

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23



Deutsche
Akkreditierungsstelle
D-PL-12053-01-01

**Test Report acc. to FCC Title 47 CFR Part 15
relating to
WERMA Signaltechnik GmbH + Co. KG
WIN1
implemented in following host devices:
win master
win slave / reflect slave
reflect master**

**Title 47 - Telecommunication
Part 15 - Radio Frequency Devices
Subpart C – Intentional Radiators
Measurement Procedure:
ANSI C63.4-2009**

EUT: WIN1
 FCC ID: ZGHWIN1

Date of issue: 2011-05-23

Manufacturer's details	
Manufacturer	WERMA Signaltechnik GmbH + Co. KG
Manufacturer's grantee code	ZGH
Manufacturer's address	WERMA Signaltechnik GmbH + Co. KG
	Dürbheimer Str. 15
	D-78604 Rietheim-Weilheim
	Germany
	Phone: +49 (0)7424 9557-223
	Fax: +49 (0)7424 9557-171
	Email: daniel.kensy@werma.com
Relevant standard used	47 CFR Part 15C - Intentional Radiators
	ANSI C63.4-2009

Test Report prepared by	
Technical engineer	Ralf Trepper
	m. dudde hochfrequenz-technik (laboratory)
	Rottland 5a
	51429 Bergisch Gladbach
	Germany
	Phone: +49 2207 96890
	Fax: +49 2207 968920
	Email: m.duddelabor@dudde.com

Equipment Under Test (EUT)	
Equipment category	Transceiver
Trade name	WERMA
Type designation	WIN1
Serial no.	42.002668
Host Variants / Serial no.	win master /
	win slave /
	reflect slave
	reflect master /

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1. Test results

Clause	Requirements headline	Test result			Report page number
		Pass	Fail	Not*	
8.1	Antenna Requirement	Pass	Fail	Not*	9
8.2	Restricted bands of operation	Pass	Fail	Not*	10 to 11
8.3	Conducted limits	Pass	Fail	Not*	12 to 15
8.4	Radiated emission limits	Pass	Fail	Not*	16 to 23
8.5	Frequency tolerance	Pass	Fail	Not*	24 to 26
8.6	Bandwidth (20 dB)	Pass	Fail	Not*	27 to 28

* Not tested

The equipment meets the requirements	Yes	No
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 Signature: 
 (Technician)

 Signature: 
 (Manager)

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2. Introduction

This test report consists of:

- Test result summary
- List of contents
- Introduction and further information
- Performance assessment
- Detailed test information

All pages have been numbered consecutively and bear the m. dudde hochfrequenz-technik logo, the test report number, the date, the test specification in its current version as well as the type designation of the EUT. The total number of pages in this report is **37**.

The tests were carried out at:

- m. dudde hochfrequenz-technik, D-51429 Bergisch Gladbach

in a representative assembly and in accordance with the test methods and/or requirements stated in:

FCC Title 47 CFR Part 15 Subpart C & ANSI C63.4-2009

The sample of the product was received on:

- 2011-04-11

The tests were carried out in the following period of time:

- 2011-05-13 – 2011-05-17

3. Testing laboratory

m. dudde hochfrequenz-technik
Rottland 5a, 51429 Bergisch Gladbach, Germany

Phone: +49 - (0) 22 07 / 96 89-0

Fax: +49 - (0) 22 07 / 96 89-20

- FCC Registration Number: **699717**

Accredited by:

DAkkS Deutsche Akkreditierungsstelle GmbH

DAkkS accreditation number: D-PL-12053-01

EUT: WIN1
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4. Applicant

Company name : WERMA Signaltechnik GmbH + Co. KG
Address : Dürbheimer Str. 15
: D-78604 Rietheim-Weilheim
Country : Germany
Telephone : +49 (0)7424 9557-223
Fax : +49 (0)7424 9557-171
Email : daniel.kensy@werma.com
Date of order : 2011-04-11
References : Mr. Daniel Kensy

5. Product and product documentation

Samples of the following apparatus were submitted for testing:

Manufacturer : WERMA Signaltechnik GmbH + Co. KG
Trademark : WERMA
Type designation : **WIN1**
Hardware versions : WIN1
Serial number : ---
Software release : 2.2.1.291
Type of equipment : Transceiver
Power used : 5.0 V DC / 24 V DC
Frequency used : 912.997284 MHz, 913.997040 MHz, 915.996552 MHz, 916.996307 MHz
Generated frequencies : 912.997284 MHz, 913.997040 MHz, 915.996552 MHz,
916.996307 MHz (Carrier Frequencies), 26 MHz (Crystal), 12 MHz (int. clock),
32.786 kHz (Crystal)
ITU emission class : 134K F1D

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For issuing this report the following product documentation was used:

Description	Date	Identifications
External photographs of the Equipment Under Test (EUT)	2011-05-23	Annex no. 1
Internal photographs of the Equipment Under Test (EUT)	2011-05-23	Annex no. 2
Channel occupancy / bandwidth	2011-05-17	Annex no. 3
Label sample	2011-05-23	Annex no. 4
Functional description / User manual	2011-05-17	Annex no. 5
Test setup photos	2011-05-17	Annex no. 6
Block diagram	2011-05-23	Annex no. 7
Operational description	2011-05-17	Annex no. 8
Schematics	2011-05-23	Annex no. 9
Parts list	2011-05-23	Annex no. 10
Antenna characteristics / Antenna description	2011-05-17	Annex no. 11

6. Conclusions, observations and comments

The test report will be filed at m. dudde hochfrequenz-technik for a period of 10 years following the issue of this report. It may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of m. dudde hochfrequenz-technik.

The results of the tests as stated in this report are exclusively applicable to the EUT as identified in this report. m. dudde hochfrequenz-technik cannot be held liable for properties of the EUT that have not been observed during these tests.

m. dudde hochfrequenz-technik assumes the sample to comply with the requirements of FCC Title 47 CFR Part 15 for the respective test sector, if the test results turn out positive.

Comments: ---

Date : 2011-05-23

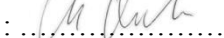
Date : 2011-05-23

Name : Ralf Trepper

Name : Manfred Dudde

Function : Technician

Function : Manager

Signature : Signature : 

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7. Operational description

7.1 EUT details

Transceiver module

The module will be integrated in the following host devices: win master, win slave / reflect slave, reflect master. win slave and reflect slave are 100 % identically, the only different is their application aria. The module will be built in only by the manufacturer!

The WERMA **wireless information network (WIN)** in conjunction with a **KombiSIGN 70** or **KombiSIGN 71** signal tower informs you about the current status of up to 50 machines.

7.2 EUT configuration

Some **WINI** samples integrated in different host devices operate in the continuous transmitting mode after connecting the DC power line.

(Prepared Sample only for Radiated emission tests, (Only the channels can be changed!))

Some **WINI** samples integrated in different host devices operated in normal mode for transmission time measurements.

The modular transmitter is to be part of a host device and complies with the applicable certification requirements. The power supply regulation is only part of the host device and is in all host devices, listed above, technical identically. The module will only be implemented in host devices by the manufacturer!

