



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/EIRP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	32.01	27.56	38.5	PASS
		MCH	32.17	27.72	38.5	PASS
		HCH	31.95	27.5	38.5	PASS
	GSM/TM2	LCH	25.78	21.33	38.5	PASS
		MCH	25.71	21.26	38.5	PASS
		HCH	25.68	21.23	38.5	PASS
GSM1900	GSM/TM1	LCH	28.69	28.45	33	PASS
		MCH	28.62	28.38	33	PASS
		HCH	28.63	28.39	33	PASS
	GSM/TM2	LCH	24.84	24.6	33	PASS
		MCH	24.86	24.62	33	PASS
		HCH	24.85	24.61	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:

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

$$\text{SET RBW} = 1\% \text{ of the OBW, not to exceed 1MHz}$$

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

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
GSM1900	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.14	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	3	13	PASS
		MCH	3.11	13	PASS
		HCH	3.06	13	PASS

3Appendix_C: Modulation Characteristics

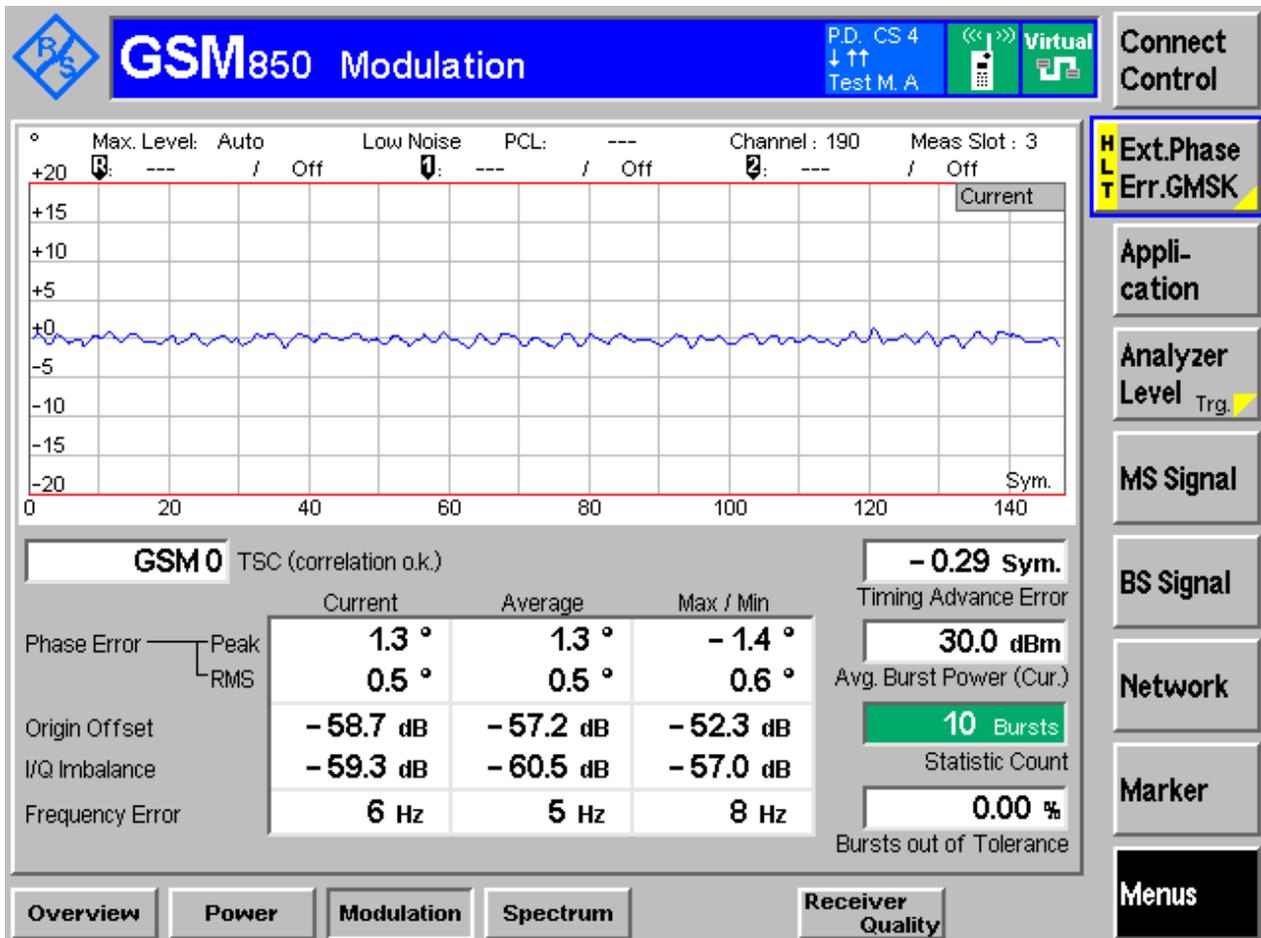
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

3.1.1.1 Test Mode = GSM/TM1

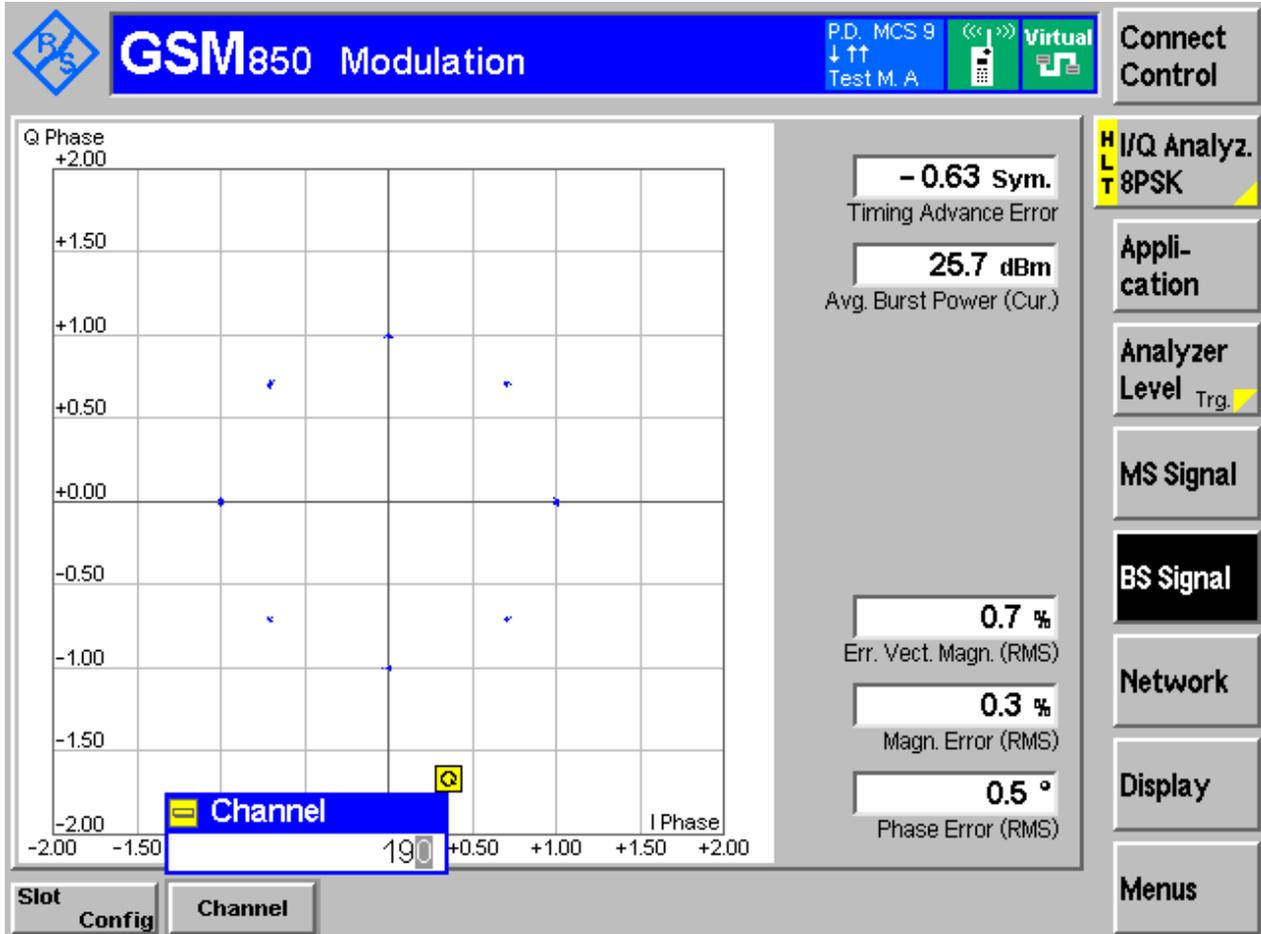
3.1.1.1.1 Test Channel = MCH





3.1.1.2 Test Mode = GSM/TM2

3.1.1.2.1 Test Channel = MCH

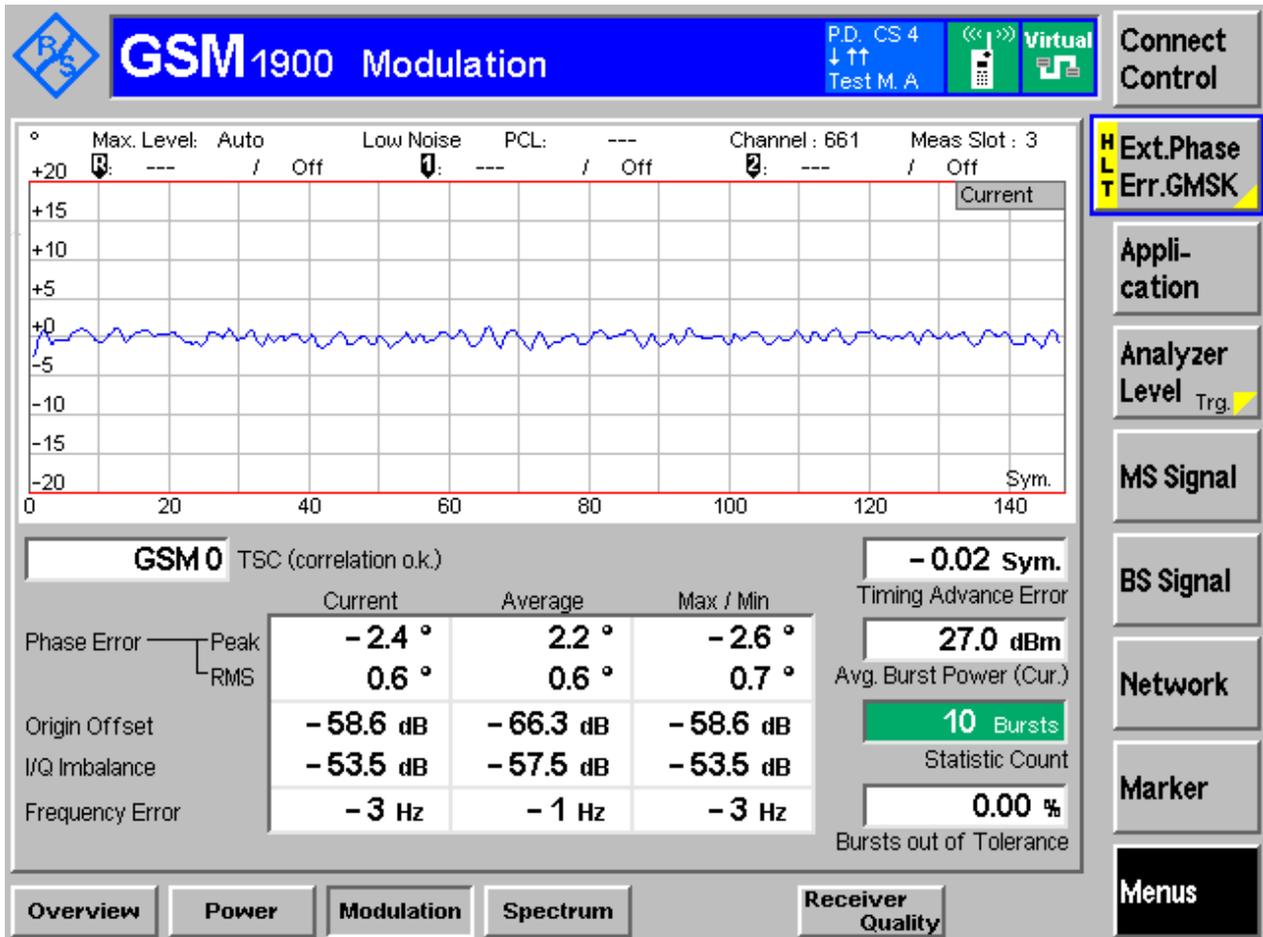




3.1.2 Test Band = GSM1900

3.1.2.1 Test Mode = GSM/TM1

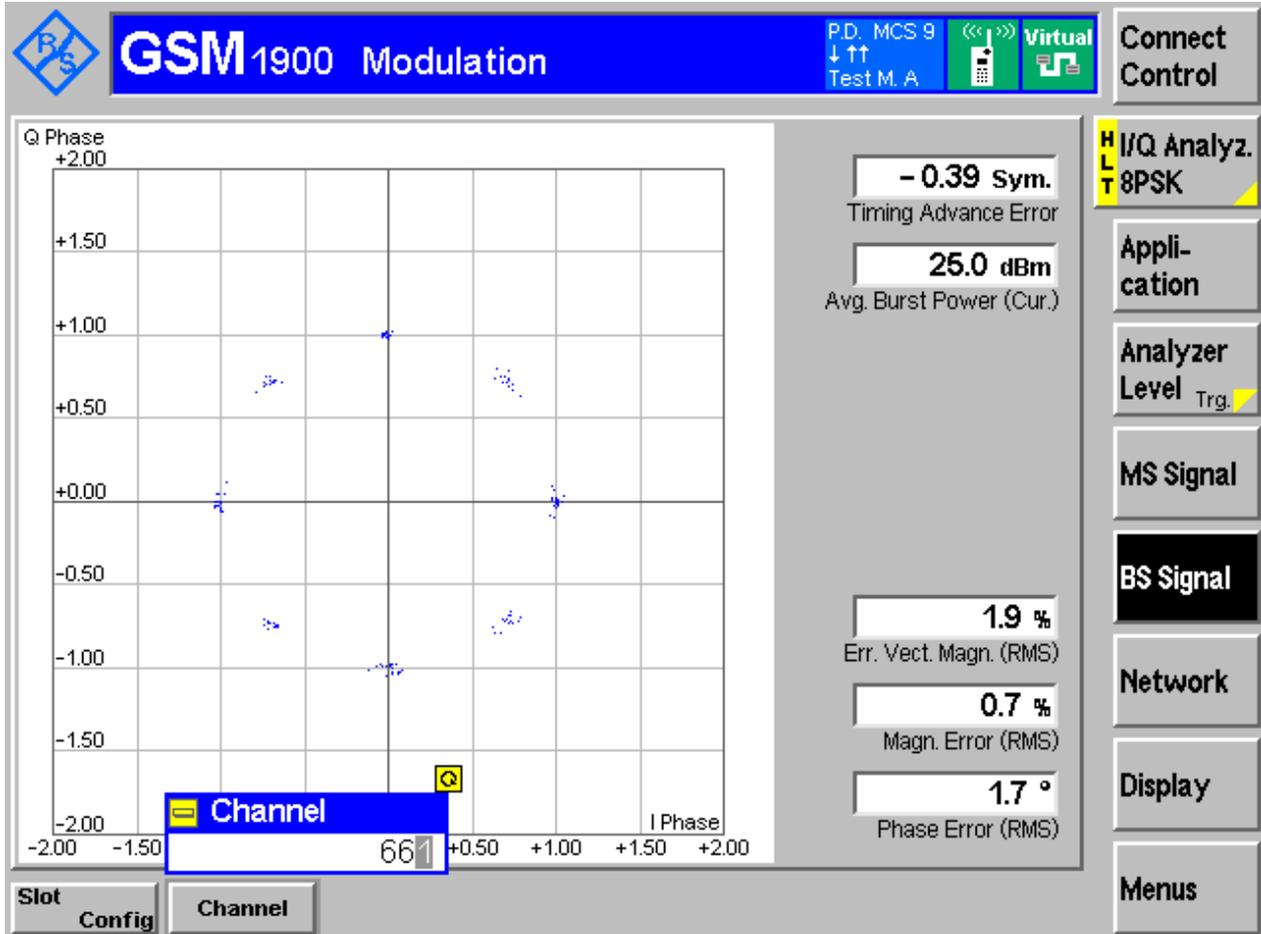
3.1.2.1.1 Test Channel = MCH





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	244.39	315.31	Pass
		MCH	242.95	315.58	Pass
		HCH	246.52	316.40	Pass
	GSM/TM2	LCH	247.52	314.57	Pass
		MCH	243.12	308.85	Pass
		HCH	245.01	303.28	Pass
GSM1900	GSM/TM1	LCH	243.15	321.22	Pass
		MCH	245.82	320.60	Pass
		HCH	249.53	315.92	Pass
	GSM/TM2	LCH	248.32	312.42	Pass
		MCH	246.06	320.30	Pass
		HCH	247.46	308.05	Pass



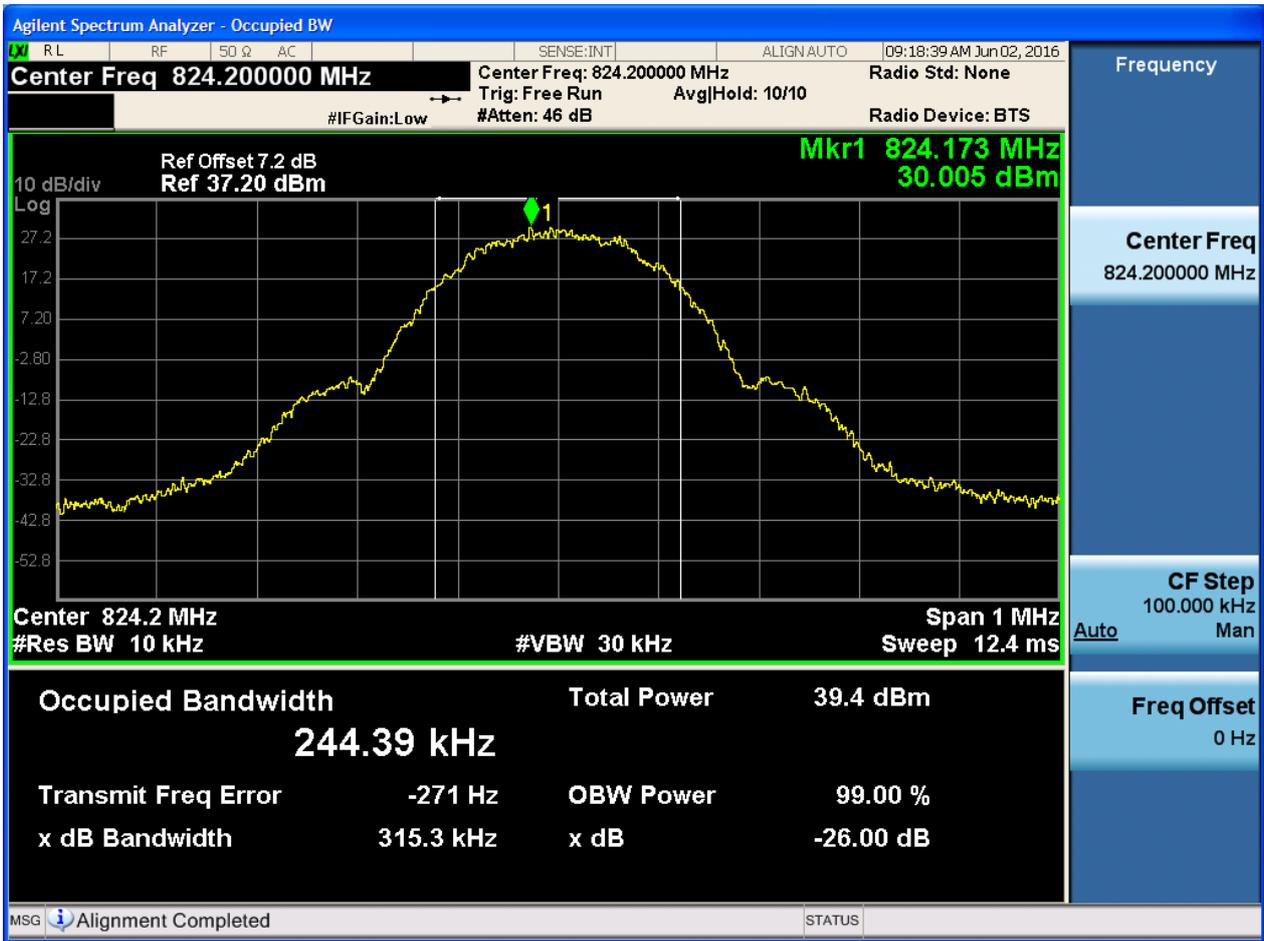
Part II - Test Plots

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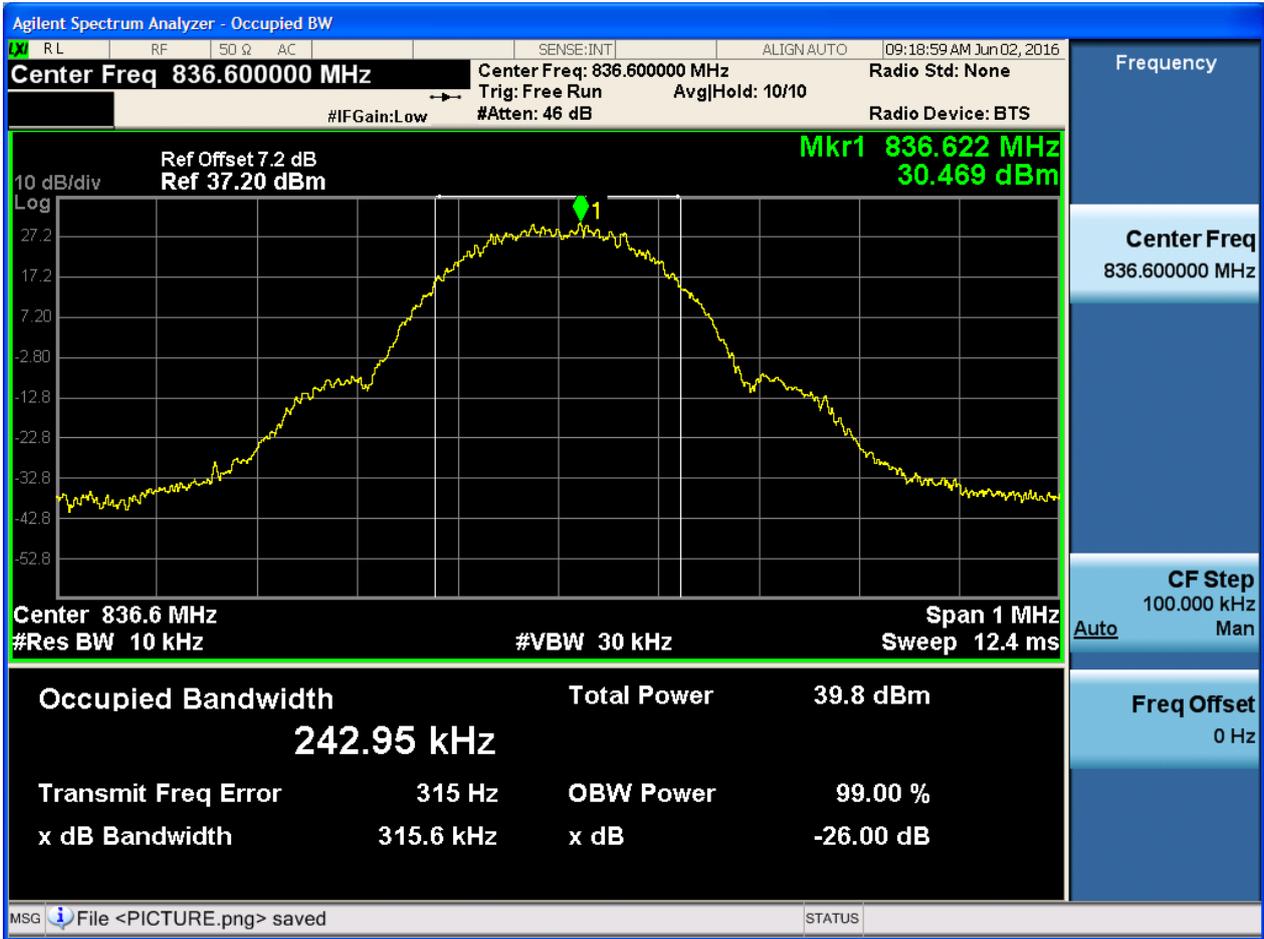
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



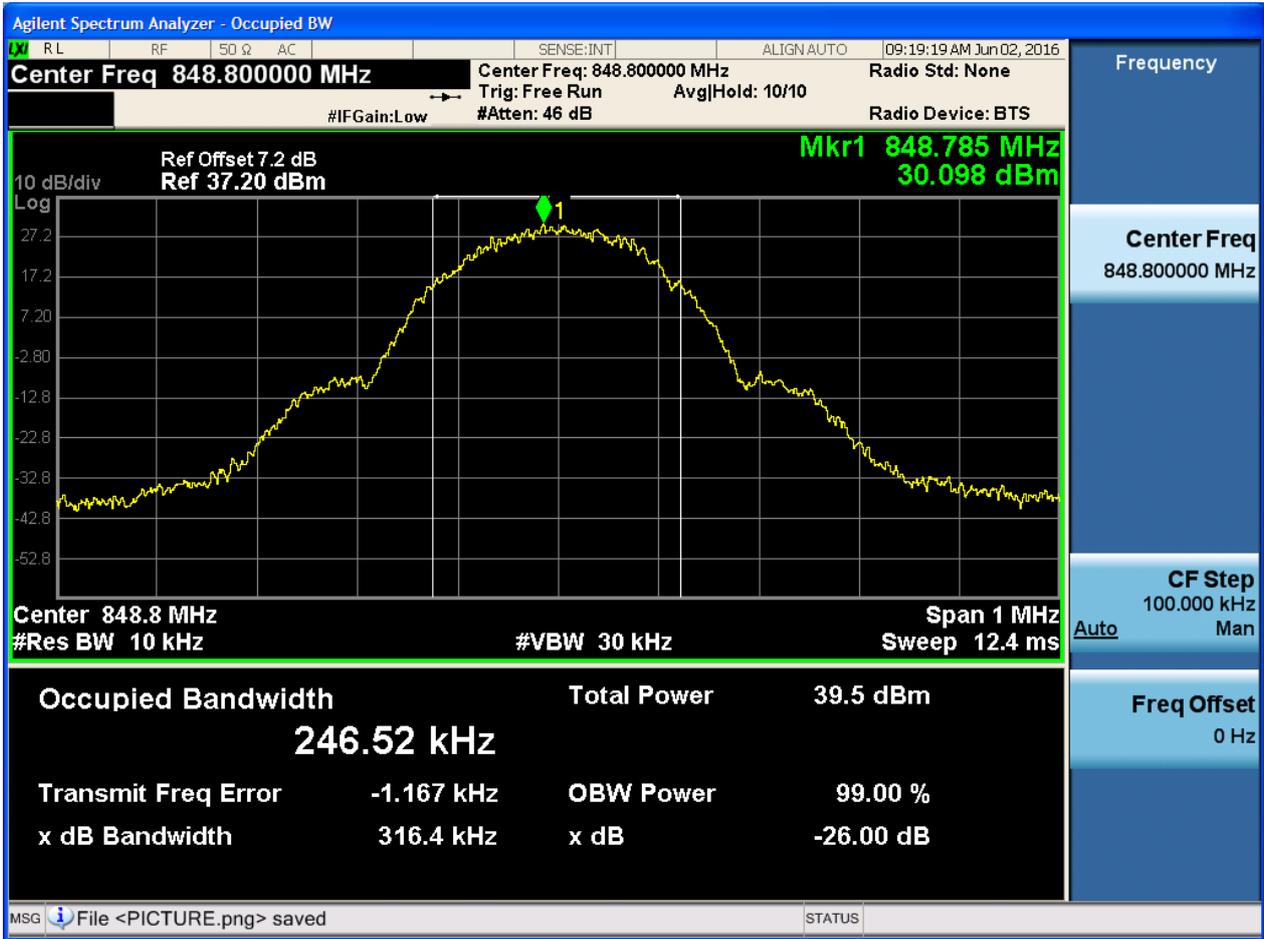


4.1.1.1.2 Test Channel = MCH





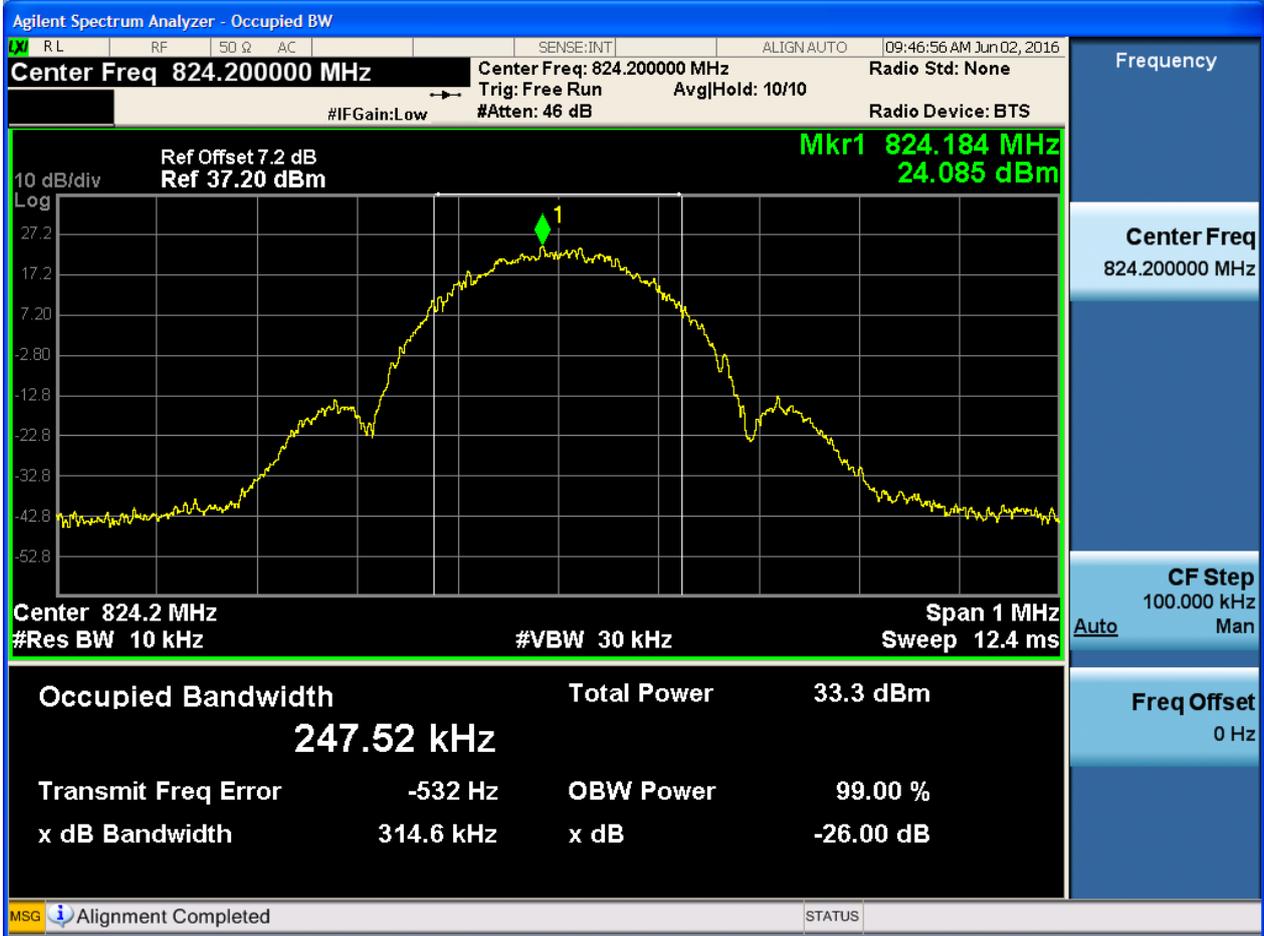
4.1.1.1.3 Test Channel = HCH





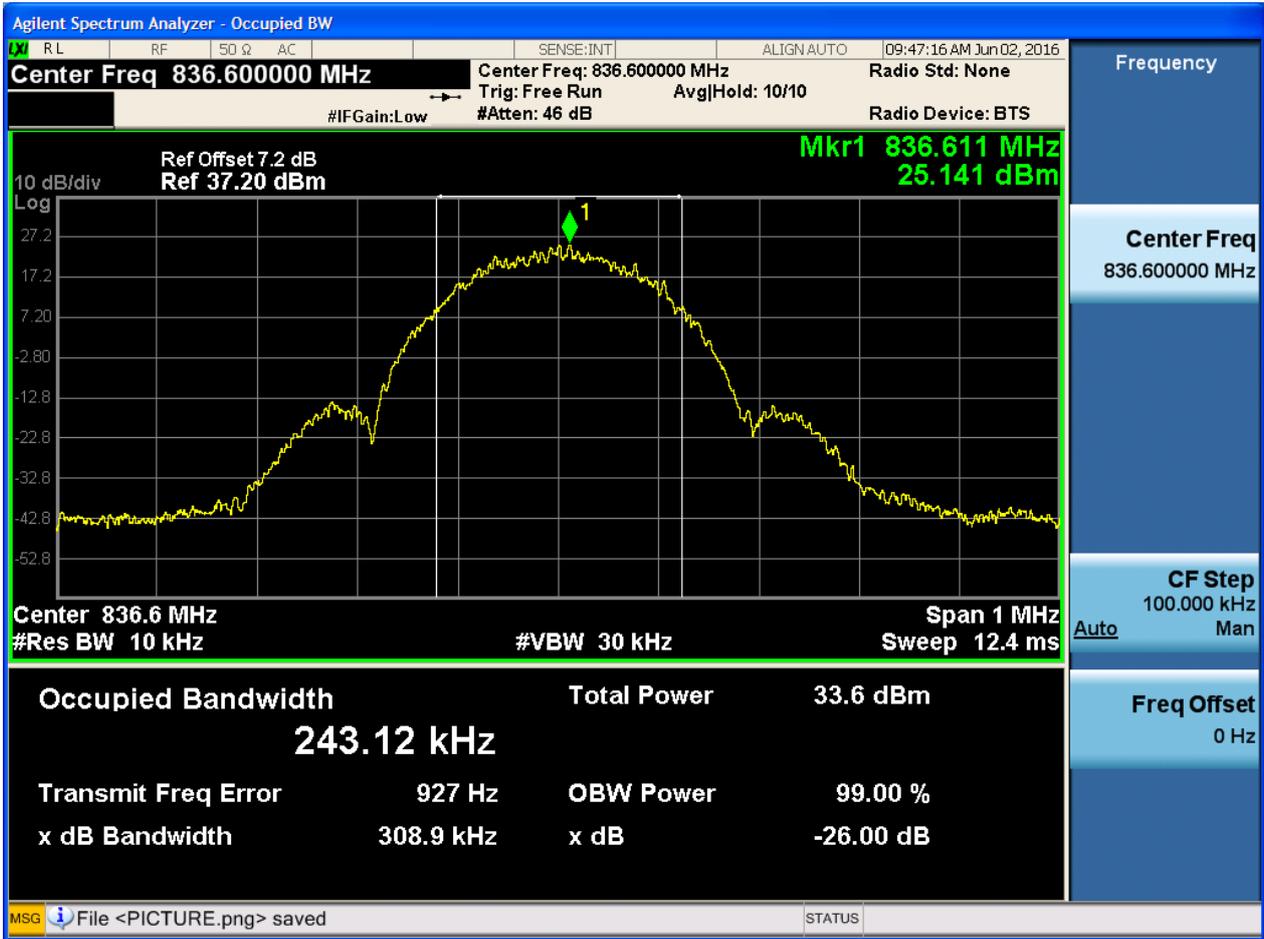
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4.1.1.2.1 Test Channel = LCH



