

Co-Located RF Exposure Condition

FCC ID: EJE-WB0073 (IC ID: 337J-WB0073)
FCC ID: N7NMC8781-F (IC ID: 2417C-MC8781)
and
FCC ID: EJE-WL0014 (IC ID: 337J-WL0014)
FCC ID: N7NMC8781-F (IC ID: 2417C-MC8781)

The intention of this Class II Permissive Change application is to enable the certified MC8781 Sierra Wireless UMTS module (FCC ID: N7NMC8781-F (IC ID: 2417C-MC8781)) to be co-located with WLAN and/ or BT modules. Independent antennas are used for each of the Radio modules and simultaneous transmission is possible.

SAR is not required as the EUT is hand held only portable device in accordance with section 7 of KDB 447498.

In accordance with Section 1.1310, the Maximum Permissible Exposure (MPE) limit for the General Population/Uncontrolled Exposure of 1.0 has been applied, i.e 1mW/cm².

Friis transmission formula: $P_d = (P \cdot G) / (4 \cdot \pi \cdot r^2)$
 where: P_d = power density (mW/cm²)
 P = power input to the antenna (mW)
 G = antenna gain (numeric)
 r = distance to the center of radiation of the antenna (cm)

The MPE calculations shown below are for the UMTS, *WLAN and *BT modules.

Transmitter Modules	FCC ID	Frequency GHz	Peak Power dBm	Antenna Type	Antenna Gain (dBi)	Power Density @ 20 cm mW/cm ²	MPE Limit mW/cm ²
UMTS	N7NMC8781-F	0.85	31.9	Nissei Electric	-2.22	0.185	0.55
		1.9	28.8		-1.53	0.107	1.0
*WLAN (802.11abg)	EJE-WB0073	2.4	29.6	Inverted-F	1.94	0.284	1.0
		5.0	29.85		1.96	0.302	1.0
*BT		2.4	1.0	Taiyo Yuden	2.0	0.001	1.0
Sum of Worst Case Power Densities of Co-located Transmitters						0.488	1.0

The AR5BHB92 Atheros WLAN module and EYSMJCS TAIYO YUDEN Bluetooth Module have been recently certified by Fujitsu under the FCC ID: EJE-WB0073 (IC ID: 337J-WB0073).

The MPE calculations shown below are for the UMTS and *WLAN modules.

Transmitter Modules	FCC ID	Frequency GHz	Peak Power dBm	Antenna Type	Antenna Gain (dBi)	Power Density @ 20 cm mW/cm ²	MPE Limit mW/cm ²
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		5.0	29.85		1.96	0.302	1.0
Sum of Worst Case Power Densities of Co-located Transmitters						0.487	1.0

The AR5BHB92 Atheros WLAN module has been recently certified by Fujitsu under the FCC ID: EJE-WL0014 (IC ID: 337J-WL0014).

Conclusions: Calculations show that the radio modules with described antennas complied with Maximum Permissible Exposure (MPE) limit for the General Population/Uncontrolled Exposure.