



**TEST REPORT OF A HONEYWELL IMPACT
EXTREME MULTI GAS DETECTOR, BRAND
HONEYWELL,
MODEL IMPACT EXTREME**

**TESTED IN CONFORMITY WITH THE DFS
TECHNICAL REQUIREMENTS SPECIFICATION FOR
SLAVE DEVICES, CLAUSE 4.7.2.4 OF
ETSI EN 301 893 V1.5.1 AND FCC PART 15 (10-1-09
EDITION) SECTION 15.501**

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R&TTE, LVD, EMC Notified Body : 1856

TÜV Rheinland Electronic Products & Services (EPS) B.V.
P.O. Box 37
9350 AA Leek (NL)
Eiberkamp 10
9351 VT Leek (NL)

Telephone: +31 594 505005
Telefax: +31 594 504804

Internet: www.tuv-eps.com
E-mail: info@tuv-eps.com

Description of test item

Test item : Multi Gas Detector
Manufacturer : Honeywell
Brand : Honeywell
Model : Impact eXtreme
MAC address : 00 27 13 EA 2A 5E
Receipt date : May 4, 2011

Applicant information

Applicant's representative : Mr. Narasimha Charyulu
Company : Honeywell Technologies Solutions LAB PVT. LTD.
Address : Adarsh Sez Unit, Survey No 19/2, Devarabisanahalli Village,
Varthur Hobli, Bangalore East
Postal code : 560103
City : Bangalore
Country : India
Telephone number : +91-80-26588360
Telefax number : +91-80-39834455

Test(s) performed

Location : Leek
Test(s) started : February 10, 2012
Test(s) completed : February 10, 2012
Purpose of test(s) : Compliance with the DFS technical requirements specification for
Slave devices
Test specification(s) : Clause 4.7.2.4 of ETSI EN 301893 V1.5.1 and
FCC part 15 (10-1-09 Edition) section 15.501

Project leader : L. Koopmans



Test engineer(s) : M.C. Edwards van Muyen
O.H. Hoekstra



Report written by : M.C. Edwards van Muyen

Report approved by : O.H. Hoekstra



Report date : February 23, 2012

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The test results as indicated in this test report relate only to the item(s) tested.

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1 Remarks.

1.1 Applied standards.

The Honeywell Impact eXtreme Multi Gas Detector, brand Honeywell, model Impact eXtreme, has been tested in conformity with parts of the standard:

- ETSI EN 301 893 V1.5.1 (2008-12) "Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN; Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive"
- FCC part 15 (10-1-09 Edition) section 15.501

The uncertainty figures have been calculated in accordance with the methods as described in the ETR 100-028-1 and ETR 100-028-2 for the test methods as laid out in the ETSI EN 301 893 V1.5.1 (2008-12) document. The expansion factor used is 1.96, which provides a confidence level of 95% (Gaussian).

1.2 Description of the EUT.

The Honeywell Impact eXtreme Multi Gas Detector, brand Honeywell, model Impact eXtreme, is designed to operate in the 5 GHz frequency band, channels 36 to 64 (5150 MHz to 5350 MHz), channels 100 to 140 (5470 MHz to 5725 MHz) and utilizes OFDM modulation techniques.

1.3 Test modes of operation, test frequencies

5 GHz frequency band	Test frequencies (MHz)		
	<i>Frequency 1</i>	<i>Frequency 2</i>	<i>Frequency 3</i>
channels 36 to 64 (5150 MHz to 5350 MHz)	5260	5280	5320
channels 100 to 140 (5470 MHz to 5725 MHz)	5520	5560	5700

1.4 Description of test configuration.

Test item

Description	: Honeywell Impact eXtreme Multi Gas Detector
Manufacturer	: Honeywell
Brand	: Honeywell
Model	: Impact eXtreme
MAC address	: 00 27 13 EA 2A 5E
Voltage input rating	: 6 V _{dc}
Current input rating	: -
Remarks	: -

Auxiliary equipment 1

Description	: Cisco Aironet IOS Access Point
Manufacturer	: Cisco
Brand	: Cisco
Model	: AIR-AP1252AG-E-K9
MAC address	: -
Voltage input rating	: 56 V _{dc}
Current input rating	: -
Remarks	: Access Point with a radar signal detection mechanism.

