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

Accredited by the
German Accreditation Council
DAR–Registration Number
DAT-P-176/94-D1

Accredited Bluetooth® Test Facility (BQTF)

Test report no.	**:**	**2-4386-01-26/06**
Applicant	**:**	**Phonak AG**
Type	**:**	**iCube**
Test Standard	**:**	**FCC Part 15.209** **RSS-210 Issue 7**
FCC ID	**:**	**KWC-ICUBE1**
Certification No. IC	**:**	**2262A-ICUBE1**

Table of contents

1. Administrative data

1.1. Administrative data of the test facility

1.1.1 Identification of the testing laboratory

Company name:	Cetecom ICT Services GmbH
Address:	Untertürkheimerstr. 6-10 D-66117 Saarbruecken Germany
Laboratory accreditation:	DAR-Registration No. DAT-P-176/94-D1 Bluetooth Qualification Test Facility (BQTF)
Responsible for testing laboratory:	Stefan Bös Phone: +49 681 598 0 Fax: +49 681 598 9075 email: info@ict.cetecom.de

.....
Responsible for testing
(Stefan Bös)

1.1.2 Organizational items

Reference No.:	2-4386-01-05/06
Order No.:	
Receipt of EUT:	2007-11-13
Date(s) of test:	2007-11-13 to 2007-11-14
Date of report:	2008-01-10
Number of report pages:	30
Number of diagram pages (annex):	
Version of template: 1.8	

.....
Responsible for laboratory
(Detlev Gillmann)

Note:
The test results of this test report relate exclusively to the item tested as specified in this report. The CETECOM ICT Services GmbH does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item.

During the test no hardware and software changes are allowed to be performed at the EUT.

1.1.3 Applicant´s details

Applicant´s name:	Phonak AG
Address:	Laubisrütistrasse 28 8712 Stäfa Swisse
Contact person:	Mr. Stefan Hänggi Phone: +41 (0) 26 672 33 48 Fax: +41 (0) 26 672 93 80 email: stefan.haenggi@phonakcom.ch

1.2 Administrative data of manufacturer / member

Manufacturer´s name:	Flextronics Design
Address:	Friesacher Strasse 3 A-9330 Althofen Austria

1.3 Description of the Equipment under test (EUT)

1.3.1 EUT: Type, S/N etc.

Type of equipment	:	Link device to hearing aids
Model name	:	iCube
Manufacturer	:	Phonak AG
Address	:	Laubisrütistrasse 28
City	:	8712 Stäfa
Country	:	Swisse
Tested to Radio Standards Specification(RSS) No.	:	210 Issue 7
Open Area Test Site Industry Canada Number	:	IC 3463A-1
Frequency Range (or fixed frequency)	:	10.6 MHz
R F: Power in Watts	:	-/-
Field Strength (at what distance)	:	0.01 mV/m (27 dBµV/m) in 10m
Occupied Bandwidth (99% BW)	:	500.0 kHz
Type of Modulation	:	F1D (inductive loop)
Antenna Information	:	Neckstrap-antenna
Emission Designator	:	500KF1D
Transmitter Spurious (worst case)	:	(noise floor)
IC no.	:	2262A-ICUBE1
FCC ID	:	KWC-ICUBE1

ATTESTATION:
DECLARATION OF COMPLIANCE: I declare that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned Industry Canada standard(s); and that the equipment identified in this application has been subjected to all the applicable test conditions specified in the Industry Canada standards and all of the requirements of the standard have been met.

Laboratory Manager :

2008-01-10	Stefan Bös	
Date	Name	Signature

1.4 Test Setup

Hardware	:	PT4
Software	:	7.6.0

1.5 Test Specifications

FCC:	**CFR Part 15.209**
IC:	**RSS 210, Issue 7**

2 Statement of Compliance

No deviations from the technical specification(s) were ascertained in the course of the tests performed.

2.1 Summary of Measurement Results

2.1.1 CFR 47 Part 15 Radio frequency devices

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210 Issue 7	applicable	Verdict
4.1	§ 15.35 (c) Timing of the transmitter (Duty cycle correction factor)		NO	
4.2	§ 15.209 (a) FIELDSTRENGTH OF FUNDAMENTAL	2.6	YES	pass
4.3	§ 15.209 (a) FIELDSTRENGTH OF HARMONICS and SPURIOUS	2.6	YES	pass
4.4	§ 15.109 Receiver spurious emissions (radiated)	2.6	YES	pass
4.5	§ 15.107 / 15.207 Conducted Limits		YES	pass

3 Measurements and results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 20 GHz in semi-anechoic chambers. The EUT is positioned on a non-conductive support with a height of 0.80 m above a conductive ground plane that covers the whole chamber.
The receiving antennas are conform with specifications ANSI C63.2-1996 clause 15 and ANSI C63.4-2003 clause 4.1.5. These antennas can be moved over the height range between 1.0 m and 4.0 m in order to search for maximum field strength emitted from EUT. The measurement distances between EUT and receiving antennas are indicated in the test set-ups for the various frequency ranges. For each measurement, the EUT is rotated in all three axes until the maximum field strength is received.
The wanted and unwanted emissions are received by spectrum analysers where the detector modes and resolution bandwidths over various frequency ranges are set according to requirement ANSI C63.4-2003 clause 4.2.
Antennas are conform with ANSI C63.2-1996 item 15.
150 kHz - 30 MHz: Quasi Peak measurement, 9kHz Bandwidth, passive loop antenna.
30 MHz - 200 MHz: Quasi Peak measurement, 120KHz Bandwidth, biconical antenna
200MHz - 1GHz: Quasi Peak measurement, 120KHz Bandwidth, log periodic antenna
>1GHz: Average, RBW 1MHz, VBW 10 Hz, wave guide horn

All measurement settings are according to FCC 15.209 and 15.207

4 FCC Part 15 Subpart C

4.1 Timing of the transmitter

Not applicable

Reference

FCC:	CFR Part SUBCLAUSE § 15.35 (c)
IC:	

Measurement not applicable, transmitter is continous modulated (F1D)

Limits: § 15.35 (c)

(c) Unless otherwise specified, e.g. Section 15.255(b), when the radiated emission limits are expressed in terms of the average value of the emission, and pulsed operation is employed, the measurement field strength shall be determined by averaging over one complete pulse train, including blanking intervals, as long as the pulse train does not exceed 0.1 seconds. As an alternative (provided the transmitter operates for longer than 0.1 seconds) or in cases where the pulse train exceeds 0.1 seconds, the measured field strength shall be determined from the average absolute voltage during a 0.1 second interval during which the field strength is at its maximum value. The exact method of calculating the average field strength shall be submitted with any application for certification or shall be retained in the measurement data file for equipment subject to notification or verification.

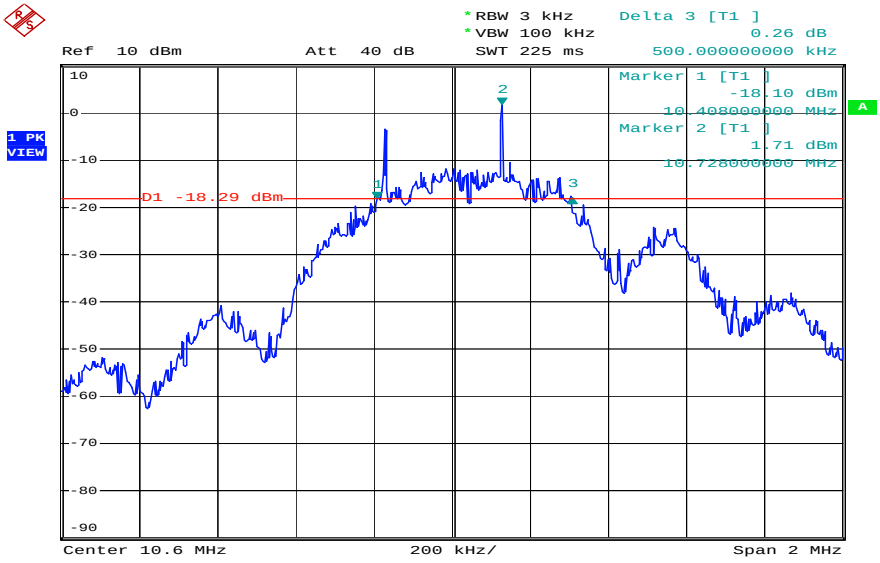
4.2 Field strength of the fundamental § 15.209 (a)

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a) / § 15.223
IC:	RSS 210, Issue 7, 2.6

	Occupied Bandwidth (kHz)
20 dB	500.0

Plot 1: 20 dB-Bandwidth



Date: 19.NOV.2007 09:02:08

Maximum output power (quasi peak) - (radiated)
Power measured

TEST CONDITIONS		MAXIMUM POWER (µV/m)		
Frequency		10.6 MHz		
Distance		10 m	30 m	
T_{nom} +23 °C	V_{nom} 3.6V DC	22.39 µV/m 27 dBµV/m	2.24 µV/m 7 dBµV/m	Neckstrap-antenna
Measurement uncertainty		±3dB		

Measured field strength in 0.03 m distance: 127.0 dBµV/m
Correction for 10 m distance: -100 dB ➔ 27.0 dBµV/m
Correction for 30 m distance: -120 dB ➔ 7.0 dBµV/m

Measurement distance 10 m
This measurement was done in 3 planes, the plot shows the worst case ase

(to convert the measuring distance from 10m to 30m and 30 to 300m a correction factor from 40 dB/decade was used. Here we use 20 dB to recalculate from 10m to 30m)

Limits **SUBCLAUSE § 15.209 (a)**

Fundamental Frequency (MHz)	Field strength of Fundamental (µV/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

4.3 Field strength of the harmonics and the spurious § 15.209 (a)

Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a)
IC:	RSS 210, Issue 7, 2.6

Valid for both types of antenna (worst case)

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dBµV/m) Average/QP	limit max. allowed emmision power **at 10m**	actual attenuation below frequency of operation (dB)	results
No spurious found					
Measurement uncertainty			± 3dB		

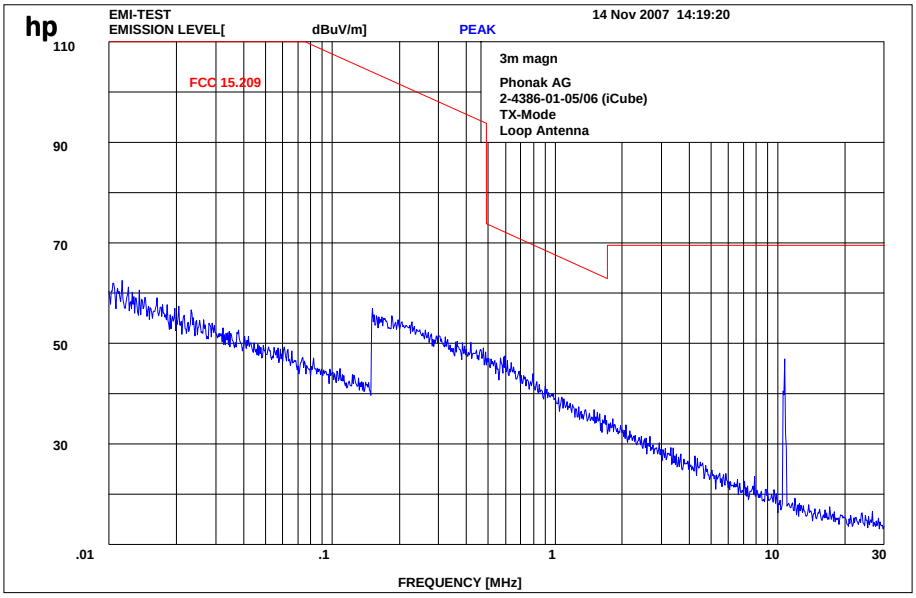
RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz, 120 kHz up to 1 GHz

Limits **SUBCLAUSE § 15.209 (a)**

Fundamental Frequency (MHz)	Field strength of Fundamental (µV/m)	Measurement Distance (meters)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30.0 – 88.0	100	3
88 – 216	150	3
216 – 960	200	3
Above 960	500	3

4.4 Plots of measurements

Plot 1: ***Part 15.209 Magnetics TX***



RBW/VBW : 200 Hz up to 150 kHz, 9 kHz up to 30 MHz

Performed in a fully anechoic chamber at 3m to get an overview about radiated emissions.
This values may have some errors because of the small distance between measureing antenna and sample.
Therefore we remeasured all found peaks at 10m. (see page 10)

