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Report No.: SZEM141100608802

Page: 1 of 33

## Appendix for Test Report

Authorized Signature:



Jack Zhang

EMC Laboratory Manager

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If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 2 of 33

## CONTENT

<b>APPENDIX FOR TEST REPORT .....</b>	<b>1</b>
<b>1 APPENDIX_A: EFFECTIVE (ISOTROPIC) RADIATED POWER OUTPUT DATA.....</b>	<b>3</b>
<b>PART I - TEST RESULTS.....</b>	<b>3</b>
<b>2 APPENDIX_B: PEAK-TO-AVERAGE RATIO.....</b>	<b>4</b>
<b>PART I - TEST RESULTS.....</b>	<b>4</b>
<b>3 APPENDIX_C: MODULATION CHARACTERISTICS .....</b>	<b>5</b>
<b>PART I - TEST PLOTS .....</b>	<b>5</b>
3.1 FOR GSM.....	5
3.1.1 TEST BAND = GSM850 .....	5
3.1.2 TEST BAND = GSM1900 .....	6
<b>4 APPENDIX_D: BANDWIDTH.....</b>	<b>7</b>
4.1 FOR GSM.....	8
4.1.1 TEST BAND = GSM850 .....	8
4.1.2 TEST BAND = GSM1900 .....	11
<b>5 APPENDIX_E: BAND EDGES COMPLIANCE .....</b>	<b>14</b>
5.1 FOR GSM.....	14
5.1.1 TEST BAND = GSM850 .....	14
5.1.2 TEST BAND = GSM1900 .....	16
<b>6 APPENDIX_F: SPURIOUS EMISSION AT ANTENNA TERMINAL.....</b>	<b>18</b>
6.1 FOR GSM.....	19
6.1.1 TEST BAND = GSM850 .....	19
6.1.2 TEST BAND = GSM1900 .....	22
<b>7 APPENDIX_G: FIELD STRENGTH OF SPURIOUS RADIATION.....</b>	<b>25</b>
7.1 FOR GSM.....	25
7.1.1 TEST BAND = GSM850 .....	25
7.1.2 Test Band = GSM1900 .....	28
<b>8 APPENDIX_H: FREQUENCY STABILITY .....</b>	<b>31</b>
8.1 8.1 FOR GSM.....	31
8.1.1 8.1.1 FREQUENCY ERROR VS. VOLTAGE: .....	31
8.1.2 FREQUENCY ERROR VS. TEMPERATURE: .....	32-33

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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 3 of 33

## 1 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	32.56	33.41	38.5	PASS
		MCH	32.53	33.38	38.5	PASS
		HCH	32.59	33.44	38.5	PASS

Note1: a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic 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.

Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	28.86	31.86	33	PASS
		MCH	28.69	31.69	33	PASS
		HCH	28.61	31.61	33	PASS

Note1: a, For getting the ERP (Efficient Radiated Power) or 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.

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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 4 of 33

## 2 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	-0.12	13	PASS
		MCH	-0.15	13	PASS
		HCH	-0.09	13	PASS
GSM1900	GSM/TM1	LCH	0.24	13	PASS
		MCH	0.08	13	PASS
		HCH	0.05	13	PASS

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### 3 APPENDIX\_C: MODULATION CHARACTERISTICS

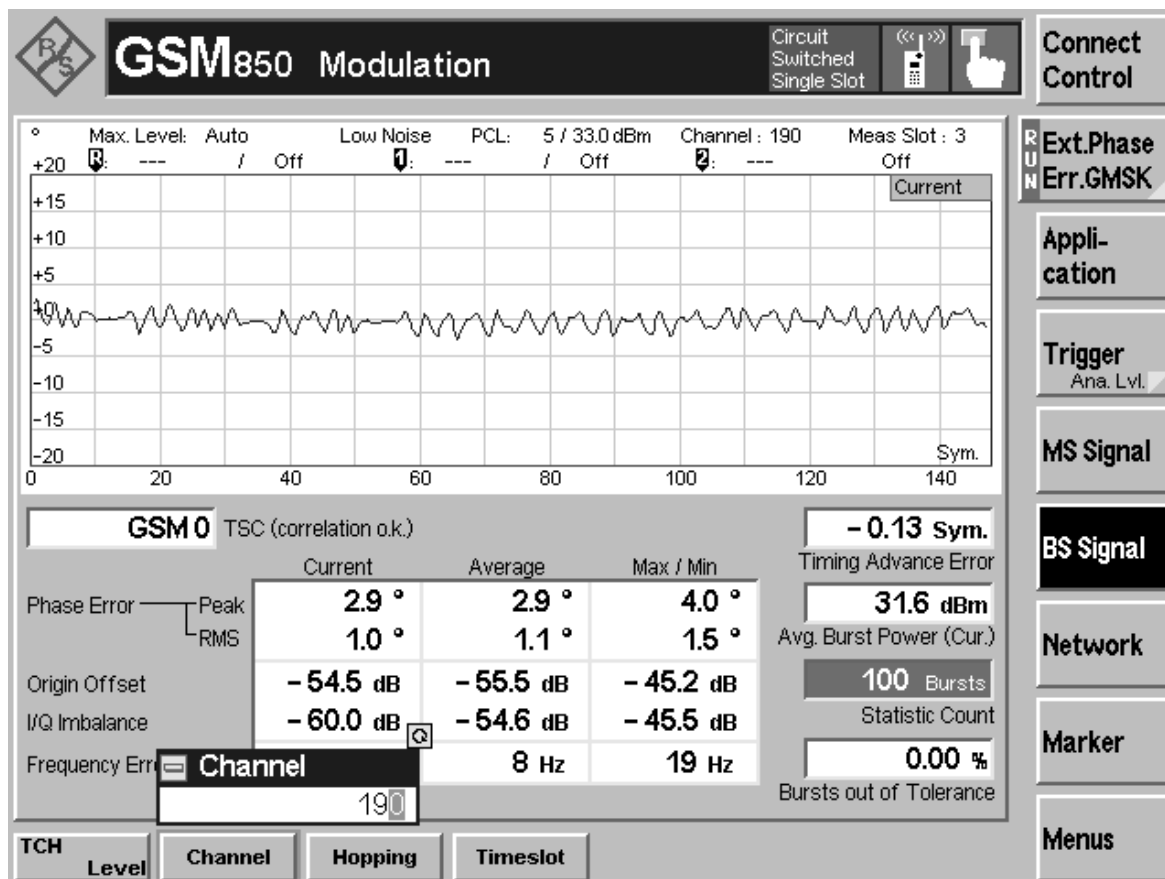
#### Part I - Test Plots

#### 3.1 FOR GSM

##### 3.1.1 TEST BAND = GSM850

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

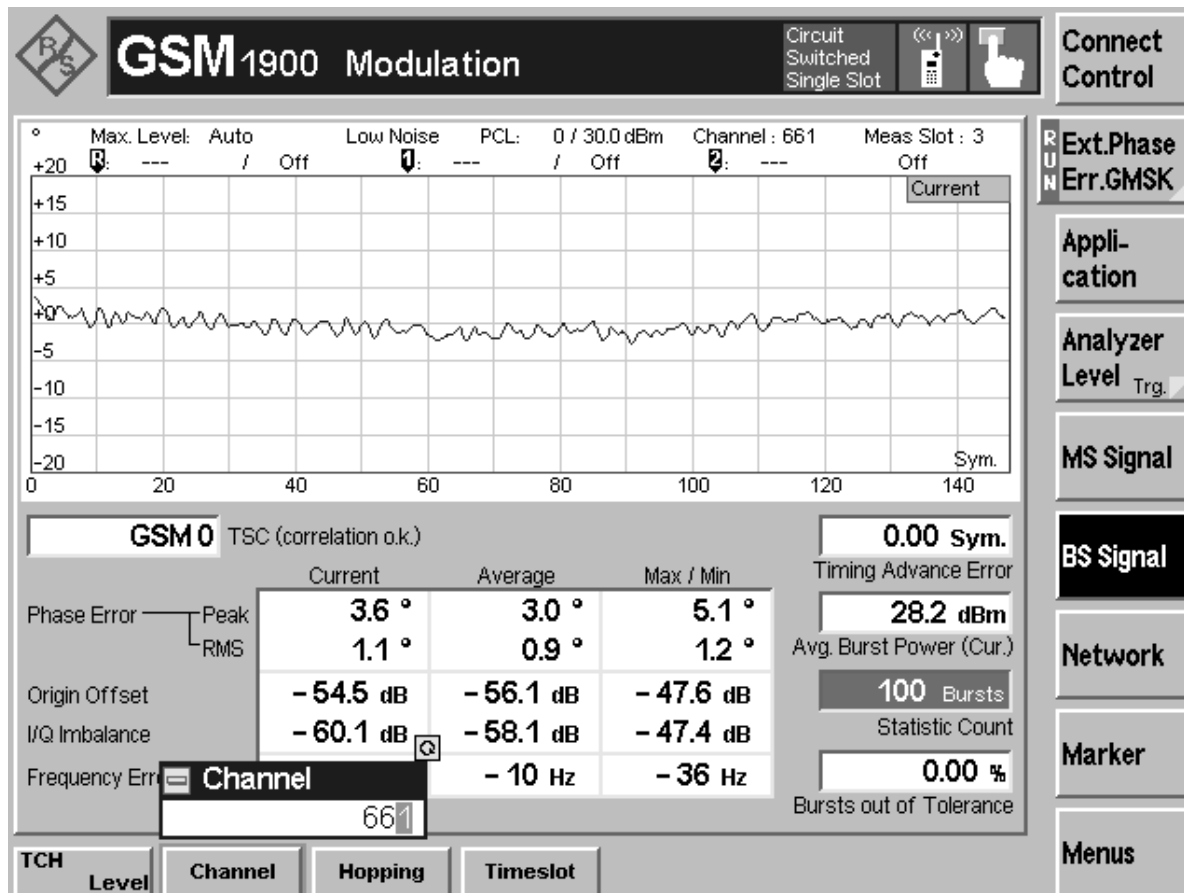
##### 3.1.1.1.1 Test Channel = MCH



## 3.1.2 TEST BAND = GSM1900

### 3.1.2.1 Test Mode = GSM/TM1

#### 3.1.2.1.1 Test Channel = MCH



# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 7 of 33

## 4 APPENDIX\_D: BANDWIDTH

### Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	241.52	316.7	PASS
		MCH	239.37	313.4	PASS
		HCH	240.55	316.8	PASS
GSM1900	GSM/TM1	LCH	238.07	314.8	PASS
		MCH	244.04	310.0	PASS
		HCH	242.21	319.8	PASS

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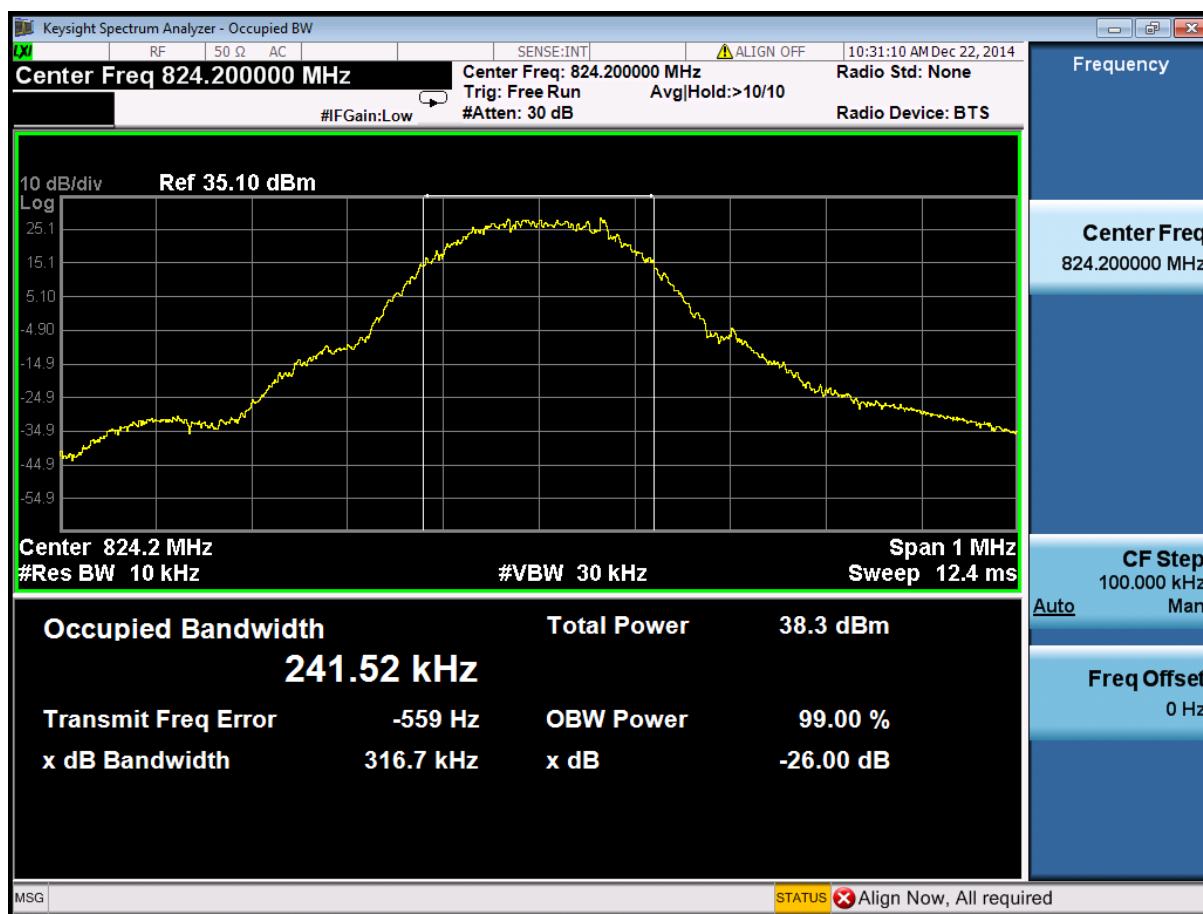
## Part II - Test Plots

### 4.1 FOR GSM

#### 4.1.1 TEST BAND = GSM850

##### 4.1.1.1 Test Mode = GSM/TM1

##### 4.1.1.1.1 Test Channel = LCH



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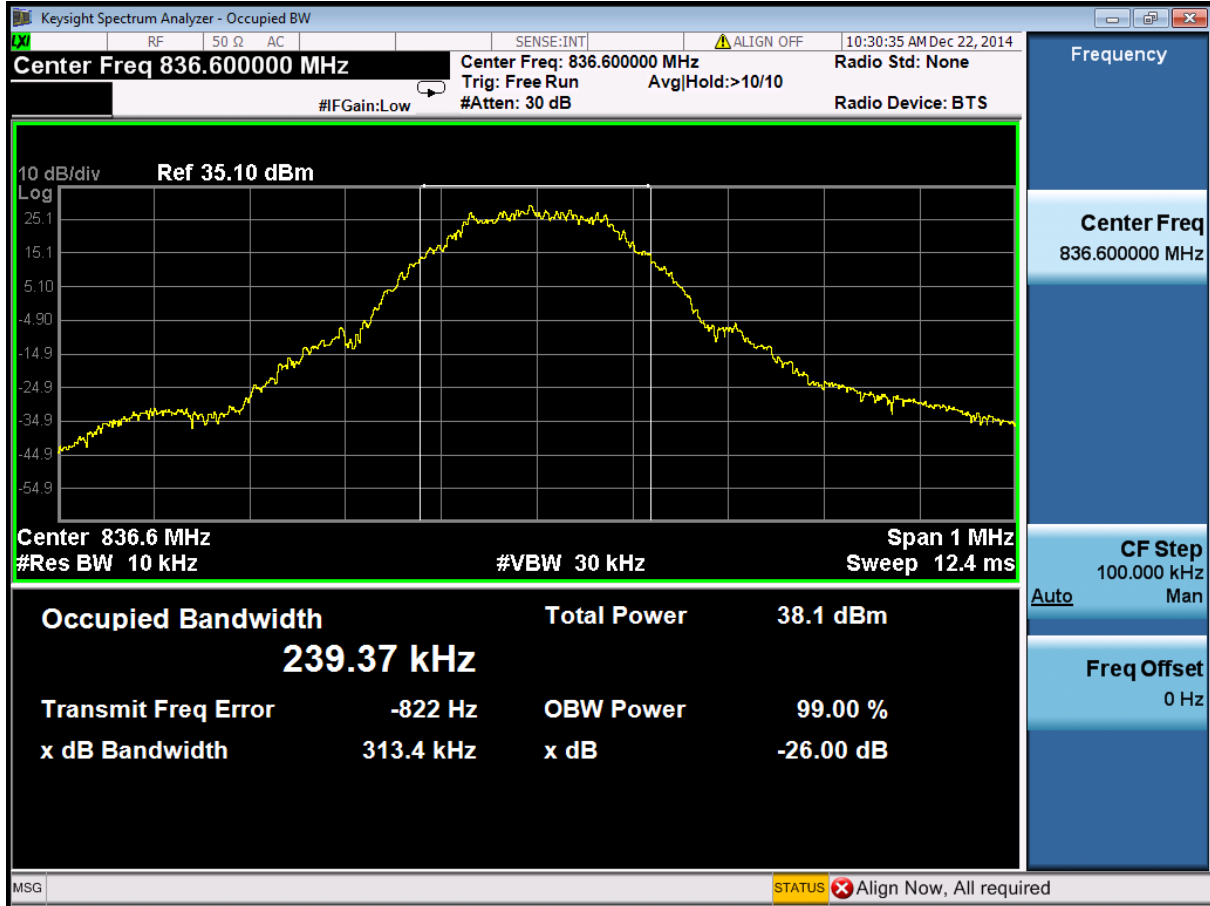


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Report No.: SZEM141100608802

Page: 9 of 33

## 4.1.1.1.2 Test Channel = MCH



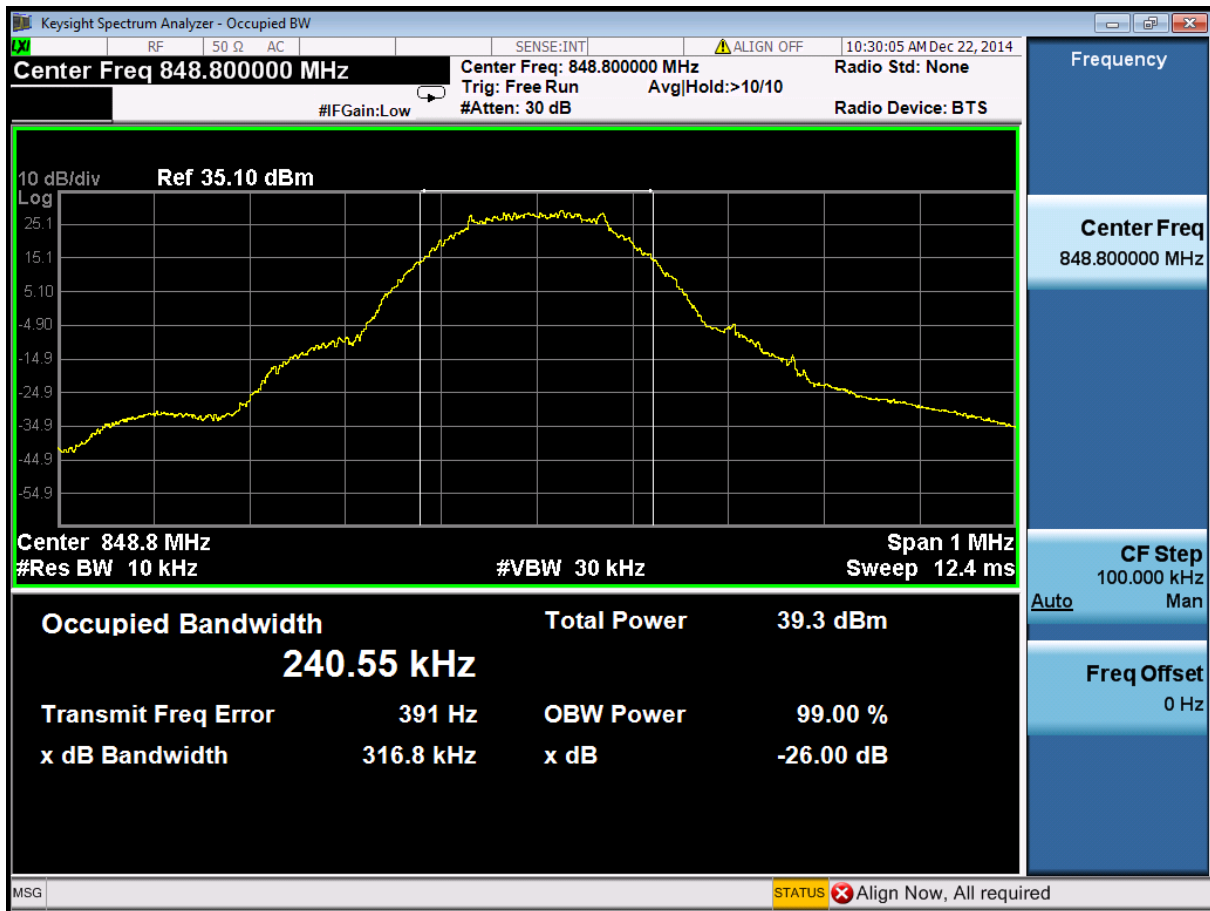
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Report No.: SZEM141100608802