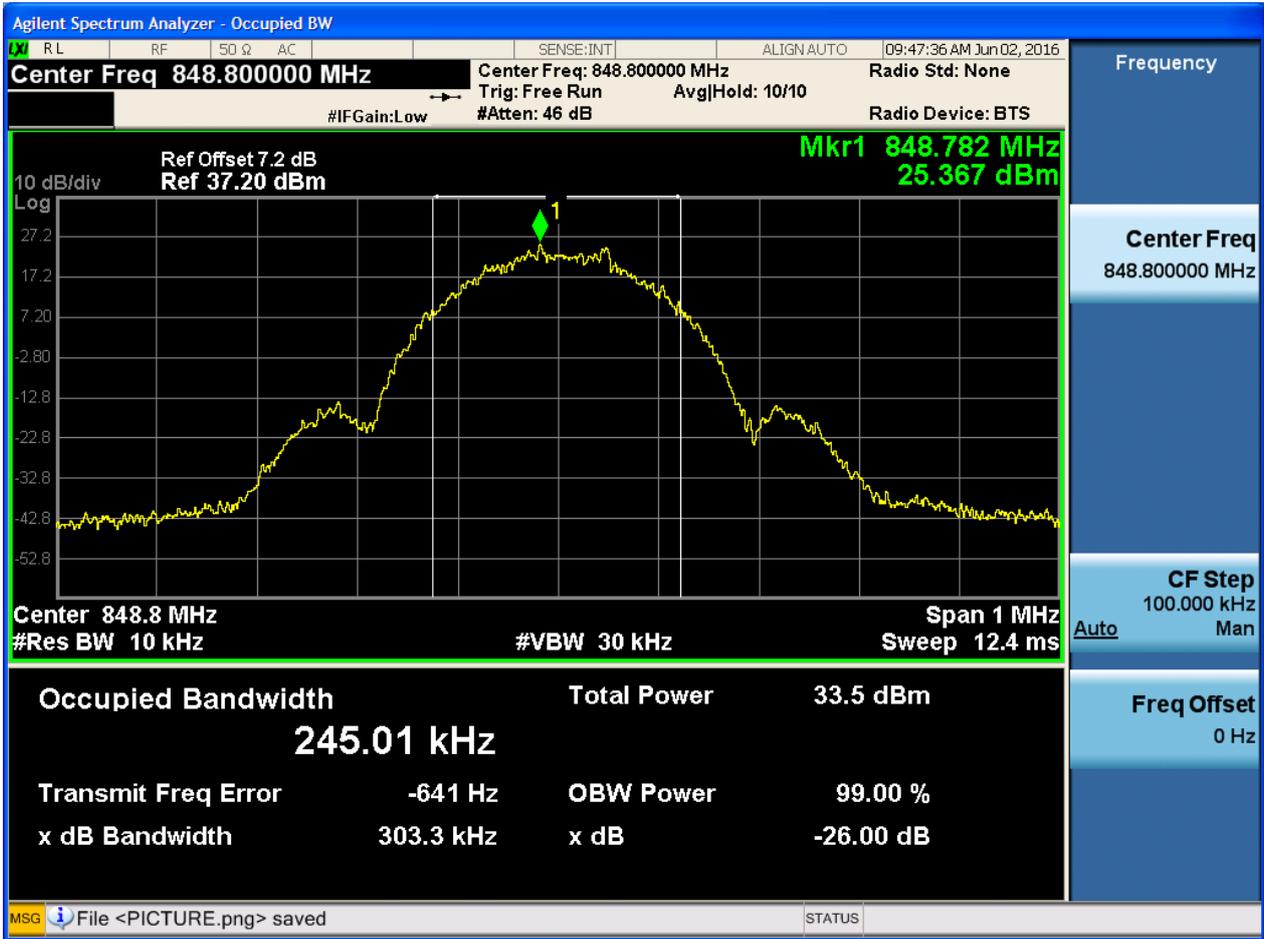


4.1.1.2.2 Test Channel = MCH





4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

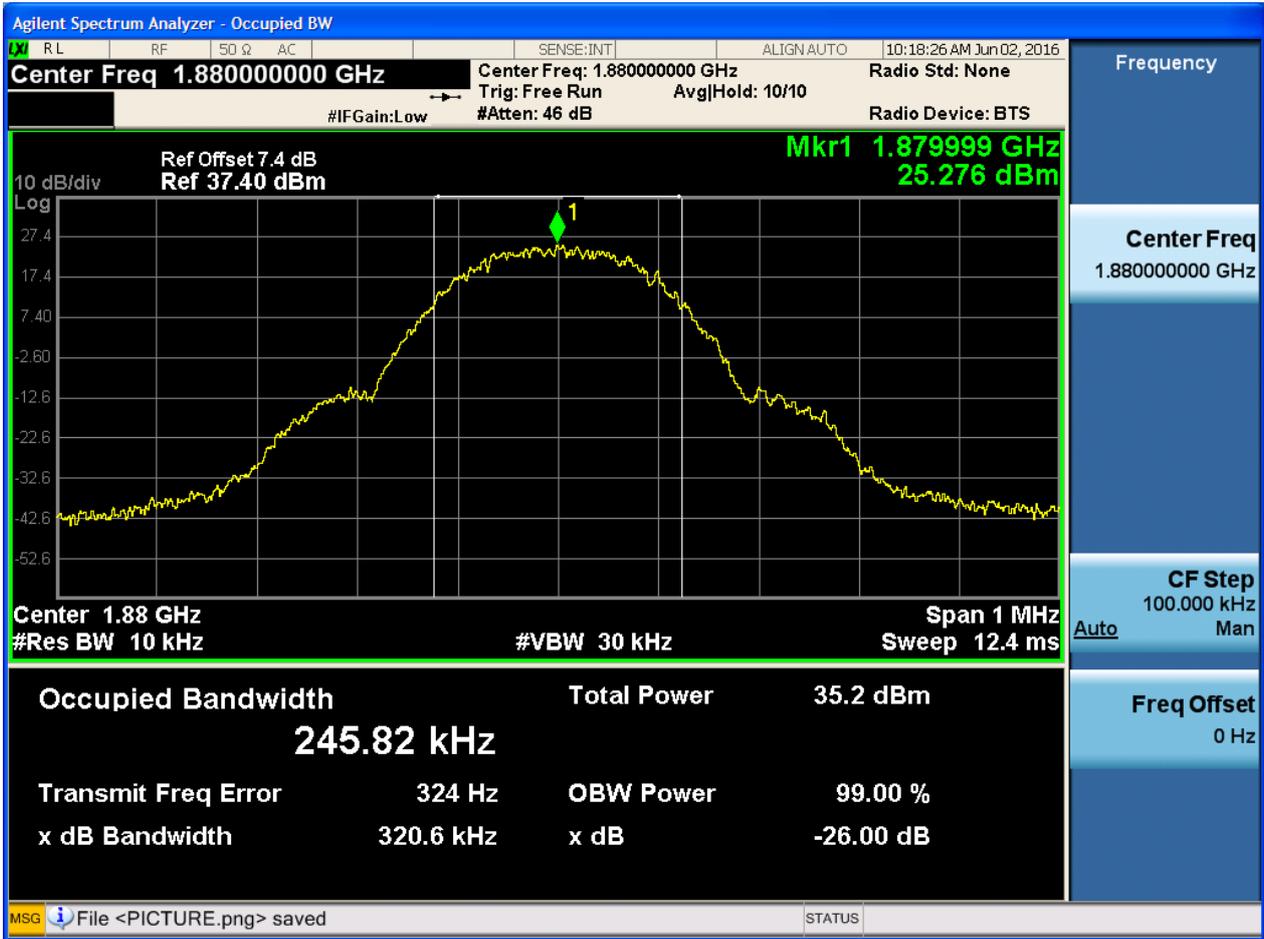
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



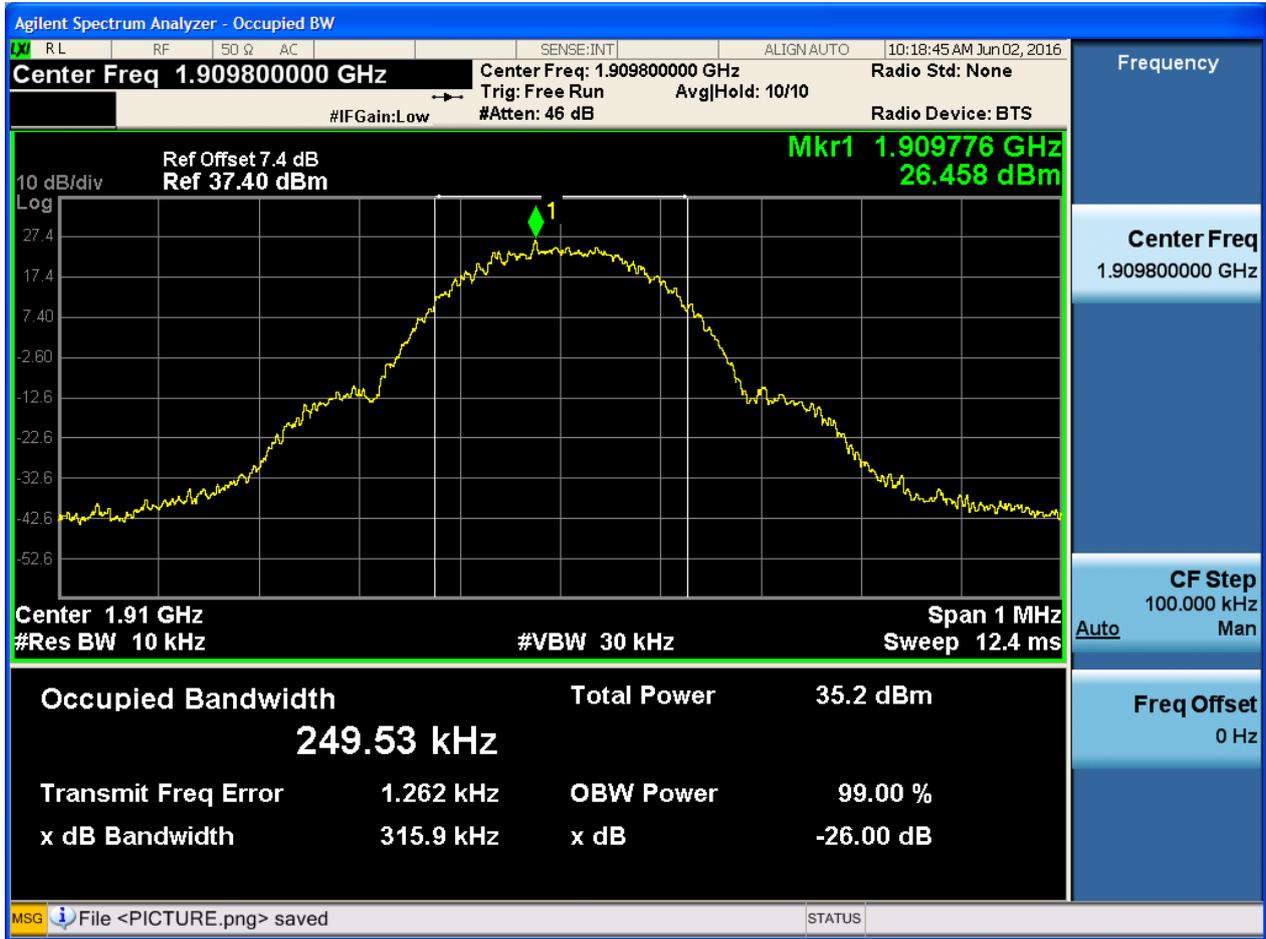


4.1.2.1.2 Test Channel = MCH





4.1.2.1.3 Test Channel = HCH





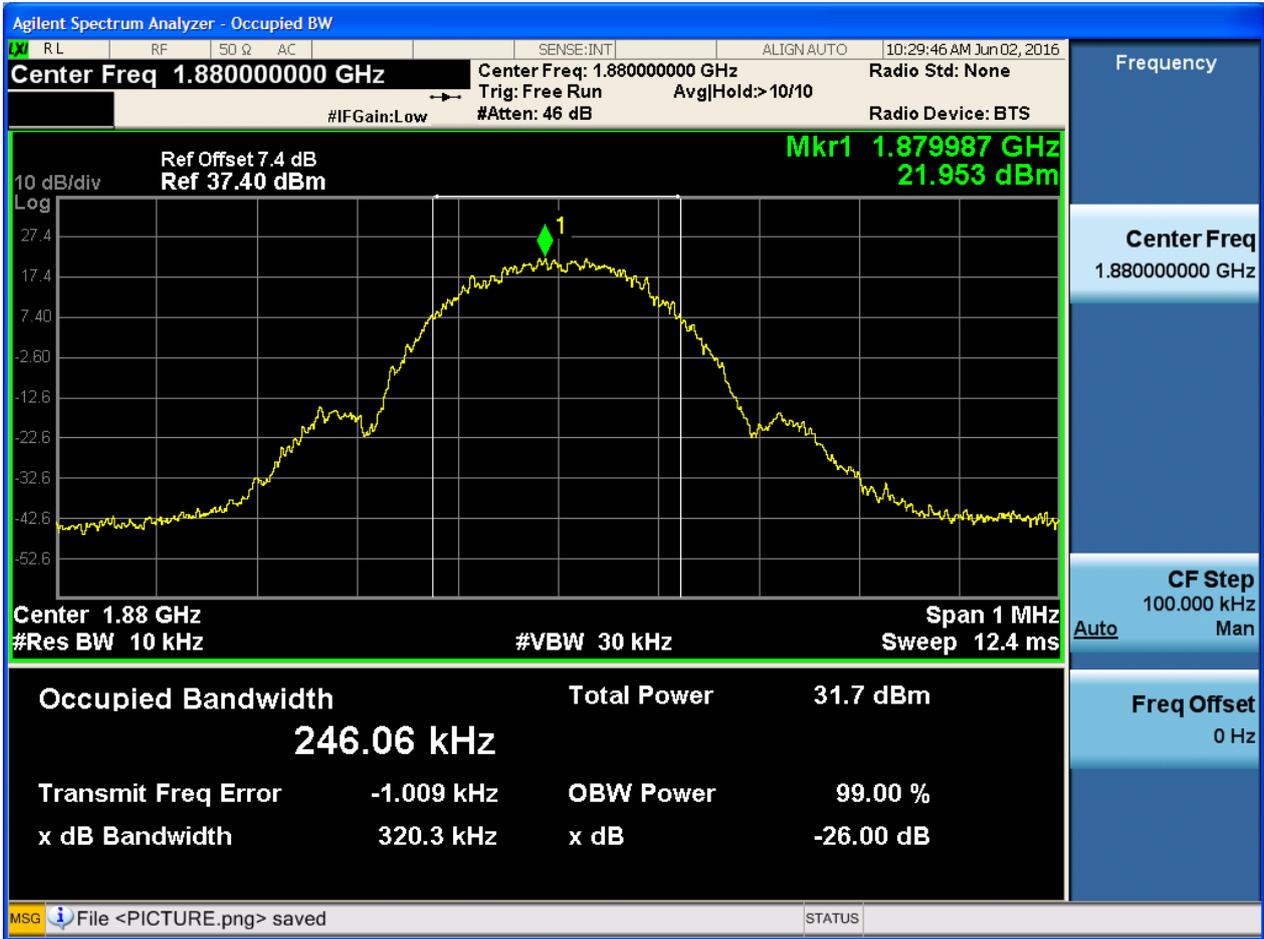
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



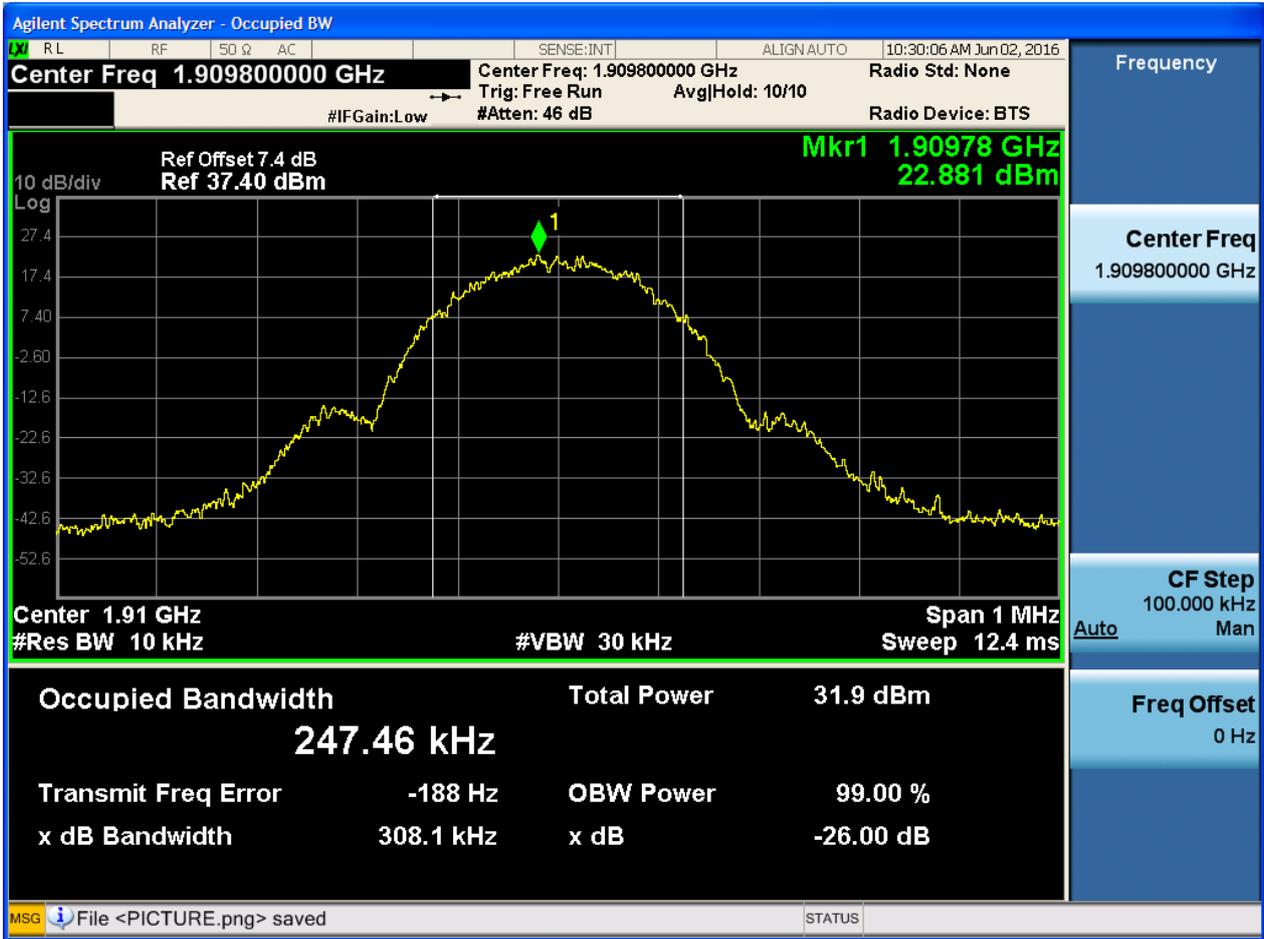


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

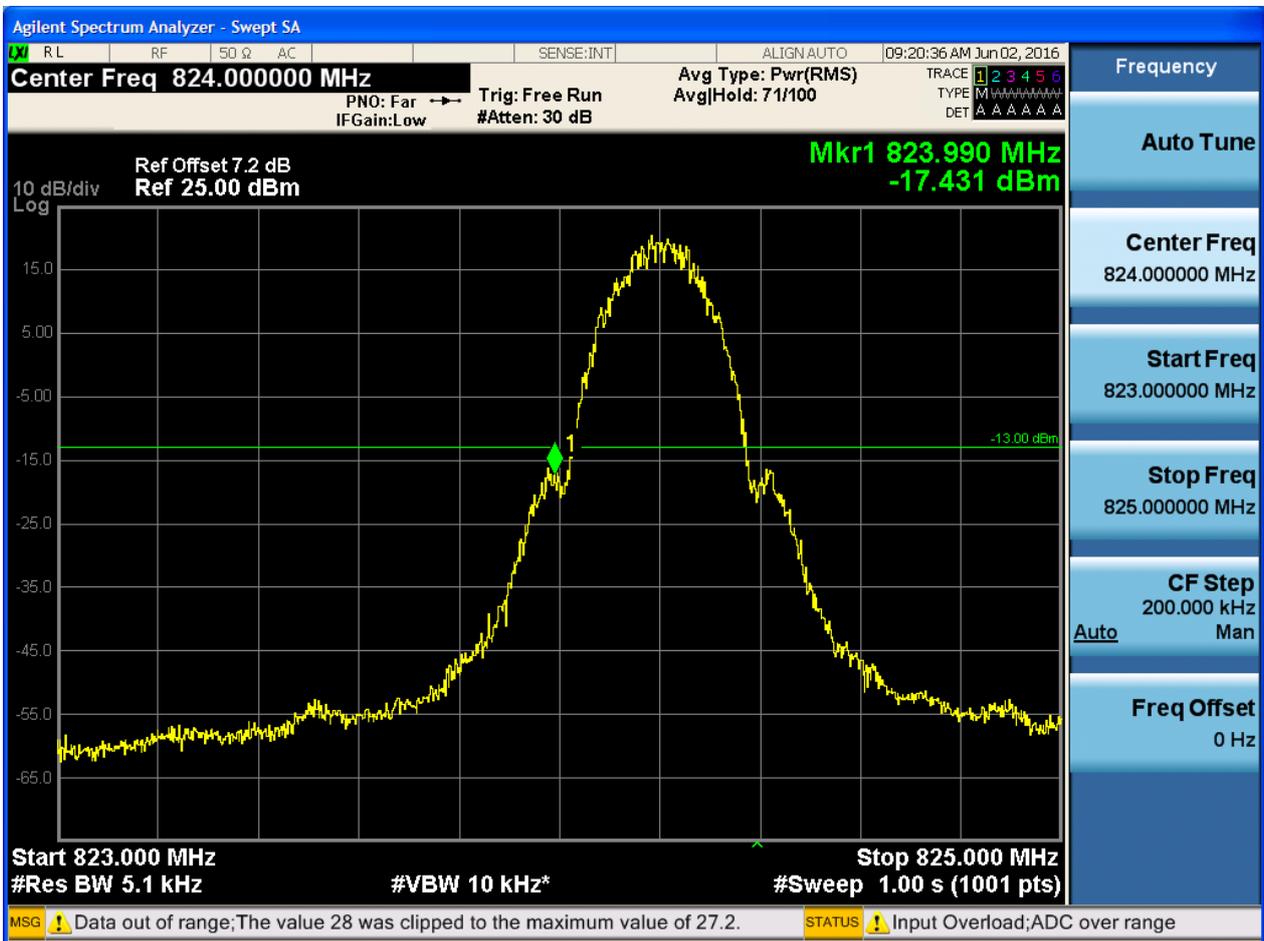
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

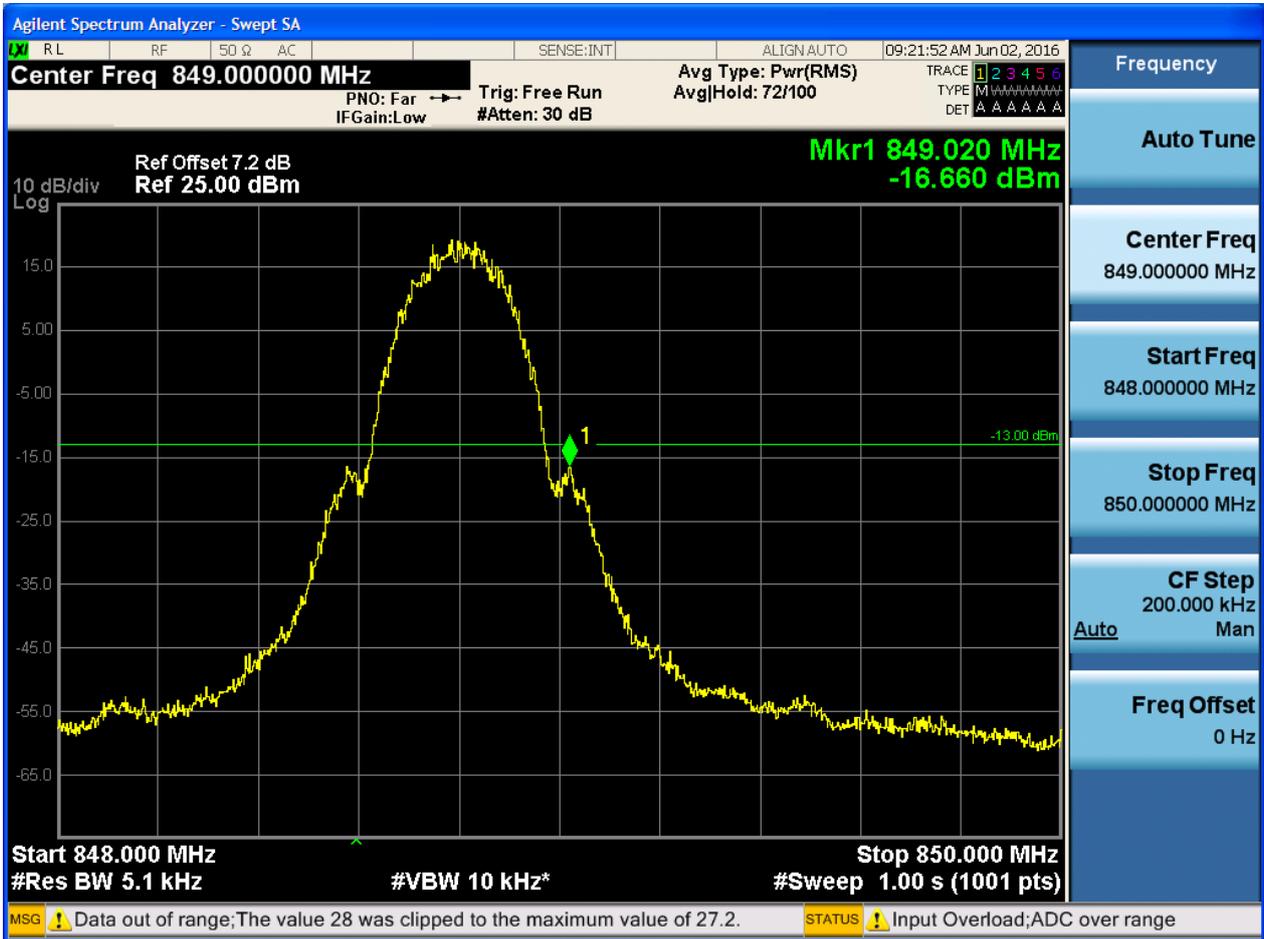
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





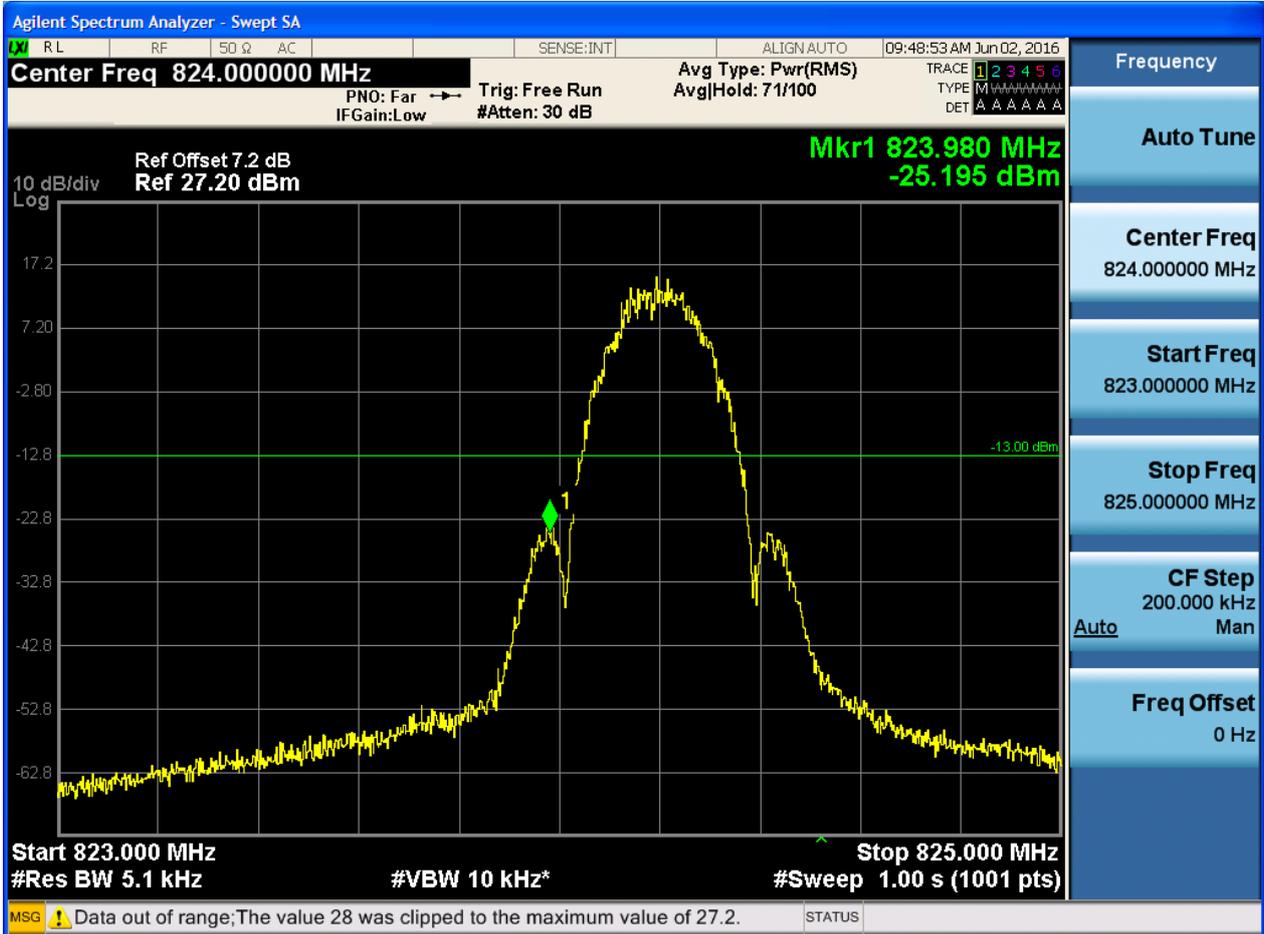
5.1.1.1.2 Test Channel = HCH





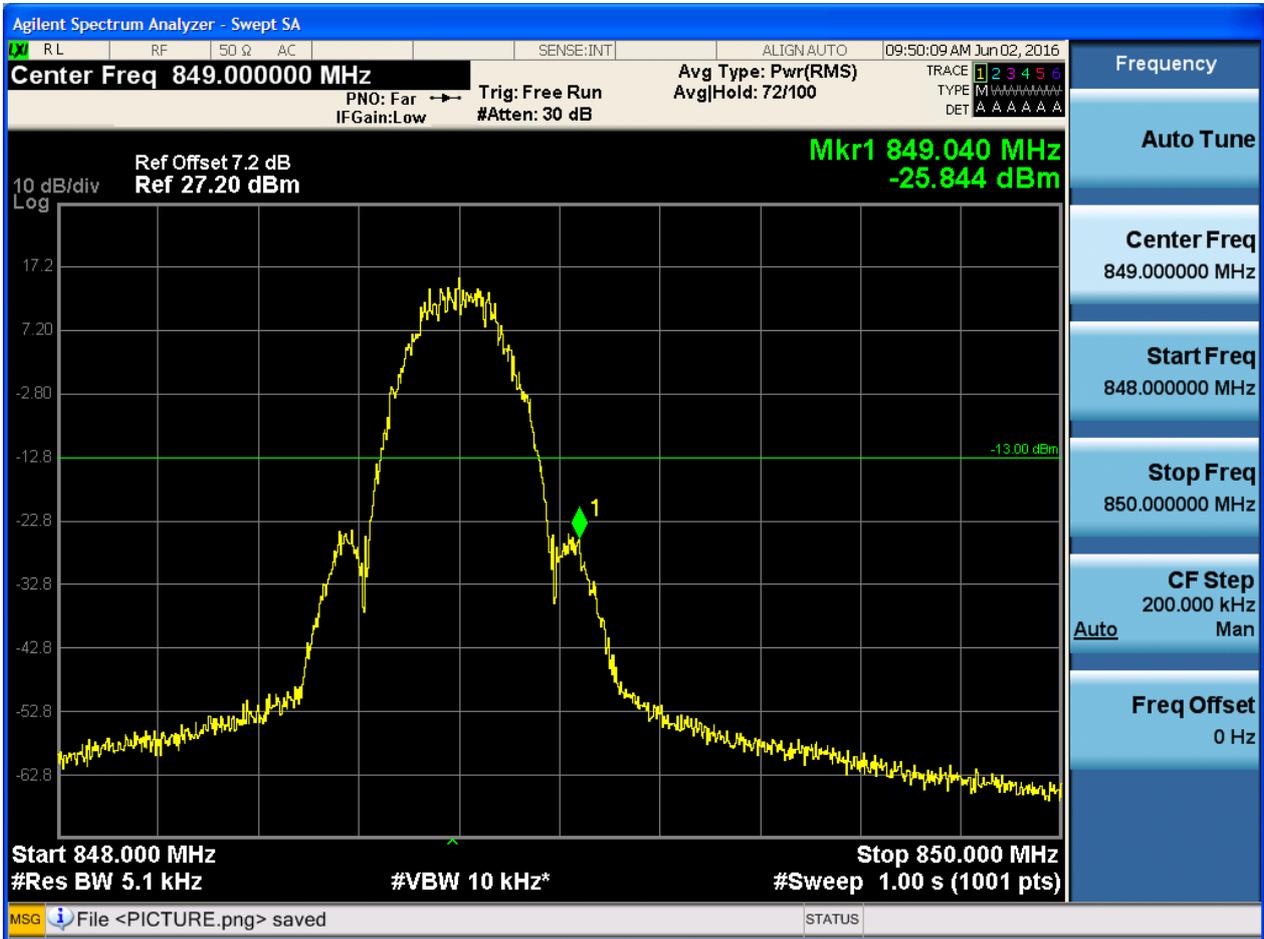
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5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

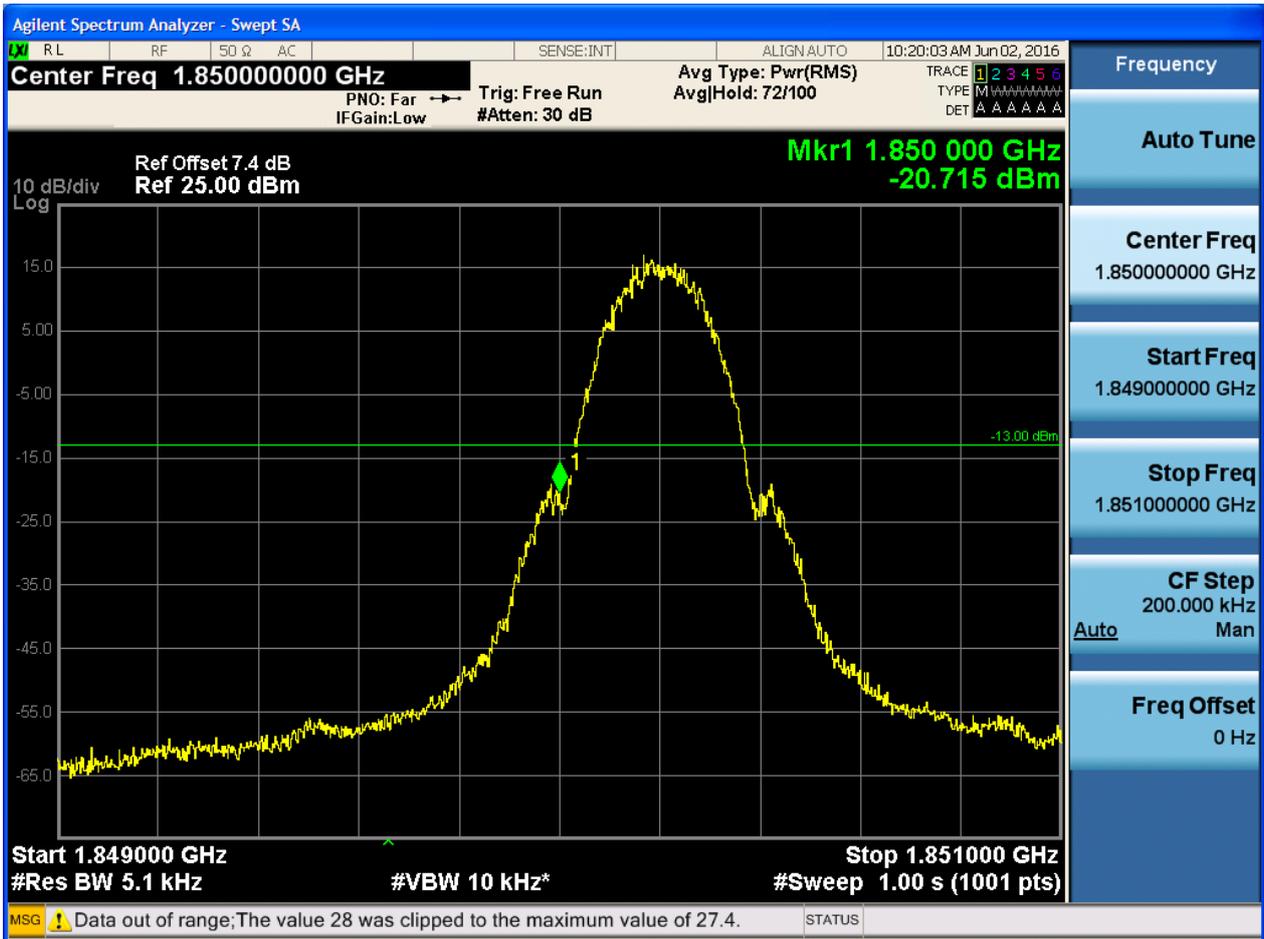




5.1.2 Test Band = GSM1900

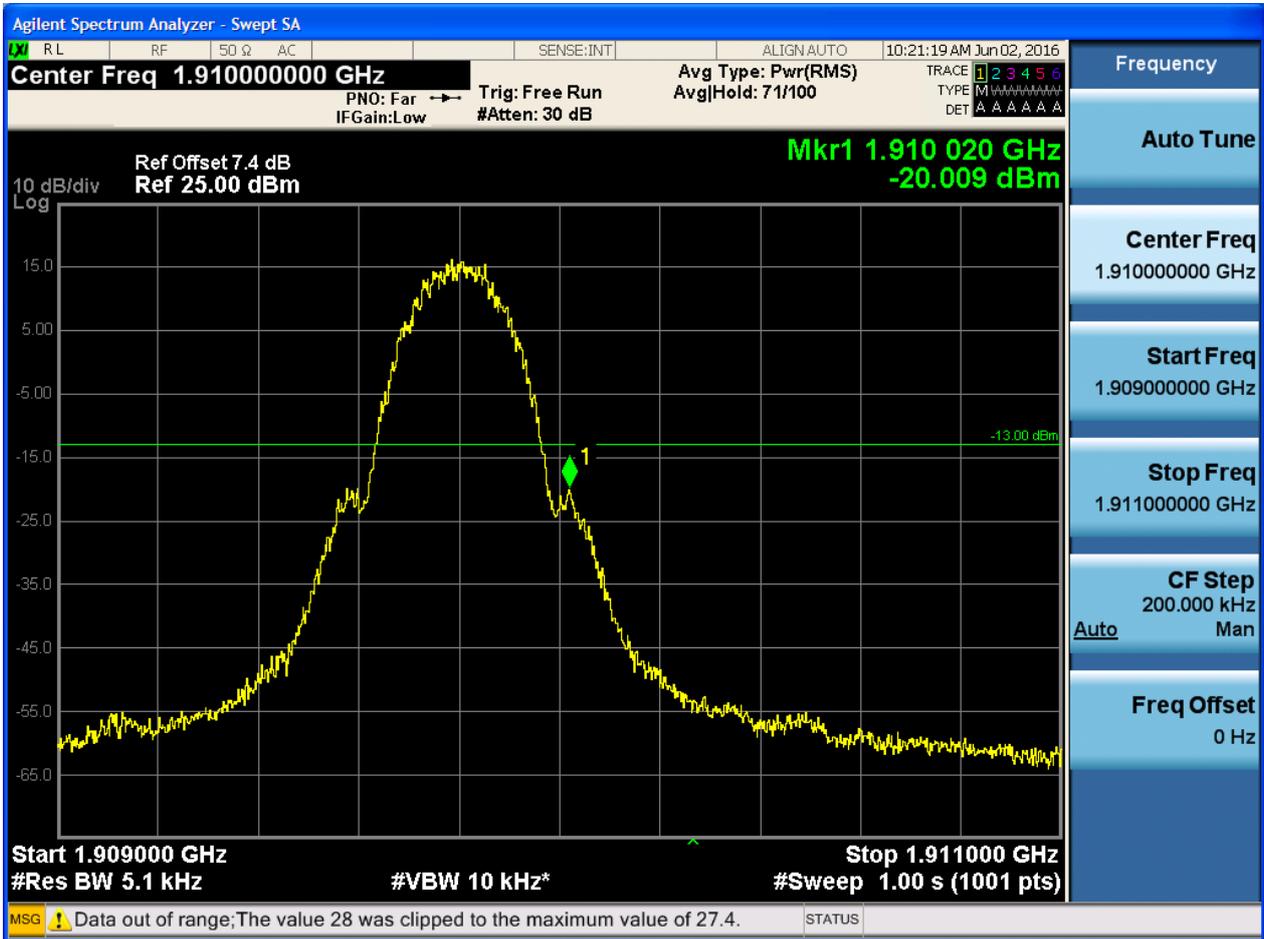
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





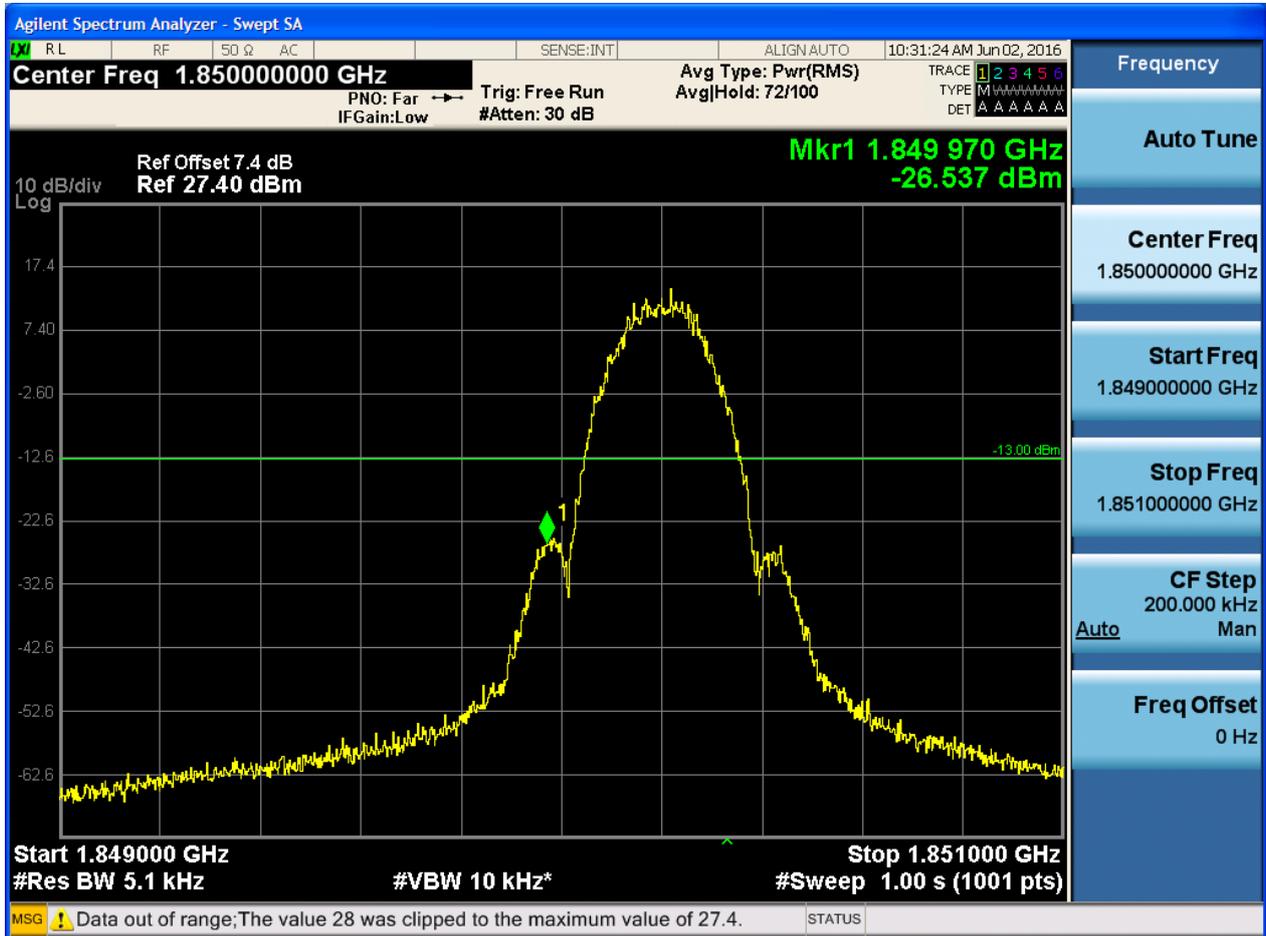
5.1.2.1.2 Test Channel = HCH





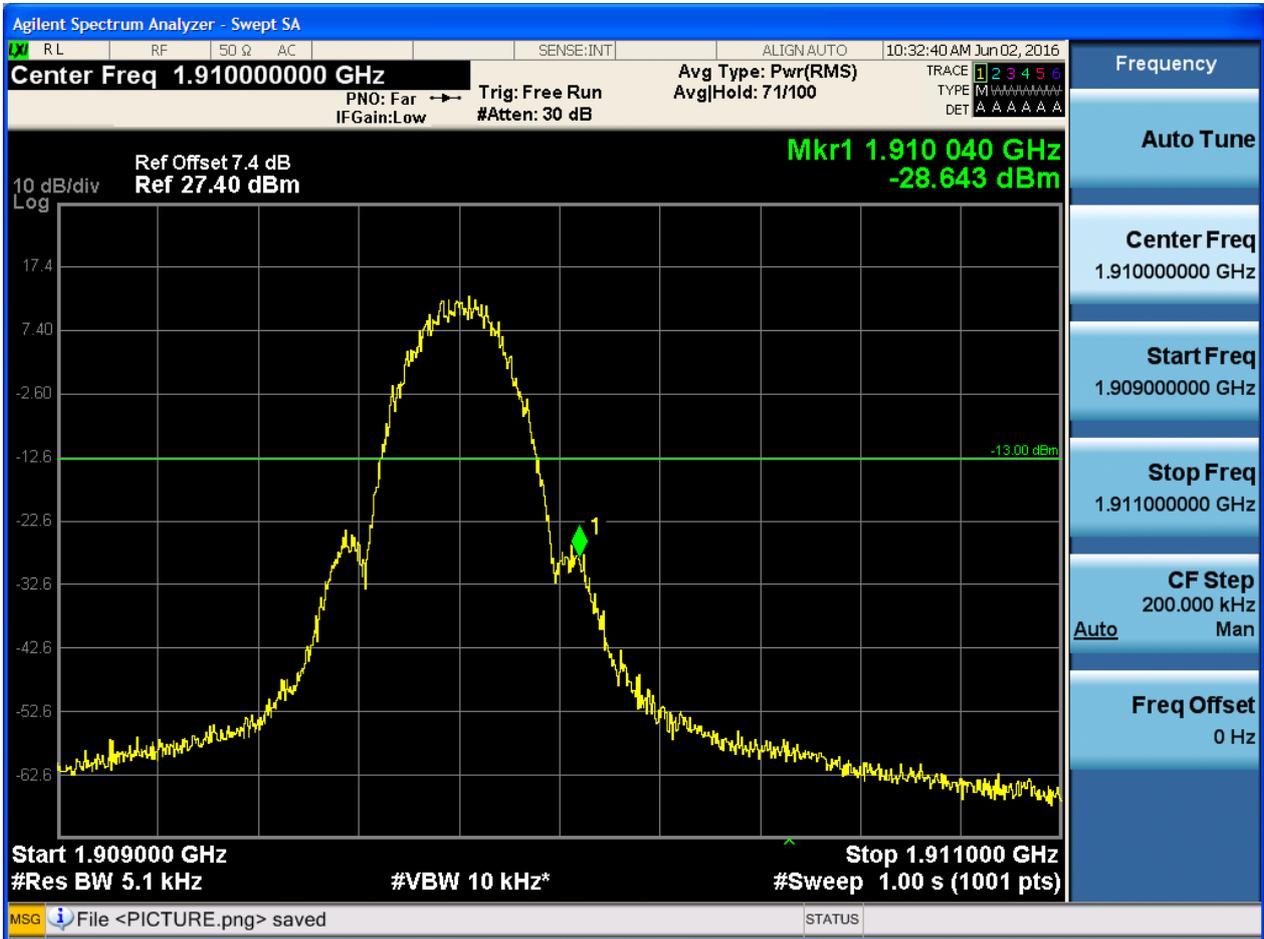
5.1.2.2 Test Mode = GSM/TM2

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

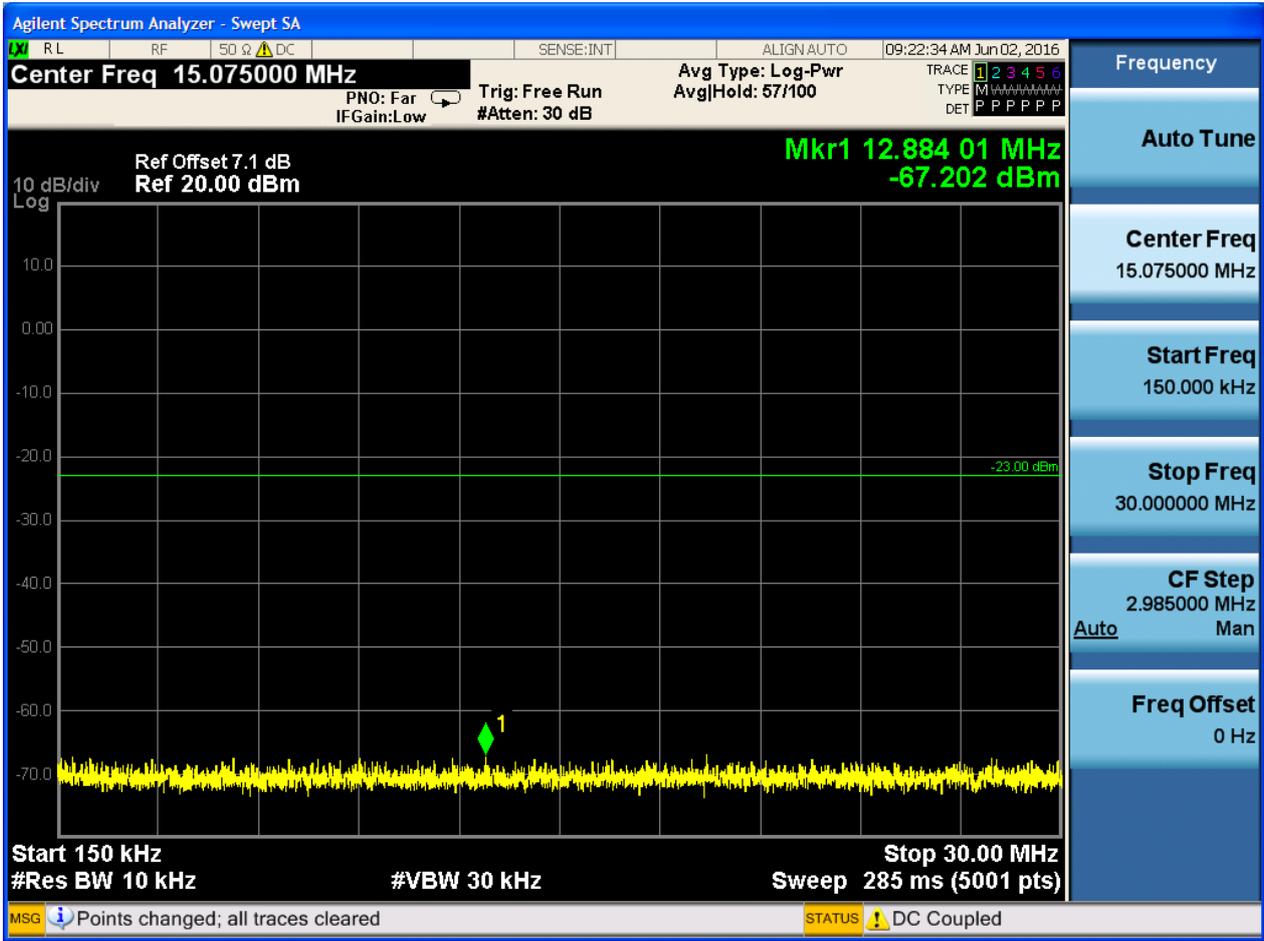
6.1 For GSM

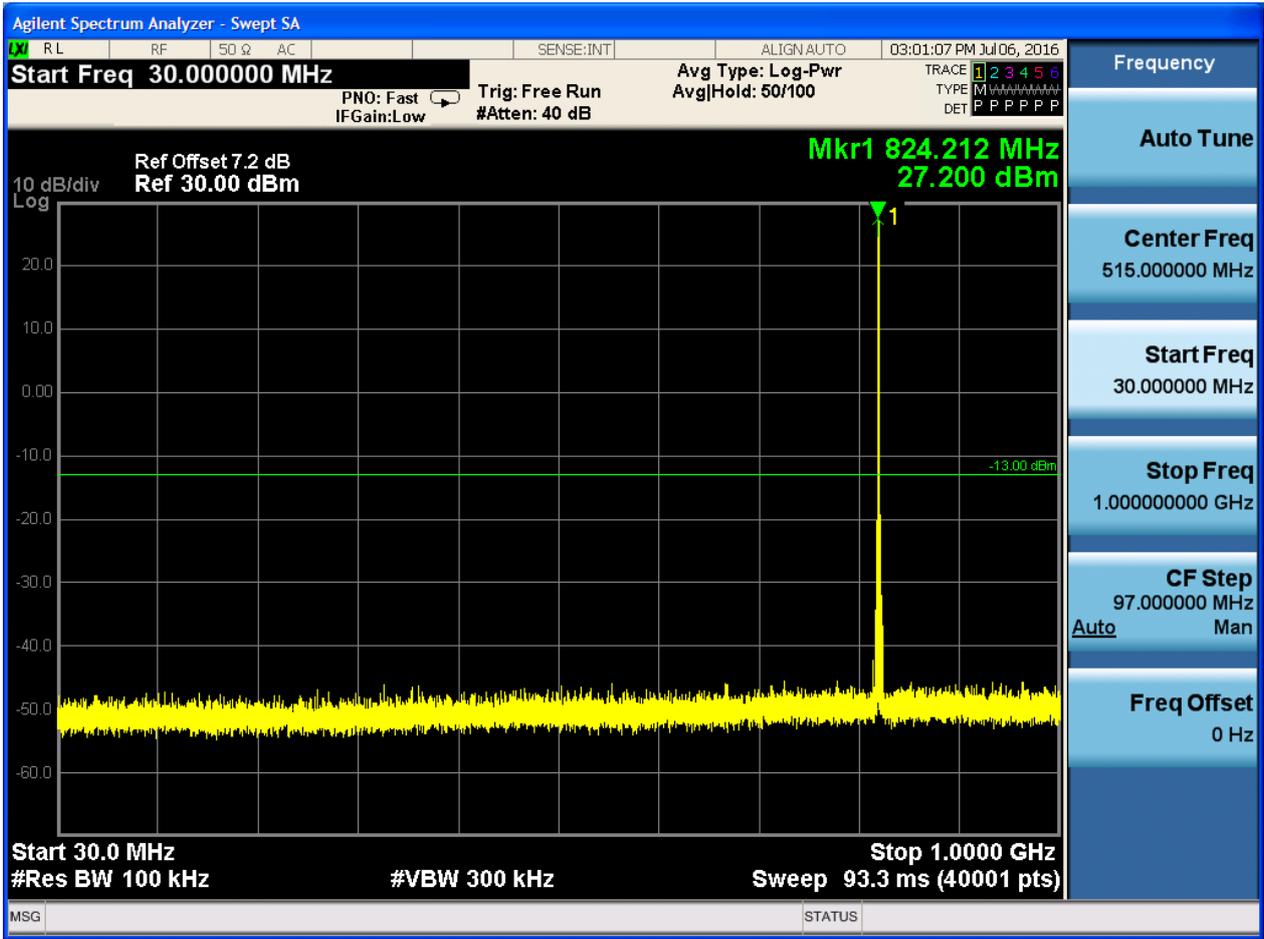
6.1.1 Test Band = GSM850

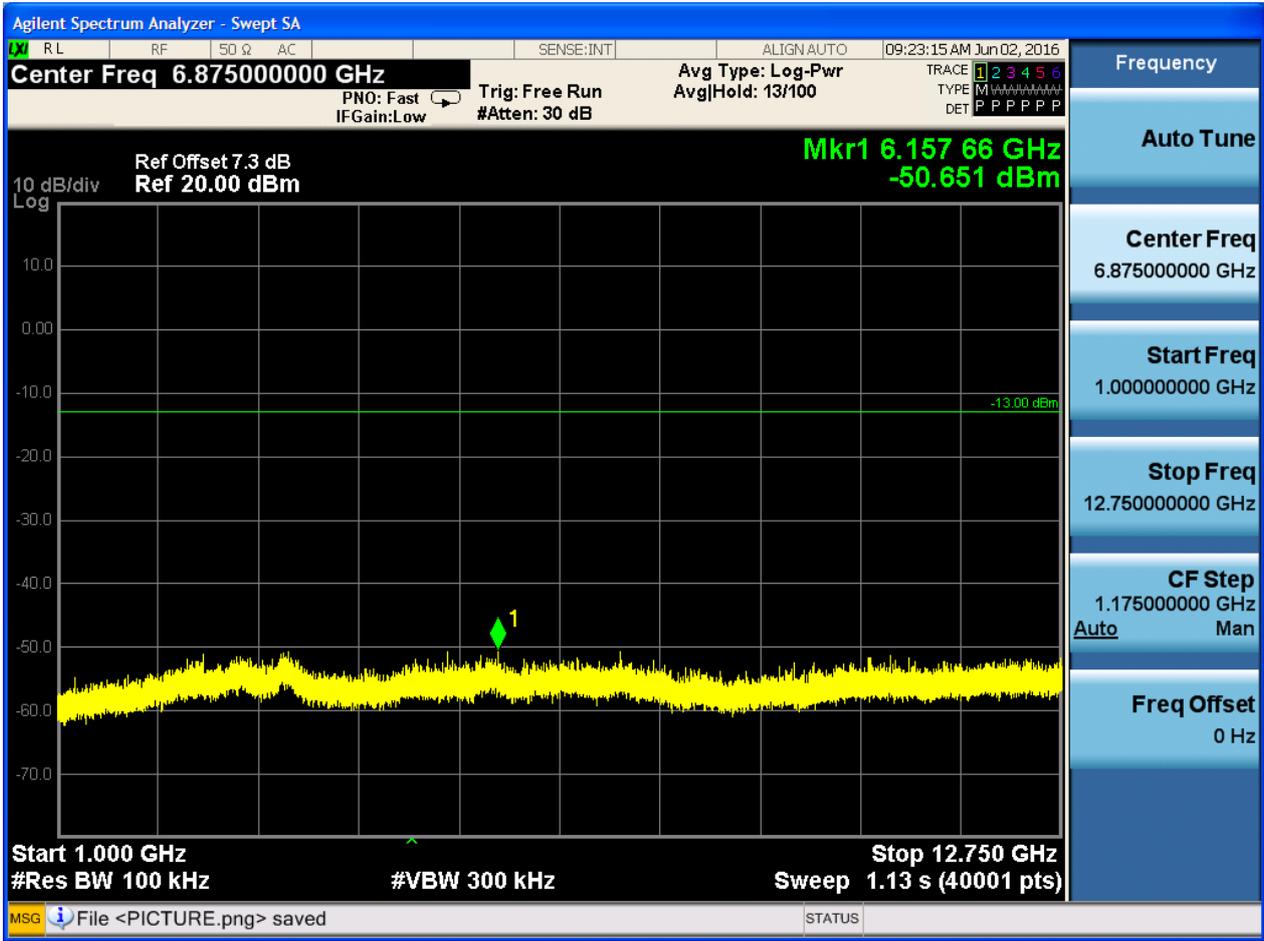
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



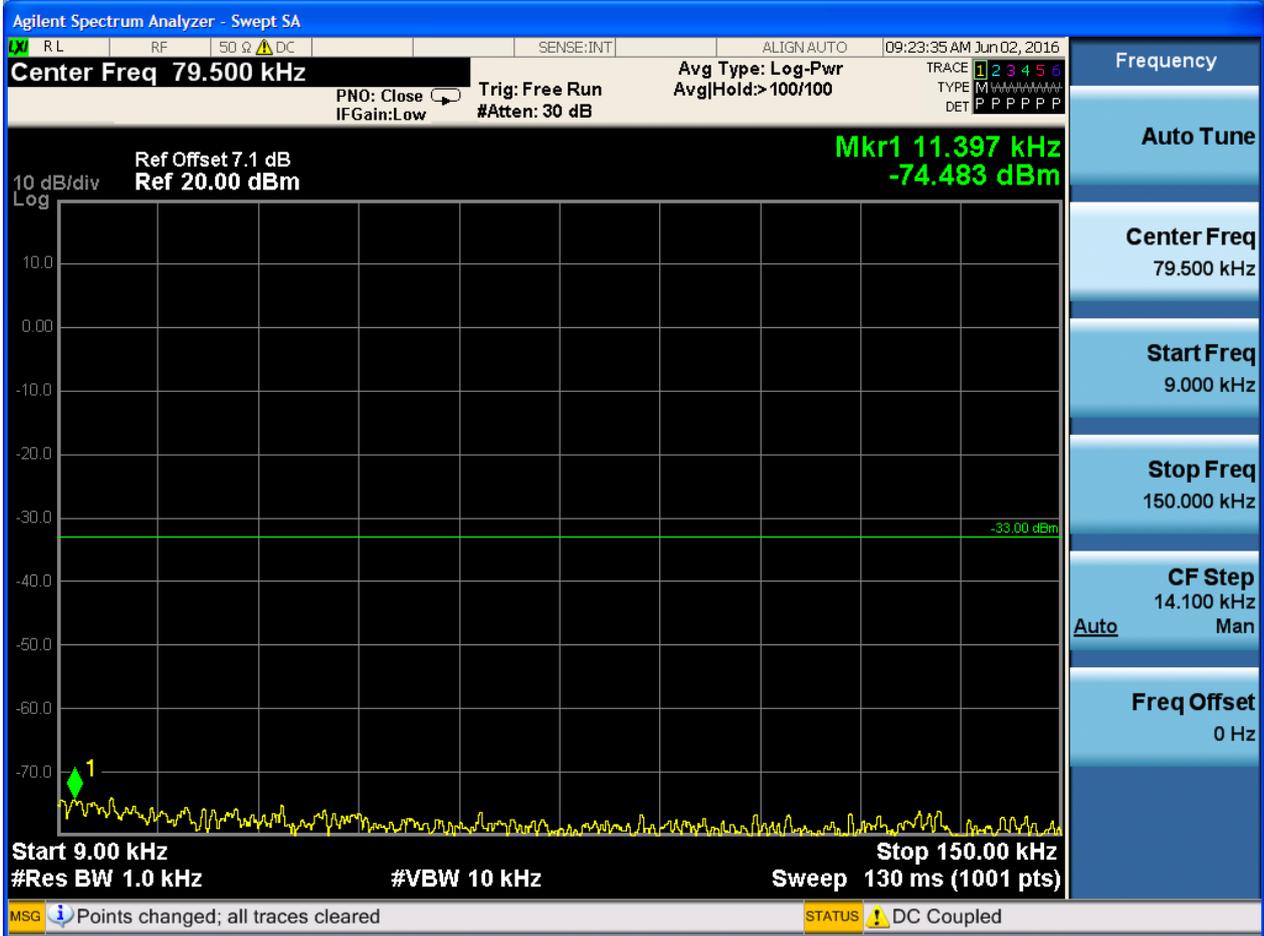


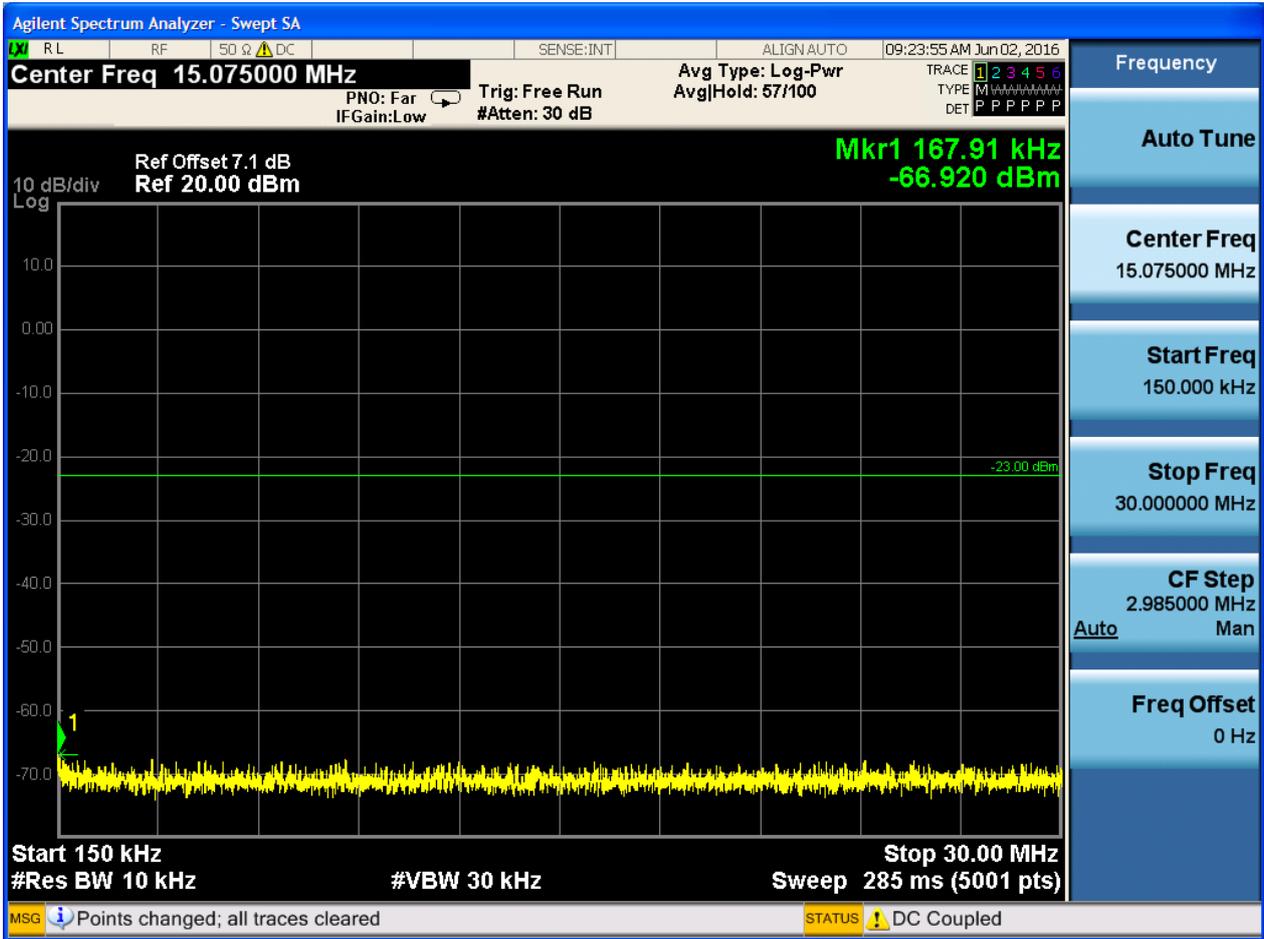


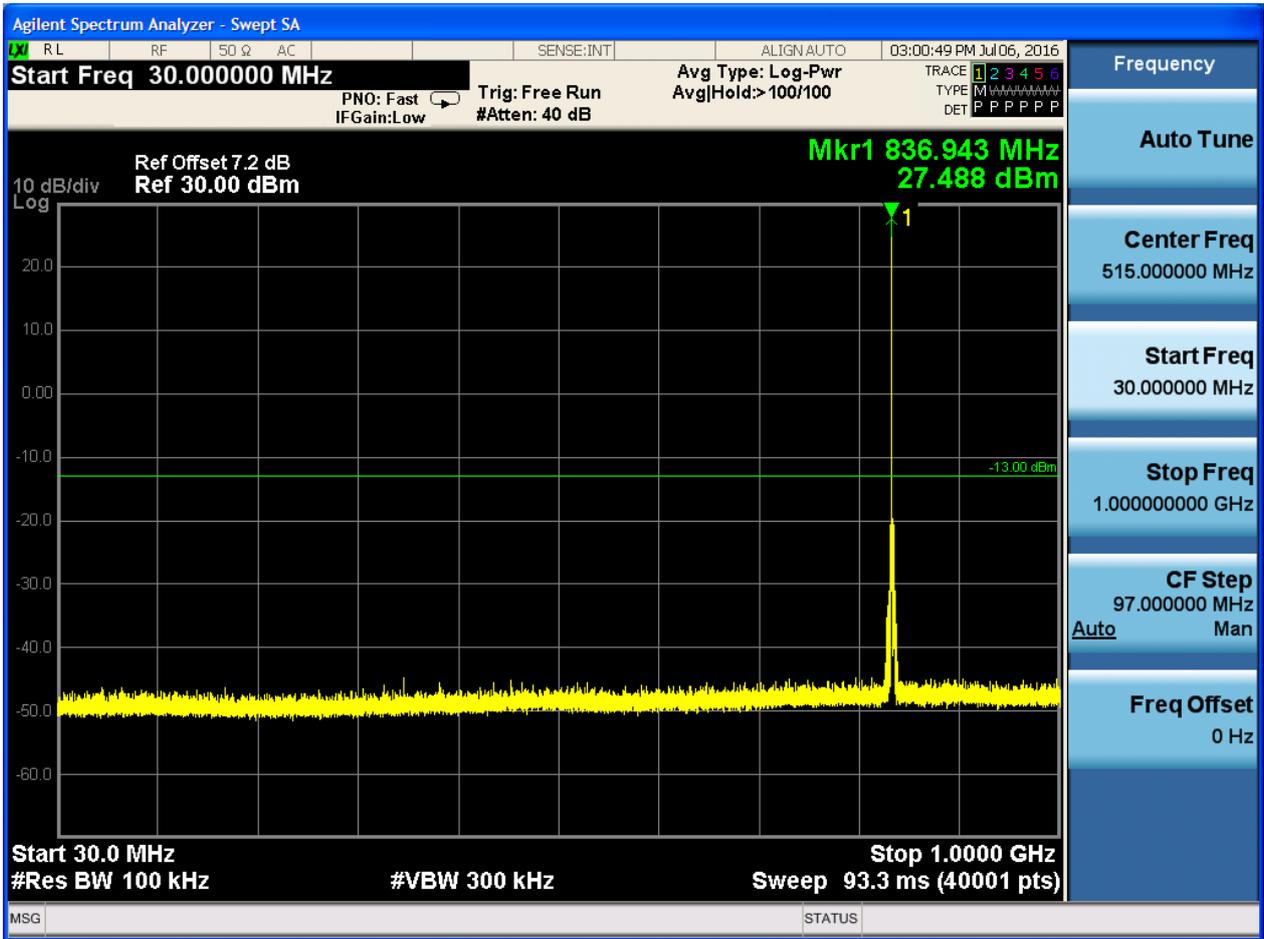


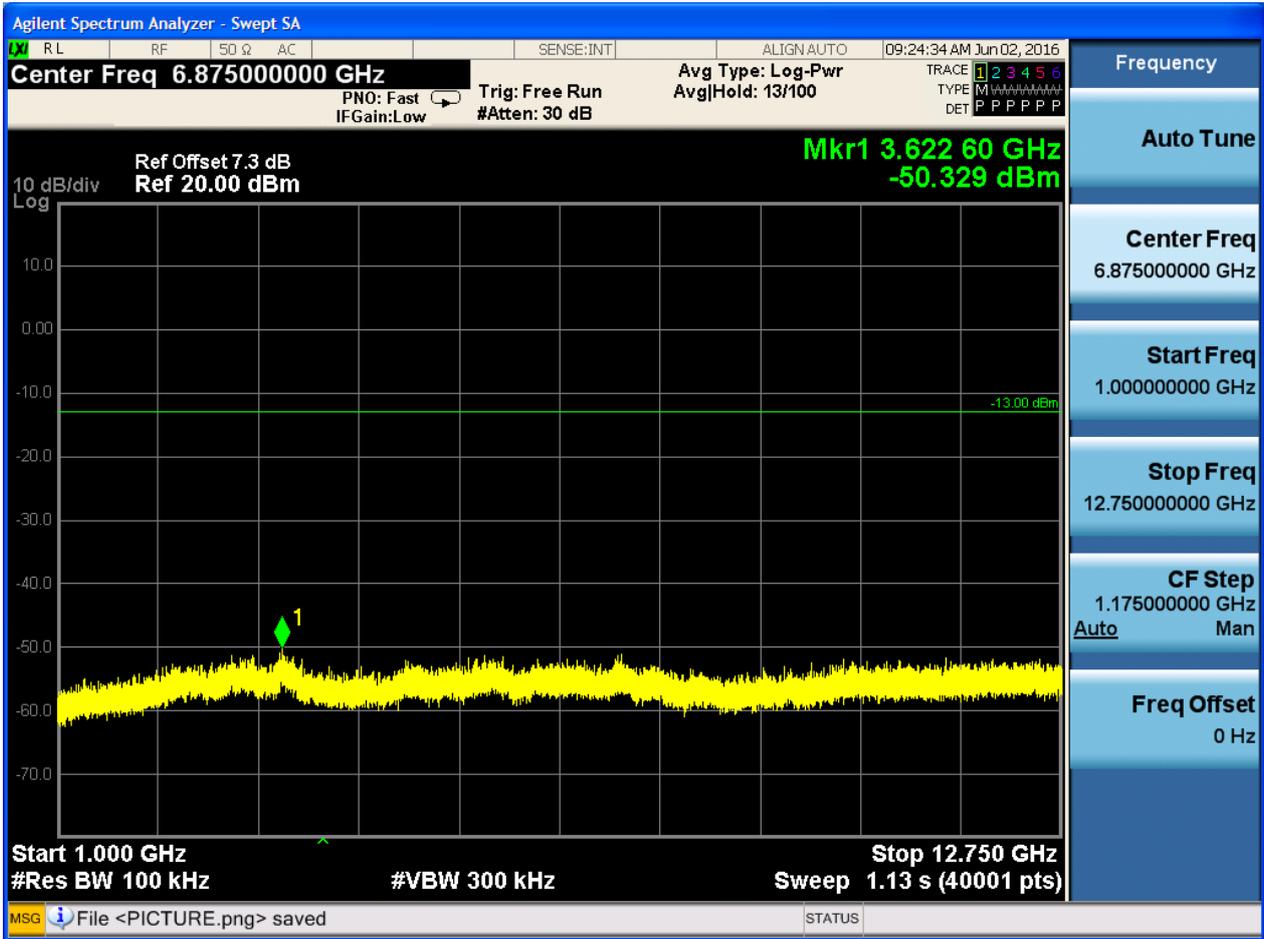


6.1.1.1.2 Test Channel = MCH



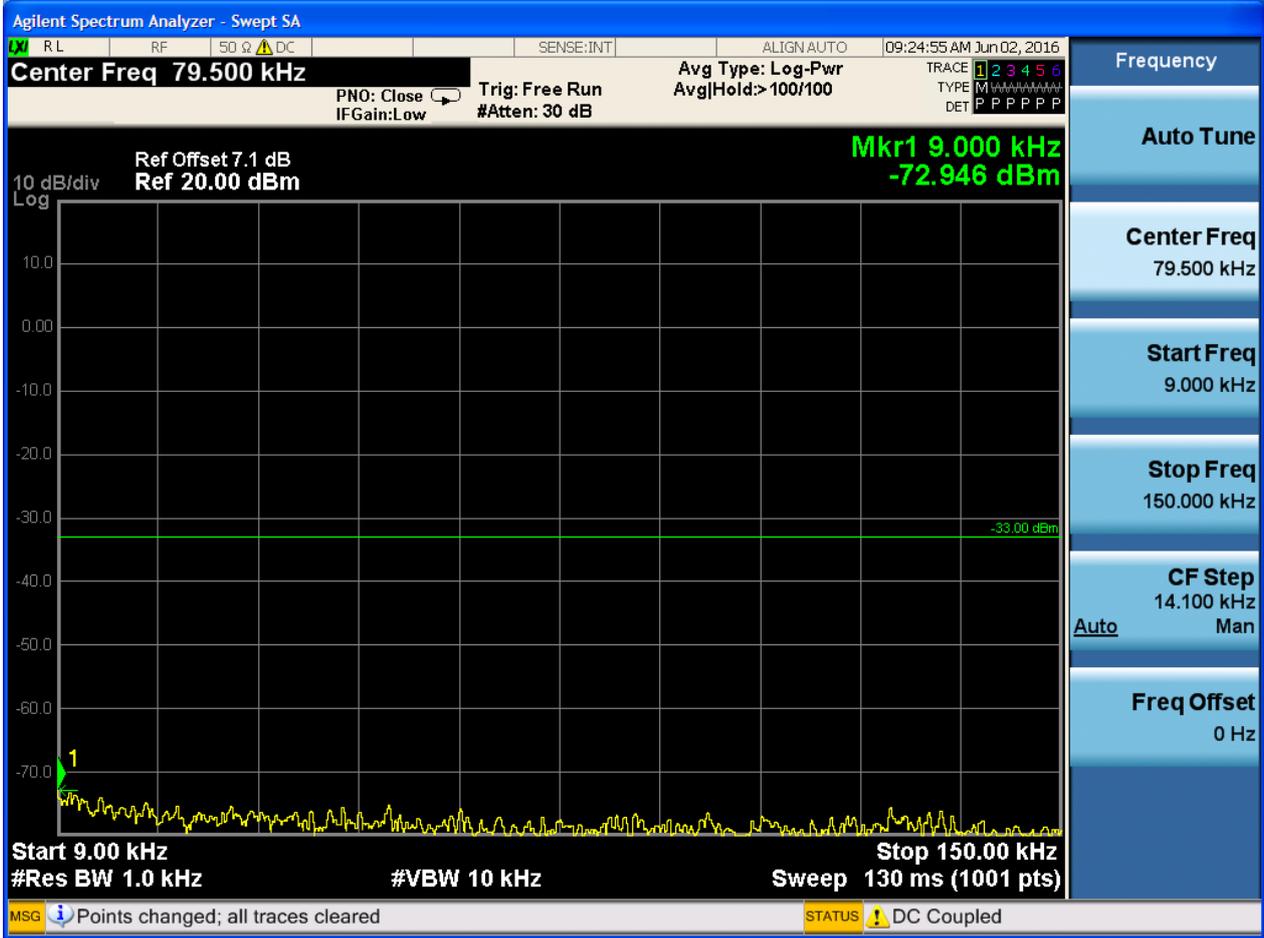


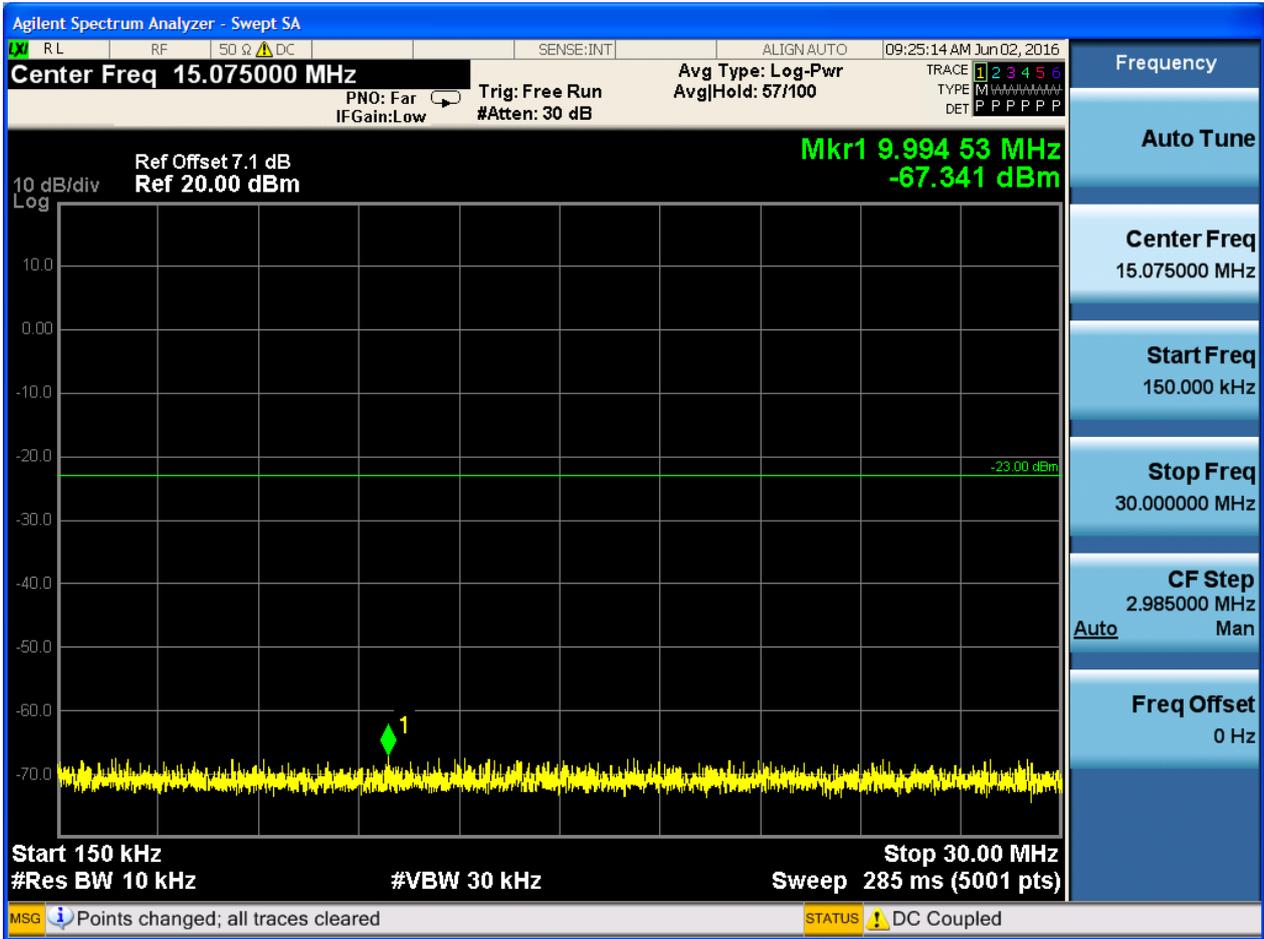


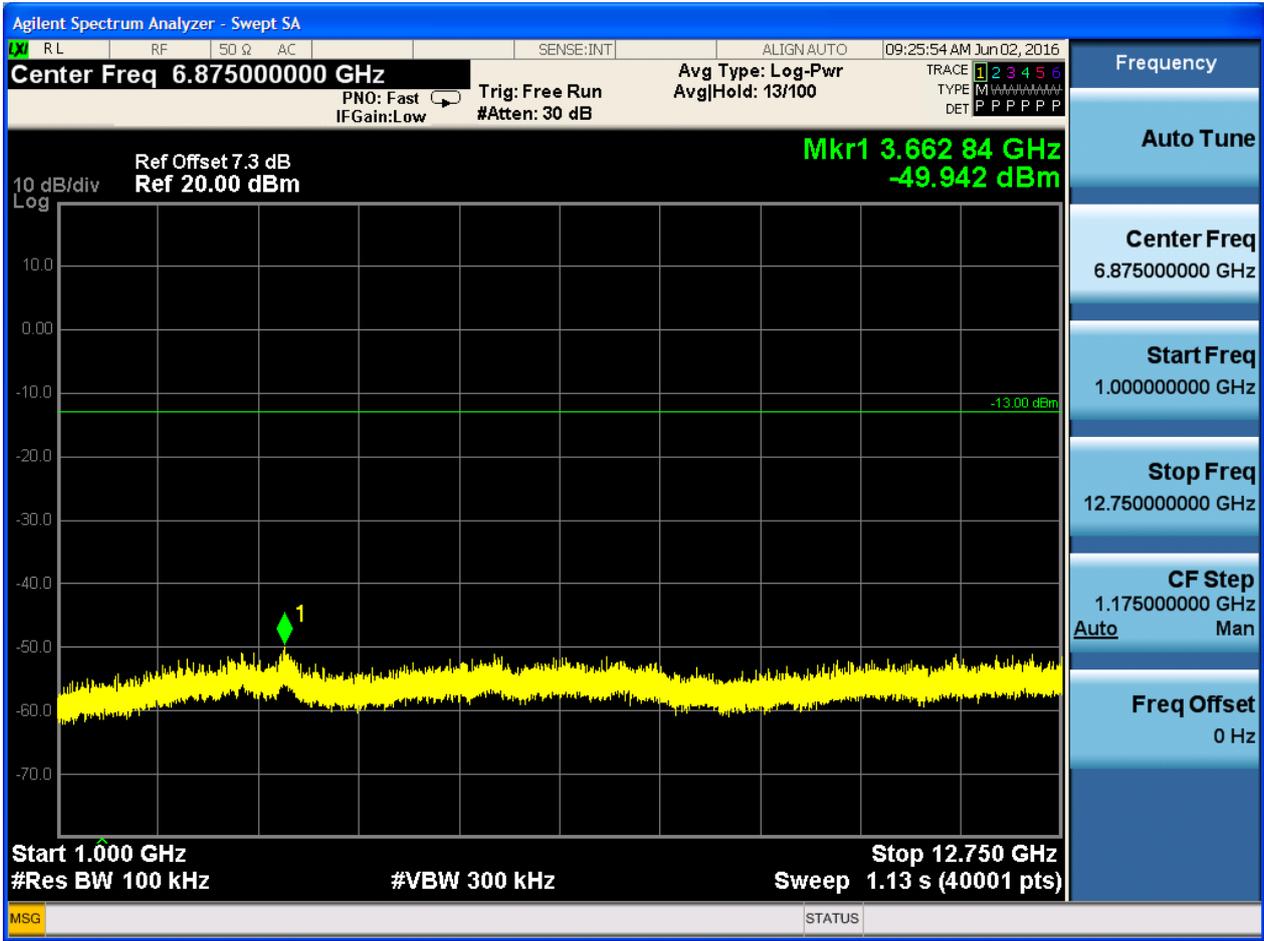




6.1.1.1.3 Test Channel = HCH



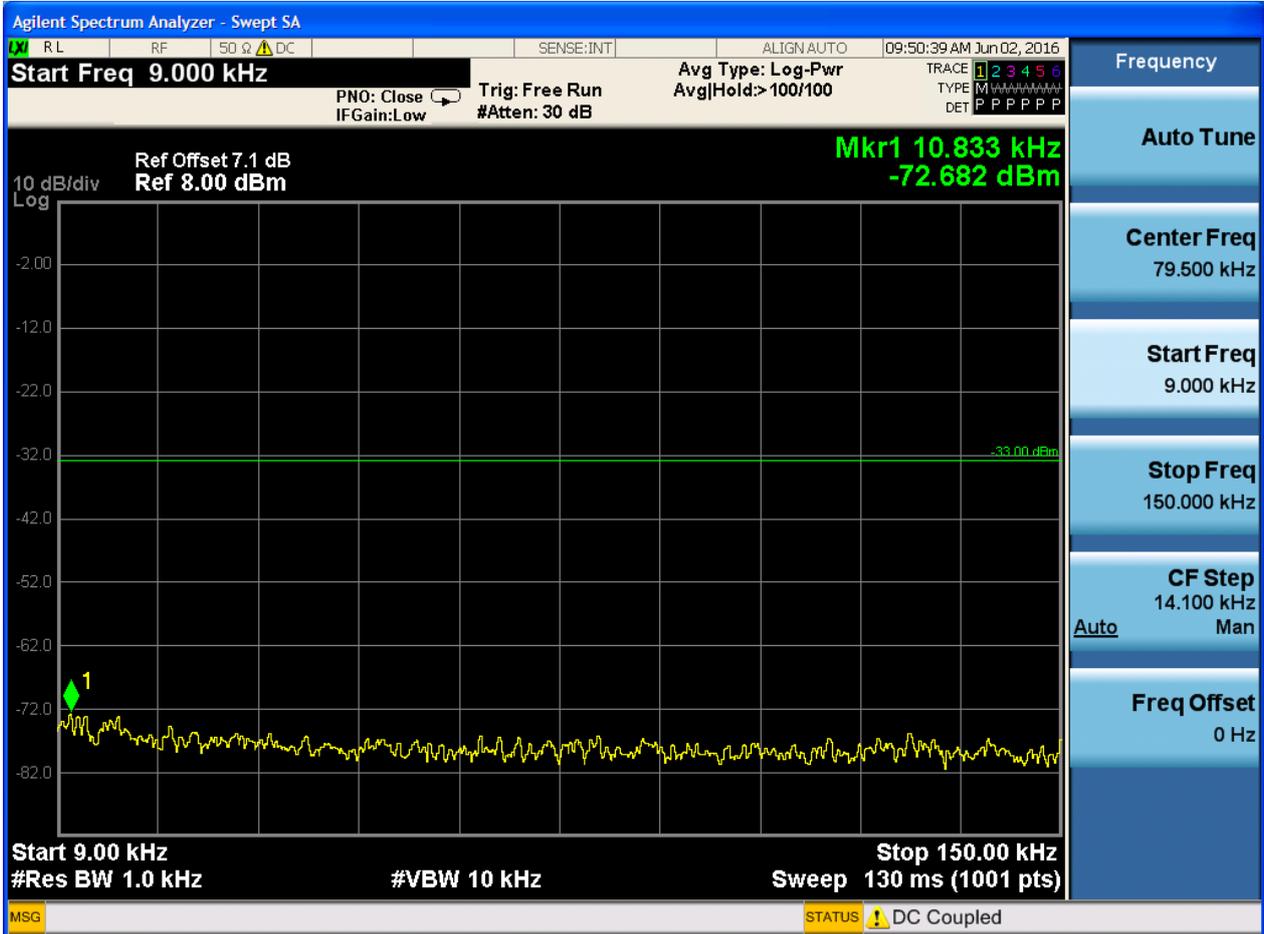


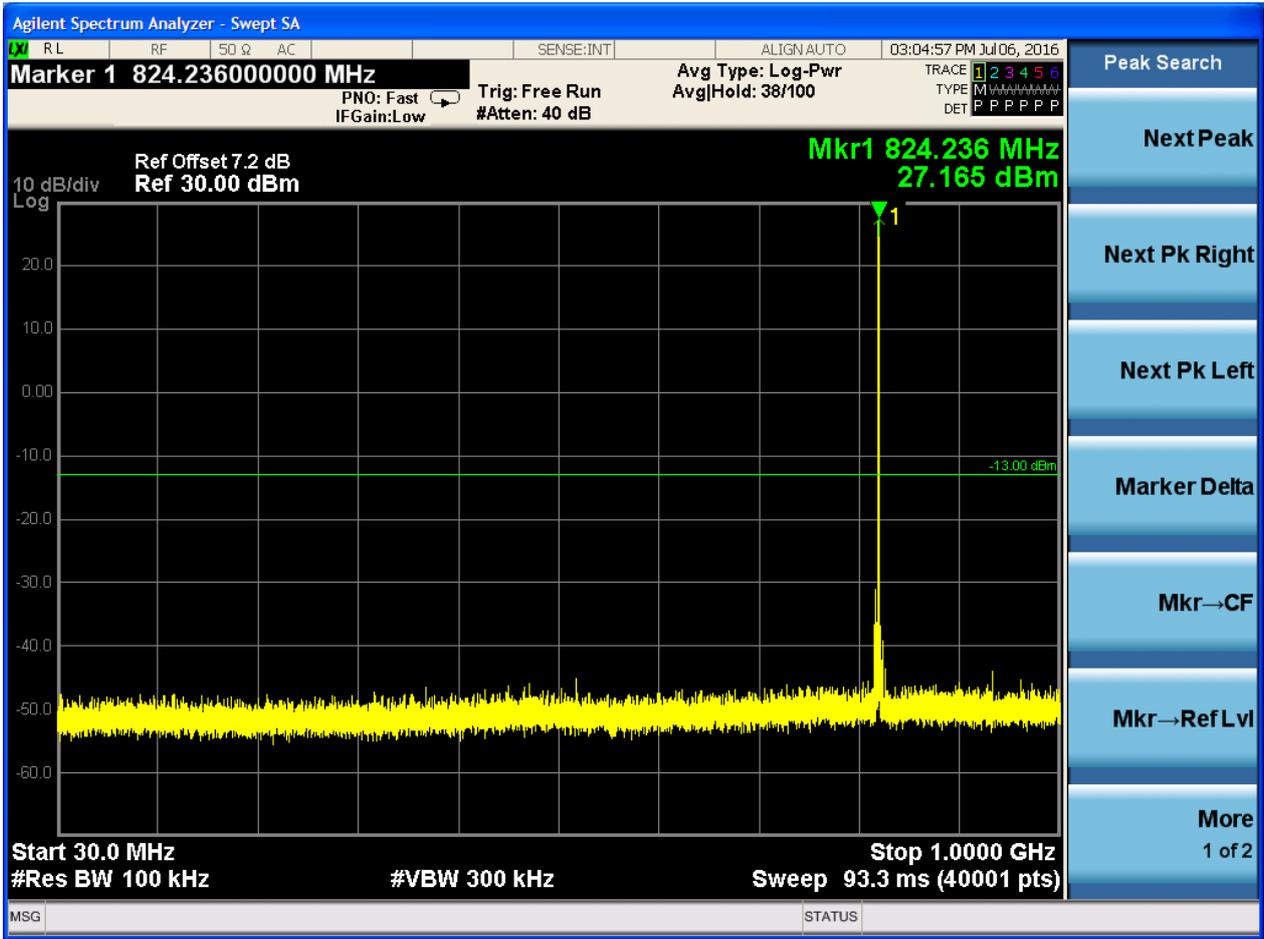


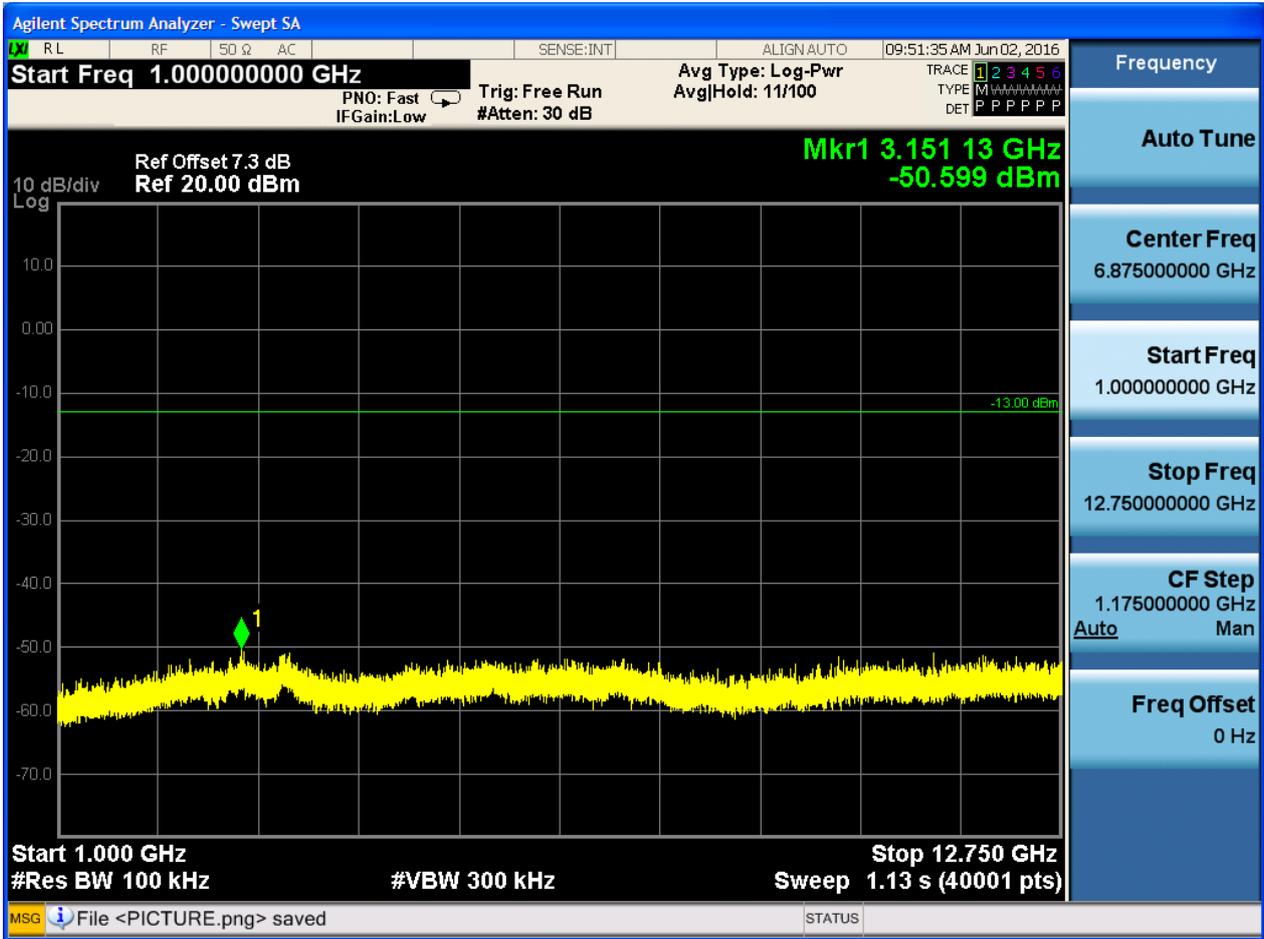


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

