



Appendix for test report



1 Appendix_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	32.91	30.26	38.5	PASS
		MCH	32.91	30.26	38.5	PASS
		HCH	32.92	30.27	38.5	PASS
	GSM/TM2	LCH	26.07	23.42	38.5	PASS
		MCH	26.04	23.39	38.5	PASS
		HCH	26.16	23.51	38.5	PASS
GSM1900	GSM/TM1	LCH	29.26	31.26	33	PASS
		MCH	29.39	31.39	33	PASS
		HCH	29.85	31.85	33	PASS
	GSM/TM2	LCH	25.54	27.54	33	PASS
		MCH	25.77	27.77	33	PASS
		HCH	25.72	27.72	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 wxceed 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	.19	13	PASS
		MCH	.15	13	PASS
		HCH	.18	13	PASS
	GSM/TM2	LCH	3.17	13	PASS
		MCH	2.86	13	PASS
		HCH	2.94	13	PASS
GSM1900	GSM/TM1	LCH	.15	13	PASS
		MCH	.14	13	PASS
		HCH	.14	13	PASS
	GSM/TM2	LCH	3.03	13	PASS
		MCH	3.05	13	PASS
		HCH	3.12	13	PASS

3Appendix_C: Modulation Characteristics

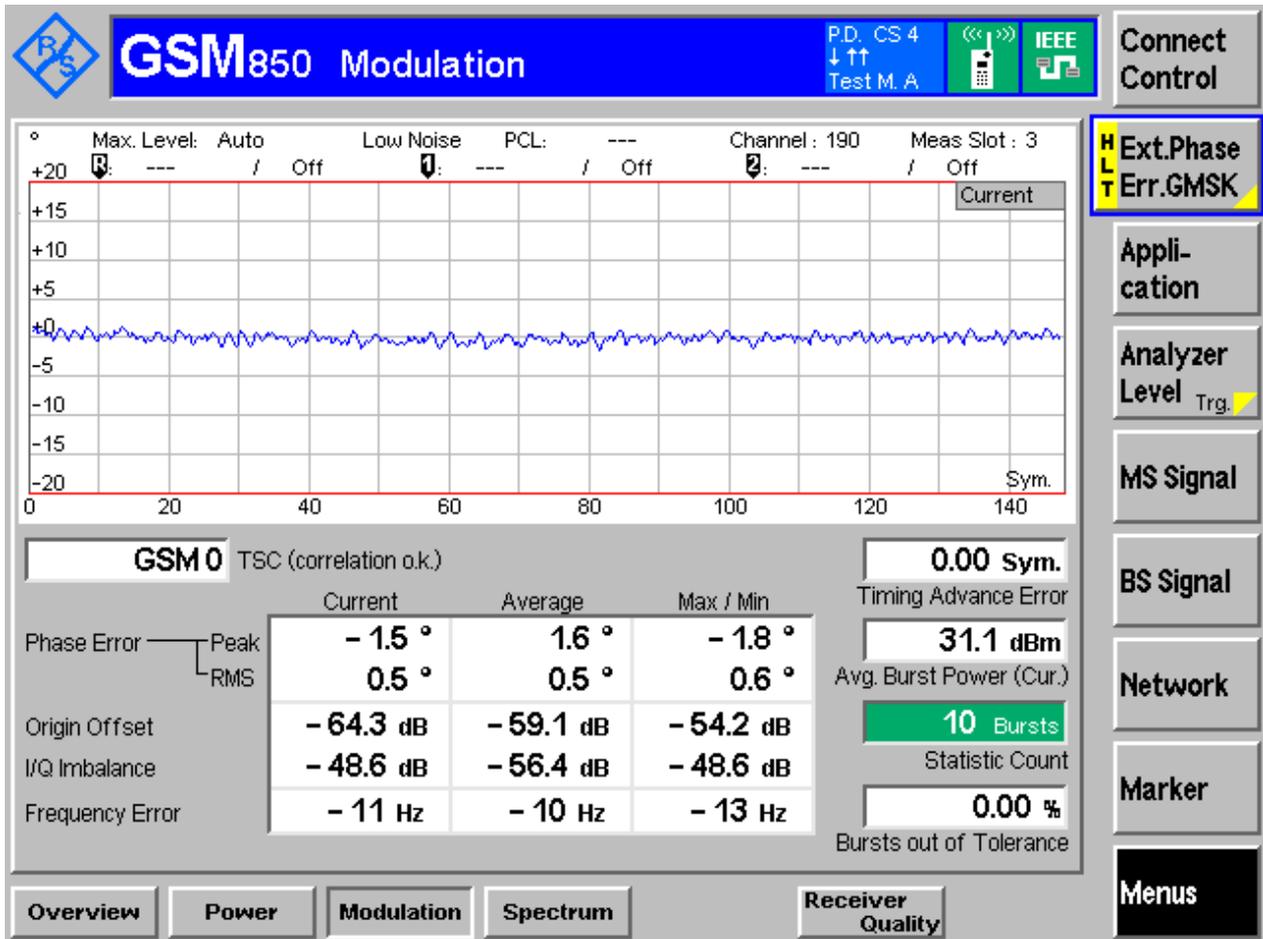
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

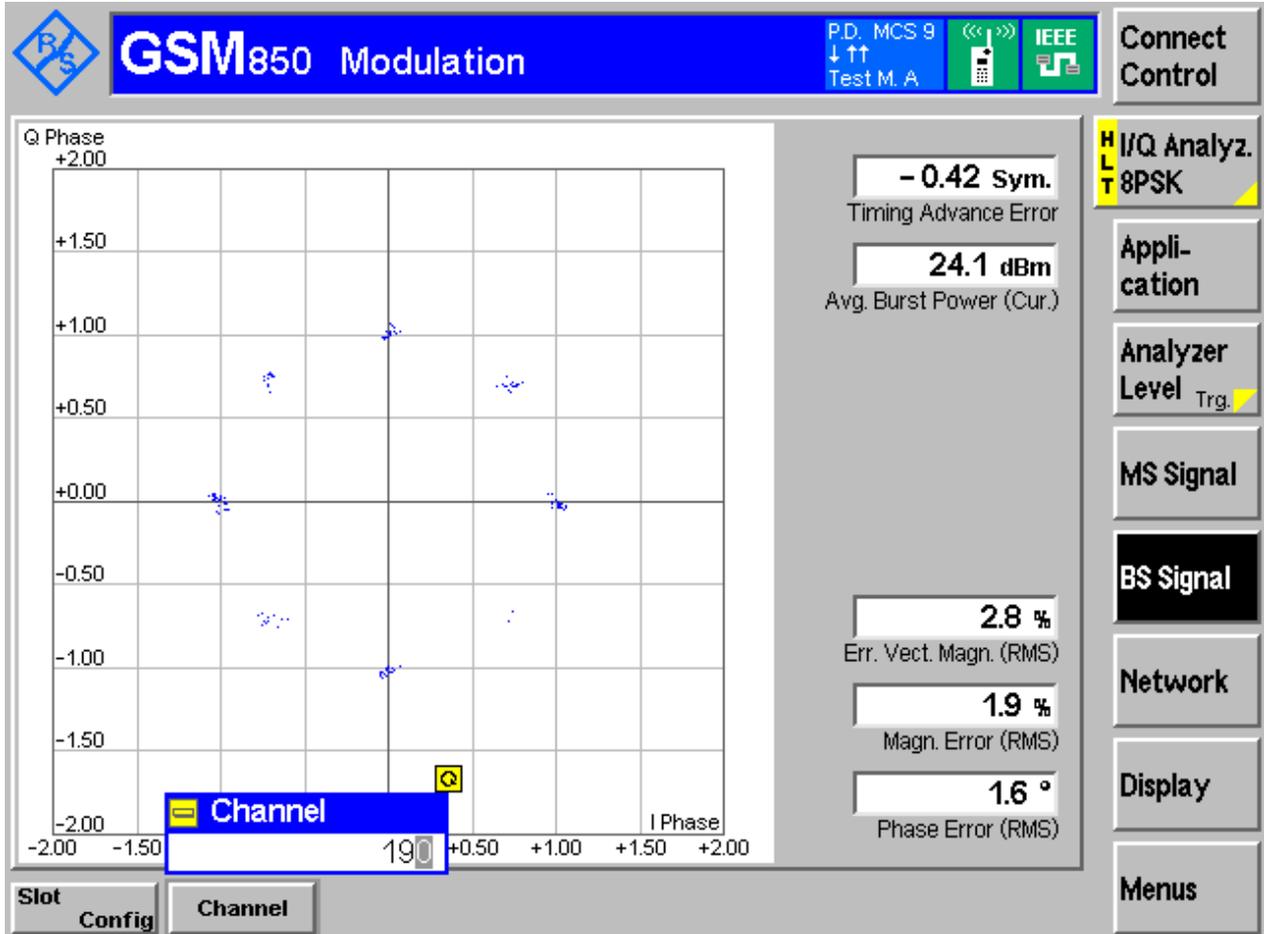
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

3.1.1.2.1 Test Channel = MCH

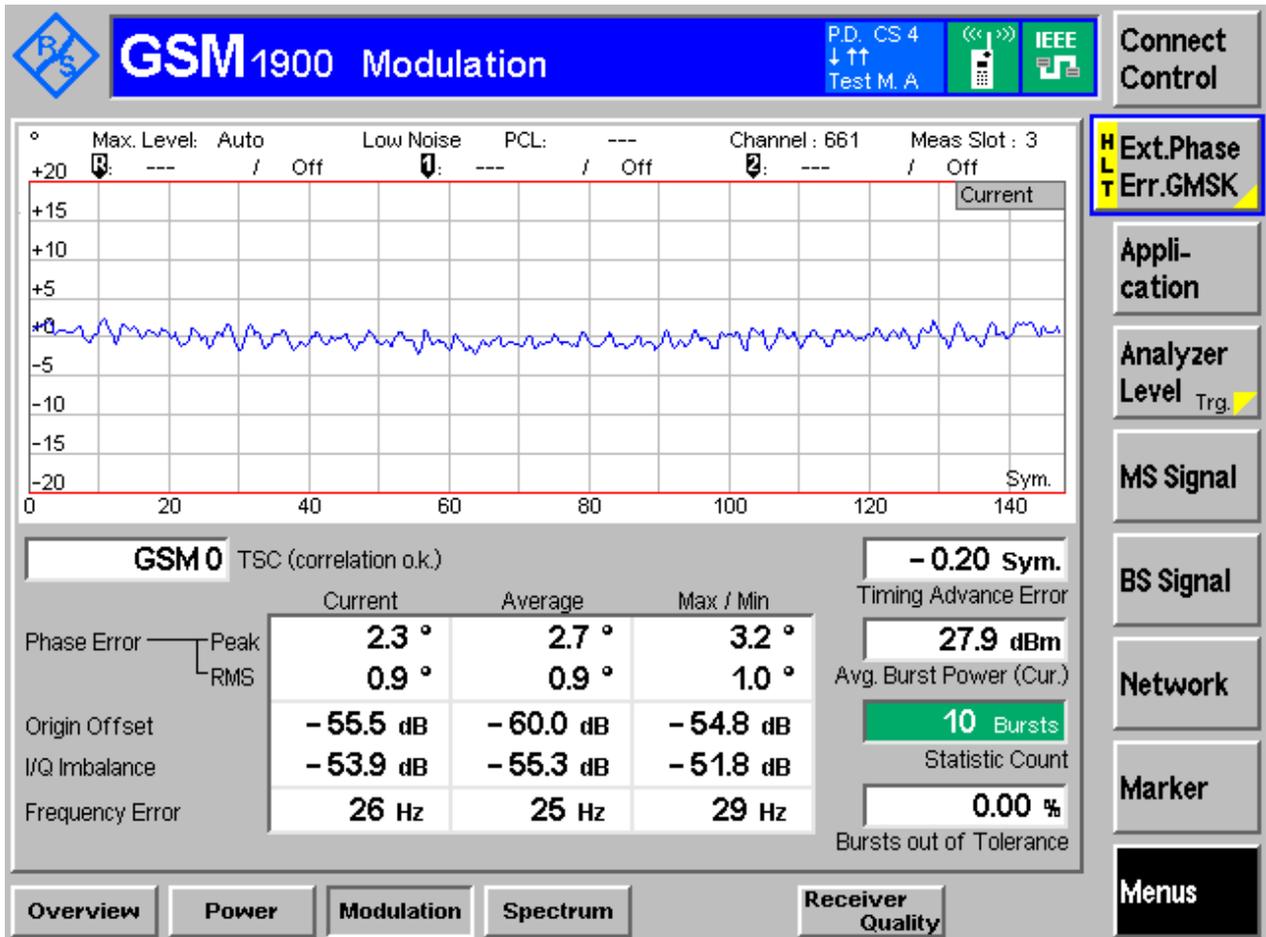




3.1.2 Test Band = GSM1900

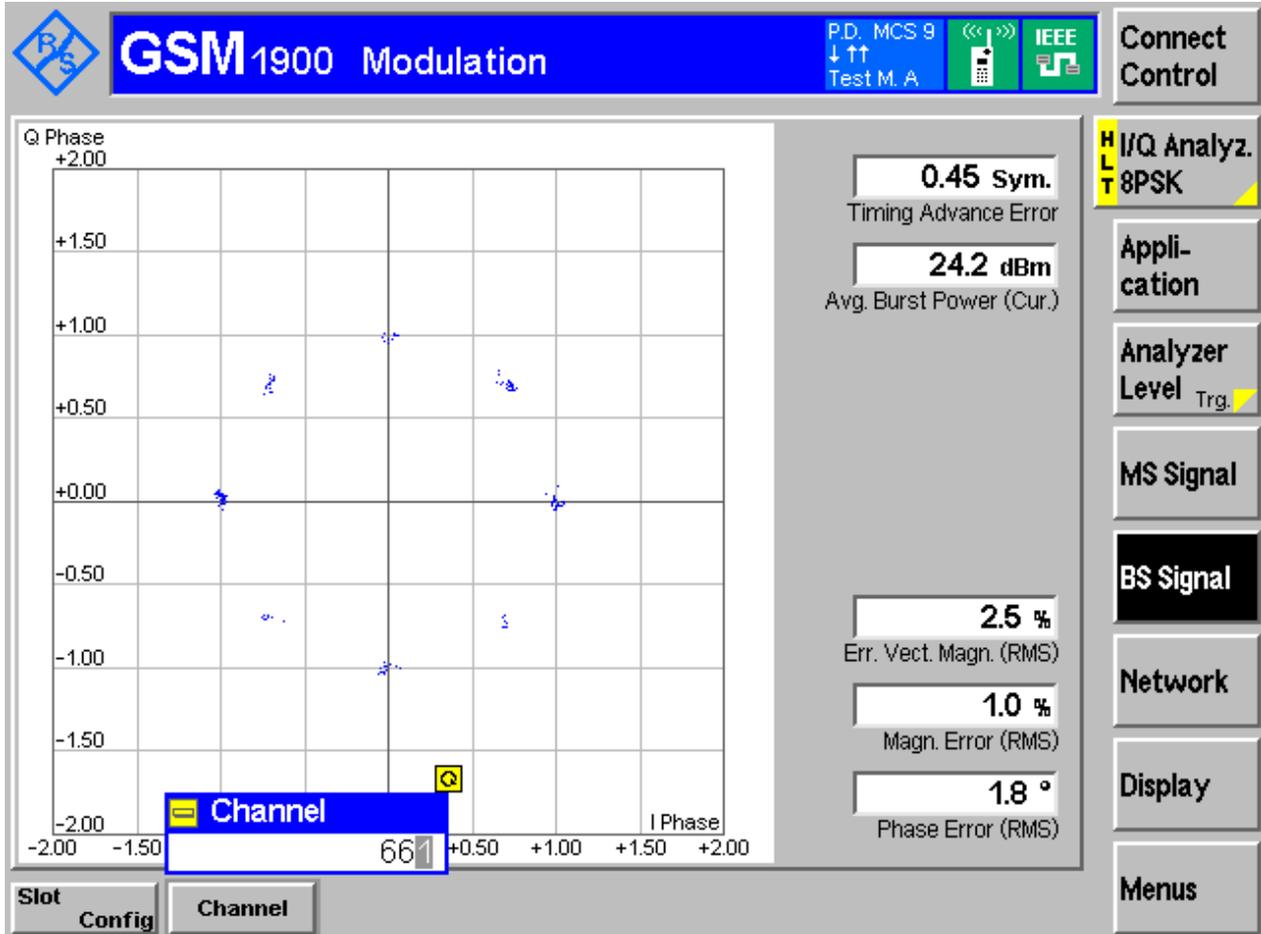
3.1.2.1 Test Mode = GSM/TM1

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	243.38	315.66	Pass
		MCH	239.90	315.39	Pass
		HCH	244.09	309.13	Pass
	GSM/TM2	LCH	230.06	298.26	Pass
		MCH	235.47	314.30	Pass
		HCH	241.55	300.99	Pass
GSM1900	GSM/TM1	LCH	243.04	308.78	Pass
		MCH	243.53	313.53	Pass
		HCH	242.73	310.21	Pass
	GSM/TM2	LCH	248.50	317.84	Pass
		MCH	242.24	316.72	Pass
		HCH	240.30	311.35	Pass



