

13 Maximum Permissible Exposure (MPE) Evaluation

13.1 Standard Applicable

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission’s guideline.

This is a Mobile device, the MPE is required.

According to §1.1310 and §2.1093 RF exposure is calculated.

Limits for Maximum Permissive Exposure (MPE)

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
1500-100.000	/	/	1.0	30

F = frequency in MHz

* = Plane-wave equipment power density

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only.

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13.2 Maximum Permissible Exposure (MPE) Evaluation

Frequency (MHz)	Peak Power Output (dBm)	Required Limit
2405	8.32	1 Watt = 30 dBm
2440	8.29	1 Watt = 30 dBm
2480	-4.81	1 Watt = 30 dBm

*Note: Measured by power meter, cable loss as 11dB that offsets on the power meter.

MPE Prediction

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4R^2}$$

Where: S = Power density

P = Power input to antenna

G = Power gain of the antenna in the direction of interest relative to an isotropic radiator

R = Distance to the center of radiation of the antenna

Internal Antenna-DFZM-E7221-DT0R

Maximum peak output power at antenna input terminal:	8.32	(dBm)
Maximum peak output power at antenna input terminal:	6.792036326	(mW)
Duty cycle:	99	(%)
Maximum Pav :	6.724115963	(mW)
Antenna gain (typical):	0.68	(dBi)
Maximum antenna gain:	1.169499391	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2405	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.001565	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.001565mW/cm². This is below the uncontrolled exposure limit of 1mW/cm² at 2405MHz.

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External Antenna- DFZM-E7220-DT0R

Maximum peak output power at antenna input terminal:	8.32	(dBm)
Maximum peak output power at antenna input terminal:	6.792036326	(mW)
Duty cycle:	99	(%)
Maximum Pav :	6.724115963	(mW)
Antenna gain (typical):	2	(dBi)
Maximum antenna gain:	1.584893192	(numeric)
Prediction distance:	20	(cm)
Prediction frequency:	2405	(MHz)
MPE limit for uncontrolled exposure at prediction	1	(mW/cm ²)
Power density at predication frequency at 20 (cm)	0.002121	(mW/cm ²)

Measurement Result

The predicted power density level at 20 cm is 0.002121mW/cm². This is below the uncontrolled exposure limit of 1mW/cm² at 2405MHz.

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