Auxiliary equipment 2

Description	: Power supply
Manufacturer	: Voltcraft
Model	: PS 303 Pro
Voltage input rating	: 230 V _{ac}
Current input rating	: -
Adjusted output voltage	: 6 V _{dc}
Remarks	: power supply for the Honeywell Impact eXtreme device.

The Honeywell Impact eXtreme Multi Gas Detector, brand Honeywell, model Impact eXtreme, will be referred to as EUT for the purpose of this test report.

2 Test conditions.

2.1 General.

The purpose of this test is to check the channel shutdown and the channel move time for slave devices, comparing with the limits of the applied standard. The EUT is configured as slave device. The Cisco Aironet IOS access point is configured as master device and has a built-in radar signal detection mechanism for the 5 GHz frequency band. The block diagram of the test setup is shown below.

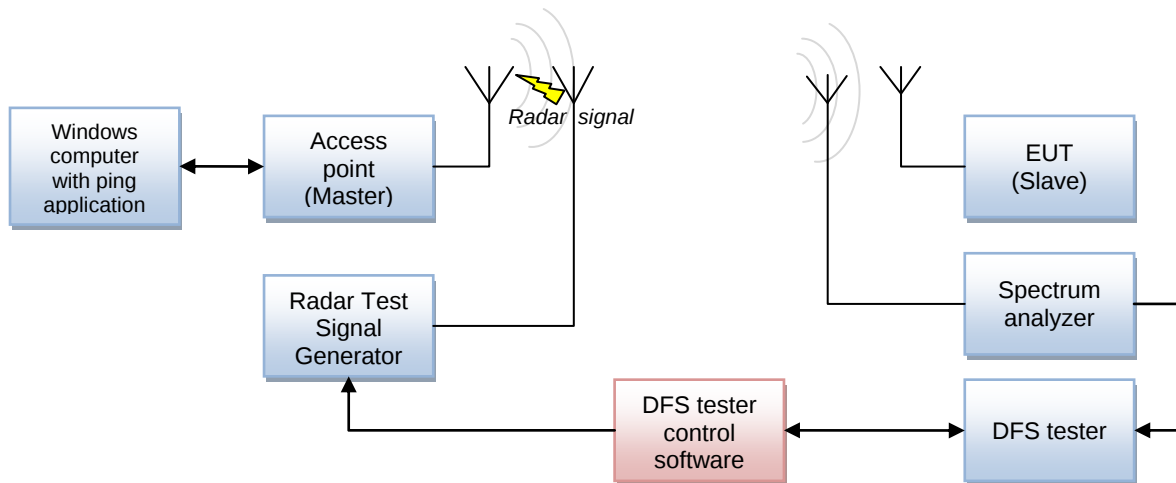


Figure: 1 Test setup DFS test for slave devices

A wireless connection between the EUT and the access point is established. Via the ping application a continuously ping command will send to the EUT to transfer data. The ping application will also be used to monitor the connection. When a time out error appears, this indicates that the connection between the access point and the EUT is lost. The input level of the DFS tester is adjusted so that it only pickups the radio signal of the EUT. The spectrum is set into zero span mode to monitor the broadcasts of the EUT in time domain.

A radar signal of 18 pulses with a pulse width of 1 μ s and a pulse repetition frequency of 700 pps, will be broadcasted. The Access point detects the radar signal and instructs the EUT to stop transmitting on current radio channel and move to another channel. The time of stopping the broadcast on the current radio channel and moving to another channel, will be measured with the DFS tester. The DFS tester control software displays the measured values.

2.2 Standard test conditions.

Environmental condition	Parameter	Range
Temperature	°C	+20 to +23
Relative humidity	%	40 – 60
Supply voltage EUT	Volts DC/AC	6

2.3 Extreme test conditions.

Not applicable for DFS testing.

3 Essential test suites (overview).

An overview of radio test suites, as laid out in ETSI EN 301 893 V1.5.1, and a summary of test results is given below.

3.1 Transmitter test suites and overview of results.

Essential radio test suite (EN 301 893 V1.5.1)	Applicable	Report clause	Compliance results
Carrier frequencies	No	4.1	-
Nominal, and occupied, channel bandwidth	No	4.2	-
RF output power	No	4.3	-
Transmit Power Control	No	4.4	-
Power Density	No	4.5	-
Transmitter unwanted emissions outside the 5 GHz RLAN bands - conducted	No	4.6	-
Transmitter unwanted emissions outside the 5 GHz RLAN bands - radiated	No	4.7	-

3.2 Receiver test suites and overview of results.

Essential radio test suite	Applicable	Report clause	Compliance results
Spurious radiations - conducted	No	5.1	-
Spurious radiations - radiated	No	5.2	-
DFS: Channel Availability Check	No	6.1	-
DFS: In service Monitoring	No	6.2	-
DFS: Channel shutdown	Yes	6.3	Pass
DFS: Non-occupancy period	No	6.4	-
DFS: Uniform spreading	No	6.5	-

4 Transmitter test results.

4.1 Carrier frequencies.

Not applicable. Not requested by applicant.

4.2 Nominal, and occupied, channel bandwidth.

Not applicable. Not requested by applicant.

4.3 RF output power at the highest power level.

Not applicable. Not requested by applicant.

4.4 RF output power at the lowest power level of the TPC range.

Not applicable. Not requested by applicant.

4.5 Power density at the highest power level.

Not applicable. Not requested by applicant.

5 Receiver test results.

5.1 Receiver conducted emissions.

Not applicable. Not requested by applicant.

5.2 Receiver radiated spurious emissions.

Not applicable. Not requested by applicant.

6 Dynamic frequency selection (DFS).

6.1 Channel Availability Check (clause 4.7.2.1).

Not applicable, the EUT is a slave RLAN device without radar detection.
Therefore the Channel Availability Check is not required.

6.2 In-Service Monitoring (clause 4.7.2.2).

Not applicable, the EUT is a slave RLAN device without radar detection.
Therefore the In-Service Monitoring is not required.

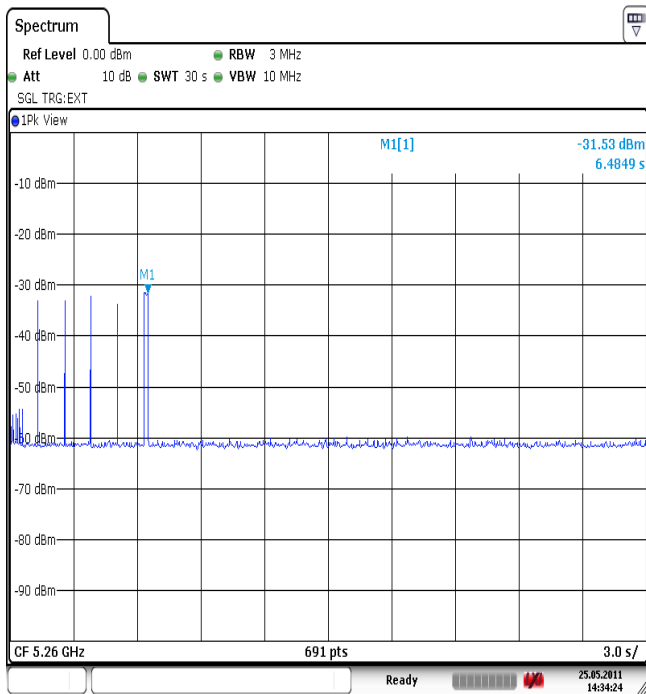
6.3 Channel Shutdown (clause 4.7.2.3).

Band 1

Test frequency 5260 MHz	Measured	Limits	
		ETSI	FCC part 15
Channel Move Time (ms)	6484.89	10000	10000
Channel Closing Transmission Time (ms)	35.98	1000	200
Measurement uncertainty	0.1% ± 21 µs		

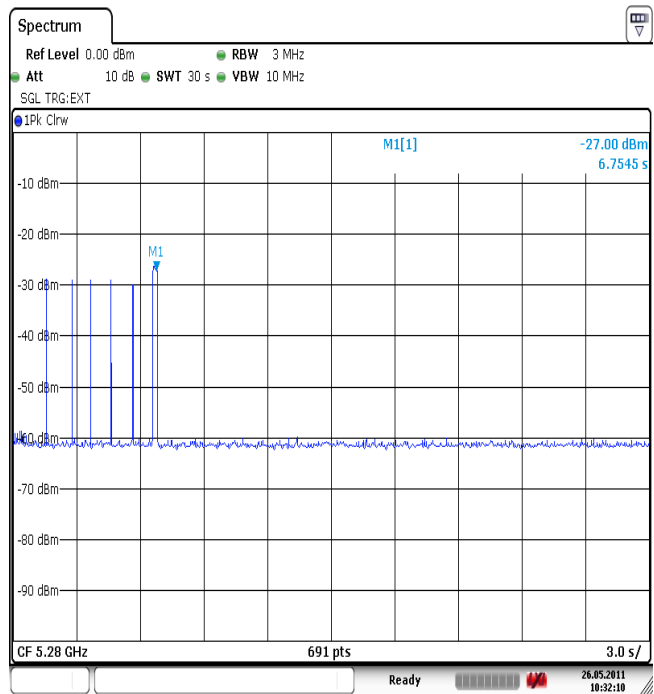
Test frequency 5280 MHz	Measured	Limits	
		ETSI	FCC part 15
Channel Move Time (ms)	6754.58	10000	10000
Channel Closing Transmission Time (ms)	35.02	1000	200
Measurement uncertainty	0.1% ± 21 µs		