Page: 10 of 33

## 4.1.1.1.3 Test Channel = HCH

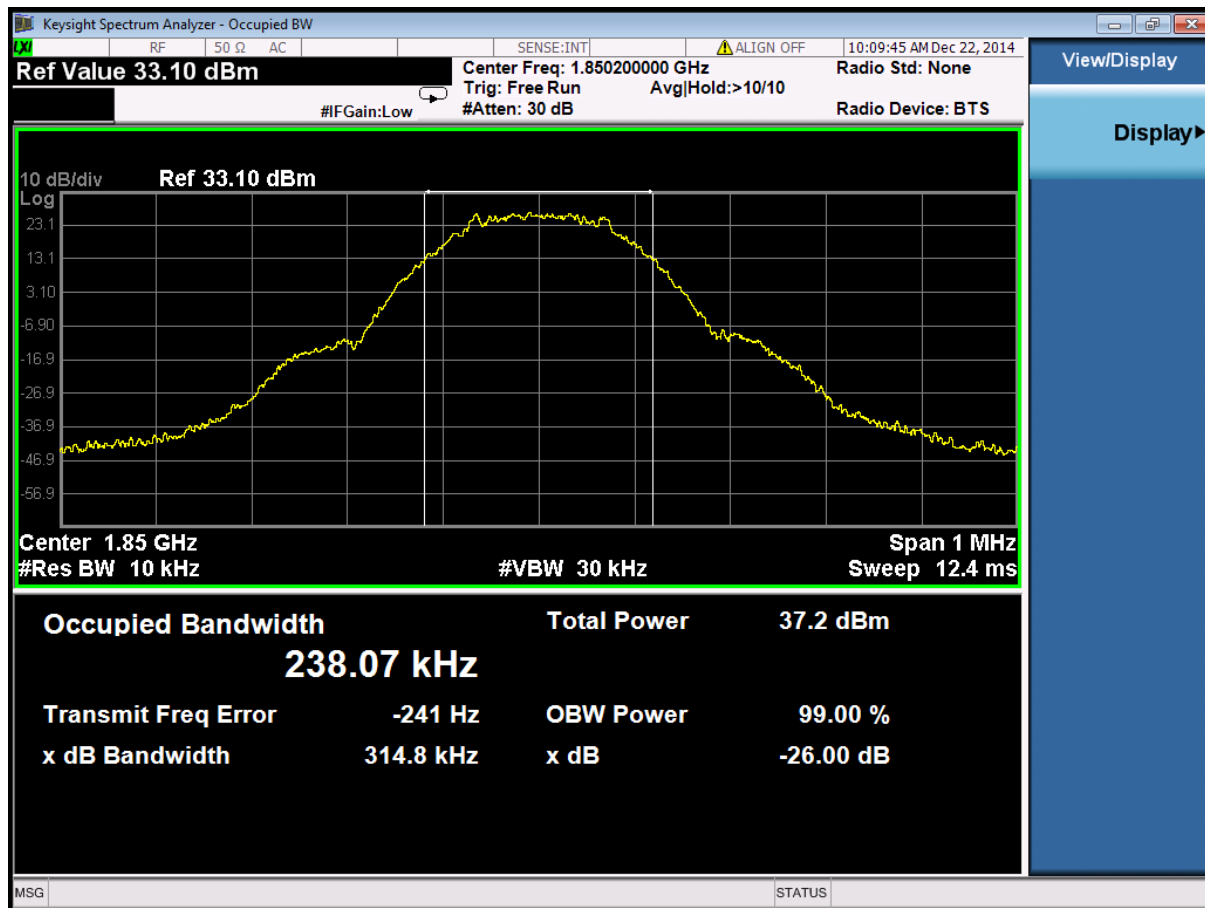


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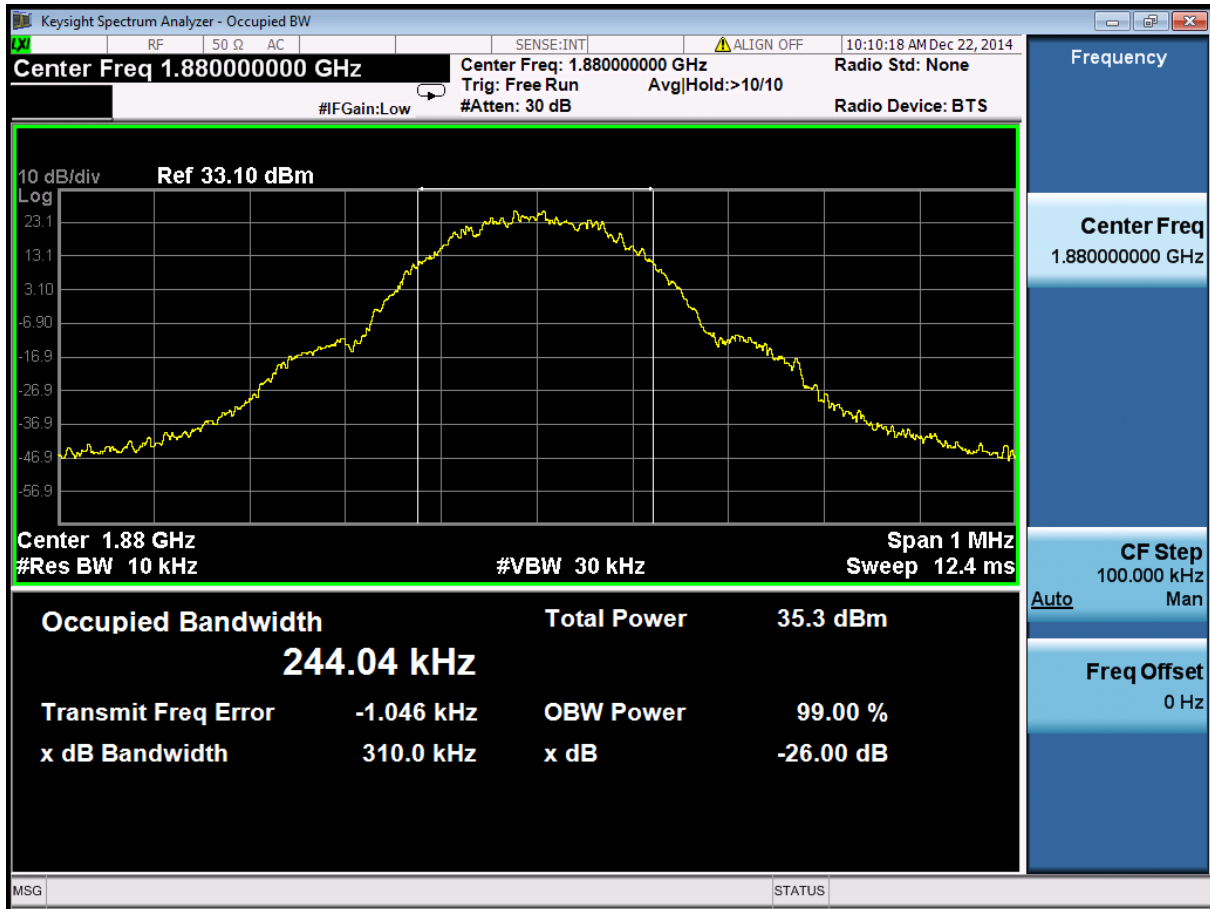
## 4.1.2 TEST BAND = GSM1900

### 4.1.2.1 Test Mode = GSM/TM1

#### 4.1.2.1.1 Test Channel = LCH

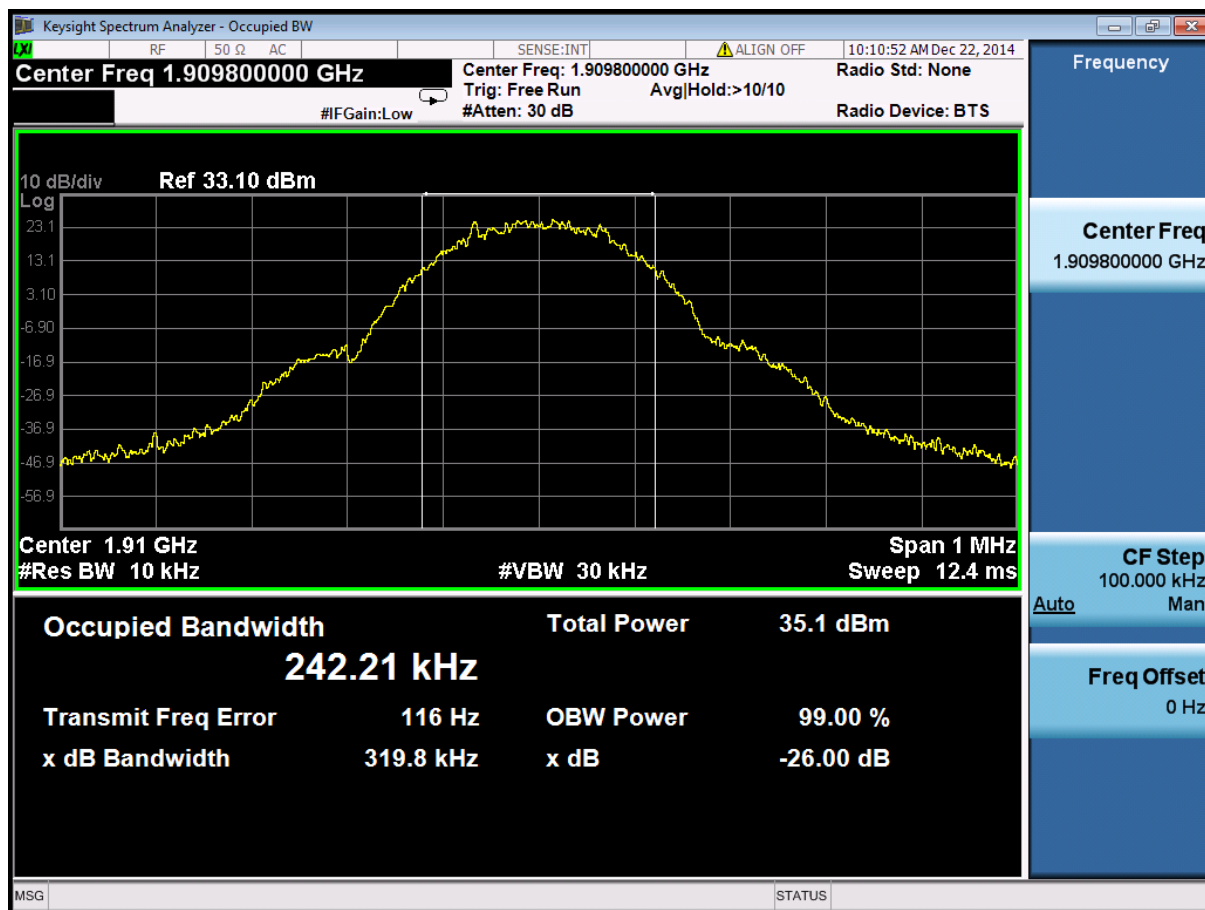


## 4.1.2.1.2 Test Channel = MCH



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## 4.1.2.1.3 Test Channel = HCH



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## 5 APPENDIX\_E: BAND EDGES COMPLIANCE

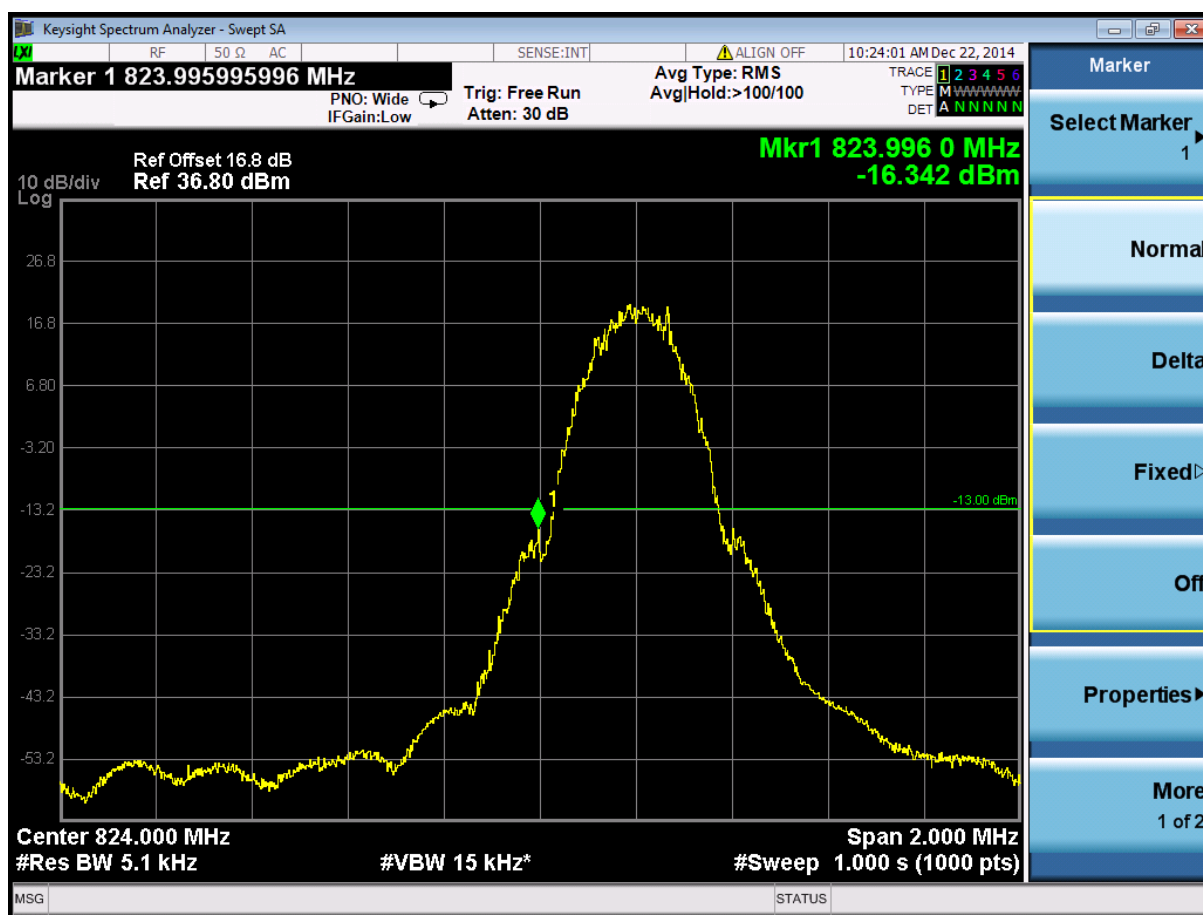
### Part I - Test Plots

#### 5.1 FOR GSM

##### 5.1.1 TEST BAND = GSM850

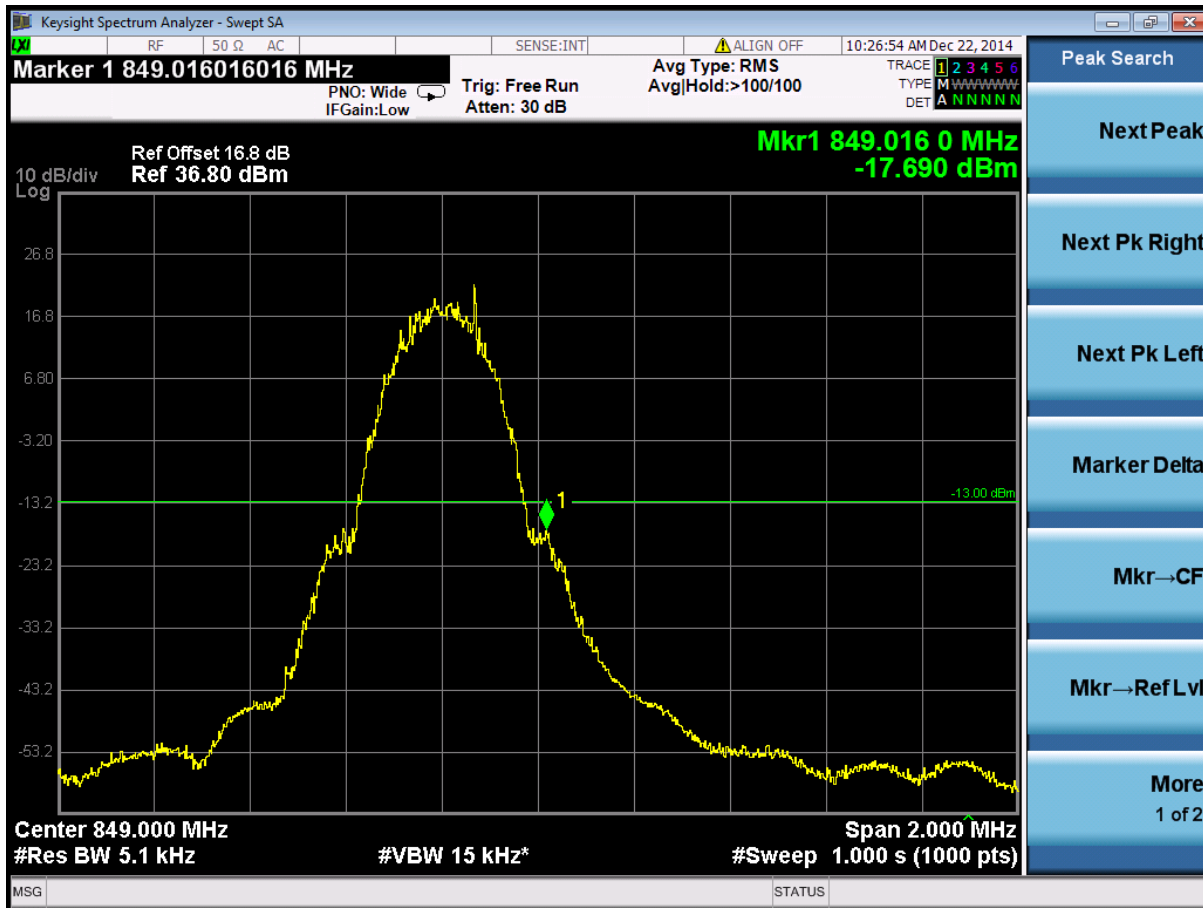
##### 5.1.1.1 Test Mode = GSM/TM1

##### 5.1.1.1.1 Test Channel = LCH



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## 5.1.1.1.2 Test Channel = HCH



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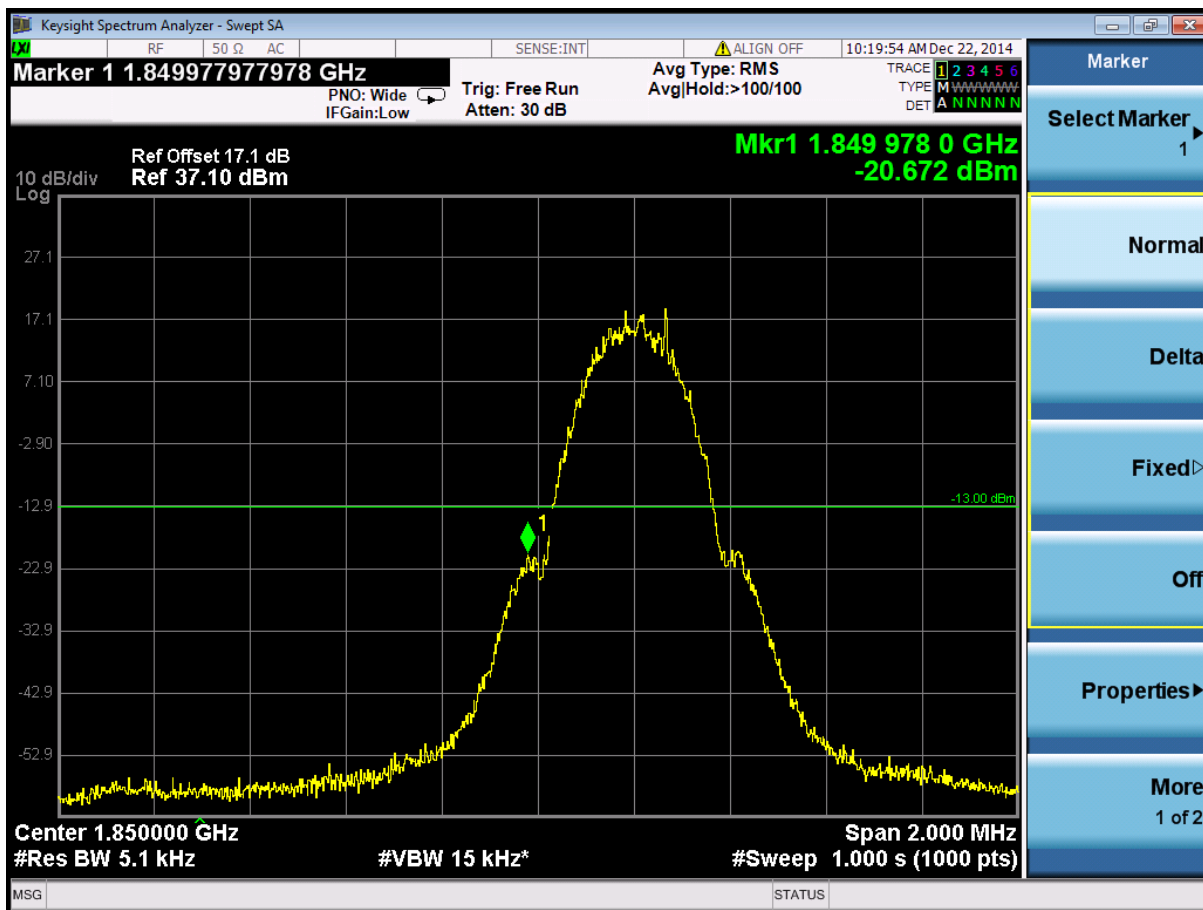
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Page: 16 of 33

## 5.1.2 TEST BAND = GSM1900

### 5.1.2.1 Test Mode = GSM/TM1

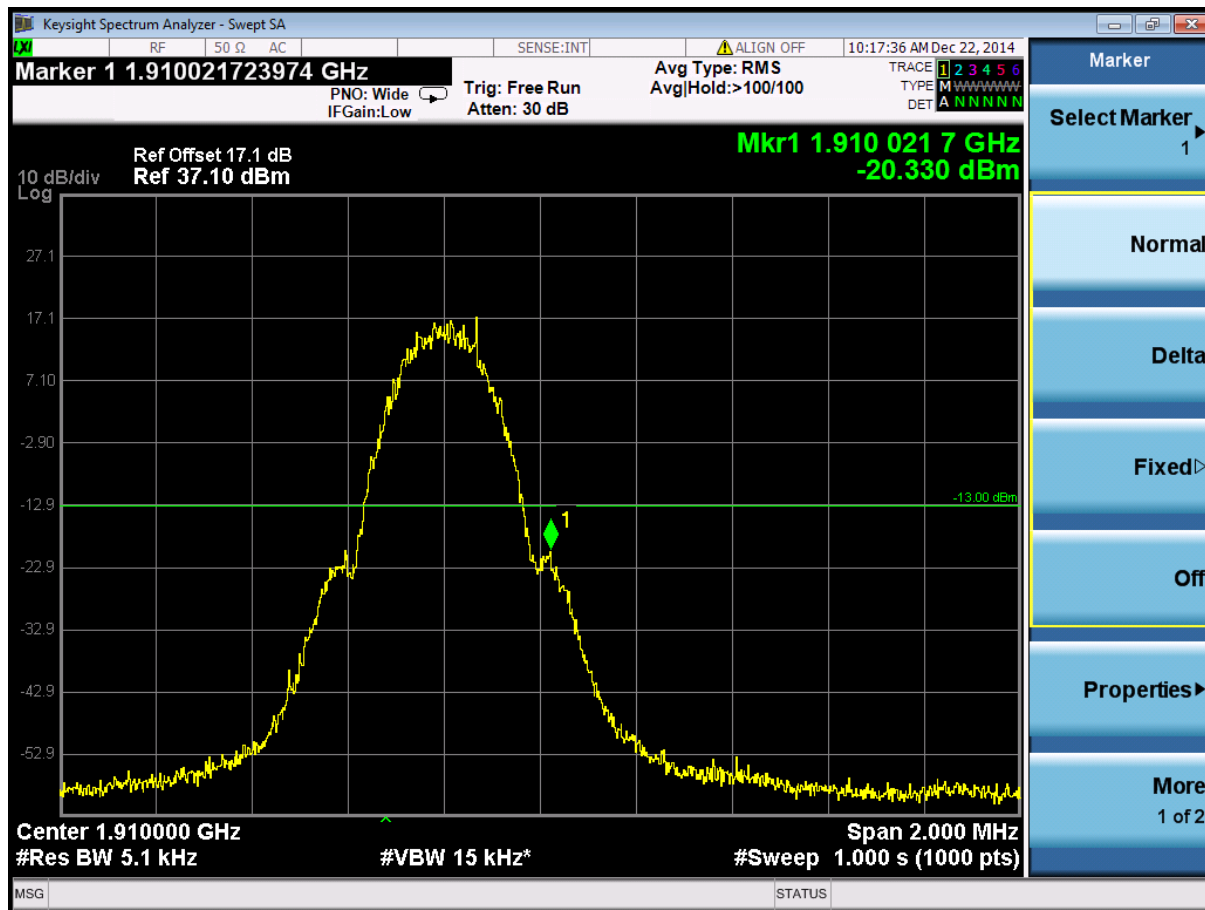
#### 5.1.2.1.1 Test Channel = LCH



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## 5.1.2.1.2 Test Channel = HCH



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## **6 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.

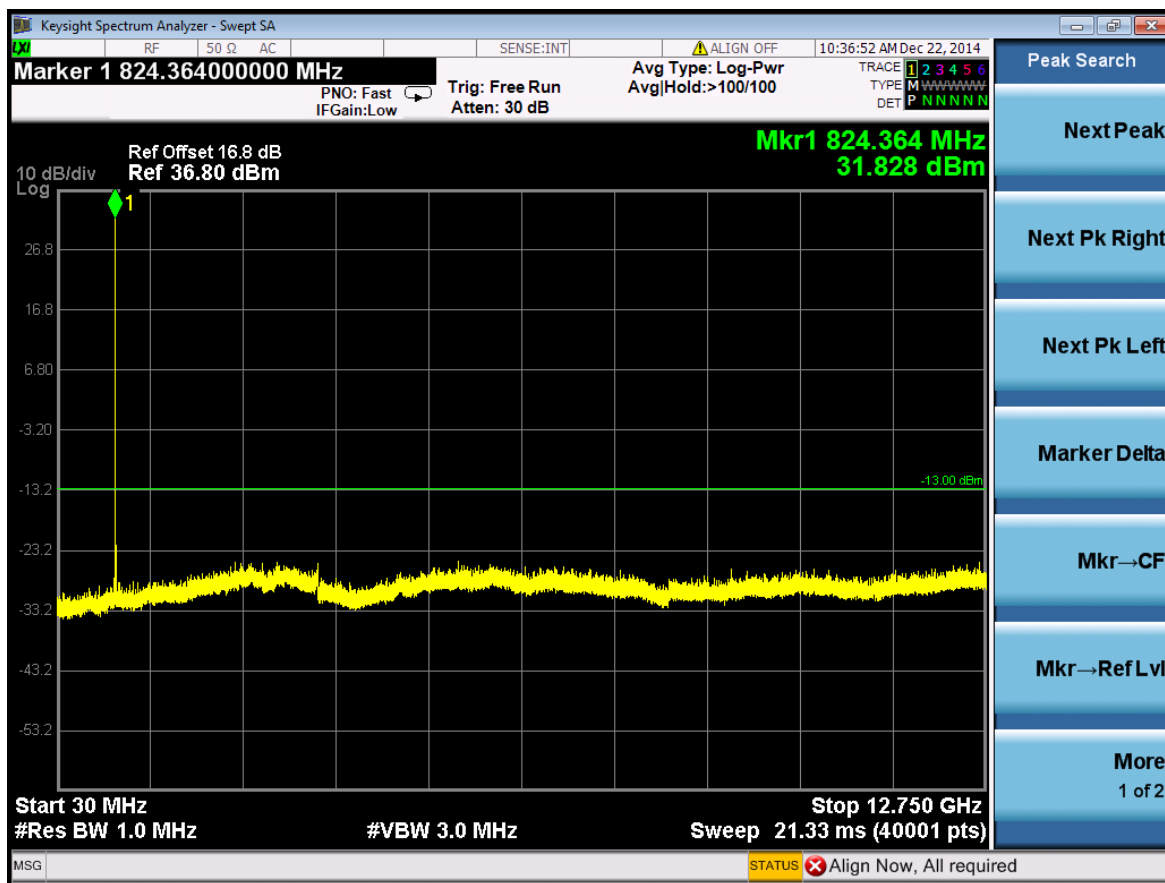
## Part I - Test Plots

### 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



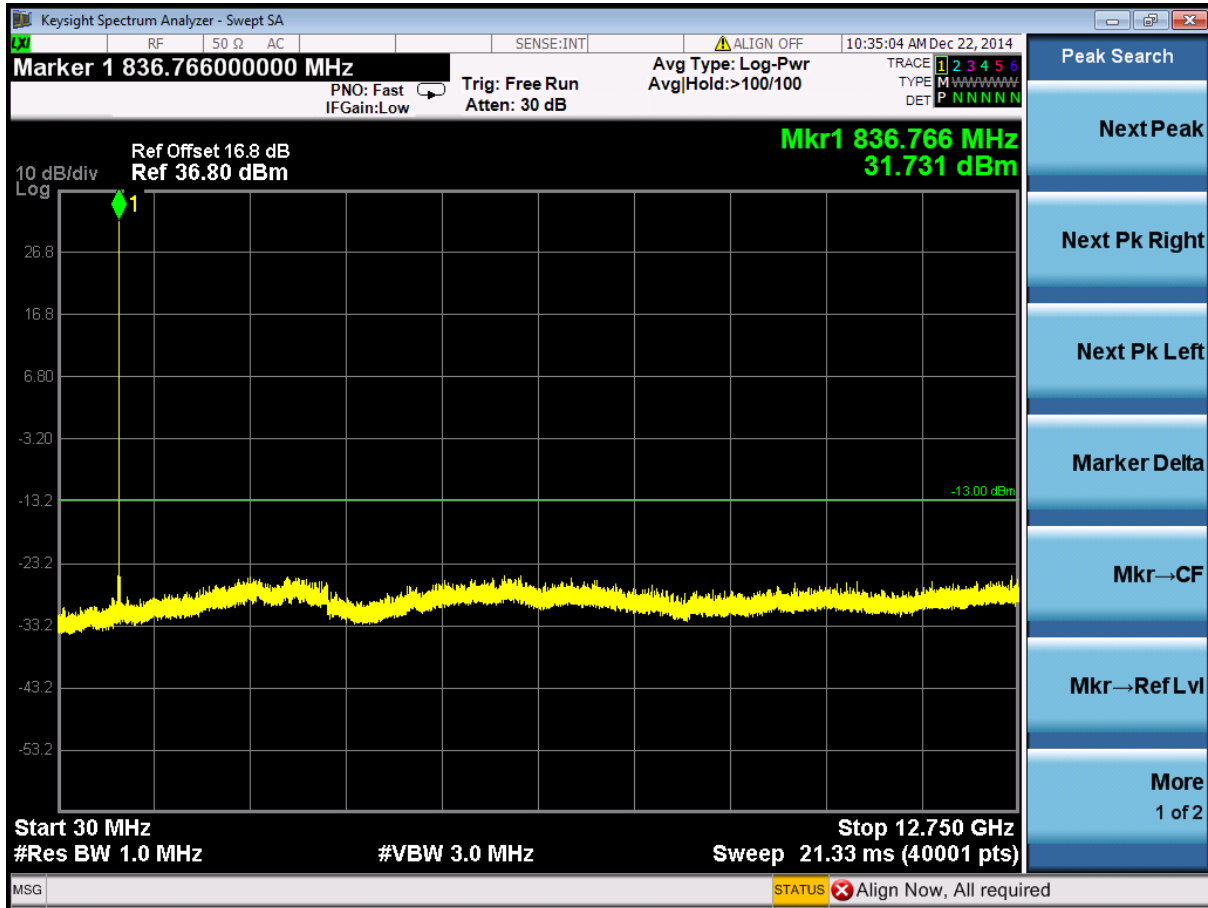
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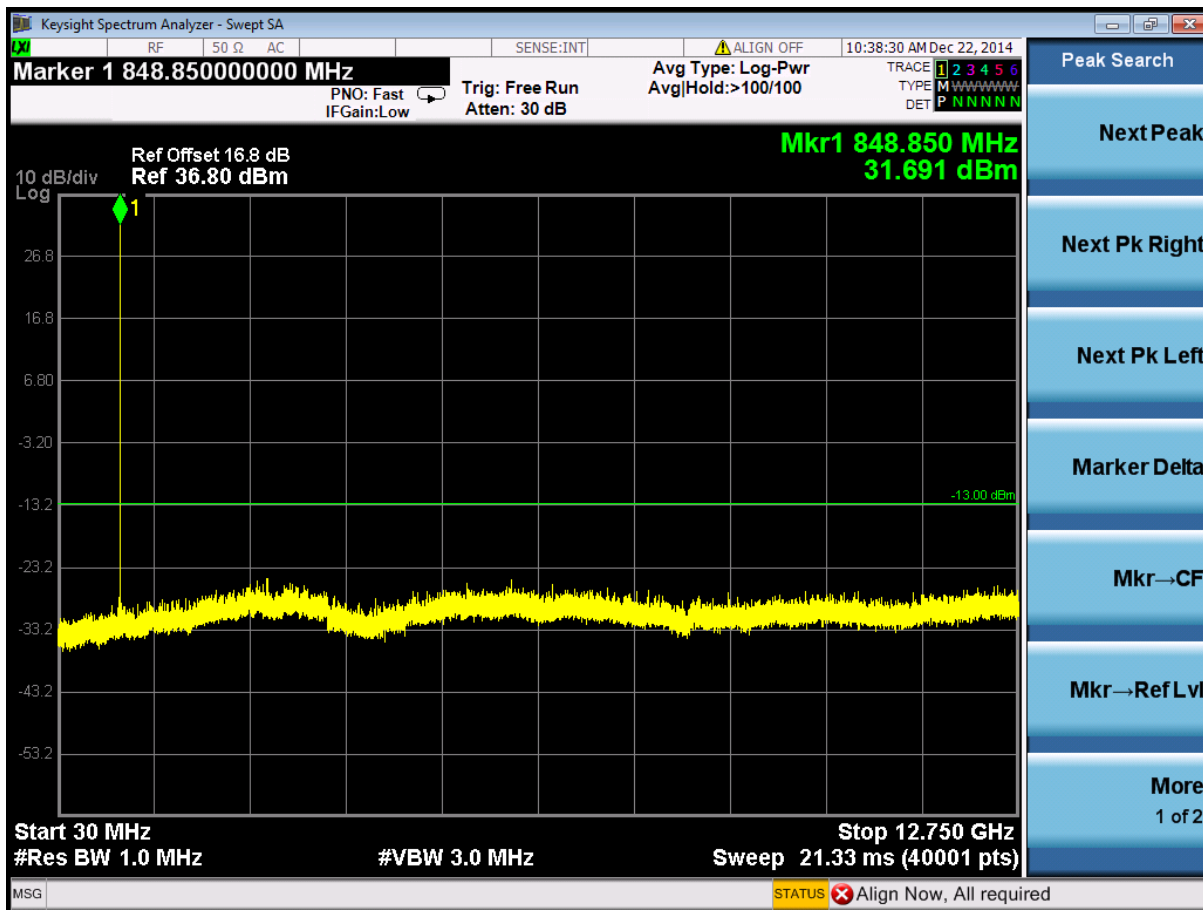
Page: 20 of 33

#### 6.1.1.1.2 Test Channel = MCH



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6.1.1.1.3 Test Channel = HCH



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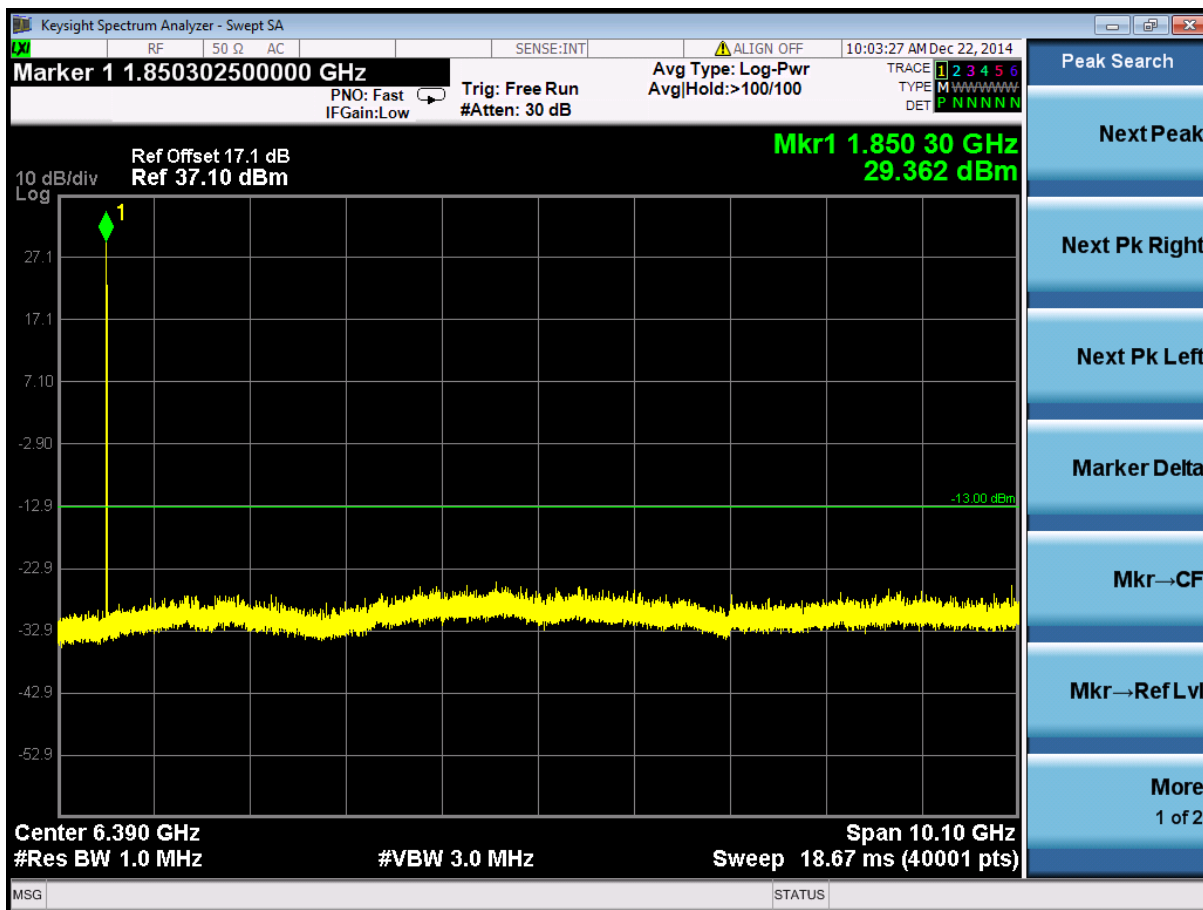
Report No.: SZEM141100608802

Page: 22 of 33

## 6.1.2 TEST BAND = GSM1900

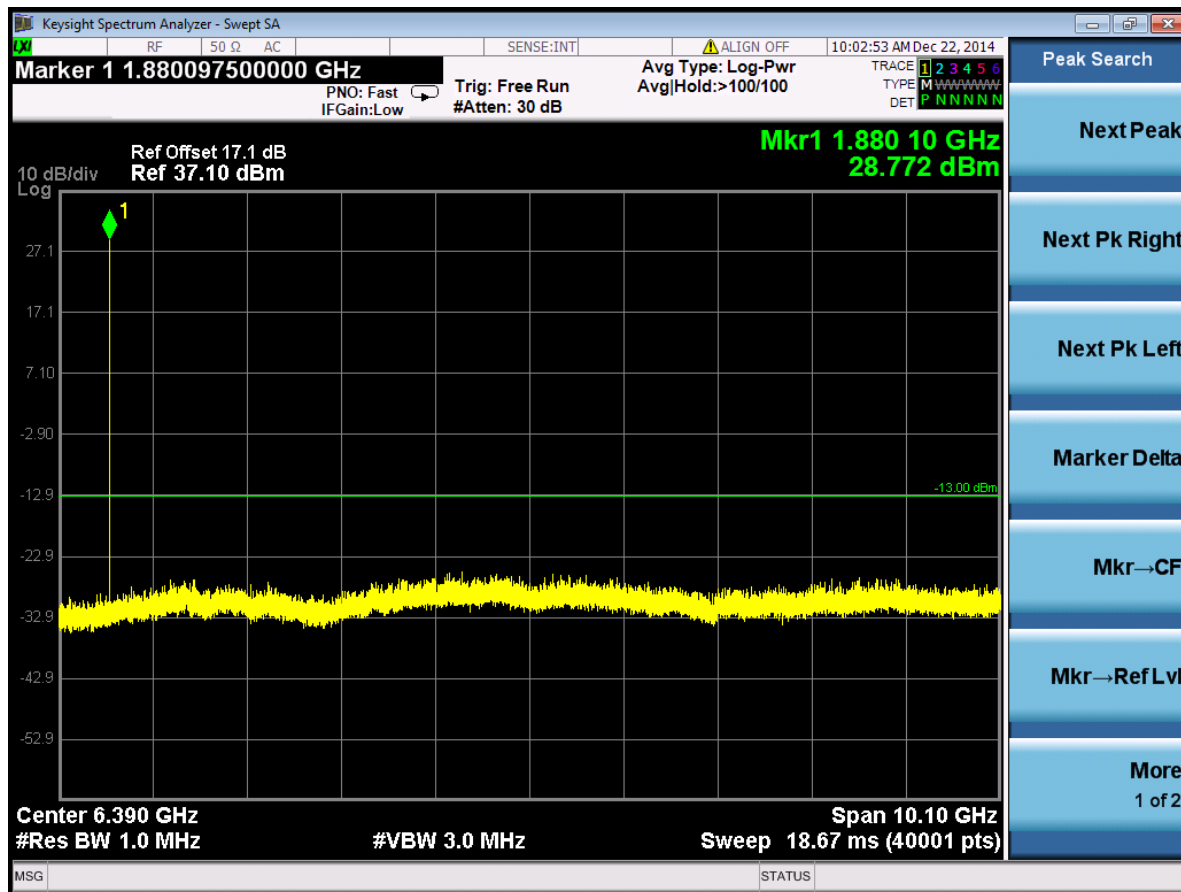
### 6.1.2.1 Test Mode = GSM/TM1

#### 6.1.2.1.1 Test Channel = LCH



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6.1.2.1.2 Test Channel = MCH



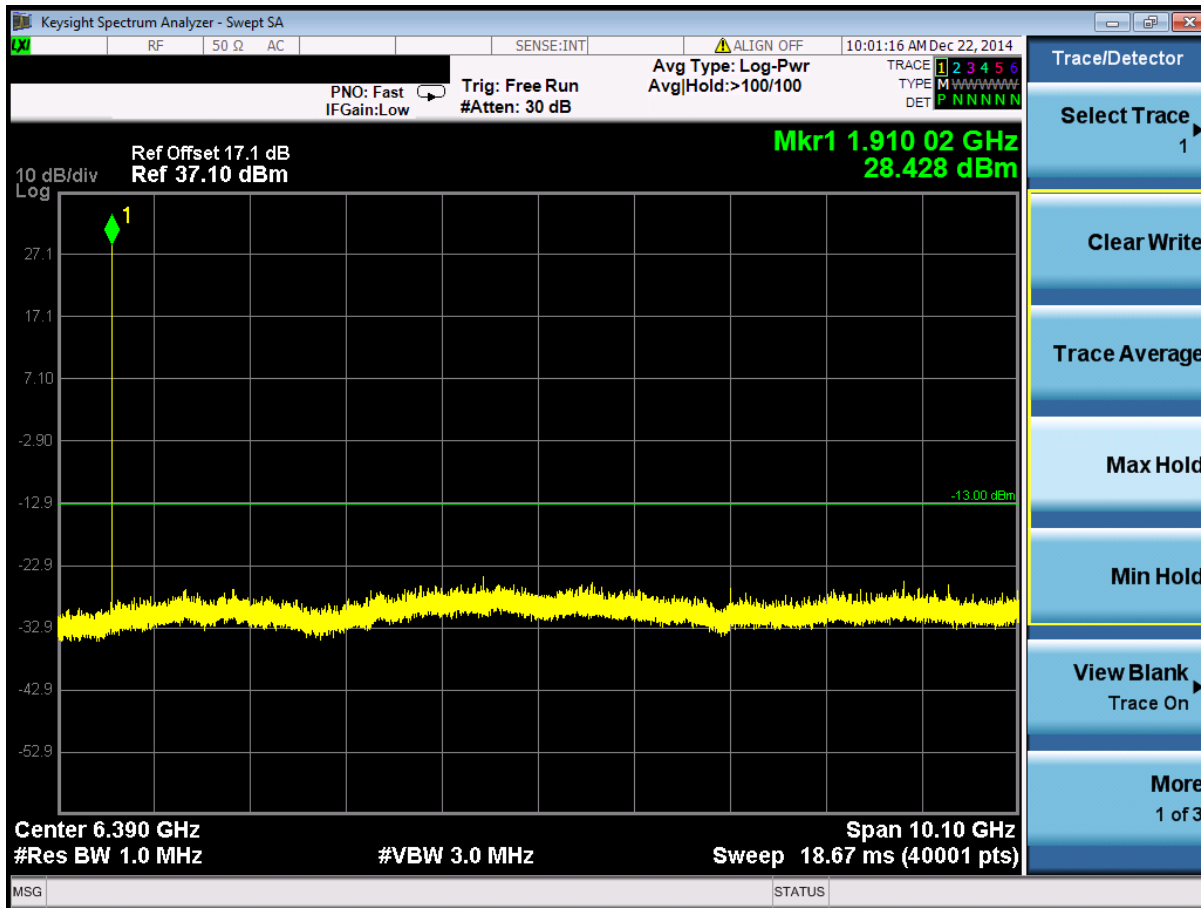
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Report No.: SZEM141100608802

Page: 24 of 33

## 6.1.2.1.3 Test Channel = HCH



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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 25 of 33

## 7 APPENDIX\_G: FIELD STRENGTH OF SPURIOUS RADIATION

### Part I - Test Plots

#### 7.1 FOR GSM

##### 7.1.1 TEST BAND = GSM850

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

Low channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
41.660	-65.4	-13.0	-52.4	Horizontal
53.644	-66.0	-13.0	-53.0	Horizontal
76.476	-68.4	-13.0	-55.4	Horizontal
189.273	-61.8	-13.0	-48.8	Horizontal
335.126	-67.0	-13.0	-54.0	Horizontal
501.883	-62.4	-13.0	-49.4	Horizontal
1645.823	-30.7	-13.0	-17.7	Horizontal
2436.322	-34.7	-13.0	-21.7	Horizontal
3299.224	-40.2	-13.0	-27.2	Horizontal
4121.903	-30.3	-13.0	-17.3	Horizontal
4946.388	-36.2	-13.0	-23.2	Horizontal
5774.414	-31.4	-13.0	-18.4	Horizontal

Low channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
36.056	-64.7	-13.0	-51.7	Vertical
52.597	-66.5	-13.0	-53.5	Vertical
90.714	-64.2	-13.0	-51.2	Vertical
221.583	-67.8	-13.0	-54.8	Vertical
393.623	-65.5	-13.0	-52.5	Vertical
629.498	-60.9	-13.0	-47.9	Vertical
1645.823	-34.0	-13.0	-21.0	Vertical
2472.751	-39.1	-13.0	-26.1	Vertical
3299.224	-43.8	-13.0	-30.8	Vertical
4121.903	-35.8	-13.0	-22.8	Vertical
4946.388	-38.5	-13.0	-25.5	Vertical
5774.414	-36.8	-13.0	-23.8	Vertical

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Report No.: SZEM141100608802

Page: 26 of 33

Middle channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
31.931	-70.8	-13.0	-57.8	Horizontal
52.425	-66.9	-13.0	-53.9	Horizontal
92.215	-70.3	-13.0	-57.3	Horizontal
222.312	-66.4	-13.0	-53.4	Horizontal
309.731	-67.6	-13.0	-54.6	Horizontal
505.190	-63.3	-13.0	-50.3	Horizontal
1670.433	-27.5	-13.0	-14.5	Horizontal
2013.080	-38.1	-13.0	-25.1	Horizontal
2509.725	-35.0	-13.0	-22.0	Horizontal
3348.556	-40.2	-13.0	-27.2	Horizontal
4183.536	-30.8	-13.0	-17.8	Horizontal
5020.349	-37.6	-13.0	-24.6	Horizontal

Middle channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
38.377	-70.3	-13.0	-57.3	Vertical
52.597	-65.9	-13.0	-52.9	Vertical
74.984	-64.2	-13.0	-51.2	Vertical
89.530	-57.8	-13.0	-44.8	Vertical
237.400	-67.5	-13.0	-54.5	Vertical
528.954	-62.5	-13.0	-49.5	Vertical
1670.433	-36.2	-13.0	-23.2	Vertical
2509.725	-39.6	-13.0	-26.6	Vertical
3257.518	-45.0	-13.0	-32.0	Vertical
4183.536	-35.7	-13.0	-22.7	Vertical
5020.349	-39.2	-13.0	-26.2	Vertical
5860.756	-37.1	-13.0	-24.1	Vertical

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Report No.: SZEM141100608802

Page: 27 of 33

High channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
39.140	-70.3	-13.0	-57.3	Horizontal
52.597	-66.6	-13.0	-53.6	Horizontal
98.151	-70.6	-13.0	-57.6	Horizontal
225.991	-67.0	-13.0	-54.0	Horizontal
341.794	-66.1	-13.0	-53.1	Horizontal
550.211	-62.1	-13.0	-49.1	Horizontal
1670.433	-29.6	-13.0	-16.6	Horizontal
2509.725	-33.1	-13.0	-20.1	Horizontal
3348.556	-42.5	-13.0	-29.5	Horizontal
4183.536	-32.5	-13.0	-19.5	Horizontal
5020.349	-35.4	-13.0	-22.4	Horizontal
5860.756	-35.8	-13.0	-22.8	Horizontal

High channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
33.543	-70.4	-13.0	-57.4	Vertical
52.253	-67.7	-13.0	-54.7	Vertical
88.362	-68.1	-13.0	-55.1	Vertical
228.229	-67.7	-13.0	-54.7	Vertical
498.598	-63.4	-13.0	-50.4	Vertical
652.649	-60.8	-13.0	-47.8	Vertical
1670.433	-36.2	-13.0	-23.2	Vertical
2420.874	-37.7	-13.0	-24.7	Vertical
3155.547	-44.9	-13.0	-31.9	Vertical
4183.536	-34.2	-13.0	-21.2	Vertical
5020.349	-40.2	-13.0	-27.2	Vertical
5860.756	-36.9	-13.0	-23.9	Vertical

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Report No.: SZEM141100608802

Page: 28 of 33

## 7.1.2 TEST BAND = GSM1900

### 7.1.2.1 Test Mode = GSM/TM1

Low channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
35.237	-70.6	-13.0	-57.6	Horizontal
58.809	-69.6	-13.0	-56.6	Horizontal
112.295	-70.6	-13.0	-57.6	Horizontal
268.066	-67.6	-13.0	-54.6	Horizontal
528.954	-64.4	-13.0	-51.4	Horizontal
764.058	-61.2	-13.0	-48.2	Horizontal
3234.474	-44.5	-13.0	-31.5	Horizontal
3699.687	-43.7	-13.0	-30.7	Horizontal
5035.087	-42.1	-13.0	-29.1	Horizontal
6187.203	-39.4	-13.0	-26.4	Horizontal
6926.565	-38.3	-13.0	-25.3	Horizontal
8965.441	-35.4	-13.0	-22.4	Horizontal

Low channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
36.894	-73.1	-13.0	-60.1	Vertical
93.742	-67.7	-13.0	-54.7	Vertical
154.412	-70.7	-13.0	-57.7	Vertical
221.583	-70.1	-13.0	-57.1	Vertical
379.660	-68.2	-13.0	-55.2	Vertical
625.378	-62.5	-13.0	-49.5	Vertical
3234.474	-44.0	-13.0	-31.0	Vertical
3699.687	-41.4	-13.0	-28.4	Vertical
5107.780	-41.9	-13.0	-28.9	Vertical
6367.146	-39.7	-13.0	-26.7	Vertical
7322.183	-37.3	-13.0	-24.3	Vertical
8774.732	-36.3	-13.0	-23.3	Vertical

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Report No.: SZEM141100608802

Page: 29 of 33

Middle channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
36.653	-72.0	-13.0	-59.0	Horizontal
72.800	-72.8	-13.0	-59.8	Horizontal
160.617	-71.7	-13.0	-58.7	Horizontal
338.444	-66.8	-13.0	-53.8	Horizontal
488.871	-64.0	-13.0	-51.0	Horizontal
654.796	-61.3	-13.0	-48.3	Horizontal
3109.455	-44.6	-13.0	-31.6	Horizontal
3759.831	-42.3	-13.0	-29.3	Horizontal
5044.117	-41.8	-13.0	-28.8	Horizontal
6165.071	-39.9	-13.0	-26.9	Horizontal
7880.337	-37.7	-13.0	-24.7	Horizontal
9631.584	-34.5	-13.0	-21.5	Horizontal

Middle channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
33.875	-71.6	-13.0	-58.6	Vertical
56.910	-69.5	-13.0	-56.5	Vertical
109.384	-67.2	-13.0	-54.2	Vertical
252.682	-70.2	-13.0	-57.2	Vertical
511.868	-64.1	-13.0	-51.1	Vertical
774.159	-62.4	-13.0	-49.4	Vertical
3228.683	-45.1	-13.0	-32.1	Vertical
3759.831	-39.4	-13.0	-26.4	Vertical
4963.428	-42.2	-13.0	-29.2	Vertical
6435.965	-39.5	-13.0	-26.5	Vertical
7521.645	-37.6	-13.0	-24.6	Vertical
9443.610	-35.3	-13.0	-22.3	Vertical

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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 30 of 33

High channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
35.469	-71.6	-13.0	-58.6	Horizontal
57.284	-70.2	-13.0	-57.2	Horizontal
117.578	-72.2	-13.0	-59.2	Horizontal
257.710	-68.1	-13.0	-55.1	Horizontal
469.984	-64.7	-13.0	-51.7	Horizontal
759.057	-60.9	-13.0	-47.9	Horizontal
3109.455	-44.4	-13.0	-31.4	Horizontal
4104.854	-45.2	-13.0	-32.2	Horizontal
4990.180	-41.7	-13.0	-28.7	Horizontal
6012.346	-40.0	-13.0	-27.0	Horizontal
7508.180	-38.1	-13.0	-25.1	Horizontal
8853.696	-36.3	-13.0	-23.3	Horizontal

High channel				
Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
34.098	-71.4	-13.0	-58.4	Vertical
92.518	-67.5	-13.0	-54.5	Vertical
225.991	-69.6	-13.0	-56.6	Vertical
392.333	-67.4	-13.0	-54.4	Vertical
561.158	-64.2	-13.0	-51.2	Vertical
759.057	-61.4	-13.0	-48.4	Vertical
3160.004	-44.3	-13.0	-31.3	Vertical
3814.113	-39.3	-13.0	-26.3	Vertical
4972.330	-42.2	-13.0	-29.2	Vertical
6143.018	-40.1	-13.0	-27.1	Vertical
7535.134	-38.2	-13.0	-25.2	Vertical
8727.692	-36.7	-13.0	-23.7	Vertical

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**8 8APPENDIX\_H: FREQUENCY STABILITY****8.1 8.1 FOR GSM****8.1.1 8.1.1 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	-3.13	-0.00380	±2.5	PASS
				VN	-8.03	-0.00974	±2.5	PASS
				VH	0.49	0.00059	±2.5	PASS
		MCH	TN	VL	-7.77	-0.00929	±2.5	PASS
				VN	-6.55	-0.00783	±2.5	PASS
				VH	-5.19	-0.00620	±2.5	PASS
		HCH	TN	VL	-0.83	-0.00098	±2.5	PASS
				VN	-5.55	-0.00654	±2.5	PASS
				VH	-8.97	-0.01057	±2.5	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-12.77	-0.00690	±2.5	PASS
				VN	-10.16	-0.00549	±2.5	PASS
				VH	-8.61	-0.00465	±2.5	PASS
		MCH	TN	VL	-2.47	-0.00131	±2.5	PASS
				VN	-1.76	-0.00094	±2.5	PASS
				VH	-7.45	-0.00396	±2.5	PASS
		HCH	TN	VL	-1.12	-0.00059	±2.5	PASS
				VN	-8.35	-0.00437	±2.5	PASS
				VH	-19.00	-0.00995	±2.5	PASS

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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 32 of 33

## 8.1.2 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	-1.91	-0.00232	±2.5	PASS
				-20	-1.20	-0.00146	±2.5	PASS
				-10	-1.52	-0.00184	±2.5	PASS
				0	-3.46	-0.00420	±2.5	PASS
				10	1.32	0.00160	±2.5	PASS
				20	2.55	0.00309	±2.5	PASS
				30	2.55	0.00309	±2.5	PASS
				40	1.07	0.00130	±2.5	PASS
				50	6.17	0.00749	±2.5	PASS
		MCH	VN	-30	0.23	0.00027	±2.5	PASS
				-20	2.94	0.00351	±2.5	PASS
				-10	-0.63	-0.00075	±2.5	PASS
				0	-1.98	-0.00237	±2.5	PASS
				10	0.41	0.00049	±2.5	PASS
				20	-1.14	-0.00136	±2.5	PASS
				30	0.92	0.00110	±2.5	PASS
				40	1.50	0.00179	±2.5	PASS
				50	2.34	0.00280	±2.5	PASS
		HCH	VN	-30	0.30	0.00035	±2.5	PASS
				-20	4.95	0.00583	±2.5	PASS
				-10	-0.67	-0.00079	±2.5	PASS
				0	-1.12	-0.00132	±2.5	PASS
				10	-0.86	-0.00101	±2.5	PASS
				20	-1.12	-0.00132	±2.5	PASS
				30	-1.32	-0.00156	±2.5	PASS
				40	-2.22	-0.00262	±2.5	PASS
				50	-0.15	-0.00018	±2.5	PASS



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# SGS-CSTC Standards Technical Services Ltd.

Report No.: SZEM141100608802

Page: 33 of 33

GSM1900	GSM/TM1	LCH	VN	-30	-14.93	-0.00807	±2.5	PASS
				-20	-8.87	-0.00479	±2.5	PASS
				-10	-14.04	-0.00759	±2.5	PASS
				0	-2.22	-0.00120	±2.5	PASS
				10	1.65	0.00089	±2.5	PASS
				20	-5.06	-0.00273	±2.5	PASS
				30	-13.84	-0.00748	±2.5	PASS
				40	-10.42	-0.00563	±2.5	PASS
				50	1.33	0.00072	±2.5	PASS
		MCH	VN	-30	-5.77	-0.00307	±2.5	PASS
				-20	-7.39	-0.00393	±2.5	PASS
				-10	-13.13	-0.00698	±2.5	PASS
				0	-0.67	-0.00036	±2.5	PASS
				10	-15.33	-0.00815	±2.5	PASS
				20	-7.64	-0.00406	±2.5	PASS
				30	2.43	0.00129	±2.5	PASS
				40	-8.87	-0.00472	±2.5	PASS
				50	-11.96	-0.00636	±2.5	PASS
		HCH	VN	-30	-14.73	-0.00771	±2.5	PASS
				-20	-5.24	-0.00274	±2.5	PASS
				-10	-6.79	-0.00356	±2.5	PASS
				0	-11.76	-0.00616	±2.5	PASS
				10	1.02	0.00053	±2.5	PASS
				20	2.57	0.00135	±2.5	PASS
				30	-6.34	-0.00332	±2.5	PASS
				40	-13.64	-0.00714	±2.5	PASS
				50	-2.21	-0.00116	±2.5	PASS

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