7.3 EUT measurement description

Radiated measurements

The **WINI** samples integrated in all different host devices was tested in a typical fashion. During preliminary emission tests the **WINI** was operated in the continuous transmitting mode for worst case emission mode investigation. Therefore, the final qualification testing was completed with **WINI** operated in continuous modes.

All tests were performed with the applicant's declared maximum voltage: 24 V DC and 5 V DC (USB)

In order to establish the maximum radiation, firstly, there have been viewed all orthogonal adjustments of the test samples, secondly the test ample have been rotated at all adjustments around the own axis between 0° and 360°, and thirdly, the antenna polarization between horizontal and vertical had been varied.

Conducted measurements

1.) The device was connected to the artificial mains network via an USB- connector to the USB- port of a HP Notebook and this to the artificial mains network. It has been tested in two runs: first, with inactive **WINI**, second with activated **WINI**. All different host devices in combination with the **WINI** was tested.

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8. Compliance assessment

8.1 Antenna requirement

8.1.1 Regulation

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

8.1.2 Result

The equipment meets the requirements	Yes	No	N.t.
Further test results are attached	Yes	No	Page no.

Dedicated antenna (win master and reflect master)! See Antenna description (Annex No. 12)
Integrated antenna (win slave and reflect slave)!

N.t.* See page no. 36

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8.2 Restricted bands of operation

8.2.1 Regulation

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)
13.36 - 13.41			

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e), regardless of the field strength limits specified elsewhere in this Subpart, the provisions of this Section apply to emissions from any intentional radiator.

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(d) The following devices are exempt from the requirements of this Section:

- (1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a), the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a), and the fundamental emission is outside of the bands listed in paragraph (a) more than 99% of the time the device is actively transmitting, without compensation for duty cycle.
- (2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.
- (3) Cable locating equipment operated pursuant to Section 15.213.
- (4) Any equipment operated under the provisions of § 15.253, § 15.255 or § 15.257 of this part.
- (5) Biomedical telemetry devices operating under the provisions of Section 15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.
- (6) Transmitters operating under the provisions of Subpart D or F of this part.
- (7) Devices operated pursuant to § 15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.
- (8) Devices operated in the 24.075-24.175 GHz band under § 15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in § 15.245(b).
- (9) Devices operated in the 24.0-24.25 GHz band under § 15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in § 15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of Section 15.245 shall not exceed the limits specified in Section 15.245(b).

8.2.2 Result

The equipment meets the requirements	Yes	No	N.t.
Further test results are attached	Yes	No	Page no.

N.t.* See page no. 36

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8.3 Conducted limits

8.3.1 Regulation

(a) For an intentional radiator which 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 limits in the following table, as measured using a 50 μ H/50ohms line impedance stabilization network (LISN). Compliance with this provision of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal.

The lower limit applies at the boundary between the frequency ranges.

Frequency of emission(MHz)	Conducted limit (dB μ V)	
	Quasi-peak	Average
0.15-0.50	66 to 56*	56 to 46*
0.50-5.0	56	46
5.0-30.0	60	50

* Decreases with the logarithm of the frequency

(c) Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines. Devices that include, or make provision for, the use of battery chargers which permit operating while charging, AC adaptors or battery eliminators or connected to the AC power lines indirectly, obtaining their power through another device which is connected to the AC power lines, shall be tested to demonstrate compliance with the conducted limits.

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8.3.2 Test equipment

Type	Manufacturer/ Model no.	Serial no.	Last calibration	Next calibration	Calibration executed by
Receiver (9 kHz - 30MHz)	Schwarzbeck FMLK 1518 (428)	1518294 9360	08 / 10	08/13	Rohde & Schwarz
Panorama- Monitor FMLK / VUMA	PAZ1550 (429)	---	---	---	---
Protector limiter 9 kHz - 30MHz 10 dB	Rhode & Schwarz ESH 3Z2 (272)	357,881052	03 / 11	03 / 14	Dudde
V-LISN 50 ohms/(50 uH+5 ohms)	RFT NNB 11 (72)	13835240	06 / 08	06 / 11	Rohde & Schwarz
V-LISN 50 ohms/(50 uH+5 ohms)	EMCO (49b)	9512-1227	08 / 08 05/09	08 / 11	Dudde
RF- cable	Aircell 1.5m [BNC/N]	K30	2011/01	2012/01	Dudde

8.3.3 Test procedures

The EUT and the additional equipment (if required) are connected to the main power through a line impedance stabilization network (LISN). The LISN must be appropriate to ANSI C63.4-2009 Section 7.

Additional equipment must also be connected to a second LISN with the same specifications described in the above sentence (if required).

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8.3.4 Result

Tested with a Laptop over USB port (Laptop stand alone)

CONDUCTED EMISSIONS (Section 15.207)						
Tested line	Emission frequency [MHz]	Receiver bandwidth [kHz]	Result quasi-peak [dB μ V]	Spec. limit (average) [dB μ V]	Margin [dB]	Remarks
L1	0.1960	9	44.0	55.3	11.3	* ²
N	0.1960	9	44.0	55.3	11.3	* ²
L1	0.301	9	-2	51.7	53.7	* ¹
N	0.301	9	-2	51.7	53.2	* ¹
L1	0.475	9	-2	47	49.0	* ¹
N	0.475	9	-2	47	49.0	* ¹
L1	0.600	9	-2	46	48.0	* ¹
N	0.600	9	-2	46	48.0	* ¹
L1	0.775	9	-2	46	48.0	* ²
N	0.775	9	-2	46	48.0	* ²
L1	0.850	9	-2	46	48.0	* ¹
N	0.850	9	-2	46	48.0	* ¹
L1	1.000	9	-2	46	48.0	* ¹
N	1.000	9	-2	46	48.0	* ¹
L1	1.787	9	29.0	46	17.0	* ²
N	1.787	9	29.0	46	17.0	* ²
L1	2.084	9	29.5	46	16.5	* ²
N	2.084	9	29.5	46	16.5	* ²
L1	2.423	9	25.0	46	21.0	* ²
N	2.423	9	25.0	46	21.0	* ²
L1	6.7644	9	-2	50	52.0	* ¹
N	6.7644	9	-2	50	52.0	* ¹
L1	13.5288	9	-2	50	52.0	* ¹
N	13.5288	9	-2	50	52.0	* ¹
L1	20.2931	9	-2	50	52.0	* ¹
N	20.2931	9	-2	50	52.0	* ¹
L1	27.0575	9	-2	50	52.0	* ¹
N	27.0575	9	-2	50	52.0	* ¹

Remark: *¹ Noise level of the measuring instrument ≤ -2 dB μ V (0.009 – 30MHz)

Remark: *² Quasi peak measurements lower than “Specified Average Limit”

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

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win master tested with a Laptop over USB port (WIN1 active)

