

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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MPE test on Ericsson Radio 2203 B2 B25

(4 appendices)

Test object

Product name: Radio 2203 B2 B25
 Product number: KRC 161 489/1

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	-

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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 B2 B25) 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 frequency:

Frequency [MHz]	Comment
1930.7	TX bottom frequency in 1.4 MHz BW configuration
1931.5	TX bottom frequency in 3 MHz BW configuration
1932.5	TX bottom frequency in 5 MHz BW configuration
1935.0	TX bottom frequency in 10 MHz BW configuration
1937.5	TX bottom frequency in 15 MHz BW configuration
1940.0	TX bottom frequency in 20 MHz BW configuration
1962.5	TX mid frequency in 1.4 MHz - 20 MHz BW configurations
1985.0	TX top frequency in 20 MHz BW configuration
1987.5	TX top frequency in 15 MHz BW configuration
1990.0	TX top frequency in 10 MHz BW configuration
1992.5	TX top frequency in 5 MHz BW configuration
1993.5	TX top frequency in 3 MHz BW configuration
1994.3	TX top frequency in 1.4 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 ksps slotformat 10" was used in all cells.

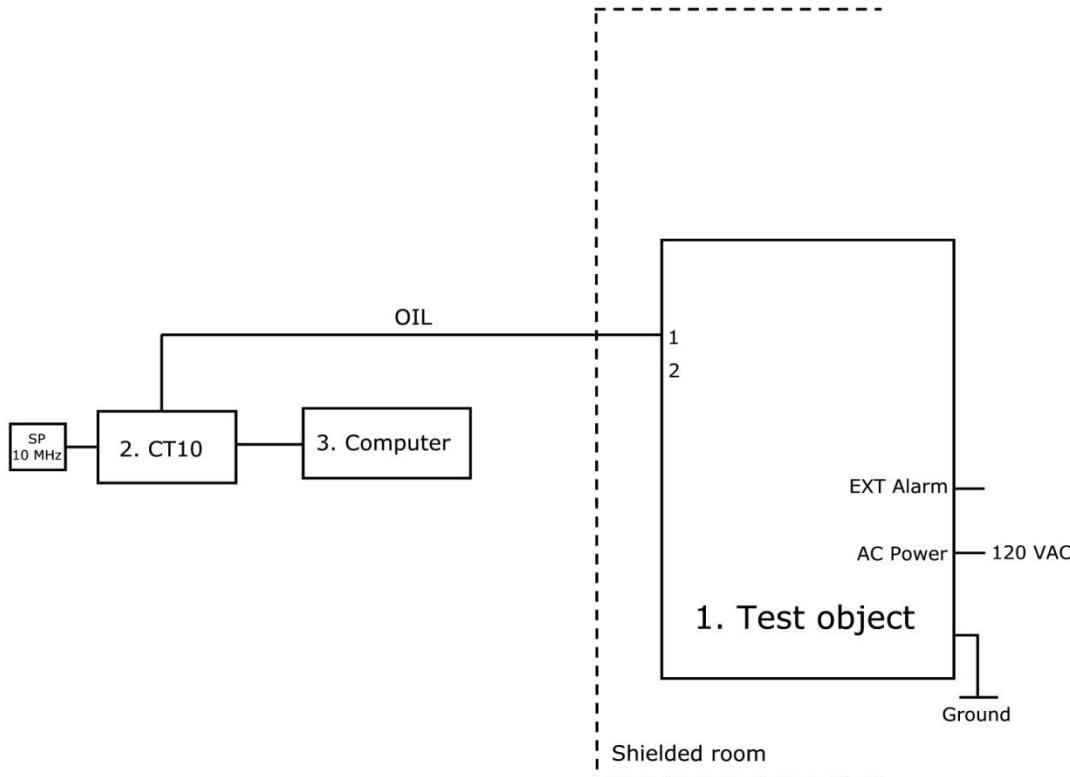
The test object was configured with both RF paths allocated to the following frequency:

Frequency [MHz]	Comment
1932.4	TX bottom frequency
1962.6	TX mid frequency
1992.6	TX top frequency

All RX frequencies were configured 80 MHz below the corresponding TX frequency according to the applicable duplex offset for the operating band.

Appendix 1

Test setup:

**Test object:**

1.	Radio 2203 B2 B25 with antenna, see appendix 3 for details
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Associated equipment:

2.	Testing Equipment: CT10, LPC 102 487/1, rev. R1C, s/n: T01F375047, BAMS – 1001466801 with software CXA 104 446/1, rev. R8M01/7
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Functional test equipment:

3.	HP EliteBook 8560w, BAMS – 1001236851
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Interface:	Type of port:
Power: 120 VAC, 60 Hz	AC Power
1, optical interface	Signal
2, optical interface, not used in this configuration	Signal
Ext Alarm	Signal
Ground wire	Ground

Appendix 1

Measurement equipment

	Calibration Due	SP number
Test site Tesla	2017-01	503 881
Measurement software: Antennkalibrering V1.24	-	-
Calculation software: EMF V1.5	-	-
Laser probe AR FL7018	2017-03	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
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: 2016-05-06.

Test engineers

Tomas Isbring and Rolf Kühn, SP.

Test participant

None.

Appendix 2

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

Date	Temperature	Humidity
2016-05-12	23 °C ± 3 °C	21 % ± 5 %
2016-05-13	23 °C ± 3 °C	31 % ± 5 %
2016-05-16	23 °C ± 3 °C	25 % ± 5 %
2016-05-17	23 °C ± 3 °C	34 % ± 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 RSS-102 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

The test object is measured in twelve directions (in 30° steps) with the field probe continuously scanning from 0.1 – 2 m in height.

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 respect to the 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 for the worst case configurations:

LTE 1.4 MHz, TX top frequency:	4.9 W (36.9 dBm)
LTE 3 MHz, TX mid frequency:	4.8 W (36.8 dBm)
LTE 20 MHz, TX mid frequency:	4.9 W (36.9 dBm)
WCDMA, TX bottom frequency:	4.9 W (36.9 dBm)
WCDMA, TX mid frequency:	4.8 W (36.8 dBm)

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

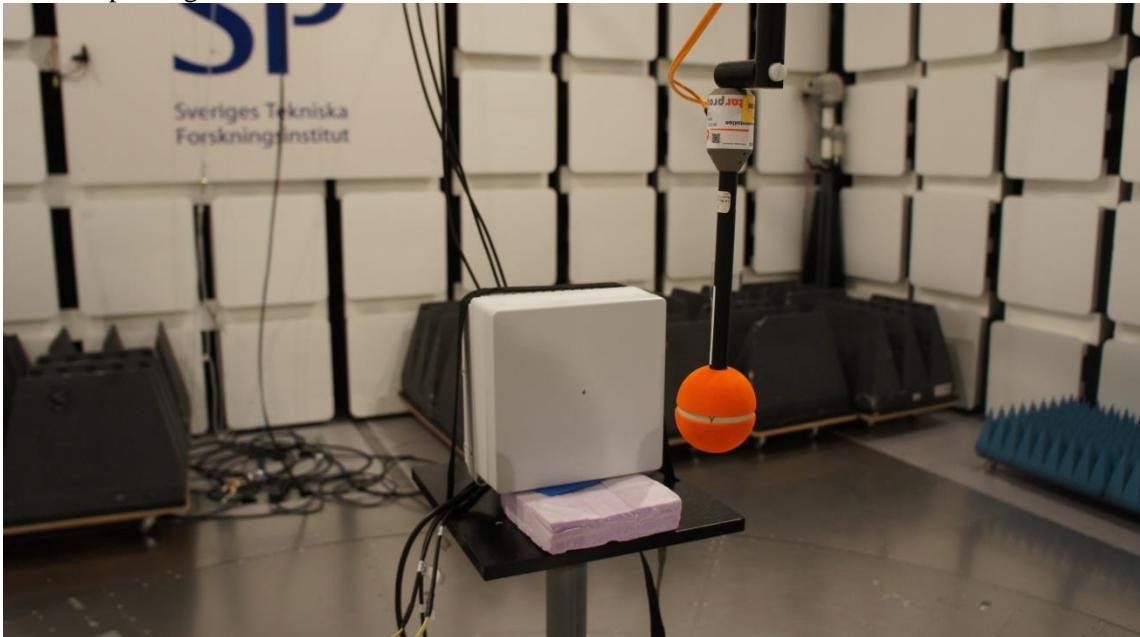
LTE 1.4 MHz, TX top frequency:	0.7 dBm
LTE 3 MHz, TX mid frequency:	0.8 dBm
LTE 20 MHz, TX mid frequency:	0.7 dBm
WCDMA, TX bottom frequency:	0.7 dBm
WCDMA, TX mid frequency:	0.8 dBm

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

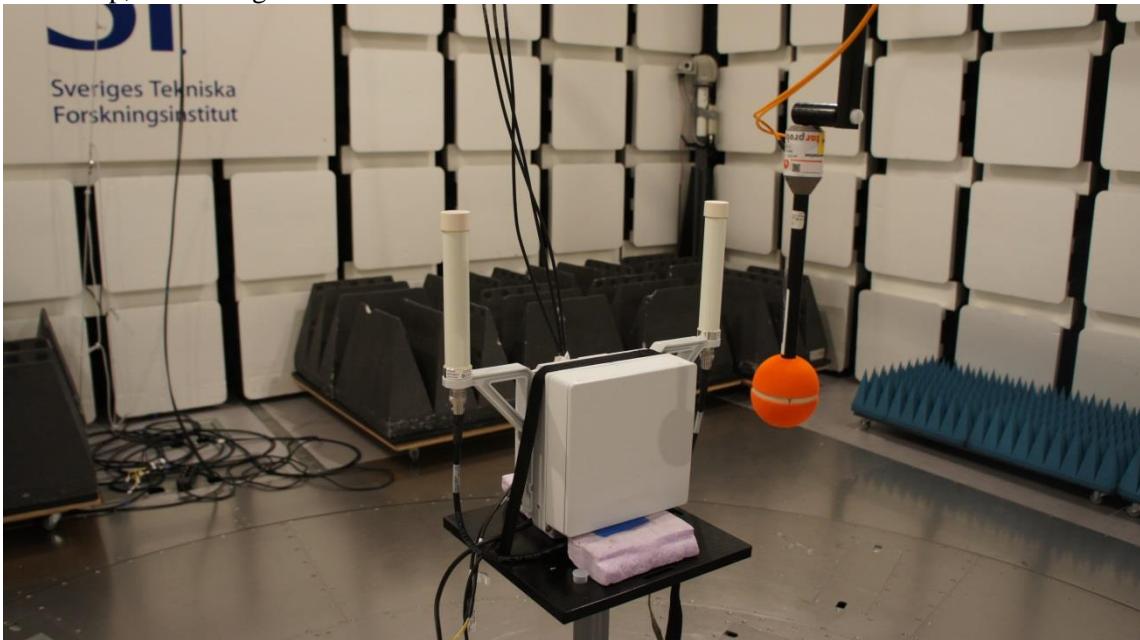
The distance for compliance for Adult is derived from spatial average over the full scan height. The distance for compliance for Child is derived from spatial average over ± 45 cm from the height where the highest level was detected.

Appendix 2

Test setup, Integrated antenna KRE 101 2249/1:

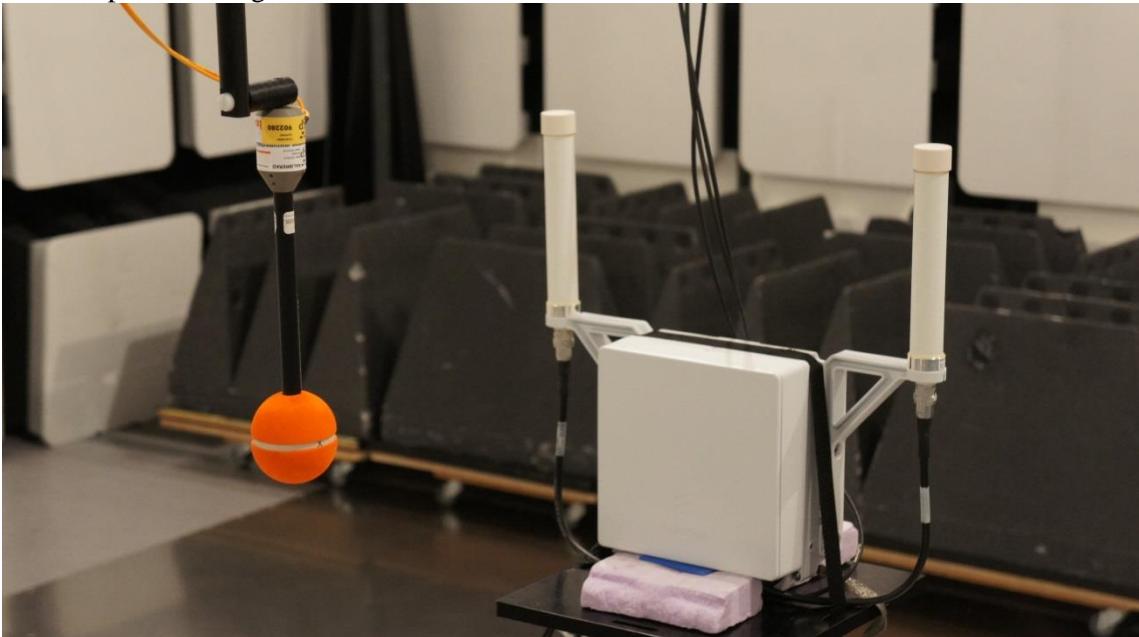


Test setup, Semi-integrated omni antenna KRE 101 2233/1:



Appendix 2

Test setup, Semi-integrated omni antenna KRE 101 2245/1:

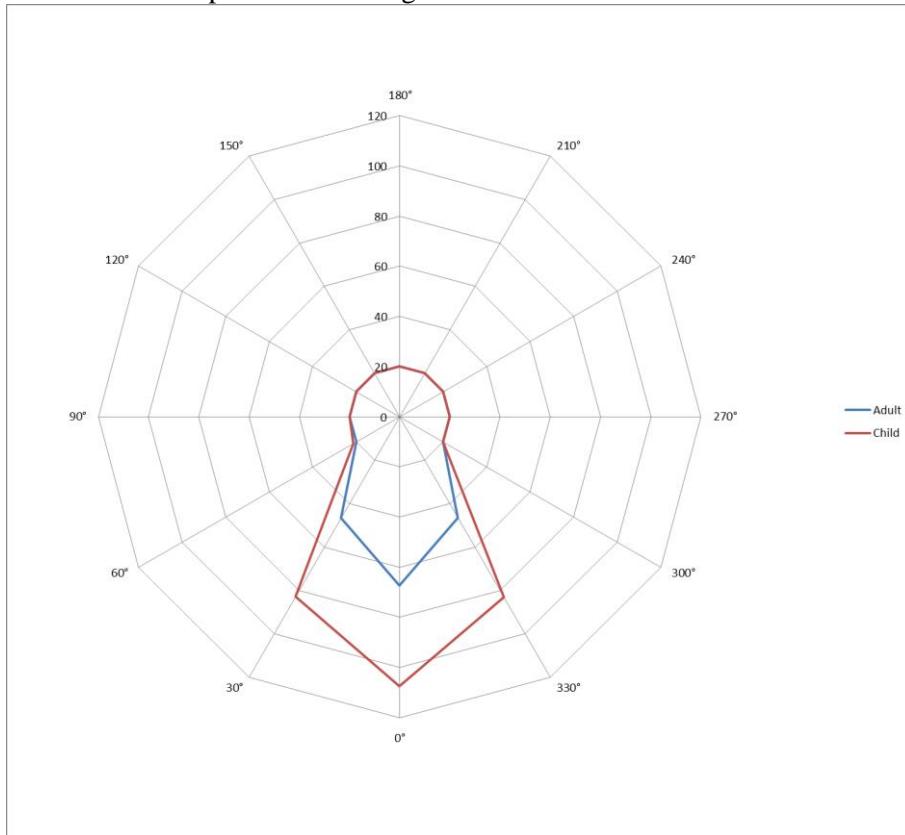


Appendix 2

Results

Integrated antenna KRE 101 2249/1, worst case: LTE BW 20 MHz, TX mid frequency.

Distance for compliance according to RSS-102:



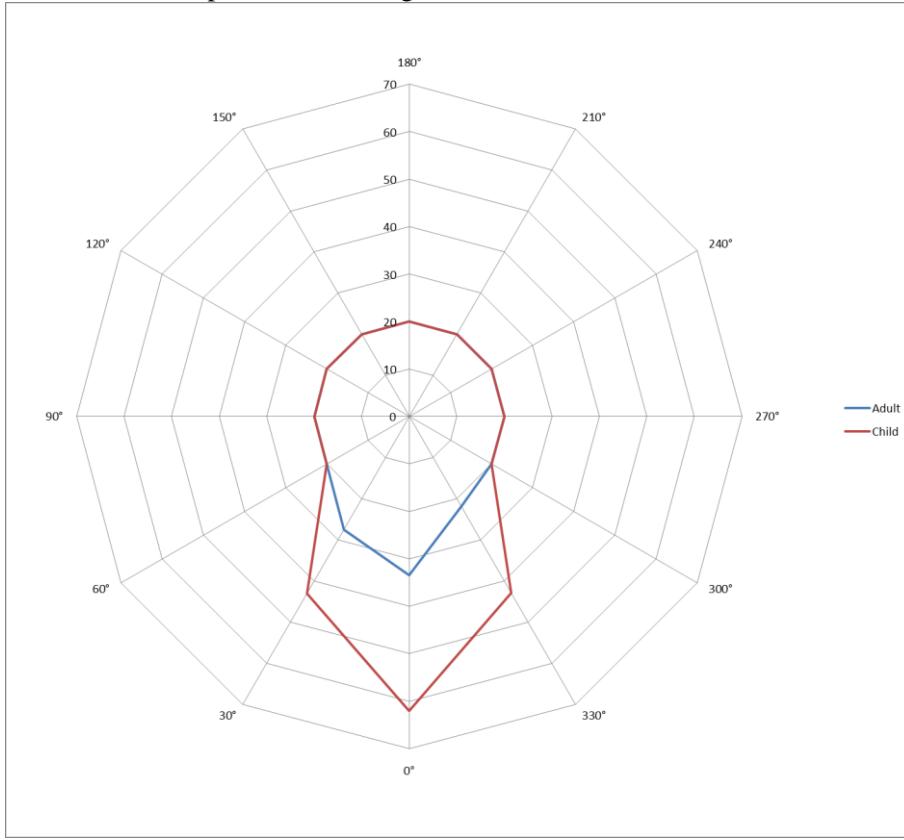
Note: The test object was placed with the front side facing 0° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	67.2	107.3
30°	46.6	82.9
60°	20.0	21.3
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°	46.5	83.1

