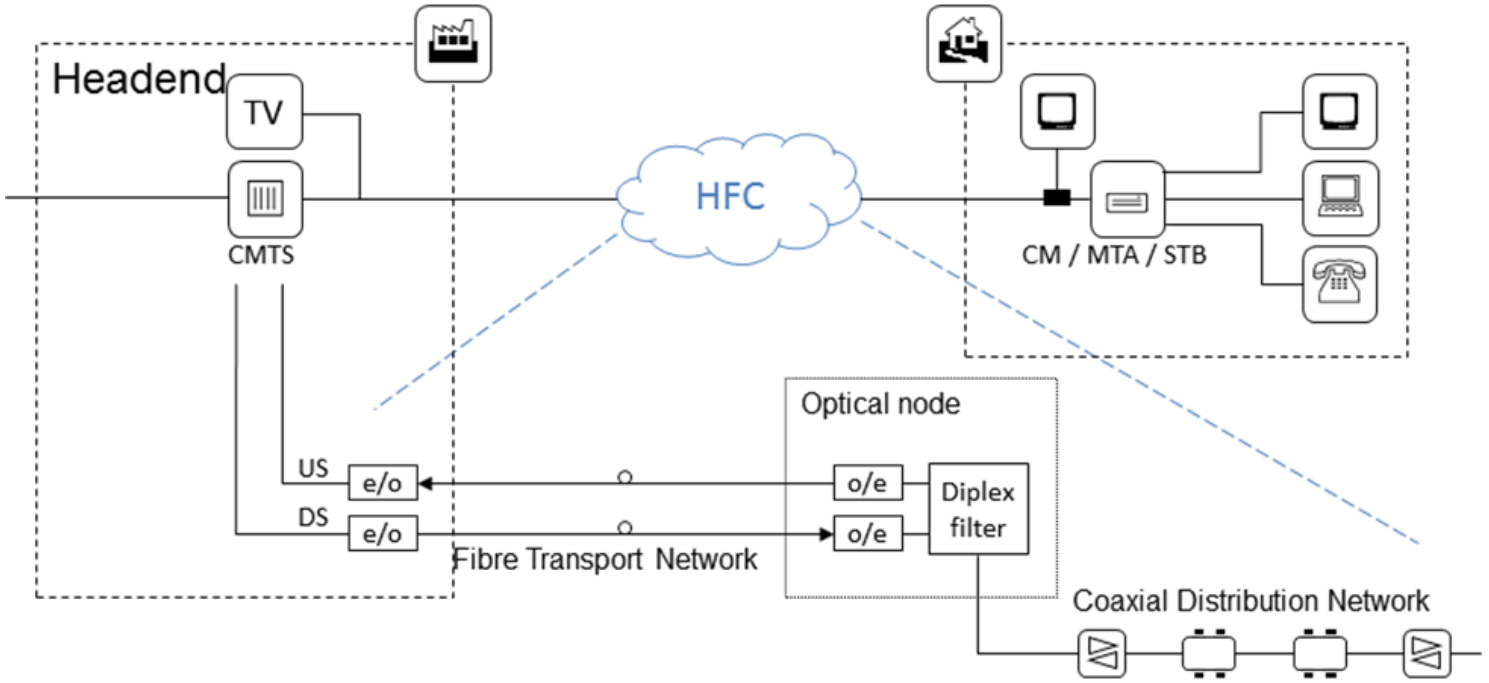
Contributing to Draft ECC Mandate to Develop Harmonised Technical Conditions for the 694 – 790 MHz Frequency Band

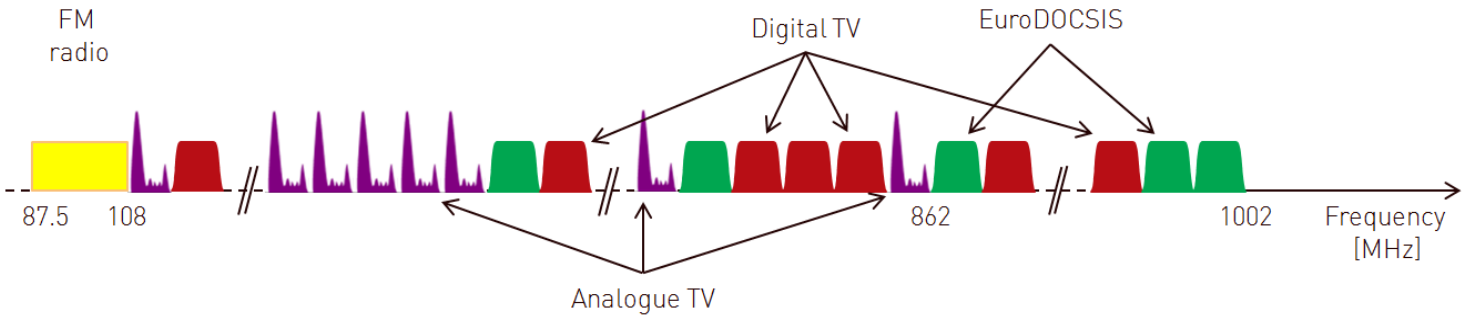
Cable Network use case as analysis describing cable network services from a perspective to afford protection from new radio services in 700 MHz band.

