



Highest output power operation mode

GX 0202



About this document

Overview and Purpose

This document gives a description on the operation mode that produces the highest GPRS/EDGE output power for the GX 0202.

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Version History

Date	Version	Author(s)	Revision(s)	Remarks
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1 INTRODUCTION

The GX 0202 is a PCMCIA data card with 850/900/1800/1900 GSM/GPRS/EDGE and FDD1/FDD2/FDD5 UMTS/HDSPA. Because the device supports GPRS/EGPRS multislot class 12, 4 TX slots are possible.

2 CALIBRATION

Confirming the 3GPP specs we have implemented a GPRS power reduction as followed:

Maximum power for 850, GSMK and 8PSK

2 slots => 32 dBm

3 slots => 30.5 dBm

4 slots => 29 dBm

Maximum power for 1800, GSMK and 8PSK

2 slots => 29 dBm

3 slots => 29 dBm

4 slots => 29 dBm

3 REFERENCES

3GPP TS 51.010-1 version 6.5.0 Release 6

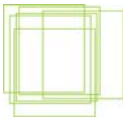
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ETSI TS 151 010-1 V6.5.0 (2005-11)

13.16.2.2

Conformance requirement

4a. From R99 onwards, the supported maximum output power for each number of uplink timeslots shall form a monotonic sequence. The maximum reduction of maximum output power from an allocation of n uplink timeslots to an allocation of $n+1$ uplink timeslots shall be equal to the difference of maximum permissible nominal reduction of maximum output power for the corresponding number of timeslots, as defined in 3GPP TS 05.05, subclause 4.1.1, sixth table.



In order to manage mobile terminal heat dissipation resulting from transmission on multiple uplink timeslots, the mobile station shall reduce its maximum output power by the following values on a per-assignment basis:

Number of timeslots in uplink assignment	Permissible nominal reduction of maximum output power, (dB)
1	0
2	0 to 3,0
3	1,8 to 4,8
4	3,0 to 6,0

The supported maximum output power for each number of uplink timeslots shall form a monotonic sequence. The maximum reduction of maximum output power from an allocation of *n* uplink timeslots to an allocation of *n*+1 uplink

timeslots shall be equal to the difference of maximum permissible nominal reduction of maximum output power for the corresponding number of timeslots, as defined in the table above.

As an exception, in case of a multislot uplink assignment, the first power control step down from the maximum output power is allowed to be in the range 0...2 dB.

4 MEASUREMENTS

4.1 Set-up

For the measurement we used a CMU200 from R&S. As we are trying to investigate the operation mode which has the highest averaged output power; the absolute results of this measurement have no meaning and should be interpreted relatively.



4.2 Results

4.2.1 GPRS 850

Lowest channel	Power (dBm)				Power (mW)				Total average power
	n -1	n	n +1	n +2	n -1	n	n +1	n +2	
1TX		32,0				1584,9			1584,9
2TX	31,8	31,7			1513,6	1479,1			2992,7
3TX	30,2	30,1	30,1		1047,1	1023,3	1023,3		3093,7
4TX	28,6	28,5	28,5	28,5	724,4	707,9	707,9	707,9	2848,3

Mid channel	Power (dBm)				Power (mW)				Total average power
	n -1	n	n +1	n +2	n -1	n	n +1	n +2	
1TX		32,0				1584,9			1584,9
2TX	31,8	31,7			1513,6	1479,1			2992,7
3TX	30,1	30,0	30,0		1023,3	1000,0	1000,0		3023,3
4TX	28,6	28,5	28,5	28,5	724,4	707,9	707,9	707,9	2848,3

Highest Channel	Power (dBm)				Power (mW)				Total average power
	n -1	n	n +1	n +2	n -1	n	n +1	n +2	
1TX		31,9				1548,8			1548,8
2TX	31,8	31,7			1513,6	1479,1			2992,7
3TX	30,0	30,0	30,0		1000,0	1000,0	1000,0		3000,0
4TX	28,5	28,5	28,5	28,5	707,9	707,9	707,9	707,9	2831,8



4.2.2 GPRS 1900

	Power (dBm)				Power (mW)				
Lowest channel	n -1	n	n +1	n +2	n -1	n	n +1	n +2	Total average power
1TX		28,7				741,3			741,3
2TX	28,6	29,4			724,4	871,0			1595,4
3TX	28,4	28,4	28,3		691,8	691,8	676,1		2059,7
4TX	28,2	28,13	28,0	28,1	660,7	650,1	631,0	645,7	2587,4

	Power (dBm)				Power (mW)				
Mid channel	n -1	n	n +1	n +2	n -1	n	n +1	n +2	Total average power
1TX		28,6				724,4			724,4
2TX	28,4	28,9			691,8	776,2			1468,1
3TX	28,2	28,2	28,2		660,7	660,7	660,7		1982,1
4TX	28,1	28,0	28,0	28,0	645,7	631,0	631,0	631,0	2538,5

	Power (dBm)				Power (mW)				
Highest Channel	n -1	n	n +1	n +2	n -1	n	n +1	n +2	Total average power
1TX		28,5				707,9			707,9
2TX	28,5	28,4			707,9	691,8			1399,8
3TX	28,3	27,8	27,8		676,1	602,6	602,6		1881,2
4TX	28,1	28,2	28,1	28,1	645,7	660,7	645,7	645,7	2597,7



5 CONCLUSION

We can clearly conclude that the worst case conditions for GPRS/EGPRS 850 MHz are in the operation mode with 3 TX slots, due to the GPRS/EGPRS power reduction we have implemented. For the 1900 MHz we have not implemented such a reduction and therefore 4TX slots is the operation mode with the highest average output power.

Consequently SAR measurements with the GX 0202 should be performed with 3TX on 850 band and 4TX slots on 1900 band.