Test frequency 5320 MHz	Measured	Limits	
		ETSI	FCC part 15
Channel Move Time (ms)	4450.54	10000	10000
Channel Closing Transmission Time (ms)	34.27	1000	200
Measurement uncertainty	0.1% ± 21 µs		



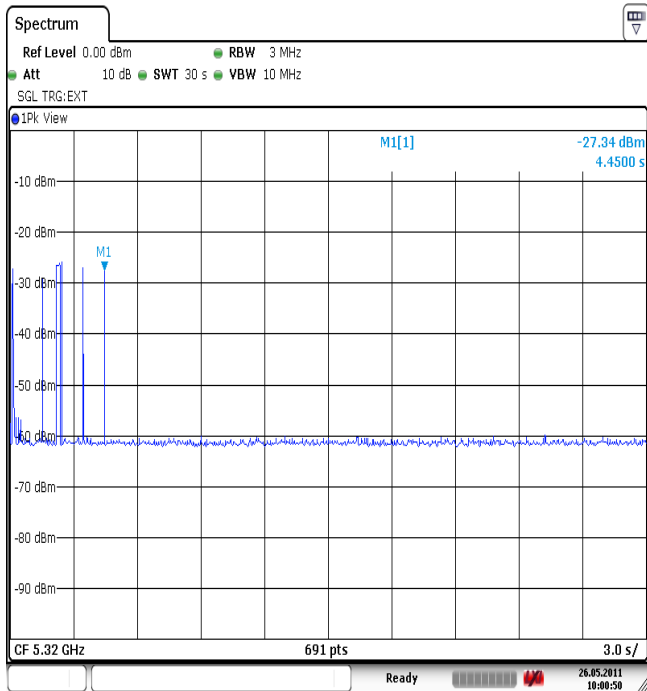
Date: 25.MAY.2011 14:34:24

Radio channel 5260 MHz



Date: 26.MAY.2011 10:32:11

Radio channel 5280 MHz



Date: 26.MAY.2011 10:00:50

Radio channel 5320 MHz

Band 2

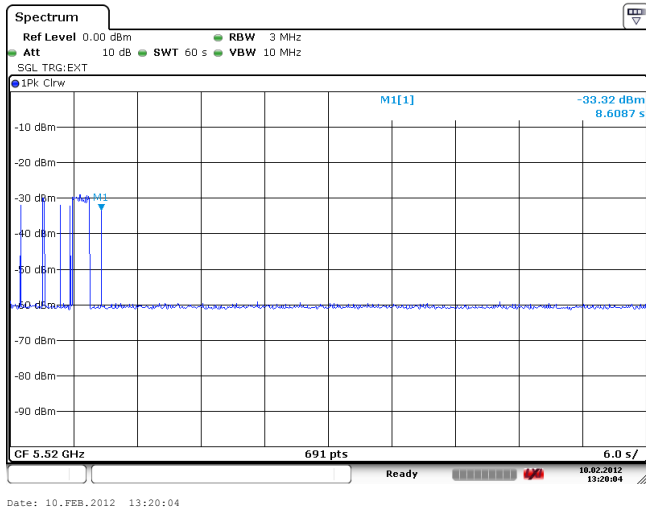
Test frequency 5520 MHz	Measured	Limits	
		ETSI	FCC part 15
Channel Move Time (ms)	8609.91	10000	10000
Channel Closing Transmission Time (ms)	92.35	1000	200
Measurement uncertainty	0.1% ± 21 µs		

Test frequency 5560 MHz	Measured	Limits	
		ETSI	FCC part 15
Channel Move Time (ms)	9324.32	10000	10000
Channel Closing Transmission Time (ms)	19.76	1000	200
Measurement uncertainty	0.1% ± 21 µs		

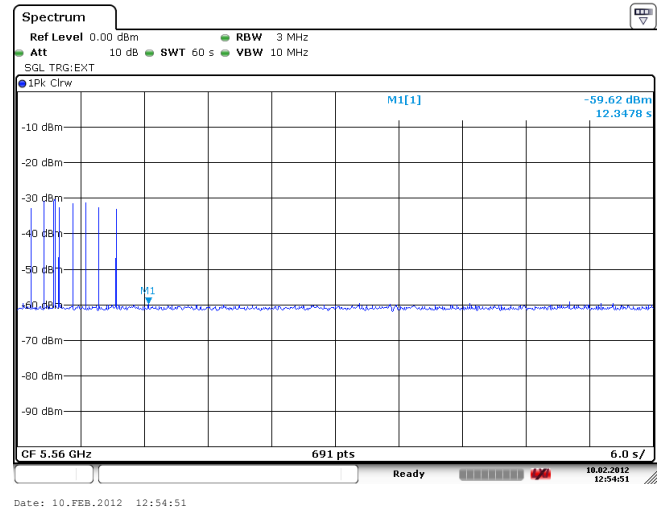
Test frequency 5700 MHz	Measured	Limits	
		ETSI	FCC part 15
Channel Move Time (ms)	0.00	10000	10000
Channel Closing Transmission Time (ms)	0.00	1000	200
Measurement uncertainty	0.1% ± 21 µs		

Note:

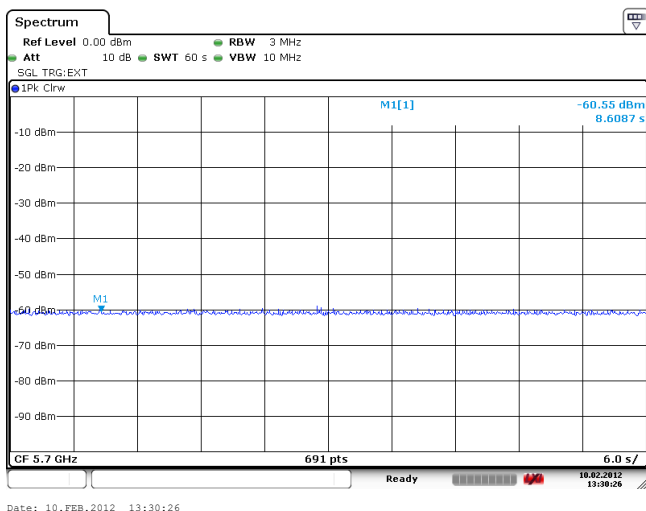
Channel Move Time was shorter than the duration of the radar burst. Therefore, the measured time is 0.00 ms.



Radio channel 5520 MHz



Radio channel 5560 MHz



Radio channel 5700 MHz

Note: disconnected within the radar burst.

Note: tested with a Cisco Aironet 108 Access Point, model AIR-AP1252AG-E-K9.

6.3.1 Limits ETSI (clause 4.7.2.3.2).

The Channel Shutdown process shall start immediately after a radar signal has been detected.

The Channel Move Time shall not exceed 10 s.

The Channel Closing Transmission Time shall not exceed 1000 ms.

6.3.2 Limits FCC part 15 (section 15.501).

The Channel Move Time shall not exceed 10 s.

The Channel Closing Transmission Time shall not exceed 200 ms.

6.3.3 Test equipment used (for reference see equipment list).

12520	12559	13526	13664	99538
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6.4 Non-Occupancy Period (clause 4.7.2.4).

Not applicable, the EUT is a slave RLAN device without radar detection.
Therefore the Non-Occupancy Period is not required.

6.5 Uniform Spreading (clause 4.7.2.5).

Not applicable, the EUT is a slave RLAN device without radar detection.
Therefore the Uniform Spreading is not required.

6.6 Medium Access Protocol

A medium access protocol is implemented in the equipment and is active under all circumstances.

6.6.1 Requirements (clause 4.8.2).

A medium access protocol shall be implemented by the equipment and shall be active under all circumstances.

6.7 User Access Restrictions

DFS controls (hardware and software) related to radar detection are not accessible to the user. The DFS requirements described in clauses 4.7.2.1 to 4.7.2.6 can neither be disabled or altered by the user.

