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Test report issued by an Accredited Testing Laboratory

EMF Test Report: Radio 4415

Document number:	GFTB-17:001313 Uen Rev D	**Date of report:**	2018-10-19
Testing laboratory:	Ericsson EMF Research Laboratory Ericsson AB SE-164 80 Stockholm Sweden	**Company/Client:**	Magnus Karlsson Ericsson AB SE-164 80 Stockholm Sweden
Tests performed by:	Bo Xu Björn Thors	**Dates of tests:**	2017-09-25 (Rev B). This document replaces the GFTB-17:001313 Uen Rev A. 2018-04-25 (Rev C) 2018-10-12 (Rev D)
Manufacturer and market name(s) of device:	Radio 4415		
Testing has been performed in accordance with:	European standards: EN 50385, EN/IEC 62232:2017 FCC OET Bulletin 65		
Test results:	The tested equipment complies with the requirements in respect of all parameters subject to the test.		
Additional information:	By inclusion of the test report summary and the content of Appendices A and B in the product documentation, the tested equipment complies with the requirements of EN 50385.		

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Summary of EMF Test Report[1]

Equipment under test (EUT)

Product number	KRC 161 635/1 KRC 161 635/2 KRC 161 760/3 KRC 161 769/3 KRC 161 771/2		
Supported bands, Tx frequency range (MHz)	Band 1	2110 – 2170	WCDMA, LTE
	Band 3	1805 – 1880	GSM, LTE
	Band 30	2350 – 2360	LTE
	Band 70	1995 – 2020	LTE
EIRP[2] (dBm) and EN/IEC 62232:2017 installation class [3]	72.9	E+	
	72.3	E+	
	71.4	E+	
	72.9	E+	

Antennas

Product number	KRE 101 2294/1
Tested mode(s)	Band 1 (W/L) Band 3 (G/L) Band 30 (L) Band 70 (L)

Results

RF exposure compliance boundaries, outside of which the exposure is below the general public (GP) and workers (W) exposure limits, are listed below.

Dimensions of the box-shaped compliance boundary for general public (GP) and workers (W) exposure for Radio 4415 applicable in markets employing the ICNIRP, EU, or FCC RF exposure limits with assumed 0.5 dB transmission loss and 0.6 dB output power tolerance.

Mode and output power for Radio 4415			**Dimensions of the box-shaped compliance boundary[3] (m)**							
			Distance in front of antenna		**Width**		**Height**		**Distance behind the antenna**	
Band	**Standard**	**Nominal output power from the radio**	**GP**	**W**	**GP**	**W**	**GP**	**W**	**GP**	**W**
B1	W/L	160 W	12.7	5.3	9.9	3.6	3.5	1.6	<0.1	<0.1
B3	G/L	160 W	12.1	5.1	9.6	4.3	3.8	1.7	<0.1	<0.1
B30	L	100 W	10.2	4.1	7.4	2.5	3.7	1.7	<0.1	<0.1
B70	L	160 W	12.4	5.2	9.9	4.5	3.5	1.6	<0.1	<0.1

With the accepted power taken as the total power delivered to the antenna including tolerances, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative

[1] This page contains a summary of the test results. The full report provides a complete description of all test details and results.
[2] The stated EIRP value is the nominal peak beam EIRP without power tolerance or loss included.
[3] The provided compliance boundary dimensions are valid for all sub-bands within the tested bands.

Dimensions of the box-shaped compliance boundary for general public (GP) and workers (W) exposure for Radio 4415 determined according to the exposure limits applicable in Canada with assumed 0.5 dB transmission loss and 0.6 dB output power tolerance.

Mode and output power for Radio 4415			Dimensions of the box-shaped compliance boundary[3] (m)							
			Distance in front of antenna		Width		Height		Distance behind the antenna	
Band	**Standard**	**Nominal output power from the radio**	**GP**	**W**	**GP**	**W**	**GP**	**W**	**GP**	**W**
B30	L	100 W	14.2	5.5	10.2	3.4	5.0	2.1	<0.1	<0.1

With the accepted power taken as the total power delivered to the antenna including tolerances, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative

1 General information

The test results presented in this report define compliance boundaries for maximum power configurations of Radio 4415. Outside these compliance boundaries, the radio frequency (RF) exposure levels are below the international exposure limits specified by the International Commission on Non-Ionizing Radiation Protection (ICNIRP) [4], the European Commission [5], [6] and the Federal Communications Commission (FCC) [7], and Health Canada [8]. The tests were performed by calculations in accordance with the Ericsson RF exposure calculation procedure for base stations [10], which is in conformity with the European standards EN 50385 [2], EN/IEC 62232:2017 [3], and FCC OET Bulletin 65 [9].

