



Date 2007-08-28

Reference F711820-F27 Page 1 (2) NED4C REDITE 1002 ISO/IEC 17025

Handled by, department Jonas Bremholt Electronics +46 10 516 54 38, jonas.bremholt@sp.se

ERICSSON AB Pehr-Åke Bergström PDU WCDMA RAN Färögatan 6 164 80 Stockholm

Permissible change measurements on WCDMA Base Station 1700/2100 MHz Radio Unit with FCC ID: TA8AKRC11829-2 (3 appendices)

Test object

Radio Unit KRC 118 29/2 rev R1B

Summary

Standard	Compliant	Appendix	Remarks
FCC CFR 47			
2.1053 Field strength of spurious radiation	Yes	2	-8

SP Sveriges Tekniska Forskningsinstitut Electronics - EMC

Jan Welinder Technical Manager

Jonas Bremholt Technical Officer

SP Technical Research Institute of Sweden

Postal address SP Box 857 SE-501 15 Boràs SWEDEN Office location Västeråsen Brinellgatan 4 SE-504 62 Borås SWEDEN Phone / Fax / E-mail +46 10 516 50 00 +46 33 13 55 02 info@sp.se Laboratories are accredited by the Swedish Board for Accreditation and Conformity Assessment (SWEDAC) under the terms of Swedish legislation. This report may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.



FCC ID: TA8AKRC11829-2

Table of contents	
Description of the test object	Appendix 1
Operation mode during measurements	Appendix 1
Purpose of test	Appendix 1
Test setups	Appendix 1
Field strength of spurious radiation	Appendix 2
Photos	Appendix 3



FCC ID: TA8AKRC11829-2

Appendix 1

Description – **Test object**

Equipment:WCDMA Transceiver unit 1900 MHz, single and multi carrierTx Frequency range:2112.4-2152.6 MHzModulations:QPSK and 16QAMMaximum output power:Single carrier: 1x46 dBm (1x40W)
Multi carrier: 2x43 dBm (2x20W)

Nominal power voltage: -48 VDC

Tested channels

UARFCN	Frequency
1537	2112.4 MHz
1587	2122.4 MHz
1662	2137.4 MHz
1738	2152.6 MHZ

Operation mode during measurements

Test models

All measurements were performed with the test object configured with the test models 1 and 5 as defined in 3GPP TS 25.141. Test model 1 uses the QPSK modulation only, and test model 5 includes the 16QAM modulation.

The settings below were found to be representative for all traffic scenarios when several settings were tested to find the setting for worst case.

Radiated measurements

All radiated measurements were performed with the test object installed in a wooden rack without EMC shielding. This configuration represents worst case for radiated spurious emission measurements. The test object was powered with 48 VDC.

The RU unit were activated as Single Carrier 1x1 (1x46 dBm) and Multi Carrier 2x1 (2x43 dBm). The RF output power port were terminated with 50 ohm loads.

Downlink	1537	1537	1662	1662	1738	1738
	(2112.4	(2112.4	(2137.4	(2137.4	(2152.6	(2152.6
	MHz)	MHz)	MHz)	MHz)	MHz)	MHz)
Uplink	1312	1312	1437	1437	1513	1513
_	(1712.4	(1712.4	(1737.4	(1737.4	(1752.6	(1752.6
	MHz)	MHz)	MHz)	MHz)	MHz)	MHz)
Test model	1	5	1	5	1	5

The RU unit were allocated to the following UARFCN:

Test model 1: 64 DPCHs at 30 ksps (SF=128)

Test model 5: 30 DHCPs at 30 ksps (SF=128) and 8 HS-PDSCHs at 240 ksps (SF=16)



FCC ID: TA8AKRC11829-2

Appendix 1

Multi Carrier:

Cell	1	2
Downlink	1537	1587
	(2112,4	(2122,4
	MHz)	MHz)
Uplink	1312	1362
	(1712,4	(1722,4
	MHz)	MHz)
Test model	1	5

Test model 1: 32 DPCHs at 30 ksps (SF=128) Test model 5: 30 DHCPs at 30 ksps (SF=128) and 8 HS-PDSCHs at 240 ksps (SF=16)

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in FCC CFR 47.

