

Impossibility Results

The best can be found using hamming bound proof: -

$$2^k \leq \frac{2^n}{\sum_{f=0}^{\frac{d-1}{2}} \binom{n}{f}}$$
$$2^k (\sum_{f=0}^{\frac{d-1}{2}} \binom{n}{f}) \leq 2^n$$

For 15: -

$$2^{10} \times (20C_0 + 20C_1 + 20C_2 + 20C_3 + 20C_4 + 20C_5) \leq 2^{20}$$
$$2^{10} \times (1 + 20 + 190 + 1140 + 4845 + 15504) \leq 1,048,576$$
$$1024 \times (21,700) \leq 1,048,576$$
$$22,220,800 \not\leq 1,048,576$$

Possible

For 16: -

$$2^{10} \times (1 + 20 + 190 + 1140 + 4845) \leq 1,048,576$$
$$1024 \times (6,196) \leq 1,048,576$$
$$6,344,704 \not\leq 1,048,576$$

Possible

For 17: -

$$2^{10} \times (1 + 20 + 190 + 1140) \leq 1,048,576$$
$$1024 \times (1,351) \leq 1,048,576$$
$$1,383,424 \not\leq 1,048,576$$

Possible

For 18: -

$$2^{10} \times (1 + 20 + 190) \leq 1,048,576$$
$$1024 \times (1,211) \leq 1,048,576$$
$$216,064 \leq 1,048,576$$

Impossible

The best Possible result is 17.