

1 MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended to comply with § 2.1091
Radiofrequency radiation exposure evaluation: mobile devices of the FCC CFR
47 Rules, CFR 1.1310 (b) Radio frequency Radiation Exposure Requirement.

1.2 Special Accessories

Not available for this EUT intended for grant

1.3 Equipment Modifications

Not available for this EUT intended for grant.

1.4 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

1.5 Exposure (MPE) Evaluation

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

Operation Configuration of the Worst-Case picked up to evaluate:

LTE Band 2 / 4 / 13

OPERATION IN LTE BAND 2 (1850 – 1910 MHz)

BAND 2 / BW: 15M / 16QAM / RB: 1,0

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
LTE BAND 2	1857.5	18675	V	19.09	9.95	-4.47	24.58	33.01
			H	16.06	9.95	-4.47	21.54	33.01
	1880.0	18900	V	20.54	10.02	-4.50	26.06	33.01
			H	16.73	10.02	-4.50	22.25	33.01
	1902.5	19125	V	18.17	10.08	-4.53	23.72	33.01
			H	14.41	10.09	-4.54	19.97	33.01

Power Density = EIRP*Duty Cycle/(4πR²)

Duty Cycle is 1 for LTE band operation and R is 20cm.

EIRP	26.06	(dBm)
EIRP	403.645	(mW)
Duty cycle:	1	(%)
Maximum Pav :	4.03645393	(mW)
Prediction distance:	20	(cm)
Prediction frequency:	1880	(MHz)
MPE limit for uncontrolled exposure at prediction	1.0000	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.00080	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0008 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 1880MHz.

OPERATION IN LTE BAND 4 (1710 TO 1755 MHz)

BAND 4 / BW: 10M / 16QAM / RB: 1,0

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
LTE BAND 4	1715.0	20000	V	21.96	9.49	-4.31	27.14	30.00
			H	17.48	9.49	-4.31	22.65	30.00
	1732.0	20175	V	22.40	9.54	-4.31	27.64	30.00
			H	17.81	9.54	-4.31	23.04	30.00
	1750.0	20350	V	21.76	9.60	-4.33	27.03	30.00
			H	16.94	9.60	-4.33	22.22	30.00

Power Density = EIRP*Duty Cycle/(4πR²)

Duty Cycle is 1 for LTE band operation and R is 20cm.

EIRP	27.64	(dBm)
EIRP	580.764	(mW)
Duty cycle:	1	(%)
Maximum Pav :	5.80764418	(mW)
Prediction distance:	20	(cm)
Prediction frequency:	1732	(MHz)
MPE limit for uncontrolled exposure at prediction	1.0000	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.00116	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.00116 mW/cm².

This is below the uncontrolled exposure limit of 1 mW/cm² at 1732MHz.

OPERATION IN LTE BAND 13 (777 TO 787 MHz)

BAND 13 / BW: 5M / QPSK / RB: 1,0

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
LTE BAND 13	779.5	23205	V	22.64	3.28	-2.91	23.01	34.77
			H	17.20	3.28	-2.91	17.57	34.77
	782.0	23230	V	22.27	3.29	-2.91	22.65	34.77
			H	19.35	3.29	-2.91	19.73	34.77
	784.5	23255	V	20.96	3.29	-2.91	21.35	34.77
			H	16.40	3.29	-2.91	16.78	34.77

Power Density = EIRP*Duty Cycle/(4πR²)

Duty Cycle is 1 for LTE band operation and R is 20cm.

ERP	23.01	(dBm)
ERP	199.986	(mW)
Duty cycle:	1	(%)
Maximum Pav :	1.99986187	(mW)
Prediction distance:	20	(cm)
Prediction frequency:	779.5	(MHz)
MPE limit for uncontrolled exposure at prediction	0.5197	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.00040	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.0004 mW/cm².

This is below the uncontrolled exposure limit of 0.5197 mW/cm² at 779.5MHz.