

 <p>Accred. no. 1761 Testing ISO/IEC 17025</p>	<p>Test report issued by an Accredited Testing Laboratory</p>
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EMF Test Report: Ericsson AIR 5322 B258/B258A (FCC)

Document number:	GFTL-20:001526 Uen Rev H	Date of report:	2021-06-03 (Rev H) Replaces GFTL-20:001526 Uen Rev G.
Testing laboratory:	Ericsson EMF Research Laboratory Ericsson AB SE-164 80 Stockholm Sweden	Company/Client:	Per Norling Ericsson AB SE-164 80 Stockholm Sweden
Tests performed by:	David Anguiano	Dates of tests:	2020-11-25 (Rev A) 2021-03-05 (Rev C) 2021-05-18 (Rev E) 2021-05-24 (Rev F)
Manufacturer and market name(s) of device:	Ericsson AIR 5322 B258/B258A		
Testing has been performed in accordance with:	FCC OET Bulletin 65 IEC 62232:2017		
Test results:	RF exposure compliance boundaries (exclusion zones) related to the limits in FCC 47 CFR 1.1310 to be included in the Customer Product Information (CPI) for Ericsson AIR 5322 B258/B258A.		
Additional information:			
Signature:	Test Engineer  David Anguiano Researcher david.anguiano.sanjurjo@ericsson.com Tel: +46724666970	Quality Manager  Christer Törnevik Senior Expert – EMF and Health christer.tornevik@ericsson.com Tel: +46705863148	

Summary of EMF Test Report¹

Equipment under test (EUT)

Product name	AIR 5322 B258		AIR 5322 B258A
Product number	KRD 901 200/1 (DC), KRD 901 200/4 (AC)		KRD 901 200/2 (DC), KRD 901 200/5 (AC)
Supported bands, Tx frequency range (GHz) and standards	B258 B258C B258D	24.25 – 27.5 24.25 – 24.45 24.75 – 25.25	NR
Duplexing technology and fraction of downlink transmission time to total time	TDD (75 %)		
Exposure environment	General public/uncontrolled, Workers/controlled		

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 AIR 5322 applicable in markets employing the FCC RF exposure limits. The compliance boundaries are determined for total EIRP² with tolerance and TDD downlink duty cycle included.

¹ This page contains a summary of the test results. The full report provides a complete description of all test details and results.

² Effective Isotropic Radiated Power.

Mode and EIRP for AIR 5322							Dimensions of the box-shaped compliance boundary (m)									
							Distance in front of EUT		Width		Height		Distance behind EUT			
Band	Standard	Configuration Mode	EIRP		IEC 62232 installation class	TDD DL duty cycle	Sector shapes ³	GP	W	GP	W	GP	W	GP	W	
			Nominal total (dBm)	Tolerance (dB)				GP	W	GP	W	GP	W			
B258/ B258A ⁴	NR	0	46	2.4	E100	75 %	H1, H5, M3, M4	0.7	0.3	0.8	0.6	0.7	0.7	0.2	0.2	
			50		E100			1.0	0.5	1.2	0.6	0.7	0.7	0.2	0.2	
			53		E+			1.4	0.7	1.7	0.8	0.7	0.7	0.2	0.2	
			56		E+			2.0	0.9	2.4	1.1	0.9	0.7	0.2	0.2	
		1	49	2.4	E100	75 %	H2, M3, M3(7.5°tilt), M9, M10, M11	0.9	0.5	1.1	0.6	0.7	0.7	0.2	0.2	
								M9(7.5°tilt), M11(7.5°tilt)	0.4							
			53	E+	H2, M3, M3(7.5°tilt), M9, M10, M11	1.5	0.7	1.7	0.8	0.7	0.7	0.2	0.2			
						M9(7.5°tilt), M11(7.5°tilt)								1.4		
			56	E+	M3, M9, M11	2.1	0.9	2.4	1.1	0.7	0.7	0.2	0.2			
						H2, M3(7.5°tilt), M10				0.9						
						M9(7.5°tilt), M11(11.25°tilt)				2.0						
			59	E+	M3, M9, M11	2.9	1.3	3.4	1.6	0.7	0.7	0.2	0.2			
						H2, M3(7.5°tilt), M10				1.2						
						M9(7.5°tilt), M11(7.5°tilt)				2.7						
			2	52	2.4	E+	75 %	H2, M5, M5(7.5°tilt), M7, M7(11.25°tilt), M13, M13(7.5°tilt)	1.3	0.6	1.5	0.7	0.7	0.7	0.2	0.2
									M5, M7, M13							
		56		E+	H2, M5(7.5°tilt)	0.9	0.9	2.4	1.1	0.7	0.7	0.2	0.2			
						M7(11.25°tilt), M13(7.25°tilt)				2.0						
						M5, M7, M13				2.9						
		59		E+	H2, M5(7.5°tilt), M13(7.5°tilt)	1.3	1.3	3.4	1.5	0.7	0.7	0.2	0.2			
						M7(11.25°tilt)				2.8						
		62		E+	M7	4.1	1.8	4.8	2.2	0.7	0.7	0.2	0.2			
						M5, M13				0.9						
						H2, M5(7.5°tilt)				1.8						
			M13(7.5°tilt)			4.0										
			M7(11.25°tilt)			3.9										

For the EIRP levels specified in the table with tolerances added, 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 AIR 5322 B258/B258A. Outside of these compliance boundaries, the radio frequency (RF) exposure levels are below the limits specified by the Federal Communications Commission (FCC) [1]. The tests were performed by calculations in accordance with the Ericsson RF exposure calculation procedure for base stations [2], which is in conformity with the FCC OET Bulletin 65 [3] and IEC 62232:2017 [4].

It should be noted that the test results presented in this test report are valid for the frequency range specified in Table 1, for the antenna properties specified in Table 2, and for the EIRP levels, the tolerance and TDD downlink duty cycle specified in Table 3. These data as well as the applied antenna pattern files were supplied by the client and may affect the validity of the results.

Proposed EMF health and safety information for inclusion in the Customer Product Information (CPI) is provided in Appendices A, B and C.

2 Equipment under test

Tables 1 and 2 below summarize the technical data for the equipment under test (EUT) and the antenna properties for the integrated antenna.

Table 3 lists the nominal total EIRP levels of the radio unit and the total time-averaged EIRP including tolerance and the TDD downlink duty cycle for Configuration Mode 0, Configuration Mode 1 and Configuration Mode 2. In Configuration Mode 0, the phased array antenna module (PAAM) of the product is divided into three thirds, each containing 2 x 22 subarrays. In this configuration, the product can generate six beams, one for each array third and polarization. In Configuration Mode 1, the phased array antenna module (PAAM) of the product is divided into two halves, each containing 4 x 22 subarrays. In this configuration, the product can generate four beams, one for each array half and polarization. In Configuration Mode 2, the full array, containing 8 x 22 subarrays, can generate two beams, one for each polarization.

EMF compliance assessments were conducted at four nominal total EIRP levels for each Configuration Mode, out of eleven of those provided in Table 3, specifically at 46 dBm, 50 dBm, 53 dBm and 56 dBm for Configuration Mode 0, at 49 dBm, 53 dBm, 56 dBm and 59 dBm for Configuration Mode 1 and at 52 dBm, 56 dBm, 59 dBm and 62 dBm for Configuration Mode 2.

The antenna radiation pattern files for AIR 5322 B258 provided by the client were also used for AIR 5322 B258A in the frequency ranges covered by B258C and B258D. Since the frequencies in the bands B258C and B258D are sub-sets of the frequency range covered by B258, the EMF compliance boundaries obtained for

³ Sector shapes in this report are abbreviated according to: H1 for Hotspot1, H2 for Hotspot2, H5 for Hotspot5, M3 for Macro3, M4 for Macro4, M5 for Macro5, M7 for Macro7, M9 for Macro9, M10 for Macro10, M11 for Macro11 and M13 for Macro13.

⁴ Within the frequency ranges of the sub-bands B258C and B258D.

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AIR 5322 B258 have also been reported as those of AIR 5322 B258A (in the frequency range B258C and B258D) in this report.

The EUT related data in Tables 1-3 were supplied by the client.

Table 1 Technical data for the EUT.

Product name and product number	AIR 5322 B258		KRD 901 200/1 (DC), KRD 901 200/4 (AC)
	AIR 5322 B258A		KRD 901 200/2 (DC), KRD 901 200/5 (AC)
Supported bands, Tx frequency range (GHz), and standards	B258 B258C B258D	24.25 - 27.5 24.25 - 24.45 24.75 - 25.25	NR
Dimensions⁵, H x W x D (mm)	279 x 200 x 130		
Duplexing technology and fraction of downlink transmission time to total time	TDD (75 %)		
Exposure environment	General public/uncontrolled, Workers/controlled		
IEC 62232 installation class [4]⁶	E100 (for configurations with total EIRP ≤ 50 dBm) E+ (for configurations with total EIRP > 50 dBm)		

⁵ The dimensions of the EUT exclude mounting brackets and protrusions.

⁶ The stated IEC 62232 installation class was determined based on the nominal total EIRP without tolerance included and considering the TDD downlink duty cycle.

Table 2 Properties of the integrated antenna.

Type	Phased Array Antenna Module (PAAM)
Number of antenna panels	4 (Configuration Mode 0) 2 (Configuration Mode 1) 1 (Configuration Mode 2)
Maximum nominal gain⁷ (dBi)	25.9 (Configuration Mode 0) 28.8 (Configuration Mode 1) 31.7 (Configuration Mode 2)
Horizontal HPBW⁸ (degrees)	5.4
Vertical HPBW⁸ (degrees)	19.7 (Configuration Mode 0) 10.4 (Configuration Mode 1) 5 (Configuration Mode 2)
Number of antenna elements (N_H, N_V) per antenna panel	(22, 2) (2 polarizations) for Configuration Mode 0 (22, 4) (2 polarizations) for Configuration Mode 1 (22, 8) (2 polarizations) for Configuration Mode 2
Element separation distance (Δ_H, Δ_V) (mm)	(5.67, 6.87)
Maximum scan range in horizontal plane (degrees)	±60
Maximum scan range in vertical plane (degrees)	±15

Table 3 EUT configuration with nominal EIRP levels and total EIRP levels including tolerance and TDD downlink duty cycle.

Band	Standard	Configuration Mode	EIRP		TDD downlink duty cycle	Total time-averaged EIRP (dBm)
			Nominal total (dBm)	Tolerance (dB)		
B258 / B258A	NR	0	46.0	2.4	75 %	47.2
			47.0			48.2
			48.0			49.2
			49.0			50.2
			50.0			51.2
			51.0			52.2
			52.0			53.2
			53.0			54.2
			54.0			55.2
			55.0			56.2
			56.0			57.2
B258 / B258A	NR	1	49.0	2.4	75 %	50.2
			50.0			51.2
			51.0			52.2
			52.0			53.2
			53.0			54.2
			54.0			55.2
			55.0			56.2
			56.0			57.2
			57.0			58.2
			58.0			59.2
			59.0			60.2
B258 / B258A	NR	2	52.0	2.4	75 %	53.2
			53.0			54.2
			54.0			55.2
			55.0			56.2
			56.0			57.2
			57.0			58.2
			58.0			59.2
			59.0			60.2
			60.0			61.2
			61.0			62.2
			62.0			63.2

3 Exposure conditions

The EUT is intended to be installed on walls, poles 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 maximum TDD downlink duty cycle was considered to obtain the maximum time-averaged EIRP. Other factors such as beam scanning in elevation and azimuth, RBS utilization, and scheduling time are reasonably foreseeable and will significantly reduce the time-averaged EIRP and the RF exposure. These factors were however not considered in this assessment, which adds to the conservativeness of the obtained compliance boundaries.

4 EMF compliance boundary calculations

The RF exposure was evaluated using calculations performed according to the Ericsson RF Exposure Calculation Procedure for Base Stations [2], which conforms to FCC OET Bulletin 65 [3] and IEC 62232 [4]. The calculations were made using the far-field spherical formula. The first step in calculating the compliance boundary was to use the spherical far-field formula to estimate power density:

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

where S, P_a, G, r, θ , and ϕ denote the power density, the total time-averaged power accepted by antenna, the antenna gain, the distance from the antenna, and the angular variables in a spherical coordinate system, respectively. The EIRP, i.e., the product of P_a and $G(\theta, \phi)$, include tolerances and the TDD downlink duty cycle. The envelopes of EIRP values for all possible traffic beams were obtained from far-field measurements provided by the client. Such envelope patterns were provided for three different frequencies, specifically 24.25 GHz, 26 GHz and 27.5 GHz within Band 258. Since the provided patterns also cover the frequency ranges B258C and B258D of AIR 5322 B258A, the obtained EMF compliance boundaries for AIR 5322 B258 are also valid for AIR 5322 B258A. Also, these patterns were provided for different sector shapes corresponding to different deployment scenarios, namely, Hotspot1, Hotspot5, Macro3 and Macro4 for Configuration Mode 0, Hotspot2, Macro3, Macro3 (tilt 7.5°), Macro9, Macro9 (tilt 7.5°), Macro10, Macro11 and Macro11 (tilt 7.5°) for Configuration Mode 1, and Hotspot2, Macro5, Macro5 (tilt 7.5°), Macro7, Macro7 (tilt 11.25°), Macro13 and Macro13 (tilt 7.5°) for Configuration Mode 2. For each sector shape, power density values were estimated from the equation above using the maximum EIRP values of the envelope patterns provided for the three different frequencies. The maximum EIRP of the envelope traffic beams were found to be 46.7 dBm per beam for Configuration Mode 0, 52.9 dBm per beam for Configuration Mode 1 and 58.9 dBm per beam for Configuration Mode 2.

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

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

where $S_{\text{gp,w}}^{\text{lim}}$ denotes the FCC power density reference levels [1] for general public/uncontrolled and workers/controlled exposure in the frequency range used by the EUT. RF EMF exposure limits are given in Table 4.

⁷ The stated gain values are provided by the client.

⁸ The stated half-power beam widths are for broadside beam.

Table 4 RF EMF exposure limits applicable for the frequency range used by the EUT.

Band	S_{gp}^{lim} (W/m ²)	S_w^{lim} (W/m ²)
B258	10	50

Based on the calculated compliance distances, a box-shaped compliance boundary was determined. To comply with the FCC requirement of a minimum test separation distance for a non-portable device of 20 cm, the minimum distance from the EUT to the compliance boundary was set to 20 cm.

5 Results

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

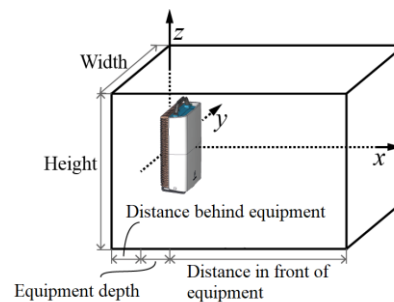


Figure 1 Box-shaped structure specifying the compliance boundary for the tested RBS product.

In Figure 2 through Figure 20 compliance distance results as obtained using the far-field spherical formula for general public (blue line) and workers (red line) exposure are given for the tested configuration leading to the largest compliance boundary for each sector shape. Results are provided for the FCC exposure limits. Also shown are the resulting symmetric compliance boundaries (black lines, solid for general public, dashed for workers exposure). The reported compliance boundary dimensions are given in Table 5 rounded upwards to the nearest decimeter.

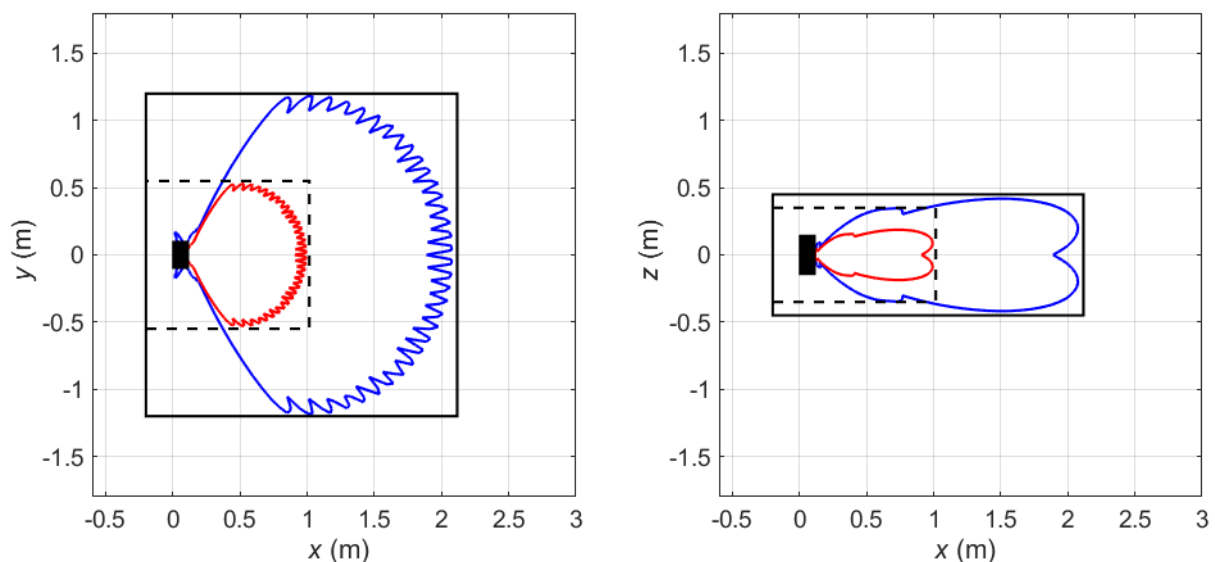


Figure 2 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Hotspot1 sector shape (Configuration Mode 0). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 57.2 dBm.

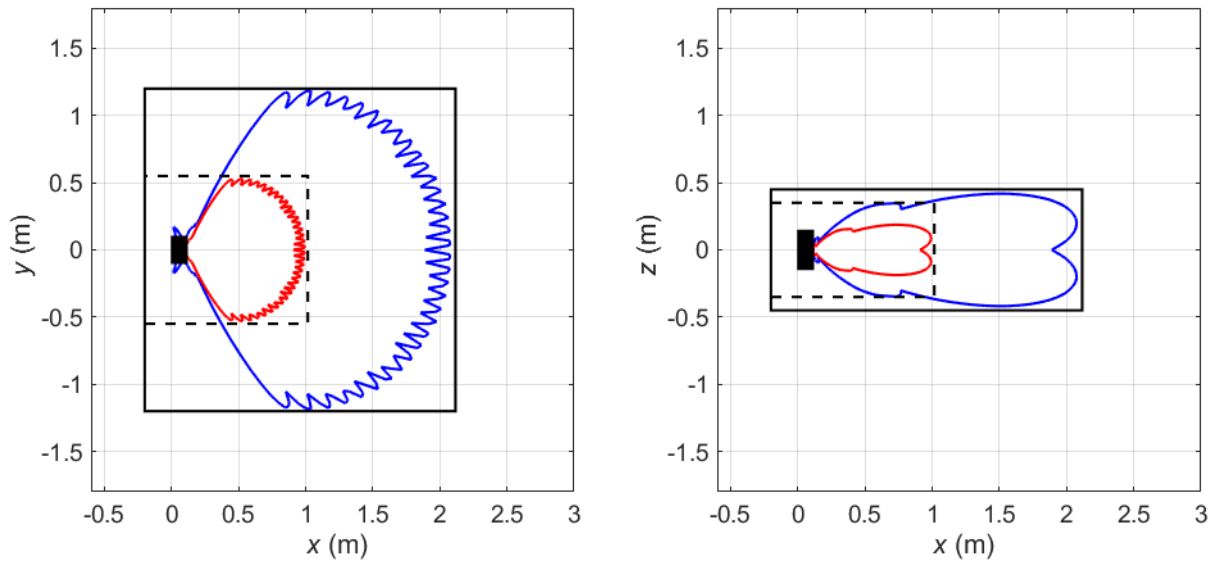


Figure 3 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Hotspot5 sector shape (Configuration Mode 0). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 57.2 dBm.

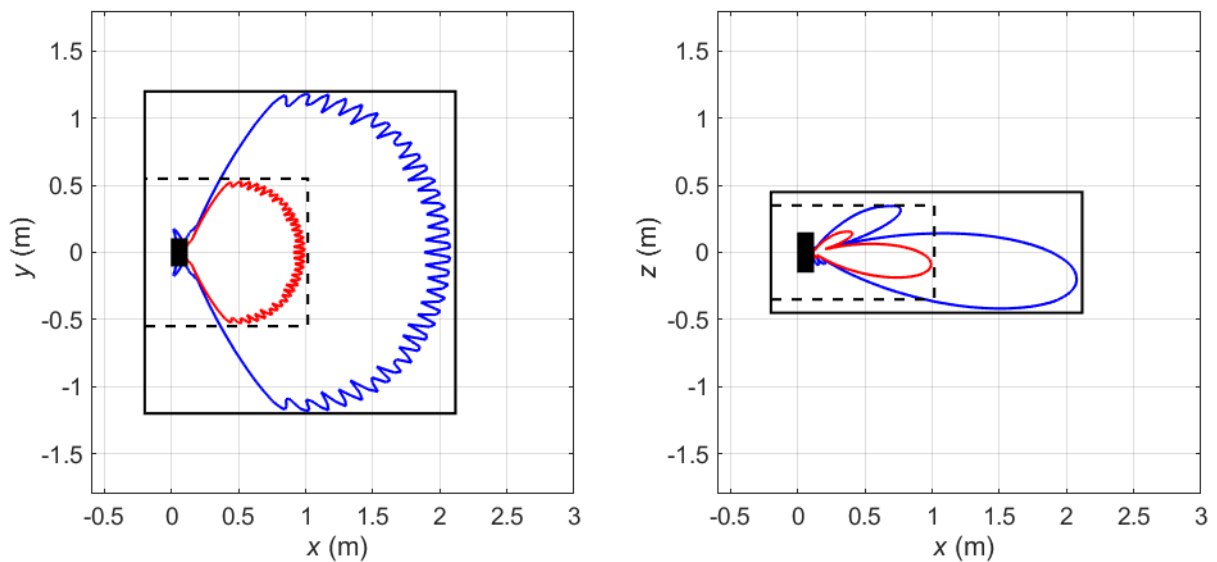


Figure 4 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro3 sector shape (Configuration Mode 0). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 57.2 dBm.

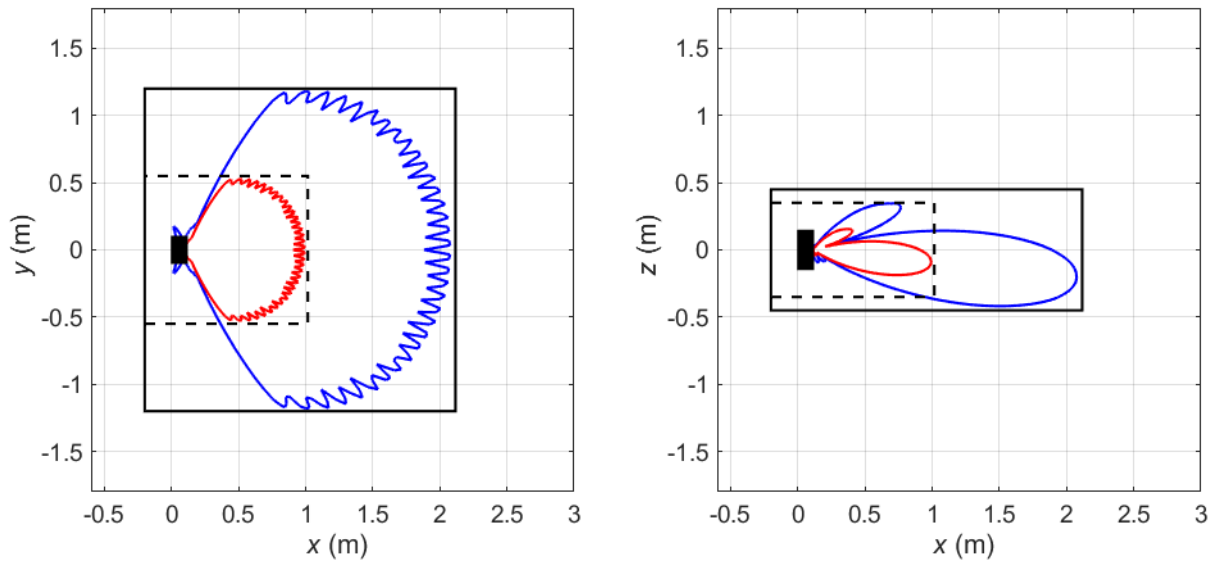


Figure 5 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro4 sector shape (Configuration Mode 0). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 57.2 dBm.

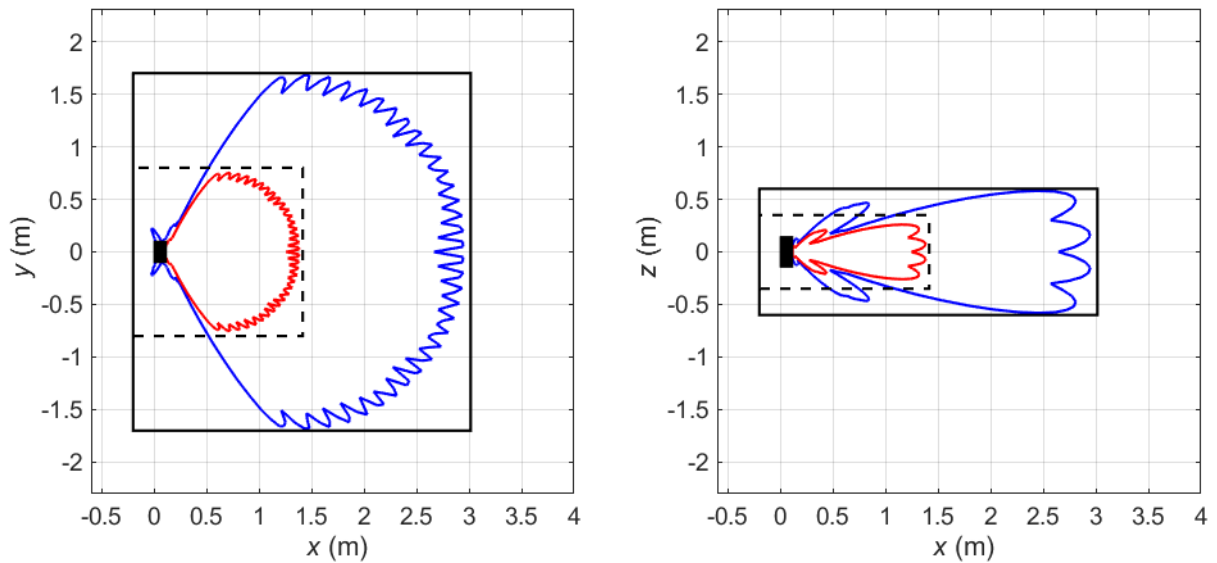


Figure 6 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Hotspot2 sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

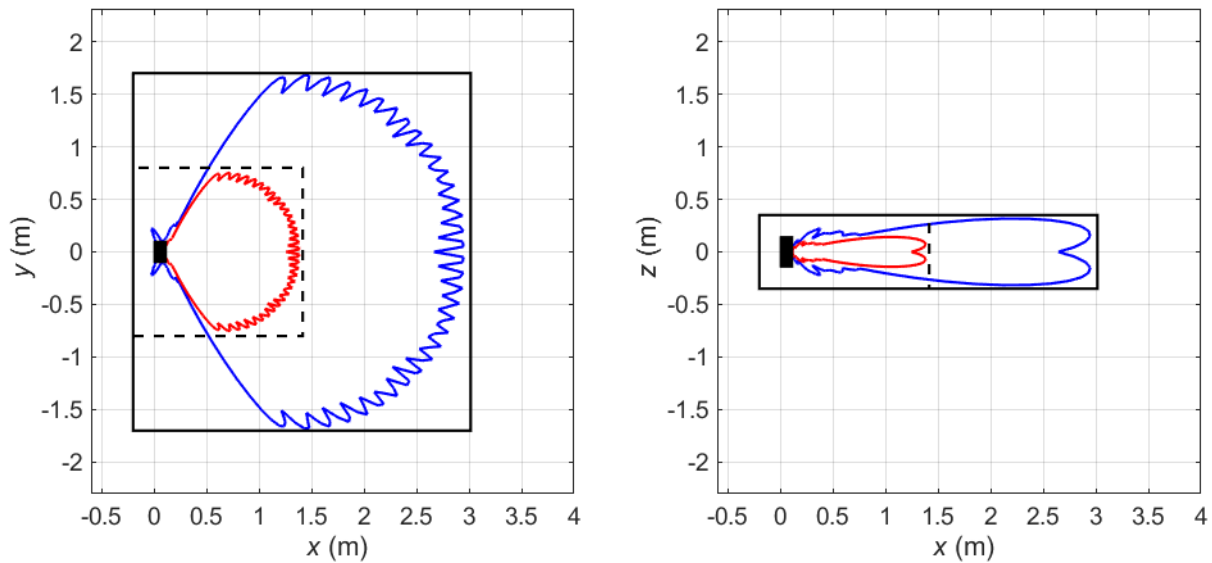


Figure 7 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro3 sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

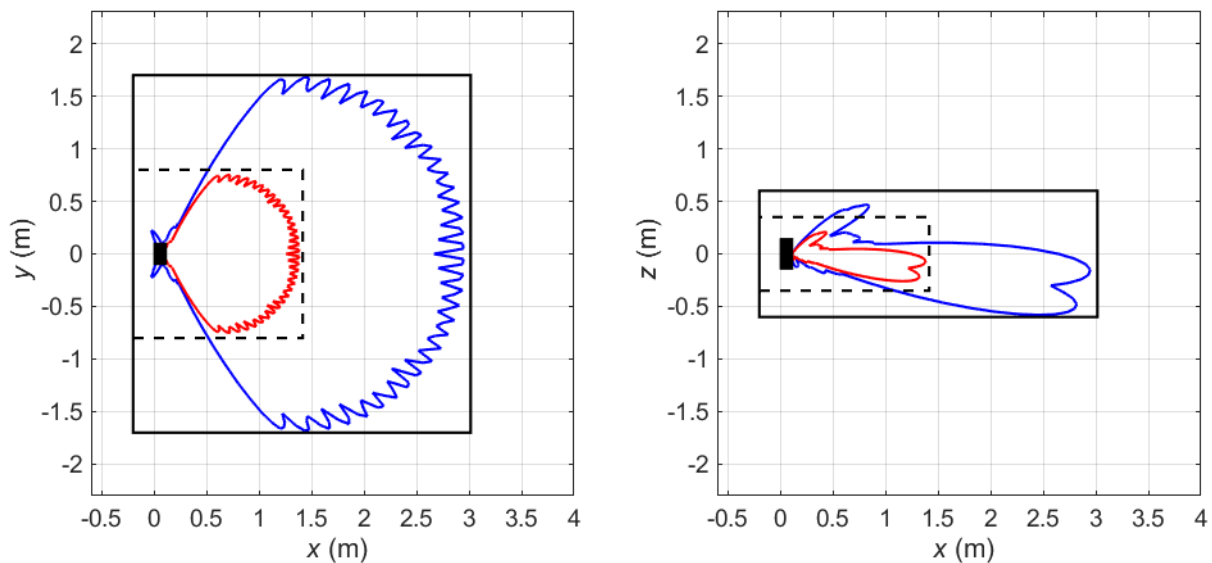


Figure 8 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro3 (tilt 7.5°) sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

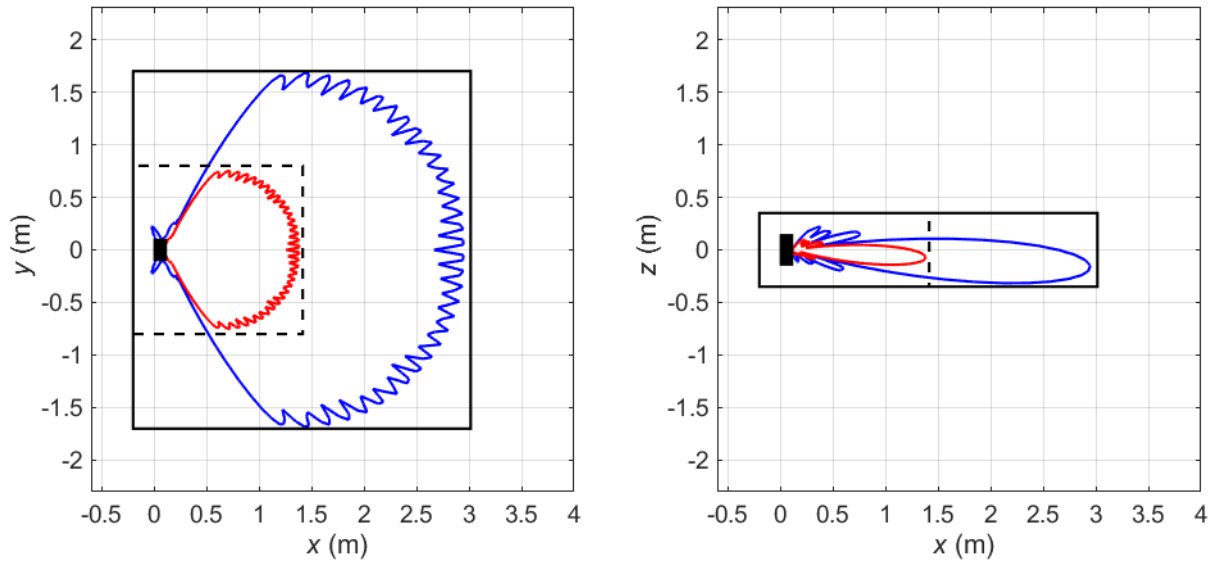


Figure 9 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro9 sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

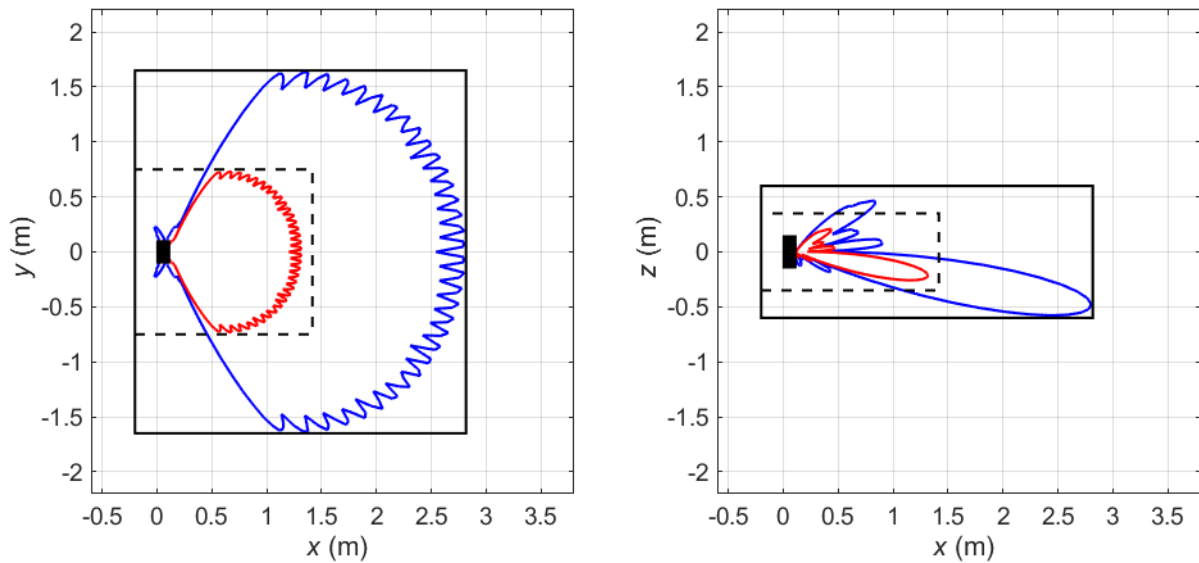


Figure 10 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro9 (tilt 7.5°) sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

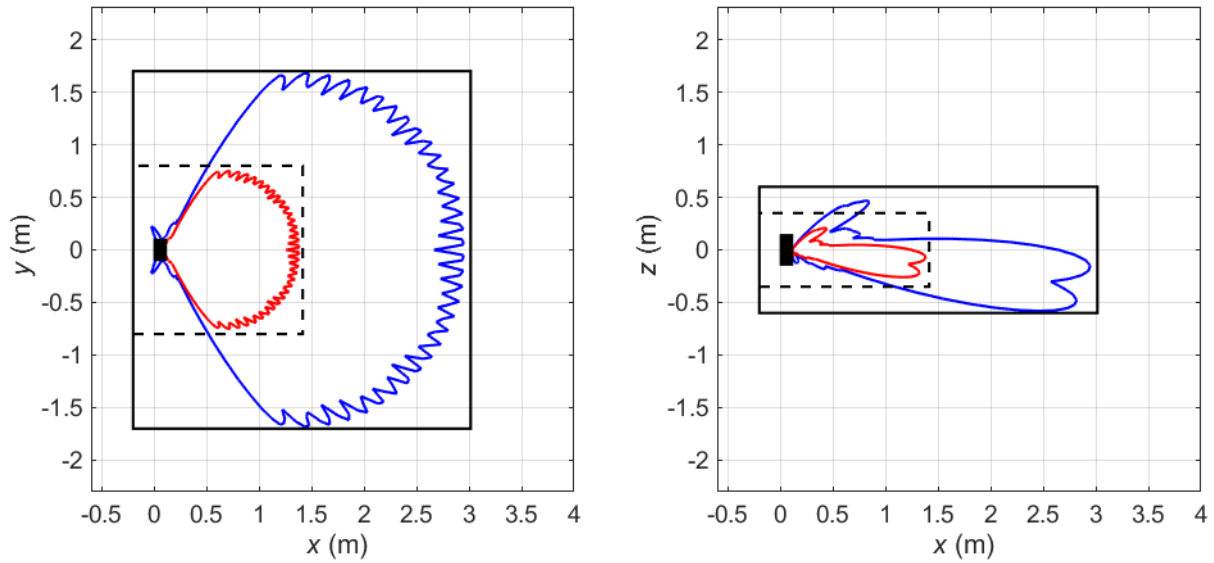


Figure 11 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro10 sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

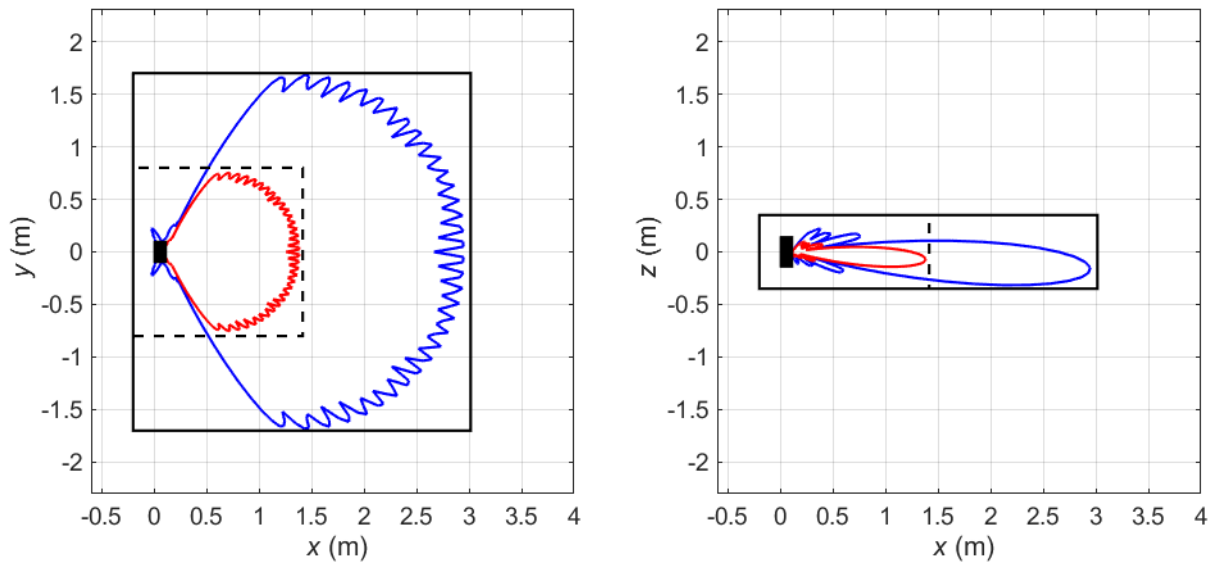


Figure 12 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro11 sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

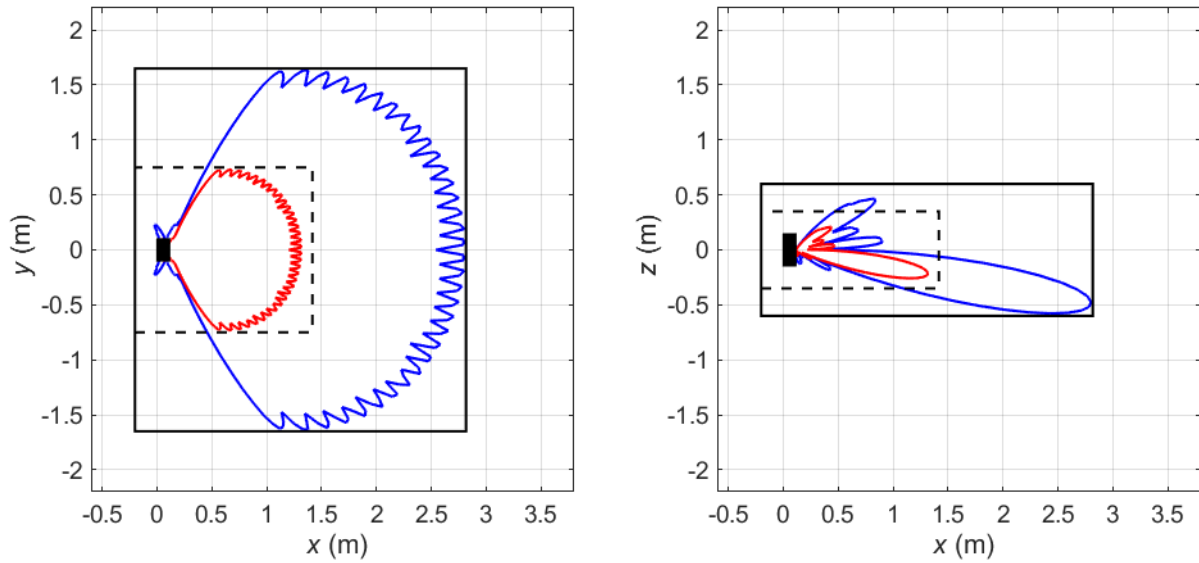


Figure 13 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro11 (tilt 7.5°) sector shape (Configuration Mode 1). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 60.2 dBm.

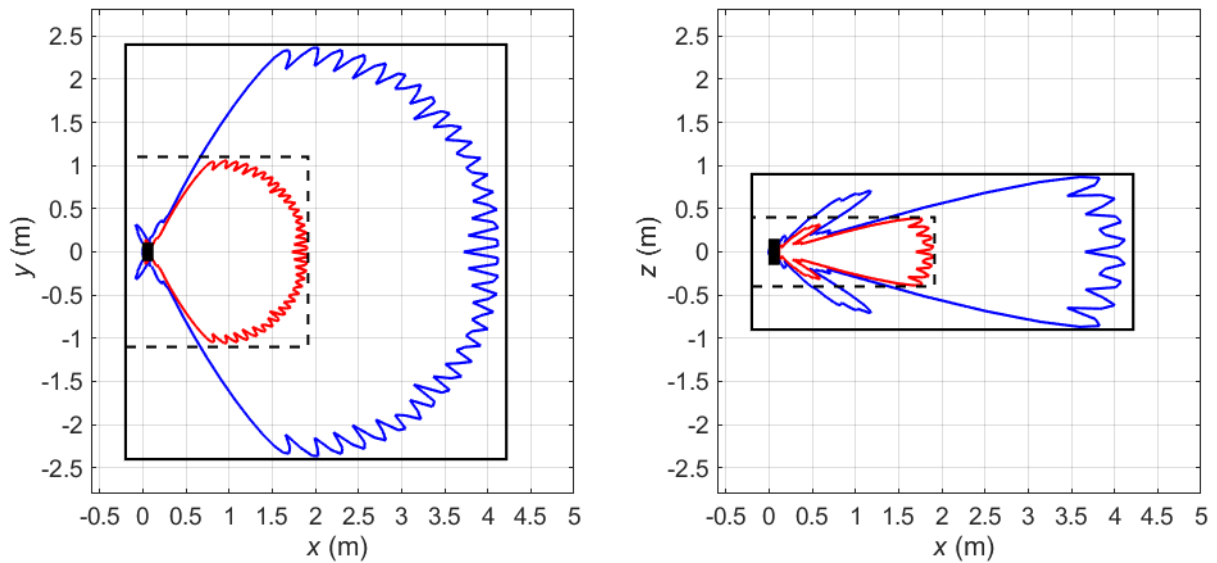


Figure 14 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Hotspot2 sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

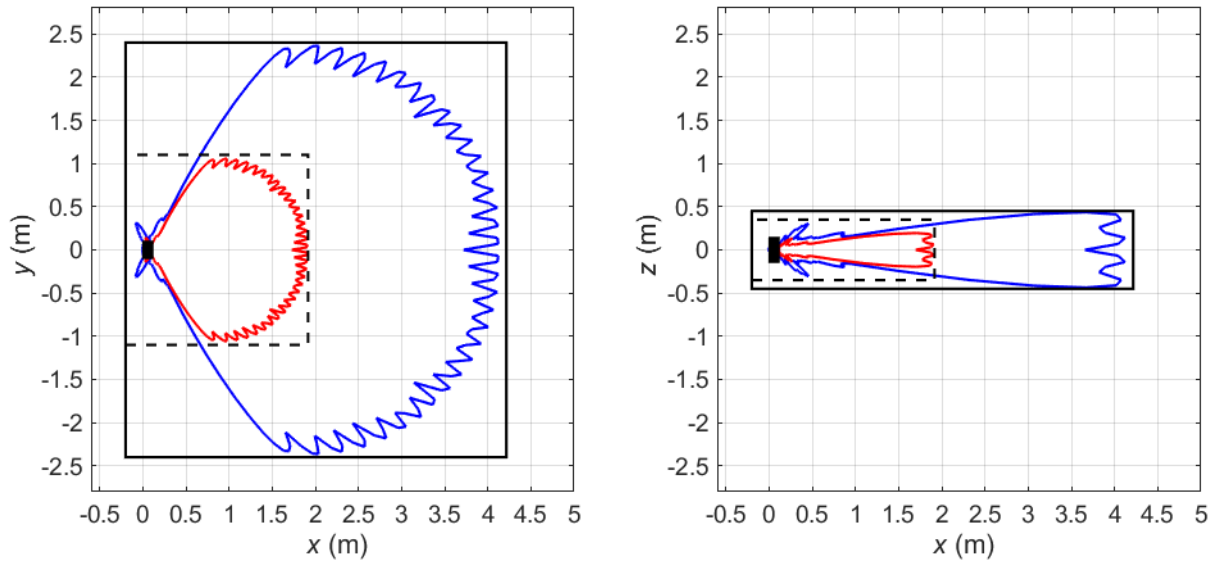


Figure 15 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro5 sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

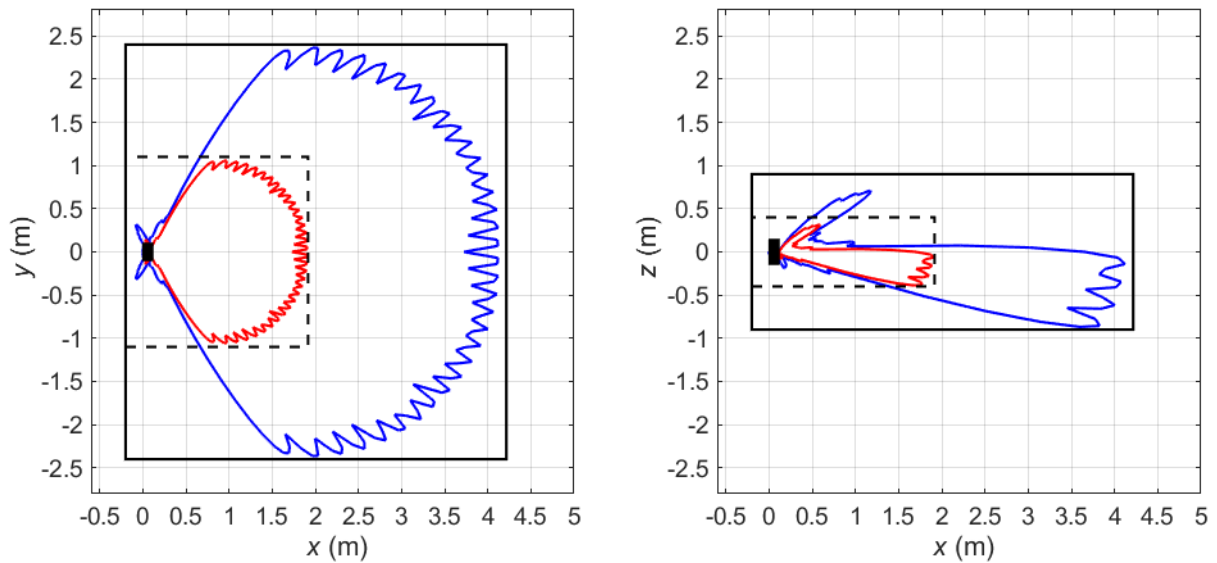


Figure 16 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro5 (tilt 7.5°) sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

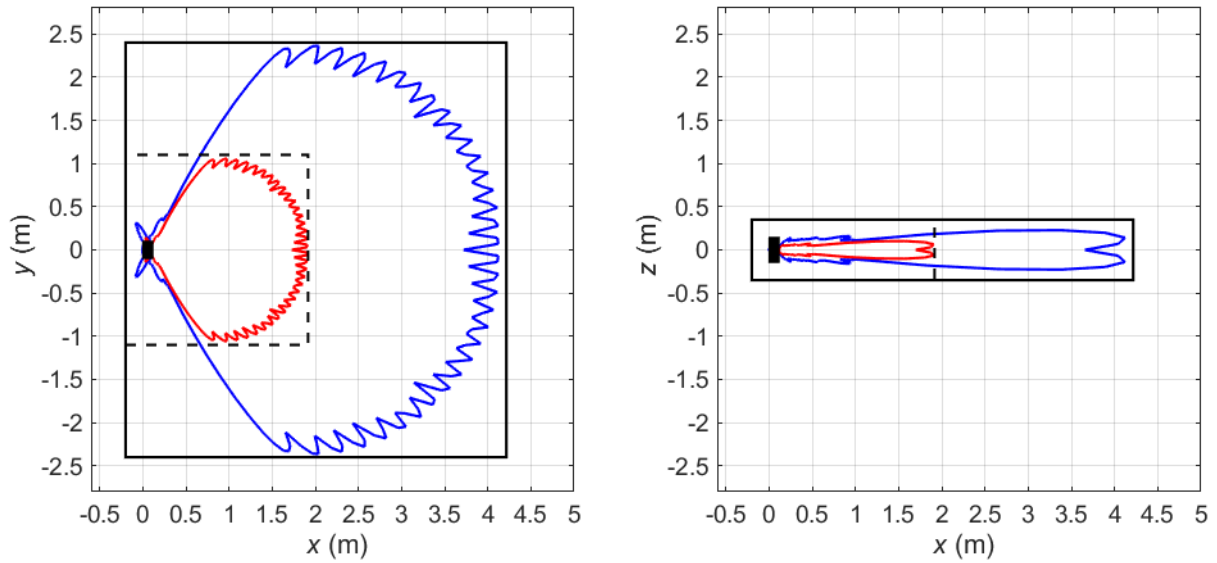


Figure 17 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro7 sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

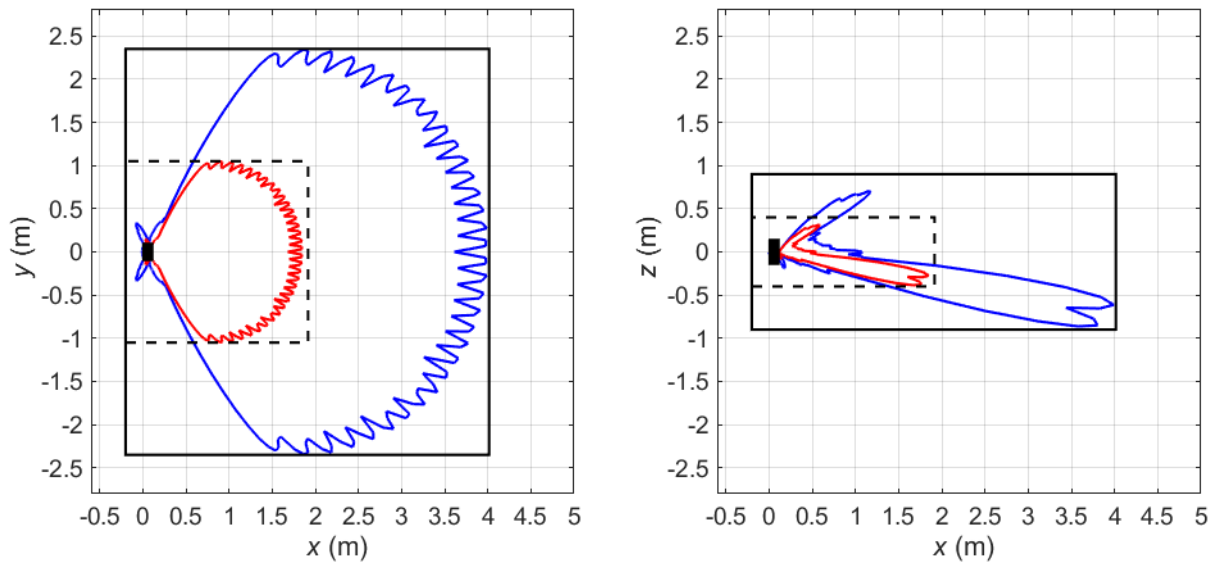


Figure 18 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro7 (tilt 11.25°) sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

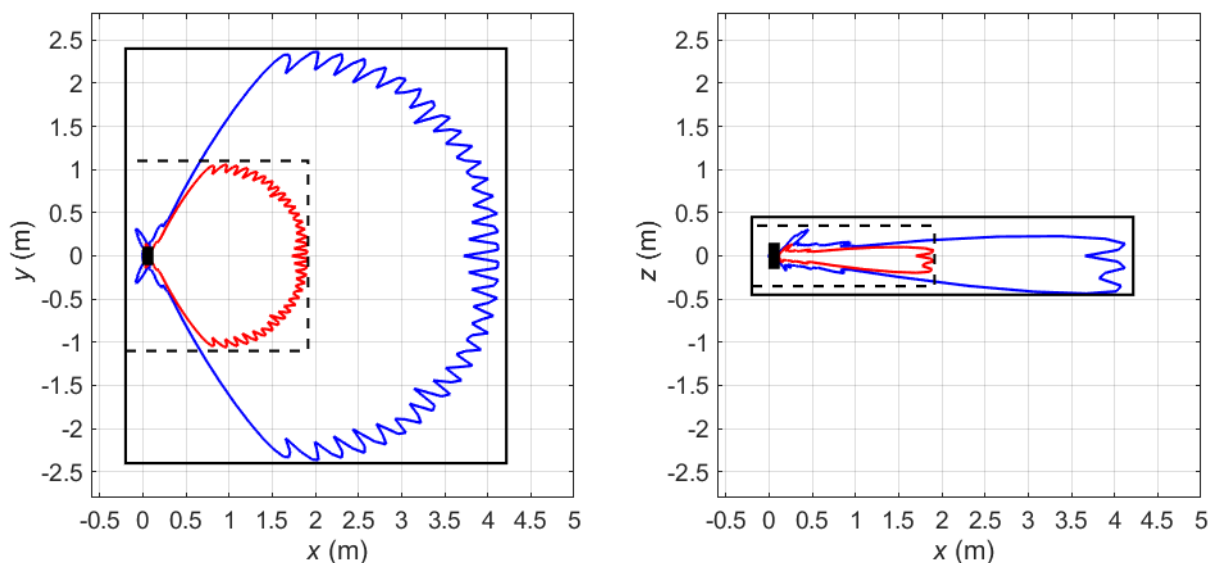


Figure 19 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro13 sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

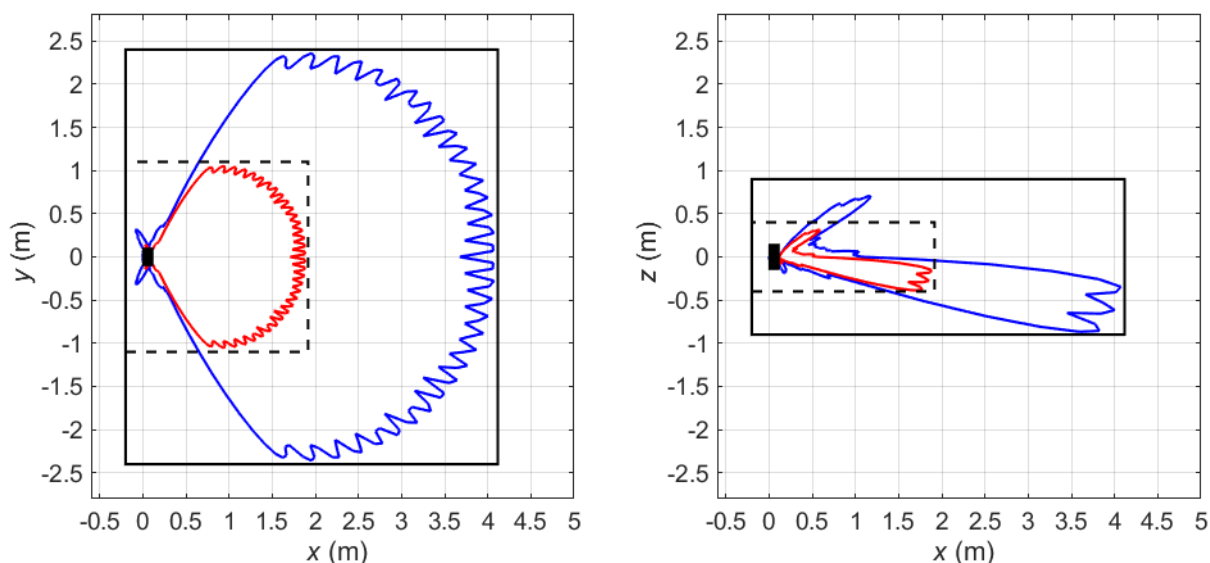


Figure 20 Compliance boundaries for general public (black solid line) and workers (black dashed line) exposure for markets where the FCC exposure limits apply for Macro13 (tilt 11.25°) sector shape (Configuration Mode 2). The blue solid lines correspond to compliance distance results for general public exposure obtained using the spherical models. The solid red lines indicate the corresponding compliance distance results for workers exposure. The EUT is shown from above (left) and from the side (right) with its backplane located at $x = 0$ m. Mode: B258 (26 GHz) (NR). Total EIRP of the radio: 63.2 dBm.

Table 5 Dimensions of the box-shaped compliance boundary for general public (GP) and workers (W) exposure for AIR 5322 applicable in markets employing the FCC RF exposure limits. The compliance boundaries are determined for total EIRP with tolerance and TDD downlink duty cycle included.