Recommended product specific EMF health and safety information for Ericsson radio products is found in [1]. By inclusion of the test report summary in [1] and the content of Appendices A and B in the product documentation, the tested equipment complies with the documentation requirements listed in the clause 8 of EN 50385 [2].

2 Equipment under test

Table 1 and Table 2 below summarize the technical data for the equipment under test (EUT) and the antenna properties for the integrated antenna. The tested antenna is a directional sector antenna.

Table 3 lists the nominal output power from the radio unit (total power from all antenna branches) and the total power delivered to the antenna for the specified configuration. The total power delivered to the antenna includes a tolerance of 0.6 dB and a transmission loss of 0.5 dB.

Table 1 Equipment under test.

Product name and product number	Radio 4415	KRC 161 635/1 KRC 161 635/2 KRC 161 760/3 KRC 161 769/3 KRC 161 771/2	
Configuration	Radio 4415 B1 Radio 4415 B3B Radio 4415 B30 Radio 4415 B70		
Supported bands, Tx frequency range (MHz), and standards	Band 1 (2100)	2110 - 2170	WCDMA, LTE
	Band 3 (1800)	1805 – 1880	GSM, LTE
	Band 30 (2300)	2350 – 2360	LTE
	Band 70 (2000)	1995 – 2020	LTE
Antenna(s)	KRE 101 2294/1		
EIRP[2] (dBm) and EN/IEC 62232:2017 installation class [3]	72.9	E+	
	72.3	E+	
	71.4	E+	
	72.9	E+	

Table 2 Properties of the considered antenna.

Product number	KRE 101 2294/1
Type	Macro cell, directional, 4 Tx
Frequency range (MHz)	1695 – 2690
Tested band and frequency range (MHz)	B1: 2110 – 2170 B3: 1805 – 1880 B30: 2350 – 2360 B70: 1995 – 2020
Maximum gain[4] (dBi)	17.9 ± 0.4, 17.8 ± 0.5 (B1, B70) 18.3 ± 0.4, 18.4 ± 0.4 (B30) 17.3 ± 0.4, 17.1 ± 0.4 (B3)
Horizontal HPBW (degrees)	63 ± 2.6, 64 ± 4.1 (B1,B70) 60 ± 3.5, 59 ± 2.6 (B30) 66 ± 3.2, 68 ± 3.8 (B3)
Vertical HPBW (degrees)	6.1 ± 0.5, 6.0 ± 0.5 (B1, B70) 5.2 ± 0.3, 5.2 ± 0.3 (B30) 6.8 ± 0.5, 6.8 ± 0.4 (B3)
Number of elements per column	14, 14, 14, 14
Averge distance between the elements in each column (m)	0.1
Dimensions, $H \times W \times D$ (mm)	1496 × 275× 104

Table 3 EUT configuration for Radio 4415 with nominal output power levels and total power levels including a tolerance of 0.6 dB and transmission loss of 0.5 dB.

Band	Standard	Nominal output power from the radio (dBm/W)	Total power delivered to the antenna (dBm/W)
B1 (2100)	W/L	52 / 160	52.1 / 162
B3 (1800)	G/L	52 / 160	52.1 / 162
B30 (2300)	L	50 / 100	50.1 / 102
B70 (2000)	L	52 / 160	52.1 / 162

3 Exposure conditions

The EUT is intended to be installed on roof-tops, masts, towers, buildings, and similar structures making it possible to ensure that the general public has no access to the EMF compliance boundary. Other installation related exposure conditions are not reasonably foreseeable for the EUT.

The assessments were conducted for maximum power configurations, i.e. by assuming 100% utilization and beamforming without taking time-averaging into account. Effects of real RBS utilization (time-averaged) is reasonably foreseeable and will significantly reduce the time-averaged power and the RF exposure. This factor was not considered in this assessment, which adds to the conservativeness of the obtained compliance boundaries.

