



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	33.11	28.85	38.5	PASS
		MCH	33.13	28.72	38.5	PASS
		HCH	33.11	28.93	38.5	PASS
	GSM/TM2	LCH	26.46	21.95	38.5	PASS
		MCH	26.37	21.86	38.5	PASS
		HCH	26.35	21.94	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.02	32.11	33	PASS
		MCH	29.84	31.88	33	PASS
		HCH	30.06	32.16	33	PASS
	GSM/TM2	LCH	25.66	27.61	33	PASS
		MCH	25.61	27.69	33	PASS



Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	25.66	27.49	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: RBW > emission bandwidth, VBW > 3 x RBW.

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	0.22	13	PASS
		MCH	0.23	13	PASS
		HCH	0.21	13	PASS
	GSM/TM2	LCH	3.2	13	PASS
		MCH	3.19	13	PASS
		HCH	3	13	PASS

3Appendix_C: Modulation Characteristics

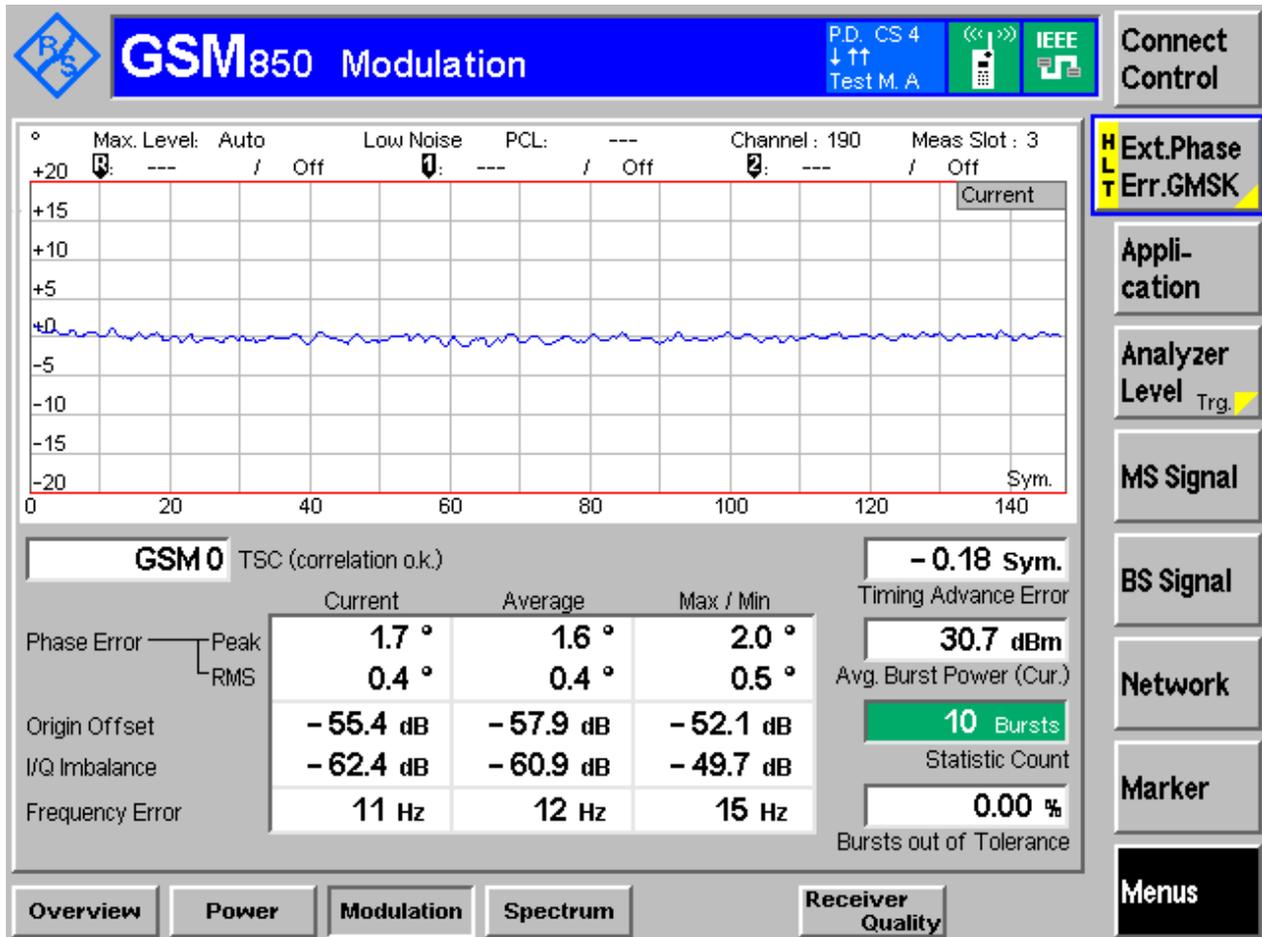
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

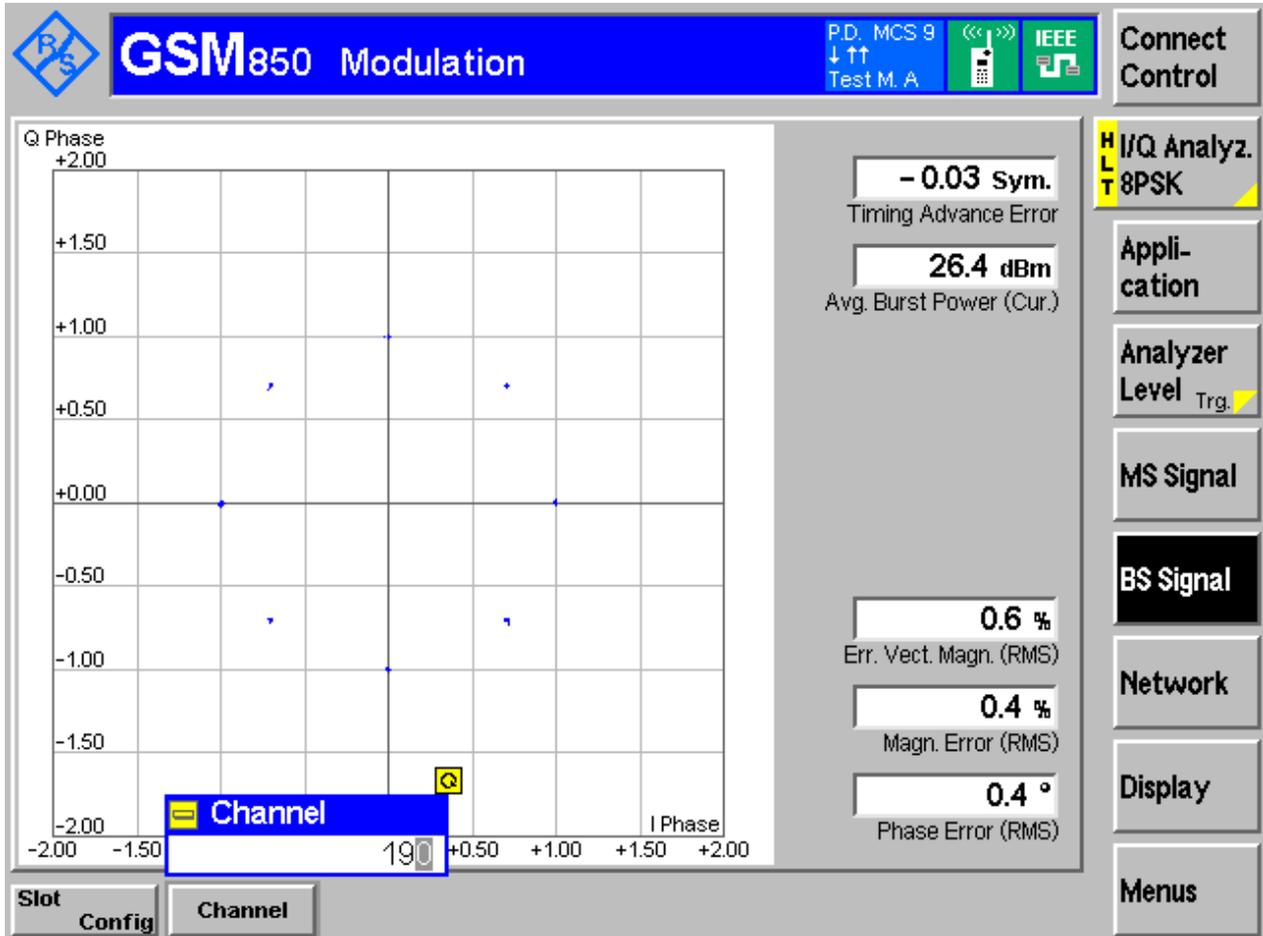
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

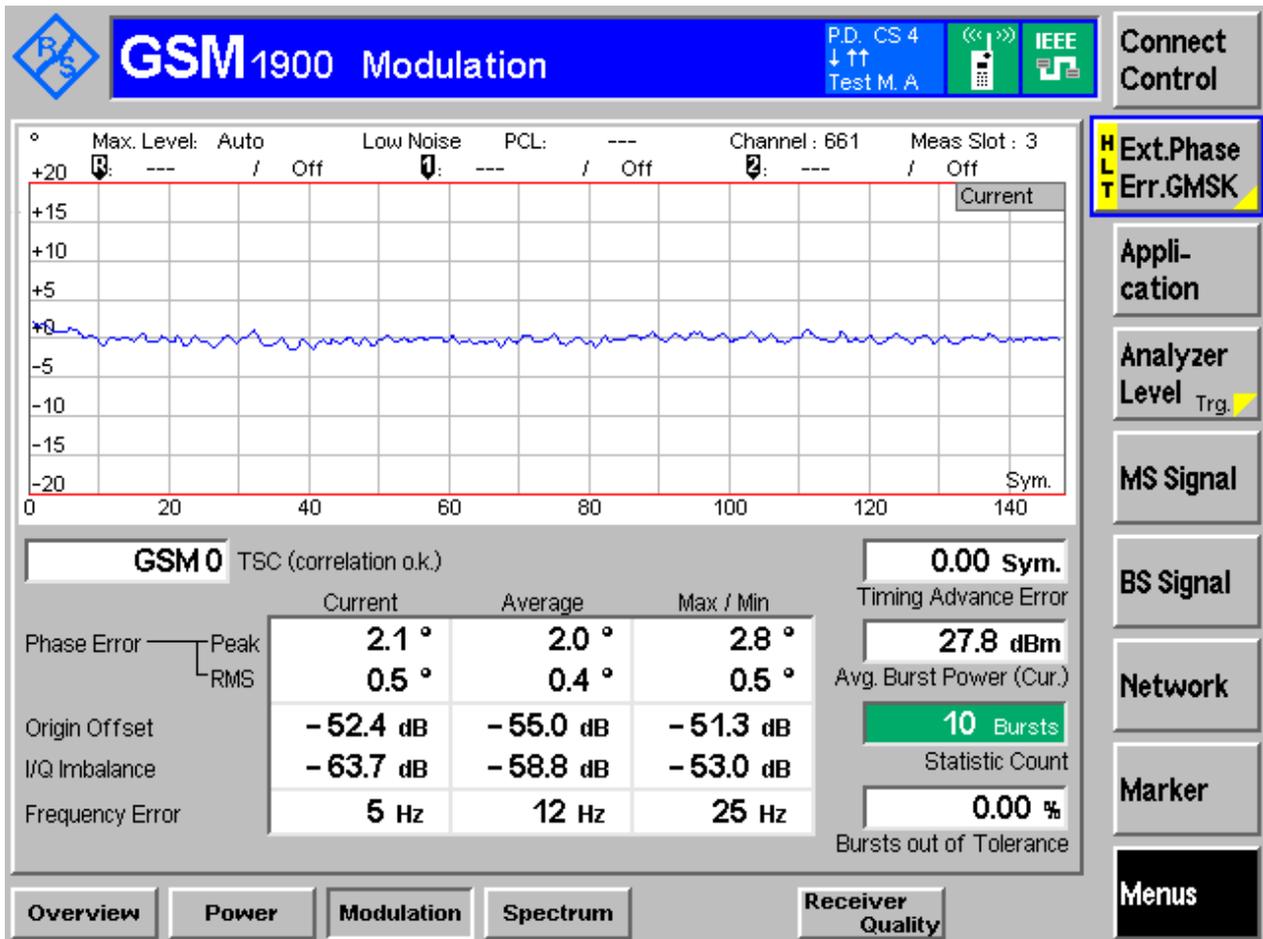
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

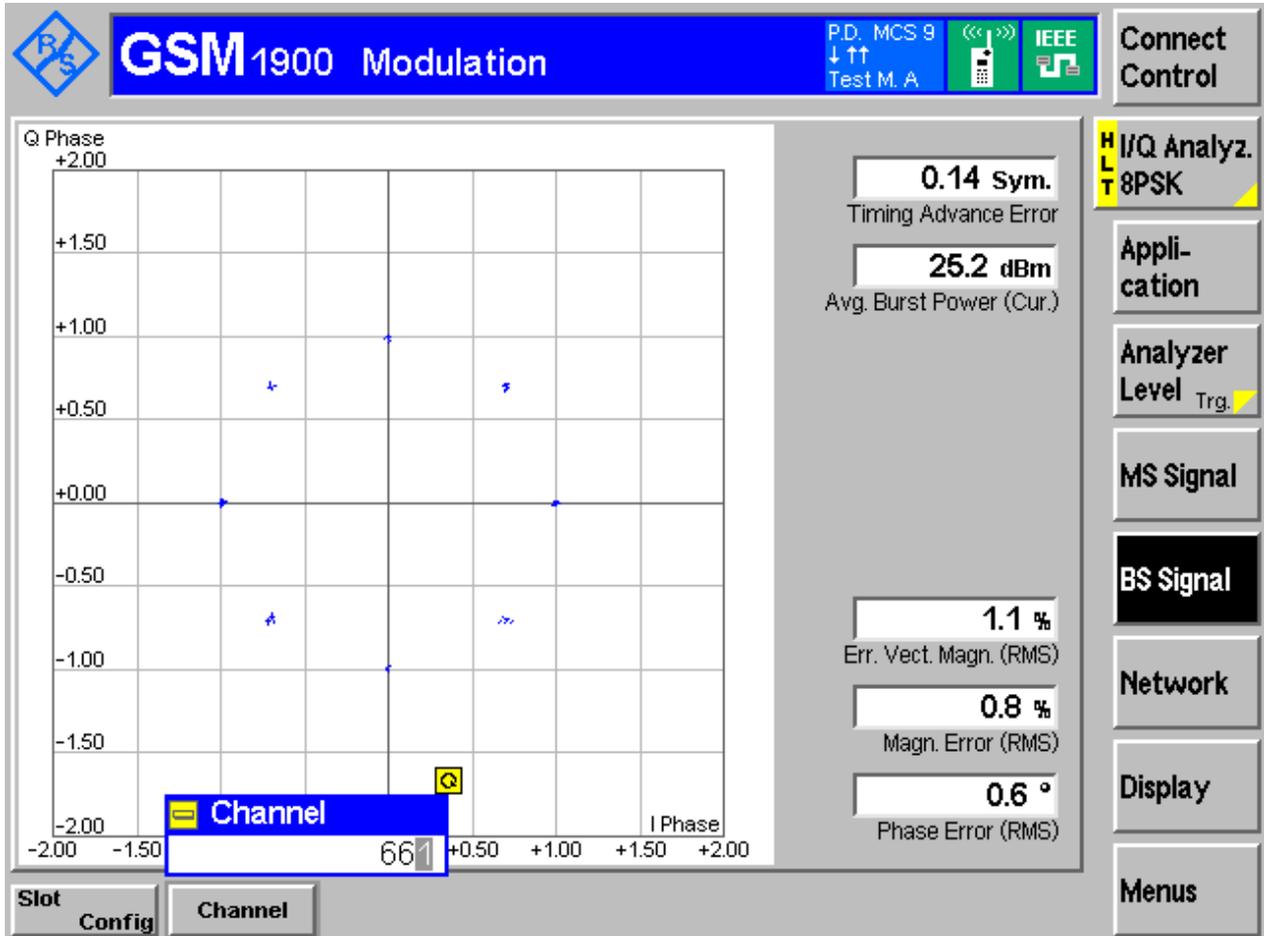
3.1.2.1 Test Mode = GSM/TM1

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	245.33	319.34	Pass
		MCH	243.97	310.51	Pass
		HCH	244.92	311.41	Pass
	GSM/TM2	LCH	246.19	316.70	Pass
		MCH	241.99	316.66	Pass
		HCH	244.42	316.92	Pass
GSM1900	GSM/TM1	LCH	247.26	316.04	Pass
		MCH	246.54	313.45	Pass
		HCH	248.89	311.08	Pass
	GSM/TM2	LCH	241.64	312.43	Pass
		MCH	245.37	312.25	Pass
		HCH	243.46	316.71	Pass



Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

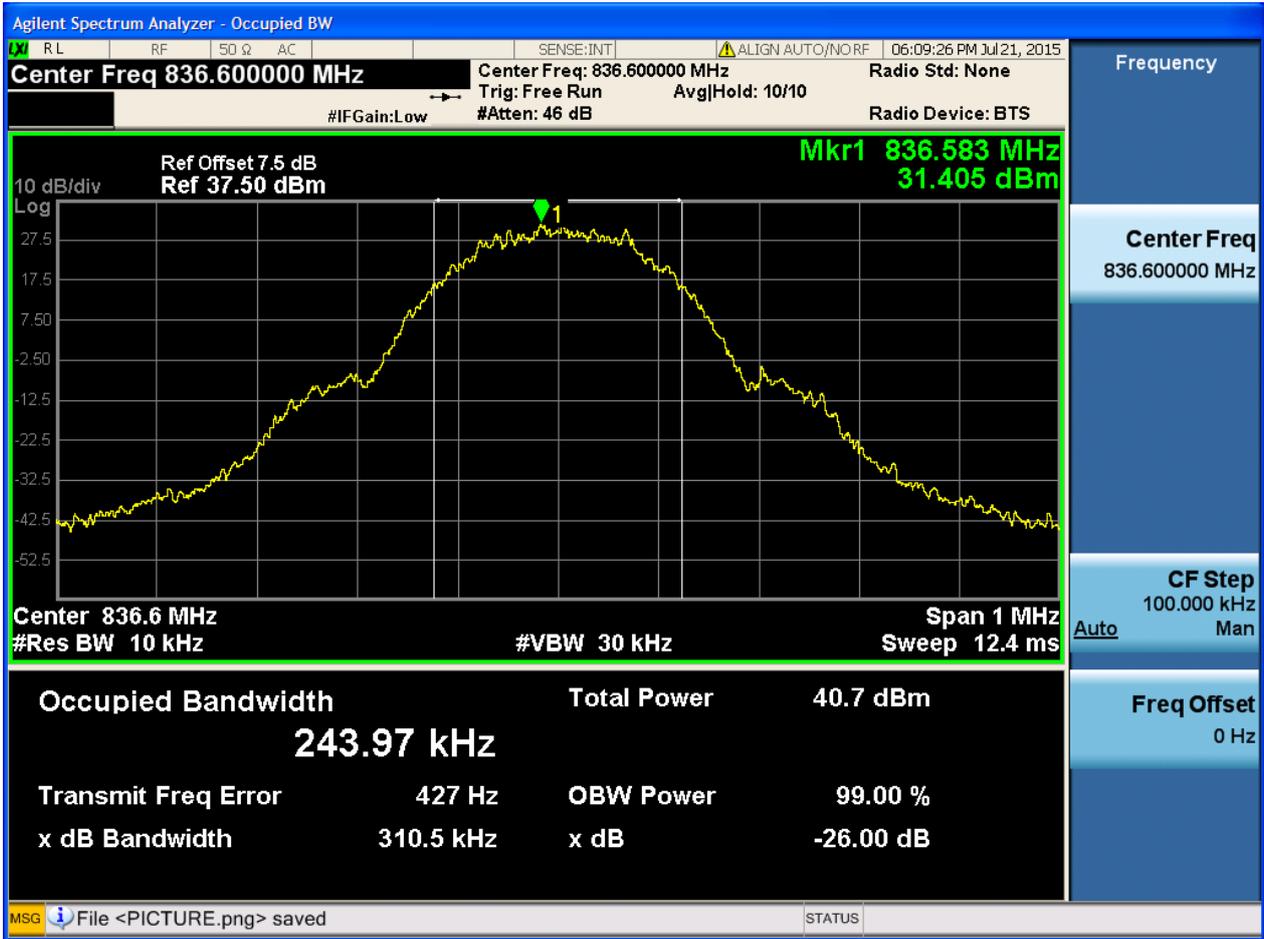
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH





4.1.1.1.2 Test Channel = MCH





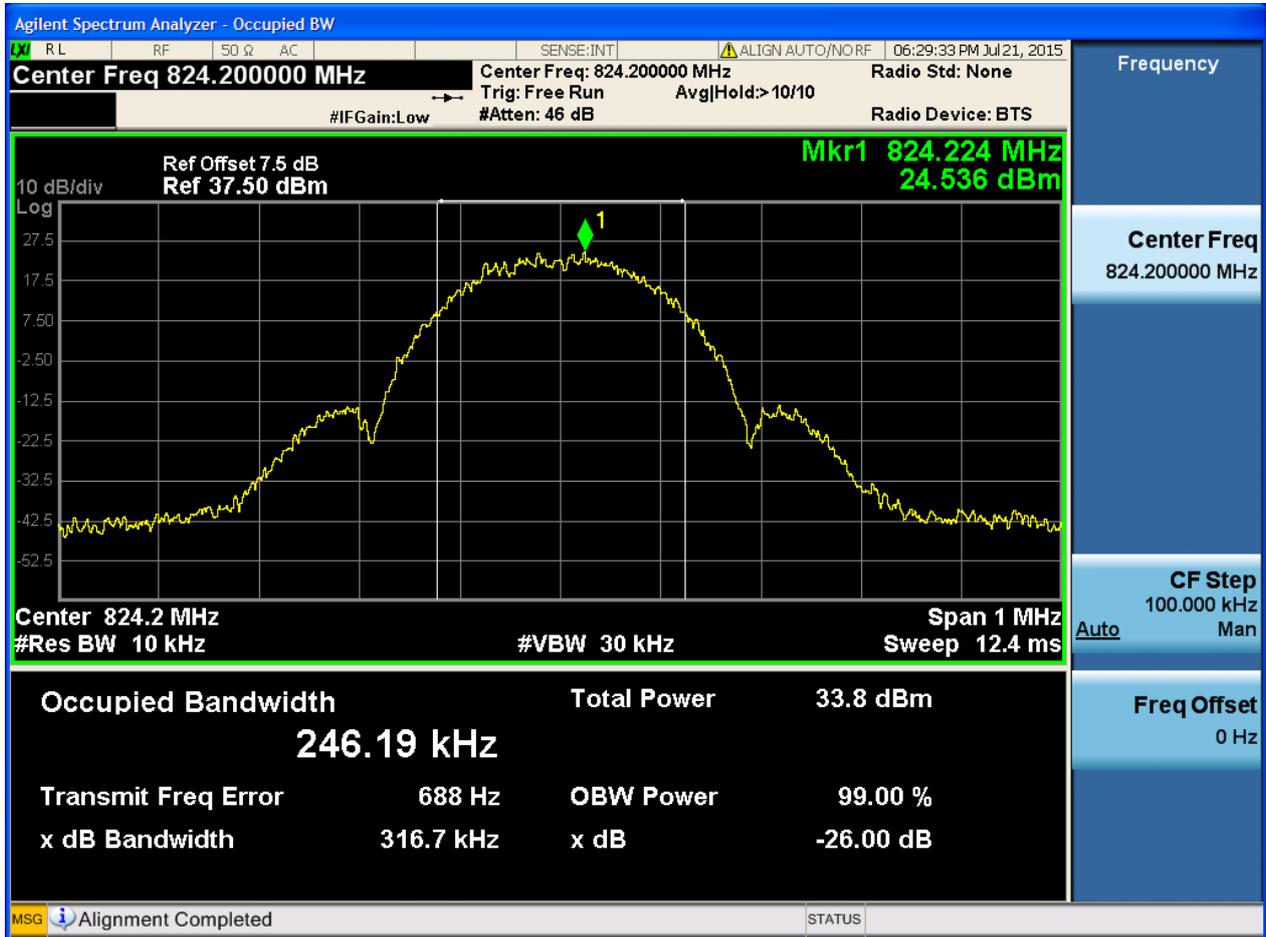
4.1.1.1.3 Test Channel = HCH





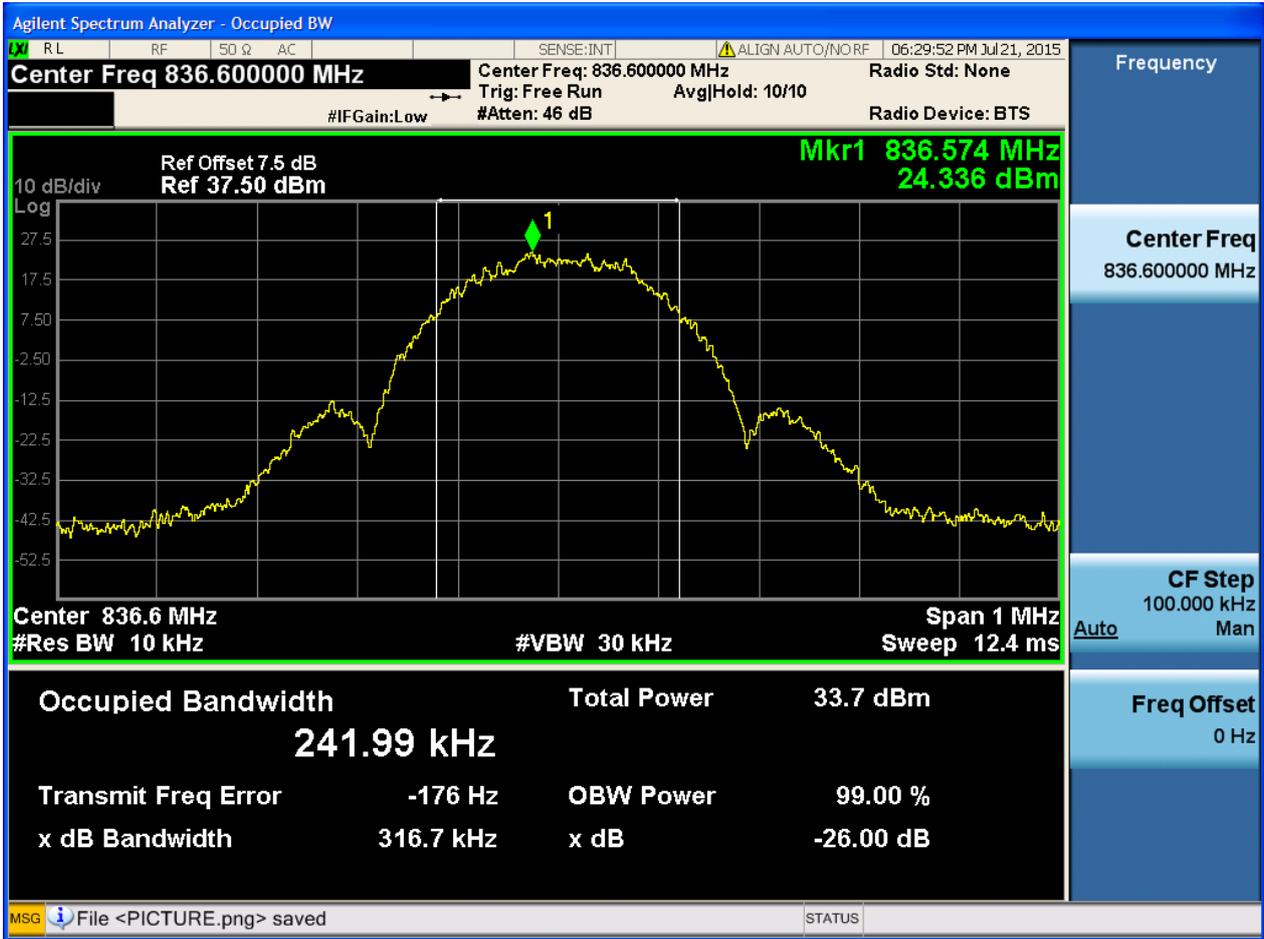
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



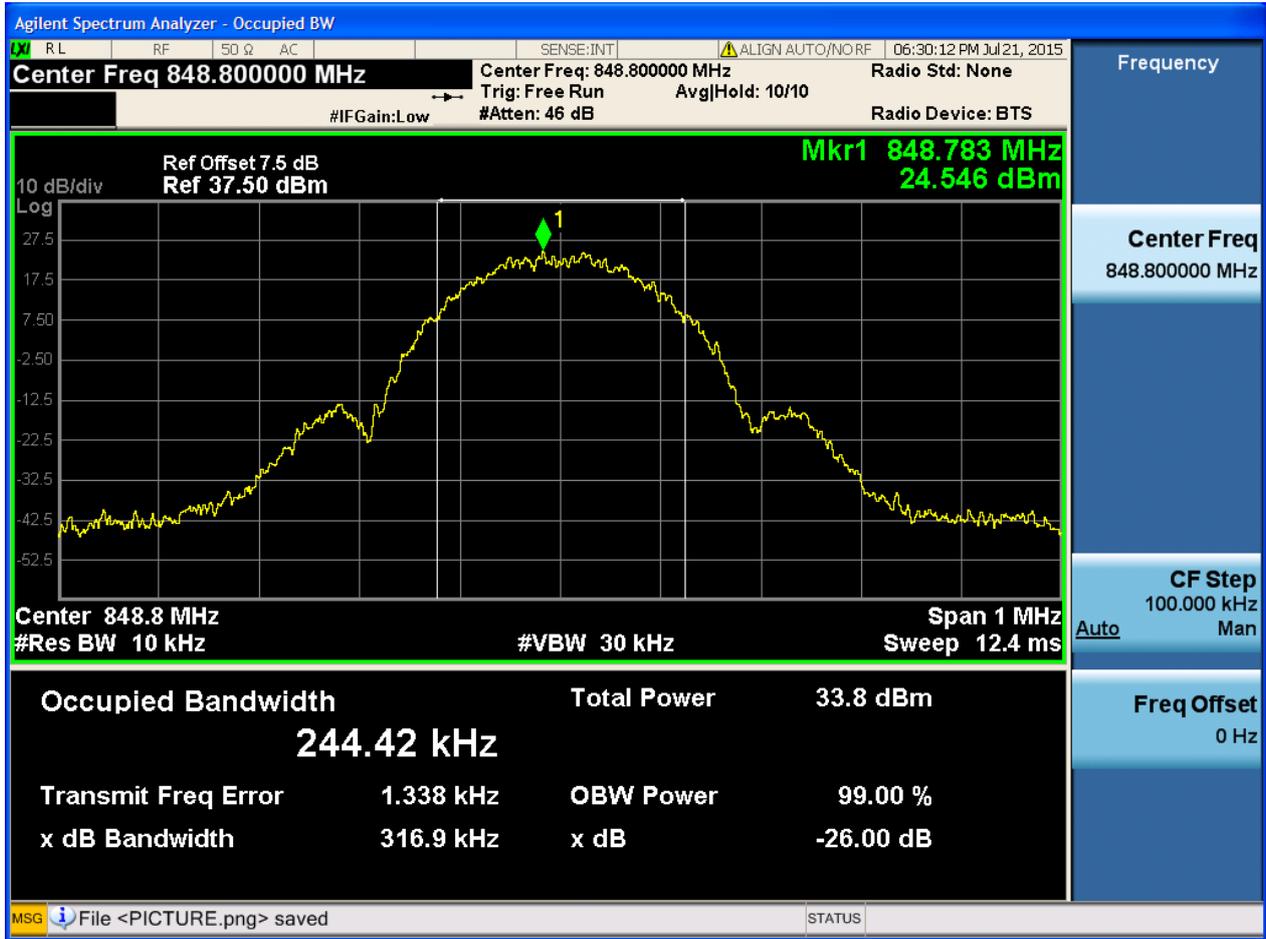


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH

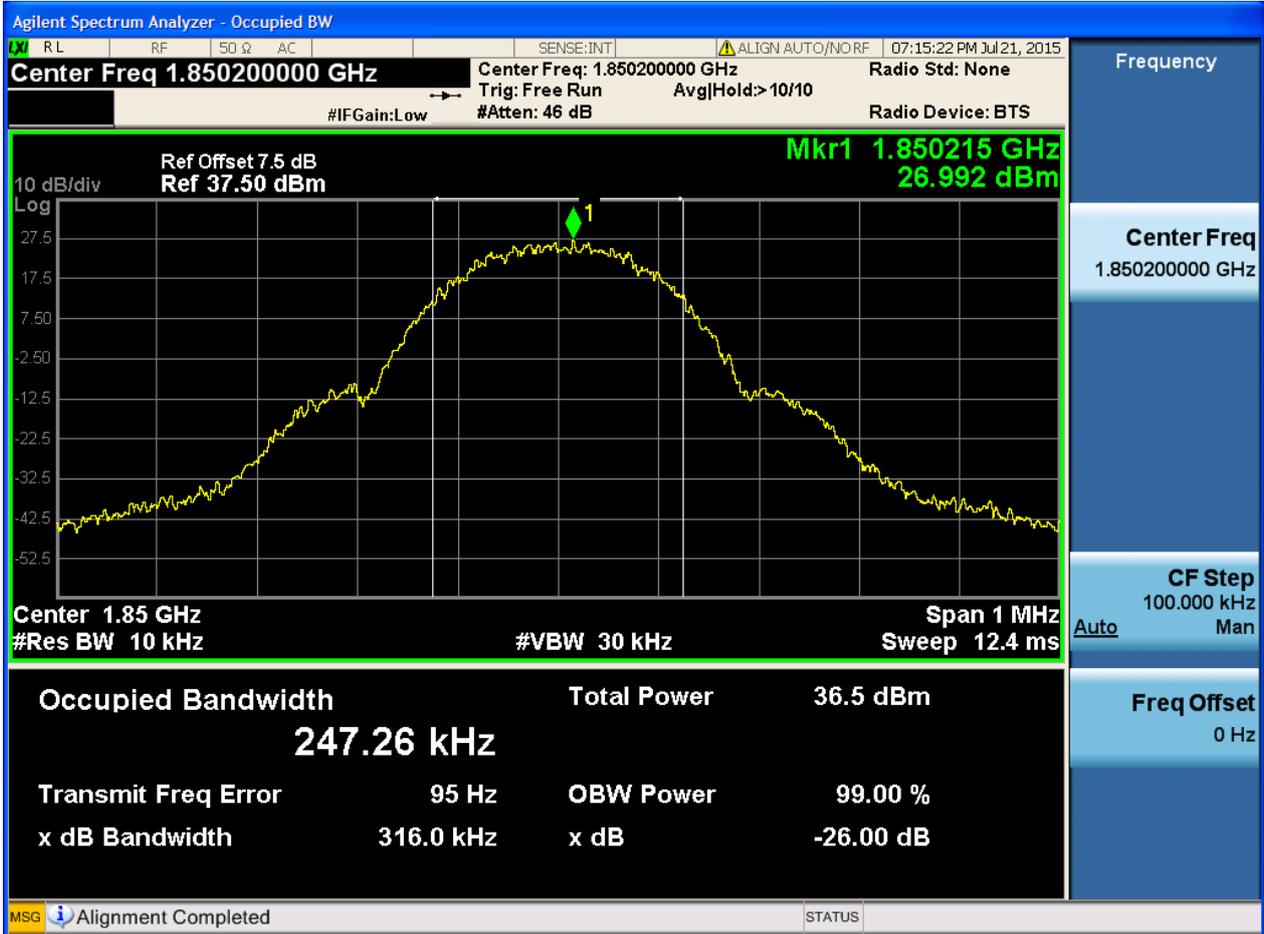




4.1.2 Test Band = GSM1900

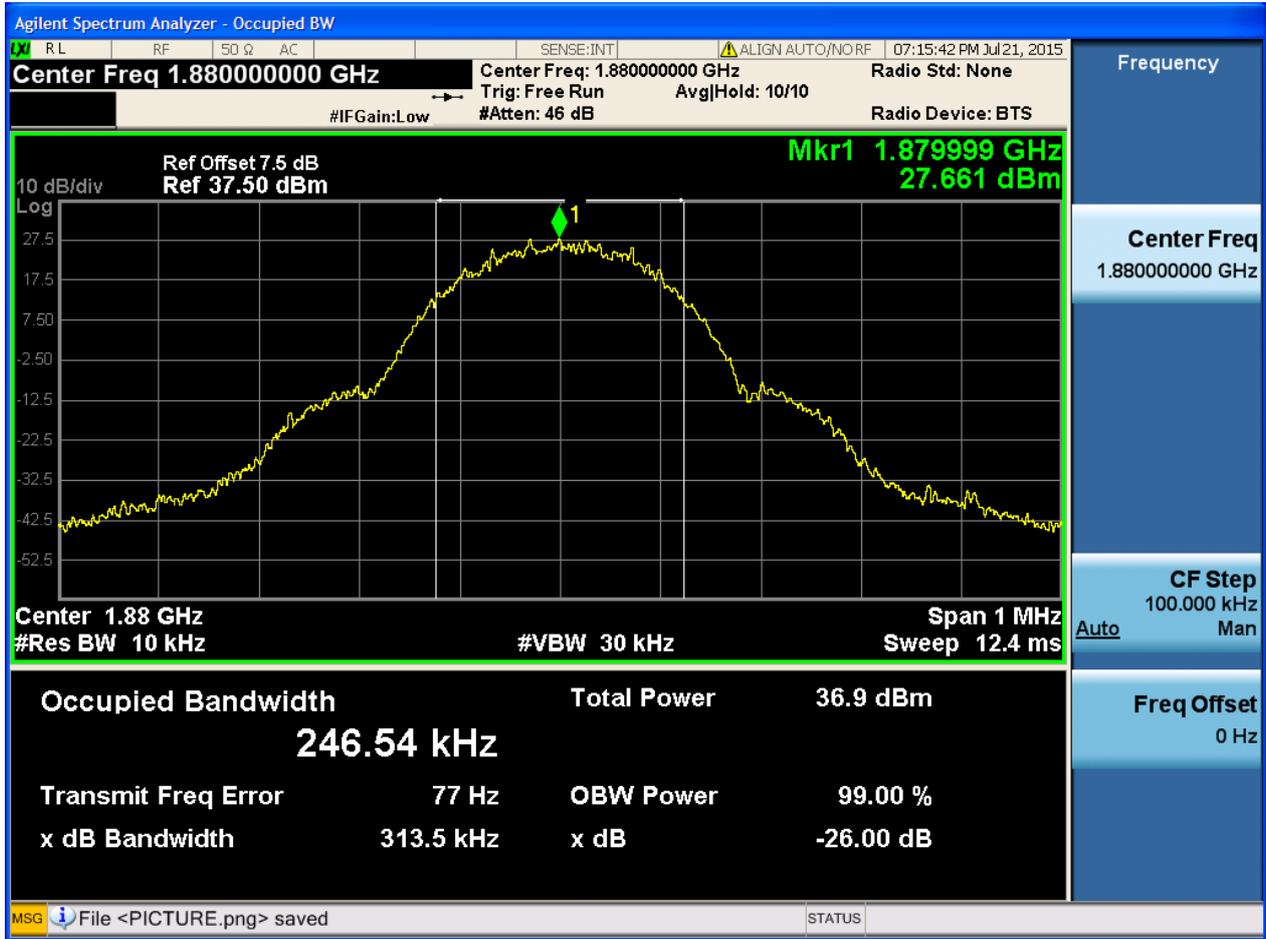
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



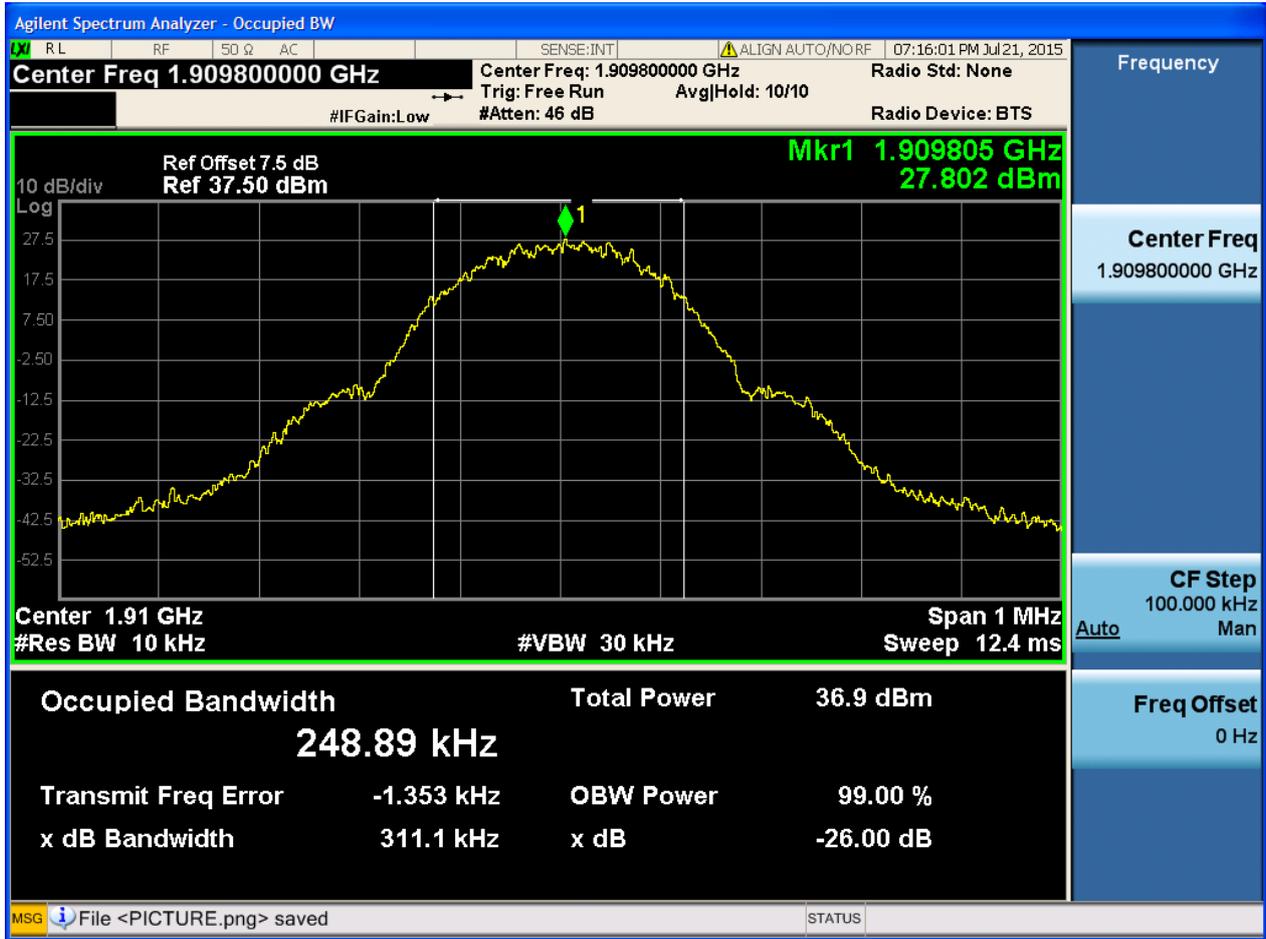


4.1.2.1.2 Test Channel = MCH





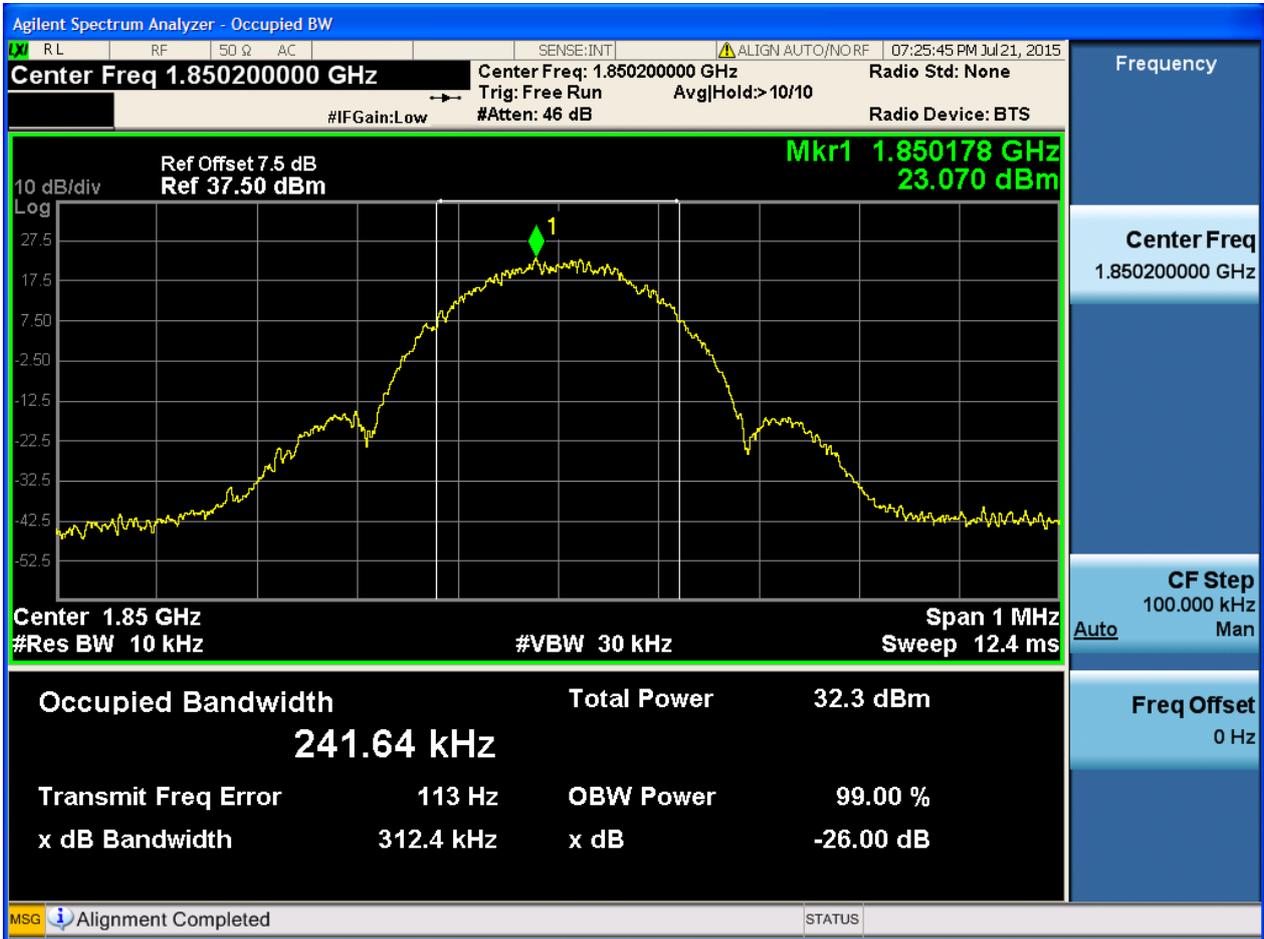
4.1.2.1.3 Test Channel = HCH





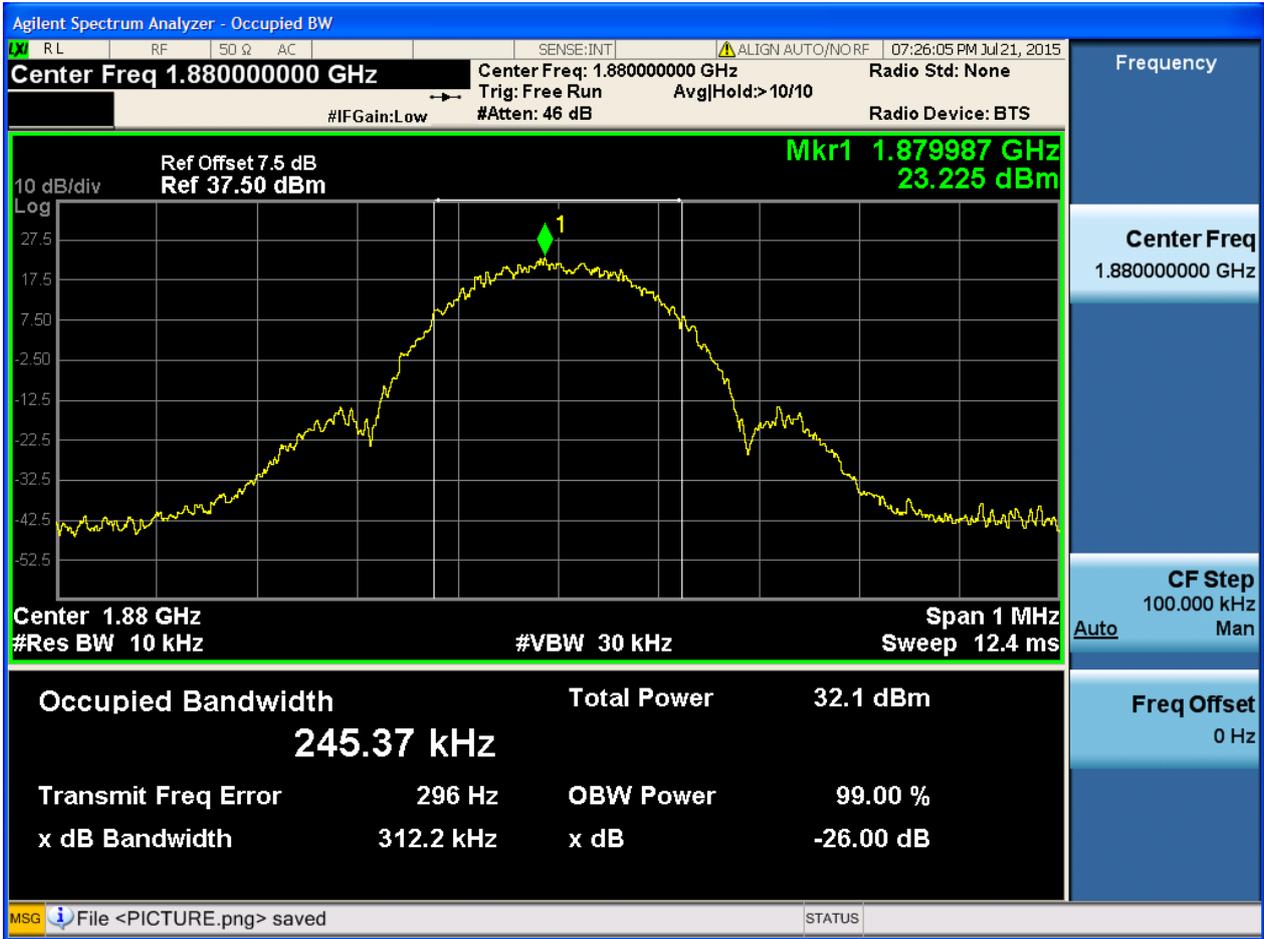
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



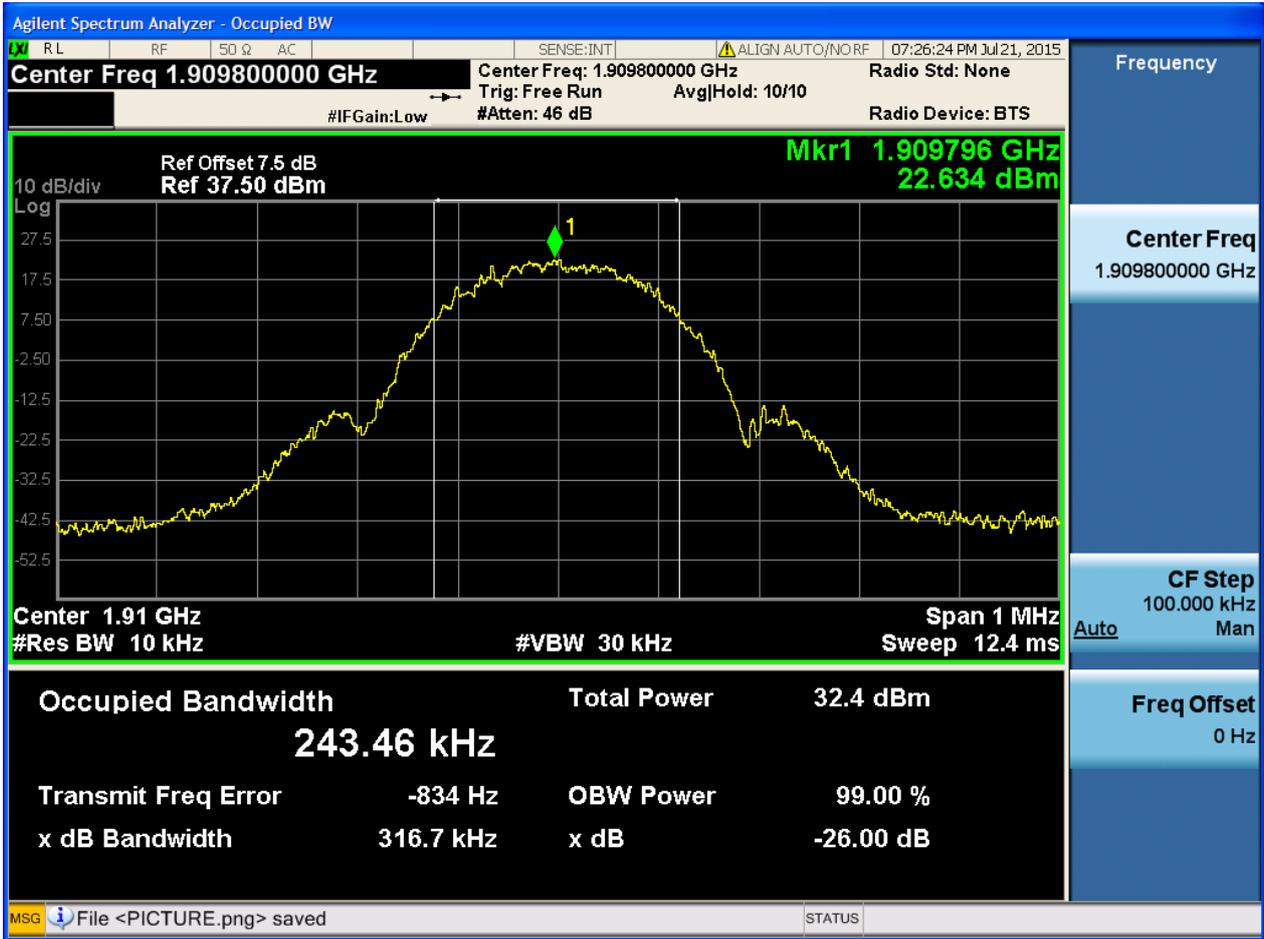


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

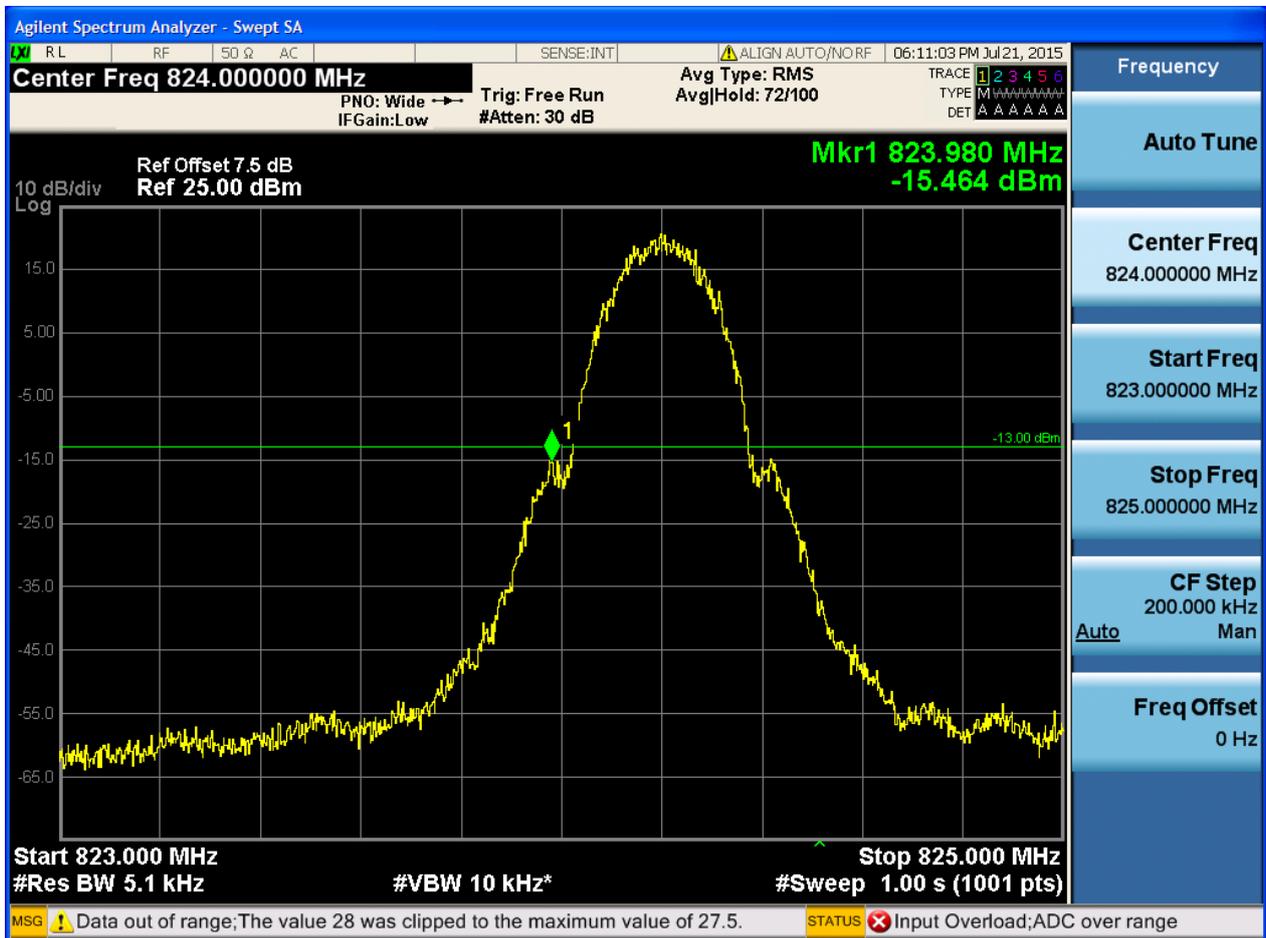
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

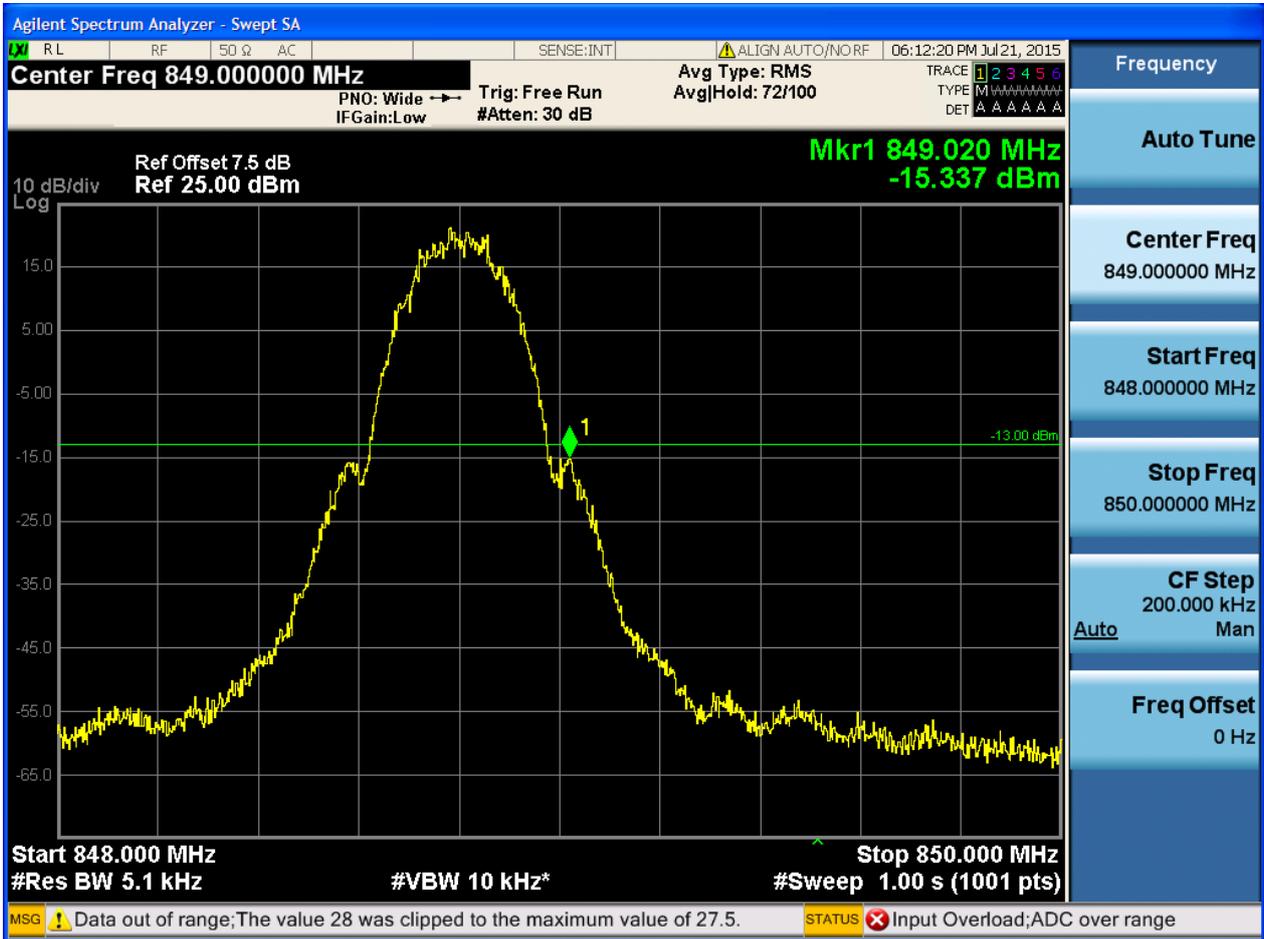
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





