

EMI - TEST REPORT

- FCC Part 15B -

Test Report No. :	T38010-00-01TK	13. June 2014 Date of issue
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Type / Model Name : Airtraq A-360

Product Description : Wi-Fi Camera

Applicant : PRODOL MEDITEC S.A.

Address : Muelle Tomas Olabarri, 5 3d

48930 Las Arenas, Vizcaya, SPAIN

Manufacturer : Bizintek Innova S.L

Address : Av. de la Ribera de Axpe, Ed. 11B mod. 210

48950 Erandio, SPAIN

Licence holder : PRODOL MEDITEC S.A.

Address : Muelle Tomas Olabarri, 5 3d

48930 Las Arenas, Vizcaya, SPAIN

Test Result according to the standards listed in clause 1 test standards:
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POSITIVE



The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

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ATTACHMENT	NONE

1 TEST STANDARDS

The tests were performed according to following standards:

FCC Rules and Regulations Part 15 Subpart A - General (September, 2013)

Part 15, Subpart A, Section 15.31	Measurement standards
Part 15, Subpart A, Section 15.33	Frequency range of radiated measurements
Part 15, Subpart A, Section 15.35	Measurement detector functions and bandwidths

FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (September, 2013)

Part 15, Subpart B, Section 15.107	AC Line conducted emission	<input type="checkbox"/> Class A device	<input checked="" type="checkbox"/> Class B device
Part 15, Subpart B, Section 15.109	Radiated emission, general requirements		
Part 15, Subpart B, Section 15.111	Antenna power conduction		

ANSI C63.4: 2009	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
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CISPR 16-4-2: 2011 EN 55016-4-2: 2011	Uncertainty in EMC measurement
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CISPR 22: 2008 EN 55022: 2010	Information technology equipment
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2 SUMMARY

2.1 General remarks

None

2.2 Final assessment

The equipment under test **fulfills** the EMI requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 10 April 2014

Testing concluded on : 22 May 2014

Checked by:

Eduard Stangl
Technical Manager

Tested by:

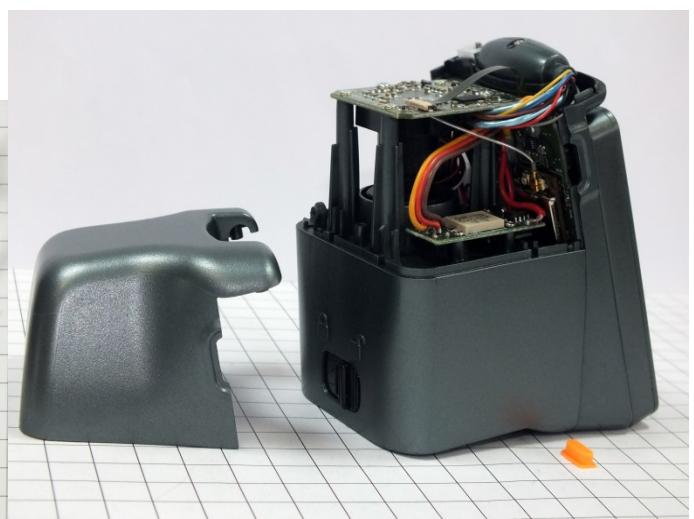
Tobias Kammerer
Radio Team

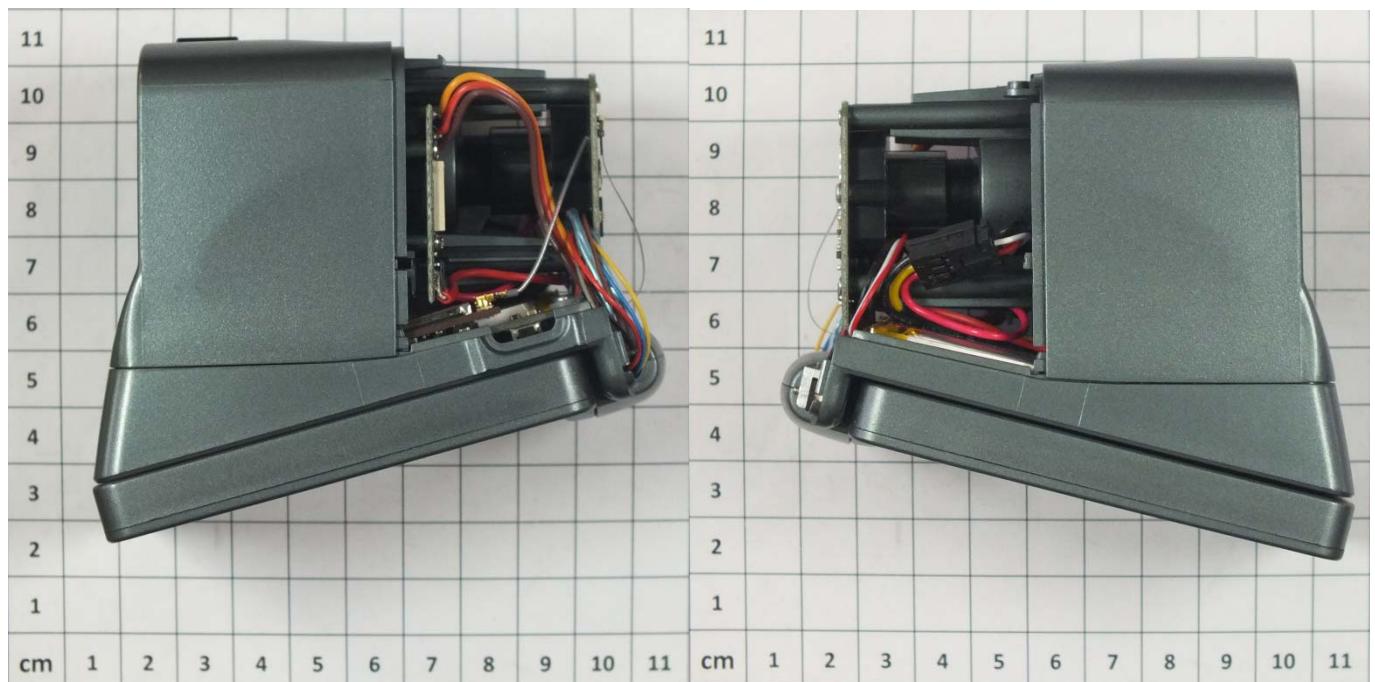
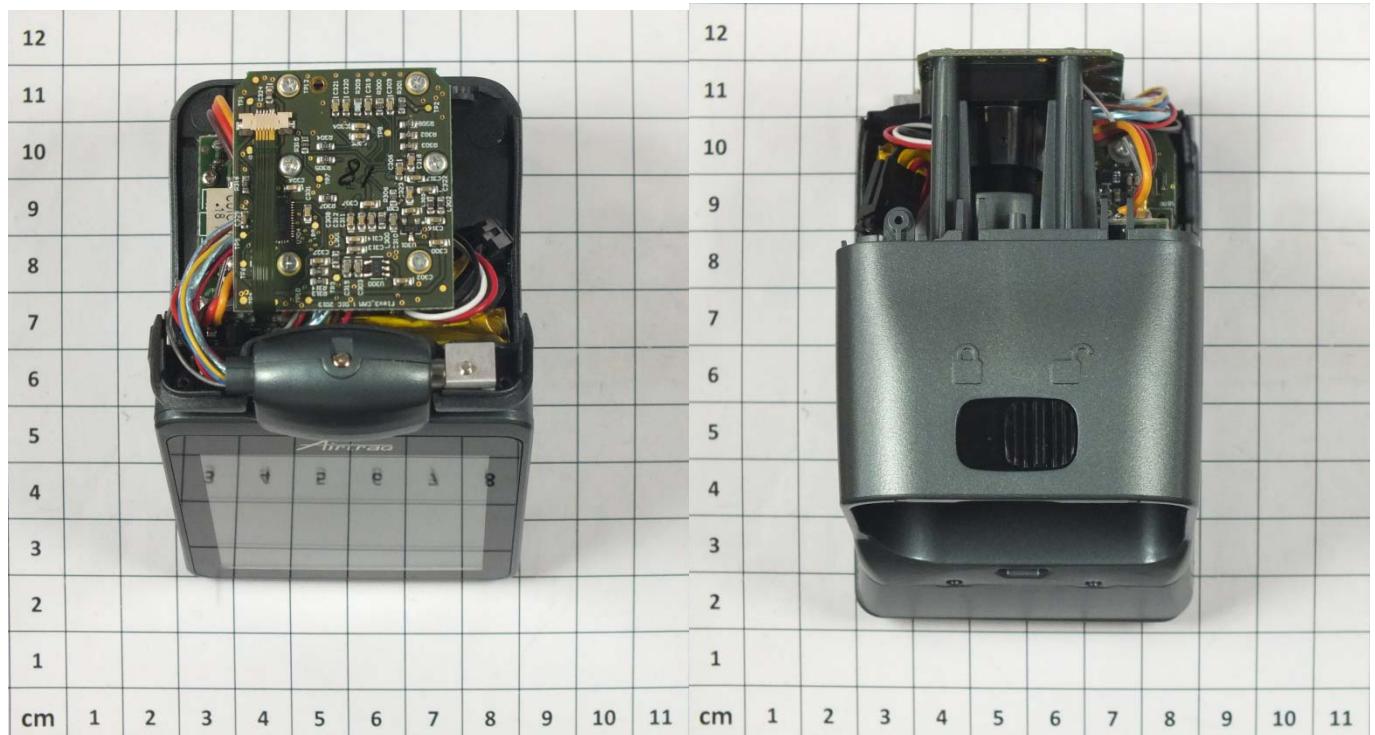
3 EQUIPMENT UNDER TEST

