



# Appendix B

## GSM850&1900



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## 1. Effective (Isotropic) Radiated Power Output Data

### 1.1. Test Result

BAND	Channel	Power(dBm)	ERP(dBm)	Limit(dBm)	Verdict
GSM850	128	32.21	29.56	38.45	PASS
GSM850	190	32.19	29.54	38.45	PASS
GSM850	251	32.18	29.53	38.45	PASS

BAND	Channel	Power(dBm)	EIRP(dBm)	Limit(dBm)	Verdict
GSM1900	512	28.78	30.18	33.00	PASS
GSM1900	661	28.68	30.08	33.00	PASS
GSM1900	810	28.52	29.92	33.00	PASS

Note:

a: For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b: SGP=Signal Generator Level



## 2. Peak-to-Average Ratio

### 2.1. Test Result

BAND	Channel	Peak-to-Average Ratio(dB)	Limit(dB)	Verdict
GSM850	128	7.65	13	PASS
GSM850	190	7.71	13	PASS
GSM850	251	7.71	13	PASS
GSM1900	512	7.68	13	PASS
GSM1900	661	7.68	13	PASS
GSM1900	810	7.68	13	PASS

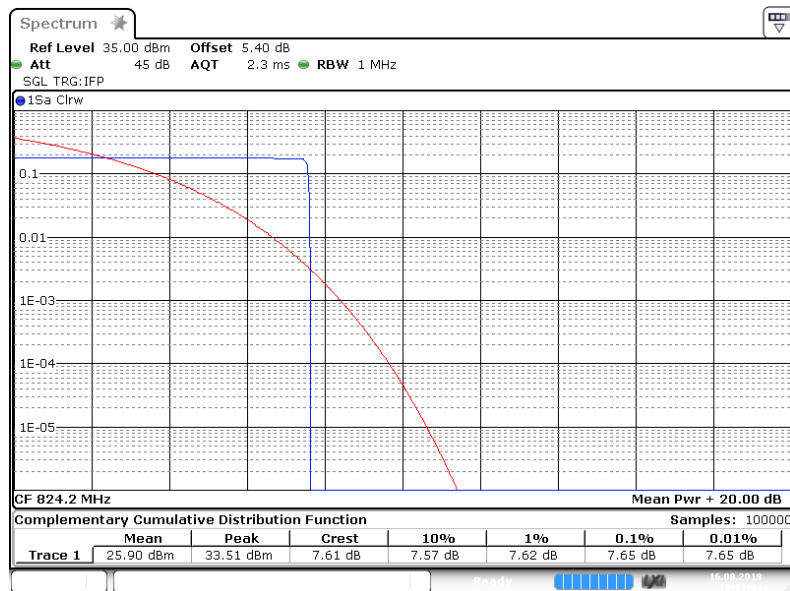
Part II - Test Plots

### 2.2. For GSM

#### 2.2.1. Test Band = GSM 850

##### 2.2.1.1. Test Mode = GSM/TM1

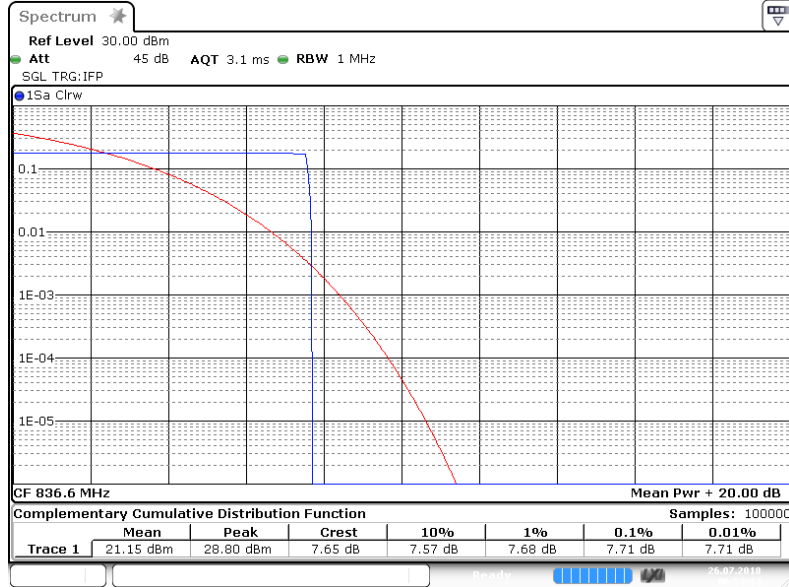
##### 2.2.1.1.1. Test Channel = LCH



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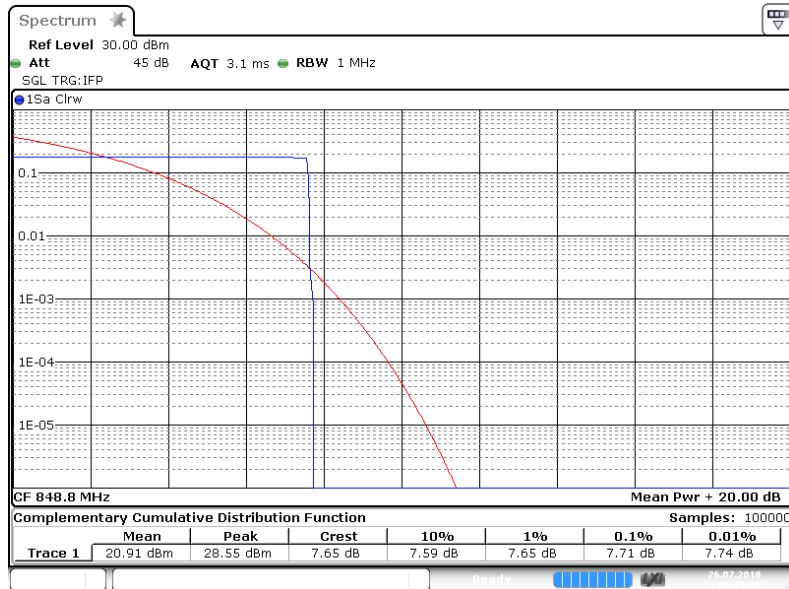


### 2.2.1.1.2. Test Channel = MCH



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### 2.2.1.1.3. Test Channel = HCH

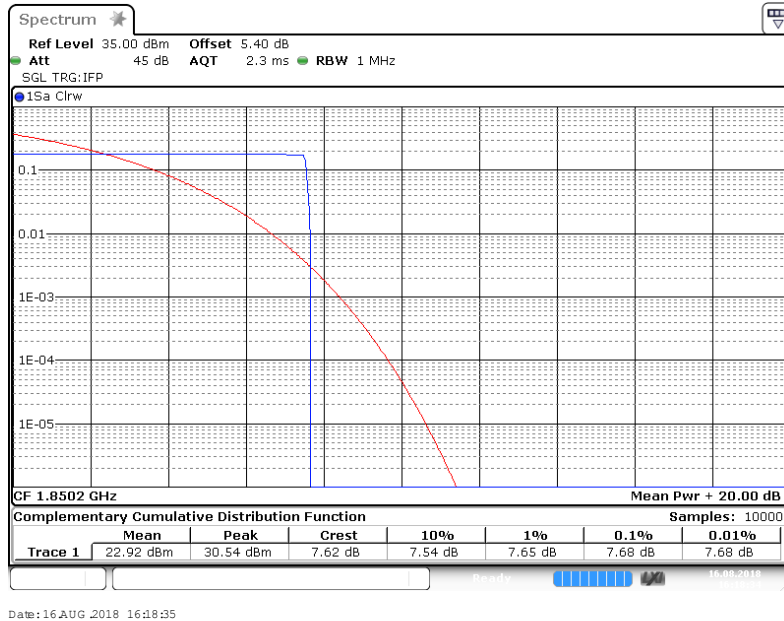


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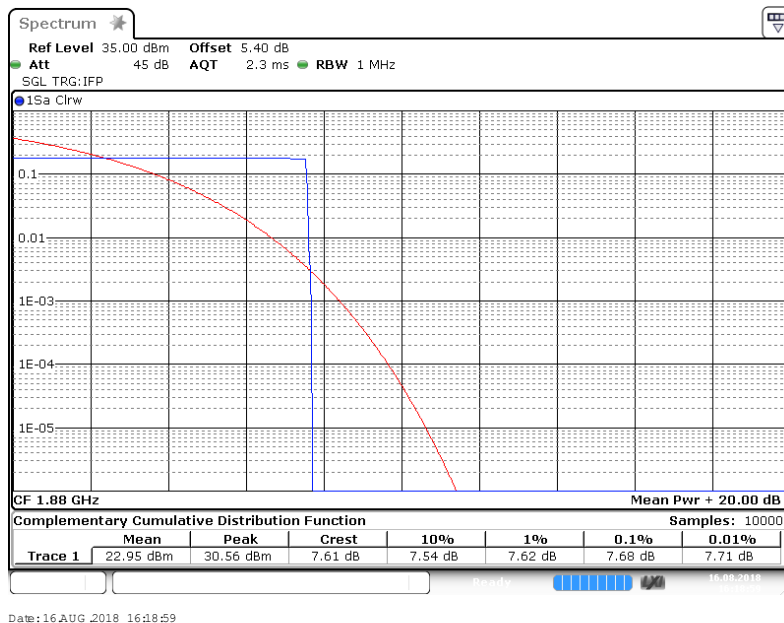
**2.2.2. Test Band = GSM 1900**

**2.2.2.1. Test Mode = GSM/TM1**

**2.2.2.1.1. Test Channel = LCH**

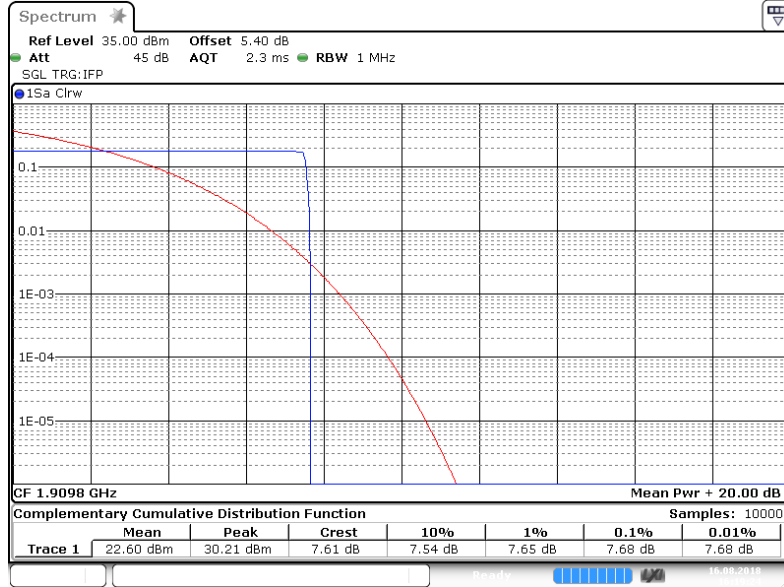


**2.2.2.1.2. Test Channel = MCH**





2.2.2.1.3. Test Channel = HCH



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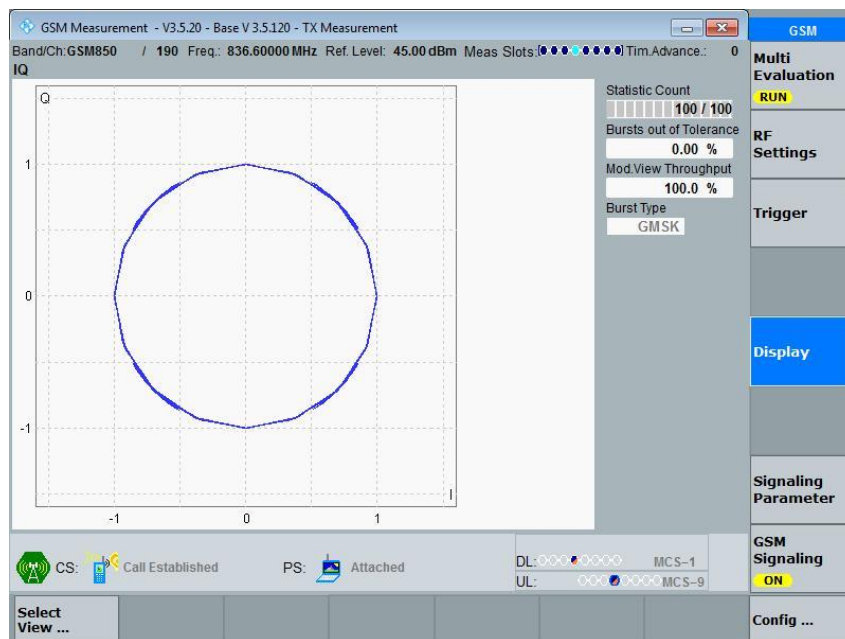
### 3. Modulation Characteristics

#### 3.1. For GSM

##### 3.1.1. Test BAND = GSM 850

##### 3.1.1.1. Test Mode = GSM/TM1

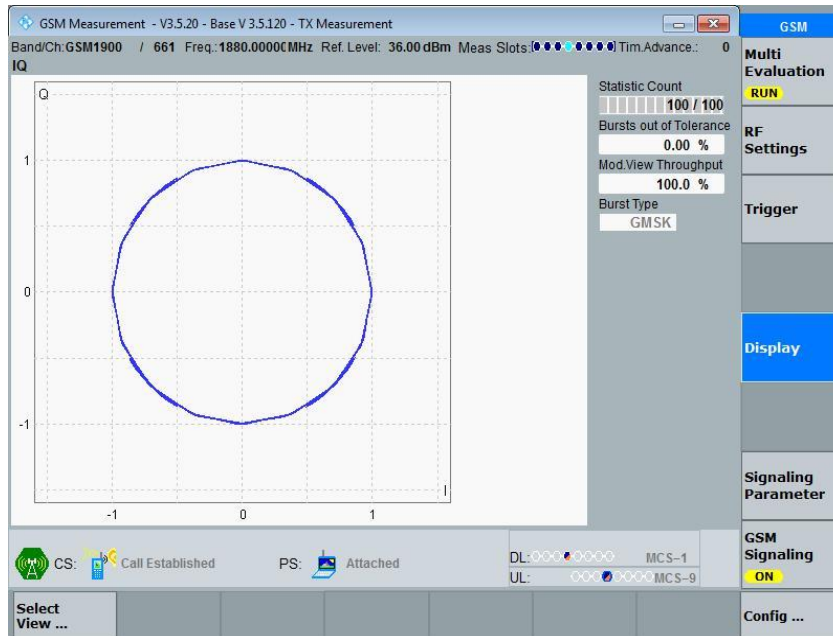
##### 3.1.1.1.1. Test Channel = MCH



### 3.1.2. Test BAND = GSM 1900

#### 3.1.2.1. Test Mode = GSM/TM1

##### 3.1.2.1.1. Test Channel = MCH

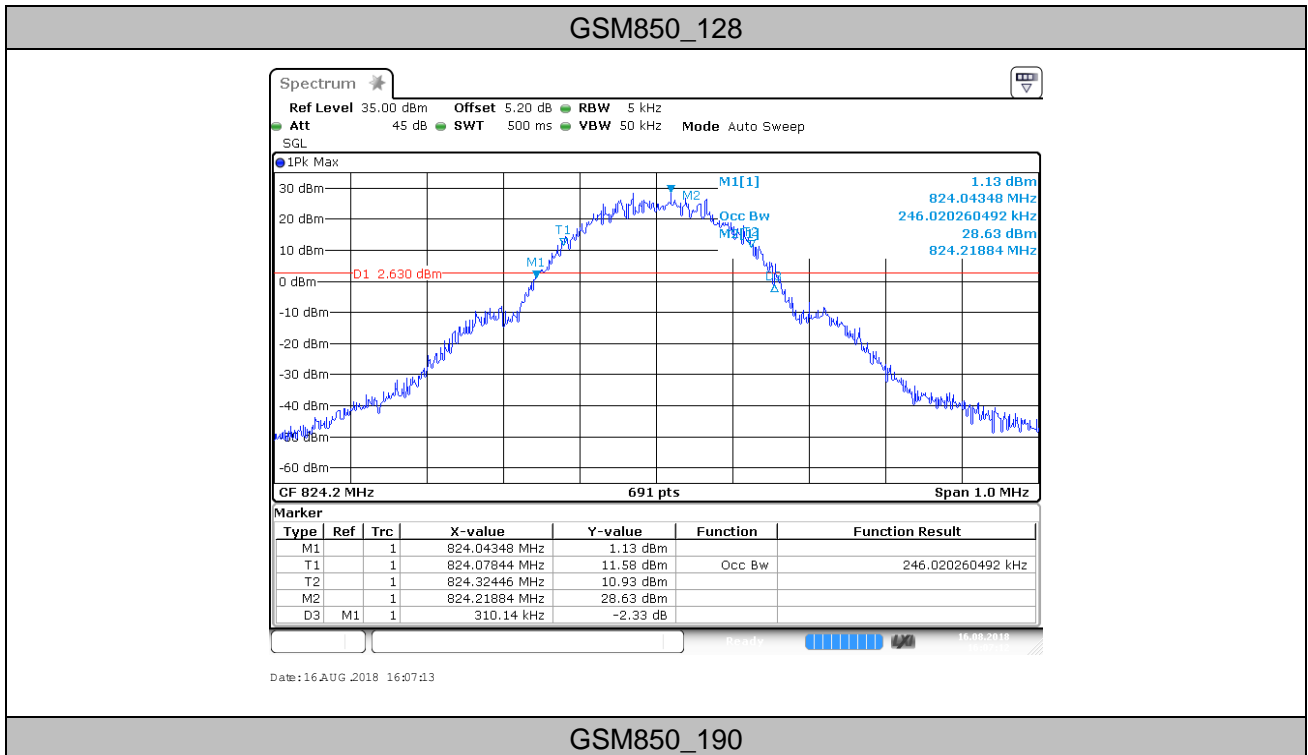


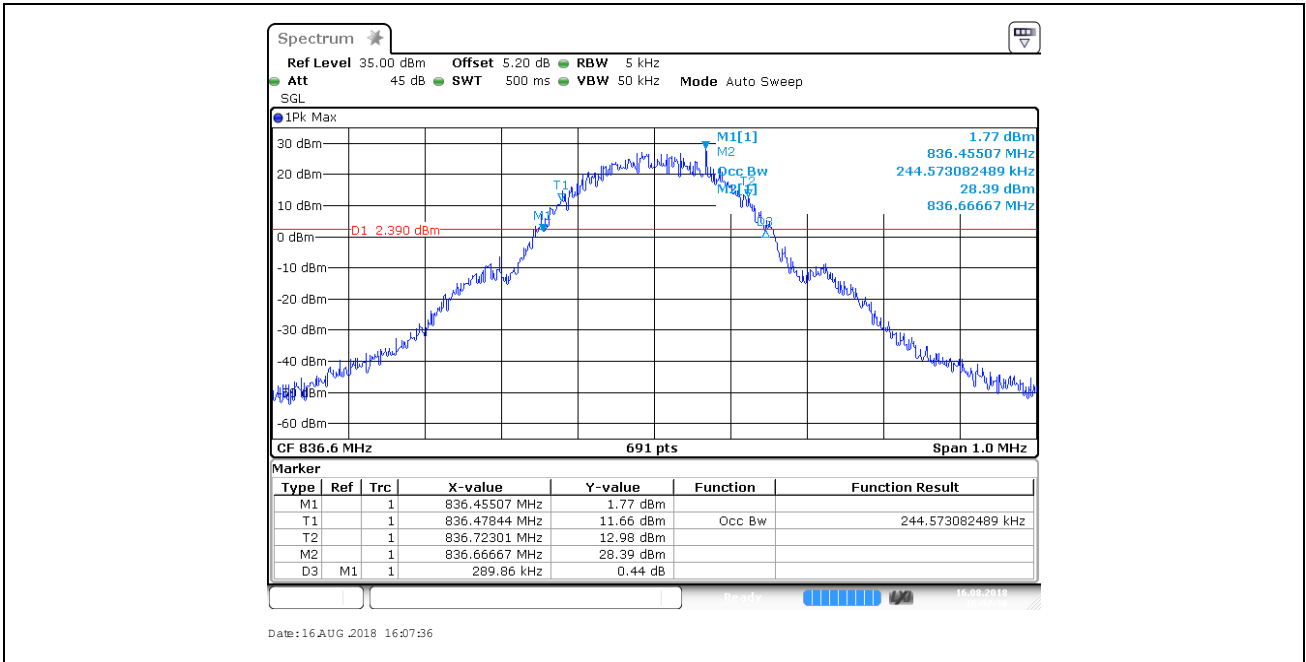
## 4. 26dB Bandwidth and Occupied Bandwidth

### 4.1. Test Result

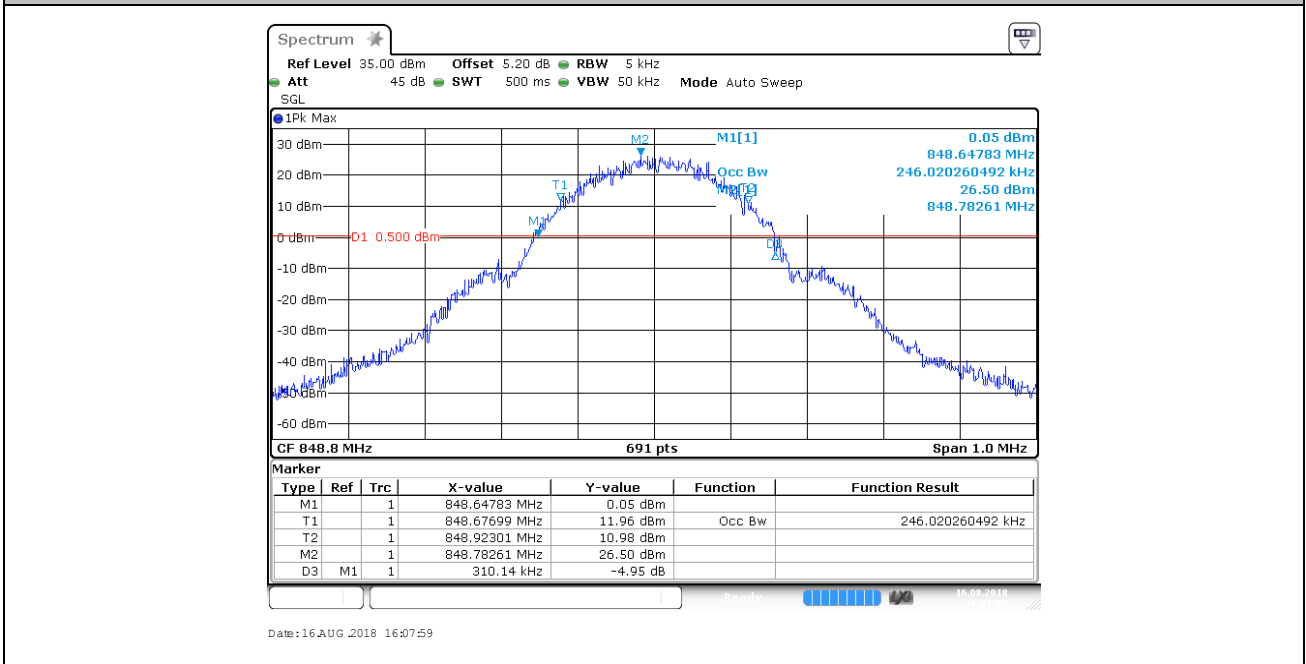
BAND	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	246.02	310.14	---	PASS
GSM850	190	244.57	289.86	---	PASS
GSM850	251	246.02	310.14	---	PASS
GSM1900	512	248.91	307.25	---	PASS
GSM1900	661	246.02	311.59	---	PASS
GSM1900	810	246.02	307.25	---	PASS

### 4.2. Test Plots

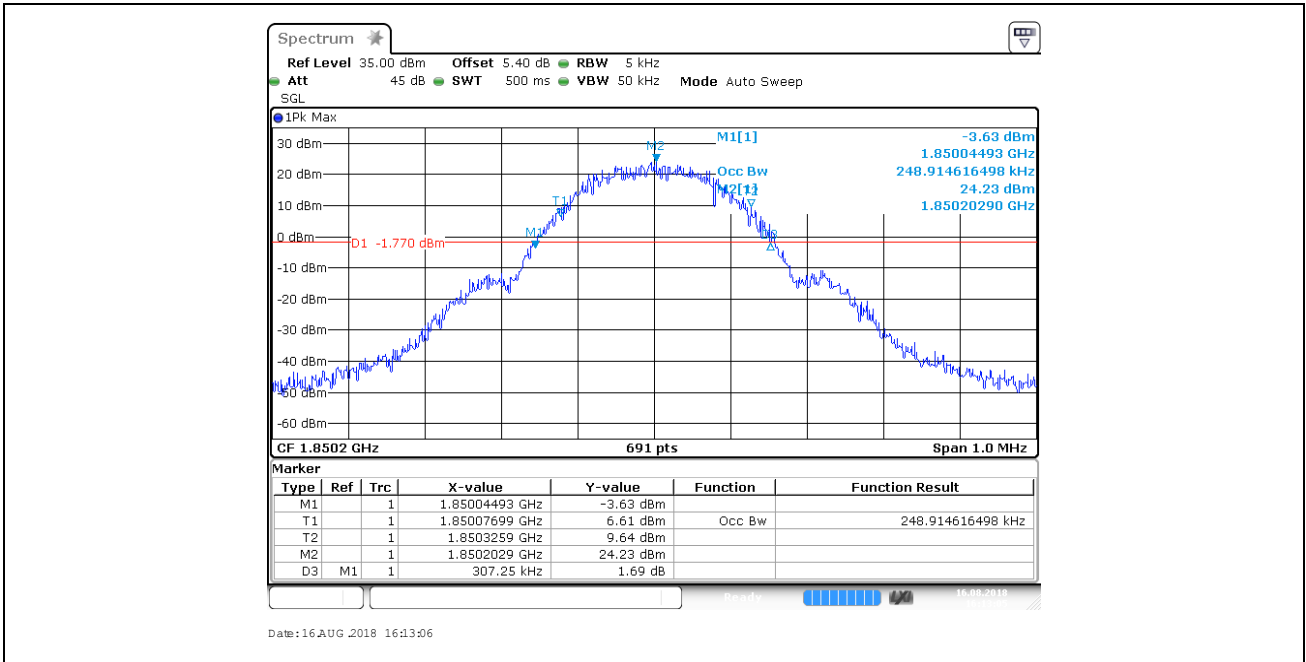




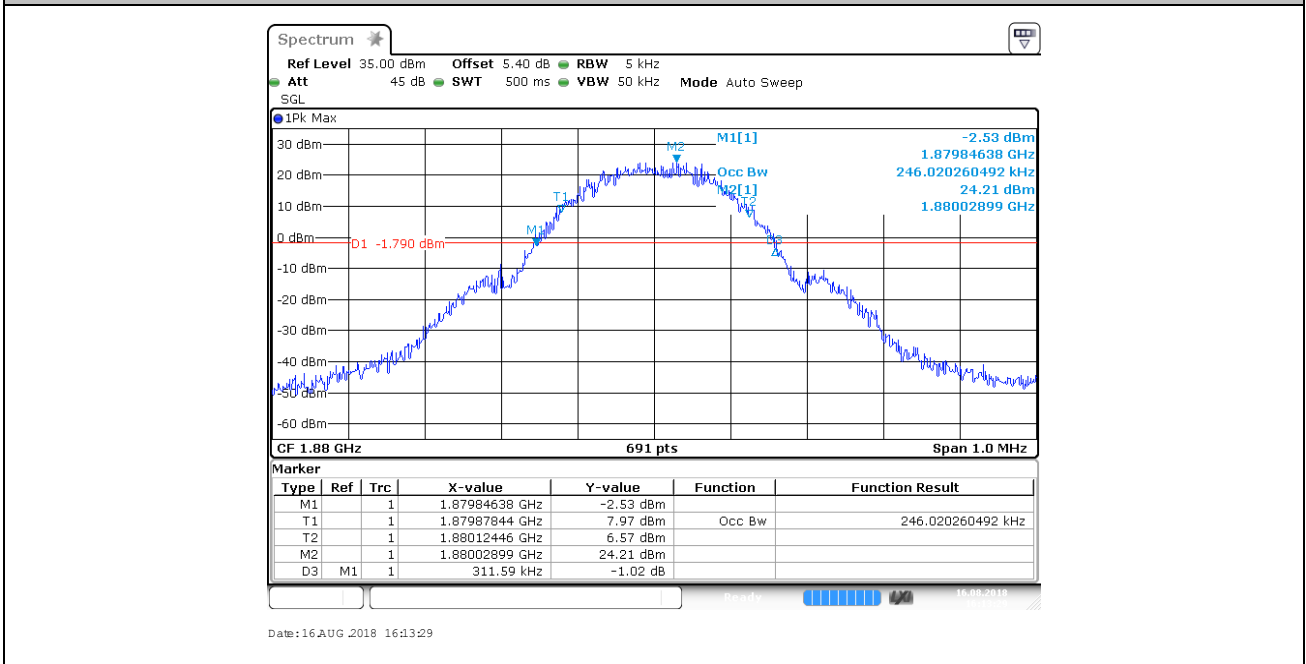
**GSM850\_251**



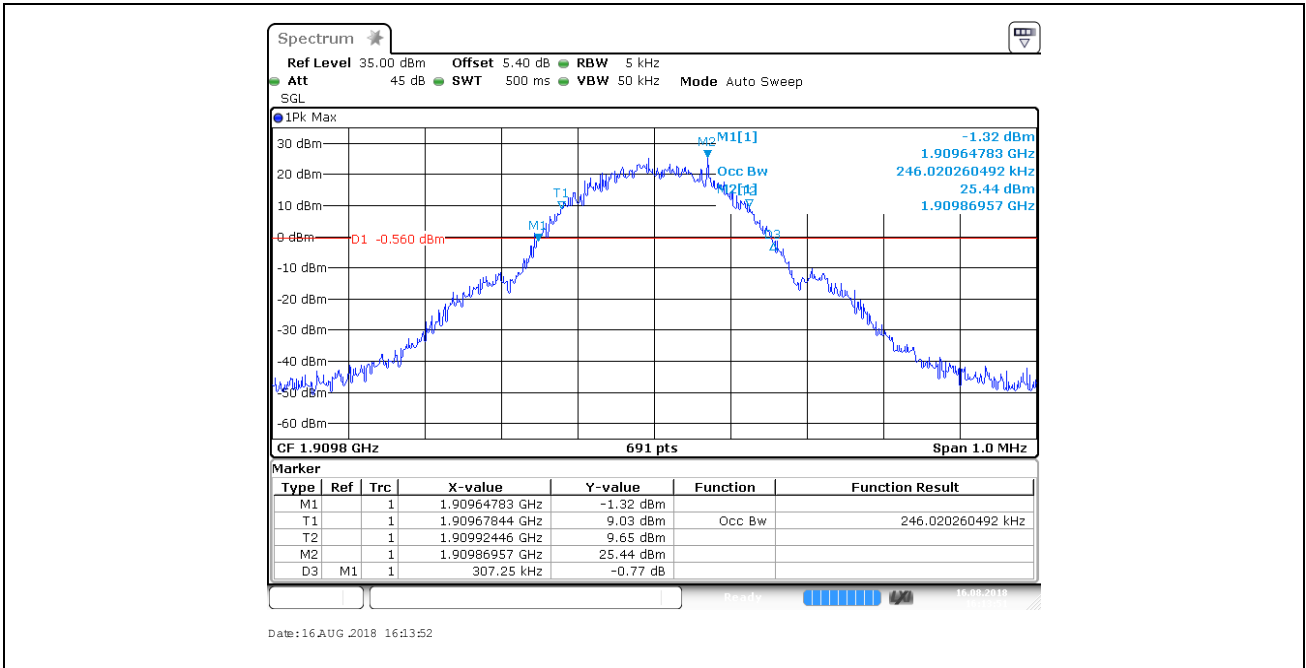
**GSM1900\_512**



**GSM1900\_661**

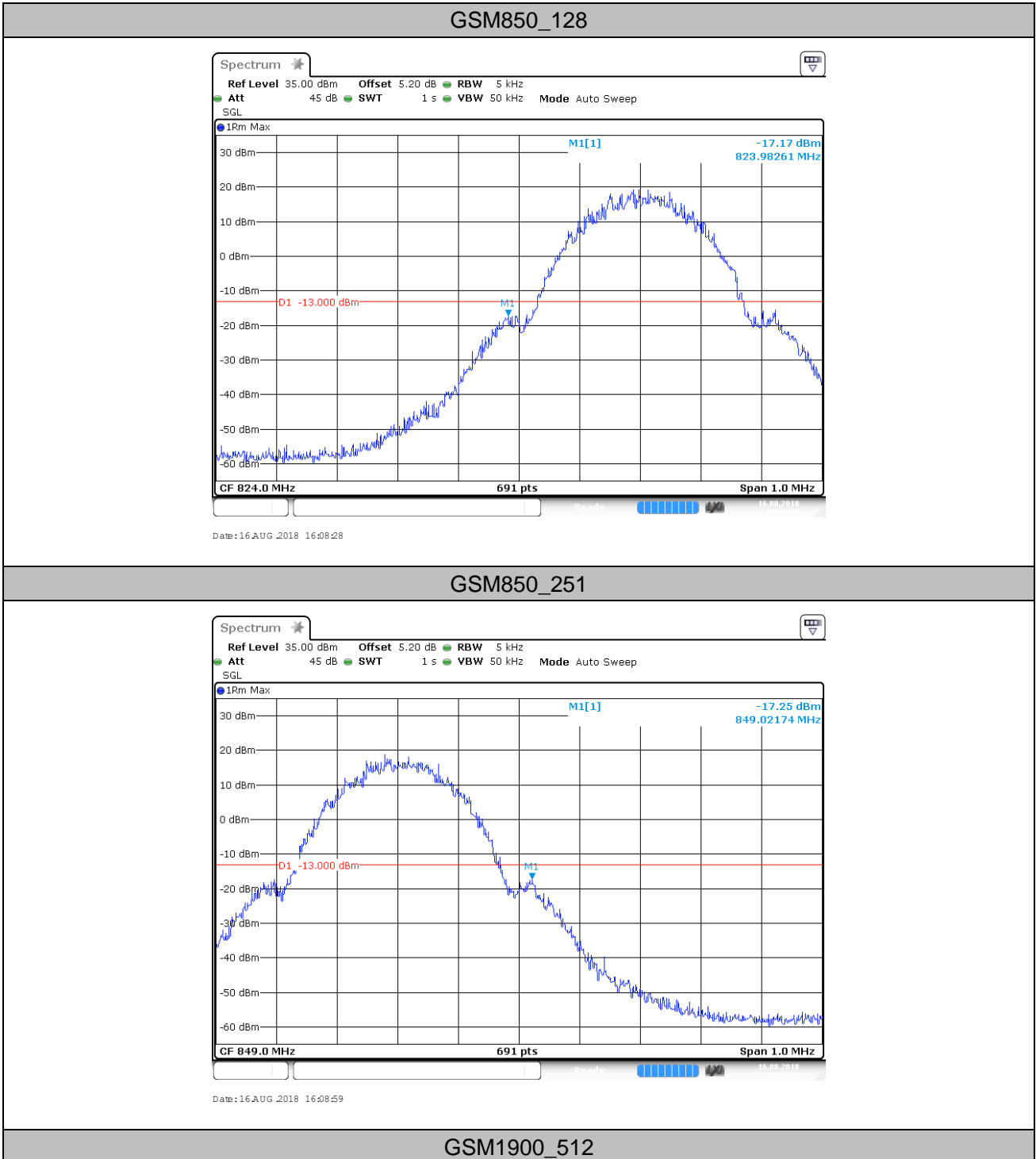


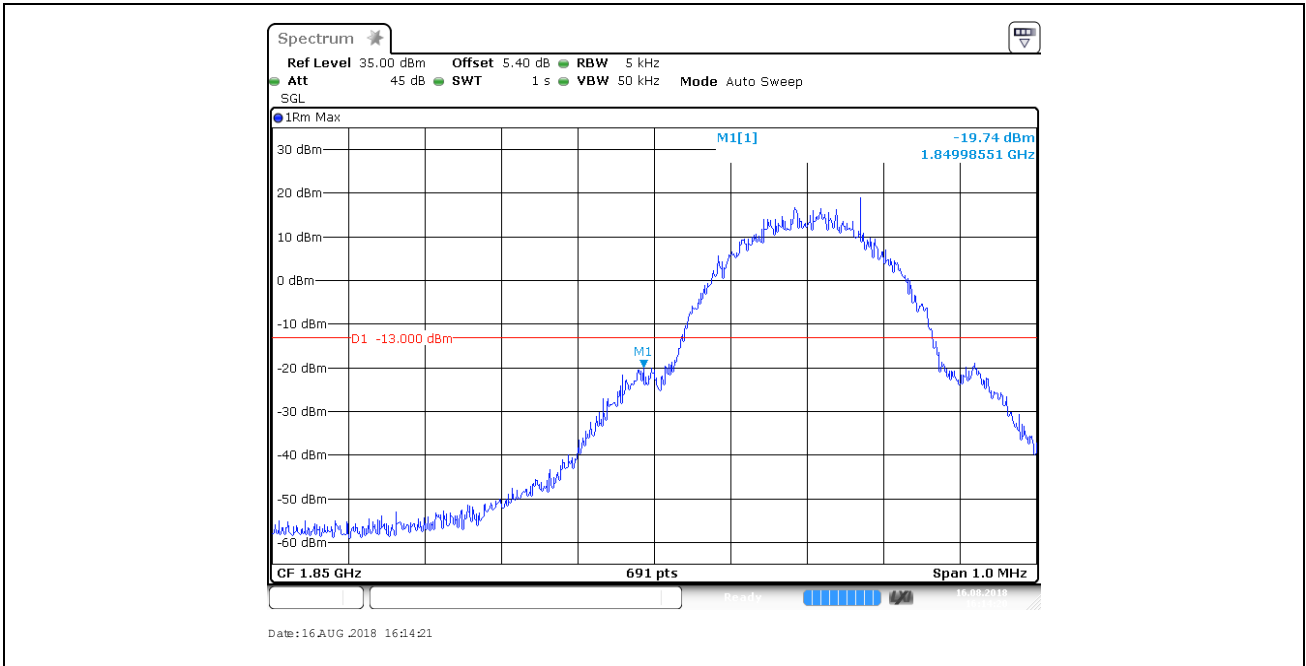
**GSM1900\_810**



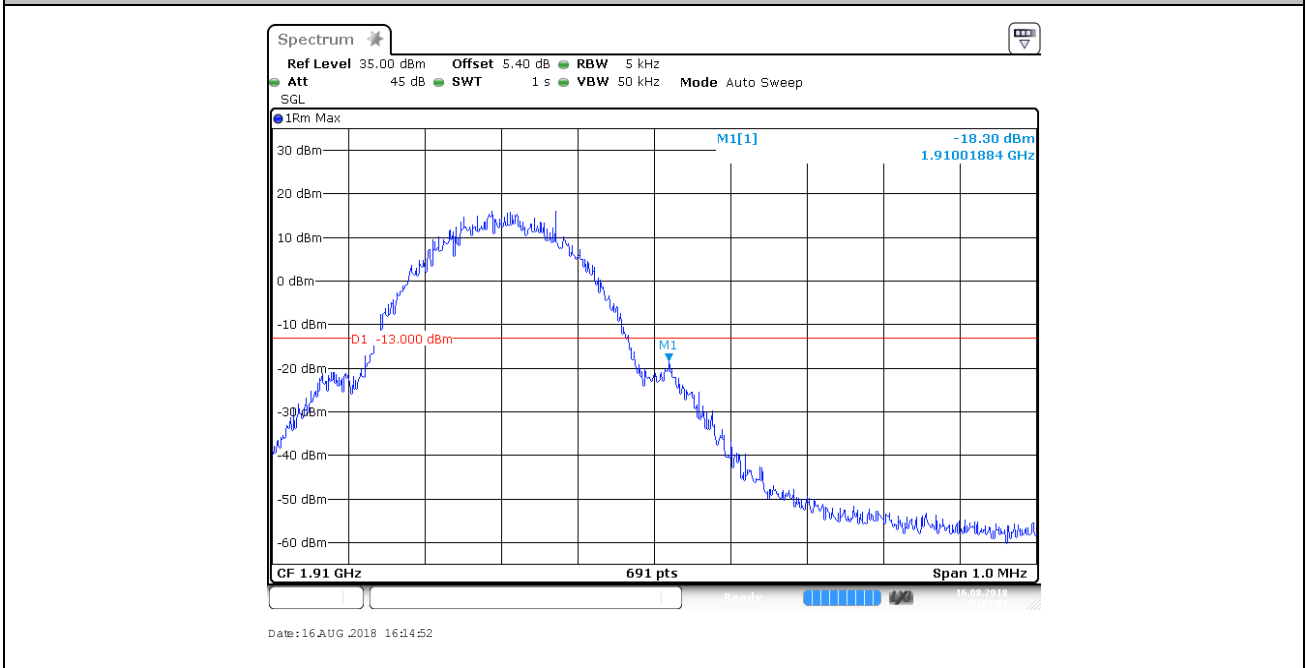
## 5. Band Edge Compliance

### 5.1. Test Plots



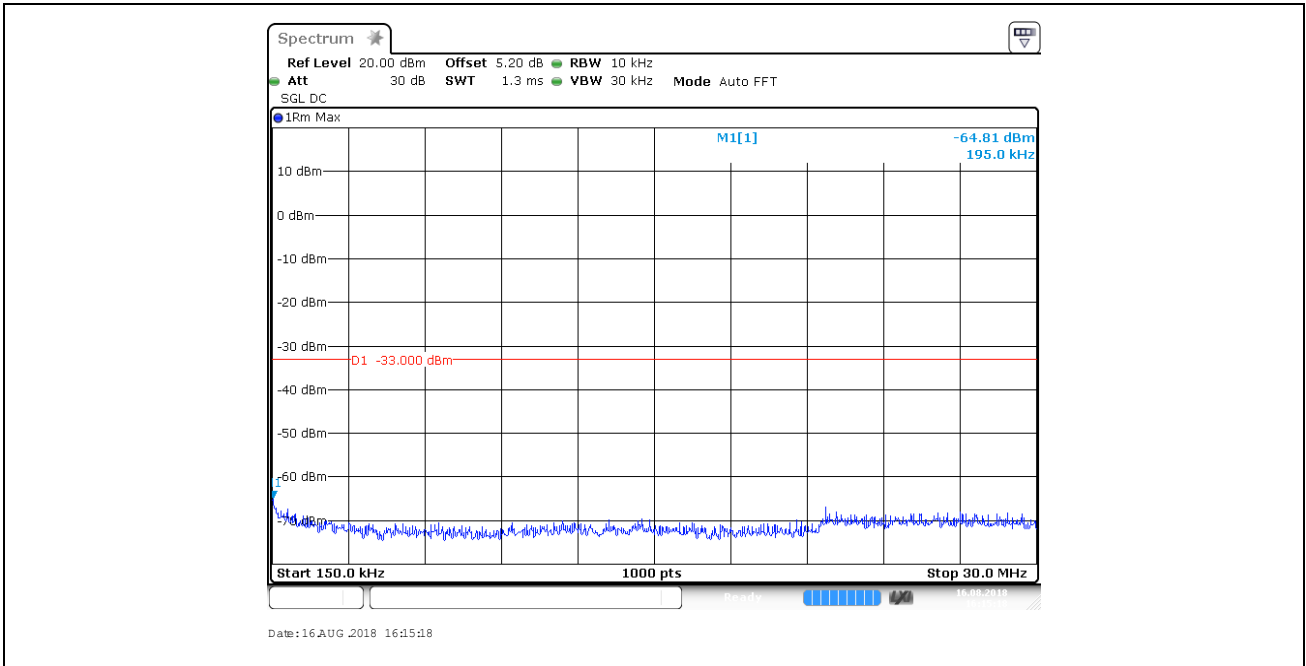


**GSM1900\_810**

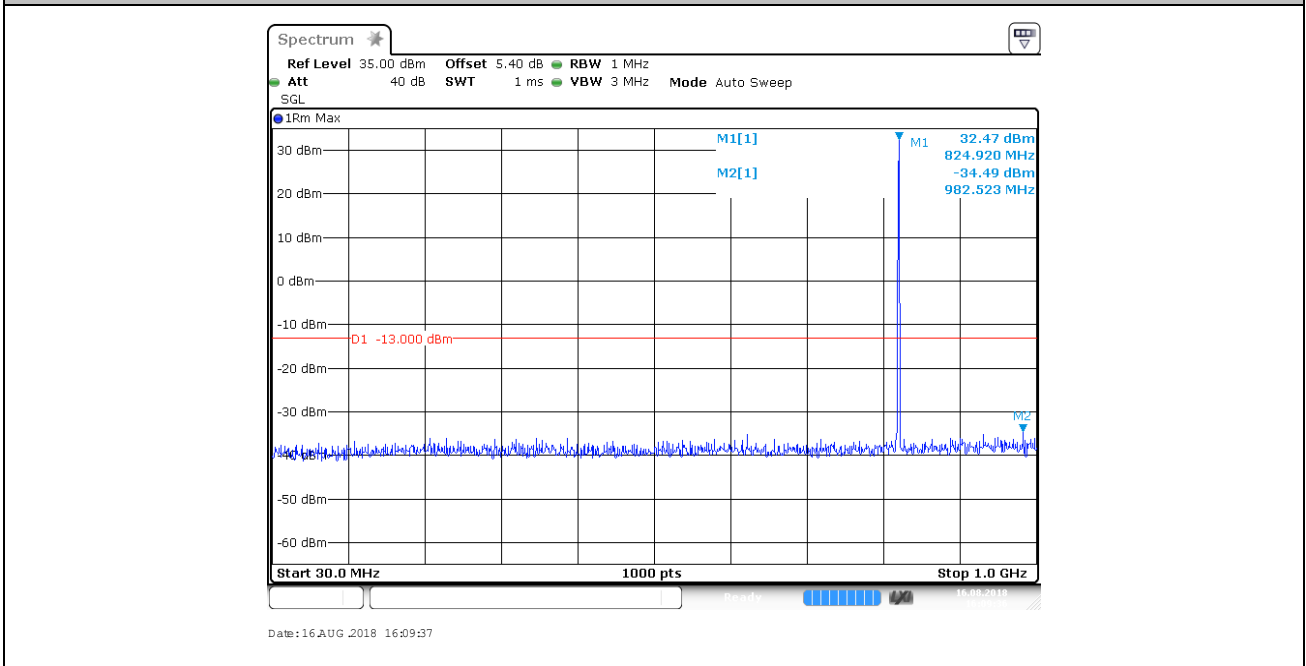




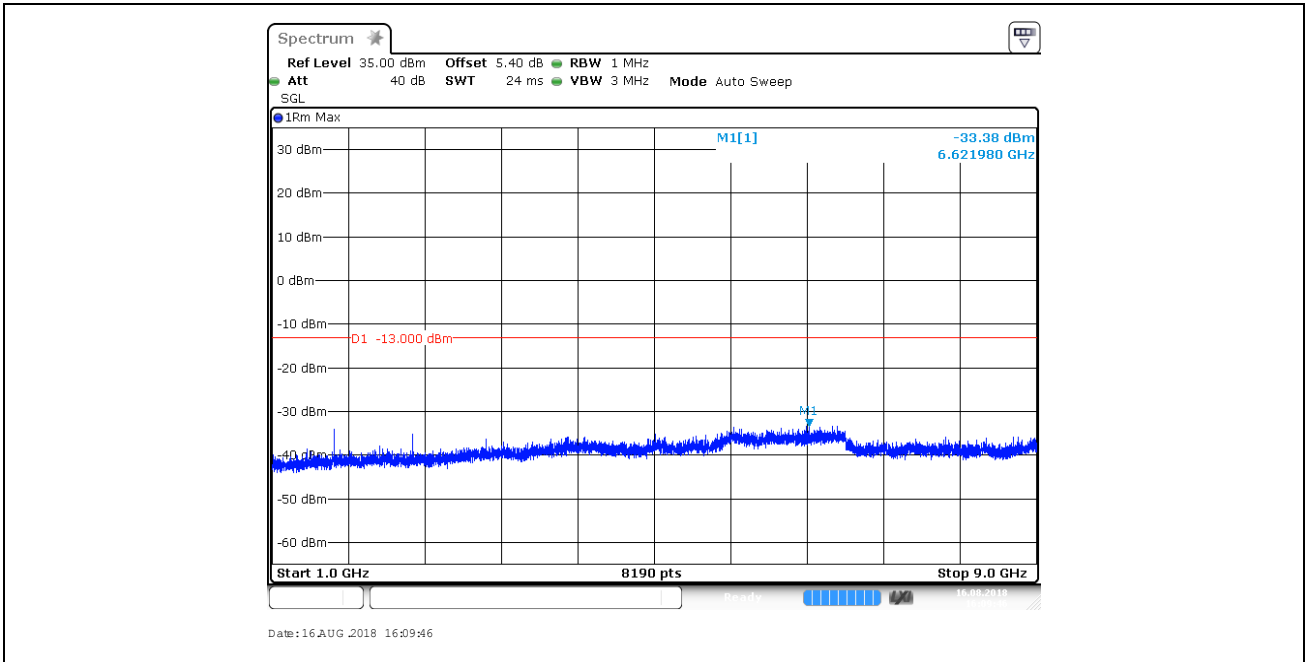




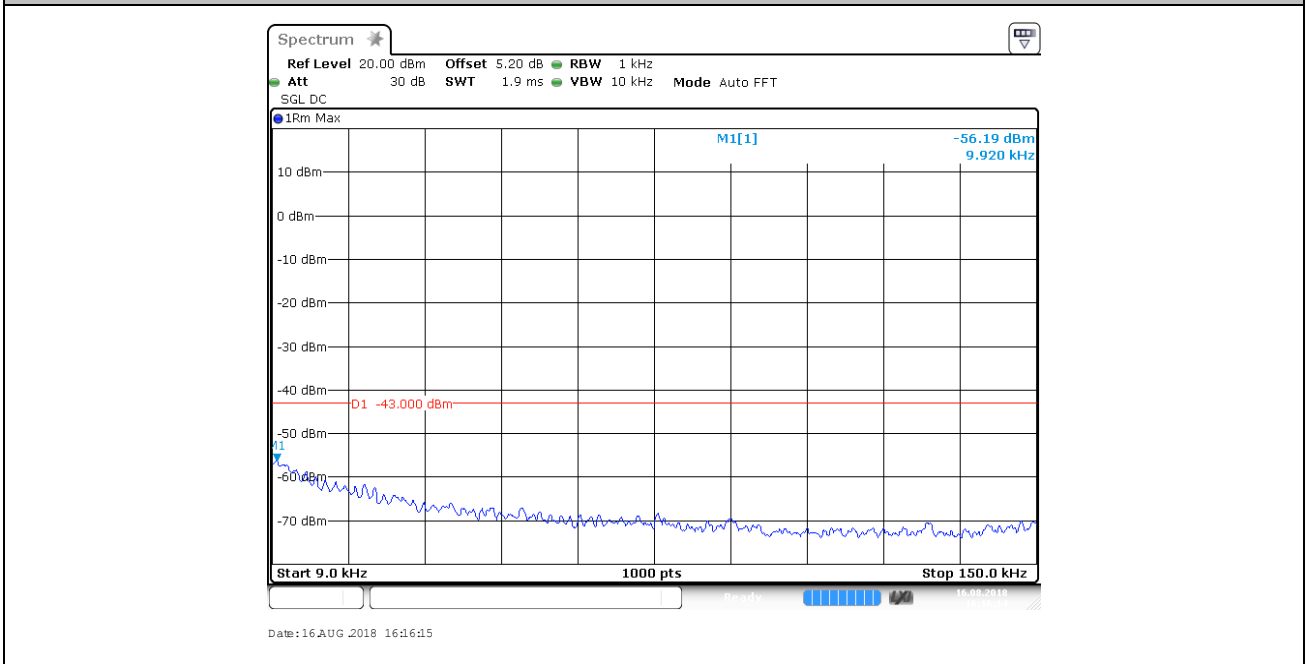
GSM850\_128



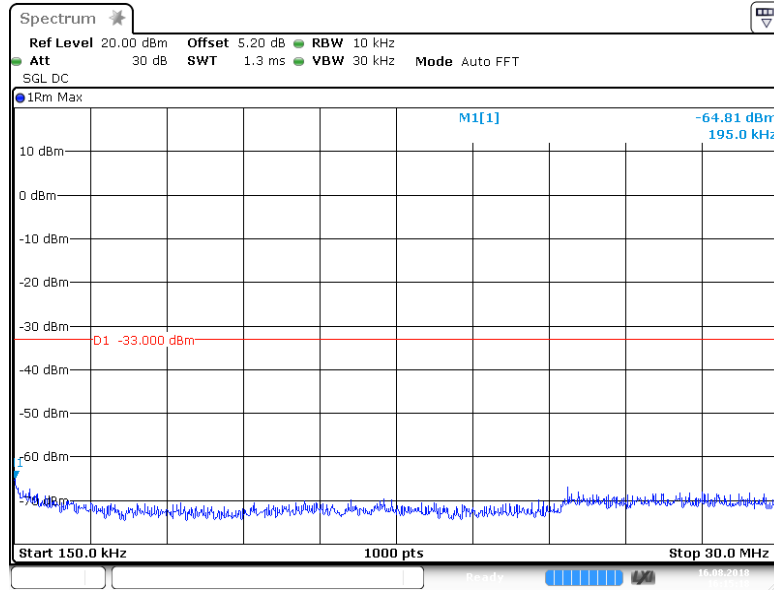
GSM850\_128



GSM850\_190

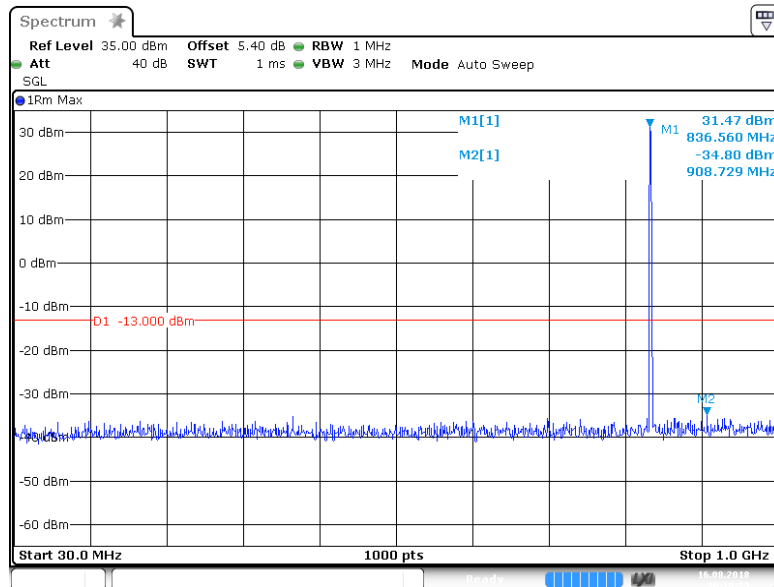


GSM850\_190



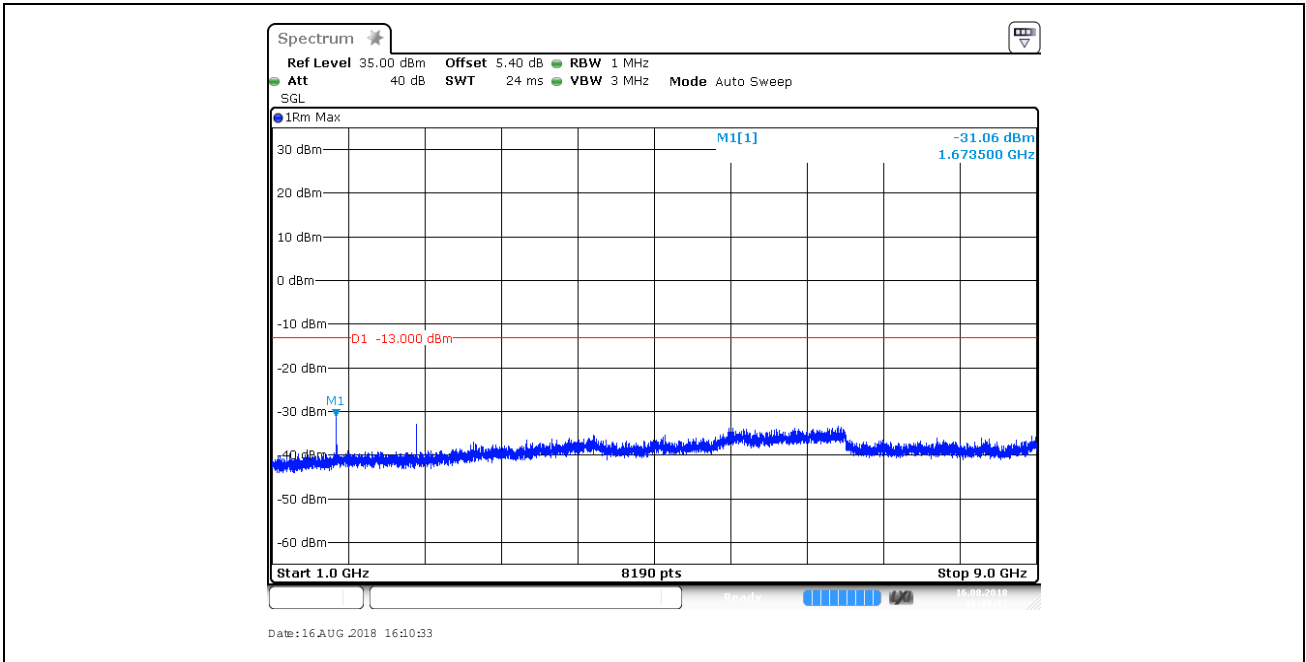
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GSM850\_190

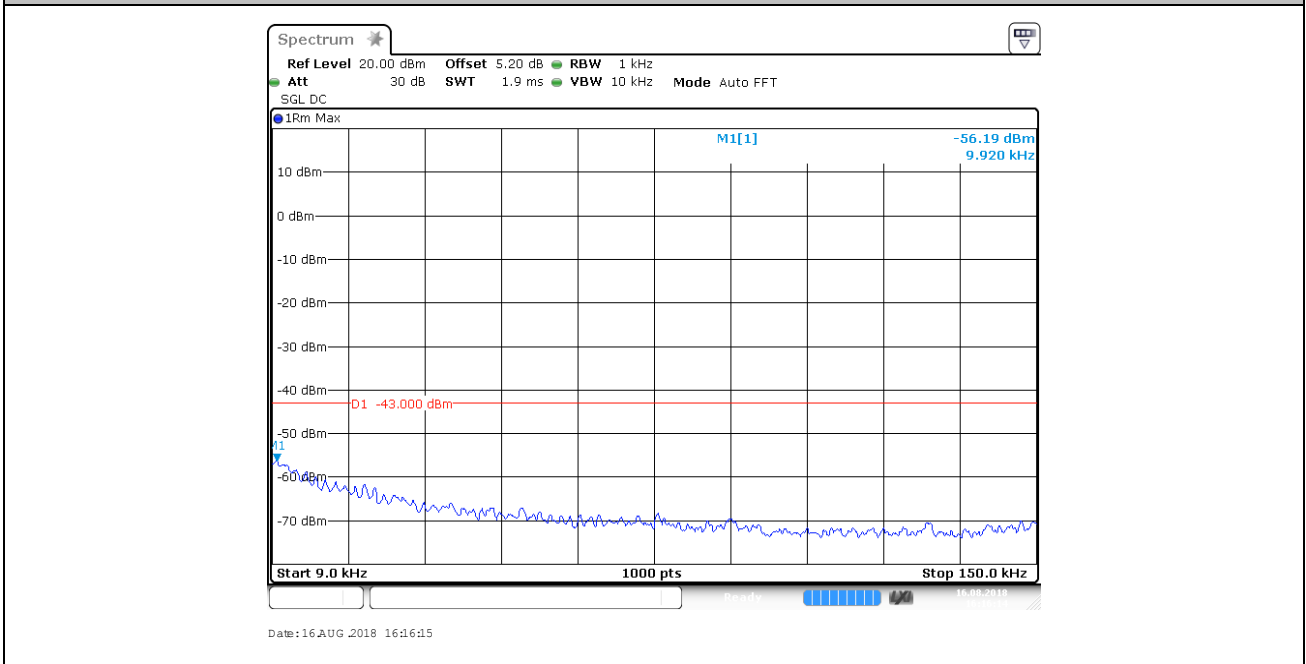


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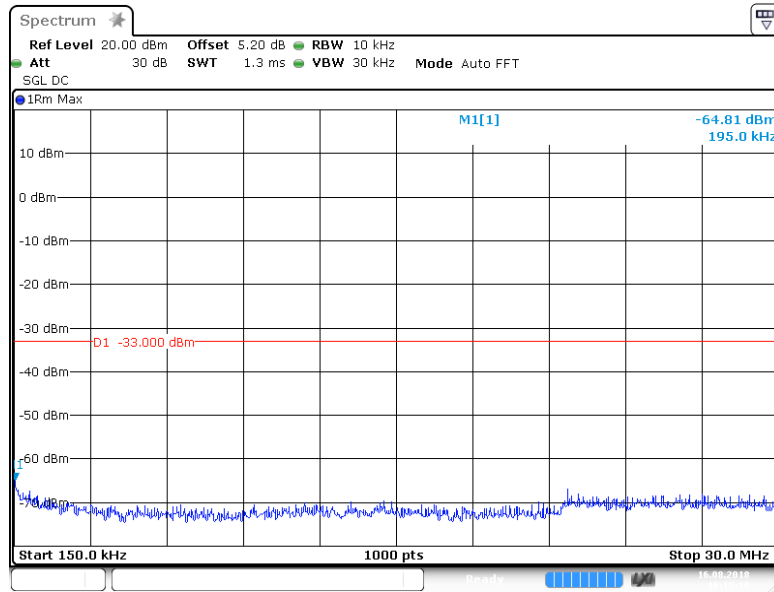
GSM850\_190



GSM850\_251

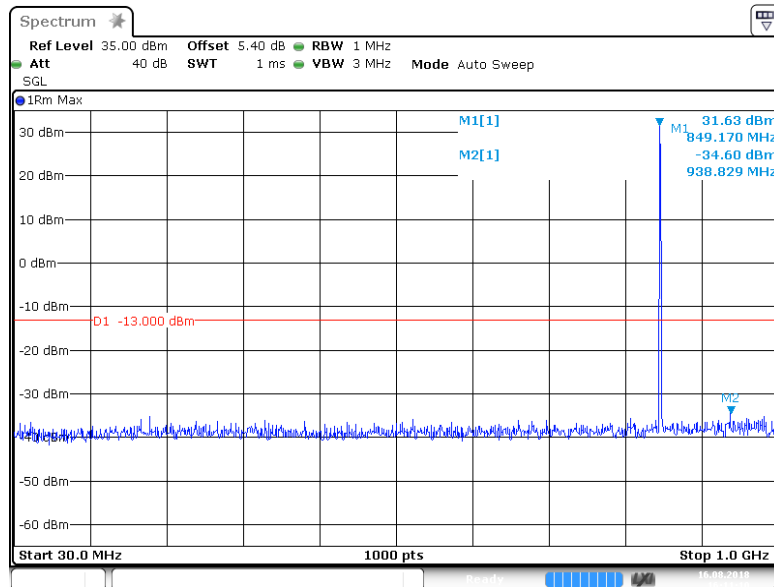


GSM850\_251



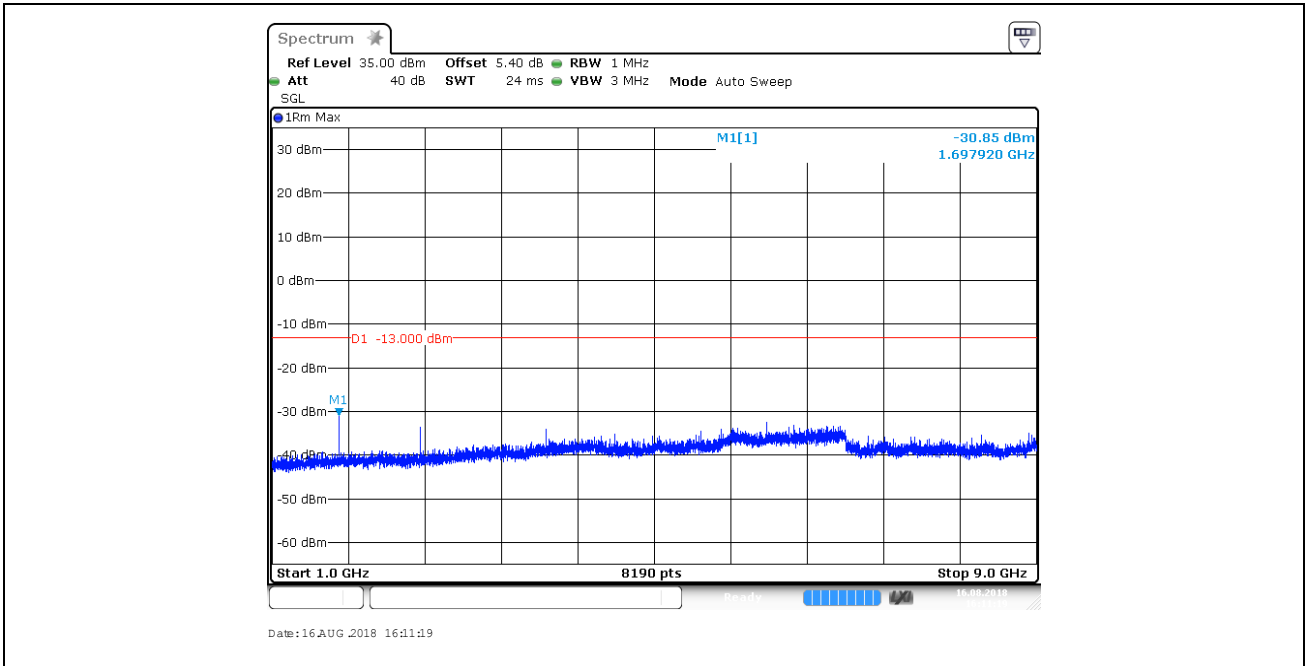
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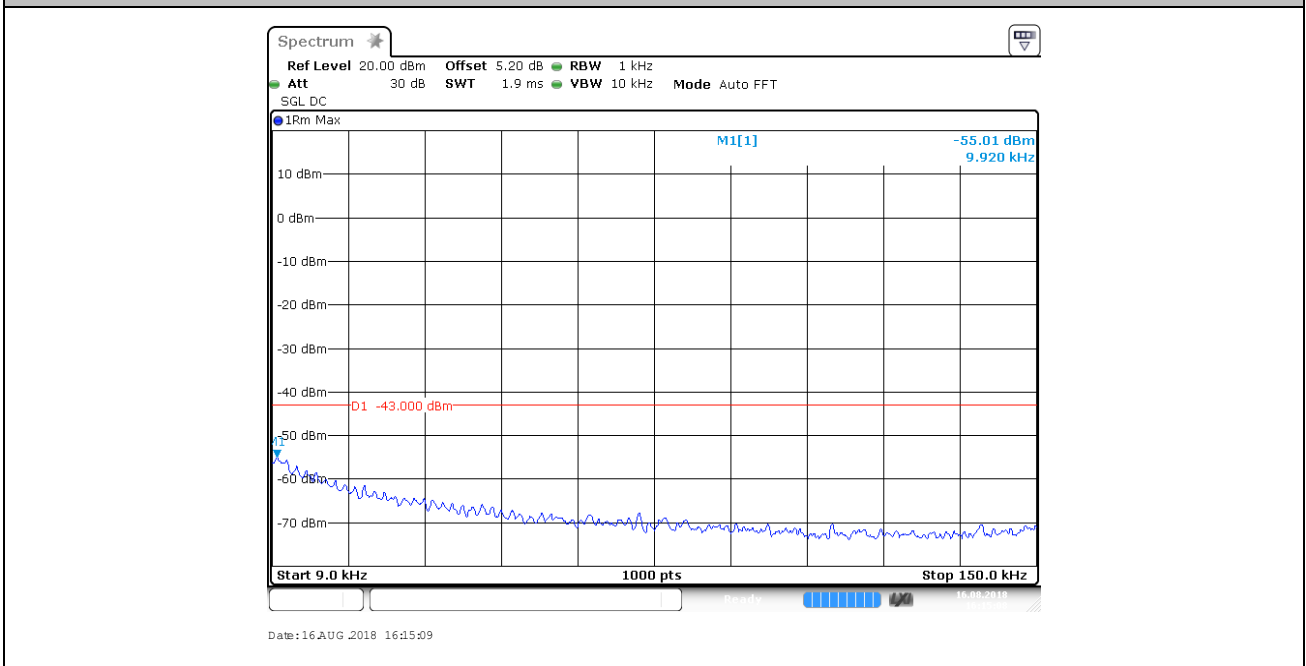


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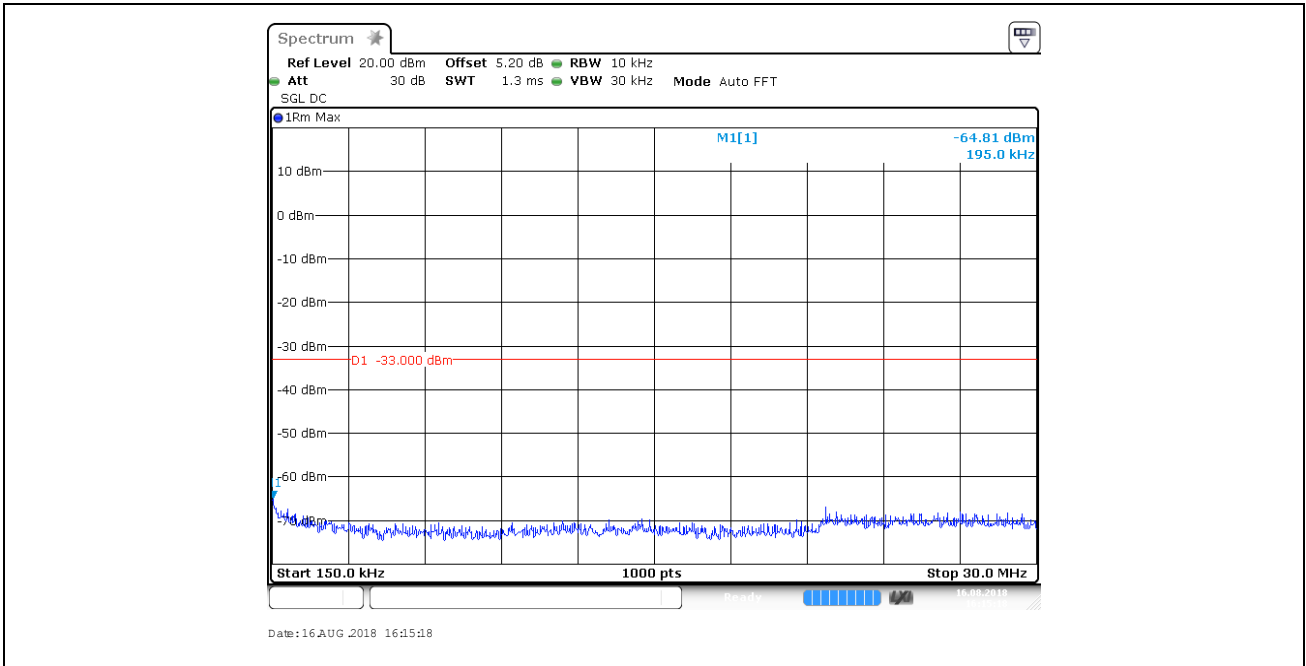
GSM850\_251



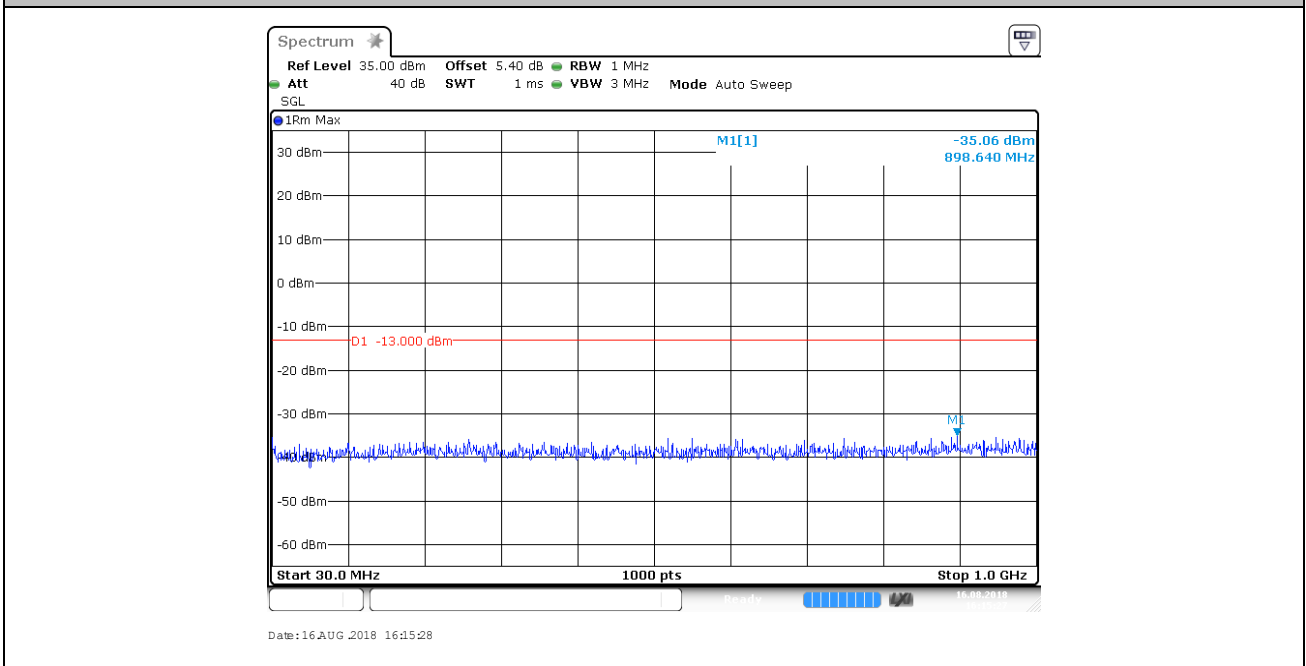
GSM1900\_512



GSM1900\_512

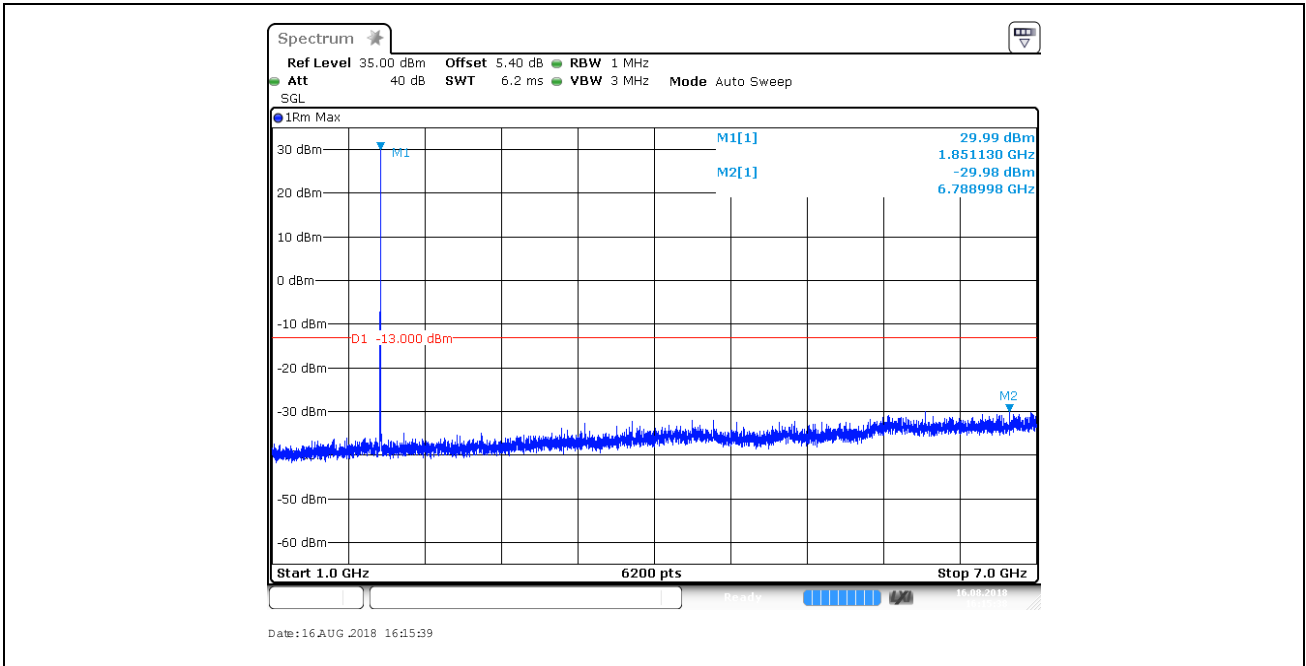


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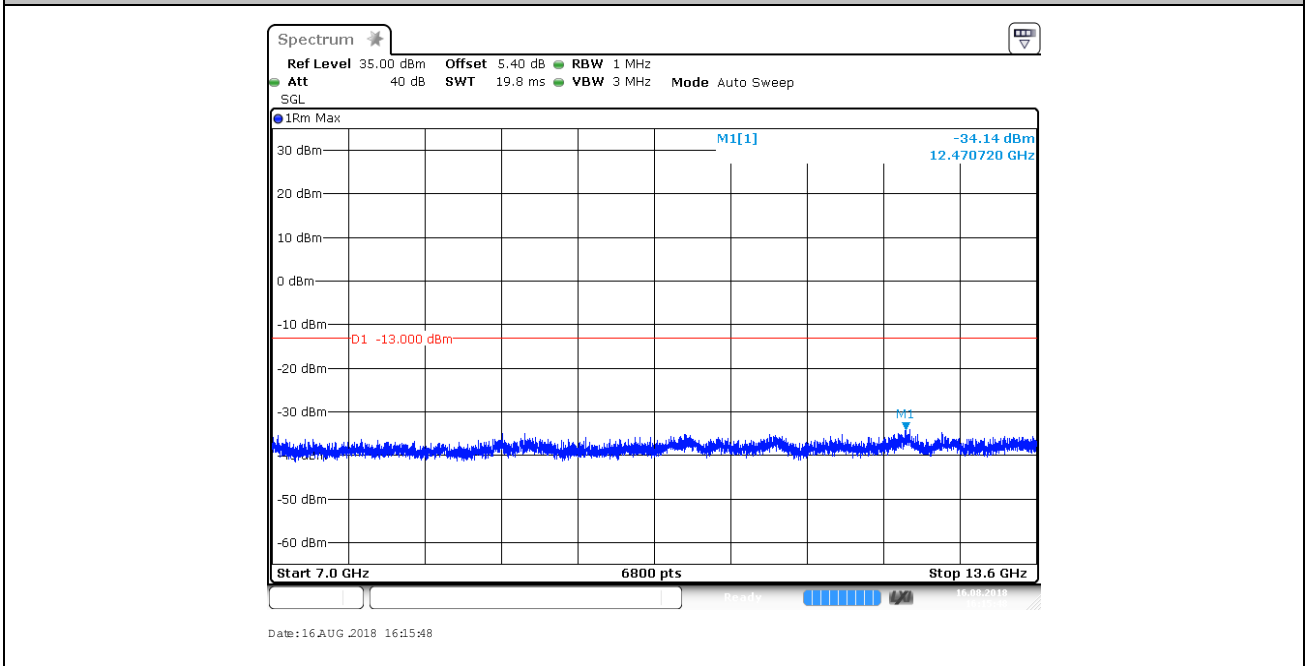


GSM1900\_512

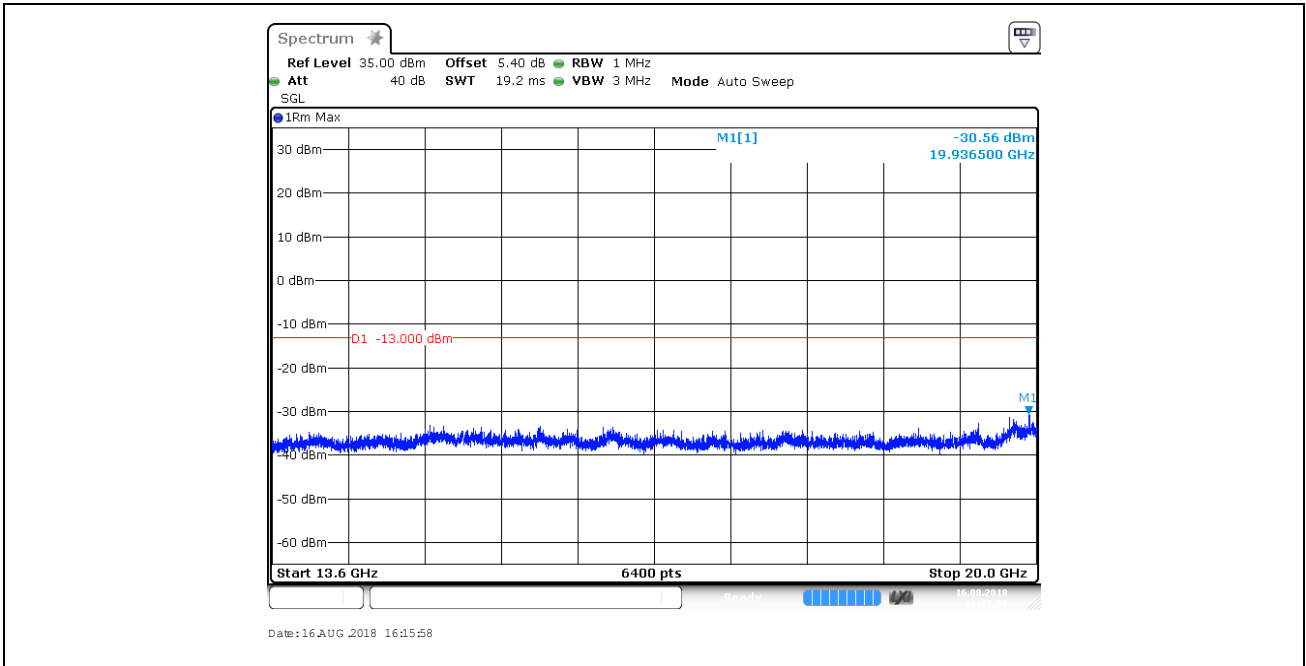




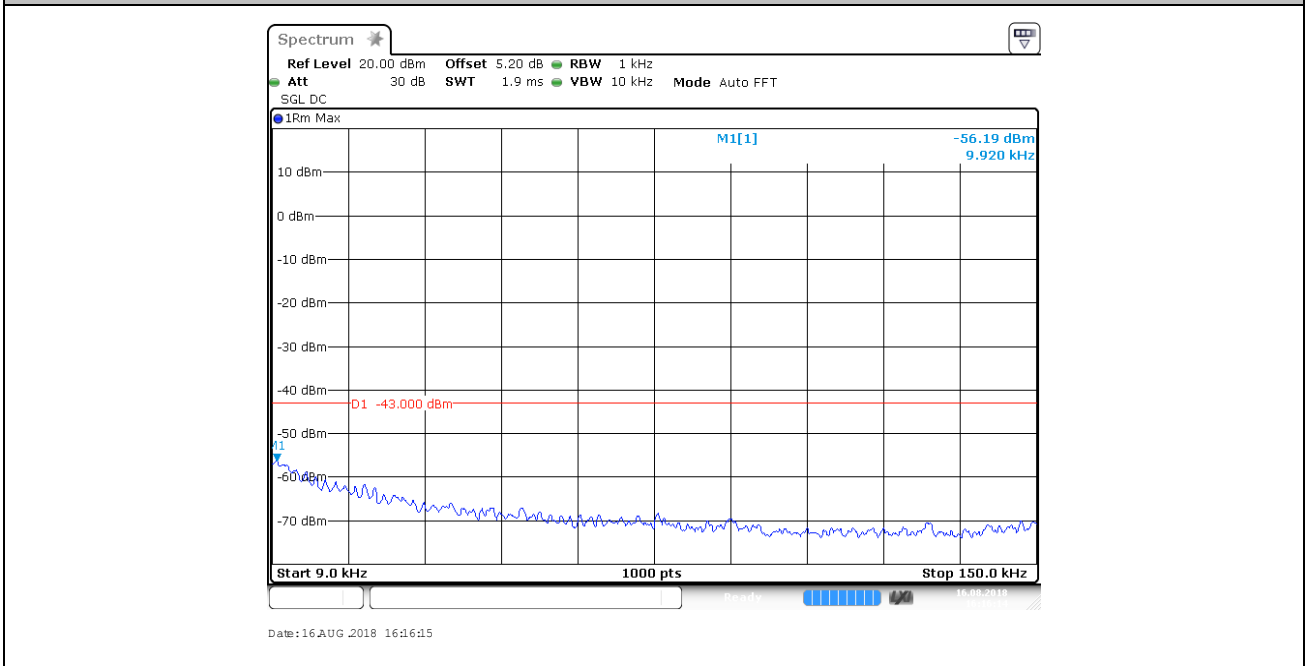
GSM1900\_512



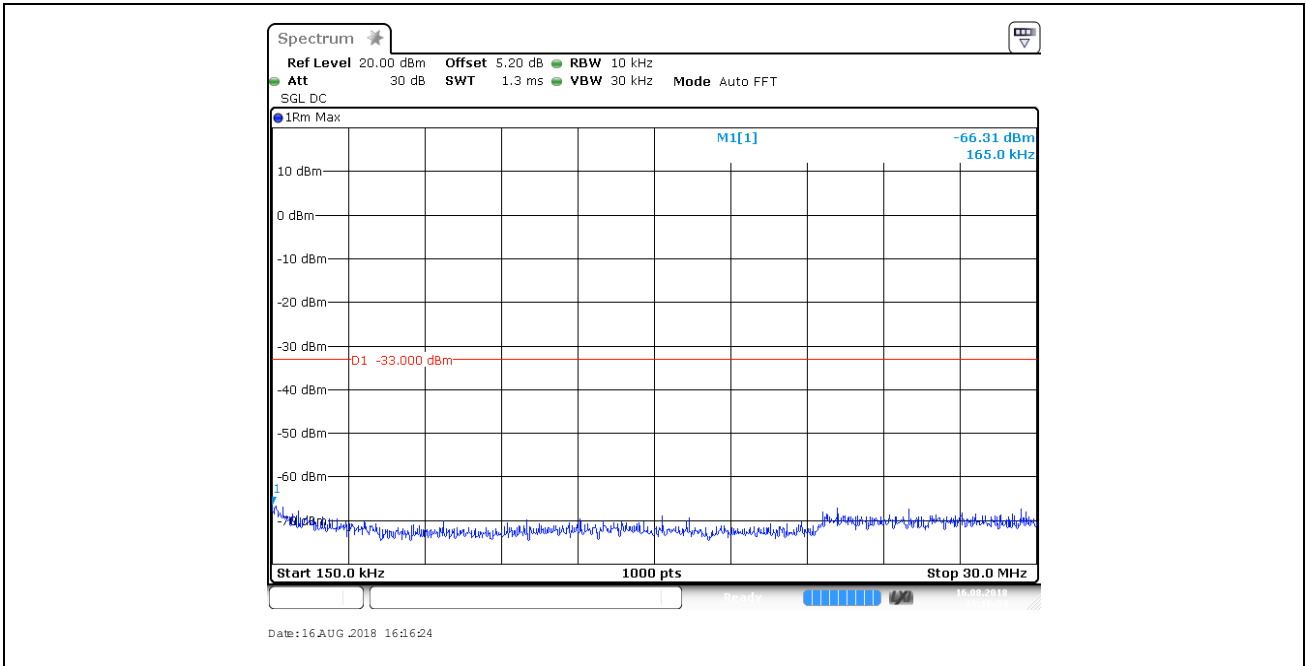
GSM1900\_512



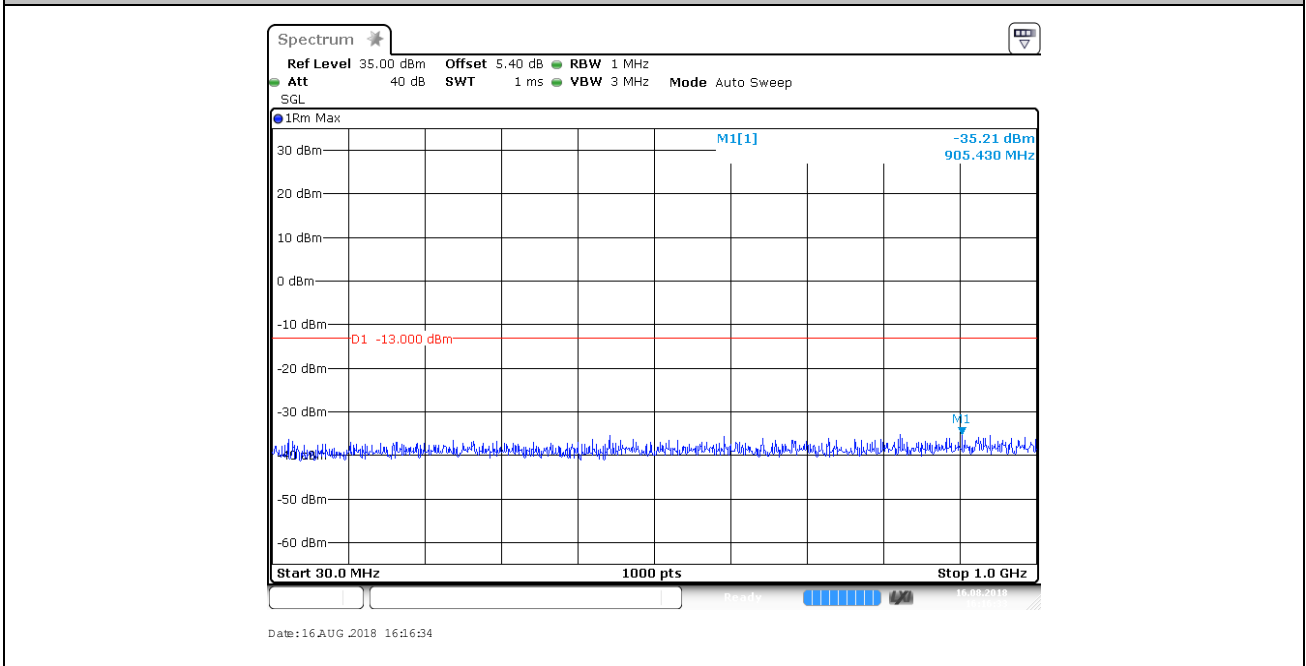
GSM1900\_661



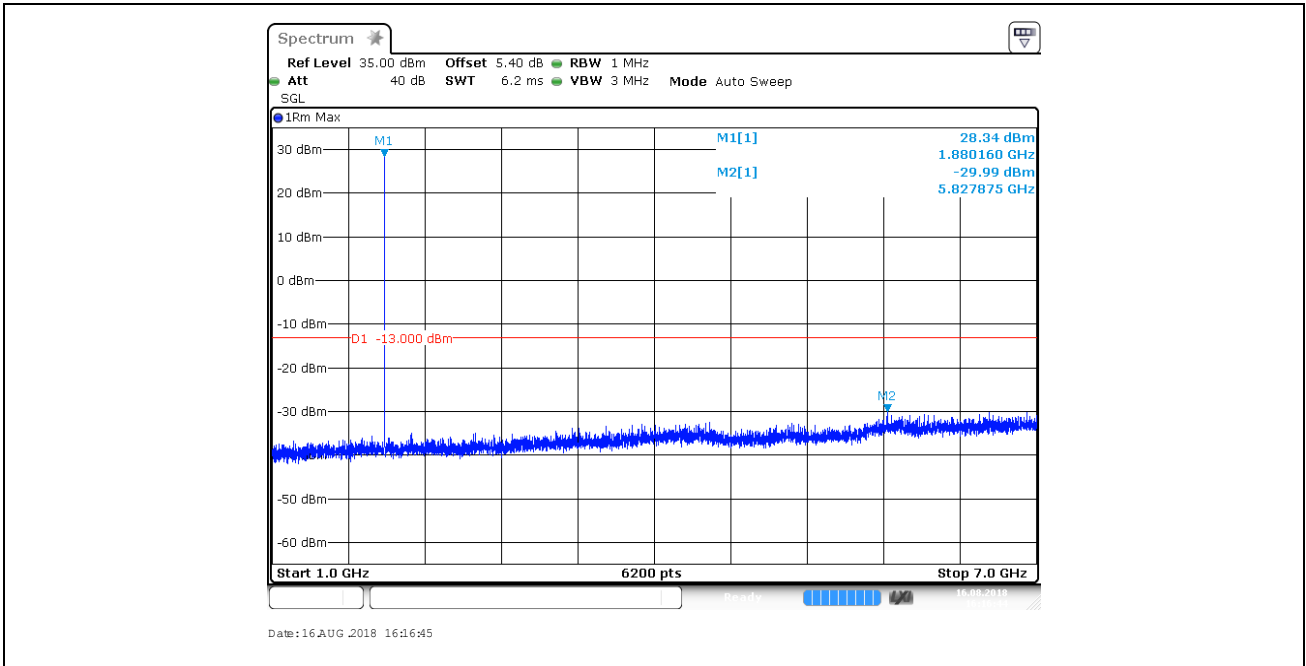
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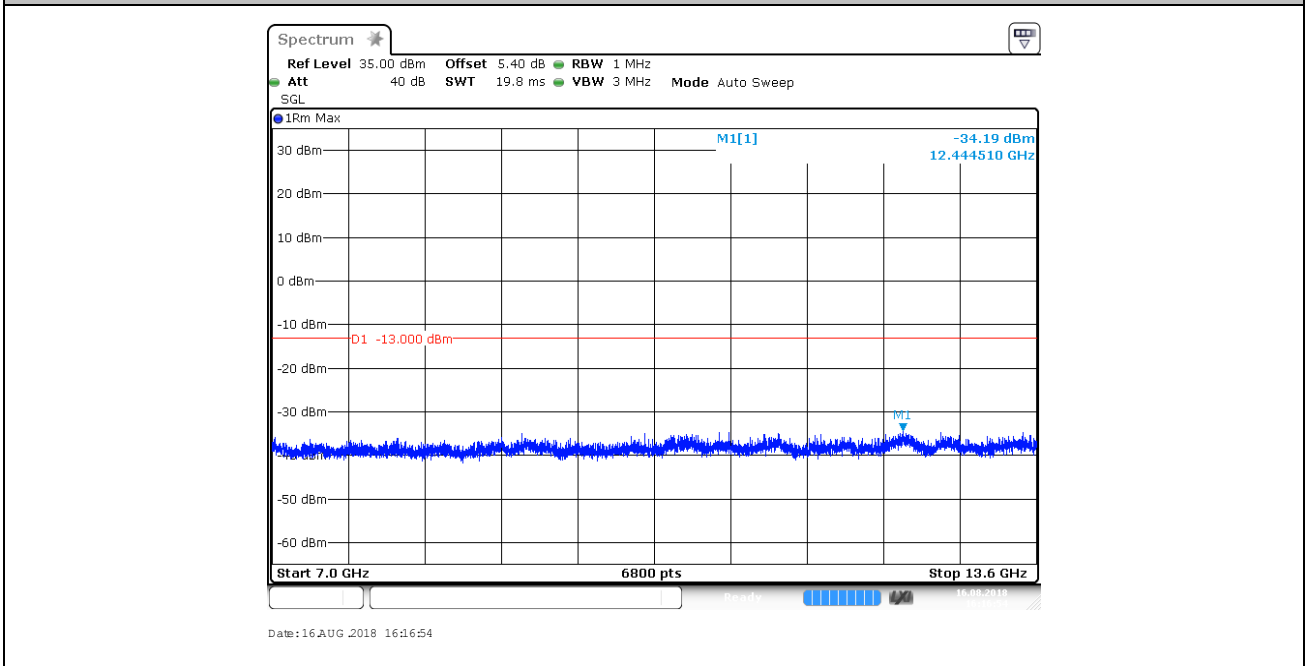
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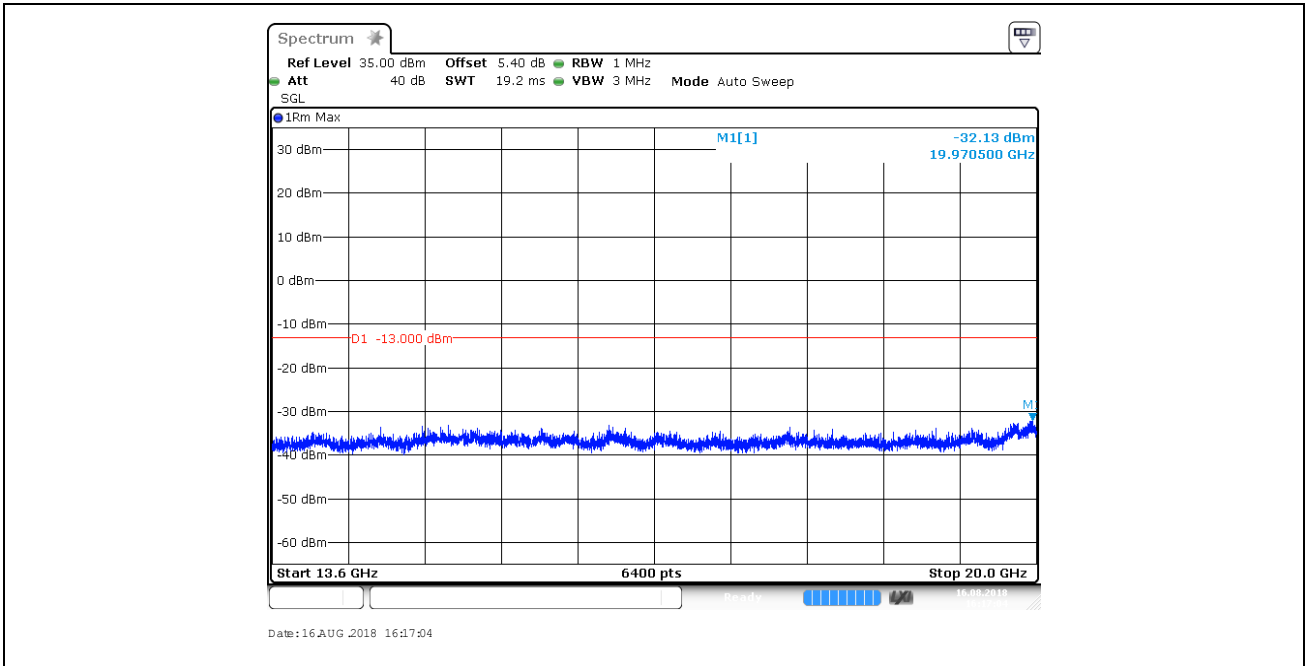
GSM1900\_661



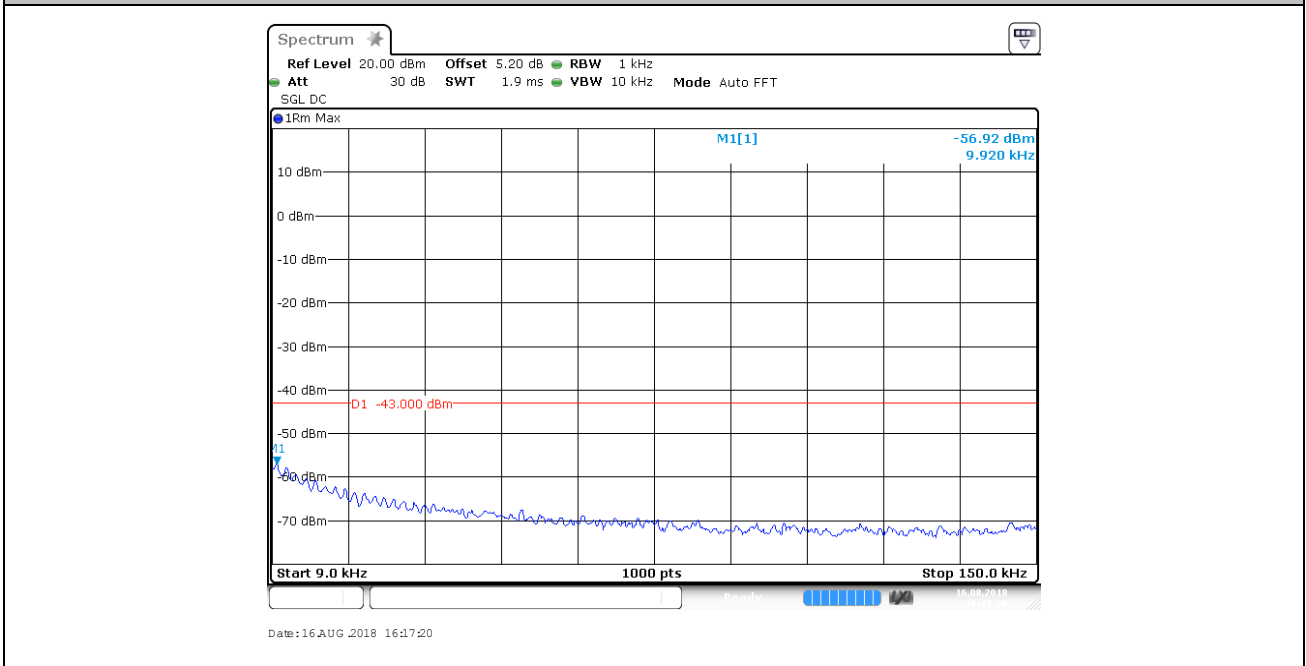
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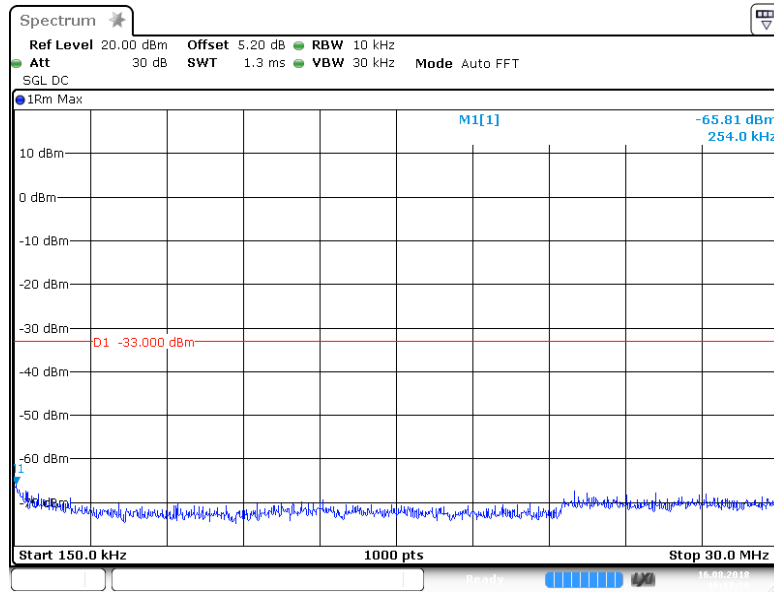
GSM1900\_661



GSM1900\_810

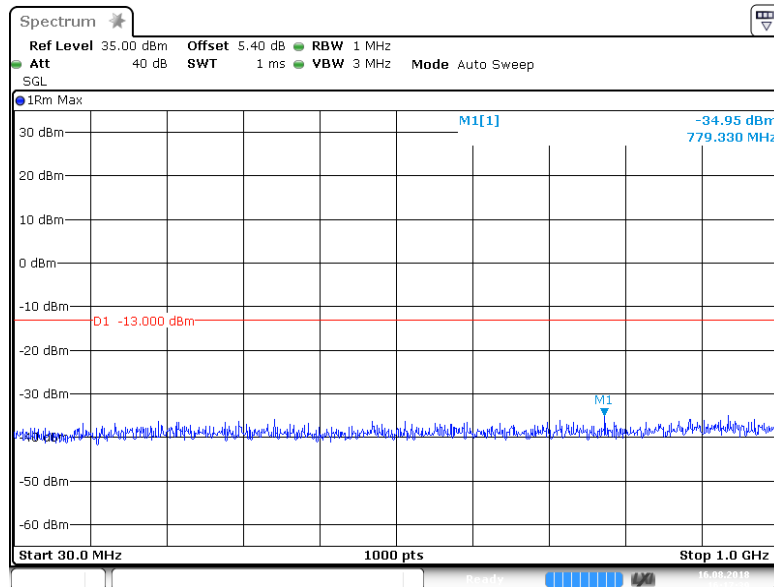


GSM1900\_810



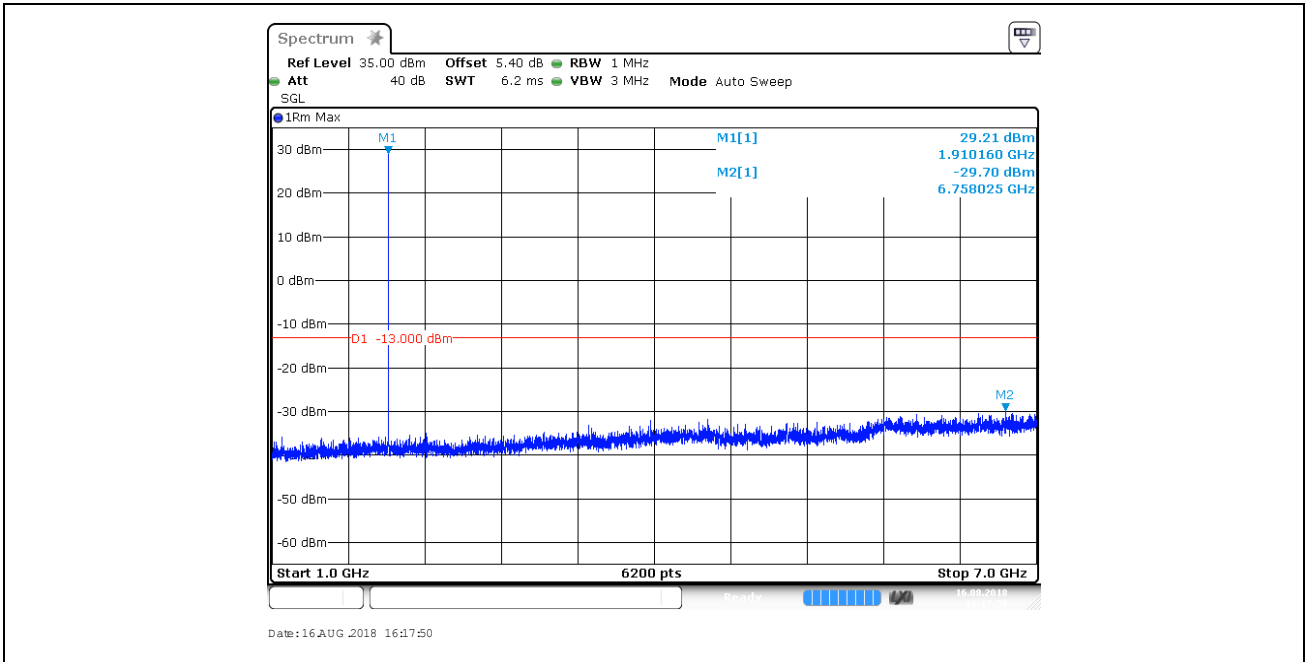
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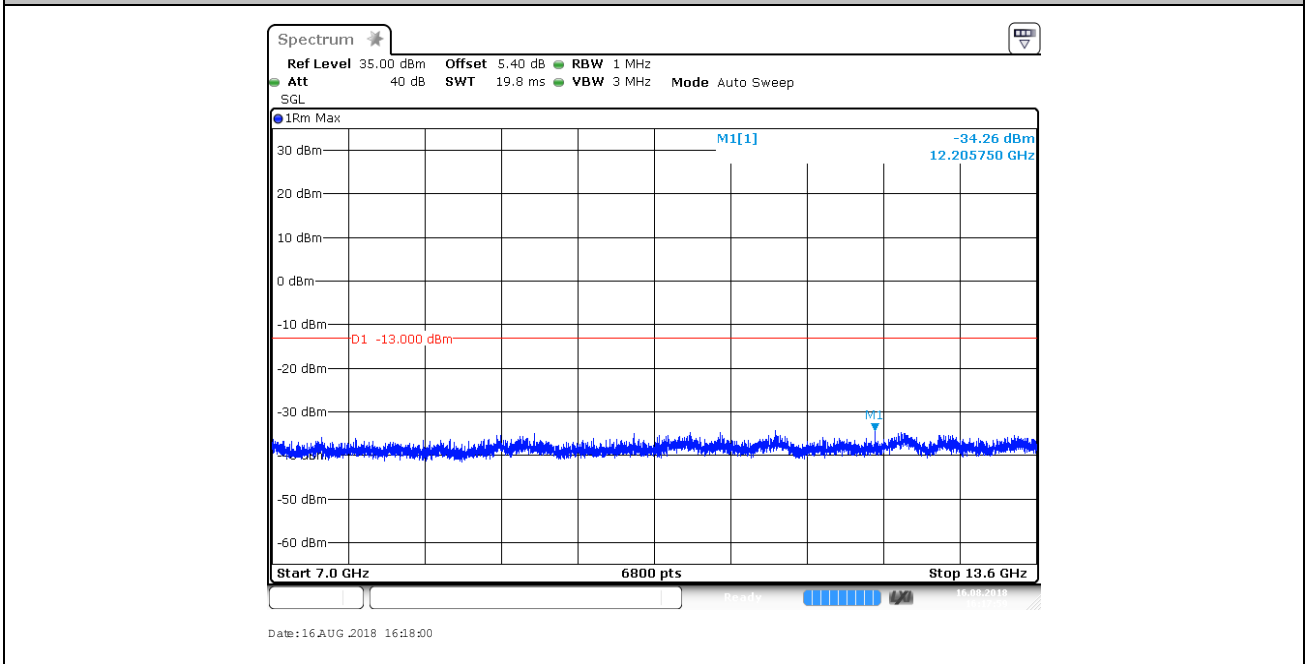


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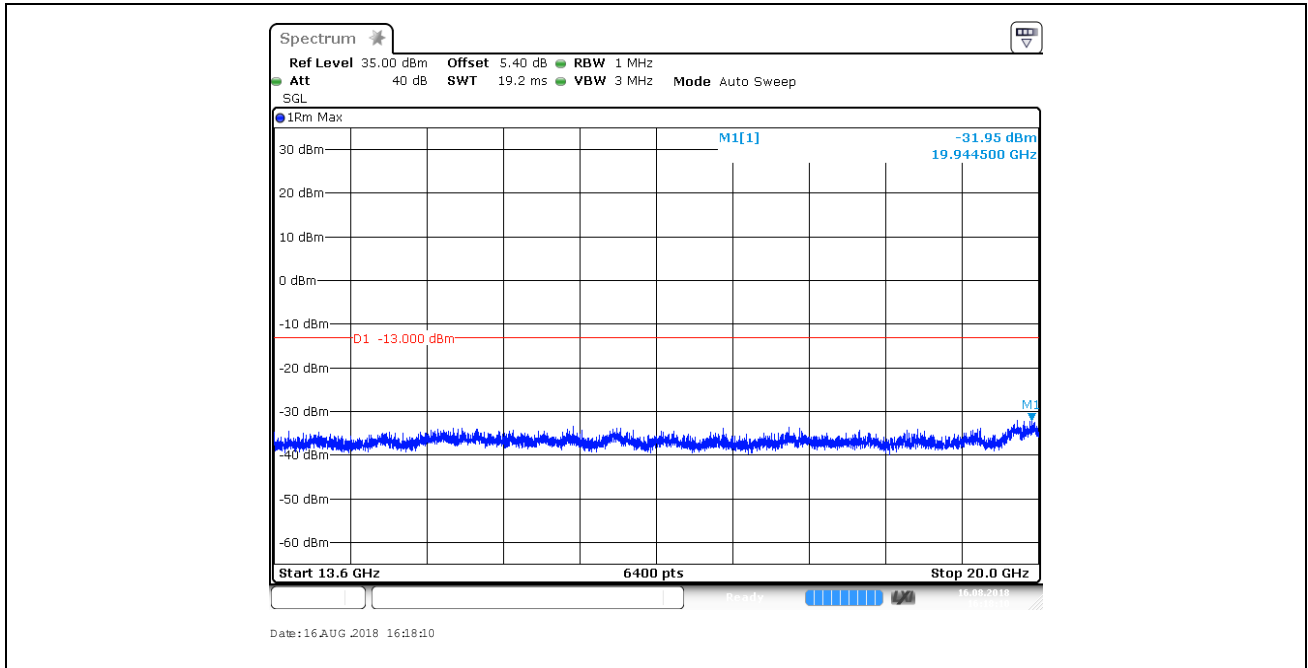
GSM1900\_810



GSM1900\_810



GSM1900\_810







## 7. Field Strength of Spurious Radiation

### 1.1. For GSM

#### 1.1.1. Test Band = GSM850

##### 1.1.1.1. Test Mode = GSM/TM1

##### 1.1.1.1.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin(dB)	Polarization
60.070000	-67.68	-13.00	54.68	Horizontal
187.479500	-69.48	-13.00	56.48	Horizontal
412.519500	-68.35	-13.00	55.35	Horizontal
1648.350000	-39.62	-13.00	26.62	Horizontal
2472.450000	-47.68	-13.00	34.68	Horizontal
4330.700000	-55.47	-13.00	42.47	Horizontal
62.689000	-73.14	-13.00	60.14	Vertical
187.479500	-72.93	-13.00	59.93	Vertical
400.006500	-67.26	-13.00	54.26	Vertical
1647.975000	-41.56	-13.00	28.56	Vertical
2472.375000	-42.68	-13.00	29.68	Vertical
5030.700000	-55.22	-13.00	42.22	Vertical

##### 1.1.1.1.2. Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin(dB)	Polarization
61.525000	-69.93	-13.00	56.93	Horizontal
187.479500	-70.30	-13.00	57.30	Horizontal
400.006500	-68.27	-13.00	55.27	Horizontal
1672.950000	-40.59	-13.00	27.59	Horizontal
2509.800000	-46.98	-13.00	33.98	Horizontal
3345.800000	-58.50	-13.00	45.50	Horizontal
40.476000	-74.06	-13.00	61.06	Vertical
187.479500	-72.85	-13.00	59.85	Vertical
400.006500	-67.30	-13.00	54.30	Vertical
1672.950000	-36.07	-13.00	23.07	Vertical
2510.025000	-43.39	-13.00	30.39	Vertical
3346.500000	-56.54	-13.00	43.54	Vertical



### 1.1.1.1.3. Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin(dB)	Polarization
61.622000	-68.67	-13.00	55.67	Horizontal
187.479500	-70.08	-13.00	57.08	Horizontal
399.958000	-68.18	-13.00	55.18	Horizontal
1697.700000	-39.03	-13.00	26.03	Horizontal
2546.475000	-45.85	-13.00	32.85	Horizontal
4243.900000	-54.43	-13.00	41.43	Horizontal
40.427500	-73.98	-13.00	60.98	Vertical
187.479500	-72.84	-13.00	59.84	Vertical
400.006500	-69.55	-13.00	56.55	Vertical
1697.625000	-37.83	-13.00	24.83	Vertical
2546.475000	-44.65	-13.00	31.65	Vertical
3335.650000	-57.53	-13.00	44.53	Vertical

### 1.1.2. Test Band = GSM 1900

#### 1.1.2.1. Test Mode = GSM/TM1

##### 1.1.2.1.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin(dB)	Polarization
59.950000	-65.38	-13.00	52.38	Horizontal
187.500000	-66.65	-13.00	53.65	Horizontal
387.500000	-69.21	-13.00	56.21	Horizontal
3936.000000	-51.39	-13.00	38.39	Horizontal
5551.125000	-48.90	-13.00	35.90	Horizontal
9266.000000	-47.06	-13.00	34.06	Horizontal
59.950000	-72.40	-13.00	59.40	Vertical
125.000000	-77.46	-13.00	64.46	Vertical
387.500000	-68.35	-13.00	55.35	Vertical
3700.125000	-51.17	-13.00	38.17	Vertical
5217.000000	-49.68	-13.00	36.68	Vertical
7024.000000	-48.17	-13.00	35.17	Vertical



**1.1.2.1.2. Test Channel = MCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin(dB)	Polarization
59.950000	-64.02	-13.00	51.02	Horizontal
187.500000	-66.17	-13.00	53.17	Horizontal
878.333333	-51.07	-13.00	38.07	Horizontal
4108.500000	-51.00	-13.00	38.00	Horizontal
5609.250000	-48.96	-13.00	35.96	Horizontal
7943.000000	-47.59	-13.00	34.59	Horizontal
60.050000	-71.57	-13.00	58.57	Vertical
187.500000	-68.84	-13.00	55.84	Vertical
387.500000	-69.30	-13.00	56.30	Vertical
3740.250000	-50.31	-13.00	37.31	Vertical
5799.000000	-49.61	-13.00	36.61	Vertical
9214.000000	-47.97	-13.00	34.97	Vertical

**1.1.2.1.3. Test Channel = HCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin(dB)	Polarization
60.000000	-64.89	-13.00	51.89	Horizontal
187.500000	-68.14	-13.00	55.14	Horizontal
400.000000	-69.93	-13.00	56.93	Horizontal
3819.750000	-51.34	-13.00	38.34	Horizontal
5728.875000	-48.28	-13.00	35.28	Horizontal
7980.000000	-48.06	-13.00	35.06	Horizontal
59.950000	-71.60	-13.00	58.60	Vertical
187.500000	-70.34	-13.00	57.34	Vertical
400.000000	-65.40	-13.00	52.40	Vertical
3819.750000	-49.69	-13.00	36.69	Vertical
5728.875000	-49.65	-13.00	36.65	Vertical
7969.000000	-47.65	-13.00	34.65	Vertical

**NOTE:**

- 1) All modes were tested, but the data presented above is the worst case.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 above harmonics had been displayed.



## 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	-17.34	-0.021036	2.5	PASS
GSM850	128	VN	TN	-18.37	-0.022289	2.5	PASS
GSM850	128	VH	TN	-20.11	-0.024404	2.5	PASS
GSM850	190	VL	TN	-10.78	-0.012890	2.5	PASS
GSM850	190	VN	TN	-10.33	-0.012349	2.5	PASS
GSM850	190	VH	TN	-8.98	-0.010729	2.5	PASS
GSM850	251	VL	TN	-11.14	-0.013123	2.5	PASS
GSM850	251	VN	TN	-11.78	-0.013884	2.5	PASS
GSM850	251	VH	TN	-10.43	-0.012286	2.5	PASS
GSM1900	512	VL	TN	-0.58	-0.000314	2.5	PASS
GSM1900	512	VN	TN	-6.26	-0.003385	2.5	PASS
GSM1900	512	VH	TN	-3.68	-0.001989	2.5	PASS
GSM1900	661	VL	TN	-25.73	-0.013687	2.5	PASS
GSM1900	661	VN	TN	-21.83	-0.011609	2.5	PASS
GSM1900	661	VH	TN	-26.38	-0.014031	2.5	PASS
GSM1900	810	VL	TN	-12.24	-0.006407	2.5	PASS
GSM1900	810	VN	TN	-12.04	-0.006306	2.5	PASS
GSM1900	810	VH	TN	-10.56	-0.005528	2.5	PASS



## 8.2. Frequency Error Vs Temperature

Temperature							
BAND	Channel	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
GSM850	128	VN	-30	-18.21	-0.022093	2.5	PASS
GSM850	128	VN	-20	-18.14	-0.022015	2.5	PASS
GSM850	128	VN	-10	-19.31	-0.023425	2.5	PASS
GSM850	128	VN	0	-17.05	-0.020683	2.5	PASS
GSM850	128	VN	10	-17.79	-0.021584	2.5	PASS
GSM850	128	VN	20	-19.15	-0.023229	2.5	PASS
GSM850	128	VN	30	-19.40	-0.023543	2.5	PASS
GSM850	128	VN	40	-18.21	-0.022093	2.5	PASS
GSM850	128	VN	50	-16.85	-0.020448	2.5	PASS
GSM850	190	VN	-30	-10.78	-0.012890	2.5	PASS
GSM850	190	VN	-20	-8.14	-0.009725	2.5	PASS
GSM850	190	VN	-10	-10.40	-0.012427	2.5	PASS
GSM850	190	VN	0	-11.17	-0.013353	2.5	PASS
GSM850	190	VN	10	-9.30	-0.011114	2.5	PASS
GSM850	190	VN	20	-8.46	-0.010111	2.5	PASS
GSM850	190	VN	30	-11.07	-0.013237	2.5	PASS
GSM850	190	VN	40	-8.10	-0.009687	2.5	PASS
GSM850	190	VN	50	-9.98	-0.011925	2.5	PASS
GSM850	251	VN	-30	-12.72	-0.014987	2.5	PASS
GSM850	251	VN	-20	-11.36	-0.013389	2.5	PASS
GSM850	251	VN	-10	-11.75	-0.013845	2.5	PASS
GSM850	251	VN	0	-11.85	-0.013960	2.5	PASS
GSM850	251	VN	10	-11.11	-0.013085	2.5	PASS
GSM850	251	VN	20	-11.85	-0.013960	2.5	PASS
GSM850	251	VN	30	-12.56	-0.014796	2.5	PASS
GSM850	251	VN	40	-11.33	-0.013351	2.5	PASS
GSM850	251	VN	50	-11.59	-0.013655	2.5	PASS
GSM1900	512	VN	-30	-0.97	-0.000523	2.5	PASS
GSM1900	512	VN	-20	-3.29	-0.001780	2.5	PASS
GSM1900	512	VN	-10	-2.87	-0.001553	2.5	PASS
GSM1900	512	VN	0	-4.65	-0.002513	2.5	PASS
GSM1900	512	VN	10	-3.23	-0.001745	2.5	PASS
GSM1900	512	VN	20	-3.07	-0.001658	2.5	PASS
GSM1900	512	VN	30	-1.97	-0.001064	2.5	PASS
GSM1900	512	VN	40	-4.84	-0.002617	2.5	PASS
GSM1900	512	VN	50	-5.62	-0.003036	2.5	PASS
GSM1900	661	VN	-30	-23.18	-0.012330	2.5	PASS
GSM1900	661	VN	-20	-25.96	-0.013807	2.5	PASS
GSM1900	661	VN	-10	-23.73	-0.012622	2.5	PASS
GSM1900	661	VN	0	-20.76	-0.011042	2.5	PASS
GSM1900	661	VN	10	-21.41	-0.011386	2.5	PASS
GSM1900	661	VN	20	-21.66	-0.011523	2.5	PASS
GSM1900	661	VN	30	-28.77	-0.015301	2.5	PASS



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GSM1900	661	VN	40	-25.15	-0.013378	2.5	PASS
GSM1900	661	VN	50	-23.18	-0.012330	2.5	PASS
GSM1900	810	VN	-30	-14.88	-0.007793	2.5	PASS
GSM1900	810	VN	-20	-8.39	-0.004395	2.5	PASS
GSM1900	810	VN	-10	-10.62	-0.005562	2.5	PASS
GSM1900	810	VN	0	-9.33	-0.004886	2.5	PASS
GSM1900	810	VN	10	-11.46	-0.006001	2.5	PASS
GSM1900	810	VN	20	-11.95	-0.006255	2.5	PASS
GSM1900	810	VN	30	-11.75	-0.006154	2.5	PASS
GSM1900	810	VN	40	-11.53	-0.006035	2.5	PASS
GSM1900	810	VN	50	-9.85	-0.005156	2.5	PASS

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The End