



SENTON

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8 July 2011

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Prüfbericht / Test Report

Nr. / No. 486892-03756-1 (Edition 2)

Auftraggeber <i>Applicant</i>	Icom Inc.
Geräteart <i>Type of equipment</i>	Class B AIS Transponder
Typenbezeichnung <i>Type designation</i>	MA-500TR
Seriennummer / <i>Serial number</i>	09001021 09001023 09001025 09002099
Auftragsnummer / <i>Order No.</i>	IE-001-/11
Prüfgrundlage <i>Test standards</i>	IEC 62287-1:2006, Clause 9 IEC 60945:2002 + Corr 1:2010, Clauses 9 and 10



Summary

Prüfergebnisse / Test Results	Auftragsnummer / Order No. IE-001-/11				
Die Prüfungen wurden nach folgenden Vorschriften durchgeführt: <i>Tests were performed according to:</i> IEC 62287-1:2006, Clause 9 IEC 60945:2002 + Corr 1:2010, Clauses 9 and 10					
Durchgeführte Prüfung Test performed	Prüfergebnis Test result				
	Erfüllt Passed	Nicht erfüllt Not Passed	Nicht zutreffend Not applicable	Nicht durchgeführt Not performed	Kriterium Criterion
Gestrahlte Störgrößen / Radiated disturbance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Störspannung / Disturbance voltage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elektromagnetisches HF-Feld / Radio-frequency electromagnetic field	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A
Entladung statischer Elektrizität / Electrostatic discharge	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B
Hochfrequenz, asymmetrisch / Radio-frequency common mode	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	A
Schnelle Transienten / Fast transients	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B
Stoßspannungen / Surges	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	B
Spannungseinbrüche und -unterbrechungen / Voltage dips and interruptions	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	B
Ausfall der Stromversorgung / Power supply failure	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	B

Bemerkungen / Remarks:

Die Prüfergebnisse beziehen sich ausschließlich auf das zur Prüfung vorgestellte Prüfmuster. Ohne schriftliche Genehmigung des Prüflabors darf der Prüfbericht auszugsweise nicht vervielfältigt werden. *The test results relate only to the individual item which has been tested. Without the written approval of the test laboratory this report may not be reproduced in extracts.*

Datum / Date	Geprüft von / Tested by	Freigabe durch / Checked by	Prüfergebnis / Test Result <input checked="" type="checkbox"/> Erfüllt / Passed <input type="checkbox"/> Nicht erfüllt / Not passed
2011-07-08	 Martin Steindl Responsible for testing	 • IF Elektronisch = "" "" Johann Roidt * CHARFORMAT Johann	



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1 Administrative Data

Application details	
Applicant:	Icom Inc. 1-1-32 Kamiminami, Hirano-Ku Osaka 547-003, Japan
Contact person:	Ms. Saki Shimoyama (TÜV SÜD Japan Ltd.)
Order number:	IE-001-/11
Receipt of EUT:	April 11, 2011 (09001021, 09001023) June 16, 2011 (09001025, 09002099)
Return of EUT:	
Date(s) of test:	April 11, 2011 – June 30, 2011
Note(s):	
Responsible for testing:	Mr. Martin Steindl
Responsible for test report:	Mr. Martin Steindl
Test report checked by:	Mr. Johann Roidt

Report details	
Report number:	486892-03756-1
Edition:	2
Issue date:	2011-07-08



2 Details about the Test Laboratory

Details about the Test Laboratory	
Company name:	TÜV SÜD SENTON GmbH
Address:	Äußere Frühlingstraße 45 D-94315 Straubing Germany
Laboratory accreditation:	DAR-Registration No. DAT-PL-171/94-03
Contact:	Mr. Johann Roidt
	Phone: +49 9421 5522-0 Fax: +49 9421 5522-99



3 Description of the Equipment Under Test

Equipment characteristics	
Type designation:	MA-500TR
Parts of the system:	
Options and accessories:	
Type of equipment:	Class B AIS Transponder
Serial number:	09001021 09001023 09001025 09002099
Manufacturer:	ICOM Inc.
Power supply:	External DC supply Nominal: 12.0 V Minimum: 9.6 V Maximum: 15.6 V
Version of EUT:	As received each



4 Operation Mode and Configuration of EUT

Operation Mode(s)

The applicant provided two test samples which provided an inspection mode for continuous receiving and transmitting (Signal 5).

List of ports and cables

No.	Description	Classification ¹	Cable type	Cable length
D1	DC 12 V power supply	dc power	Unshielded	2 m
S1	GPS supply	signal/control port	Unshielded	9 m
S2	RS-422 (used as RS-232)	signal/control port	Shielded	2 m
S3	RF port	signal/control port	Shielded	2 m

List of devices connected to EUT

No.	Description	Type designation	Serial no. or ID	Manufacturer

List of support devices

No.	Description	Type designation	Serial no. or ID	Manufacturer
1	Laptop PC	DELL dimension		DELL
2	USB-RS-232-interface convertor			MOXA
3	Attenuator 20 dB	RDL50	31821101	Rohde & Schwarz
4	Attenuator 32 dB	82-40-33	ME928	Weinschel Corp.

¹ Ports shall be classified as ac power, dc power or signal/control port.

5 Performance Criteria and Methods of Observation

Definition of General Performance Criteria	
Referenced Standard:	IEC 60945:2002 + Corr 1:2010
<i>Performance criterion</i>	<i>Specification</i>
A	The EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed, as defined in the relevant equipment standard and in the technical specification published by the manufacturer.
B	The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed, as defined in the relevant equipment standard and in the technical specification published by the manufacturer. During the test, degradation or loss of function or performance which is self-recoverable is however, allowed, but no change of actual operating state or stored data is allowed.
C	Temporary degradation or loss of function or performance is allowed during the test, provided the function is self-recoverable, or can be restored at the end of the test by the operation of the controls, as defined in the relevant equipment standard and in the technical specification published by the manufacturer.

Methods of Observation			
<i>Function</i>	<i>Observed size</i>	<i>Permissible range</i>	<i>Observation method</i>
Continous data transmission	Reception rate of RX sample	PER < 20 %	Visual observation of test program.

6 Annotations to Performed Tests

6.1 Conducted emission tests

In general conducted emission tests in the frequency range 150 kHz - 30 MHz are required to be performed with quasi-peak and average detector. To simplify testing the following procedure is used:

First the whole spectrum of emission caused by equipment under test (EUT) is recorded with detector set to peak. After that all emission levels having less margin than 20 dB to or exceeding the appropriate limit (in general average limit is 10 dB lower than quasi-peak limit) are retested with detector set to quasi-peak. If average limit is kept no additional scan with average detector is necessary. In cases of emission levels between quasi-peak and average limit an additional scan with detector set to average has to be recorded.

6.2 Radiated emission tests

Radiated emission tests in the frequency range 30 - 1000 MHz are performed in a semi-anechoic room with groundplane at the required test distance (maximum 10 metres):

First a peak scan is performed in four positions to get the whole spectrum of emission caused by EUT with the measuring antenna raised and lowered from 1 to 4 m to find table position, antenna height and antenna polarisation for the maximum emission levels.

Data reduction is applied to these results to select those levels having less margin than 10 dB to or exceeding the limit using subranges and limited number of maximums. Further maximization is following.

With detector of the test receiver set to quasi-peak final measurements are performed immediately after frequency zoom (for drifting disturbances) and maximum adjustment.

