



# Appendix for test report

## 1Appendix\_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	32.72	26.92	38.5	PASS
		MCH	32.8	27	38.5	PASS
		HCH	32.84	27.04	38.5	PASS
	GSM/TM2	LCH	26.72	20.92	38.5	PASS
		MCH	26.66	20.86	38.5	PASS
		HCH	26.62	20.82	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	29.59	27.09	33	PASS
		MCH	29.49	26.99	33	PASS
		HCH	29.44	26.94	33	PASS
	GSM/TM2	LCH	25.19	22.69	33	PASS
		MCH	25.14	22.64	33	PASS
		HCH	25.15	22.65	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,

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

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

b, SGP = Signal Generator Level

Note2:

$$\text{SET Span} = 1.5 * \text{OBW}$$

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

$$\text{SET VBW} \geq 3 * \text{RBW}$$

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
GSM850	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.13	13	PASS
		HCH	0.1	13	PASS
	GSM/TM2	LCH	3.12	13	PASS
		MCH	3.11	13	PASS
		HCH	2.96	13	PASS
GSM1900	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.2	13	PASS
		MCH	3.1	13	PASS
		HCH	3.03	13	PASS

### 3Appendix\_C: Modulation Characteristics

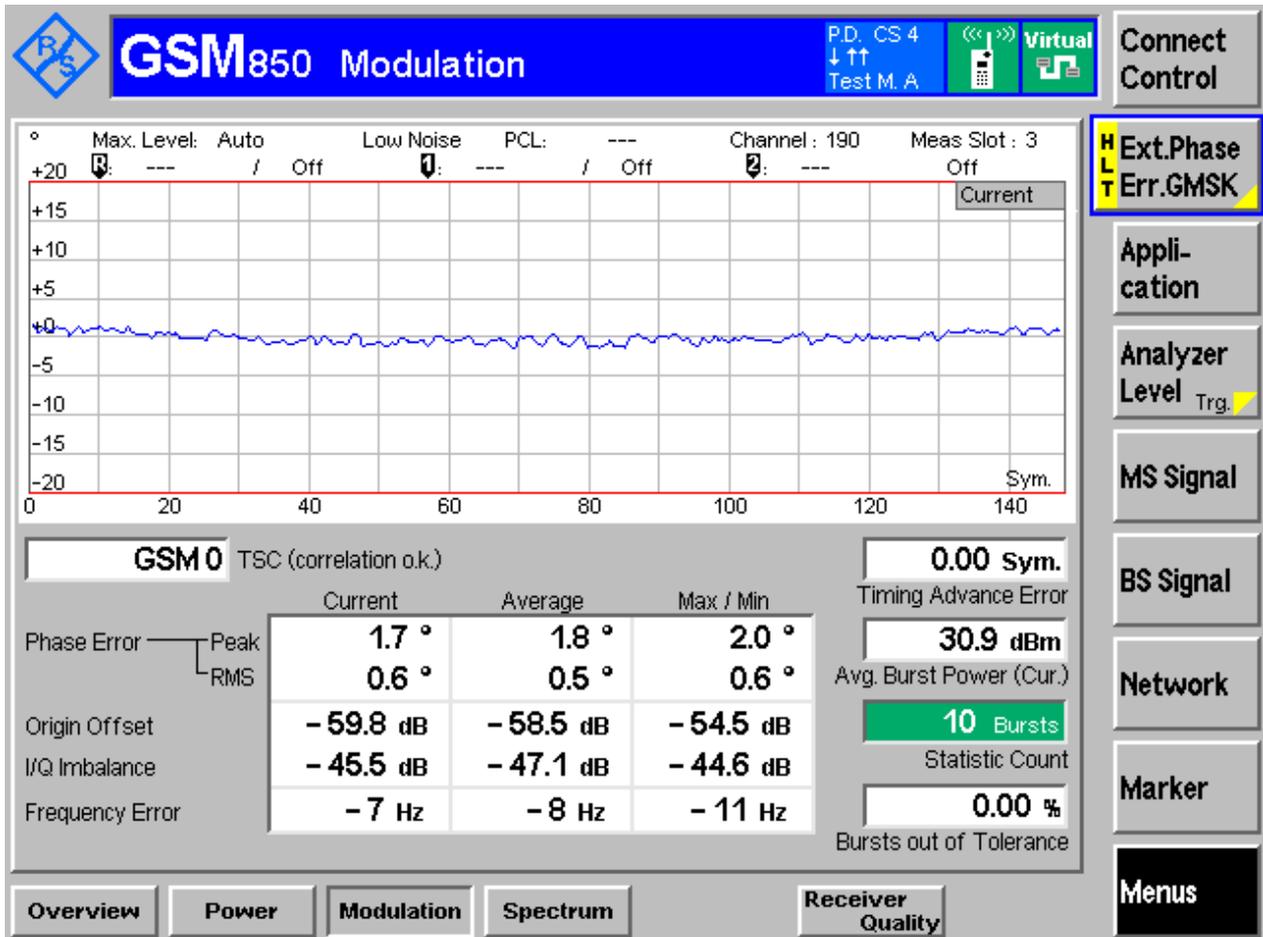
#### Part I - Test Plots

#### 3.1 For GSM

#### 3.1.1 Test Band = GSM850

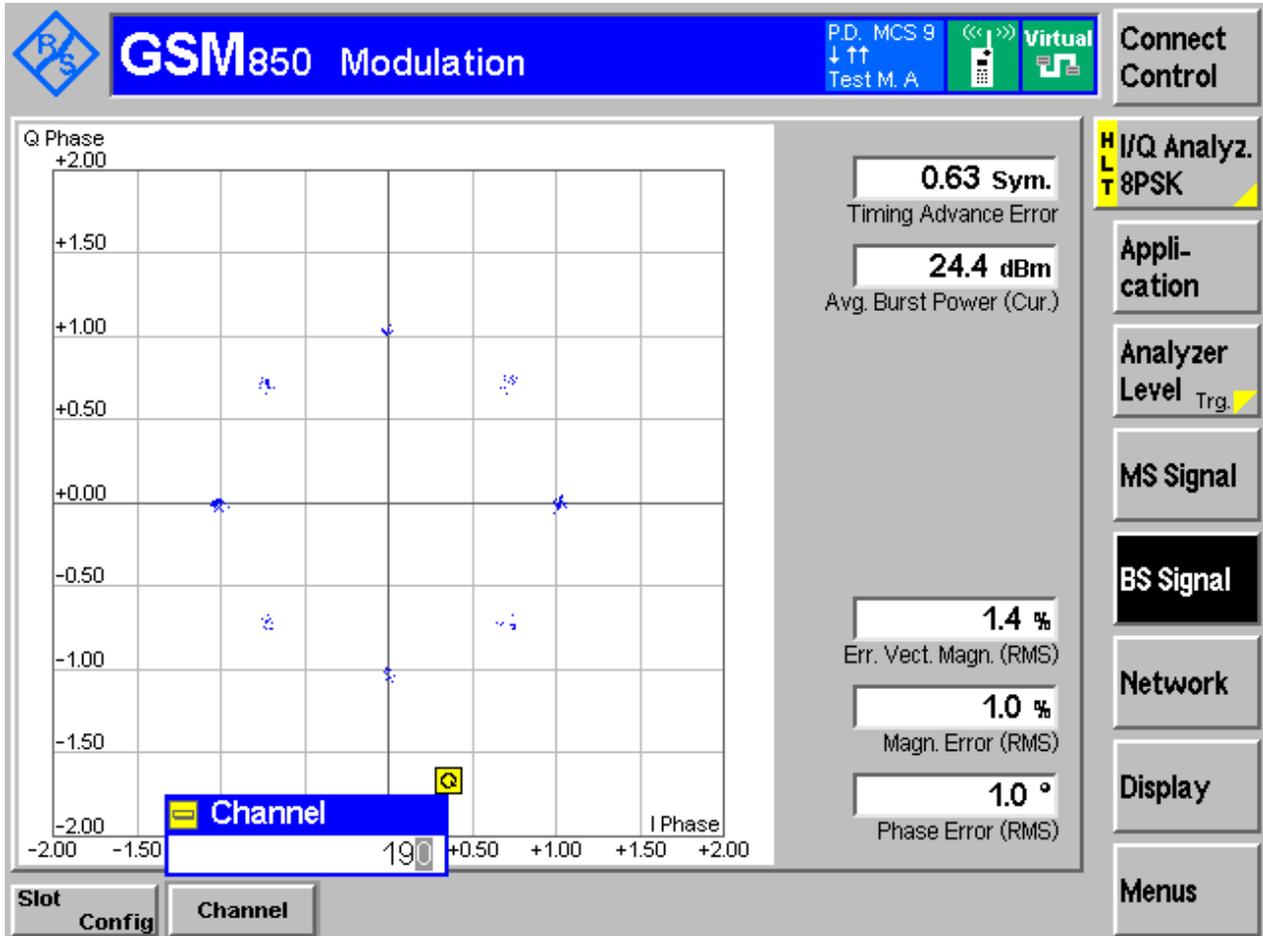
#### 3.1.1.1 Test Mode = GSM/TM1

#### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

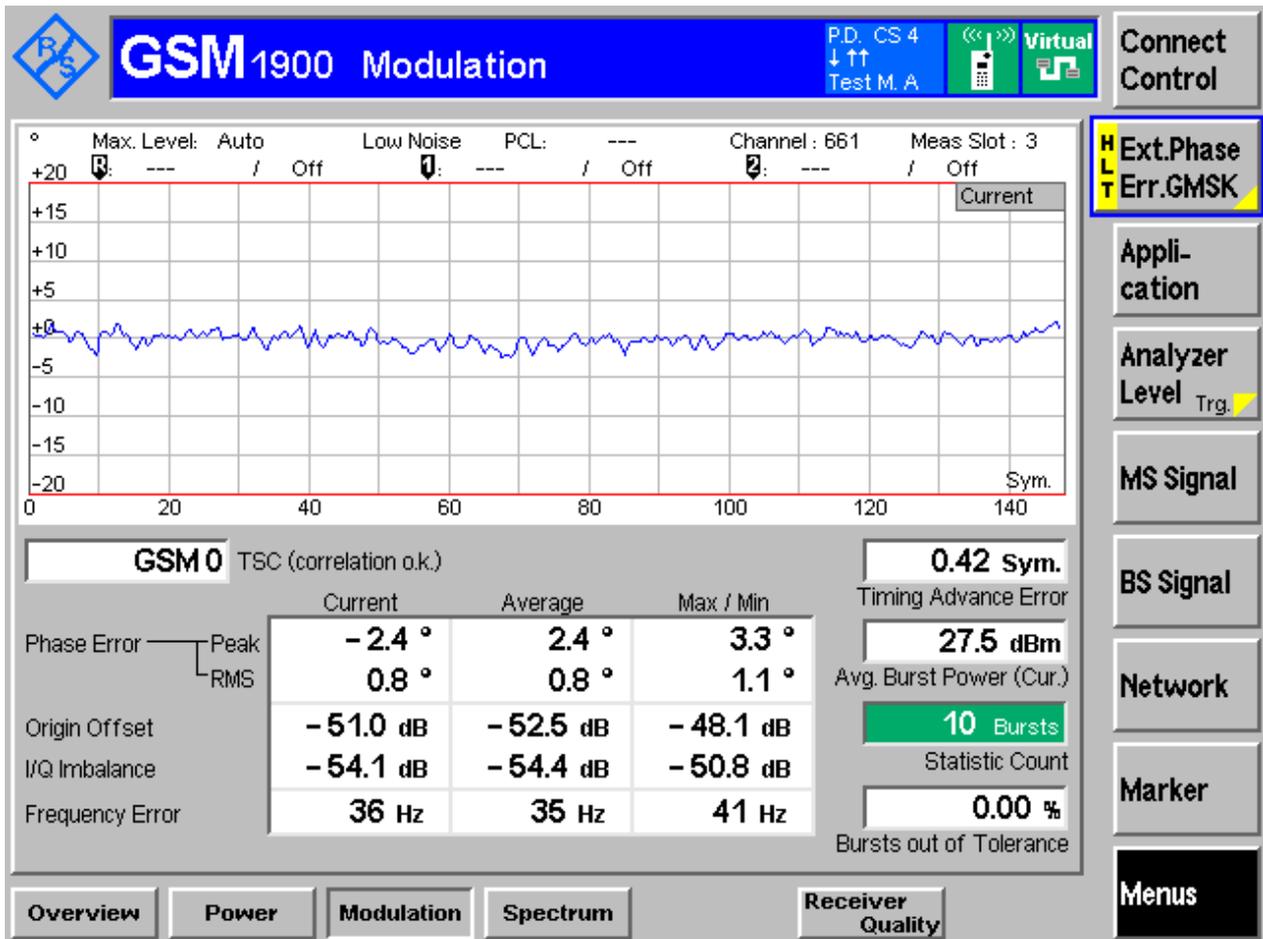
#### 3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

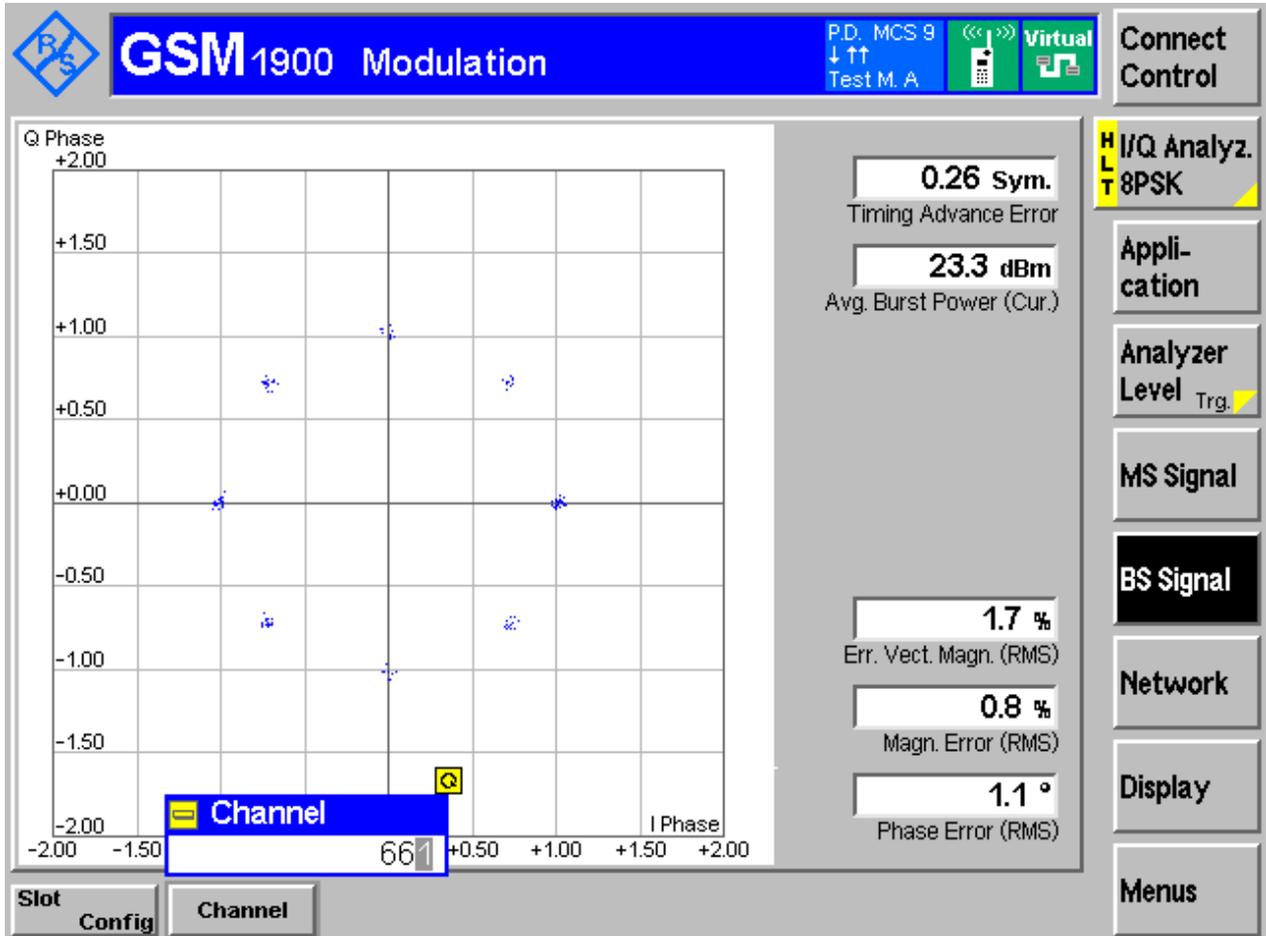
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



### 3.1.2.2 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	248.31	318.53	Pass
		MCH	244.66	320.71	Pass
		HCH	245.46	319.23	Pass
	GSM/TM2	LCH	252.31	326.31	Pass
		MCH	250.05	314.35	Pass
		HCH	250.98	321.29	Pass
GSM1900	GSM/TM1	LCH	244.61	318.87	Pass
		MCH	244.97	316.03	Pass
		HCH	247.35	318.84	Pass
	GSM/TM2	LCH	251.73	314.62	Pass
		MCH	247.10	331.02	Pass
		HCH	253.92	321.73	Pass



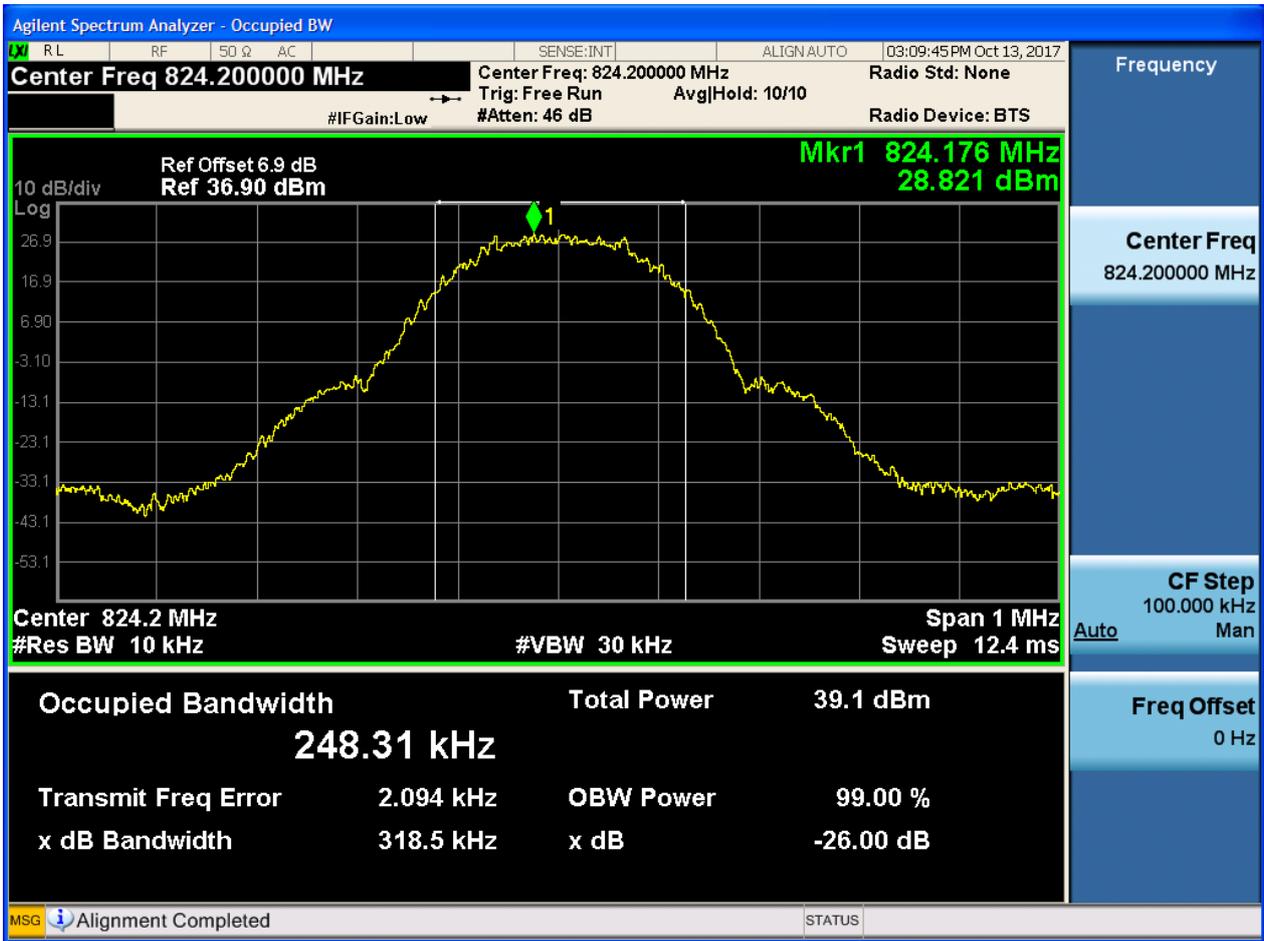
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

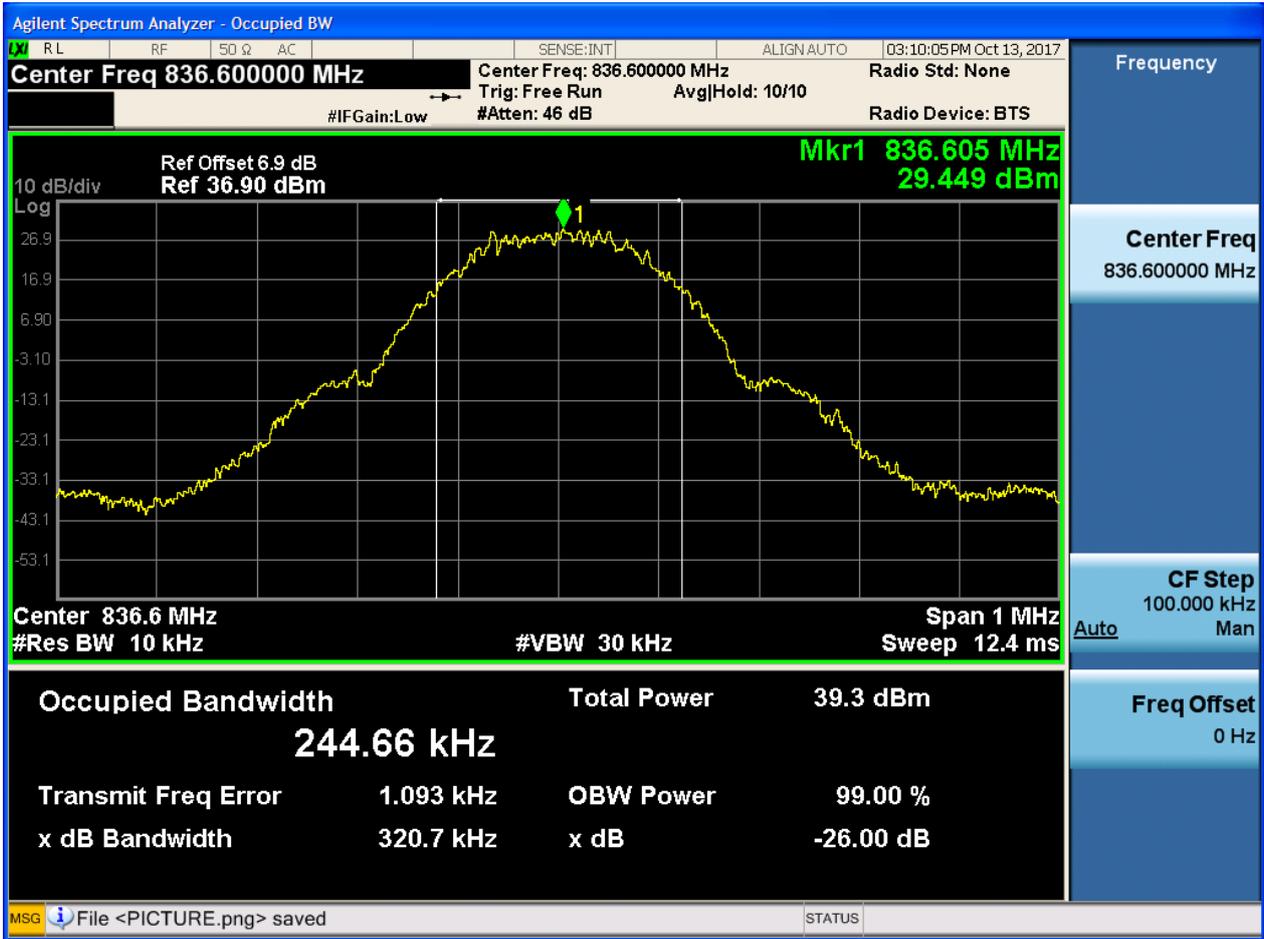
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



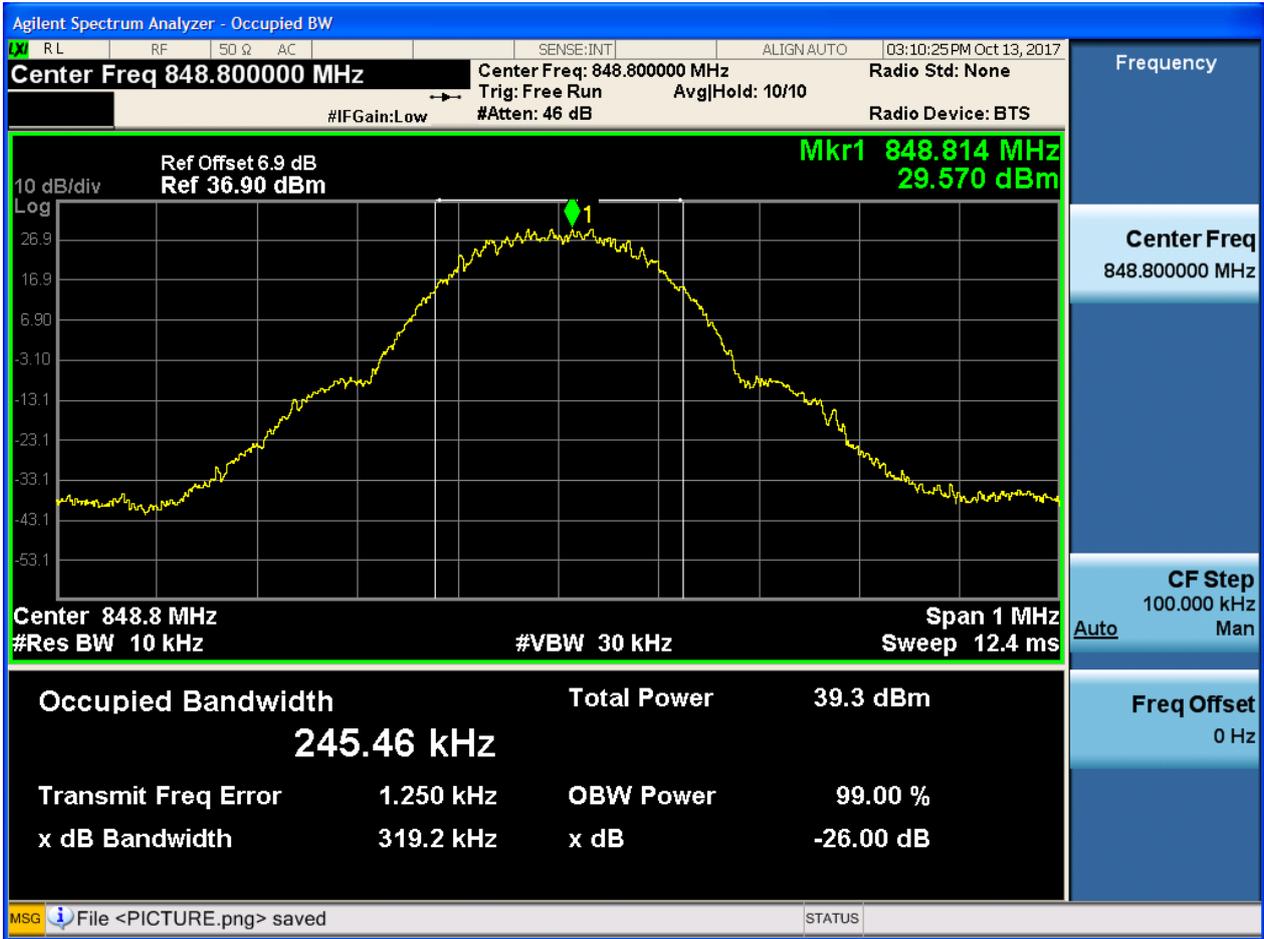


4.1.1.1.2 Test Channel = MCH





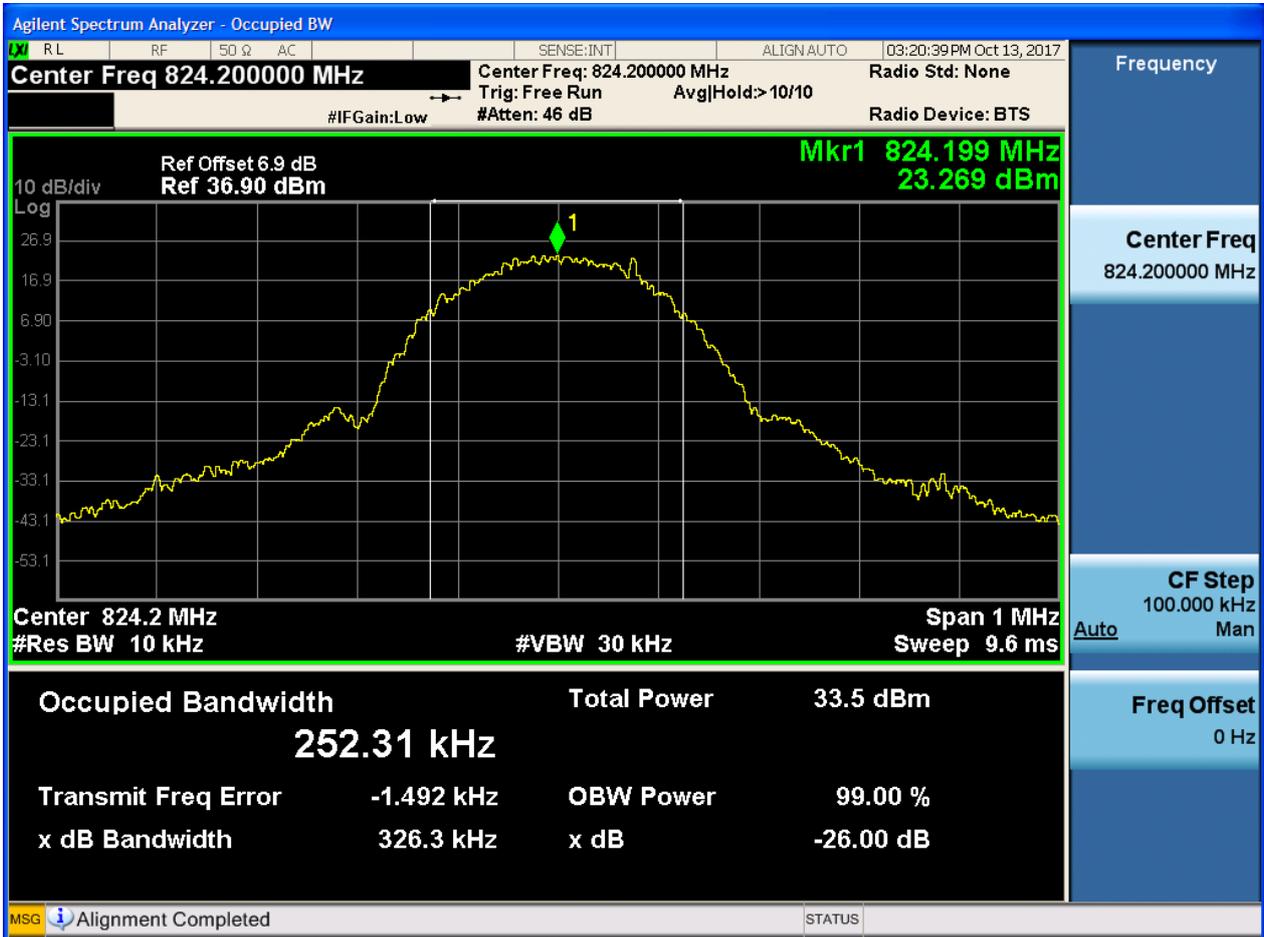
4.1.1.1.3 Test Channel = HCH





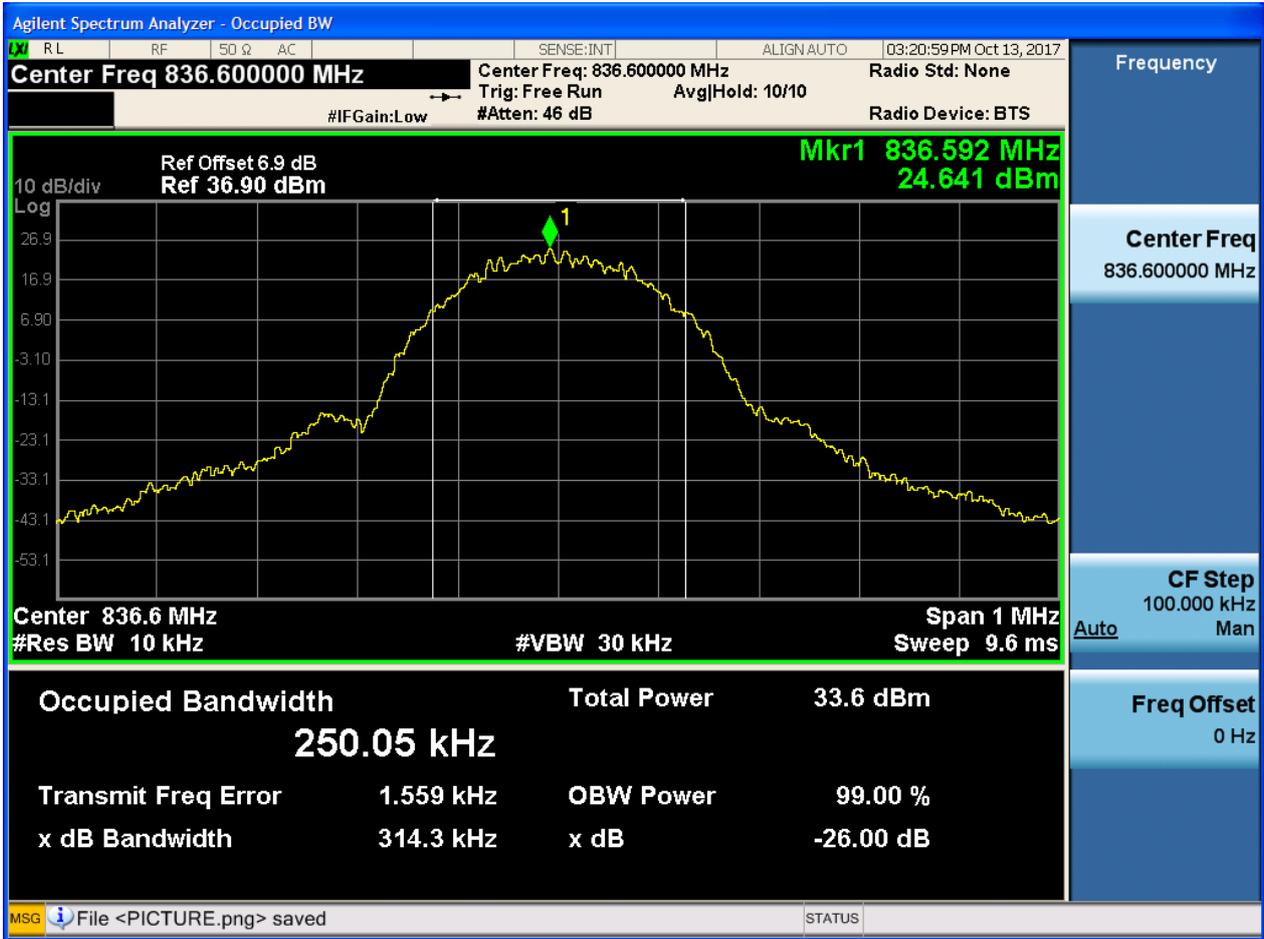
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4.1.1.2.1 Test Channel = LCH



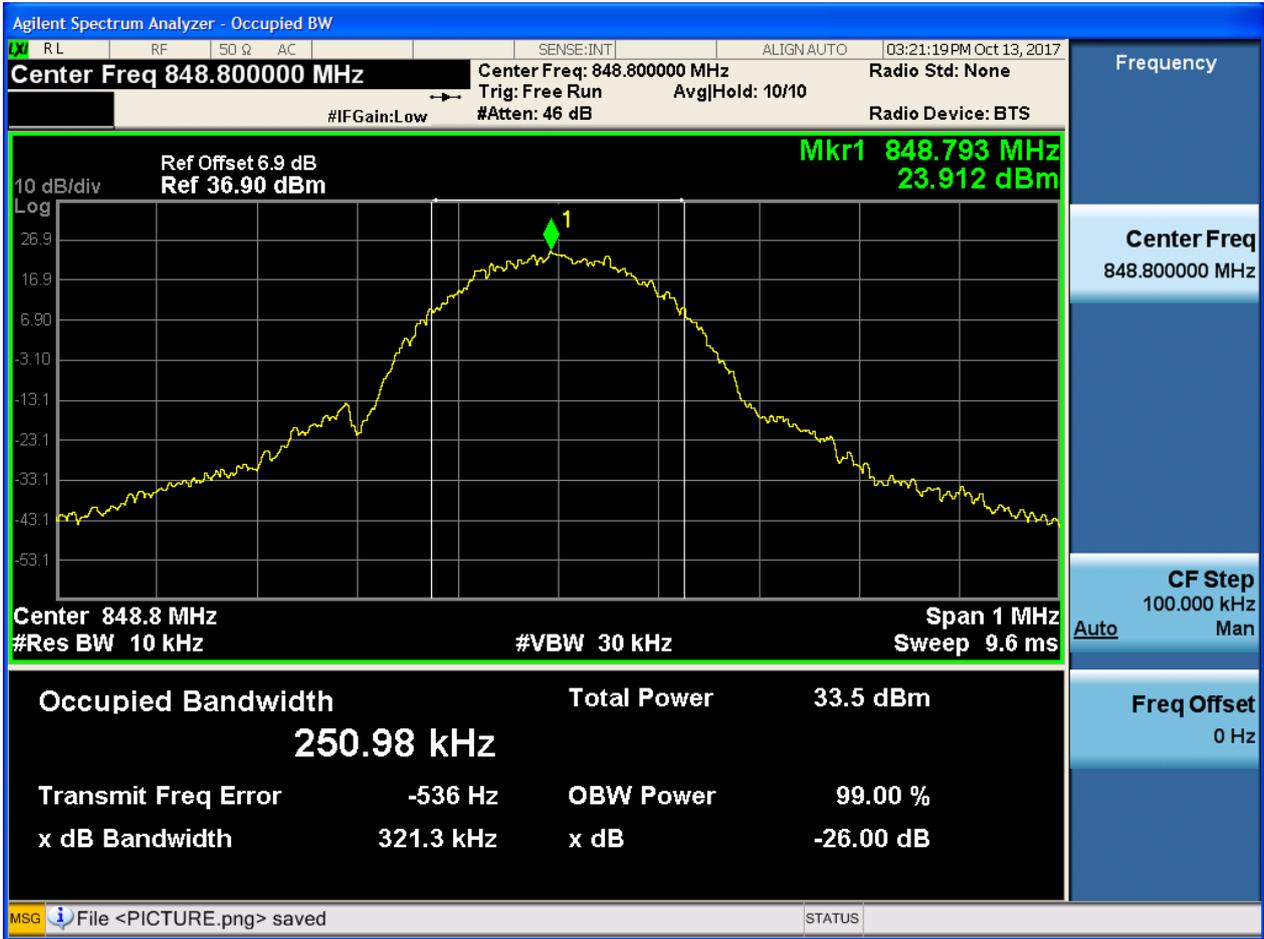


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

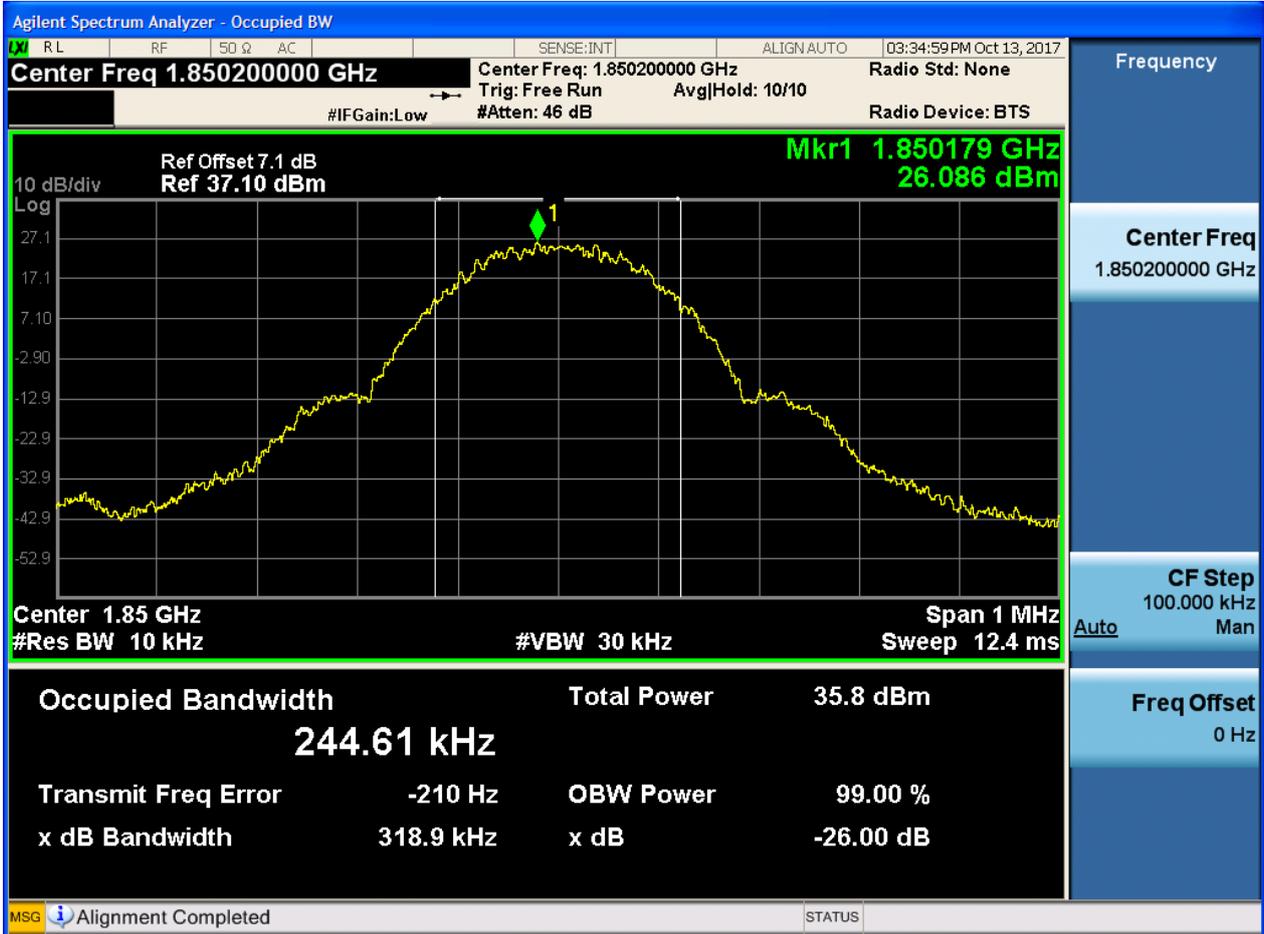




4.1.2 Test Band = GSM1900

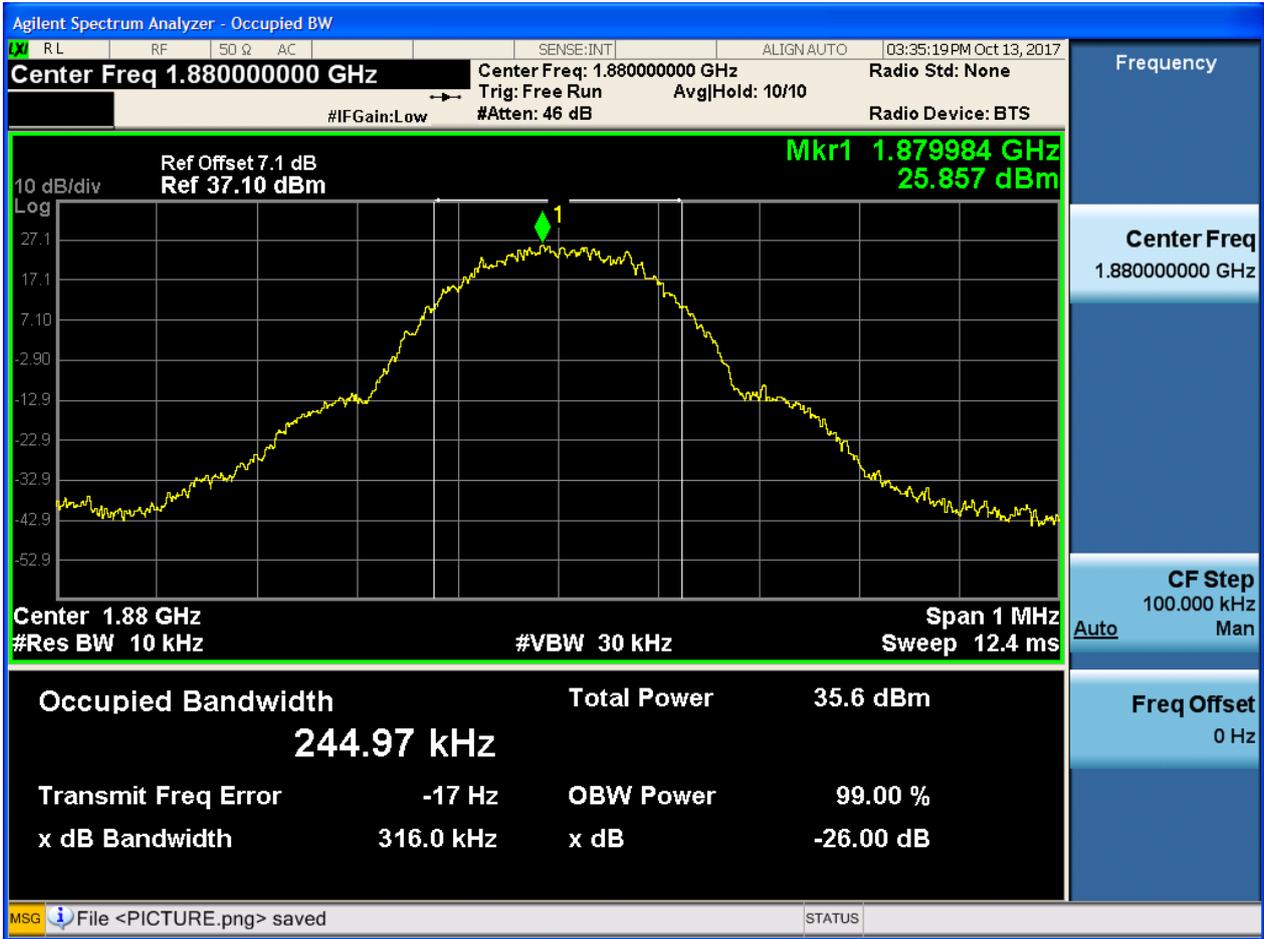
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



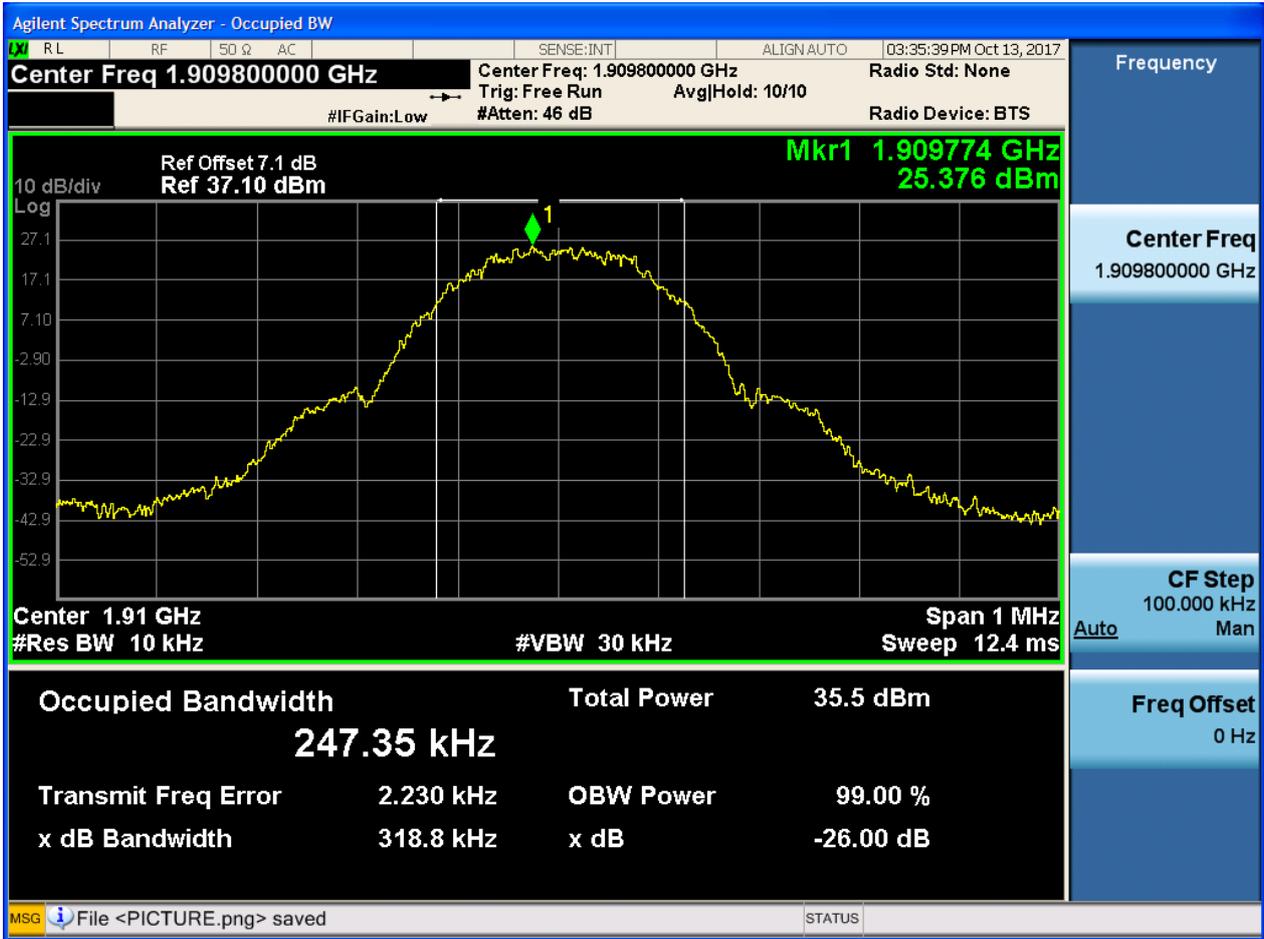


4.1.2.1.2 Test Channel = MCH





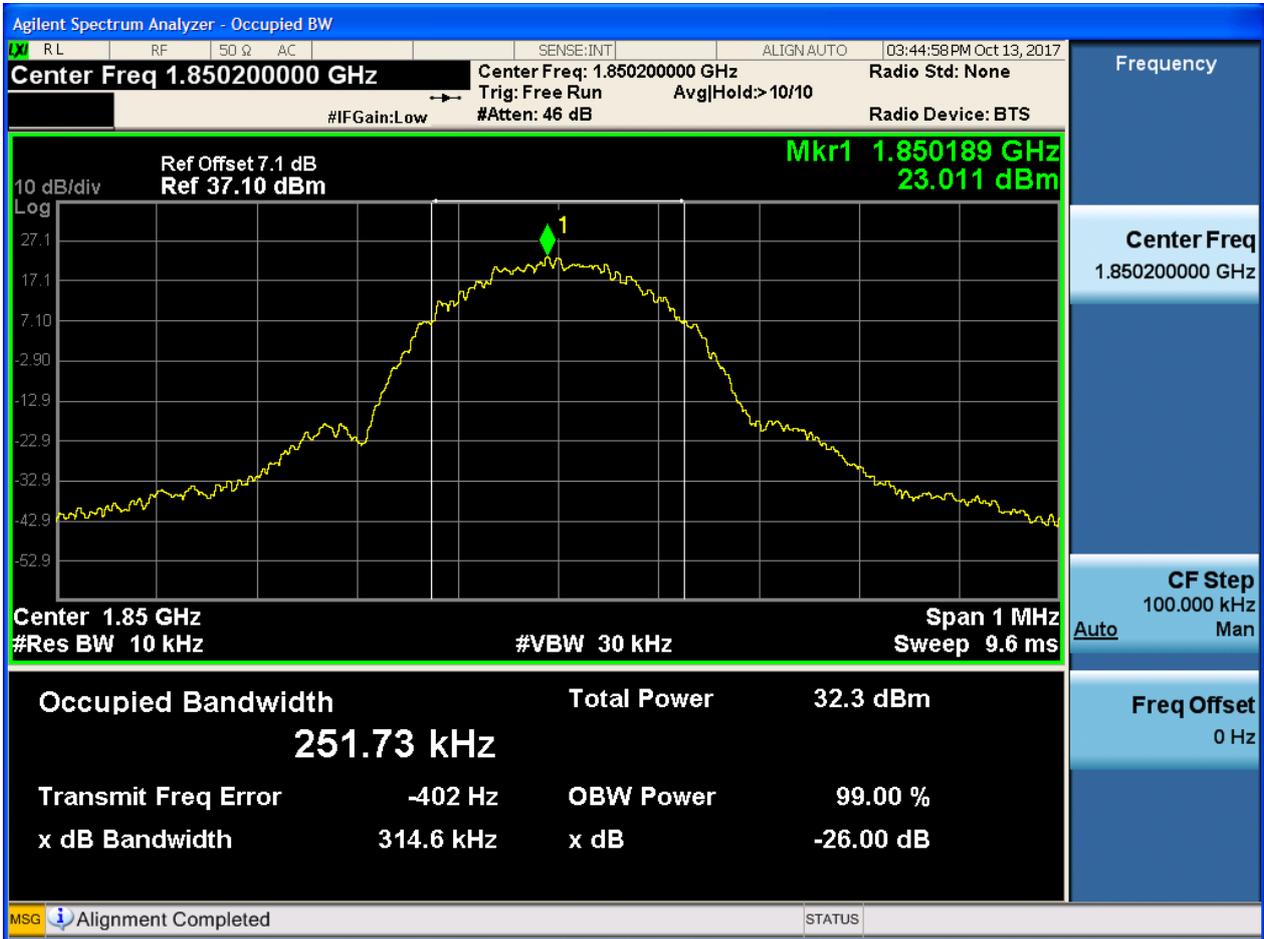
4.1.2.1.3 Test Channel = HCH





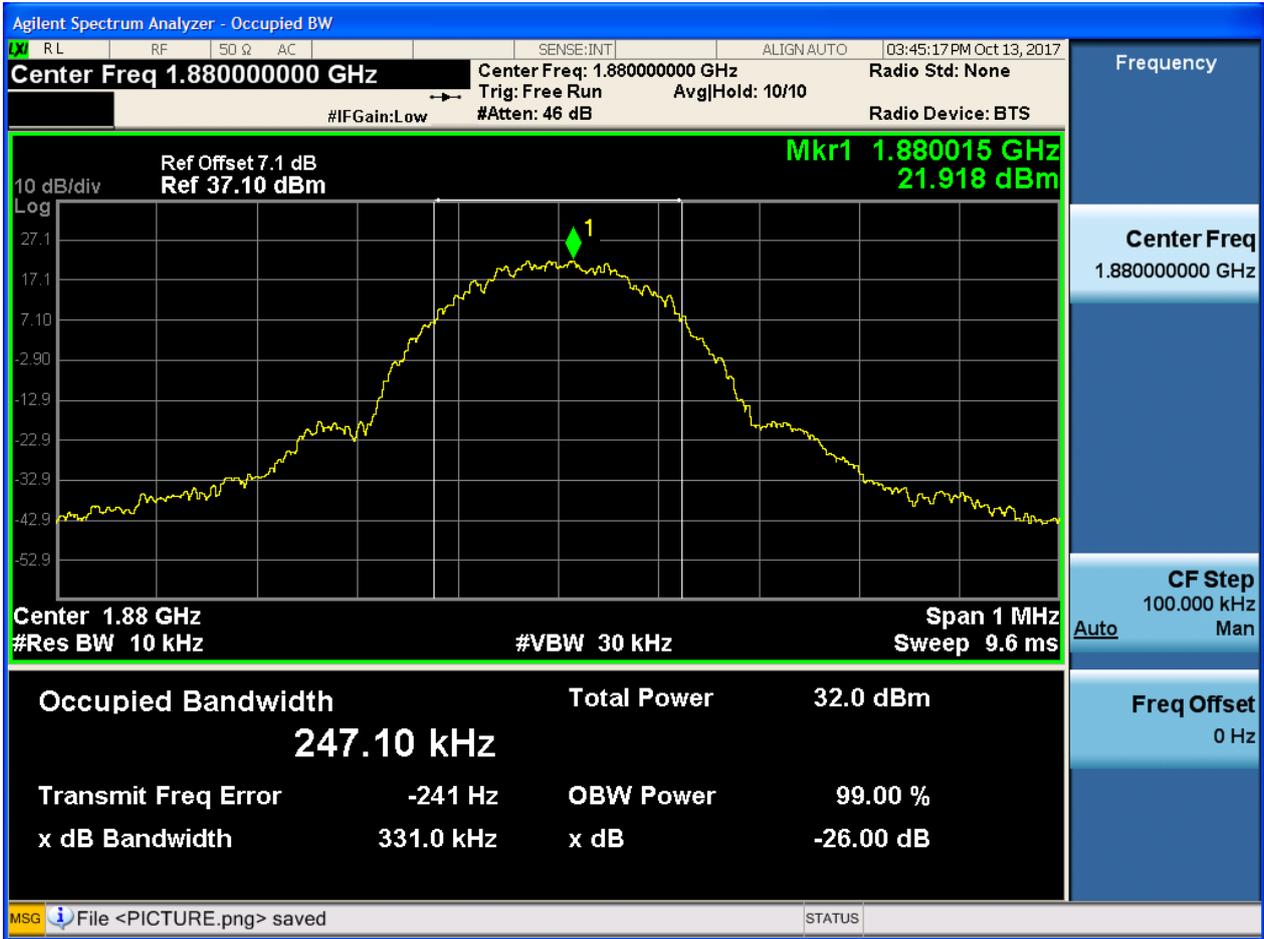
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



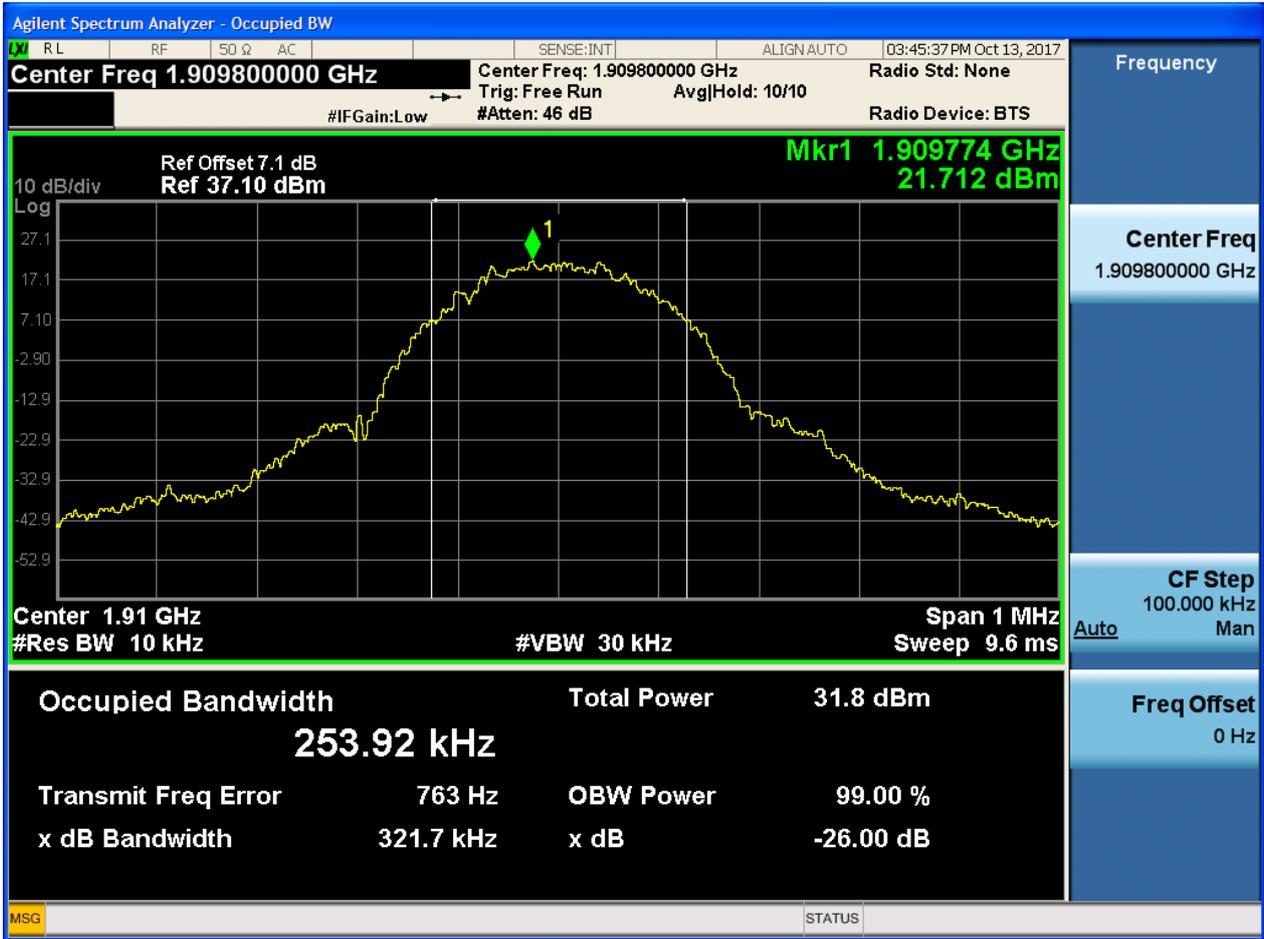


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





# 5Appendix\_E: Band Edges Compliance

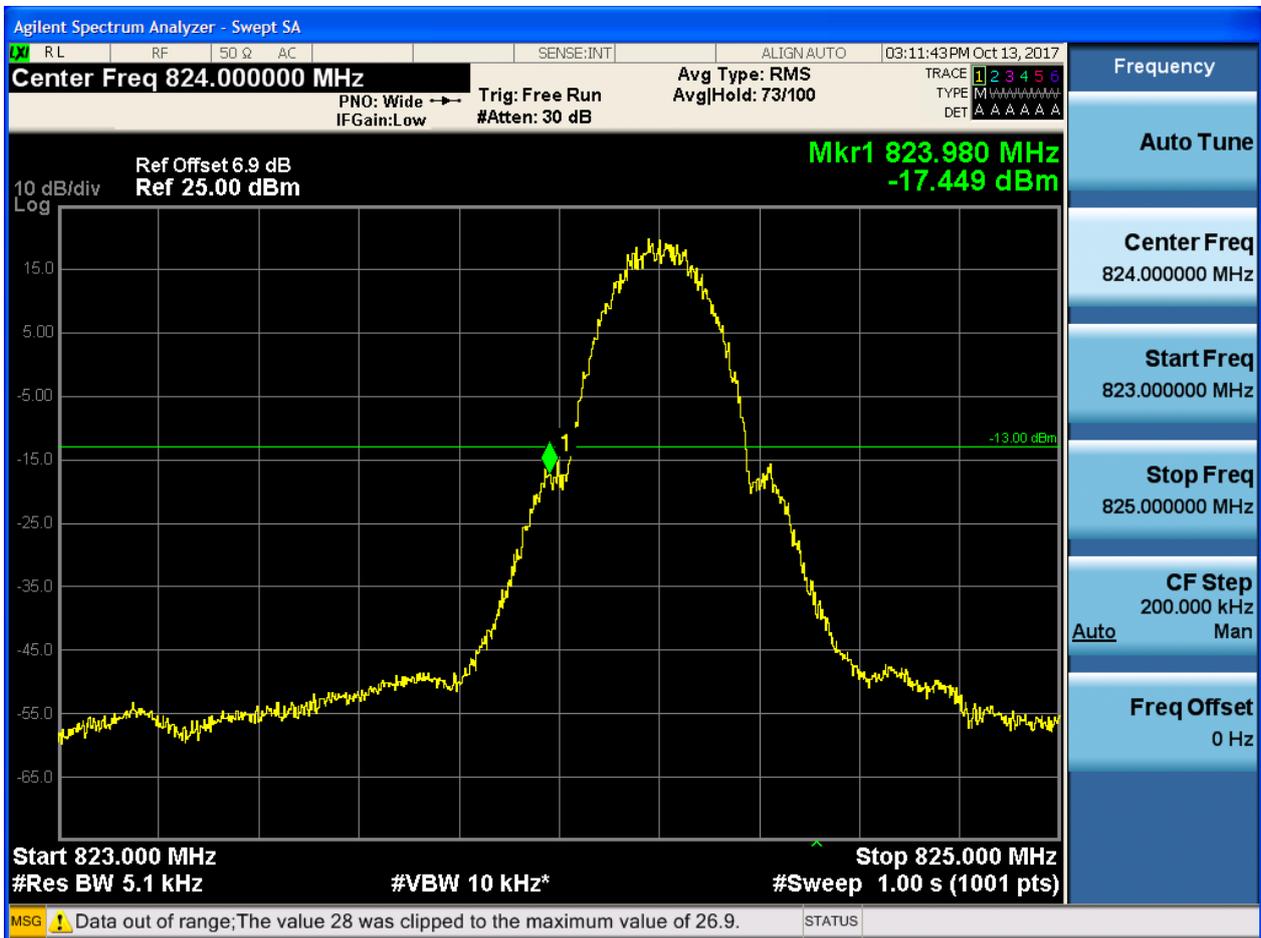
## Part I - Test Plots

### 5.1 For GSM

#### 5.1.1 Test Band = GSM850

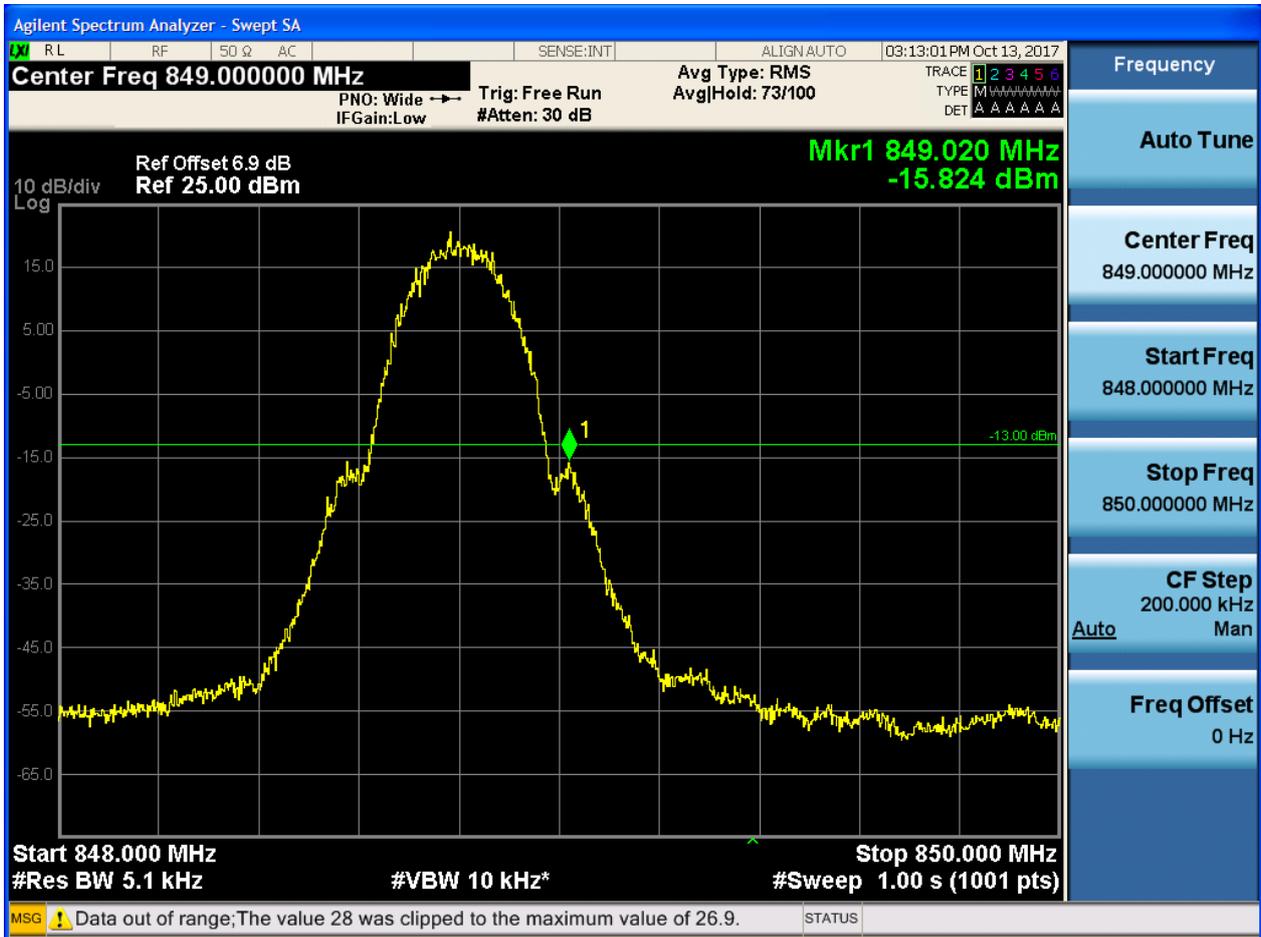
##### 5.1.1.1 Test Mode = GSM/TM1

##### 5.1.1.1.1 Test Channel = LCH



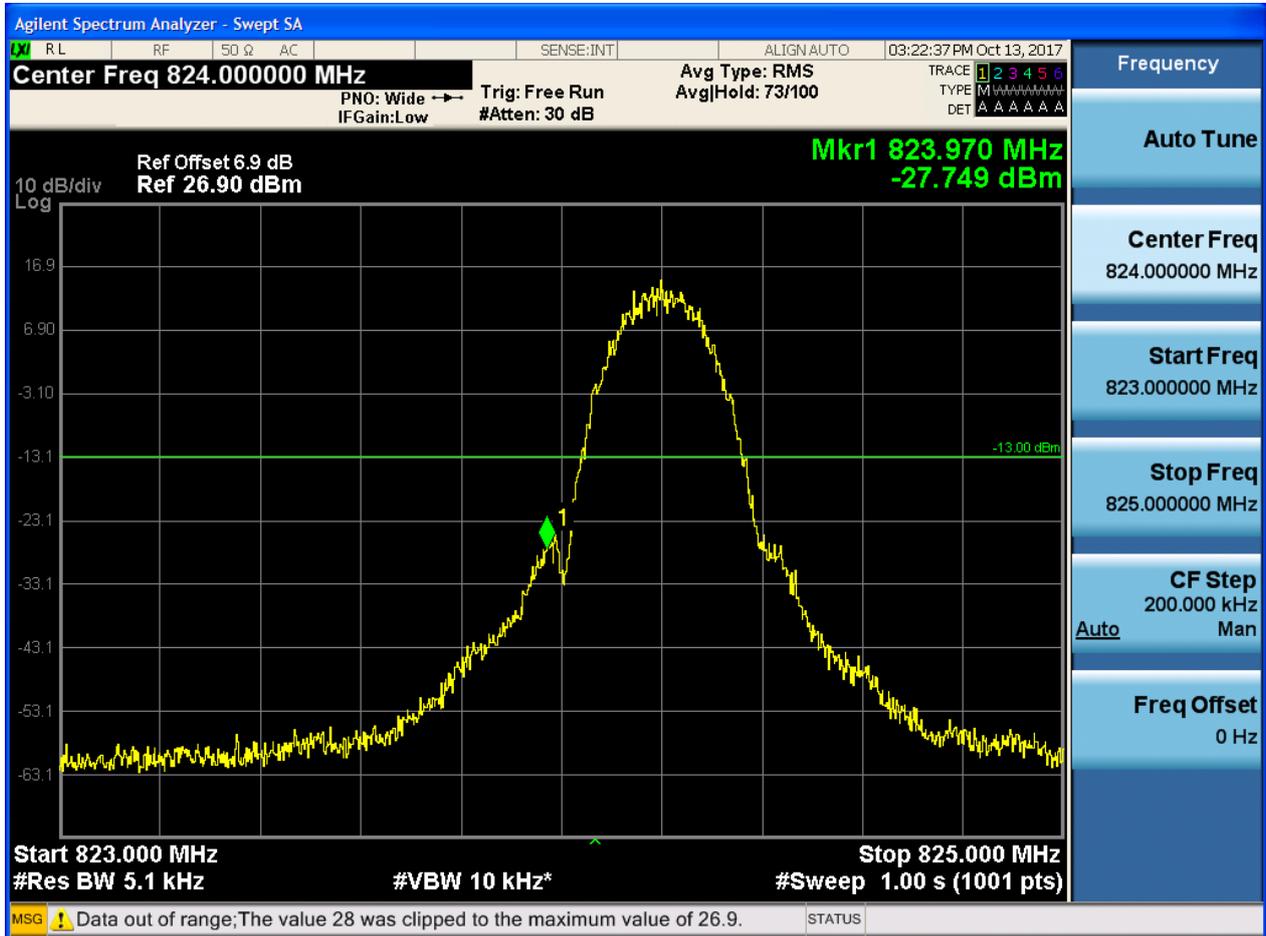


5.1.1.1.2 Test Channel = HCH

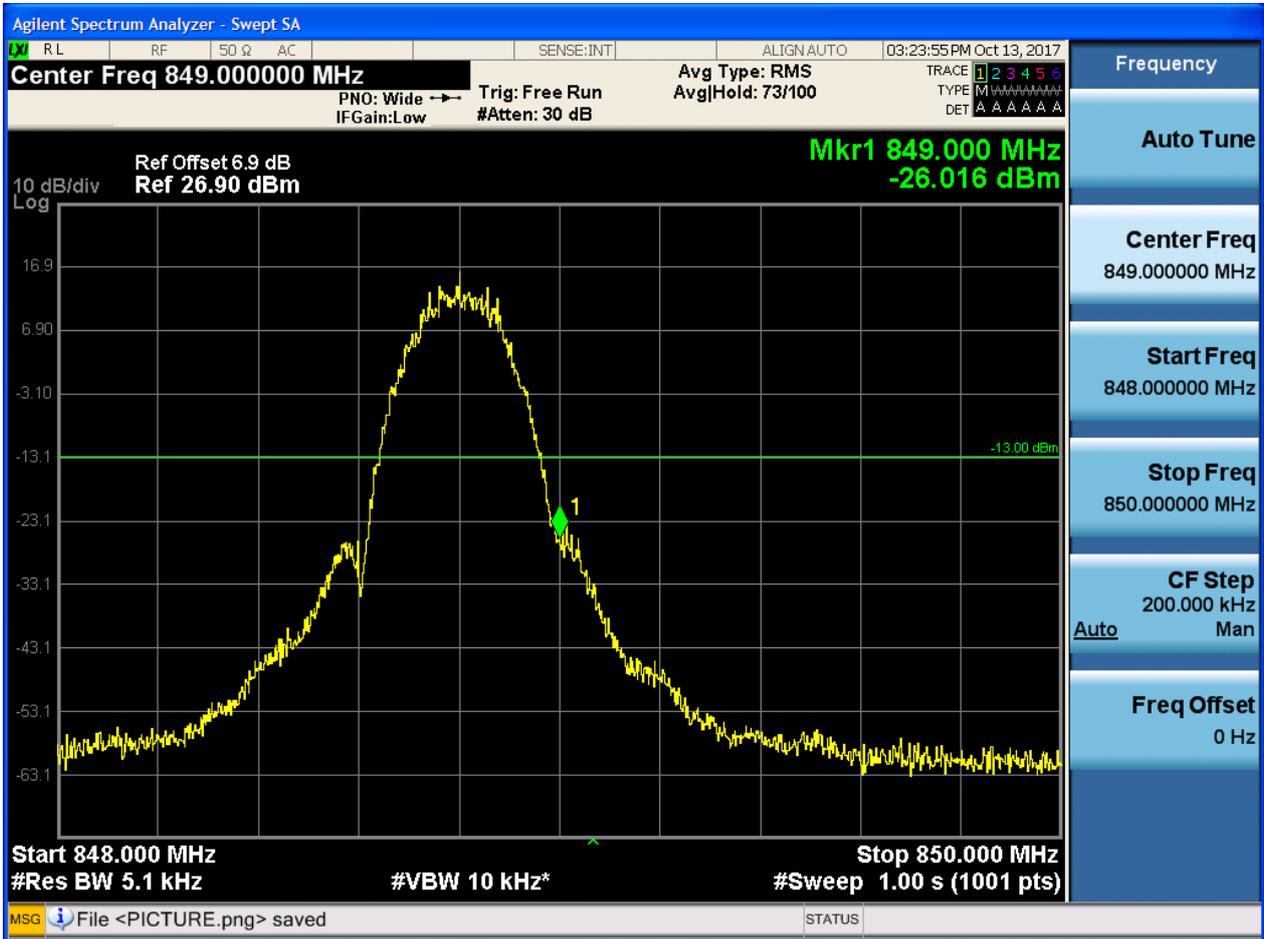


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

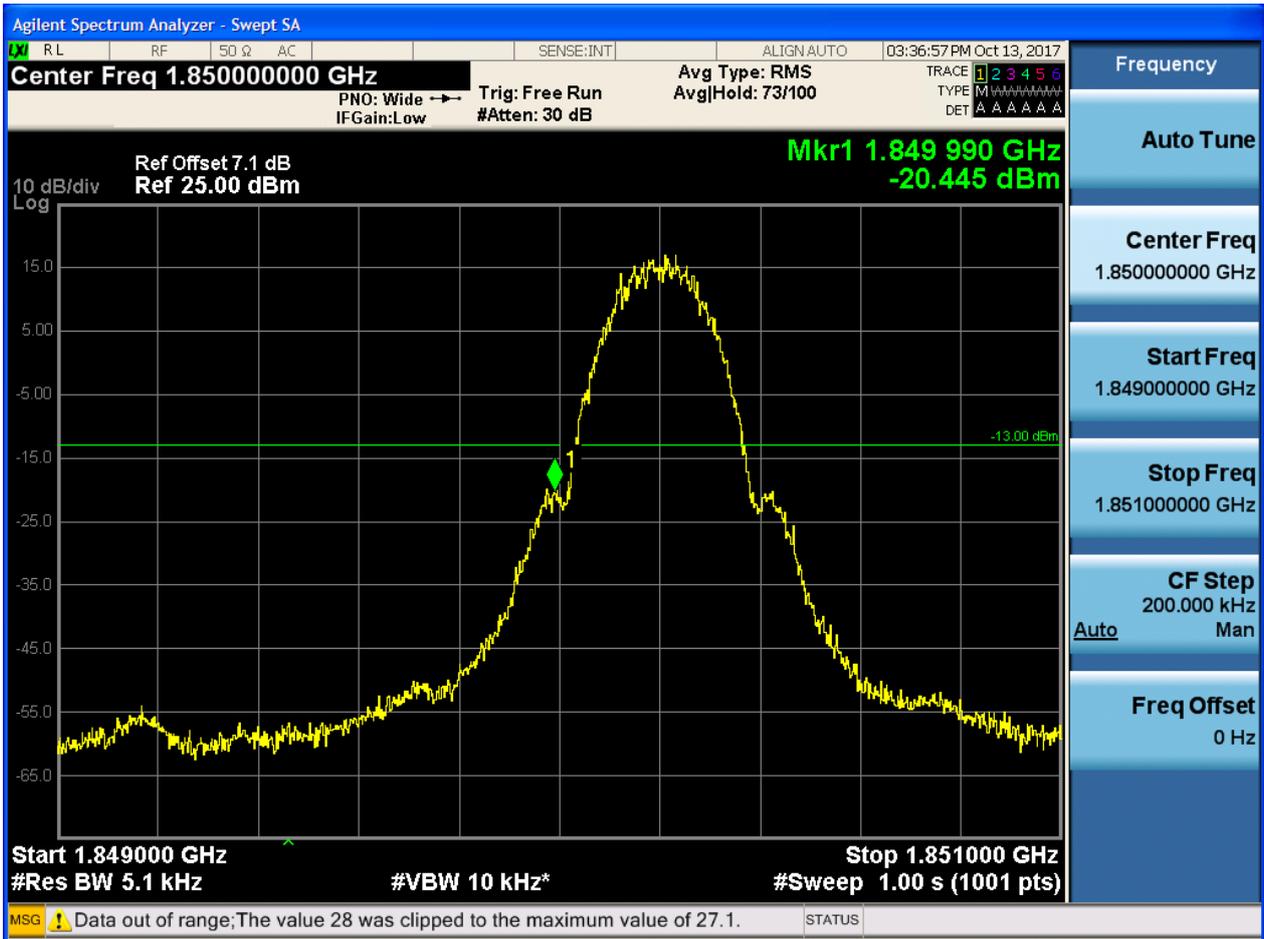




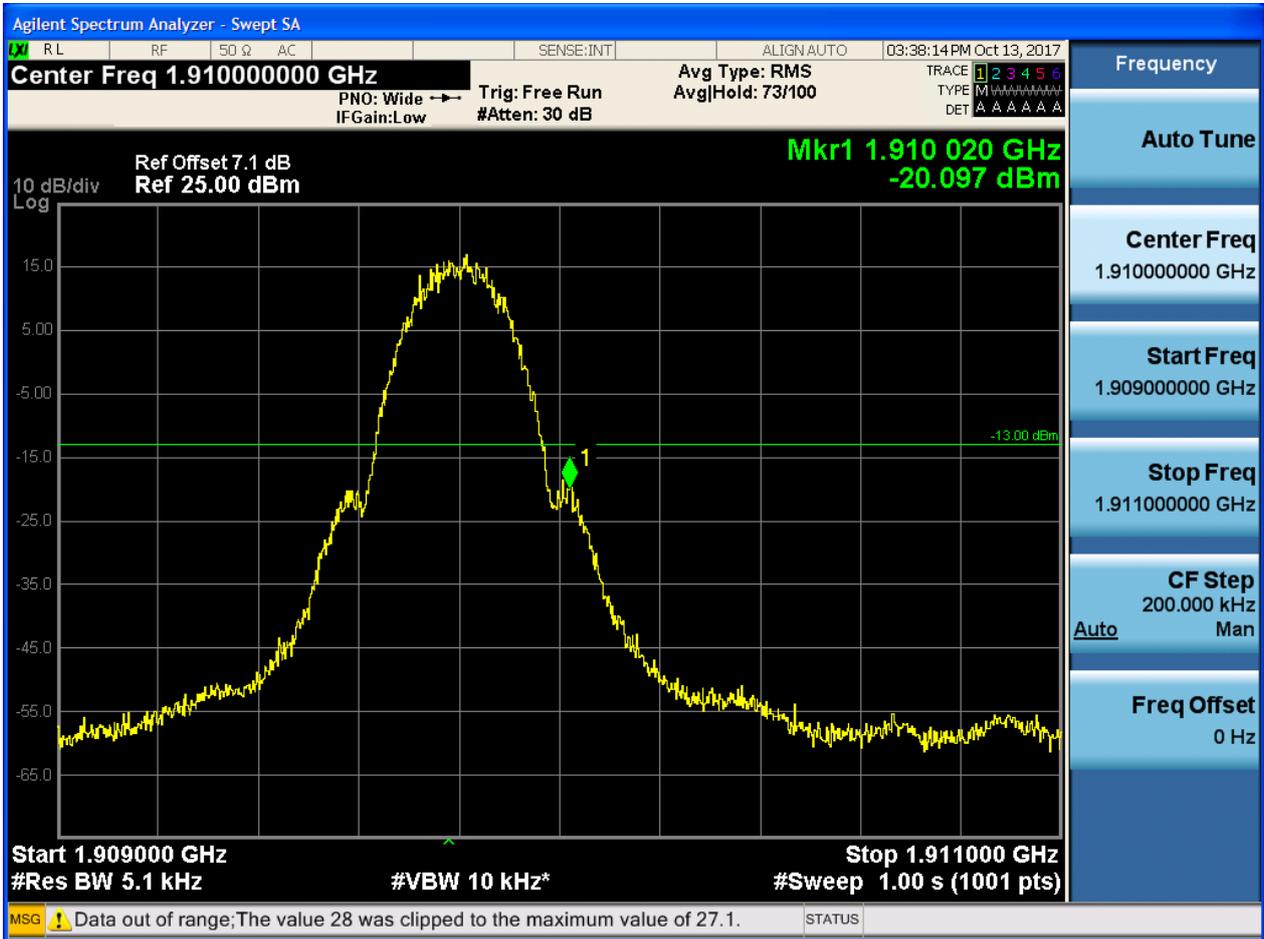
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

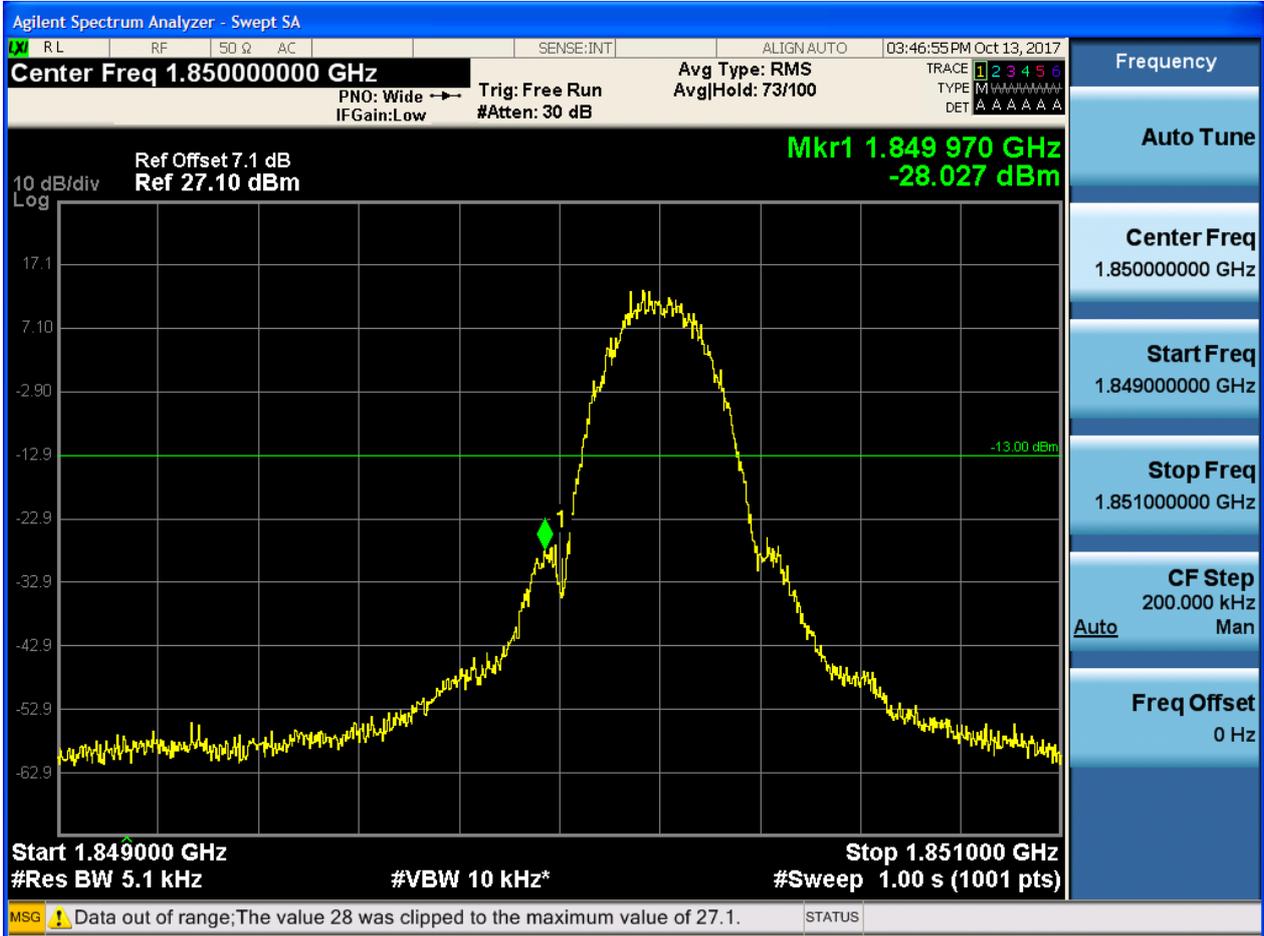


5.1.2.1.2 Test Channel = HCH

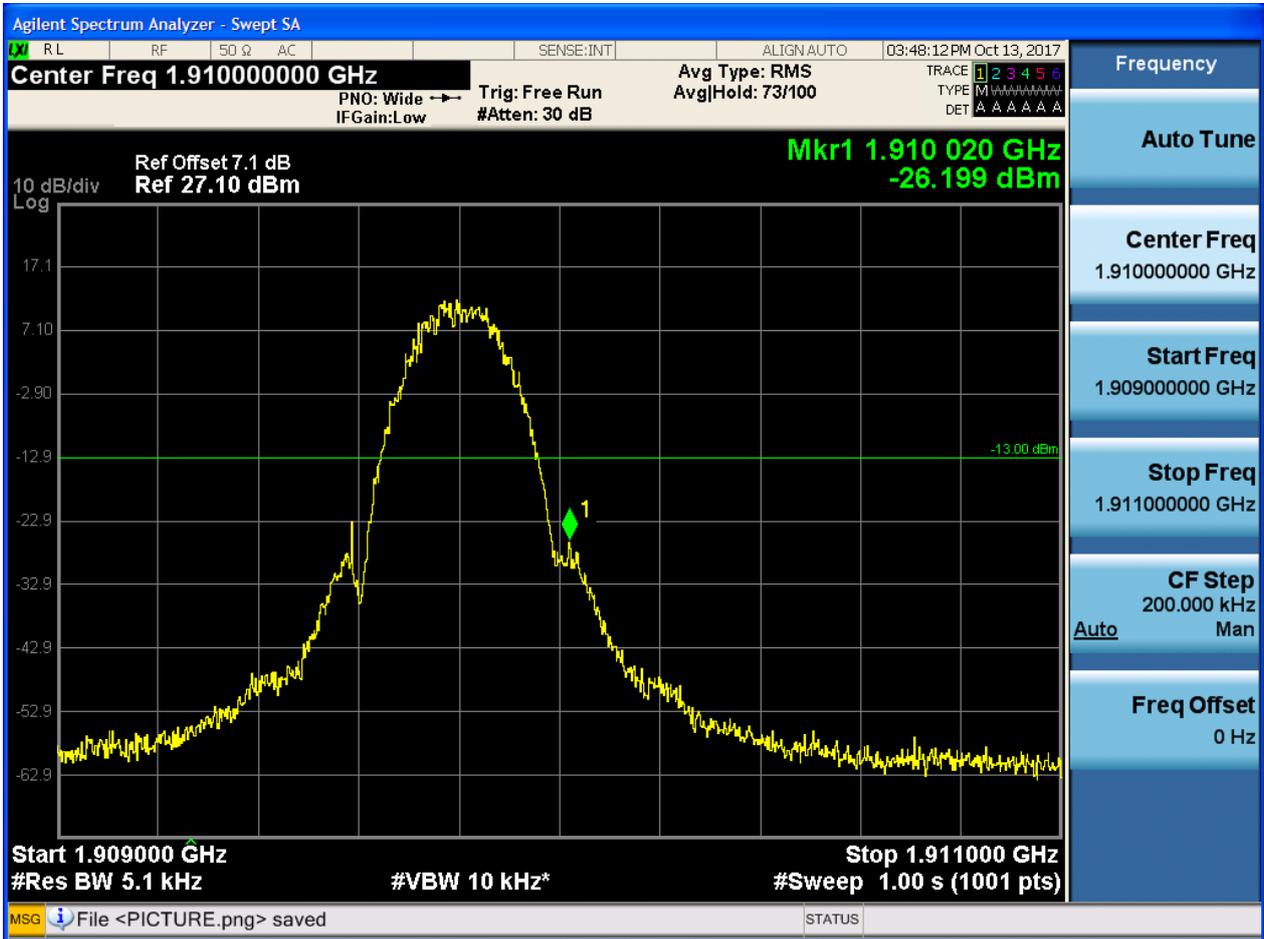


5.1.2.2 Test Mode = GSM/TM2

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.

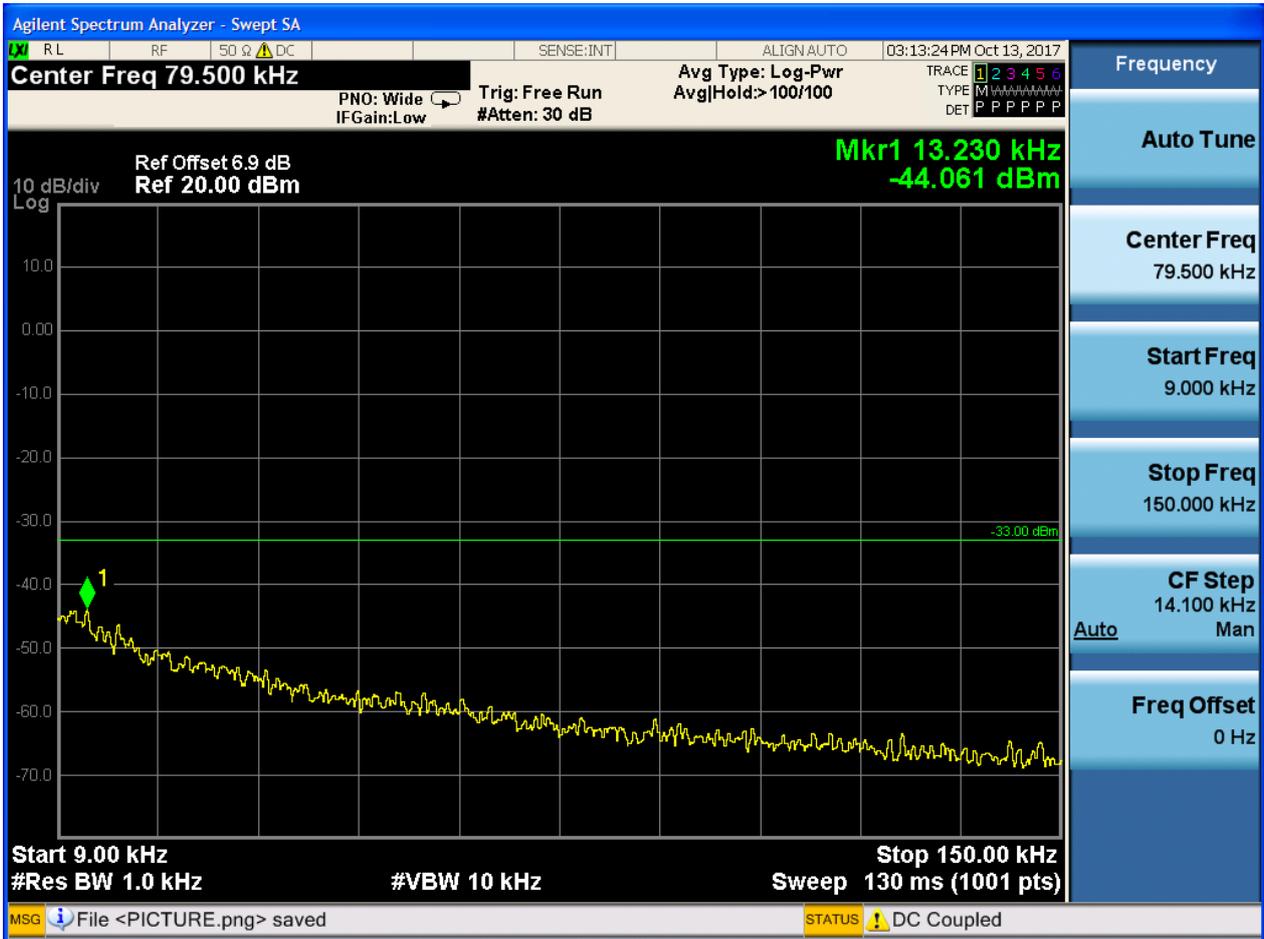
### Part I - Test Plots

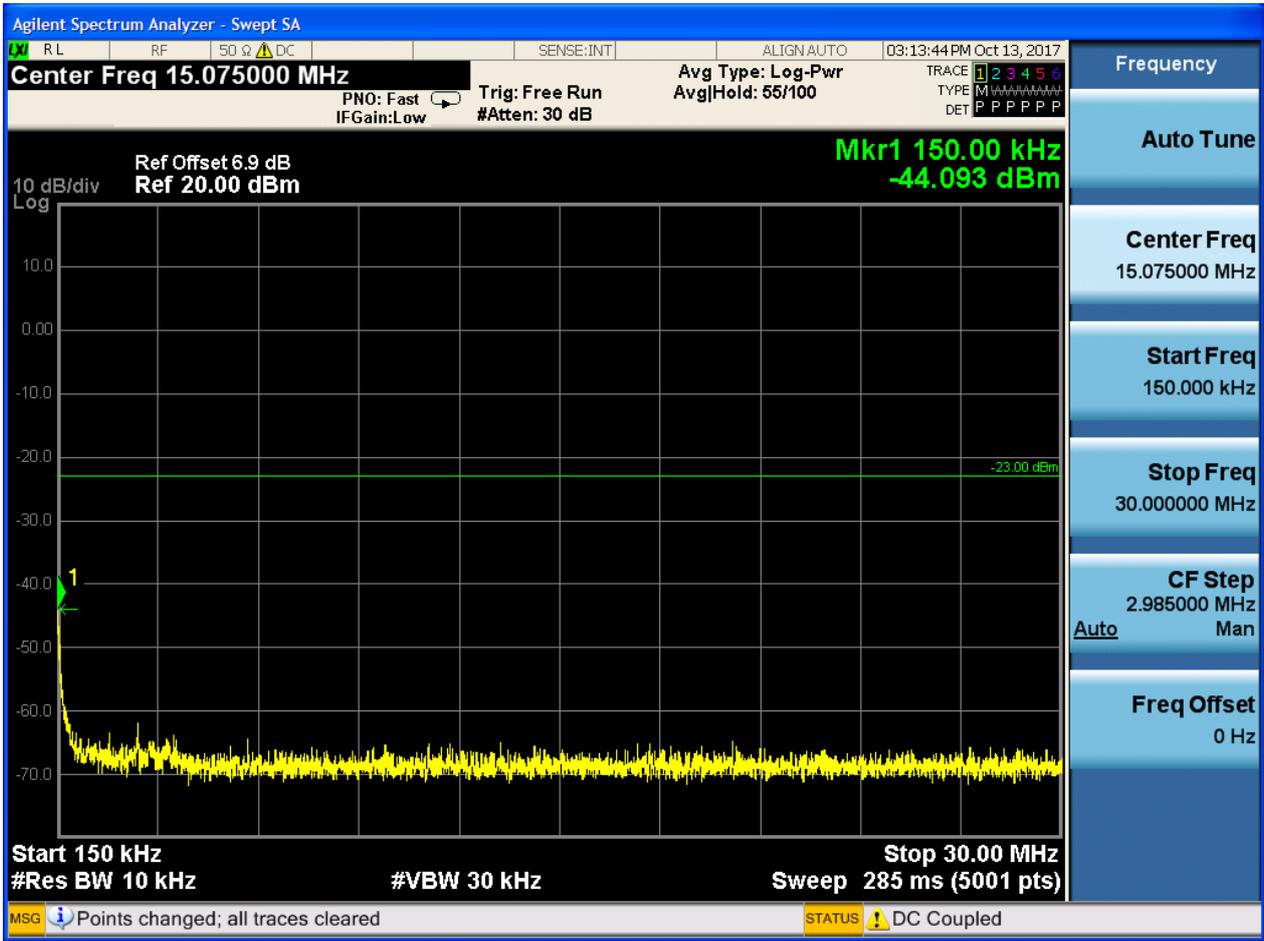
#### 6.1 For GSM

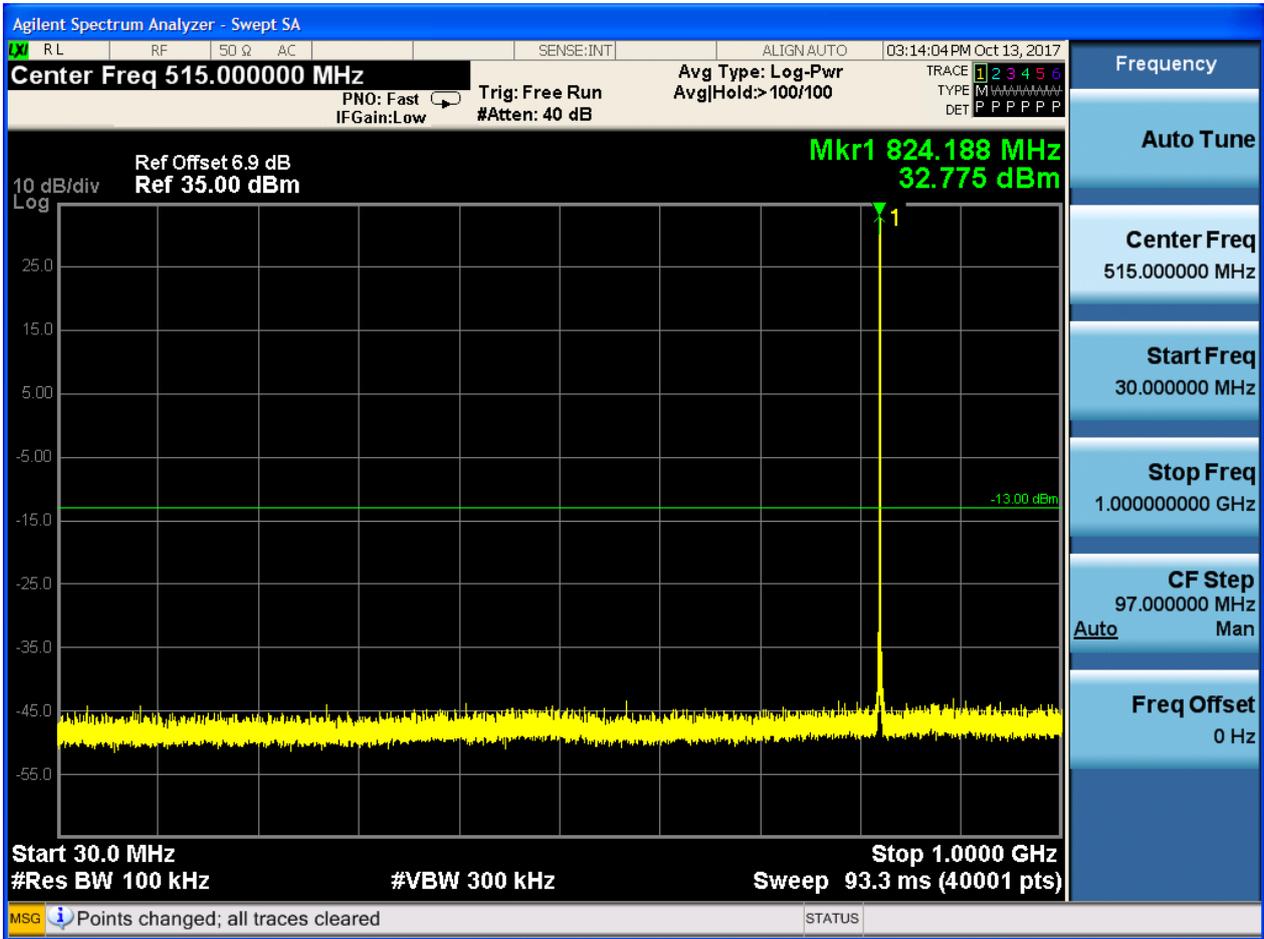
##### 6.1.1 Test Band = GSM850

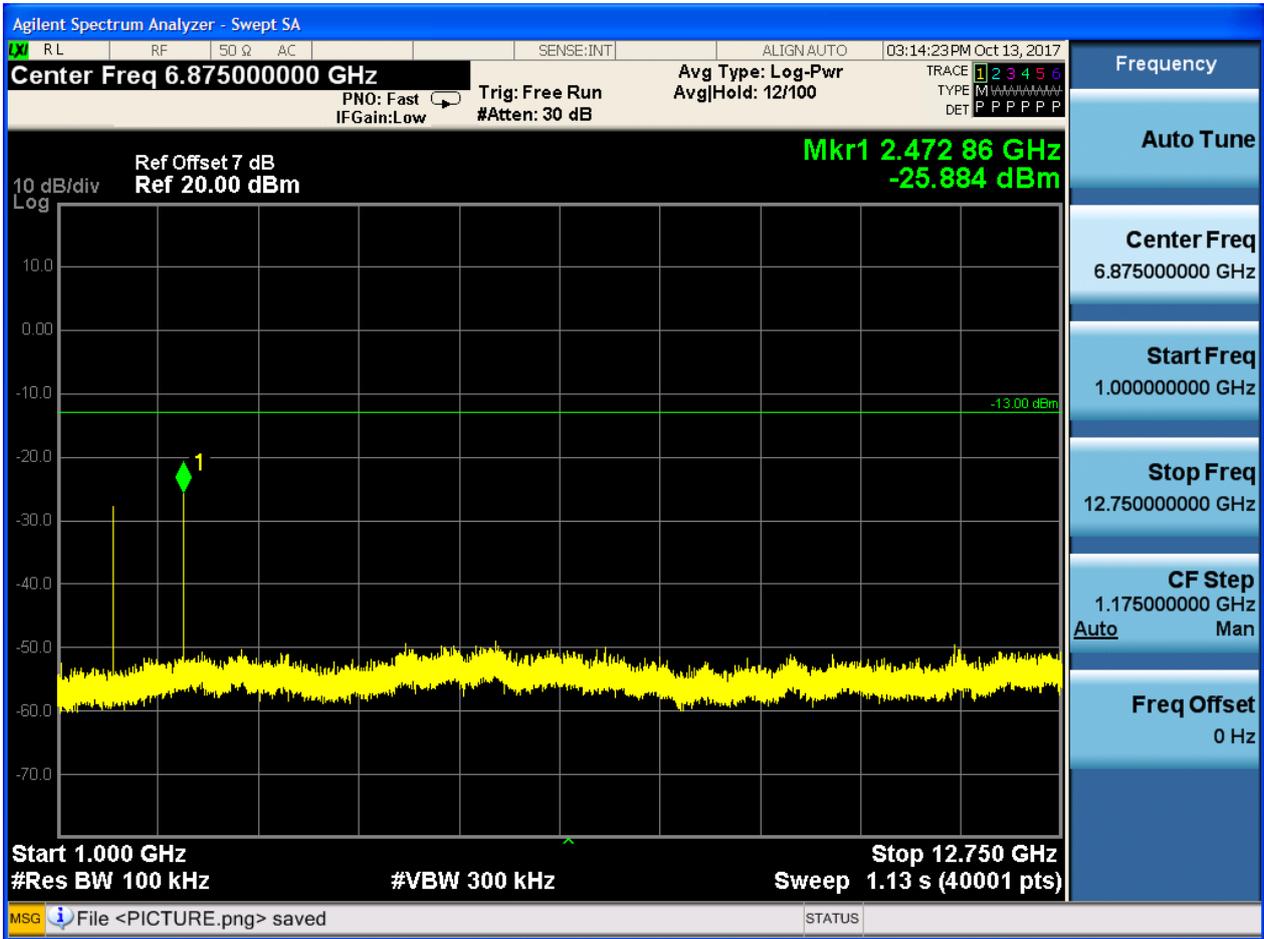
##### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH



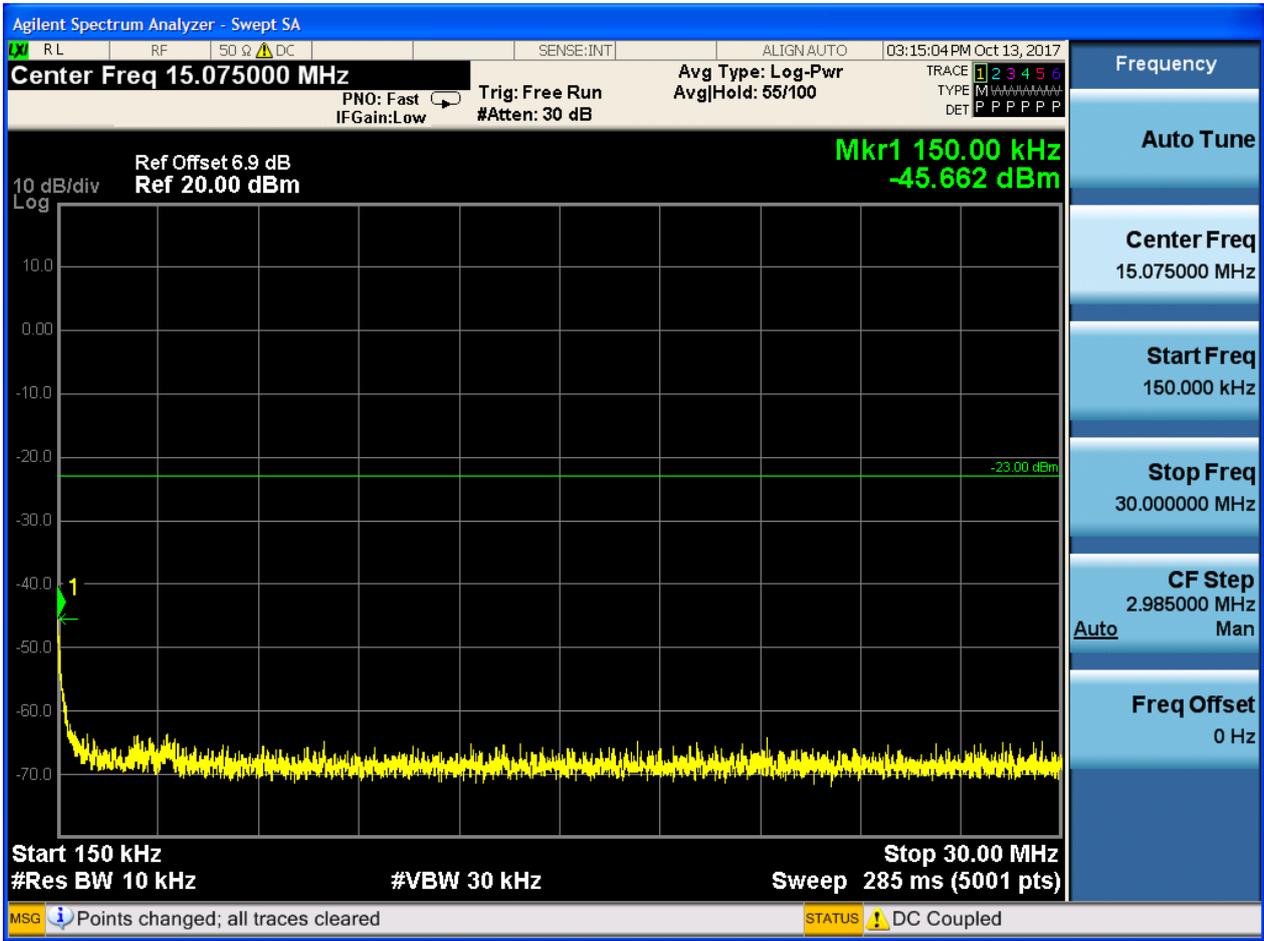


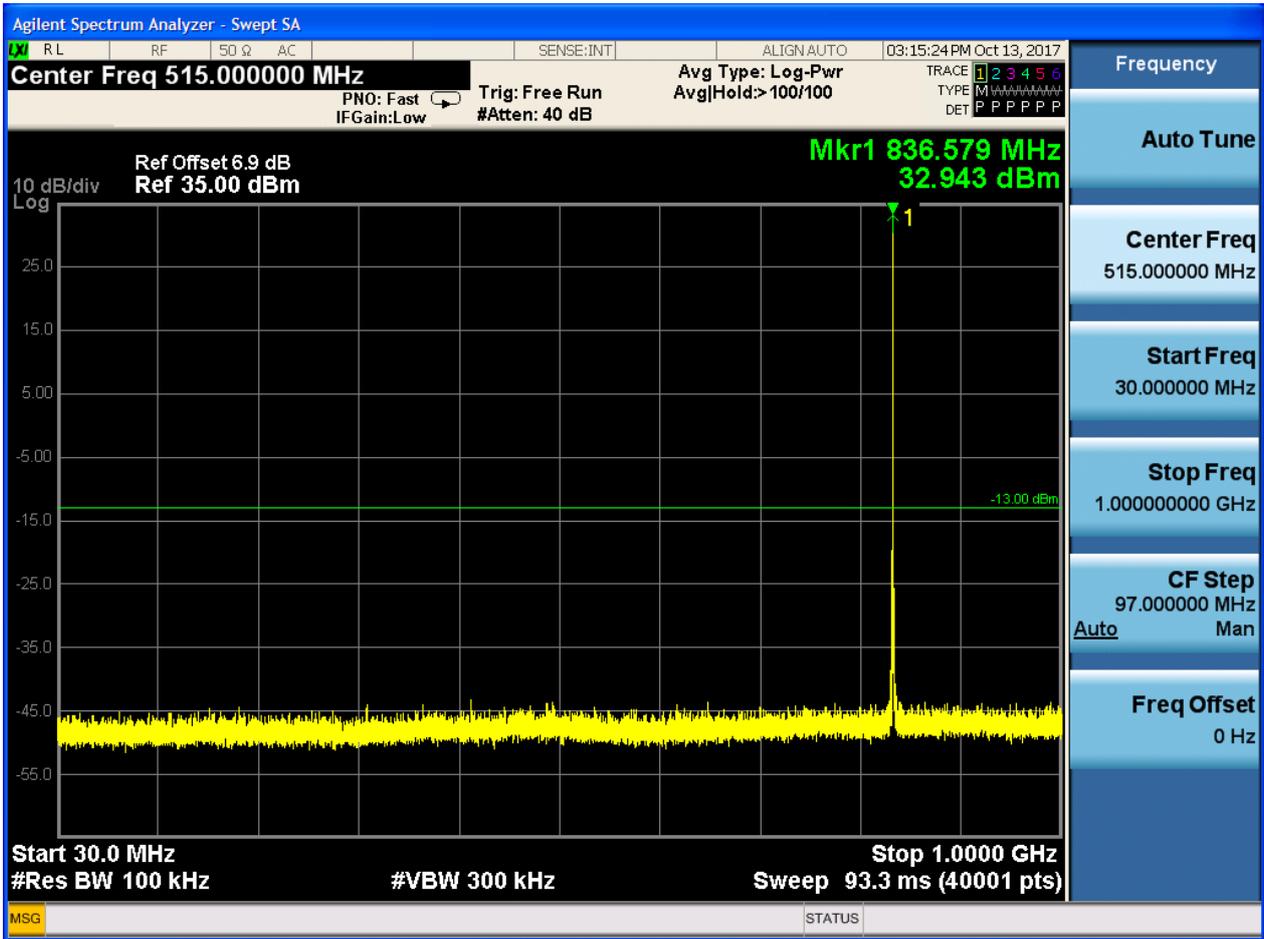


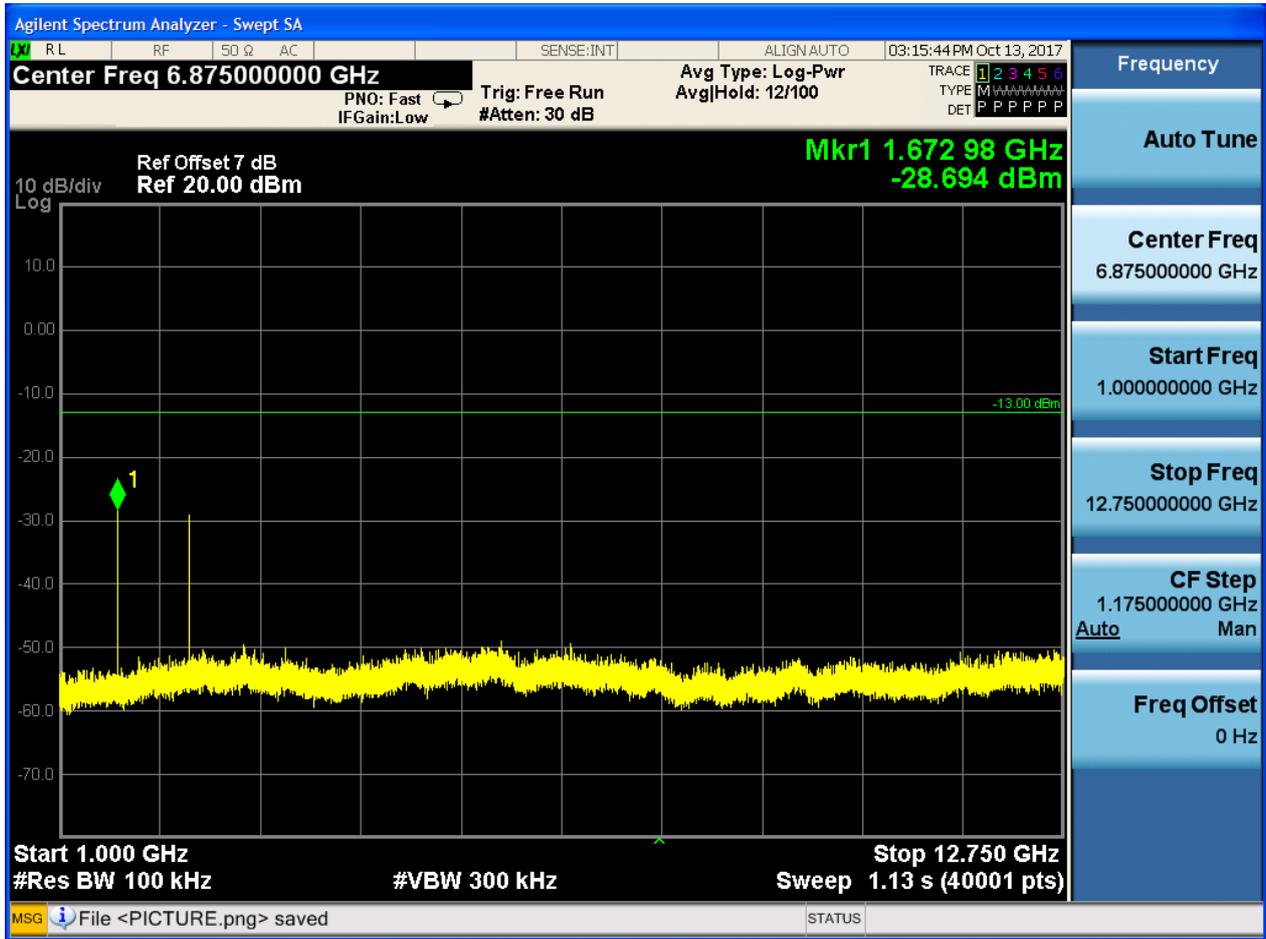


6.1.1.1.2 Test Channel = MCH



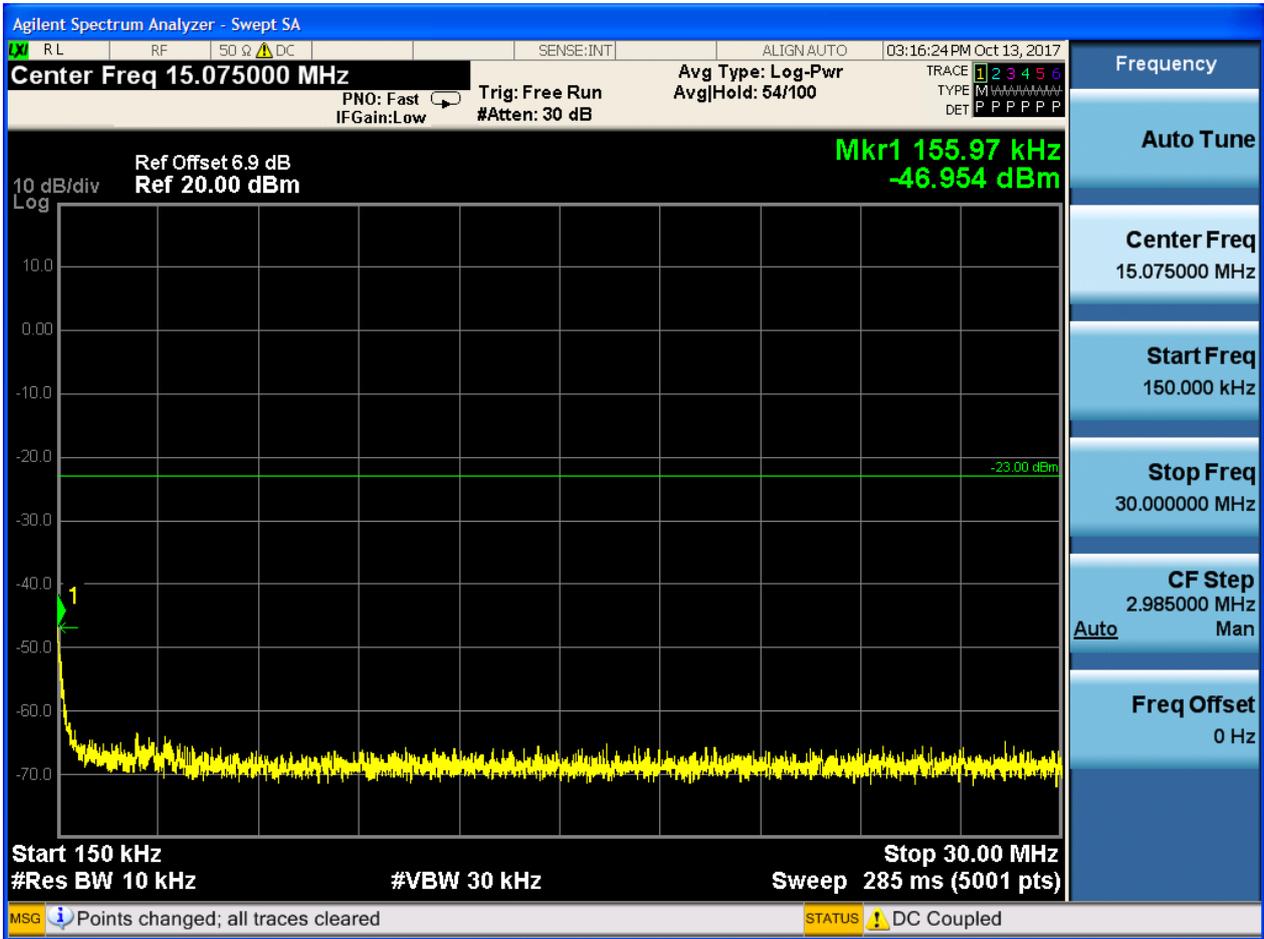


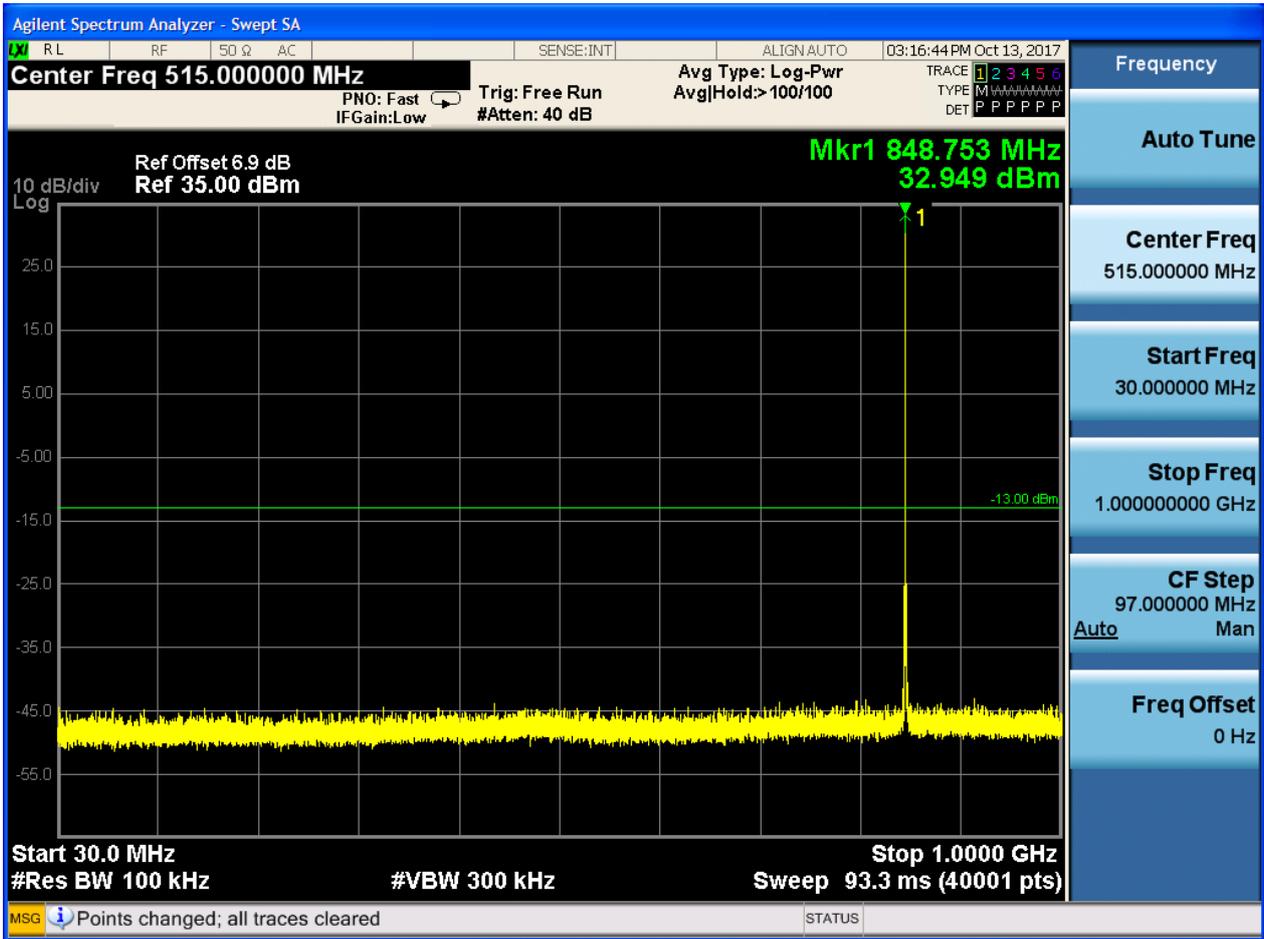


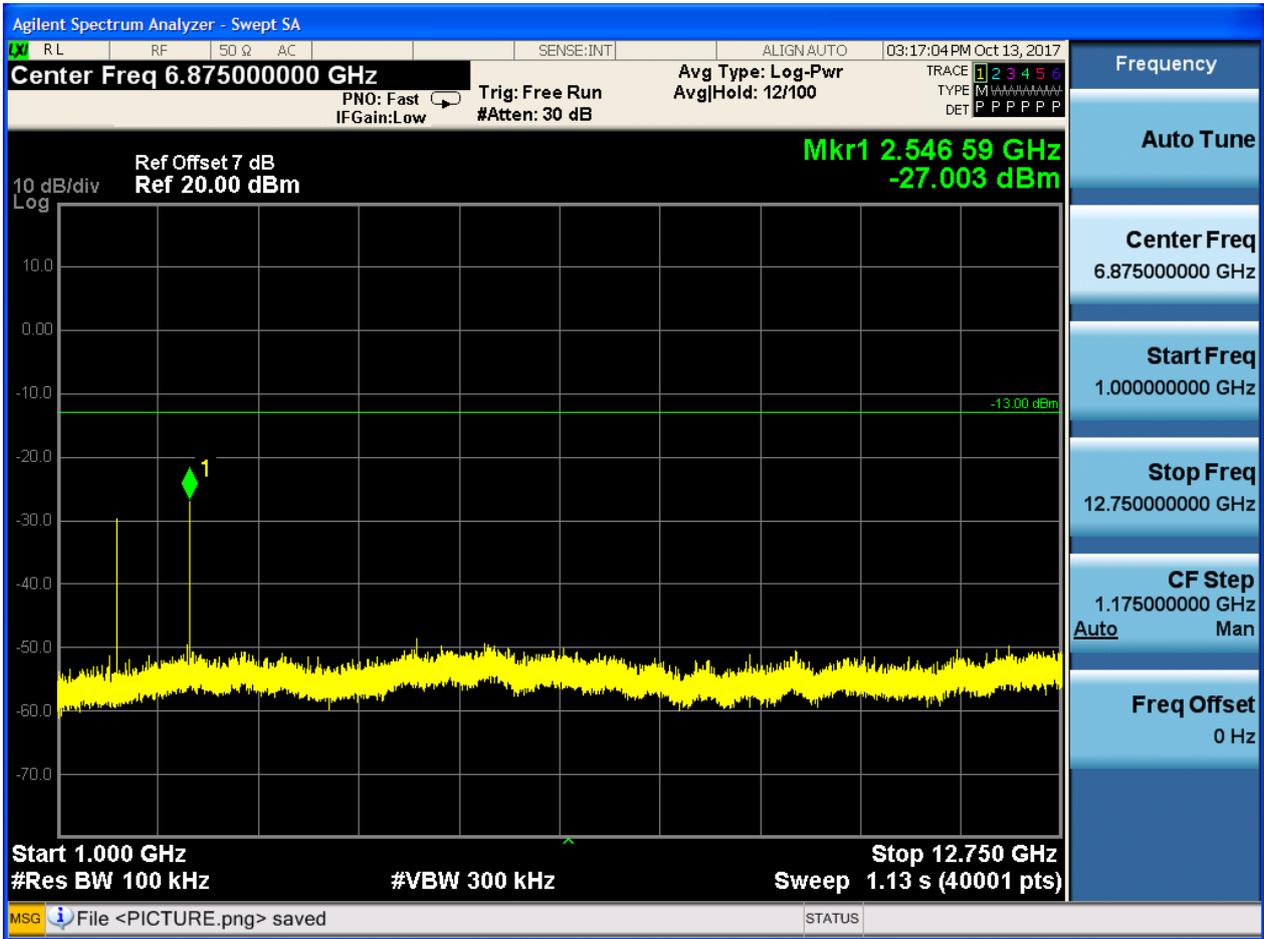


## 6.1.1.1.3 Test Channel = HCH





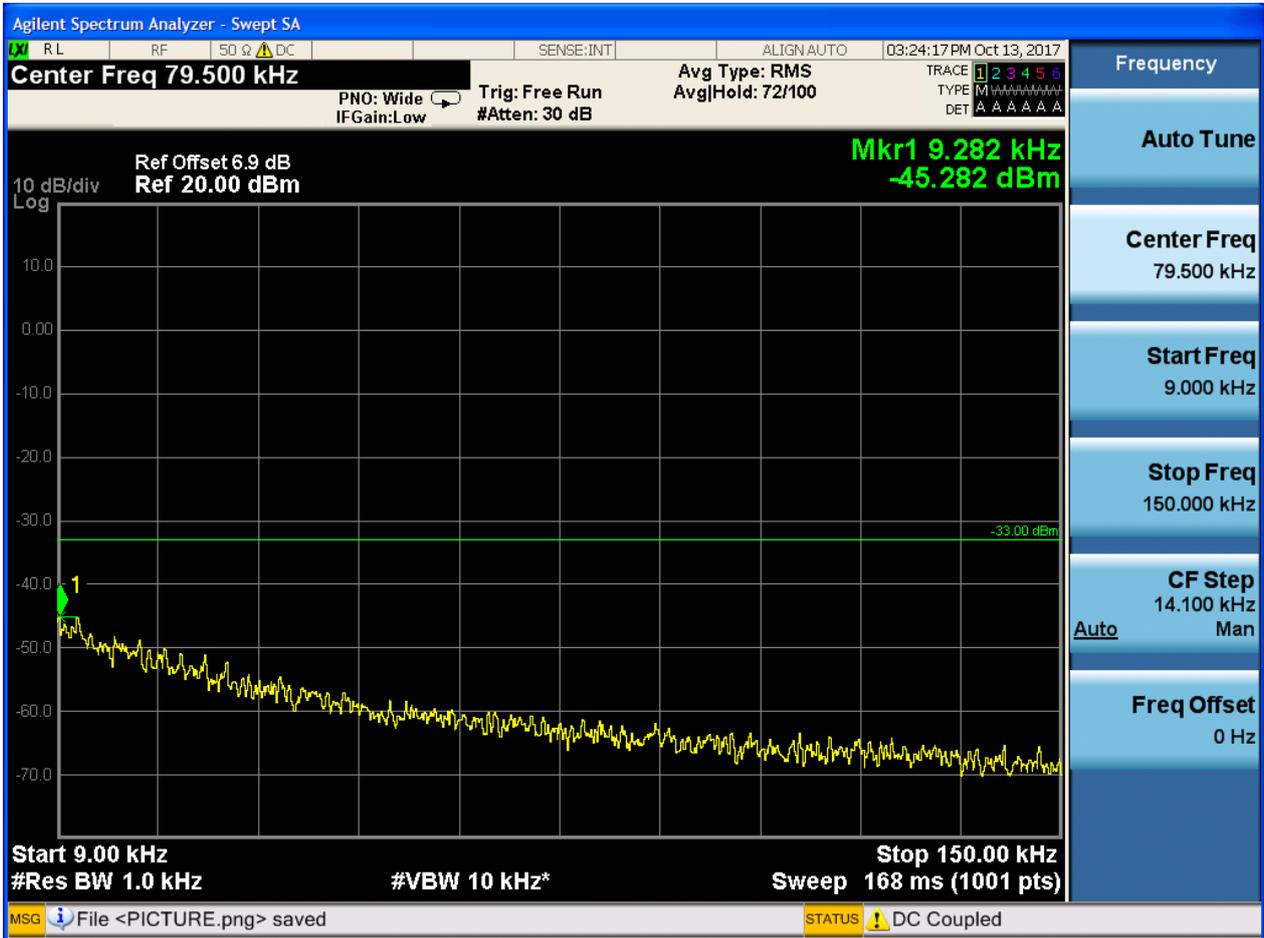


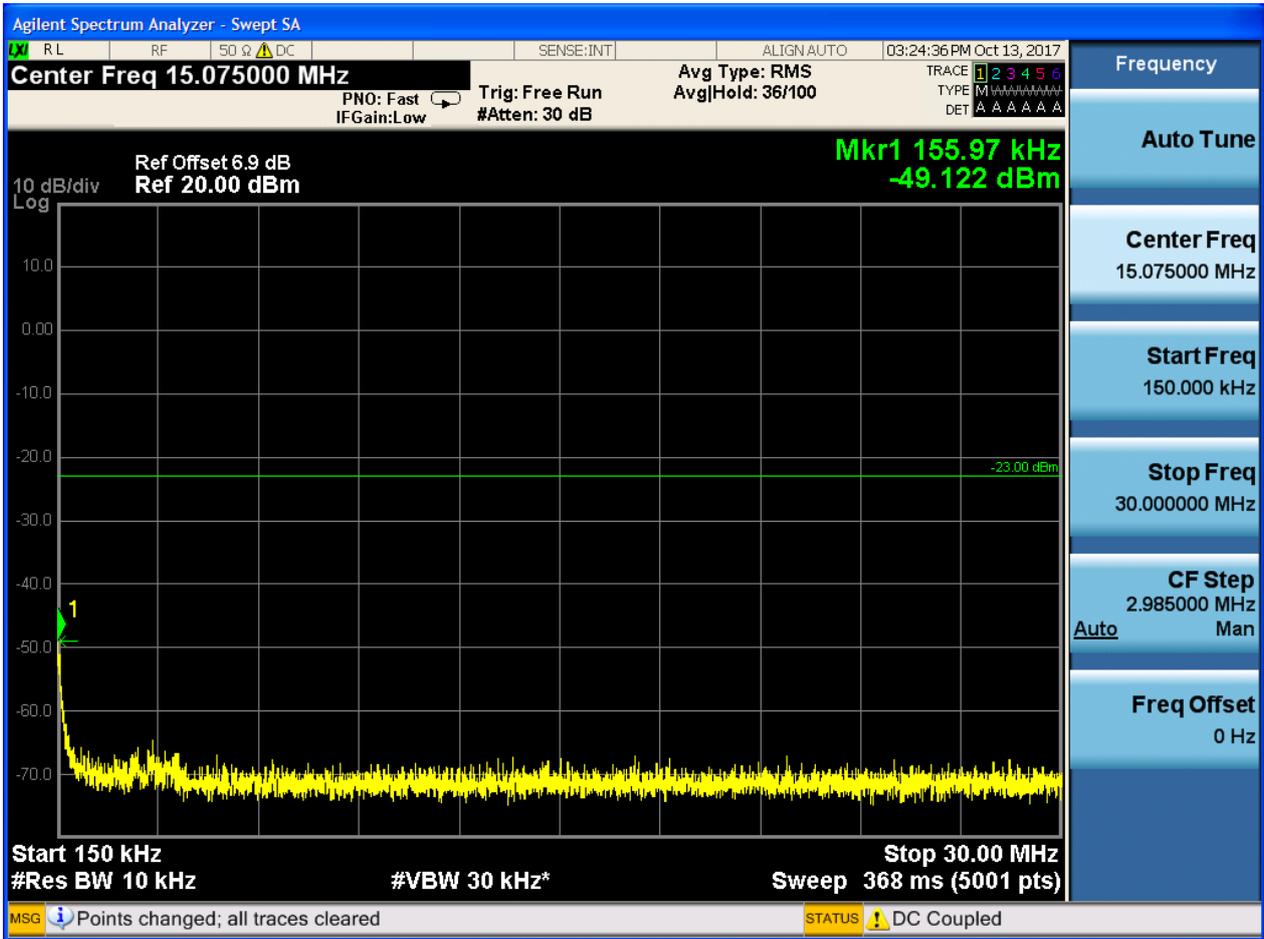


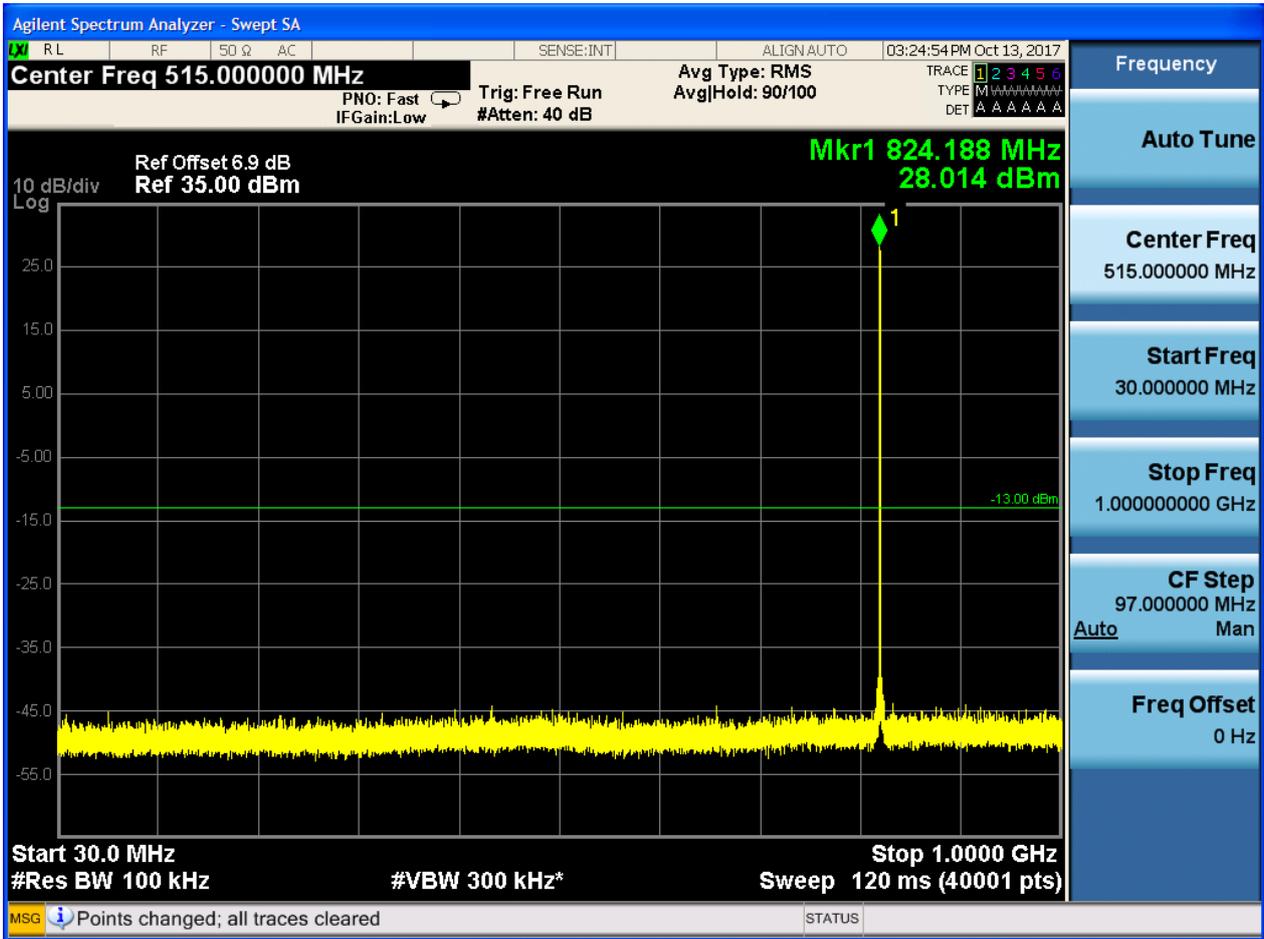


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

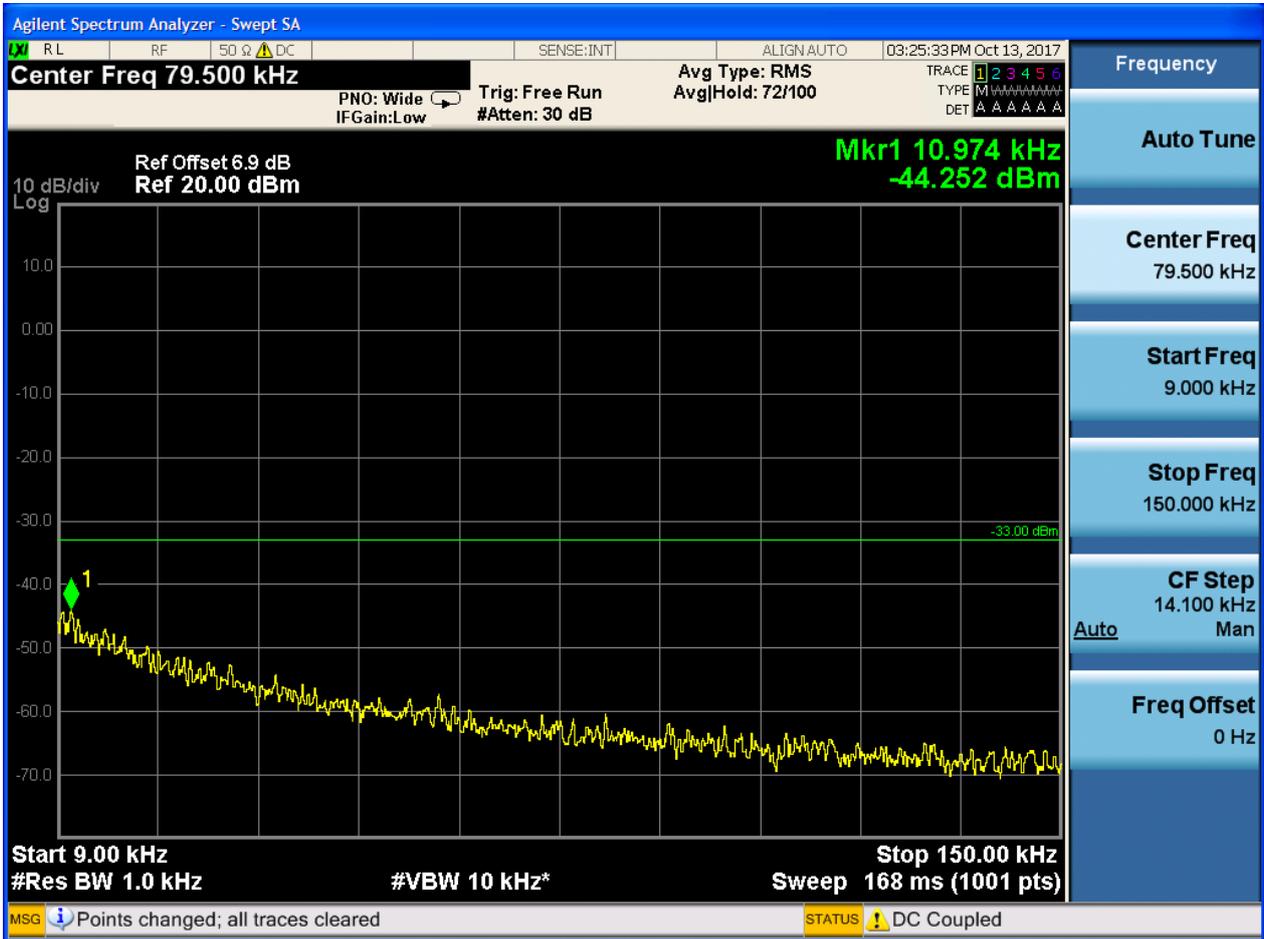


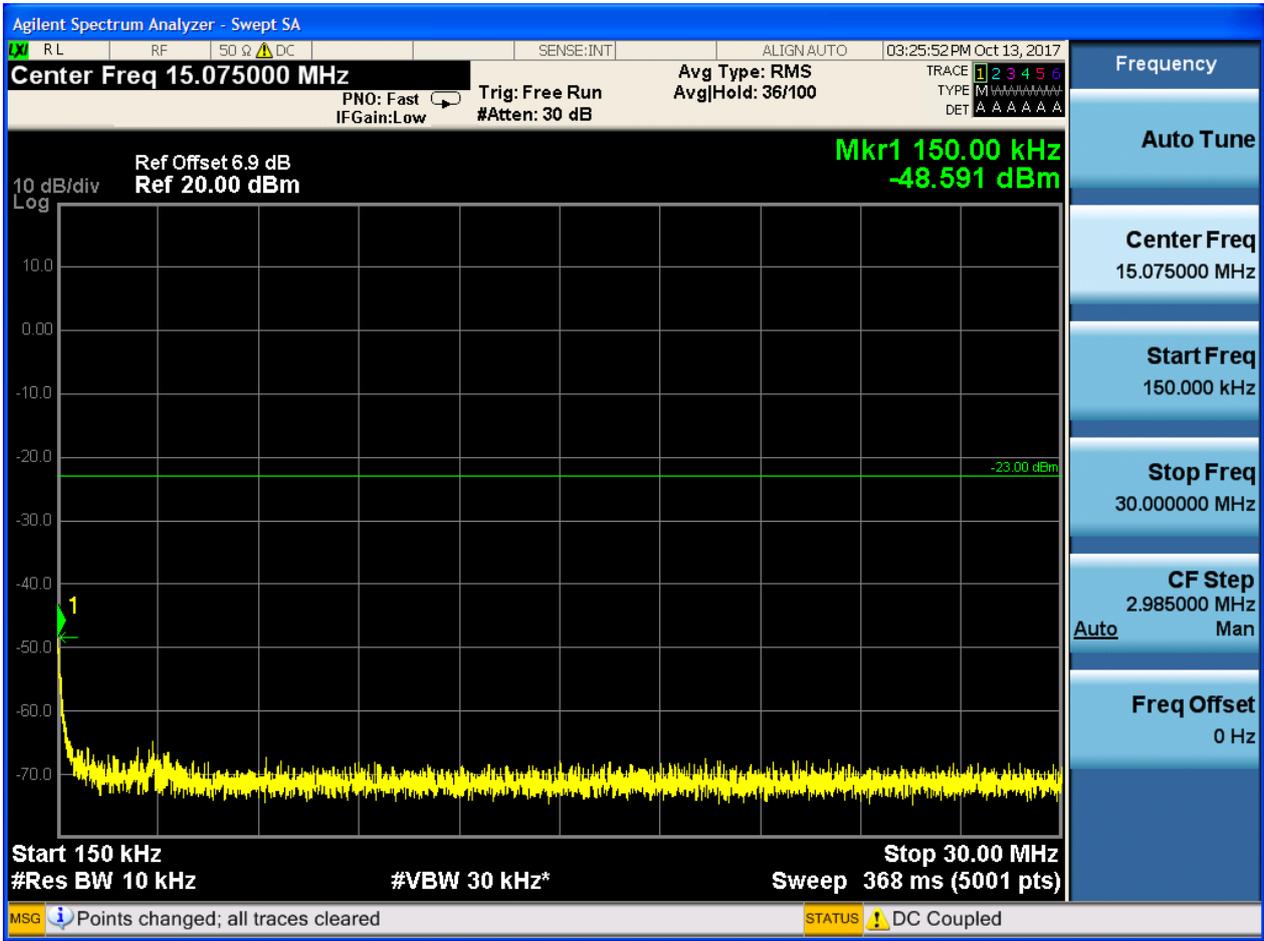


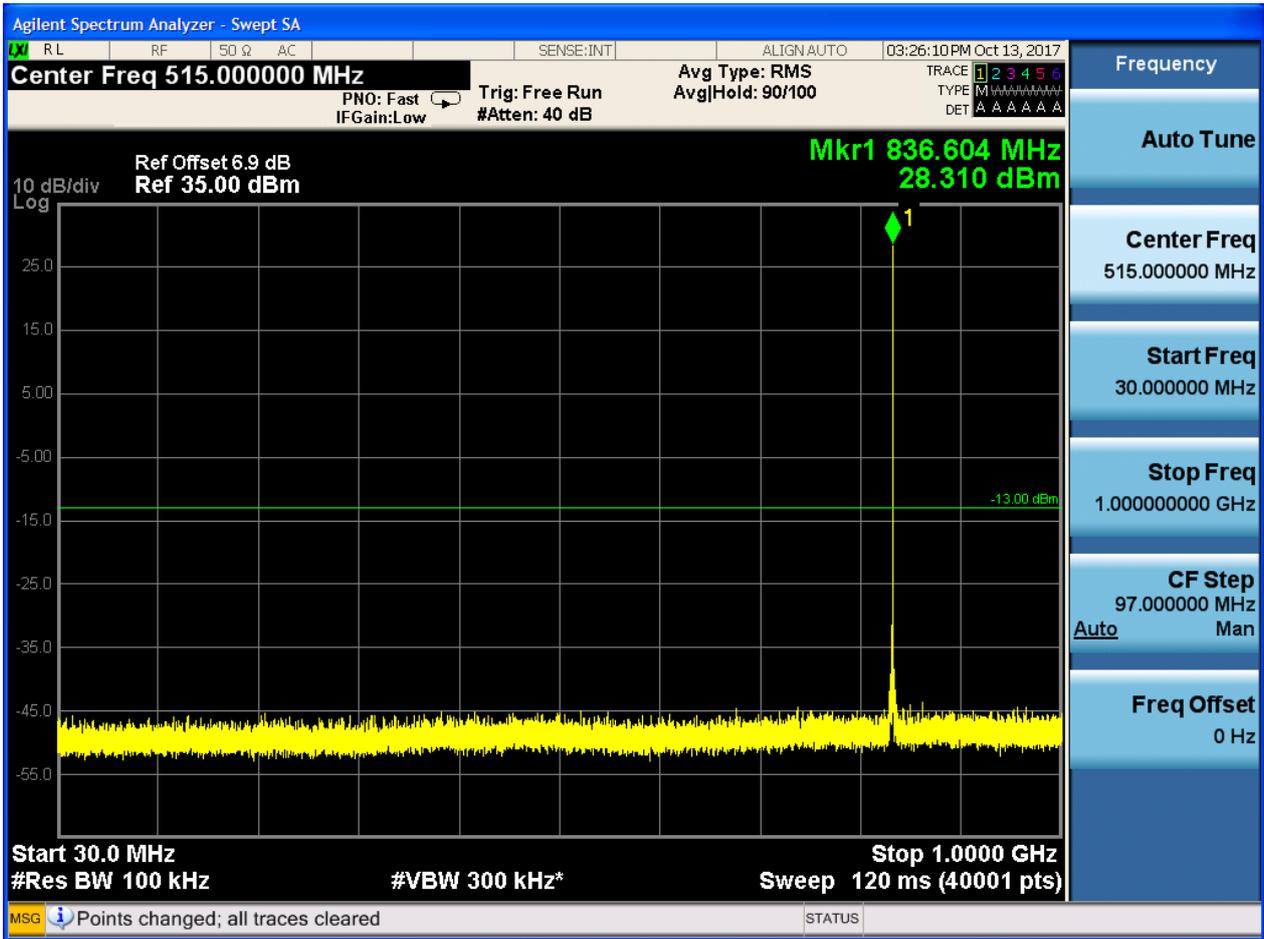


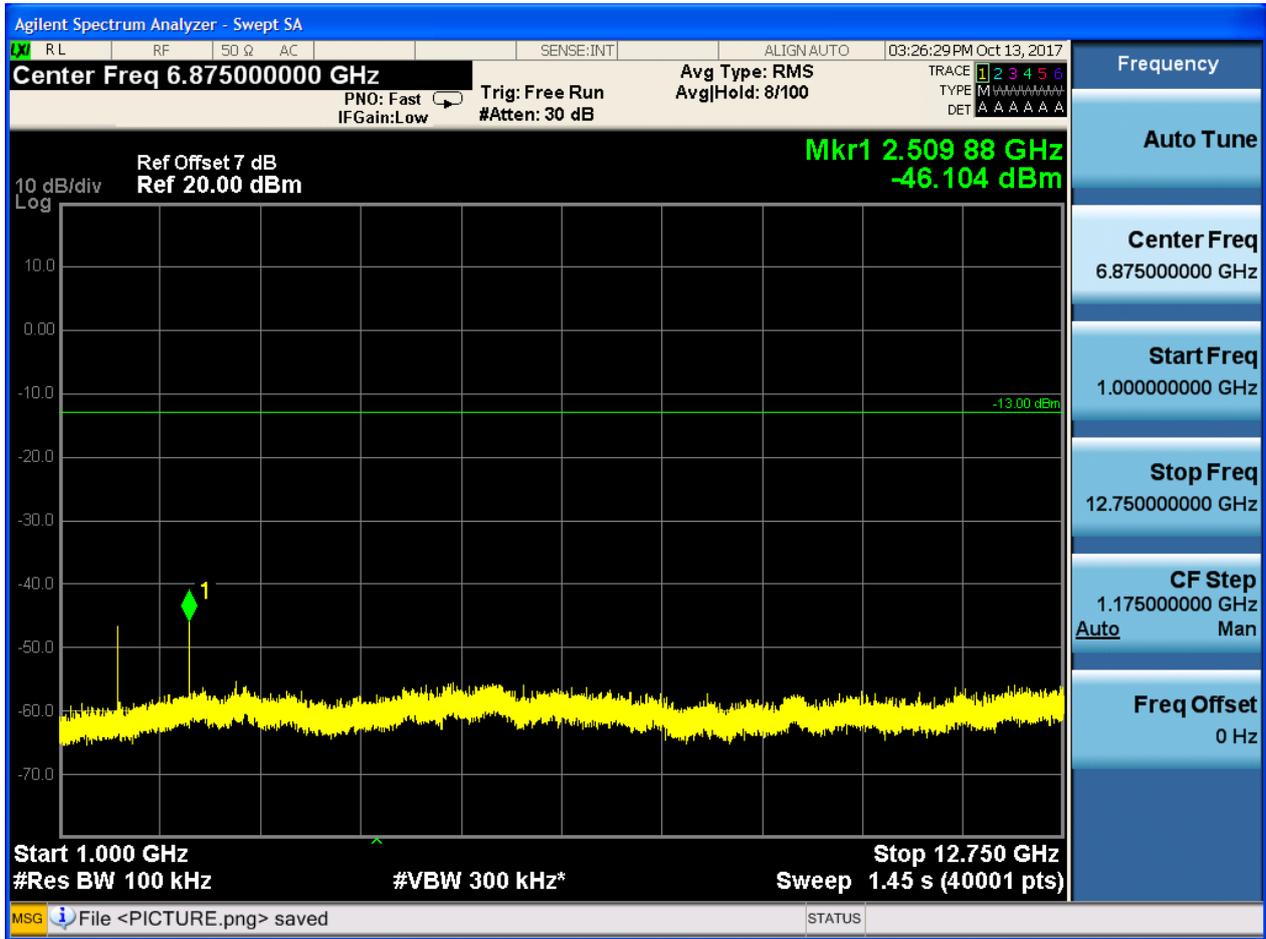


6.1.1.2.2 Test Channel = MCH

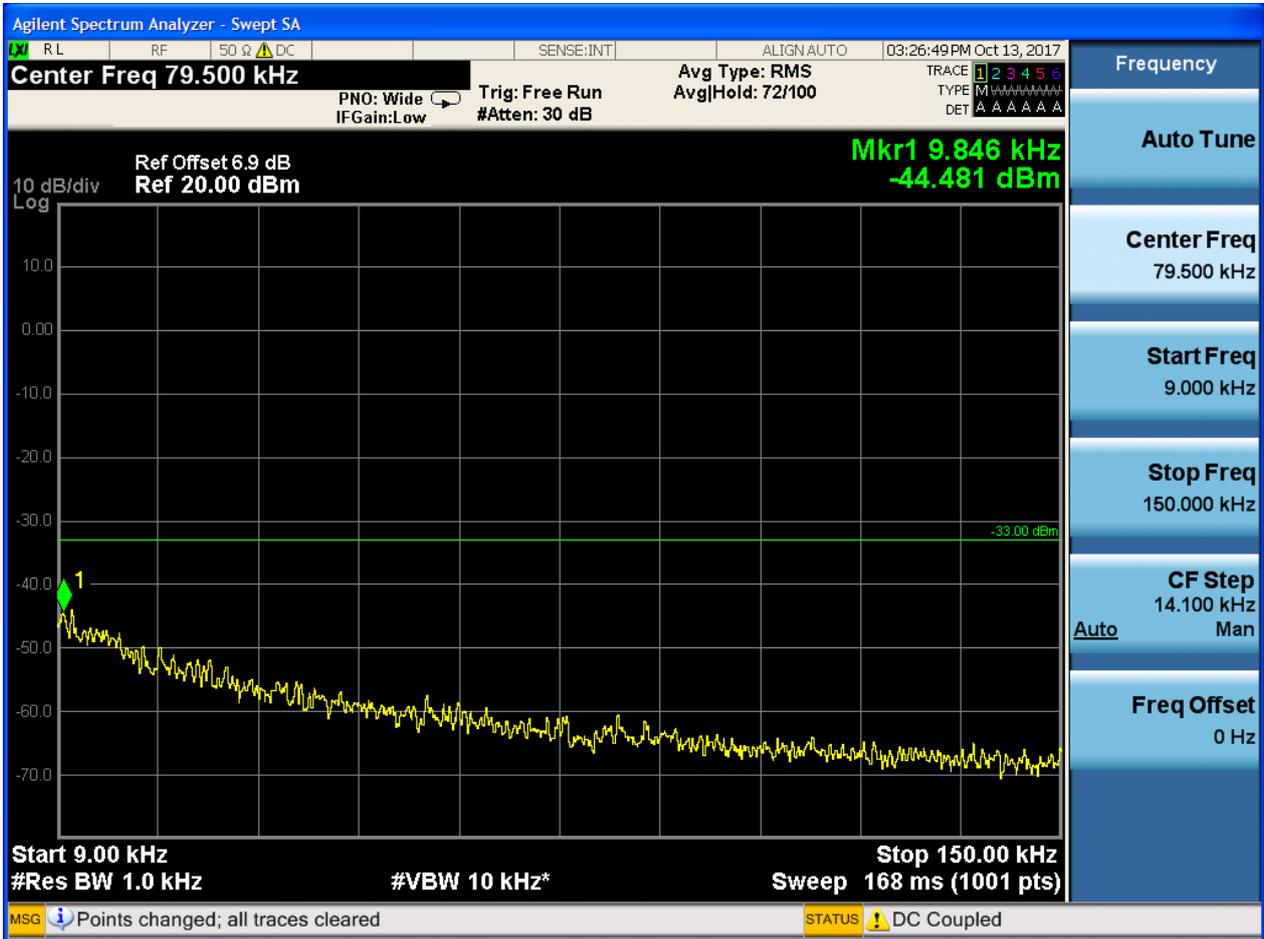


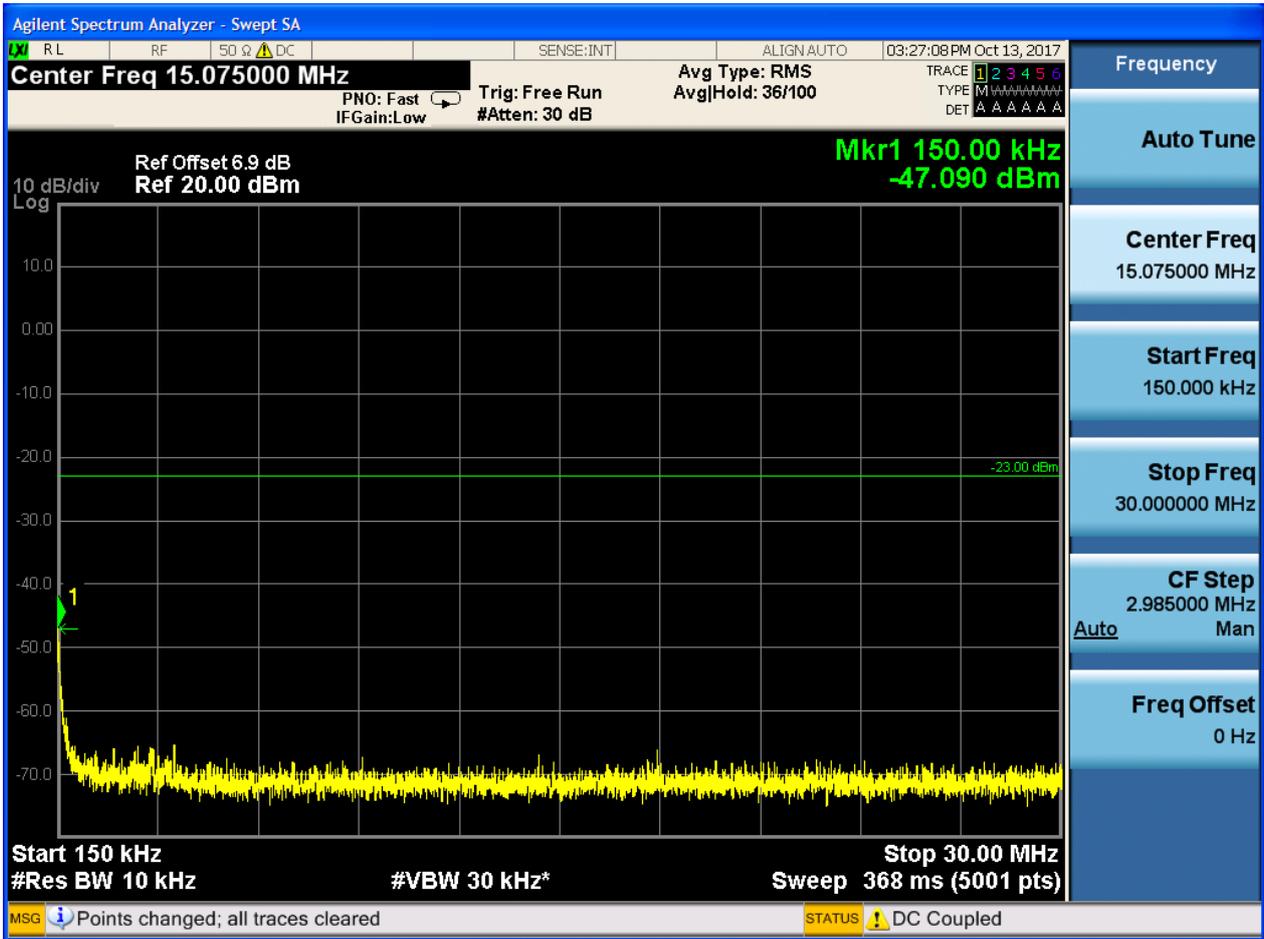


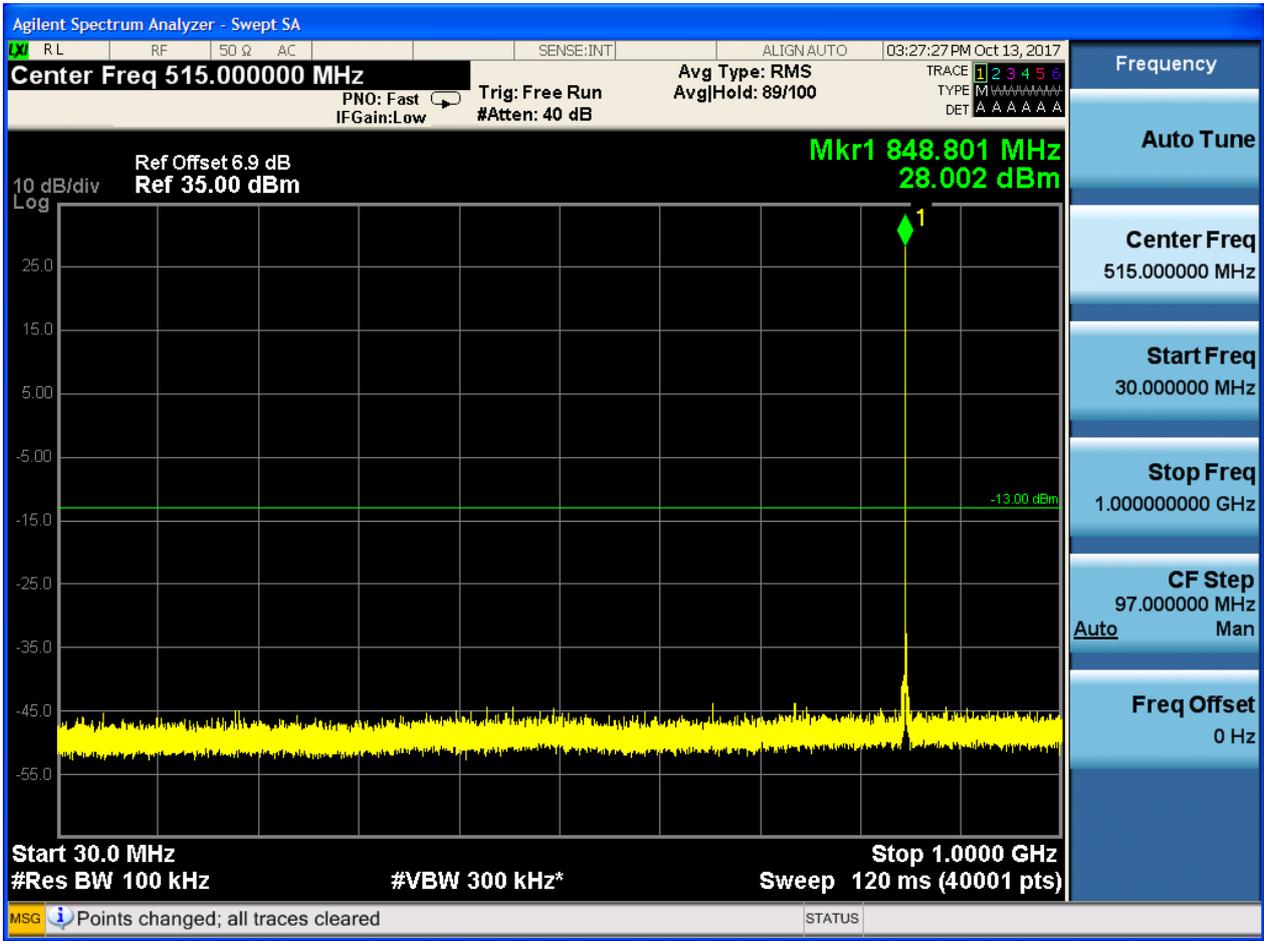




6.1.1.2.3 Test Channel = HCH









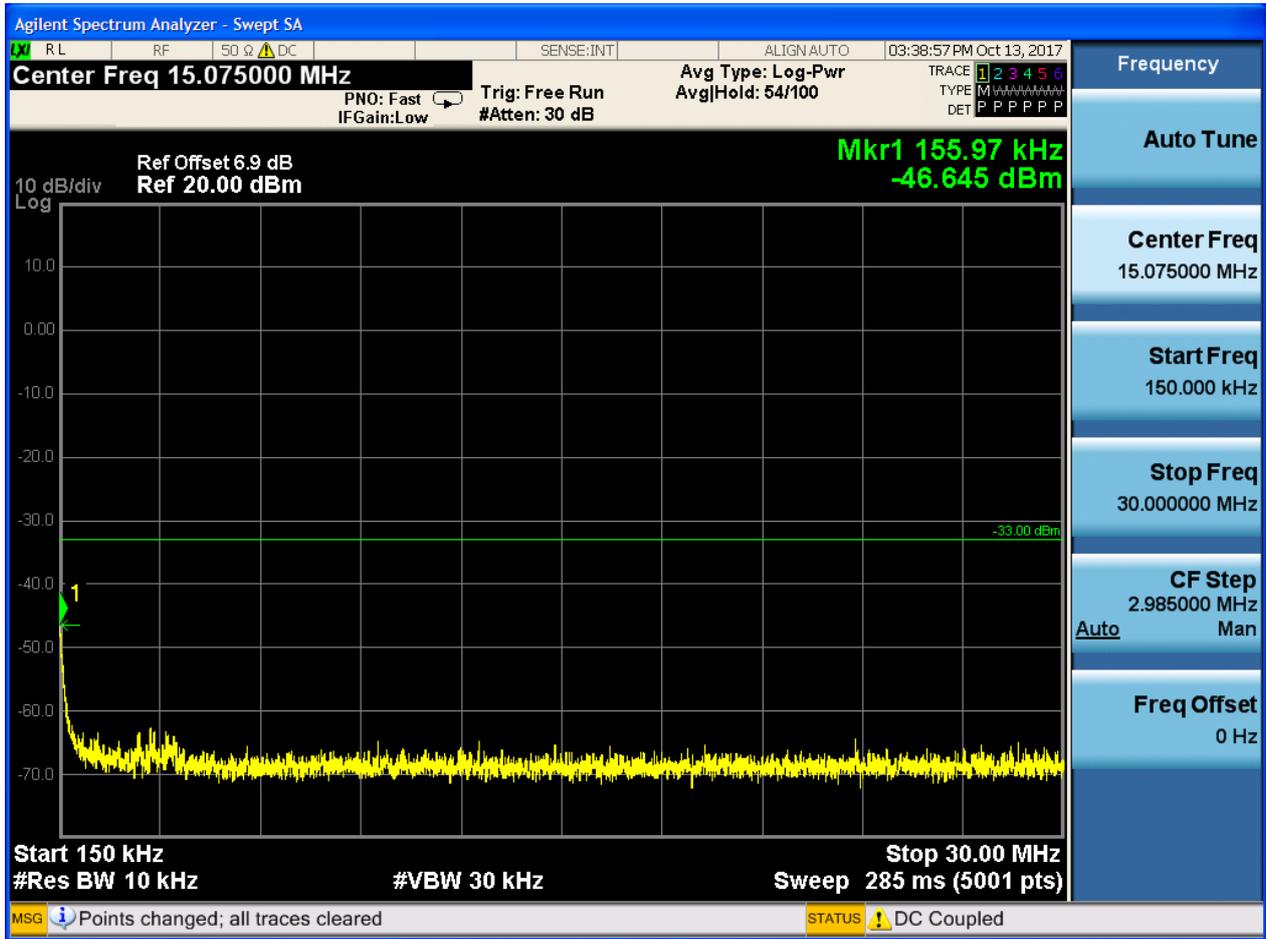


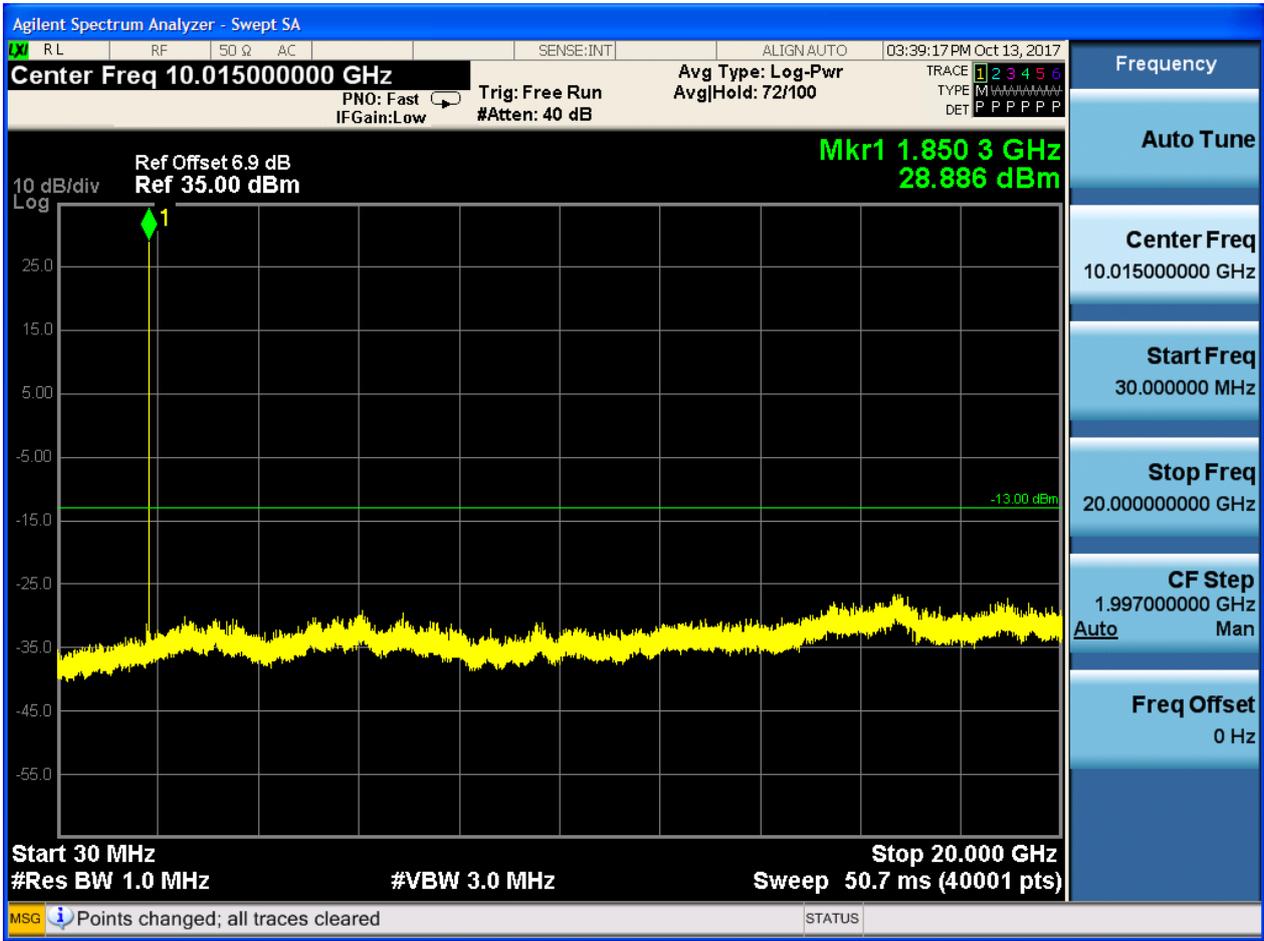
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

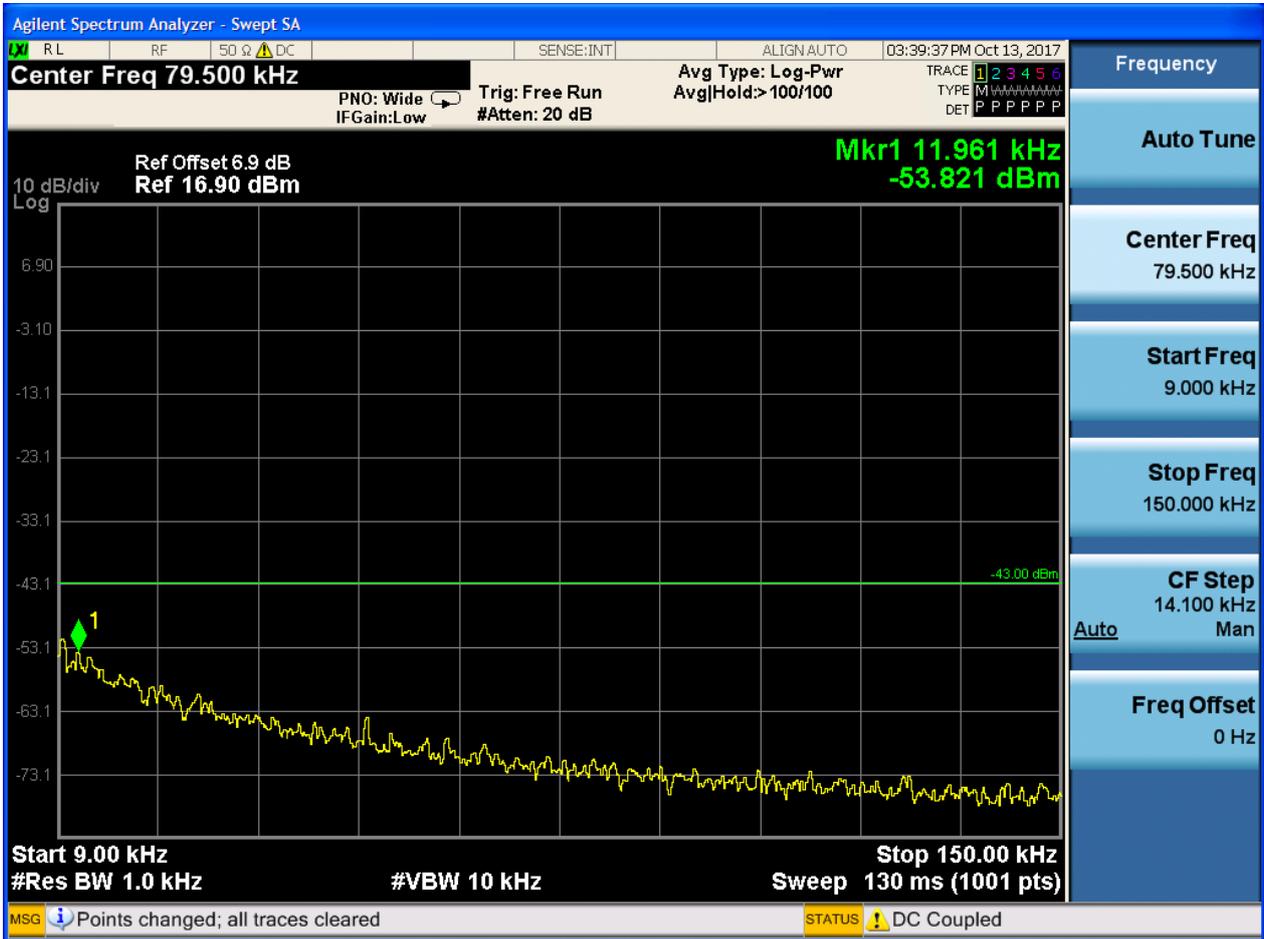
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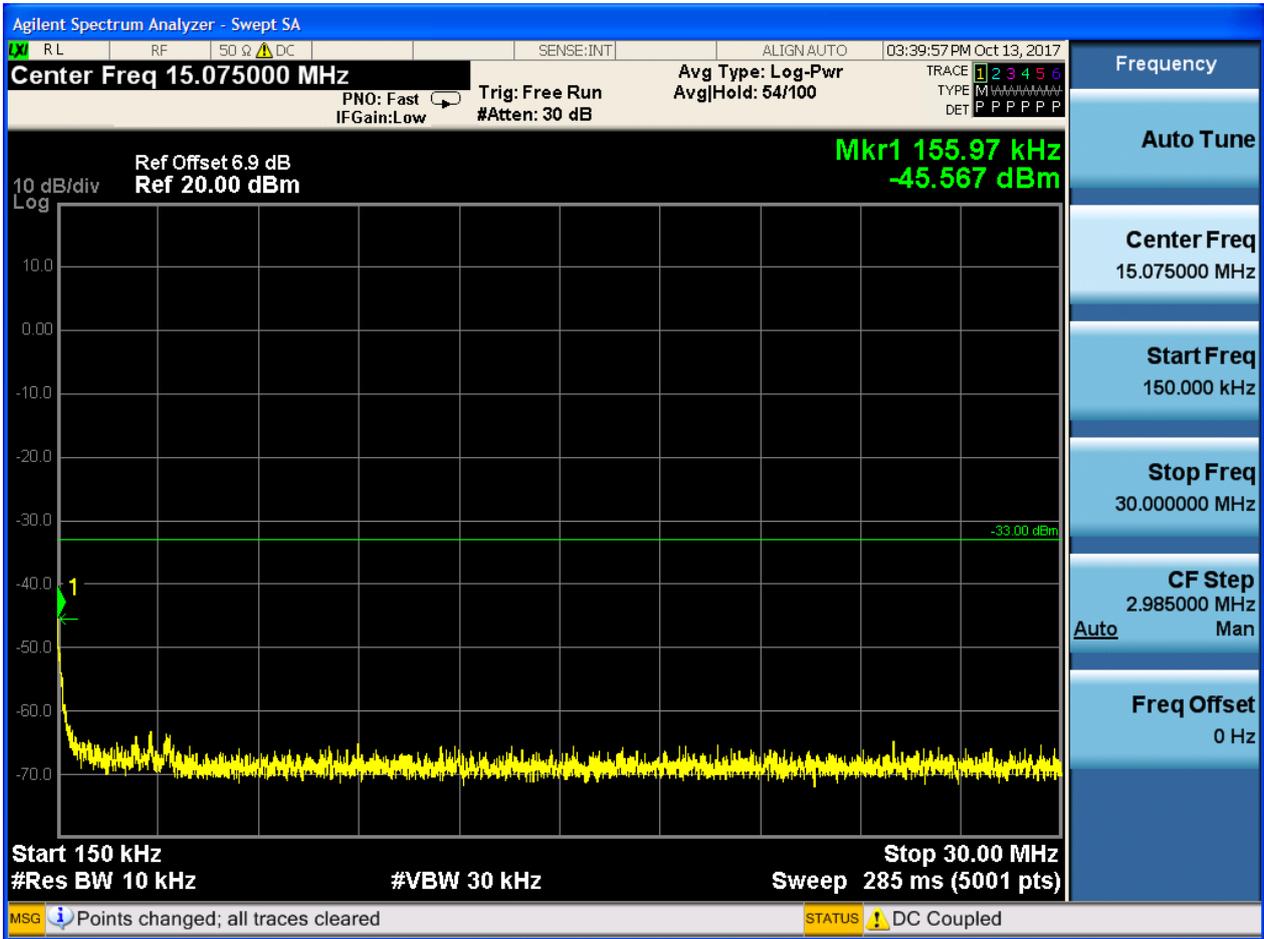


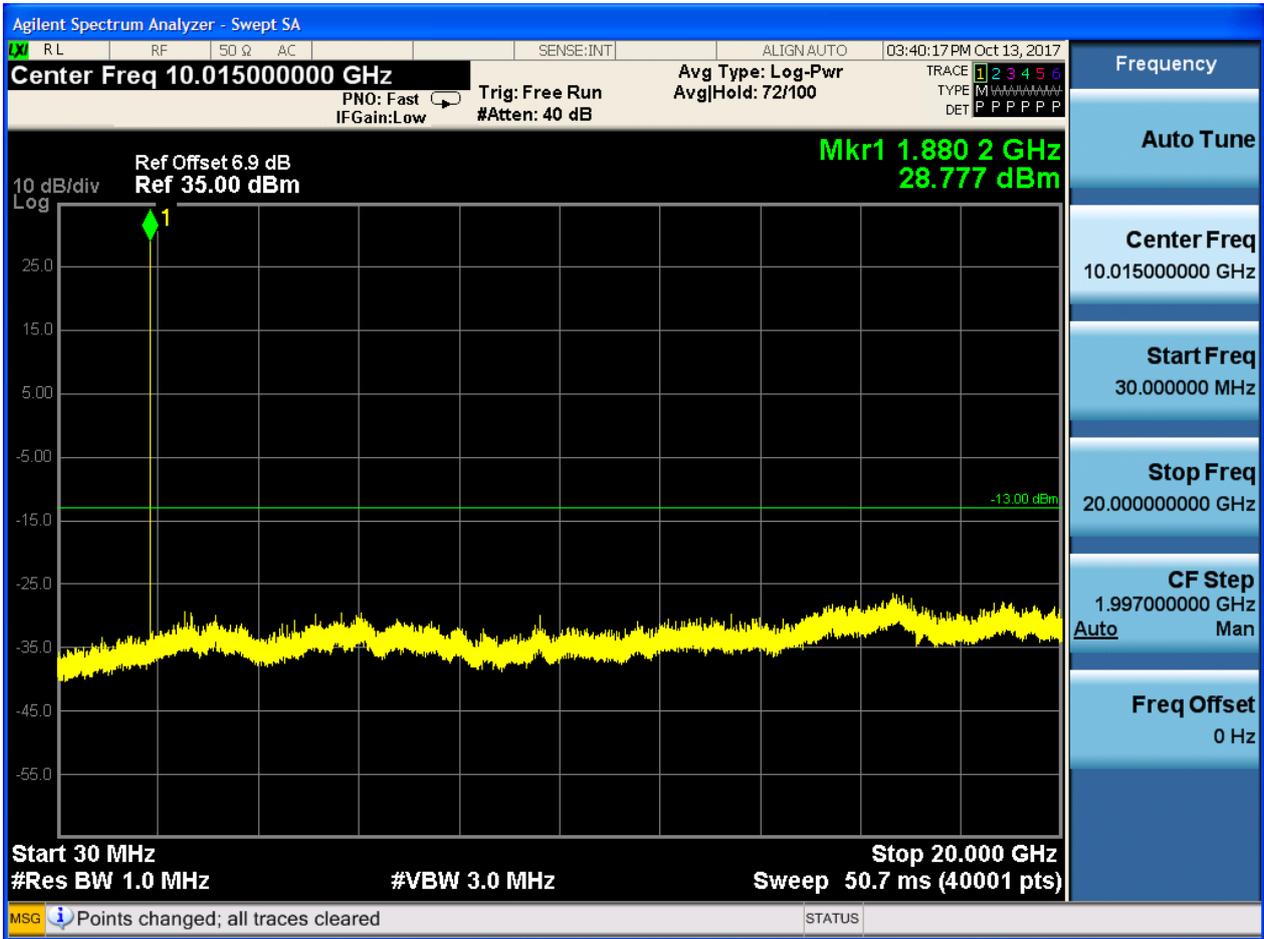




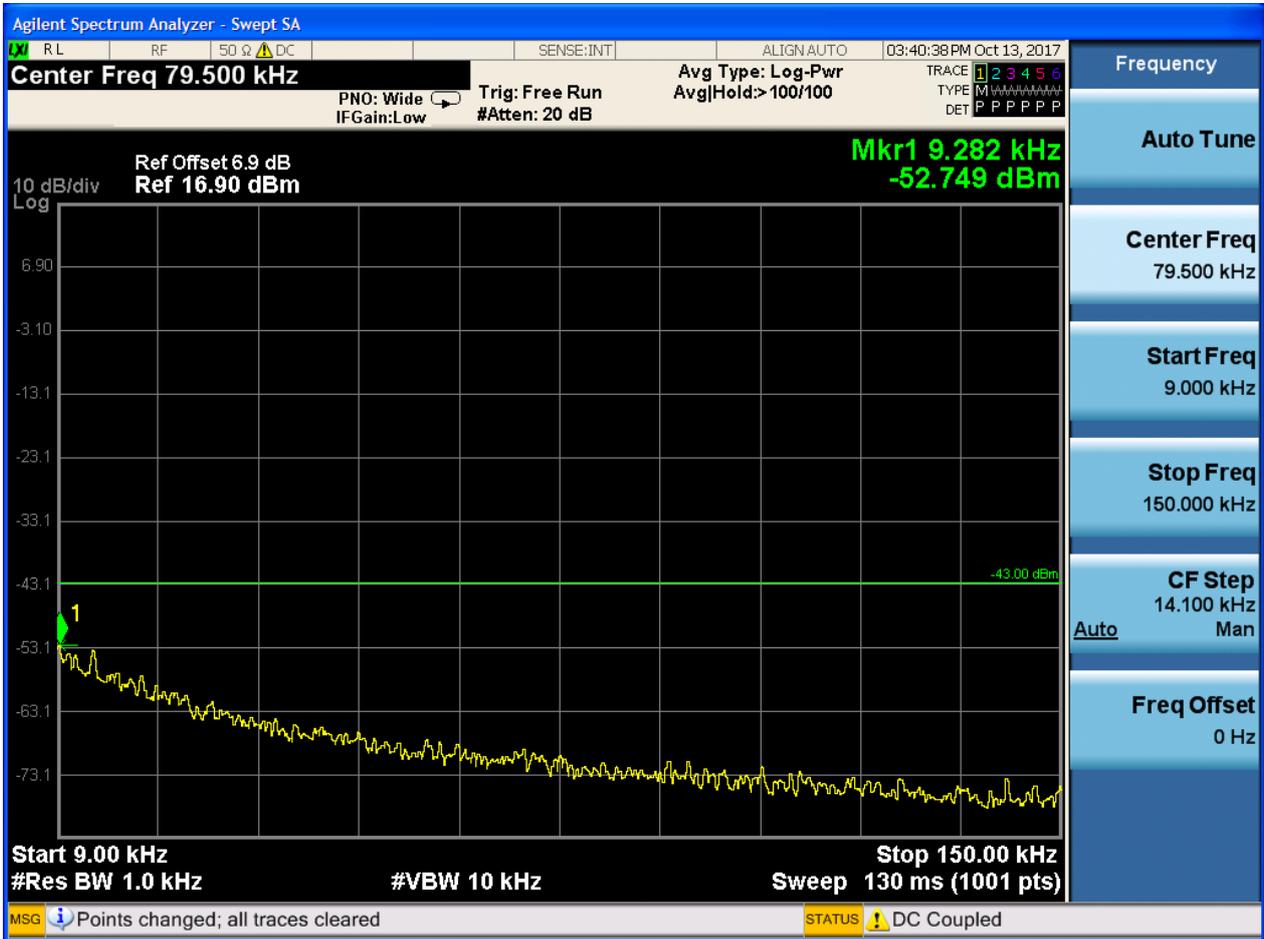
6.1.2.1.2 Test Channel = MCH

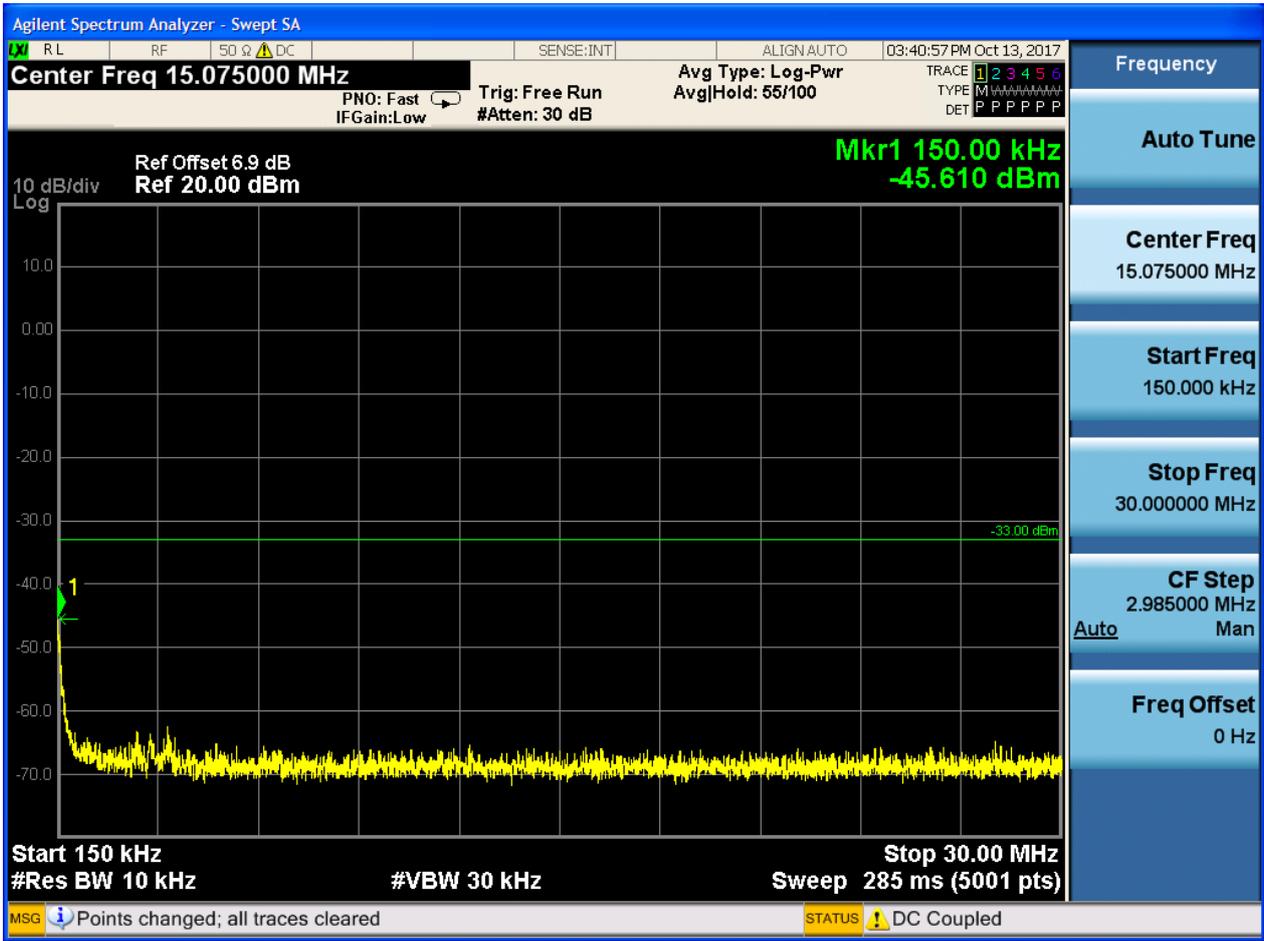


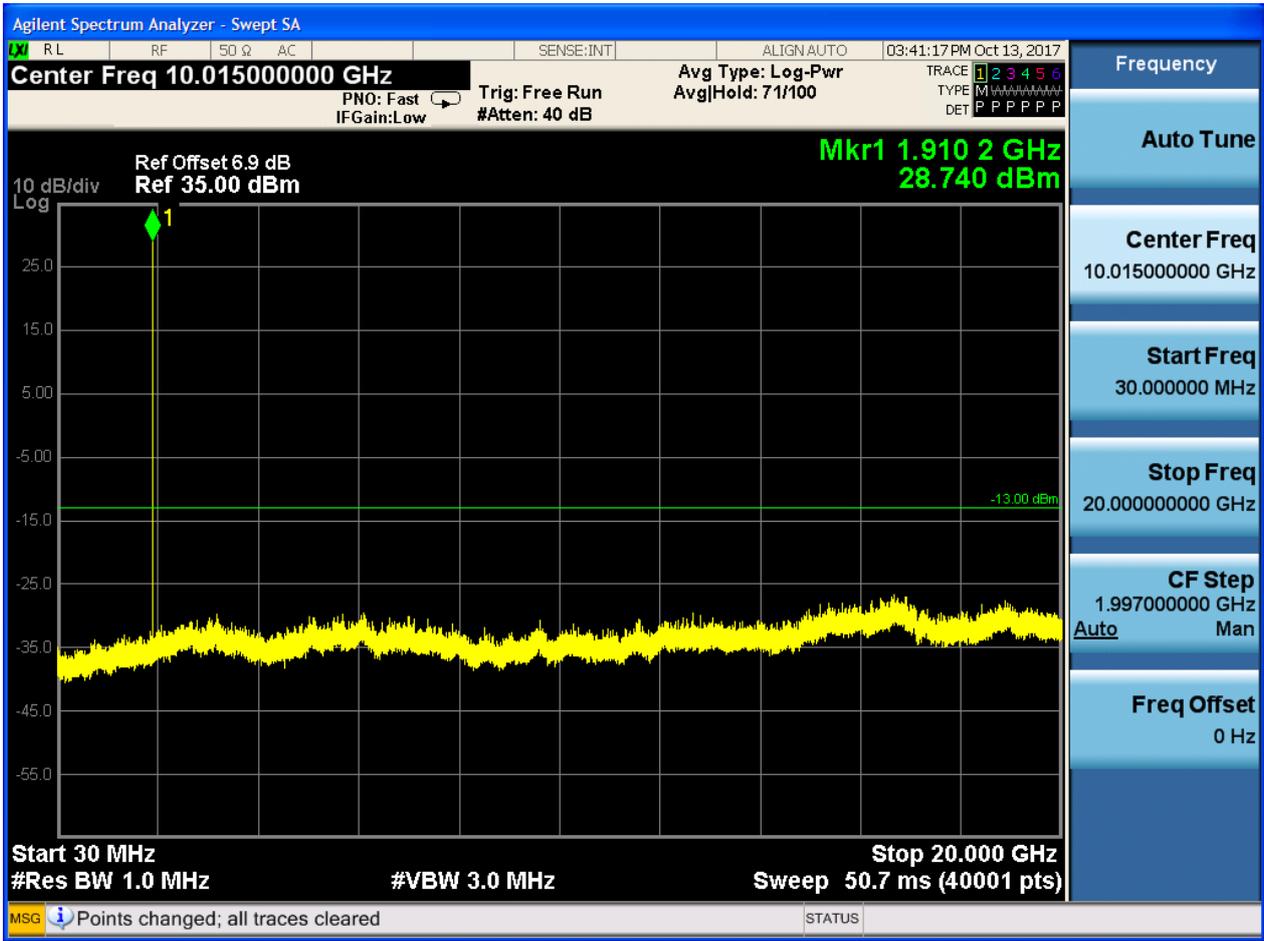




6.1.2.1.3 Test Channel = HCH



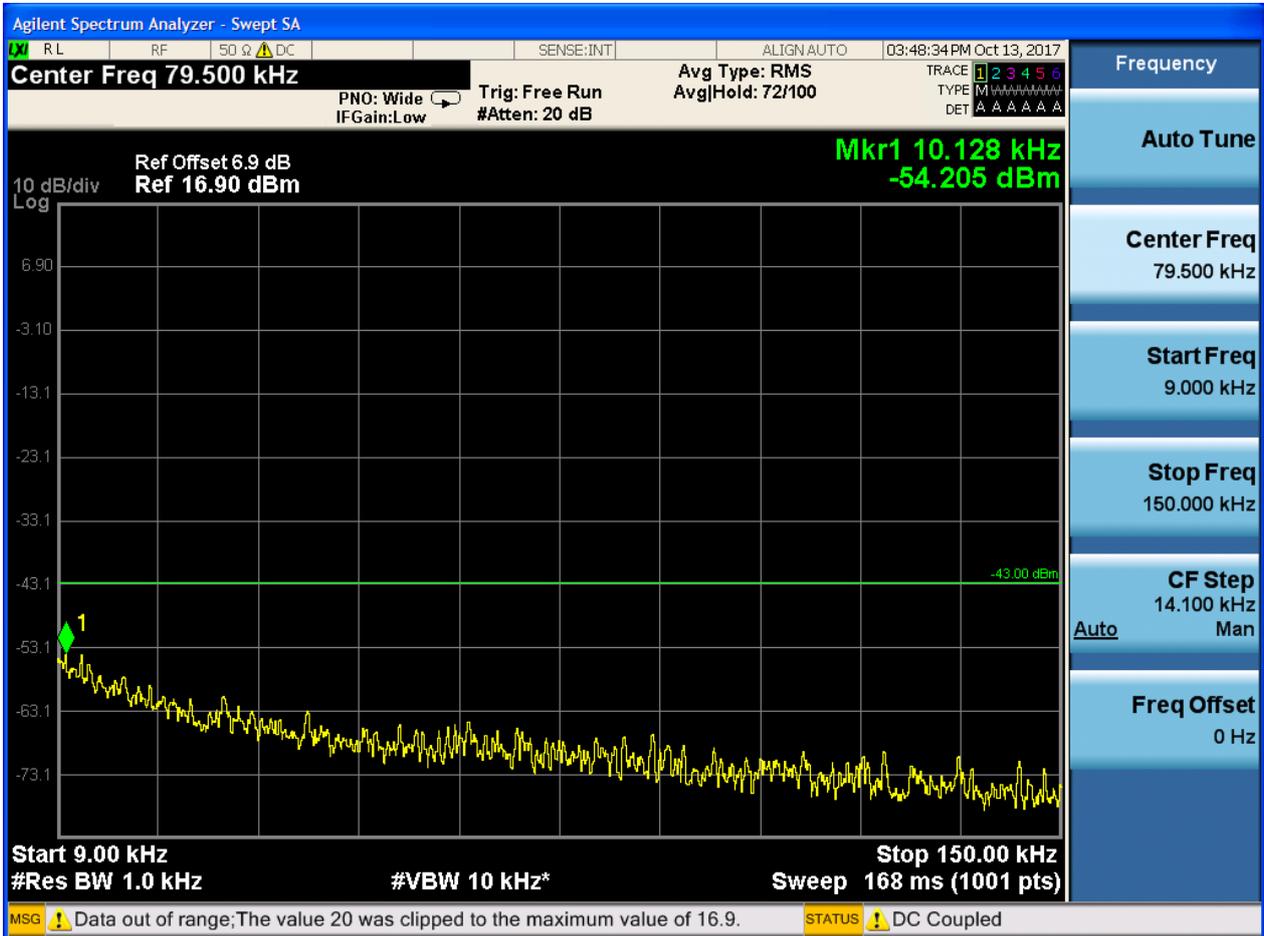


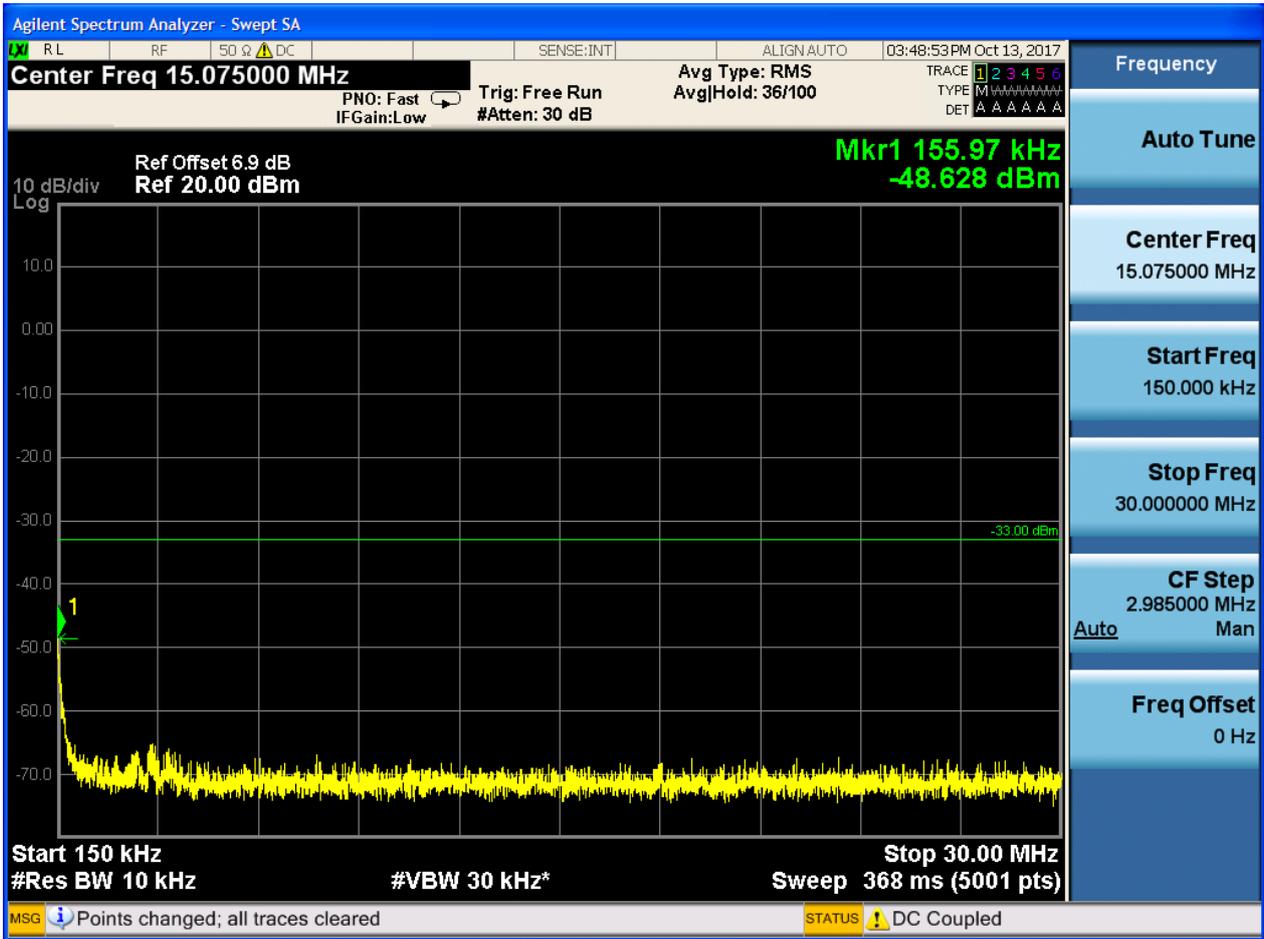


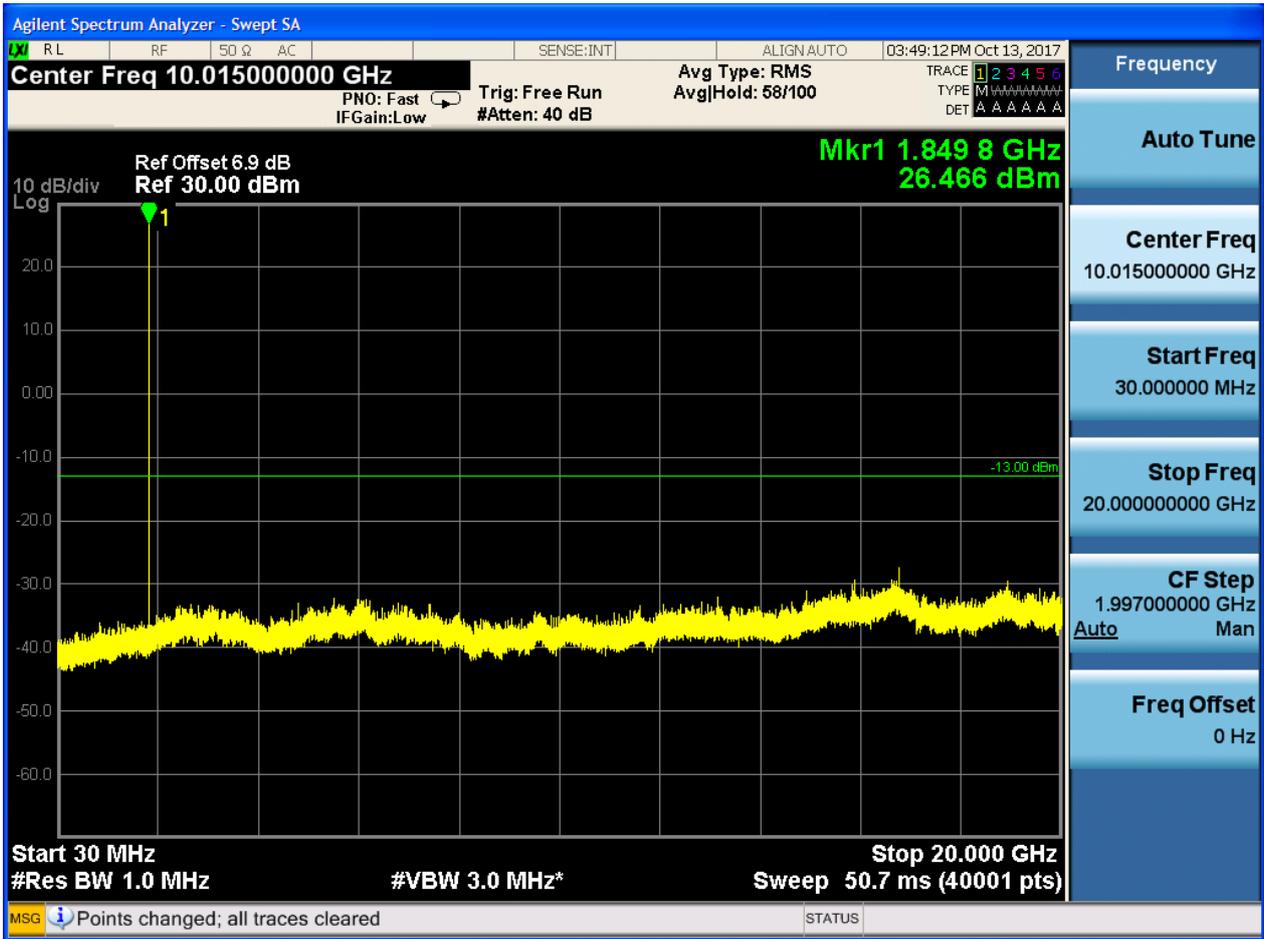


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

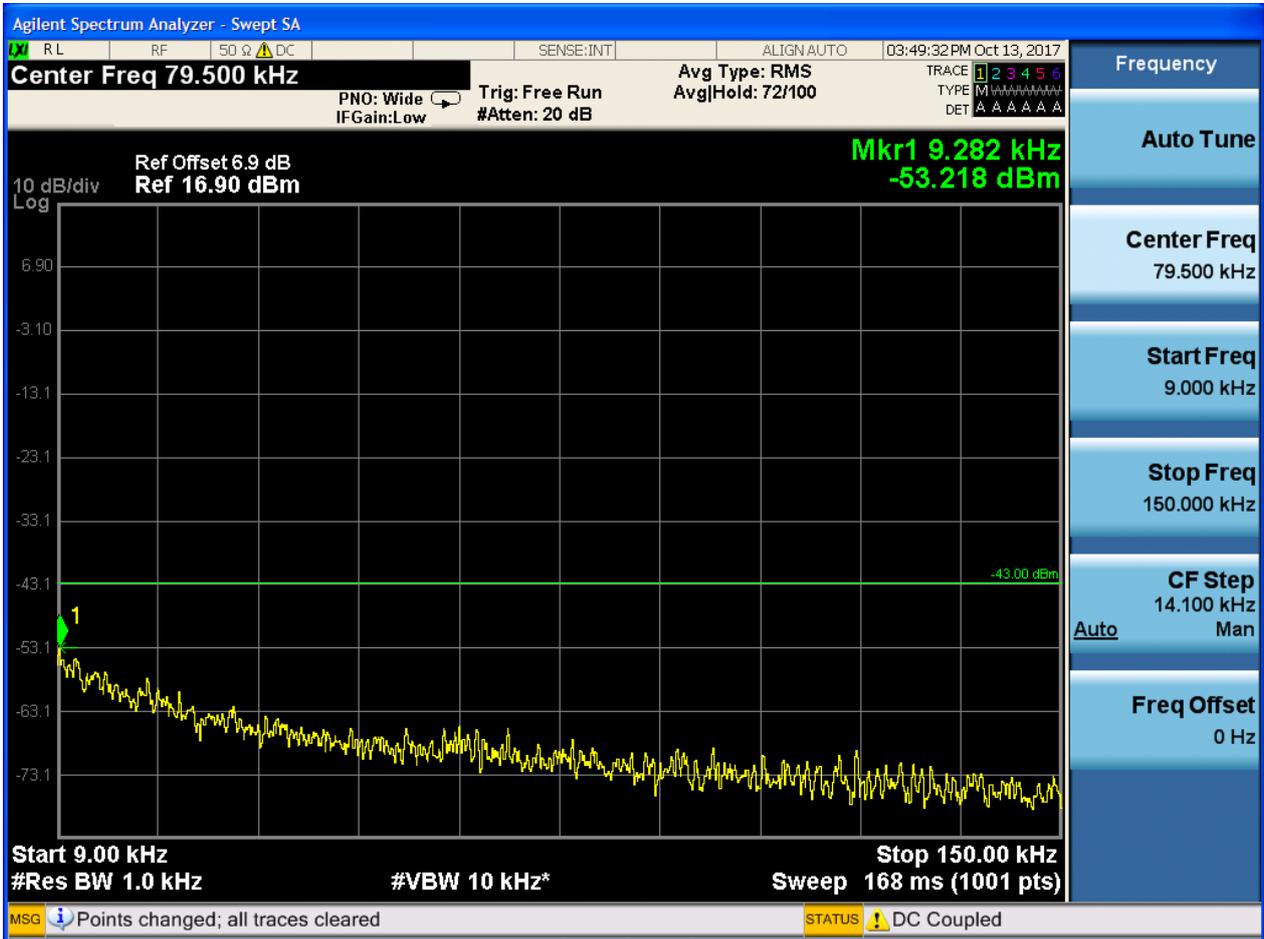


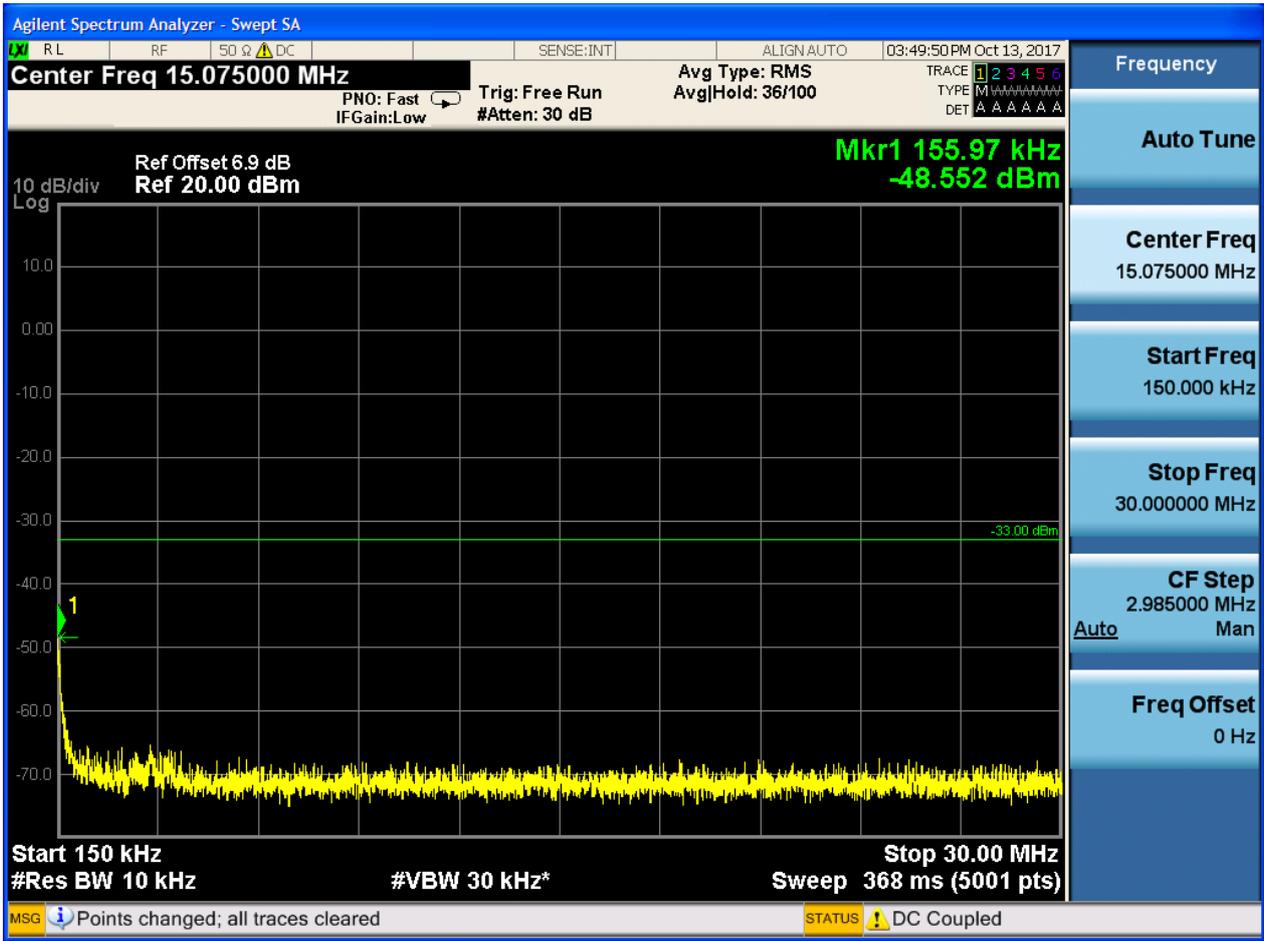


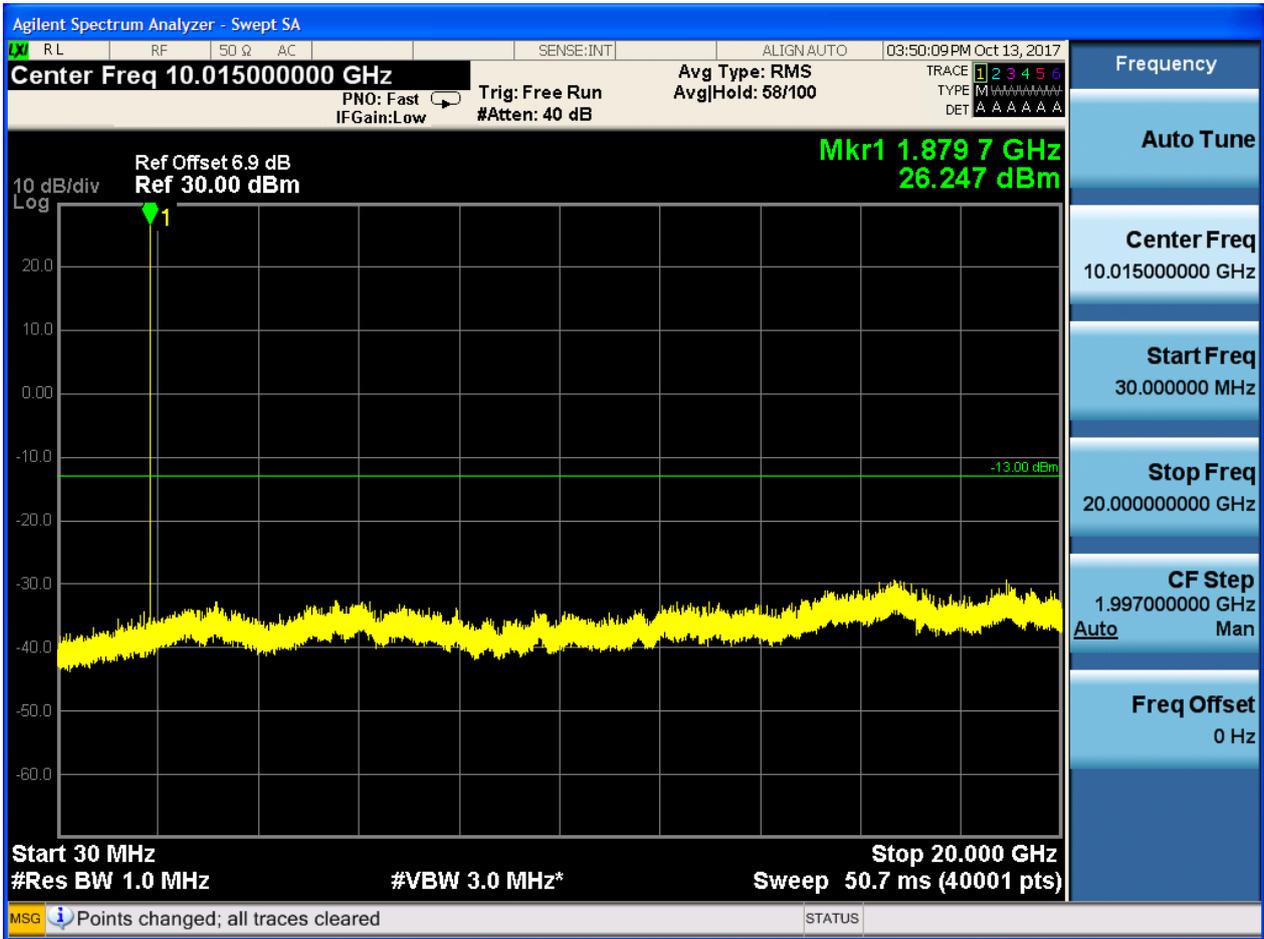




6.1.2.2.2 Test Channel = MCH

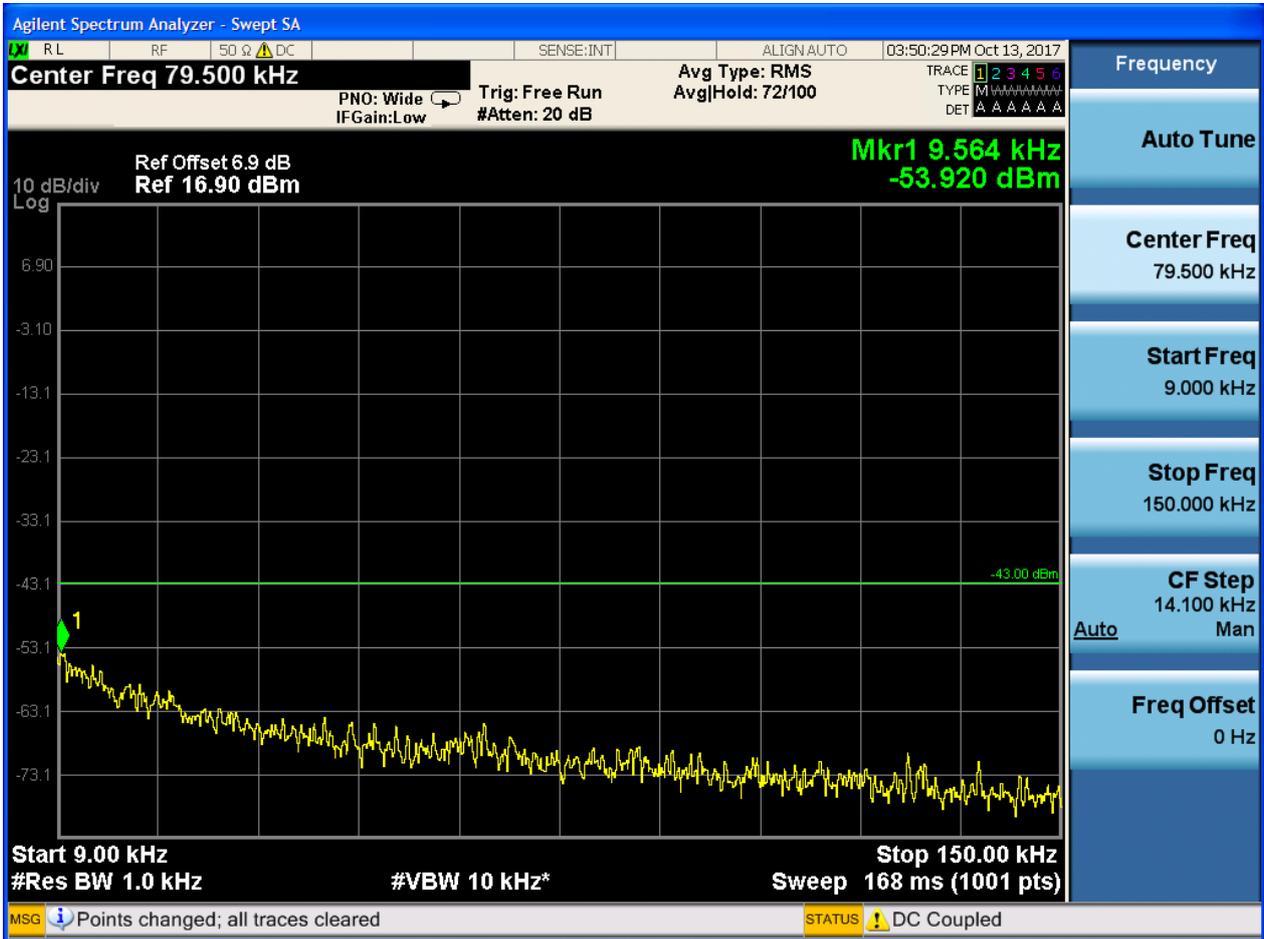


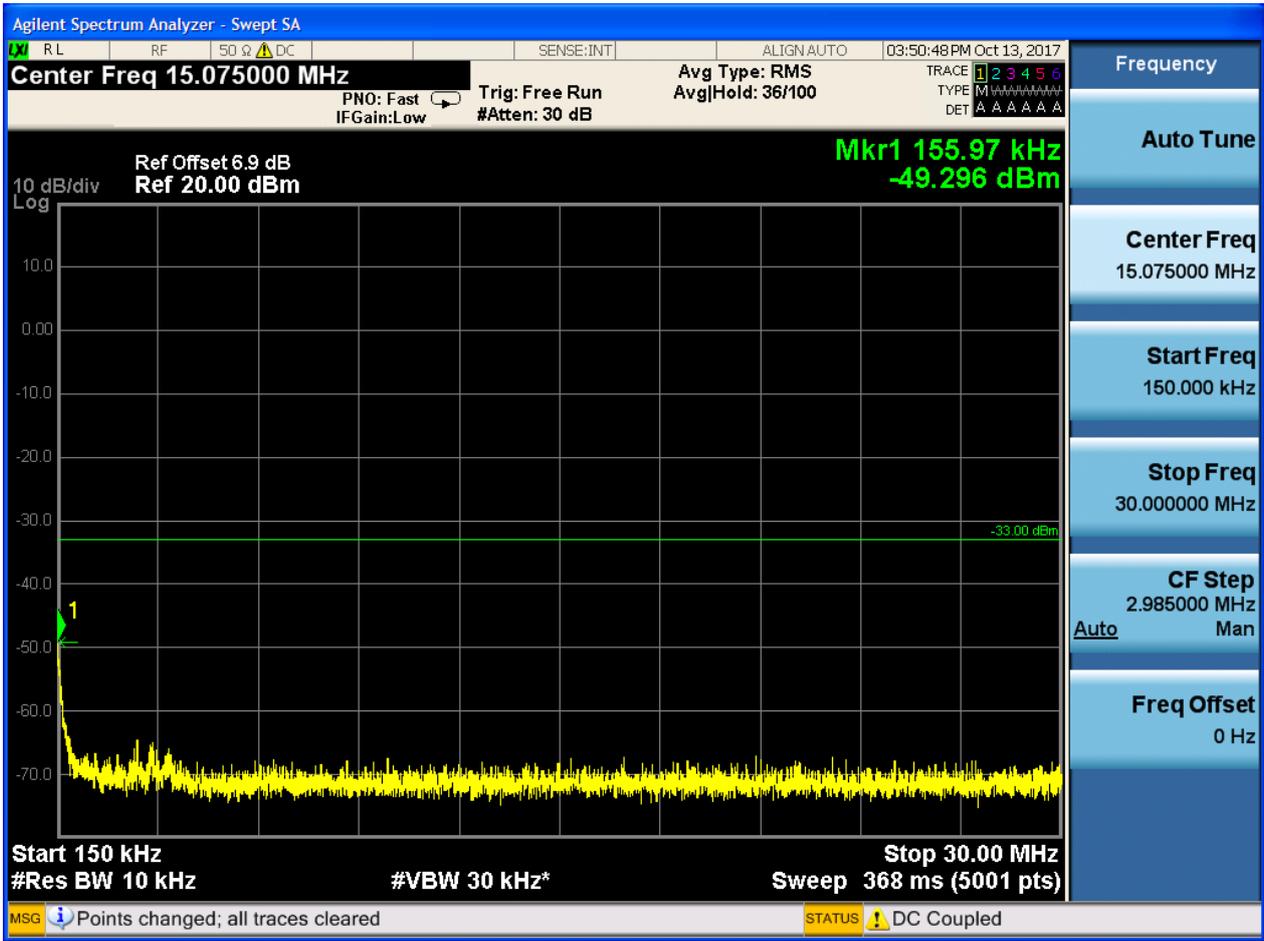


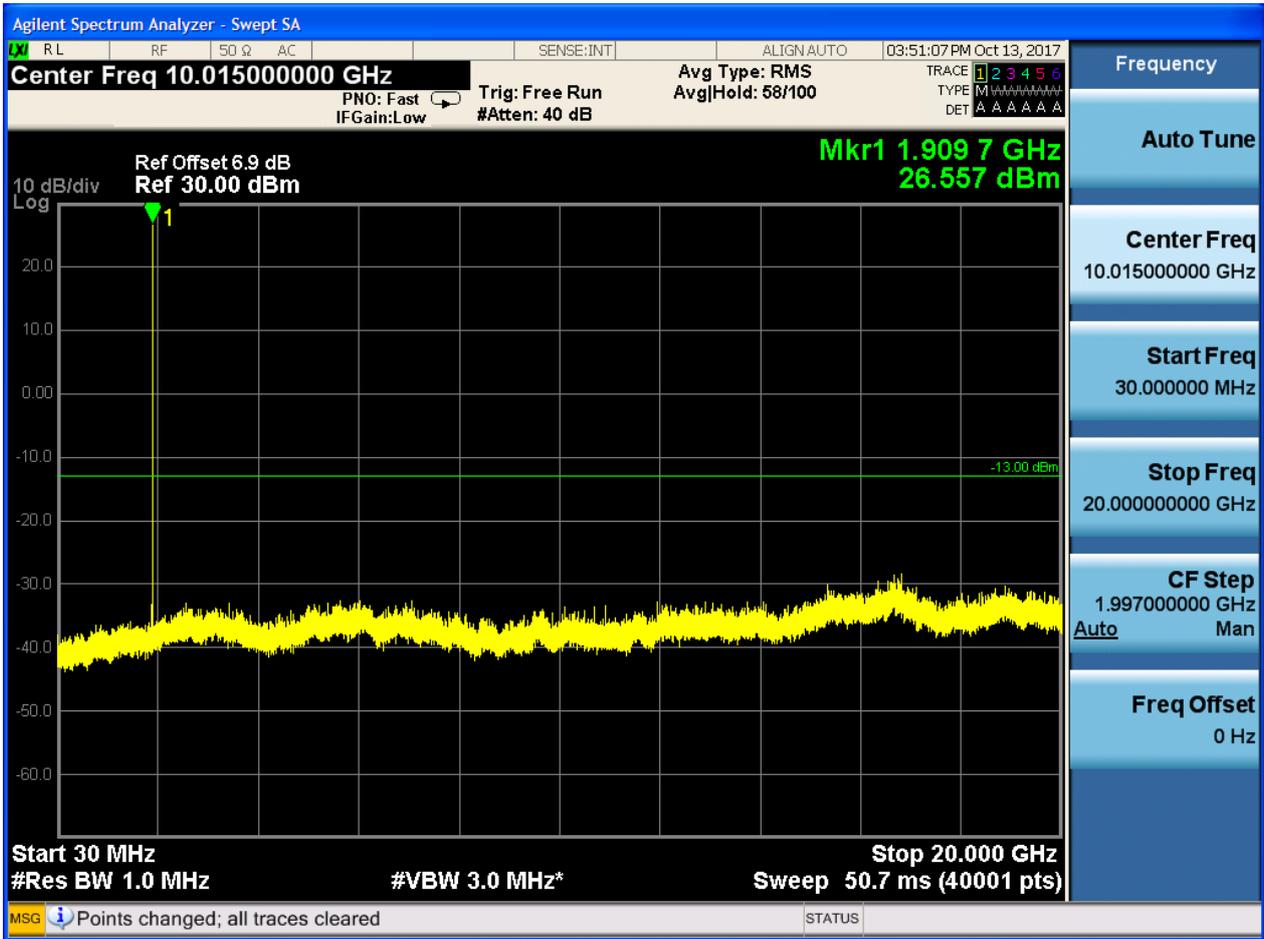




6.1.2.2.3 Test Channel = HCH







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

Note: We tested all modes, but the data presented below is the worst case.

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

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

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

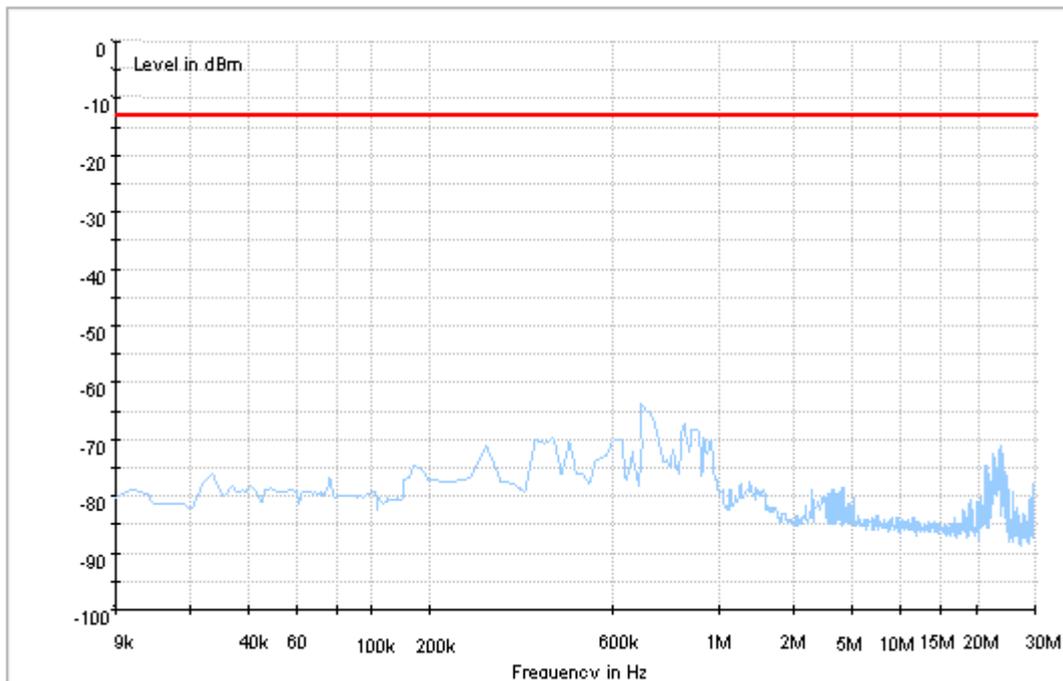
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

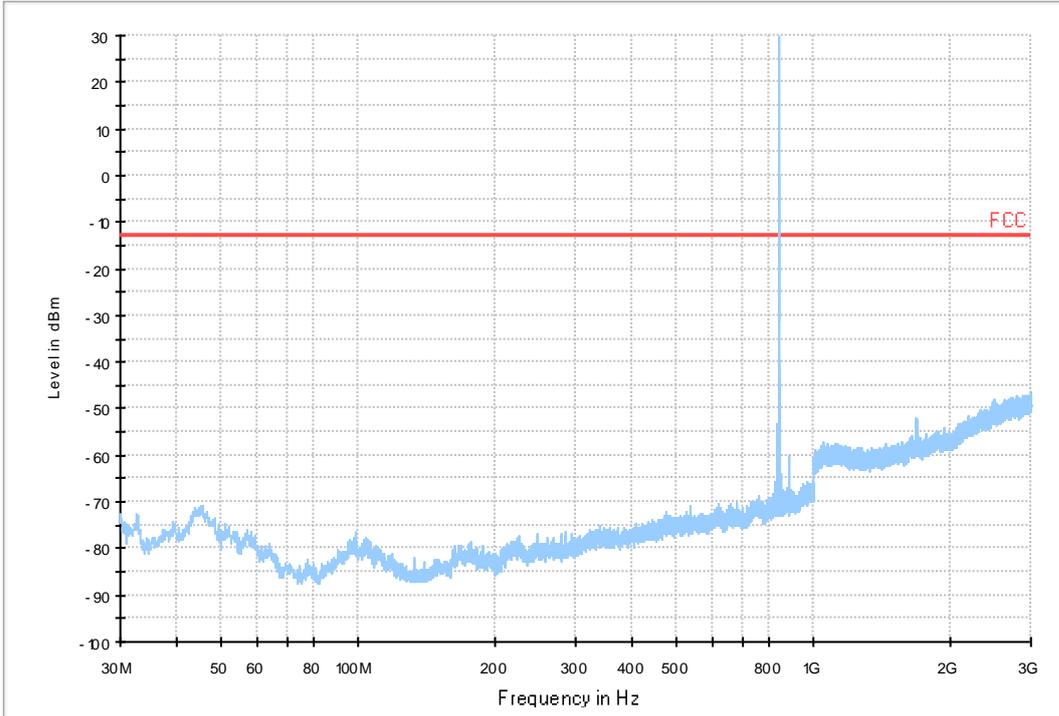
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850\_ANT1

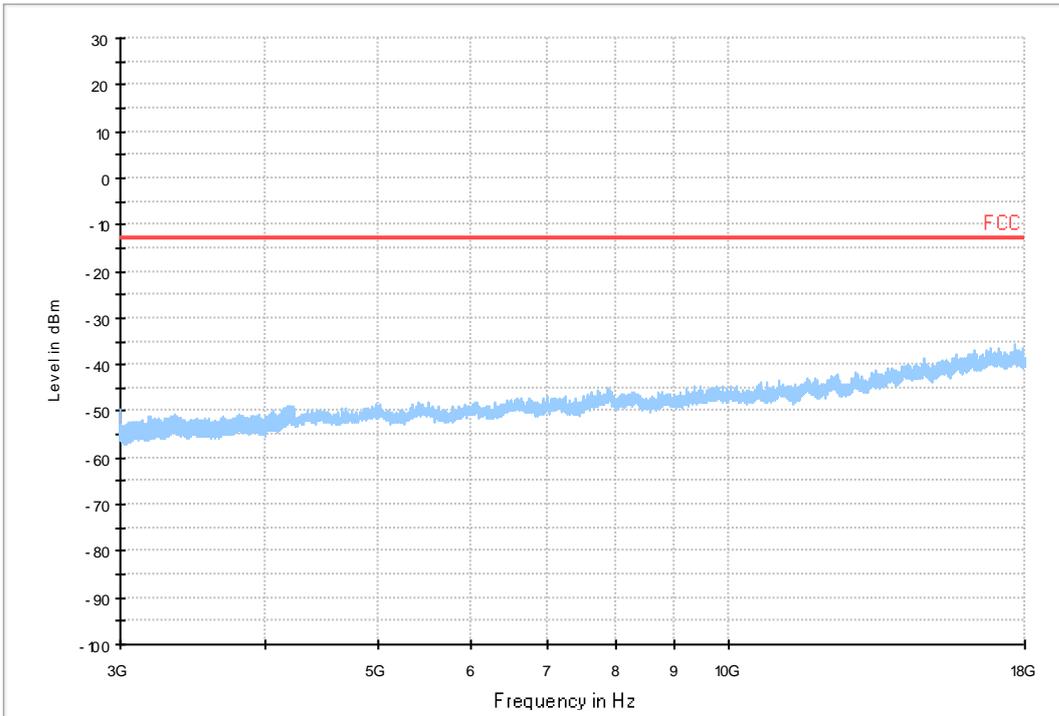
##### 7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART 22 GS M850\_L

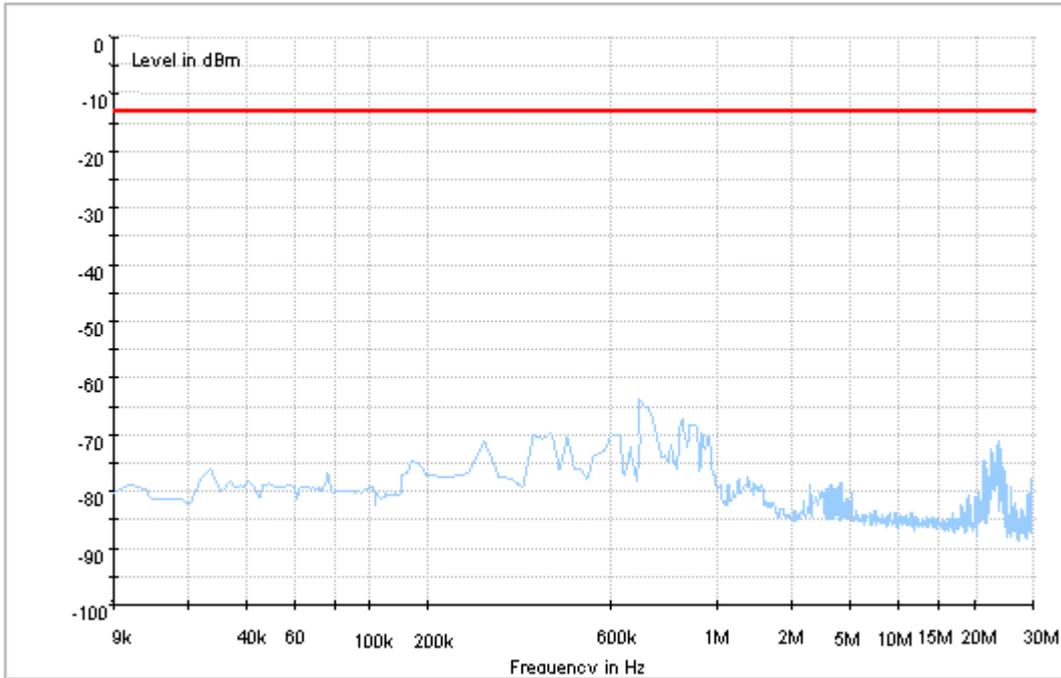


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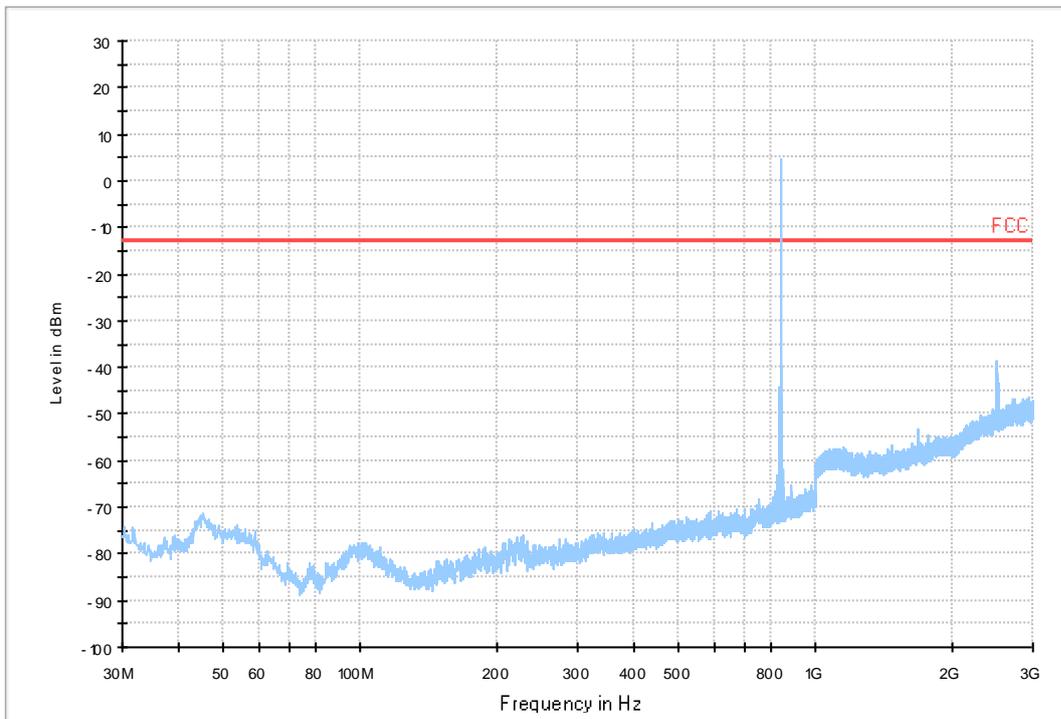


### 7.1.2 Test Band = GSM850\_ANT2

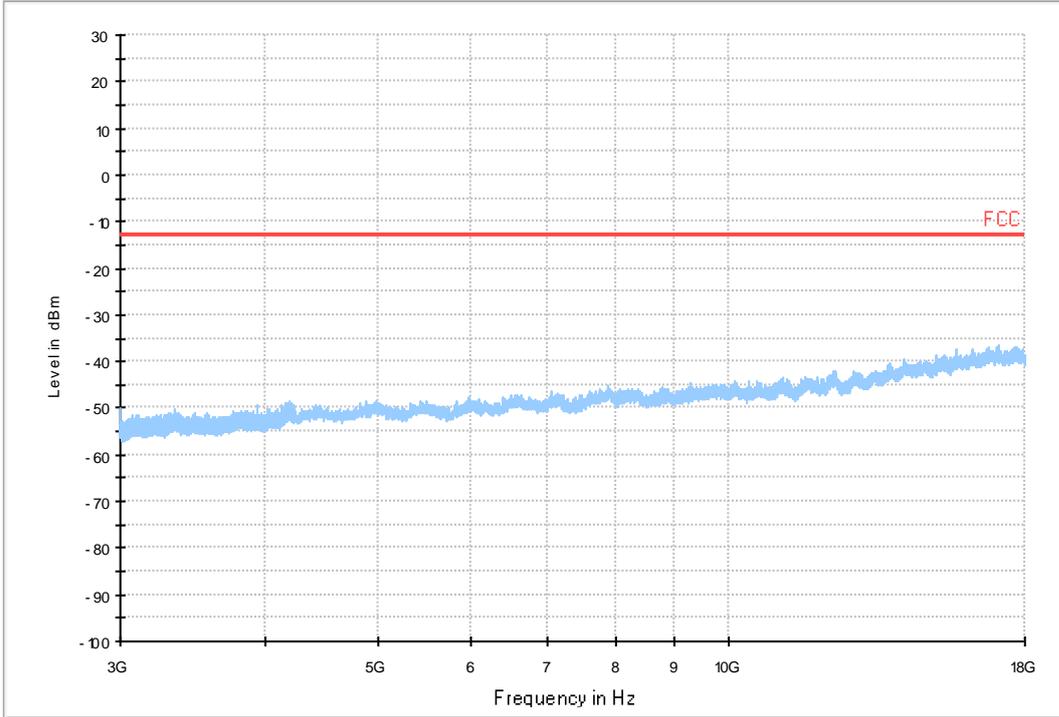
#### 7.1.2.1 Test Mode = GSM/TM1



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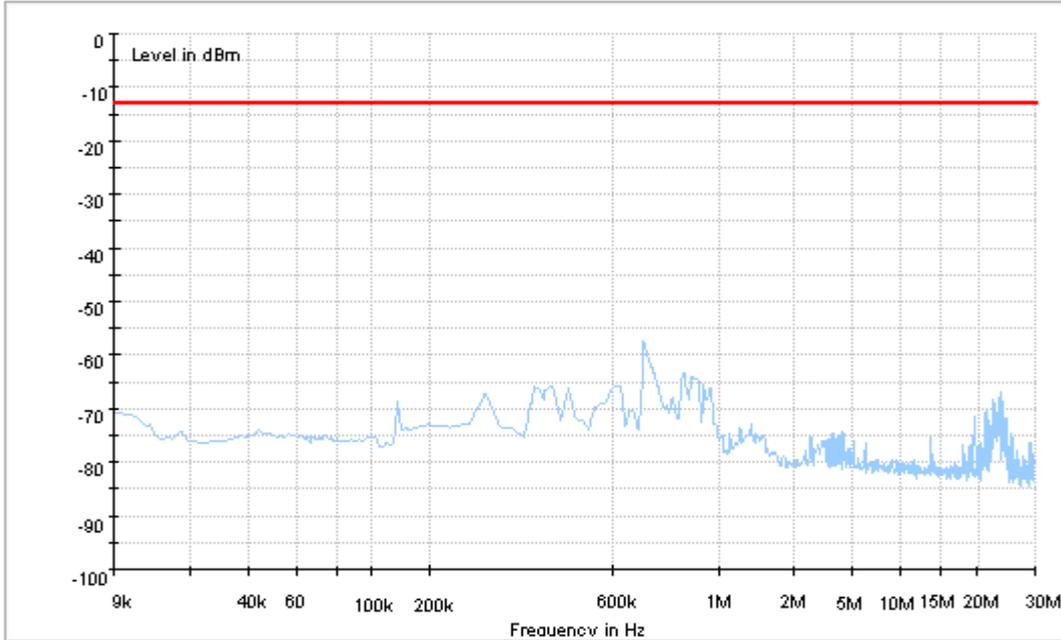


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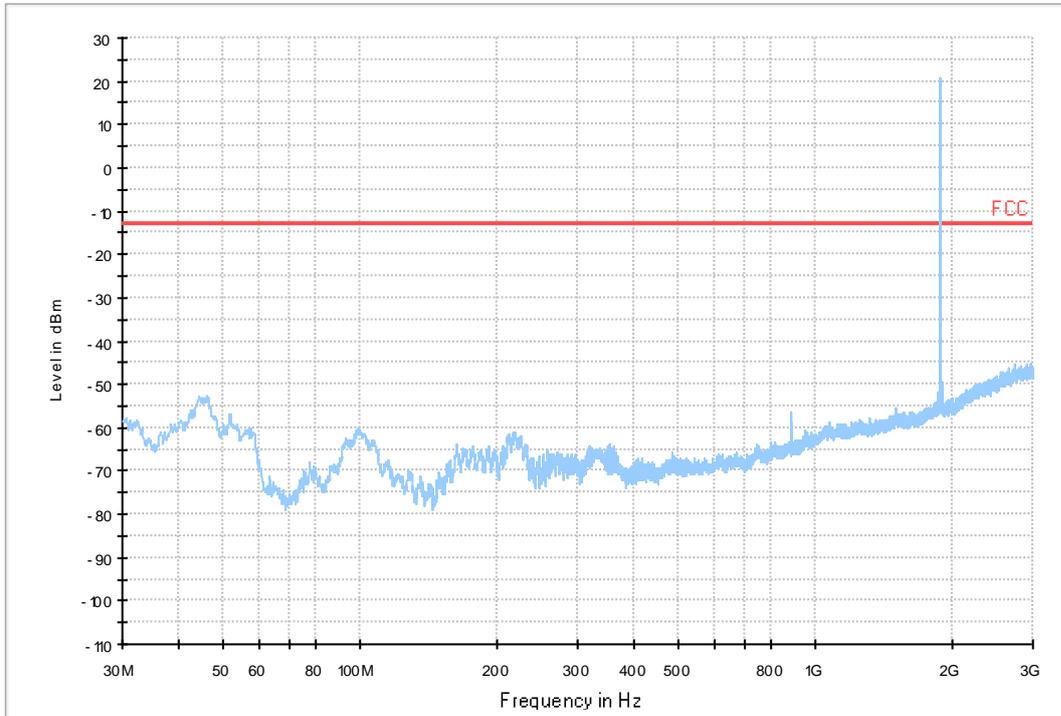


### 7.1.3 Test Band = GSM1900\_ANT1

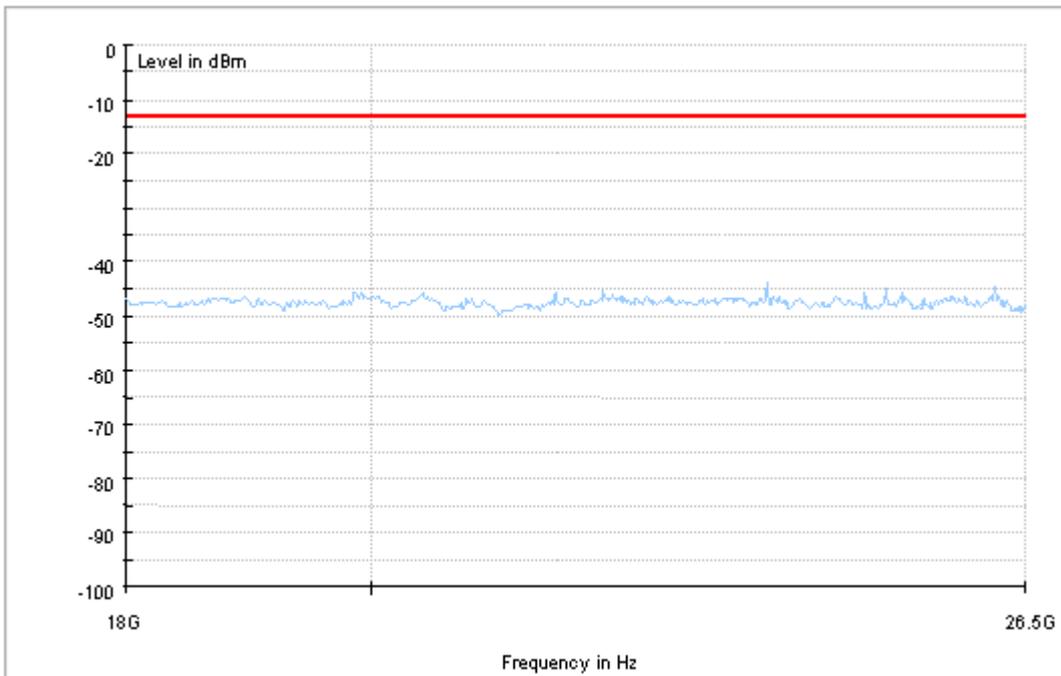
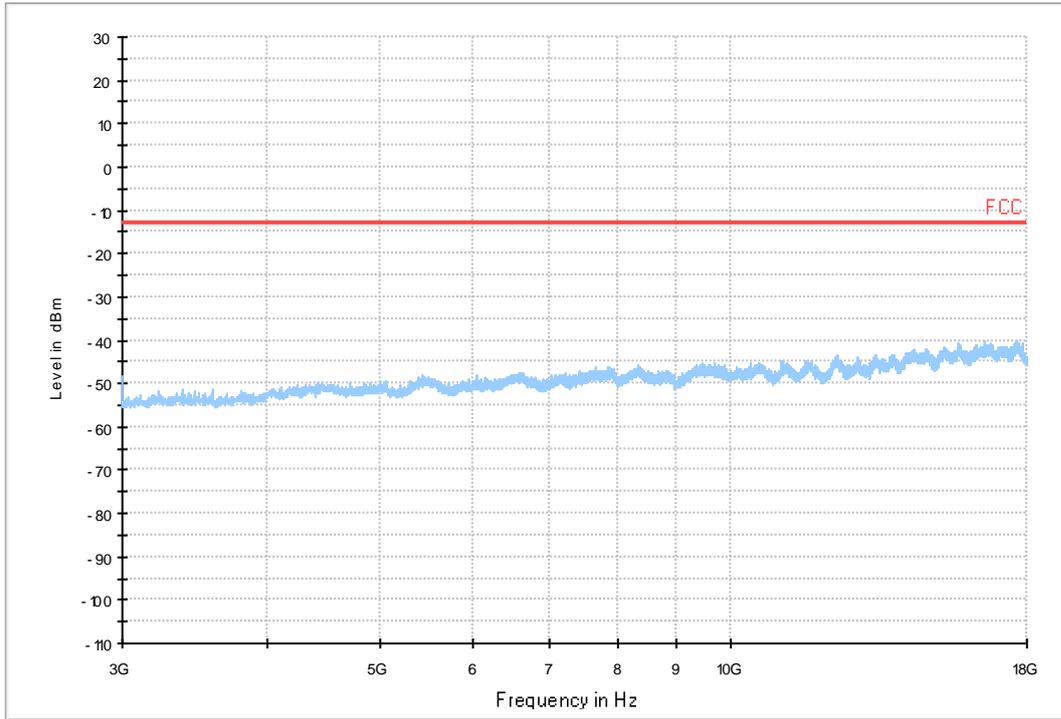
#### 7.1.3.1 Test Mode = GSM/TM1



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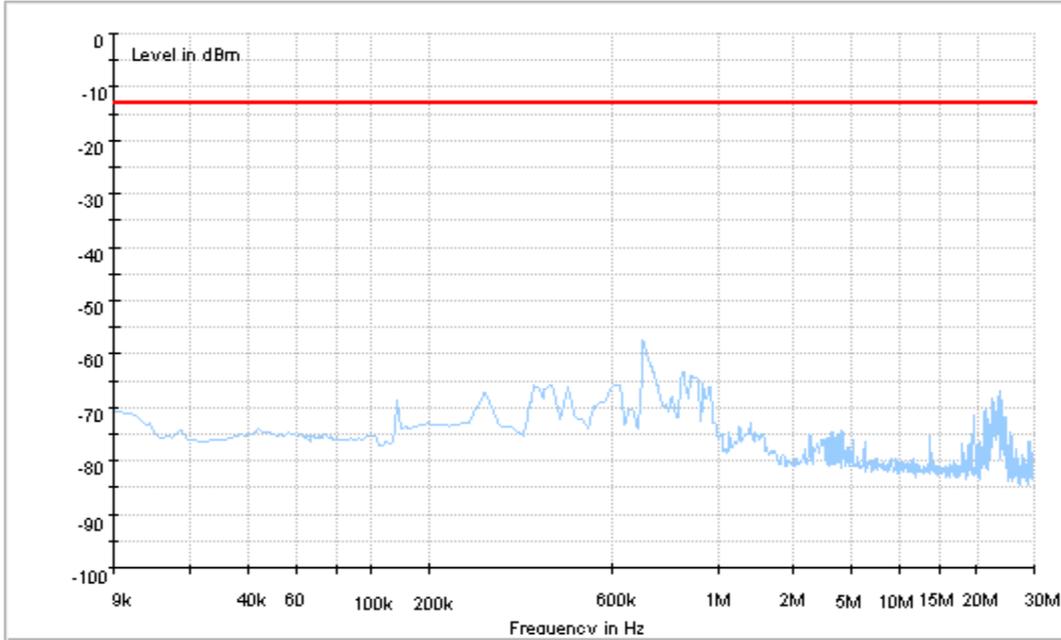


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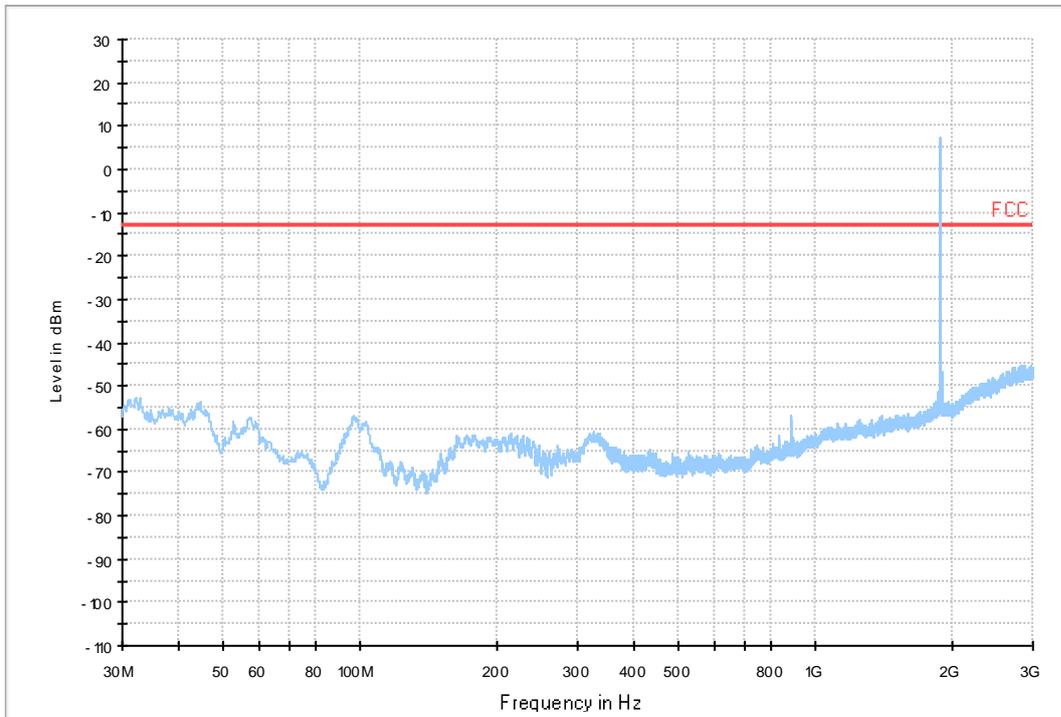


### 7.1.4 Test Band = GSM1900\_ANT2

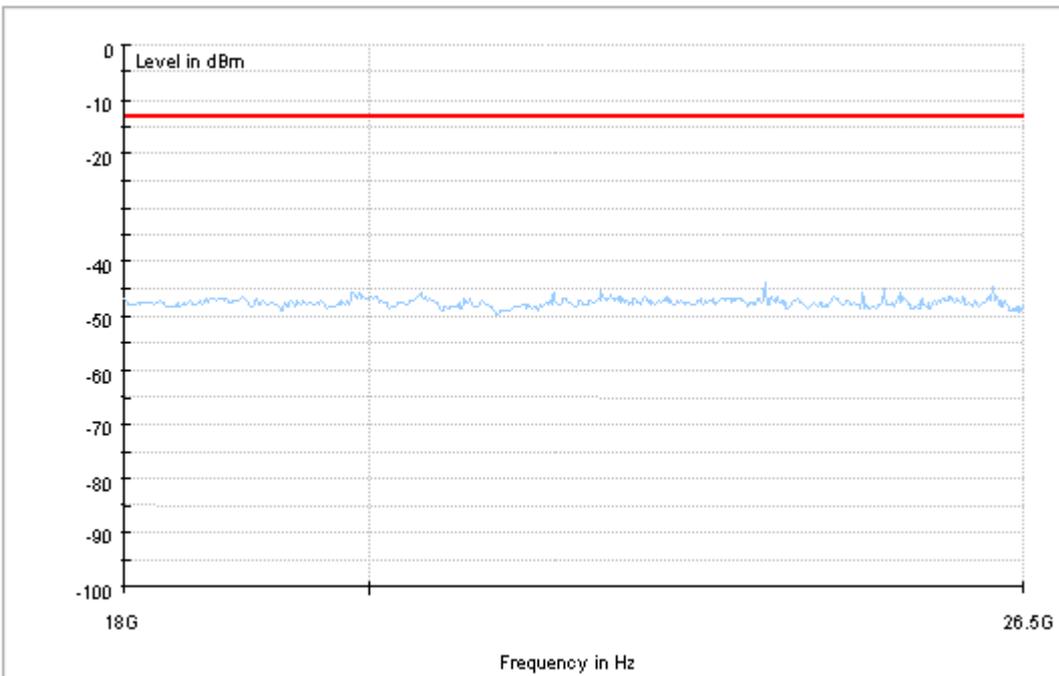
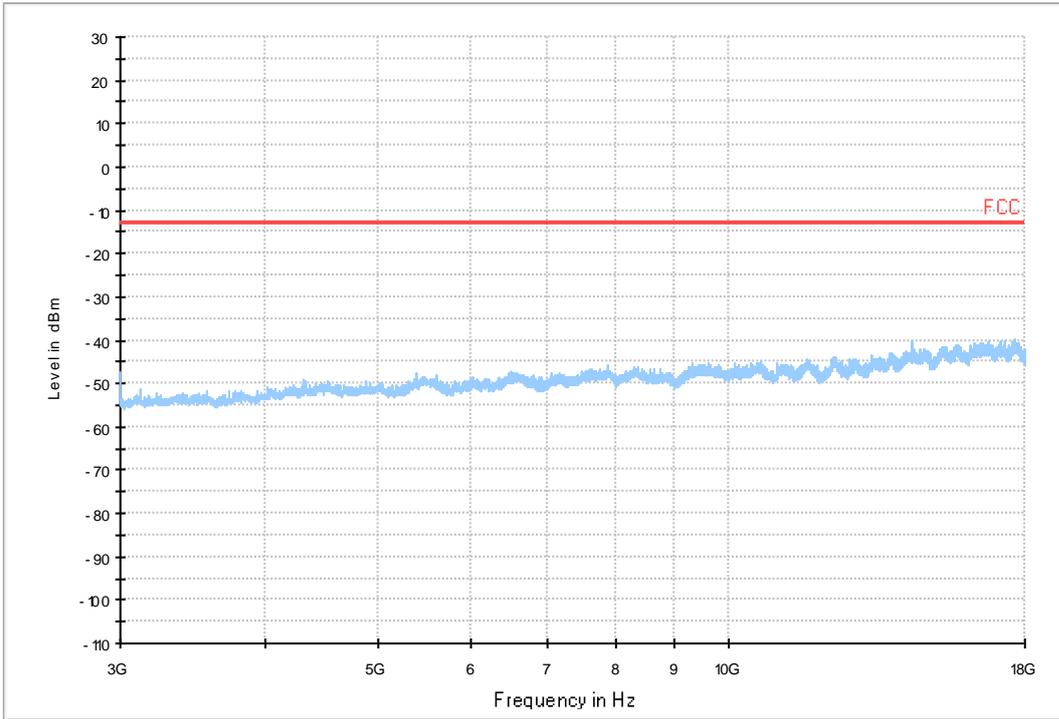
#### 7.1.4.1 Test Mode = GSM/TM1



Copy of FCC PART 24 GSM1900\_L



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## 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	-15.05	-0.01826	PASS
				VN	-14.66	-0.01779	PASS
				VH	-13.56	-0.01645	PASS
		MCH	TN	VL	-5.23	-0.00625	PASS
				VN	-9.69	-0.01158	PASS
				VH	-7.36	-0.0088	PASS
		HCH	TN	VL	-9.17	-0.0108	PASS
				VN	-8.20	-0.00966	PASS
				VH	-8.91	-0.0105	PASS
	GSM/TM2	LCH	TN	VL	-22.08	-0.02679	PASS
				VN	-14.40	-0.01747	PASS
				VH	-15.82	-0.01919	PASS
		MCH	TN	VL	-15.69	-0.01875	PASS
				VN	-11.33	-0.01354	PASS
				VH	-15.34	-0.01834	PASS
		HCH	TN	VL	-10.23	-0.01205	PASS
				VN	-7.72	-0.0091	PASS
				VH	-14.50	-0.01708	PASS
GSM1900	GSM/TM1	LCH	TN	VL	8.52	0.0046	PASS
				VN	4.33	0.00234	PASS
				VH	11.82	0.00639	PASS
		MCH	TN	VL	20.08	0.01068	PASS
				VN	12.01	0.00639	PASS
				VH	12.79	0.0068	PASS
		HCH	TN	VL	19.95	0.01045	PASS
				VN	19.63	0.01028	PASS
				VH	19.11	0.01001	PASS
	GSM/TM2	LCH	TN	VL	-19.60	-0.01059	PASS
				VN	3.55	0.00192	PASS
				VH	-2.71	-0.00146	PASS
		MCH	TN	VL	0.52	0.00028	PASS
				VN	-4.71	-0.00251	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	-3.03	-0.00161	PASS
		HCH	TN	VL	-6.84	-0.00358	PASS
				VN	-3.49	-0.00183	PASS
				VH	7.30	0.00382	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	-11.04	-0.01339	PASS
				-20	-9.56	-0.0116	PASS
				-10	-10.14	-0.0123	PASS
				0	-9.62	-0.01167	PASS
				10	-9.36	-0.01136	PASS
				20	-8.85	-0.01074	PASS
				30	-8.91	-0.01081	PASS
				40	-11.24	-0.01364	PASS
		50	-10.65	-0.01292	PASS		
		MCH	VN	-30	-5.10	-0.0061	PASS
				-20	-5.36	-0.00641	PASS
				-10	-6.97	-0.00833	PASS
				0	-7.43	-0.00888	PASS
				10	-8.20	-0.0098	PASS
				20	-10.33	-0.01235	PASS
				30	-2.26	-0.0027	PASS
				40	-3.36	-0.00402	PASS
		50	-7.81	-0.00934	PASS		
		HCH	VN	-30	-9.75	-0.01149	PASS
				-20	-6.39	-0.00753	PASS
				-10	-6.91	-0.00814	PASS
				0	-1.81	-0.00213	PASS
				10	-8.27	-0.00974	PASS
				20	-9.10	-0.01072	PASS
	30			-9.17	-0.0108	PASS	
	40			-9.36	-0.01103	PASS	
	50	-3.16	-0.00372	PASS			
	GSM/TM2	LCH	VN	-30	-14.24	-0.01728	PASS
				-20	-8.30	-0.01007	PASS
				-10	-15.21	-0.01845	PASS
				0	-12.82	-0.01555	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				10	-11.04	-0.01339	PASS						
				20	-6.75	-0.00819	PASS						
				30	-12.85	-0.01559	PASS						
				40	-14.17	-0.01719	PASS						
				50	-13.50	-0.01638	PASS						
		MCH	VN			-30	-8.75	-0.01046	PASS				
						-20	-12.88	-0.0154	PASS				
						-10	-14.56	-0.0174	PASS				
						0	-5.62	-0.00672	PASS				
						10	-5.88	-0.00703	PASS				
						20	-5.75	-0.00687	PASS				
						30	-9.46	-0.01131	PASS				
						40	-6.65	-0.00795	PASS				
						50	-6.52	-0.00779	PASS				
						HCH	VN			-30	-14.79	-0.01742	PASS
		-20	-5.20	-0.00613	PASS								
		-10	-13.08	-0.01541	PASS								
		0	-15.21	-0.01792	PASS								
		10	-17.14	-0.02019	PASS								
		20	-12.07	-0.01422	PASS								
		30	-8.94	-0.01053	PASS								
		40	-4.68	-0.00551	PASS								
		50	-14.43	-0.017	PASS								
		GSM1900	GSM/TM1	LCH	VN								
										-30	12.46	0.00673	PASS
										-20	17.37	0.00939	PASS
										-10	7.75	0.00419	PASS
0	3.75									0.00203	PASS		
10	-1.23									-0.00066	PASS		
20	9.23									0.00499	PASS		
30	5.88									0.00318	PASS		
40	0.90									0.00049	PASS		
50	-0.26			-0.00014	PASS								
MCH	VN												
										-30	30.35	0.01614	PASS
										-20	22.79	0.01212	PASS
										-10	13.43	0.00714	PASS
										0	26.80	0.01426	PASS
										10	13.30	0.00707	PASS
										20	26.15	0.01391	PASS
										30	21.57	0.01147	PASS
		40	17.50							0.00931	PASS		



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	27.51	0.01463	PASS
				-30	19.82	0.01038	PASS
				-20	19.63	0.01028	PASS
				-10	15.17	0.00794	PASS
				0	22.21	0.01163	PASS
				10	14.27	0.00747	PASS
				20	7.04	0.00369	PASS
				30	16.66	0.00872	PASS
				40	15.30	0.00801	PASS
				50	7.75	0.00406	PASS
	GSM/TM2	LCH	VN	-30	-19.24	-0.0104	PASS
				-20	-7.88	-0.00426	PASS
				-10	-6.13	-0.00331	PASS
				0	-7.91	-0.00428	PASS
				10	3.10	0.00168	PASS
				20	-8.52	-0.0046	PASS
				30	0.71	0.00038	PASS
				40	-14.53	-0.00785	PASS
				50	-15.05	-0.00813	PASS
				MCH	VN	-30	-7.39
		-20	8.33			0.00443	PASS
		-10	-1.74			-0.00093	PASS
		0	6.17			0.00328	PASS
		10	-7.39			-0.00393	PASS
		20	3.39			0.0018	PASS
		30	3.55			0.00189	PASS
		40	-0.29			-0.00015	PASS
		50	-0.84			-0.00045	PASS
		HCH	VN			-30	-0.32
				-20	-3.29	-0.00172	PASS
				-10	-6.55	-0.00343	PASS
				0	-5.81	-0.00304	PASS
				10	4.07	0.00213	PASS
				20	1.26	0.00066	PASS
				30	4.91	0.00257	PASS
				40	-6.46	-0.00338	PASS
				50	6.39	0.00335	PASS

END