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MPE test on Ericsson RBS 6501 B12

(3 appendices)

Test object

Product name: RBS 6501 B12

Product number: KRD 901 112/X, see appendix 1 for details.

See appendix 1 for the tested hardware configuration and general information.

See appendix 3 for photos.

Summary

Standard	Compliant	Appendix	Remarks
FCC 47 CFR 2.1091 Radiofrequency radiation exposure evaluation: mobile devices	Yes	2	-
RSS-102 Radio Frequency Exposure compliance of Radio communication Apparatus, Issue 4	Yes	2	-
OET Bulletin 65/KDB447498 D01 v05r02	Yes	2	-

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Performed by

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Appendix 1

Measurement equipment

	Calibration Due	SP number
Test site Tesla	2017-01	503 881
Measurement software: Antennkalibrering V1.20	-	-
Calculation software: EMF 1.2	-	-
Laser probe AR FL7006	2014-07	901 492
Testo 625 Temperature and humidity meter	2014-06	504 188

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation "SP-QD 10885". The measurement uncertainties can be found in the table below. The uncertainties are calculated with a coverage factor $k=2$ (95% level of confidence).

Standard	Method	Uncertainty
FCC 47 CFR 2.1091 and RSS-102	RF exposure evaluation	10 %, Note

Note: Stated uncertainty refers to the calculated distance.

Compliance evaluation is based on a shared risk principle with respect to the measurement uncertainty.

Purpose of test

The tests were performed to verify that the radiofrequency exposure of the RBS 6501 meets the requirements of 47 CFR 2.1091 and RSS-102.

Description of the test object

The test object is a Radio Base Station configured in Single RAT mode for LTE designed to provide mobile users with a connection to a mobile network.

The test scope covers the following models of test objects:

Product number: KRD 901 112/1, 100-250 VAC integrated antenna
Product number: KRD 901 112/2, -48 VDC integrated antenna
Product number: KRD 901 112/3, 100-250 VAC no integrated antenna
Product number: KRD 901 112/4, -48 VDC no integrated antenna

FCC ID: TA8AKRD901112
IC ID: 287AB-AS901112

IC model numbers:
IC MODEL NO: AS9011121
IC MODEL NO: AS9011122
IC MODEL NO: AS9011123
IC MODEL NO: AS9011124

Appendix 1

Delivery of test object

The test object was delivered: 2014-06-10.

Test facility

The used test site (503 881) is compliant with the requirements of section 2.948 of the FCC rules and listed, registration number 93866, as a facility accepted for certification under parts 15 and 18. The site complies with RSS-Gen, Issue 3 and is accepted by Industry Canada for the performance of radiated measurements, file no: IC 3482A-1.

Reservation

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

Test engineers

Tomas Isbring, Andreas Johnson, Benyamin Mashouf and Kexin Chen, SP.

Test participant

None.

Appendix 1

Tested configuration

RF A configuration: 1x 37.0 dBm (5 W)
RF B configuration: 1x 37.0 dBm (5 W)
Communication: IP via electrical interface
Power configuration: 120 VAC/ 60 Hz

Operational test mode

The RBS 6501 unit was activated for maximum transmit power transmitting test model E-TM1.1 as defined in ETSI TS 136 141/ 3GPP TS 36.141.

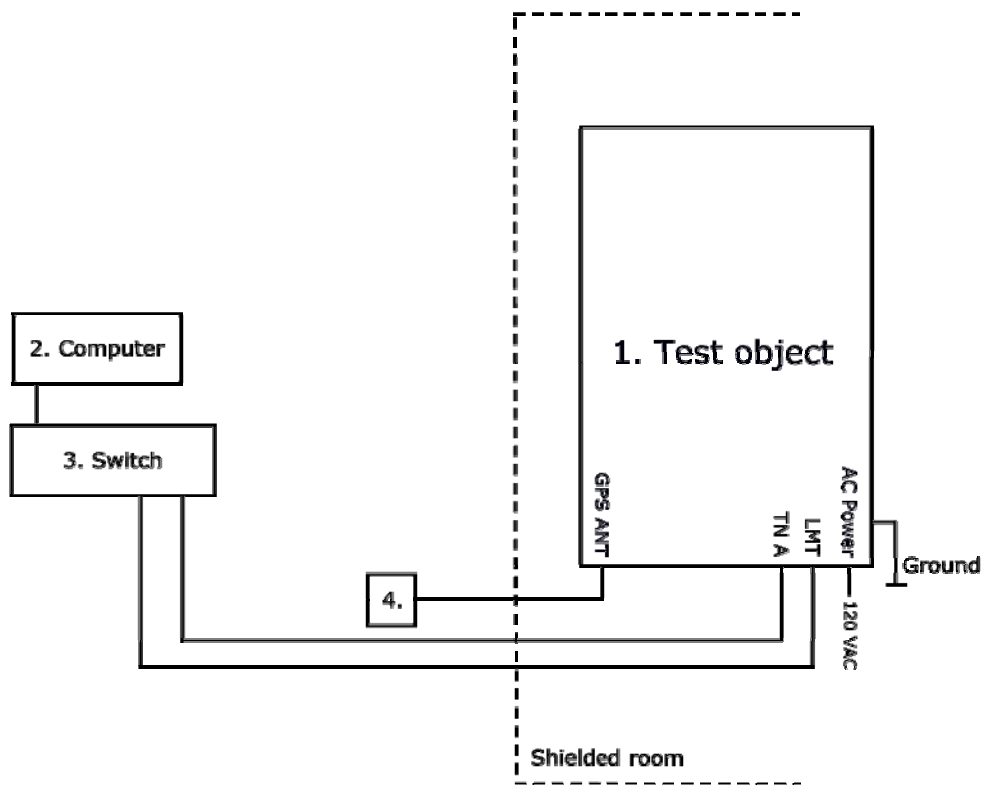
The test object was configured in MIMO mode with both RF paths allocated to the following EARFCN:

EARFCN Downlink	Frequency [MHz]	Comment
5035	731.5	Single carrier TX bottom frequency in 5 MHz BW configuration
5090	737.0	Single carrier TX mid frequency in 5 MHz BW configuration
5145	742.5	Single carrier TX top frequency in 5 MHz BW configuration

All RX frequencies were configured 30 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

Appendix 1

Test setup:



1.	RBS 6501 B12 AC, KRD 901 112/1, rev. R1A, s/n: CB4T818581 Software CXP 901 3268/9, rev. R51TB
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Functional test equipment:

2.	Computer HP EliteBook 8540w BAMS – 1001052042
3.	Switch Netgear GS108E
4.	GPS Active Antenna, KRE 101 2082/1

Integrated antenna

Directional antenna, KRE 101 2134/1, rev. R1C, s/n: T89U200079

Representing version: KRD 901 112/1 and KRD 901 112/2

Semi-integrated omni antenna

VPol Omni 694-894, KRE 101 2245/1, s/n: DEG4843265, Type no. 80010846

VPol Omni 694-894, KRE 101 2245/1, s/n: DEG4843302, Type no. 80010846

Representing version: KRD 901 112/3 and KRD 901 112/4

Appendix 1

Interface:	Type of port:
Power: 120 VAC/ 60 Hz	AC Power
TNA, RJ45 interface	Telecom
TNB, Optical interface	Telecom
EC bus and Ext Alarm	Signal
GPS	Signal
Ground wire	Ground

RBS software

Software	Revision
CXP 102 051/19	R37AL

Appendix 2

RF exposure evaluation: 2.1091 Mobile devices / RSS-102 4.2

Date	Temperature	Humidity
2014-06-16	22 °C ± 3 °C	49 % ± 5 %
2014-06-17	23 °C ± 3 °C	32 % ± 5 %
2014-06-18	23 °C ± 3 °C	40 % ± 5 %

Procedure

Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess limit for maximum permissible exposure. In accordance with 47 CFR Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

Test setup and procedure

1. The test object is measured in twelve directions (in 30° steps) with the field probe continuously scanning from 0.1 – 2.0 m in height.
2. Measuring distance was 20 cm from the centre of the test object, step 1 is repeated with a distance increment of 20 cm until the measured field strength is compliant.

The distance for compliance for Adult is derived from spatial average over the full scan height. The distance for compliance for Child is derived from spatial average over ± 45 cm from the height where the highest level was detected.

The calculation were adjusted according to:

1. measured output power with tolerance of ± 1 dB.
2. field probe characteristics with respect to the modulated signal LTE BW 5 MHz at different levels of the field strength.

The nominal power stated by the manufacturer is 2x 5 W (2x 37 dBm), with a tolerance of ± 1 dB. The measured output power was as follows:

Bottom frequency: 4.7 W (36.7 dBm)
Mid frequency: 4.8 W (36.8 dBm)
Top frequency: 4.8 W (36.8 dBm)

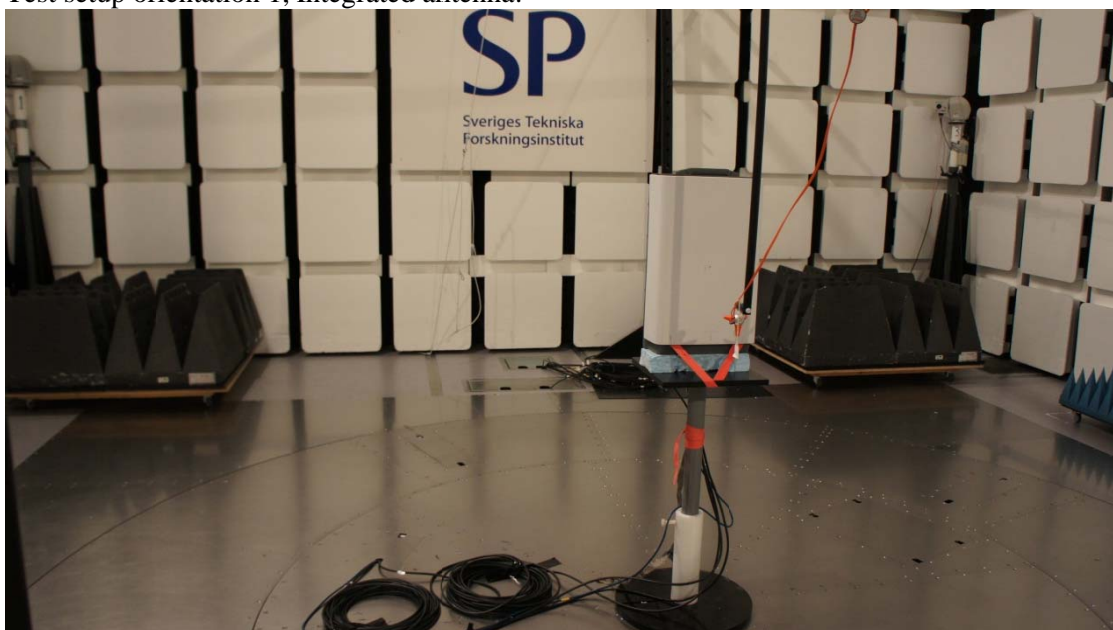
The calculation was therefore adjusted by the following corrections to cover the highest possible output power:

Bottom frequency: 1.3 dBm
Mid frequency: 1.2 dBm
Top frequency: 1.2 dBm

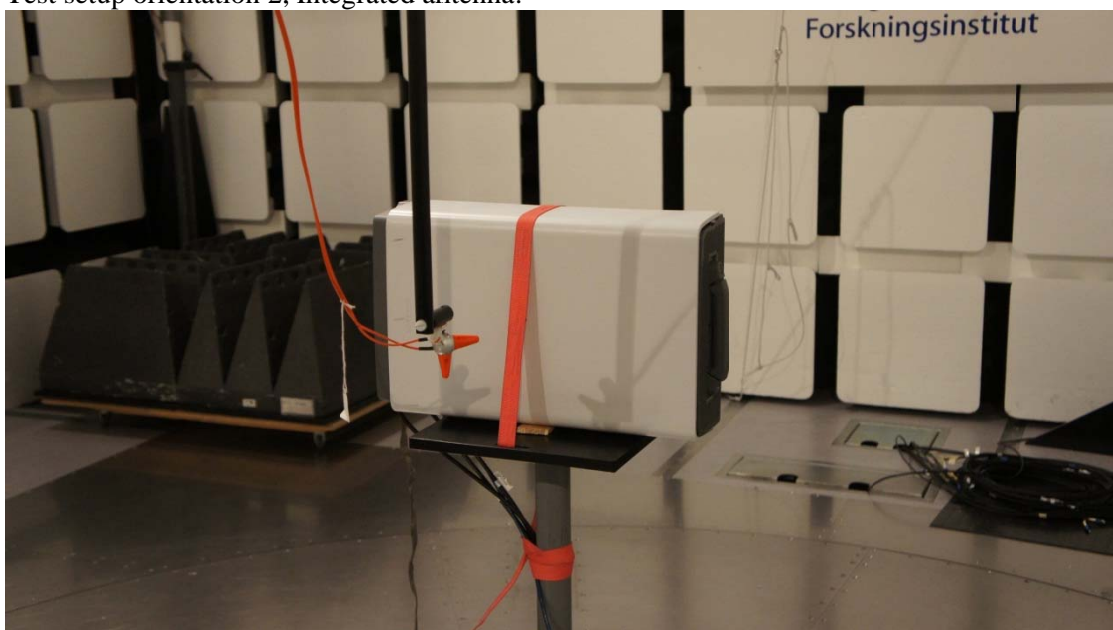
The measurement were made with an Integrated antenna and a Semi-integrated omni antenna.

Appendix 2

Test setup orientation 1, Integrated antenna:

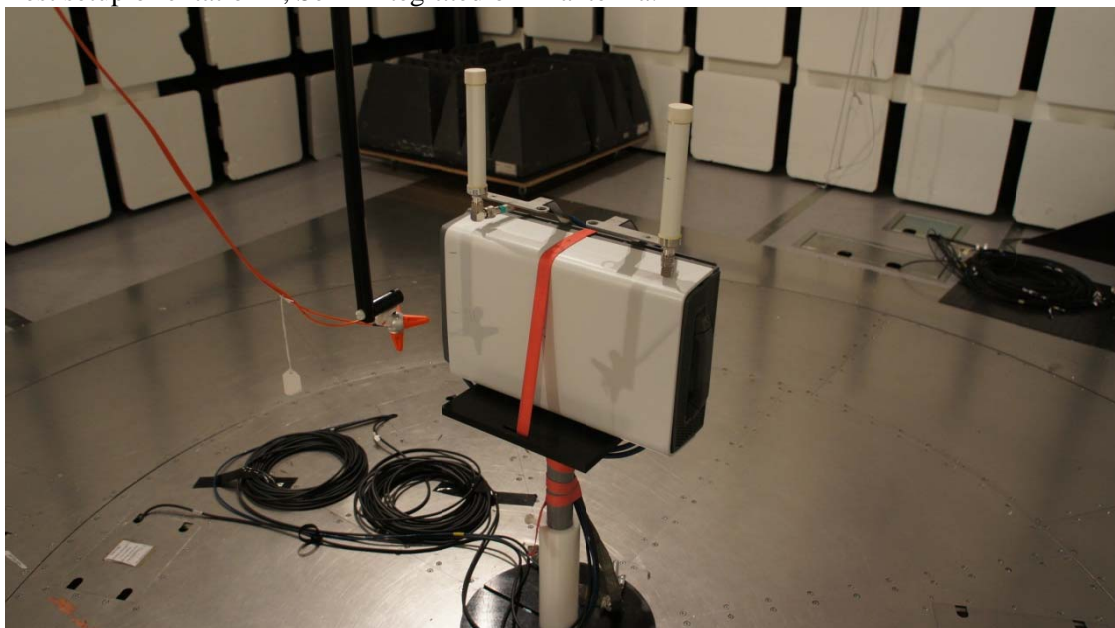


Test setup orientation 2, Integrated antenna:



Appendix 2

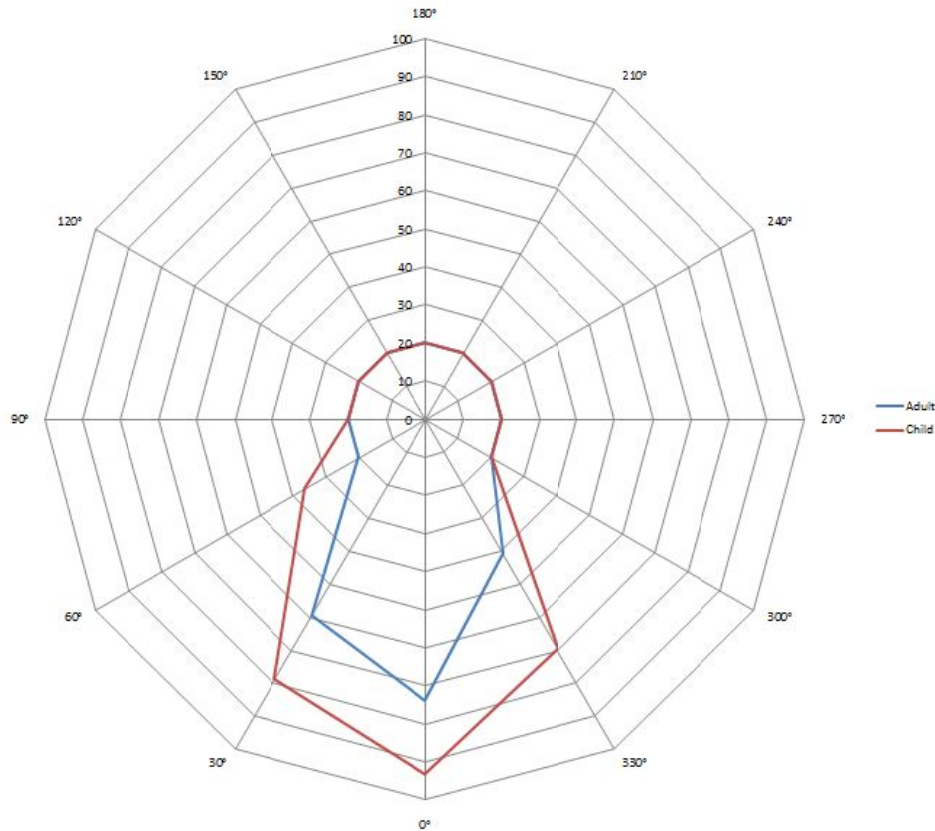
Test setup orientation 2, Semi-integrated omni antenna:



Appendix 2

Results

Orientation 1, Integrated antenna, worst case: TX bottom frequency



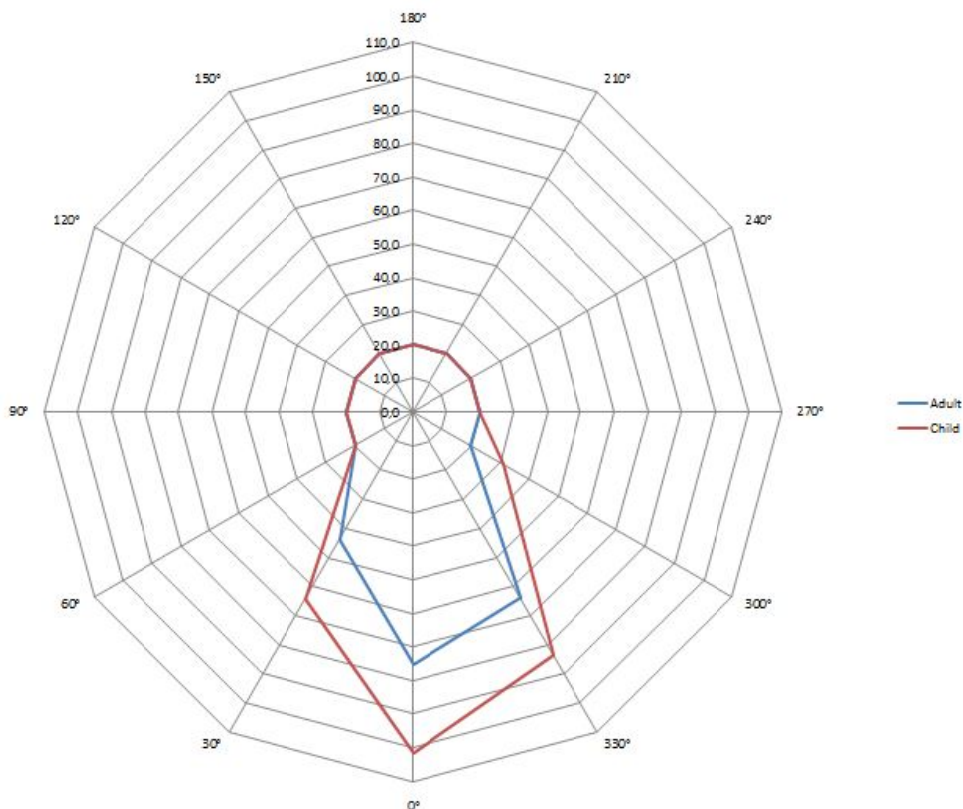
Note: The test object was placed with the front side facing 0° and the rear side facing 180° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	74.0	93.4
30°	59.3	78.7
60°	20.0	36.3
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	20.0
330°	40.7	69.7

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object.

Appendix 2

Orientation 2, Integrated antenna, worst case: TX mid frequency



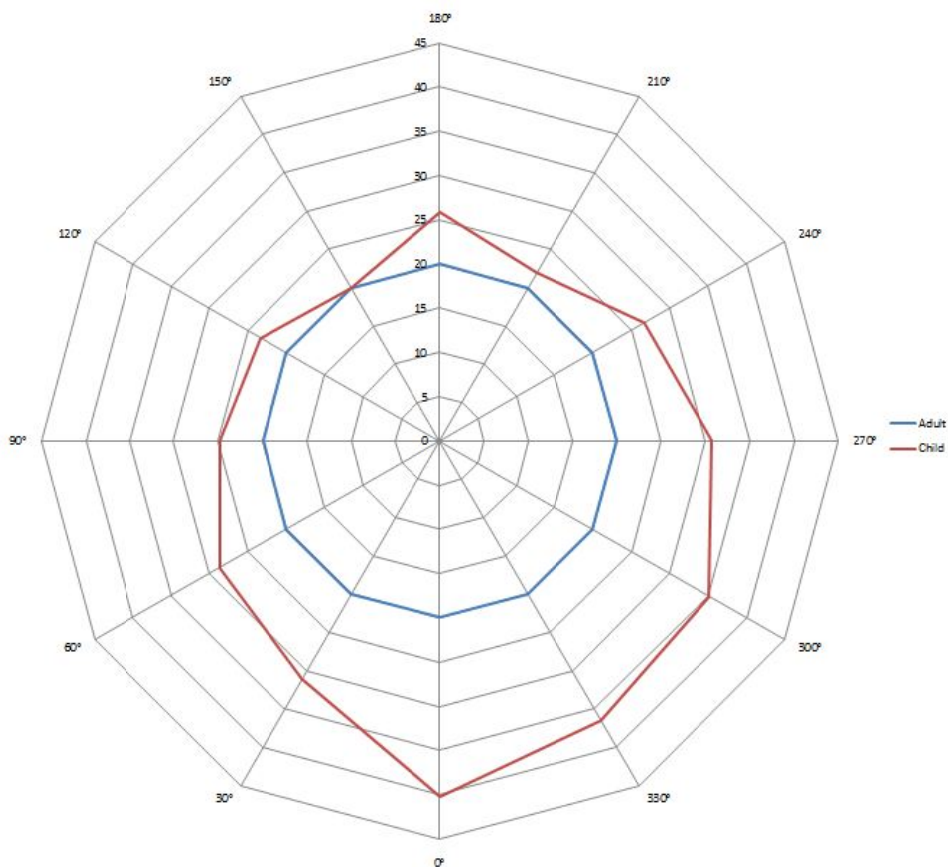
Note: The test object was placed with the front side facing 0° and the cable inlet facing 90° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	75.4	101.5
30°	43.8	64.2
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	30.8
330°	63.8	83.7

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object.

Appendix 2

Orientation 2, Semi-integrated omni antenna, worst case: TX Bottom frequency



Note: The test object was placed with the front side facing 0° and the cable inlet facing 90° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	40.2
30°	20.0	31.1
60°	20.0	28.7
90°	20.0	24.8
120°	20.0	23.3
150°	20.0	20.0
180°	20.0	25.9
210°	20.0	21.9
240°	20.0	26.7
270°	20.0	30.7
300°	20.0	35.2
330°	20.0	36.5

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object.

Appendix 2

Limits

According to 47 CFR 1.1310.

(B) Limits for General Population/Uncontrolled Exposure

Frequency range (MHz)	Electric field strength [E] (V/m)	Magnetic field strength [H] (A/m)	Power density [S] (mW/cm ²)	Averaging time E ² , H ² or S (minutes)
300-1500	-	-	0.5 (f/1500)	(Note 1)

According to RSS-102 4.2

RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency range (MHz)	Electric field strength [E] (V/m)	Magnetic field strength [H] (A/m)	Power density [S] (W/m ²)	Averaging time E ² , H ² or S (minutes)
300-1500	-	-	5 (f/150)	(Note 1)

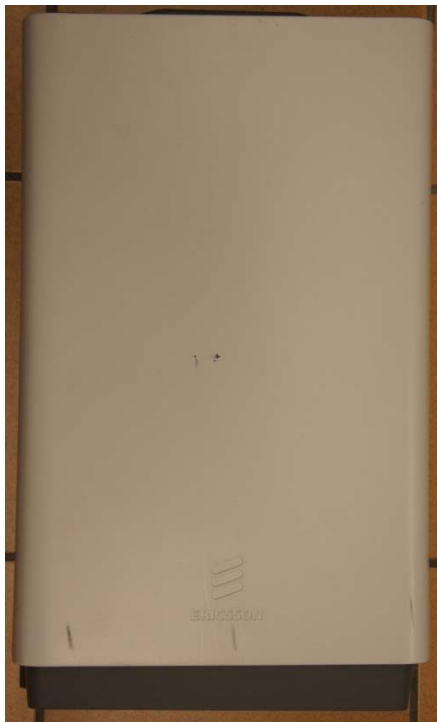
Note 1: The test was executed with the test object configured for continuous transmission with maximum output power setting to represent worst case. Therefore no averaging time measurement was made.

Complies?	Yes
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Appendix 3

Photos of test object

Front side with cover:



Front side without cover:



Front side without Integrated antenna and without cover:



Back side:



Appendix 3

Right side without Integrated antenna and without cover:



Left side without Integrated antenna and without cover:



Front side with Semi-integrated omni antenna



Appendix 3

Labels:

RBS 6501 B12:



Integrated antenna:



Semi-integrated omni antennas

Antenna 1



Antenna 2

