

## RF Exposure Evaluation according to KDB 447498 D01 v06

**Report identification number: 1-5421/22-01-19\_TR1-R1**

Certification numbers and labeling requirements	
FCC ID	K6KSATCOM5G

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## 1. MPE at given distance (KDB 447498 D01 General RF Exposure Guidance v06)

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

$$S = PG / 4\pi R^2$$

where: S = Power density

P = Power input to the antenna

G = Antenna gain

R = Distance to the center of radiation of the antenna

PG = Output Power including antenna gain

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled "Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure"

Frequency Range (MHz)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

## 2. EUT technologies

**WLAN:**

Declared minimum safety distance: **107cm**

SRD Technology	Frequency [MHz]		Reference #	Output Power [dBm]			Power Density [mW/cm <sup>2</sup> ]		Share of Limit %
	f <sub>Min</sub>	f <sub>Max</sub>		P <sub>ERP</sub>	P <sub>EIRP</sub>	P <sub>RF Exp</sub>	S <sub>Result</sub>	S <sub>Limit</sub>	
WLAN 2.4 GHz	2412	2462	A+B	N/A	23.5	<b>23.5</b>	0.002	1.000	<b>0.16%</b>
WLAN U-NII-1	5180	5240	A+B	N/A	17.8	<b>17.8</b>	0.000	1.000	<b>0.04%</b>
WLAN U-NII-3	5745	5825	A+B	N/A	17.8	<b>17.8</b>	0.000	1.000	<b>0.04%</b>

Note:

- EIRP Output Power [dBm] = Conducted Output Power [dBm] + Antenna Gain (dBi)
- Worst case of WLAN is marked green.

Referenced Documents:

#	Results from:
A	Operational_Descriptio
B	WiFi Antenna Info

**Inmarsat:**Declared minimum safety distance: **107cm**

SRD Technology	Frequency [MHz]		Reference #	Output Power [dBm]			Power Density [mW/cm <sup>2</sup> ]		Share of Limit %
	f <sub>Min</sub>	f <sub>Max</sub>		P <sub>ERP</sub>	P <sub>EIRP</sub>	P <sub>RF Exp</sub>	S <sub>Result</sub>	S <sub>Limit</sub>	
Inmarsat	1626	1660	A	N/A	47.1	<b>47.1</b>	0.356	1.000	<b>35.65%</b>

**Note:**

- EIRP Output Power [dBm] = Conducted Output Power [dBm] + Antenna Gain (dBi)
- Worst case of WLAN is marked green.

