



# Appendix for test report

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

### Part I - Test Results

Test Band	Test Mode	Test Channel	Conducted Power[dBm]	ERP[dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	33.09	29.34	38.5	PASS
		MCH	33.2	29.45	38.5	PASS
		HCH	33.28	29.53	38.5	PASS
	GSM/TM2	LCH	25.82	22.07	38.5	PASS
		MCH	25.8	22.05	38.5	PASS
		HCH	25.84	22.09	38.5	PASS
Test Band	Test Mode	Test Channel	Conducted Power[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.05	31.55	33	PASS
		MCH	29.87	31.37	33	PASS
		HCH	29.79	31.29	33	PASS
	GSM/TM2	LCH	25.62	27.12	33	PASS
		MCH	25.66	27.16	33	PASS
		HCH	25.61	27.11	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: SET Span=1.5\*OBW

SET RBW=1%of the OBW,not to exceed 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
GSM850	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	2.97	13	PASS
		MCH	3.17	13	PASS
		HCH	2.91	13	PASS
GSM1900	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.14	13	PASS
		MCH	3.11	13	PASS
		HCH	2.91	13	PASS

### 3Appendix\_C: Modulation Characteristics

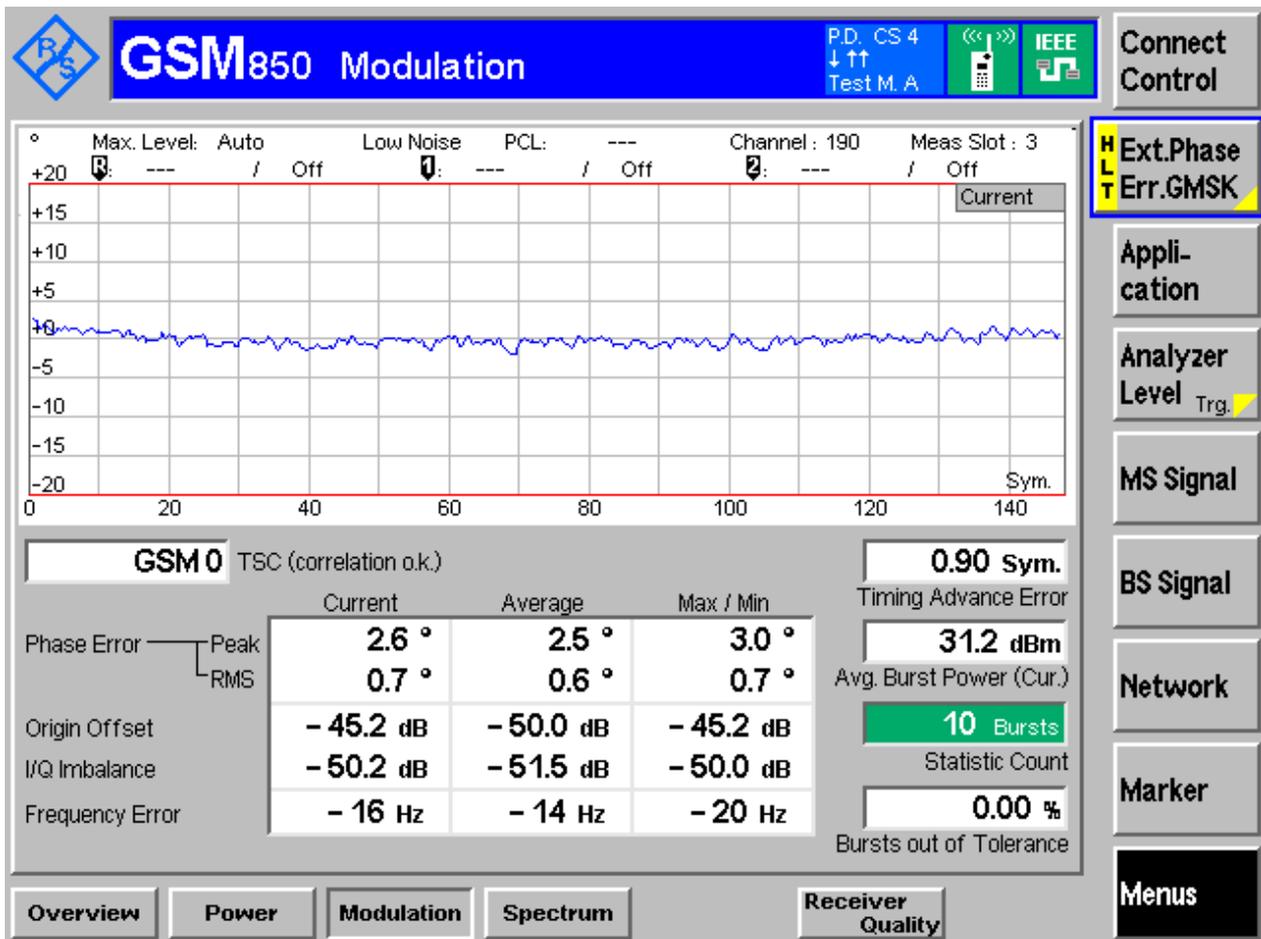
#### Part I - Test Plots

#### 3.1 For GSM

#### 3.1.1 Test Band = GSM850

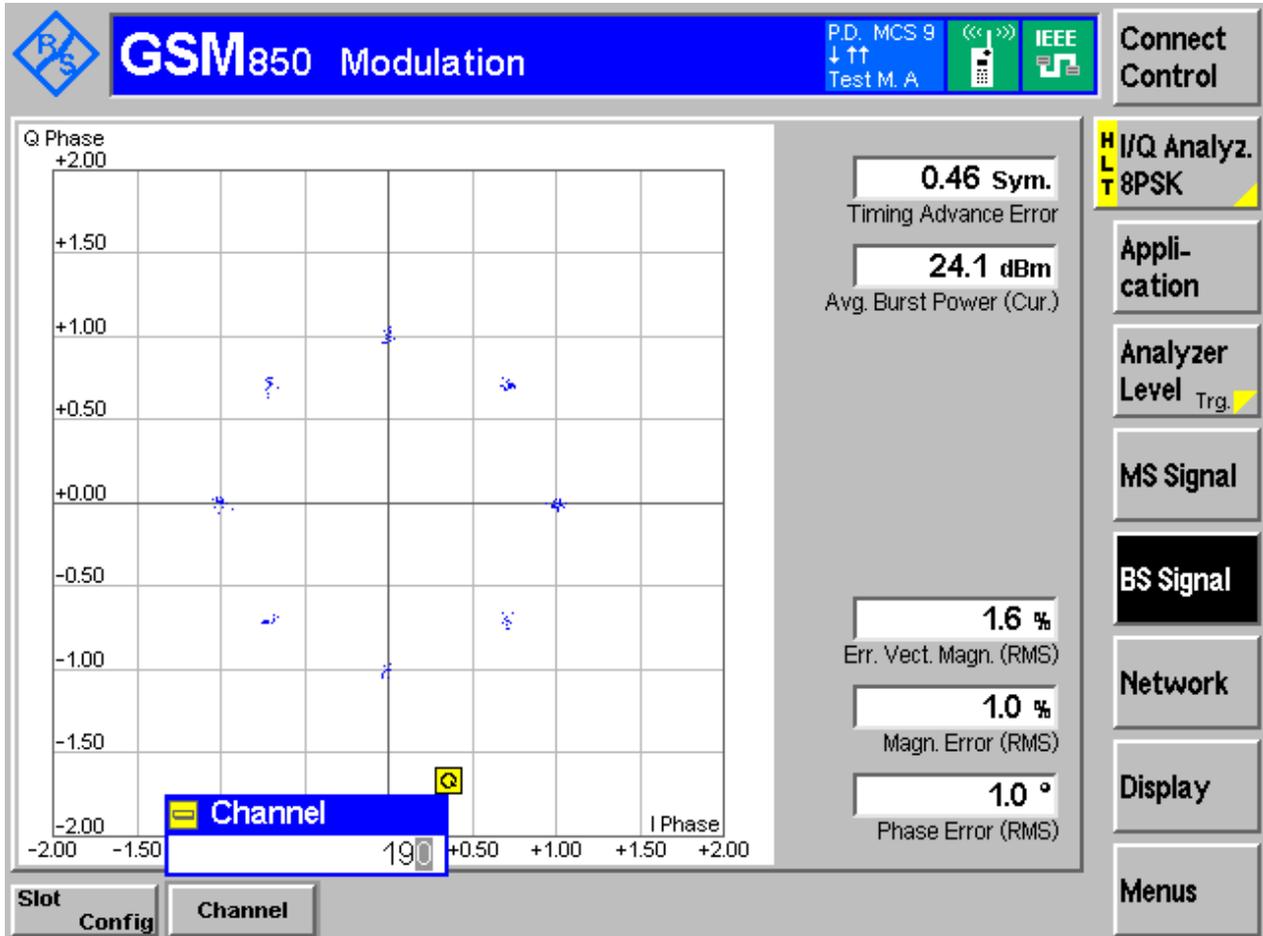
#### 3.1.1.1 Test Mode = GSM/TM1

#### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

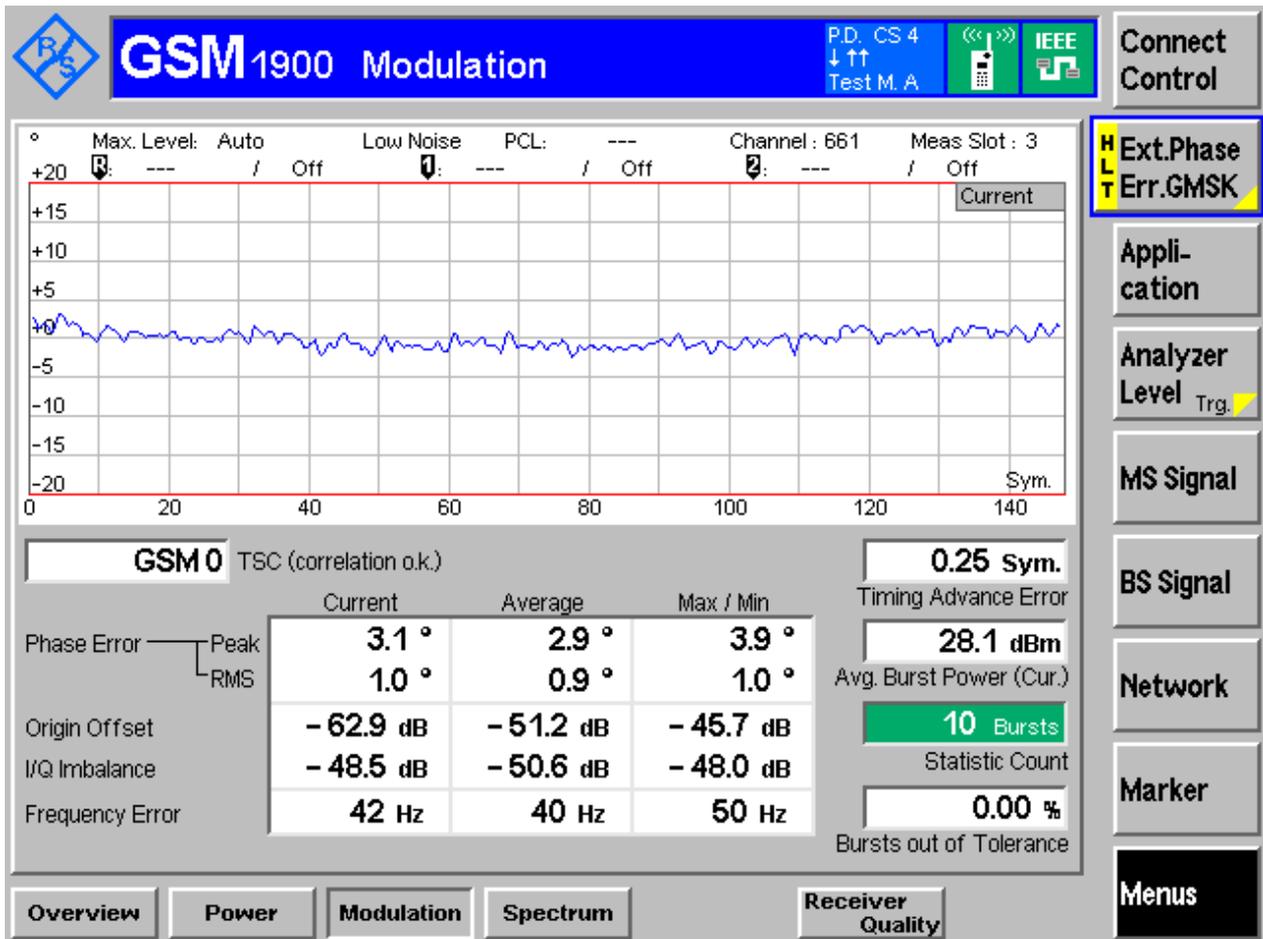
#### 3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

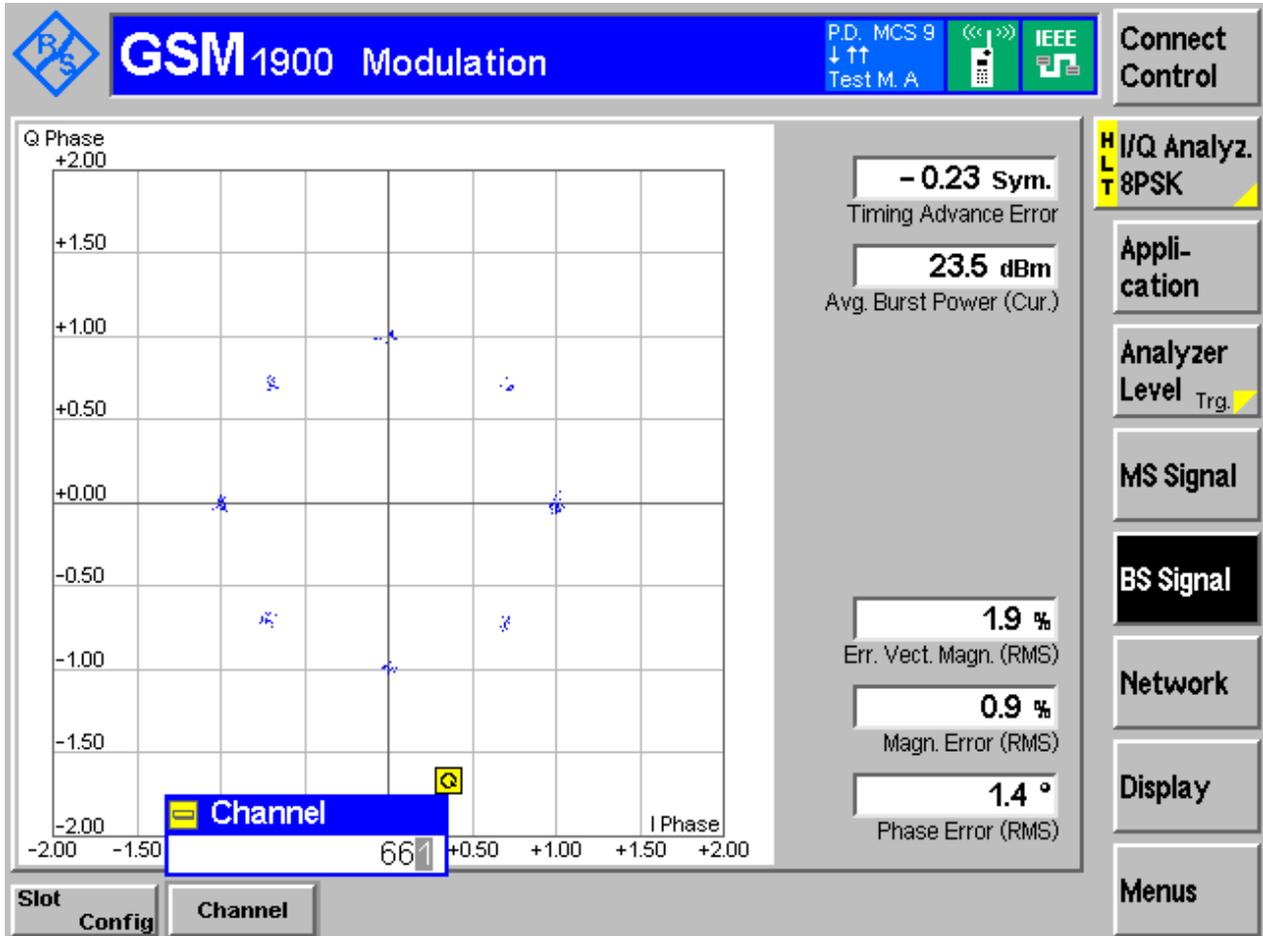
3.1.2.1 Test Mode = GSM/TM1

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	244.94	315.80	Pass
		MCH	244.43	317.2	Pass
		HCH	244.48	313.6	Pass
	GSM/TM2	LCH	249.44	318.2	Pass
		MCH	250.17	314.5	Pass
		HCH	252.41	314.0	Pass
GSM1900	GSM/TM1	LCH	244.11	318.9	Pass
		MCH	249.91	318.0	Pass
		HCH	247.06	314.4	Pass
	GSM/TM2	LCH	246.43	315.2	Pass
		MCH	249.17	323.2	Pass
		HCH	247.60	314.2	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