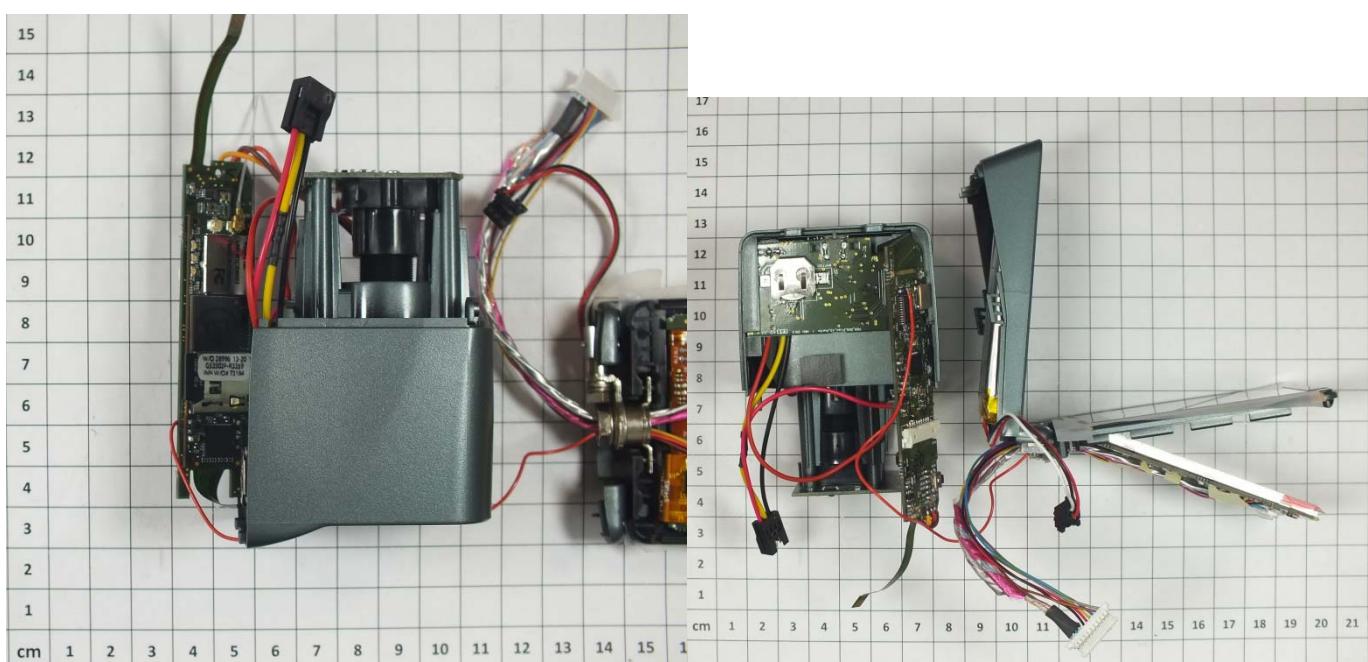
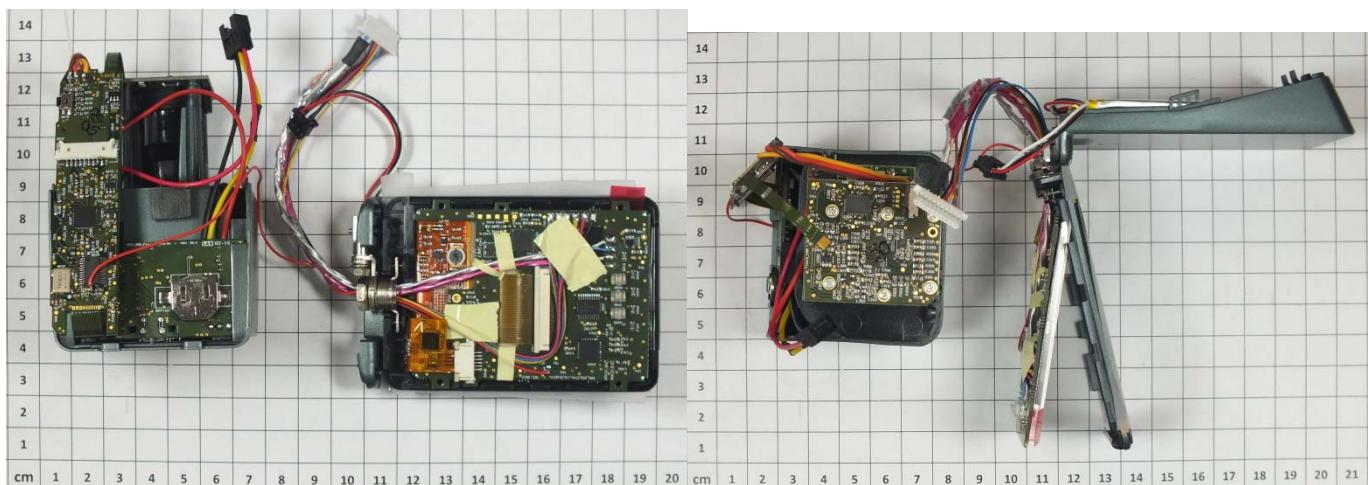
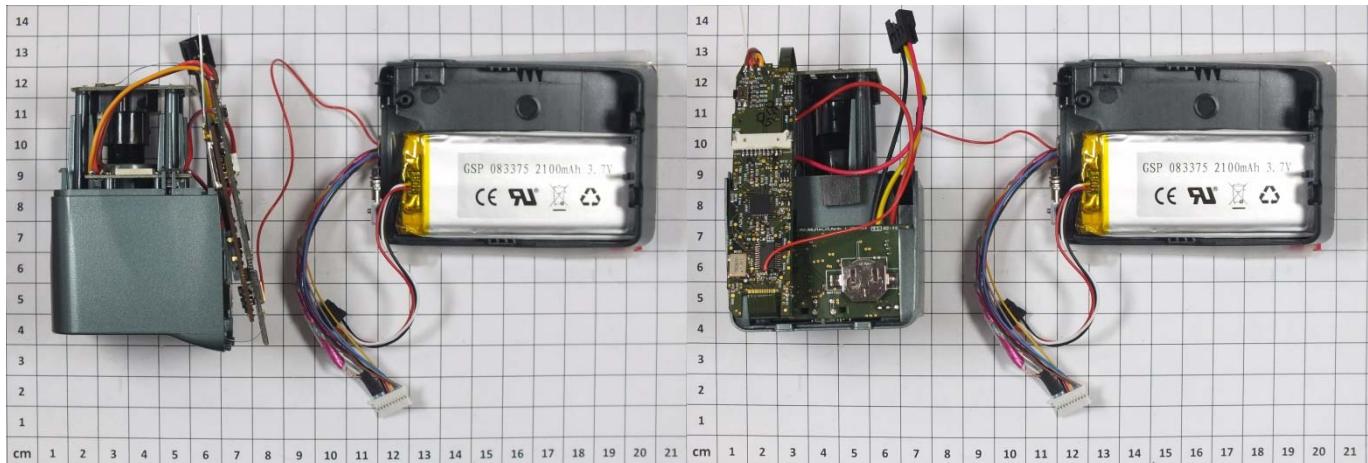
3.1 Photo documentation of the EUT