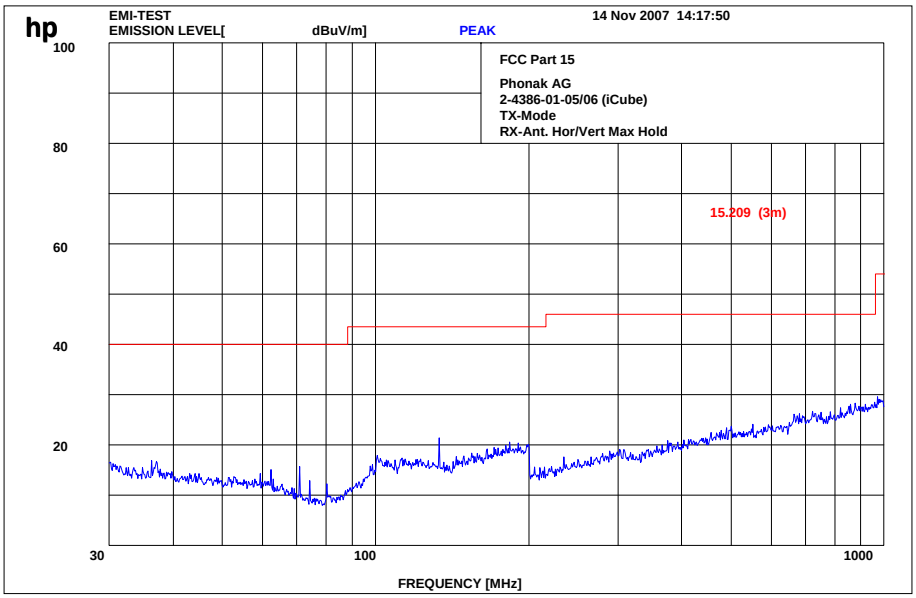
(to convert the measuring distance from 10m to 30m and 30 to 300m a correction factor from 40 dB/decade was used.
Here we use 40 dB to recalculate from 3m to 30m)

Measurement distance 3 m
This measurement was done in 3 planes, the plot shows the worst case ase

Limits **SUBCLAUSE § 15.209**

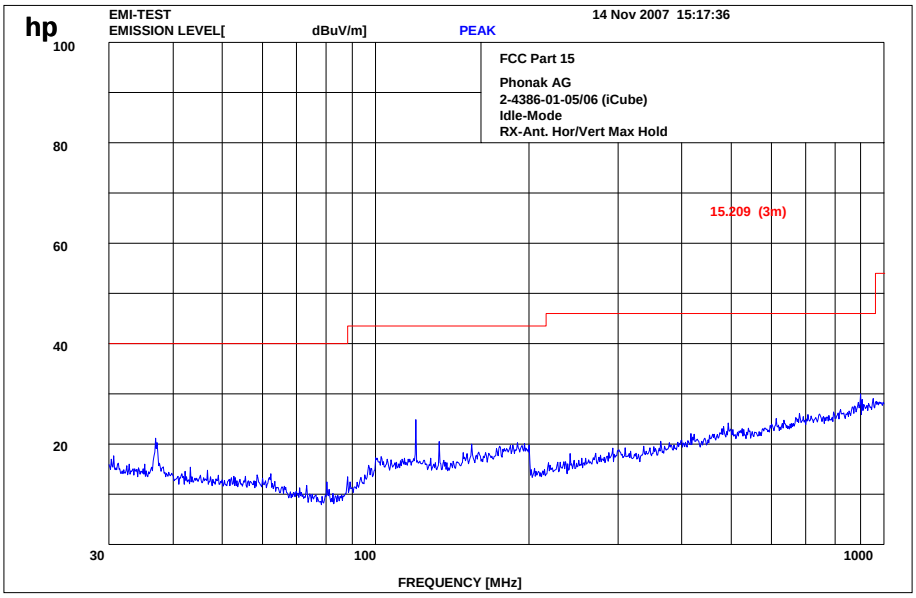
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
0.0009 – 0.490	2400/F(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

Plot 2: TX (30 MHz to 1 GHz)



4.5 Receiver spurious emission (radiated)

Plot 1: Idle (30 MHz to 1 GHz)



Reference

FCC:	CFR Part SUBCLAUSE § 15.109
IC:	RSS 210, Issue 7, Section 2.6

SPURIOUS EMISSIONS LEVEL (µV/m)								
10.6 MHz			MHz			MHz		
F [MHz]	Detector	Level [µV/m]	F [MHz]	Detector	Level [µV/m]	F [MHz]	Detector	Level [µV/m]
No critical peaks found								
Measurement uncertainty			±3 dB					

f < 1 GHz : RBW/VBW: 100 kHz f ≥ 1GHz : RBW/VBW: 1 MHz

Limits **SUBCLAUSE § 15.109**

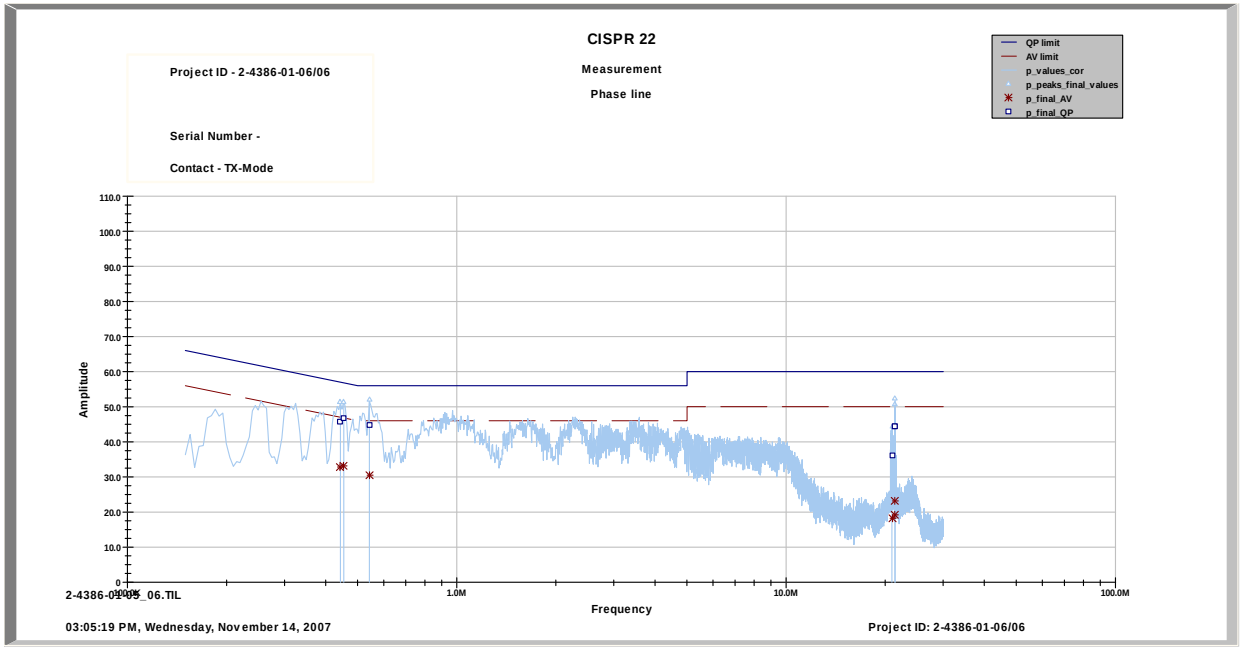
Frequency (MHz)	Field strength (µV/m)	Measurement distance (m)
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
above 960	500	3

