Accredited testing-laboratory

DAR registration number: DAT-P-176/94-D1

Federal Motor Transport Authority (KBA)
DAR registration number: KBA-P 00070-97

Recognized by the Federal Communications Commission
Anechoic chamber registration no.: 90462 (FCC)
Anechoic chamber registration no.: 3463A-1 (IC)
Certification ID: DE 0001
Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

Test report no.	**:**	**1-0345-07-03a/08**
Type identification	**:**	**GlobeSurfer 311**
Applicant	**:**	**Option N.V.**
FCC ID	**:**	**NCMOGS0311**
IC Certification No	**:**	**-**
Test standards	**:**	**ANSI/IEEE C95.1-1992** **ANSI/IEEE C95.3-1992** **FCC OET Bulletin 65, Supplement C (Edition 01-01)** **RSS-102 Issue 2**

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1 General information

1.1 Notes

The test results of this test report relate exclusively to the test item specified in 3.1.1. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalisations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of the CETECOM ICT Services GmbH.

Test laboratory manager:

2008-08-25	**Stefan Bös**	
Date	Name	Signature

Technical responsibility for area of testing:

2008-08-25	**Michael Berg**	
Date	Name	Signature

1.2 Testing laboratory

CETECOM ICT Services GmbH

Untertürkheimer Straße 6 - 10
66117 Saarbrücken
Germany
Phone: + 49 681 5 98 - 0
Fax: + 49 681 5 98 - 9075
e-mail: info@ICT.cetecom.de
Internet: http://www.cetecom-ict.de

State of accreditation: **The test laboratory (area of testing) is accredited according to DIN EN ISO/IEC 17025**
DAR registration number: DAT-P-176/94-D1

Accredited by: **Federal Motor Transport Authority (KBA)**
DAR registration number: KBA-P 00070-97

Testing location, if different from CETECOM ICT Services GmbH:

Name :
Street :
Town :
Country :
Phone :
Fax :

1.3 Details of applicant

Name:	**Option N.V.**
Street:	**Gaston Geenslaan 14**
Town:	**3001 Leuven**
Country:	**BELGIUM**
Telephone:	**+32 16 317 411**
Fax:	**+32 16 207 164**
Contact:	**Thomas Gulinck**
E-mail:	**T.Gulinck@option.com**
Telephone:	**+32 16 311 694**

1.4 Application details

Date of receipt of order:	**2008-07-17**
Date of receipt of test item:	**2008-08-12**
Date of start test:	**2008-08-12**
Date of end test	**2008-08-21**
Persons(s) who have been present during the test:	**-**

2 Test standard/s:

The EUT has been shown to be compliant for colocated Maximum Permissible Exposure (MPE) for uncontrolled environment / general population exposure limits specified in ANSI/IEEE Std. C95.1-1992 and has been tested in accordance with the measurement procedures specified in ANSI/IEEE Std. C95.3-1992. This device complies with the rules and regulations specified for Maximum Permissible Exposure (MPE) by the Federal Communications Commission described in FCC OET Bulletin 65 (01-01) and Industry Canada´s Radio Standard Specification RSS-102 Issue 2 (11-05)

3 Technical tests

3.1 Details of manufacturer

Name:	**Option N.V.**
Street:	**Gaston Geenslaan 14**
Town:	**3001 Leuven**
Country:	**BELGIUM**

3.1.1 Test item

Kind of test item	:	**Router mit GSM / W-CDMA Module (850/900/1800/1900/FDD I/FDD VIII), GPRS, EGPRS, HSDPA, HSUPA and WLAN b/g-mode**
Type identification	:	**GlobeSurfer 311**
S/N serial number	:	**GT248780JK**
HW hardware status	:	**2.0**
SW software status	:	**R1A12**
Frequency Band [MHz]	:	**ISM 2.400 - 2.483,5 (WLAN)** **1850.2 – 1909.8 MHz and 824.2 – 848.8 MHz (GSM)**
Antenna	:	**Integrated pcb-antenna for each mode (colocated)**
Power Supply	:	**5.0 V DC via external power supply / 230 V AC**
Temperature Range	:	**-10 °C to 55 °C**

3.1.2 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T_{nom}	°C	**23**
Nominal Humidity	H_{nom}	%	**63**
Nominal Power Source	V_{nom}	V	**5.0**

Type of power source: DC via external power supply / 230V AC
(Type: PHIHONG PSA15R-050P)

4 MPE Measurement Guidelines

The safety limits used for the RF exposure environmental measurements are based on the criteria published by the American Standard Institute (ANSI) for colocated MPE in IEEE/ANSI C95.1-1992 standard for safety levels with respect to human exposure to radio frequency electromagnetic fields, 3 kHz – 300 GHz. The measurement procedure described in ANSI/IEEE C95.3-1992 recommended practice for the measurement of potentially hazardous electromagnetic fields – RF and microwave is used for guidance in measuring MPE due to RF exposure from the particular transmitting device. The new guidelines incorporate limits for MPE in terms of electric and magnetic field strength, and power density for transmitters operating at frequencies between 300 kHz and 100 GHz. The criteria for MPE evaluation is also described in FCC Bulletin 65, Supplement C (01-01), Evaluating compliance with FCC guidelines for human exposure to radio frequency electromagnetic fields and Industry Canada´s radio standard specification RSS-102 Issue 2, evaluation procedure for mobile and portable radio transmitterswith respect to health canada´s safety code 6 for exposure of humans to radio frequency fields.

4.1 MPE Definition

MPE is the RMS and peak electric and magnetic field strength, their squares, or the plane-wave equivalent power densities associated with these fields to which a person may be exposed without harmful effect, and with an acceptable safety factor.

The MPE prescribed by the standard are set in terms of different parameters of effects, depending on the frequency generated by the device. The MPE levels are set in terms of power density, whose definition and relationship to electric and magnetic field strengths are described by the following equation:

$$S(mW / cm^2) = \frac{E^2}{3770} = 37.7\ H^2$$

Where:

S = Power density (mW/cm²)
Power per unit area normal to the direction of propagation usually expressed in units of watts per square meter (W/m²), or units of milliwatts per square centimeter (mW/cm²). For plane waves, power density, electric field strength (E), and magnetic field strength (H) are related by the impedance of free space (377Ω).

E = Electric Field Strength (V/m)

H = Magnetic Field Strength (A/m)

4.1.1 Radiated measurements

The radiated measurements are performed in fully-anechoic chambers. The EUT is positioned on a non-conductive support which is positioned on a turntable. The receiving field probe is fix placed. The measurement distance between EUT and field probe is 20 cm. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.

4.2 MPE Limits

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm²)	Averaging Time |E|², |H|² or S (minutes)
0.3 – 3.0	614	1.63	(100)*	6
3.0 – 30	1842/f	4.89/f	(900/f²)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	--	--	f/300	6
1500 – 100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm²)	Averaging Time |E|², |H|² or S (minutes)
0.3 – 1.34	614	1.63	(100)*	30
1.34 – 30	824/f	2.19/f	(180/f²)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	--	--	f/1500	30
1500 – 100,000	--	--	1.0	30

f = frequency in MHz *Plane-wave equivalent power density

Note 1: ***Occupational/controlled limits*** apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2: ***General population/uncontrolled limits*** exposure apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

5 Details of MPE evaluation

The EUT supports the following services:

- GSM850, incl GPRS / EGPRS (Multislot class:12)
- GSM1900, incl GPRS / EGPRS (Multislot class:12)
- UMTS FDD I, incl Rel-5 and Rel-6
- UMTS FDD VIII, incl Rel-5 and Rel-6
- WIFI 2.4GHz b-mode (DSSS)
- WIFI 2.4GHz g-mode (OFDM)

The distance of the transmit antenna of radio and WIFI is less than 5 cm. This requires a MPE evaluation for colocated conditions. For the measurements these mode-settings were selected which result in the maximum MPE values in single mode.

1) The EUT was placed on the turntable in the first measurement position (see photo 1) and the probe was fixed in a measurement distance of 20cm from the radiating antenna.
2) The turntable was positioned so that the initial start angle was 0 degrees.
3) The EUT was powered on an allowed sufficient time to stabilize. The EUT was operated at full power in both modes with maximal conditions. (Radio and WIFI at the same time) Settings according setup 1(see chapter 6).
4) The probe was set for maximum hold and set on the appropriate power range.
5) The turntable was rotated 360 degrees and the maximum reading was obtained for that measurement position.
6) The EUT was positioned in the second measurement position (see Photo 2) and step 2 – 5 were repeated.
7) The EUT was positioned in the third measurement position (see Photo 3) and step 2 – 5 were repeated.
8) The maximum value of these three measurements was documented.
9) Repeat step 3 to 8 with settings according setup 2 (see chapter 6).

Photo 1:

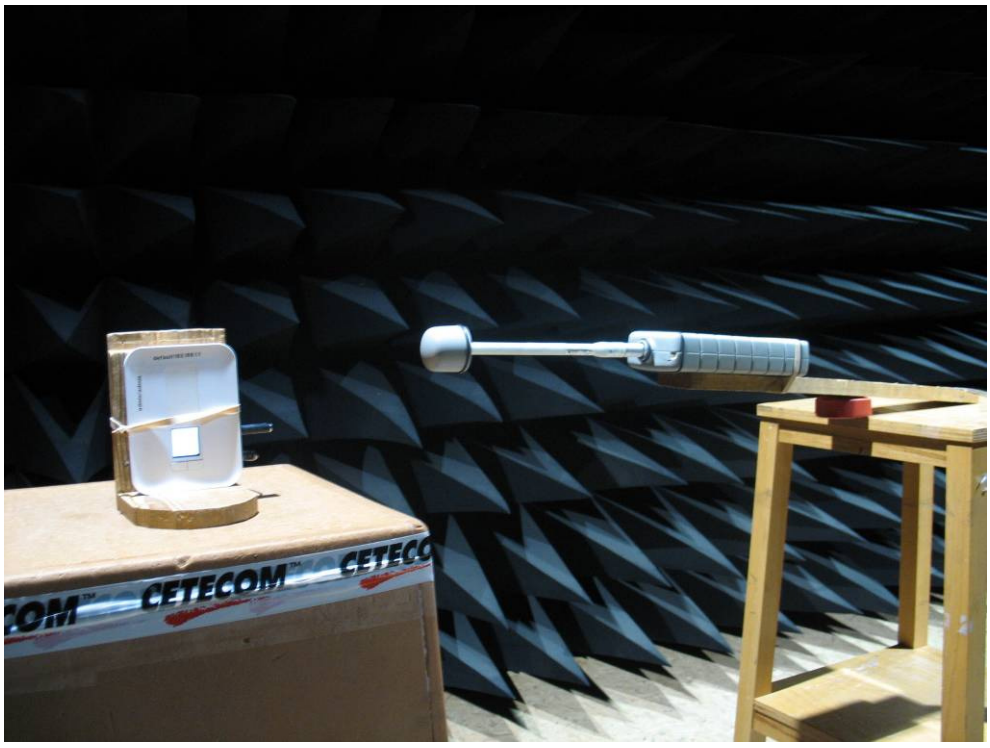
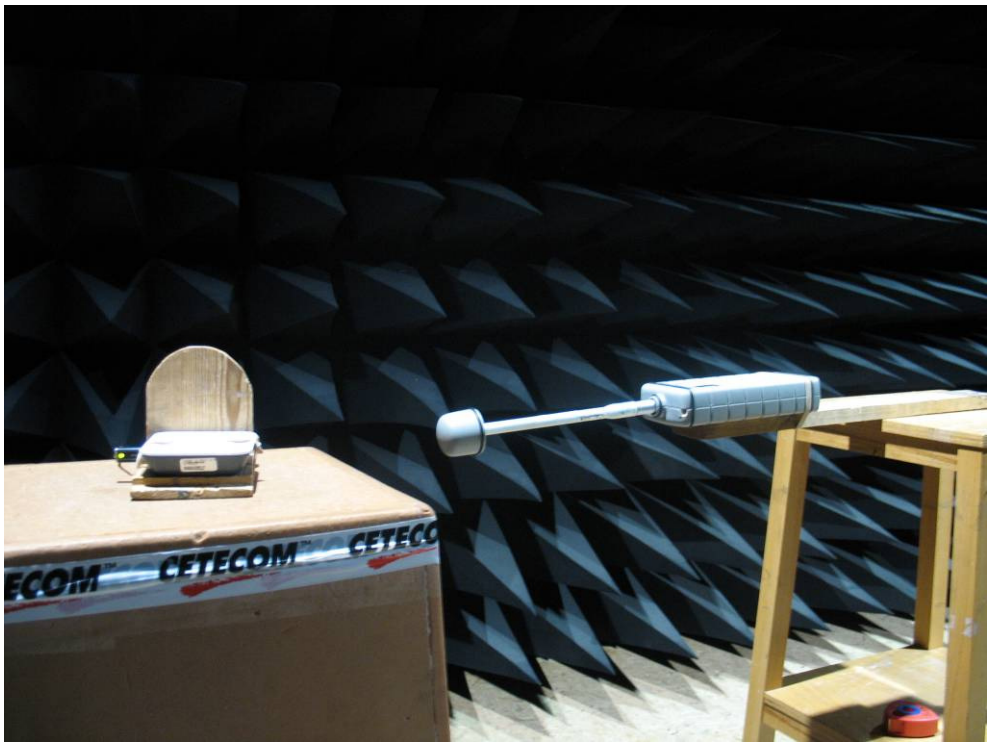


