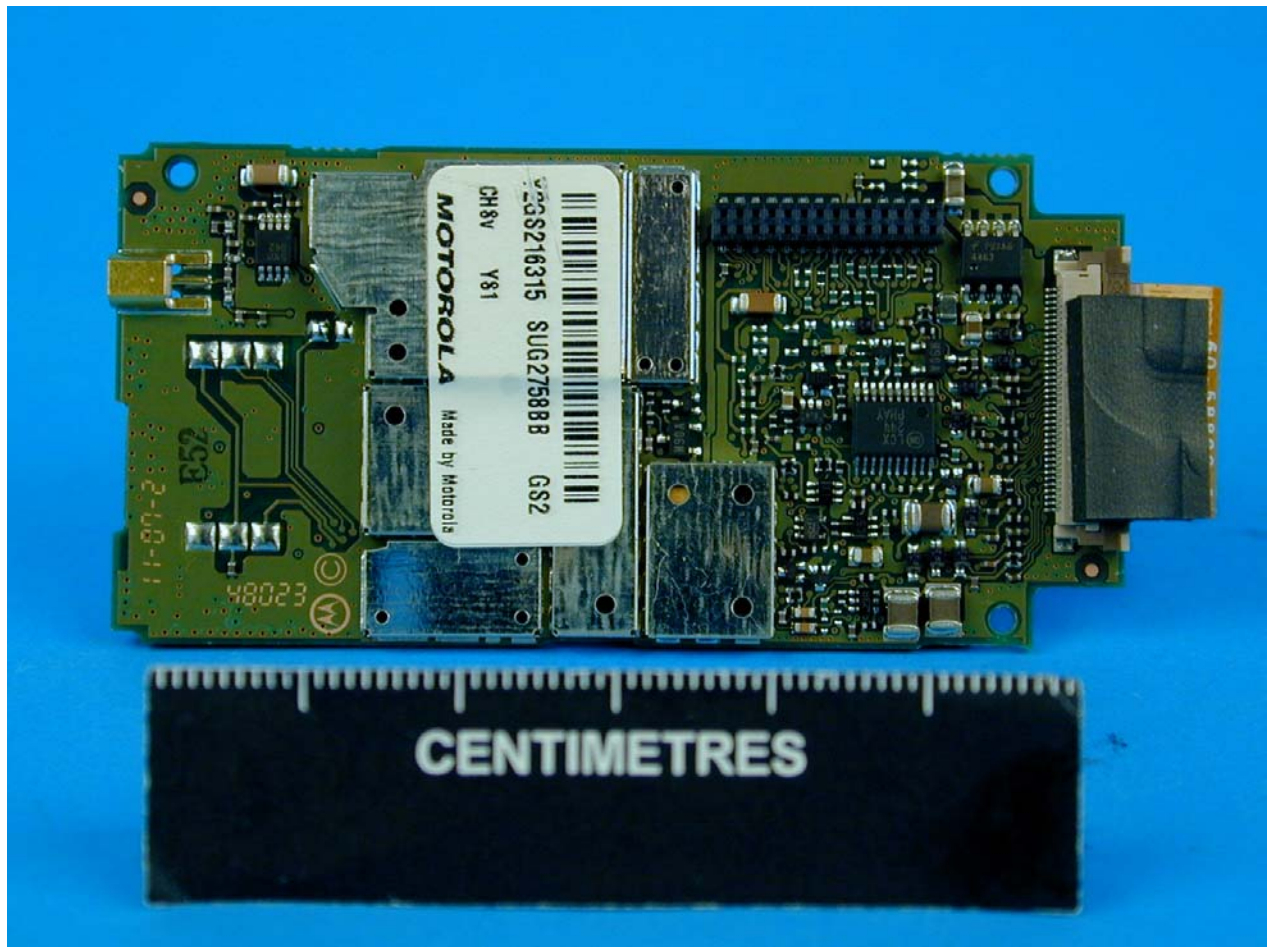
PDT8056
Internal 2



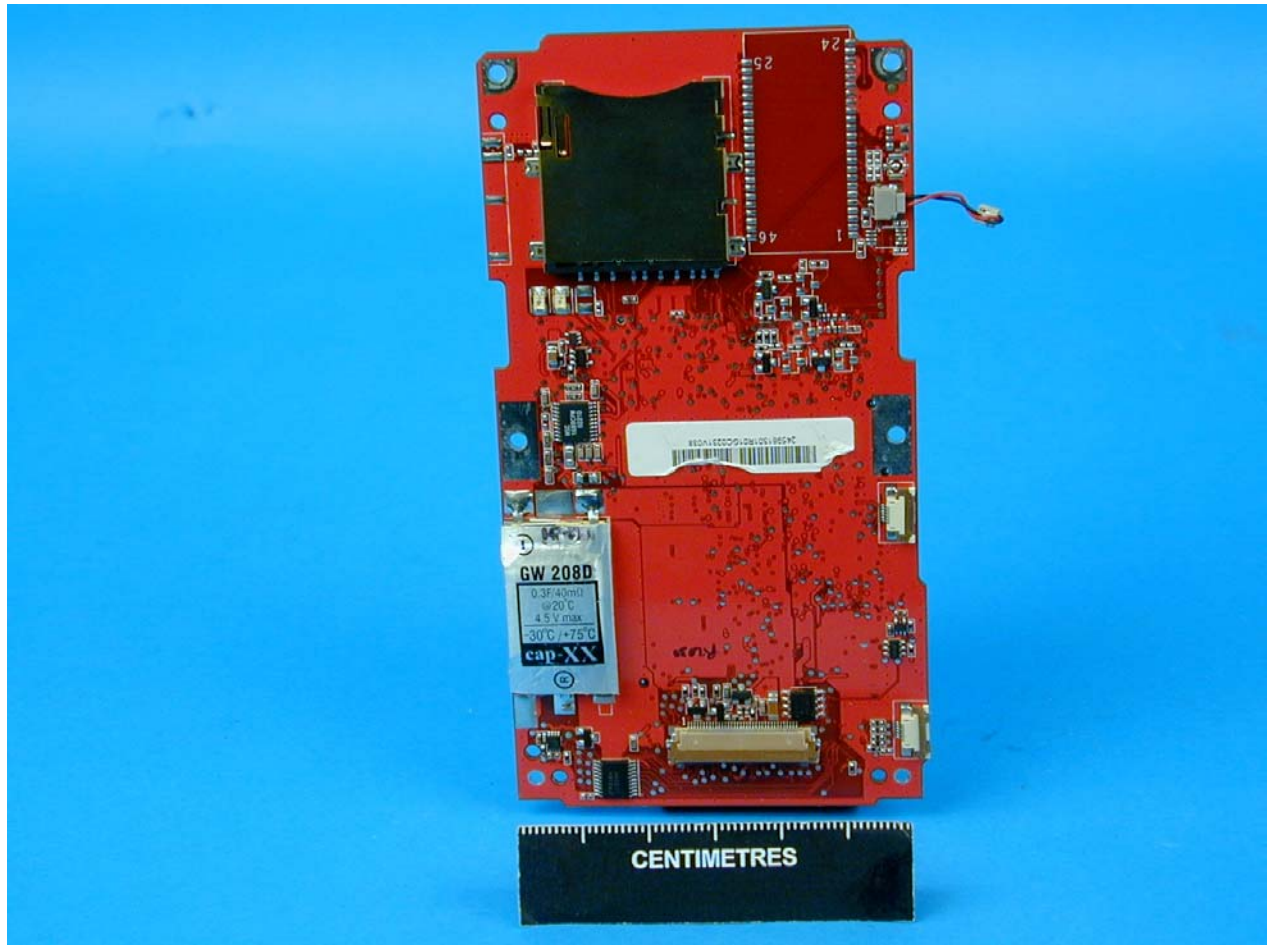
PDT8056
Internal 3



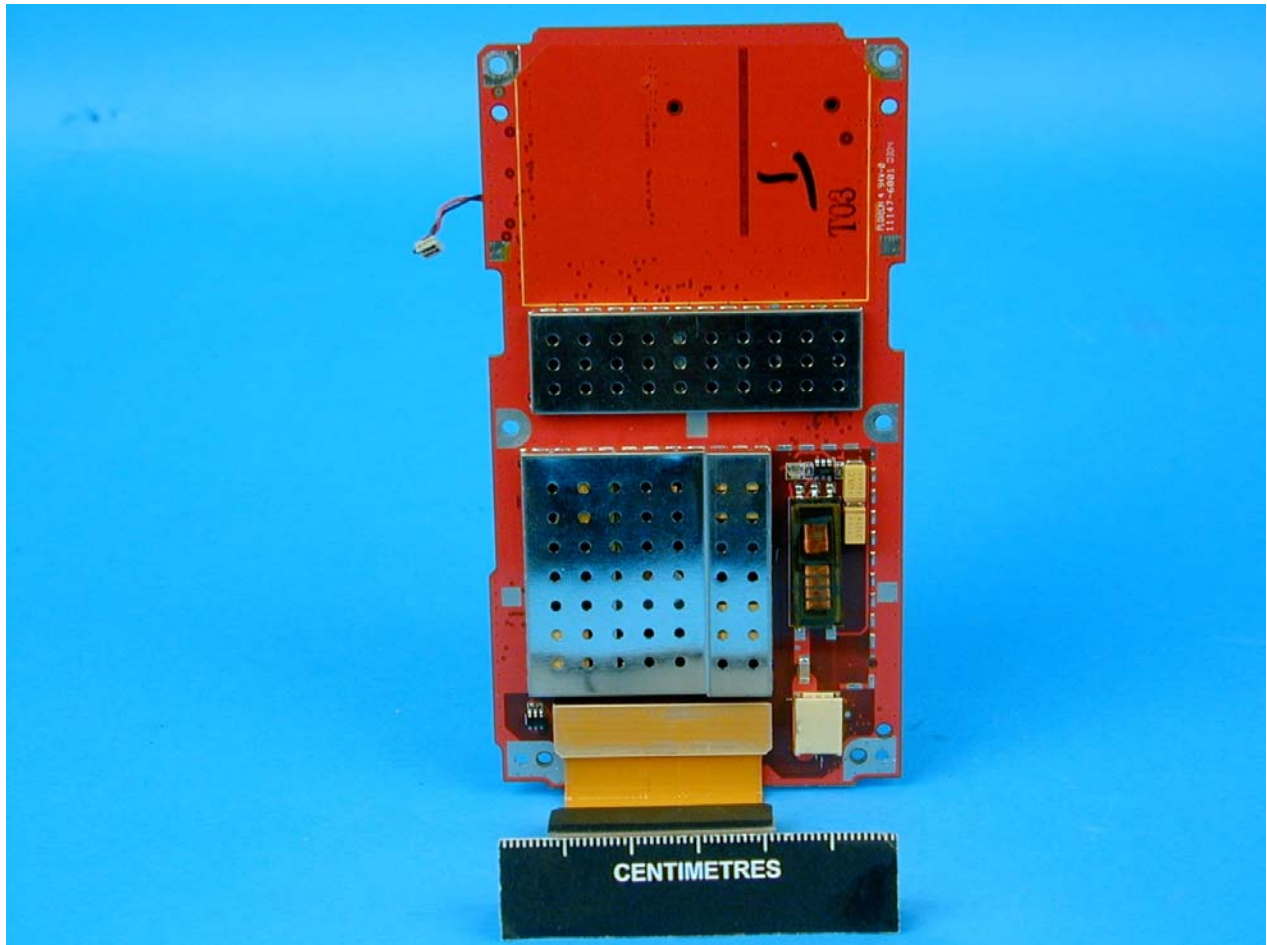
PDT8056
Internal 4



PDT8056
Internal 5



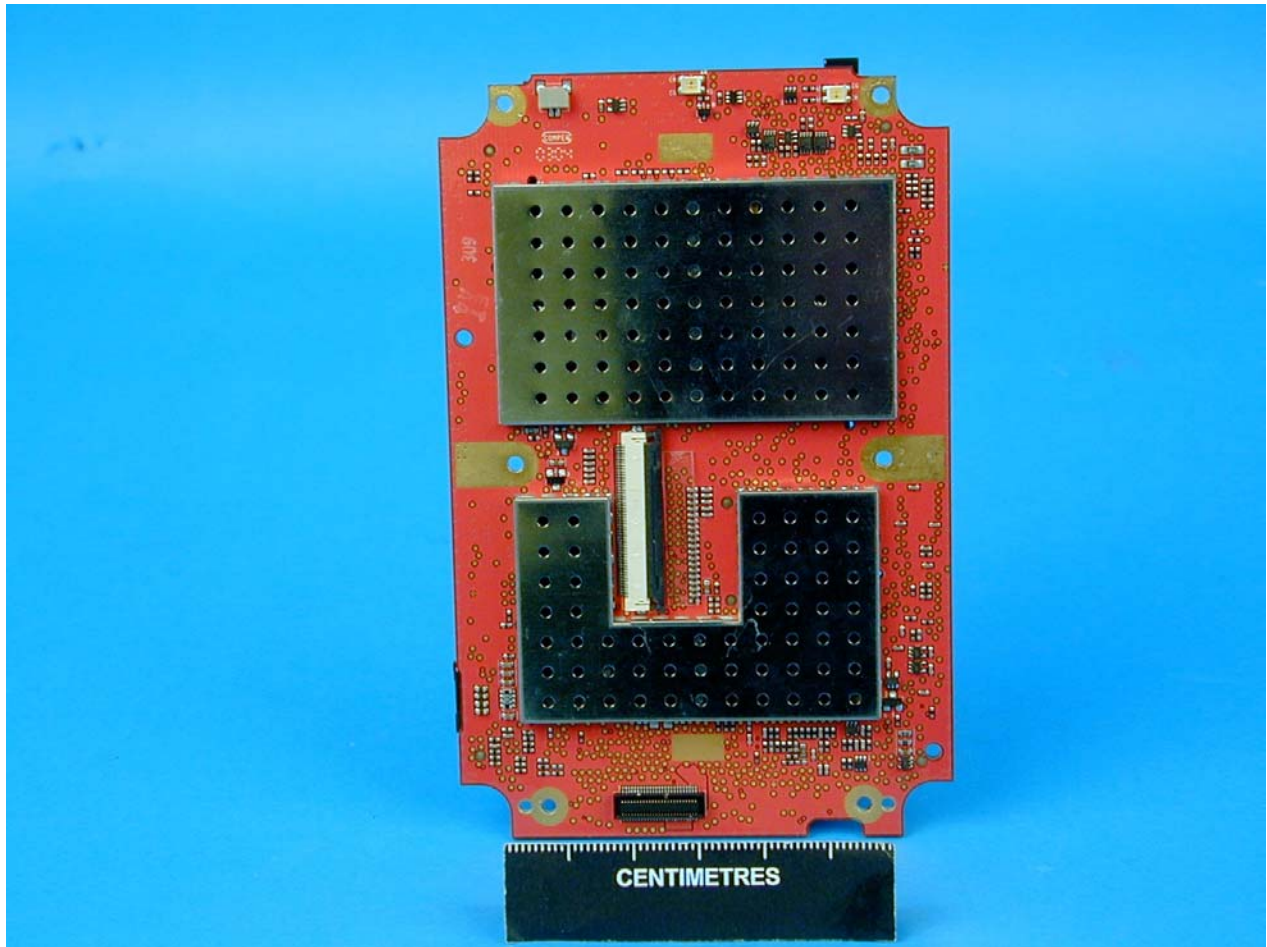
