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

Test object

Radio Unit KRC 118 29/2

Summary

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

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REPORT

FCC ID: TA8AKRC11829-2

Date
2007-03-23

Reference
F700107-F27

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Description – Test object

Equipment: WCDMA Radio Unit (RU) 2100 MHz, single and multi carrier

Tx Frequency range: 2112.4-2152.6 MHz

Modulations: QPSK and 16QAM

Maximum output power: Single carrier: 1x46 dBm (40W)
Multi carrier: 2x43 dBm (2x20W)

Nominal power voltage: -48 VDC

Tested channels

| UARFCN | Frequency |
|--------|------------|
| 1537 | 2112.4 MHz |
| 1637 | 2132.4 MHz |
| 1738 | 2152.6 MHz |

Operation mode during measurements

Test models

All measurements were performed with the test object transmitting the test model 1 defined in 3GPP TS 25.141.

Radiated measurements

All radiated measurements were performed with the test object installed in a RBS 2106i cabinet powered with 3-phase 208/120 VAC, 60 Hz. The cabinet was equipped with radio units for both GSM and WCDMA during the measurements. The used configuration represents worst case configuration.

The RU units were activated for maximum transmit power. The RU units were activated as Single Carrier 3x1. The RF output power ports were terminated with 50 ohm loads.

The RU units were allocated to the following UARFCN:

RF configuration: Single Carrier 3x1 40W(3 RU, 1x46 dBm)
Transmission: CBU (T1)

| RU | 1 | 2 | 3 |
|------------|----------------------|----------------------|----------------------|
| Downlink | 1537 (2112.4 MHz) | 1637 (2132.4 MHz) | 1738 (2152.6 MHz) |
| Uplink | 1312 (1712.4 MHz) | 1412 (1732.4 MHz) | 1513 (1752.6 MHz) |
| Test model | 1 | 1 | 1 |

16 DPCHs at 30 kps (SF=128)

GSM

Transmission: T1

| dTRU | ARFCN | Frequency | Modulation | Configuration |
|------|-------|-----------|------------|---------------|
| No 1 | 128 | 869.2 MHz | GMSK | Combined+TCC |
| | | | | - |
| No 2 | 153 | 874.2 MHz | GMSK | Combined |
| | 190 | 881.6 MHz | 8-PSK | Combined |
| No 3 | 226 | 888.8 MHz | GMSK | Uncombined |
| | 251 | 893.8 MHz | 8-PSK | Uncombined |

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in FCC CFR 47 with the test object is installed in an alternative RBS cabinet.