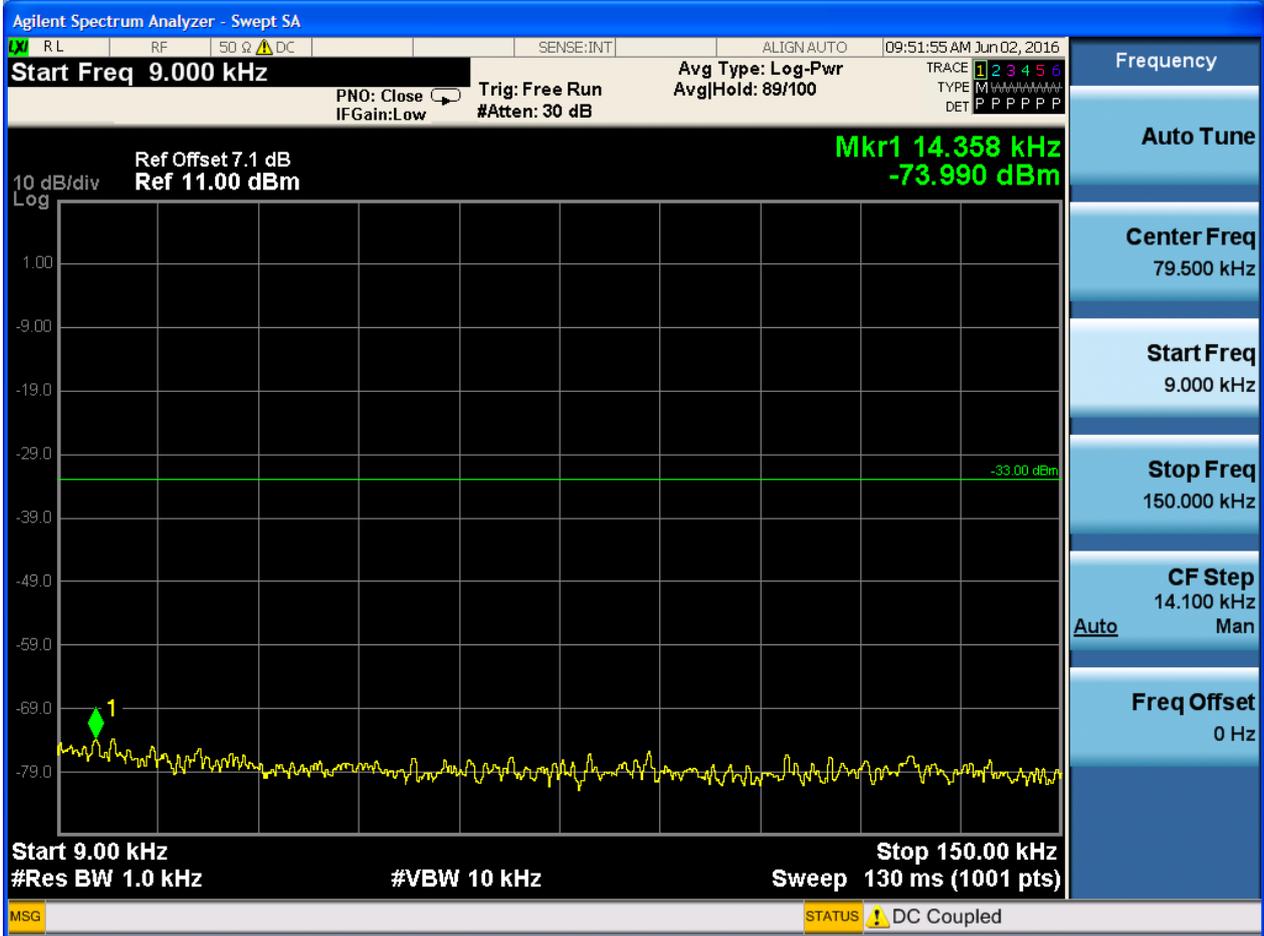


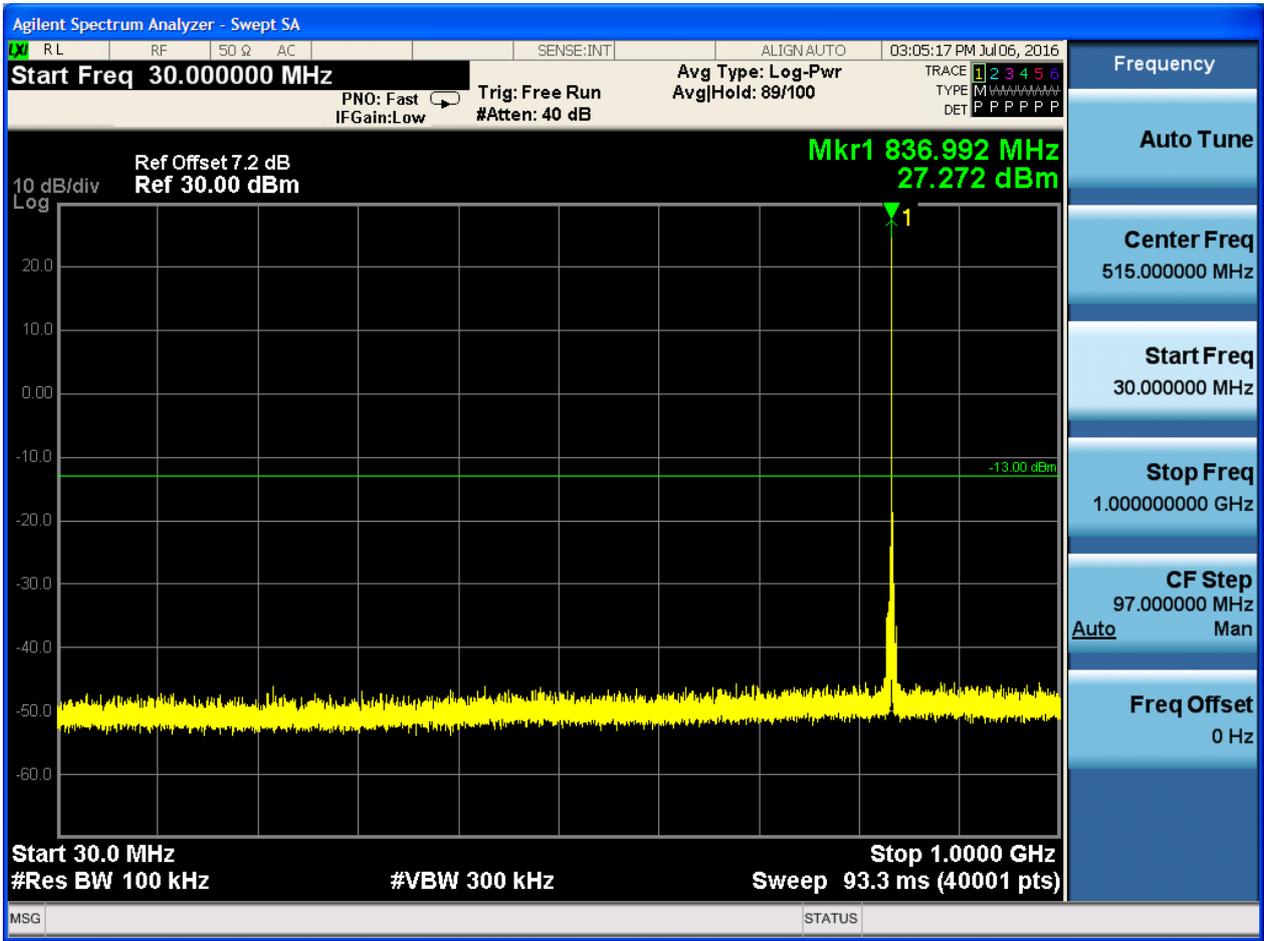


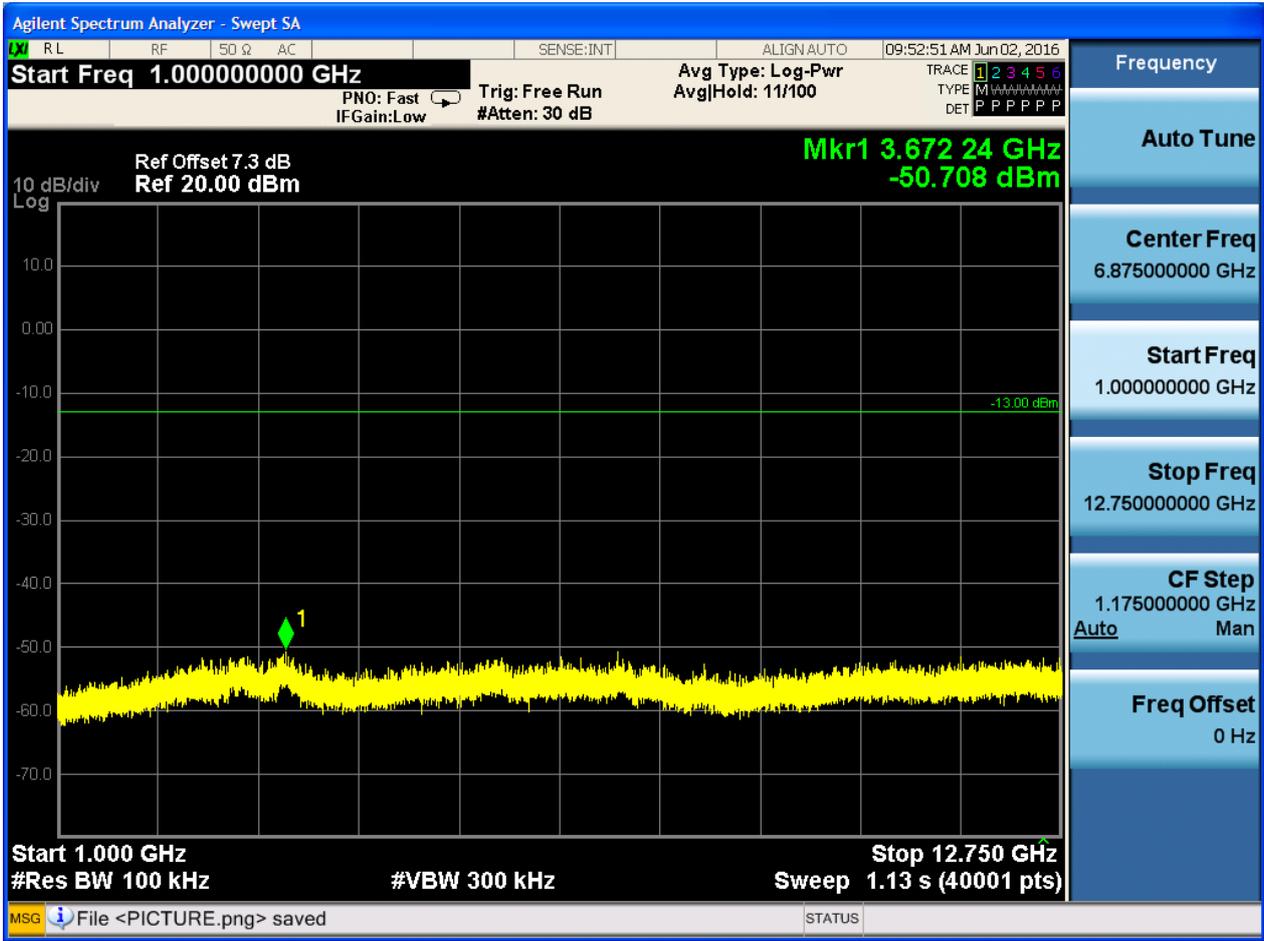




6.1.1.2.2 Test Channel = MCH

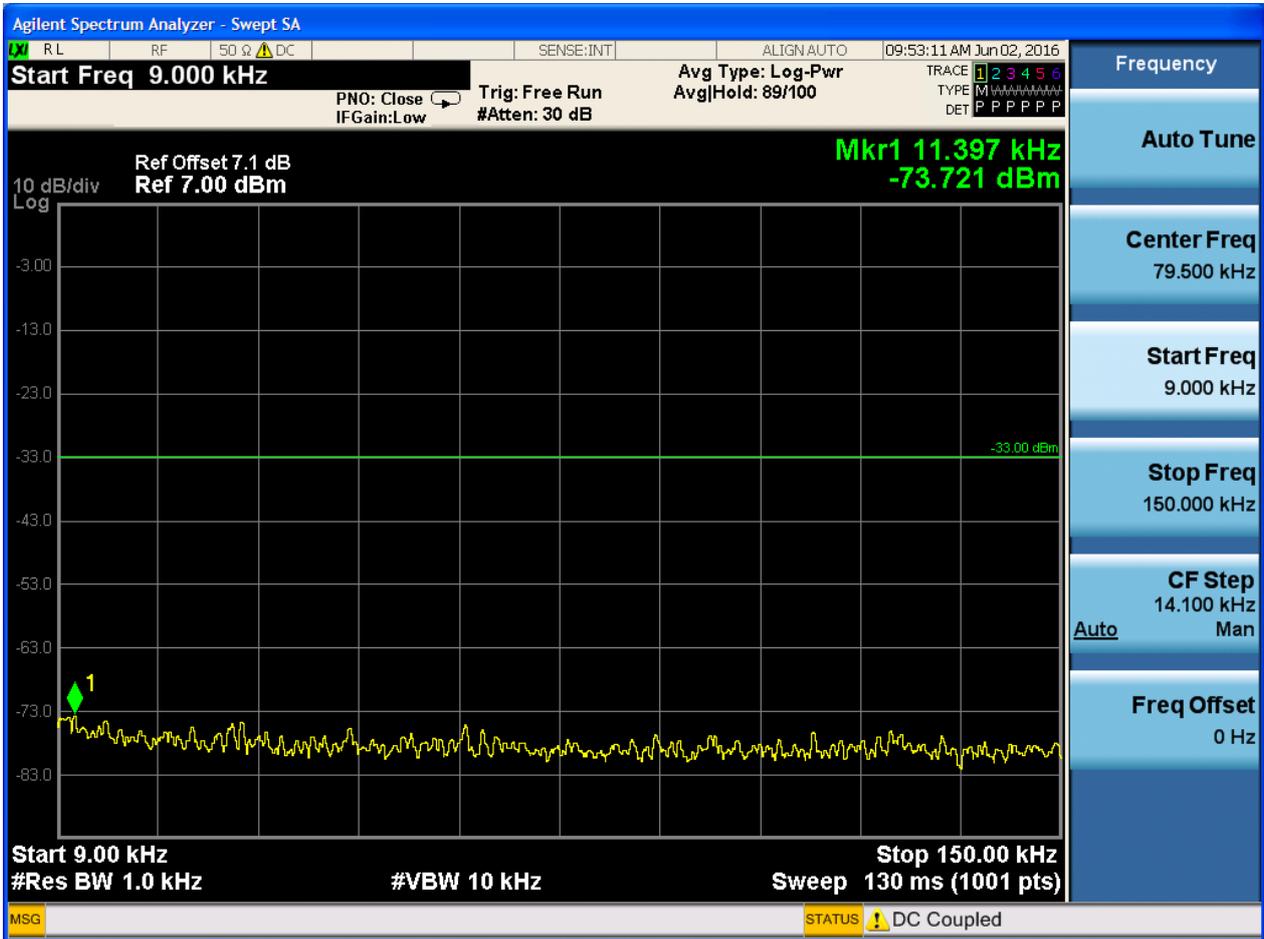


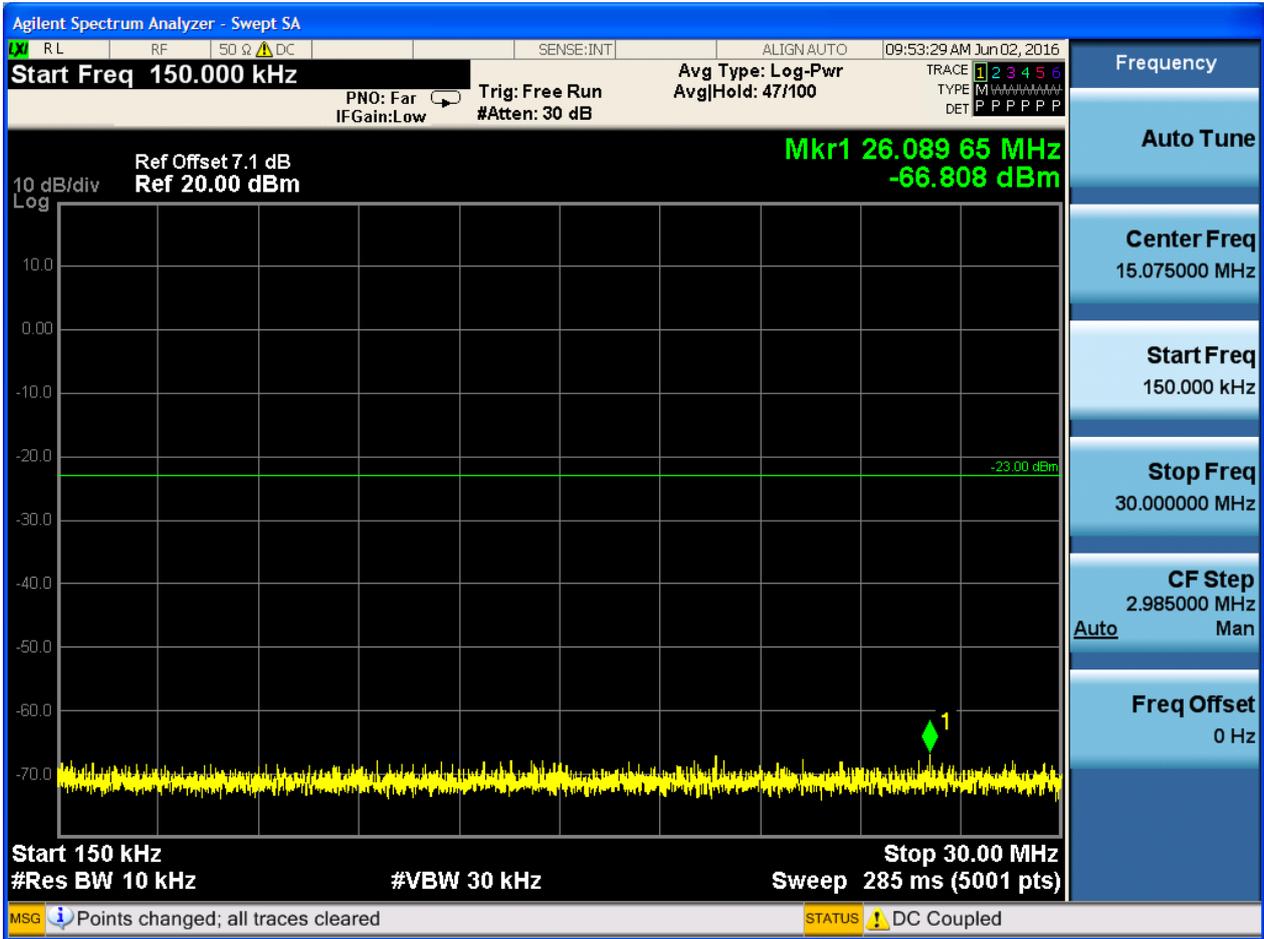


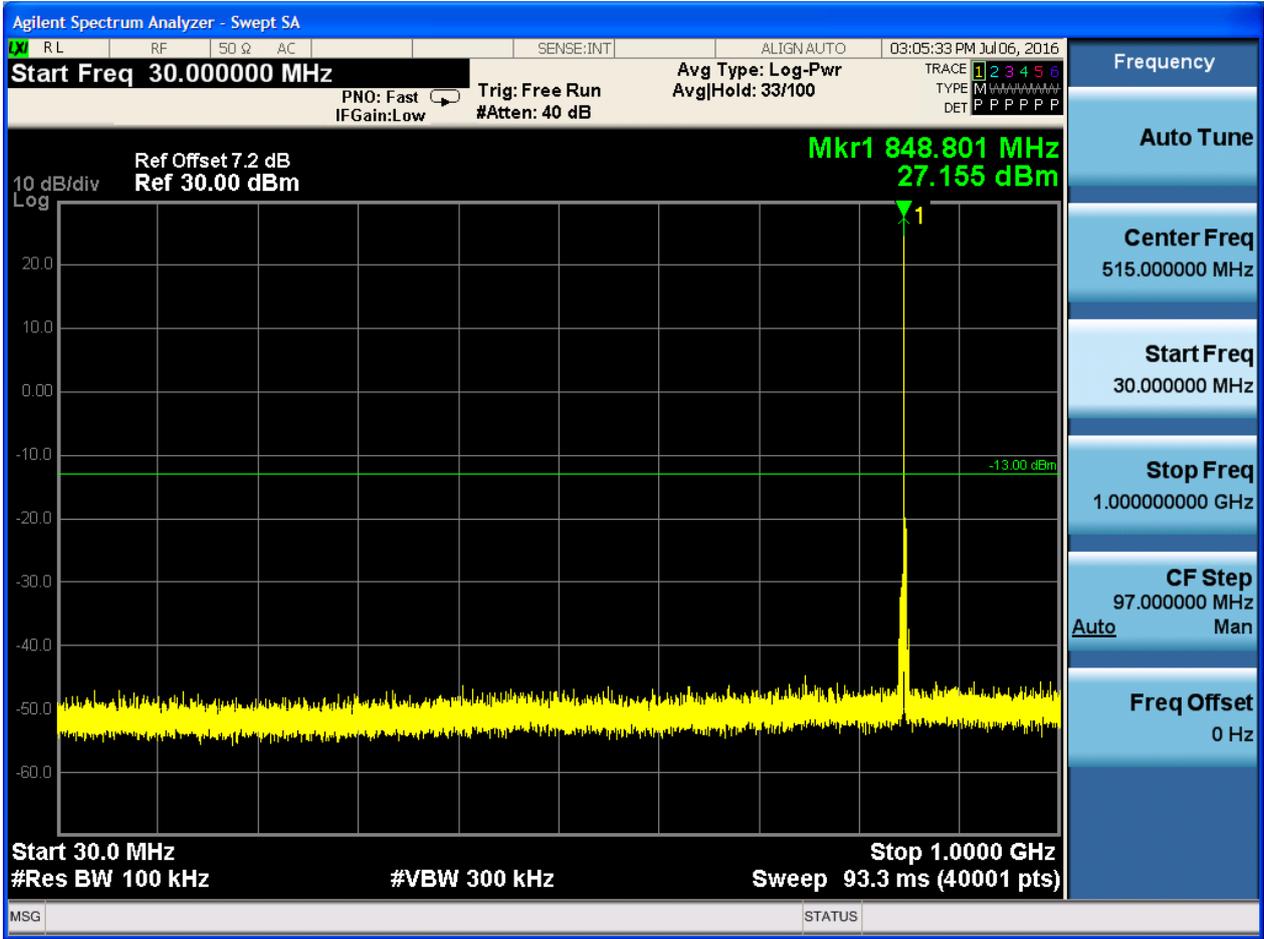


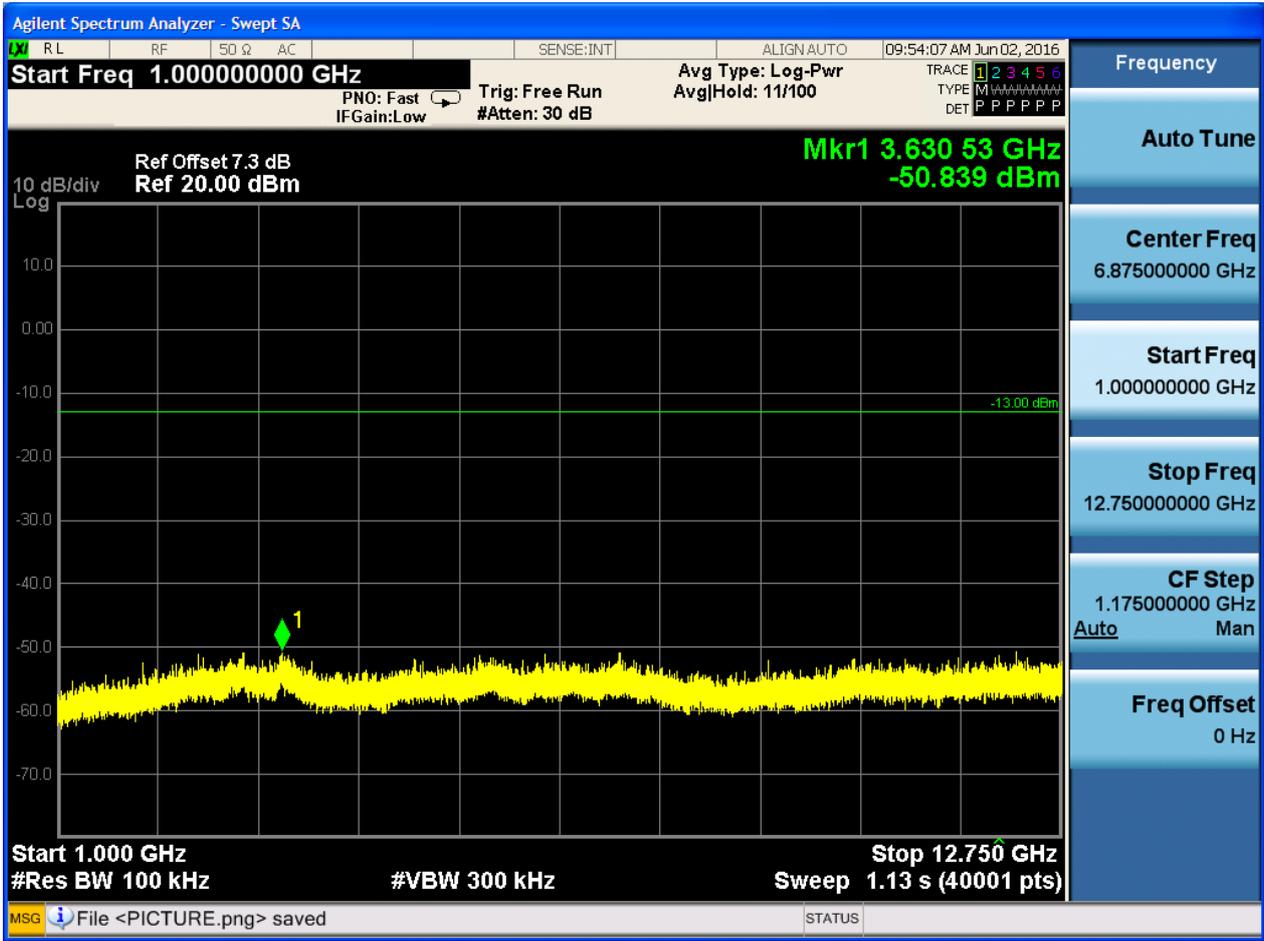


6.1.1.2.3 Test Channel = HCH







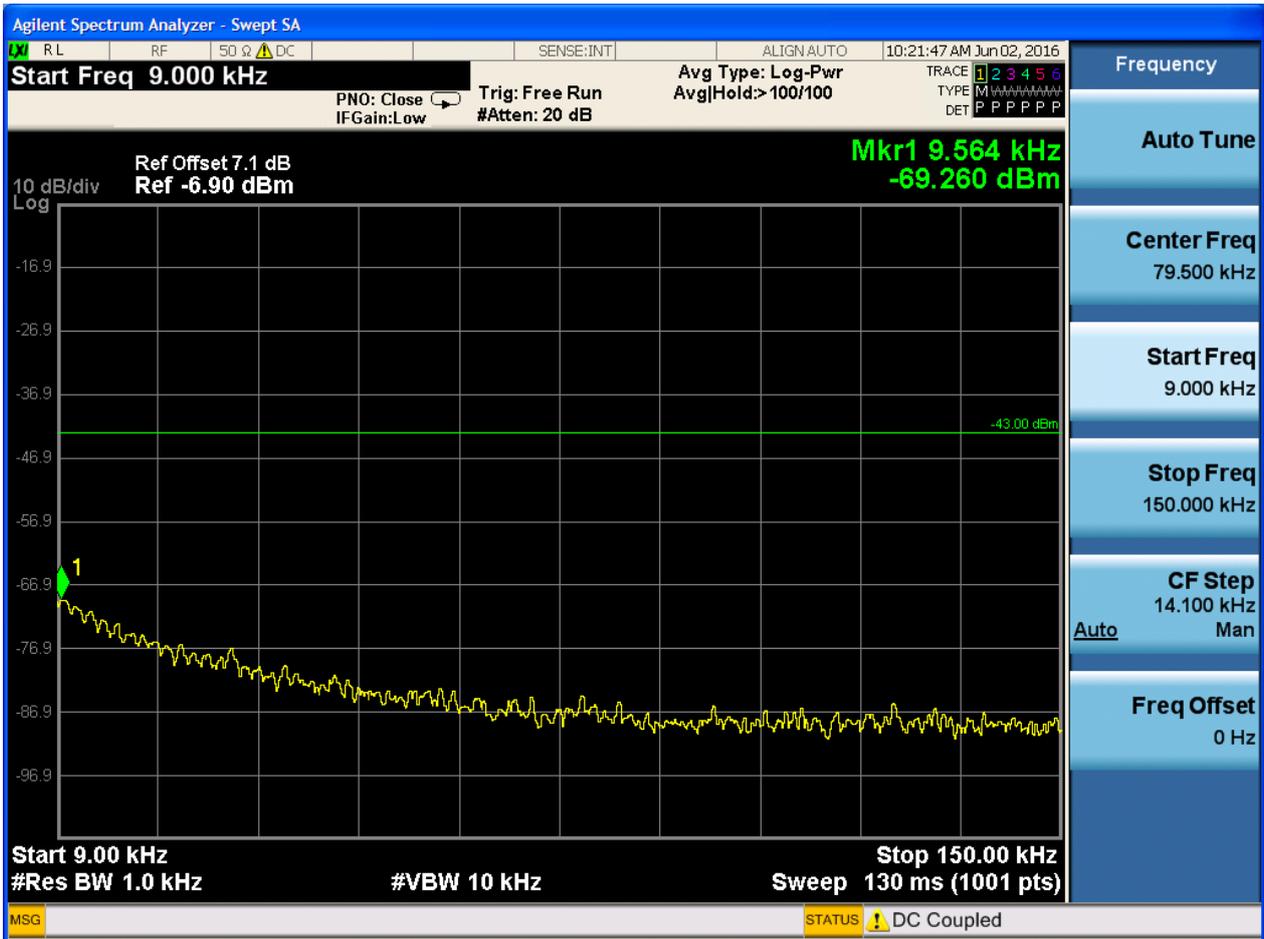


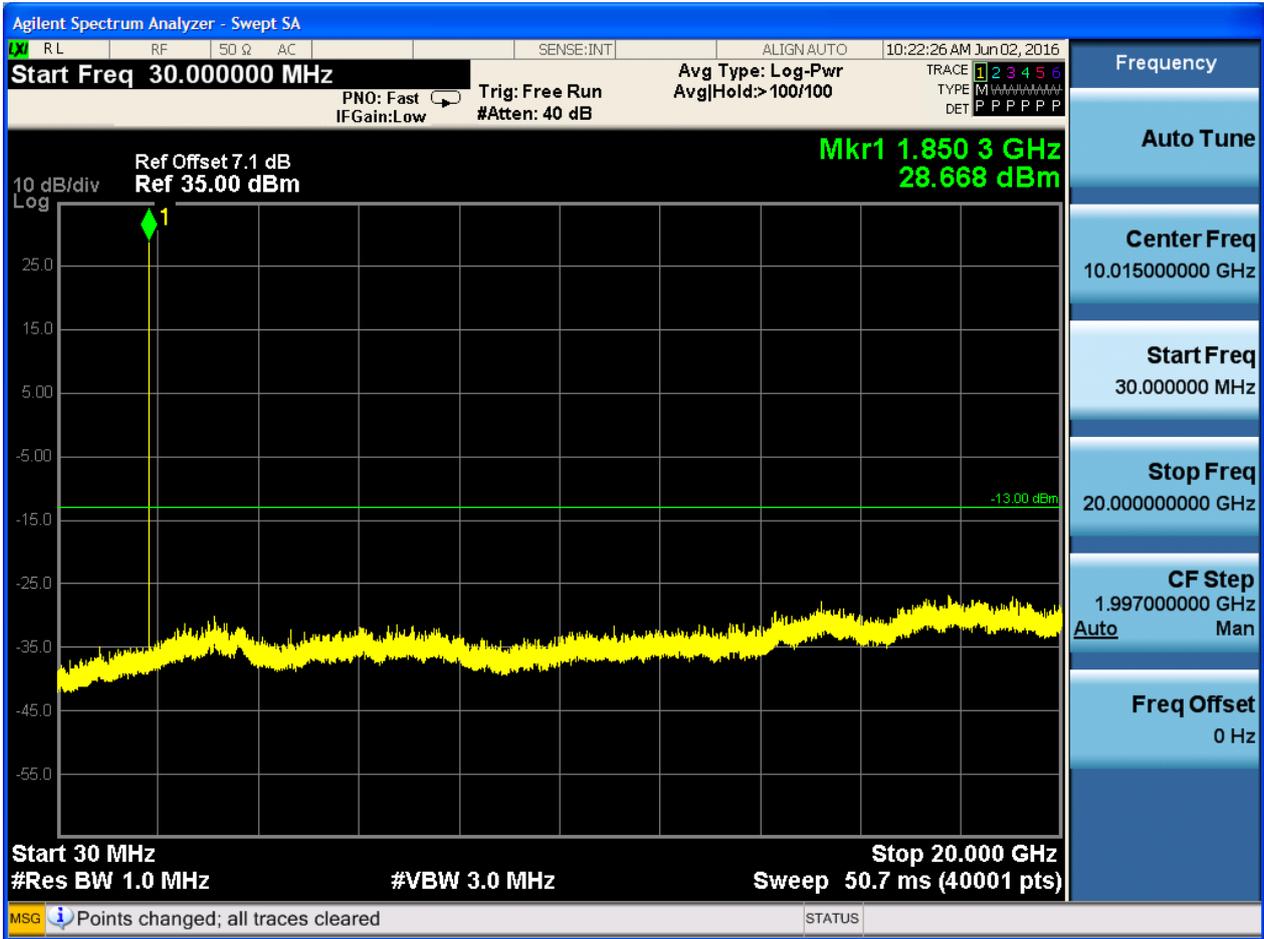


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

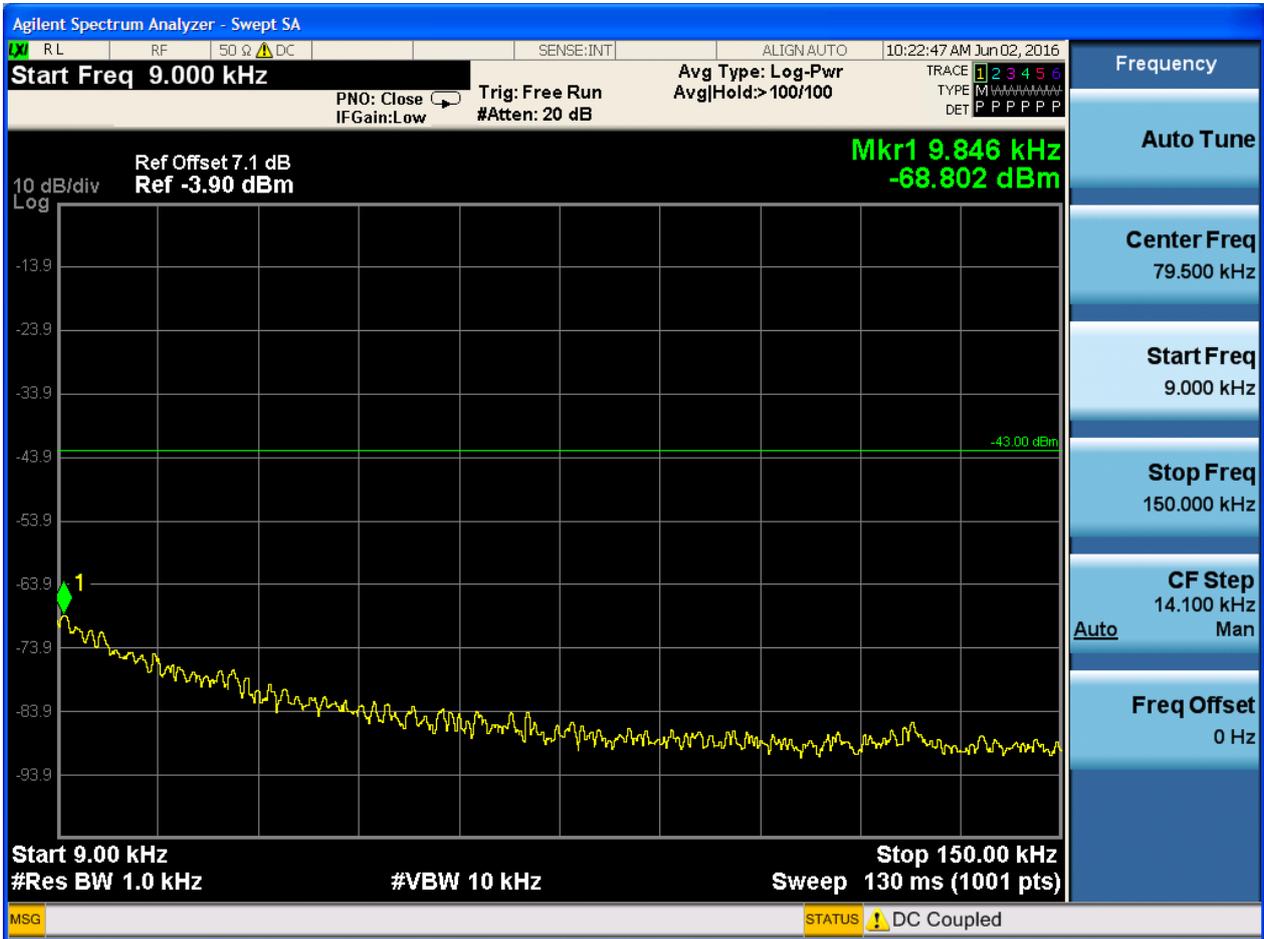
