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Report No.: SZEM140800475309  
Page: 1 of 31

## Appendix for Test Report

Authorized Signature:



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### 3 Appendix\_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	33.01	32.86	38.5	PASS
		MCH	33.21	33.06	38.5	PASS
		HCH	33.18	33.03	38.5	PASS

Note1:

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

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

- b. SGP=Signal Generator Level

Note2:

RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

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Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.81	31.81	33	PASS
		MCH	29.64	31.64	33	PASS
		HCH	29.41	31.41	33	PASS

Note1:

- a. For getting the EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

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

- b. SGP=Signal Generator Level

Note2:

RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

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## 4 Appendix\_B: Peak-to-Average Ratio

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM850	GSM/TM1	LCH	0.11	13	PASS
		MCH	0.15	13	PASS
		HCH	0.23	13	PASS
GSM1900	GSM/TM1	LCH	0.07	13	PASS
		MCH	0.13	13	PASS
		HCH	0.19	13	PASS

## 5 Appendix\_C: Modulation Characteristics

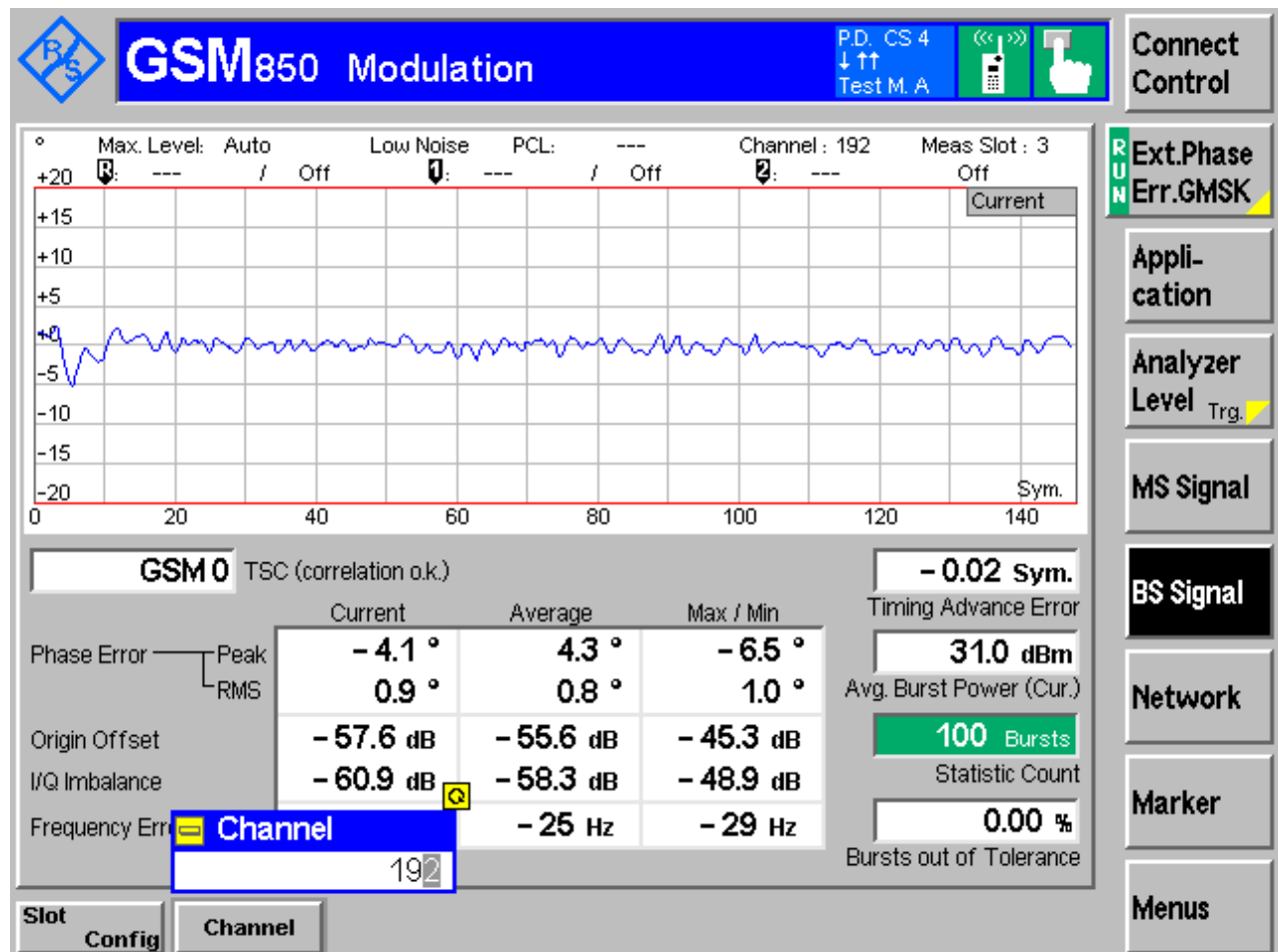
Part I - Test Plots

### 5.1 For GSM

#### 5.1.1 Test Band = GSM850

##### 5.1.1.1 Test Mode = GSM/TM1

##### 5.1.1.1.1 Test Channel = MCH

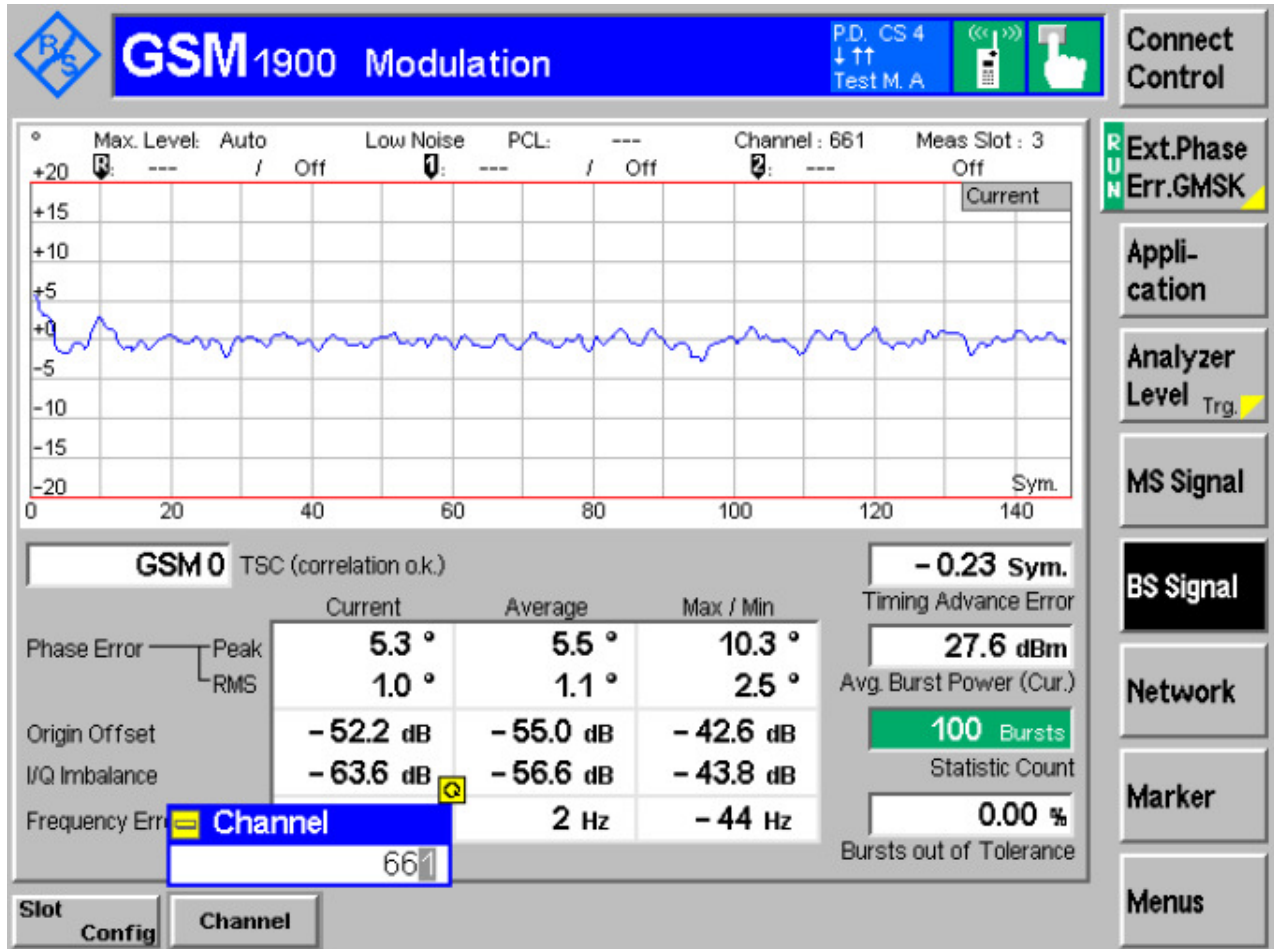




5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = MCH



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## 6 Appendix\_D: Bandwidth

### Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	243.89	318.0	PASS
		MCH	243.51	313.6	PASS
		HCH	245.31	313.1	PASS
GSM1900	GSM/TM1	LCH	244.95	315.8	PASS
		MCH	245.63	314.3	PASS
		HCH	247.71	318.6	PASS





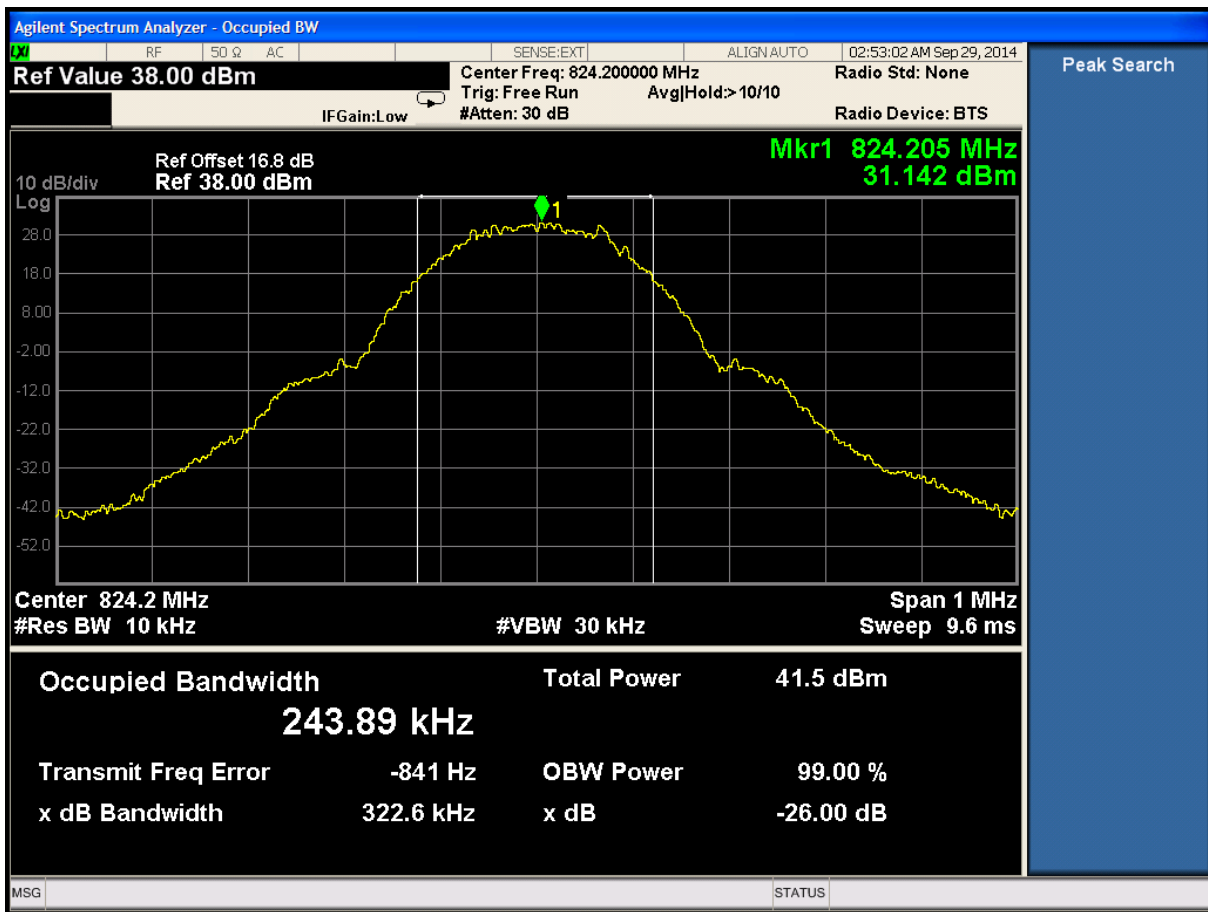
Part II - Test Plots

6.1 For GSM

6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

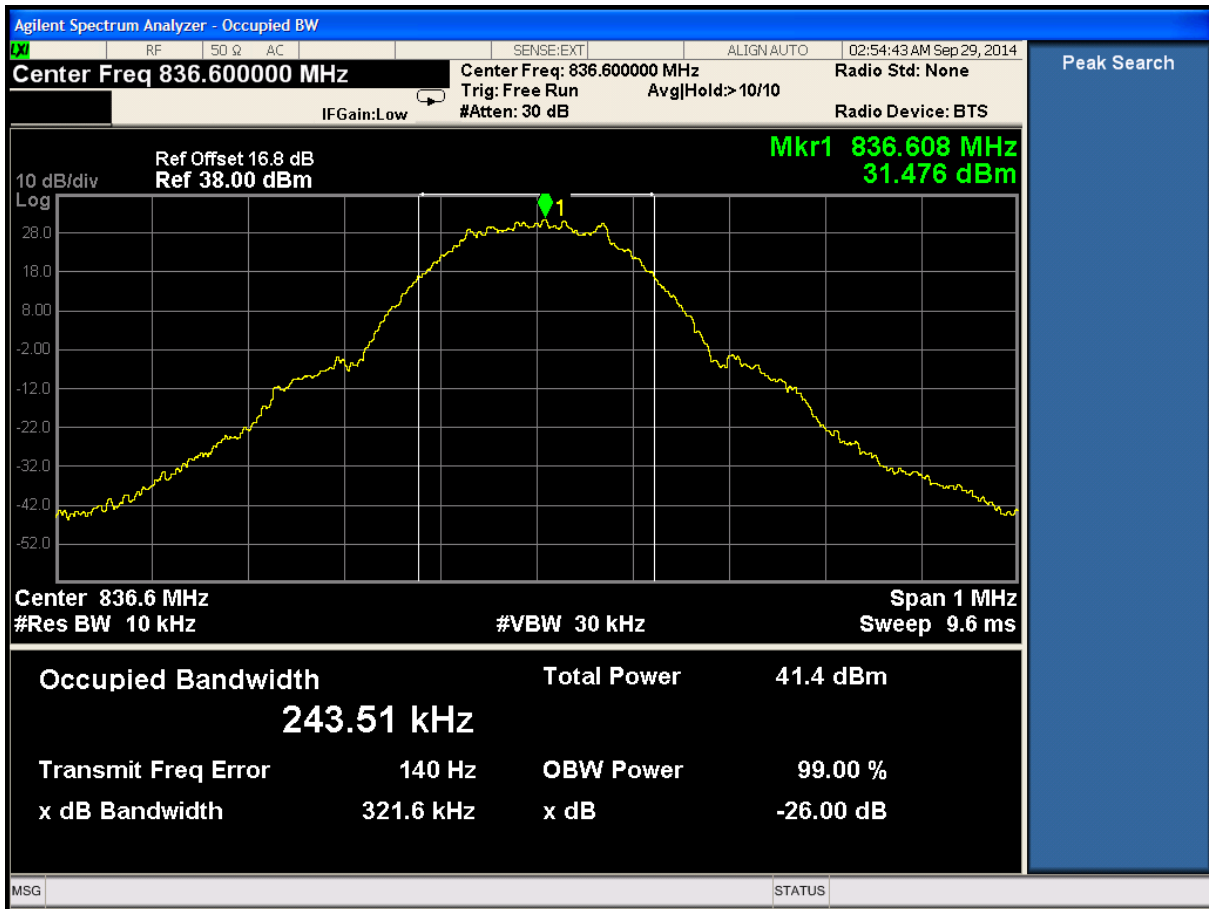
6.1.1.1.1 Test Channel = LCH



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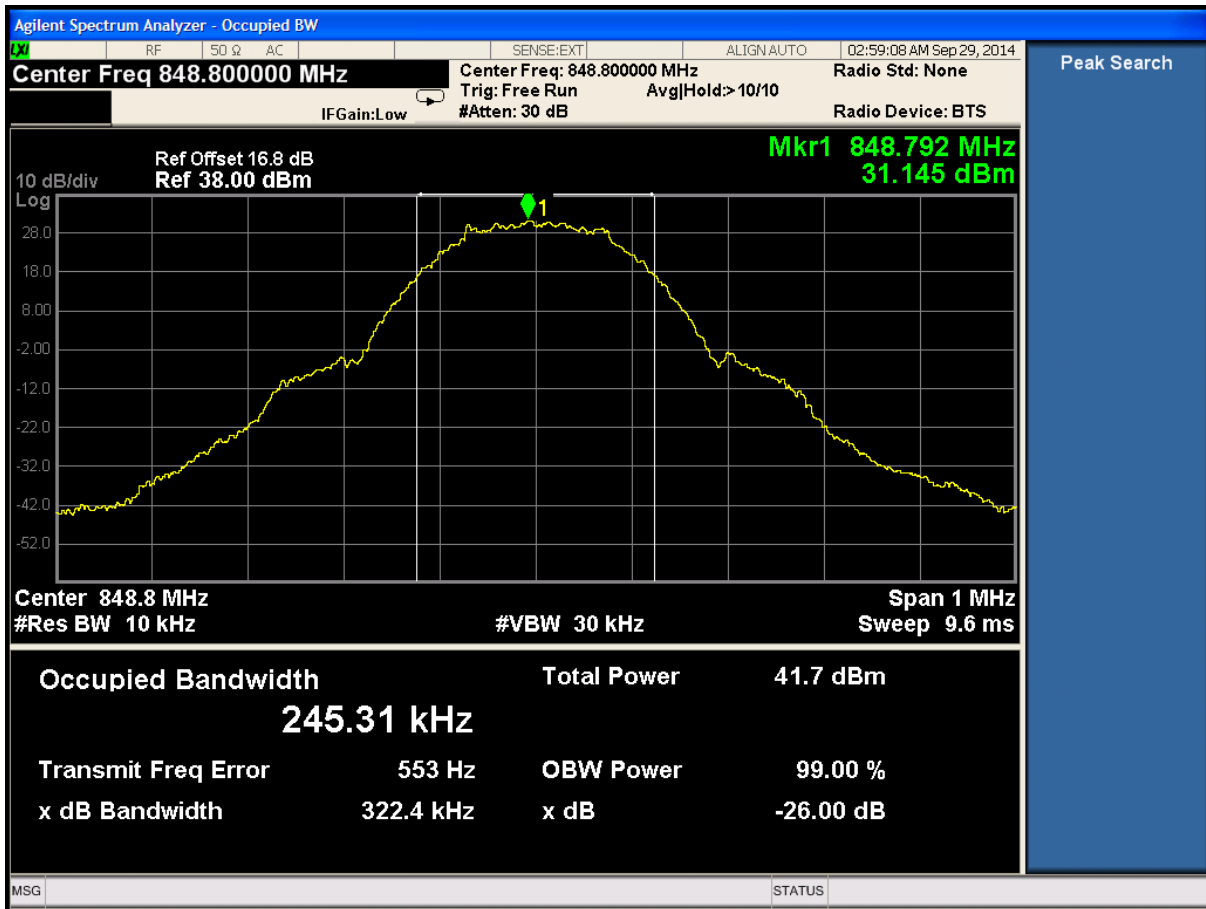
6.1.1.1.2 Test Channel = MCH



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6.1.1.1.3 Test Channel = HCH



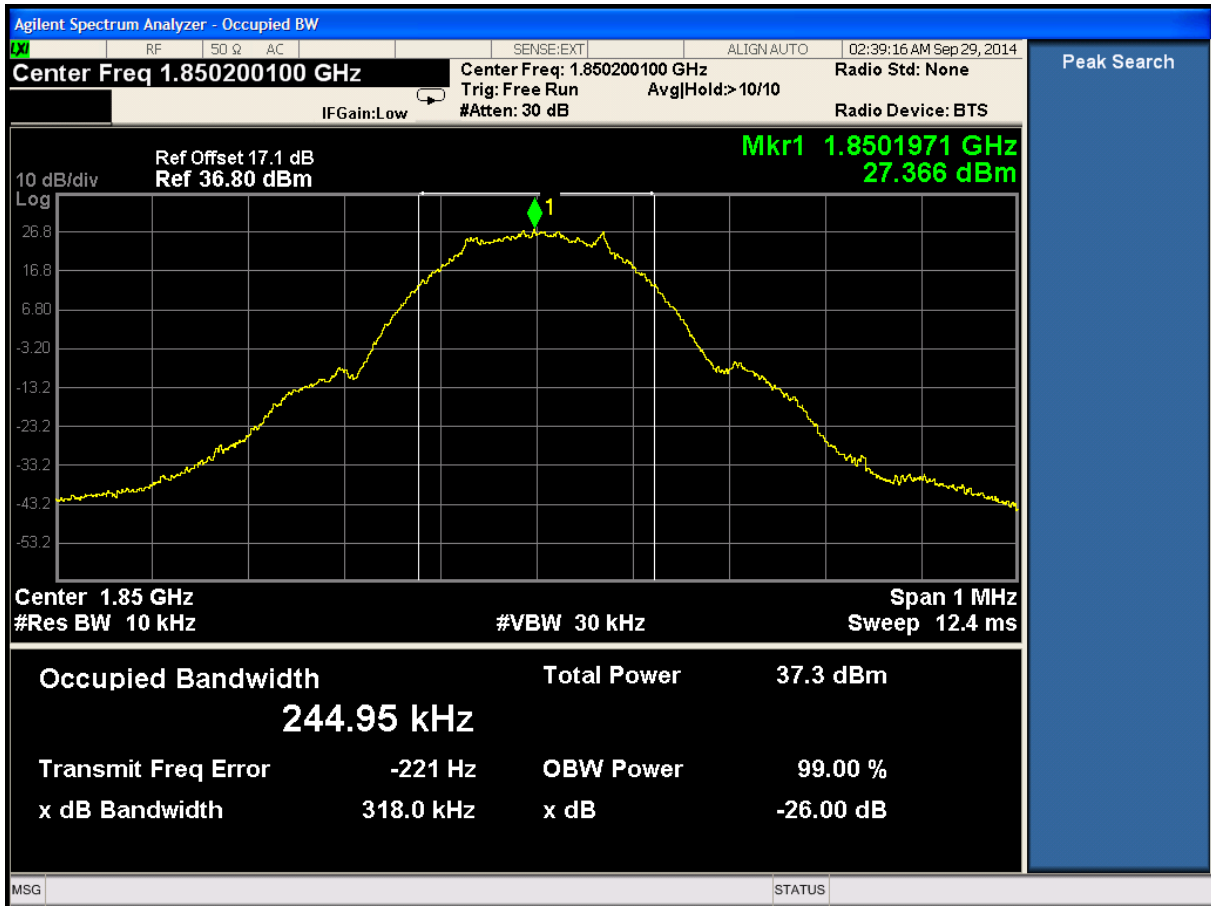
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6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

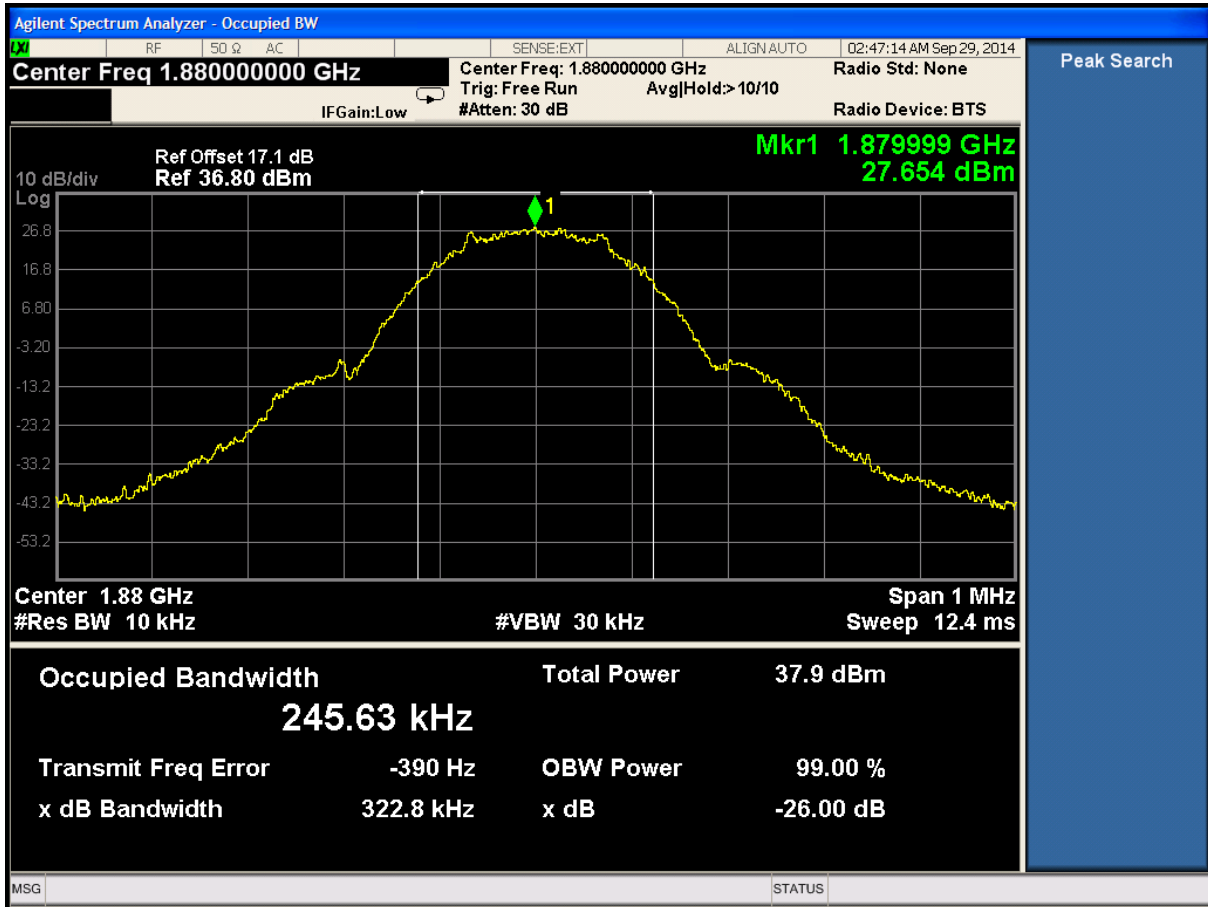
6.1.2.1.1 Test Channel = LCH



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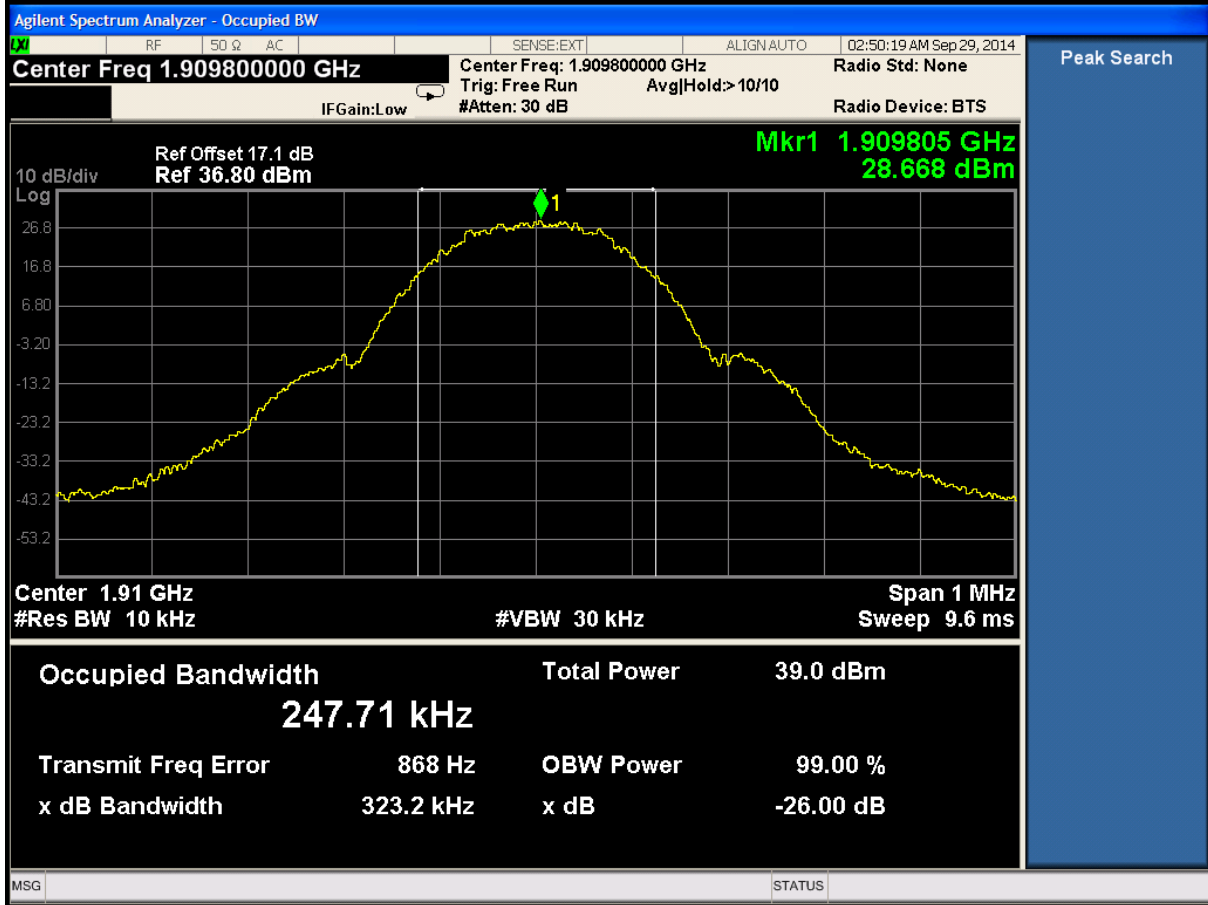
6.1.2.1.2 Test Channel = MCH



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6.1.2.1.3 Test Channel = HCH



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## 7 Appendix\_E: Band Edges Compliance

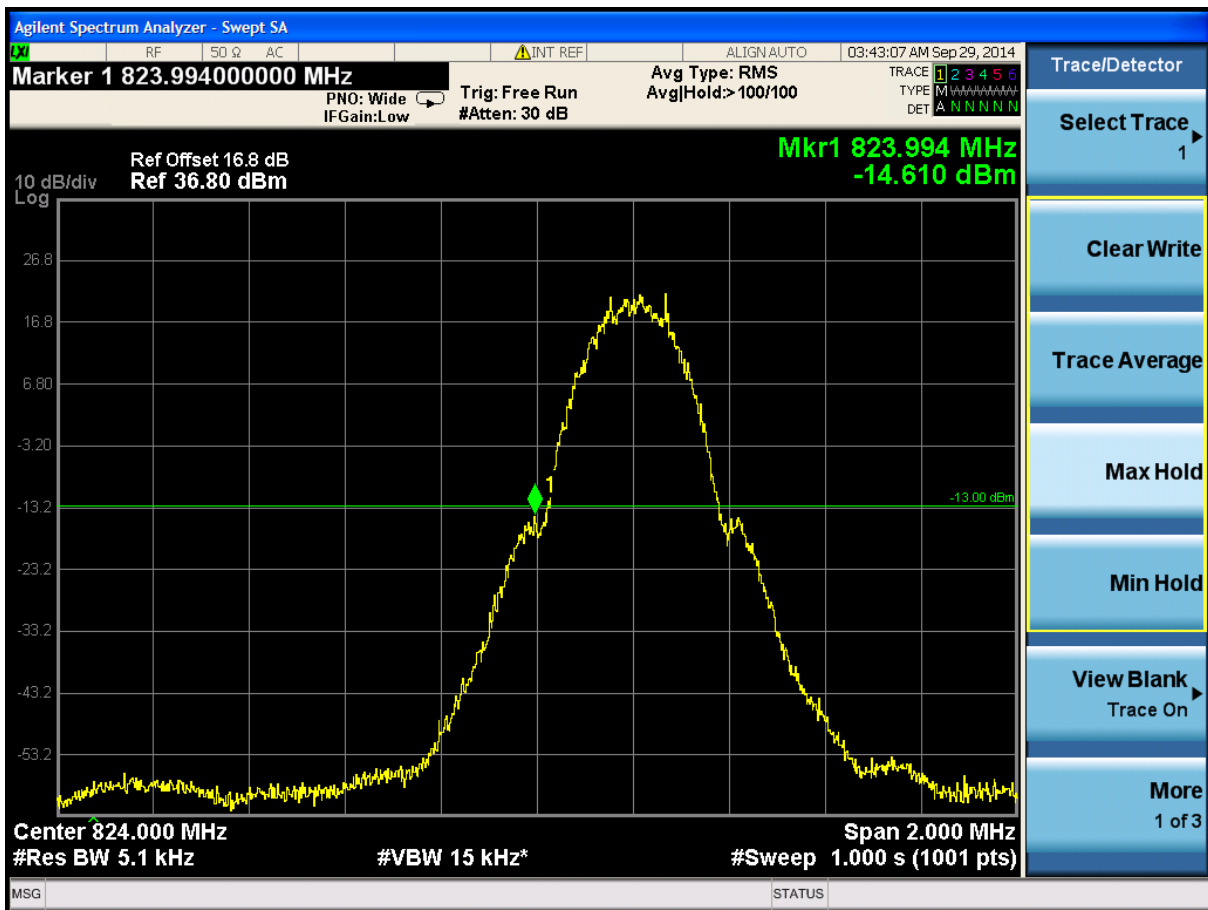
Part I - Test Plots

### 7.1 For GSM

#### 7.1.1 Test Band = GSM850

##### 7.1.1.1 Test Mode = GSM/TM1

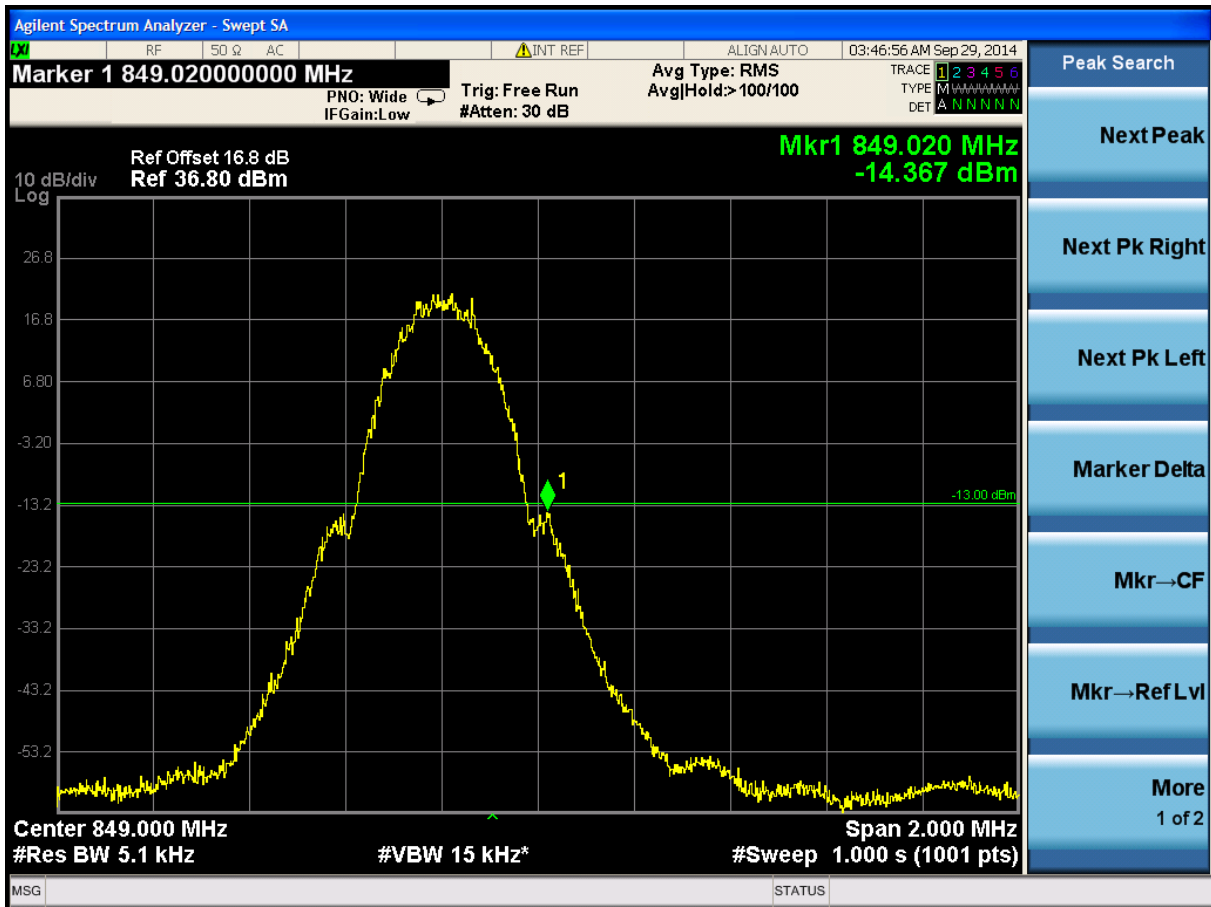
##### 7.1.1.1.1 Test Channel = LCH



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7.1.1.1.2 Test Channel = HCH



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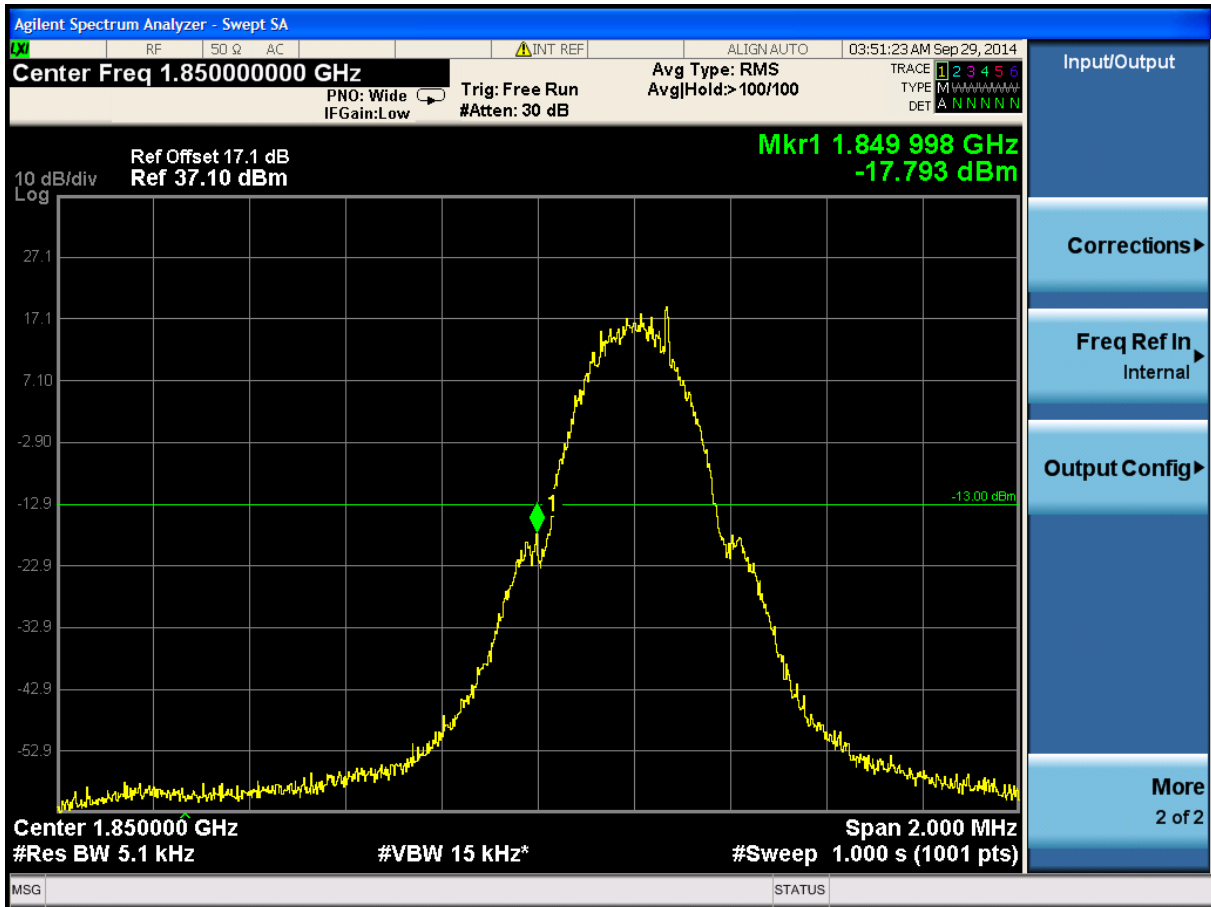




7.1.2 Test Band = GSM1900

7.1.2.1 Test Mode = GSM/TM1

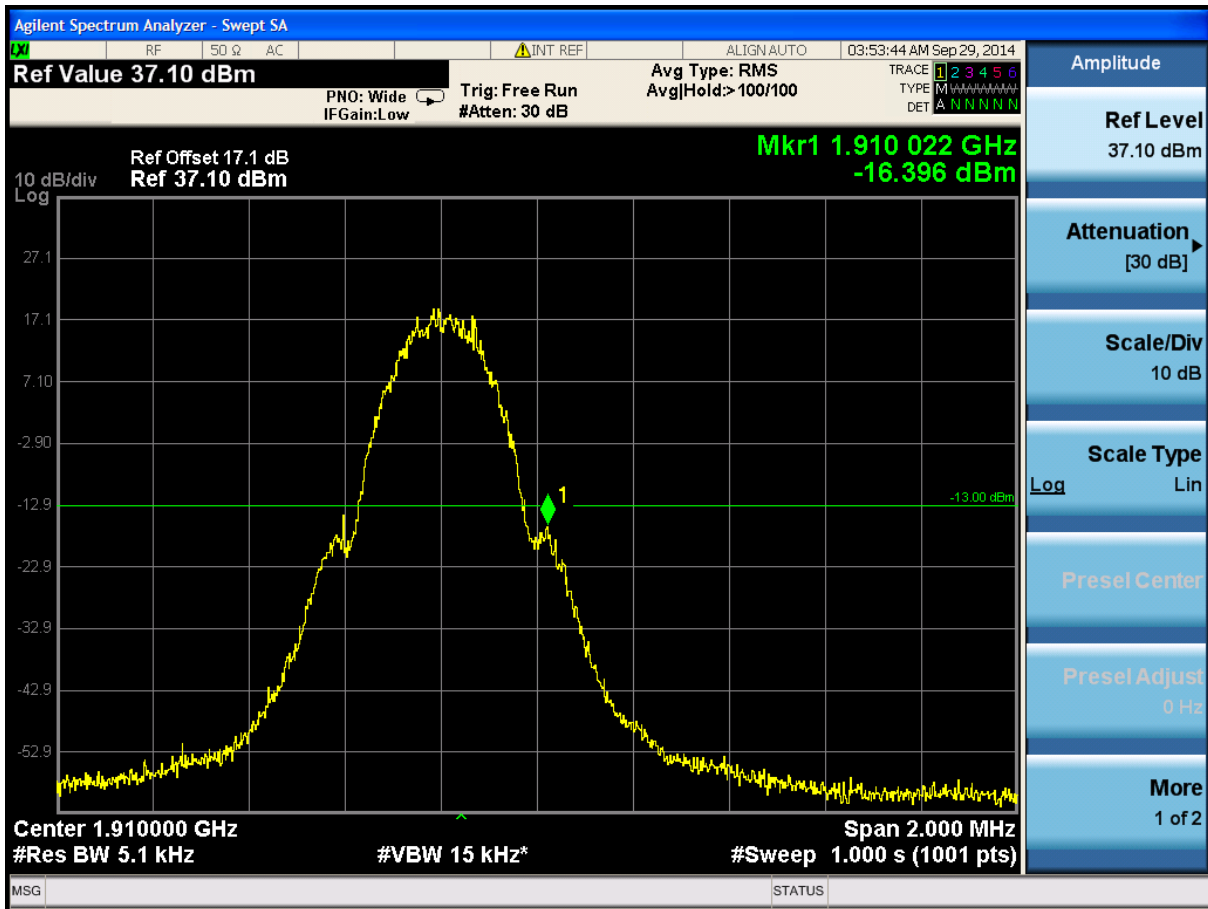
7.1.2.1.1 Test Channel = LCH



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7.1.2.1.2 Test Channel = HCH



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## 8 Appendix\_F: Spurious Emission at Antenna Terminal

NOTE: 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.

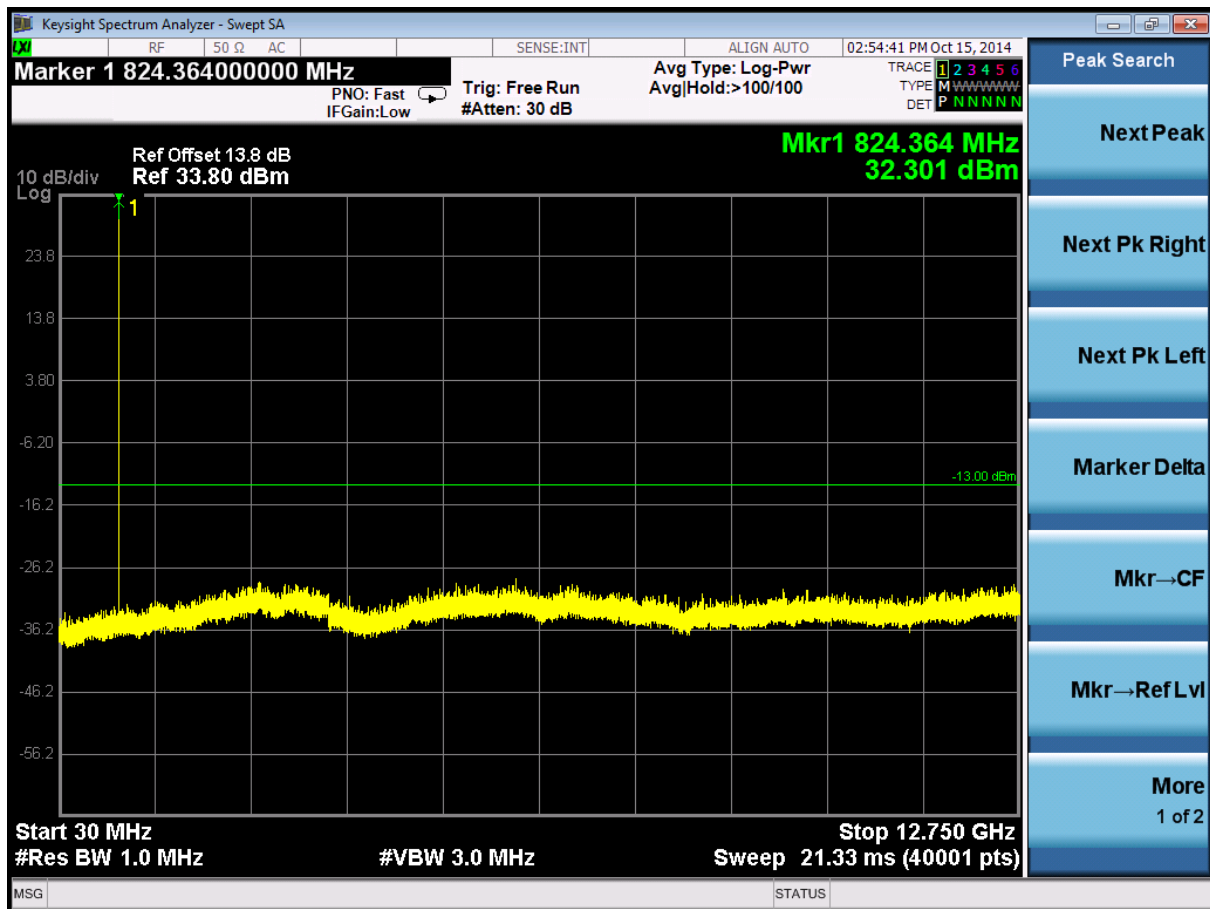
Part I - Test Plots

### 8.1 For GSM

#### 8.1.1 Test Band = GSM850

##### 8.1.1.1 Test Mode = GSM/TM1

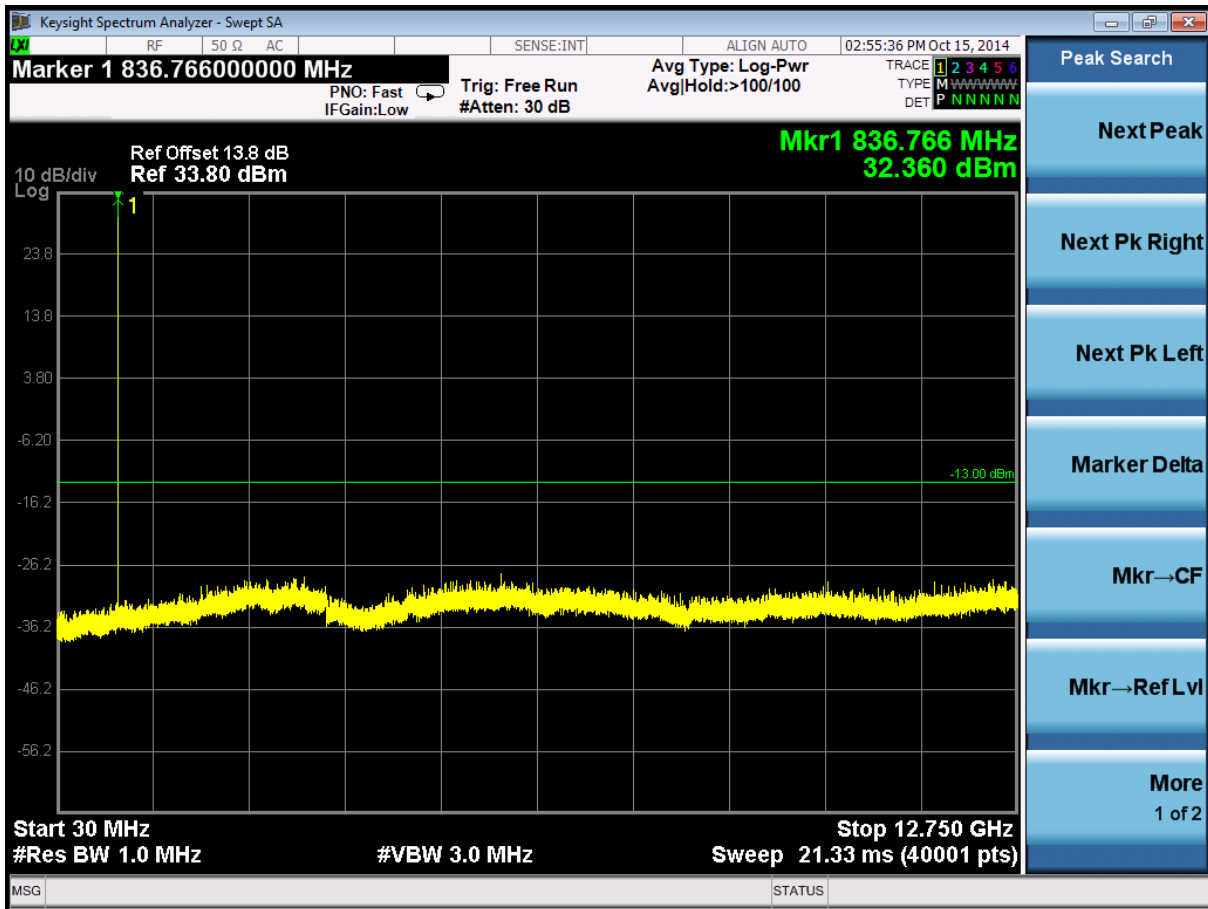
##### 8.1.1.1.1 Test Channel = LCH



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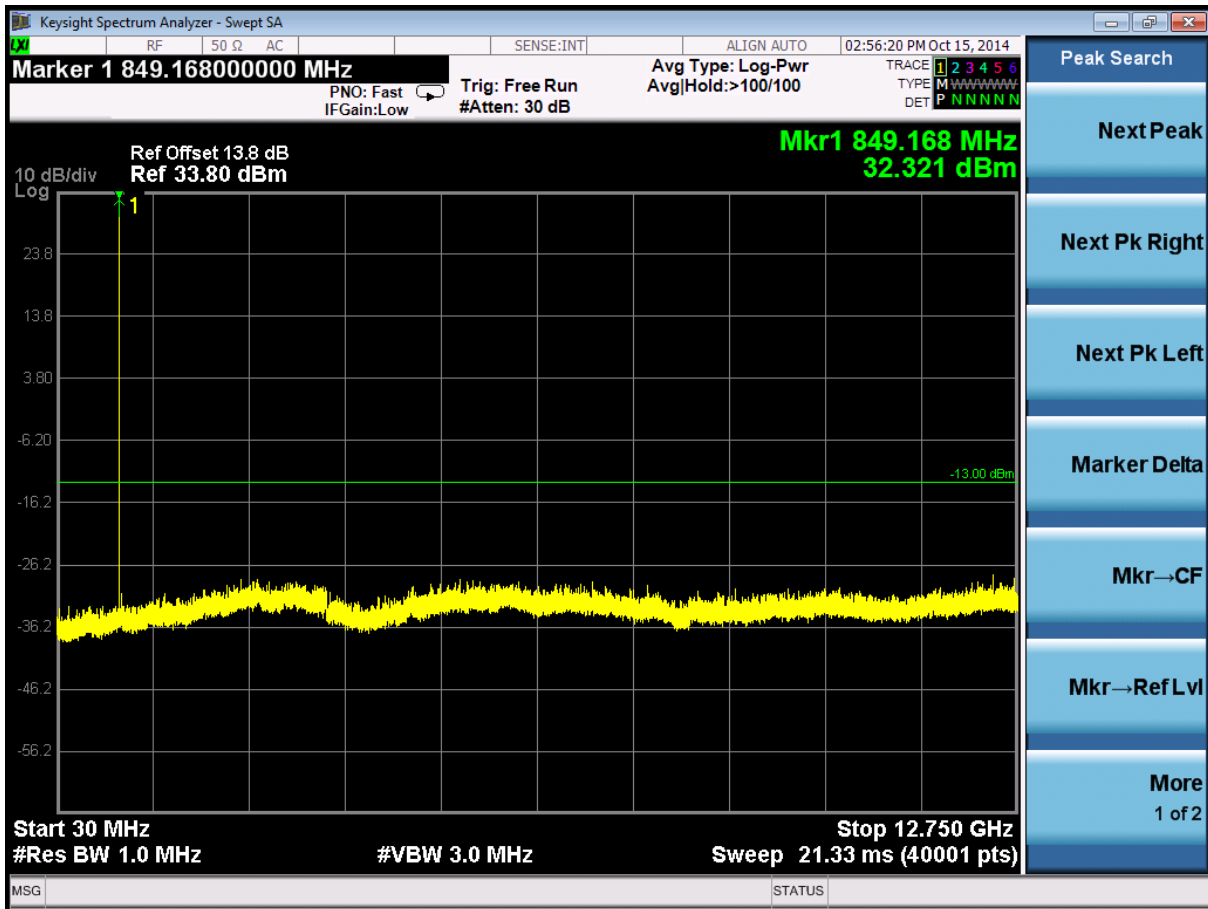
8.1.1.1.2 Test Channel = MCH



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8.1.1.1.3 Test Channel = HCH



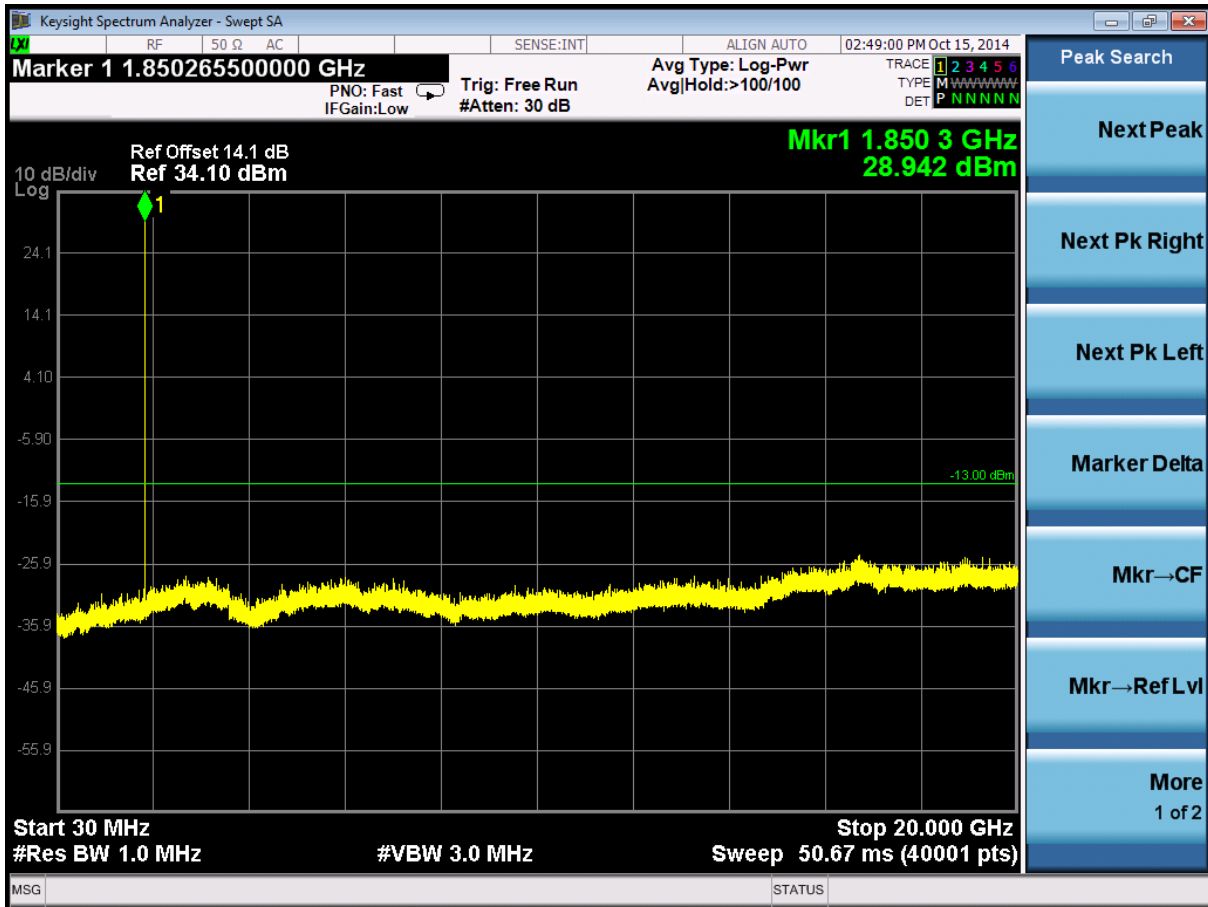
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8.1.2 Test Band = GSM1900

8.1.2.1 Test Mode = GSM/TM1

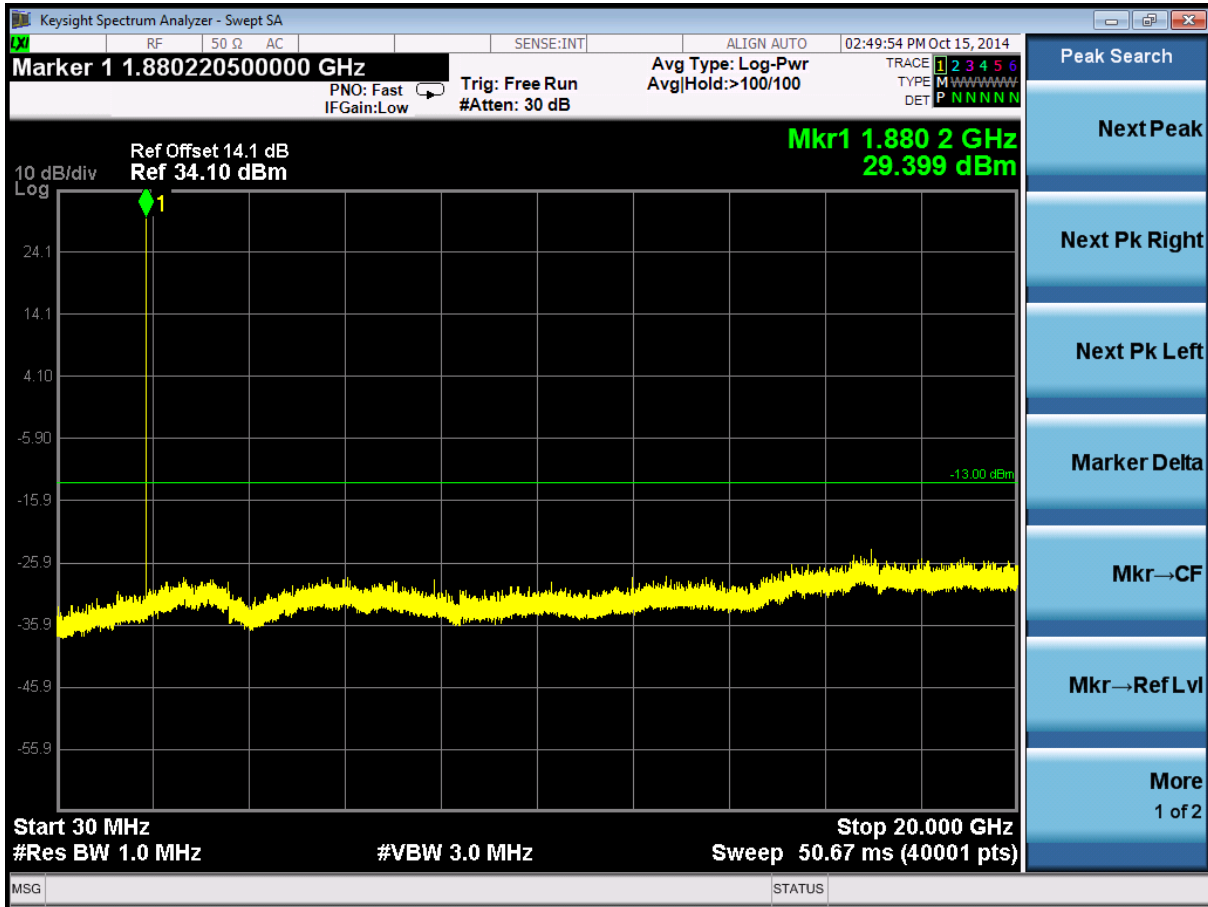
8.1.2.1.1 Test Channel = LCH



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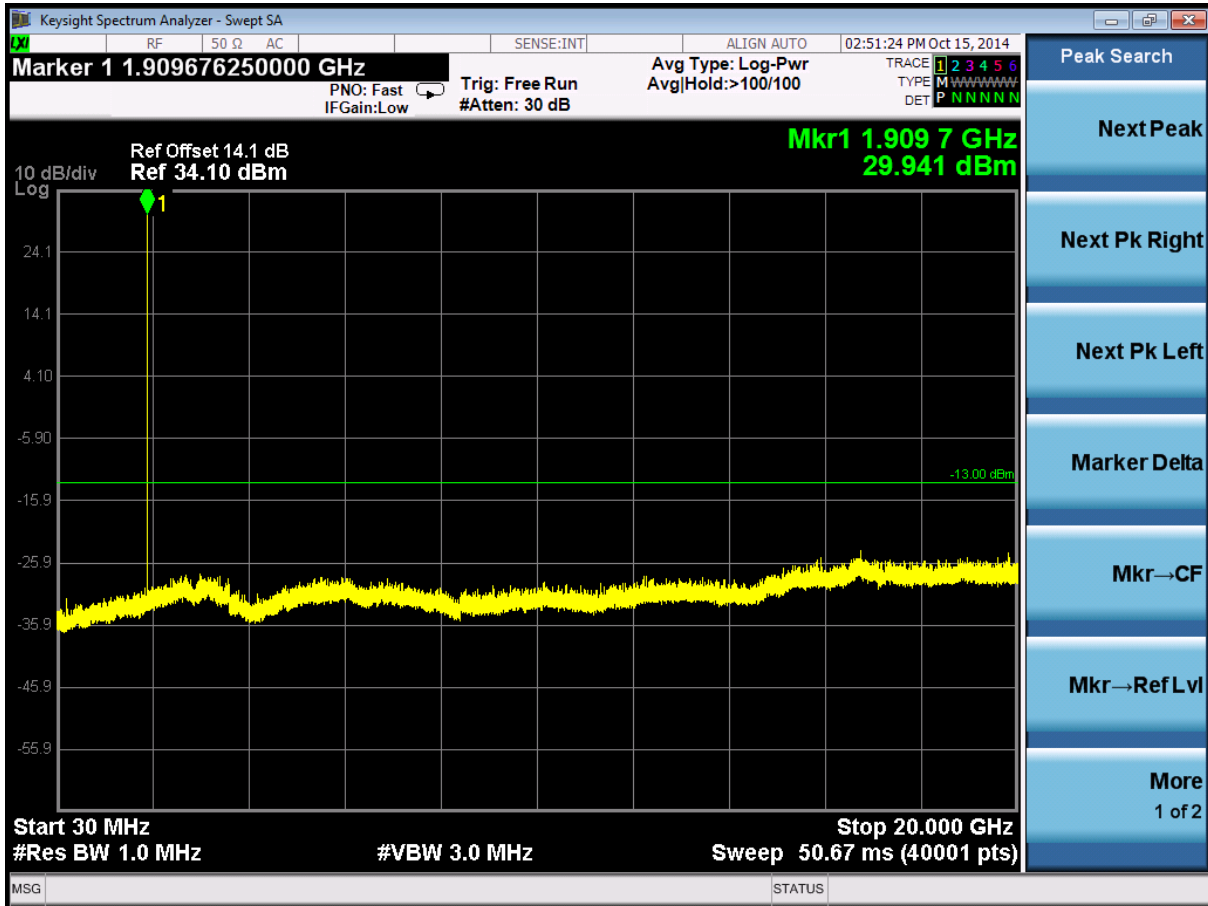
8.1.2.1.2 Test Channel = MCH



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8.1.2.1.3 Test Channel = HCH



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## 9 Appendix\_G: Field Strength of Spurious Radiation

Part I - Test Plots

### 9.1 For GSM

#### 9.1.1 Test Band = GSM850

##### 9.1.1.1 Test Mode = GSM/TM1

Below 1GHz

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
39.299	11.82	13.49	27.32	-65.32	-67.33	-13	-54.33	Vertical
48.672	15.88	9.28	27.29	-65.31	-67.44	-13	-54.44	Vertical
67.913	11.75	6.96	27.25	-59.60	-68.14	-13	-55.14	Vertical
129.468	12.98	7.71	27.01	-54.24	-60.56	-13	-47.56	Vertical
535.707	11.49	18.67	27.64	-65.01	-62.49	-13	-49.49	Vertical
935.546	11.35	23.3	26.61	-73.05	-65.01	-13	-52.01	Vertical
36.127	8.69	15.27	27.33	-79.82	-83.19	-13	-70.19	Horizontal
70.832	11.24	6.97	27.25	-64.24	-73.28	-13	-60.28	Horizontal
136.939	14.31	7.98	26.97	-64.12	-68.80	-13	-55.80	Horizontal
214.514	11.31	10.95	26.65	-69.61	-74.00	-13	-61.00	Horizontal
520.888	11.48	18.38	27.66	-63.66	-61.46	-13	-48.46	Horizontal
586.844	11.42	19.43	27.56	-72.01	-68.72	-13	-55.72	Horizontal



Above 1GHz

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
1673.200	3.42	29.54	38.39	-51.45	-41.75	-13	-28.75	Vertical
2509.800	4.27	32.45	38.47	-62.85	-52.58	-13	-39.58	Vertical
3346.400	4.65	32.64	38.67	-66.92	-57.68	-13	-44.68	Vertical
4183.000	5.18	33.94	39.02	-71.03	-60.64	-13	-47.64	Vertical
5019.600	5.53	34.90	39.30	-67.25	-56.96	-13	-43.96	Vertical
5856.200	5.86	36.02	39.20	-69.28	-56.33	-13	-43.33	Vertical
1673.200	3.42	29.54	38.39	-46.45	-39.75	-13	-26.75	Horizontal
2509.800	4.27	32.45	38.47	-62.17	-50.47	-13	-37.47	Horizontal
3346.400	4.65	32.64	38.67	-68.10	-56.47	-13	-43.47	Horizontal
4183.000	5.18	33.94	39.02	-71.39	-59.21	-13	-46.21	Horizontal
5019.600	5.53	34.90	39.30	-67.22	-55.37	-13	-42.37	Horizontal
5856.200	5.86	36.02	39.20	-68.03	-55.67	-13	-42.67	Horizontal

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9.1.2 Test Band = GSM1900

9.1.2.1 Test Mode = GSM/TM1

Below 1GHz

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
42.302	14.10	12.09	27.31	-68.03	-69.15	-13	-56.15	Vertical
69.845	11.62	6.90	27.25	-61.22	-69.95	-13	-56.95	Vertical
130.837	13.22	7.73	27.01	-54.46	-60.52	-13	-47.52	Vertical
203.523	11.58	10.38	26.69	-66.90	-71.63	-13	-58.63	Vertical
291.036	10.55	13.51	26.42	-72.90	-75.26	-13	-62.26	Vertical
755.387	10.57	21.76	27.35	-74.28	-69.30	-13	-56.30	Vertical
40.988	14.28	12.67	27.32	-78.57	-78.94	-13	-65.94	Horizontal
72.084	10.60	7.07	27.24	-66.17	-75.74	-13	-62.74	Horizontal
200.688	11.63	10.24	26.70	-68.67	-73.50	-13	-60.50	Horizontal
524.554	11.57	18.49	27.65	-63.28	-60.87	-13	-47.87	Horizontal
584.790	11.35	19.37	27.57	-72.20	-69.05	-13	-56.05	Horizontal
942.131	11.26	23.30	26.58	-73.04	-65.06	-13	-52.06	Horizontal

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Above 1GHz

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Polarization
3760.000	4.97	33.12	38.85	-48.86	-37.09	-13	-24.09	Vertical
5640.000	6.13	35.52	39.22	-56.54	-43.85	-13	-30.85	Vertical
7520.000	6.79	35.46	39.04	-51.22	-35.60	-13	-22.60	Vertical
9400.000	8.43	36.94	38.06	-73.89	-53.75	-13	-40.75	Vertical
11280.000	9.74	38.13	38.36	-69.66	-46.95	-13	-33.95	Vertical
13917.240	9.36	39.11	40.23	-68.86	-44.64	-13	-31.64	Vertical
3760.000	4.97	33.12	38.85	-53.30	-42.89	-13	-29.89	Horizontal
5640.000	6.13	35.52	39.22	-50.97	-39.09	-13	-26.09	Horizontal
7520.000	6.79	35.46	39.04	-56.54	-40.63	-13	-27.63	Horizontal
9400.000	8.43	36.94	38.06	-74.70	-54.44	-13	-41.44	Horizontal
11280.000	9.74	38.13	38.36	-70.18	-46.82	-13	-33.82	Horizontal
13757.270	9.13	39.10	40.11	-67.74	-44.65	-13	-31.65	Horizontal

NOTE:

- 1) The disturbance above 13GHz 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.
- 2) Pretest was performed at the EUT in low, middle, high channel, but only the worst test channel(Channel 192 for GSM850 and Channel 661 for GSM1900)and only the data of the worst case show in the test report.

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## 10 Appendix\_H: Frequency Stability

### 10.1 For GSM

#### 10.1.1 Frequency Error VS. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	-3.54	-0.00430	±2.5	PASS
				VN	-5.62	-0.00682	±2.5	PASS
				VH	-2.45	-0.00297	±2.5	PASS
		MCH	TN	VL	-8.34	-0.00890	±2.5	PASS
				VN	-6.49	-0.00693	±2.5	PASS
				VH	-5.12	-0.00547	±2.5	PASS
		HCH	TN	VL	-2.54	-0.00299	±2.5	PASS
				VN	-6.1	-0.00719	±2.5	PASS
				VH	-10.21	-0.01203	±2.5	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-13.89	-0.00751	±2.5	PASS
				VN	-10.04	-0.00543	±2.5	PASS
				VH	-9.09	-0.00491	±2.5	PASS
		MCH	TN	VL	-3.35	-0.00178	±2.5	PASS
				VN	-3.74	-0.00199	±2.5	PASS
				VH	-8.43	-0.00448	±2.5	PASS
		HCH	TN	VL	-3.1	-0.00162	±2.5	PASS
				VN	-9.83	-0.00515	±2.5	PASS
				VH	-20.18	-0.01057	±2.5	PASS



10.1.2 Frequency Error VS. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	-1.71	-0.00207	±2.5	PASS
				-20	-1.2	-0.00146	±2.5	PASS
				-10	-1.52	-0.00184	±2.5	PASS
				0	-3.25	-0.00394	±2.5	PASS
				10	1.31	0.001589	±2.5	PASS
				20	2.54	0.003082	±2.5	PASS
				30	2.21	0.002681	±2.5	PASS
				40	0.73	0.000886	±2.5	PASS
				50	5.83	0.007074	±2.5	PASS
		MCH	VN	-30	0.25	0.000299	±2.5	PASS
				-20	2.61	0.00312	±2.5	PASS
				-10	-0.62	-0.00074	±2.5	PASS
				0	-1.76	-0.0021	±2.5	PASS
				10	0.41	0.00049	±2.5	PASS
				20	-1.14	-0.00136	±2.5	PASS
				30	0.92	0.0011	±2.5	PASS
				40	1.5	0.001793	±2.5	PASS
				50	2.34	0.002797	±2.5	PASS
		HCH	VN	-30	0.36	0.000424	±2.5	PASS
				-20	4.81	0.005667	±2.5	PASS
				-10	-0.81	-0.00095	±2.5	PASS
				0	-1.05	-0.00124	±2.5	PASS
				10	-1.01	-0.00119	±2.5	PASS
				20	-1.27	-0.0015	±2.5	PASS
				30	-1.47	-0.00173	±2.5	PASS
				40	-2.37	-0.00279	±2.5	PASS
				50	-0.3	-0.00035	±2.5	PASS

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GSM1900	GSM/TM1	LCH	VN	-30	-14.15	-0.00765	±2.5	PASS
				-20	-8.72	-0.00471	±2.5	PASS
				-10	-13.61	-0.00736	±2.5	PASS
				0	-2.05	-0.00109	±2.5	PASS
				10	1.79	0.00095	±2.5	PASS
				20	-4.64	-0.00247	±2.5	PASS
				30	-10.05	-0.00526	±2.5	PASS
				40	-11.13	-0.00583	±2.5	PASS
				50	1.81	0.00095	±2.5	PASS
		MCH	VN	-30	-4.98	-0.00269	±2.5	PASS
				-20	-7.16	-0.00387	±2.5	PASS
				-10	-13.15	-0.00711	±2.5	PASS
				0	-1.58	-0.00084	±2.5	PASS
				10	-5.24	-0.00279	±2.5	PASS
				20	-7.45	-0.00396	±2.5	PASS
				30	3.42	0.00179	±2.5	PASS
				40	-8.78	-0.00460	±2.5	PASS
				50	-11.52	-0.00603	±2.5	PASS
		HCH	VN	-30	-11.59	-0.00626	±2.5	PASS
				-20	-5.16	-0.00279	±2.5	PASS
				-10	-6.41	-0.00346	±2.5	PASS
				0	-11.52	-0.00613	±2.5	PASS
				10	1.78	0.00095	±2.5	PASS
				20	2.51	0.00134	±2.5	PASS
				30	-6.21	-0.00325	±2.5	PASS
				40	-11.45	-0.00600	±2.5	PASS
				50	-5.17	-0.00271	±2.5	PASS

The End

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