5.7   Maximum Permissible Exposure (MPE)

For test instruments and accessories used see section 6 Part **CPC 3**.

5.7.1   Description of the test location

Test location: AREA4

5.7.2   Photo documentation of the test set-up

5.7.3   Applicable standard

According to FCC Part 15 Subpart 15.407 (f): U-NII devices are subject to the radio frequency radiation exposure requirements specified in §§ 1.1307 (b), 2.1091 and 2.1093 of this chapter, as appropriate.

The test methods used comply with ANSI/IEEE C95.1-1992, "IEEE Standard for Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz".
This test report shows the compliance with the limits for Maximum Permissible Exposure (MPE) specified in FCC 1.1310 and the criteria to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified in FCC 1.1307(b).

5.7.4   Description of Measurement

The maximum total power input to the antenna has been measured conducted as described in clause 5.3 of this document. Through the Friis transmission formula, which is a far field assumption and the known maximum gain of the antenna, the maximum MPE at a defined distance away from the product, can be calculated.

Friis transmission formula: $P_d = \dfrac{P_{out} * G}{4 * \Pi * r^2}$

where

P_d = power density in mW/cm^2
P_{out} = output power to antenna in mW
G = gain of antenna (linear scale)
r = distance between antenna and observation point [cm]

5.7.5   Compliance regarding co-location and co-transmission

There is no co-location issue with 2 and 3 transmitters operating simultaneously. The reason for this is, that one module with the test software transmits with the highest possible duty cycle. If more than one module is active, the duty cycle for each module will be reduced. It is not possible (controlled by host computer) that the modules transmit at the same time slot.

5.7.6   Test result

Technology 802.11a

Worst case: Antenna ANT795-6DN with an antenna gain of 9 dBi
Power setting: -6

Channel No.	Frequency (MHz)	Max Power Output to Antenna (dBm)	(mW)	Antenna gain (dBi)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
36	5180	13.5	22.39	9	0.035	1.0
48	5240	13.1	20.42	9	0.032	1.0

Technology 802.11h

Worst case: Antenna ANT795-6MN with an antenna gain of 9 dBi
Power setting: -6

Channel No.	Frequency (MHz)	Max Power Output to Antenna (dBm)	(mW)	Antenna gain (dBi)	Power Density (mW/cm^2)	Limit of Power Density (mW/cm^2)
36	5180	13.5	22.39	9	0.035	1.0
64	5320	12.4	17.38	9	0.027	1.0
100	5500	11.2	13.18	9	0.021	1.0
120	5600	10.7	11.75	9	0.019	1.0
140	5700	12.0	15.85	9	0.025	1.0

Limits for Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
(A) Limits for Occupational / Controlled Exposure				
0.3 – 3.0	614	1.63	100	6
3.0 – 30	1842/f	4.89/f	900/f^2	6
30 - 300	61.4	0.163	1.0	6
300-1500	---	---	f/300	6
1500-100000	---	---	5.0	6
(**B) Limits for General Population / Uncontrolled Exposure**				
0.3 – 3.0	614	1.63	100	30
3.0 – 30	824/f	2.19/f	180/ f^2	30
30 - 300	27.5	0.073	0.2	30
300-1500	---	---	f/1500	30
1500-100000	---	---	1.0	30

f = Frequency in MHz

The requirements are **FULFILLED.**

Remarks: