

Model: D53AC		Test Number: 200115	
MPE Calculator	RF Exposure uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi. dBi = dB gain compared to an isotropic radiator. S = power density in mW/cm ²		
	Transmitter Output power (mW)	185.6	
	Transmitter Output power (W)	0.186	
Output Power for % duty Cycle operation (Watts)	100	0.186	Antenna Gain (dBi)
	Output Power for 100% duty Cycle operation (Watts)	0.186	Antenna Gain (Numeric)
			3
Tx Frequency (MHz)	2437	Calculation power (Watts)	0.186
			dBd + 2.17 = dBi
			dBi to dBd
			2.2
			Antenna Gain (dBd)
			0.83
Cable Loss (dB)	0.0	Adjusted Power (dBm)	22.69
			Antenna minus cable (dBi)
			3.00
			Antenna Gain (Numeric)
			2.00
	Calculated ERP (mw) 224.696		EIRP = Po(dBm) + Gain (dB)
	Calculated EIRP (mw) 370.335		Radiated (EIRP) dBm
			25.686
			ERP = EIRP - 2.17 dB
			Radiated (ERP) dBm
			23.516
	<div style="border: 1px solid black; padding: 5px; width: fit-content;"> Power density (S) mW/cm² = $\frac{\text{EIRP}}{4 \pi r^2}$ r (cm) = $\sqrt{\frac{\text{EIRP}}{4 \pi S}}$ </div>		
	Occupational Limit	FCC radio frequency radiation exposure limits per 1.1310	
		Frequency (MHz)	Occupational Limit (mW/cm ²)
	5	30-300	1
	50		0.2
	General Public Limit	300-1,500	ƒ300
		1,500-10,000	ƒ1500
	1		5
	10		1
	Occupational Limit	IC radio frequency radiation exposure limits per RSS-102	
		Frequency (MHz)	Occupational Limit (W/m ²)
	0.6455 f ^{0.5}	100-6,000	0.6455 f ^{0.5}
	39.7		
	General Public Limit	6,000-15,000	50
		48-300	1.291
	0.02619 f ^{0.6834}	300-6,000	0.02619 f ^{0.6834}
	5.4	6,000-15,000	50
			10
f = Transmit Frequency (MHz)		f (MHz) =	2437 MHz
P _T = Power Input to Antenna (mW)		P _T (mW) =	185.6072 mW
Duty cycle (percentage of operation)		% =	100 %
P _A = Adjusted Power due to Duty cycle or Cable Loss (mW)		P _A (mW) =	185.61 mW
G _N = Numeric Gain of the Antenna		G _N (numeric) =	2.00 numeric
S ₂₀ = Power Density of device at 20cm (mW/m ²)		S ₂₀ (mW/m ²) =	0.07 mW/m ²
S ₂₀ = Power Density of device at 20cm (W/m ²)		S ₂₀ (W/m ²) =	0.74 W/m ²
S _L = Power Density Limit (W/m ²)		S _L (W/m ²) =	5.404 W/m ²
R _C = Minimum distance to the Radiating Element for Compliance (cm)		R _C (cm) =	7.4 cm
S _C = Power Density of the device at the Compliance Distance R _C (W/m ²)		S _C (W/m ²) =	5.40 W/m ²
R ₂₀ = 20cm		R ₂₀ =	20 cm
			7.4 cm
			0.07 Meters
	For Compliance with Canada General Population Limits, User Manual must indicate a minimum separation distance of		
	Or in Meters for Compliance with Canada General Population Limits, a minimum separation distance of		
Summary: Standalone MPE Calculations and Summary			
Band (MHz)	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)
2402-2480	100	2437	186
			Antenna Gain (numeric)
			2.00
			S _L (W/m ²)
			5.404
			S ₂₀ (W/m ²)
			0.74
			R _C (cm)
			7.4
			S _C (W/m ²)
			5.40
Band (MHz)	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)
5150-5825	100	5745	330.11
			Antenna Gain (dBi)
			3.55
			S _L (W/m ²)
			9.710
			S ₂₀ (W/m ²)
			2.33
			R _C (cm)
			9.8
			S _C (W/m ²)
			9.71
Simultaneous MPE Calculation			
	Transmitter 1	Transmitter 2	
Tx Frequency (MHz)	2437	5745	
S ₂₀ (W/m ²)	0.74	2.33	
S _L (W/m ²)	5.404	9.710	
Power Ratio (S _L / S ₂₀)	0.136	0.240	
Sum of Power Ratios at 20cm (Tx1 + Tx2)	0.376		
Requirement = Σ of MPE Ratio ≤ 1	0.376		

