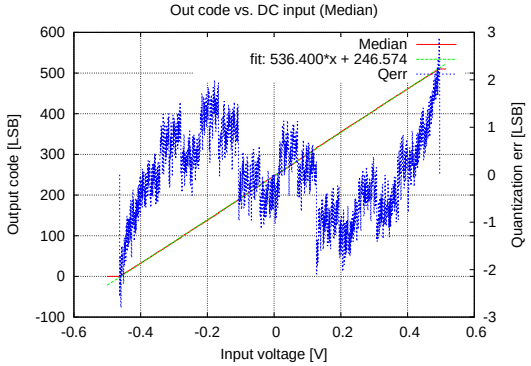
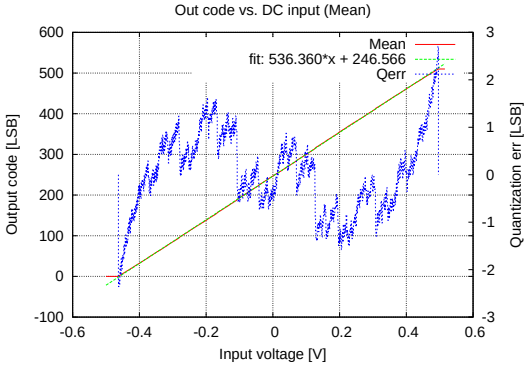
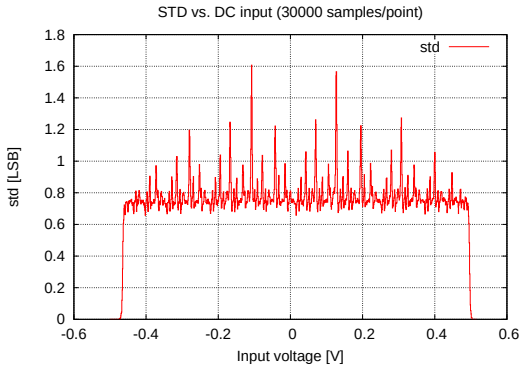
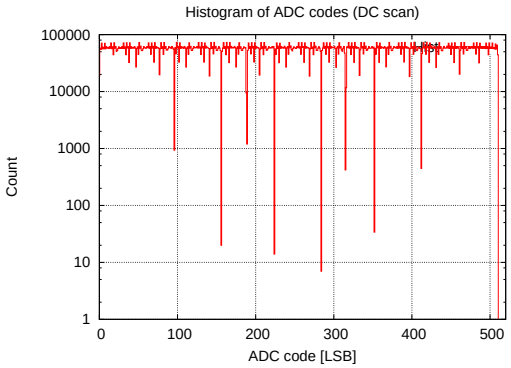
# 1 Frequency changes

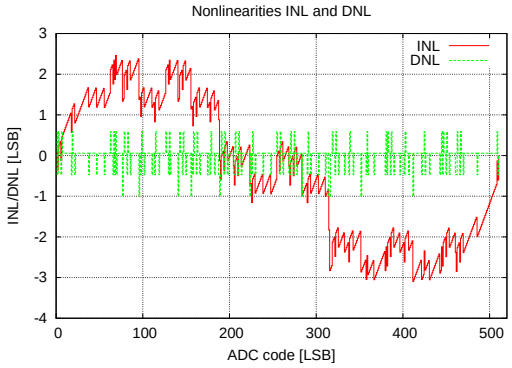
## 1.1 $f = 100$ kHz

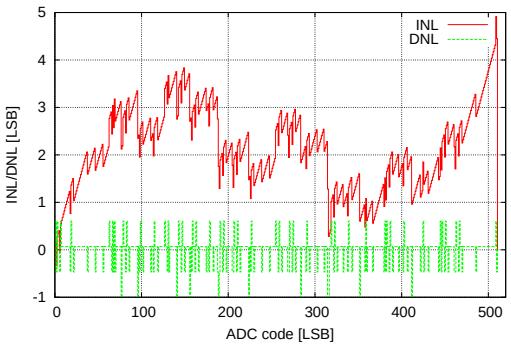


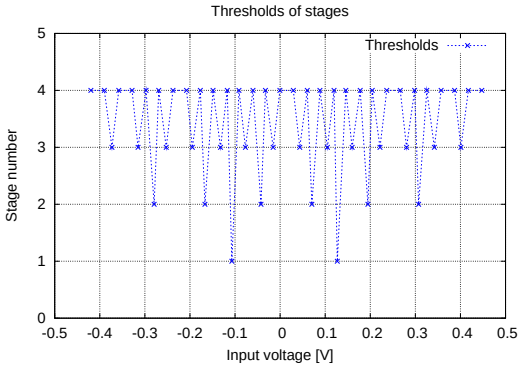



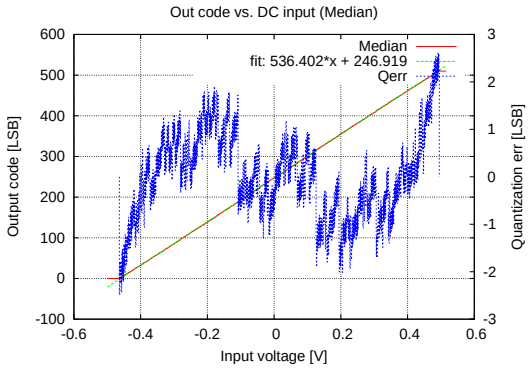

| Type | ENOB |
|---|---|
| XY | 6.39 |
| Fit | 5.99 |

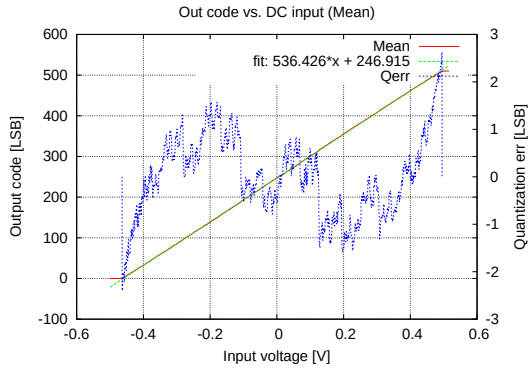
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1070 |
| $+1/4\,V_{ref}$ | 0.1268 |

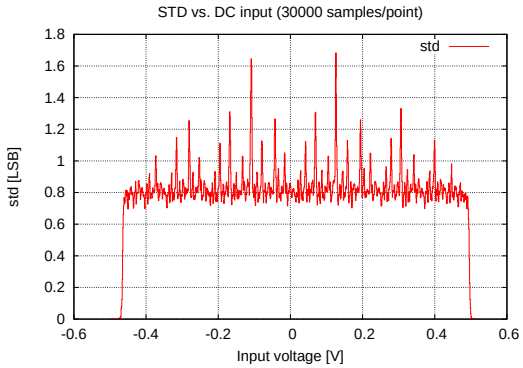
| Missing Code | Number of apperence |
|---|---|
| 77 | 19696 |
| 96 | 933 |
| 141 | 18694 |
| 156 | 20 |
| 189 | 1198 |

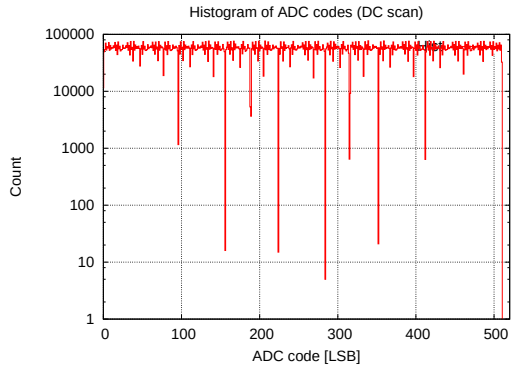
| Missing Code | Number of apperence |
|---|---|
| 224 | 14 |
| 284 | 7 |
| 315 | 421 |
| 316 | 11702 |
| 352 | 34 |
| 412 | 447 |

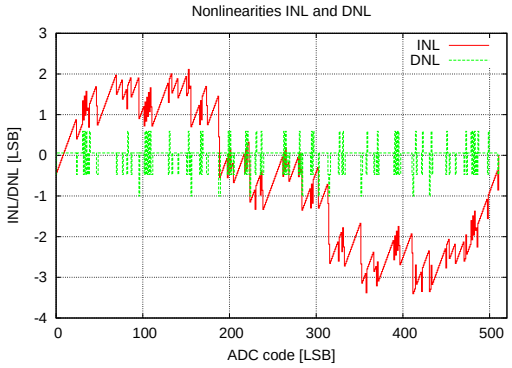
## 1.2 $f = 1$ MHz

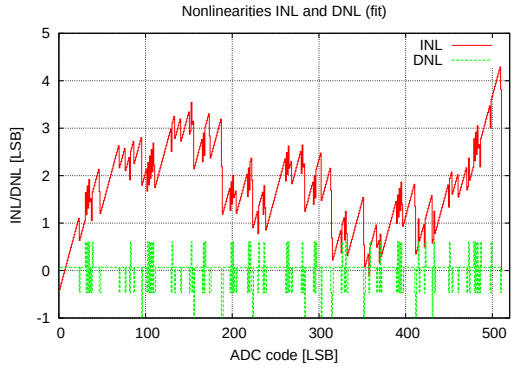


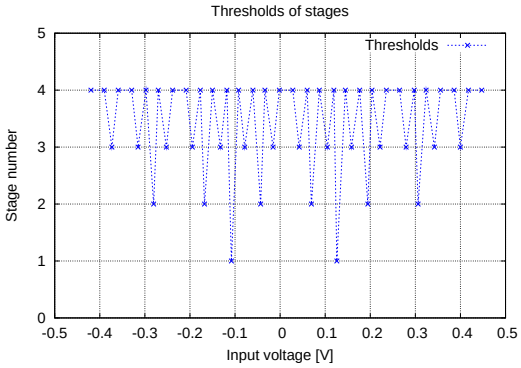



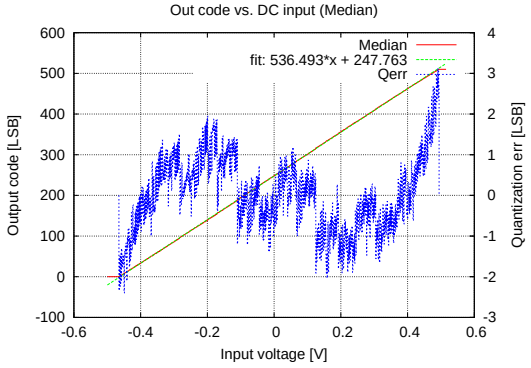

| Type | ENOB |
|---|---|
| XY | 6.41 |
| Fit | 6.22 |

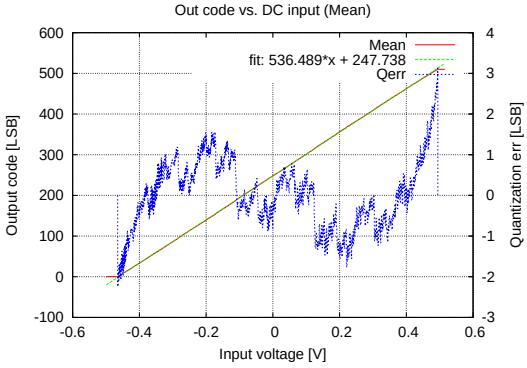
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1081 |
| $+1/4\,V_{ref}$ | 0.1258 |

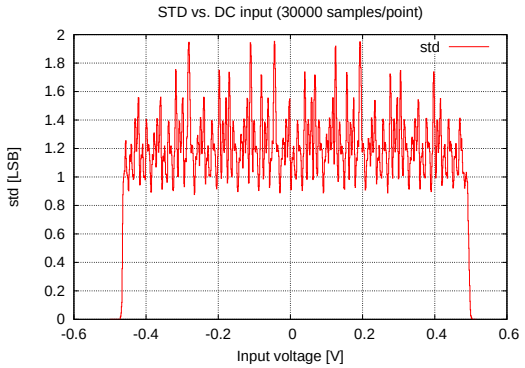
| Missing Code | Number of apperence |
|---|---|
| 96 | 1158 |
| 156 | 16 |
| 188 | 5327 |
| 189 | 3649 |
| 224 | 15 |

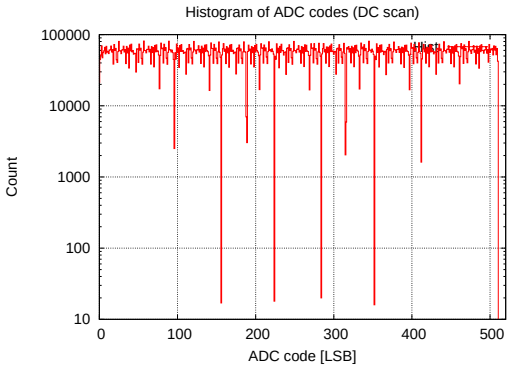
| Missing Code | Number of apperence |
|---|---|
| 284 | 5 |
| 303 | 26184 |
| 315 | 644 |
| 352 | 21 |
| 412 | 636 |
| 431 | 25993 |

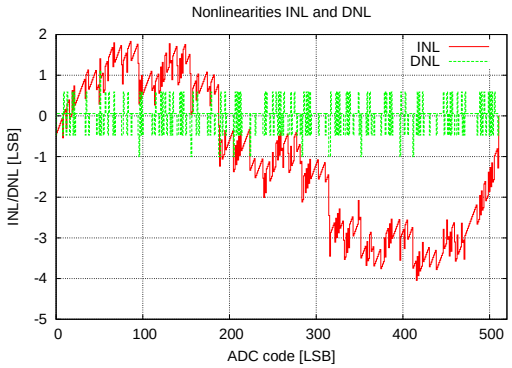
## 1.3 f = 3 MHz

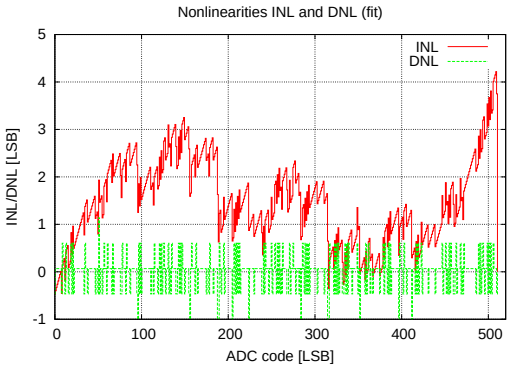


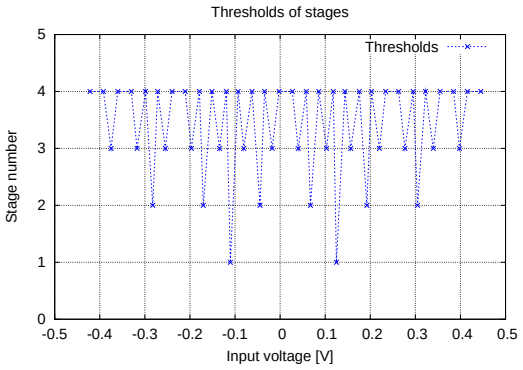





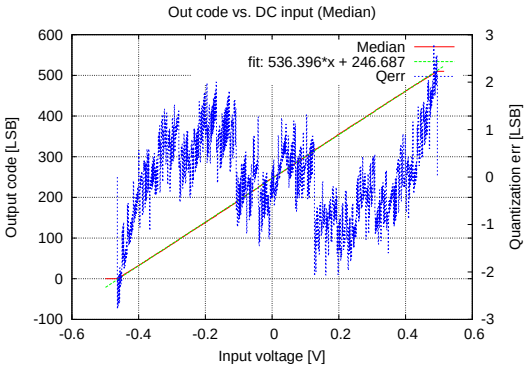

| Type | ENOB |
|---|---|
| XY | 6.16 |
| Fit | 6.41 |

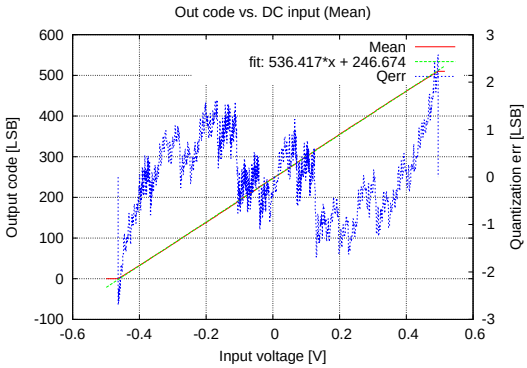
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1103 |
| $+1/4\,V_{ref}$ | 0.1249 |

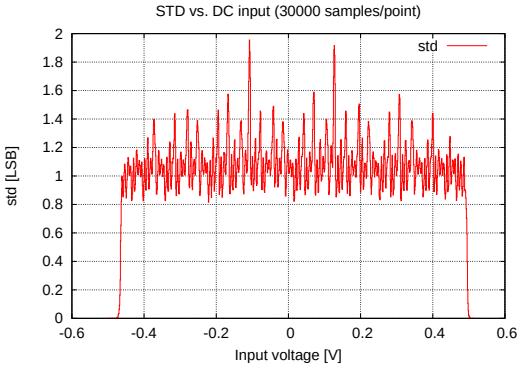
| Missing Code | Number of apperence |
|---|---|
| 96 | 2507 |
| 156 | 17 |
| 188 | 6994 |
| 189 | 3034 |
| 205 | 16867 |
| 224 | 18 |

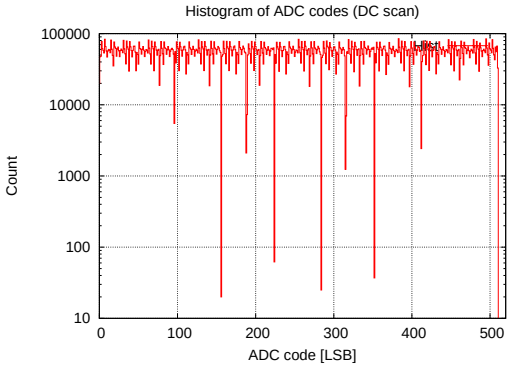
| Missing Code | Number of apperence |
|---|---|
| 284 | 20 |
| 315 | 2044 |
| 316 | 5919 |
| 352 | 16 |
| 397 | 16799 |
| 412 | 1614 |

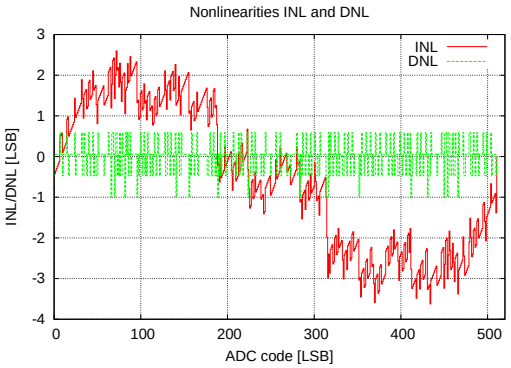
## 1.4 $f = 5$ MHz

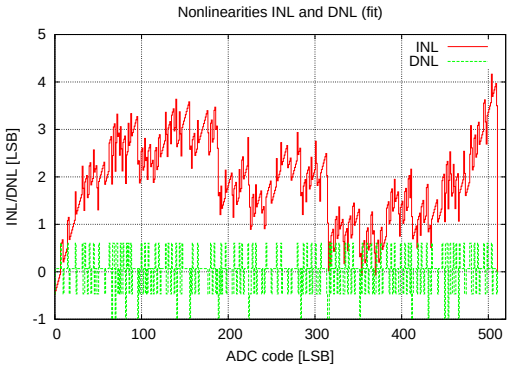


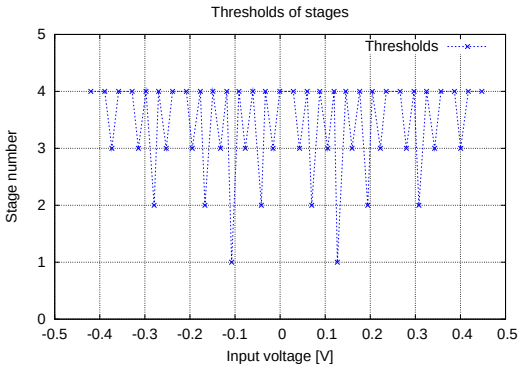





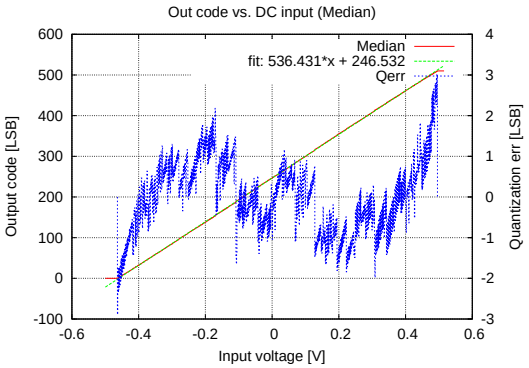

| Type | ENOB |
|---|---|
| XY | 6.31 |
| Fit | 6.13 |

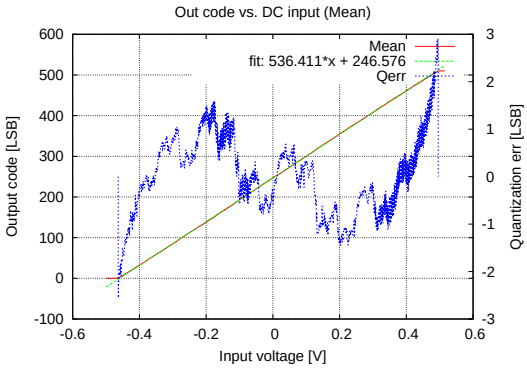
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1076 |
| $+1/4\,V_{ref}$ | 0.1269 |