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Mode and EIRP for AIR 5322						Dimensions of the box-shaped compliance boundary (m)									
						Distance in front of EUT		Width		Height		Distance behind EUT			
Band	Standard	Configuration Mode	EIRP		TDD DL duty cycle	Sector shapes ⁹	GP	W	GP	W	GP	W	GP	W	
			Nominal total (dBm)	Tolerance (dB)											
B258/B258A ¹⁰	NR	0	46	2.4	75 %	H1, H5, M3, M4	0.7	0.3	0.8	0.6	0.7	0.7	0.2	0.2	
			50				1.0	0.5	1.2	0.6	0.7	0.7	0.2	0.2	
			53				1.4	0.7	1.7	0.8	0.7	0.7	0.2	0.2	
			56				2	0.9	2.4	1.1	0.9	0.7	0.2	0.2	
		1	49	2.4	75 %	H2, M3, M3(7.5°tilt), M9, M10, M11	0.9	0.5	1.1	0.6	0.7	0.7	0.2	0.2	
						M9(7.5°tilt), M11(7.5°tilt)	0.4								
			53	2.4	75 %	H2, M3, M3(7.5°tilt), M9, M10, M11	1.5	0.7	1.7	0.8	0.7	0.7	0.2	0.2	
						M9(7.5°tilt), M11(7.5°tilt)	1.4								
			56	2.4	75 %	M3, M9, M11	2.1	0.9	2.4	1.1	0.7	0.7	0.2	0.2	
						H2, M3(7.5°tilt), M10					0.9				
						M9(7.5°tilt), M11(11.25°tilt)					2				
			59	2.4	75 %	M3, M9, M11	2.9	1.3	3.4	1.6	0.7	0.7	0.2	0.2	
						H2, M3(7.5°tilt), M10					1.2				
						M9(7.5°tilt), M11(7.5°tilt)					2.7				
			2	52	2.4	75 %	H2, M5, M5(7.5°tilt), M7, M7(11.25°tilt), M13, M13(7.5°tilt)	1.3	0.6	1.5	0.7	0.7	0.7	0.2	0.2
							M5, M7, M13	2.1							
		56		2.4	75 %	H2, M5(7.5°tilt)	2	0.9	2.4	1.1	0.7	0.7	0.2	0.2	
						M7(11.25°tilt), M13(7.25°tilt)					0.9				
						M5, M7, M13					2.9				
		59		2.4	75 %	H2, M5(7.5°tilt), M13(7.5°tilt)	2.8	1.3	3.4	1.5	0.7	0.7	0.2	0.2	
						M7(11.25°tilt)					1.3				
						M7					0.7				
		62		2.4	75 %	M5, M13	4.1	1.8	4.8	2.2	0.9	0.7	0.2	0.2	
						H2, M5(7.5°tilt)					0.7				
M13(7.5°tilt)	1.8														
M7(11.25°tilt)	0.8														

For the EIRP levels specified in the table with tolerances added, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative.

⁹ Sector shapes in this report are abbreviated according to: H1 for Hotspot1, H2 for Hotspot2, H5 for Hotspot5, M3 for Macro3, M4 for Macro4, M5 for Macro5, M7 for Macro7, M9 for Macro9, M10 for Macro10, M11 for Macro11 and M13 for Macro13.
¹⁰ Within the frequency ranges of the sub-bands B258C and B258D.

6 Uncertainty

For the input parameters defined in the test report, the calculated compliance boundary dimensions determined according to the approach described in Section 4 results in an exposure assessment which is conservative. The compliance boundary dimensions were determined by comparing the evaluated RF exposure directly with the limits.

7 Conclusion

The Ericsson AIR 5322 B258/B258A has been tested using methods and procedures specified in FCC OET Bulletin 65 [3] and IEC 62232:2017 [4]. The results in Section 5 show the compliance boundary dimensions for the considered configuration of the product. Outside of these compliance boundaries, the RF exposure is below the limits specified in [1].

8 References

- [1] FCC, Code of Federal Regulations CFR title 47, part 1.1310 "Radiofrequency radiation exposure limits", Federal Communications Commission (FCC), August 1997.
- [2] GFTE-16:001718 Uen, "Ericsson RF exposure calculation procedure for base stations".
- [3] 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.
- [4] 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, June 2017.
- [5] Ericsson, LME-12:001904 Uen, "Exposure to radio frequency electromagnetic fields".

9 Revision history

Rev.	Date	Description
A	2020-11-27	First revision.
B	2020-11-27	Second revision: Fixed error in Table 2 (Number of antenna panels in Configuration Mode 0).
C	2021-03-05	Included AIR 5322 B258A product version.
D	2021-03-17	Fixed typo in Table A.1
E	2021-05-18	Recalculation with updated product dimensions. Update of maximum gain.
F	2021-05-24	Recalculation with updated product dimensions
G	2021-05-25	Update of Table 2, corrected vertical beamwidth
H	2021-06-03	Fixed typo in Table A.1. 'O' for occupational exposure instead of 'W'

Appendix A. Information to be included in the CPI

Table A.1 lists the compliance boundaries (exclusion zones), outside of which the RF EMF exposure from AIR 5322 is below the limits applicable in:

- USA (47 CFR 1.1310)

Information is provided for the theoretical maximum exposure condition.

Table A.1: Dimensions of the box-shaped compliance boundary for general public (GP) and occupational (O) exposure applicable in USA and markets employing the FCC RF exposure limits.

Mode and EIRP for AIR 5322							Dimensions of the box-shaped compliance boundary ⁽¹⁾ (m)									
							Distance in front of EUT		Width		Height		Distance behind EUT			
Band	Standard	Configuration Mode	EIRP Nominal total (dBm)	Tolerance (dB)	IEC 62232 installation class	TDD DL duty cycle	Sector shapes ⁽³⁾		GP	O	GP	O	GP	O	GP	O
B258/B258A ⁽²⁾	NR	0	46	2.4	E100	75 %	H1, H5, M3, M4	0.7	0.3	0.8	0.6	0.7	0.7	0.2	0.2	
			50		E100			1.0	0.5	1.2	0.6	0.7	0.7	0.2	0.2	
			53		E+			1.4	0.7	1.7	0.8	0.7	0.7	0.2	0.2	
			56		E+			2.0	0.9	2.4	1.1	0.9	0.7	0.2	0.2	
		1	49	E100	75 %	H2, M3, M3(7.5°tilt), M9, M10, M11	0.9	0.5	1.1	0.6	0.7	0.7	0.2	0.2		
							M9(7.5°tilt), M11(7.5°tilt)	0.4								
			53	E+	75 %	H2, M3, M3(7.5°tilt), M9, M10, M11	1.5	0.7	1.7	0.8	0.7	0.7	0.2	0.2		
							M9(7.5°tilt), M11(7.5°tilt)	1.4								
			56	E+	75 %	M3, M9, M11	2.1	0.9	2.4	1.1	0.7	0.7	0.2	0.2		
							H2, M3(7.5°tilt), M10								0.9	
			59	E+	75 %	M9(7.5°tilt), M11(11.25°tilt)	2.0	1.3	3.4	1.6	0.7	0.7	0.2	0.2		
							M3, M9, M11								2.9	
		H2, M3(7.5°tilt), M10					1.3									
		M9(7.5°tilt), M11(7.5°tilt)					2.7									
		2	52	E+	75 %	H2, M5, M5(7.5°tilt), M7, M7(11.25°tilt), M13, M13(7.5°tilt)	1.3	0.6	1.5	0.7	0.7	0.7	0.2	0.2		
							M5, M7, M13								2.1	
			56	E+	75 %	H2, M5(7.5°tilt)	2.0	0.9	2.4	1.1	0.7	0.7	0.2	0.2		
							M7(11.25°tilt), M13(7.25°tilt)								2.0	
			59	E+	75 %	M5, M7, M13	2.9	1.3	3.4	1.5	0.7	0.7	0.2	0.2		
							H2, M5(7.5°tilt), M13(7.5°tilt)								2.9	
			62	E+	75 %	M7(11.25°tilt)	2.8	1.8	4.8	2.2	0.7	0.7	0.2	0.2		
							M7								4.1	
		M5, M13					4.1									
		H2, M5(7.5°tilt)					4.0									
M13(7.5°tilt)	4.0	1.8	0.8	0.8	0.2	0.2										
	M7(11.25°tilt)						3.9									
M7(11.25°tilt)	3.9	4.7	2.1	1.8	0.8	0.8										

For the EIRP levels specified in the table with tolerances added, and the upward rounding of compliance boundary dimensions to the nearest decimeter, the specified results are conservative.

- (1) The compliance boundaries are determined for total EIRP with tolerance and TDD downlink duty cycle included.
- (2) Within the frequency ranges of the sub-bands B258C and B258D.
- (3) Sector shapes are abbreviated according to: H1 for Hotspot1, H2 for Hotspot2, H5 for Hotspot5, M3 for Macro3, M4 for Macro4, M5 for Macro5, M7 for Macro7, M9 for Macro9, M10 for Macro10, M11 for Macro11 and M13 for Macro13

Appendix B. Guidelines on how to install the product

The Ericsson AIR 5322 B258 product (KRD 901 200/1 (DC), KRD 901 200/4 (AC)) and the Ericsson AIR 5322 B258A product (KRD 901 200/2 (DC), KRD 901 200/5 (AC)) 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.

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

For The Ericsson AIR 5322 B258 product (KRD 901 200/1 (DC), KRD 901 200/4 (AC)) and the Ericsson AIR 5322 B258A product (KRD 901 200/2 (DC), KRD 901 200/5 (AC)), 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.

If work is conducted on behalf of Ericsson, minimum EMF related requirements are provided in [5].