3.1

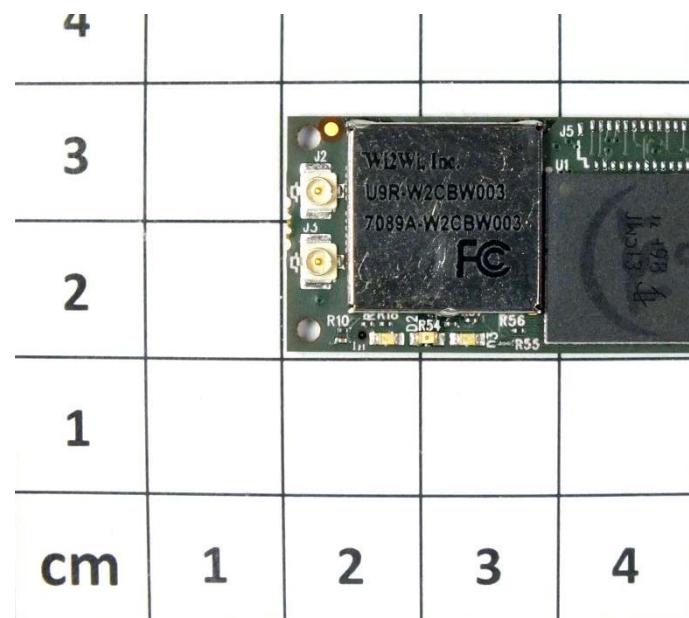
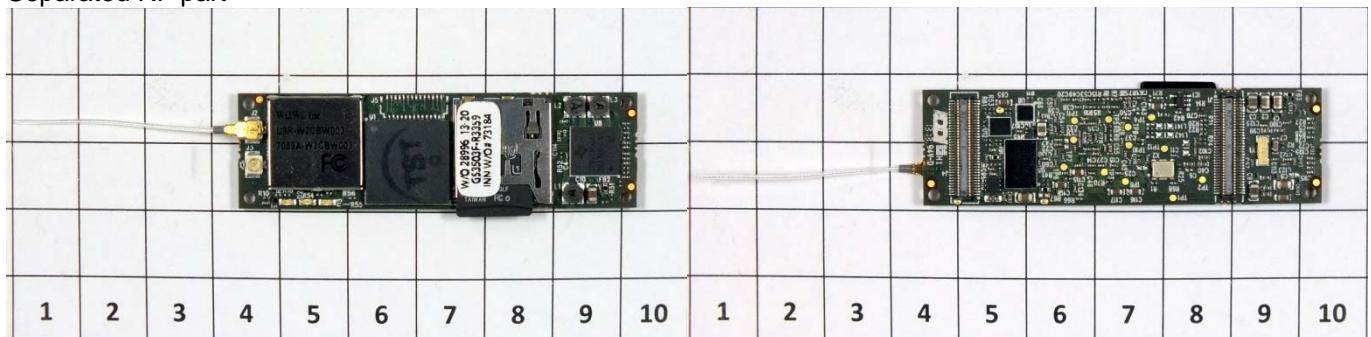








Separated RF part



3.2 Power supply system utilised

Power supply voltage : 3.7 V DC (Battery powered)

3.3 Short description of the equipment under test (EUT)

The EUT is a WLAN system with included CCD-Camera and video recording function. A tablet computer or a smart phone may be used to stream the camera video signal. Video streaming is mandatory for modulation type and data rate selection. There is also the possibility to record the camera's video signal if necessary. The recording is stored to the integrated memory of the EUT. The recorded data can be transferred via USB connection. While having connected the EUT to a PC via USB cable no other function is possible. The intended use is data transfer, only. Wireless function is inactive.

Number of tested samples: 1
Serial number: 3d26

EUT operation mode:

The equipment under test was operated during the measurement under the following conditions:

- Data transfer on USB line

-

-

EUT configuration:

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- Toshiba Laptop

Model : TECRA A11-127

- _____

Model : _____

- _____

Model : _____

- _____

Model : _____

4 TEST ENVIRONMENT

4.1 Address of the test laboratory

CSA Group Bayern GmbH
Ohmstrasse 1-4
94342 STRASSKIRCHEN
GERMANY

4.2 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

4.3 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor $k = 2$. The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 11.2003 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

4.4 Measurement protocol for FCC

4.4.1 General information

4.4.1.1 Justification

The equipment under test (EUT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

4.4.2 Details of test procedures

4.4.2.1 General standard information

In compliance with 47 CFR Part 15 Subpart A, Section 15.38 testing for FCC compliance may be achieved by following the procedures set out in ANSI C63.4 and applying the CISPR 22 limits.

4.4.3 Conducted emission

4.4.3.1 Description of measurement

The final level, expressed in dB μ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC limit or to the CISPR limit.

To convert between dB μ V and μ V, the following conversions apply:

$$\begin{aligned} \text{dB}\mu\text{V} &= 20 \cdot \log(\mu\text{V}) \\ \mu\text{V} &= 10^{(\text{dB}\mu\text{V}/20)} \end{aligned}$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EUT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50Ω / $50 \mu\text{H}$ (CISPR 16) characteristics. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emissions are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

4.4.4 Radiated emission (electrical field 30 MHz - 1 GHz)

4.4.4.1 Description of measurement

Spurious emission from the EUT is measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarised antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 m non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre in a serpentine fashion so that they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. The antenna is positioned in horizontal polarisation and is repeated vertically. To locate maximum emission from the test sample the antenna is varied in height from 1 to 4 metres and the EUT is rotated 360 degrees.