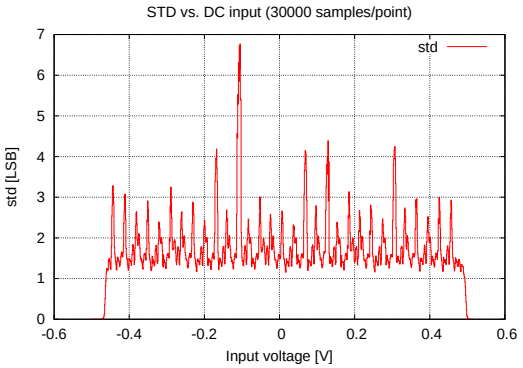
| Missing Code | Number of apperence |
|---|---|
| 66 | 37285 |
| 70 | 30082 |
| 82 | 36801 |
| 96 | 5467 |
| 141 | 18466 |
| 156 | 20 |
| 189 | 7288 |
| 224 | 62 |

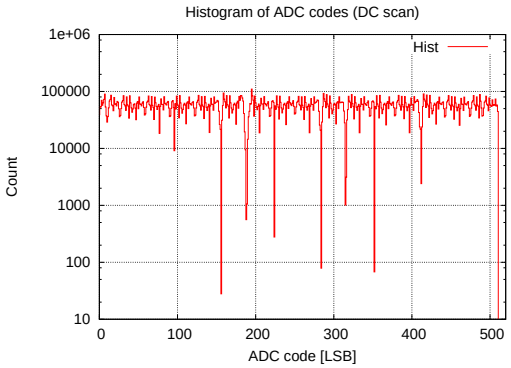
| Missing Code | Number of apperence |
|---|---|
| 284 | 25 |
| 315 | 1239 |
| 316 | 6973 |
| 352 | 37 |
| 412 | 2422 |
| 431 | 27182 |
| 450 | 36405 |
| 454 | 29890 |
| 466 | 36364 |

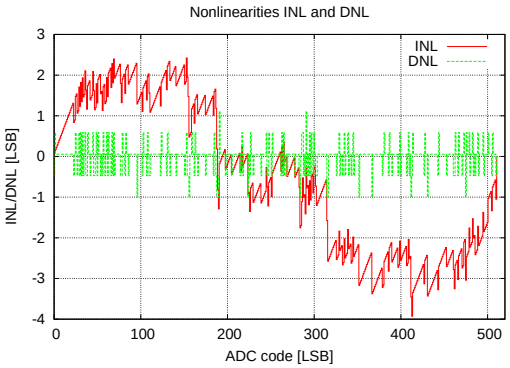
## 1.5 $f = 8$ MHz

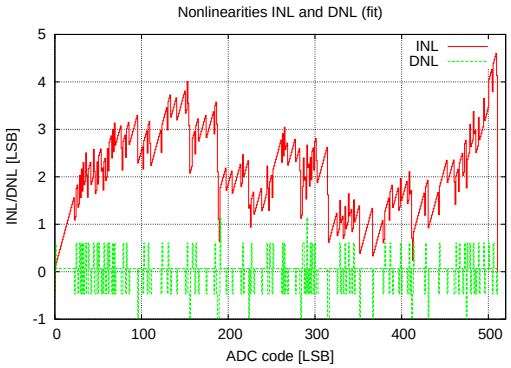


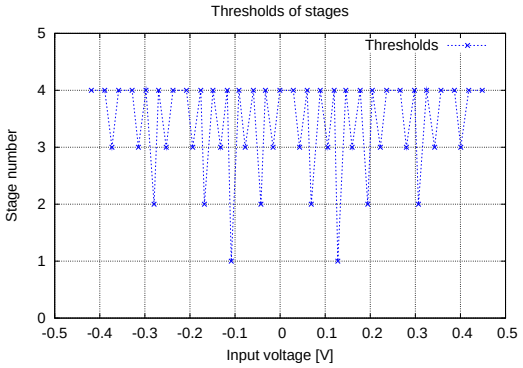





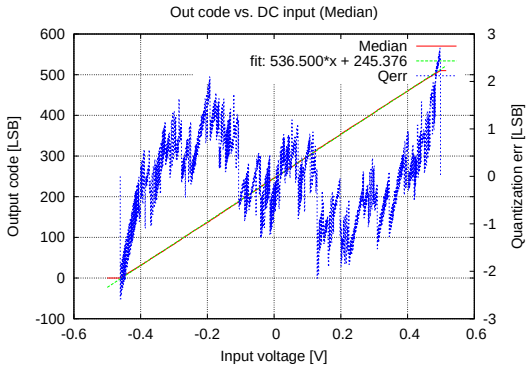

| Type | ENOB |
|---|---|
| XY | 6.28 |
| Fit | 6.01 |

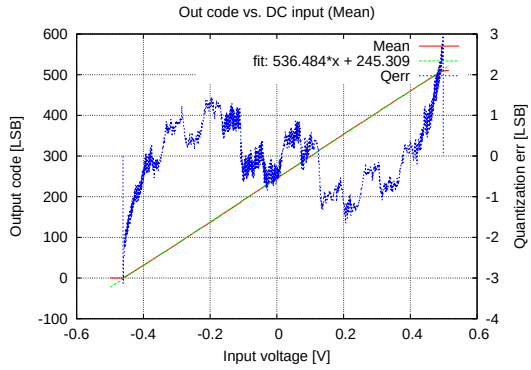
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1084 |
| $+1/4\,V_{ref}$ | 0.1279 |

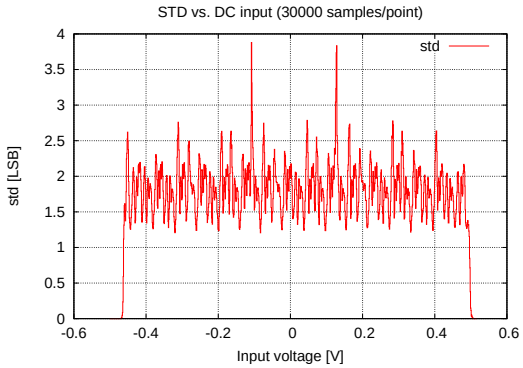
| Missing Code | Number of apperence |
|---|---|
| 96 | 9102 |
| 156 | 28 |
| 188 | 560 |
| 189 | 1057 |
| 224 | 278 |
| 284 | 79 |

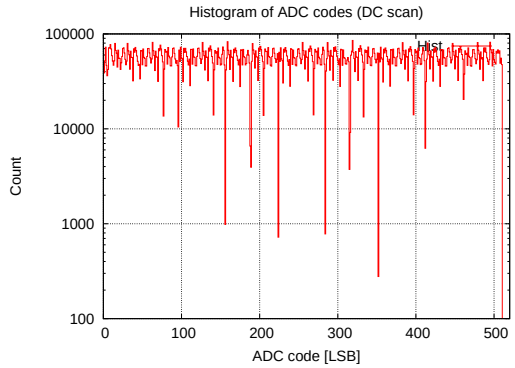
| Missing Code | Number of apperence |
|---|---|
| 315 | 1012 |
| 316 | 3127 |
| 352 | 68 |
| 367 | 25867 |
| 412 | 2405 |
| 431 | 26757 |
| 475 | 38632 |

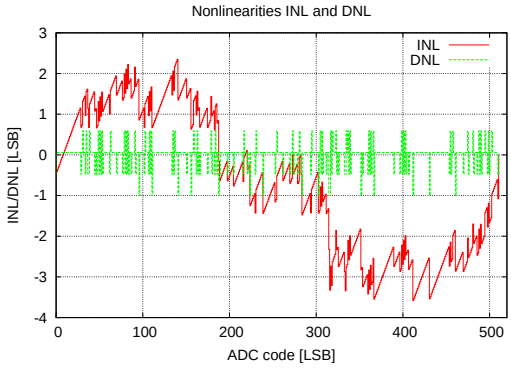
## 1.6 $f = 10$ MHz

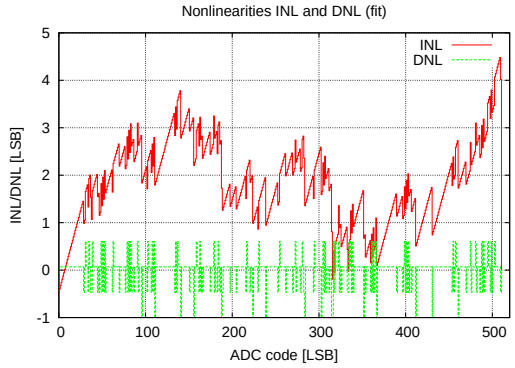


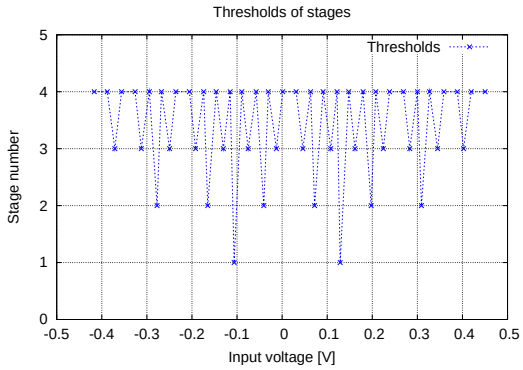



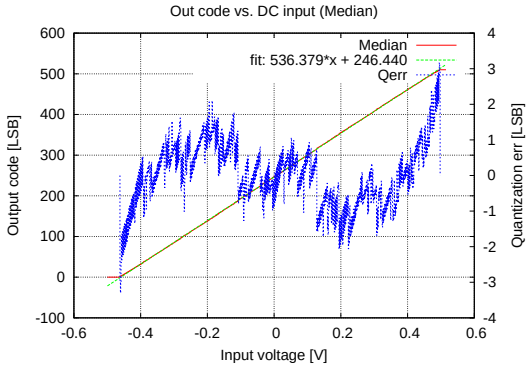

| Type | ENOB |
|---|---|
| XY | 6.30 |
| Fit | 6.16 |

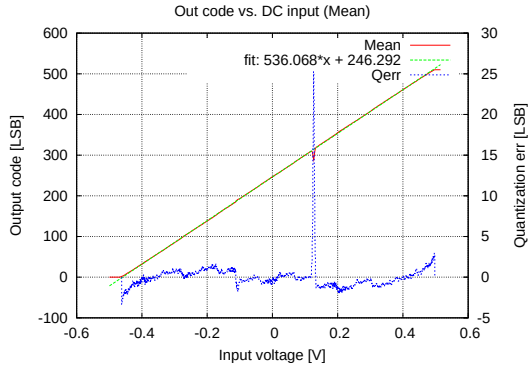
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1064 |
| $+1/4\,V_{ref}$ | 0.1289 |

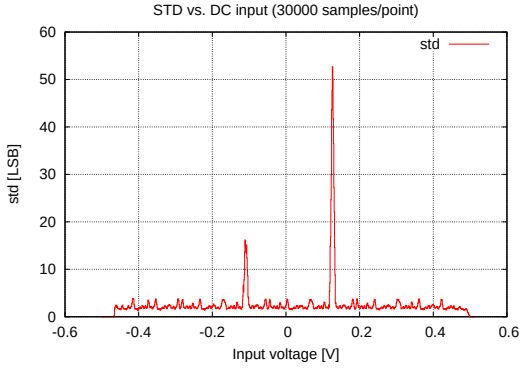
| Missing Code | Number of apperence |
|---|---|
| 96 | 10464 |
| 111 | 28505 |
| 141 | 13973 |
| 156 | 984 |
| 188 | 6588 |
| 224 | 722 |
| 239 | 28092 |
| 284 | 782 |

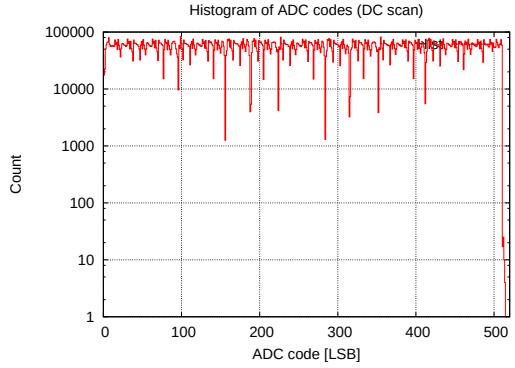
| Missing Code | Number of apperence |
|---|---|
| 303 | 27977 |
| 315 | 3740 |
| 316 | 9177 |
| 352 | 278 |
| 367 | 28110 |
| 412 | 6239 |
| 431 | 28039 |
| 461 | 20376 |

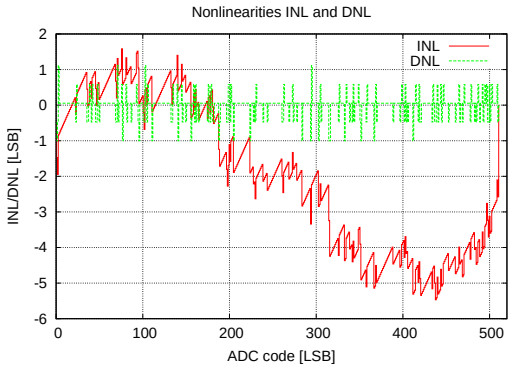
## 1.7 $f = 12$ MHz

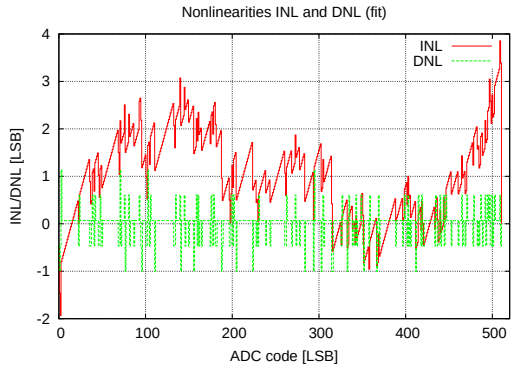


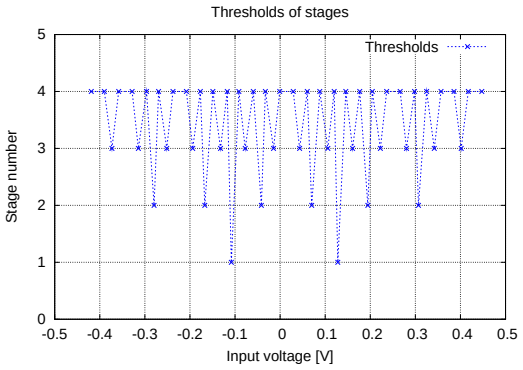





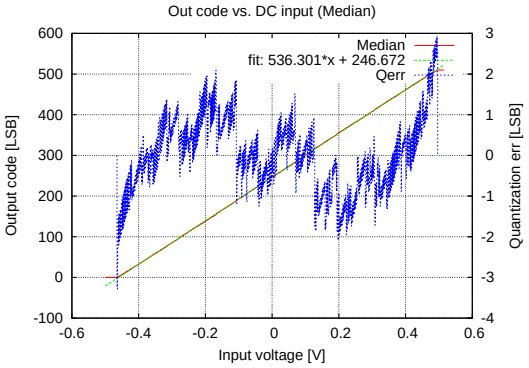

| Type | ENOB |
|---|---|
| XY | 5.68 |
| Fit | 6.75 |

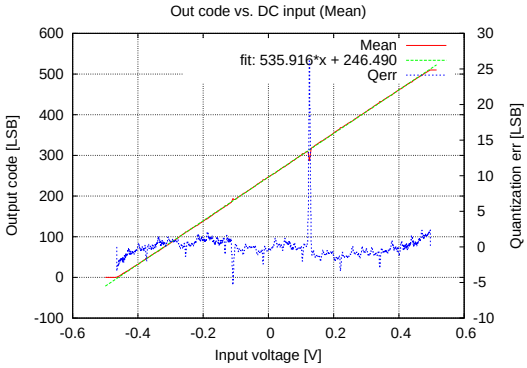
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1082 |
| $+1/4\,V_{ref}$ | 0.1280 |

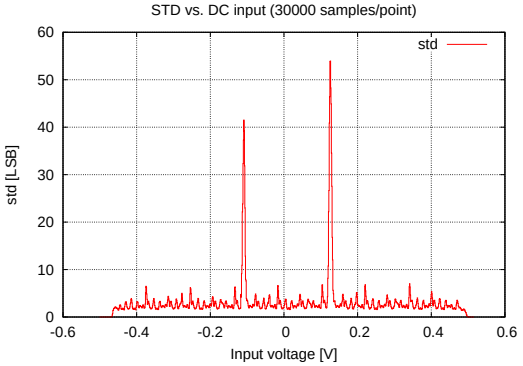
| Missing Code | Number of apperence |
|---|---|
| 1 | 17574 |
| 77 | 15174 |
| 96 | 9640 |
| 111 | 26471 |
| 141 | 15271 |
| 156 | 1259 |
| 188 | 3987 |
| 205 | 14752 |
| 224 | 4173 |

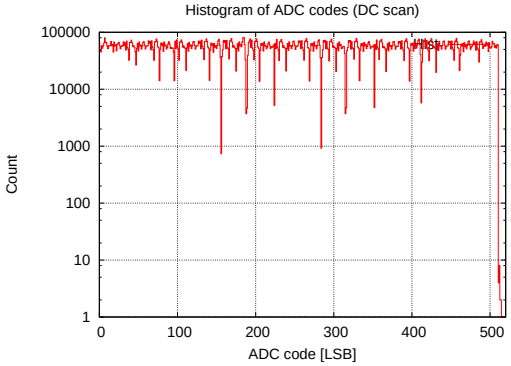
| Missing Code | Number of apperence |
|---|---|
| 284 | 1294 |
| 294 | 29657 |
| 303 | 25680 |
| 315 | 3250 |
| 316 | 7389 |
| 333 | 15250 |
| 352 | 3843 |
| 367 | 26489 |
| 412 | 5524 |

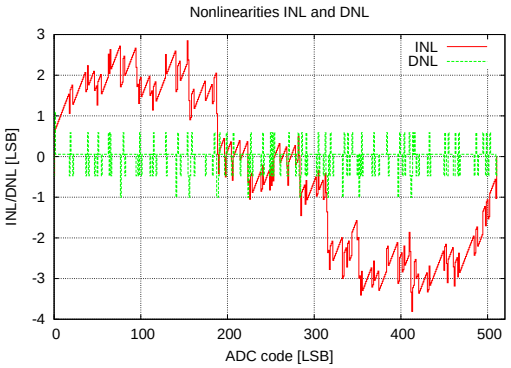
## 1.8 $f = 13$ MHz

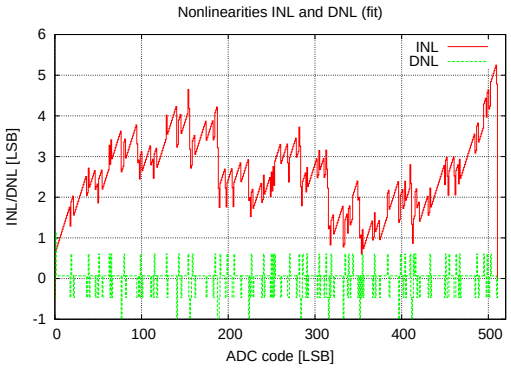


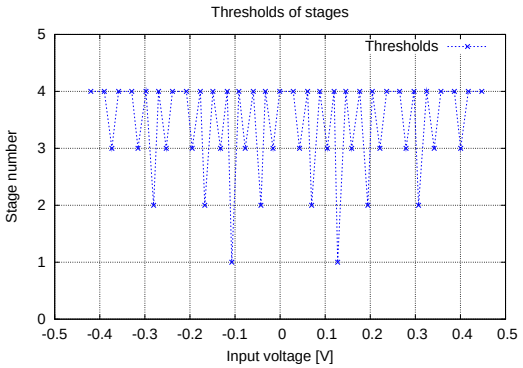





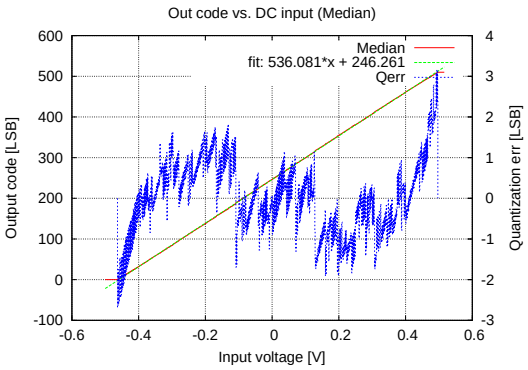

| Type | ENOB |
|---|---|
| XY | 6.22 |
| Fit | 5.76 |

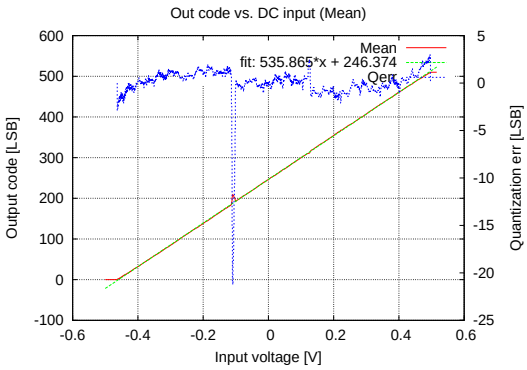
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1073 |
| $+1/4\,V_{ref}$ | 0.1277 |

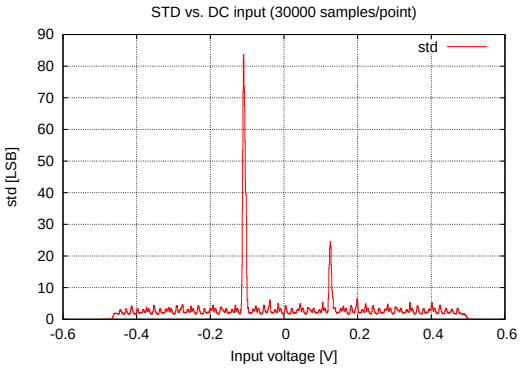
| Missing Code | Number of apperence |
|---|---|
| 77 | 14113 |
| 141 | 14321 |
| 156 | 739 |
| 188 | 3717 |
| 189 | 4682 |
| 224 | 5213 |

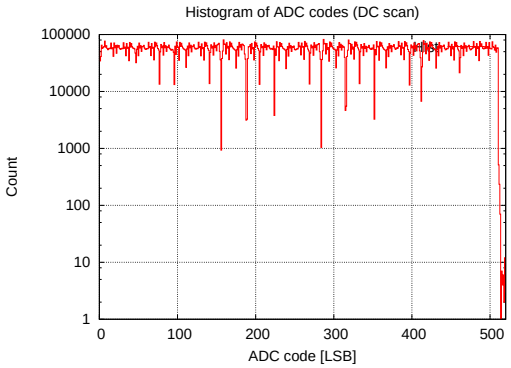
| Missing Code | Number of apperence |
|---|---|
| 284 | 924 |
| 316 | 4735 |
| 333 | 14113 |
| 352 | 4755 |
| 397 | 13859 |
| 412 | 5766 |

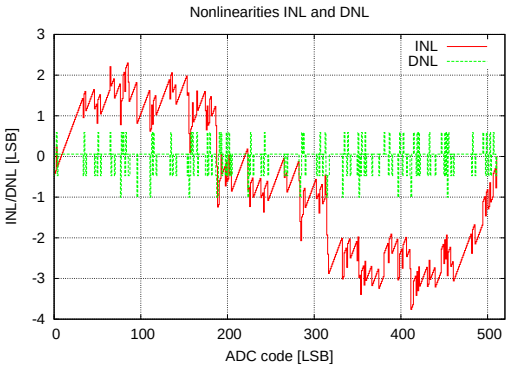
## 1.9 $f = 14$ MHz

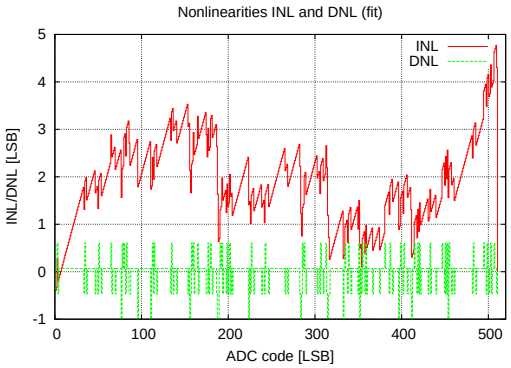


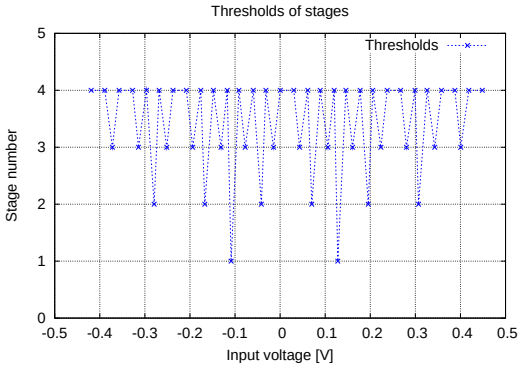





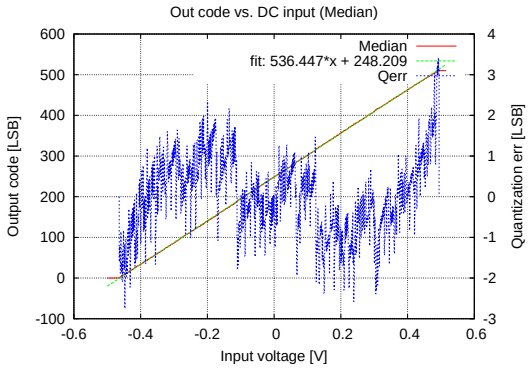

| Type | ENOB |
|---|---|
| XY | 6.34 |
| Fit | 6.13 |

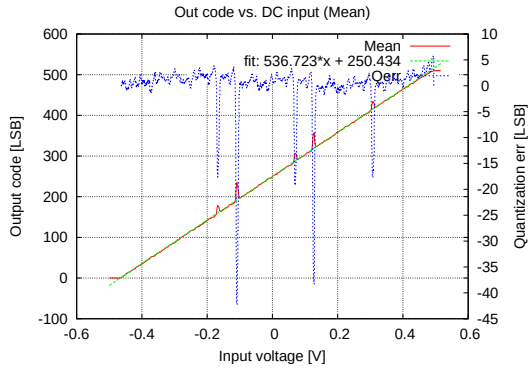
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1086 |
| $+1/4\,V_{ref}$ | 0.1279 |

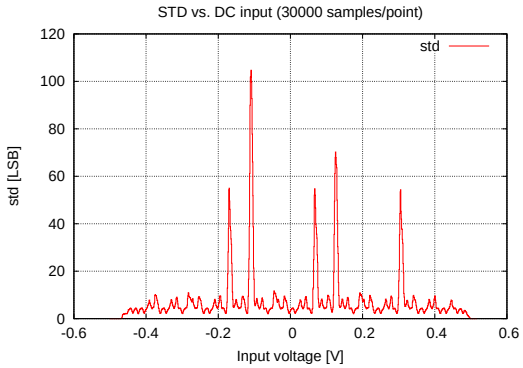
| Missing Code | Number of apperence |
|---|---|
| 77 | 13425 |
| 96 | 13211 |
| 111 | 26501 |
| 156 | 932 |
| 188 | 3132 |
| 189 | 3255 |
| 224 | 3785 |

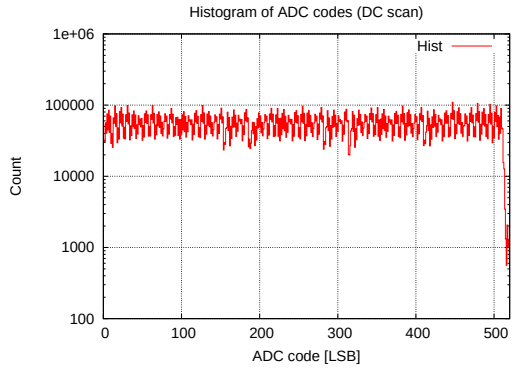
| Missing Code | Number of apperence |
|---|---|
| 284 | 1043 |
| 315 | 4657 |
| 333 | 13701 |
| 352 | 3257 |
| 397 | 12923 |
| 412 | 6722 |
| 454 | 35613 |

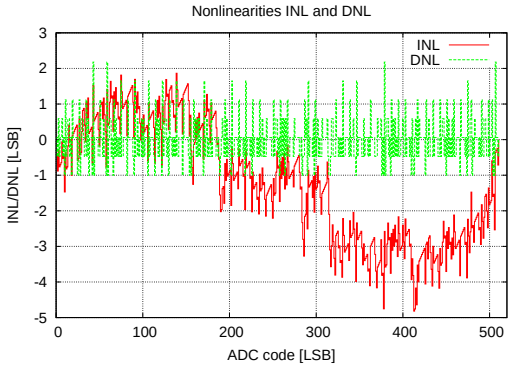
## 1.10 $f = 15$ MHz

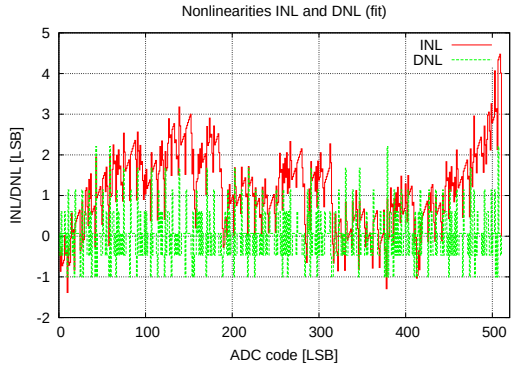


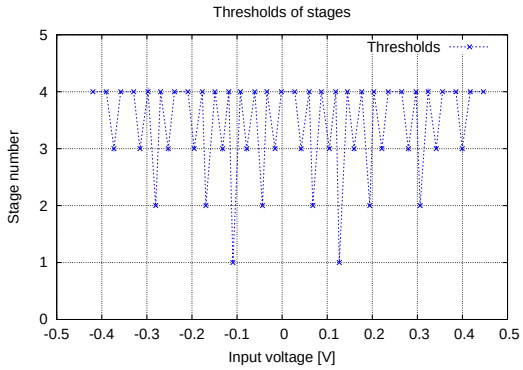




| Type | ENOB |
|---|---|
| XY | 6.17 |
| Fit | 6.61 |

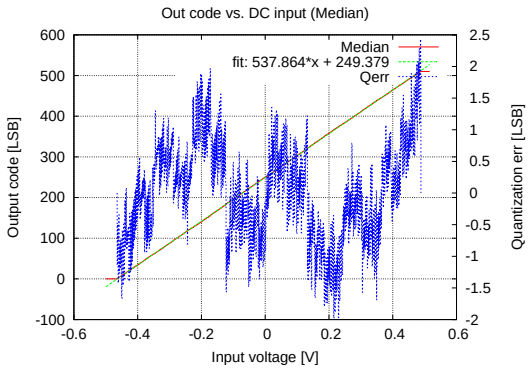
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1092 |
| $+1/4\,V_{ref}$ | 0.1268 |

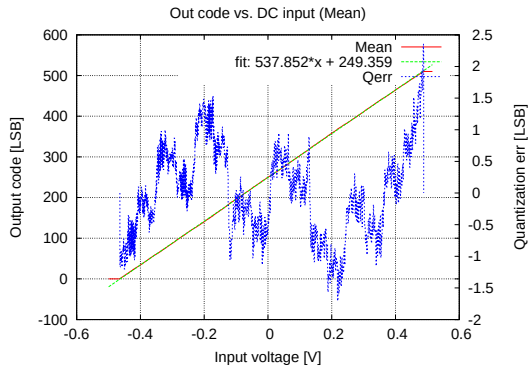
| Missing Code | Number of apperence |
|---|---|
| 10 | 28935 |
| 18 | 29579 |
| 25 | 74651 |
| 28 | 33481 |
| 38 | 49794 |
| 42 | 34021 |
| 44 | 39274 |
| 58 | 36682 |
| 60 | 36824 |
| 66 | 33227 |
| 82 | 34284 |
| 90 | 36251 |
| 106 | 35443 |
| 114 | 32377 |
| 122 | 35975 |
| 130 | 33258 |
| 146 | 33474 |
| 154 | 23450 |
| 156 | 28136 |
| 170 | 36313 |
| 189 | 29153 |
| 202 | 40872 |

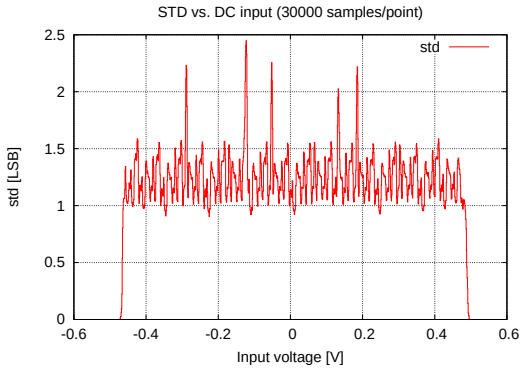
| Missing Code | Number of apperence |
|---|---|
| 218 | 36193 |
| 226 | 31559 |
| 258 | 31743 |
| 264 | 50254 |
| 284 | 27964 |
| 290 | 26335 |
| 298 | 36188 |
| 315 | 19966 |
| 316 | 26926 |
| 346 | 36479 |
| 376 | 55656 |
| 378 | 36315 |
| 380 | 34767 |
| 386 | 31974 |
| 410 | 26918 |
| 413 | 41911 |
| 426 | 36340 |
| 450 | 33815 |
| 466 | 31216 |
| 474 | 35945 |
| 480 | 57401 |
| 504 | 50008 |
| 506 | 33195 |

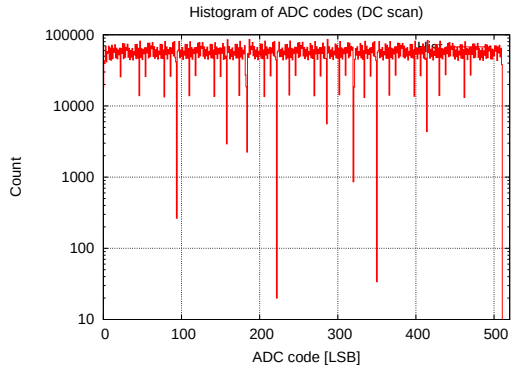
# 2 Common voltage changes

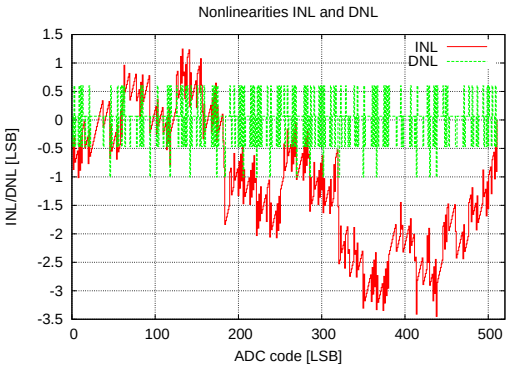
## 2.1 $vcm = 1.2$ V

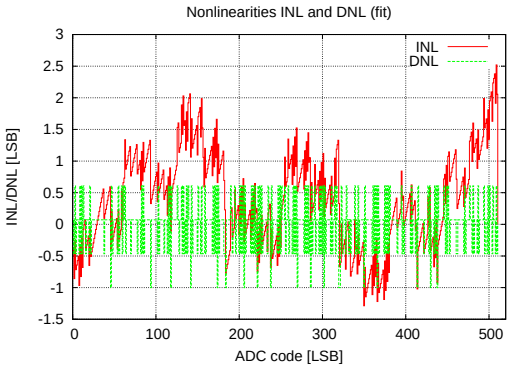


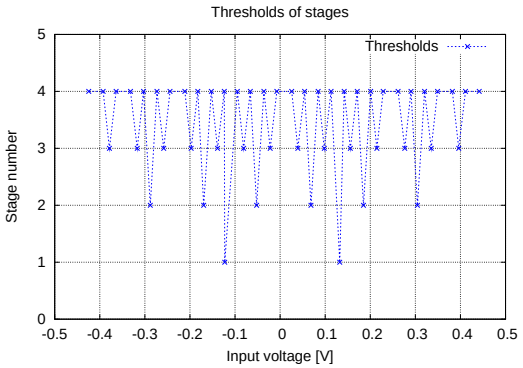





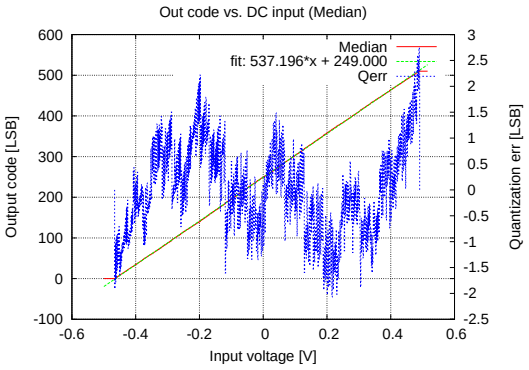

| Type | ENOB |
|---|---|
| XY | 6.54 |
| Fit | 7.38 |

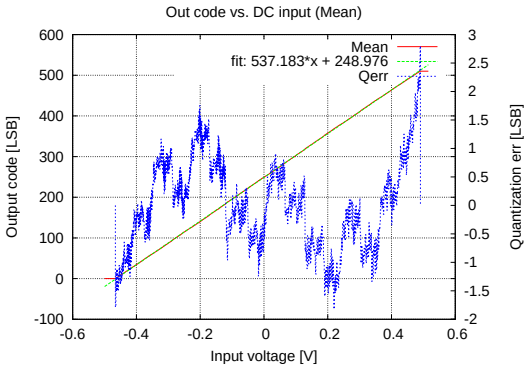
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1229 |
| $+1/4\,V_{ref}$ | 0.1323 |

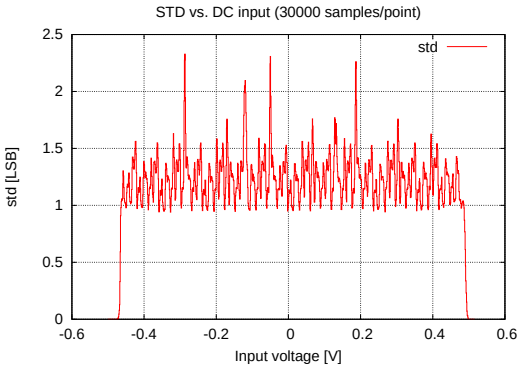
| Missing Code | Number of apperence |
|---|---|
| 46 | 13963 |
| 94 | 265 |
| 118 | 26700 |
| 142 | 13633 |
| 174 | 14072 |
| 184 | 2249 |
| 206 | 13544 |
| 222 | 20 |
| 238 | 14220 |

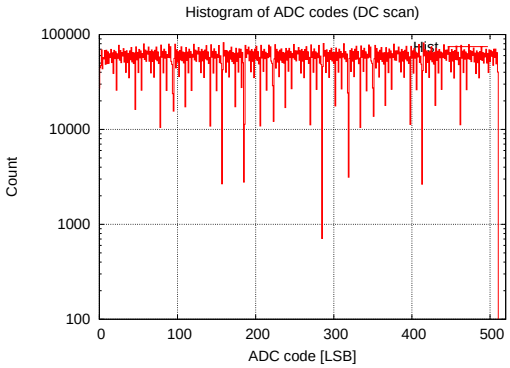
| Missing Code | Number of apperence |
|---|---|
| 270 | 13906 |
| 286 | 5610 |
| 302 | 14398 |
| 320 | 859 |
| 321 | 18532 |
| 350 | 34 |
| 366 | 14149 |
| 414 | 4358 |
| 430 | 14000 |
| 438 | 27426 |

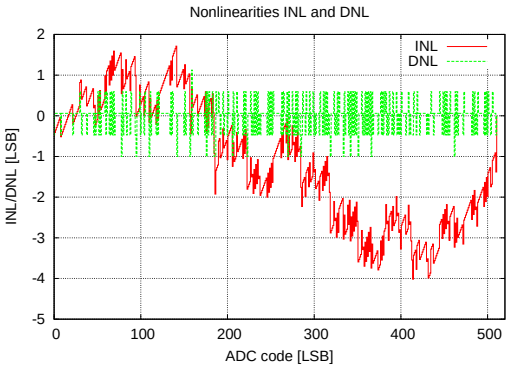
## 2.2 $vcm = 1.3$ V

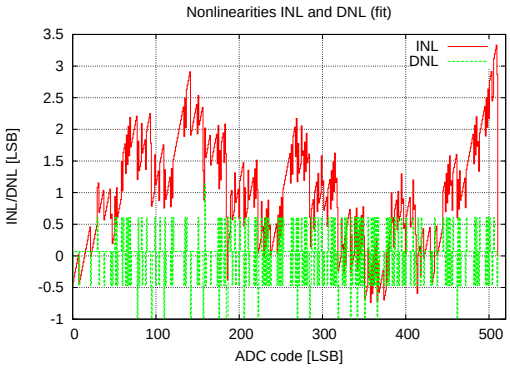


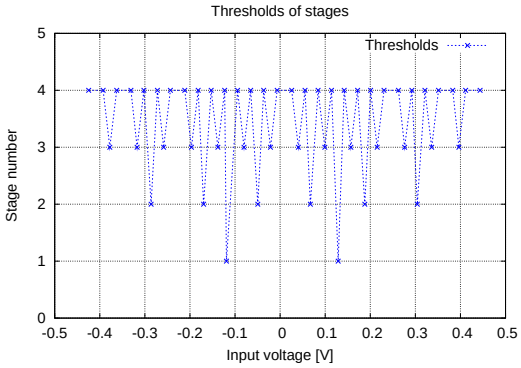





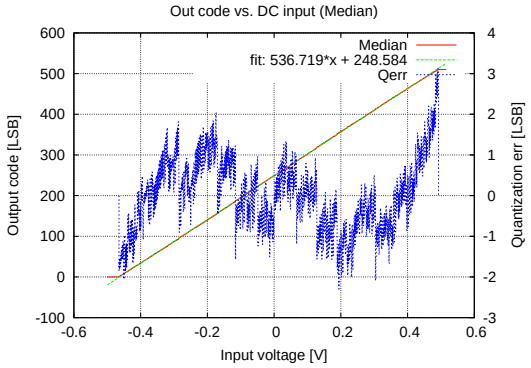

| Type | ENOB |
|---|---|
| XY | 6.27 |
| Fit | 6.81 |

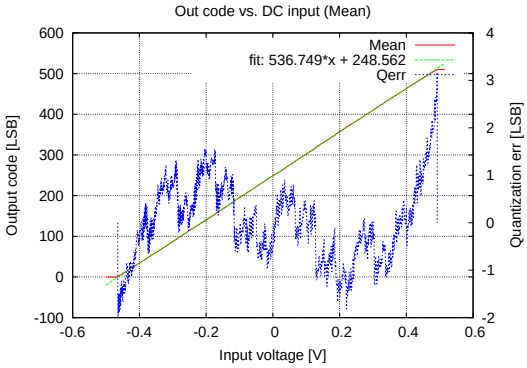
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1191 |
| $+1/4\,V_{ref}$ | 0.1288 |

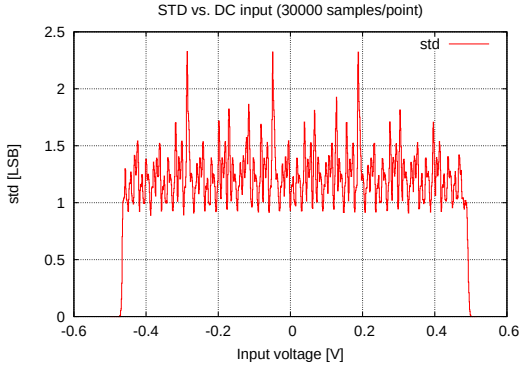
| Missing Code | Number of apperence |
|---|---|
| 78 | 10504 |
| 95 | 15590 |
| 110 | 17294 |
| 142 | 10844 |
| 157 | 2677 |
| 176 | 52357 |
| 185 | 2786 |
| 186 | 11330 |
| 206 | 10877 |

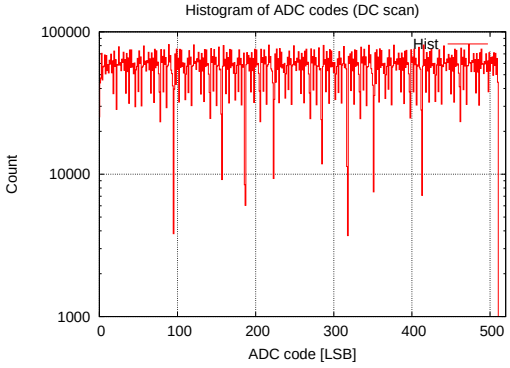
| Missing Code | Number of apperence |
|---|---|
| 223 | 12156 |
| 270 | 11170 |
| 285 | 711 |
| 319 | 3139 |
| 334 | 10471 |
| 342 | 25489 |
| 351 | 13751 |
| 366 | 17865 |
| 462 | 11192 |

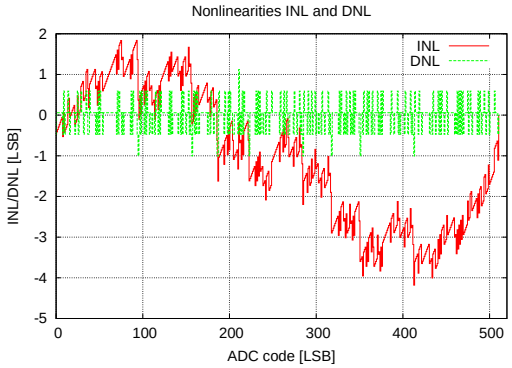
## 2.3 $vcm = 1.4$ V

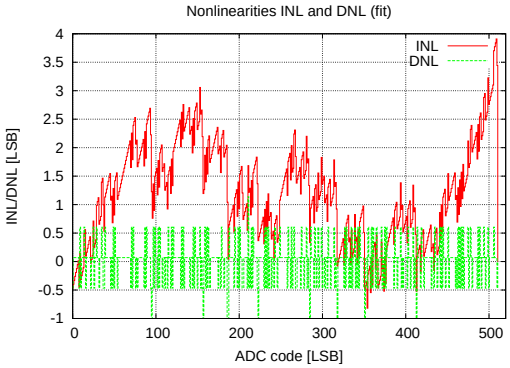


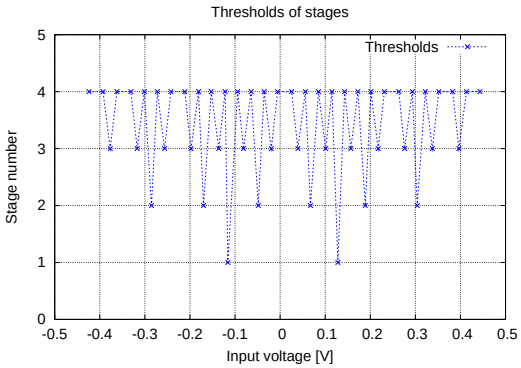



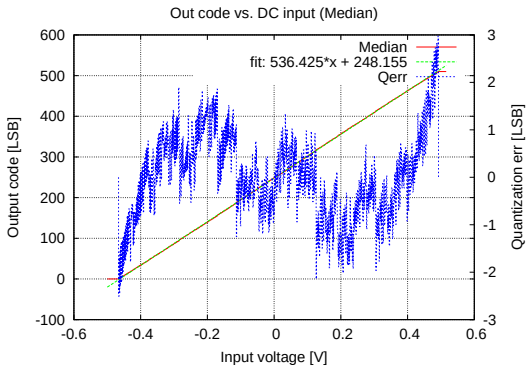

| Type | ENOB |
|---|---|
| XY | 6.24 |
| Fit | 6.61 |

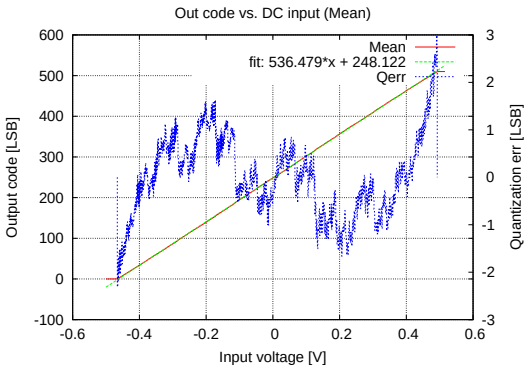
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1160 |
| $+1/4\,V_{ref}$ | 0.1280 |

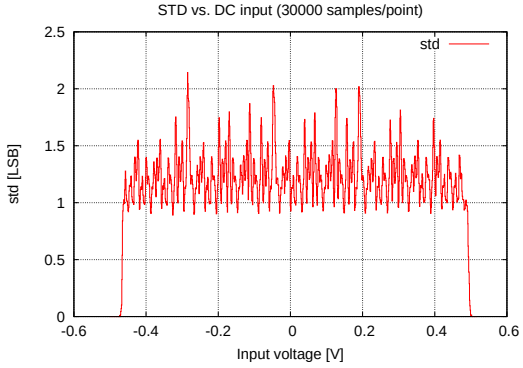
| Missing Code | Number of apperence |
|---|---|
| 95 | 3820 |
| 157 | 9175 |
| 186 | 8441 |
| 187 | 6040 |

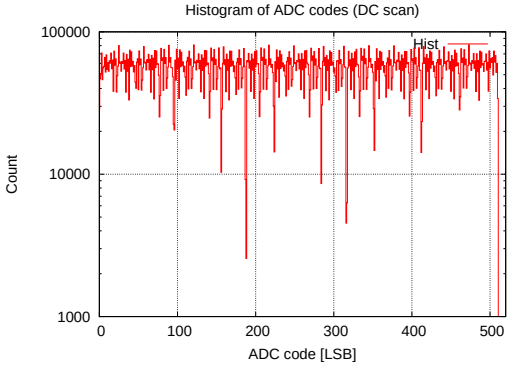
| Missing Code | Number of apperence |
|---|---|
| 223 | 9332 |
| 285 | 11822 |
| 318 | 3706 |
| 351 | 7519 |
| 413 | 7108 |

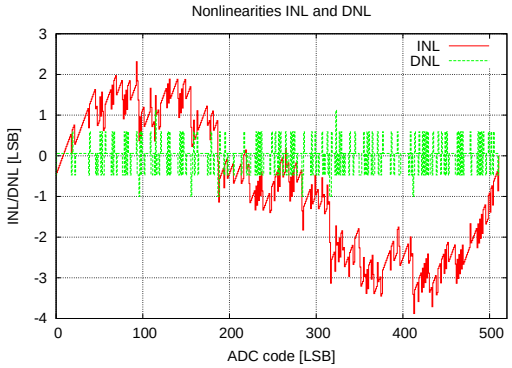
## 2.4 $vcm = 1.5$ V

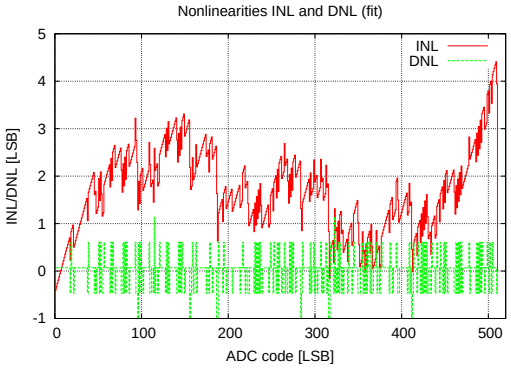


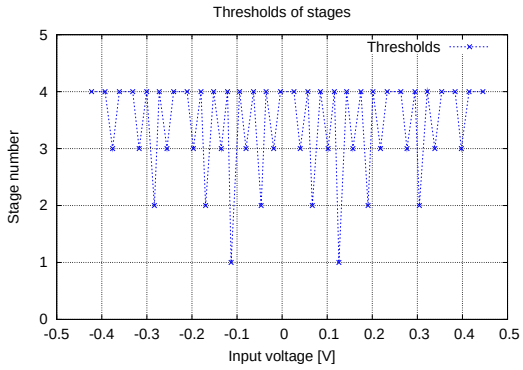



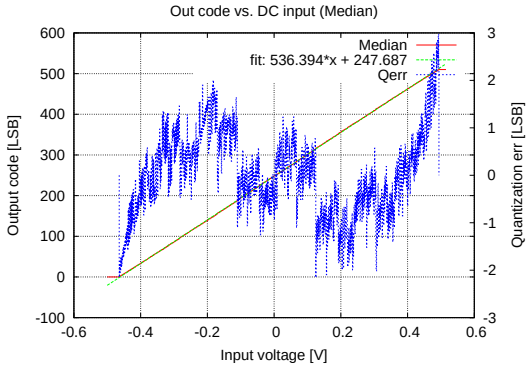

| Type | ENOB |
|---|---|
| XY | 6.36 |
| Fit | 6.27 |

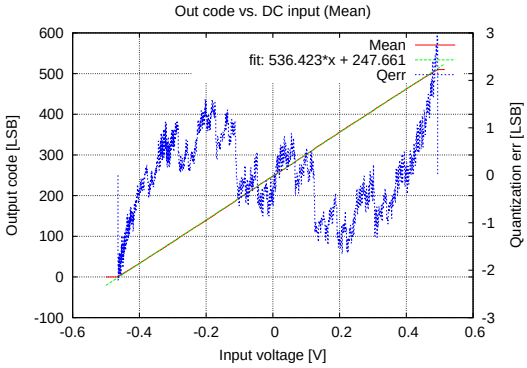
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1132 |
| $+1/4\,V_{ref}$ | 0.1259 |

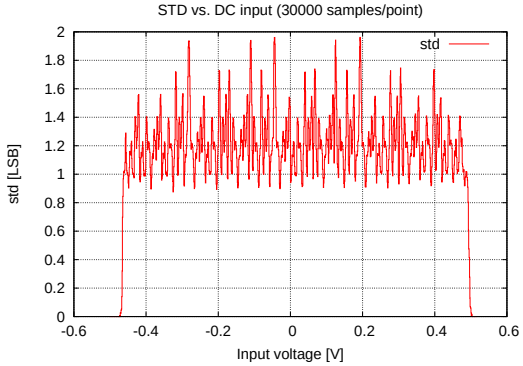
| Missing Code | Number of apperence |
|---|---|
| 96 | 20429 |
| 156 | 10321 |
| 187 | 9172 |
| 188 | 2564 |

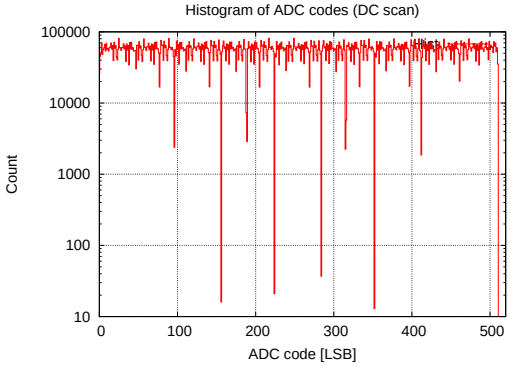
| Missing Code | Number of apperence |
|---|---|
| 284 | 8601 |
| 316 | 4532 |
| 317 | 6286 |
| 412 | 14202 |

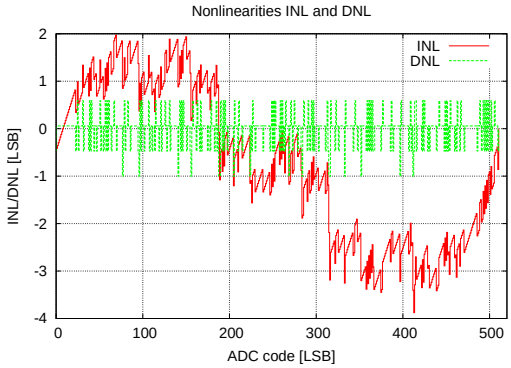
## 2.5 vcm = 1.6 V

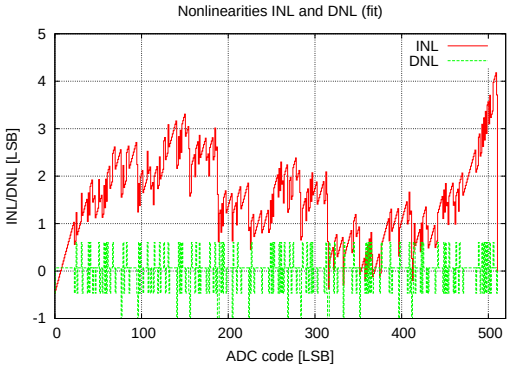


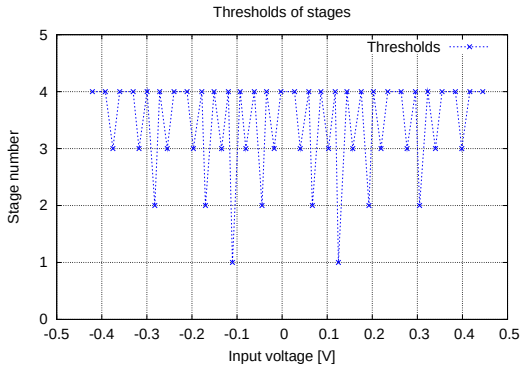



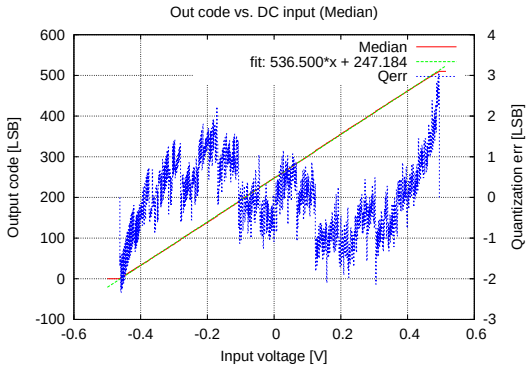

| Type | ENOB |
|---|---|
| XY | 6.35 |
| Fit | 6.37 |

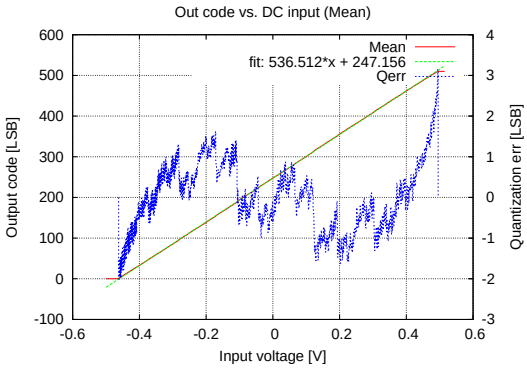
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1103 |
| $+1/4\,V_{ref}$ | 0.1249 |

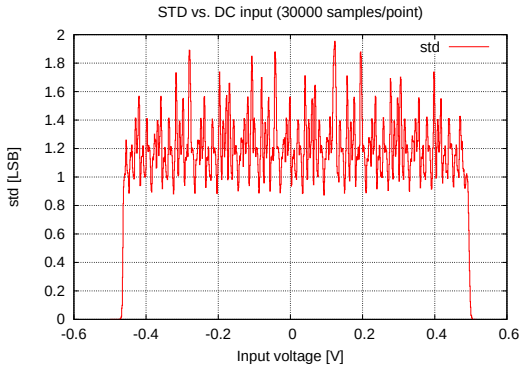
| Missing Code | Number of apperence |
|---|---|
| 77 | 16787 |
| 96 | 2392 |
| 141 | 16949 |
| 156 | 16 |
| 188 | 7342 |
| 189 | 2896 |
| 205 | 16797 |
| 224 | 21 |

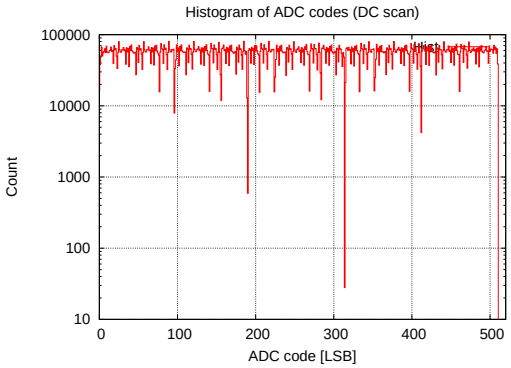
| Missing Code | Number of apperence |
|---|---|
| 269 | 16731 |
| 284 | 37 |
| 315 | 2249 |
| 316 | 5757 |
| 333 | 16993 |
| 352 | 13 |
| 397 | 17193 |
| 412 | 1860 |

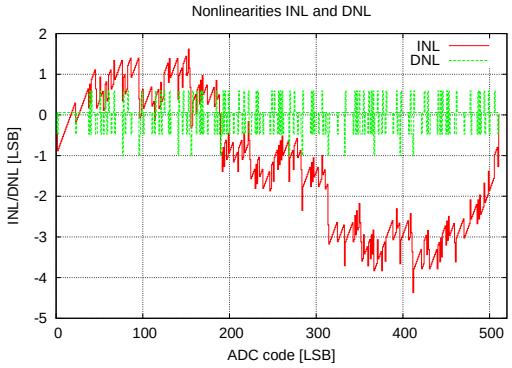
## 2.6 $vcm = 1.7$ V

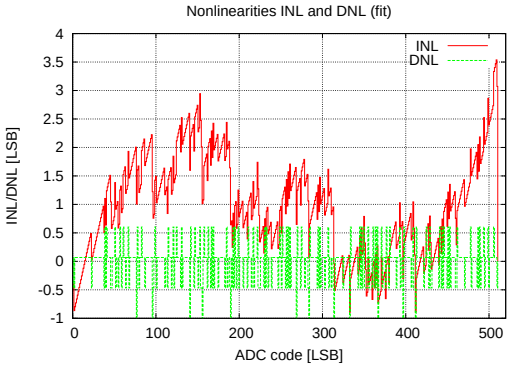


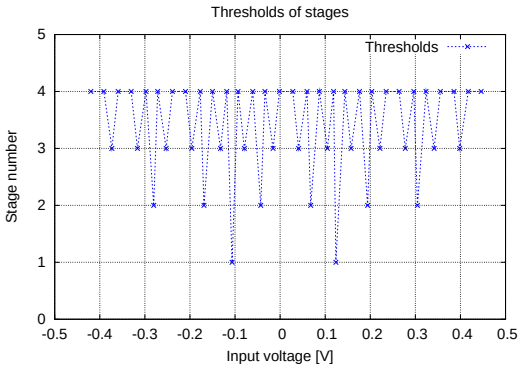





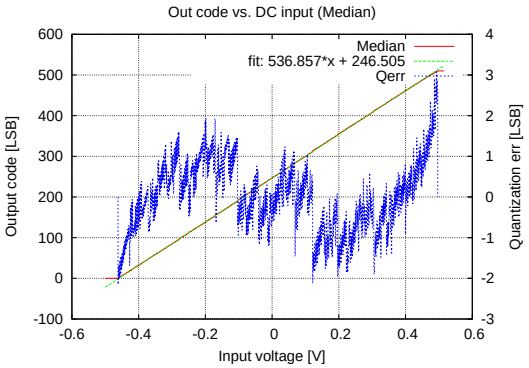

| Type | ENOB |
|---|---|
| XY | 6.20 |
| Fit | 6.79 |

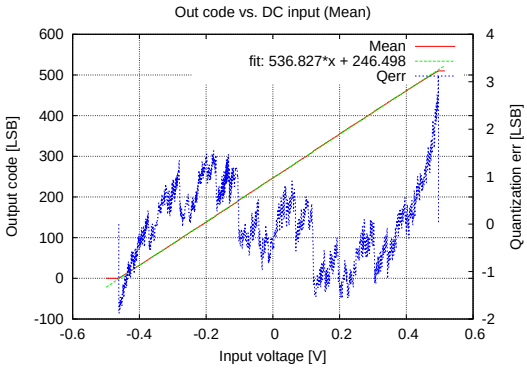
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1065 |
| $+1/4\,V_{ref}$ | 0.1237 |