**Referenced Documents:**

#	Results from:
A	Operational_Description (Worst case is Class 7: 35.1 dBm + 1 dB tolerance + 11 dBi gain = 47.1 dBm)

**Cellular:**Declared minimum safety distance: **107cm**

Cellular Technology	Frequency [MHz]		Reference #	Output Power [dBm]					Power Density [mW/cm <sup>2</sup> ]		Share of Limit %
	f <sub>Min</sub>	f <sub>Max</sub>		Conducted		Radiated		Corrected	S <sub>Result</sub>	S <sub>Limit</sub>	
			P <sub>Meas</sub>	P <sub>Max</sub>	P <sub>ERP</sub>	P <sub>EIRP</sub>	P <sub>RFExp</sub>				
WCDMA Band II	1850	1910	A+B	N/A	25.0	27.7	29.8	<b>29.8</b>	0.01	1.00	<b>0.66%</b>
WCDMA Band IV	1710	1755	A+B	N/A	25.0	29.0	31.1	<b>31.1</b>	0.01	1.00	<b>0.90%</b>
WCDMA Band V	824	849	A+B	N/A	25.0	26.8	28.9	<b>28.9</b>	0.01	0.55	<b>0.98%</b>
LTE Band 2	1850	1910	A+B	N/A	25.0	27.7	29.8	<b>29.8</b>	0.01	1.00	<b>0.66%</b>
LTE Band 4	1710	1755	A+B	N/A	25.0	29.0	31.1	<b>31.1</b>	0.01	1.00	<b>0.90%</b>
LTE Band 5	824	849	A+B	N/A	25.0	26.8	28.9	<b>28.9</b>	0.01	0.55	<b>0.98%</b>
LTE Band 7	2500	2570	A+B	N/A	25.0	27.9	30.0	<b>30.0</b>	0.01	1.00	<b>0.70%</b>
LTE Band 12	699	716	A+B	N/A	25.0	26.5	28.6	<b>28.6</b>	0.01	0.47	<b>1.08%</b>
LTE Band 13	777	787	A+B	N/A	25.0	26.5	28.6	<b>28.6</b>	0.01	0.52	<b>0.97%</b>
LTE Band 14	788	798	A+B	N/A	25.0	26.5	28.6	<b>28.6</b>	0.01	0.53	<b>0.96%</b>
LTE Band 17	704	716	A+B	N/A	25.0	26.5	28.6	<b>28.6</b>	0.01	0.47	<b>1.07%</b>
LTE Band 25	1850	1915	A+B	N/A	25.0	27.7	29.8	<b>29.8</b>	0.01	1.00	<b>0.66%</b>
LTE Band 26	814	849	A+B	N/A	25.0	26.8	28.9	<b>28.9</b>	0.01	0.54	<b>0.99%</b>
LTE Band 30	2305	2315	A+B	N/A	25.0	27.9	30.0	<b>30.0</b>	0.01	1.00	<b>0.70%</b>
LTE Band 38	2570	2620	A+B	N/A	25.0	27.9	30.0	<b>30.0</b>	0.01	1.00	<b>0.70%</b>
LTE Band 41	2496	2690	A+B	N/A	28.0	30.9	33.0	<b>33.0</b>	0.01	1.00	<b>1.39%</b>
LTE Band 42	3450	3550	A+B	N/A	25.0	30.2	32.3	<b>32.3</b>	0.01	1.00	<b>1.18%</b>
LTE Band 66	1710	1780	A+B	N/A	25.0	29.0	31.1	<b>31.1</b>	0.01	1.00	<b>0.90%</b>
LTE Band 71	663	698	A+B	N/A	25.0	23.8	25.9	<b>25.9</b>	0.00	0.44	<b>0.61%</b>
5G n2	1850	1910	A+B	N/A	25.0	27.7	29.8	<b>29.8</b>	0.01	1.00	<b>0.66%</b>

5G n5	824	849	A+B	N/A	25.0	26.8	28.9	<b>28.9</b>	0.01	0.55	<b>0.98%</b>
5G n7	2500	2570	A+B	N/A	25.0	27.9	30.0	<b>30.0</b>	0.01	1.00	<b>0.70%</b>
5G n25	1850	1915	A+B	N/A	25.0	27.7	29.8	<b>29.8</b>	0.01	1.00	<b>0.66%</b>
5G n30	2305	2315	A+B	N/A	25.0	27.9	30.0	<b>30.0</b>	0.01	1.00	<b>0.70%</b>
5G n38	1850	1915	A+B	N/A	25.0	27.7	29.8	<b>29.8</b>	0.01	1.00	<b>0.66%</b>
5G n41	2496	2690	A+B	N/A	28.0	30.9	33.0	<b>33.0</b>	0.01	1.00	<b>1.39%</b>
5G n66	1710	1780	A+B	N/A	25.0	29.0	31.1	<b>31.1</b>	0.01	1.00	<b>0.90%</b>
5G n71	663	698	A+B	N/A	25.0	23.8	25.9	<b>25.9</b>	0.00	0.44	<b>0.61%</b>
5G n77	3450	3980	A+B	N/A	28.0	33.2	35.3	<b>35.3</b>	0.02	1.00	<b>2.36%</b>
5G n78	3450	3980	A+B	N/A	28.0	33.2	35.3	<b>35.3</b>	0.02	1.00	<b>2.36%</b>

## Note:

- Max rated conducted output power taken from customer's tune up info as attached in this filing.
- Worst case is marked yellow.

## Referenced Documents:

A	Operational_Description
B	Antenna_information_Cellular_Part_1 (Highest gain values for each scenario and band were chosen)

### 3. Collocation overview:

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is  $\leq 1.0$ , according to calculated/estimated, numerically modeled, or measured field strengths or power density.

Technology	Share of Limit [%]
WLAN	0.16%
Inmarsat	35.65%
Cellular	2.36%
Sum	<b>38.17%</b>

### 4. Conclusion

This prediction demonstrates the following:

The power density levels for FCC at a distance of 107 cm are below the maximum levels allowed by regulations.

**Conclusion:** RF exposure evaluation is not required.