4 Calculations

The RF exposure was evaluated using calculations performed according to the Ericsson RF Exposure Calculation Procedure for Base Stations [10], which conforms to EN/IEC 62232:2017[3]. The calculations were made using the far-field spherical formula and the cylindrical wave model. The first step in calculating the compliance boundary was to use the spherical far-field formula to estimate power density:

$$S_{\text{sph}}(\theta,\phi) = \frac{P_{\text{a}} G(\theta,\phi)}{4\pi r^2},$$

[4] The stated far-field properties are given for a single excited port.

where S,P_a, G, r,θ, and ϕ denote the power density, the power accepted by each antenna port, the antenna gain per port, the distance from the antenna, and the angular variables in a spherical coordinate system, respectively. The gain for each of the four antenna ports was obtained from far-field measurements provided by the antenna manufacturer.

The accepted power per port was taken as the total power delivered to the antenna, including tolerances, divided by the number of ports. In the frontal hemisphere ($\phi \in \left[-\frac{\pi}{2},\frac{\pi}{2}\right]$), the exposure from antenna ports with the same nominal polarizations (denoted ±45) were summed in a correlated way to consider beamforming while the exposure from antenna ports with different nominal polarizations were summed in an uncorrelated manner. Also, in the rear hemisphere ($\phi \notin \left[-\frac{\pi}{2},\frac{\pi}{2}\right]$), uncorrelated exposure was assumed [10]. With the two antenna panels denoted 1 and 2, the total power density as estimated by the spherical far-field formula is thus given by

$$S_{\text{total, sph}} = \begin{cases} \left(\sqrt{S_{\text{sph,1, + 45}}} + \sqrt{S_{\text{sph,2, + 45}}}\right)^2 + \left(\sqrt{S_{\text{sph,1, - 45}}} + \sqrt{S_{\text{sph,2, - 45}}}\right)^2 & , \phi \in \left[-\frac{\pi}{2},\frac{\pi}{2}\right] \\ S_{\text{sph,1, + 45}} + S_{\text{sph,2, + 45}} + S_{\text{sph,1, - 45}} + S_{\text{sph,2, - 45}} & , \phi \notin \left[-\frac{\pi}{2},\frac{\pi}{2}\right] \end{cases}$$

The compliance distance for the spherical model, $\text{CD}_{\text{sph}}(\theta,\phi)$ was obtained by solving the following equation for r:

$$\frac{S_{\text{total,sph}}(r,\theta,\phi)}{S_{\text{gp,w}}^{\text{lim}}} = 1,$$

where $S_{\text{gp,w}}^{\text{lim}}$ denotes the applicable RF EMF exposure limits on power density given in Table 4 for general public and workers exposure. .

Table 4 RF EMF exposure limits on power density applicable for the frequency band used by the EUT [4], [7], [8].

Limits/Markets	Band	$S_{\text{gp}}^{\text{lim}}$ (W/m²)	$S_{\text{w}}^{\text{lim}}$ (W/m²)
ICNIRP	B1 (2100)	10	50
	B3 (1800)	9.0	45.1
US	B30 (2300)	10	50
	B70 (2000)	10	50
Canada	B30 (2300)	5.3	31.3

If the spherical far-field formula is applied in the near-field, very conservative results may be obtained. Within the main beam direction, a better approximation of the spatial peak power density per antenna is in this case obtained by using the cylindrical wave model[5] [11]

$$S_{\text{cyl}}(r,\phi) = \frac{6P_{\text{av}}2^{-\left(\frac{2\phi}{\Phi_{\text{3dB}}}\right)^2}}{\pi\Phi_{\text{3dB}}\, rL\cos^2(\gamma)\sqrt{1+\left(\frac{2r}{r_0}\right)^2}},\ r_0 = \frac{\Phi_{\text{3dB}}}{12}D_{\text{A}}L\cos^2(\gamma),$$

where P_{av}, L, D_{A},Φ_{3dB},and γ denote the transmitted power per antenna port[6] (W), the length over which the antenna elements are distributed (m), the peak directivity (unit-less), the horizontal half-power beam width (radians) and the electrical down tilt (radians), respectively. Here, D_{A} and Φ_{3dB} were obtained from the far-field measurement for each antenna port for the lowest applicable electrical tilt.

Similarly, as for the spherical formula, the total power density as estimated using the cylindrical wave model is given by

[5] In EN/IEC 62232:2017 [2], a slightly simplified cylindrical wave model is specified based on the approximation $\pi \approx 3$. Here, the expression in the original journal paper [11] has been used which in the main beam direction $\phi = 0°$ correctly converges to the spherical far field formula as $r \to \infty$.

