



# Appendix B

## GSM850&1900



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

### 1.1. Test Result

BAND	Channel	Conducted Power(dBm)	ERP(dBm)	Limit(dBm)	Verdict
GSM850	128	32.71	28.66	38.45	PASS
GSM850	190	32.83	28.78	38.45	PASS
GSM850	251	32.77	28.72	38.45	PASS

BAND	Channel	Conducted Power(dBm)	EIRP(dBm)	Limit(dBm)	Verdict
GSM1900	512	29.95	28.55	33.00	PASS
GSM1900	661	30.22	28.82	33.00	PASS
GSM1900	810	30.11	28.81	33.00	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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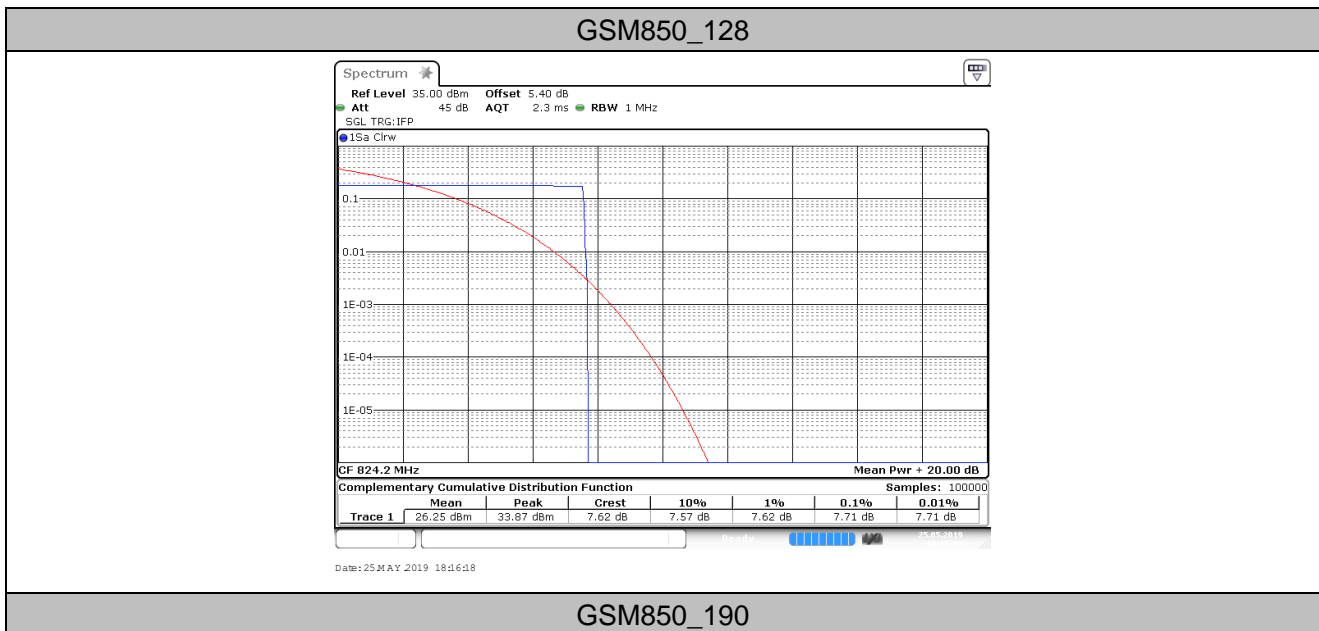
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## 2. Peak-to-Average Ratio

### 2.1. Test Result

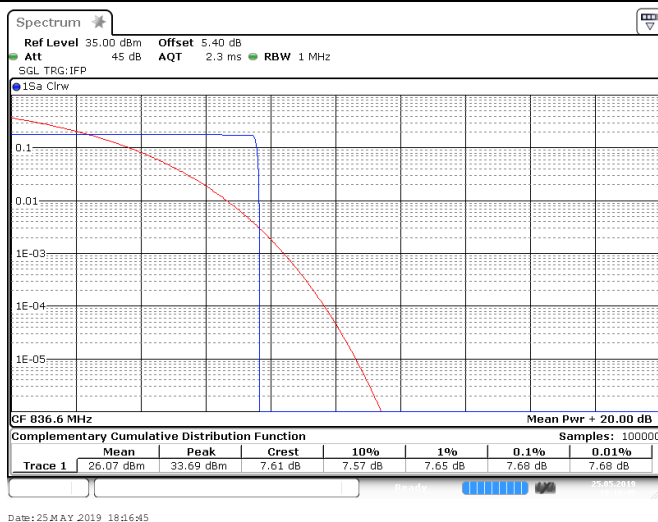
BAND	Channel	Peak-to-Average Ratio(dB)	Limit(dB)	Verdict
GSM850	128	7.71	13	PASS
GSM850	190	7.68	13	PASS
GSM850	251	7.68	13	PASS
GSM1900	512	7.68	13	PASS
GSM1900	661	7.71	13	PASS
GSM1900	810	7.65	13	PASS

### 2.2. Part II - Test Plots



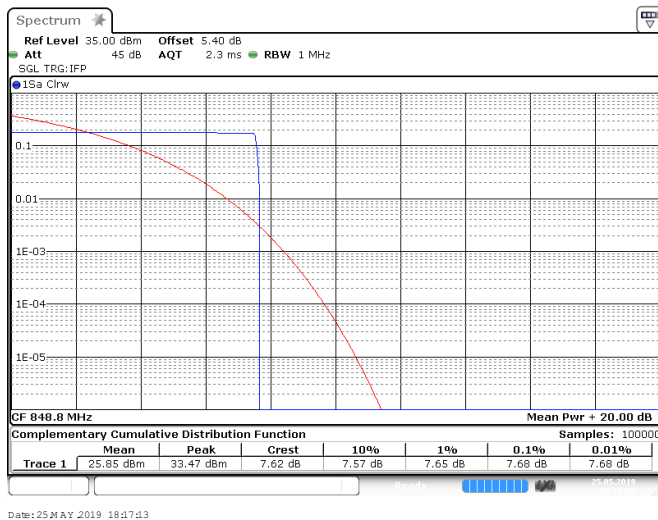
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**GSM850\_251**



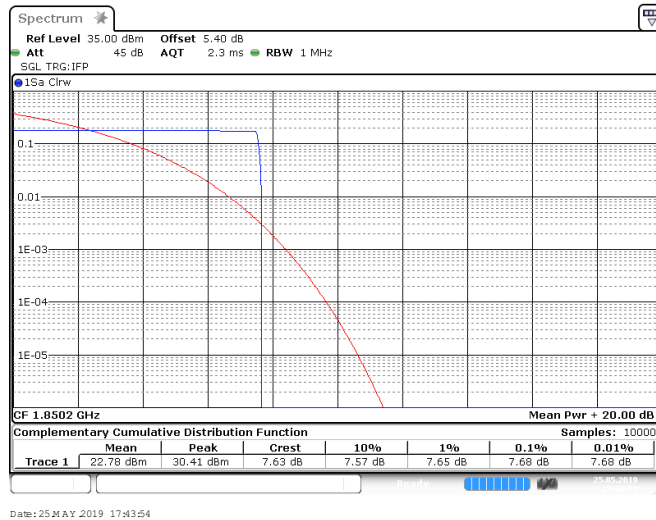
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**GSM1900\_512**



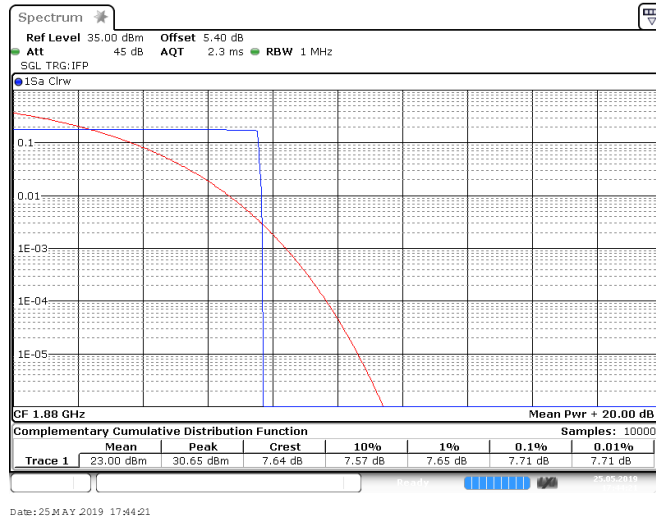
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**GSM1900\_661**

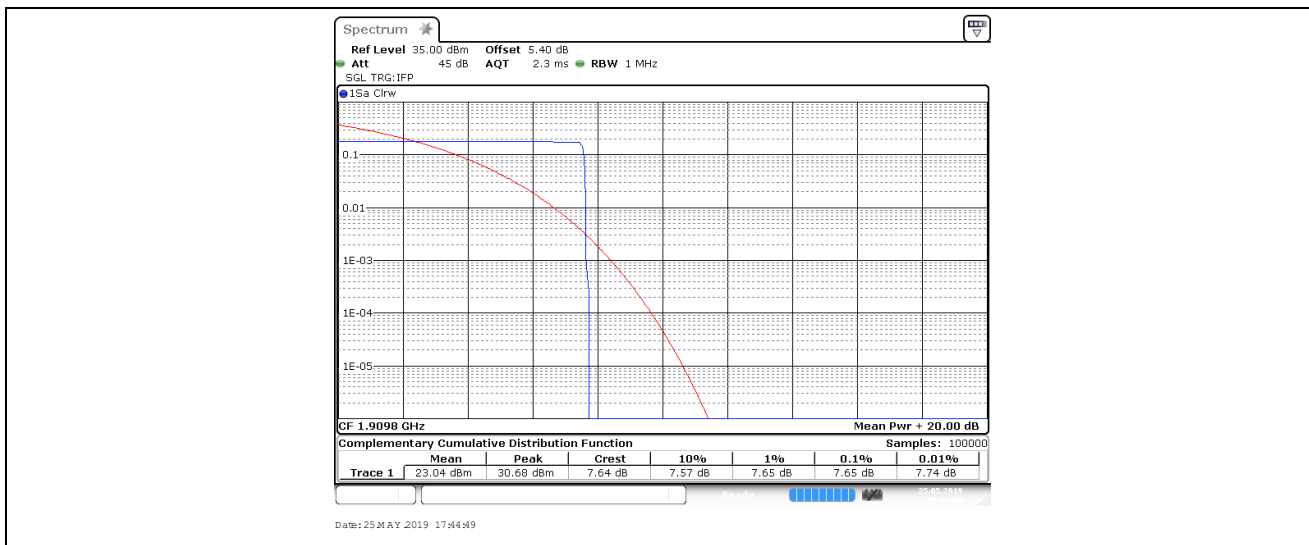


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**GSM1900\_810**



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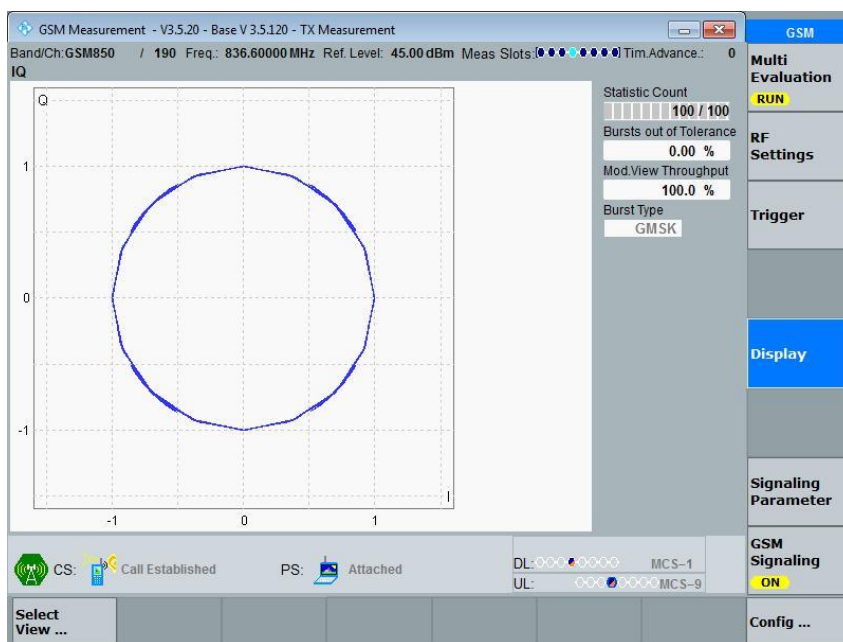
### 3. Modulation Characteristics

#### 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



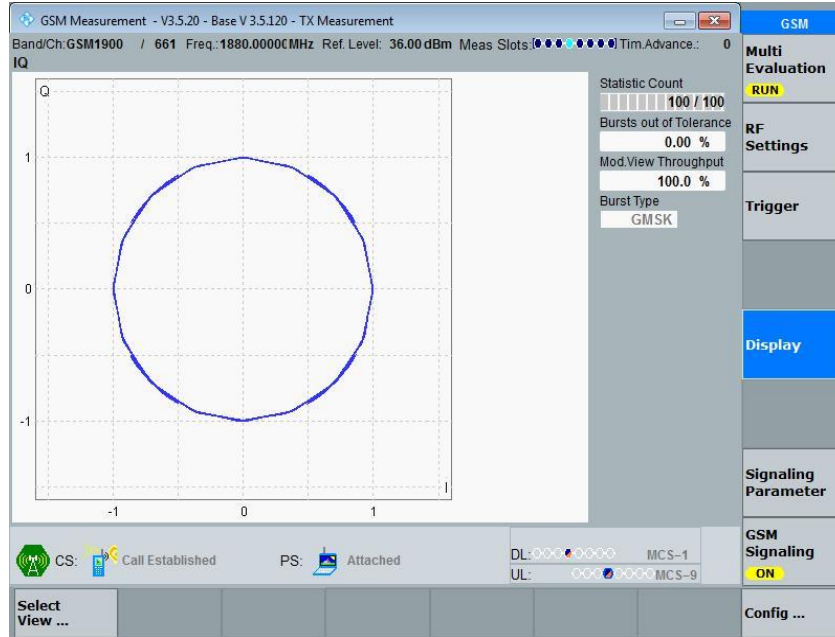
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**3.1.2. Test BAND = GSM 1900**

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

**3.1.2.1.1. Test Channel = MCH**



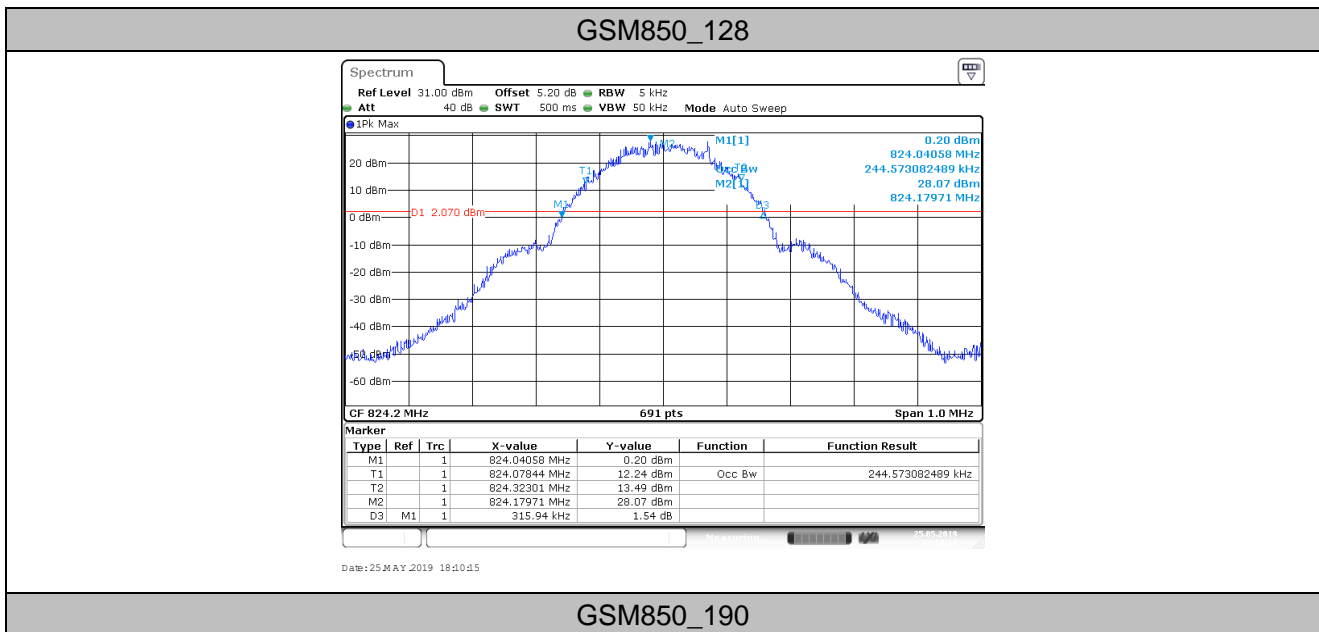
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## 4. 26dB Bandwidth and Occupied Bandwidth

### 4.1. Test Result

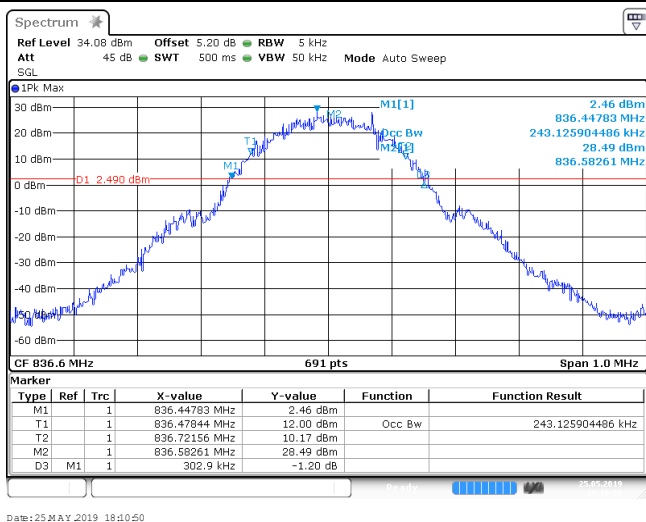
BAND	Channel	Occupied Bandwidth (kHz)	26dB Bandwidth (kHz)	Limit(kHz)	Verdict
GSM850	128	246.02	315.94	---	PASS
GSM850	190	243.13	302.90	---	PASS
GSM850	251	244.57	310.14	---	PASS
GSM1900	512	246.02	305.80	---	PASS
GSM1900	661	243.13	310.14	---	PASS
GSM1900	810	244.57	314.49	---	PASS

### 4.2. Test Plots



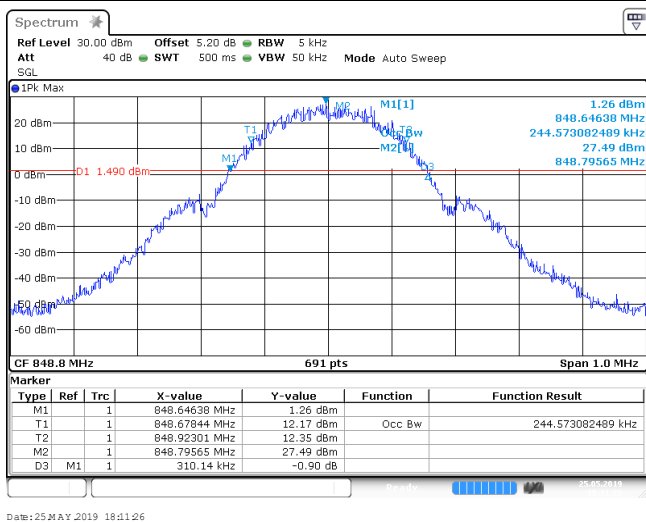
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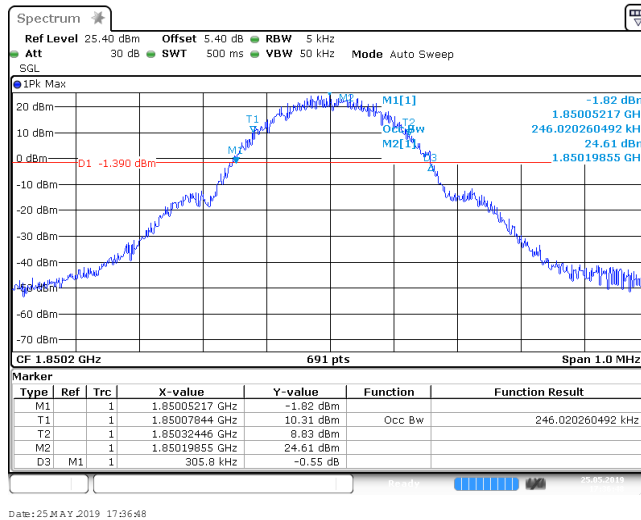
GSM1900\_512



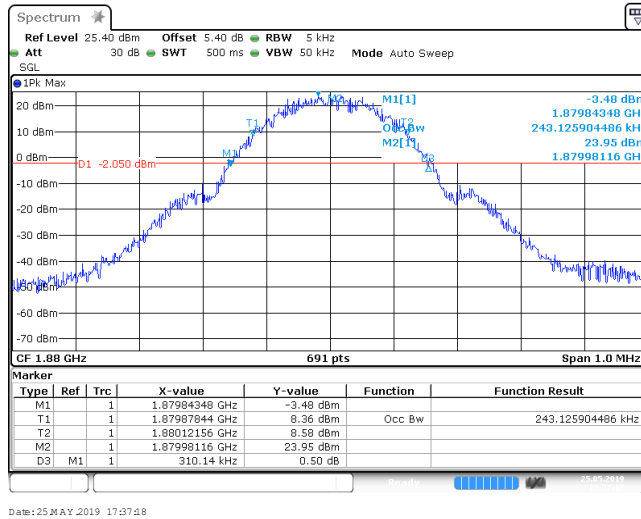
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**GSM1900\_661**

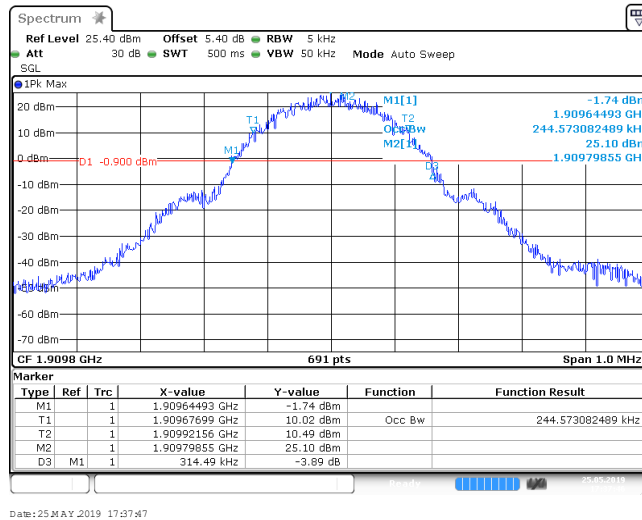


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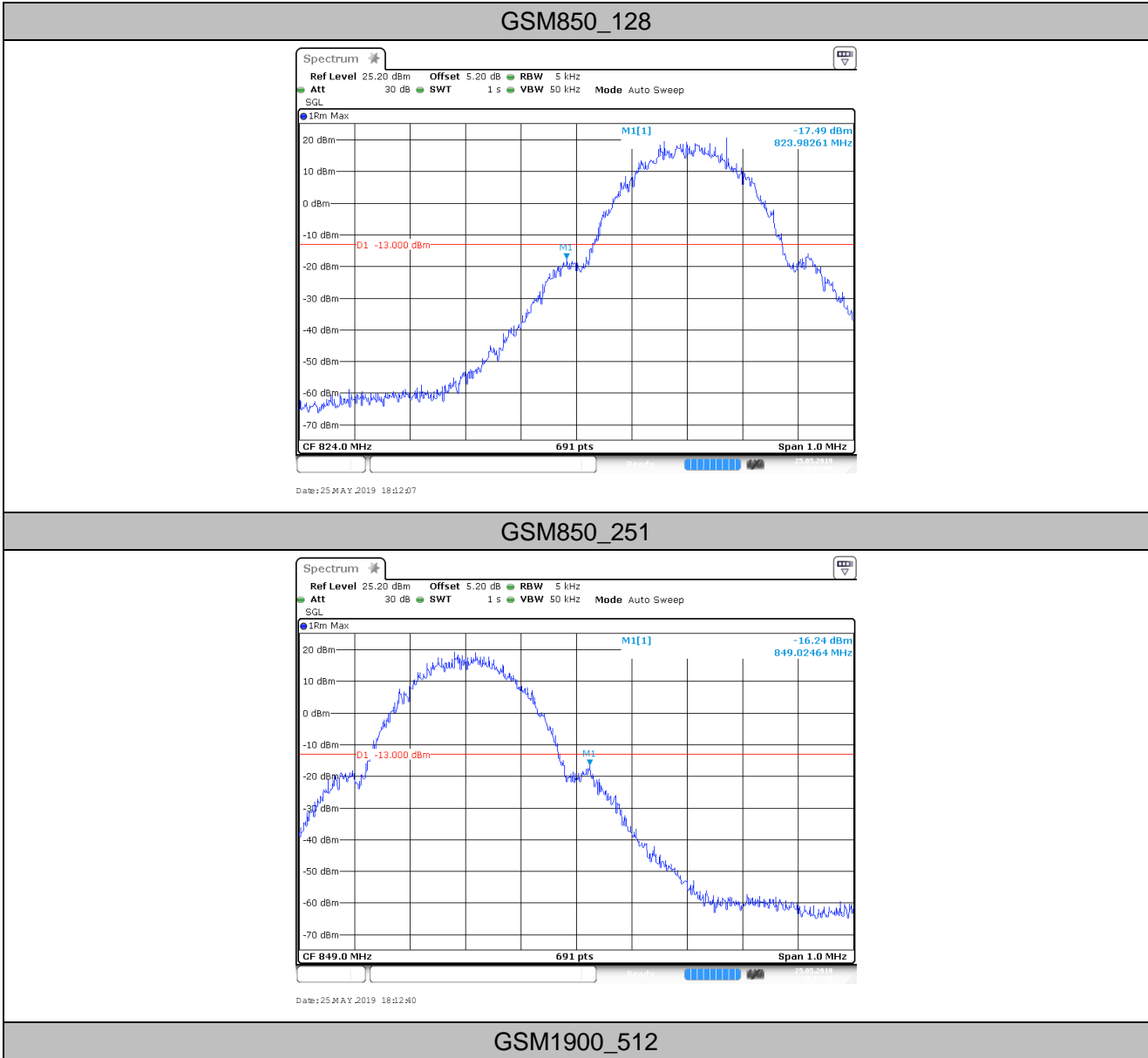


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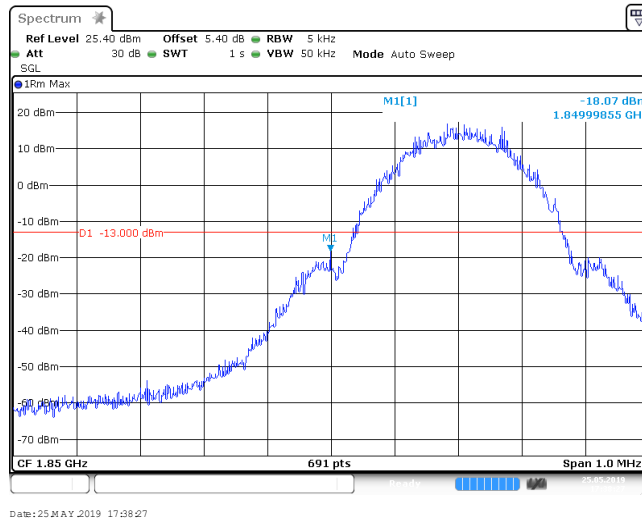
## 5. Band Edge Compliance

### 5.1. Test Plots

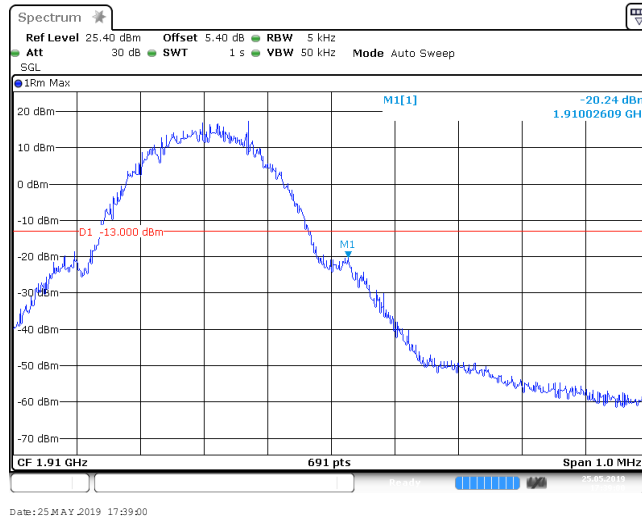


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**GSM1900\_810**



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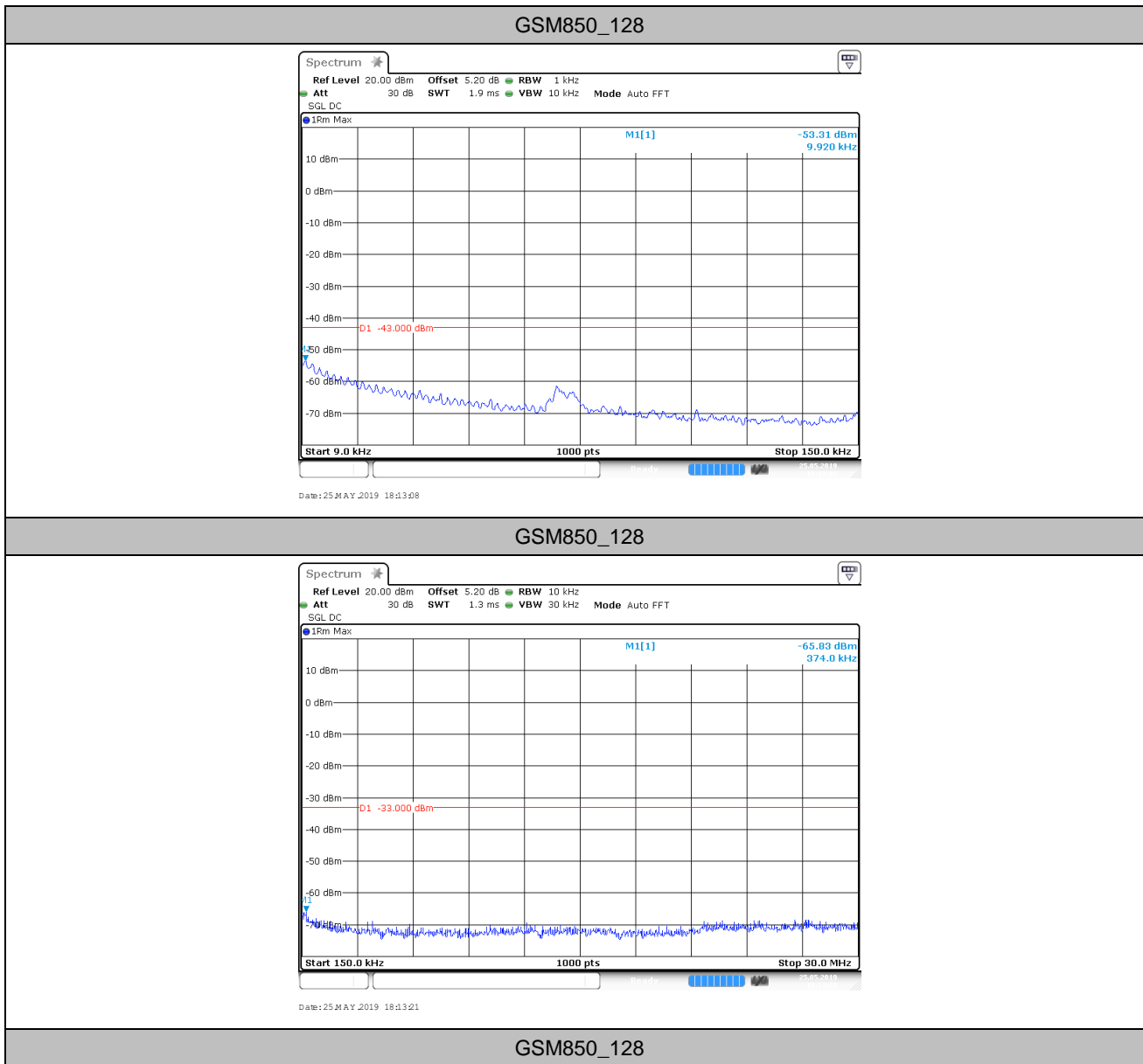
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## 6. Spurious Emission at Antenna Terminal

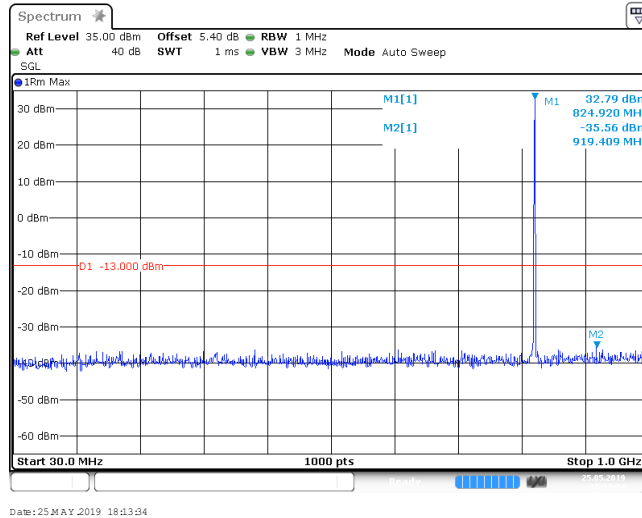
Remark1: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of  $< RBW/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (Span / RBW)$ " 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.

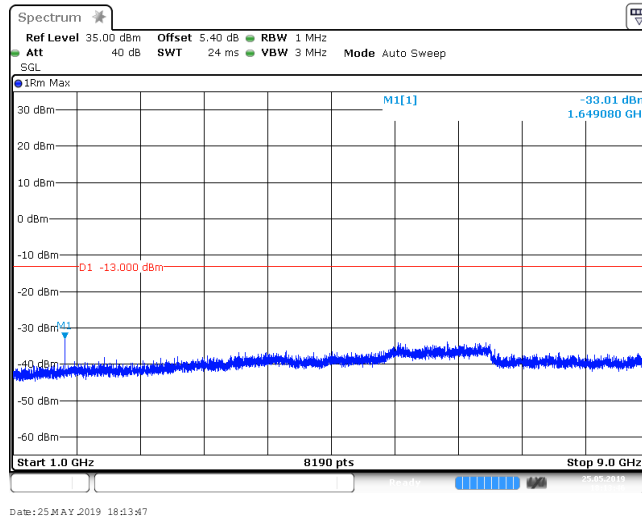
### 6.1. Test Plots



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GSM850\_128

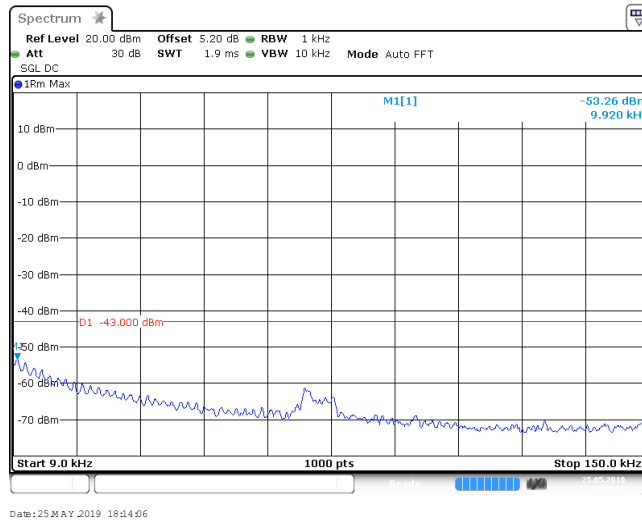


GSM850\_190

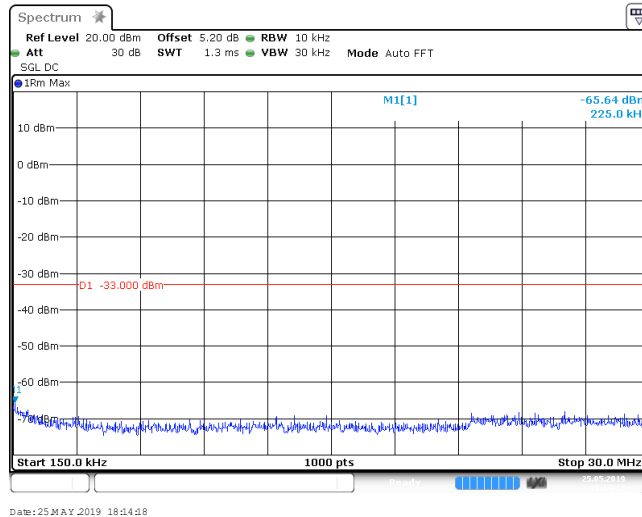


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GSM850\_190



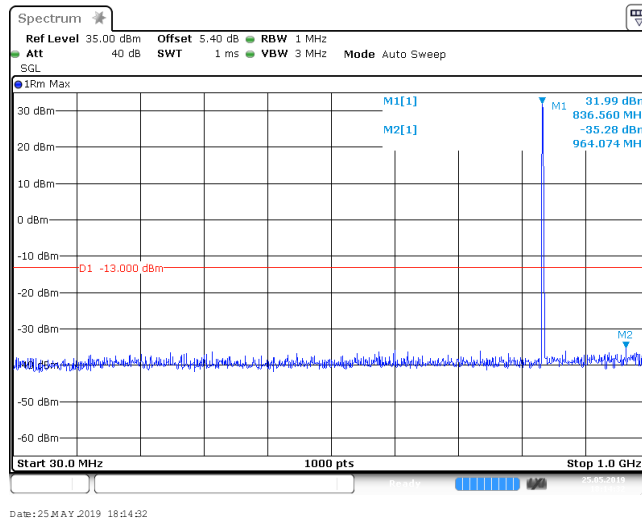
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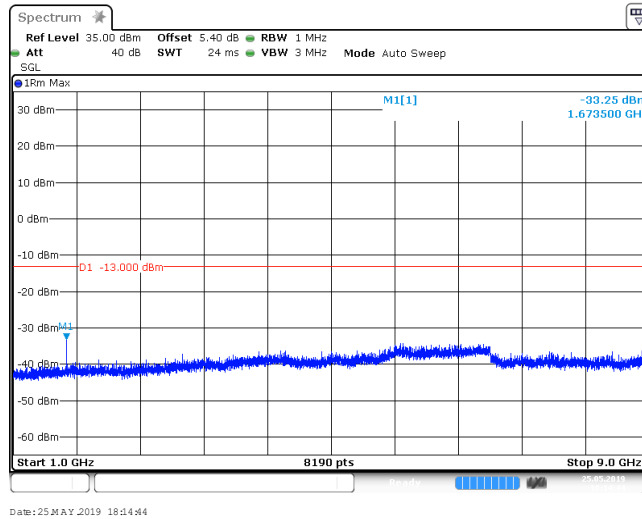
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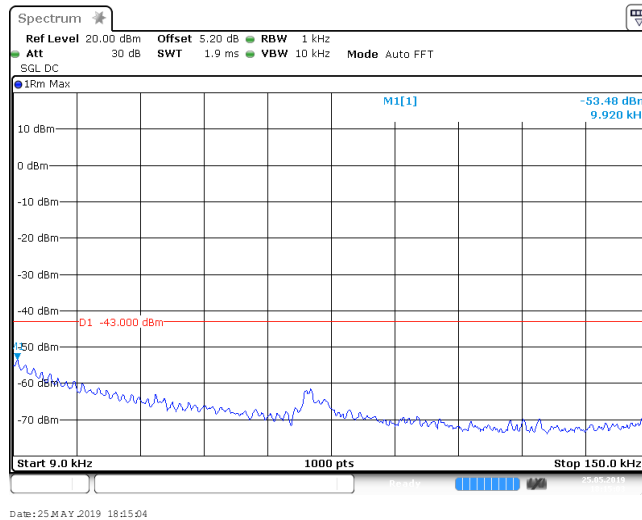
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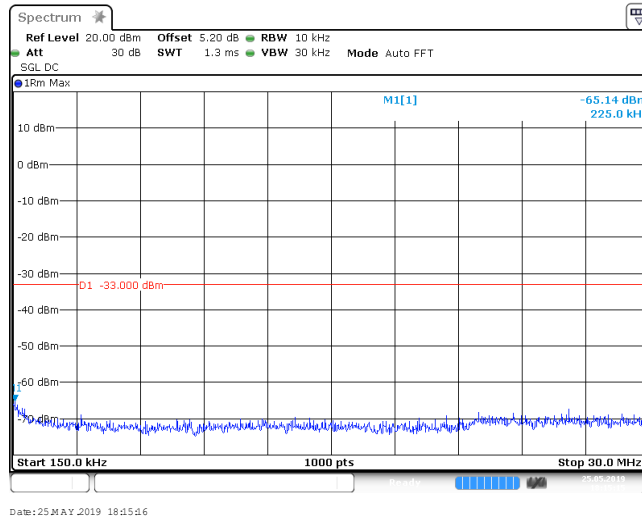
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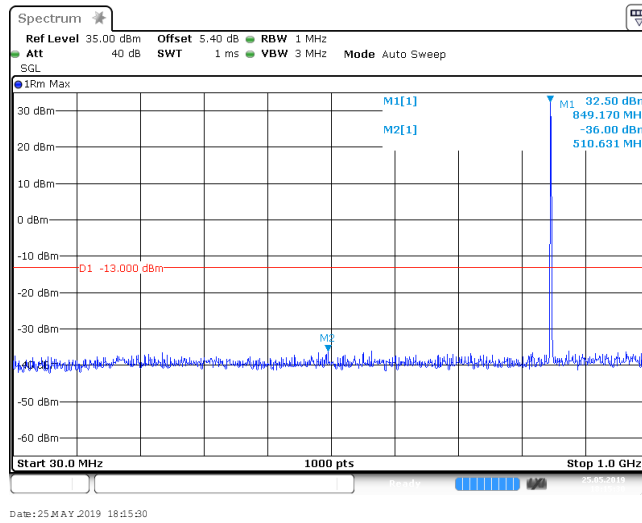
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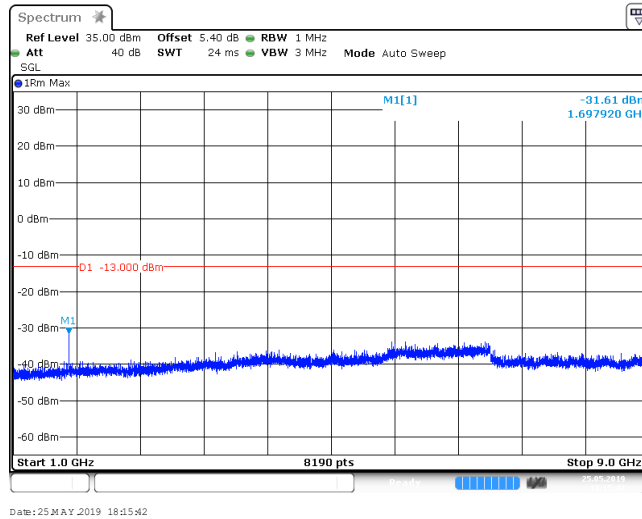
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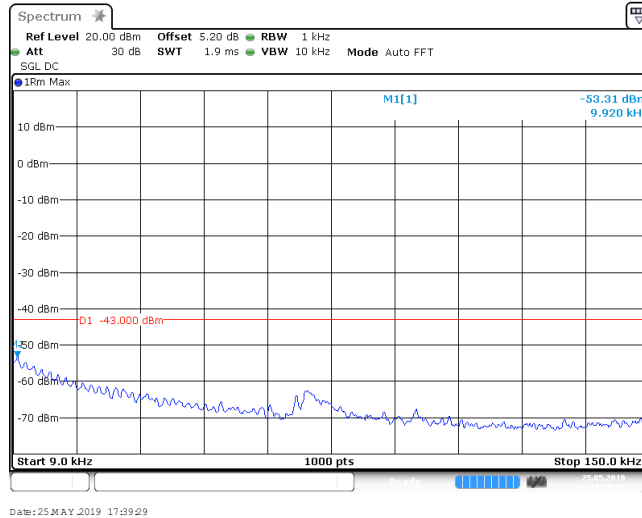
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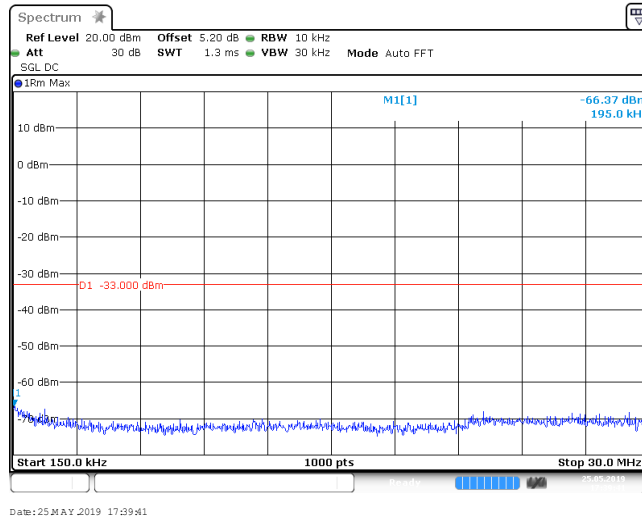
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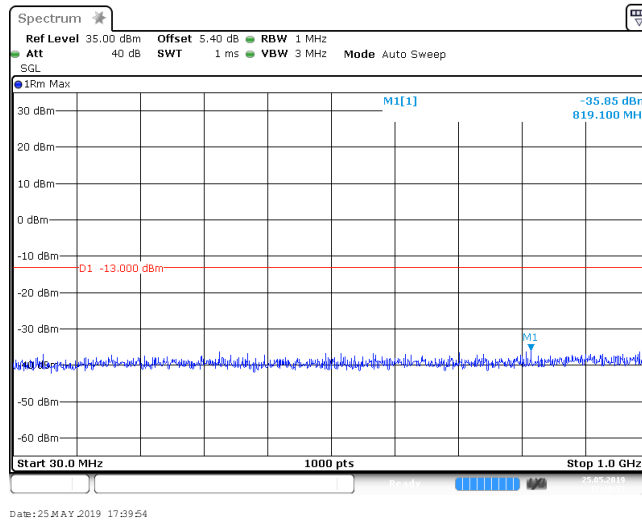


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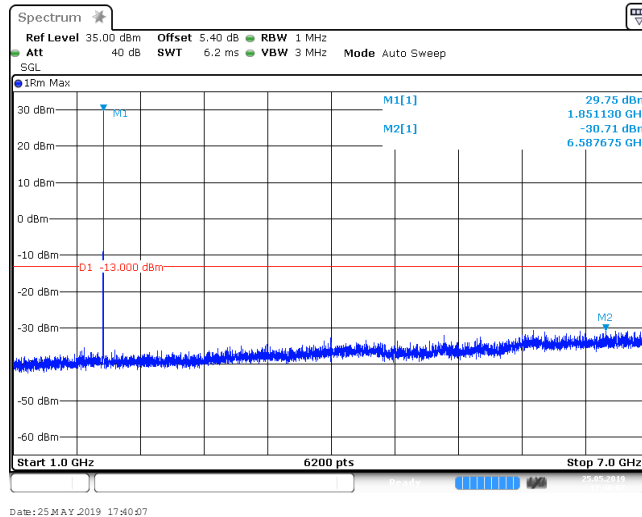


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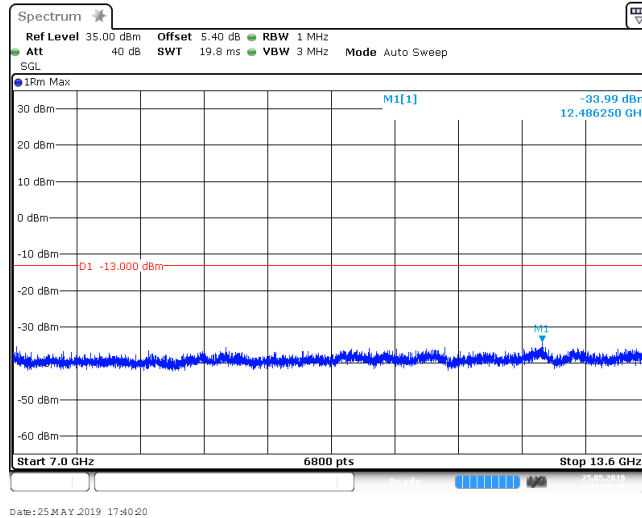
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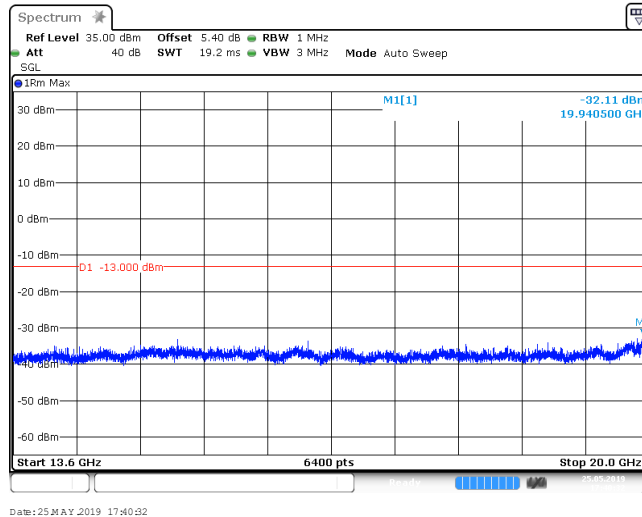
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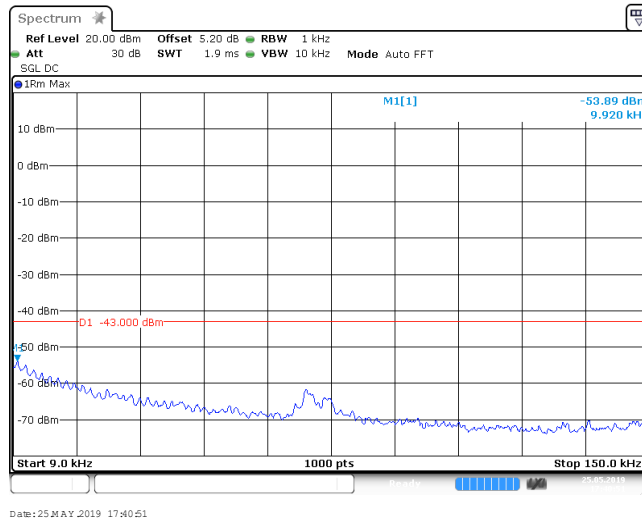
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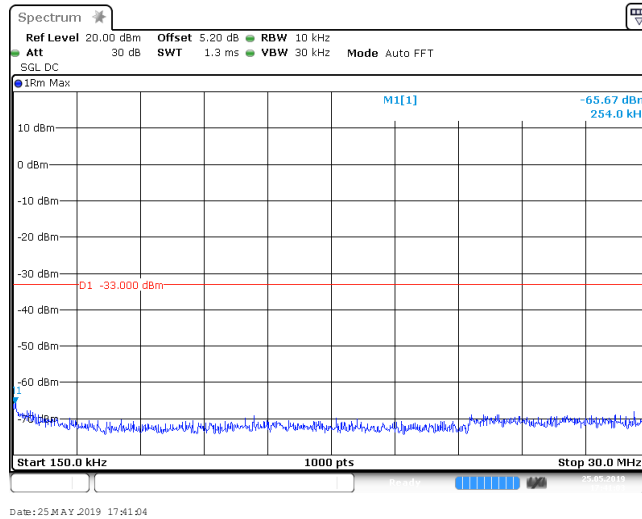
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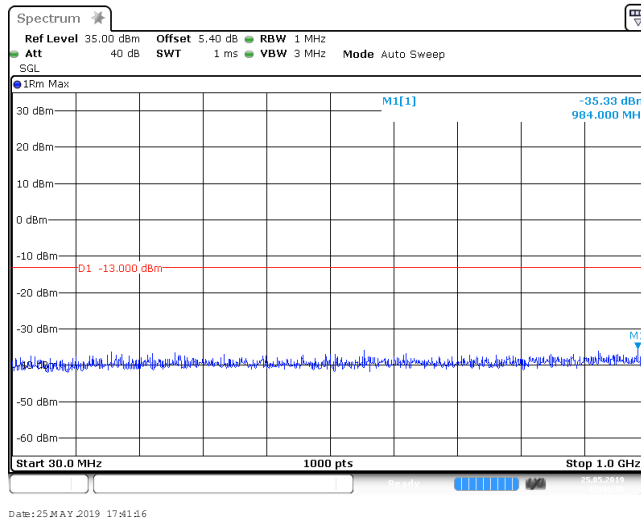


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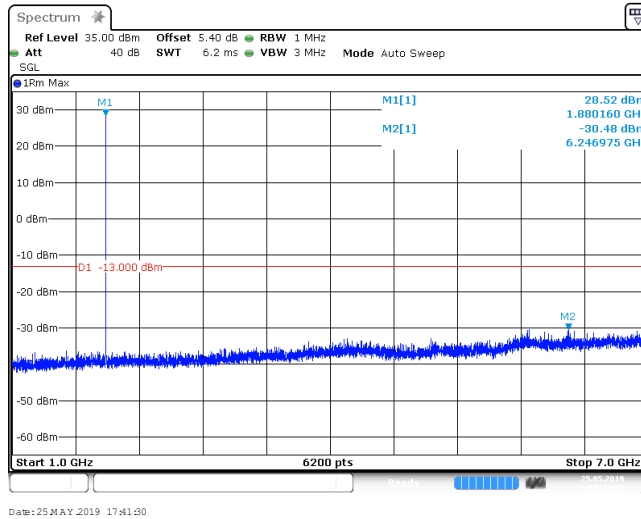


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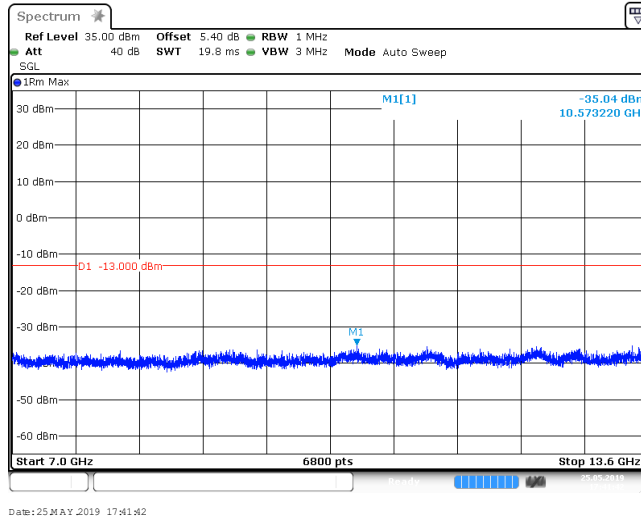


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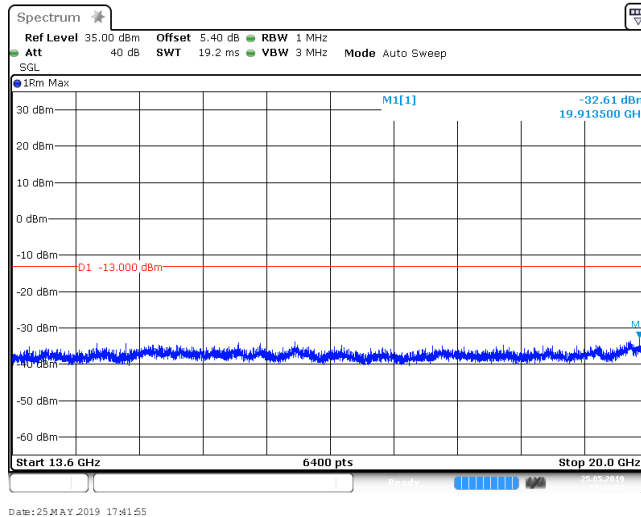


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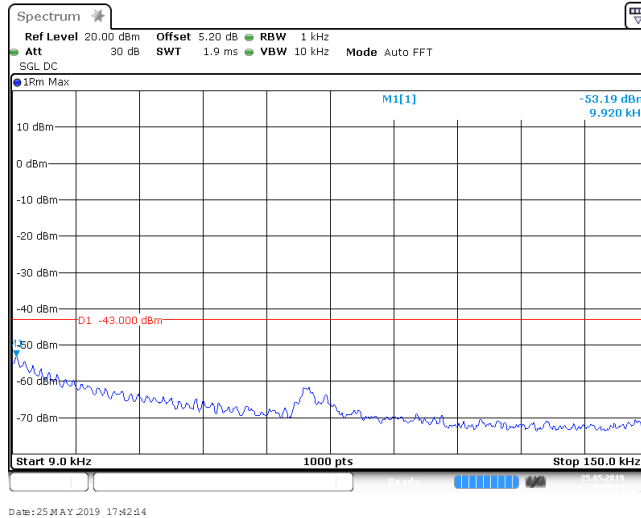


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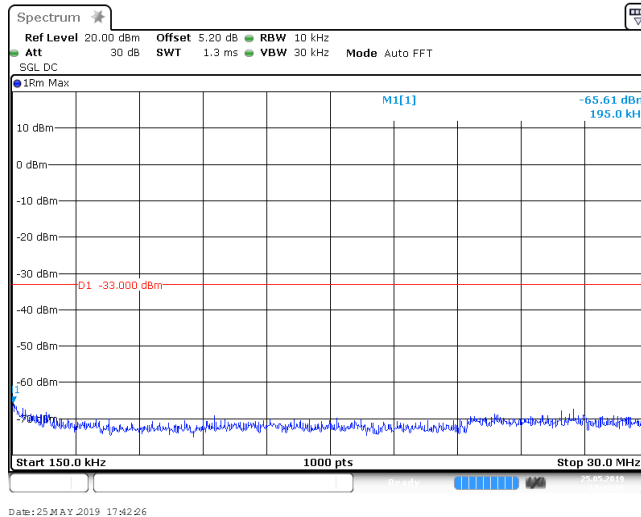


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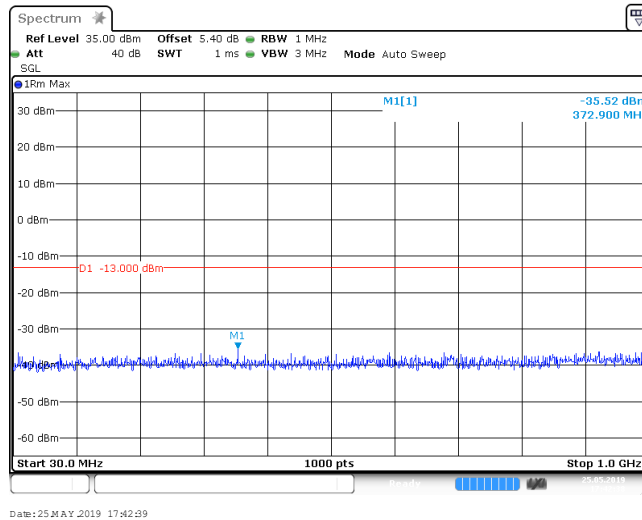
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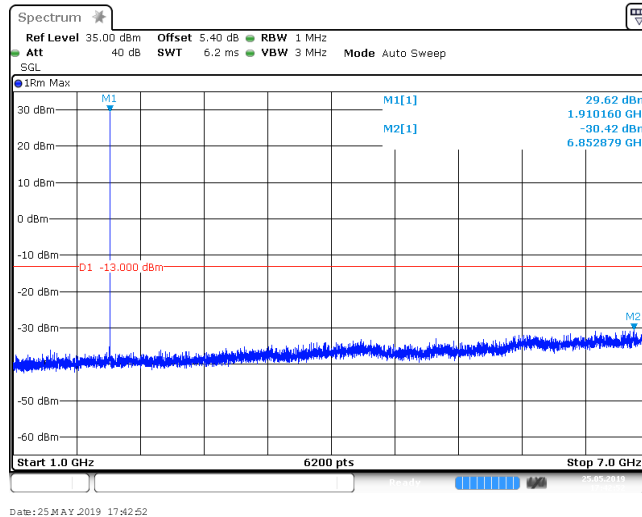
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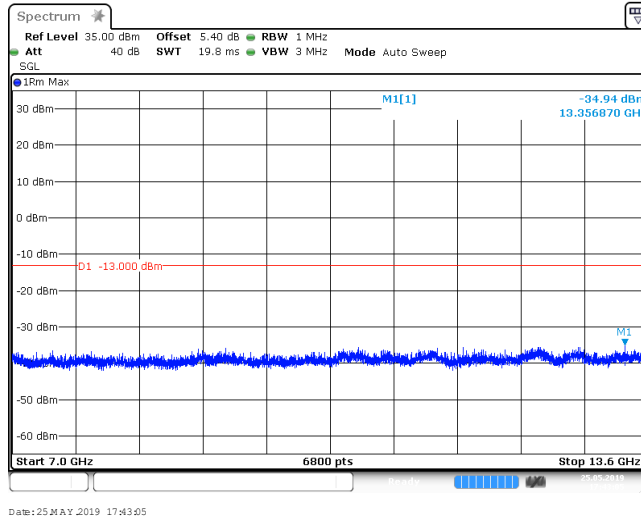


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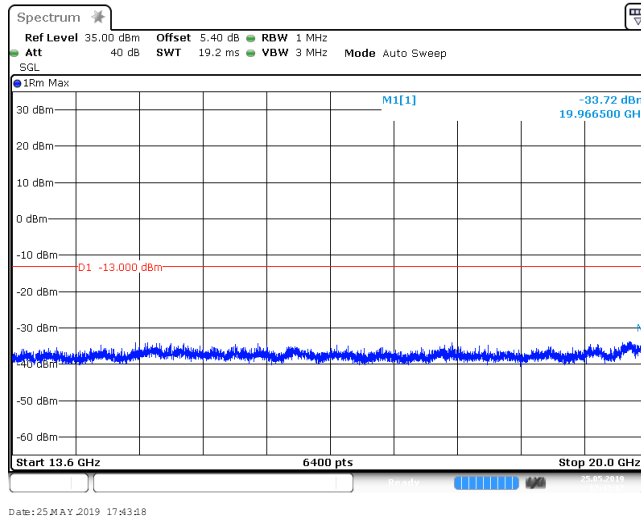


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## 7. Field Strength of Spurious Radiation

### 7.1. Test Band = GSM 850

#### 7.1.1. Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
41.2526	-69.25	-13.00	56.25	Vertical
1673.3347	-55.76	-13.00	42.76	Vertical
2455.4911	-54.76	-13.00	41.76	Vertical
5856.5952	-50.13	-13.00	37.13	Vertical
17984.9995	-32.73	-13.00	19.73	Vertical
44.9872	-61.71	-13.00	48.71	Horizontal
249.0855	-68.30	-13.00	55.30	Horizontal
1673.3347	-48.23	-13.00	35.23	Horizontal
2448.6897	-37.16	-13.00	24.16	Horizontal
3346.5116	-54.97	-13.00	41.97	Horizontal
16405.4468	-37.95	-13.00	24.95	Horizontal

#### 7.1.2. Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
45.6178	-67.34	-13.00	54.34	Vertical
619.9835	-61.76	-13.00	48.76	Vertical
1648.1296	-52.70	-13.00	39.70	Vertical
2472.6945	-51.79	-13.00	38.79	Vertical
4121.0374	-55.86	-13.00	42.86	Vertical
5769.0923	-52.11	-13.00	39.11	Vertical
45.0358	-62.58	-13.00	49.58	Horizontal
572.3056	-63.88	-13.00	50.88	Horizontal
1648.1296	-46.02	-13.00	33.02	Horizontal
2419.0838	-31.20	-13.00	18.20	Horizontal
3297.0099	-50.78	-13.00	37.78	Horizontal
5769.5923	-49.82	-13.00	36.82	Horizontal

#### 7.1.3. Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
112.3086	-64.70	-13.00	51.70	Vertical
594.7137	-63.36	-13.00	50.36	Vertical
1697.7395	-59.34	-13.00	46.34	Vertical
2455.4911	-53.03	-13.00	40.03	Vertical
5941.5981	-52.01	-13.00	39.01	Vertical



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17988.9996	-33.07	-13.00	20.07	Vertical
44.9872	-62.46	-13.00	49.46	Horizontal
513.6662	-64.65	-13.00	51.65	Horizontal
1697.3395	-48.56	-13.00	35.56	Horizontal
2454.6909	-51.35	-13.00	38.35	Horizontal
3395.0132	-56.60	-13.00	43.60	Horizontal
16371.9457	-38.08	-13.00	25.08	Horizontal

**7.2. Test Band = GSM 1900**

**7.2.1. Test Channel = LCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
45.6178	-68.32	-13.00	55.32	Vertical
119.3415	-64.62	-13.00	51.62	Vertical
604.6082	-63.86	-13.00	50.86	Vertical
2696.7393	-37.51	-13.00	24.51	Vertical
5550.5850	-51.12	-13.00	38.12	Vertical
17997.4999	-32.91	-13.00	19.91	Vertical
41.2041	-63.57	-13.00	50.57	Horizontal
239.9185	-68.65	-13.00	55.65	Horizontal
2699.5399	-36.00	-13.00	23.00	Horizontal
3700.5234	-52.03	-13.00	39.03	Horizontal
5550.5850	-49.53	-13.00	36.53	Horizontal
16400.9467	-38.14	-13.00	25.14	Horizontal

**7.2.2. Test Channel = MCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
41.2041	-68.04	-13.00	55.04	Vertical
117.2074	-63.96	-13.00	50.96	Vertical
2700.3401	-37.48	-13.00	24.48	Vertical
3760.0253	-54.00	-13.00	41.00	Vertical
5640.0880	-49.24	-13.00	36.24	Vertical
17998.5000	-32.94	-13.00	19.94	Vertical
45.3753	-63.15	-13.00	50.15	Horizontal
758.3124	-60.41	-13.00	47.41	Horizontal
2693.1386	-36.20	-13.00	23.20	Horizontal
3760.0253	-51.03	-13.00	38.03	Horizontal
5640.0880	-47.27	-13.00	34.27	Horizontal
16400.4467	-38.16	-13.00	25.16	Horizontal



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**7.2.3. Test Channel = HCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Margin (dB)	Polarization
115.0733	-64.32	-13.00	51.32	Vertical
705.8328	-62.37	-13.00	49.37	Vertical
2697.5395	-37.49	-13.00	24.49	Vertical
3819.5273	-50.95	-13.00	37.95	Vertical
5729.5910	-47.92	-13.00	34.92	Vertical
17979.9993	-32.63	-13.00	19.63	Vertical
45.8118	-62.64	-13.00	49.64	Horizontal
233.8072	-67.22	-13.00	54.22	Horizontal
2693.1386	-36.33	-13.00	23.33	Horizontal
3819.5273	-51.67	-13.00	38.67	Horizontal
5729.0910	-48.24	-13.00	35.24	Horizontal
16396.4465	-38.08	-13.00	25.08	Horizontal

Remark:

- 1) 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 had been displayed.
- 2) We have tested all modulation and all Bandwidth , but only the worst case data presented in this report.



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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	9.40	0.011399	±2.5	PASS
GSM850	128	VN	TN	11.24	0.013632	±2.5	PASS
GSM850	128	VH	TN	3.03	0.003682	±2.5	PASS
GSM850	190	VL	TN	10.07	0.012041	±2.5	PASS
GSM850	190	VN	TN	7.43	0.008876	±2.5	PASS
GSM850	190	VH	TN	8.10	0.009687	±2.5	PASS
GSM850	251	VL	TN	10.98	0.012933	±2.5	PASS
GSM850	251	VN	TN	10.46	0.012324	±2.5	PASS
GSM850	251	VH	TN	11.04	0.013009	±2.5	PASS
GSM1900	512	VL	TN	13.08	0.007067	±2.5	PASS
GSM1900	512	VN	TN	18.60	0.010051	±2.5	PASS
GSM1900	512	VH	TN	20.86	0.011273	±2.5	PASS
GSM1900	661	VL	TN	12.59	0.006698	±2.5	PASS
GSM1900	661	VN	TN	14.69	0.007814	±2.5	PASS
GSM1900	661	VH	TN	19.11	0.010167	±2.5	PASS
GSM1900	810	VL	TN	28.19	0.014758	±2.5	PASS
GSM1900	810	VN	TN	24.41	0.012780	±2.5	PASS
GSM1900	810	VH	TN	26.64	0.013947	±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	5.81	0.007051	±2.5	PASS
GSM850	128	VN	-20	6.10	0.007404	±2.5	PASS
GSM850	128	VN	-10	6.59	0.007991	±2.5	PASS
GSM850	128	VN	0	4.49	0.005445	±2.5	PASS
GSM850	128	VN	10	6.33	0.007678	±2.5	PASS
GSM850	128	VN	20	6.94	0.008422	±2.5	PASS
GSM850	128	VN	30	-0.61	-0.000744	±2.5	PASS
GSM850	128	VN	40	-0.71	-0.000862	±2.5	PASS
GSM850	128	VN	50	0.90	0.001097	±2.5	PASS
GSM850	190	VN	-30	8.72	0.010420	±2.5	PASS
GSM850	190	VN	-20	9.78	0.011693	±2.5	PASS
GSM850	190	VN	-10	7.04	0.008413	±2.5	PASS
GSM850	190	VN	0	3.55	0.004245	±2.5	PASS
GSM850	190	VN	10	7.49	0.008953	±2.5	PASS
GSM850	190	VN	20	8.85	0.010574	±2.5	PASS



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GSM850	190	VN	30	9.72	0.011616	±2.5	PASS
GSM850	190	VN	40	6.39	0.007641	±2.5	PASS
GSM850	190	VN	50	11.04	0.013198	±2.5	PASS
GSM850	251	VN	-30	12.33	0.014530	±2.5	PASS
GSM850	251	VN	-20	8.14	0.009585	±2.5	PASS
GSM850	251	VN	-10	9.33	0.010993	±2.5	PASS
GSM850	251	VN	0	12.33	0.014530	±2.5	PASS
GSM850	251	VN	10	6.04	0.007113	±2.5	PASS
GSM850	251	VN	20	14.21	0.016736	±2.5	PASS
GSM850	251	VN	30	7.65	0.009015	±2.5	PASS
GSM850	251	VN	40	9.01	0.010612	±2.5	PASS
GSM850	251	VN	50	9.14	0.010764	±2.5	PASS
GSM1900	512	VN	-30	15.59	0.008428	±2.5	PASS
GSM1900	512	VN	-20	20.21	0.010924	±2.5	PASS
GSM1900	512	VN	-10	18.89	0.010208	±2.5	PASS
GSM1900	512	VN	0	11.95	0.006456	±2.5	PASS
GSM1900	512	VN	10	16.92	0.009144	±2.5	PASS
GSM1900	512	VN	20	-7.14	-0.003856	±2.5	PASS
GSM1900	512	VN	30	7.94	0.004293	±2.5	PASS
GSM1900	512	VN	40	-3.55	-0.001919	±2.5	PASS
GSM1900	512	VN	50	2.65	0.001431	±2.5	PASS
GSM1900	661	VN	-30	20.08	0.010682	±2.5	PASS
GSM1900	661	VN	-20	18.66	0.009926	±2.5	PASS
GSM1900	661	VN	-10	19.31	0.010270	±2.5	PASS
GSM1900	661	VN	0	9.85	0.005238	±2.5	PASS
GSM1900	661	VN	10	11.53	0.006131	±2.5	PASS
GSM1900	661	VN	20	7.07	0.003761	±2.5	PASS
GSM1900	661	VN	30	10.49	0.005581	±2.5	PASS
GSM1900	661	VN	40	23.08	0.012279	±2.5	PASS
GSM1900	661	VN	50	19.98	0.010630	±2.5	PASS
GSM1900	810	VN	-30	24.86	0.013017	±2.5	PASS
GSM1900	810	VN	-20	26.47	0.013862	±2.5	PASS
GSM1900	810	VN	-10	19.40	0.010160	±2.5	PASS
GSM1900	810	VN	0	10.56	0.005528	±2.5	PASS
GSM1900	810	VN	10	16.50	0.008639	±2.5	PASS
GSM1900	810	VN	20	21.57	0.011293	±2.5	PASS
GSM1900	810	VN	30	19.63	0.010278	±2.5	PASS
GSM1900	810	VN	40	13.11	0.006864	±2.5	PASS
GSM1900	810	VN	50	15.50	0.008115	±2.5	PASS

The End



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