



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.: 3462C-1 (IC)

Certification ID: DE 0001

Accreditation ID: DE 0002

Accredited Bluetooth® Test Facility (BQTF)

*The Bluetooth word mark and logos are owned by the Bluetooth SIG,
Inc. and any use of such marks by Cetecom ICT is under license*

Test report no. : 1-1557-01-03/09-A
Type identification : BSC TM Orion Q60030
Applicant : Bibliotheca RFID Library Systems
FCC ID : Y2Z-SELFCHECK
IC Certification No : 5417A-SELFCHECK
Test standards : 47 CFR Part 15.225
RSS - 210 Issue 7



Table of contents

1 General information...3
1.1 Notes ...3
1.2 Testing laboratory ...4
1.3 Details of applicant ...4
1.4 Application details ...4
2 Test standard/s ...5
3 Technical tests ...6
3.1 Details of manufacturer...6
3.2 Test Item ...6
3.3 Test Item (Additional EUT information For IC Canada (appendix 2) ...7
3.4 Extreme conditions testing values ...8
3.5 Reference documents ...8
3.6 Additional comments ...8
4 Statement of Compliance...9
4.1 Summary of Measurement Results...9
4.2 CFR 47 Part 15.225...9
5 Measurements and results ...10
6 FCC Part 15.225 ...11
6.1 Field strength of the fundamental...11
6.2 Field strength of the harmonics and the spurious ...12
6.3 Frequency tolerance ...17
6.4 Conducted Limits ...18
7 Test equipment and ancillaries used for tests ...20
8 Photographs of the Test Set-up...22
9 Photographs of the EUT ...24

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:

2010-11-11 Marco Bertolino
Date Name


Signature

Technical responsibility for area of testing:

2010-11-11 Stefan Bös
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:	Bibliotheca RFID Library Systems
Street:	Hinterbergstraße 17
Town:	6330 Cham
Country:	SWITZERLAND
Telephone:	+41 41726 9955
Fax:	-/-
Contact:	Bruno Alessandri
E-mail:	Bruno.alessandri@bibliotheca-rfid.com
Telephone:	+41 41726 9933

1.4 Application details

Date of receipt of order:	2009-09-07
Date of receipt of test item:	2009-09-30
Date of start test:	2009-09-30
Date of end test:	2009-10-02
Persons(s) who have been present during the test:	Mr. Bruno Alessandri Portfolio Manager

2 Test standard/s

47 CFR Part 15	2008-07	Title 47 of the Code of Federal Regulations; Chapter I- Federal Communications Commission subchapter A - general, Part 15-Radio frequency devices
RSS - 210 Issue 7	2007-06	Spectrum Management and Telecommunications - Radio Standards Specification Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

3 Technical tests

3.1 Details of manufacturer

Name:	Schalttag AG
Street:	Industriestarsse 8
Town:	8307 Effretikon
Country:	SWITZERLAND

3.2 Test Item

Kind of test item	:	RFID Reader
Type identification	:	BSC TM Orion Q60030
S/N serial number	:	RFID Module: 1863360 (FEIG Electronic)
HW hardware status	:	No information available!
SW software status	:	No information available!
Frequency Band [MHz]	:	13.553 ≤ f ≤ 13.567 (ISM)
Frequency Range (or fixed frequency)	:	13.56 MHz
Type of Modulation	:	N0N
Number of channels	:	1
Antenna	:	Loop antenna – for more information please take a look at the sub clause 9 – Photos of the EUT
Power Supply	:	115 V AC by mains adapter
Temperature Range	:	-20 °C to +55 °C

FCC ID: Y2Z-SELFCHECK
IC: 5417A-SELFCHECK

3.3 Test Item (Additional EUT information For IC Canada (appendix 2))

IC Registration Number:	5417A-SELFCHECK
Model Name:	BSC TM Orion Q60030
Details of Manufacturer	
Company	: Schaltag AG
Address	: Industriestarsse 8
City	: 8307 Effretikon
Country	: SWITZERLAND
Details of EUT	
S/N serial number	: RFID Module: 1863360 (FEIG Electronic)
HW hardware status	: No information available!
SW software status	: No information available!
Tested to Radio Standards Specification (RSS) No.:	RSS-210 Issue 7
Open Area Test Site Industry Canada Number	: IC 3462C-1
Frequency Range (or fixed frequency)	: 13.56 MHz
Field Strength	: 44 dB μ V/m @ 30 m
Occupied Bandwidth (99% BW)	: 6 kHz
Type of Modulation	: N0N
Emission designator	: 6K00N0N
Number of channels	: 1
Antenna information	: Loop antenna – for more information please take a look at the sub clause 9 – Photos of the EUT
Transmitter Spurious (worst case)	: 51 dB μ V/m @ 3m (11.9 GHz)
Power Supply	: 115 V AC by mains adapter
Temperature Range	: -20 °C to +55 °C

ATTESTATION:

I attest that the testing was performed or supervised by me; that the test measurements were made in accordance with the above-mentioned departmental standard(s), and that the radio equipment identified in this application has been subject to all applicable test conditions specified in the departmental standards and all of the requirements of the standards have been met.

Signature:



Test engineer: Marco Bertolino **Date:** 2010-11-11

3.4 Extreme conditions testing values

Description	Shortcut	Unit	Value
Nominal Temperature	T _{nom}	°C	20
Nominal Humidity	H _{nom}	%	53
Nominal Power Source	V _{nom}	V	115

Type of power source: 115 V AC by mains adapter

3.5 Reference documents

Module test report: SENTON → EMV – Prüfbüro

FEIG Electronic
Test report No.: 50602-20327

3.6 Additional comments

Operation mode: Polling mode – searching for new books

4 Statement of Compliance

4.1 Summary of Measurement Results

- No deviations from the technical specifications were ascertained**
 There were deviations from the technical specifications ascertained

4.2 CFR 47 Part 15.225

Section in this Report	Test Name / Section FCC Part 15	Test Name / Section RSS 210	applicable	Verdict
6.1	§ 15.225 (a) FIELDSTRENGTH OF FUNDAMENTAL	Annex 2.6	YES	passed
6.2	§ 15.225 (b,c,d) FIELDSTRENGTH OF HARMONICS and SPURIOUS	Annex 2.6	YES	passed
6.3	§ 15.225 (e) Frequency tolerance	Annex 2.6	YES	passed
6.4	§ 15.107 / 15.207 Conducted Limits	Section 6.6 , 7.4	YES	passed

5 Measurements and results

The radiated measurements are performed in vertical and horizontal plane in the frequency range from 9 kHz to 1 GHz in semi-anechoic chambers or free field. 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

6 FCC Part 15.225

6.1 Field strength of the fundamental

Reference

FCC:	CFR Part SUBCLAUSE § 15.225 (a)
IC:	RSS 210, Annex 2.6

Results:

TEST CONDITIONS		MAXIMUM POWER (dB μ V/m)
Frequency		13.56 MHz
T _{nom}	V _{nom}	44
Measurement uncertainty		± 3 dB

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

Note:

Measured value = 64 dB μ V/m @ 10 m
 Recalculation factor = 40 / decade
 Recalculated value = 64 dB μ V/m @ 10 m - 20 dB = 44 dB μ V/m @ 30 m

Limits: § 15.225 (a)

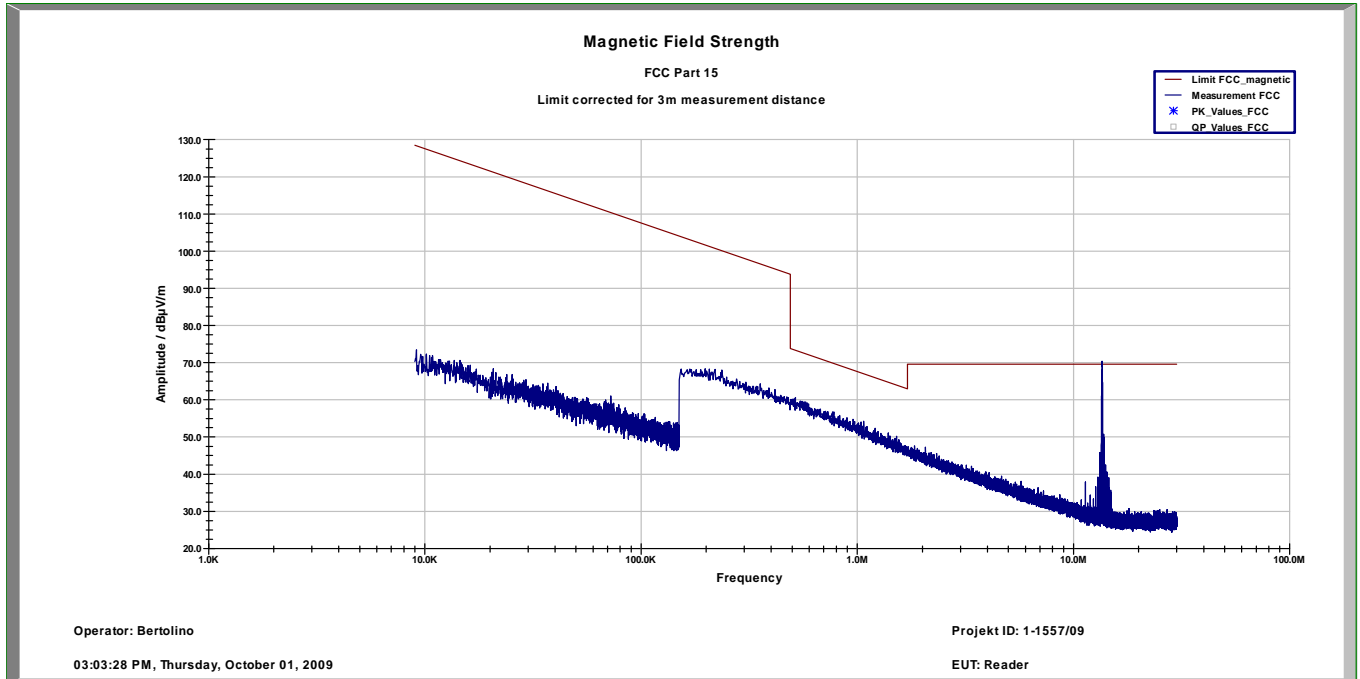
§ 15.225 (a) The field strength of any emission within the band 13.553 – 13.567 MHz shall not exceed 15,848 microvolts / meter at 30 meters (84 dB μ V/m @ 30 m)
--

6.2 Field strength of the harmonics and the spurious

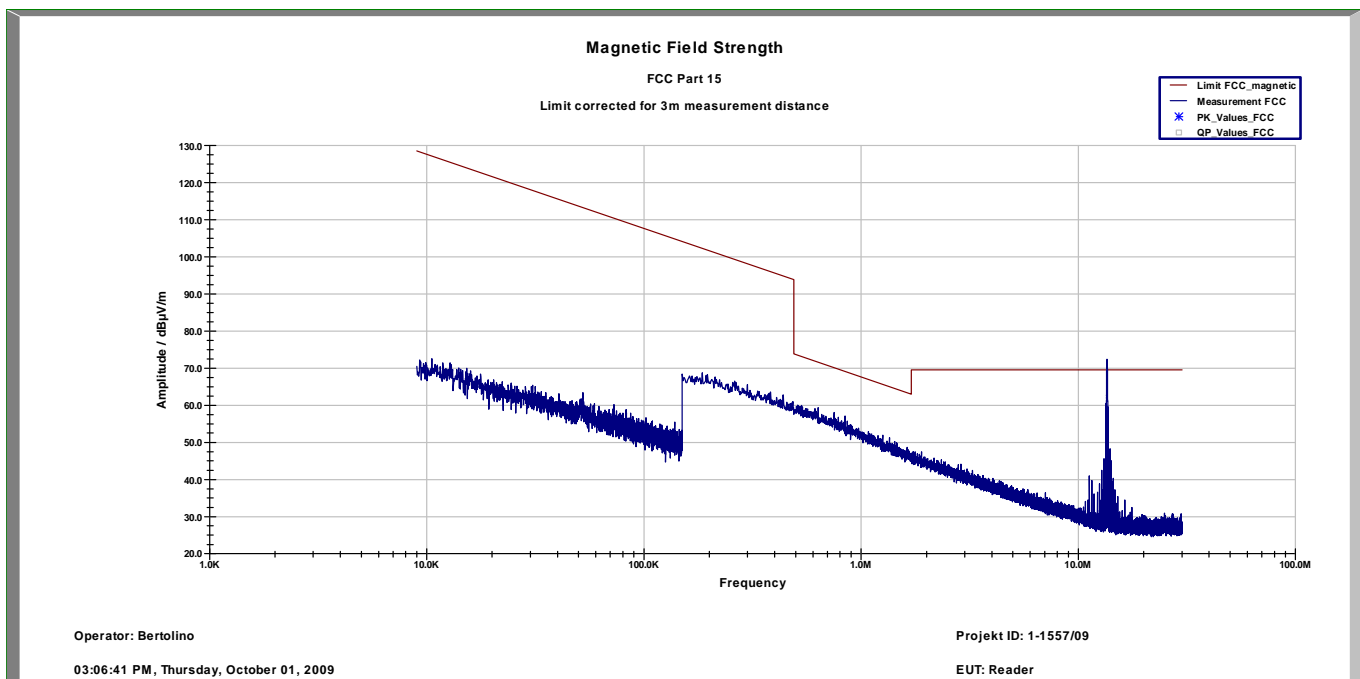
Reference

FCC:	CFR Part SUBCLAUSE § 15.209 (a) , §15.225 (d)
IC:	RSS 210, Annex 2.6

Plot 1: Position 1 - front side of the antenna



Plot 2: Position 2 - back side of the antenna



Results:

EMISSION LIMITATIONS					
f (MHz)		amplitude of emission (dB μ V/m)	limit max. allowed field strength	Distance (Meter)	results
No critical peaks detected – all emissions are 20 dB below the limit.				300	
				30	
Measurement uncertainty			± 3dB		

Limits

SUBCLAUSE § 15.209 (a)

Fundamental Frequency (MHz)	Field strength of Fundamental (μ V/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 (29.5 dB μ V/m)	30
30.0 – 88.0	100 (40 dB μ V/m)	3
88 – 216	150 (43.5 dB μ V/m)	3
216 – 960	200 (46 dB μ V/m)	3