CONDUCTED EMISSIONS (Section 15.207)						
Tested line	Emission frequency [MHz]	Receiver bandwidth [kHz]	Result quasi-peak [dB μ V]	Spec. limit (average) [dB μ V]	Margin [dB]	Remarks
L1	0.1960	9	44.0	55.3	11.3	* ²
N	0.1960	9	44.0	55.3	11.3	* ²
L1	0.301	9	-2	51.7	53.7	* ¹
N	0.301	9	-2	51.7	53.2	* ¹
L1	0.475	9	-2	47	49.0	* ¹
N	0.475	9	-2	47	49.0	* ¹
L1	0.600	9	-2	46	48.0	* ¹
N	0.600	9	-2	46	48.0	* ¹
L1	0.775	9	-2	46	48.0	* ²
N	0.775	9	-2	46	48.0	* ²
L1	0.850	9	-2	46	48.0	* ¹
N	0.850	9	-2	46	48.0	* ¹
L1	1.000	9	-2	46	48.0	* ¹
N	1.000	9	-2	46	48.0	* ¹
L1	1.787	9	29.0	46	17.0	* ²
N	1.787	9	29.0	46	17.0	* ²
L1	2.084	9	29.5	46	16.5	* ²
N	2.084	9	29.5	46	16.5	* ²
L1	2.423	9	25.0	46	21.0	* ²
N	2.423	9	25.0	46	21.0	* ²
L1	6.7644	9	-2	50	52.0	* ¹
N	6.7644	9	-2	50	52.0	* ¹
L1	13.5288	9	-2	50	52.0	* ¹
N	13.5288	9	-2	50	52.0	* ¹
L1	20.2931	9	-2	50	52.0	* ¹
N	20.2931	9	-2	50	52.0	* ¹
L1	27.0575	9	-2	50	52.0	* ¹
N	27.0575	9	-2	50	52.0	* ¹

Remark: *¹ Noise level of the measuring instrument \leq -2dB μ V (0.009 – 30MHz)Remark: *² Quasi peak measurements lower than "Specified Average Limit"

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

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win slave/reflect slave tested with a Laptop over USB port (WIN1 active)

CONDUCTED EMISSIONS (Section 15.207)						
Tested line	Emission frequency [MHz]	Receiver bandwidth [kHz]	Result quasi-peak [dB μ V]	Spec. limit (average) [dB μ V]	Margin [dB]	Remarks
L1	0.1960	9	44.0	55.3	11.3	* ²
N	0.1960	9	44.0	55.3	11.3	* ²
L1	0.301	9	-2	51.7	53.7	* ¹
N	0.301	9	-2	51.7	53.2	* ¹
L1	0.475	9	-2	47	49.0	* ¹
N	0.475	9	-2	47	49.0	* ¹
L1	0.600	9	-2	46	48.0	* ¹
N	0.600	9	-2	46	48.0	* ¹
L1	0.775	9	-2	46	48.0	* ²
N	0.775	9	-2	46	48.0	* ²
L1	0.850	9	-2	46	48.0	* ¹
N	0.850	9	-2	46	48.0	* ¹
L1	1.000	9	-2	46	48.0	* ¹
N	1.000	9	-2	46	48.0	* ¹
L1	1.787	9	29.0	46	17.0	* ²
N	1.787	9	29.0	46	17.0	* ²
L1	2.084	9	29.5	46	16.5	* ²
N	2.084	9	29.5	46	16.5	* ²
L1	2.423	9	25.0	46	21.0	* ²
N	2.423	9	25.0	46	21.0	* ²
L1	6.7644	9	-2	50	52.0	* ¹
N	6.7644	9	-2	50	52.0	* ¹
L1	13.5288	9	-2	50	52.0	* ¹
N	13.5288	9	-2	50	52.0	* ¹
L1	20.2931	9	-2	50	52.0	* ¹
N	20.2931	9	-2	50	52.0	* ¹
L1	27.0575	9	-2	50	52.0	* ¹
N	27.0575	9	-2	50	52.0	* ¹

Remark: *¹ Noise level of the measuring instrument $\leq -2\text{dB}\mu\text{V}$ (0.009 – 30MHz)Remark: *² Quasi peak measurements lower than "Specified Average Limit"

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

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reflect master tested with a Laptop over USB port (WIN1 active)

CONDUCTED EMISSIONS (Section 15.207)						
Tested line	Emission frequency [MHz]	Receiver bandwidth [kHz]	Result quasi-peak [dB μ V]	Spec. limit (average) [dB μ V]	Margin [dB]	Remarks
L1	0.1960	9	44.0	55.3	11.3	* ²
N	0.1960	9	44.0	55.3	11.3	* ²
L1	0.301	9	-2	51.7	53.7	* ¹
N	0.301	9	-2	51.7	53.2	* ¹
L1	0.475	9	-2	47	49.0	* ¹
N	0.475	9	-2	47	49.0	* ¹
L1	0.600	9	-2	46	48.0	* ¹
N	0.600	9	-2	46	48.0	* ¹
L1	0.775	9	-2	46	48.0	* ²
N	0.775	9	-2	46	48.0	* ²
L1	0.850	9	-2	46	48.0	* ¹
N	0.850	9	-2	46	48.0	* ¹
L1	1.000	9	-2	46	48.0	* ¹
N	1.000	9	-2	46	48.0	* ¹
L1	1.787	9	29.0	46	17.0	* ²
N	1.787	9	29.0	46	17.0	* ²
L1	2.084	9	29.5	46	16.5	* ²
N	2.084	9	29.5	46	16.5	* ²
L1	2.423	9	25.0	46	21.0	* ²
N	2.423	9	25.0	46	21.0	* ²
L1	6.7644	9	-2	50	52.0	* ¹
N	6.7644	9	-2	50	52.0	* ¹
L1	13.5288	9	-2	50	52.0	* ¹
N	13.5288	9	-2	50	52.0	* ¹
L1	20.2931	9	-2	50	52.0	* ¹
N	20.2931	9	-2	50	52.0	* ¹
L1	27.0575	9	-2	50	52.0	* ¹
N	27.0575	9	-2	50	52.0	* ¹

Remark: *¹ Noise level of the measuring instrument ≤ -2 dB μ V (0.009 – 30MHz)Remark: *² Quasi peak measurements lower than "Specified Average Limit"

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

8.4 Radiated emission limits

8.4.1 Regulation

(a) Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (millivolts/meter)	Field strength of harmonics (microvolts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

(b) Fixed, point-to-point operation as referred to in this paragraph shall be limited to systems employing a fixed transmitter transmitting to a fixed remote location. Point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information are not allowed. Fixed, point-to-point operation is permitted in the 24.05–24.25 GHz band subject to the following conditions:

(1) The field strength of emissions in this band shall not exceed 2500 millivolts/meter.

(c) Field strength limits are specified at a distance of 3 meters.

(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

(e) As shown in §15.35(b), for frequencies above 1000 MHz, the field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

(f) Parties considering the manufacture, importation, marketing or operation of equipment under this section should also note the requirement in §15.37(d).

EUT: WIN1
 FCC ID: ZGHWIN1

Date of issue: 2011-05-23

8.4.2 Test equipment

Type	Manufacturer/ Model no.	Serial no.	Last calibration	Next calibration	Calibration executed by
Receiver (9 kHz –18.0 GHz)	Rohde & Schwarz Spectrum Analyzer FSL 18 (171a)	100.117	2010/10	2011/10	Rohde & Schwarz
Receiver (9 kHz –30.0 GHz)	Rohde & Schwarz Spectrum Analyzer FSV 30 (502)	100932	2011/04	2012/04	Dudde
Pre-amplifier (100kHz - 1.3GHz)	Hewlett Packard 8447 E (166a)	1726A00705	2011/02	2012/02	Dudde
Pre-amplifier (1GHz - 18GHz)	Narda --- (345)	---	2011/02	2012/02	Dudde
Magnetic loop antenna (9 kHz - 30 MHz)	Schwarzbeck FMZB 1516 (23)	---	2010/09	2011/09	Dudde
Bilog antenna (30- 1000 MHz)	Schwarzbeck VULP 9168 (406)	---	2010/09	2011/09	Dudde
Bilog antenna (1- 18 GHz)	Schwarzbeck VULP 9168 (408)	---	2011/02	2012/02	Dudde
Horn antenna (0.86-8.5 GHz)	Schwarzbeck BBHA 9120 A (284)	236	2011/02	2012/02	Dudde
Horn antenna (2.0-14.0 GHz)	Schwarzbeck BBHA 9120 C (169)	305	2011/02	2012/02	Dudde
RF- cable	Kabelmetal 18m [N]	K1	2011/02	2012/02	Dudde
RF- cable	Aircell 0.5m [BNC]	K40	2011/02	2012/02	Dudde
RF- cable	Aircell 1m [BNC/N]	K56	2011/02	2012/02	Dudde
RF- cable	Sucoflex 106 Suhner 6,4m [N]	K74	2011/02	2012/02	Dudde
RF- cable	Sucoflex 106 Suhner 6,4m [N]	K75	2011/02	2012/02	Dudde

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

8.4.3 Test procedure

The EUT and this peripheral (when additional equipment exists) are placed on a turn table which is 0.8 m above the ground. The turn table would be allowed to rotate 360 degrees to determine the position of the maximum emission level. The test distance between the EUT and the receiving antenna are 3m. To find the maximum emission, the polarization of the receiving antenna is changed in horizontal and vertical polarization; the position of the EUT was changed in different orthogonal determinations.

ANSI C63.4-2009 Section 8 “Radiated Emissions Testing”

Measurement procedures for electric field radiated emissions above 1 GHz are covered in Clause 8 of ANSI C63.4-2009. The ANSI C63.4-2009 measurement procedure consists of both an exploratory test and a final measurement. The exploratory test is critical to determine the frequency of all significant emissions. For each mode of operation required to be tested, the frequency spectrum is monitored. Variations in antenna height, antenna orientation, antenna polarization, EUT azimuth, and cable or wire placement is explored to produce the emission that has the highest amplitude relative to the limit.

The final measurements are made based on the findings in the exploratory testing. When making exploratory and final measurements it is necessary to maximize the measured radiated emission. Subclause 8.3.1.2 of ANSI C63.4-2009 states that the measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” We consider the “cone of radiation” to be the 3 dB beam width of the measurement antenna.

While the “bore-sighting” technique is not explicitly mentioned in ANSI C63.4-2009, it is a useful technique for measurements using a directional antenna, such as a double-ridged waveguide antenna. Several precautions must be observed, including: knowledge of the beam width of the antenna and the resulting illumination area relative to the size of the EUT, estimation for source of the emission and general location within larger EUTS, measuring system sensitivity, etc.

ANSI C63.4-2009 requires that the measurement antenna is kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. That means that if the directional radiation pattern of the EUT results in a maximum emission at an upwards angle from the EUT, when a directional antenna is used to make the measurement it will be necessary for it to be pointed towards the source of the emission within the EUT. This can be done by either pointing the antenna at an angle towards the source of the emission, or by rotating the EUT, in both height and polarization, to maximize the measured emission. The emission must be kept within the illumination area of the 3 dB beamwidth of the antenna so that the maximum emission from the EUT is measured.

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

Radiated emissions test characteristics	
Frequency range	30 MHz - 4,000 MHz
Test distance	3 m*
Test instrumentation resolution bandwidth	120 kHz (30 MHz - 1,000 MHz)
	1 MHz (1000 MHz - 4,000 MHz)
Receive antenna scan height	1 m - 4 m
Receive antenna polarization	Vertical/horizontal

* According to Section 15.31 (f) (1): At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

8.4.4 Calculation of the field strength

The field strength is calculated by the following calculation:

Corrected Level = Receiver Level + Correction Factor (without the use of a pre-amplifier)

Corrected Level = Receiver Level + Correction Factor – Pre-amplifier (with the use of a pre-amplifier)

Receiver Level : Receiver reading without correction factors
Correction Factor : Antenna factor + cable loss

For example:

The receiver reading is 32.7 dB μ V. The antenna factor for the measured frequency is +2.5 dB (1/m) and the cable factor for the measured frequency is 0.71 dB, giving a field strength of 35.91dB μ V/m.

The 35.91dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

Level in μ V/m = Common Antilogarithm (35.91/20) = 39.8

For test distance other than what is specified, but fulfilling the requirements of Section 15.31 (f) (1) the field strength is calculated by adding additionally an extrapolation factor of 20 dB/decade (inverse linear distance for field strength measurements).

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

8.4.5 Result

win master Channel 1: 912.997284 MHz

FUNDAMENTAL EMISSION & HARMONICS (Section 15.249)										
f (MHz)	Bandwidth (kHz), Type of detector	Noted receiver level dBμV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBμV/m	Limit dBμV/m @ meter	Margin dBμV/m	Polaris. EUT / antenna orientation height/cm	
912.997284	QPK/120 kHz	86.5	3	4.6* ⁶	0	91.1	94.0 @ 3	2.9	V, 0°	141
1825.994568	AV/1 MHz	36.6	3	11.1* ⁷	0	47.7	54.0 @ 3	6.3	V, 0°	114
2738.991852	AV/1 MHz	40.6	3	9.8* ⁷	0	50.4	54.0 @ 3	3.6	H, 60°	152
3651.989136	AV/1 MHz	≤ 10	3	13.7* ⁷	0	23.7	54.0 @ 3	30.3	H/V	100-400
4564.98642	AV/1 MHz	≤ 10	3	18.0* ⁷	0	28.0	54.0 @ 3	26.0	H/V	100-400
5477.983704	AV/1 MHz	≤ 10	3	22.8* ⁷	0	32.8	54.0 @ 3	21.2	H/V	100-400
6390.980988	AV/1 MHz	≤ 14	3	24.3* ⁷	0	38.6	54.0 @ 3	15.4	H/V	100-400
7303.978272	AV/1 MHz	≤ 14	3	12.9* ⁷	0	26.9	54.0 @ 3	27.1	H/V	100-400
8216.975556	AV/1 MHz	≤ 14	3	14.0* ⁷	0	28.0	54.0 @ 3	26.0	H/V	100-400
9129.972840	AV/1 MHz	≤ 14	3	16.0* ⁷	0	30.0	54.0 @ 3	24.0	H/V	100-400
Measurement uncertainty			4 dB							

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBμV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBμV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBμV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBμV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBμV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win master Channel 4: 916.996307 MHz

FUNDAMENTAL EMISSION & HARMONICS (Section 15.249)										
f (MHz)	Bandwidth (kHz), Type of detector	Noted receiver level dBμV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBμV/m	Limit dBμV/m @ meter	Margin dBμV/m	Polaris. EUT / antenna orientation height/cm	
916.996307	QPK/120 kHz	86.5	3	4.6 ^{*6}	0	91.1	94.0 @ 3	2.9	V, 0°	141
1833.992614	AV/1 MHz	36.6	3	11.1 ^{*7}	0	47.7	54.0 @ 3	6.3	V, 0°	114
2750.988921	AV/1 MHz	40.6	3	9.8 ^{*7}	0	50.4	54.0 @ 3	3.6	H, 60°	152
3667.985228	AV/1 MHz	≤ 10	3	13.7 ^{*7}	0	23.7	54.0 @ 3	30.3	H/V	100-400
4584.981535	AV/1 MHz	≤ 10	3	18.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400
5501.977842	AV/1 MHz	≤ 10	3	22.8 ^{*7}	0	32.8	54.0 @ 3	21.2	H/V	100-400
6418.974149	AV/1 MHz	≤ 14	3	24.3 ^{*7}	0	38.6	54.0 @ 3	15.4	H/V	100-400
7335.970456	AV/1 MHz	≤ 14	3	12.9 ^{*7}	0	26.9	54.0 @ 3	27.1	H/V	100-400
8252.966763	AV/1 MHz	≤ 14	3	14.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400
9169.96307	AV/1 MHz	≤ 14	3	16.0 ^{*7}	0	30.0	54.0 @ 3	24.0	H/V	100-400
Measurement uncertainty			4 dB							

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: ^{*1} noise floor noise level of the measuring instrument ≤ 4.0dBμV @ 10m distance (0.009 MHz – 30 MHz)
- Remark: ^{*2} noise floor noise level of the measuring instrument ≤ 3.5dBμV @ 3m distance (30 – 1,000 MHz)
- Remark: ^{*3} noise floor noise level of the measuring instrument ≤ 4.5dBμV @ 3m distance (1,000 – 2,000 MHz)
- Remark: ^{*4} noise floor noise level of the measuring instrument ≤ 10dBμV @ 3m distance (2,000 – 5,500 MHz)
- Remark: ^{*5} noise floor noise level of the measuring instrument ≤ 14dBμV @ 3m distance (5,500 – 14,500 MHz)
- Remark: ^{*6} for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: ^{*7} for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win master Channel 1: 912.997284 MHz

SPURIOUS RADIATION (Section 15.209)									
f (MHz)	Bandwidth (kHz) Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m	Margin dBµV/m	Polarisation EUT / antenna orientation
0.1200	0.2, PK	< 4.0	10	20.2	-59.1	-34.9	46.0 @ 300 m	80.90	V, H/0-360°
	0.2, AV	< 4.0	10	20.2	-59.1	-34.9	26.0 @ 300 m	80.90	V, H/0-360°
0.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	33.6 @ 30 m	28.5	V, H/0-360°
1.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	24.1 @ 30 m	19.00	V, H/0-360°
3.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
5.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
8.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
10.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
20.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
30.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
35.0000	100, AV	≤ 3.5	3	-3.1* ⁶	0	0	0.4	40.0	H,V/H,V
88.0000	100, AV	≤ 3.5	3	-10.8* ⁶	0	-7.3	40.0	47.3	H,V/H,V
216.0000	100, AV	≤ 3.5	3	-10.3* ⁶	0	-6.8	43.5	50.3	H,V/H,V
960.0000	100, AV	≤ 3.5	3	8.5* ⁶	0	12.0	43.5	31.5	H,V/H,V
1700.0000	1000, AV	≤ 4.5	3	3.8* ⁷	0	8.3	54.0	45.7	H,V/H,V
2250.0000	1000, AV	≤ 10	3	8.0* ⁷	0	18.0	54.0	36.0	H,V/H,V
4000.0000	1000, AV	≤ 10	3	8.4* ⁷	0	18.4	54.0	35.6	H,V/H,V
5000.0000	1000, AV	≤ 10	3	9.1* ⁷	0	19.4	54.0	34.6	H,V/H,V
7500.0000	1000, AV	≤ 14	3	12.9* ⁷	0	26.9	54.0	27.1	H,V/H,V
8300.0000	1000, AV	≤ 14	3	14.0* ⁷	0	28.8	54.0	25.2	H,V/H,V
9400.0000	1000, AV	≤ 14	3	16.0* ⁷	0	30.0	54.0	24.0	H,V/H,V
All other emissions than harmonics are lower than the noise level of the measuring equipment!									
Measurement uncertainty			4 dB						

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz – 30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win master Channel 4: 916.996307 MHz

SPURIOUS RADIATION (Section 15.209)									
f (MHz)	Bandwidth (kHz) Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m	Margin dBµV/m	Polarisation EUT / antenna orientation
0.1200	0.2, PK	< 4.0	10	20.2	-59.1	-34.9	46.0 @ 300 m	80.90	V, H/0-360°
	0.2, AV	< 4.0	10	20.2	-59.1	-34.9	26.0 @ 300 m	80.90	V, H/0-360°
0.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	33.6 @ 30 m	28.5	V, H/0-360°
1.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	24.1 @ 30 m	19.00	V, H/0-360°
3.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
5.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
8.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
10.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
20.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
30.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
35.0000	100, AV	≤ 3.5	3	-3.1* ⁶	0	0	0.4	40.0	H,V/H,V
88.0000	100, AV	≤ 3.5	3	-10.8* ⁶	0	-7.3	40.0	47.3	H,V/H,V
216.0000	100, AV	≤ 3.5	3	-10.3* ⁶	0	-6.8	43.5	50.3	H,V/H,V
960.0000	100, AV	≤ 3.5	3	8.5* ⁶	0	12.0	43.5	31.5	H,V/H,V
1700.0000	1000, AV	≤ 4.5	3	3.8* ⁷	0	8.3	54.0	45.7	H,V/H,V
2250.0000	1000, AV	≤ 10	3	8.0* ⁷	0	18.0	54.0	36.0	H,V/H,V
4000.0000	1000, AV	≤ 10	3	8.4* ⁷	0	18.4	54.0	35.6	H,V/H,V
5000.0000	1000, AV	≤ 10	3	9.1* ⁷	0	19.4	54.0	34.6	H,V/H,V
7500.0000	1000, AV	≤ 14	3	12.9* ⁷	0	26.9	54.0	27.1	H,V/H,V
8300.0000	1000, AV	≤ 14	3	14.0* ⁷	0	28.8	54.0	25.2	H,V/H,V
9400.0000	1000, AV	≤ 14	3	16.0* ⁷	0	30.0	54.0	24.0	H,V/H,V
All other emissions than harmonics are lower than the noise level of the measuring equipment!									
Measurement uncertainty			4 dB						

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz – 30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

reflect master Channel 1: 912.997284 MHz

FUNDAMENTAL EMISSION & HARMONICS (Section 15.249)

f (MHz)	Bandwidth (kHz), Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m @ meter	Margin dBµV/m	Polaris. EUT / antenna orientation height/cm		
912.997284	QPK/120 kHz	86.0	3	4.6^{*6}	0	90.6	94.0 @ 3	3.4	V, 0°	145	
1825.994568	AV/1 MHz	35.3	3	11.1^{*7}	0	46.4	54.0 @ 3	7.6	V, 0°	110	
2738.991852	AV/1 MHz	39.5	3	9.8^{*7}	0	49.3	54.0 @ 3	4.7	V, 30°	161	
3651.989136	AV/1 MHz	≤ 10	3	13.7 ^{*7}	0	23.7	54.0 @ 3	30.3	H/V	100-400	
4564.98642	AV/1 MHz	≤ 10	3	18.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400	
5477.983704	AV/1 MHz	≤ 10	3	22.8 ^{*7}	0	32.8	54.0 @ 3	21.2	H/V	100-400	
6390.980988	AV/1 MHz	≤ 14	3	24.3 ^{*7}	0	38.6	54.0 @ 3	15.4	H/V	100-400	
7303.978272	AV/1 MHz	≤ 14	3	12.9 ^{*7}	0	26.9	54.0 @ 3	27.1	H/V	100-400	
8216.975556	AV/1 MHz	≤ 14	3	14.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400	
9129.972840	AV/1 MHz	≤ 14	3	16.0 ^{*7}	0	30.0	54.0 @ 3	24.0	H/V	100-400	
Measurement uncertainty			4 dB								

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

reflect master Channel 4: 916.996307 MHz

FUNDAMENTAL EMISSION & HARMONICS (Section 15.249)

f (MHz)	Bandwidth (kHz), Type of detector	Noted receiver level dBμV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBμV/m	Limit dBμV/m @ meter	Margin dBμV/m	Polaris. EUT / antenna orientation height/cm		
916.996307	QPK/120 kHz	85.9	3	4.6 ^{*6}	0	90.5	94.0 @ 3	3.5	V, 0°	145	
1833.992614	AV/1 MHz	35.7	3	11.1 ^{*7}	0	46.8	54.0 @ 3	7.2	V, 0°	110	
2750.988921	AV/1 MHz	39.0	3	9.8 ^{*7}	0	48.8	54.0 @ 3	5.2	V, 30°	161	
3667.985228	AV/1 MHz	≤ 10	3	13.7 ^{*7}	0	23.7	54.0 @ 3	30.3	H/V	100-400	
4584.981535	AV/1 MHz	≤ 10	3	18.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400	
5501.977842	AV/1 MHz	≤ 10	3	22.8 ^{*7}	0	32.8	54.0 @ 3	21.2	H/V	100-400	
6418.974149	AV/1 MHz	≤ 14	3	24.3 ^{*7}	0	38.6	54.0 @ 3	15.4	H/V	100-400	
7335.970456	AV/1 MHz	≤ 14	3	12.9 ^{*7}	0	26.9	54.0 @ 3	27.1	H/V	100-400	
8252.966763	AV/1 MHz	≤ 14	3	14.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400	
9169.96307	AV/1 MHz	≤ 14	3	16.0 ^{*7}	0	30.0	54.0 @ 3	24.0	H/V	100-400	
Measurement uncertainty			4 dB								

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: ^{*1} noise floor noise level of the measuring instrument ≤ 4.0dBμV @ 10m distance (0.009 MHz – 30 MHz)
- Remark: ^{*2} noise floor noise level of the measuring instrument ≤ 3.5dBμV @ 3m distance (30 – 1,000 MHz)
- Remark: ^{*3} noise floor noise level of the measuring instrument ≤ 4.5dBμV @ 3m distance (1,000 – 2,000 MHz)
- Remark: ^{*4} noise floor noise level of the measuring instrument ≤ 10dBμV @ 3m distance (2,000 – 5,500 MHz)
- Remark: ^{*5} noise floor noise level of the measuring instrument ≤ 14dBμV @ 3m distance (5,500 – 14,500 MHz)
- Remark: ^{*6} for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: ^{*7} for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

reflect master Channel 1: 912.997284 MHz

SPURIOUS RADIATION (Section 15.209)									
f (MHz)	Bandwidth (kHz) Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m	Margin dBµV/m	Polarisation EUT / antenna orientation
0.1200	0.2, PK	< 4.0	10	20.2	-59.1	-34.9	46.0 @ 300 m	80.90	V, H/0-360°
	0.2, AV	< 4.0	10	20.2	-59.1	-34.9	26.0 @ 300 m	80.90	V, H/0-360°
0.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	33.6 @ 30 m	28.5	V, H/0-360°
1.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	24.1 @ 30 m	19.00	V, H/0-360°
3.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
5.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
8.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
10.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
20.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
30.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
35.0000	100, AV	≤ 3.5	3	-3.1* ⁶	0	0	0.4	40.0	H,V/H,V
88.0000	100, AV	≤ 3.5	3	-10.8* ⁶	0	-7.3	40.0	47.3	H,V/H,V
216.0000	100, AV	≤ 3.5	3	-10.3* ⁶	0	-6.8	43.5	50.3	H,V/H,V
960.0000	100, AV	≤ 3.5	3	8.5* ⁶	0	12.0	43.5	31.5	H,V/H,V
1700.0000	1000, AV	≤ 4.5	3	3.8* ⁷	0	8.3	54.0	45.7	H,V/H,V
2250.0000	1000, AV	≤ 10	3	8.0* ⁷	0	18.0	54.0	36.0	H,V/H,V
4000.0000	1000, AV	≤ 10	3	8.4* ⁷	0	18.4	54.0	35.6	H,V/H,V
5000.0000	1000, AV	≤ 10	3	9.1* ⁷	0	19.4	54.0	34.6	H,V/H,V
7500.0000	1000, AV	≤ 14	3	12.9* ⁷	0	26.9	54.0	27.1	H,V/H,V
8300.0000	1000, AV	≤ 14	3	14.0* ⁷	0	28.8	54.0	25.2	H,V/H,V
9400.0000	1000, AV	≤ 14	3	16.0* ⁷	0	30.0	54.0	24.0	H,V/H,V
All other emissions than harmonics are lower than the noise level of the measuring equipment!									
Measurement uncertainty			4 dB						

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

reflect master Channel 4: 916.996307 MHz

SPURIOUS RADIATION (Section 15.209)									
f (MHz)	Bandwidth (kHz) Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m	Margin dBµV/m	Polarisation EUT / antenna orientation
0.1200	0.2, PK	< 4.0	10	20.2	-59.1	-34.9	46.0 @ 300 m	80.90	V, H/0-360°
	0.2, AV	< 4.0	10	20.2	-59.1	-34.9	26.0 @ 300 m	80.90	V, H/0-360°
0.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	33.6 @ 30 m	28.5	V, H/0-360°
1.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	24.1 @ 30 m	19.00	V, H/0-360°
3.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
5.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
8.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
10.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
20.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
30.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
35.0000	100, AV	≤ 3.5	3	-3.1* ⁶	0	0	0.4	40.0	H,V/H,V
88.0000	100, AV	≤ 3.5	3	-10.8* ⁶	0	-7.3	40.0	47.3	H,V/H,V
216.0000	100, AV	≤ 3.5	3	-10.3* ⁶	0	-6.8	43.5	50.3	H,V/H,V
960.0000	100, AV	≤ 3.5	3	8.5* ⁶	0	12.0	43.5	31.5	H,V/H,V
1700.0000	1000, AV	≤ 4.5	3	3.8* ⁷	0	8.3	54.0	45.7	H,V/H,V
2250.0000	1000, AV	≤ 10	3	8.0* ⁷	0	18.0	54.0	36.0	H,V/H,V
4000.0000	1000, AV	≤ 10	3	8.4* ⁷	0	18.4	54.0	35.6	H,V/H,V
5000.0000	1000, AV	≤ 10	3	9.1* ⁷	0	19.4	54.0	34.6	H,V/H,V
7500.0000	1000, AV	≤ 14	3	12.9* ⁷	0	26.9	54.0	27.1	H,V/H,V
8300.0000	1000, AV	≤ 14	3	14.0* ⁷	0	28.8	54.0	25.2	H,V/H,V
9400.0000	1000, AV	≤ 14	3	16.0* ⁷	0	30.0	54.0	24.0	H,V/H,V
All other emissions than harmonics are lower than the noise level of the measuring equipment!									
Measurement uncertainty			4 dB						

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win slave /reflect slave Channel 1: 912.997284 MHz

FUNDAMENTAL EMISSION & HARMONICS (Section 15.249)

f (MHz)	Bandwidth (kHz), Type of detector	Noted receiver level dBμV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBμV/m	Limit dBμV/m @ meter	Margin dBμV/m	Polaris. EUT / antenna orientation height/cm		
912.997284	QPK/120 kHz	84.9	3	4.6 ^{*6}	0	89.5	94.0 @ 3	4.5	V, 0°	140	
1825.994568	AV/1 MHz	32.1	3	11.1 ^{*7}	0	43.2	54.0 @ 3	10.8	V, 0°	117	
2738.991852	AV/1 MHz	35.7	3	9.8 ^{*7}	0	45.5	54.0 @ 3	8.5	V, 95°	156	
3651.989136	AV/1 MHz	≤ 10	3	13.7 ^{*7}	0	23.7	54.0 @ 3	30.3	H/V	100-400	
4564.98642	AV/1 MHz	≤ 10	3	18.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400	
5477.983704	AV/1 MHz	≤ 10	3	22.8 ^{*7}	0	32.8	54.0 @ 3	21.2	H/V	100-400	
6390.980988	AV/1 MHz	≤ 14	3	24.3 ^{*7}	0	38.6	54.0 @ 3	15.4	H/V	100-400	
7303.978272	AV/1 MHz	≤ 14	3	12.9 ^{*7}	0	26.9	54.0 @ 3	27.1	H/V	100-400	
8216.975556	AV/1 MHz	≤ 14	3	14.0 ^{*7}	0	28.0	54.0 @ 3	26.0	H/V	100-400	
9129.972840	AV/1 MHz	≤ 14	3	16.0 ^{*7}	0	30.0	54.0 @ 3	24.0	H/V	100-400	
Measurement uncertainty			4 dB								

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: ^{*1} noise floor noise level of the measuring instrument ≤ 4.0dBμV @ 10m distance (0.009 MHz –30 MHz)
- Remark: ^{*2} noise floor noise level of the measuring instrument ≤ 3.5dBμV @ 3m distance (30 – 1,000 MHz)
- Remark: ^{*3} noise floor noise level of the measuring instrument ≤ 4.5dBμV @ 3m distance (1,000 – 2,000 MHz)
- Remark: ^{*4} noise floor noise level of the measuring instrument ≤ 10dBμV @ 3m distance (2,000 – 5,500 MHz)
- Remark: ^{*5} noise floor noise level of the measuring instrument ≤ 14dBμV @ 3m distance (5,500 – 14,500 MHz)
- Remark: ^{*6} for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: ^{*7} for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win slave /reflect slave Channel 4: 916.996307 MHz

FUNDAMENTAL EMISSION & HARMONICS (Section 15.249)

f (MHz)	Bandwidth (kHz), Type of detector	Noted receiver level dBμV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBμV/m	Limit dBμV/m @ meter	Margin dBμV/m	Polaris. EUT / antenna orientation height/cm		
916.996307	QPK/120 kHz	84.7	3	4.6* ⁶	0	89.3	94.0 @ 3	4.7	V, 0°	140	
1833.992614	AV/1 MHz	32.6	3	11.1* ⁷	0	43.7	54.0 @ 3	10.3	V, 0°	117	
2750.988921	AV/1 MHz	35.0	3	9.8* ⁷	0	44.8	54.0 @ 3	9.2	V, 95°	156	
3667.985228	AV/1 MHz	≤ 10	3	13.7* ⁷	0	23.7	54.0 @ 3	30.3	H/V	100-400	
4584.981535	AV/1 MHz	≤ 10	3	18.0* ⁷	0	28.0	54.0 @ 3	26.0	H/V	100-400	
5501.977842	AV/1 MHz	≤ 10	3	22.8* ⁷	0	32.8	54.0 @ 3	21.2	H/V	100-400	
6418.974149	AV/1 MHz	≤ 14	3	24.3* ⁷	0	38.6	54.0 @ 3	15.4	H/V	100-400	
7335.970456	AV/1 MHz	≤ 14	3	12.9* ⁷	0	26.9	54.0 @ 3	27.1	H/V	100-400	
8252.966763	AV/1 MHz	≤ 14	3	14.0* ⁷	0	28.0	54.0 @ 3	26.0	H/V	100-400	
9169.96307	AV/1 MHz	≤ 14	3	16.0* ⁷	0	30.0	54.0 @ 3	24.0	H/V	100-400	
Measurement uncertainty			4 dB								

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBμV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBμV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBμV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBμV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBμV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win slave /reflect slave Channel 1: 912.997284 MHz

SPURIOUS RADIATION (Section 15.209)									
f (MHz)	Bandwidth (kHz) Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m	Margin dBµV/m	Polarisation EUT / antenna orientation
0.1200	0.2, PK	< 4.0	10	20.2	-59.1	-34.9	46.0- @ 300 m	80.90	V, H/0-360°
	0.2, AV	< 4.0	10	20.2	-59.1	-34.9	26.0 @ 300 m	80.90	V, H/0-360°
0.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	33.6 @ 30 m	28.5	V, H/0-360°
1.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	24.1 @ 30 m	19.00	V, H/0-360°
3.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
5.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
8.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
10.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
20.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
30.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
35.0000	100, AV	≤ 3.5	3	-3.1* ⁶	0	0	0.4	40.0	H,V/H,V
88.0000	100, AV	≤ 3.5	3	-10.8* ⁶	0	-7.3	40.0	47.3	H,V/H,V
216.0000	100, AV	≤ 3.5	3	-10.3* ⁶	0	-6.8	43.5	50.3	H,V/H,V
960.0000	100, AV	≤ 3.5	3	8.5* ⁶	0	12.0	43.5	31.5	H,V/H,V
1700.0000	1000, AV	≤ 4.5	3	3.8* ⁷	0	8.3	54.0	45.7	H,V/H,V
2250.0000	1000, AV	≤ 10	3	8.0* ⁷	0	18.0	54.0	36.0	H,V/H,V
4000.0000	1000, AV	≤ 10	3	8.4* ⁷	0	18.4	54.0	35.6	H,V/H,V
5000.0000	1000, AV	≤ 10	3	9.1* ⁷	0	19.4	54.0	34.6	H,V/H,V
7500.0000	1000, AV	≤ 14	3	12.9* ⁷	0	26.9	54.0	27.1	H,V/H,V
8300.0000	1000, AV	≤ 14	3	14.0* ⁷	0	28.8	54.0	25.2	H,V/H,V
9400.0000	1000, AV	≤ 14	3	16.0* ⁷	0	30.0	54.0	24.0	H,V/H,V
All other emissions than harmonics are lower than the noise level of the measuring equipment!									
Measurement uncertainty			4 dB						

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

EUT: WIN1
FCC ID: ZGHWIN1

Date of issue: 2011-05-23

win slave /reflect slave Channel 4: 916.996307 MHz

SPURIOUS RADIATION (Section 15.209)									
f (MHz)	Bandwidth (kHz) Type of detector	Noted receiver level dBµV	Test distance m	Correction factor dB	Distance extrapol. factor dB	Level corrected dBµV/m	Limit dBµV/m	Margin dBµV/m	Polarisation EUT / antenna orientation
0.1200	0.2, PK	< 4.0	10	20.2	-59.1	-34.9	46.0- @ 300 m	80.90	V, H/0-360°
	0.2, AV	< 4.0	10	20.2	-59.1	-34.9	26.0 @ 300 m	80.90	V, H/0-360°
0.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	33.6 @ 30 m	28.5	V, H/0-360°
1.5000	0.2, AV	< 4.0	10	20.2	-19.1	5.1	24.1 @ 30 m	19.00	V, H/0-360°
3.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
5.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
8.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
10.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
20.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
30.0000	9, AV	< 4.0	10	20.2	-19.1	5.1	29.5 @ 30 m	24.4	V, H/0-360°
35.0000	100, AV	≤ 3.5	3	-3.1* ⁶	0	0	0.4	40.0	H,V/H,V
88.0000	100, AV	≤ 3.5	3	-10.8* ⁶	0	-7.3	40.0	47.3	H,V/H,V
216.0000	100, AV	≤ 3.5	3	-10.3* ⁶	0	-6.8	43.5	50.3	H,V/H,V
960.0000	100, AV	≤ 3.5	3	8.5* ⁶	0	12.0	43.5	31.5	H,V/H,V
1700.0000	1000, AV	≤ 4.5	3	3.8* ⁷	0	8.3	54.0	45.7	H,V/H,V
2250.0000	1000, AV	≤ 10	3	8.0* ⁷	0	18.0	54.0	36.0	H,V/H,V
4000.0000	1000, AV	≤ 10	3	8.4* ⁷	0	18.4	54.0	35.6	H,V/H,V
5000.0000	1000, AV	≤ 10	3	9.1* ⁷	0	19.4	54.0	34.6	H,V/H,V
7500.0000	1000, AV	≤ 14	3	12.9* ⁷	0	26.9	54.0	27.1	H,V/H,V
8300.0000	1000, AV	≤ 14	3	14.0* ⁷	0	28.8	54.0	25.2	H,V/H,V
9400.0000	1000, AV	≤ 14	3	16.0* ⁷	0	30.0	54.0	24.0	H,V/H,V
All other emissions than harmonics are lower than the noise level of the measuring equipment!									
Measurement uncertainty			4 dB						

Blue marked: restricted bands

Bandwidth = the measuring receiver bandwidth

- Remark: *¹ noise floor noise level of the measuring instrument ≤ 4.0dBµV @ 10m distance (0.009 MHz –30 MHz)
- Remark: *² noise floor noise level of the measuring instrument ≤ 3.5dBµV @ 3m distance (30 – 1,000 MHz)
- Remark: *³ noise floor noise level of the measuring instrument ≤ 4.5dBµV @ 3m distance (1,000 – 2,000 MHz)
- Remark: *⁴ noise floor noise level of the measuring instrument ≤ 10dBµV @ 3m distance (2,000 – 5,500 MHz)
- Remark: *⁵ noise floor noise level of the measuring instrument ≤ 14dBµV @ 3m distance (5,500 – 14,500 MHz)
- Remark: *⁶ for using a pre-amplifier in the range between 100 kHz and 1,000 MHz
- Remark: *⁷ for using a pre-amplifier in the range between 1.0 GHz and 18.0 GHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Page no.
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N.t.* See page no. 36

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8.5 Bandwidth (20 dB)

8.5.1 Regulation

(c) The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. For devices operating above 900 MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20 dB down from the modulated carrier.

8.5.2 Calculation of the 20 dB bandwidth limit

The 20 dB bandwidth limit = $0.005 * 912.99 \text{ MHz} = 4.565 \text{ MHz}$

8.5.3 Test equipment

Type	Manufacturer/ Model no.	Serial no.	Last calibration	Next calibration	Calibration executed by
Receiver (9 kHz –30.0 GHz)	Rohde & Schwarz Spectrum Analyzer FSV 30 (502)	100932	2011/04	2012/04	Rohde & Schwarz
signal generator (10 kHz –5.4 GHz)	Marconi Instruments Low noise signal generator 2042 (6)	119347/003	2011/01	2012/01	Rohde & Schwarz
Frequency counter (10MHz -26.5GHz)	Hewlett & Packard 5351A Microwave frequency counter (130)	2432A00054	2010/09	2011/09	Rohde & Schwarz
Frequency reference	Schomandl Frequency normal FN77-OCXO	F-Nr. 10-025	2011/03	2012/03	Dudde
RF- cable	Sucoflex 104 P Suhner 2,13m [APC 3.5]	K17a	2011/03	2012/03	Dudde
RF- cable	Sucoflex 104 P Suhner 2,13m [APC 3.5]	K18a	2011/03	2012/03	Dudde
Test fixture	Dudde	---	2011/04	2012/04	Dudde

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8.5.4 Test procedure

ANSI C63.4-2009 Section 13.1.7 Occupied bandwidth measurements. The bandwidth is measured at an amplitude level reduced from the reference level by a specified ratio. The reference level is the level of the highest amplitude signal observed from the transmitter at either the fundamental frequency or first-order modulation products in all typical modes of operation, including the unmodulated carrier, even if atypical. Once the reference level is established, the equipment is conditioned with typical modulating signals to produce worst-case (i.e., the widest) bandwidth. In order to measure the modulated signal properly, a resolution bandwidth that is small compared to the bandwidth required by the procuring or regulatory agency shall be used on the measuring instrument. However, the 6 dB resolution bandwidth of the measuring instrument shall be set to a value greater than 5% of the bandwidth requirements.

8.5.5 Test result

The maximum measured 20 dB bandwidth of the WIN1 module in any combination with a host device is:

89.7 kHz

The equipment meets the requirements	Yes	No	N.t.
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Further test results are attached	Yes	No	Annex No. 3
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N.t.* See page no. 36

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9. Additional information to the test report

Remarks

- | | |
|-------------------|---|
| N.t. ¹ | Not tested, because the antenna is part of the PCB |
| N.t. ² | Not tested, because the EUT is directly battery powered |
| N.t. ³ | Not tested, because not applicable to the EUT |
| N.t. ⁴ | Not tested, because not ordered |

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End of test report