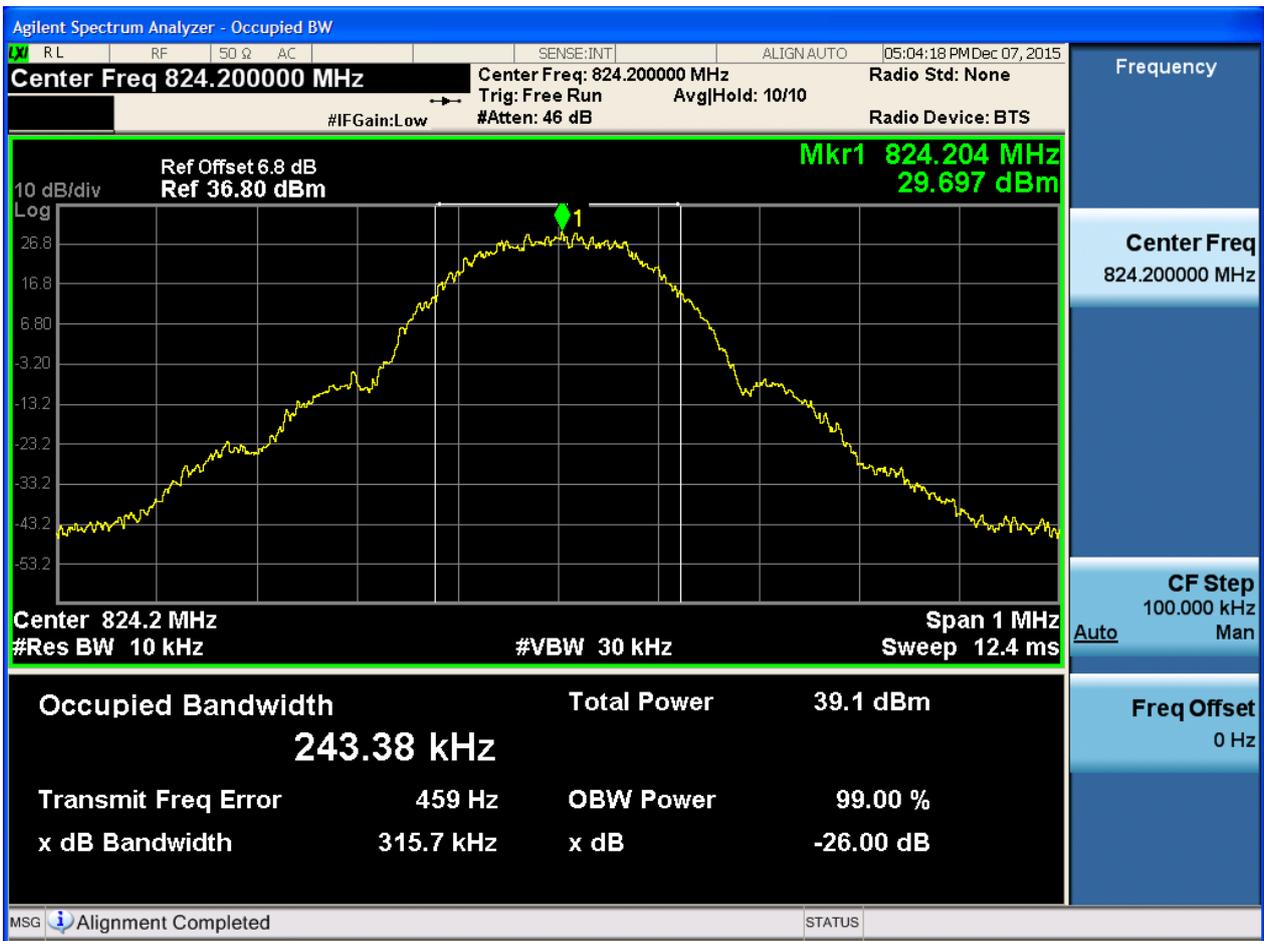
Part II - Test Plots

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



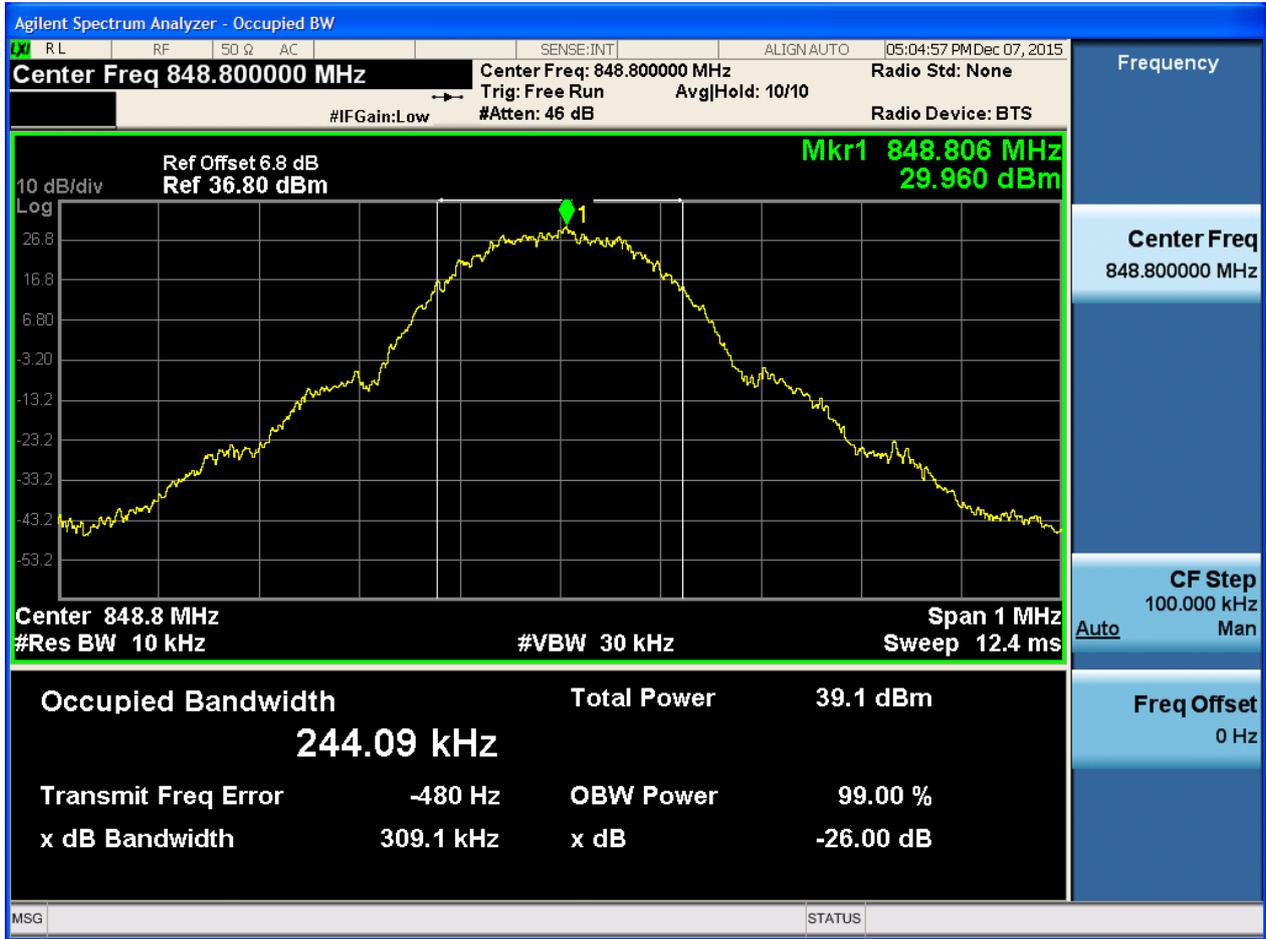


4.1.1.1.2 Test Channel = MCH





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

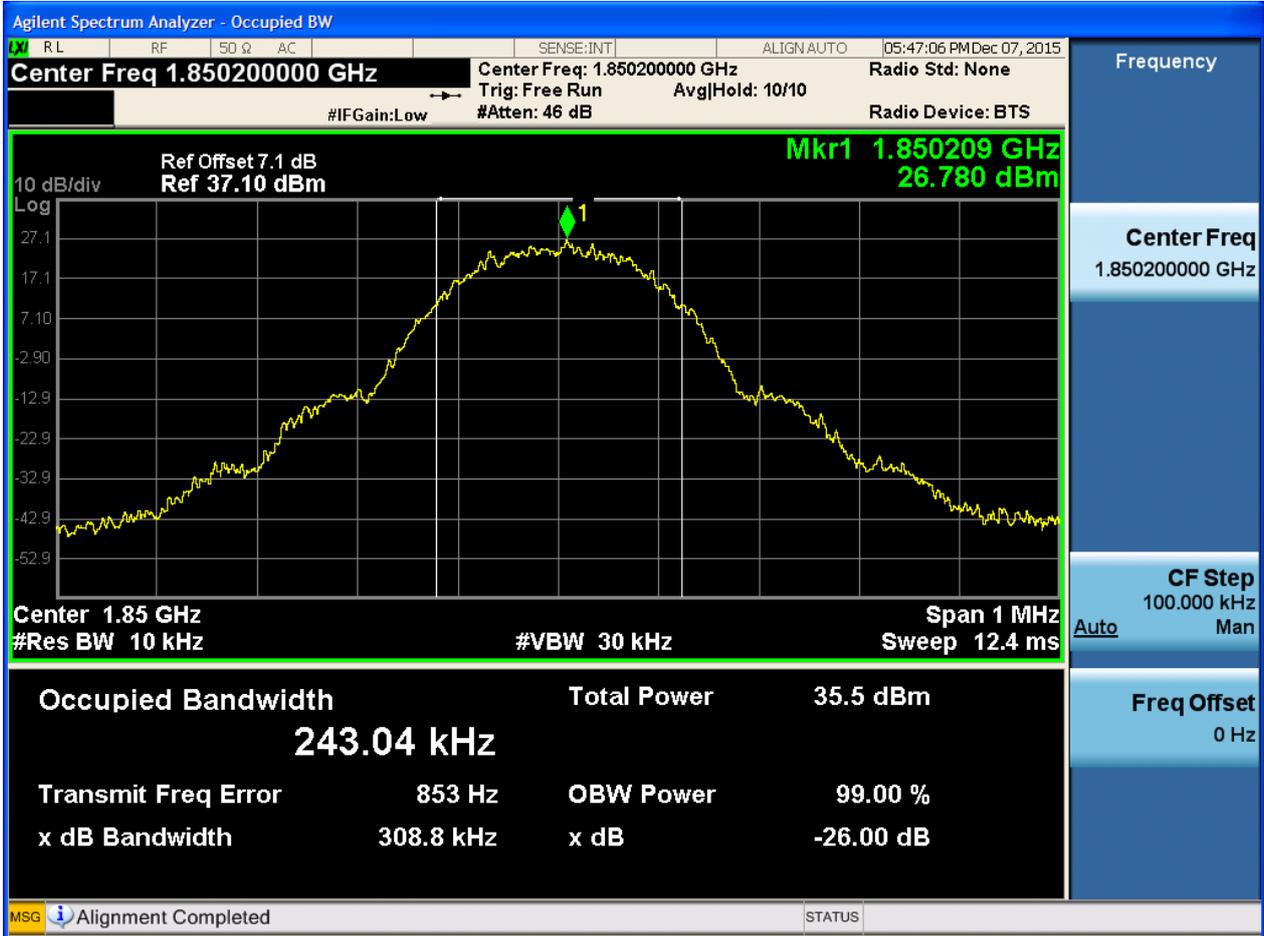




4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



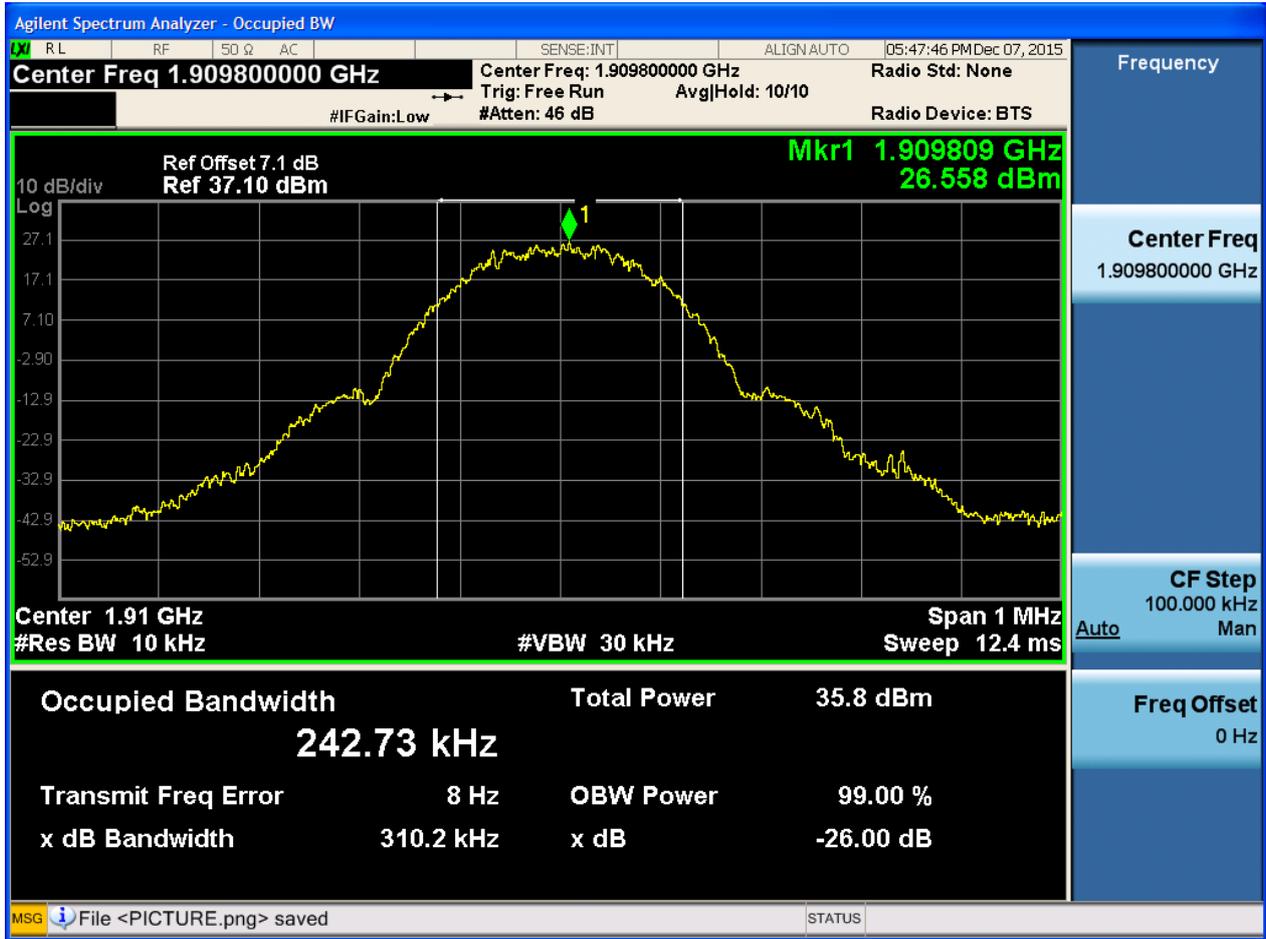


4.1.2.1.2 Test Channel = MCH





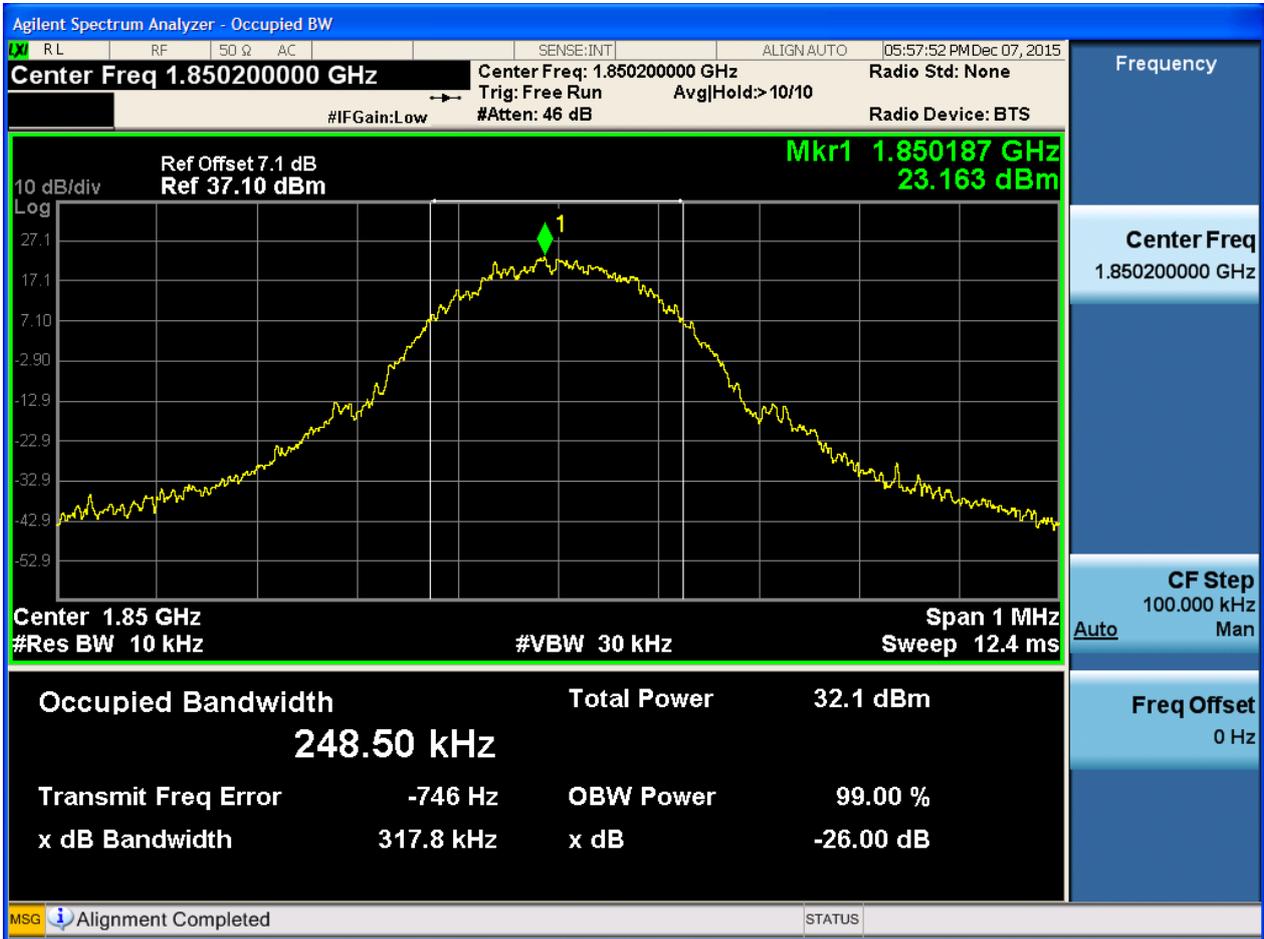
4.1.2.1.3 Test Channel = HCH





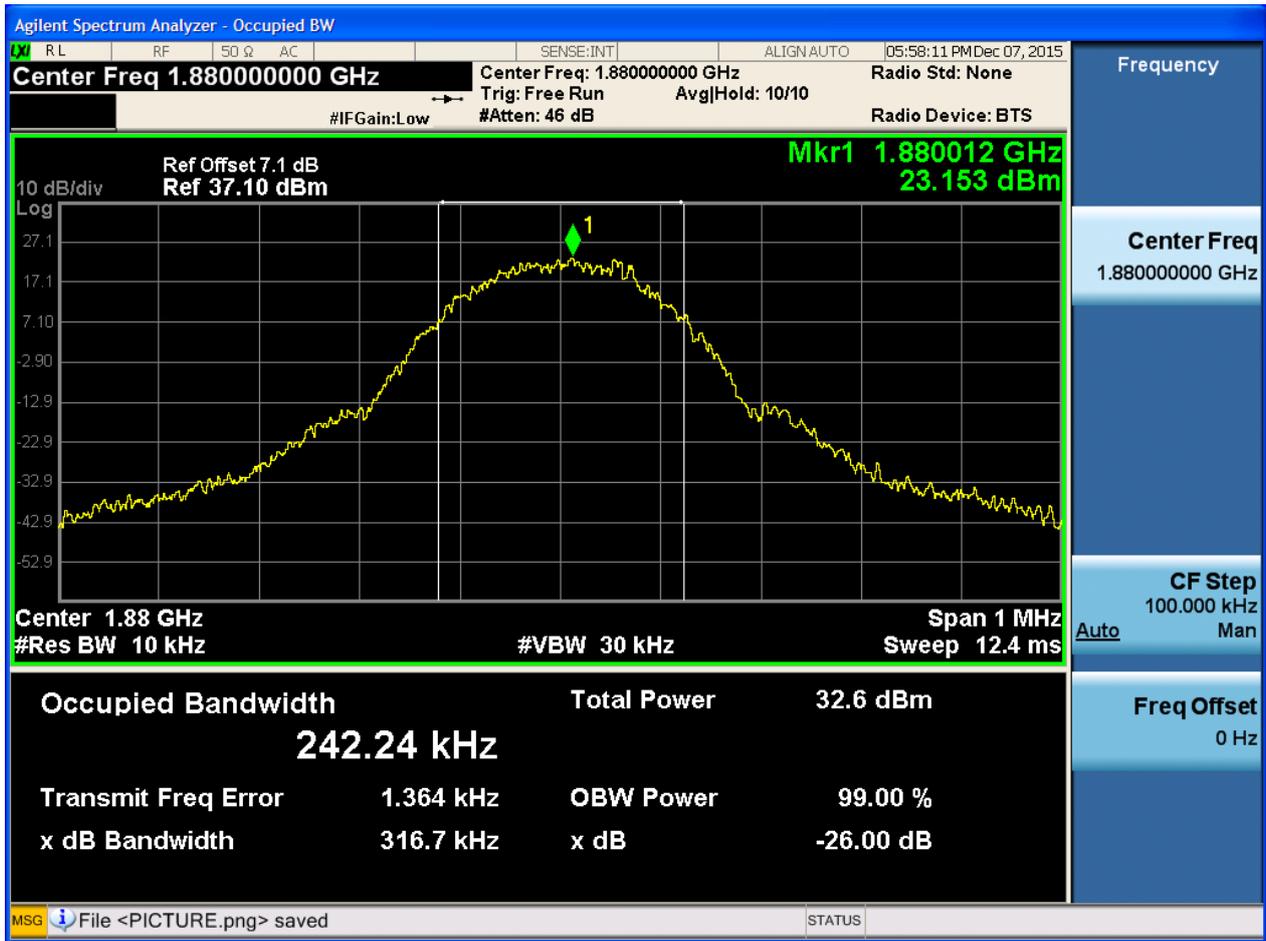
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



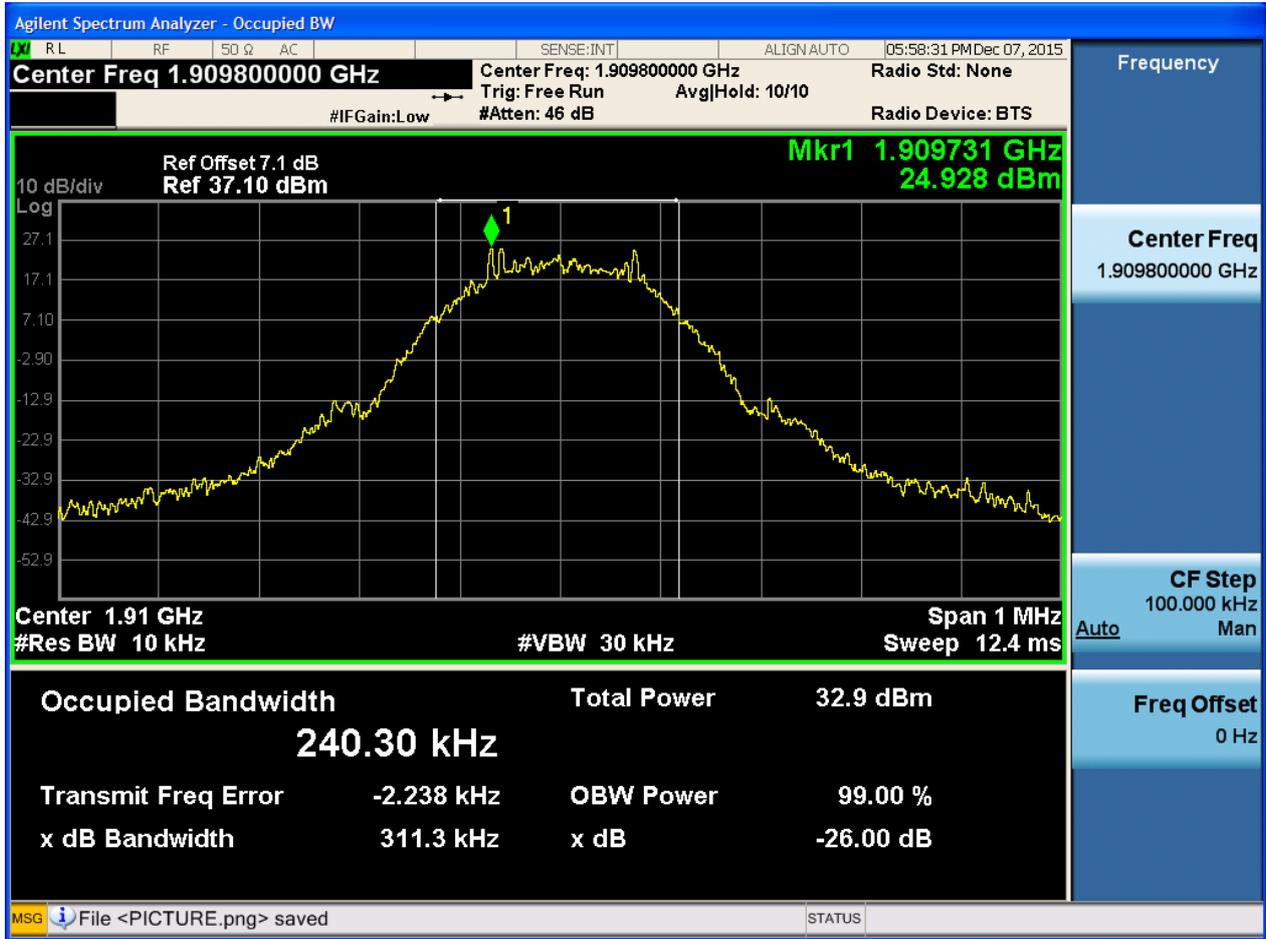


4.1.2.2.2 Test Channel = MCH





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

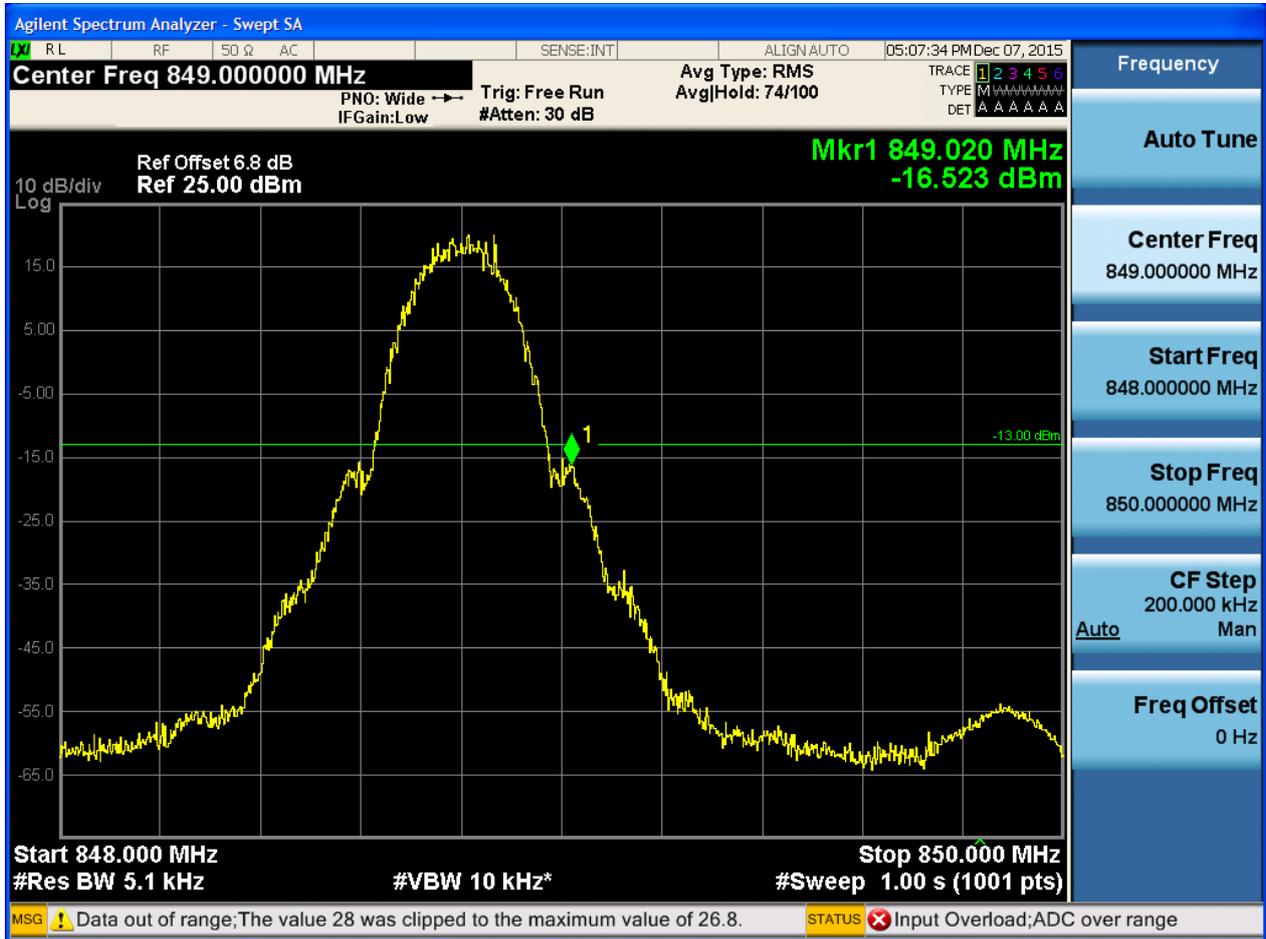
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





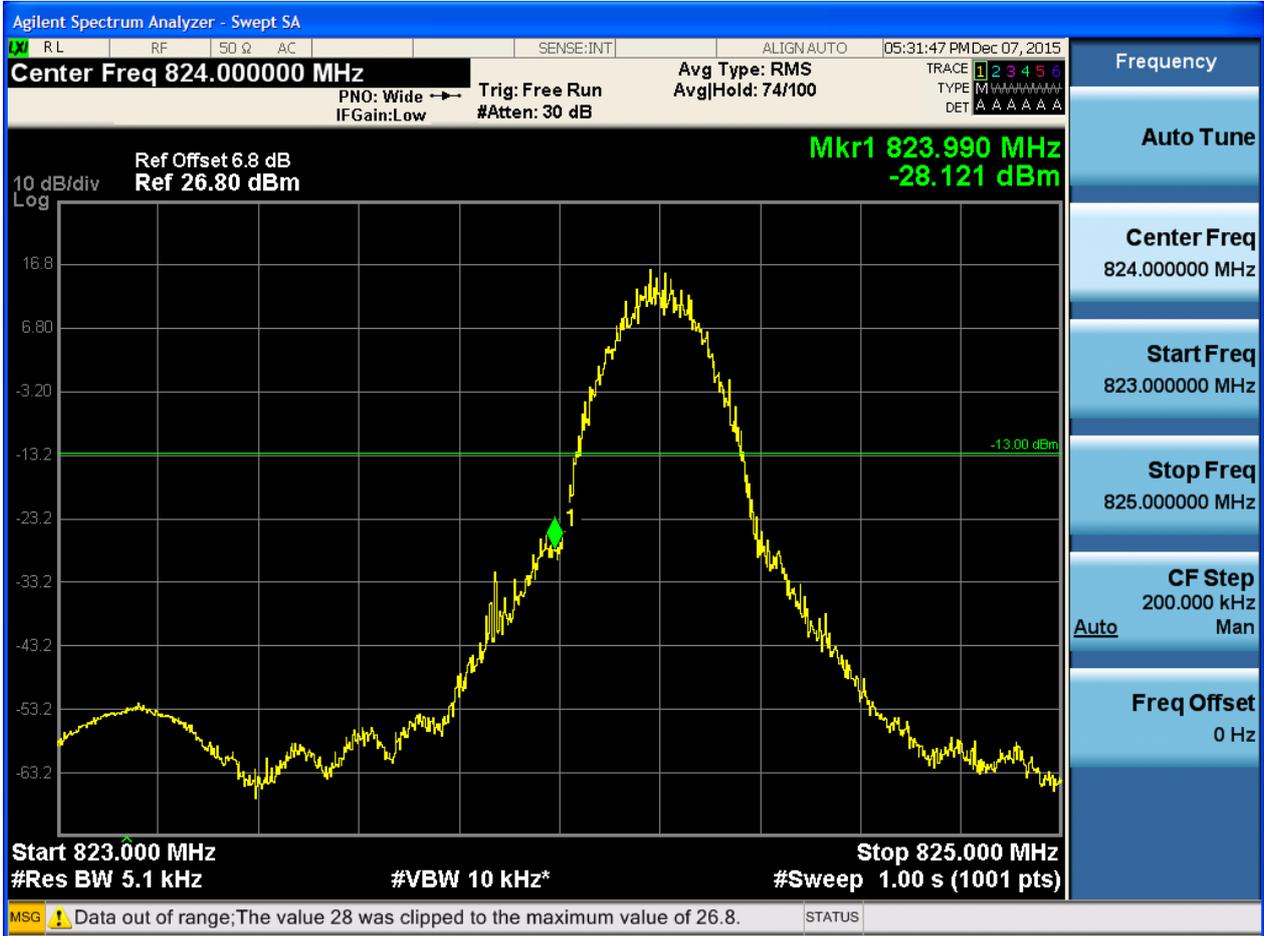
5.1.1.1.2 Test Channel = HCH





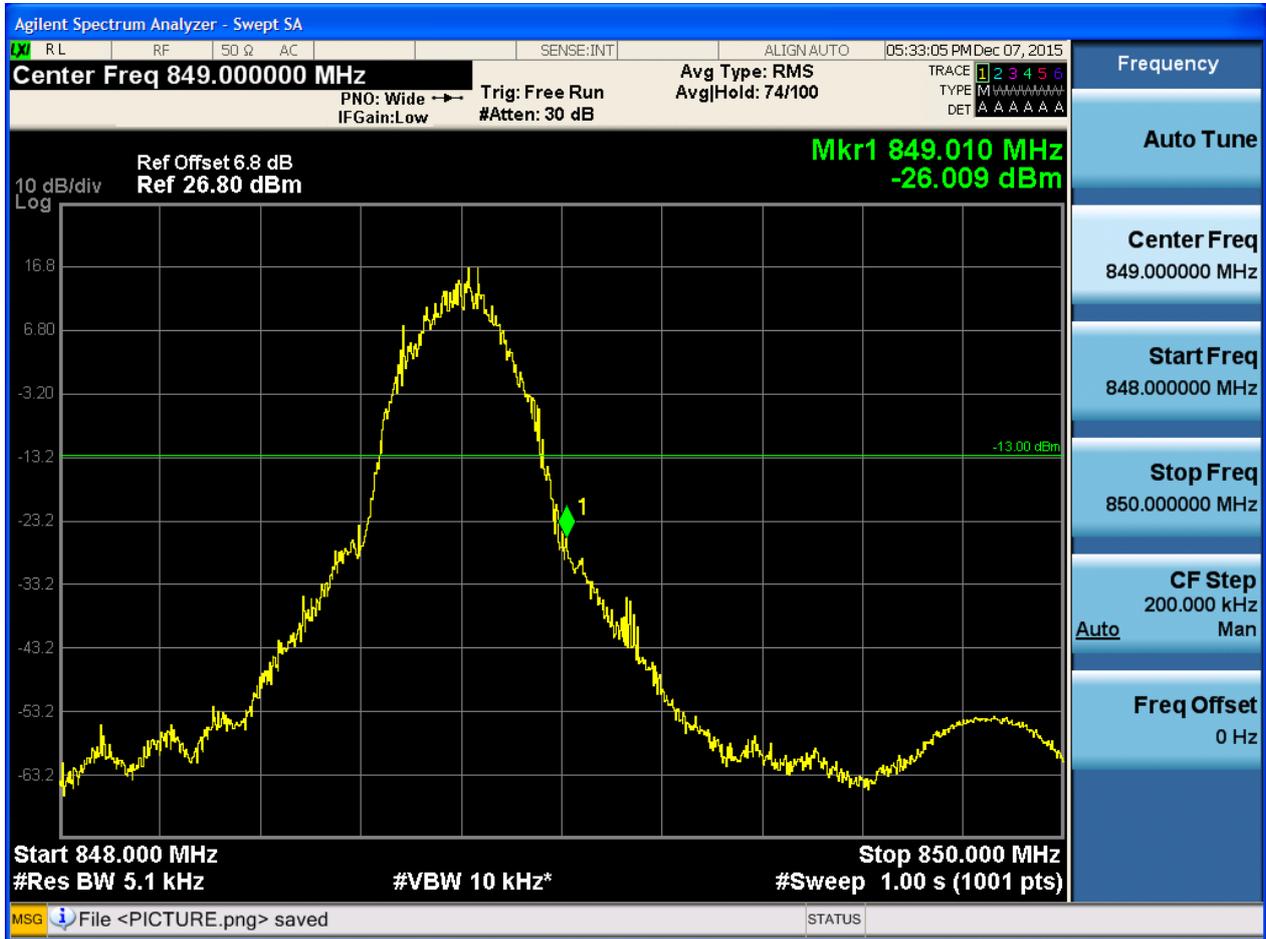
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

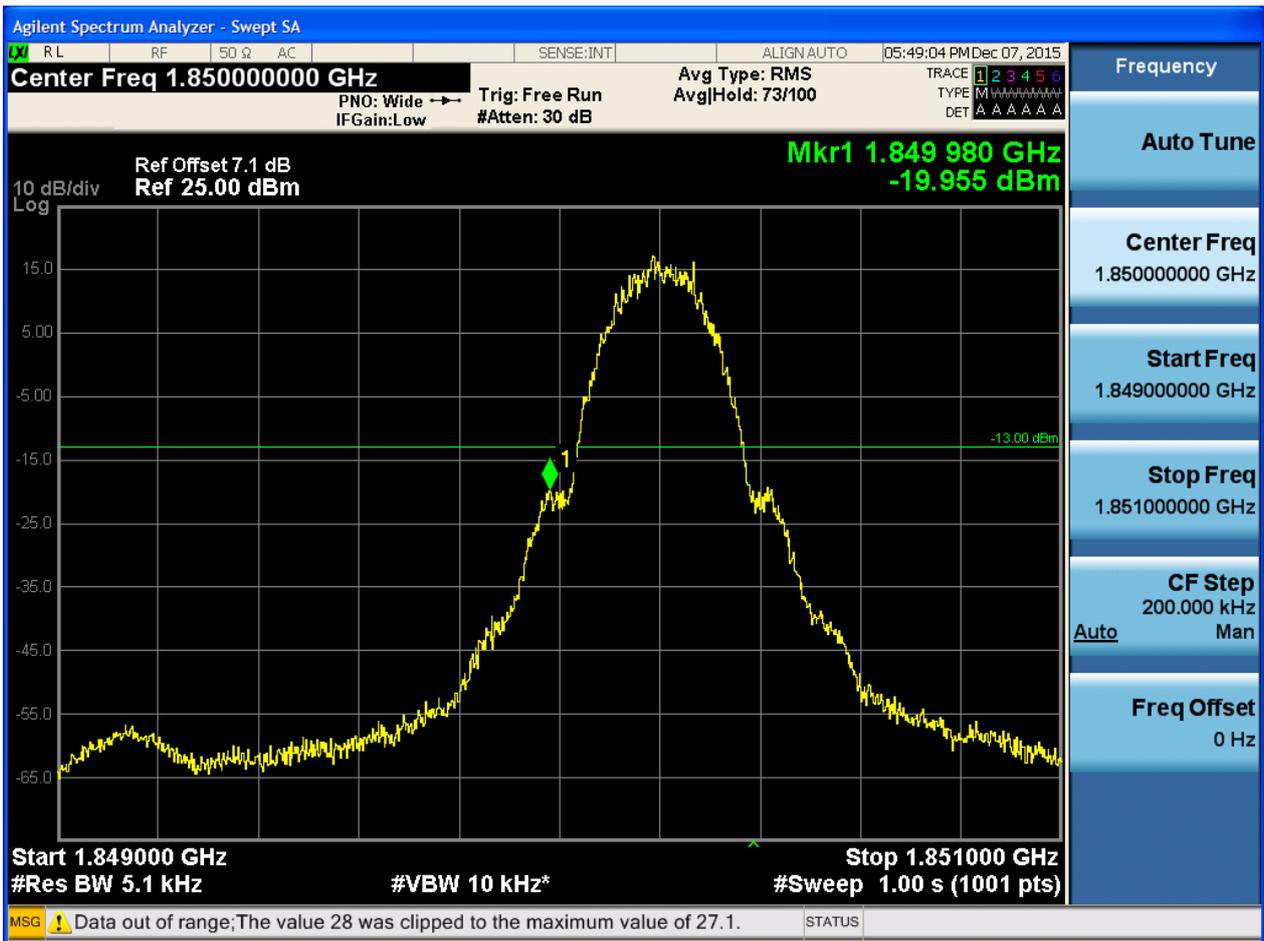




5.1.2 Test Band = GSM1900

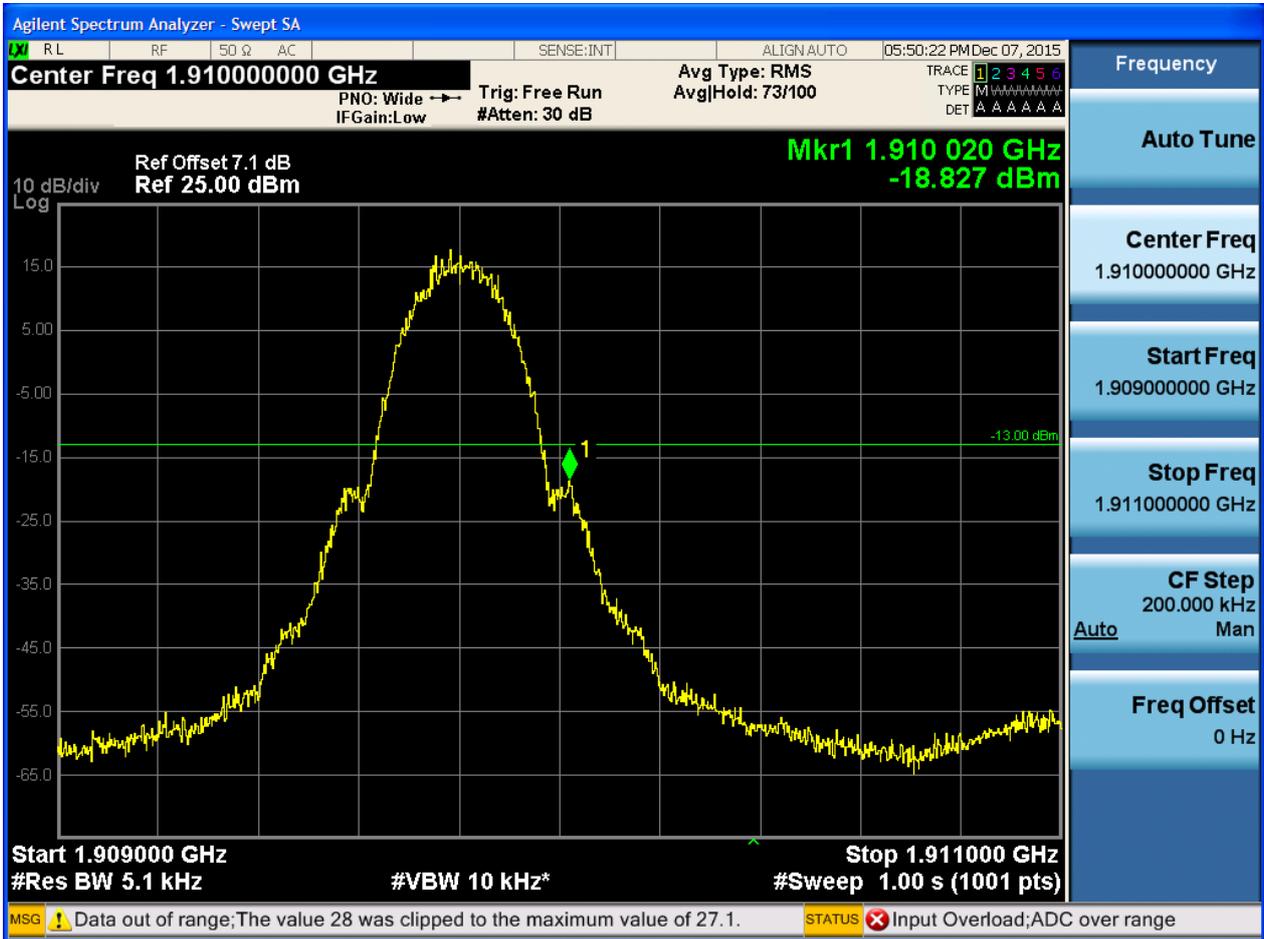
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





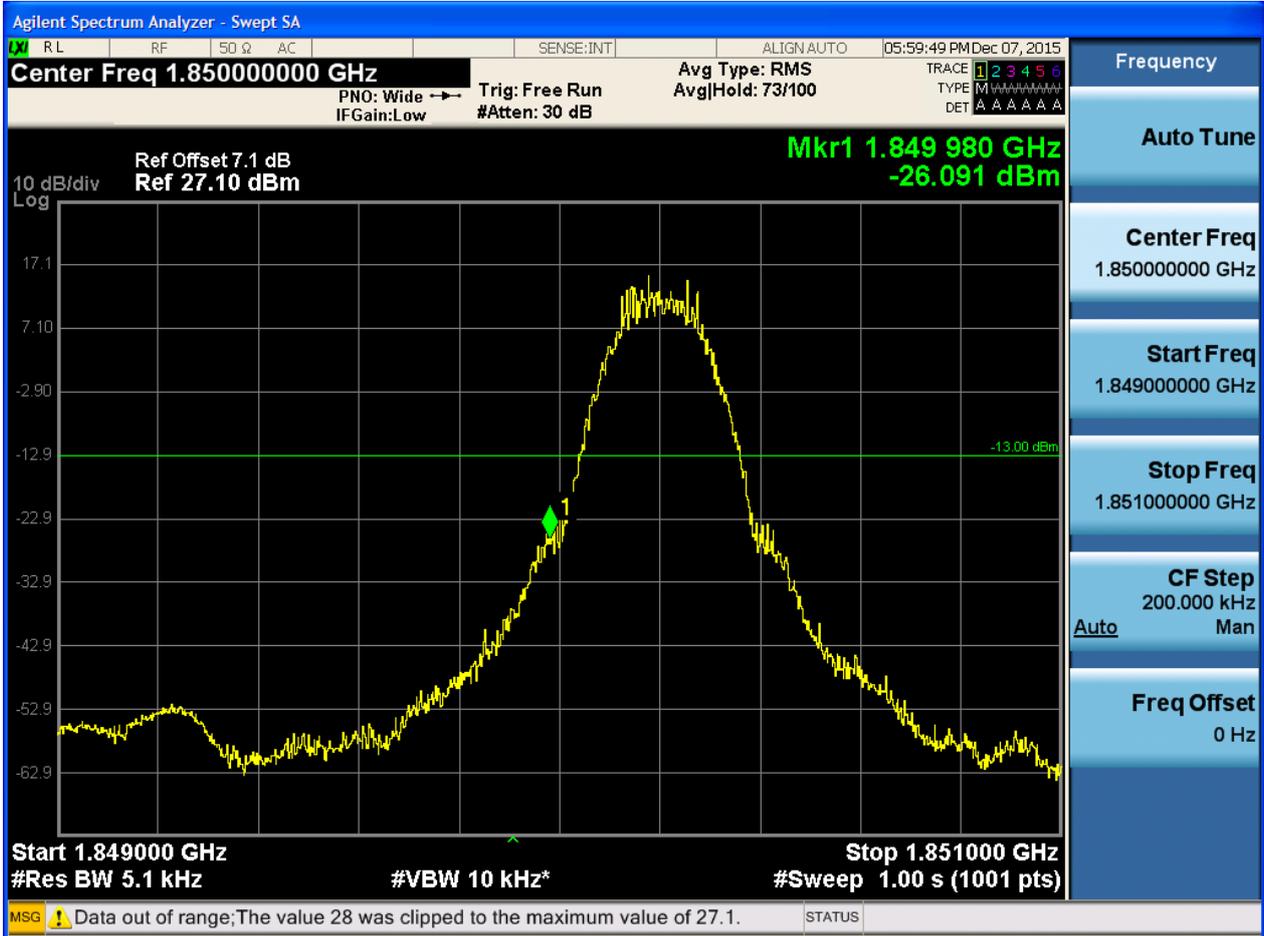
5.1.2.1.2 Test Channel = HCH



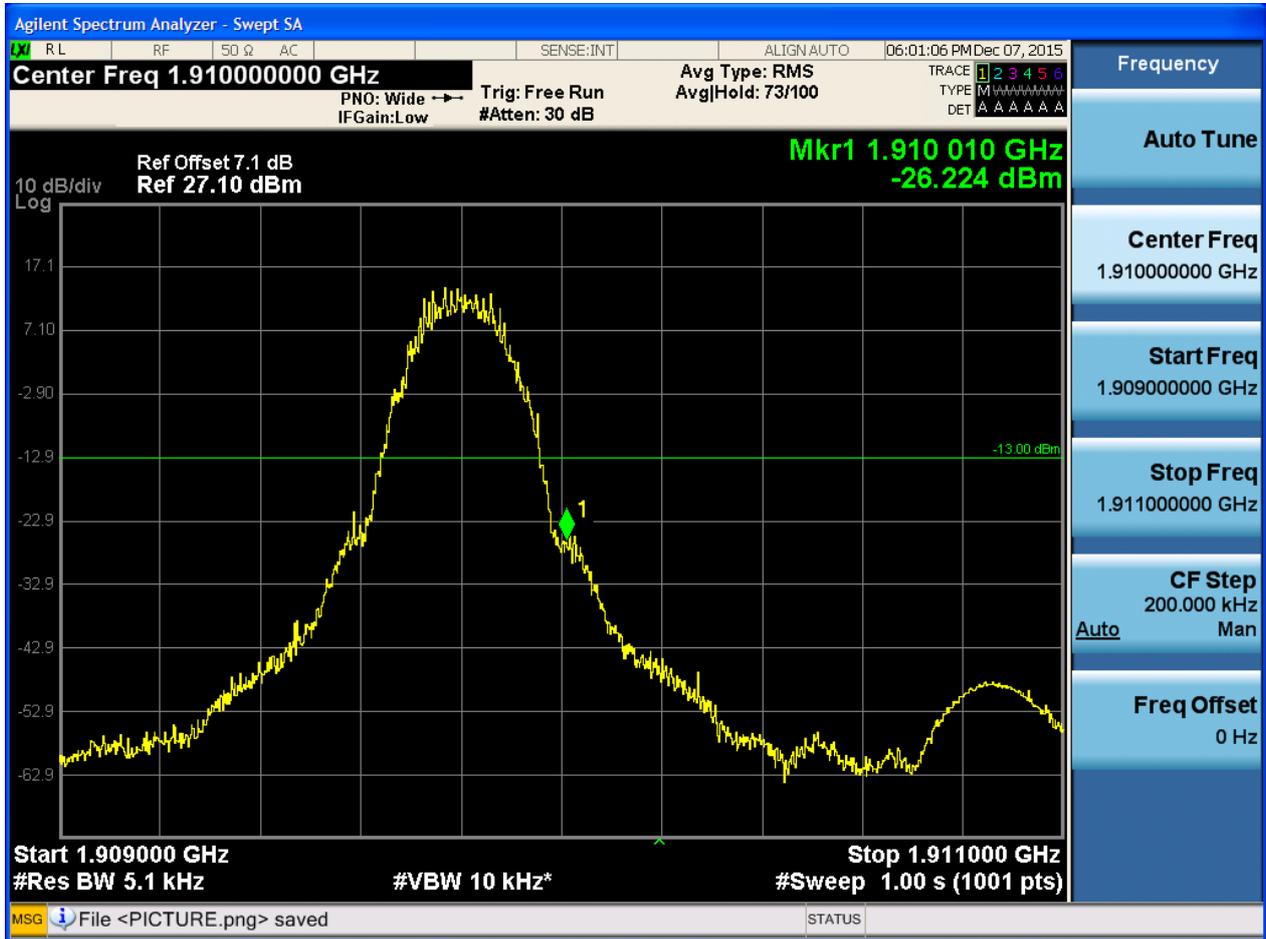


5.1.2.2 Test Mode = GSM/TM2

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.

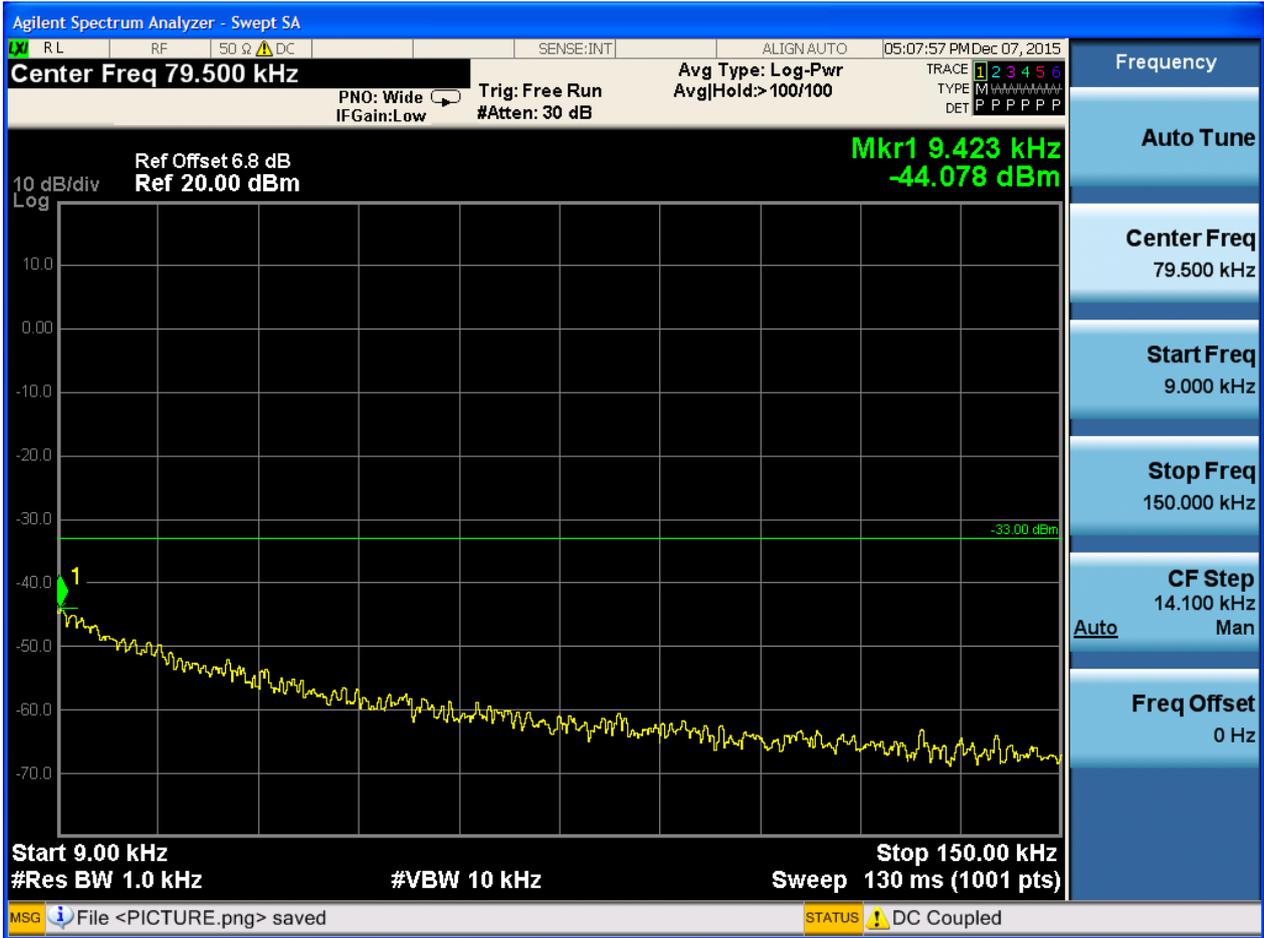
Part I - Test Plots

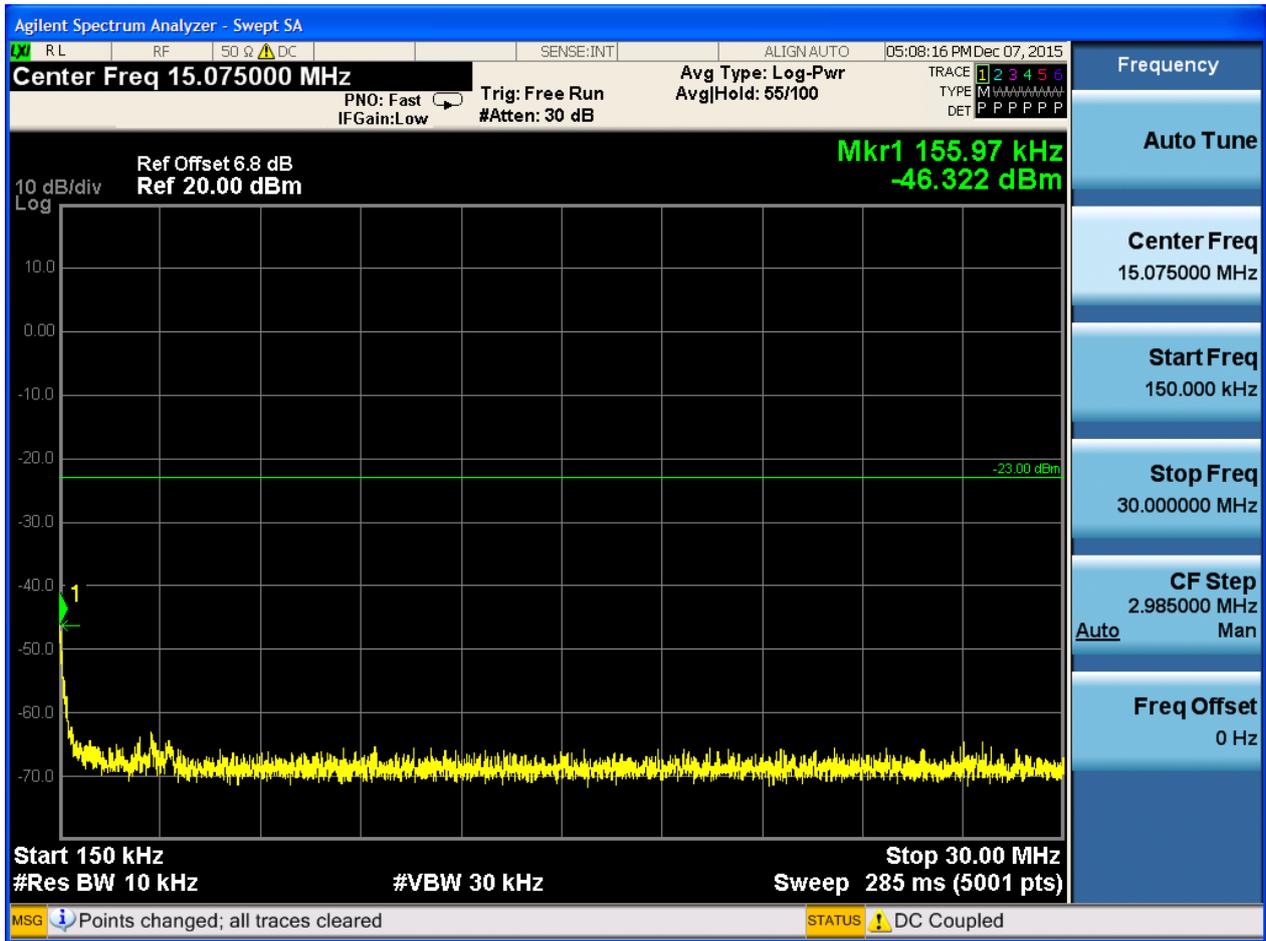
6.1 For GSM

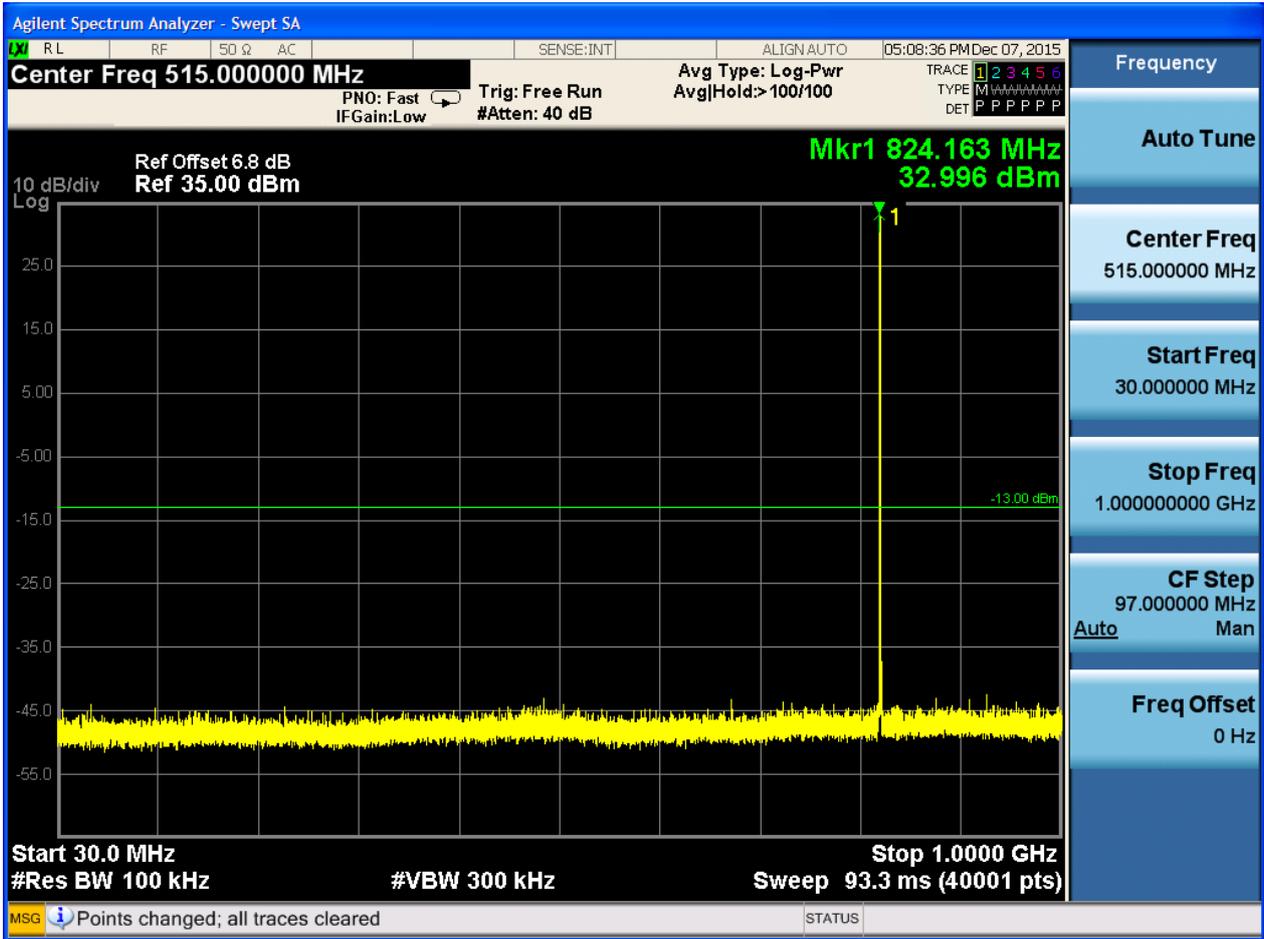
6.1.1 Test Band = GSM850

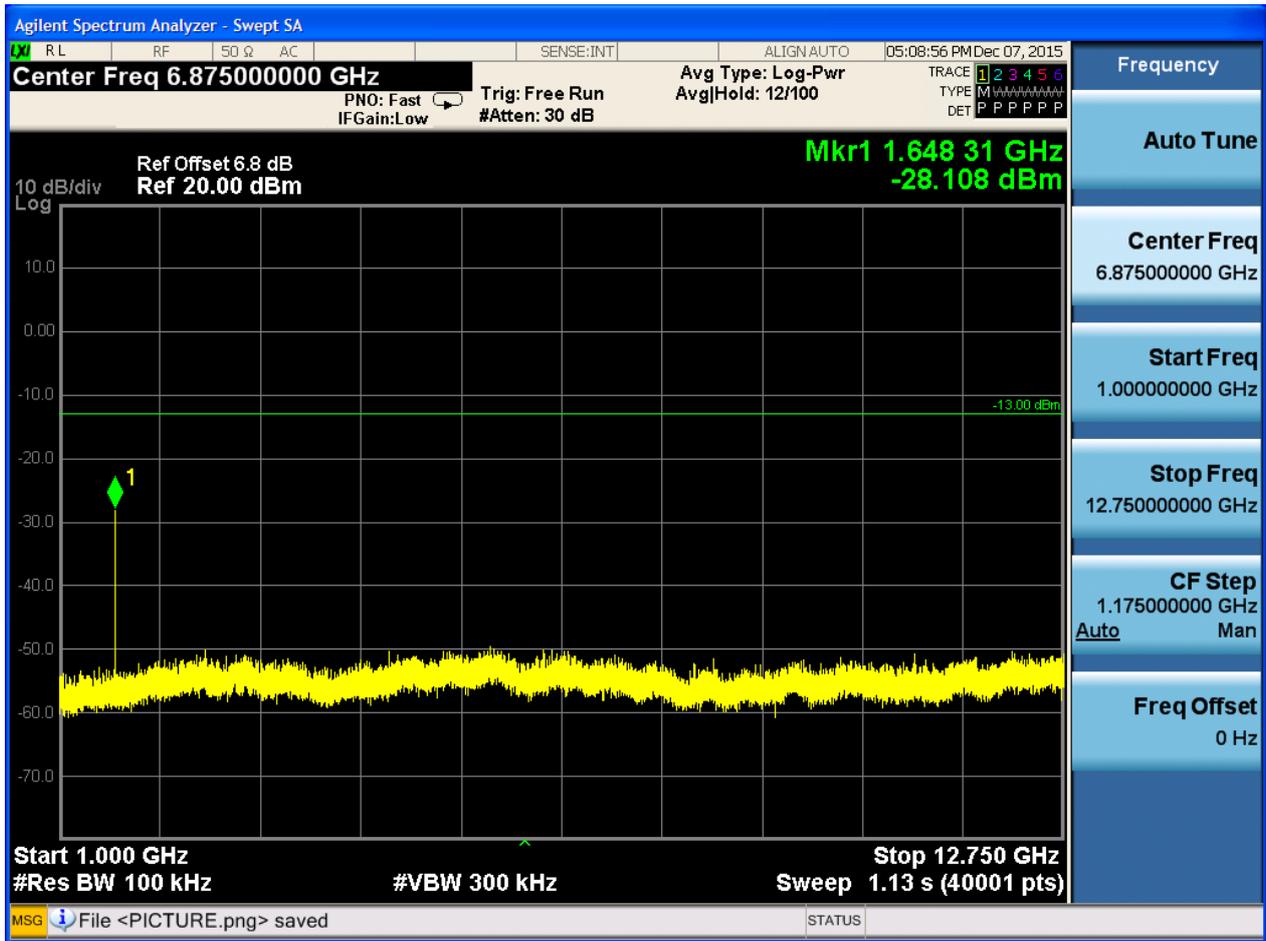
6.1.1.1 Test Mode = GSM/TM1

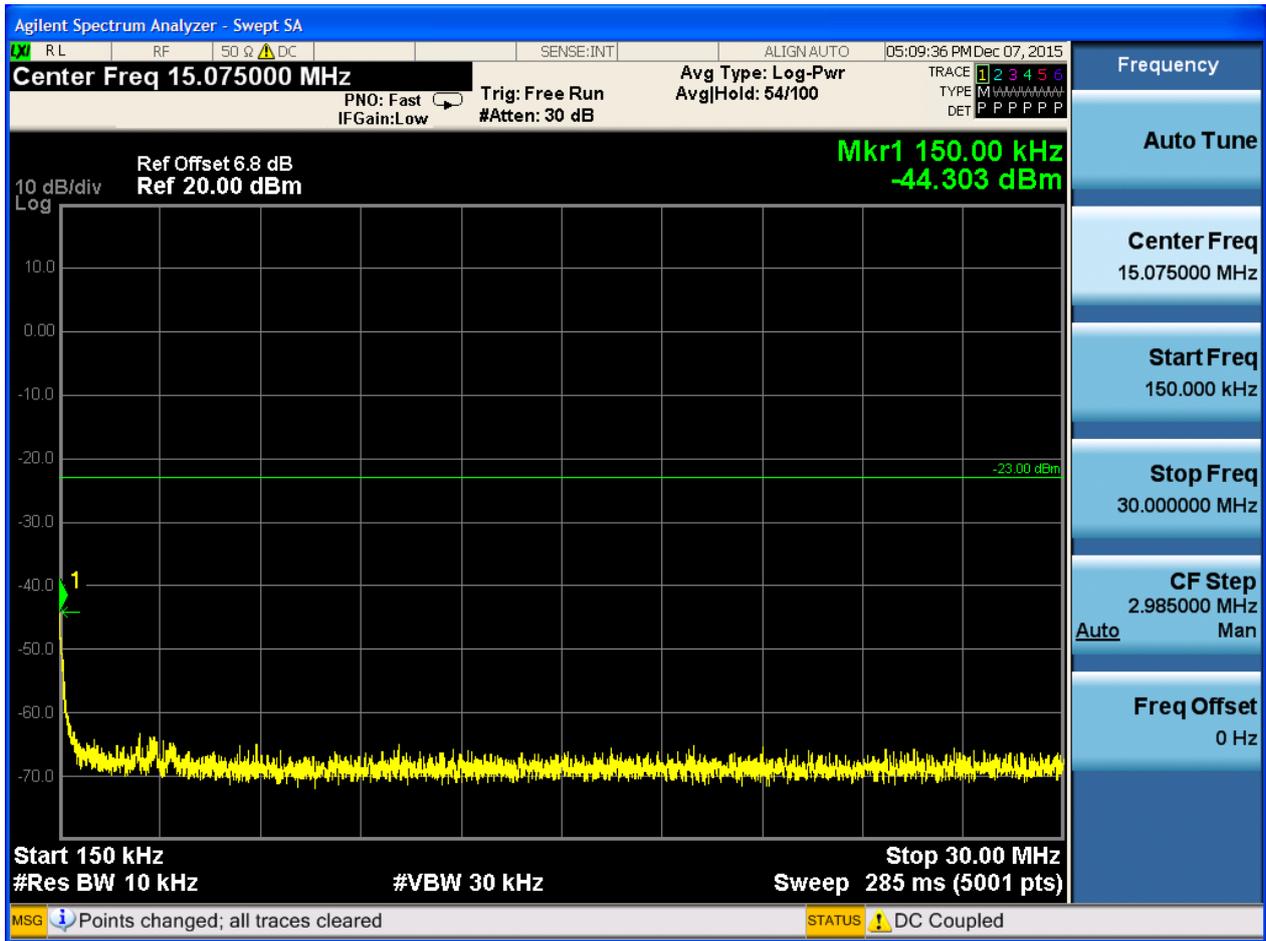
6.1.1.1.1 Test Channel = LCH

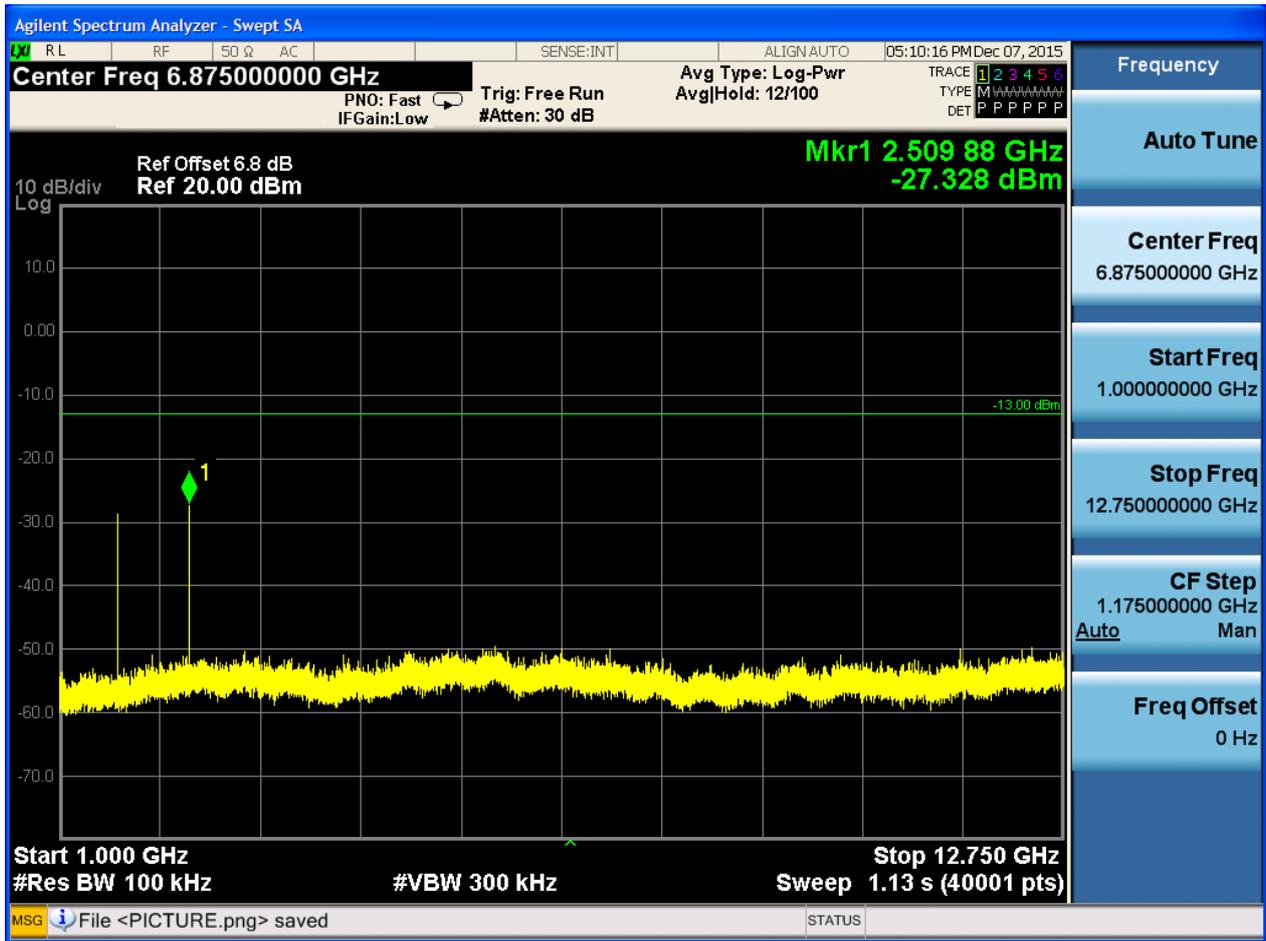


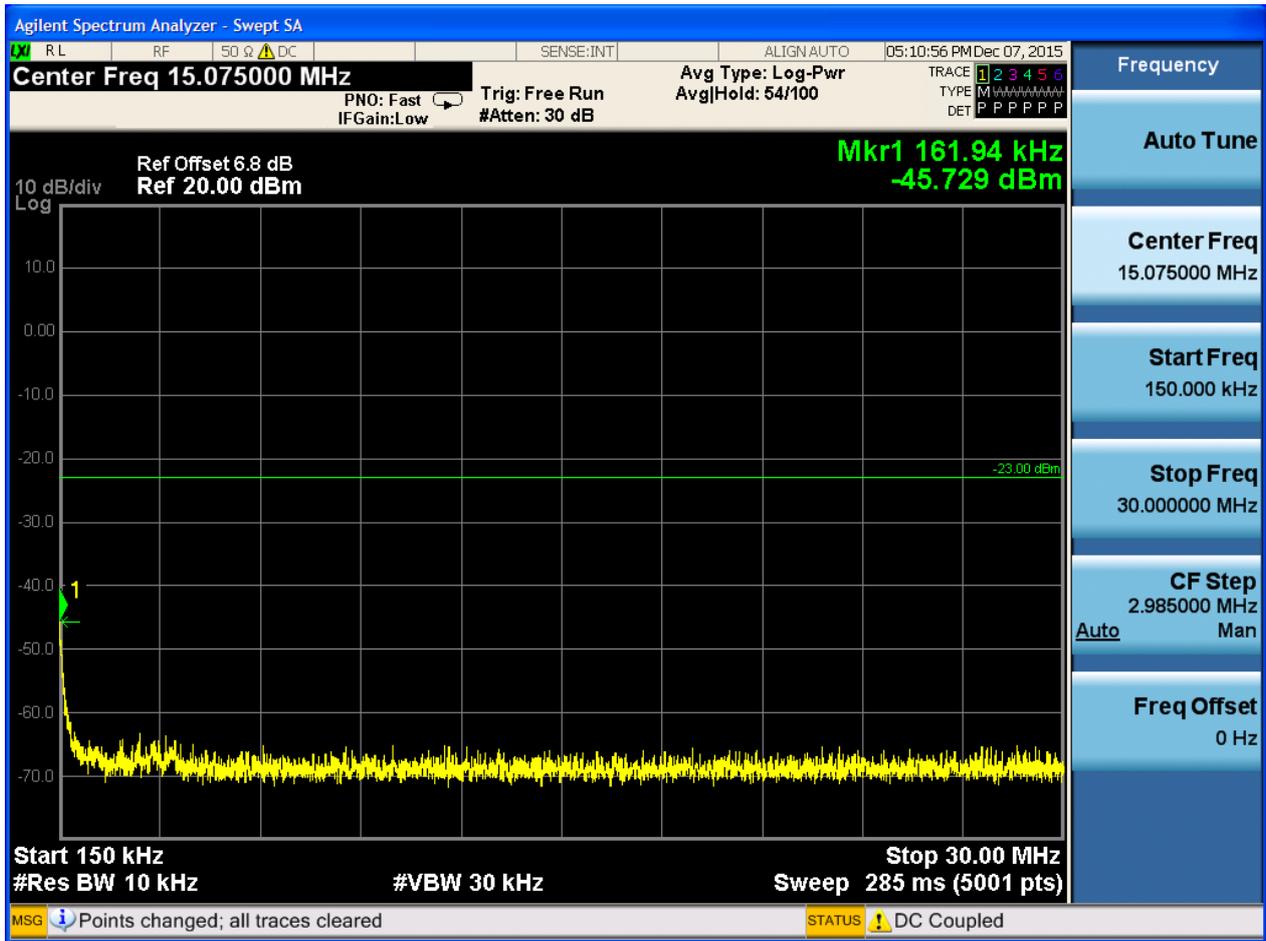


