MPE Calculation for Mobile Device to FCC and RSS-102 Issue 5

For the following equipment:

FCC ID: U4Y-DAXAO1
IC: 7049A-DAXAO1

The WiFi module in this filing was tested stand alone for a single modular scenario, with the following antenna:

description: ¨Puck antenna¨
manufacturer: TE connectivity
model: part number 1513164-1
maximum gain: 4 dBi (peak)

For FCC:

The minimum use distance for this device is d > 20 cm and the power density limit for mobile devices at 2.4 and 5 GHz is S ≤ 1 mW/cm^2. The worst case operation mode generating the highest power in each frequency range is taken from the RF test report for calculation. In this case, the peak aggregate power is taken to calculate with, which is worst case compared to avarage power. The formula is given here below. The conclusion in the table below, is that the EUT with antenna passes the requirement for FCC.

$$\text{POWER DENSITY } S = (P_{radiated}) / (4\pi \times d^2) = \ldots\ldots\ldots \text{ mW/cm}^2$$

MODULATION MODE	FREQUENCY RANGE FROM – TO (MHz)		MAX POWER (dBm) Average	MAX ANTENNA GAIN (dBi)	CABLE LOSS (dB)	Additional Power reduction (dB)	Total EIRP (dBm)	MINIUM DISTANCE d (cm)	POWER DENSITY (mW/cm^2)	LIMIT (mW/cm^2)	Verdict
802.11a	5180	5240	17.84	4	0	0	21.84	20	0.030	1	PASS
802.11n(20)	5180	5240	18.42	4	0	0	22.42	20	**0.035**	1	PASS
802.11n(40)	5190	5230	18.04	4	0	0	22.04	20	0.032	1	PASS
802.11n(80)	5210	5210	17.29	4	0	0	21.29	20	0.027	1	PASS

For ISED Canada:

Section 2.5.2 of RSS-102 Issue 5 stipulates that for use distance > 20 cm or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than the maximum power limit as calculated (and adjusted for tune-up tolerance) according to the formula below, where f is in MHz. The lowest frequency from the frequency range is worst case and used for calculation, expressed in as bold font in the table below. The conclusion in the table below, is that the EUT with antenna passes the requirement for ISED Canada.

$$\text{MAXIMUM POWER LIMIT} = 1.31 \times 10^{-2} f^{\,0.6834} = \ldots\ldots\ldots \text{W}$$

MODULATION MODE	FREQUENCY RANGE FROM – TO (MHz)		MAX POWER (dBm) Average	MAX ANTENNA GAIN (dBi)	CABLE LOSS (dB)	Additional Power reduction (dB)	Total EIRP (dBm)	Total EIRP (W)	DISTANCE GREATER THEN d (cm)	MAX POWER LIMIT (W)	Verdict
802.11a	**5180**	5240	17.84	4	0	0	21.84	0.153	20	4.53	PASS
802.11n(20)	5180	5240	18.42	4	0	0	22.42	0.175	20	4.53	PASS
802.11n(40)	5190	5230	18.04	4	0	0	22.04	0.160	20	4.53	PASS
802.11n(80)	5210	5210	17.29	4	0	0	21.29	0.135	20	4.53	PASS

(worst case for FCC is 0.035 mW/cm^2 which equals 0.35 W/m^2 wheras the corresponding limit is 10 W/m^2 , so also PASS for ISED Canada)