6.1.2.1.1 Test Channel = LCH

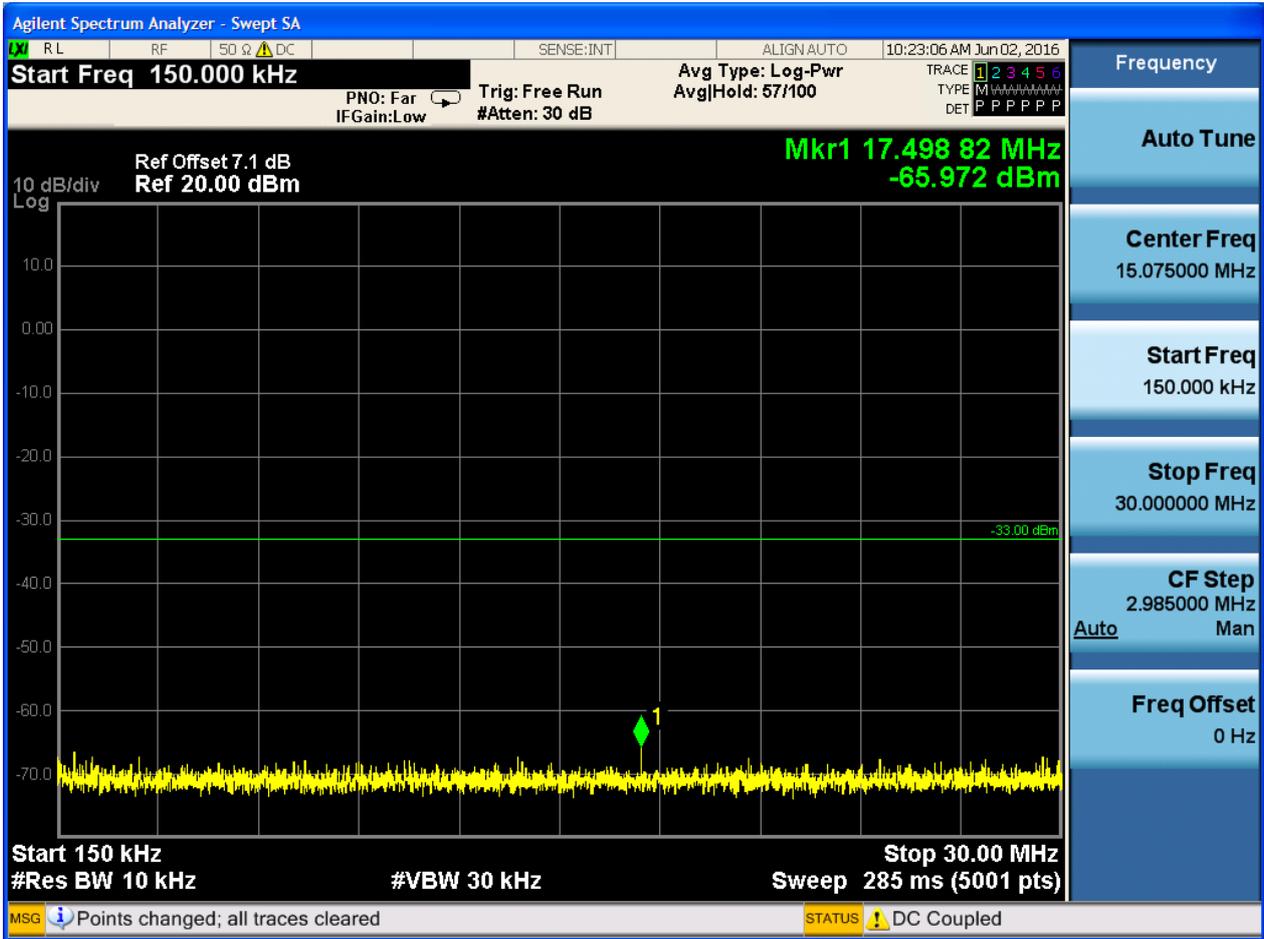






6.1.2.1.2 Test Channel = MCH

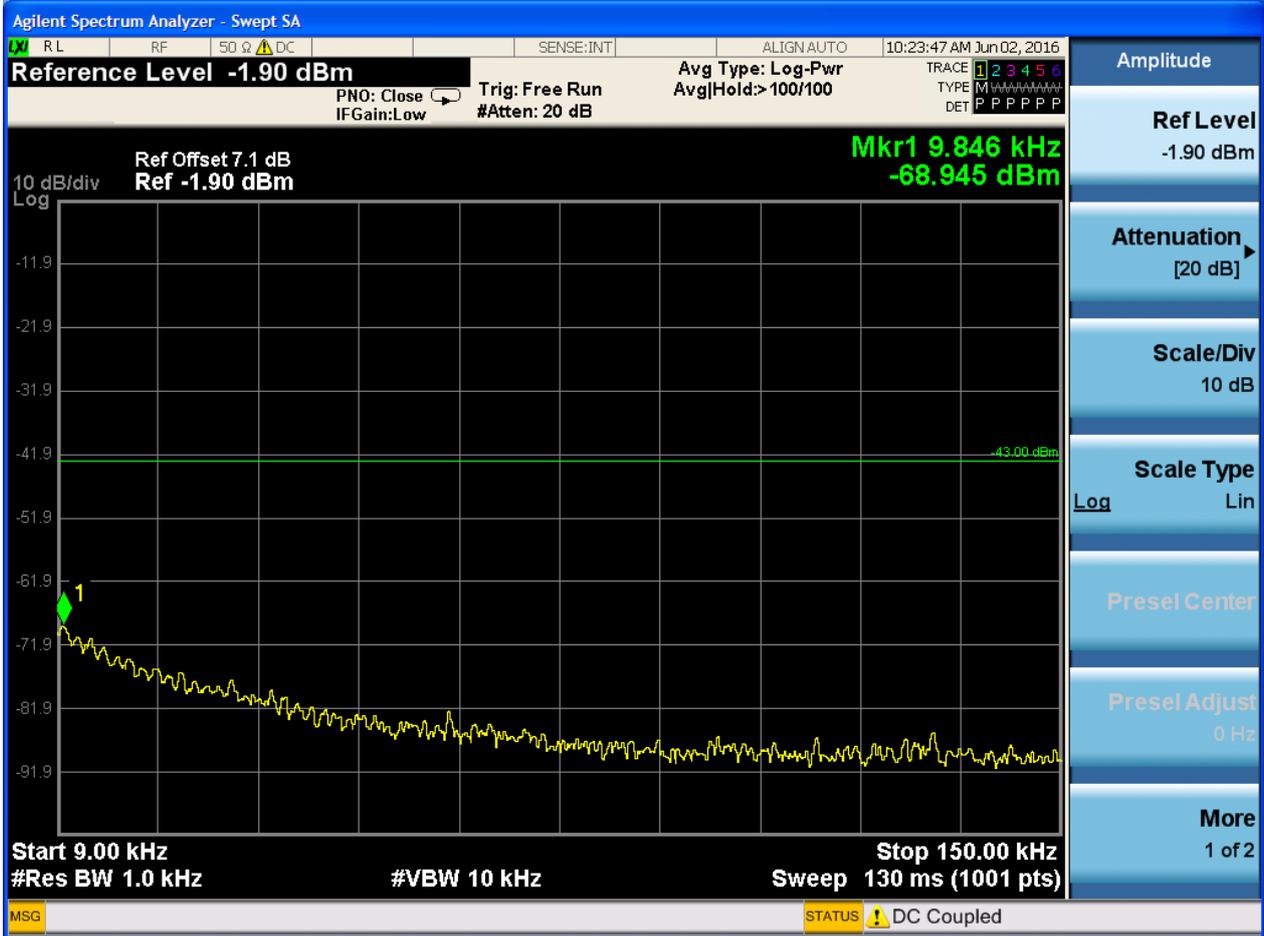


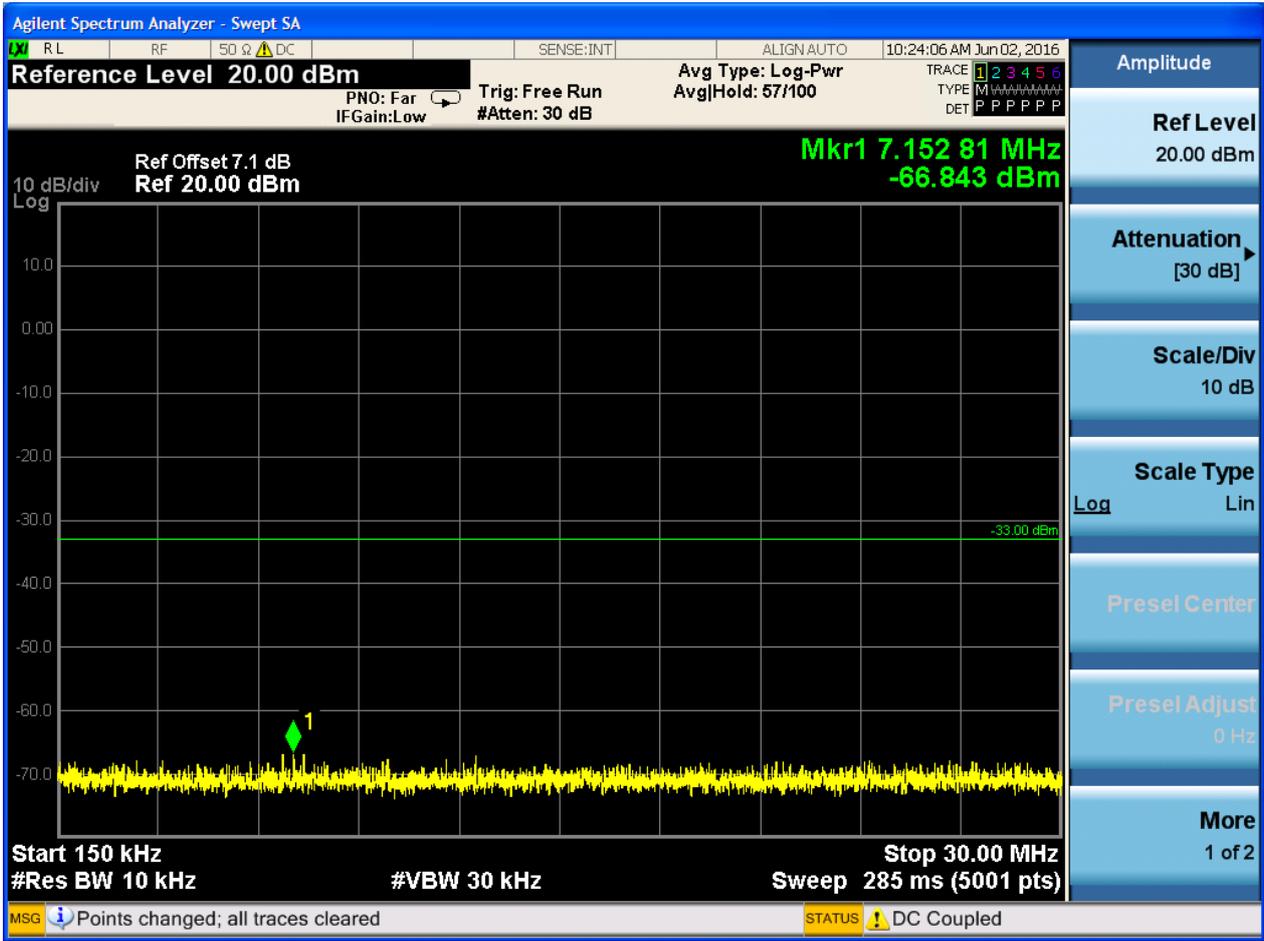


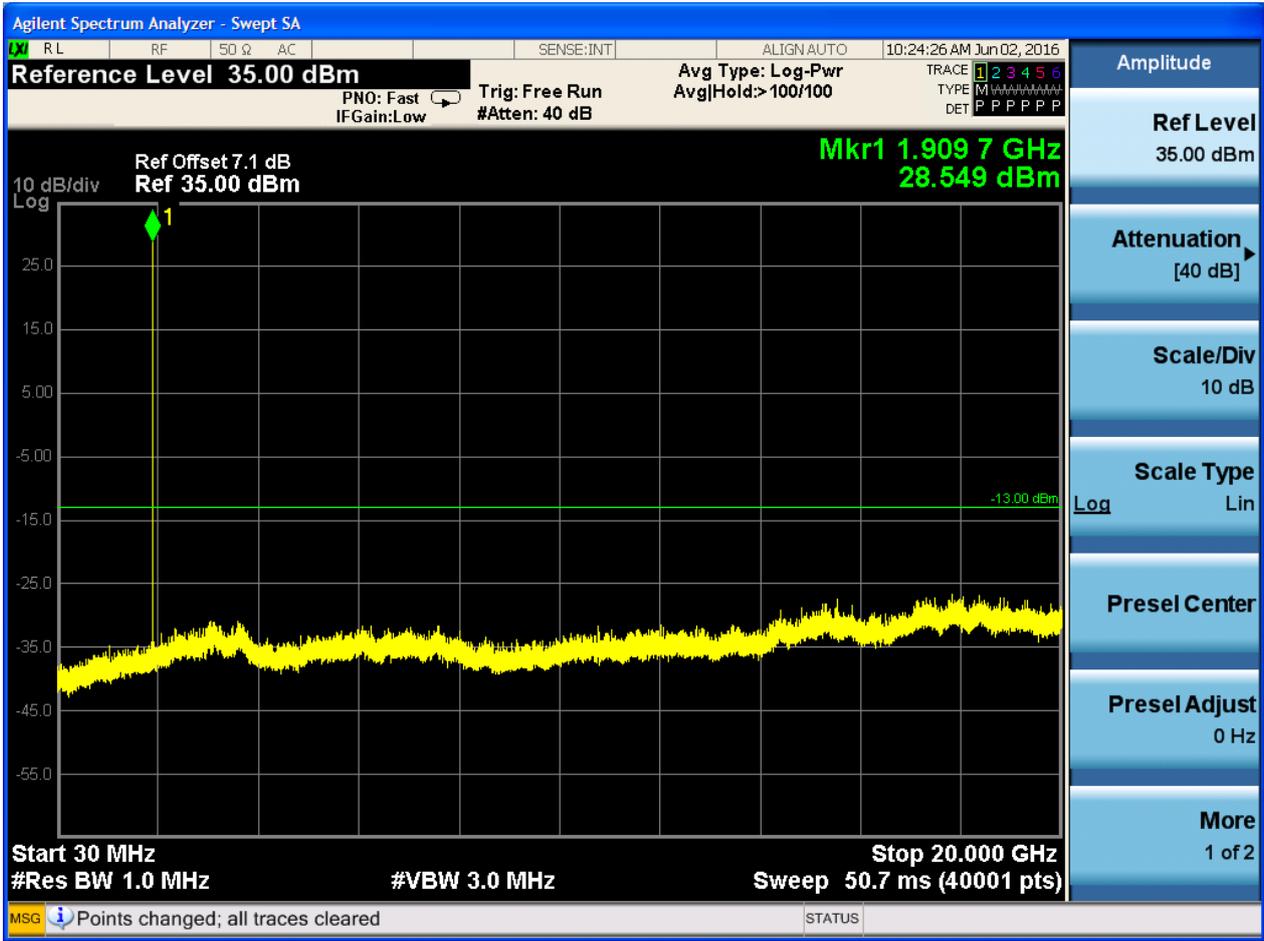




6.1.2.1.3 Test Channel = HCH



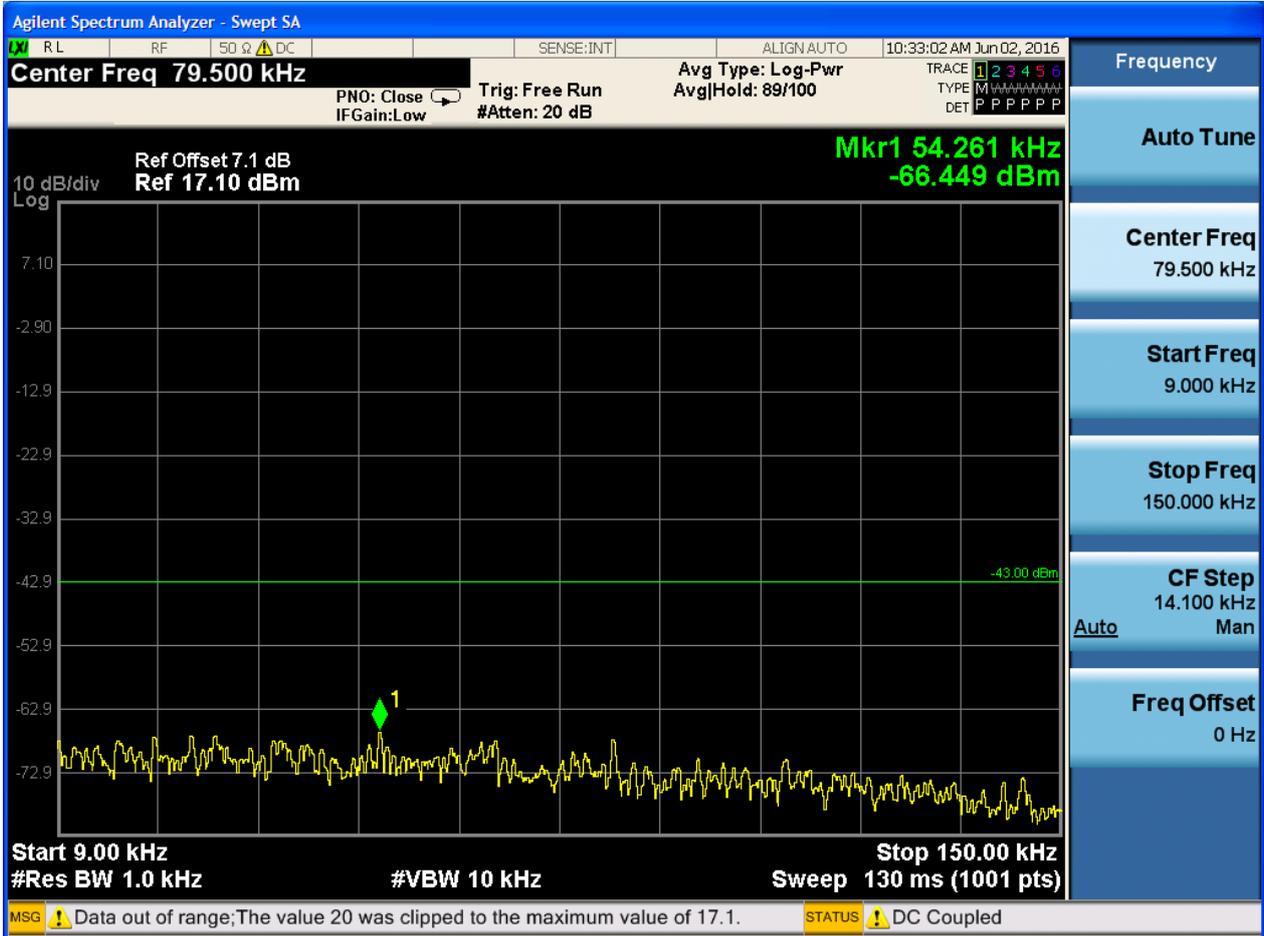


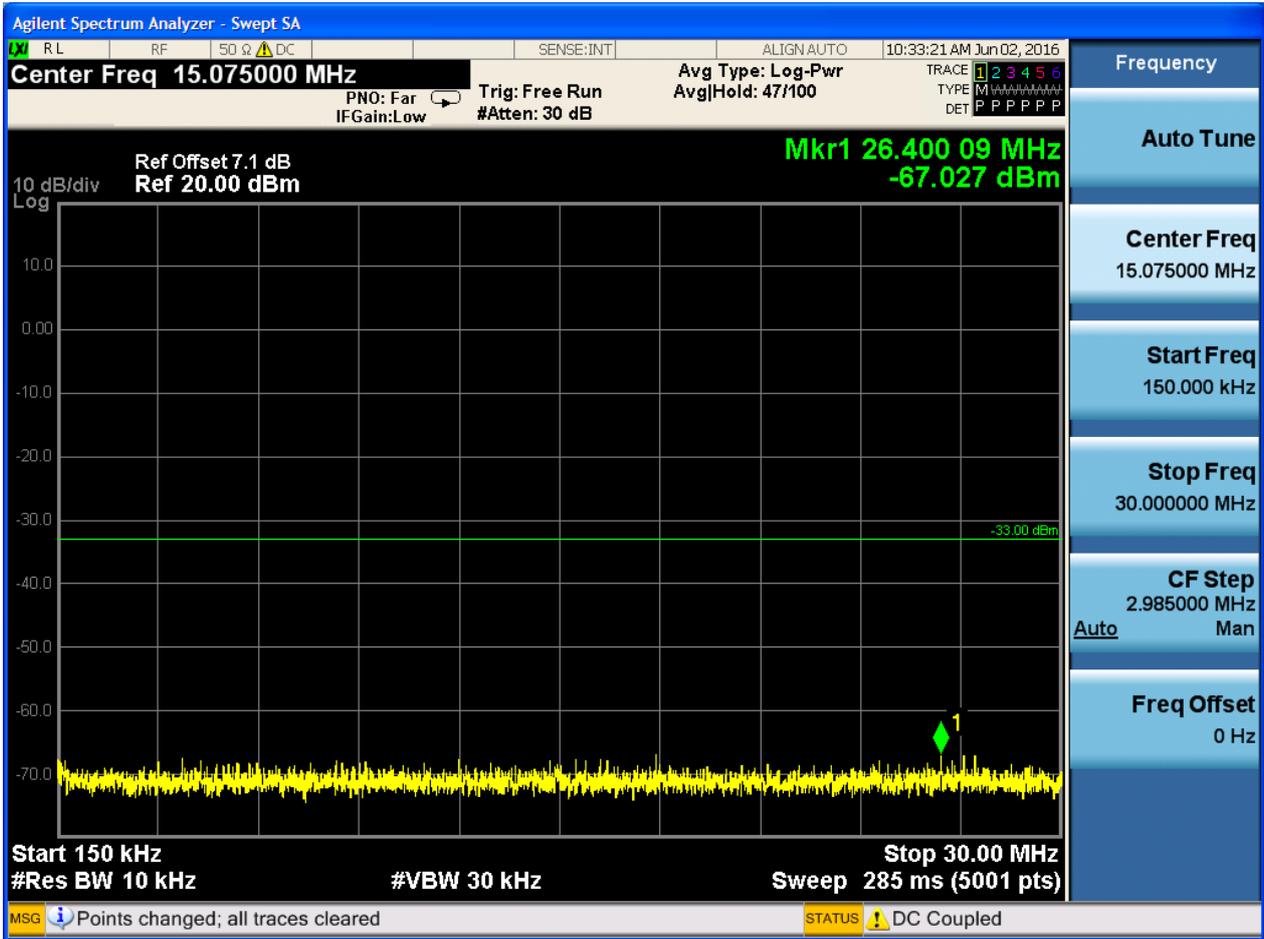




6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

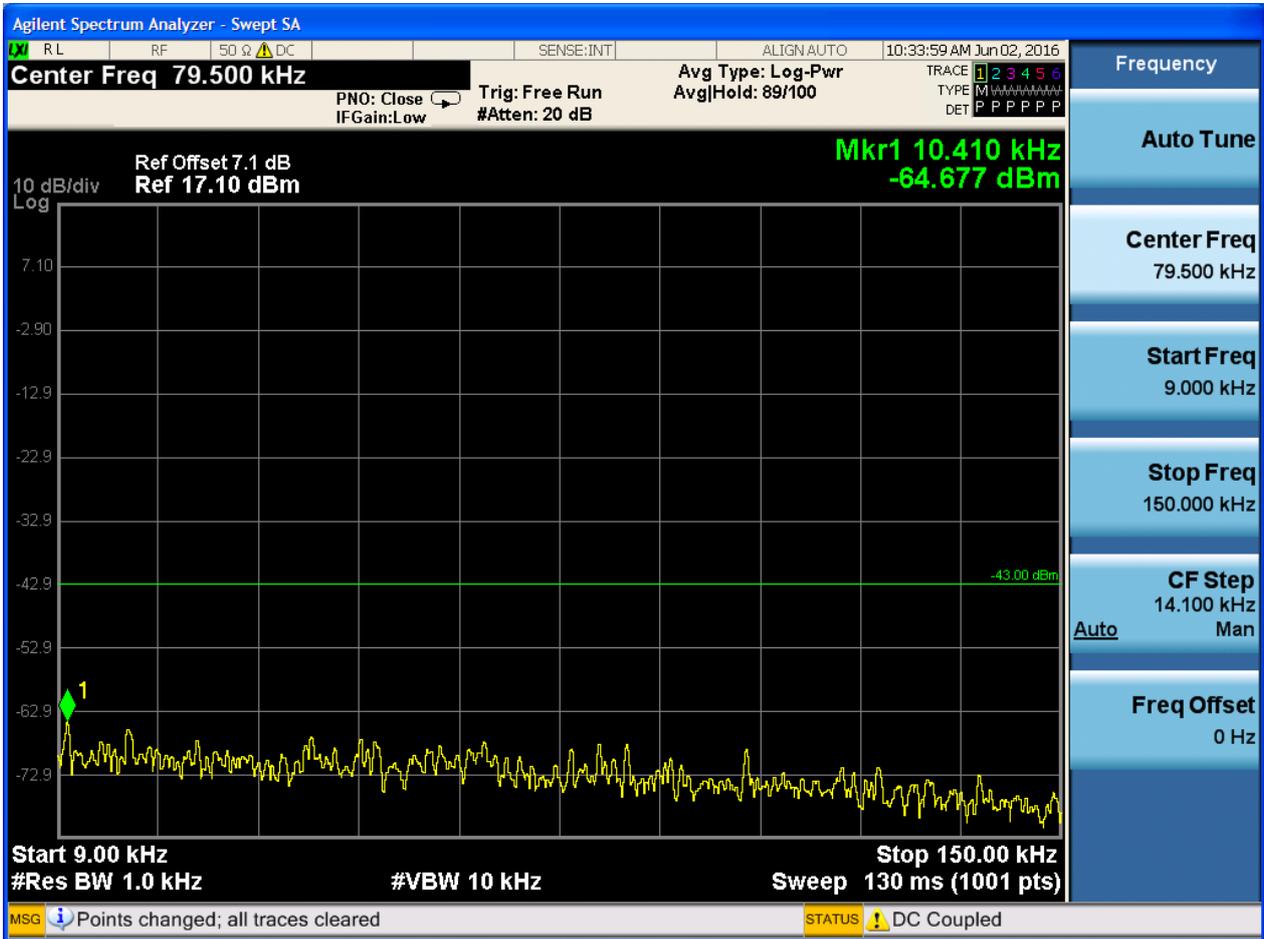


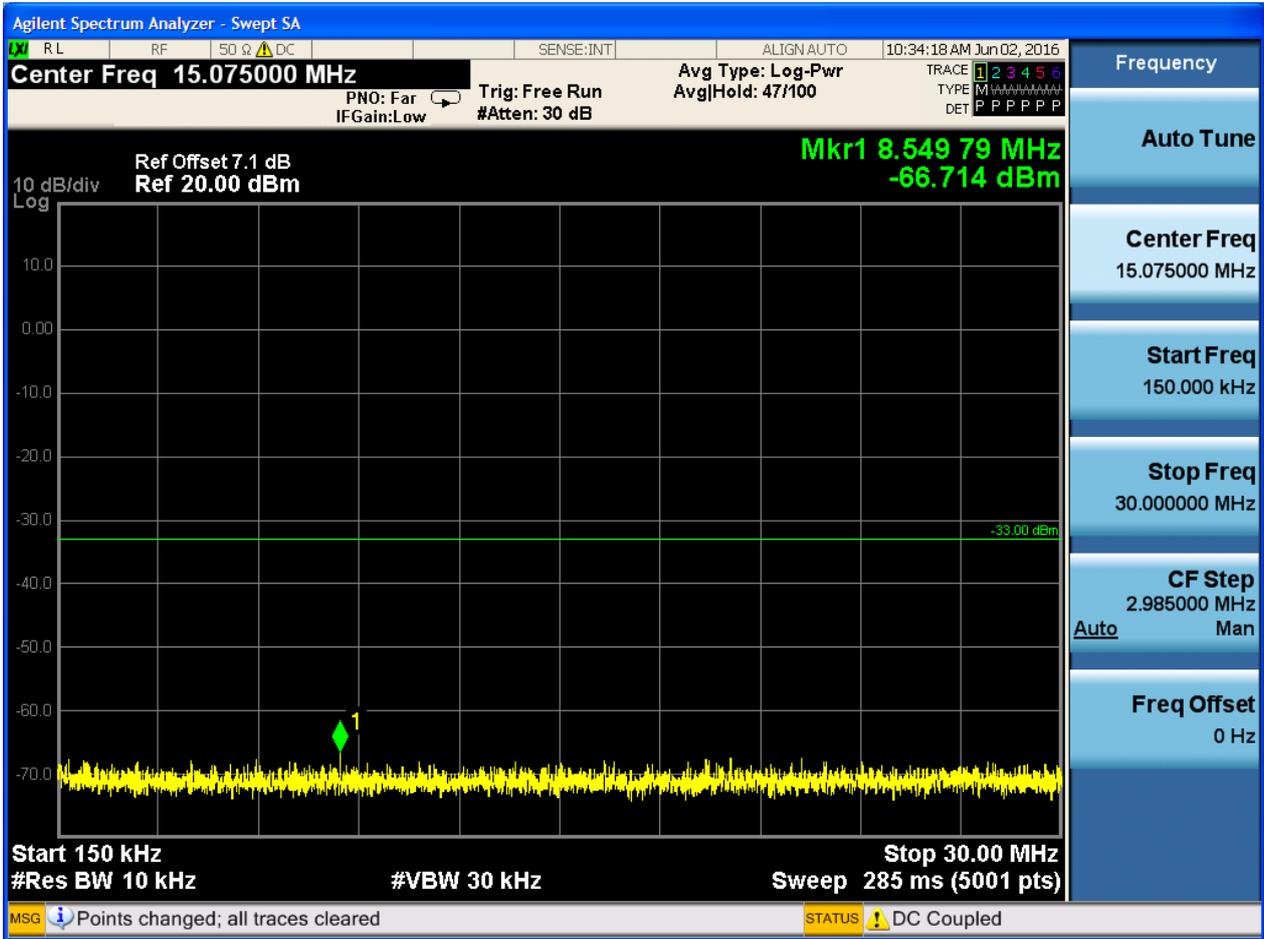






6.1.2.2.2 Test Channel = MCH

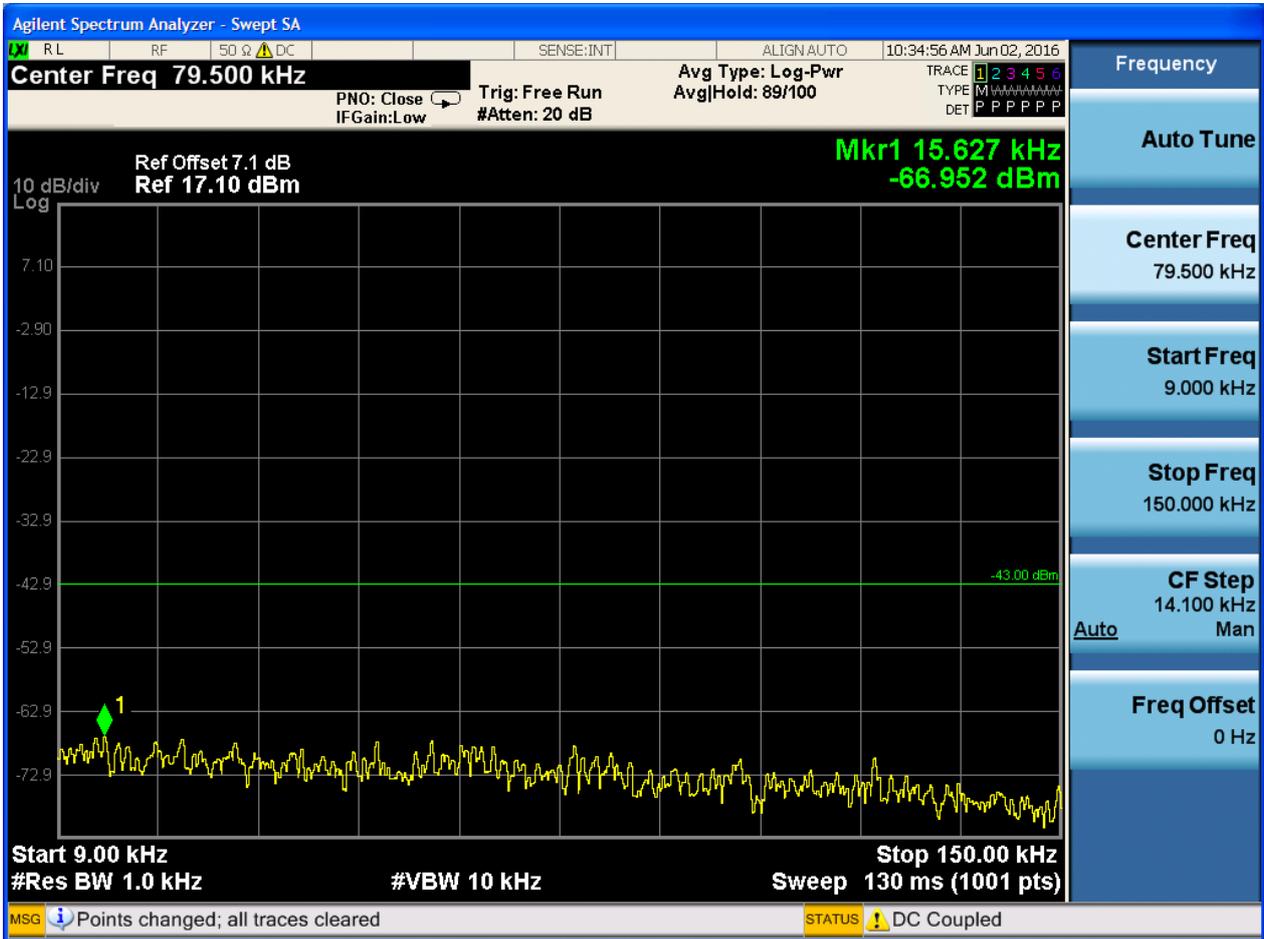