Photo 2:

Photo 3:



6 Result of MPE evaluation

The following modes represent the maximum MPE values for single mode:

1st Setup:

1) GSM: 850 MHz-band, channel 251, GFSK-mode
2) WIFI: DSSS-mode, channel 1, datarate 11Mbit/s

2nd Setup:

3) GSM: 1900 MHz-band, channel 512, GFSK-mode
4) WIFI: DSSS-mode, channel 1, datarate 11Mbit/s

The measurement was performed at three setups. The following photo shows the EUT positioning with the highest result:

Photo 1:

Maximum recorded field strength: Setup 1: 12.4 V/m @ 20cm

Setup 2: 11.6 V/m @ 20cm

Calculation: $S(mW / cm^2) = \frac{E^2}{3770} = 37.7\ H^2$

Result: **Setup 1:** **S = 0.041 mW/cm² @ 20cm**

Setup 2: **S = 0.036 mW/cm² @ 20cm**

7 Test equipment and ancillaries used for tests

To simplify the identification on each page of the test equipment used, on each page of the test report, each item of test equipment and ancillaries such as cables are identified (numbered) by the Test Laboratory, below.

BITTE LÖSCHEN WAS NICHT BENUTZT WURDE
Anechoic chamber C:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Anechoic chamber	MWB	87400/02	300000996	Monthly verification		
2	System-Rack 85900	HP I.V.	*	300000222	n.a.		
3	Measurement System 1						
4	Spektrum Analyzer 8566B	HP	2747A05306	300001000	05.10.2006	24	05.10.2008
5	Spektrum Analyzer Display 85662A	HP	2816A16541	300002297	05.10.2006	24	05.10.2008
6	Quasi-Peak-Adapter 85650A	HP	2811A01131	300000999	05.10.2006	24	05.10.2008
7	RF-Preselector 85685A	HP	2837A00779	300000218	08.11.2006	24	08.11.2008
8	PC Vectra VL	HP		300001688	n.a.		
9	Software EMI	HP		300000983	n.a.		
10	Measurement System 2						
11	FSP 30	R&S	100623	ICT 300003464	05.10.2007	24	15.10.2009
12	PC	F+W			n.a.		
13	TILE	TILE			n.a.		
14	Biconical antenna	EMCO	S/N: 860 942/003		Monthly verification (System cal.)		
15	Log. Period. Antenna 3146	EMCO	2130	300001603	Monthly verification (System cal.)		
16	Double Ridged Antenna HP 3115P	EMCO	3088	300001032	Monthly verification (System cal.)		
17	Active Loop Antenna 6502	EMCO	2210	300001015	Monthly verification (System cal.)		
18	Power Supply 6032A	HP	2818A03450	300001040	12.05.2007	36	12.05.2010
19	Busisolator	Kontron		300001056	n.a.		
20	Leitungsteiler 11850C	HP		300000997	Monthly verification (System cal.)		
21	Power attenuator 8325	Byrd	1530	300001595	Monthly verification (System cal.)		
22	Band reject filter WRCG1855/1910	Wainwright	7	300003350	Monthly verification (System cal.)		
23	Band reject filter WRCG2400/2483	Wainwright	11	300003351	Monthly verification (System cal.)		
24	PMM	Electric and Magnetic Field Meter	PMM 8053	0220J10945	19.04.2007	24	19.04.2009
25	PMM	Electric Field Probe 100 kHz - 3 GHz	EP330	1010J10627	19.04.2007	24	19.04.2009
26	PMM	Electric Field Probe 1 MHz - 40 GHz	EP408	0000J10902	19.04.2007	24	19.04.2009
27	PMM	Optical Repeater	OR 02	0100J10812	19.04.2007	24	19.04.2009
28	PMM	Electric and Magnetic Field Analyser 5 Hz – 100 kHz	EHP-50B	241WM30404	19.04.2007	24	19.04.2009