PDT8056
Internal 6



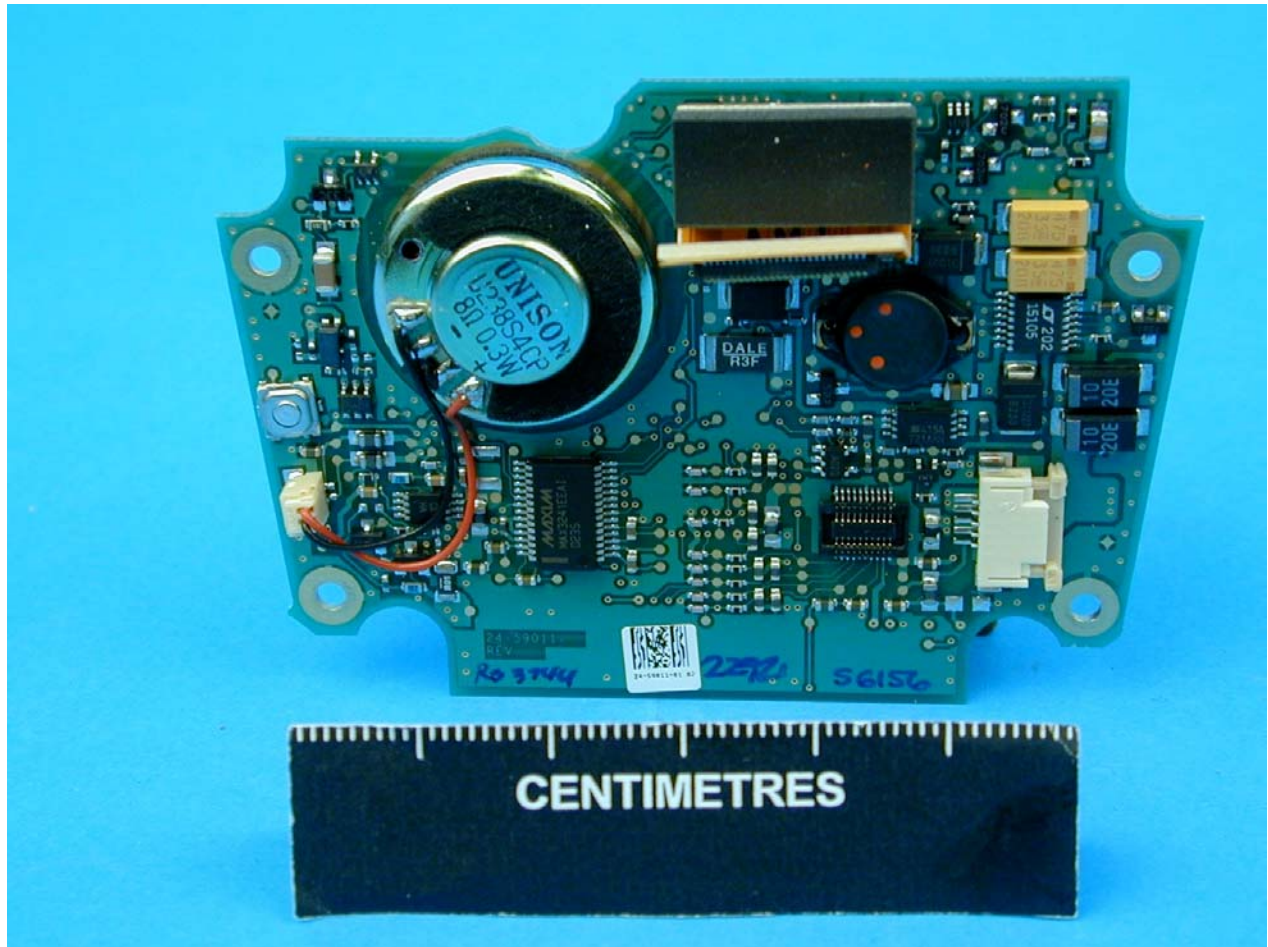
PDT8056
Internal 7



PDT8056
Internal 8



PDT8056
Internal 9



PDT8056
Internal 10



PDT8056
Back View of the LA-4137 (11Mbps DSSS) RLAN Radio Card



PDT8056
Front View of the LA-4137 (11Mbps DSSS) RLAN Radio Card



PDT8056
Manufacturers Label Diagram



PHOTOGRAPHS OF THE SYMBOL PDT8037



PDT8037
Front View



PDT8037
Rear View



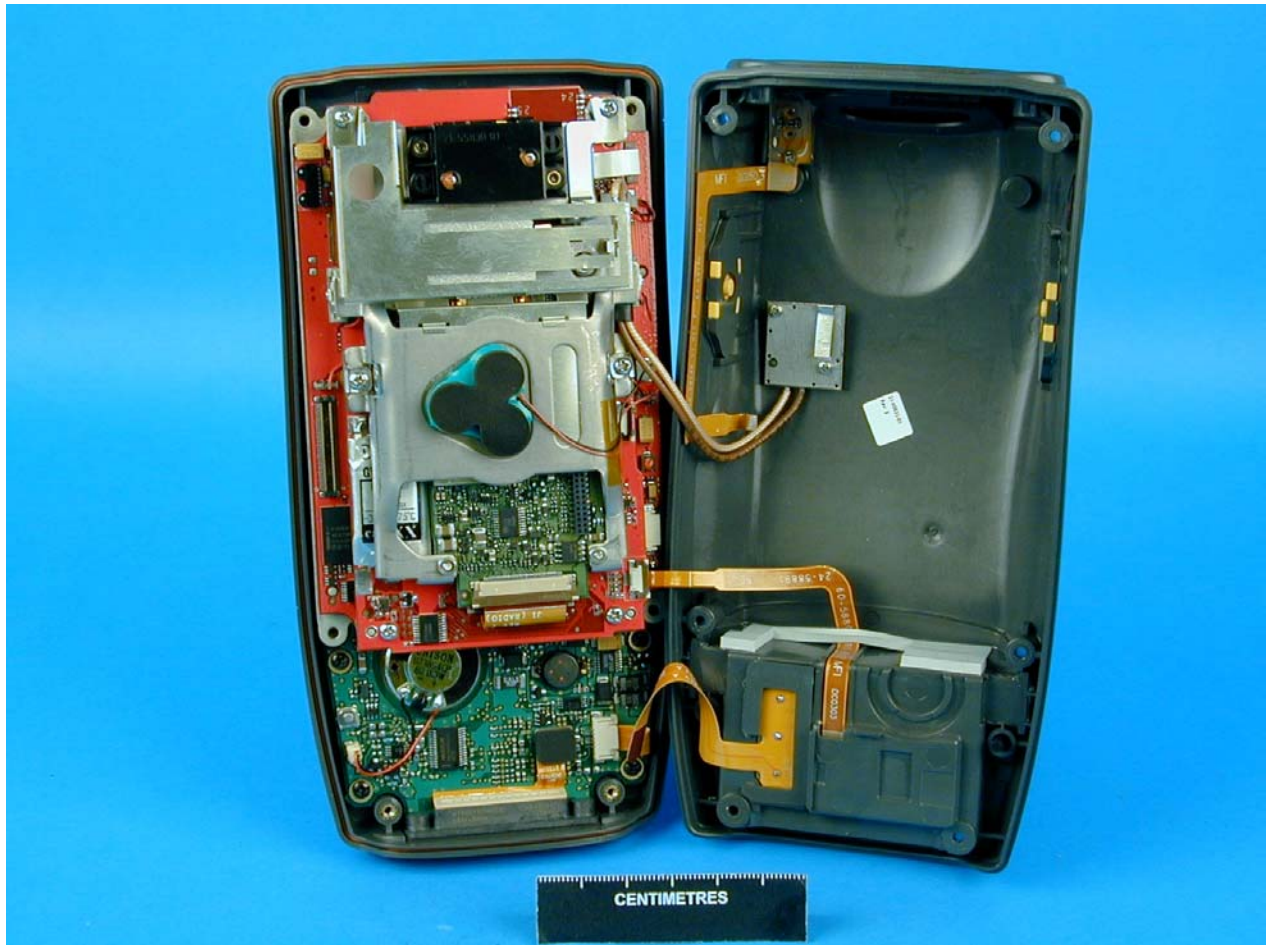
PDT8037