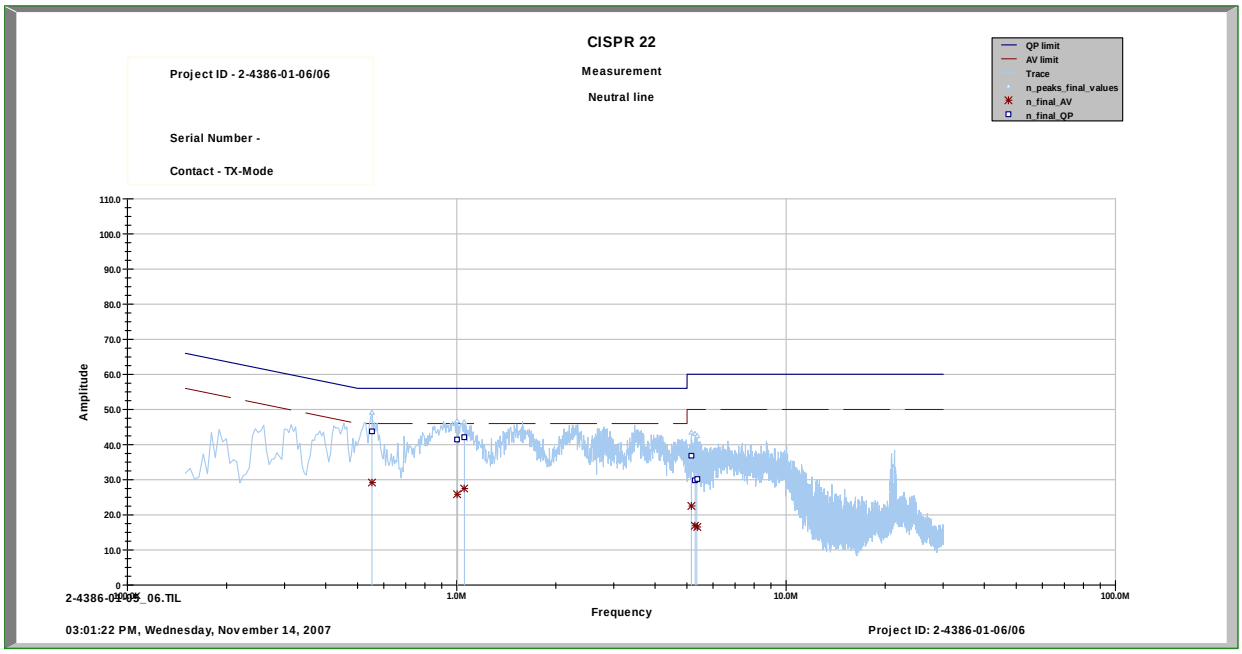
4.6 Conducted Limits

Reference

FCC:	CFR Part 15.207, 15.107
IC:	

```
EUT:                  iCube
Manufacturer:         Flextronics Design
Operating Condition:  Transmitting Mode
Test Site:            CETECOM ICT Services Chamber C
Operator:             Boes
Test Specification:   EN 55022 / CISPR 22
```





Limits: § 15.107 / 15.207

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56 *	56 to 46 *
0.5 – 5	56	46
5 - 30	60	50

* Decreases with the logarithm of the frequency

5 Used Testequipment

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	26.10.2007	24	26.10.2009
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.)		

SRD Laboratory Room 002:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	System Controller PSM 12	R&S	835259/007	3000002681-00xx	n.a.		
2	Memory Extension PSM-K10	R&S	To 1	3000002681	n.a.		
3	Operating Software PSM-B2	R&S	To 1	3000002681	n.a.		
4	19'' Monitor		22759020-ED	3000002681	n.a.		
5	Mouse		LZE 0095/6639	3000002681	n.a.		
6	Keyboard		G00013834L461	3000002681	n.a.		
7	Spectrum Analyser FSIQ 26	R&S	835540/018	3000002681-0005	01.08.2006	24	01.08.2008
8	Tracking Generator FSIQ-B10	R&S	835107/015	3000002681	s.No.7		
10	RF-Generator SMIQ03 (B1 Signal)	R&S	835541/056	3000002681-0002	01.08.2006	36	01.08.2009
11	Modulation Coder SMIQ-B20	R&S	To 10	3000002681	s.No.10		
12	Data Generator SMIQ-B11	R&S	To 10	3000002681	s.No.10		
13	RF Rear Connection SMIQ-B19	R&S	To 10	3000002681	s.No.10		
14	Fast CPU SM-B50	R&S	To 10	3000002681	s.No.10		
15	FM Modulator SM-B5	R&S	835676/033	3000002681	s.No.10		
16	RF-Generator SMIQ03 (B2 Signal)	R&S	835541/055	3000002681-0001	01.08.2006	36	01.08.2009
17	Modulation Coder SMIQ-B20	R&S	To 16	3000002681	s.No.16		
18	Data Generator SMIQ-B11	R&S	To 16	3000002681	s.No.16		
19	RF Rear Connection SMIQ-B19	R&S	To 16	3000002681	s.No.16		
20	Fast CPU SM-B50	R&S	To 16	3000002681	s.No.16		
21	FM Modulator SM-B5	R&S	836061/022	3000002681	s.No.16		
22	RF-Generator SMP03 (B3 Signal)	R&S	835133/011	3000002681-0003	01.08.2006	36	01.08.2009
23	Attenuator SMP-B15	R&S	835136/014	3000002681	S.No.22		
24	RF Rear Connection SMP-B19	R&S	834745/007	3000002681	S.No.22		
25	Power Meter NRVD	R&S	835430/044	3000002681-0004	01.08.2006	24	01.08.2008
26	Power Sensor NRVD-Z1	R&S	833894/012	3000002681-0013	01.08.2006	24	01.08.2008
27	Power Sensor NRVD-Z1	R&S	833894/011	3000002681-0010	01.08.2006	24	01.08.2008
28	Rubidium Standard RUB	R&S		3000002681-0009	01.08.2006	24	01.08.2008
29	Switching and Signal Conditioning Unit SSCU	R&S	338864/003	3000002681-0006	01.08.2006	24	01.08.2008
30	Laser Printer HP Deskjet 2100	HP	N/A	3000002681-0011	n.a.		
31	19'' Rack	R&S	11138363000004	3000002681	n.a.		
32	RF-cable set	R&S	N/A	3000002681	n.a.		
33	IEEE-cables	R&S	N/A	3000002681	n.a.		

34	Sampling System FSIQ-B70	R&S	835355/009	3000002681	s.No.7		
35	RSP programmable attenuator	R&S	834500/010	3000002681-0007	01.08.2006	24	01.08.2008
36	Signalling Unit	R&S	838312/011	3000002681	n.a.		
37	NGPE programmable Power Supply for EUT	R&S	192.033.41	3000002681			
38	Climatic box VT 4002	Heraeus Vötsch	58566046820010	300003019	11.05.2007	24	11.05.2009
39	Signaling Unit CMU200	R&S	832221/0055	300002862	12.01.2006	24	12.01.2008
40	Power Splitter 6005-3	Inmet Corp.	none	300002841	23.12.2006	24	23.12.2008
41	SMA Cables SPS-1151-985-SPS	Insulated Wire	different	different	n.a.		
42	CBT32 with EDR Signaling Unit	R&S					
43	Coupling unit	Narda	N/A	--	n.a.		
44	2xSwitch Matrix PSU	R&S	872584/021	300001329	n.a.		
45	RF-cable set	R&S	N/A	different	n.a.		
46	IEEE-cables	R&S	N/A	--	n.a.		

Anmerkung: 3000002681-00xx als Systeme inventarisiert

SRD Laboratory Room 005:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Spektrum Analyzer 8566B	HP	2747A05275	300000219	08.11.2006	24	08.11.2008
2	Spektrum Analyzer Display 85662A	HP	2816A16497	300001690	08.11.2006	24	08.11.2008
3	Quasi-Peak-Adapter 85650A	HP	2811A01135	300000216	08.11.2006	24	08.11.2008
4	Power Supply	Heiden	003202	300001187	12.05.2007	36	12.05.2010
5	Power Supply	Heiden	1701	300001392	12.05.2007	36	12.05.2010

6 Annex A: Photographs of Test site

Photo 1 (Radiated Emissions):

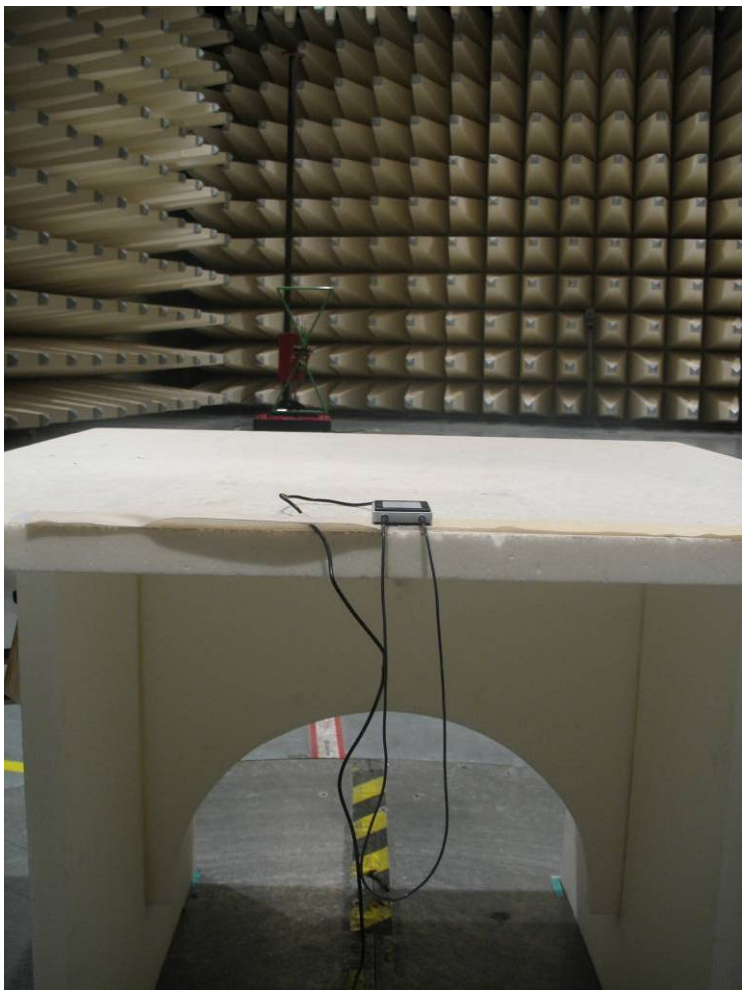


Photo 2 (Radiated Emissions):

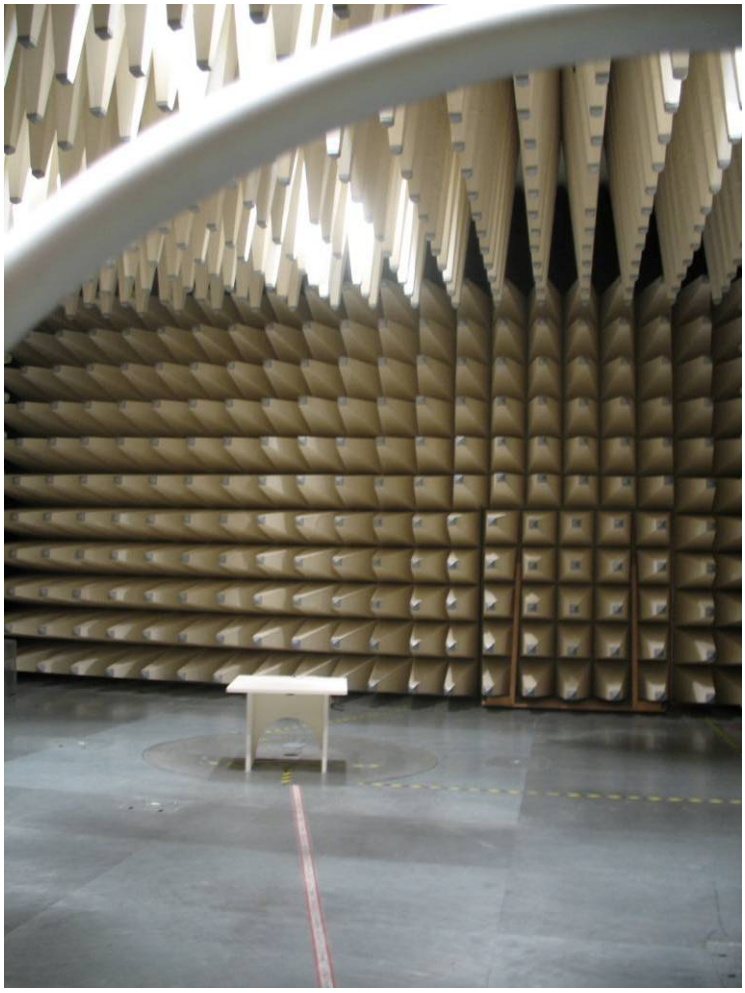
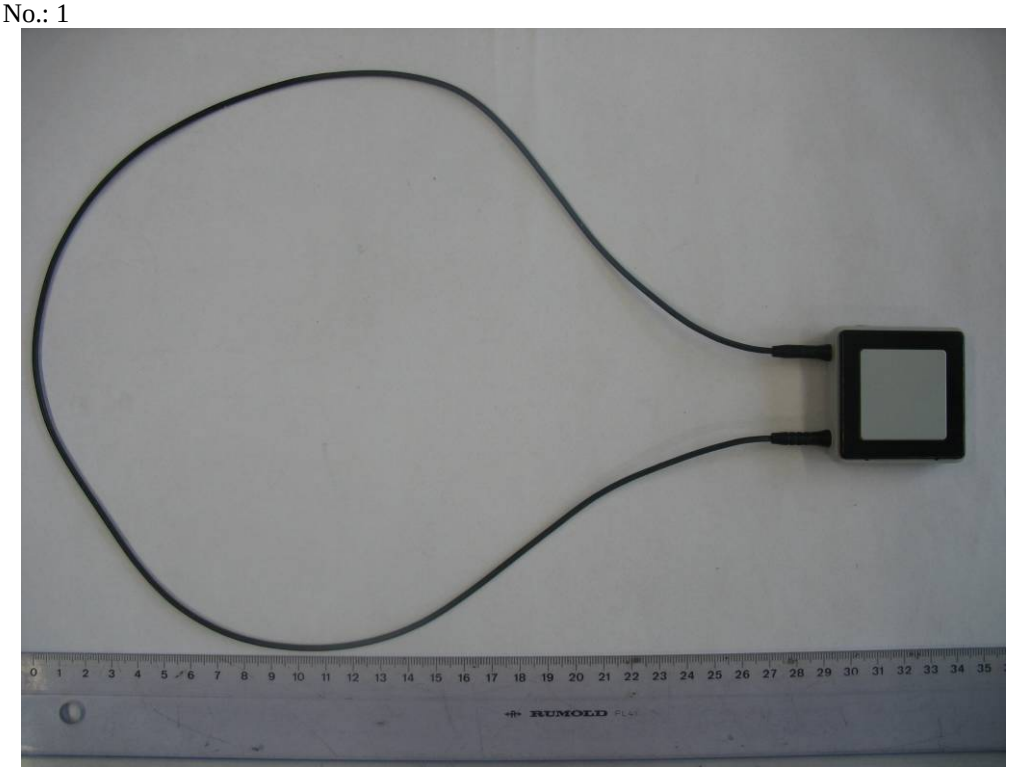


Photo 3 (Conducted Emissions):

7 Annex B: External Photographs of the Equipment

Photograph No.: 1



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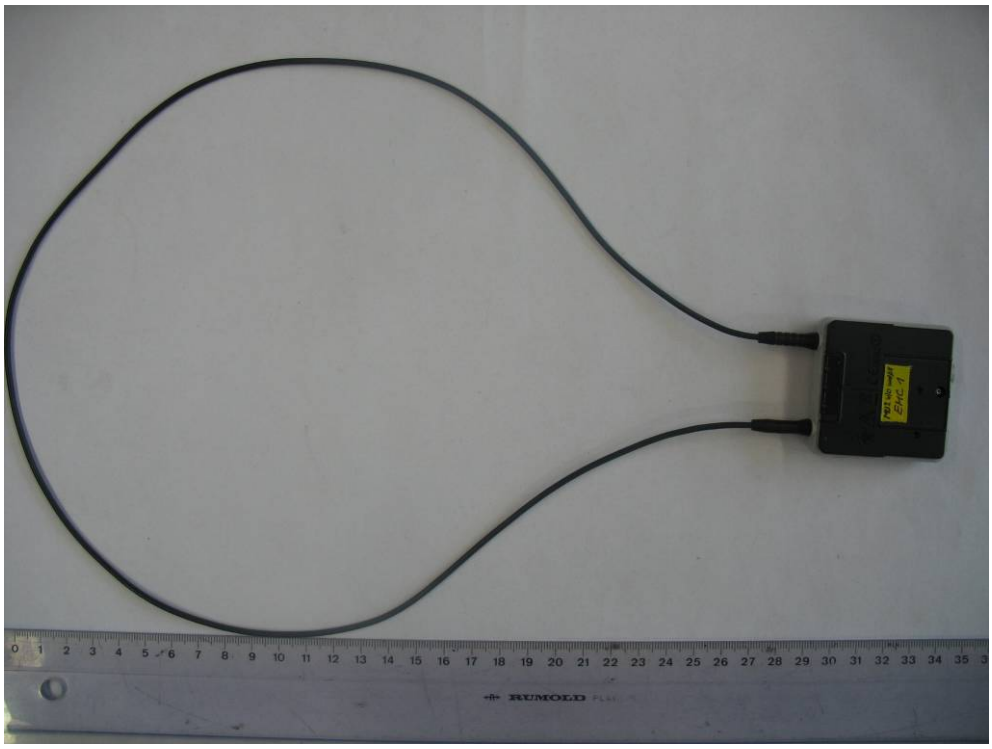
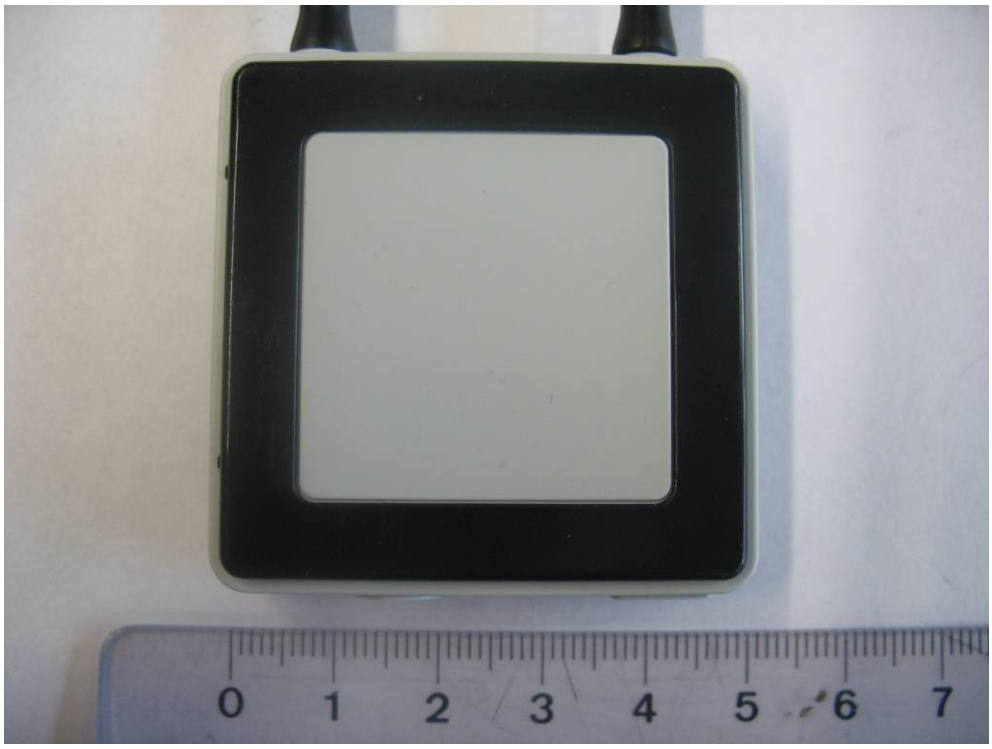


Photograph No.: 3



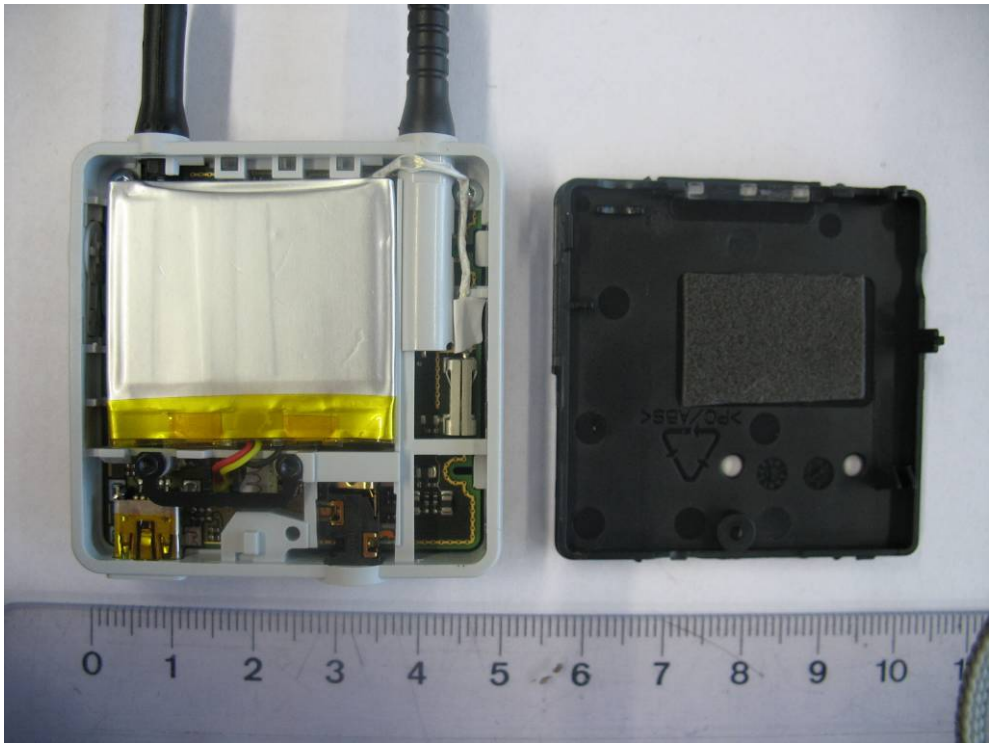
Photograph No.: 4

Photograph No.: 5

Photograph No.: 6

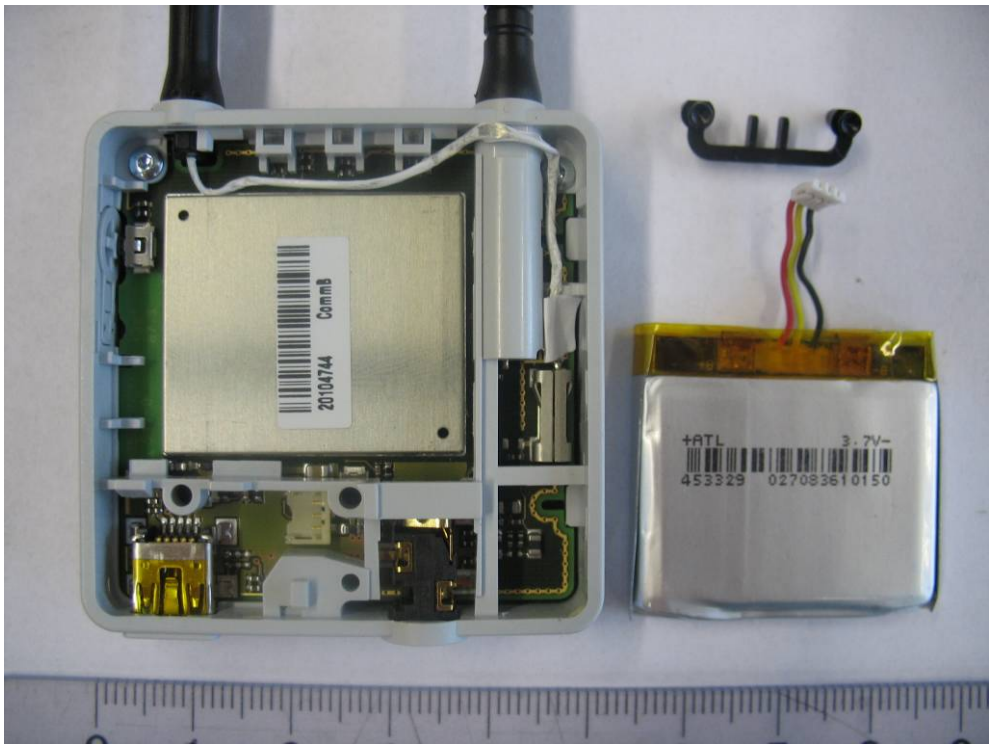
8 Annex C: INTERNAL PHOTOGRAPHS OF THE EQUIPMENT

Photograph No.: 1



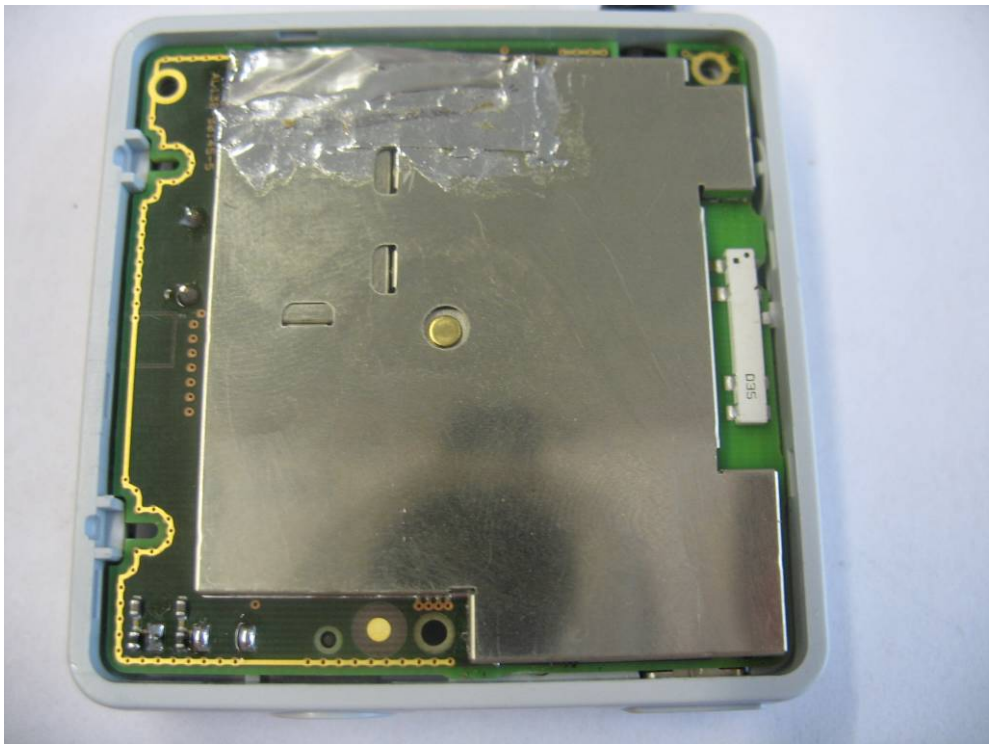
Photograph No.: 2

Photograph No.: 3

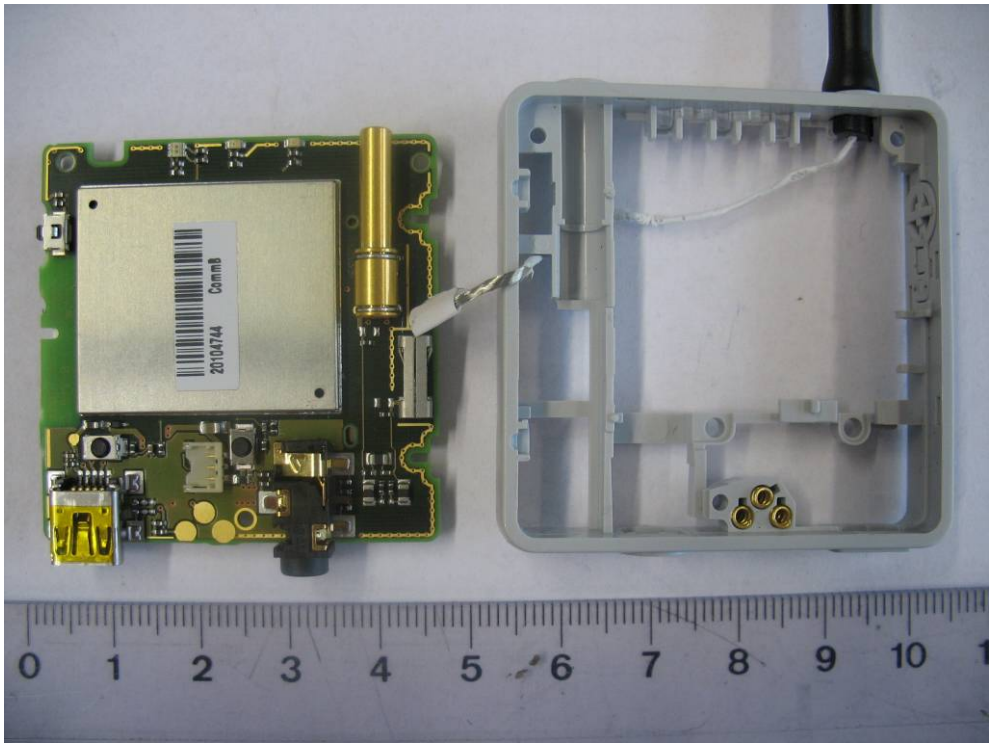


Photograph No.: 4

Photograph No.: 5



Photograph No.: 6



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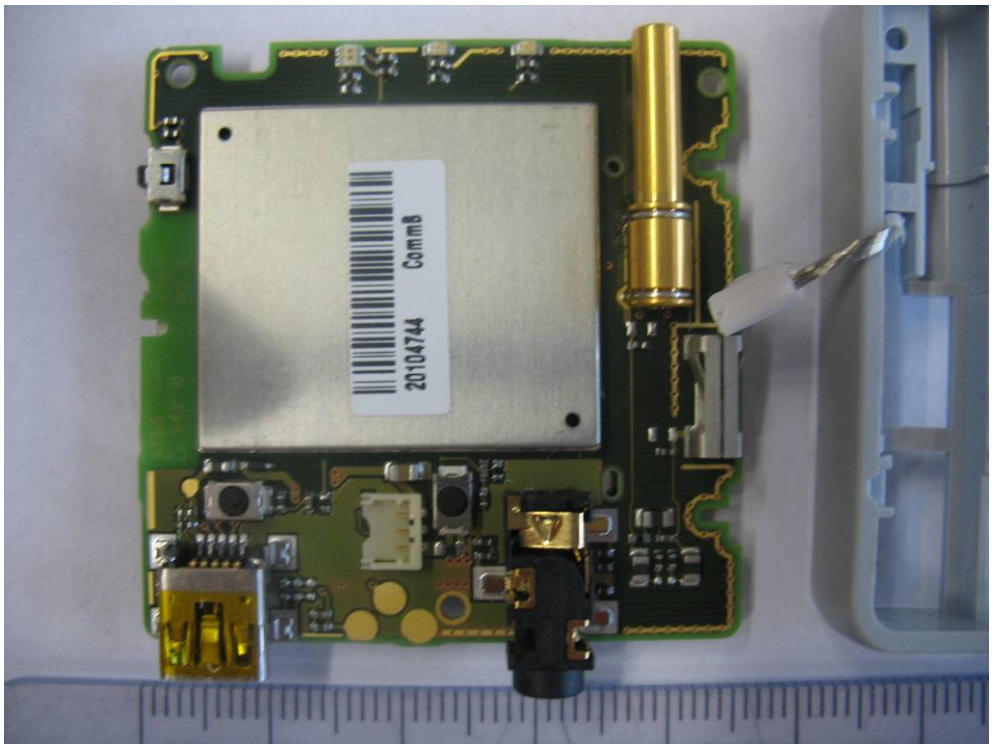

Photograph No.: 8