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Report On

RF Exposure Assessment of the
Nokia
Flexi Zone Micro Base Station

FCC ID: FWHR - 2AD8UFZMFWHR01 & Bluetooth - 2AD8UNBTM01
IC: FWHR - 109D-FZMFWHR01 & Bluetooth - 109D-NBTM01

Document 75933080 Report 01 Issue 1

February 2016



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REPORT ON

RF Exposure Assessment of the
Nokia
Flexi Zone Micro Base Station

Document 75933080 Report 01 Issue 1

February 2016

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05 February 2016



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SECTION 1

REPORT SUMMARY

RF Exposure Assessment of the
Nokia
Flexi Zone Micro Base Station



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1.1 INTRODUCTION

The information contained in this report is intended to show verification of the RF Exposure Assessment of the Nokia Flexi Zone Micro Base Station to the requirements of the applied test specifications.

Objective	To perform RF Exposure Assessment to determine the Equipment Under Test's (EUT's) compliance of the applied rules.
Applicant	Nokia
Manufacturer	Nokia
Manufacturing Description	Base Station
Model Number(s)	Flexi Zone Micro Base Station
Test Specification/Issue/Date	EN 62311:2008 CFR 47 Pt1.1310 Health Canada Safety Code 6 ARPANSA Radiation Protection Series No.3



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1.2 REGIONAL REQUIREMENTS

The table below shows the regional requirements that are referenced in this test report. A full list of the requirements is shown in Annex A.

Report Reference	Regional Requirement
EU	EN 62311:2008
FCC	CFR 47 Pt1.1310
IC	Health Canada Safety Code 6
AUS	ARPANSA Radiation Protection Series No.3



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1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment under test was a Nokia Flexi Zone Micro Base Station. A full technical description can be found in the manufacturer's documentation.

All reported calculations were carried out on the relevant information supplied for the Flexi Zone Micro Base Station to demonstrate compliance with the applied test specification(s). The sample assessed was found to comply with the requirements of the applied rules.

1.3.2 Supported Features

The following radio access technologies and frequency bands are supported by the equipment under test.

Radio Access Technology	LTE FDD
	LTE TDD
	Bluetooth
Frequency Band	Band 7 – 2620 - 2690 MHz
	Band 41 - 2496 - 2690 MHz
	2400 MHz

1.3.3 Antennas

The following antennas are supported by the equipment under test.

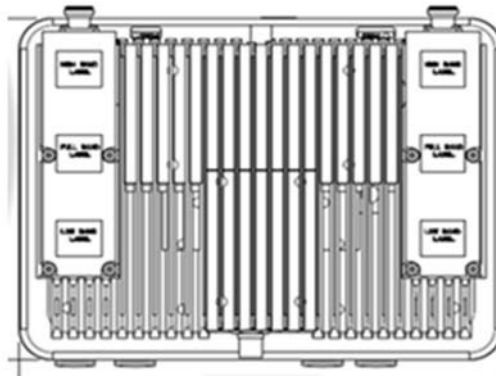
No.	Model	Gain (dBi)
1	Alpha Wireless	6.9
2	Laird WXC2400SMRP-NS1	0
3	PCTEL MHO242703NM	2

1.3.4 EUT Configurations

The EUT has one configuration as shown in the table below

Configuration	Antenna Port	RAT
Configuration 1	1	LTE x 2 Carriers
	2	LTE x 2 Carriers
	3	Bluetooth

FWHR



Configuration 1



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6.1 BRIEF SUMMARY OF RESULTS

The wireless device described within this report has been shown to be capable of compliance with the basic restrictions related to human exposure to electromagnetic fields for both General Public and Occupational. The calculations shown in this report were made in accordance the procedures specified in the applied test specification(s).

Configuration	Required Compliance Boundary (m)	
	Occupational	General Population
Band 7 LTE FDD	1.11	2.67
Band 41 LTE TDD	1.63	3.93
Bluetooth	0.01	0.02
Band 7 LTE FDD + Bluetooth	1.12	2.68
Band 41 LTE TDD + Bluetooth	1.63	3.94

Table 1 – Compliance Boundary Results



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6.1.1 Configuration 1 - Band 7 LTE FDD

Regional Requirement	Calculated RF exposure level at compliance boundary of 1.11 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
EU	8.1885	50.0000	111.1214	137.0000	0.2948	0.3630
FCC*	0.8188	5.0000	N/A	N/A	N/A	N/A
IC	8.1885	33.0449	111.1214	111.6166	0.2948	0.2961
AUS	8.1885	50.0000	111.1214	137.0000	0.2948	0.3640

* Requirement and Result in mW/cm²

Table 2 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 1.11 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 2.67 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
EU	1.4152	10.0000	46.1965	61.0000	0.1225	0.1620
FCC*	0.1415	1.0000	N/A	N/A	N/A	N/A
IC	1.4152	5.6791	46.1965	46.2679	0.1225	0.1227
AUS	1.4152	10.0000	46.1965	61.4000	0.1225	0.1630

* Requirement and Result in mW/cm²

Table 3 – General Population Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 2.67 m.



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6.1.2 Configuration 2 - Band 41 LTE TDD

Regional Requirement	Calculated RF exposure level at compliance boundary of 1.63 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
EU	7.9679	50.0000	109.6144	137.0000	0.2908	0.3630
FCC*	0.7968	5.0000	N/A	N/A	N/A	N/A
IC	7.9679	32.2537	109.6144	110.2722	0.2908	0.2925
AUS	7.9679	50.0000	109.6144	137.0000	0.2908	0.3640

* Requirement and Result in mW/cm²

Table 4 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 1.63 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 3.93 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
EU	1.3707	10.0000	45.4635	61.0000	0.1206	0.1620
FCC*	0.1371	1.0000	N/A	N/A	N/A	N/A
IC	1.3707	5.4941	45.4635	45.5078	0.1206	0.1207
AUS	1.3707	10.0000	45.4635	61.4000	0.1206	0.1630

* Requirement and Result in mW/cm²

Table 5 – General Population Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 3.93 m.



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6.1.3 Configuration 3 - Bluetooth

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.01 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
EU	7.9577	50.0000	54.7723	137.0000	0.1453	0.3630
FCC*	0.7958	5.0000	N/A	N/A	N/A	N/A
IC	7.9577	31.6361	54.7723	109.2114	0.1453	0.2897
AUS	7.9577	50.0000	54.7723	137.0000	0.1453	0.3640

* Requirement and Result in mW/cm²

Table 6 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 0.01 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 0.02 m					
	S Field (W/m ²)		E Field (V/m)		H Field (A/m)	
	Result	Limit	Result	Limit	Result	Limit
EU	1.9894	10.0000	27.3861	61.0000	0.0726	0.1620
FCC*	0.1989	1.0000	N/A	N/A	N/A	N/A
IC	1.9894	5.3508	27.3861	44.9105	0.0726	0.1191
AUS	1.9894	10.0000	27.3861	61.4000	0.0726	0.1630

* Requirement and Result in mW/cm²

Table 7 – General Population Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 0.02 m.



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6.1.4 Configuration 4 - Band 7 LTE FDD + Bluetooth

The tables below show the summed fractional results from the antenna port summary in section 2.2. Where the result is less than one, the EUT is deemed compliant.

Regional Requirement	Calculated RF exposure level at compliance boundary of 1.12 m as a Fraction of the Limit		
	S Field	E Field	H Field
EU	0.1609	0.8074	0.8083
FCC	0.1609	N/A	N/A
IC	0.2434	0.9912	0.9911
AUS	0.1609	0.8074	0.8061

Table 8 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 1.12 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 2.68 m as a Fraction of the Limit		
	S Field	E Field	H Field
EU	0.1405	0.7578	0.7569
FCC	0.1405	N/A	N/A
IC	0.2474	0.9993	0.9992
AUS	0.1405	0.7529	0.7523

Table 9 – General Population Results

The calculations show that the EUT complies with the general population exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 2.68 m.



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6.1.5 Configuration 5 - Band 41 LTE TDD + Bluetooth

The tables below show the summed fractional results from the antenna port summary in section 2.2. Where the result is less than one, the EUT is deemed compliant.

Regional Requirement	Calculated RF exposure level at compliance boundary of 1.63 m as a Fraction of the Limit		
	S Field	E Field	H Field
EU	0.1594	0.8026	0.8034
FCC	0.1594	N/A	N/A
IC	0.2470	0.9971	0.9971
AUS	0.1594	0.8026	0.8012

Table 10 – Occupational Results

The calculations show that the EUT complies with the occupational exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 1.63 m.

Regional Requirement	Calculated RF exposure level at compliance boundary of 3.94 m as a Fraction of the Limit		
	S Field	E Field	H Field
EU	0.1364	0.7457	0.7448
FCC	0.1364	N/A	N/A
IC	0.2482	0.9996	0.9995
AUS	0.1364	0.7408	0.7402

Table 11 – General Population Results

The calculations show that the EUT complies with the general population exposure levels described in the EN 62311:2008, CFR 47 Pt1.1310, Health Canada Safety Code 6 and ARPANSA Radiation Protection Series No.3 at the point of investigation, 3.94 m.



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SECTION 2

TEST DETAILS

7.1 RATIONALE FOR ASSESSMENT OF THE RF EXPOSURE

The aim of the assessment report is to evaluate the compliance boundary for a set of given input power(s) according to the basic restrictions (directly or indirectly via compliance with reference levels) related to human exposure to radio frequency electromagnetic fields.

The chosen assessment method to establish the compliance boundary in the far-field region is the reference method as defined in the relevant specifications.

The RF exposure assessment is based upon the following criteria:

The Flexi Zone Micro Base Station Base Station operates with the following transmitters active on the antenna ports shown in Section 1.3.3. For each transmitter, the Radio Access Technology (RAT), EIRP inclusive of antenna gain and duty cycle, gain of the antenna and lowest frequency of operation are shown as they contribute to the calculation of S Field, E field and H field values according to the following formulas.

The power flux (S Field):

$$S = \frac{PG_{(\theta, \phi)}}{4\pi r^2}$$

The electric field strength (E Field):

$$E = \frac{\sqrt{30PG_{(\theta, \phi)}}}{r}$$

The magnetic field strength (H Field):

$$H = \frac{E}{\eta_0}$$

Where:

P = Average Power (W)

G = Antenna Gain (dBi)

r = Distance (cm) or (m)

$\eta_0 = 377$



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7.2 TEST RESULT DETAILS

The frequencies shown in the tables below have been chosen based on the lowest possible frequency that the EUT can transmit.

7.2.1 Configuration 1 - Band 7 LTE FDD

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 1.11 m		
								S Field	E Field	H Field
1	1	3	LTE FDD	31.696	100	2	2620.7	2.0471	27.7803	0.0737
	2	3	LTE FDD	31.696	100	2	2620.7	2.0471	27.7803	0.0737
2	1	3	LTE FDD	31.696	100	2	2620.7	2.0471	27.7803	0.0737
	2	3	LTE FDD	31.696	100	2	2620.7	2.0471	27.7803	0.0737

Table 12 – Occupational Transmitter Summary

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 2.67 m		
								S Field	E Field	H Field
1	1	3	LTE FDD	31.696	100	2	2620.7	0.3538	11.5491	0.0306
	2	3	LTE FDD	31.696	100	2	2620.7	0.3538	11.5491	0.0306
2	1	3	LTE FDD	31.696	100	2	2620.7	0.3538	11.5491	0.0306
	2	3	LTE FDD	31.696	100	2	2620.7	0.3538	11.5491	0.0306

Table 13 – General Population Transmitter Summary



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7.2.2 Configuration 2 - Band 41 LTE TDD

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 1.63 m		
								S Field	E Field	H Field
1	1	1	LTE TDD	66.507	67.9	6.9	2496.7	1.9920	27.4036	0.0727
	2	1	LTE TDD	66.507	67.9	6.9	2496.7	1.9920	27.4036	0.0727
2	1	1	LTE TDD	13.579	67.9	6.9	2496.7	1.9920	27.4036	0.0727
	2	1	LTE TDD	13.579	67.9	6.9	2496.7	1.9920	27.4036	0.0727

Table 14 – Occupational Transmitter Summary

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 3.93 m		
								S Field	E Field	H Field
1	1	1	LTE TDD	66.507	67.9	6.9	2496.7	0.3427	11.3659	0.0301
	2	1	LTE TDD	66.507	67.9	6.9	2496.7	0.3427	11.3659	0.0301
2	1	1	LTE TDD	13.579	67.9	6.9	2496.7	0.3427	11.3659	0.0301
	2	1	LTE TDD	13.579	67.9	6.9	2496.7	0.3427	11.3659	0.0301

Table 15 – General Population Transmitter Summary



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7.2.3 Configuration 3 - Bluetooth

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 0.01 m		
								S Field	E Field	H Field
1	1	2	Bluetooth	0.010	100	0	2402.0	7.9577	54.7723	0.1453

Table 16 – Occupational Transmitter Summary

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 0.02 m		
								S Field	E Field	H Field
1	1	2	Bluetooth	0.010	100	0	2402.0	1.9894	27.3861	0.0726

Table 17 – General Population Transmitter Summary



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7.2.4 Configuration 4 - Band 7 LTE FDD + Bluetooth

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 1.12 m		
								S Field	E Field	H Field
1	1	3	LTE FDD	31.696	100	2	2620.7	2.0107	27.5323	0.0730
	2	3	LTE FDD	31.696	100	2	2620.7	2.0107	27.5323	0.0730
2	1	3	LTE FDD	31.696	100	2	2620.7	2.0107	27.5323	0.0730
	2	3	LTE FDD	31.696	100	2	2620.7	2.0107	27.5323	0.0730
3	1	2	Bluetooth	0.010	100	0	2402.0	0.0006	0.4890	0.0013

Table 18 – Occupational Transmitter Summary

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 2.68 m		
								S Field	E Field	H Field
1	1	3	LTE FDD	31.696	100	2	2620.7	0.3512	11.5060	0.0305
	2	3	LTE FDD	31.696	100	2	2620.7	0.3512	11.5060	0.0305
2	1	3	LTE FDD	31.696	100	2	2620.7	0.3512	11.5060	0.0305
	2	3	LTE FDD	31.696	100	2	2620.7	0.3512	11.5060	0.0305
3	1	2	Bluetooth	0.010	100	0	2402.0	0.0001	0.2044	0.0005

Table 19 – General Population Transmitter Summary

The following tables show the regional requirements for the frequencies used in the RF exposure calculation. A full list of the requirements is shown in Annex A.

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (W/m ²)	E Field (V/m)	H Field (A/m)	S Field (W/m ²)	E Field (V/m)	H Field (A/m)
2620.7	50.0000	137.0000	0.3630	10.0000	61.0000	0.1620
2402.0	50.0000	137.0000	0.3630	10.0000	61.0000	0.1620

Table 20 – EN 62311:2008 Limits

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (mW/cm ²)	E Field (V/m)	H Field (A/m)	S Field (mW/cm ²)	E Field (V/m)	H Field (A/m)
2620.7	5.0000	-	-	1.0000	-	-
2402.0	5.0000	-	-	1.0000	-	-

Table 21 – CFR 47 Pt1.1310 Limits

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (W/m ²)	E Field (V/m)	H Field (A/m)	S Field (W/m ²)	E Field (V/m)	H Field (A/m)
2620.7	33.0449	111.6166	0.2961	5.6791	46.2679	0.1227
2402.0	31.6361	109.2114	0.2897	5.3508	44.9105	0.1191

Table 22 – Health Canada Safety Code 6 Limits

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (W/m ²)	E Field (V/m)	H Field (A/m)	S Field (W/m ²)	E Field (V/m)	H Field (A/m)
2620.7	50.0000	137.0000	0.3640	10.0000	61.4000	0.1630
2402.0	50.0000	137.0000	0.3640	10.0000	61.4000	0.1630

Table 23 – ARPANSA Radiation Protection Series No.3 Limits



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7.2.5 Configuration 5 - Band 41 LTE TDD + Bluetooth

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 1.63 m		
								S Field	E Field	H Field
1	1	1	LTE TDD	66.507	67.9	6.9	2496.7	1.9920	27.4036	0.0727
	2	1	LTE TDD	66.507	67.9	6.9	2496.7	1.9920	27.4036	0.0727
2	1	1	LTE TDD	66.507	67.9	6.9	2496.7	1.9920	27.4036	0.0727
	2	1	LTE TDD	66.507	67.9	6.9	2496.7	1.9920	27.4036	0.0727
3	1	2	Bluetooth	0.010	100	0	2402.0	0.0003	0.3360	0.0009

Table 24 – Occupational Transmitter Summary

Antenna Port	Tx No.	Ant No.	RAT	EIRP (W)	Duty Cycle (%)	Gain (dBi)	Frequency (MHz)	RF Exposure Level at compliance boundary of 3.94 m		
								S Field	E Field	H Field
1	1	1	LTE TDD	66.507	67.9	6.9	2496.7	0.3409	11.3370	0.0301
	2	1	LTE TDD	66.507	67.9	6.9	2496.7	0.3409	11.3370	0.0301
2	1	1	LTE TDD	66.507	67.9	6.9	2496.7	0.3409	11.3370	0.0301
	2	1	LTE TDD	66.507	67.9	6.9	2496.7	0.3409	11.3370	0.0301
3	1	2	Bluetooth	0.010	100	0	2402.0	0.0001	0.1390	0.0004

Table 25 – General Population Transmitter Summary

The following tables show the regional requirements for the frequencies used in the RF exposure calculation. A full list of the requirements is shown in Annex A.

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (W/m ²)	E Field (V/m)	H Field (A/m)	S Field (W/m ²)	E Field (V/m)	H Field (A/m)
2496.7	50.0000	137.0000	0.3630	10.0000	61.0000	0.1620
2402.0	50.0000	137.0000	0.3630	10.0000	61.0000	0.1620

Table 26 – EN 62311:2008 Limits

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (mW/cm ²)	E Field (V/m)	H Field (A/m)	S Field (mW/cm ²)	E Field (V/m)	H Field (A/m)
2496.7	5.0000	-	-	1.0000	-	-
2402.0	5.0000	-	-	1.0000	-	-

Table 27 – CFR 47 Pt1.1310 Limits

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (W/m ²)	E Field (V/m)	H Field (A/m)	S Field (W/m ²)	E Field (V/m)	H Field (A/m)
2496.7	32.2537	110.2722	0.2925	5.4941	45.5078	0.1207
2402.0	31.6361	109.2114	0.2897	5.3508	44.9105	0.1191

Table 28 – Health Canada Safety Code 6 Limits

Frequency (MHz)	Occupational Limit			General Population Limit		
	S Field (W/m ²)	E Field (V/m)	H Field (A/m)	S Field (W/m ²)	E Field (V/m)	H Field (A/m)
2496.7	50.0000	137.0000	0.3640	10.0000	61.4000	0.1630
2402.0	50.0000	137.0000	0.3640	10.0000	61.4000	0.1630

Table 29 – ARPANSA Radiation Protection Series No.3 Limits



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SECTION 3

DISCLAIMERS AND COPYRIGHT



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8.1 DISCLAIMERS AND COPYRIGHT

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ANNEX A

REGIONAL REQUIREMENTS



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Frequency Range (MHz)	Power Density (W/m ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.065 - 1	-	610/f	1.6/f
1 - 10	-	610/f	1.6/f
10 - 400	10	61	0.162
400 - 2000	f/40	3*f ^{0.5}	0.00796*f ^{0.5}
2000 - 300000	50	137	0.363

Table A.1 – EN 62311:2008 Occupational Limits

Frequency Range (MHz)	Power Density (W/m ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.003 - 0.15	-	87	5
0.15 - 1	-	87/f	0.73/f
1 - 10	-	87/f ^{0.5}	0.73/f
10 - 400	2	27	0.071
400 - 2000	f/200	1.375*f ^{0.5}	0.00364*f ^{0.5}
2000 - 300000	10	61	0.162

Table A.2 – EN 62311:2008 General Population Limits

Frequency Range (MHz)	S Field (mW/cm ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0 - 0.3	-	-	-
0.3 - 3	100	614	1.63
3 - 30	900/f ²	1842/f	4.89/f
30 - 300	1	61.4	0.163
300 - 1500	f/300	-	-
1500 - 100000	5	-	-

Table A.3 – CFR 47 Pt1.1310 Occupational Limits

Frequency Range (MHz)	S Field (mW/cm ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0 - 0.3	-	-	-
0.3 - 3	100	614	1.63
3 - 30	180/f ²	824/f	2.19/f
30 - 300	0.2	27.5	0.073
300 - 1500	f/1500	-	-
1500 - 100000	1	-	-

Table A.4 – CFR 47 Pt1.1310 General Population Limits

Frequency Range (MHz)	Power Density (W/m ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
10 - 20	10	61.4	0.163
20 - 48	44.72/f ^{0.5}	129.8/f ^{0.25}	0.3444/f ^{0.25}
48 - 100	6.455	49.33	0.1309
100 - 6000	0.6455*f ^{0.5}	15.60*f ^{0.25}	0.04138*f ^{0.25}
6000 - 150000	50	137	0.364

Table A.5 – Health Canada Safety Code 6 Occupational Limits



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Frequency Range (MHz)	Power Density (W/m ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
10 - 20	2	27.46	0.0728
20 - 48	$8.944/f^{0.5}$	$58.07/f^{0.25}$	$0.1540/f^{0.25}$
48 - 300	1.291	22.06	0.05852
300 - 6000	$0.02619*f^{0.6834}$	$3.142*f^{0.3417}$	$0.008335*f^{0.3417}$
6000 - 15000	10	61.4	0.163

Table A.6 – Health Canada Safety Code 6 General Population Limits

Frequency Range (MHz)	Power Density (W/m ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.1 - 1	-	614	$1.63/f$
1 - 10	$1000/f^2$	614	$1.63/f$
10 - 400	10	61.4	0.163
400 - 2000	$f/40$	$3.07*f^{0.5}$	$0.00814*f^{0.5}$
2000 - 300000	50	137	0.364

Table A.7 – ARPANSA Radiation Protection Series No.3 Occupational Limits

Frequency Range (MHz)	Power Density (W/m ²)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)
0.1 - 0.15	-	86.8	4.86
0.15 - 1	-	86.8	$0.729/f$
1 - 10	-	$86.8/f^{0.5}$	$0.729/f$
10 - 400	2	27.4	0.0729
400 - 2000	$f/200$	$1.37*f^{0.5}$	$0.00364*f^{0.5}$
2000 - 300000	10	61.4	0.163

Table A.8 – ARPANSA Radiation Protection Series No.3 General Population Limits