The final level in dB μ V/m is calculated by add the antenna correction factor and cable loss factor (dB) on the reading from the EMI receiver (dB μ V). The FCC or CISPR limit is subtracted from this result in order to provide the delta to limit listed in the measurement protocol.

Example:

Frequency (MHz)	Reading level (dB μ V)	+	Correction Factor (dB/m)	=	Level (dB μ V/m)	-	CISPR Limit (dB μ V/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

4.4.5 Radiated emission (electrical field 1 GHz - 40 GHz)

4.4.5.1 Description of measurement

Radiated emission from the EUT are measured in the frequency range 1 GHz up to the maximum frequency as specified in 47 CFR Part 15, Subpart A, Section 15.33, using a spectrum analyser and appropriate linearly polarized antennas. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is following set out in ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyser set to max peak detector function and a resolution 1 MHz and video bandwidth 3 MHz for peak and 10 Hz for average measurement. The conditions determined as worst case will then be used for the final measurements. When the EUT is larger than the beam width of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to detect emission under better uncertainty and is calculated to the specified test distance.

4.5 Determination of worst case measurement conditions

Measurements have been made in all three orthogonal axes and the settings of the EUT were changed to locate at which position and at what setting of the EUT produce the maximum of the emission. For the further measurement the EUT is set in X position with the following settings.

5 TEST CONDITIONS AND RESULTS

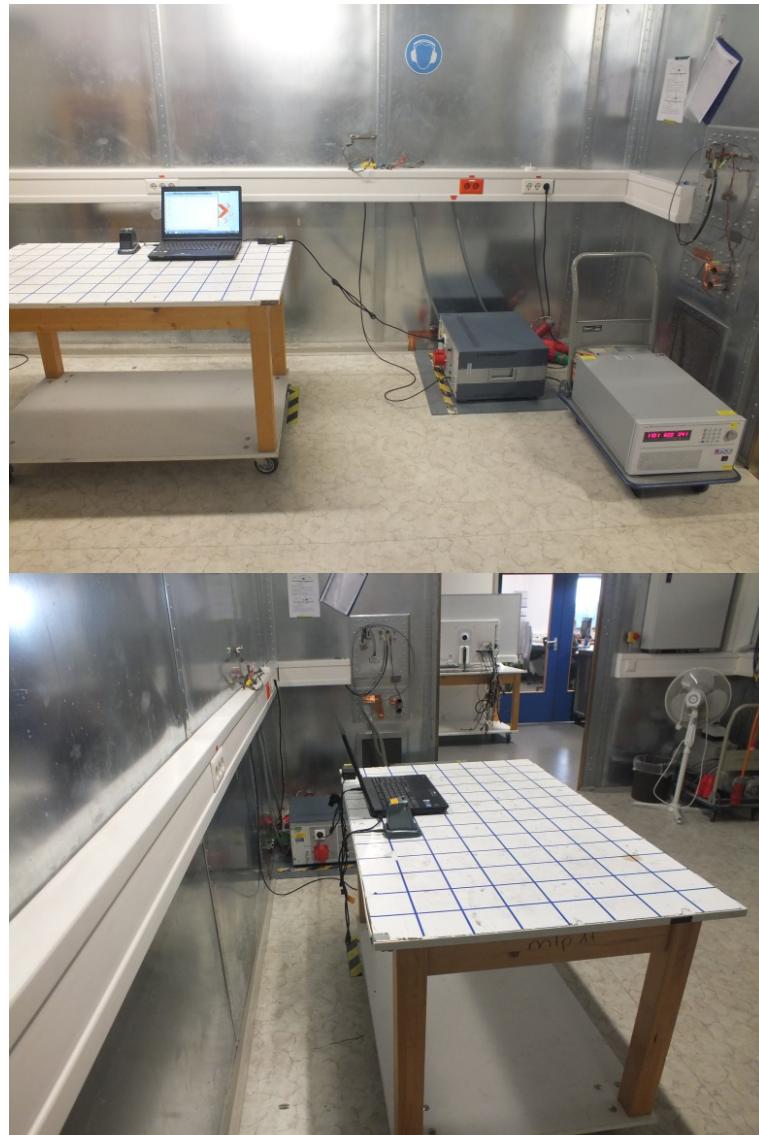
5.1 Conducted emission

For test instruments and accessories used see section 6 Part A 4.

5.1.1 Description of the test location

Test location: Shielded Room S2

5.1.2 Photo documentation of the test set-up



5.1.3 Applicable standard

According to FCC Part 15, Section 15.107(a):

Except for Class A devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the given limits.

5.1.4 Description of Measurement

The measurements are performed following the procedures set out in ANSI C63.4. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission are re-measured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

5.1.5 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 13.5 dB at 15.0495 MHz.