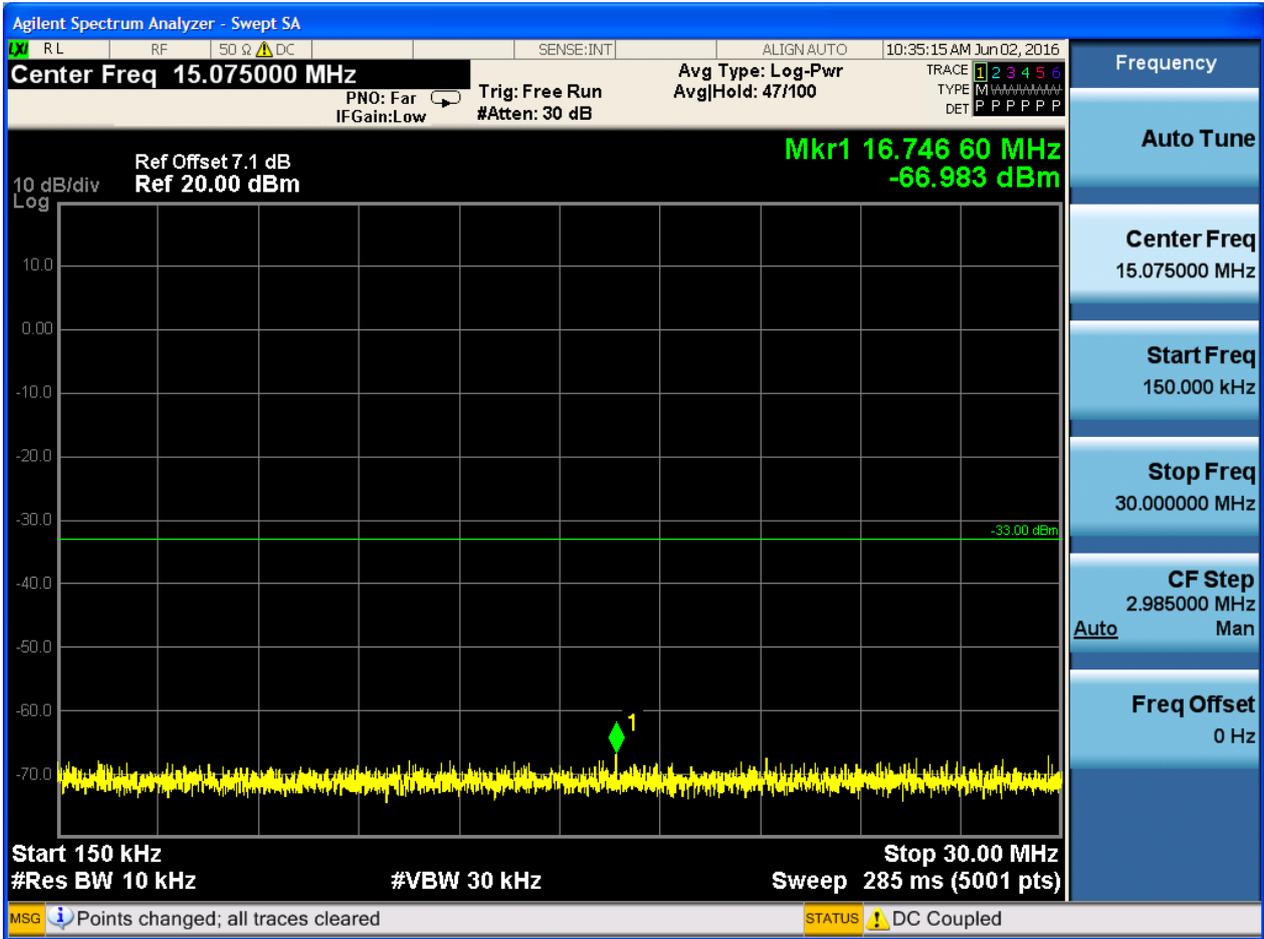


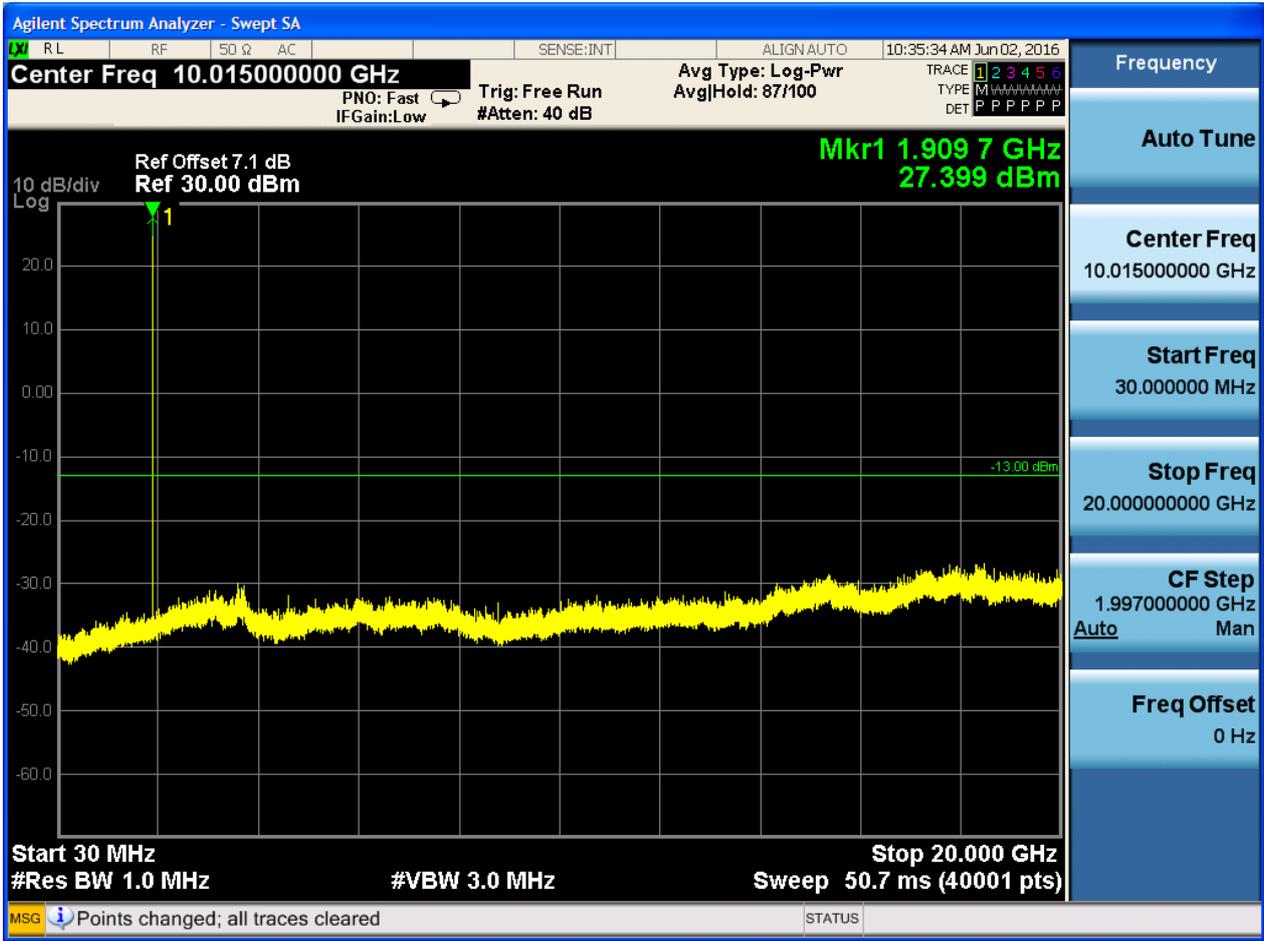




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

Note: 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

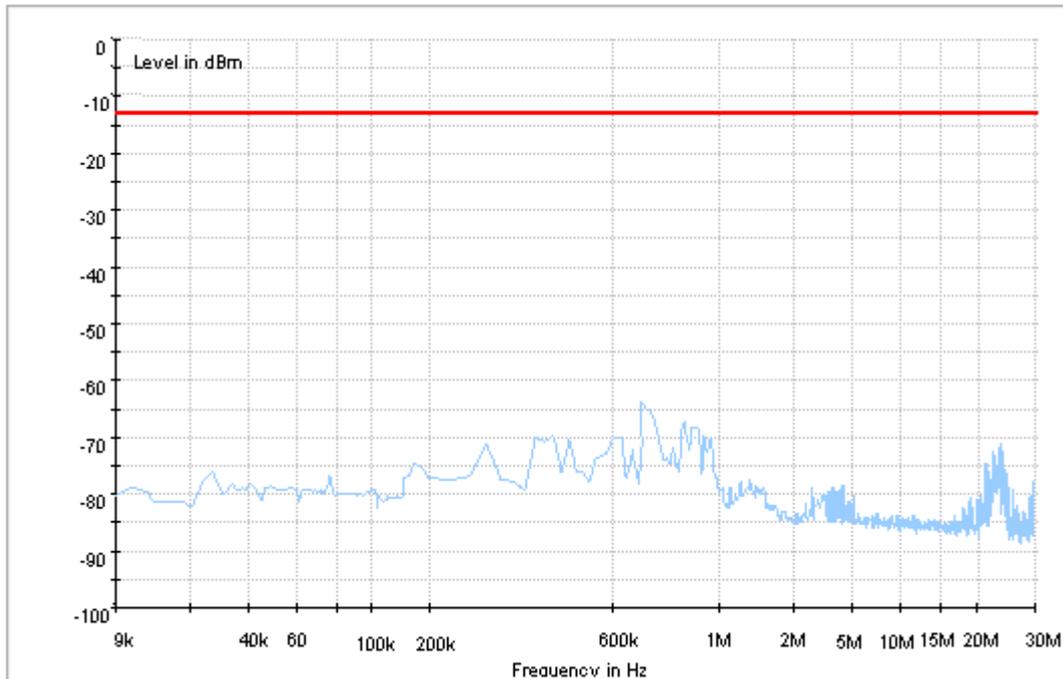
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

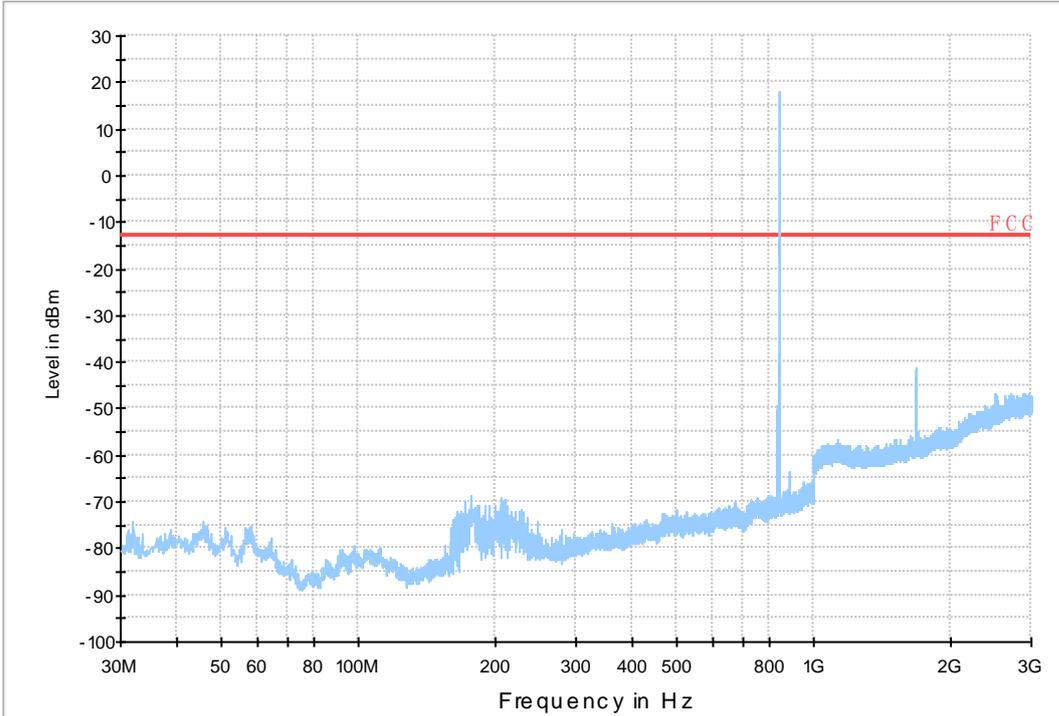
7.1 For GSM

7.1.1 Test Band = GSM850_Ant1

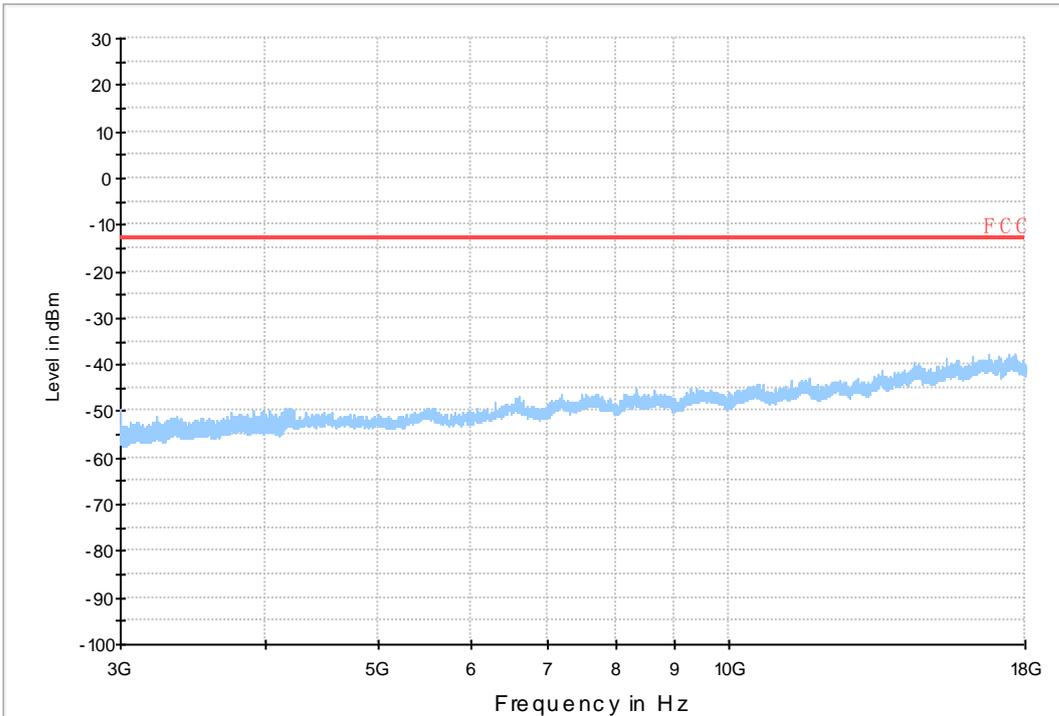
7.1.1.1 Test Mode = GSM/TM1



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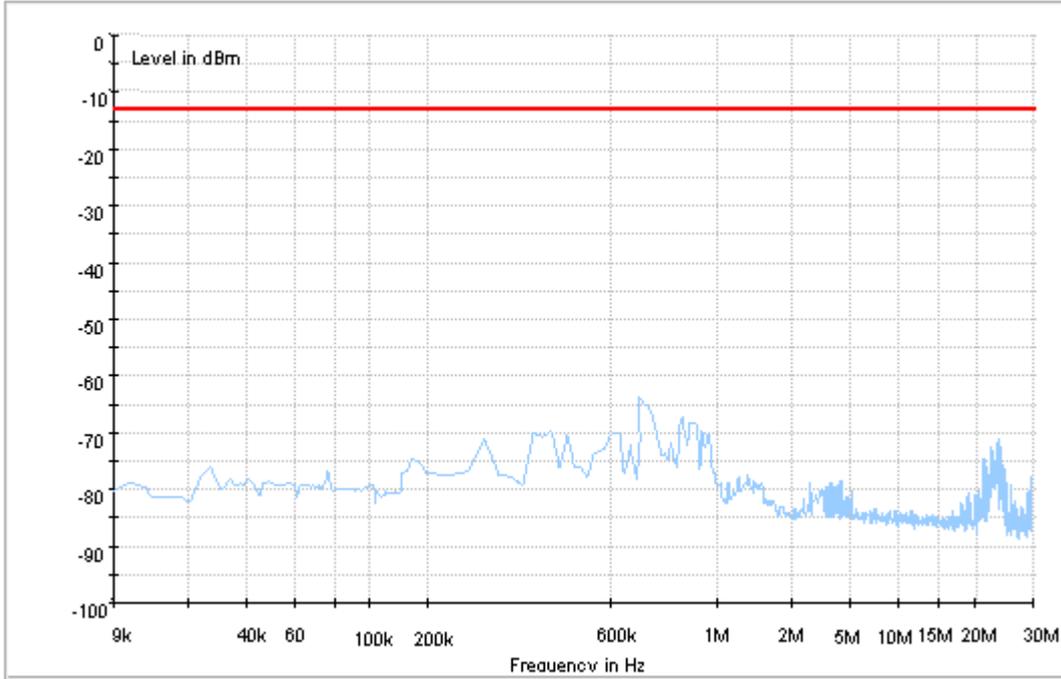


