

RF Exposure evaluation

Applicant Data: SIEMENS AG
Östliche Rheinbrückenstr. 50
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Germany

Product Data: Industrial WLAN Access Point / Client
MSAX65-W1-M12-E2
Siemens

WLAN 2,4 GHz and 5 GHz

mobile 20cm

General Population/Uncontrolled

FCC ID: LYHMSAX65V1

Standards
KDB 447498 v06

FCC CFR 47, Part 2.1091: Radiofrequency radiation exposure evaluation: mobile devices.
FCC CFR 47, Part 2.1307: Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.
FCC CFR 47, Part 2.1310: Radiofrequency radiation exposure limits.

RF Exposure evaluation

Maximum Permissible Exposure

As specified in Chapter e(1) of 47 CFR Part 1.1310 – Limits for Maximum Permissible Exposure (MPE)

Table (i) - Limits for Occupational/ Controlled Exposure

Frequency range (MHz)	Power density (mW / cm ²)
300 – 1500	f/300
1500 - 100000	5.0

Table (ii) – Limits for General Population/ Uncontrolled Exposure

Frequency range (MHz)	Power density (mW / cm ²)
300 – 1500	f/1500
1500 - 100000	1.0

RF Exposure evaluation

Calculations

$$S = P * G / (4 * \pi * R^2)$$

$$R = \sqrt{ (P * G / S_{lim} * 4 * \pi) }$$

$$G = S_{lim} * 4 * \pi * R^2 / P$$

Where:

S = power density (mW/cm²)

P = power input to the antenna (mW)

G = power gain of the antenna (mW)

R = distance to the centre of radiation of the antenna (cm)

S_{lim} = FCC / IC Limit (mW/cm²)

Simultaneous Transmission Considerations

The calculation below is used to consider situations in which simultaneous exposure to fields of different frequencies occur. The calculation is performed by the sum of each relative exposure for each equipment according to the following criteria.

$$\sum_{1}^N \frac{S_{eqn}}{S_{Limn}} = \frac{S_{eq1}}{S_{Lim1}} + \frac{S_{eq2}}{S_{Lim2}} + \dots + \frac{S_{eqN}}{S_{LimN}} \leq 1$$

Where:

S_{eq} = S = power density (mW/cm²)

S_{lim} = FCC / IC Limit (mW/cm²)

RF Exposure evaluation

Assessment

Operational Mode	Frequency Band (MHz)	Antenna Gain (dBi)	Antenna Gain - numeric- (mW)	Output Power (dBm)	Output Power (mW)	Power Density value (mW/cm ²)	FCC Limit (mW/cm ²)	Relative Power Density value
WLAN 2.4 GHz	2412 - 2462	9,0	7,94	19,4	87,10	0,1376	1,0000	0,1376
WLAN 2.4 GHz	2412 - 2462	14,0	25,12	14,4	27,54	0,1376	1,0000	0,1376
WLAN 5 GHz	5180-5240	8,0	6,31	22,9	194,98	0,2448	1,0000	0,2448
WLAN 5 GHz	5260-5320	8,0	6,31	20,7	117,49	0,1475	1,0000	0,1475
WLAN 5 GHz	5500-5720	8,0	6,31	21,6	144,54	0,1814	1,0000	0,1814
WLAN 5 GHz	5745-5825	8,0	6,31	24,8	302,00	0,3791	1,0000	0,3791
WLAN 5 GHz	5180-5240	9,0	7,94	20,2	104,71	0,1655	1,0000	0,1655
WLAN 5 GHz	5260-5320	9,0	7,94	19,8	95,50	0,1509	1,0000	0,1509
WLAN 5 GHz	5500-5720	9,0	7,94	19,9	97,72	0,1544	1,0000	0,1544
WLAN 5 GHz	5745-5825	9,0	7,94	20,8	120,23	0,1900	1,0000	0,1900
WLAN 5 GHz	5180-5240	14,2	26,30	14,7	29,51	0,1544	1,0000	0,1544
WLAN 5 GHz	5260-5320	14,2	26,30	14,9	30,90	0,1617	1,0000	0,1617
WLAN 5 GHz	5500-5720	14,2	26,30	14,6	28,84	0,1509	1,0000	0,1509
WLAN 5 GHz	5745-5825	14,2	26,30	21,3	134,90	0,7059	1,0000	0,7059

Note1: only worst-case values per frequency band are listed in the table above.

Note2: max output power values per frequency band has been marked yellow.

Simultaneous Transmission:

	WLAN 2,4 GHz	WLAN 5 GHz
(S _{seq} / S _{lim})	0,1376	0,7059
Sum	0,8435	
Limit	1	
Conclusion	passed	

Note: max. values marked green in the assessment table.

Report Reference:

- MDE_Siem_1911_FCC_01_rev01 from 7layers GmbH, Germany issued on 2022-02-23
- MDE_Siem_1911_FCC_02_rev01 from 7layers GmbH, Germany issued on 2022-02-23
- MDE_Siem_1911_FCC_05_rev01 from 7layers GmbH, Germany issued on 2024-02-06

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