7 Referenced Regulations

<i>European publication</i>	<i>International publication</i>	<i>Title</i>
EN 55016-1-1:2007 + A1:2007 + A2:2008	IEC/CISPR 16-1-1:2007 Edition 2.2	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-1: Radio disturbance and immunity measuring apparatus - Measuring apparatus
EN 55016-1-2:2004 + A1:2005 + A2:2006	IEC/CISPR 16-1-2:2006 Edition 1.2	Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-2: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Conducted disturbances
EN 55016-1-4:2007 + A1:2008	IEC/CISPR 16-1-4:2008 Edition 2.1	Specification for radio disturbance and immunity measuring apparatus and methods - Specification for radio disturbance and immunity measuring apparatus and methods - Part 1-4: Radio disturbance and immunity measuring apparatus - Ancillary equipment - Radiated disturbances
EN 60945:2002 + A1:2010	IEC 60945:2002 +A1:2008	Maritime navigation and radiocommunication equipment and systems - General requirements - Methods of testing and required test results
EN 61000-4-2:1995 + A1:1998 + A2:2001	IEC 61000-4-2:1995 + A1:1998 + A2:2000	Electromagnetic compatibility (EMC) Part 4-2: Testing and measuring techniques - Electrostatic discharge immunity test
EN 61000-4-3:2006	IEC 61000-4-3:2006	Electromagnetic compatibility (EMC) Part 4-3: Testing and measurement techniques - Radiated, radio-frequency electromagnetic field immunity test
EN 61000-4-4:2004	IEC 61000-4-4:2004	Electromagnetic compatibility (EMC) Part 4-4: Testing and measuring techniques - Electrical fast transient/burst immunity test
EN 61000-4-6:2007 + Corrigendum 2007-08	IEC 61000-4-6:2003 + A1:2004 + A2:2006	Electromagnetic compatibility (EMC) Part 4-6: Testing and measuring techniques - Immunity to conducted disturbances, induced by radio-frequency fields
EN 61000-4-11:2004	IEC 61000-4-11:2004	Electromagnetic compatibility (EMC) Part 4-11: Testing and measuring techniques - Voltage dips, short interruptions and voltage variations immunity tests
EN 62287-1:2006	IEC 62287-1:2006	Maritime navigation and radiocommunication equipment and systems - Class B shipborne equipment of the automatic identification system (AIS) - Part 1: Carrier-sense time division multiple access (CSTMA) techniques

8 Measurement Uncertainty Values

Radio Interference Emission Testing			
Test	k_p	Expanded Uncertainty	Note
Conducted Voltage Emission			
9 kHz to 150 kHz (50Ω/50μH V-NetznachbildungAMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH V-NetznachbildungAMN)	2	± 3.4 dB	1
100 kHz to 200 MHz (50Ω/5μH NetznachbildungAMN)	2	± 3.6 dB	1
Discontinuous Conducted Emission			
9 kHz to 150 kHz (50Ω/50μH V-NetznachbildungAMN)	2	± 3.8 dB	1
150 kHz to 30 MHz (50Ω/50μH V-NetznachbildungAMN)	2	± 3.4 dB	1
Conducted Current Emission			
9 kHz to 200 MHz	2	± 3.5 dB	1
Magnetic Fieldstrength			
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB	1
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB	1
Radiated Emission			
Test distance 3 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 5.0 dB	1
1 GHz to 6 GHz	2	± 4.6 dB	1
Test distance 10 m			
30 MHz to 300 MHz	2	± 4.9 dB	1
300 MHz to 1 GHz	2	± 4.9 dB	1
Radio Interference Power			
30 MHz to 300 MHz	2	± 3.5 dB	1
Harmonic Current Emissions			
			4
Voltage Changes, Voltage Fluctuations and Flicker			
			4

Immunity Testing			
Test	k_p	Expanded Uncertainty	Note
Electrostatic Discharges			4
Radiated RF-Field			
Pre-calibrated field level	2.05	+21.9 / -18.0 %	3
Dynamic feedback field level	2.05	+21.2 / -17.5 %	3
Electrical Fast Transients (EFT) / Bursts			4
Surges			4
Conducted Disturbances, induced by RF-Fields	2	+30.3 / -23.2 %	2
Power Frequency Magnetic Field	2	+20.7 / -17.1 %	2
Pulse Magnetic Field			4
Voltage Dips, Short Interruptions and Voltage Variations			4
Oscillatory Waves			4
Conducted Low Frequency Disturbances			
Voltage setting	2	± 0.9 %	2
Frequency setting	2	± 0.1 %	2
Electrical Transient Transmission in Road Vehicles			4

Note 1:

The expanded uncertainty reported according to CISPR 16-4-2:2003-11 is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 2:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2$, providing a level of confidence of $p = 95.45\%$

Note 3:

The expanded uncertainty reported according to UKAS Lab 34 (Edition 1, 2002-08) is based on a standard uncertainty multiplied by a coverage factor of $k_p = 2.05$, providing a level of confidence of $p = 95.45\%$

Note 4:

It has been demonstrated that the used test equipment meets the specified requirements in the standard with at least a 95% confidence.



9 Test Results

Emission Tests

IEC 60945 :2002 + Corr 1:2010			
Section(s)	Test performed	Page	Test Result
9.2	Conducted emissions 10 kHz - 30 MHz	16	Test passed
	Conducted emissions at low voltage DC port		
	Conducted emissions at low voltage AC mains port		
9.3	Radiated disturbance 150 kHz - 2 GHz	23	Test passed

Immunity Tests

IEC 60945 :2002 + Corr 1:2010			
Section(s)	Test performed	Page	Test Result
10.3	Radio-frequency common mode	40	Test passed
10.4	Radio-frequency electromagnetic field	34	Test passed
10.5	Fast transients	37	Test passed
10.6	Surges	---	Not applicable
10.7	Voltage dips and interruptions	---	Not applicable
10.8	Power supply fail	44	Test passed
10.9	Electrostatic discharge	29	Test passed

9.1 Interference Voltage Test

9.1.1 Test Setup



9.1.2 Test Equipment List

Type	Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input type="checkbox"/> EMI test receiver	ESMI	1569	839379/013 839587/006	Rohde & Schwarz
<input checked="" type="checkbox"/> Test receiver	ESHS 10	1028	860043/016	Rohde & Schwarz
<input type="checkbox"/> EMI test receiver	ESPI7	1711	836914/0002	Rohde & Schwarz
<input type="checkbox"/> EMI test receiver	Cabin no. 3 ESPI7	2010	101018	Rohde & Schwarz
<input type="checkbox"/> EMI test receiver	ESCI3	1863	100008	Rohde & Schwarz
<input type="checkbox"/> EMI test receiver	ESU8	2044	100232	Rohde & Schwarz
<input type="checkbox"/> Preamplifier	CPA9231A	1716	3557	Schaffner
<input type="checkbox"/> Digital oscilloscope	WaveJet 314	1963	LCRY0101J23209	LeCroy
<input type="checkbox"/> Digital oscilloscope	Wave Surfer 452	1796	LCRY0301J11938	LeCroy
<input type="checkbox"/> Digital oscilloscope	WaveRunner 104Xi-A	2075	LCRY0617N51108	LeCroy
<input type="checkbox"/> V-network	ESH 3-Z5	1060	862770/021	Rohde & Schwarz
<input checked="" type="checkbox"/> V-network	ESH 3-Z5	1059	894785/005	Rohde & Schwarz
<input type="checkbox"/> V-network	ESH 3-Z5	1218	830952/025	Rohde & Schwarz
<input type="checkbox"/> V-network	ESH 3-Z6	1594	825993/027	Rohde & Schwarz
<input type="checkbox"/> V-network	ESH 3-Z6	1220	830722/010	Rohde & Schwarz
<input type="checkbox"/> Artificial mains network	ESH 2-Z5	1536	842966/004	Rohde & Schwarz
<input type="checkbox"/> 4-wire ISN	ENY 41	1652	836077/003	Rohde & Schwarz
<input type="checkbox"/> 2-wire ISN	ENY 22	1813	100150	Rohde & Schwarz
<input type="checkbox"/> Impedance stabization network	ISN T800	2080	28597	Teseq
<input type="checkbox"/> Current probe	EZ-17	1606	830633/010	Rohde & Schwarz
<input type="checkbox"/> High impedance probe	TK 9416	1106	---	Schwarzbeck
<input type="checkbox"/> Shielded room	No. 1	1451	---	Albatross
<input type="checkbox"/> Fully anechoic room	No. 2	1452	---	Albatross
<input type="checkbox"/> Semi anechoic room	No. 3	1453	---	Siemens
<input checked="" type="checkbox"/> Shielded room	No. 4	1454	3FD 100 544	Euroshield
<input type="checkbox"/> Shielded room	No. 5	1537	5468	Ray Proof Division
<input type="checkbox"/> Fully anechoic room	No. 6	1865	---	Albatross
<input type="checkbox"/> Shielded room	No. 7	1866	---	Albatross

9.1.3 Test Results

Results for interference voltage test are documented as listed below.

