PMN:	aranet PRO Plus LTE base		Test Number:	230227B				
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							
	Peak Transmitter Output power (mW)		1					
	Peak Transmitter Output power (W)		0.001					
Output Power for 250mS in 60 second duty Cycle	100		0.0010		Antenna Gain (dBi)	0		
	Output Power for 100% duty Cycle operation (Watts)		0.0010		Antenna Gain (Numeric)	1.00		
Tx Frequency (MHz)	923	Calcualtion power (Watts)	0.0010	dBd + 2.17 = dBi	dBi to dBd	2.2		
					Antenna Gain (dBd)	-2.17		
Cable Loss (dB)	0.0	Adjusted Power (dBm)	0.00		Antenna minus cable (dBi)	0.00		
					Antenna Gain (Numeric)	1.00		
	Calculated ERP (mw)	0.607			EIRP = Po(dBM) + Gain (dB)			
	Calculated EIRP (mw)	1.000			Radiated (EIRP) dBm	0.000		
					ERP = EIRP - 2.17 dB			
					Radiated (ERP) dBm	-2.170		

Power density (S) mW/cm^2 = EIRP / (4 p r^2)

r (cm) EIRP (mW)

	Occupational Limit	FCC radio frequency radiation exposure limits per 1.1310		
3.076666667	mW/cm^2	Frequency (MHz)	Occupational Limit (mW/cm^2)	Public Limit (mW/cm^2)
31	W/m^2	30-300	1	0.2
	General Public Limit	300-1,500	f/300	f/1500
0.615333333	mW/cm^2	1,500-10,000	5	1
6	W/m^2			

	Occupational Limit			
$0.6455f^{0.5}$	W/m^2	IC radio frequency radiation exposure limits per RSS-102		
24.4	W/m^2	Frequency (MHz)	Occupational Limit (W/m^2)	Public Limit (W/m^2)
	General Public Limit	100-6,000	$0.6455f^{0.5}$	
$0.02619f^{0.6834}$	W/m^2	6,000-15,000	50	
2.8	W/m^2	48-300		1.291
		300-6,000		$0.02619f^{0.6834}$
		6,000-15,000	50	10

f = Transmit Frequecny (MHz)		f (MHz) =	923 MHz
P_T = Power Input to Antenna (mW)		P_T (mW) =	1.0000 mW
Duty cycle (percentage of operation)		% =	100 %
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)		P_A (mW) =	1.00 mW
G_N = Numeric Gain of the Antenna		GN (numeric) =	1.00 numeric
S_{20} = Power Density of device at 20cm (mW/m^2)	$S_{20}=(P_AG_N)/(4\pi R_{20})^2$	S_{20} (mW/m^2) =	0.00 mW/m^2
S_{20} = Power Density of device at 20cm (W/m^2)	$S_{20}=(P_AG_N)/(4\pi R_{20})^2$	S_{20} (W/m^2) =	0.00 W/m^2
S_L = Power Density Limit (W/m^2)		S_L (W/m^2)=	2.783 W/m^2
R_C = Minimum distance to the Radiating Element for Compliance (cm)	$R_C=\sqrt{(P_AG_N/4\pi S_L)}$	R_C (cm) =	0.5 cm
S_C = Power Density of the device at the Compliance Distance R_C (W/m^2)	$S_C=(P_AG_N)/(4\pi R_C)^2$	S_C (W/m^2) =	2.78 W/m^2
R_{20} = 20cm		R20=	20 cm

For Complaince with Canada General Population Limits, User Manual must indicate a minimum seperation distance of	0.5	cm
Or in Meters for Complaince with Canada General Population Limits, a minimum seperation distance of	0.01	Meters

Summary: Standalone MPE Calculations and Summary

Tx1 Band (MHz)	Tx Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Antenna Gain (numeric)	S_L (W/m^2)	S_{20} (W/m^2)	R_C (cm)	S_C (W/m^2)
902-928	100	923	1	1.00	2.783	0.00	0.5	2.78
Tx2 Band (MHz)	Tx Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Antenna Gain (dBi)	SL (W/m2)	S20 (W/m2)	RC (cm)	SC (W/m2)
2400-2483.5	100	2442	120.00	1.00	5.412	0.24	4.2	5.41
Tx3 Band (MHz)	Tx Duty Cycle (%)	Tx Frequeny (MHz)	Power Total (mW)	Antenna Gain (dBi)	SL (W/m2)	S20 (W/m2)	RC (cm)	SC (W/m2)
824.2	100	824.2	381.07	1.69	2.576	1.28	14.1	2.58

Simlutaneous MPE Calculation

	Transmitter 1	Transmitter 2	Transmitter 3
Tx Frequeny (MHz)	923	2442	824.2
S_{20} (W/m^2)	0.00	0.24	0.24
S_L (W/m^2)	2.783	5.412	2.576
Power Ratio (S_L / S_{20})	0.001	0.044	0.093
Sum of Power Ratios at 20cm (Tx1 + Tx2 + Tx3)			0.138
Requirement = Σ of MPE Ratio ≤ 1			Therefore the design is Exempt

	PMN:	aranet PRO Plus LTE base	Test Number:	230227B		
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					
	Peak Transmitter Output power (mW)		120			
	Transmitter maximum Output power operating at 100% (Watts)		0.1200			
	Percent Duty Cycle operation (%)		100.0		Antenna Gain (dBi)	0
	Output Power for 100% duty Cycle operation (Watts)		0.1200		Antenna Gain (Numeric)	1.00
Tx Frequency (MHz)	2442	Calcualtion power (Watts)	0.1200	dBd + 2.17 = dBi	dBi to dBd	2.2
					Antenna Gain (dBd)	-2.17
Cable Loss (dB)	0.0	Adjusted Power (dBm)	20.79		Antenna minus cable (dBi)	0.00
	Calculated ERP (mw)	72.808			EIRP = Po(dBM) + Gain (dB)	
	Calculated EIRP (mw)	120.000			Radiated (EIRP) dBm	20.792
					ERP = EIRP - 2.17 dB	
					Radiated (ERP) dBm	18.622

Power density (S) mW/cm^2 = EIRP / (4 p r^2)

r (cm) EIRP (mW)

	Occupational Limit	FCC radio frequency radiation exposure limits per 1.1310		
5	mW/cm^2	Frequency (MHz)	Occupational Limit (mW/cm^2)	Public Limit (mW/cm^2)
50	W/m^2	30-300	1	0.2
	General Public Limit	300-1,500	f/300	f/1500
1	mW/cm^2	1,500-10,000	5	1
10	W/m^2			

	Occupational Limit			
$0.6455f^{0.5}$	W/m^2	IC radio frequency radiation exposure limits per RSS-102		
39.7	W/m^2	Frequency (MHz)	Occupational Limit (W/m^2)	Public Limit (W/m^2)
	General Public Limit	100-6,000	$0.6455f^{0.5}$	
$0.02619f^{0.6834}$	W/m^2	6,000-15,000	50	
5.4	W/m^2	48-300		1.291
		300-6,000		$0.02619f^{0.6834}$
		6,000-15,000	50	10

f = Transmit Frequecny (MHz)	f (MHz) =	2442	MHz
P_T = Power Input to Antenna (mW)	P_T (mW) =	120.0000	mW
Duty cycle (percentage of operation)	% =	100.0	%
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)	P_A (mW) =	120.00	mW
G_N = Numeric Gain of the Antenna	GN (numeric) =	1.00	numeric
S_{20} = Power Density of device at 20cm (mW/m^2)	$S_{20}=(P_AG_N)/(4\pi R_{20})^2$ S_{20} (mW/m^2) =	0.02	mW/m^2
S_{20} = Power Density of device at 20cm (W/m^2)	$S_{20}=(P_AG_N)/(4\pi R_{20})^2$ S_{20} (W/m^2) =	0.24	W/m^2
S_L = Power Density Limit (W/m^2)	S_L (W/m^2)=	5.412	W/m^2
R_C = Minimum distance to the Radiating Element for Compliance (cm)	$R_C=\sqrt{(P_AG_N/4\pi S_L)}$ R_C (cm) =	4.2	cm
S_C = Power Density of the device at the Compliance Distance R_C (W/m^2)	$S_C=(P_AG_N)/(4\pi R_C)^2$ S_C (W/m^2) =	5.41	W/m^2
R_{20} = 20cm	R20=	20	cm
For Complaince with Canada General Population Limits, User Manual must indicate a minimum seperation distance of		4.2	cm
Or in Meters for Complaince with Canada General Population Limits, a minimum seperation distance of		0.04	Meters

	PMN:	aranet PRO Plus LTE base	Test Number:	230227B		
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					
	Peak Transmitter Output power (mW)		381			
	Transmitter maximum Output power operating at 100% (Watts)		0.3811			
	Percent Duty Cycle operation (%)		100.0		Antenna Gain (dBi)	2.29
	Output Power for 100% duty Cycle operation (Watts)		0.3811		Antenna Gain (Numeric)	1.69
Tx Frequency (MHz)	824.2	Calcualtion power (Watts)	0.3811	dBd + 2.17 = dBi	dBi to dBd	2.2
					Antenna Gain (dBd)	0.12
Cable Loss (dB)	0.0	Adjusted Power (dBm)	25.81		Antenna minus cable (dBi)	2.29
	Calculated ERP (mw)	391.746			EIRP = Po(dBM) + Gain (dB)	
	Calculated EIRP (mw)	645.661			Radiated (EIRP) dBm	28.100
					ERP = EIRP - 2.17 dB	
					Radiated (ERP) dBm	25.930

Power density (S) mW/cm^2 = EIRP / (4 p r^2)

r (cm) EIRP (mW)

	Occupational Limit	FCC radio frequency radiation exposure limits per 1.1310		
2.747333333	mW/cm^2	Frequency (MHz)	Occupational Limit (mW/cm^2)	Public Limit (mW/cm^2)
27	W/m^2	30-300	1	0.2
	General Public Limit	300-1,500	f/300	f/1500
0.549466667	mW/cm^2	1,500-10,000	5	1
5	W/m^2			
	Occupational Limit			
$0.6455f^{0.5}$	W/m^2	IC radio frequency radiation exposure limits per RSS-102		
23.1	W/m^2	Frequency (MHz)	Occupational Limit (W/m^2)	Public Limit (W/m^2)
	General Public Limit	100-6,000	$0.6455f^{0.5}$	
$0.02619f^{0.6834}$	W/m^2	6,000-15,000	50	
2.6	W/m^2	48-300		1.291
		300-6,000		$0.02619f^{0.6834}$
		6,000-15,000	50	10

f = Transmit Frequecny (MHz)			f (MHz) =	824.2	MHz
P_T = Power Input to Antenna (mW)			P_T (mW) =	381.0700	mW
Duty cycle (percentage of operation)			% =	100.0	%
P_A = Adjusted Power due to Duty cycle or Cable Loss (mW)			P_A (mW) =	381.07	mW
G_N = Numeric Gain of the Antenna			GN (numeric) =	1.69	numeric
S_{20} = Power Density of device at 20cm (mW/m^2)		$S_{20}=(P_AG_N)/(4\pi R_{20})^2$	S_{20} (mW/m^2) =	0.13	mW/m^2
S_{20} = Power Density of device at 20cm (W/m^2)		$S_{20}=(P_AG_N)/(4\pi R_{20})^2$	S_{20} (W/m^2) =	1.28	W/m^2
S_L = Power Density Limit (W/m^2)			S_L (W/m^2)=	2.576	W/m^2
R_C = Minimum distance to the Radiating Element for Compliance (cm)		$R_C=\sqrt{(P_AG_N/4\pi S_L)}$	R_C (cm) =	14.1	cm
S_C = Power Density of the device at the Compliance Distance R_C (W/m^2)		$S_C=(P_AG_N)/(4\pi R_C)^2$	S_C (W/m^2) =	2.58	W/m^2
R_{20} = 20cm			R20=	20	cm
For Complaince with Canada General Population Limits, User Manual must indicate a minimum seperation distance of				14.1	cm
Or in Meters for Complaince with Canada General Population Limits, a minimum seperation distance of				0.14	Meters