Correction Physique 2011

1)

E = 20 log 10 (Dmax / 10^-6)
= 20 log 10(3 sqrt(10P) * 10^6 / d)
= 120 + 20 log 10(3 * sqrt(10P) / d)

2)

Att = 10 log (pe / pr)
= 10 log ($16pi^2d^2$ / GeGr * $lambda^2$) = 10 log ($16pi^2d^2$ / $lambda^2$)
= 10 log ($16 pi^2 d^2$ / (c^2/F^2))
= 10 log ($16 pi^2$) + 10 log(d^2) – 10 log(c^2) + 10 log(F^2)
= 21.98 – 109.54 + 10 log (d^2F^2)
= -88 + 10 log (d^2F^2)

3)

UPLINK
Att = -88 + 10log(450^2) = -88 +53 = -35
DOWNLINK
Att = -88 + 10log(900^2) = -88 +59 = -29

4)

	UPLINK	Downlink
sensibilité	-110 dbm	-104
pertes câbles	+ 3 db	+ 0
duplexer	+ 1 db	+ 0
gain antenne	- 18 db	- -3
sensibilité antenne =	-124 dbm	- 101 db
marge + 3db –>	-121dbm	+3 db → -98db
puissance Tx	30dbm	40 dbm
Pertes câbles	- 0	- 3
Duplexer	- 0	- 1
combiner	- 0	- 0
Gain antenne	+ -3	+ 18
Pire	27 dbm	54 dbm
ATT =	27 + 121 = 148 db	54 + 98 = 152

4.1)

ATTmax = 148 db

4.2)

K1 = 69.55 +26.16*log(F) -13.82 * log(hb) = 126.419
K2 = 44.9 -6.55log(hb)*log(d) = 35.224 log(d)

=> log(d) = (ATT – K1) / (K2/log(d))
= (148 – 126.119) / 35.224
= 0.6212
d = 10^0.6212 = 4.018 km

4.3)

$a(hm) = 2\,[\log(900/28)]^2 + 5.4 = 9.94$

$K1' = K1 - a(hm) = 126.419 - 9.94 = 116.419$

$d = 10^{((148 - 116.419) / 35.224)} = 10^{0.897} = 7.88$ km

4.4)

	UPLINK	DOWNLINK
sensibilté + nouvelle marge(+10)	-111dbn	-88db
	ATT=27+111= 138dbm	54+88=142dbm

ATTmax = 138dbm

$d = 10^{((138 - 116.419) / 35.224)} = 10^{0.61} = 4.07$ Km