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: 2007-01-12

Manufacturer's representative

Larry Lindström, Ericsson AB

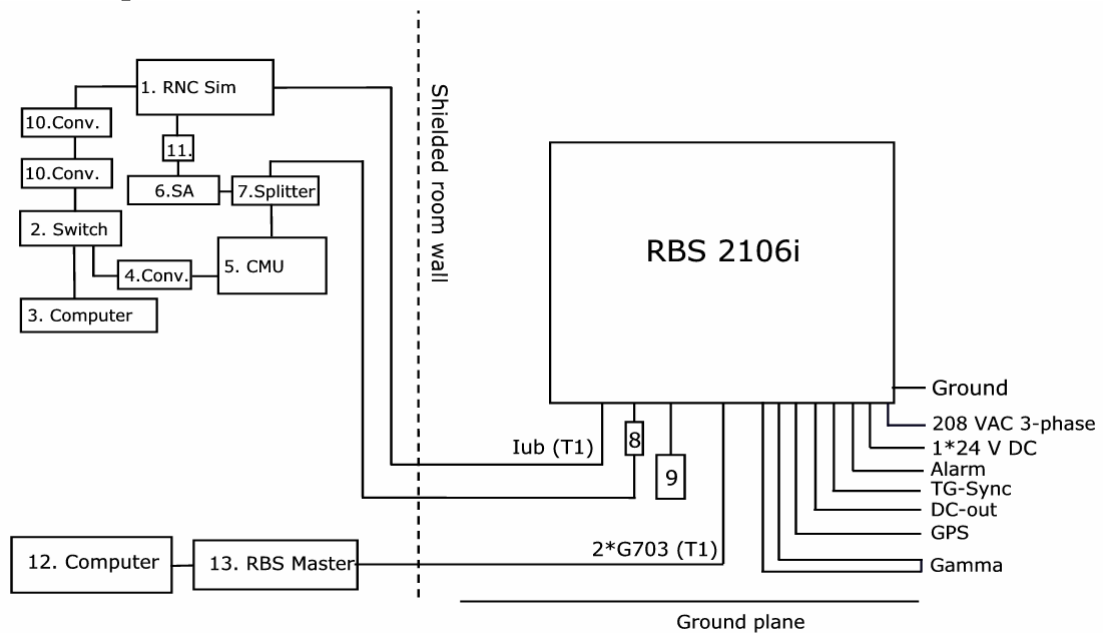
Test engineers

Jonas Bremholt, Nina Johansson and Jörgen Wassholm.

Test witnesses

Lars Hagbjörk, Christer Gustavsson and Behzad Nourparvar Ericsson AB

Appendix 1

Test set-up


More information about the RBS hardware units are shown in SP document F700107-H27

1. RNC Sim 4780 DA, mini-SIM#53, powered via isolation transformer
2. Fast Ethernet switch, Netgear
3. Computer SUN Microsystems Sun Blade 2500
4. Ethernet/GPIB converter, National Instrument
5. CMU 300, R & S, BAMS-1000290156
6. Spectrum analyzer, R & S, FSIQ 3, BAMS0000000401
7. Splitter, Mini circuit 15542, ZAPD-21
8. Attenuator
9. Dummy loads (50 ohm)
10. D-link media converter
11. Synchronization (10 MHz) with Isolation box
12. Computer, with software RBSMMI ver. R10A05 BAMS 1000208320
13. Ericsson RBS Master 2 LPY 107 1007/1 R1E/A 0000000104, software ver. R6A05

Interfaces:

Power: 208 VAC, 60 Hz

Antenna: Coaxial cables 50 ohm

GSM

G703: T1, shielded multi-wire with RJ-45 connector

TG-sync: Shielded multi-wire, 9-pin DSUB, terminated by DSUB

Alarm: Shielded multi-wire, 9-pin DSUB, unterminated

GPS: Shielded multi-wire, unterminated

WCDMA

Iub configured as T1 by CBU: Shielded multi-wire with RJ-45 connector (120 ohm)

Gamma: Shielded multi-wire

Mub: No cable

Test: No cable

Type of port:

AC mains

Antenna

Telecom

Signal

Signal

Signal

Telecom

Signal

Test purposes

Test purposes

Appendix 2

Field strength of spurious radiation measurements according to 47 CFR 2.1053

| | | |
|----------------------------------|--------------------------------|---------------------------|
| Date 2007-01-22 to 2007-01-25 | Temperature 21-22 °C ± 3 °C | Humidity 14-25 % ± 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 modulated with pseudorandom data 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,

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

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 average detector and the average value is reported, frequencies closer than 10 dB to the limit measured with the average detector was measured with the substitution method according to the standard.

| Measurement equipment | Calibration Due | SP number |
|--|-----------------|-----------|
| Test site, Tesla | 2008-11 | 503 881 |
| Spectrum analyzer R&S ESI 26 | 2007-07 | 503 292 |
| Control computer, Fujitsu Siemens | - | - |
| Software: R&S ES-K1, ver. 1.60 | - | 503 423 |
| Antenna Chase Bilog CBL 6111A | 2008-11 | 503 182 |
| Horn antenna EMCO 3115 | 2007-11 | 502 175 |
| Std gain horn, model 16240-25 | - | 503 939 |
| Std gain horn, model 18240-25 | - | 503 900 |
| Std gain horn, model 20240-20 | - | s/n 407 |
| Preamplifier Miteq, 0.1-26 GHz | 2007-08 | 503 285 |
| Temperature and humidity meter Testo 615 | 2007-09 | 503 505 |

Appendix 2

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



Results

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

Limits

§27.53 g) 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 |
|-----------|-----|