[6] The transmitted power per antenna port were conservatively taken as the accepted power per antenna port.

$$S_{\text{total,cyl}}(r,\phi) = \left(\sqrt{S_{\text{cyl,1,+45}}(r,\phi)} + \sqrt{S_{\text{cyl,2,+45}}(r,\phi)}\right)^2 + \left(\sqrt{S_{\text{cyl,1,-45}}(r,\phi)} + \sqrt{S_{\text{cyl,2,-45}}(r,\phi)}\right)^2$$

The compliance distance for the cylindrical model, $\text{CD}_{\text{cyl}}(\phi)$ was obtained by solving the following equation for r:

$$\frac{S_{\text{total,cyl}}(r,\phi)}{S_{\text{gp,w}}^{\text{lim}}} = 1$$

The cylindrical wave model is applicable within the main beam for $-\pi/6 \le \phi \le -\pi/6$ and $|z| \le L/2$ (where z is the axis defined along the height of the antenna) and it is more accurate in the near-field regions where the spherical model is conservative. Therefore, within this angular range in the horizontal plane, the compliance distance is taken as the lesser of the values obtained by the two models [10].

$$\text{CD}(\theta,\phi) = \min\left(\text{CD}_{\text{spherical}}(\theta,\phi), \text{CD}_{\text{cylindrical}}(\phi)\right),$$

5 Results

A box-shaped compliance boundary is used, characterized by its width, height, and the compliance distances behind and in front of the back plane of the antenna, see Figure 1. Outside of this box, the RF exposure is below the exposure limits.

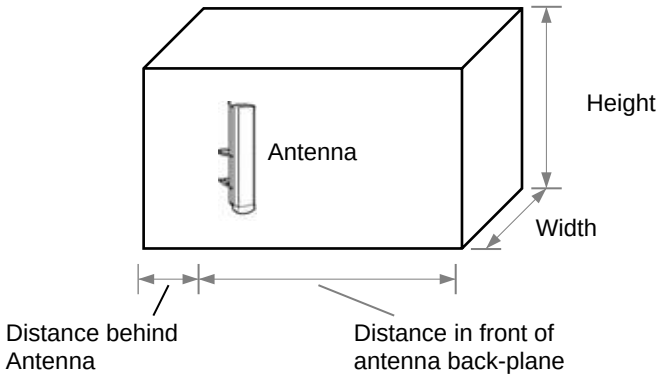

Figure 1 Box-shaped structure specifying the compliance boundary for the tested RBS product.

If the spherical far-field formula is applied behind the antenna, very conservative results are obtained. Given the relatively large distance from the antenna array elements to the back of the antenna, and based on extensive experience from a large set of numerical EMF tests for products and antennas with similar geometrical configurations and power levels [1], it is possible to state that the compliance distance behind the antenna measured from its back plane is less than 0.1 m. This is also confirmed by applying the SAR estimation formula for the back direction [9],

$$\text{SAR}_{10g}(d, P_{\text{avg}}, N_{\text{e}}) = D_{10g}^{\text{B}} \frac{P_{\text{tot}}}{N_{\text{e}} \cdot d}, \; d \ge 0.01 \text{ m},$$

$$\text{SAR}_{1g}(d, P_{\text{tot}}, N_{\text{e}}) = D_{1g}^{\text{B}} \frac{P_{\text{tot}}}{N_{\text{e}} d}, \; d \ge 0.01 \text{ m},$$

where $D_{10g}^{\text{B}} = 0.005 \text{ m} \cdot \text{kg}^{-1}$, $D_{1g}^{\text{B}} = 0.01 \text{ m} \cdot \text{kg}^{-1}$, and P_{tot} and N_{e} denote the total accepted power by the antenna and the number of dual-polarized antenna elements. The distance d is measured from the antenna ground plane. At a distance of 0.1 m, the 10g SAR estimation formula gives $\text{SAR}_{10g}(0.1 \text{ m}, 162 \text{ W}, 28) = 0.29 \text{ W/kg}$, which is well below the ICNIRP limits of 2 W/kg and 10 W/kg for general public and occupational exposure, respectively [4] . At a distance of 0.1 m, the 1g SAR estimation formula gives $\text{SAR}_{1g}(0.1 \text{ m}, 162 \text{ W}, 28) = 0.58 \text{ W/kg}$. This value is well below the exposure limits of 1.6 W/kg and 8 W/kg for general public and workers exposure applicable in both the U.S. and Canada , respectively [7], [8].

In Figure 2 to Figure 6, compliance distance results for general public (blue line) and workers (red line) exposure are given. The solid colored lines represent the result obtained with the spherical model while the dash-dotted line represents the result obtained with the cylindrical wave model. Also shown are the resulting compliance boundaries (black lines, solid for general public, dashed for workers). The resulting compliance boundary dimensions are given in Table 5 and Table 6 rounded upwards to the nearest decimeter.

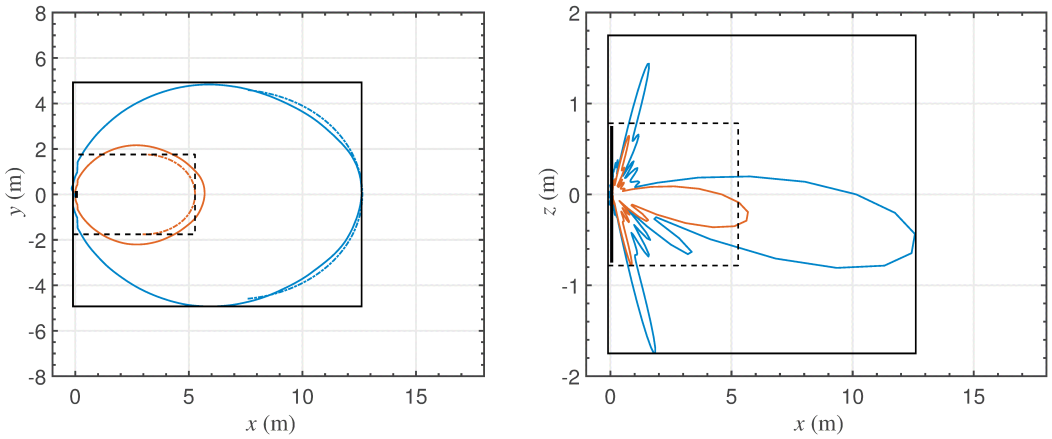

Figure 2 Compliance boundary for general public (black solid line) and workers (black dashed line) exposure for markets where the ICNIRP exposure limits apply. The blue solid and dash-dotted lines correspond to compliance distance results for general public exposure obtained using the spherical and cylindrical models, respectively . The solid and dash-dotted red lines indicate the corresponding compliance distance results for workers exposure. The antenna is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B1 (2100) (W/L). Total power delivered to the antenna: 162 W.

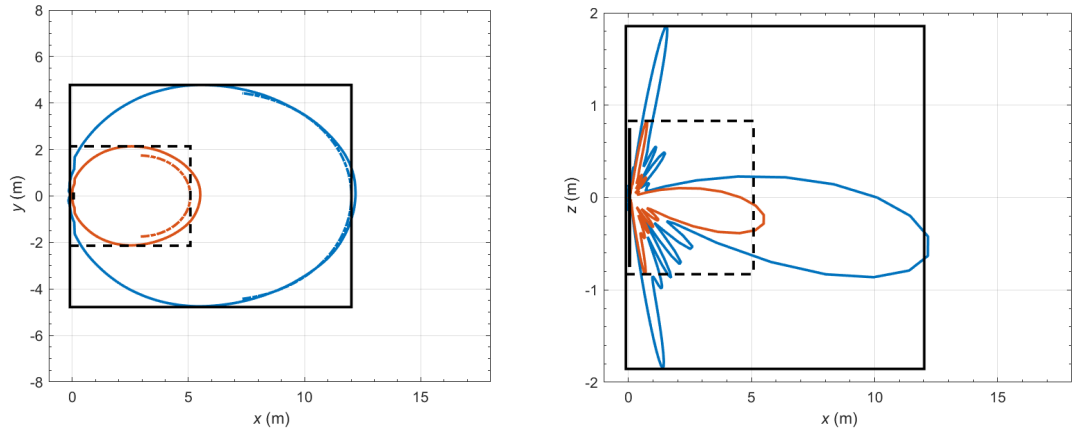

Figure 3 Compliance boundary for general public (black solid line) and workers (black dashed line) exposure for markets where the ICNIRP exposure limits apply. The blue solid and dash-dotted lines correspond to compliance distance results for general public exposure obtained using the spherical and cylindrical models, respectively . The solid and dash-dotted red lines indicate the corresponding compliance distance results for workers exposure. The antenna is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B3 (1800) (G/L). Total power delivered to the antenna: 162 W.

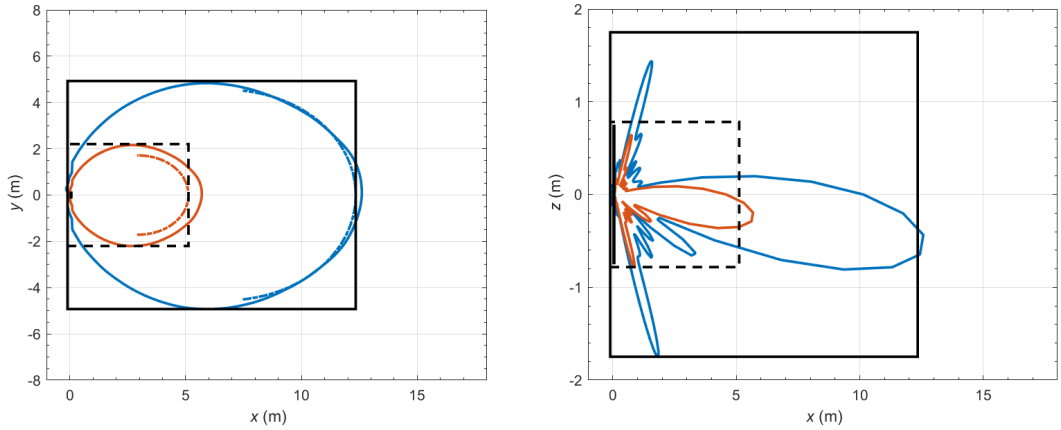

Figure 4 **Compliance boundary for general public (black solid line) and workers (black dashed line) exposure for the US markets. The blue solid and dash-dotted lines correspond to compliance distance results for general public exposure obtained using the spherical and cylindrical models, respectively . The solid and dash-dotted red lines indicate the corresponding compliance distance results for workers exposure. The antenna is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B70 (2000) (L). Total power delivered to the antenna: 162 W.**

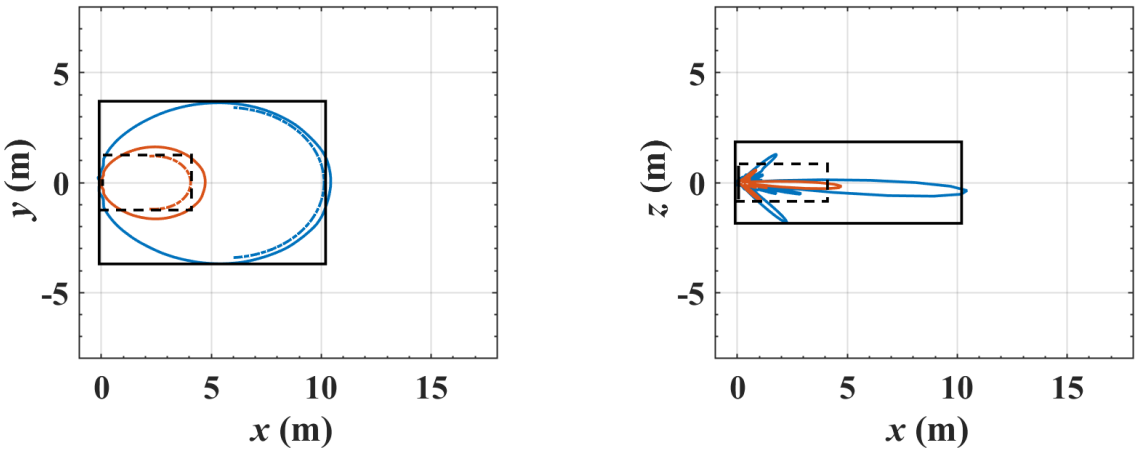

Figure 5 **Compliance boundary for general public (black solid line) and workers (black dashed line) exposure for the US markets. The blue solid and dash-dotted lines correspond to compliance distance results for general public exposure obtained using the spherical and cylindrical models, respectively . The solid and dash-dotted red lines indicate the corresponding compliance distance results for workers exposure. The antenna is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B30 (2000) (L). Total power delivered to the antenna: 102 W.**

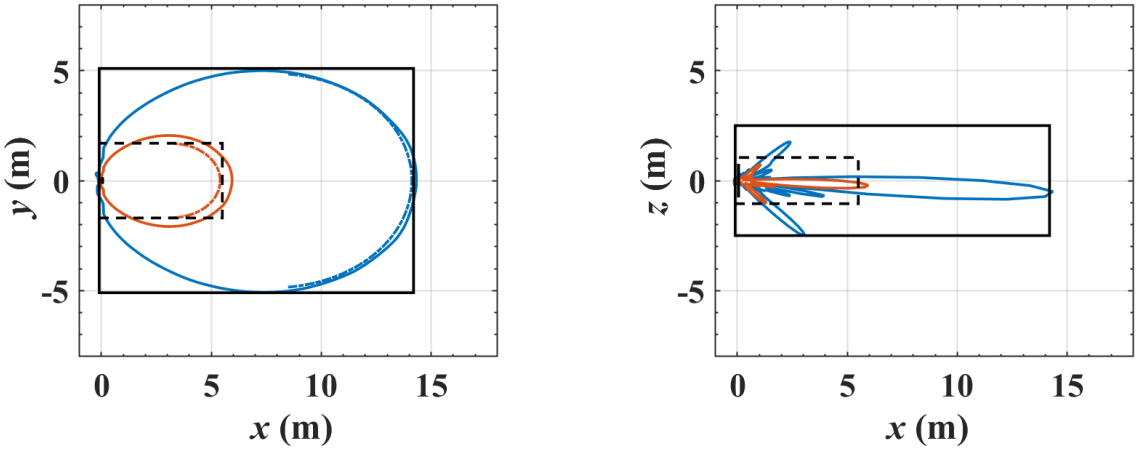

Figure 6 **Compliance boundary for general public (black solid line) and workers (black dashed line) exposure for the Canadian markets. The blue solid and dash-dotted lines correspond to compliance distance results for general public exposure obtained using the spherical and cylindrical models, respectively . The solid and dash-dotted red lines indicate the**

corresponding compliance distance results for workers exposure. The antenna is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B30 (2000) (L). Total power delivered to the antenna: 102 W.

Table 5 Dimensions of the box-shaped compliance boundary for general public (GP) and workers (W) exposure for Radio 4415 applicable in markets employing the ICNIRP, EU, or FCC RF exposure limits with assumed 0.5 dB transmission loss and 0.6 dB output power tolerance.

Mode and output power for Radio 4415			Dimensions of the box-shaped compliance boundary[3] (m)							
			Distance in front of antenna		Width		Height		Distance behind the antenna	
Band	Standard	Nominal output power from the radio	GP	O	GP	O	GP	O	GP	O
B1	W/L	160 W	12.7	5.3	9.9	3.6	3.5	1.6	<0.1	<0.1
B3	G/L	160 W	12.1	5.1	9.6	4.3	3.8	1.7	<0.1	<0.1
B30	L	100 W	10.2	4.1	7.4	2.5	3.7	1.7	<0.1	<0.1
B70	L	160 W	12.4	5.2	9.9	4.5	3.5	1.6	<0.1	<0.1

With the accepted power taken as the total power delivered to the antenna including tolerances, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative

Table 6 Dimensions of the box-shaped compliance boundary for general public (GP) and workers (W) exposure for Radio 4415 determined according to the exposure limits applicable in Canada with assumed 0.5 dB transmission loss and 0.6 dB output power tolerance.

Mode and output power for Radio 4415			Dimensions of the box-shaped compliance boundary[3] (m)							
			Distance in front of antenna		Width		Height		Distance behind the antenna	
Band	Standard	Nominal output power from the radio	GP	W	GP	W	GP	W	GP	W
B30	L	100 W	14.2	5.5	10.2	3.4	5.0	2.1	<0.1	<0.1

With the accepted power taken as the total power delivered to the antenna including tolerances, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative

6 Uncertainty

The input parameters were chosen within their range so as to maximize the calculated compliance boundary dimensions. With the accepted power taken as the total power delivered to the antenna including tolerances, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative.

The fact that effects of RBS utilization and time-averaging were not included in this assessment also adds to the conservativeness of the obtained compliance boundary dimensions.

