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consulting - testing - certification >>>



Deutsche
Akkreditierungsstelle
D-PL-12076-01-00

Maximum Permissible Exposure (MPE) & Exposure evaluation

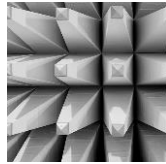
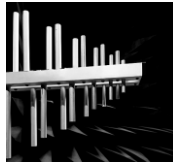
Report identification number: 1-0825/15-01-01

Certification numbers and labeling requirements	
FCC ID	X46XT06
IC number	8816A-XT06
HVIN (Hardware Version Identification Number)	XTOIP630
PMN (Product Marketing Name)	XTOIP630
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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Testing Manager
Radio Communications & EMC

**EUT technologies:**

Case 1

Technologies:	Max. power:	Timebased AVG-Power:	Max. gain:	Min. pathloss:
GSM 850 GPRS	33.5 dBm	27.5 dBm (2Slots)	1.46 dBi	-/-
S2View (915 MHz)	20 dBm	100% Duty Cycle	4.98 dBi	-/-

Case 2 (PCS1900 GPRS with the highest output power in this band)

Technologies:	Max. power: (AVG)	Timebased AVG-Power:	Max. gain:	Min. pathloss:
PCS 1900 GPRS	30.5 dBm	24.5 dBm (2Slots)	4.69 dBi	-/-
S2View (915 MHz)	20 dBm	100% Duty Cycle	4.98 dBi	-/-

Case 3

Technologies:	Max. power: (AVG)	Timebased AVG-Power:	Max. gain:	Min. pathloss:
WCDMA 1700	24 dBm	100% Duty Cycle	-0.21 dBi	-/-
S2View (915 MHz)	20 dBm	100% Duty Cycle	4.98 dBi	-/-

Note: Maximum Power includes maximum tune-up tolerance.

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

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)

Case 1 GSM850 and S2View 915 MHz active simultaneously

	< 1500 MHz	< 1500 MHz
Technology	S2View (915 MHz)	GSM 850
P Maximum power	20 dBm	27.5 dBm
R Distance	20 cm	20 cm
G Antenna gain	4.98 dBi	1.46 dBi
S MPE limit for uncontrolled exposure	0.6 mW/cm ²	0.56 mW/cm ²
Calculated Power density:	0.063 mW/cm²	0.16 mW/cm²
Colocation:	10.44 %	27.96 %
Sum (worst case/all transmitters active):	38.40 %	

Case 2 PCS 1900 and S2View 915 MHz active simultaneously

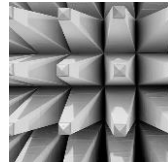
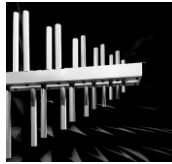
	< 1500 MHz	> 1500 MHz
Technology	S2View (915 MHz)	PCS 1900
P Maximum power	20 dBm	24.5 dBm
R Distance	20 cm	20 cm
G Antenna gain	4.98 dBi	4.69 dBi
S MPE limit for uncontrolled exposure	0.6 mW/cm ²	1.0 mW/cm ²
Calculated Power density:	0.063 mW/cm²	0.17 mW/cm²
Colocation:	10.44 %	16.51 %
Sum (worst case/all transmitters active):	26.95 %	

Case 3 WCDMA 1700 and S2View 915 MHz active simultaneously

		< 1500 MHz		> 1500 MHz
	Technology	S2View (915 MHz)		WCDMA 1700
P	Maximum power	20 dBm		24.0 dBm
R	Distance	20 cm		20 cm
G	Antenna gain	4.98 dBi		-0.21 dBi
S	MPE limit for uncontrolled exposure	0.6 mW/cm ²		1.0 mW/cm ²
	Calculated Power density:	0.063 mW/cm²		0.05 mW/cm²
	Colocation:	10.44 %		4.76 %
	Sum (worst case/all transmitters active):	15.20 %		

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:

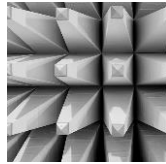
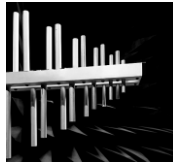
- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $4.49/f^{0.5}W$ (adjusted 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 S2View 915 MHz active simultaneously

	Technology	GSM 850		Proprietary FHSS (915 MHz)	-/-
P	Max power	27.5 dBm		20 dBm	Sum
G	Antenna gain	1.46 dBi		4.98 dBi	
S	MPE limit for uncontrolled exposure	1300 mW		1400 mW	
	Calculated output power:	787 mW		314.8 mW	
	Colocation GSM 850 + FHSS 915	60.54 %		---	<u>83.02 %</u>
	Colocation GSM 850 + FHSS 915	---		22.48 %	

Case 2 PCS 1900 and S2View 915 MHz active simultaneously

	Technology	PCS 1900		Proprietary FHSS (915 MHz)	-/-
P	Max power	24.5 dBm		20 dBm	Sum
G	Antenna gain	4.69 dBi		4.98 dBi	
S	MPE limit for uncontrolled exposure	2280 mW		1400 mW	
	Calculated output power:	830 mW		314.8 mW	
	Colocation PCS 1900 + FHSS 915	36.40 %		---	<u>58.88 %</u>
	Colocation PCS 1900 + FHSS 915	---		22.48 %	

**CETECOM™****CETECOM ICT Services***consulting - testing - certification >>>*Case 3 WCDMA 1700 and S2View 915 MHz active simultaneously

	Technology	WCDMA 1700		Proprietary FHSS (915 MHz)	-/-
P	Max power	24.0 dBm		20 dBm	Sum
G	Antenna gain	-0.21 dBi		4.98 dBi	
S	MPE limit for uncontrolled exposure	2113.3 mW		1400 mW	
	Calculated output power:	239 mW		314.8 mW	
	Colocation WCDMA 1700 + FHSS 915	11.33 %		---	<u>33.8 %</u>
	Colocation WCDMA 1700 + FHSS 915	---		22.48 %	

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