Limit according to FCC Part 15, Section 15.107(a):

Frequency of emission (MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

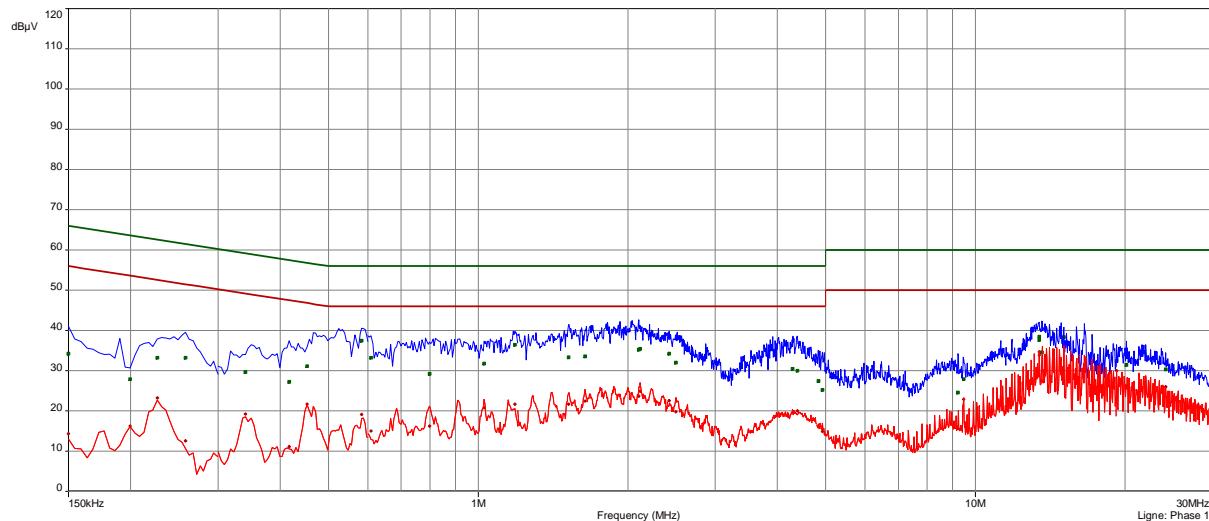
* Decreases with the logarithm of the frequency

The requirements are **FULFILLED**.

Remarks: For detailed test result please refer to following test protocols

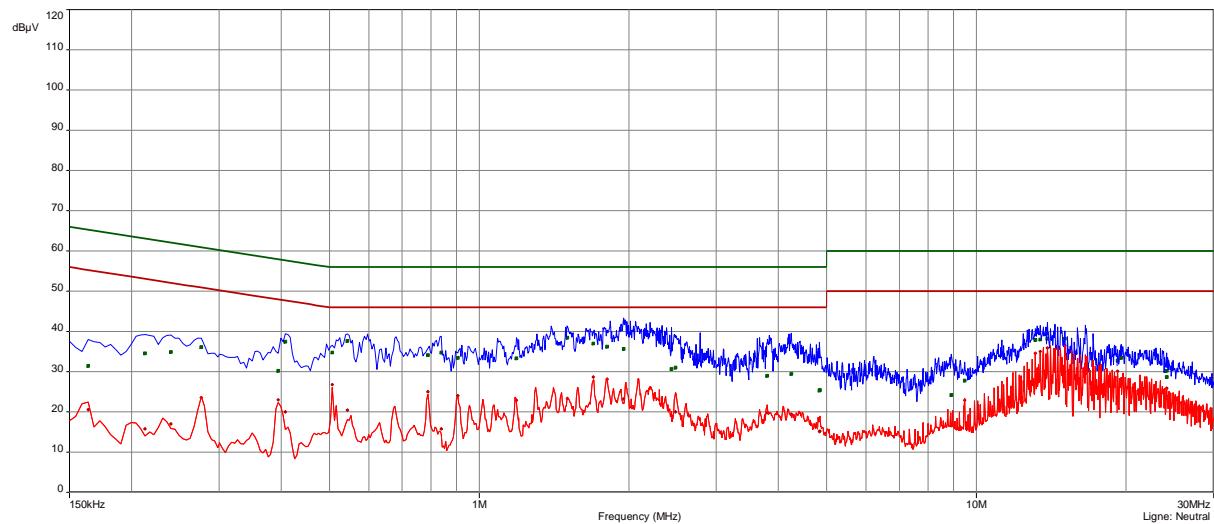
5.1.6 Test protocol

File No.:	T38010-00-01TK	Result	positive
Operation mode:	Data connection to PC		
Tested by:	TK		
Location:	Shielded Room 2	Date:	15.05.2014 07:28:32
Remarks:	Phase 1		



frequency MHz	SR	QP dB(μV)	margin dB	limit dB	AV dB(μV)	margin dB	limit dB	line
0.15	1	34.26	31.74	66	14.32	41.68	56	Phase 1
0.1995	1	27.95	35.68	63.63	16.23	37.4	53.63	Phase 1
0.2265	1	33.22	29.36	62.58	23.21	29.37	52.58	Phase 1
0.258	1	33.2	28.29	61.5	12.51	38.98	51.5	Phase 1
0.3405	2	29.66	29.53	59.19	19.26	29.93	49.19	Phase 1
0.417	2	27.2	30.31	57.51	11.16	36.35	47.51	Phase 1
0.453	2	31.15	25.67	56.82	21.69	25.13	46.82	Phase 1
0.5835	2	37.44	18.56	56	19.08	26.92	46	Phase 1
0.609	3	33.25	22.75	56	15	31	46	Phase 1
0.798	3	29.23	26.77	56	16.27	29.73	46	Phase 1
1.0275	3	31.79	24.21	56	20.83	25.17	46	Phase 1
1.185	3	36.42	19.58	56	21.7	24.3	46	Phase 1
1.5195	4	33.33	22.67	56	21.66	24.34	46	Phase 1
1.641	4	33.57	22.43	56	22.49	23.51	46	Phase 1
2.1045	4	35.23	20.77	56	23.63	22.37	46	Phase 1
2.118	4	35.41	20.59	56	24.88	21.12	46	Phase 1
2.4225	5	34.25	21.75	56	22.59	23.41	46	Phase 1
2.499	5	32.05	23.95	56	19.83	26.17	46	Phase 1
4.2855	5	30.45	25.55	56	19.61	26.39	46	Phase 1
4.3845	5	30.03	25.97	56	19.99	26.01	46	Phase 1
4.836	6	27.46	28.54	56	16.24	29.76	46	Phase 1
4.926	6	25.23	30.77	56	14.91	31.09	46	Phase 1
9.228	6	24.55	35.45	60	15.51	34.49	50	Phase 1
9.4665	6	27.93	32.07	60	22.95	27.05	50	Phase 1
13.4295	7	38.4	21.6	60	34.7	15.3	50	Phase 1
13.434	7	37.62	22.38	60	33.89	16.11	50	Phase 1
13.614	7	34.54	25.46	60	27.4	22.6	50	Phase 1
15.0495	7	38.35	21.65	60	36.2	13.8	50	Phase 1
19.2405	8	32.42	27.58	60	30.03	19.97	50	Phase 1
20.1315	8	31.48	28.52	60	25.82	24.18	50	Phase 1
24.132	8	30.3	29.7	60	25.97	24.03	50	Phase 1