7 Conclusions

The results in Section 5 show the compliance boundary dimensions for the considered configuration when tested according to the European standards EN 50385 [2], EN/IEC 62232:2017 [3], and FCC OET Bulletin 65 [9]. Outside of this compliance boundary, the exposure is below the exposure limits [4], [7], [8]..

By inclusion of the test report summary and the content of Appendices A and B in the product documentation, the tested equipment complies with the documentation requirements of EN 50385. The tested equipment complies with the requirements in respect of all parameters subject to the test.

8 References

[1] 5/124 46-LZA 701 6001, “Radio Frequency Electromagnetic Exposure, CDMA/GSM/LTE/WCDMA”, Ericsson safety information.

[2] EN 50385, “Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz – 100 GHz), when placed on the market”, European Committee for Electrotechnical Standardization (CENELEC), 2017.

[3] EN/IEC 62232:2017, Determination of RF field strength, power density and SAR in the vicinity of radiocommunication base stations for the purpose of evaluating human exposure, 2017.

[4] ICNIRP, “Guidelines for limiting exposure to time-varying electric, magnetic, and electromagnetic fields (up to 300 GHz)”, International Commission on Non-Ionizing Radiation Protection (ICNIRP), Health Physics, vol. 74, pp 494-522, April 1998.

[5] Council Recommendation 1999/519/EC of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 HZ to 300 GHz) (Official Journal L 197 of 30 July 1999).

[6] 2013/35/EU, ” Directive of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields) (20th individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) and repealing Directive 2004/40/EC”, June 2013.

[7] FCC, Code of Federal Regulations CFR title 47, part 1.1310 “Radiofrequency radiation exposure limits”, Federal Communications Commission (FCC), August 1997.

[8] Health Canada Safety Code 6, Limits of human exposure to radiofrequency electromagnetic energy in the frequency range from 3 kHz to 300 GHz, June 2015.

[9] FCC, “Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields. OET Bulletin 65. Edition 97-01.” Federal Communications Commission (FCC), Office of Engineering and Technology, August 1997.

[10] GFTE-16:001718, ”Ericsson RF Exposure Calculation Procedure for Base Stations”.

[11] R. Cicchetti and A. Faraone, “Estimation of the peak power density in the vicinity of cellular and radio base station antennas”, IEEE Trans. Electromagn. Compat., vol. 46, no. 2, pp. 275–290, 2004.

[12] EN 50 401, “Product standard to demonstrate the compliance of base station equipment with radiofrequency electromagnetic field exposure limits (110 MHz - 100 GHz), when put into service”, 2017.

[13] Ericsson, LME-12:001904 Uen, “Exposure to radio frequency electromagnetic fields”.

9 Revision History

Rev.	Date	Description
A	2017-09-27	First revision
B	2017-10-23	Fixed reference source error.
C	2018-04-25	Added B3B and B70.
D	2018-10-19	Added B30

Appendix A. Guidelines on how to install the product

The antenna connected to Radio 4415 (KRC 161 635/1, KRC 161 635/2, KRC 161 760/3, KRC 161 769/3, KRC 161 771/2) shall be installed to make sure that the general public does not have access to the applicable RF EMF compliance boundary. The compliance boundary dimensions were determined for the product transmitting in free space for at least one typical configuration. To consider possible contributions from ambient sources (e.g. other RBS products already present on site) or the influence from any reflecting or scattering objects in the vicinity of the product installation, the requirements in EN 50 401 [12] apply.

Appendix B. Guidelines for workers during installation, maintenance, and repair of the product

For Radio 4415 (KRC 161 635/1, KRC 161 635/2, KRC 161 760/3, KRC 161 769/3, KRC 161 771/2), it is normally possible to work behind the RBS antenna without any restrictions related to RF EMF exposure if the product is installed so that contributions from other ambient sources (e.g. other RBS products) are not significant and may be neglected. If work needs to be performed within the compliance boundary applicable for workers, the radio equipment shall be powered off, or the power be reduced to a level ensuring that the RF EMF exposure is below the relevant exposure limit for workers. To consider possible contributions from ambient sources (e.g. other RBS products already present on site) or the influence from any reflecting or scattering objects in the vicinity of the product installation, the requirements in EN 50 401 [12] apply.

If work is conducted on behalf of Ericsson, minimum EMF related requirements are provided in [13].