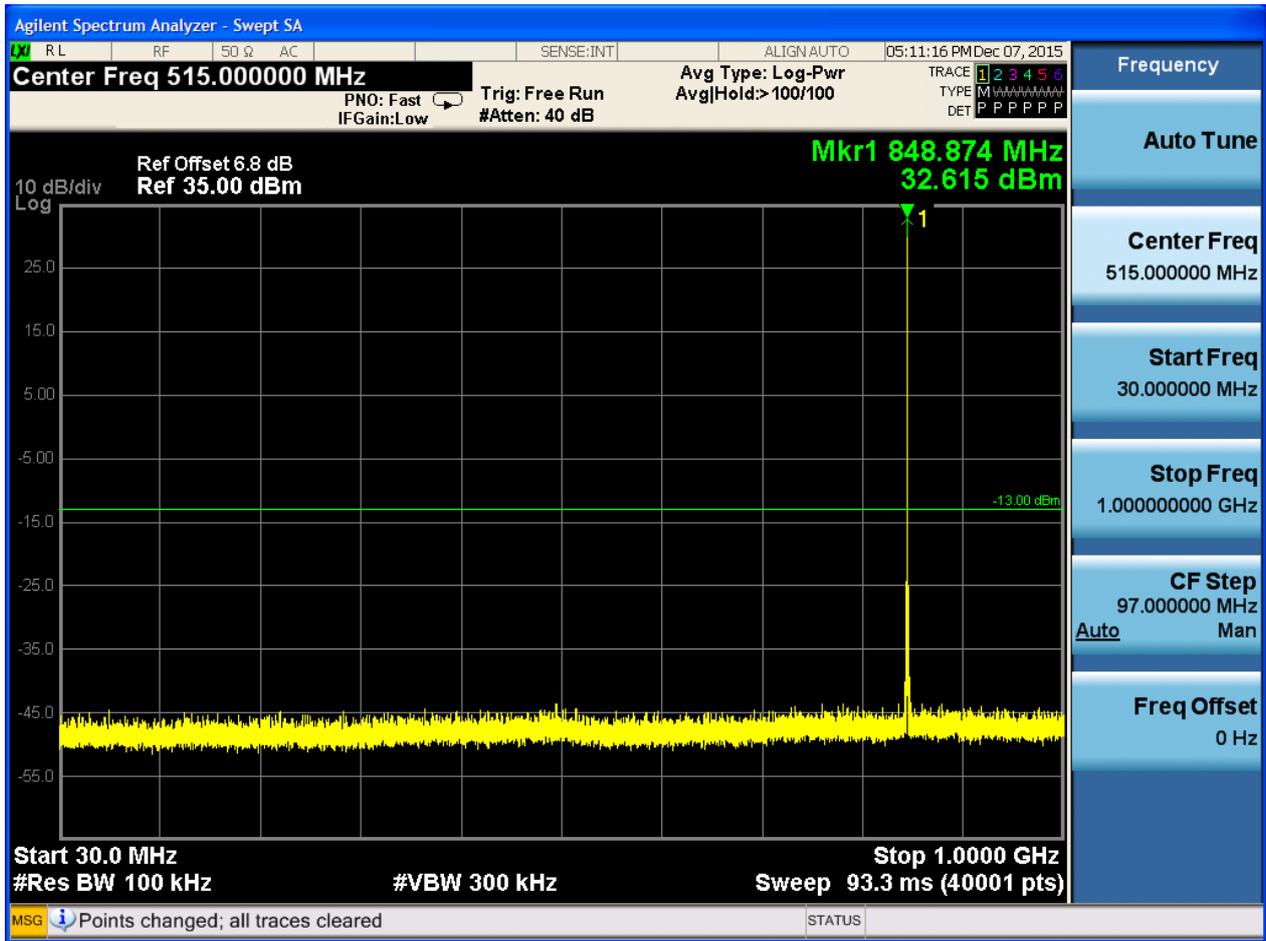


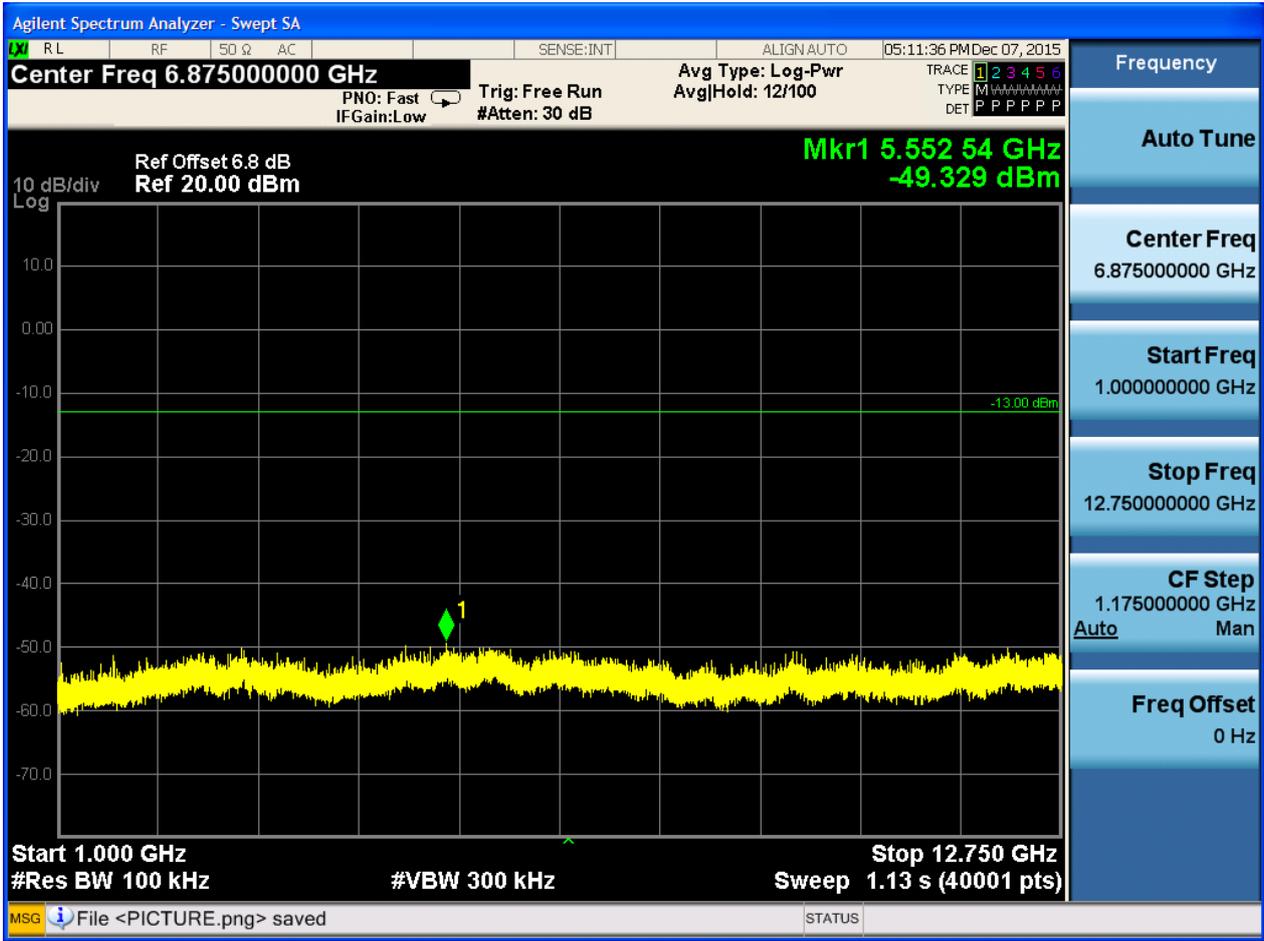


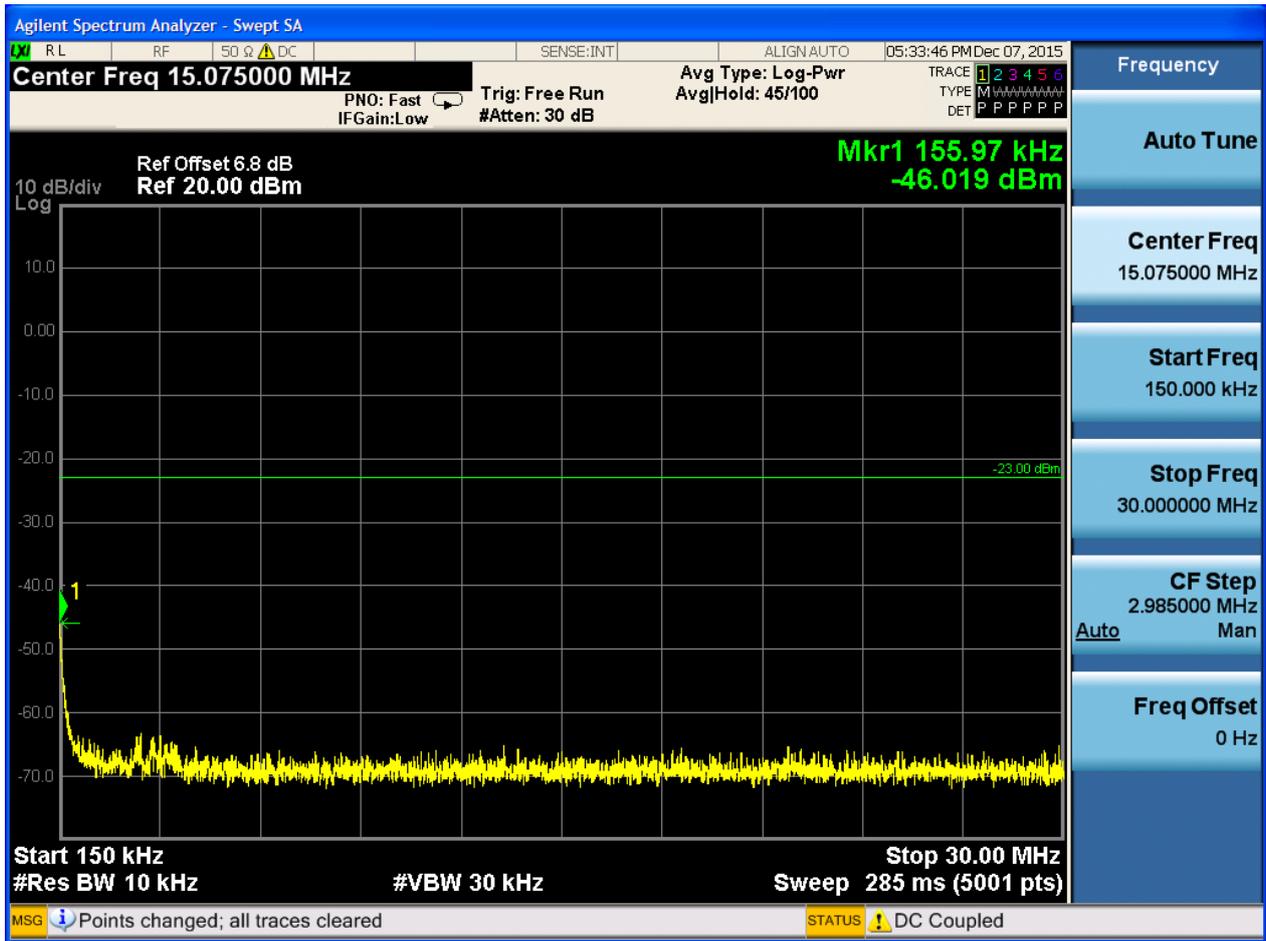


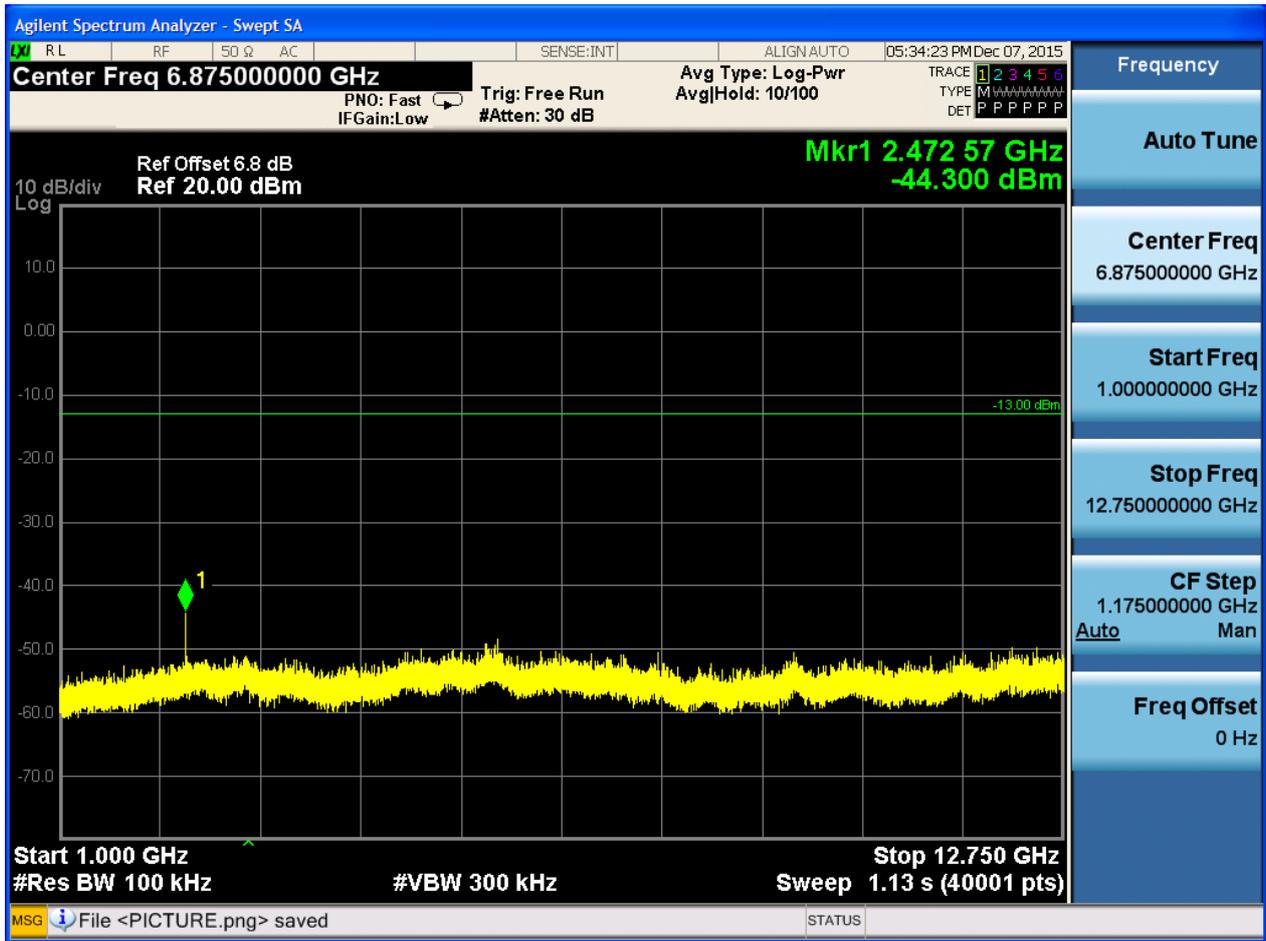






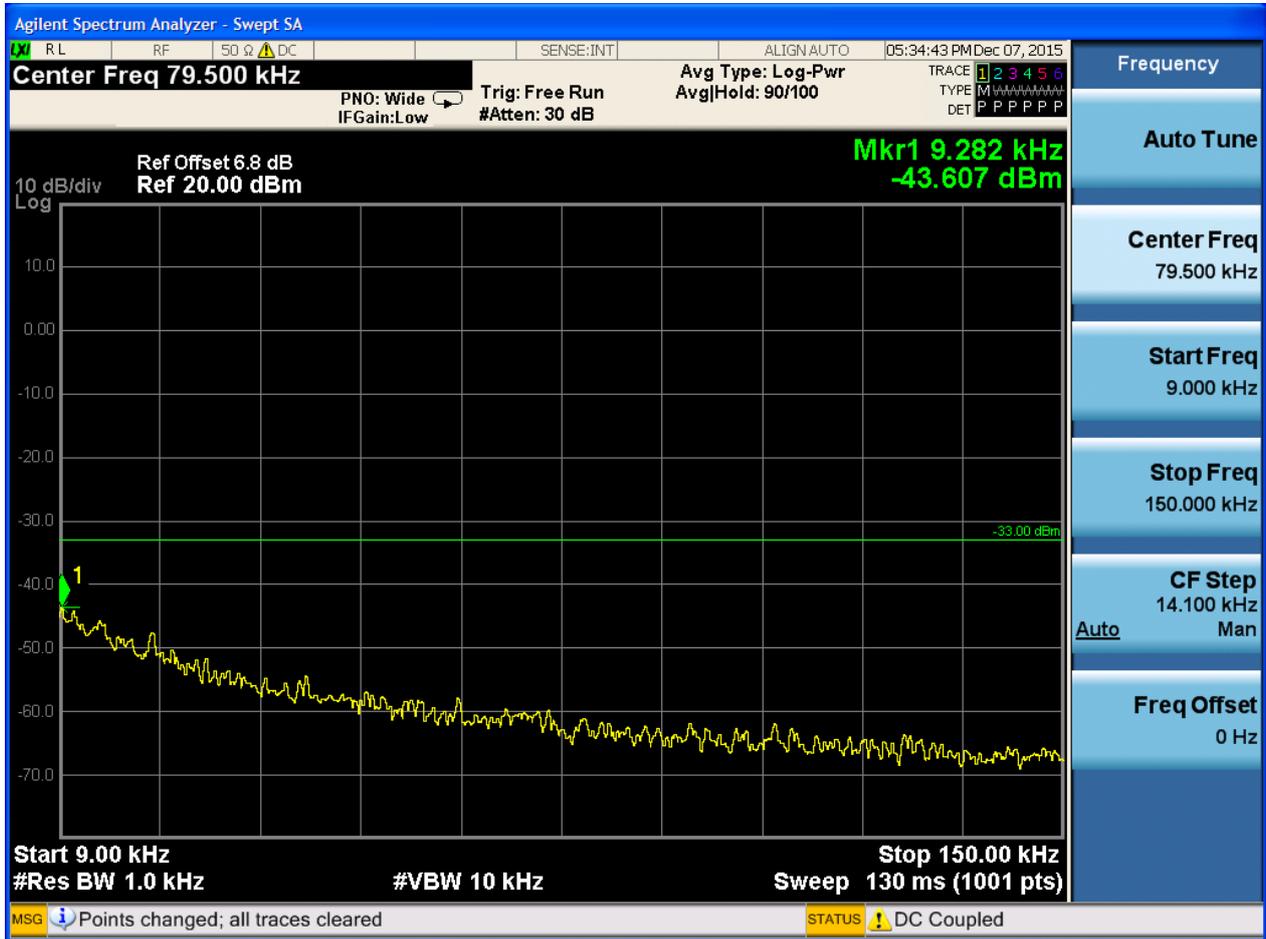


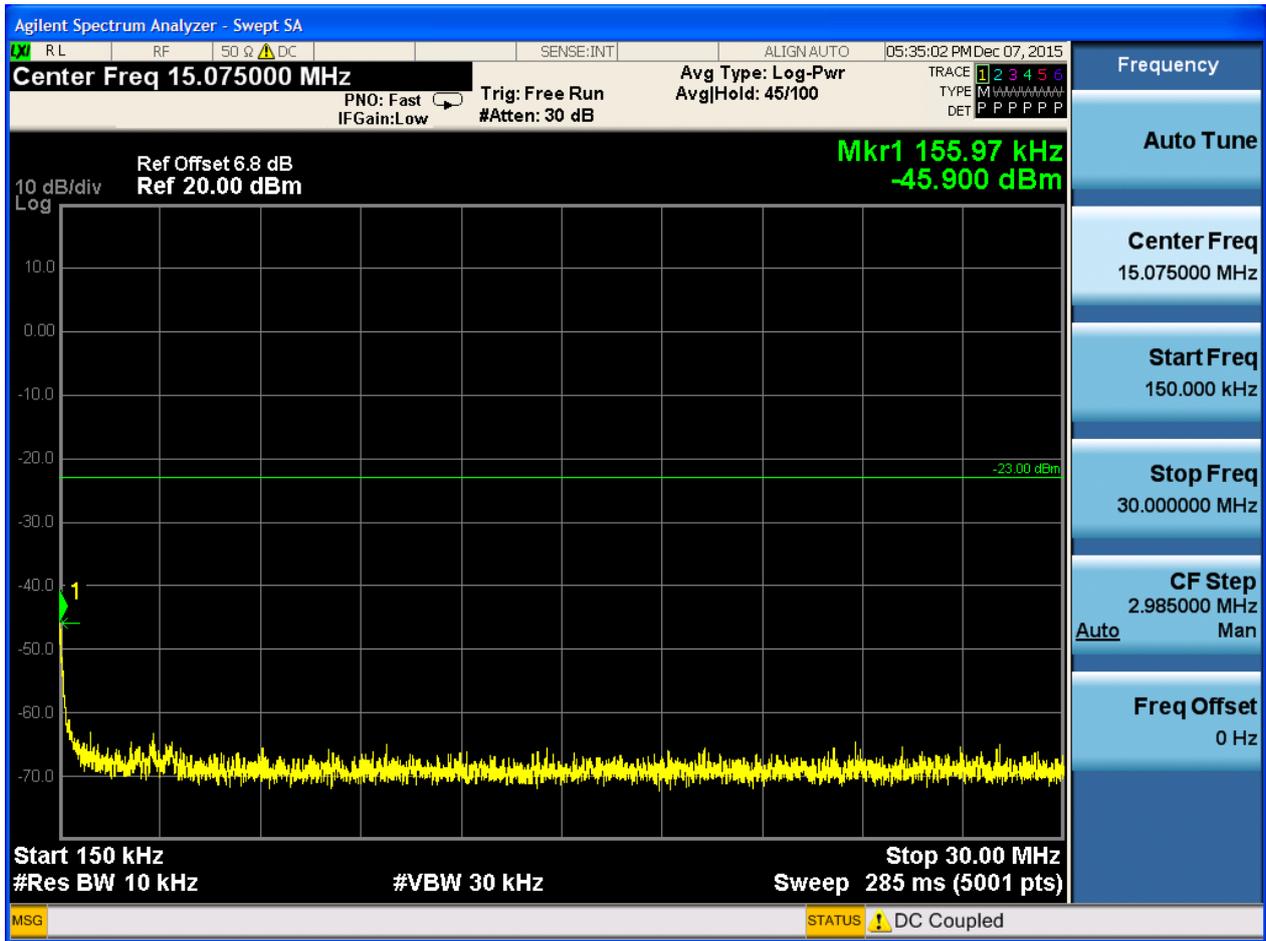


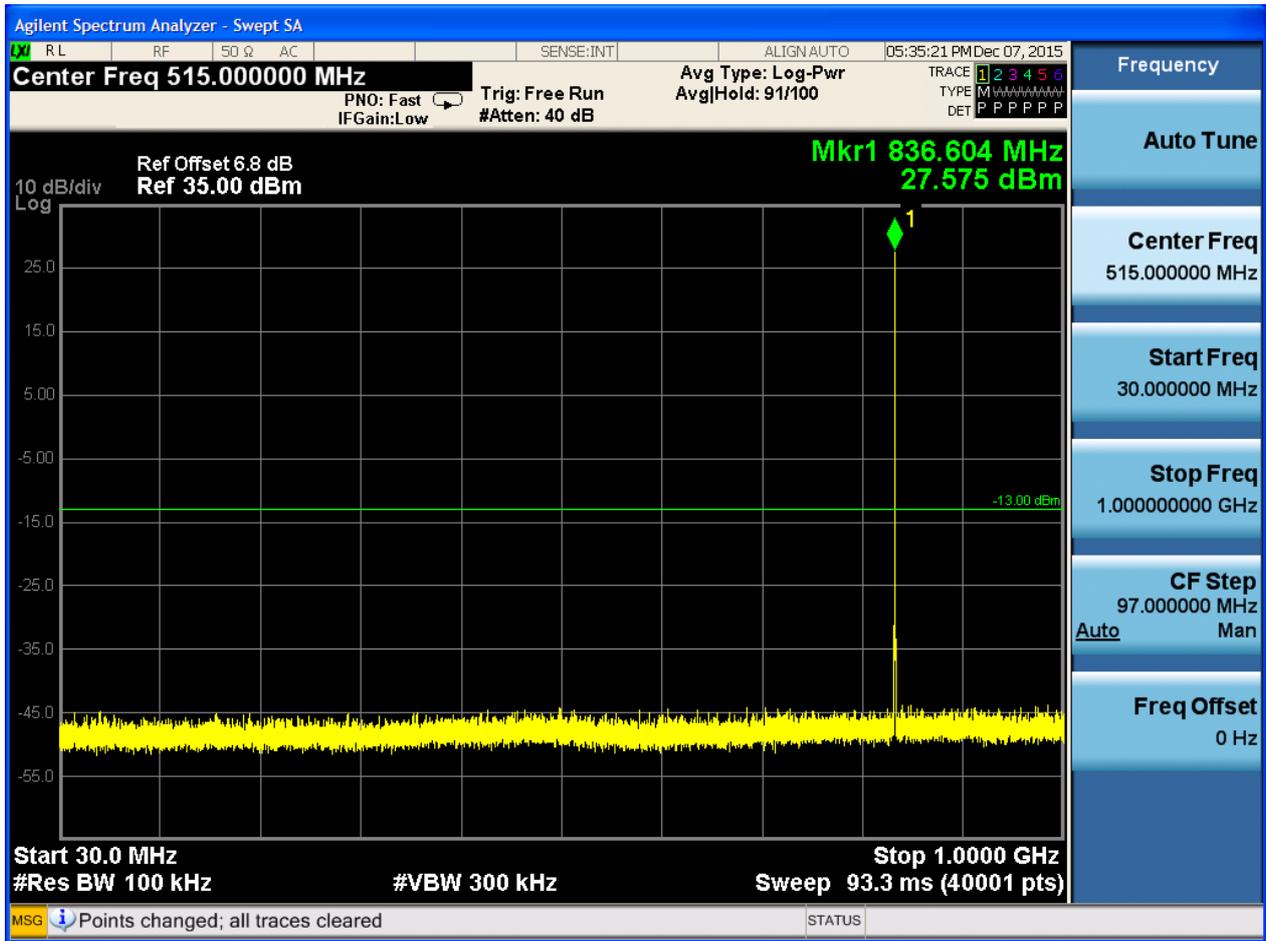


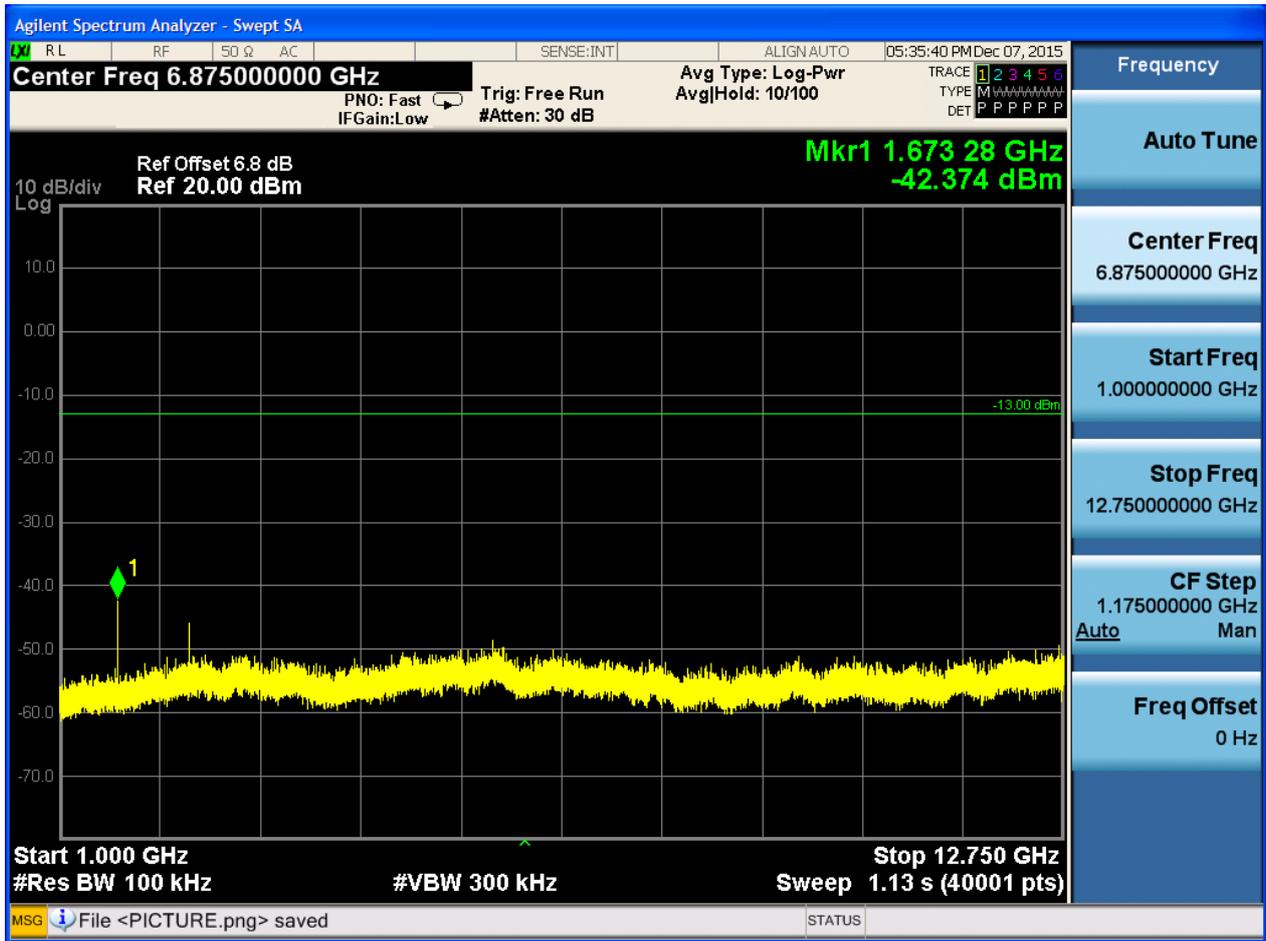


6.1.1.2.2 Test Channel = MCH



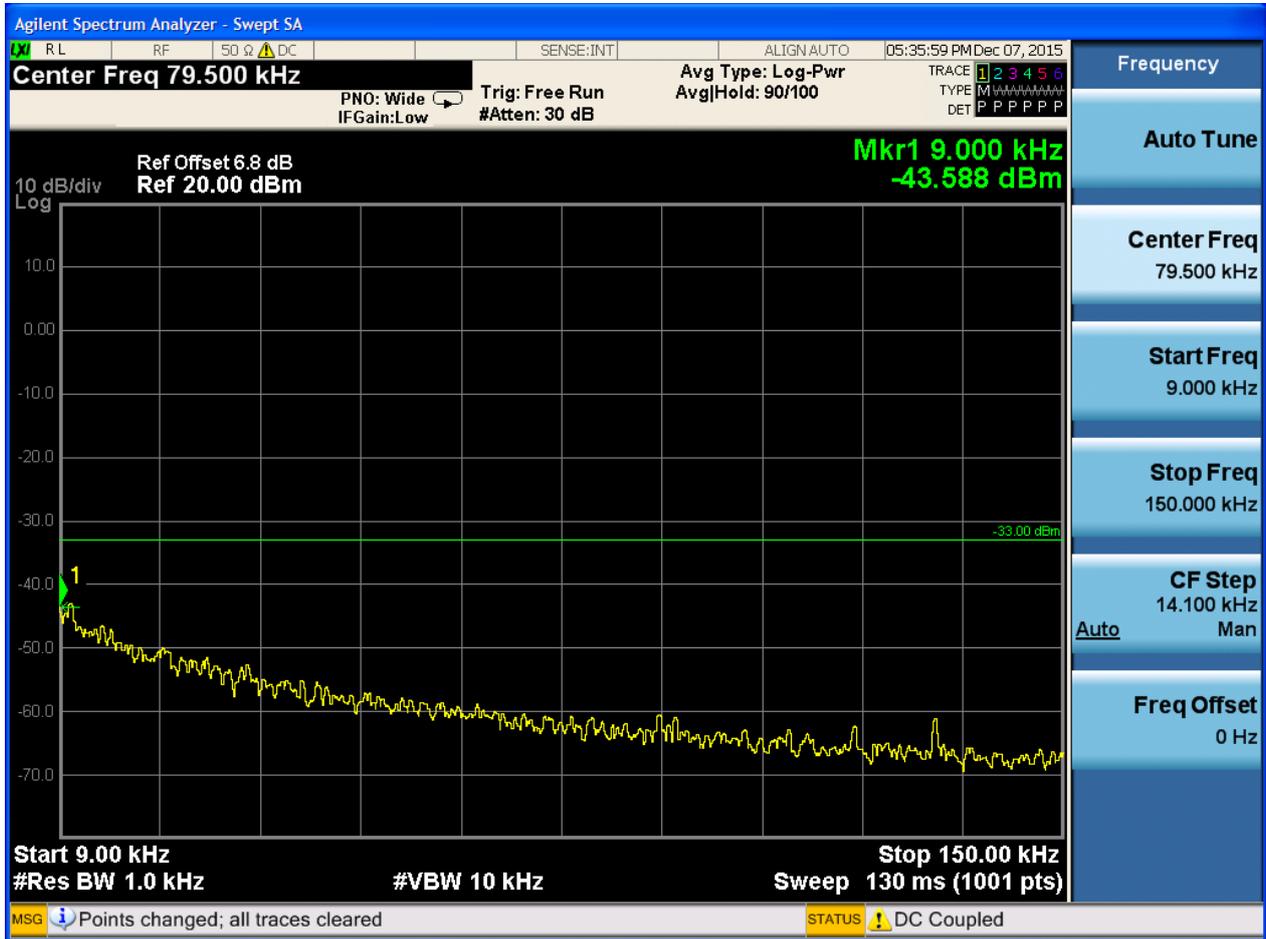


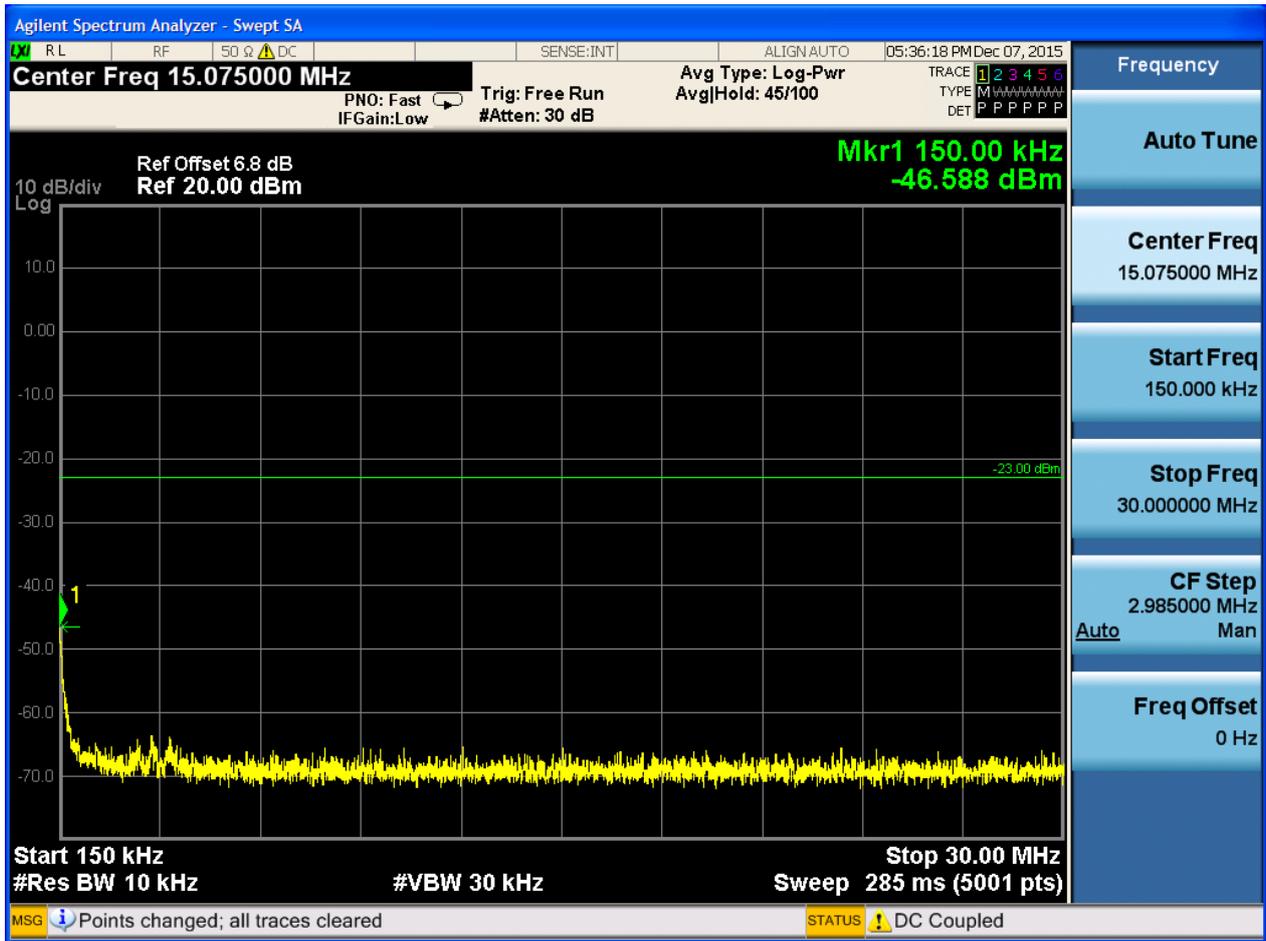


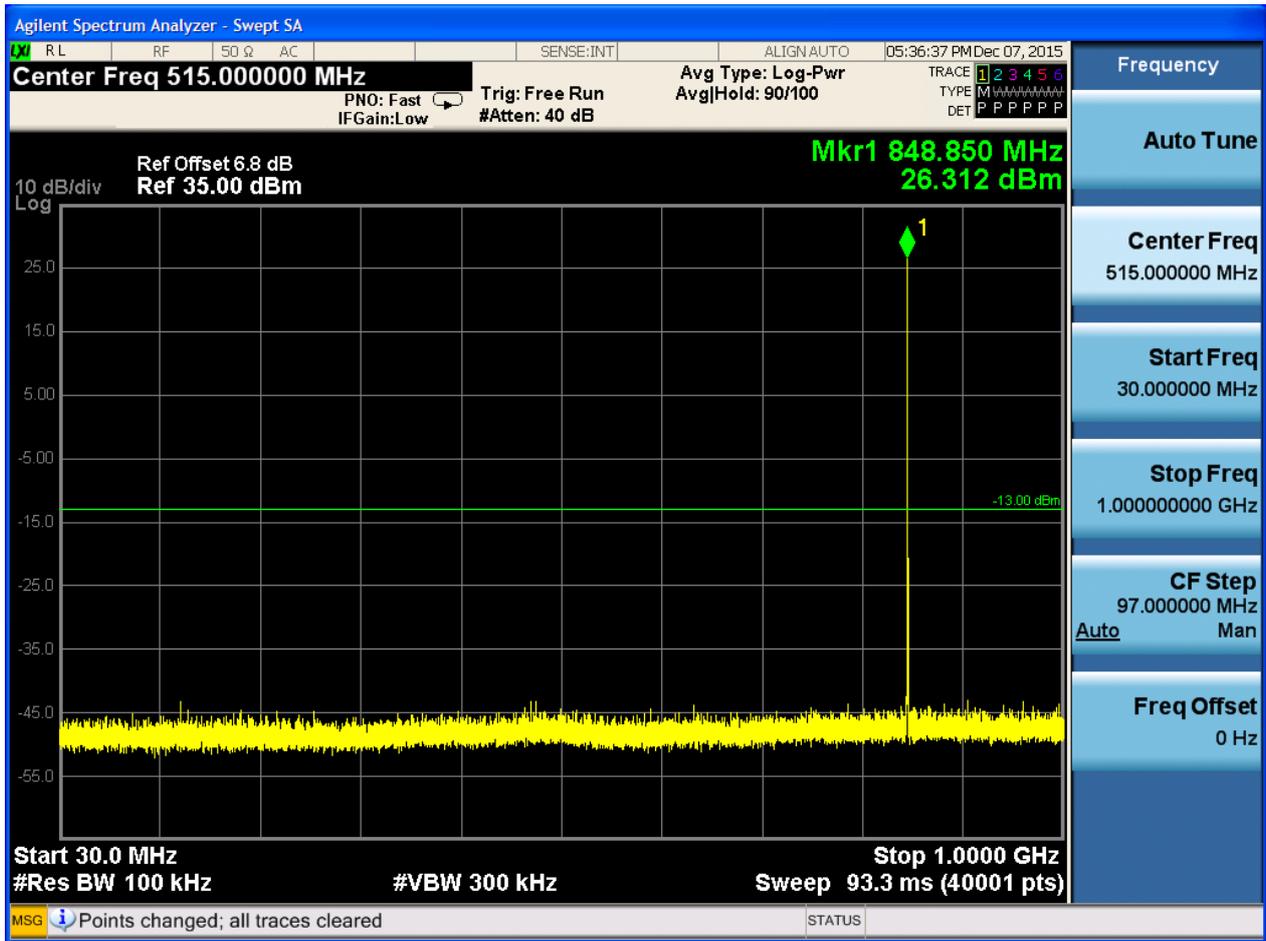


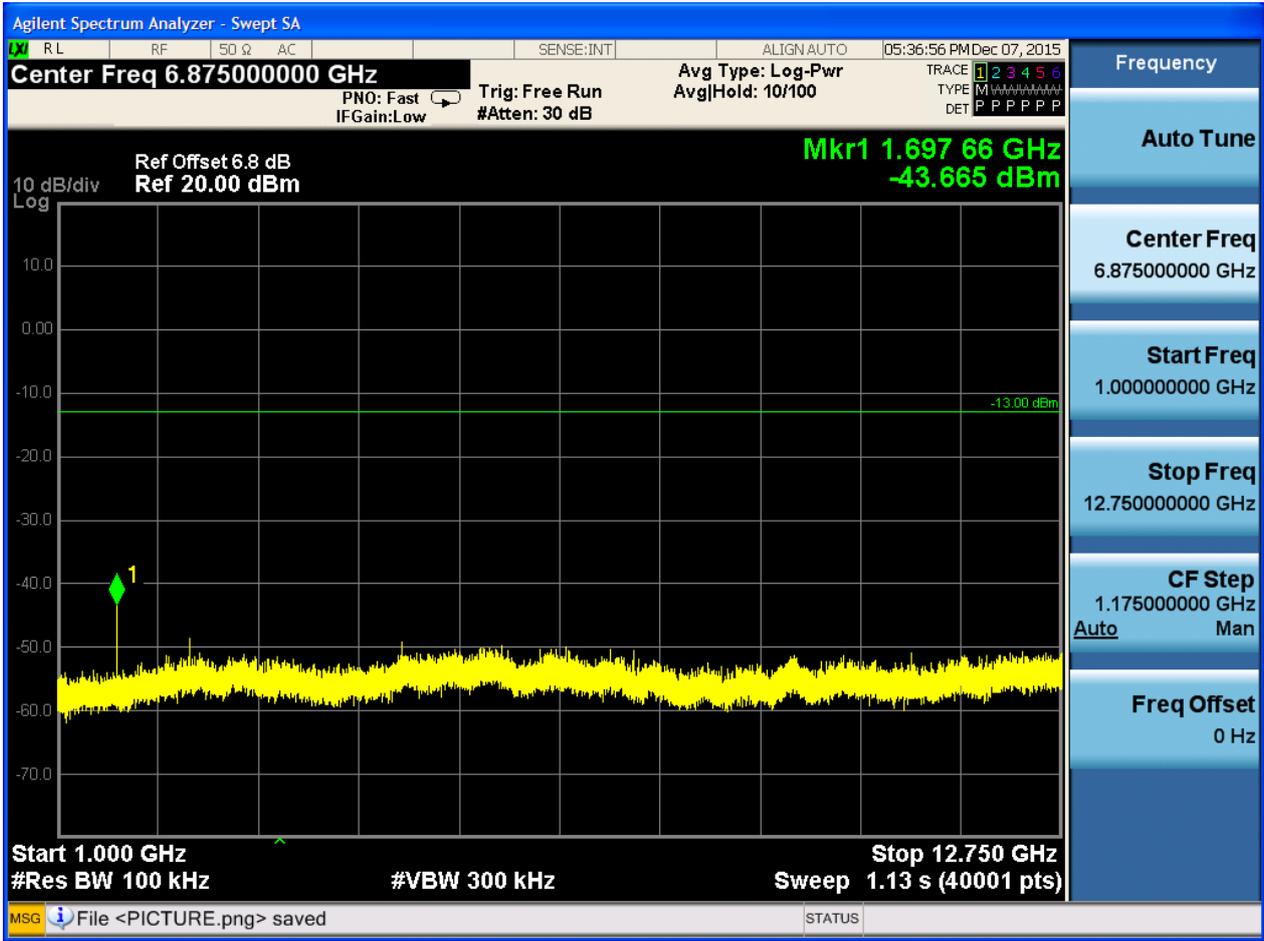


6.1.1.2.3 Test Channel = HCH







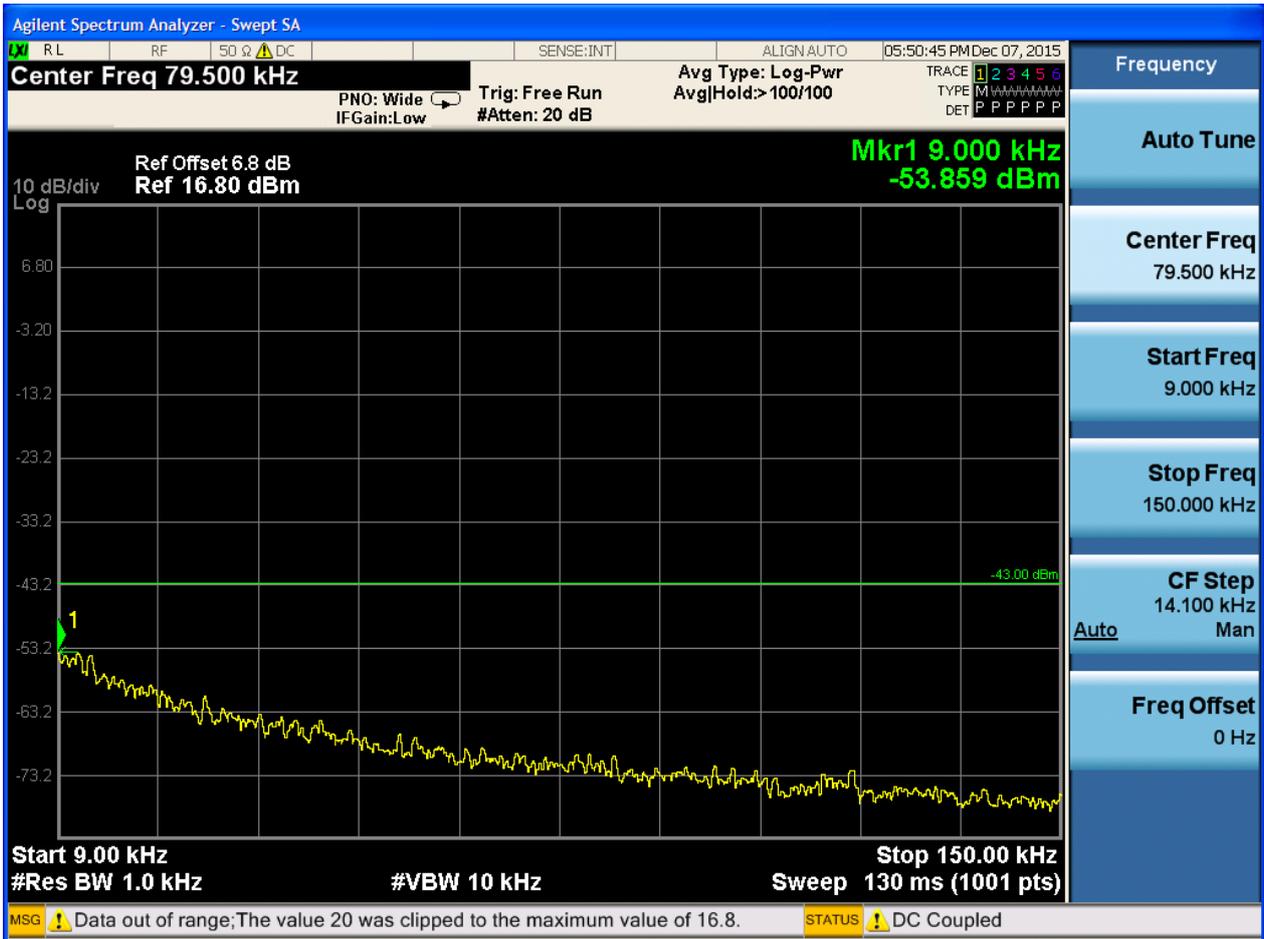


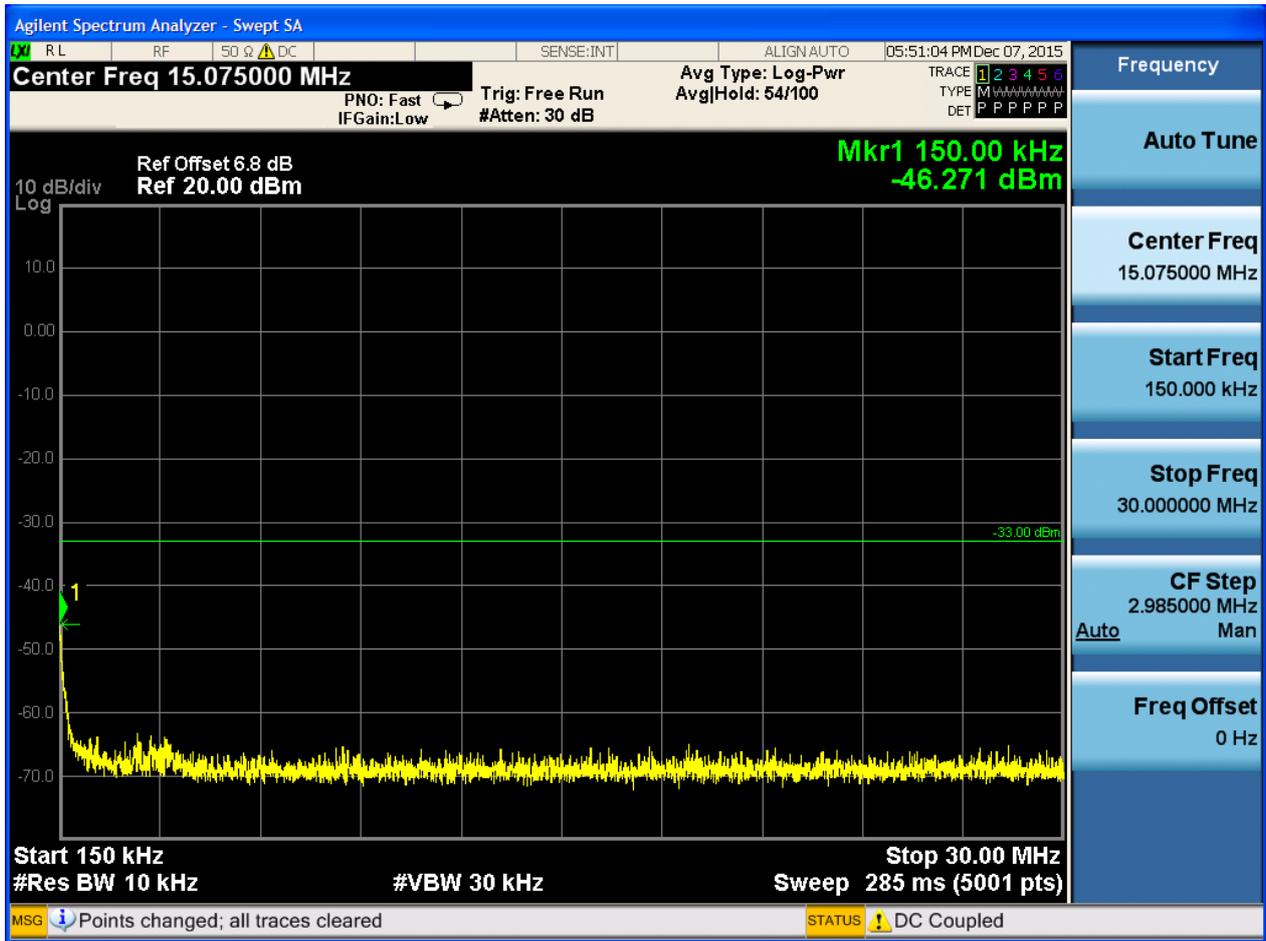


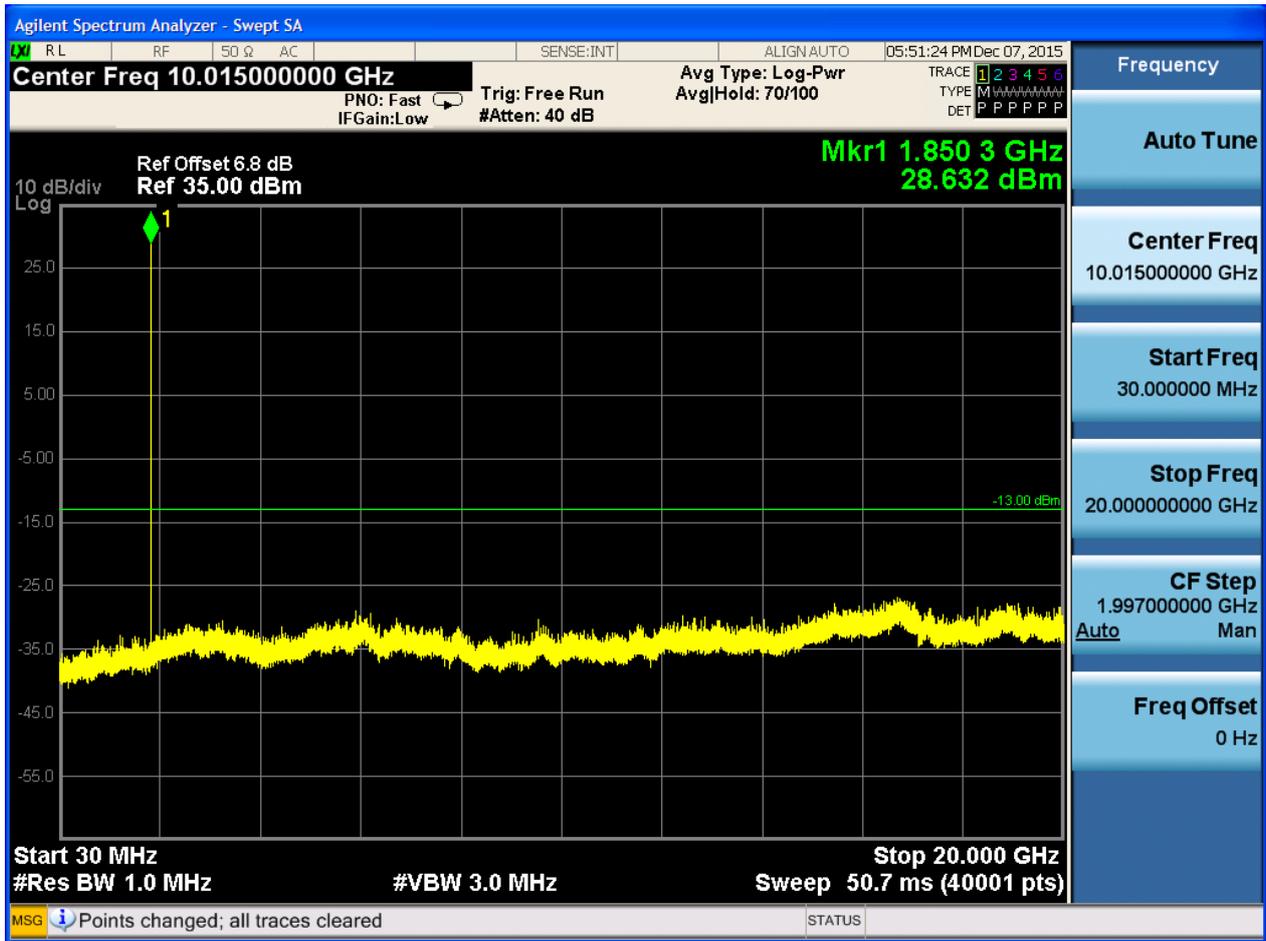
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

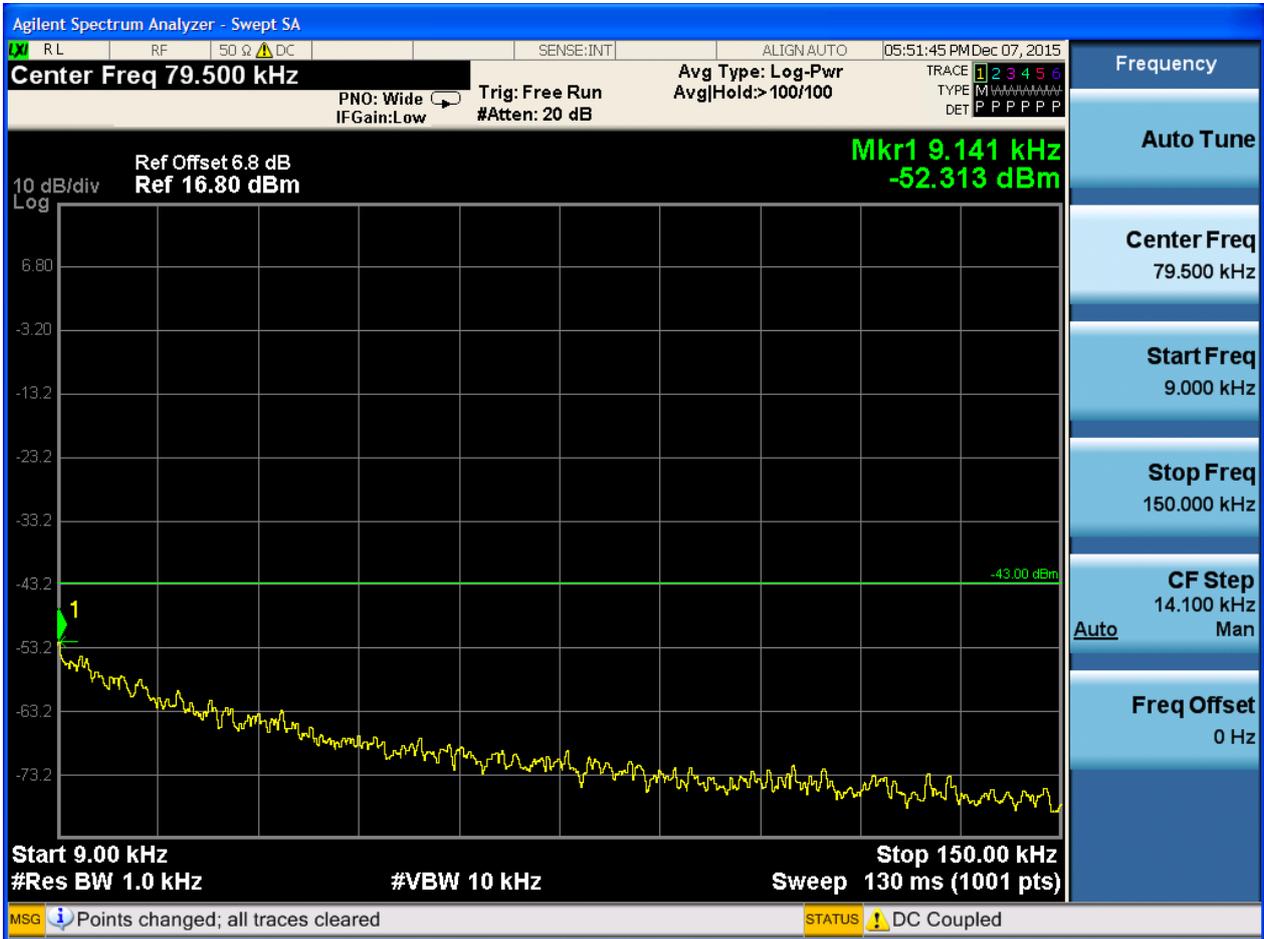


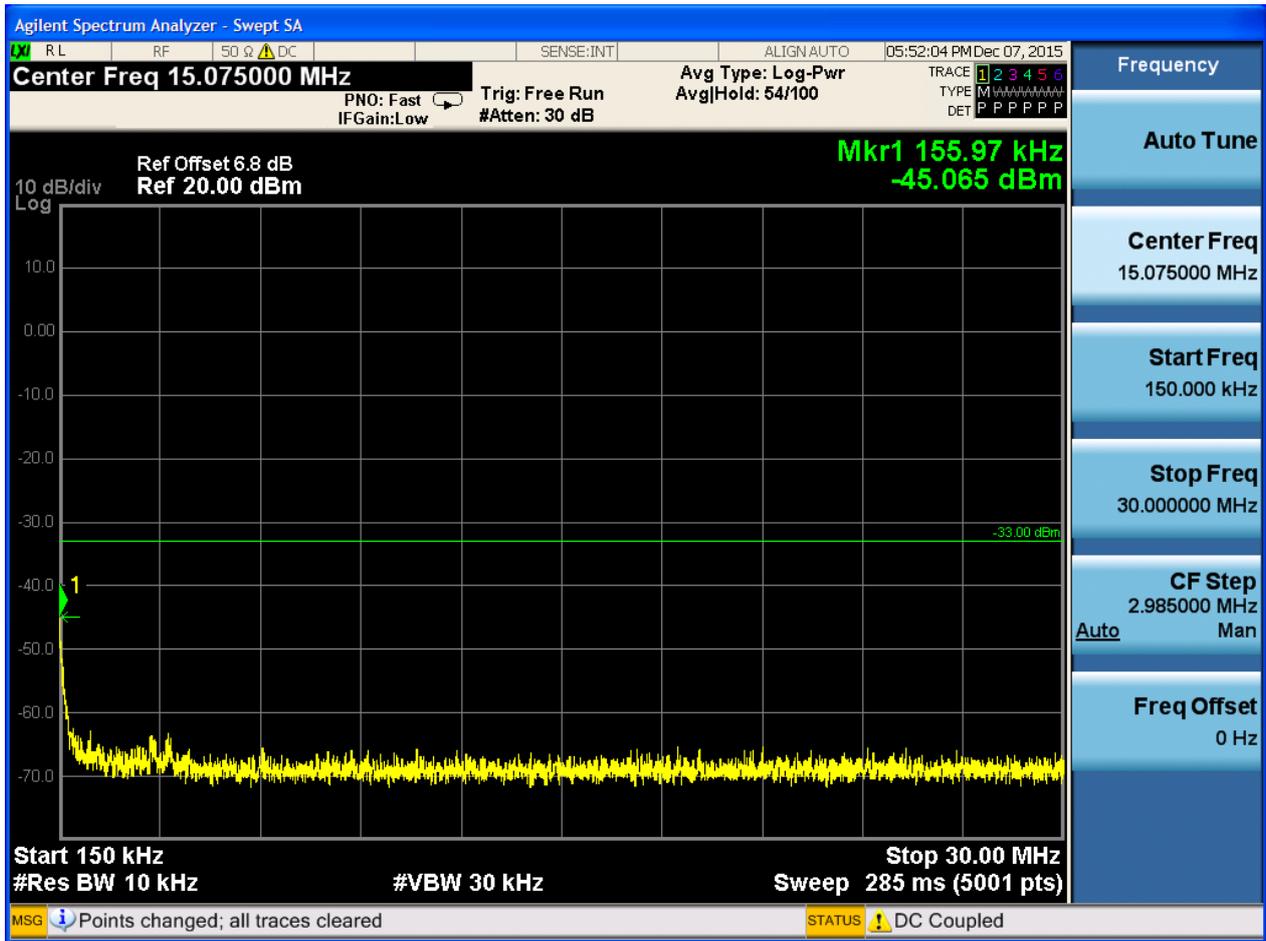


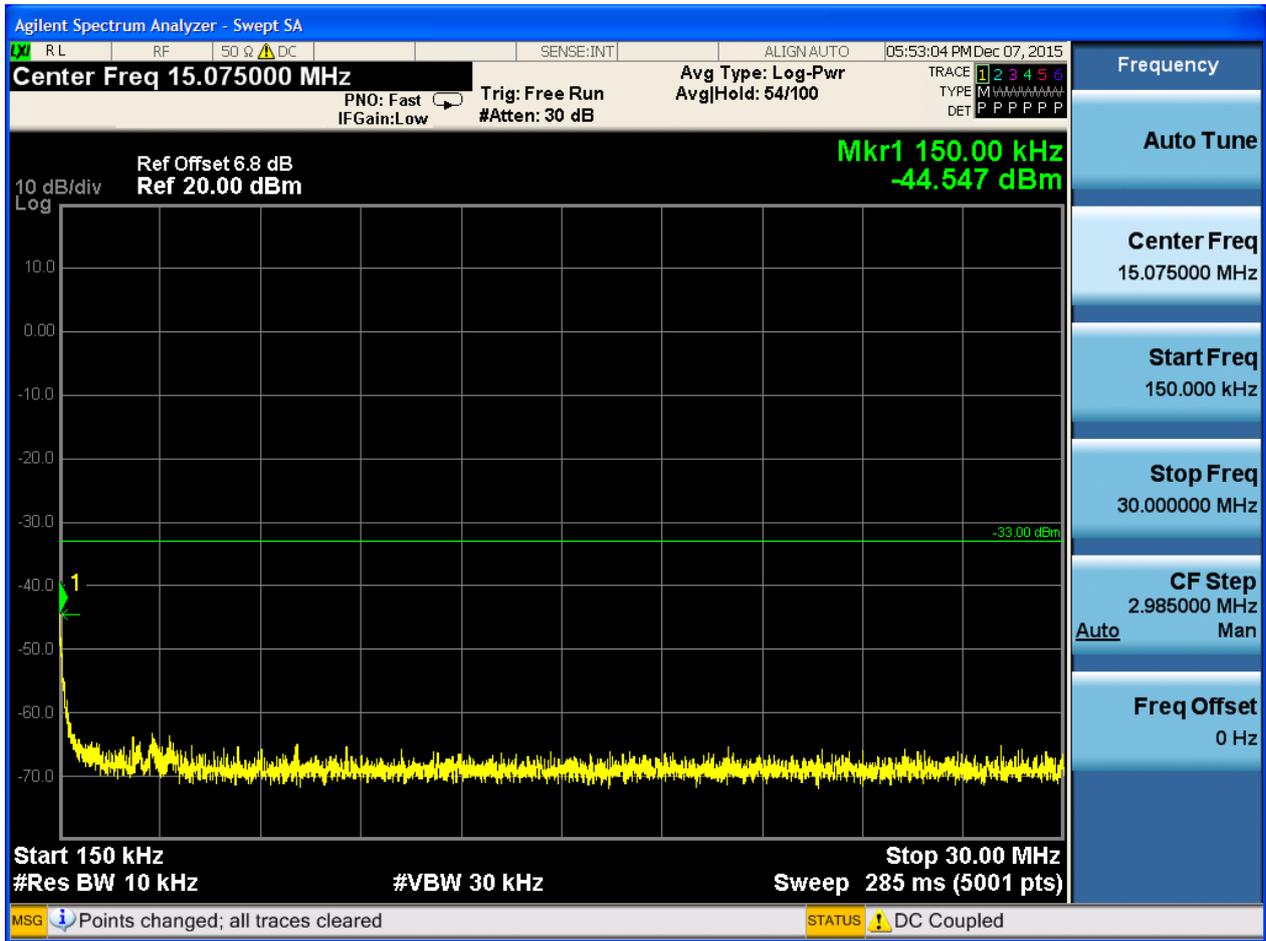


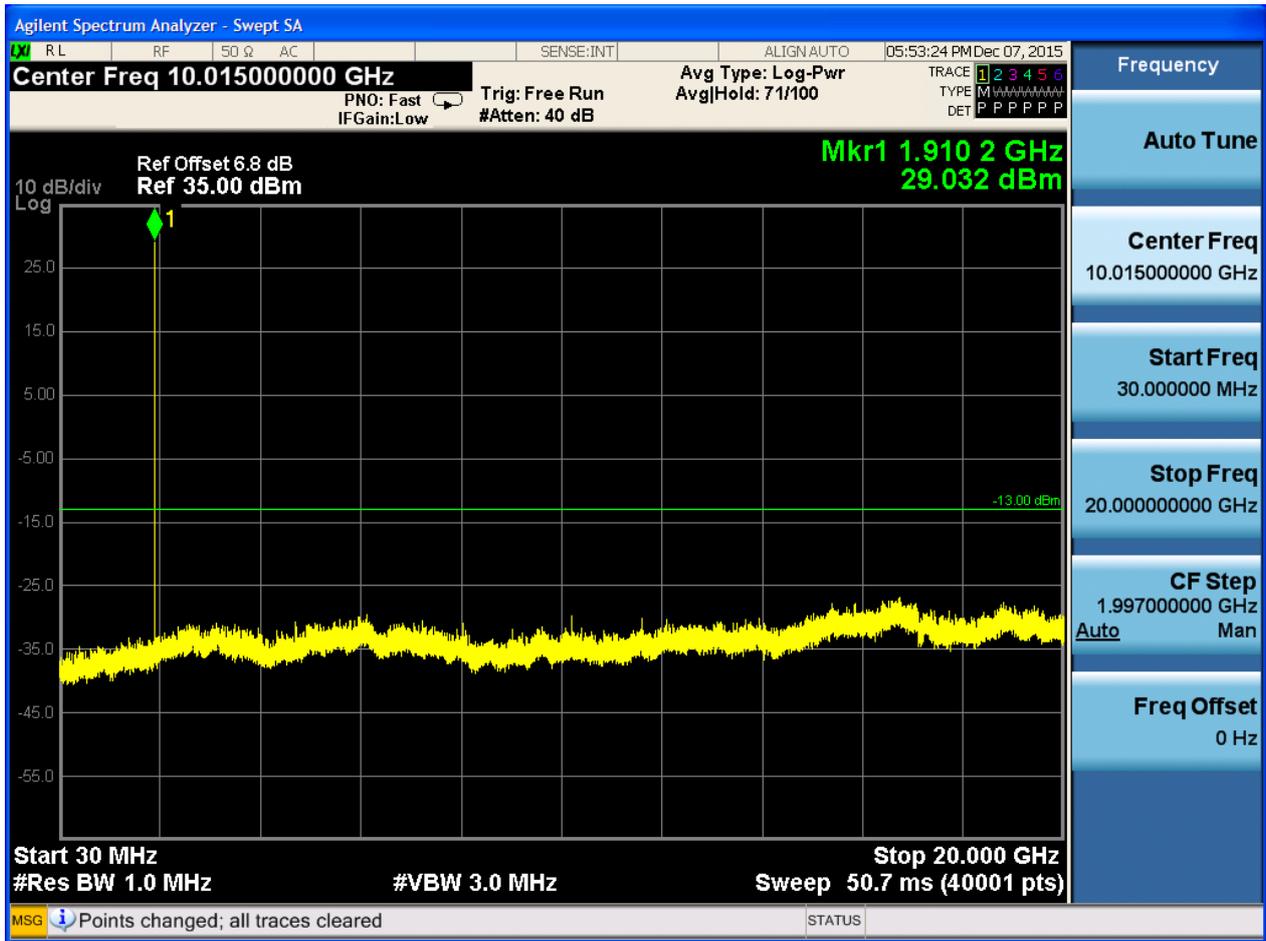


6.1.2.1.2 Test Channel = MCH





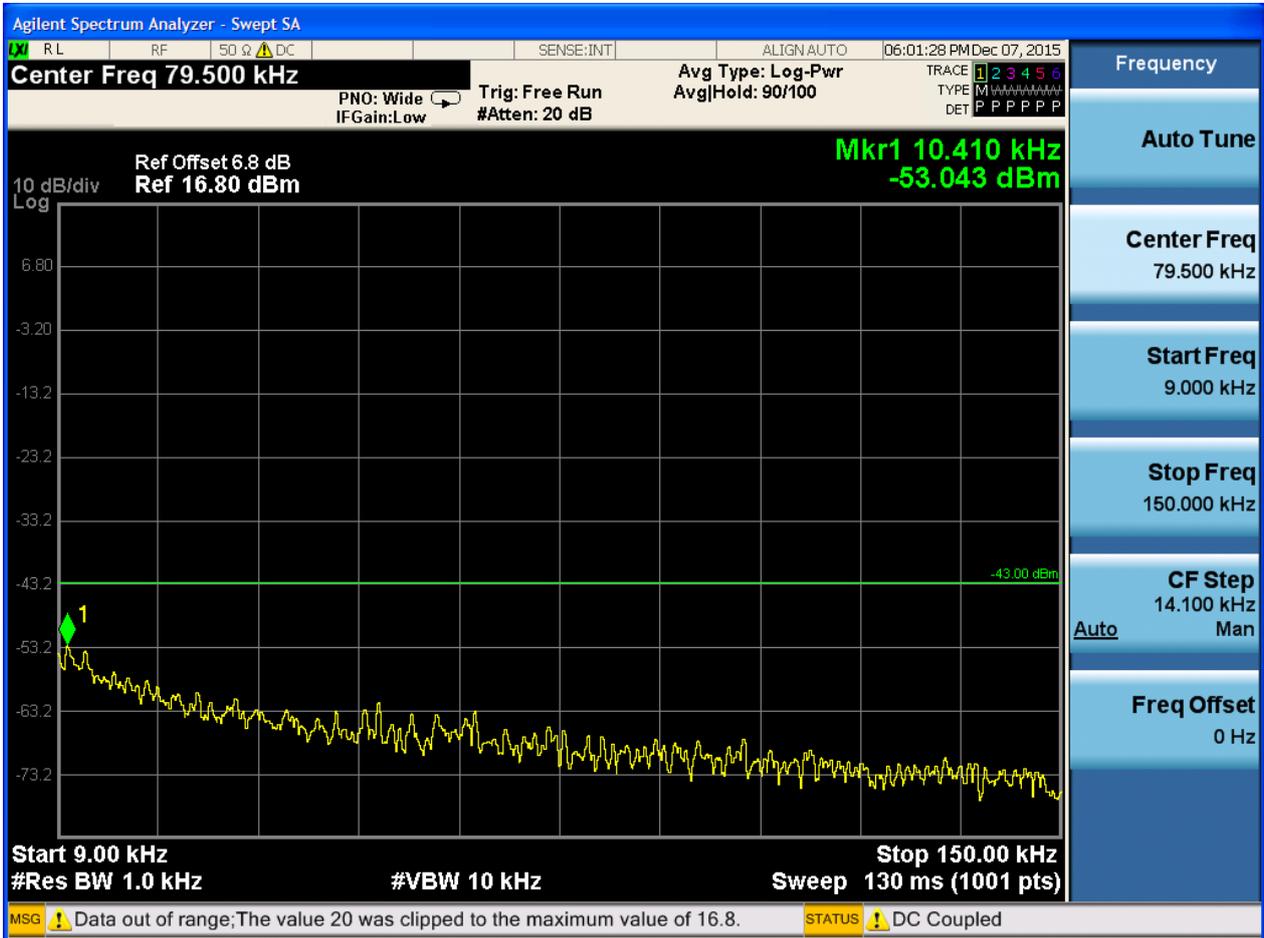


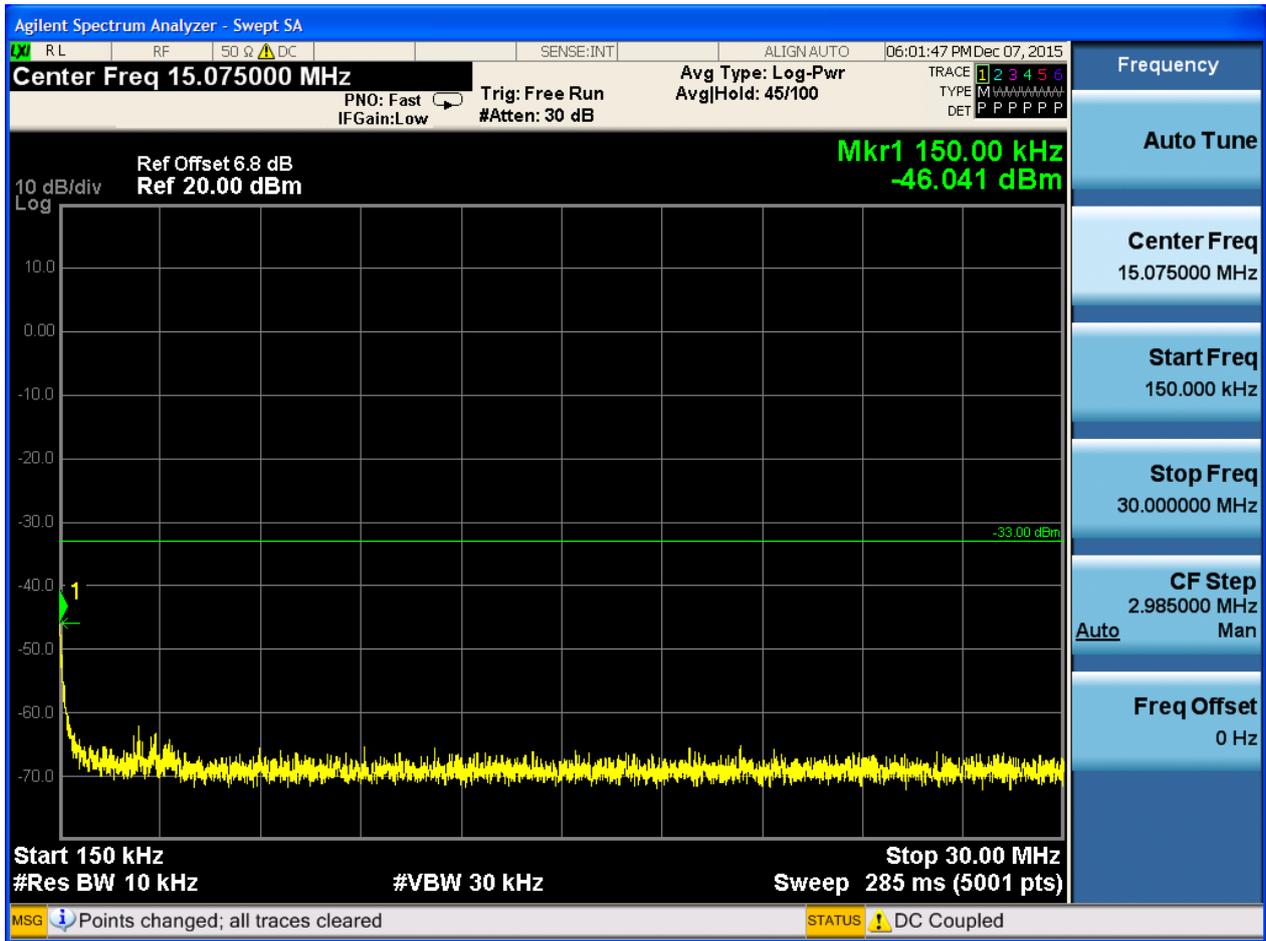


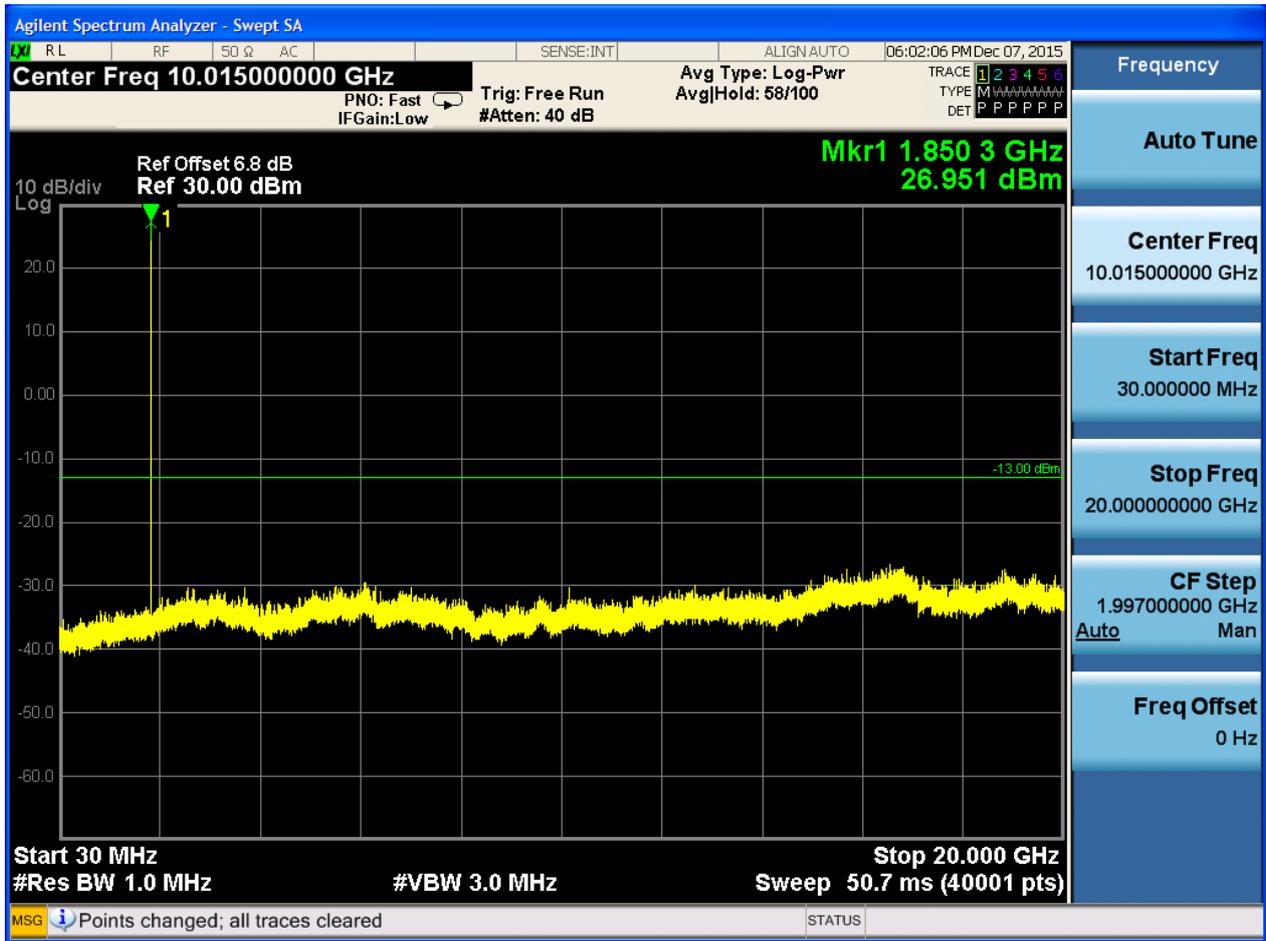


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

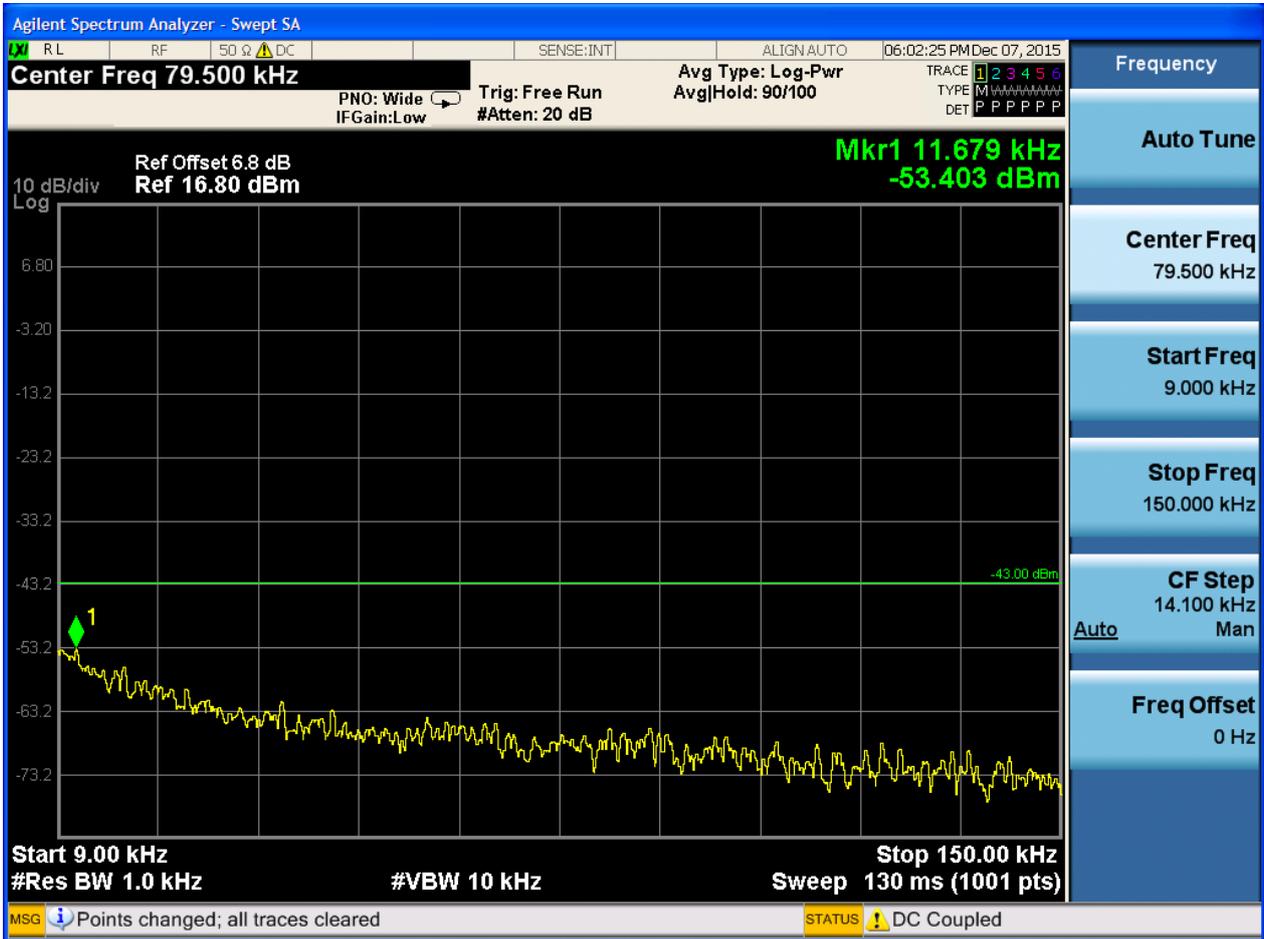


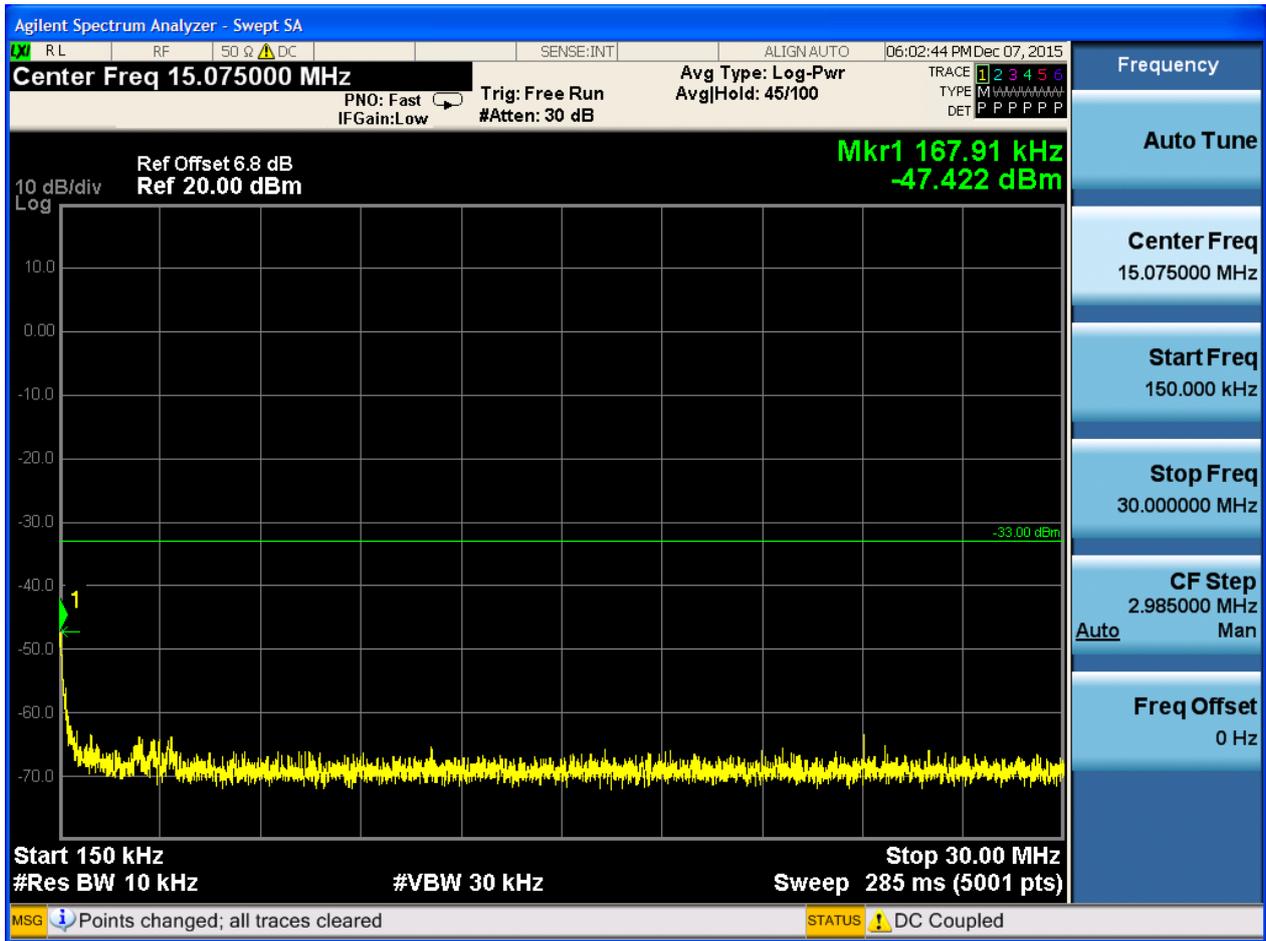


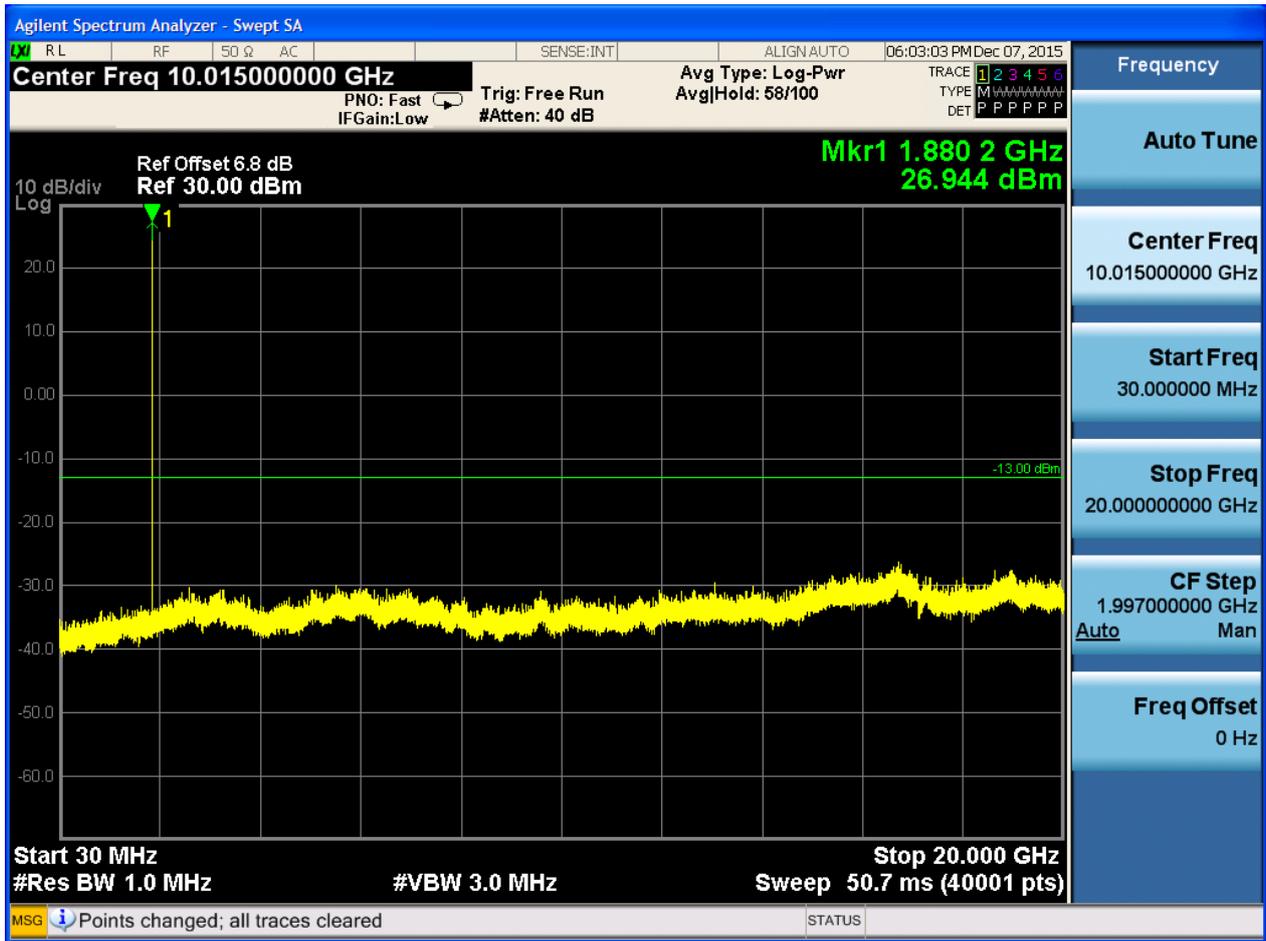




6.1.2.2.2 Test Channel = MCH

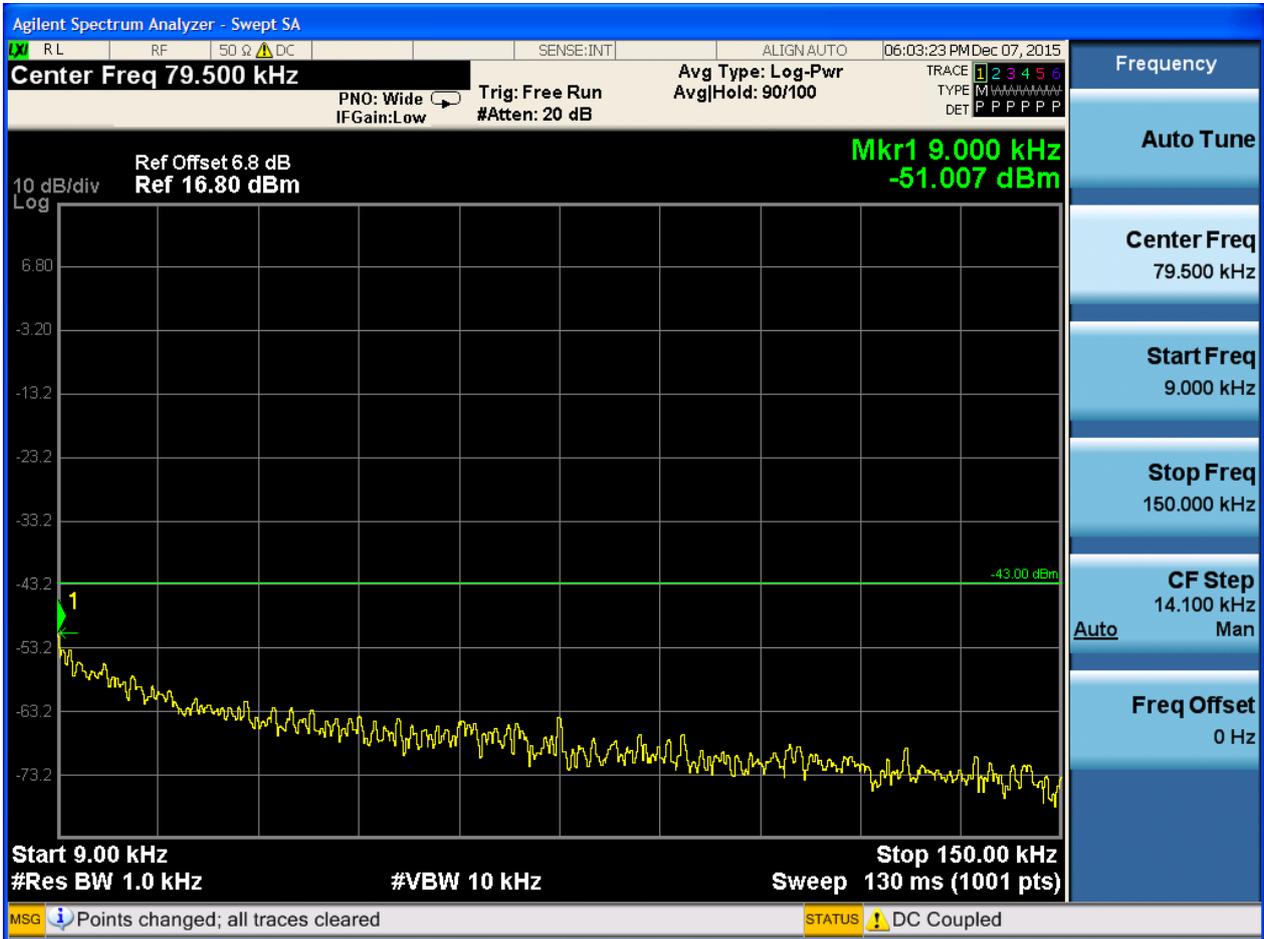


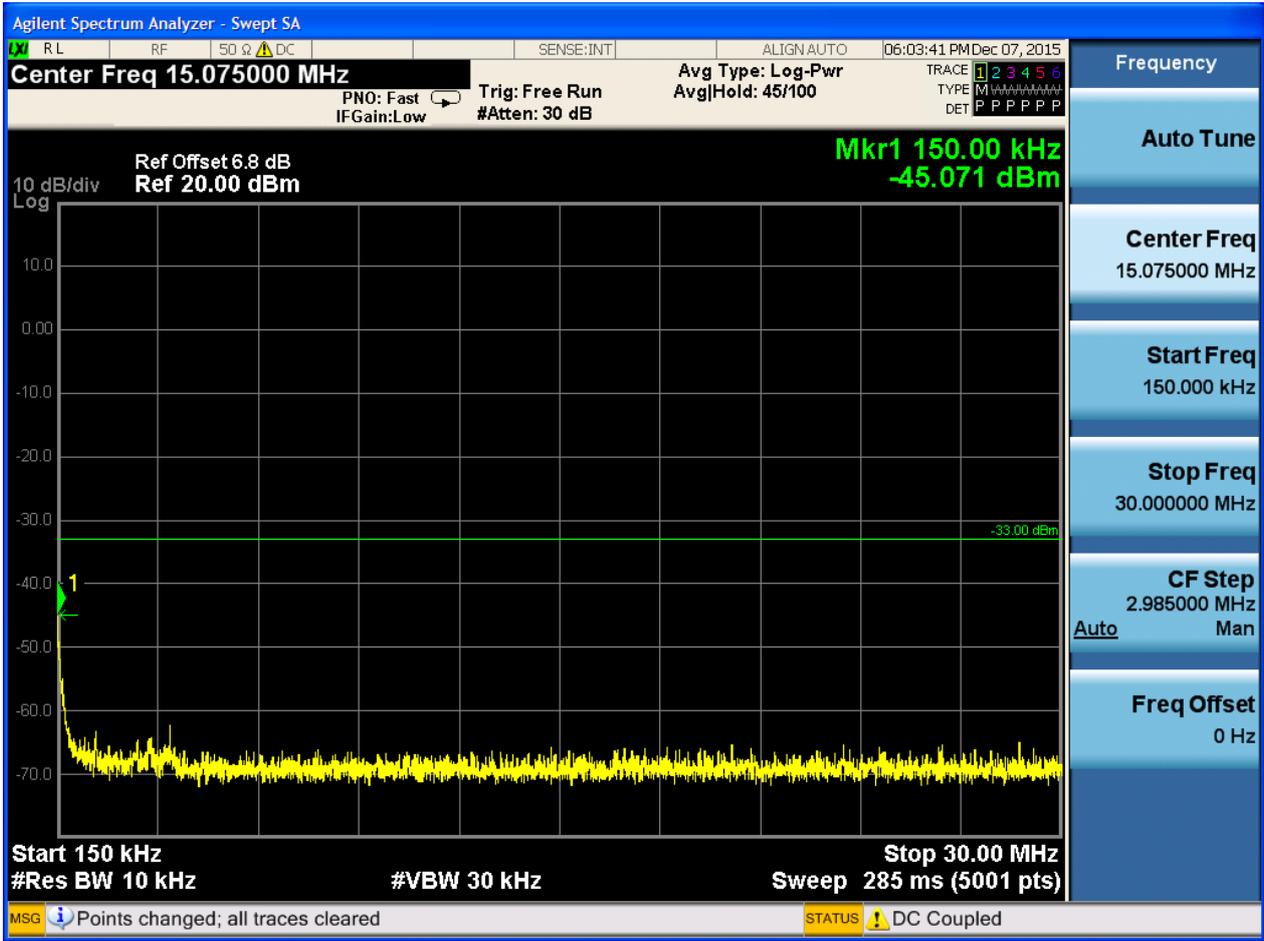


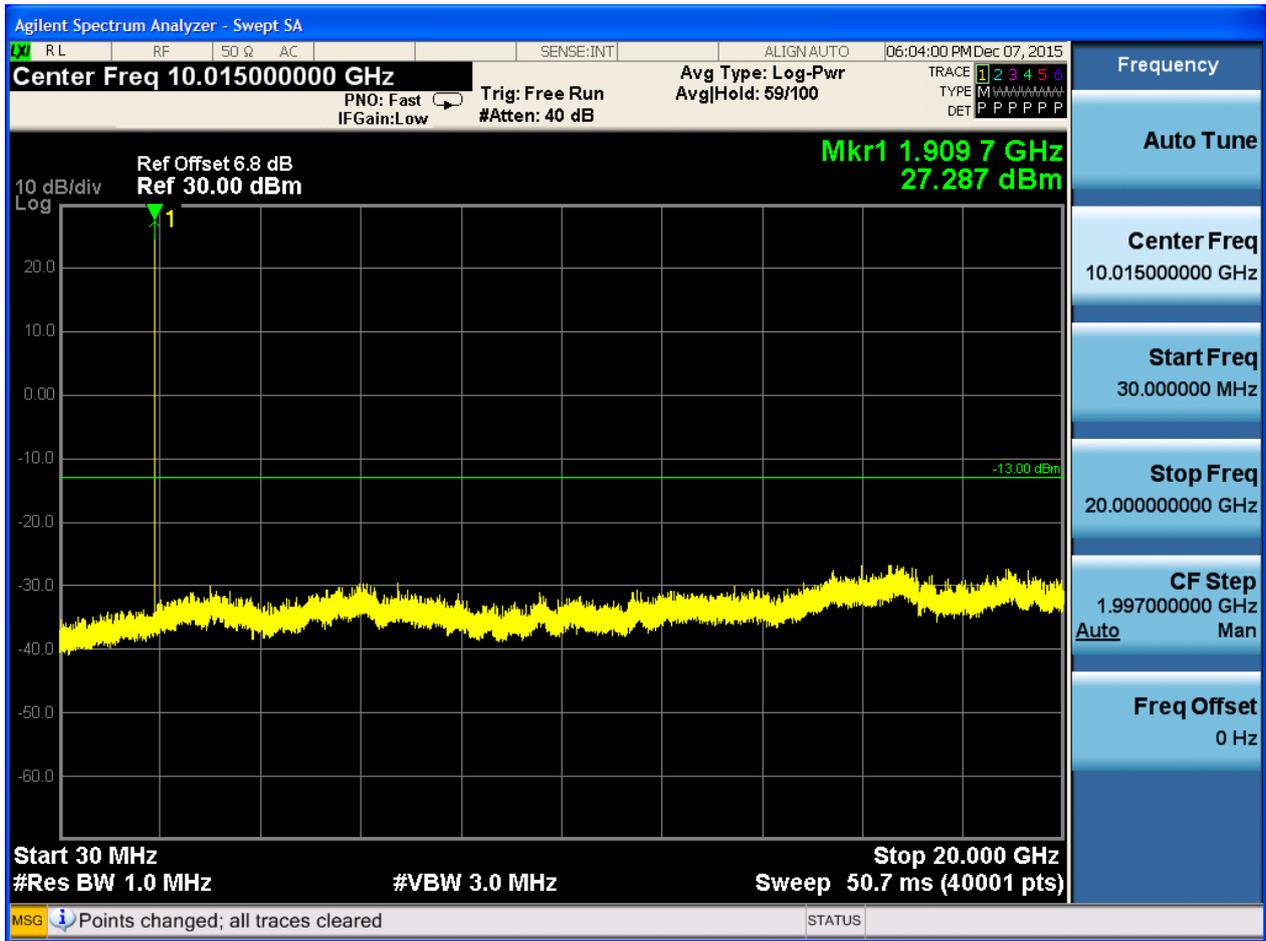




6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

Note:

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

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

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

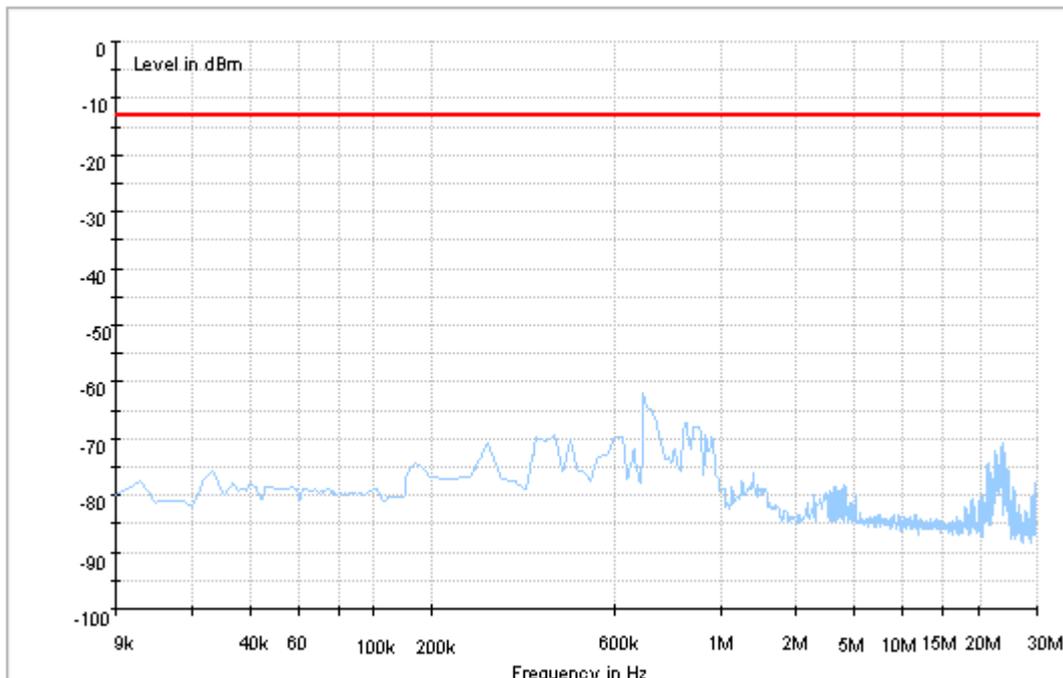
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

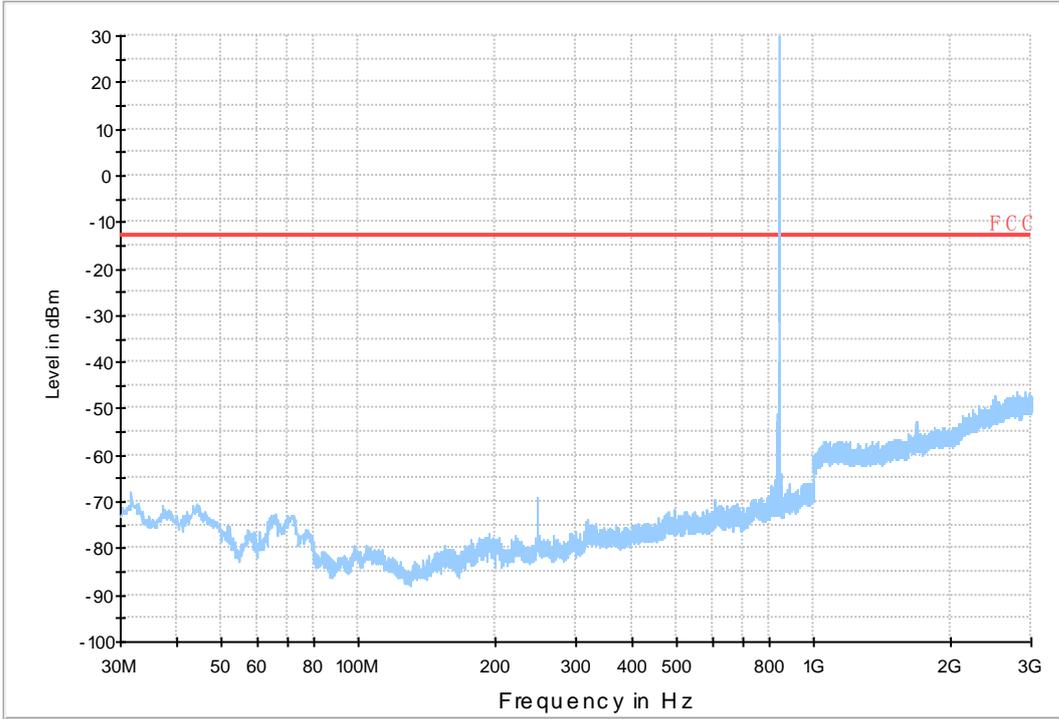
7.1 For GSM

7.1.1 Test Band = GSM850

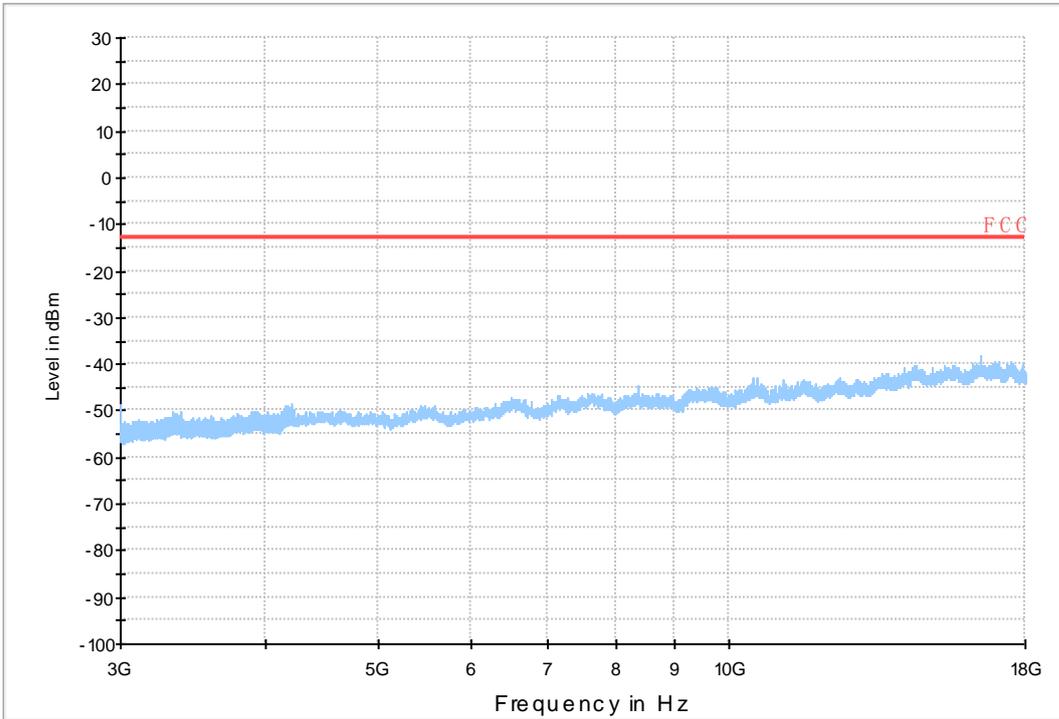
7.1.1.1 Test Mode = GSM/TM1



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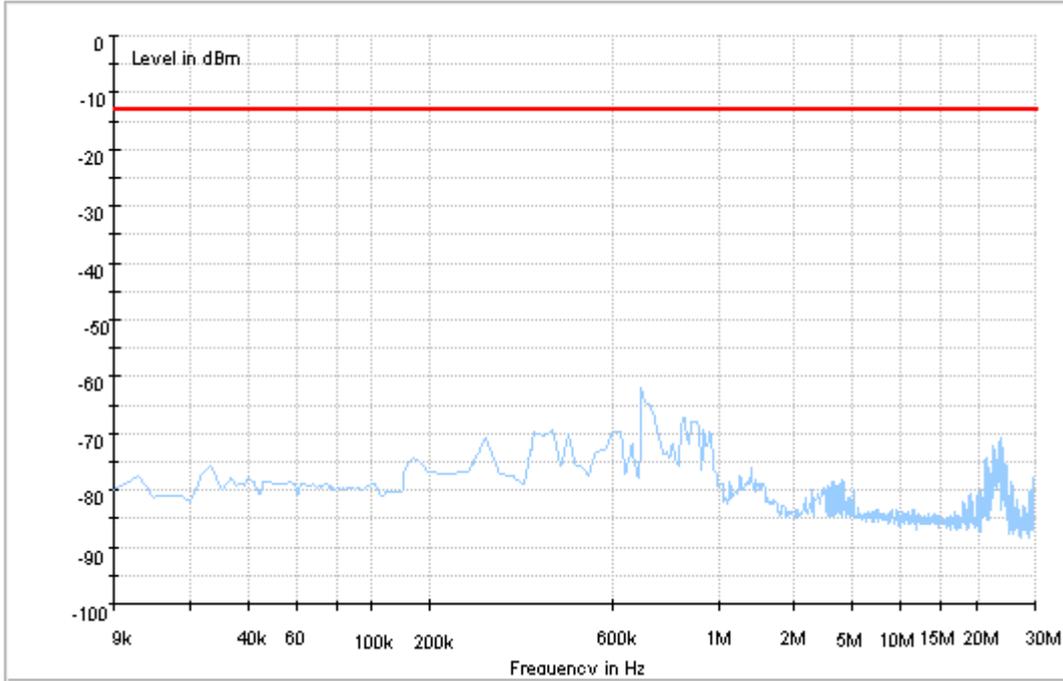


Copy of FCC PART22 GSM850_H

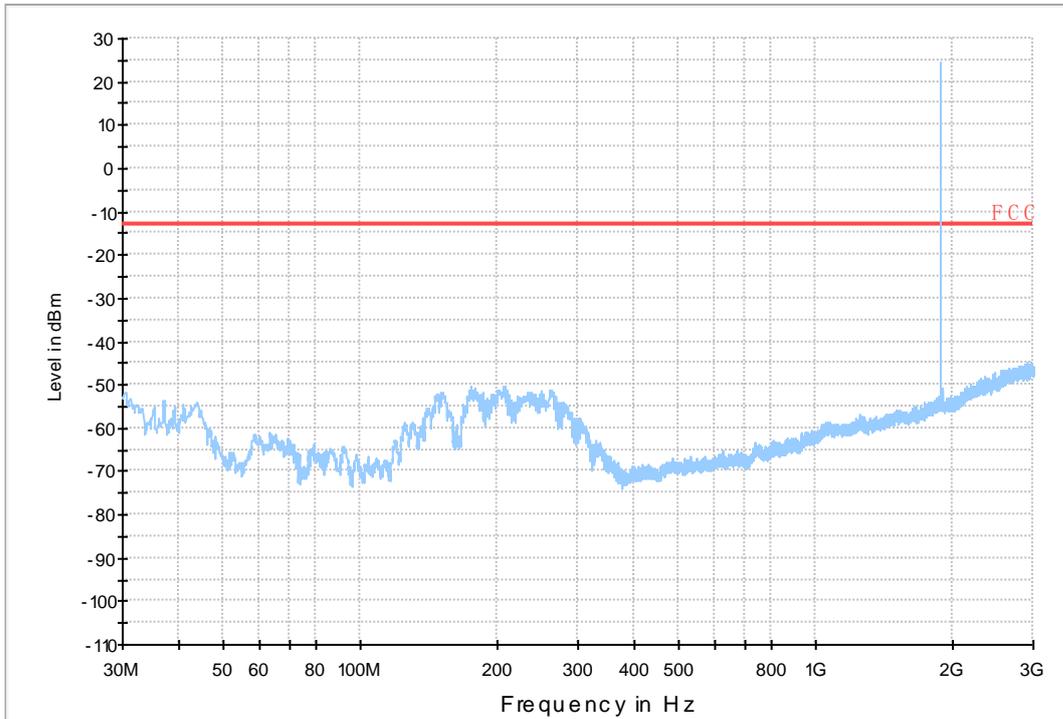


7.1.2 Test Band = GSM1900

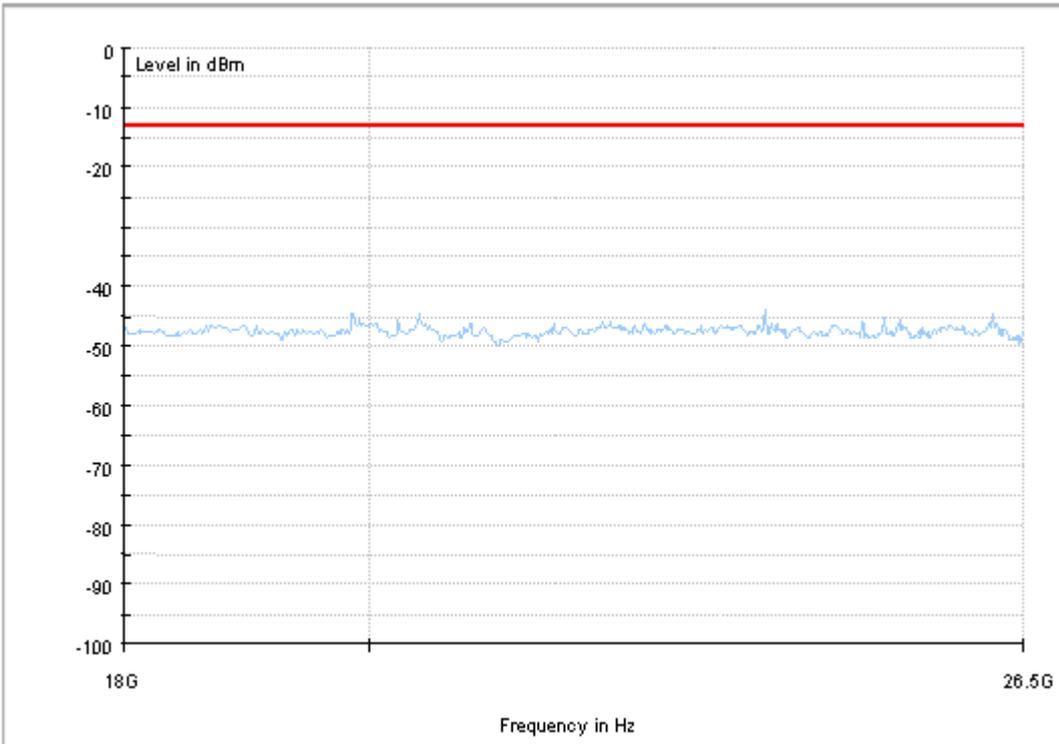
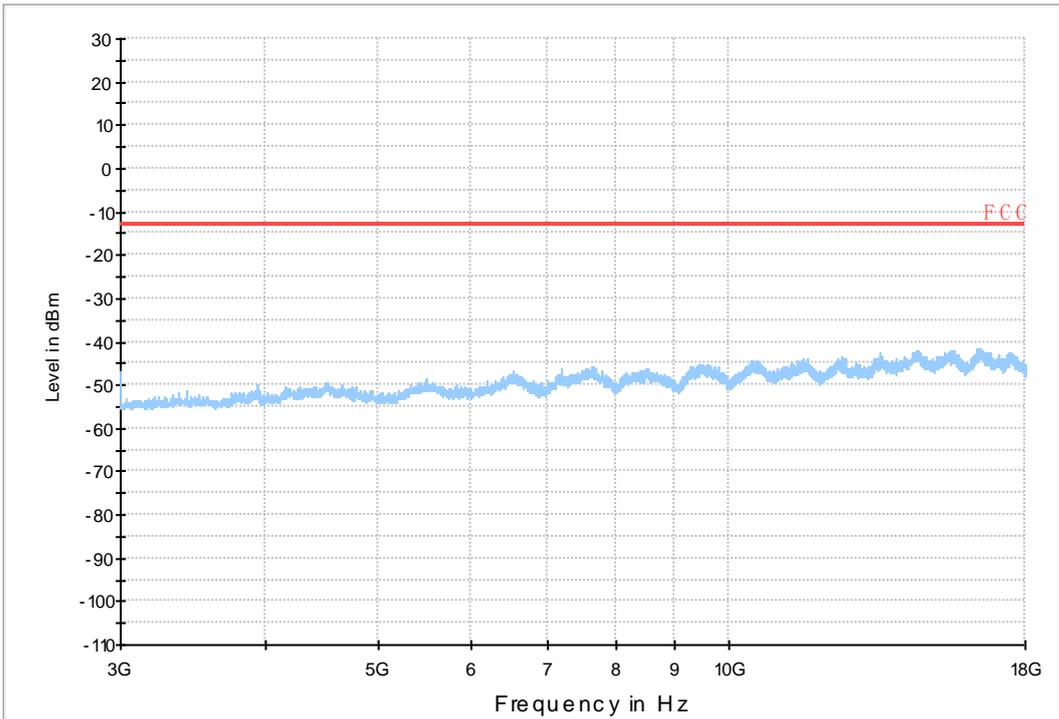
7.1.2.1 Test Mode = GSM/TM1



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	-9.69	-0.01176	PASS
				VN	-13.56	-0.01645	PASS
				VH	-11.62	-0.0141	PASS
		MCH	TN	VL	-5.94	-0.0071	PASS
				VN	-8.78	-0.01049	PASS
				VH	-4.39	-0.00525	PASS
		HCH	TN	VL	-2.65	-0.00312	PASS
				VN	-6.78	-0.00799	PASS
				VH	-5.49	-0.00647	PASS
	GSM/TM2	LCH	TN	VL	-8.36	-0.01014	PASS
				VN	-15.82	-0.01919	PASS
				VH	-15.92	-0.01932	PASS
		MCH	TN	VL	-10.46	-0.0125	PASS
				VN	-9.23	-0.01103	PASS
				VH	-3.58	-0.00428	PASS
		HCH	TN	VL	-9.62	-0.01133	PASS
				VN	-7.33	-0.00864	PASS
				VH	-4.91	-0.00578	PASS
GSM1900	GSM/TM1	LCH	TN	VL	22.21	0.012	PASS
				VN	18.47	0.00998	PASS
				VH	18.98	0.01026	PASS
		MCH	TN	VL	26.09	0.01388	PASS
				VN	24.34	0.01295	PASS
				VH	33.25	0.01769	PASS
		HCH	TN	VL	21.95	0.01149	PASS
				VN	23.37	0.01224	PASS
				VH	28.48	0.01491	PASS
	GSM/TM2	LCH	TN	VL	4.13	0.00223	PASS
				VN	-7.10	-0.00384	PASS
				VH	6.91	0.00373	PASS
		MCH	TN	VL	6.33	0.00337	PASS
				VN	16.63	0.00885	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	29.64	0.01577	PASS
		HCH	TN	VL	18.85	0.00987	PASS
				VN	8.33	0.00436	PASS
				VH	26.41	0.01383	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	-14.66	-0.01779	PASS
				-20	-14.72	-0.01786	PASS
				-10	-9.62	-0.01167	PASS
				0	-11.17	-0.01355	PASS
				10	-12.33	-0.01496	PASS
				20	-12.79	-0.01552	PASS
				30	-10.59	-0.01285	PASS
				40	-9.62	-0.01167	PASS
		50	-12.40	-0.01504	PASS		
		MCH	VN	-30	-7.17	-0.00857	PASS
				-20	-7.04	-0.00842	PASS