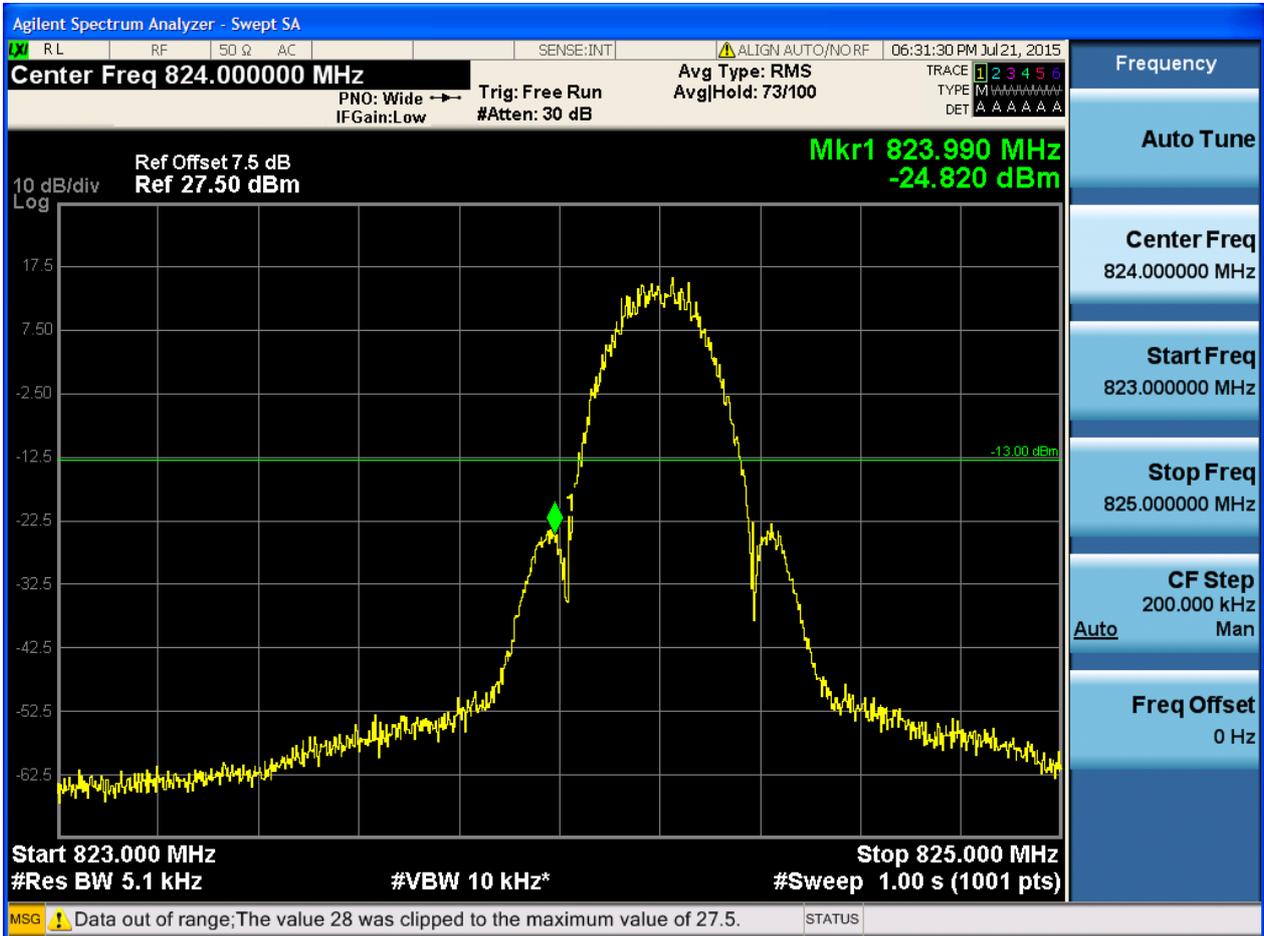
5.1.1.1.2 Test Channel = HCH



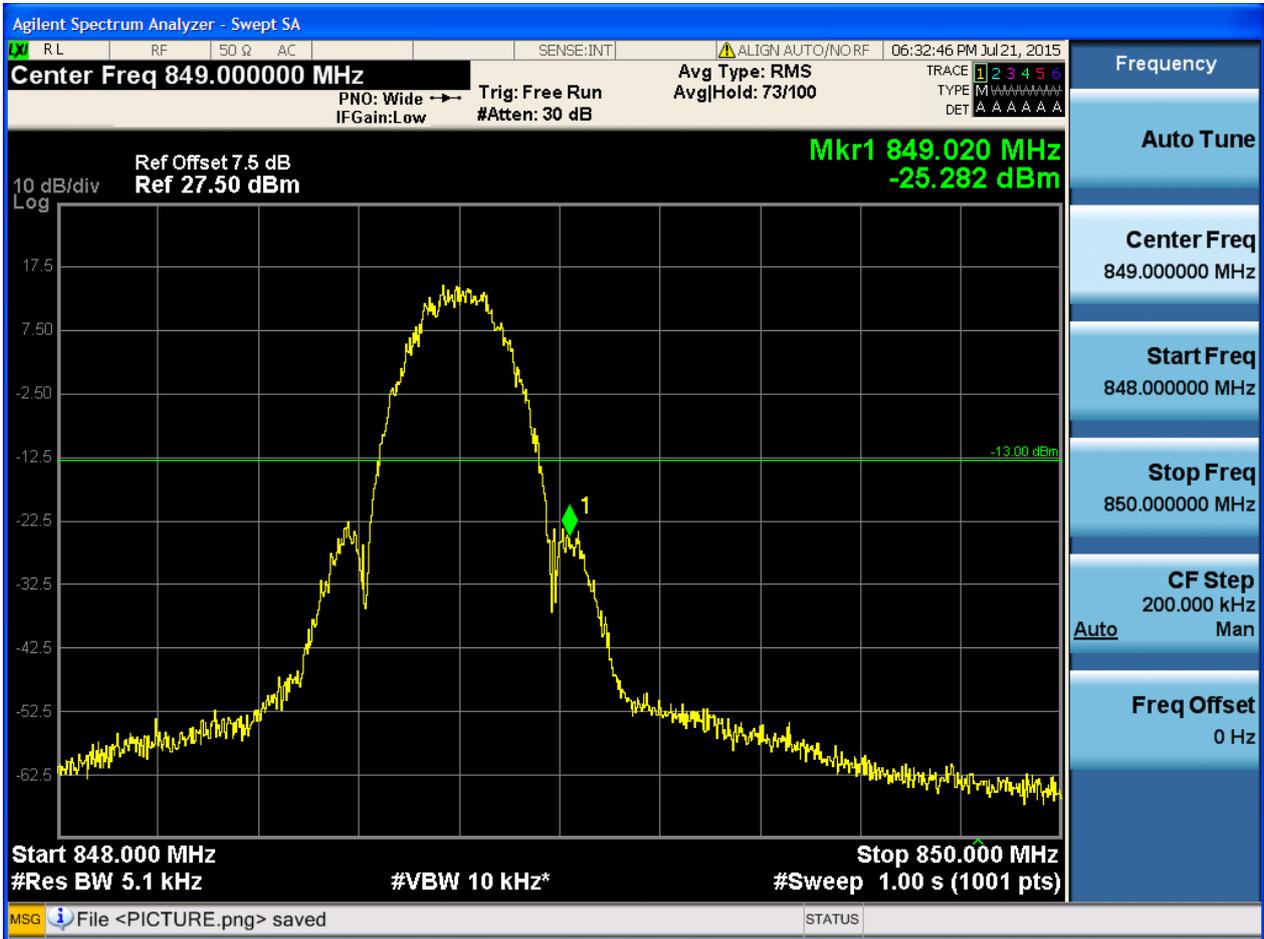


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

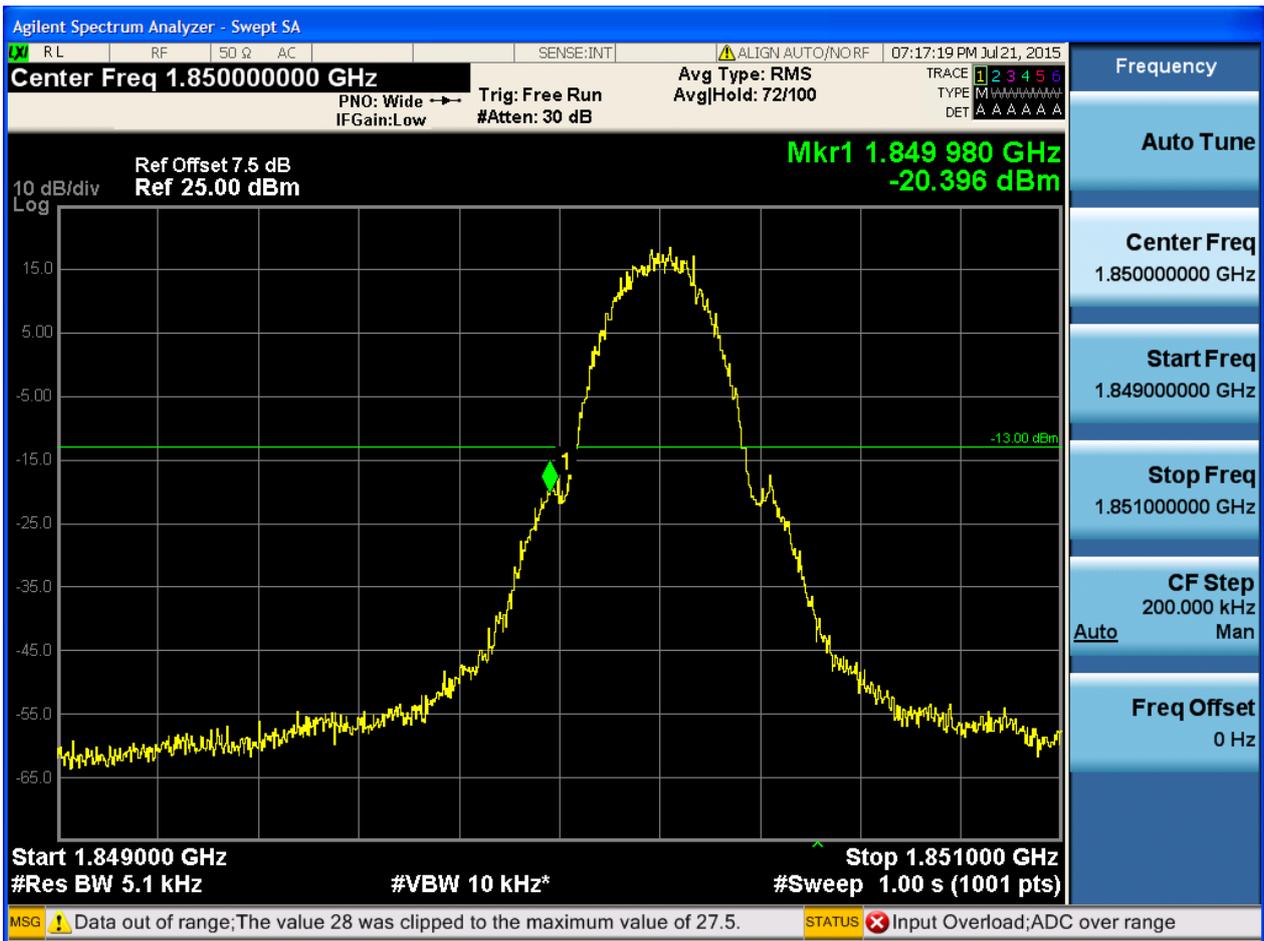




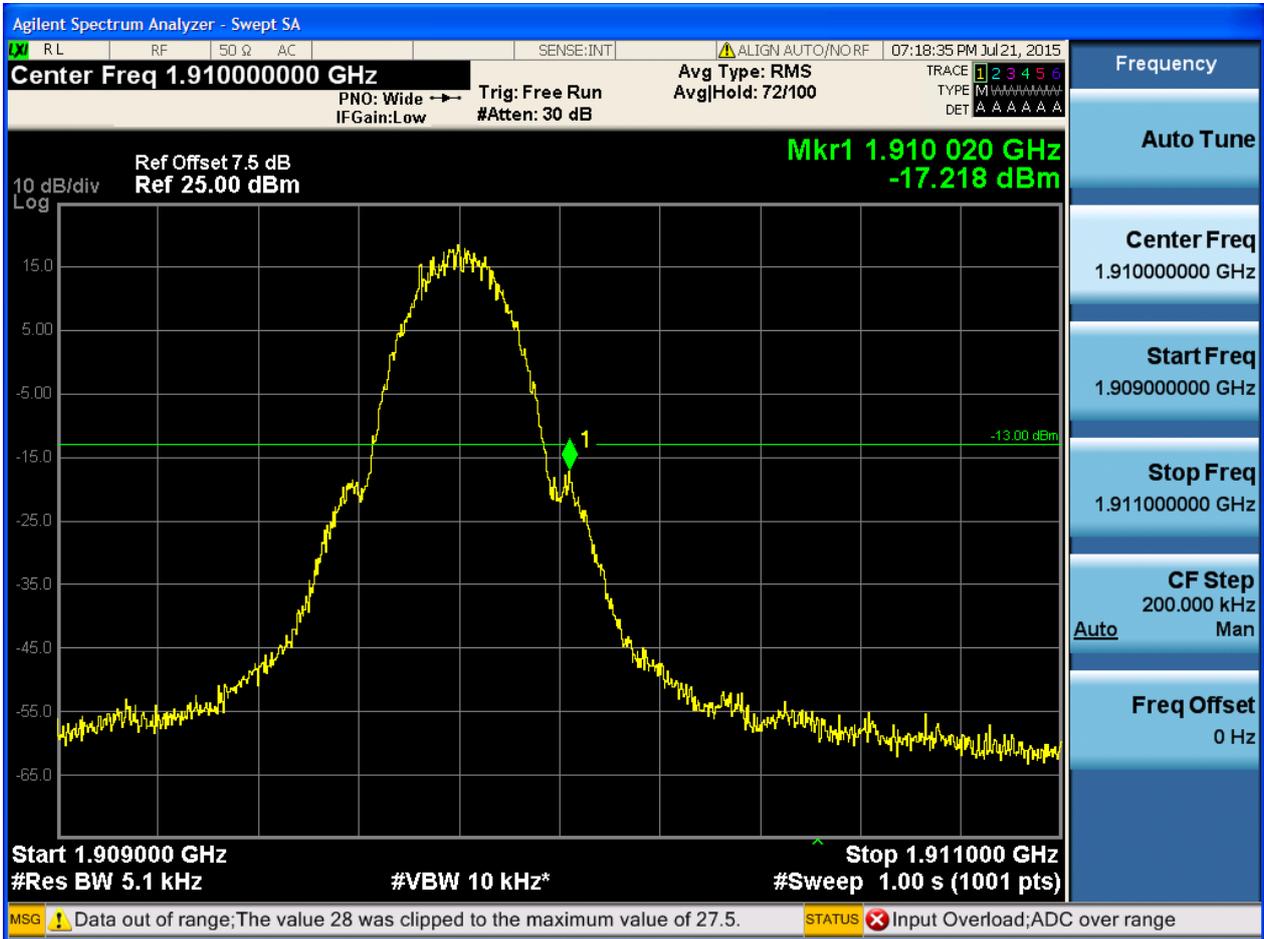
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

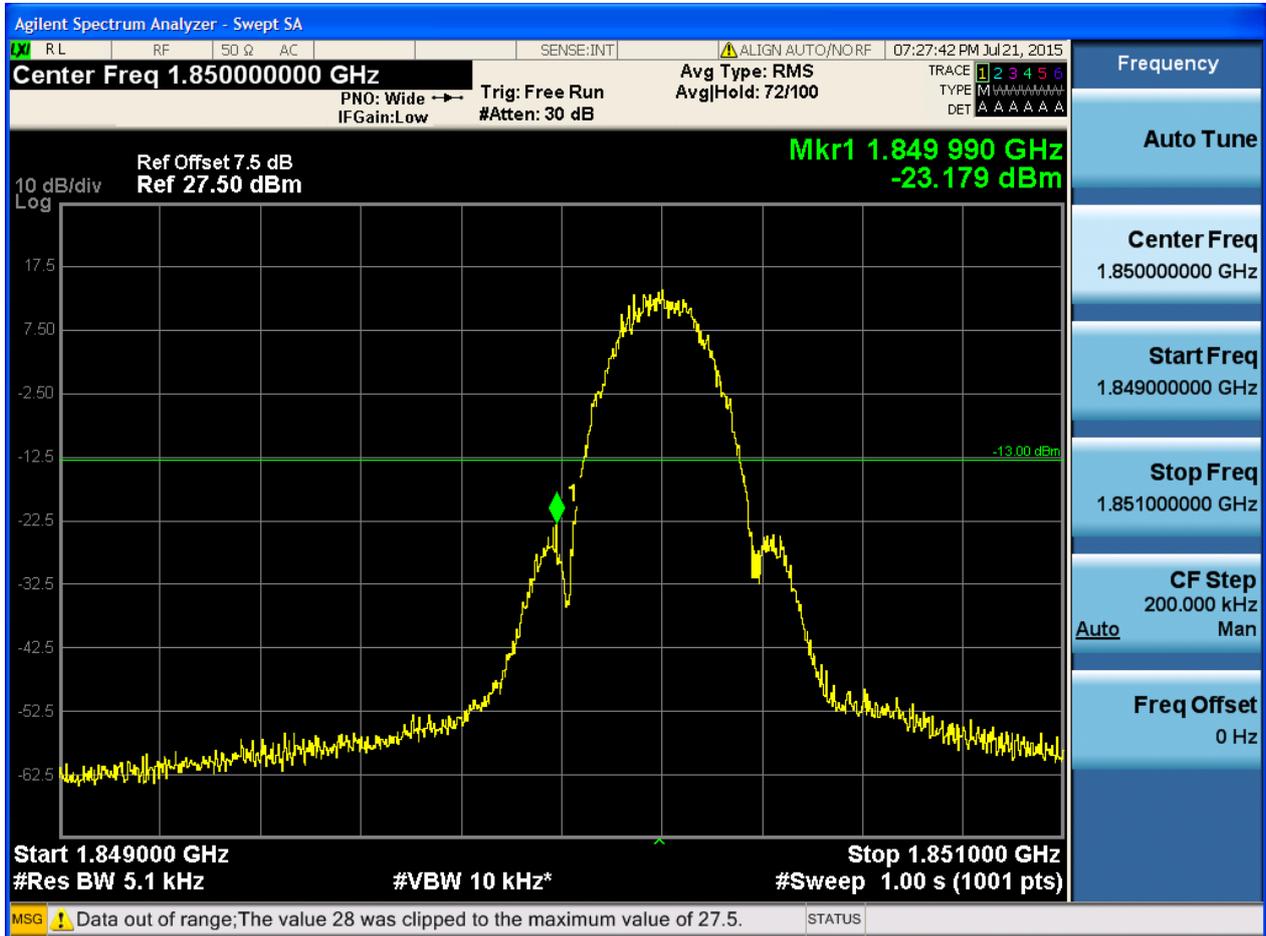


5.1.2.1.2 Test Channel = HCH

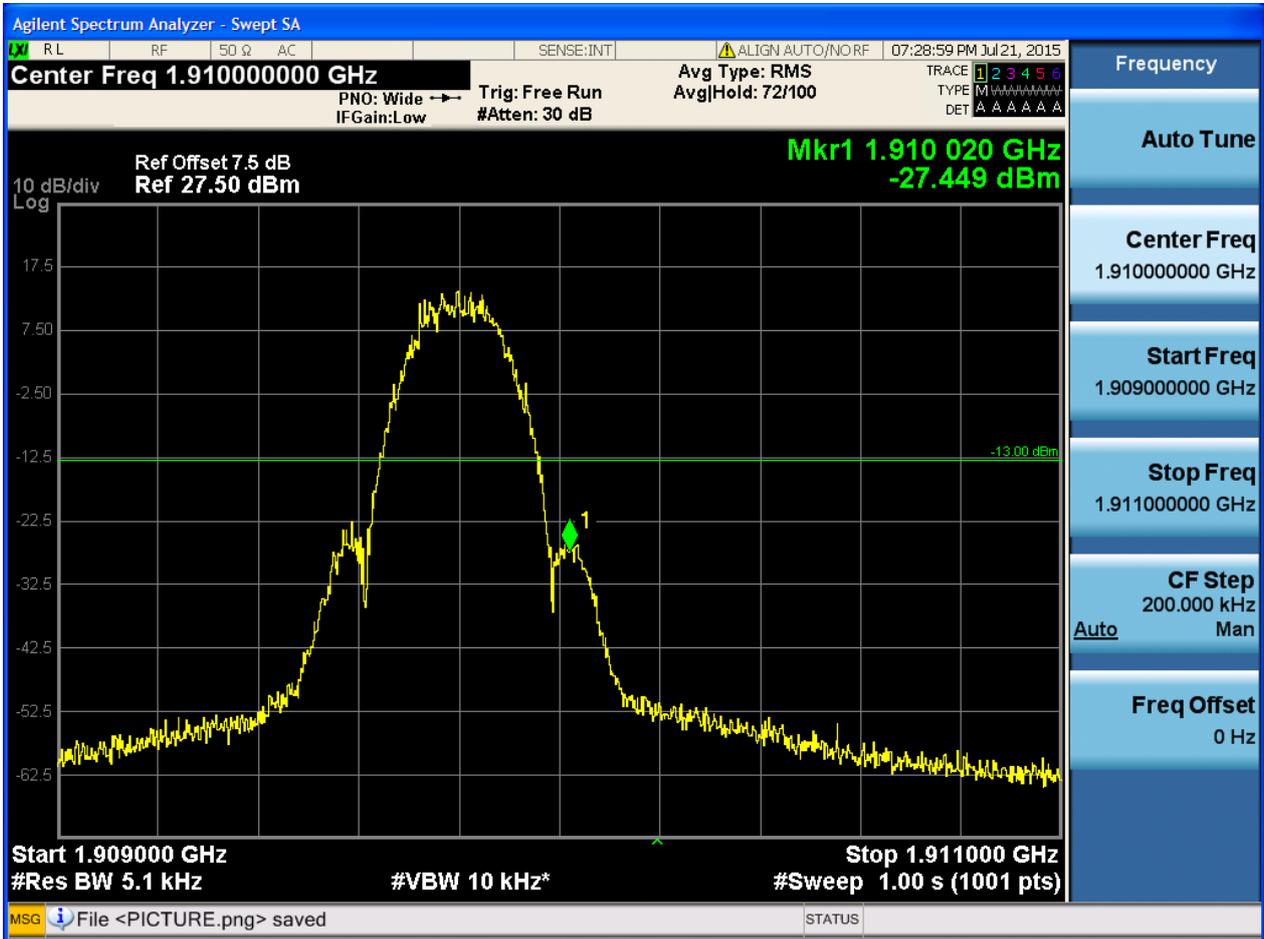


5.1.2.2 Test Mode = GSM/TM2

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.

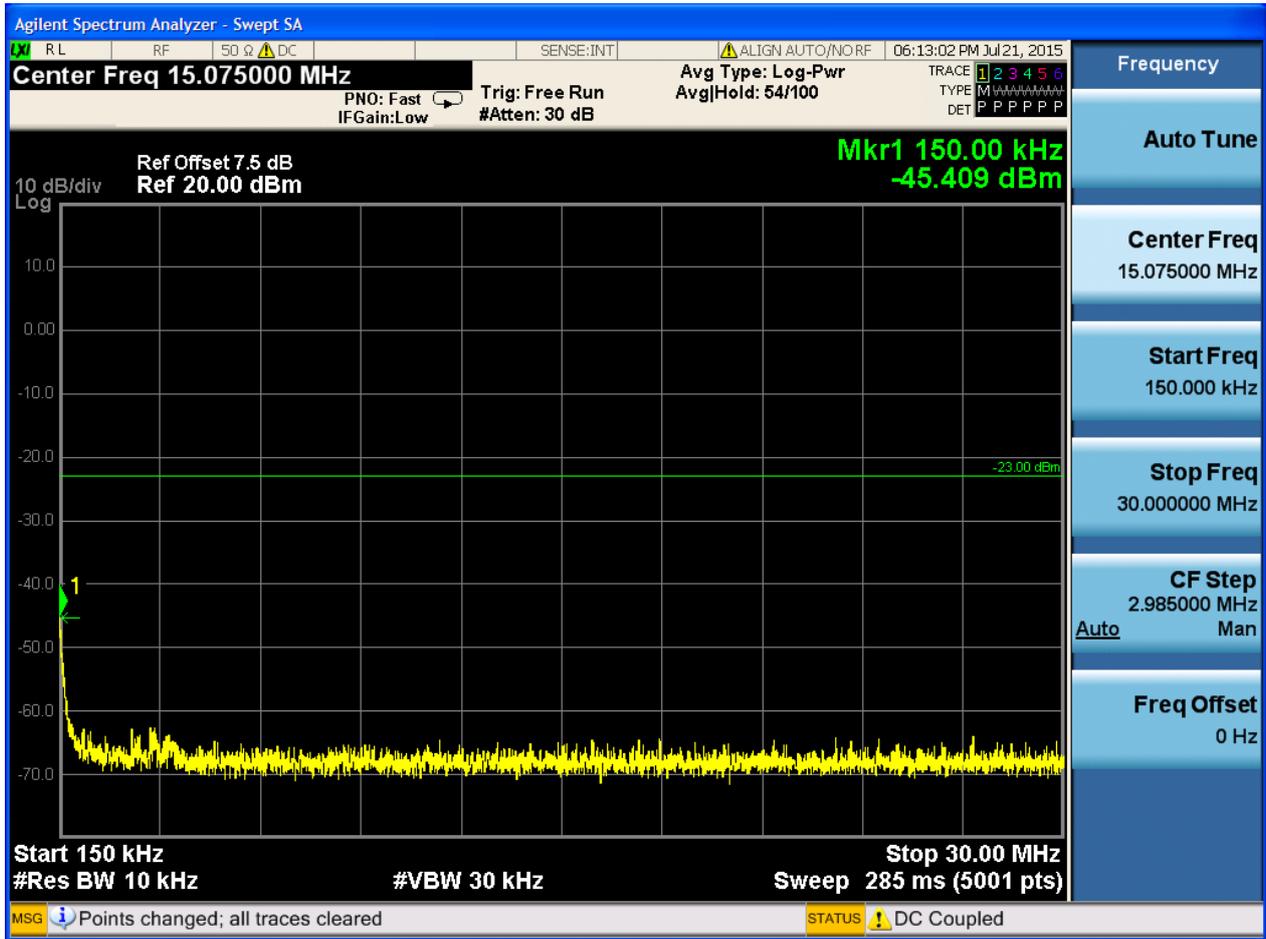
Part I - Test Plots

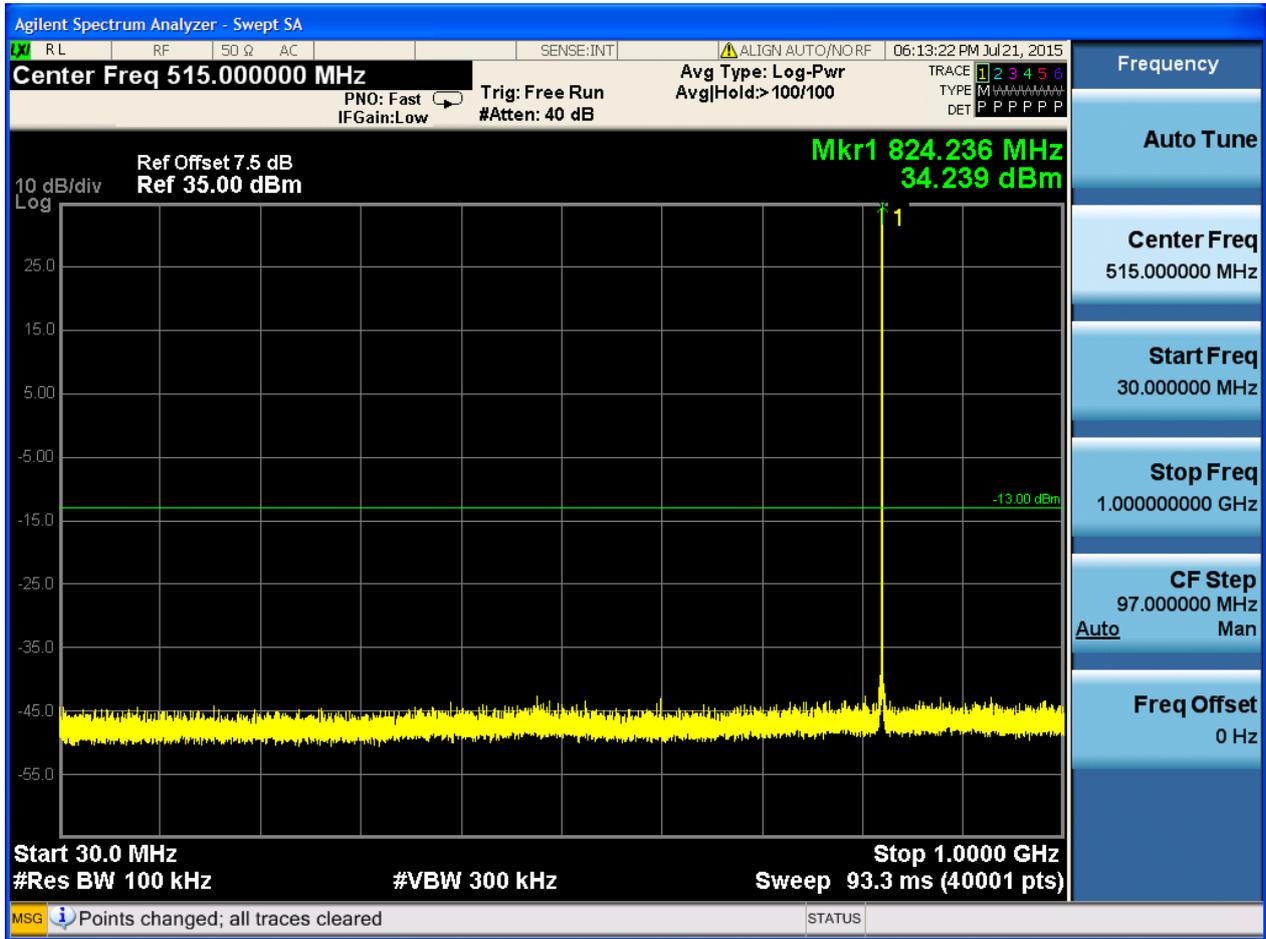
6.1 For GSM

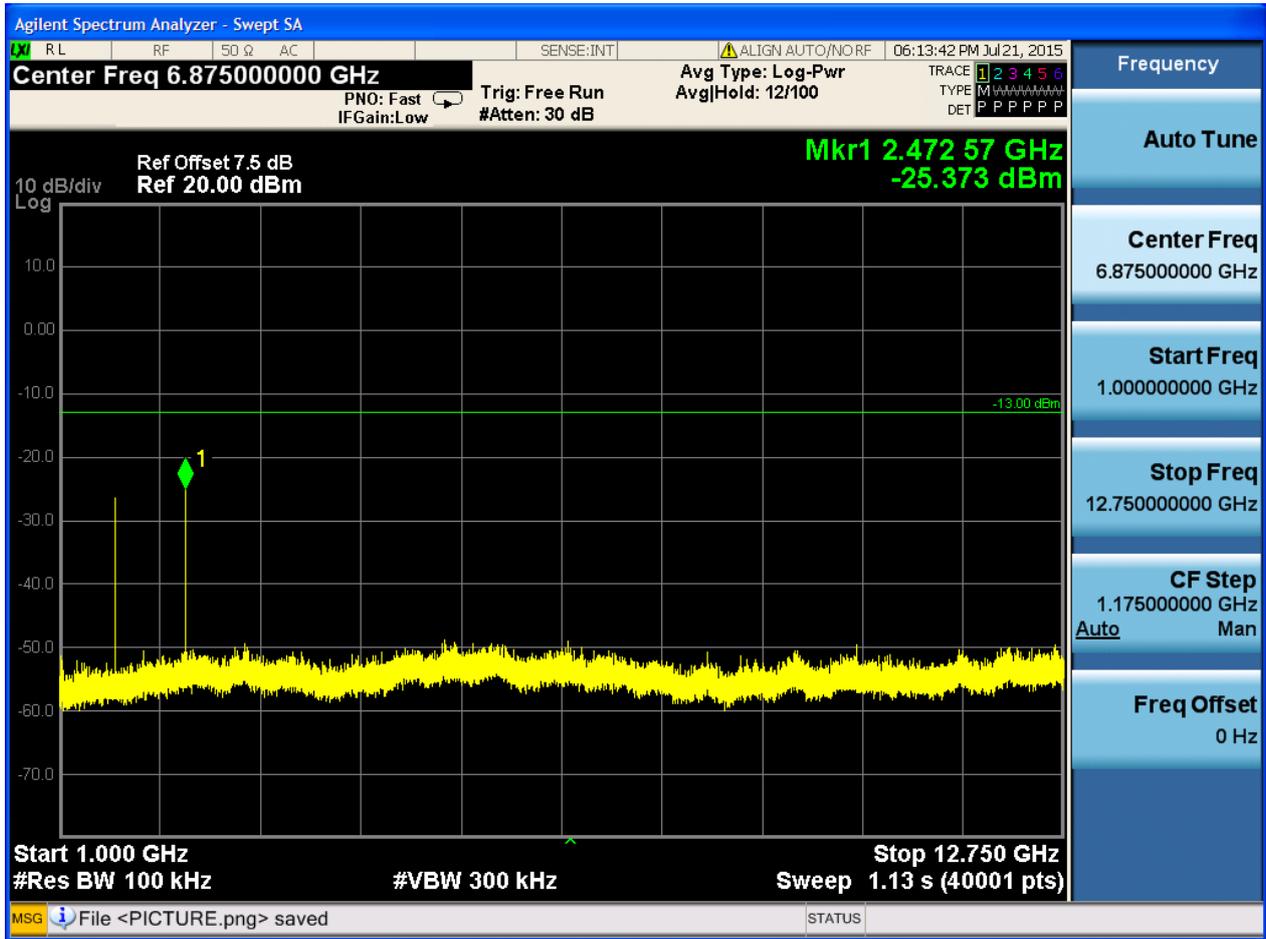
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