File No.:	T38010-00-01TK	Result	positive
Operation mode:	Data connection to PC		
Tested by:	TK		
Location:	Shielded Room 2	Date:	15.05.2014 07:28:32
Remarks:	Phase 1		



frequency	SR	QP	margin	limit	AV	margin	limit	line
MHz		dB(μ V)	dB	dB	dB(μ V)	dB	dB	
0.1635	9	31.48	33.8	65.28	20.53	34.75	55.28	Neutral
0.213	9	34.52	28.57	63.09	15.74	37.35	53.09	Neutral
0.24	9	34.86	27.23	62.1	16.96	35.13	52.1	Neutral
0.276	9	36.08	24.85	60.94	23.55	27.38	50.94	Neutral
0.3945	10	30.26	27.71	57.97	22.96	25.01	47.97	Neutral
0.408	10	37.5	20.19	57.69	20.05	27.64	47.69	Neutral
0.507	10	34.76	21.24	56	26.76	19.24	46	Neutral
0.543	10	37.68	18.32	56	20.4	25.6	46	Neutral
0.789	11	34.08	21.92	56	25.01	20.99	46	Neutral
0.8385	11	34.74	21.26	56	15.77	30.23	46	Neutral
0.906	11	33.45	22.55	56	23.97	22.03	46	Neutral
1.1895	11	33.37	22.63	56	22.95	23.05	46	Neutral
1.506	12	38.4	17.6	56	23.38	22.62	46	Neutral
1.695	12	37.04	18.96	56	28.65	17.35	46	Neutral
1.8075	12	36.24	19.76	56	28.08	17.92	46	Neutral
1.9515	12	35.64	20.36	56	23.26	22.74	46	Neutral
2.436	13	30.7	25.3	56	18.98	27.02	46	Neutral
2.481	13	31.04	24.96	56	20.01	25.99	46	Neutral
3.795	13	29.05	26.95	56	19.8	26.2	46	Neutral
4.245	13	29.43	26.57	56	19.49	26.51	46	Neutral
4.8315	14	25.38	30.62	56	15.1	30.9	46	Neutral
4.8405	14	25.42	30.58	56	15.26	30.74	46	Neutral
8.9085	14	24.24	35.76	60	16.51	33.49	50	Neutral
9.471	14	27.84	32.16	60	22.92	27.08	50	Neutral
13.146	15	37.9	22.1	60	34.56	15.44	50	Neutral
13.4295	15	38.02	21.98	60	34.99	15.01	50	Neutral
13.9065	15	38.22	21.78	60	35.85	14.15	50	Neutral
15.0495	15	38.25	21.75	60	36.49	13.51	50	Neutral
19.2405	16	32.8	27.2	60	30.11	19.89	50	Neutral
19.5285	16	33.45	26.55	60	28.18	21.82	50	Neutral
24.132	16	30.22	29.78	60	25.91	24.09	50	Neutral
24.1365	16	28.68	31.32	60	23.93	26.07	50	Neutral

