



# REPORT

issued by an FCC listed Laboratory Reg. no. 93866.  
The test site complies with RSS-Gen, file no: IC 3482A

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2016-03-04

Reference  
6P01882-MPE

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Weil Ma  
PDU Radio Products  
164 80 Stockholm

## MPE test on Ericsson Radio 2203 B5

(4 appendices)

### Test object

Product name: Radio 2203 B5  
Product number: KRC 161 508/1

See appendix 1 for the tested hardware configuration and general information.  
See appendix 4 for photos.

### Summary

Standard	Compliant	Appendix	Remarks
CFR 47 part 2.1091 Radiofrequency radiation exposure evaluation: mobile devices	Yes	2	-
RSS-102 Radio Frequency Exposure compliance of Radio communication Apparatus	Yes	2	-
OET Bulletin 65/ KDB 447498	Yes	2	-

### SP Technical Research Institute of Sweden Electronics - EMC

Performed by

Examined by

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## Appendix 1

### **Purpose of test**

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

### **References**

Measurements were done according to relevant parts of the following standards:

CFR 47 part 2, 2015  
RSS-102 Issue 5  
3GPP TS 25.141, version 13.0.0  
3GPP TS 36.141, version 11.11.0  
KDB 447498 D01 General RF Exposure Guidance v06  
OET Bulletin 65 1997

### **Description of the test object**

The test object is a Remote Radio Unit (Radio 2203 B5) for a LTE and WCDMA base station and designed to provide mobile users with a connection to a mobile network.

## Appendix 1

### Tested configuration

RF configuration:

Antenna port A: 1x 37.0 dBm (5 W)

Antenna port B: 1x 37.0 dBm (5 W)

SFP module: See appendix 4 for details

OIL: Opto fibre, single mode, 10 Gbit/s

Power configuration: -48 VDC

### Operational test mode

LTE:

The test object was activated for maximum transmit power. E-TM1.1 as defined in ETSI TS 136 141/ 3GPP TS 36.141 was used in all cells.

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

EARFCN Downlink	Frequency [MHz]	Symbolic name	Comment
2407	869.7	B	TX bottom frequency in 1.4 MHz BW configuration
2415	870.5	B	TX bottom frequency in 3 MHz BW configuration
2425	871.5	B	TX bottom frequency in 5 MHz BW configuration
2450	874.0	B	TX bottom frequency in 10 MHz BW configuration
2525	881.5	M	TX mid frequency in 1.4 MHz - 10 MHz BW configurations
2643	893.3	T	TX top frequency in 1.4 MHz BW configuration
2635	892.5	T	TX top frequency in 3 MHz BW configuration
2625	891.5	T	TX top frequency in 5 MHz BW configuration
2600	889.0	T	TX top frequency in 10 MHz BW configuration

WCDMA:

The test object was activated for maximum transmit power. TM 1 (SF=128) as defined in ETSI TS 125 141/ 3GPP TS 25.141 was used in all cells. The channel type "3GPP Reference channel 12.2 kps slotformat 10" was used in all cells with DPCH=64.

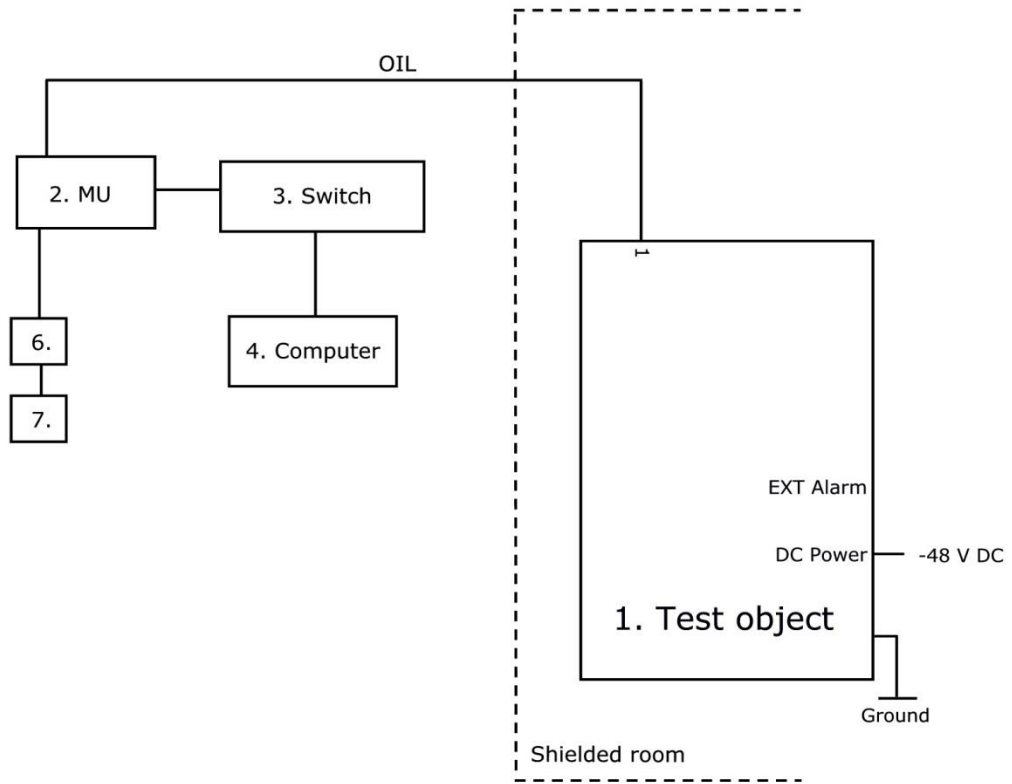
The test object was configured with both RF paths allocated to the following UARFCN:

UARFCN Downlink	Frequency [MHz]	Symbolic name	Comment
4357	871.4	B	Single carrier TX bottom frequency
4407	881.4	M	Single carrier TX band mid frequency
4458	891.6	T	Single carrier TX top frequency

All RX frequencies were configured 45 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

Appendix 1

Test setup LTE:



1.	Radio 2203 B5 with antenna, see appendix 3 for details FCC ID TA8AKRC161508-1 and IC 287AB-AS1615081
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**Associated equipment:**