April 2014

Cable Europe

Topology and Spectral Overview





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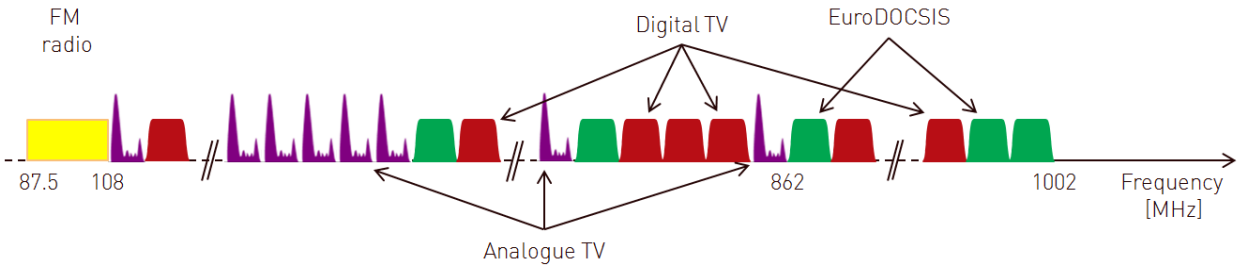
Signal Characteristics and Interference Thresholds



Signal type	Min level [dBmV/8MHz]	Typical level [dBmV/8MHz]	Max level [dBmV/8MHz]	Maximum tolerated noise level [dBmV/8MHz]
Analogue TV (PAL)	-3	5	17	-49
DVB-C 64 QAM Digital Television	-13	-4	7	-39
DVB-C 256 QAM Digital Television	-6	0	14	-38
DVB-C 64 QAM TV and EuroDOCSIS	-17	-4	13	-17 – 25.5 dB SNR = -42.5
DVB-C 256 QAM TV and EuroDOCSIS	-13	0	17	-13 – 34,5 dB SNR= -47.5

EN 60728-1
EN 302 878-2

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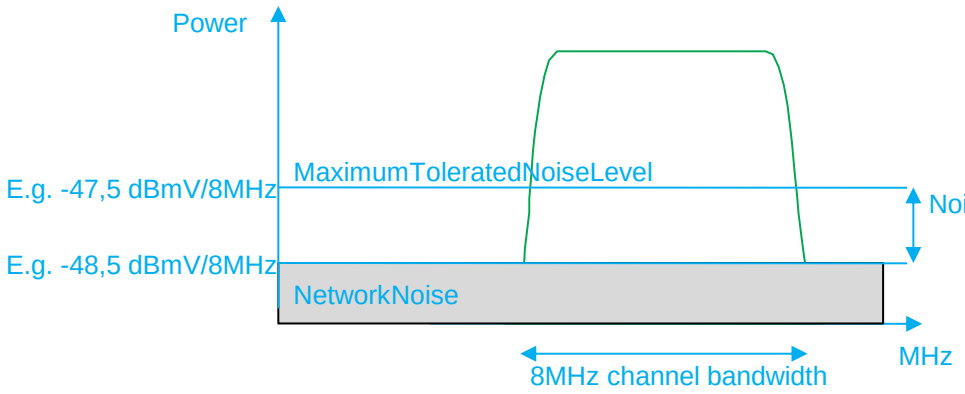
General Calculation Method
Interference on RF Cable Systems

Noise margin [dB]	C_{noise_margin} [dB]
0,5	9,6
1	6,9
2	4,3
3	3,0
4	2,2
7	1,0
10	0,5



Noise margin gap to be filled with acceptable interference

E.g.: The 1 dB noise marging between
-47,5 dBmV/8MHz MaximumToleratedNoise and
-48,5 dBmV/8MHz NetworkNoise
will be 'filled' by adding -54,4 dBmV/8MHz induced by a NRS transmitter which is 6,9 dB below the original MaximumToleratedNoise.

$$Network\ Noise\,[\mathrm{W}] + NRS\ Interference\,[\mathrm{W}] < Maximum\ Tolerated\ Noise\ Level\,[\mathrm{W}]$$

$$NRS\ Interference\,[\mathrm{dBmV}] < Maximum\ Tolerated\ Noise\ Level\,[\mathrm{dBmV}] - C_{noise\_margin}\,[\mathrm{dB}]$$

-54,4 dBmV/8MHz -47,5 dBmV/8MHz -6,9

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General Calculation Method Interference on RF Cable Systems

$$U_{induced}[\mathrm{dBmV}] = P_t[\mathrm{dBm}] - 20\log_{10}(r[\mathrm{m}]) - 20\log_{10}(f[\mathrm{MHz}]) - a_b - a_s + G_t + 78.34$$

- a_s = shielding effectiveness
  - Passive equipment norm
  - Coaxial cable norm
  - Device shielding effectiveness
  - Industry accepted shielding effectiveness
    - 55 dB 65 dB 75 dB

EN 50083-2

EN 50117-2-5

EN 55020/CISPR20

ATRT PG ESKM

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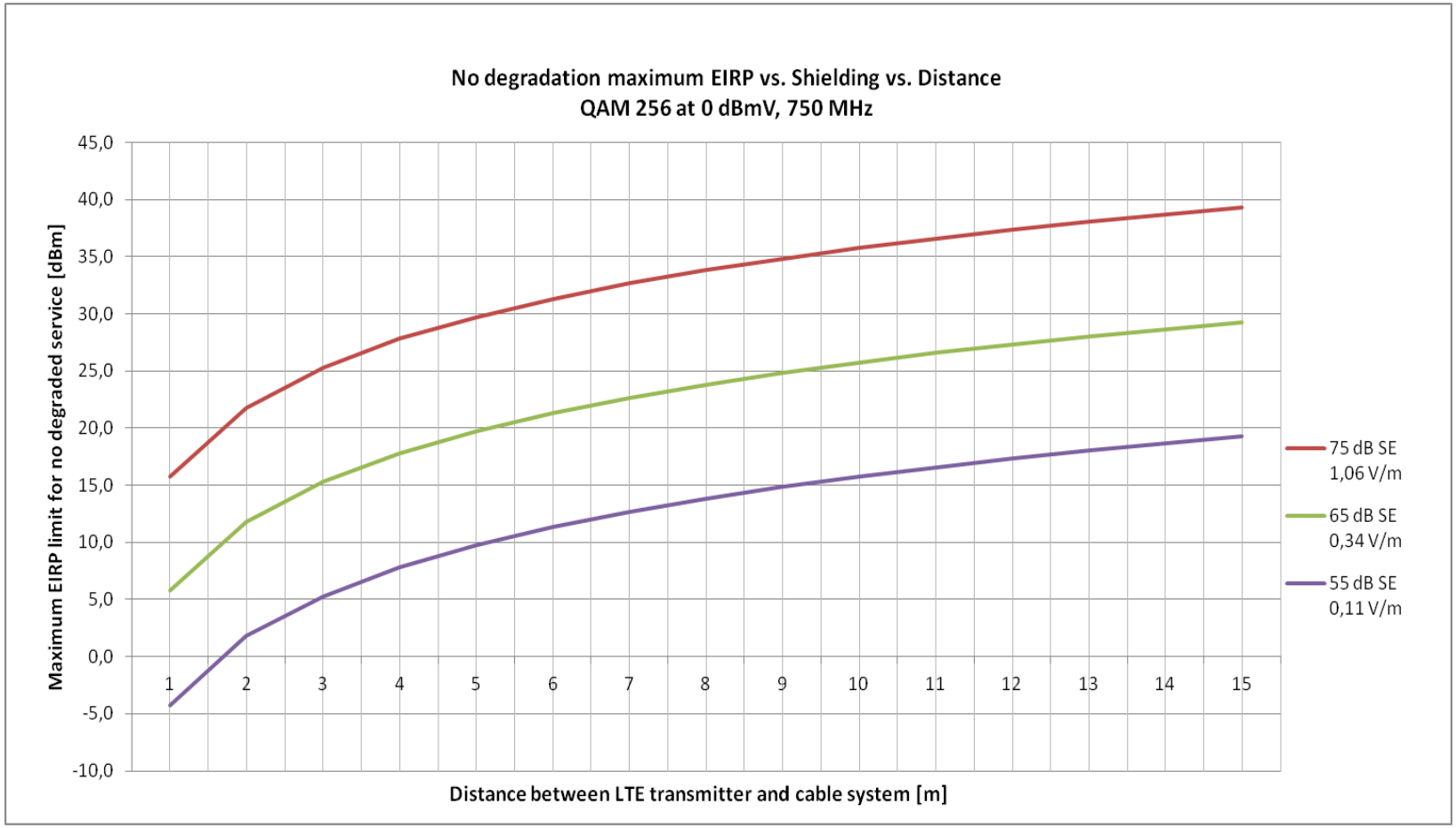
Case I: Typical Rx level vs. Shielding effectiveness

$a_b = 0$ dB
$G_t = 0$ dB



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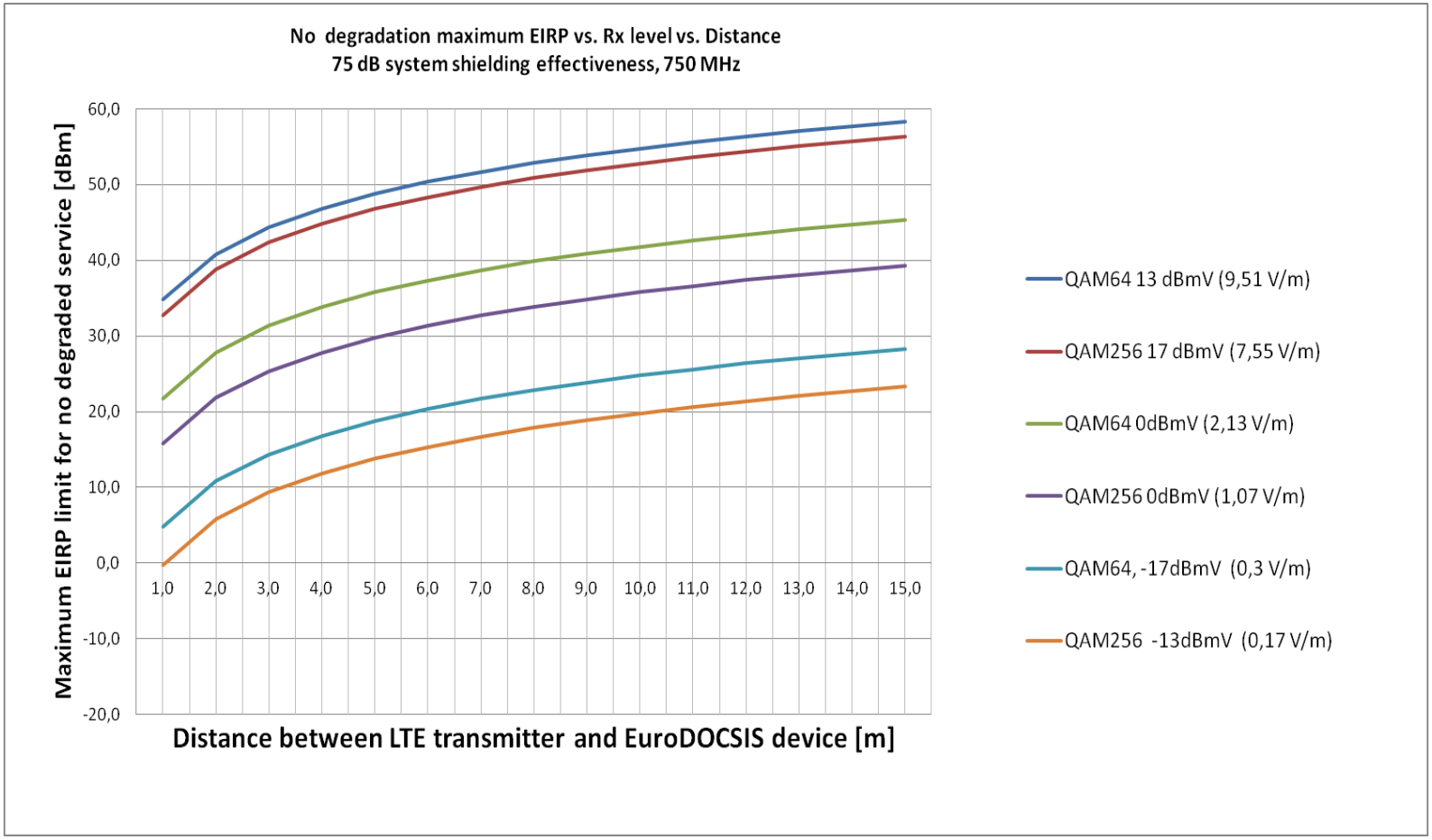
Case II: High shielding v.s. Receive level

