# Appendix: GSM

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# Appendix A: Effective (Isotropic) Radiated Power Output Data

## Test Result

| Band | Channel | Slot | Conducted Power(dBm) | ERP(dBm) | Limit(dBm) | Verdict |
|---|---|---|---|---|---|---|
| GSM850 | 128 | _ | 32.63 | 32.12 | 38.45 | PASS |
| GSM850 | 190 | _ | 32.94 | 32.43 | 38.45 | PASS |
| GSM850 | 251 | _ | 32.70 | 32.19 | 38.45 | PASS |
| GPRS850 | 128 | 1 | 32.62 | 32.11 | 38.45 | PASS |
| GPRS850 | 128 | 2 | 31.74 | 31.23 | 38.45 | PASS |
| GPRS850 | 128 | 3 | 29.80 | 29.29 | 38.45 | PASS |
| GPRS850 | 128 | 4 | 28.51 | 28.00 | 38.45 | PASS |
| GPRS850 | 190 | 1 | 32.85 | 32.34 | 38.45 | PASS |
| GPRS850 | 190 | 2 | 31.82 | 31.31 | 38.45 | PASS |
| GPRS850 | 190 | 3 | 30.13 | 29.62 | 38.45 | PASS |
| GPRS850 | 190 | 4 | 28.90 | 28.39 | 38.45 | PASS |
| GPRS850 | 251 | 1 | 32.60 | 32.09 | 38.45 | PASS |
| GPRS850 | 251 | 2 | 31.79 | 31.28 | 38.45 | PASS |
| GPRS850 | 251 | 3 | 29.87 | 29.36 | 38.45 | PASS |
| GPRS850 | 251 | 4 | 28.60 | 28.09 | 38.45 | PASS |
| EGPRS850 | 128 | 1 | 27.60 | 27.09 | 38.45 | PASS |
| EGPRS850 | 128 | 2 | 26.28 | 25.77 | 38.45 | PASS |
| EGPRS850 | 128 | 3 | 23.98 | 23.47 | 38.45 | PASS |
| EGPRS850 | 128 | 4 | 22.82 | 22.31 | 38.45 | PASS |
| EGPRS850 | 190 | 1 | 27.55 | 27.04 | 38.45 | PASS |
| EGPRS850 | 190 | 2 | 26.29 | 25.78 | 38.45 | PASS |
| EGPRS850 | 190 | 3 | 24.02 | 23.51 | 38.45 | PASS |
| EGPRS850 | 190 | 4 | 22.83 | 22.32 | 38.45 | PASS |
| EGPRS850 | 251 | 1 | 27.62 | 27.11 | 38.45 | PASS |
| EGPRS850 | 251 | 2 | 26.38 | 25.87 | 38.45 | PASS |
| EGPRS850 | 251 | 3 | 24.12 | 23.61 | 38.45 | PASS |
| EGPRS850 | 251 | 4 | 22.91 | 22.4 | 38.45 | PASS |

| Band | Channel | Slot | Conducted Power(dBm) | EIRP(dBm) | Limit(dBm) | Verdict |
|---|---|---|---|---|---|---|
| GSM1900 | 512 | _ | 29.57 | 30.38 | 33.01 | PASS |
| GSM1900 | 661 | _ | 29.70 | 30.51 | 33.01 | PASS |
| GSM1900 | 810 | _ | 29.81 | 30.62 | 33.01 | PASS |
| GPRS1900 | 512 | 1 | 29.58 | 30.39 | 33.01 | PASS |
| GPRS1900 | 512 | 2 | 28.76 | 29.57 | 33.01 | PASS |
| GPRS1900 | 512 | 3 | 26.99 | 27.8 | 33.01 | PASS |
| GPRS1900 | 512 | 4 | 25.78 | 26.59 | 33.01 | PASS |
| GPRS1900 | 661 | 1 | 29.64 | 30.45 | 33.01 | PASS |
| GPRS1900 | 661 | 2 | 28.78 | 29.59 | 33.01 | PASS |
| GPRS1900 | 661 | 3 | 27.05 | 27.86 | 33.01 | PASS |
| GPRS1900 | 661 | 4 | 25.84 | 26.65 | 33.01 | PASS |
| GPRS1900 | 810 | 1 | 29.73 | 30.54 | 33.01 | PASS |
| GPRS1900 | 810 | 2 | 28.81 | 29.62 | 33.01 | PASS |
| GPRS1900 | 810 | 3 | 27.04 | 27.85 | 33.01 | PASS |
| GPRS1900 | 810 | 4 | 25.89 | 26.70 | 33.01 | PASS |
| EGPRS1900 | 512 | 1 | 26.45 | 27.26 | 33.01 | PASS |
| EGPRS1900 | 512 | 2 | 25.06 | 25.87 | 33.01 | PASS |
| EGPRS1900 | 512 | 3 | 22.89 | 23.7 | 33.01 | PASS |
| EGPRS1900 | 512 | 4 | 21.68 | 22.49 | 33.01 | PASS |
| EGPRS1900 | 661 | 1 | 26.54 | 27.35 | 33.01 | PASS |
| EGPRS1900 | 661 | 2 | 25.22 | 26.03 | 33.01 | PASS |
| EGPRS1900 | 661 | 3 | 22.97 | 23.78 | 33.01 | PASS |
| EGPRS1900 | 661 | 4 | 21.86 | 22.67 | 33.01 | PASS |
| EGPRS1900 | 810 | 1 | 26.55 | 27.36 | 33.01 | PASS |
| EGPRS1900 | 810 | 2 | 25.29 | 26.1 | 33.01 | PASS |
| EGPRS1900 | 810 | 3 | 23.04 | 23.85 | 33.01 | PASS |
| EGPRS1900 | 810 | 4 | 21.79 | 22.6 | 33.01 | PASS |

Remark:

a.For getting the EIRP (Effcient Isotropic Radiated Power), the following formula should be taken to calculate it,

ERP(dBm) = Conducted output powe(dBm) + antenna gain (dBd)

EIRP(dBm) = Conducted output powe(dBm) + antenna gain (dBi)

EIRP=ERP+2.15dB

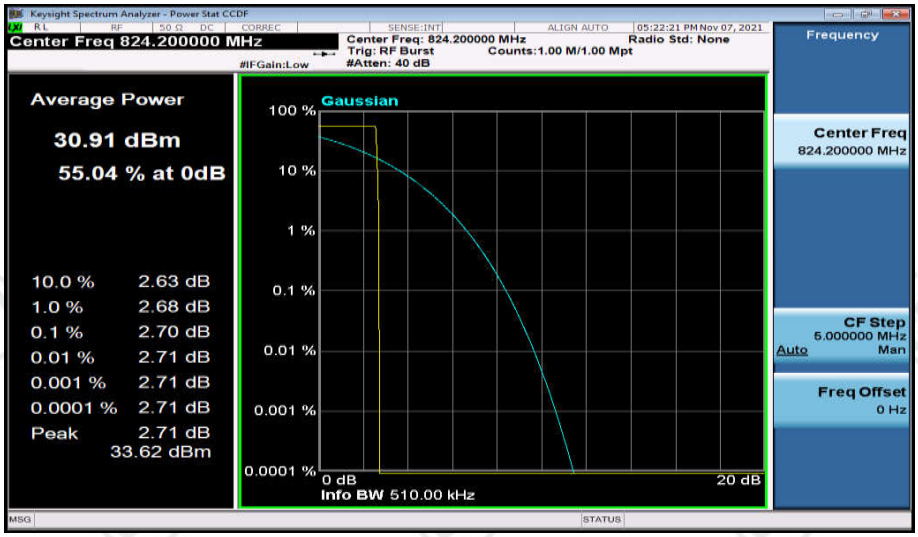
# Appendix B: Peak-to-Average Ratio(CCDF)

## Test Result

| Band | Channel | Result(dB) | Limit(dB) | Verdict |
|---|---|---|---|---|
| GSM850 | 128 | 2.70 | 13 | PASS |
| GSM850 | 190 | 2.69 | 13 | PASS |
| GSM850 | 251 | 2.71 | 13 | PASS |
| GPRS850 | 128 | 2.71 | 13 | PASS |
| GPRS850 | 190 | 2.70 | 13 | PASS |
| GPRS850 | 251 | 2.71 | 13 | PASS |
| EGPRS850 | 128 | 5.93 | 13 | PASS |
| EGPRS850 | 190 | 5.95 | 13 | PASS |
| EGPRS850 | 251 | 5.96 | 13 | PASS |
| GSM1900 | 512 | 2.78 | 13 | PASS |
| GSM1900 | 661 | 2.78 | 13 | PASS |
| GSM1900 | 810 | 2.78 | 13 | PASS |
| GPRS1900 | 512 | 2.78 | 13 | PASS |
| GPRS1900 | 661 | 2.78 | 13 | PASS |
| GPRS1900 | 810 | 2.79 | 13 | PASS |
| EGPRS1900 | 512 | 6.12 | 13 | PASS |
| EGPRS1900 | 661 | 6.19 | 13 | PASS |
| EGPRS1900 | 810 | 6.19 | 13 | PASS |

## Test Graphs

GSM850-128

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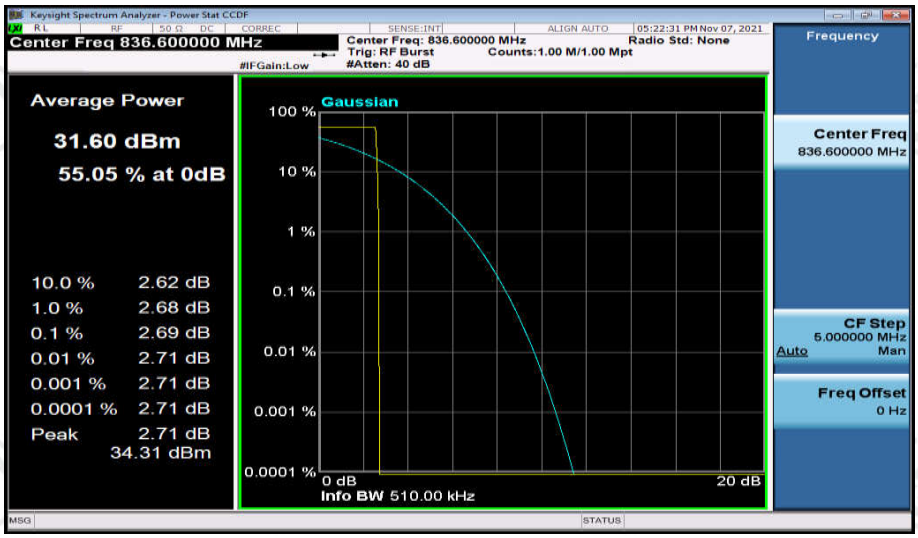

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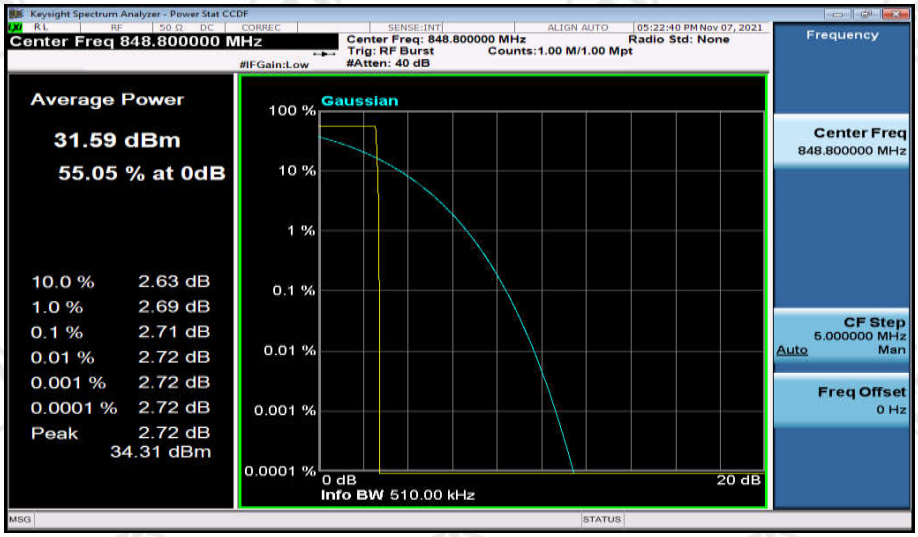


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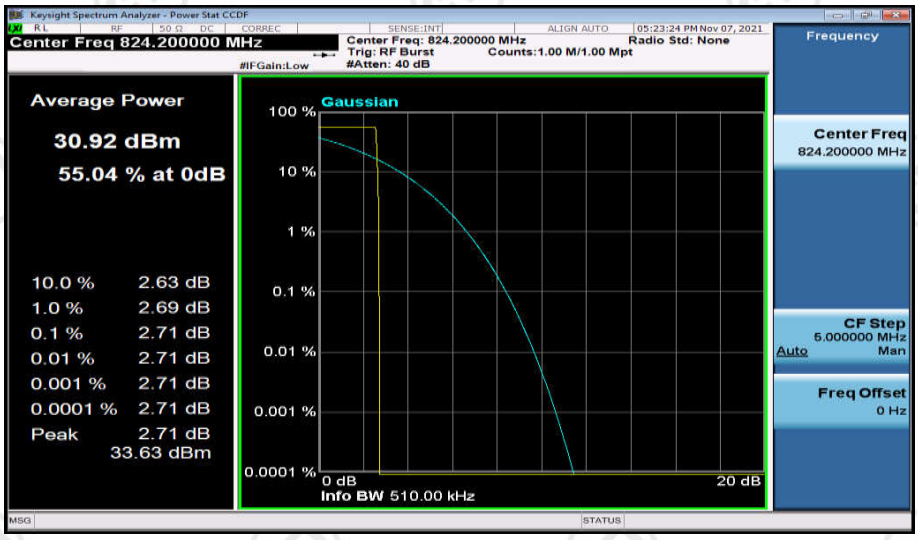

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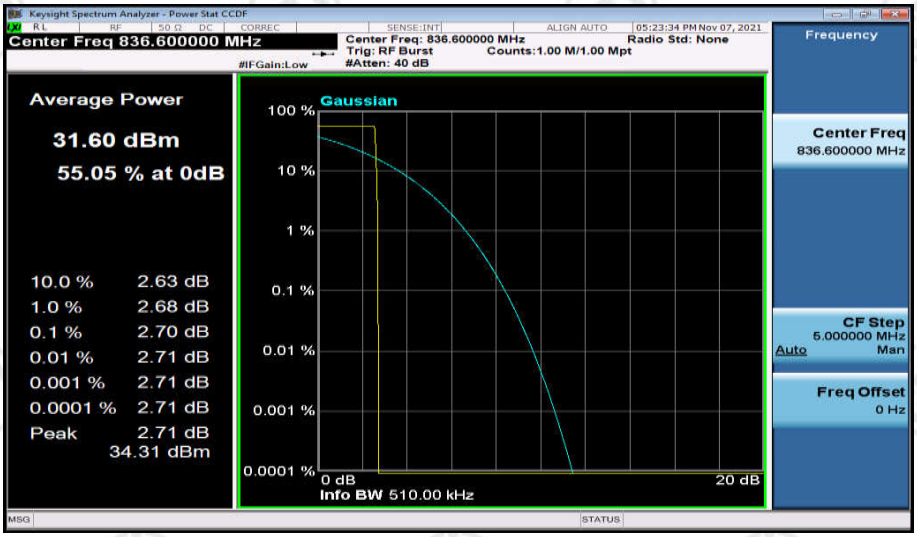


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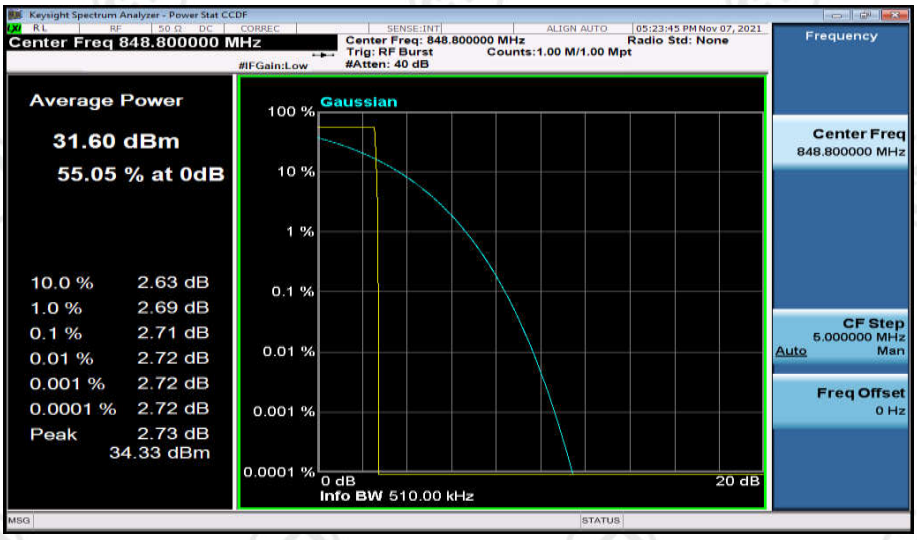

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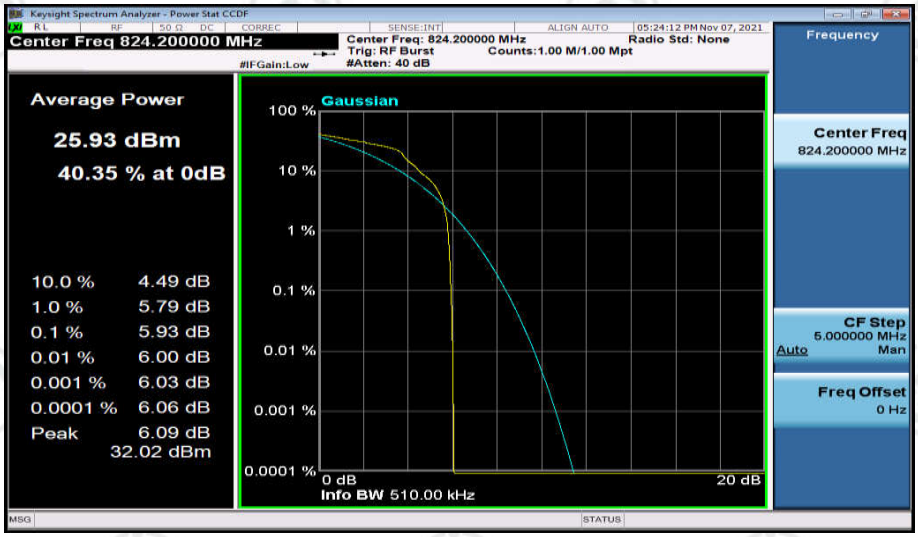


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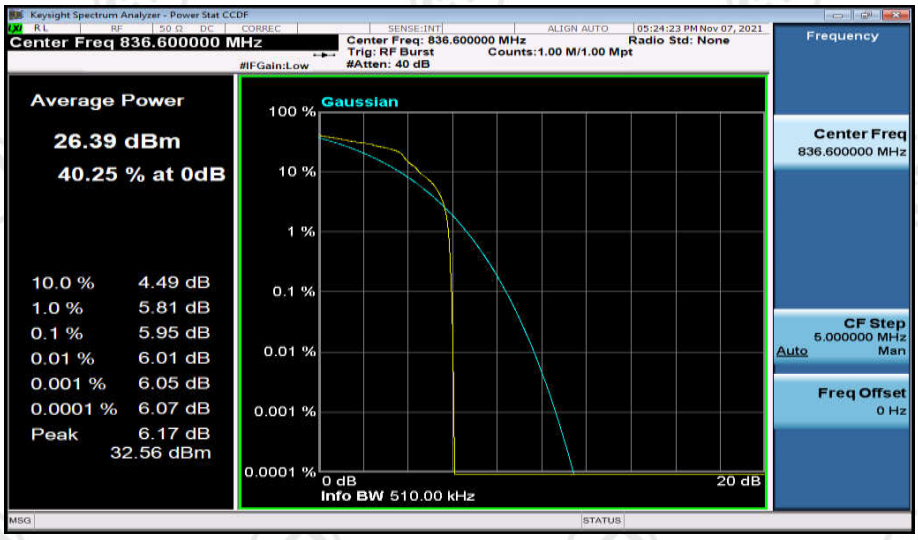

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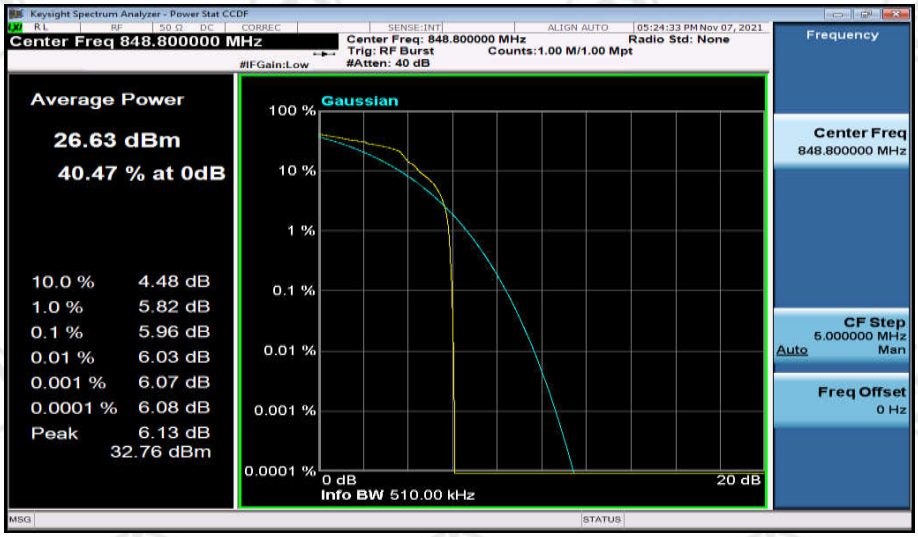


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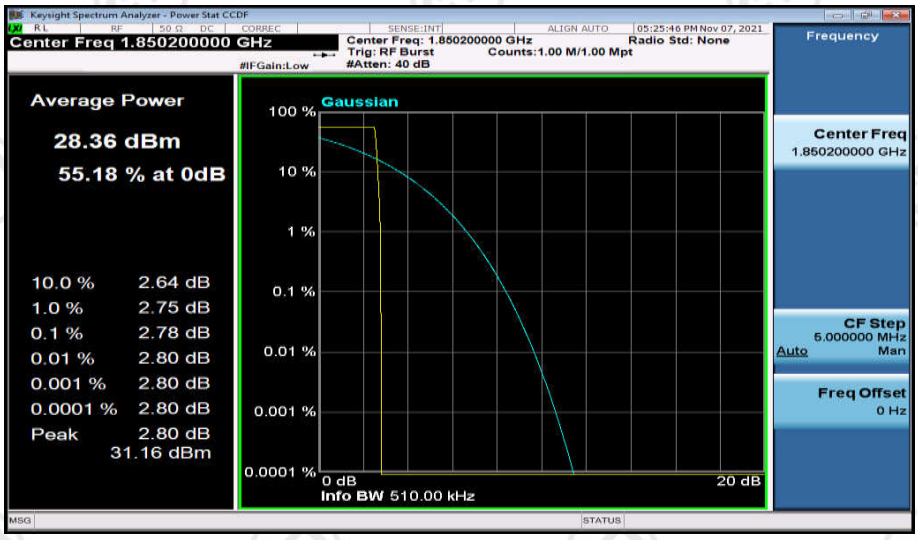

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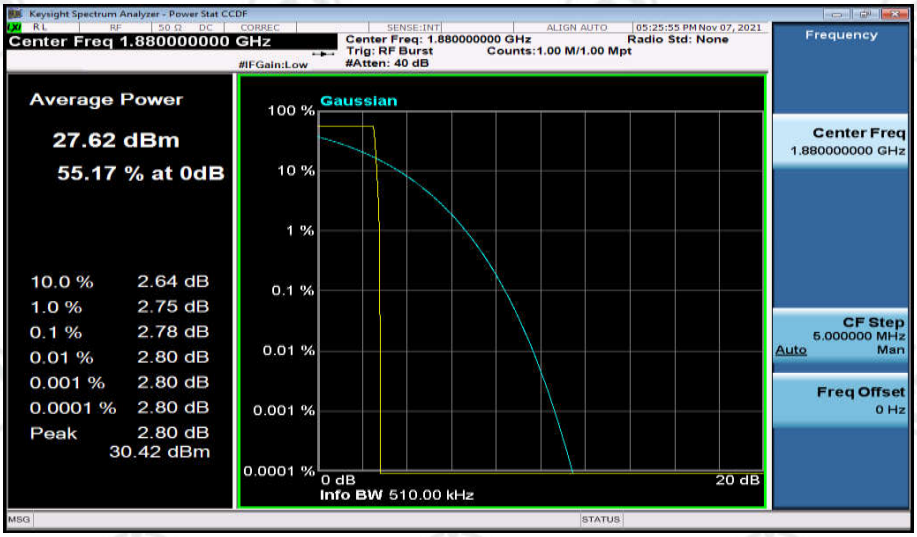


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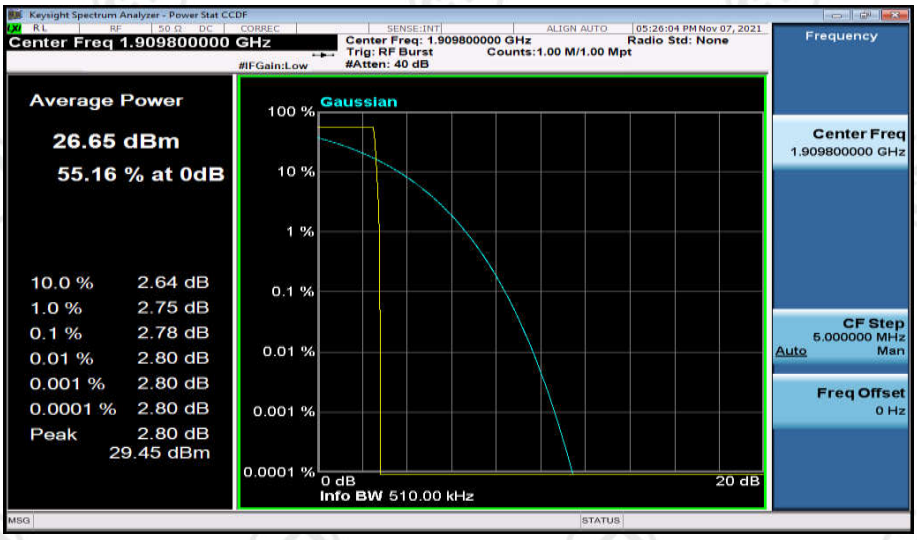

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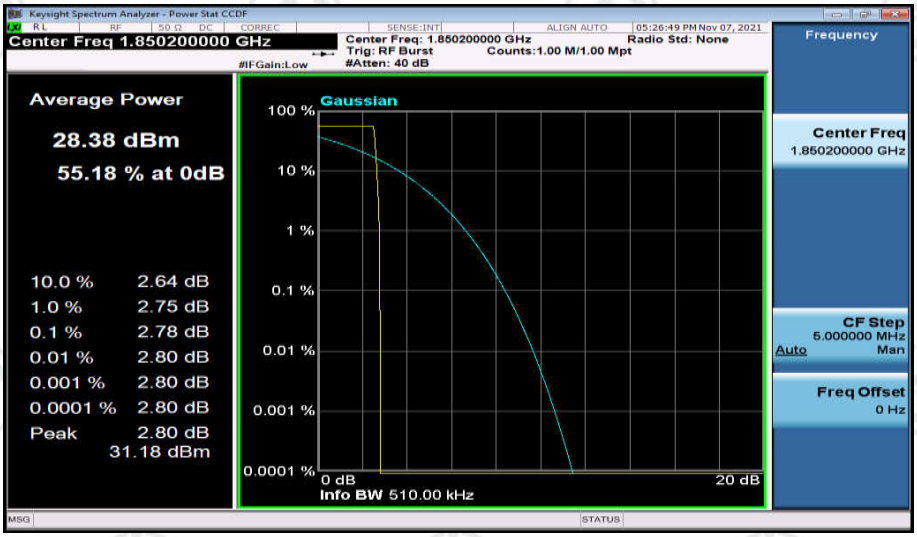


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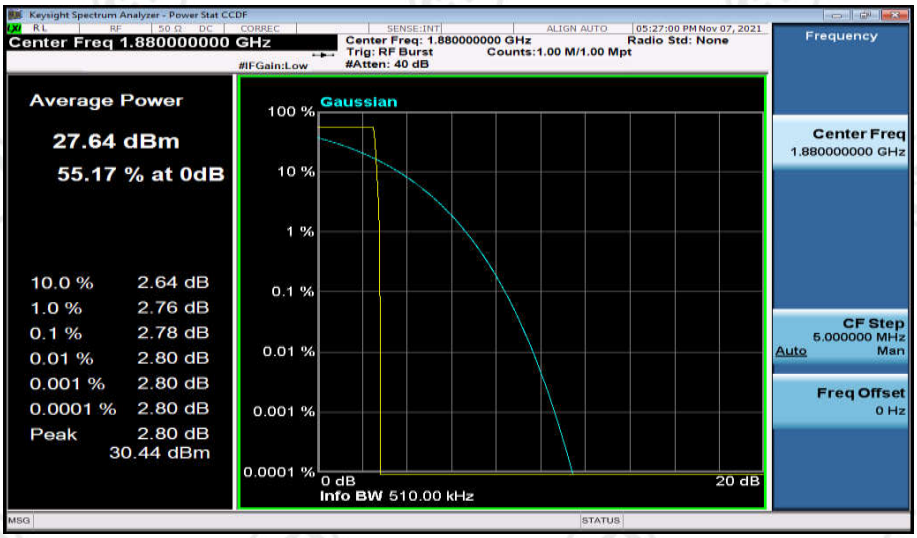

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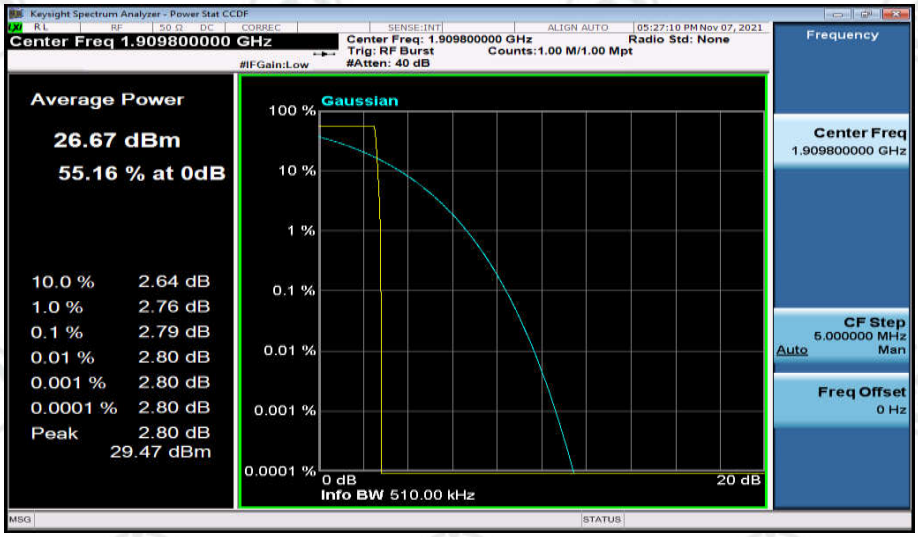


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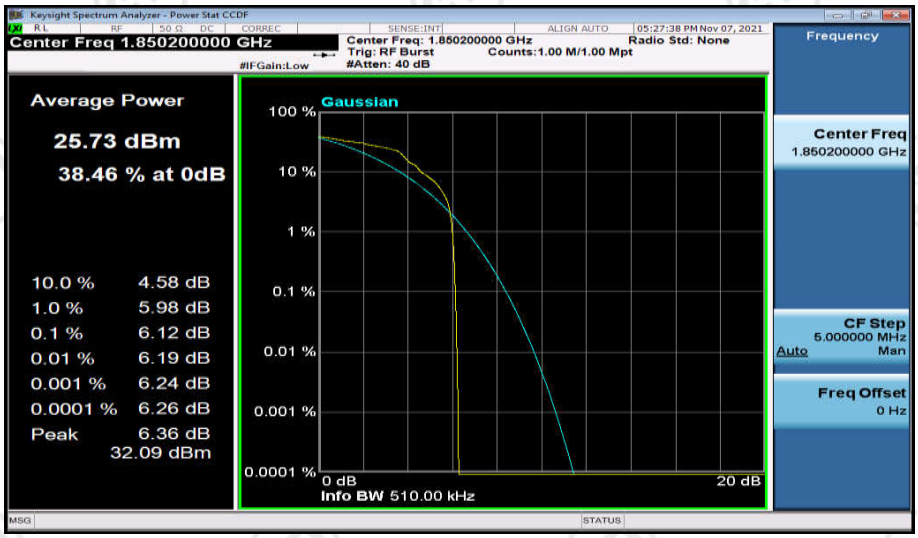

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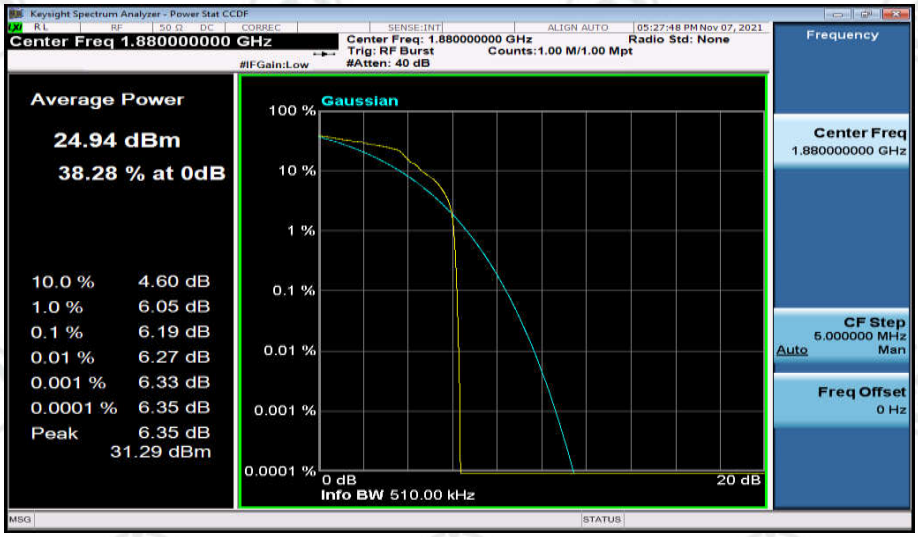


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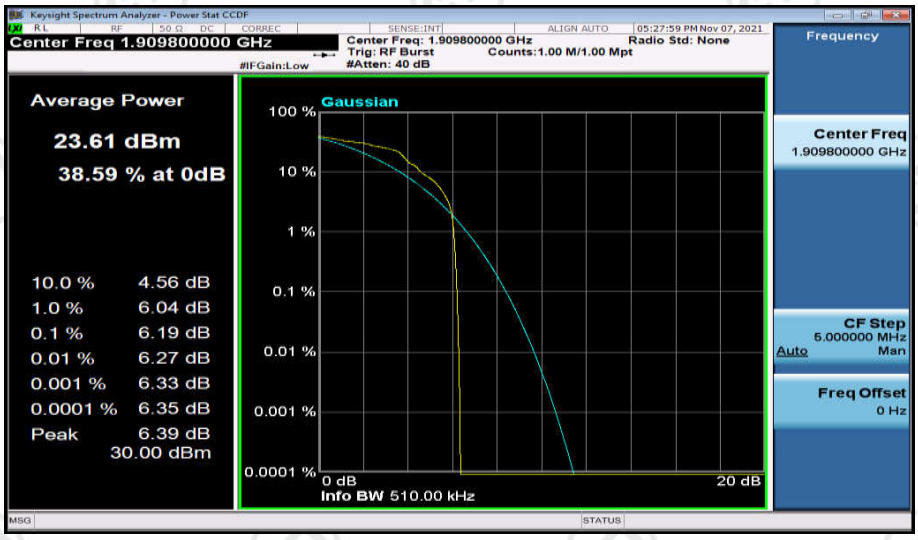


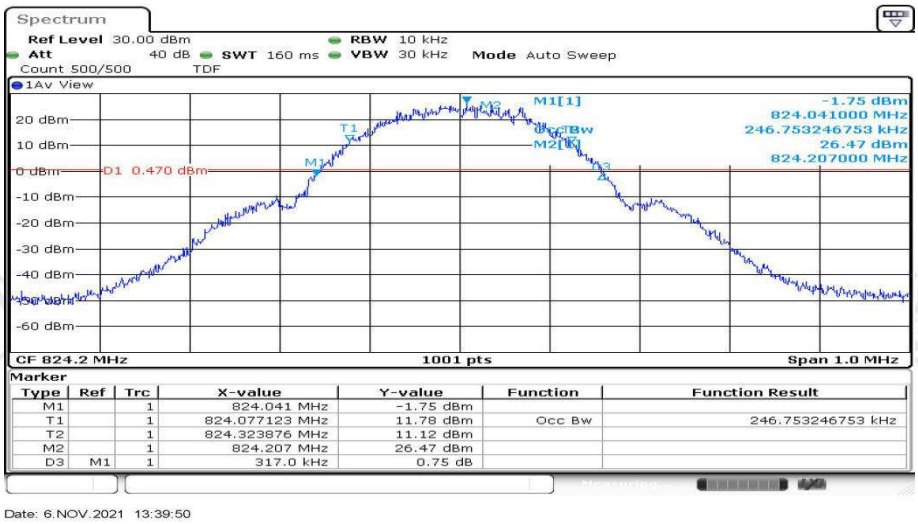
# Appendix C: 26dB Bandwidth and Occupied Bandwidth

## Test Result

| Band | Channel | Occupied Bandwidth (MHz) | 26dB Bandwidth (MHz) | Limit (MHz) | Verdict |
|---|---|---|---|---|---|
| GSM850 | 128 | 0.247 | 0.317 | --- | PASS |
| GSM850 | 190 | 0.247 | 0.312 | --- | PASS |
| GSM850 | 251 | 0.247 | 0.321 | --- | PASS |
| GPRS850 | 128 | 0.245 | 0.320 | --- | PASS |
| GPRS850 | 190 | 0.246 | 0.318 | --- | PASS |
| GPRS850 | 251 | 0.244 | 0.317 | --- | PASS |
| EGPRS850 | 128 | 0.247 | 0.315 | --- | PASS |
| EGPRS850 | 190 | 0.246 | 0.315 | --- | PASS |
| EGPRS850 | 251 | 0.246 | 0.310 | --- | PASS |
| GSM1900 | 512 | 0.246 | 0.308 | --- | PASS |
| GSM1900 | 661 | 0.247 | 0.315 | --- | PASS |
| GSM1900 | 810 | 0.246 | 0.311 | --- | PASS |
| GPRS1900 | 512 | 0.246 | 0.315 | --- | PASS |
| GPRS1900 | 661 | 0.246 | 0.323 | --- | PASS |
| GPRS1900 | 810 | 0.247 | 0.321 | --- | PASS |
| EGPRS1900 | 512 | 0.242 | 0.307 | --- | PASS |
| EGPRS1900 | 661 | 0.243 | 0.311 | --- | PASS |
| EGPRS1900 | 810 | 0.242 | 0.308 | --- | PASS |

## Test Graphs

GSM850-128

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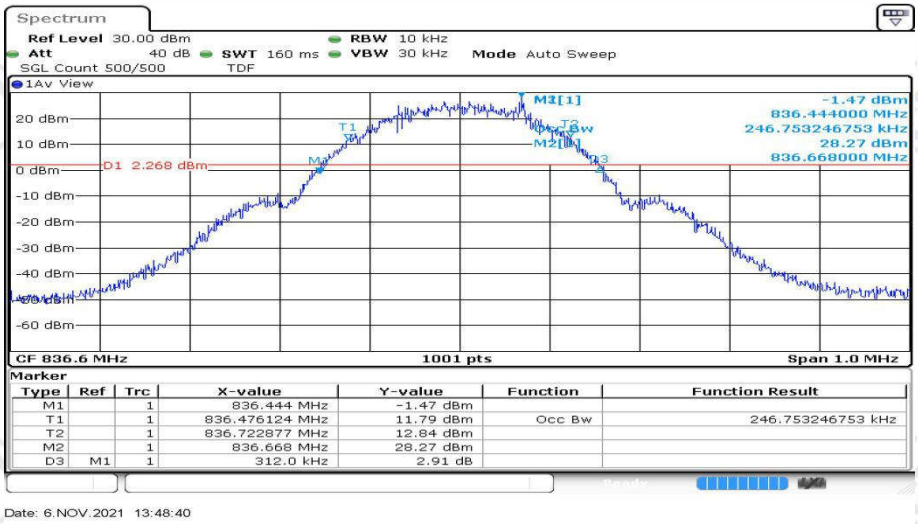

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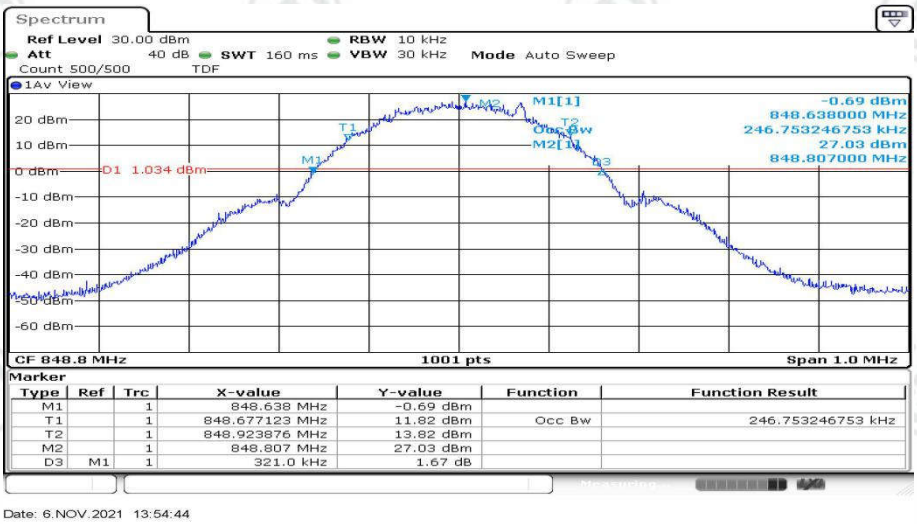


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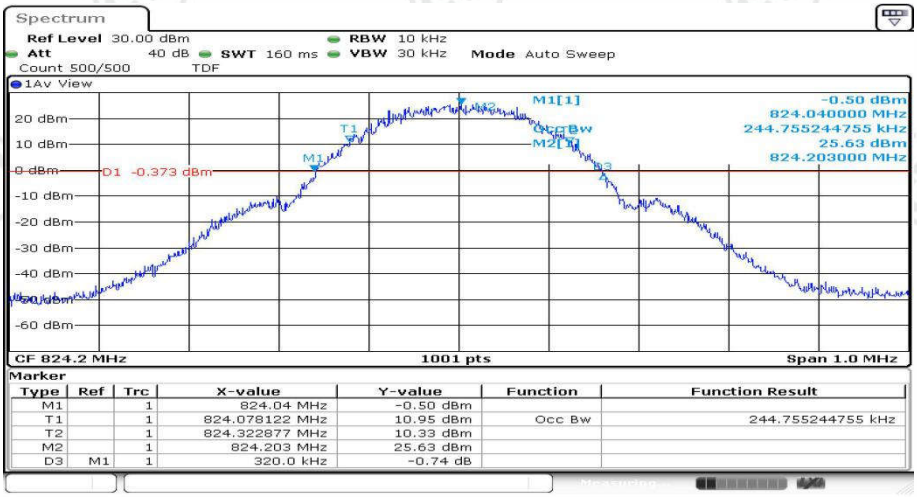


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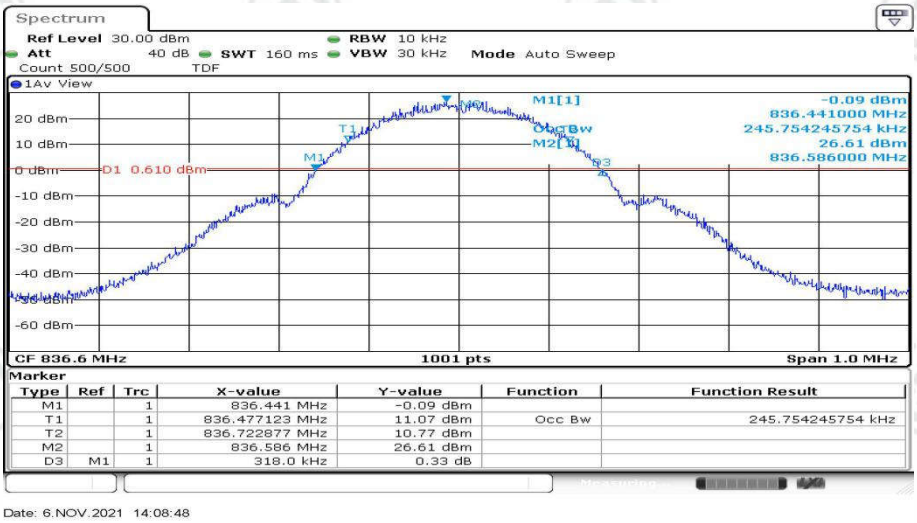


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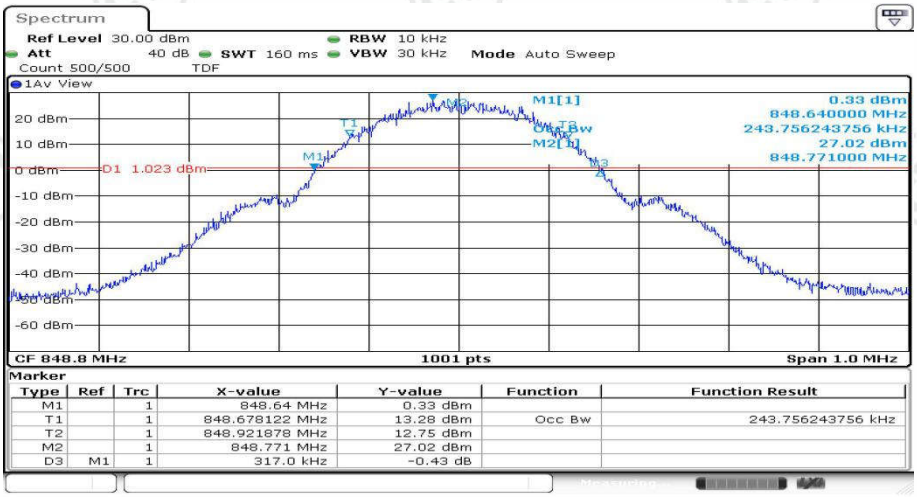


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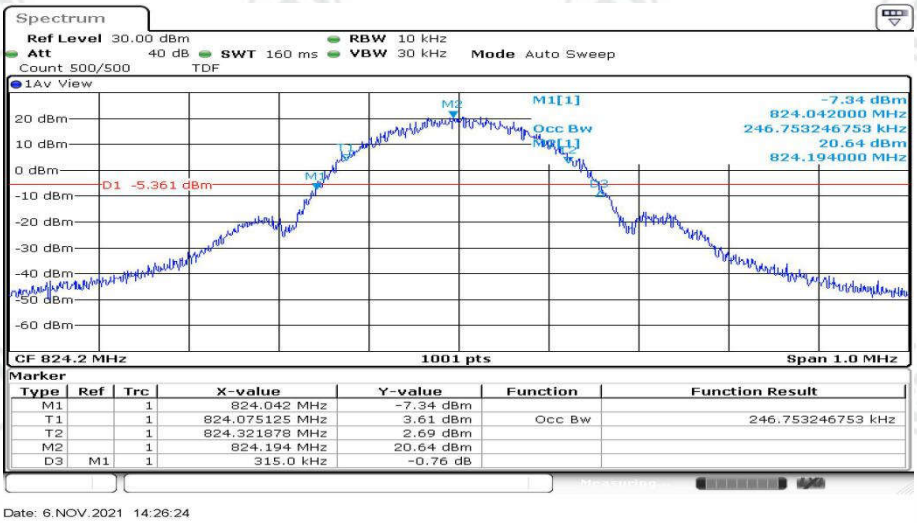


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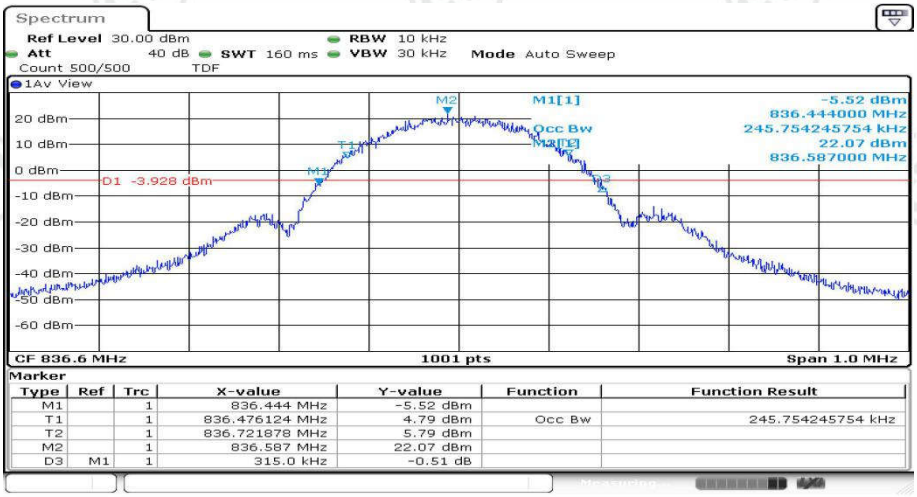


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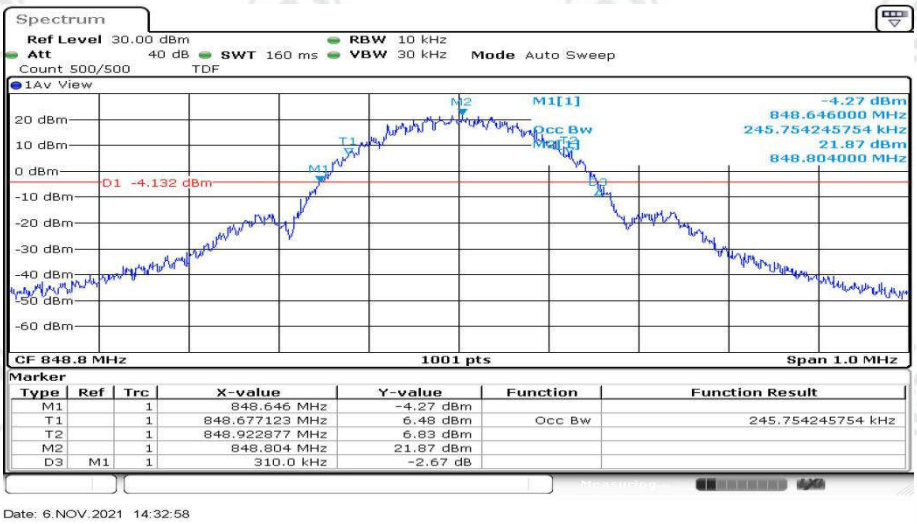


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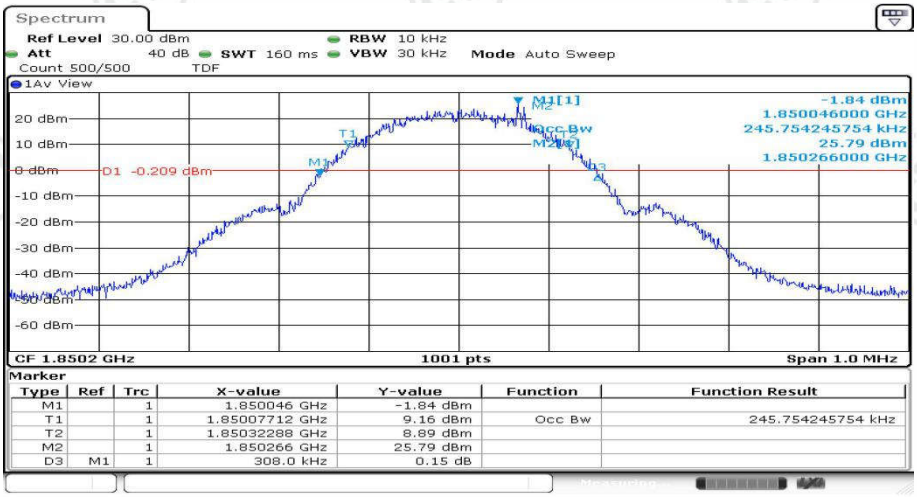


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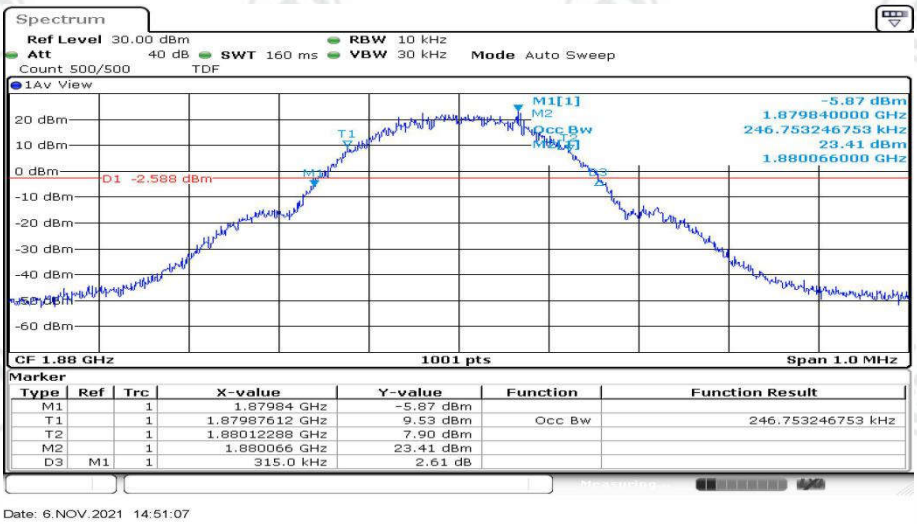


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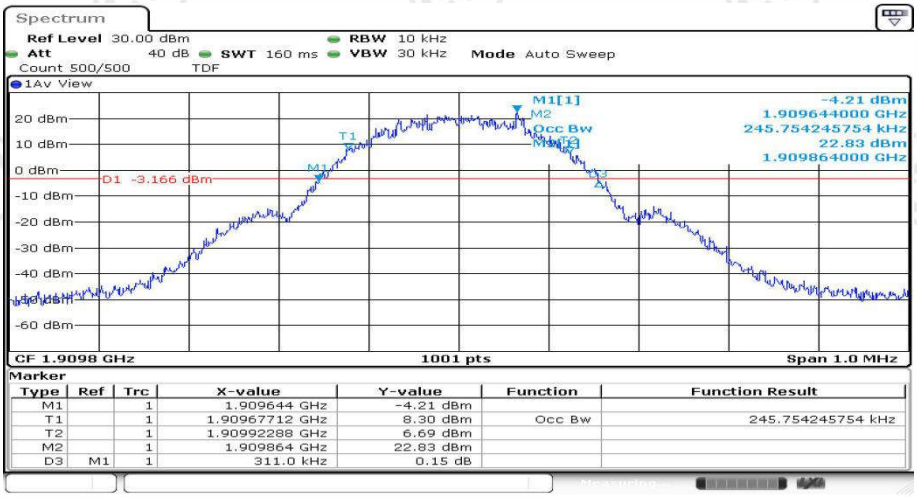


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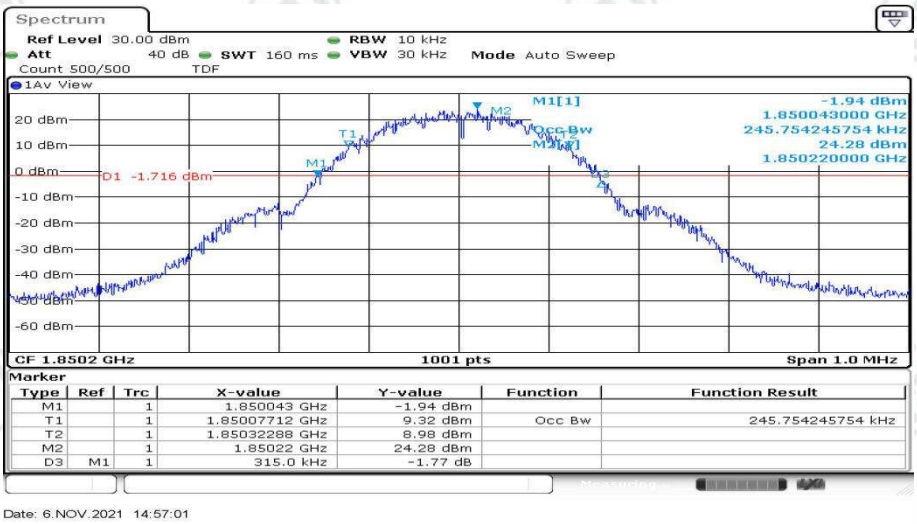


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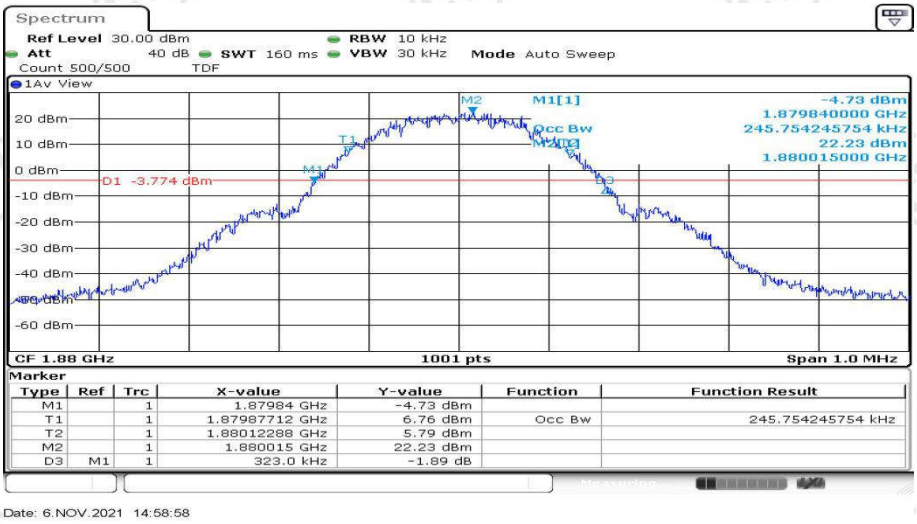


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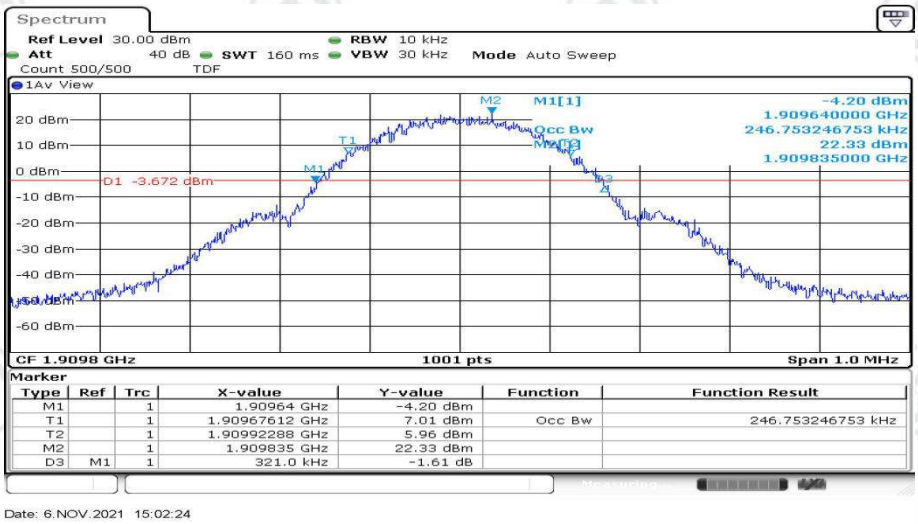


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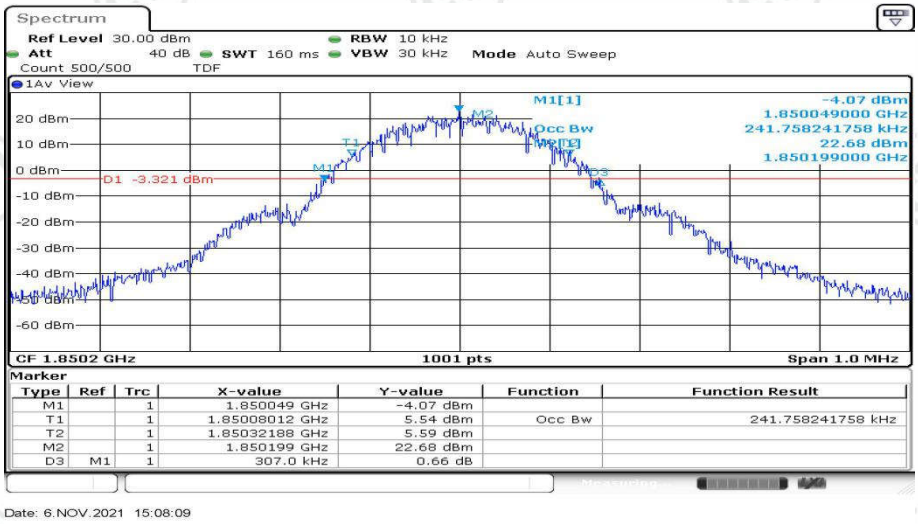


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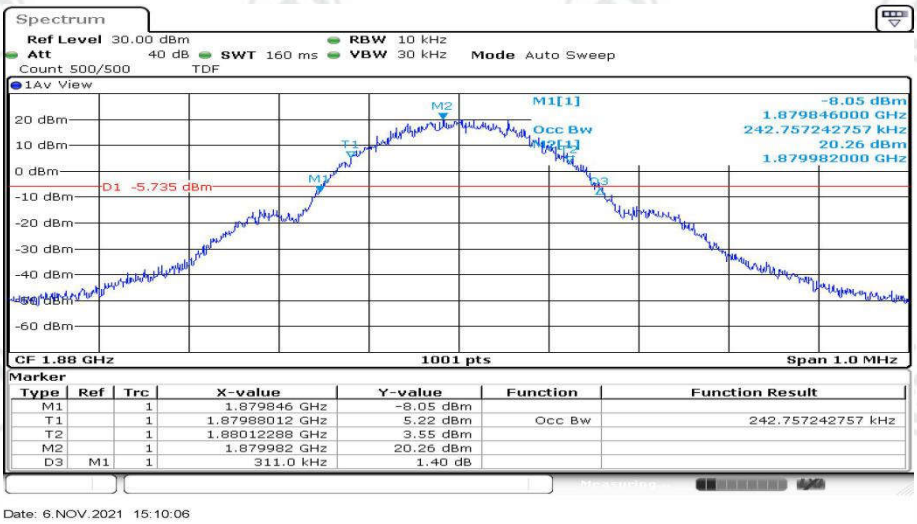
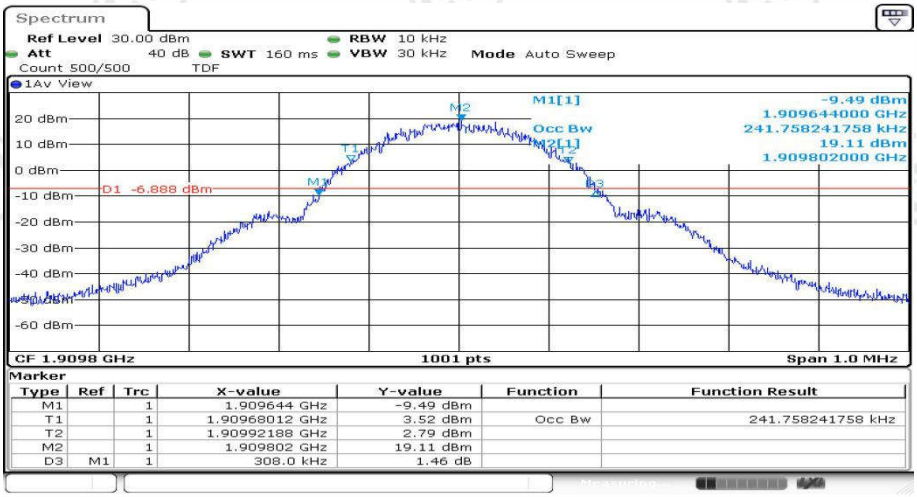



Date: 6.NOV.2021 15:10:06

EGPRS1900-810




Date: 6.NOV.2021 15:12:04

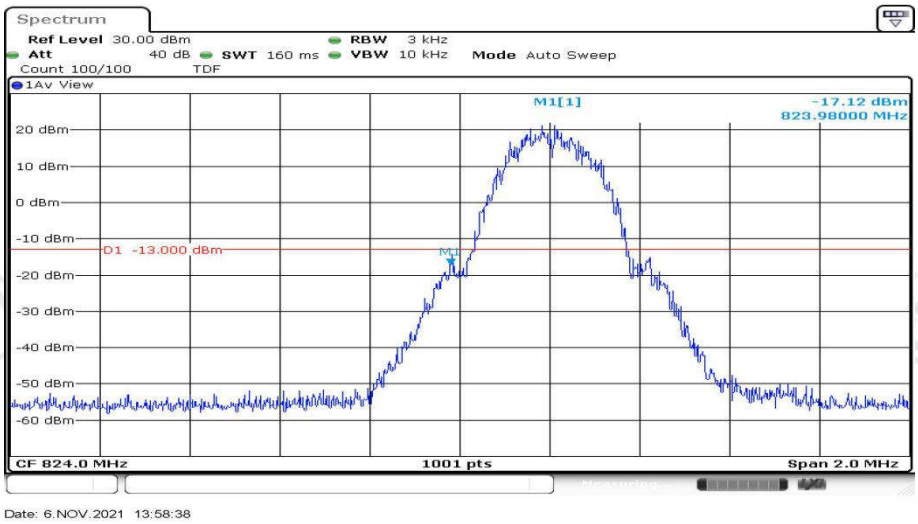
# Appendix D: Band Edge

## Test Result

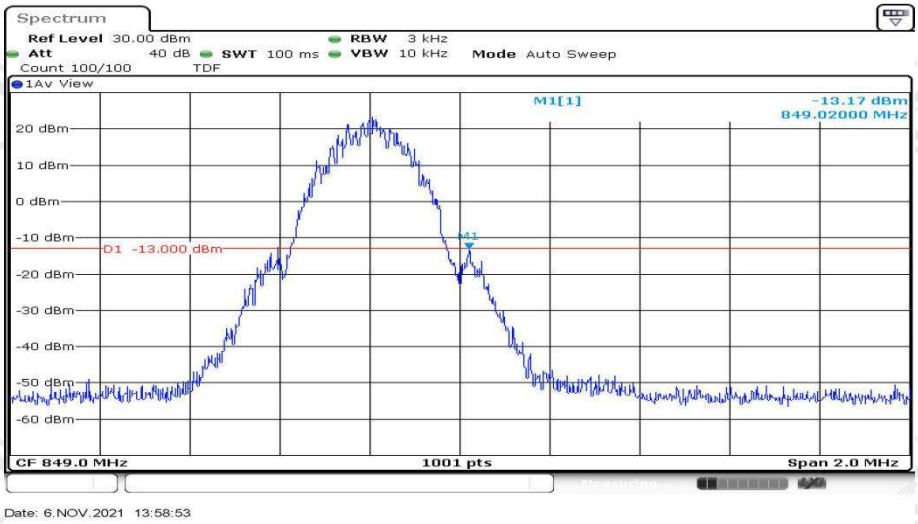
| Band | Channel | Freq (MHz) | Result (dBm) | Limit(dBm) | Verdict |
|---|---|---|---|---|---|
| GSM850 | 128 | 823.98 | <-13 | -13 | PASS |
| GSM850 | 251 | 849.02 | <-13 | -13 | PASS |
| GPRS850 | 128 | 824.00 | <-13 | -13 | PASS |
| GPRS850 | 251 | 849.02 | <-13 | -13 | PASS |
| EGPRS850 | 128 | 823.98 | <-13 | -13 | PASS |
| EGPRS850 | 251 | 849.02 | <-13 | -13 | PASS |
| GSM1900 | 512 | 1849.98 | <-13 | -13 | PASS |
| GSM1900 | 810 | 1910.02 | <-13 | -13 | PASS |
| GPRS1900 | 512 | 1850.00 | <-13 | -13 | PASS |
| GPRS1900 | 810 | 1910.00 | <-13 | -13 | PASS |
| EGPRS1900 | 512 | 1849.98 | <-13 | -13 | PASS |
| EGPRS1900 | 810 | 1910.02 | <-13 | -13 | PASS |

## Test Graphs

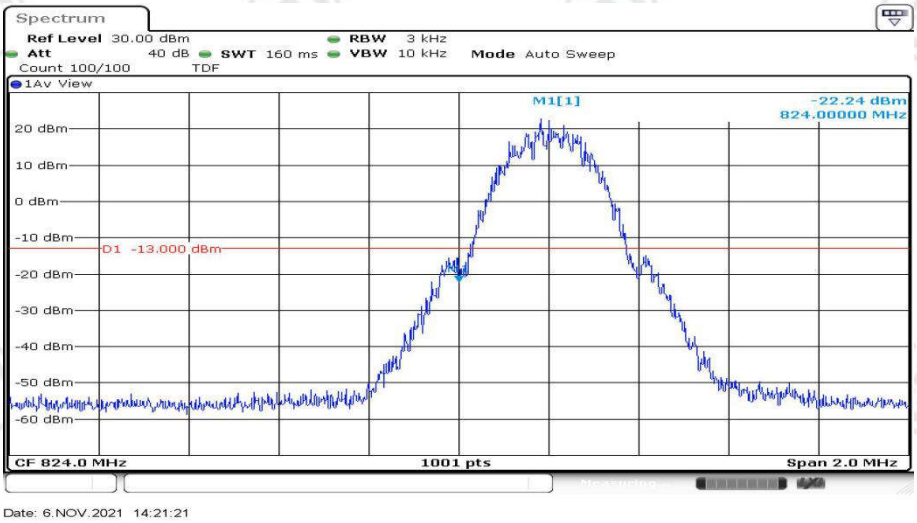
GSM850-128



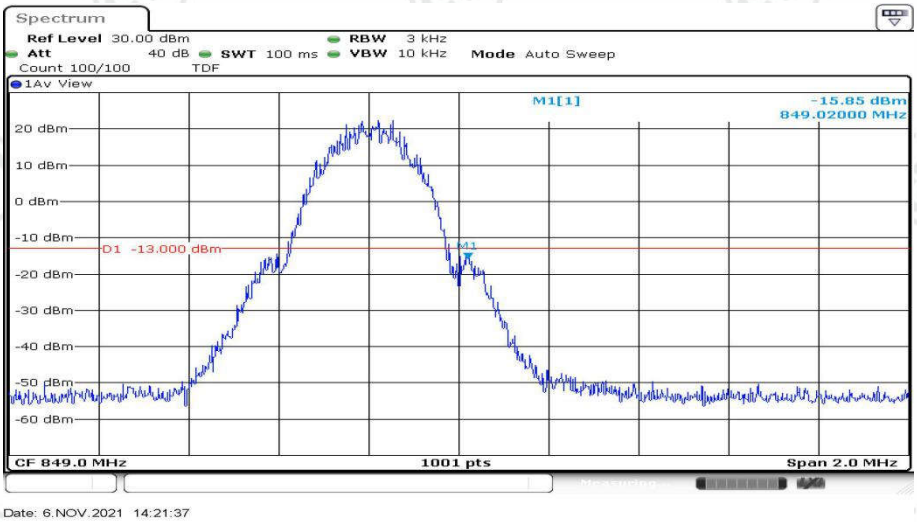

GSM850-251



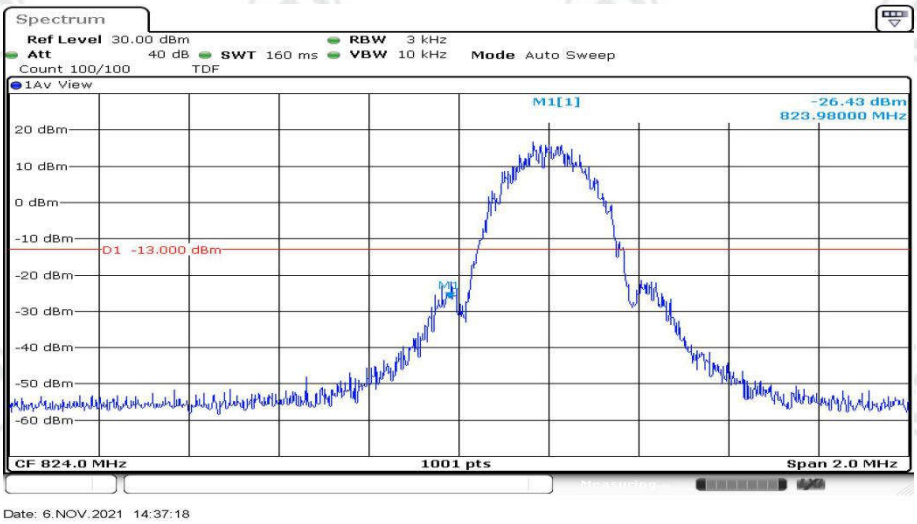
GPRS850-128




GPRS850-251

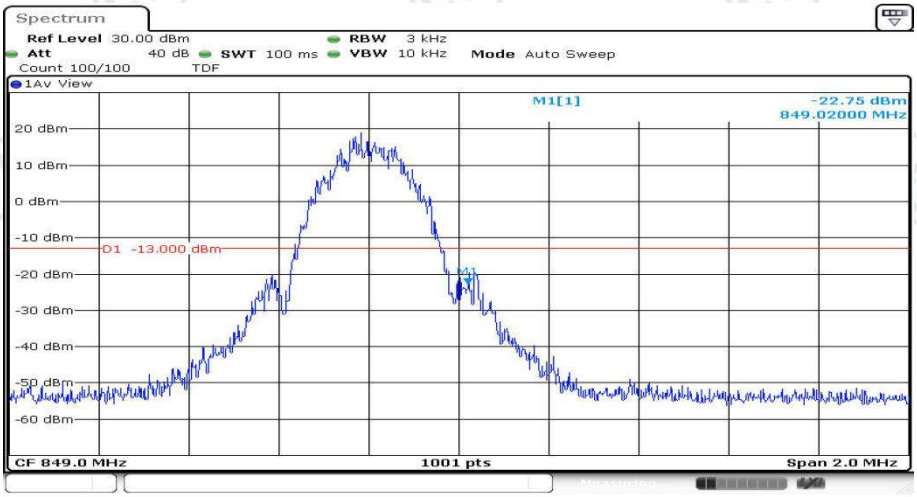


EGPRS850-128



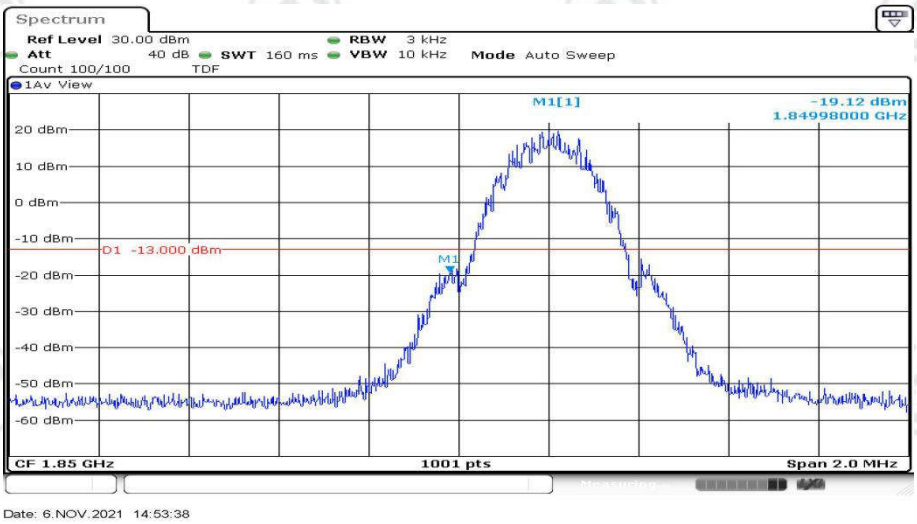

Date: 6.NOV.2021 14:37:18

EGPRS850-251

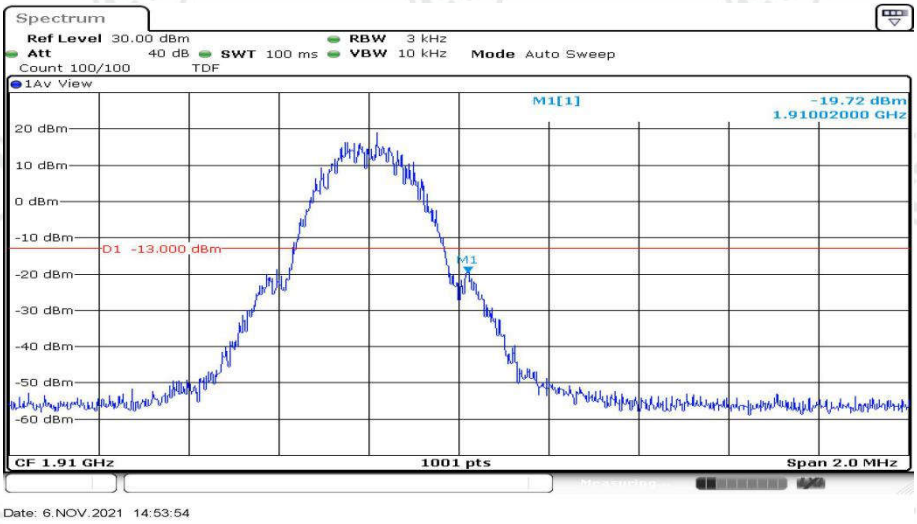



Date: 6.NOV.2021 14:37:35

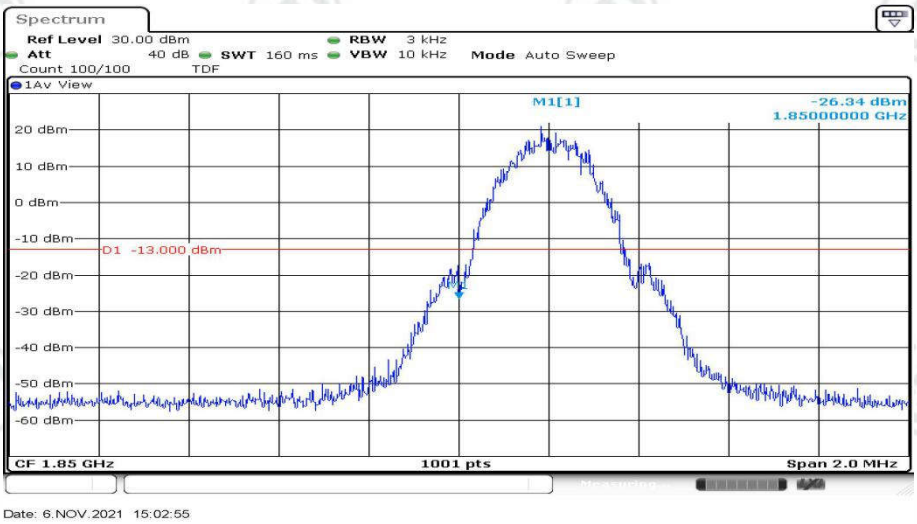
GSM1900-512




GSM1900-810

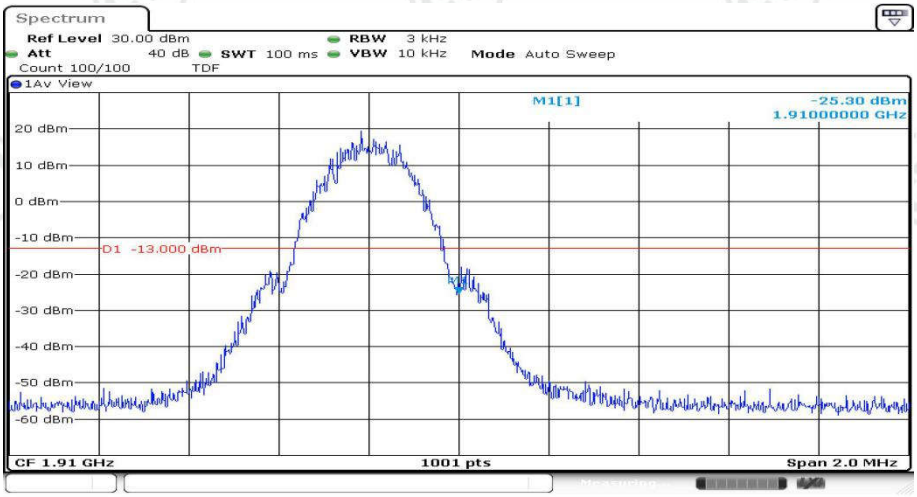


GPRS1900-512



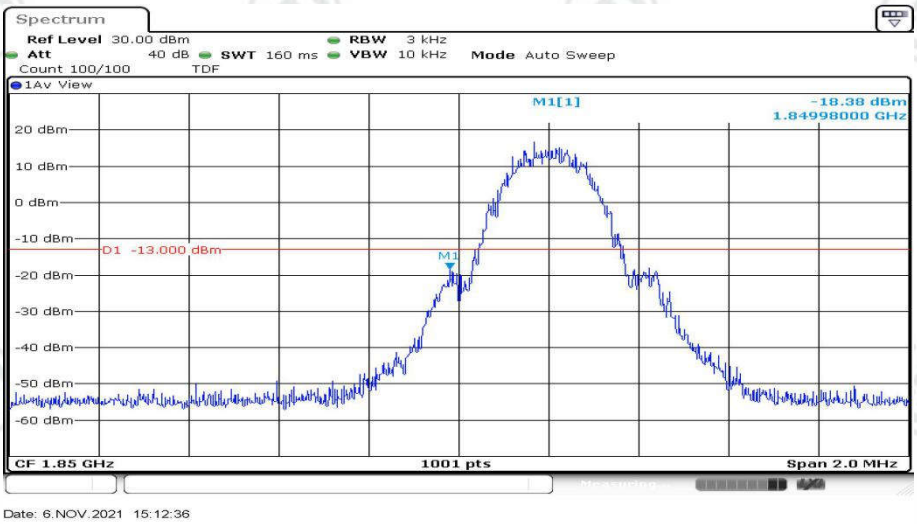

Date: 6.NOV.2021 15:02:55

GPRS1900-810



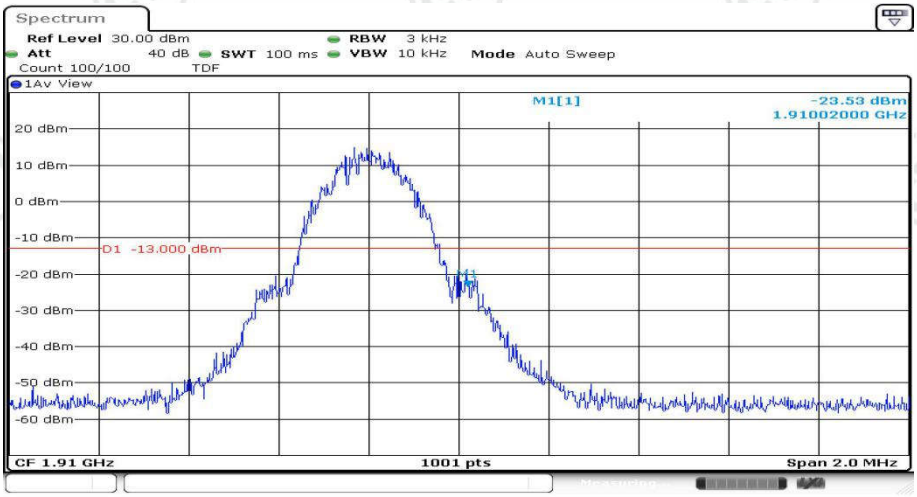

Date: 6.NOV.2021 15:03:12

EGPRS1900-512




Date: 6.NOV.2021 15:12:36

EGPRS1900-810




Date: 6.NOV.2021 15:12:53

# Appendix E: Conducted Spurious Emission

## Test Result

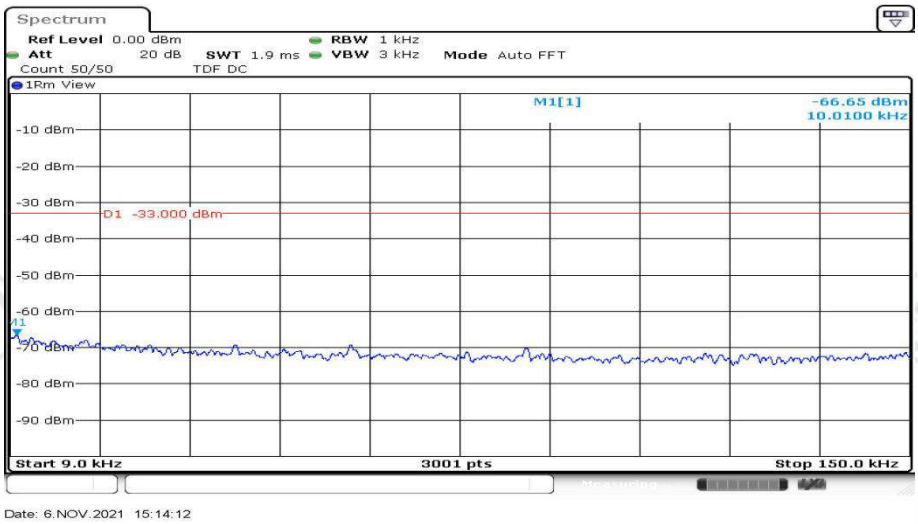
| Band | Channel | Frequency Range(MHz) | Max.Freq. (MHz) | Result (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|
| GSM850 | 128 | 0.009~0.15MHz | 0.01 | -66.65 | -33 | PASS |
| GSM850 | 128 | 0.15~30MHz | 28.88 | -43.75 | -13 | PASS |
| GSM850 | 128 | 30~1000MHz | 314.95 | -30.23 | -13 | PASS |
| GSM850 | 128 | 1000~3000MHz | 2507.72 | -37.74 | -13 | PASS |
| GSM850 | 128 | 3000~10000MHz | 4580.66 | -42.79 | -13 | PASS |
| GSM850 | 190 | 0.009~0.15MHz | 0.01 | -66.61 | -33 | PASS |
| GSM850 | 190 | 0.15~30MHz | 23.06 | -42.77 | -13 | PASS |
| GSM850 | 190 | 30~1000MHz | 592.37 | -29.85 | -13 | PASS |
| GSM850 | 190 | 1000~3000MHz | 2529.25 | -37.66 | -13 | PASS |
| GSM850 | 190 | 3000~10000MHz | 4577.63 | -43 | -13 | PASS |
| GSM850 | 251 | 0.009~0.15MHz | 0.01 | -67.63 | -33 | PASS |
| GSM850 | 251 | 0.15~30MHz | 27.76 | -43.98 | -13 | PASS |
| GSM850 | 251 | 30~1000MHz | 84.26 | -30.2 | -13 | PASS |
| GSM850 | 251 | 1000~3000MHz | 2526.18 | -37.75 | -13 | PASS |
| GSM850 | 251 | 3000~10000MHz | 4576.93 | -42.96 | -13 | PASS |
| GPRS850 | 128 | 0.009~0.15MHz | 0.01 | -67.83 | -33 | PASS |
| GPRS850 | 128 | 0.15~30MHz | 23.66 | -43.44 | -13 | PASS |
| GPRS850 | 128 | 30~1000MHz | 580.38 | -30.71 | -13 | PASS |
| GPRS850 | 128 | 1000~3000MHz | 2506.85 | -37.86 | -13 | PASS |
| GPRS850 | 128 | 3000~10000MHz | 4561.76 | -42.95 | -13 | PASS |
| GPRS850 | 190 | 0.009~0.15MHz | 0.01 | -66.55 | -33 | PASS |
| GPRS850 | 190 | 0.15~30MHz | 25.8 | -44.49 | -13 | PASS |
| GPRS850 | 190 | 30~1000MHz | 649.8 | -29.9 | -13 | PASS |
| GPRS850 | 190 | 1000~3000MHz | 2099 | -37.74 | -13 | PASS |
| GPRS850 | 190 | 3000~10000MHz | 4575.76 | -42.79 | -13 | PASS |
| GPRS850 | 251 | 0.009~0.15MHz | 0.01 | -66.62 | -33 | PASS |
| GPRS850 | 251 | 0.15~30MHz | 27.99 | -43.75 | -13 | PASS |
| GPRS850 | 251 | 30~1000MHz | 585.52 | -30.48 | -13 | PASS |
| GPRS850 | 251 | 1000~3000MHz | 2124.2 | -37.79 | -13 | PASS |
| GPRS850 | 251 | 3000~10000MHz | 4557.33 | -42.97 | -13 | PASS |
| EGPRS850 | 128 | 0.009~0.15MHz | 0.01 | -66.49 | -33 | PASS |
| EGPRS850 | 128 | 0.15~30MHz | 25.28 | -43.65 | -13 | PASS |
| EGPRS850 | 128 | 30~1000MHz | 417.84 | -30.44 | -13 | PASS |
| EGPRS850 | 128 | 1000~3000MHz | 2510.72 | -37.74 | -13 | PASS |

| | | | | | | |
|---|---|---|---|---|---|---|
| EGPRS850 | 128 | 3000~10000MHz | 4570.4 | -42.8 | -13 | PASS |
| EGPRS850 | 190 | 0.009~0.15MHz | 0.01 | -66.04 | -33 | PASS |
| EGPRS850 | 190 | 0.15~30MHz | 23.09 | -43.63 | -13 | PASS |
| EGPRS850 | 190 | 30~1000MHz | 588.53 | -30.52 | -13 | PASS |
| EGPRS850 | 190 | 1000~3000MHz | 2518.18 | -37.71 | -13 | PASS |
| EGPRS850 | 190 | 3000~10000MHz | 4575.06 | -42.91 | -13 | PASS |
| EGPRS850 | 251 | 0.009~0.15MHz | 0.01 | -67.18 | -33 | PASS |
| EGPRS850 | 251 | 0.15~30MHz | 25.15 | -43.16 | -13 | PASS |
| EGPRS850 | 251 | 30~1000MHz | 745.89 | -30.59 | -13 | PASS |
| EGPRS850 | 251 | 1000~3000MHz | 2507.65 | -37.78 | -13 | PASS |
| EGPRS850 | 251 | 3000~10000MHz | 4561.06 | -43.04 | -13 | PASS |
| GSM1900 | 512 | 0.009~0.15MHz | 0.01 | -53.46 | -43 | PASS |
| GSM1900 | 512 | 0.15~30MHz | 24.64 | -43.66 | -23 | PASS |
| GSM1900 | 512 | 30~1000MHz | 923.87 | -29.75 | -13 | PASS |
| GSM1900 | 512 | 1000~3000MHz | 2536.4 | -37.57 | -13 | PASS |
| GSM1900 | 512 | 3000~10000MHz | 5639.96 | -32.59 | -13 | PASS |
| GSM1900 | 512 | 10000~20000MHz | 10056.83 | -47.36 | -13 | PASS |
| GSM1900 | 661 | 0.009~0.15MHz | 0.01 | -53.57 | -43 | PASS |
| GSM1900 | 661 | 0.15~30MHz | 24.62 | -42.4 | -23 | PASS |
| GSM1900 | 661 | 30~1000MHz | 906.12 | -29.52 | -13 | PASS |
| GSM1900 | 661 | 1000~3000MHz | 2531.93 | -37.5 | -13 | PASS |
| GSM1900 | 661 | 3000~10000MHz | 5639.73 | -33.5 | -13 | PASS |
| GSM1900 | 661 | 10000~20000MHz | 10054.16 | -47.28 | -13 | PASS |
| GSM1900 | 810 | 0.009~0.15MHz | 0.01 | -53.76 | -43 | PASS |
| GSM1900 | 810 | 0.15~30MHz | 23.97 | -43.49 | -23 | PASS |
| GSM1900 | 810 | 30~1000MHz | 921.93 | -29.65 | -13 | PASS |
| GSM1900 | 810 | 1000~3000MHz | 2488.67 | -37.65 | -13 | PASS |
| GSM1900 | 810 | 3000~10000MHz | 3760.06 | -32.78 | -13 | PASS |
| GSM1900 | 810 | 10000~20000MHz | 10065.83 | -47.07 | -13 | PASS |
| GPRS1900 | 512 | 0.009~0.15MHz | 0.01 | -53.58 | -43 | PASS |
| GPRS1900 | 512 | 0.15~30MHz | 23.34 | -42.61 | -23 | PASS |
| GPRS1900 | 512 | 30~1000MHz | 883.65 | -29.58 | -13 | PASS |
| GPRS1900 | 512 | 1000~3000MHz | 2511.93 | -37.5 | -13 | PASS |
| GPRS1900 | 512 | 3000~10000MHz | 3760.06 | -32.84 | -13 | PASS |
| GPRS1900 | 512 | 10000~20000MHz | 10057.83 | -47.33 | -13 | PASS |
| GPRS1900 | 661 | 0.009~0.15MHz | 0.01 | -53.53 | -43 | PASS |
| GPRS1900 | 661 | 0.15~30MHz | 25.26 | -42.68 | -23 | PASS |
| GPRS1900 | 661 | 30~1000MHz | 537.86 | -29.13 | -13 | PASS |
| GPRS1900 | 661 | 1000~3000MHz | 2516.33 | -37.57 | -13 | PASS |
| GPRS1900 | 661 | 3000~10000MHz | 5639.96 | -32.78 | -13 | PASS |

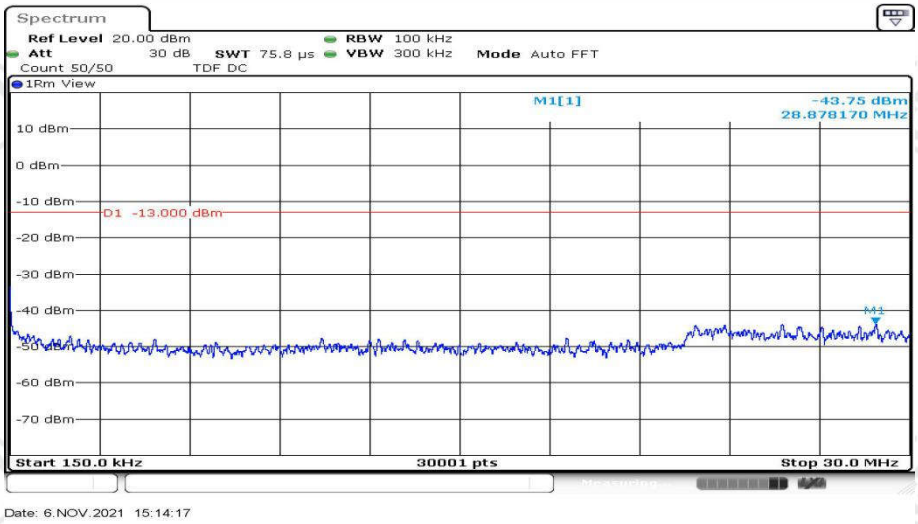
| | | | | | | |
|---|---|---|---|---|---|---|
| GPRS1900 | 661 | 10000~20000MHz | 10072.5 | -47.23 | -13 | PASS |
| GPRS1900 | 810 | 0.009~0.15MHz | 0.01 | -53.57 | -43 | PASS |
| GPRS1900 | 810 | 0.15~30MHz | 22.95 | -43.65 | -23 | PASS |
| GPRS1900 | 810 | 30~1000MHz | 870.88 | -29.85 | -13 | PASS |
| GPRS1900 | 810 | 1000~3000MHz | 2511.6 | -37.5 | -13 | PASS |
| GPRS1900 | 810 | 3000~10000MHz | 3759.82 | -33.42 | -13 | PASS |
| GPRS1900 | 810 | 10000~20000MHz | 10079.16 | -47.45 | -13 | PASS |
| EGPRS1900 | 512 | 0.009~0.15MHz | 0.02 | -47.36 | -43 | PASS |
| EGPRS1900 | 512 | 0.15~30MHz | 23.72 | -43.75 | -23 | PASS |
| EGPRS1900 | 512 | 30~1000MHz | 585.19 | -29.43 | -13 | PASS |
| EGPRS1900 | 512 | 1000~3000MHz | 2089.8 | -37.69 | -13 | PASS |
| EGPRS1900 | 512 | 3000~10000MHz | 5639.73 | -37.61 | -13 | PASS |
| EGPRS1900 | 512 | 10000~20000MHz | 10063.5 | -47.25 | -13 | PASS |
| EGPRS1900 | 661 | 0.009~0.15MHz | 0.01 | -46.93 | -43 | PASS |
| EGPRS1900 | 661 | 0.15~30MHz | 23.28 | -43.71 | -23 | PASS |
| EGPRS1900 | 661 | 30~1000MHz | 879.97 | -28.74 | -13 | PASS |
| EGPRS1900 | 661 | 1000~3000MHz | 2487.2 | -37.49 | -13 | PASS |
| EGPRS1900 | 661 | 3000~10000MHz | 5640.43 | -37.67 | -13 | PASS |
| EGPRS1900 | 661 | 10000~20000MHz | 10052.83 | -47.28 | -13 | PASS |
| EGPRS1900 | 810 | 0.009~0.15MHz | 0.02 | -46.3 | -43 | PASS |
| EGPRS1900 | 810 | 0.15~30MHz | 23.32 | -43.01 | -23 | PASS |
| EGPRS1900 | 810 | 30~1000MHz | 895.81 | -29.41 | -13 | PASS |
| EGPRS1900 | 810 | 1000~3000MHz | 2519.2 | -37.42 | -13 | PASS |
| EGPRS1900 | 810 | 3000~10000MHz | 3760.06 | -36.61 | -13 | PASS |
| EGPRS1900 | 810 | 10000~20000MHz | 10042.17 | -47.24 | -13 | PASS |

## Test Graphs

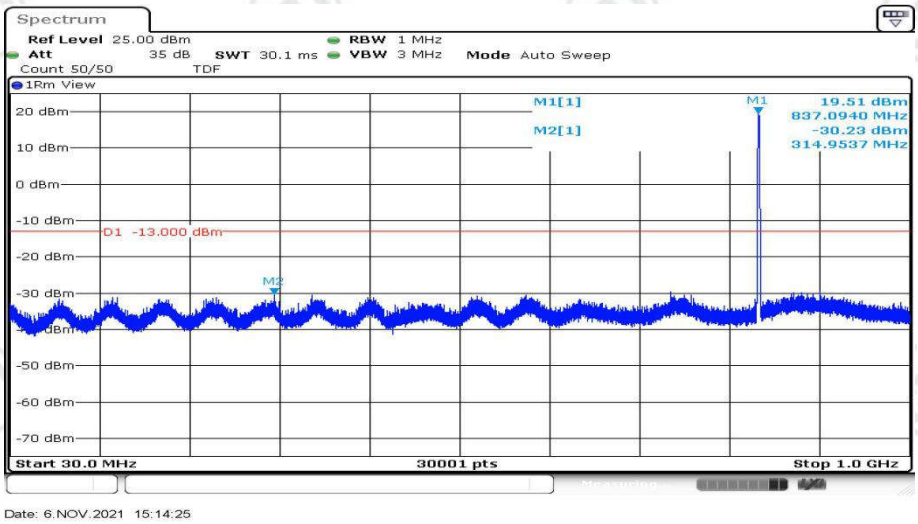
GSM850-128-0.009~0.15MHz

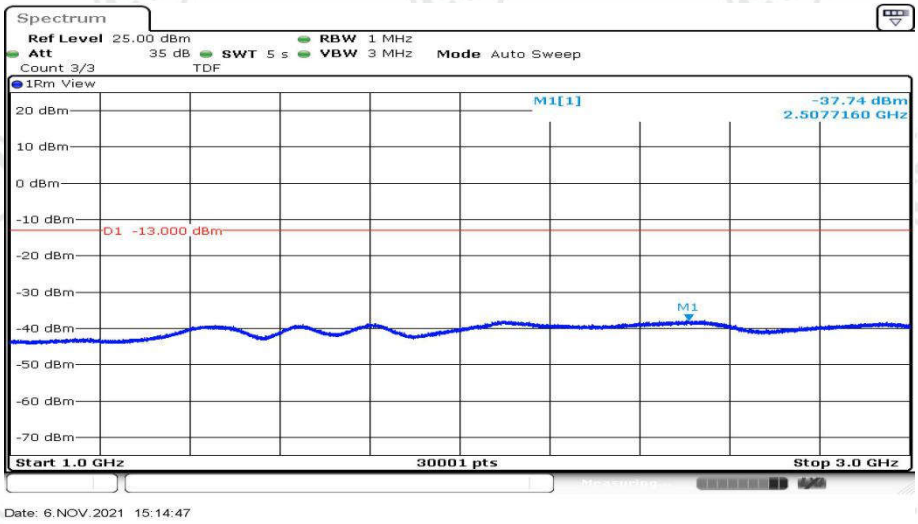



GSM850-128-0.15~30MHz



GSM850-128-30~1000MHz




GSM850-128-1000~3000MHz