6.7.1 Requirements (clause 4.9.2).

DFS controls (hardware or software) related to radar detection shall not be accessible to the user so that the DFS requirements described in clauses 4.7.2.1 to 4.7.2.6 can neither be disabled or altered.

7 Test equipment and ancillaries used for tests.

To facilitate inclusion of the test equipment, used for performing the tests, on each page of this test report, each item of test equipment and ancillaries, such as cables, must be identified (numbered) by the test laboratory.

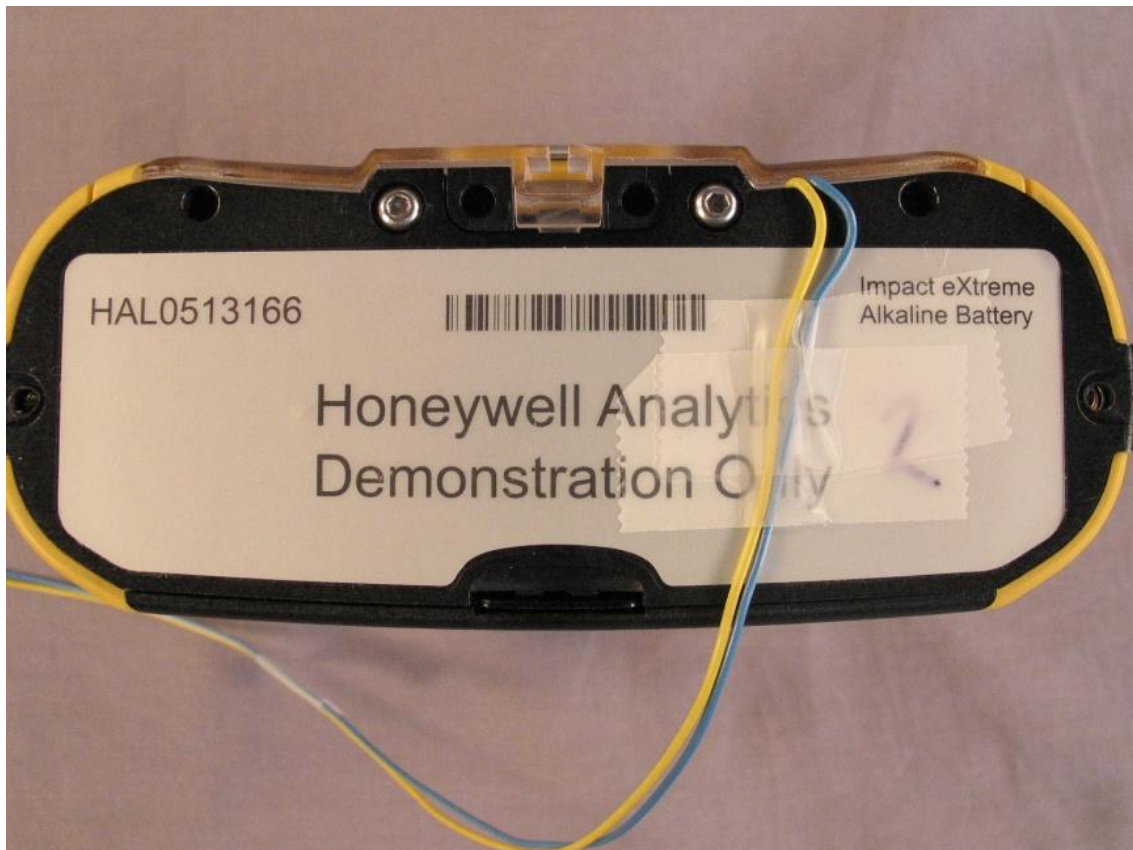
Inventory number	Description	Brand	Model
12482	Loop antenna	EMCO	6507
12483	Guidehorn	EMCO	3115
12484	Guidehorn	EMCO	3115
12488	Guidehorn 18 - 26.5 GHz	EMCO	RA42-K-F-4B-C
12520	Signal generator	Tabor	8201
12533	Signalgenerator	MARCONI	2032
12559	Digital storage oscilloscope	Le Croy	9310M
12561	DC Power Supply 20A/70V	DELTA	SM7020D
12605	Calibrated dipole 28MHz-1GHz	Emco	3121c
12640	Temperature chamber	Heraeus	VEM03/500
13452	Digital multi meter	HP	34401A
13526	Signalgenerator 20 GHz	Hewlett & Packard	83620A
13664	Spectrum analyzer	HP	HP8593E
13886	Open Area testsite	Comtest	--
14051	Anechoic room	Comtest	--
15633	Biconilog Test antenna	Chase	CBL 6111B
15667	Measuring receiver	R&S	ESCS 30
99045	DC Power Supply 3A/30V	DELTA	E030/3
99061	Non-conducting support 150cm	--	--
99077	Regulating trafo	RFT	LTS006
99538	Spectrum analyzer	Rohde & Schwarz	FSP40
99550	DFS test tool	TNO	TNO
99576	Peak power meter	Agilent	N1911A
99577	Peak power sensor	Agilent	N1921A
99606	Band filter / preamplifier system	EMCS	RFS06S
99733	Signal Analyzer/Spectrum Analyzer	Rohde & Schwarz	FSV30
99737	Cable RF	Huber + Suhner	Sucotest 18/Sucoflex 102
99738	Cable RF	Huber + Suhner	Sucotest 18/Sucoflex 102

