
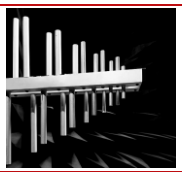
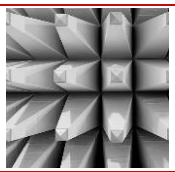

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Maximum Permissible Exposure (MPE) & Exposure evaluation

Report identification number: 1-0644/15-01-04

EUT: RWE LSX made by Insys Microelectronics GmbH	
Certification numbers and labeling requirements	
FCC ID	2AKBXIEKA160 QIPEHS8 (WWAN module) PPD-AR6103 (WLAN module)

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.

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EUT technologies:

Case 1

Technologies:	Max. power:	Timebased AVG-Power:	Max. gain:	Max. EIRP
GSM 850 GPRS	34.0 dBm	28.0 dBm (2Slots)	0 dBi	28.0 dBm
WLAN 2.4 GHz	19 dBm	100% Duty Cycle	5 dBi	24.0 dBm

Case 2

Technologies:	Max. power:	Timebased AVG-Power:	Max. gain:	Max. EIRP
WCDMA 850	25.0 dBm	100% Duty Cycle	0 dBi	25.0 dBm
WLAN 2.4 GHz	19 dBm	100% Duty Cycle	5 dBi	24.0 dBm

Case 3

Technologies:	Max. power:	Timebased AVG-Power:	Max. gain:	Max. EIRP
PCS 1900 GPRS	31 dBm	25 dBm (2Slots)	-2 dBi	29.0 dBm
WLAN 2.4 GHz	19 dBm		5 dBi	24.0 dBm

Case 4

Technologies:	Max. power:	Timebased AVG-Power:	Max. gain:	Max. EIRP
WCDMA 1900	25 dBm	100% Duty Cycle	-2 dBi	23.0 dBm
WLAN 2.4 GHz	19 dBm	100% Duty Cycle	5 dBi	24.0 dBm

Notes:

- This calculation covers the worst case configuration ‘LSX Mobile Extended’ including both WWAN and WLAN modules.
- Maximum Power includes maximum tune-up tolerance of +1 dB for GSM and +1 dB for WCDMA according to tune-up tolerance of the WWAN module.
- Corresponding to RF-test report 1-0644/15-01-03 a maximum gain of 0 dBi for the 850 MHz range and -2 dBi for the 1900 MHz range was assumed.
- Corresponding to RF-test report 1-0644/15-01-02 a maximum gain of 5 dBi is assumed for WLAN.

Prediction of MPE limit at given distance - FCC

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

$S = PG / 4\pi R^2$

where: S = Power density
P = Power input to the antenna
G = Antenna gain (declared by provider)
R = Distance to the center of radiation of the antenna

Note: for BT/BTLE the worst case EIRP has been assumed as P = 16 dBm with gain G = 0 dBi

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/cm²)	Averaging Time (minutes)
300 -1500	f/1500	30
1500 - 100000	1.0	30

where f = Frequency (MHz)

a) Internal antenna

Case 1 GSM850 and WLAN active simultaneously

		> 1500 MHz		< 1500 MHz
	Technology	WLAN 2.4 GHz		GSM 850
P	Maximum power	19 dBm		28.0 dBm
R	Distance	20 cm		20 cm
G	Antenna gain	5 dBi		0 dBi
S	MPE limit for uncontrolled exposure	1.0 mW/cm²		0.56 mW/cm²
	Calculated Power density:	**0.05 mW/cm²**		**0.126 mW/cm²**
	Colocation:	**5.00 %**		**22.4 %**
	Sum (worst case/all transmitters active):	**27.4 %**		

Case 2 WCDMA850 and WLAN active simultaneously

		> 1500 MHz		< 1500 MHz
	Technology	WLAN 2.4 GHz		WCDMA 850
P	Maximum power	19 dBm		25.0 dBm
R	Distance	20 cm		20 cm
G	Antenna gain	5 dBi		0 dBi
S	MPE limit for uncontrolled exposure	1.0 mW/cm²		0.56 mW/cm²
	Calculated Power density:	**0.05 mW/cm²**		**0.063 mW/cm²**
	Colocation:	**5.00 %**		**11.2 %**
	Sum (worst case/all transmitters active):	**16.2 %**		

Case 3 PCS 1900 and WLAN active simultaneously

		> 1500 MHz		> 1500 MHz
	Technology	WLAN 2.4 GHz		PCS 1900
P	Maximum power	19 dBm		29 dBm
R	Distance	20 cm		20 cm
G	Antenna gain	5 dBi		-2 dBi
S	MPE limit for uncontrolled exposure	1.0 mW/cm^2		1.0 mW/cm^2
	Calculated Power density:	**0.05 mW/cm^2**		**0.100 mW/cm²**
	Colocation:	**5.00 %**		**10.0 %**
	Sum (worst case/all transmitters active):	**15.0 %**		

Case 4 WCDMA 1900 and WLAN active simultaneously

		> 1500 MHz		> 1500 MHz
	Technology	WLAN 2.4 GHz		WCDMA 1900
P	Maximum power	19 dBm		25.0 dBm
R	Distance	20 cm		20 cm
G	Antenna gain	5 dBi		-2 dBi
S	MPE limit for uncontrolled exposure	1.0 mW/cm^2		1.0 mW/cm^2
	Calculated Power density:	**0.05 mW/cm^2**		**0.040 mW/cm²**
	Colocation:	**5.00 %**		**4.0 %**
	Sum (worst case/all transmitters active):	**9.0 %**		

This prediction demonstrates the following:

The power density levels for FCC at a distance of 20 cm are below the maximum levels allowed by regulations.

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).

Case 1 GSM850 and BT active simultaneously

	Technology	GSM 850		WLAN 2.4 GHz	-/-
P	Max power	28.0 dBm		19 dBm	**Sum**
G	Antenna gain	0 dBi		5 dBi	
S	MPE limit for uncontrolled exposure	1300 mW		2700 mW	
	Calculated output power:	631 mW		251 mW	
	Colocation GSM 850 + WLAN 2.4 GHz	**48.5 %**		**---**	**57.8 %**
		---		**9.3 %**	

Case 2 WCDMA 850 and BT active simultaneously

	Technology	WCDMA 850		WLAN 2.4 GHz	-/-
P	Max power	25.0 dBm		19 dBm	**Sum**
G	Antenna gain	0 dBi		5 dBi	
S	MPE limit for uncontrolled exposure	1300 mW		2700 mW	
	Calculated output power:	316 mW		251 mW	
	Colocation WCDMA 850 + BT 2.4 GHz	**24.3 %**		**---**	**33.6 %**
		---		**9.3 %**	

Case 3 PCS 1900 and BT active simultaneously

	Technology	PCS 1900		WLAN 2.4 GHz	-/-
P	Max power	29.0 dBm		19 dBm	**Sum**
G	Antenna gain	-2 dBi		5 dBi	
S	MPE limit for uncontrolled exposure	2280 mW		2700 mW	
	Calculated output power:	501 mW		251 mW	
	Colocation PCS 1900	**22.8 %**		**---**	**32.1 %**
	+ WLAN 2.4 GHz	**---**		**9.3 %**	

Case 4 WCDMA 1900 and BT active simultaneously

	Technology	WCDMA 1900		WLAN 2.4 GHz	-/-
P	Max power	25.0 dBm		19 dBm	**Sum**
G	Antenna gain	-2 dBi		5 dBi	
S	MPE limit for uncontrolled exposure	2113 mW		2700 mW	
	Calculated output power:	200 mW		251 mW	
	Colocation WCDMA 1900	**9.4 %**		**---**	**18.7 %**
	+ WLAN 2.4 GHz	**---**		**9.3 %**	

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