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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Date	Reference	Page
2014-06-17	3P08659-MPE	1 (2)

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MPE test on Ericsson mRRUS 12 B12

(3 appendices)

Test object

Product name: mRRUS 12 B12
Product number: KRC 161 331/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 ver 05 rev 1	Yes	2	-

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Performed by

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Anders Nordlöf

Table of contents

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.

Compliancy 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 mRRUS meets the requirements of 47 CFR 2.1091 and RSS-102.

Description of the test object

The test object is a micro Remote Radio Unit configured in Single Standard mode for a LTE base station and designed to provide mobile users with a connection to a mobile network.

The test scope covers the following models of test objects:

Product number: KRC 161 331/1, 110-240 VAC internal antenna
Product number: KRC 161 331/2, -48 VDC internal antenna
Product number: KRC 161 331/3, 110-240 VAC no internal antenna
Product number: KRC 161 331/4, -48 VDC no internal antenna

FCC ID: TA8AKRC161331
IC ID: 287AB-AS161331

IC model numbers:
IC MODEL NO: AS1613311
IC MODEL NO: AS1613312
IC MODEL NO: AS1613313
IC MODEL NO: AS1613314

Delivery of test object

The test object was delivered: 2014-05-16.

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, Hyder Khalaf and Kexin Chen, SP.

Test participant

Mihai Simon, Ericsson AB.

Tested configuration

RF A configuration:	1x 37.0 dBm (5 W)
RF B configuration:	1x 37.0 dBm (5 W)
SFP module Data 1:	RDH 102 47/2, Oclaro Inc. , s/n: L13H32852
OIL:	Opto fibre, single mode, 2.5 Gbit/s
Power configuration:	-48 VDC

Operational test mode

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

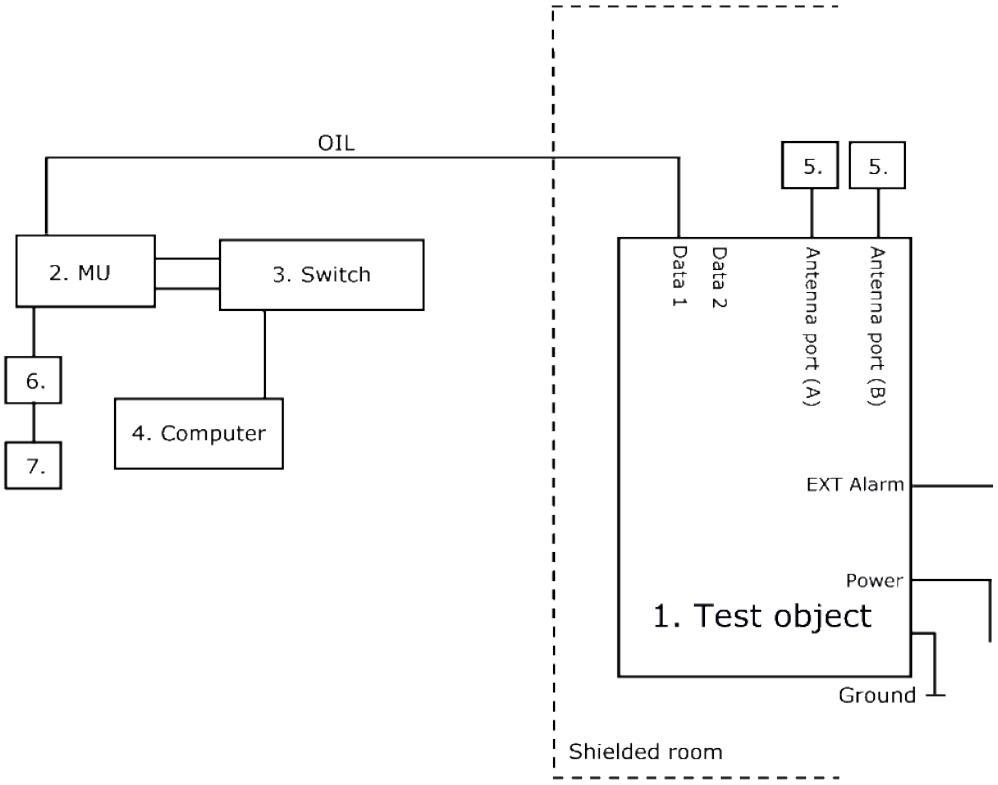
The test object was configured in MIMO mode with both RF paths allocated to the following EARFCN:

EARFCN Downlink	Frequency [MHz]	Symbolic name	Comment
5035	731.5	B	TX bottom frequency in 5 MHz BW configuration
5090	737.0	M	TX mid frequency in 5 MHz BW configuration
5145	742.5	T	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.	mRRUS 12 B12, KRC 161 331/2, rev. R1C, s/n: C827930693 working software CXP 901 7316/2, rev. R51NN

Functional test equipment:

2.	Main Unit SUP 6601, 1/BFL 901 009/4, rev. R1E, s/n: BR88258854 DUS 41 01, KDU 137 624/1, rev. R5A, s/n: D168382181
3.	Netgear Switch GSM7212, BAMS – 1000517299
4.	Computer Sun ultra27-01, BAMS – 1000758436
5.	Antenna, see antenna details below
6.	GPS 02 01, NCD 901 41/1, rev. R1C, s/n: A401677751
7.	GPS Active Antenna, KRE 101 2082/1

Integrated antenna
Sector antenna, KRE 101 2134/1, rev. R1C, s/n: T89U200136
Representing version: KRC 161 331/1 and KRC 161 331/2

Semi-integrated omni antenna
VPol Omni 694-894, KRE 101 2245/1, s/n: D7G3305551, D7G3305547
Type no. 80010846
Representing version: KRC 161 331/3 and KRC 161 331/4

Appendix 1

Interface:	**Type of port:**
Power: -48 VDC	DC Power
Data 1, optical interface	Signal
Data 2, optical interface	Signal
Ext Alarm, unshielded multi wire	Signal
Ground wire	Ground

RBS software:

Product number	**Revision**
CXP 102 051/19	R39BC

Appendix 2

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

Date	Temperature	Humidity
2014-06-02	23 °C ± 3 °C	33 % ± 5 %
2014-06-03	23 °C ± 3 °C	49 % ± 5 %
2014-06-04	23 °C ± 3 °C	50 % ± 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 – 1.9 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.

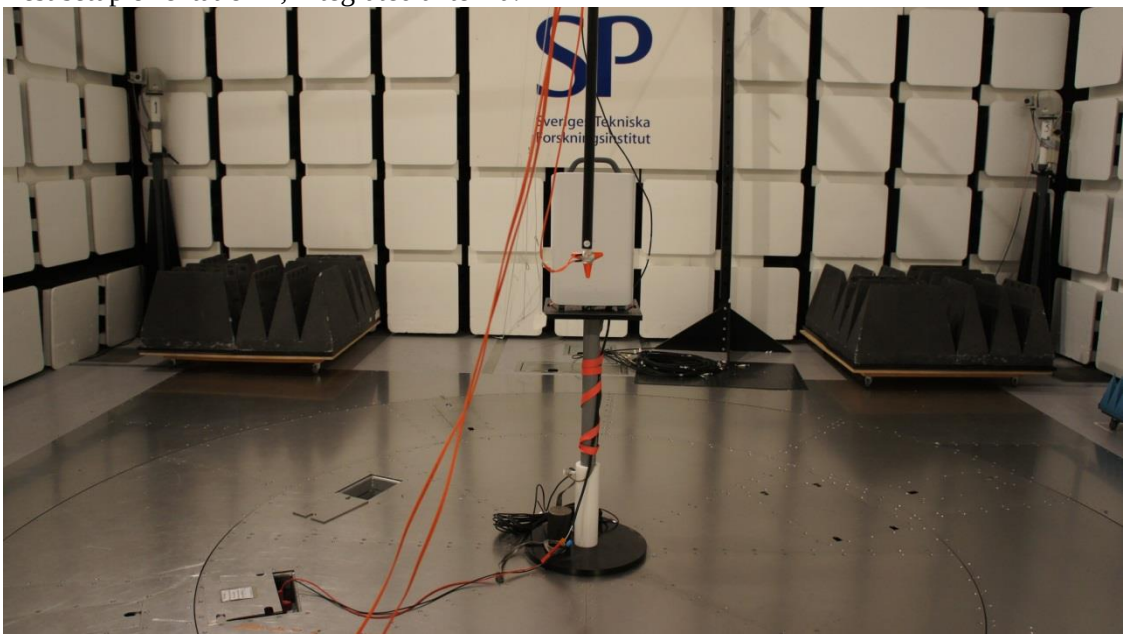
2. field probe characteristics with respect to the modulated signal LTE BW 5 MHz at different levels of the field strength.

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 4.7 W (36.7 dBm). Therefore the calculation was adjusted by 1.3 dBm to cover the highest possible output power.

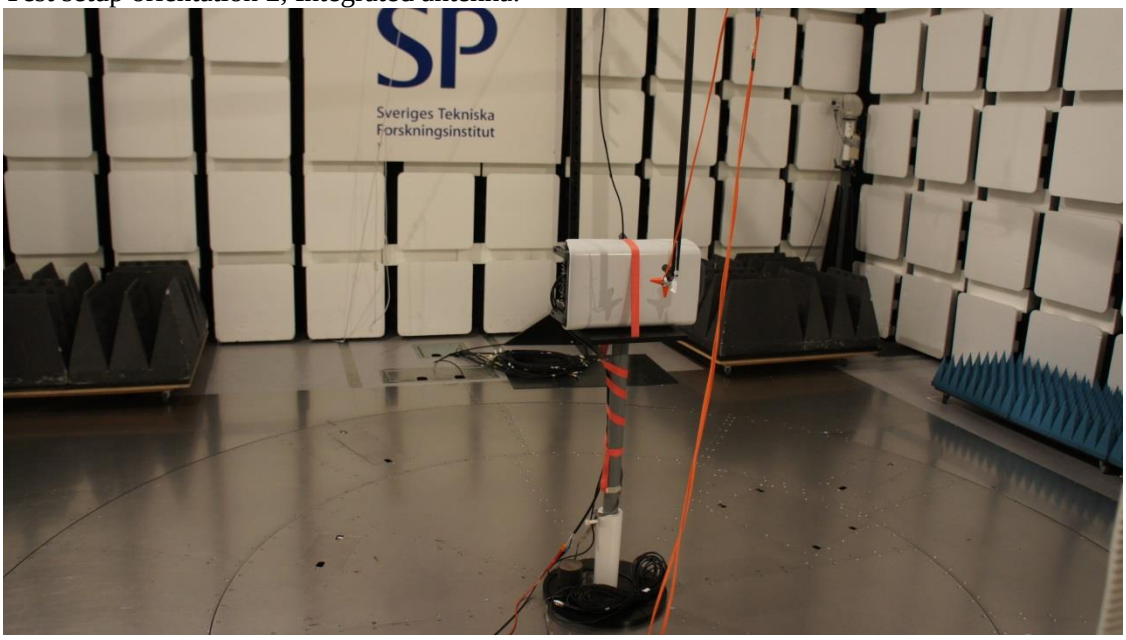
The measurement were made with an Integrated and a Semi-integrated omni antenna.

Appendix 2

Test setup orientation 1, Integrated antenna:

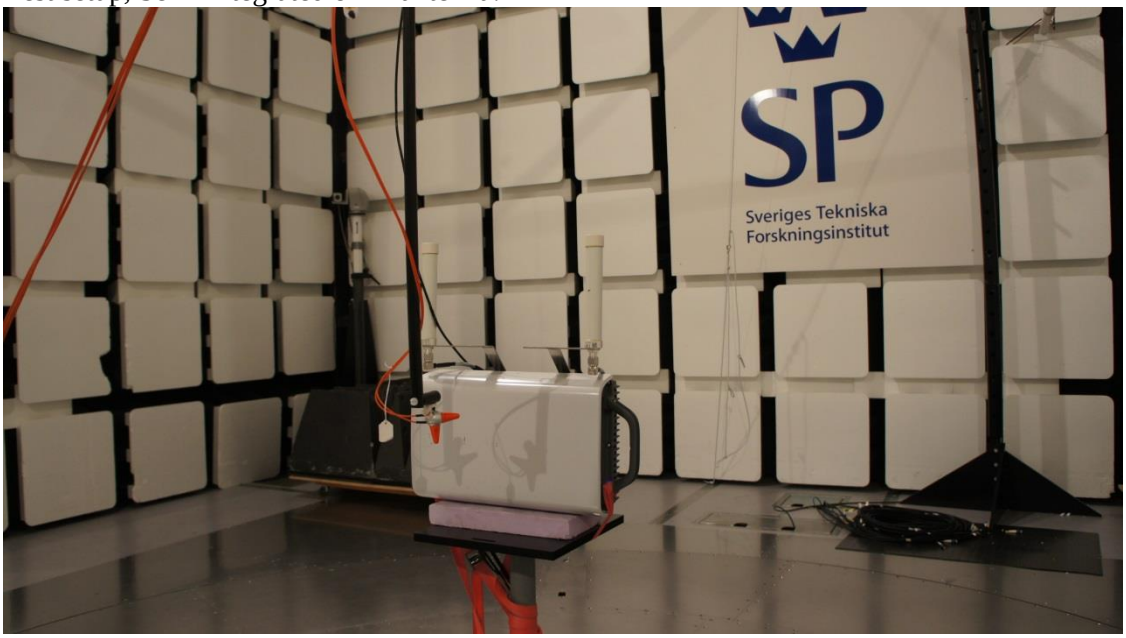


Test setup orientation 2, Integrated antenna:



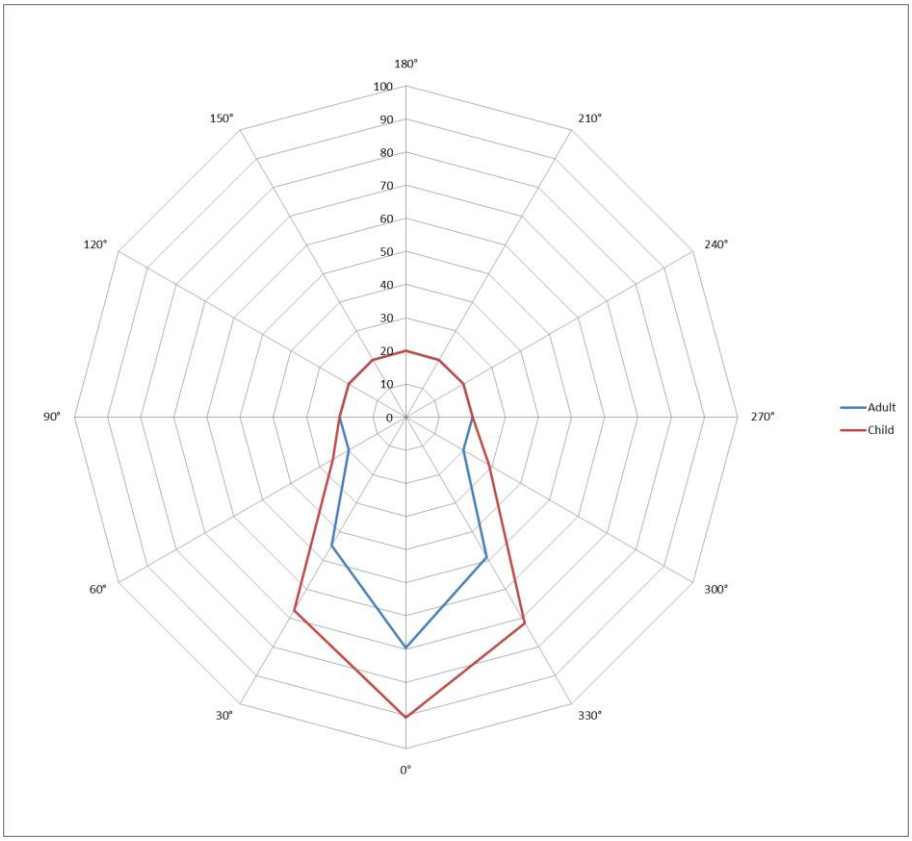
Appendix 2

Test setup, Semi-integrated omni antenna:



Results

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

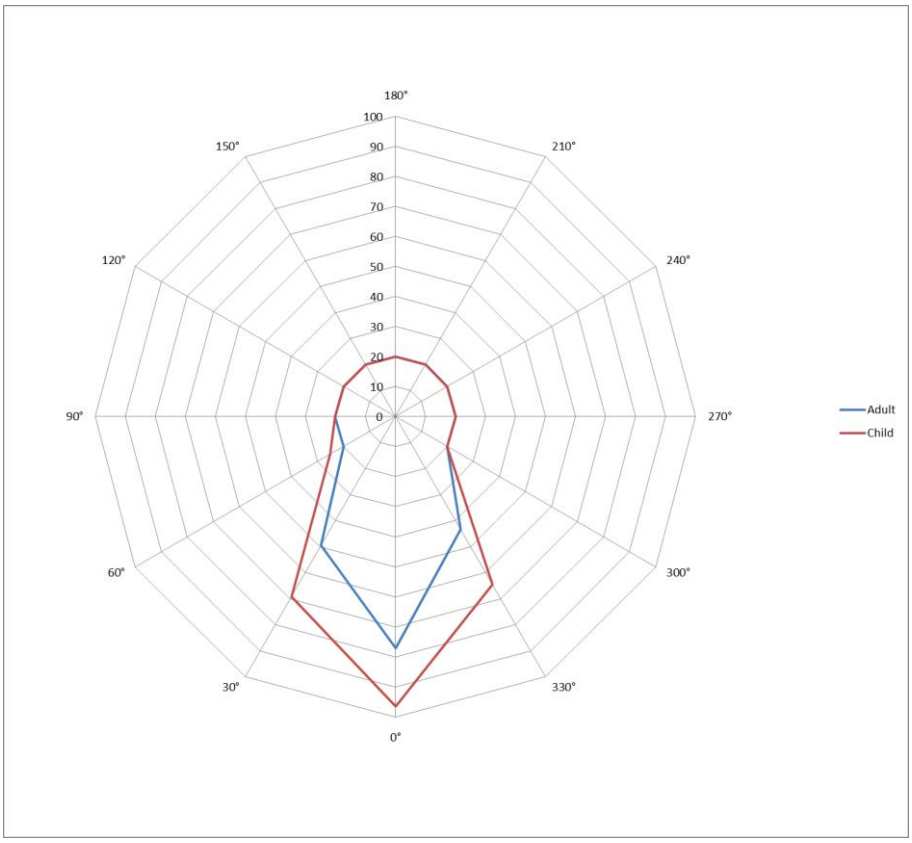


Note: The test object was placed with the front side facing 0° and the rear side facing 180° as shown in the test setup photo.

	Distance for compliance (cm).	
Direction	Adult	Child
0°	69.5	90.7
30°	44.7	67.4
60°	20.0	25.6
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	29.0
330°	48.7	71.8

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

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

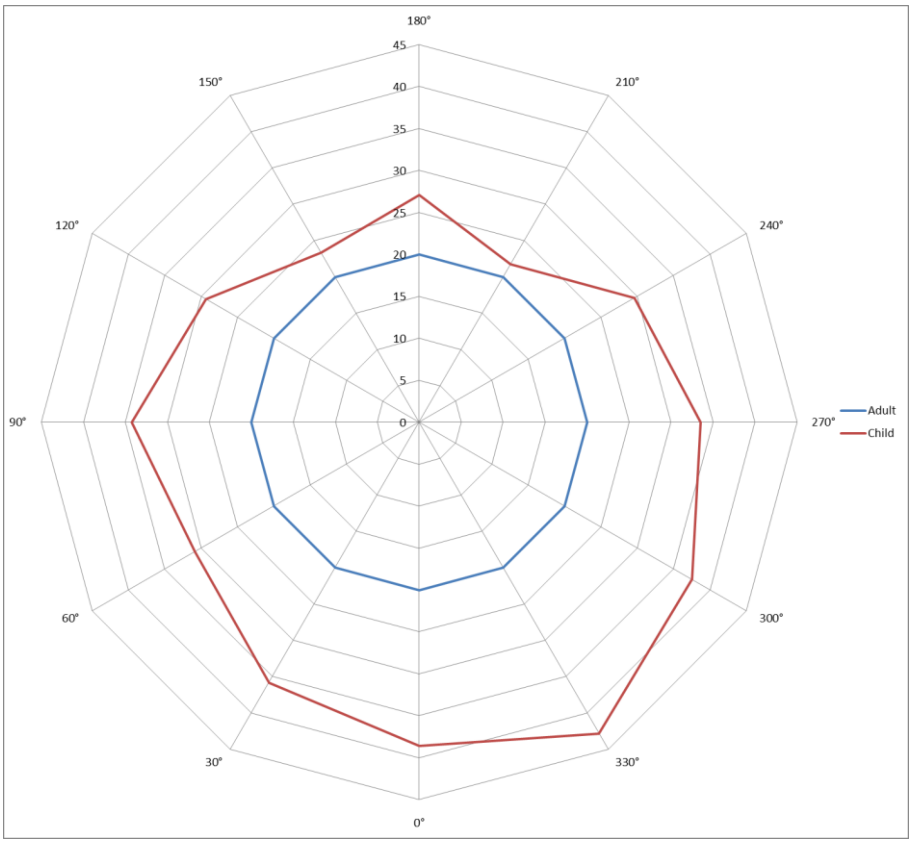


Note: The test object was placed with the front side facing 0° and the cable inlet facing 90° as shown in the test setup photo.

	Distance for compliance (cm).	
Direction	Adult	Child
0°	77.2	96.4
30°	49.4	69.2
60°	20.0	25.0
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°	43.4	64.5

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

Semi-integrated omni 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.

	Distance for compliance (cm).	
Direction	Adult	Child
0°	20.0	38.6
30°	20.0	35.8
60°	20.0	30.8
90°	20.0	34.3
120°	20.0	29.3
150°	20.0	23.3
180°	20.0	27.0
210°	20.0	21.7
240°	20.0	29.6
270°	20.0	33.5
300°	20.0	37.5
330°	20.0	42.9

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

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

Appendix 3

Photos of test object

Front side with cover:

Front side without cover:

Front side without Integrated antenna and without cover:

Left side without Integrated antenna and without cover:

Appendix 3

Right side without Integrated antenna and without cover:

Back side :

Front side with Semi-integrated omni antenna

Appendix 3

Labels:

mRRUS 12 B12:

SFP module:

Data port 1:

Integrated antenna:

Appendix 3

Semi-integrated omni antennas (KRE 101 2245/1):

Antenna 1

Antenna 2