



# Appendix for Test Report



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

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	ERP[dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.03	28.86	33	PASS
		MCH	32.09	28.95	33	PASS
		HCH	32.09	28.91	33	PASS
WCDMA850	UMTS/TM1	LCH	23.55	20.43	38.5	PASS
		MCH	23.67	20.56	38.5	PASS
		HCH	23.46	20.33	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.81	28.63	33	PASS
		MCH	29.7	28.55	33	PASS
		HCH	29.74	28.51	33	PASS
WCDMA1900	UMTS/TM1	LCH	23.18	21.95	38.5	PASS
		MCH	22.87	21.69	38.5	PASS
		HCH	22.61	21.43	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,

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

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

b, SGP=Signal Generator Level

Note2: RBW > emission bandwidth, VBW > 3 x RBW.



## 2Appendix\_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	0.11	13	PASS
		HCH	0.11	13	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	3.19	13	PASS
		MCH	2.93	13	PASS
		HCH	3.10	13	PASS

### 3Appendix\_C: Modulation Characteristics

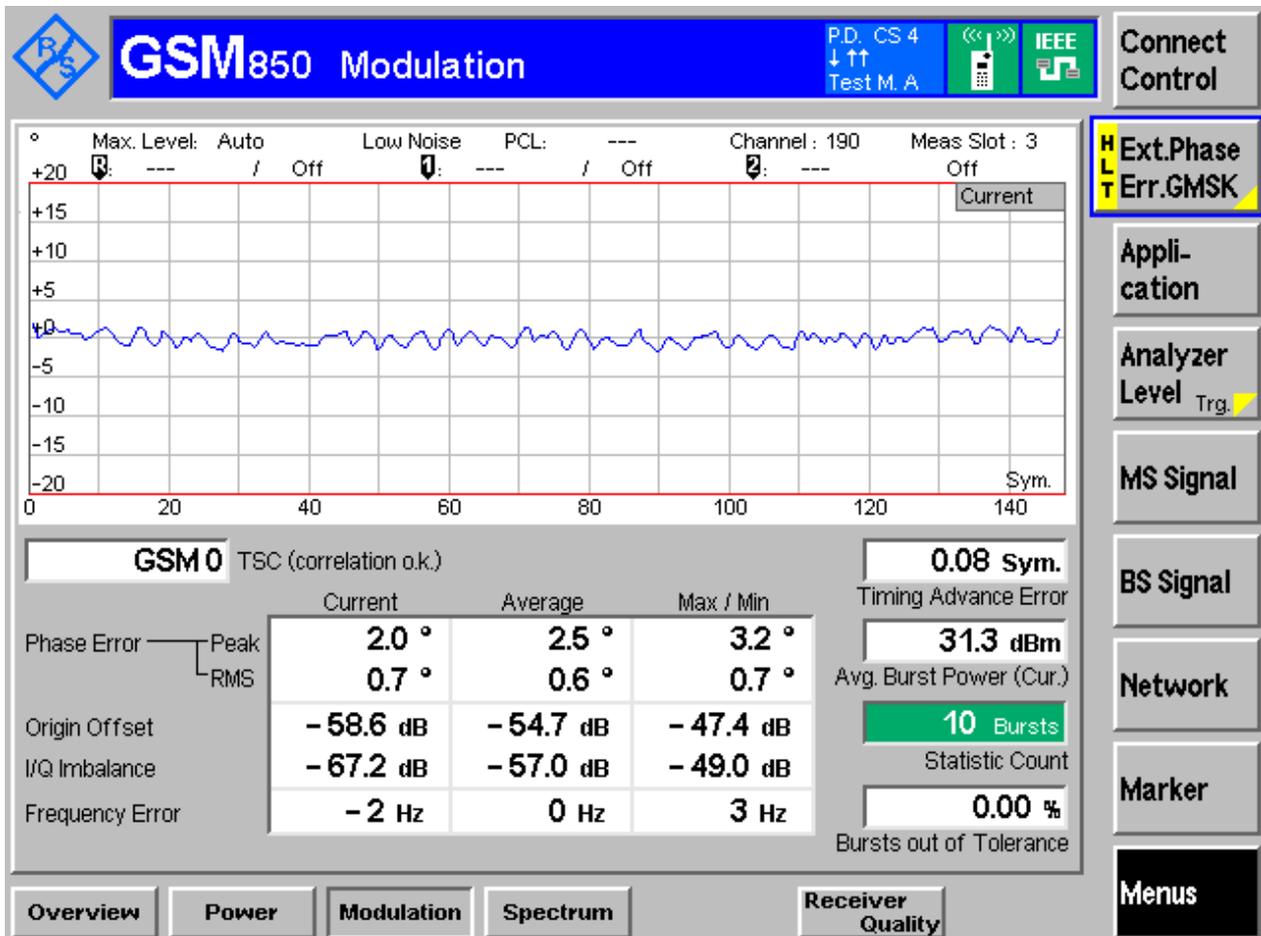
#### Part I - Test Plots

#### 3.1 For GSM

#### 3.1.1 Test Band = GSM850

#### 3.1.1.1 Test Mode = GSM/TM1

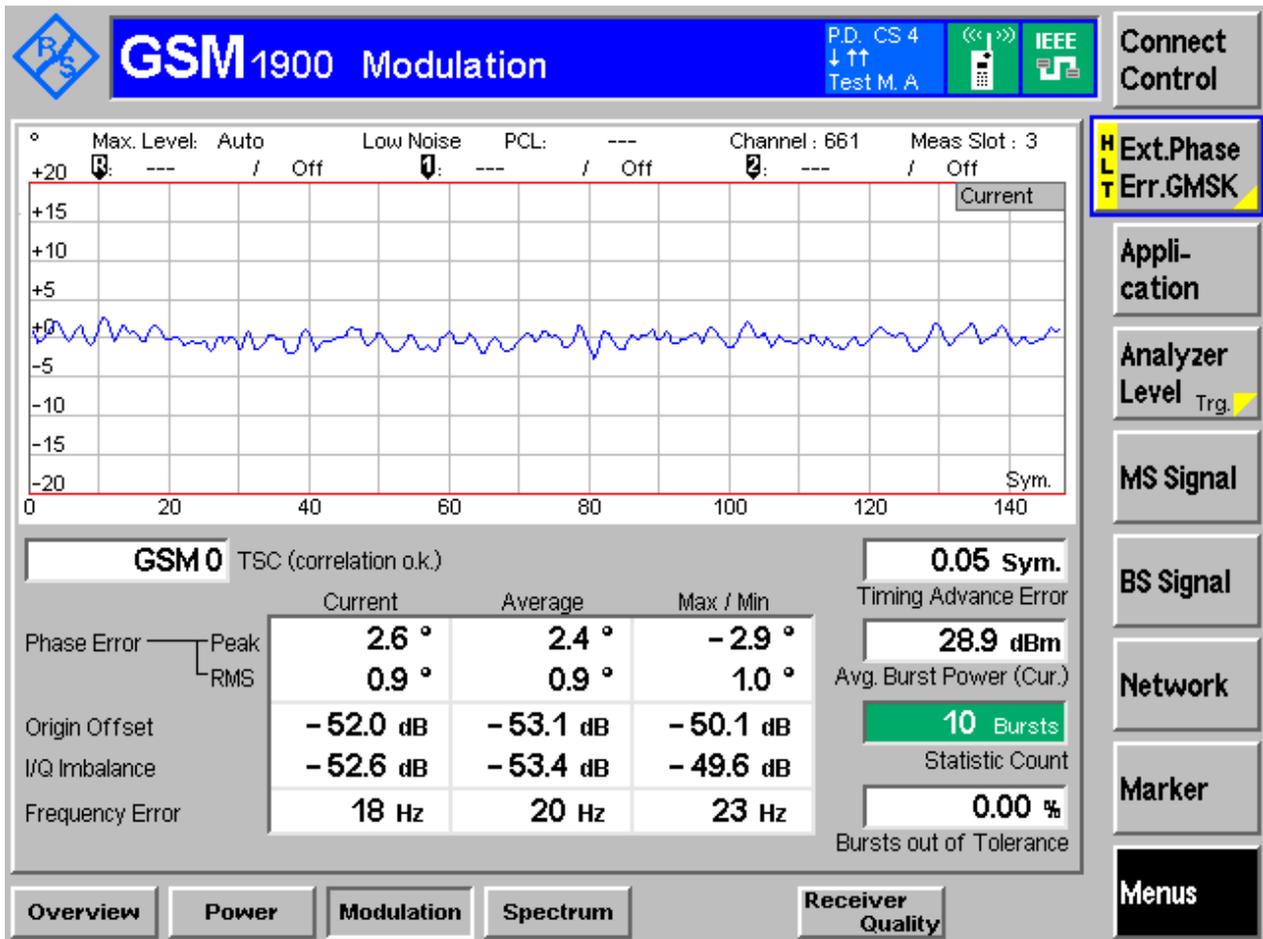
#### 3.1.1.1.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH

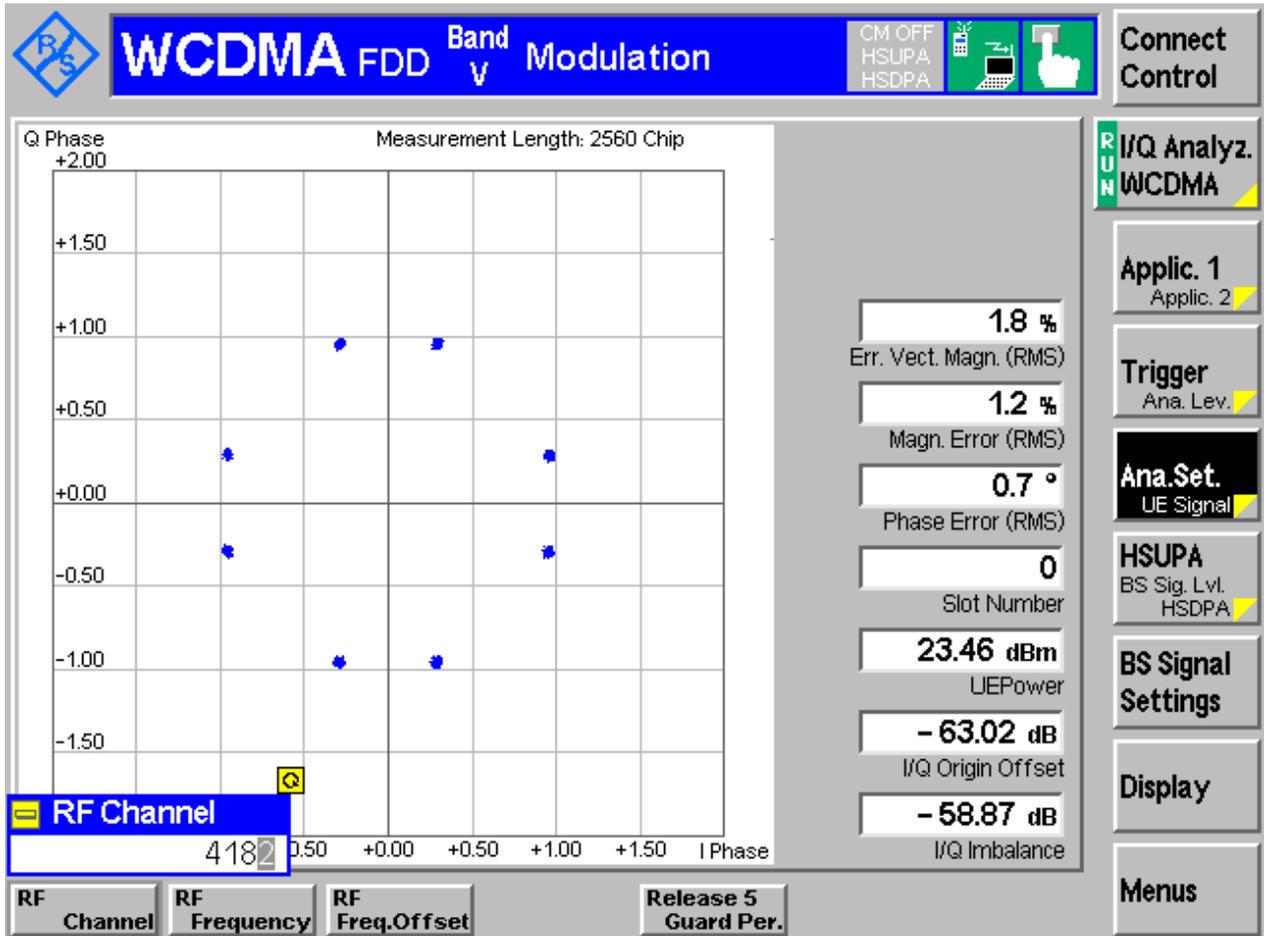


### 3.2 For UMTS

#### 3.2.1 Test Band = WCDMA850

##### 3.2.1.1 Test Mode = UMTS/TM1

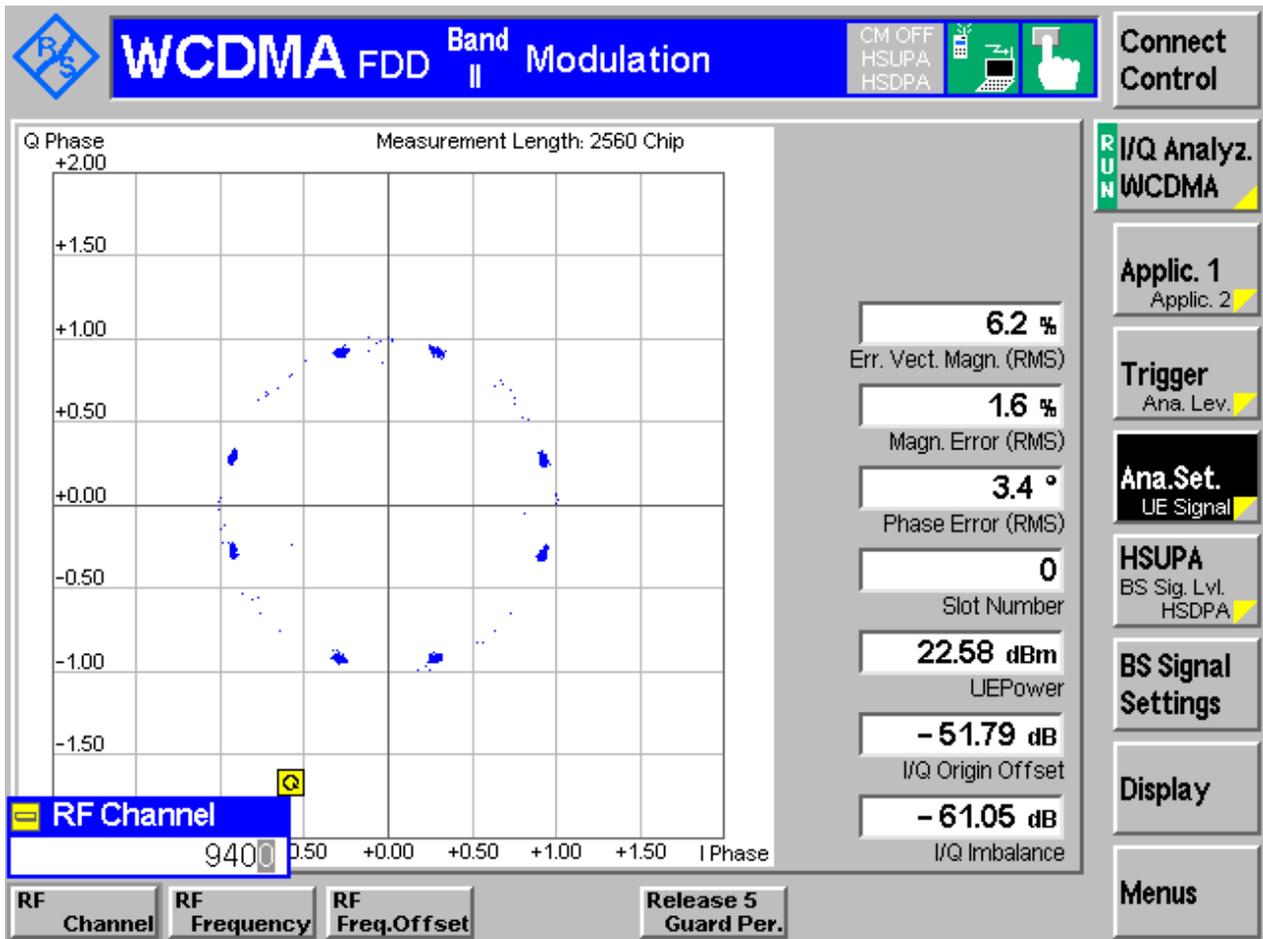
##### 3.2.1.1.1 Test Channel = MCH



3.2.2 Test Band = WCDMA1900

3.2.2.1 Test Mode = UMTS/TM1

3.2.2.1.1 Test Channel = MCH





## 4Appendix\_D: Bandwidth

### Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	247.79	319.23	Pass
		MCH	242.89	315.27	Pass
		HCH	243.88	320.14	Pass
GSM1900	GSM/TM1	LCH	247.02	319.44	Pass
		MCH	246.38	313.02	Pass
		HCH	246.14	319.43	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.16	4.67	Pass
		MCH	4.17	4.68	Pass
		HCH	4.16	4.69	Pass
WCDMA1900	UMTS/TM1	LCH	4.16	4.67	Pass
		MCH	4.17	4.68	Pass
		HCH	4.17	4.68	Pass



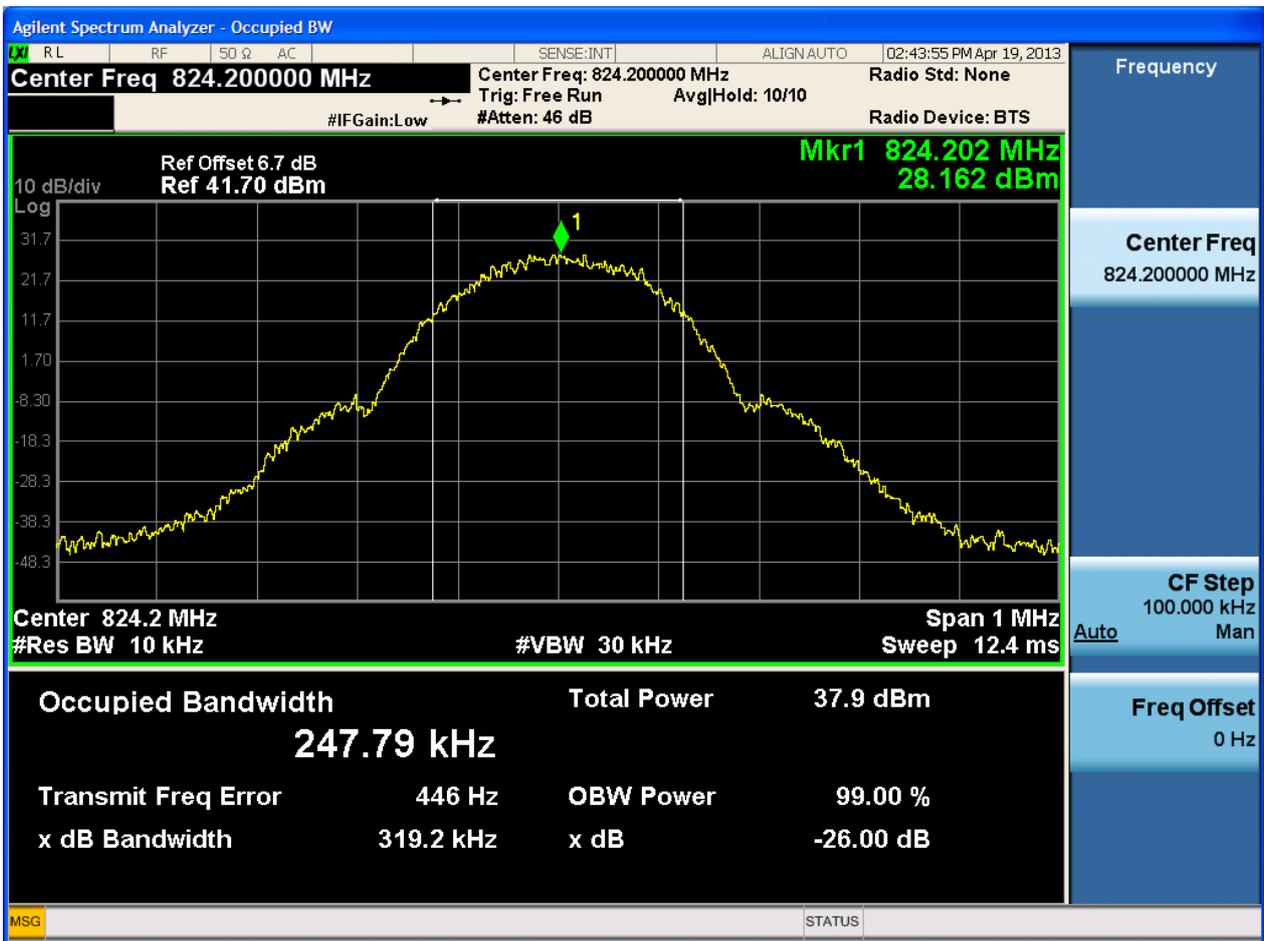
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

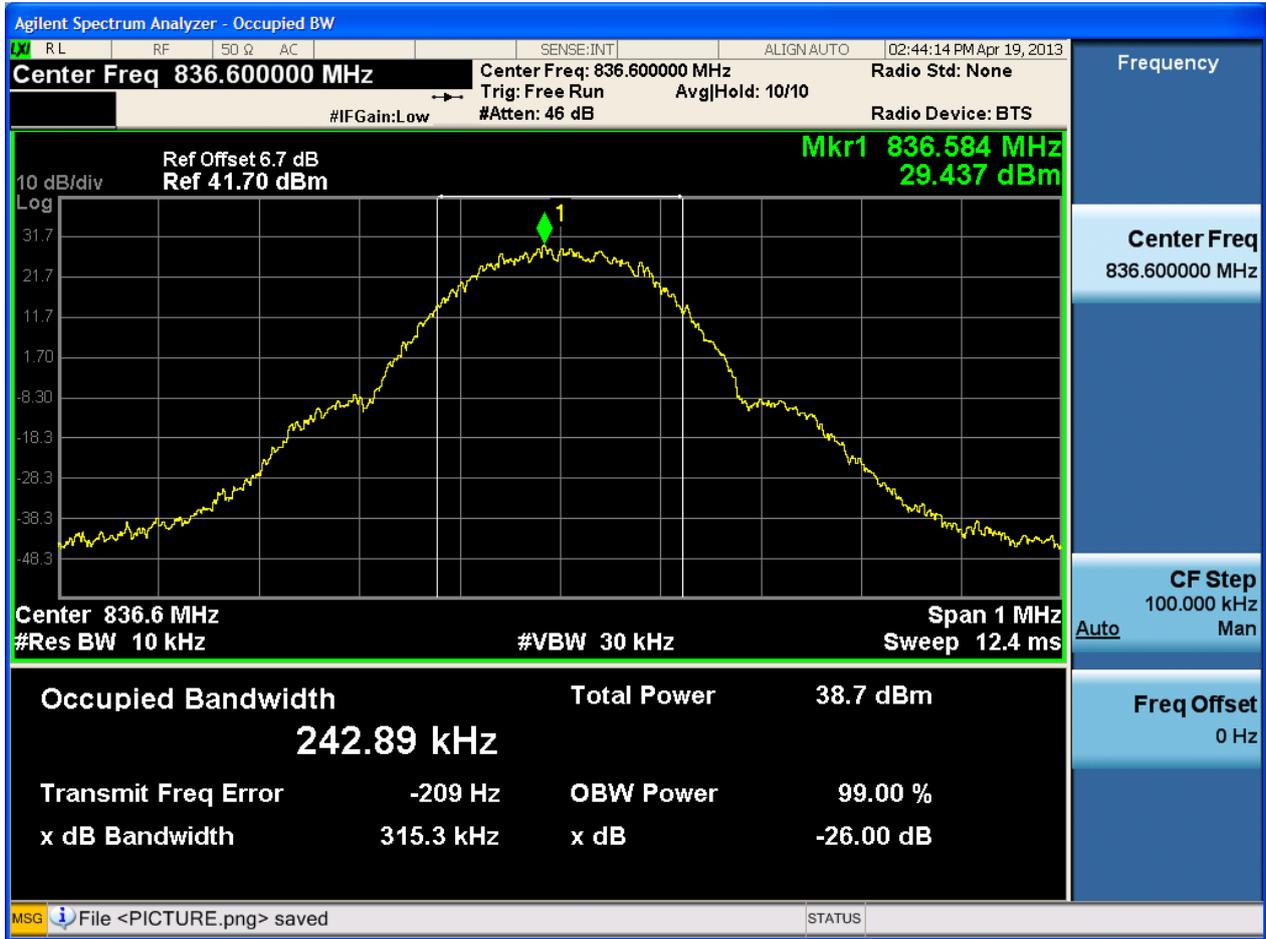
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH





4.1.1.1.2 Test Channel = MCH





4.1.1.1.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



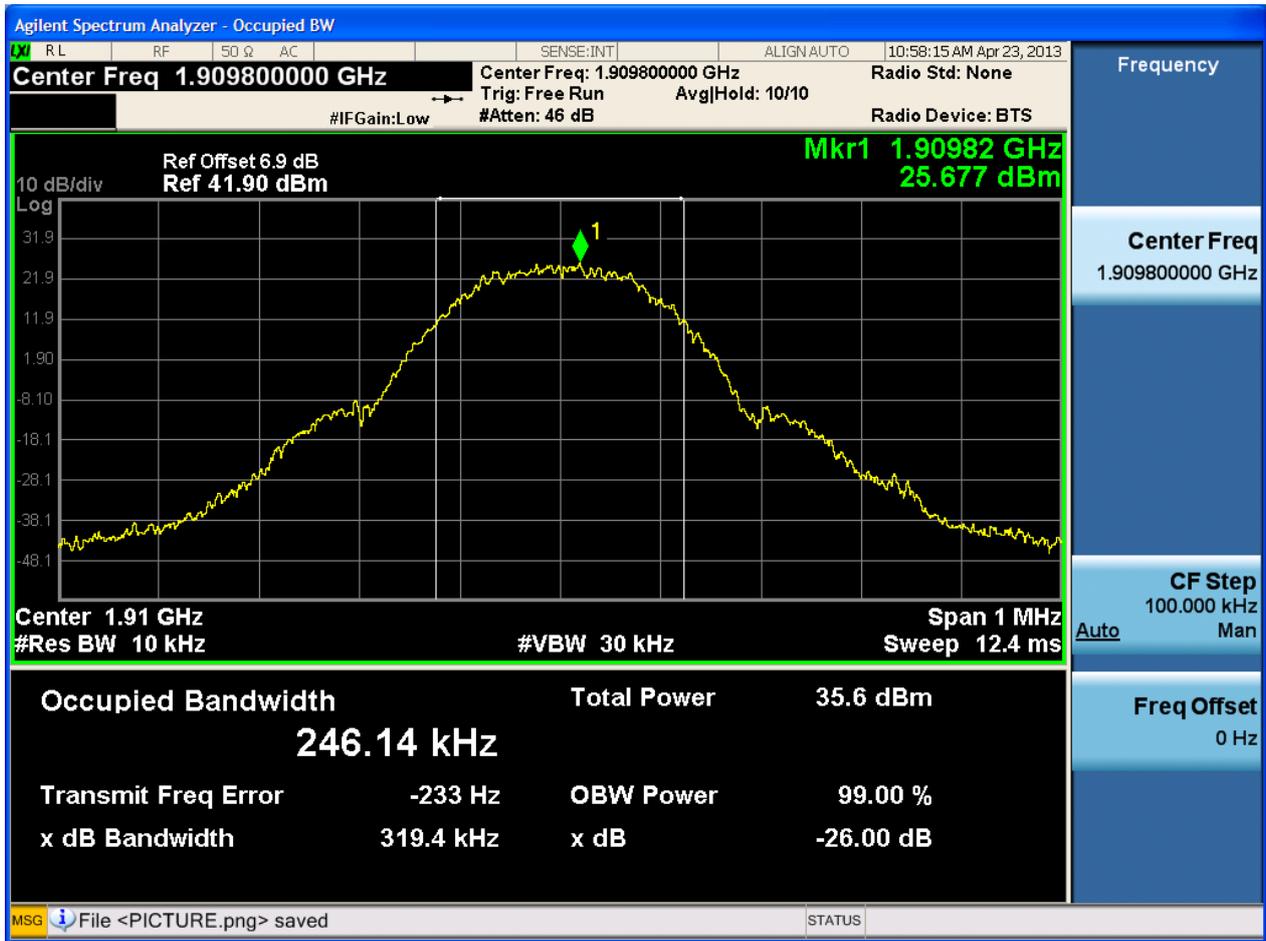


4.1.2.1.2 Test Channel = MCH





4.1.2.1.3 Test Channel = HCH



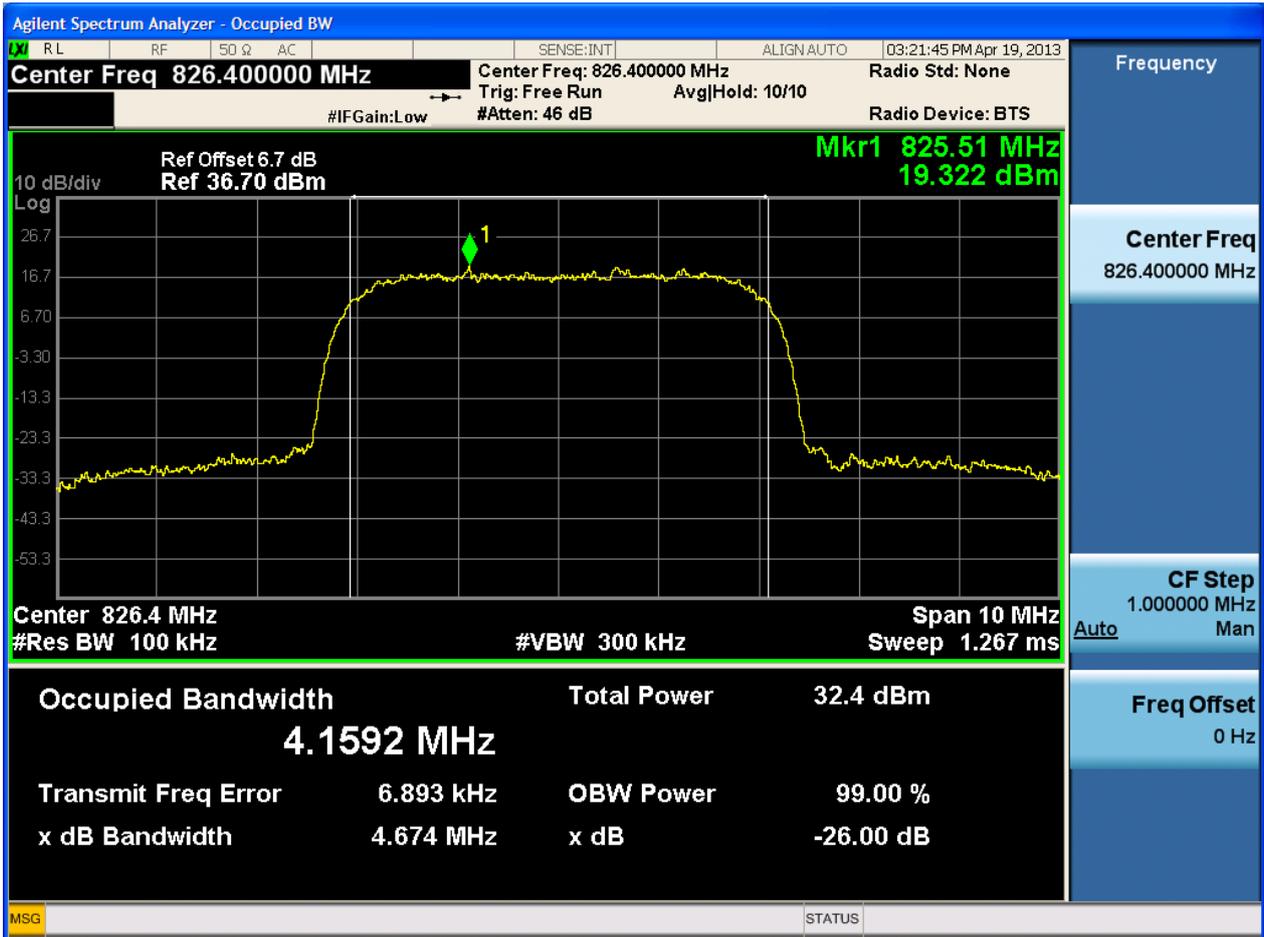


### 4.2 For UMTS

#### 4.2.1 Test Band = WCDMA850

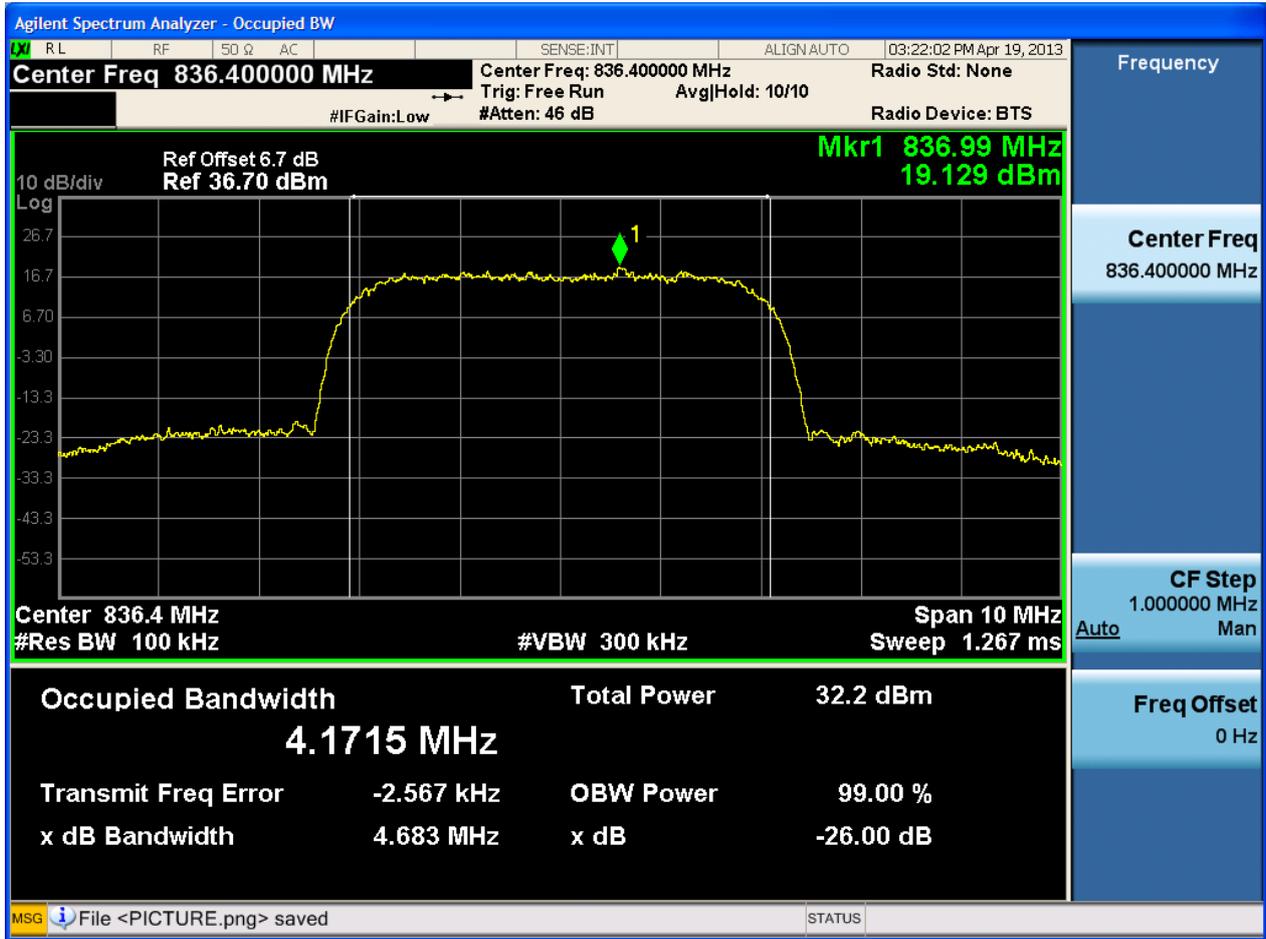
##### 4.2.1.1 Test Mode = UMTS/TM1

##### 4.2.1.1.1 Test Channel = LCH



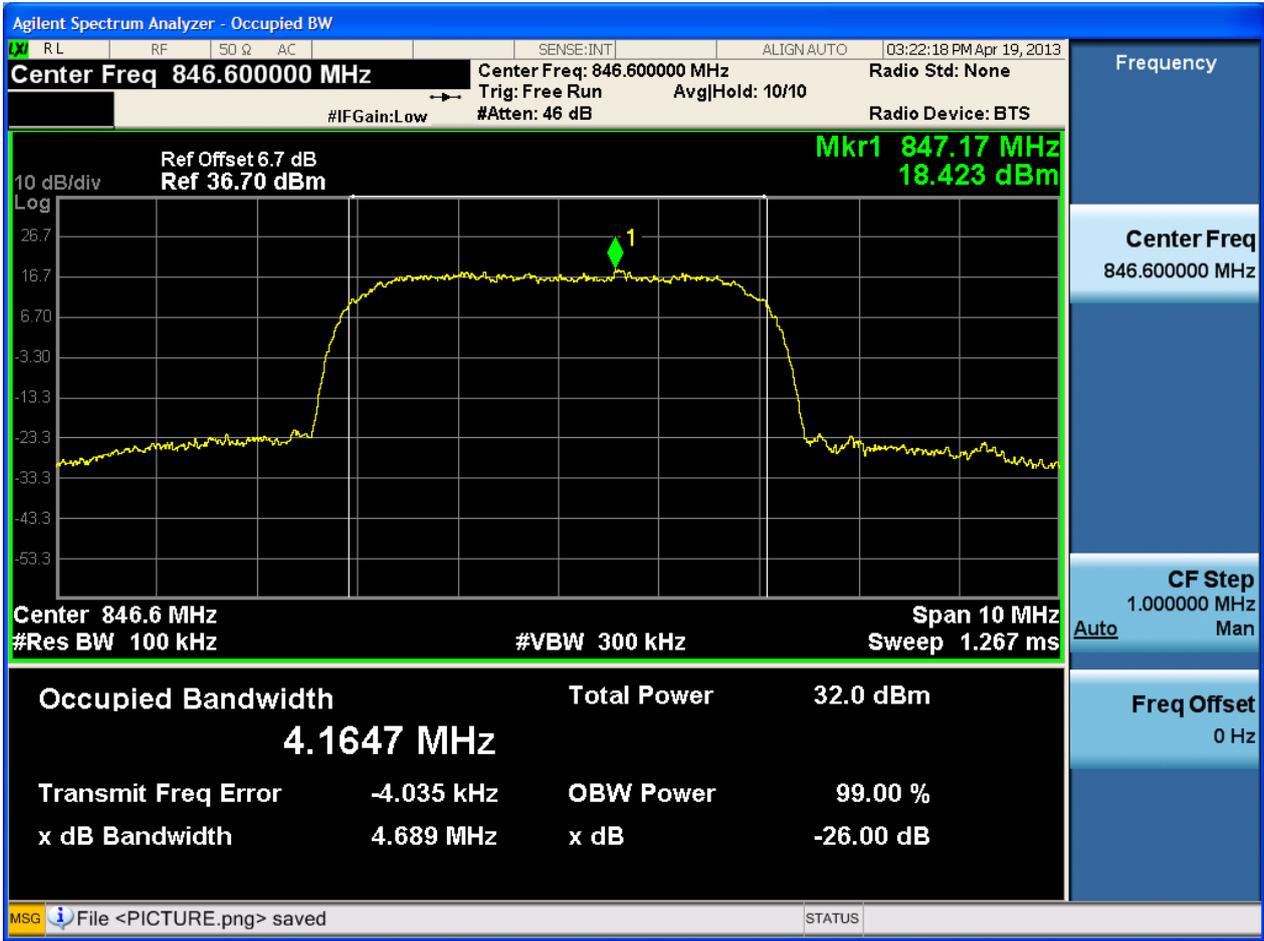


### 4.2.1.1.2 Test Channel = MCH





4.2.1.1.3 Test Channel = HCH

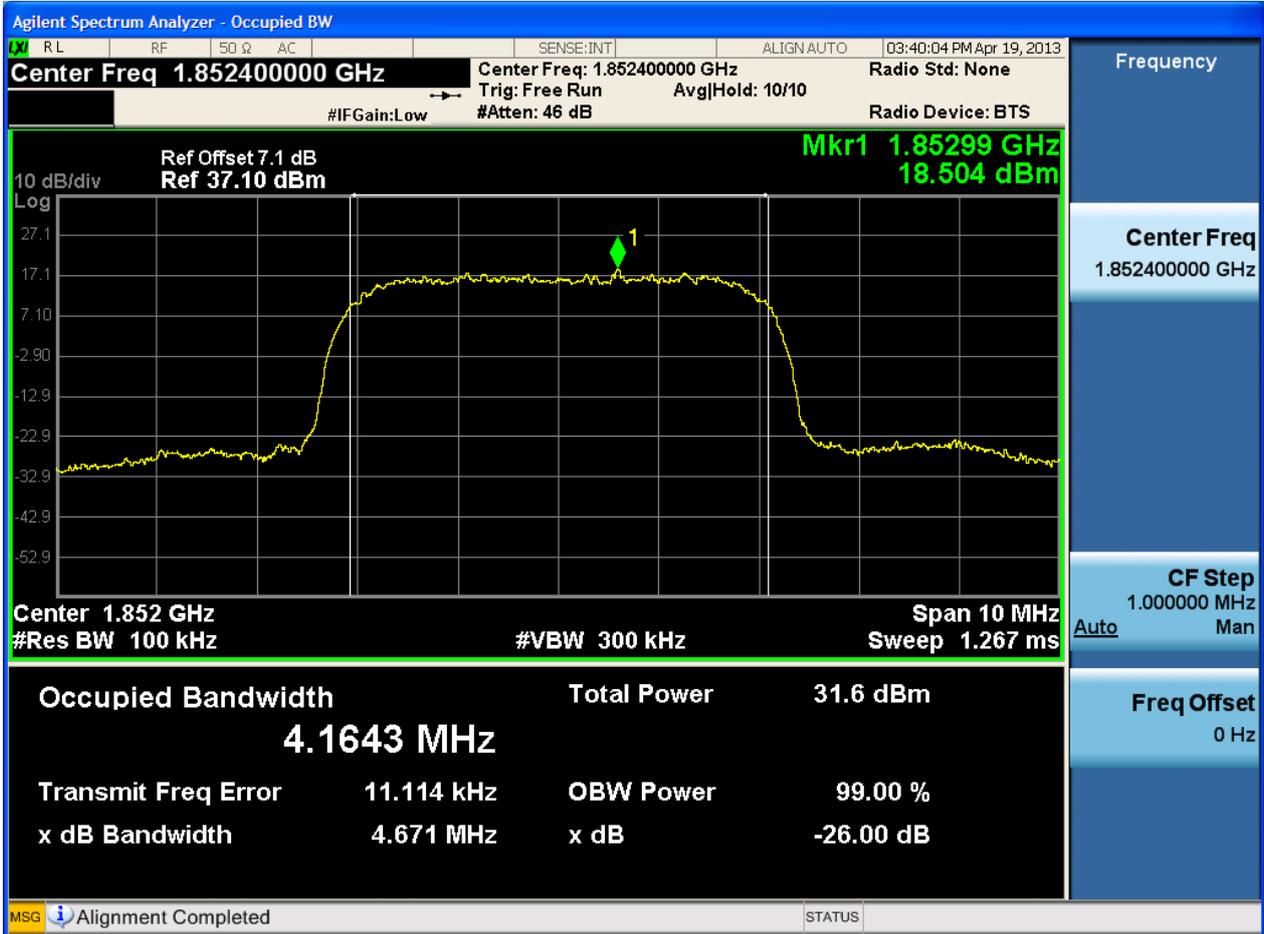




4.2.3 Test Band = WCDMA1900

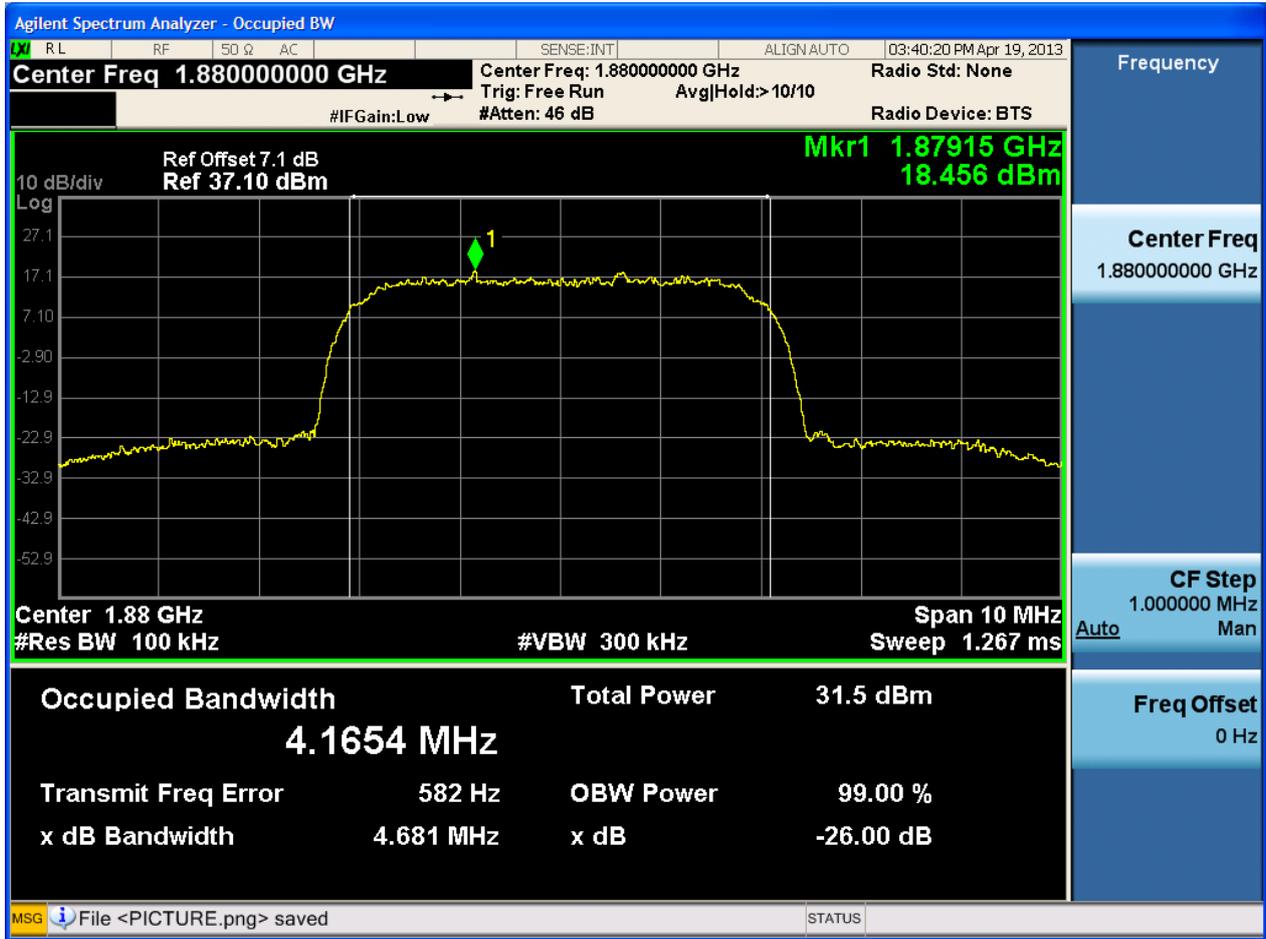
4.2.3.1 Test Mode = UMTS/TM1

4.2.3.1.1 Test Channel = LCH



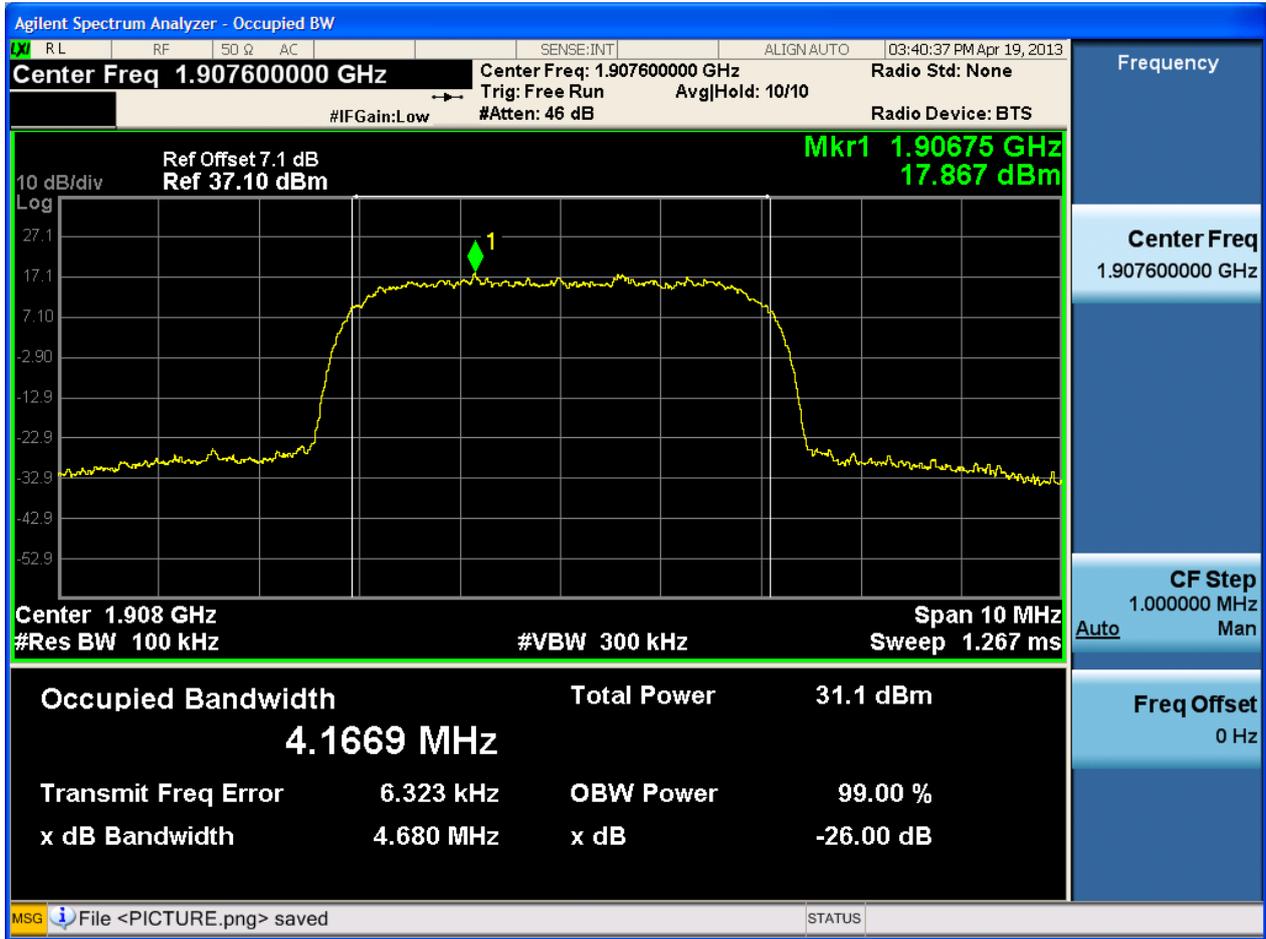


4.2.3.1.2 Test Channel = MCH





### 4.2.3.1.3 Test Channel = HCH





## 5Appendix\_E: Band Edges Compliance

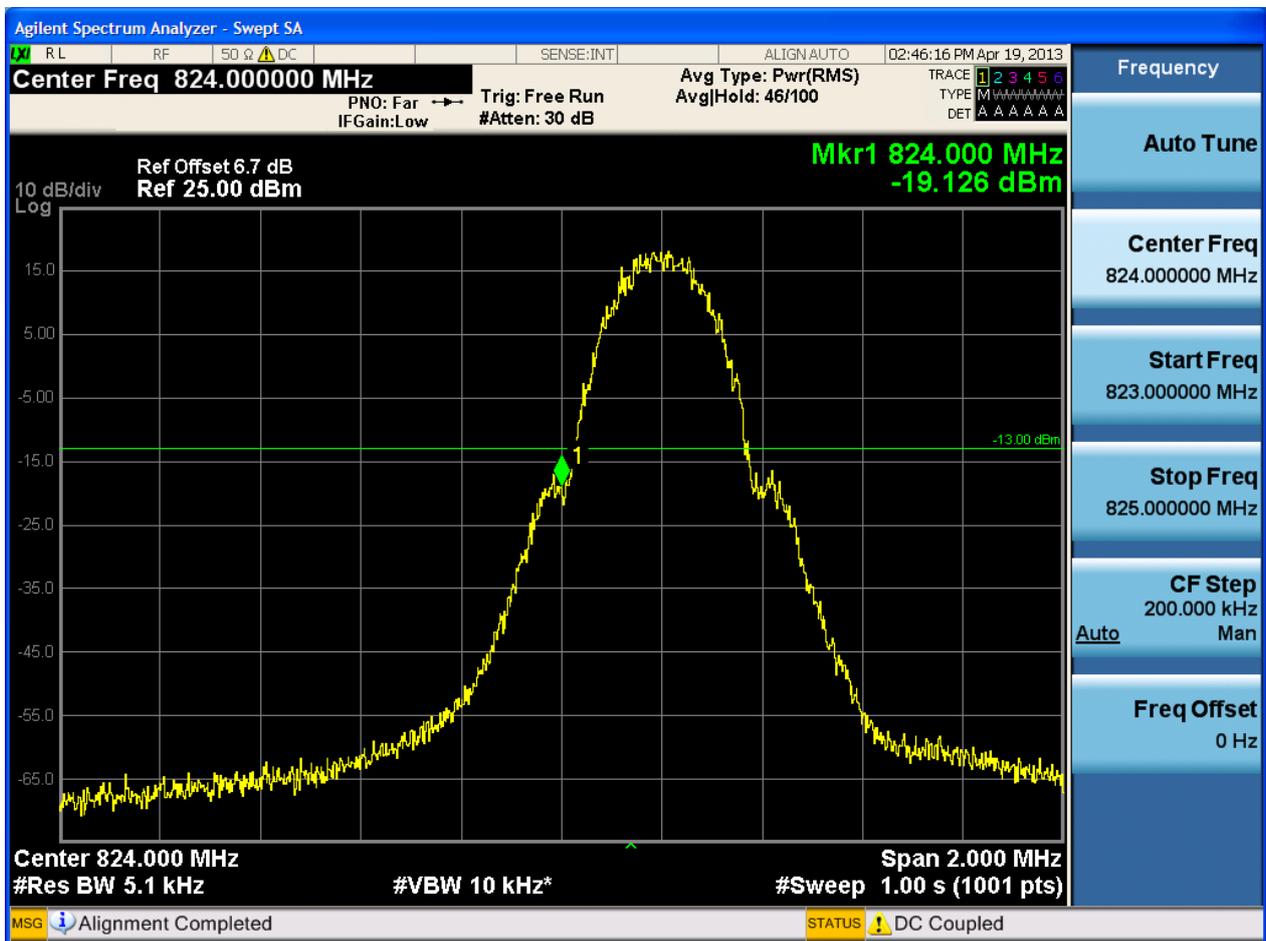
### Part I - Test Plots

#### 5.1 For GSM

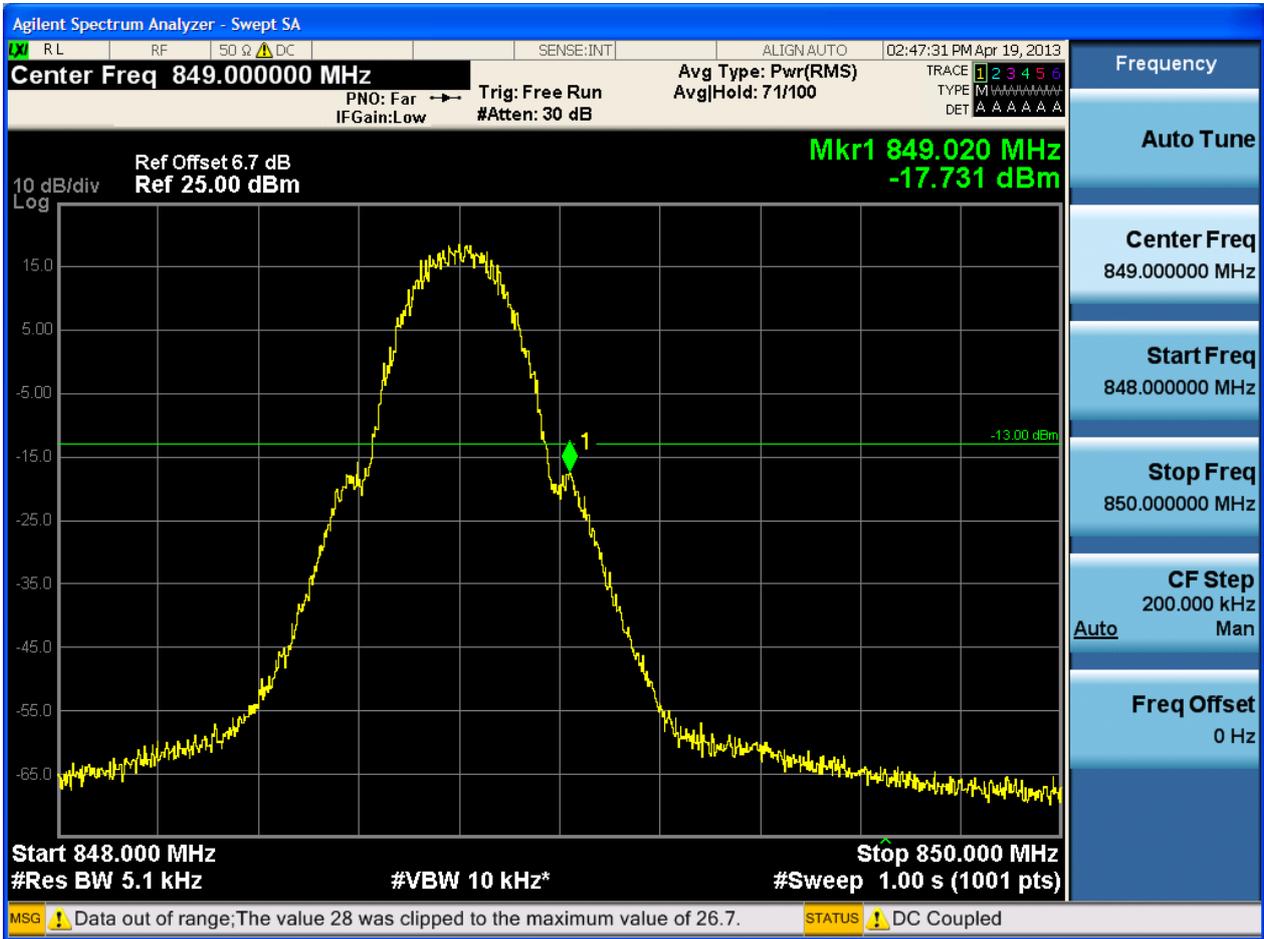
##### 5.1.1 Test Band = GSM850

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

##### 5.1.1.1.1 Test Channel = LCH



5.1.1.1.2 Test Channel = HCH

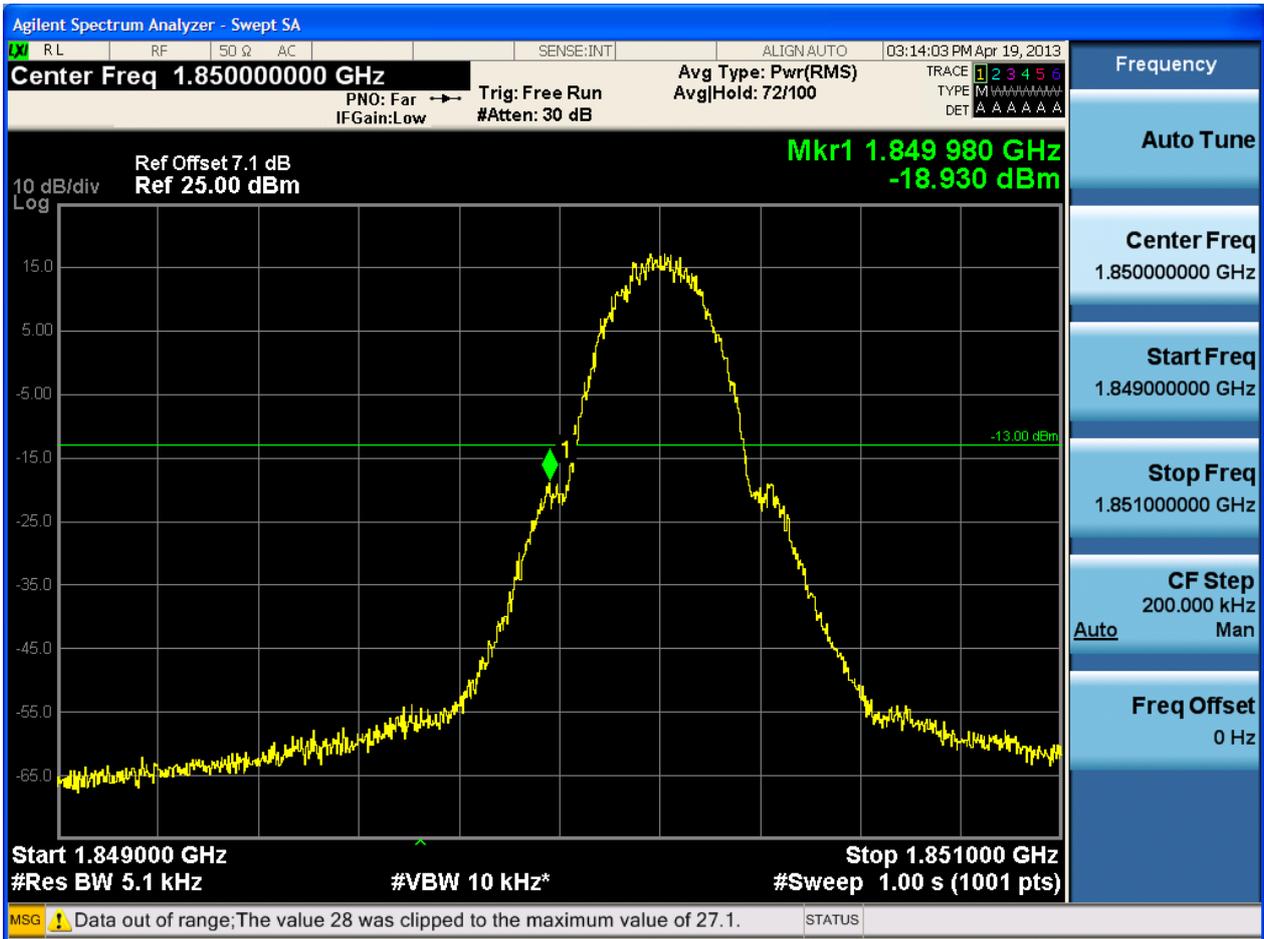




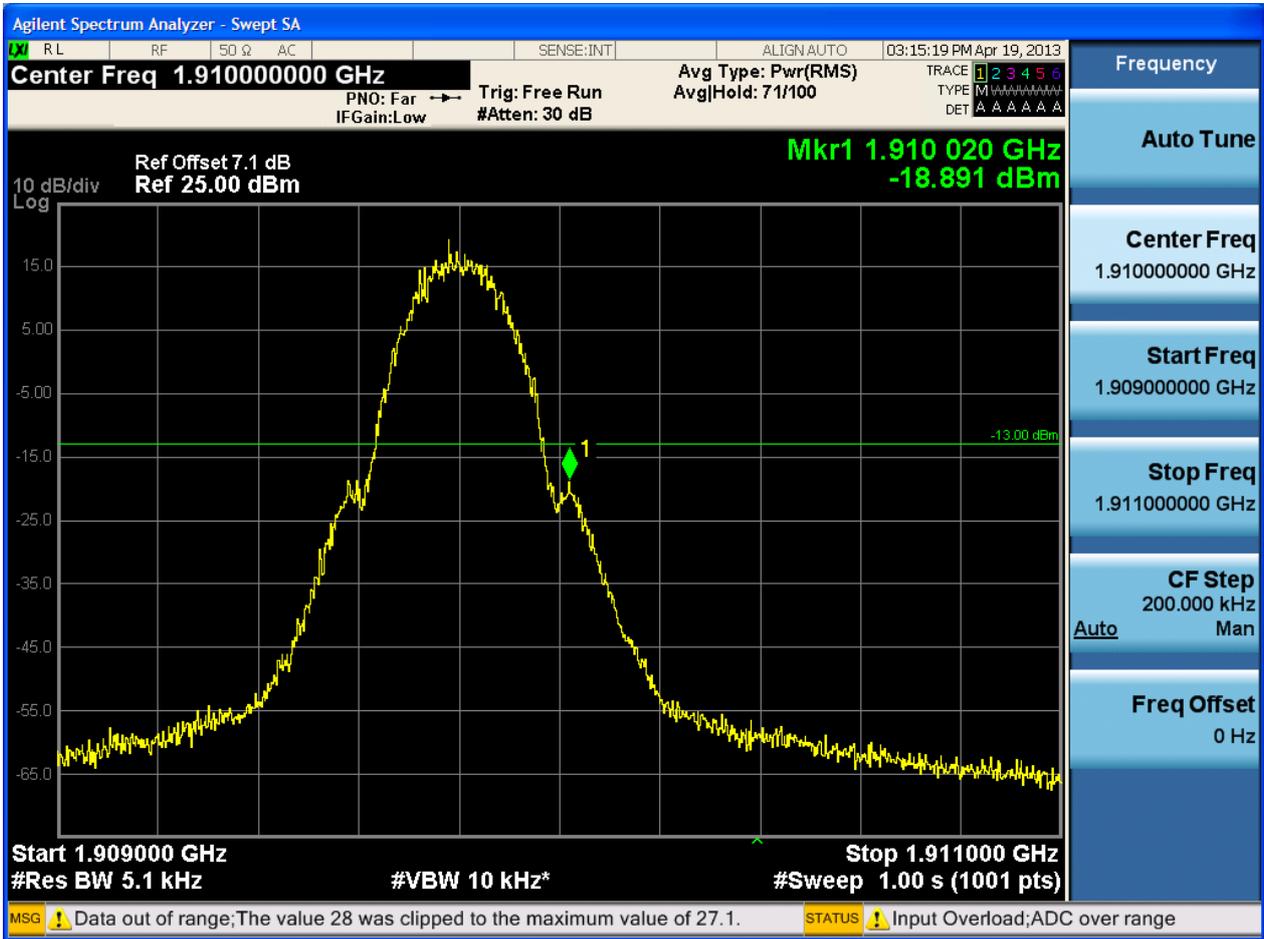
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



5.1.2.1.2 Test Channel = HCH



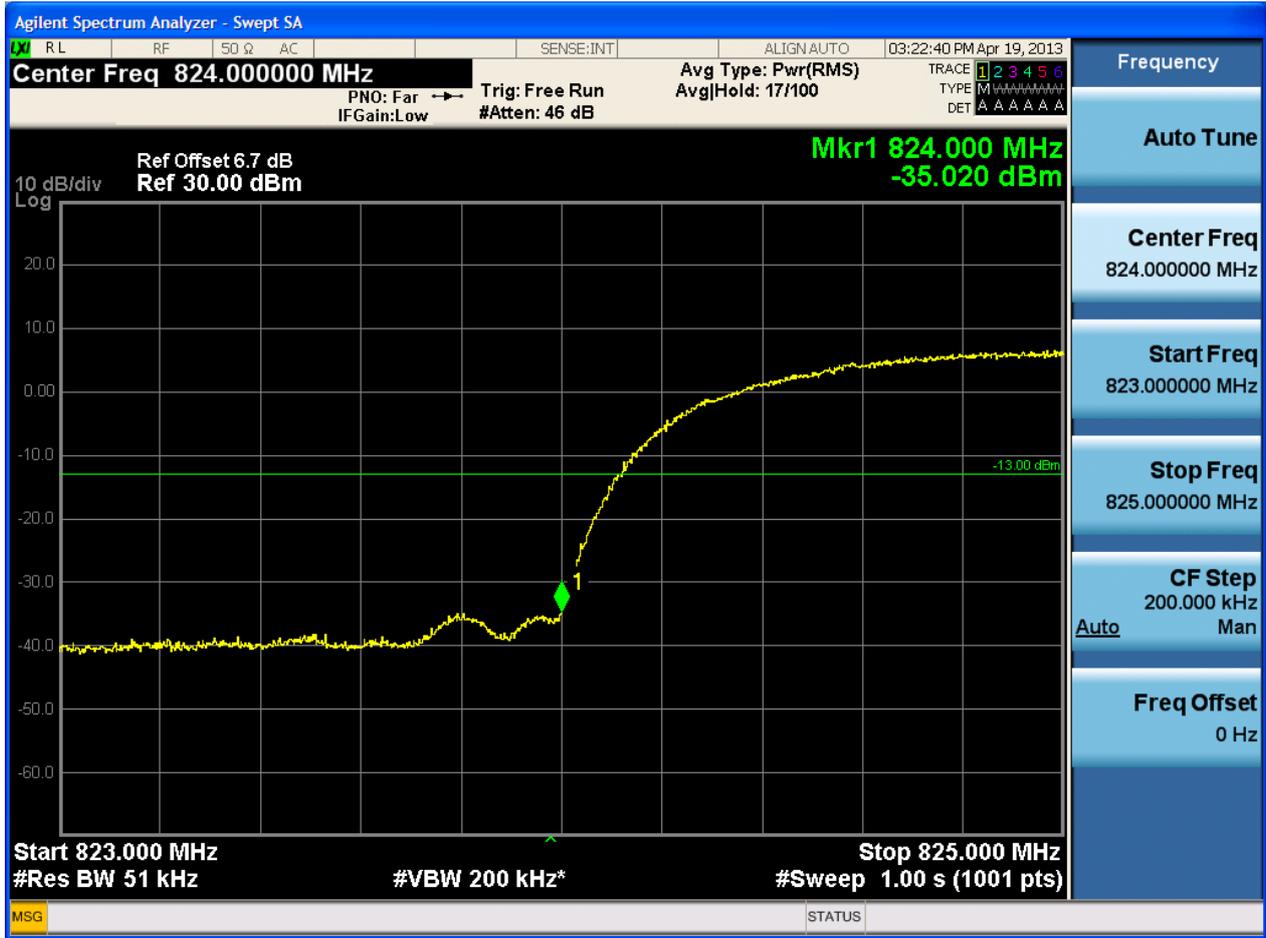


## 5.2 For UMTS

### 5.2.1 Test Band = WCDMA850

#### 5.2.1.1 Test Mode = UMTS/TM1

##### 5.2.1.1.1 Test Channel = LCH



5.2.1.1.2 Test Channel = HCH





### 5.2.3 Test Band = WCDMA1900

#### 5.2.3.1 Test Mode = UMTS/TM1

##### 5.2.3.1.1 Test Channel = LCH



5.2.3.1.2 Test Channel = HCH





## 6Appendix\_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.

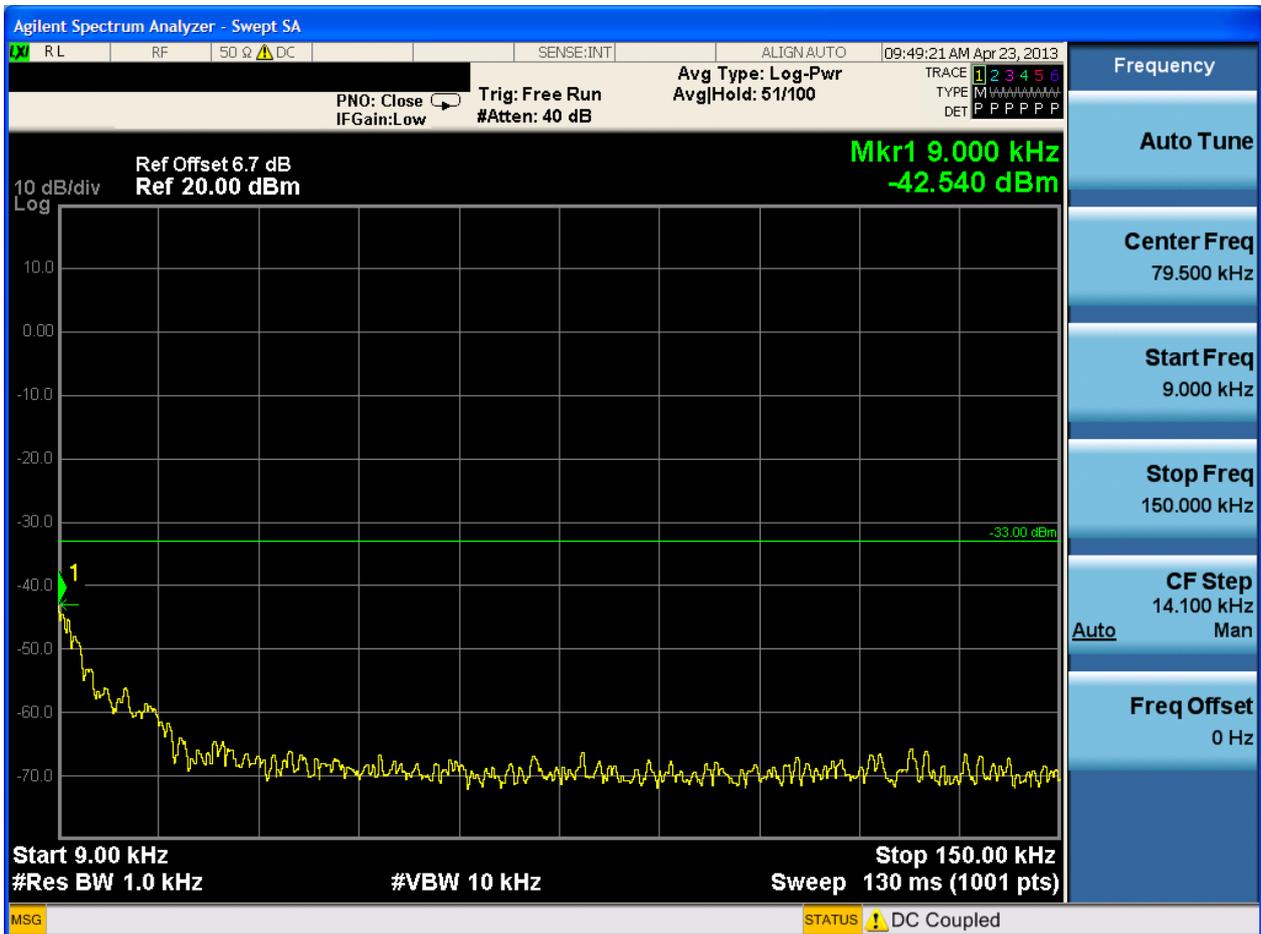
### Part I - Test Plots

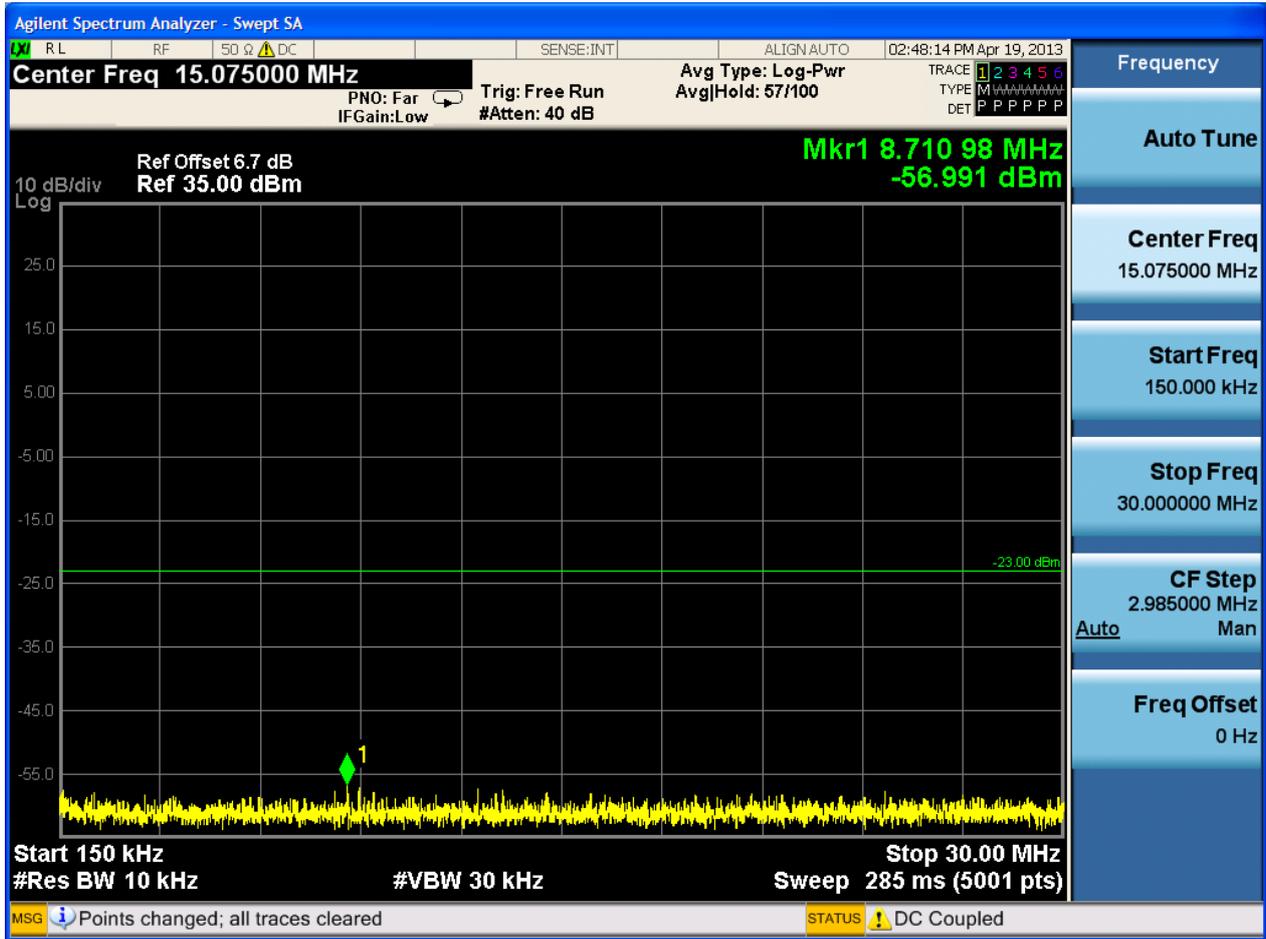
#### 6.1 For GSM

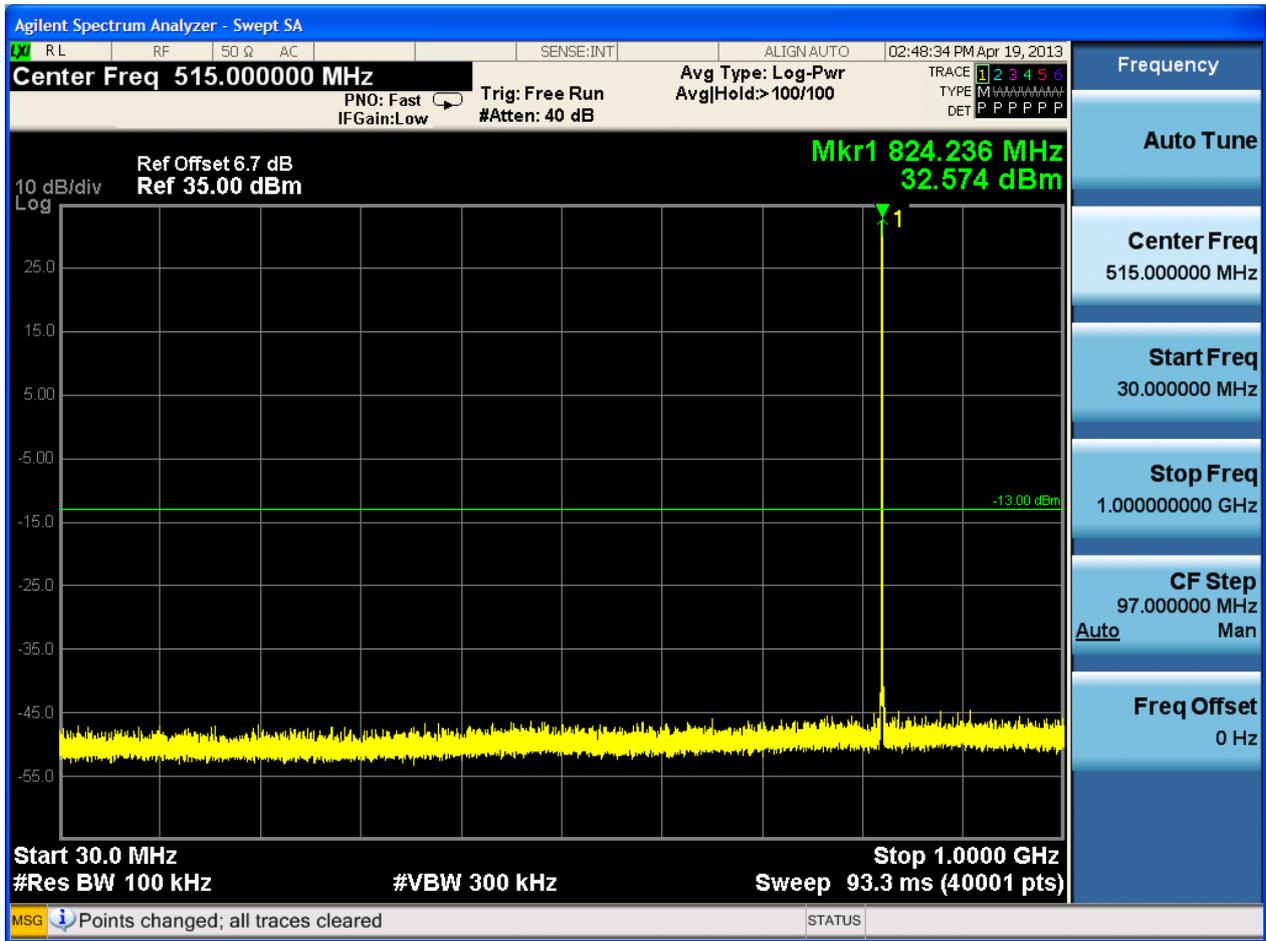
##### 6.1.1 Test Band = GSM850

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

##### 6.1.1.1.1 Test Channel = LCH

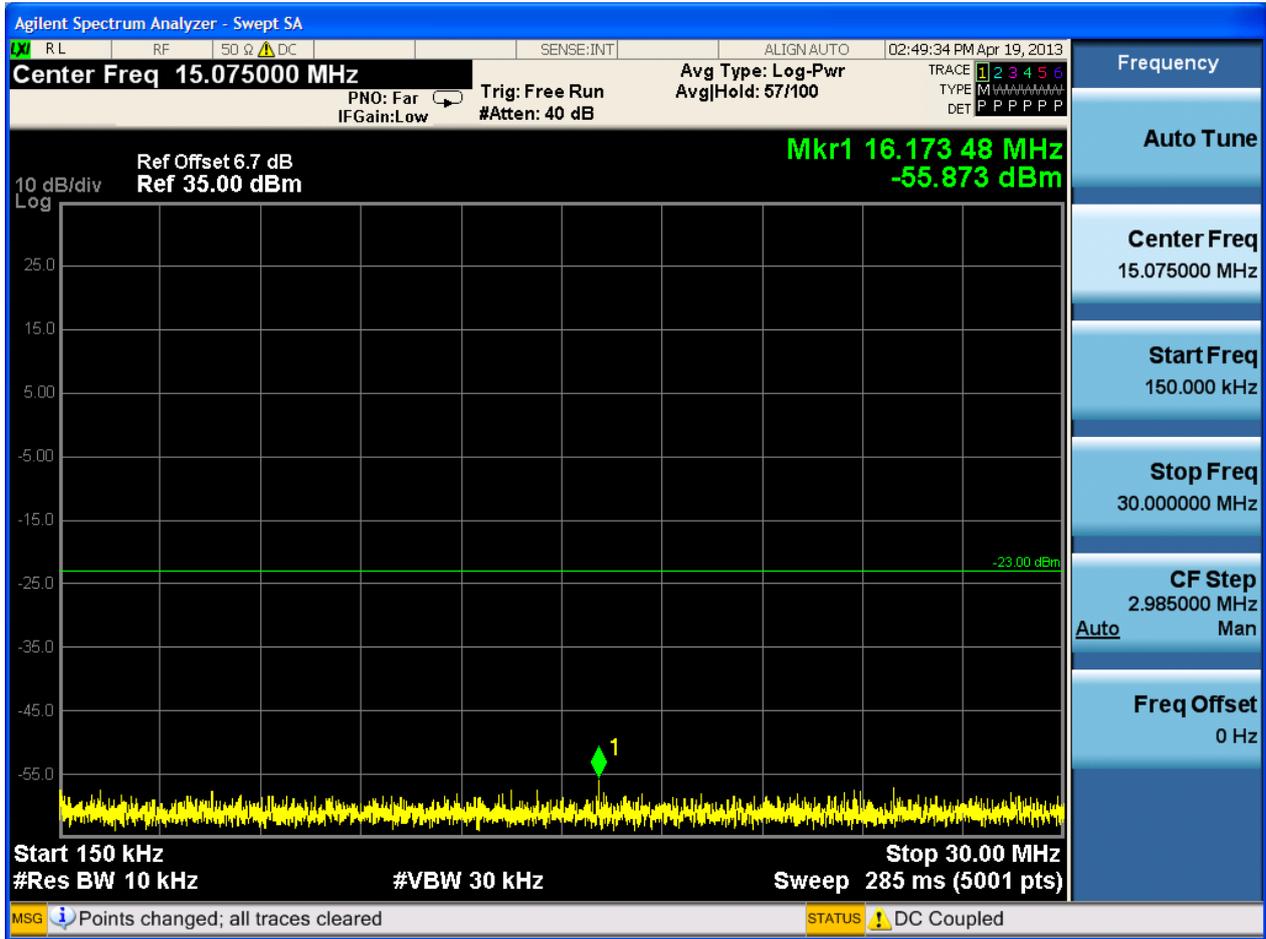


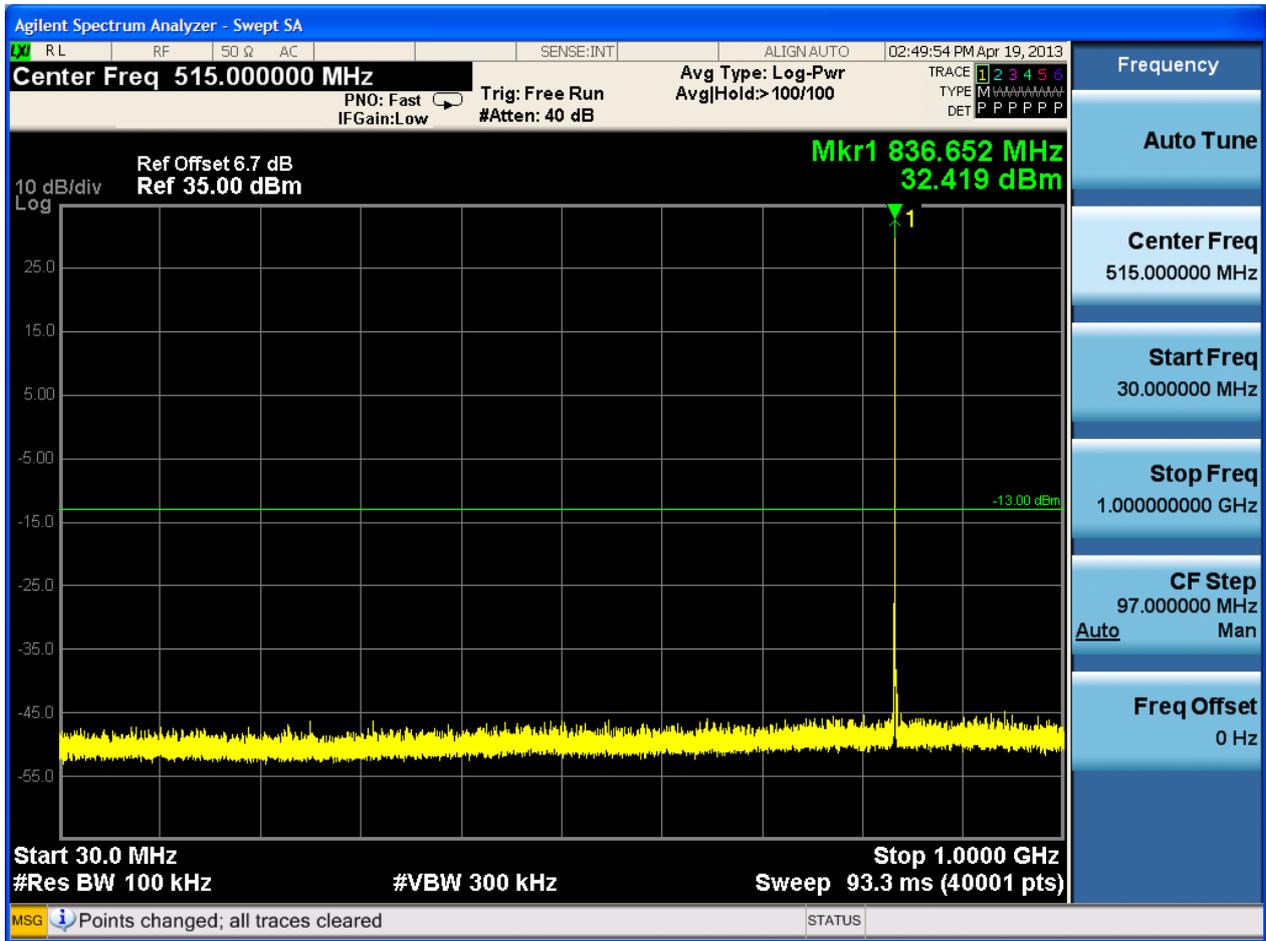


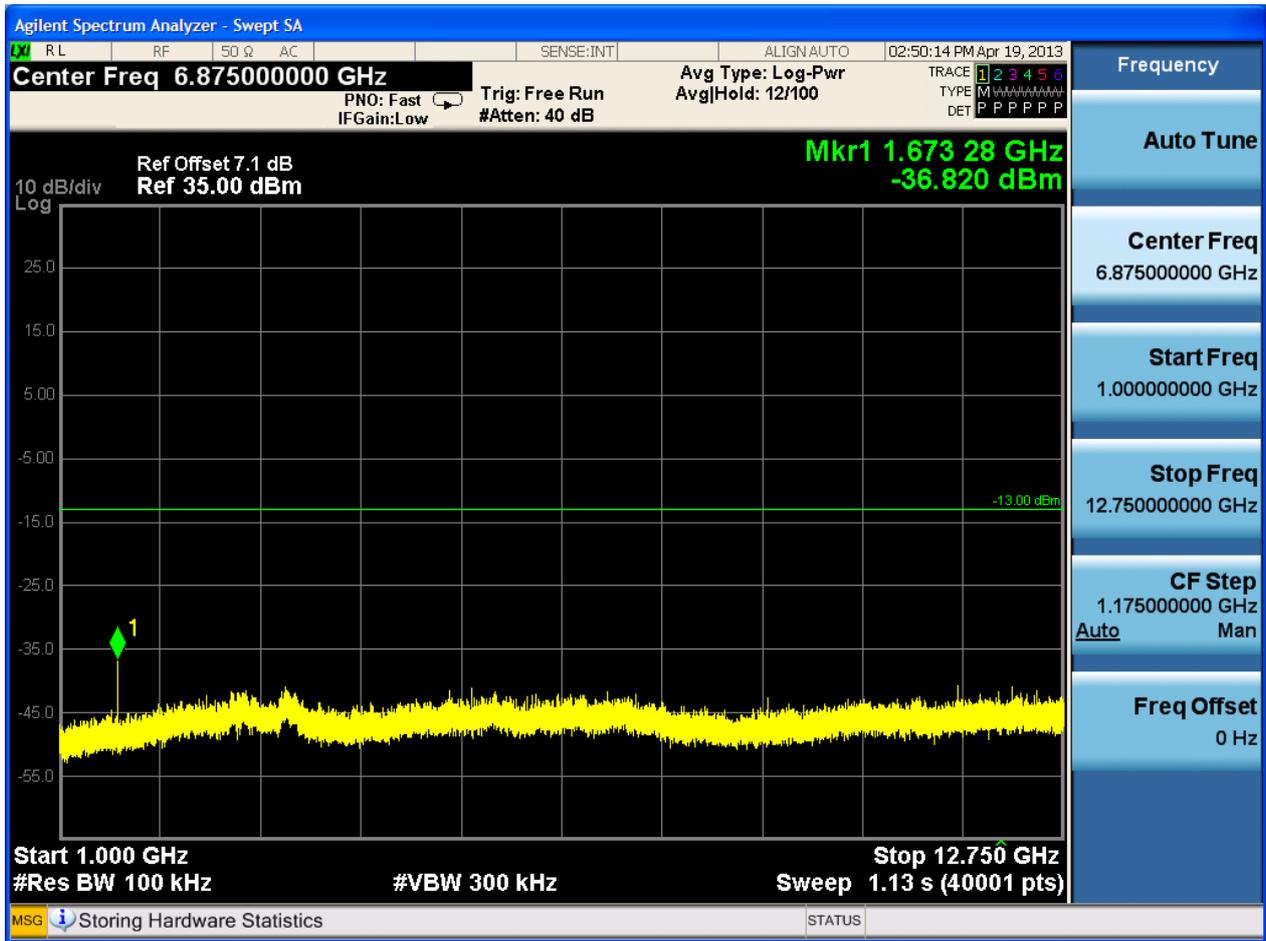






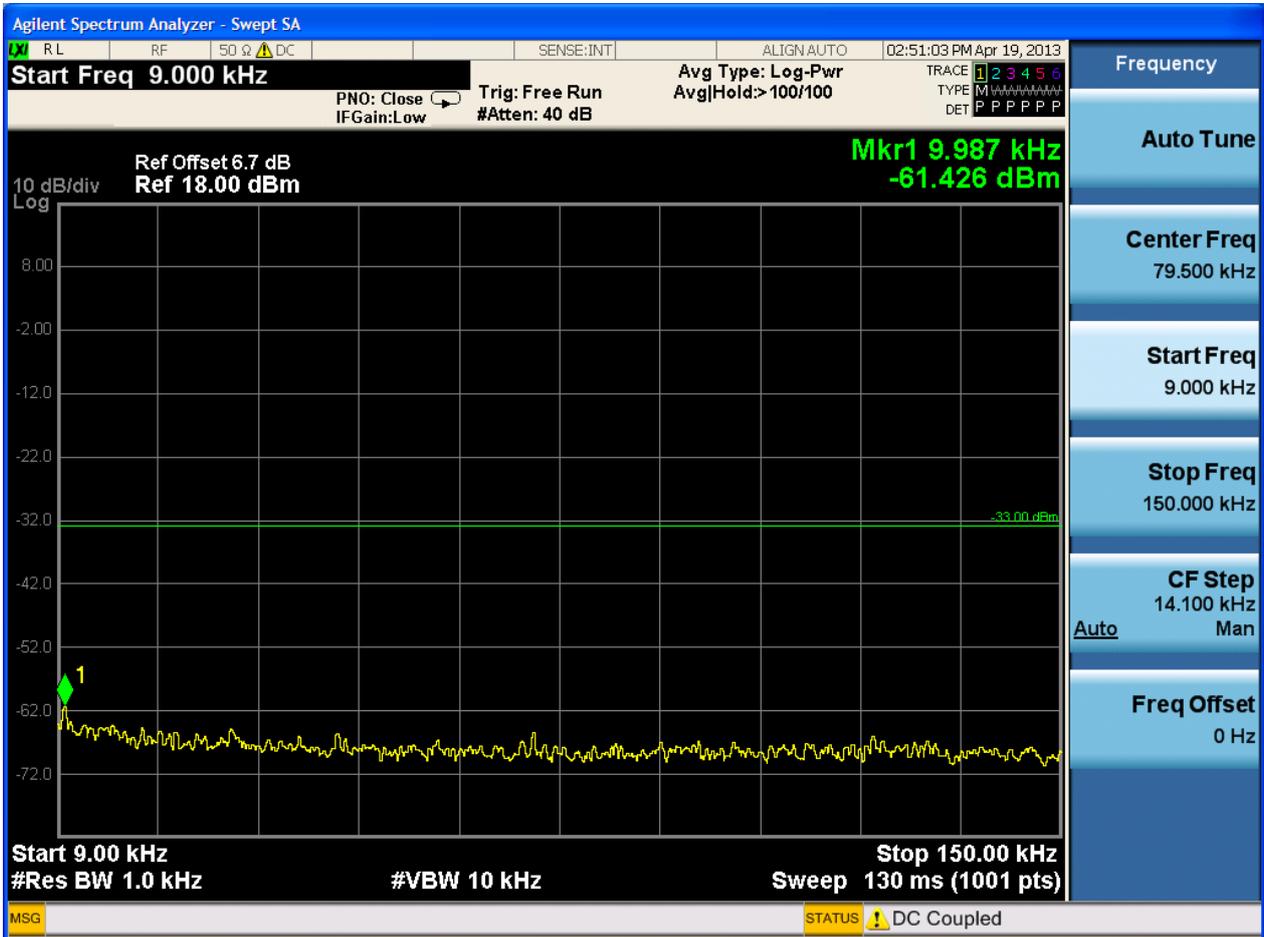


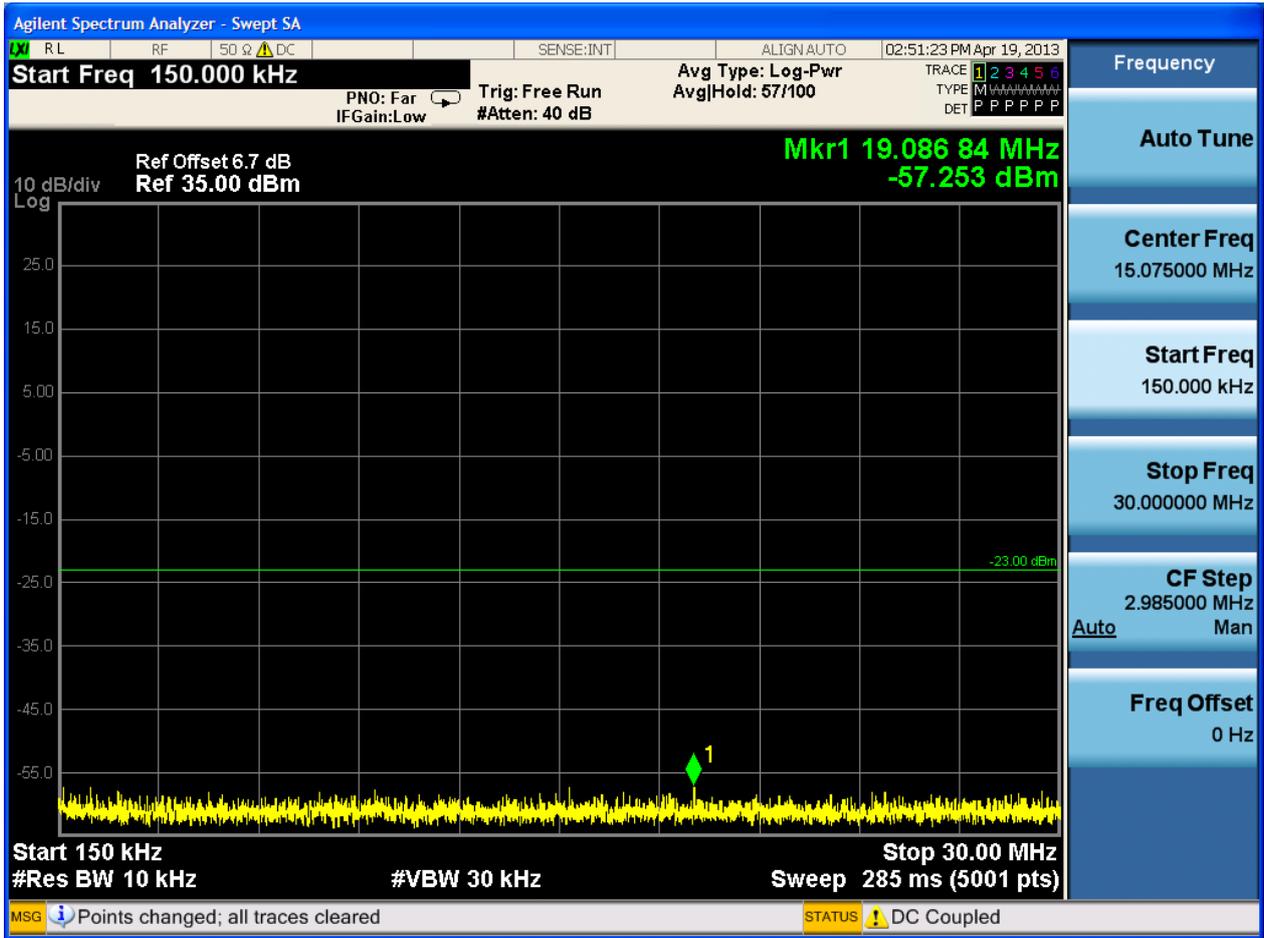


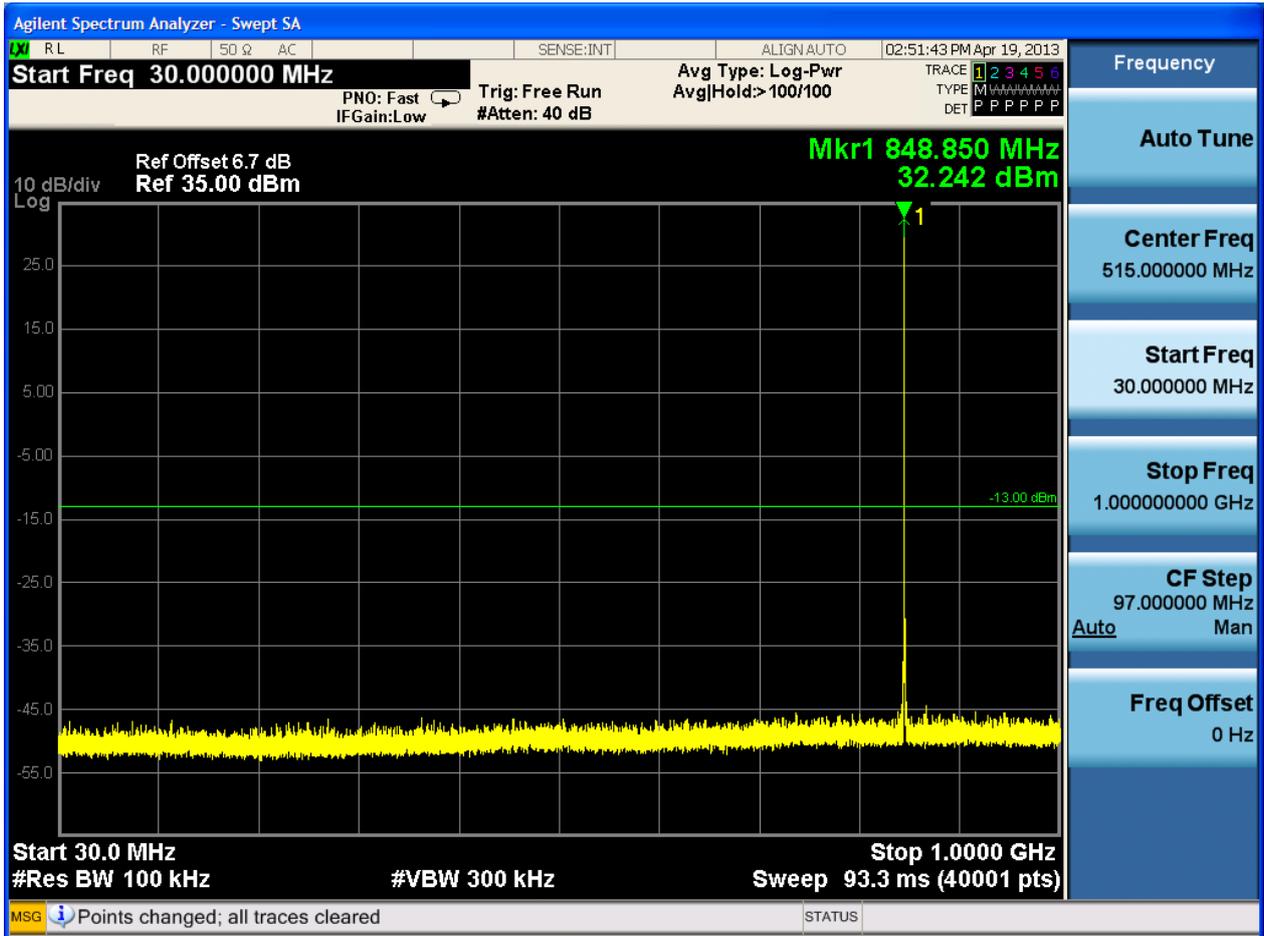




### 6.1.1.1.3 Test Channel = HCH







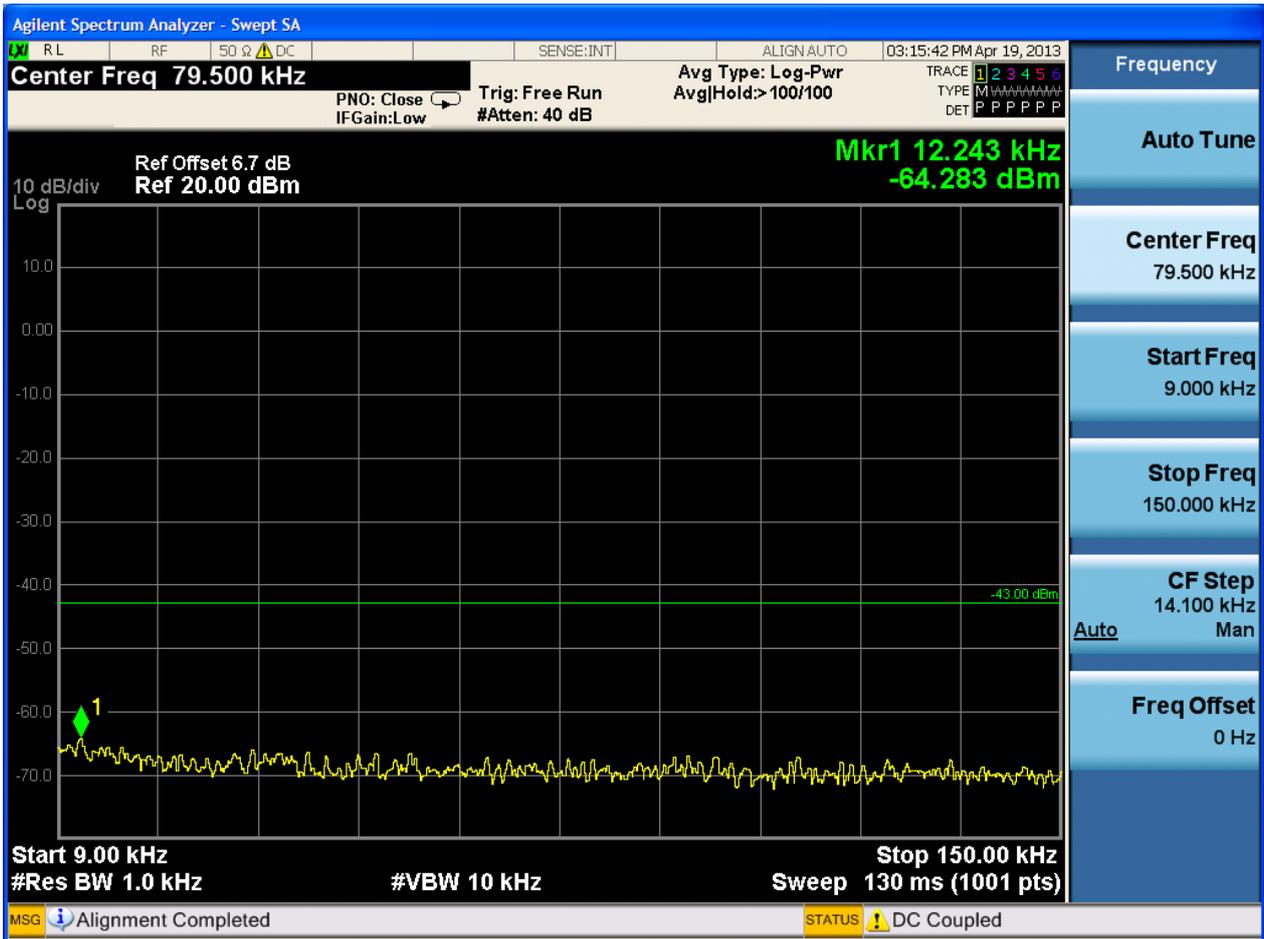


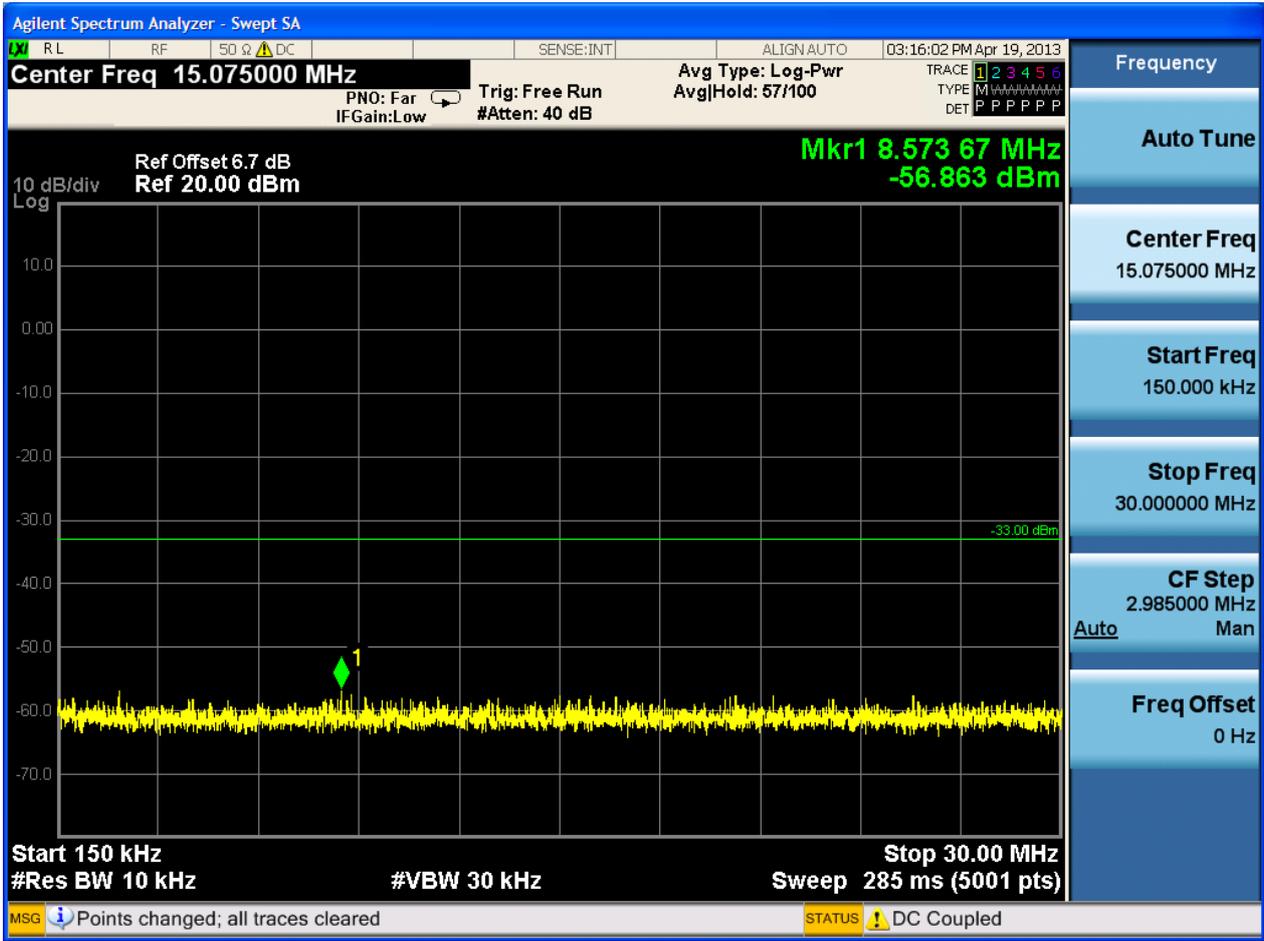


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

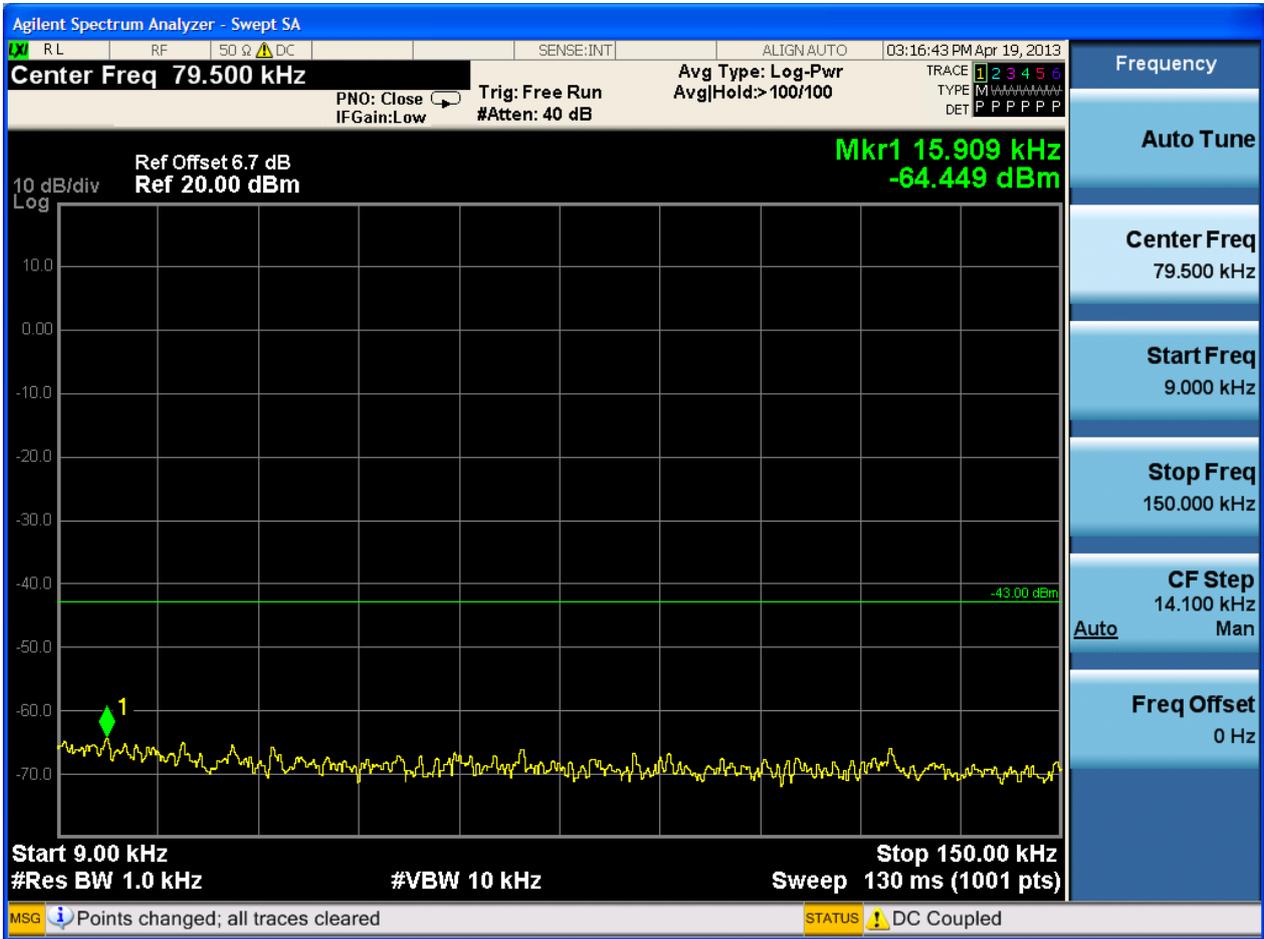


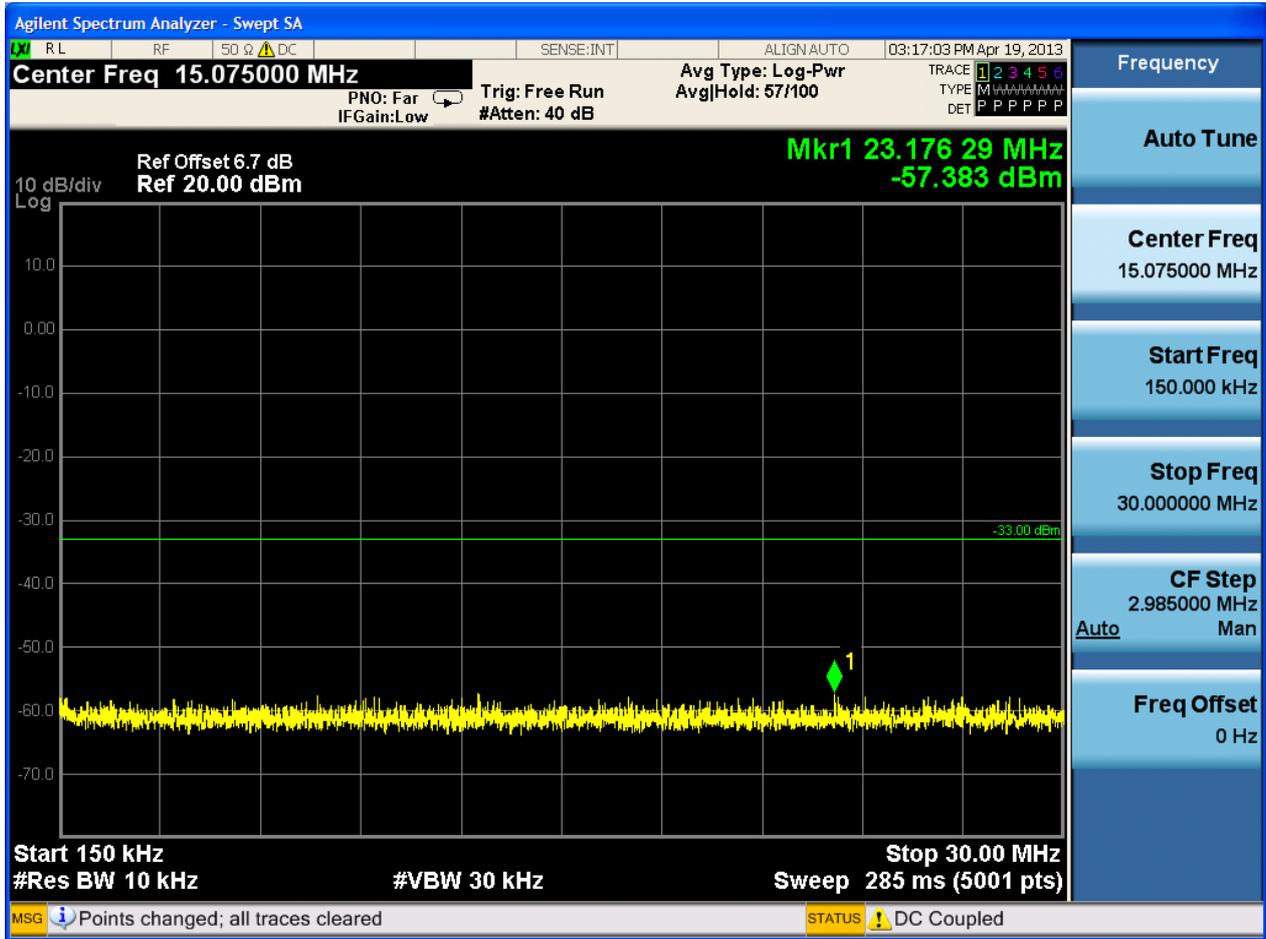






6.1.2.1.2 Test Channel = MCH

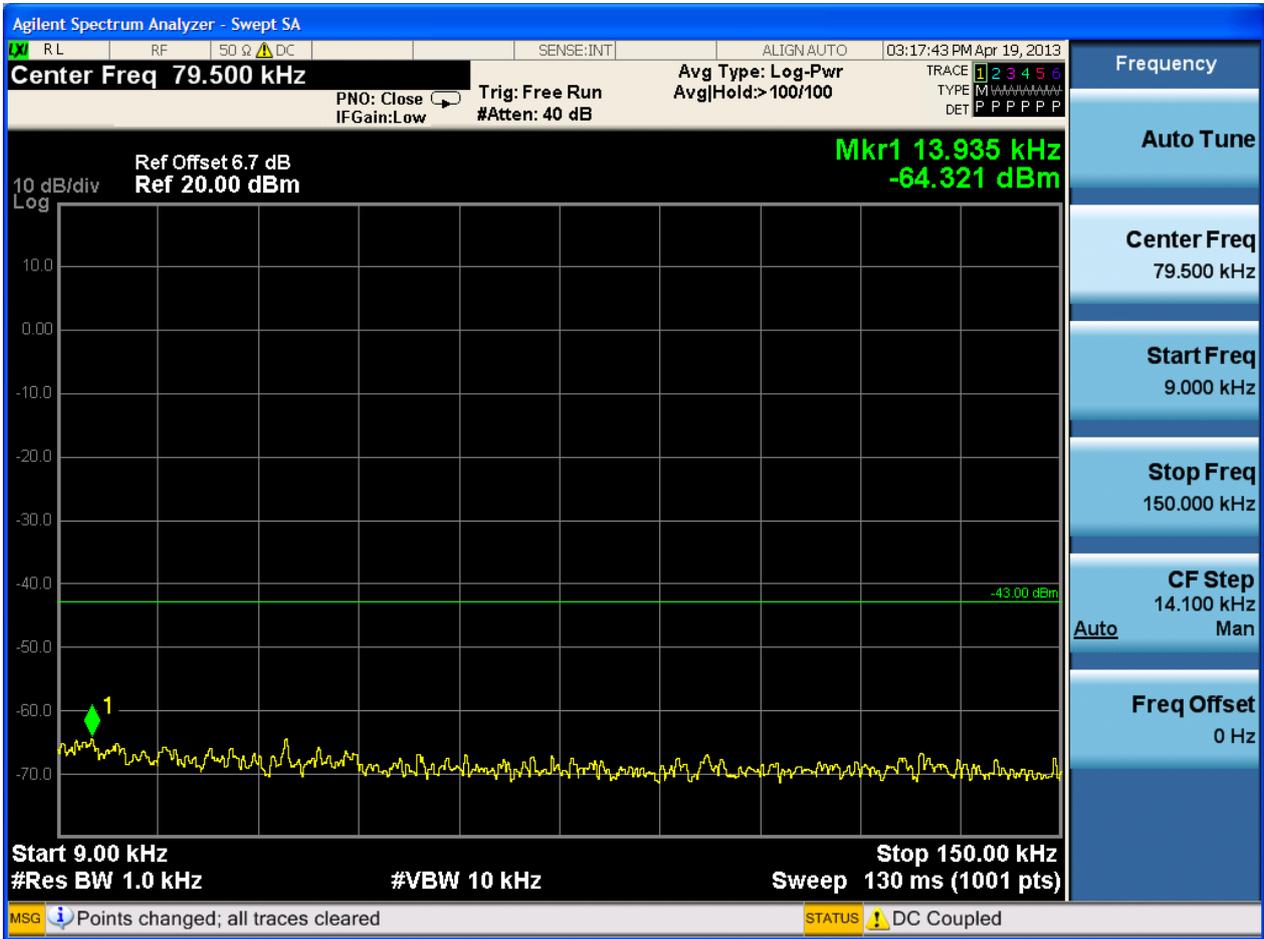


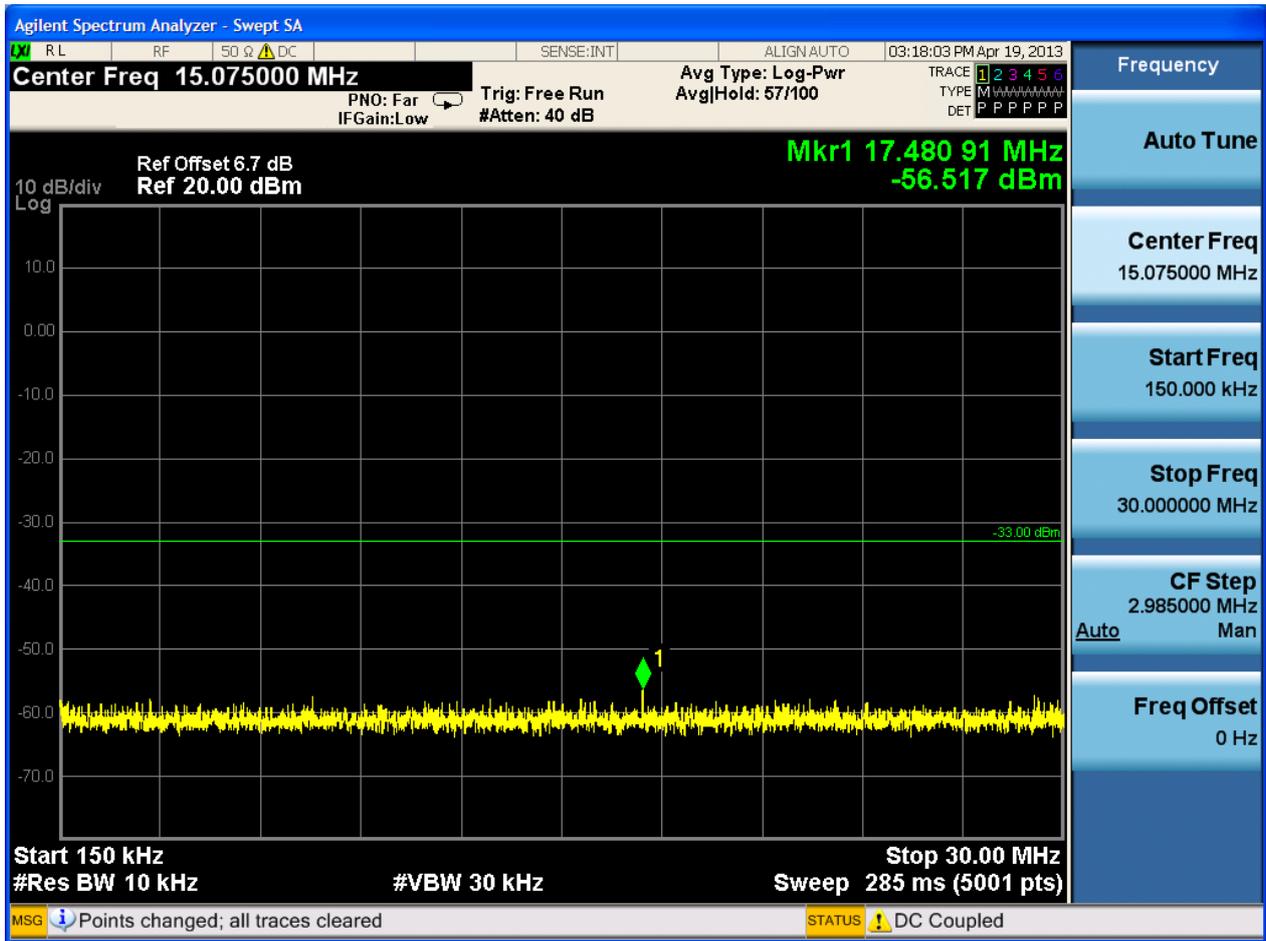


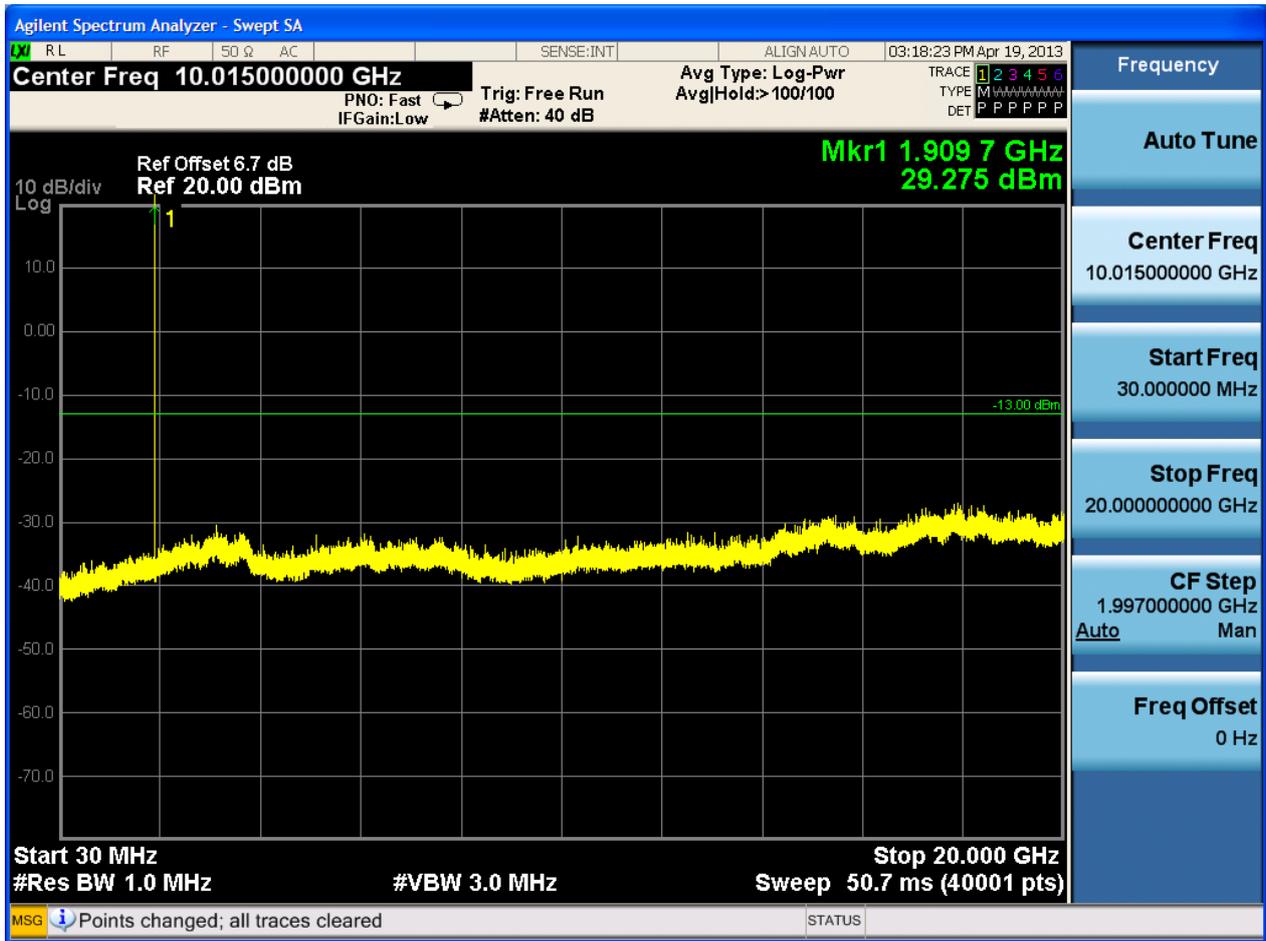




6.1.2.1.3 Test Channel = HCH







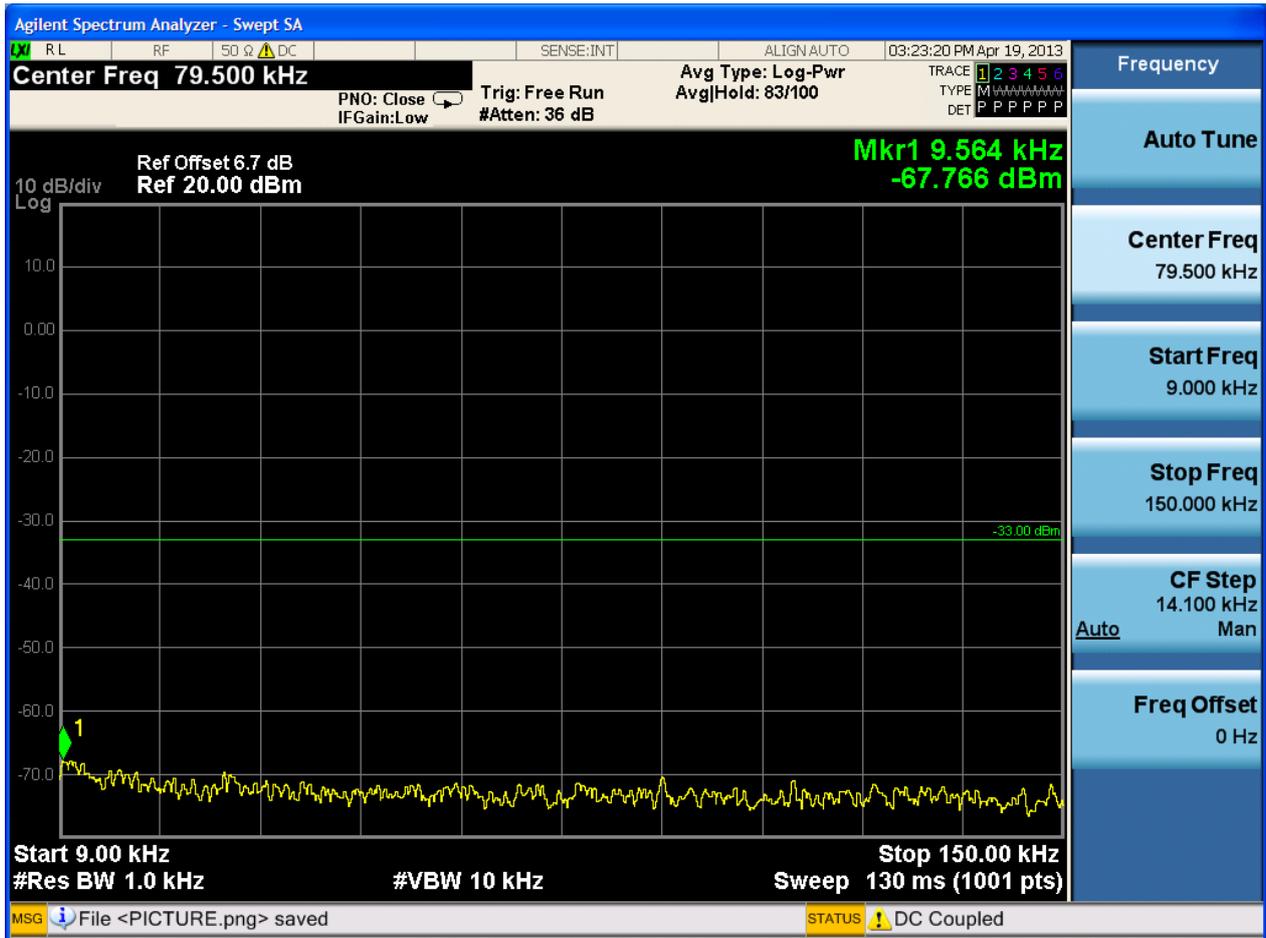


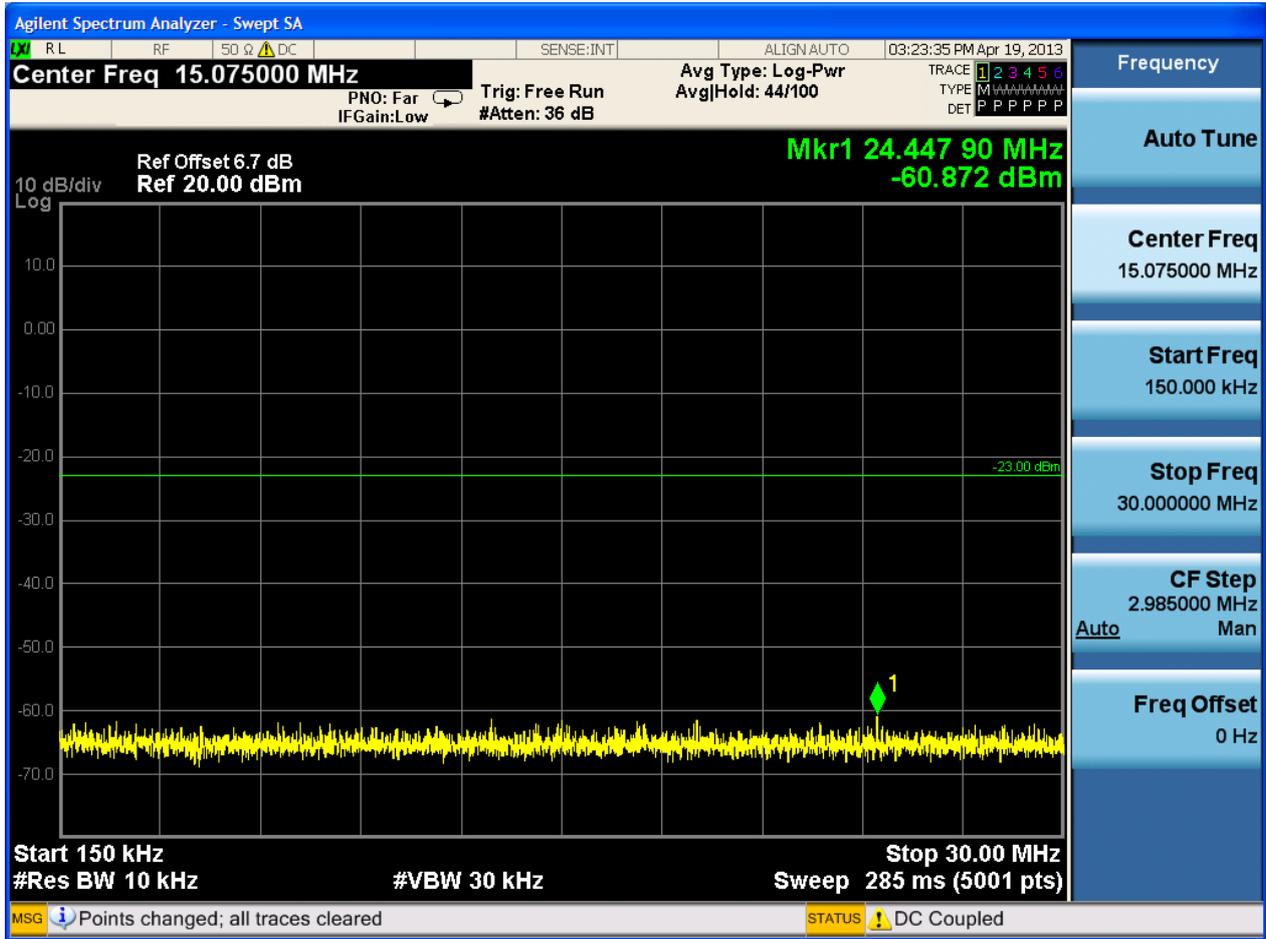
## 6.2 For UMTS

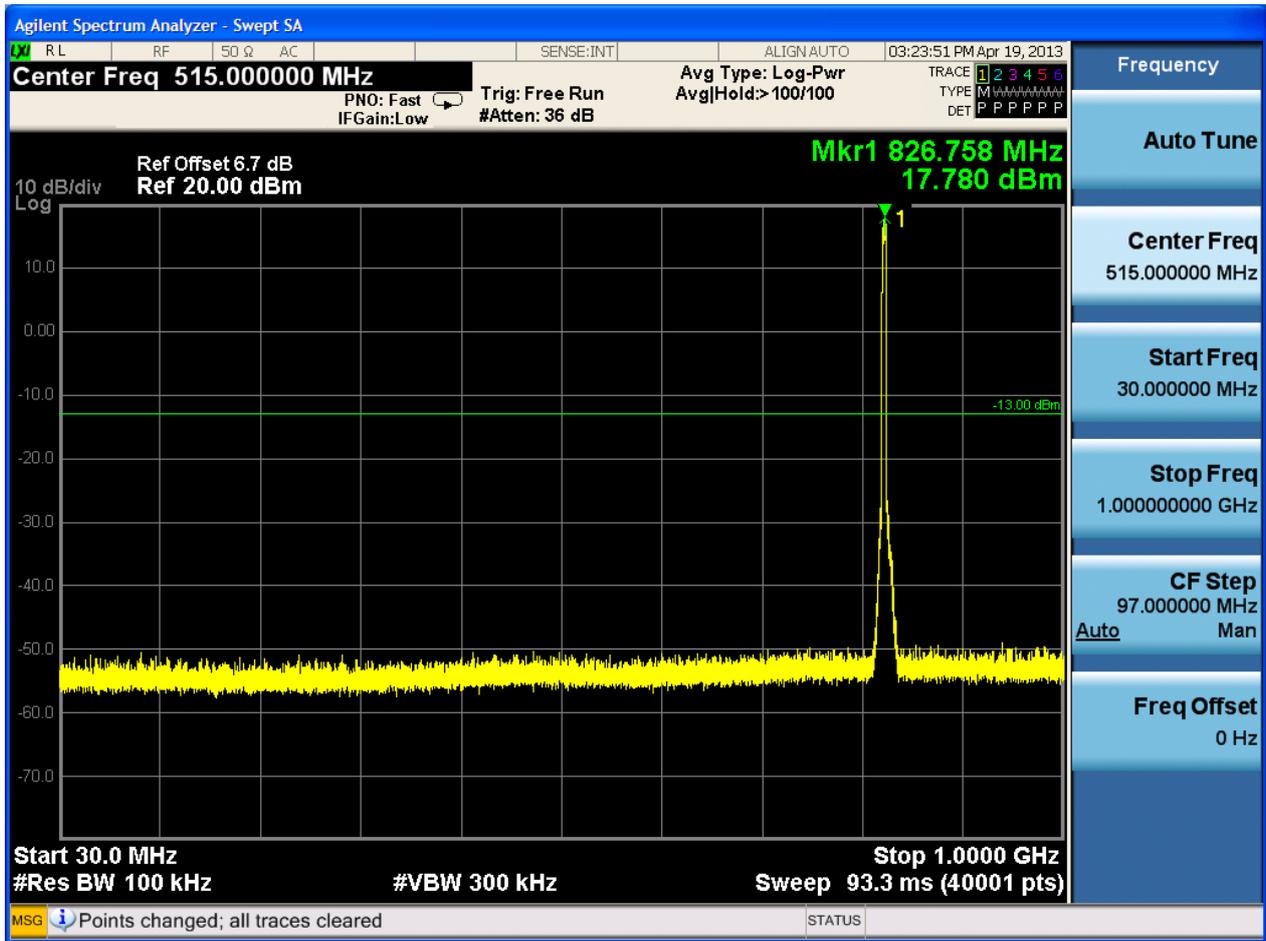
### 6.2.1 Test Band = WCDMA850

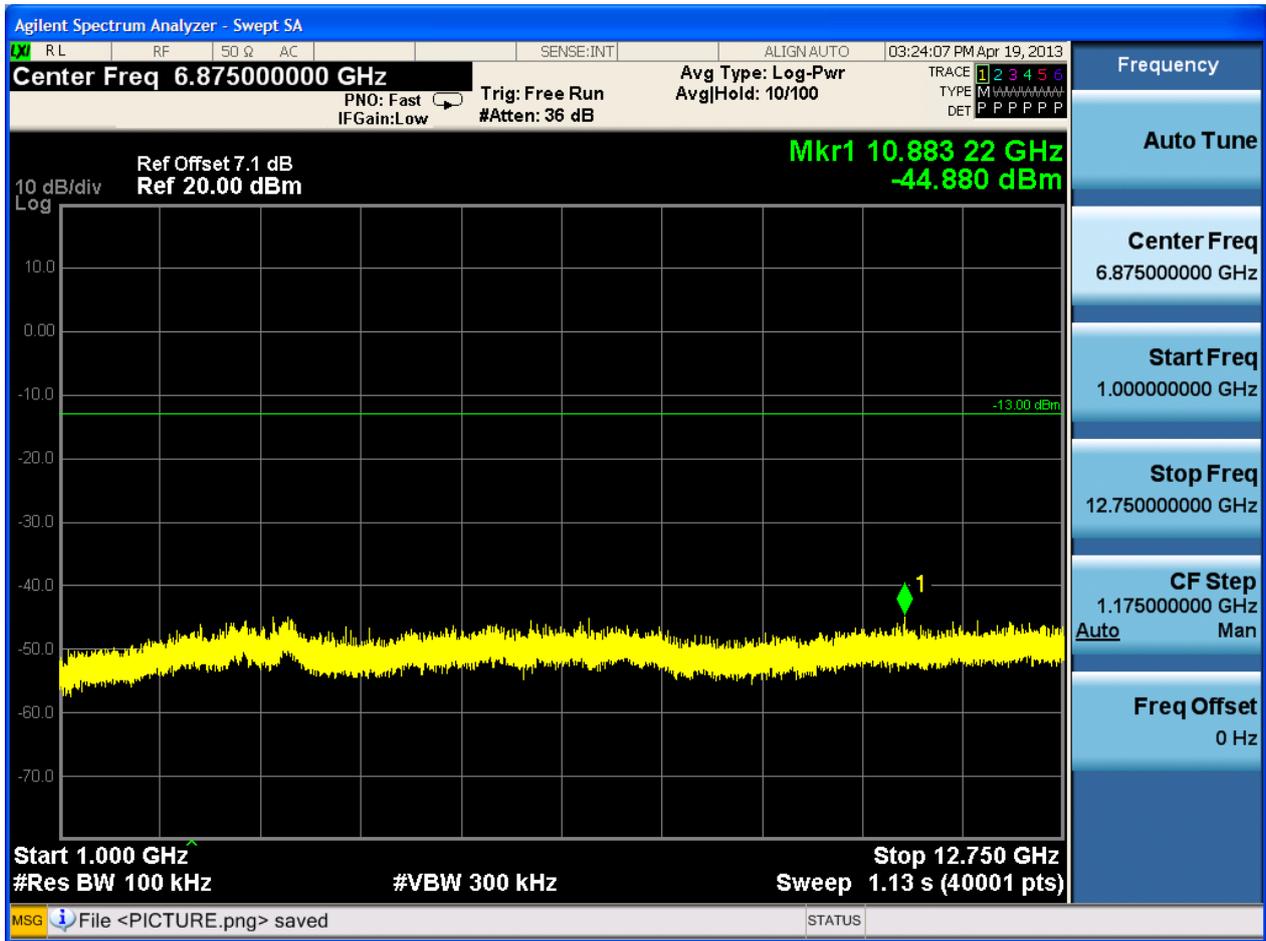
#### 6.2.1.1 Test Mode = UMTS/TM1

##### 6.2.1.1.1 Test Channel = LCH

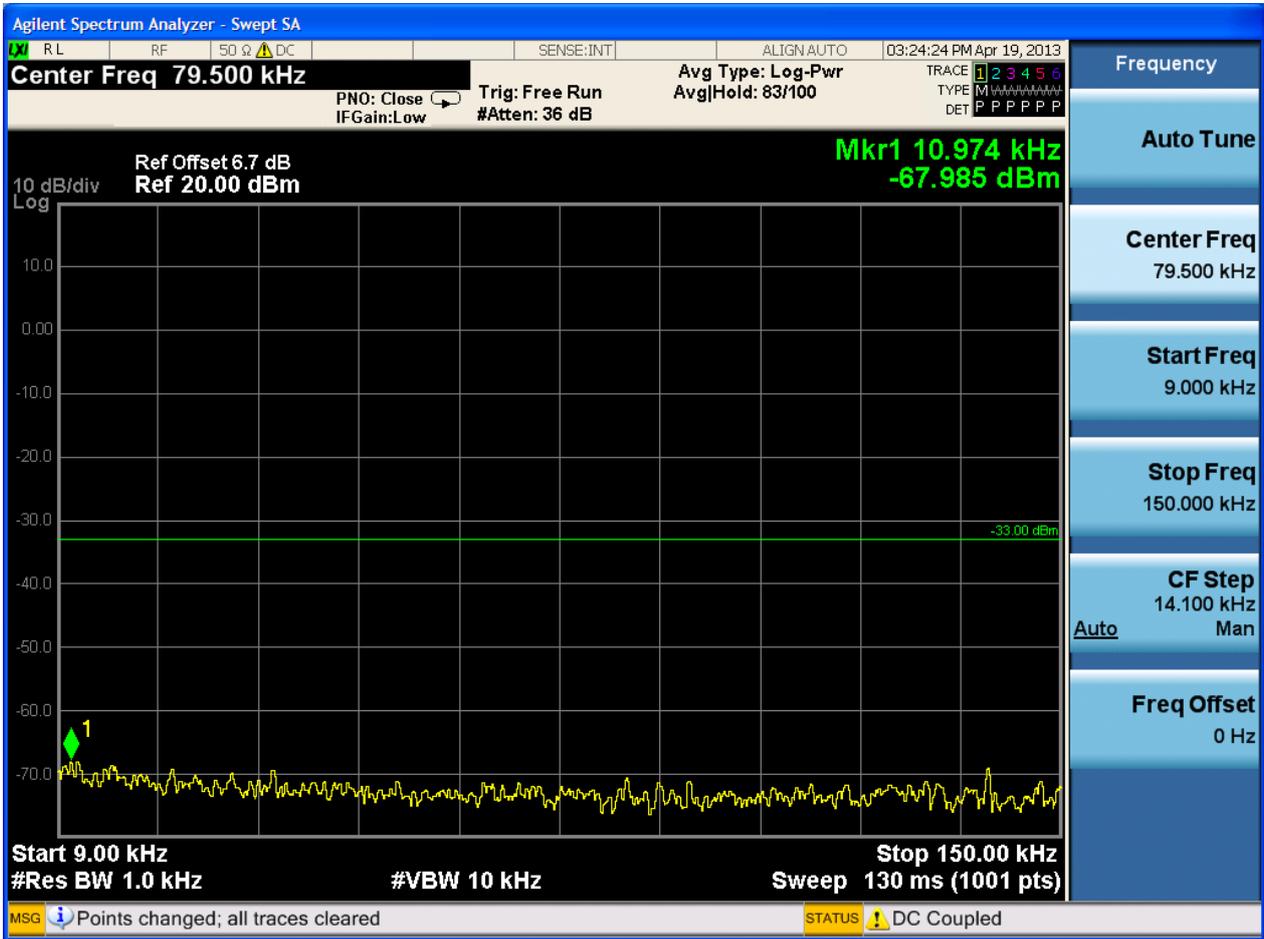


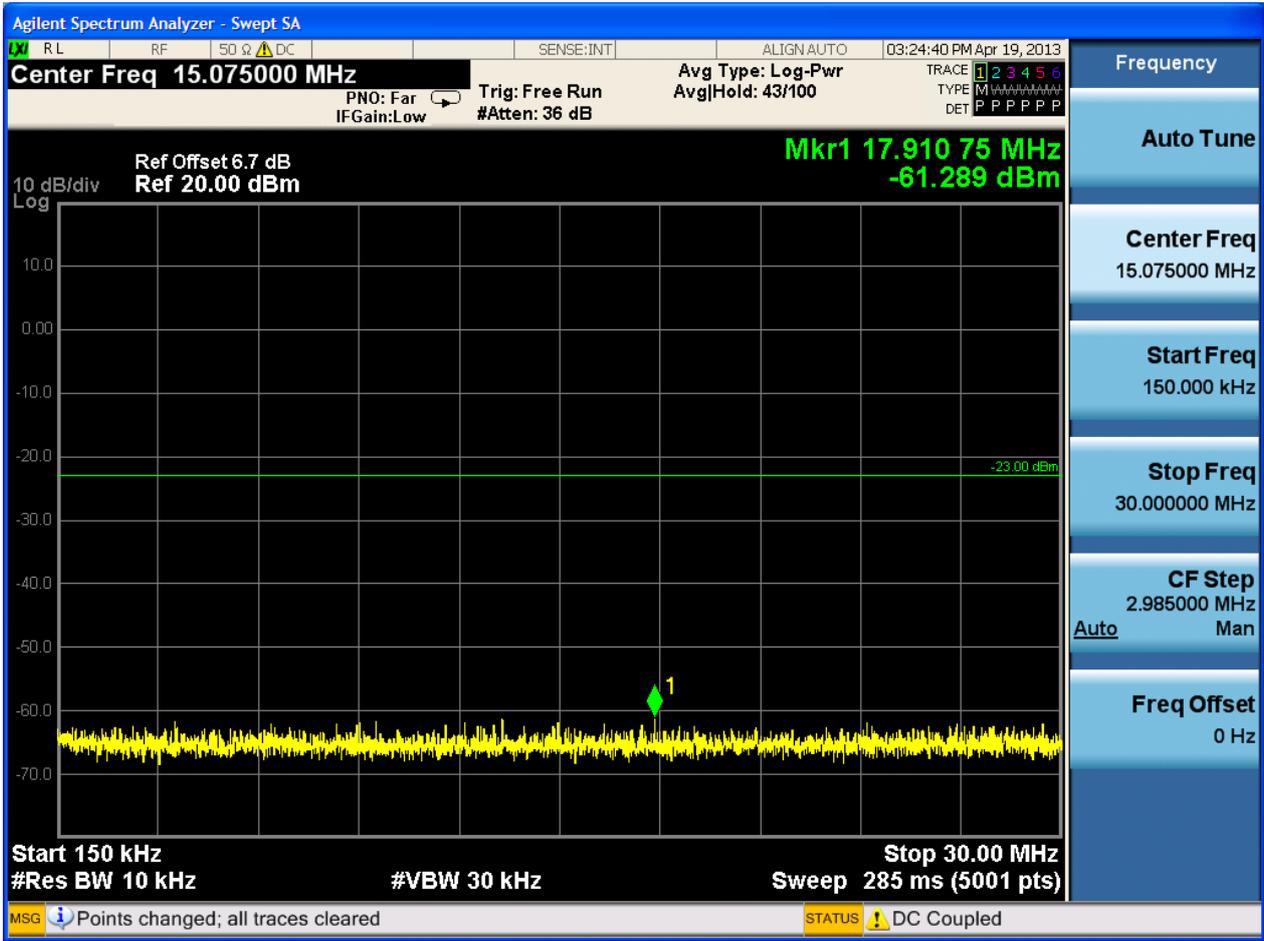


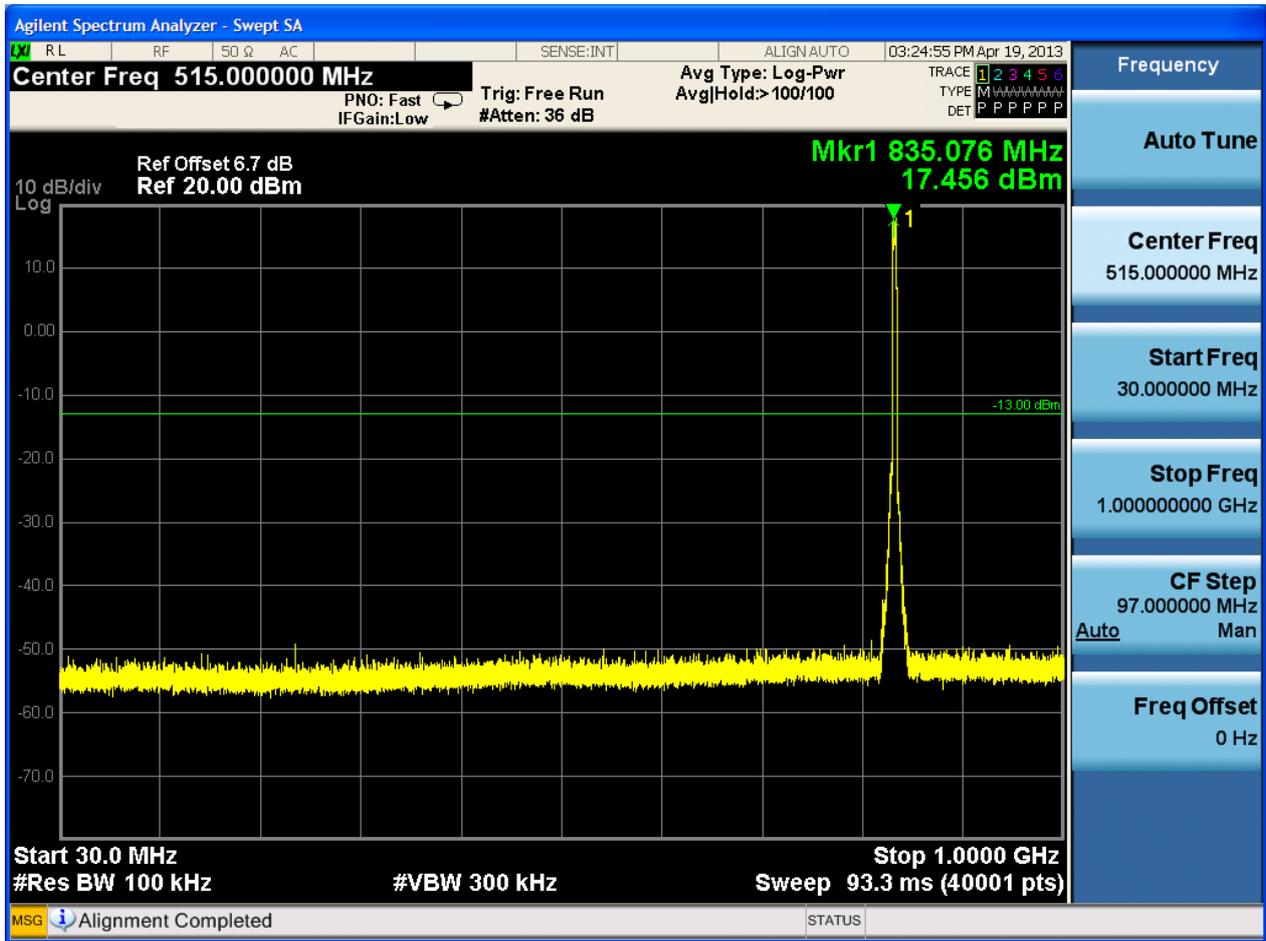


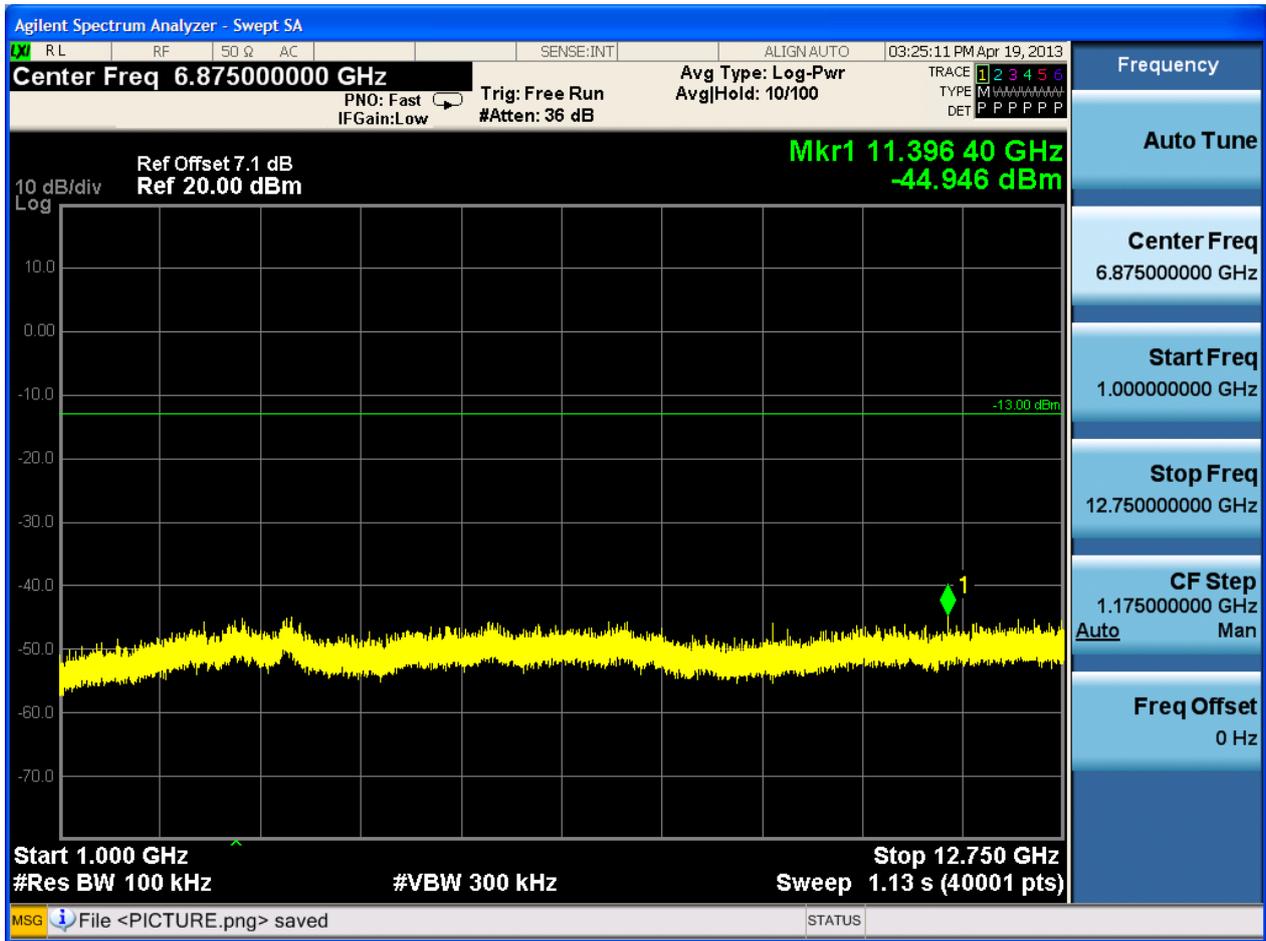


6.2.1.1.2 Test Channel = MCH



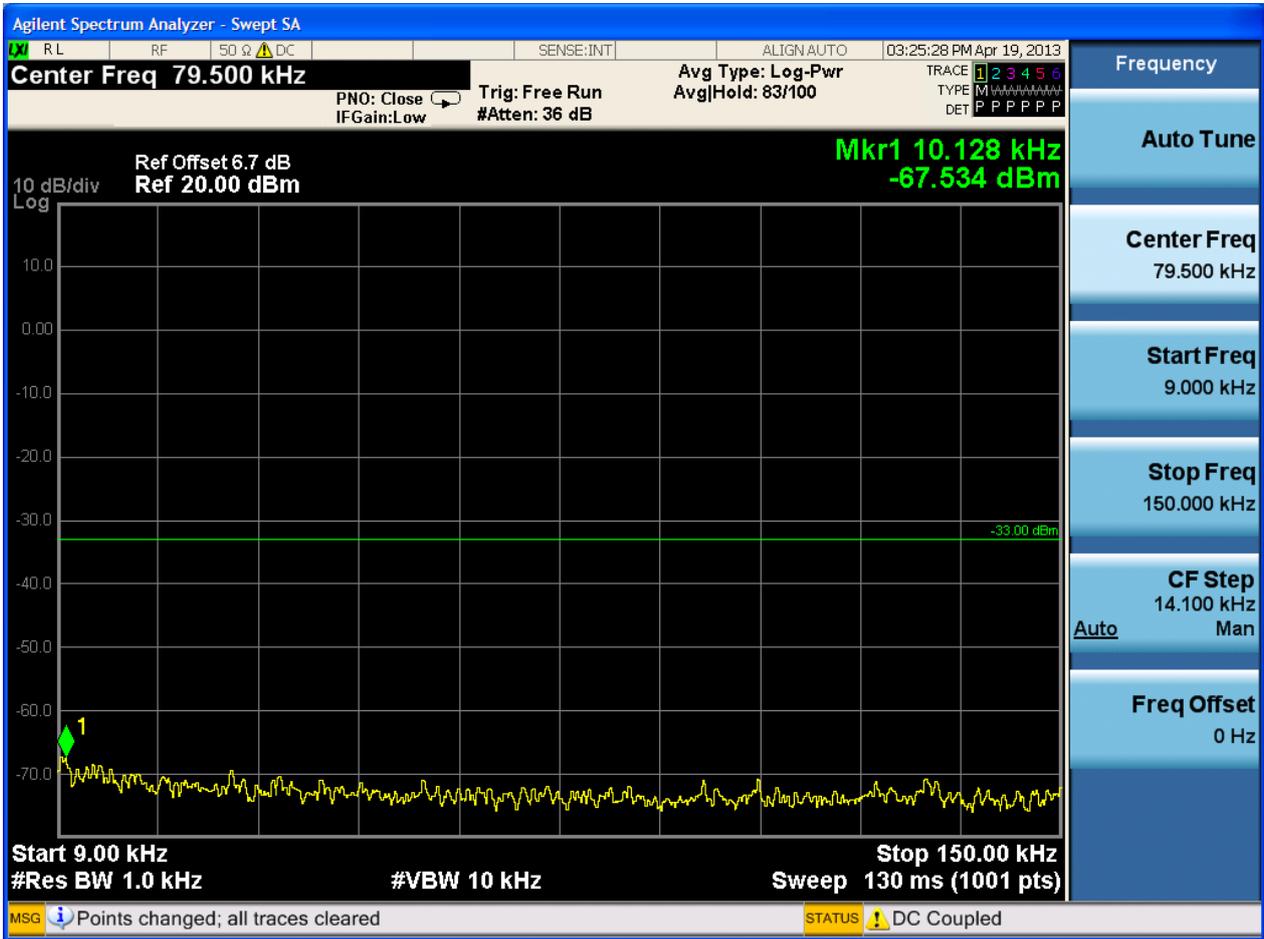


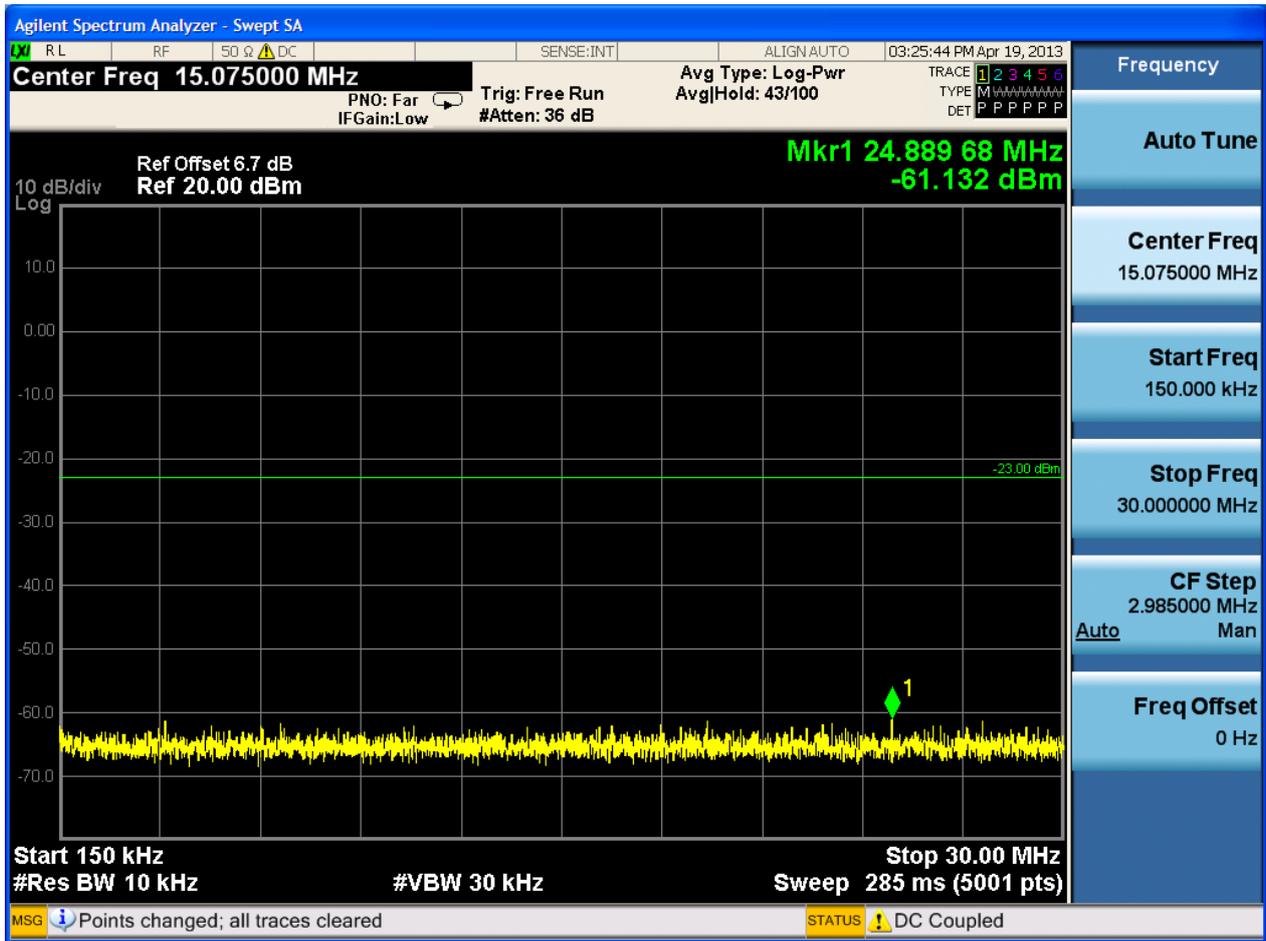


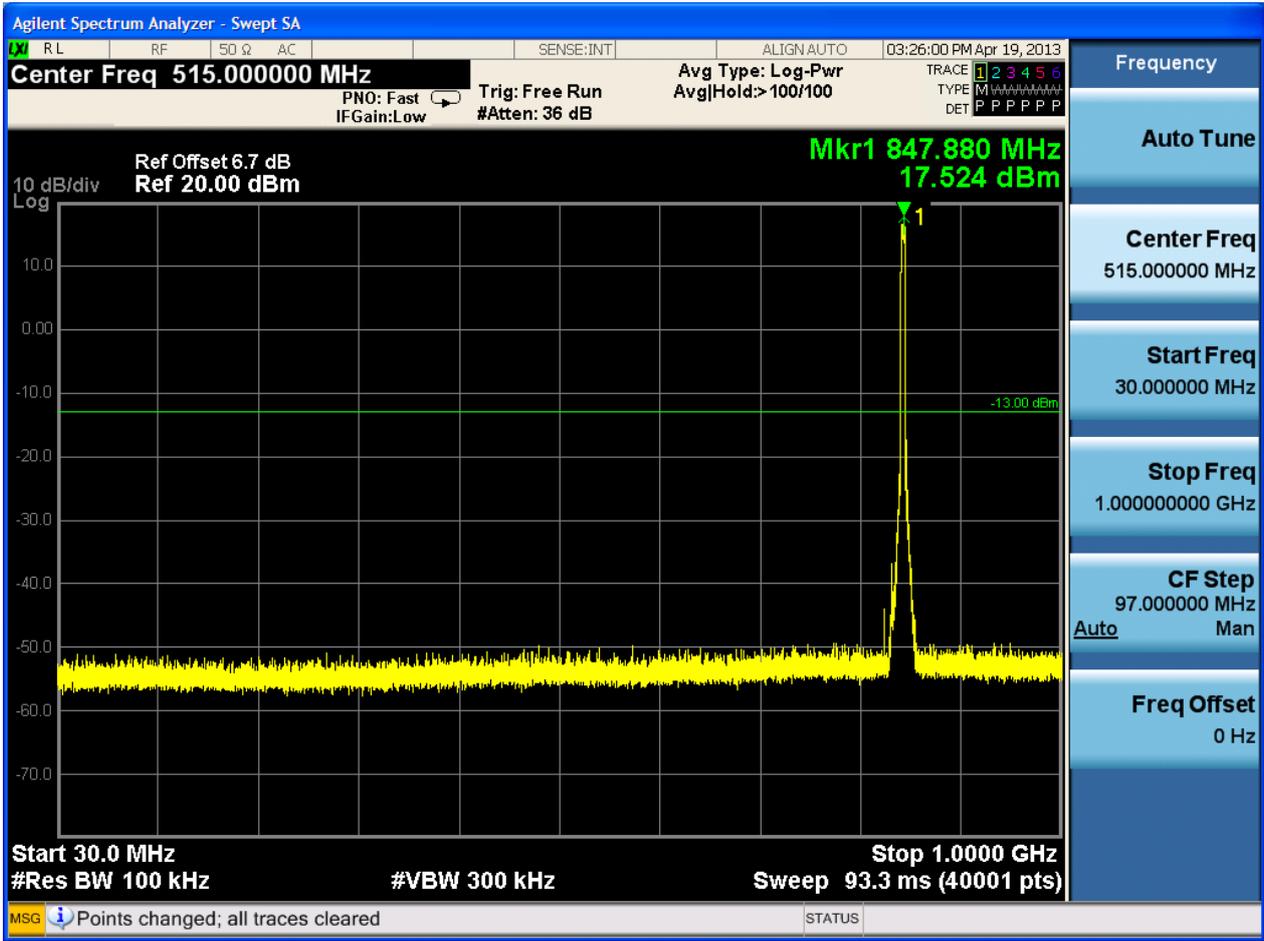


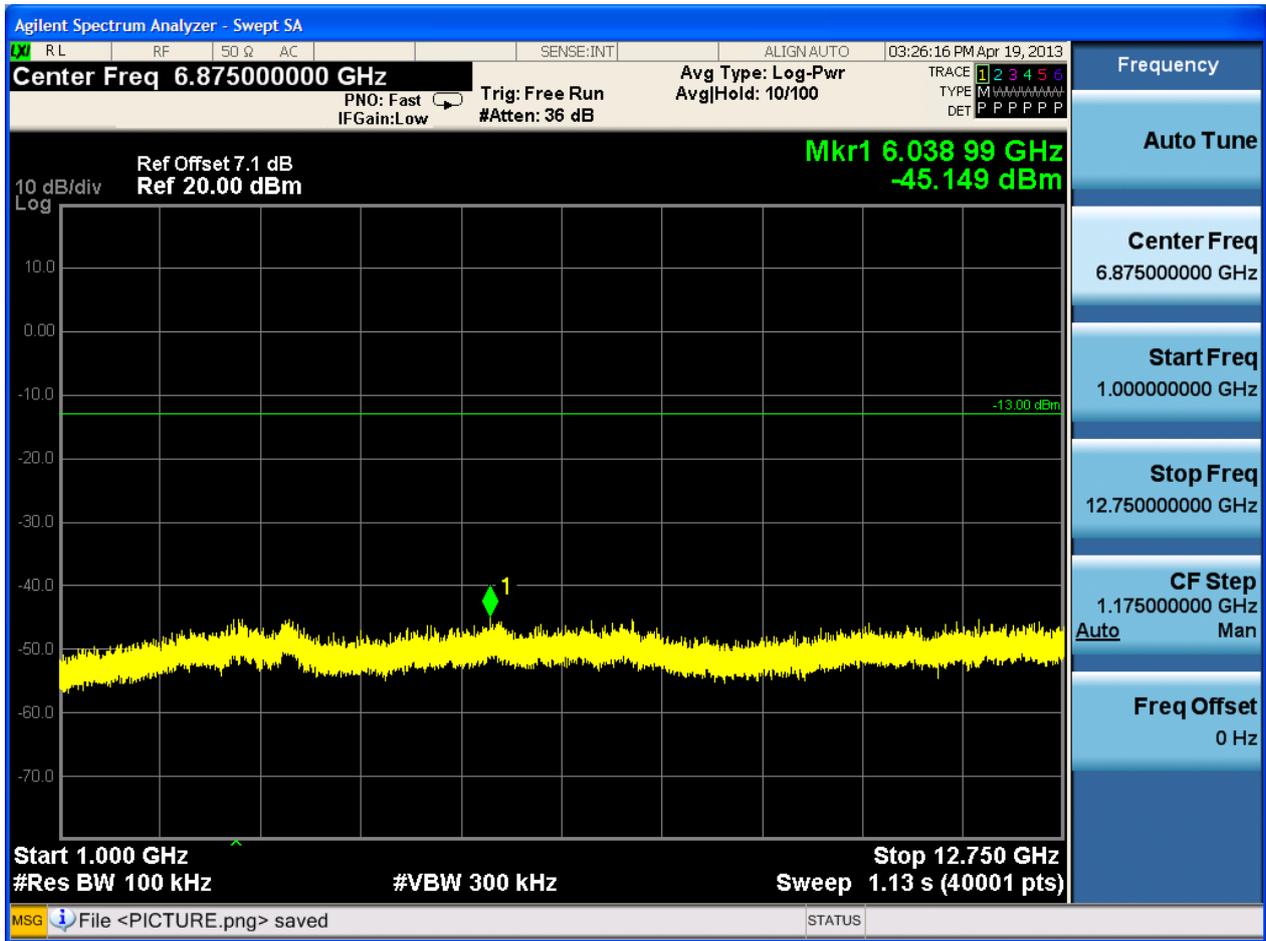


6.2.1.1.3 Test Channel = HCH







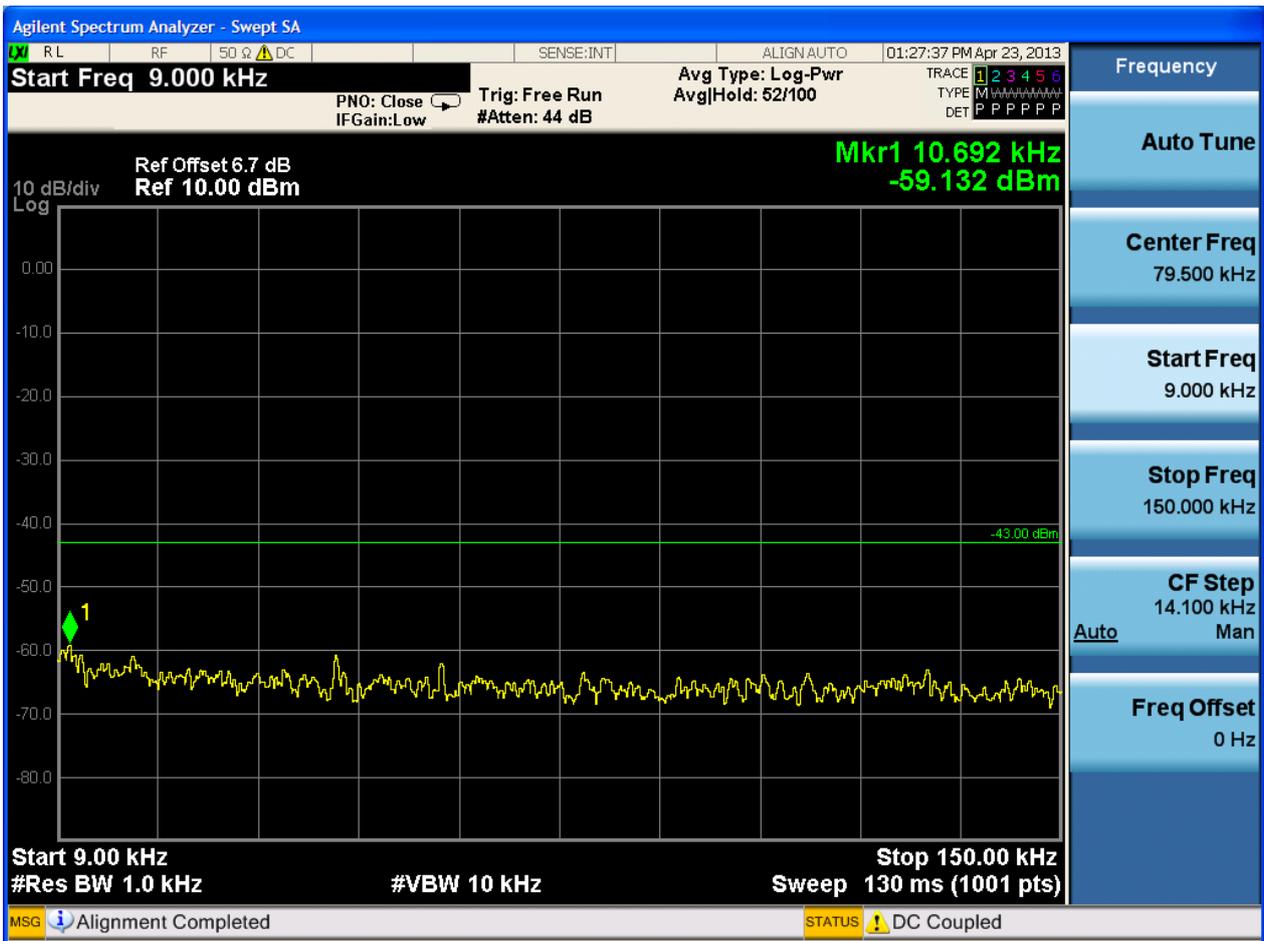


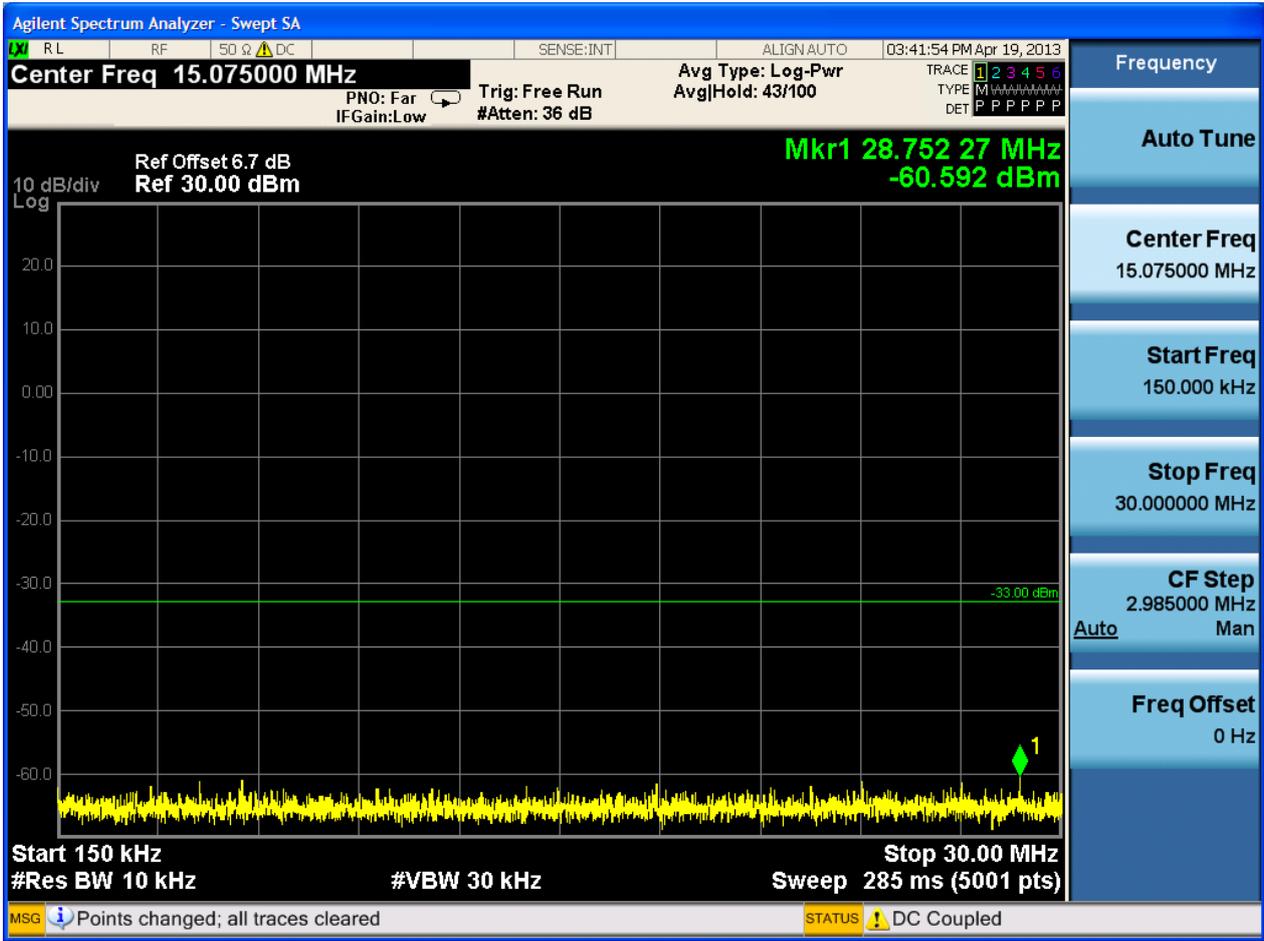


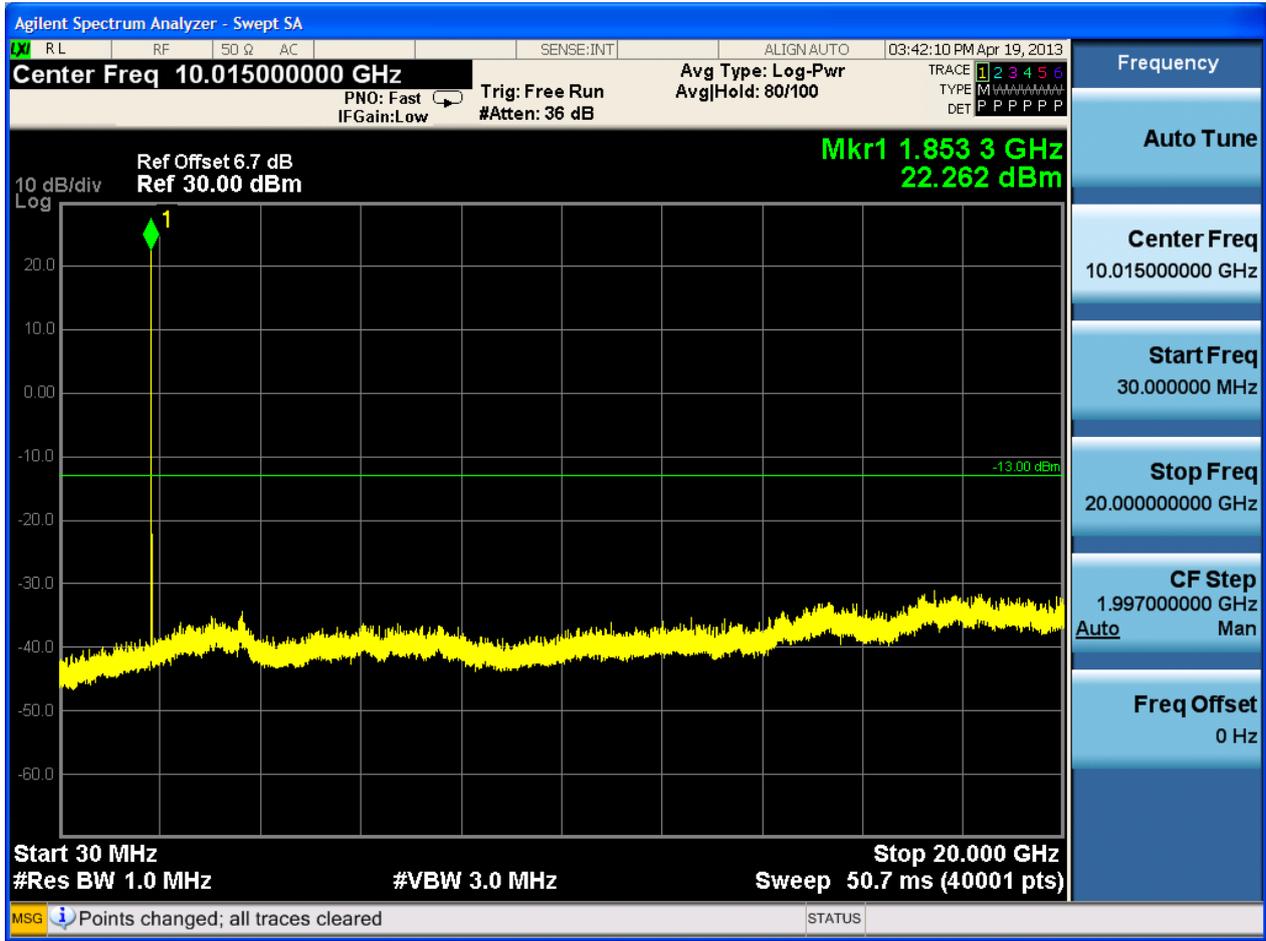
6.2.3 Test Band = WCDMA1900

6.2.3.1 Test Mode = UMTS/TM1

6.2.3.1.1 Test Channel = LCH

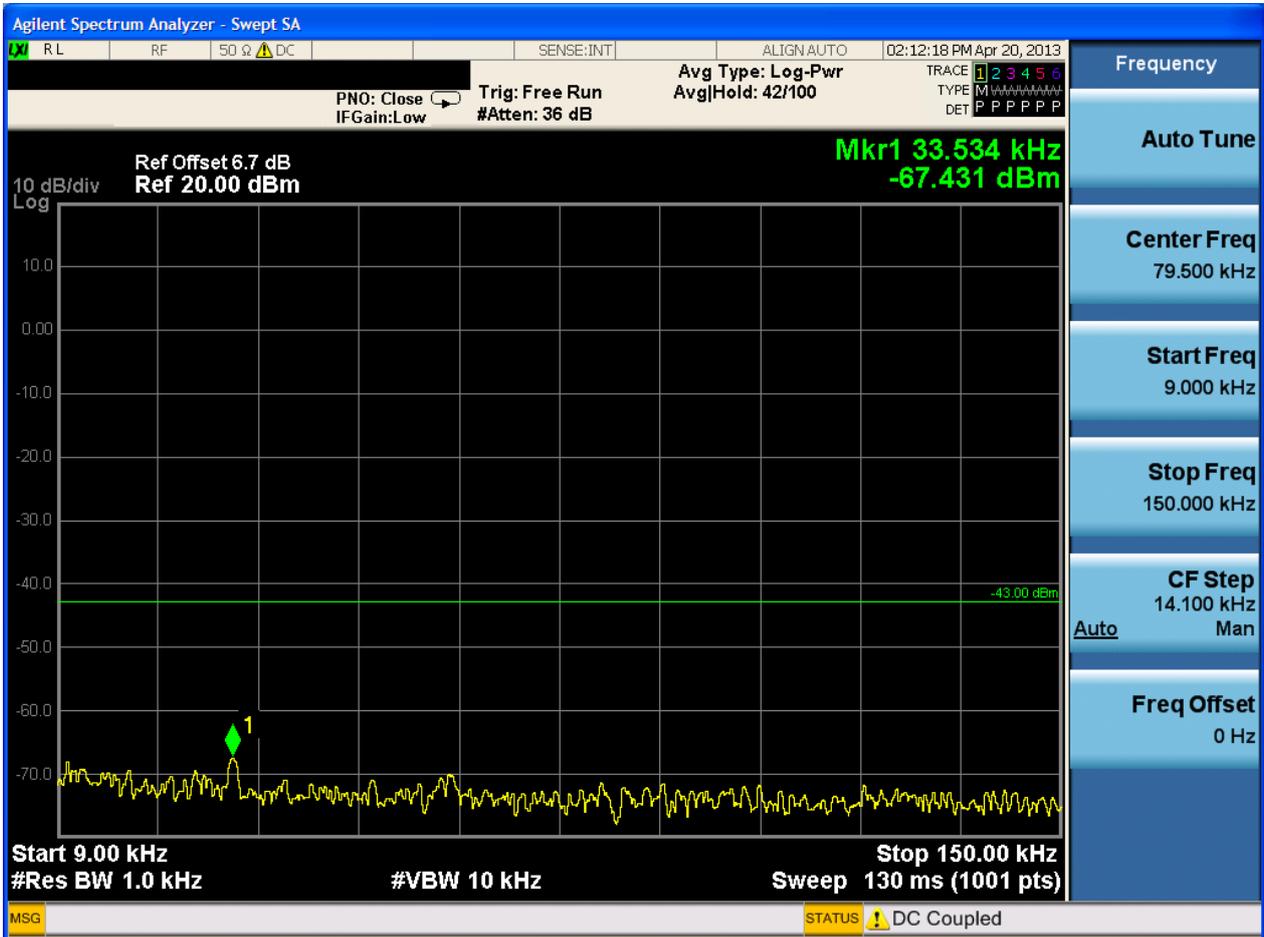


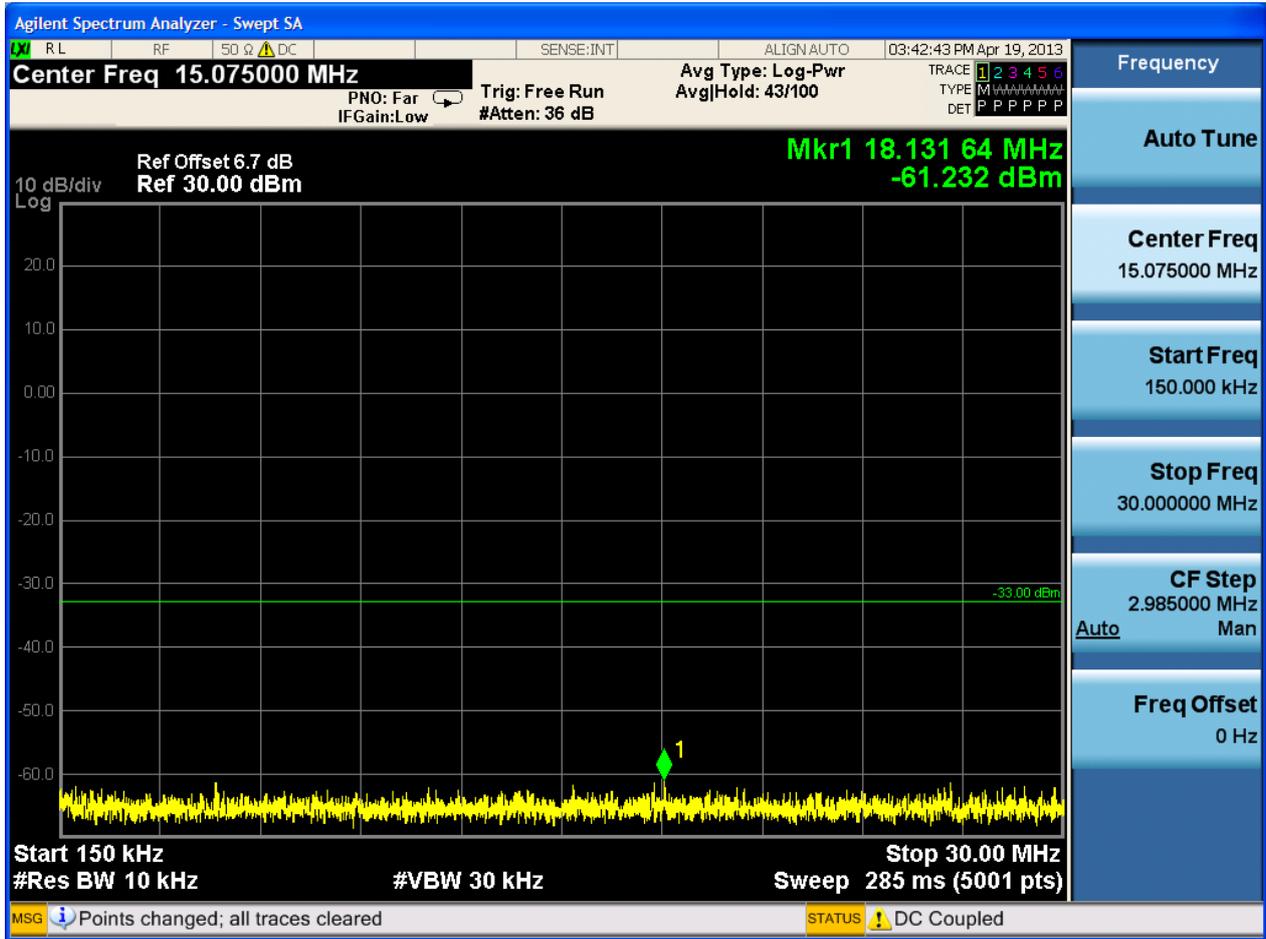


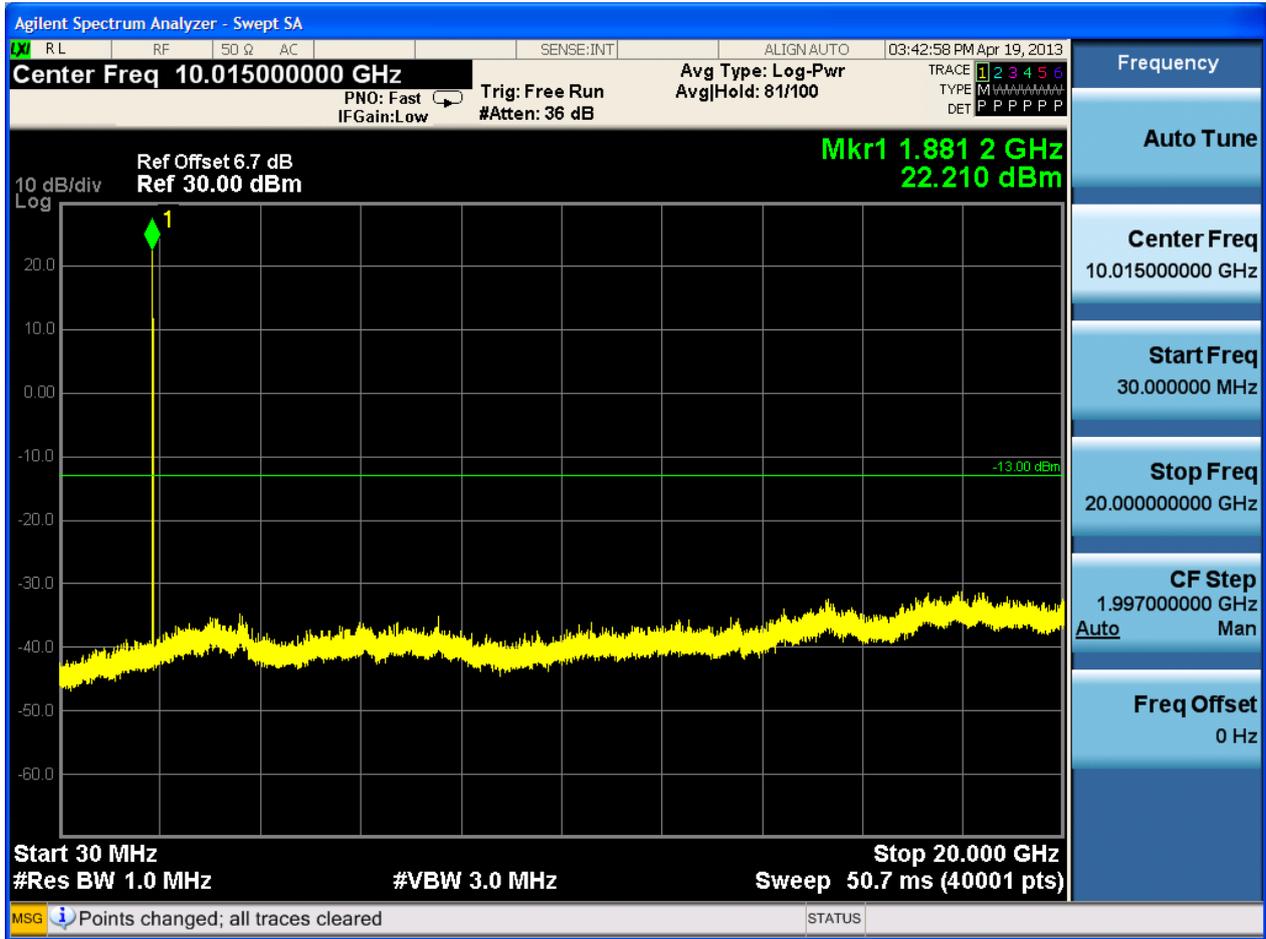




### 6.2.3.1.2 Test Channel = MCH

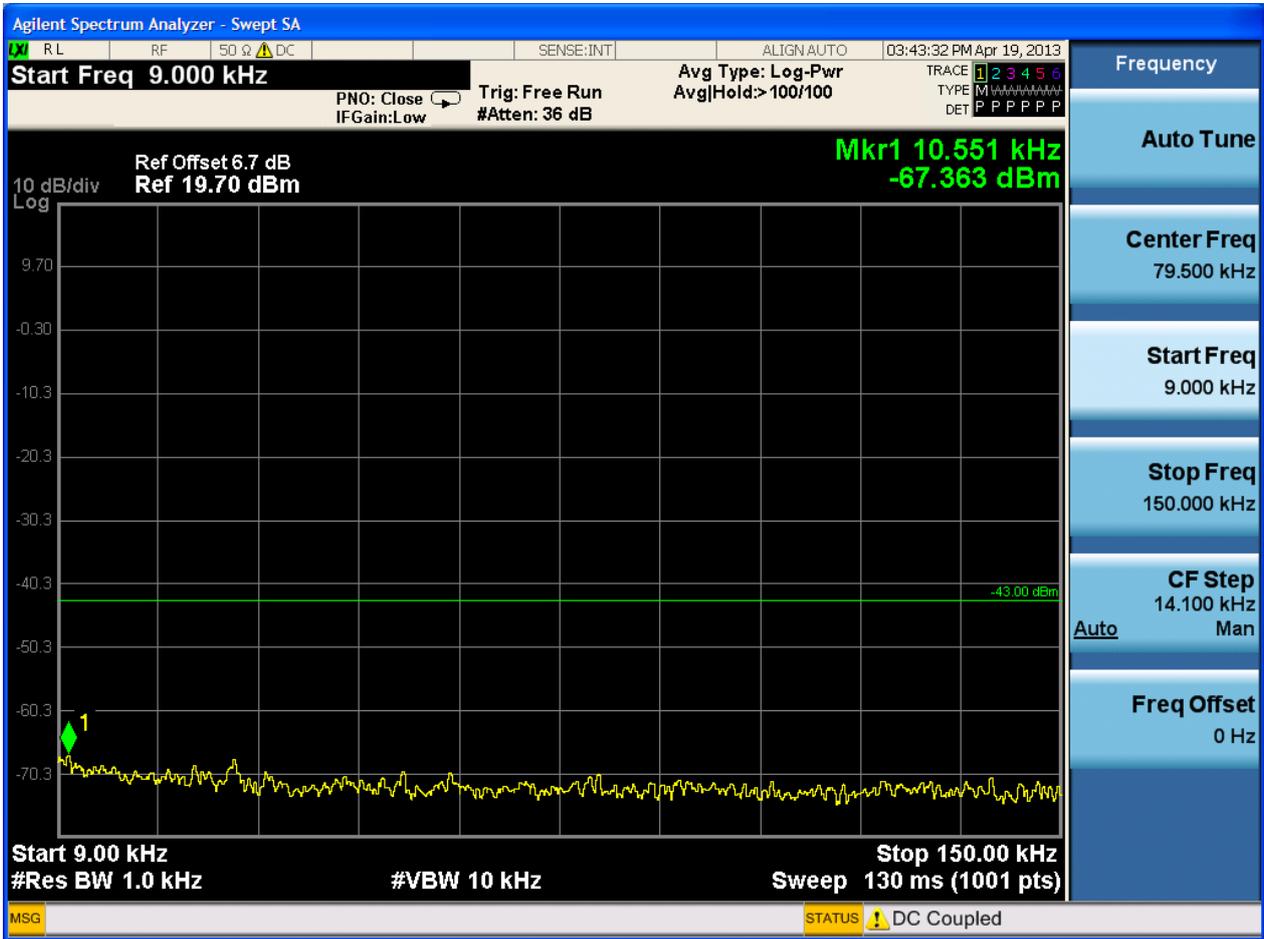




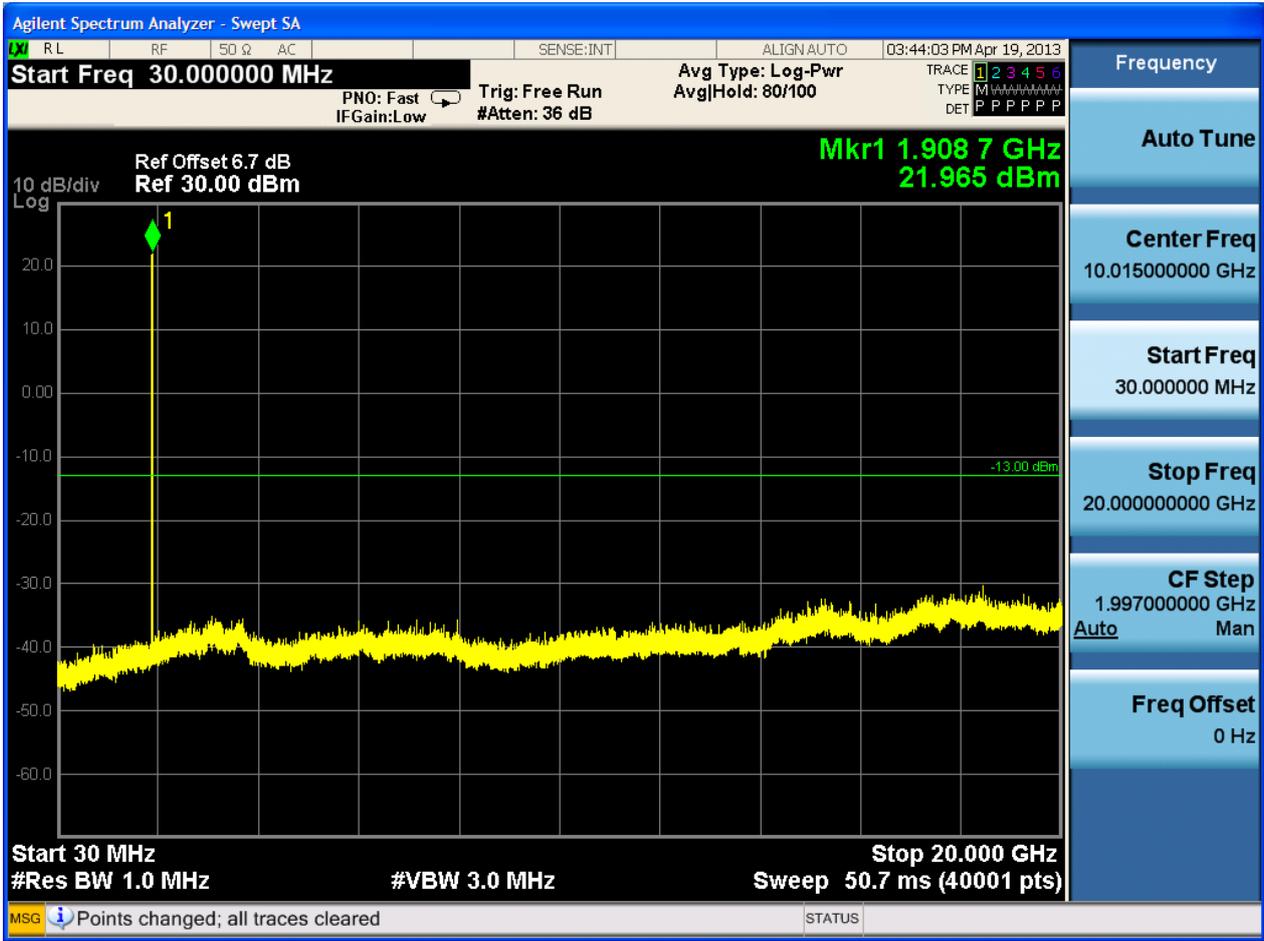




6.2.3.1.3 Test Channel = HCH







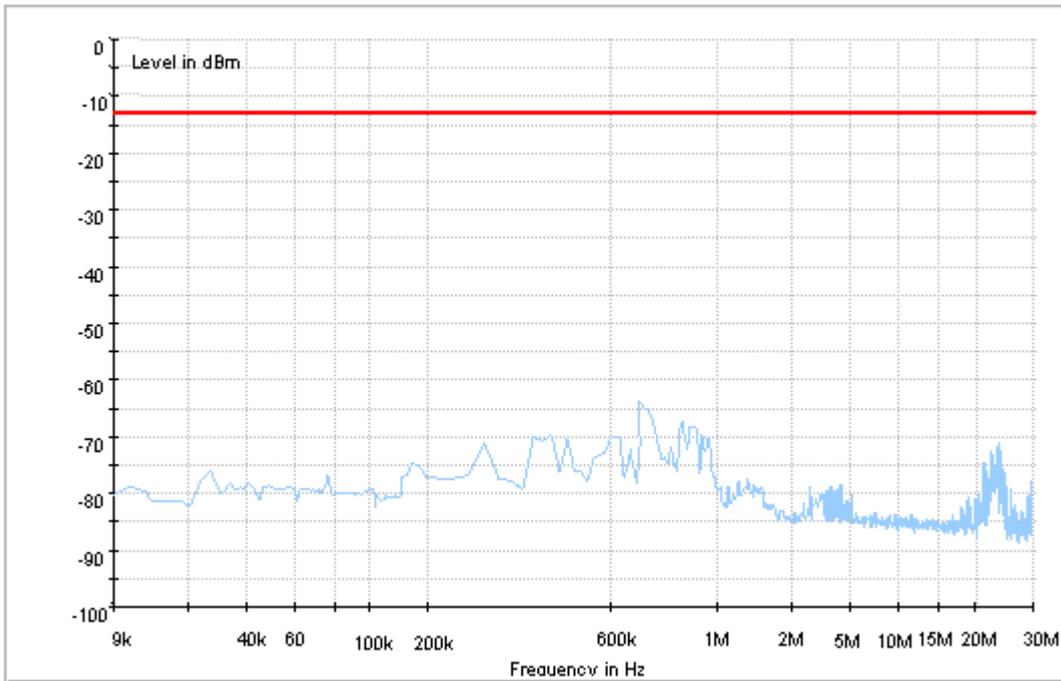
## 7Appendix\_G: Field Strength of Spurious Radiation

### Part I - Test Plots

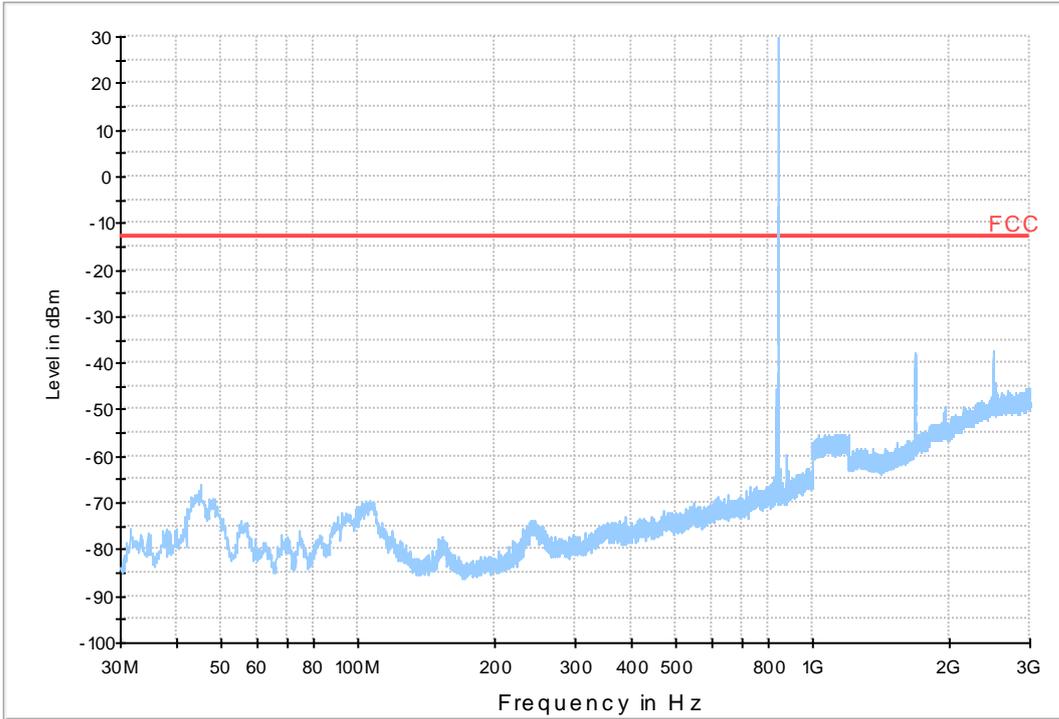
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850

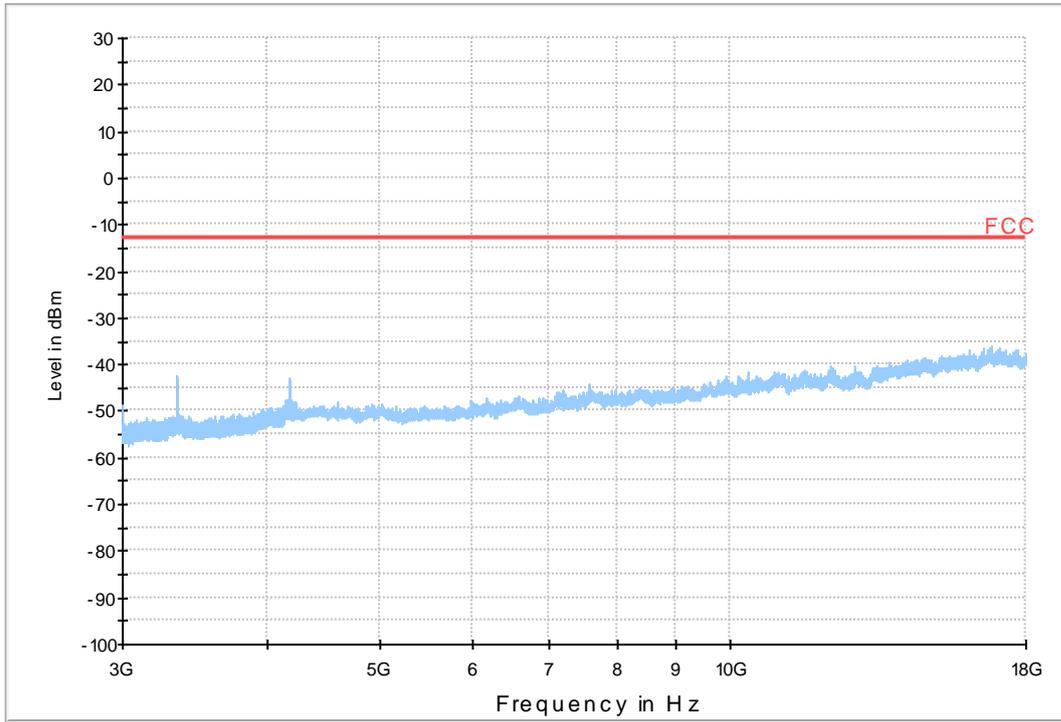
##### 7.1.1.1 Test Mode = GSM/TM1



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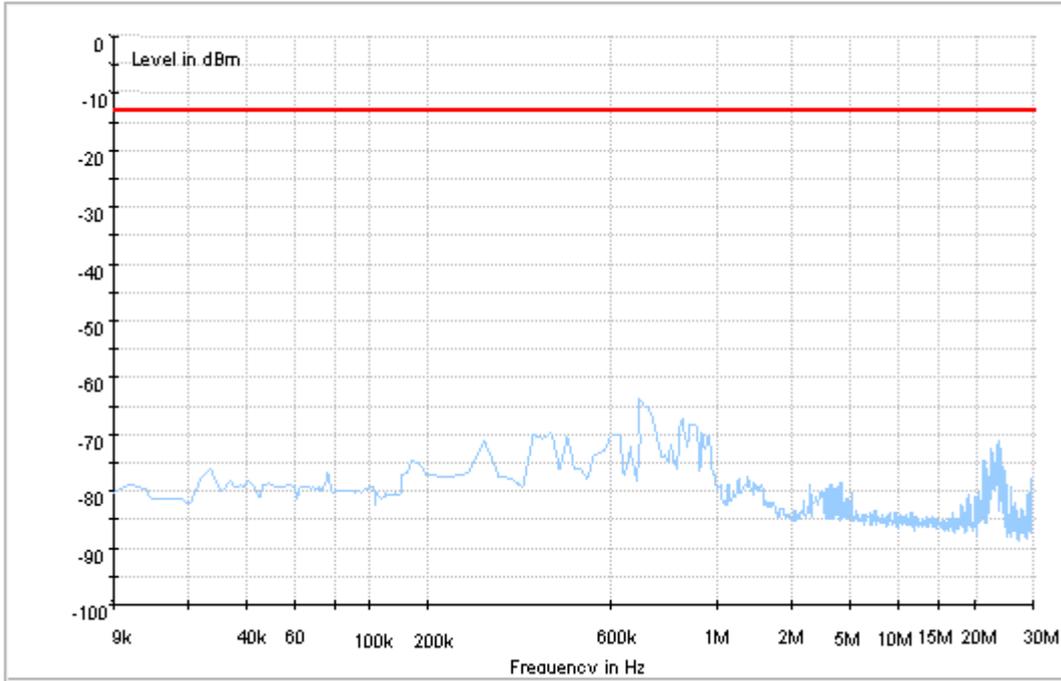


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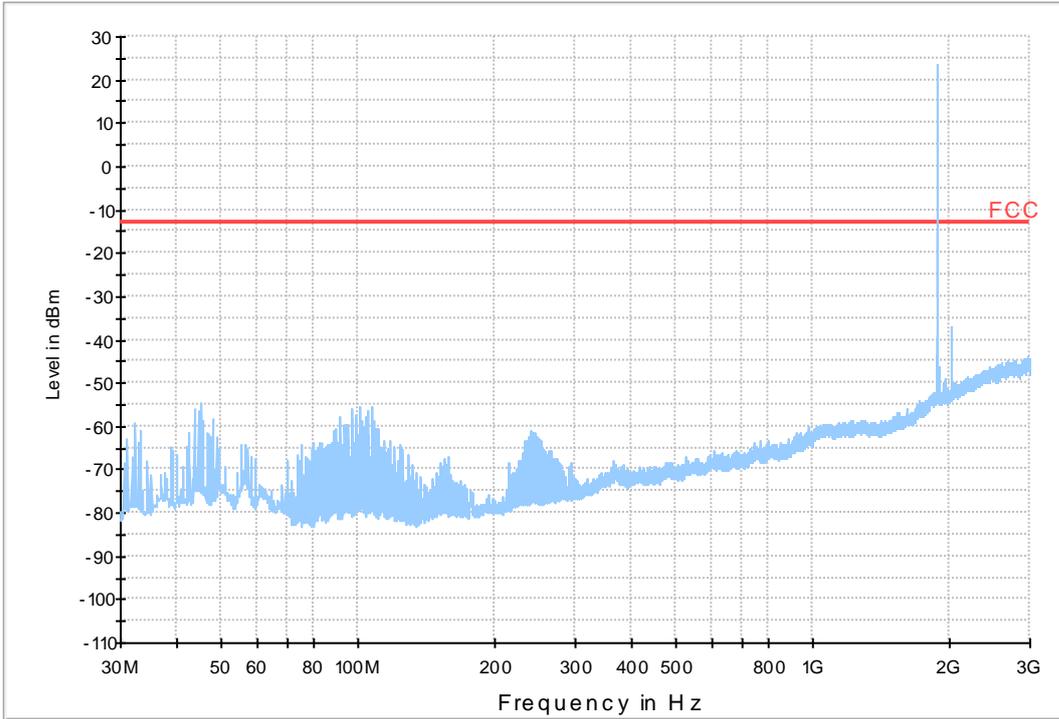


### 7.1.2 Test Band = GSM1900

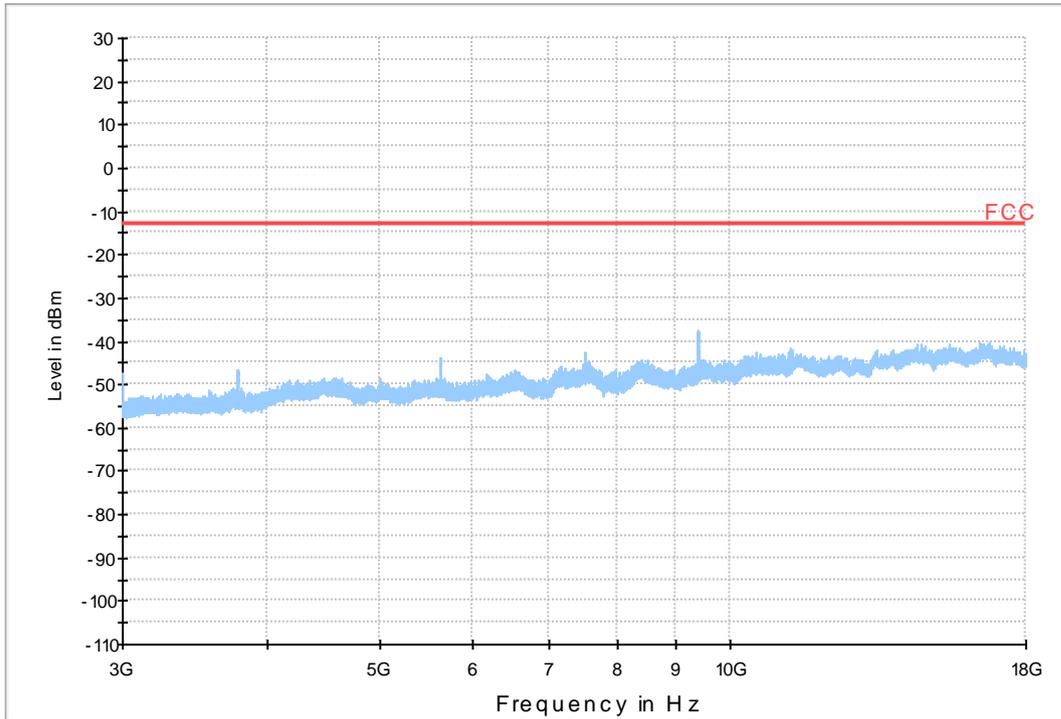
#### 7.1.2.1 Test Mode = GSM/TM1

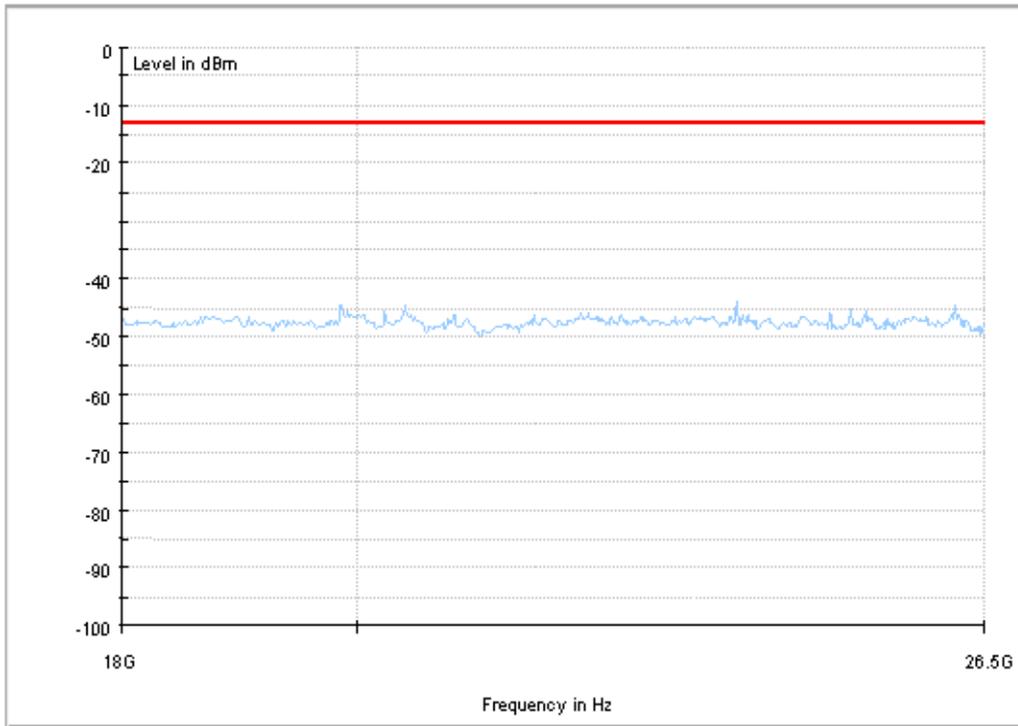


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Copy of FCC PART 24 GSM 1900\_H

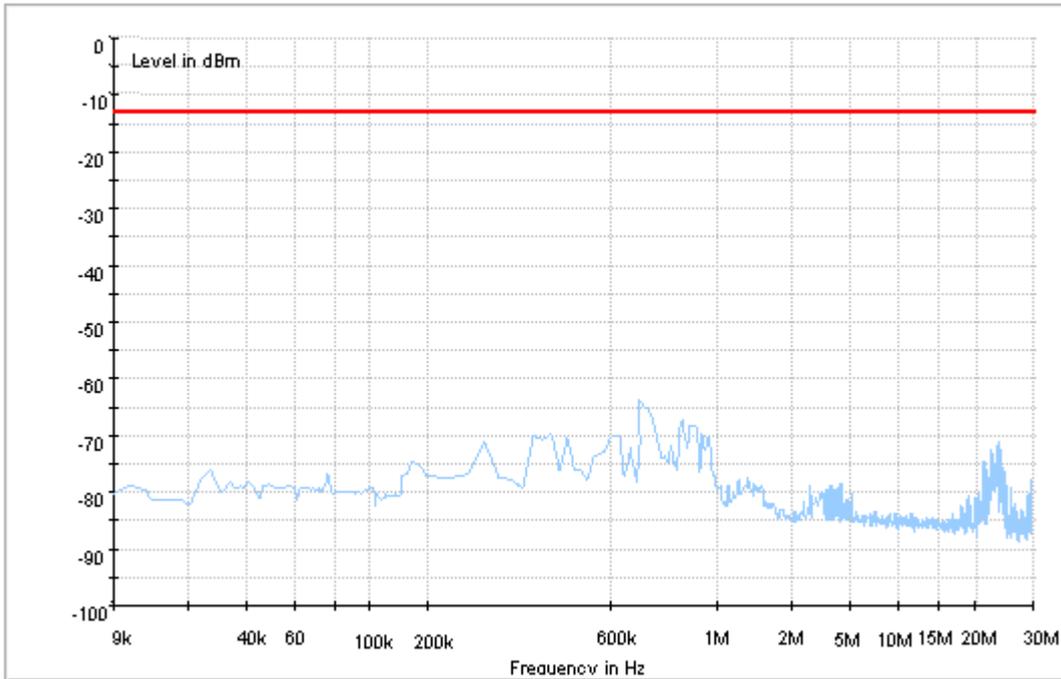




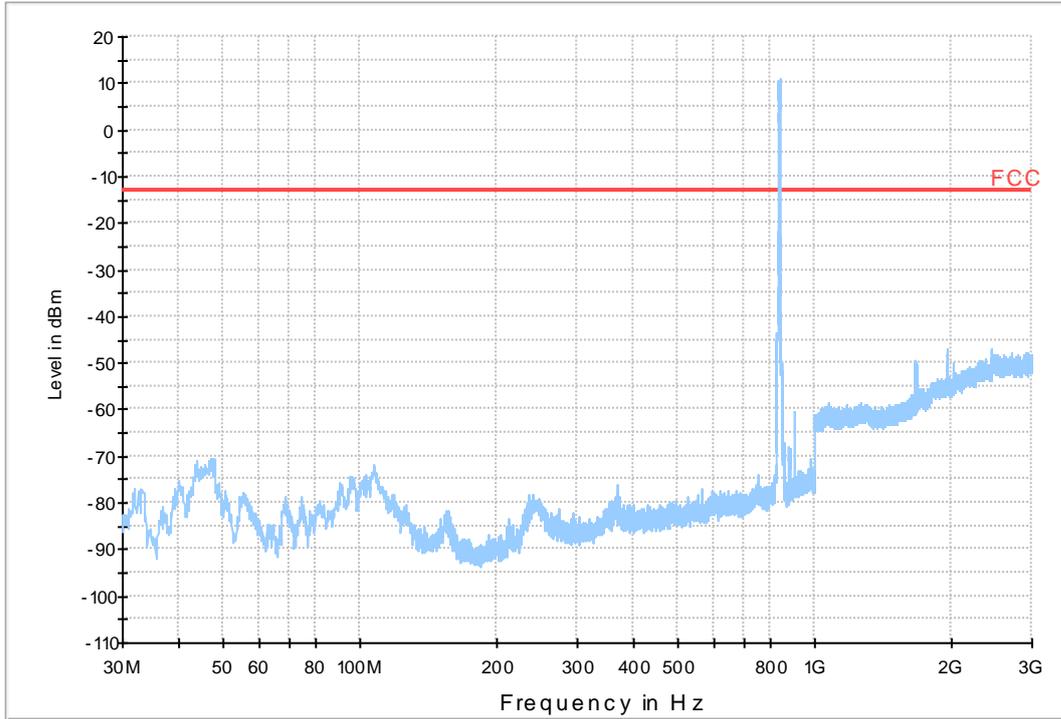
## 7.2 For UMTS

### 7.2.1 Test Band = WCDMA850

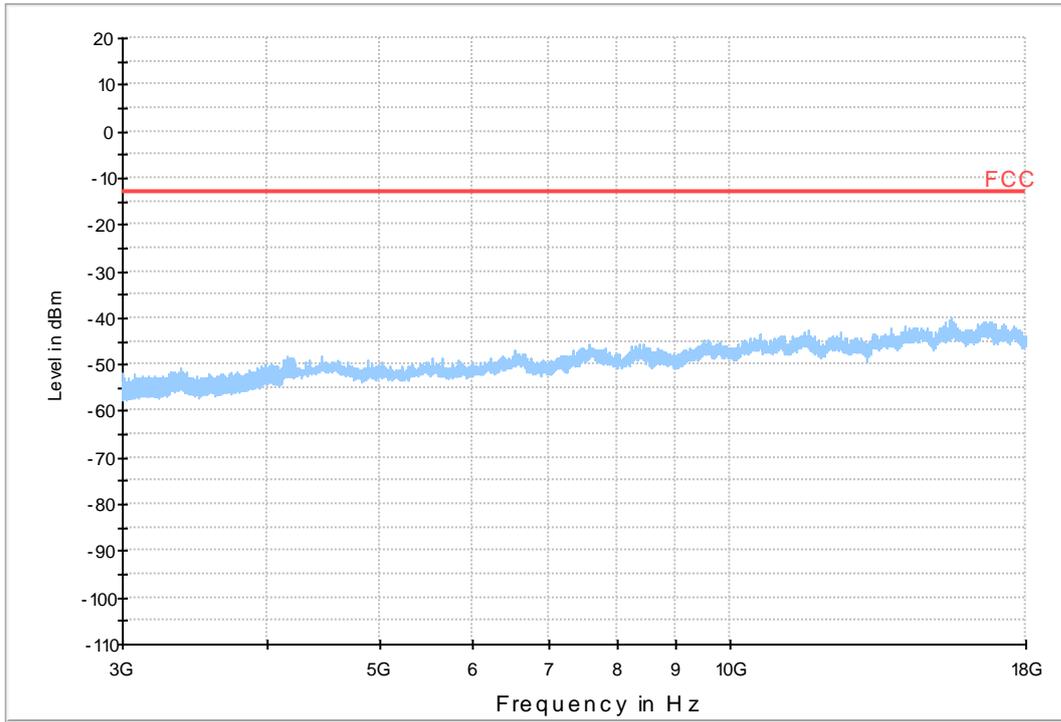
#### 7.2.1.1 Test Mode = UMTS/TM1



Copy of FCC PART22 W CDMA850\_L

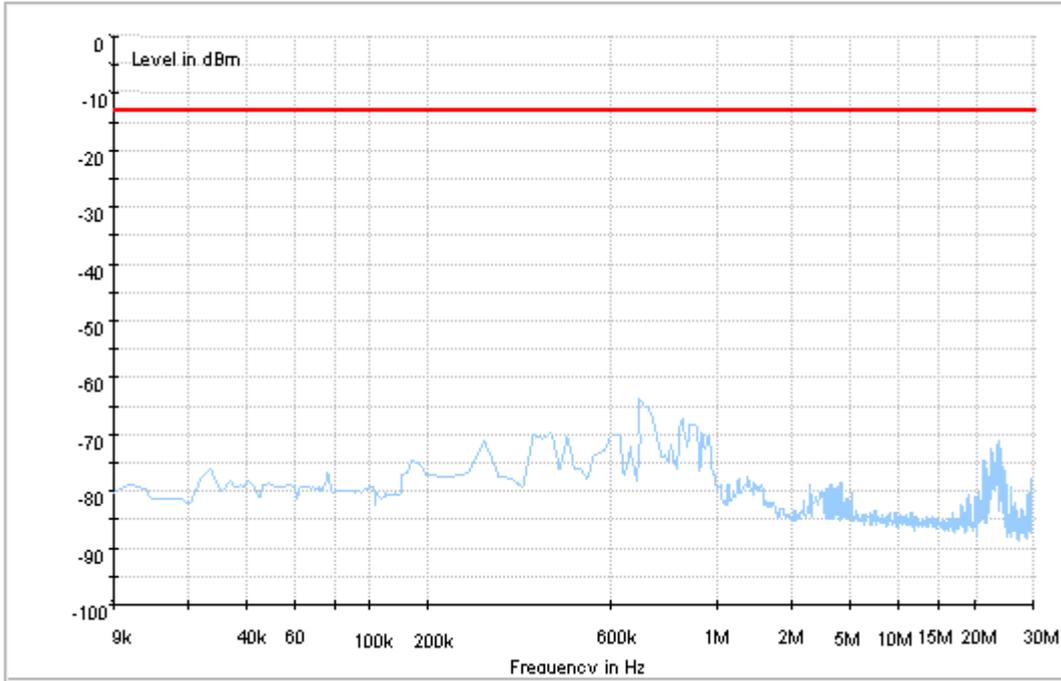


Copy of FCC PART22 W CDMA850\_H

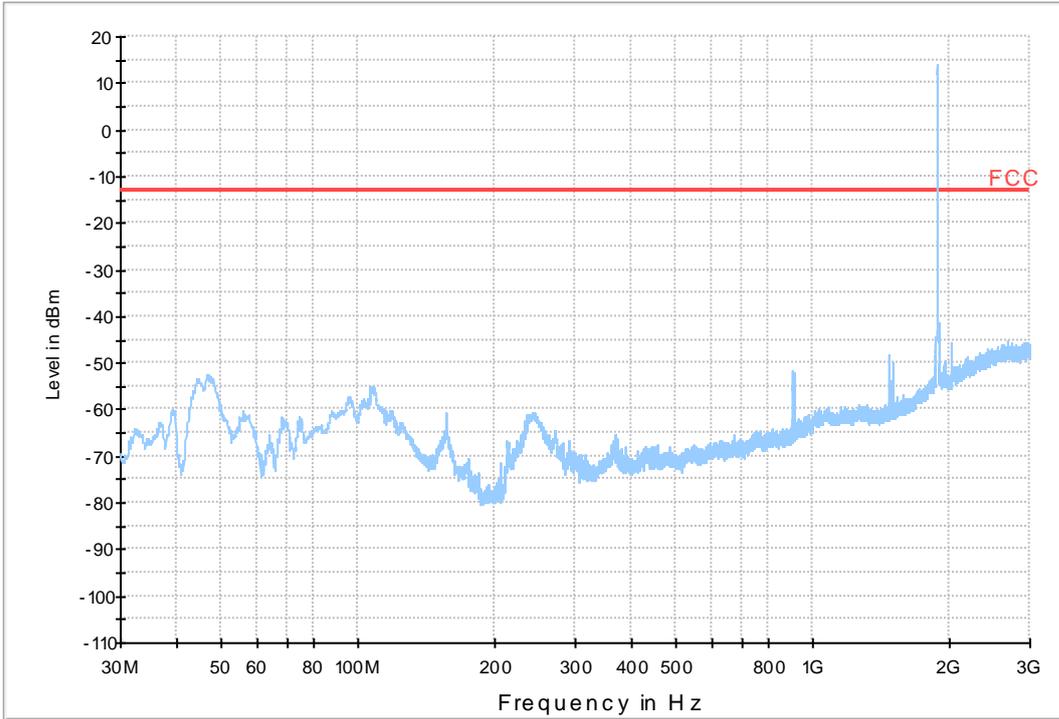


### 7.2.3 Test Band = WCDMA1900

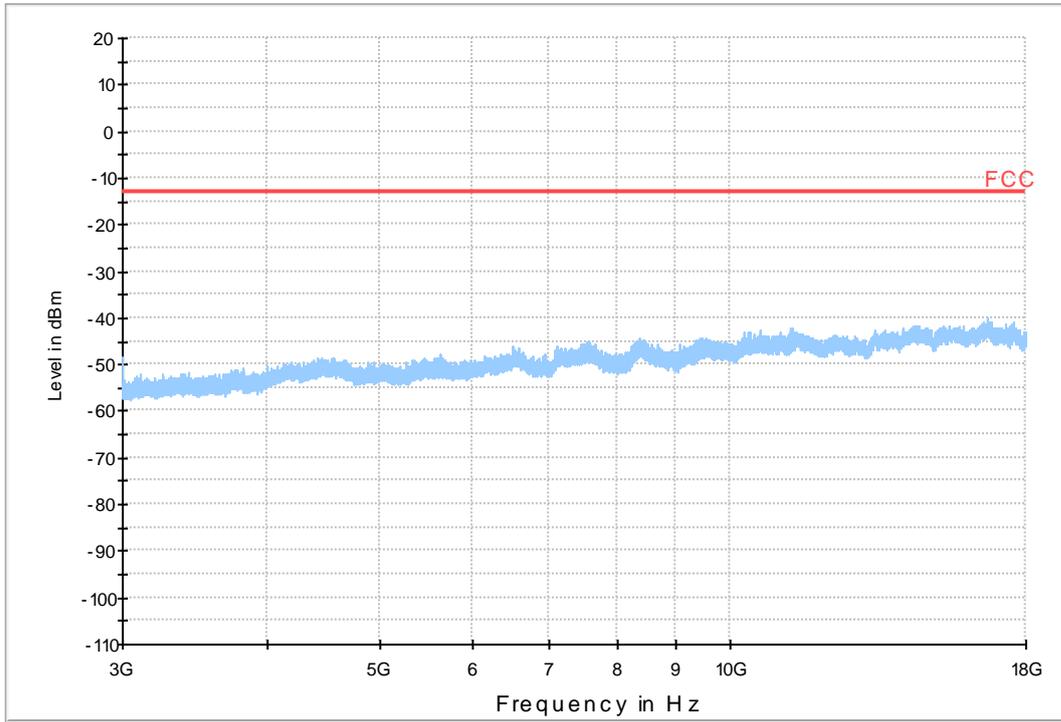
#### 7.2.3.1 Test Mode = UMTS/TM1

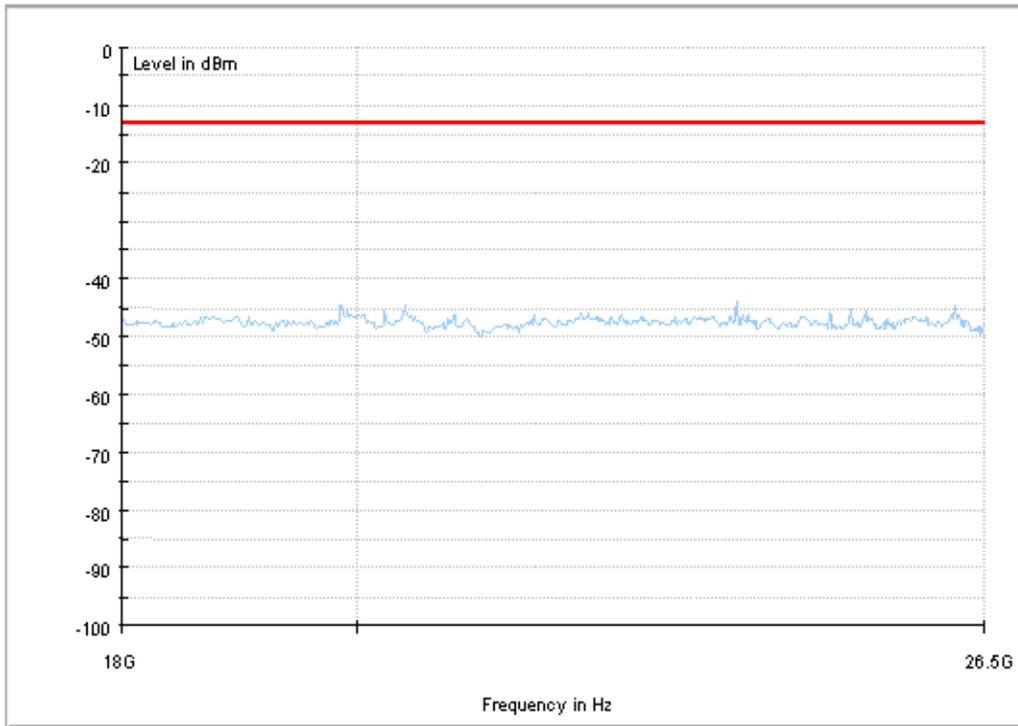


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Copy of FCC PART24 W CDMA1900\_H





## 8Appendix\_H: Frequency Stability

### 8.1 For GSM

#### 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	-7.14	-0.00897	±2.5	PASS
				VN	-6.03	-0.00690	±2.5	PASS
				VH	-7.37	-0.00872	±2.5	PASS
		MCH	TN	VL	-9.17	-0.01052	±2.5	PASS
				VN	-13.67	-0.01568	±2.5	PASS
				VH	-12.03	-0.01429	±2.5	PASS
		HCH	TN	VL	-11.40	-0.01244	±2.5	PASS
				VN	-10.33	-0.01219	±2.5	PASS
				VH	-8.23	-0.00994	±2.5	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-0.28	0.00022	±2.5	PASS
				VN	7.50	0.00339	±2.5	PASS
				VH	5.96	0.00274	±2.5	PASS
		MCH	TN	VL	-12.53	-0.00716	±2.5	PASS
				VN	-16.45	-0.00925	±2.5	PASS
				VH	-12.81	-0.00648	±2.5	PASS
		HCH	TN	VL	-15.51	-0.00821	±2.5	PASS
				VN	-7.75	-0.00365	±2.5	PASS
				VH	-13.79	-0.00729	±2.5	PASS

#### 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	-9.86	-0.01200	±2.5	PASS
				-20	-8.00	-0.00888	±2.5	PASS
				-10	-8.97	-0.01051	±2.5	PASS
				0	-9.68	-0.01164	±2.5	PASS
				10	-8.30	-0.00969	±2.5	PASS
				20	-8.04	-0.00914	±2.5	PASS
				30	-8.46	-0.00976	±2.5	PASS
				40	-6.13	-0.00769	±2.5	PASS
				50	-7.90	-0.00992	±2.5	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
		MCH	VN	-30	-11.89	-0.01410	±2.5	PASS
				-20	-13.28	-0.01554	±2.5	PASS
				-10	-14.10	-0.01678	±2.5	PASS
				0	-12.69	-0.01532	±2.5	PASS
				10	-14.72	-0.01797	±2.5	PASS
				20	-12.64	-0.01506	±2.5	PASS
				30	-12.11	-0.01448	±2.5	PASS
				40	-13.74	-0.01624	±2.5	PASS
				50	-13.32	-0.01621	±2.5	PASS
		HCH	VN	-30	-10.11	-0.01177	±2.5	PASS
				-20	-11.12	-0.01307	±2.5	PASS
				-10	-6.22	-0.00658	±2.5	PASS
				0	-8.00	-0.00932	±2.5	PASS
				10	-6.78	-0.00852	±2.5	PASS
				20	-5.27	-0.00613	±2.5	PASS
				30	-5.61	-0.00690	±2.5	PASS
				40	-4.05	-0.00549	±2.5	PASS
				50	-7.89	-0.00986	±2.5	PASS
GSM1900	GSM/TM1	LCH	VN	-30	-4.00	-0.00197	±2.5	PASS
				-20	0.41	-0.00014	±2.5	PASS
				-10	-1.46	-0.00127	±2.5	PASS
				0	5.13	0.00230	±2.5	PASS
				10	-0.78	-0.00039	±2.5	PASS
				20	-0.64	-0.00076	±2.5	PASS
				30	6.10	0.00275	±2.5	PASS
				40	3.90	0.00252	±2.5	PASS
				50	-0.82	-0.00070	±2.5	PASS
		MCH	VN	-30	-16.19	-0.00884	±2.5	PASS
				-20	-20.30	-0.01033	±2.5	PASS
				-10	-27.50	-0.01483	±2.5	PASS
				0	-20.86	-0.01087	±2.5	PASS
				10	-20.30	-0.01032	±2.5	PASS
				20	-23.77	-0.01257	±2.5	PASS
				30	-22.56	-0.01268	±2.5	PASS
				40	-16.93	-0.00851	±2.5	PASS
				50	-17.00	-0.00882	±2.5	PASS
		HCH	VN	-30	-6.82	-0.00337	±2.5	PASS
				-20	-13.89	-0.00791	±2.5	PASS
				-10	-11.64	-0.00605	±2.5	PASS
				0	-9.41	-0.00469	±2.5	PASS



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
				10	-8.79	-0.00463	±2.5	PASS
				20	-8.45	-0.00425	±2.5	PASS
				30	-10.20	-0.00488	±2.5	PASS
				40	-14.46	-0.00772	±2.5	PASS
				50	-8.54	-0.00443	±2.5	PASS



**8.2 For UMTS**

**8.2.1 Frequency Error vs. Voltage:**

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	TN	VL	-1.50	-0.00152	±2.5	PASS
				VN	-3.69	-0.00416	±2.5	PASS
				VH	-3.78	-0.00488	±2.5	PASS
		MCH	TN	VL	-6.61	-0.00842	±2.5	PASS
				VN	4.69	0.00606	±2.5	PASS
				VH	-4.54	-0.00528	±2.5	PASS
		HCH	TN	VL	-2.47	-0.00263	±2.5	PASS
				VN	-1.00	-0.00077	±2.5	PASS
				VH	-7.71	-0.00888	±2.5	PASS
WCDMA1900	UMTS/TM1	LCH	TN	VL	0.95	0.00029	±2.5	PASS
				VN	6.46	0.00335	±2.5	PASS
				VH	5.53	0.00302	±2.5	PASS
		MCH	TN	VL	3.75	0.00253	±2.5	PASS
				VN	-1.62	-0.00111	±2.5	PASS
				VH	-1.07	-0.00028	±2.5	PASS
		HCH	TN	VL	0.73	-0.00004	±2.5	PASS
				VN	3.46	0.00231	±2.5	PASS
				VH	4.08	0.00256	±2.5	PASS

**8.2.2 Frequency Error vs. Temperature:**

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	VN	-30	-2.21	-0.00230	±2.5	PASS
				-20	-0.25	-0.00052	±2.5	PASS
				-10	3.20	0.00396	±2.5	PASS
				0	1.77	0.00238	±2.5	PASS
				10	3.59	0.00398	±2.5	PASS
				20	-1.05	-0.00074	±2.5	PASS
				30	-5.74	-0.00724	±2.5	PASS
				40	0.21	0.00020	±2.5	PASS
		50	5.83	0.00773	±2.5	PASS		
		MCH	VN	-30	-2.05	-0.00196	±2.5	PASS
-20	0.68			0.00136	±2.5	PASS		



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict				
				-10	-5.21	-0.00576	±2.5	PASS				
				0	4.70	0.00579	±2.5	PASS				
				10	-3.97	-0.00518	±2.5	PASS				
				20	3.87	0.00548	±2.5	PASS				
				30	-0.63	-0.00090	±2.5	PASS				
				40	-6.32	-0.00729	±2.5	PASS				
				50	-1.34	-0.00162	±2.5	PASS				
		HCH	VN	-30	-1.78	-0.00224	±2.5	PASS				
				-20	-2.32	-0.00238	±2.5	PASS				
				-10	0.11	-0.00007	±2.5	PASS				
				0	-7.17	-0.00766	±2.5	PASS				
				10	-5.79	-0.00674	±2.5	PASS				
				20	-10.39	-0.01220	±2.5	PASS				
				30	0.86	0.00152	±2.5	PASS				
				40	0.68	0.00130	±2.5	PASS				
				50	1.71	0.00152	±2.5	PASS				
				WCDMA1900	UMTS/TM1	LCH	VN	-30	0.58	-0.00014	±2.5	PASS
								-20	2.32	0.00107	±2.5	PASS
-10	-2.97	-0.00153	±2.5					PASS				
0	-0.62	-0.00053	±2.5					PASS				
10	3.25	0.00157	±2.5					PASS				
20	4.47	0.00293	±2.5					PASS				
30	-4.30	-0.00205	±2.5					PASS				
40	-2.23	-0.00067	±2.5					PASS				
50	-0.13	-0.00049	±2.5					PASS				
MCH	VN	-30	-1.89			-0.00148	±2.5	PASS				
		-20	1.67			0.00117	±2.5	PASS				
		-10	0.29			-0.00051	±2.5	PASS				
		0	3.88			0.00243	±2.5	PASS				
		10	-7.50			-0.00339	±2.5	PASS				
		20	0.29			0.00042	±2.5	PASS				
		30	6.41			0.00355	±2.5	PASS				
		40	4.95			0.00267	±2.5	PASS				
		50	3.52			0.00158	±2.5	PASS				
HCH	VN	-30	1.11			0.00131	±2.5	PASS				
		-20	-0.34			-0.00039	±2.5	PASS				
		-10	2.86			0.00211	±2.5	PASS				
		0	-10.22			-0.00493	±2.5	PASS				
		10	1.10			0.00127	±2.5	PASS				



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Limit [ppm]	Verdict
				20	-6.44	-0.00355	±2.5	PASS
				30	-3.32	-0.00240	±2.5	PASS
				40	-3.71	-0.00176	±2.5	PASS
				50	-8.68	-0.00419	±2.5	PASS

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END