				-10	-3.03	-0.00362	PASS
				0	-0.97	-0.00116	PASS
				10	-4.46	-0.00533	PASS
				20	-0.45	-0.00054	PASS
				30	-3.23	-0.00386	PASS
				40	-2.20	-0.00263	PASS
		50	-2.13	-0.00255	PASS		
		HCH	VN	-30	-4.65	-0.00548	PASS
				-20	-6.13	-0.00722	PASS
				-10	-4.91	-0.00578	PASS
				0	-1.36	-0.0016	PASS
				10	-1.16	-0.00137	PASS
				20	-1.74	-0.00205	PASS
	30			-2.84	-0.00335	PASS	
	40			-3.36	-0.00396	PASS	
	50	-2.45	-0.00289	PASS			
	GSM/TM2	LCH	VN	-30	-11.01	-0.01336	PASS
				-20	-11.56	-0.01403	PASS
				-10	-10.65	-0.01292	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	-15.53	-0.01884	PASS						
				20	-8.04	-0.00975	PASS						
				30	-13.24	-0.01606	PASS						
				40	-12.91	-0.01566	PASS						
				50	-14.27	-0.01731	PASS						
		MCH	VN			-30	-5.39	-0.00644	PASS				
						-20	-6.17	-0.00738	PASS				
						-10	-4.20	-0.00502	PASS				
						0	-9.46	-0.01131	PASS				
						10	-6.10	-0.00729	PASS				
						20	-4.65	-0.00556	PASS				
						30	-5.75	-0.00687	PASS				
						40	-15.17	-0.01813	PASS				
						50	-9.27	-0.01108	PASS				
						HCH	VN			-30	-7.14	-0.00841	PASS
		-20	-3.84	-0.00452	PASS								
		-10	-6.88	-0.00811	PASS								
		0	-8.30	-0.00978	PASS								
		10	-8.85	-0.01043	PASS								
		20	-8.07	-0.00951	PASS								
		30	-6.20	-0.0073	PASS								
		40	-6.17	-0.00727	PASS								
		50	-10.43	-0.01229	PASS								
		GSM1900	GSM/TM1	LCH	VN					-30	16.14	0.00872	PASS
										-20	14.40	0.00778	PASS
-10	12.85									0.00695	PASS		
0	24.41									0.01319	PASS		
10	18.21									0.00984	PASS		
20	16.72									0.00904	PASS		
30	18.47									0.00998	PASS		
40	16.98									0.00918	PASS		
50	19.31									0.01044	PASS		
MCH	VN									-30	34.29	0.01824	PASS
										-20	33.71	0.01793	PASS
										-10	37.77	0.02009	PASS
										0	31.58	0.0168	PASS
										10	35.00	0.01862	PASS
										20	34.42	0.01831	PASS
										30	31.12	0.01655	PASS
										40	33.71	0.01793	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	33.51	0.01782	PASS
				-30	29.57	0.01548	PASS
				-20	28.99	0.01518	PASS
				-10	27.57	0.01444	PASS
				0	28.28	0.01481	PASS
				10	28.48	0.01491	PASS
				20	29.83	0.01562	PASS
				30	27.89	0.0146	PASS
				40	31.12	0.01629	PASS
				50	30.80	0.01613	PASS
	GSM/TM2	LCH	VN	-30	8.98	0.00485	PASS
				-20	15.85	0.00857	PASS
				-10	9.43	0.0051	PASS
				0	4.62	0.0025	PASS
				10	-6.30	-0.00341	PASS
				20	8.88	0.0048	PASS
				30	-0.81	-0.00044	PASS
				40	8.14	0.0044	PASS
				50	14.88	0.00804	PASS
				MCH	VN	-30	14.08
		-20	30.25			0.01609	PASS
		-10	26.51			0.0141	PASS
		0	9.01			0.00479	PASS
		10	27.41			0.01458	PASS
		20	25.80			0.01372	PASS
		30	26.15			0.01391	PASS
		40	17.11			0.0091	PASS
		50	14.50			0.00771	PASS
		HCH	VN			-30	13.92
				-20	20.34	0.01065	PASS
				-10	23.44	0.01227	PASS
				0	16.63	0.00871	PASS
				10	26.96	0.01412	PASS
				20	25.54	0.01337	PASS
				30	19.24	0.01007	PASS
				40	14.98	0.00784	PASS
				50	28.77	0.01506	PASS

END