Side/Bottom View



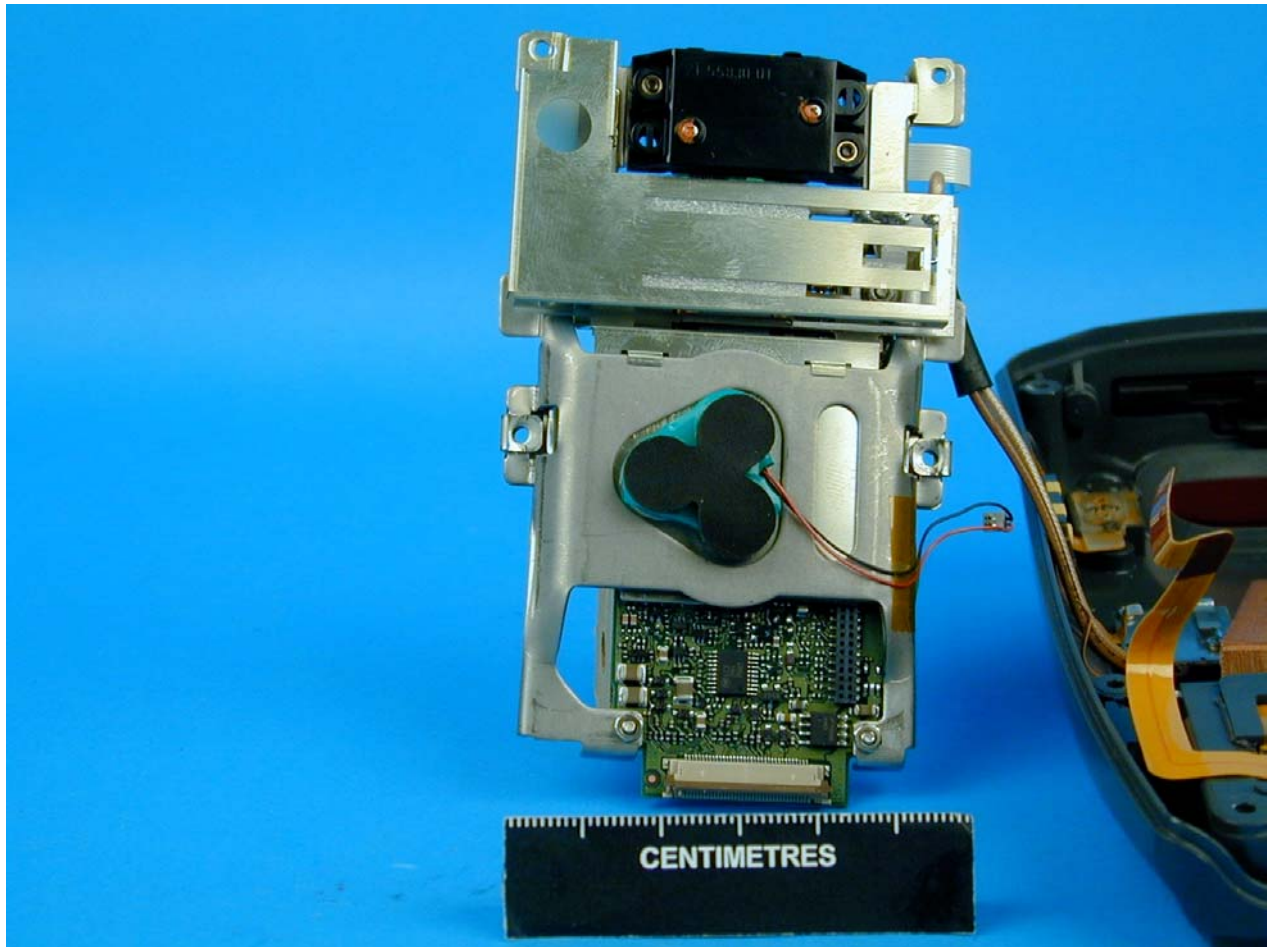
PDT8037
Side/Top View



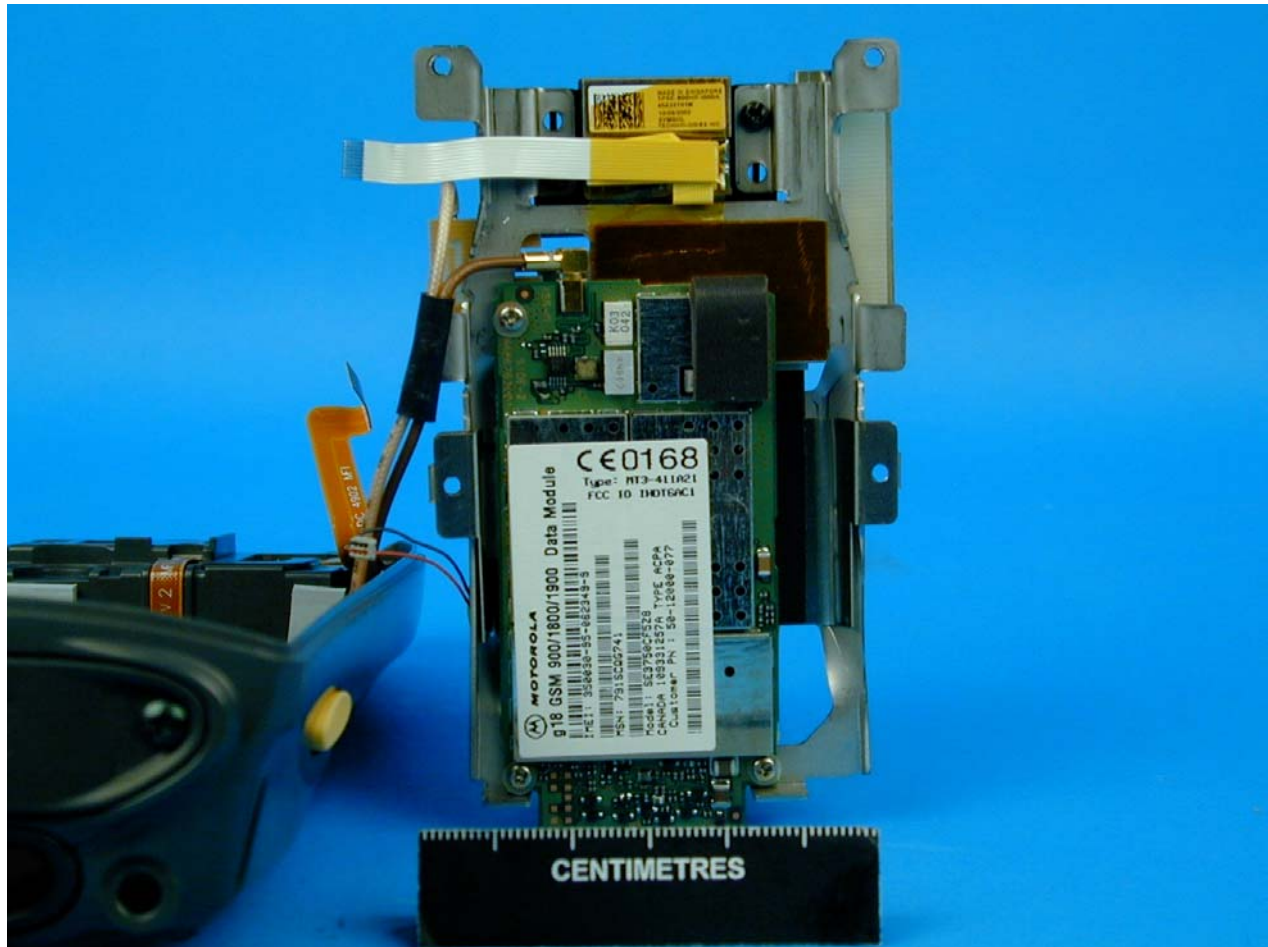
PDT8037
Rear View/ Battery Compartment



PDT8037
Internal 1



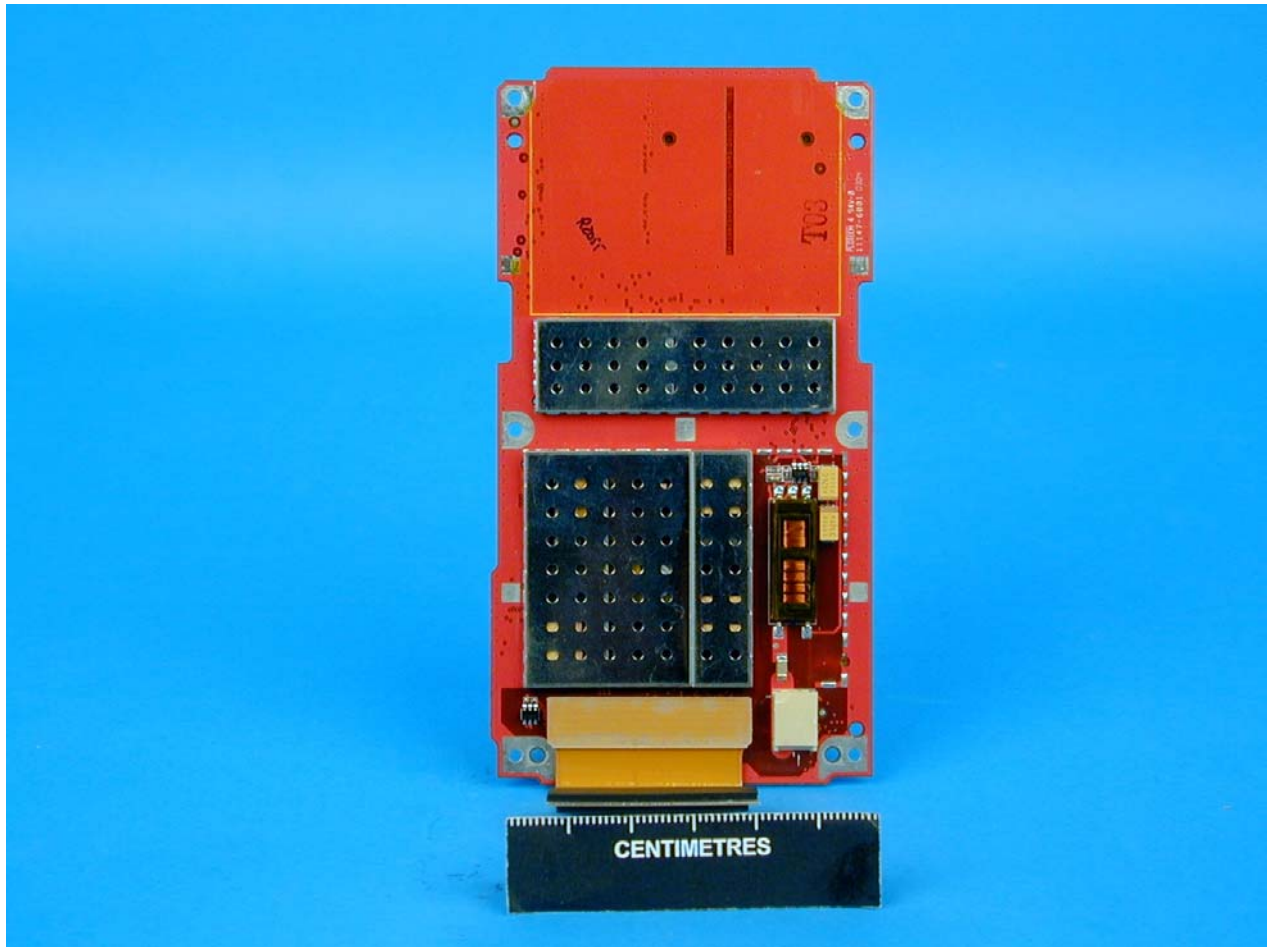
PDT8037