$a_b = 0$ dB
$G_t = 0$ dB



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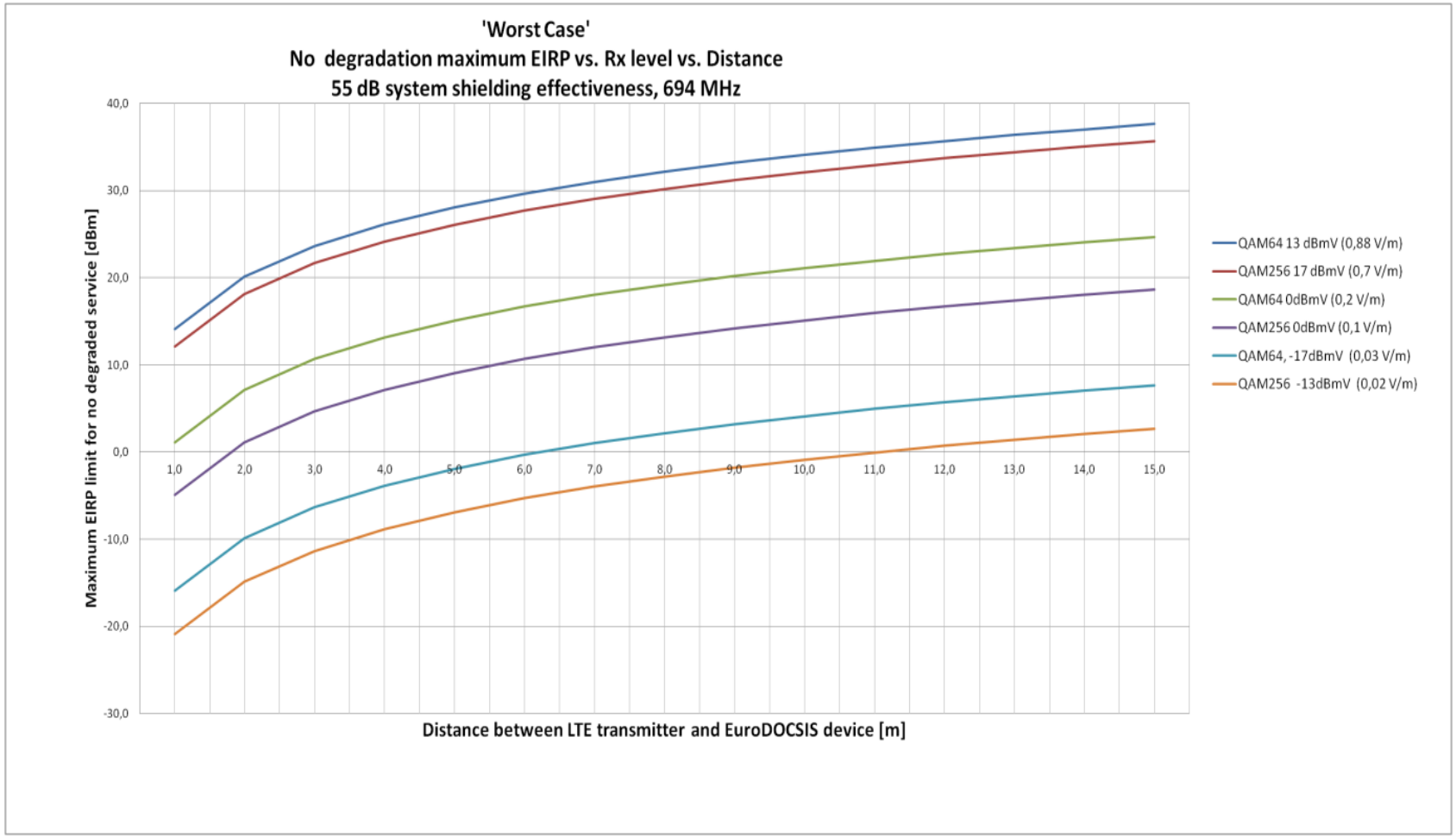
Case III: Worst Case - Low shielding

a_b = 0 dB
G_t = 0 dB



Case III: Worst Case - Low shielding

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Thank you for your attention

- **Any questions?**

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