

Co-Located RF Exposure Condition

FCC ID: EJE-WB0053 (IC ID: 337J-WB0053)
FCC ID: N7NMC8781-F (IC ID: 2417C-MC8781)

The AR5BXB6 Atheros WLAN module and EYTF3CSFT TAIYO YUDEN Bluetooth Module have been recently certified by Fujitsu under the FCC ID: EJE-WB0053 (IC ID: 337J-WB0053). 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 BT modules under EJE-WB0053 (IC: 337J-WB0053). Independent antennas are used for each of the Radio modules and simultaneous transmission is possible.

The systems are required to be operated in a manner that ensures that the public is not exposed to RF energy levels in accordance with CFR 47, Section 1.1307(b)(1).

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: $P_d = (P * G) / (4 * \pi * r^2)$

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	0.48	0.345	0.55
		1.9	28.8		3.65	0.169	1.0
WLAN (802.11abg)	EJE-WB0053	2.4	17.9	Yokowo Monopole	-2.5	0.01	1.0
		5.0	17.1		2.18	0.02	1.0
BT		2.4	3.9	Taiyo Yuden Inverted F	-3.0	0.003	1.0
Sum of Worst Case Power Densities of Co-located Transmitters						0.368	1.0

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