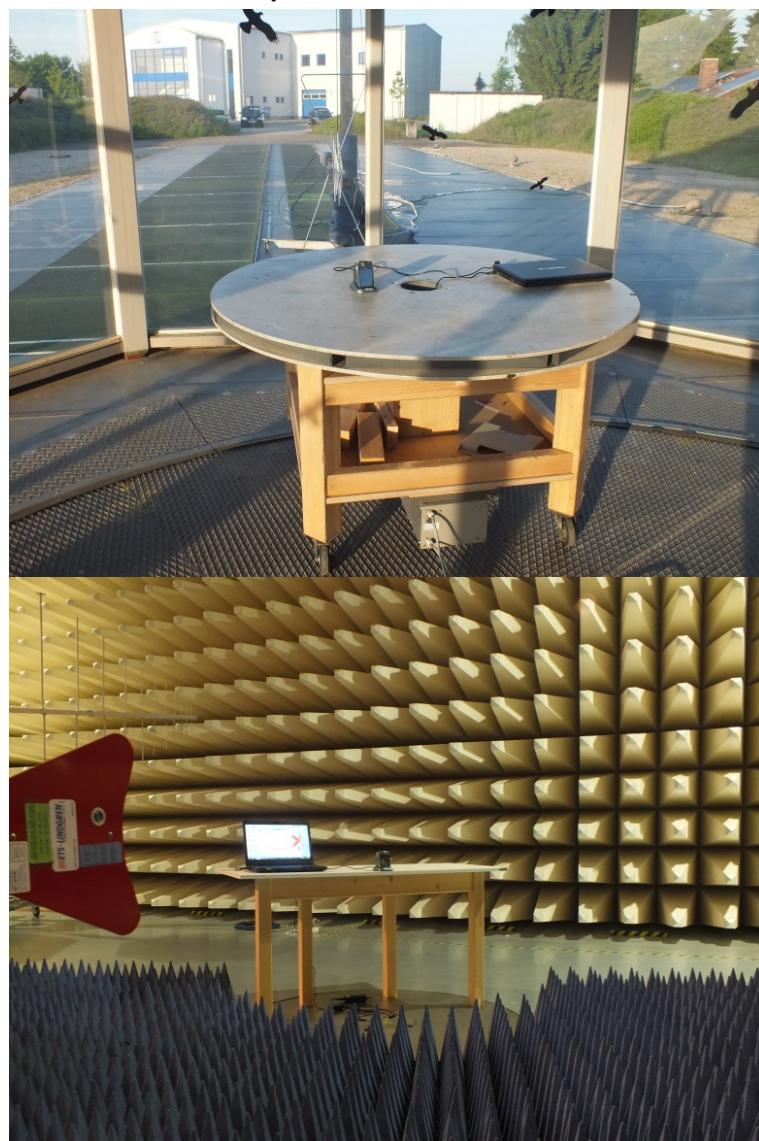
5.2 Radiated emission

For test instruments and accessories used see section 6 Part **SER 2, SER 3**.

5.2.1 Description of the test location

Test location: OATS 1
Test location: Anechoic chamber 2
Test distance: 3 m

5.2.2 Photo documentation of the test setup



5.2.3 Applicable standard

According to FCC Part 15B, Section 15.109 (a):

Except for Class A digital devices, the field strength of radiated emission from unintentional radiators at a distance of 3 m shall not exceed the given limit.

5.2.4 Description of Measurement

The radiated emissions from the EUT are measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. The setup of the EUT and the measurement procedure is in accordance to ANSI C63.4, Item 8 and 12. In the frequency range above 1 GHz a spectrum analyser is used. If the emission level in peak mode complies with the average limit, testing is stopped and peak values will be reported, otherwise, the emission is measured in average mode again and both are reported. The EUT is measured in RX continuous mode under normal conditions.

Instrument settings:

30 MHz – 1000 MHz:	RBW:	120 kHz
1000 MHz – 6 GHz	RBW:	1 MHz

5.2.5 Test result

f < 1 GHz

Frequency (MHz)	L: QP (dB μ V)	L: AV (dB μ V)	Bandwidth (kHz)	Correct. (dB)	L: QP (dB μ V)	L: AV (dB μ V)	Limit (dB μ V)	Delta (dB)
192.00	20.9	-	120	12.0	32.9	-	43.5	-10.6
264.00	23.5	-	120	14.2	37.7	-	46.0	-8.3
312.00	19.8	-	120	16.3	36.1	-	46.0	-9.9
336.00	20.9	-	120	17.0	37.9	-	46.0	-8.1
368.00	17.8	-	120	17.9	35.7	-	46.0	-10.3
720.00	14.5	-	120	26.0	40.5	-	46.0	-5.5

f > 1 GHz

Frequency (MHz)	L: PK (dB μ V)	L: AV (dB μ V)	Bandwidth (kHz)	Correct. (dB)	L: PK (dB μ V)	L: AV (dB μ V)	Limit (dB μ V)	Delta (dB)
1440.25	66.6	-	1000	-20.1	46.5	-	54	-7.5
2654.13	59.0	-	1000	-12.7	46.3	-	54	-7.8
5500.00	42.6	-	1000	4.8	47.4	-	54	-6.6
5630.00	42.9	-	1000	4.5	47.4	-	54	-6.6

Limit according to FCC Part 15B, Section 15.109(a):

Frequency (MHz)	Limit (μ V/m)	Limit (dB μ V/m)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

The requirements are **FULFILLED**.

Remarks: The measurement is performed according to FCC Part 15A, Section 15.33(b), up to the 5th harmonic.

6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used are calibrated and verified regularly. The calibration history is available on request.

Test ID	Model Type	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	ESHS 30	02-02/03-05-002	16/07/2014	16/07/2013		
	ESH 2 - Z 5	02-02/20-05-004	18/10/2015	18/10/2013	28/08/2014	28/02/2014
	N-4000-BNC	02-02/50-05-138				
	N-1500-N	02-02/50-05-140				
	ESH 3 - Z 2	02-02/50-05-155			10/10/2014	10/04/2014
SER 2	ESVS 30	02-02/03-05-006	28/06/2014	28/06/2013		
	VULB 9168	02-02/24-05-005	08/04/2015	08/04/2014	08/10/2014	08/04/2014
	S10162-B	02-02/50-05-031				
	NW-2000-NB	02-02/50-05-113				
	KK-EF393/U-16N-21N20 m	02-02/50-12-018				
SER 3	FSP 30	02-02/11-05-001	24/10/2014	24/10/2013		
	AFS5-12001800-18-10P-6	02-02/17-06-002				
	AFS4-01000400-10-10P-4	02-02/17-13-002				
	AMF-4F-04001200-15-10P	02-02/17-13-003				
	3117	02-02/24-05-009	07/05/2015	07/05/2014		
	Sucoflex N-1600-SMA	02-02/50-05-073				
	Sucoflex N-2000-SMA	02-02/50-05-075				
	SF104/11N/11N/1500MM	02-02/50-13-015				