



# Appendix for test report



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

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.79	27.79	33	PASS
		MCH	29.71	27.71	33	PASS
		HCH	29.79	27.79	33	PASS
	GSM/TM2	LCH	25.71	23.71	33	PASS
		MCH	25.73	23.73	33	PASS
		HCH	25.76	23.76	33	PASS

Test Band	Test Mode	Test Channel	Measured [dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.6	29.6	38.5	PASS
		MCH	32.64	29.64	38.5	PASS
		HCH	32.67	29.67	38.5	PASS
	GSM/TM2	LCH	26.86	23.86	38.5	PASS
		MCH	26.87	23.87	38.5	PASS
		HCH	26.79	23.79	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:

SET Span=1.5\*OBW

SET RBW=1%of the OBW,not to wxceed 1MHz

SET VBW>= 3\*RBW

SET Sweep time=auto-couple.

Detector:RMS



## 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	0.14	13	PASS
		MCH	0.12	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	2.99	13	PASS
		MCH	3	13	PASS
		HCH	3.02	13	PASS
GSM850	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.15	13	PASS
		MCH	3.13	13	PASS
		HCH	3.18	13	PASS

### 3Appendix\_C: Modulation Characteristics

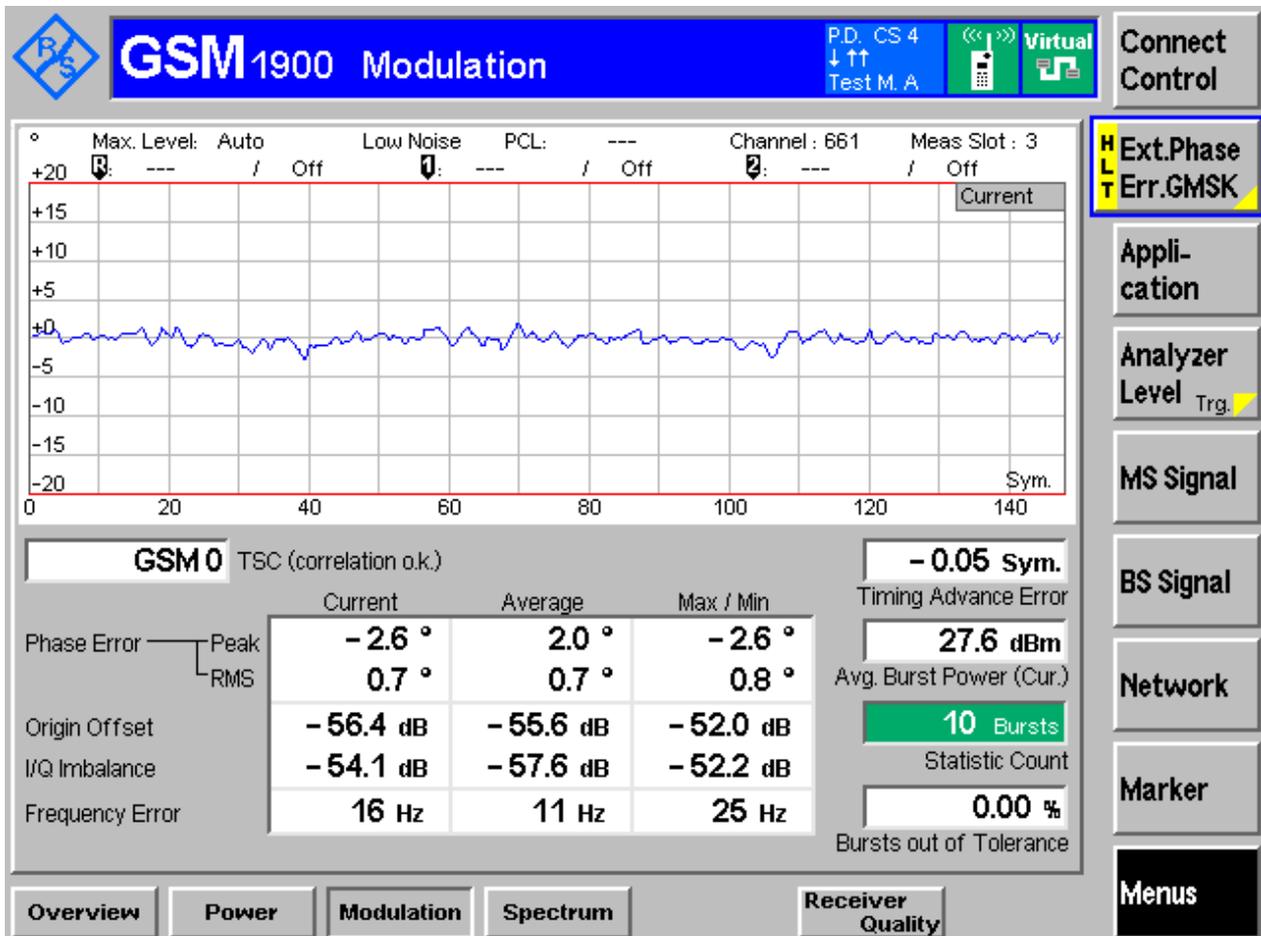
#### Part I - Test Plots

#### 3.1 For GSM

#### 3.1.1 Test Band = GSM1900

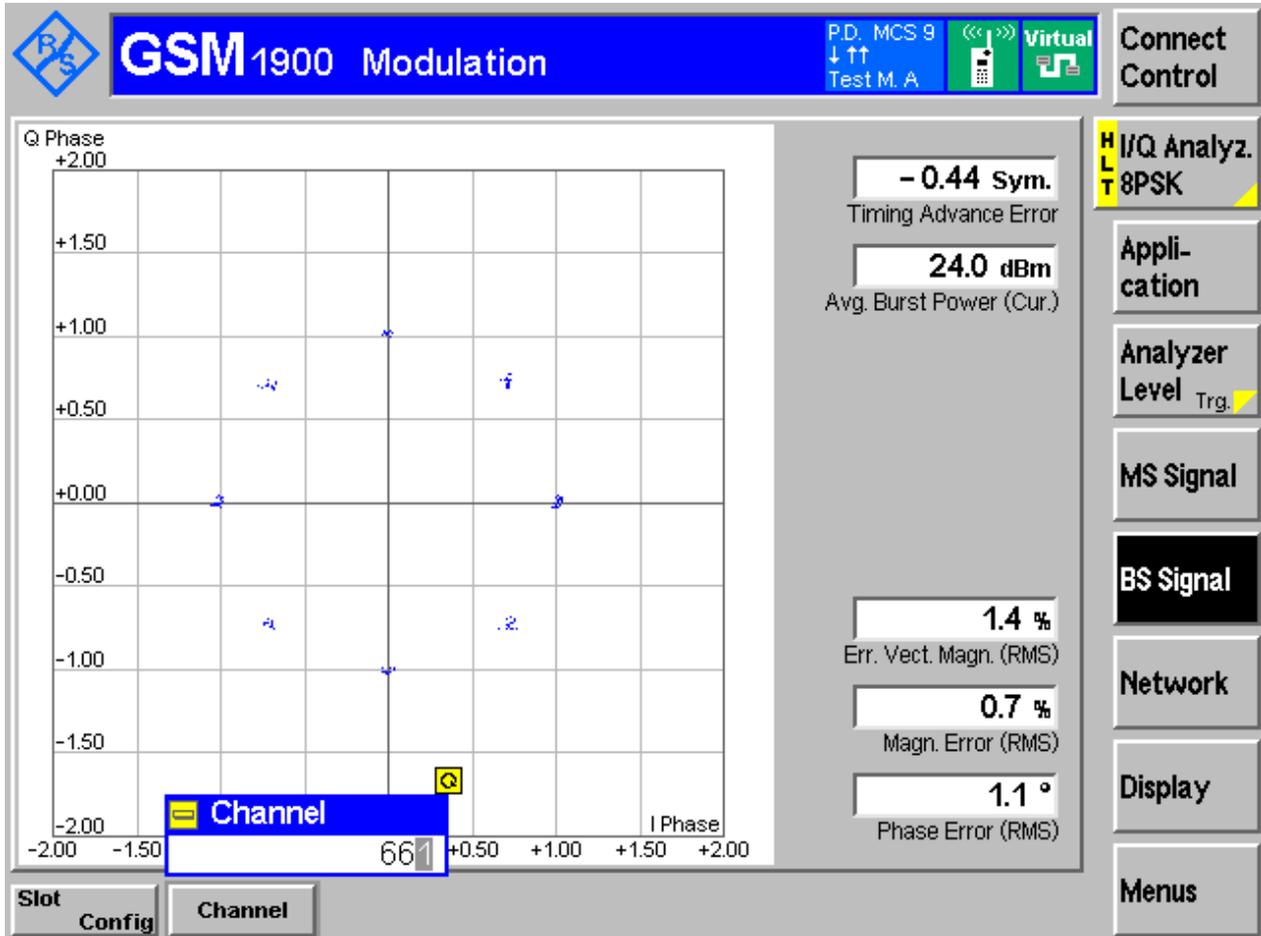
#### 3.1.1.1 Test Mode = GSM/TM1

#### 3.1.1.1.1 Test Channel = MCH



## 3.1.1.2 Test Mode = GSM/TM2

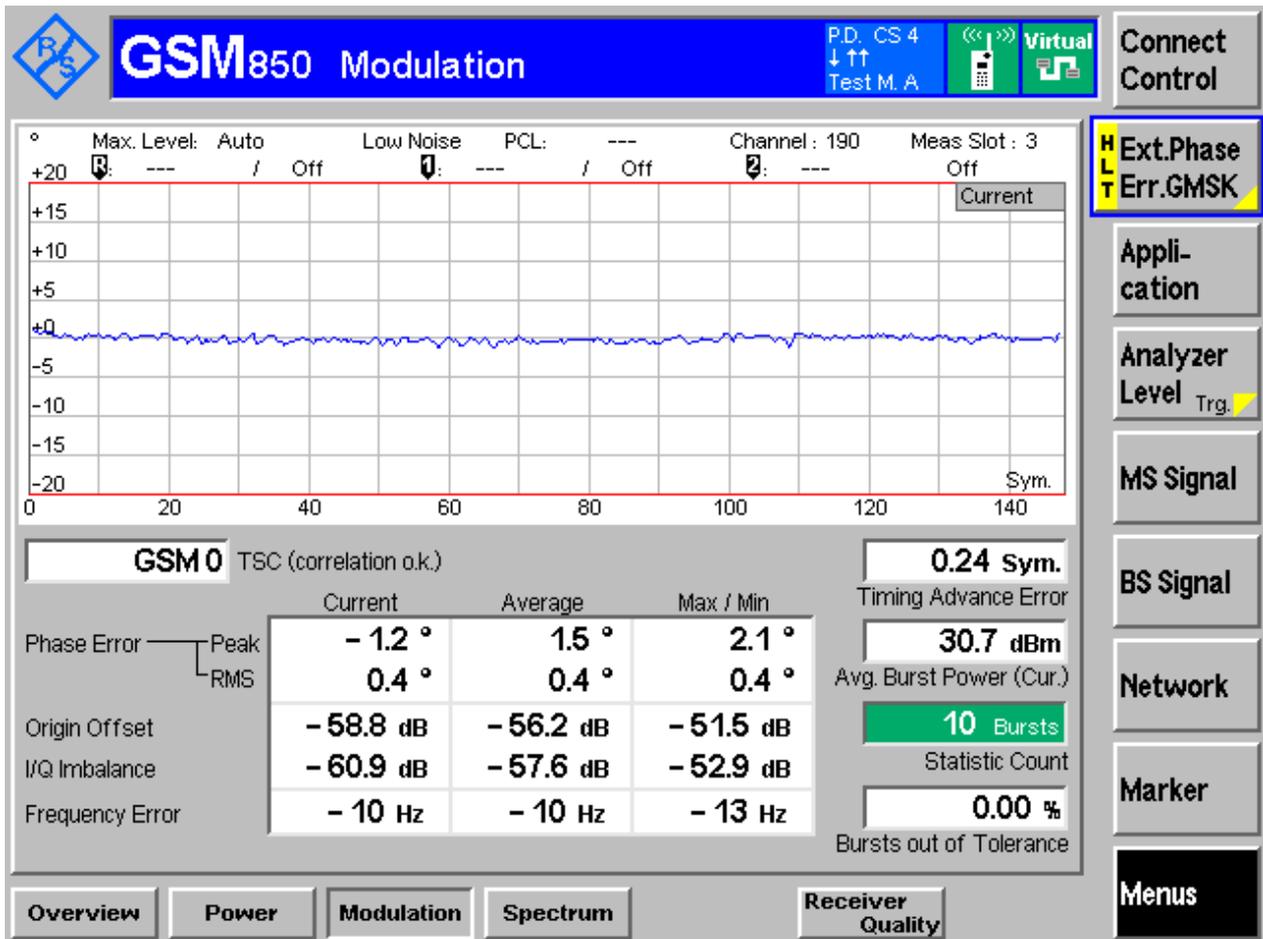
## 3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM850

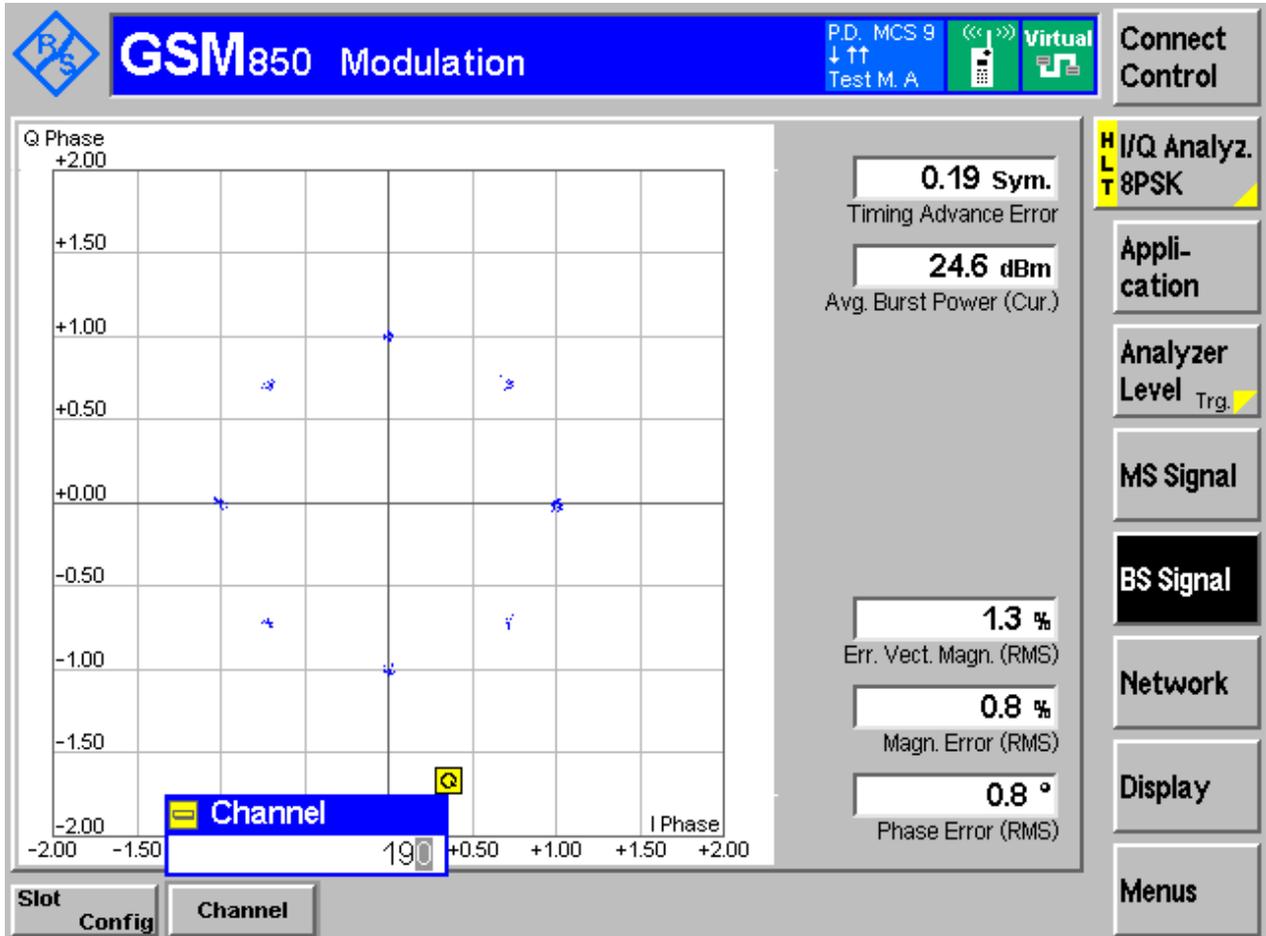
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



### 3.1.2.2 Test Mode = GSM/TM2

#### 3.1.2.2.1 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	244.47	321.37	Pass
		MCH	244.83	321.30	Pass
		HCH	243.52	317.32	Pass
	GSM/TM2	LCH	253.17	312.64	Pass
		MCH	243.30	309.61	Pass
		HCH	247.10	313.30	Pass
GSM1900	GSM/TM1	LCH	246.07	324.57	Pass
		MCH	245.39	323.13	Pass
		HCH	245.56	313.52	Pass
	GSM/TM2	LCH	244.96	318.82	Pass
		MCH	250.81	318.08	Pass
		HCH	249.51	329.49	Pass



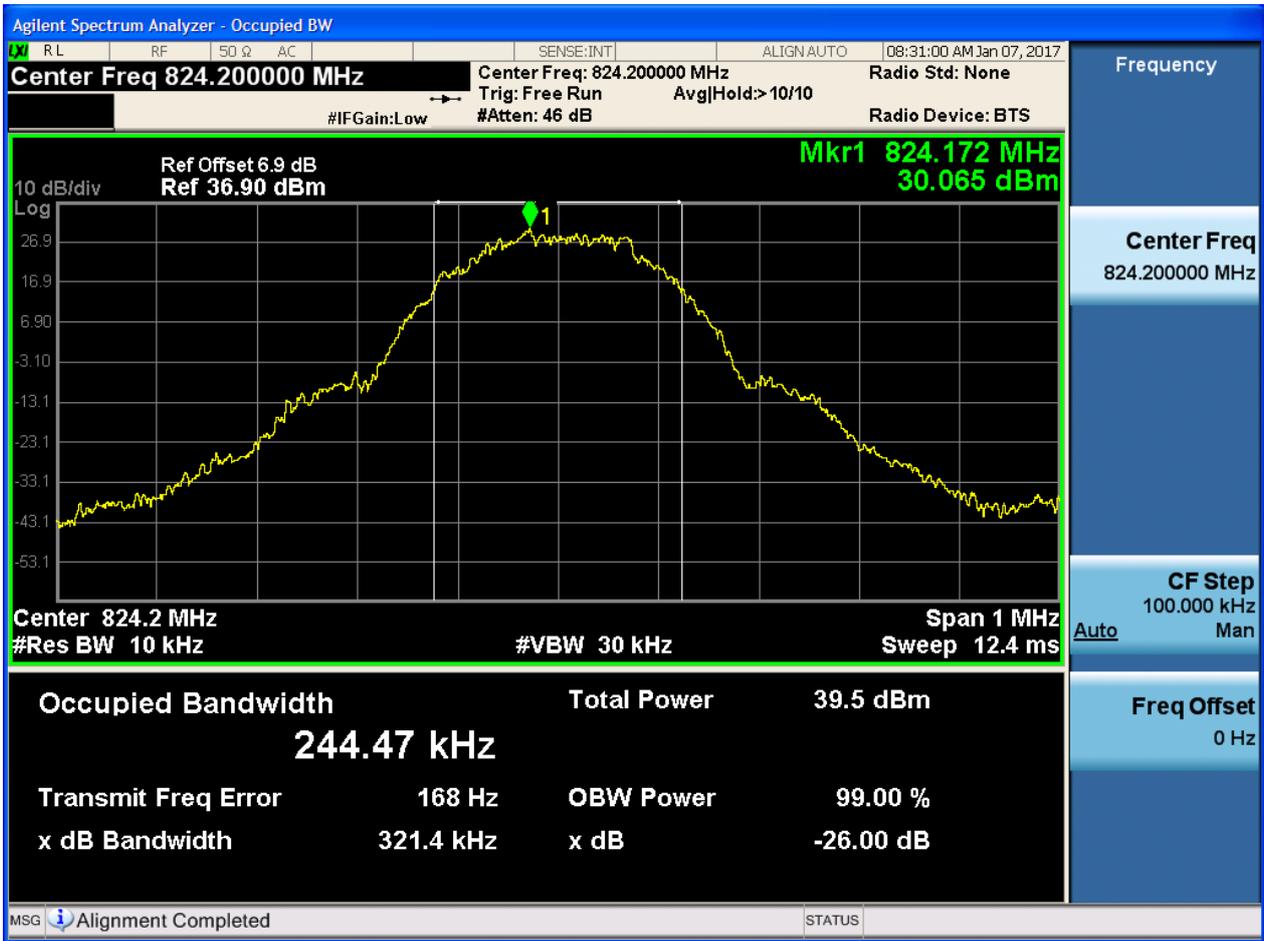
Part II - Test Plots

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



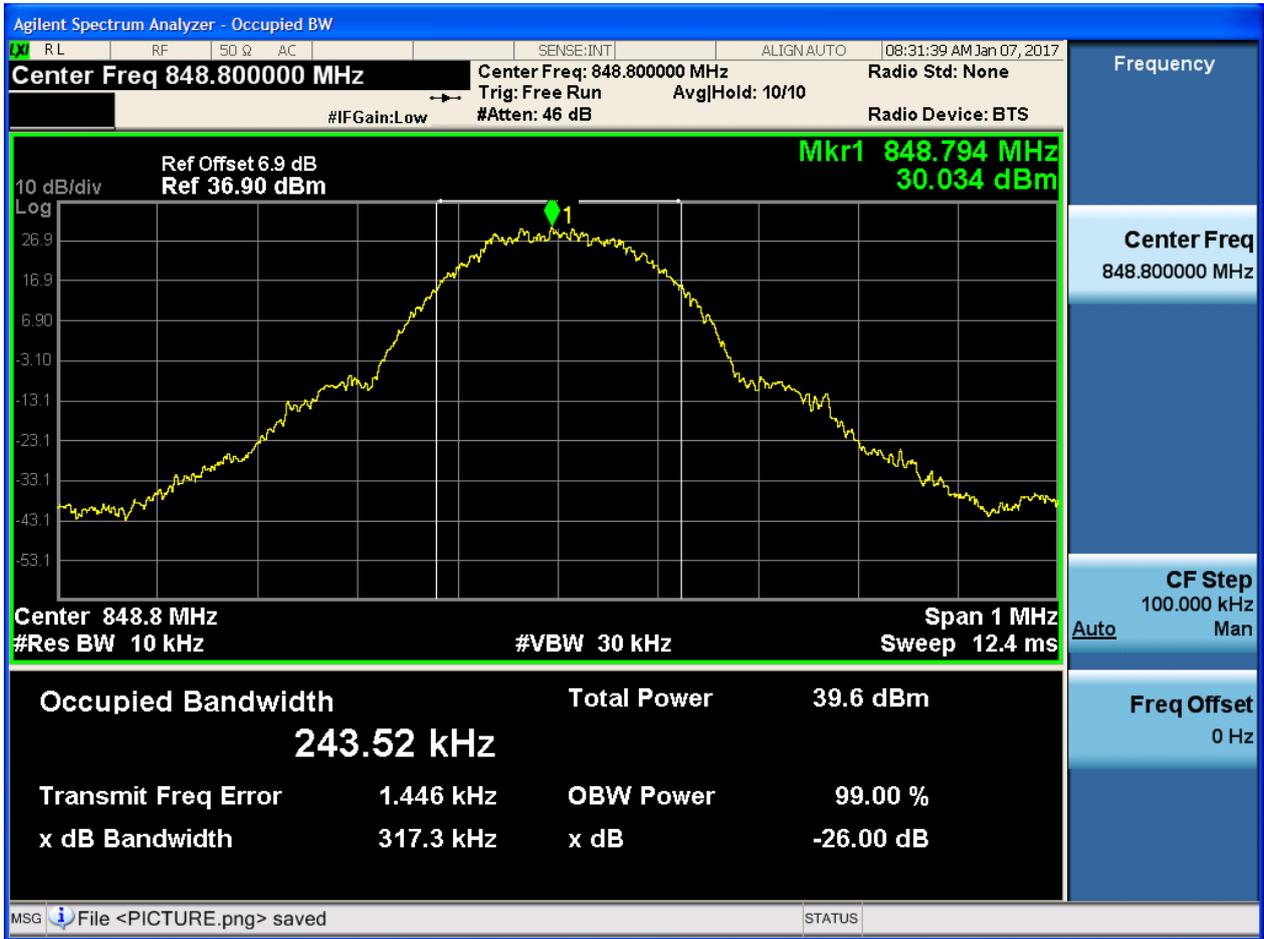


4.1.1.1.2 Test Channel = MCH





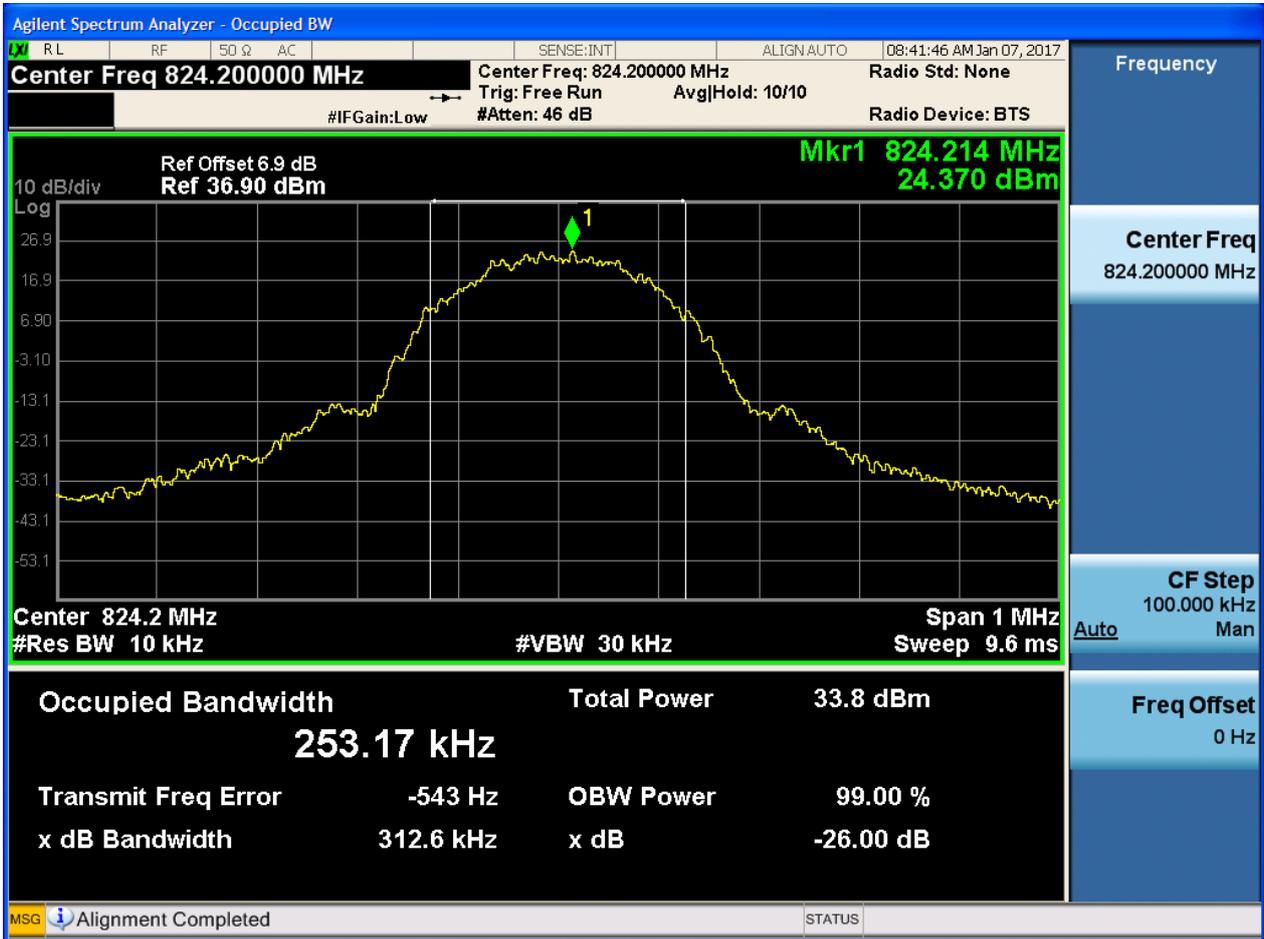
4.1.1.1.3 Test Channel = HCH





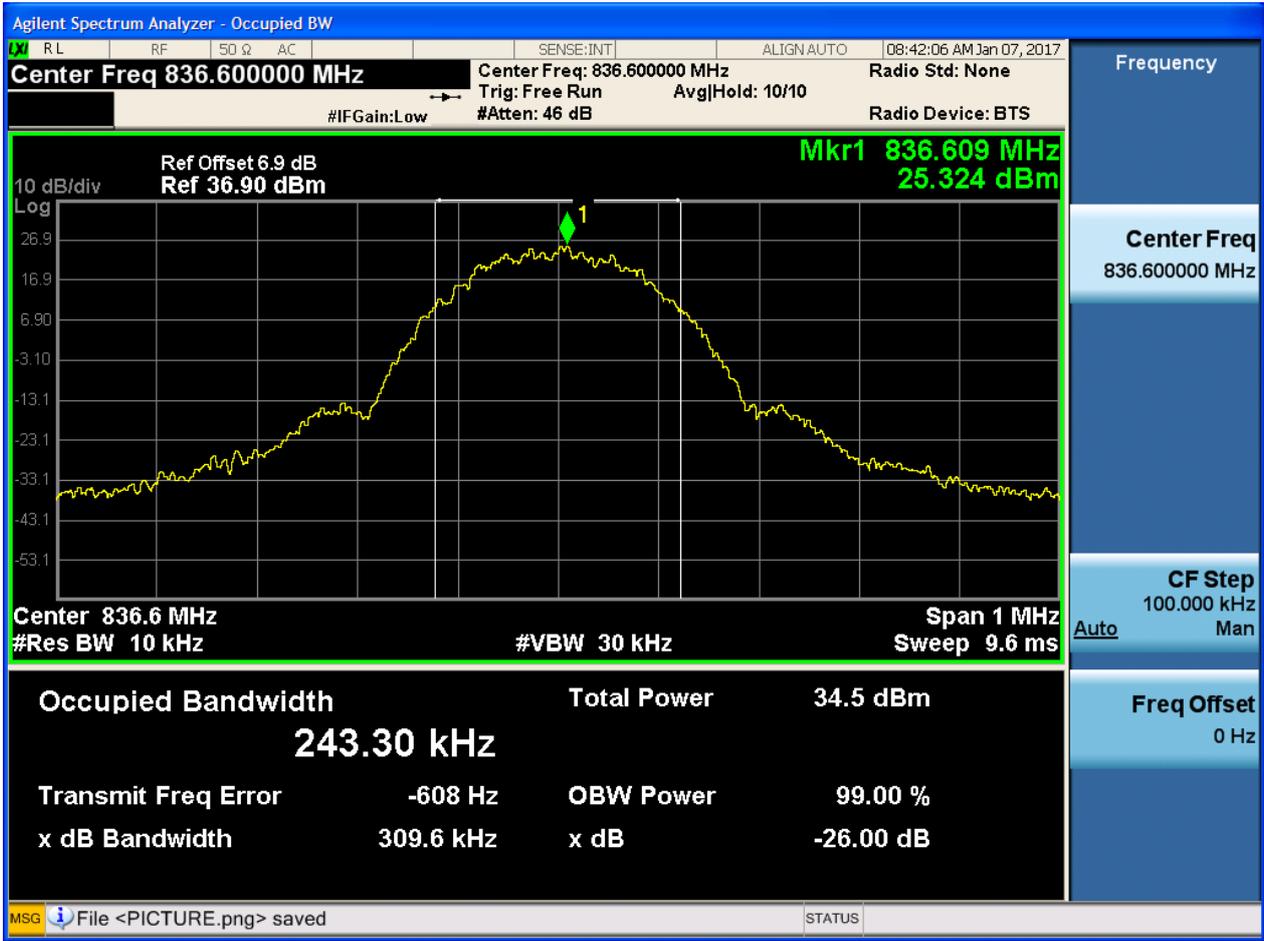
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



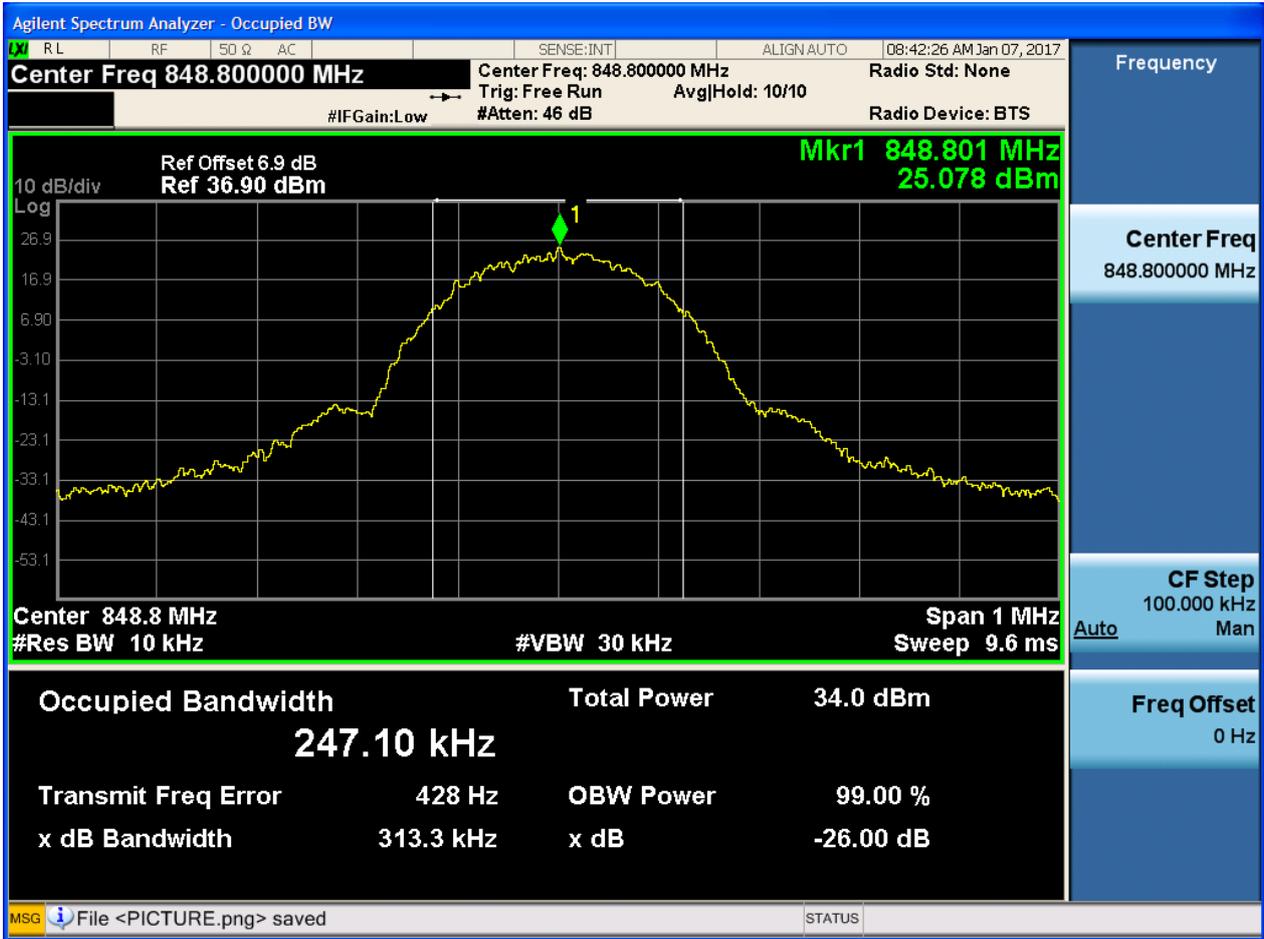


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

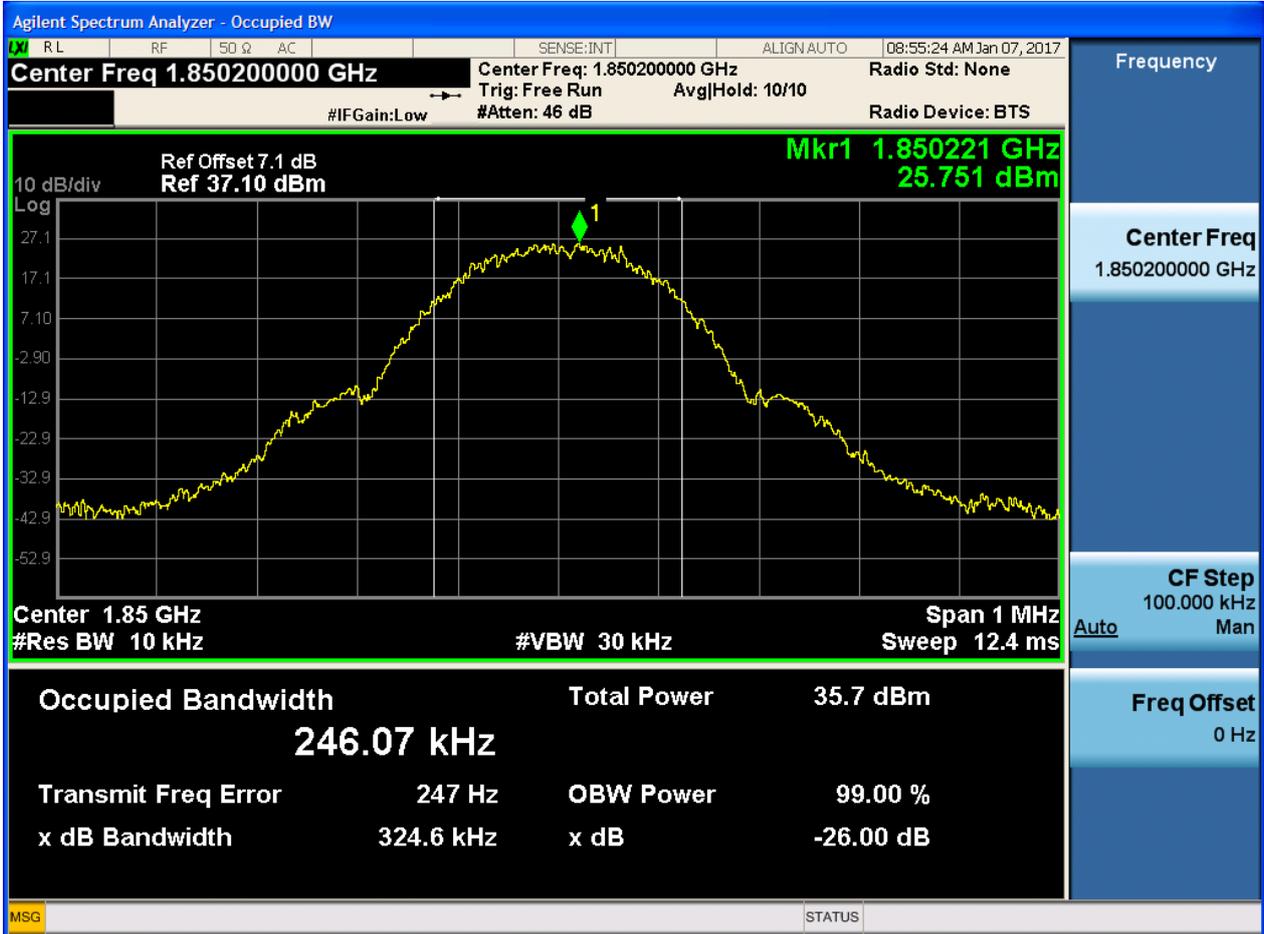




4.1.2 Test Band = GSM1900

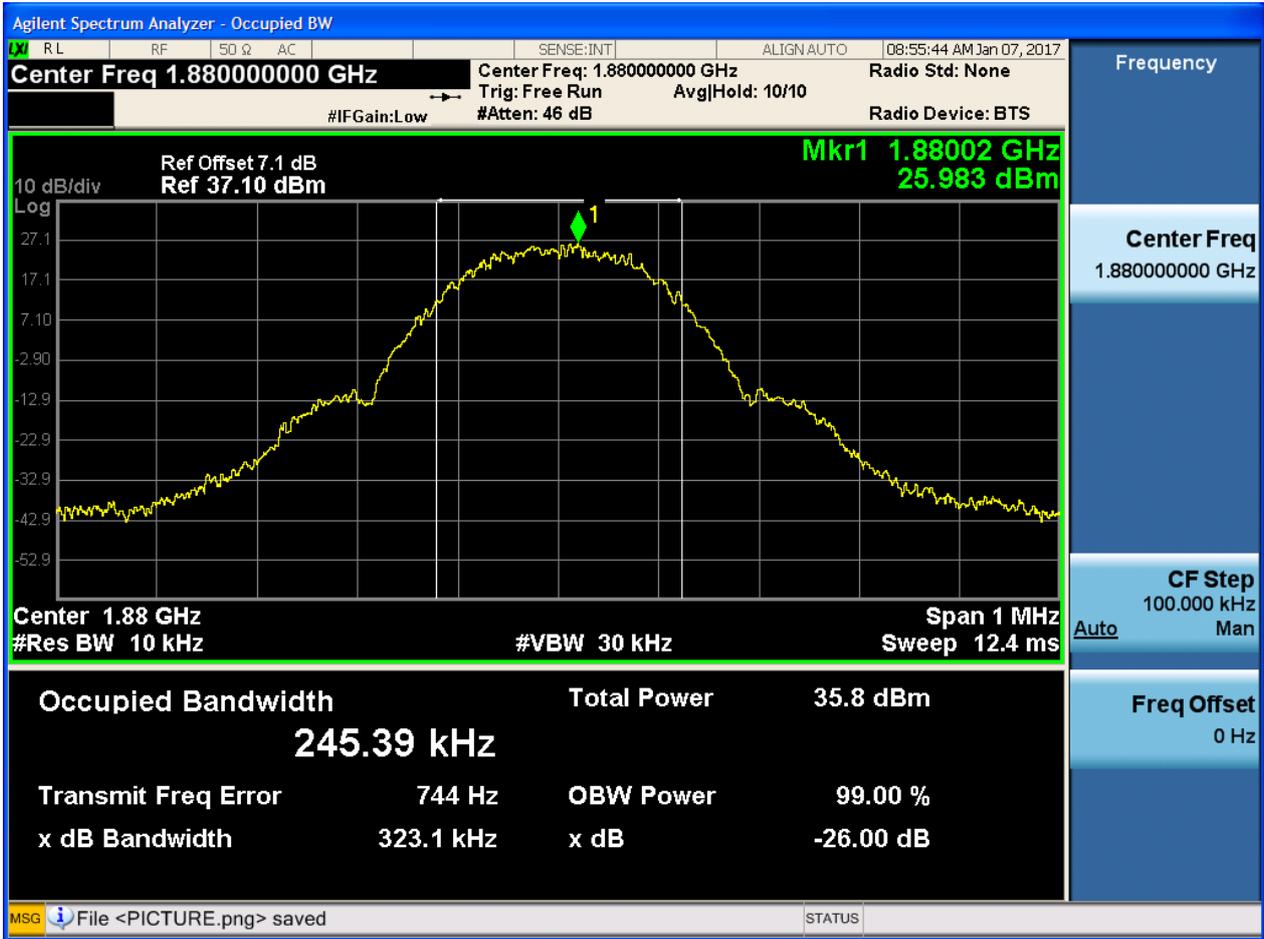
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH





4.1.2.1.2 Test Channel = MCH





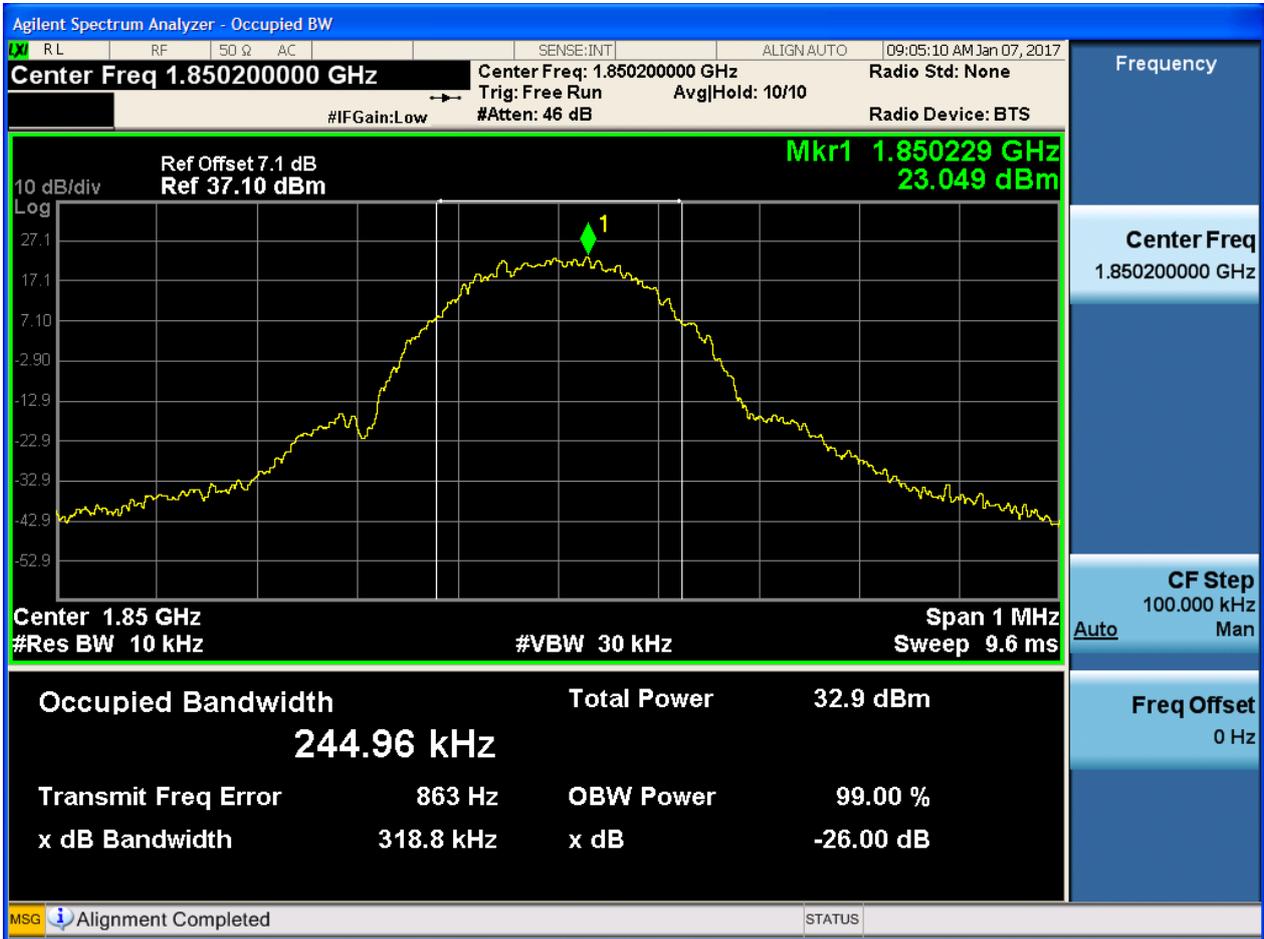
4.1.2.1.3 Test Channel = HCH





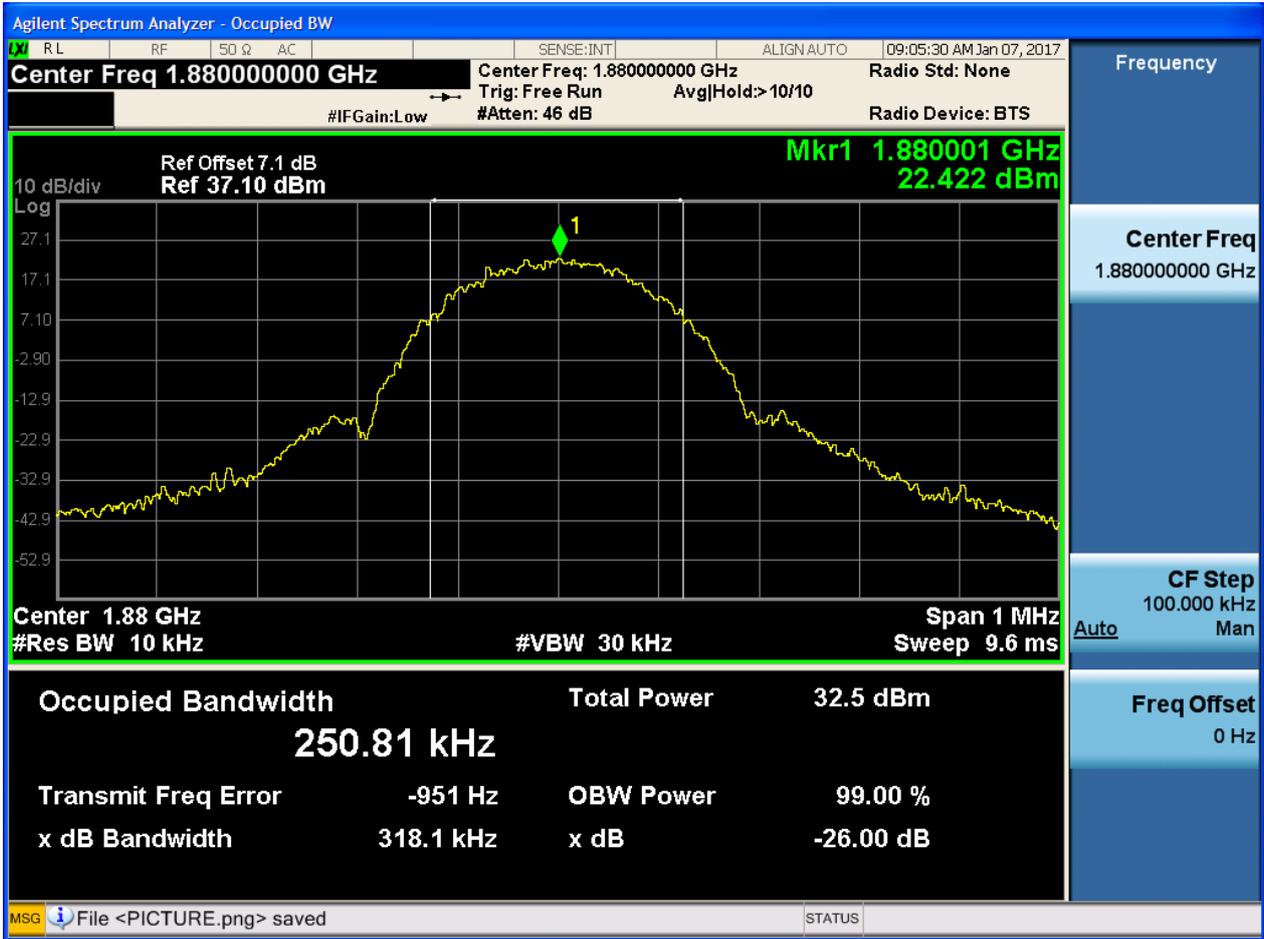
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



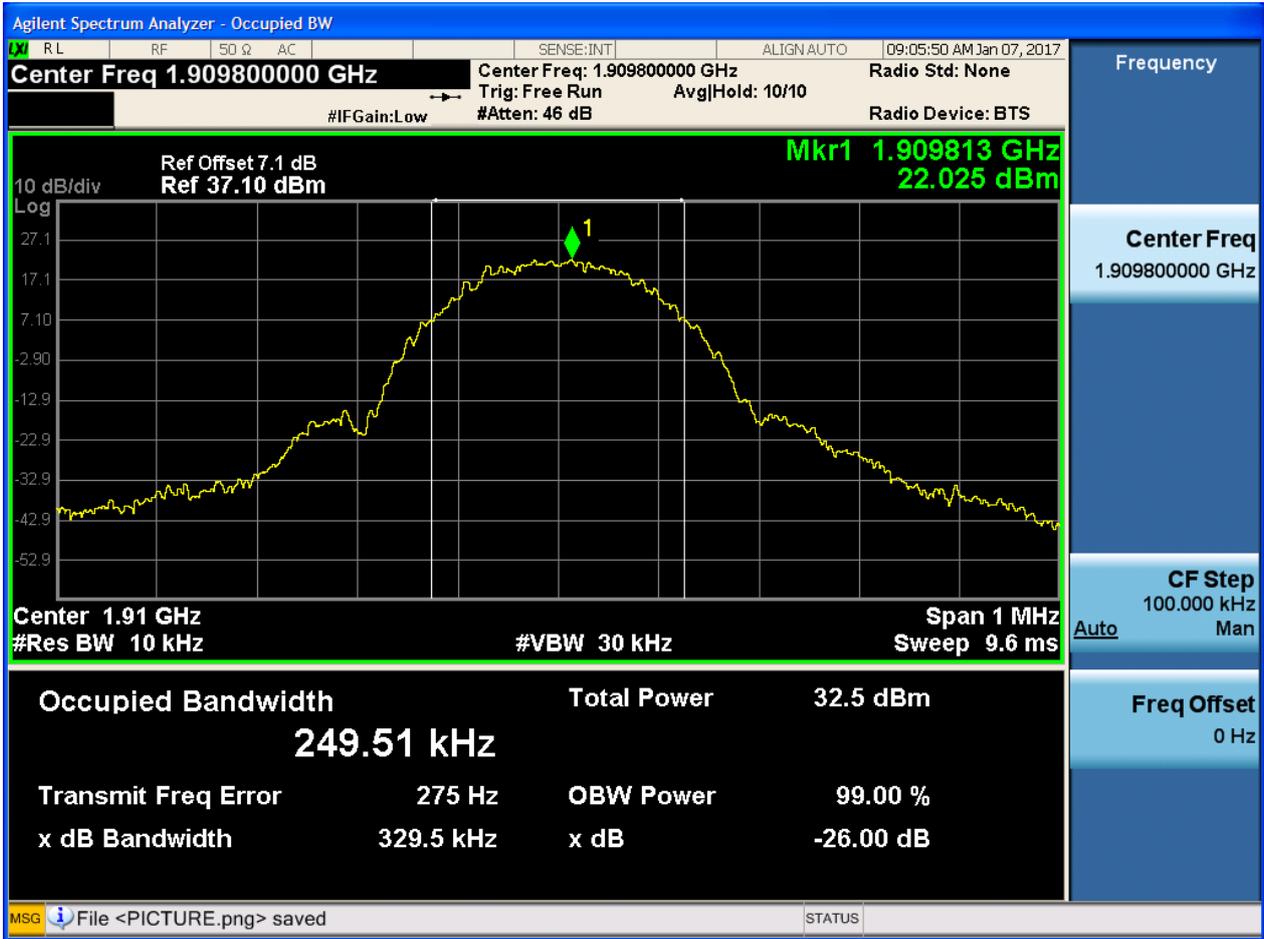


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





# 5Appendix\_E: Band Edges Compliance

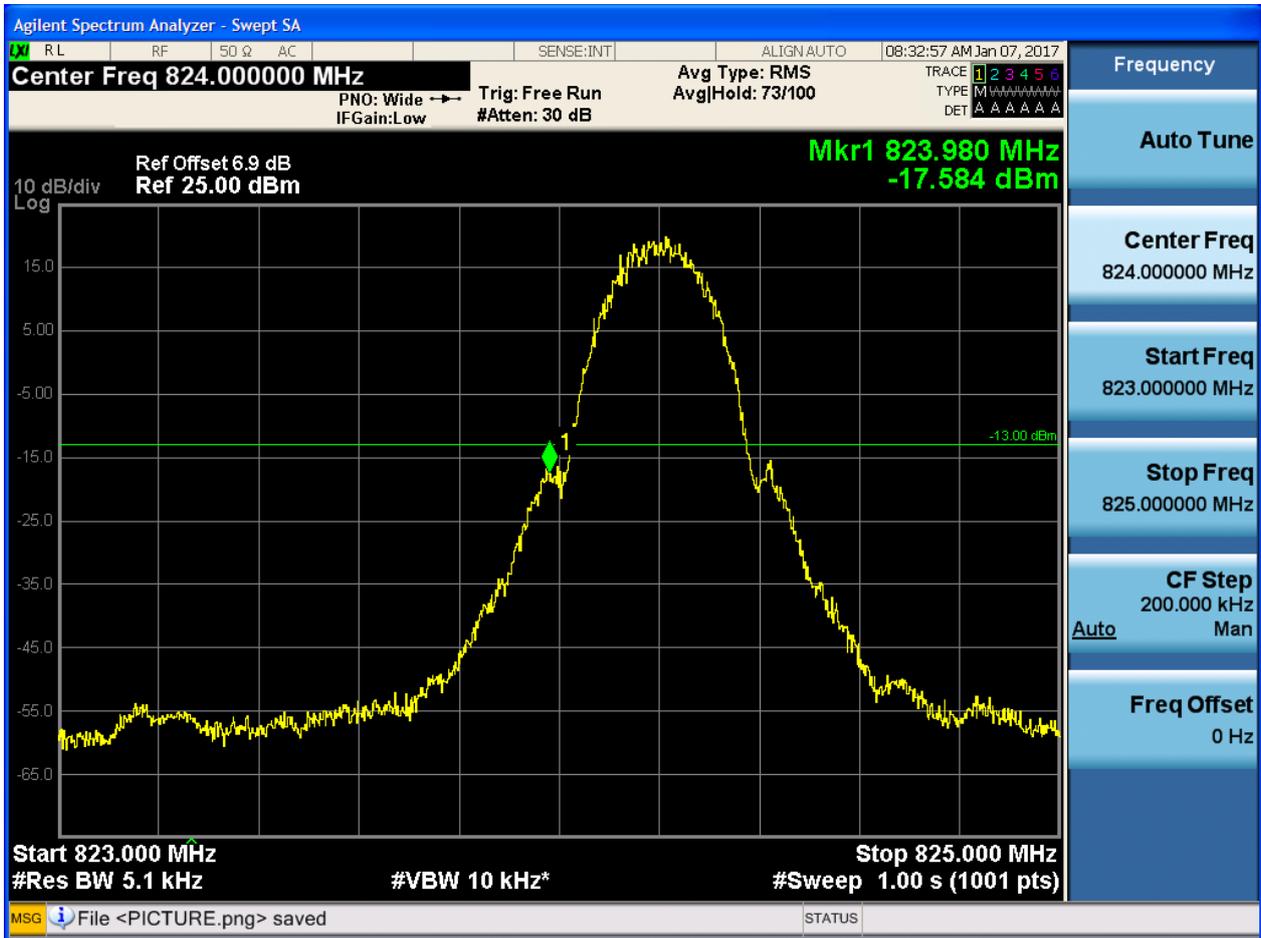
## Part I - Test Plots

### 5.1 For GSM

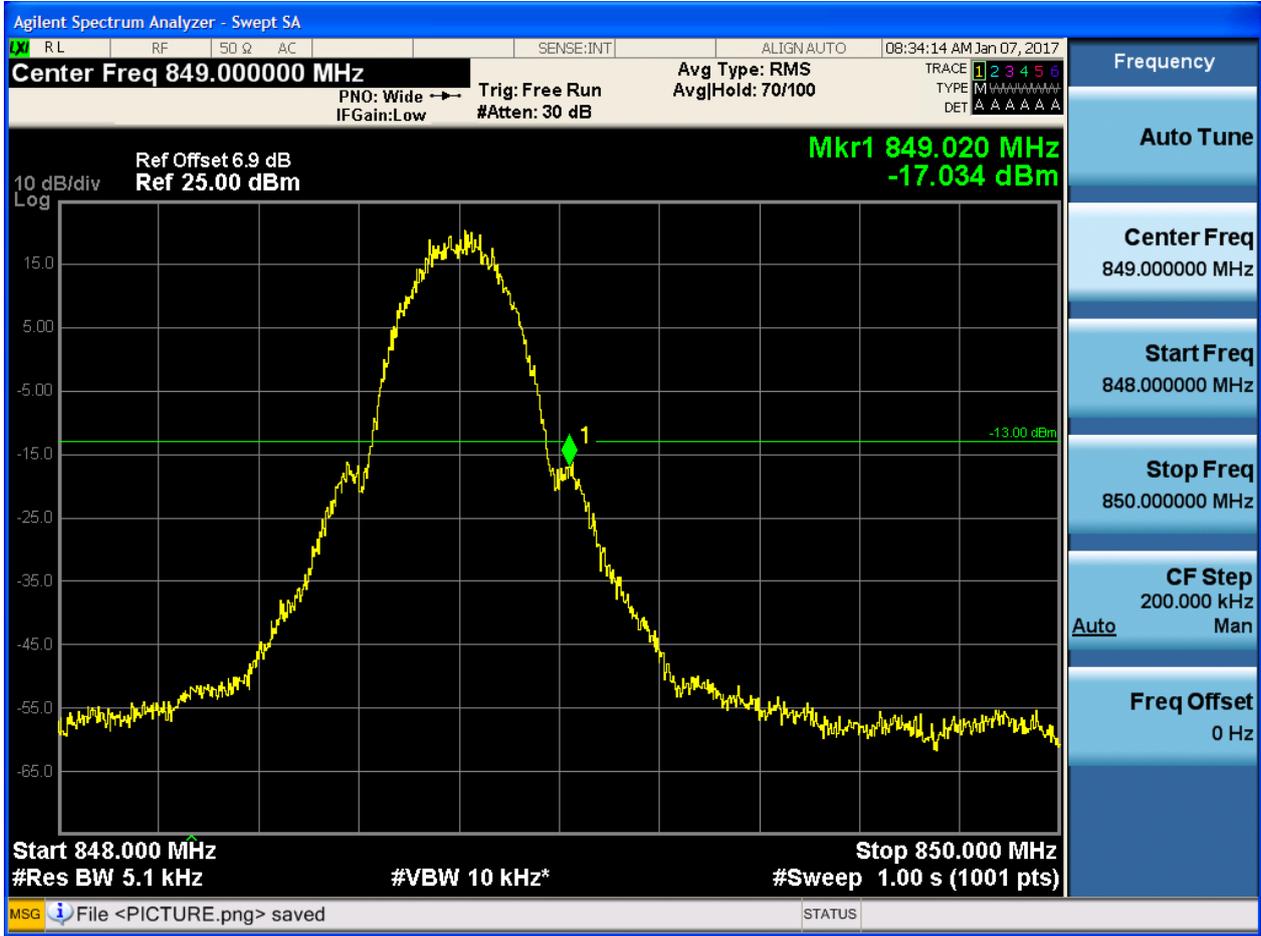
#### 5.1.1 Test Band = GSM850

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

##### 5.1.1.1.1 Test Channel = LCH

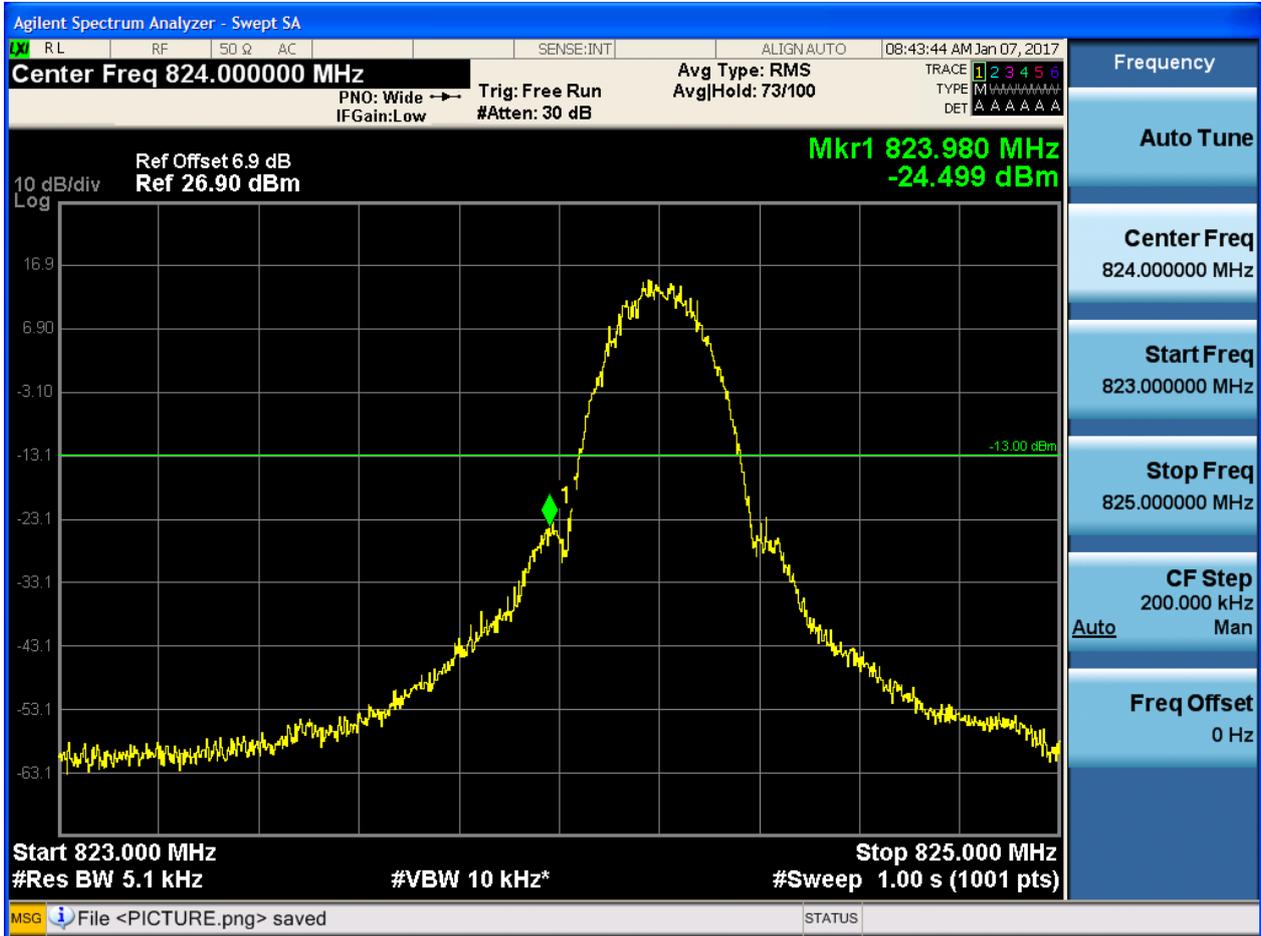


5.1.1.1.2 Test Channel = HCH



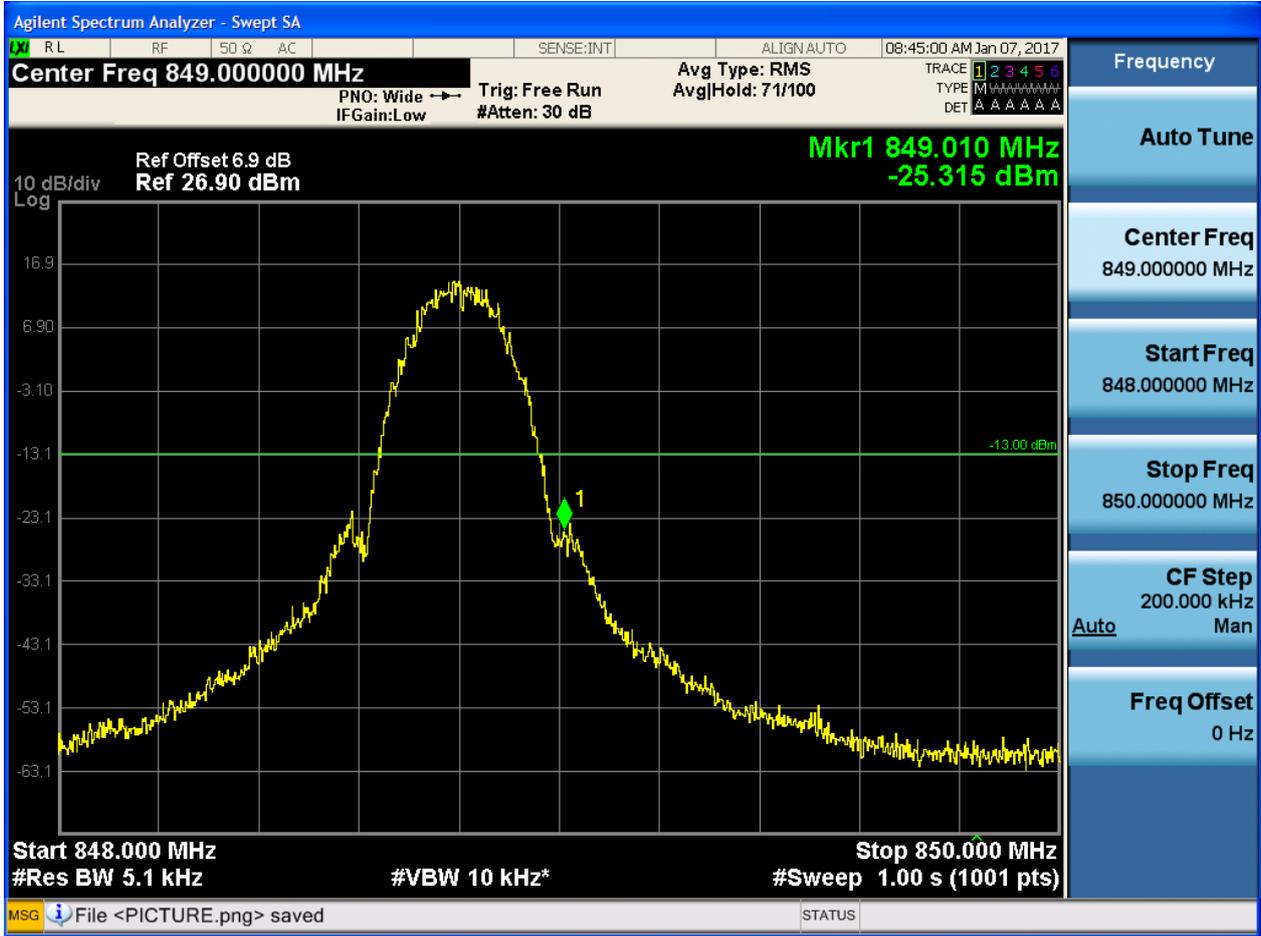
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

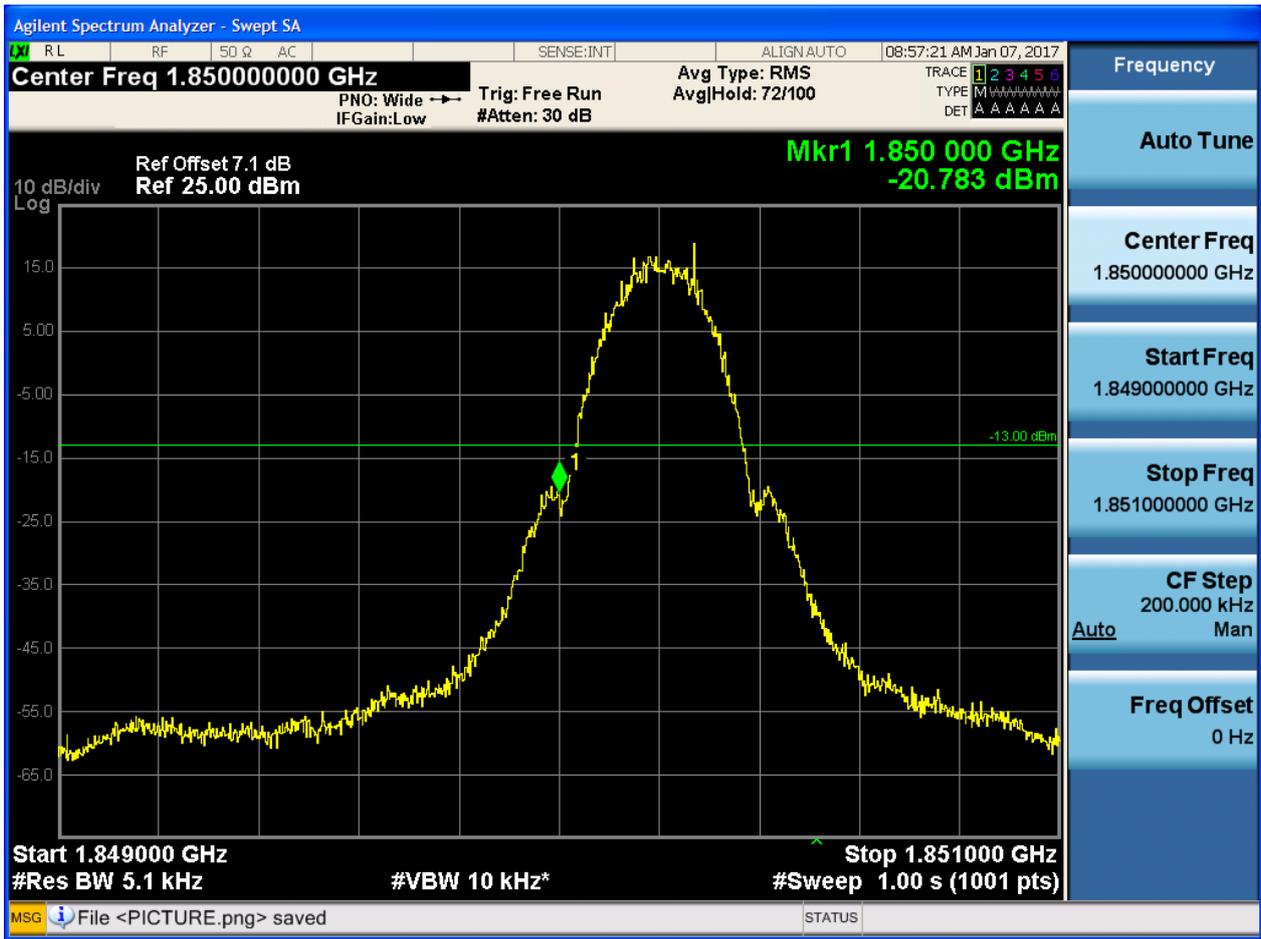




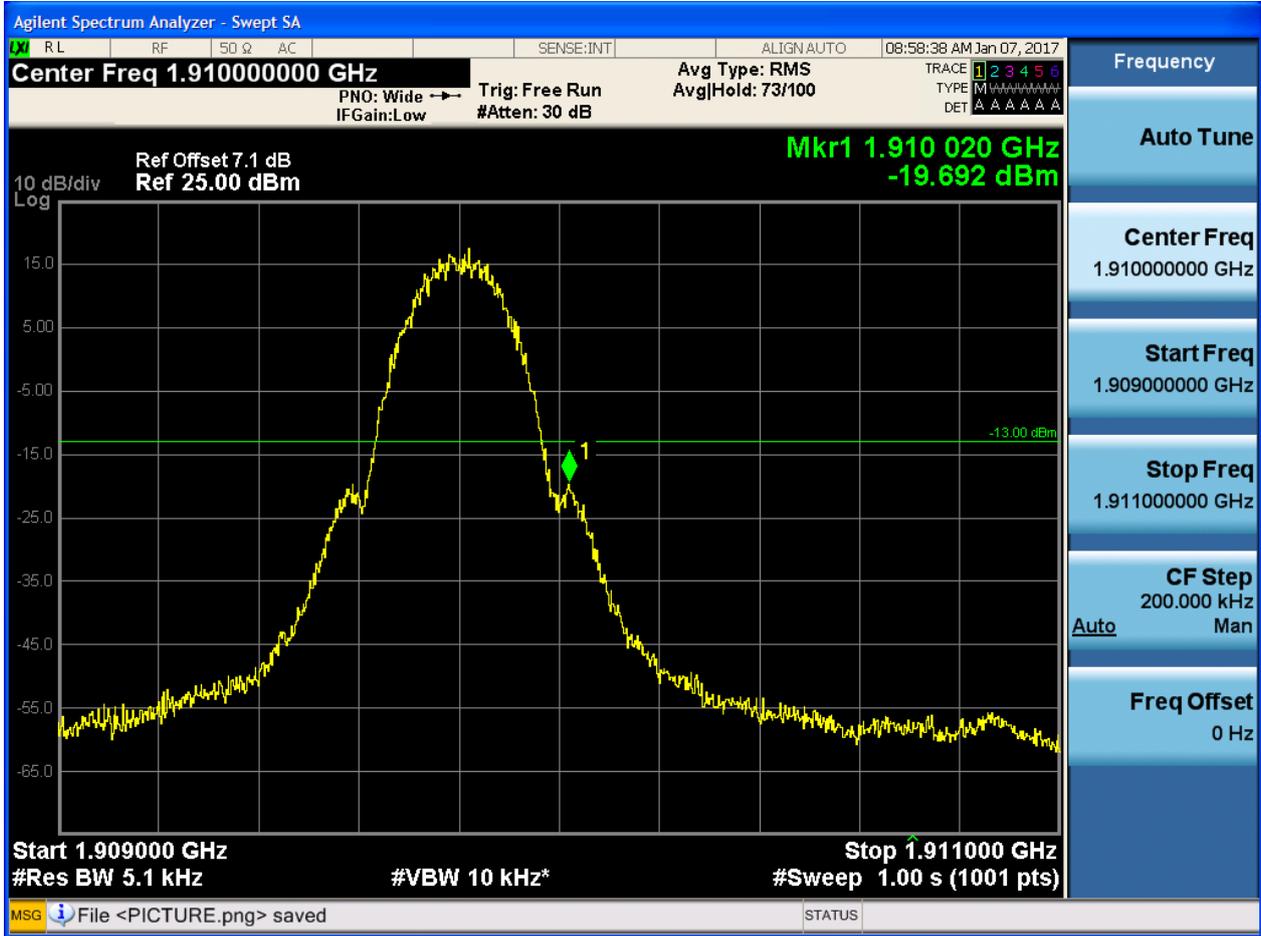
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



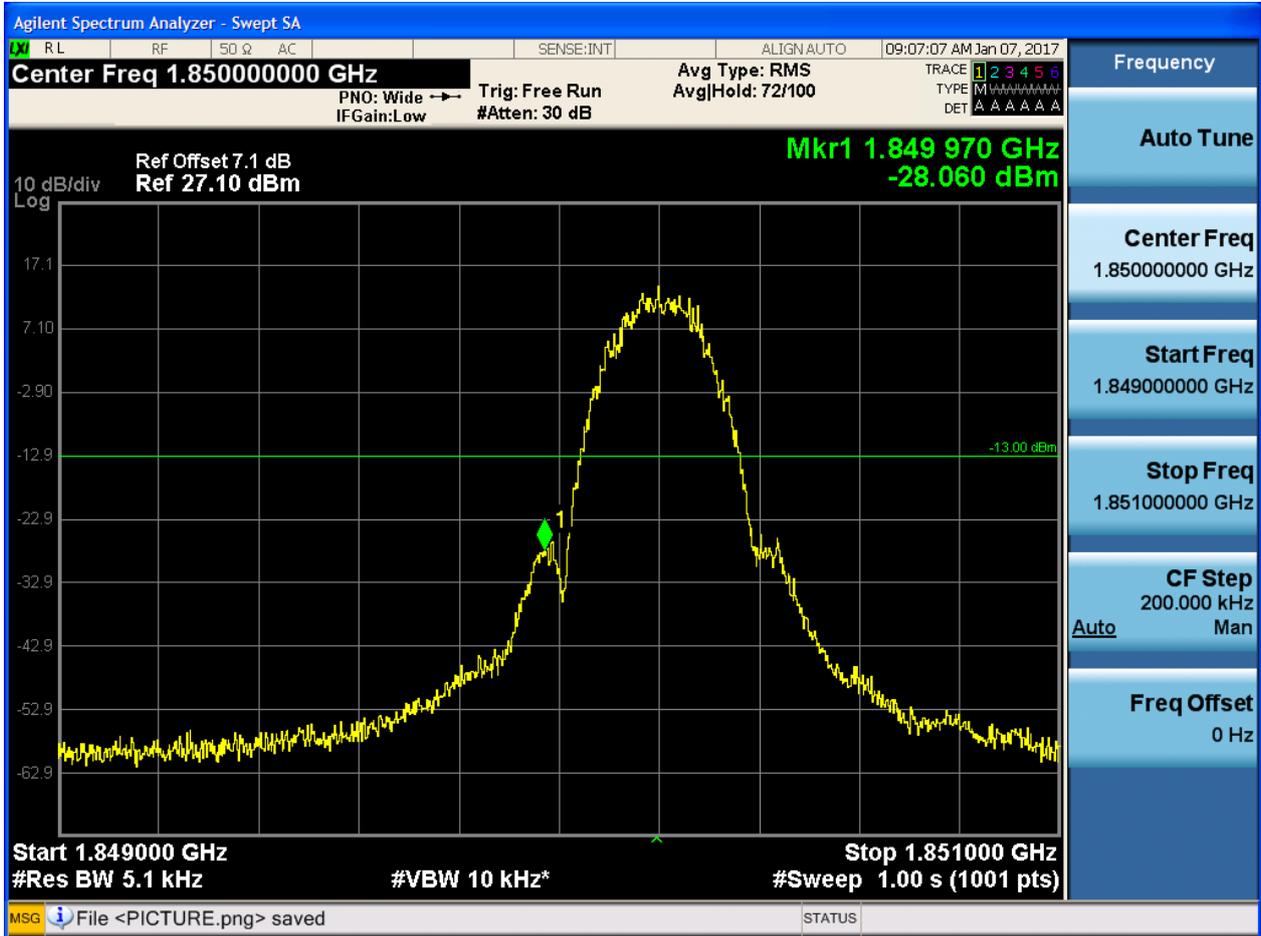
5.1.2.1.2 Test Channel = HCH



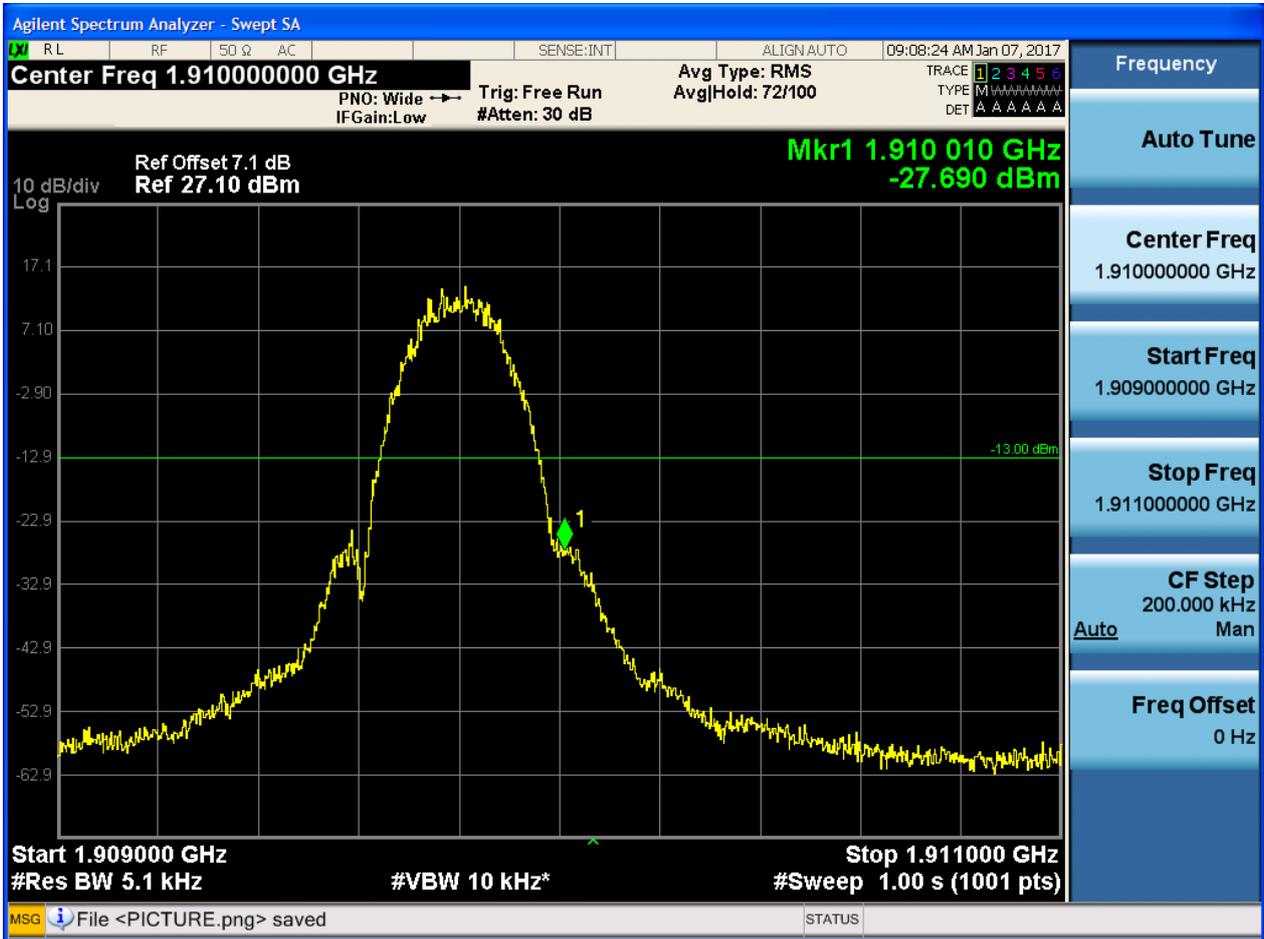


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 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.