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

Plot 3: Spurious emission 30 MHz – 1 GHz

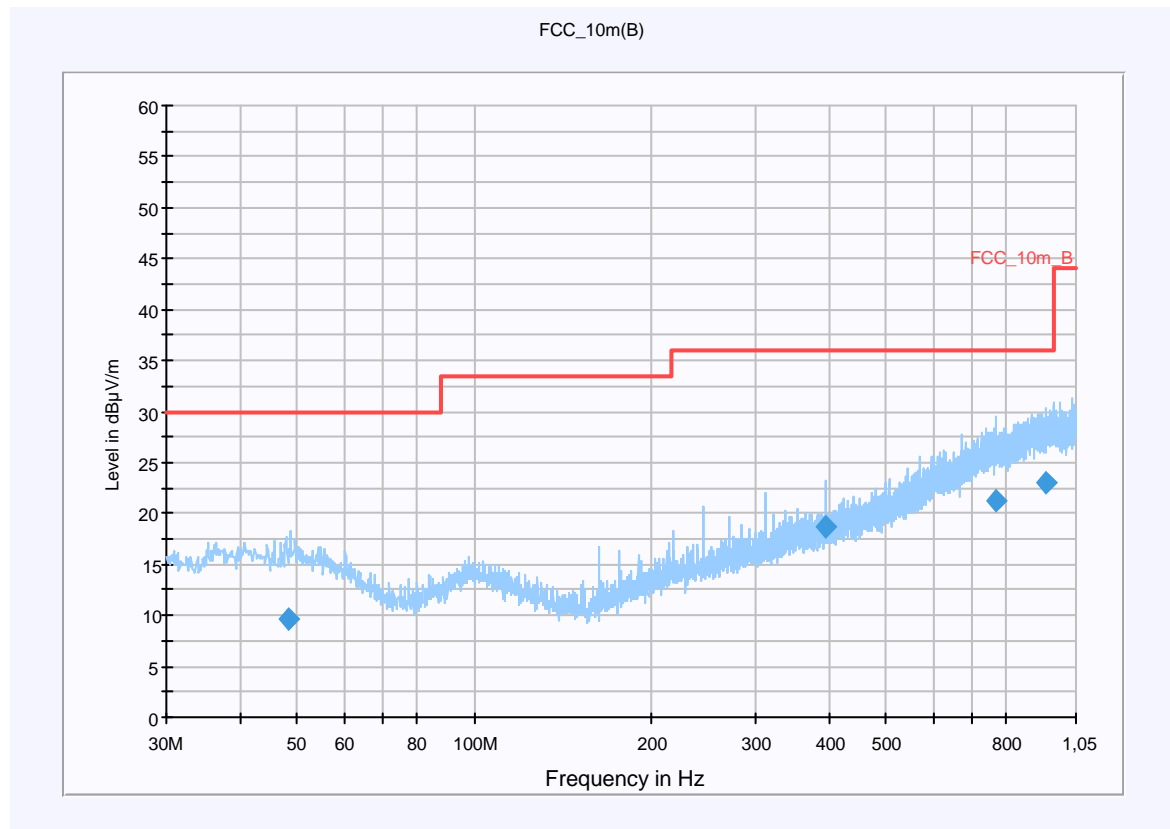
Common Information

EUT:	RFID Reader
Serial Number:	RFID Module: 1863360 (FEIG Electronic)
Test Description:	FCC part 15 B class B @ 10 m
Operating Conditions:	cont RX/TX
Operator Name:	Kraus
Comment:	DC via AC: 115 V / 60 Hz

Scan Setup: STAN_Fin [EMI radiated]

Hardware Setup:	Electric Field (NOS)
Level Unit:	dBµV/m

Subrange	Detectors	IF Bandwidth	Meas. Time	Receiver
30 MHz - 1,05 GHz	QuasiPeak	120 kHz	15 s	Receiver



Final Result 1

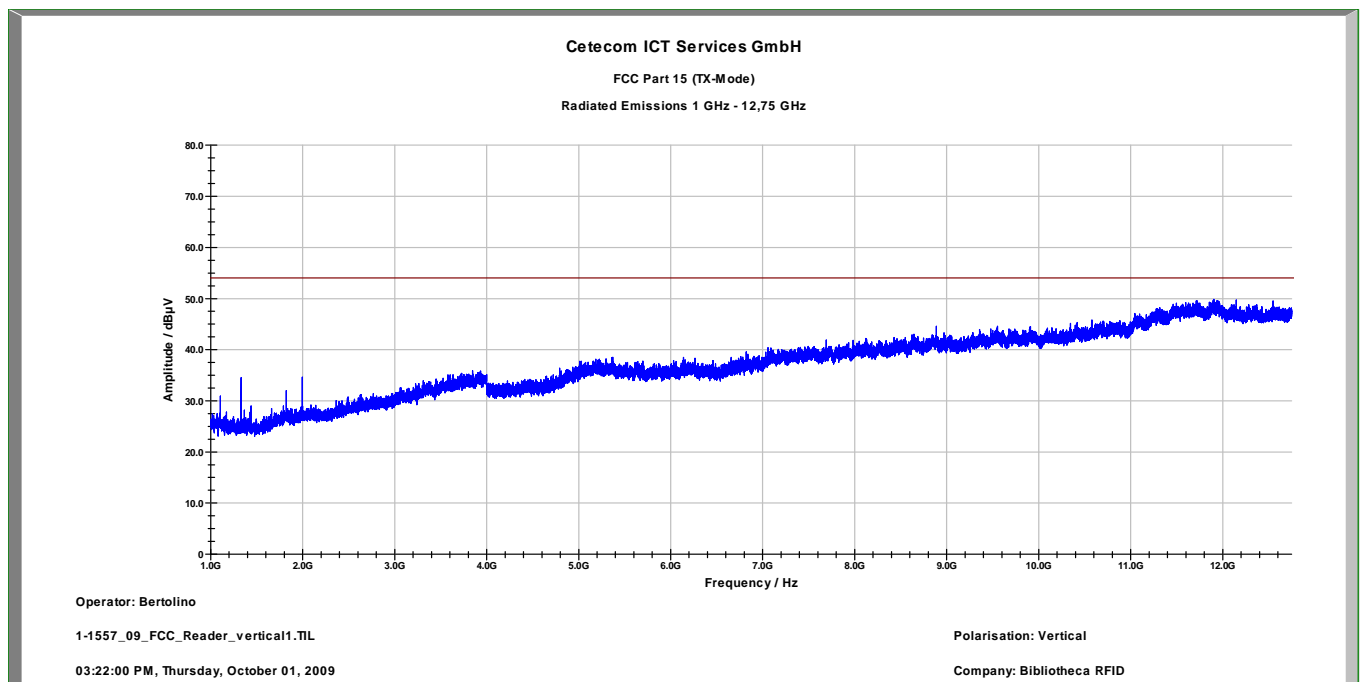
Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Antenna height (cm)	Polarity	Turntable position (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
48.423900	9.7	15000.000	120.000	198.0	V	191.0	13.5	20.4	30.0	
393.248550	18.7	15000.000	120.000	189.0	H	177.0	17.2	17.3	36.0	
766.132050	21.2	15000.000	120.000	400.0	V	262.0	24.2	14.8	36.0	
936.568050	23.0	15000.000	120.000	400.0	H	266.0	25.8	13.0	36.0	

Hardware Setup: EMI radiated\Electric Field (NOS) - [EMI radiated]

