

MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with Section Part 22, subpart H and Part 24, subpart E of the FCC CFR 47 Rules. And Part 90 subpart S For 47 CFR 1.1310 Radio frequency Radiation Exposure requirement.

Special Accessories

Not available for this EUT intended for grant.

Equipment Modifications

Not available for this EUT intended for grant.

Limitation

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
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
1500-15000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

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/f	2.19/f	-	6
10-30	28	2.19/f	-	6
30-300	28	0.073	2*	6
300-1500	1.585 f ^{0.5}	0.0042 f ^{0.5}	f/150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/f ^{1.2}
150000-300000	0.158 f ^{0.5}	4.21 x 10 ⁻⁴ f ^{0.5}	6.67 x 10 ⁻⁵ f	616000/f ^{1.2}

Note: f is frequency in MHz.

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

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No.134,WuKungRoad,NewTaipeiIndustrialPark,WukuDistrict,NewTaipeiCity,Taiwan24803/新北市五股區新北產業園區五工路 134 號

t (886-2) 2299-3279

f (886-2) 2298-0488

www.tw.sgs.com

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Maximum Permissible Exposure (MPE) Evaluation

The evaluation and calculation as deduces below presents only worst-case that produces highest value of the result:

Operation in cellular band (824 – 849 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 850	824.2	128	V	25.52	3.45	-2.94	26.04	38.45
			H	16.89	3.45	-2.94	17.41	38.45
	836.6	190	V	25.28	3.46	-2.97	25.76	38.45
			H	13.59	3.46	-2.97	14.07	38.45
	848.8	251	V	25.09	3.47	-3.01	25.55	38.45
			H	14.71	3.47	-3.01	15.17	38.45

$$\text{ERP} = 26.04 \text{ dBm} = 401.791 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{ERP} \times \text{Duty Cycle} / (4 \pi R^2) \\ &= 401.791 \times 0.25 / (4 \times \pi \times 20^2) = 0.0200 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 0.25 for GPRS operation (class 10) and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 824.2/1500 = 0.55 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in PCS band (1850 – 1910 MHz) (Antenna Model No.:CVL-WLF-2V-BLK-12)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
GPRS 1900	1850.2	512	V	24.18	4.84	-4.49	24.54	33.01
			H	30.15	4.84	-4.49	30.51	33.01
	1880.0	661	V	24.90	4.79	-4.53	25.16	33.01
			H	31.00	4.79	-4.53	31.27	33.01
	1909.8	810	V	25.47	4.74	-4.57	25.65	33.01
			H	31.77	4.74	-4.57	31.95	33.01

$$\text{EIRP} = 31.95 \text{ dBm} = 1566.751 \text{ mW}$$

$$\text{Power Density} = \text{EIRP} \times \text{Duty Cycle} / (4 \pi R^2)$$

$$= 1566.751 \times 0.25 / (4 \times \pi \times 20^2) = 0.0779 \text{ mW/cm}^2$$

where Duty Cycle is 0.25 for GPRS operation (class 10) and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in HSDPA band II (1850 – 1910 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
HSDPA B2	1852.4	9262	V	27.11	4.84	-4.49	27.46	33.01
			H	19.11	4.84	-4.49	19.46	33.01
	1880.0	9400	V	25.43	4.79	-4.53	25.70	33.01
			H	16.85	4.79	-4.53	17.12	33.01
	1907.6	9538	V	25.31	4.75	-4.56	25.50	33.01
			H	16.74	4.75	-4.56	16.92	33.01

$$\text{EIRP} = 27.46 \text{ dBm} = 557.1857 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{EIRP} \times \text{Duty Cycle} / (4 \pi R^2) \\ &= 557.1857 \times 1 / (4 \times \pi \times 20^2) = 0.1108 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 1 for HSUPA band II mode and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in HSDPA band IV (1712.4 – 1752.6 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
HSDPA B4	1712.4	1312	V	26.42	5.08	-4.29	27.21	33.01
			H	23.12	5.09	-4.29	23.92	33.01
	1732.6	1413	V	24.96	5.05	-4.31	25.70	33.01
			H	22.40	5.05	-4.31	23.14	33.01
	1752.6	1513	V	28.47	5.01	-4.37	29.12	33.01
			H	23.65	5.01	-4.37	24.29	33.01

$$\text{EIRP} = 29.12 \text{ dBm} = 816.5824 \text{ mW}$$

$$\text{Power Density} = \text{EIRP} \times \text{Duty Cycle} / (4 \pi R^2)$$

$$= 816.5824 \times 1 / (4 \times \pi \times 20^2) = 0.1625 \text{ mW/cm}^2$$

where Duty Cycle is 1 for HSUPA band IV mode and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in HSDPA band V (826 – 849 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
HSDPA B5	826.4	4132	V	21.46	3.46	-2.94	21.97	38.45
			H	10.85	3.46	-2.94	11.36	38.45
	836.6	4183	V	19.99	3.46	-2.97	20.48	38.45
			H	10.17	3.46	-2.97	10.66	38.45
	846.6	4233	V	20.66	3.47	-3.00	21.12	38.45
			H	8.65	3.47	-3.00	9.11	38.45

$$\text{EIRP} = 21.97 \text{ dBm} = 157.3983 \text{ mW}$$

$$\text{Power Density} = \text{ERP} \cdot \text{Duty Cycle} / (4 \pi R^2)$$

$$= 157.3983 \cdot 1 / (4 \cdot \pi \cdot 20^2) = 0.0313 \text{ mW/cm}^2$$

where Duty Cycle is 1 for HSDPA band V mode and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 826.4/1500 = 0.55 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in cellular band (824 – 849 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
CDMA BC0	824.7	1013	V	21.26	3.45	-2.94	21.78	38.45
			H	10.29	3.45	-2.94	10.80	38.45
	836.52	384	V	20.83	3.46	-2.98	21.32	38.45
			H	8.15	3.46	-2.98	8.63	38.45
	848.31	777	V	19.03	3.47	-3.01	19.50	38.45
			H	8.85	3.47	-3.01	9.31	38.45

$$\text{ERP} = 21.78\text{dBm} = 150.6607 \text{ mW}$$

$$\text{Power Density} = \text{ERP} \cdot \text{Duty Cycle} / (4 \pi R^2)$$

$$= 150.6607 \cdot 1 / (4 \cdot \pi \cdot 20^2) = 0.0300 \text{ mW/cm}^2$$

where Duty Cycle is 1 for CDMA BC0 operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 824.7/1500 = 0.55\text{mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in PCS band (1850 – 1910 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
CDMA BC1	1851.25	25	V	25.21	4.84	-4.49	25.57	33.00
			H	16.73	4.84	-4.49	17.09	33.00
	1880.0	600	V	23.90	4.79	-4.53	24.17	33.00
			H	16.29	4.79	-4.53	16.56	33.00
	1908.75	1175	V	24.56	4.75	-4.56	24.74	33.00
			H	19.11	4.75	-4.56	19.30	33.00

$$\text{EIRP} = 25.57 \text{ dBm} = 360.5786 \text{ mW}$$

$$\text{Power Density} = \text{EIRP} \times \text{Duty Cycle} / (4 \pi R^2)$$

$$= 360.5786 \times 1 / (4 \times \pi \times 20^2) = 0.0717 \text{ mW/cm}^2$$

where Duty Cycle is 1 for CDMA2000 BC1operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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f (886-2) 2298-0488

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Operation in cellular band (817.9 – 823.1 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
CDMA BC10	817.9	476	V	20.84	3.45	-2.92	21.38	50.00
			H	10.05	3.45	-2.92	10.59	50.00
	820.5	580	V	20.84	3.45	-2.93	21.37	50.00
			H	9.29	3.45	-2.92	9.82	50.00
	823.1	684	V	20.84	3.45	-2.93	21.36	50.00
			H	9.08	3.45	-2.93	9.60	50.00

$$\text{ERP} = 21.38 \text{ dBm} = 137.4042 \text{ mW}$$

$$\text{Power Density} = \text{ERP} \times \text{Duty Cycle} / (4 \pi R^2)$$

$$= 137.4042 \times 1 / (4 \times \pi \times 20^2) = 0.0273 \text{ mW/cm}^2$$

where Duty Cycle is 1 for CDMA2000 BC10 operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 817.9/1500 = 0.55 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in LTE band (1850.7 – 1909.3 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 2 BW: 1.4M 16QAM RB: 1,0	1850.7	18607	V	30.34	4.84	-4.49	30.70	33.01
			H	20.72	4.84	-4.49	21.08	33.01
	1880.0	18900	V	27.64	4.80	-4.52	27.91	33.01
			H	19.83	4.80	-4.52	20.10	33.01
	1909.3	19193	V	26.50	4.75	-4.56	26.68	33.01
			H	20.59	4.75	-4.56	20.77	33.01

$$\text{EIRP} = 28.53 \text{ dBm} = 1174.898 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{EIRP} \cdot \text{Duty Cycle} / (4 \pi R^2) \\ &= 1174.898 \cdot 1 / (4 \cdot \pi \cdot 20^2) = 0.2337 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 1 for LTE band 2 1.4MHz /16QAM/RB 1 0 offset operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in LTE band (1715.5 – 1747.5 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 4 BW: 15M 16QAM RB: 1,74	1717.5	20025	V	25.14	5.06	-4.30	25.90	30.00
			H	18.35	5.06	-4.30	19.12	30.00
	1732.5	20175	V	29.03	5.04	-4.33	29.74	30.00
			H	18.09	5.04	-4.33	18.80	30.00
	1747.5	20325	V	26.65	5.01	-4.37	27.29	30.00
			H	20.39	5.01	-4.37	21.03	30.00

$$\text{EIRP} = 29.47 \text{ dBm} = 941.8896 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{EIRP} \times \text{Duty Cycle} / (4 \pi R^2) \\ &= 941.8896 \times 1 / (4 \times \pi \times 20^2) = 0.1874 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 1 for LTE band 4 15MHz /16QAM/RB 1 74 offset operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in LTE band (824.7 – 848.3 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 5 BW: 1.4M 16QAM RB: 1,0	824.7	20407	V	23.52	3.45	-2.94	24.04	38.45
			H	13.72	3.45	-2.94	14.23	38.45
	836.5	20525	V	22.01	3.46	-2.97	22.50	38.45
			H	14.39	3.46	-2.97	14.88	38.45
	848.3	20643	V	21.85	3.47	-3.01	22.31	38.45
			H	14.32	3.47	-3.00	14.78	38.45

$$\text{ERP} = 24.04 \text{ dBm} = 253.5129 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{ERP} \cdot \text{Duty Cycle} / (4 \pi R^2) \\ &= 253.5129 \cdot 1 / (4 \cdot \pi \cdot 20^2) = 0.0504 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 1 for LTE band 5 1.4MHz /16QAM/RB 1 0 offset operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

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Operation in LTE band (782 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 13 BW: 10M 16QAM RB: 1,0	782.0	23230	V	23.33	3.37	-2.77	23.93	34.77
			H	13.39	3.37	-2.77	13.99	34.77

$$\text{ERP} = 23.93 \text{ dBm} = 247.1724 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{ERP} \cdot \text{Duty Cycle} / (4 \pi R^2) \\ &= 247.1724 \cdot 1 / (4 \cdot \pi \cdot 20^2) = 0.0492 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 1 for LTE band 13 10MHz /16QAM/RB 1 0 offset operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 824.7/1500 = 0.55 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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f (886-2) 2298-0488

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Operation in LTE band (706.5 – 713.5 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	ERP	Limit
	MHz		V/H	dBm	dBd	dB	dBm	dBm
BAND 17 BW: 5M 16QAM RB: 1,0	706.5	23755	V	21.55	3.37	-2.60	22.32	34.77
			H	12.71	3.37	-2.60	13.48	34.77
	710.0	23790	V	19.66	3.37	-2.60	20.43	34.77
			H	11.23	3.37	-2.60	11.99	34.77
	713.5	23825	V	19.87	3.36	-2.60	20.63	34.77
			H	11.46	3.36	-2.60	12.22	34.77

$$\text{ERP} = 22.32 \text{ dBm} = 170.6082 \text{ mW}$$

$$\text{Power Density} = \text{ERP} \cdot \text{Duty Cycle} / (4 \pi R^2)$$

$$= 170.6082 \cdot 1 / (4 \cdot \pi \cdot 20^2) = 0.03394 \text{ mW/cm}^2$$

where Duty Cycle is 1 for LTE band 17 5MHz /16QAM/RB 1 0 offset operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 824.7/1500 = 0.55 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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f (886-2) 2298-0488

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Operation in LTE band (1850.7 – 1914.3 MHz) (Antenna Model No.: TRA6927M3)

EUT			Measurement					
Operation Band	Fundamental Frequency	CH	Antenna Pol.	S.G. Output	Antenna Gain	Cable Loss	EIRP	Limit
	MHz		V/H	dBm	dBi	dB	dBm	dBm
BAND 25 BW: 1.4M 16QAM RB: 1,5	1850.7	26047	V	30.03	4.84	-4.49	30.38	33.00
			H	21.44	4.84	-4.49	21.80	33.00
	1882.5	26365	V	27.44	4.79	-4.53	27.70	33.00
			H	20.45	4.79	-4.53	20.71	33.00
	1914.3	26683	V	25.19	4.74	-4.57	25.35	33.00
			H	17.69	4.74	-4.57	17.85	33.00

$$\text{EIRP} = 30.38 \text{ dBm} = 1091.44 \text{ mW}$$

$$\begin{aligned} \text{Power Density} &= \text{EIRP} \times \text{Duty Cycle} / (4 \pi R^2) \\ &= 1091.44 \times 1 / (4 \times \pi \times 20^2) = 0.2171 \text{ mW/cm}^2 \end{aligned}$$

where Duty Cycle is 1 for LTE band 25 1.4MHz /16QAM/RB 1 5 offset operation and R is 20 cm.

The MPE limit for General Population/Uncontrolled Exposure is shown in the FCC OET Bulletin 65 Supplement C and can be calculated as follows:

$$\text{MPE limit} = 1.0 \text{ mW/cm}^2$$

As we can see the resulted power density is below the MPE limit, this is compliant with the FCC rules on RF exposure.

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t (886-2) 2299-3279

f (886-2) 2298-0488

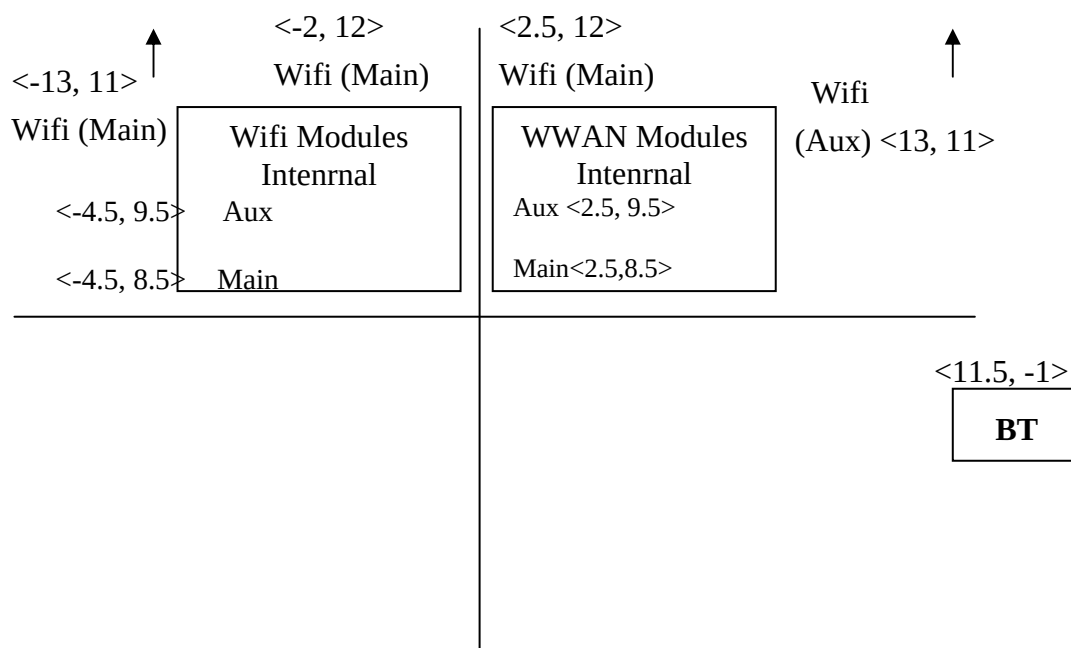
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Collocated MPE analysis:

As per KDB447498 D01, if the radio application is composed of the multiple transmitters confining in the host platform, and placing nearby, the simultaneous transmission due to impact of accumulation of individual MPE shall be evaluated if or not given application could conditionally qualify for MPE test exclusion.

Location of the transmitting antennas where they distribute:



Scenario of operation when simultaneous transmission occurs:

Scenario 1:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 700)

Scenario 2:

External Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 700)

Scenario 3:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 700)

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Scenario 4:

External Antenna:

Wifi n_5G (MIMO) + Bluetooth LE + 2/3/4G (frequency band 700)

Scenario 5:

Internal Antenna:

Wifi b or g + Bluetooth LE+ 2/3/4G (frequency band 700)

Scenario 6:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 700)

Scenario 7:

Internal Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 700)

Scenario 8:

Internal Antenna:

Wifi n 5G_MIMO + Bluetooth LE + 2/3/4G (frequency band 700)

Scenario 9:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 850)

Scenario 10:

External Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 850)

Scenario 11:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 850)

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Scenario 12:

External Antenna:

Wifi n_5G (MIMO) + Bluetooth LE+ 2/3/4G (frequency band 850)

Scenario 13:

Internal Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 850)

Scenario 14:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 850)

Scenario 15:

Internal Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 850)

Scenario 16:

Internal Antenna:

Wifi n 5G_MIMO + Bluetooth LE + 2/3/4G (frequency band 850)

Scenario 17:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1700)

Scenario 18:

External Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 1700)

Scenario 19:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 1700)

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Scenario 20:

External Antenna:

Wifi n_5G (MIMO) + Bluetooth LE+ 2/3/4G (frequency band 1700)

Scenario 21:

Internal Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1700)

Scenario 22:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 1700)

Scenario 23:

Internal Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 1700)

Scenario 24:

Internal Antenna:

Wifi n 5G_MIMO + Bluetooth LE + 2/3/4G (frequency band 1700)

Scenario 25:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1900)

Scenario 26:

External Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 1900)

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Scenario 27:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 1900)

Scenario 28:

External Antenna:

Wifi n_5G (MIMO) + Bluetooth LE+ 2/3/4G (frequency band 1900)

Scenario 29:

Internal Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1900)

Scenario 30:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 1900)

Scenario 31:

Internal Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 1900)

Scenario 32:

Internal Antenna:

Wifi n 5G_MIMO + Bluetooth LE + 2/3/4G (frequency band 1900)

Exclusion of test condition:

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on calculated or measured field strengths or power density, is ≤ 1.0 .

$$\sum MPE\ ratio1 + MPE\ ratio2 + MPE\ ratio3 \leq 1.0$$

The spreadsheet as FCC deduces, and releases is employed to conduct the measurement:

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Scenario 1:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	700
MPE Limit	mW/cm ²		1.00	1.00	0.47
Max % MPE	%	25.7	3.2	0.0	22.8
Power	(W)	0.347	0.098	0.001	0.239
Antenna Gain	dBi		2.10	0.5	3.50
EIRP	(W)	0.71	0.159	0.001	0.535
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 25.7/100 = 0.26 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 2:

External Antenna:

Wifi n_MIMO + Bluetooth LE

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	700
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.47
Max % MPE	%	26.2	3.2	0.0	0.7	22.8
Power	(W)	0.370	0.098	0.001	0.023	0.239
Antenna Gain	dBi		2.10	0.5	2.10	3.50
EIRP	(W)	0.74	0.159	0.001	0.037	0.535
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 26.2/100 = 0.262 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 3:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	700
MPE Limit	mW/cm ²		1.00	1.00	0.47
Max % MPE	%	24.9	2.1	0.0	22.8
Power	(W)	0.283	0.034	0.001	0.239
Antenna Gain	dBi		5.00	0.5	3.50
EIRP	(W)	0.65	0.108	0.001	0.535
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120
θ ₂			60	60	60
θ ₁		actual	-120	-120	-120
θ ₂			60	60	60

MPE = 24.9/100 = 0.249 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 4:

External Antenna:

Wifi n_MIMO 5G + Bluetooth LE + 2/3/4G (frequency band 700)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	700
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.47
Max % MPE	%	26.5	2.1	0.0	2.5	22.8
Power	(W)	0.314	0.034	0.001	0.040	0.239
Antenna Gain	dBi		5.00	0.5	5.00	3.50
EIRP	(W)	0.78	0.108	0.001	0.126	0.535
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120	-120
θ ₂			60	60	60	60
θ ₁		actual	-120	-120	-120	-120
θ ₂			60	60	60	60

MPE = 26.5/100 = 0.265 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 5:

Internal Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	700
MPE Limit	mW/cm ²		1.00	1.00	0.47
Max % MPE	%	26.8	5.2	0.0	22.8
Power	(W)	0.338	0.098	0.001	0.239
Antenna Gain	dBi		4.25	0.5	3.50
EIRP	(W)	0.80	0.261	0.011	0.535
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 26.8/100 = 0.268 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 6:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 700)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	700
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.47
Max % MPE	%	27.7	5.2	0.0	1.2	22.8
Power	(W)	0.361	0.098	0.001	0.023	0.239
Antenna Gain	dBi		4.25	0.50	4.25	3.50
EIRP	(W)	0.86	0.261	0.001	0.061	0.535
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 27.7/100 = 0.277 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 7:

Internal Antenna:

Wifi a + Bluetooth LE+ 2/3/4G (frequency band 700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	700
MPE Limit	mW/cm ²		1.00	1.00	0.47
Max % MPE	%	24.5	2.4	0.0	22.8
Power	(W)	0.274	0.034	0.001	0.239
Antenna Gain	dBi		5.00	0.50	3.50
EIRP	(W)	0.64	0.121	0.001	0.535
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120
θ ₂			60	60	60
θ ₁		actual	-120	-120	-120
θ ₂			60	60	60

MPE = 24.5 / 100 = 0.245 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 8:

Internal Antenna:

Wifi n_5G_MIMO + Bluetooth LE

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	700
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.47
Max % MPE	%	26.5	2.1	0.0	2.8	22.8
Power	(W)	0.314	0.034	0.001	0.040	0.239
Antenna Gain	dBi		5.00	0.50	5.50	3.50
EIRP	(W)	0.79	0.108	0.001	0.142	0.535
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120	-120
θ ₂			60	60	60	60
θ ₁		actual	-120	-120	-120	-120
θ ₂			60	60	60	60

MPE = 26.5/100 = 0.265 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 9:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	850
MPE Limit	mW/cm ²		1.00	1.00	0.57
Max % MPE	%	30.8	3.2	0.0	28.0
Power	(W)	0.324	0.098	0.001	0.225
Antenna Gain	dBi		2.10	0.50	5.50
EIRP	(W)	0.96	0.048	0.001	0.798
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 30.8/100 = 0.308 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 10:

External Antenna:

Wifi n_MIMO + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	850
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.57
Max % MPE	%	31.4	3.2	0.0	0.7	28.0
Power	(W)	0.347	0.098	0.001	0.023	0.225
Antenna Gain	dBi		2.10	0.50	2.10	5.50
EIRP	(W)	1.00	0.159	0.001	0.037	0.798
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 31.4/100 = 0.314 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 11:

External Antenna:

Wifi a + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	850
MPE Limit	mW/cm ²		1.00	1.00	0.57
Max % MPE	%	29.9	2.1	0.0	28.0
Power	(W)	0.260	0.034	0.001	0.225
Antenna Gain	dBi		5.00	0.50	5.50
EIRP	(W)	0.91	0.108	0.001	0.798
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 29.9/100 = 0.299 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 12:

External Antenna:

Wifi n_MIMO 5G + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	850
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.57
Max % MPE	%	31.8	2.1	0.0	2.5	28.0
Power	(W)	0.300	0.034	0.001	0.040	0.225
Antenna Gain	dBi		5.00	0.50	5.00	5.50
EIRP	(W)	1.03	0.108	0.001	0.142	0.798
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 31.8/100 = 0.318 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 13:

Internal Antenna:

Wifi b or g + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	850
MPE Limit	mW/cm ²		1.00	1.00	0.57
Max % MPE	%	32.1	5.2	0.0	28.0
Power	(W)	0.324	0.098	0.001	0.225
Antenna Gain	dBi		4.25	0.50	5.50
EIRP	(W)	1.06	0.261	0.001	0.798
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 32.1/100 = 0.321 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 14:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	850
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.57
Max % MPE	%	32.9	5.2	0.0	1.2	28.0
Power	(W)	0.347	0.098	0.001	0.023	0.225
Antenna Gain	dBi		4.25	0.50	4.25	5.50
EIRP	(W)	1.12	0.261	0.001	0.061	0.798
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 32.9/100 = 0.329 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 15:

Internal Antenna:

Wifi a + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	850
MPE Limit	mW/cm ²		1.00	1.00	0.57
Max % MPE	%	29.9	2.4	0.0	28.0
Power	(W)	0.260	0.034	0.001	0.225
Antenna Gain	dBi		5.50	0.50	5.50
EIRP	(W)	0.92	0.121	0.001	0.798
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 29.9 / 100 = 0.299 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 16:

Internal Antenna:

Wifi n_5G_MIMO + Bluetooth LE+ 2/3/4G (frequency band 850)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	850
MPE Limit	mW/cm ²		1.00	1.00	1.00	0.57
Max % MPE	%	31.9	2.4	0.0	2.8	28.0
Power	(W)	0.300	0.034	0.001	0.040	0.225
Antenna Gain	dBi		5.50	0.50	5.50	5.50
EIRP	(W)	1.06	0.121	0.001	0.142	0.798
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 31.9/100 = 0.319 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 17:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	20.0	3.2	0.0	17.1
Power	(W)	0.342	0.098	0.001	0.243
Antenna Gain	dBi		2.10	0.50	5.50
EIRP	(W)	1.02	0.159	0.001	0.862
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 20/100 = 0.20 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 18:

External Antenna:

Wifi n_MIMO + Bluetooth LE+ 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	20.5	3.2	0.0	0.7	17.1
Power	(W)	0.365	0.098	0.001	0.023	0.243
Antenna Gain	dBi		2.10	0.50	2.10	5.50
EIRP	(W)	1.06	0.159	0.001	0.037	0.862
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 20.5/100 = 0.205 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 19:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	19.1	2.1	0.0	17.1
Power	(W)	0.278	0.034	0.001	0.243
Antenna Gain	dBi		5.00	0.50	5.50
EIRP	(W)	0.97	0.108	0.001	0.862
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120
θ ₂			60	60	60
θ ₁		actual	-120	-120	-120
θ ₂			60	60	60

MPE = 19.1/100 = 0.191 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 20:

External Antenna:

Wifi n_MIMO 5G + Bluetooth LE + 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	20.9	2.1	0.0	2.5	17.1
Power	(W)	0.318	0.034	0.001	0.040	0.243
Antenna Gain	dBi		5.00	0.50	5.00	5.50
EIRP	(W)	1.10	0.108	0.001	0.126	0.862
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120	-120
θ ₂			60	60	60	60
θ ₁		actual	-120	-120	-120	-120
θ ₂			60	60	60	60

MPE = 20.9/100 = 0.209 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 21:

Internal Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	21.2	5.2	0.0	17.1
Power	(W)	0.342	0.098	0.001	0.243
Antenna Gain	dBi		4.25	0.50	5.50
EIRP	(W)	1.12	0.261	0.001	0.862
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 21.2/100 = 0.212 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 22:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	22.1	5.2	0.0	1.2	17.1
Power	(W)	0.365	0.098	0.001	0.023	0.243
Antenna Gain	dBi		4.25	0.50	4.25	5.50
EIRP	(W)	1.19	0.261	0.001	0.061	0.862
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 22.1/100 = 0.221 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 23:

Internal Antenna:

Wifi a + Bluetooth LE+ 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	19.0	2.4	0.0	17.1
Power	(W)	0.278	0.034	0.001	0.243
Antenna Gain	dBi		5.50	0.50	5.50
EIRP	(W)	0.98	0.121	0.001	0.862
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 19.0 /100 = 0.190 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 24:

Internal Antenna:

Wifi n_5G_MIMO + Bluetooth LE + 2/3/4G (frequency band 1700)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	1700
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	21.1	2.4	0.0	2.8	17.1
Power	(W)	0.318	0.034	0.001	0.040	0.243
Antenna Gain	dBi		5.50	0.50	5.50	5.50
EIRP	(W)	1.13	0.121	0.001	0.142	0.862
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 21.1/100 = 0.211 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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台灣檢驗科技股份有限公司

t (886-2) 2299-3279

f (886-2) 2298-0488

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Scenario 25:

External Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	19.6	3.2	0.0	16.7
Power	(W)	0.336	0.098	0.001	0.237
Antenna Gain	dBi		2.10	0.50	5.50
EIRP	(W)	1.00	0.159	0.001	0.841
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 19.6/100 = 0.196 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 26:

External Antenna:

Wifi n_MIMO + Bluetooth LE+ 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	20.1	3.2	0.0	0.7	16.7
Power	(W)	0.359	0.098	0.001	0.023	0.237
Antenna Gain	dBi		2.10	0.50	2.10	5.50
EIRP	(W)	1.04	0.159	0.001	0.037	0.841
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 20.1/100 = 0.201 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 27:

External Antenna:

Wifi a + Bluetooth LE + 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	18.6	2.1	0.0	16.7
Power	(W)	0.272	0.034	0.001	0.237
Antenna Gain	dBi		5.00	0.50	5.50
EIRP	(W)	0.95	0.108	0.001	0.841
X	(cm)		-13.0	11.5	2.5
Y	(cm)		11.0	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120
θ ₂			60	60	60
θ ₁		actual	-120	-120	-120
θ ₂			60	60	60

MPE = 18.6/100 = 0.186 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 28:

External Antenna:

Wifi n_MIMO 5G + Bluetooth LE + 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	20.5	2.1	0.0	2.5	16.7
Power	(W)	0.312	0.034	0.001	0.040	0.237
Antenna Gain	dBi		5.00	0.50	5.00	5.50
EIRP	(W)	1.08	0.108	0.001	0.126	0.841
X	(cm)		-13.0	11.5	13.0	2.5
Y	(cm)		11.0	-1.0	11.0	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ ₁	degs	input	-120	-120	-120	-120
θ ₂			60	60	60	60
θ ₁		actual	-120	-120	-120	-120
θ ₂			60	60	60	60

MPE = 20.5/100 = 0.205 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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台灣檢驗科技股份有限公司

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f (886-2) 2298-0488

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Scenario 29:

Internal Antenna:

Wifi b or g + Bluetooth LE + 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		2462	2402	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	20.8	5.2	0.0	16.7
Power	(W)	0.336	0.098	0.001	0.237
Antenna Gain	dBi		4.25	0.50	5.50
EIRP	(W)	1.10	0.261	0.001	0.841
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 20.8/100 = 0.208 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 30:

Internal Antenna:

Wifi n_MIMO + Bluetooth LE + 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		2462	2402	2462	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	21.6	5.2	0.0	1.2	16.7
Power	(W)	0.359	0.098	0.001	0.023	0.237
Antenna Gain	dBi		4.25	0.50	4.25	5.50
EIRP	(W)	1.16	0.261	0.001	0.061	0.841
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 21.6/100 = 0.216 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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Scenario 31:

Internal Antenna:

Wifi a + Bluetooth LE+ 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3
Tx Status			On	On	On
Frequency	MHz		5500	2402	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00
Max % MPE	%	18.6	2.4	0.0	16.7
Power	(W)	0.272	0.034	0.001	0.237
Antenna Gain	dBi		5.50	0.50	5.50
EIRP	(W)	0.96	0.121	0.001	0.841
X	(cm)		-4.5	11.5	2.5
Y	(cm)		9.5	-1.0	9.5
Sector			FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120
θ_2			60	60	60
θ_1		actual	-120	-120	-120
θ_2			60	60	60

MPE = 18.6 / 100 = 0.186 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

Scenario 32:

Internal Antenna:

Wifi n_5G_MIMO + Bluetooth LE + 2/3/4G (frequency band 1900)

Antenna No.		Total	1	2	3	4
Tx Status			On	On	On	On
Frequency	MHz		5500	2402	5500	1900
MPE Limit	mW/cm ²		1.00	1.00	1.00	1.00
Max % MPE	%	20.6	2.4	0.0	2.8	16.7
Power	(W)	0.312	0.034	0.001	0.040	0.237
Antenna Gain	dBi		5.50	0.50	5.50	5.50
EIRP	(W)	1.10	0.121	0.001	0.142	0.841
X	(cm)		-4.5	11.5	-4.5	2.5
Y	(cm)		9.5	-1.0	8.5	9.5
Sector			FALSE	FALSE	FALSE	FALSE
Arc			FALSE	FALSE	FALSE	FALSE
θ_1	degs	input	-120	-120	-120	-120
θ_2			60	60	60	60
θ_1		actual	-120	-120	-120	-120
θ_2			60	60	60	60

MPE = 20.6/100 = 0.206 < 1.0, and therefore maximum MPE generated from individual transmitter can be excluded.

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