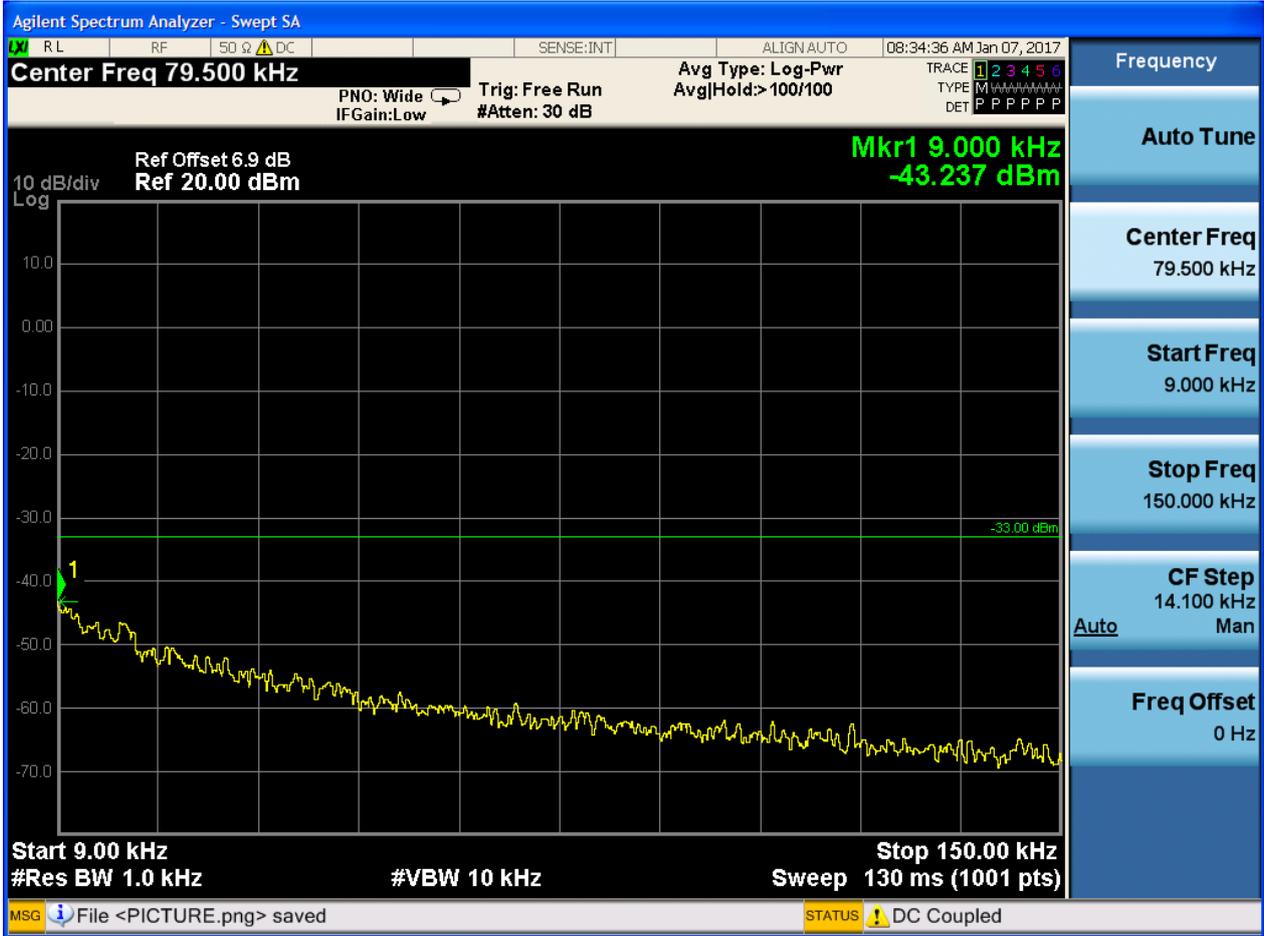
### Part I - Test Plots

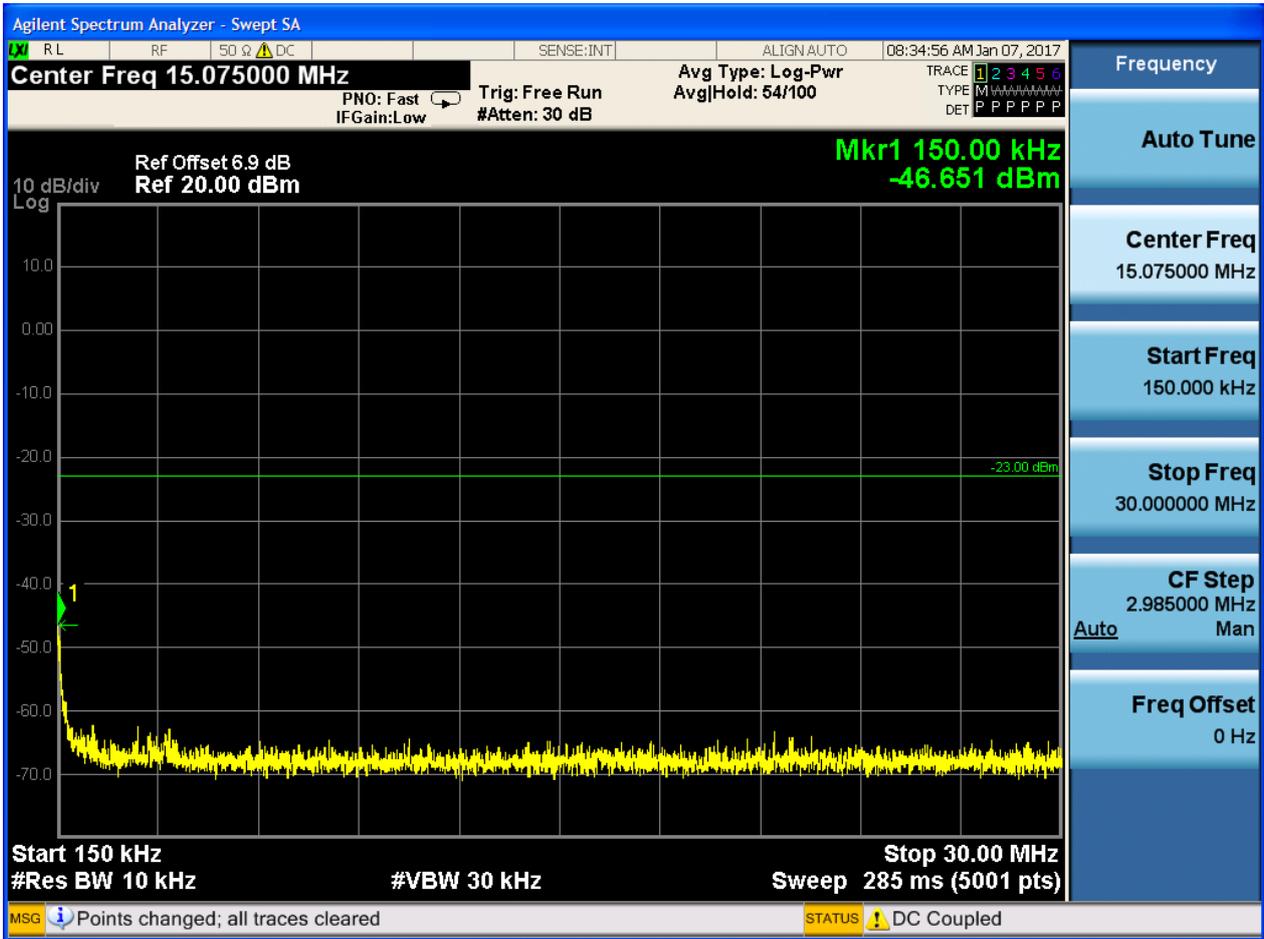
#### 6.1 For GSM

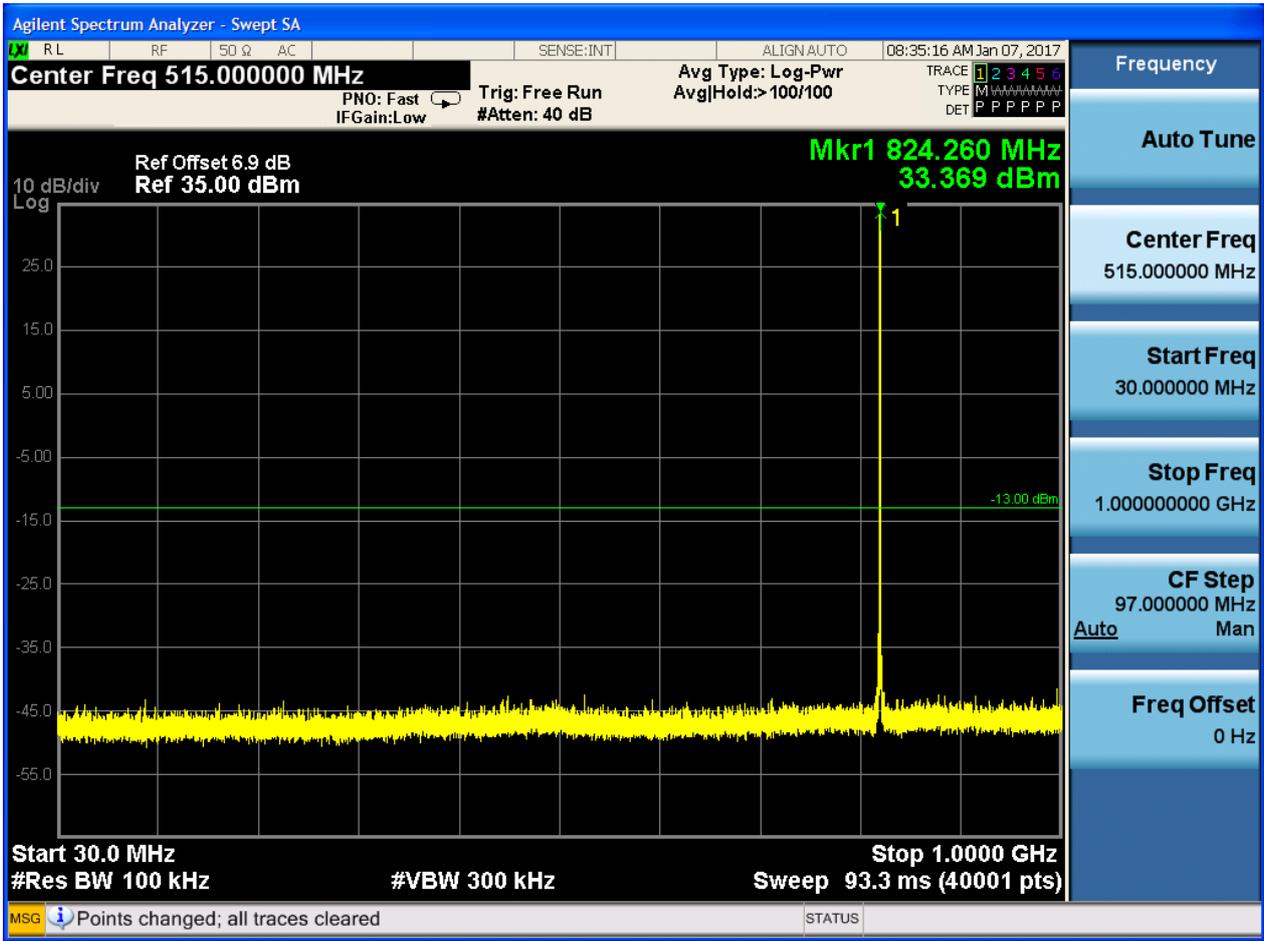
##### 6.1.1 Test Band = GSM850

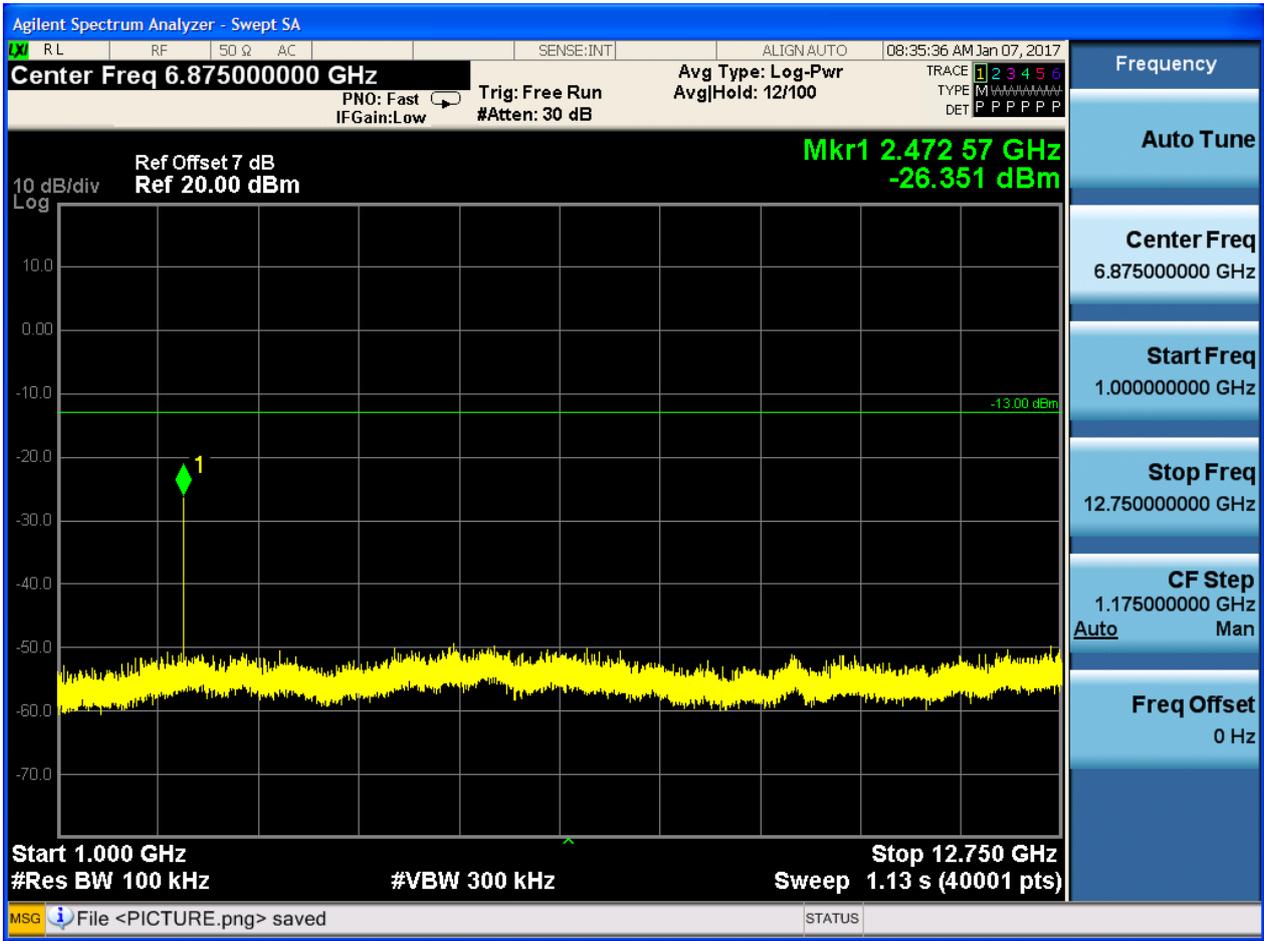
##### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH

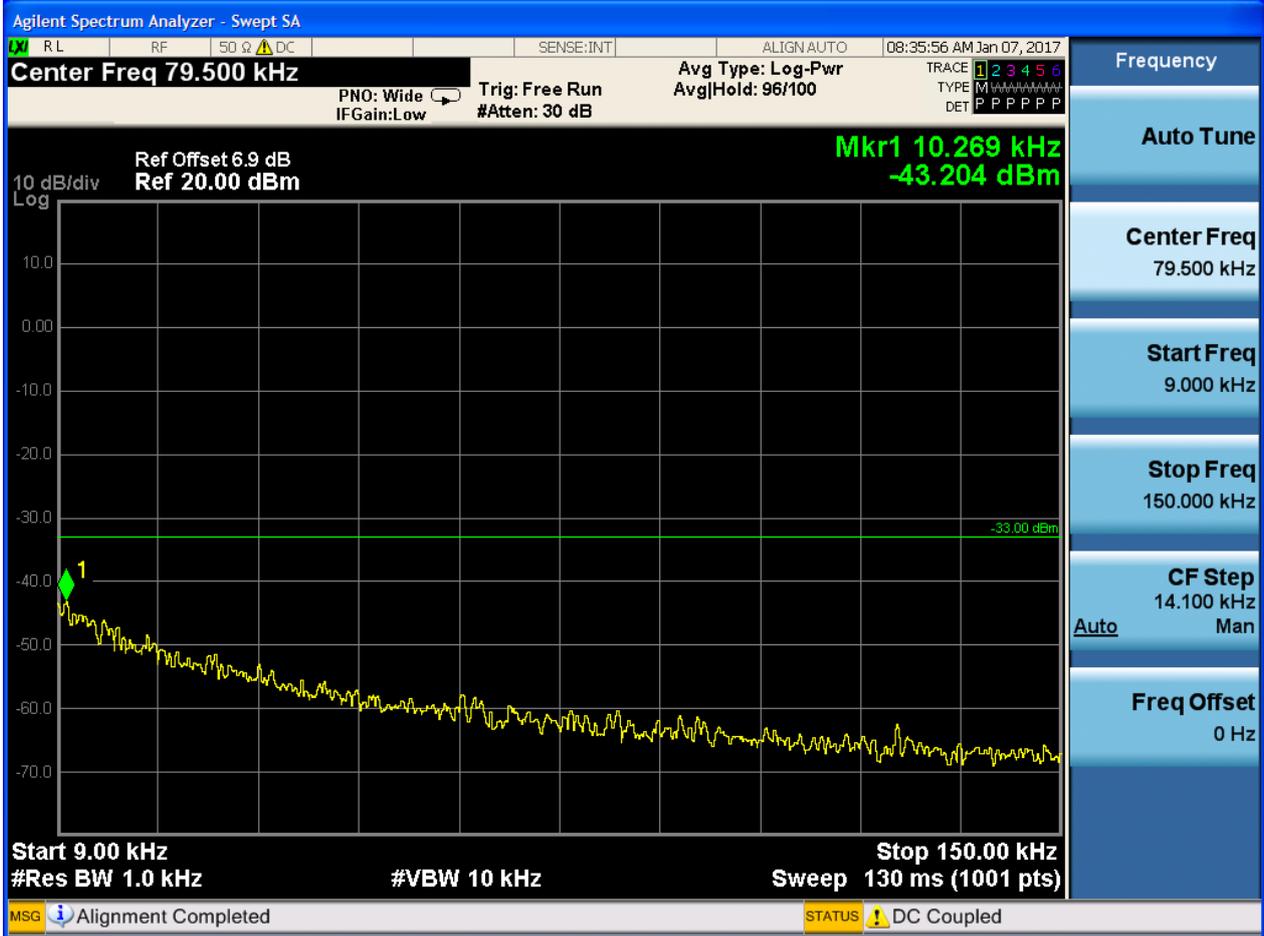


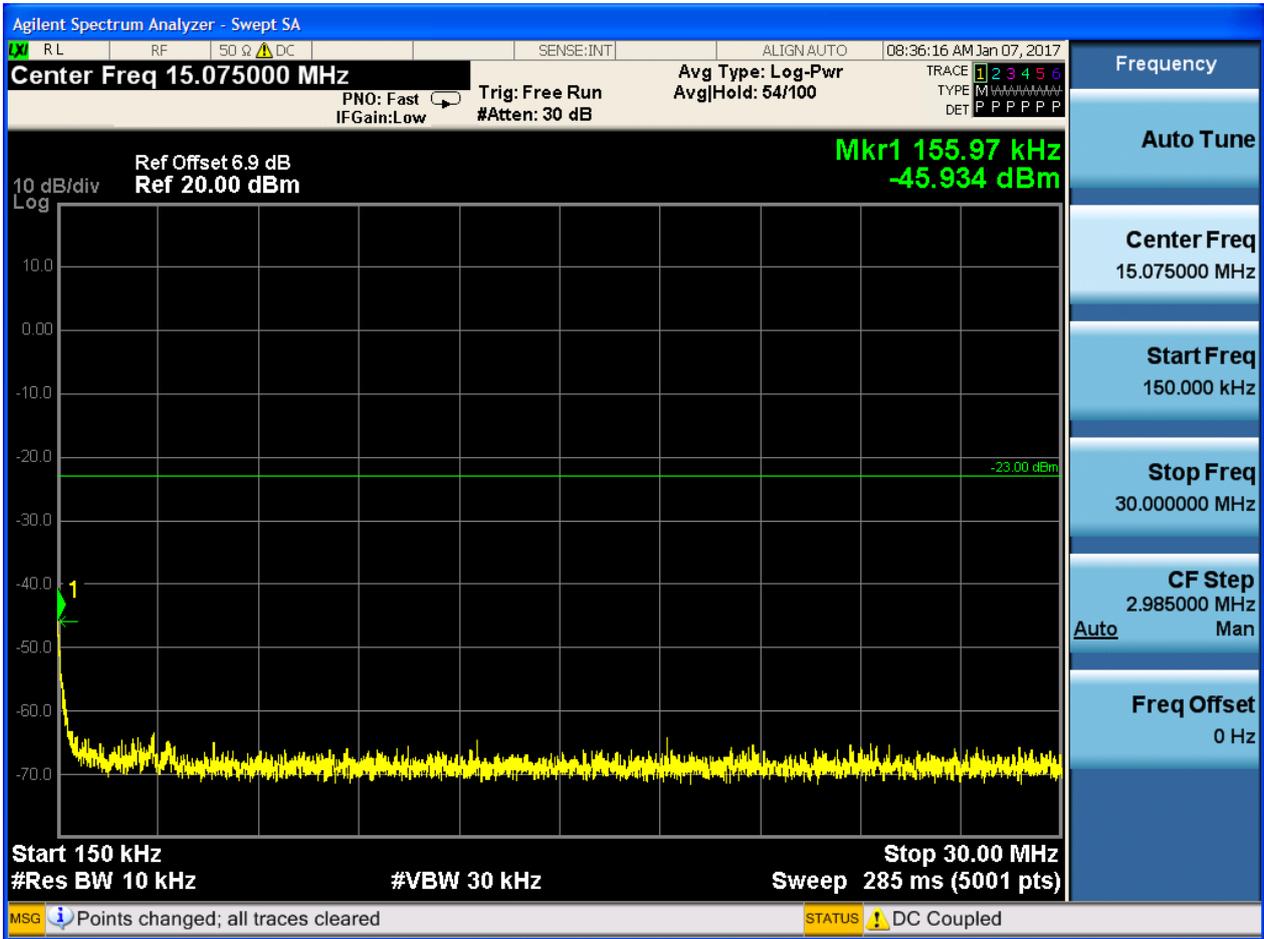


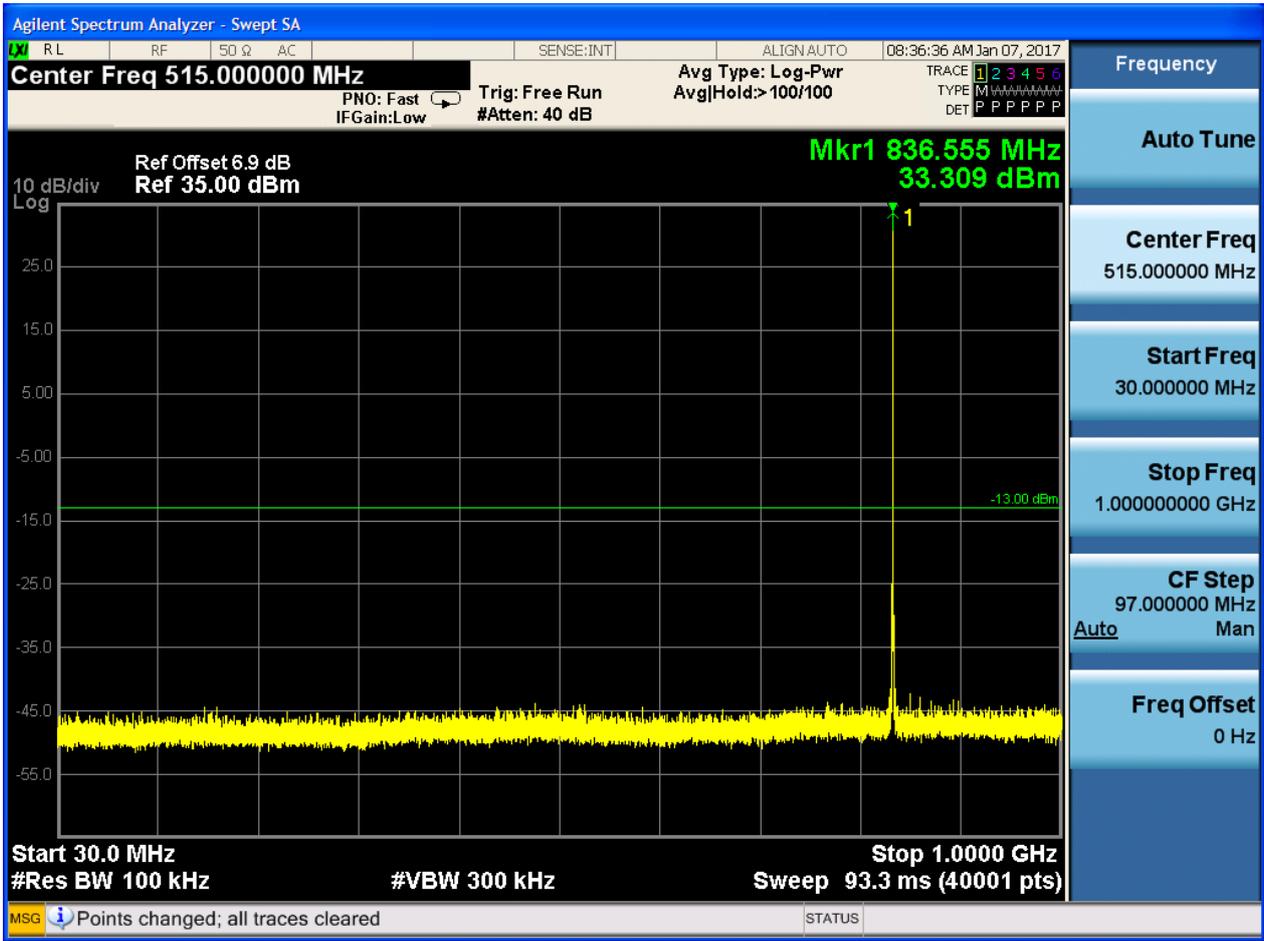


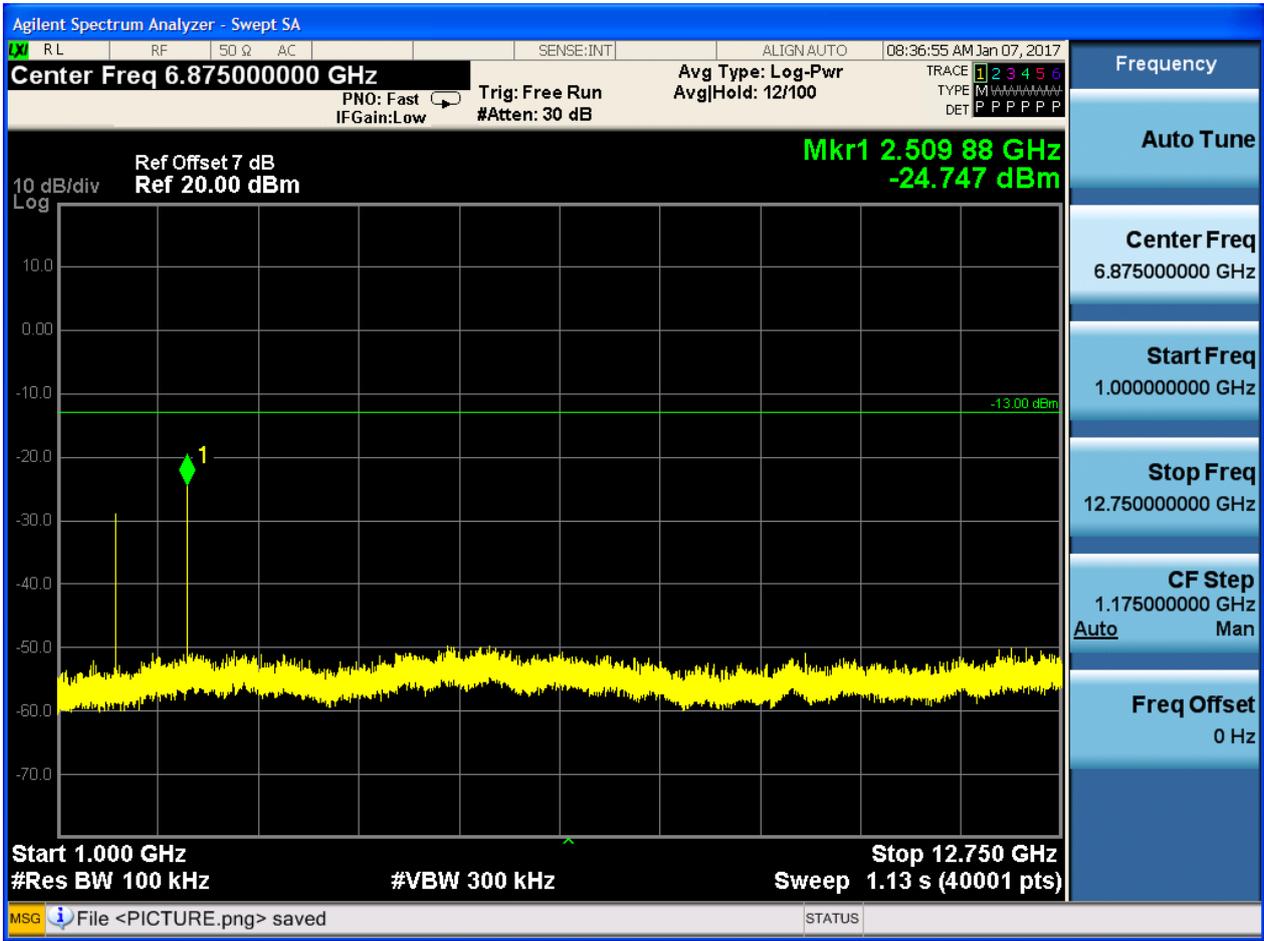


6.1.1.1.2 Test Channel = MCH



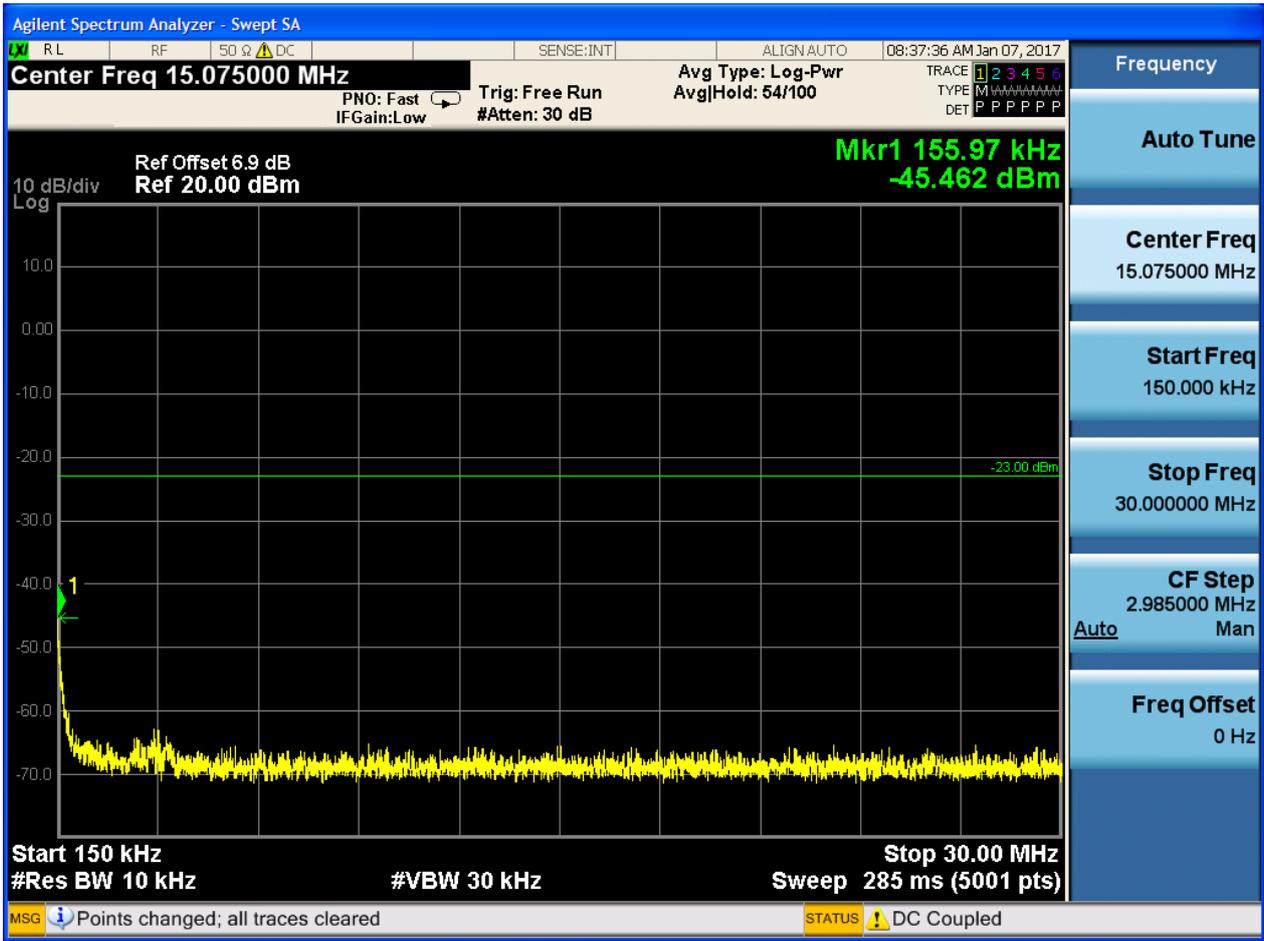


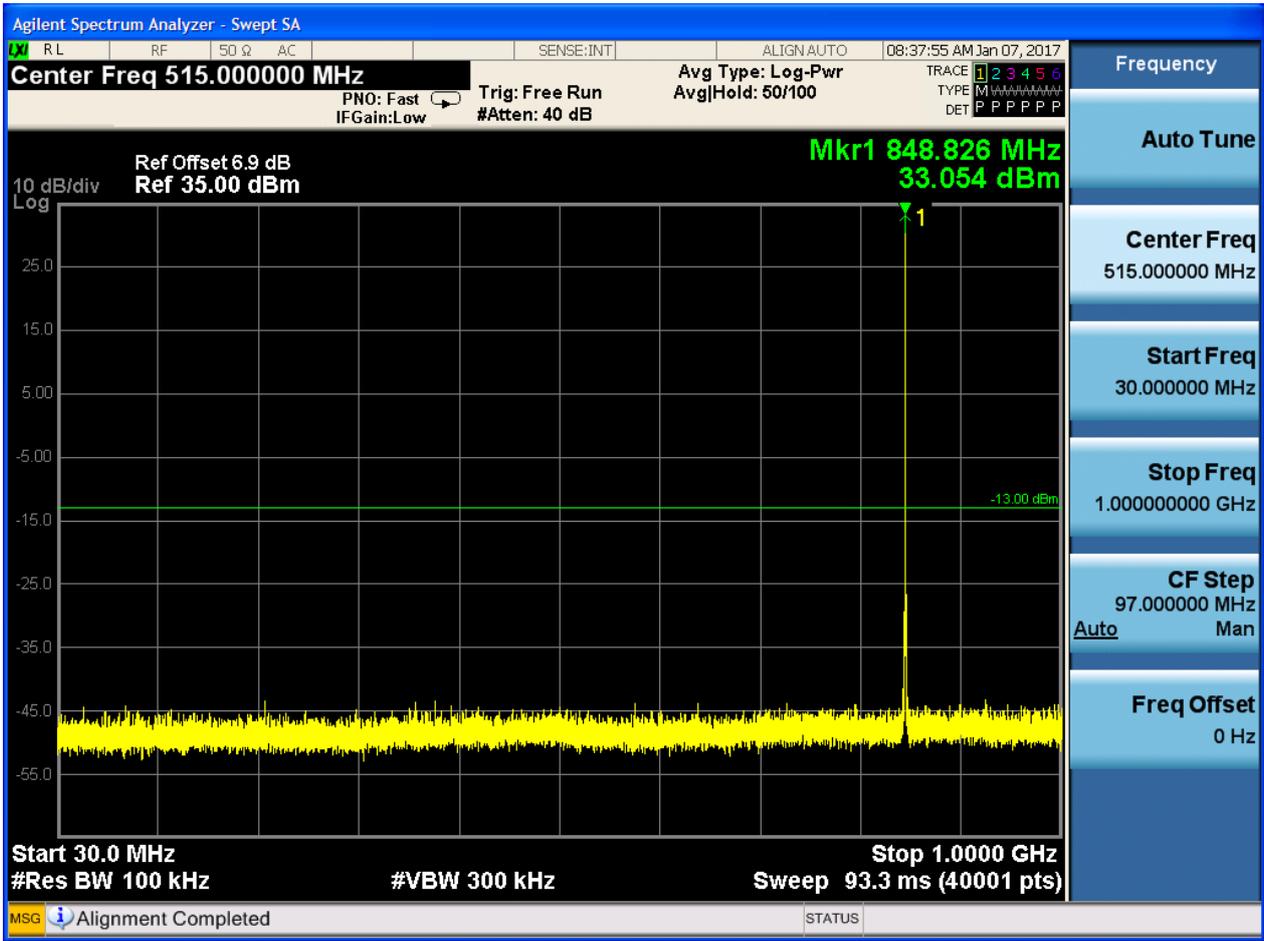


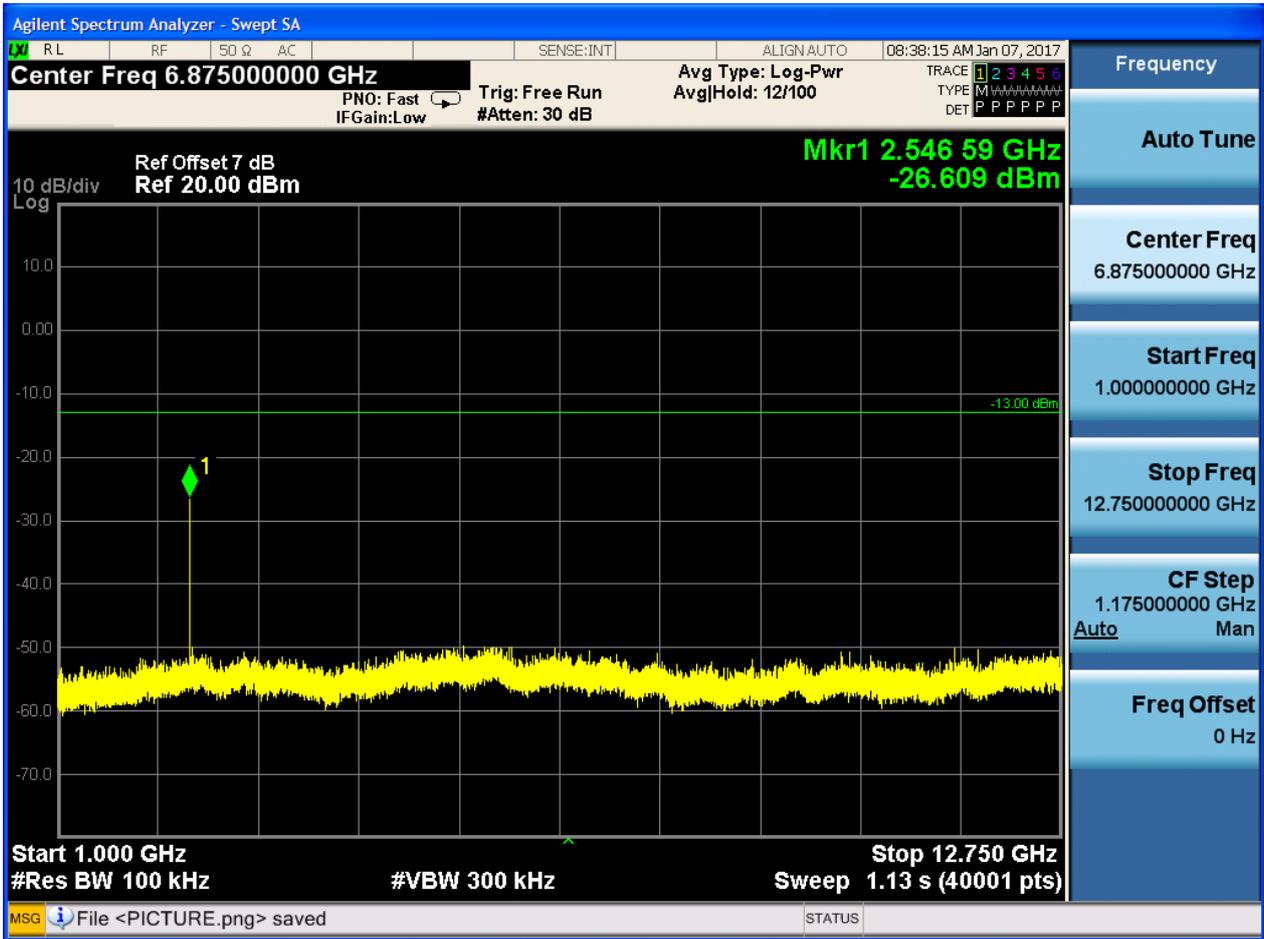


6.1.1.1.3 Test Channel = HCH





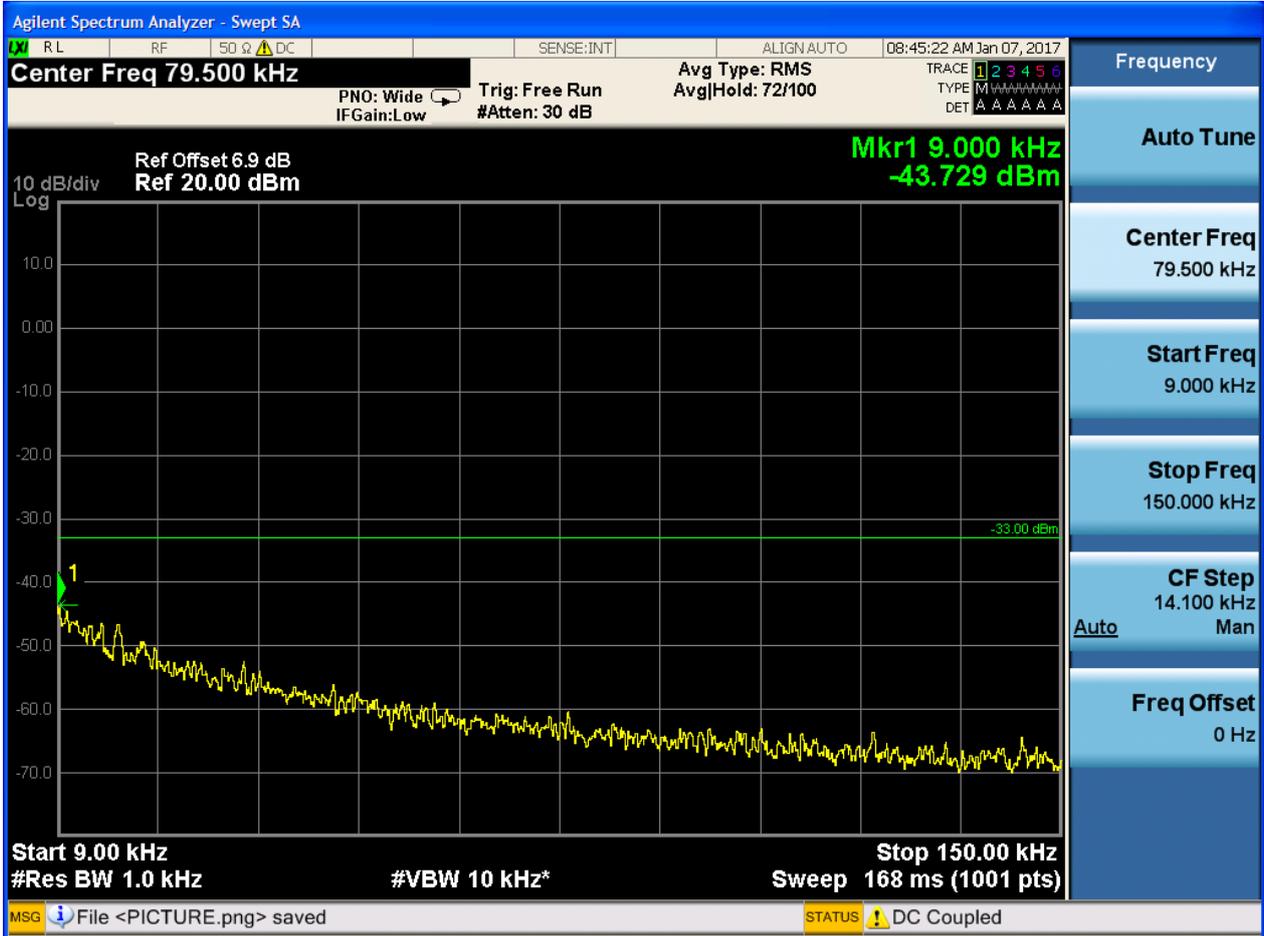


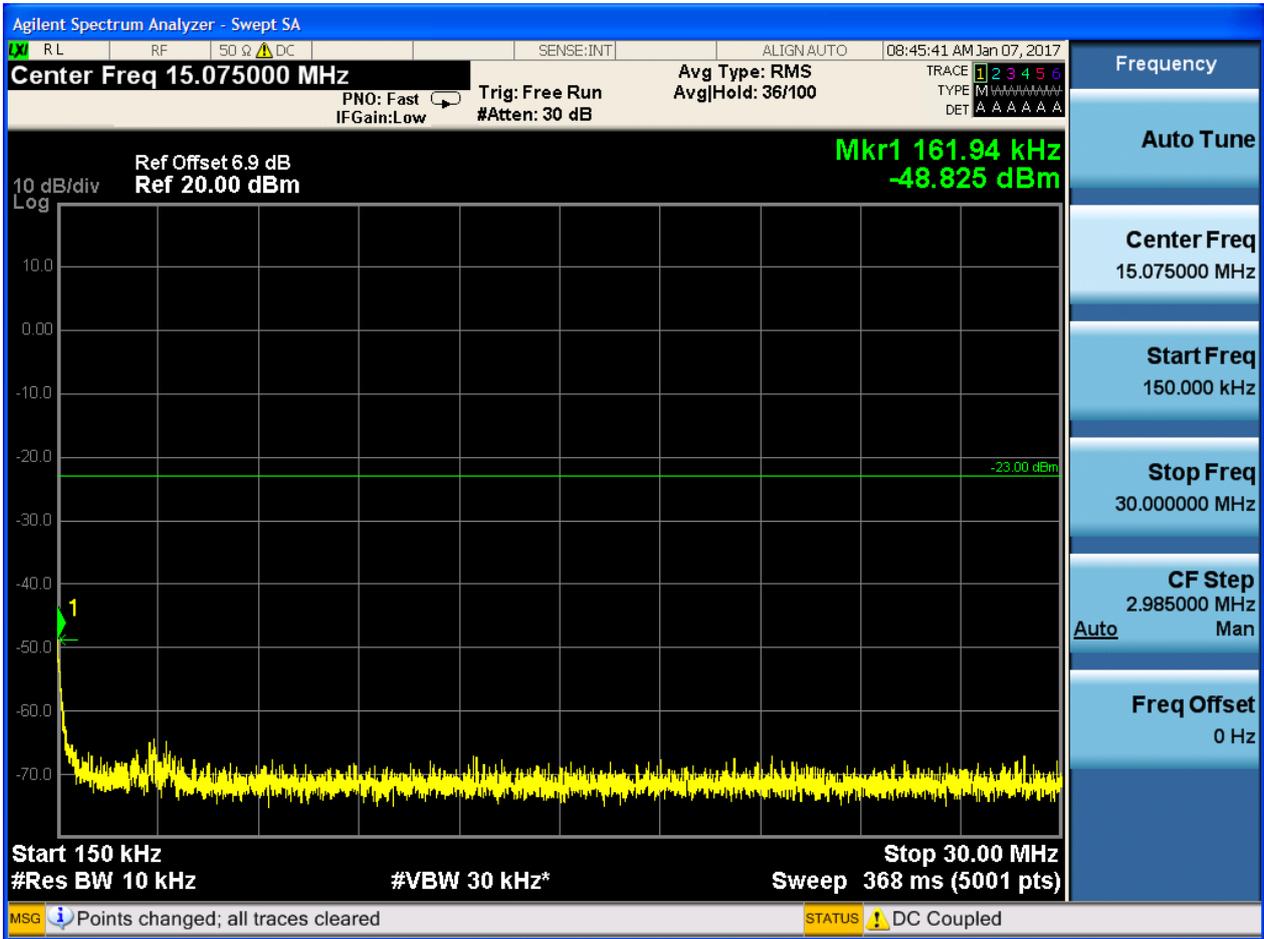




6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

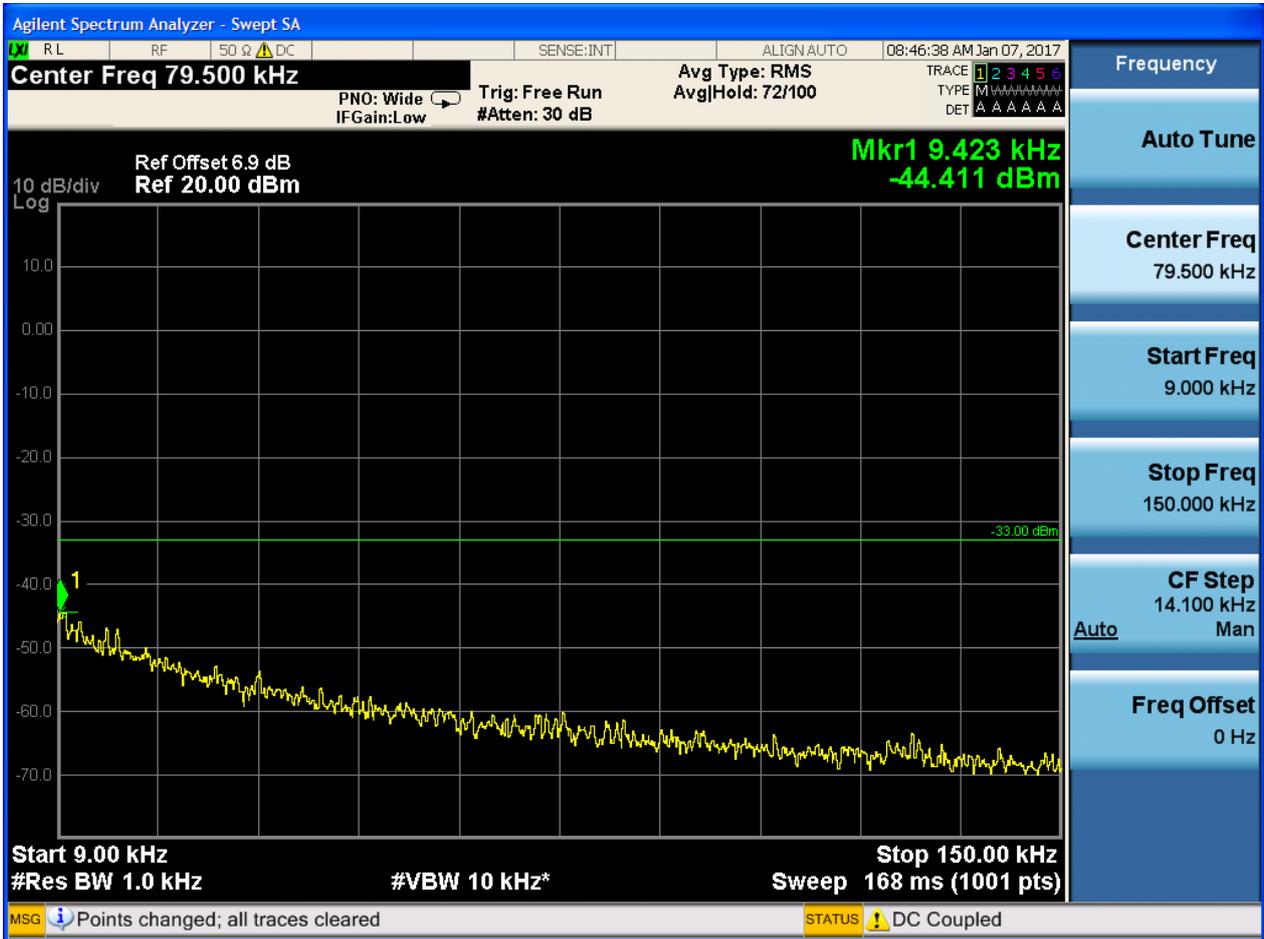


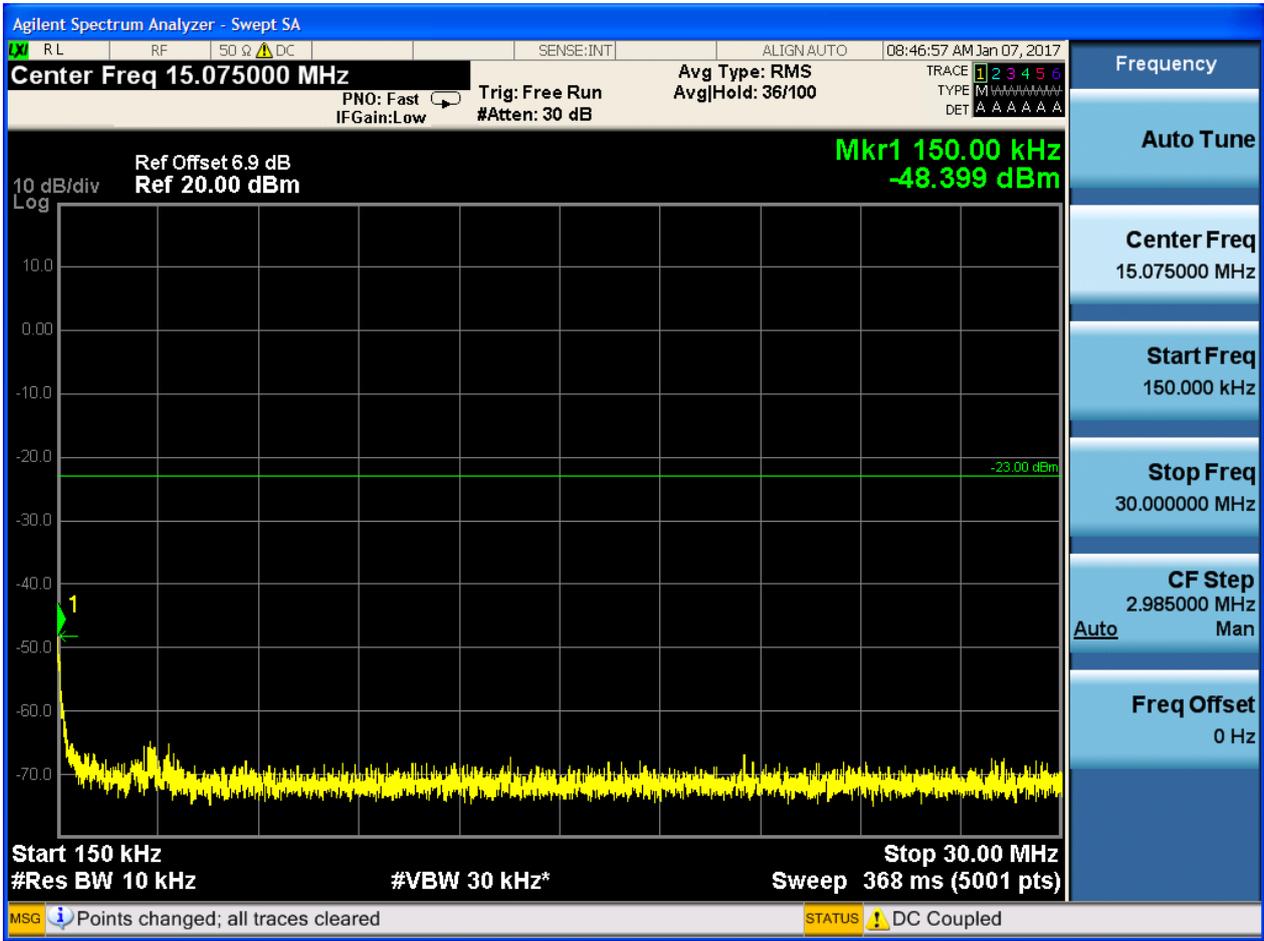


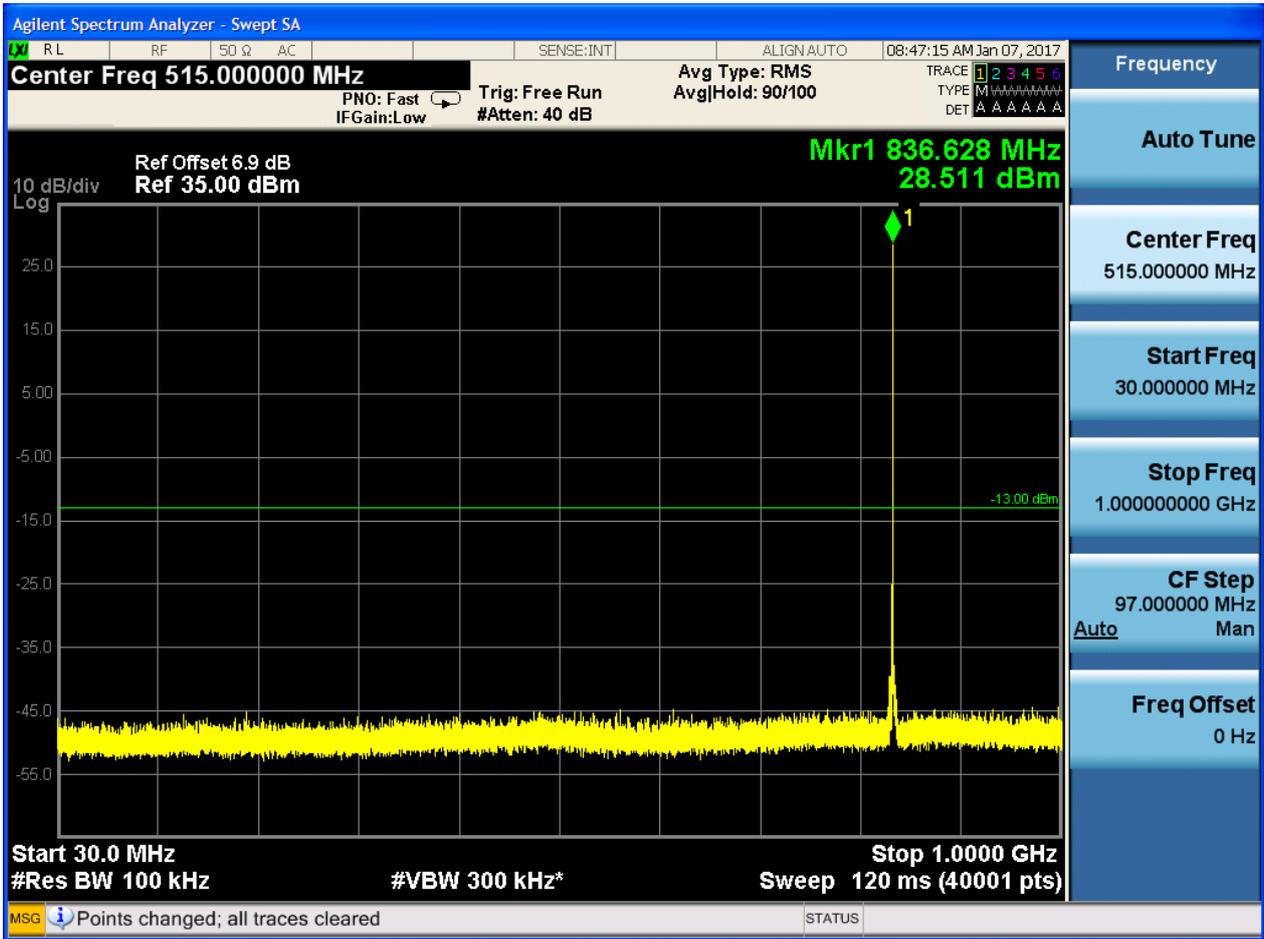




6.1.1.2.2 Test Channel = MCH

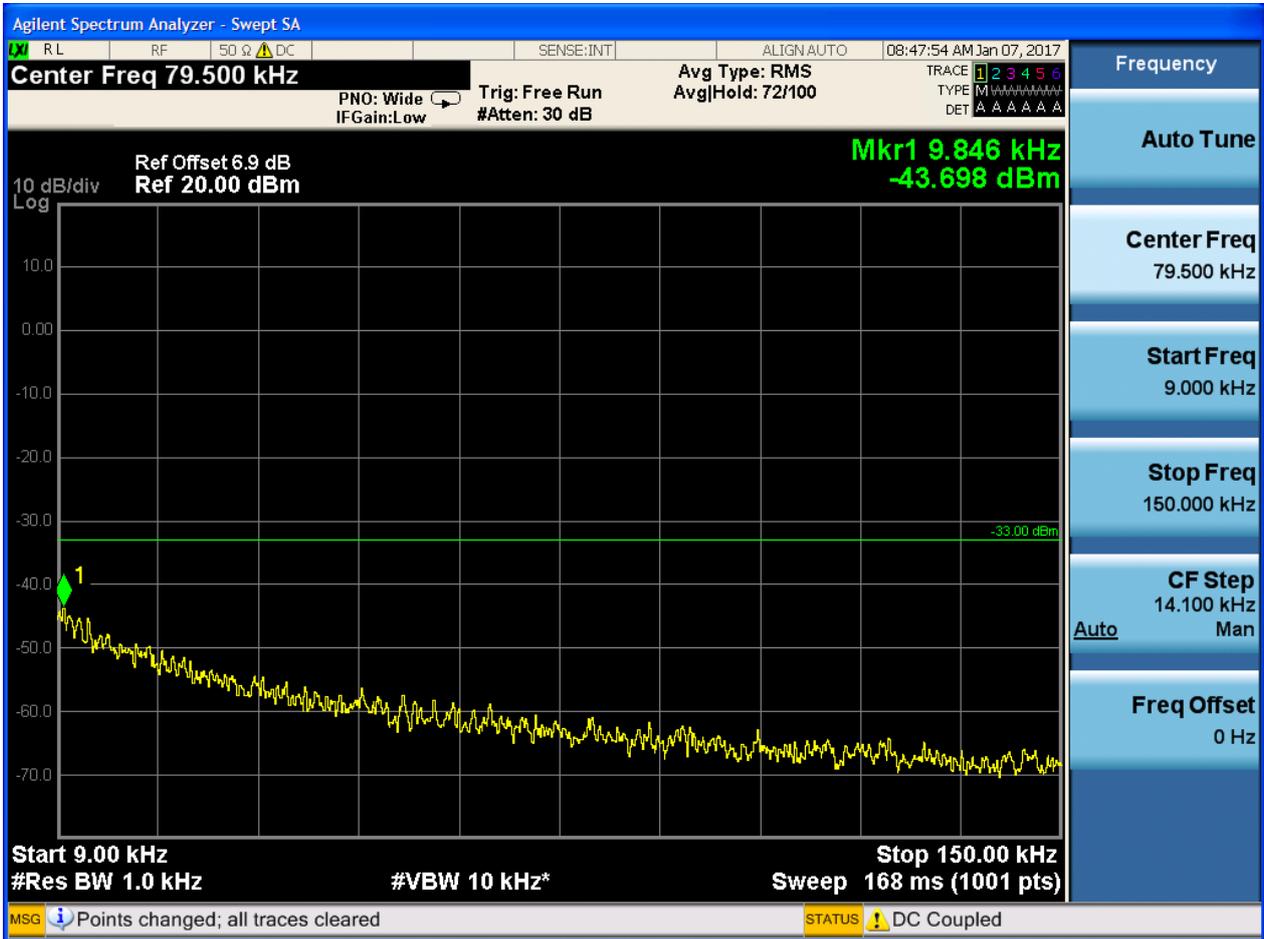


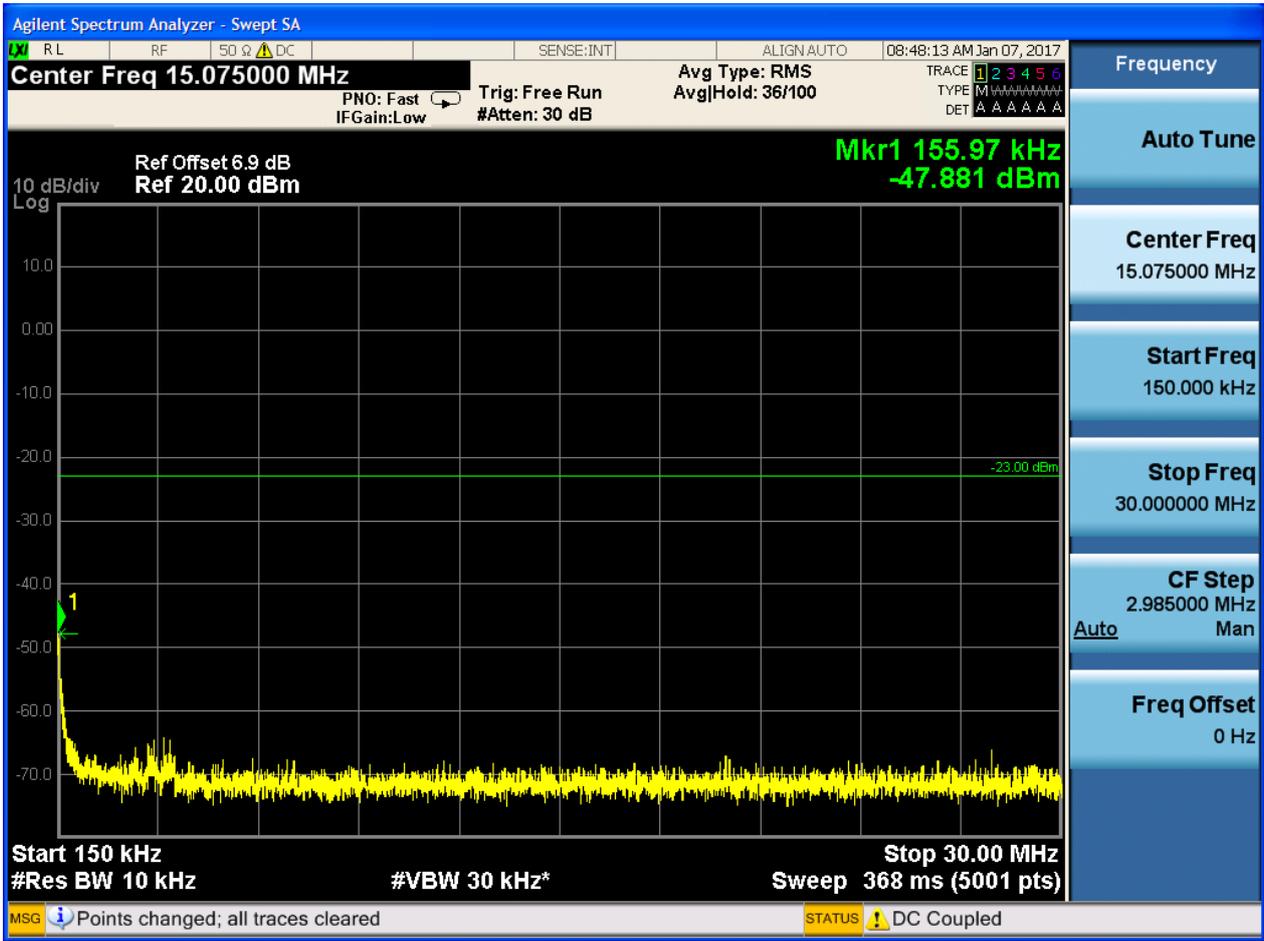


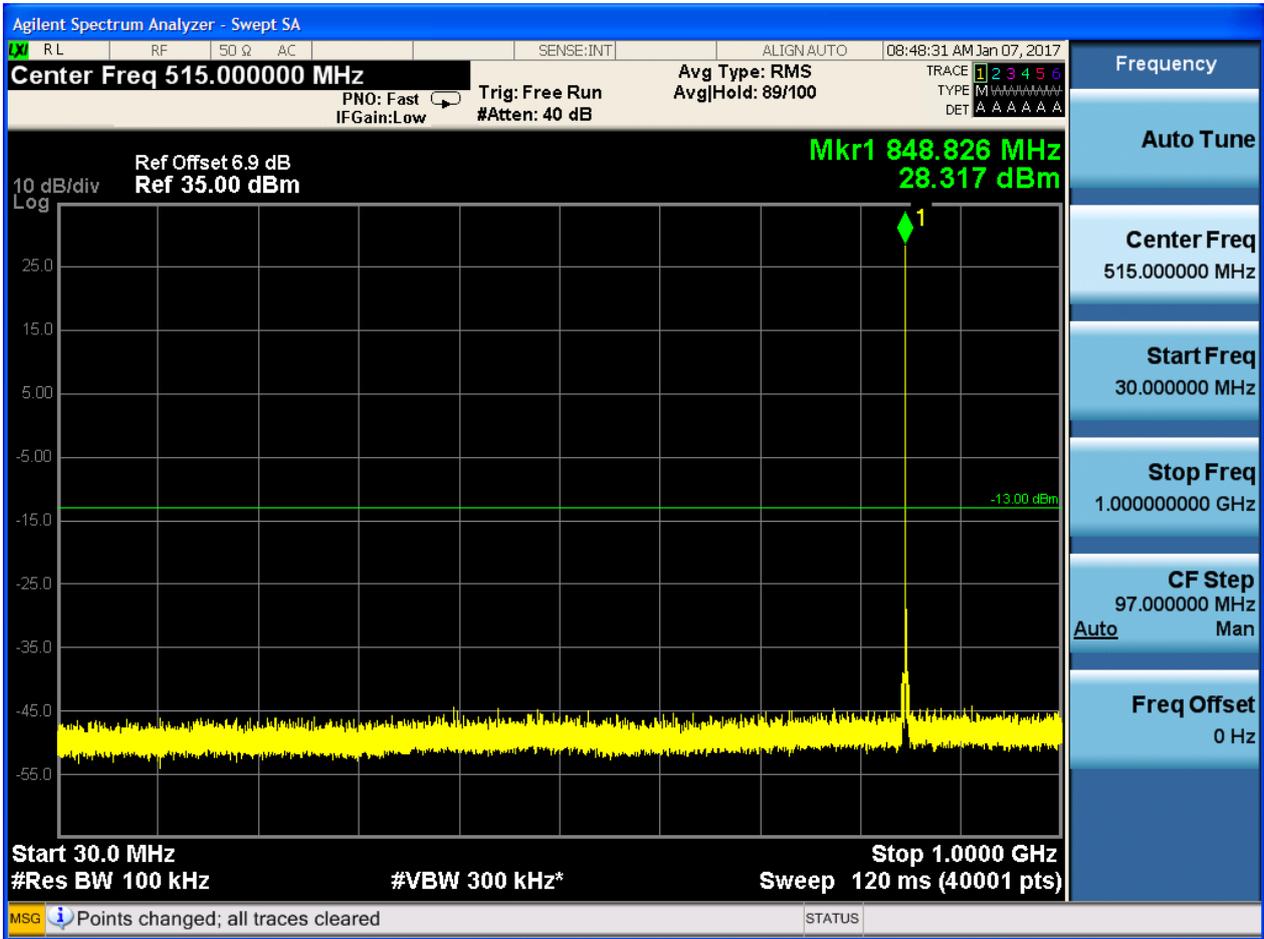


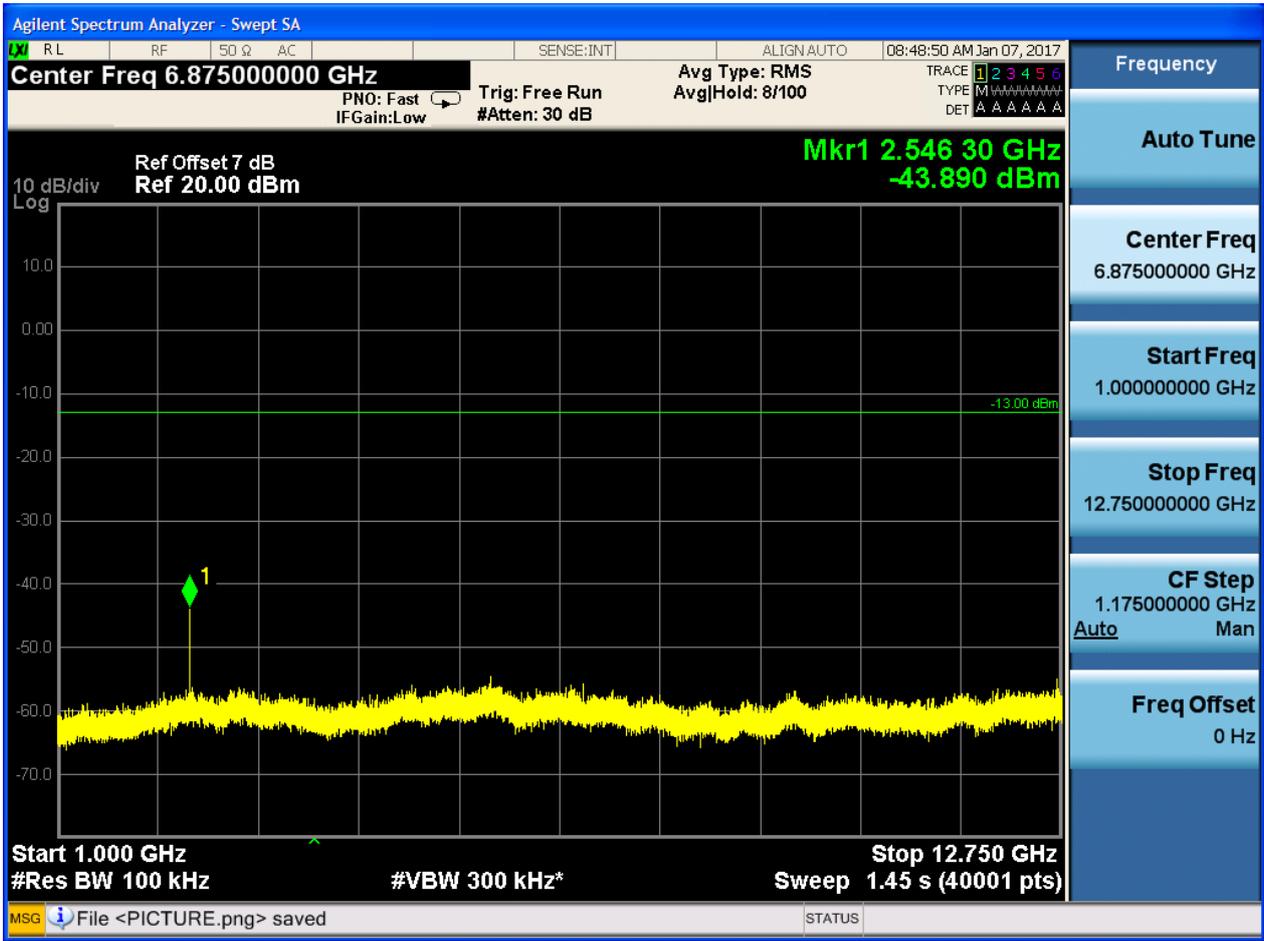


### 6.1.1.2.3 Test Channel = HCH









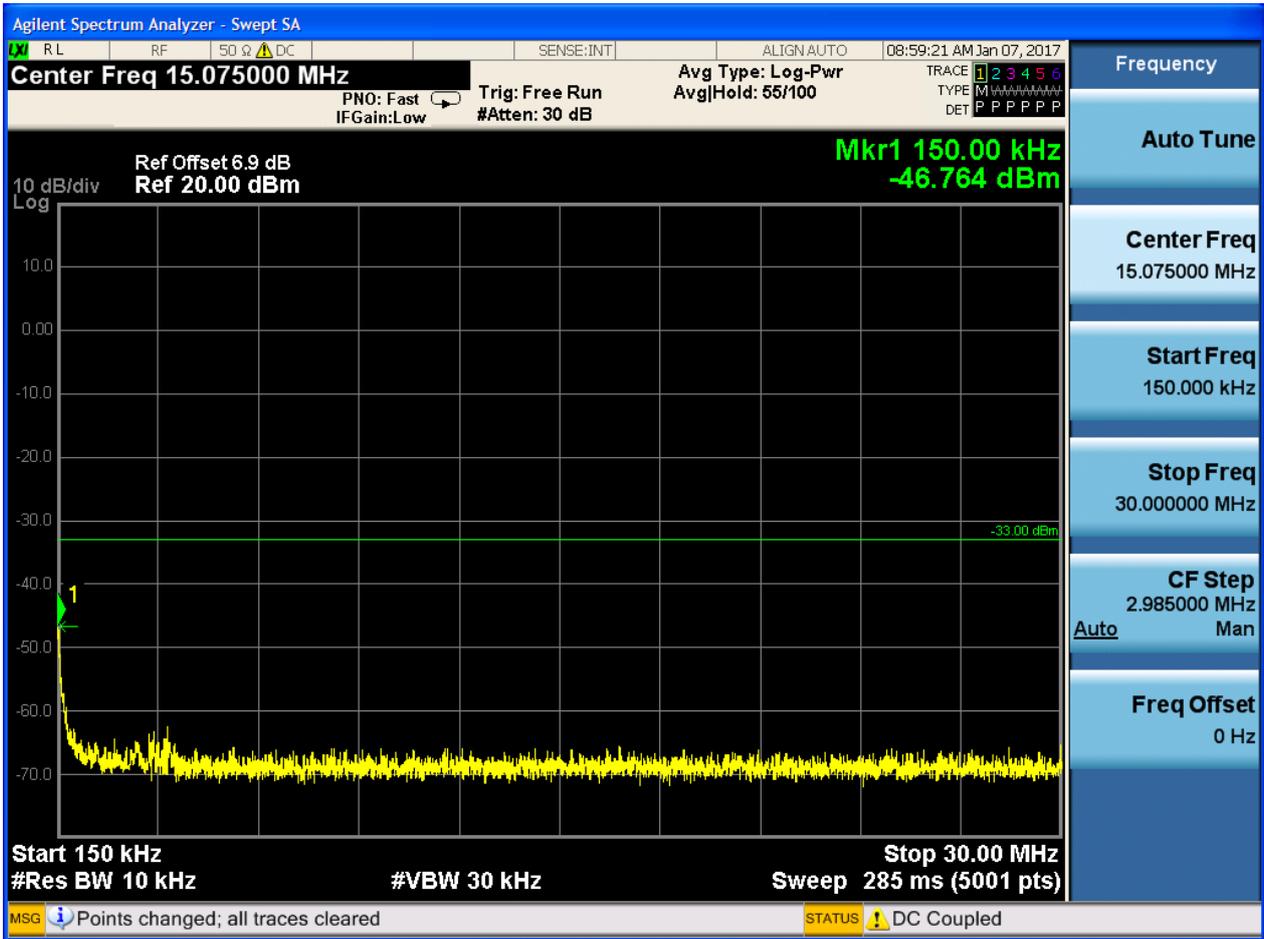


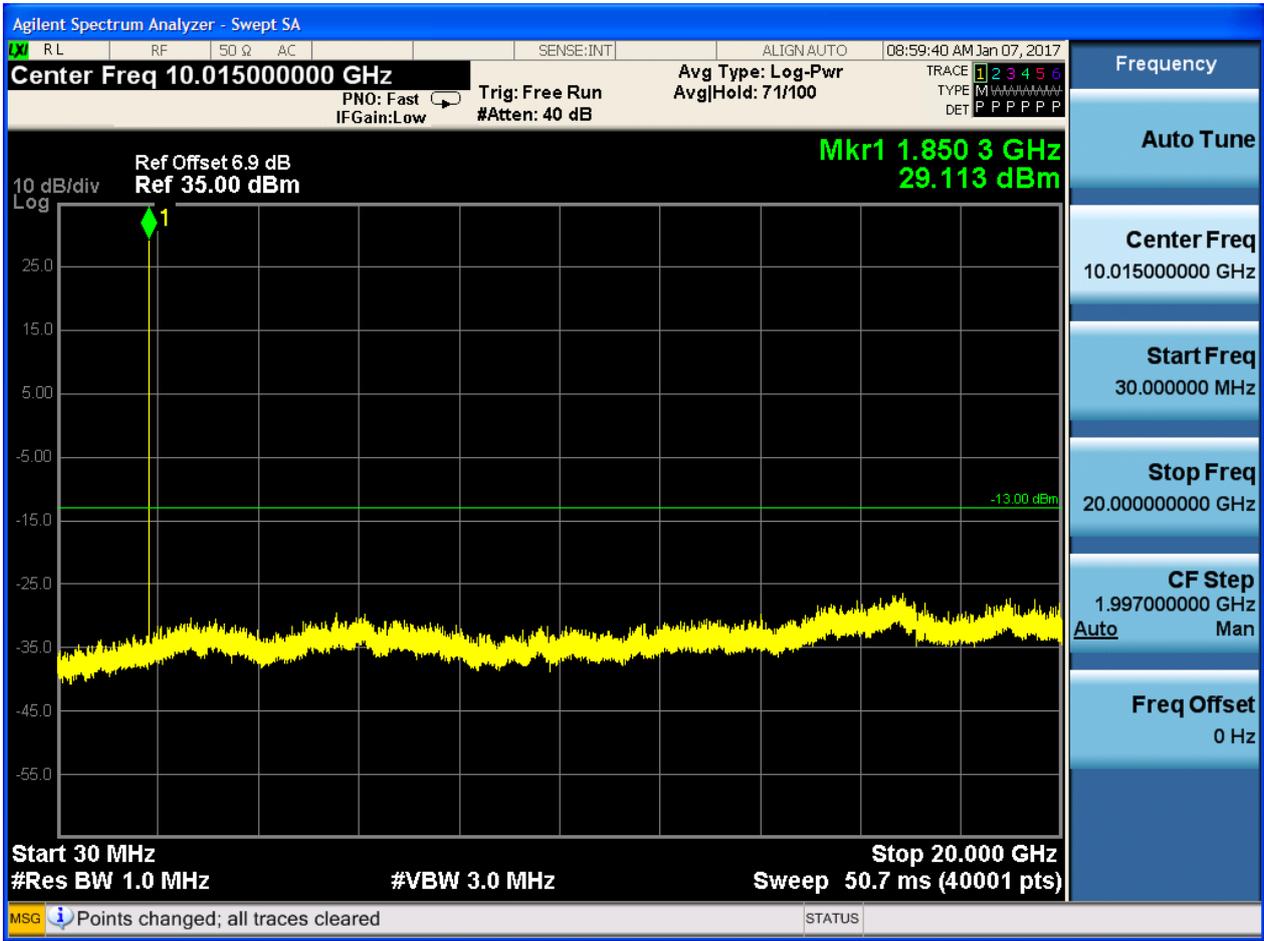
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

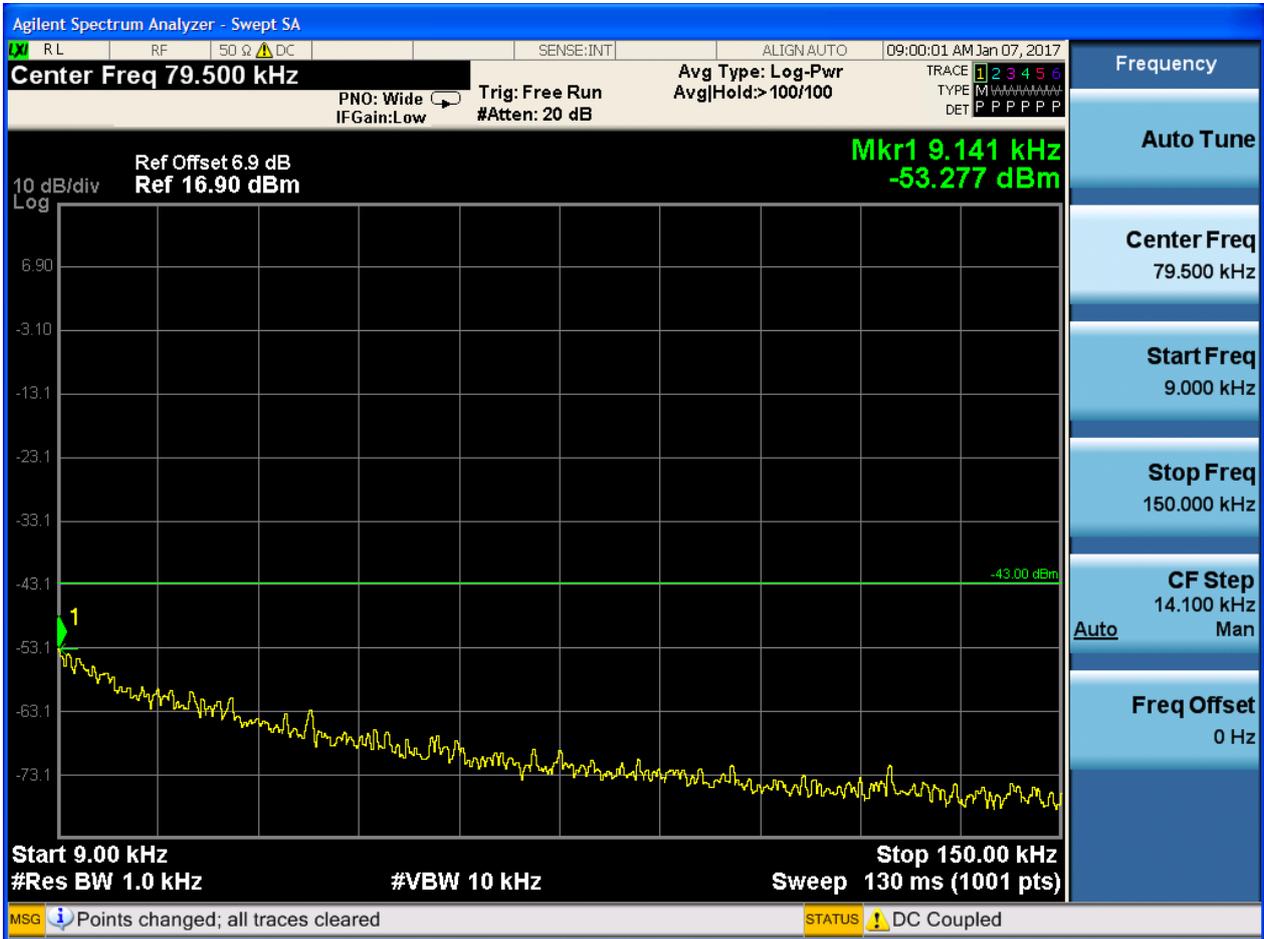




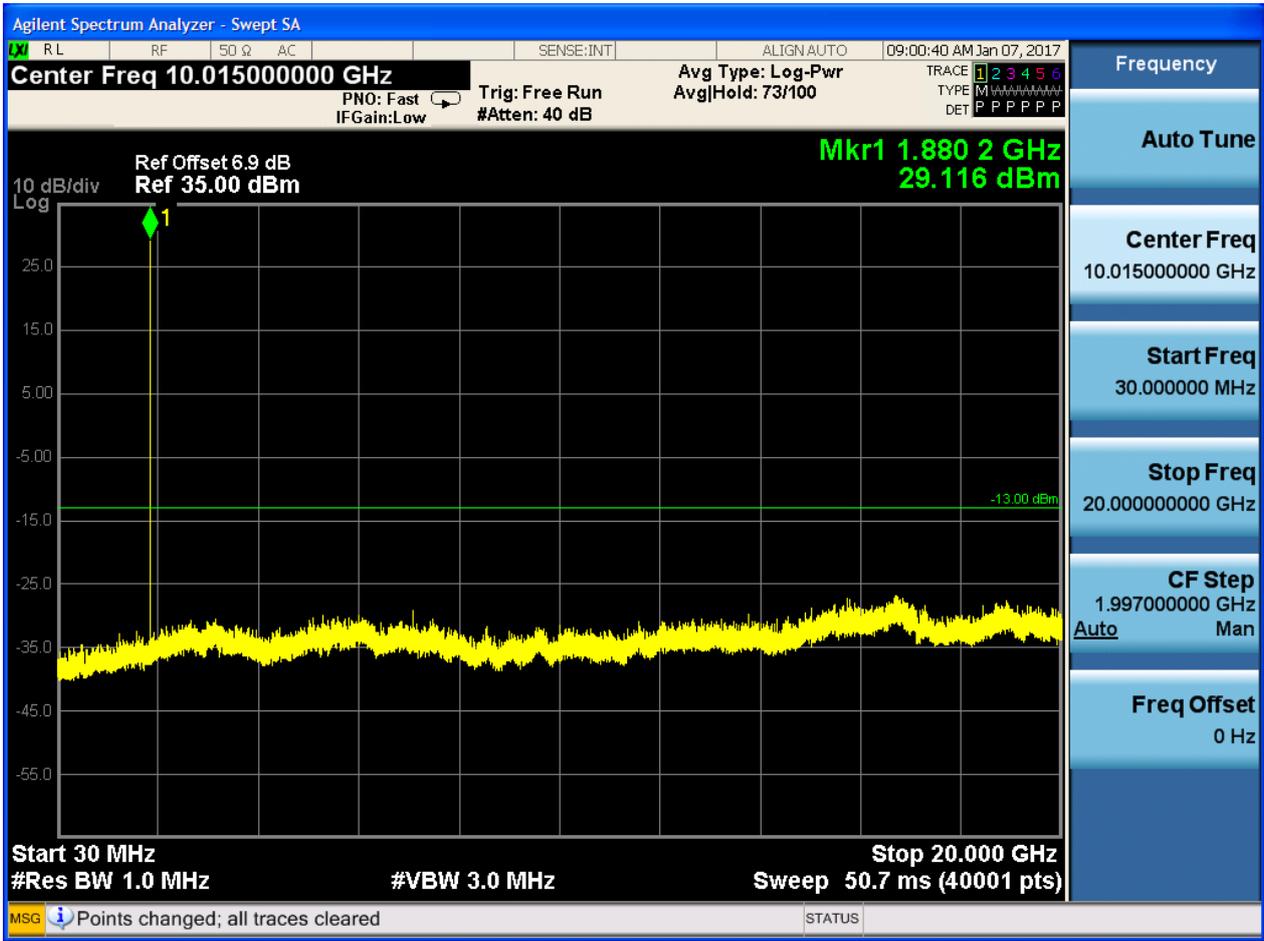




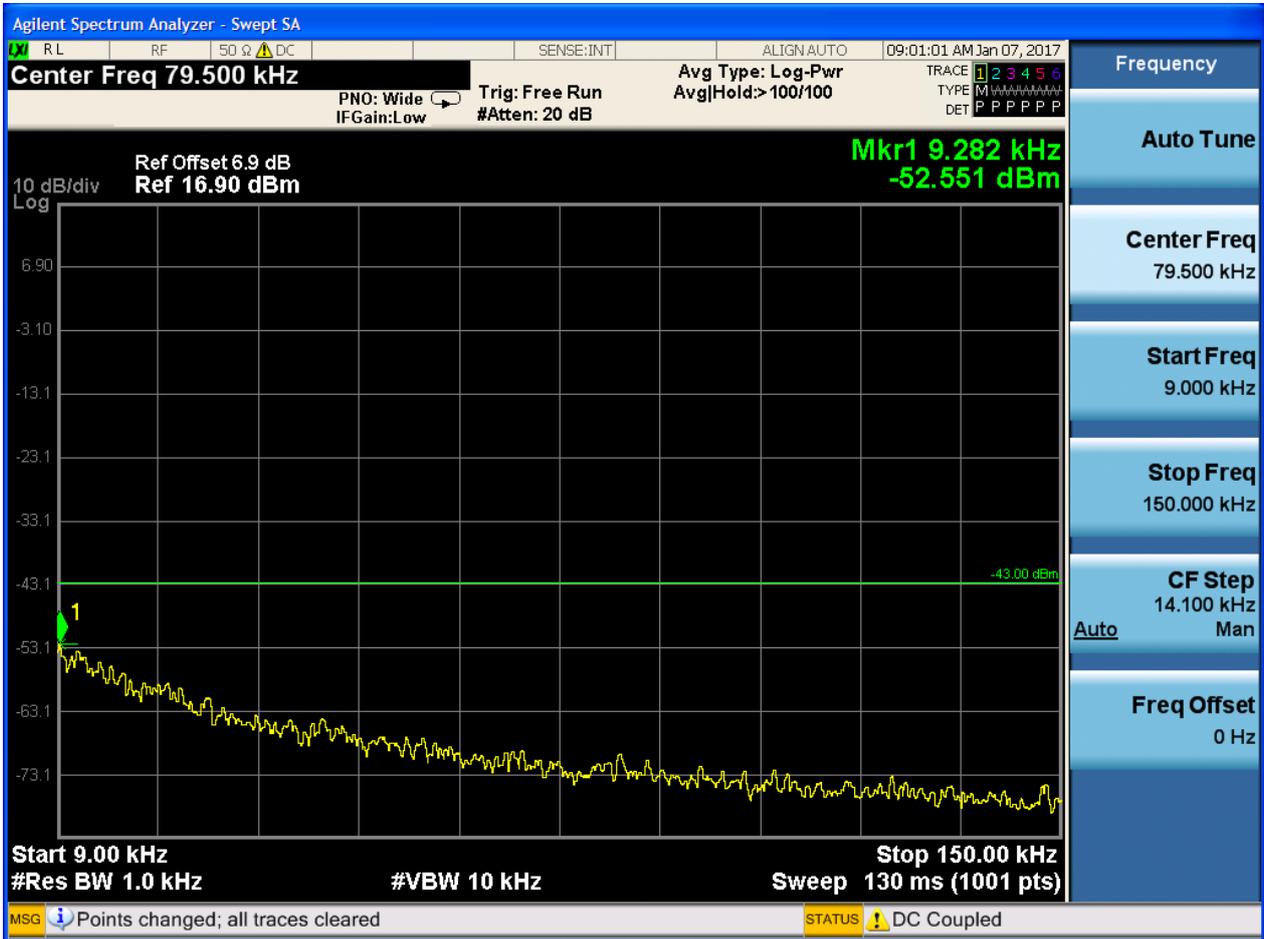
6.1.2.1.2 Test Channel = MCH

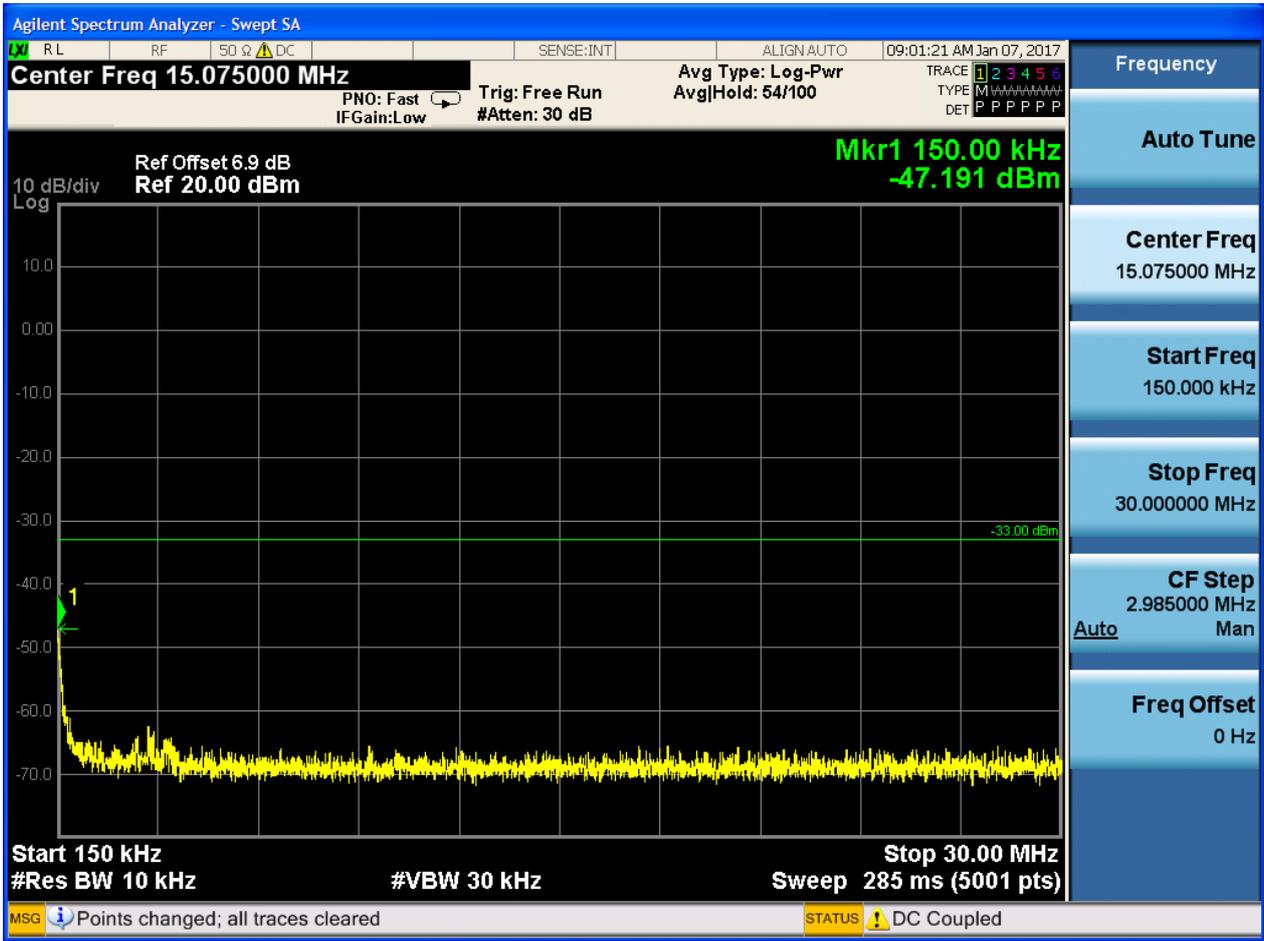


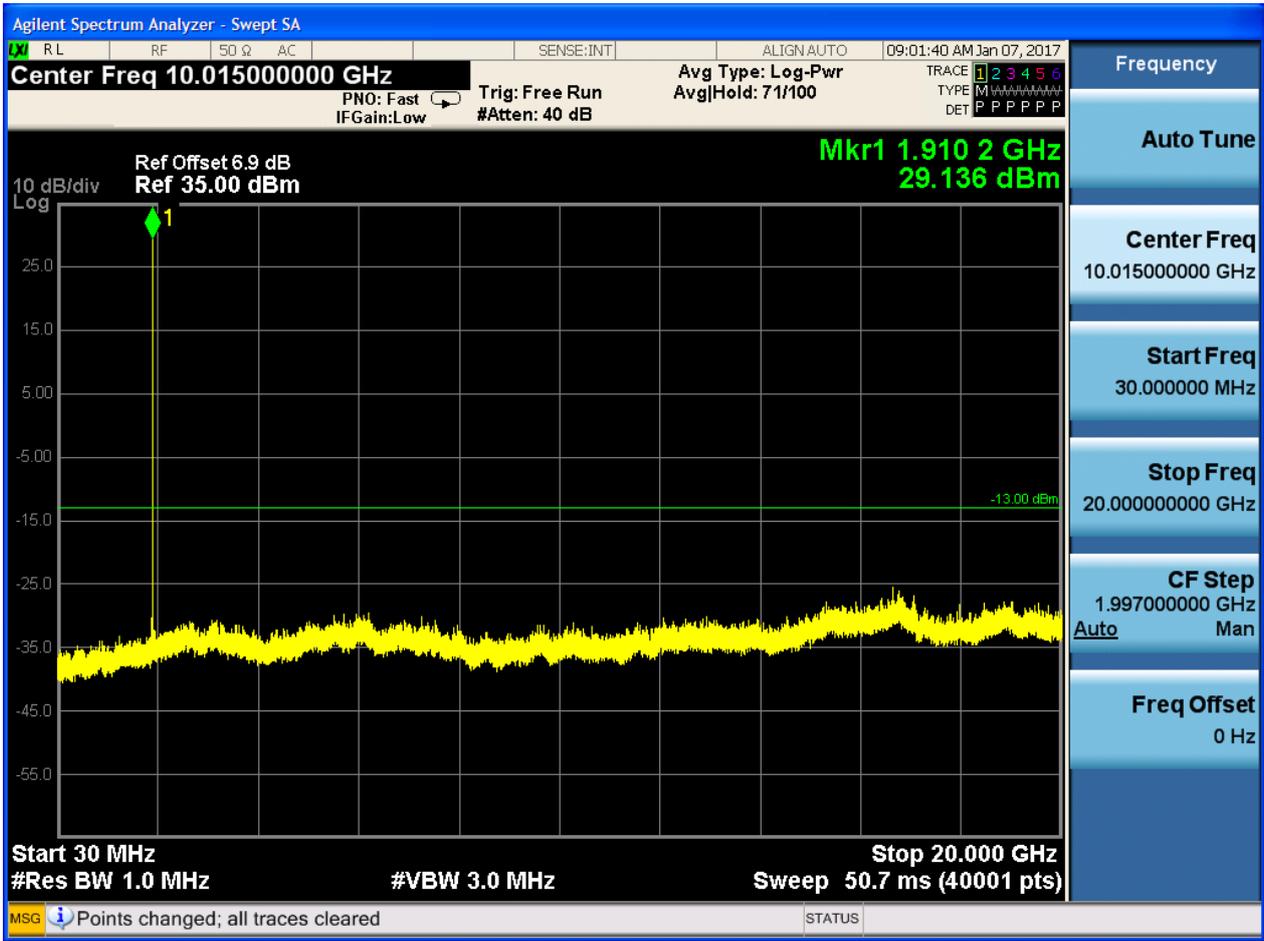




6.1.2.1.3 Test Channel = HCH



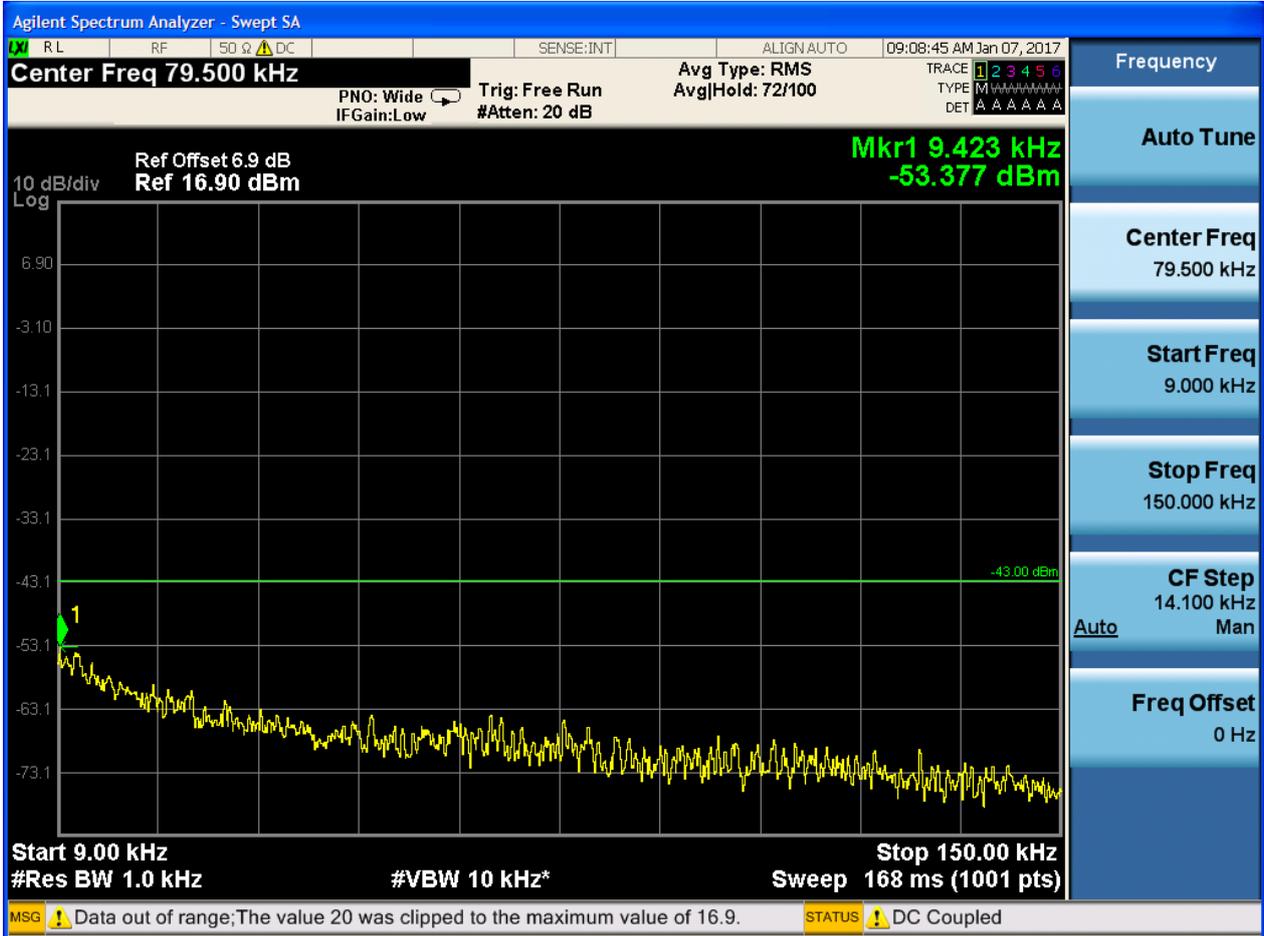


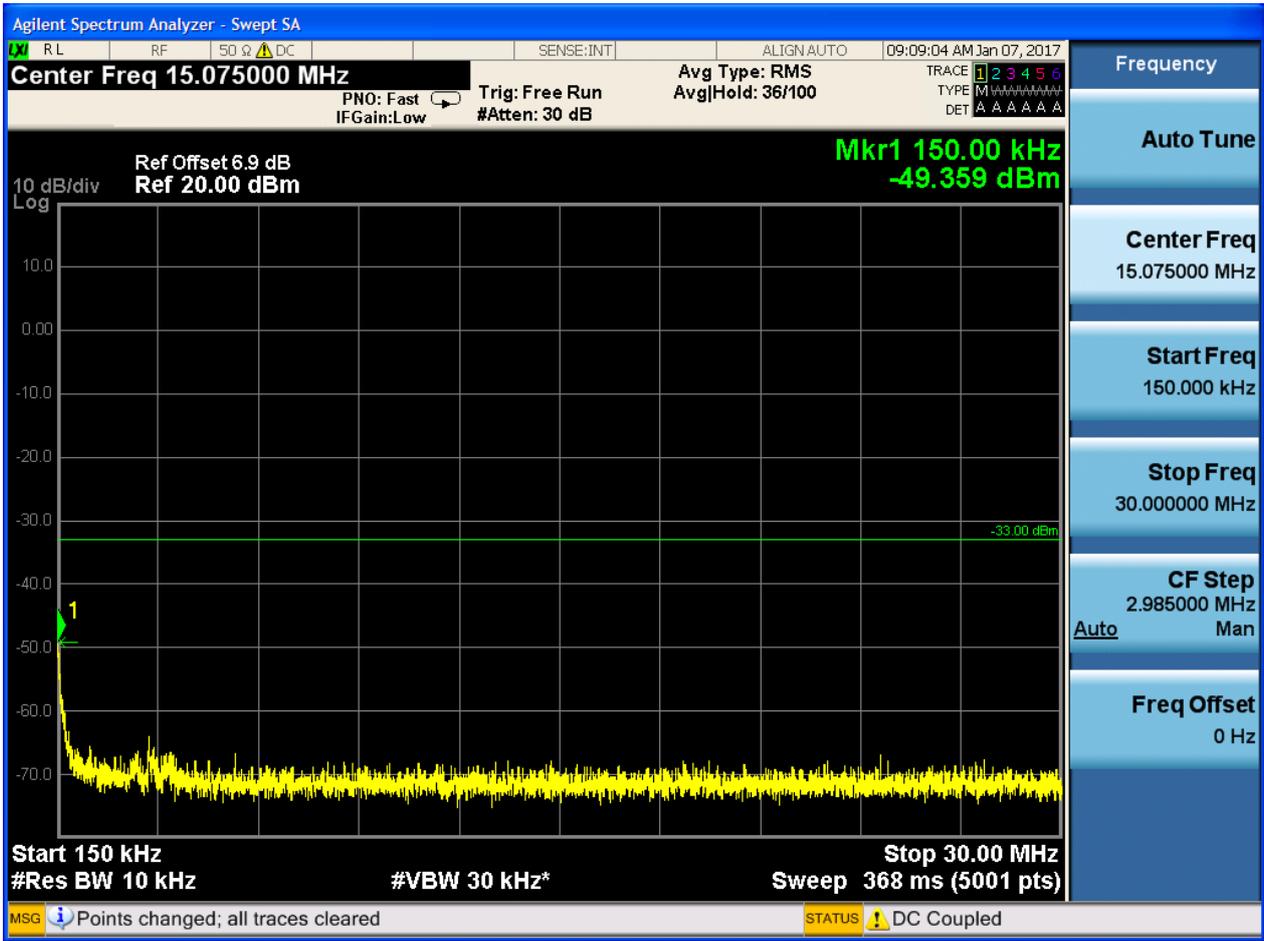


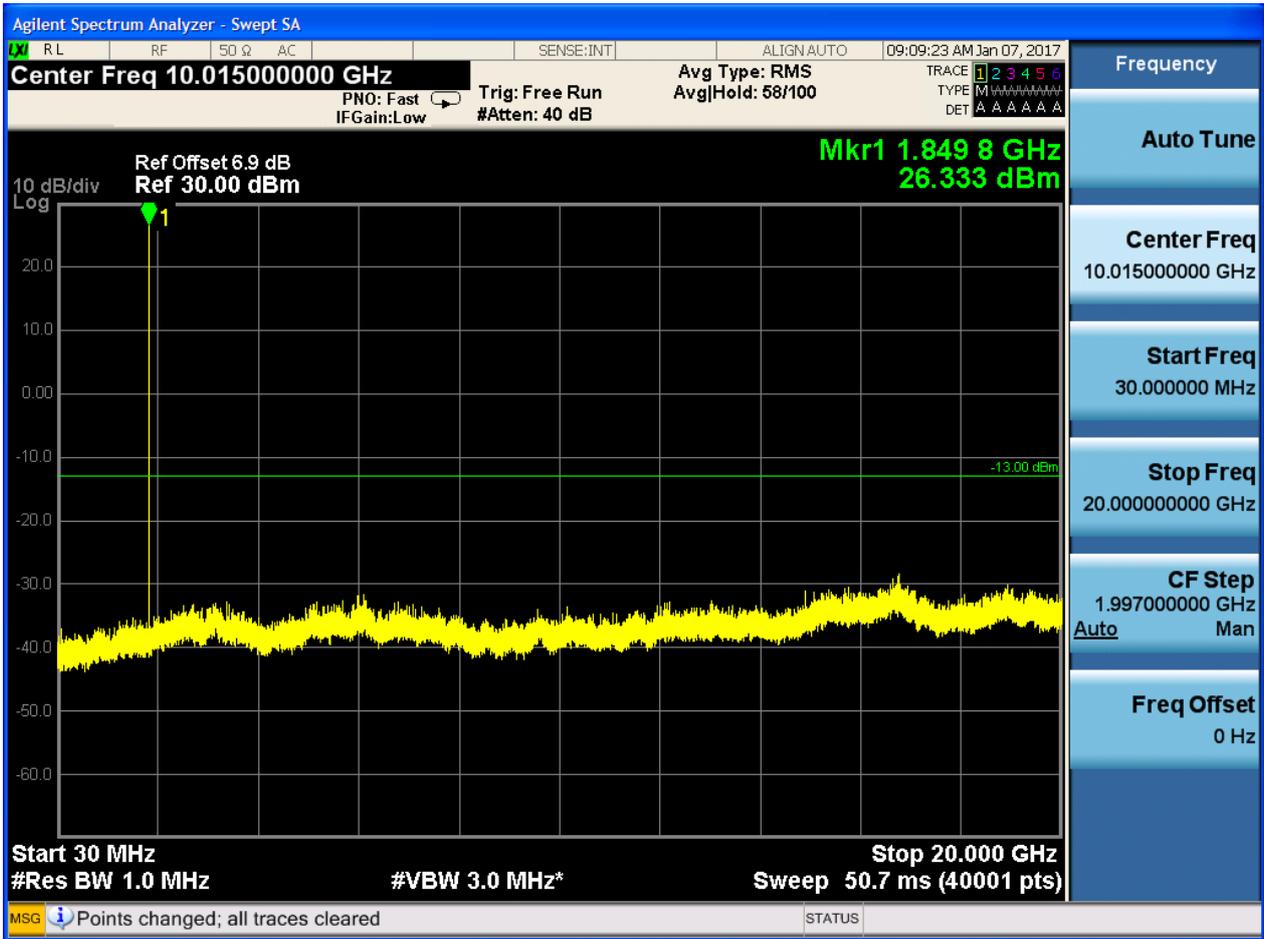


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

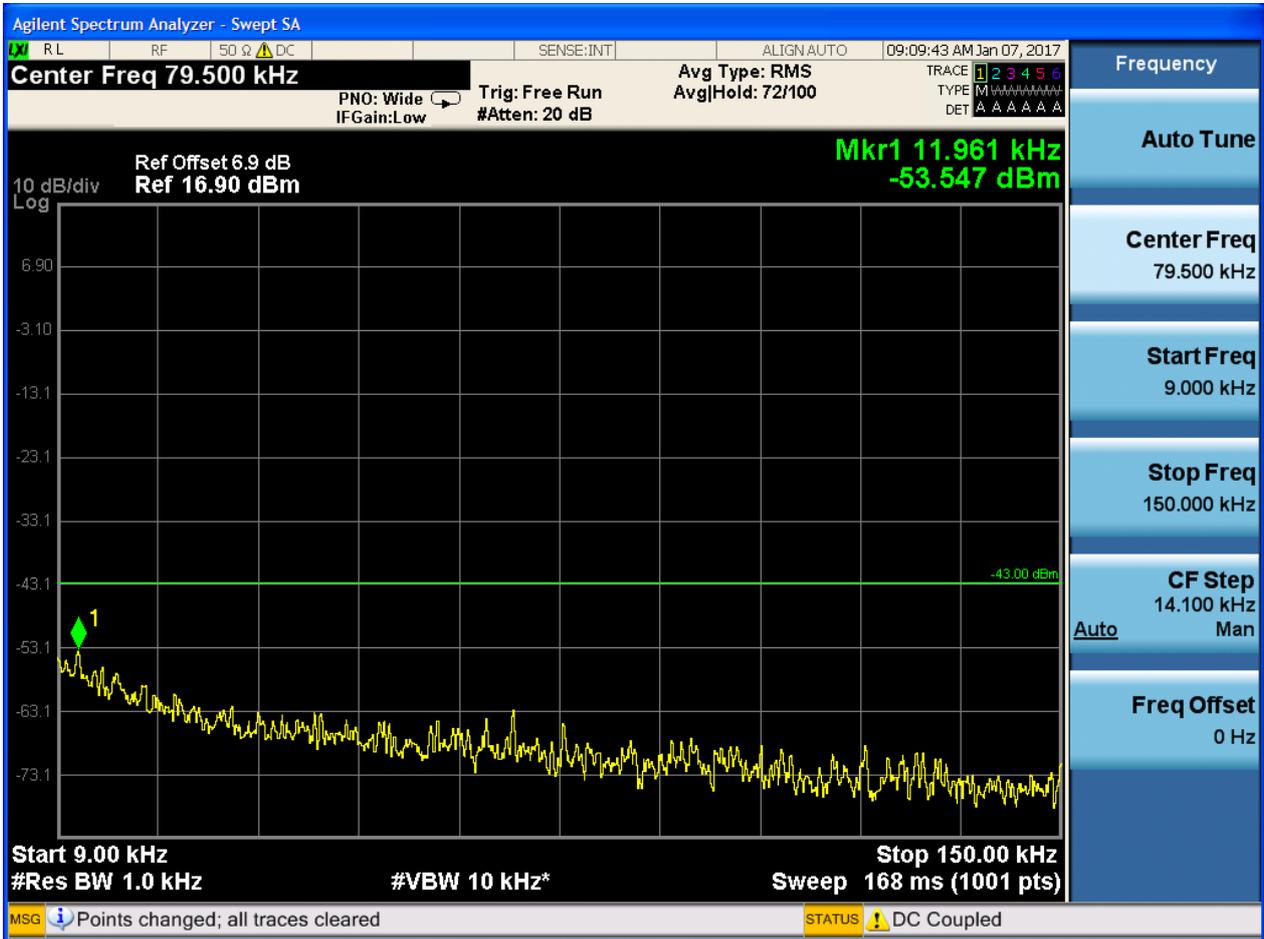


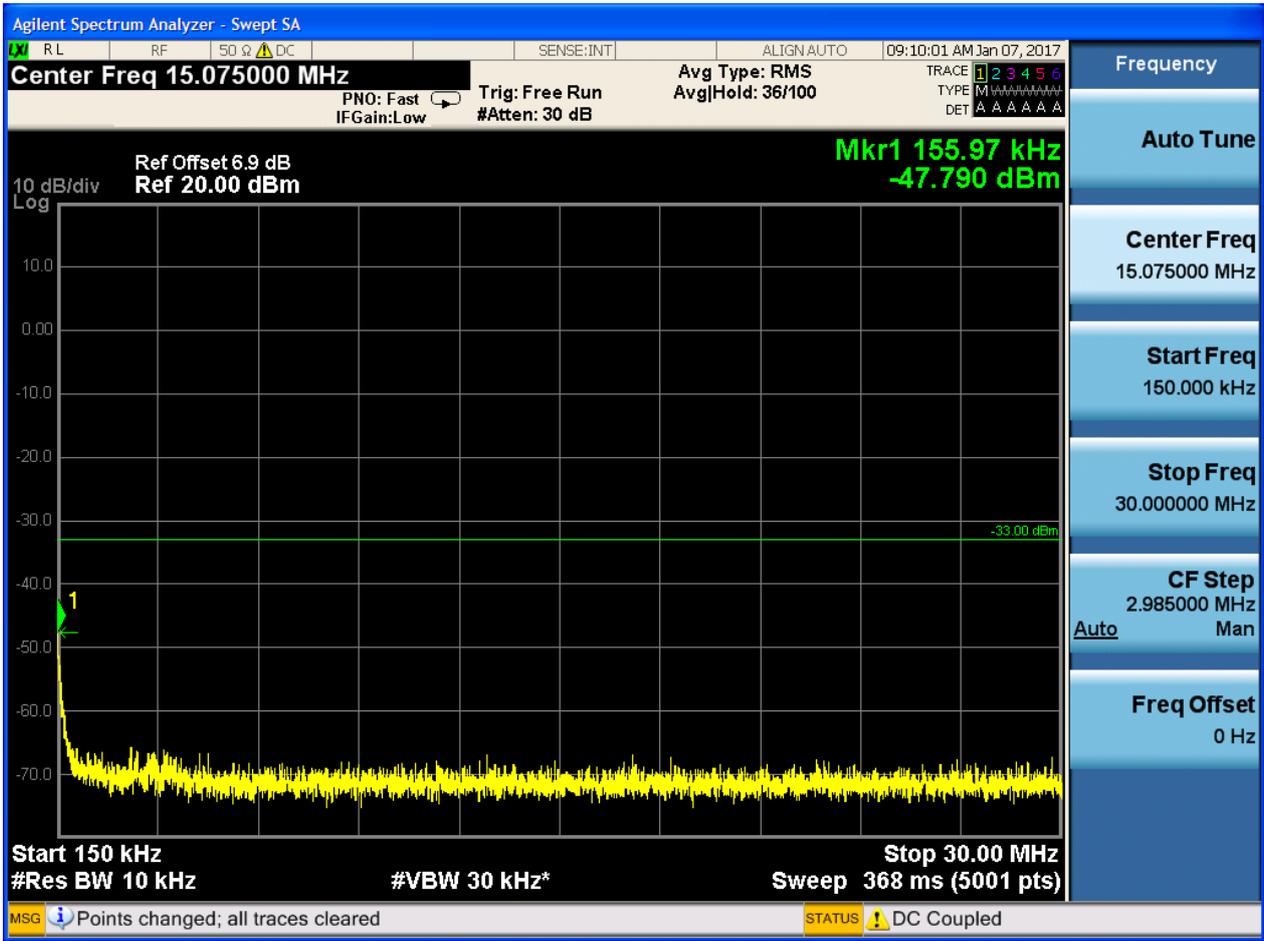


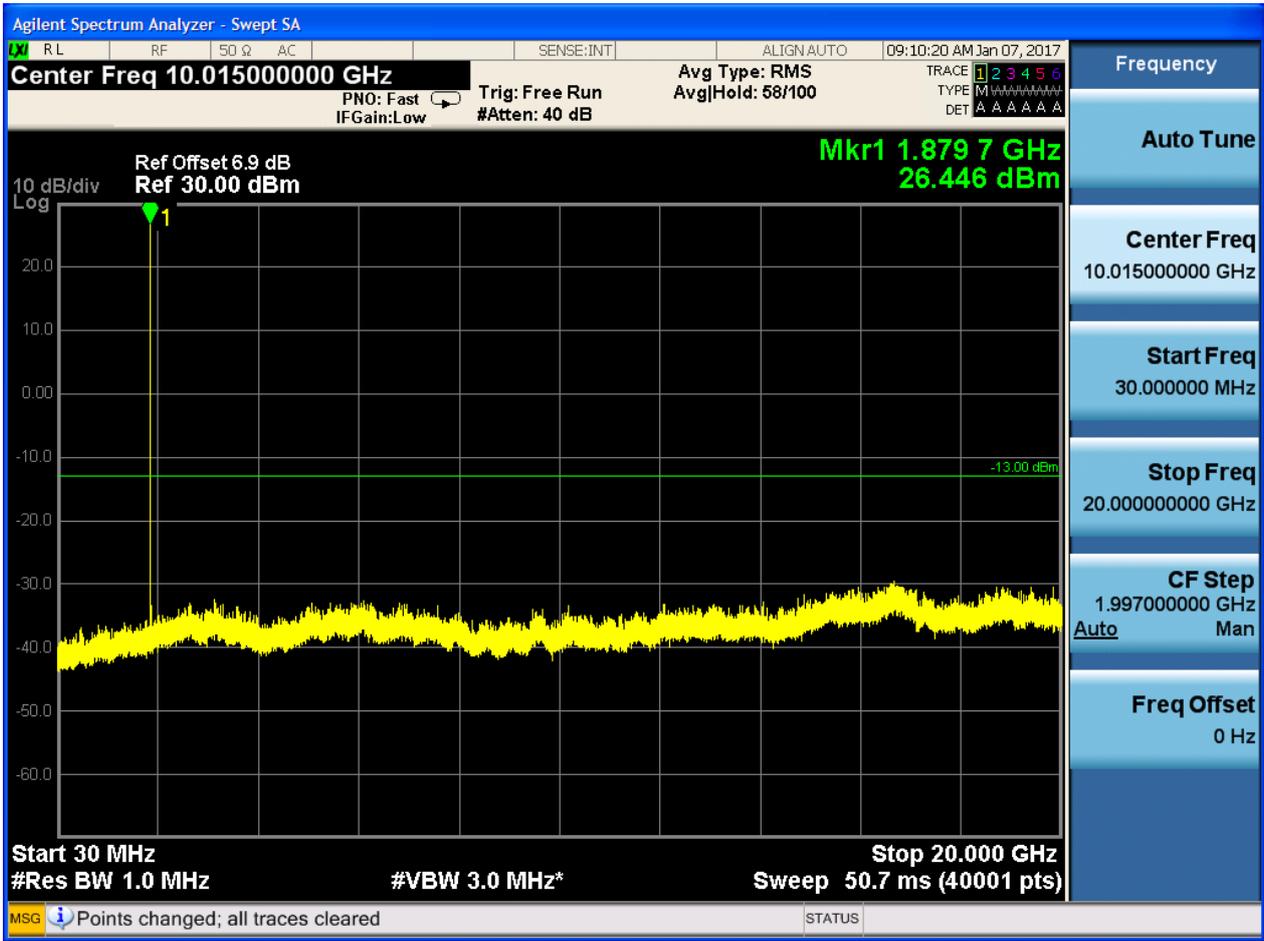




6.1.2.2.2 Test Channel = MCH

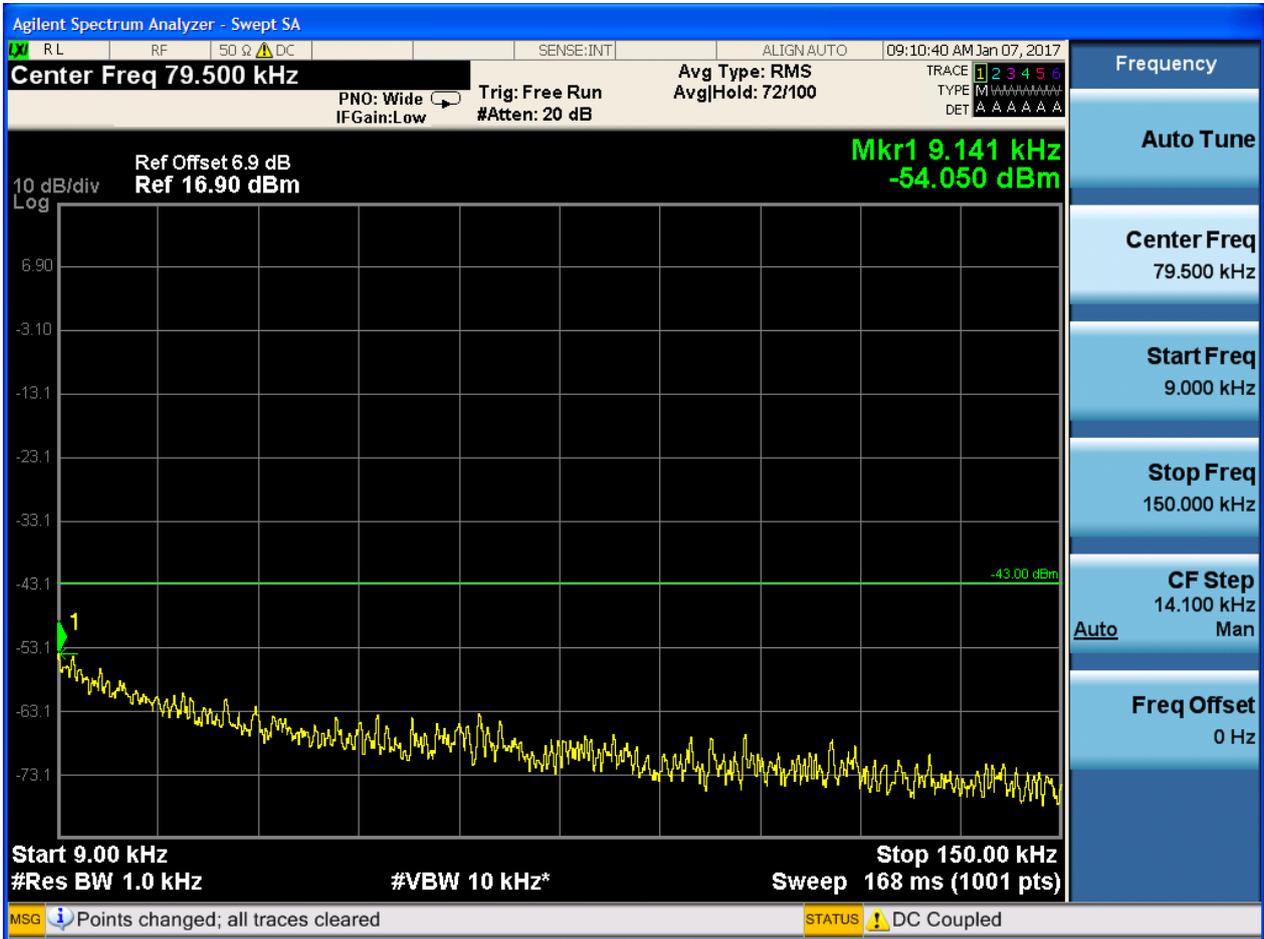




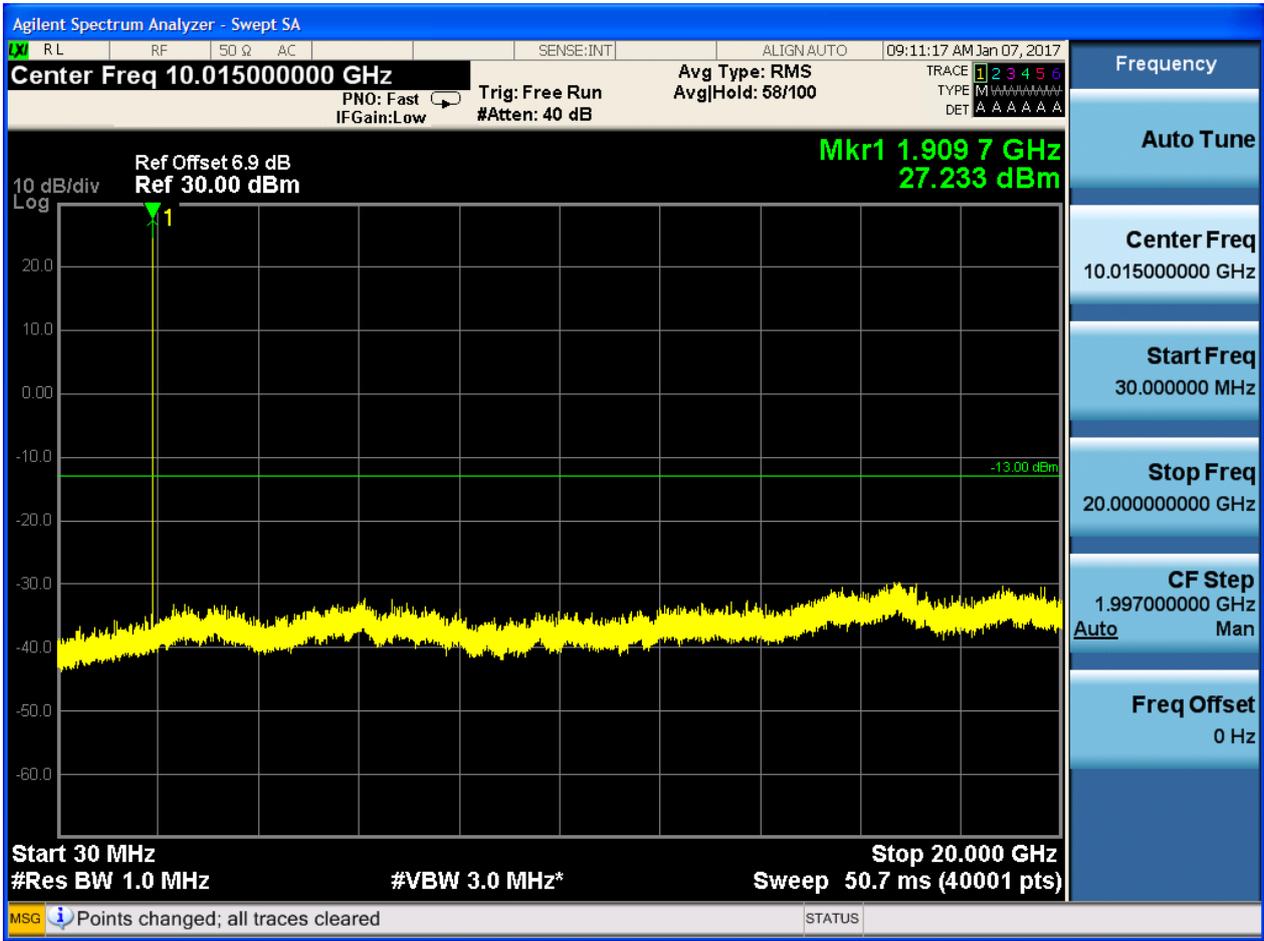




6.1.2.2.3 Test Channel = HCH









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

Note:

9kHz~150kHz, VBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, VBW = 9kHz, VBW = 30k Hz, Detector: PK

30MHz~1GHz, RBW = 100 kHz, VBW = 300 kHz. Detector: PK

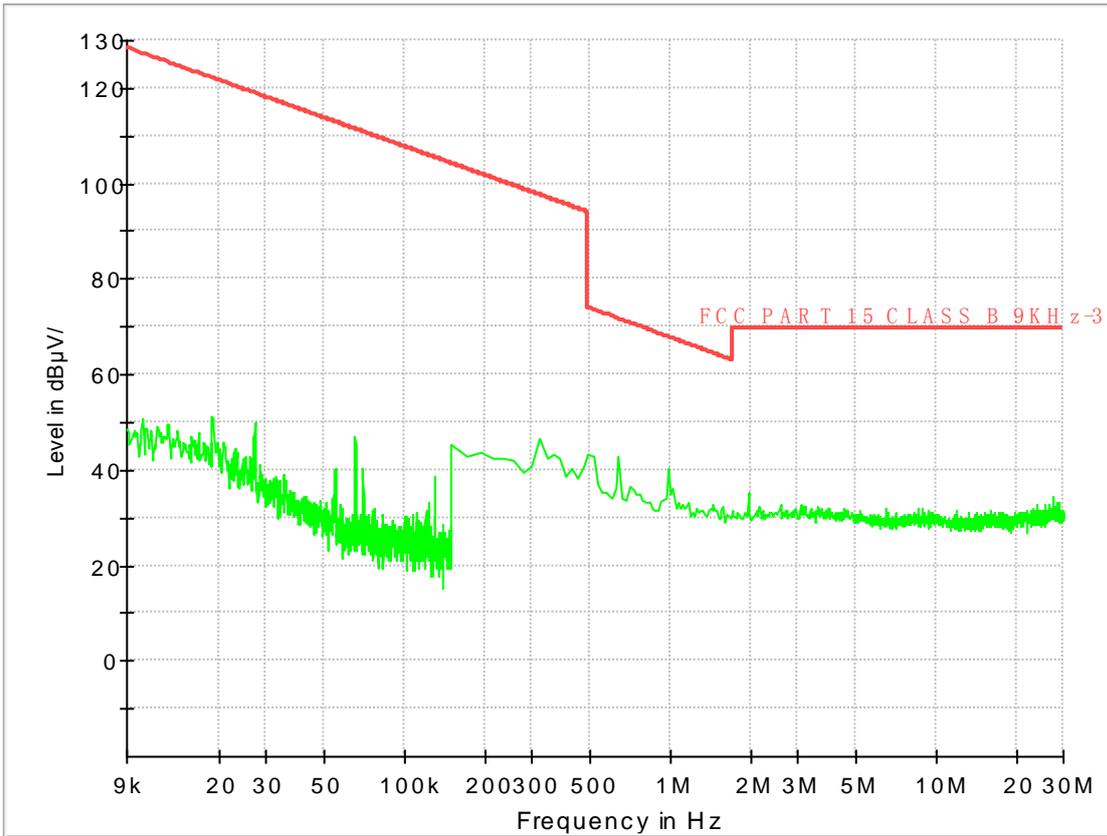
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

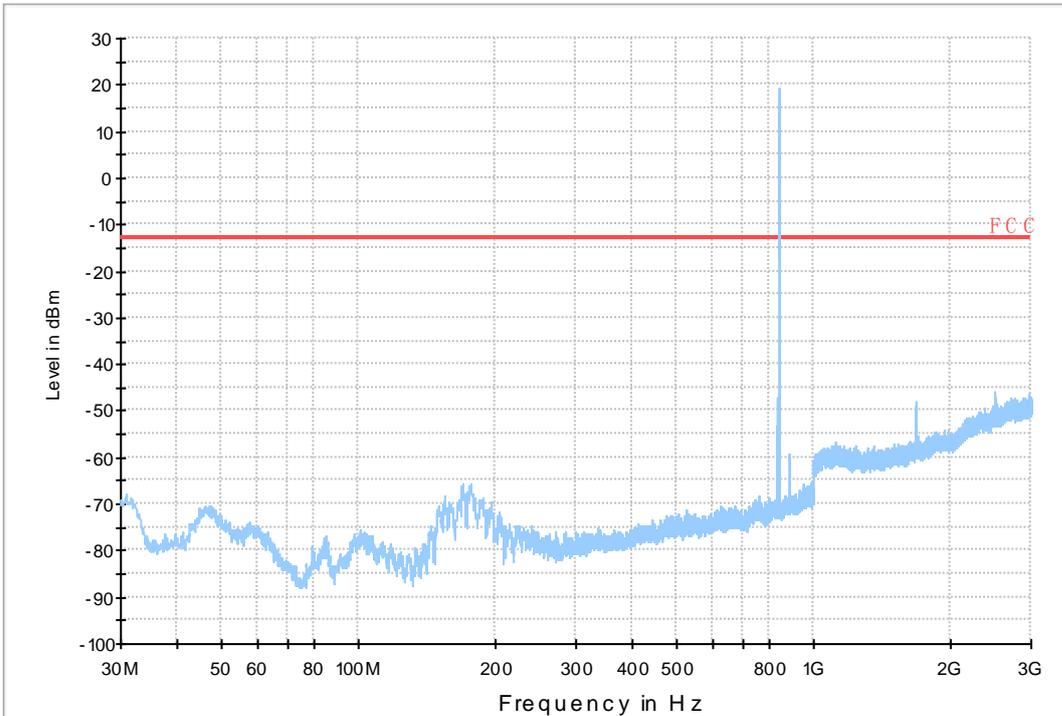
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850

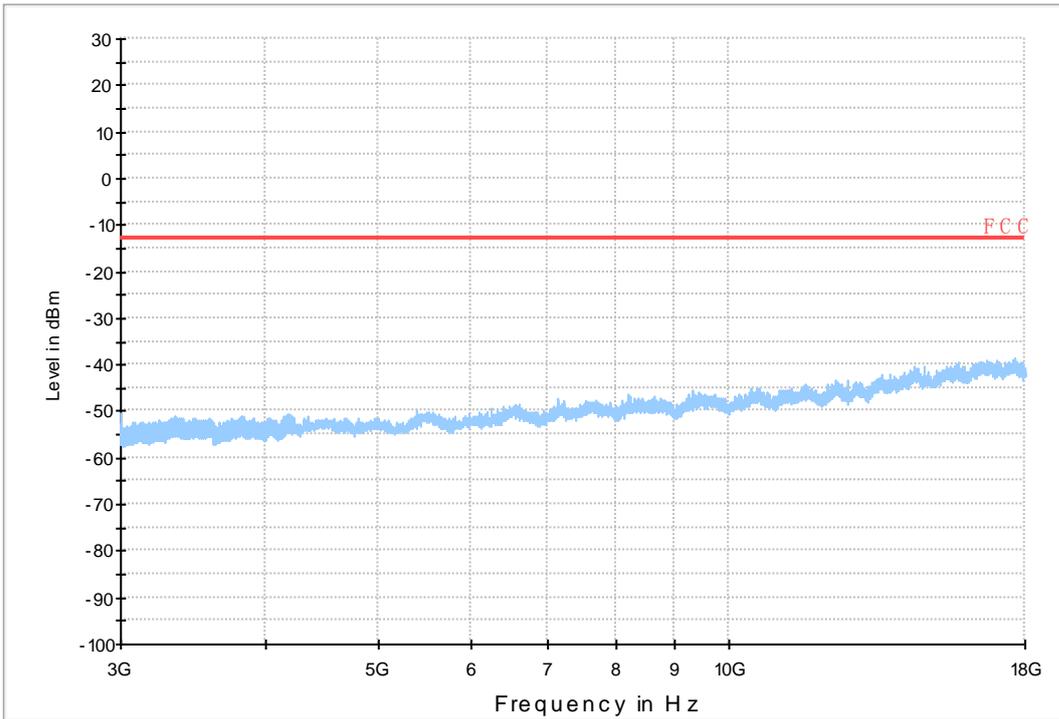
##### 7.1.1.1 Test Mode = GSM/TM1



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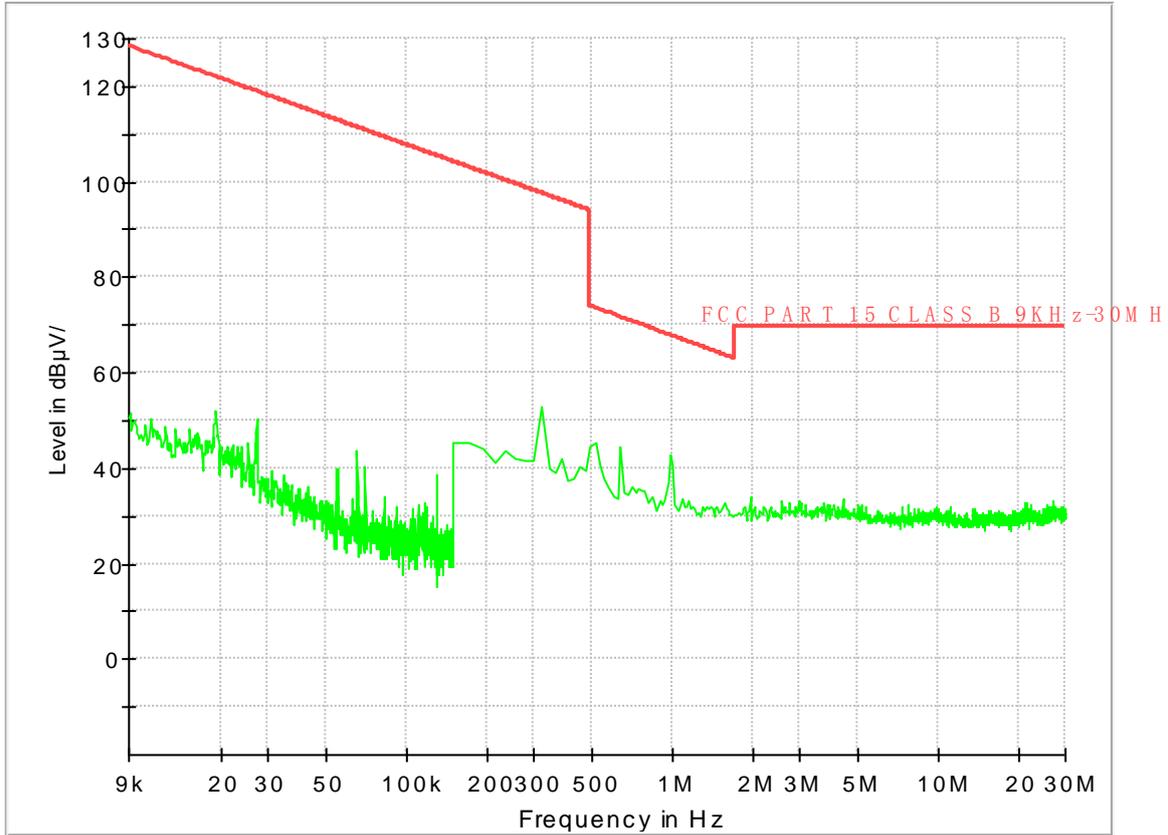


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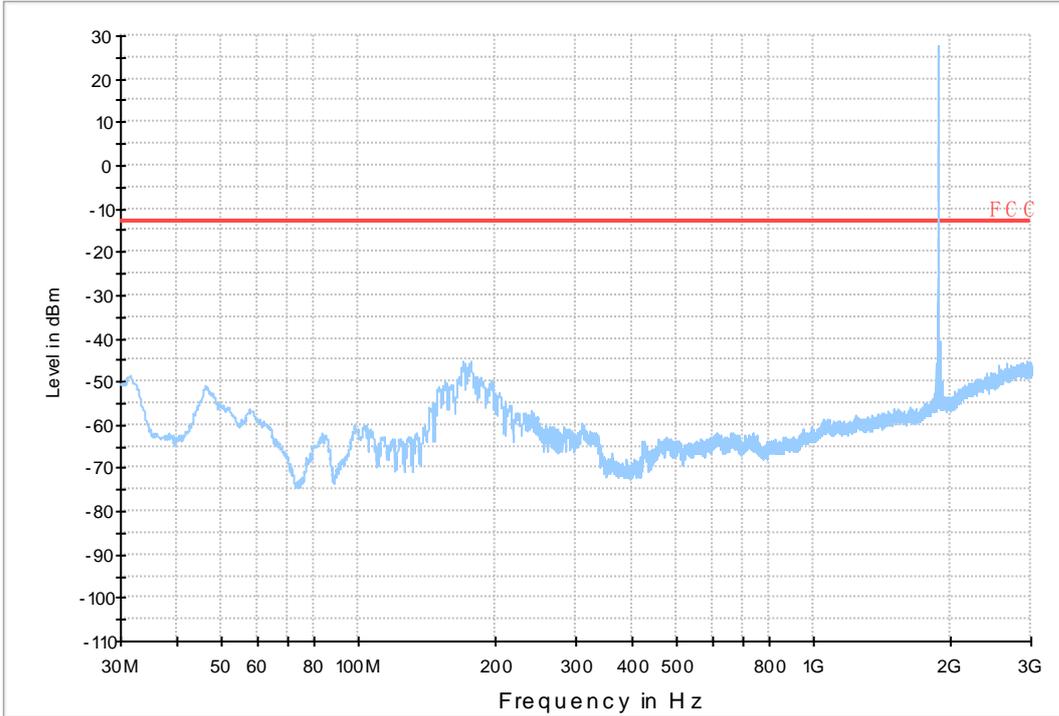


7.1.2 Test Band = GSM1900

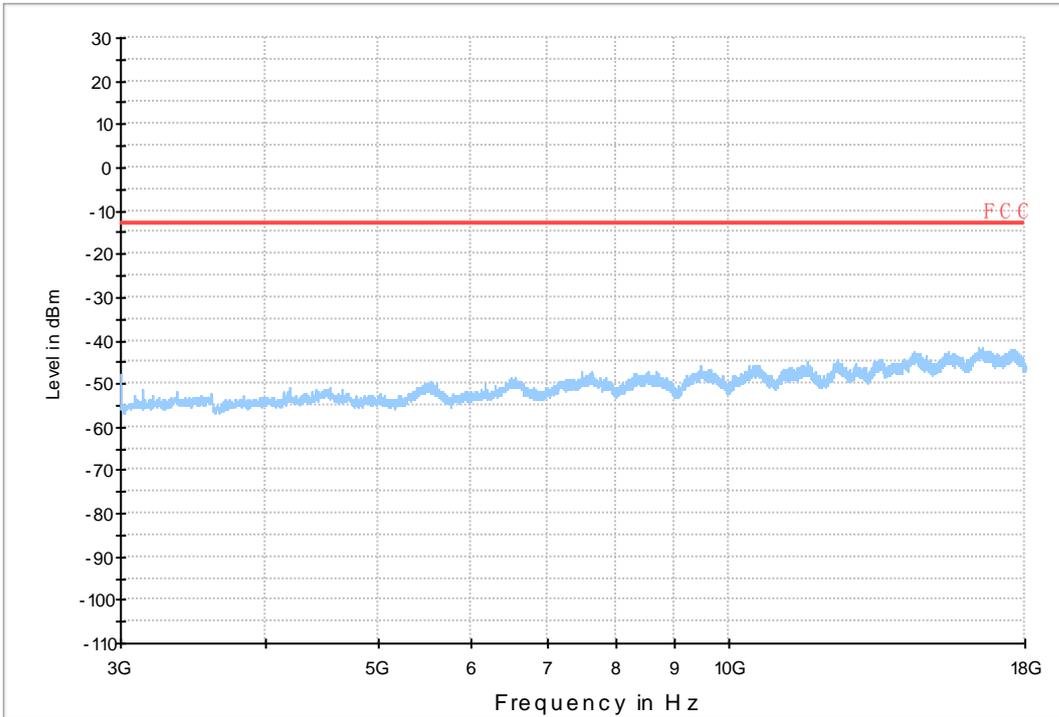
7.1.2.1 Test Mode = GSM/TM1

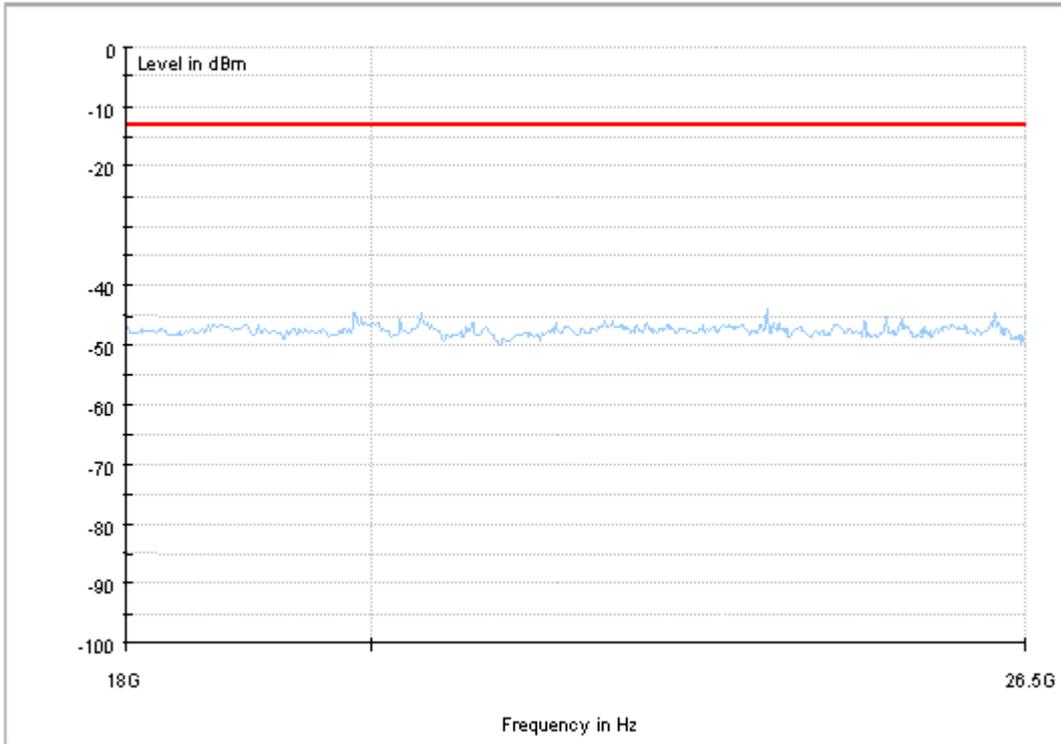


Copy of FCC PART24 GSM1900\_L



Copy of FCC PART24 GSM1900\_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]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	-5.17	-0.00627	PASS
				VN	-9.10	-0.01104	PASS
				VH	-6.33	-0.00768	PASS
		MCH	TN	VL	-7.94	-0.00949	PASS
				VN	-7.88	-0.00942	PASS
				VH	-7.43	-0.00888	PASS
		HCH	TN	VL	-5.75	-0.00677	PASS
				VN	-4.71	-0.00555	PASS
				VH	-8.14	-0.00959	PASS
	GSM/TM2	LCH	TN	VL	-5.20	-0.00631	PASS
				VN	-8.20	-0.00995	PASS
				VH	-6.04	-0.00733	PASS
		MCH	TN	VL	-15.40	-0.01841	PASS
				VN	-14.92	-0.01783	PASS
				VH	-6.81	-0.00814	PASS
		HCH	TN	VL	-7.97	-0.00939	PASS
				VN	-4.75	-0.0056	PASS
				VH	-10.30	-0.01213	PASS
GSM1900	GSM/TM1	LCH	TN	VL	9.69	0.00524	PASS
				VN	9.36	0.00506	PASS
				VH	5.10	0.00276	PASS
		MCH	TN	VL	20.28	0.01079	PASS
				VN	5.55	0.00295	PASS
				VH	26.93	0.01432	PASS
		HCH	TN	VL	13.43	0.00703	PASS
				VN	7.36	0.00385	PASS
				VH	25.57	0.01339	PASS
	GSM/TM2	LCH	TN	VL	-11.53	-0.00623	PASS
				VN	-23.79	-0.01286	PASS
				VH	-6.23	-0.00337	PASS
		MCH	TN	VL	3.45	0.00184	PASS
				VN	5.91	0.00314	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	4.13	0.0022	PASS
		HCH	TN	VL	-1.49	-0.00078	PASS
				VN	0.03	0.00002	PASS
				VH	-6.10	-0.00319	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]	Verdict
GSM850	GSM/TM1	LCH	VN	-30	-9.69	-0.01176	PASS
				-20	-9.62	-0.01167	PASS
				-10	-10.46	-0.01269	PASS
				0	-8.07	-0.00979	PASS
				10	-12.59	-0.01528	PASS
				20	-9.88	-0.01199	PASS
				30	-6.07	-0.00736	PASS
				40	-8.20	-0.00995	PASS
		50	-5.23	-0.00635	PASS		
		MCH	VN	-30	-13.30	-0.0159	PASS
				-20	-8.78	-0.01049	PASS
				-10	-11.56	-0.01382	PASS
				0	-11.11	-0.01328	PASS
				10	-14.59	-0.01744	PASS
				20	-8.46	-0.01011	PASS
				30	-6.01	-0.00718	PASS
				40	-10.65	-0.01273	PASS
		50	-11.36	-0.01358	PASS		
		HCH	VN	-30	-14.59	-0.01719	PASS
				-20	-6.46	-0.00761	PASS
				-10	-8.52	-0.01004	PASS
				0	-6.78	-0.00799	PASS
				10	-10.20	-0.01202	PASS
				20	-11.49	-0.01354	PASS
	30			-11.88	-0.014	PASS	
	40			-8.91	-0.0105	PASS	
	50	-11.95	-0.01408	PASS			
	GSM/TM2	LCH	VN	-30	-9.14	-0.01109	PASS
				-20	-3.39	-0.00411	PASS
				-10	-8.81	-0.01069	PASS
				0	-12.95	-0.01571	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				10	-12.91	-0.01566	PASS						
				20	-15.88	-0.01927	PASS						
				30	-8.30	-0.01007	PASS						
				40	-11.36	-0.01378	PASS						
				50	-3.49	-0.00423	PASS						
		MCH	VN			-30	-9.65	-0.01153	PASS				
						-20	-8.62	-0.0103	PASS				
						-10	-9.69	-0.01158	PASS				
						0	-10.14	-0.01212	PASS				
						10	-16.82	-0.02011	PASS				
						20	-14.63	-0.01749	PASS				
						30	-10.14	-0.01212	PASS				
						40	-14.53	-0.01737	PASS				
						50	-19.69	-0.02354	PASS				
						HCH	VN			-30	-5.52	-0.0065	PASS
		-20	-13.72	-0.01616	PASS								
		-10	-10.62	-0.01251	PASS								
		0	-13.79	-0.01625	PASS								
		10	-11.27	-0.01328	PASS								
		20	-11.36	-0.01338	PASS								
		30	-11.53	-0.01358	PASS								
		40	-13.46	-0.01586	PASS								
		50	-14.46	-0.01704	PASS								
		GSM1900	GSM/TM1	LCH	VN					-30	9.43	0.0051	PASS
-20	9.04									0.00489	PASS		
-10	13.04									0.00705	PASS		
0	19.31									0.01044	PASS		
10	18.73									0.01012	PASS		
20	13.62									0.00736	PASS		
30	2.00									0.00108	PASS		
40	12.46									0.00673	PASS		
50	21.63									0.01169	PASS		
MCH	VN									-30	11.04	0.00587	PASS
										-20	12.91	0.00687	PASS
										-10	11.75	0.00625	PASS
										0	15.63	0.00831	PASS
										10	16.47	0.00876	PASS
										20	20.40	0.01085	PASS
										30	20.86	0.0111	PASS
										40	3.75	0.00199	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	20.08	0.01068	PASS
				-30	25.25	0.01322	PASS
				-20	19.44	0.01018	PASS
				-10	17.18	0.009	PASS
				0	24.99	0.01309	PASS
				10	15.37	0.00805	PASS
				20	15.37	0.00805	PASS
				30	9.56	0.00501	PASS
				40	15.50	0.00812	PASS
				50	20.40	0.01068	PASS
	GSM/TM2	LCH	VN	-30	-6.88	-0.00372	PASS
				-20	-12.20	-0.00659	PASS
				-10	-2.03	-0.0011	PASS
				0	-3.91	-0.00211	PASS
				10	-7.30	-0.00395	PASS
				20	-2.58	-0.00139	PASS
				30	3.42	0.00185	PASS
				40	-9.56	-0.00517	PASS
				50	-5.39	-0.00291	PASS
				MCH	VN	-30	-2.97
		-20	1.55			0.00082	PASS
		-10	-5.81			-0.00309	PASS
		0	2.84			0.00151	PASS
		10	6.88			0.00366	PASS
		20	-4.52			-0.0024	PASS
		30	14.14			0.00752	PASS
		40	-3.71			-0.00197	PASS
		50	2.00			0.00106	PASS
		HCH	VN			-30	-6.17
				-20	-0.90	-0.00047	PASS
				-10	-0.42	-0.00022	PASS
				0	-4.00	-0.00209	PASS
				10	10.82	0.00567	PASS
				20	4.33	0.00227	PASS
				30	0.26	0.00014	PASS
				40	9.30	0.00487	PASS
				50	14.11	0.00739	PASS

END