Internal View 2



PDT8037
Internal View 3



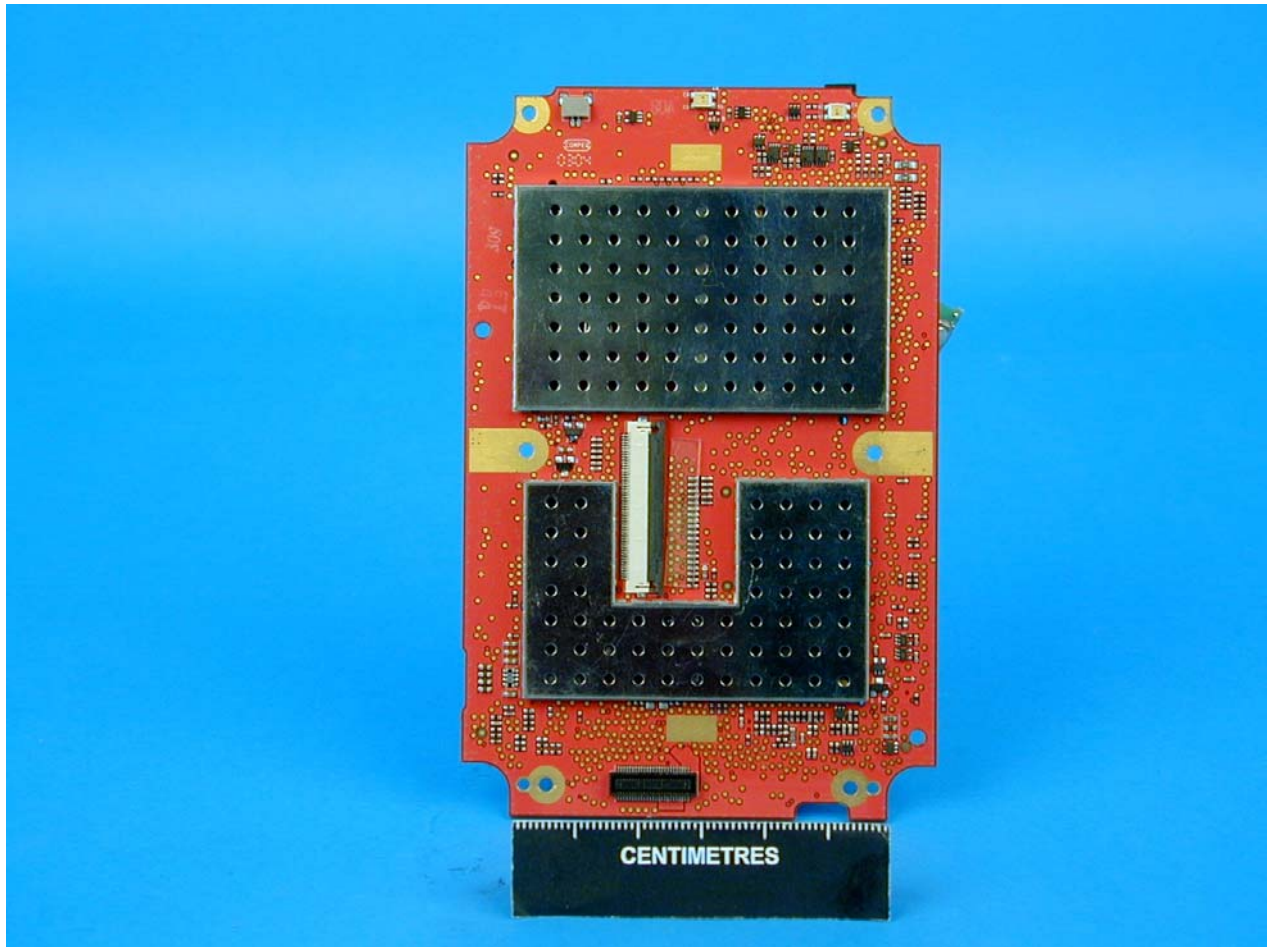
PDT8037
Internal View 4



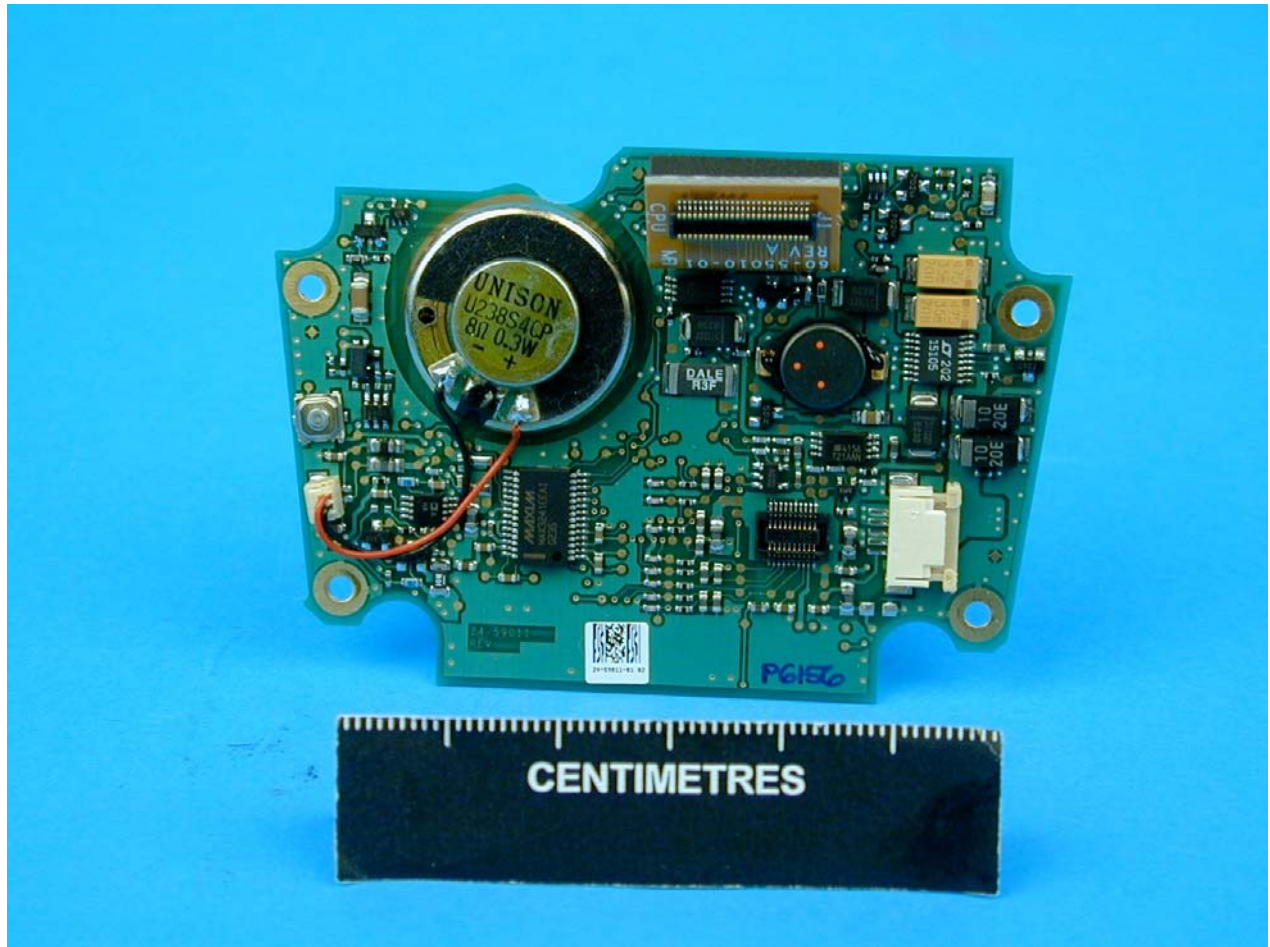
PDT8037
Internal View 5



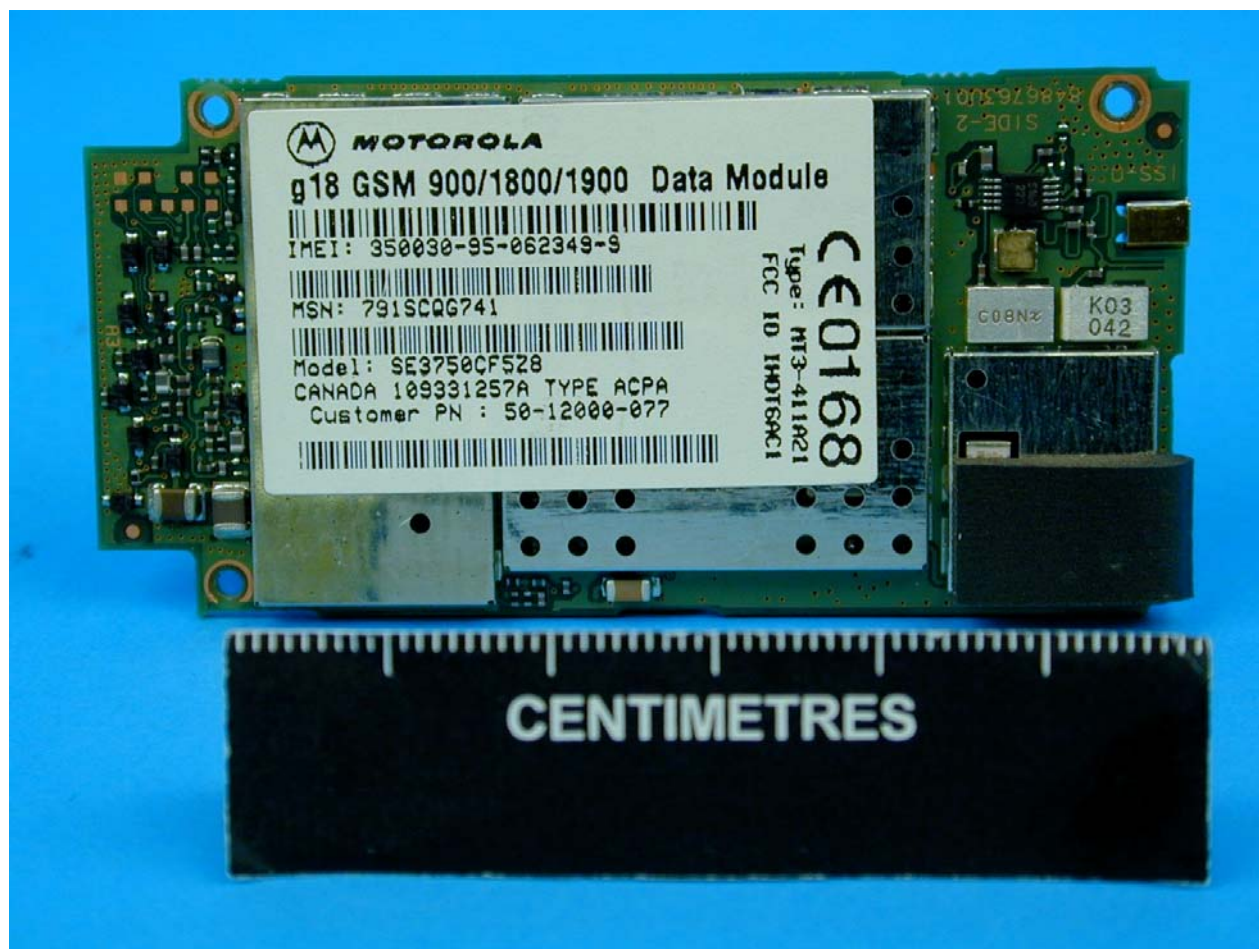
PDT8037
Internal View 6



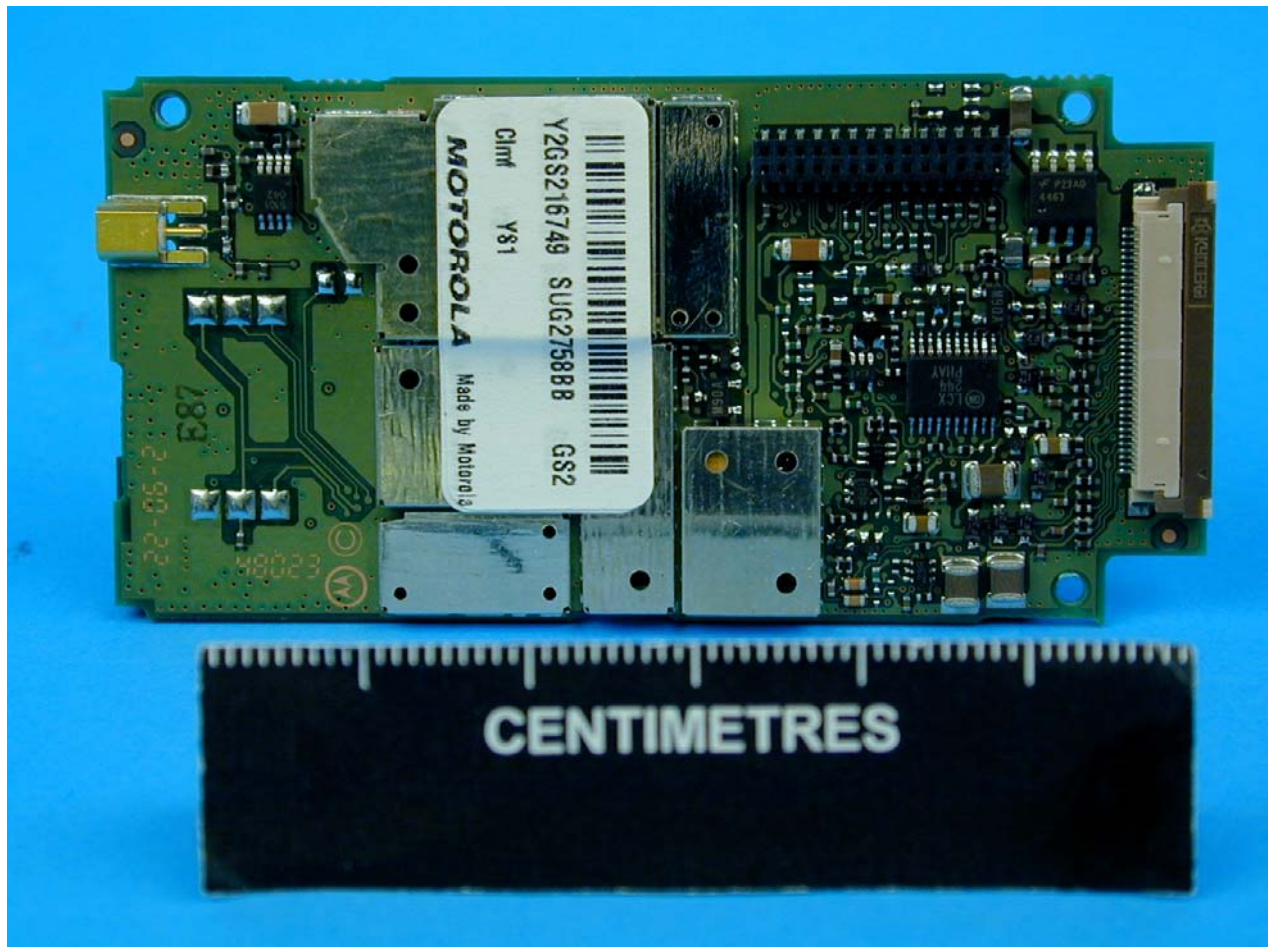
PDT8037
Internal View 7



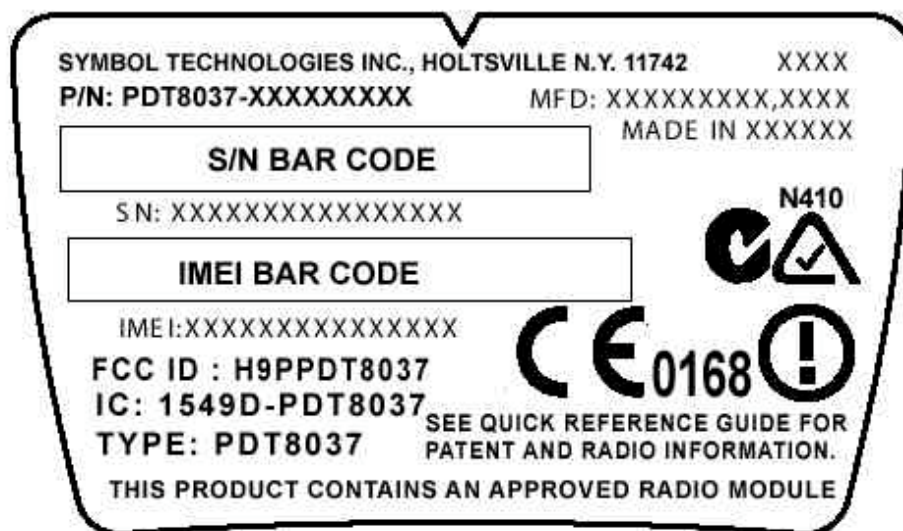
PDT8037
Internal View 8



PDT8037
Internal View 9



PDT8037
Internal View 10



PDT8037
Manufacturers Label Diagram



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

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Results of tests not yet included in our UKAS Accreditation Schedule are marked NUA
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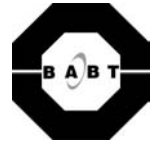
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Annex A

FCC Measurement Facility Compliance Letter

(comprising of 1 page)



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