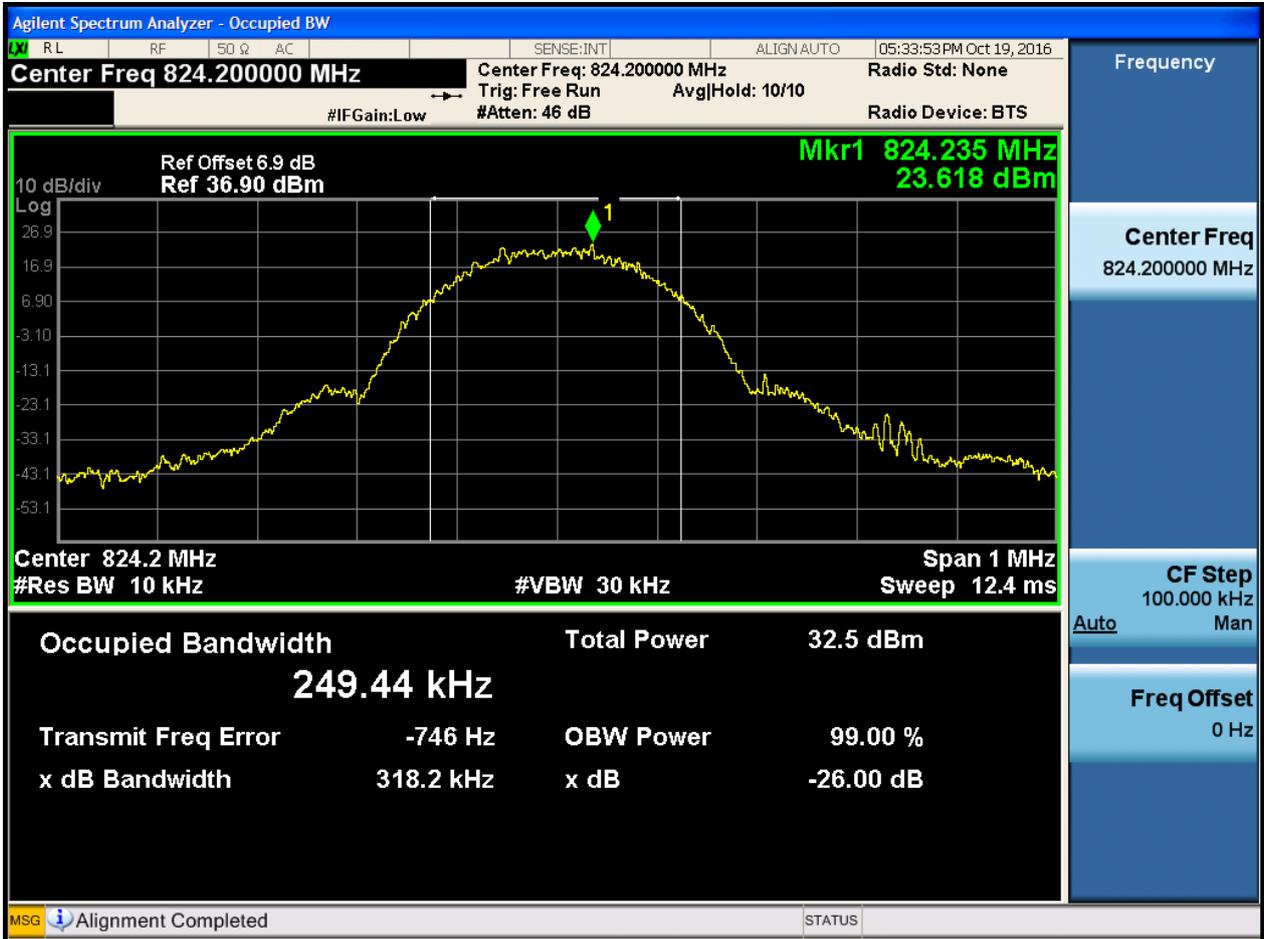
4.1.1.1.3 Test Channel = HCH





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



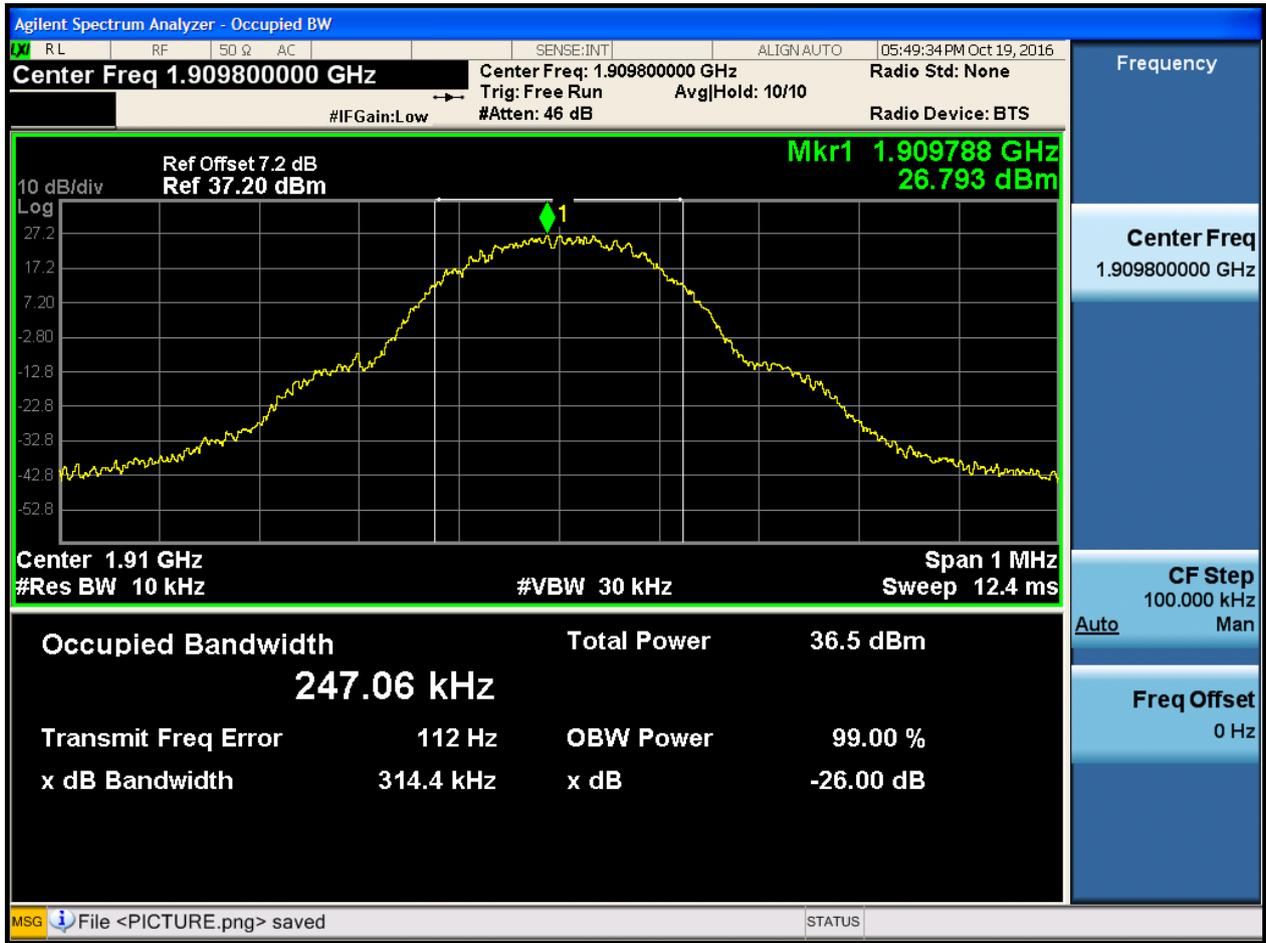


4.1.2.1.2 Test Channel = MCH





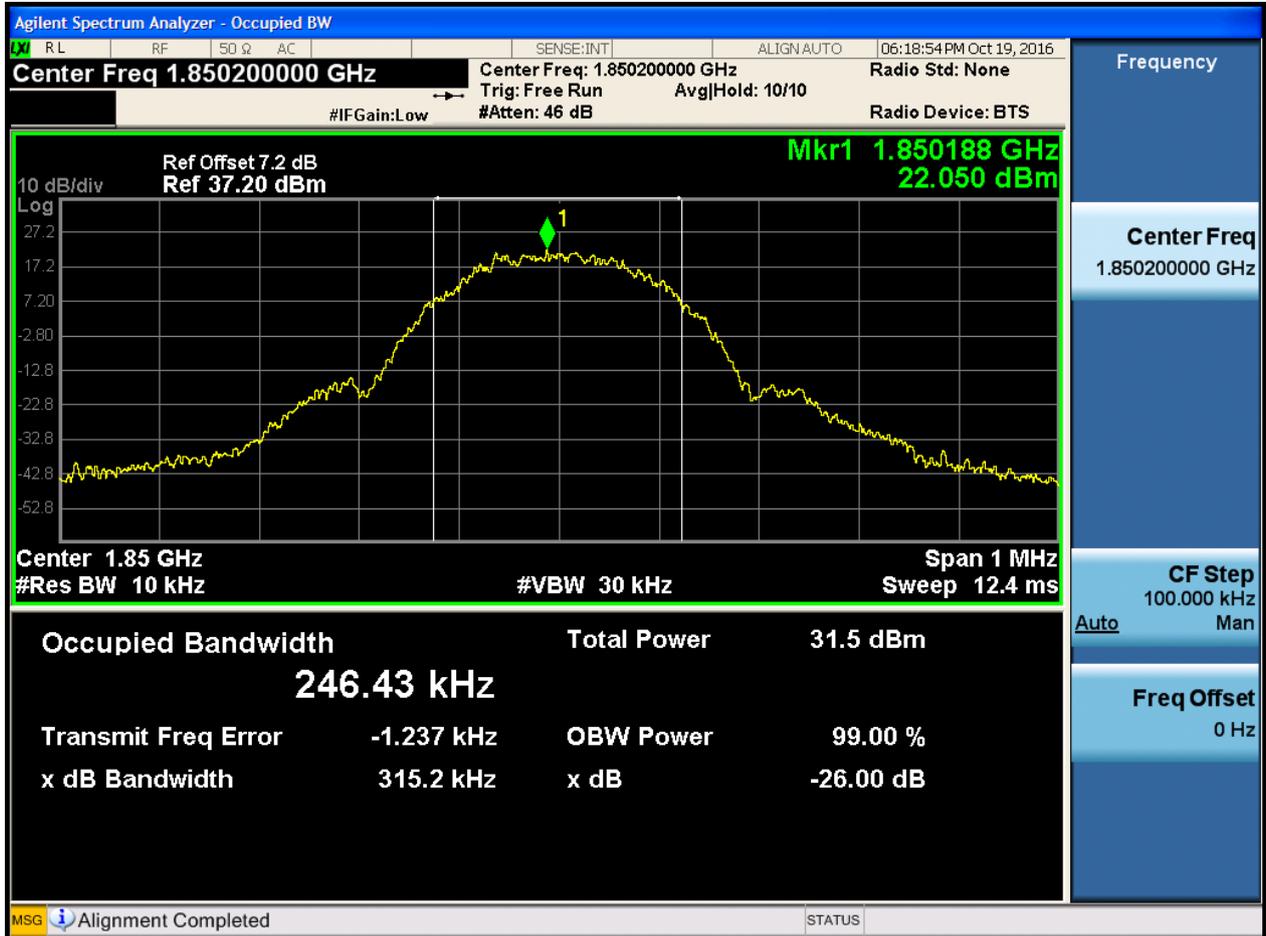
4.1.2.1.3 Test Channel = HCH





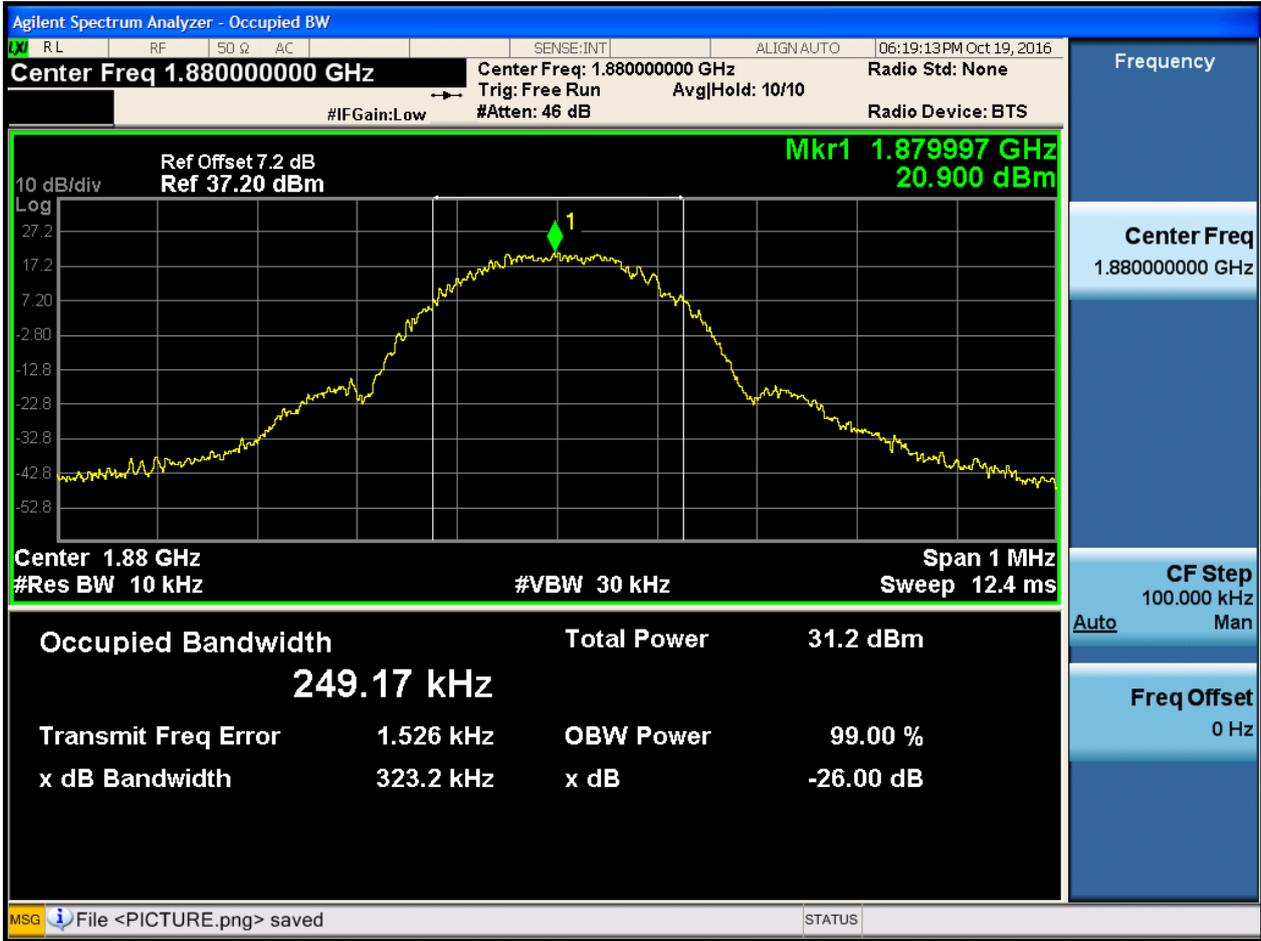
### 4.1.2.3 Test Mode = GSM/TM2

#### 4.1.2.3.1 Test Channel = LCH



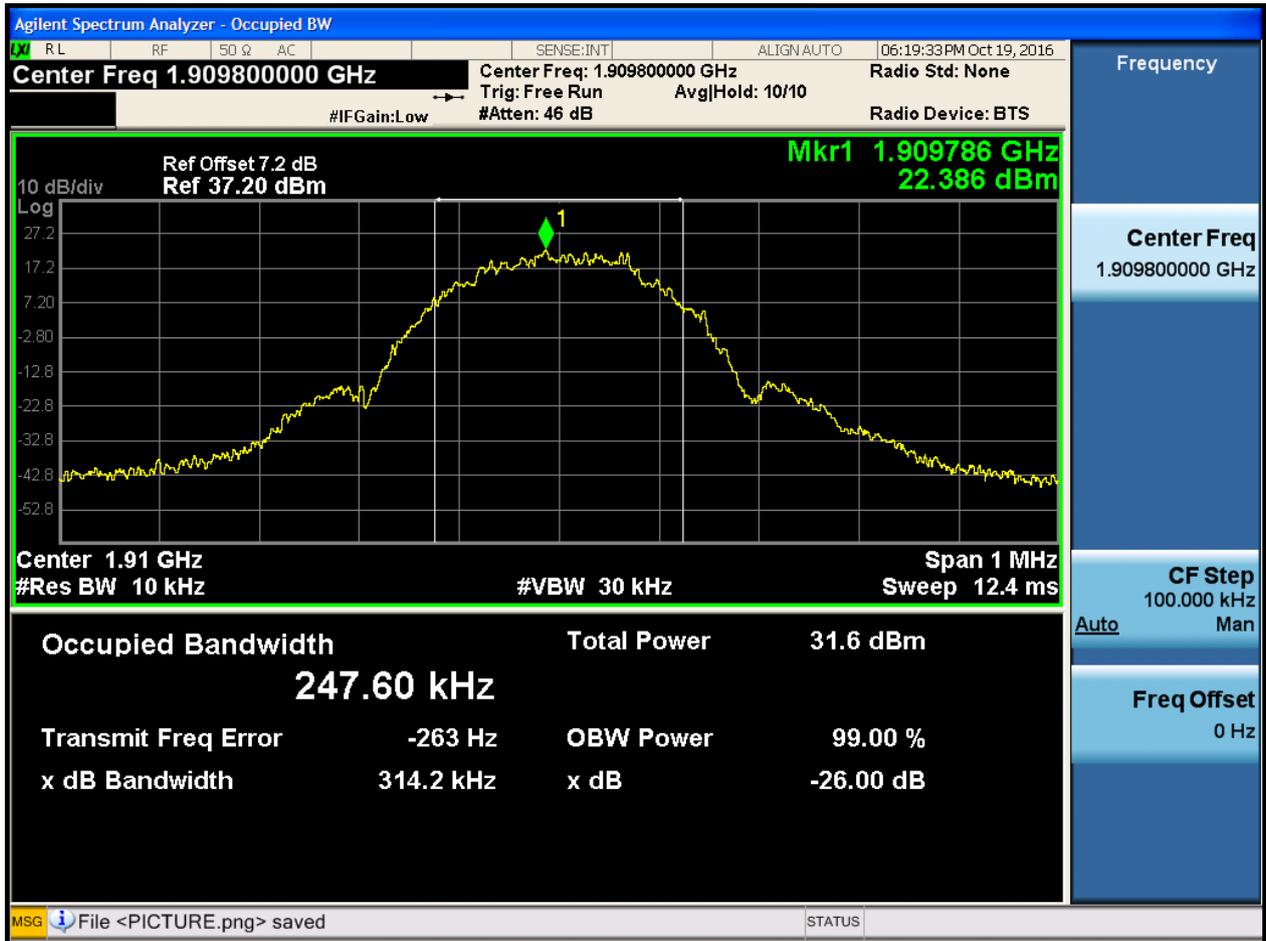


### 4.1.2.3.2 Test Channel = MCH





4.1.2.3.3 Test Channel = HCH





## 5Appendix\_E: Band Edges Compliance

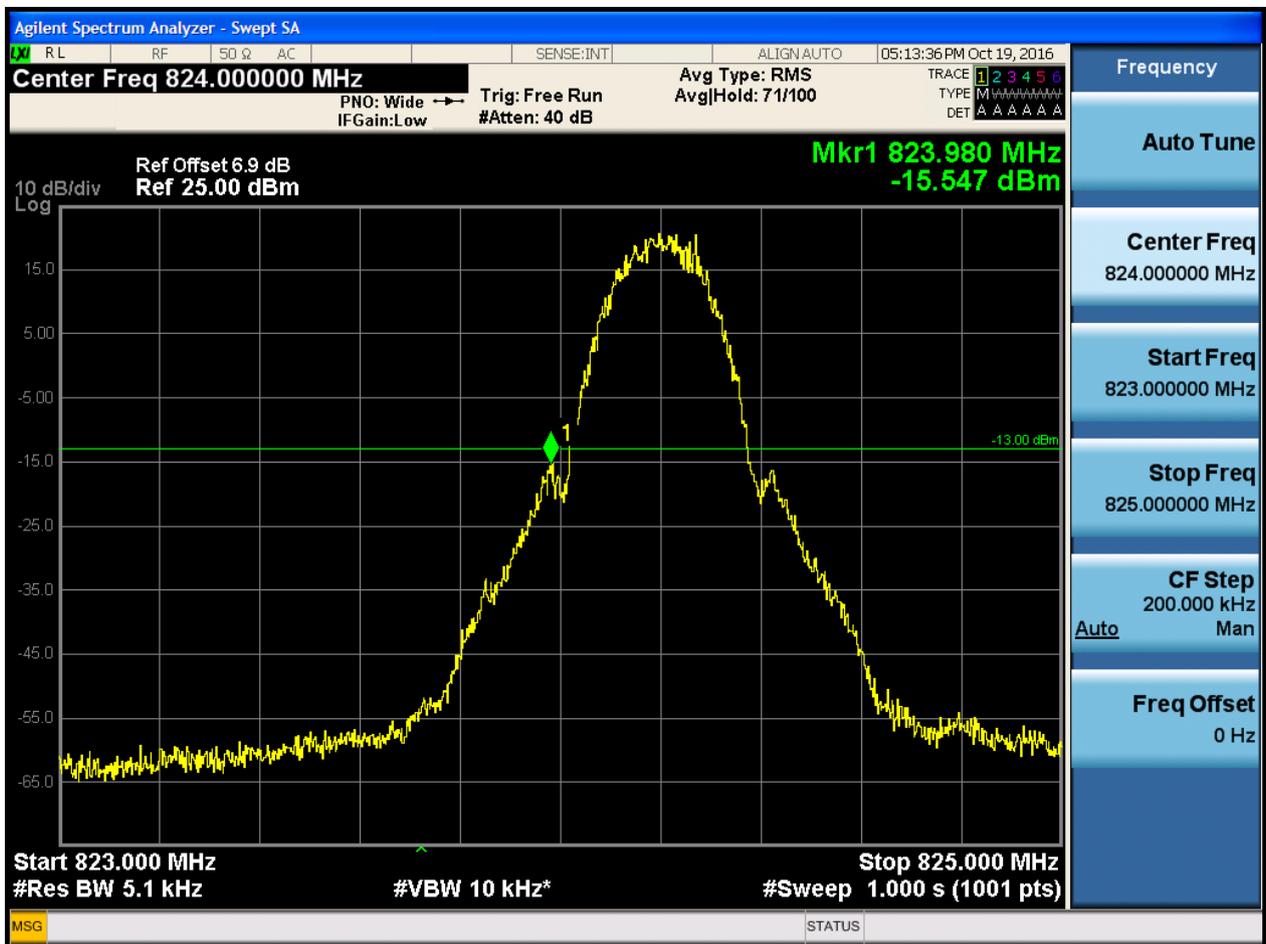
### Part I - Test Plots

#### 5.1 For GSM

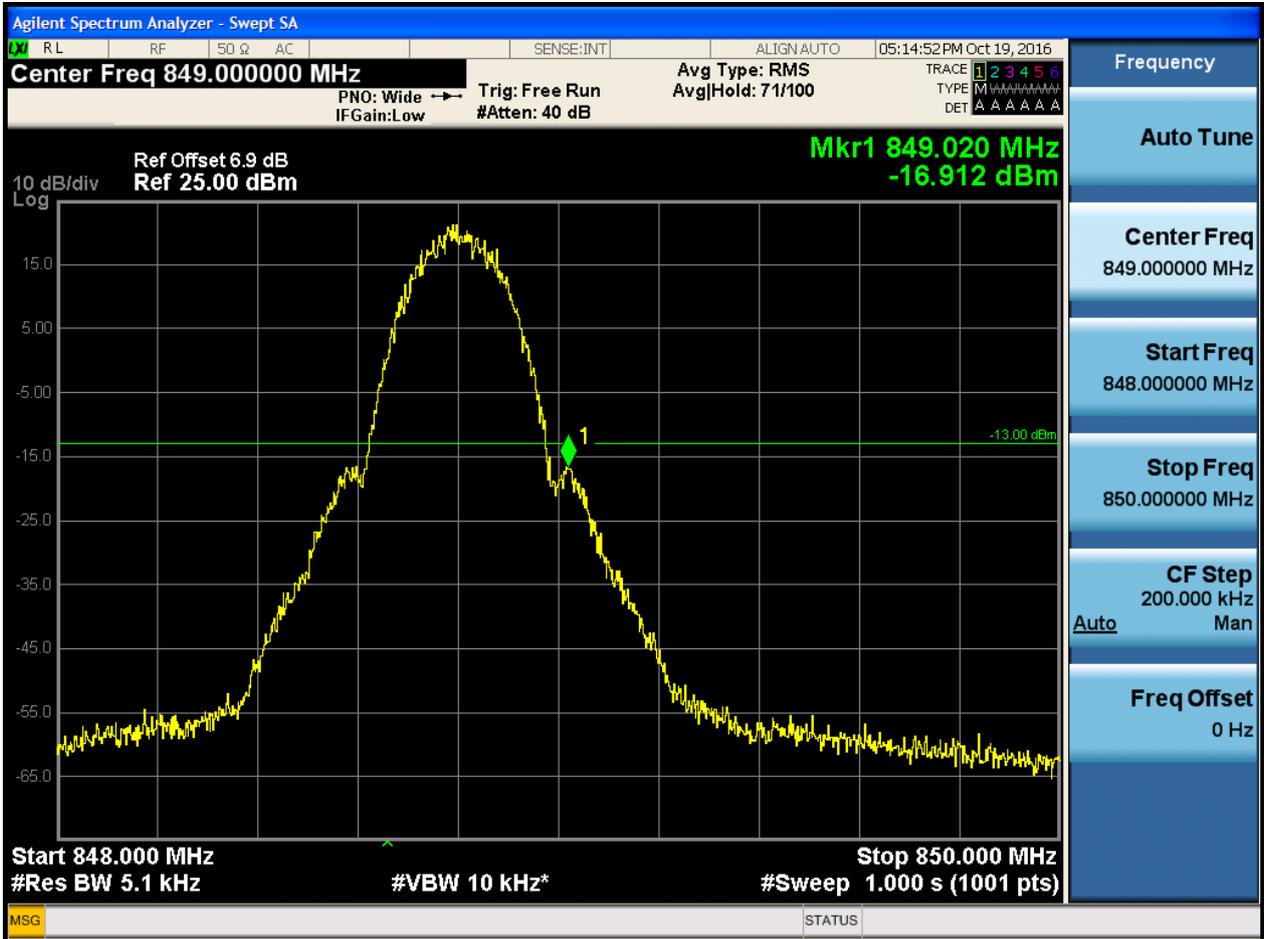
##### 5.1.1 Test Band = GSM850

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

##### 5.1.1.1.1 Test Channel = LCH



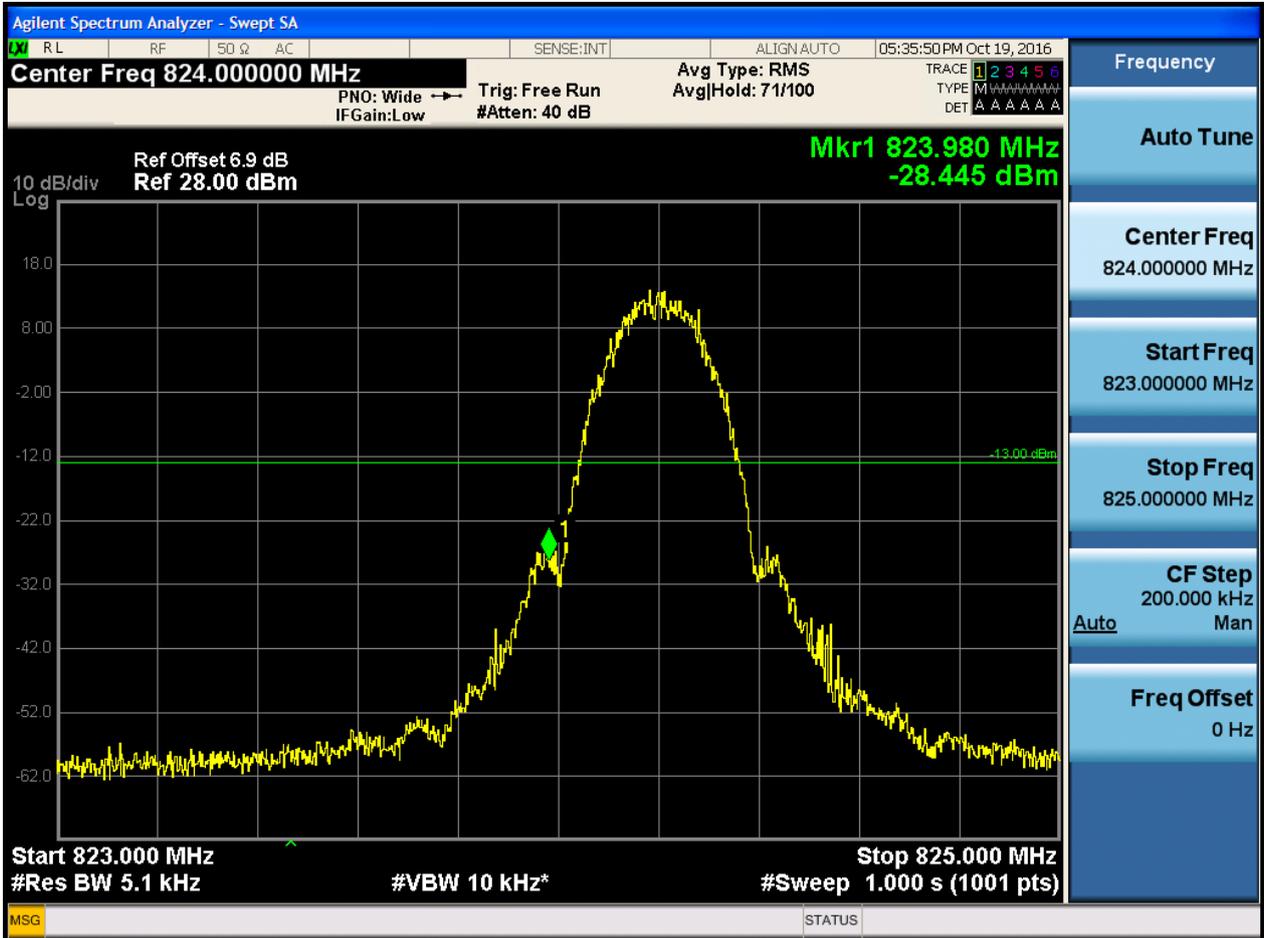
5.1.1.1.2 Test Channel = HCH





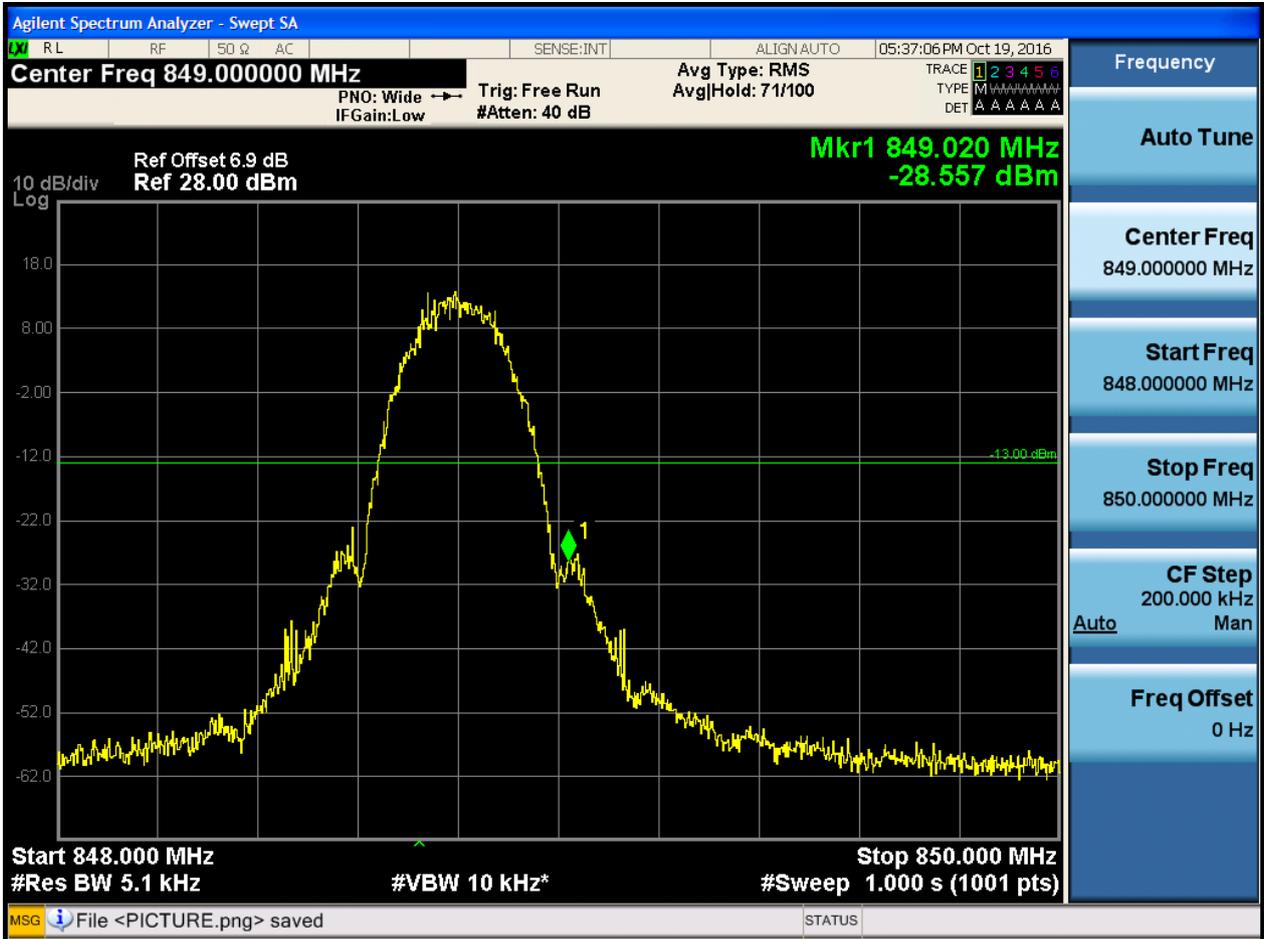
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

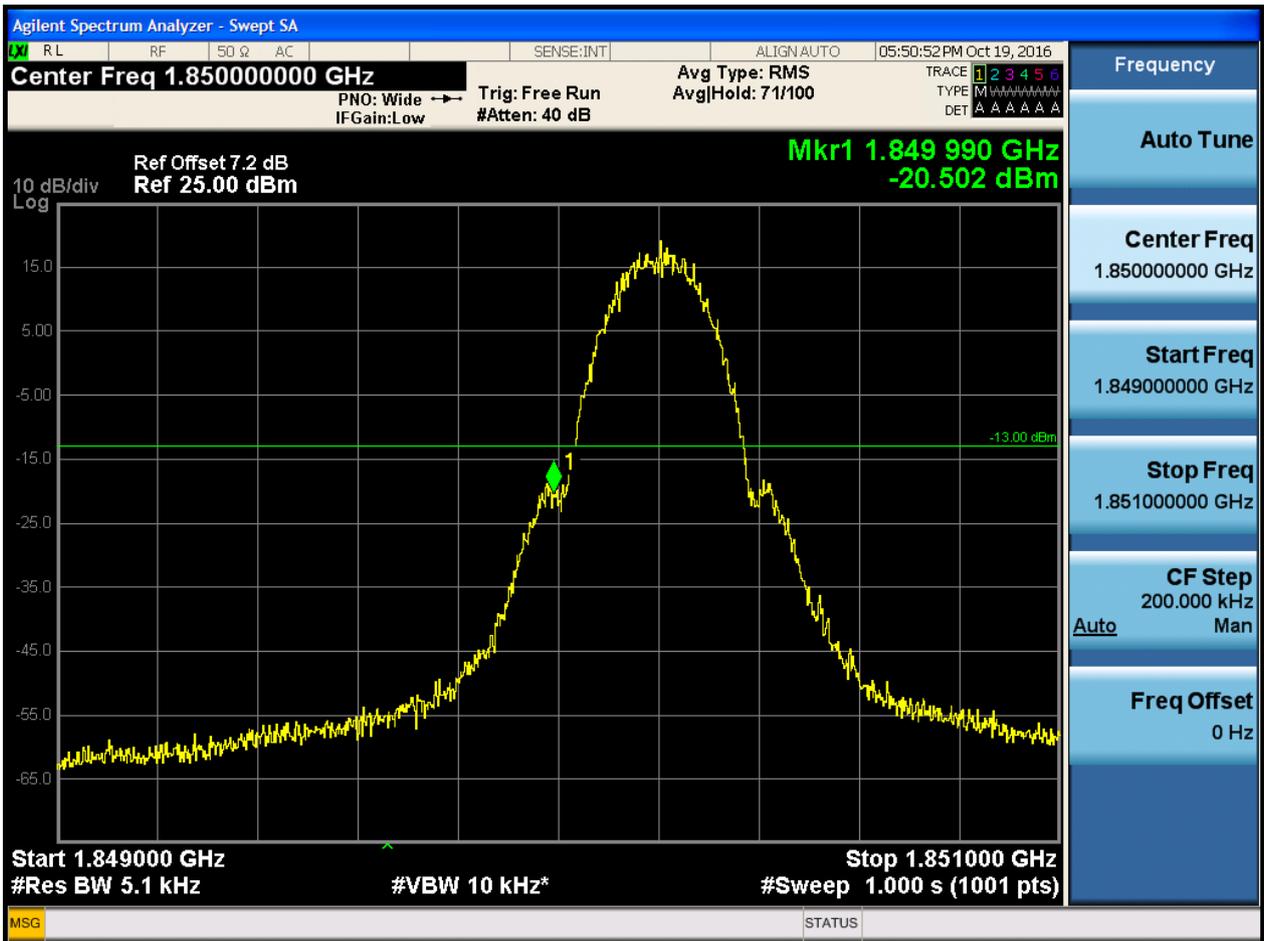




5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

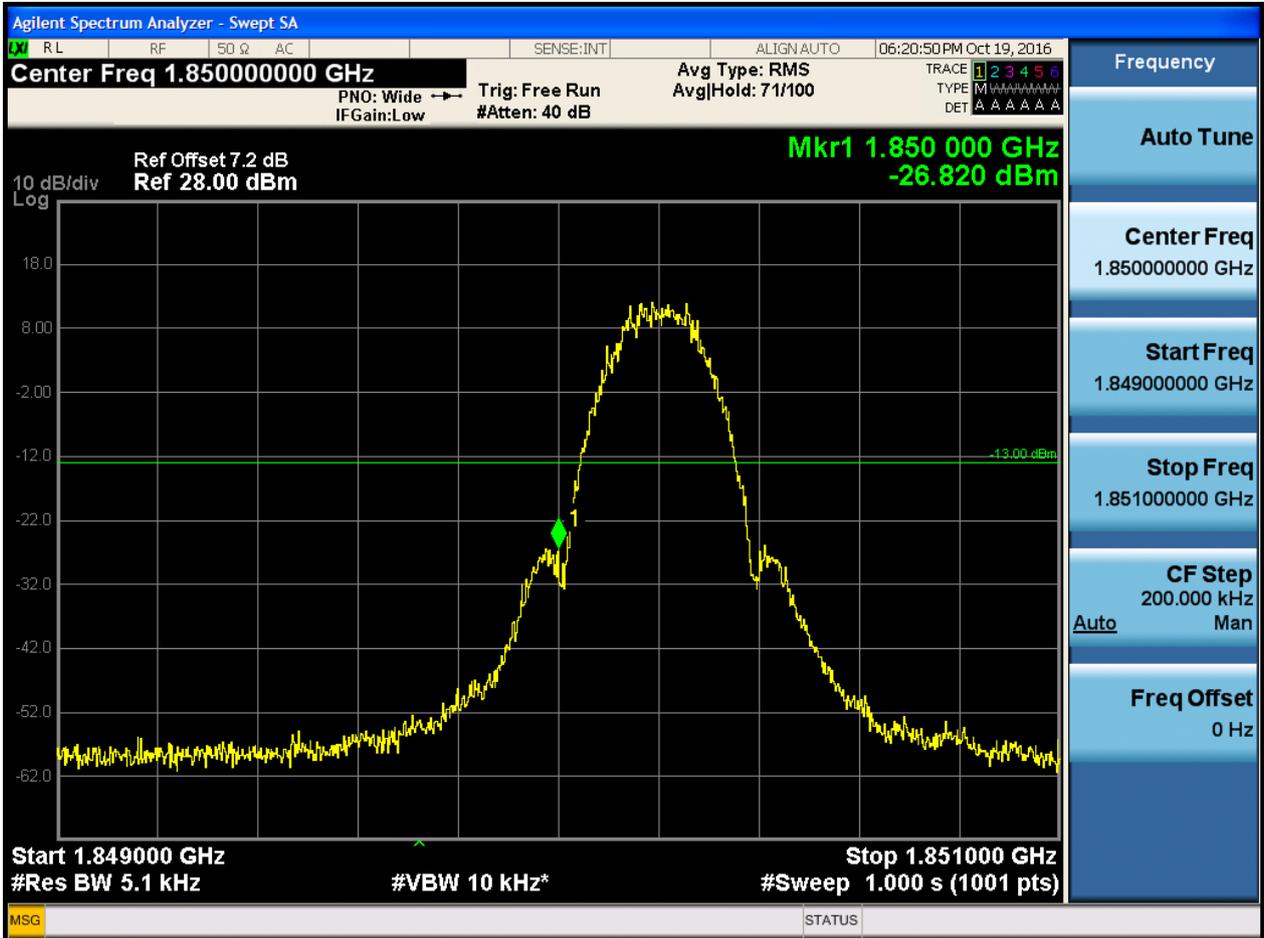






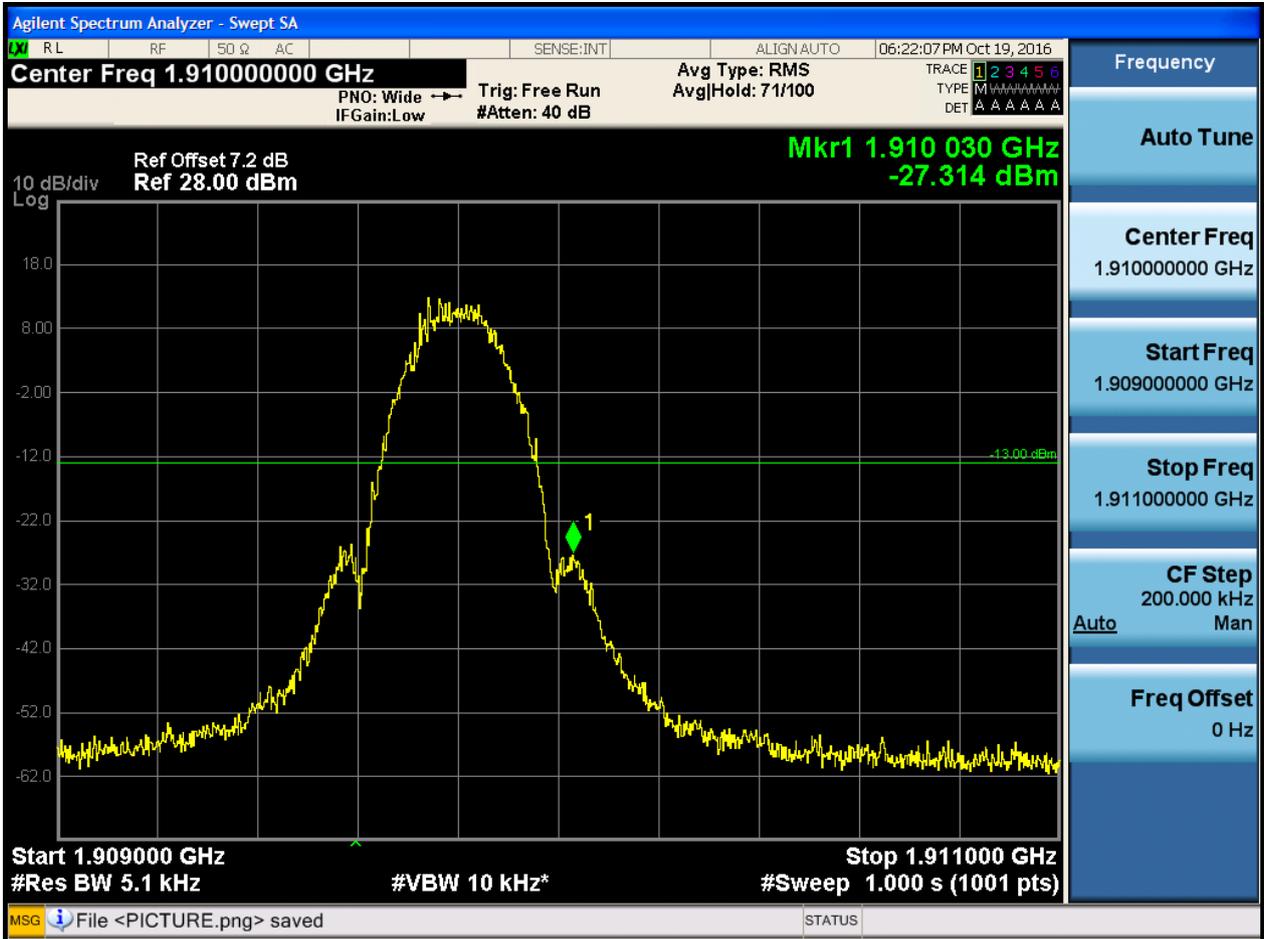
### 5.1.2.2 Test Mode = GSM/TM2

#### 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.

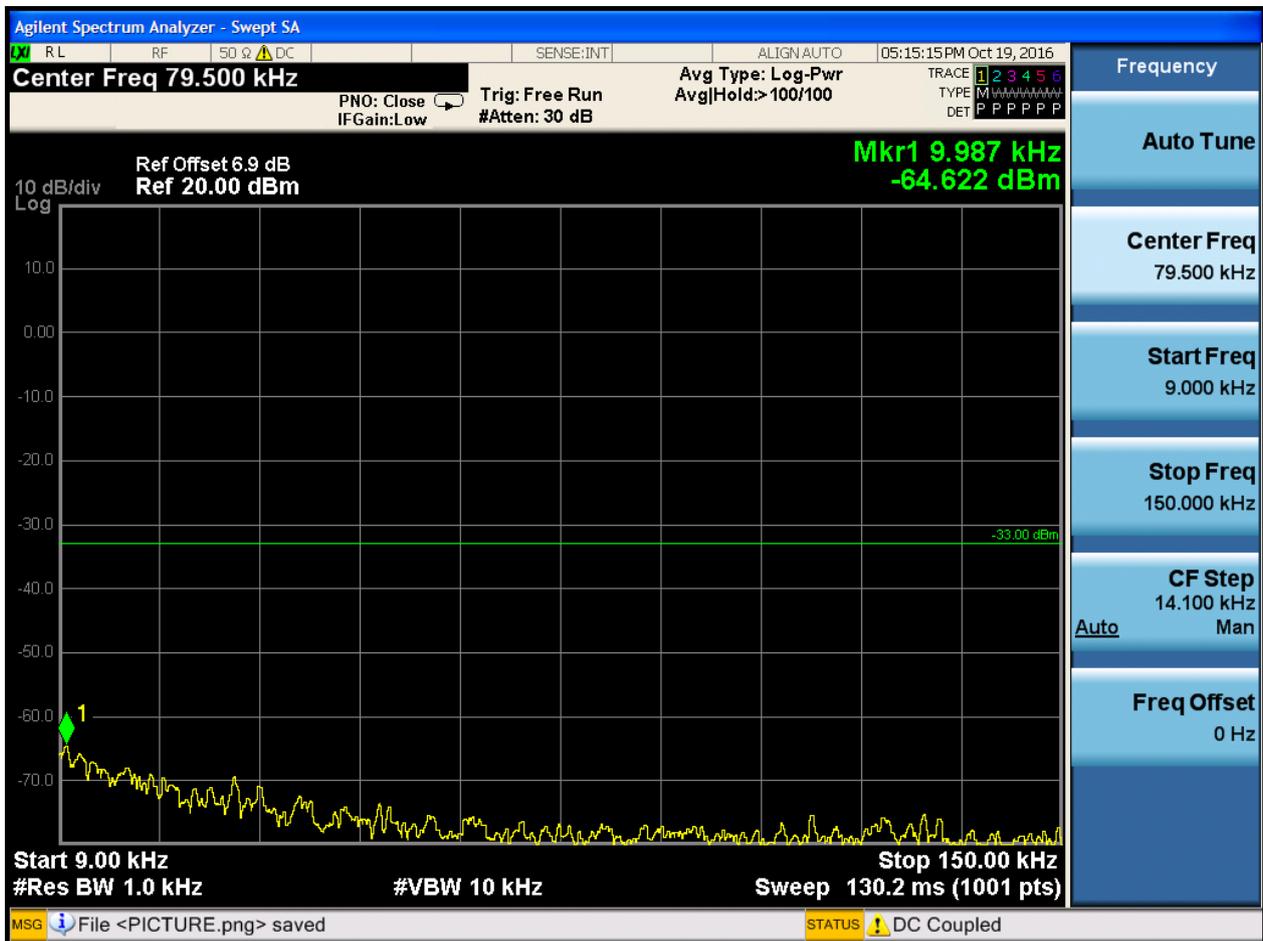
### Part I - Test Plots

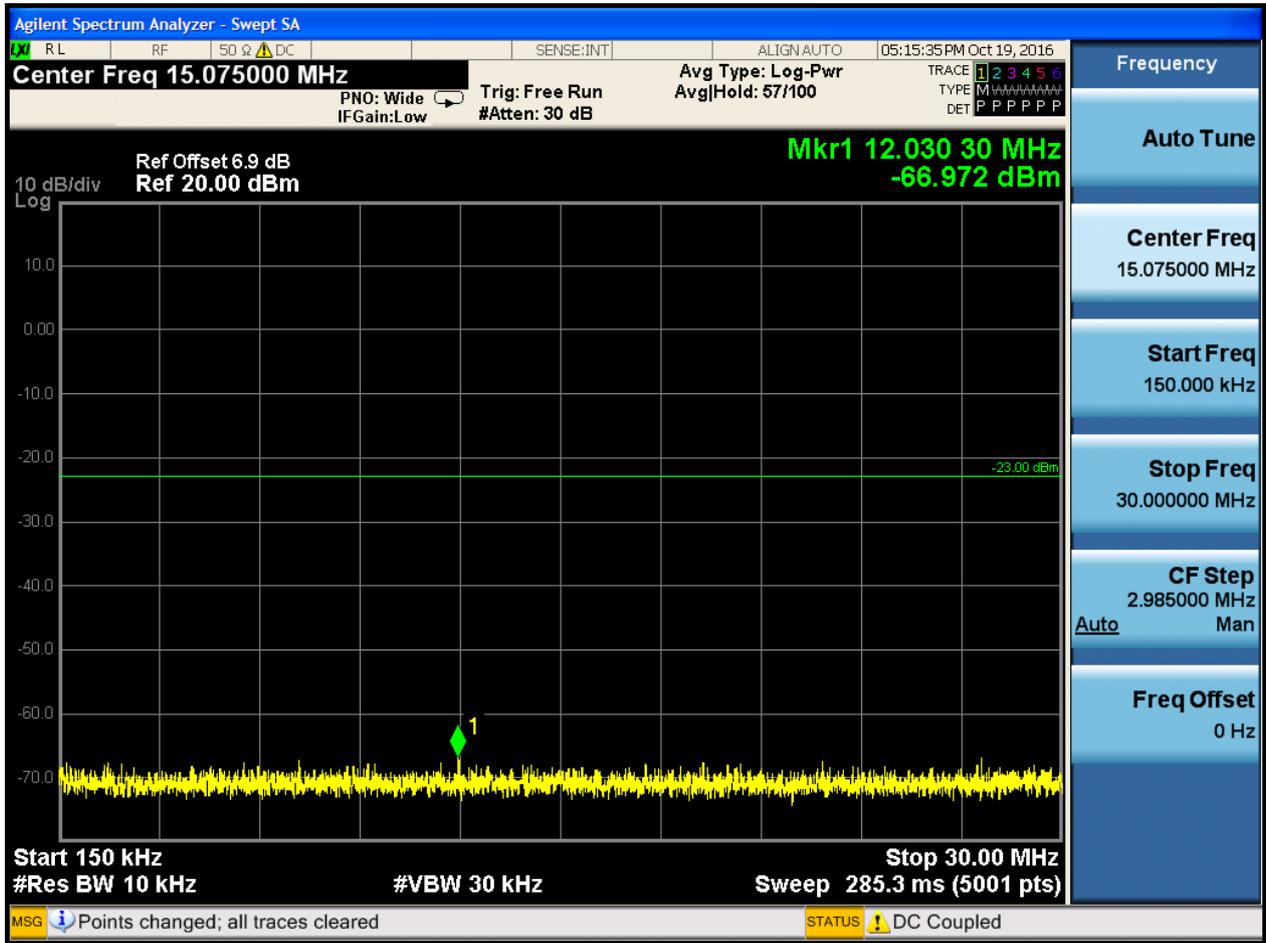
#### 6.1 For GSM

##### 6.1.1 Test Band = GSM850

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

##### 6.1.1.1.1 Test Channel = LCH



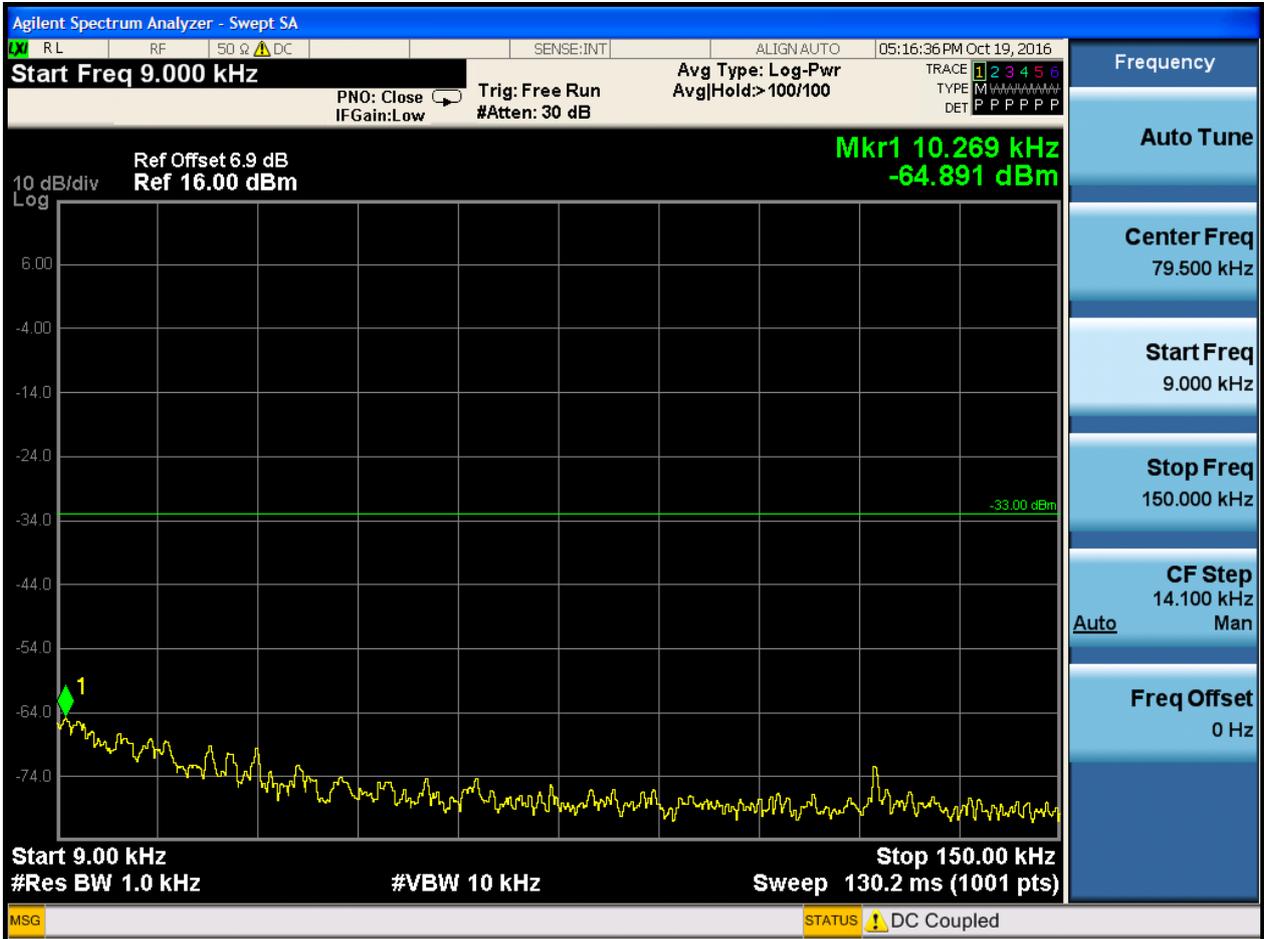


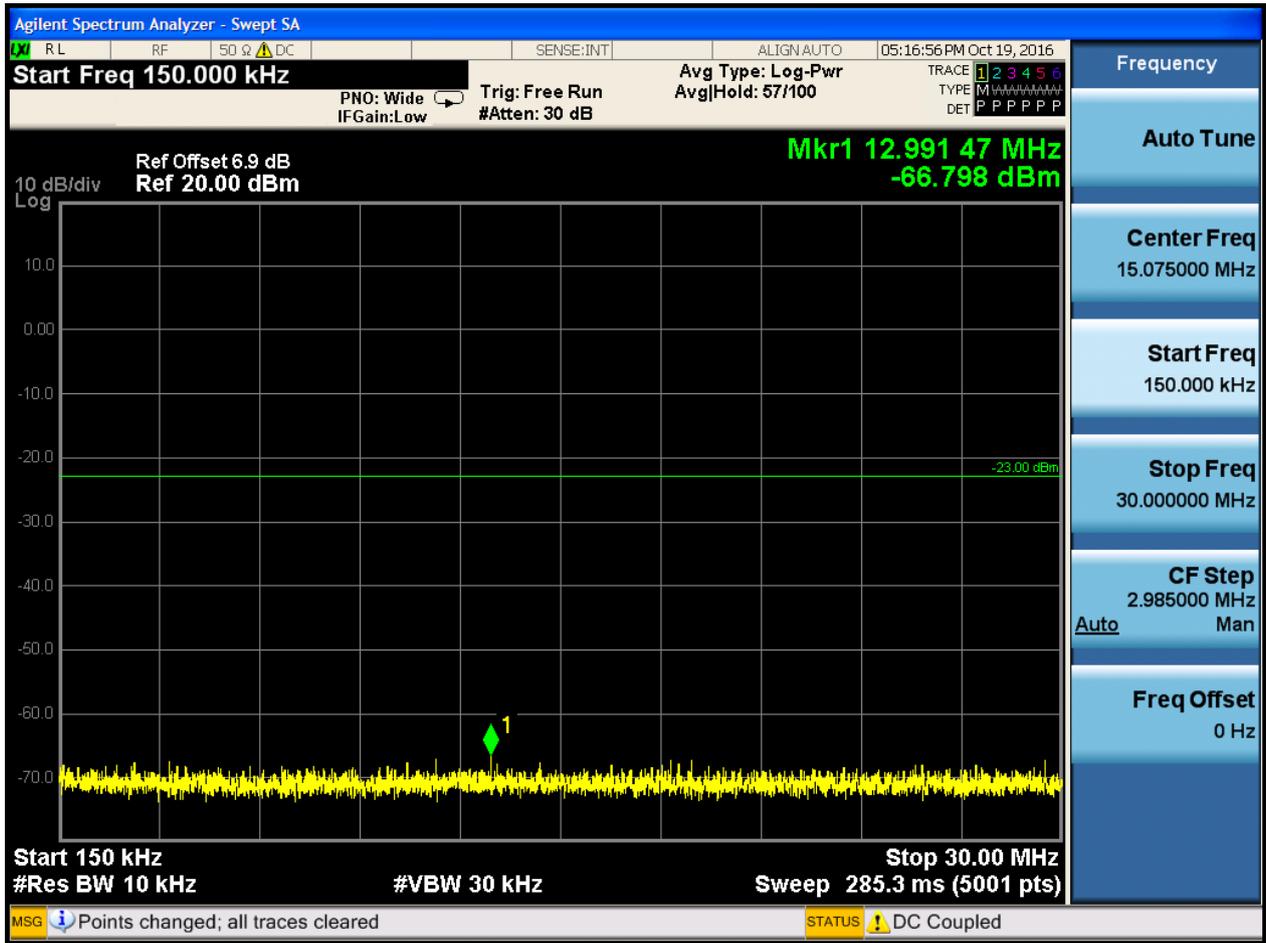






6.1.1.1.2 Test Channel = MCH



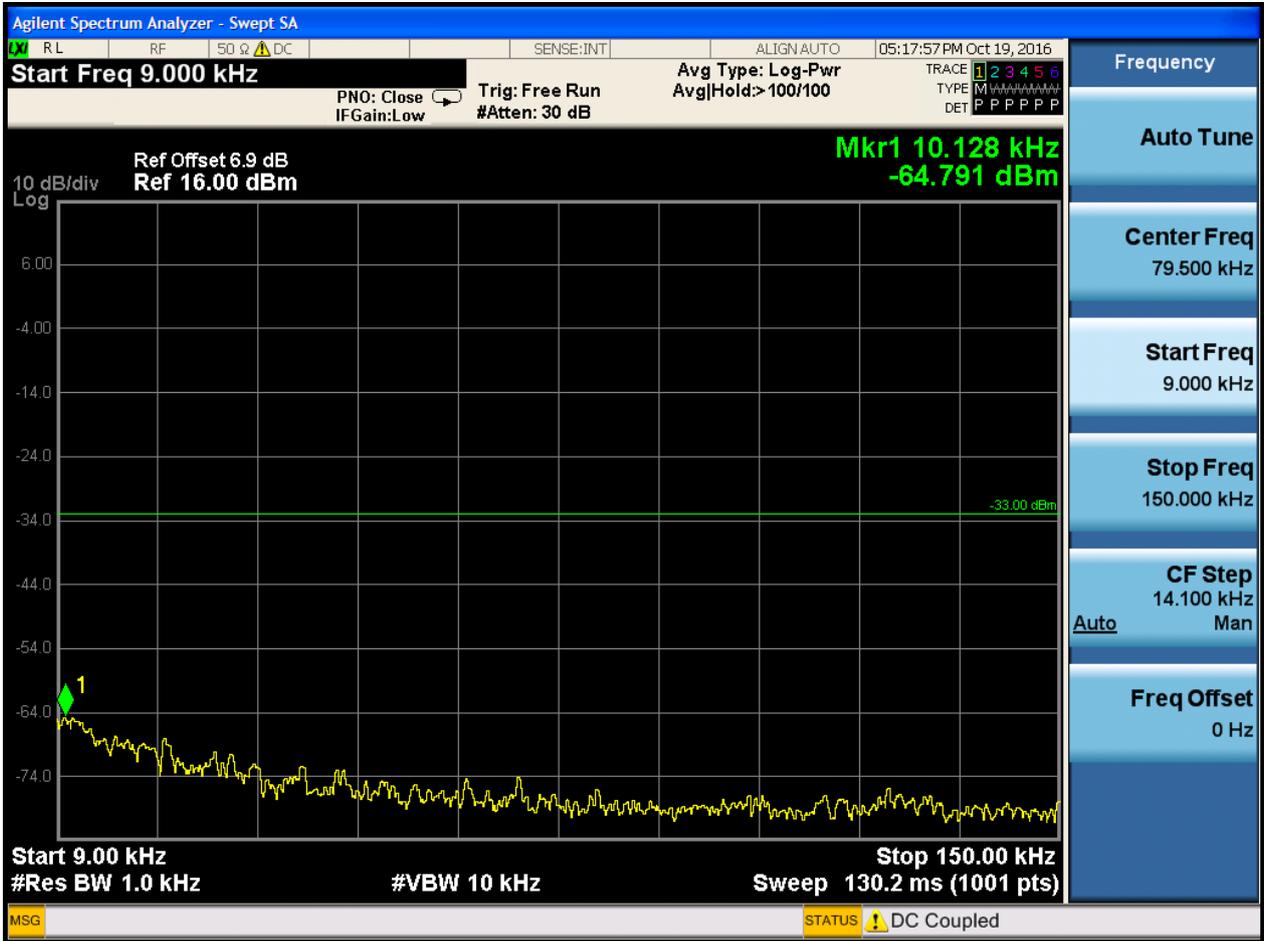


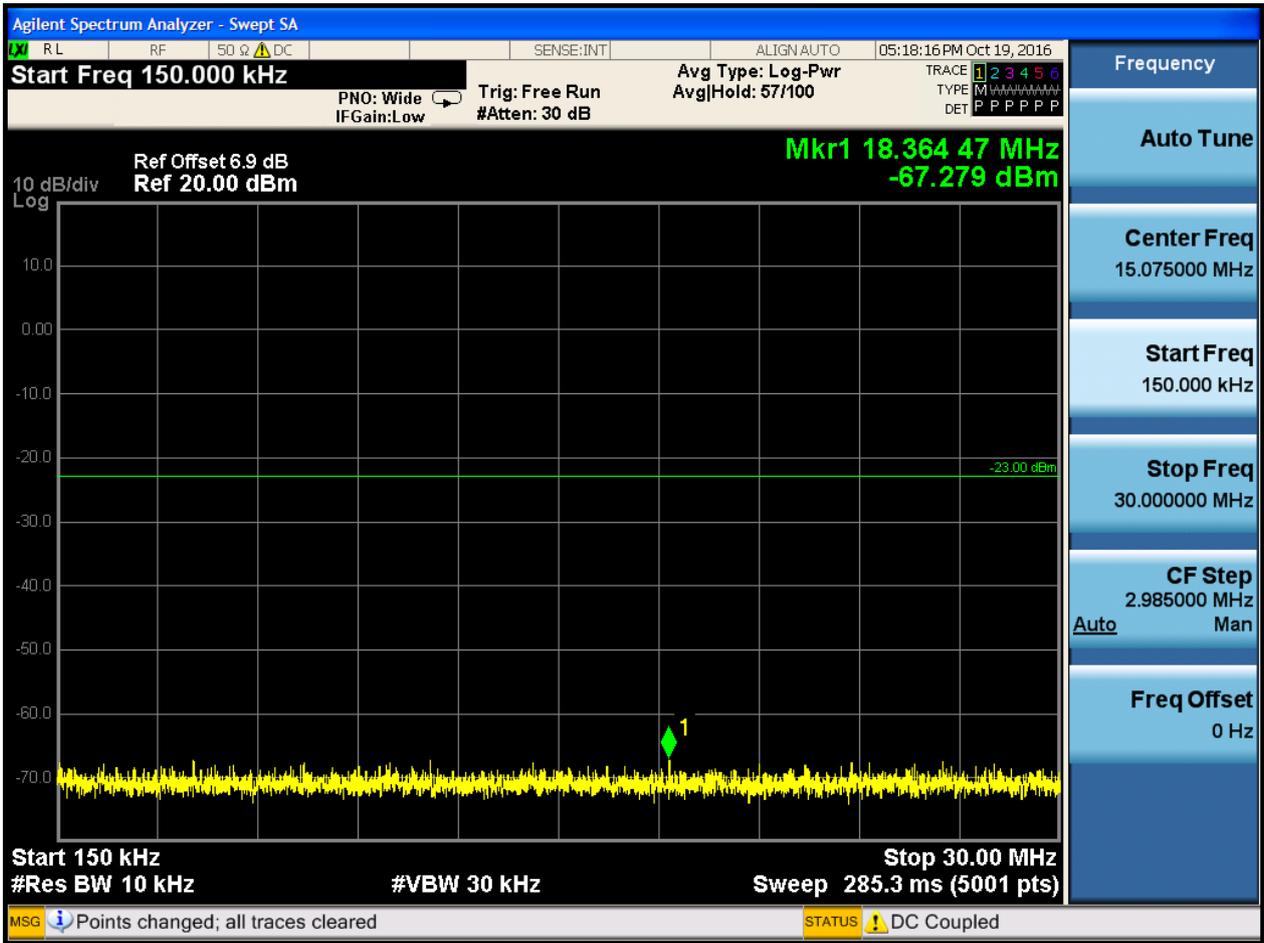




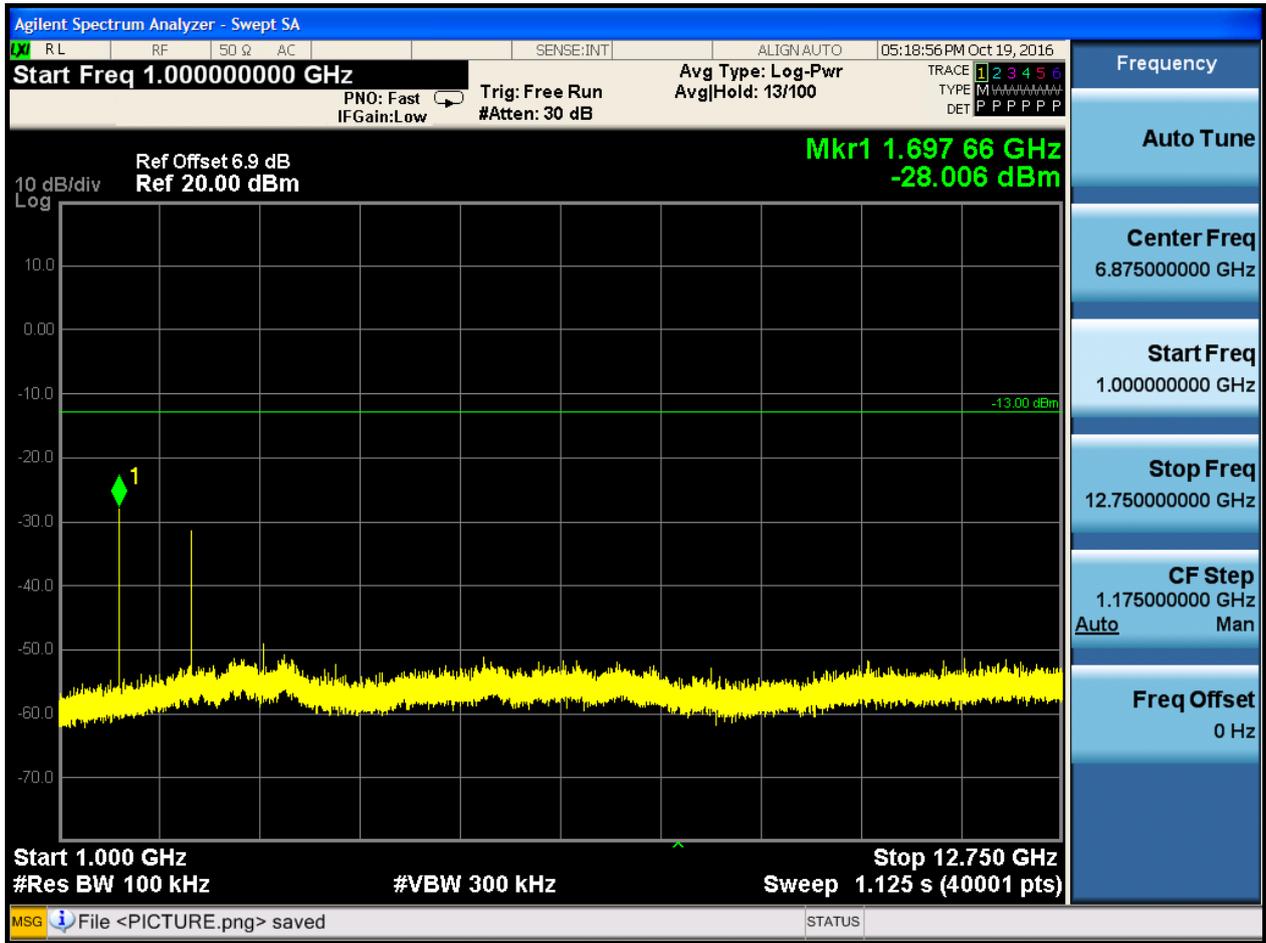


6.1.1.1.3 Test Channel = HCH





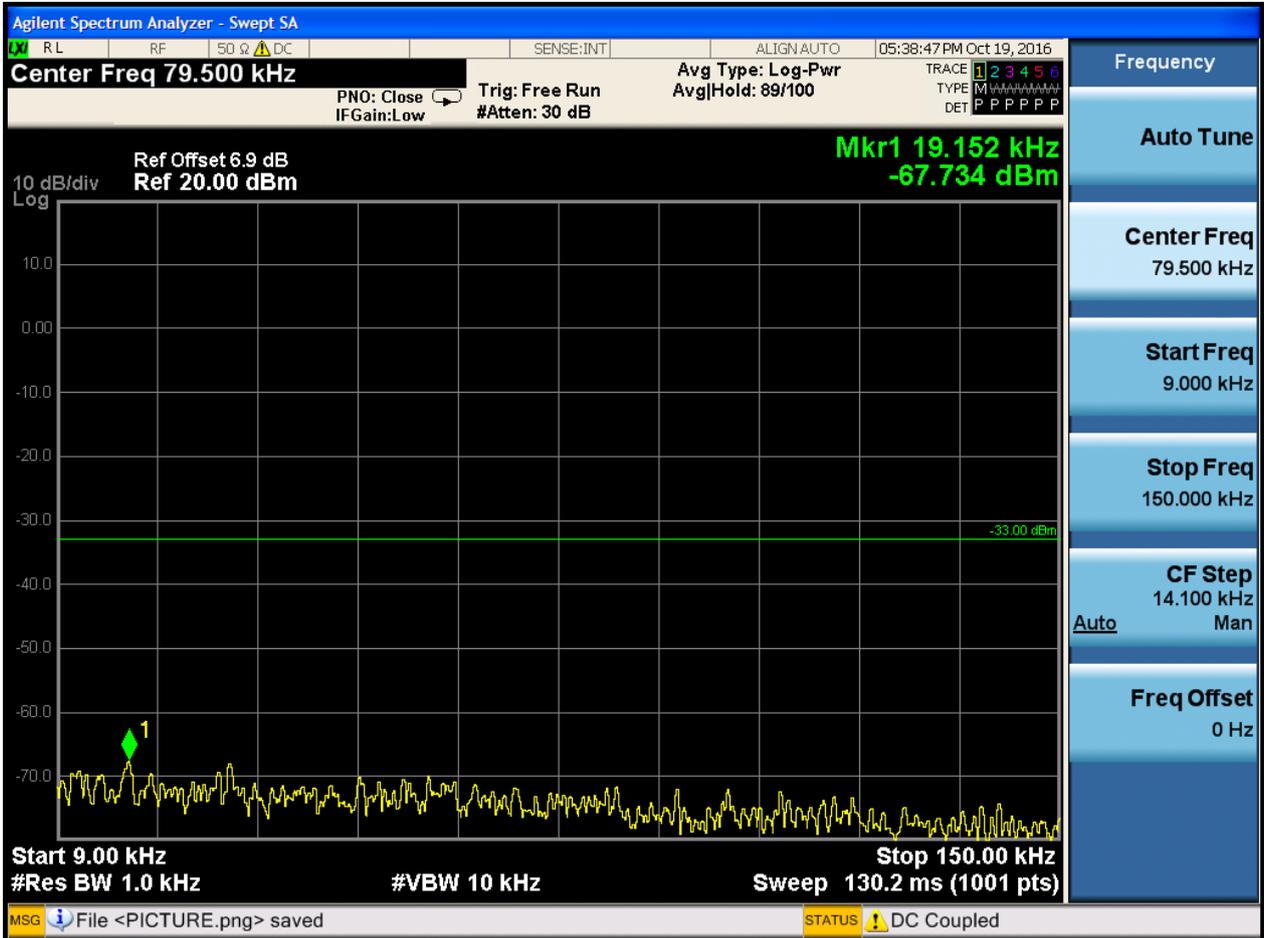




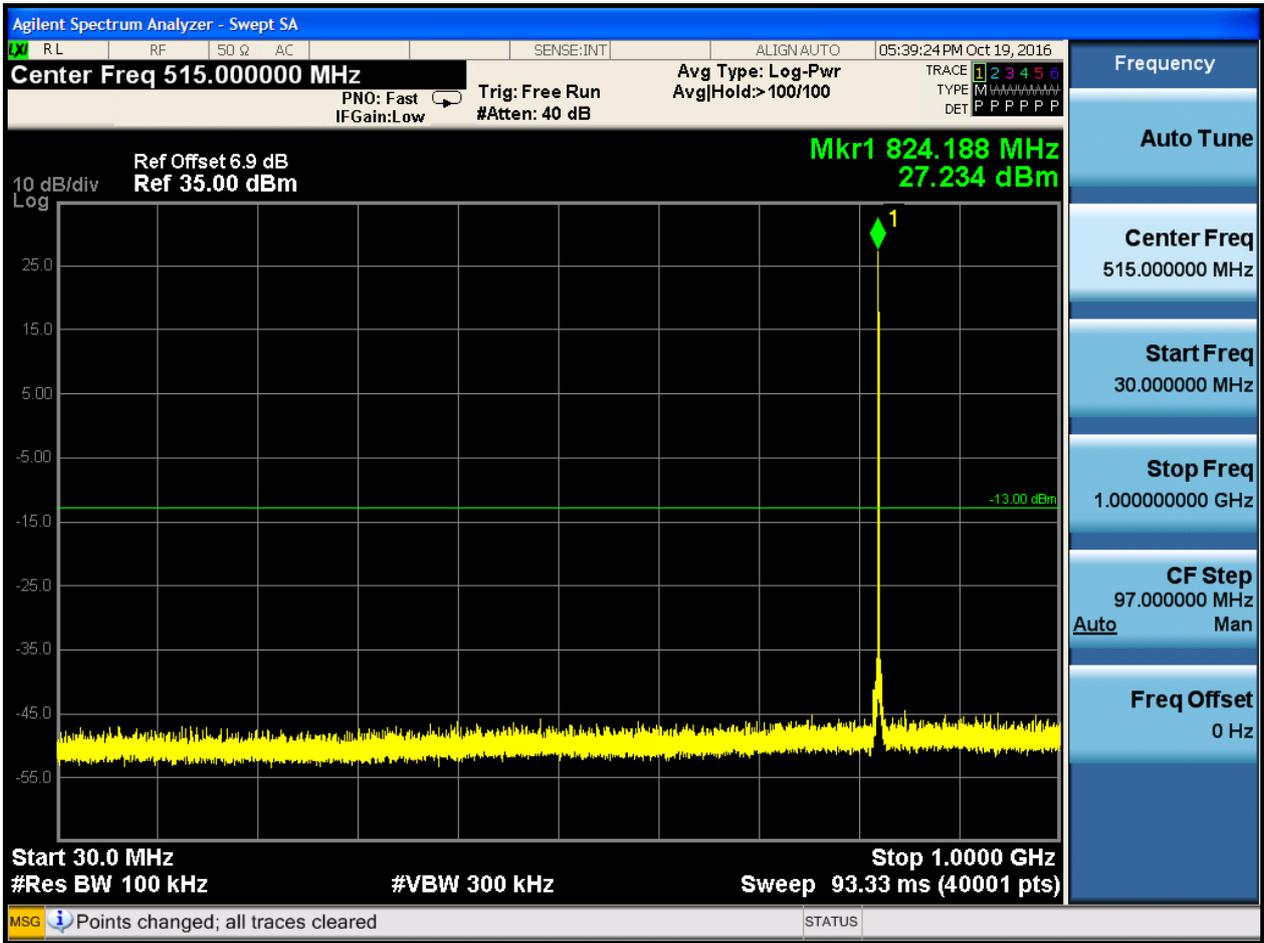


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



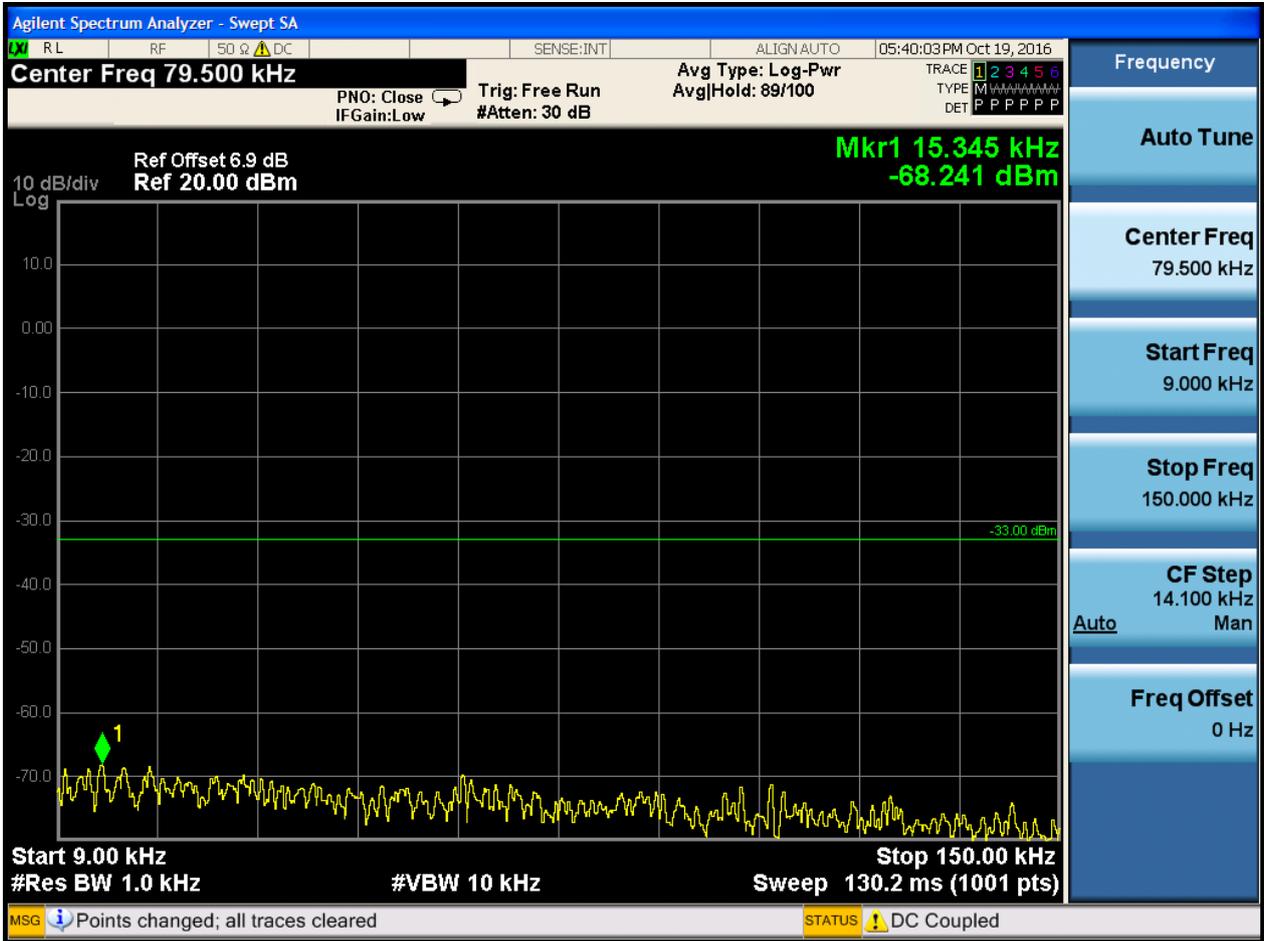


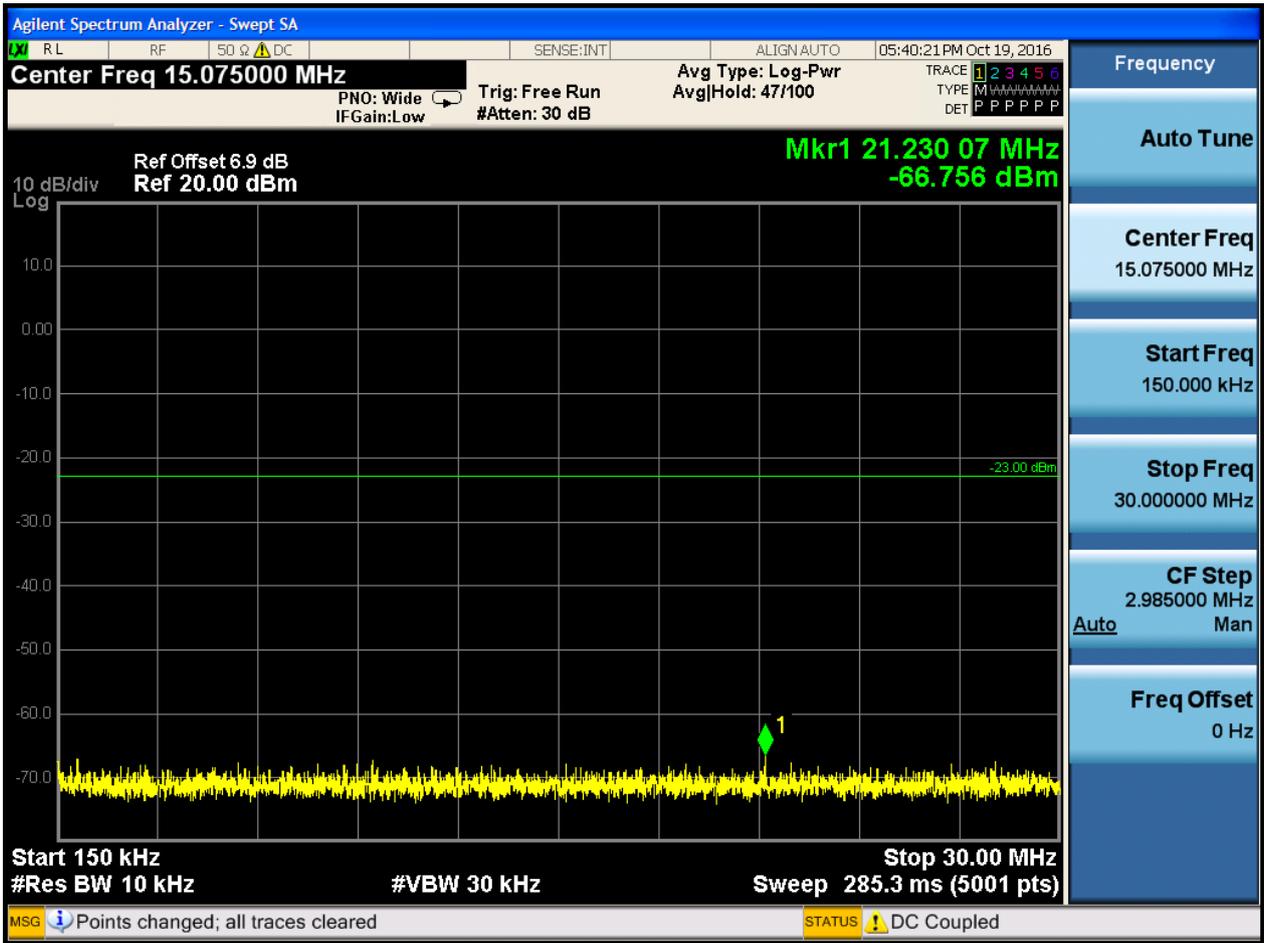






6.1.1.2.2 Test Channel = MCH



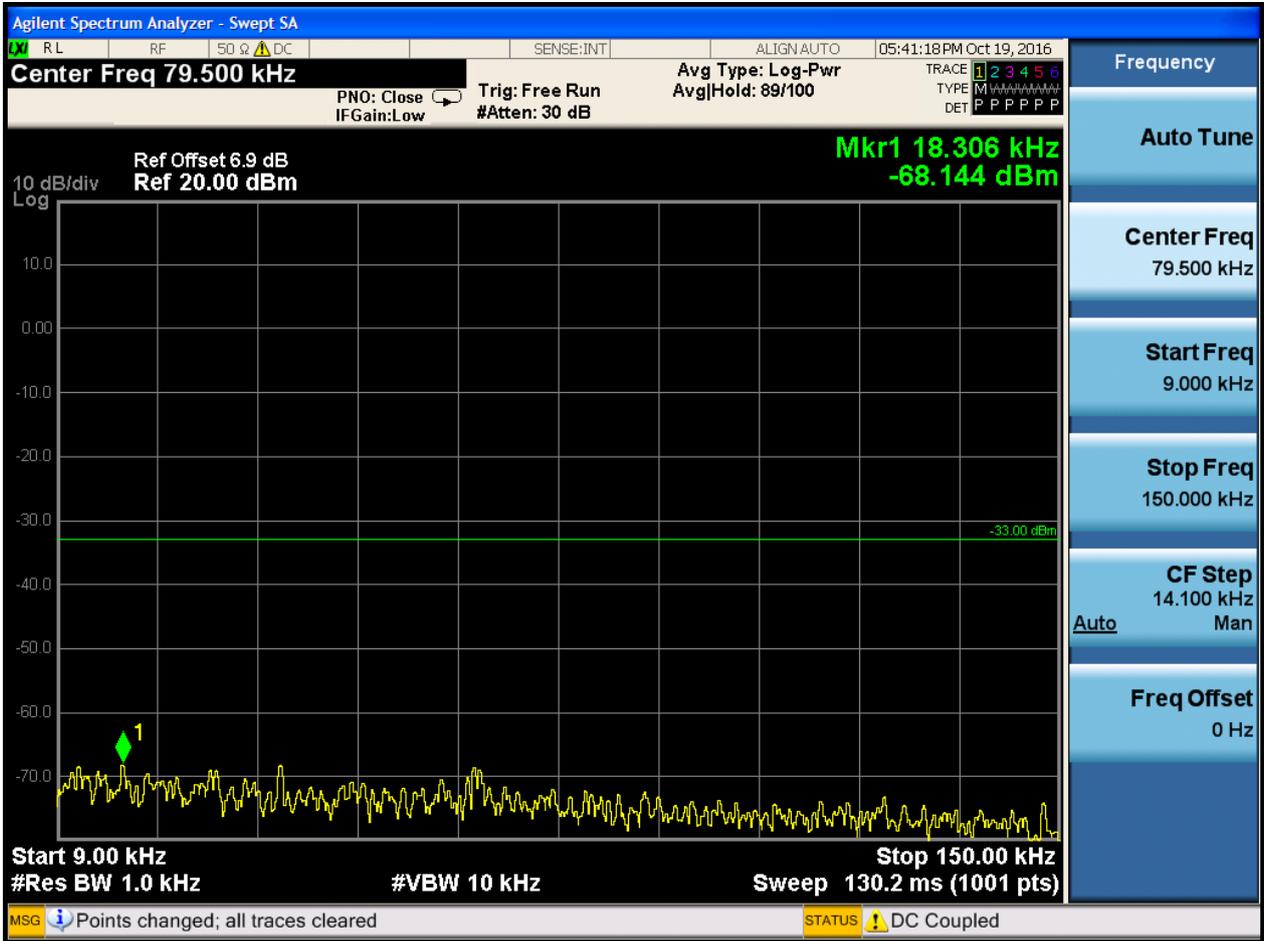






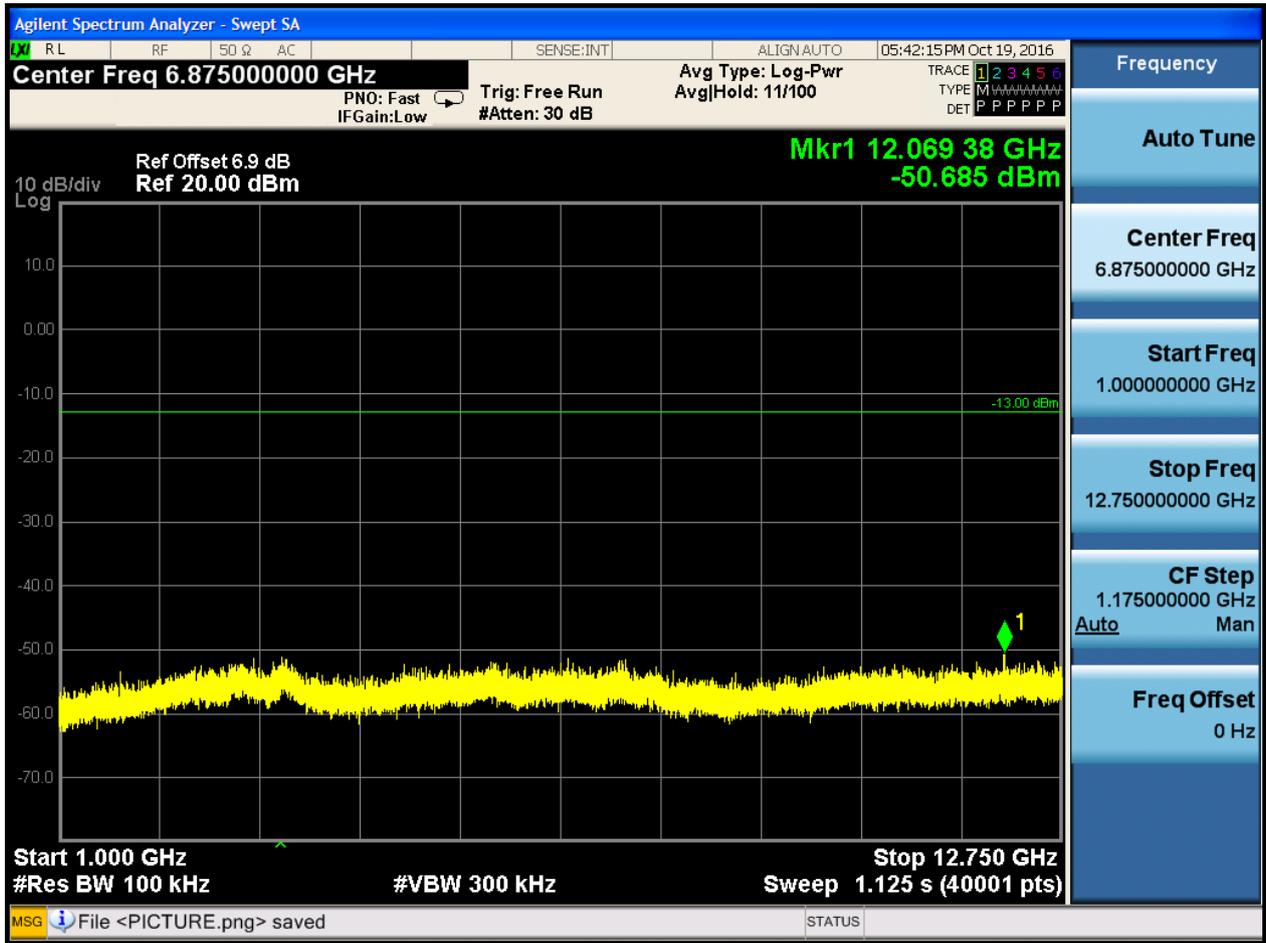


### 6.1.1.2.3 Test Channel = HCH







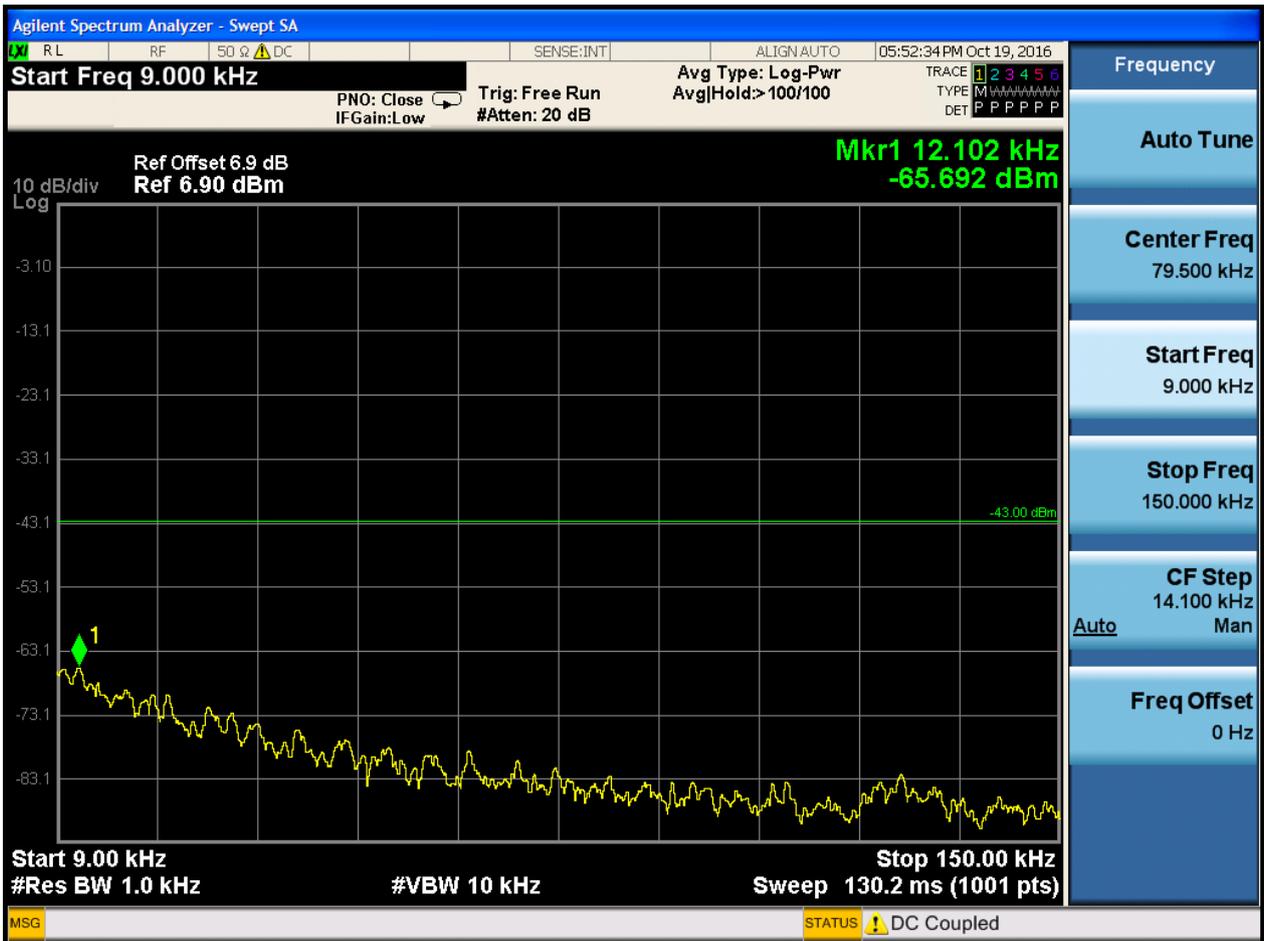




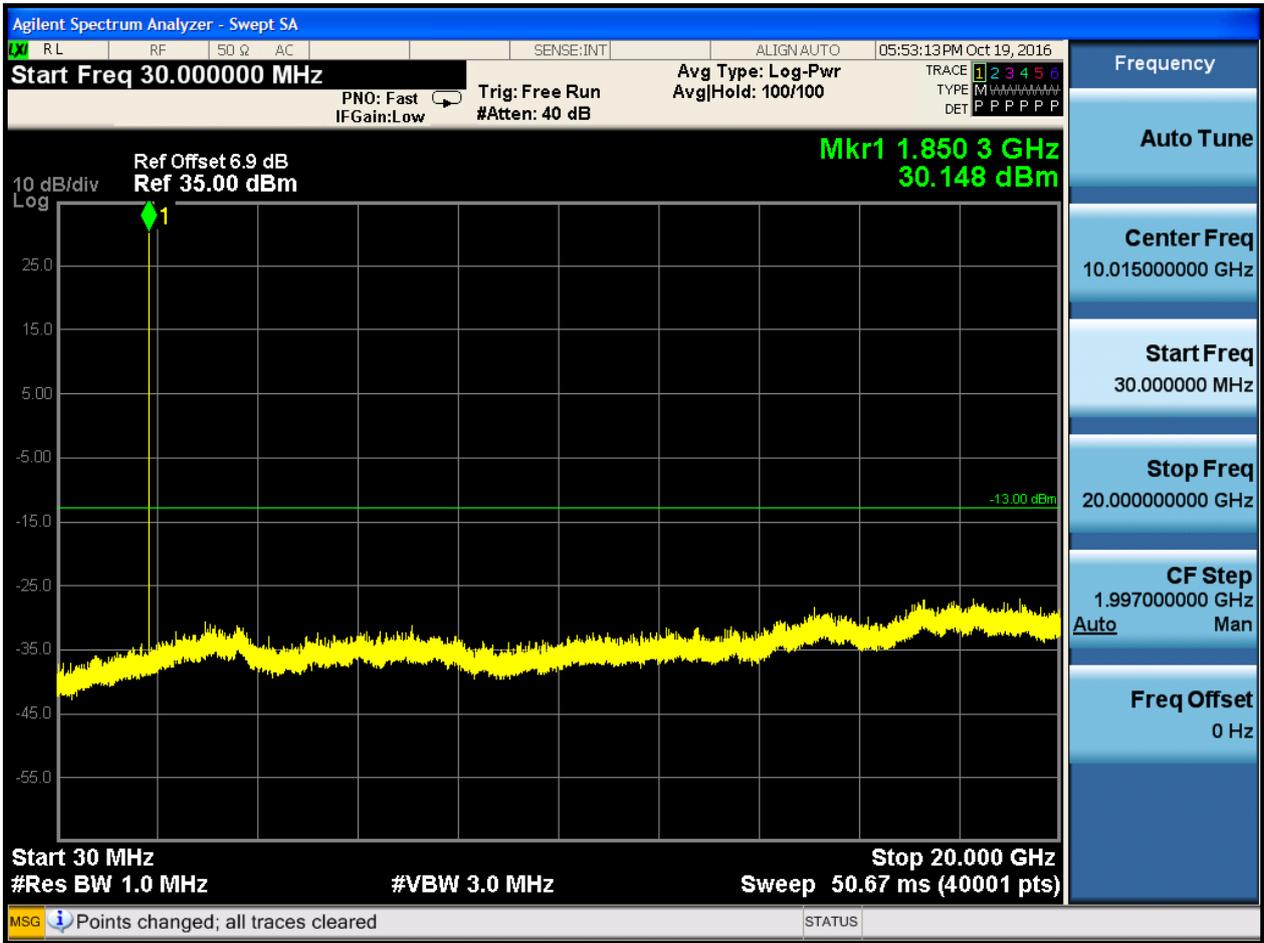
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

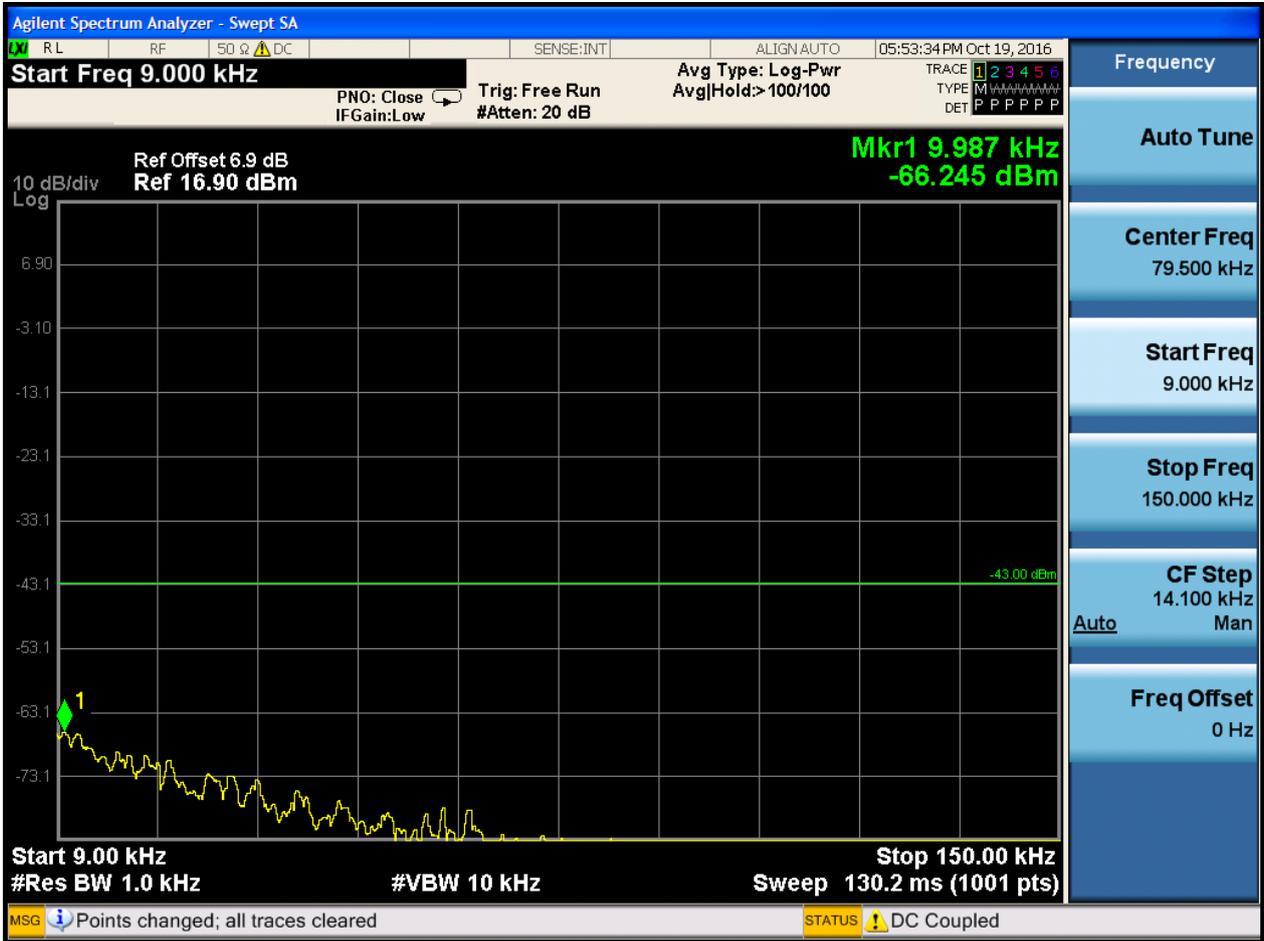


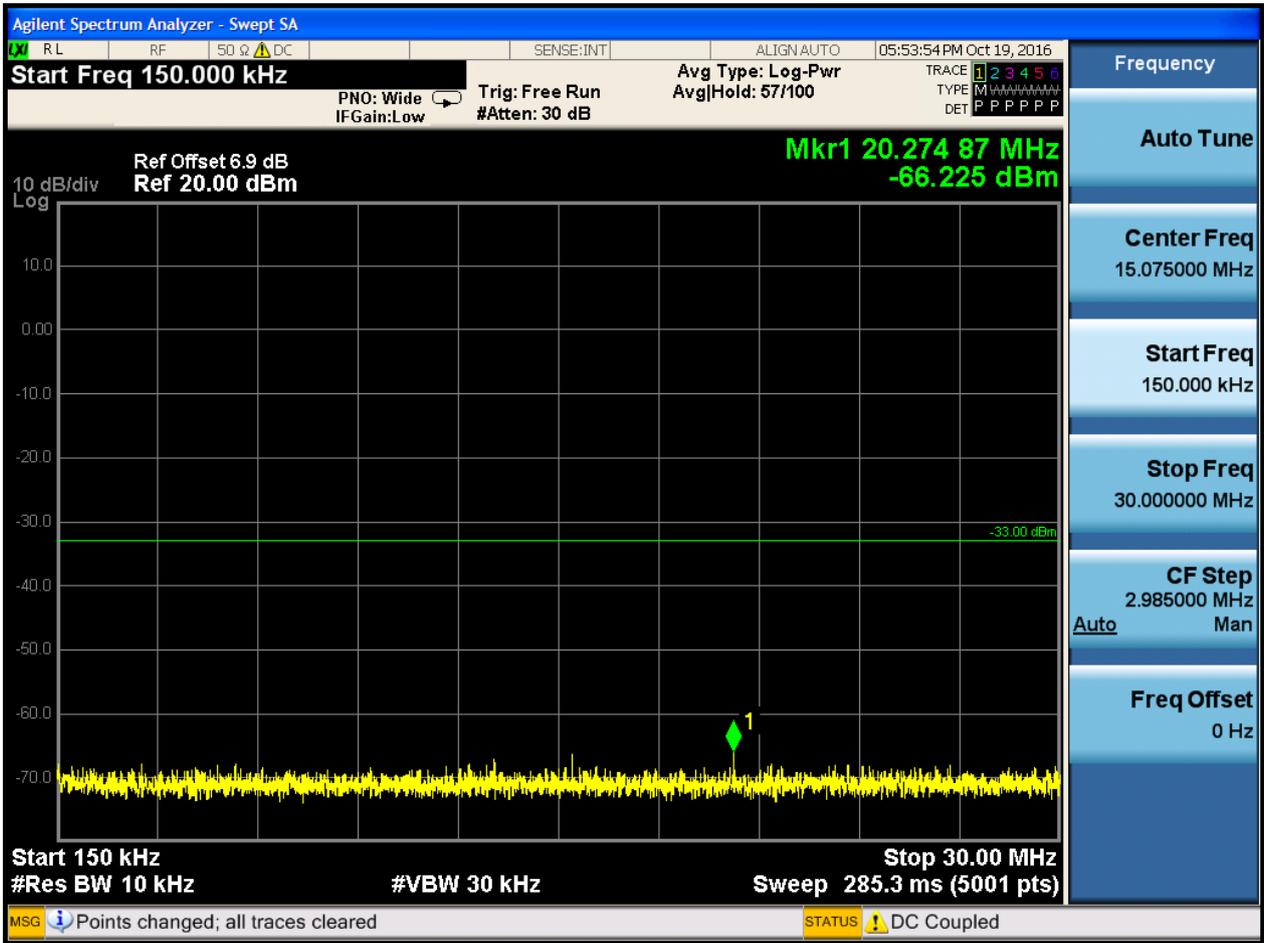


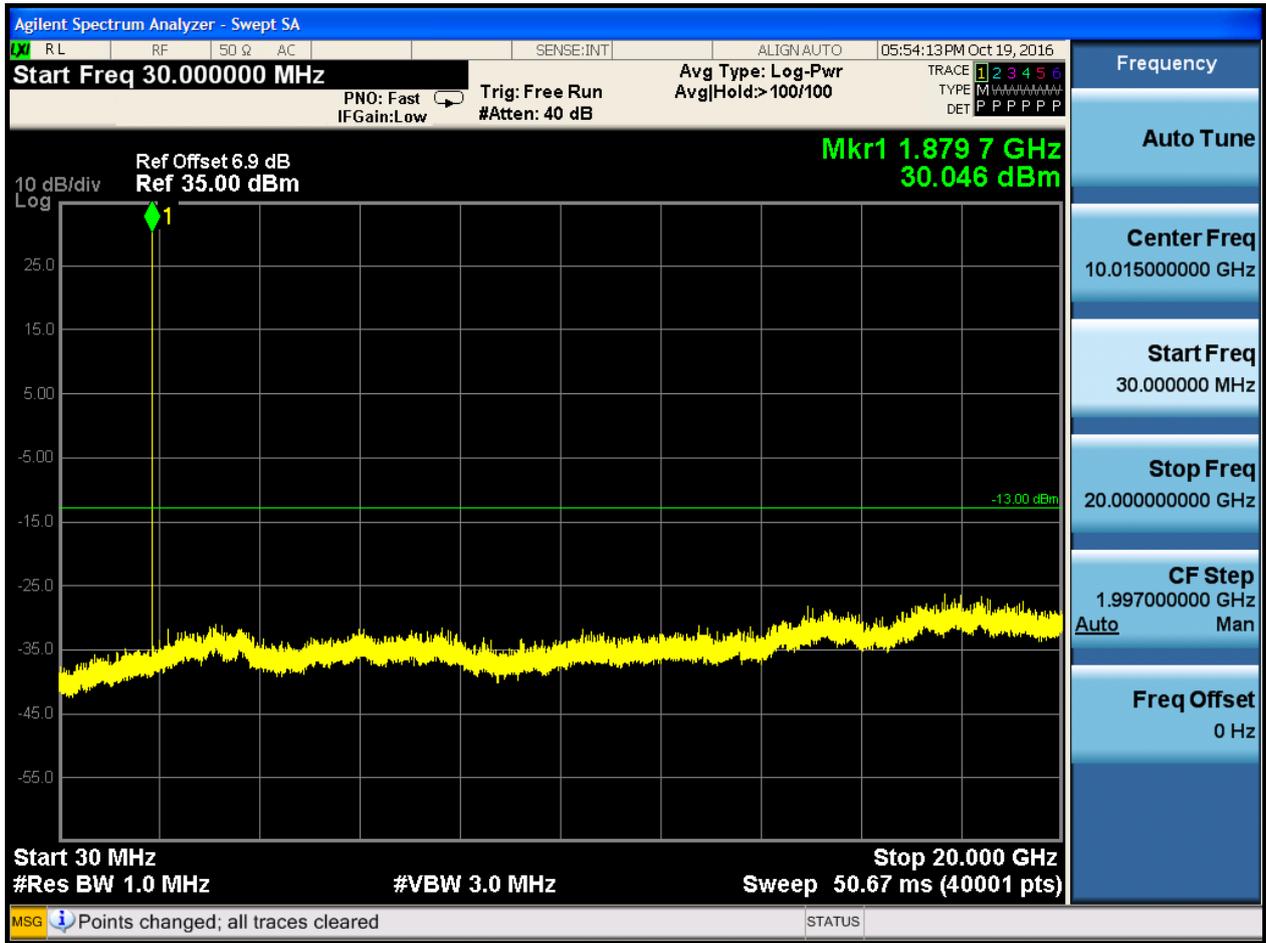




### 6.1.2.1.2 Test Channel = MCH









6.1.2.1.3 Test Channel = HCH



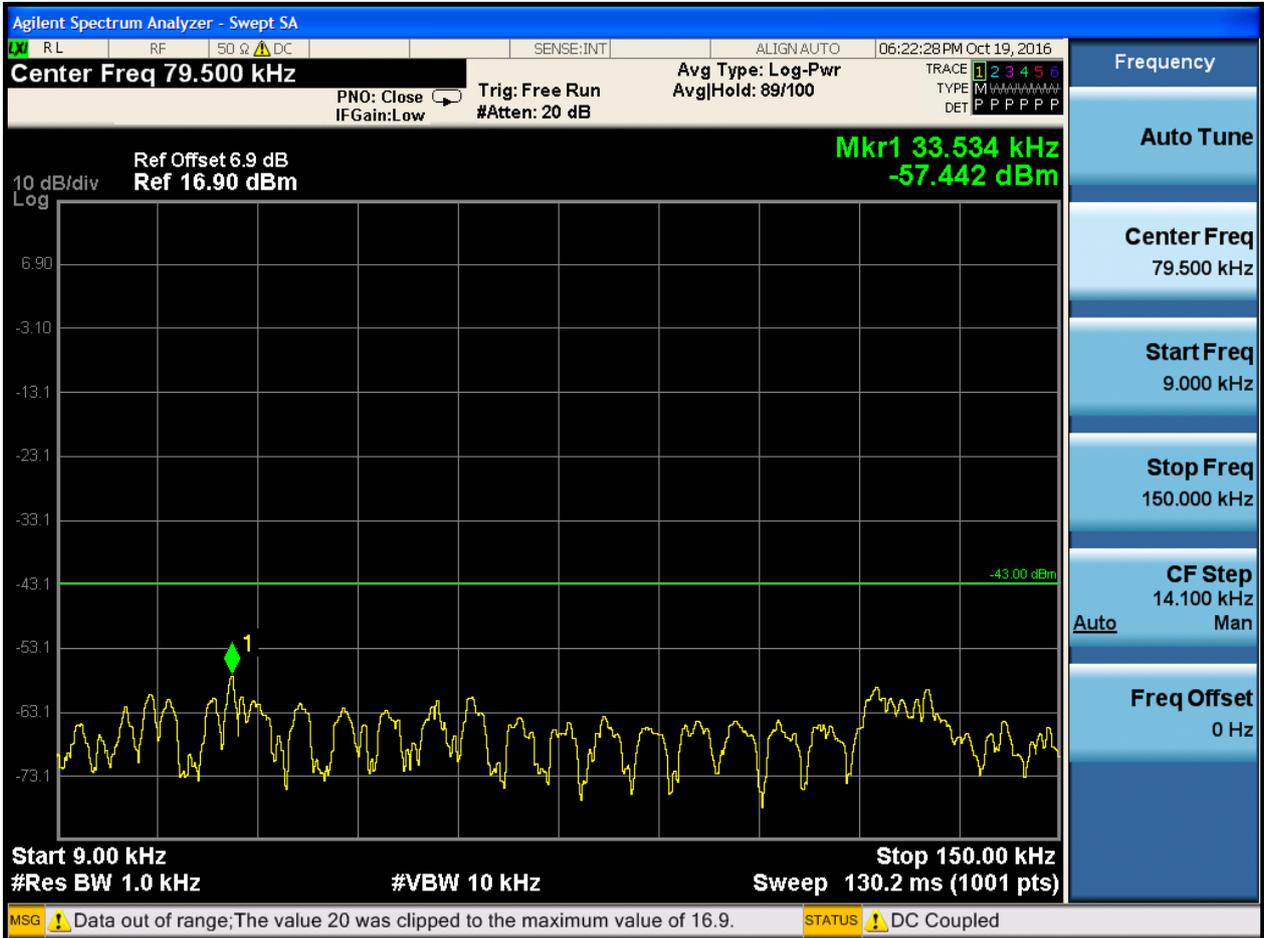


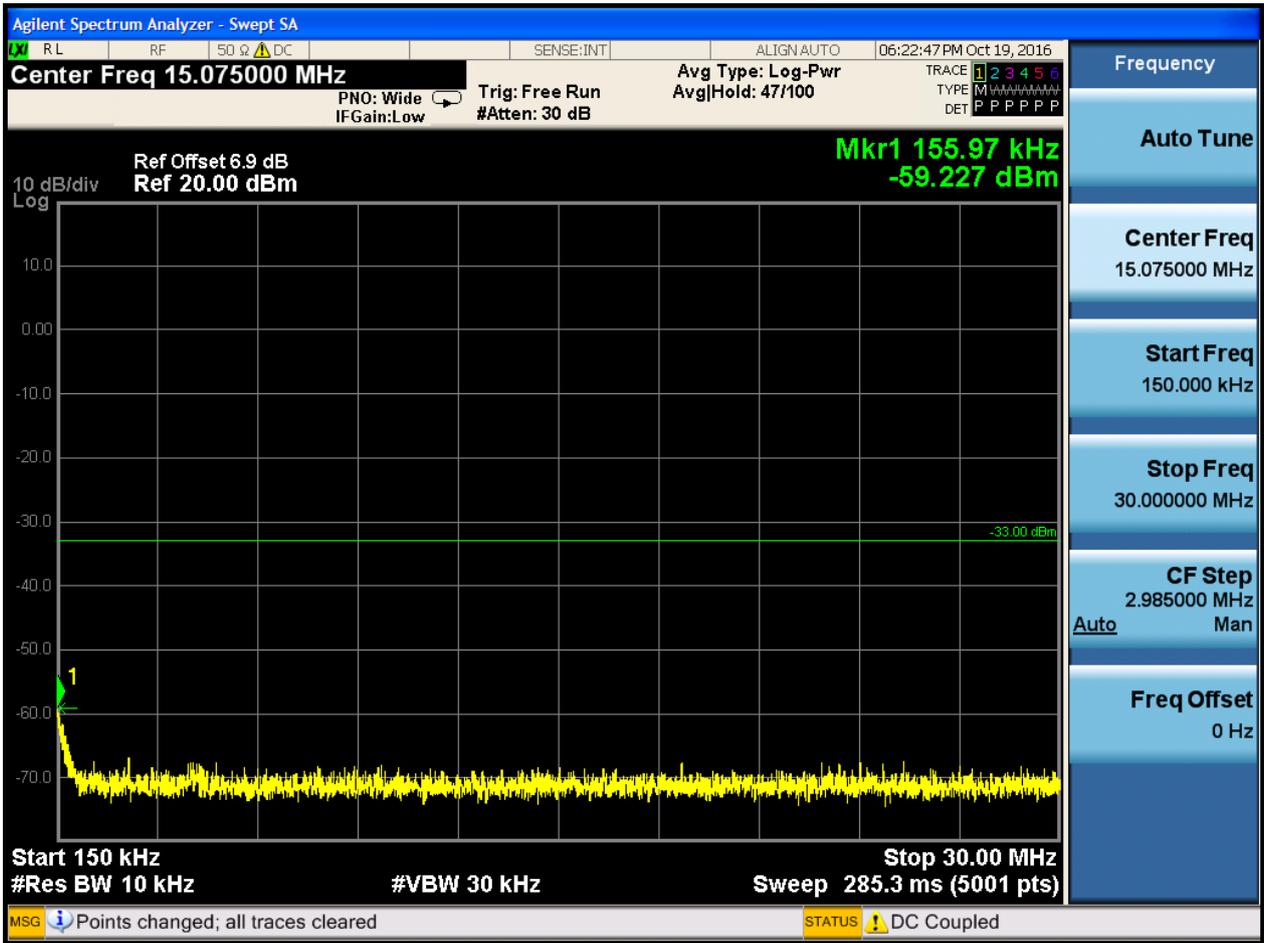




### 6.1.2.2 Test Mode = GSM/TM2

#### 6.1.2.2.1 Test Channel = LCH

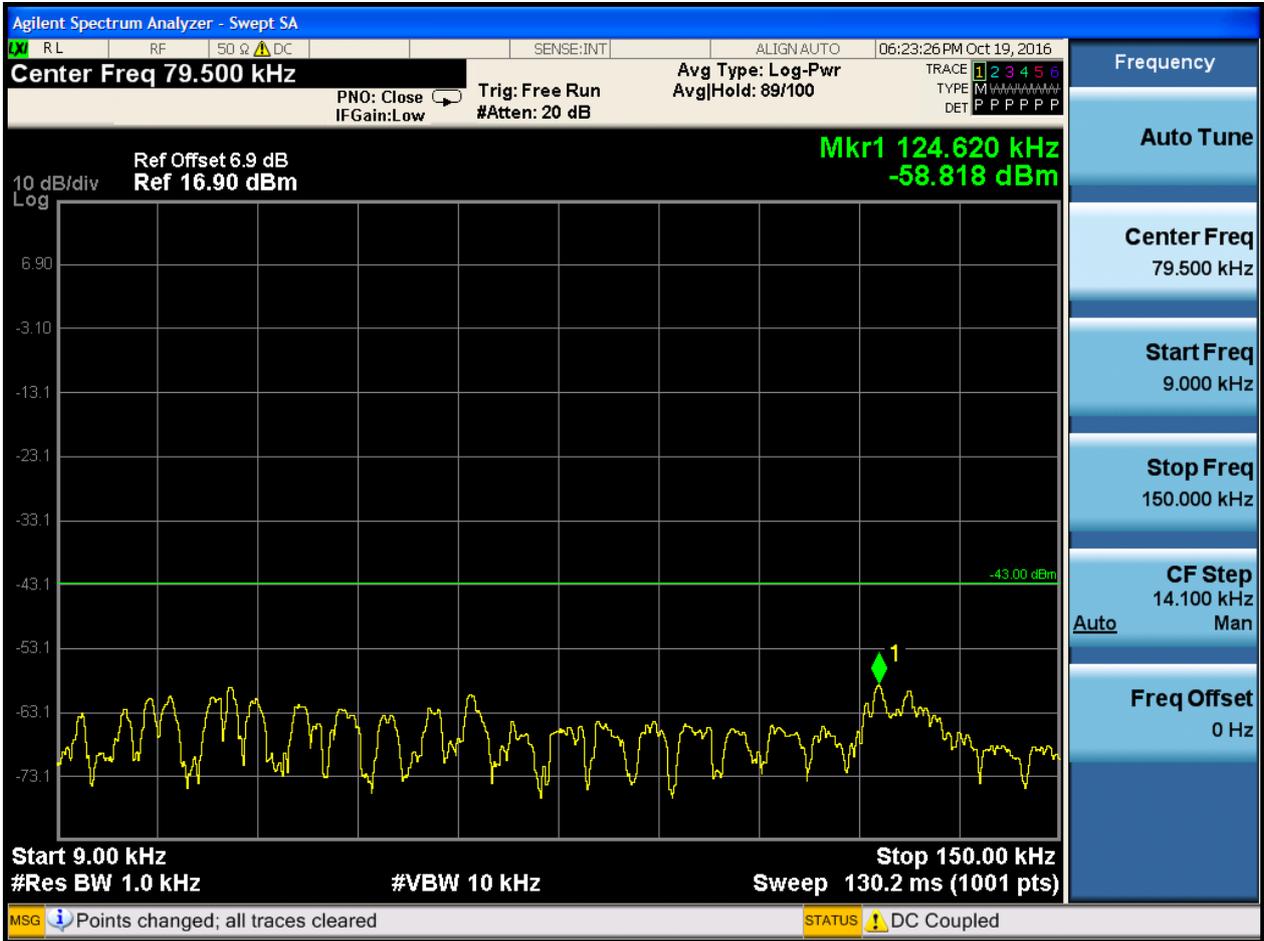








6.1.2.2.2 Test Channel = MCH

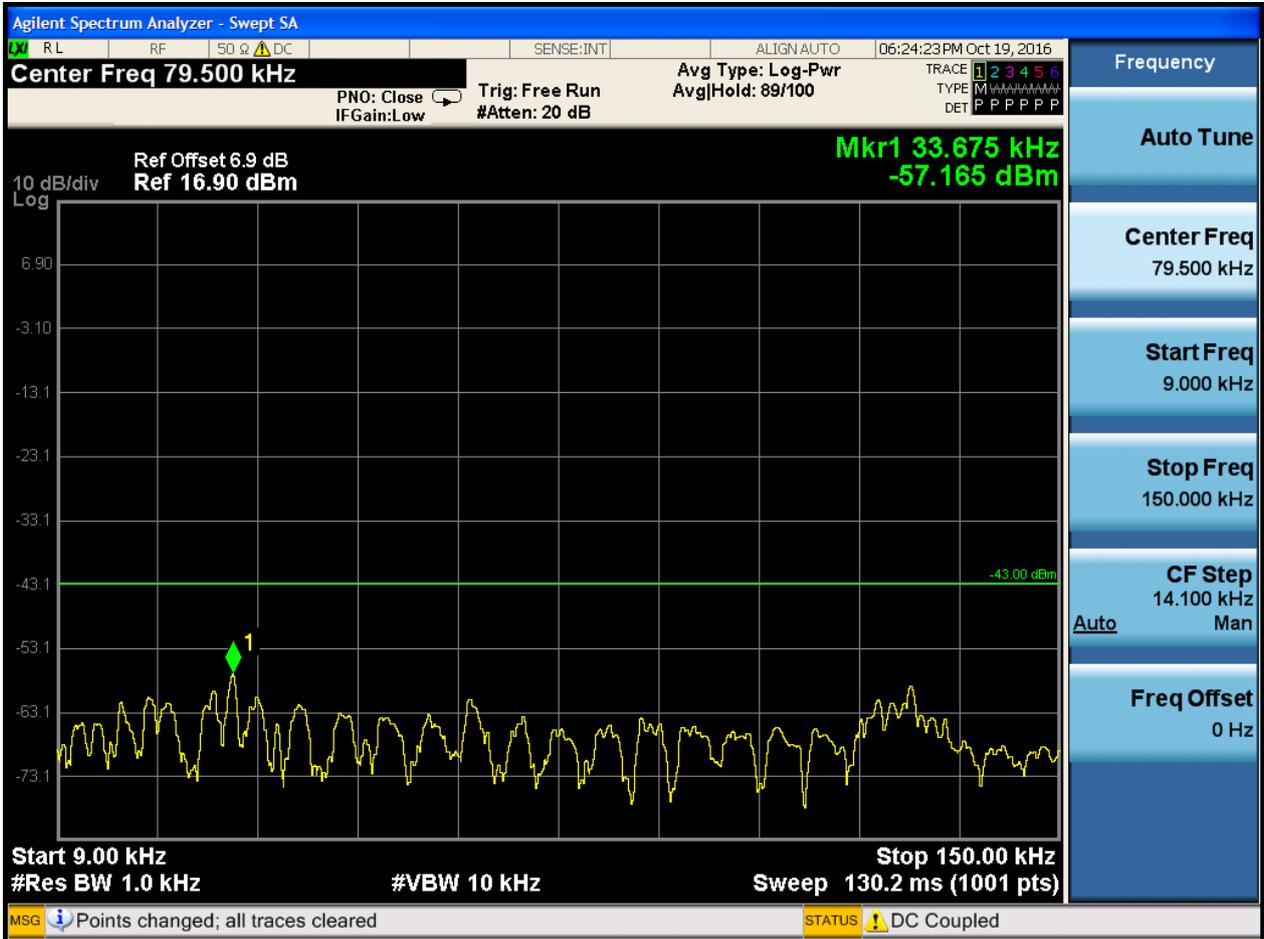


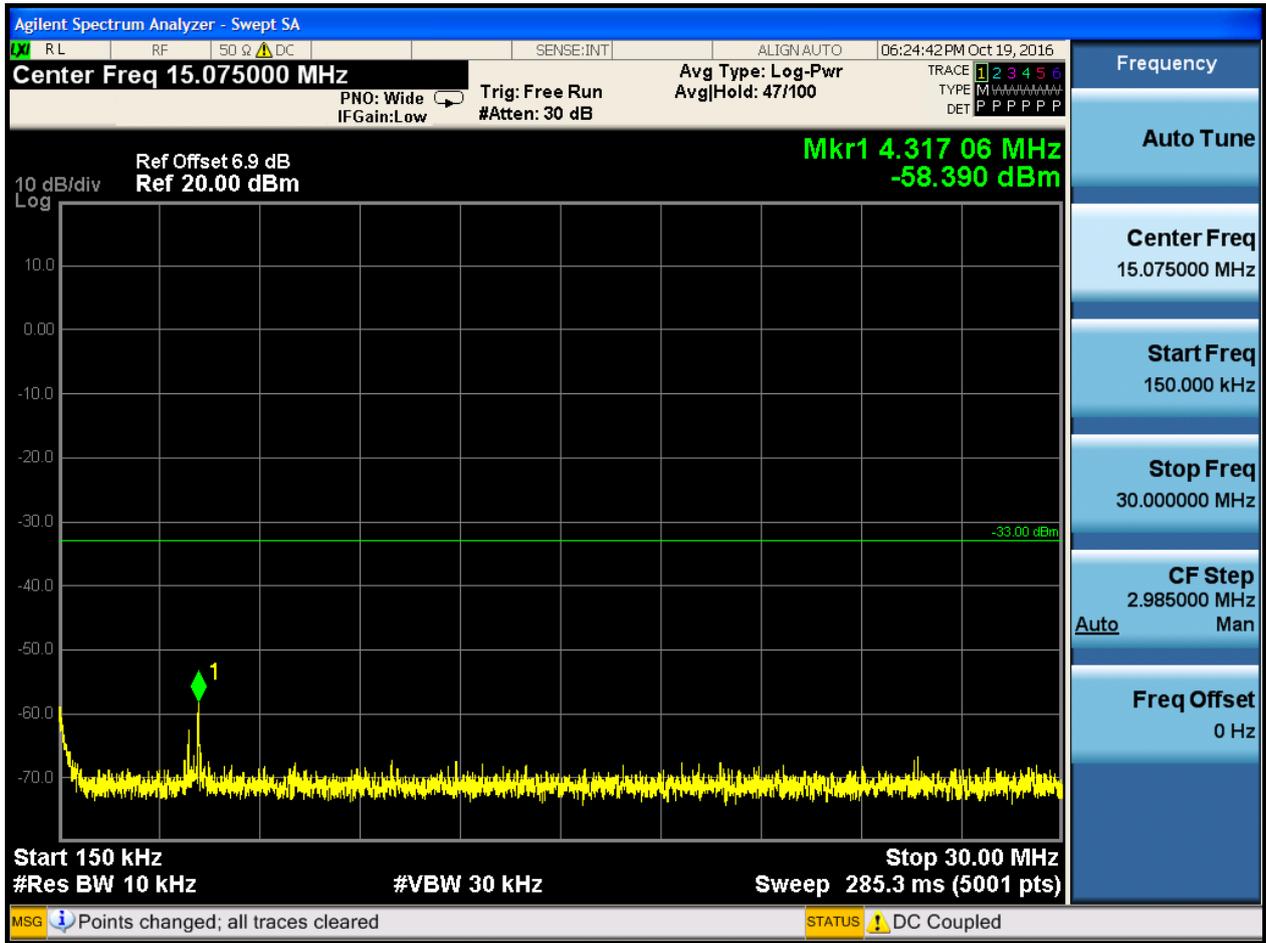






6.1.2.2.3 Test Channel = HCH







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

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

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

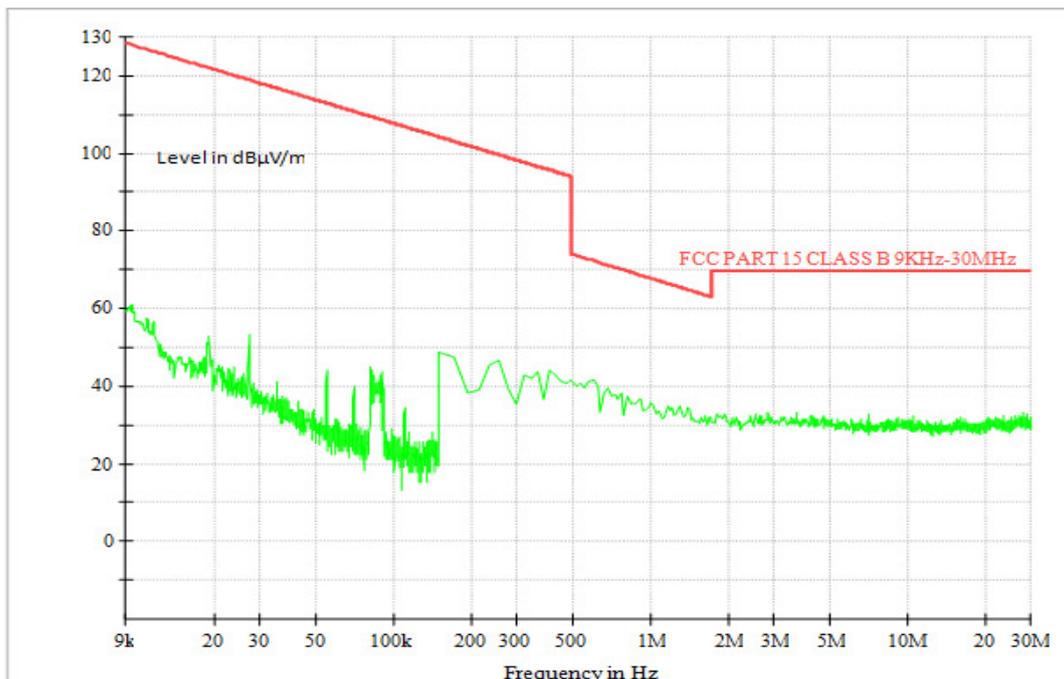
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

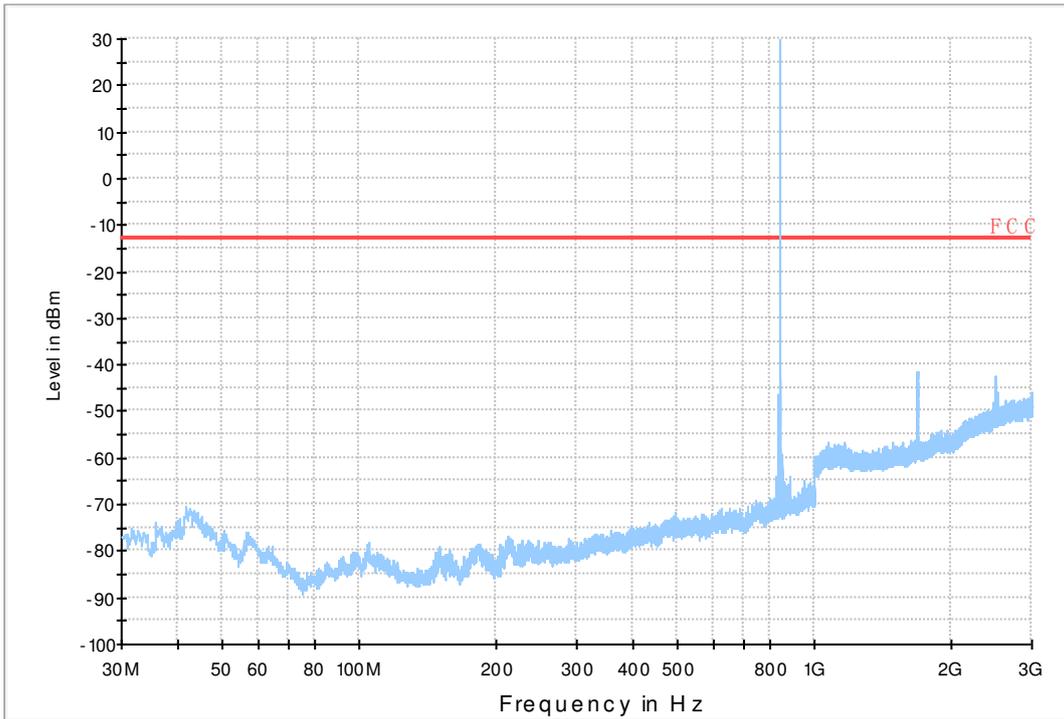
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850

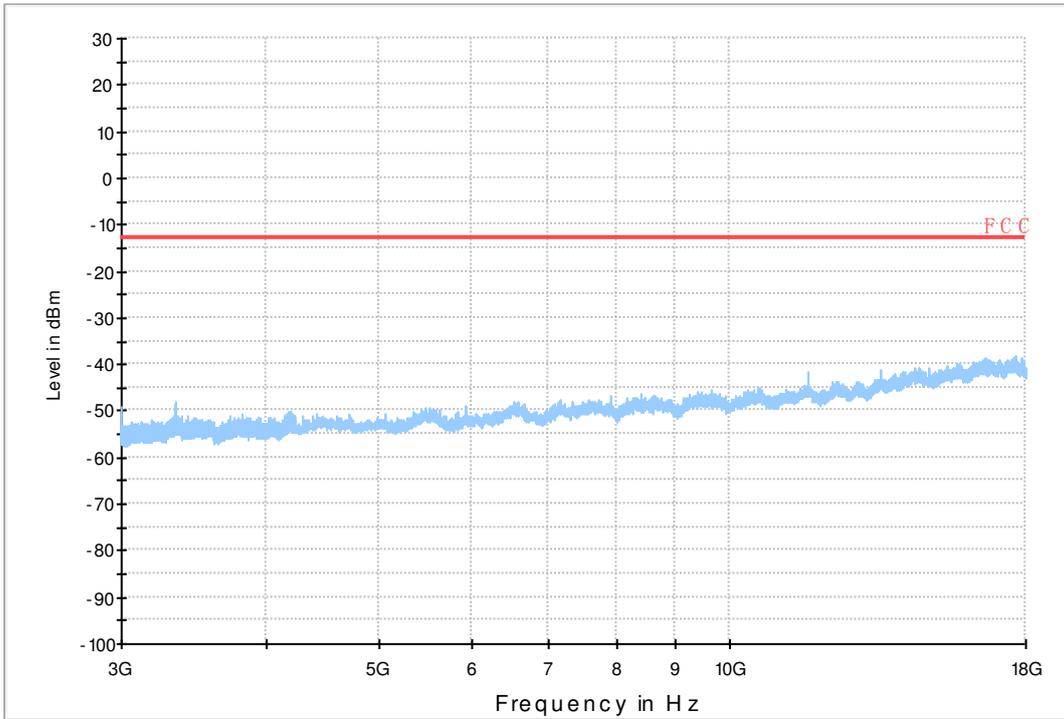
##### 7.1.1.1 Test Mode = GSM/TM1



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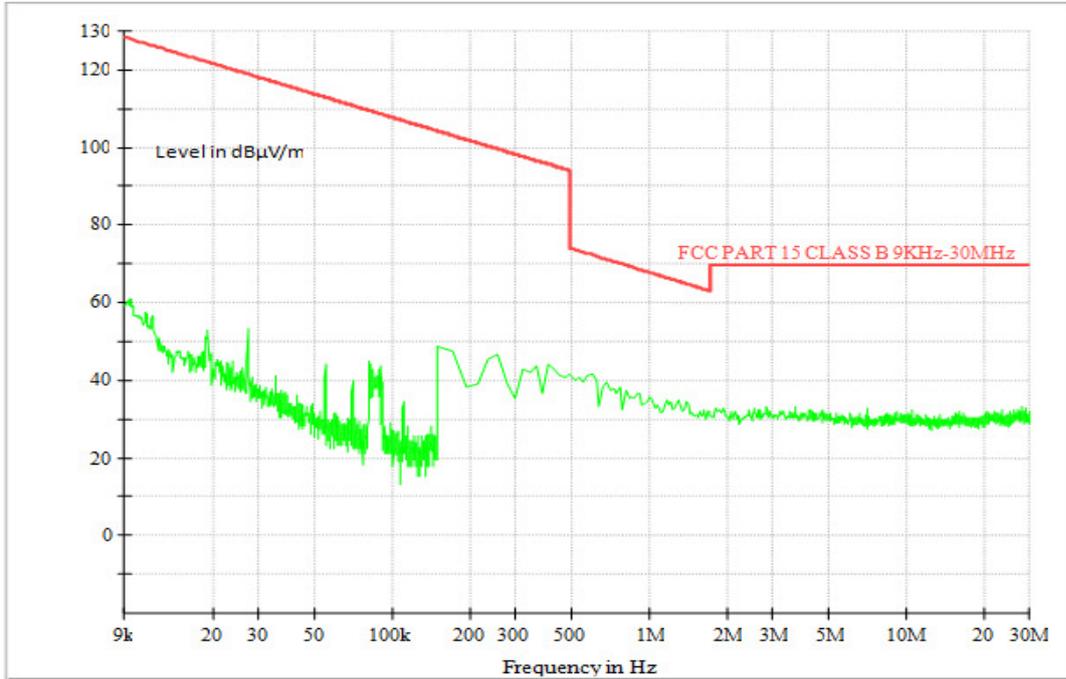


Copy of FCC PART22 GSM850\_H

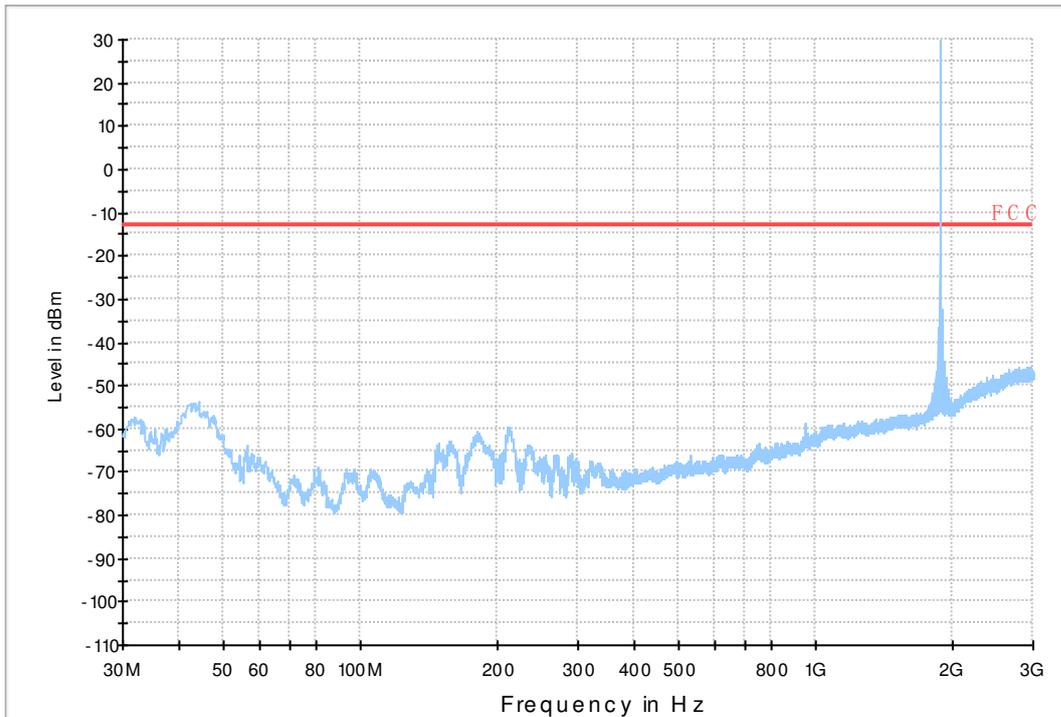


### 7.1.2 Test Band = GSM1900

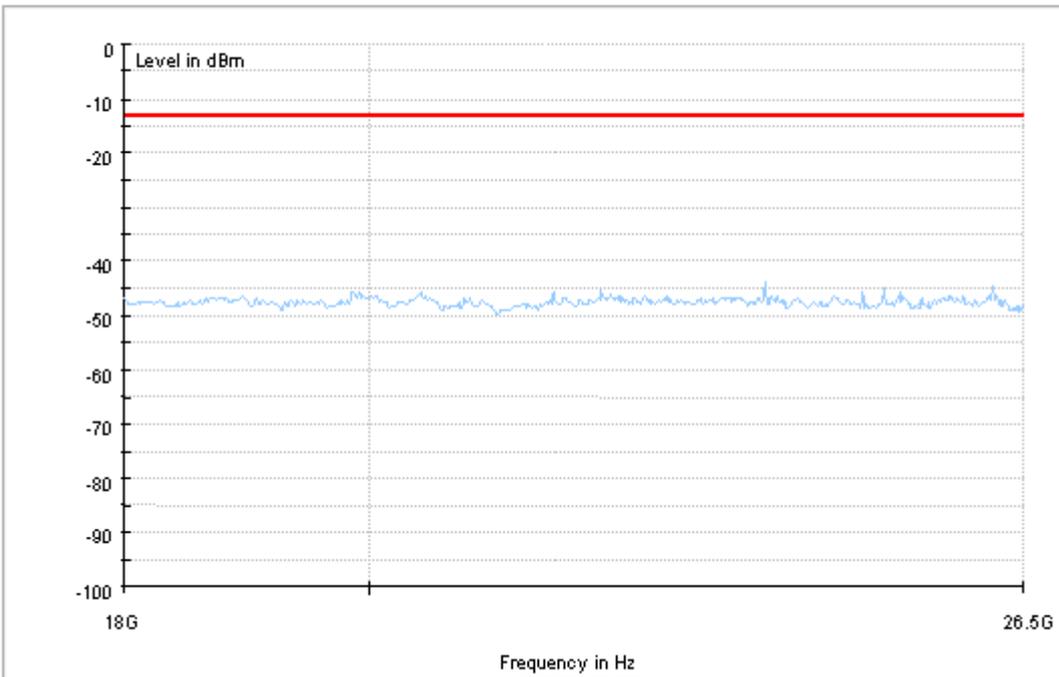
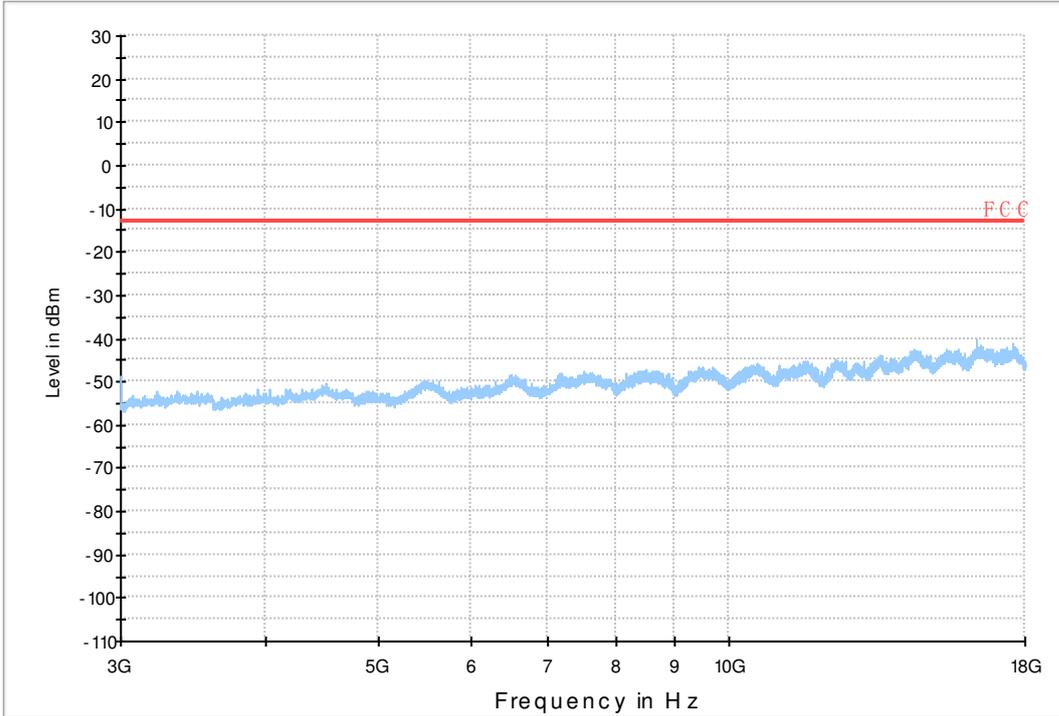
#### 7.1.2.1 Test Mode = GSM/TM1



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	-15.43	-0.01872	PASS
				VN	-12.14	-0.01473	PASS
				VH	-14.92	-0.0181	PASS
		MCH	TN	VL	-11.75	-0.01404	PASS
				VN	-8.52	-0.01018	PASS
				VH	-10.59	-0.01266	PASS
		HCH	TN	VL	-11.17	-0.01316	PASS
				VN	-10.98	-0.01294	PASS
				VH	-12.01	-0.01415	PASS
	GSM/TM2	LCH	TN	VL	-3.23	-0.00392	PASS
				VN	-4.62	-0.00561	PASS
				VH	-15.27	-0.01853	PASS
		MCH	TN	VL	-12.75	-0.01524	PASS
				VN	-10.01	-0.01197	PASS
				VH	-14.59	-0.01744	PASS
		HCH	TN	VL	-2.10	-0.00247	PASS
				VN	-6.84	-0.00806	PASS
				VH	-2.68	-0.00316	PASS
GSM1900	GSM/TM1	LCH	TN	VL	28.15	0.01521	PASS
				VN	39.52	0.02136	PASS
				VH	37.52	0.02028	PASS
		MCH	TN	VL	36.48	0.0194	PASS
				VN	35.00	0.01862	PASS
				VH	41.20	0.02191	PASS
		HCH	TN	VL	32.74	0.01714	PASS
				VN	31.06	0.01626	PASS
				VH	40.81	0.02137	PASS
	GSM/TM2	LCH	TN	VL	12.95	0.007	PASS
				VN	5.52	0.00298	PASS
				VH	21.31	0.01152	PASS
		MCH	TN	VL	25.89	0.01377	PASS
				VN	20.66	0.01099	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	22.41	0.01192	PASS
		HCH	TN	VL	17.82	0.00933	PASS
				VN	20.44	0.0107	PASS
				VH	27.51	0.0144	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	-22.79	-0.02765	PASS
				-20	-9.94	-0.01206	PASS
				-10	-11.30	-0.01371	PASS
				0	-7.36	-0.00893	PASS
				10	-9.88	-0.01199	PASS
				20	-7.81	-0.00948	PASS
				30	-9.88	-0.01199	PASS
				40	-12.40	-0.01504	PASS
		50	-14.14	-0.01716	PASS		
		MCH	VN	-30	-12.20	-0.01458	PASS
				-20	-10.40	-0.01243	PASS
				-10	-6.20	-0.00741	PASS
				0	-13.11	-0.01567	PASS
				10	-8.91	-0.01065	PASS
				20	-12.46	-0.01489	PASS
				30	-11.82	-0.01413	PASS
				40	-4.52	-0.0054	PASS
		50	-14.08	-0.01683	PASS		
		HCH	VN	-30	-12.79	-0.01507	PASS
				-20	-12.46	-0.01468	PASS
				-10	-8.20	-0.00966	PASS
				0	-12.46	-0.01468	PASS
				10	-16.14	-0.01902	PASS
				20	-8.91	-0.0105	PASS
	30			-8.52	-0.01004	PASS	
	40			-14.72	-0.01734	PASS	
	50	-13.69	-0.01613	PASS			
	GSM/TM2	LCH	VN	-30	-6.72	-0.00815	PASS
				-20	-1.36	-0.00165	PASS
				-10	-2.78	-0.00337	PASS
				0	-10.27	-0.01246	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				10	-12.40	-0.01504	PASS						
				20	-11.20	-0.01359	PASS						
				30	-4.91	-0.00596	PASS						
				40	-8.56	-0.01039	PASS						
				50	-4.94	-0.00599	PASS						
		MCH	VN			-30	-10.40	-0.01243	PASS				
						-20	-3.16	-0.00378	PASS				
						-10	-4.29	-0.00513	PASS				
						0	-5.62	-0.00672	PASS				
						10	-1.42	-0.0017	PASS				
						20	-8.52	-0.01018	PASS				
						30	-6.33	-0.00757	PASS				
						40	-12.30	-0.0147	PASS				
						50	-10.72	-0.01281	PASS				
						HCH	VN			-30	-6.65	-0.00783	PASS
		-20	-10.88	-0.01282	PASS								
		-10	-4.16	-0.0049	PASS								
		0	-6.65	-0.00783	PASS								
		10	-7.14	-0.00841	PASS								
		20	-11.24	-0.01324	PASS								
		30	-12.72	-0.01499	PASS								
		40	-6.49	-0.00765	PASS								
		50	-9.10	-0.01072	PASS								
		GSM1900	GSM/TM1	LCH	VN					-30	35.77	0.01933	PASS
										-20	37.32	0.02017	PASS
-10	37.58									0.02031	PASS		
0	26.99									0.01459	PASS		
10	31.06									0.01679	PASS		
20	31.19									0.01686	PASS		
30	31.58									0.01707	PASS		
40	35.97									0.01944	PASS		
50	32.54									0.01759	PASS		
MCH	VN									-30	28.28	0.01504	PASS
										-20	18.98	0.0101	PASS
										-10	37.90	0.02016	PASS
										0	36.87	0.01961	PASS
										10	28.28	0.01504	PASS
										20	31.96	0.017	PASS
										30	42.17	0.02243	PASS
										40	30.61	0.01628	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	24.67	0.01312	PASS
				-30	35.45	0.01856	PASS
				-20	30.48	0.01596	PASS
				-10	30.09	0.01576	PASS
				0	28.86	0.01511	PASS
				10	32.74	0.01714	PASS
				20	35.64	0.01866	PASS
				30	43.26	0.02265	PASS
				40	27.57	0.01444	PASS
				50	29.06	0.01522	PASS
	GSM/TM2	LCH	VN	-30	18.56	0.01003	PASS
				-20	3.91	0.00211	PASS
				-10	6.30	0.00341	PASS
				0	28.77	0.01555	PASS
				10	16.69	0.00902	PASS
				20	19.27	0.01042	PASS
				30	22.89	0.01237	PASS
				40	11.43	0.00618	PASS
				50	26.09	0.0141	PASS
				MCH	VN	-30	16.11
		-20	19.82			0.01054	PASS
		-10	27.83			0.0148	PASS
		0	34.68			0.01845	PASS
		10	22.37			0.0119	PASS
		20	17.01			0.00905	PASS
		30	19.05			0.01013	PASS
		40	24.92			0.01326	PASS
		50	20.89			0.01111	PASS
		HCH	VN			-30	15.82
				-20	0.03	0.00002	PASS
				-10	24.25	0.0127	PASS
				0	16.53	0.00866	PASS
				10	27.44	0.01437	PASS
				20	19.92	0.01043	PASS
				30	26.89	0.01408	PASS
				40	21.47	0.01124	PASS
				50	16.95	0.00888	PASS

END