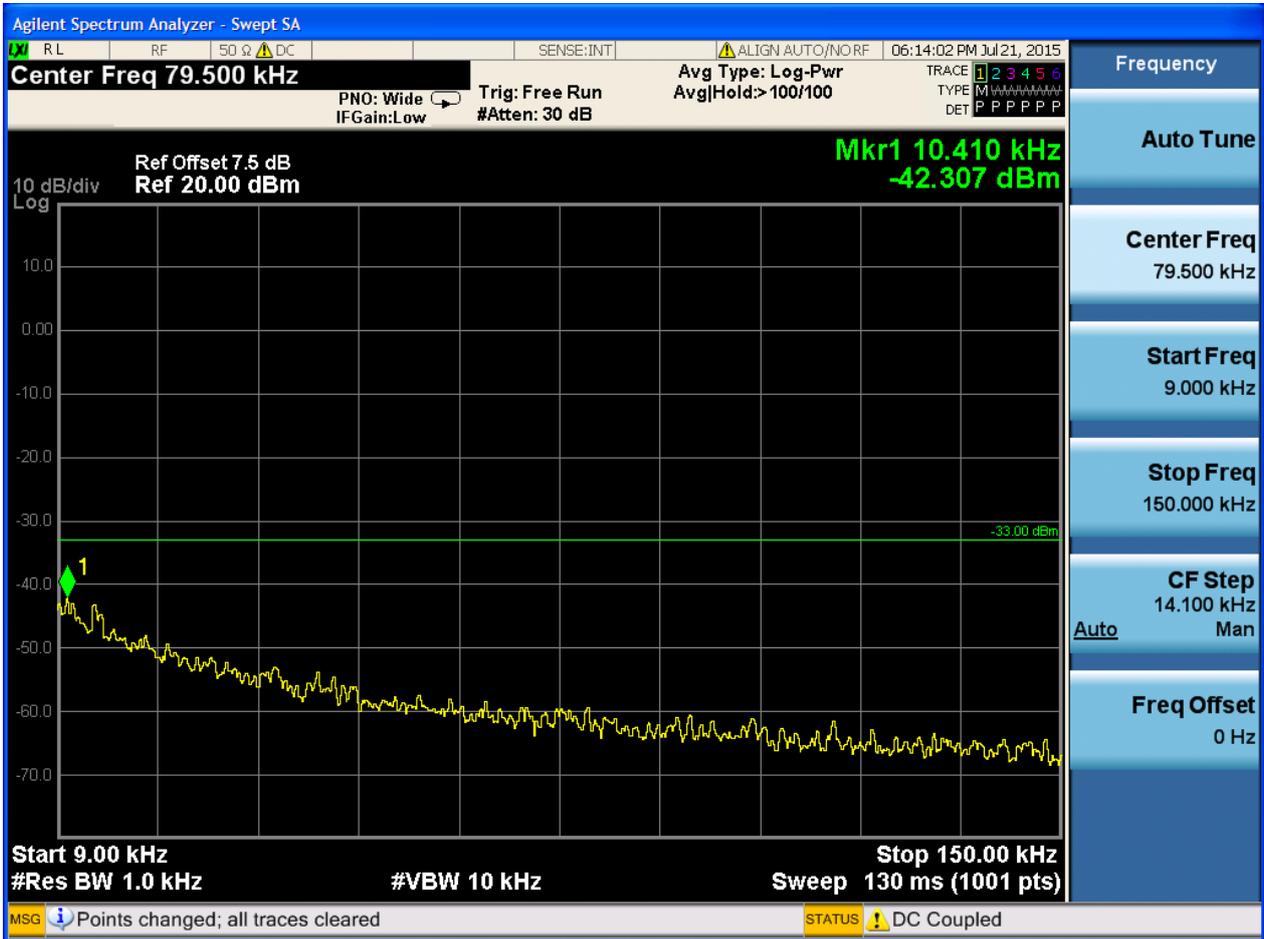


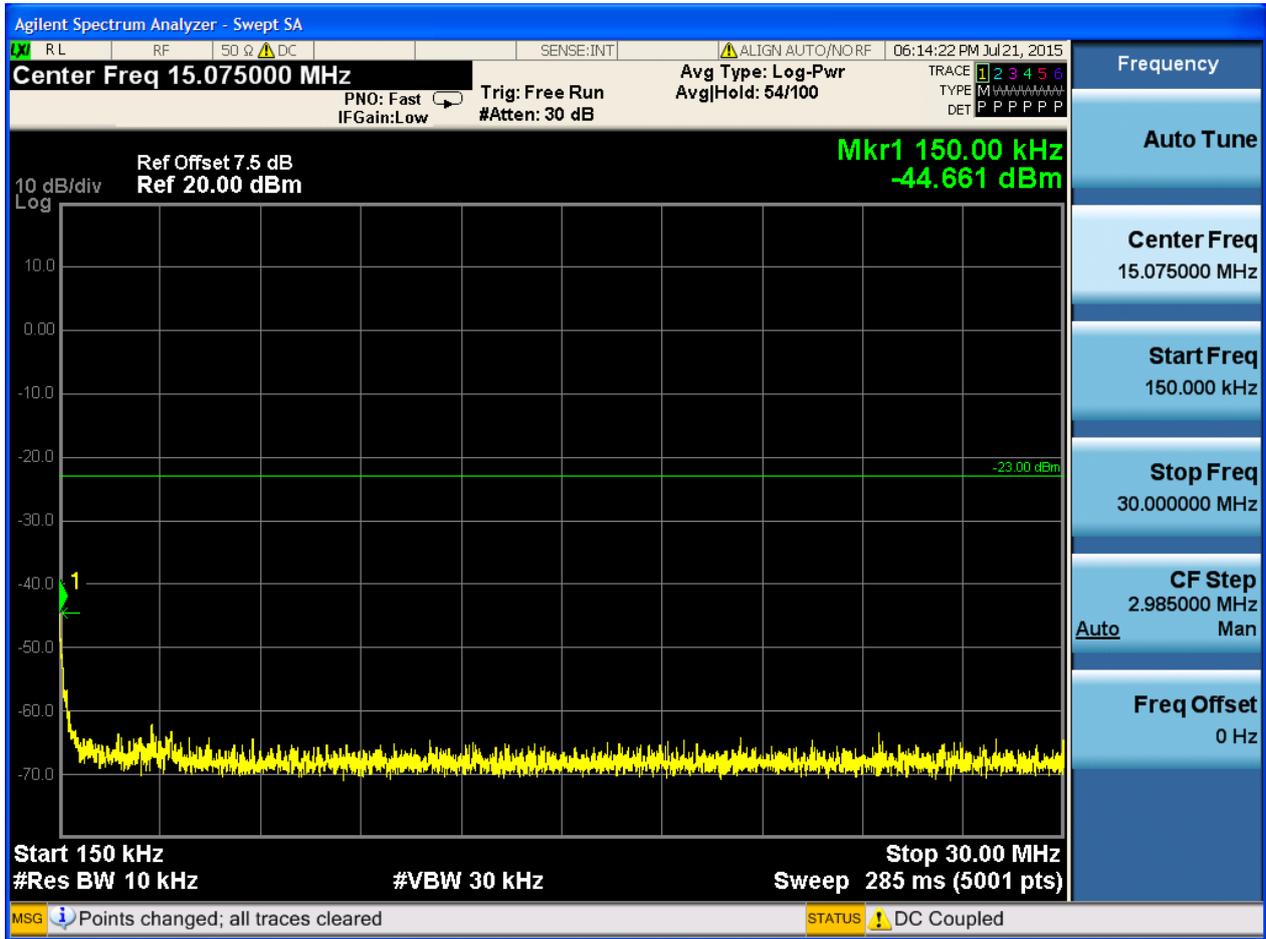


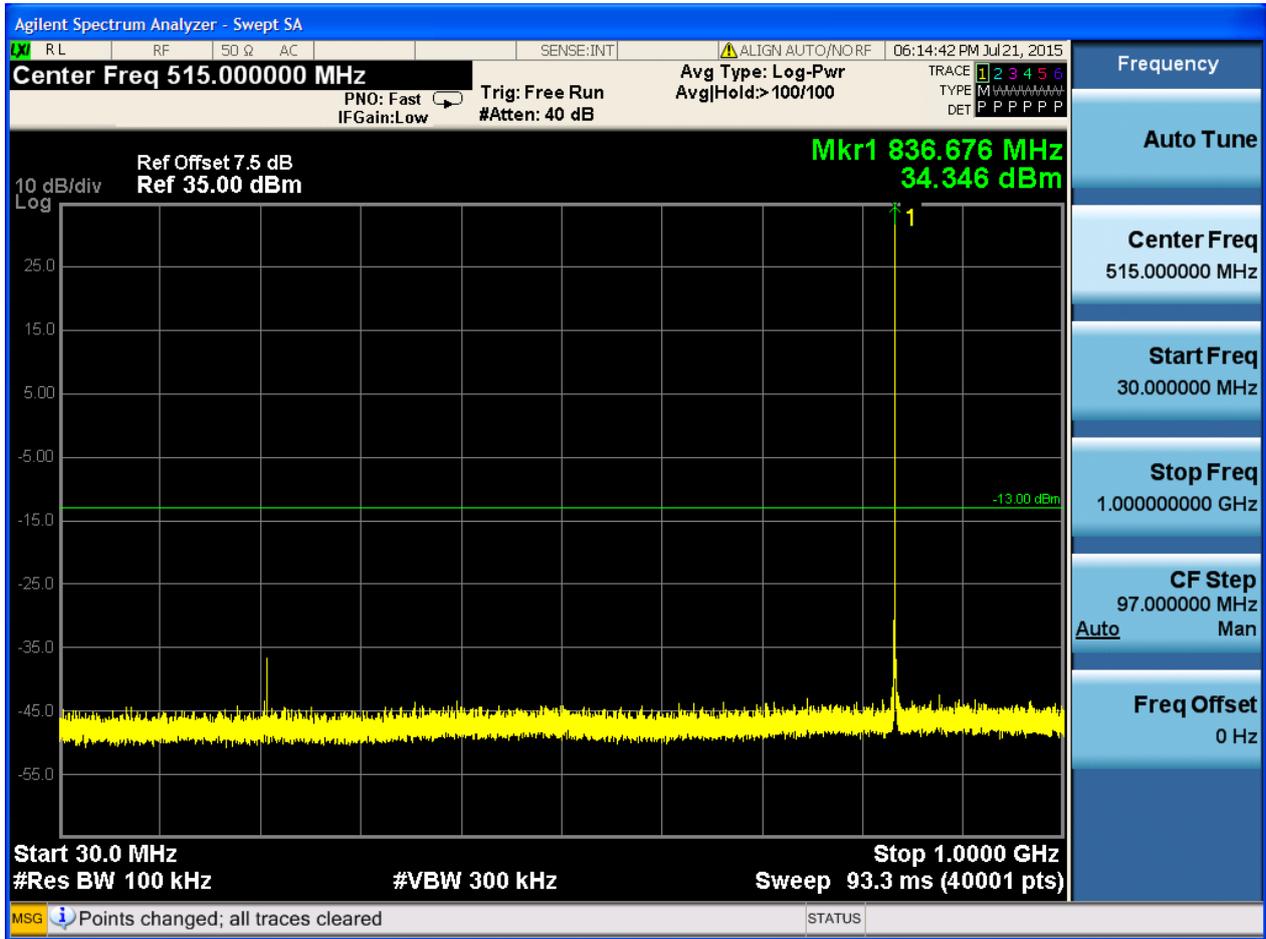


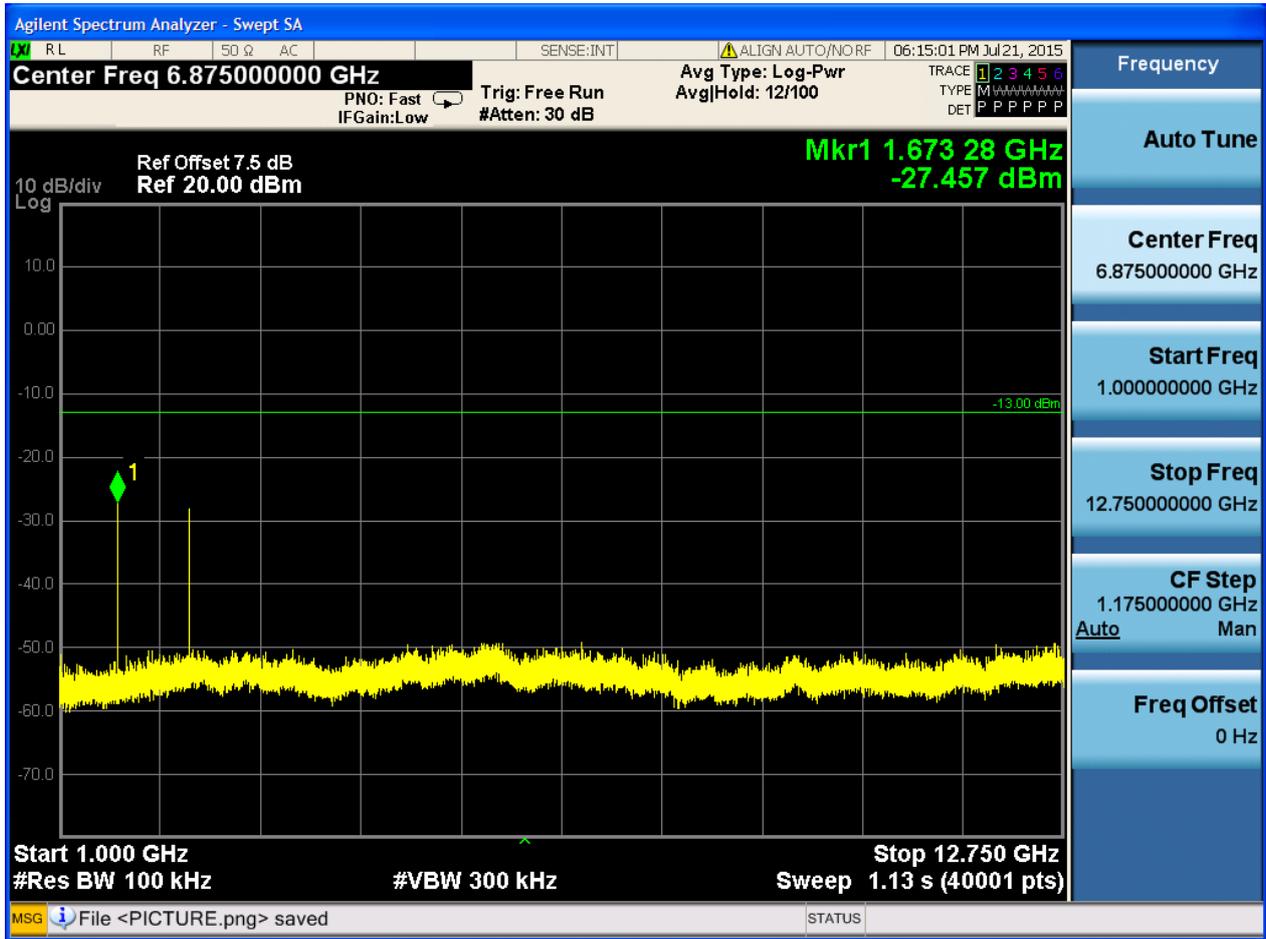


6.1.1.1.2 Test Channel = MCH





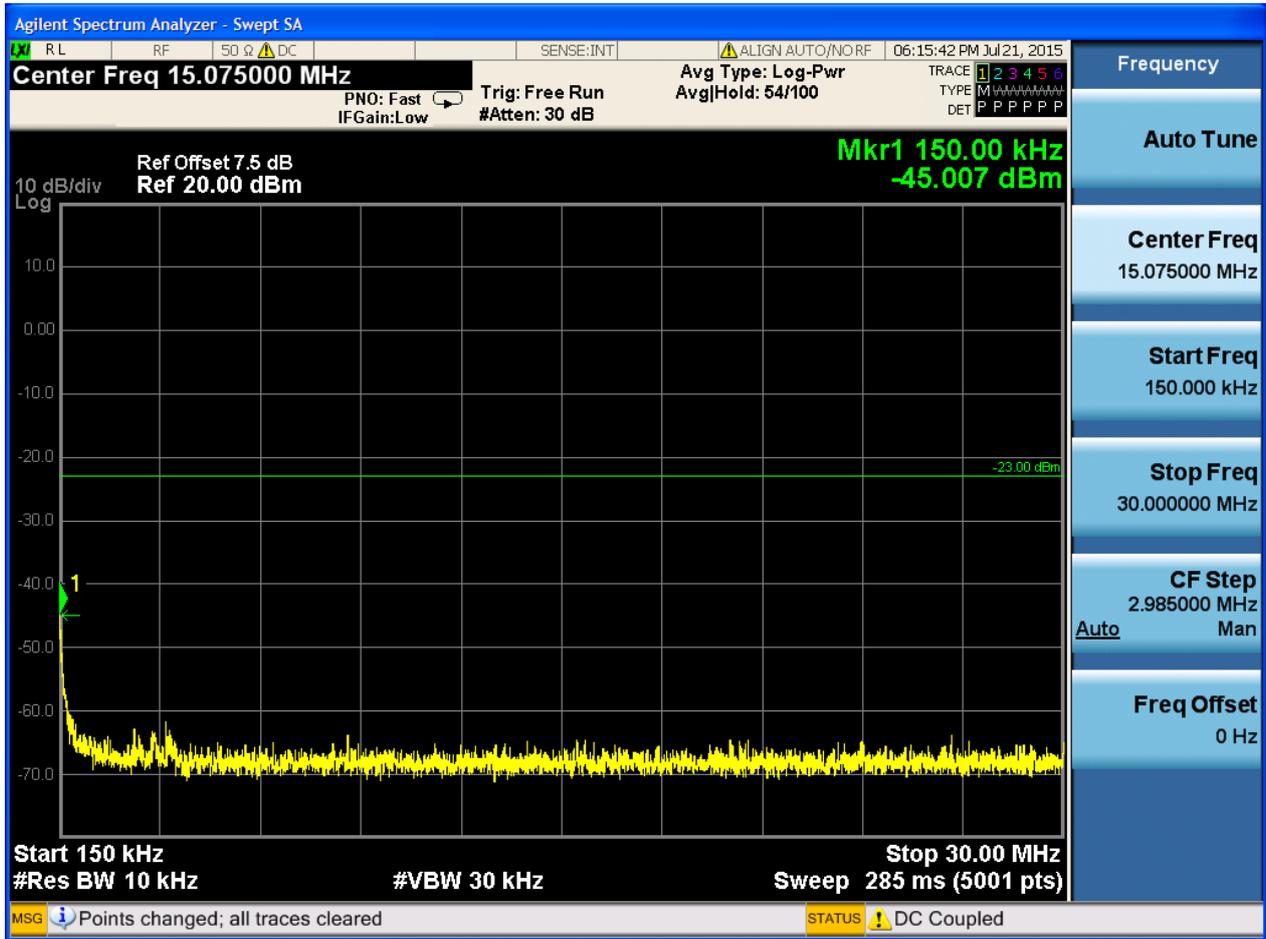


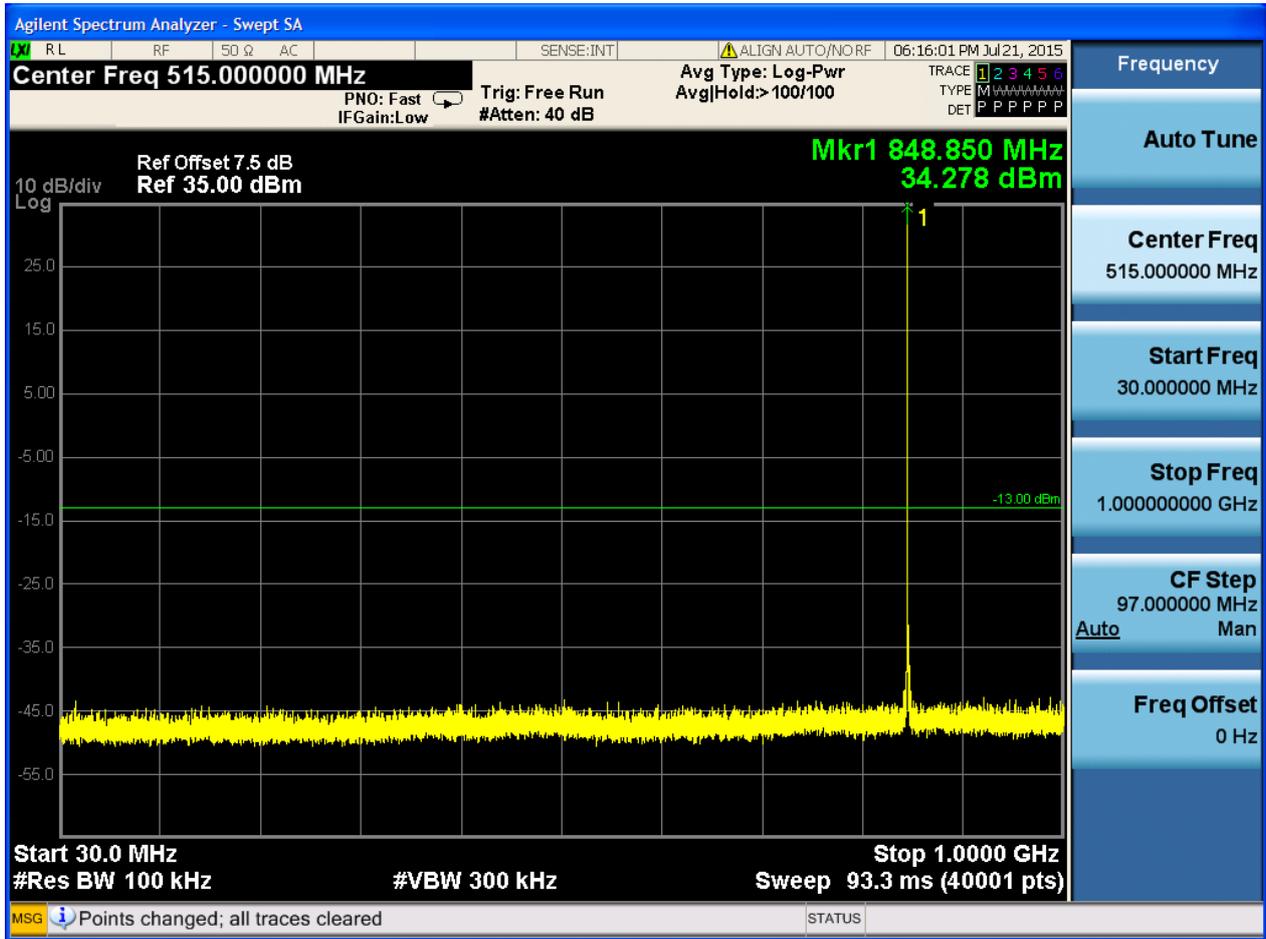


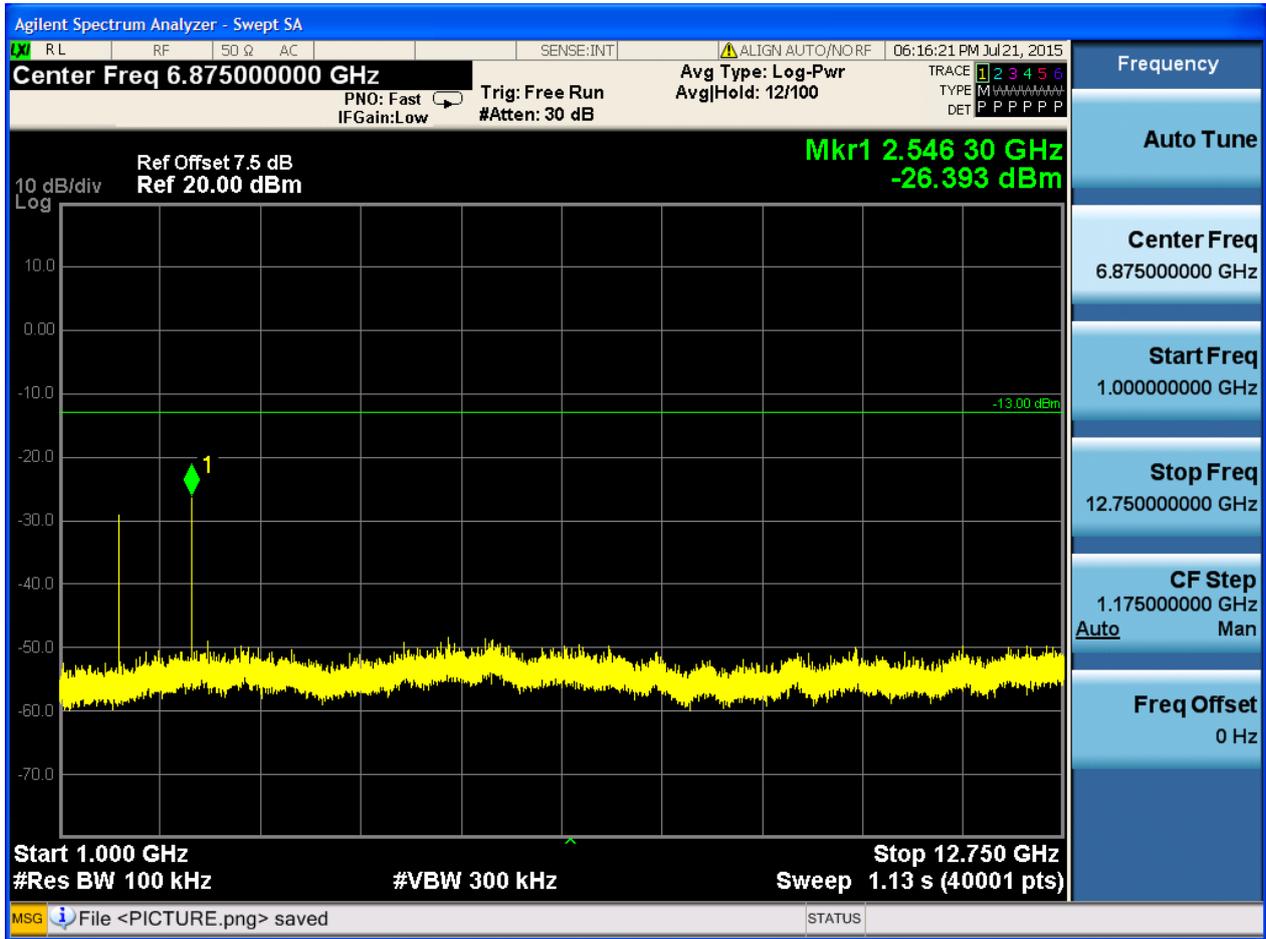


6.1.1.1.3 Test Channel = HCH







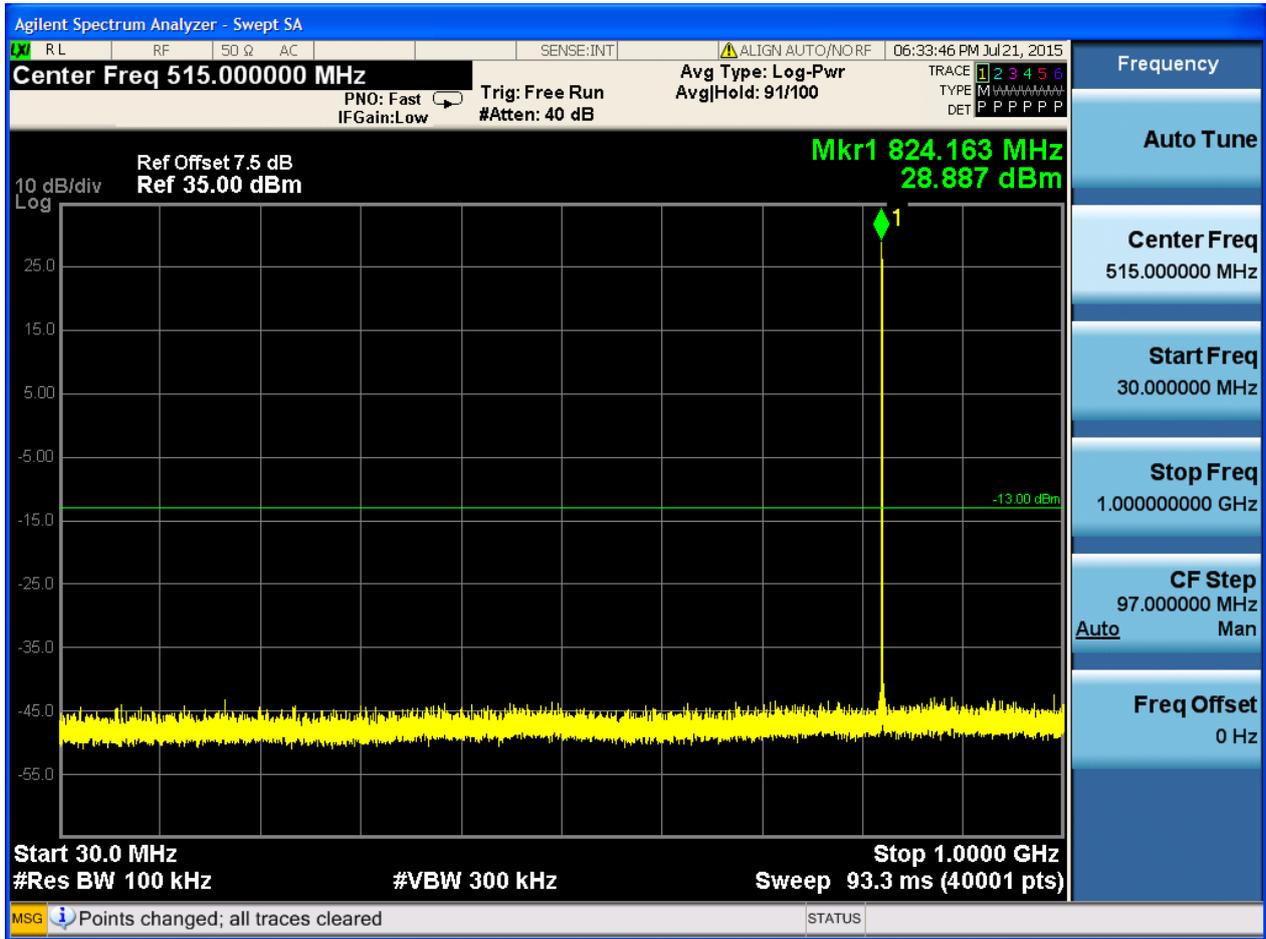


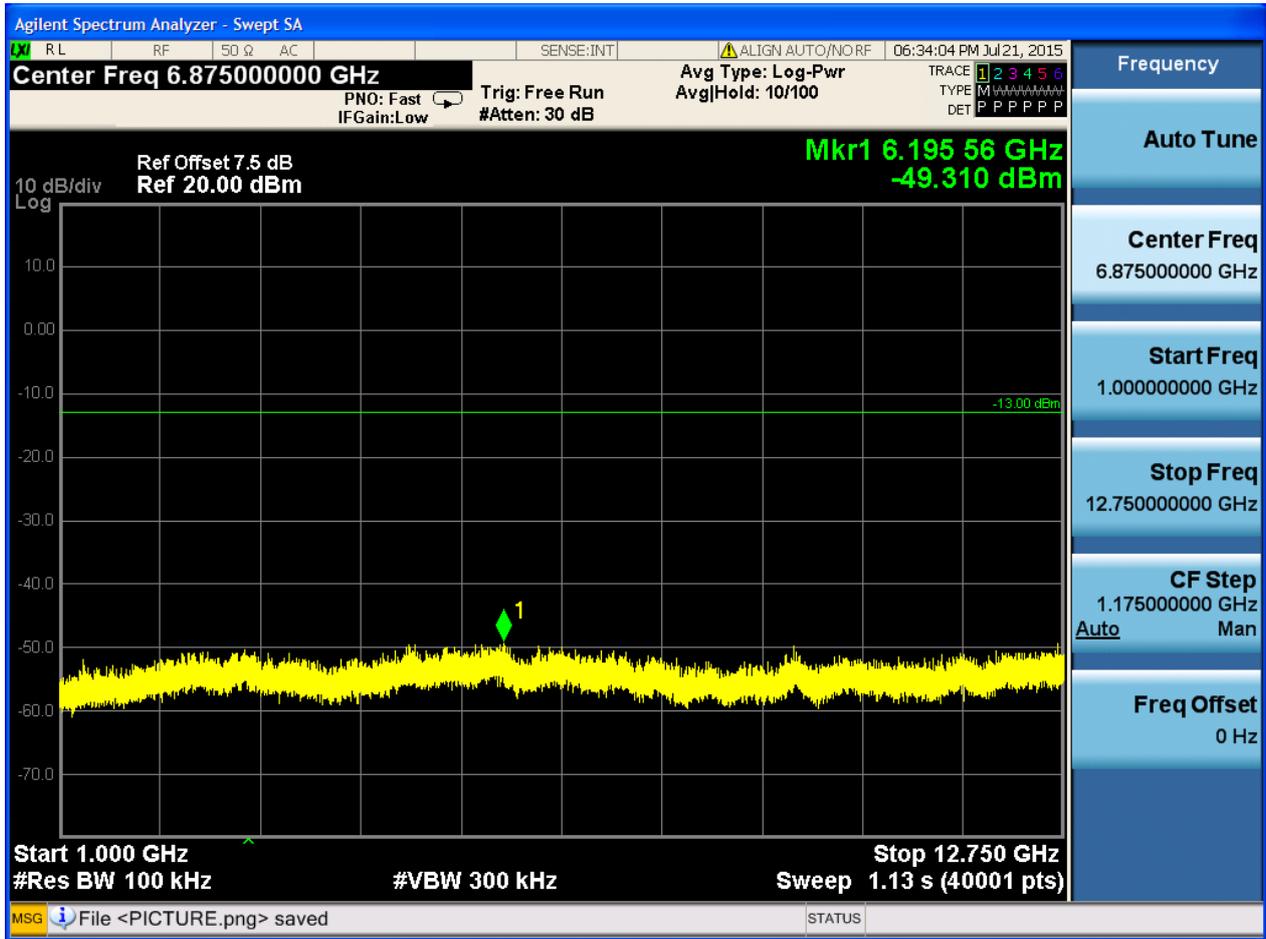


6.1.1.2 Test Mode = GSM/TM2

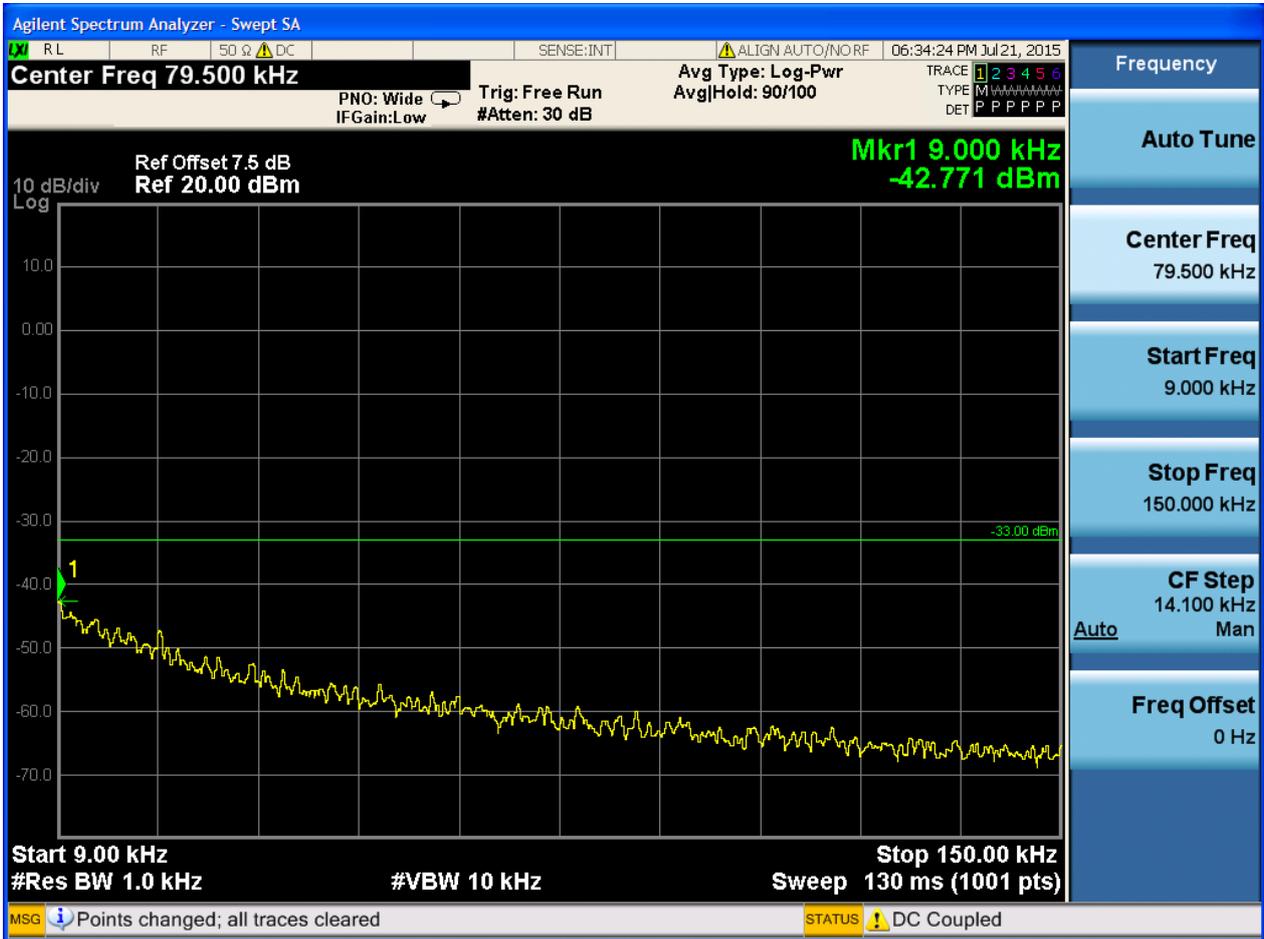
6.1.1.2.1 Test Channel = LCH