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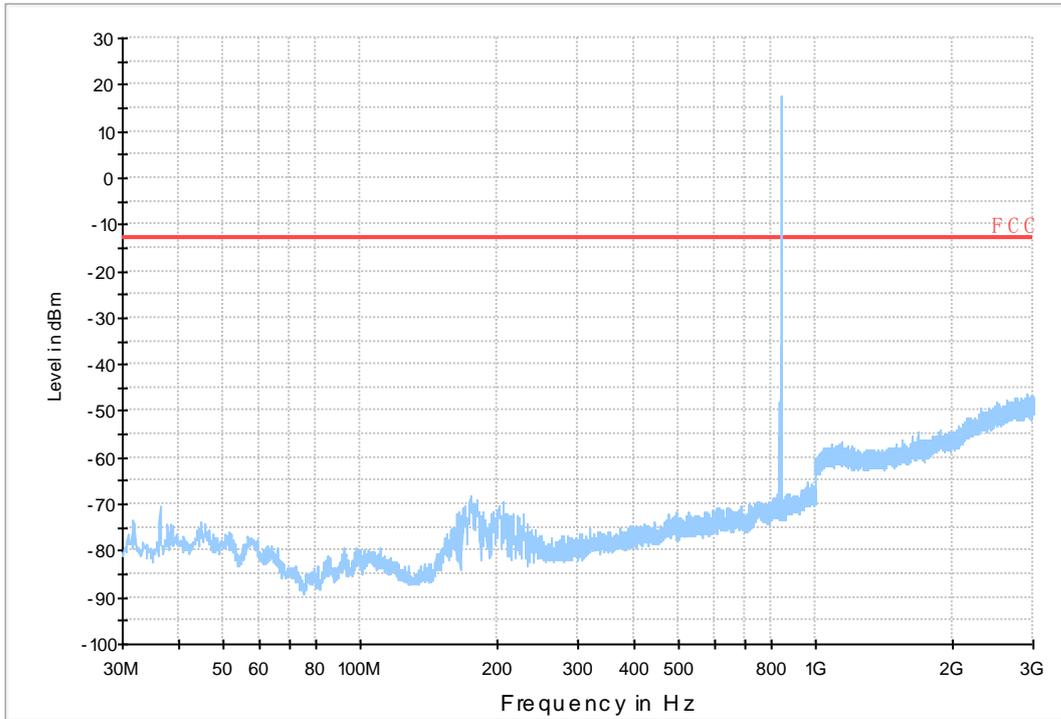


7.1.2 Test Band = GSM850_Ant2

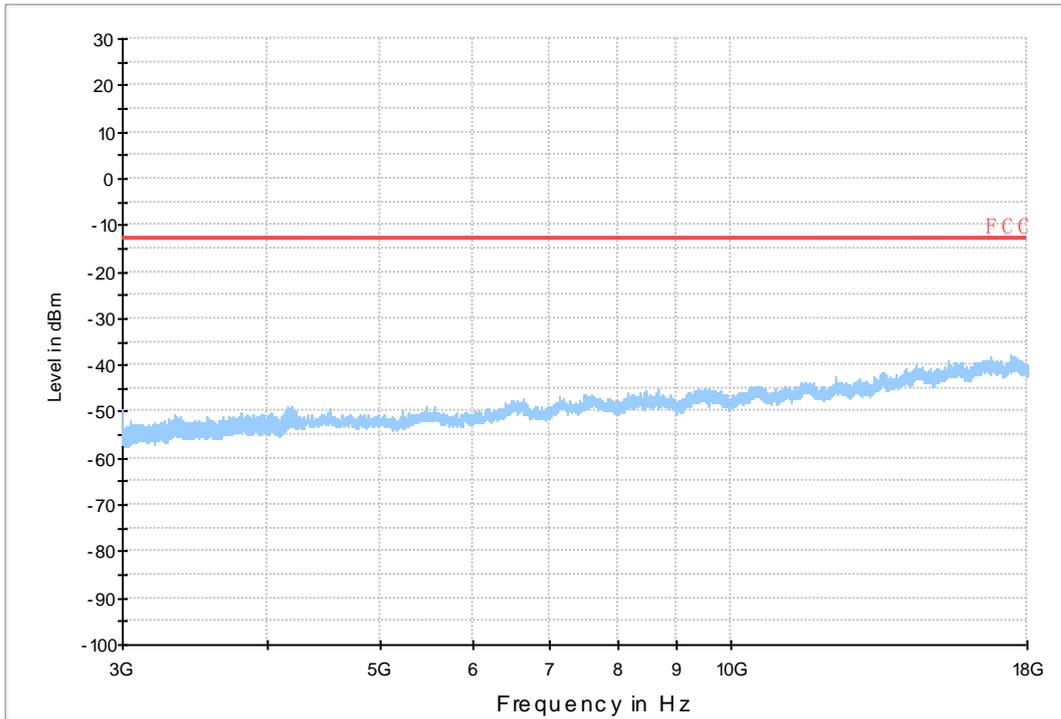
7.1.2.1 Test Mode = GSM/TM1



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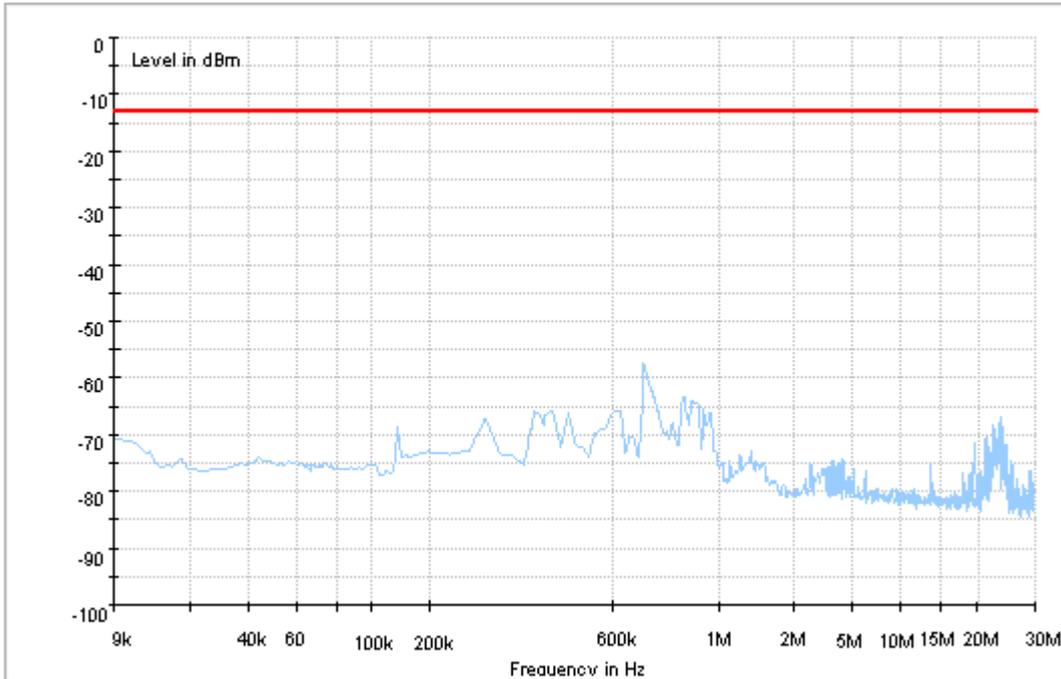


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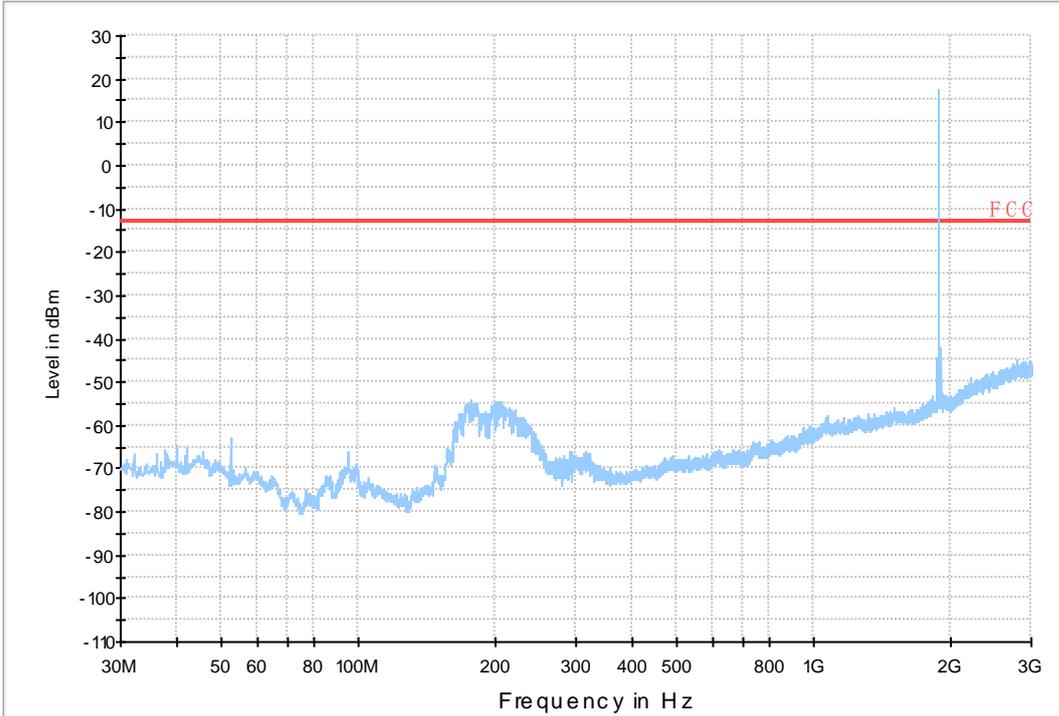


7.1.3 Test Band = GSM1900_Ant1

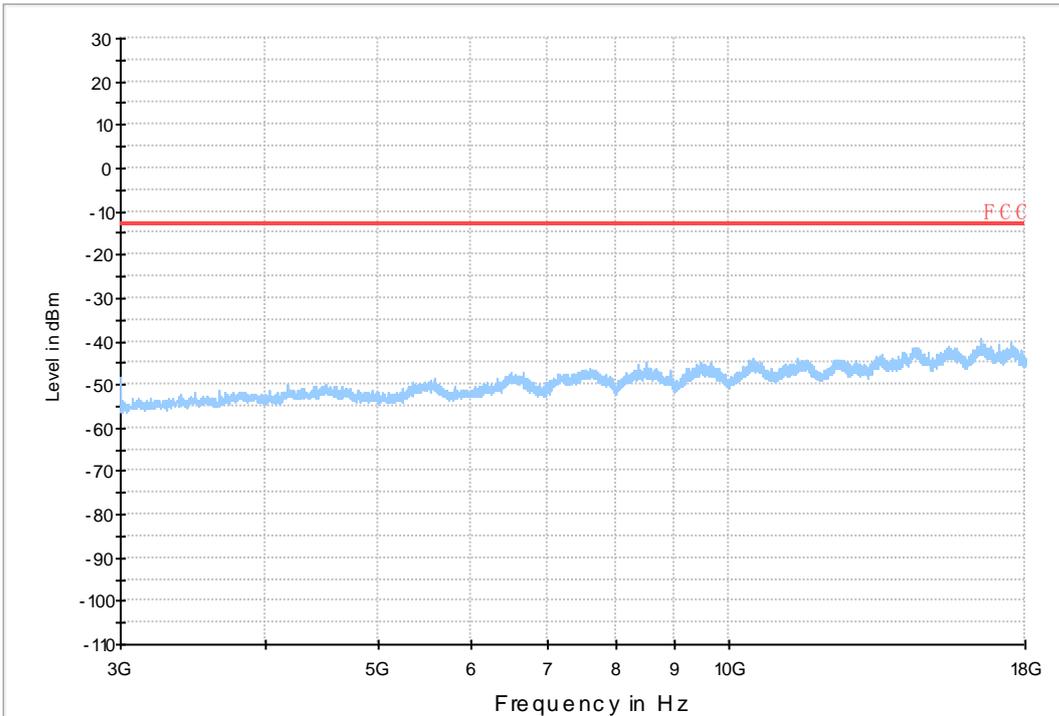
7.1.3.1 Test Mode = GSM/TM1

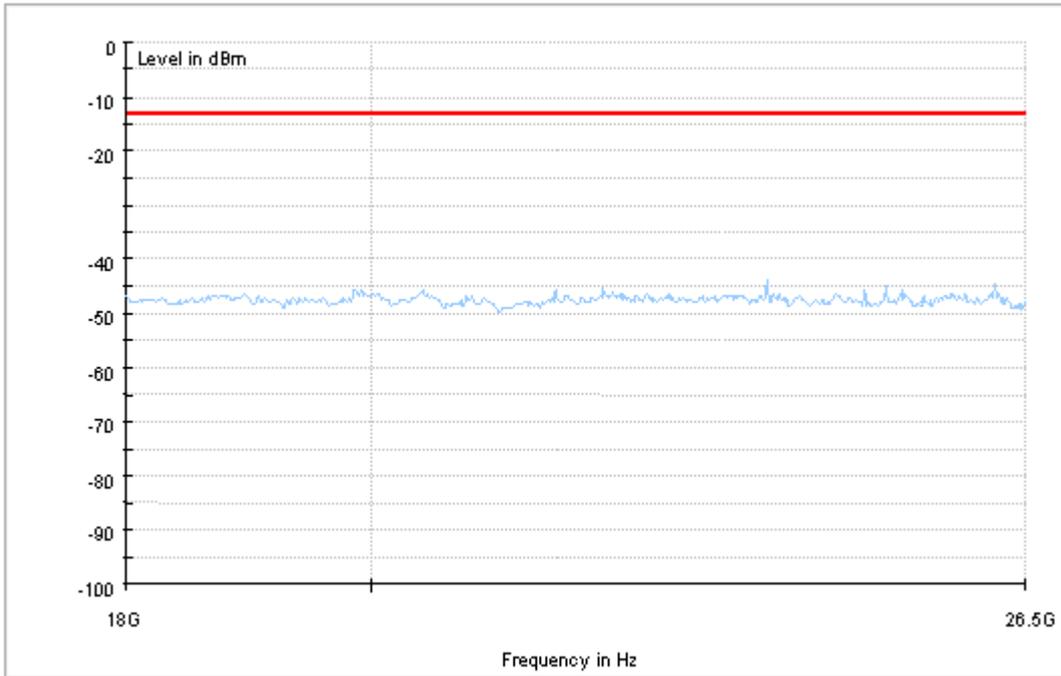


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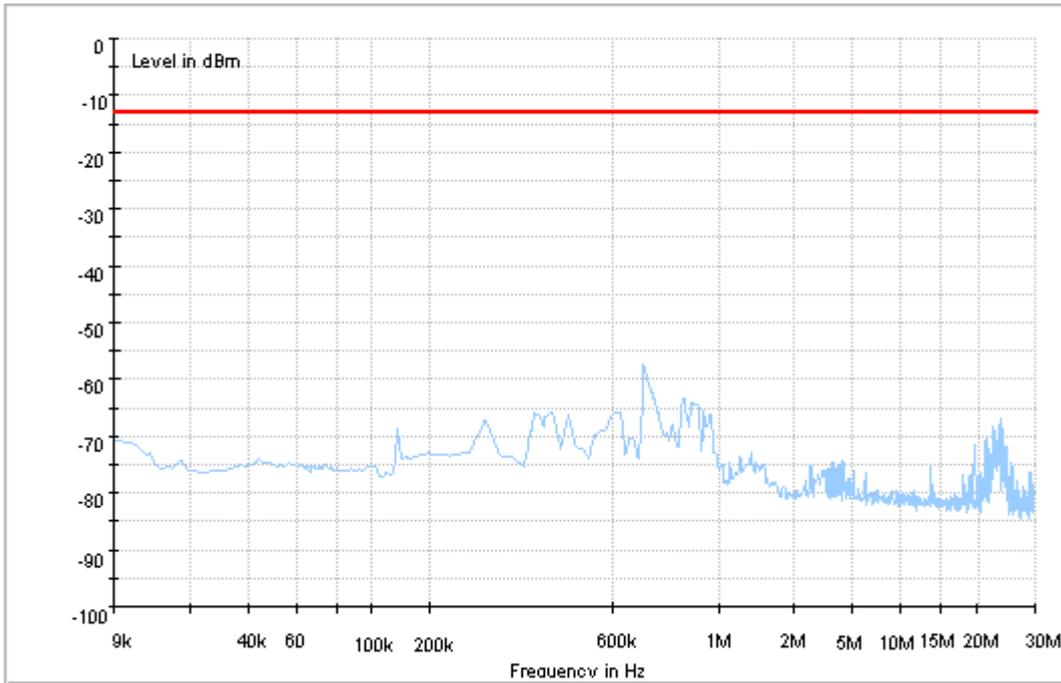
Copy of FCC PART24 GSM 1900_H



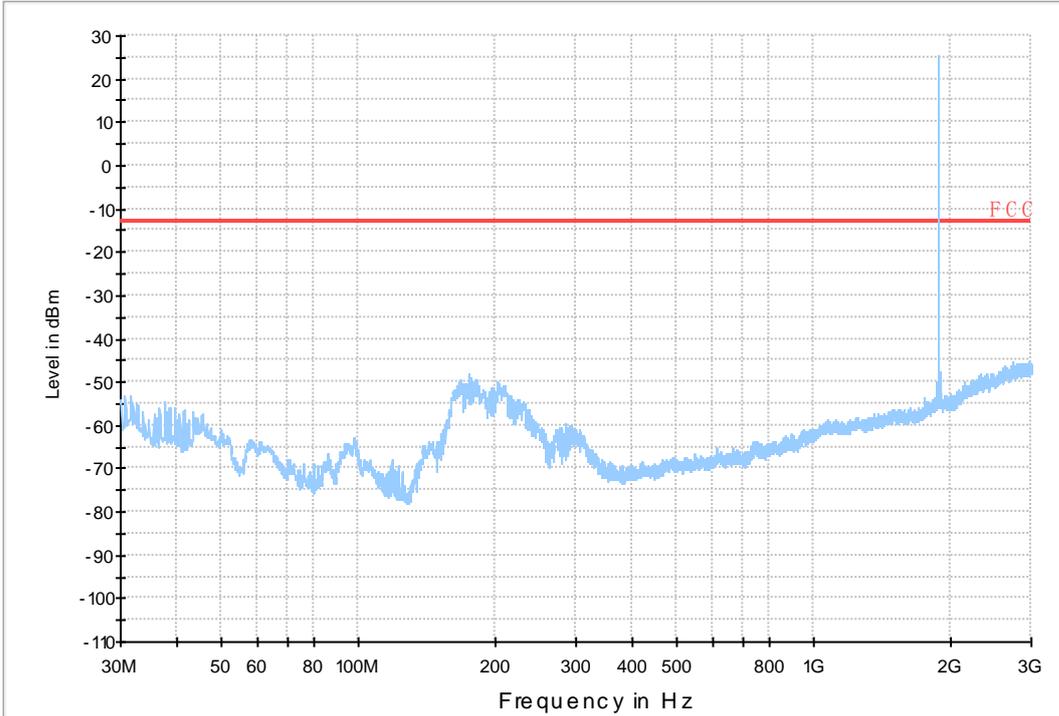


7.1.4 Test Band = GSM1900_Ant2

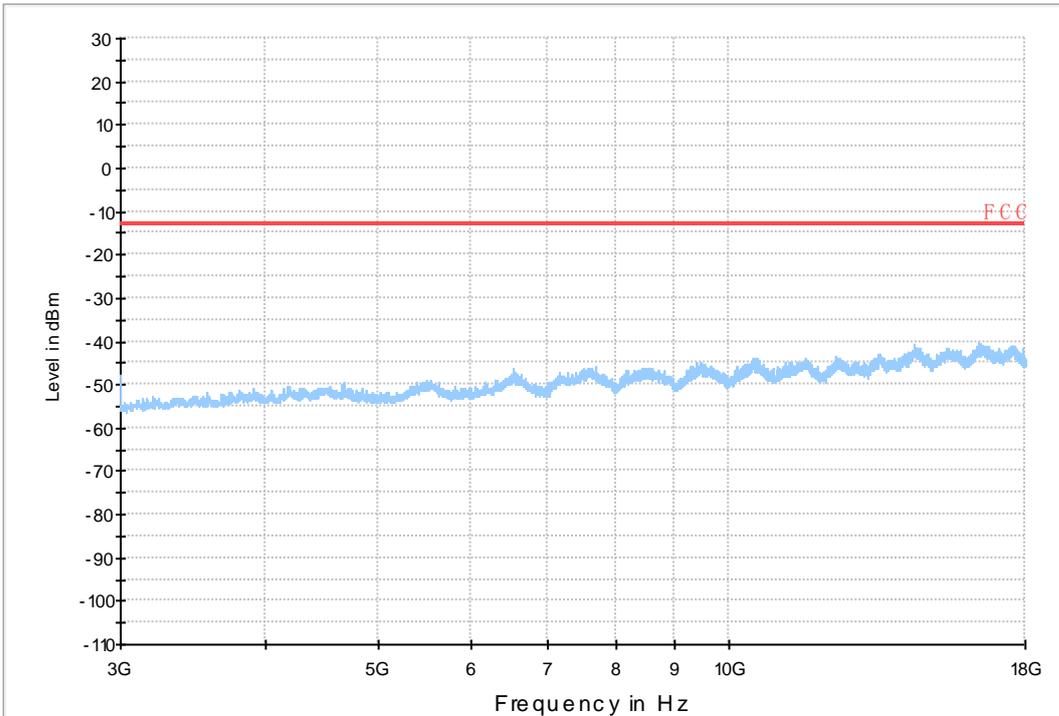
7.1.4.1 Test Mode = GSM/TM1

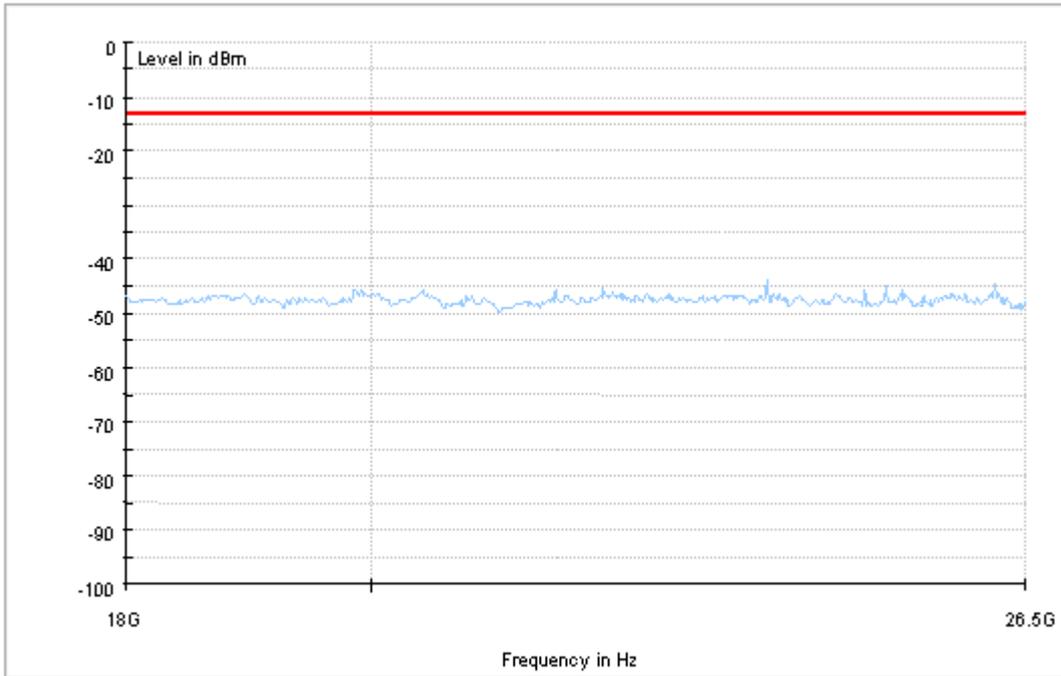


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8Appendix_H: Frequency Stability

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	0.26	0.00032	PASS
				VN	0.32	0.00039	PASS
				VH	3.36	0.00408	PASS
		MCH	TN	VL	7.49	0.00895	PASS
				VN	2.97	0.00355	PASS
				VH	3.49	0.00417	PASS
		HCH	TN	VL	3.1	0.00365	PASS
				VN	2.07	0.00244	PASS
				VH	4.84	0.0057	PASS
	GSM/TM2	LCH	TN	VL	4.58	0.00556	PASS
				VN	9.69	0.01176	PASS
				VH	12.46	0.01512	PASS
		MCH	TN	VL	10.82	0.01293	PASS
				VN	9.3	0.01112	PASS
				VH	9.3	0.01112	PASS
		HCH	TN	VL	5.84	0.00688	PASS
				VN	10.17	0.01198	PASS
				VH	10.91	0.01285	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-3.68	-0.00199	PASS
				VN	0.19	0.0001	PASS
				VH	-1.87	-0.00101	PASS
		MCH	TN	VL	-3.87	-0.00206	PASS
				VN	-7.04	-0.00374	PASS
				VH	-4.13	-0.0022	PASS
		HCH	TN	VL	-0.84	-0.00044	PASS
				VN	-1.74	-0.00091	PASS
				VH	-7.17	-0.00375	PASS
	GSM/TM2	LCH	TN	VL	-4.36	-0.00236	PASS
				VN	-0.16	-0.00009	PASS
				VH	-1.1	-0.00059	PASS
		MCH	TN	VL	0.19	0.0001	PASS
				VN	1.58	0.00084	PASS
				VH			



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	1.13	0.0006	PASS
		HCH	TN	VL	3.91	0.00205	PASS
				VN	11.46	0.006	PASS
				VH	1.78	0.00093	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	6.52	0.00791	PASS
				-20	3.1	0.00376	PASS
				-10	4.58	0.00556	PASS
				0	0.19	0.00023	PASS
				10	2.71	0.00329	PASS
				20	4.39	0.00533	PASS
				30	4.78	0.0058	PASS
				40	2.58	0.00313	PASS
		50	8.46	0.01026	PASS		
		MCH	VN	-30	5.29	0.00632	PASS
				-20	5.17	0.00618	PASS
				-10	4.33	0.00518	PASS
				0	6.39	0.00764	PASS
				10	7.04	0.00842	PASS
				20	6.07	0.00726	PASS
				30	9.04	0.01081	PASS
				40	4.33	0.00518	PASS
		50	10.2	0.01219	PASS		
		HCH	VN	-30	6.2	0.0073	PASS
				-20	11.82	0.01393	PASS
				-10	-2.65	-0.00312	PASS
				0	1.81	0.00213	PASS
				10	3.36	0.00396	PASS
				20	2.84	0.00335	PASS
	30			4.13	0.00487	PASS	
	40			6.2	0.0073	PASS	
	50	5.62	0.00662	PASS			
	GSM/TM2	LCH	VN	-30	14.92	0.0181	PASS
				-20	17.11	0.02076	PASS
				-10	16.89	0.02049	PASS
				0	13.46	0.01633	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	16.66	0.02021	PASS
				20	14.17	0.01719	PASS
				30	16.79	0.02037	PASS
				40	12.14	0.01473	PASS
				50	12.91	0.01566	PASS
		MCH	VN	-30	12.33	0.01474	PASS
				-20	11.11	0.01328	PASS
				-10	10.91	0.01304	PASS
				0	11.04	0.0132	PASS
				10	9.01	0.01077	PASS
				20	9.72	0.01162	PASS
				30	12.3	0.0147	PASS
				40	11.85	0.01416	PASS
				50	8.33	0.00996	PASS
				HCH	VN	-30	10.11
		-20	9.56			0.01126	PASS
		-10	10.01			0.01179	PASS
		0	11.72			0.01381	PASS
		10	15.82			0.01864	PASS
		20	11.3			0.01331	PASS
		30	10.69			0.01259	PASS
		40	12.24			0.01442	PASS
		50	11.33	0.01335	PASS		
		GSM1900	GSM/TM1	LCH	VN	-30	-7.04
-20	-8.98					-0.00485	PASS
-10	-5.55					-0.003	PASS
0	-4.07					-0.0022	PASS
10	-6.39					-0.00345	PASS
20	-10.33					-0.00558	PASS
30	-0.52					-0.00028	PASS
40	-5.1					-0.00276	PASS
50	-3.75					-0.00203	PASS
MCH	VN			-30	-5.75	-0.00306	PASS
				-20	-7.1	-0.00378	PASS
				-10	4.58	0.00244	PASS
				0	-3.62	-0.00193	PASS
				10	-1.23	-0.00065	PASS
				20	0.84	0.00045	PASS
				30	-2.13	-0.00113	PASS
				40	-4.26	-0.00227	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	-6.59	-0.00351	PASS
				-30	5.49	0.00287	PASS
				-20	1.16	0.00061	PASS
				-10	-5.17	-0.00271	PASS
				0	4.91	0.00257	PASS
				10	1.81	0.00095	PASS
				20	4.2	0.0022	PASS
				30	-5.29	-0.00277	PASS
				40	-1.55	-0.00081	PASS
				50	-1.49	-0.00078	PASS
	GSM/TM2	LCH	VN	-30	0.29	0.00016	PASS
				-20	-5.13	-0.00277	PASS
				-10	0.58	0.00031	PASS
				0	-1.78	-0.00096	PASS
				10	2.97	0.00161	PASS
				20	-2.62	-0.00142	PASS
				30	2.13	0.00115	PASS
				40	-6.84	-0.0037	PASS
				50	-0.19	-0.0001	PASS
				MCH	VN	-30	1.61
		-20	4.55			0.00242	PASS
		-10	5.84			0.00311	PASS
		0	7.26			0.00386	PASS
		10	-1.45			-0.00077	PASS
		20	1.07			0.00057	PASS
		30	2.32			0.00123	PASS
		40	-0.55			-0.00029	PASS
		50	0.77			0.00041	PASS
		HCH	VN			-30	4.23
				-20	10.56	0.00553	PASS
				-10	2.58	0.00135	PASS
				0	4.91	0.00257	PASS
				10	7.88	0.00413	PASS
				20	8.17	0.00428	PASS
				30	9.01	0.00472	PASS
				40	-0.32	-0.00017	PASS
				50	6.17	0.00323	PASS

END