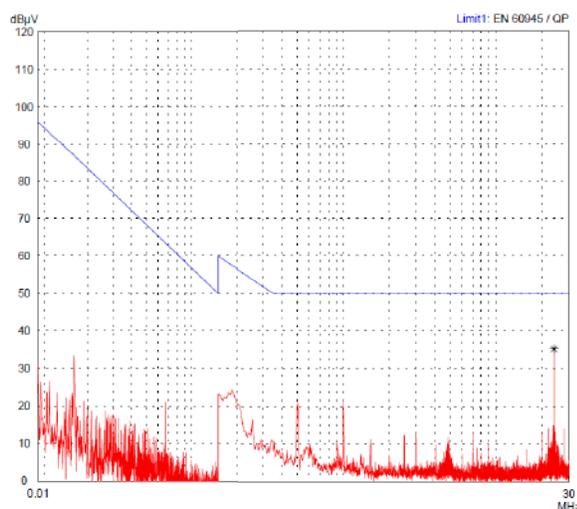
Interference Voltage Test 10 kHz - 30 MHz

Prüfdatum / Date of test:	April 11, 2011
Prüfer / Operator:	Martin Steindl
Messplatz / Test site:	Shielded room, cabin no. 4

Prüfergebnis / Test Result	
<input checked="" type="checkbox"/>	Erfüllt / Passed
<input type="checkbox"/>	Nicht erfüllt / Not passed

Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010
Basisnorm / Basic standard:	IEC/CISPR 16-2-1:2003, 7.4.1 IEC/CISPR 16-1-2:2006, 4.3
Betriebsart / Operation mode:	Transmitting mode
Kommentar / Comment:	

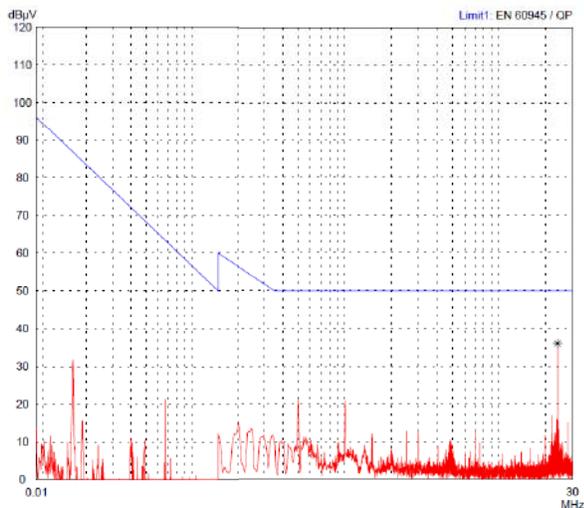
Messbezug / Tested on:	DC, Plus
------------------------	----------



Quasipeak			
Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)
24.0	35.3	50.0	14.7



Messbezug / Tested on: DC, Minus

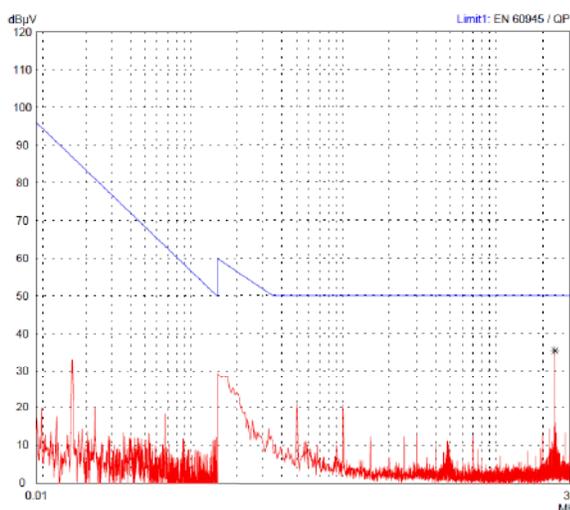


Quasipeak			
Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)
24.0	36.0	50.0	14.0



Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010
Basisnorm / Basic standard:	IEC/CISPR 16-2-1:2003, 7.4.1 IEC/CISPR 16-1-2:2006, 4.3
Betriebsart / Operation mode:	Receiving mode
Kommentar / Comment:	

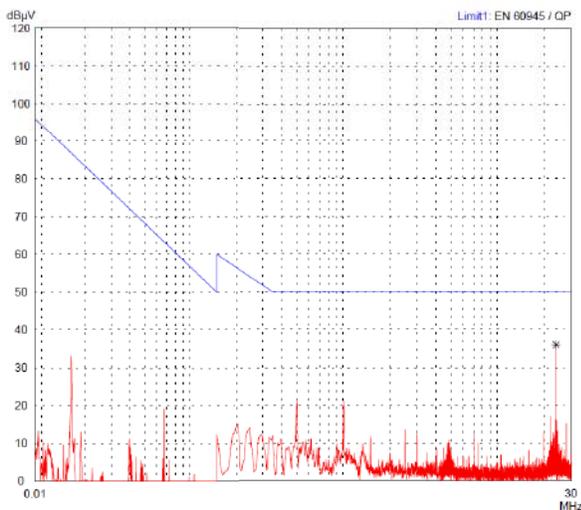
Messbezug / Tested on:	DC, Plus
------------------------	----------



Quasipeak			
Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)
24.0	35.4	50.0	14.6



Messbezug / Tested on: DC, Minus

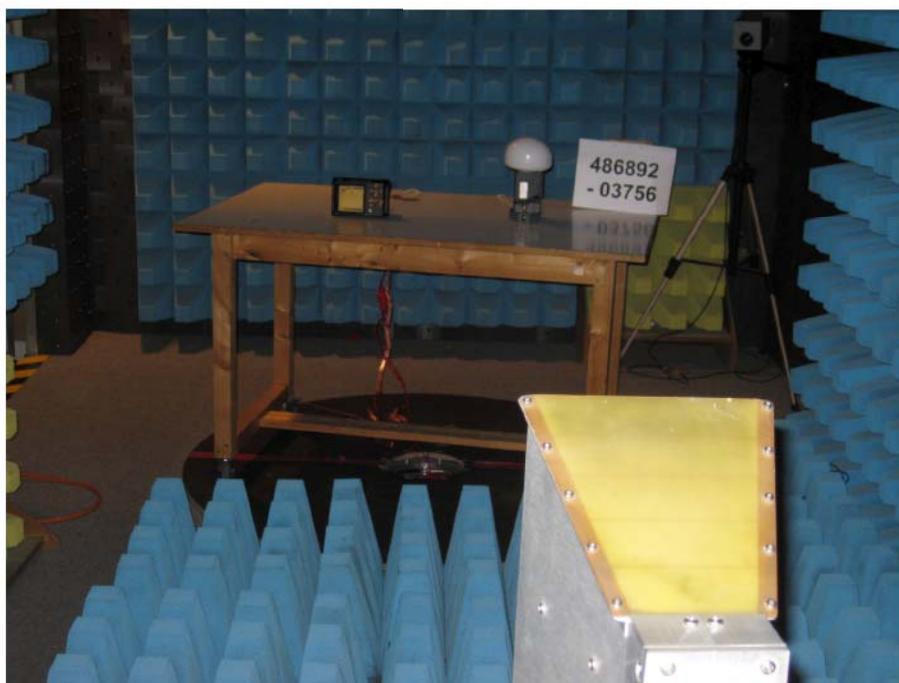


Quasipeak			
Frequency (MHz)	Level (dBµV)	Limit (dBµV)	Margin (dB)
24.0	36.0	50.0	14.0

9.2 Radiated Emission Test

9.2.1 Test Setup





9.2.2 Test Equipment List

Type		Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input type="checkbox"/>	EMI test receiver	ESMI	1569	839379/013 839587/006	Rohde & Schwarz
<input type="checkbox"/>	EMI test receiver	ESPI7	1711	836914/0002	Rohde & Schwarz
<input type="checkbox"/>	EMI test receiver	Cabin no. 3 ESPI7	2010	101018	Rohde & Schwarz
<input type="checkbox"/>	EMI test receiver	ESC13	1863	100008	Rohde & Schwarz
<input checked="" type="checkbox"/>	EMI test receiver	ESU8	2044	100232	Rohde & Schwarz
<input type="checkbox"/>	Test receiver	ESVP	1025	881120/024	Rohde & Schwarz
<input type="checkbox"/>	Test receiver	ESVP	2031	891846/003	Rohde & Schwarz
<input type="checkbox"/>	Spectrum analyzer	FSP30	(R&S)	100062	Rohde & Schwarz
<input checked="" type="checkbox"/>	Spectrum analyzer	FSP30	1666	100063	Rohde & Schwarz
<input type="checkbox"/>	Preamplifier	Cabin no. 2 CPA9231A	1651	3393	Schaffner
<input type="checkbox"/>	Preamplifier	Cabin no. 2 AFS3-00100800-32-LN	1684	847743	Miteq
<input checked="" type="checkbox"/>	Preamplifier	Cabin no. 2 AFS3-00100800-32-LN	2076	1344017	Miteq
<input type="checkbox"/>	Preamplifier	Cabin no. 2 ACO/180-3530	1484	32641	CTT
<input type="checkbox"/>	Preamplifier	CPA9231A	1716	3557	Schaffner
<input type="checkbox"/>	Preamplifier	R14601	1142	13120026	Advantest
<input type="checkbox"/>	Preamplifier	AMF-4D-005080-25-13P	1685	860149	Miteq
<input type="checkbox"/>	Magnetic Field Pickup Coil	HZ-10	1605	827129/013	Rohde & Schwarz
<input checked="" type="checkbox"/>	Loop antenna	HFH2-Z2	1016	882964/1	Rohde & Schwarz
<input type="checkbox"/>	Rod antenna	HFH2-Z6	1017	893053/001	Rohde & Schwarz
<input type="checkbox"/>	Trilog antenna	Cabin no. 2 VULB 9163	1722	9163-188	Schwarzbeck
<input type="checkbox"/>	Trilog antenna	Cabin no. 3 VULB 9163	2058	9163-408	Schwarzbeck
<input checked="" type="checkbox"/>	Trilog antenna	Cabin no. 8 VULB 9163	1802	9163-214	Schwarzbeck
<input checked="" type="checkbox"/>	Horn antenna	3115	1516	9508-4553	EMCO
<input type="checkbox"/>	Horn antenna	HF907	2073	100154	Rohde & Schwarz
<input type="checkbox"/>	Shielded room	No. 1	1451	---	Albatross
<input checked="" type="checkbox"/>	Fully anechoic room	No. 2	1452	---	Albatross
<input type="checkbox"/>	Semi anechoic room	No. 3	1453	---	Siemens
<input type="checkbox"/>	Shielded room	No. 4	1454	3FD 100 544	Euroshield
<input type="checkbox"/>	Shielded room	No. 5	1537	5468	Ray Proof Division
<input type="checkbox"/>	Fully anechoic room	No. 6	1865	---	Albatross
<input type="checkbox"/>	Shielded room	No. 7	1866	---	Albatross
<input checked="" type="checkbox"/>	Semi anechoic room	No. 8	2057	---	Albatross
<input type="checkbox"/>	Open field test site	EG 1	1450	---	Senton

9.2.3 Test Results

Results for radiated emission test are documented as listed below.

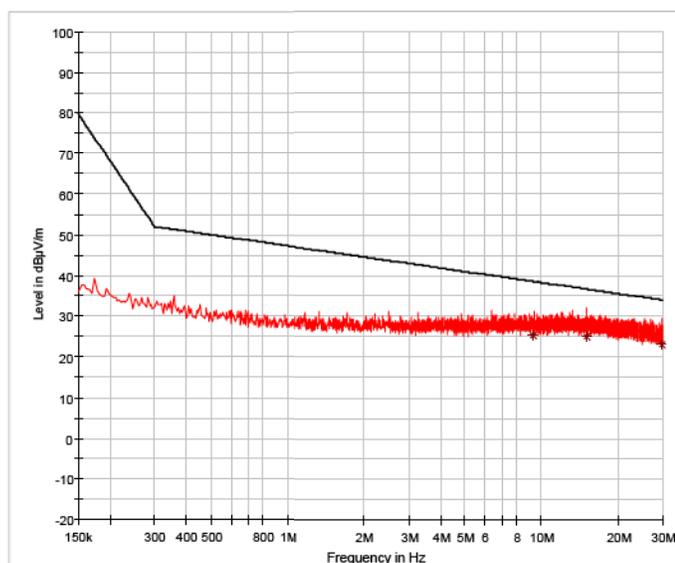
Radiated Emission Test 150 kHz – 30 MHz

Prüfdatum / Date of test:	April 13, 2011
Prüfer / Operator:	Martin Steindl
Messplatz / Test site:	Semi anechoic room, cabin no. 8

Prüfergebnis / Test Result	
<input checked="" type="checkbox"/>	Erfüllt / Passed
<input type="checkbox"/>	Nicht erfüllt / Not passed

Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010
Basisnorm / Basic standard:	IEC/CISPR 16-2-3:2006
Betriebsart / Operation mode:	Receiving mode
Kommentar / Comment:	

Messentfernung / Test distance:	3 m
---------------------------------	-----



— EN 60945 3m QP Limit Line — Preview Result 1-PK* * Final Result 1-GPK

Frequency MHz	QuasiPeak dBµV/m	Meas. Time ms	Bandwidth kHz	Corr. dB	Margin dB	Limit dBµV/m
9.281720	25.4	1000.0	9.000	20.0	13.2	38.6
15.060440	25.0	1000.0	9.000	20.0	11.7	36.7
29.740920	23.1	1000.0	9.000	20.0	11.0	34.0

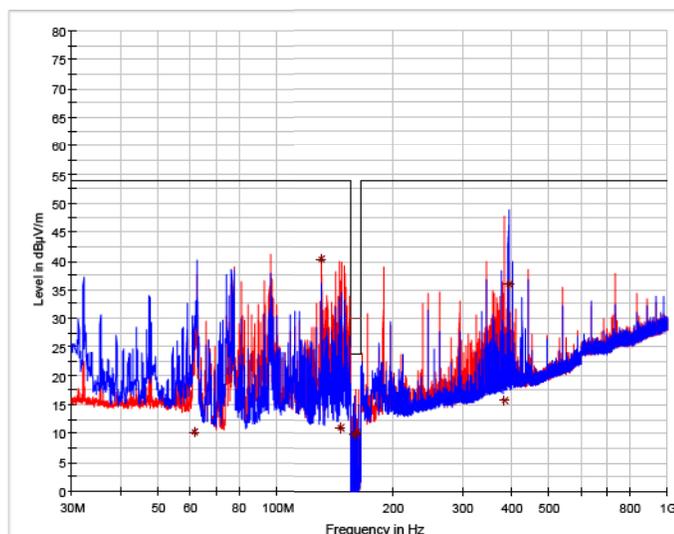
Radiated Emission Test 30 MHz - 1 GHz

Prüfdatum / Date of test:	April 13, 2011
Prüfer / Operator:	Martin Steindl
Messplatz / Test site:	Semi anechoic room, cabin no. 8

Prüfergebnis / Test Result	
<input checked="" type="checkbox"/>	Erfüllt / Passed
<input type="checkbox"/>	Nicht erfüllt / Not passed

Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010
Basisnorm / Basic standard:	IEC/CISPR 16-2-3:2006
Betriebsart / Operation mode:	Receiving mode
Kommentar / Comment:	

Messentfernung / Test distance:	3 m
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— EN 60945 3m QP.LimitLine
* Preview Result 1H-PK+
— EN 60945 3m PK.LimitLine
* Preview Result 1V-PK+
* Final Measurement Result 1-GPK

Frequency MHz	QuasiPeak dBµV/m	Meas. Time ms	Bandwidth kHz	Height cm	Polarization	Azimuth deg	Corr. dB	Margin dB	Limit dBµV/m
61.980000	10.3	1000.0	120.000	100.0	V	-39.0	12.3	54.0	43.7
131.160000	40.4	1000.0	120.000	250.0	H	-88.0	10.3	54.0	13.6
146.850000	11.1	1000.0	120.000	213.0	H	-88.0	9.7	54.0	42.9
157.872000	-5.0	1000.0	9.000	100.0	V	-22.0	9.9	24.0	29.0
158.378250	10.0	1000.0	9.000	200.0	V	-45.0	10.0	24.0	14.0
161.051250	10.3	1000.0	9.000	130.0	H	-70.0	10.1	24.0	13.7
384.660000	15.8	1000.0	120.000	100.0	H	-90.0	16.7	54.0	38.2
393.210000	35.9	1000.0	120.000	243.0	V	-191.0	16.9	54.0	18.1

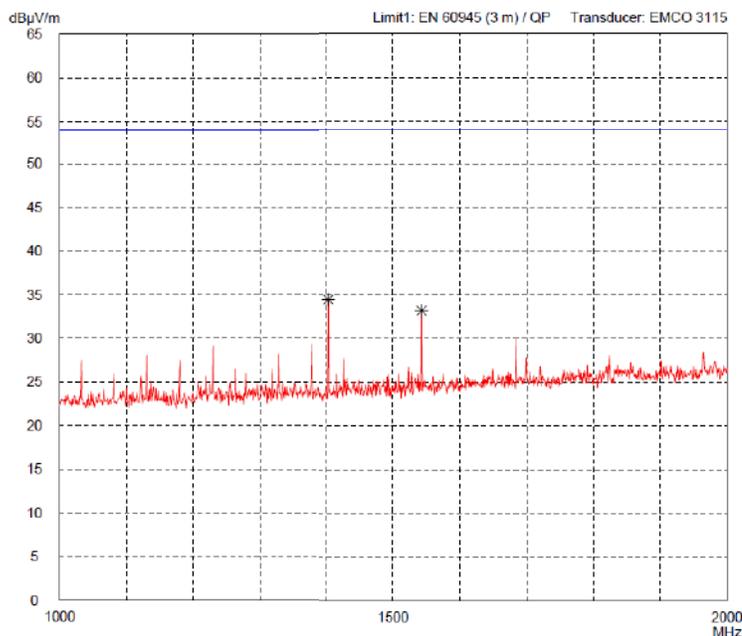
Radiated Emission Test 1 GHz - 2 GHz

Prüfdatum / Date of test:	April 13, 2011
Prüfer / Operator:	Martin Steindl
Messplatz / Test site:	Fully anechoic room, cabin no. 2

Prüfergebnis / Test Result	
<input checked="" type="checkbox"/>	Erfüllt / Passed
<input type="checkbox"/>	Nicht erfüllt / Not passed

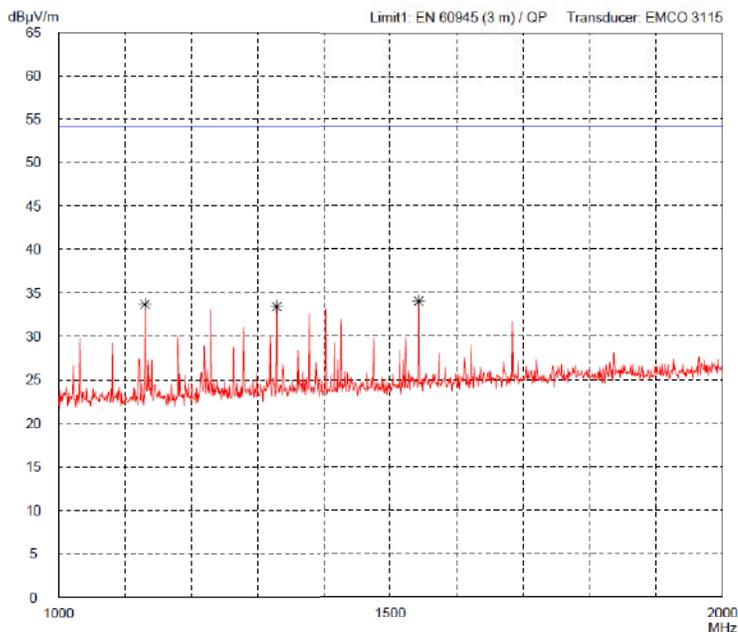
Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010
Basisnorm / Basic standard:	IEC/CISPR 16-2-3:2006
Betriebsart / Operation mode:	Receiving mode
Kommentar / Comment:	

Messentfernung / Test distance:	10 m
Polarisation / Polarization:	horizontal



Peak					
Frequency (MHz)	Reading (dBµV)	Correction (dB/m)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1403.0	5.18	29.28	34.46	54.00	19.54
1543.0	3.34	29.85	33.19	54.00	20.81

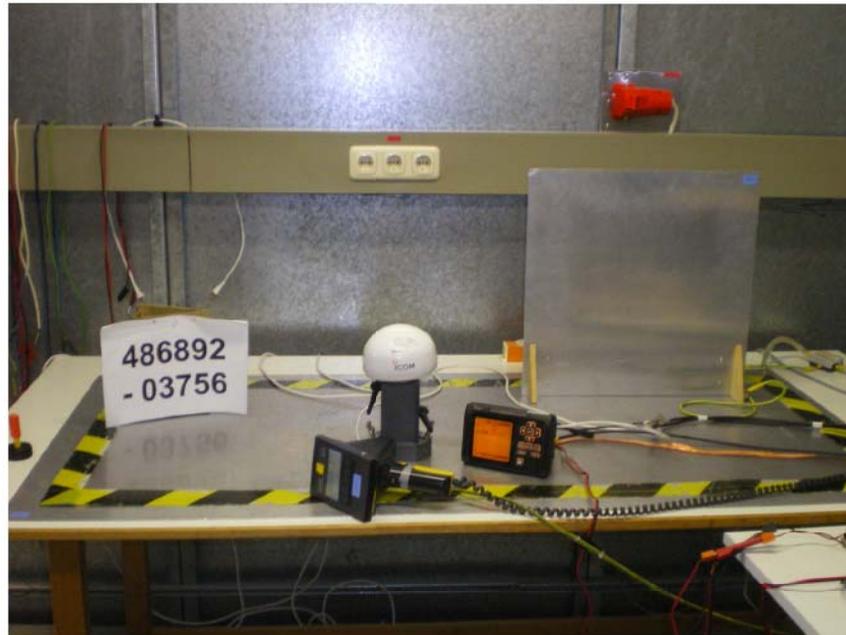
Messentfernung / Test distance: 10 m
 Polarisation / Polarization: vertical



Peak					
Frequency (MHz)	Reading (dBµV)	Correction (dB/m)	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1130.0	5.42	28.26	33.68	54.00	20.32
1328.0	4.40	29.02	33.42	54.00	20.58
1543.0	4.16	29.85	34.01	54.00	19.99

9.3 Electrostatic Discharge

9.3.1 Test Setup



9.3.2 Test Equipment List

Type	Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/> ESD simulator	NSG 435	1223	000290	Schaffner
<input checked="" type="checkbox"/> ESD Generator	ESD 30	1650	0500-09	EM Test
<input checked="" type="checkbox"/> Shielded room	No. 1	1451	---	Albatross
<input type="checkbox"/> Fully anechoic room	No. 2	1452	---	Albatross
<input type="checkbox"/> Semi anechoic room	No. 3	1453	---	Siemens
<input type="checkbox"/> Shielded room	No. 4	1454	3FD 100 544	Euroshield
<input type="checkbox"/> Shielded room	No. 5	1537	5468	Ray Proof Division
<input type="checkbox"/> Fully anechoic room	No. 6	1865	---	Albatross
<input type="checkbox"/> Shielded room	No. 7	1866	---	Albatross

9.3.3 Test Results

Results for electrostatic discharge test are documented as listed below.



Electrostatic Discharge

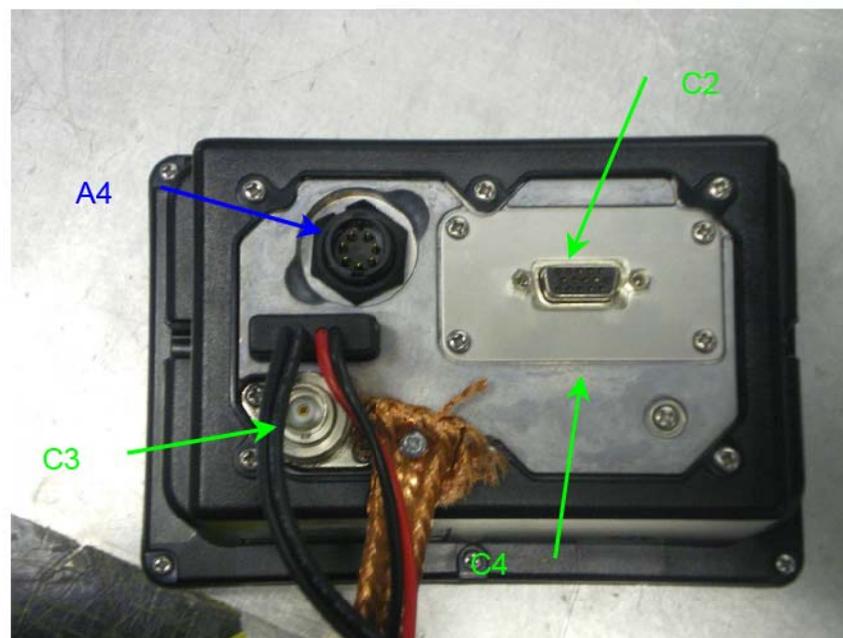
Prüfdatum / <i>Date of test:</i>	May 11, 2011
Prüfer / <i>Operator:</i>	Martin Steindl
Messplatz / <i>Test site:</i>	Shielded room, cabin no. 4

Prüfergebnis / <i>Test Result</i>	
<input checked="" type="checkbox"/>	Erfüllt / <i>Passed</i>
<input type="checkbox"/>	Nicht erfüllt / <i>Not passed</i>

Luftdruck / <i>Barometric pressure:</i>	982.4 hPa
Relative Luftfeuchtigkeit / <i>Relative humidity:</i>	32.8 %
Temperatur / <i>Ambient temperature:</i>	26.0 °C

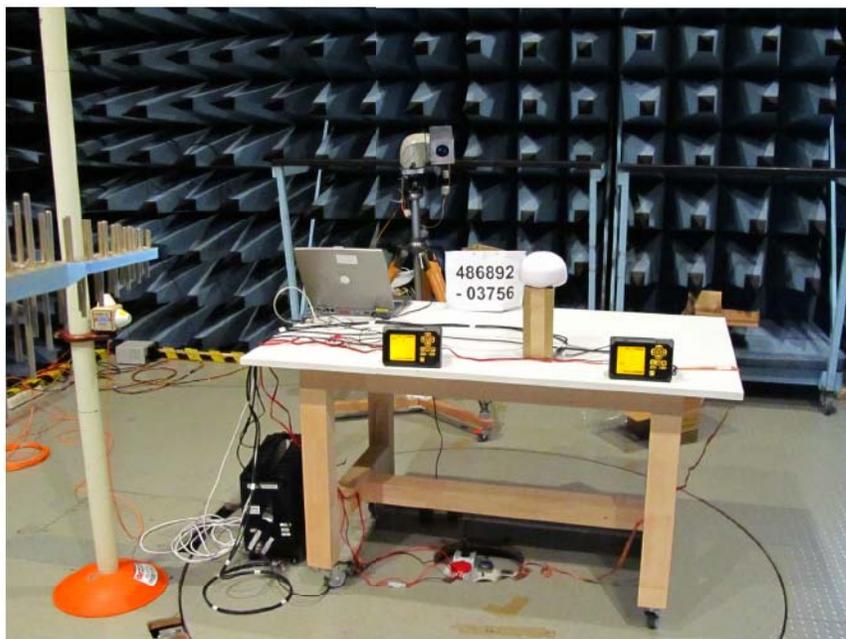
Prüfgrundlage / <i>Specifications:</i>	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010
Bewertungskriterium / <i>Performance criterion:</i>	B
Anforderung / <i>Requirement:</i>	Contact discharge: ± 6 kV Air discharge: ± 8 kV
Basisnorm / <i>Basic standard:</i>	IEC 61000-4-2:1995 + A1:1998 + A2:2000
Betriebsart / <i>Operation mode:</i>	Receiving and Transmitting mode
Kommentar / <i>Comment:</i>	

<i>Discharge method</i>	<i>Discharge voltage</i>	<i>Test points</i>	<i>Result</i>	<i>Note</i>
Via contact to horizontal coupling plane	± 2 kV, ± 4 kV, ± 6 kV	Several points on horizontal coupling plane (around EUT)	Passed	
Via contact to vertical coupling plane	± 2 kV, ± 4 kV, ± 6 kV	On vertical coupling plane placed in the vicinity of EUT	Passed	
Via direct contact to EUT	± 2 kV, ± 4 kV, ± 6 kV	All conductive parts of EUT accessible to normal user	Passed	
Via air gap to EUT	± 2 kV, ± 4 kV, ± 8 kV	All non conductive parts of EUT accessible to normal user	Passed	
<i>Note(s):</i>				



9.4 RF-Electromagnetic Fields

9.4.1 Test Setup



9.4.2 Test Equipment List

Type		Designation	Inv.-no.	Serial No. or ID	Manufacturer	
<input type="checkbox"/>	Signal generator	Cabin no. 2	SML 02	1759	836926/016	Rohde & Schwarz
<input checked="" type="checkbox"/>	Signal generator	Cabin no. 3	SML 03	1729	101495	Rohde & Schwarz
<input type="checkbox"/>	Signal generator	Cabin no. 6	SML 03	1867	102131	Rohde & Schwarz
<input type="checkbox"/>	Signal generator		SMB100A	2027	100112	Rohde & Schwarz
<input type="checkbox"/>	Power amplifier	Cabin no. 6	HVV 250	1508	836956/004	Rohde & Schwarz
<input type="checkbox"/>	Power amplifier	Cabin no. 3	1000L	1704	8923	Amplifier Research
<input type="checkbox"/>	Power amplifier	Cabin no. 2	10W1000	1119	5239	Amplifier Research
<input checked="" type="checkbox"/>	Power amplifier	Cabin no. 3	200W1000	1225	12904	Amplifier Research
<input type="checkbox"/>	Power amplifier	Cabin no. 6	1000W1000B	1827	307669	Amplifier Research
<input checked="" type="checkbox"/>	Power amplifier		25S1G4	1587	23171	Amplifier Research
<input type="checkbox"/>	Power amplifier		BLMA 1040-450D	2074	097733	Bonn
<input type="checkbox"/>	Power amplifier	Cabin no. 6	TD81-250	1829	H040-0204	IFI
<input type="checkbox"/>	Power amplifier	Cabin no. 6	T188-20	1864	G119-0703	IFI
<input type="checkbox"/>	Power meter	Cabin no. 2	NRVS	1726	100808	Rohde & Schwarz
<input checked="" type="checkbox"/>	Power meter	Cabin no. 3	NRVD	1797	101092	Rohde & Schwarz
<input type="checkbox"/>	Power meter	Cabin no. 6	NRP	1818	100006	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	Cabin no. 2	NRV-Z4	1727	100179	Rohde & Schwarz
<input checked="" type="checkbox"/>	Power sensor	Cabin no. 3	NRV-Z4	1798	100238	Rohde & Schwarz
<input checked="" type="checkbox"/>	Power sensor	Cabin no. 3	NRV-Z4	1799	100236	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	Cabin no. 6	NRP-Z91	1819	100064	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	Cabin no. 6	NRP-Z91	1820	100065	Rohde & Schwarz
<input type="checkbox"/>	E-field generator		3107 B	1019	2302	Emco
<input type="checkbox"/>	Trilog antenna		VULB 9163	1722	9163-188	Schwarzbeck
<input checked="" type="checkbox"/>	Hybrid log. periodic antenna		HLP-2603	1655	120500	EMC Automation
<input type="checkbox"/>	Stacked log. per. antenna		STLP 9128 E special	1854	019	Schwarzbeck
<input type="checkbox"/>	Horn antenna		3115	1516	9508-4553	Emco
<input type="checkbox"/>	Horn antenna		HF907	2073	100154	Rohde & Schwarz
<input type="checkbox"/>	Horn antenna		ATH1G4	2078	0330665	Amplifier Research
<input type="checkbox"/>	Horn antenna		3160-03	1010	9112-1003	Emco
<input type="checkbox"/>	Horn antenna		3160-04	1011	9112-1001	Emco
<input type="checkbox"/>	Horn antenna		3160-05	1012	9112-1001	Emco
<input type="checkbox"/>	Horn antenna		3160-06	1013	9112-1001	Emco
<input type="checkbox"/>	Horn antenna		3160-07	1014	9112-1008	Emco
<input type="checkbox"/>	Horn antenna		3160-08	1015	9112-1002	Emco
<input type="checkbox"/>	Horn antenna		3161-01	1749	1091	Emco
<input type="checkbox"/>	Stripline		SL 150	1604	---	Senton
<input type="checkbox"/>	Stripline 90 Ohms (3.2 m)		SL 090	1811	---	Stimpfl
<input checked="" type="checkbox"/>	Isotropic field probe		FP 2000	1228	12847	Amplifier Research
<input checked="" type="checkbox"/>	Isotropic field monitor		FM 2004	1229	12632	Amplifier Research
<input type="checkbox"/>	Electromagnetic radiation meter		EMR-200	1723	AT-0023	Narda
<input type="checkbox"/>	Electric field probe		Type 8.3	1724	AU-0008	Narda
<input type="checkbox"/>	Fully anechoic room		No. 2	1452	---	Albatross
<input checked="" type="checkbox"/>	Semi anechoic room		No. 3	1453	---	Siemens
<input type="checkbox"/>	Fully anechoic room		No. 6	1865	---	Albatross
<input type="checkbox"/>	Shielded room		No. 8b	2057-2	---	Albatross



9.4.3 Test Results

Results for RF-electromagnetic fields test are documented as listed below.



RF-Electromagnetic Fields

Prüfdatum / <i>Date of test:</i>	June 27, 2011	Prüfergebnis / Test Result <input checked="" type="checkbox"/> Erfüllt / <i>Passed</i> <input type="checkbox"/> Nicht erfüllt / <i>Not passed</i>
Prüfer / <i>Operator:</i>	Martin Steindl	
Messplatz / <i>Test site:</i>	Semi anechoic room, cabin no. 3	

Luftdruck / <i>Barometric pressure:</i>	983.7 hPa
Relative Luftfeuchtigkeit / <i>Relative humidity:</i>	57.4%
Temperatur / <i>Ambient temperature:</i>	23.7 °C

Prüfgrundlage / <i>Specifications:</i>	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010	
Bewertungskriterium / <i>Performance criterion:</i>	A	
Anforderung / <i>Requirement:</i>	80 MHz - 2 GHz::	10 V/m
Störsignal / <i>Interfering signal:</i>	Modulation:	AM
	Modulation depth:	80 %
	Modulation frequency:	400 Hz
Schrittweite / <i>Step size:</i>	1 %	
Verweildauer / <i>Dwell time:</i>	80 MHz – 1 GHz:	3 s
	1 GHz – 2 GHz:	9 s
Antennenpolarisation / <i>Antenna polarization:</i>	<input checked="" type="checkbox"/> horizontal	<input checked="" type="checkbox"/> vertical
Basisnorm / <i>Basic standard:</i>	EN 61000-4-3:2006 + A1:2006	
Betriebsart / <i>Operation mode:</i>	Receiving and Transmitting mode	
Kommentar / <i>Comment:</i>		

<i>Position of EUT</i>	<i>Field strength level</i>	<i>Result</i>	<i>Note</i>
Front to antenna	10 V/m	Passed	
Rear side to antenna	10 V/m	Passed	
Left side to antenna	10 V/m	Passed	
Right side to antenna	10 V/m	Passed	

Note(s):

9.5 Electrical fast Transients (Bursts)

9.5.1 Test Setup



9.5.2 Test Equipment List

Type	Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/> High energy pulse generator	NSG 2050	1680	200104-005AR	Schaffner
<input checked="" type="checkbox"/> Pulse network module	PNW 2225	1806	200448-527LU	Schaffner
<input type="checkbox"/> Ultra compact simulator	UCS500M4	1898	V0602101058	EM Test
<input type="checkbox"/> Coupling network	CNI 503	1591	0796-04	EM Test
<input type="checkbox"/> Coupling clamp Cabin no. 1	CDN 8014	1221	131	Schaffner
<input checked="" type="checkbox"/> Coupling clamp Cabin no. 4	SL 400-071D	1076	007	Schaffner
<input type="checkbox"/> Shielded room	No. 1	1451	---	Albatross
<input type="checkbox"/> Fully anechoic room	No. 2	1452	---	Albatross
<input type="checkbox"/> Semi anechoic room	No. 3	1453	---	Siemens
<input checked="" type="checkbox"/> Shielded room	No. 4	1454	3FD 100 544	Euroshield
<input type="checkbox"/> Shielded room	No. 5	1537	5468	Ray Proof Division
<input type="checkbox"/> Fully anechoic room	No. 6	1865	---	Albatross
<input type="checkbox"/> Shielded room	No. 7	1866	---	Albatross

9.5.3 Test Results

Results for electrical fast transients test are documented as listed below.



Electrical fast Transients (Bursts)

Prüfdatum / Date of test:	June 27, 2011 / June 30, 2011
Prüfer / Operator:	Martin Steindl
Messplatz / Test site:	Shielded room, cabin no. 4

Prüfergebnis / Test Result	
<input checked="" type="checkbox"/>	Erfüllt / Passed
<input type="checkbox"/>	Nicht erfüllt / Not passed

Luftdruck / Barometric pressure:	974.8 hPa
Relative Luftfeuchtigkeit / Relative humidity:	49.3 %
Temperatur / Ambient temperature:	25.5 °C

Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010	
Bewertungskriterium / Performance criterion:	B	
Anforderung / Requirement:	Signal and control lines:	± 1 kV
	DC mains inputs and outputs:	± 1 kV
	AC mains inputs and outputs:	± 2 kV
Störsignal / Interfering signal:	Test pulse:	5 ns / 50 ns
	Pulse frequency:	5 kHz
	Burst duration:	15 ms
	Repetition period:	300 ms
Prüfdauer / Test time:	5 min per polarity	
Basisnorm / Basic standard:	IEC 61000-4-4:2004	
Betriebsart / Operation mode:	Transmitting and Receiving mode	
Kommentar / Comment:		

Port	Voltage level	Coupling	Coupling mode	Result	Note
D1	± 1 kV	(50 Ω)	Coupling clamp	Passed	1
D1	± 1 kV	(50 Ω)	Coupling clamp	Passed	2
S1	± 1 kV	(50 Ω)	Coupling clamp	Passed	1
S1	± 1 kV	(50 Ω)	Coupling clamp	Passed	2
S2	± 1 kV	(50 Ω)	Coupling clamp	Passed	1
S2	± 1 kV	(50 Ω)	Coupling clamp	Passed	2
S3	± 1 kV	(50 Ω)	Coupling clamp	Passed	1
S3	± 1 kV	(50 Ω)	Coupling clamp	Passed	2

Note(s):					
1	Tested in receiving mode				
2	Tested in transmitting mode				

9.6 Induced conducted disturbances

9.6.1 Test Setup



9.6.2 Test Equipment List

Type		Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input checked="" type="checkbox"/>	Signal generator	Cabin no. 1 SMX	1036	883184/018	Rohde & Schwarz
<input type="checkbox"/>	Signal generator	Cabin no. 8b SML 02	1759	836926/016	Rohde & Schwarz
<input checked="" type="checkbox"/>	Power amplifier	Cabin no. 1 M-100	1896	J164-1105	ifi
<input type="checkbox"/>	Power amplifier	Cabin no. 8b 411 LA	1122	299	ENI
<input type="checkbox"/>	Power amplifier	HVV250	1508	836956/004	Rohde & Schwarz
<input type="checkbox"/>	Power amplifier	10W1000	1119	5239	Amplifier Research
<input type="checkbox"/>	Power amplifier	200W1000	1225	12904	Amplifier Research
<input checked="" type="checkbox"/>	Power meter	Cabin no. 1 NRVS	1726	100808	Rohde & Schwarz
<input type="checkbox"/>	Power meter	Cabin no. 7 NRVS	1502	838624/016	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	Cabin no. 1 NRV-Z4	1727	100179	Rohde & Schwarz
<input type="checkbox"/>	Power sensor	Cabin no. 8b URV5-Z4	1116	826775/010	Rohde & Schwarz
<input type="checkbox"/>	Coupling network	FCC-801-AF4	1550	47	FCC
<input type="checkbox"/>	Coupling network	FCC-801-M5-25	1551	16	FCC
<input type="checkbox"/>	Coupling network	FCC-801-C1	1552	64	FCC
<input type="checkbox"/>	Coupling network	FCC-801-AF4	1553	48	FCC
<input type="checkbox"/>	Coupling network	FCC-801-M3-25	1554	117	FCC
<input checked="" type="checkbox"/>	Coupling network	FCC-801-M4-25	1555	17	FCC
<input type="checkbox"/>	Coupling network	CDN 801-M3	1572	---	Senton
<input type="checkbox"/>	Coupling network	CDN 801-S37	1573	---	Senton
<input type="checkbox"/>	Coupling network	CDN L-801 M2/M3	1862	2443	Lüthi
<input checked="" type="checkbox"/>	EM injection clamp	Cabin no. 1 EM 101	1568	35354	Lüthi
<input type="checkbox"/>	EM injection clamp	Cabin no. 8b EM 101	1917	35785	Lüthi
<input type="checkbox"/>	Ferrite tube clamp	FTC 101	1564	4413	Lüthi
<input checked="" type="checkbox"/>	Current clamp	F-120-9B	1514	15	FCC
<input type="checkbox"/>	Current clamp	F-55	1700	51	FCC
<input checked="" type="checkbox"/>	Shielded room	No. 1	1451	---	Albatross
<input type="checkbox"/>	Fully anechoic room	No. 2	1452	---	Albatross
<input type="checkbox"/>	Semi anechoic room	No. 3	1453	---	Siemens
<input type="checkbox"/>	Shielded room	No. 4	1454	3FD 100 544	Euroshield
<input type="checkbox"/>	Shielded room	No. 5	1537	5468	Ray Proof Division
<input type="checkbox"/>	Fully anechoic room	No. 6	1865	---	Albatross
<input type="checkbox"/>	Shielded room	No. 7	1866	---	Albatross
<input type="checkbox"/>	Shielded room	No. 8b	2057-2	---	Albatross

9.6.3 Test Results

Results for induced conducted disturbance test are documented as listed below.

Induced conducted disturbances

Prüfdatum / <i>Date of test:</i>	May 3, 2011
Prüfer / <i>Operator:</i>	Martin Steindl
Messplatz / <i>Test site:</i>	Shielded room, cabin no. 1

Prüfergebnis / <i>Test Result</i>	
<input checked="" type="checkbox"/>	Erfüllt / <i>Passed</i>
<input type="checkbox"/>	Nicht erfüllt / <i>Not passed</i>

Luftdruck / <i>Barometric pressure:</i>	969.6 hPa
Relative Luftfeuchtigkeit / <i>Relative humidity:</i>	35.8 %
Temperatur / <i>Ambient temperature:</i>	23.5 °C

Prüfgrundlage / <i>Specifications:</i>	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010	
Bewertungskriterium / <i>Performance criterion:</i>	A	
Anforderung / <i>Requirement:</i>	Frequency range:	0.15 - 80 MHz
	Signal and control lines:	3 V _{rms}
	DC mains inputs and outputs:	3 V _{rms}
	AC mains inputs and outputs:	3 V _{rms}
	Frequencies:	2 MHz, 3 MHz, 4 MHz, 6.2 MHz, 8.2 MHz, 12.6 MHz, 16.5 MHz, 18.8 MHz, 22 MHz, 25 MHz
	Signal and control lines:	10 V _{rms}
	DC mains inputs and outputs:	10 V _{rms}
	AC mains inputs and outputs:	10 V _{rms}
Störsignal / <i>Interfering signal:</i>	Modulation:	AM
	Modulation depth:	80 %
	Modulation frequency:	400 Hz
Schrittweite / <i>Step size:</i>	1 %	
Verweildauer / <i>Dwell time:</i>	3 s	
Basisnorm / <i>Basic standard:</i>	IEC 61000-4-6:2003 + A1:2004 + A2:2006	
Betriebsart / <i>Operation mode:</i>	Receiving and Transmitting mode	
Kommentar / <i>Comment:</i>		



<i>Port</i>	<i>Voltage level</i>	<i>Coupling via</i>	<i>Result</i>	<i>Note</i>
D1	3 V _{rms}	CDN FCC-801-M4-25	Passed	1, 3
D1	10 V _{rms}	CDN FCC-801-M4-25	Passed	2, 3
D1	3 V _{rms}	CDN FCC-801-M4-25	Passed	1, 4
D1	10 V _{rms}	CDN FCC-801-M4-25	Passed	2, 4
S1	3 V _{rms}	EM-Clamp EM 101	Passed	1, 3
S1	10 V _{rms}	EM-Clamp EM 101	Passed	2, 3
S1	3 V _{rms}	EM-Clamp EM 101	Passed	1, 4
S1	10 V _{rms}	EM-Clamp EM 101	Passed	2, 4
S2	3 V _{rms}	EM-Clamp EM 101	Passed	1, 3
S2	10 V _{rms}	EM-Clamp EM 101	Passed	2, 3
S2	3 V _{rms}	EM-Clamp EM 101	Passed	1, 4
S2	10 V _{rms}	EM-Clamp EM 101	Passed	2, 4
S3	3 V _{rms}	EM-Clamp EM 101	Passed	1, 3
S3	10 V _{rms}	EM-Clamp EM 101	Passed	2, 3
S3	3 V _{rms}	EM-Clamp EM 101	Passed	1, 4
S3	10 V _{rms}	EM-Clamp EM 101	Passed	2, 4

Note(s):

- 1 Tested in Transmitting mode
- 2 Tested in Receiving mode
- 3 Tested within frequency range 150 kHz – 80 MHz
- 4 Tested on fixed frequencies 2 MHz, 3 MHz, 4 MHz, 6.2 MHz, 8.2 MHz, 12.6 MHz, 16.5 MHz, 18.8 MHz, 22 MHz, 25 MHz

9.7 Power supply fail

9.7.1 Test Setup



9.7.2 Test Equipment List

Type	Designation	Inv.-no.	Serial No. or ID	Manufacturer
<input type="checkbox"/> Ultra compact simulator	UCS500M4	1898	V0602101058	EM Test
<input type="checkbox"/> Transformer	EAC/MT27016/ATE/PCG1	1590	96.24.934	ET System Electronic
<input type="checkbox"/> Oscilloscope	54602B	1535	US35060304	Hewlett Packard
<input checked="" type="checkbox"/> Analyzer reference system (including mains impedance)	ARS 16/3	2038-1	A4235 07/0 0209	Spitzenberger + Spies
<input checked="" type="checkbox"/> Control unit (synthesizers)	SyCore 1k4	2038-2	A4235 12/0 0209	Spitzenberger + Spies
<input checked="" type="checkbox"/> Amplifier	PAS 10000	2038-3	A4235 01/1 0209	Spitzenberger + Spies
<input type="checkbox"/> Amplifier	PAS 5000/10000	2038-4	A4235 01/2 0209	Spitzenberger + Spies
<input type="checkbox"/> Amplifier	PAS 5000/10000	2038-5	A4235 01/2 0209	Spitzenberger + Spies
<input checked="" type="checkbox"/> Oscilloscope	TDS2014B	2039	C041606	Tektronix
<input type="checkbox"/> Shielded room	No. 1	1451	---	Albatross
<input type="checkbox"/> Fully anechoic room	No. 2	1452	---	Albatross
<input type="checkbox"/> Semi anechoic room	No. 3	1453	---	Siemens
<input type="checkbox"/> Shielded room	No. 4	1454	3FD 100 544	Euroshield
<input type="checkbox"/> Shielded room	No. 5	1537	5468	Ray Proof Division
<input type="checkbox"/> Fully anechoic room	No. 6	1865	---	Albatross
<input type="checkbox"/> Shielded room	No. 7	1866	---	Albatross

9.7.3 Test Results

Results for voltage dips and interruptions test are documented as listed below.



Power supply fail

Prüfdatum / Date of test:	May 16, 2011
Prüfer / Operator:	Martin Steindl
Messplatz / Test site:	Non shielded room

Prüfergebnis / Test Result	
<input checked="" type="checkbox"/>	Erfüllt / Passed
<input type="checkbox"/>	Nicht erfüllt / Not passed

Luftdruck / Barometric pressure:	985.0 hPa
Relative Luftfeuchtigkeit / Relative humidity:	35.9 %
Temperatur / Ambient temperature:	23.8 °C

Prüfgrundlage / Specifications:	IEC 62287-1:2006 IEC 60945:2002 + Corr 1:2010		
Kopplung auf / Coupling to:	AC mains inputs		
Nennspannung / Nominal voltage:	U _N = 1D V DC		
Anforderung / Requirement:	Voltage reduction in % of U _N	Duration in s	Performance criterion
	100	60	B
Prüfparameter / Test parameters:	Count:	3	
	Repetition:	≥ 10 s	
Basisnorm / Basic standard:	IEC 61000-4-11:2004		
Betriebsart / Operation mode:	Receiving and Transmitting mode		
Kommentar / Comment:			

Port	Voltage reduction in % of U _N	Duration in s	Result	Note
D1	100	60	Passed	1
D1	100	60	Passed	2

Note(s):

- 1 Tested in Transmitting mode
- 2 Tested in Receiving mode



10 Revision History

Revision History			
<i>Edition</i>	<i>Date</i>	<i>Issued by</i>	<i>Modifications</i>
1	2011-07-05	M. Steindl (aw)	First Edition
2	2011-07-08	M. Steindl (aw)	Page 6: Minimum voltage 9.6 V