



**SGS-CSTC Standards Technical Services Ltd.**

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Nanshan  
District, Shenzhen, Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053  
Fax: +86 (0) 755 2671 0594  
Email: ee.shenzhen@sgs.com

Report No.: SZEM150500242102  
Page: 1 of 31

## **Appendix B for Test Report SZEM150500242102**

Authorized Signature:



Jack Zhang  
EMC Laboratory Manager

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### 3 Appendix A- Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Part I – RF Conducted Power of Transmitter for GSM850

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel128(L)		Channel190(M)		Channel251(H)	
	824.2MHz		836.6 MHz		848.8 MHz	
Tnom/ Vnom	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)
GSM/TM1 (GSM ONLY)	28.92	38.5	28.50	38.5	28.04	38.5
GSM/TM1(GPRS)	28.93	38.5	28.52	38.5	28.09	38.5

Part 2– Effective Radiated Power of Transmitter (ERP) for GSM850

Test Mode	Freq. (MHz)	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBd)	Cable Loss (dB)	Substitution Level(ERP) / dBm	Limit (dBm)	Result
GSM/TM1 (GSM ONLY)	824.2	26.77	Dipole Ant.	32.29	-4.90	0.6	26.79	38.5	Pass
GSM/TM1 (GSM ONLY)	836.6	26.35	Dipole Ant.	32.03	-5.02	0.6	26.41	38.5	Pass
GSM/TM1 (GSM ONLY)	848.8	25.89	Dipole Ant.	31.52	-5.00	0.6	25.92	38.5	Pass
GSM/TM1 (GPRS)	824.2	26.78	Dipole	32.31	-4.90	0.6	26.81	38.5	Pass
GSM/TM1 (GPRS)	836.6	26.37	Dipole	32.01	-5.02	0.6	26.39	38.5	Pass
GSM/TM1 (GPRS)	848.8	25.94	Dipole	31.58	-5.00	0.6	25.98	38.5	Pass

Note:

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

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

b: SGP=Signal Generator Level

c: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS



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## Part I – RF Conducted Power of Transmitter for GSM1900

TEST CONDITIONS	RF Output Power(Conducted)					
	Channel512(L)		Channel661(M)		Channel810(H)	
	1850.2MHz		1880.0 MHz		1909.8 MHz	
Tnom/ Vnom	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)	Measured(dBm)	Limit (dBm)
GSM/TM1 (GSM ONLY)	28.15	33	28.11	33	27.93	33
GSM/TM1 (GPRS)	28.16	33	28.10	33	27.94	33

## Part 2– Effective Isotropic Radiated Power of Transmitter (EIRP) for GSM1900

Test Mode	Freq. (MHz)	Meas. Level (dBm)	Substitution Antenna Type	SGP (dBm)	Substitution Gain(dBi)	Cable Loss (dB)	Substitution Level(EIRP ) / dBm	Limit (dBm)	Result
GSM/TM1 (GSM ONLY)	1850.2	29.65	Horn Ant.	26.19	4.5	1	29.69	33	Pass
GSM/TM1 (GSM ONLY)	1880.0	29.61	Horn Ant.	26.16	4.5	1	29.66	33	Pass
GSM/TM1 (GSM ONLY)	1909.8	29.43	Horn Ant.	25.90	4.5	1	29.40	33	Pass
GSM/TM1 (GPRS)	1850.2	29.66	Horn Ant.	26.17	4.5	1	29.67	33	Pass
GSM/TM1 (GPRS)	1880.0	29.60	Horn Ant.	26.13	4.5	1	29.63	33	Pass
GSM/TM1 (GPRS)	1909.8	29.44	Horn Ant.	25.97	4.5	1	29.47	33	Pass

Note:

- 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

- c: 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
GSM1900	GSM/TM1	LCH	0.10	13	PASS
		MCH	0.08	13	PASS
		HCH	0.13	13	PASS





## 5 Appendix C- Bandwidth

### Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	243.6	317.7	PASS
		MCH	243.9	321.5	PASS
		HCH	245.3	320.0	PASS
GSM1900	GSM/TM1	LCH	241.9	316.0	PASS
		MCH	243.0	319.4	PASS
		HCH	246.6	318.1	PASS



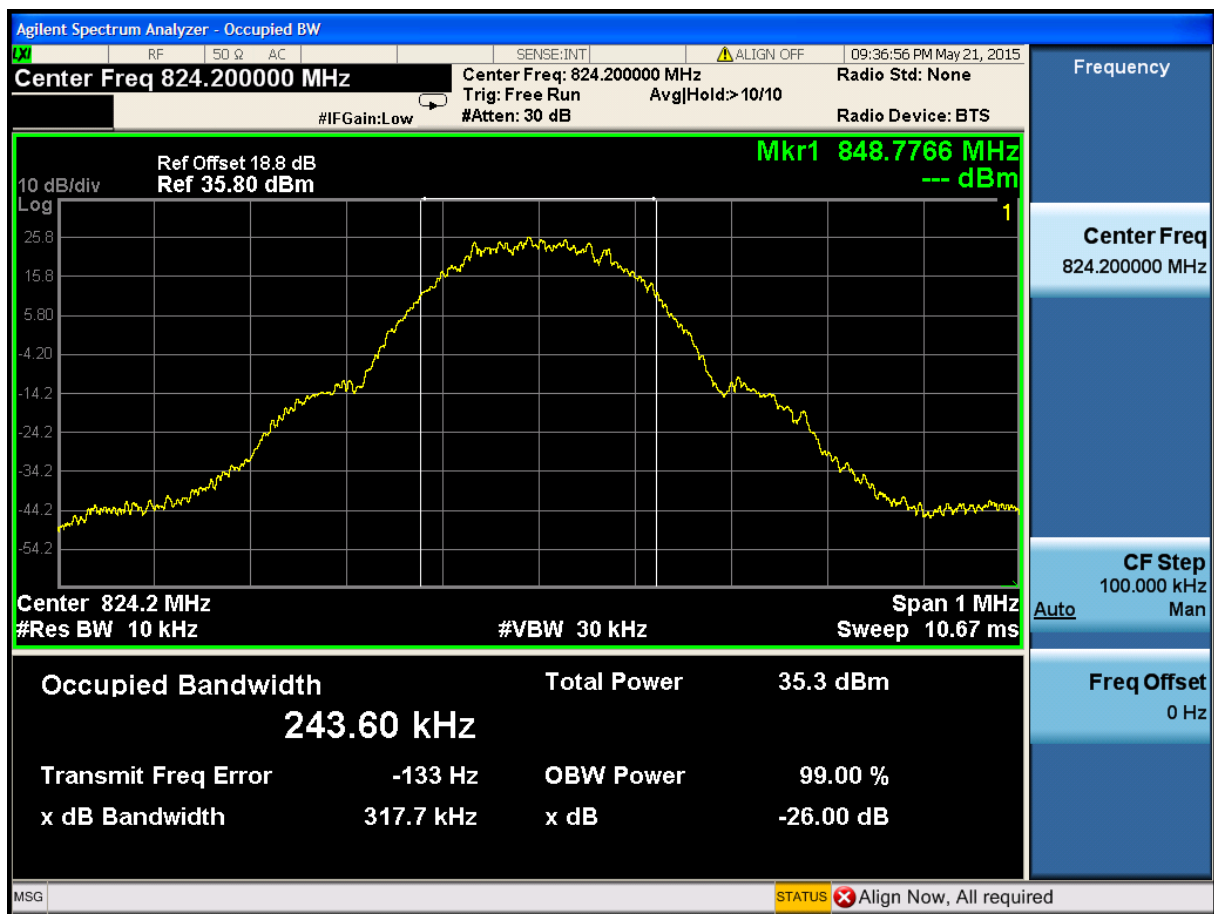
Part II - Test Plots

## 5.1 For GSM

### 5.1.1 Test Band = GSM850

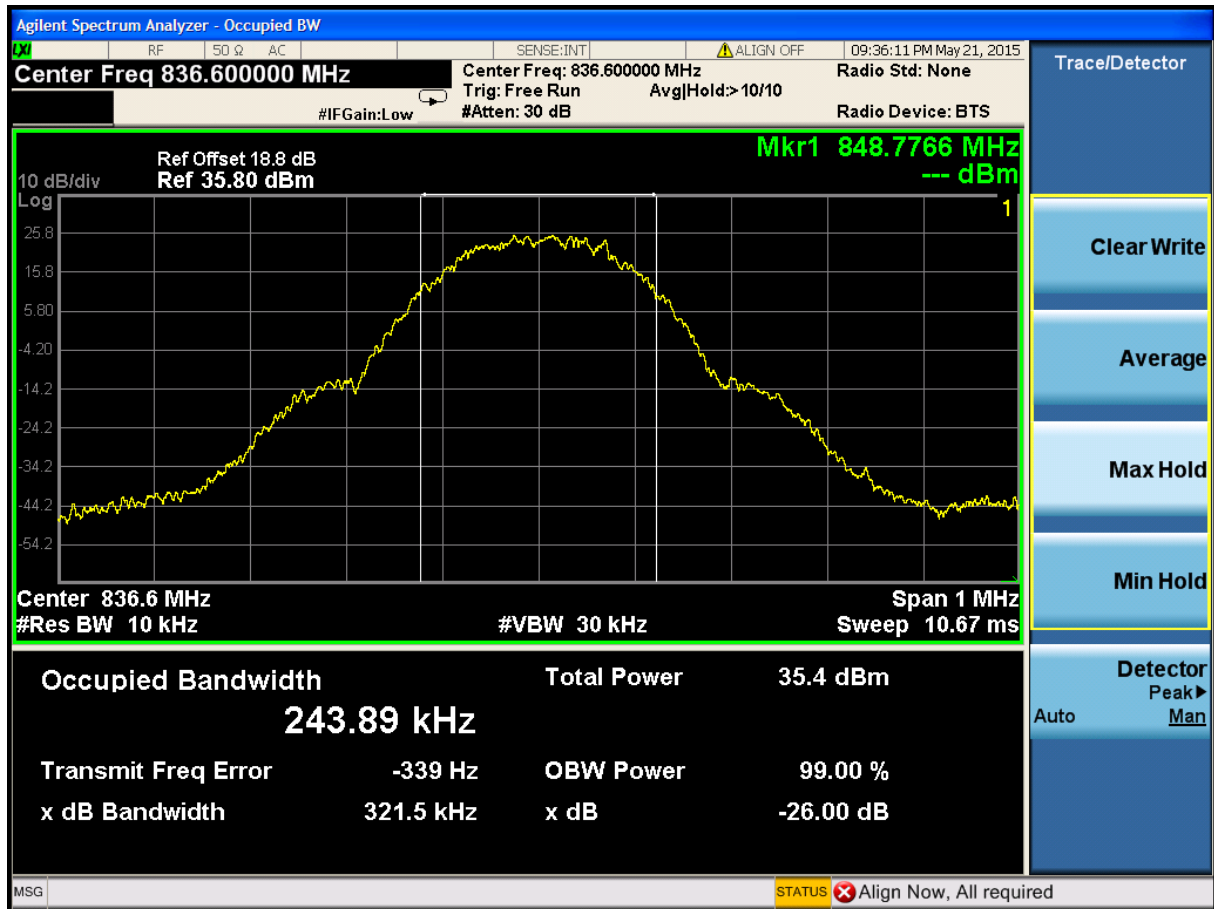
#### 5.1.1.1 Test Mode = GSM/TM1

##### 5.1.1.1.1 Test Channel = LCH



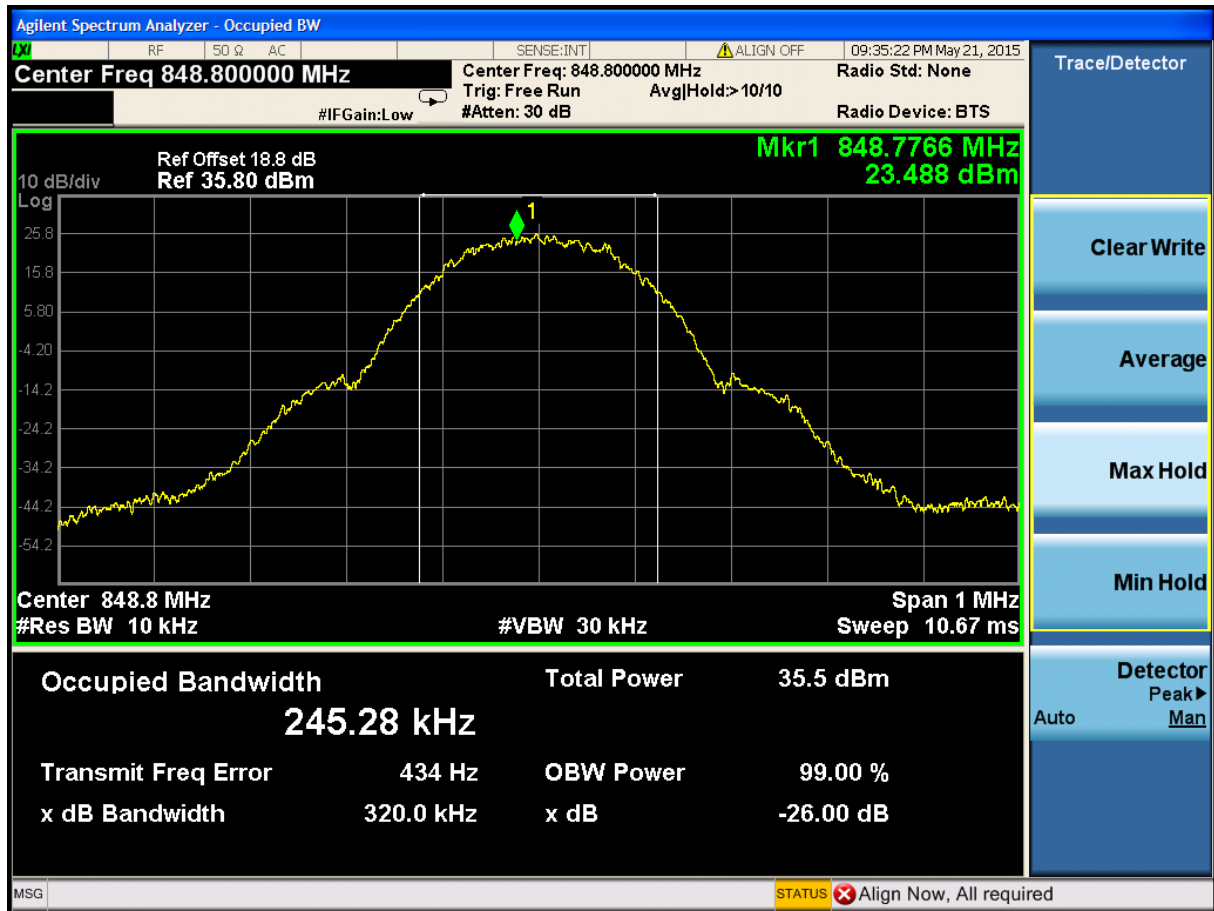


5.1.1.1.2 Test Channel = MCH





5.1.1.1.3 Test Channel = HCH

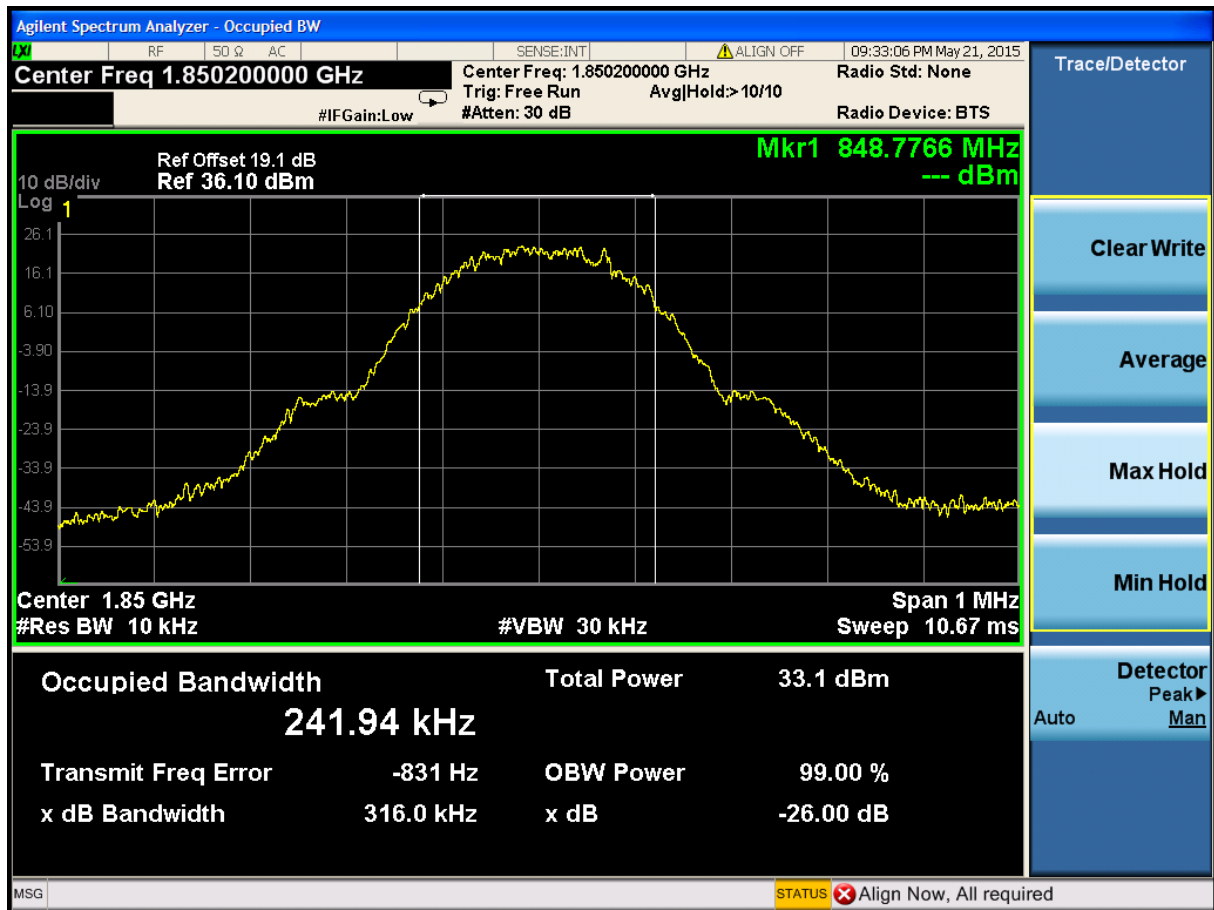




### 5.1.2 Test Band = GSM1900

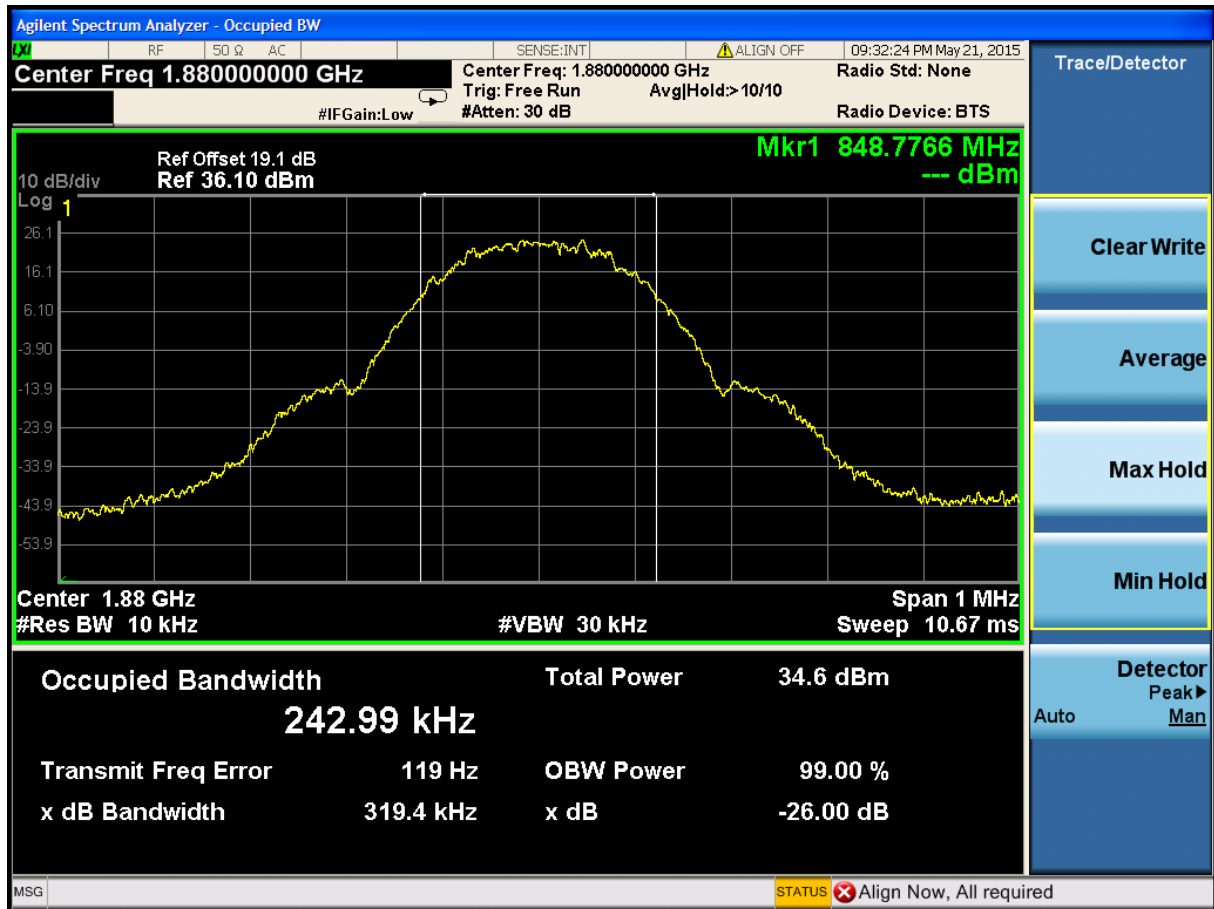
#### 5.1.2.1 Test Mode = GSM/TM1

##### 5.1.2.1.1 Test Channel = LCH



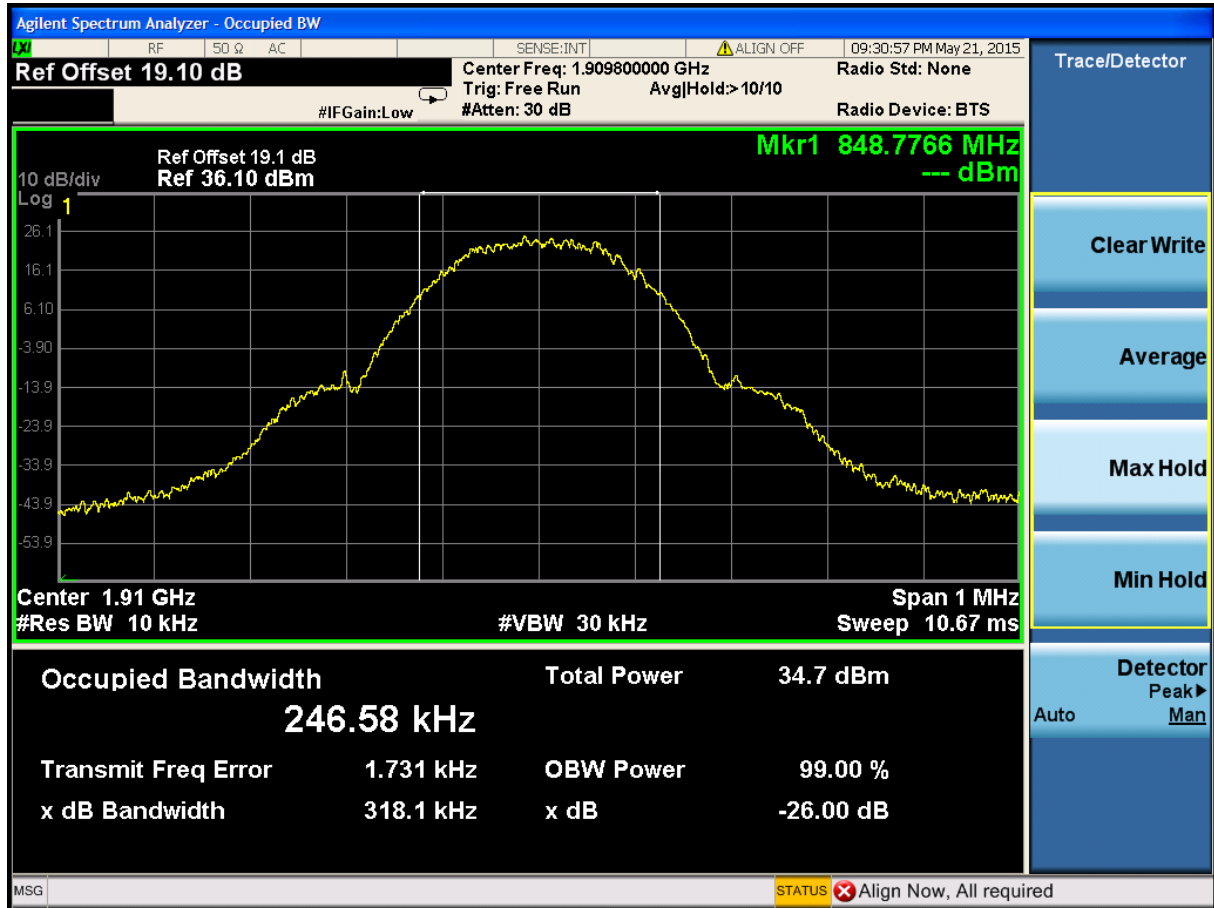


5.1.2.1.2 Test Channel = MCH





5.1.2.1.3 Test Channel = HCH



## 6 Appendix D- Band Edges Compliance

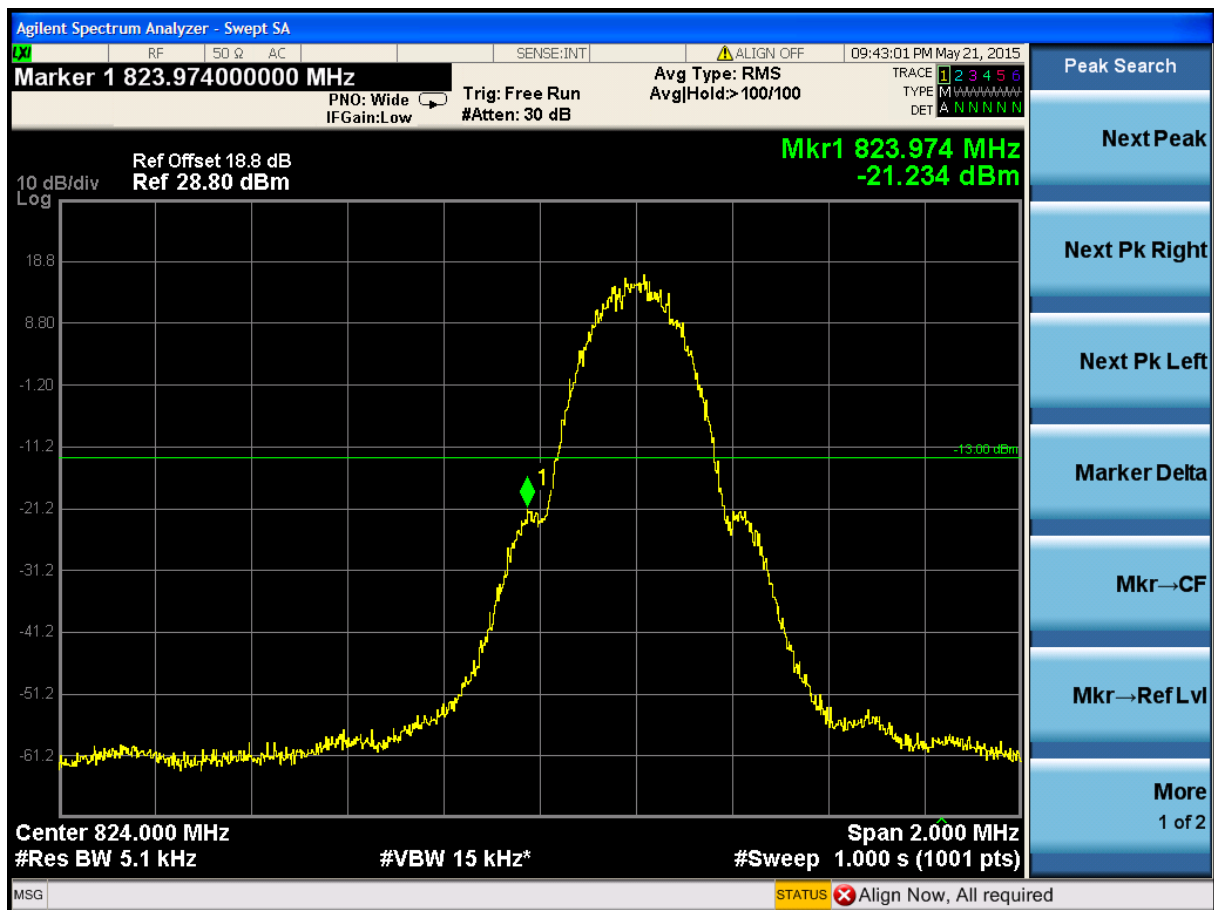
### Part I - Test Plots

#### 6.1 For GSM

##### 6.1.1 Test Band = GSM850

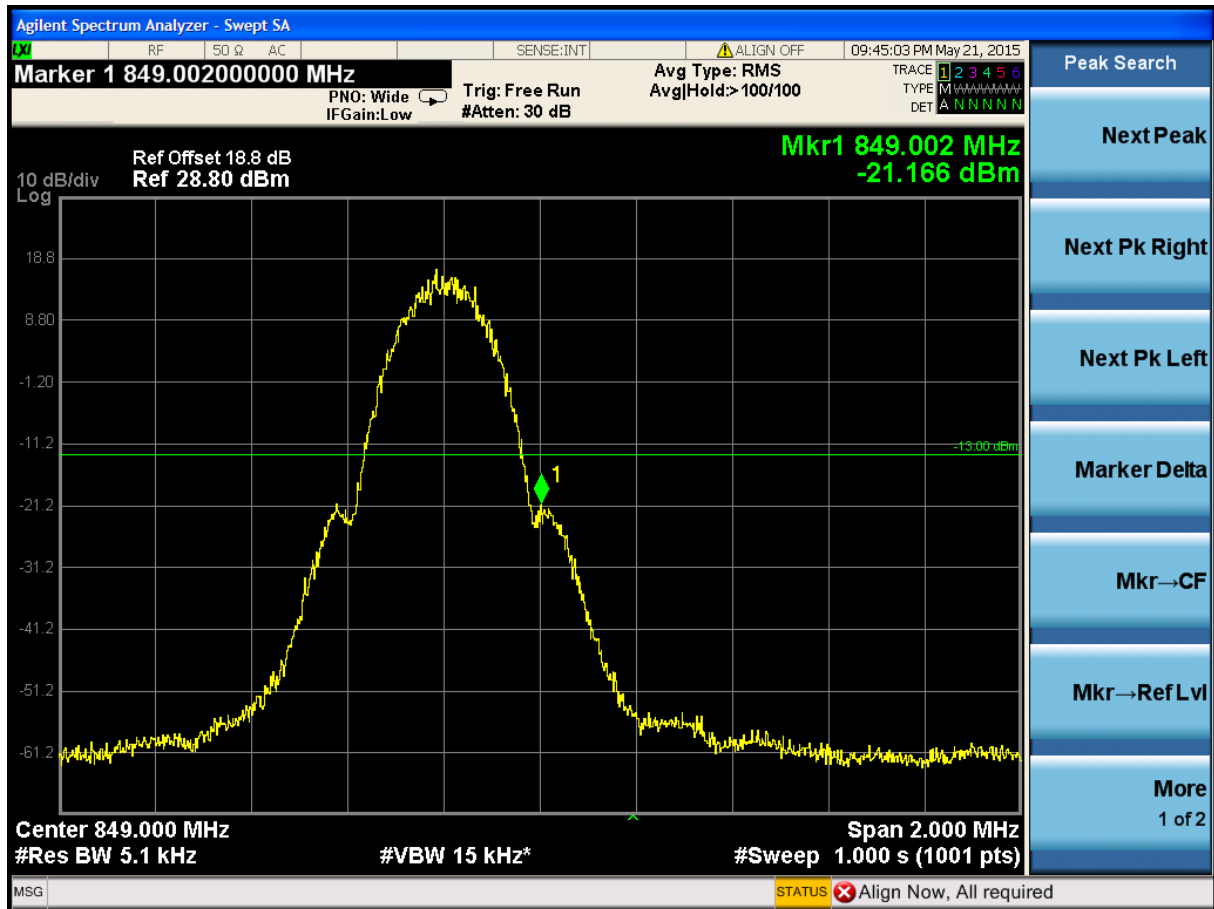
##### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH





6.1.1.1.2 Test Channel = HCH

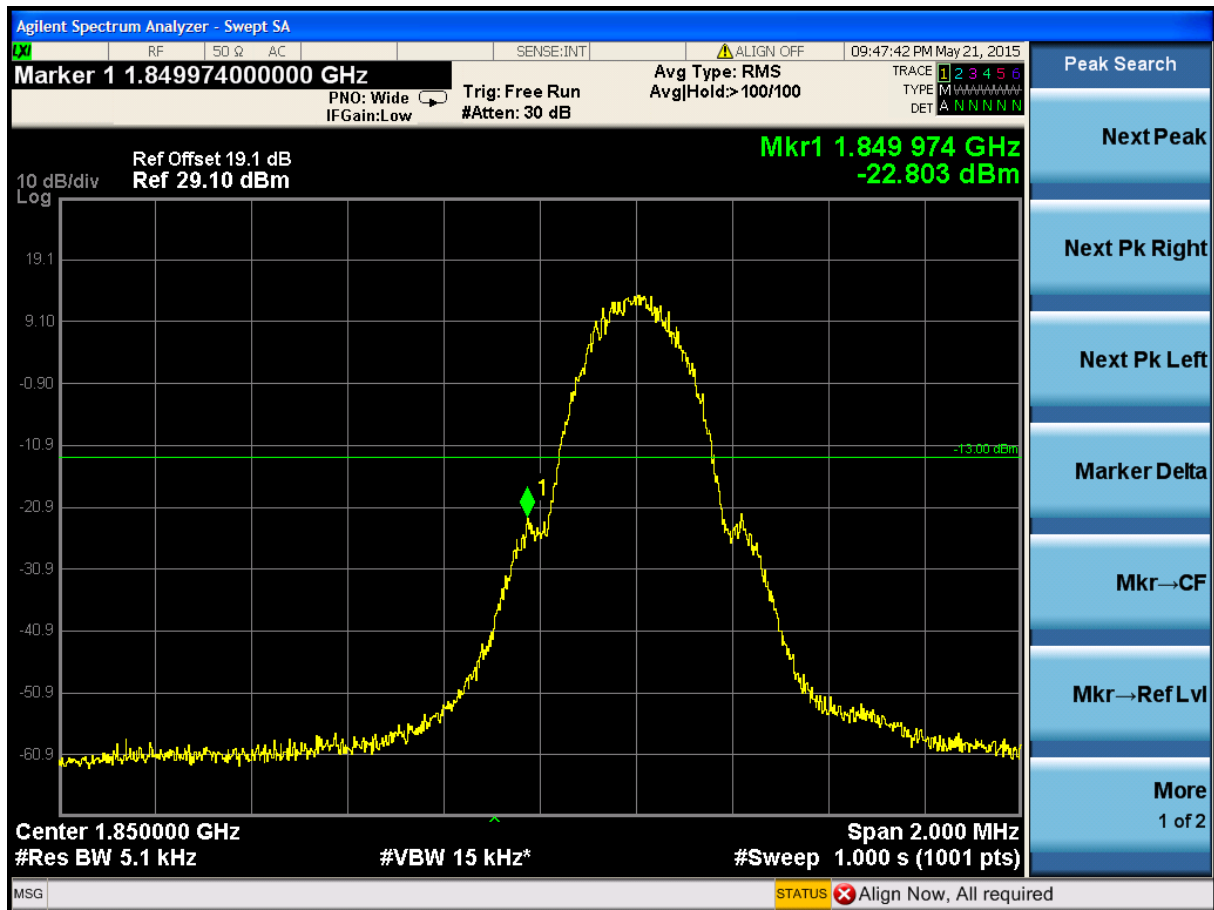




## 6.1.2 Test Band = GSM1900

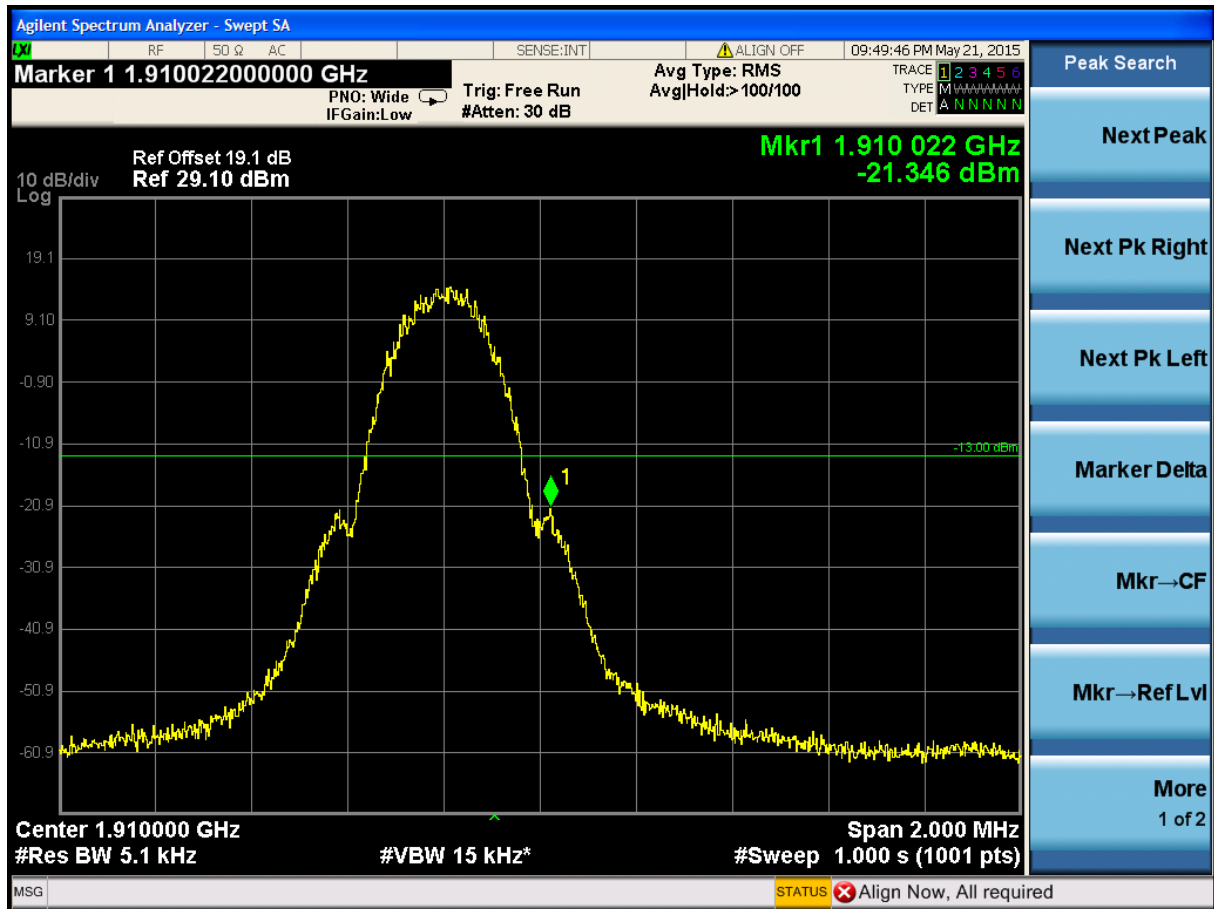
### 6.1.2.1 Test Mode = GSM/TM1

#### 6.1.2.1.1 Test Channel = LCH





6.1.2.1.2 Test Channel = HCH





## 7 Appendix E- 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  $< \text{RBW}/2$  so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points =  $k * (\text{Span} / \text{RBW})$ " with  $k$  between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

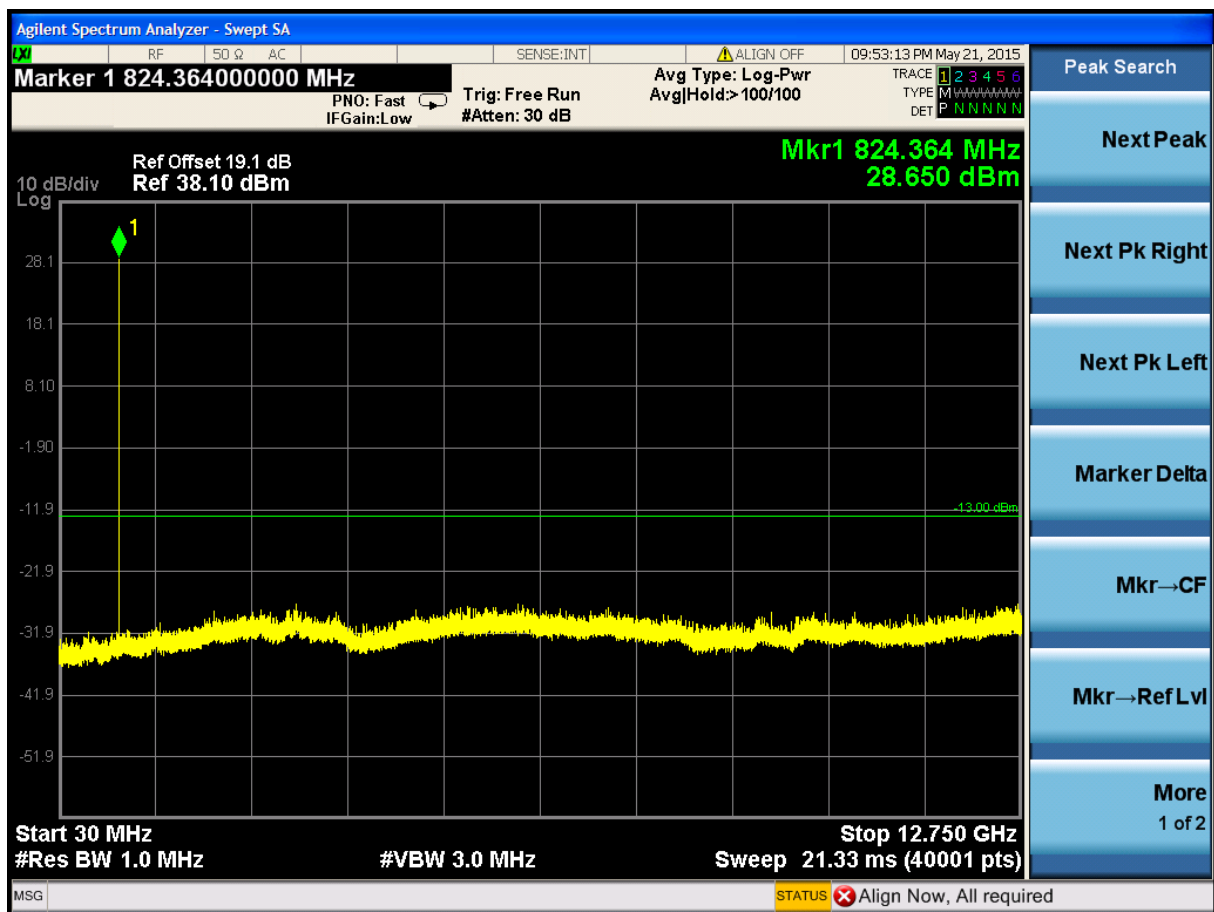
Part I - Test Plots

### 7.1 For GSM

#### 7.1.1 Test Band = GSM850

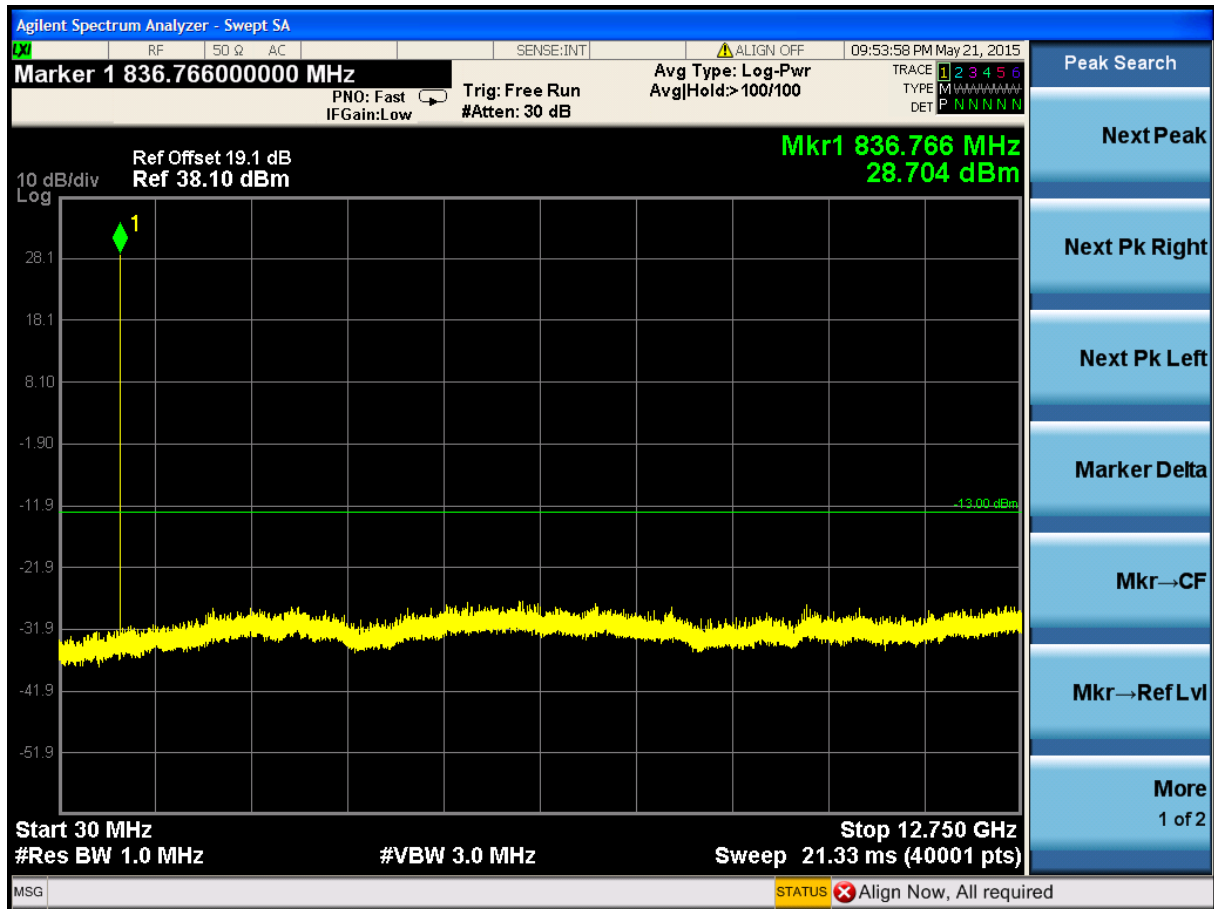
##### 7.1.1.1 Test Mode = GSM/TM1

##### 7.1.1.1.1 Test Channel = LCH



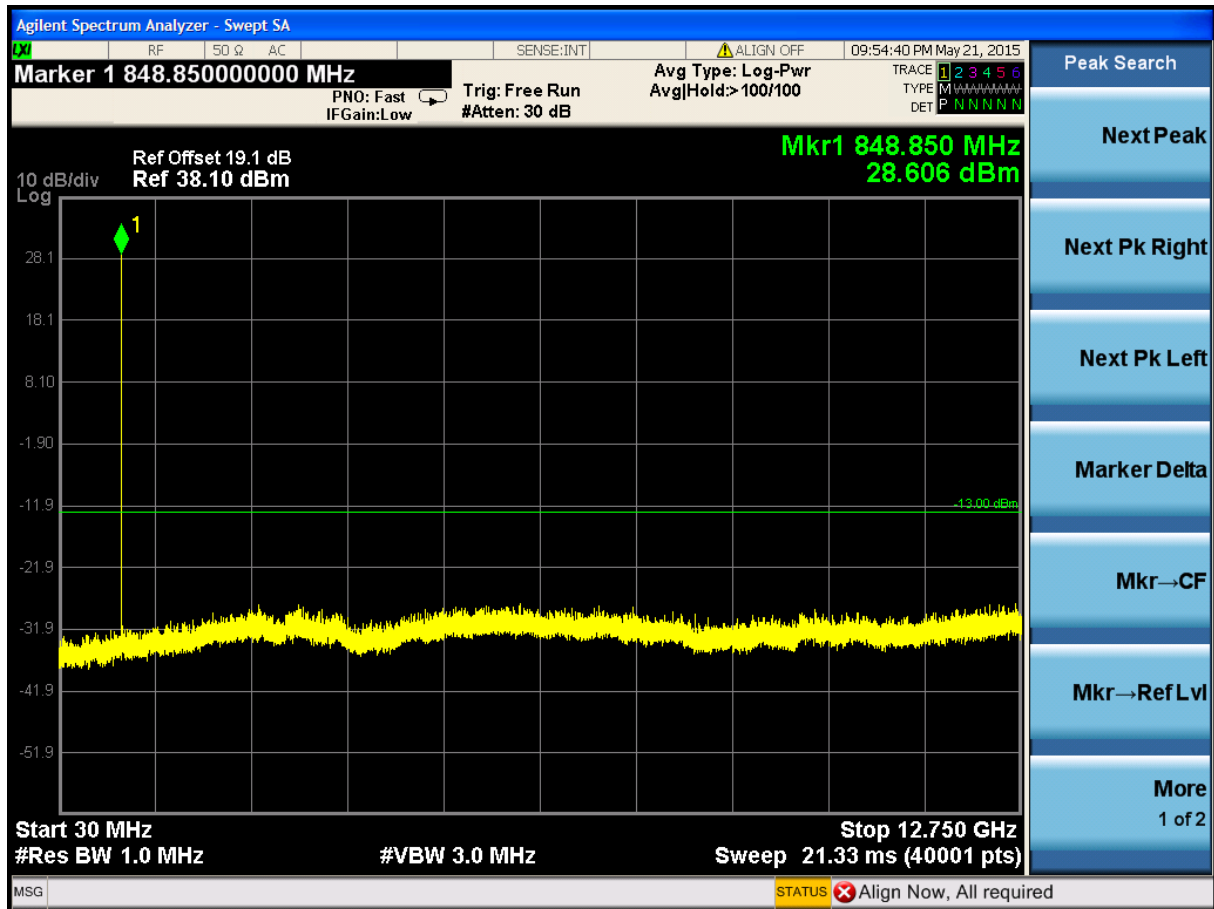


7.1.1.1.2 Test Channel = MCH





7.1.1.1.3 Test Channel = HCH





## 7.1.2 Test Band = GSM1900

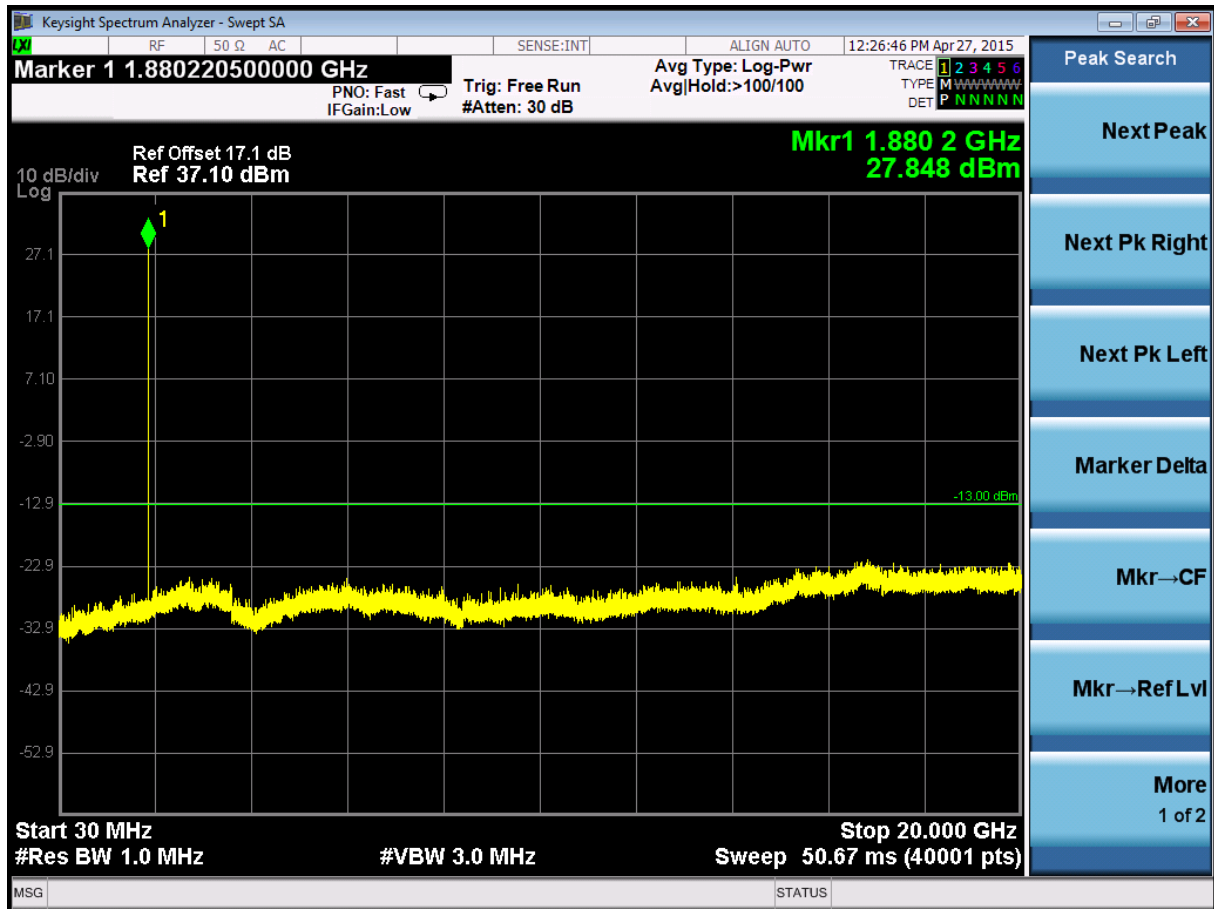
### 7.1.2.1 Test Mode = GSM/TM1

#### 7.1.2.1.1 Test Channel = LCH



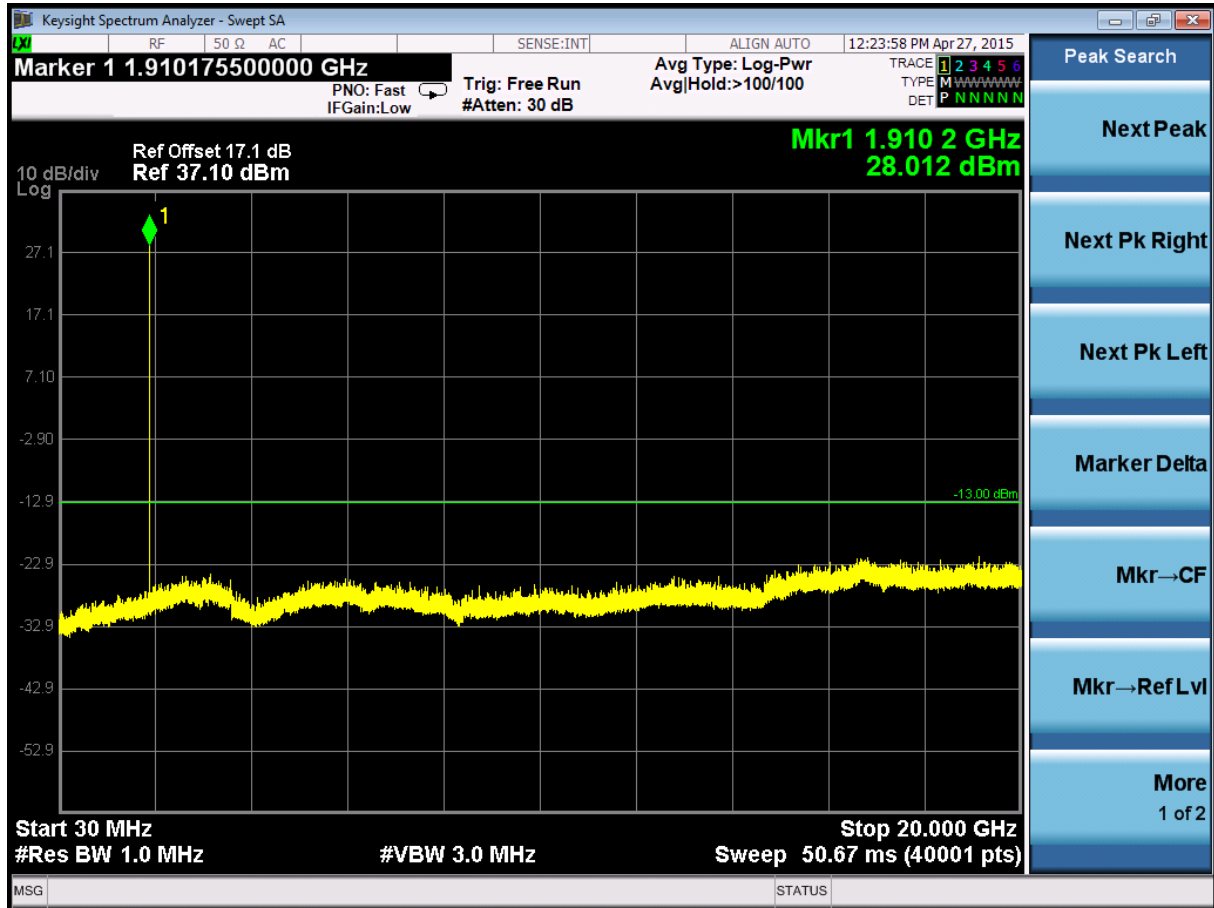


7.1.2.1.2 Test Channel = MCH





7.1.2.1.3 Test Channel = HCH





## 8 Appendix F- Field Strength of Spurious Radiation

### 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

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
87.720	-63.9	-13.0	-50.9	Vertical
129.530	-67.9	-13.0	-54.9	Vertical
196.130	-79.2	-13.0	-66.2	Vertical
286.040	-74.8	-13.0	-61.8	Vertical
458.800	-69.8	-13.0	-56.8	Vertical
647.100	-66.6	-13.0	-53.6	Vertical
1909.400	-34.9	-13.0	-21.9	Vertical
2703.600	-43.0	-13.0	-30.0	Vertical
4120.000	-52.9	-13.0	-39.9	Vertical
5597.000	-54.7	-13.0	-41.7	Vertical
7487.000	-51.1	-13.0	-38.1	Vertical
9727.000	-50.1	-13.0	-37.1	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
104.740	-68.7	-13.0	-55.7	Horizontal
146.920	-75.1	-13.0	-62.1	Horizontal
193.170	-74.7	-13.0	-61.7	Horizontal
323.780	-73.8	-13.0	-60.8	Horizontal
453.200	-67.2	-13.0	-54.2	Horizontal
646.400	-66.8	-13.0	-53.8	Horizontal
1909.400	-35.7	-13.0	-22.7	Horizontal
2635.200	-44.1	-13.0	-31.1	Horizontal
4120.000	-49.9	-13.0	-36.9	Horizontal
5450.000	-51.9	-13.0	-38.9	Horizontal
7417.000	-46.0	-13.0	-33.0	Horizontal
9223.000	-50.4	-13.0	-37.4	Horizontal

**8.1.1.1.2 Test Channel = MCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
104.000	-61.6	-13.0	-48.6	Vertical
143.960	-75.3	-13.0	-62.3	Vertical
186.140	-77.6	-13.0	-64.6	Vertical
307.870	-71.1	-13.0	-58.1	Vertical
482.600	-68.6	-13.0	-55.6	Vertical
645.700	-66.9	-13.0	-53.9	Vertical
1903.700	-31.6	-13.0	-18.6	Vertical
2762.500	-41.3	-13.0	-28.3	Vertical
4183.000	-48.3	-13.0	-35.3	Vertical
5527.000	-53.6	-13.0	-40.6	Vertical
7529.000	-49.7	-13.0	-36.7	Vertical
8922.000	-49.4	-13.0	-36.4	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
96.600	-69.1	-13.0	-56.1	Horizontal
142.110	-68.8	-13.0	-55.8	Horizontal
198.720	-78.9	-13.0	-65.9	Horizontal
277.900	-71.4	-13.0	-58.4	Horizontal
426.600	-69.1	-13.0	-56.1	Horizontal
587.600	-66.9	-13.0	-53.9	Horizontal
1909.400	-36.3	-13.0	-23.3	Horizontal
2658.000	-44.7	-13.0	-31.7	Horizontal
4183.000	-47.7	-13.0	-34.7	Horizontal
5534.000	-51.2	-13.0	-38.2	Horizontal
7529.000	-45.7	-13.0	-32.7	Horizontal
9307.000	-49.8	-13.0	-36.8	Horizontal

**8.1.1.1.3 Test Channel = HCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
103.630	-58.6	-13.0	-45.6	Vertical
142.480	-72.6	-13.0	-59.6	Vertical
235.350	-77.5	-13.0	-64.5	Vertical
344.130	-75.1	-13.0	-62.1	Vertical
463.700	-68.2	-13.0	-55.2	Vertical
654.800	-66.2	-13.0	-53.2	Vertical
1909.400	-30.0	-13.0	-17.0	Vertical
2583.900	-43.4	-13.0	-30.4	Vertical
4239.000	-50.0	-13.0	-37.0	Vertical
5667.000	-53.4	-13.0	-40.4	Vertical
7641.000	-47.2	-13.0	-34.2	Vertical
8929.000	-47.8	-13.0	-34.8	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
95.490	-67.6	-13.0	-54.6	Horizontal
147.660	-68.1	-13.0	-55.1	Horizontal
231.280	-77.5	-13.0	-64.5	Horizontal
352.640	-75.2	-13.0	-62.2	Horizontal
491.700	-67.3	-13.0	-54.3	Horizontal
738.100	-63.7	-13.0	-50.7	Horizontal
1696.600	-41.2	-13.0	-28.2	Horizontal
2310.300	-46.7	-13.0	-33.7	Horizontal
4239.000	-48.6	-13.0	-35.6	Horizontal
5562.000	-51.6	-13.0	-38.6	Horizontal
7641.000	-46.6	-13.0	-33.6	Horizontal
9202.000	-49.8	-13.0	-36.8	Horizontal



**8.1.2 Test Band = GSM1900****8.1.2.1 Test Mode = GSM/TM1****8.1.2.1.1 Test Channel = LCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
91.050	-62.4	-13.0	-49.4	Vertical
131.380	-72.8	-13.0	-59.8	Vertical
196.870	-79.9	-13.0	-66.9	Vertical
299.730	-75.0	-13.0	-62.0	Vertical
513.400	-73.6	-13.0	-60.6	Vertical
787.100	-70.0	-13.0	-57.0	Vertical
3690.000	-52.3	-13.0	-39.3	Vertical
4665.000	-54.8	-13.0	-41.8	Vertical
5550.000	-41.5	-13.0	-28.5	Vertical
7935.000	-50.4	-13.0	-37.4	Vertical
10035.000	-48.4	-13.0	-35.4	Vertical
15075.000	-46.3	-13.0	-33.3	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
105.480	-69.1	-13.0	-56.1	Horizontal
166.900	-73.5	-13.0	-60.5	Horizontal
236.090	-76.7	-13.0	-63.7	Horizontal
366.330	-73.0	-13.0	-60.0	Horizontal
649.900	-71.5	-13.0	-58.5	Horizontal
901.900	-68.7	-13.0	-55.7	Horizontal
3690.000	-55.0	-13.0	-42.0	Horizontal
4725.000	-52.5	-13.0	-39.5	Horizontal
5550.000	-41.0	-13.0	-28.0	Horizontal
7395.000	-47.7	-13.0	-34.7	Horizontal
9255.000	-47.0	-13.0	-34.0	Horizontal
13860.000	-47.4	-13.0	-34.4	Horizontal

**8.1.2.1.2 Test Channel = MCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
98.450	-65.2	-13.0	-52.2	Vertical
144.330	-77.6	-13.0	-64.6	Vertical
221.290	-79.5	-13.0	-66.5	Vertical
351.900	-75.4	-13.0	-62.4	Vertical
513.400	-73.6	-13.0	-60.6	Vertical
721.300	-71.9	-13.0	-58.9	Vertical
3690.000	-52.3	-13.0	-39.3	Vertical
4665.000	-54.8	-13.0	-41.8	Vertical
5550.000	-39.7	-13.0	-26.7	Vertical
7485.000	-52.1	-13.0	-39.1	Vertical
10035.000	-48.4	-13.0	-35.4	Vertical
13065.000	-47.4	-13.0	-34.4	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
112.880	-69.7	-13.0	-56.7	Horizontal
166.900	-73.5	-13.0	-60.5	Horizontal
236.090	-76.7	-13.0	-63.7	Horizontal
366.330	-73.0	-13.0	-60.0	Horizontal
507.800	-74.2	-13.0	-61.2	Horizontal
649.900	-71.5	-13.0	-58.5	Horizontal
3690.000	-55.0	-13.0	-42.0	Horizontal
4515.000	-52.4	-13.0	-39.4	Horizontal
5550.000	-39.2	-13.0	-26.2	Horizontal
7395.000	-47.7	-13.0	-34.7	Horizontal
9255.000	-47.0	-13.0	-34.0	Horizontal
12465.000	-47.3	-13.0	-34.3	Horizontal

**8.1.2.1.3 Test Channel = HCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
91.050	-62.4	-13.0	-49.4	Vertical
149.880	-76.9	-13.0	-63.9	Vertical
238.680	-77.7	-13.0	-64.7	Vertical
354.120	-75.4	-13.0	-62.4	Vertical
509.200	-74.5	-13.0	-61.5	Vertical
745.100	-71.6	-13.0	-58.6	Vertical
3690.000	-52.3	-13.0	-39.3	Vertical
4665.000	-54.8	-13.0	-41.8	Vertical
5550.000	-40.9	-13.0	-27.9	Vertical
7320.000	-53.1	-13.0	-40.1	Vertical
9255.000	-49.8	-13.0	-36.8	Vertical
12045.000	-47.6	-13.0	-34.6	Vertical

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
99.560	-71.7	-13.0	-58.7	Horizontal
166.900	-73.5	-13.0	-60.5	Horizontal
236.090	-76.7	-13.0	-63.7	Horizontal
366.330	-73.0	-13.0	-60.0	Horizontal
500.800	-73.8	-13.0	-60.8	Horizontal
649.900	-71.5	-13.0	-58.5	Horizontal
3690.000	-55.0	-13.0	-42.0	Horizontal
4515.000	-52.4	-13.0	-39.4	Horizontal
5550.000	-40.3	-13.0	-27.3	Horizontal
7290.000	-48.6	-13.0	-35.6	Horizontal
9255.000	-47.0	-13.0	-34.0	Horizontal
12465.000	-47.3	-13.0	-34.3	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 190 for GSM850 and Channel 661 for GSM1900)and only the data of the worst case show in the test report.



## 9 Appendix G- Frequency Stability

### 9.1 For GSM

#### 9.1.1 Frequency Error VS. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	-3.14	-0.00381	PASS
				VN	-8.04	-0.00975	PASS
				VH	0.48	0.00058	PASS
		MCH	TN	VL	-7.58	-0.00906	PASS
				VN	-6.36	-0.00760	PASS
				VH	-5.00	-0.00598	PASS
		HCH	TN	VL	-0.64	-0.00075	PASS
				VN	-5.36	-0.00631	PASS
				VH	-8.78	-0.01034	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-12.58	-0.00680	PASS
				VN	-9.93	-0.00537	PASS
				VH	-8.40	-0.00454	PASS
		MCH	TN	VL	-2.26	-0.00120	PASS
				VN	-1.71	-0.00091	PASS
				VH	-7.40	-0.00394	PASS
		HCH	TN	VL	-1.13	-0.00059	PASS
				VN	-8.36	-0.00438	PASS
				VH	-19.04	-0.00997	PASS

**9.1.2 Frequency Error VS. Temperature:**

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	-2.16	-0.00262	PASS
				-20	-1.46	-0.00177	PASS
				-10	-1.78	-0.00216	PASS
				0	-3.72	-0.00451	PASS
				10	1.15	0.00140	PASS
				20	2.38	0.00289	PASS
				30	2.38	0.00289	PASS
				40	0.90	0.00109	PASS
				50	6.45	0.00783	PASS
		MCH	VN	-30	0.51	0.00061	PASS
				-20	3.22	0.00385	PASS
				-10	-0.35	-0.00042	PASS
				0	-1.70	-0.00203	PASS
				10	0.65	0.00078	PASS
				20	-0.90	-0.00108	PASS
				30	1.16	0.00139	PASS
				40	1.78	0.00213	PASS
				50	2.62	0.00313	PASS
		HCH	VN	-30	0.58	0.00068	PASS
				-20	5.23	0.00616	PASS
				-10	-0.39	-0.00046	PASS
				0	-0.84	-0.00099	PASS
				10	-0.63	-0.00074	PASS
				20	-0.89	-0.00105	PASS
				30	-1.09	-0.00128	PASS
				40	-1.99	-0.00234	PASS
				50	0.08	0.00009	PASS



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GSM1900	GSM/TM1	LCH	VN	-30	-14.91	-0.00806	PASS
				-20	-8.85	-0.00478	PASS
				-10	-14.02	-0.00758	PASS
				0	-2.20	-0.00119	PASS
				10	1.67	0.00090	PASS
				20	-5.04	-0.00272	PASS
				30	-13.85	-0.00749	PASS
				40	-10.43	-0.00564	PASS
				50	1.32	0.00071	PASS
		MCH	VN	-30	-5.78	-0.00307	PASS
				-20	-7.42	-0.00395	PASS
				-10	-13.16	-0.00700	PASS
				0	-0.70	-0.00037	PASS
				10	-15.36	-0.00817	PASS
				20	-7.67	-0.00408	PASS
				30	2.65	0.00141	PASS
				40	-8.65	-0.00460	PASS
				50	-11.69	-0.00622	PASS
		HCH	VN	-30	-14.46	-0.00757	PASS
				-20	-5.18	-0.00271	PASS
				-10	-6.73	-0.00352	PASS
				0	-11.70	-0.00613	PASS
				10	1.08	0.00057	PASS
				20	2.63	0.00138	PASS
				30	-6.31	-0.00330	PASS
				40	-13.61	-0.00713	PASS
				50	-2.18	-0.00114	PASS

The End

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