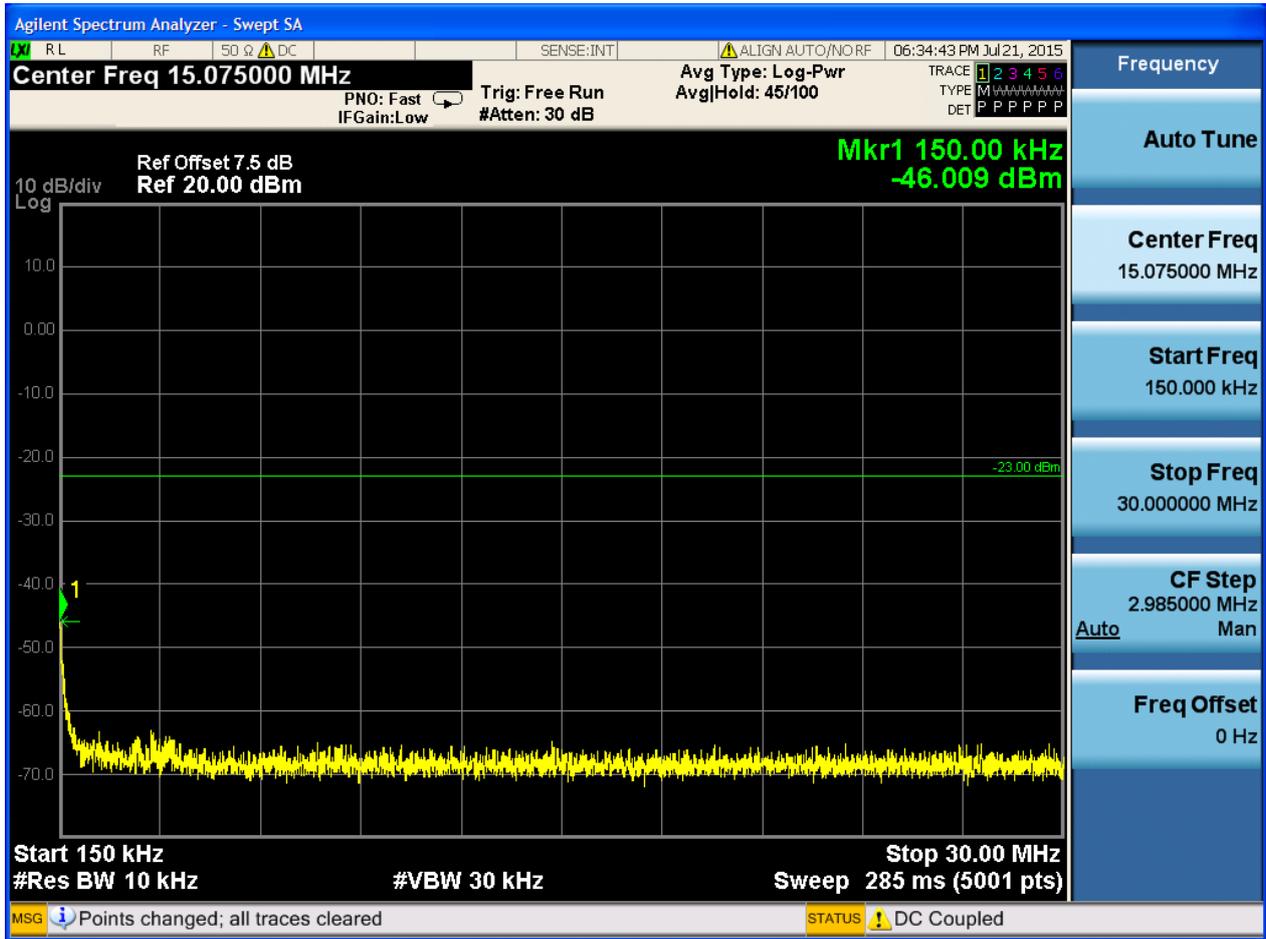


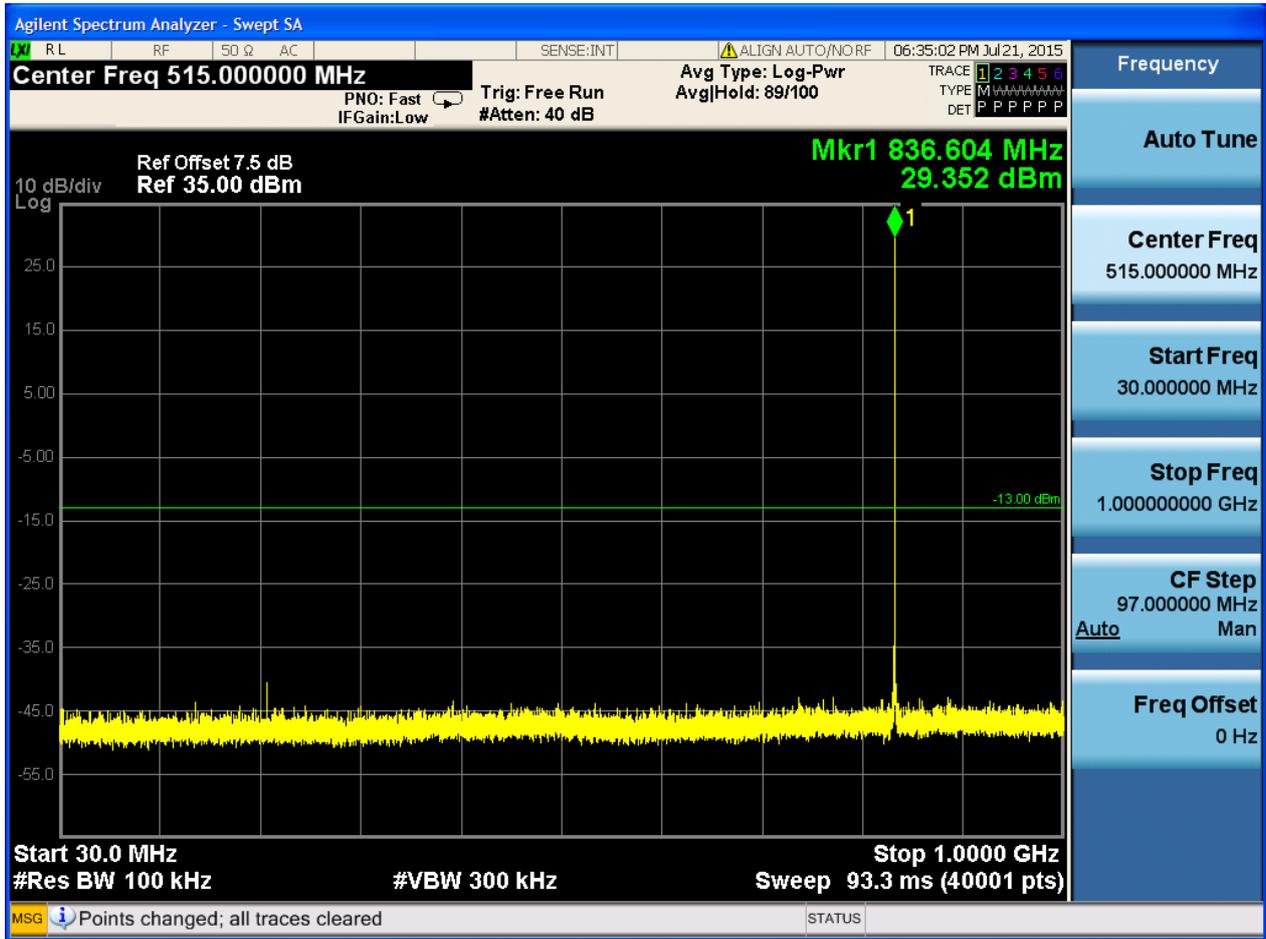


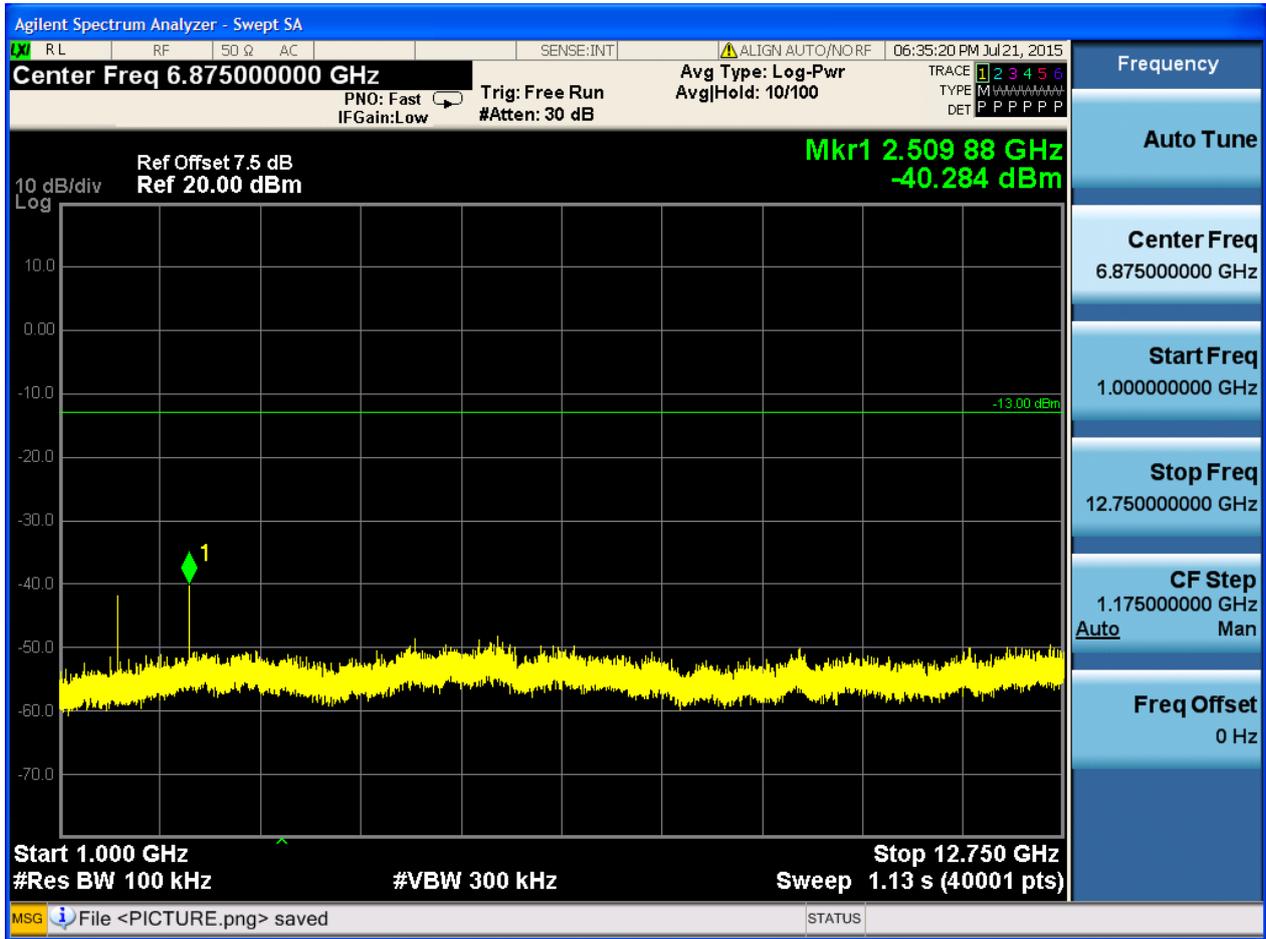


6.1.1.2.2 Test Channel = MCH

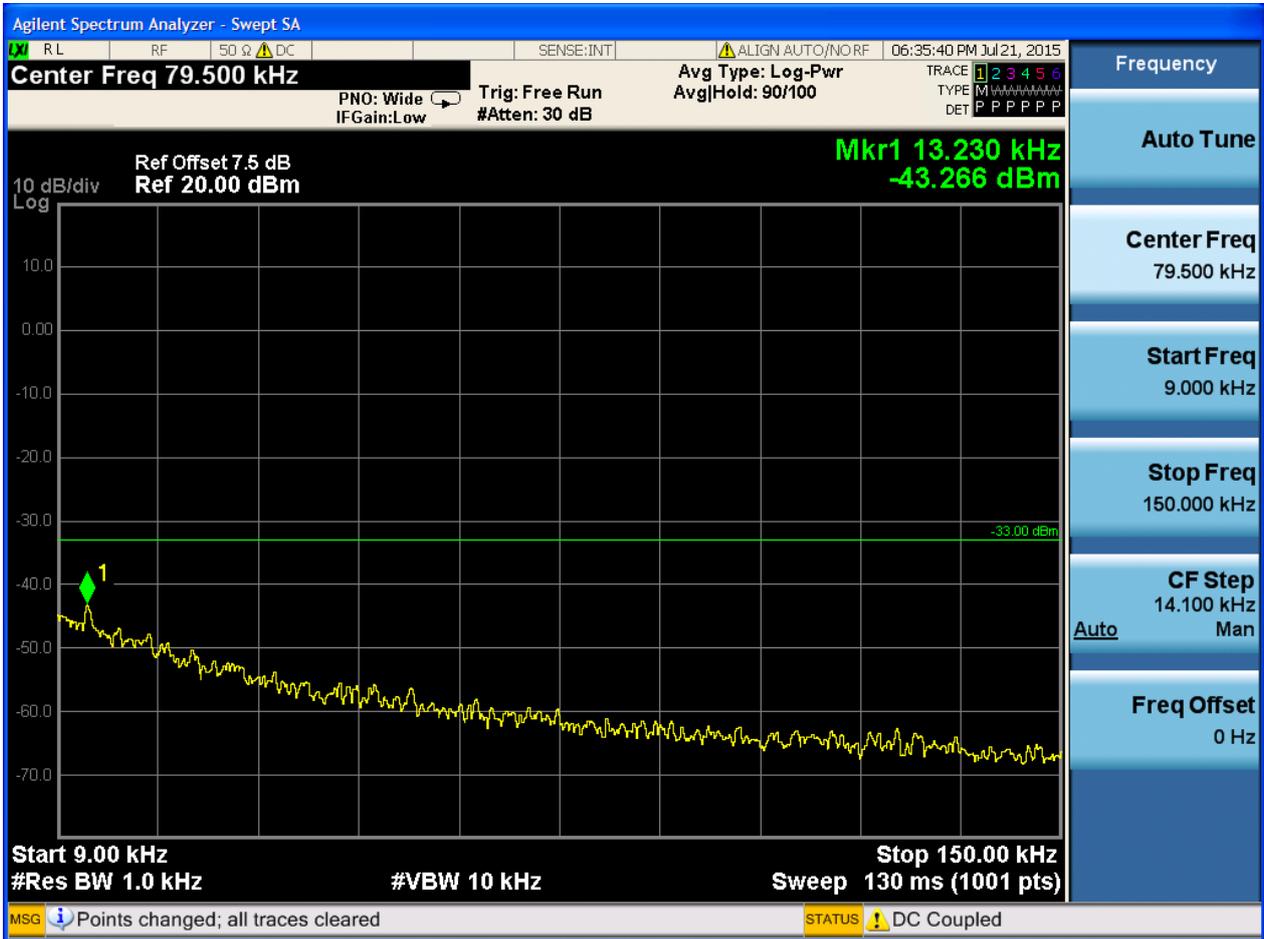


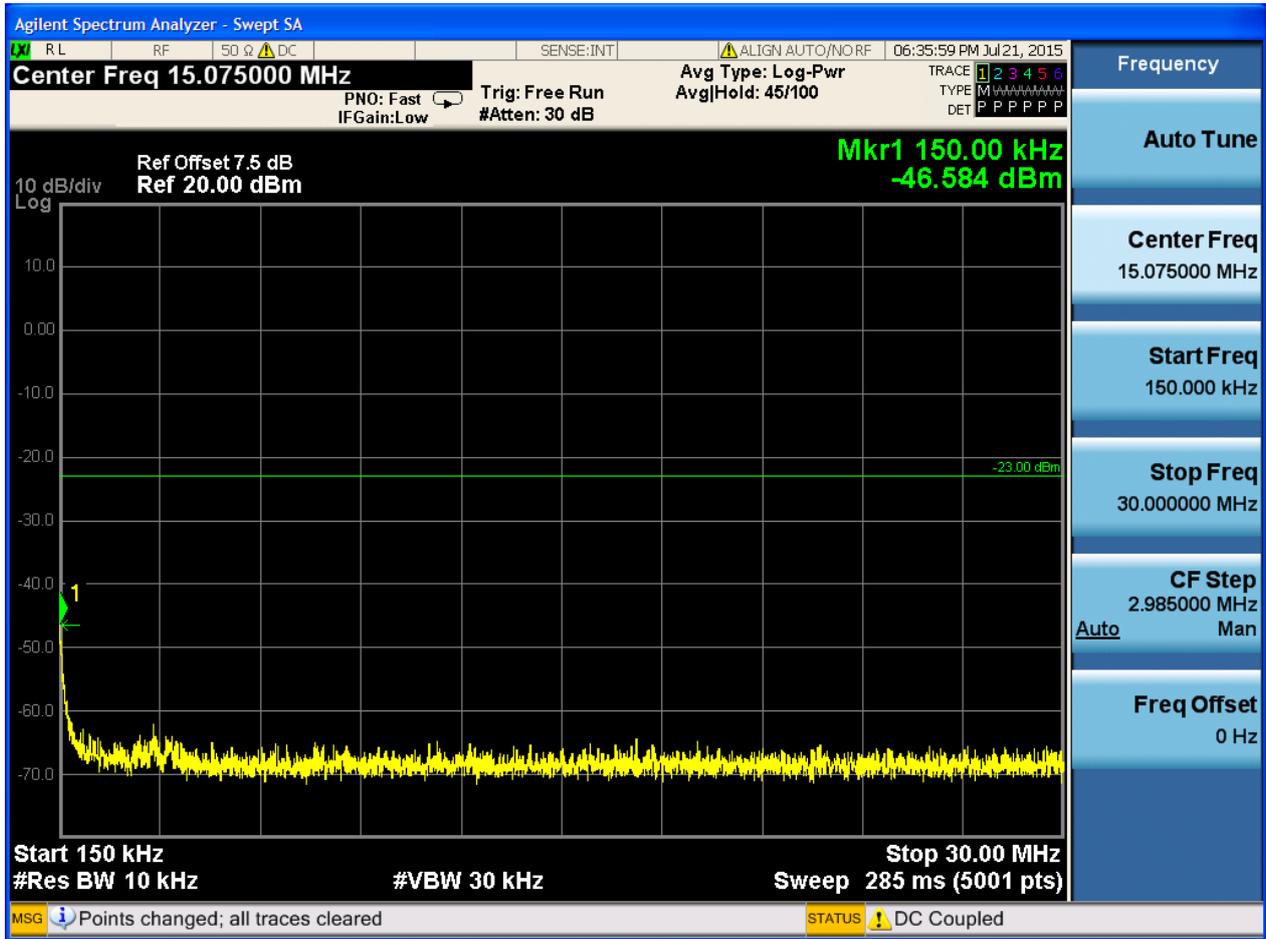


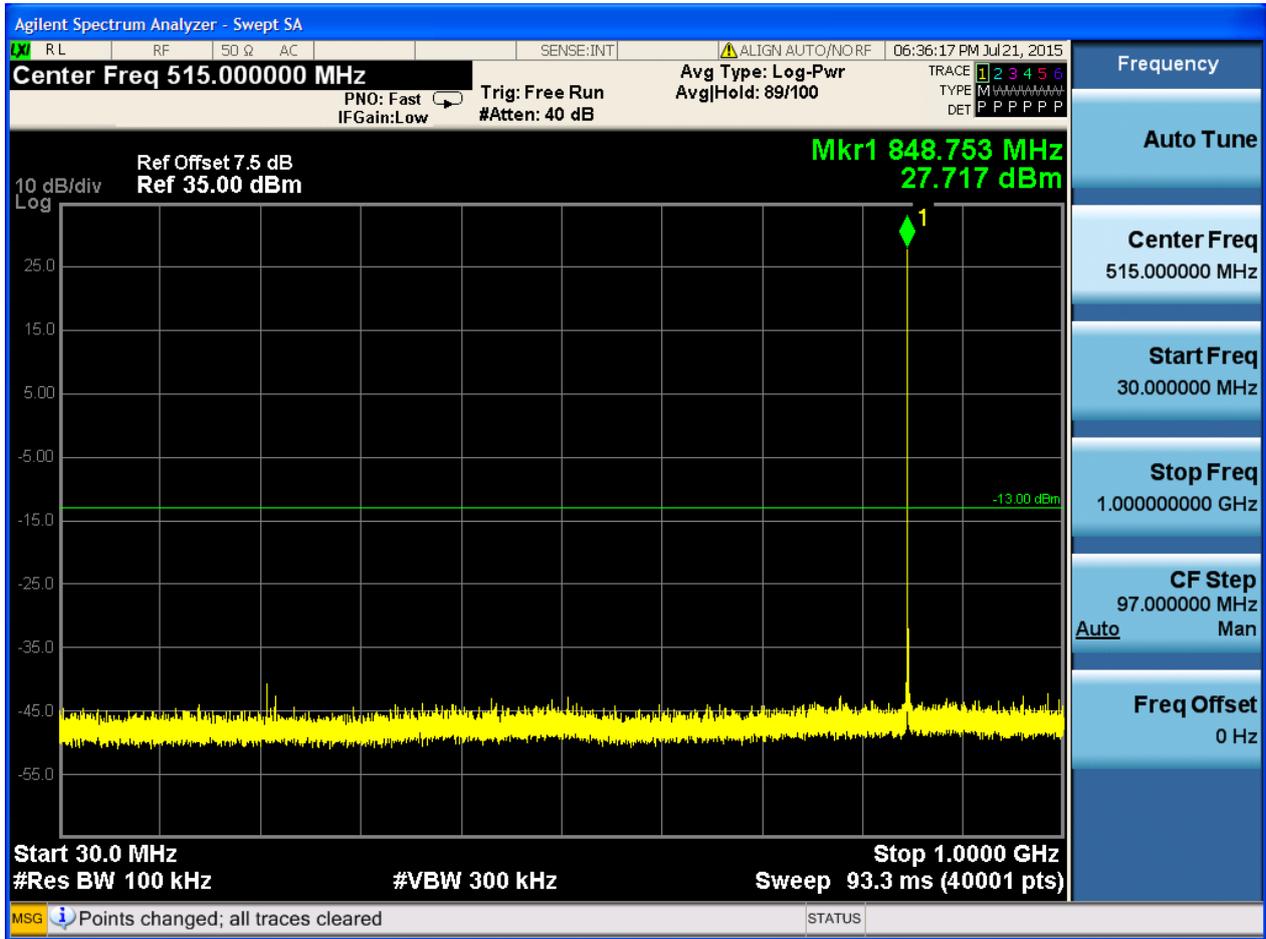


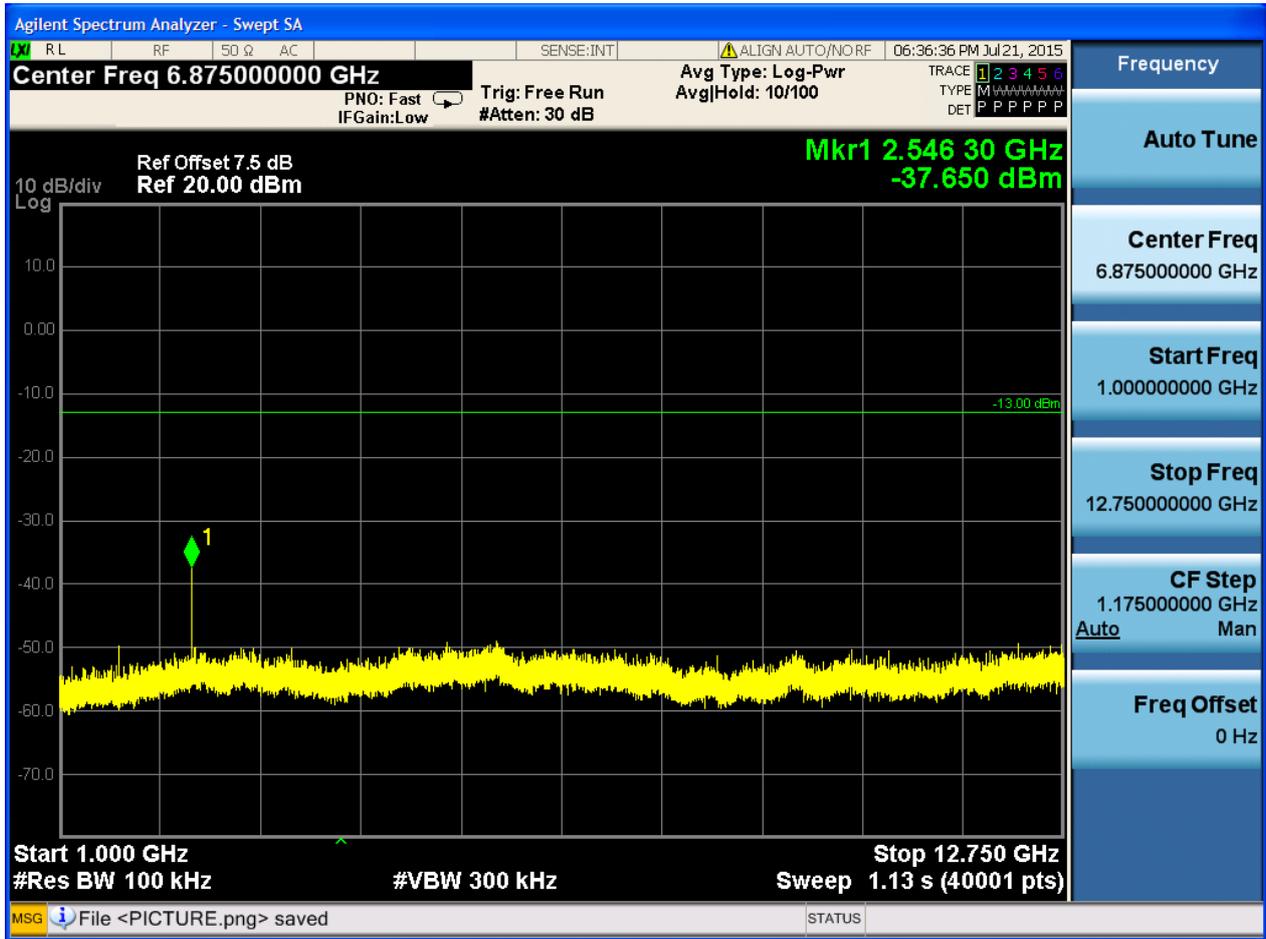


6.1.1.2.3 Test Channel = HCH







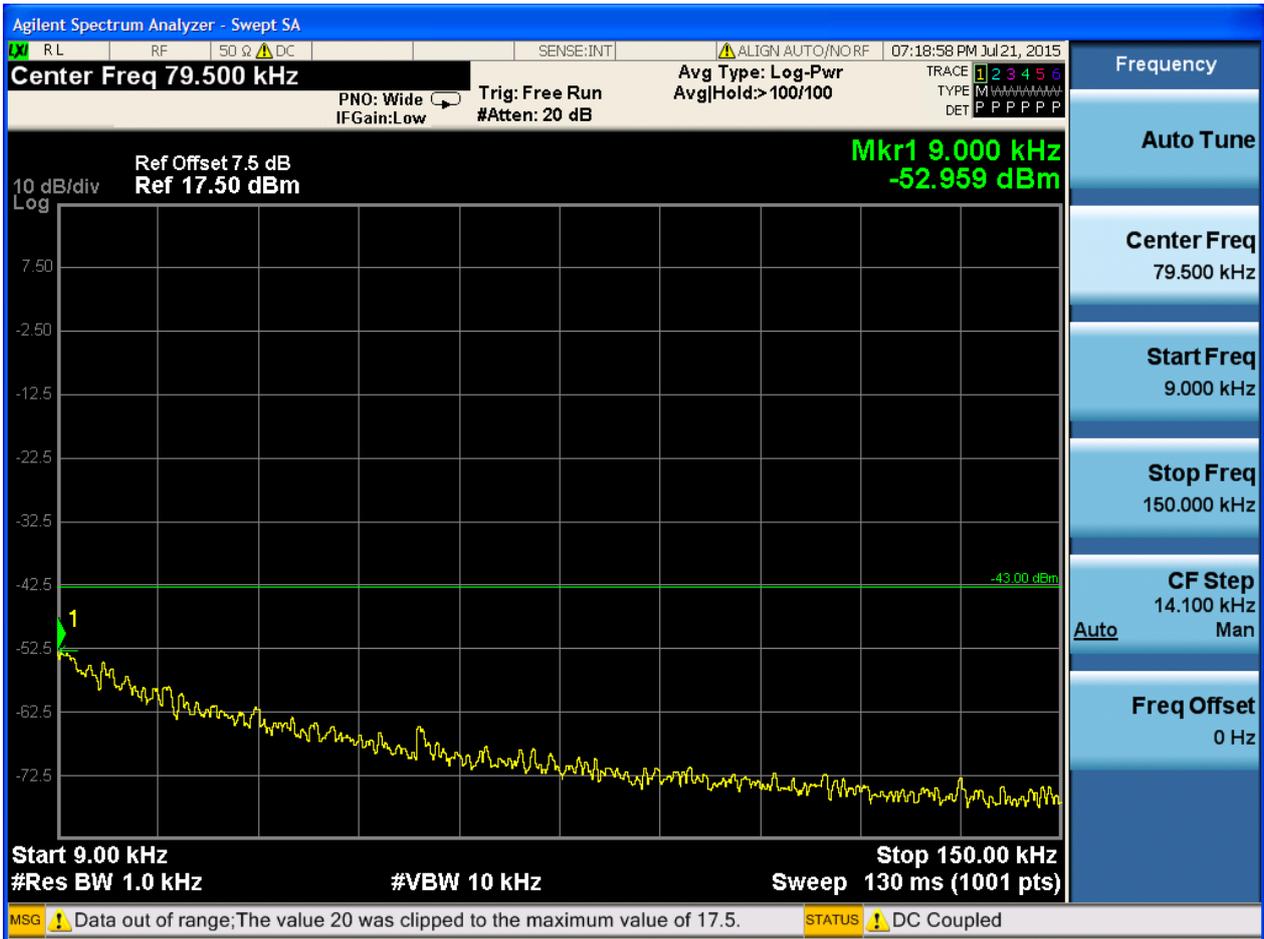


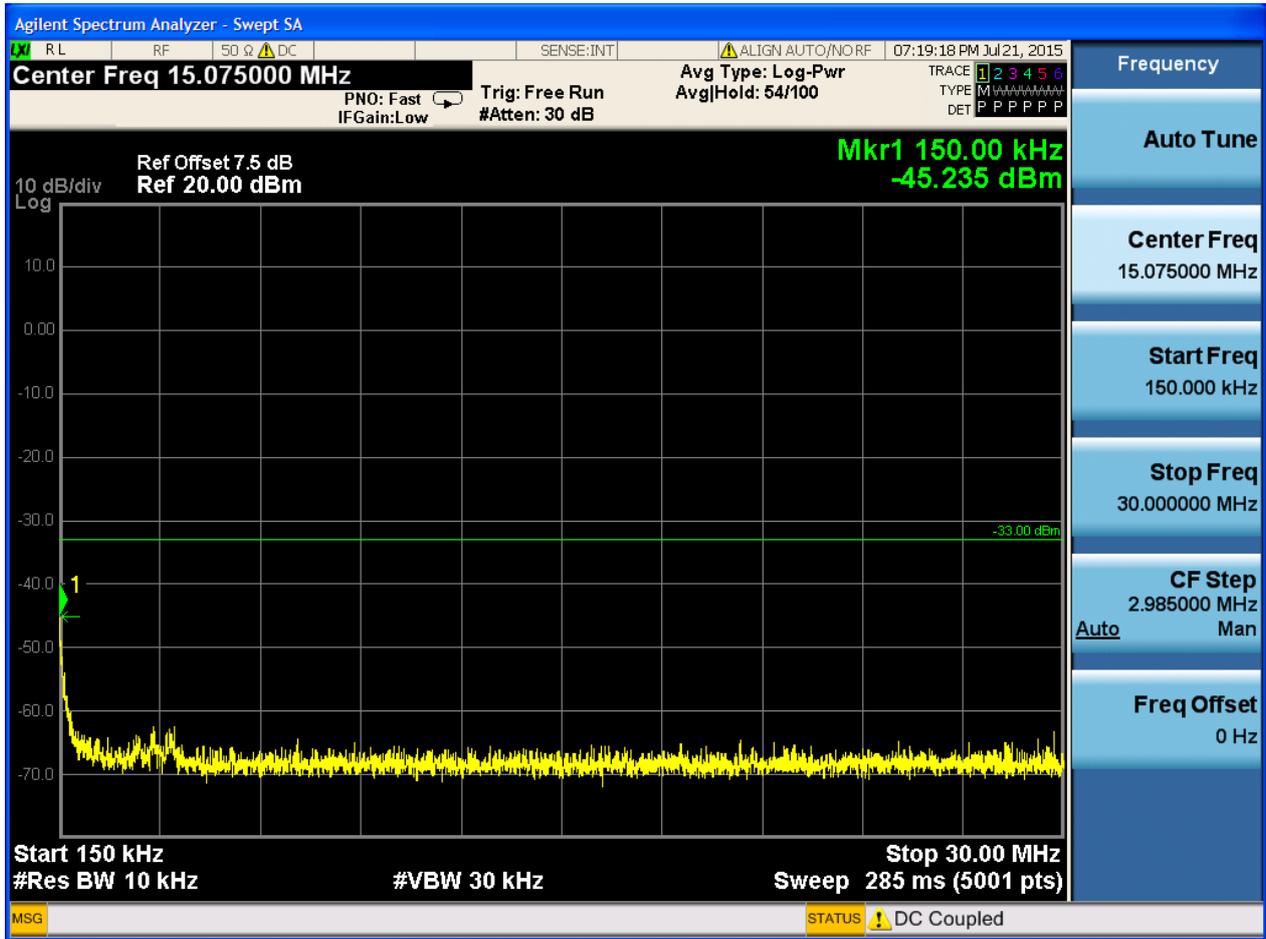


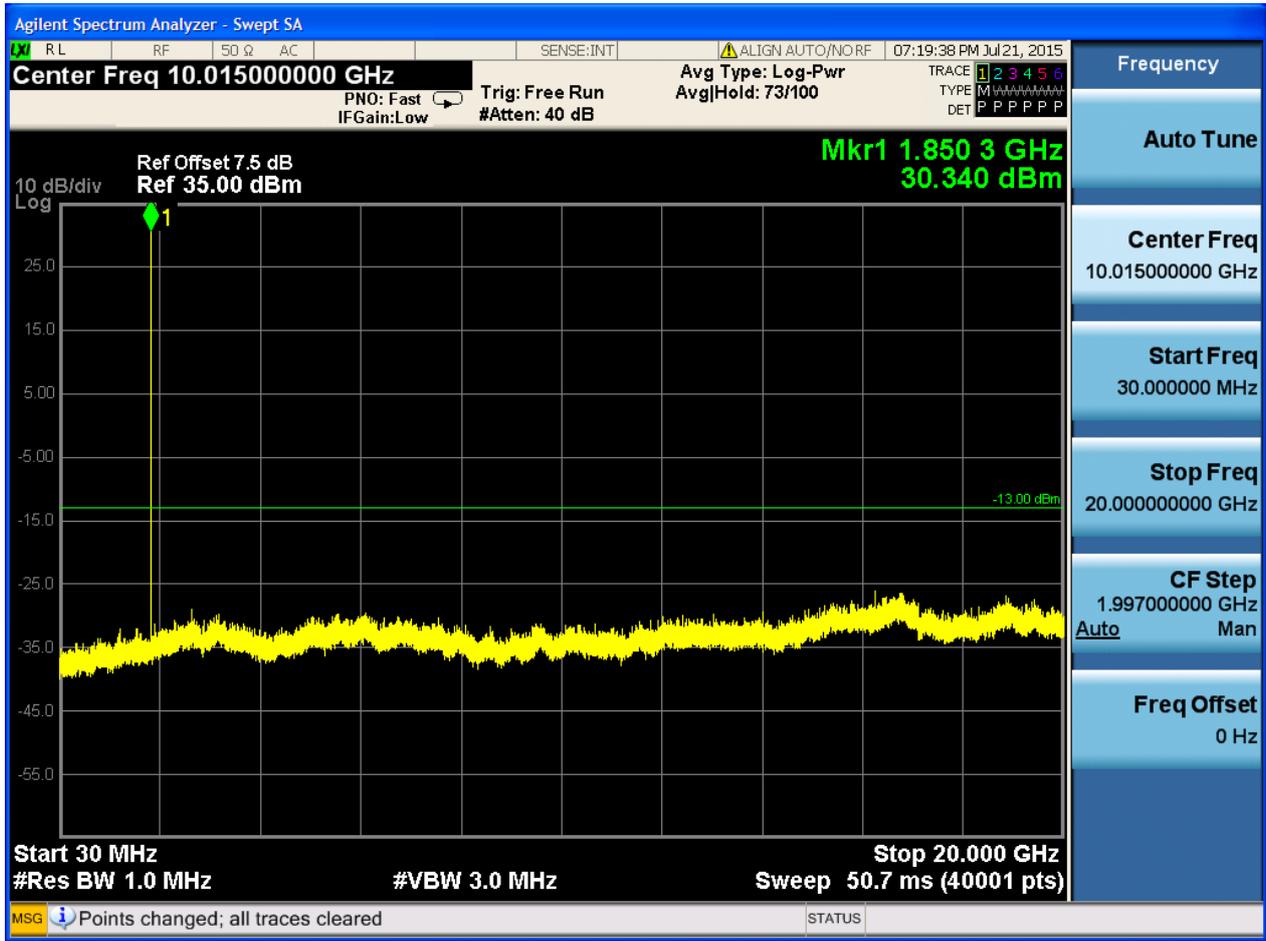
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

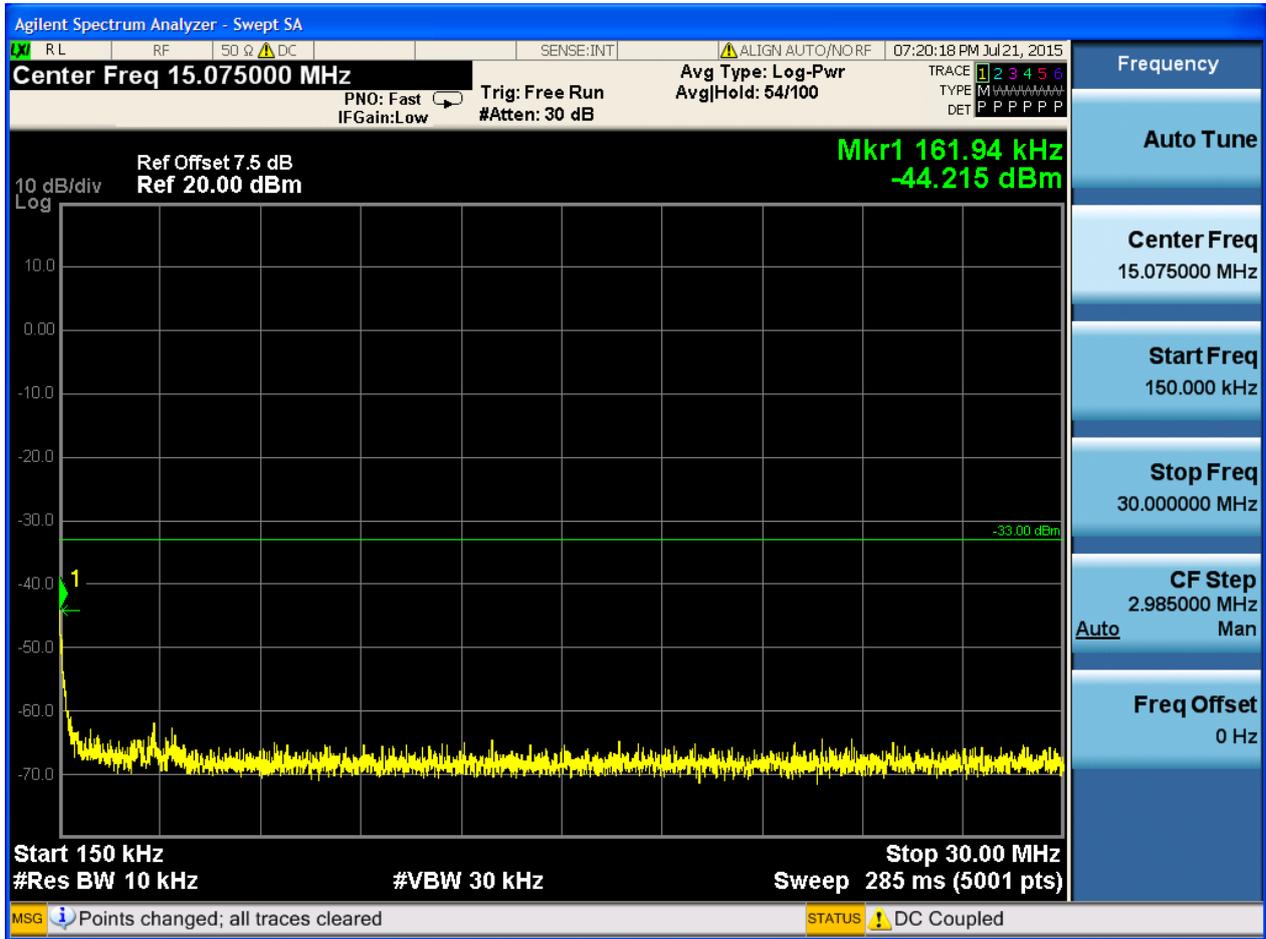


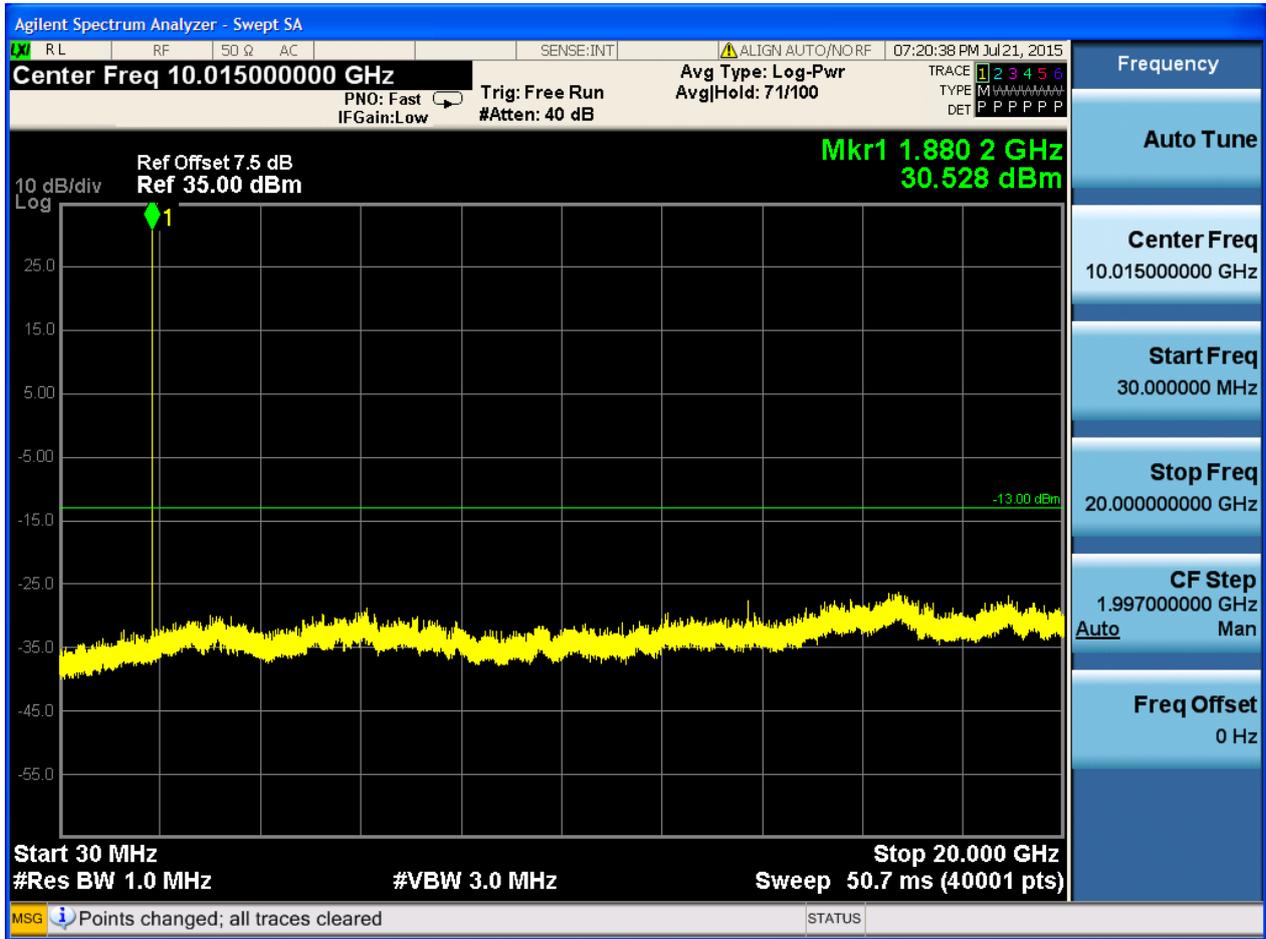




6.1.2.1.2 Test Channel = MCH

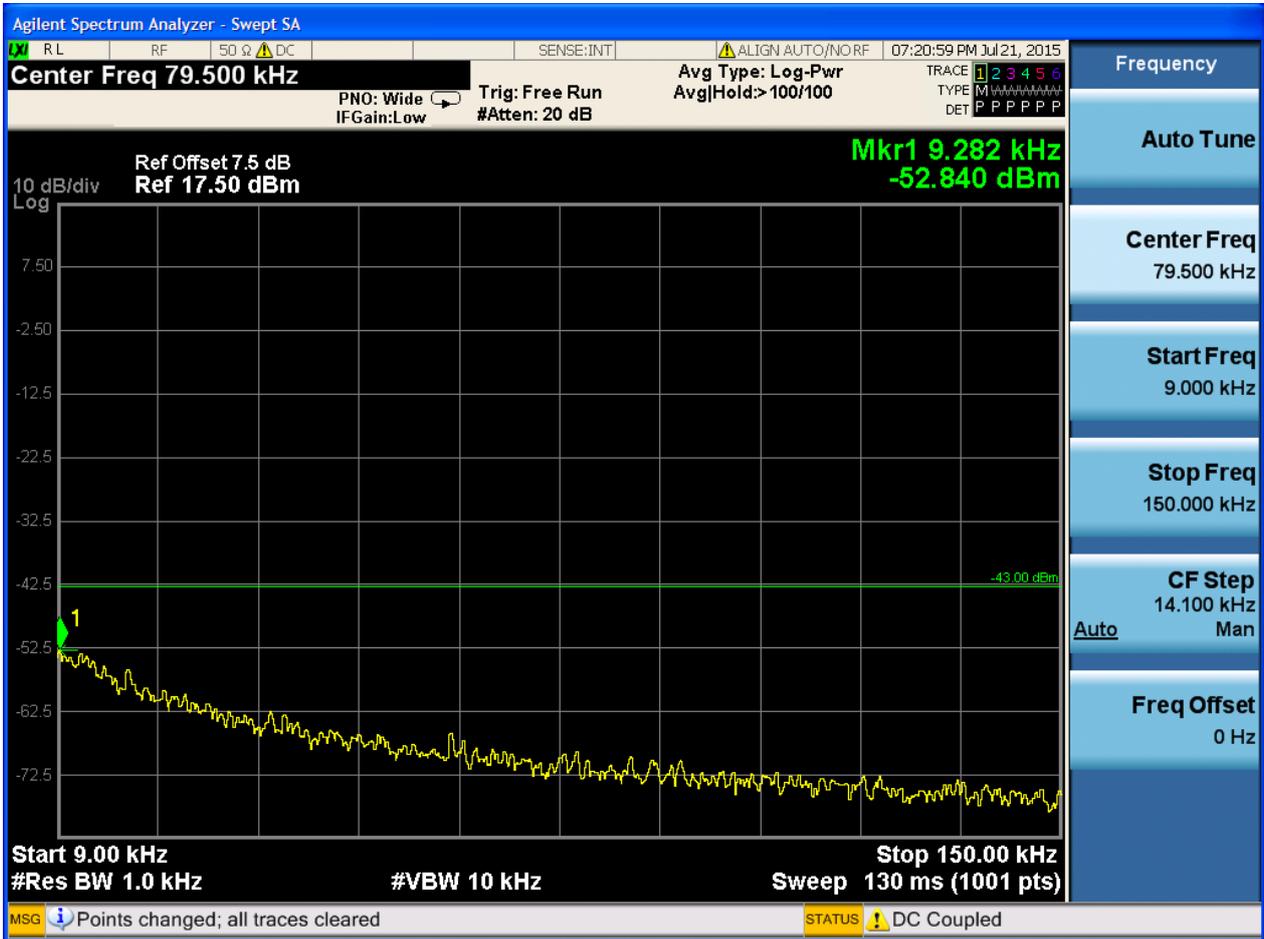


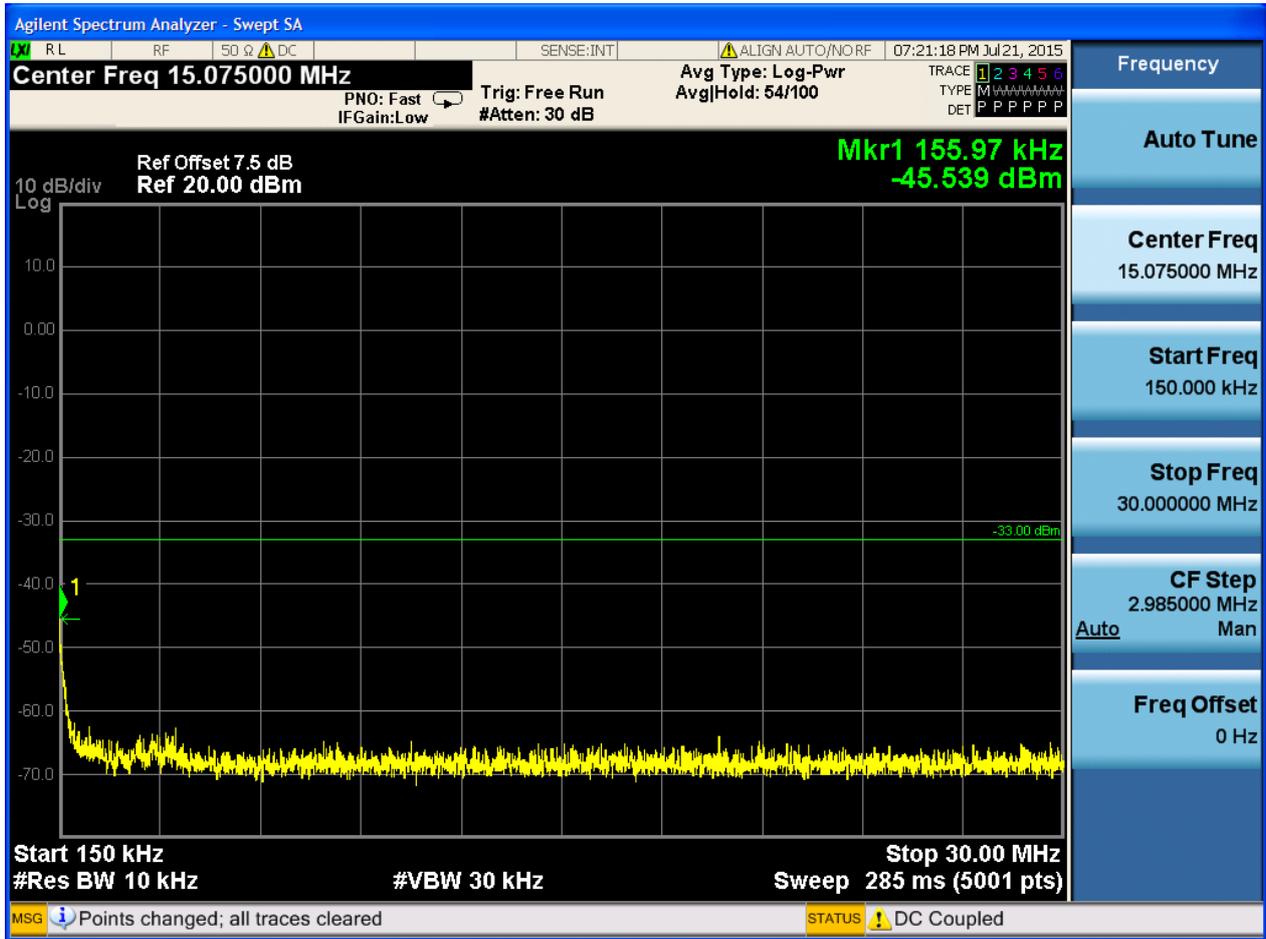


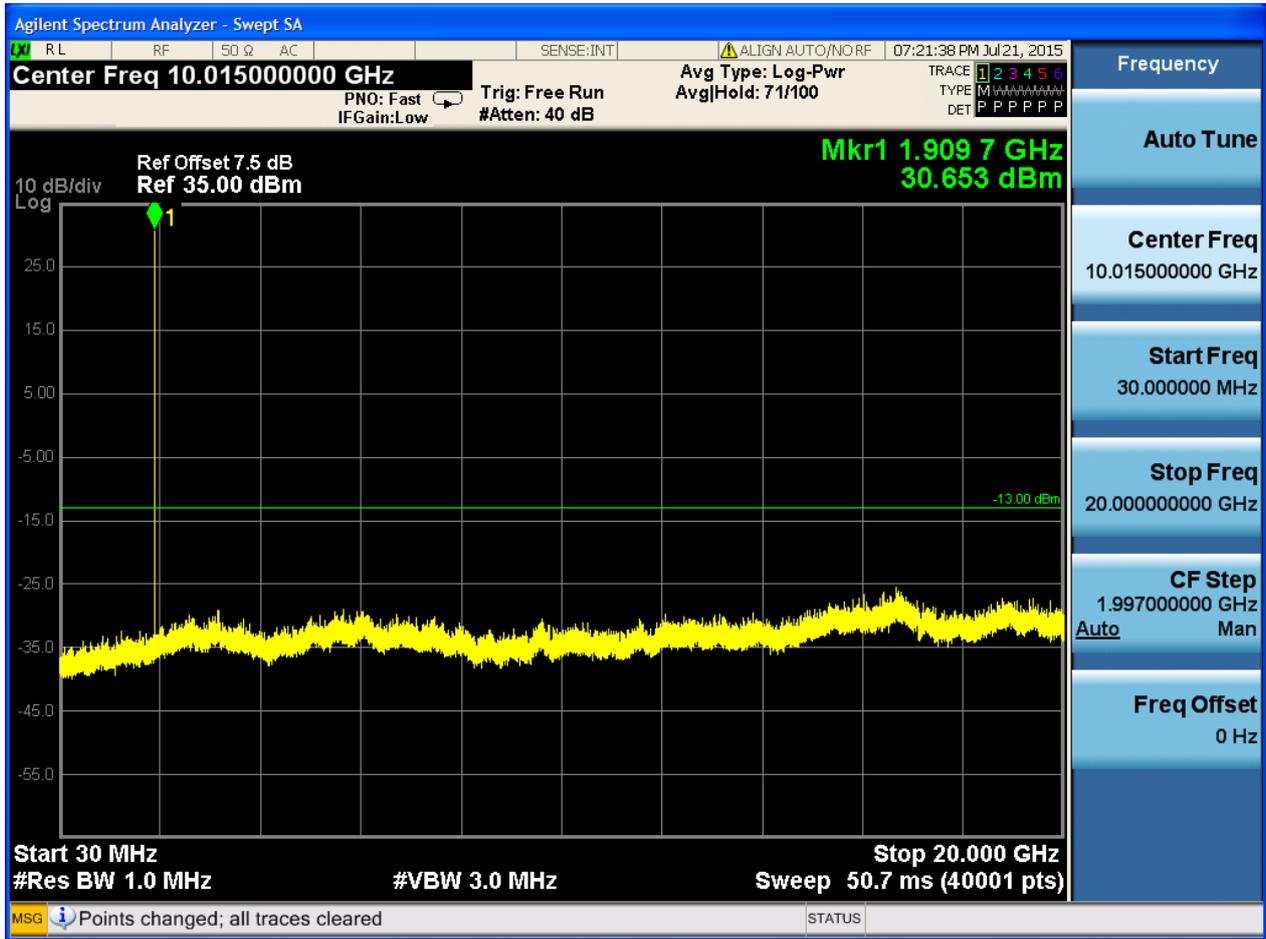




6.1.2.1.3 Test Channel = HCH



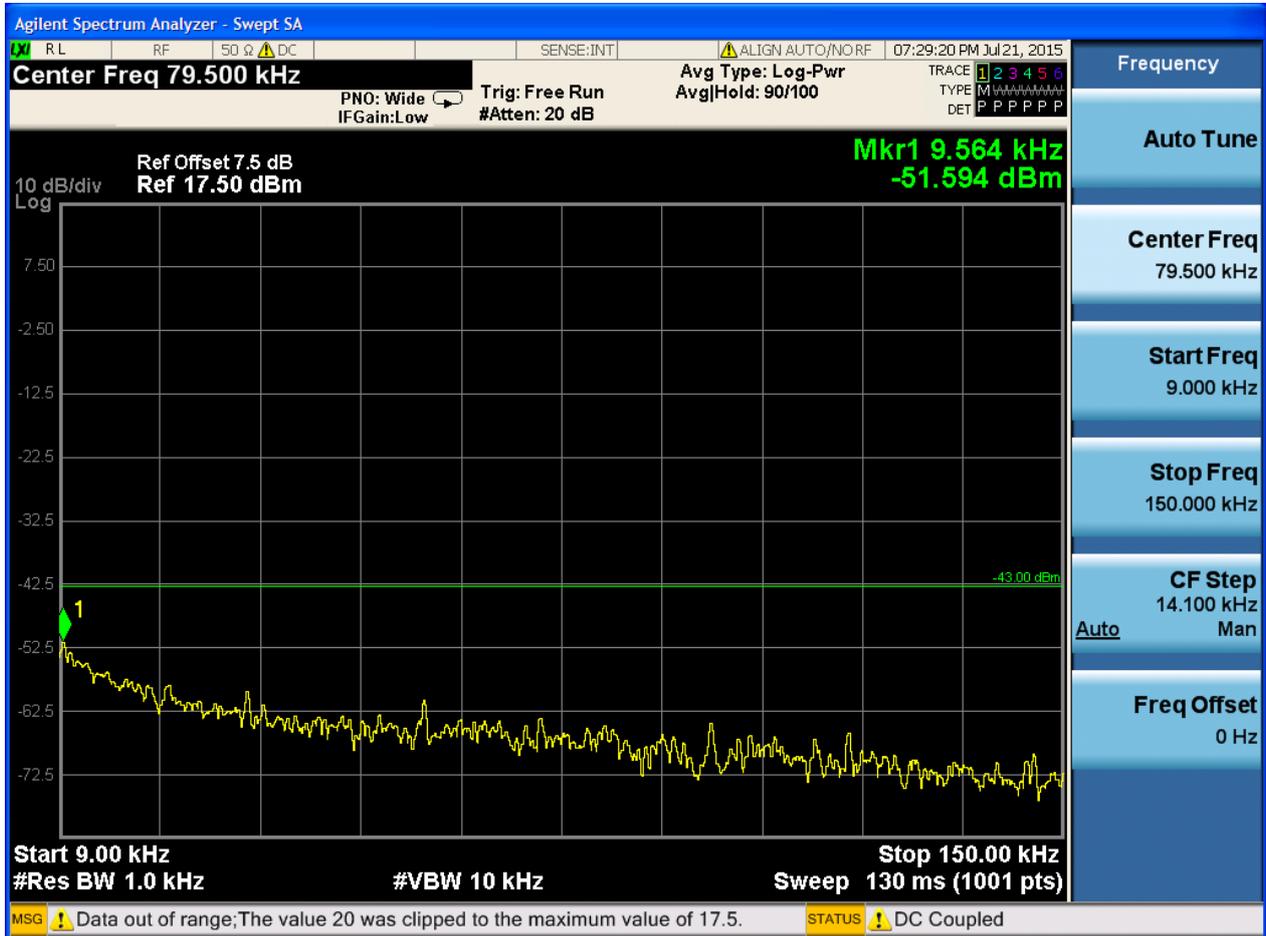


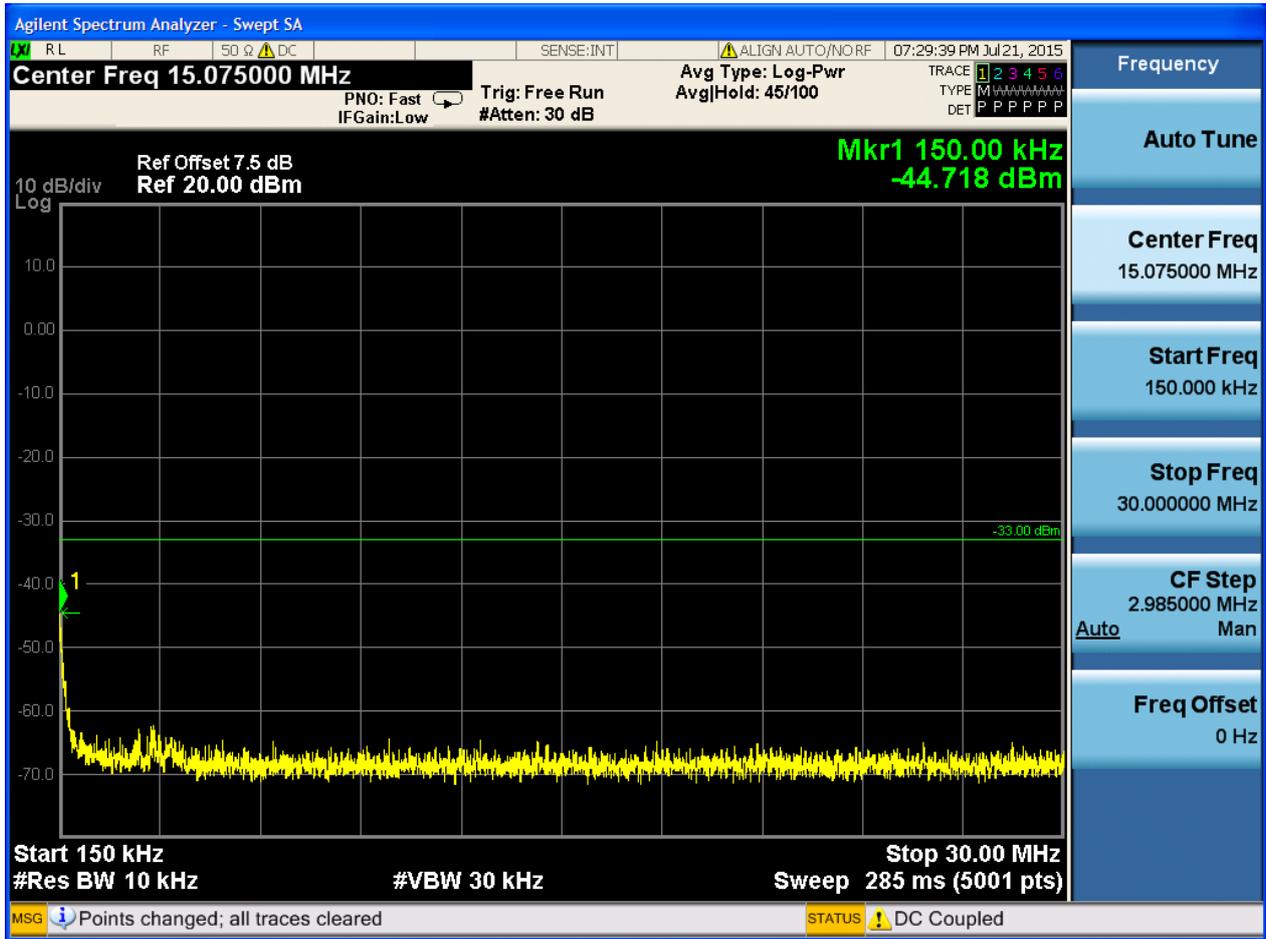


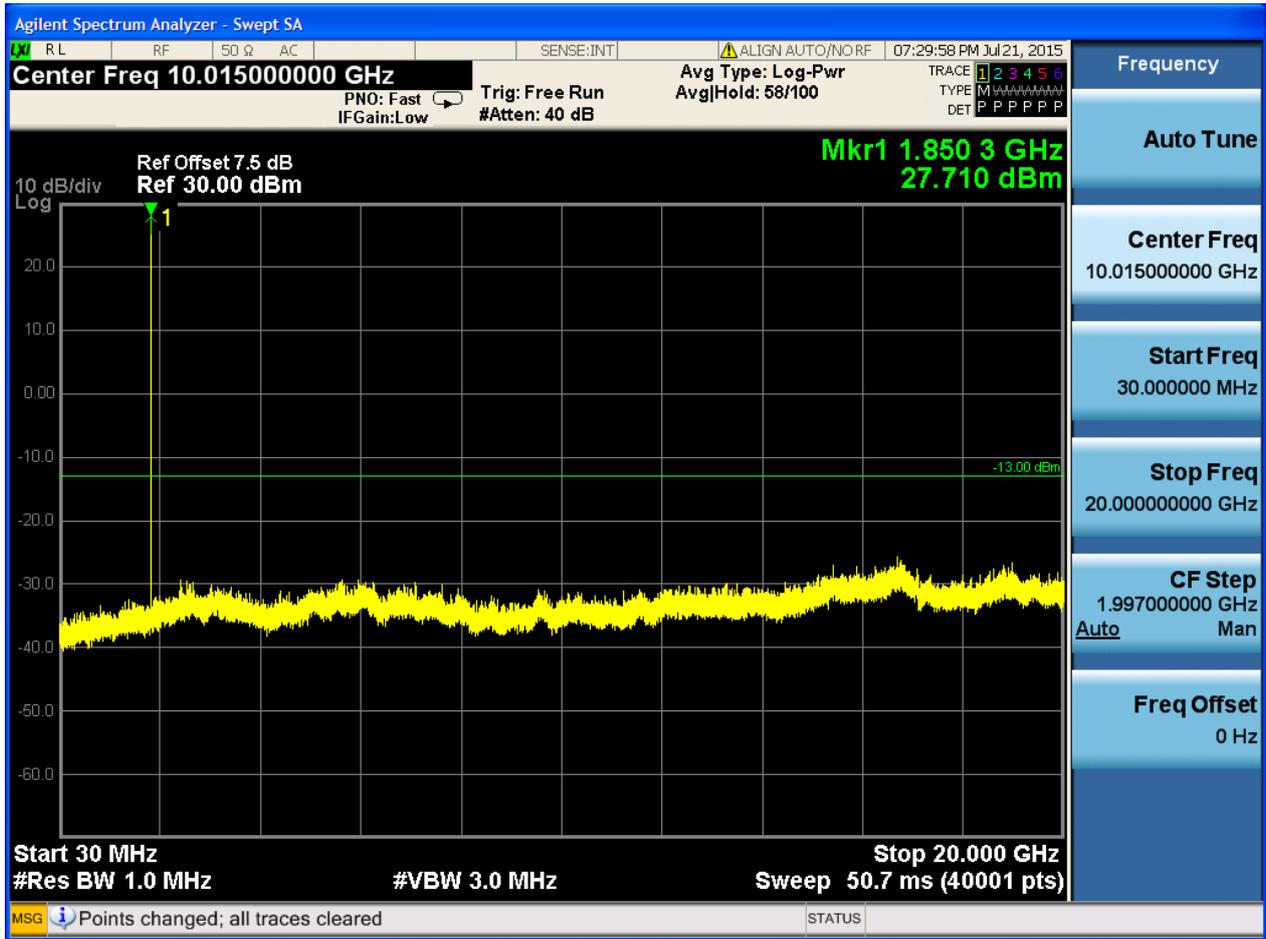


6.1.2.2 Test Mode = GSM/TM2

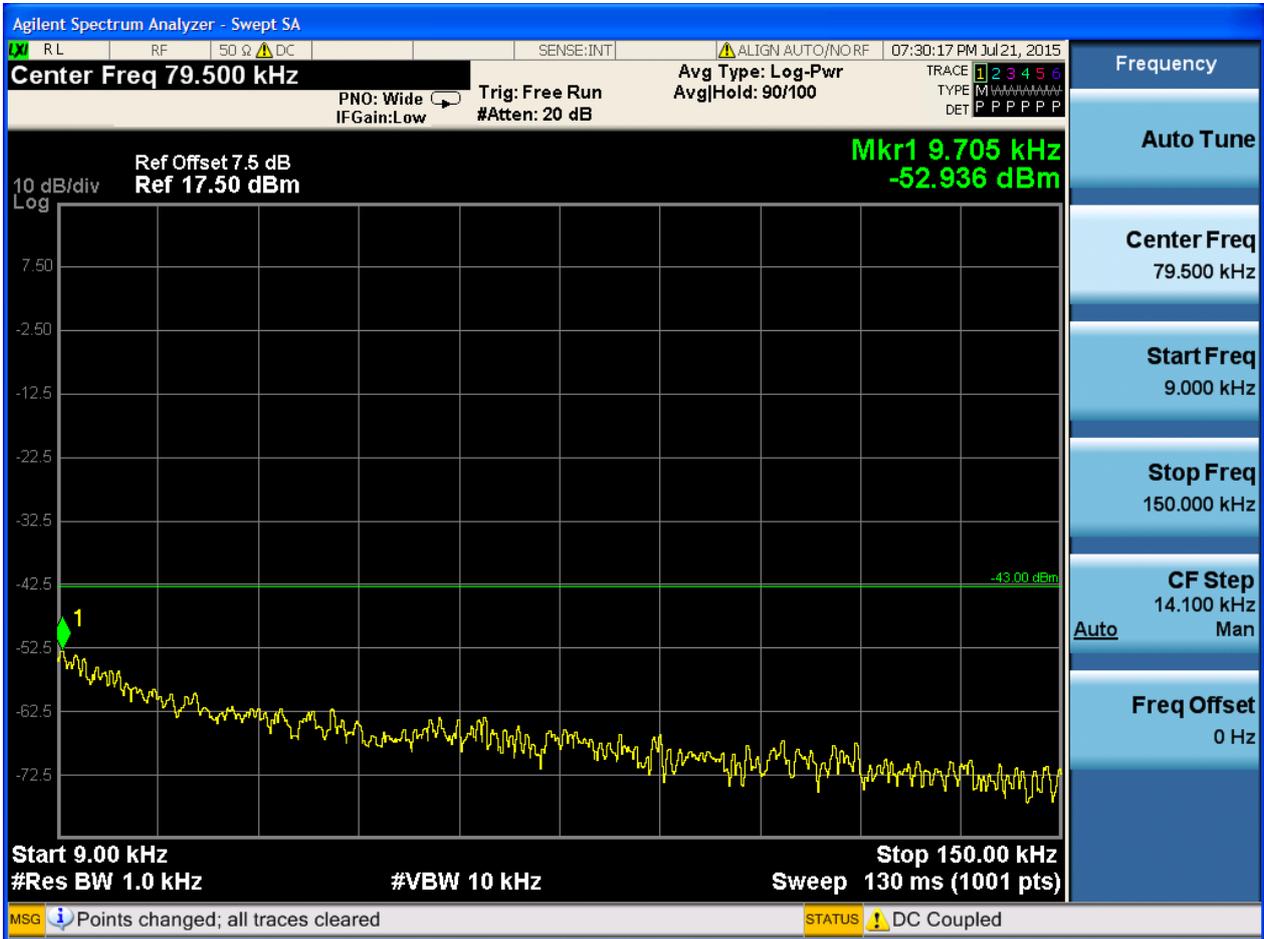
6.1.2.2.1 Test Channel = LCH

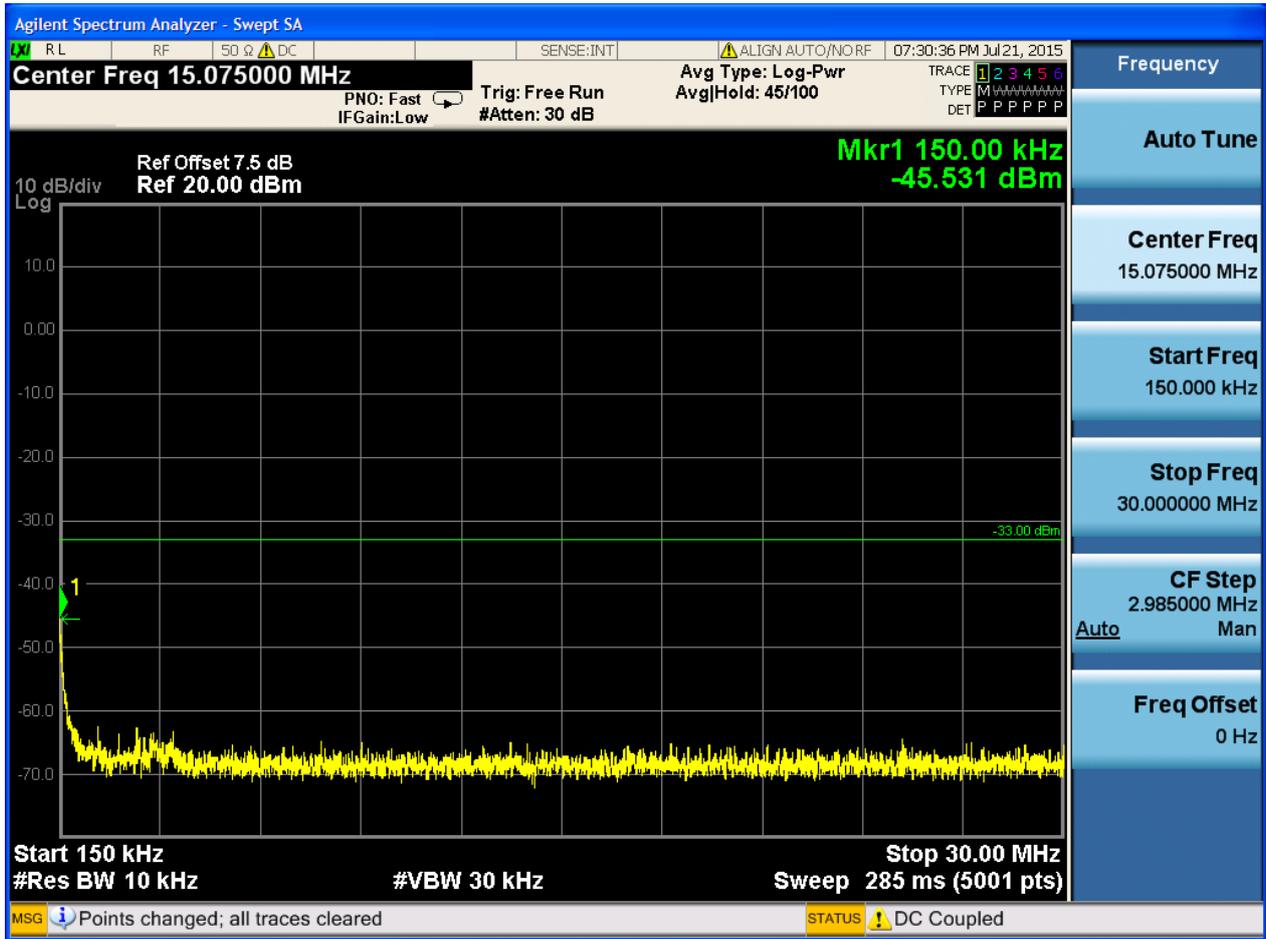


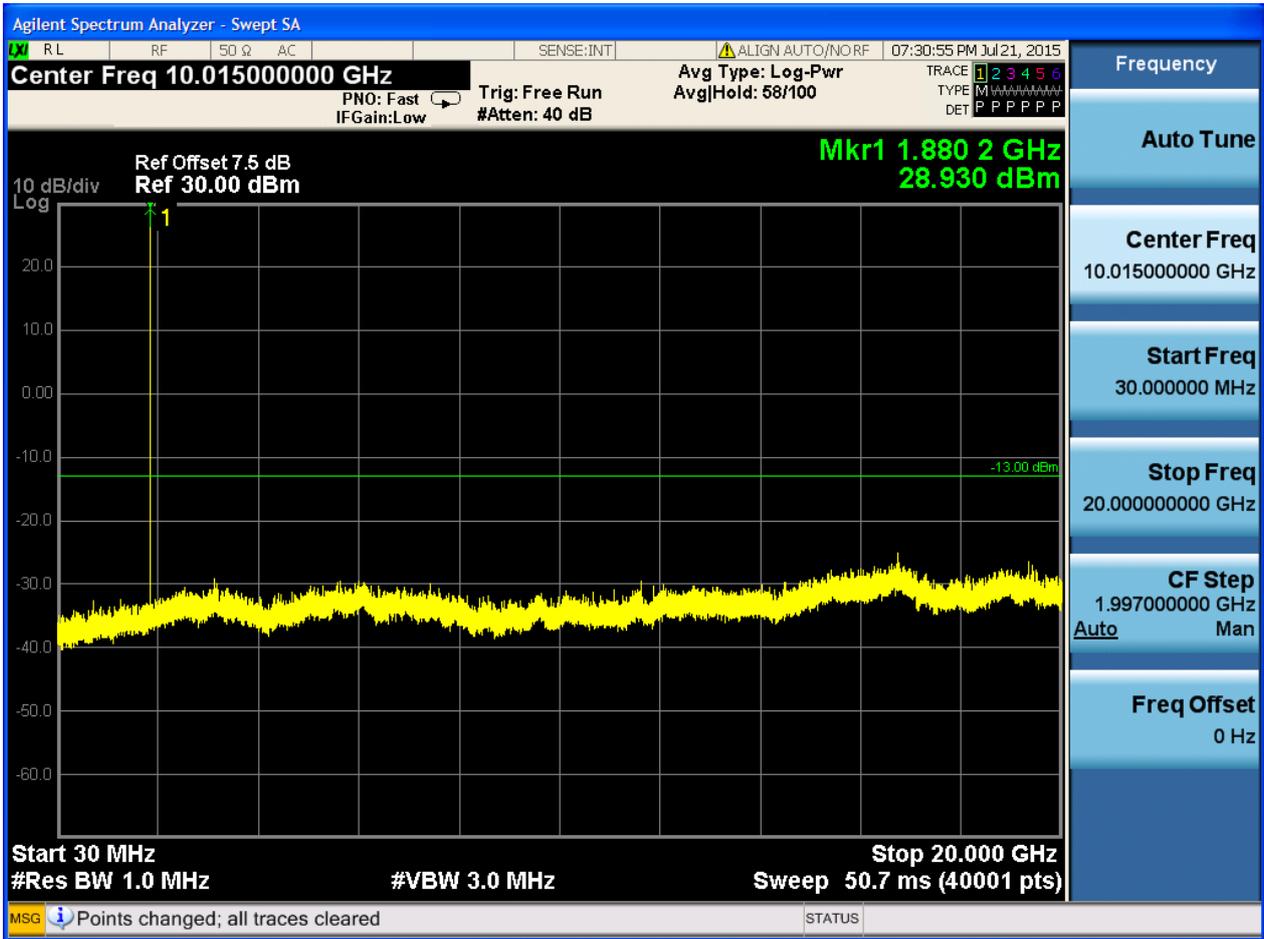




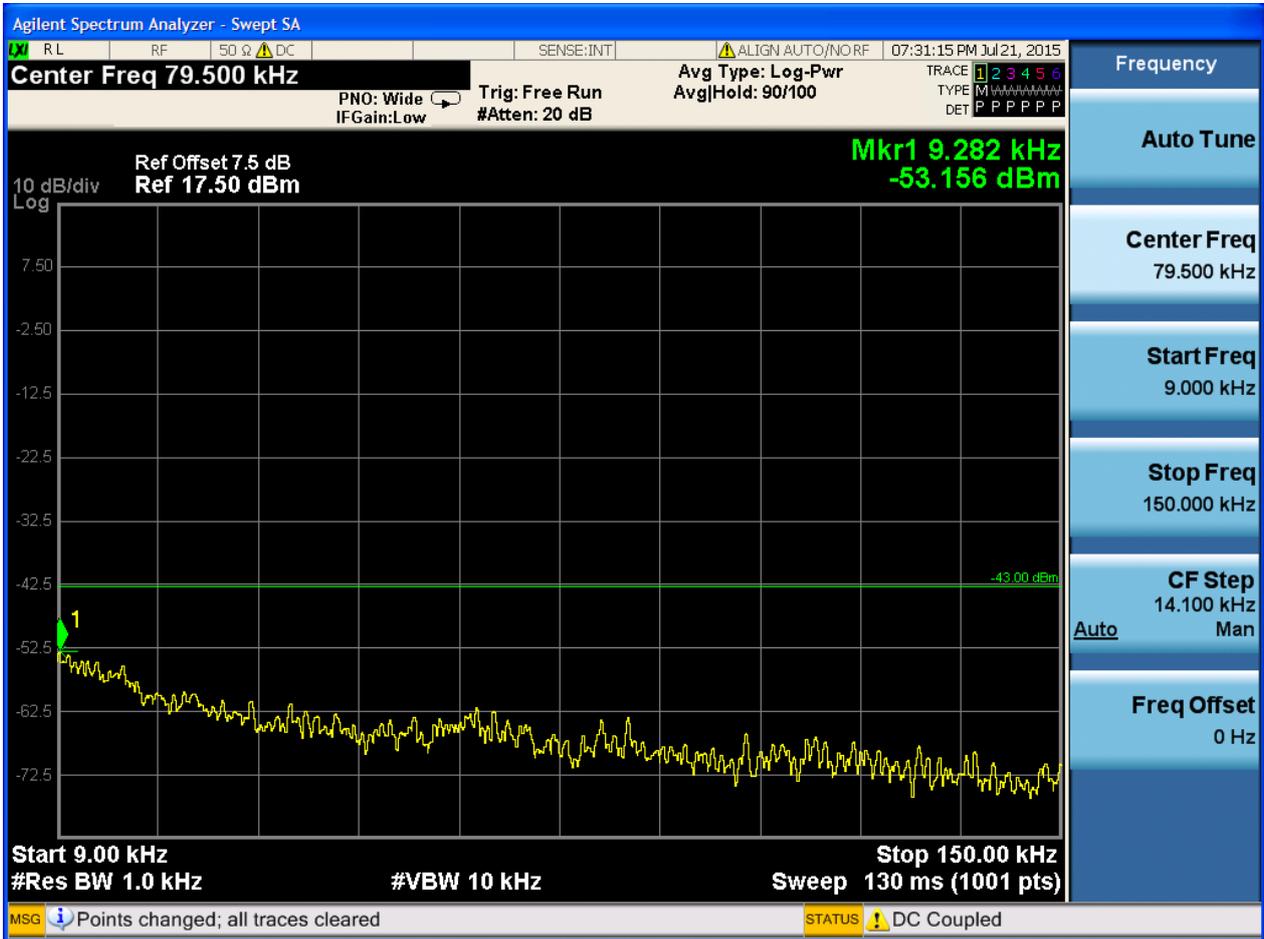
6.1.2.2.2 Test Channel = MCH

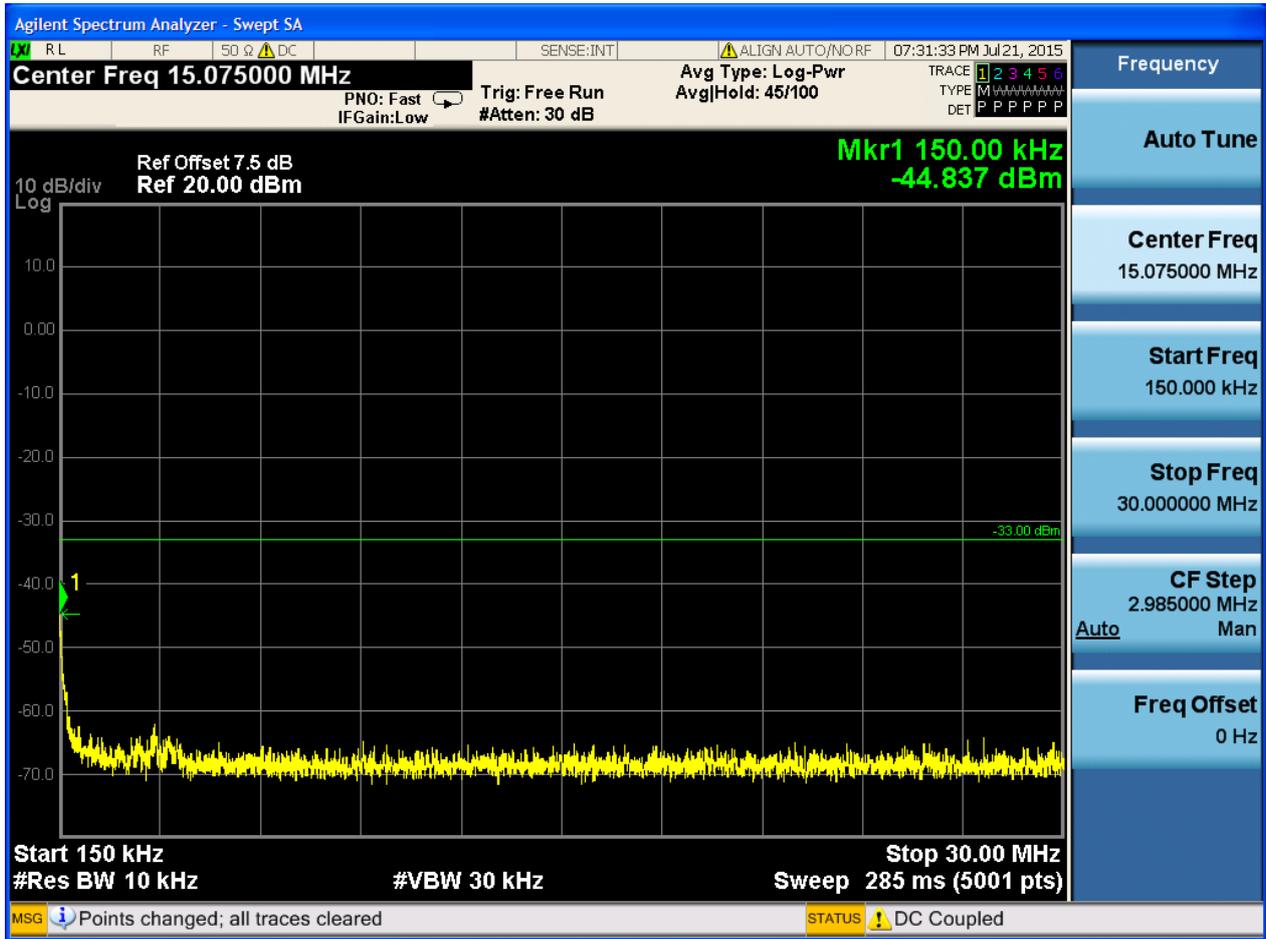


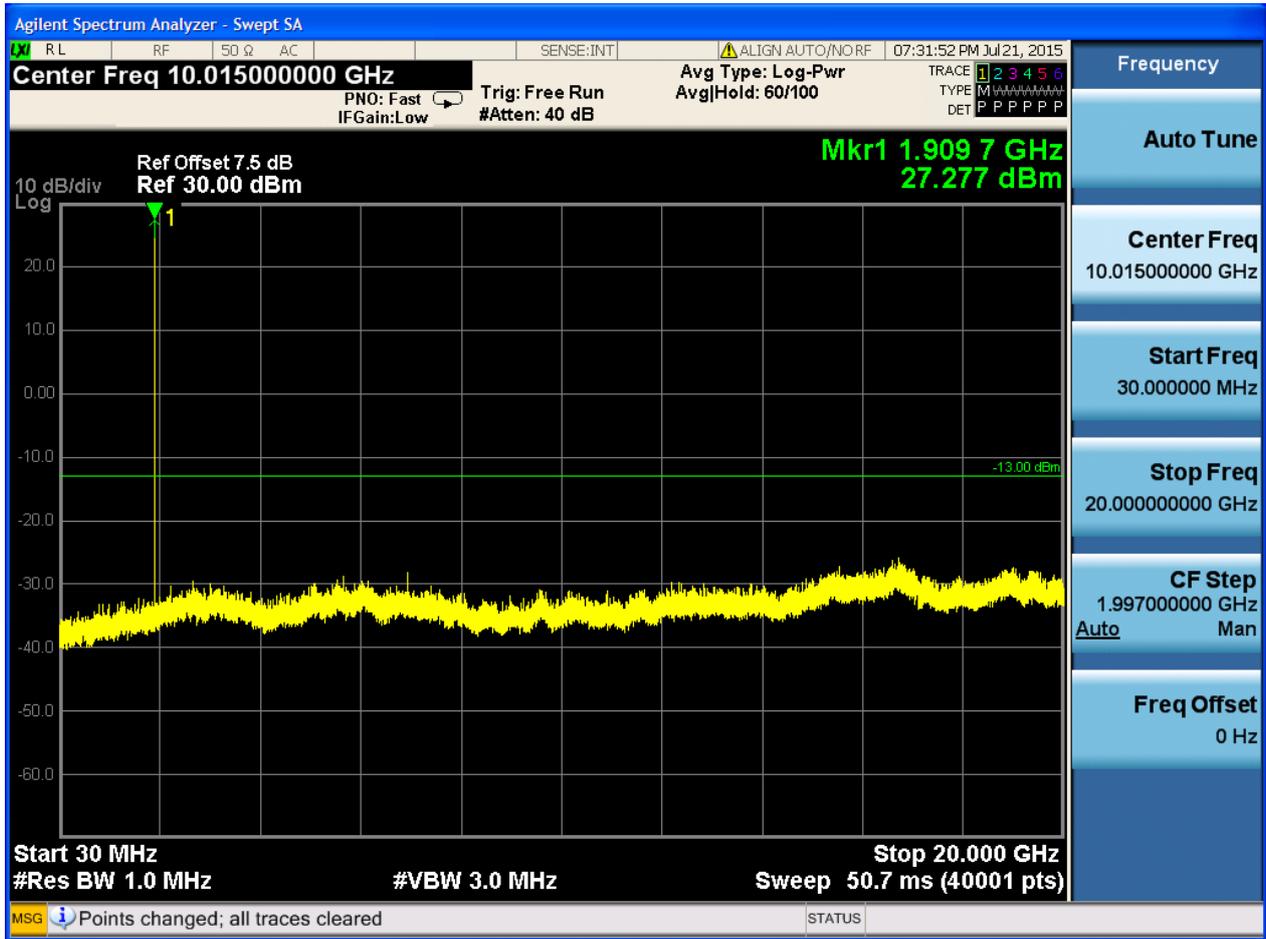




6.1.2.2.3 Test Channel = HCH







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

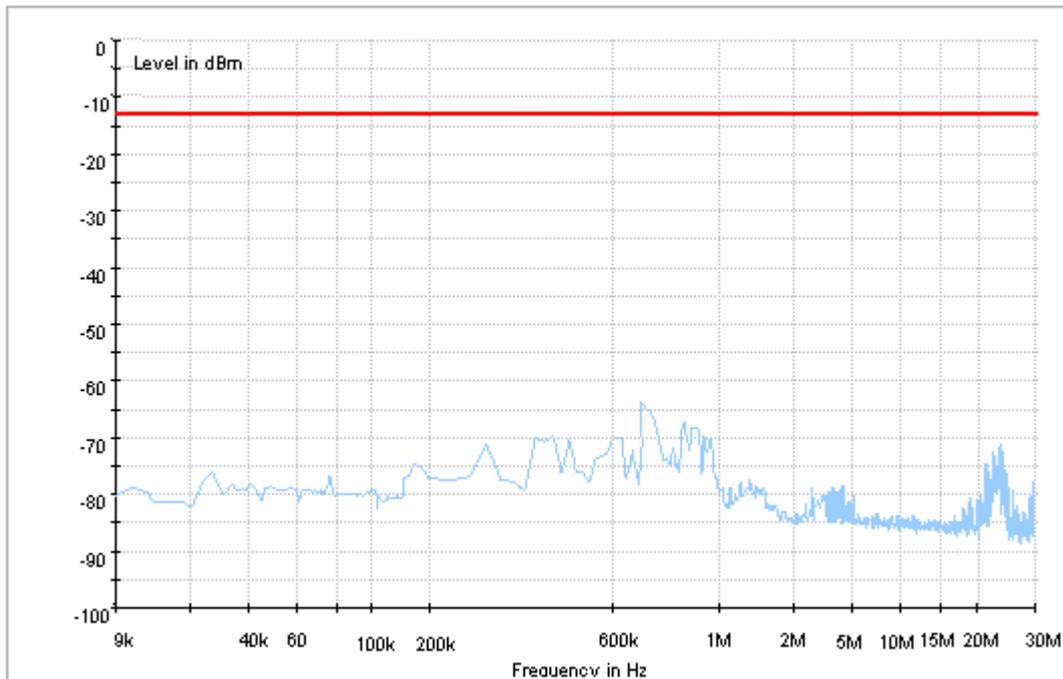
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

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

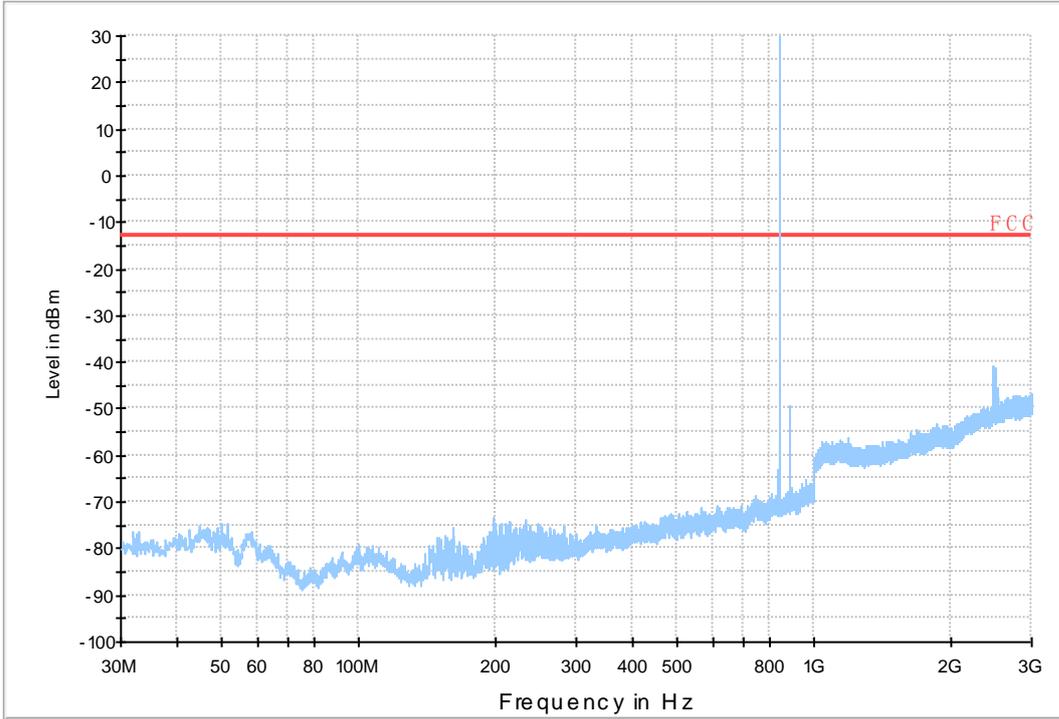
Part I - Test Plots

7.1 For GSM

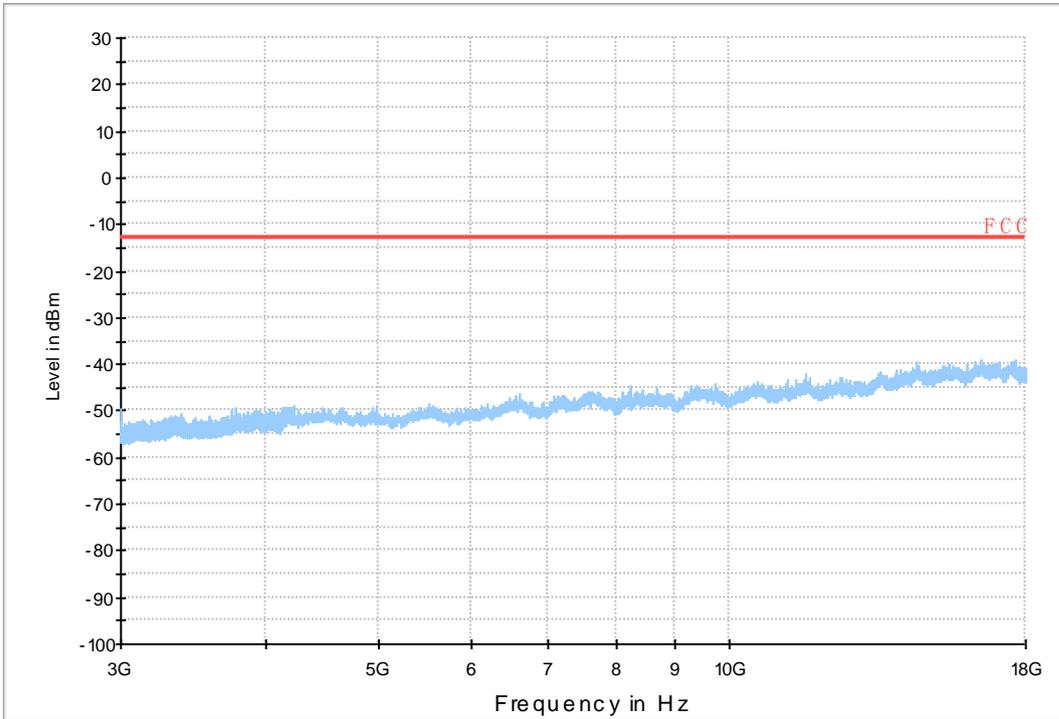
7.1.1 Test Band = GSM850



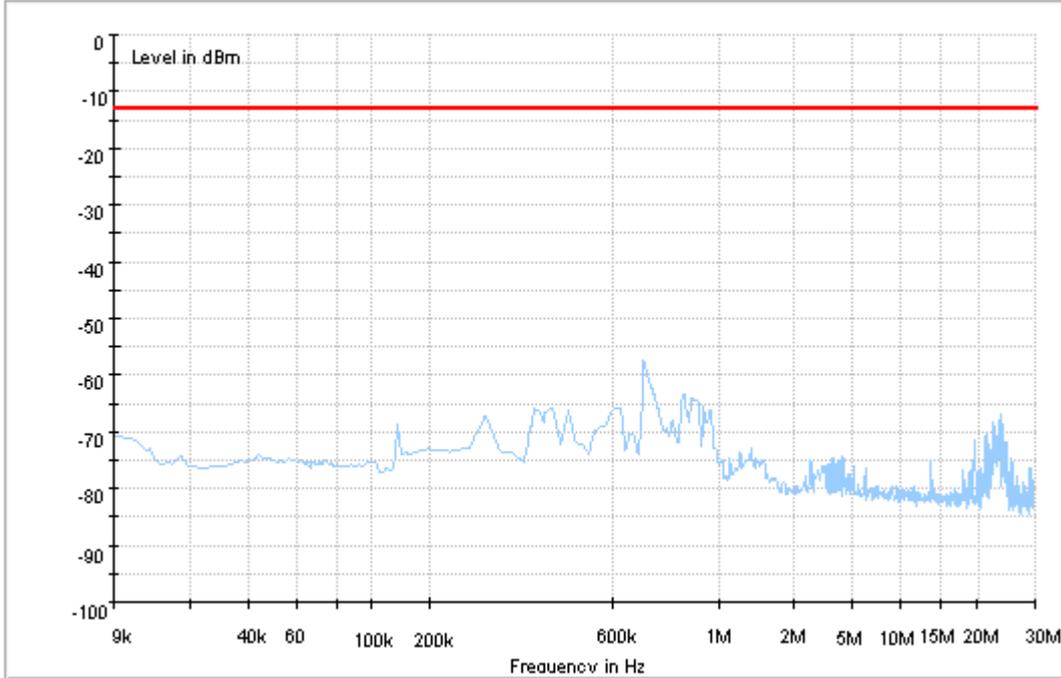
Copy of FCC PART22 GSM850_L



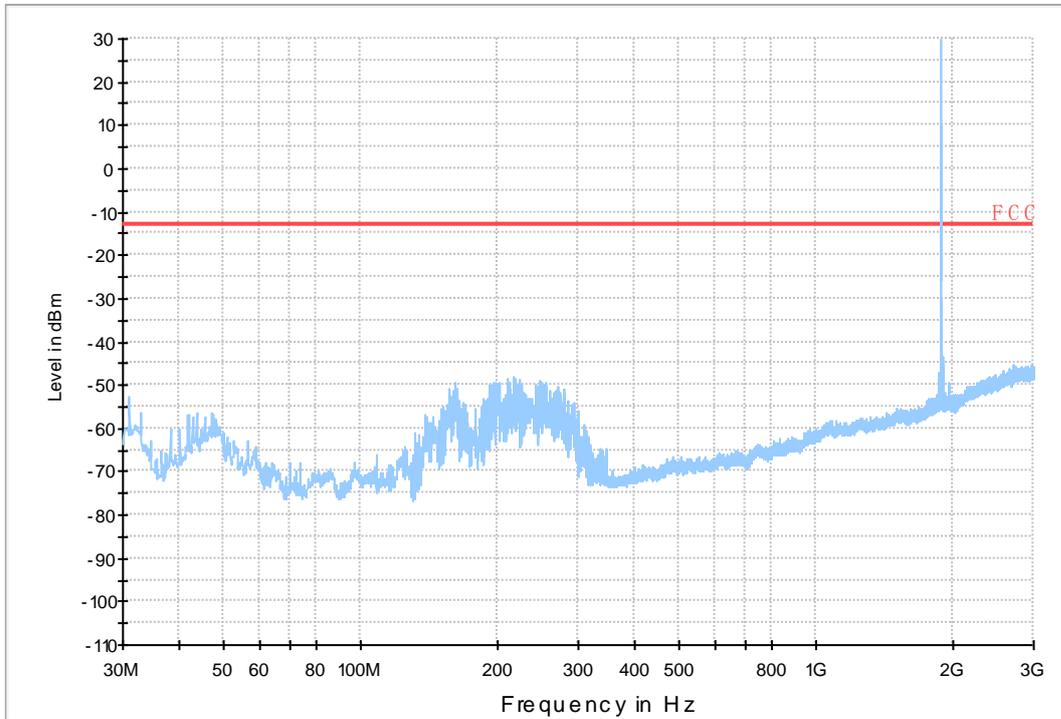
Copy of FCC PART22 GSM850_H



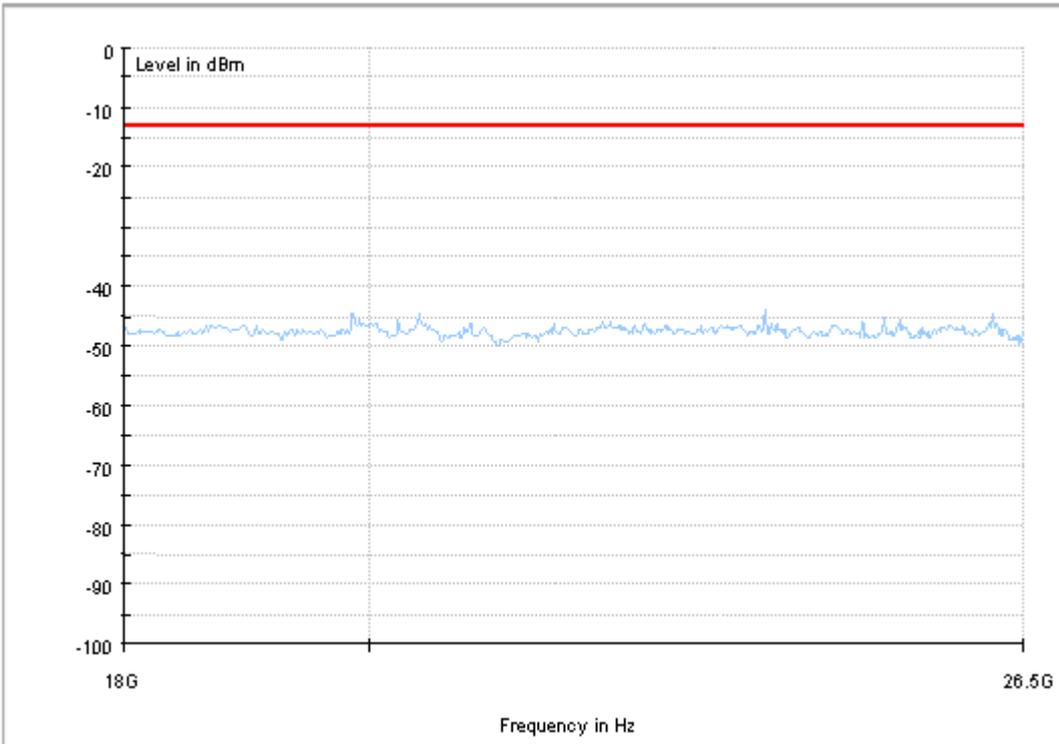
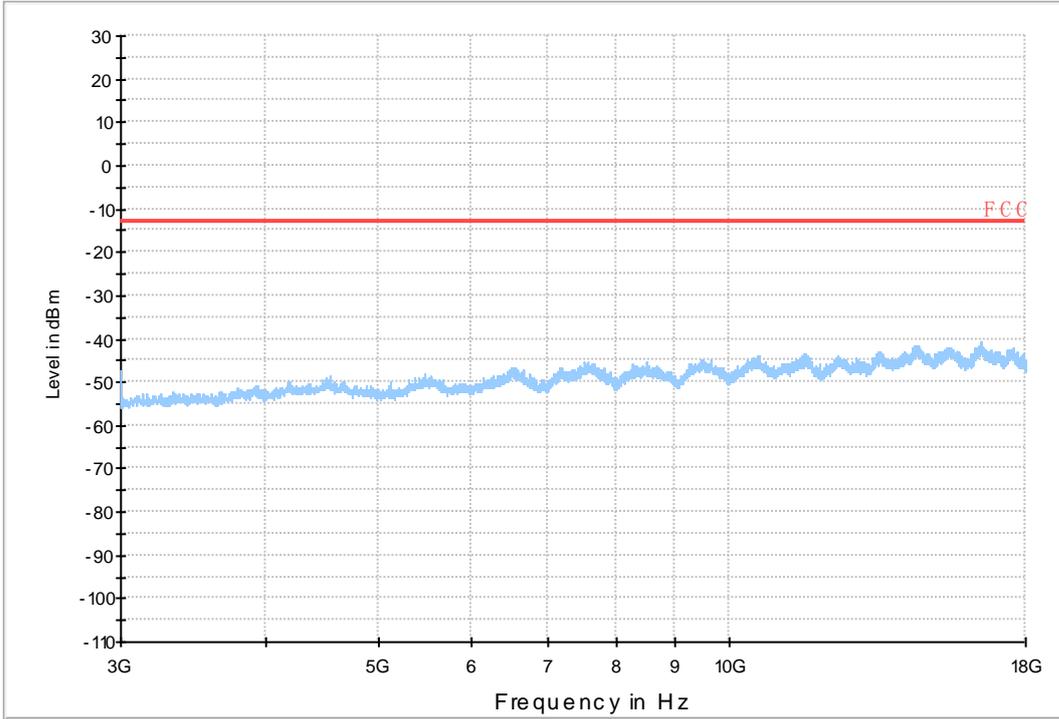
7.1.2 Test Band = GSM1900



Copy of FCC PART24 GSM 1900_L



Copy of FCC PART24 GSM 1900_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	5.75	0.00698	PASS
				VN	8.2	0.00995	PASS
				VH	4.33	0.00525	PASS
		MCH	TN	VL	9.1	0.01088	PASS
				VN	3.1	0.00371	PASS
				VH	3.81	0.00455	PASS
		HCH	TN	VL	-1.1	-0.0013	PASS
				VN	3.23	0.00381	PASS
				VH	1.29	0.00152	PASS
	GSM/TM2	LCH	TN	VL	5.91	0.00717	PASS
				VN	7.81	0.00948	PASS
				VH	9.91	0.01202	PASS
		MCH	TN	VL	9.94	0.01188	PASS
				VN	9.69	0.01158	PASS
				VH	8.07	0.00965	PASS
		HCH	TN	VL	8.59	0.01012	PASS
				VN	6.01	0.00708	PASS
				VH	9.88	0.01164	PASS
GSM1900	GSM/TM1	LCH	TN	VL	13.82	0.00747	PASS
				VN	13.56	0.00733	PASS
				VH	15.82	0.00855	PASS
		MCH	TN	VL	16.4	0.00872	PASS
				VN	12.98	0.0069	PASS
				VH	16.01	0.00852	PASS
		HCH	TN	VL	1.87	0.00098	PASS
				VN	-1.23	-0.00064	PASS
				VH	1.36	0.00071	PASS
	GSM/TM2	LCH	TN	VL	14.75	0.00797	PASS
				VN	16.98	0.00918	PASS
				VH	15.82	0.00855	PASS
		MCH	TN	VL	15.05	0.00801	PASS
				VN	12.85	0.00684	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	19.31	0.01027	PASS
		HCH	TN	VL	3.29	0.00172	PASS
				VN	6.68	0.0035	PASS
				VH	3.62	0.0019	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	0.71	0.00086	PASS
				-10	13.56	0.01645	PASS
				0	4.97	0.00603	PASS
				10	6.07	0.00736	PASS
				20	8.33	0.01011	PASS
				30	6.91	0.00838	PASS
				40	2.91	0.00353	PASS
		50	6.72	0.00815	PASS		
		MCH	VN	-30	6.72	0.00803	PASS
				-20	5.75	0.00687	PASS
				-10	7.68	0.00918	PASS
				0	7.55	0.00902	PASS
				10	4.91	0.00587	PASS
				20	5.68	0.00679	PASS
				30	2.26	0.0027	PASS
				40	5.1	0.0061	PASS
		50	9.23	0.01103	PASS		
		HCH	VN	-30	5.81	0.00684	PASS
				-20	-2.97	-0.0035	PASS
				-10	-1.16	-0.00137	PASS
				0	-1.74	-0.00205	PASS
				10	4.46	0.00525	PASS
				20	5.68	0.00669	PASS
	30			1.94	0.00229	PASS	
	40			-3.68	-0.00434	PASS	
	50	1.29	0.00152	PASS			
	GSM/TM2	LCH	VN	-30	8.27	0.01003	PASS
				-20	9.46	0.01148	PASS
				-10	9.69	0.01176	PASS
				0	8.43	0.01023	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				10	11.24	0.01364	PASS		
				20	7.33	0.00889	PASS		
				30	6.36	0.00772	PASS		
				40	8.88	0.01077	PASS		
				50	6.65	0.00807	PASS		
		MCH	VN	-30	4.33	0.00518	PASS		
				-20	8.65	0.01034	PASS		
				-10	8.98	0.01073	PASS		
				0	9.01	0.01077	PASS		
				10	8.3	0.00992	PASS		
				20	7.43	0.00888	PASS		
				30	7.3	0.00873	PASS		
				40	6.75	0.00807	PASS		
				50	8.1	0.00968	PASS		
				HCH	VN	-30	10.04	0.01183	PASS
		-20	8.17			0.00963	PASS		
		-10	10.17			0.01198	PASS		
		0	7.26			0.00855	PASS		
		10	8.94			0.01053	PASS		
		20	8.75			0.01031	PASS		
		30	10.36			0.01221	PASS		
		40	8.46			0.00997	PASS		
		50	7.1			0.00836	PASS		
		GSM1900	GSM/TM1	LCH	VN	-30	13.43	0.00726	PASS
						-20	11.88	0.00642	PASS
						-10	14.46	0.00782	PASS
						0	17.37	0.00939	PASS
10	18.27					0.00987	PASS		
20	21.63					0.01169	PASS		
30	18.85					0.01019	PASS		
40	11.17					0.00604	PASS		
50	16.34					0.00883	PASS		
MCH	VN			-30	17.89	0.00952	PASS		
				-20	20.6	0.01096	PASS		
				-10	15.24	0.00811	PASS		
				0	18.73	0.00996	PASS		
				10	13.11	0.00697	PASS		
				20	14.59	0.00776	PASS		
				30	17.37	0.00924	PASS		
				40	13.56	0.00721	PASS		



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
		HCH	VN	50	13.69	0.00728	PASS	
				-30	-0.13	-0.00007	PASS	
				-20	0.26	0.00014	PASS	
				-10	-4.13	-0.00216	PASS	
				0	-4.39	-0.0023	PASS	
				10	-4	-0.00209	PASS	
				20	4.58	0.0024	PASS	
				30	-2.84	-0.00149	PASS	
				40	-0.19	-0.0001	PASS	
				50	2.39	0.00125	PASS	
		GSM/TM2	LCH	VN	-30	13.2	0.00713	PASS
					-20	16.89	0.00913	PASS
					-10	20.57	0.01112	PASS
					0	17.56	0.00949	PASS
					10	15.21	0.00822	PASS
					20	13.59	0.00735	PASS
					30	18.63	0.01007	PASS
					40	19.79	0.0107	PASS
	50				17.43	0.00942	PASS	
	MCH		VN	-30	14.5	0.00771	PASS	
				-20	17.66	0.00939	PASS	
				-10	16.98	0.00903	PASS	
				0	15.17	0.00807	PASS	
				10	11.59	0.00616	PASS	
				20	15.4	0.00819	PASS	
				30	13.53	0.0072	PASS	
				40	16.3	0.00867	PASS	
				50	20.73	0.01103	PASS	
	HCH	VN	-30	8.85	0.00463	PASS		
			-20	3.94	0.00206	PASS		
			-10	8.01	0.00419	PASS		
			0	5.97	0.00313	PASS		
			10	6.04	0.00316	PASS		
			20	6.65	0.00348	PASS		
			30	5.33	0.00279	PASS		
			40	6.04	0.00316	PASS		
50			4.88	0.00256	PASS			

END