8 Photographs of the Test Set-up

Photo 1:

Photo 2:

Photo 3:

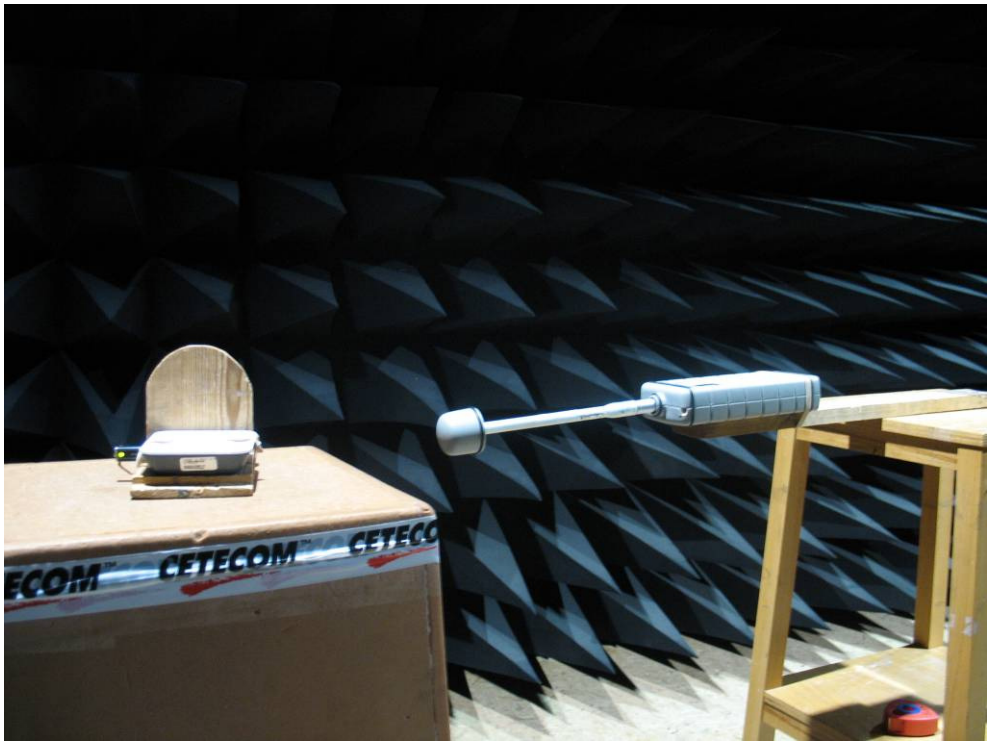


Photo 4:

9 Photographs of the EUT

Photo 1:

Photo 2:

Photo 3:

Photo 4:

Photo 5:

Photo 6:

Photo 7:

Photo 8:

Photo 9:

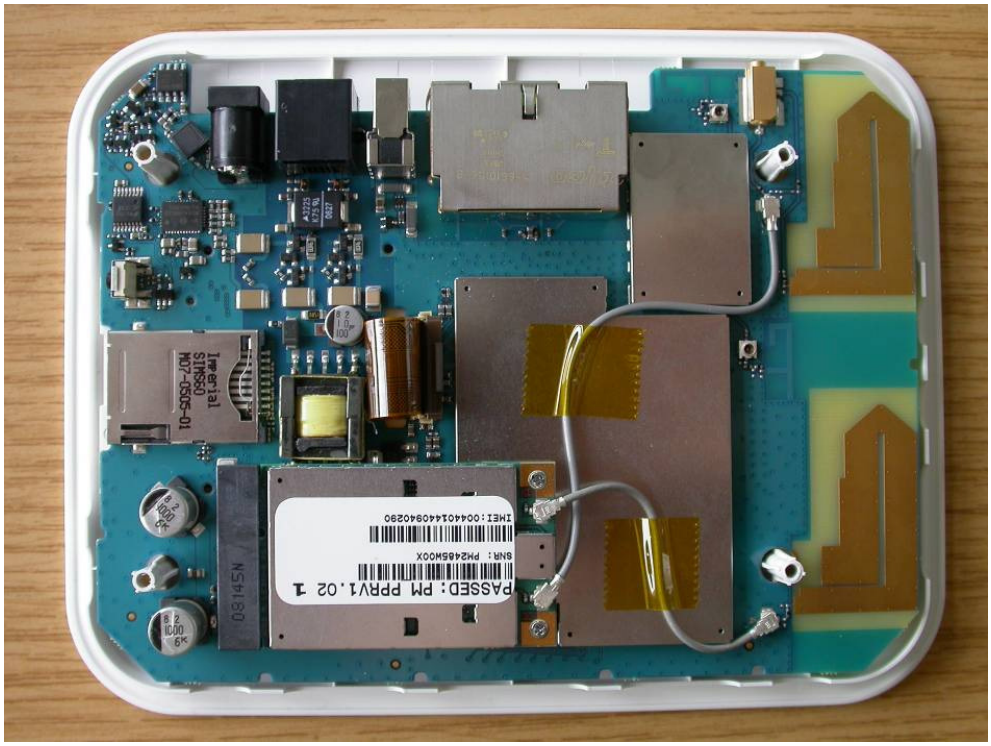


Photo 10:

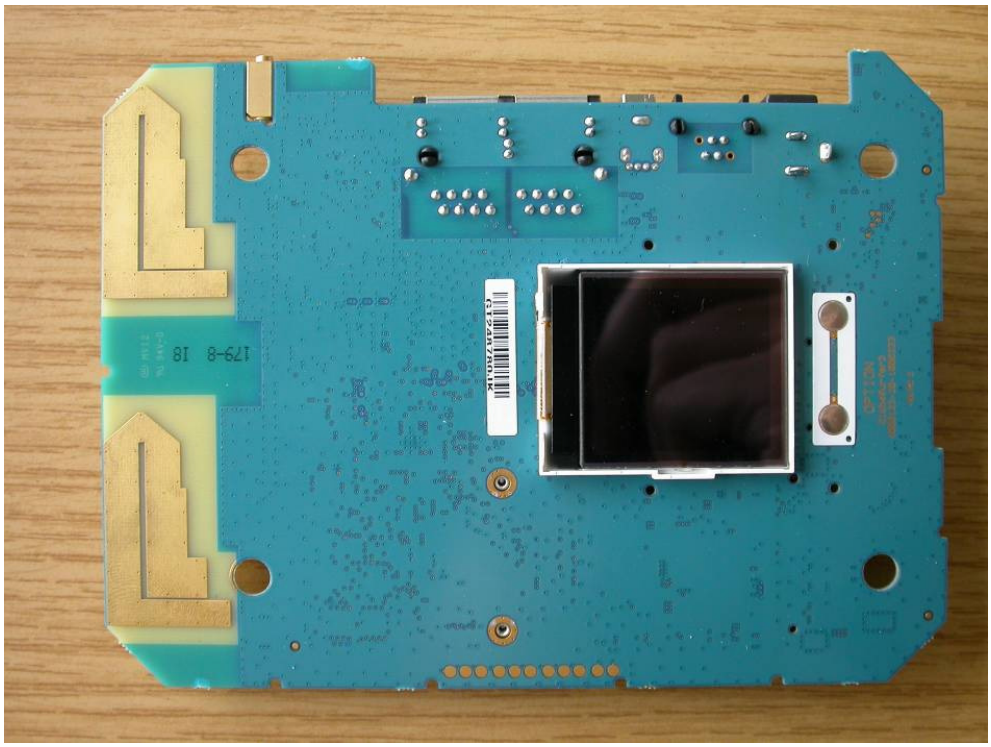


Photo 11:

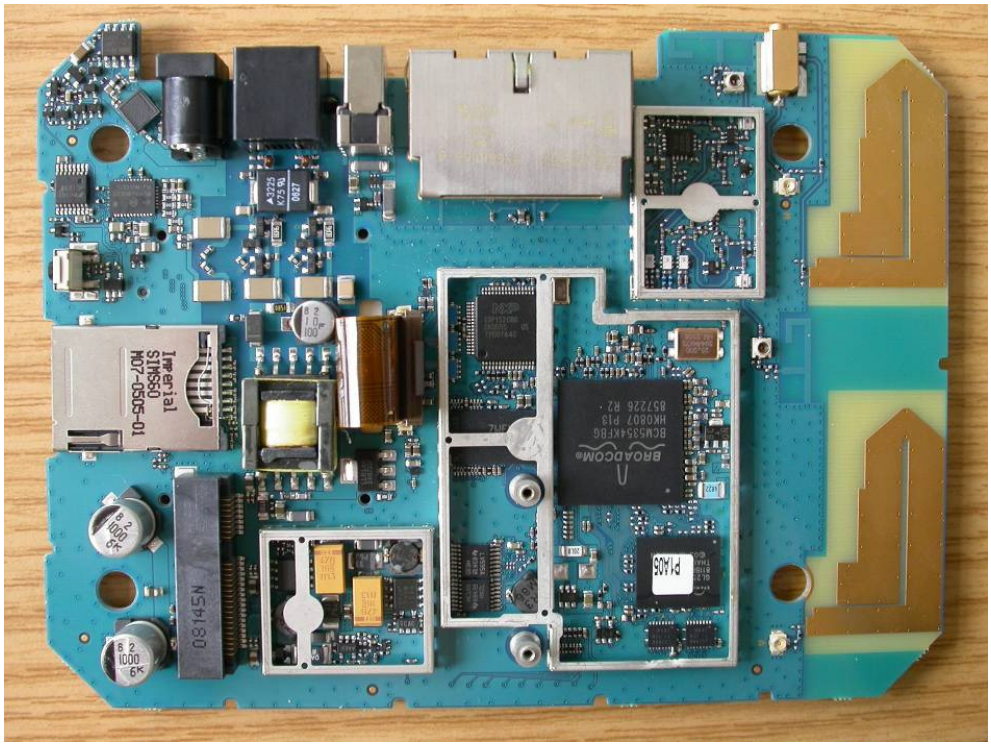


Photo 12:

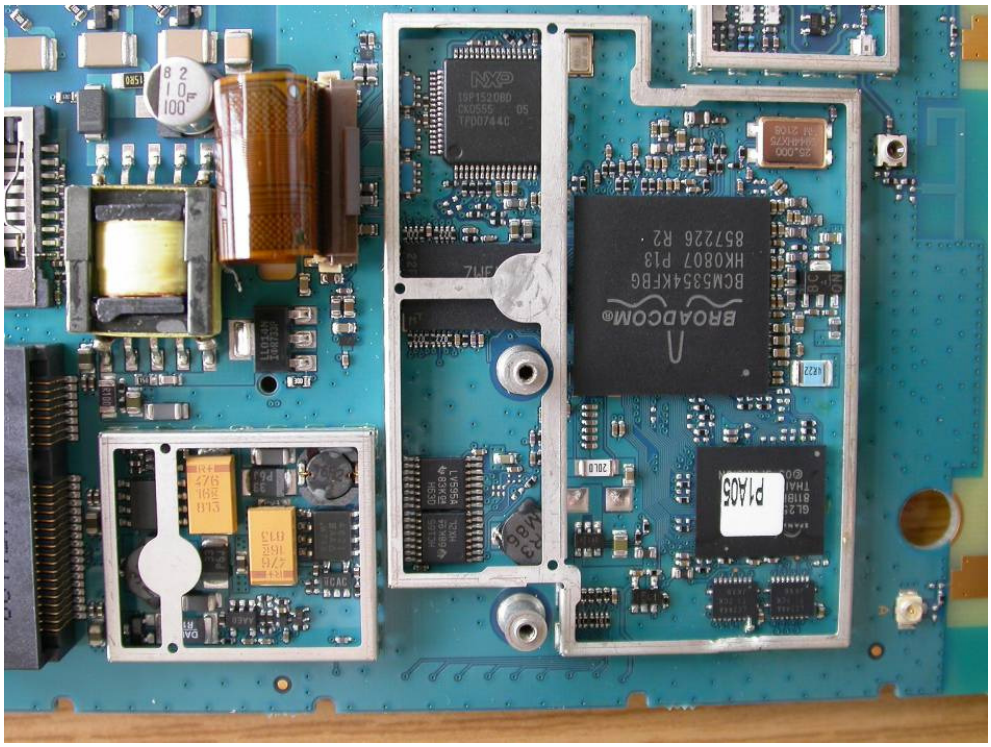


Photo 13:

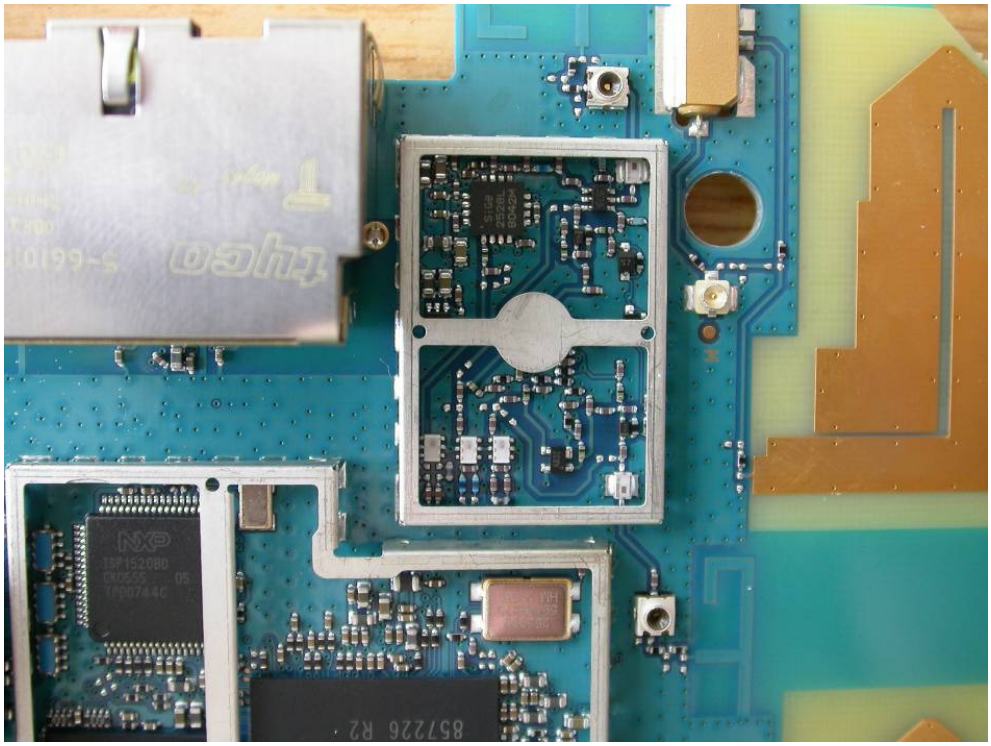


Photo 14:

Photo 15:

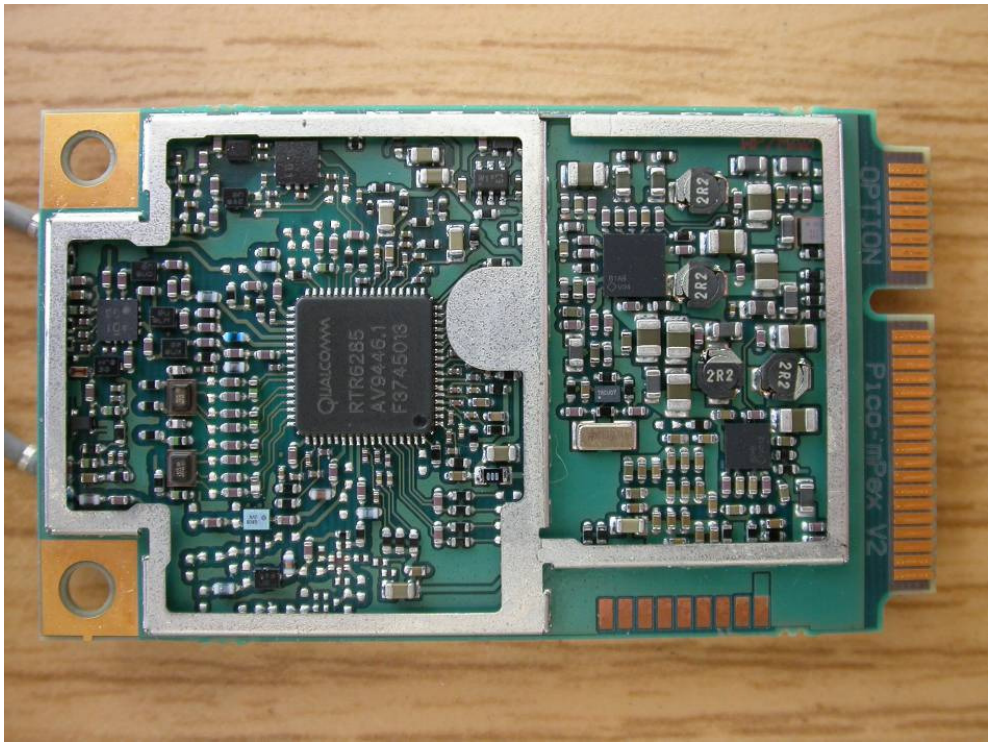


Photo 16:

Photo 17:

Photo 18: