Garmin A05043 RF Exposure Exhibit

Uncontrolled / Public Environment
HVIN: A05043
47CFR 1.1307, RSS-102 Issue 6

Summary and Simultaneous ANT and 2G WiFi MPE Calculation

Summary: Standalone MPE Calculations and Summary								
Radio	Tx Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Gain (numeric)	S_L (W/m^2)	S_{20} (W/m^2)	R_C (cm)	S_C (W/m^2)
ANT (FCC)	100.0%	2402.0	2.5	1.5	10.0	0.007	0.5	10.0
BT (FCC)	100.0%	2441.0	4.8	3.8	10.0	0.036	1.2	10.0
2G WiFi (FCC)	100.0%	2437.0	11.4	3.8	10.0	0.086	2.9	4.2
	Tx Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Gain (numeric)	SL (W/m2)	S20 (W/m2)	RC (cm)	S_C (W/m^2)
ANT (ISED)	100.0%	2402.0	2.5	1.5	1.3	0.007	1.5	1.3
BT (ISED)	100.0%	2441.0	4.8	3.8	5.4	0.036	1.6	5.4
2G WiFi (ISED)	100.0%	2437.0	11.4	3.8	5.4	0.086	3.5	2.8

FCC Simlutaneous MPE Calculation (Worst Case)						ISED Simlutaneous MPE Calculation (Worst Case)		
	ANT (FCC)	2G WiFi (FCC)					ANT (ISED)	2G WiFi (ISED)
Tx Frequency (MHz)	2402.0	2437.000				Tx Frequency (MHz)	2402.0	2437.0
S_{20} (W/m^2)	0.007	0.086				S20 (W/m^2)	0.007	0.086
S_L (W/m^2)	10.000	10.000				S_L (W/m^2)	1.3	5.4
Power Ratio (S_{20} / S_L)	0.0007	0.0086				Power Ratio (S_L / S_{20})	0.0058	0.0160
Sum of Power Ratios at compliance distance	0.01					Sum of Power Ratios at compliance distance	0.02	
Requirement = Σ of MPE Ratio ≤ 1	EXEMPT					Requirement = Σ of MPE Ratio ≤ 1	EXEMPT	

Note on simultaneous transmitting:

- BT and 2.4G WiFi cannot transmit simultaneously
- ANT can transmit simultaneously with EITHER BT or 2.4G WiFi

Conclusion

The A05043, a device that is deployed in public, uncontrolled environments, meets RF exposure requirements for both FCC and Industry Canada. For RF exposure safety, personnel should maintain a safe distance of **20 cm** from the product.

Summary ANT MPE Calculation

				Antenna Gain (dBi)	1.8	
			dBd + 2.17 = dBi	dBi to dBd	2.2	
Tx Frequency (MHz)	2402	Peak Power (Watts)	0.0025	Antenna Gain (dBd)	-0.37	
		Peak Power (mW)	2.5	Antenna Gain (numeric)	1.5	
Cable Loss (dB)	0.0	(dBm)	3.9	Antenna minus cable (dBi)	1.80	
		Duty Cycle (%)	100.0%			
		Adjusted Power (mW)	2.5			
		Adjusted Power (dBm)	3.9			
Calculated ERP (mw)	2.275			EIRP = Po(dBM) + Gain (dB)		
Calculated EIRP (mw)	3.750			Radiated (EIRP) dBm	5.740	
			ERP = EIRP - 2.17 dB			
				Radiated (ERP) dBm	3.570	

FCC radio frequency radiation exposure limits per 1.1310

Frequency (MHz)	Occupational Limit W/m^2	Public Limit W/m^2
30-300	10.0	2.0
300-1,500	f/30	f/150
1,500-100,000	50	10
2402.000	50	10

Power density (S)

$$\frac{EIRP}{4 \, p \, r^2} = mW/cm^2$$

r (cm)   EIRP (mW)

IC radio frequency radiation exposure limits per RSS-102, Issue 6 Field Reference Level FRL Limit (W/m^2)

Frequency (MHz)	Uncontrolled		Frequency (MHz)	Controlled	
10-20	2.0	2.0	10-20	10.0	10.0
20-48	$8.944/f^{0.5}$	0.2	20-48	$44.72/f^{0.5}$	0.9
48-300	1.291	1.291	48-300	6.455	6.455
300-6,000	$0.02619*f^{0.6834}$	5.351	100-6,000	$0.6455*f^{0.5}$	31.636
6,000-15,000	5.0	10.0	6,000-15,000	50.0	50.0
15,000-150,000	10	10.0	15,000-150,000	50.0	50.0
150,000-300,000	$6.67*(10^{-5})*f$	0.2	150,000-300,000	$3.33*(10^{-4})*f$	0.8

			FCC	ISED	
f = Transmit Frequecny (MHz)		f (MHz) =	2402.0	2402.0	MHz
P_T = Power Input to Antenna (mW)		P_T (mW) =	2.5	2.5	mW
Duty cycle (percentage of operation)		% =	100.0%	100.0%	%
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)		P_A (mW) =	2.48	2.48	mW
G_N = Numeric Gain of the Antenna		GN (numeric) =	1.51	1.51	numeric
S_{20} = Power Density of device at 20cm (mW/m^2)	$S_{20}=(P_A G_N)/(4\pi R_{20})^2$	S_{20} (mW/m^2) =	0.00	0.00	mW/m^2
S_{20} = Power Density of device at 20cm (W/m^2)	$S_{20}=(P_A G_N)/(4\pi R_{20})^2$	S_{20} (W/m^2) =	0.01	0.01	W/m^2
S_L = Power Density Limit (W/m^2)		S_L (W/m^2)=	10.00	1.29	W/m^2
R_C = Minimum distance to the Radiating Element for Compliance ($R_C=\sqrt{(P_A G_N/4\pi S_L)}$		R_C (cm) =	0.5	1.5	cm
S_C = Power Density of the device at the Compliance Distance R_C ($S_C=(P_A G_N)/(4\pi R_C)^2$		S_C (W/m^2) =	10.000	1.29	W/m^2
R_{20} = 20cm		R20=	20	20	cm

Summary: Standalone MPE Calculations and Summary							
Radio	x Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Gain (numeric)	S_L (W/m^2)	S_{20} (W/m^2)	R_C (cm)	S_C (W/m^2)
ANT (FCC)	100.0%	2402.000	2.5	1.51	10.00	0.01	0.5	10.0
ANT (ISED)	100.0%	2402.000	2.5	1.51	1.29	0.01	1.5	1.3

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Revision 3

FCC ID: IPH-05043   IC: 1792A-05043

Test: 250404

Test to: 47CFR 2.1307, RSS-102 Iss.6

File: A05043 RFExp FCC-IC 250404 r3

Garmin International, Inc.

PMN: A05043

SN's: 3512701210, 3512701215

Date: June 23, 2025

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BT MPE Calculation

		Antenna Gain (dBi)	5.8
	dBd + 2.17 = dBi	dBi to dBd	2.2
Tx Frequency (MHz) 2441	Peak Power (Watts) 0.0048	Antenna Gain (dBd)	3.63
	Peak Power (mW) 4.8	Antenna Gain (numeric)	3.8
Cable Loss (dB) 0.0	(dBm) 6.8	Antenna minus cable (dBi)	5.80
	Duty Cycle (%) 100.0%		
	Adjusted Power (mW) 4.8		
	Adjusted Power (dBm) 6.8		

Calculated ERP (mw) 11.041   EIRP = Po(dBM) + Gain (dB)

Calculated EIRP (mw) 18.197   Radiated (EIRP) dBm   12.600

ERP = EIRP - 2.17 dB

Radiated (ERP) dBm   10.430

Power density (S)

$$\frac{EIRP}{4\pi r^2} = mW/cm^2$$

r (cm) EIRP (mW)

FCC radio frequency radiation exposure limits per 1.1310

Frequency (MHz)	Occupational Limit W/m²	Public Limit W/m²
300-1,500	f/30	f/150
1,500-100,000	50	10
2441.0	50	10

IC radio frequency radiation exposure limits per RSS-102, Issue 6 Field Reference Level FRL Limit (W/m²)

Frequency (MHz)	Uncontrolled		Frequency (MHz)	Controlled	
10-20	2.0	2.0	10-20	10.0	10.0
20-48	$8.944/f^{0.5}$	0.2	20-48	$44.72/f^{0.5}$	0.9
48-300	1.291	1.291	48-100	6.455	6.455
300-6,000	$0.02619*f^{0.6834}$	5.4	100-6,000	$0.6455*f^{0.5}$	31.9
6,000-15,000	5.0	10.0	6,000-15,000	50.0	50.0
15,000-150,000	10	10.0	15,000-150,000	50.0	50.0
150,000-300,000	$6.67*(10^{-5})*f$	0.2	150,000-300,000	$3.33*(10^{-4})*f$	0.8

			FCC	ISED	
f = Transmit Frequency (MHz)		f (MHz) =	2441.0	2441.0	MHz
P_T = Power Input to Antenna (mW)		P_T (mW) =	4.8	4.8	mW
Duty cycle (percentage of operation)		% =	100.0%	100.0%	%
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)		P_A (mW) =	4.79	4.79	mW
G_N = Numeric Gain of the Antenna		GN (numeric) =	3.80	3.80	numeric
S_{20} = Power Density of device at 20cm (mW/m²)	$S_{20}=(P_A G_N)/(4\pi R_{20})$	S_{20} (mW/m²) =	0.00	0.00	mW/m²
S_{20} = Power Density of device at 20cm (W/m²)	$S_{20}=(P_A G_N)/(4\pi R_{20})$	S_{20} (W/m²) =	0.04	0.04	W/m²
S_L = Power Density Limit (W/m²)		S_L (W/m²)=	10.00	5.41	W/m²
R_c = Minimum distance to the Radiating Element for C	$R_C=\sqrt{(P_A G_N/4\pi S_{L})}$	R_C (cm) =	1.2	1.6	cm
S_c = Power Density of the device at the Compliance Dist	$S_C=(P_A G_N)/(4\pi R_C)^2$	S_C (W/m²) =	10.00	5.41	W/m²
R_{20}= 20cm		R20=	20	20	cm

Summary: Standalone MPE Calculations and Summary

Radio	Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Gain (numeric)	S_L (W/m²)	S_{20} (W/m²)	R_C (cm)	S_C (W/m²)
BT (FCC)	100.0%	2441.0	4.8	3.80	10.0	0.04	1.2	10.0
BT (ISED)	100.0%	2441.0	4.8	3.80	5.4	0.04	1.6	5.4

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2.4G WiFi MPE Calculation

					Antenna Gain (dBi)	5.8	
				dBd + 2.17 = dBi	dBi to dBd	2.2	
Tx Frequency (MHz)	2437	Peak Power (Watts)	0.0114		Antenna Gain (dBd)	3.63	
		Peak Power (mW)	11.4		Antenna Gain (numeric)	3.8	
Cable Loss (dB)	0.0	(dBm)	10.6		Antenna minus cable (dBi)	5.8	
		Max Duty Cycle (%)	100.0%				
		Adjusted Power (mW)	11.4				
		Adjusted Power (dBm)	10.6				

Calculated ERP (mw)	26.303	EIRP = Po(dBM) + Gain (dB)	
Calculated EIRP (mw)	43.351	Radiated (EIRP) dBm	16.370
		ERP = EIRP - 2.17 dB	
		Radiated (ERP) dBm	14.200

Power density (S)

$$\frac{EIRP}{4\pi r^2} = mW/cm^2$$

r (cm) EIRP (mW)

FCC radio frequency radiation exposure limits per 1.1310

Frequency (MHz)	Occupational Limit W/m²	Public Limit W/m²
300-1,500	$f/30$	$f/150$
1,500-100,000	50	10
2437.0	50	10

IC radio frequency radiation exposure limits per RSS-102, Issue 6 Field Reference Level FRL Limit (W/m²)

Frequency (MHz)	Uncontrolled		Frequency (MHz)	Controlled	
10-20	2.0	2.0	10-20	10.0	10.0
20-48	$8.944/f^{0.5}$	0.2	20-48	$44.72/f^{0.5}$	0.9
48-300	1.291	1.291	48-100	6.455	6.455
300-6,000	$0.02619*f^{0.6834}$	5.4	100-6,000	$0.6455*f^{0.5}$	31.9
6,000-15,000	5.0	10.0	6,000-15,000	50.0	50.0
15,000-150,000	10	10.0	15,000-150,000	50.0	50.0
150,000-300,000	$6.67*(10^{-5})*f$	0.2	150,000-300,000	$3.33*(10^{-4})*f$	0.8

			FCC	ISED	
f = Transmit Frequecny (MHz)		f (MHz) =	2437.0	2437.0	MHz
P_T = Power Input to Antenna (mW)		P_T (mW) =	11.4	11.4	mW
Duty cycle (percentage of operation)		% =	100.0%	100.0%	%
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)		P_A (mW) =	11.40	11.40	mW
G_N = Numeric Gain of the Antenna		GN (numeric) =	3.80	3.80	numeric
S_{20} = Power Density of device at 20cm (mW/m²)	$S_{20}=(P_A G_N)/(4\pi R_{20})^2$	S_{20} (mW/m²) =	0.01	0.01	mW/m²
S_{20} = Power Density of device at 20cm (W/m²)	$S_{20}=(P_A G_N)/(4\pi R_{20})^2$	S_{20} (W/m²) =	0.09	0.09	W/m²
S_L = Power Density Limit (W/m²)		S_L (W/m²)=	10.00	5.40	W/m²
R_C = Minimum distance to the Radiating Element for Compliance ($R_C=\sqrt{(P_A G_N/4\pi S_L)}$		R_C (cm) =	2.9	3.5	cm
S_C = Power Density of the device at the Compliance Distance R_C ($S_C=(P_A G_N)/(4\pi R_C)^2$		S_C (W/m²) =	4.23	2.77	W/m²
R_{20} = 20cm		R20=	20	20	cm

Summary: Standalone MPE Calculations and Summary

Radio	Tx Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Gain (numeric)	S_L (W/m²)	S_{20} (W/m²)	R_C (cm)	S_C (W/m²)
2G WiFi (FCC)	100.0%	2437	11.4	3.8	10.0	0.09	2.9	4.23
2G WiFi (ISED)	100.0%	2437	11.40	3.8	5.40	0.09	3.5	2.77