8 Photographs of the EUT.

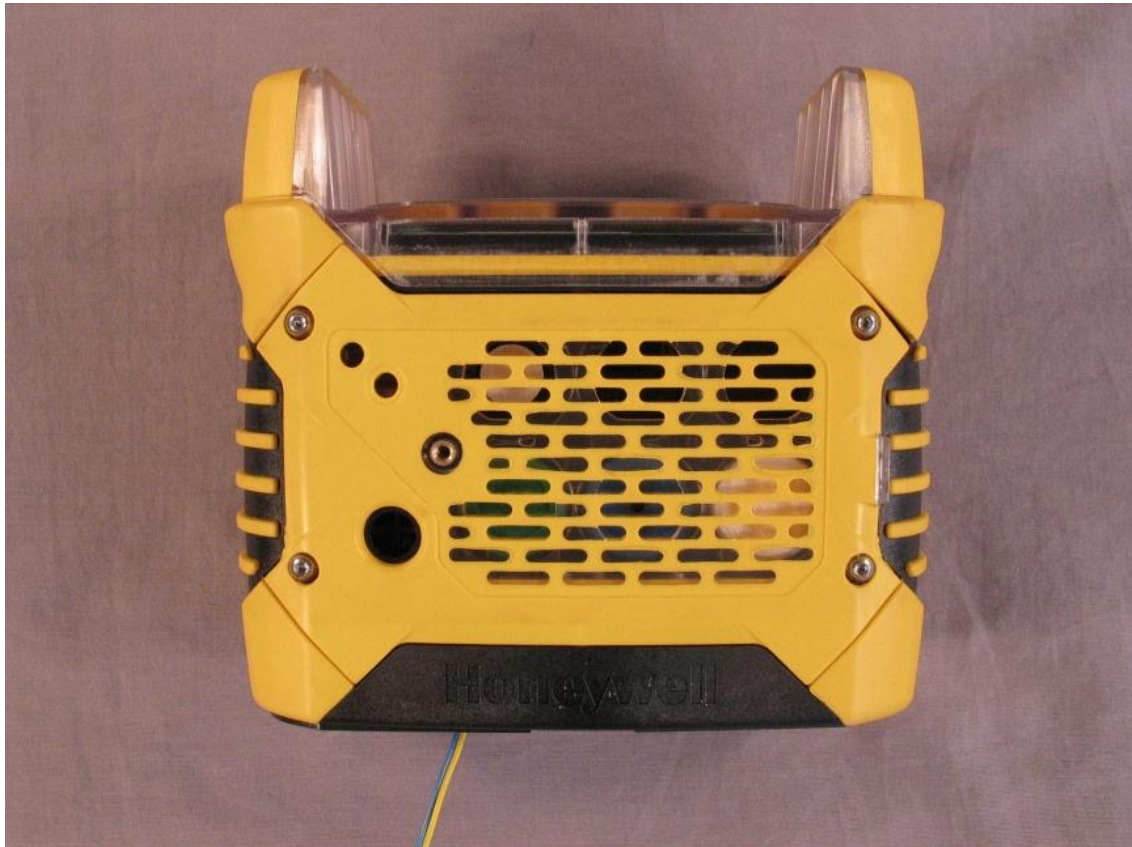
8.1.1 Front view of EUT.



8.1.2 Rear view of EUT.



8.1.3 Top view of EUT.



8.1.4 Bottom view of EUT.