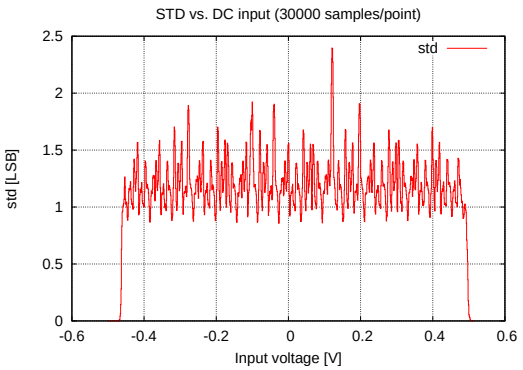
| Missing Code | Number of apperence |
|---|---|
| 77 | 15685 |
| 96 | 7902 |
| 141 | 15868 |
| 156 | 11955 |
| 190 | 592 |
| 269 | 16060 |

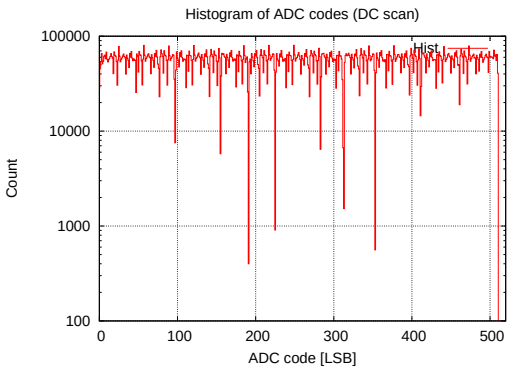
| Missing Code | Number of apperence |
|---|---|
| 284 | 12172 |
| 314 | 28 |
| 333 | 15789 |
| 367 | 27484 |
| 397 | 16019 |
| 412 | 4216 |

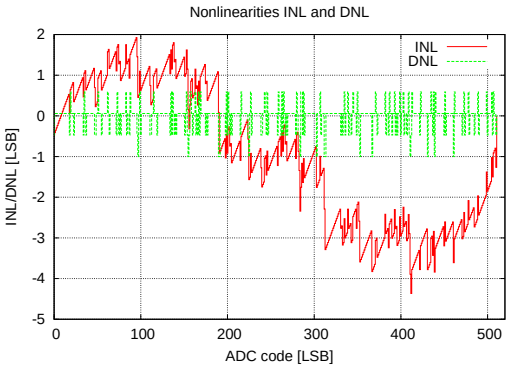
## 2.7 $vcm = 1.8$ V

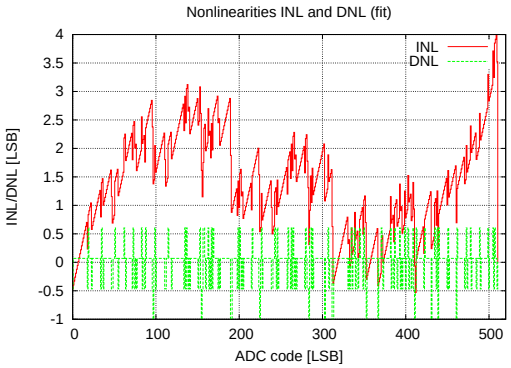


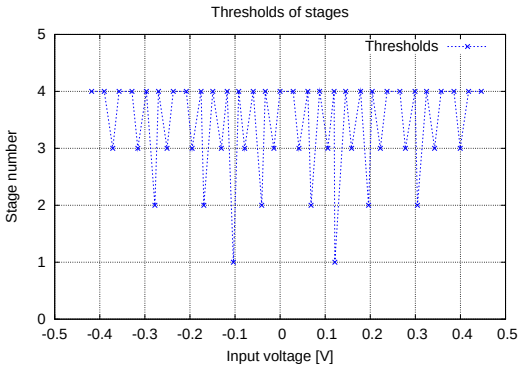





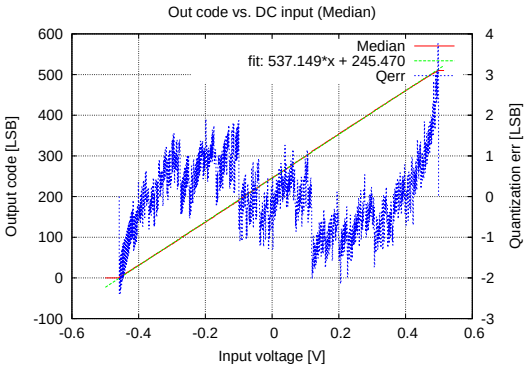

| Type | ENOB |
|---|---|
| XY | 6.21 |
| Fit | 6.47 |

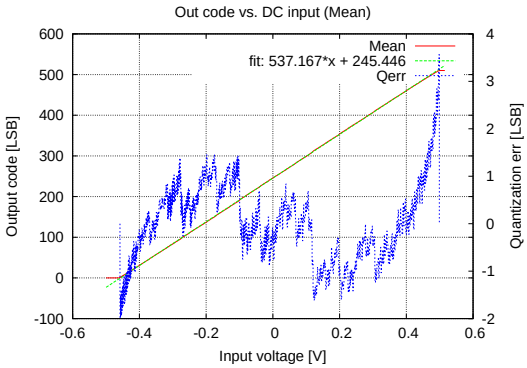
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1036 |
| $+1/4\,V_{ref}$ | 0.1213 |

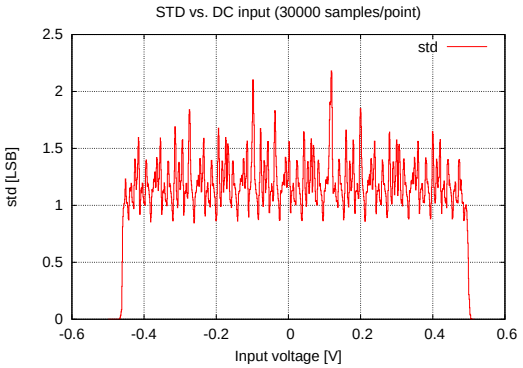
| Missing Code | Number of apperence |
|---|---|
| 97 | 7535 |
| 155 | 5779 |
| 190 | 25847 |
| 191 | 400 |
| 225 | 908 |
| 284 | 37241 |
| 303 | 28319 |

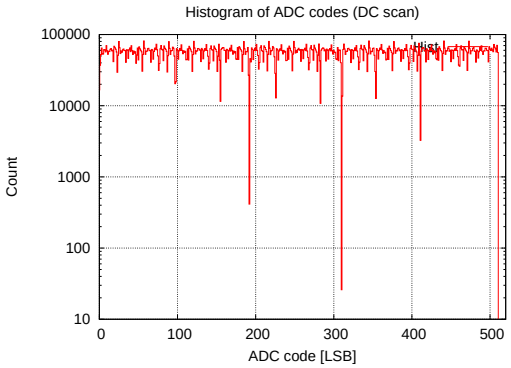
| Missing Code | Number of apperence |
|---|---|
| 312 | 6676 |
| 313 | 1525 |
| 353 | 560 |
| 367 | 28489 |
| 411 | 14522 |
| 431 | 28291 |
| 439 | 32163 |
| 461 | 18963 |

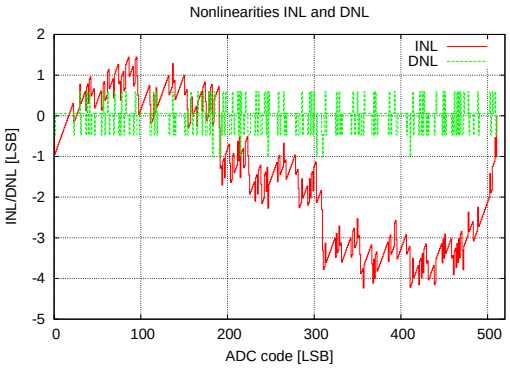
## 2.8 $vcm = 1.9$ V

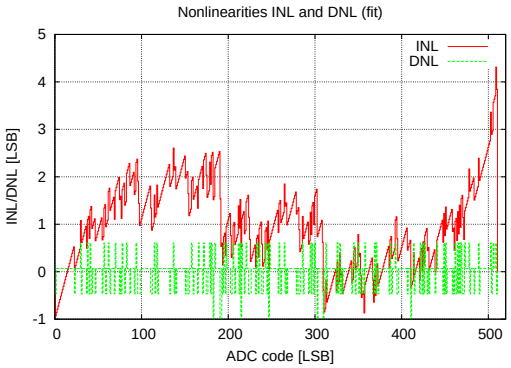


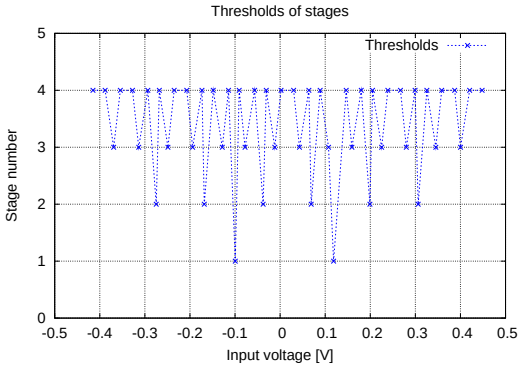





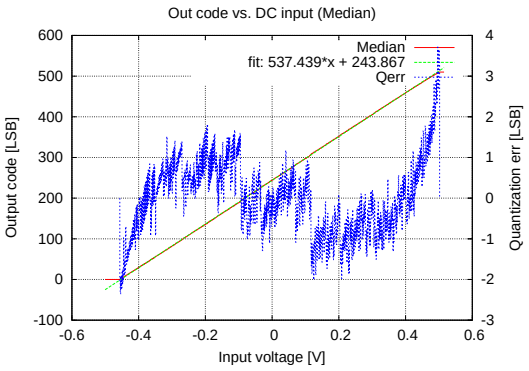

| Type | ENOB |
|---|---|
| XY | 6.05 |
| Fit | 6.79 |

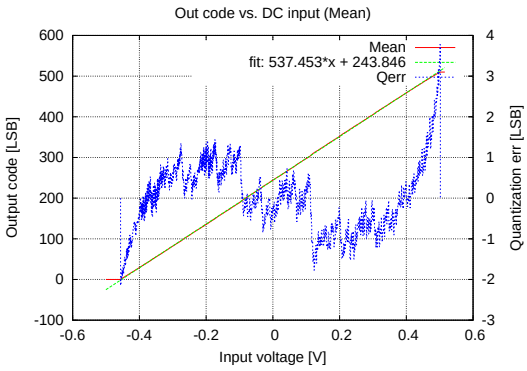
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.0995 |
| $+1/4\,V_{ref}$ | 0.1186 |

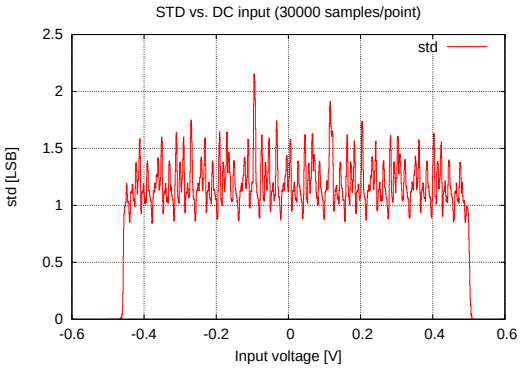
| Missing Code | Number of apperence |
|---|---|
| 183 | 30312 |
| 191 | 26805 |
| 192 | 415 |
| 215 | 30797 |

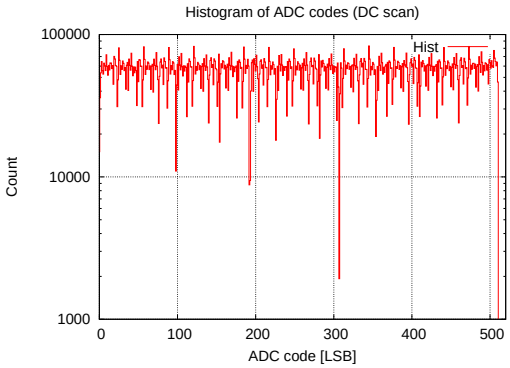
| Missing Code | Number of apperence |
|---|---|
| 247 | 30895 |
| 303 | 45219 |
| 310 | 26 |
| 411 | 3261 |

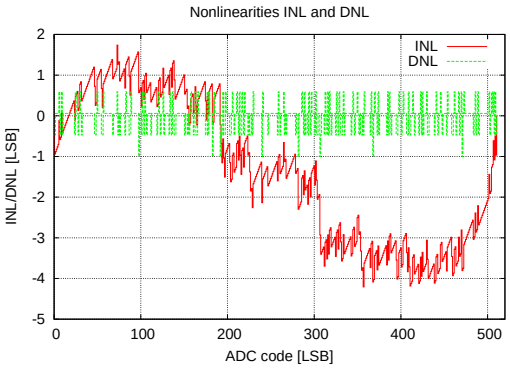
## 2.9 $vcm = 2.0$ V

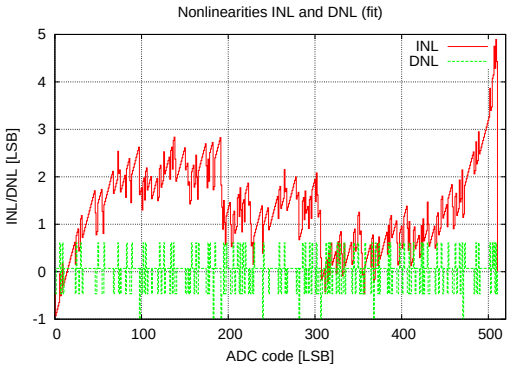


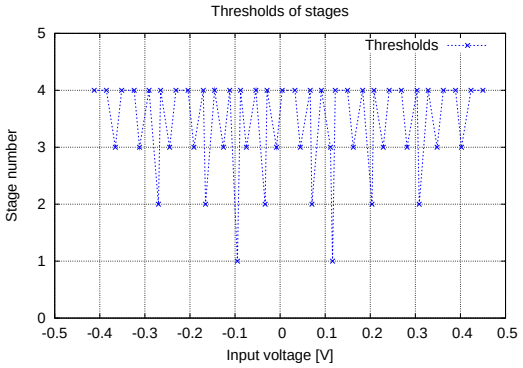






| Type | ENOB |
|---|---|
| XY | 6.04 |
| Fit | 6.50 |

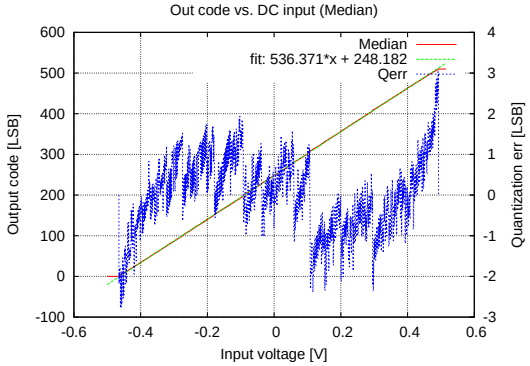
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.0948 |
| $+1/4\,V_{ref}$ | 0.1164 |

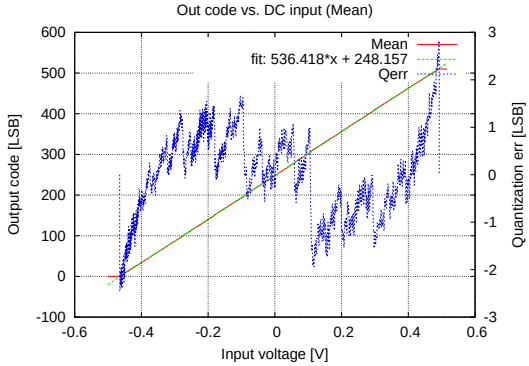
| Missing Code | Number of apperence |
|---|---|
| 98 | 10982 |
| 183 | 30452 |
| 192 | 8797 |
| 240 | 26748 |

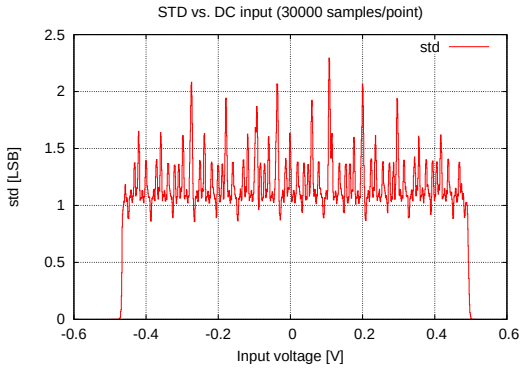
| Missing Code | Number of apperence |
|---|---|
| 282 | 18651 |
| 307 | 1927 |
| 368 | 26643 |
| 471 | 31879 |

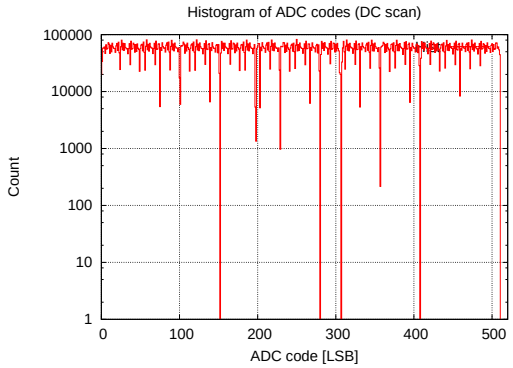
# 3 Reference window shift

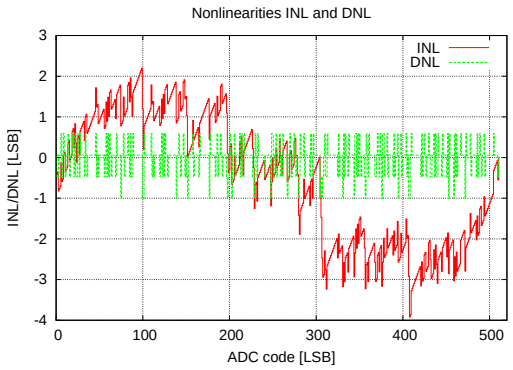
## 3.1 $\Delta vrefn = -0.2$ V, $\Delta vrefp = -0.2$ V

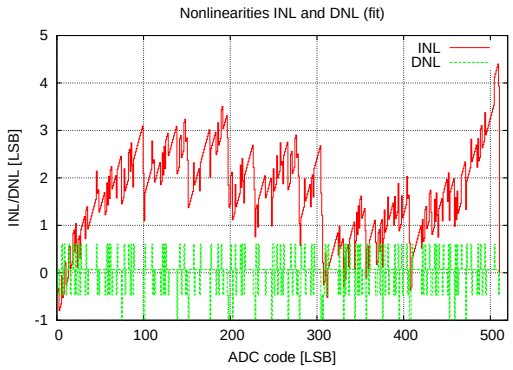


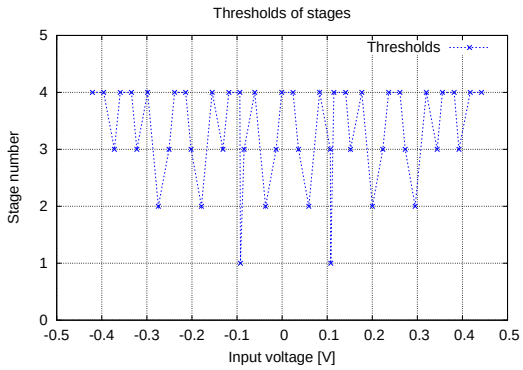



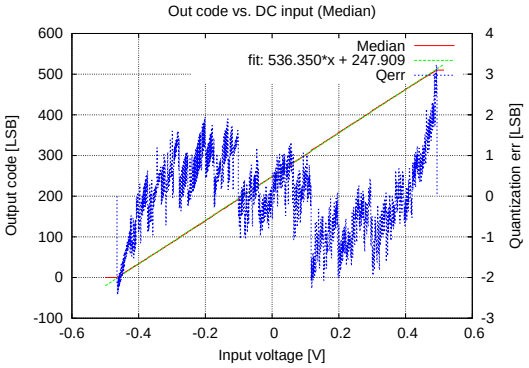

| Type | ENOB |
|---|---|
| XY | 6.46 |
| Fit | 6.25 |

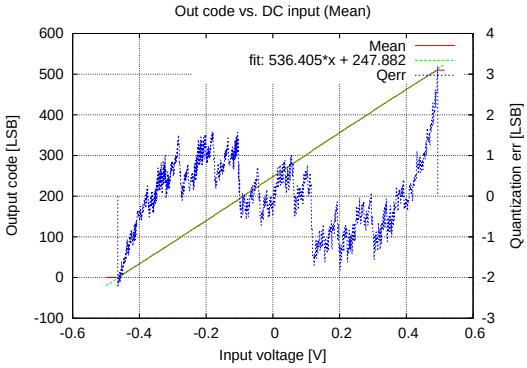
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.0925 |
| $+1/4\,V_{ref}$ | 0.1079 |

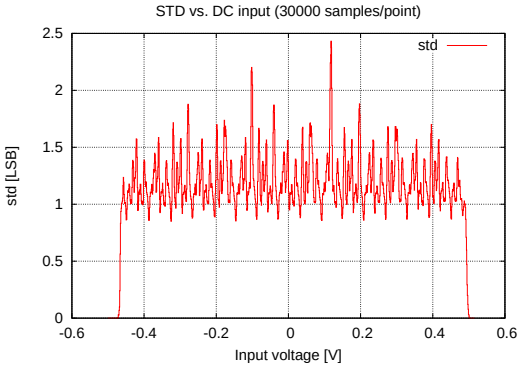
| Missing Code | Number of apperence |
|---|---|
| 75 | 5448 |
| 100 | 17380 |
| 101 | 5968 |
| 139 | 6600 |
| 152 | 0 |
| 177 | 23358 |
| 198 | 1346 |
| 203 | 5181 |
| 229 | 971 |
| 248 | 25385 |
| 267 | 6204 |
| 280 | 0 |

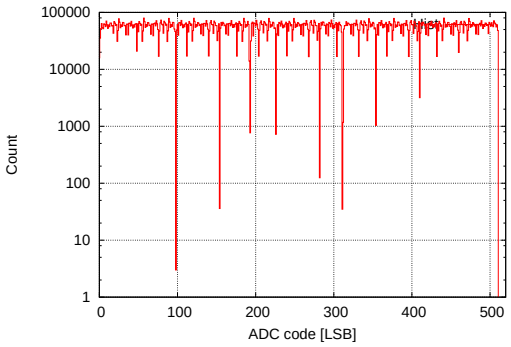
| Missing Code | Number of apperence |
|---|---|
| 305 | 21420 |
| 307 | 1 |
| 331 | 5336 |
| 344 | 25634 |
| 357 | 216 |
| 376 | 25889 |
| 395 | 6462 |
| 407 | 28582 |
| 408 | 0 |
| 453 | 29567 |
| 459 | 8330 |
| 472 | 25101 |

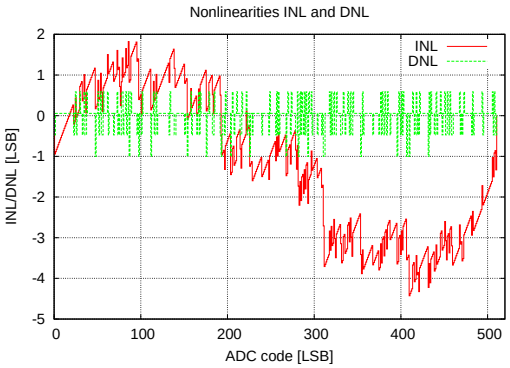
## 3.2 $\Delta vrefn = -0.1$ V, $\Delta vrefp = -0.1$ V

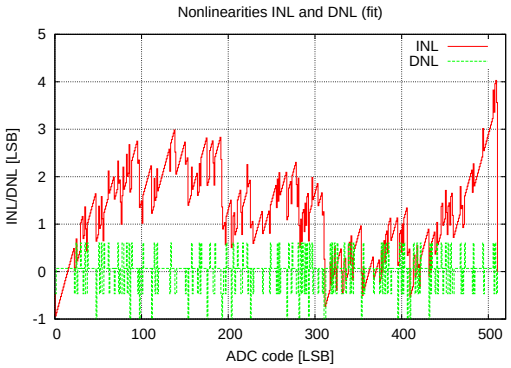


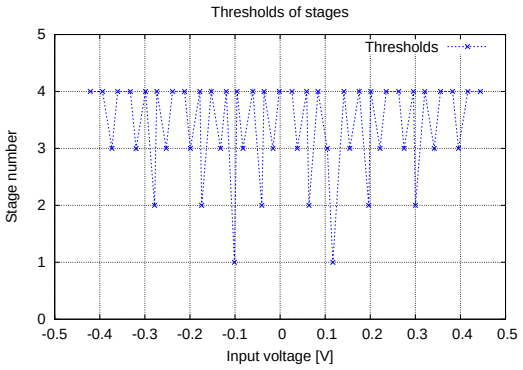





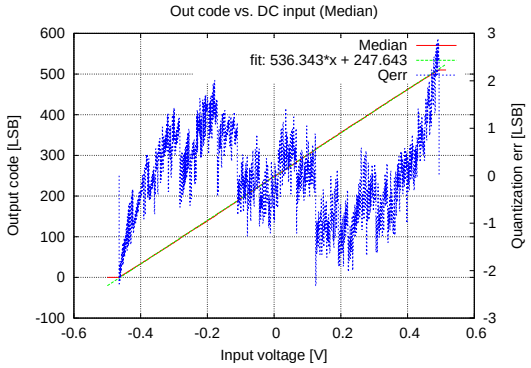

| Type | ENOB |
|---|---|
| XY | 6.12 |
| Fit | 6.54 |

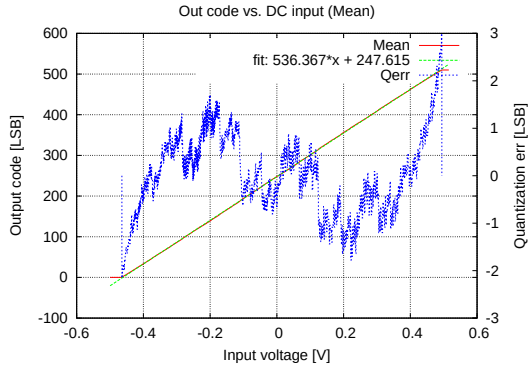
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1013 |
| $+1/4\,V_{ref}$ | 0.1169 |

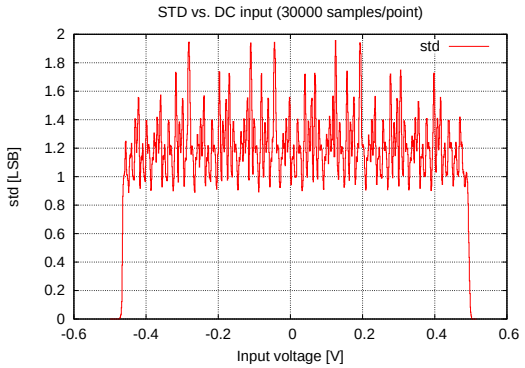
| Missing Code | Number of apperence |
|---|---|
| 48 | 20857 |
| 87 | 30801 |
| 98 | 3 |
| 112 | 17079 |
| 154 | 36 |
| 176 | 17068 |
| 193 | 768 |
| 204 | 17042 |
| 226 | 724 |

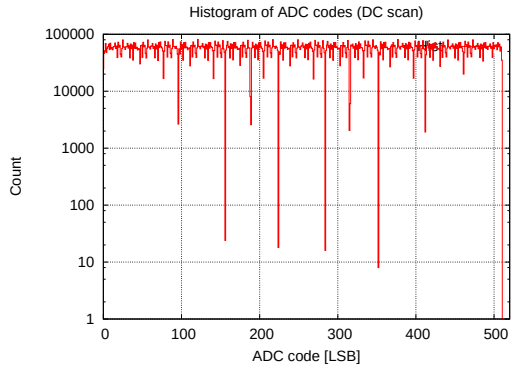
| Missing Code | Number of apperence |
|---|---|
| 268 | 16675 |
| 282 | 125 |
| 293 | 38601 |
| 311 | 35 |
| 312 | 1173 |
| 354 | 1038 |
| 396 | 16819 |
| 407 | 31726 |
| 410 | 3179 |
| 432 | 16854 |

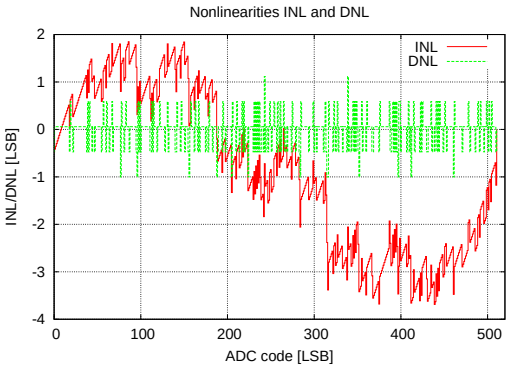
### 3.3 $\Delta$vrefn = 0 V, $\Delta$vrefp = 0 V

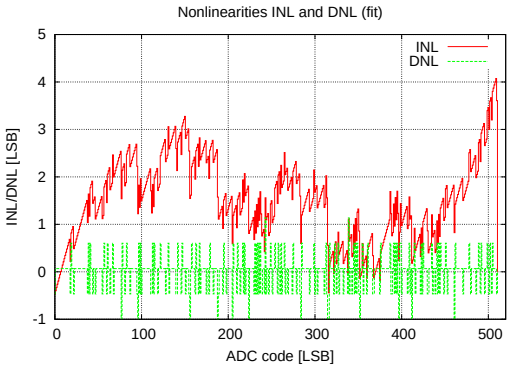


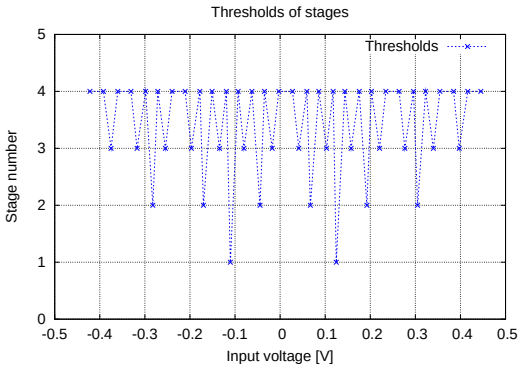





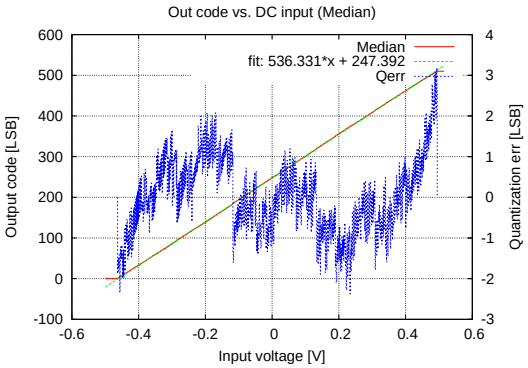

| Type | ENOB |
|---|---|
| XY | 6.28 |
| Fit | 6.39 |

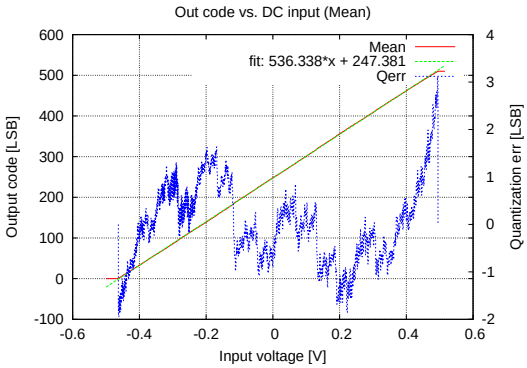
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1103 |
| $+1/4\,V_{ref}$ | 0.1245 |

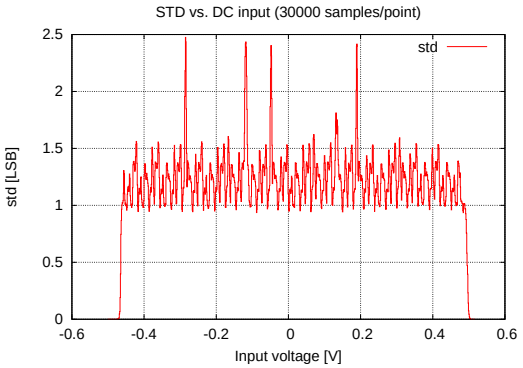
| Missing Code | Number of apperence |
|---|---|
| 77 | 16787 |
| 96 | 2650 |
| 156 | 24 |
| 188 | 8062 |
| 205 | 16959 |
| 224 | 18 |

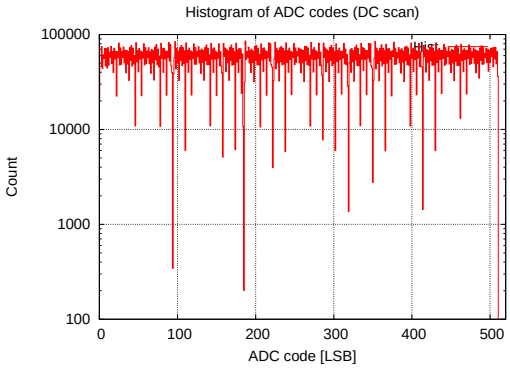
| Missing Code | Number of apperence |
|---|---|
| 284 | 16 |
| 315 | 2047 |
| 316 | 6060 |
| 352 | 8 |
| 397 | 16891 |
| 412 | 1921 |
| 461 | 20016 |

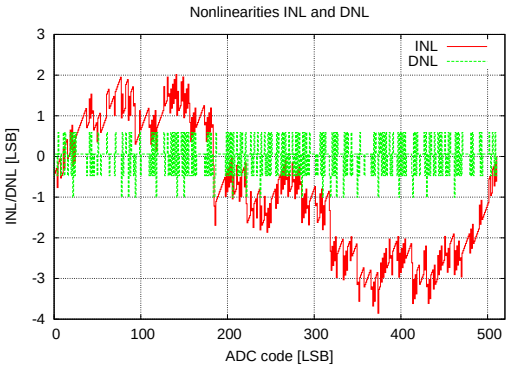
### 3.4 $\Delta vrefn = 0.1$ V, $\Delta vrefp = 0.1$ V

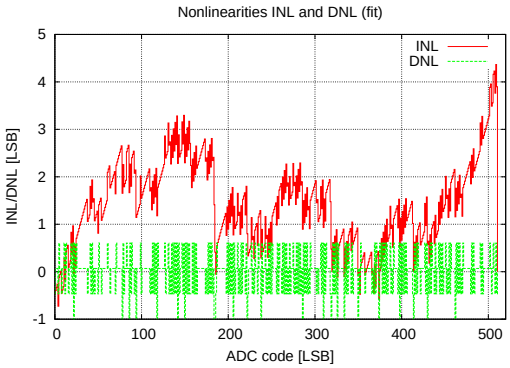


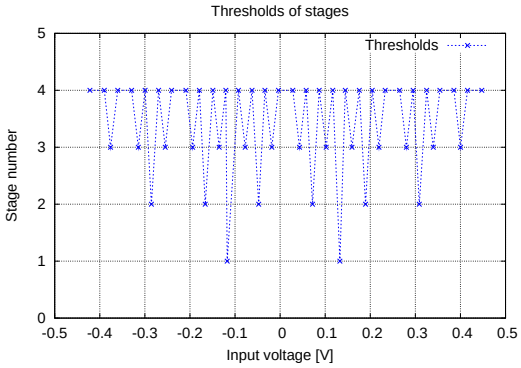





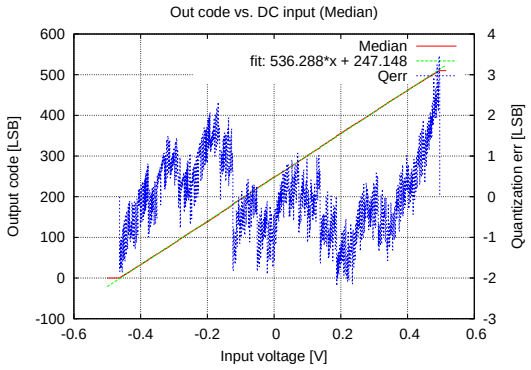

| Type | ENOB |
|---|---|
| XY | 6.37 |
| Fit | 6.44 |

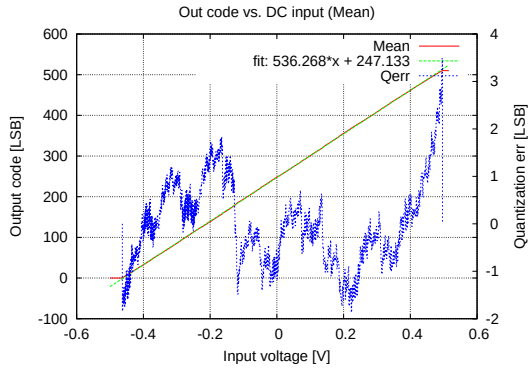
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1175 |
| $+1/4\,V_{ref}$ | 0.1326 |

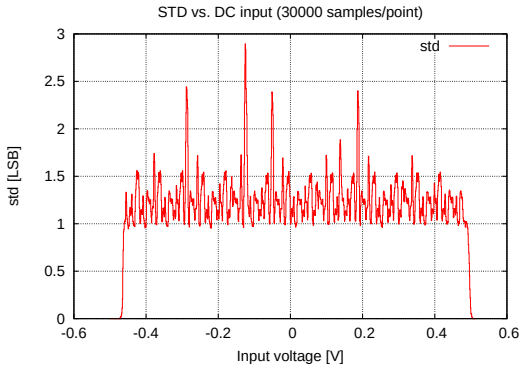
| Missing Code | Number of apperence |
|---|---|
| 22 | 22471 |
| 78 | 10804 |
| 86 | 22953 |
| 94 | 345 |
| 118 | 23092 |
| 142 | 10928 |
| 150 | 22698 |
| 184 | 10659 |
| 185 | 202 |
| 206 | 10625 |
| 222 | 3960 |

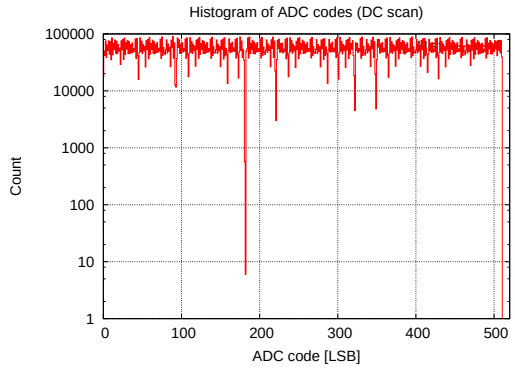
| Missing Code | Number of apperence |
|---|---|
| 238 | 5874 |
| 286 | 7777 |
| 310 | 23532 |
| 319 | 1371 |
| 326 | 32211 |
| 334 | 10933 |
| 350 | 2771 |
| 374 | 22562 |
| 398 | 10872 |
| 414 | 1439 |
| 430 | 6013 |
| 462 | 13101 |

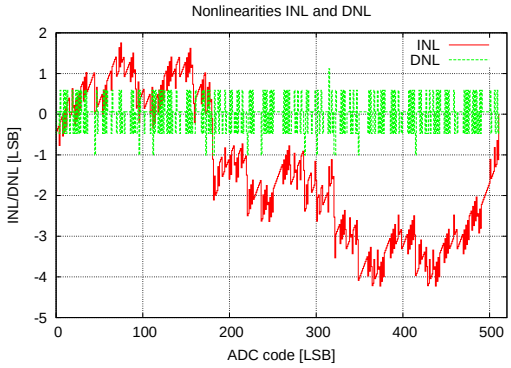
## 3.5 $\Delta vrefn = 0.2$ V, $\Delta vrefp = 0.2$ V

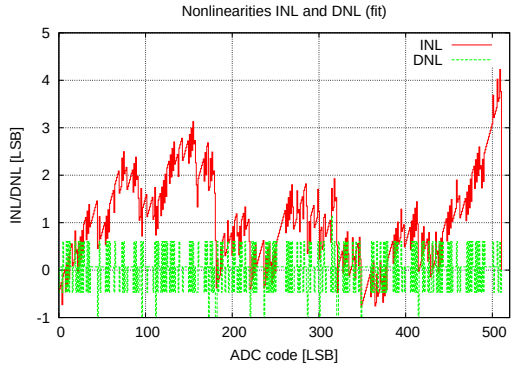


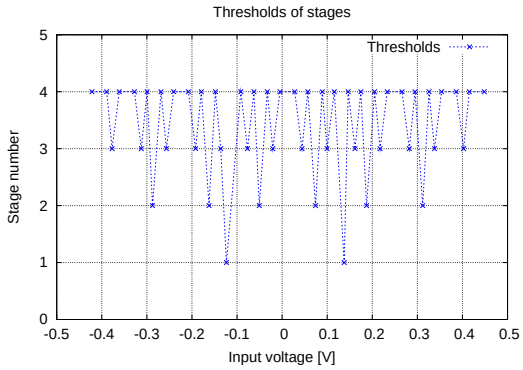




| Type | ENOB |
|---|---|
| XY | 6.07 |
| Fit | 6.69 |

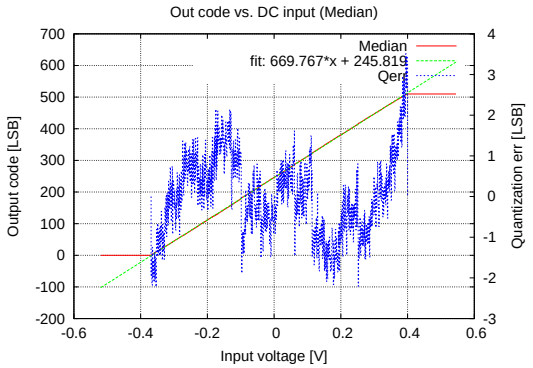
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1235 |
| $+1/4\,V_{ref}$ | 0.1377 |

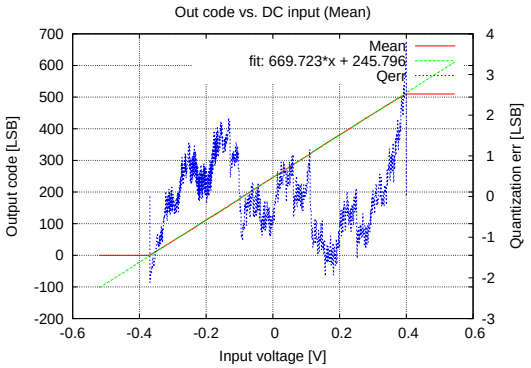
| Missing Code | Number of apperence |
|---|---|
| 45 | 15841 |
| 96 | 57780 |
| 112 | 48328 |
| 173 | 16770 |
| 181 | 566 |
| 182 | 6 |
| 221 | 3025 |

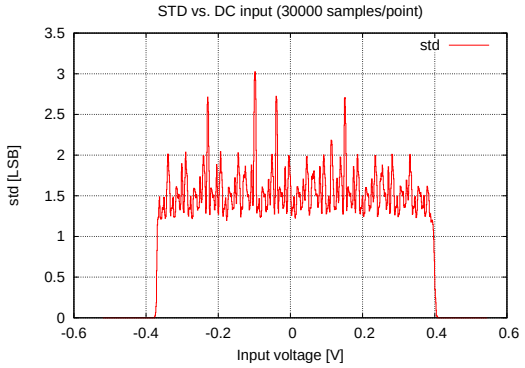
| Missing Code | Number of apperence |
|---|---|
| 237 | 17697 |
| 287 | 13591 |
| 301 | 15997 |
| 321 | 18597 |
| 322 | 4498 |
| 349 | 4835 |
| 415 | 21132 |

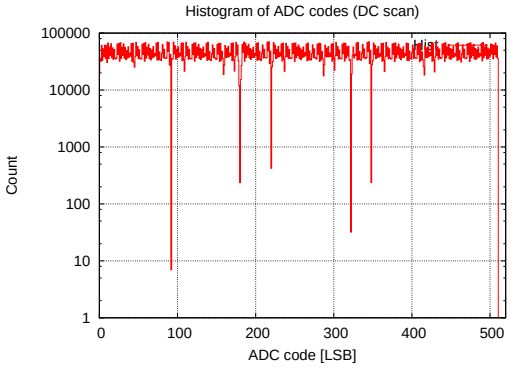
# 4 Reference window size

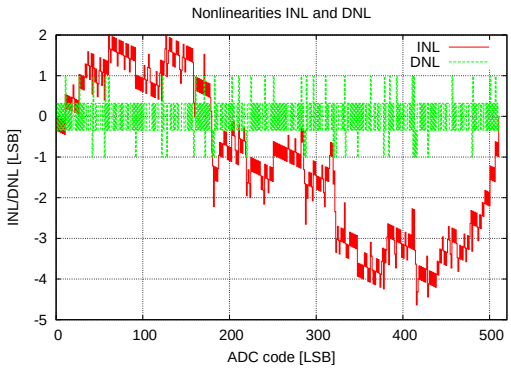
## 4.1 $vrefn = vcm - 0.4$ V, $vrefp = vcm + 0.4$ V

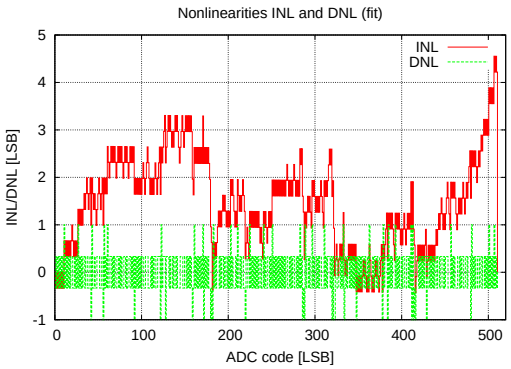


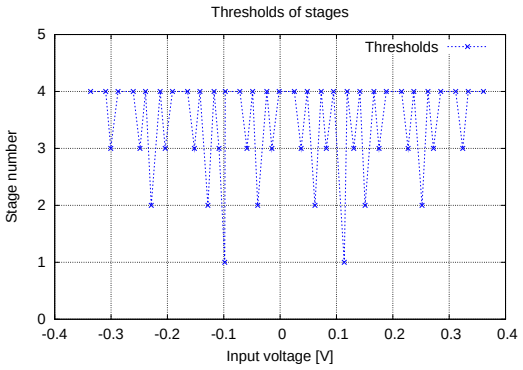





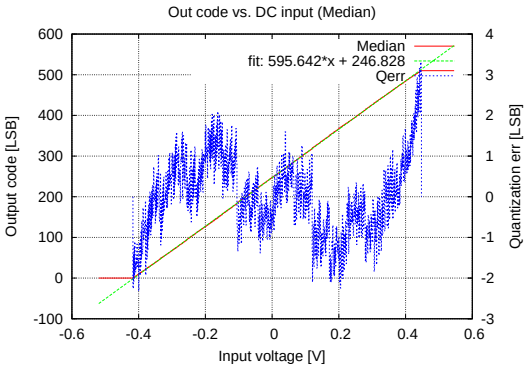

| Type | ENOB |
|---|---|
| XY | 6.06 |
| Fit | 6.37 |

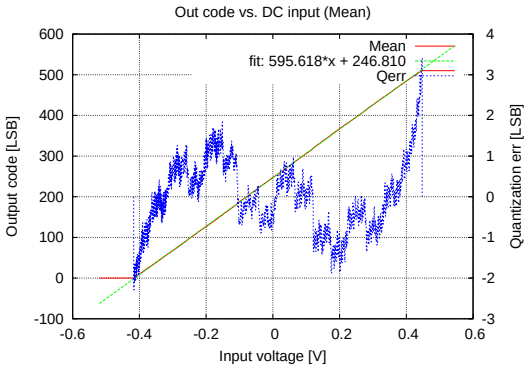
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.0984 |
| $+1/4\,V_{ref}$ | 0.1139 |

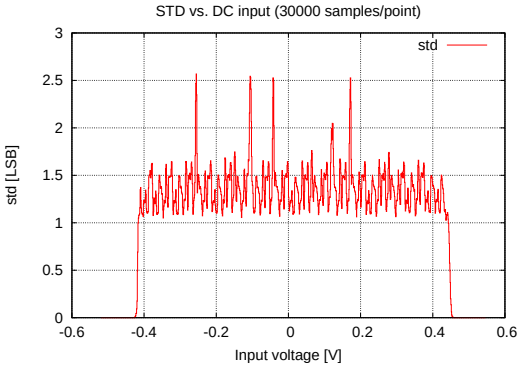
| Missing Code | Number of apperence |
|---|---|
| 42 | 31832 |
| 56 | 42587 |
| 92 | 7 |
| 122 | 32135 |
| 128 | 35792 |
| 159 | 18703 |
| 172 | 33803 |
| 180 | 237 |
| 182 | 26933 |
| 220 | 423 |
| 286 | 35782 |
| 288 | 27972 |

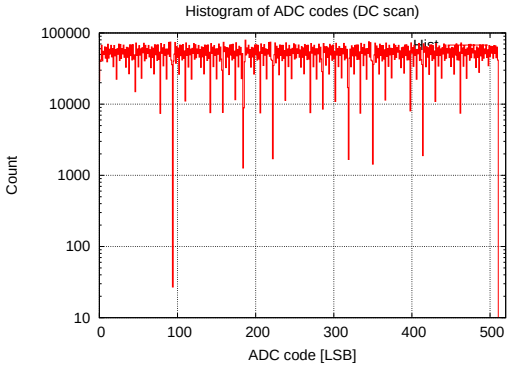
| Missing Code | Number of apperence |
|---|---|
| 320 | 33238 |
| 322 | 32 |
| 323 | 19099 |
| 334 | 34432 |
| 348 | 238 |
| 378 | 31734 |
| 384 | 36210 |
| 412 | 33410 |
| 414 | 34606 |
| 416 | 18305 |
| 429 | 20790 |
| 480 | 35194 |

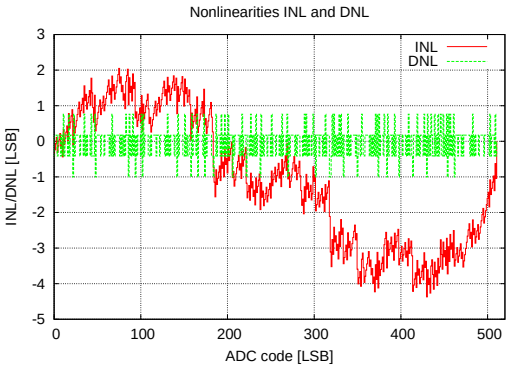
## 4.2 $vrefn = vcm - 0.45$ **V,** $vrefp = vcm + 0.45$ **V**

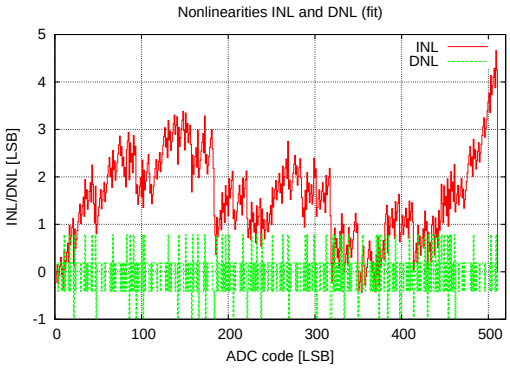


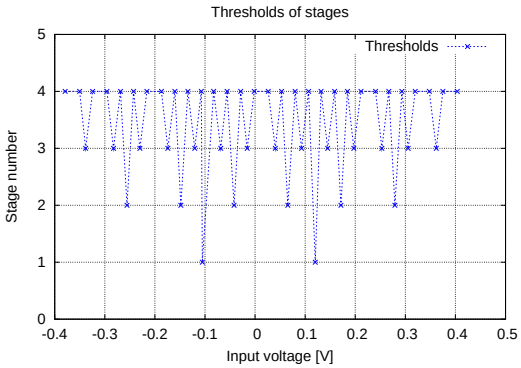





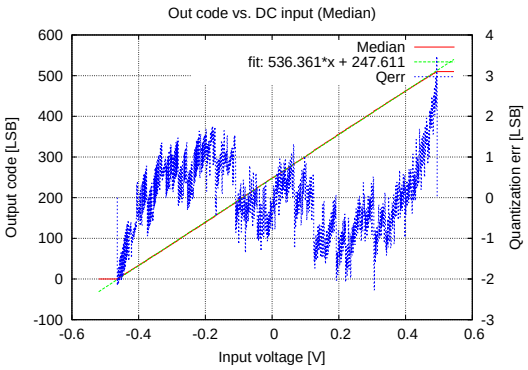

| Type | ENOB |
|---|---|
| XY | 6.10 |
| Fit | 6.33 |

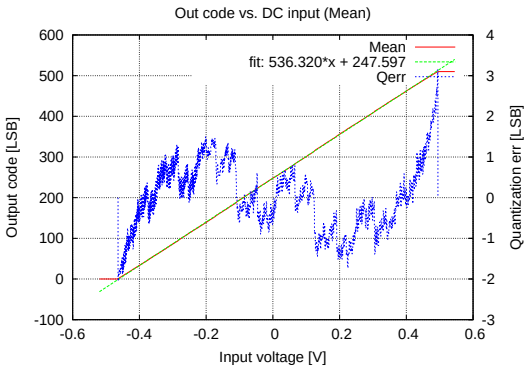
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1053 |
| $+1/4\,V_{ref}$ | 0.1201 |

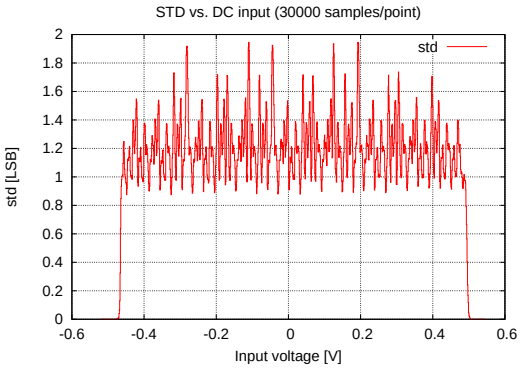
| Missing Code | Number of apperence |
|---|---|
| 22 | 22384 |
| 48 | 48439 |
| 86 | 22488 |
| 94 | 27 |
| 102 | 26278 |
| 142 | 7597 |
| 158 | 7645 |
| 166 | 26038 |
| 174 | 11538 |
| 184 | 1268 |
| 206 | 7531 |
| 222 | 1710 |
| 238 | 11300 |

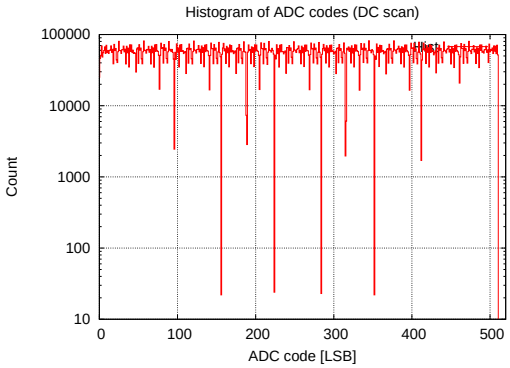
| Missing Code | Number of apperence |
|---|---|
| 270 | 7596 |
| 302 | 10891 |
| 318 | 17065 |
| 319 | 1671 |
| 334 | 7457 |
| 350 | 1435 |
| 374 | 23304 |
| 384 | 43232 |
| 398 | 8047 |
| 414 | 1894 |
| 430 | 10901 |
| 454 | 26406 |
| 462 | 7469 |

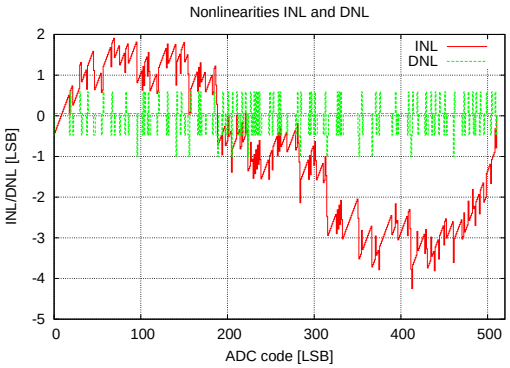
### 4.3 $vrefn = vcm - 0.5$ V, $vrefp = vcm + 0.5$ V

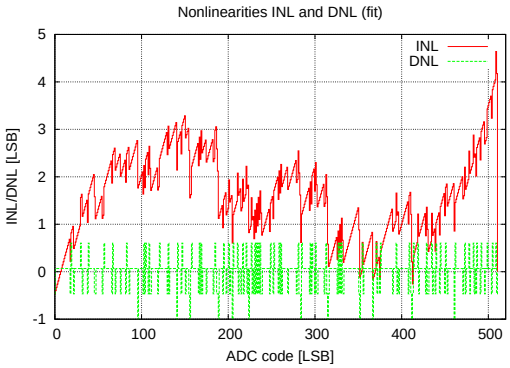


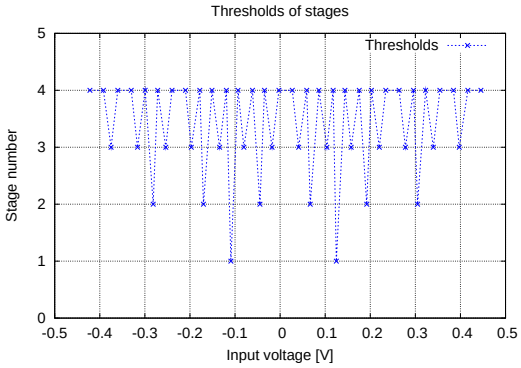





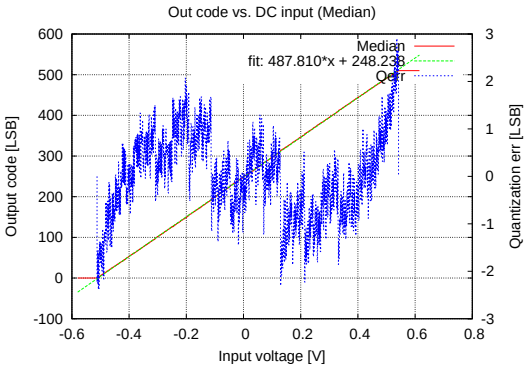

| Type | ENOB |
|---|---|
| XY | 6.24 |
| Fit | 6.32 |

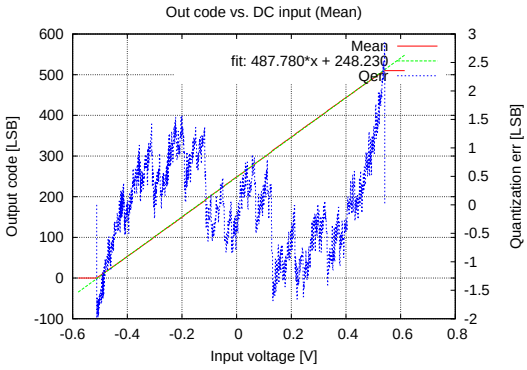
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1092 |
| $+1/4\,V_{ref}$ | 0.1247 |

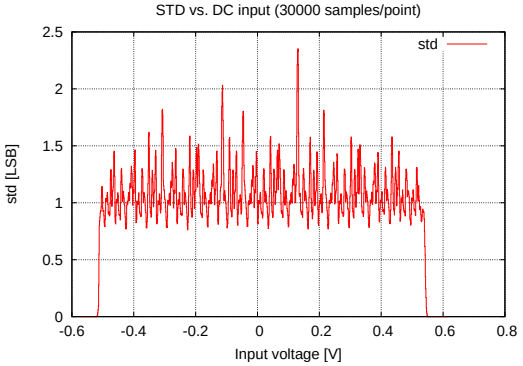
| Missing Code | Number of apperence |
|---|---|
| 96 | 2451 |
| 141 | 16648 |
| 156 | 22 |
| 189 | 2843 |
| 205 | 16874 |
| 224 | 24 |

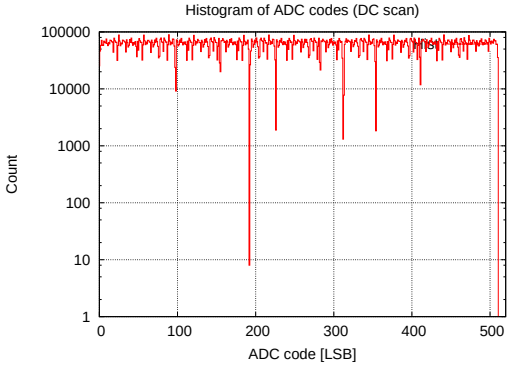
| Missing Code | Number of apperence |
|---|---|
| 284 | 23 |
| 315 | 1966 |
| 352 | 22 |
| 367 | 27962 |
| 412 | 1705 |
| 461 | 20767 |

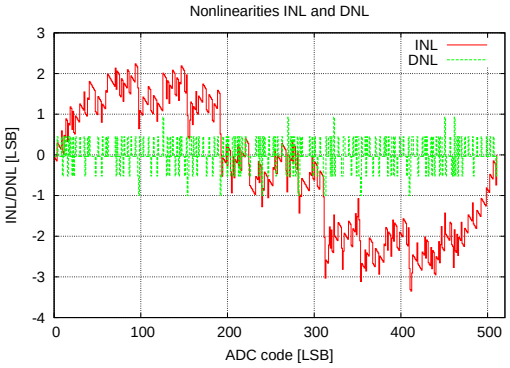
## 4.4 $vrefn = vcm - 0.55$ V, $vrefp = vcm + 0.55$ V

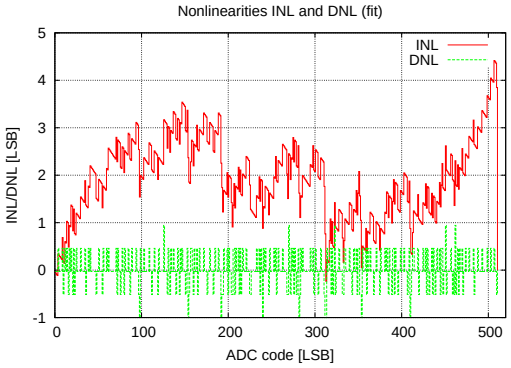


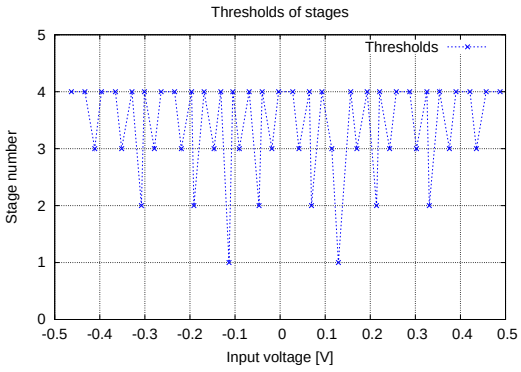



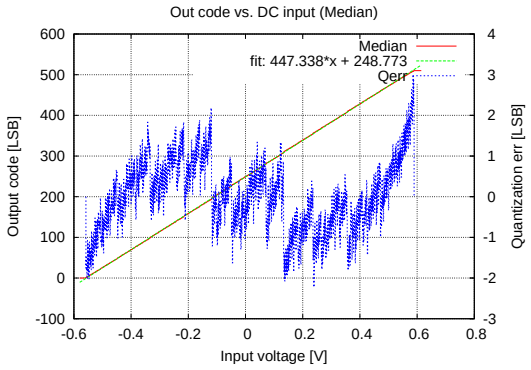

| Type | ENOB |
|---|---|
| XY | 6.49 |
| Fit | 6.13 |

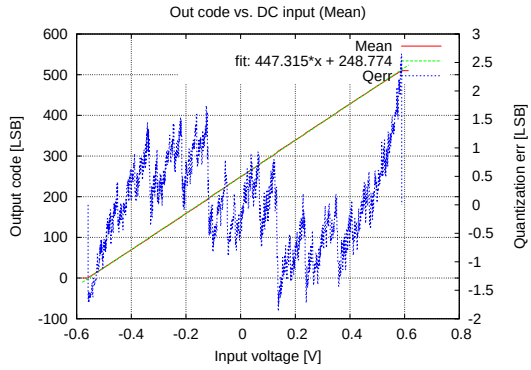
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1134 |
| $+1/4\,V_{ref}$ | 0.1293 |

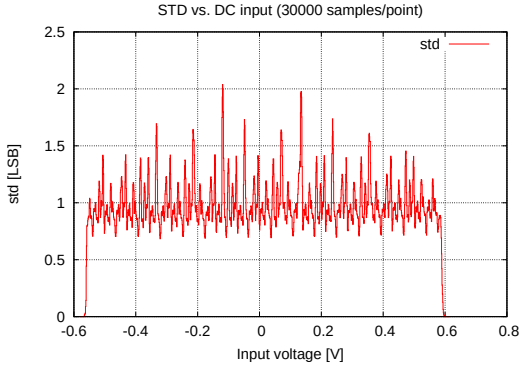
| Missing Code | Number of apperence |
|---|---|
| 98 | 9146 |
| 154 | 28597 |
| 192 | 8 |
| 240 | 31735 |

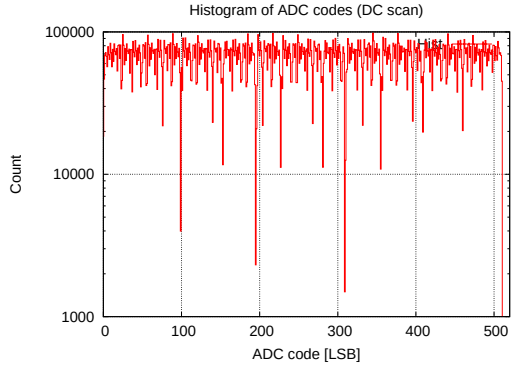
| Missing Code | Number of apperence |
|---|---|
| 282 | 29157 |
| 312 | 1310 |
| 313 | 7718 |
| 354 | 1835 |
| 410 | 35992 |

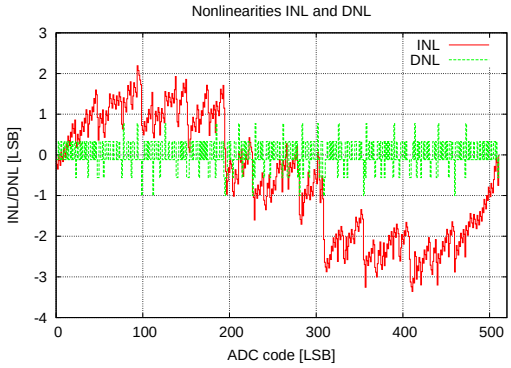
## 4.5 $vrefn = vcm - 0.6$ V, $vrefp = vcm + 0.6$ V

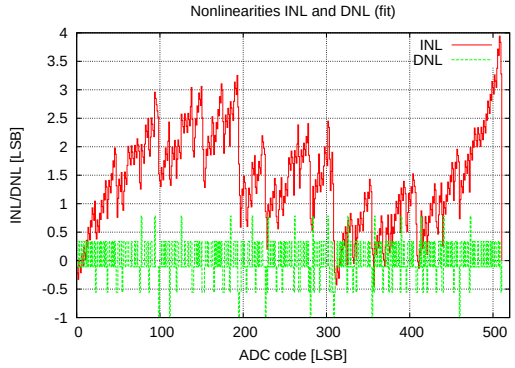


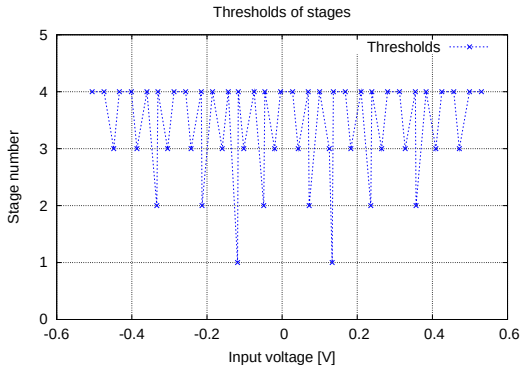




| Type | ENOB |
|---|---|
| XY | 6.52 |
| Fit | 6.46 |

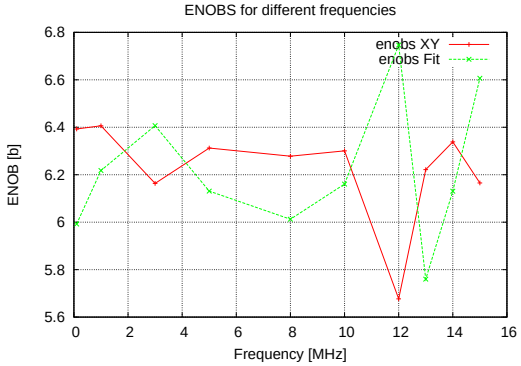
| Type | Threshold [V] |
|---|---|
| $-1/4\,V_{ref}$ | -0.1187 |
| $+1/4\,V_{ref}$ | 0.1332 |

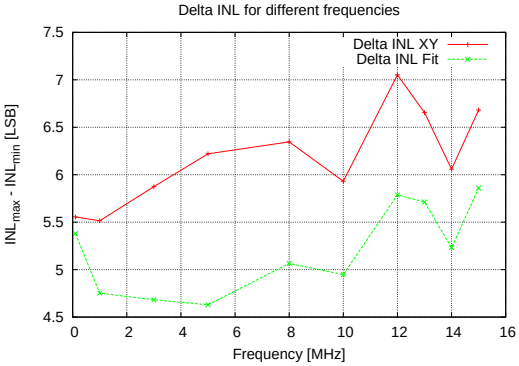
| Missing Code | Number of apperence |
|---|---|
| 99 | 3989 |
| 112 | 45781 |
| 195 | 2313 |
| 227 | 11189 |

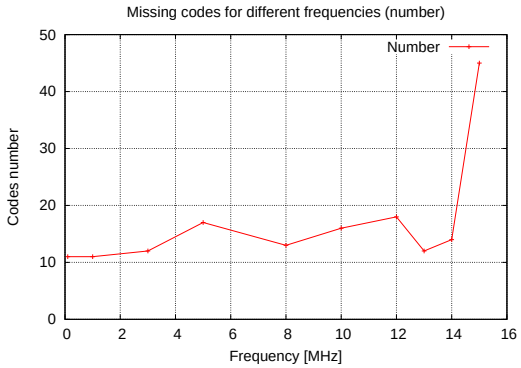
| Missing Code | Number of apperence |
|---|---|
| 281 | 11204 |
| 309 | 1494 |
| 355 | 10873 |
| 460 | 20254 |

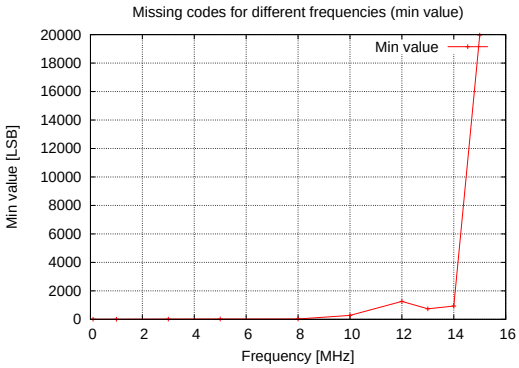
# 5 Summary

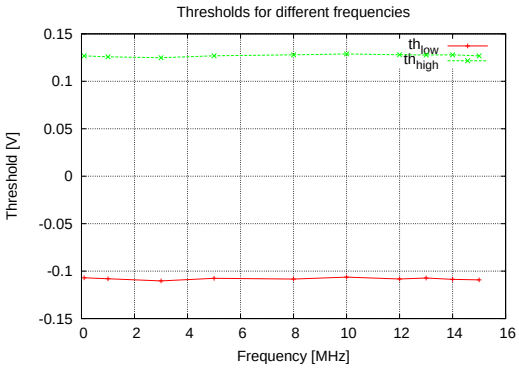
## 5.1 Frequency changes



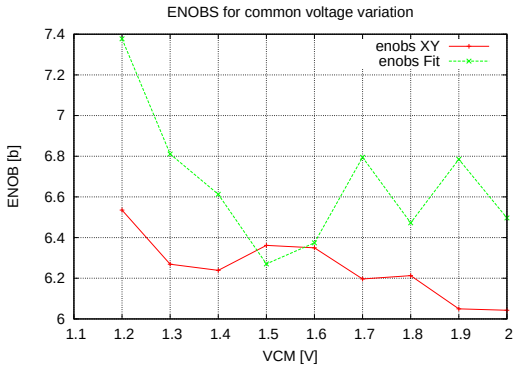



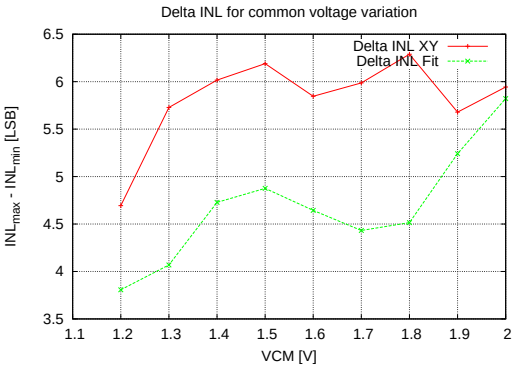



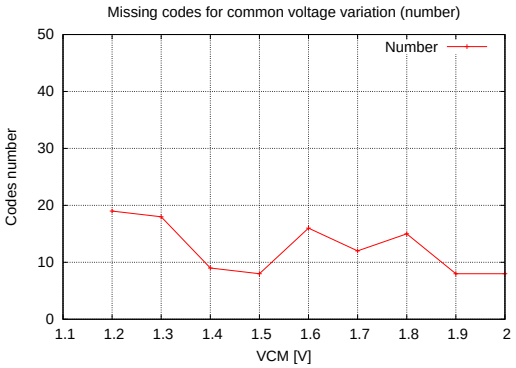



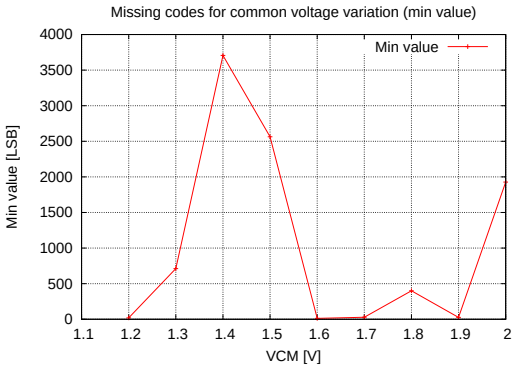

| Frequency [MHz] | $TH_{low}$[V] | $TH_{high}$[V] |
|---|---|---|
| 0 | -0.1070 | 0.1268 |
| 1 | -0.1080 | 0.1258 |
| 3 | -0.1103 | 0.1249 |
| 5 | -0.1076 | 0.1269 |
| 8 | -0.1084 | 0.1279 |
| 10 | -0.1064 | 0.1288 |
| 12 | -0.1082 | 0.1280 |
| 13 | -0.1073 | 0.1277 |
| 14 | -0.1086 | 0.1279 |
| 15 | -0.1092 | 0.1268 |

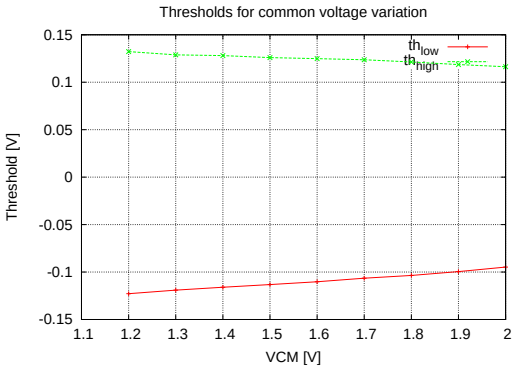
## 5.2 Common voltage changes



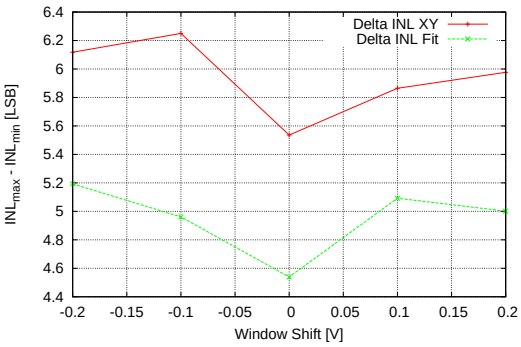


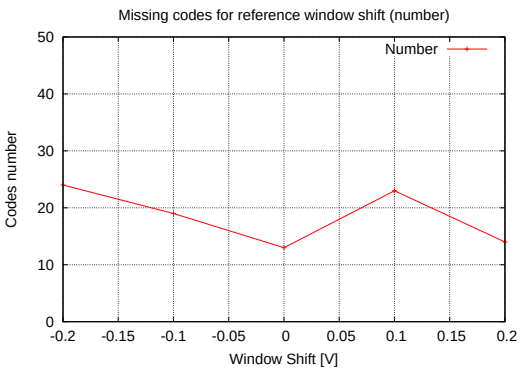



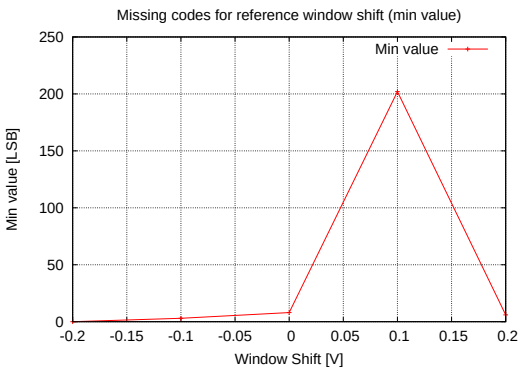



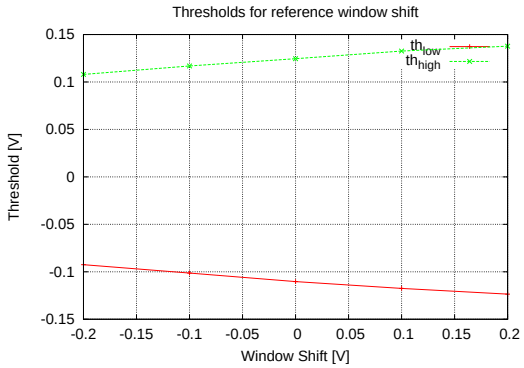

| VCM [V] | $TH_{low}$[V] | $TH_{high}$[V] |
|---|---|---|
| 1.2 | -0.1229 | 0.1323 |
| 1.3 | -0.1191 | 0.1288 |
| 1.4 | -0.1160 | 0.1280 |
| 1.5 | -0.1132 | 0.1259 |
| 1.6 | -0.1103 | 0.1249 |
| 1.7 | -0.1065 | 0.1236 |
| 1.8 | -0.1036 | 0.1213 |
| 1.9 | -0.0995 | 0.1186 |
| 2.0 | -0.0948 | 0.1163 |

## 5.3 Reference window shift

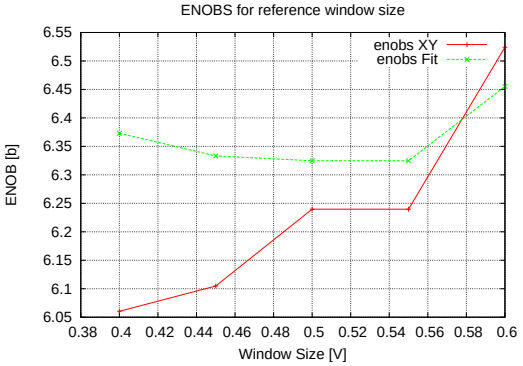



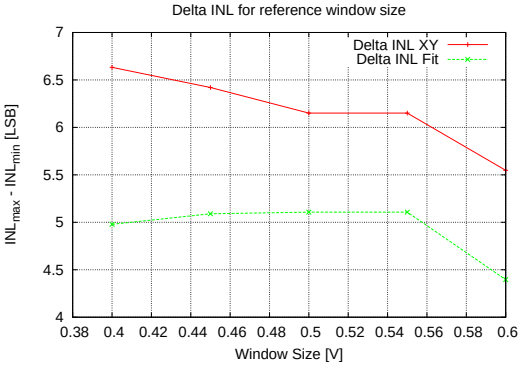



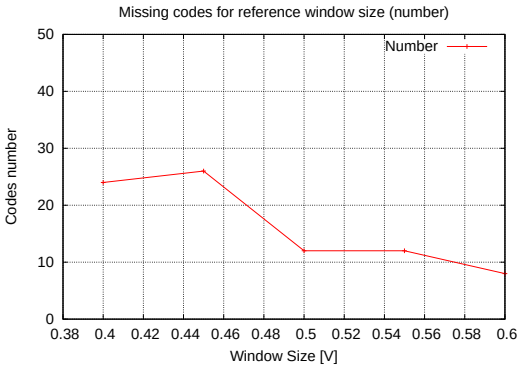


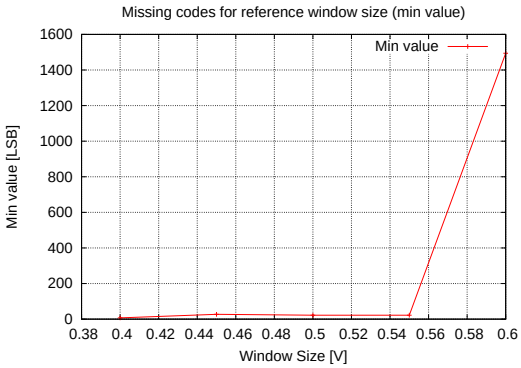

| Window Shift [V] | $TH_{low}$[V] | $TH_{high}$[V] |
|---|---|---|
| -0.2 | -0.0925 | 0.1080 |
| -0.1 | -0.1013 | 0.1169 |
| 0.0 | -0.1103 | 0.1245 |
| 0.1 | -0.1175 | 0.1326 |
| 0.2 | -0.1235 | 0.1377 |

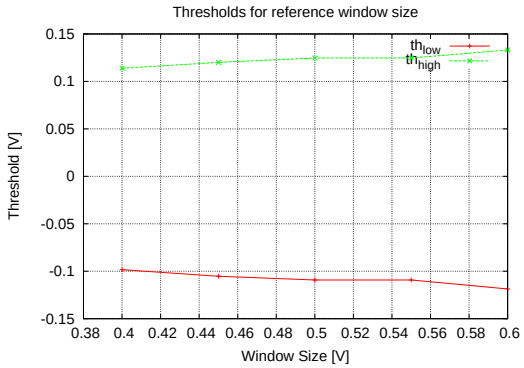
## 5.4 Reference window size




| Window Size [V] | $TH_{low}$[V] | $TH_{high}$[V] |
|---|---|---|
| 0.40 | -0.0984 | 0.1139 |
| 0.45 | -0.1053 | 0.1201 |
| 0.50 | -0.1092 | 0.1247 |
| 0.55 | -0.1092 | 0.1247 |
| 0.60 | -0.1187 | 0.1332 |