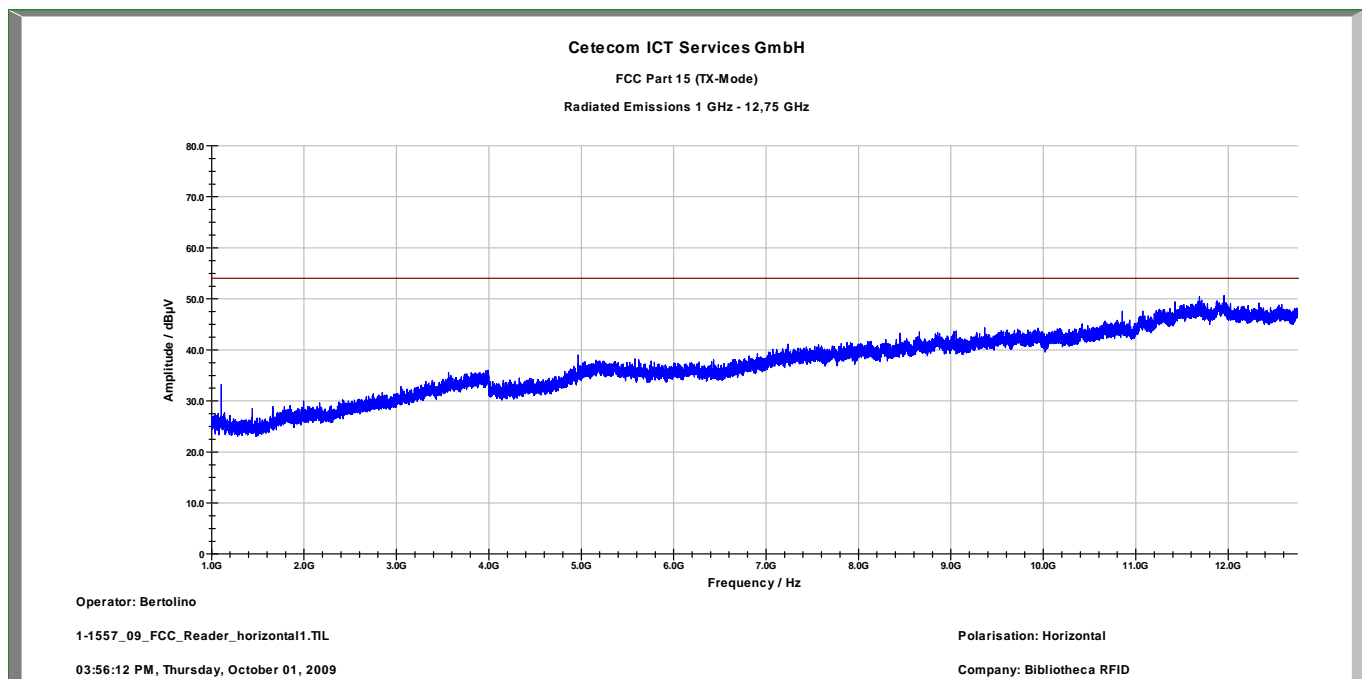
Subrange 1	
Frequency Range:	30 MHz - 2 GHz
Receiver:	Receiver [ESCI 3] @ GPIB0 (ADR 20), SN 100083/003, FW 4.32
Signal Path:	without Notch FW 1.0
Antenna:	VULB 9163 SN 9163-295, FW --- Correction Table (vertical): VULP6113 Correction Table (horizontal): VULP6113 Correction Table: Cable_EN_1GHz (0909)
Antenna Tower:	Tower [EMCO 2090 Antenna Tower] @ GPIB0 (ADR 8), FW REV 3.12
Turntable:	Turntable [EMCO Turntable] @ GPIB0 (ADR 9), FW REV 3.12

EMC 32 Version 8.10.00

Plot 4: Spurious emission 1 GHz – 12.75 GHz, vertical polarization



Plot 5: Spurious emission 1 GHz – 12.75 GHz, horizontal polarization



6.3 Frequency tolerance

Reference

FCC:	CFR Part SUBCLAUSE § 15.225 (e)
IC:	RSS 210, Annex 2.6

Results:

Frequency tolerance								
Over temperature variation			Over voltage variation					
T (°C)]	Frequency [kHz]	result	Power voltage	Frequency [kHz]	result			
-20°	13560.06	+60 Hz						
-10°	13560.01	+10 Hz						
0°	13560.00	0 Hz						
10°	13560.00	0 Hz						
20° V _{nom}	13559.99	- 10 Hz	--	--	--			
20° V _{low}	--	--	97.75 V	13559.99	- 10 Hz			
20° V _{high}	--	--	132.25 V	13559.99	- 10 Hz			
30°	13559.99	- 10 Hz						
40°	13559.99	- 10 Hz						
50°	13559.98	-20 Hz						
Measurement uncertainty			±100 Hz					

Limits

SUBCLAUSE § 15.225 (e)

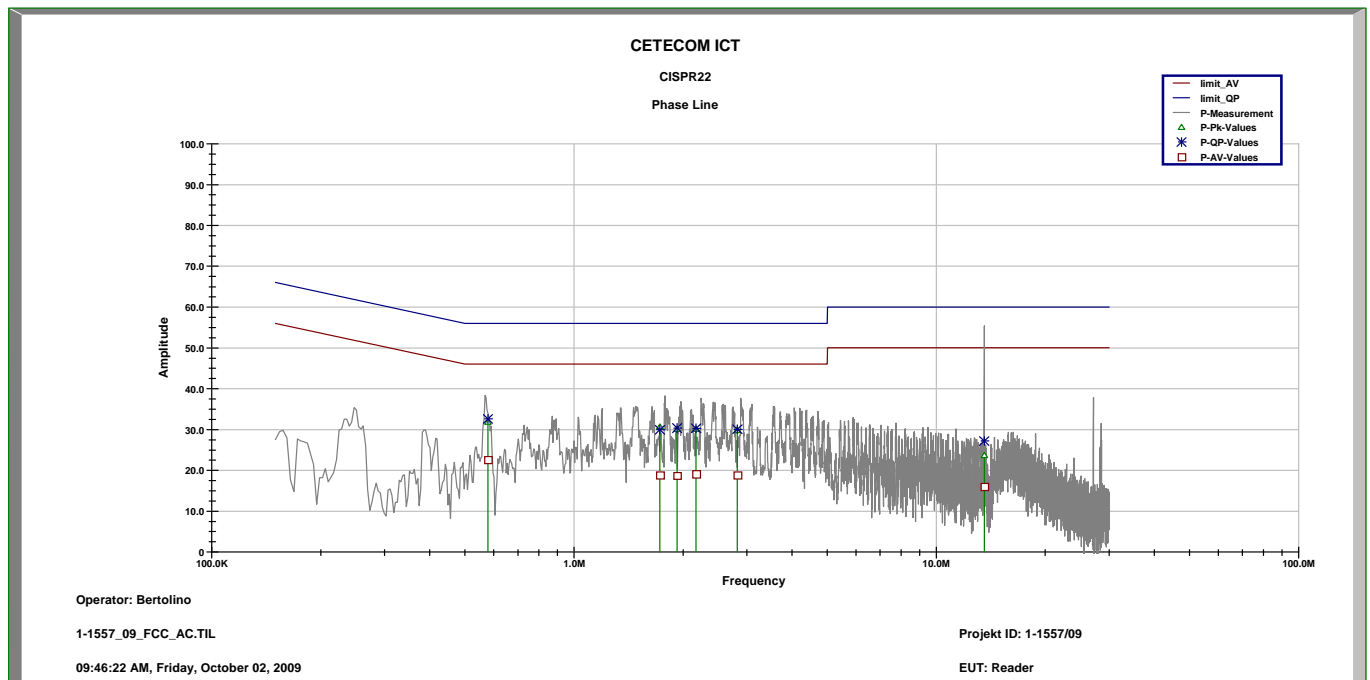
The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C.

6.4 Conducted Limits

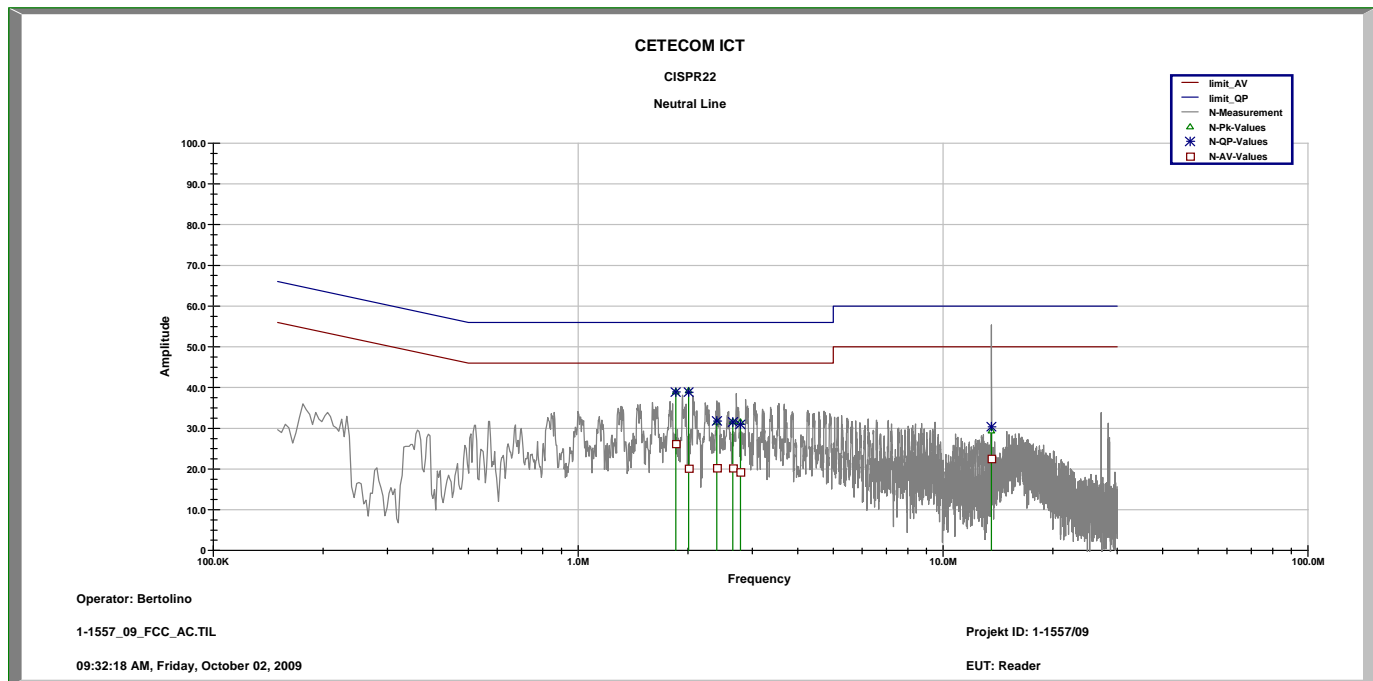
Reference

FCC:	CFR Part 15.207, 15.107
IC:	RSS 210, Issue 7, Section 6.6 , 7.4

Plot 1: Phase line



Plot 2: Neutral line



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

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.

All reported calibration intervals are calibrations according to the EN/ISO/IEC 17025 standard. These calibrations were performed from an accredited external calibration laboratory.

Additional to these calibrations the laboratory performed comparison measurements with other calibrated systems and performed a weekly chamber inspection.

All used devices are connected with a 10 MHz external reference.

According to the manufacturers' instruction is it possible to establish a calibration interval for the FSP unit of 24 month, if the device has an external 10 MHz reference.

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	18.01.2008	24	18.01.2010
2	Spektrum Analyzer Display 85662A	HP	2816A16497	300001690	23.01.2008	24	23.01.2010
3	Quasi-Peak-Adapter 85650A	HP	2811A01135	300000216	23.01.2008	24	23.01.2010
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

Anechoic chamber F:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Control Computer	F+W	FW0502032	300003303	-/-	-/-	-/-
2	Trilog Antenna VULB 9163	Schwarzbeck	295	300003787	01.04.2008	24	01.04.2010
3	Amplifier - 0518C-138	Veritech Micro-wave Inc.	-/-	-/-	-/-	-/-	-/-
4	Switch - 3488A	HP		300000368	-/-	-/-	-/-
5	EMI Test receiver - ESCI	R&S	100083	300003312	01.06.2009	24	01.06.2011
6	Turntable Controller - 1061 3M	EMCO	1218	300000661	-/-	-/-	-/-
7	Tower Controller 1051 Controller	EMCO	1262	300000625	-/-	-/-	-/-
8	Tower - 1051	EMCO	1262	300000625	-/-	-/-	-/-
10	Ultra Notch-Filter Rejected band Ch. 62	WRCD	9	-/-	-/-	-/-	-/-

Test laboratory 011:

No	Equipment/Type	Manuf.	Serial Nr.	Inv. No. Cetecom	Last Calibration	Frequency (months)	Next Calibration
1	Climatic box VUK 04/500	Heraeus Vötsch	32678	300000297	29.07.2008	24	27.07.2010
2	Spectrum Analyser 8565E	HP	3738A00773	300001665	08.01.2008	24	08.01.2010
3	Spectrum Analyser FSU 50	R&S	200012	300003443	05.06.2008	24	05.06.2010
4	SGH 12 ... 18 GHz	narda	01005	300000787	cyclic verification		
5	SGH 18 ... 27 GHz	narda	01005	300000487	cyclic verification		
6	SGH 27 ... 40 GHz	narda	82016	300000510	cyclic verification		
7	SGH 33 ...50 GHz	Thomson		300000812	cyclic verification		
8	Adapter WG/SMA	narda	64088	-/-	cyclic verification		
9	Adapter WG/SMA	flann	213	-/-	cyclic verification		
10	Adapter WG/SMA	HP	00231	-/-	cyclic verification		
11	SGH 50 ... 75GHz	Thomson	-/-	300000813	cyclic verification		
12	Mixer 50 ... 75 GHz 11970V	HP	-/-	30000781i	07.08.2007	36	07.08.2010
13	SGH 75 ... 110 GHz	Thomson	-/-	30000798b	cyclic verification		
14	Mixer 75 ... 110 GHz 11970W	HP	-/-	30000781e	07.08.2007	36	07.08.2010
15	SGH 110 ... 170 GHz	Flann	-/-	300001999	cyclic verification		
16	Mixer 110 ... 170 GHz	Tektronix	B010186	300001685d	cyclic verification		
17	SGH 170 ... 325 GHz	Flann	-/-	300002000	cyclic verification		
18	Mixer 170 ... 325 GHz	Tektronix	B010241	300001685j	cyclic verification		

8 Photographs of the Test Set-up

Photo documentation: external photos

Photo 1:

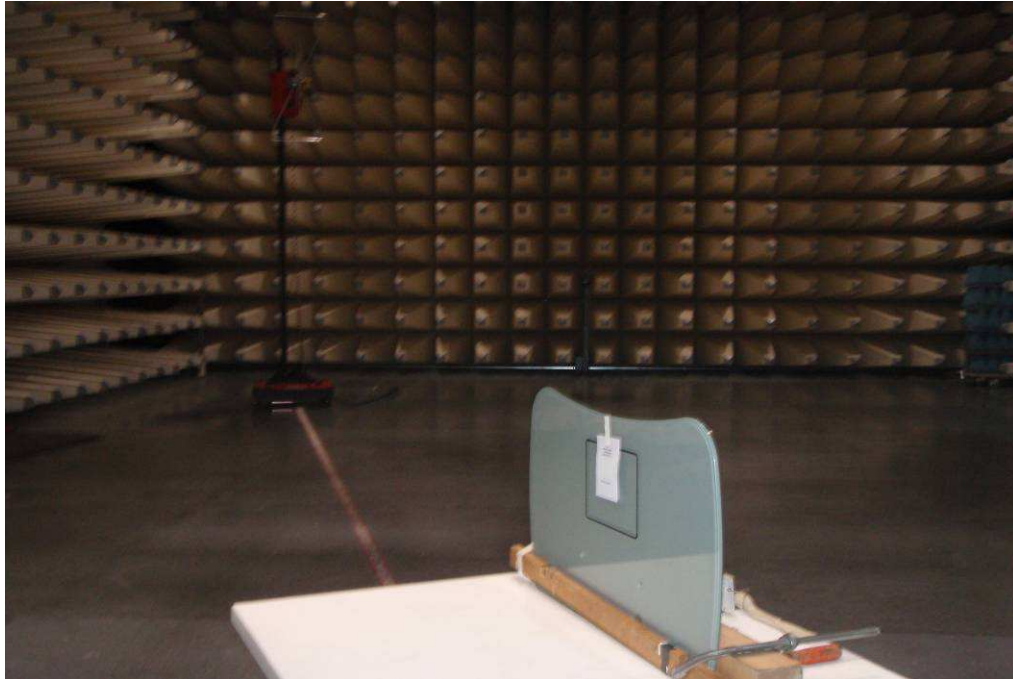


Photo 2:



Photo 3:



Photo 4:



9 Photographs of the EUT

Photo documentation: external photos

Photo 1:

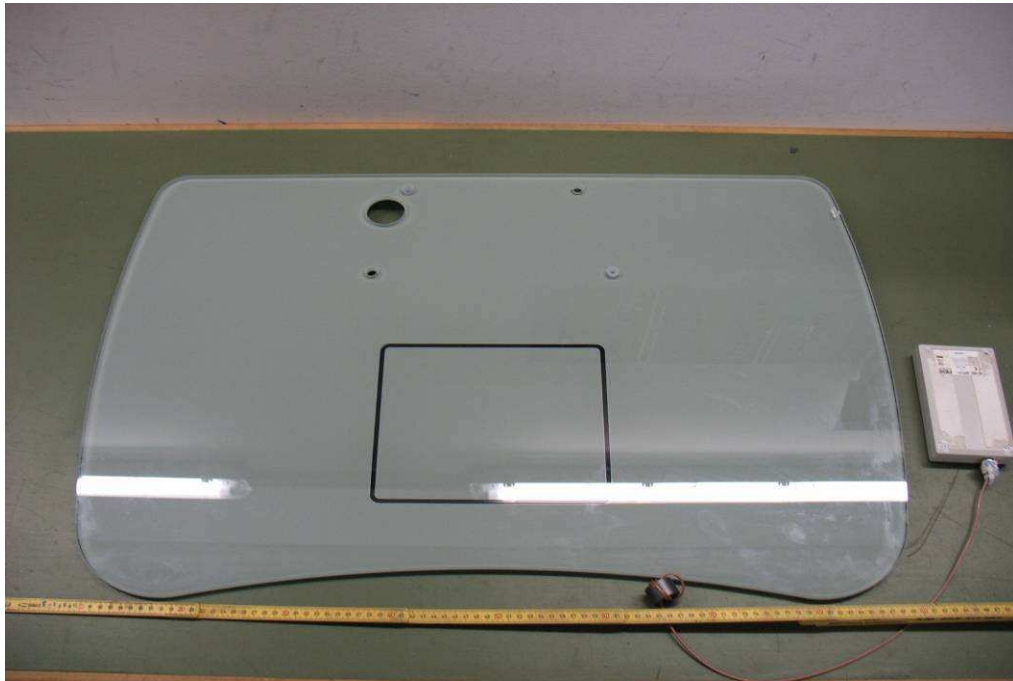


Photo 2:



Photo 3:

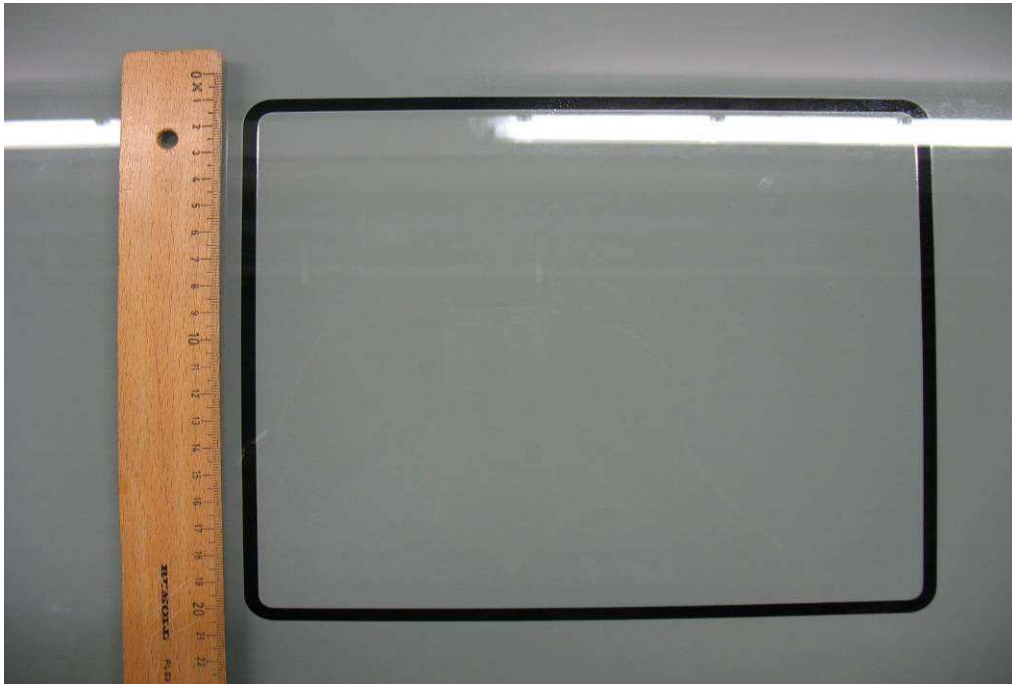


Photo 4:



Photo 5:



Photo 6:



Photo 7:



Photo 8:



Photo 9:

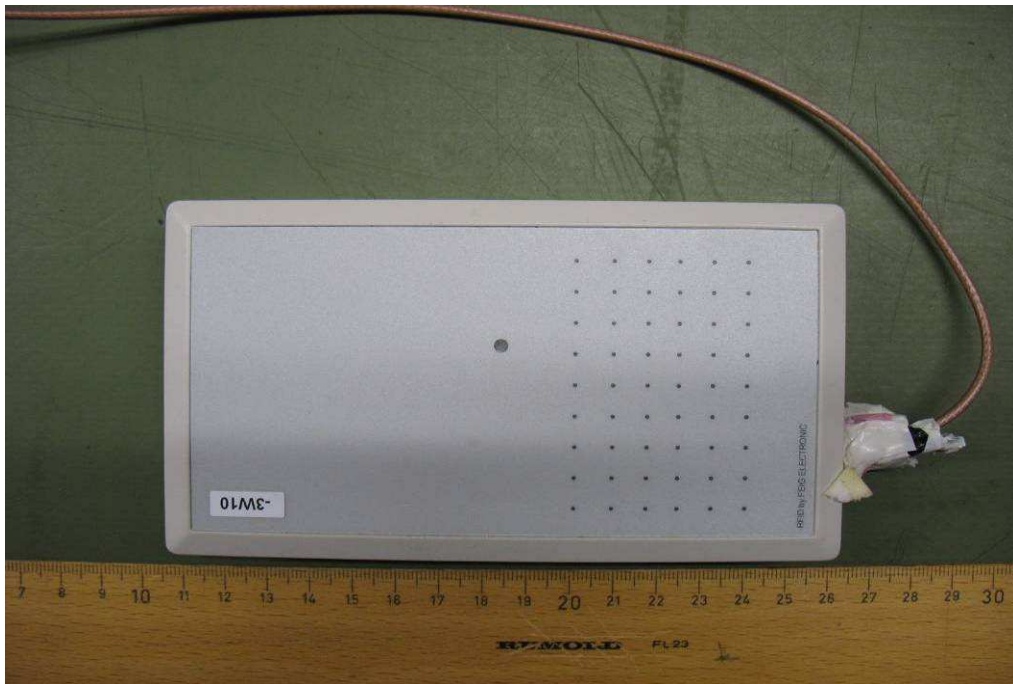


Photo documentation: internal photos

Photo 1:



Photo 2:



Photo 3:



Photo 4:



Photo 5:



Photo 6:

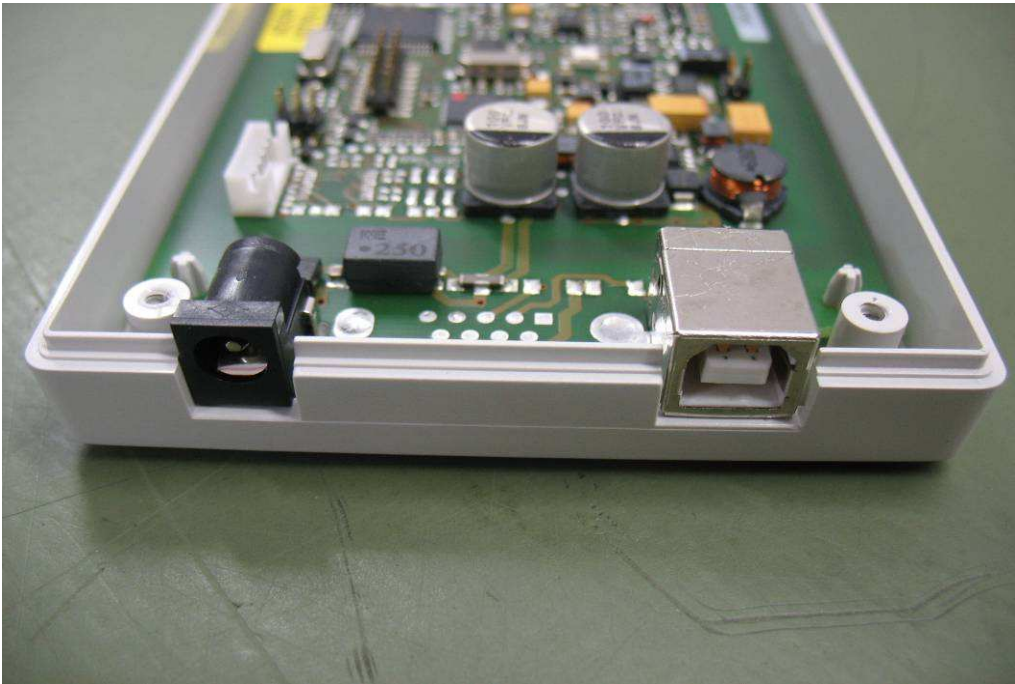


Photo 7:

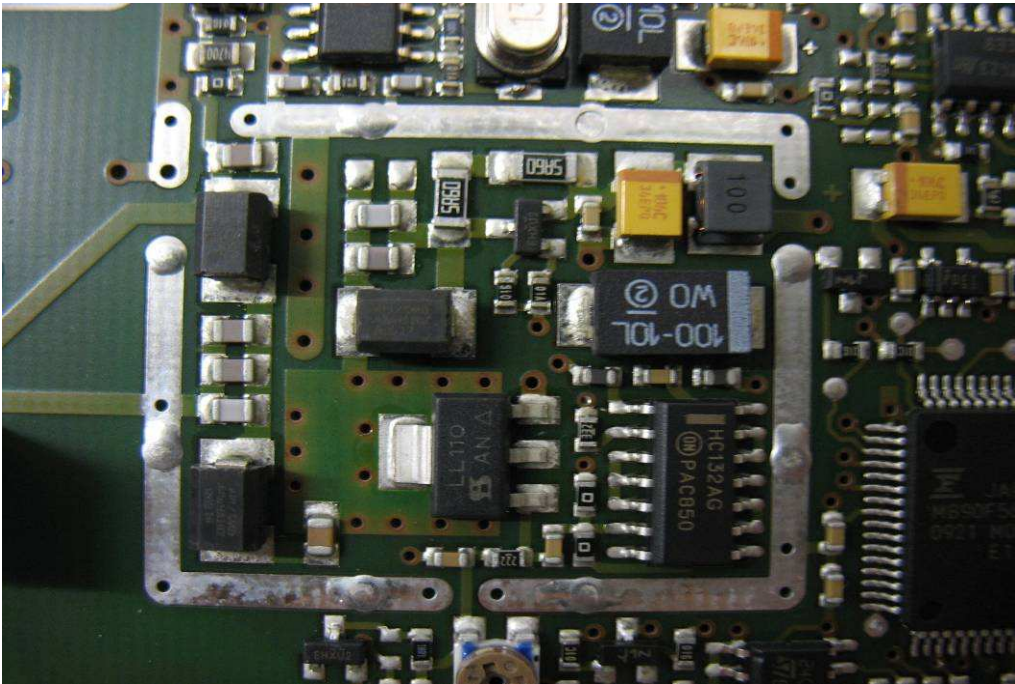


Photo 8:

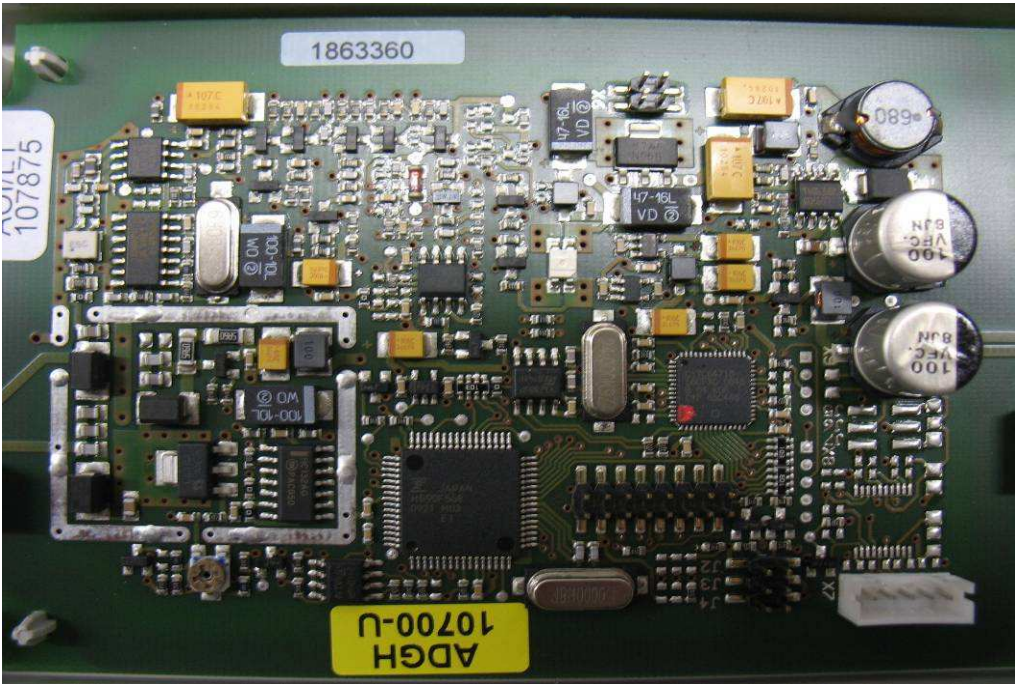


Photo 9:

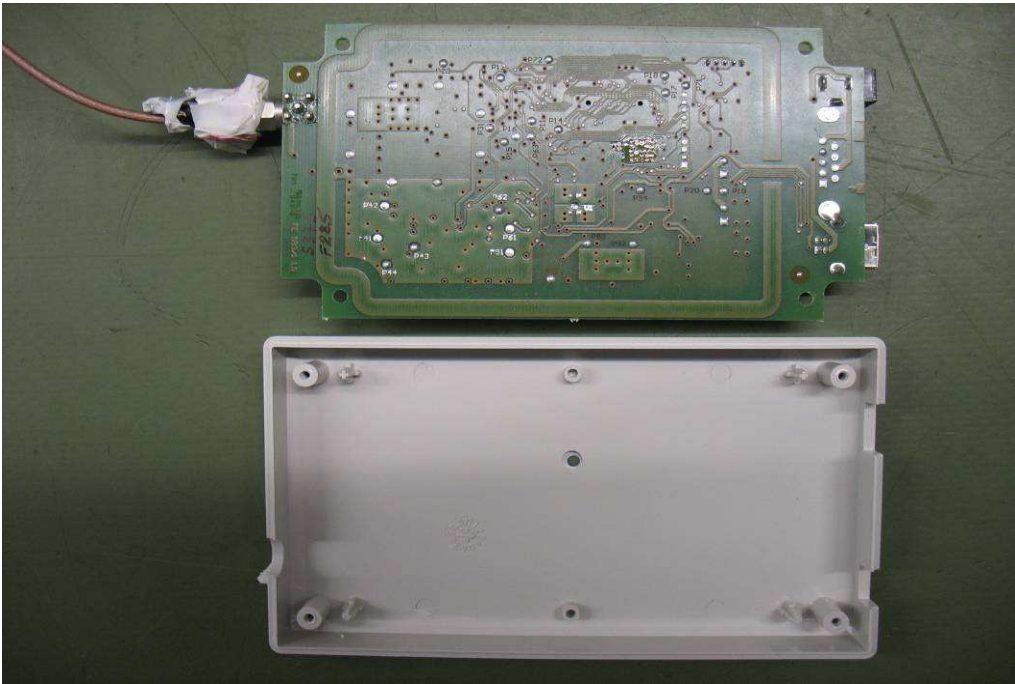


Photo 10:

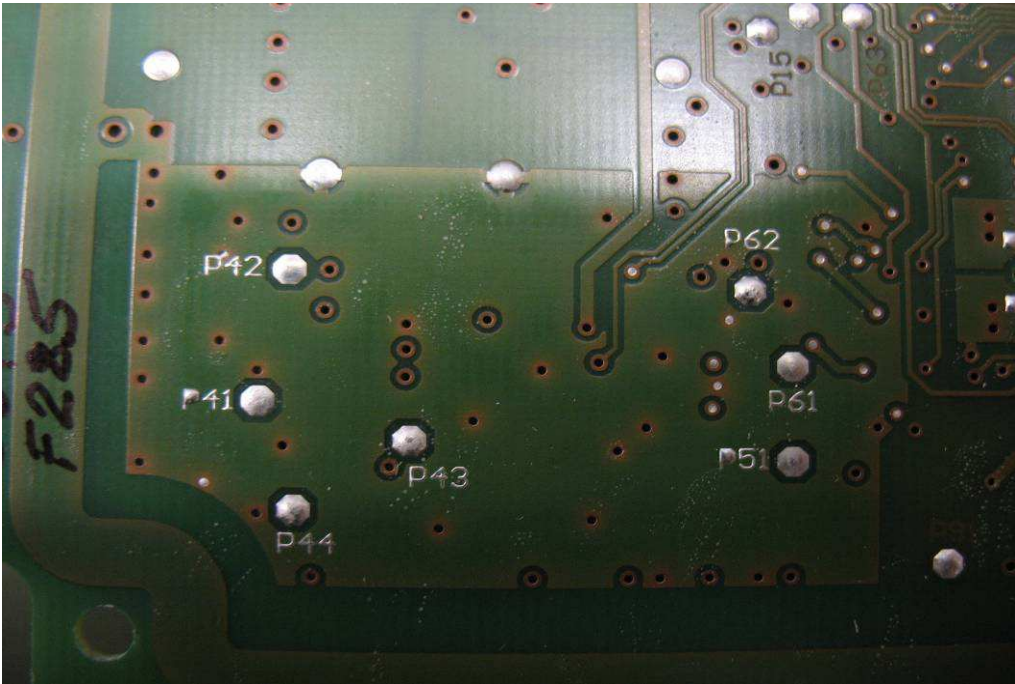


Photo 11:

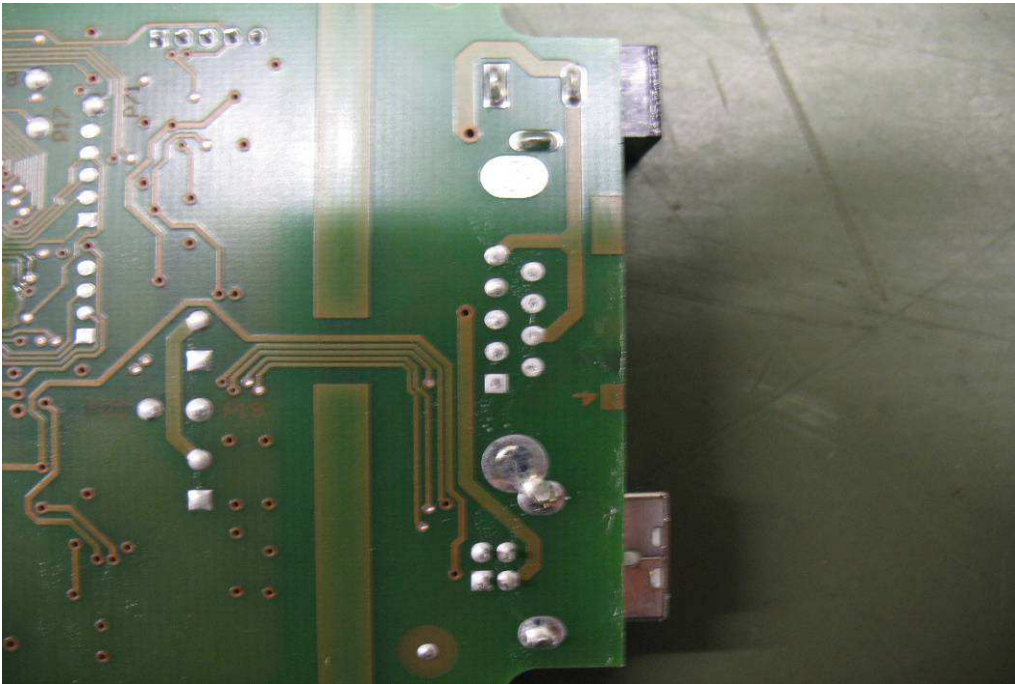


Photo 12:

