



MPE Report: RF Exposure

[FCC rule]

§1.1310 Radiofrequency radiation exposure limits.

The criteria listed in table 1 shall be used to evaluate the environmental impact of human exposure to radiofrequency (RF) radiation as specified in §1.1307(b), except in the case of portable devices which shall be evaluated according to the provisions of §2.1093 of this chapter.

Table 1—Limits for Maximum Permissible Exposure (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

Note 1 to Table 1: Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

Note 2 to Table 1: General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or can not exercise control over their exposure.

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[IC rule]

RSS-102

§4 Exposure Limits

For the purpose of this standard, Industry Canada has adopted the SAR and RF field strength limits established in Health Canada's RF exposure guideline, Safety Code 6.

§4.2 RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m ²)	Averaging Time (minutes)
0.003-1	280	2.19	-	6
1-10	280/ <i>f</i>	2.19/ <i>f</i>	-	6
10-30	28	2.19/ <i>f</i>	-	6
30-300	28	0.073	2*	6
300-1500	1.585 <i>f</i> ^{0.5}	0.0042 <i>f</i> ^{0.5}	<i>f</i> /150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> ^{1.2}
150000-300000	0.158 <i>f</i> ^{0.5}	4.21 x 10 ⁻⁴ <i>f</i> ^{0.5}	6.67 x 10 ⁻⁵ <i>f</i>	616000/ <i>f</i> ^{1.2}

Note: *f* is frequency in MHz.

* Power density limit is applicable at frequencies greater than 100 MHz.

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[Results]

Mode Channel	Peak EIRP					Duty Factor [dB]	Average EIRP [dBm]	Average EIRP [mW]	
	Horizontal [dBm]	Vertical [dBm]	Horizontal [mW]	Vertical [mW]	Total [mW]				Total [dBm]
LRP Low	29.15	27.92	822.5	619.6	1442.1	31.59	-8.69	22.90	194.9

Mode Channel	Separation Distance [cm]	Power Density (FCC)		Power Density (IC)	
		Result [mW/cm ²]	Limit [mW/cm ²]	Result [W/m ²]	Limit [W/m ²]
LRP Low	5	0.620	1	6.20	10

Calculating formula:

$$\begin{aligned} \text{Total Peak EIRP} &= \text{Horizontal Peak EIRP} + \text{Vertical Peak EIRP} \\ \text{Average EIRP} &= \text{Total Peak EIRP} + \text{Duty Factor} \\ \text{Power Density} &= \text{Average EIRP} / (4 * \text{Pi} * \text{Separation Distance}^2) \end{aligned}$$

[Duty Factor]

Tx type	Tx width [us]	Times	Tx time [us]
A	158.7	1	158.7
B	78.15	15	1172.25
C	24.4	45	1098
D	6.05	60	363
Total Tx time [ms]			2.792
Period [ms]			20.66
Duty [dB]			-8.69

Calculating formula:

$$\begin{aligned} \text{Tx time} &= \text{Tx width} * \text{Times} \\ \text{Duty} &= 10 * \log (\text{Total Tx time} / \text{Period}) \end{aligned}$$

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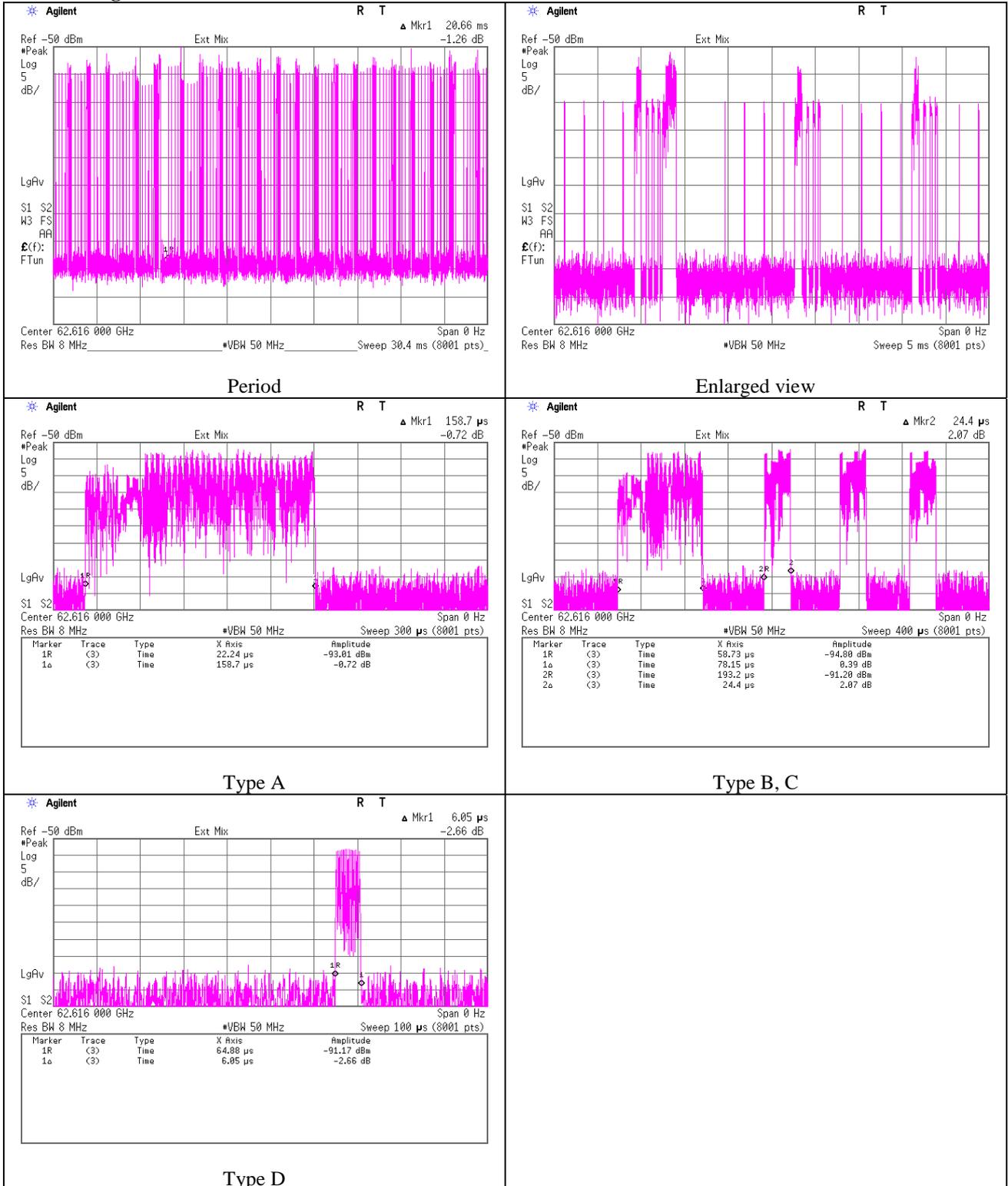
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This duty cycle has maximum transmission time in actual operating conditions. It was measured in a state that the weak signal was received from Tx unit.



End of Report