
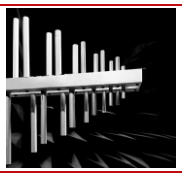
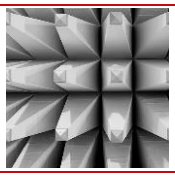

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consulting - testing - certification

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-12076-01-00

Maximum Permissible Exposure (MPE) & Exposure evaluation

Certification numbers and labeling requirements		
		Contains WLAN-module:
FCC ID	*YYRDISPB*	*YWTWF5370S1*
IC number	*9357A-DISPB*	*10633A-WF5370S01*
HVIN (Hardware Version Identification Number)	*MXDisplay+*	
PMN (Product Marketing Name)	*MXDisplay+*	
FVIN (Firmware Version Identification Number)	*-/-*	
HMN (Host Marketing Name)	*-/-*	

This test report is electronically signed and valid without handwriting signature. For verification of the electronic signatures, the public keys can be requested at the testing laboratory.

Document authorized:

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Stefan Bös
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EUT technologies:

The device is designed to carry 2 transmitters:

- RFID transmitter operating at 13.56 MHz — MX-Display+
- Transmitter operating at 2400-2483.5 MHz — USB WLAN-Stick GWF-3SO3

For this consideration the max measured source based time averaged powers are:

Max. power for 13.56 MHz operation: 0.011 mW ERP (-19.5 dBm / 55.9 dBµV/m @ 30 m))
Max. power for 2400 MHz operation: 99.3 mW EIRP (19.97 dBm, acc. test report)

Including Tune-Up tolerance the relevant power level are:

Max. power for 13.56 MHz operation: 0.012 mW ERP (Tune-Up tolerance: ±10 %)
Max. power for 2400 MHz operation: 125.0 mW EIRP (Tune-Up tolerance: ±1 dB)

Prediction of MPE limit at given distance - FCC

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S = \frac{PG}{4\pi R^2}$$

where: S = Power density
P = Power input to the antenna
G = Antenna gain
R = Distance to the center of radiation of the antenna

The table below is excerpted from Table 1B of 47 CFR 1.1310 titled “Limits for Maximum Permissible Exposure (MPE), Limits for General Population/Uncontrolled Exposure”

Frequency Range (MHz)	Power Density (mW/cm^2)	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

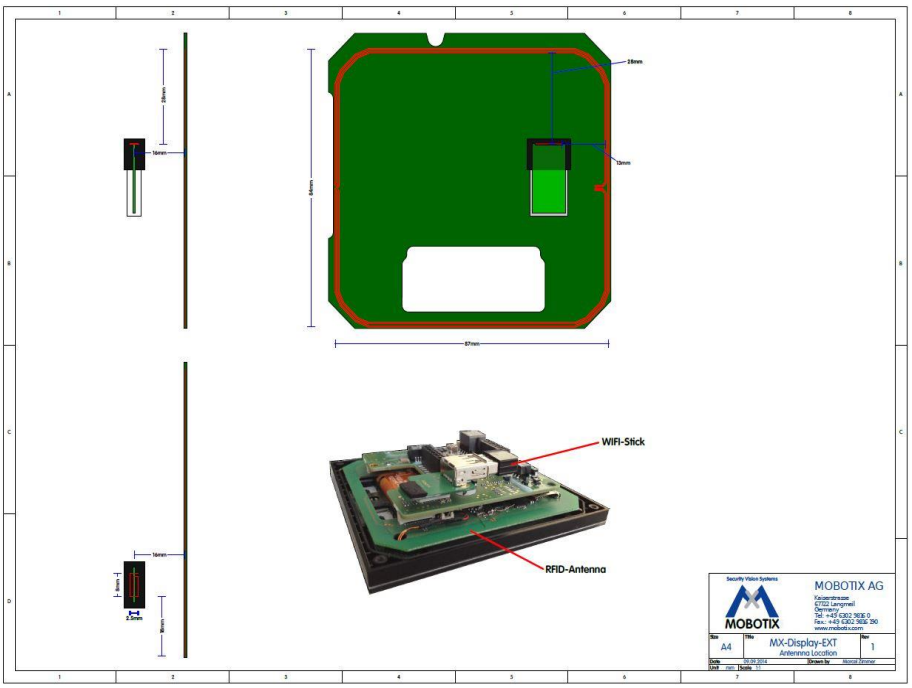
where f = Frequency (MHz)

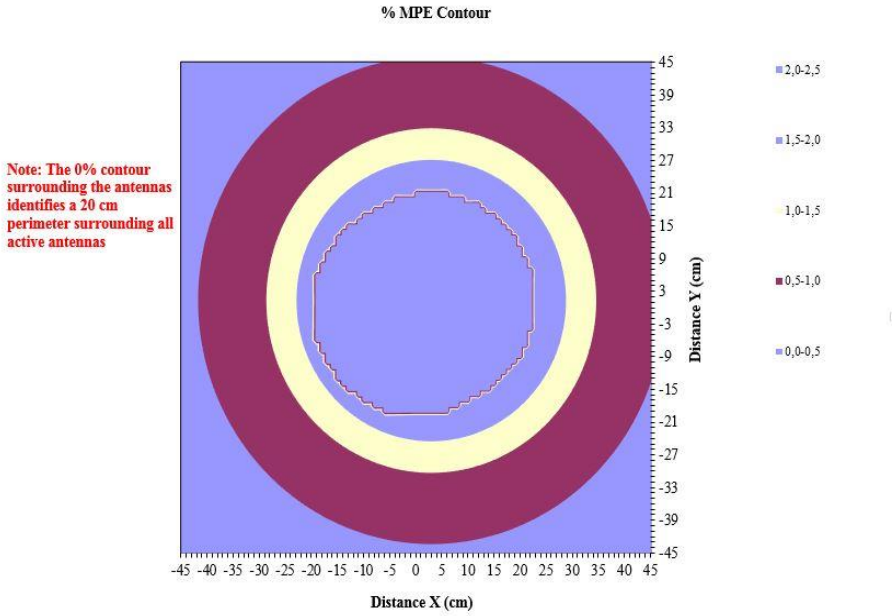
At a distance of 20 cm the calculated power density of the individual transmitter are:

13.56 MHz transmitter: **0.00000239** mW/cm^2
2400 MHz transmitter: **0.0249** mW/cm^2

13.56 MHz transmitter: **0.00 %** of Maximum Permissible Exposure
2400 MHz transmitter: **2.49 %** of Maximum Permissible Exposure

For the simulation of the simultaneous transmission condition the following antenna separation distances were estimated. (see picture)





Result: The sum percentage for location that are at least 20 cm from any active antenna is **2.49%** and below the Limits for Maximum Permissible Exposure.

Prediction of MPE limit at given distance - IC

RSS-102, Issue 5, 2.5.2

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}$W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at 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 $1.31 \times 10^{-2}\ f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

Applicable limits for this application:

13.56 MHz transmitter: **1.0 W**
2400 MHz transmitter: **2.7 W**

Prediction: worst case

Max. power for 13.56 MHz operation: 0.012 mW ERP (Tune-Up tolerance: ±10 %)
Max. power for 2400 MHz operation: 125.0 mW EIRP (Tune-Up tolerance: ±1 dB)

Technology	RFID	WLAN
Max power	0.012 mW	0.125 W
Colocation	**0.00 %**	**4.56 %**

Conclusion: for applications where minimum distance to radiating element is 20cm Annex C of RSS-102 should be filled out.