



Appendix B

GSM 850 & 1900



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CONTENT

	Page
1. EFFECTIVE (ISOTROPIC) RADIATED POWER OUTPUT DATA	4
1.1. Test Result(Down Antenna)	4
1.2. Test Result(Up Antenna)	5
2. PEAK-TO-AVERAGE RATIO	6
2.1. Test Result	6
2.2. Part II - Test Plots	7
3. MODULATION CHARACTERISTICS	19
3.1. For GSM	19
3.1.1. Test Band = GSM 850	19
3.1.1.1. Test Mode = GSM/TM1	19
3.1.1.1.1. Test Channel = MCH	19
3.1.1.2. Test Mode = GSM/TM2	20
3.1.1.2.1. Test Channel = MCH	20
3.1.2. Test Band = GSM 1900	21
3.1.2.1. Test Mode = GSM/TM1	21
3.1.2.1.1. Test Channel = MCH	21
3.1.2.2. Test Mode = GSM/TM2	22
3.1.2.2.1. Test Channel = MCH	22
4. 26dB BANDWIDTH AND OCCUPIED BANDWIDTH	23
4.1. Test Result	23
4.2. Test Plots	23
5. BAND EDGE COMPLIANCE	30
5.1. Test Plots	30
6. SPURIOUS EMISSION AT ANTENNA TERMINAL	34
6.1. Test Plots	34
7. FIELD STRENGTH OF SPURIOUS RADIATION	64
7.1. Test Band = GSM 1900	64
7.1.1. Test Channel = LCH	64
7.1.2. Test Channel = MCH	64
7.1.3. Test Channel = HCH	65
7.2. Test Band = GSM 850	65
7.2.1. Test Channel = LCH	65



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7.2.2. Test Channel = MCH	66
7.2.3. Test Channel = HCH	66
8. FREQUENCY STABILITY	67
8.1. Frequency Error Vs Voltage	67
8.2. Frequency Error Vs Temperature	68



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1. Effective (Isotropic) Radiated Power Output Data

1.1. Test Result(Down Antenna)

Band	Channel	Slot	Conducted Power (dBm)	ERP (dBm)	Limit(dBm)	Verdict
GSM850	128	---	33.39	28.2	38.45	PASS
GSM850	190	---	33.4	28.21	38.45	PASS
GSM850	251	---	33.36	28.17	38.45	PASS
EGPRS850	128	1	26.56	21.37	38.45	PASS
EGPRS850	128	2	23.6	18.41	38.45	PASS
EGPRS850	128	3	22.31	17.12	38.45	PASS
EGPRS850	128	4	21.41	16.22	38.45	PASS
EGPRS850	190	1	26.77	21.58	38.45	PASS
EGPRS850	190	2	23.74	18.55	38.45	PASS
EGPRS850	190	3	22.33	17.14	38.45	PASS
EGPRS850	190	4	21.52	16.33	38.45	PASS
EGPRS850	251	1	26.57	21.38	38.45	PASS
EGPRS850	251	2	23.64	18.45	38.45	PASS
EGPRS850	251	3	22.24	17.05	38.45	PASS
EGPRS850	251	4	21.42	16.23	38.45	PASS

Band	Channel	Slot	Conducted Power (dBm)	EIRP (dBm)	Limit(dBm)	Verdict
GSM1900	512	---	29.63	29.63	33.00	PASS
GSM1900	661	---	29.65	29.65	33.00	PASS
GSM1900	810	---	29.60	29.6	33.00	PASS
EGPRS1900	512	1	26.44	26.44	33.00	PASS
EGPRS1900	512	2	23.23	23.23	33.00	PASS
EGPRS1900	512	3	22.77	22.77	33.00	PASS
EGPRS1900	512	4	21.49	21.49	33.00	PASS
EGPRS1900	661	1	26.32	26.32	33.00	PASS
EGPRS1900	661	2	23.21	23.21	33.00	PASS
EGPRS1900	661	3	22.66	22.66	33.00	PASS
EGPRS1900	661	4	21.48	21.48	33.00	PASS
EGPRS1900	810	1	26.14	26.14	33.00	PASS
EGPRS1900	810	2	23.19	23.19	33.00	PASS
EGPRS1900	810	3	22.57	22.57	33.00	PASS
EGPRS1900	810	4	21.44	21.44	33.00	PASS



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1.2. Test Result(Up Antenna)

Band	Channel	Slot	Conducted Power (dBm)	ERP (dBm)	Limit(dBm)	Verdict
GSM850	128	---	30.93	24.33	38.45	PASS
GSM850	190	---	30.84	24.24	38.45	PASS
GSM850	251	---	30.81	24.21	38.45	PASS
EGPRS850	128	1	30.96	24.36	38.45	PASS
EGPRS850	128	2	29.08	22.48	38.45	PASS
EGPRS850	128	3	25.05	18.45	38.45	PASS
EGPRS850	128	4	23.99	17.39	38.45	PASS
EGPRS850	190	1	30.85	24.25	38.45	PASS
EGPRS850	190	2	28.95	22.35	38.45	PASS
EGPRS850	190	3	24.93	18.33	38.45	PASS
EGPRS850	190	4	23.85	17.25	38.45	PASS
EGPRS850	251	1	30.75	24.15	38.45	PASS
EGPRS850	251	2	28.71	22.11	38.45	PASS
EGPRS850	251	3	24.67	18.07	38.45	PASS
EGPRS850	251	4	23.63	17.03	38.45	PASS

Remark:

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

ERP [dBm] = Conducted Power [dBm] + Gain [dBd]

EIRP [dBm] = Conducted Power [dBm] + Gain [dBi]



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2. Peak-to-Average Ratio

2.1. Test Result

Band	Channel	Peak-to-Average Ratio(dB)	Limit(dB)	Verdict
GSM850	128	7.68	13	PASS
GSM850	190	7.65	13	PASS
GSM850	251	7.71	13	PASS
EGPRS850	128	10.26	13	PASS
EGPRS850	190	10.35	13	PASS
EGPRS850	251	10.75	13	PASS
GSM1900	512	7.65	13	PASS
GSM1900	661	7.71	13	PASS
GSM1900	810	7.68	13	PASS
EGPRS1900	512	10.26	13	PASS
EGPRS1900	661	10.06	13	PASS
EGPRS1900	810	10.12	13	PASS



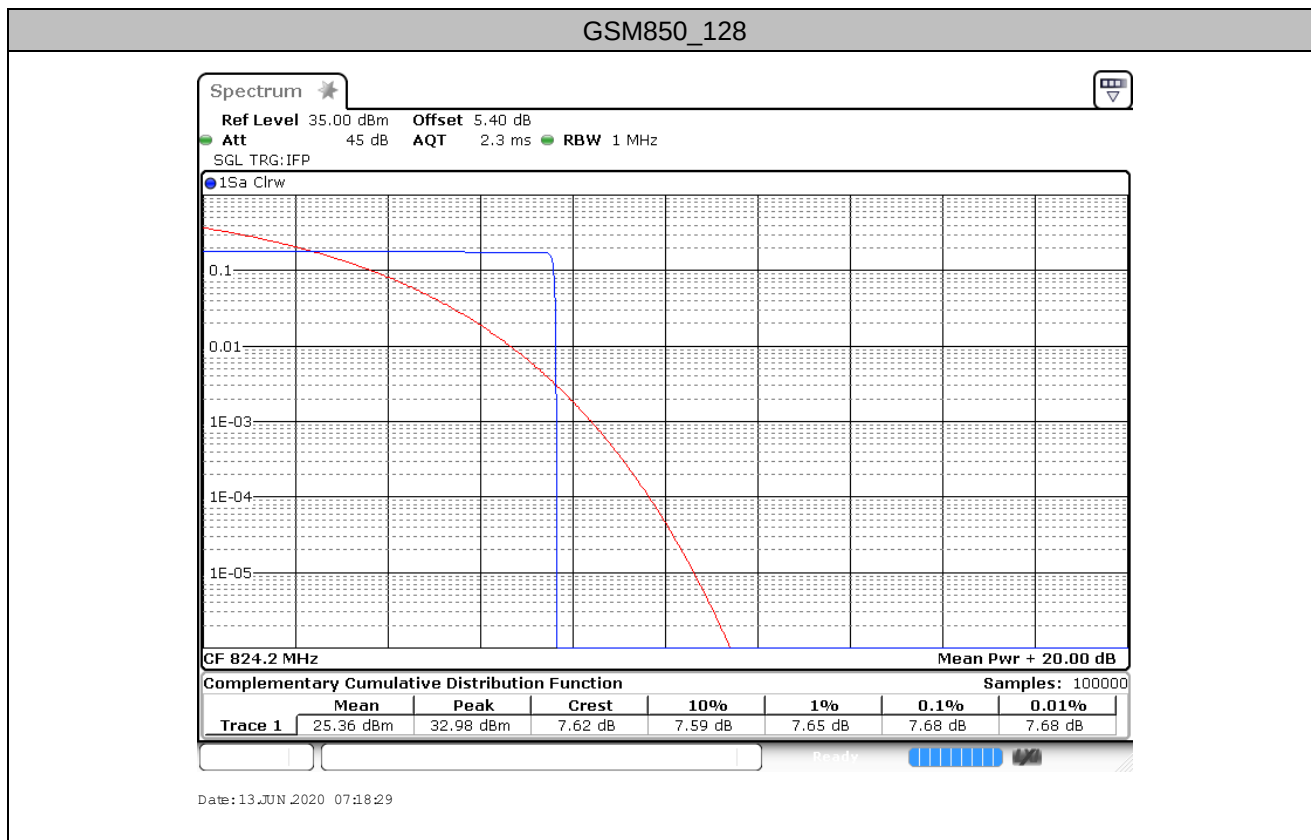
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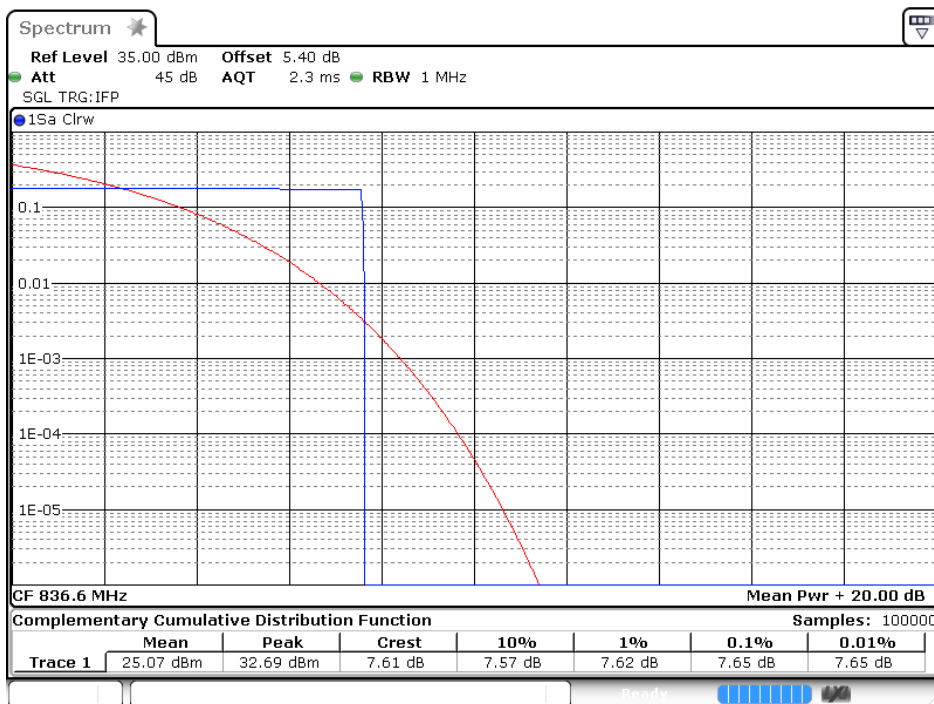
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2.2.Part II - Test Plots



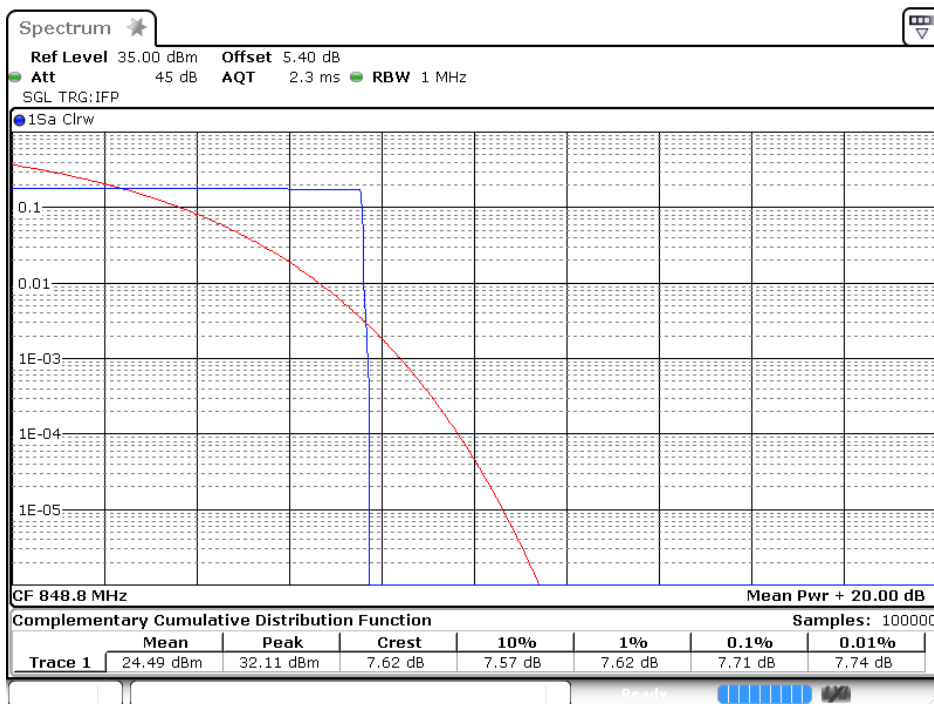
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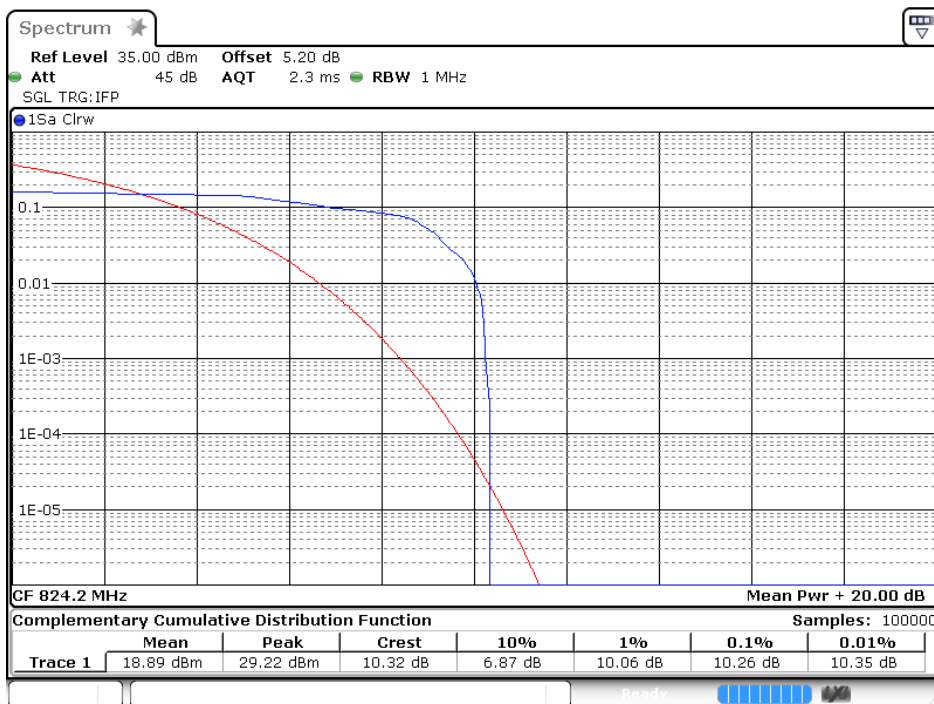
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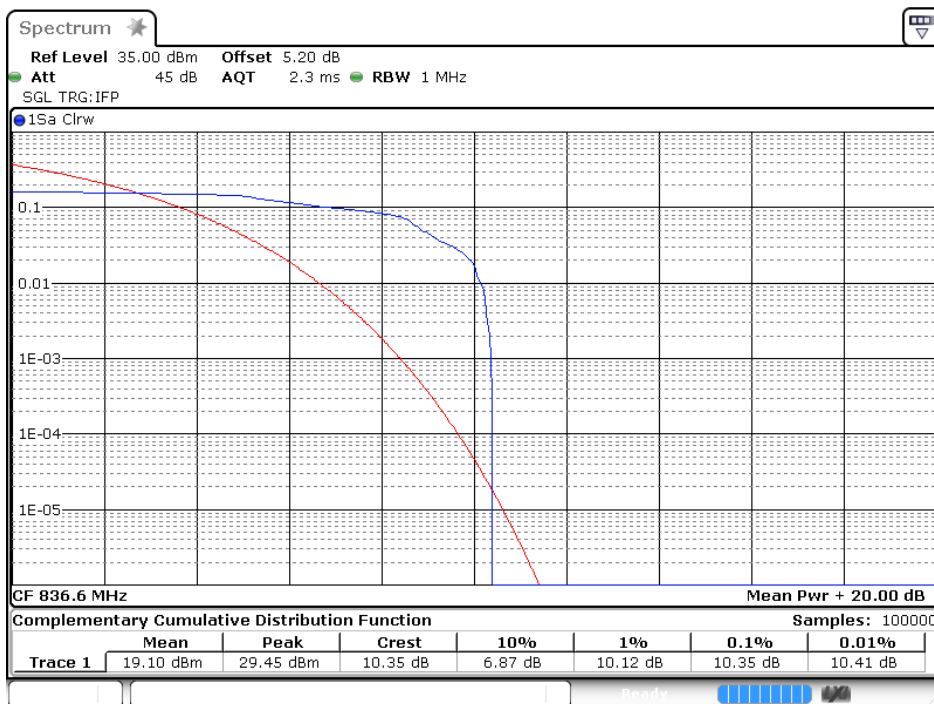
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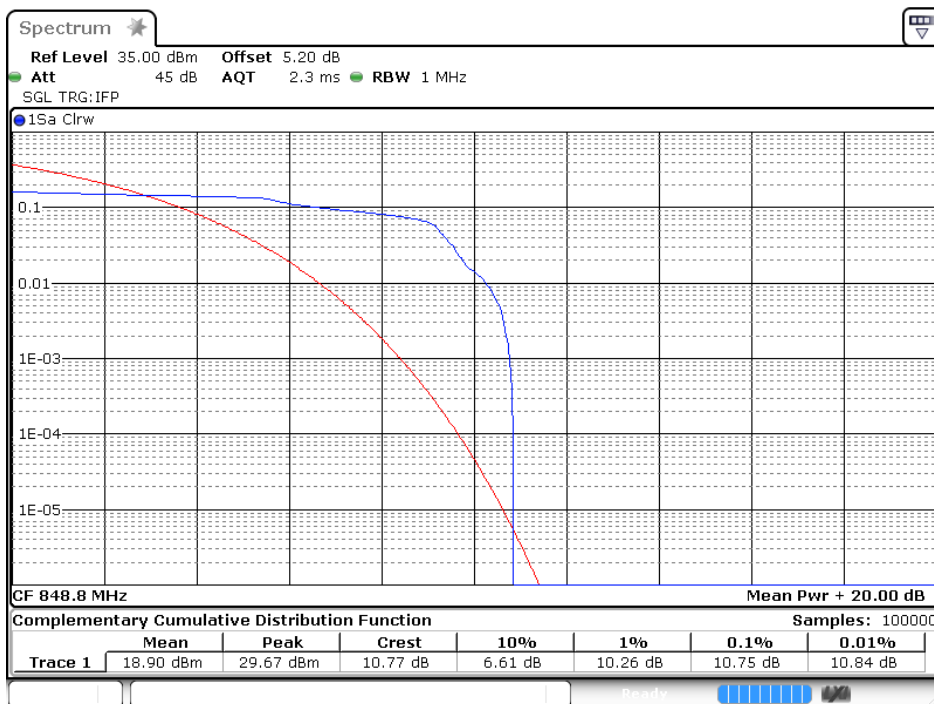
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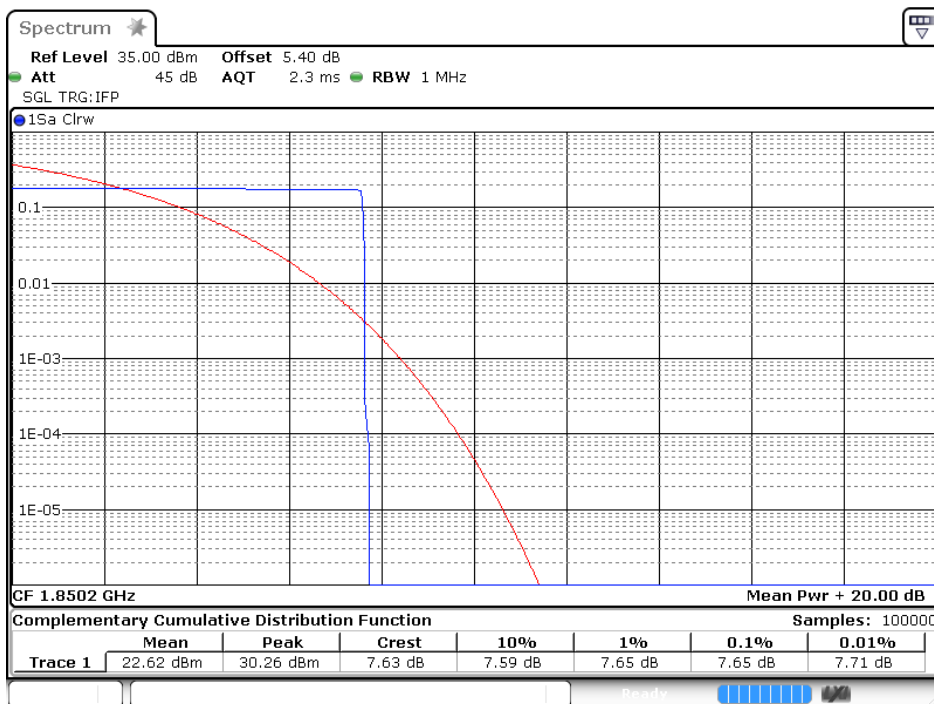
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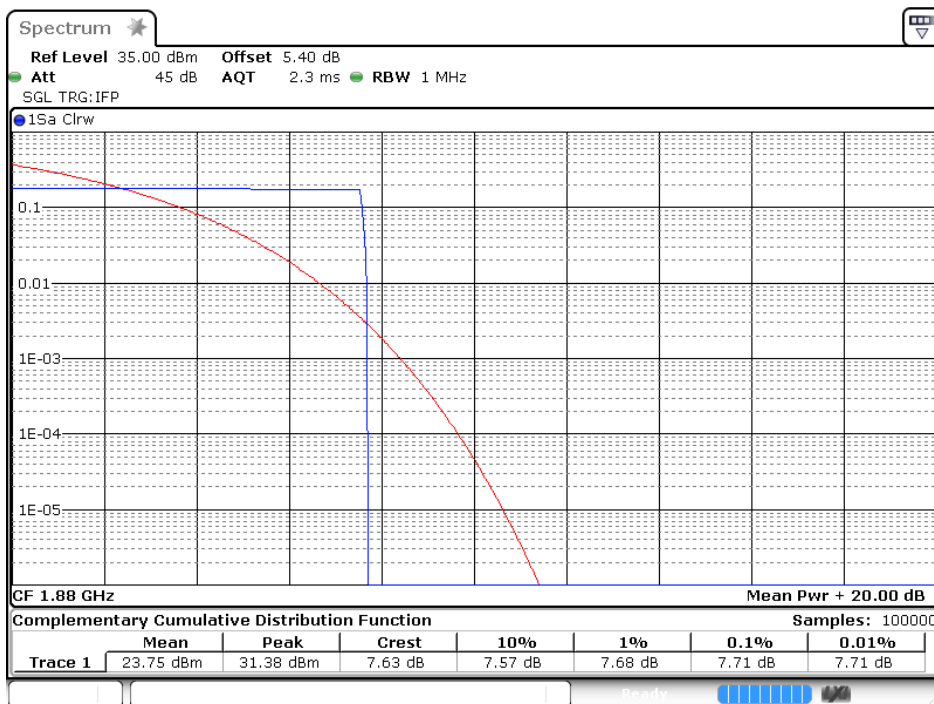
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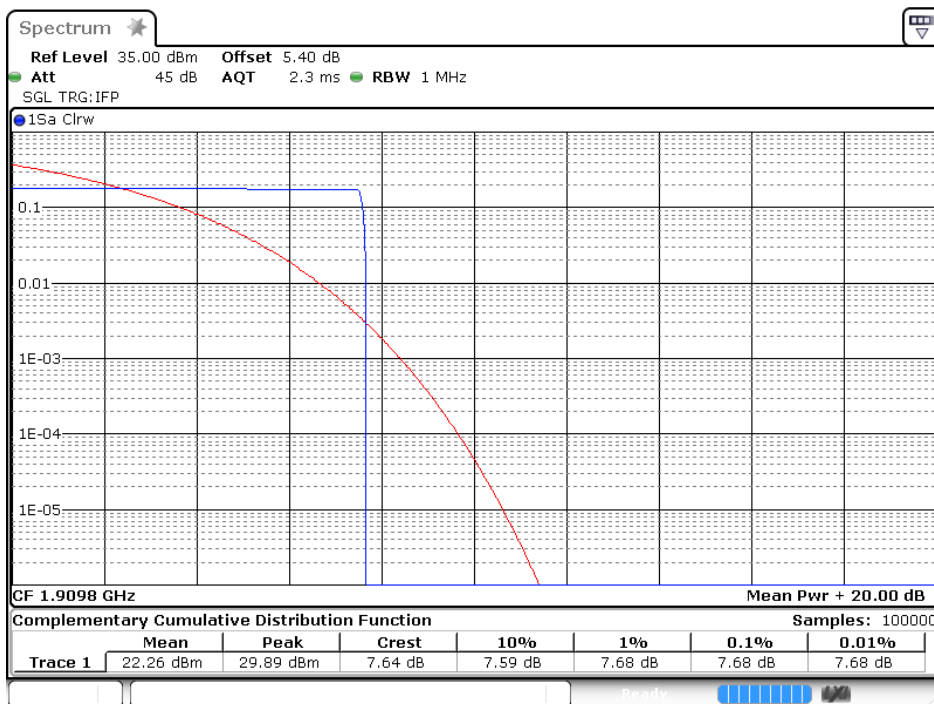
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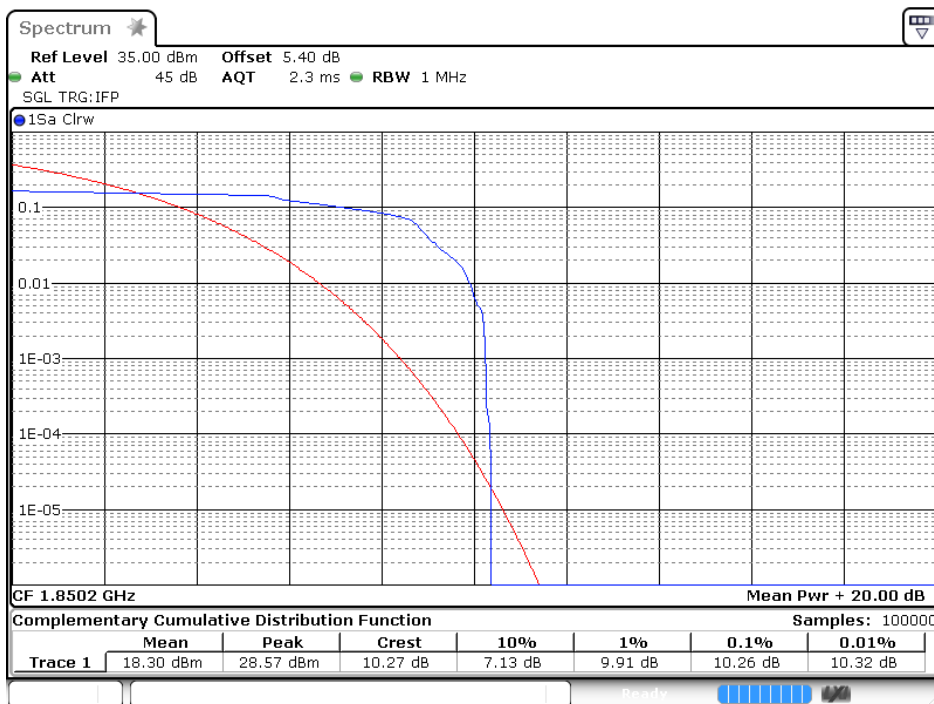
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EGPRS1900_512



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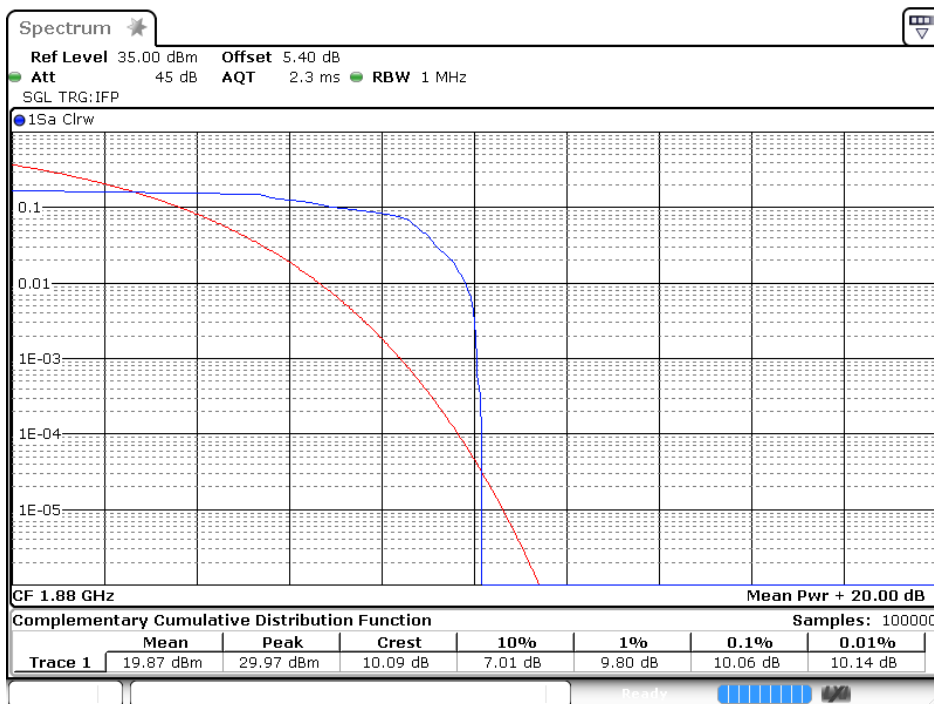
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EGPRS1900_661



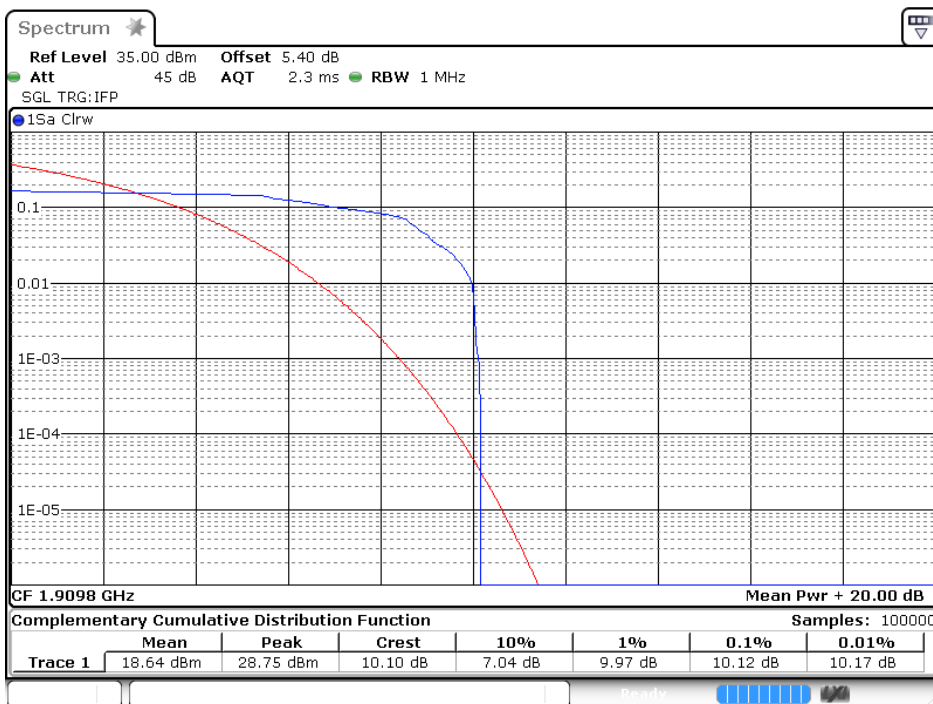
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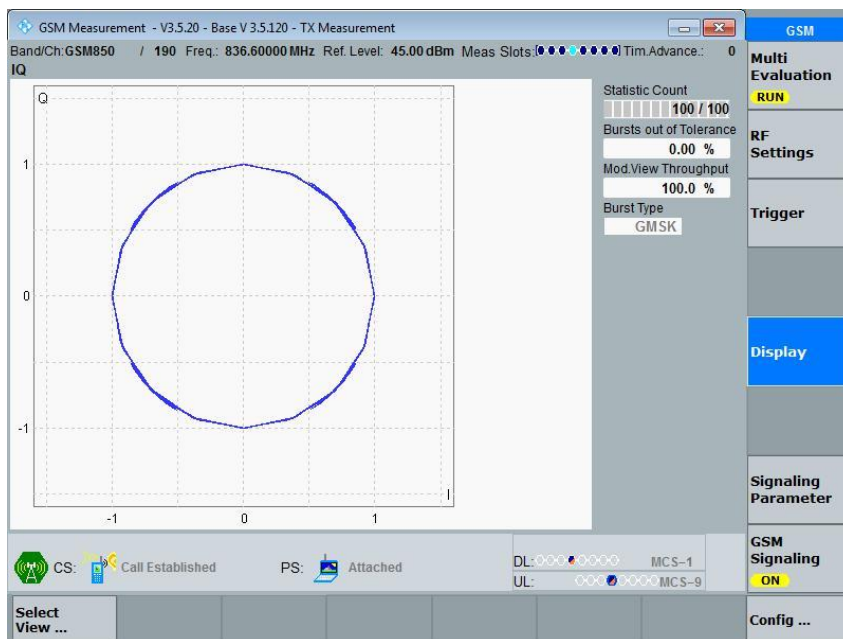
3. Modulation Characteristics

3.1. For GSM

3.1.1. Test Band = GSM 850

3.1.1.1. Test Mode = GSM/TM1

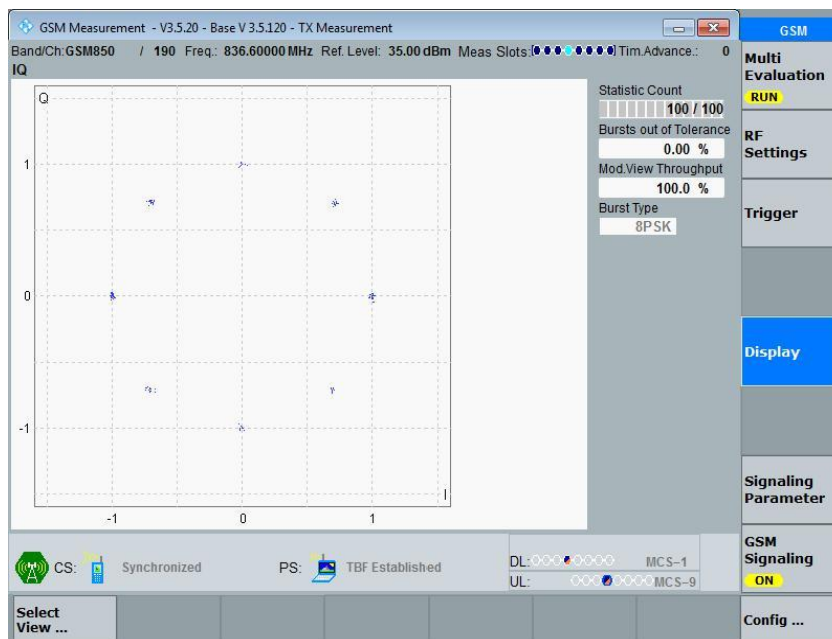
3.1.1.1.1. Test Channel = MCH





3.1.1.2. Test Mode = GSM/TM2

3.1.1.2.1. Test Channel = MCH

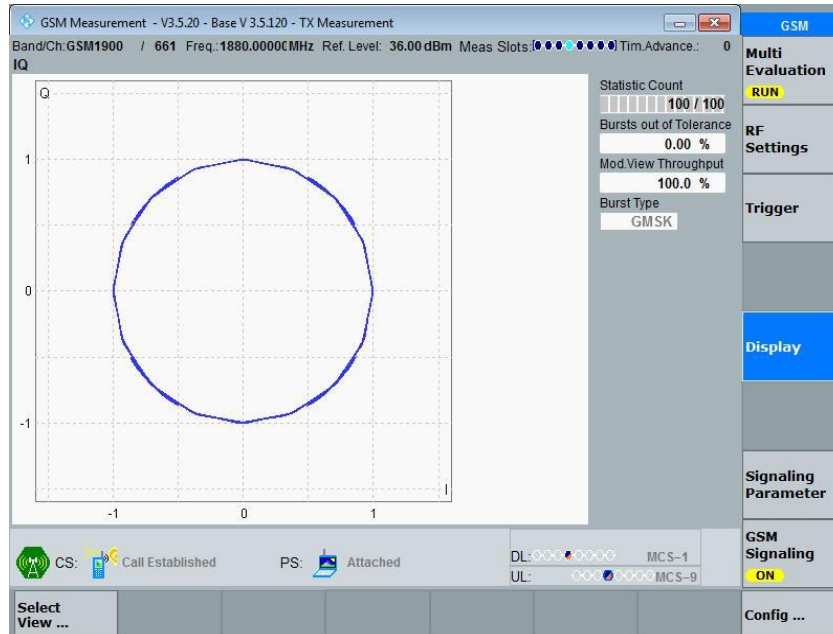




3.1.2. Test Band = GSM 1900

3.1.2.1. Test Mode = GSM/TM1

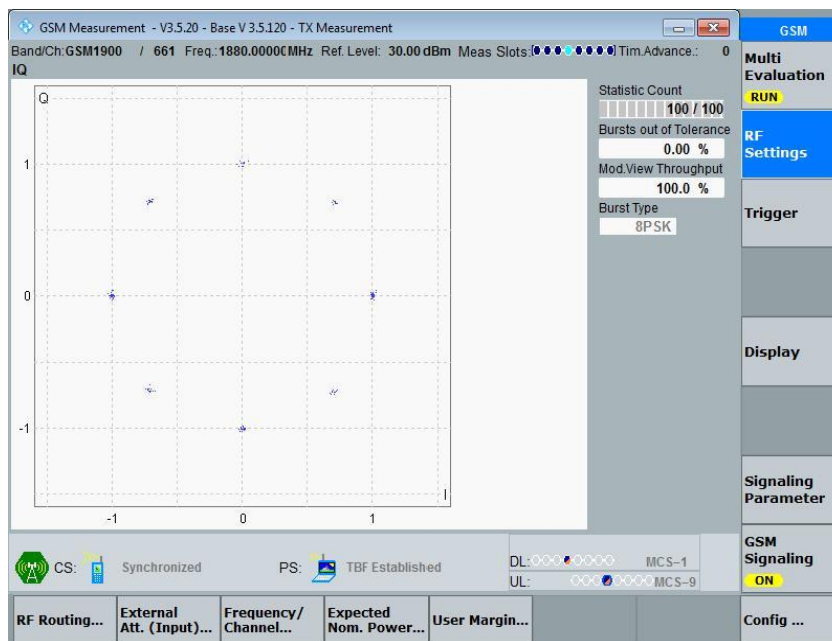
3.1.2.1.1. Test Channel = MCH





3.1.2.2. Test Mode = GSM/TM2

3.1.2.2.1. Test Channel = MCH



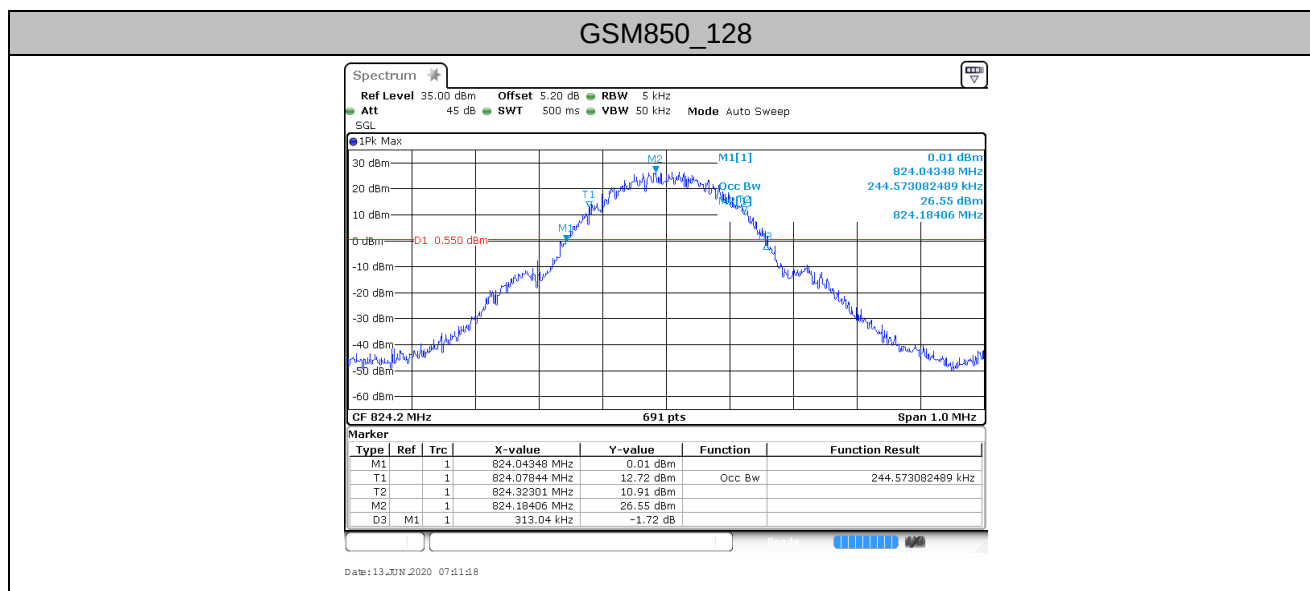


4. 26dB Bandwidth and Occupied Bandwidth

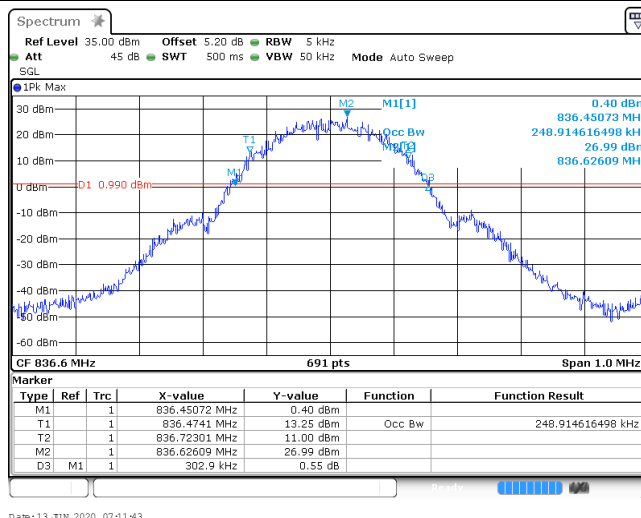
4.1. Test Result

Band	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	244.57	313.04	---	PASS
GSM850	190	248.91	302.90	---	PASS
GSM850	251	243.13	314.49	---	PASS
EGPRS850	128	247.47	300.00	---	PASS
EGPRS850	190	250.36	304.35	---	PASS
EGPRS850	251	251.81	307.25	---	PASS
GSM1900	512	244.57	310.14	---	PASS
GSM1900	661	243.13	308.70	---	PASS
GSM1900	810	243.13	308.70	---	PASS
EGPRS1900	512	256.15	307.25	---	PASS
EGPRS1900	661	254.70	313.04	---	PASS
EGPRS1900	810	251.81	318.84	---	PASS

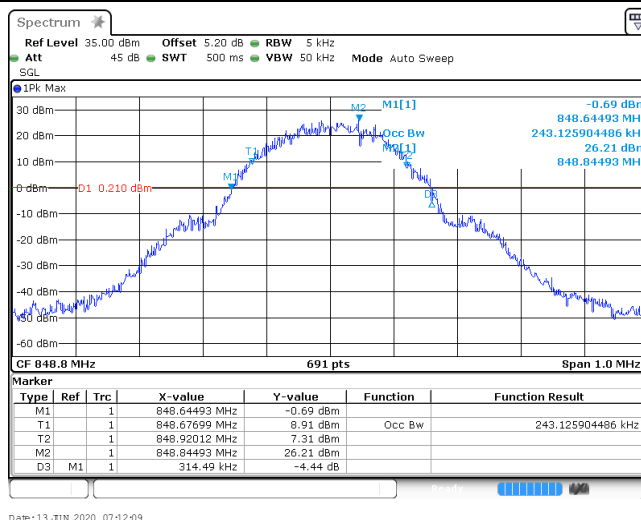
4.2. Test Plots



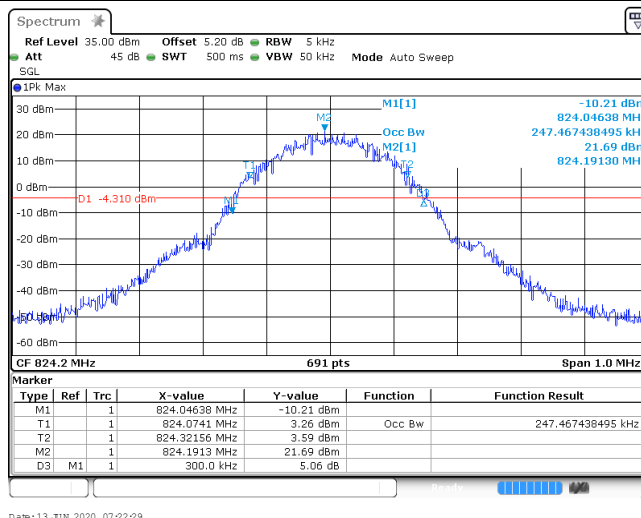
GSM850_190



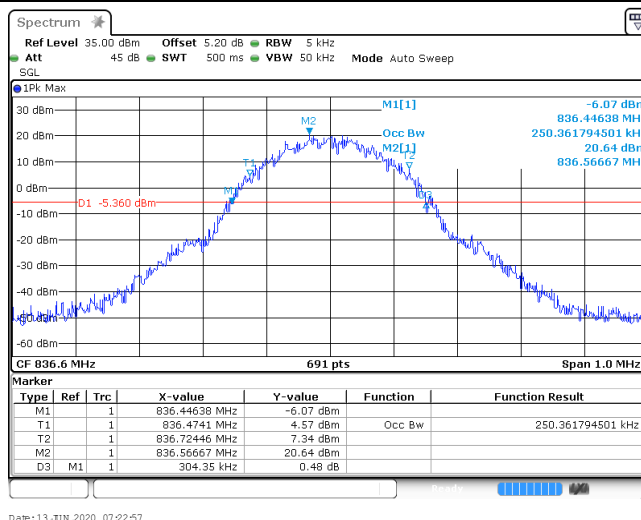
GSM850_251



EGPRS850_128

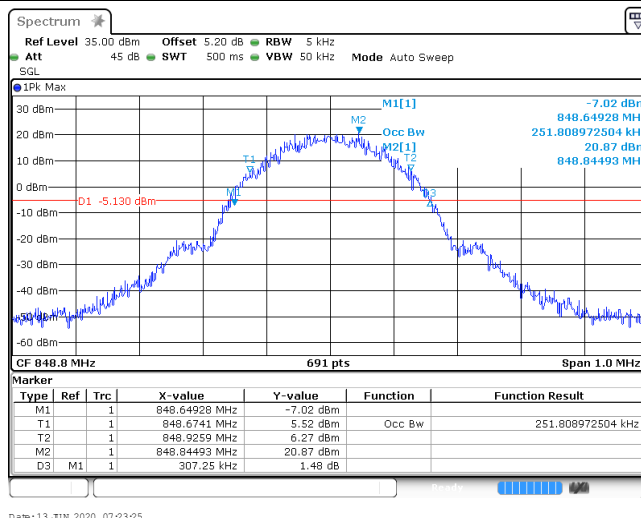


EGPRS850_190



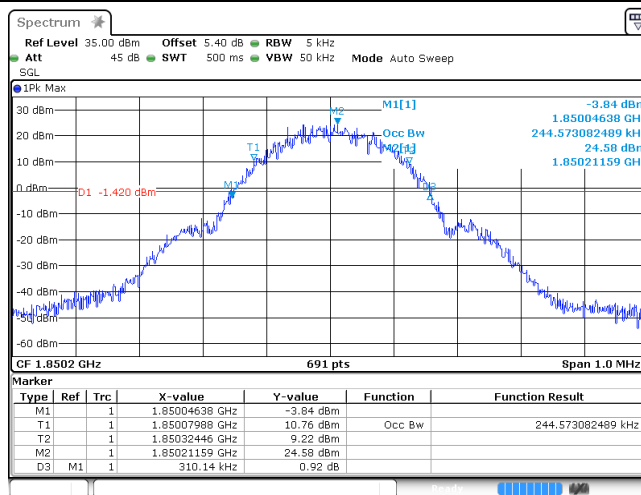
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EGPRS850_251



Date: 13 JUN 2020 07:23:25

GSM1900_512



Date: 13 JUN 2020 06:41:03

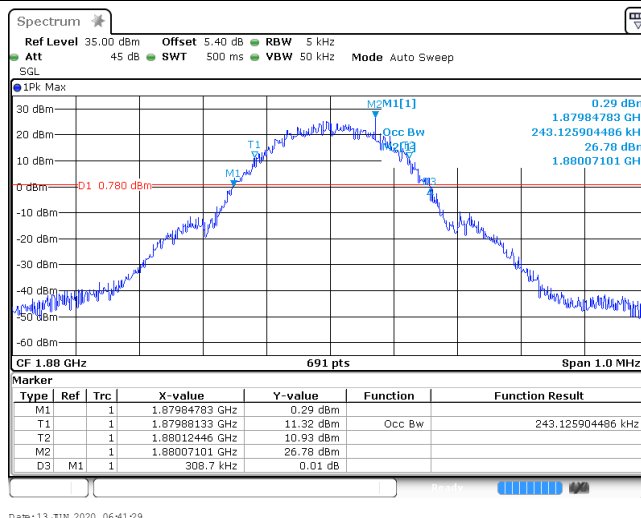


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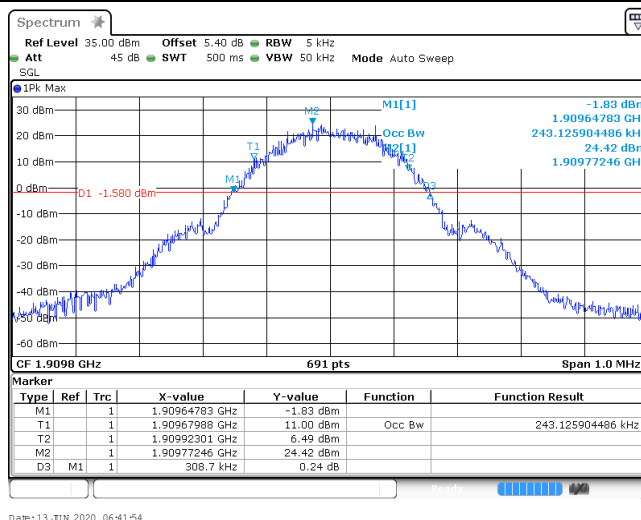
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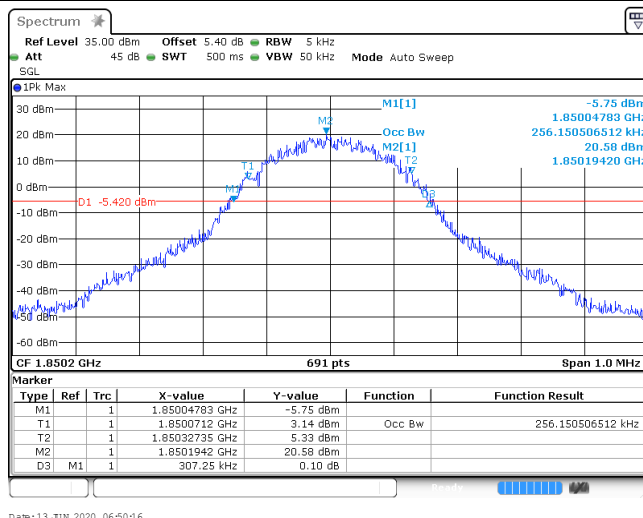
GSM1900_661



GSM1900_810

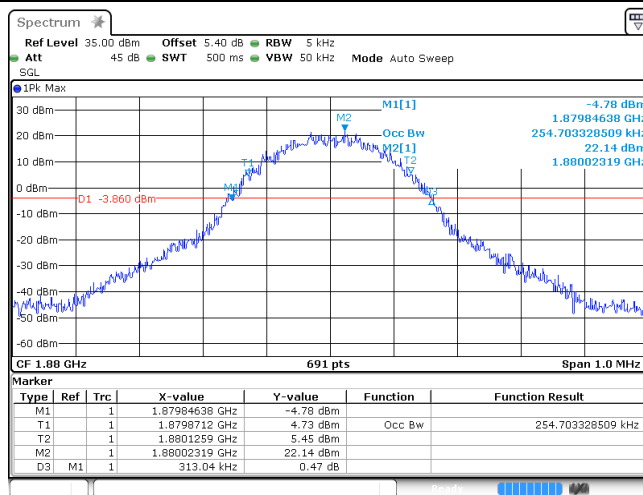


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Date: 13 JUN 2020 06:50:16

EGPRS1900_661



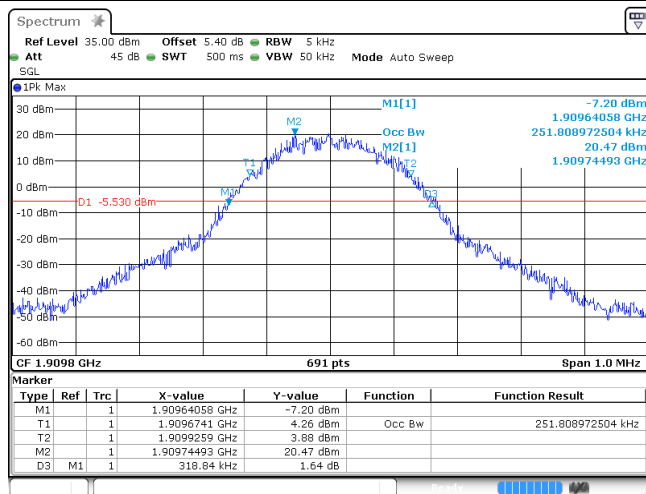
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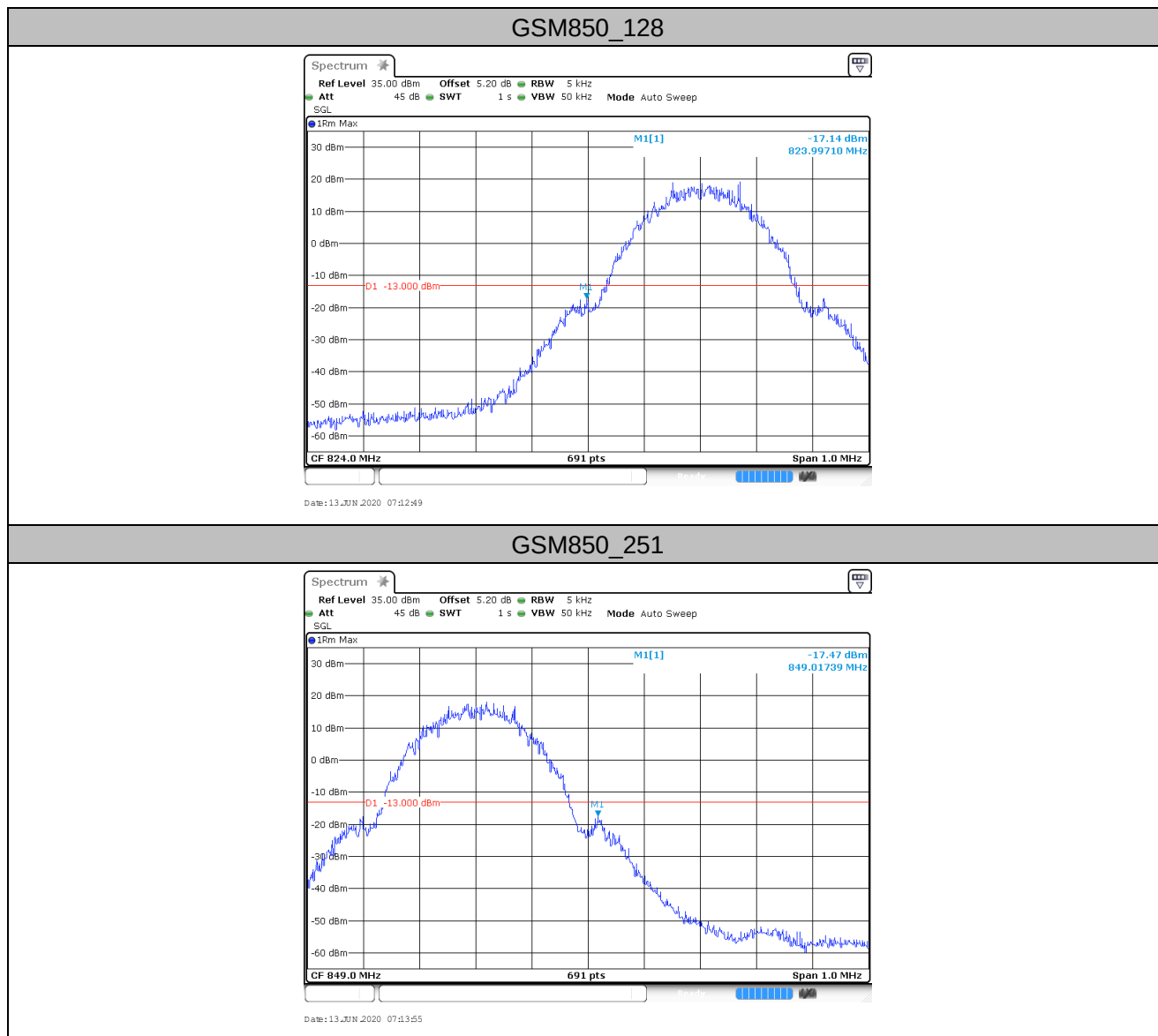
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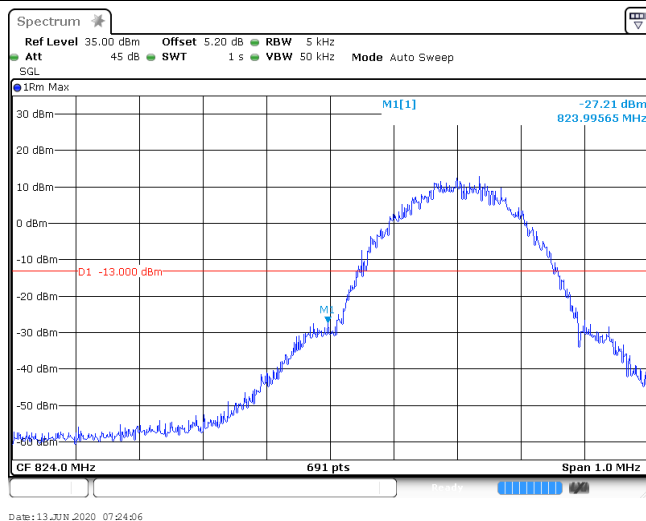
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5. Band Edge Compliance

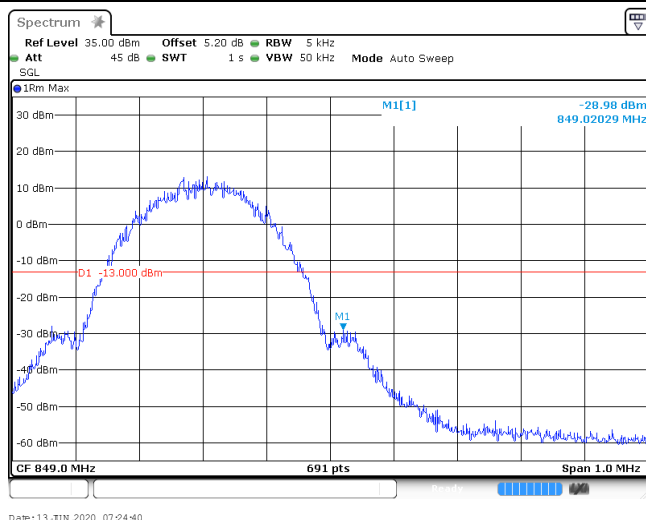
5.1. Test Plots



EGPRS850_128



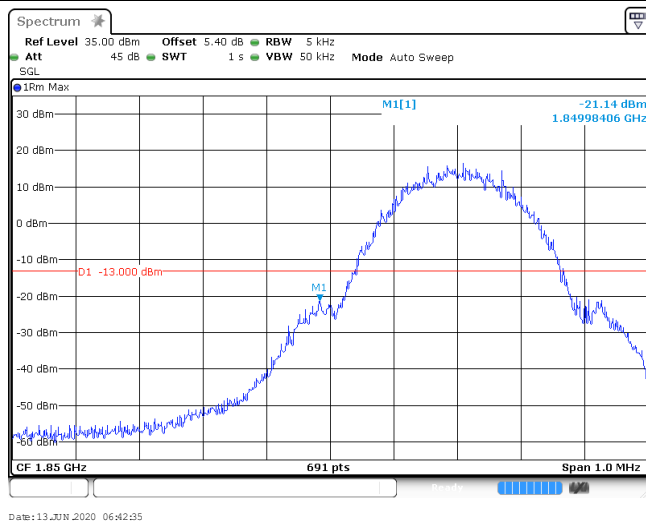
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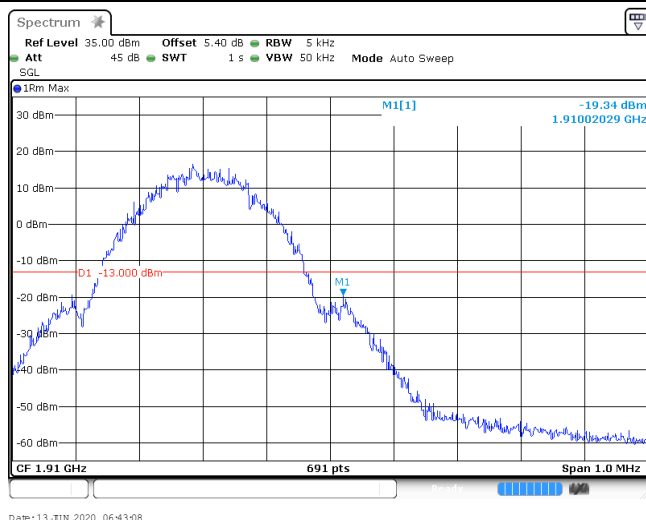
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GSM1900_512



GSM1900_810



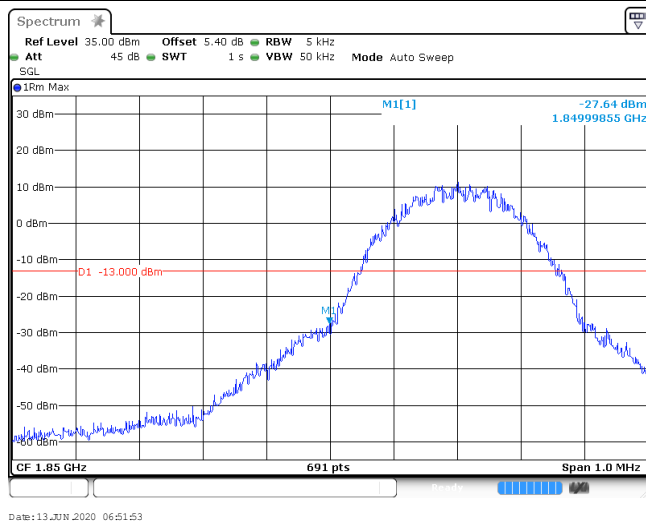
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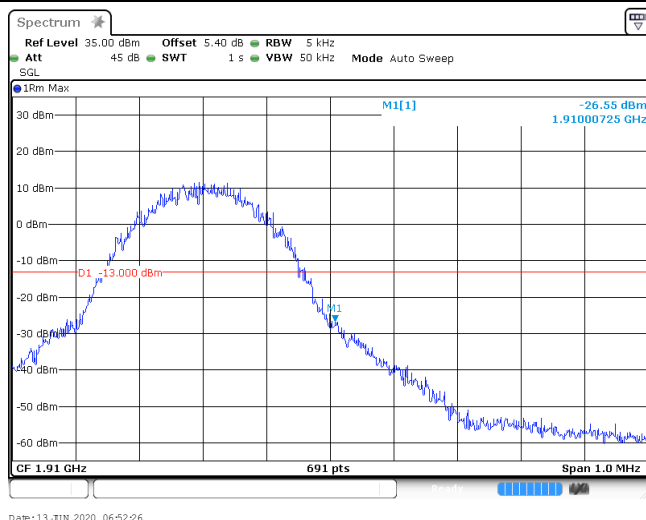
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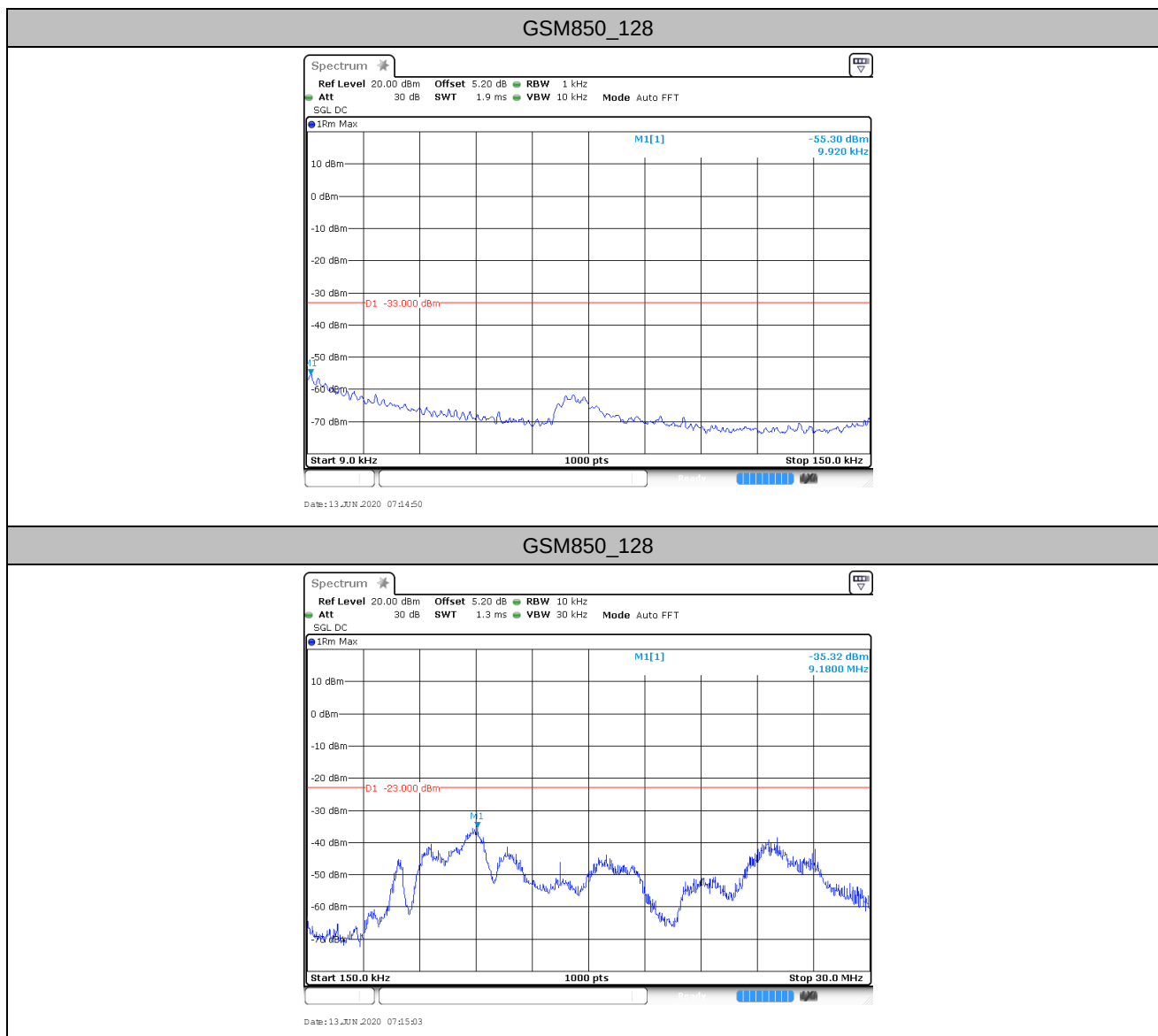


6. Spurious Emission at Antenna Terminal

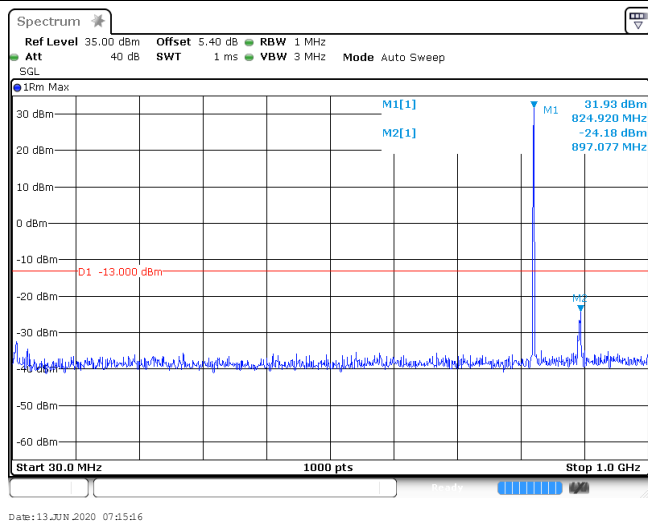
Remark1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (\text{Span} / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

Remark2: only the worst case data displayed in this report.

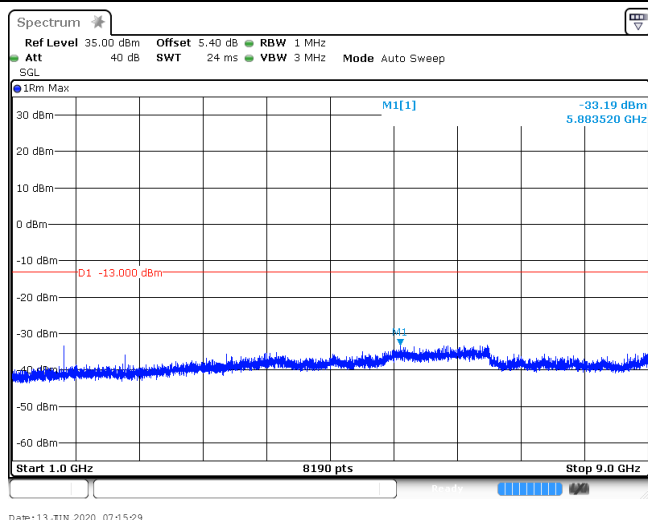
6.1. Test Plots



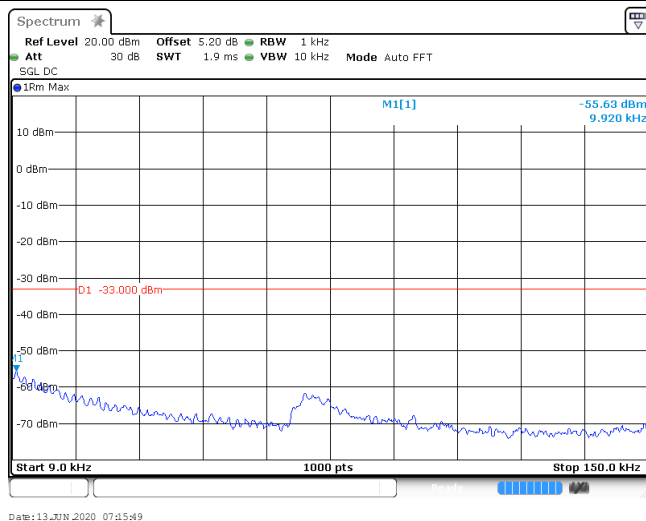
GSM850_128



GSM850_128



GSM850_190



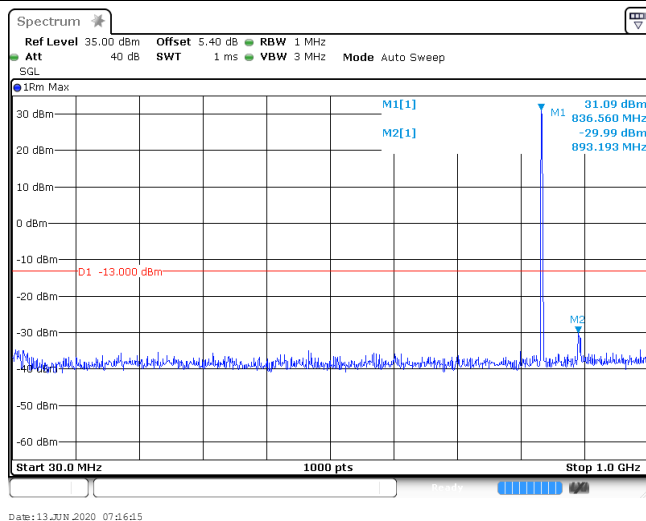
GSM850_190



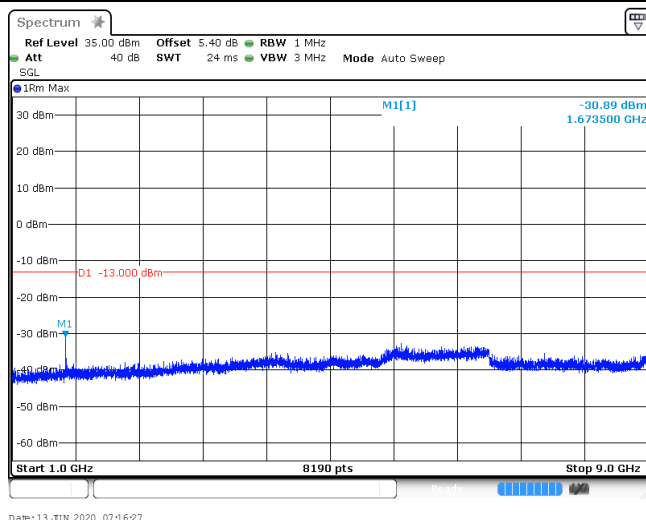
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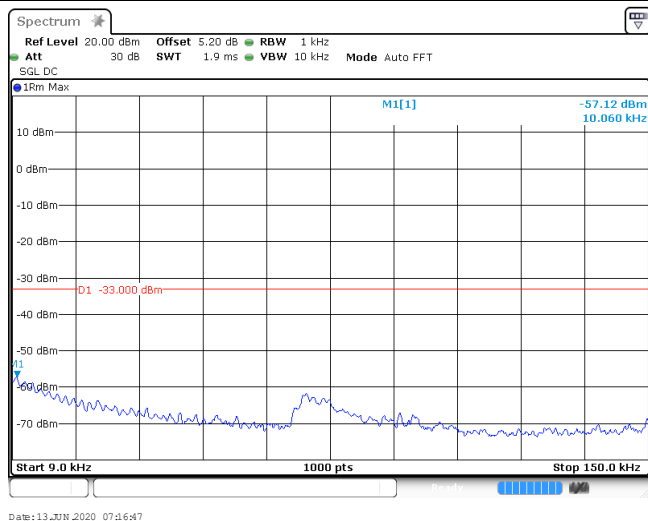


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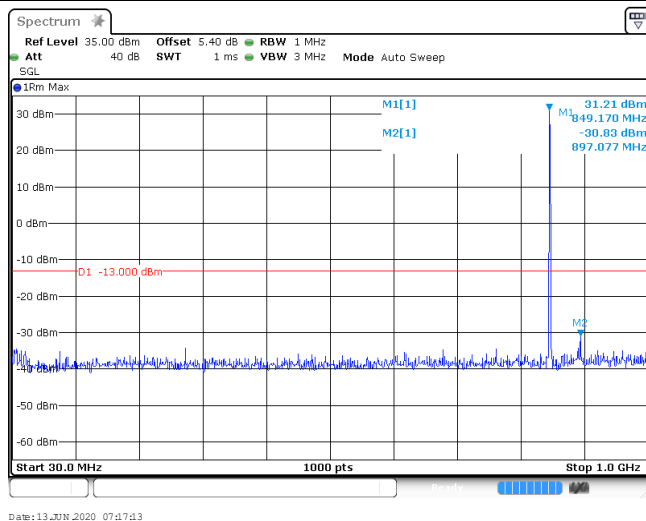
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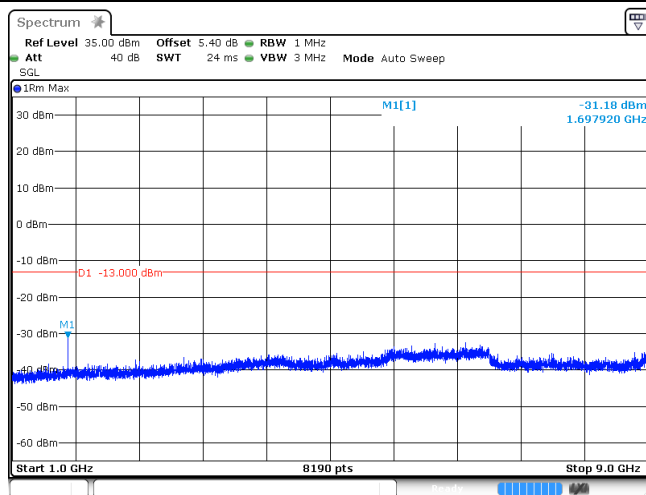
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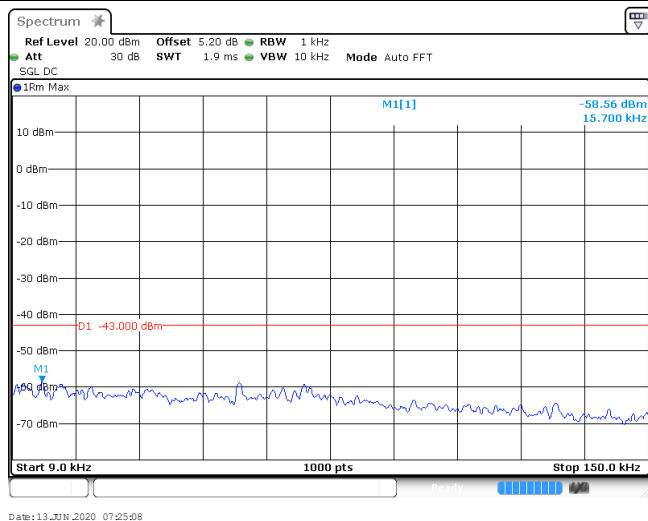
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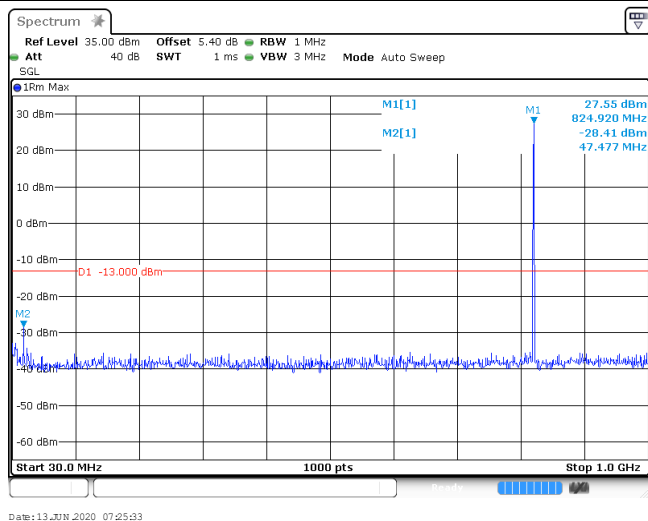
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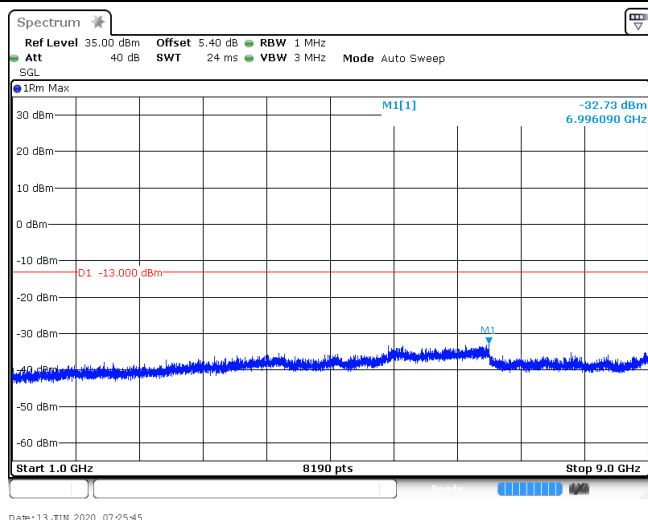
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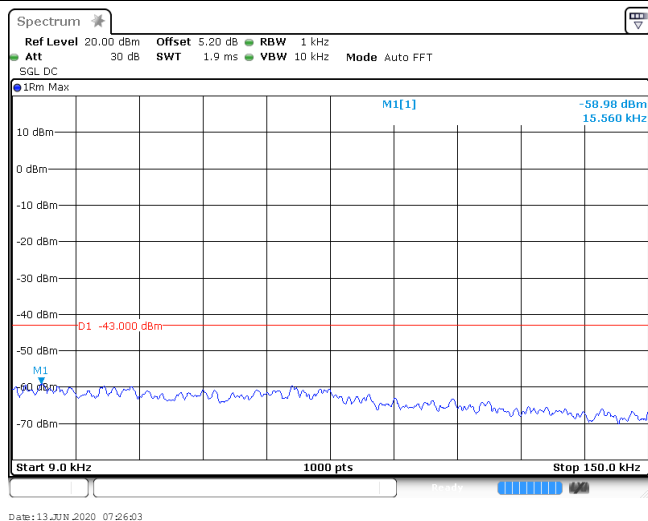


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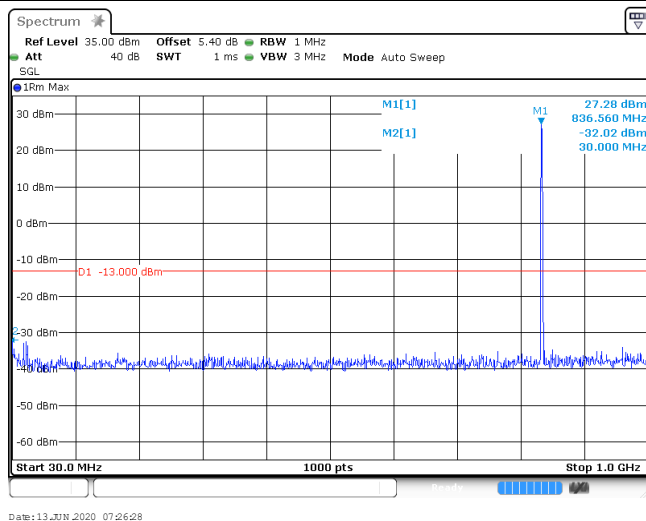
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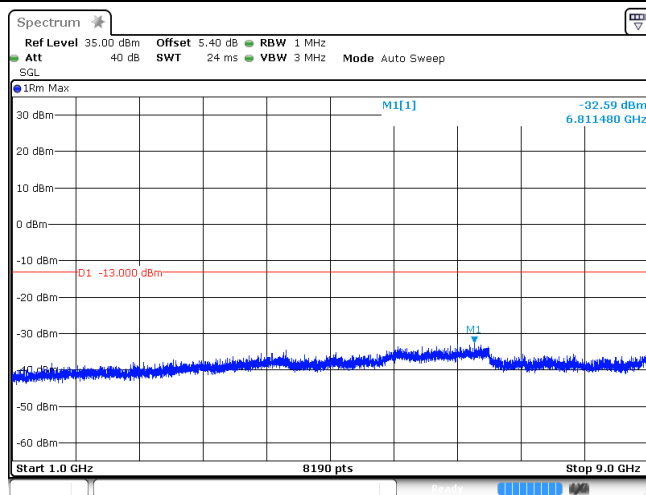
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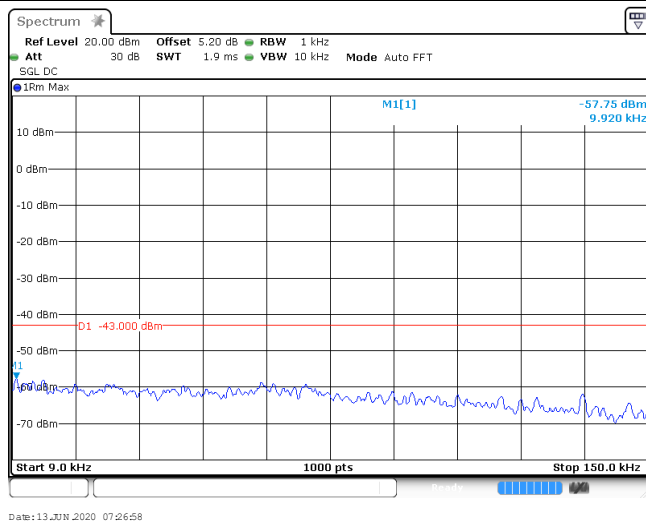
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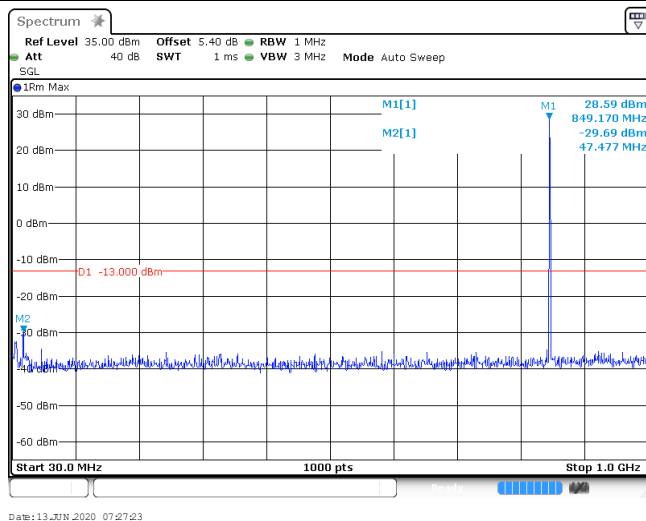
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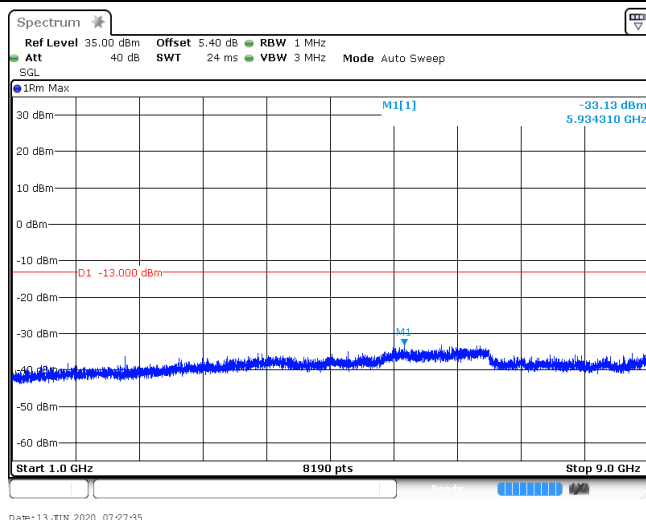
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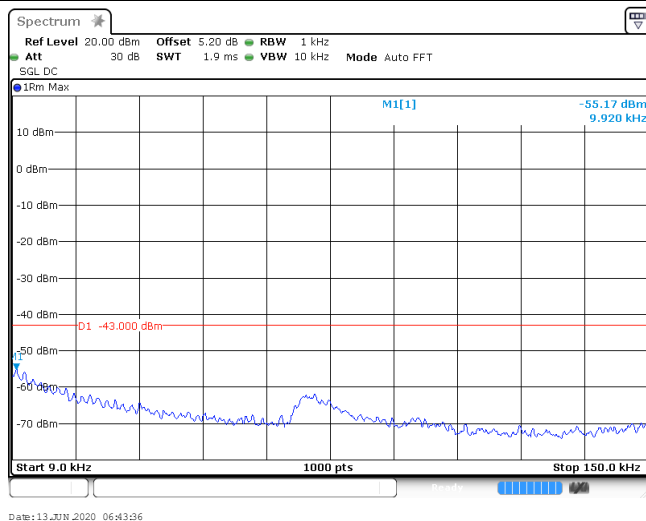
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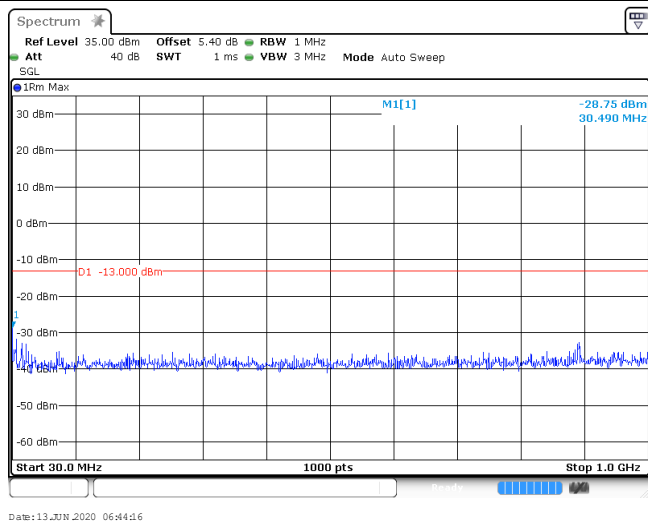
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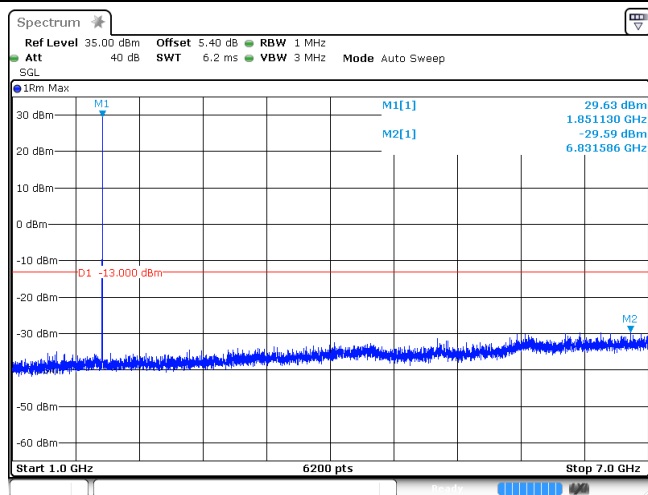


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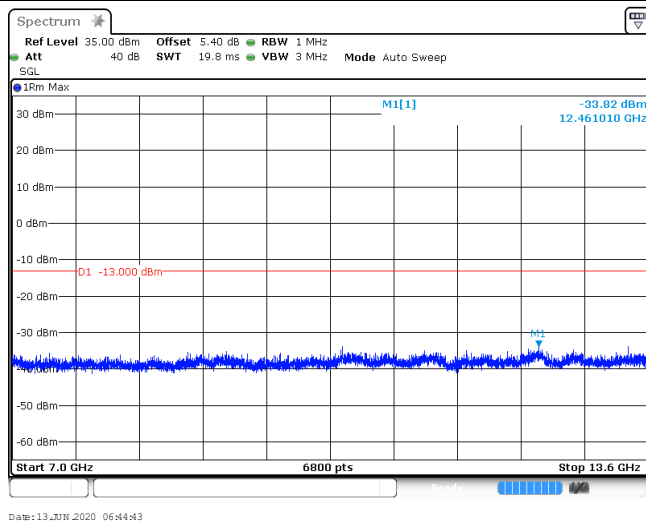
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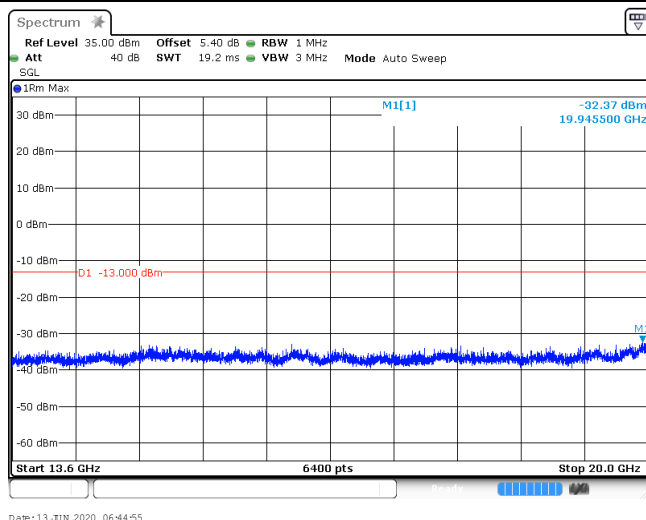
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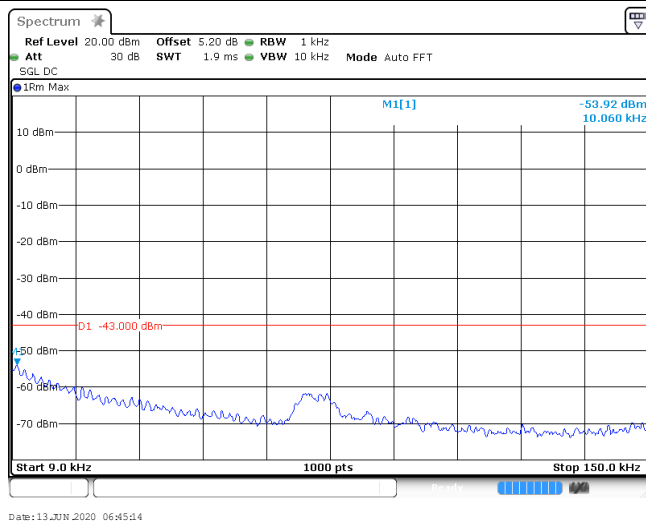


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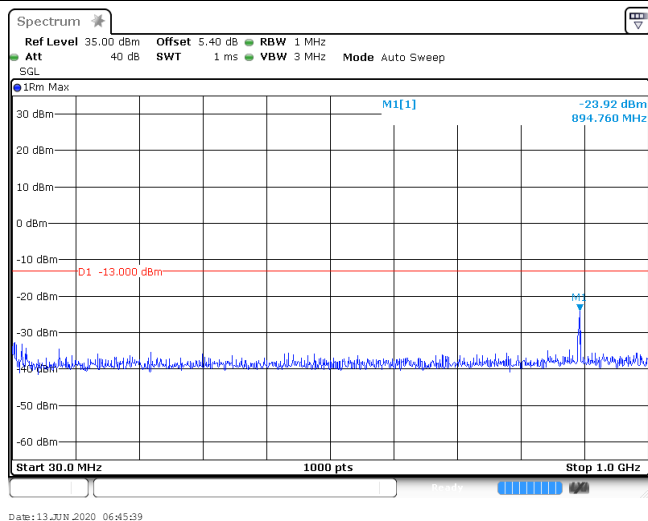


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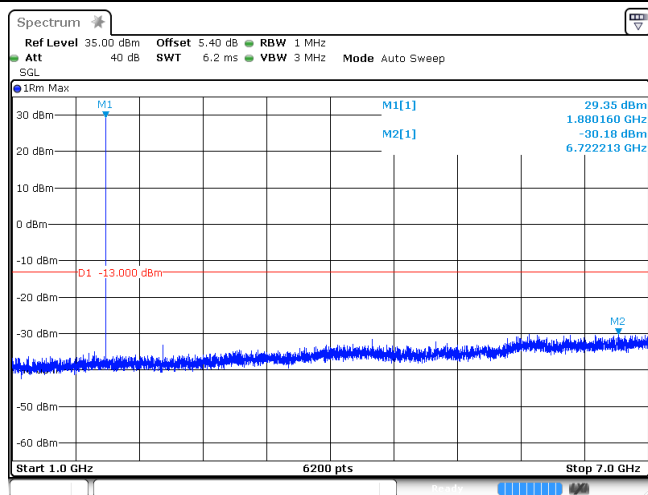
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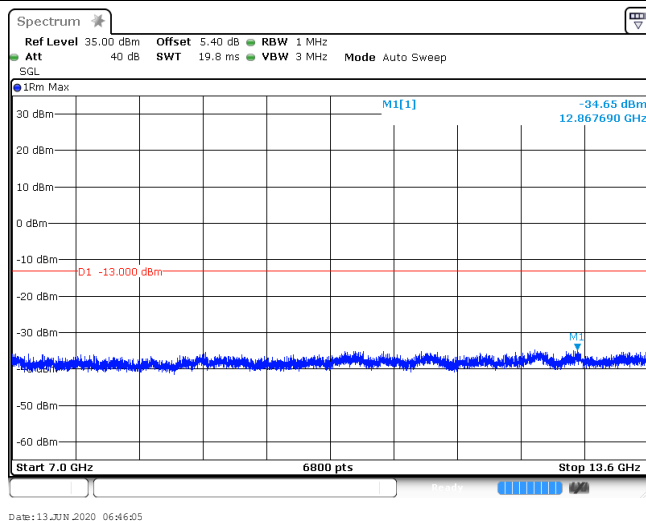
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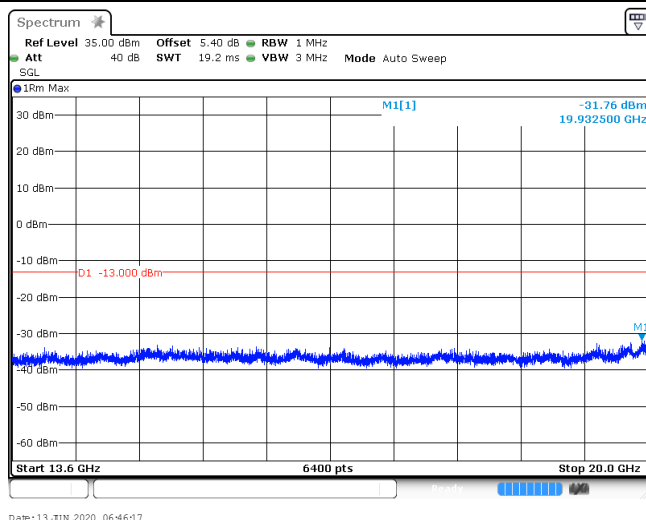
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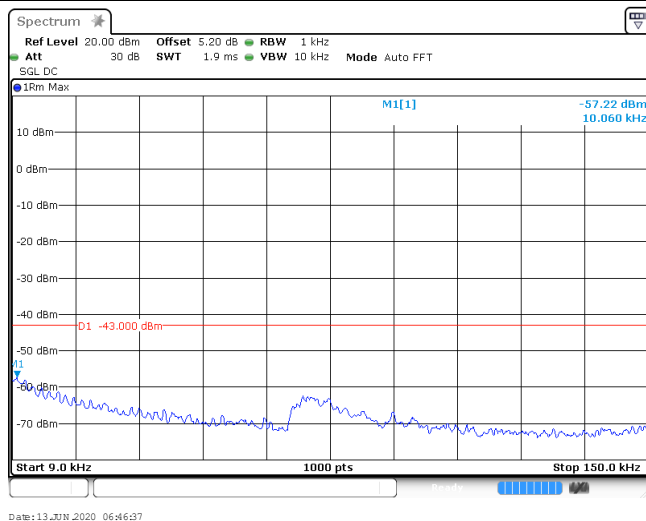


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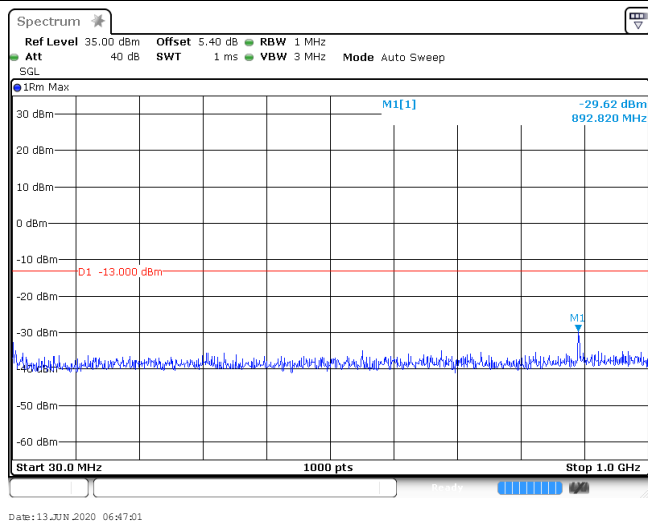
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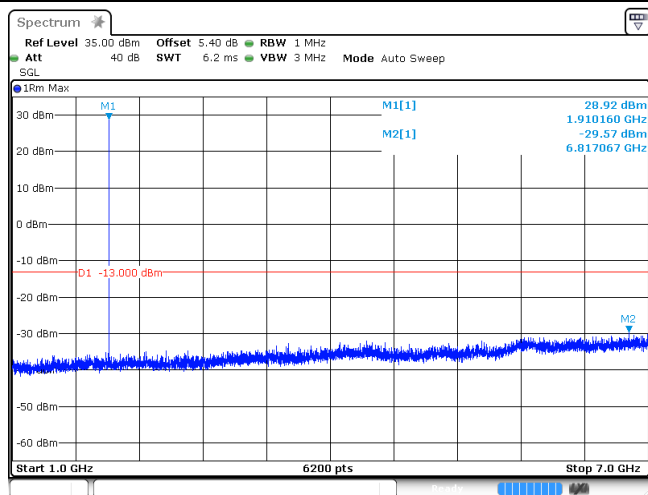
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GSM1900_810



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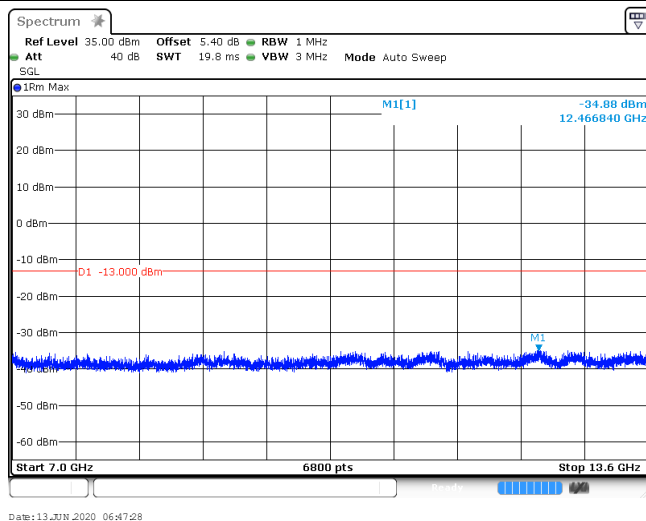


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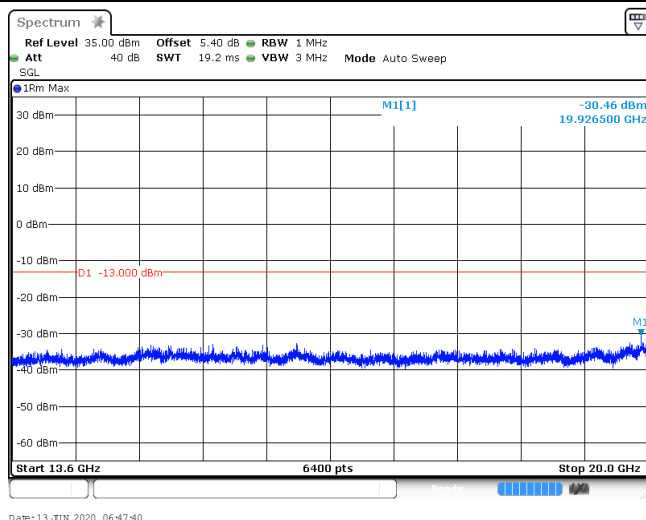
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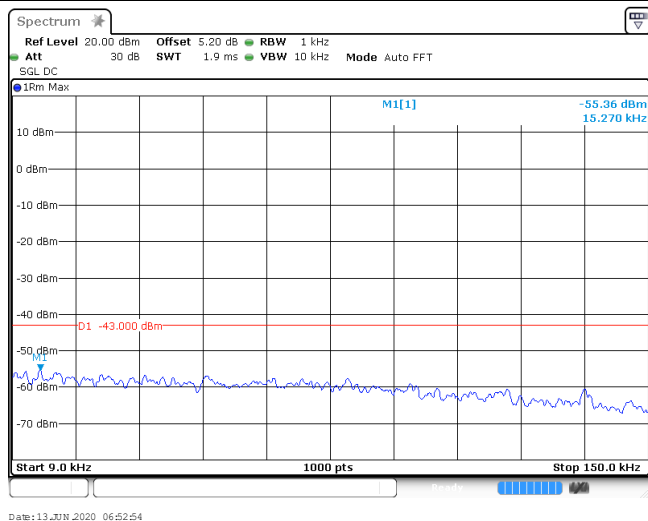
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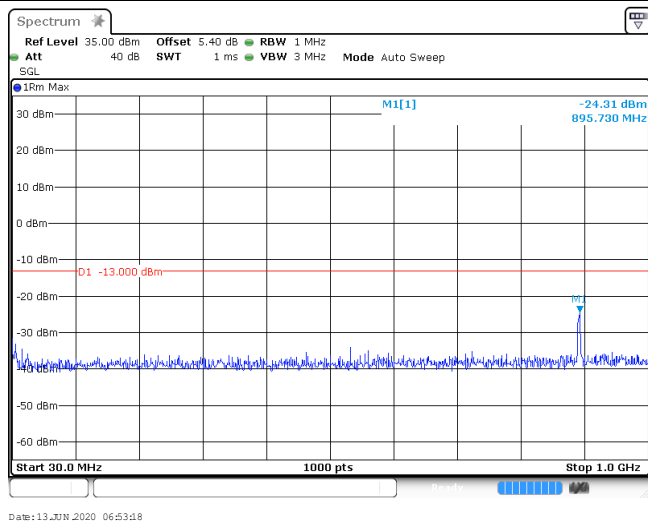
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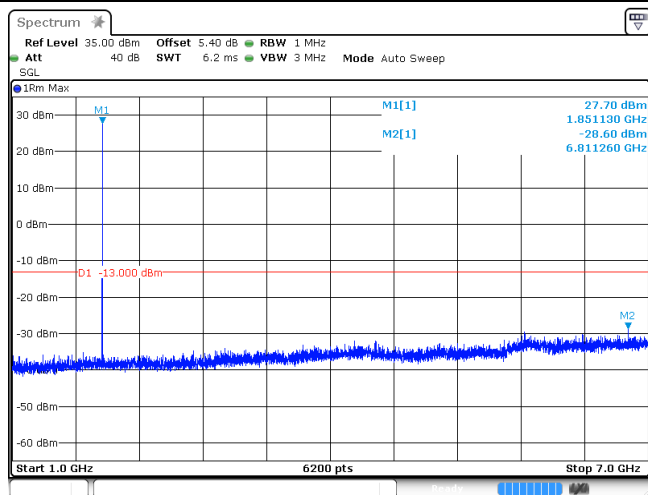


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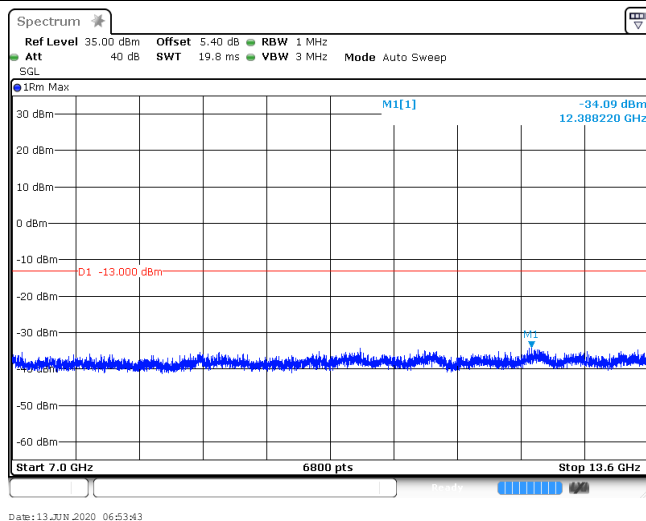
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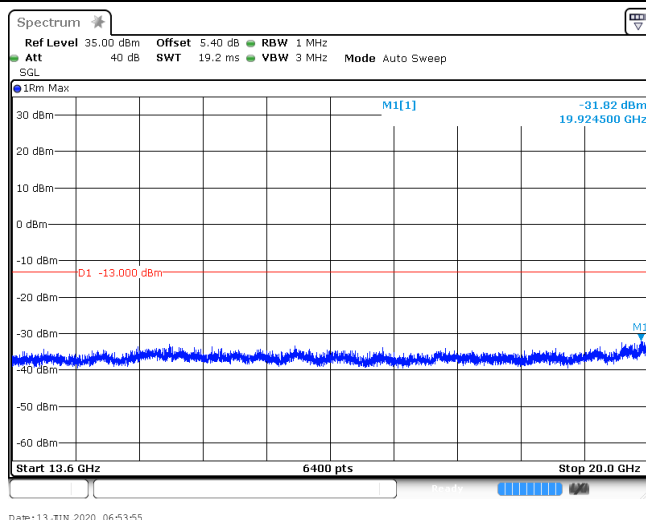
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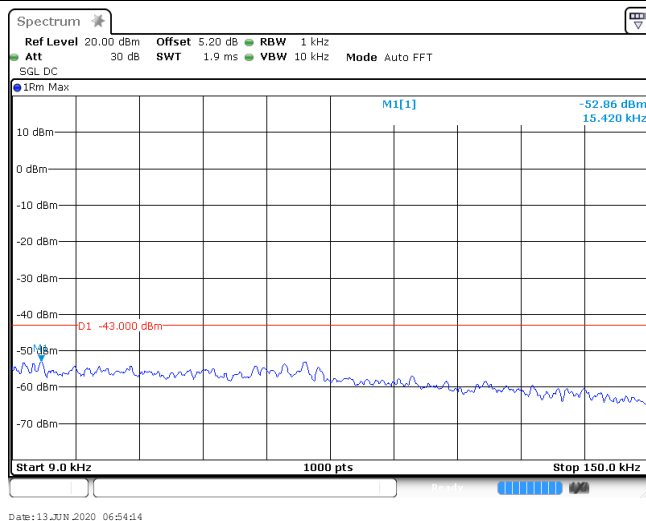
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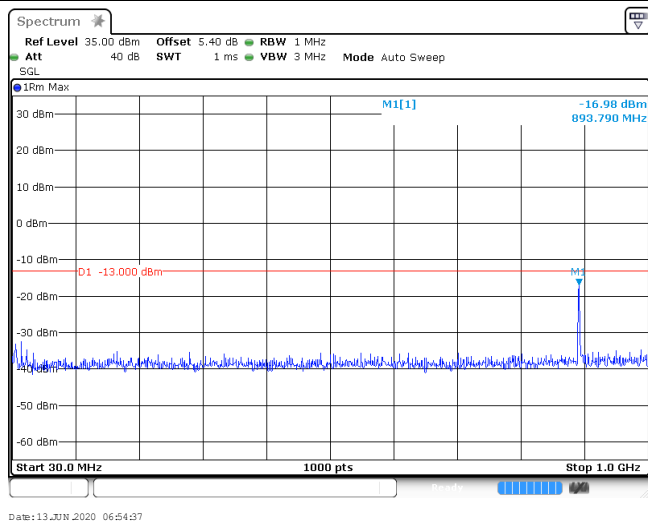
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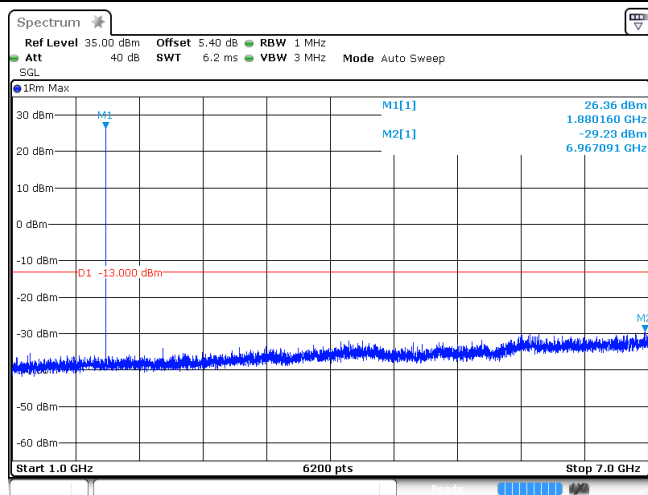


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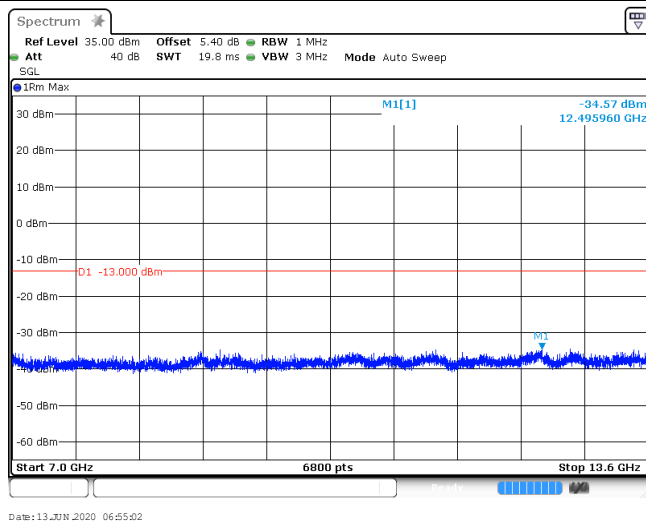
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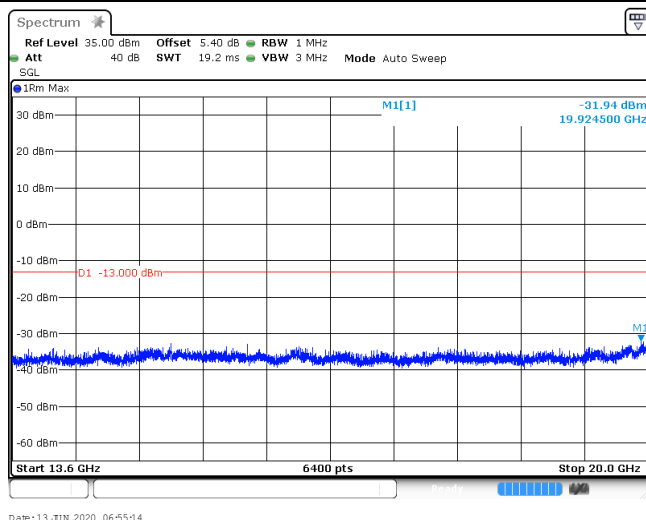
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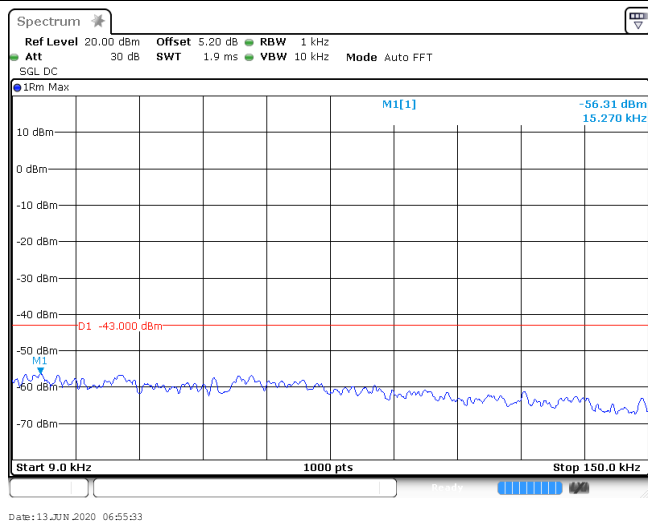
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EGPRS1900_810



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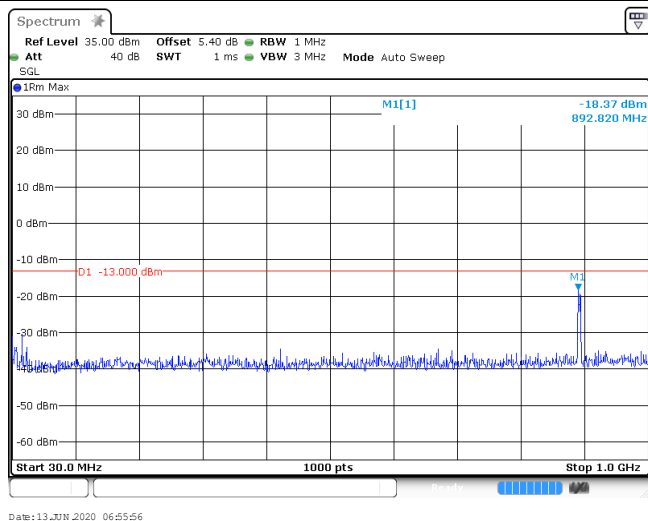
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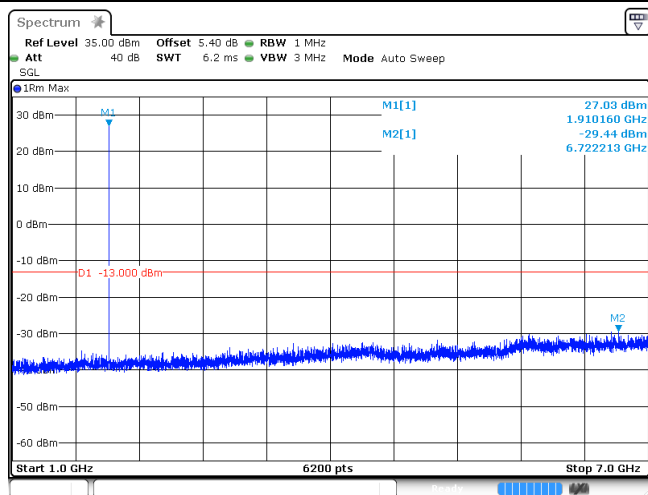
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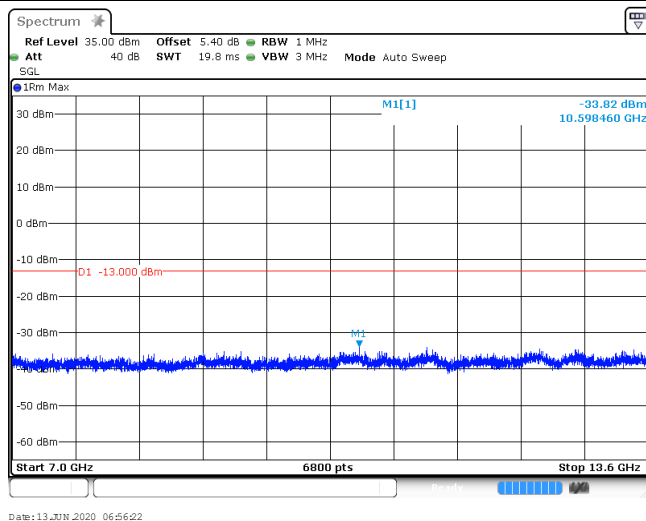


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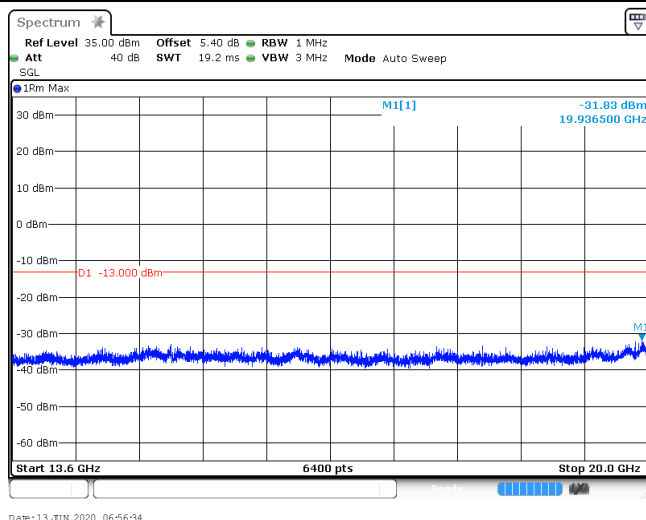




EGPRS1900_810



EGPRS1900_810





7. Field Strength of Spurious Radiation

7.1. Test Band = GSM 1900

7.1.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
110.3685	-64.77	-13.00	51.77	Vertical
341.5311	-68.77	-13.00	55.77	Vertical
2713.9428	-37.66	-13.00	24.66	Vertical
3700.5234	-54.72	-13.00	41.72	Vertical
7400.6467	-38.98	-13.00	25.98	Vertical
9251.2084	-42.75	-13.00	29.75	Vertical
43.2412	-64.38	-13.00	51.38	Horizontal
231.3336	-68.28	-13.00	55.28	Horizontal
2692.7385	-36.49	-13.00	23.49	Horizontal
3700.5234	-53.38	-13.00	40.38	Horizontal
7400.6467	-50.68	-13.00	37.68	Horizontal
16394.9465	-42.30	-13.00	29.30	Horizontal

7.1.2. Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
113.7152	-64.76	-13.00	51.76	Vertical
388.9664	-68.04	-13.00	55.04	Vertical
2699.1398	-37.49	-13.00	24.49	Vertical
3760.0253	-53.58	-13.00	40.58	Vertical
7520.1507	-36.80	-13.00	23.80	Vertical
9399.7133	-37.11	-13.00	24.11	Vertical
44.3082	-63.98	-13.00	50.98	Horizontal
244.3807	-68.57	-13.00	55.57	Horizontal
2705.5411	-36.40	-13.00	23.40	Horizontal
3760.0253	-51.22	-13.00	38.22	Horizontal
7520.1507	-46.22	-13.00	33.22	Horizontal
16386.4462	-42.49	-13.00	29.49	Horizontal



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7.1.3. Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
54.5422	-71.89	-13.00	58.89	Vertical
108.3314	-64.61	-13.00	51.61	Vertical
2690.3381	-37.54	-13.00	24.54	Vertical
3819.5273	-55.89	-13.00	42.89	Vertical
7639.1546	-44.92	-13.00	31.92	Vertical
9549.2183	-31.83	-13.00	18.83	Vertical
43.9687	-64.50	-13.00	51.50	Horizontal
240.4035	-68.08	-13.00	55.08	Horizontal
2696.7393	-36.42	-13.00	23.42	Horizontal
3819.5273	-50.74	-13.00	37.74	Horizontal
9548.7183	-44.00	-13.00	31.00	Horizontal
16401.9467	-42.25	-13.00	29.25	Horizontal

7.2. Test Band = GSM 850

7.2.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
110.9505	-64.29	-13.00	51.29	Vertical
468.7044	-64.95	-13.00	51.95	Vertical
1648.1296	-56.03	-13.00	43.03	Vertical
2472.6945	-44.75	-13.00	31.75	Vertical
7417.6473	-50.90	-13.00	37.90	Vertical
17998.5000	-38.64	-13.00	25.64	Vertical
42.6106	-63.59	-13.00	50.59	Horizontal
233.6132	-67.30	-13.00	54.30	Horizontal
1648.1296	-52.33	-13.00	39.33	Horizontal
2472.6945	-40.13	-13.00	27.13	Horizontal
7327.1442	-56.17	-13.00	43.17	Horizontal
16392.9464	-42.01	-13.00	29.01	Horizontal



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7.2.2. Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
49.0130	-71.39	-13.00	58.39	Vertical
110.8535	-63.71	-13.00	50.71	Vertical
1673.3347	-57.85	-13.00	44.85	Vertical
2509.9020	-46.80	-13.00	33.80	Vertical
7374.1458	-55.13	-13.00	42.13	Vertical
17996.4999	-38.75	-13.00	25.75	Vertical
39.4095	-63.53	-13.00	50.53	Horizontal
232.6431	-67.06	-13.00	54.06	Horizontal
1673.3347	-50.78	-13.00	37.78	Horizontal
2510.3021	-42.25	-13.00	29.25	Horizontal
7378.1459	-55.97	-13.00	42.97	Horizontal
16397.9466	-42.45	-13.00	29.45	Horizontal

7.2.3. Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
112.3086	-63.99	-13.00	50.99	Vertical
343.4227	-68.22	-13.00	55.22	Vertical
1697.7395	-57.87	-13.00	44.87	Vertical
2546.3093	-49.01	-13.00	36.01	Vertical
7639.6547	-52.57	-13.00	39.57	Vertical
17993.9998	-38.48	-13.00	25.48	Vertical
41.3981	-63.48	-13.00	50.48	Horizontal
246.5633	-67.03	-13.00	54.03	Horizontal
1697.3395	-49.84	-13.00	36.84	Horizontal
2546.7093	-43.21	-13.00	30.21	Horizontal
7958.6653	-55.96	-13.00	42.96	Horizontal
16386.9462	-42.34	-13.00	29.34	Horizontal

Remark:

- 1) According to 971168 D01 Power Meas License Digital Systems, The amplitudes of unwanted emissions that are attenuated more than 20 dB below the applicable limit are not required to be reported.
- 2) The disturbance above 12.75GHz and below 30MHz was very low, and the above harmonics were the highest point could be found when testing, so only the worst case data has been displayed.
- 3) All antenna has been tested, only the data of down antenna (worst) has been displayed.



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8. Frequency Stability

8.1. Frequency Error Vs Voltage

Voltage							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VL	TN	2.39	0.002903	2.5	PASS
GSM850	128	VN	TN	6.02	0.007306	2.5	PASS
GSM850	128	VH	TN	11.93	0.014472	2.5	PASS
GSM850	190	VL	TN	12.86	0.015375	2.5	PASS
GSM850	190	VN	TN	-4.76	-0.005691	2.5	PASS
GSM850	190	VH	TN	4.14	0.004948	2.5	PASS
GSM850	251	VL	TN	-10.11	-0.011909	2.5	PASS
GSM850	251	VN	TN	13.25	0.015606	2.5	PASS
GSM850	251	VH	TN	-12.15	-0.014315	2.5	PASS
GSM1900	512	VL	TN	22.79	0.012320	2.5	PASS
GSM1900	512	VN	TN	23.60	0.012756	2.5	PASS
GSM1900	512	VH	TN	24.63	0.013314	2.5	PASS
GSM1900	661	VL	TN	20.50	0.010905	2.5	PASS
GSM1900	661	VN	TN	16.79	0.008930	2.5	PASS
GSM1900	661	VH	TN	21.99	0.011695	2.5	PASS
GSM1900	810	VL	TN	21.41	0.011208	2.5	PASS
GSM1900	810	VN	TN	22.79	0.011935	2.5	PASS
GSM1900	810	VH	TN	22.41	0.011732	2.5	PASS



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8.2.Frequency Error Vs Temperature

Temperature							
Band	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VN	-30	14.10	0.017108	±2.5	PASS
GSM850	128	VN	-20	6.48	0.007856	±2.5	PASS
GSM850	128	VN	-10	11.48	0.013931	±2.5	PASS
GSM850	128	VN	0	0.04	0.000043	±2.5	PASS
GSM850	128	VN	10	5.78	0.007008	±2.5	PASS
GSM850	128	VN	20	6.10	0.007407	±2.5	PASS
GSM850	128	VN	30	-10.45	-0.012683	±2.5	PASS
GSM850	128	VN	40	8.06	0.009780	±2.5	PASS
GSM850	128	VN	50	6.67	0.008087	±2.5	PASS
GSM850	190	VN	-30	-13.85	-0.016552	±2.5	PASS
GSM850	190	VN	-20	2.25	0.002688	±2.5	PASS
GSM850	190	VN	-10	-8.82	-0.010539	±2.5	PASS
GSM850	190	VN	0	14.52	0.017359	±2.5	PASS
GSM850	190	VN	10	1.83	0.002185	±2.5	PASS
GSM850	190	VN	20	-9.61	-0.011483	±2.5	PASS
GSM850	190	VN	30	1.34	0.001606	±2.5	PASS
GSM850	190	VN	40	13.57	0.016225	±2.5	PASS
GSM850	190	VN	50	-11.95	-0.014288	±2.5	PASS
GSM850	251	VN	-30	0.81	0.000950	±2.5	PASS
GSM850	251	VN	-20	-7.45	-0.008781	±2.5	PASS
GSM850	251	VN	-10	2.78	0.003275	±2.5	PASS
GSM850	251	VN	0	7.47	0.008796	±2.5	PASS
GSM850	251	VN	10	14.28	0.016823	±2.5	PASS
GSM850	251	VN	20	-7.22	-0.008504	±2.5	PASS
GSM850	251	VN	30	-0.36	-0.000422	±2.5	PASS
GSM850	251	VN	40	-9.43	-0.011109	±2.5	PASS
GSM850	251	VN	50	-4.22	-0.004970	±2.5	PASS
GSM1900	512	VN	-30	22.02	0.011901	2.5	PASS
GSM1900	512	VN	-20	26.67	0.014414	2.5	PASS
GSM1900	512	VN	-10	23.76	0.012843	2.5	PASS
GSM1900	512	VN	0	19.57	0.010575	2.5	PASS
GSM1900	512	VN	10	23.37	0.012634	2.5	PASS
GSM1900	512	VN	20	22.92	0.012389	2.5	PASS
GSM1900	512	VN	30	19.02	0.010278	2.5	PASS
GSM1900	512	VN	40	14.66	0.007922	2.5	PASS



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GSM1900	512	VN	50	22.34	0.012075	2.5	PASS
GSM1900	661	VN	-30	20.37	0.010836	2.5	PASS
GSM1900	661	VN	-20	24.21	0.012880	2.5	PASS
GSM1900	661	VN	-10	19.08	0.010149	2.5	PASS
GSM1900	661	VN	0	18.56	0.009875	2.5	PASS
GSM1900	661	VN	10	16.11	0.008569	2.5	PASS
GSM1900	661	VN	20	14.98	0.007968	2.5	PASS
GSM1900	661	VN	30	16.72	0.008896	2.5	PASS
GSM1900	661	VN	40	14.53	0.007728	2.5	PASS
GSM1900	661	VN	50	18.11	0.009634	2.5	PASS
GSM1900	810	VN	-30	23.89	0.012510	2.5	PASS
GSM1900	810	VN	-20	19.89	0.010414	2.5	PASS
GSM1900	810	VN	-10	15.30	0.008013	2.5	PASS
GSM1900	810	VN	0	17.47	0.009146	2.5	PASS
GSM1900	810	VN	10	16.79	0.008791	2.5	PASS
GSM1900	810	VN	20	21.73	0.011377	2.5	PASS
GSM1900	810	VN	30	16.92	0.008858	2.5	PASS
GSM1900	810	VN	40	25.34	0.013271	2.5	PASS
GSM1900	810	VN	50	12.11	0.006340	2.5	PASS

The End



SGS-CSTC Standards Technical Services Co., Ltd.
Shenzhen Branch Testing Center (CCC Laboratory)

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