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 0.46606 mW/cm^2 for LTE BW 20 MHz, TX mid frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



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

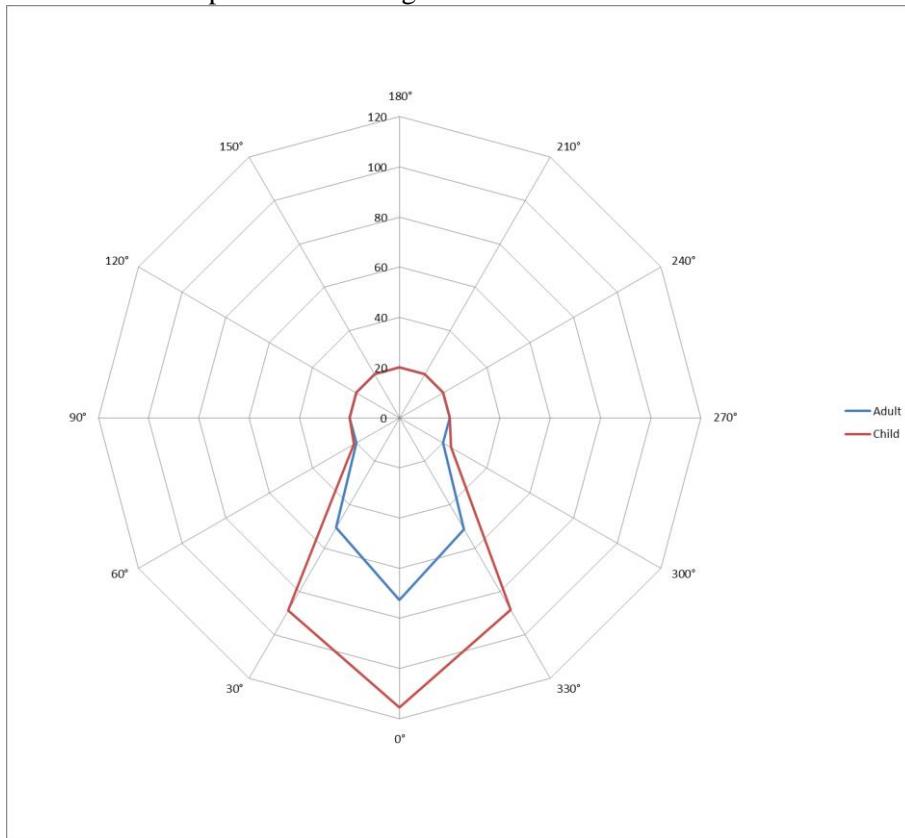
Direction	Distance for compliance (cm).	
	Adult	Child
0°	33.4	62.0
30°	27.5	43.0
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	20.0
330°	21.9	43.0

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 1.0 mW/cm² for LTE BW 20 MHz, TX mid frequency.

Appendix 2

Integrated antenna KRE 101 2249/1, worst case: WCDMA, TX bottom frequency

Distance for compliance according to RSS-102:



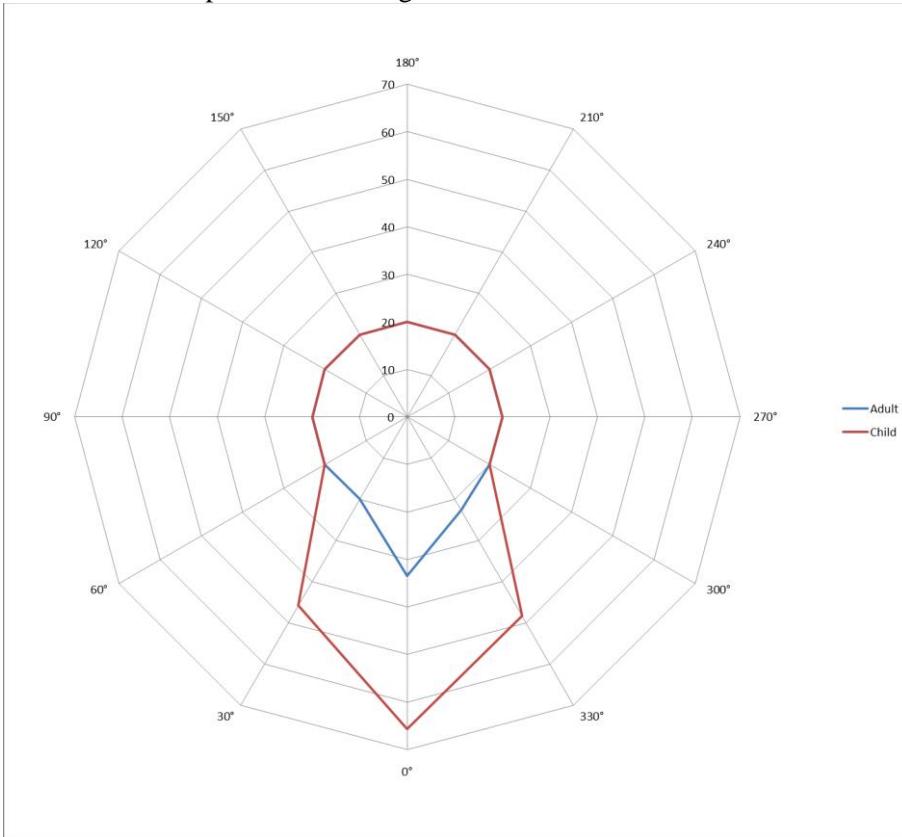
Note: The test object was placed with the front side facing 0° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	72.5	115.5
30°	50.6	88.6
60°	20.0	21.1
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	23.5
330°	51.3	88.4

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 0.461163 mW/cm² for WCDMA, TX bottom frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



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

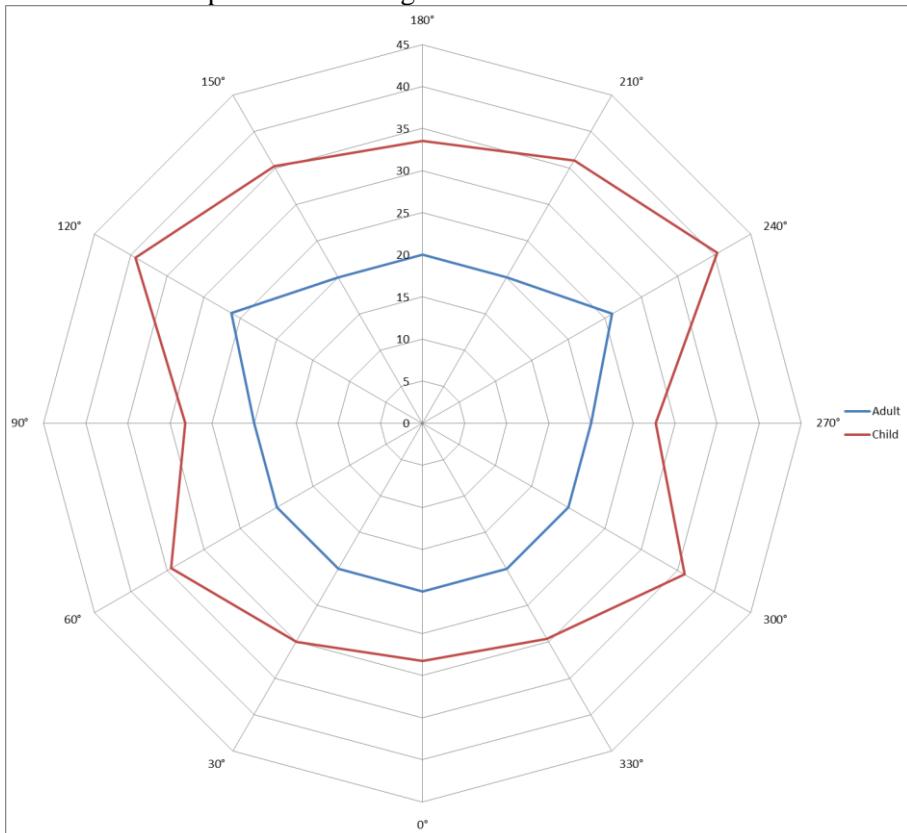
Direction	Distance for compliance (cm).	
	Adult	Child
0°	33.5	65.6
30°	20.0	45.7
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	20.0
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	20.0
270°	20.0	20.0
300°	20.0	20.0
330°	22.6	48.3

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 1.0 mW/cm² for WCDMA, TX bottom frequency.

Appendix 2

Semi-integrated omni antenna KRE 101 2233/1, worst case: LTE 3 MHz, TX mid frequency.

Distance for compliance according to RSS-102:



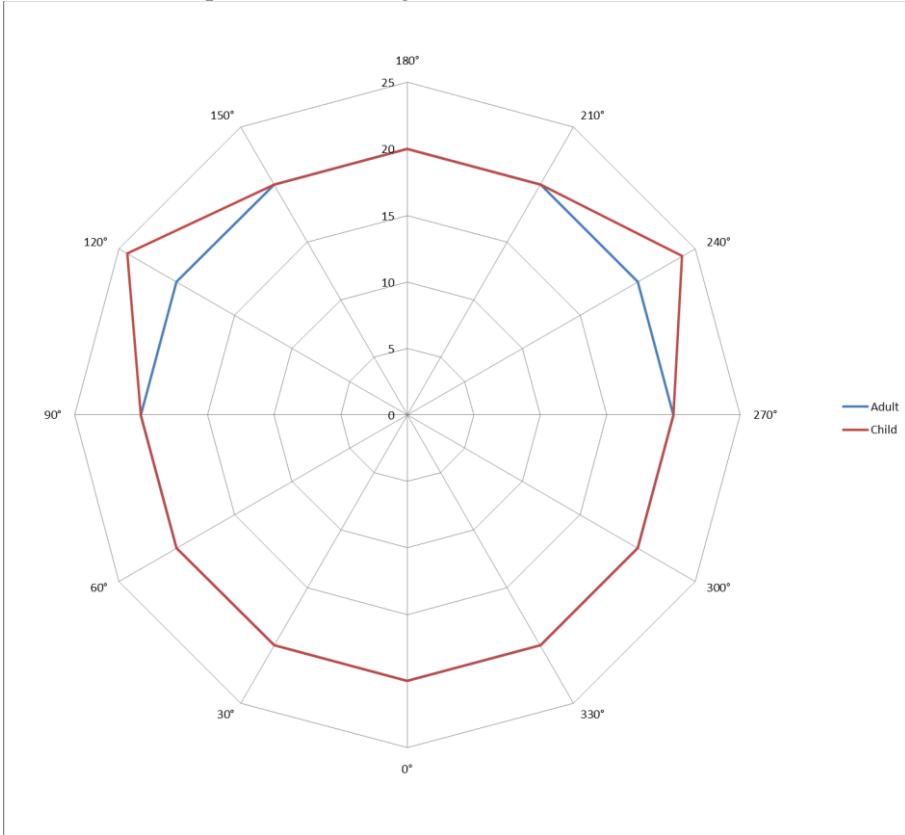
Note: The test object was placed with the front side facing 0° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	28.3
30°	20.0	30.0
60°	20.0	34.5
90°	20.0	28.2
120°	26.2	39.3
150°	20.0	35.2
180°	20.0	33.5
210°	20.0	36.1
240°	26.0	40.4
270°	20.0	27.7
300°	20.0	36.0
330°	20.0	29.6

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 0.46606 mW/cm² for LTE BW 3 MHz, TX mid frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



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

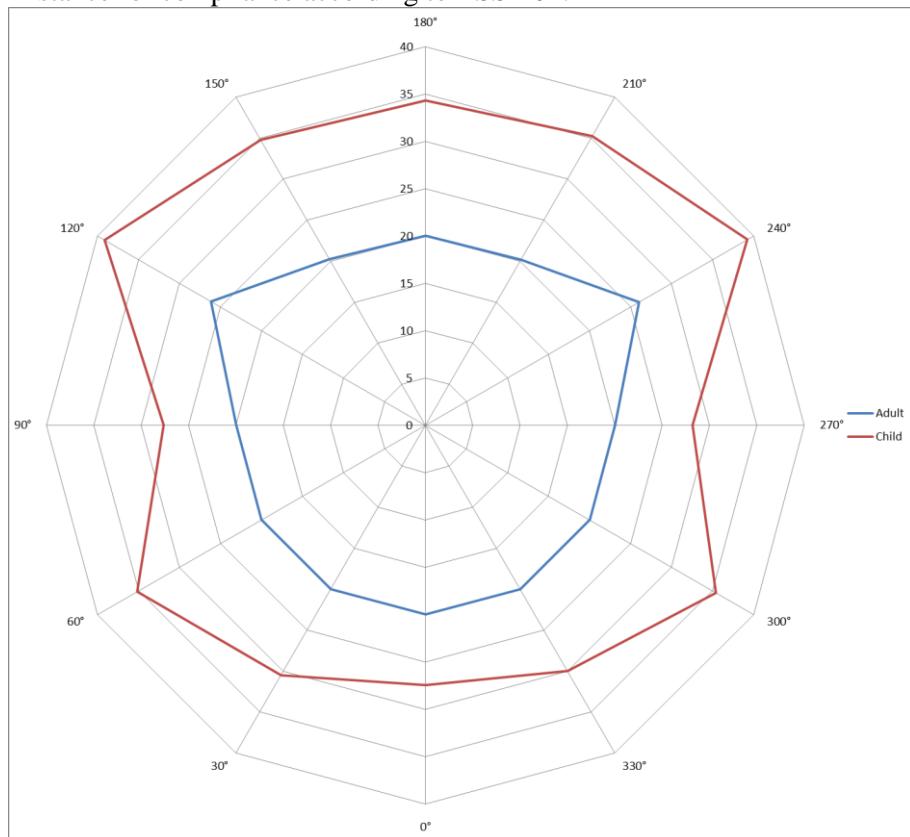
Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	20.0
30°	20.0	20.0
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	24.3
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	23.9
270°	20.0	20.0
300°	20.0	20.0
330°	20.0	20.0

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 1.0 mW/cm² for LTE BW 3 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:



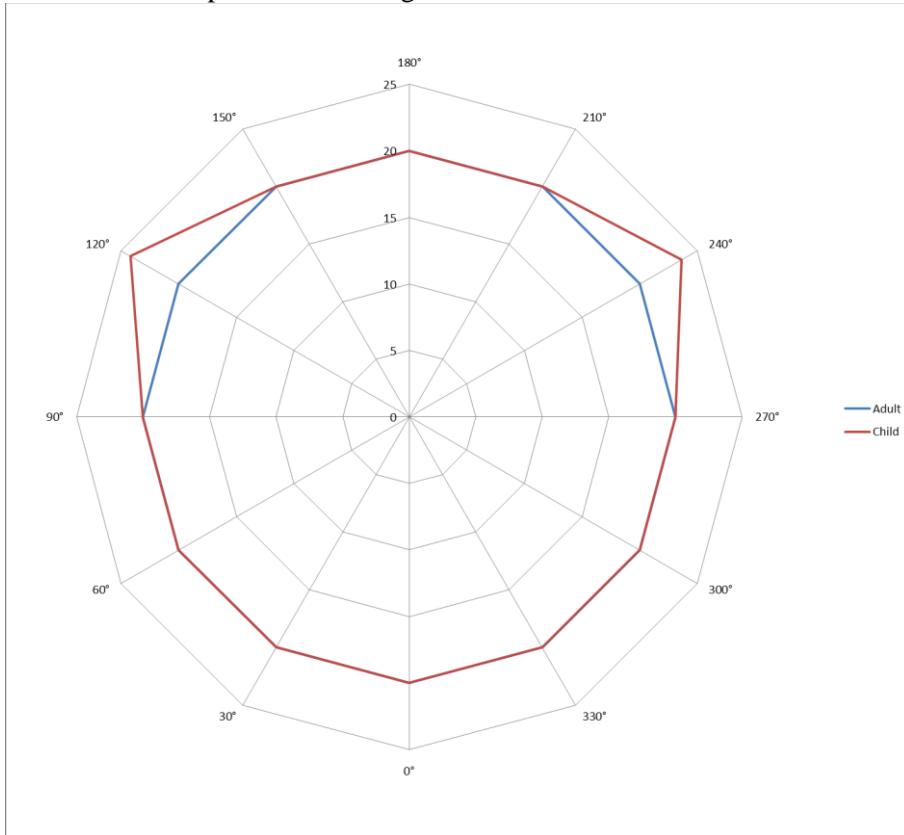
Note: The test object was placed with the front side facing 0° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	27.5
30°	20.0	30.5
60°	20.0	35.1
90°	20.0	27.6
120°	26.2	39.1
150°	20.2	34.8
180°	20.0	34.3
210°	20.2	35.3
240°	26.0	39.2
270°	20.0	28.2
300°	20.0	35.4
330°	20.0	30.0

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 0.461163 mW/cm² for WCDMA, TX bottom frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



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

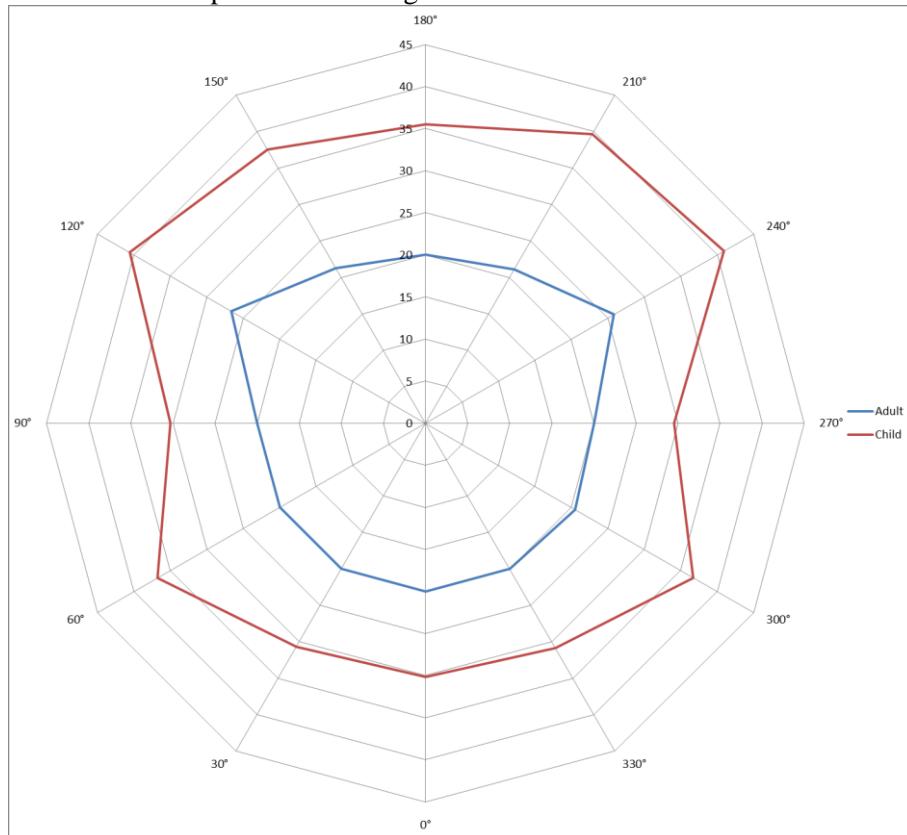
Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	20.0
30°	20.0	20.0
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	24.2
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	23.6
270°	20.0	20.0
300°	20.0	20.0
330°	20.0	20.0

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 1.0 mW/cm² for WCDMA, TX bottom frequency.

Appendix 2

Semi-integrated omni antenna KRE 101 2245/1, worst case: LTE 1.4 MHz, TX top frequency.

Distance for compliance according to RSS-102:



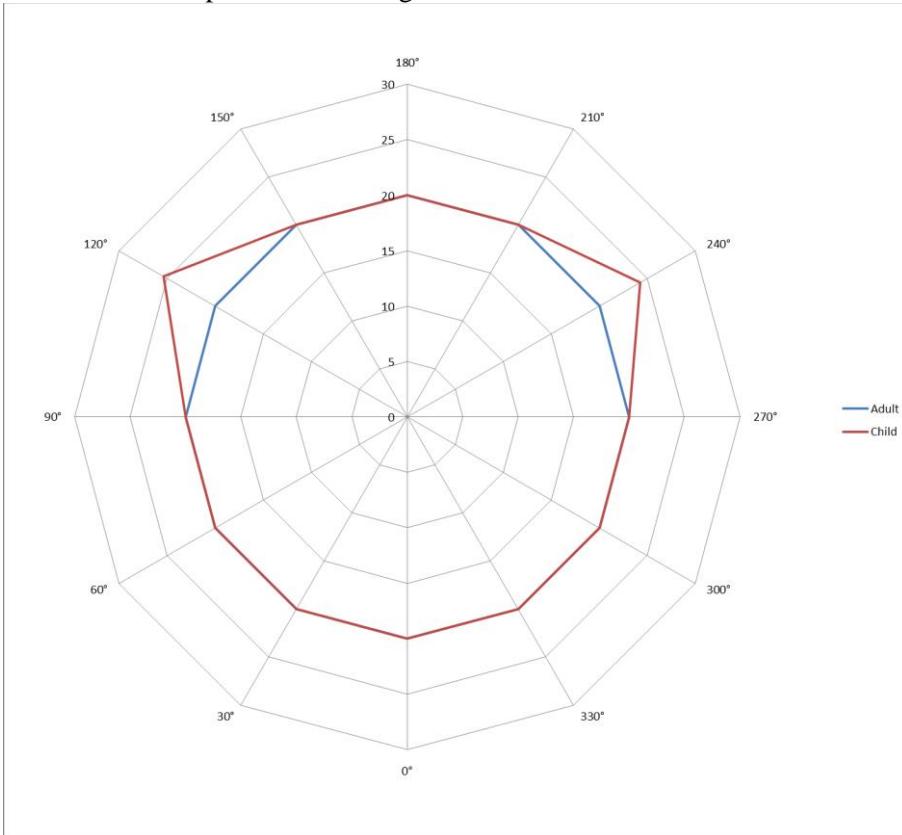
Note: The test object was placed with the front side facing 0° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	30.1
30°	20.0	30.7
60°	20.0	36.8
90°	20.0	30.3
120°	26.6	40.6
150°	21.3	37.6
180°	20.0	35.5
210°	21.1	39.7
240°	25.8	40.9
270°	20.0	29.5
300°	20.5	36.7
330°	20.0	30.8

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 0.471208 mW/cm^2 for LTE BW 1.4 MHz, TX top frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



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

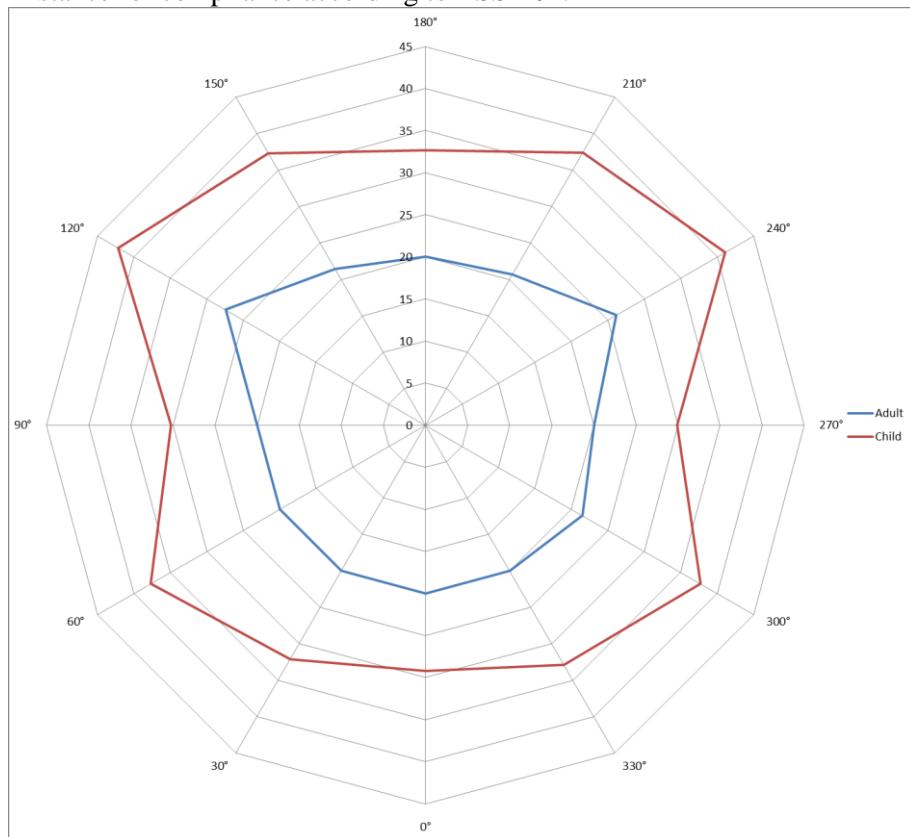
Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	20.0
30°	20.0	20.0
60°	20.0	20.0
90°	20.0	20.0
120°	20.0	25.4
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	24.2
270°	20.0	20.0
300°	20.0	20.0
330°	20.0	20.0

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 1.0 mW/cm² for LTE BW 1.4 MHz, TX top frequency.

Appendix 2

Semi-integrated omni antenna KRE 101 2245/1, worst case: WCDMA, TX mid frequency

Distance for compliance according to RSS-102:



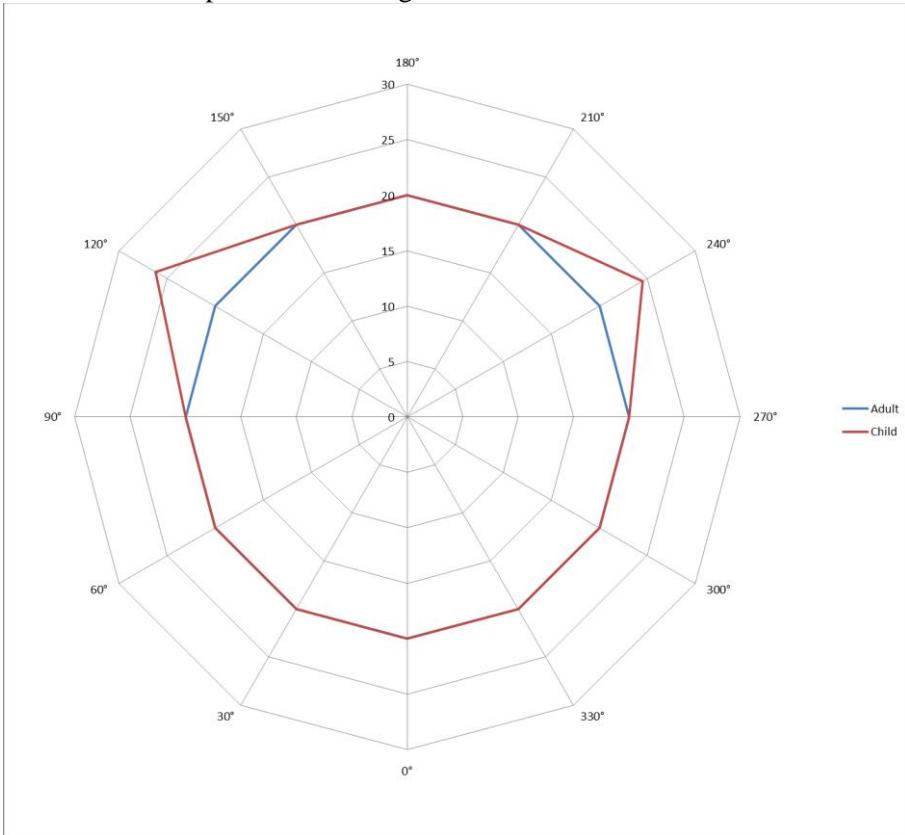
Note: The test object was placed with the front side facing 0° as shown in the test setup photo.

Direction	Distance for compliance (cm).	
	Adult	Child
0°	20.0	29.2
30°	20.0	32.2
60°	20.0	37.7
90°	20.0	30.2
120°	27.4	42.2
150°	21.4	37.3
180°	20.0	32.6
210°	20.7	37.4
240°	26.2	41.1
270°	20.0	29.9
300°	21.5	37.7
330°	20.0	32.9

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 0.466076 mW/cm² for WCDMA, TX mid frequency.

Appendix 2

Distance for compliance according to 47 CFR 1.1310:



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

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°	20.0	26.2
150°	20.0	20.0
180°	20.0	20.0
210°	20.0	20.0
240°	20.0	24.5
270°	20.0	20.0
300°	20.0	20.0
330°	20.0	20.0

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 1.0 mW/cm² for WCDMA, TX mid 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 ²)	Averaging time E ² . H ² or S (minutes)
1500-100000	-	-	1	(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 ²)	Averaging time E ² . H ² or S (minutes)
300-6000	-	-	0.02619f ^{0.6834}	(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 B2 B25	KRC 161 489/1	R1D	C82A522331
PSU AC 10	BML 901 350/1	R1B	BW9A400553
FAN UNIT	BKV 106 176/2	R2B	CE51000UEM

Antennas:

Product name	Product number	R-state	Serial number
Antenna 6503	KRE 101 2249/1	R1C	D775310040
VPol Omni 790-960/ 1710-2700 (rightside)	KRE 101 2233/1	-	DEI4027800
VPol Omni 790-960/ 1710-2700 (leftside)	KRE 101 2233/1	-	DEI4027744
VPol Omni 694-894/ 1710-2700 (rightside)	KRE 101 2245/1	-	DEI4432219
VPol Omni 694-894/ 1710-2700 (leftside)	KRE 101 2245/1	-	DEI4432235

SFP modules:

Product name	Product number	Manufacturer	Product number of Manufacturer	Serial number
SFP	RDH 102 65/3	Finisar	FTLX1471D3BTL-E7	AM9041L

Radio software:

Product number	Revision
CXP 901 7316/2	R62EU

Appendix 4

Photos of test object

Front side of Radio 2203 B2 B25



PSU AC 10 and FAN UNIT:



Appendix 4

Front side with integrated antenna KRE 101 2249/1



Front side with omni antenna KRE 101 2233/1



Front side with omni antenna KRE 101 2245/1



Appendix 4

Radio label:



PSU AC 10 label:



FAN UNIT label:



SFP module:



Appendix 4

Integrated antenna KRE 101 2249/1 label:



Semi-integrated omni antenna KRE 101 2233/1 labels:

Rightside antenna:



Leftside antenna:



Appendix 4

Semi-integrated omni antenna KRE 101 2245/1 labels:

Rightside antenna:



Leftside antenna:

