



FCC SAR Exemption per KDB 447498

Date: June 15, 2021

American Certification Body, Inc.
6731 Whittier Avenue
Suite C110
McLean, VA 22101

FCC ID : VGX6012A
Model : Wifi SOM Module
Applicant : JLT Mobile Computers

Maximum exposure limits from CFR 47, FCC Part 1.1310:
Version 06 23 Oct 2015

Table 1--Maximum Permissible Exposure (MPE) Limits

Controlled Exposure (6-Minute Average)				Uncontrolled Exposure ** (30-Minute Average)		
<i>Frequency Range (MHz)</i>	<i>Electric Field Strength (V/m)</i>	<i>Magnetic Field Strength (A/m)</i>	<i>Power Density (mW/cm²)</i>	<i>Electric Field Strength (V/m)</i>	<i>Magnetic Field Strength (A/m)</i>	<i>Power Density (mW/cm²)</i>
0.3-3.0	614	1.63	(100)*			
3.0-30	1842/f	4.89/f	(900/f ²)*			
0.3-1.34				614	1.63	(100)*
1.34-30				824/f	2.19/f	(180/f ²)*
30-300	61.4	0.163	1.0	27.5	0.073	0.2
300-1500	--	--	f/300	--	--	f/1500
1,500-100,000	--	--	5	--	--	1.0

f = frequency, in MHz.

* = Plane-wave equivalent power. (This means the equivalent far-field strength that would have the E- or H-field component calculated or measured. It does not apply well in the near field of an antenna.)

-- = Not specified.

**General population/uncontrolled exposure limits apply to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Therefore, members of the general public always fall under this category when exposure is not employment-related, as in the case of residents in an area near a broadcast tower. Neighbors of amateurs and other non-household members would normally be subject to the general population/uncontrolled exposure limits. For purposes of applying these definitions, awareness of the potential for RF exposure in a controlled or similar environment can be provided through specific training. Warning signs and labels can also be used to establish such awareness as long as they provide information, in a prominent manner, on risk of potential exposure and instructions on methods to minimize such exposure risk (For example, a sign warning of RF exposure risk and indicating that individuals should not remain in the area for more than a certain period of time could be acceptable. Bulletin 65 provides more information on warning signs.).

$$S = \frac{EIRP}{4\pi R^2}$$

EIRP = equivalent (or effective) isotropically radiated power



Calculation based on the above formula:

Note: RF exposure is being calculated from the original worse case power results and our antennas.

Tolerance of measurements uncertainty = 10% = EIRP *1.1

R = 20 cm (according to user manual of distance between device and user)

EIRP=Pout(dBm)+Gant (dBi)

2.4GHz

Pout = Conducted Output Power (2.437Ghz, ch 6, chain B, 802.11b 1Mbps)= 17.95 dBm = 61,7 mW

MIMO worst case from VGXMS01 DTS = 137,09mW (21,37 dBm)

MIMO>Pout (select MIMO for calculation)

Gant = 0 dBi at 2.4Ghz

EIRP=21.37dBm+0dBi=21.37dBm = 137.09mW

Tolerance = 10% = EIRP *1.1

Power Density Calculation = $(137.09) * 1.1 / (4 * \pi * 20^2) = 0.030 < 1 \text{ (mW/cm}^2\text{)} = \text{Pass}$

5Ghz

Pout = Conducted Output Power (5.58 Ghz, ch 116, Output power(chain A+B))= 20.18 dBm = 104.2 mW

MIMO worst case from VGXMS01 UNII = 140.93mW = 21.49dBm

MIMO>Pout (select MIMO for calculation)

Gant = 2.3 dBi Peak Gain

EIRP=21.49dBm+2.3dBi=23.79dBm = 239.33mW

Tolerance = 10% = EIRP *1.1

Power Density Calculation = $(239.33) * 1.1 / (4 * \pi * 20^2) = 0.052 \text{ (mW/cm}^2\text{)} < 1 = \text{Pass}$

NFC 13.56 MHz

Measurement at 3m

Frequency [MHz]	QuasiPeak [dB μ V/m]	BW [kHz]	Pol.	Azimuth [deg]	Margin [dB]	Limit [dB μ V/m]	Result
13.562250	54.4	9.000	V	11.0	51.00	105.40	PASSED

Table 7. Field strength of fundamental emissions test results. EUT horizontal. Antenna vertical.

Pout = 0.0000826 mW (based on converting to an EIRP value using far field equations)

Tolerance = 10% = EIRP *1.1

$(180/f^2)^* = 0.979$

Power Density Calculation = $(0.0000826) * 1.1 / (4 * \pi * 20^2) = 0.000000018 \text{ (mW/cm}^2\text{)} < 0.979 = \text{Pass}$



WWAN EM7455

Worst case EM7455-Module-FCC-MPE-Evaluation-2693960

Operating Mode	TX Freq Range (MHz)		Max Time-Avg Cond Power (dBm)	Max Time-Avg Cond Power (W)	Max Ant Gain (dBi)	Source-Based Time-Averaged Max EIRP (dBm)	IC Exemption Limit (EIRP) (dBm)	EIRP/ERP Limits
WCDMA Band II LTE Band 2	1850	1910	24	0.25	6	30	33.50	2 W EIRP
WCDMA Band IV LTE Band 4	1710	1755	24	0.25	6	30	33.27	1 W EIRP
WCDMA Band V LTE Band 5	824	849	24	0.25	6	30	31.10	6.3 W ERP

Gant = 2.15 dBi Peak Gain (Smarteq Smartwing 2.15dBi)

EIRP=24 dBm+2.15dBi=26.15dBm = 412.1mW

Limit = f/1500 = 0.557

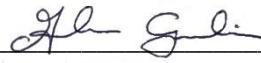
Power Density Calculation = $(412.1) * 1.1 / (4 * \pi * 20^2) = 0.090 \text{ (mW/cm}^2\text{)} < 0.557 = \text{Pass}$

Worst case normalized = 5 Ghz + NFC + WWAN < 1 = **0.052/1 + 0.000000018/0.979 + 0.09/0.557 = 0.213 < 1 = Pass**

The calculation is below the threshold, therefore the product exempt from the SAR test requirements.

Thank you,

By:


(Signature)

Anders Grandin

Title:

R&D Manager

On behalf of:

JLT Mobile Computers

Telephone:

+46 733 743 336