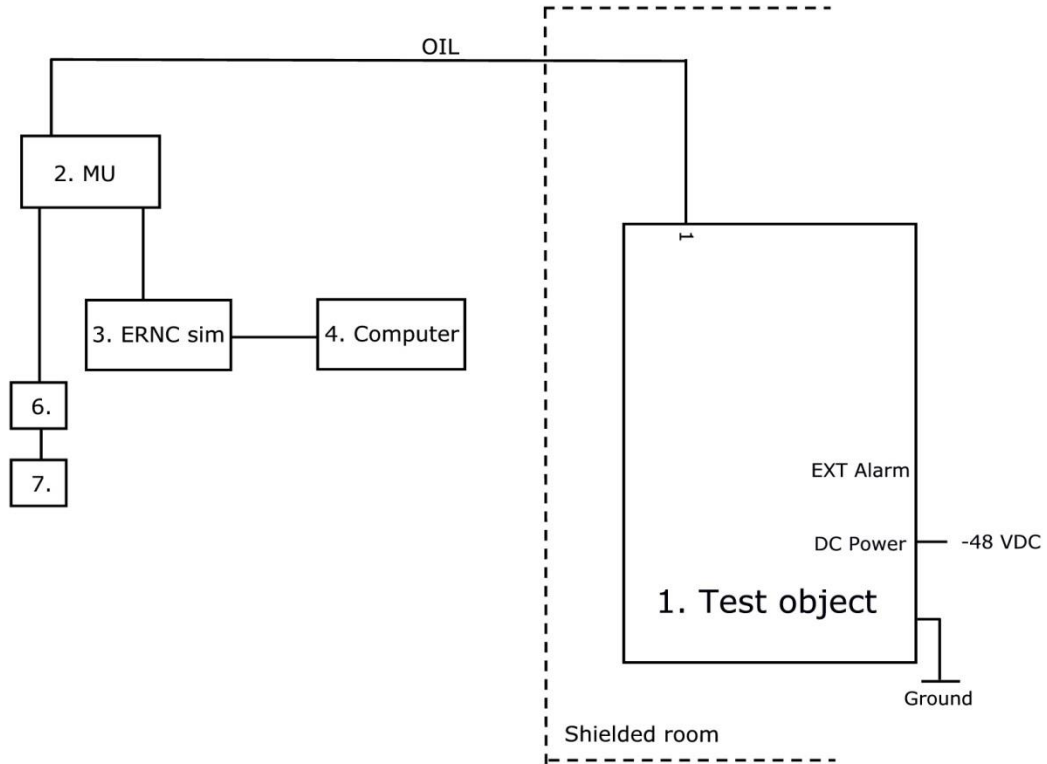
2.	RBS 6601 Main Unit: SUP 6601, 1/BFL 901 009/4, rev. R1E, s/n: BR82182832 DUS 41 01, KDU 137 624/1, rev. R3C, s/n: SC826307244 SW: CXP 102 051/23, rev. R31GN
6.	GPS 02 01, NCD 901 41/1, rev. R1D, s/n: TU8KH75515
7.	GPS Active Antenna, KRE 101 2082/1

**Functional test equipment:**

3.	Switch Neatgear ProSafe GSM7212, BAMS – 1000517299
4.	HP Z230 Workstation, BAMS – 1001561277

Appendix 1

Test setup WCDMA:



1.	Radio 2203 B5 with antenna, see appendix 3 for details FCC ID TA8AKRC161508-1 and IC 287AB-AS1615081
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**Associated equipment:**

2.	RBS 6601 Main Unit: SUP 6601, 1/BFL 901 009/4, rev. R1E, s/n: BA88186222 DUW 41 01, KDU 127 174/4, rev. R2E, S/N: TU8XQ61965 SW: CXP 902 3291/4, rev. R4EA09
6.	GPS 02 01, NCD 901 41/1, rev. R1D, s/n: TU8KH75515
7.	GPS Active Antenna, KRE 101 2082/1

**Functional test equipment:**

3.	ERNC-SIM 147, BAMS – 1000707991 Intelligent Modular Synchronization, LANTIME M1000, BAMS – 1001660890 Symmetricom 8040, BAMS – 1000838408 Switch Netgear ProSafe GSM7212, BAMS – 1000517292
4.	HP Z230 Workstation, BAMS – 1001561277

Interface:	Type of port:
Power: -48 VDC	DC Power
1, optical interface	Signal
2, optical interface, not used in this configuration	Signal
Ext Alarm, not used in this configuration	Signal
Ground wire	Ground

## Appendix 1

### Measurement equipment

	Calibration Due	SP number
Test site Tesla	2017-01	503 881
Measurement software: Antennkalibrering V1.23	-	-
Calculation software: EMF V1.5	-	-
Laser probe AR FL7018	2016-03	902 280
Testo 625 Temperature and humidity meter	2017-06	504 188

### 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 4 and is accepted by Industry Canada for the performance of radiated measurements, file no: IC 3482A-1.

### 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.

## Appendix 1

### **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: 2016-02-18.

### **Test engineers**

Tomas Isbring, SP.

### **Test participant**

None.



## Appendix 2

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

Date	Temperature	Humidity
2016-02-22	23 °C ± 3 °C	33 % ± 5 %
2016-02-23	23 °C ± 3 °C	30 % ± 5 %
2016-02-24	23 °C ± 3 °C	24 % ± 5 %
2016-02-25	23 °C ± 3 °C	22 % ± 5 %
2016-02-26	23 °C ± 3 °C	28 % ± 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 at least 20 cm 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 m in height.
2. Measuring distance was 20 cm from the surface of the test object, step 1 is repeated with a distance increment of 20 cm until the measured field strength is compliant.

The measurements were scaled according to:

1. highest possible output power with regard to declared tolerance.
2. field probe characteristics with respect to the modulated signal at different levels of the field strength.

The nominal power for each antenna port stated by the manufacturer is 5 W (total power: 10 W), with a tolerance of +0.6 dB/ -2.0 dB. The measured output power was as follows:

LTE 10 MHz, TX mid frequency: 4.8 W (36.8 dBm)  
 LTE 10 MHz, TX bottom frequency: 4.8 W (36.8 dBm)  
 WCDMA, TX bottom frequency: 4.8 W (36.8 dBm)

The measurements were therefore adjusted by the following corrections to cover the highest possible output power:

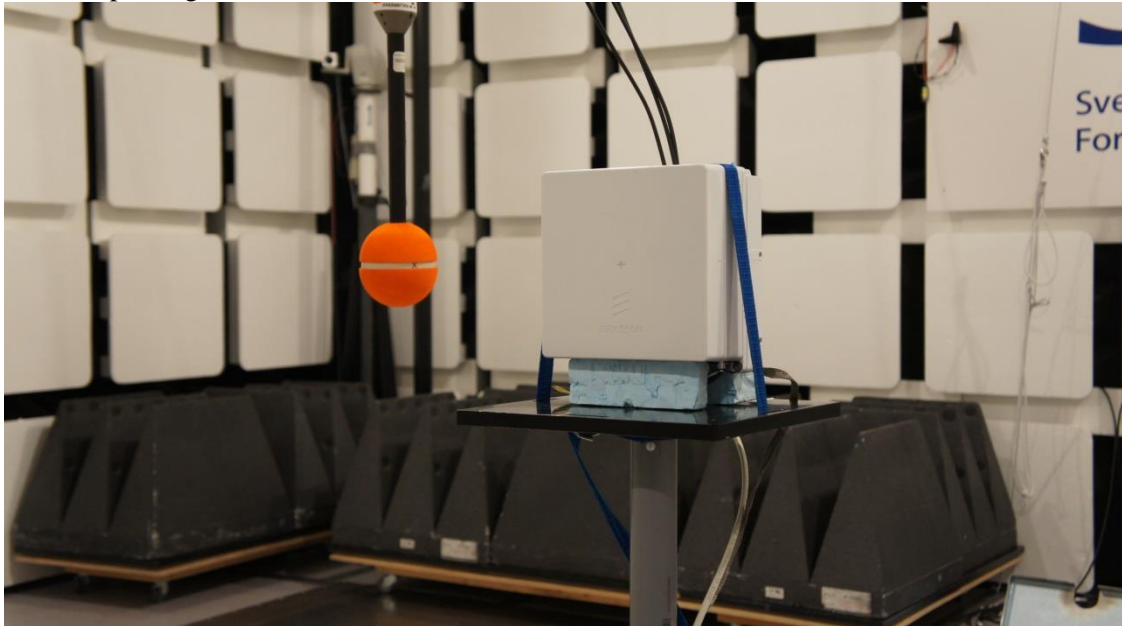
LTE 10 MHz, TX mid frequency: 0.8 dBm  
 LTE 10 MHz, TX bottom frequency: 0.8 dBm  
 WCDMA, TX bottom frequency: 0.8 dBm

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

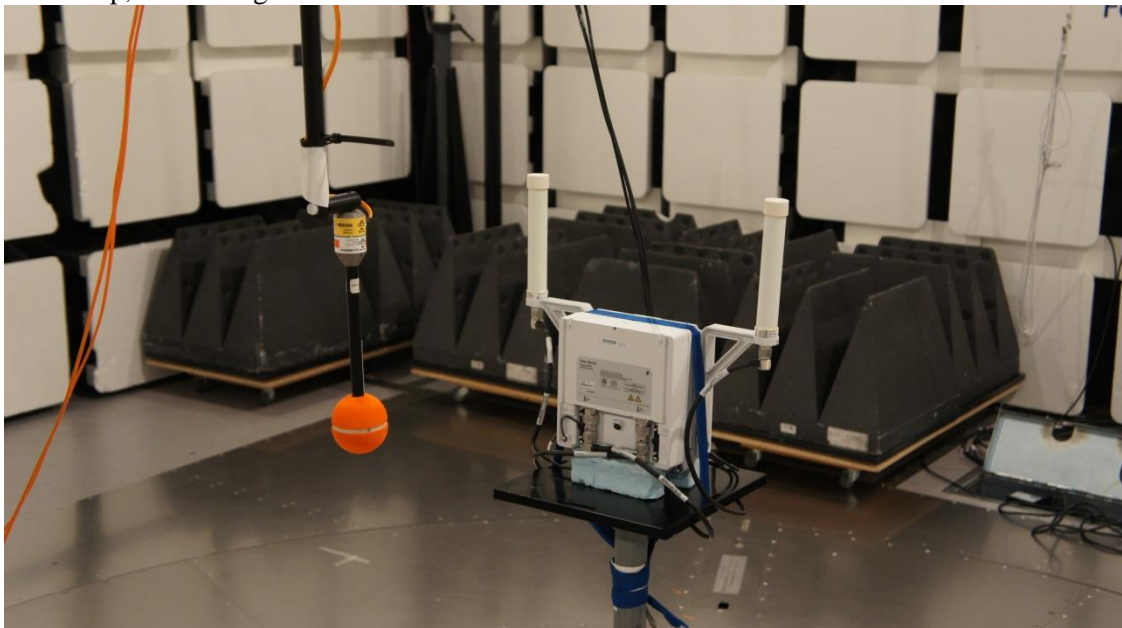
The distance for compliance for Adult is derived from spatial average over the full scan height. The distance for compliance for Child is derived from spatial average over ± 45 cm from the height where the highest level was detected.

Appendix 2

Test setup, Integrated antenna KRE 101 2199/1:



Test setup, Semi-integrated omni antenna KRE 101 2233/1:

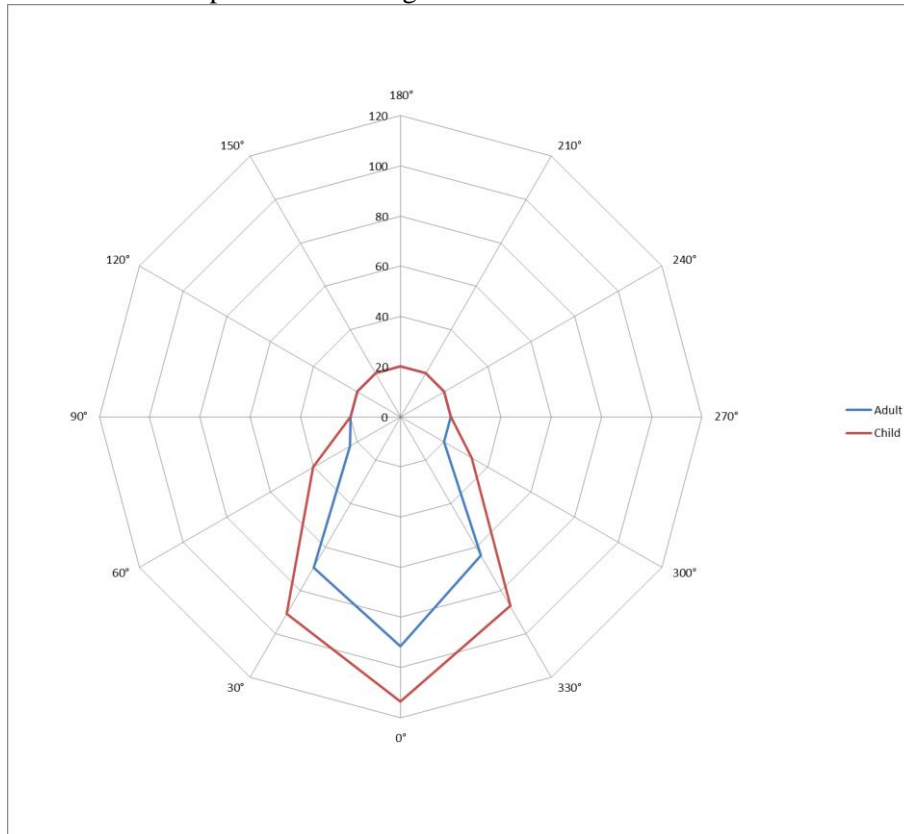


Appendix 2

**Results**

Integrated antenna KRE 101 2199/1, worst case: LTE BW 10 MHz, TX bottom frequency