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 Revision 1

Mikrotikls SIA S/N: C65F0B82560C/002, C65F0B9B0890/002
 Model: RBD53GR-5HacD2HnD-US&R11e-LTE6 IC: 7442A-D53AC
 Test: 200115 FCC ID: TV7RBD53-5ACD2ND
 Test to: 47CFR 15.C, 15E, RSS-247 Date: March 31, 2020
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Model: D53AC		Test Number: 200115	
MPE Calculator	RF Exposure uses EIRP for calculation. EIRP is based on TX power added to the antenna gain in dBi. dBi = dB gain compared to an isotropic radiator. S = power density in mW/cm ²		
	Transmitter Output power (mW)	330.1	
	Transmitter Output power (W)	0.330	
	Output Power for % duty Cycle (Watts)	100	0.330
	Output Power for 100% duty Cycle operation (Watts)	0.330	
			Antenna Gain (dB)
			Antenna Gain (Numeric)
			3.55
Tx Frequency (MHz)	5745	Calculation power (Watts)	0.33
			dBd + 2.17 = dBi
			dBi to dBd
			2.2
			Antenna Gain (dBd)
			3.33
Cable Loss (dB)	0.0	Adjusted Power (dBm)	25.19
			Antenna minus cable (dBi)
			5.50
			Antenna Gain (Numeric)
			3.55
	Calculated ERP (mW)	710.652	EIRP = Po(dBm) + Gain (dB)
	Calculated EIRP (mW)	1171.270	Radiated (EIRP) dBm
			30.687
			ERP = EIRP - 2.17 dB
			Radiated (ERP) dBm
			28.517
<div style="border: 1px solid black; padding: 5px; width: fit-content;"> $S = \frac{\text{EIRP}}{4\pi r^2}$ $r(\text{cm}) = \sqrt{\frac{\text{EIRP}}{4S}}$ </div>			
Occupational Limit		FCC radio frequency radiation exposure limits per 1.1310	
5	mW/cm ²	Frequency (MHz)	Occupational Limit (mW/cm ²)
50	W/m ²	30-300	1
			Public Limit (mW/cm ²)
			0.2
General Public Limit		300-1,500	1/300
1	mW/cm ²	1,500-10,000	5
10	W/m ²		1
Occupational Limit		IC radio frequency radiation exposure limits per RSS-102	
0.6455 f ^{0.5}	W/m ²	Frequency (MHz)	Occupational Limit (W/m ²)
60.9	W/m ²	100-6,000	0.6455 f ^{0.5}
			Public Limit (W/m ²)
			1.291
0.02619 f ^{0.6834}	W/m ²	6,000-15,000	50
9.7	W/m ²	48-300	
		300-6,000	0.02619 f ^{0.6834}
		6,000-15,000	10
f = Transmit Frequency (MHz)		f (MHz) =	5745 MHz
Pr = Power Input to Antenna (mW)		Pr (mW) =	330.1087 mW
Duty cycle (percentage of operation)		% =	100 %
Pa = Adjusted Power due to Duty cycle or Cable Loss (mW)		Pa (mW) =	330.11 mW
Gn = Numeric Gain of the Antenna		Gn (numeric) =	3.55 numeric
S20 = Power Density of device at 20cm (mW/m ²)		S20 (mW/m ²) =	0.23 mW/m ²
S20 = Power Density of device at 20cm (W/m ²)		S20 (W/m ²) =	2.33 W/m ²
Sl = Power Density Limit (W/m ²)		Sl (W/m ²) =	9.710 W/m ²
Rc = Minimum distance to the Radiating Element for Compliance (cm)		Rc (cm) =	9.8 cm
Sc = Power Density of the device at the Compliance Distance Rc (W/m ²)		Sc (W/m ²) =	9.71 W/m ²
R20 = 20cm		R20 =	20 cm
			9.8 cm
			0.10 Meters
For Compliance with Canada General Population Limits, User Manual must indicate a minimum separation distance of			
Or in Meters for Compliance with Canada General Population Limits, a minimum separation distance of			
Summary: Standalone MPE Calculations and Summary			
Band (MHZ)	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)
2402-2480	100	2437	185.61
			Antenna Gain (dBi)
			3
			SL (W/m ²)
			5.404
			S20 (W/m ²)
			0.74
			Rc (cm)
			7.4
			Sc (W/m ²)
			5.40
Band (MHZ)	Tx Duty Cycle (%)	Tx Frequency (MHz)	Power Total (mW)
5150-5825	100	5745	330.11
			Antenna Gain (dBi)
			5.5
			SL (W/m ²)
			9.710
			S20 (W/m ²)
			2.33
			RC (cm)
			9.8
			SC (W/m ²)
			9.71
Simultaneous MPE Calculation			
	Transmitter 1	Transmitter 2	
Tx Frequency (MHz)	2437	5745	
S20 (W/m ²)	0.74	2.33	
SL (W/m ²)	5.404	9.710	
Power Ratio (SL / S20)	0.136	0.240	
Sum of Power Ratios at 20cm (Tx1 + Tx2)			0.376
Requirement = Σ of MPE Ratio ≤ 1			

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