References

Measurements were done according to relevant parts of the following standards: ANSI/TIA/EIA-603-B-2002 3GPP TS 25.141

Reservation

The test results in this report apply only to the particular test object as declared in the report.

Delivery of test object

The test object was delivered: 2007-06-25

Manufacturer's representative

Larry Lindström, Ericsson AB

Test engineers

Jonas Bremholt and Jörgen Wassholm

Test witness

Larry Lindström, Ericsson AB



FCC ID: TA8AKRC11829-2

Appendix 1

Test set-up, radiated measurements



Test object

- 1. RU KRC 118 29/2 Rev. R1B, Serial No: AE53676946 (FCC ID: TA8AKRC11829-2)
- 2. FU KRC 118 28/1 Rev. R1B, Serial No: A400389533

Functional test equipment

- 3. BB subrack with software CXP 901 1610/1 rev. P11AD02
- 4. RNC Sim CES 4780BA Mini-sim #33
- 5. Switch, Netgear Ethernet switch DS108
- 6. Computer, SunBlade (IOV S1)
- 7. Wooden rack
- 8. Terminator (50 ohn)
- 9. Non conductive table



FCC ID: TA8AKRC11829-2

Appendix 2

Field strength of spurious radiation measurements according to 47 CFR 2.1053

Date	Temperature	Humidity
2007-06-28 to 2007-06-29	21-23 °C ± 3 °C	51-58 % ± 5 %

Test set-up and procedure

The test site is listed at FCC, Columbia with registration number: 93866. The test site also complies with RSS 212, Issue 1, Industry Canada file no.:IC 3482. The transmitter was set up according to Test model 1 and Test model 5 during the

measurements. The antenna ports were terminated with 50 ohm loads.

The measurements were performed with both horizontal and vertical polarisation of the antenna. The antenna distance was 3 m in the frequency range 30 MHz - 18 GHz and 1m in the frequency range 18-22 GHz.

A pre-measurement was first performed:

In the frequency range 30 MHz-22 GHz the measurement was performed in power with a RBW of 1 MHz. A propagation loss in free space was calculated. The used formula was,

$$\gamma = 20 \log \left(\frac{4\pi D}{\lambda} \right)$$
, γ is the propagation loss and D is the antenna distance.

The measurement procedure was as the following:

- 1. The pre-measurement was first performed with peak detector. The EUT was measured in eight directions and with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.
- 2. Spurious radiation on frequencies closer than 20 dB to the limit is scanned 0-360 degrees and the antenna is scanned 1-4 m for maximum response. The emission is then measured with the RMS detector and the RMS value is reported, frequencies closer than 10 dB to the limit measured with the RMS detector was measured with the substitution method according to the standard.

Measurement equipment	Calibration Due	SP number
Test site	2008-11	503 881
R&S ESI 26	2007-09	503 292
Control computer	-	503 479
Software: R&S ES-K1, ver. 1.60	-	-
Chase Bilog antenna CBL 6111A	2008-11	503 182
EMCO Horn Antenna 3115	2007-11	502 175
ETS Lindgren 3116	2007-06	503 878
MITEQ Low Noise Amplifier	2007-08	503 285
Testo 615, Temperature and humidity meter	2007-09	503 505



FCC ID: TA8AKRC11829-2

Appendix 2

The test set-ups during the spurious radiation measurements are shown in the picture below.





FCC ID: TA8AKRC11829-2

Appendix 2

Results

Single carrier

	Spurious emission level (dBm)		
Frequency (MHz)	Vertical	Horizontal	
30-22 000	All emission > 20 dB below limit	All emission > 20 dB below limit	
Ν	leasurement uncertainty	4.7 dB	

Multi carrier

	Spurious emission level (dBm)		
Frequency (MHz)	Vertical	Horizontal	
30-22 000	All emission > 20 dB below limit	All emission > 20 dB below limit	
Ν	leasurement uncertainty	4.7 dB	

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10 \log P dB$.

Complies?	Yes



FCC ID: TA8AKRC11829-2

Appendix 3

Photos

Radio Unit KRC 118 29/2









FCC ID: TA8AKRC11829-2

Appendix 3



Right side