Distance for compliance according to RSS-102:

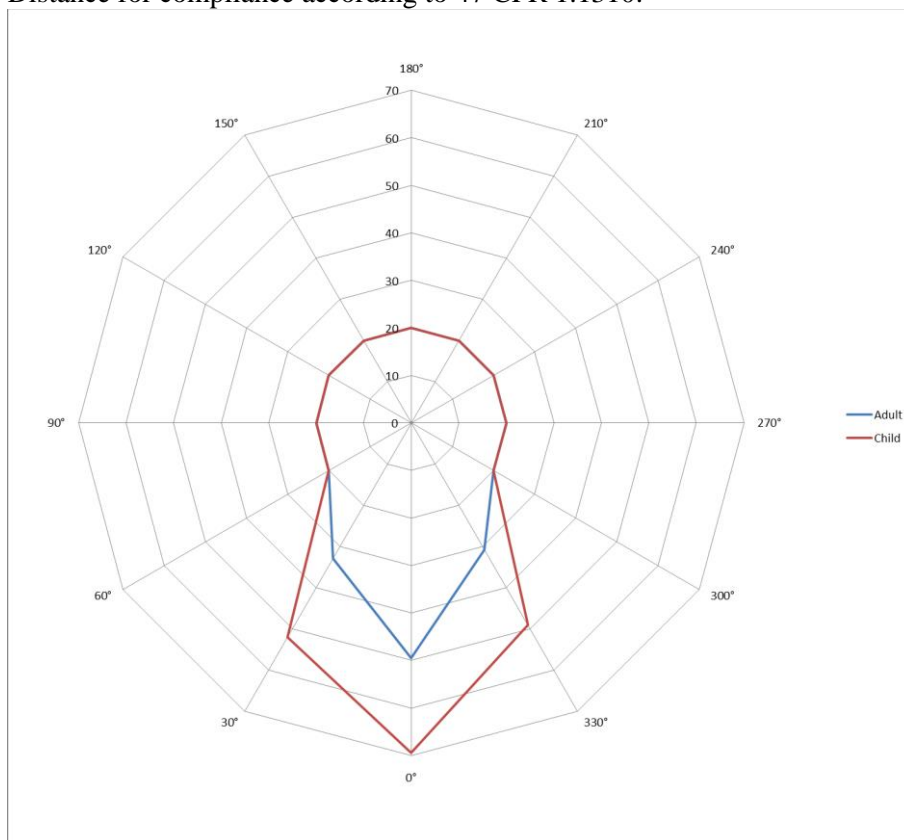


Direction	Distance for compliance (cm).	
	Adult	Child
0°	91.4	113.6
30°	69.4	90.7
60°	23.3	40.3
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	32.6
330°	63.8	87.1

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.268142 mW/cm<sup>2</sup> for LTE BW 10 MHz, TX bottom frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



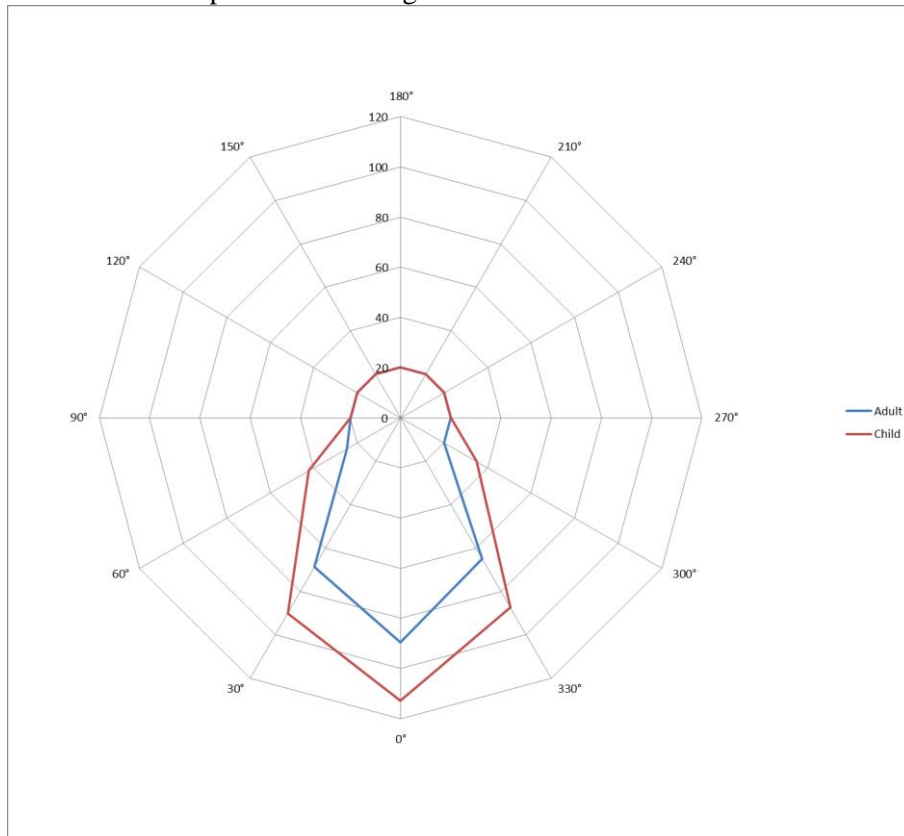
Direction	Distance for compliance (cm).	
	Adult	Child
0°	49.5	69.4
30°	33.0	52.1
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	20.0
330°	30.8	49.0

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was  $0.582667 \text{ mW/cm}^2$  for LTE BW 10 MHz, TX bottom frequency.

Appendix 2

Integrated antenna KRE 101 2199/1, worst case: WCDMA, TX bottom frequency

Distance for compliance according to RSS-102:

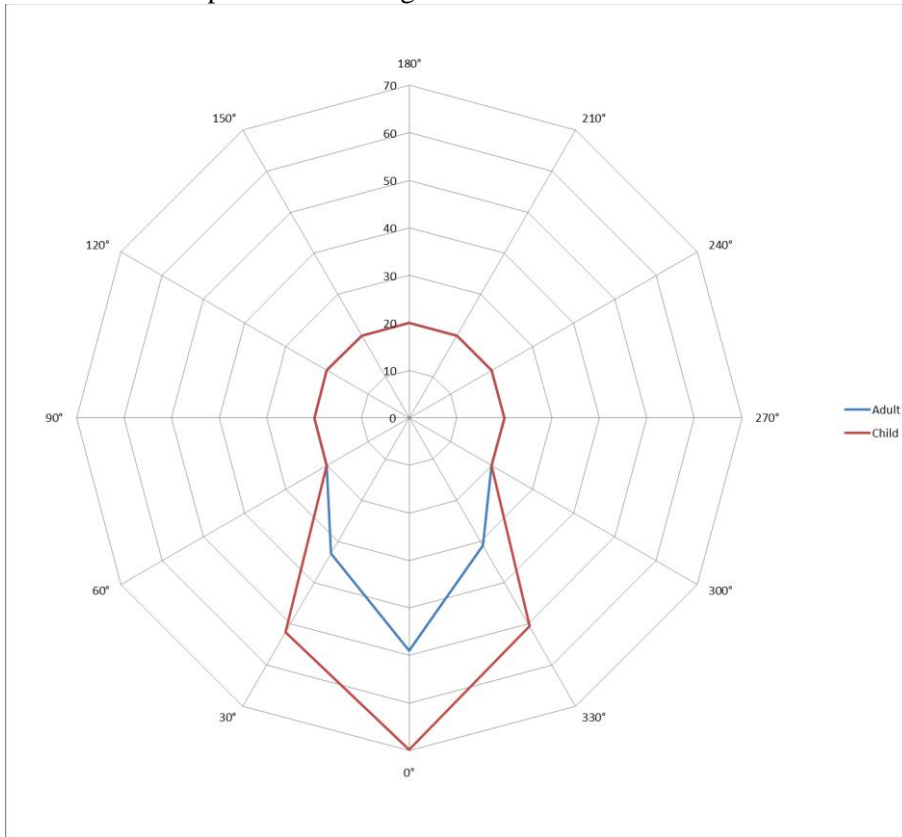


Direction	Distance for compliance (cm).	
	Adult	Child
0°	89.6	112.8
30°	68.6	90.1
60°	24.8	42.2
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	34.8
330°	65.0	87.2

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.267596 mW/cm<sup>2</sup> for WCDMA, TX bottom frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



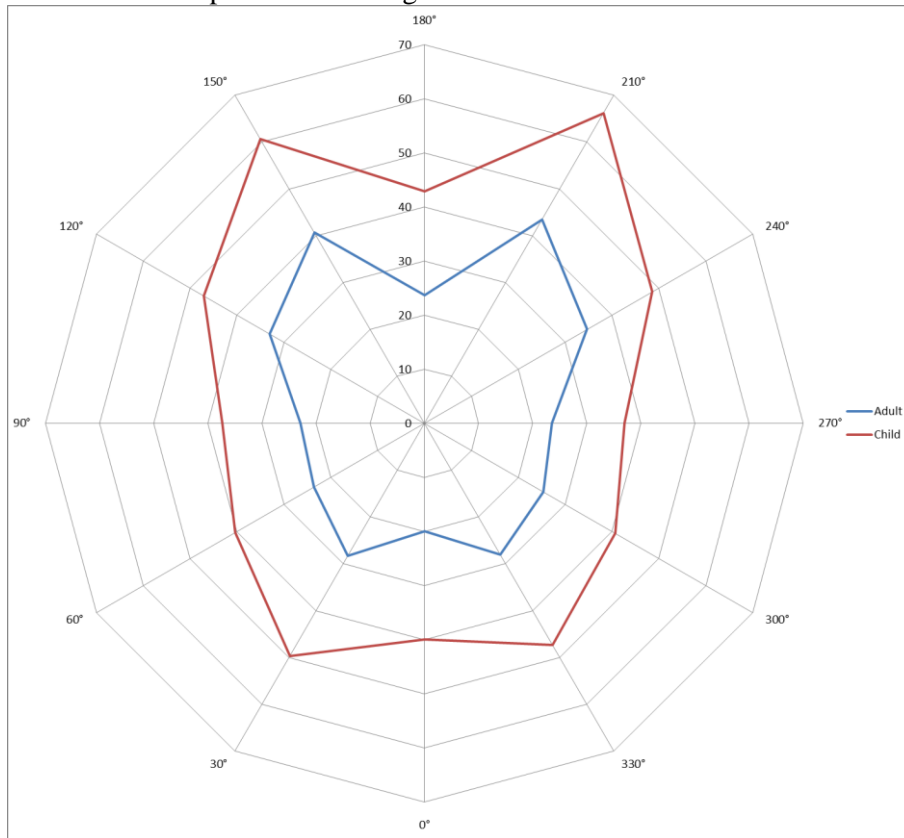
Direction	Distance for compliance (cm).	
	Adult	Child
0°	48.9	69.8
30°	32.9	52.1
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	20.0
330°	31.0	50.5

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.580933 mW/cm<sup>2</sup> for WCDMA, TX bottom frequency.

Appendix 2

Semi-integrated omni antenna KRE 101 2233/1, worst case: LTE 10 MHz, TX mid frequency

Distance for compliance according to RSS-102:

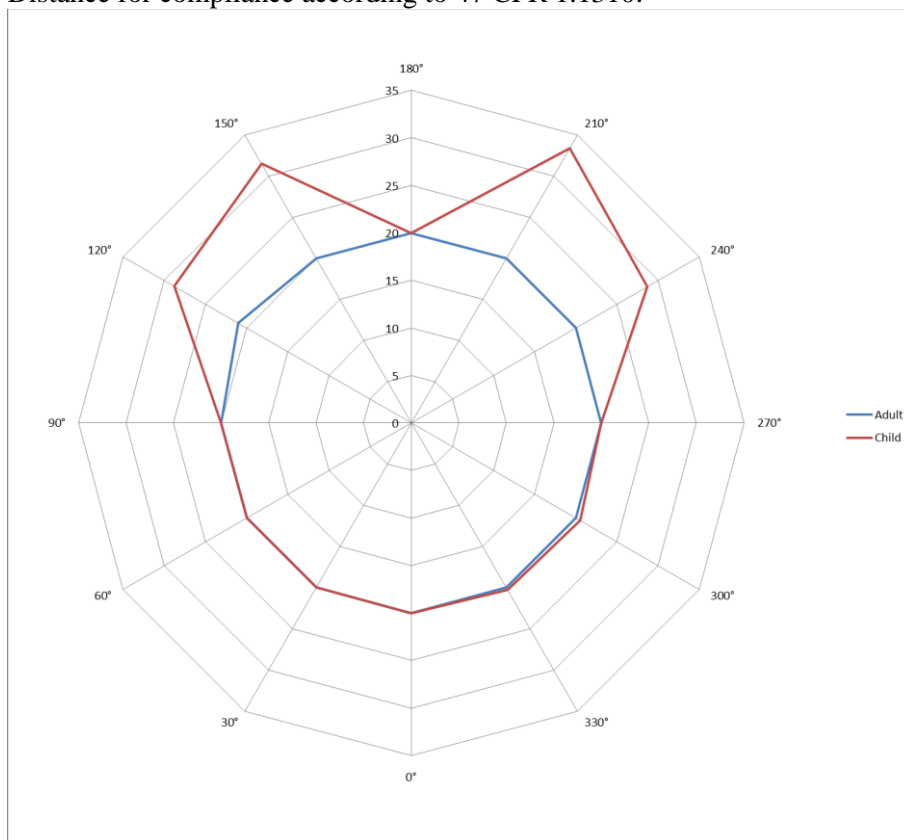


Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	39.9
30°	28.3	49.7
60°	23.6	40.4
90°	22.9	37.4
120°	33.0	47.0
150°	40.7	60.7
180°	23.7	42.9
210°	43.5	66.1
240°	34.7	48.6
270°	23.5	37.0
300°	25.4	40.7
330°	28.0	47.3

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.269712 mW/cm<sup>2</sup> for LTE BW 10 MHz, TX mid frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	20.0
30°	20.0	20.0
60°	20.0	20.0
90°	20.0	20.0
120°	21.0	28.8
150°	20.0	31.5
180°	20.0	20.0
210°	20.0	33.4
240°	20.0	28.7
270°	20.0	20.0
300°	20.0	20.5
330°	20.0	20.3

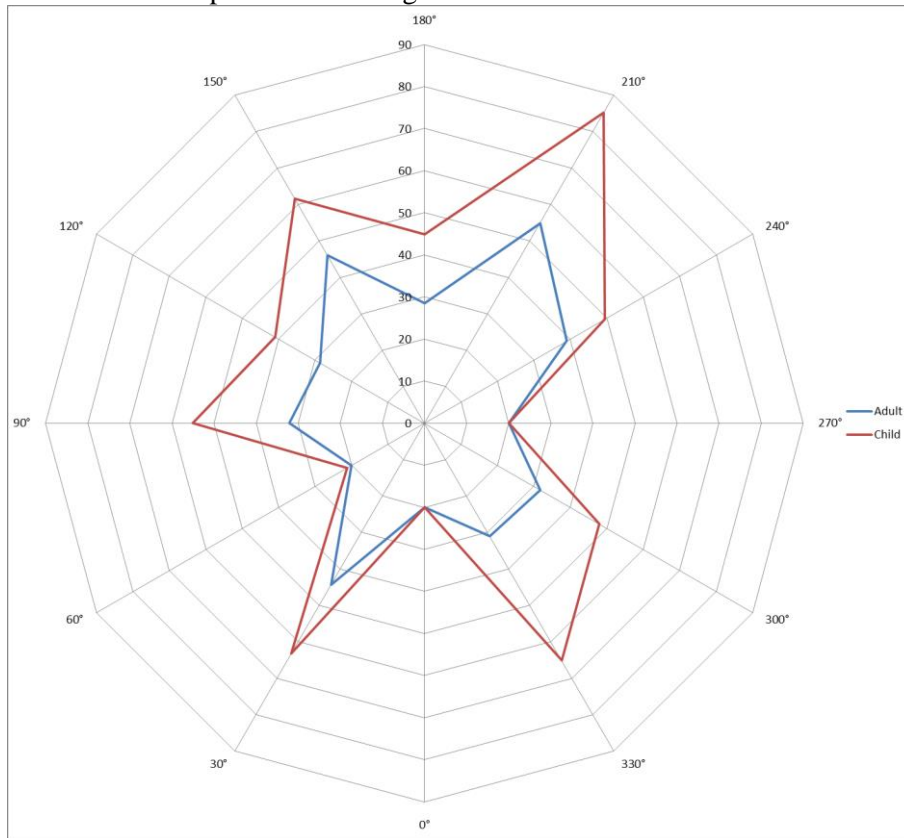
Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.587667 mW/cm<sup>2</sup> for LTE BW 10 MHz, TX mid frequency.



Appendix 2

Semi-integrated omni antenna KRE 101 2233/1, worst case: WCDMA, TX bottom frequency

Distance for compliance according to RSS-102:

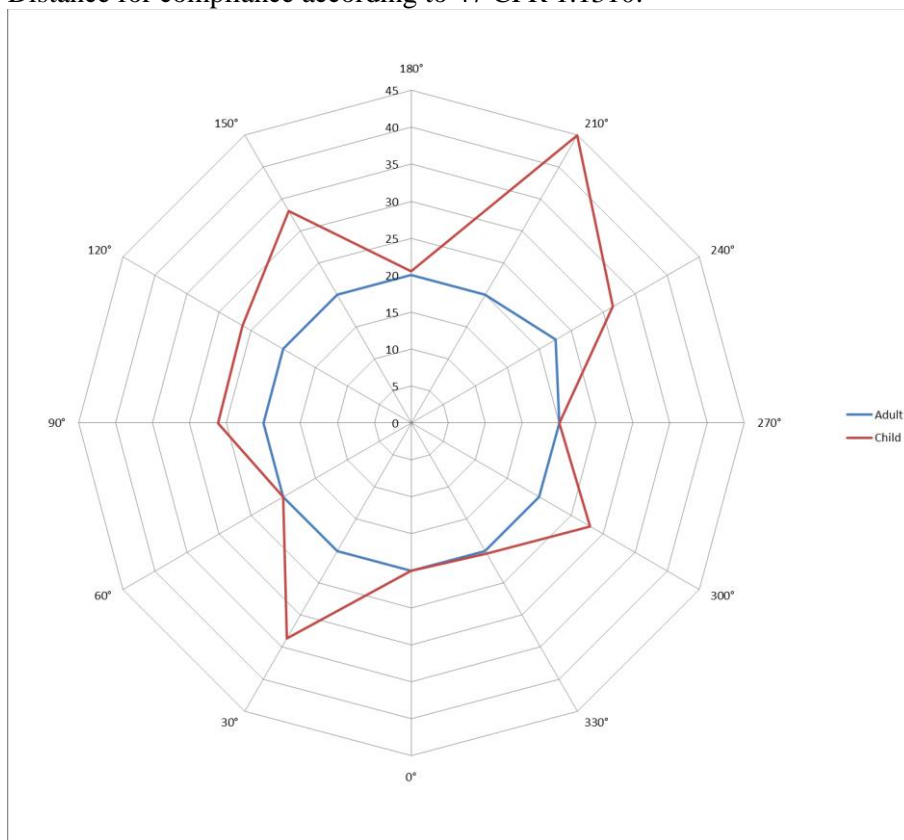


Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	20.0
30°	44.4	63.3
60°	20.0	21.2
90°	32.2	55.1
120°	28.7	40.9
150°	46.0	61.5
180°	28.6	44.9
210°	54.9	85.2
240°	39.0	49.5
270°	20.0	20.0
300°	31.8	47.9
330°	31.1	65.1

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.267596 mW/cm<sup>2</sup> for WCDMA, TX bottom frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	20.0
30°	20.0	33.6
60°	20.0	20.0
90°	20.0	26.1
120°	20.0	26.4
150°	20.0	33.1
180°	20.0	21.0
210°	20.0	44.9
240°	22.5	31.5
270°	20.0	20.0
300°	20.0	28.0
330°	20.0	20.4

Note: The distance for compliance of every direction in the table above is calculated from the chassis of the test object. The limit level was 0.580933 mW/cm<sup>2</sup> for WCDMA, TX bottom frequency.

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 <sup>2</sup> )	Averaging time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
300-1500	-	-	f/1500	(Note 1)

According to RSS-102 Table 4

**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 <sup>2</sup> )	Averaging time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
300-6000	-	-	0.02619f <sup>0.6834</sup>	(Note 1)

f = frequency in MHz.

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

**Hardware list**

Product name	Product number	R-state	Serial number
Radio 2203 B5	KRC 161 508/1	R1B	D822845959
PSU 48 05	BMR 910 434/1	R1B	BW9A601136
FAN UNIT	BKV 106 176/2	R2B	CE510012ZZ

Antennas:

Product name	Product number	R-state	Serial number
Antenna 6502	KRE 101 2199/1	R1B	D775400006
VPol Omni 790-960/ 1710-2700	KRE 101 2233/1	-	DEI2212171
VPol Omni 790-960/ 1710-2700	KRE 101 2233/1	-	DEI2212213

SFP modules:

Product name	Product number	Manufacturer	Product number of Manufacturer	Serial number
SFP	RDH 102 65/3	Finisar	FTLX1471D3BTL-E7	ARK23KN

Radio software:

Product number	Revision
CXP 901 7316/2	R62DU

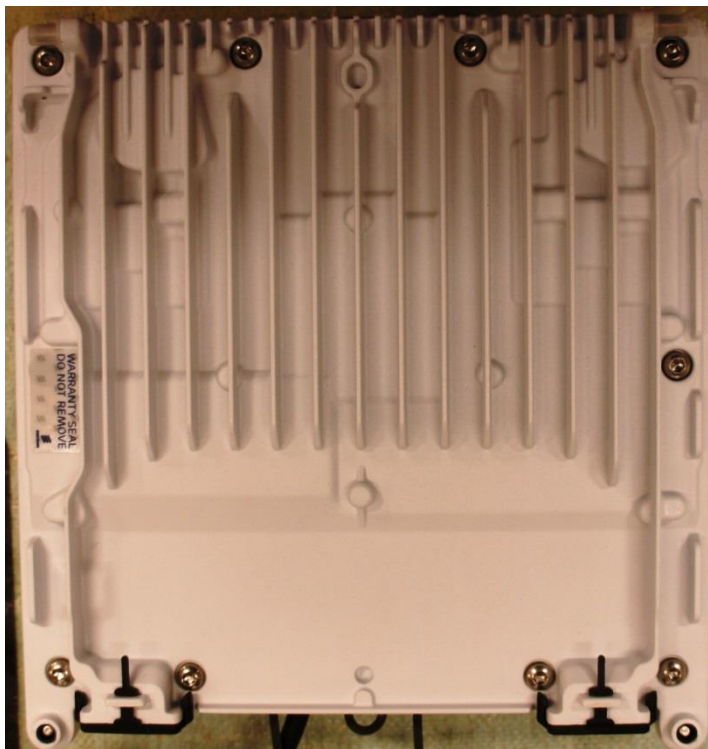
## Appendix 4

### Photos of test object

Front side of Radio 2203 B5



Rear side of Radio 2203 B5



Appendix 4

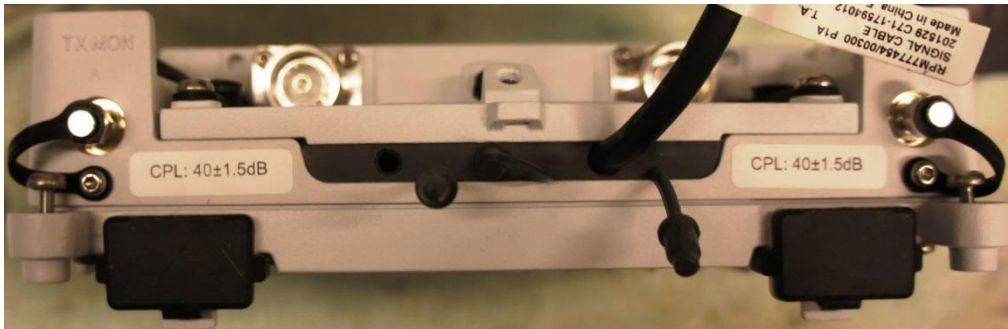
Left side of Radio 2203 B5



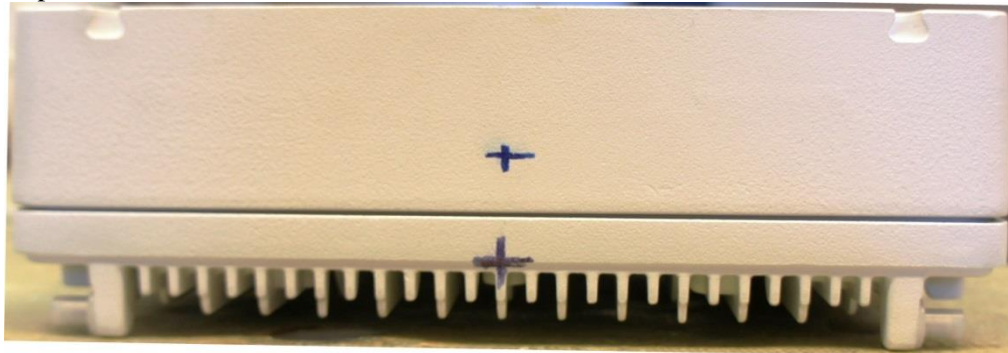
Right side of Radio 2203 B5



Bottom side of Radio 2203 B5

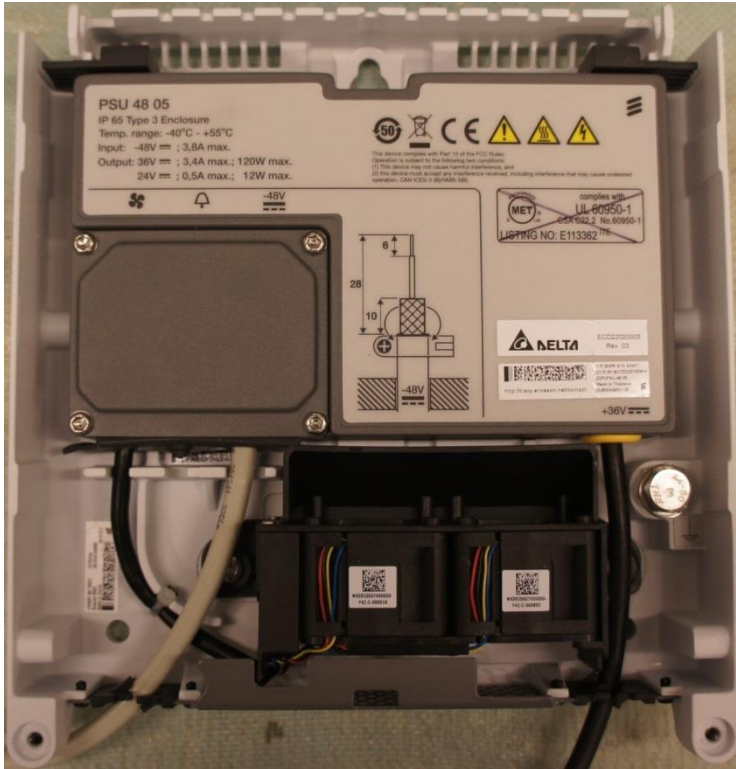


Top side of Radio 2203 B5



Appendix 4

PSU 48 05 and FAN UNIT:

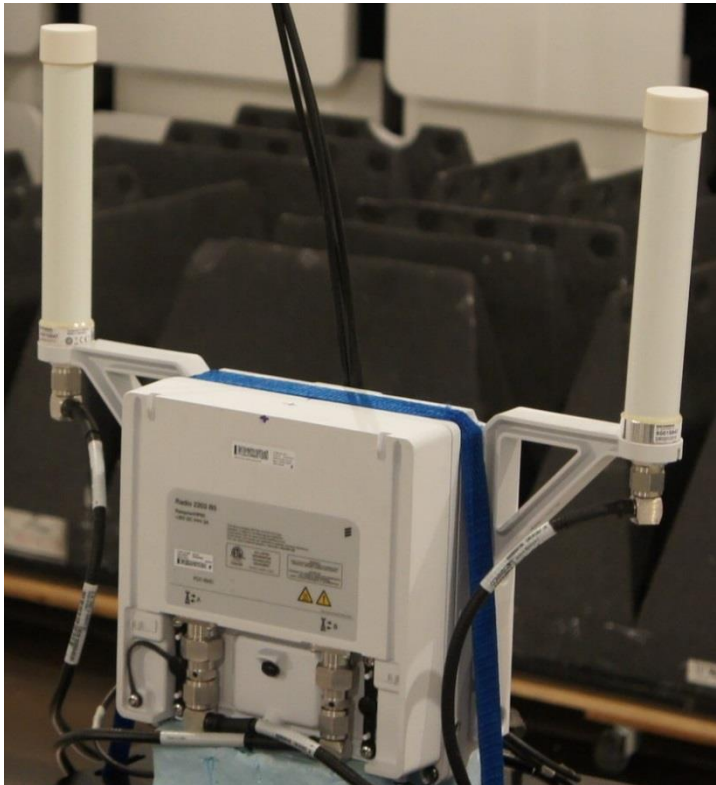


Appendix 4

Front side with integrated Antenna 6502



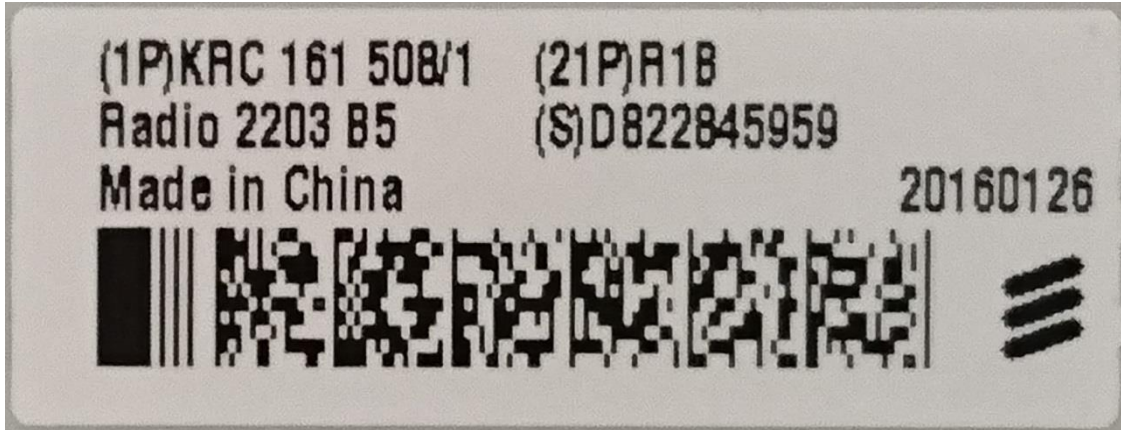
Front side with omni antenna VPol Omni 790-960/ 1710-2700





Appendix 4

Radio 2203 B5 label:



PSU 48 05 label:



FAN UNIT label:



SFP module:



Appendix 4

Integrated antenna (Antenna 6502):



Appendix 4

Semi-integrated omni antennas (VPol Omni 790-960/ 1710-2700):

Antenna 1:



Antenna 2:

