



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	32.56	29.41	38.5	PASS
		MCH	32.68	29.53	38.5	PASS
		HCH	32.7	29.55	38.5	PASS
	GSM/TM2	LCH	25.98	22.83	38.5	PASS
		MCH	25.92	22.77	38.5	PASS
		HCH	25.9	22.75	38.5	PASS
GSM1900	GSM/TM1	LCH	31.04	31.55	33	PASS
		MCH	30.84	31.35	33	PASS
		HCH	30.74	31.25	33	PASS
	GSM/TM2	LCH	25.56	26.07	33	PASS
		MCH	25.5	26.01	33	PASS
		HCH	25.52	26.03	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: $\text{RBW} > \text{emission bandwidth}$, $\text{VBW} > 3 \times \text{RBW}$.

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	0.26	13	PASS
		MCH	0.27	13	PASS
		HCH	0.24	13	PASS
	GSM/TM2	LCH	3.26	13	PASS
		MCH	3.22	13	PASS
		HCH	3.17	13	PASS

3Appendix_C: Modulation Characteristics

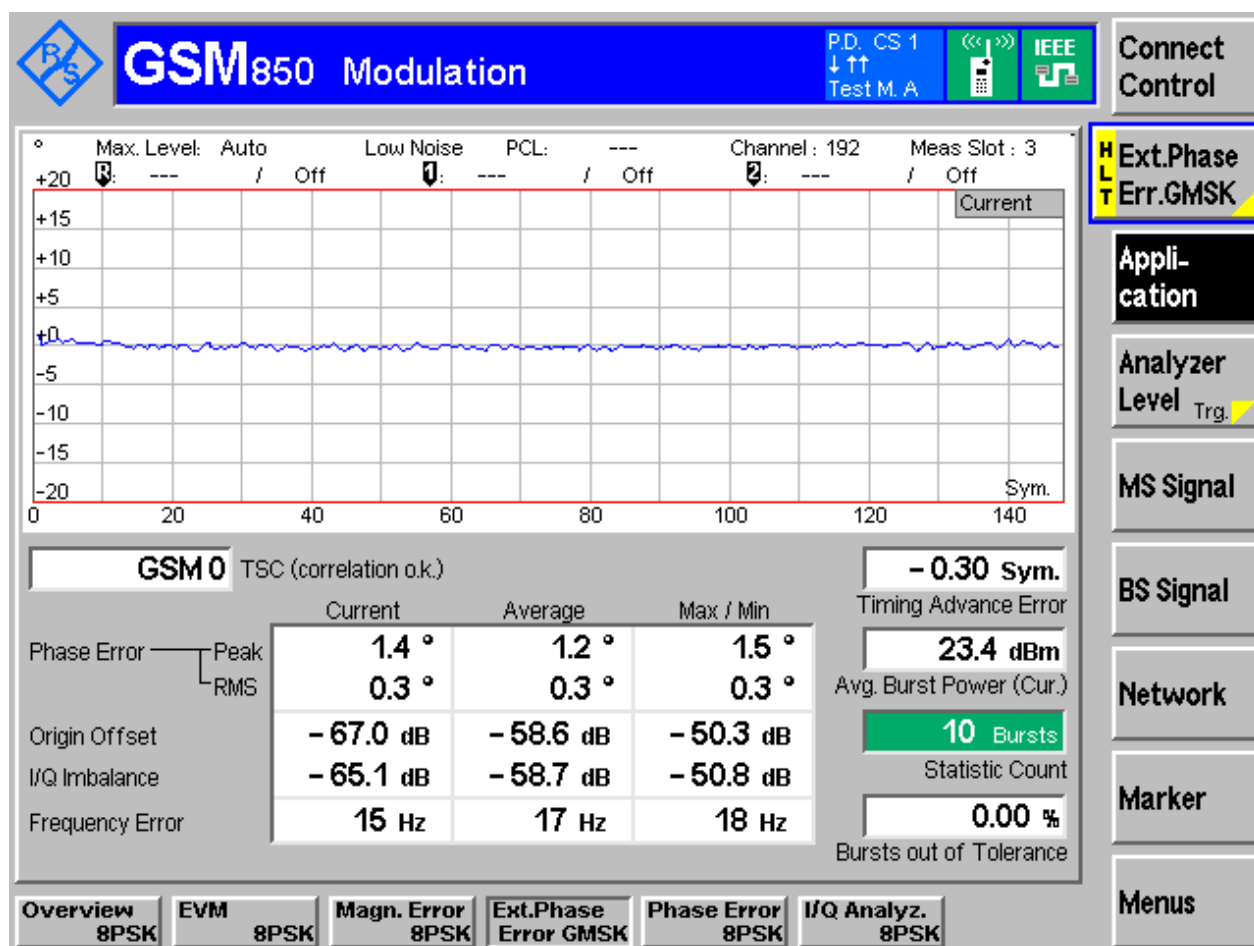
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

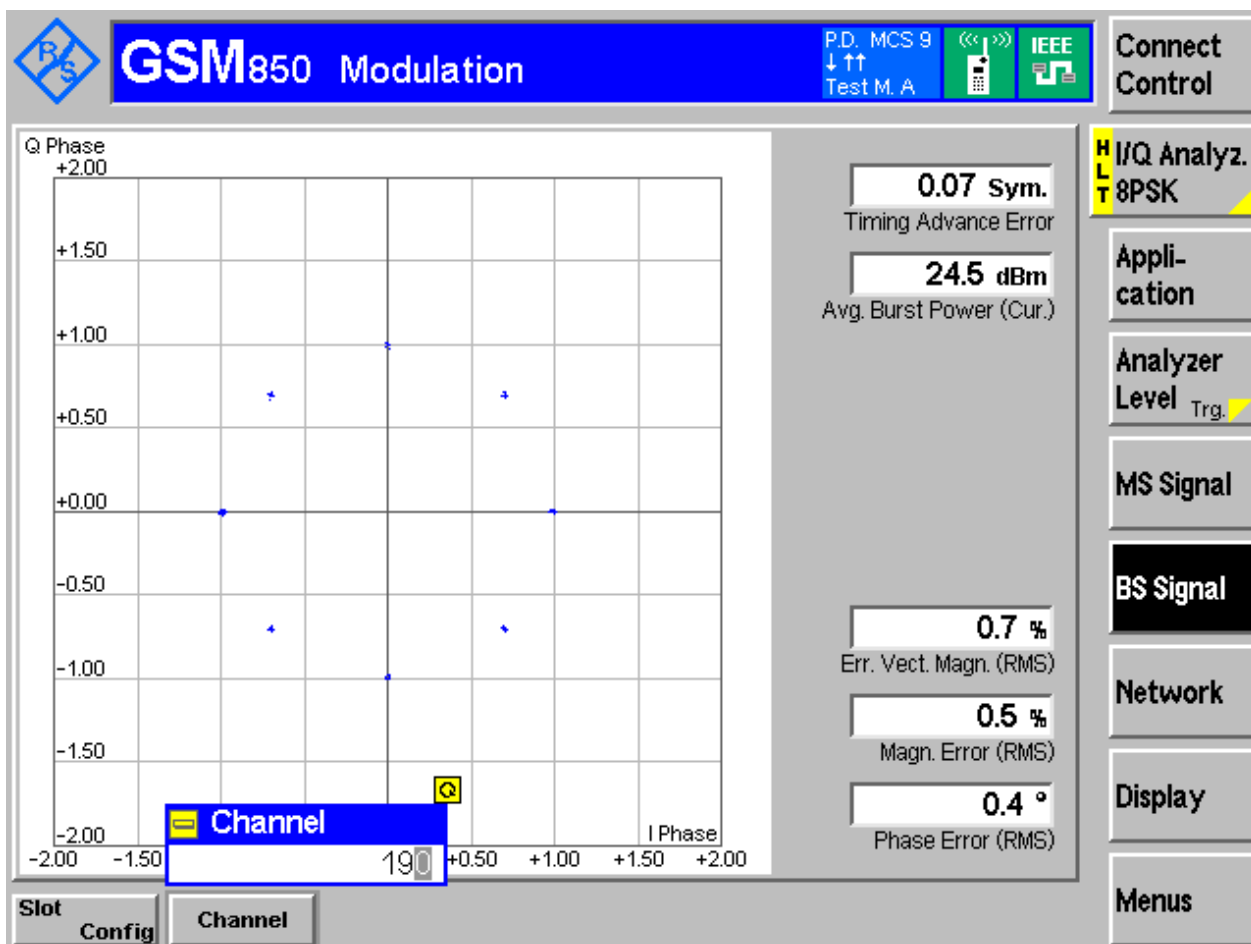
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

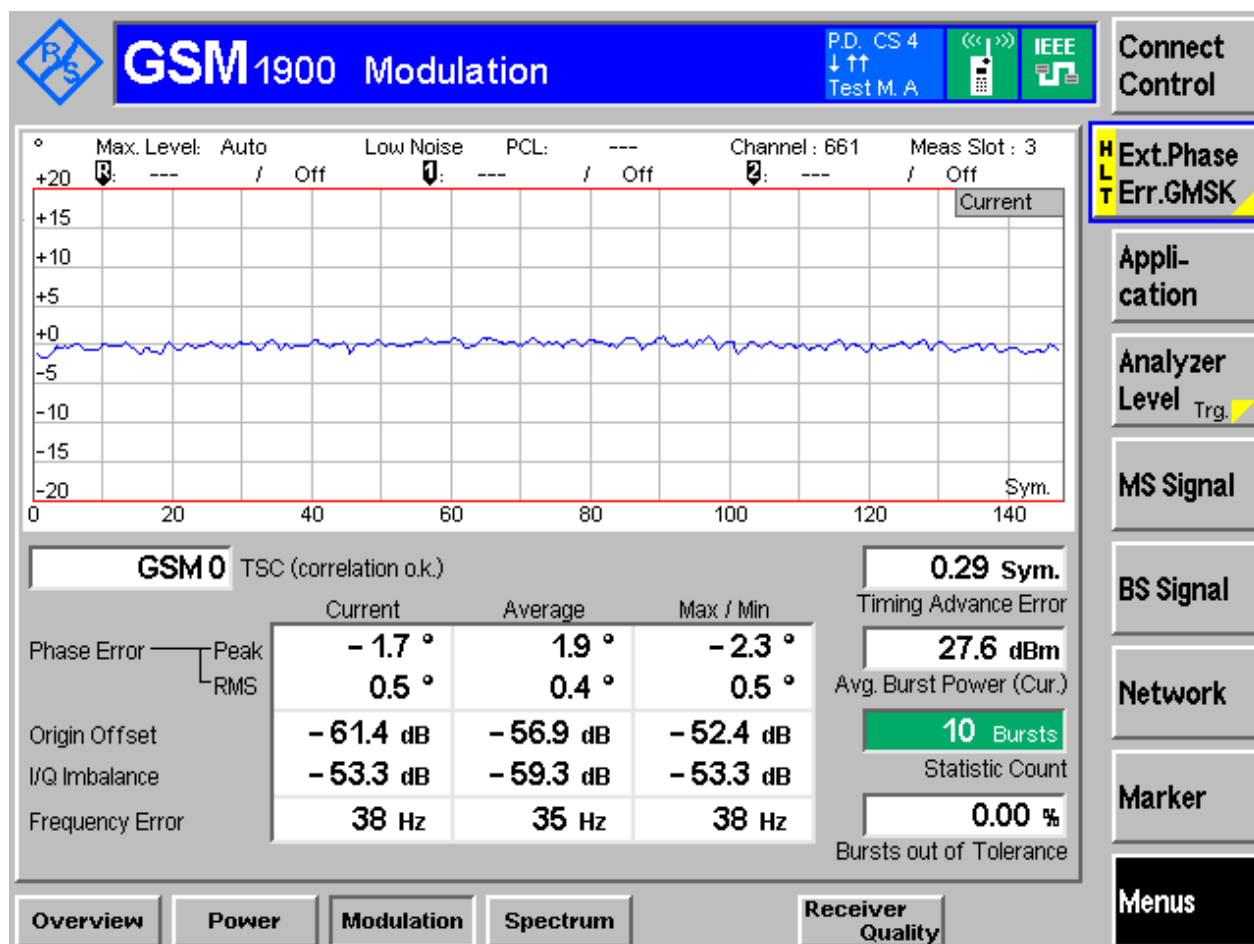
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

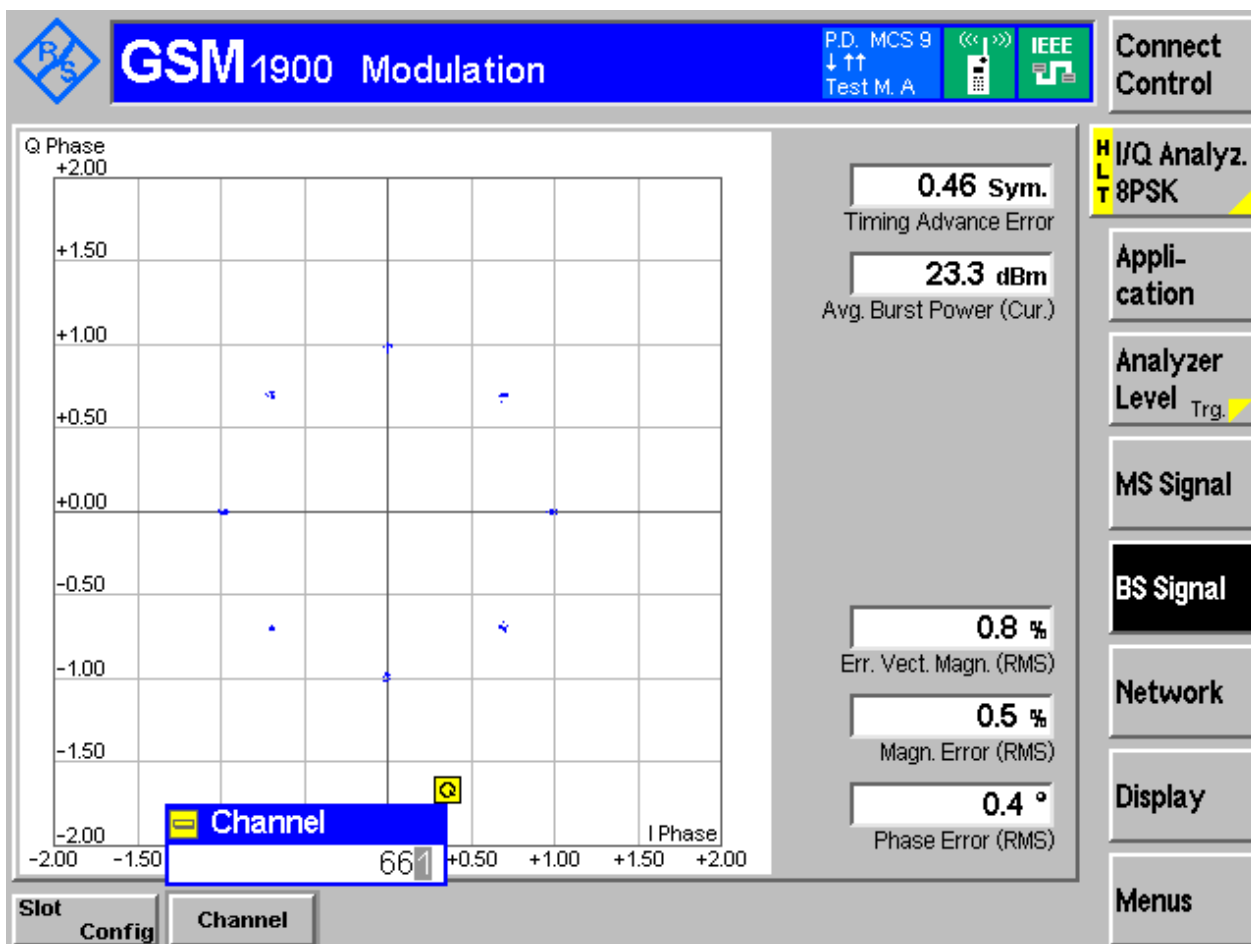
3.1.2.1 Test Mode = GSM/TM1

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	241.69	315.38	Pass
		MCH	244.27	315.97	Pass
		HCH	243.74	319.89	Pass
	GSM/TM2	LCH	247.25	311.15	Pass
		MCH	241.67	312.58	Pass
		HCH	237.23	287.40	Pass
GSM1900	GSM/TM1	LCH	247.68	319.91	Pass
		MCH	245.40	317.29	Pass
		HCH	246.68	320.06	Pass
	GSM/TM2	LCH	244.78	311.31	Pass
		MCH	242.23	311.10	Pass
		HCH	242.97	304.35	Pass

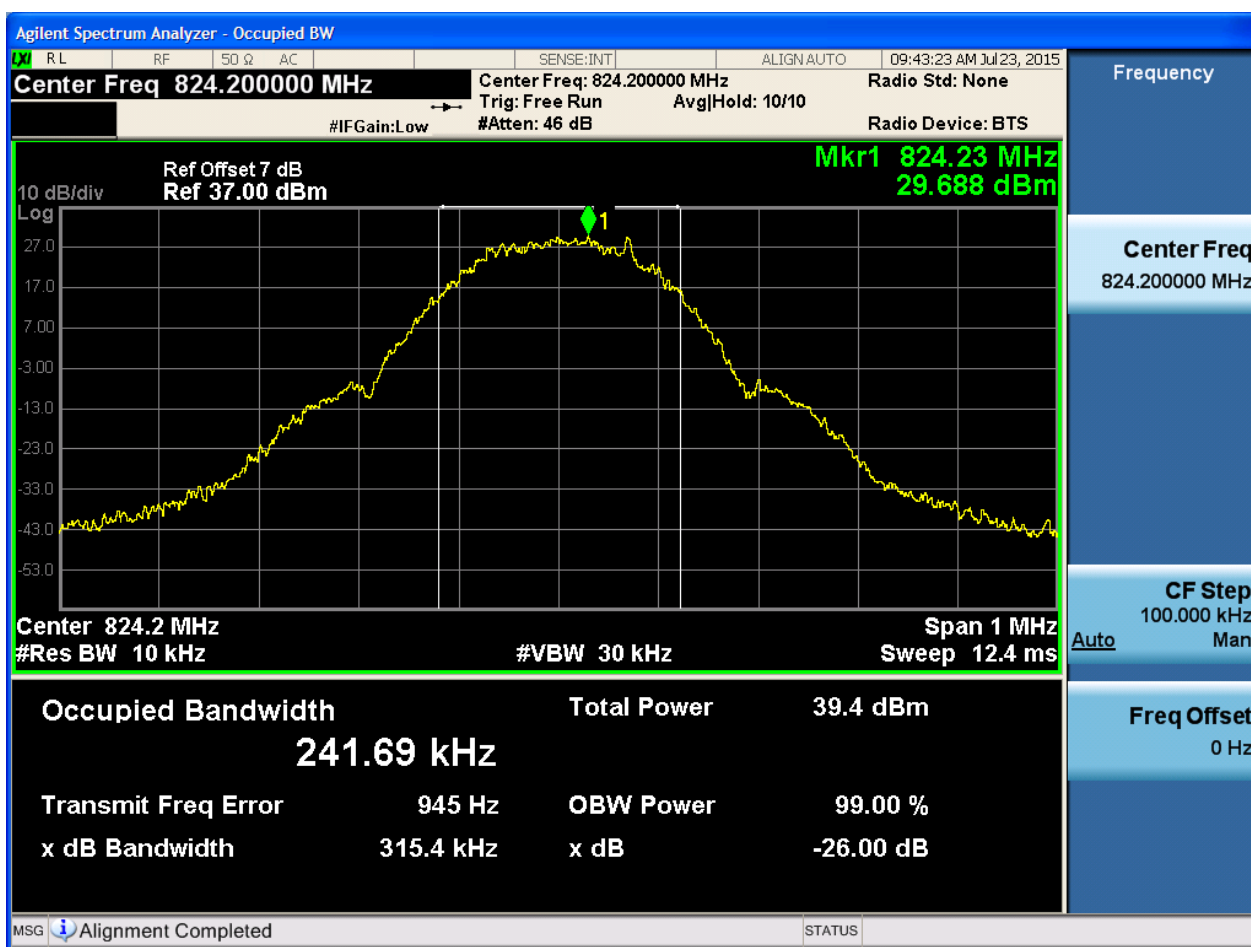
Part II - Test Plots

4.1 For GSM

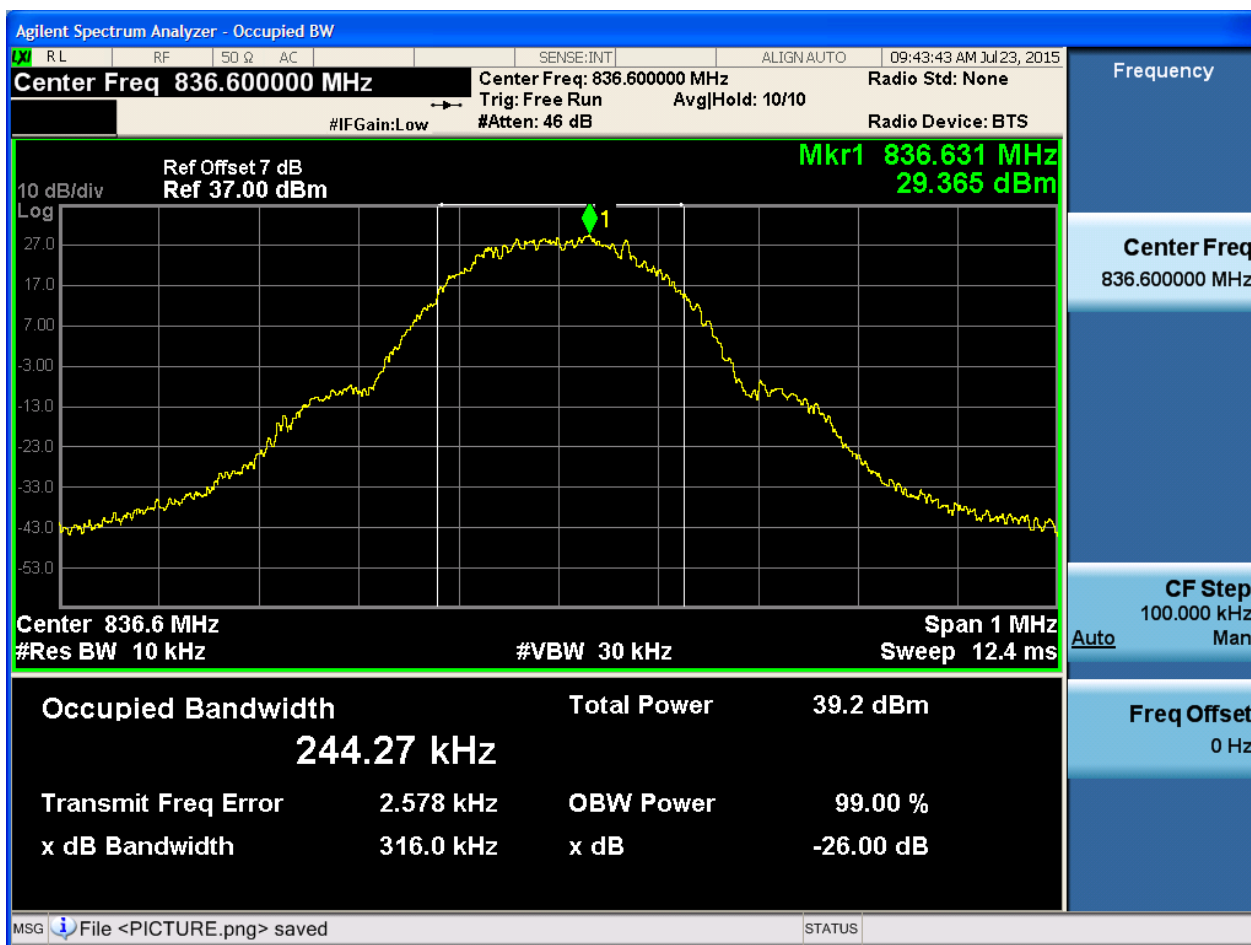
4.1.1 Test Band = GSM850

4.1.1.1 Test Mode = GSM/TM1

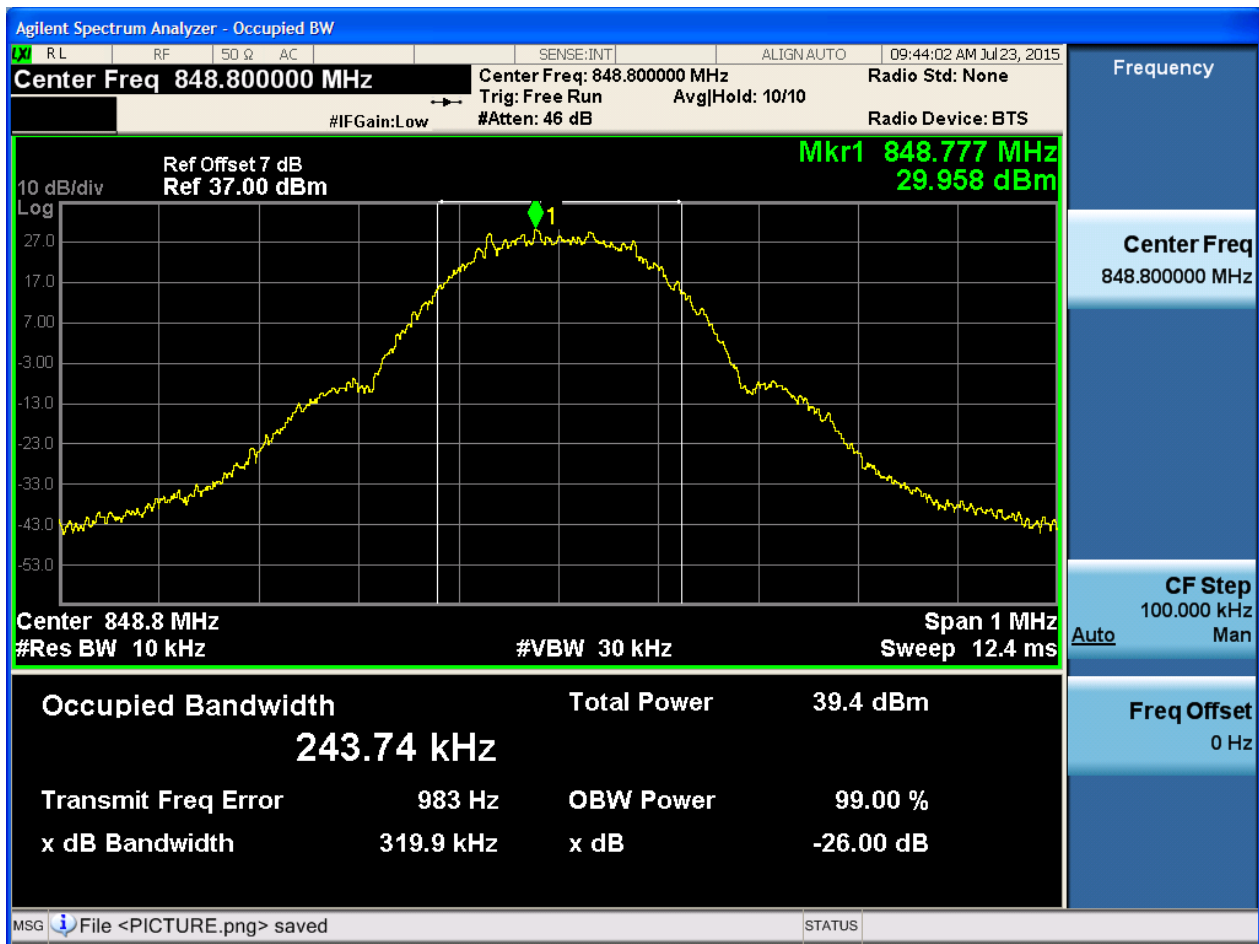
4.1.1.1.1 Test Channel = LCH



4.1.1.1.2 Test Channel = MCH



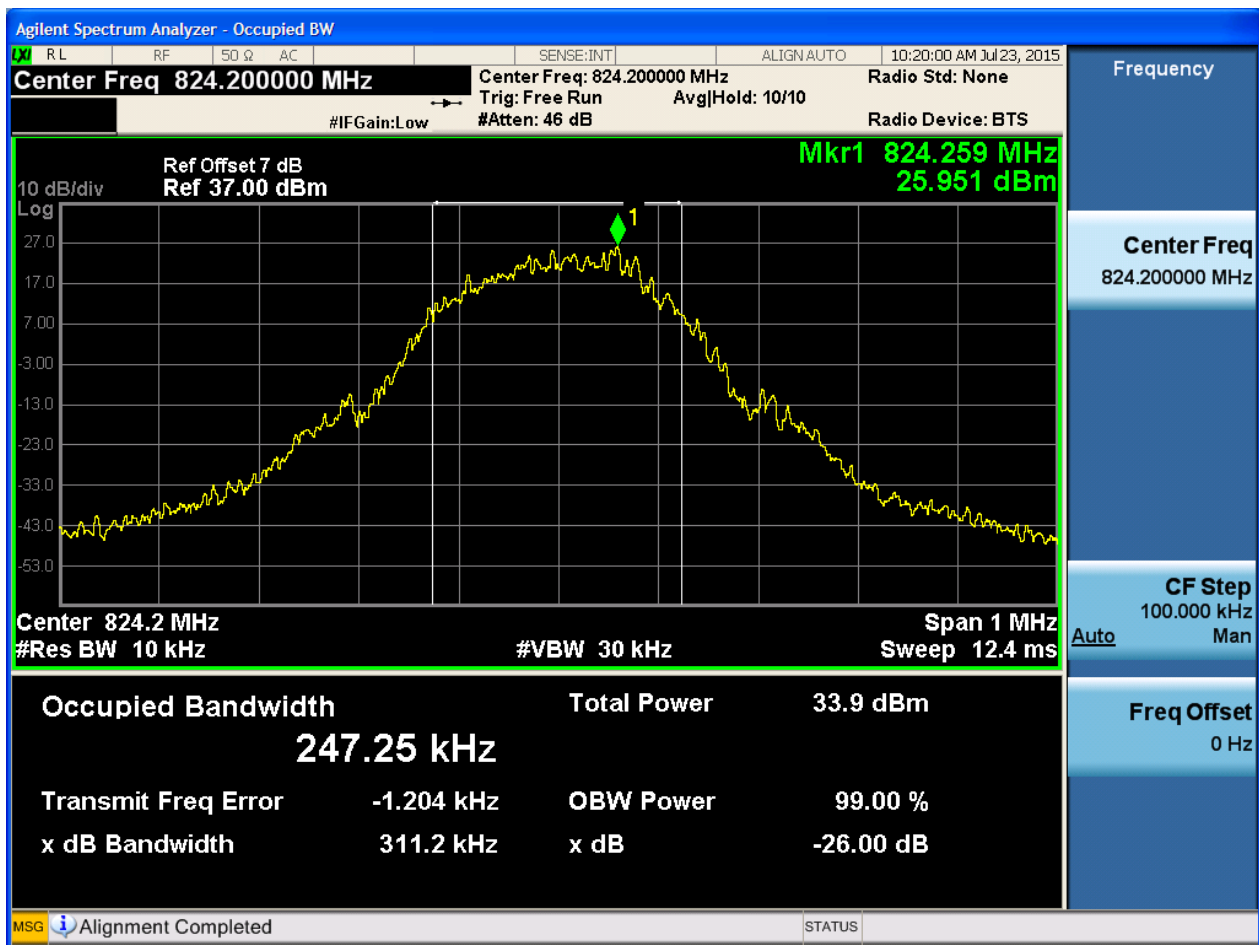
4.1.1.1.3 Test Channel = HCH





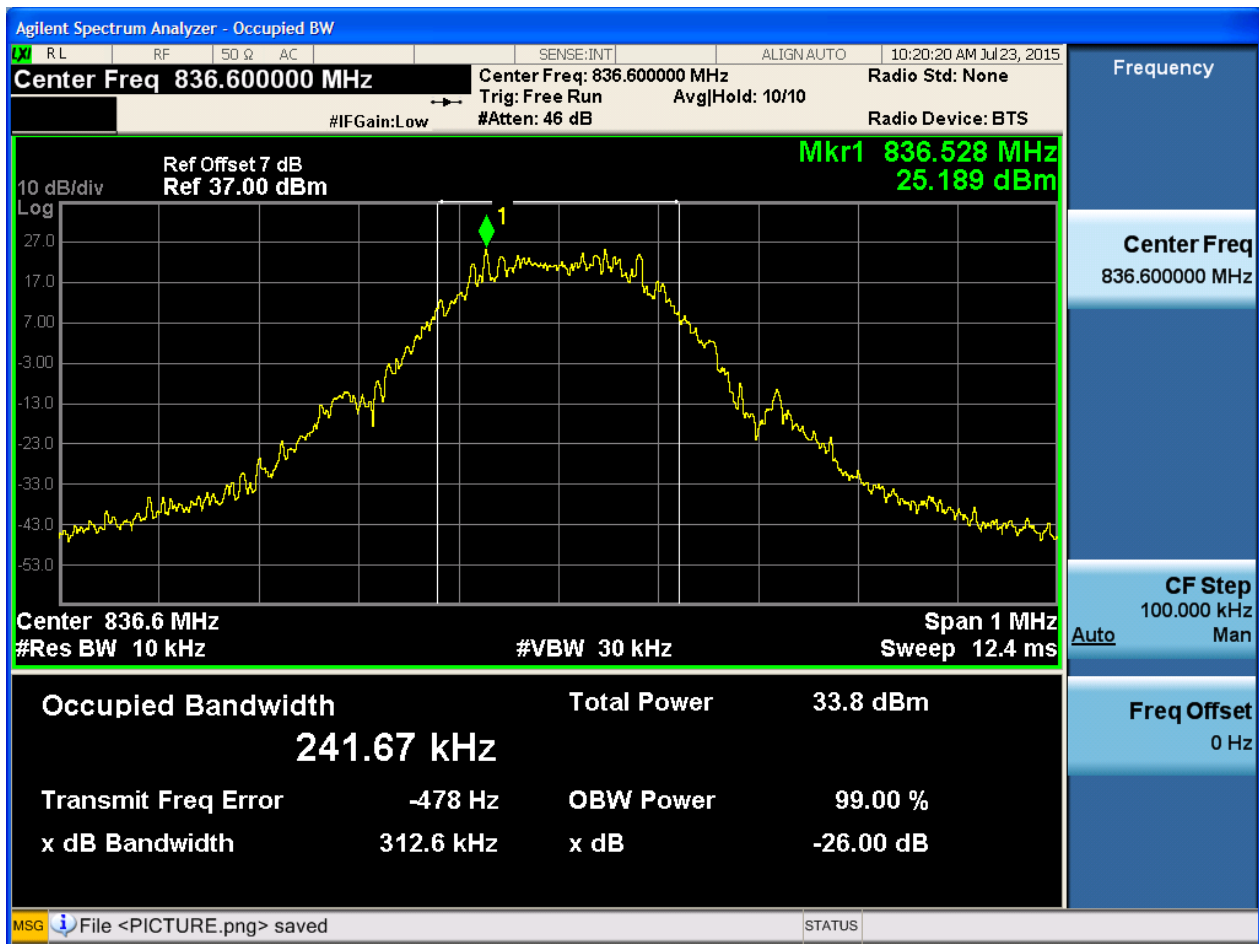
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



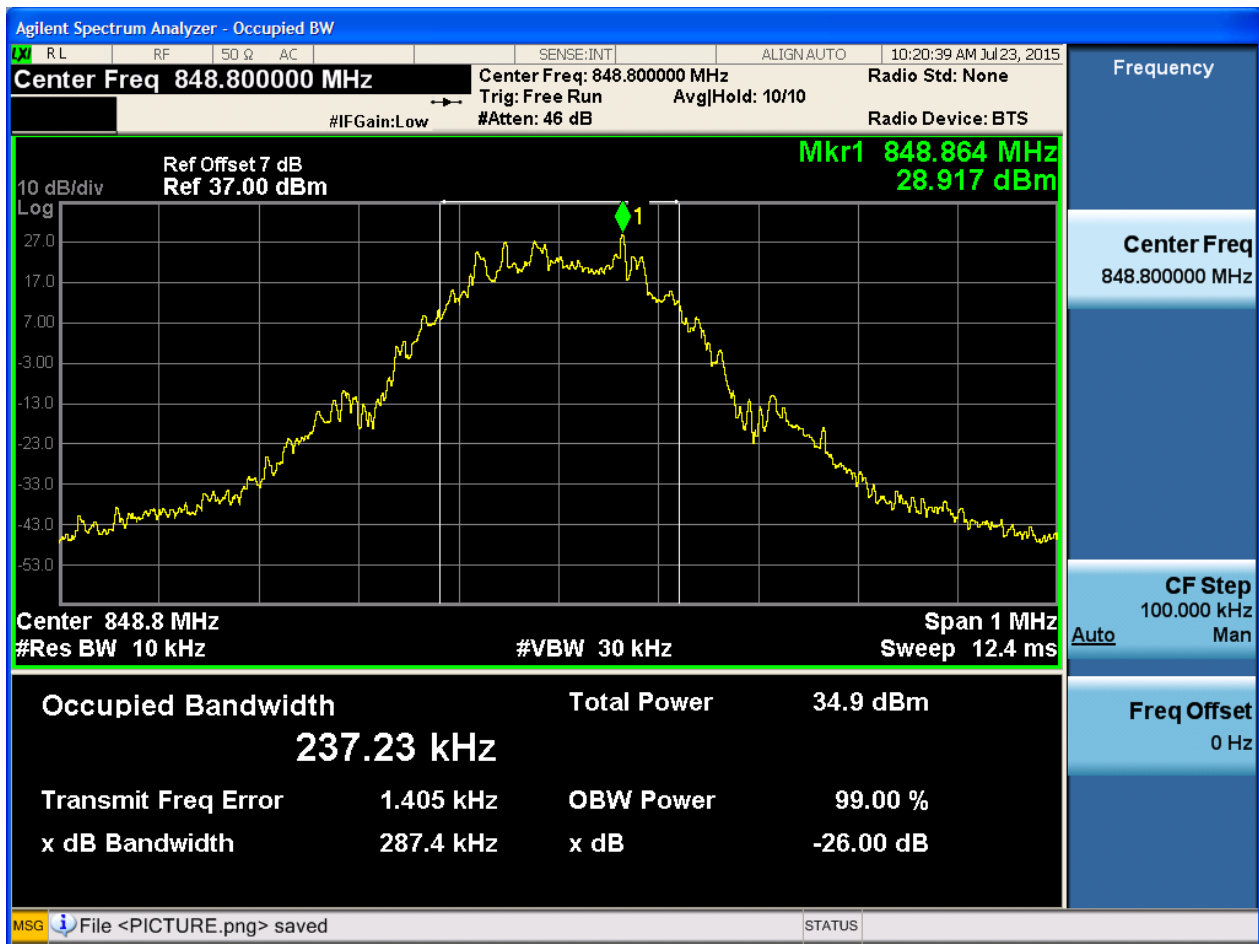


4.1.1.2.2 Test Channel = MCH





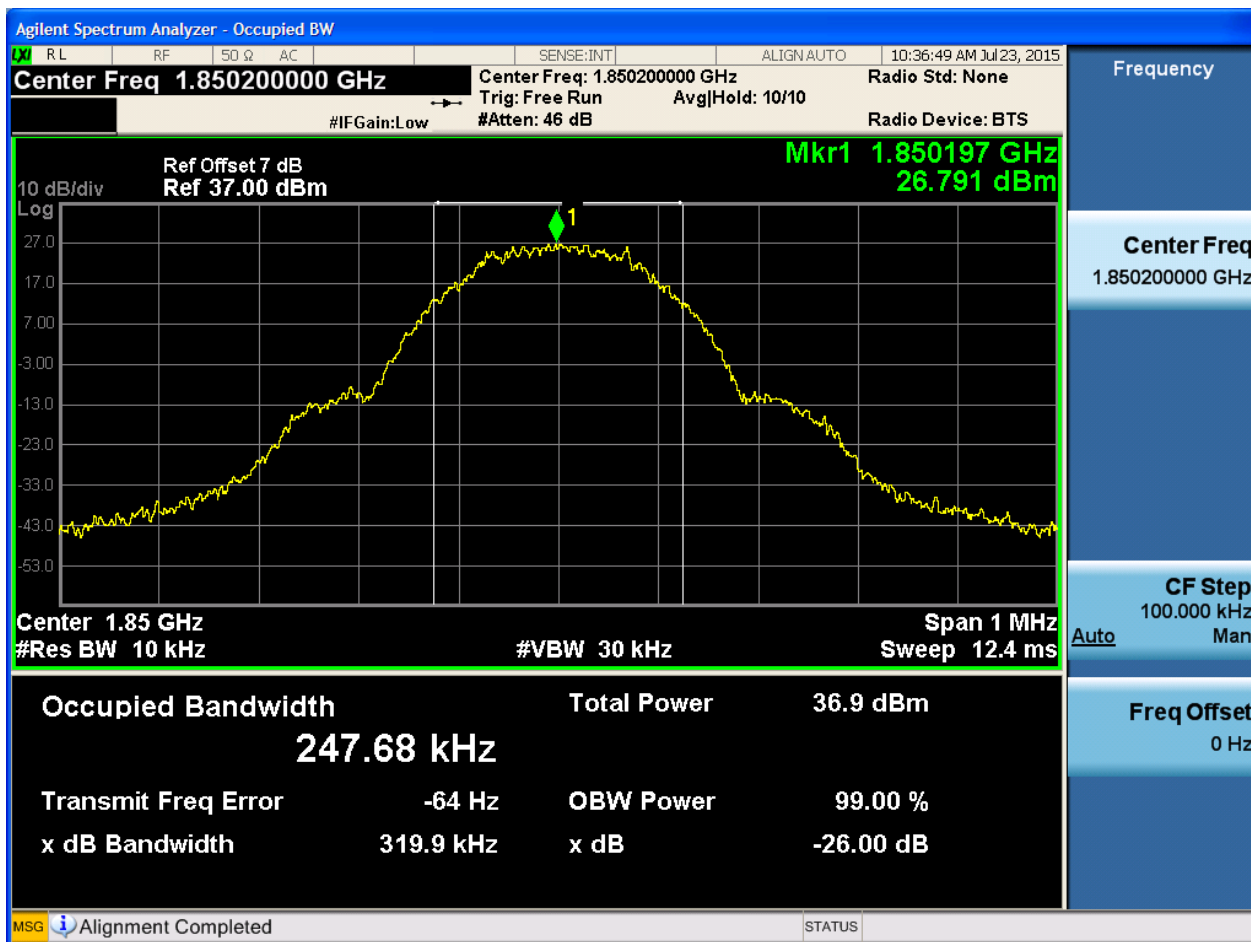
4.1.1.2.3 Test Channel = HCH



4.1.2 Test Band = GSM1900

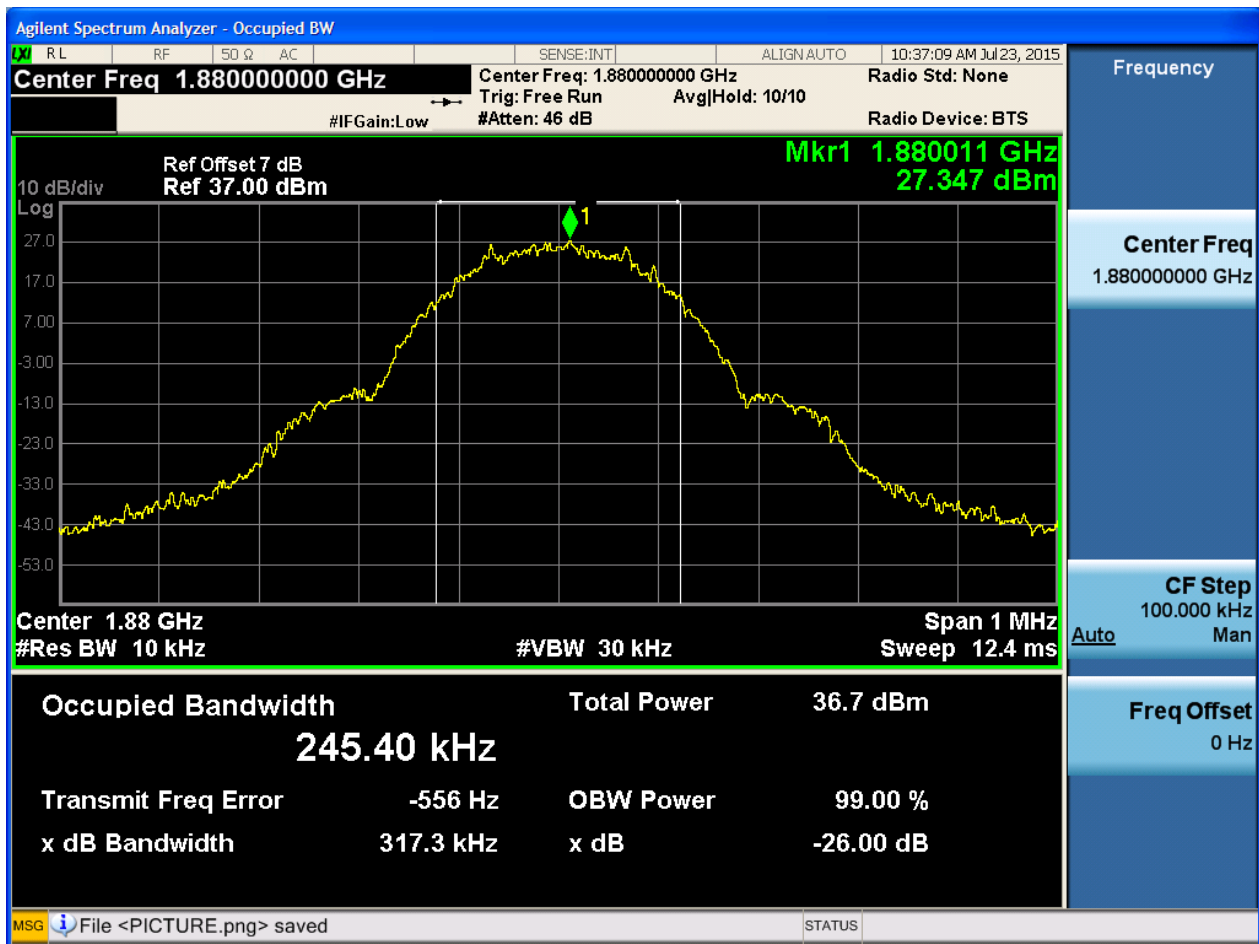
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



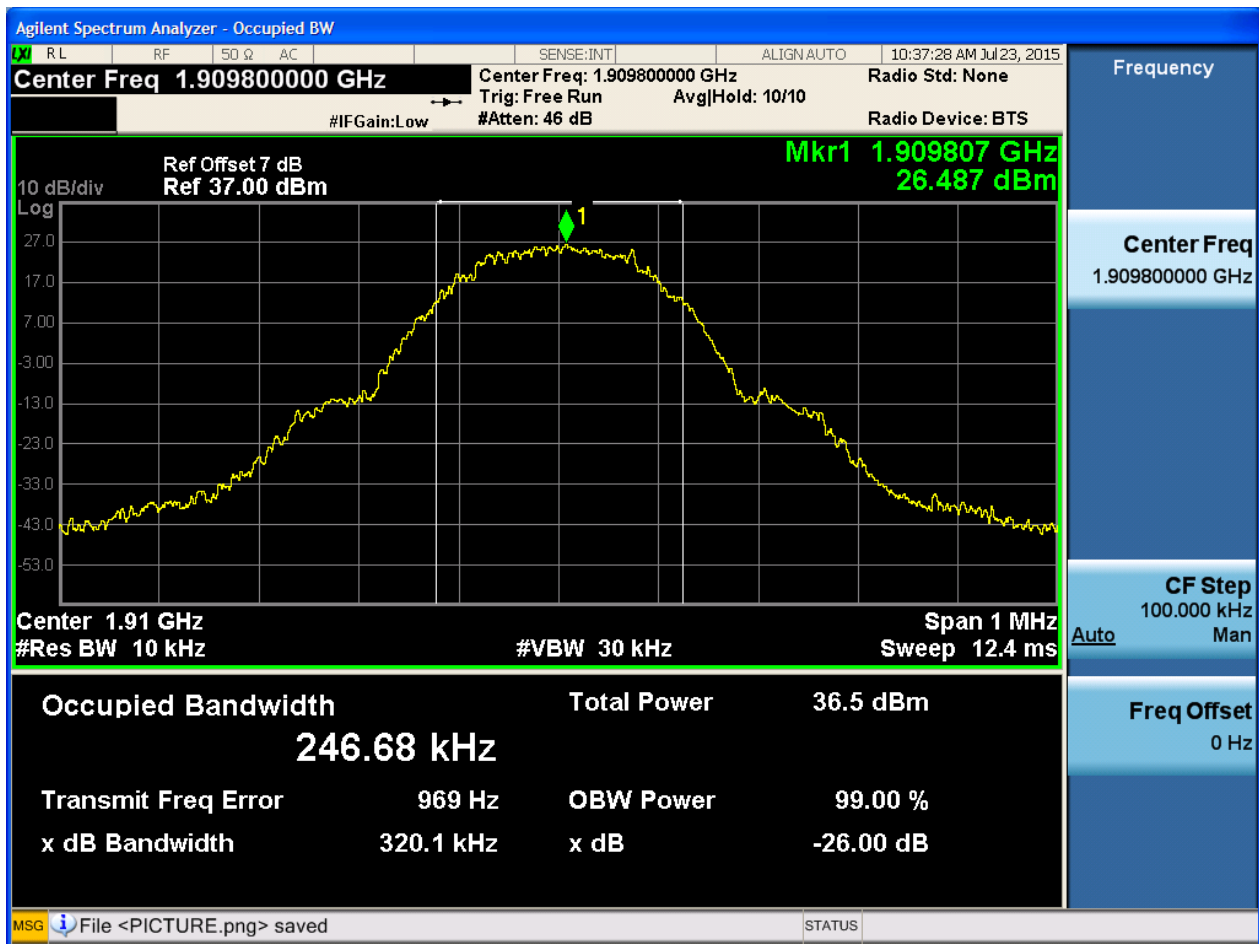


4.1.2.1.2 Test Channel = MCH





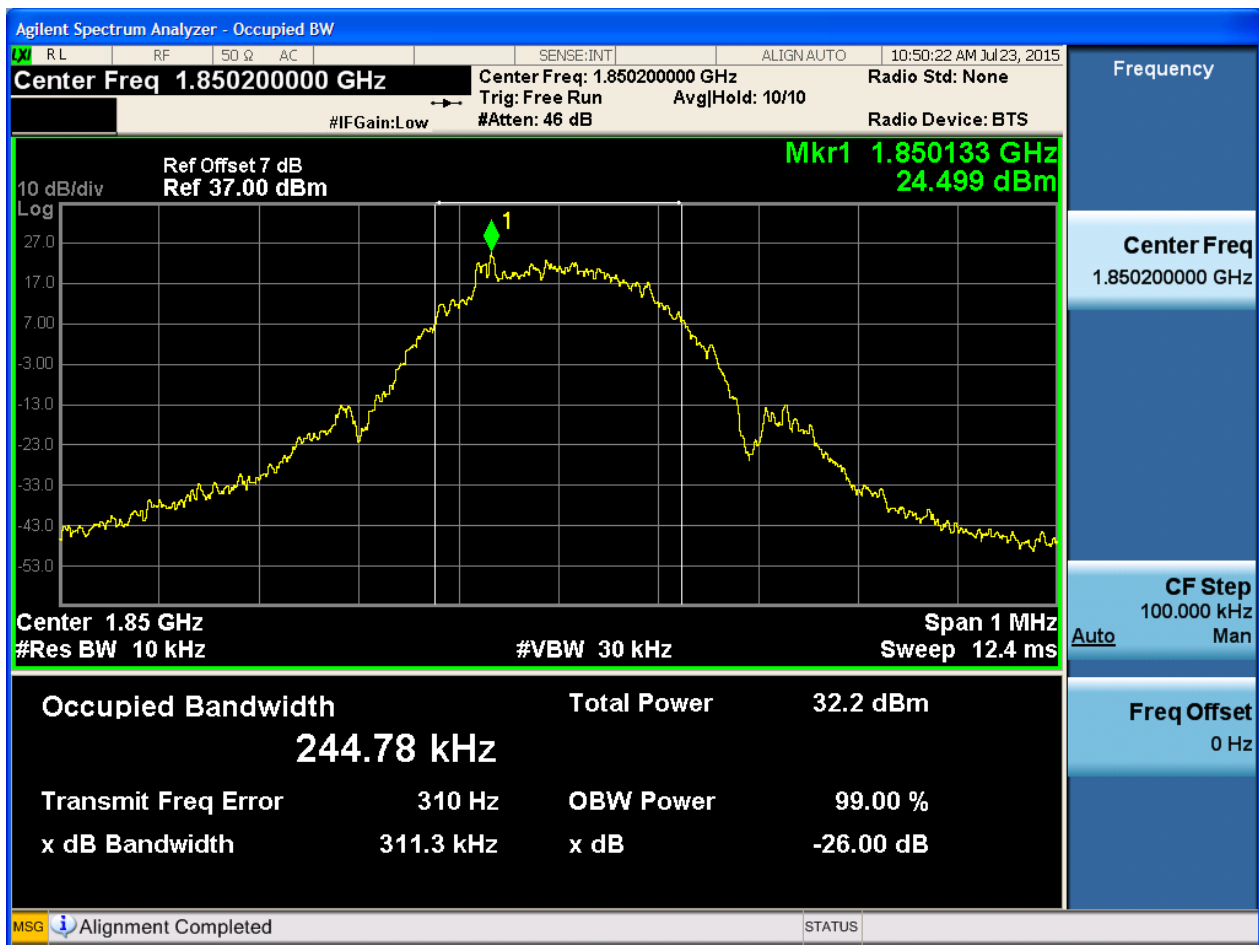
4.1.2.1.3 Test Channel = HCH





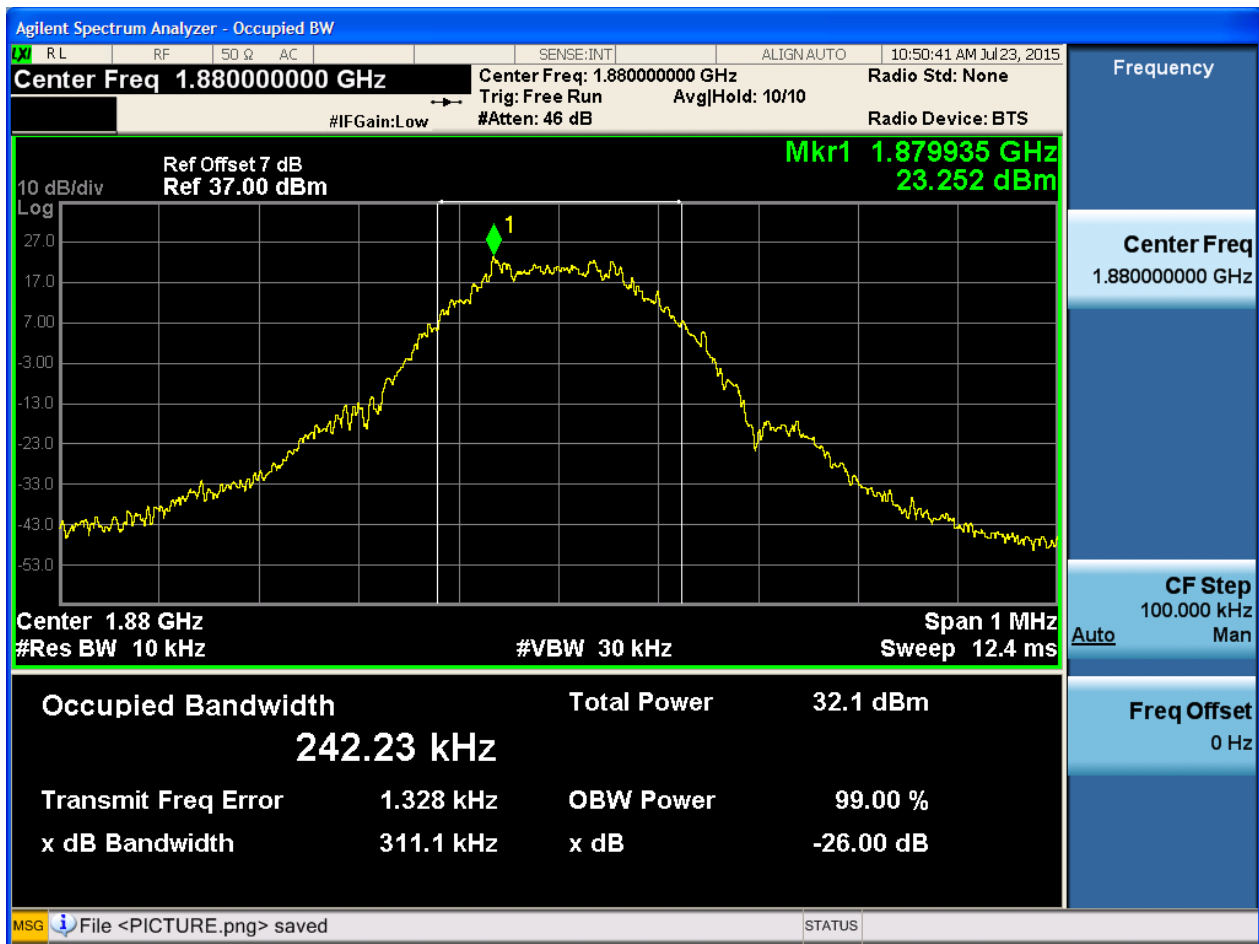
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



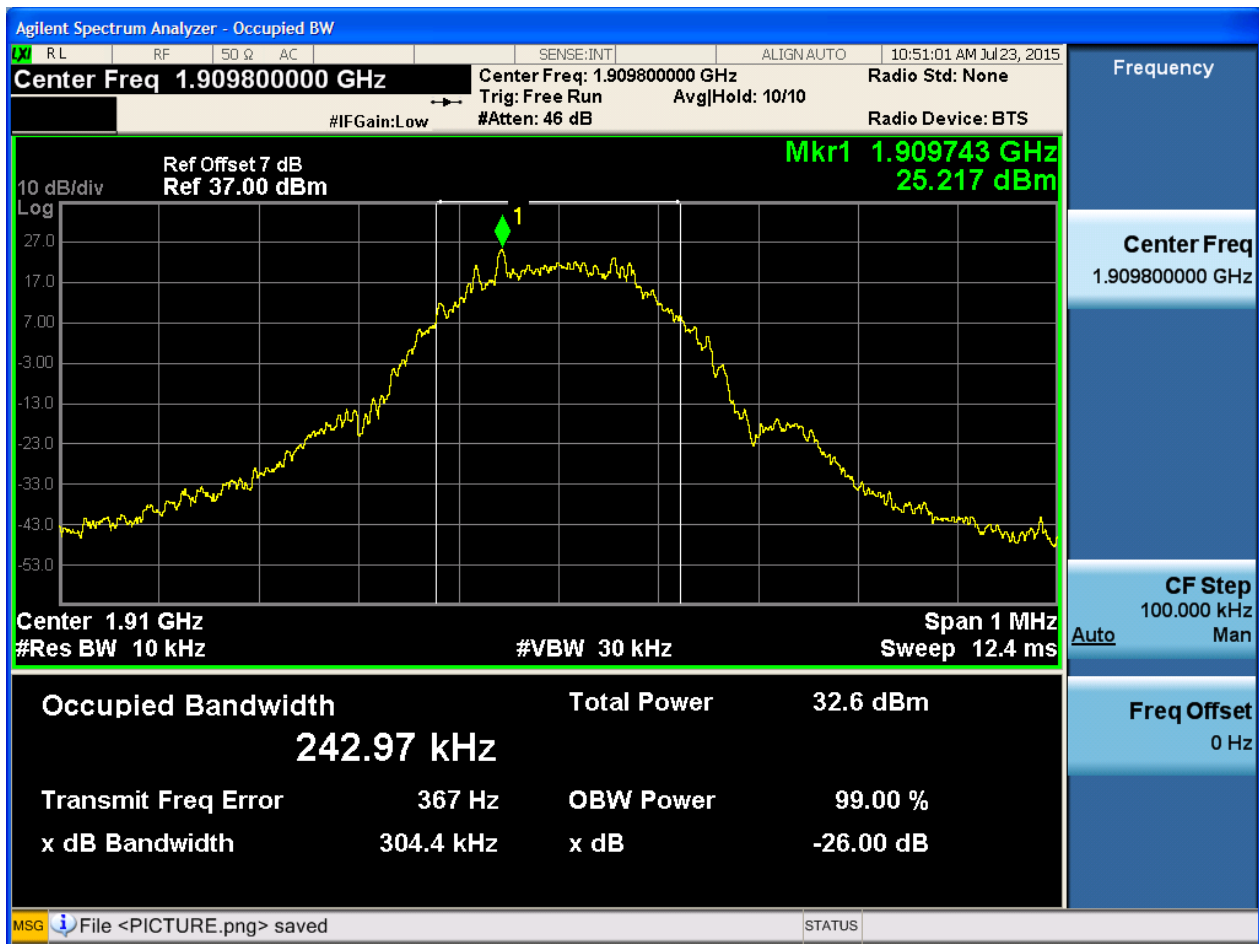


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH





5Appendix_E: Band Edges Compliance

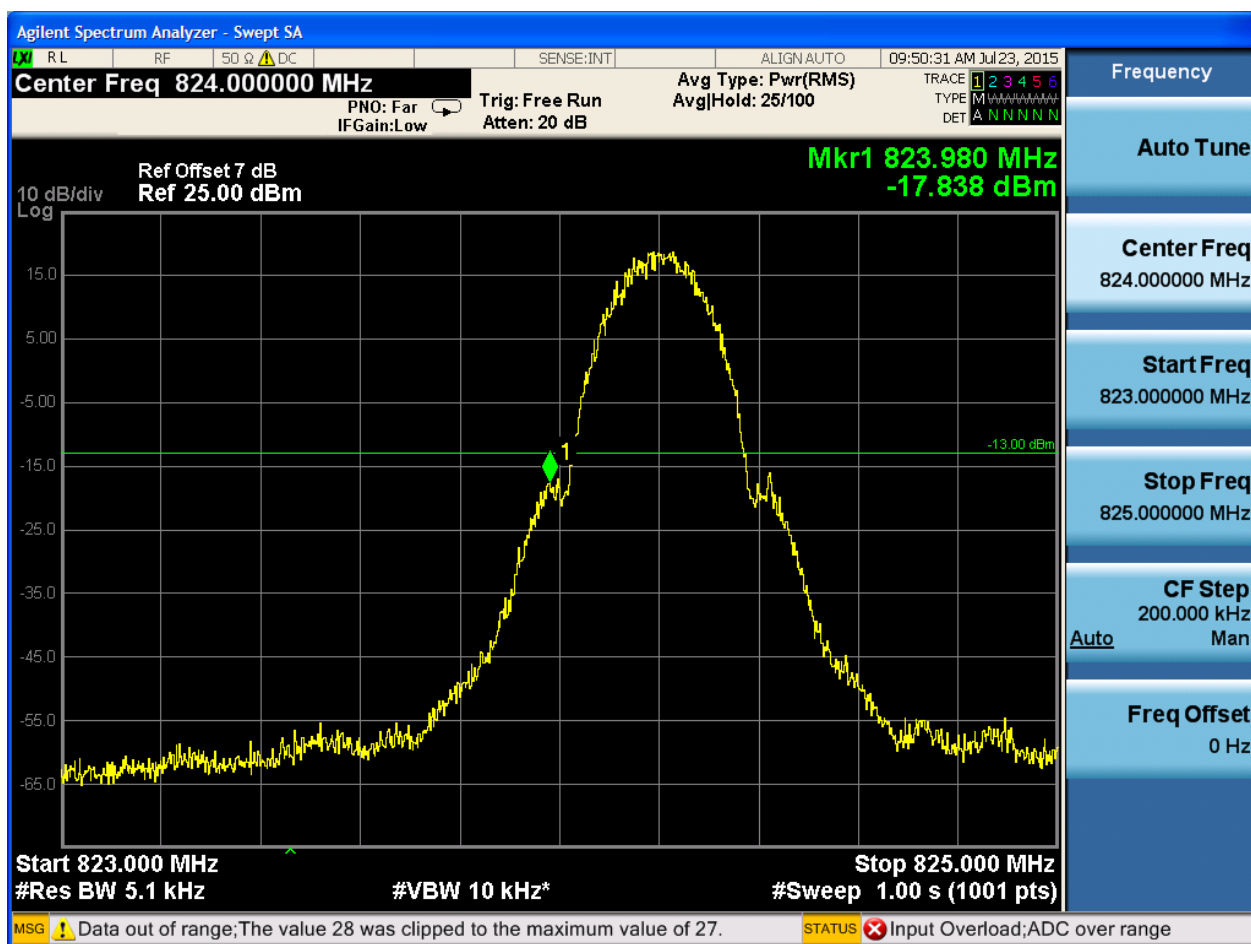
Part I - Test Plots

5.1 For GSM

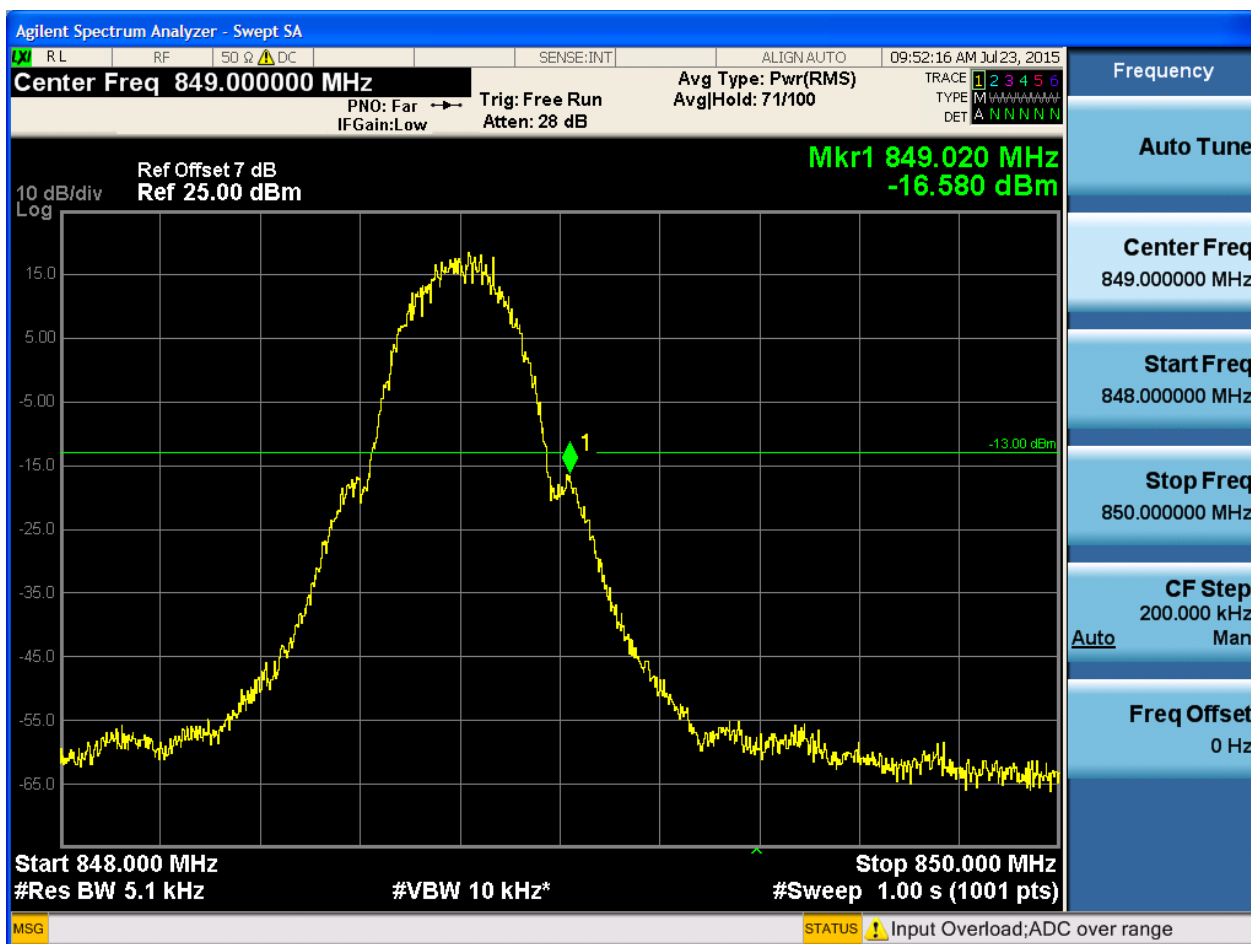
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

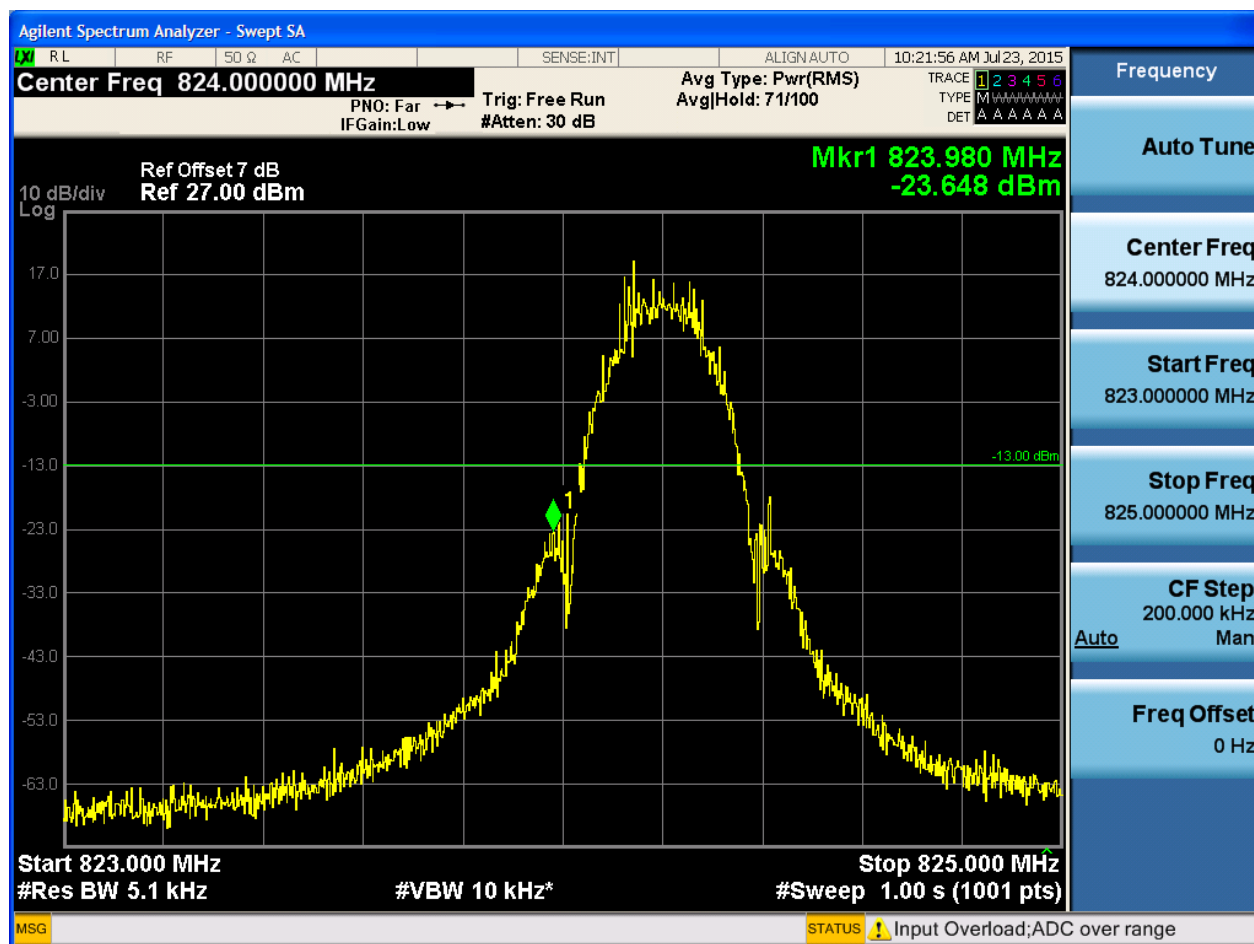


5.1.1.1.2 Test Channel = HCH

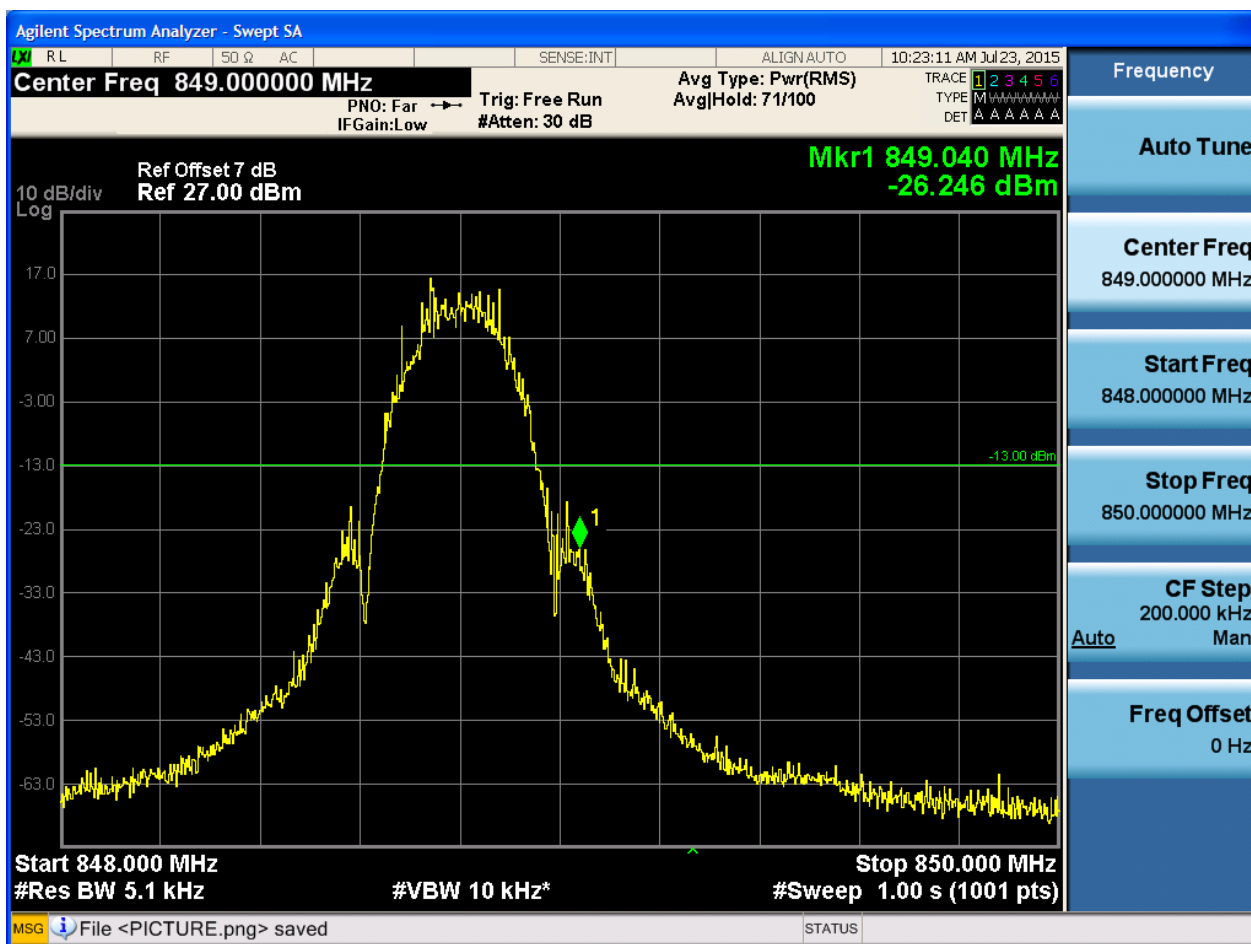


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



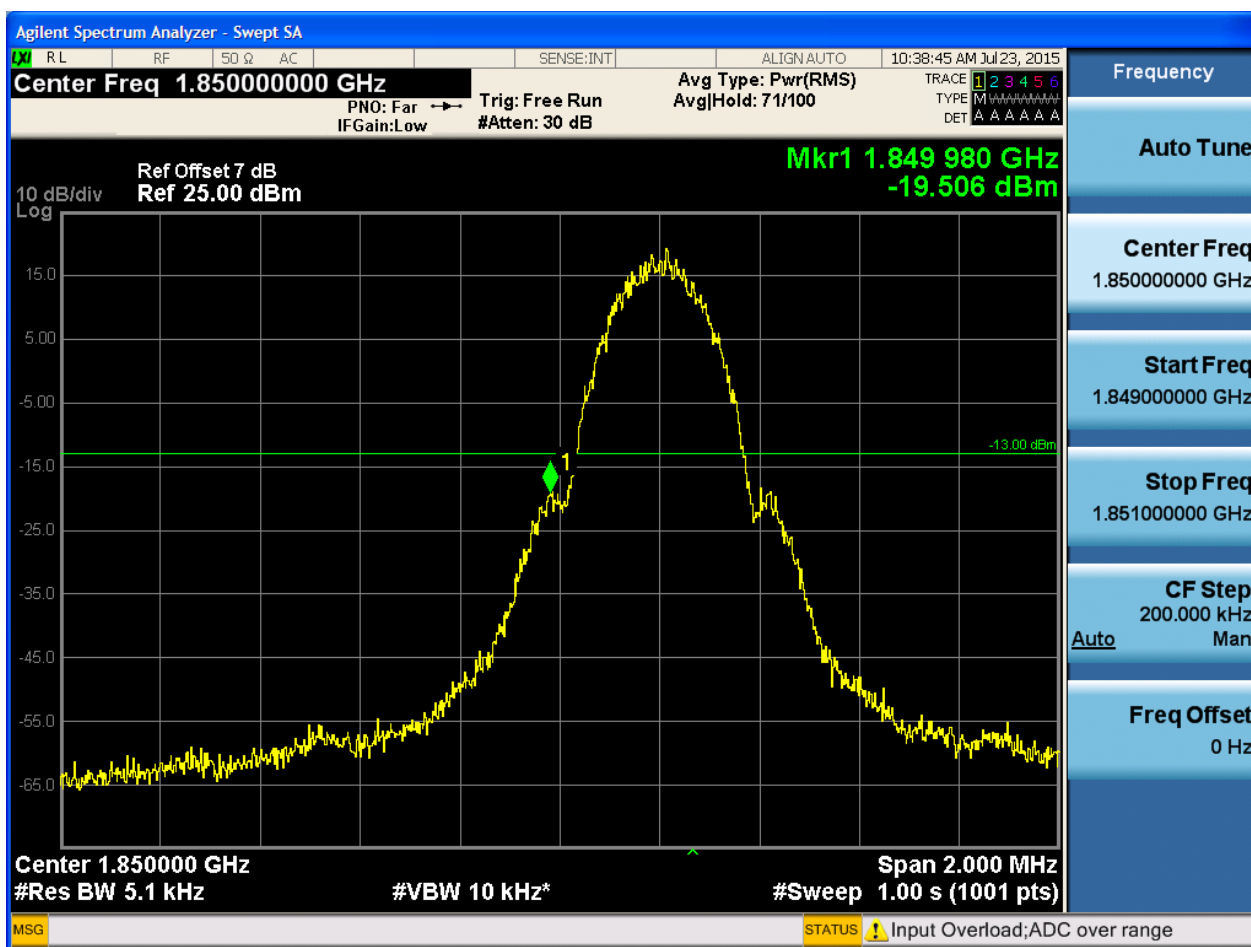
5.1.1.2.2 Test Channel = HCH



5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

Center Freq 1.91000000 GHz

Ref Offset 7 dB
Ref 25.00 dBm

Mkr1 1.910 020 GHz
-20.083 dBm

10 dB/div
Log

Center 1.91000 GHz
#Res BW 5.1 kHz
#VBW 10 kHz*

Span 2.000 MHz
#Sweep 1.00 s (1001 pts)

Frequency

Auto Tune

Center Freq
1.91000000 GHz

Start Freq
1.90900000 GHz

Stop Freq
1.91100000 GHz

CF Step
200.000 kHz
Auto Man

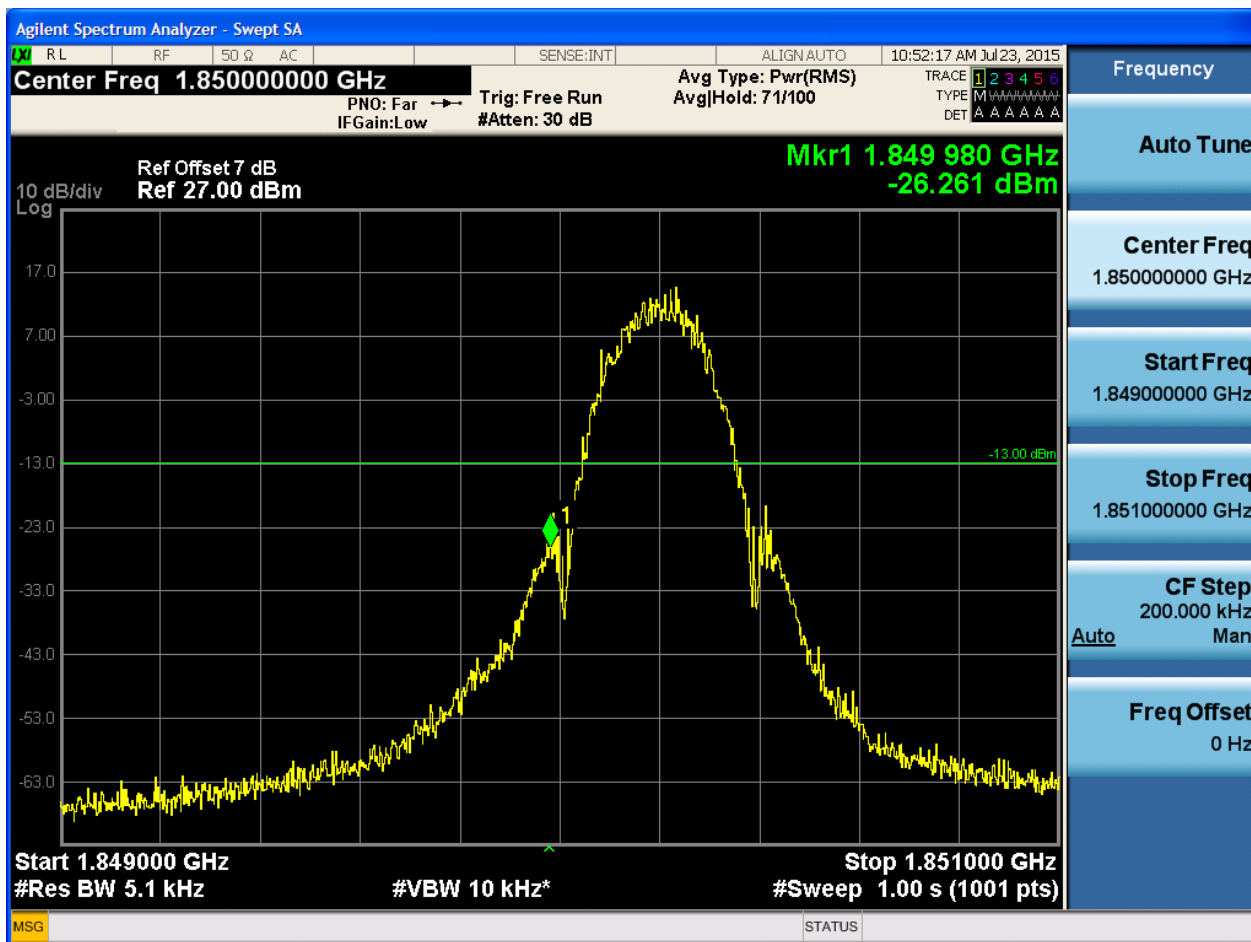
Freq Offset
0 Hz

MSG

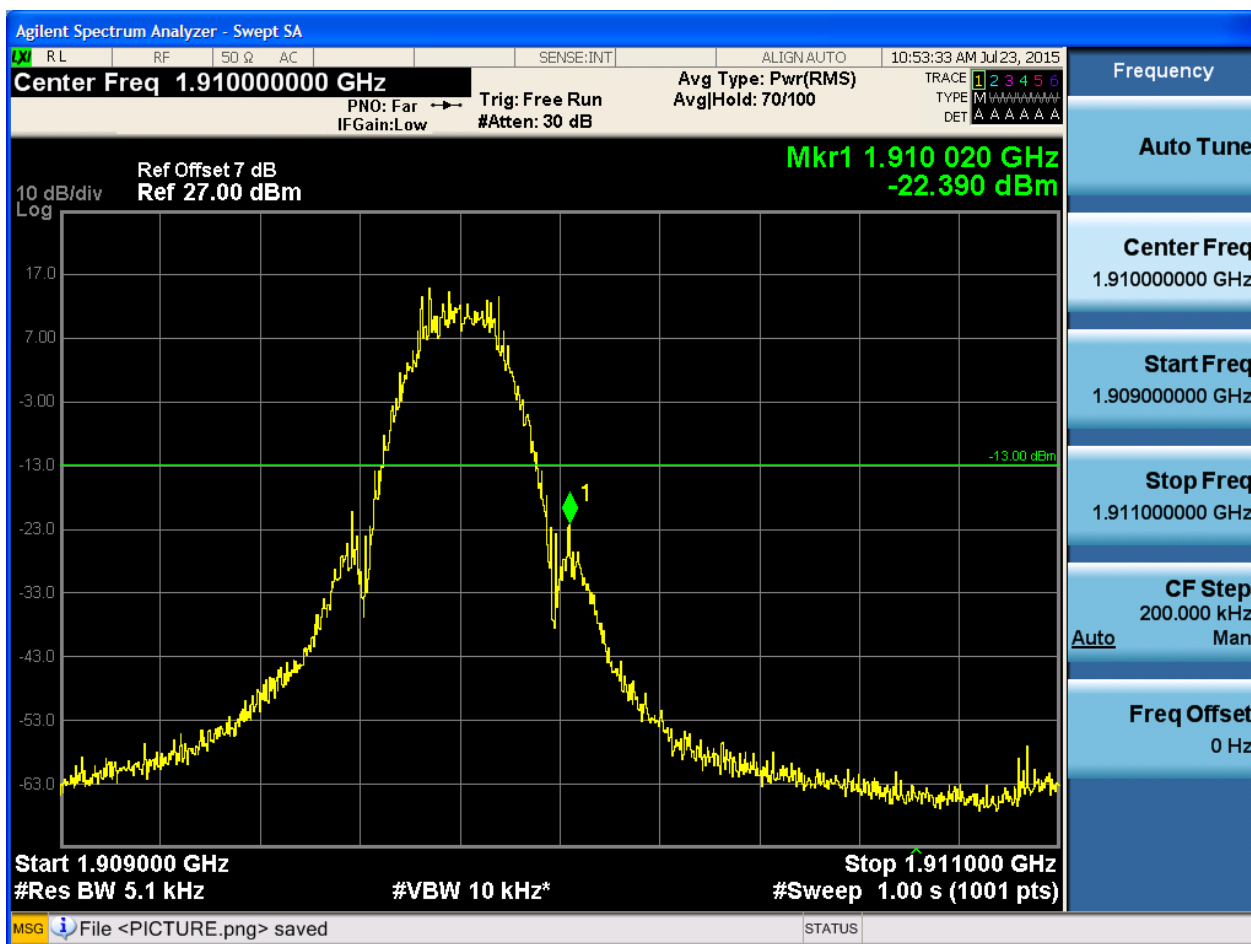
STATUS Input Overload;ADC over range

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.

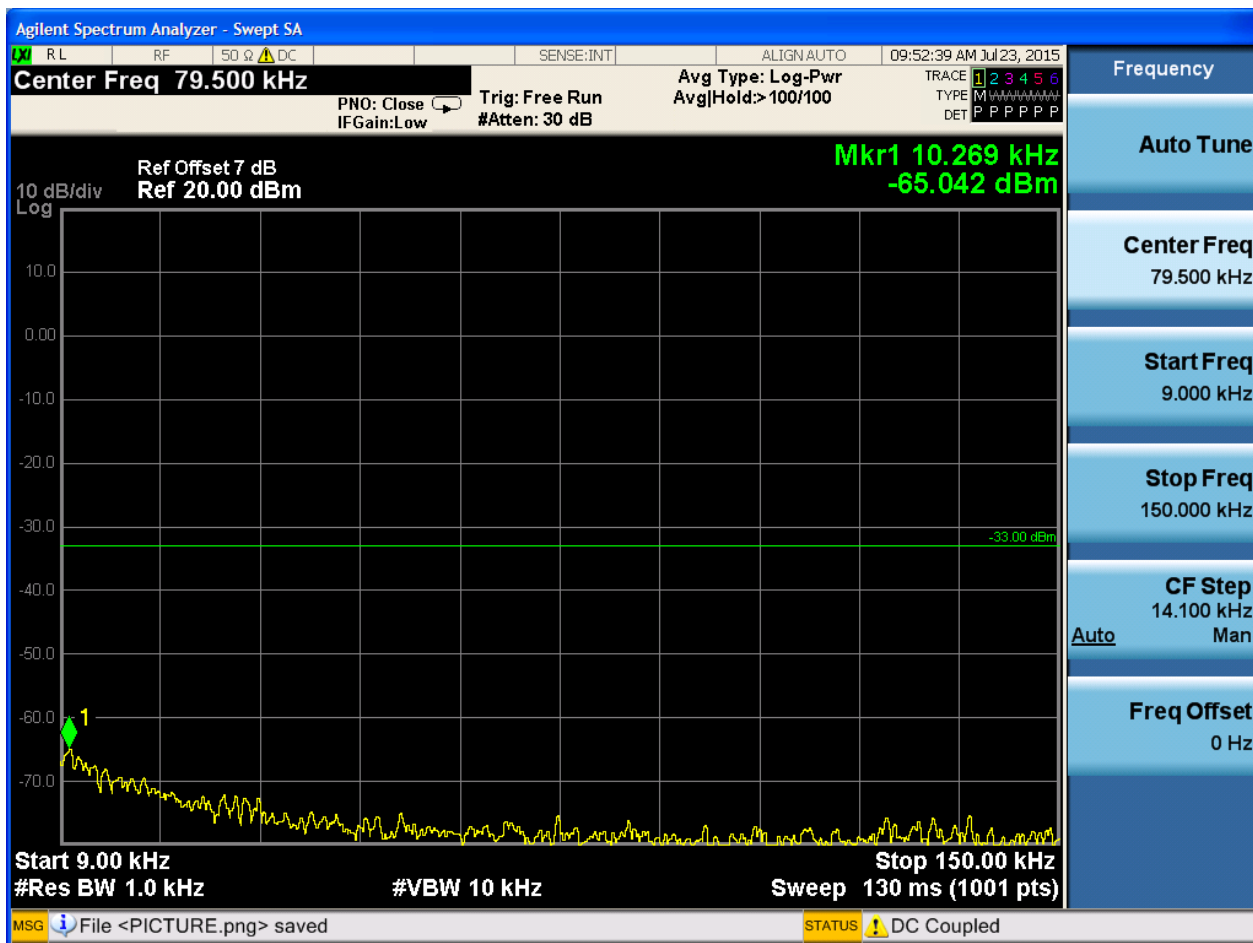
Part I - Test Plots

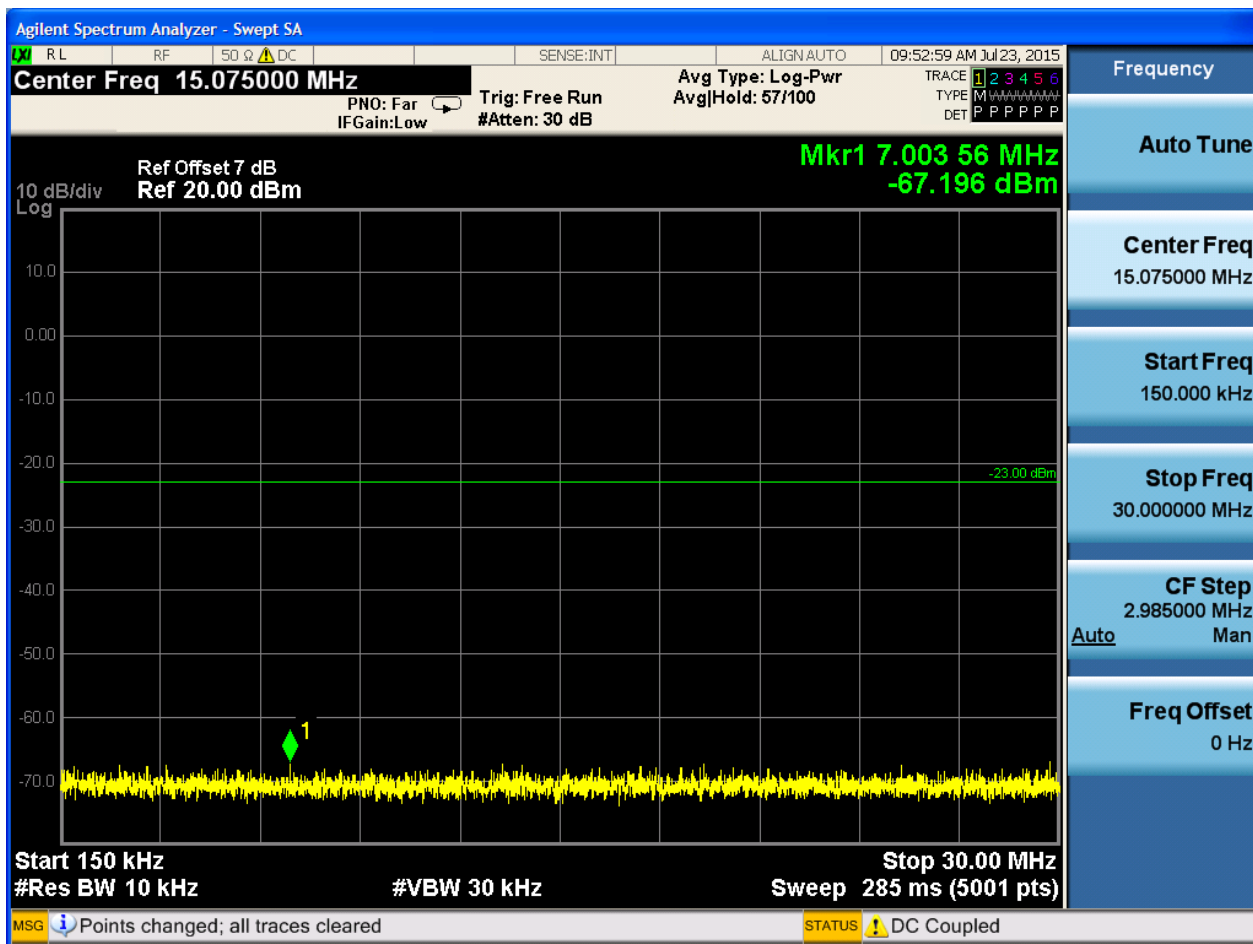
6.1 For GSM

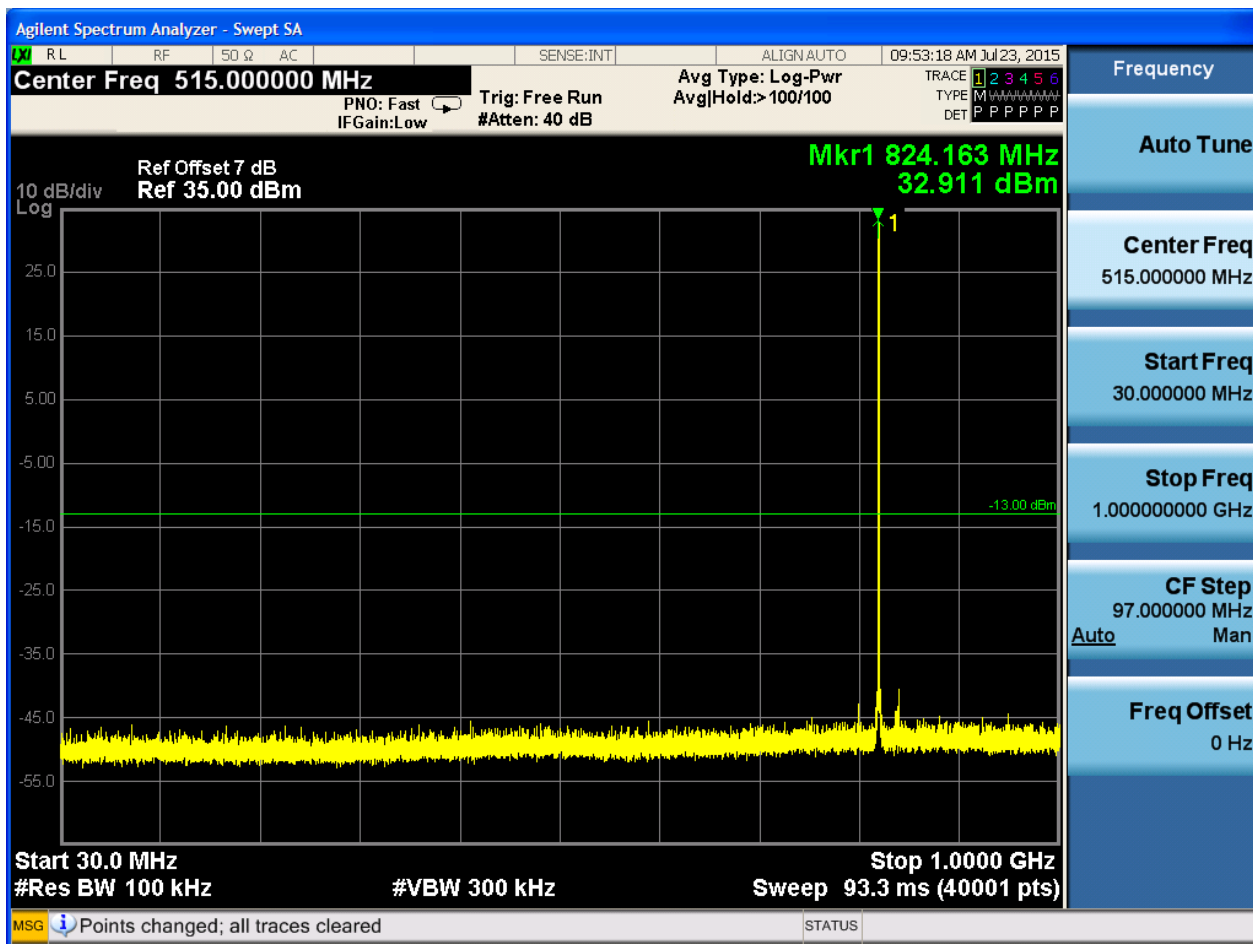
6.1.1 Test Band = GSM850

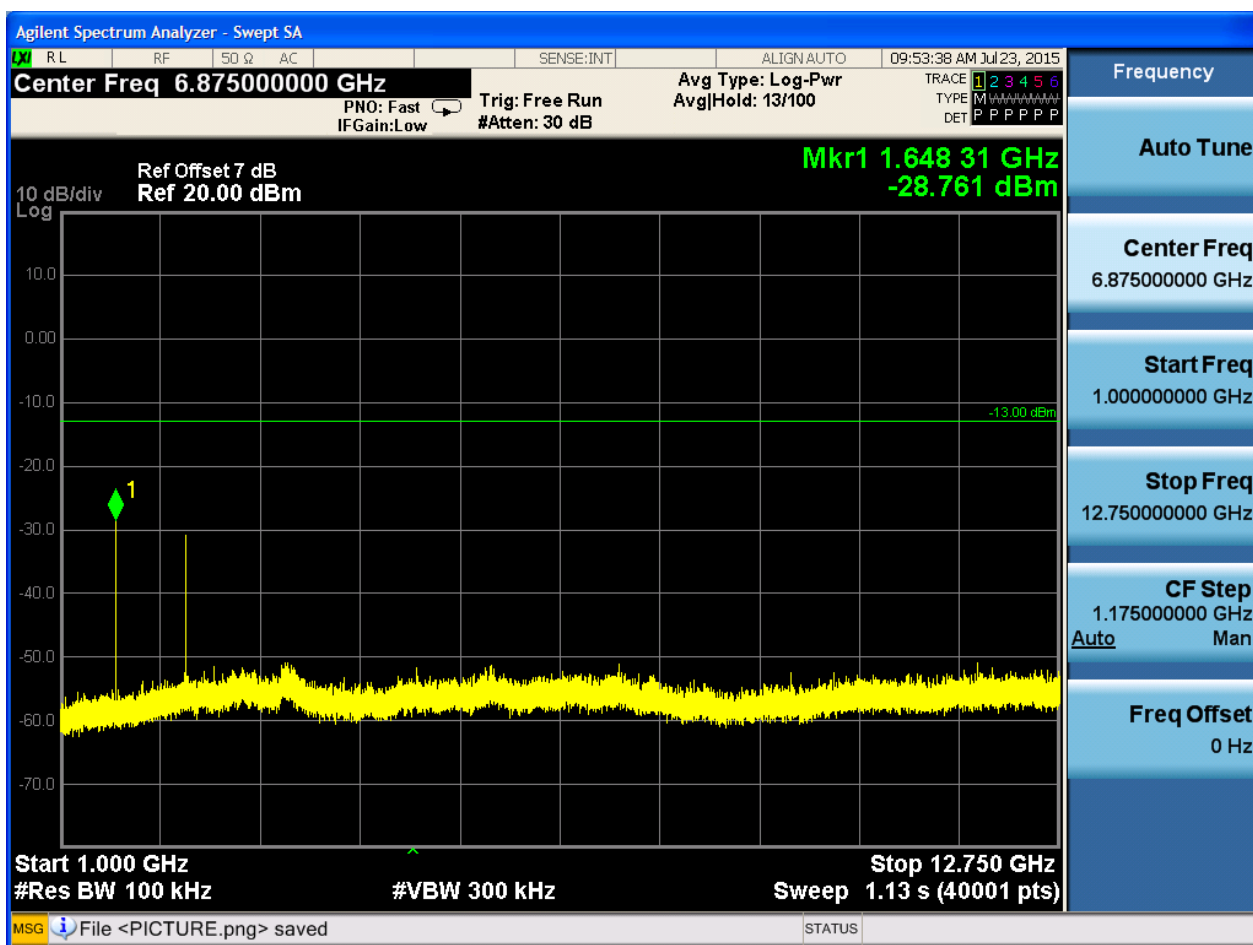
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

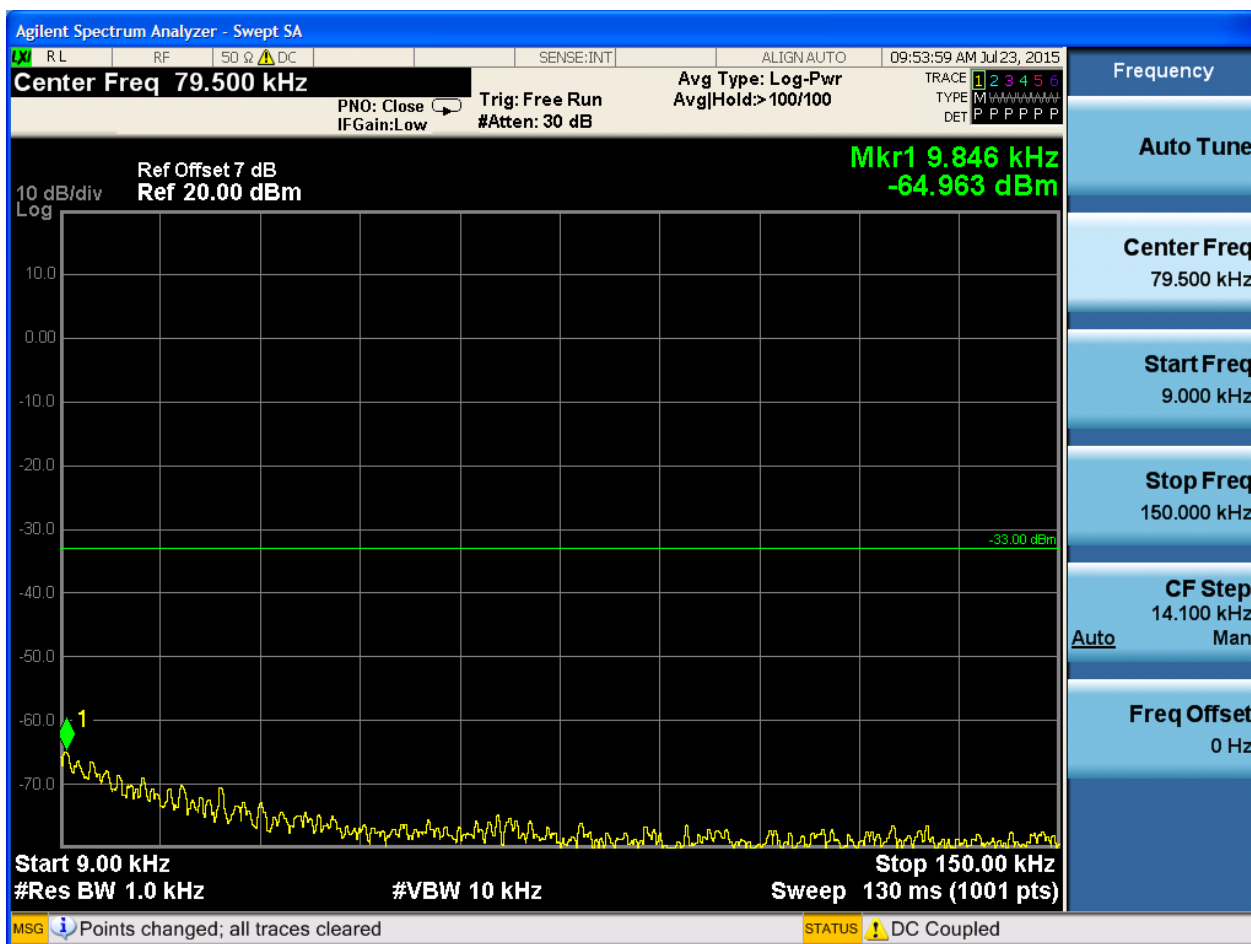


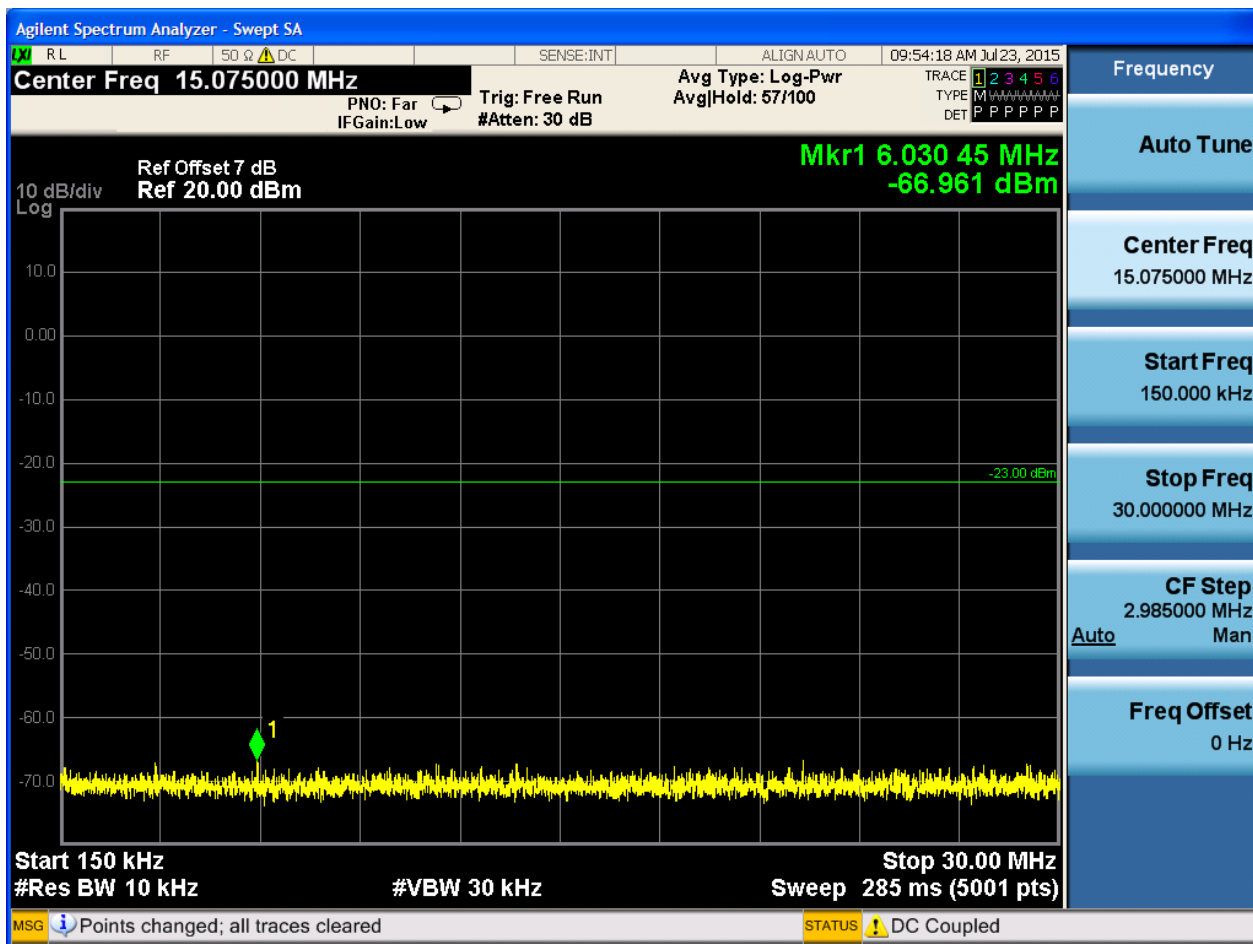


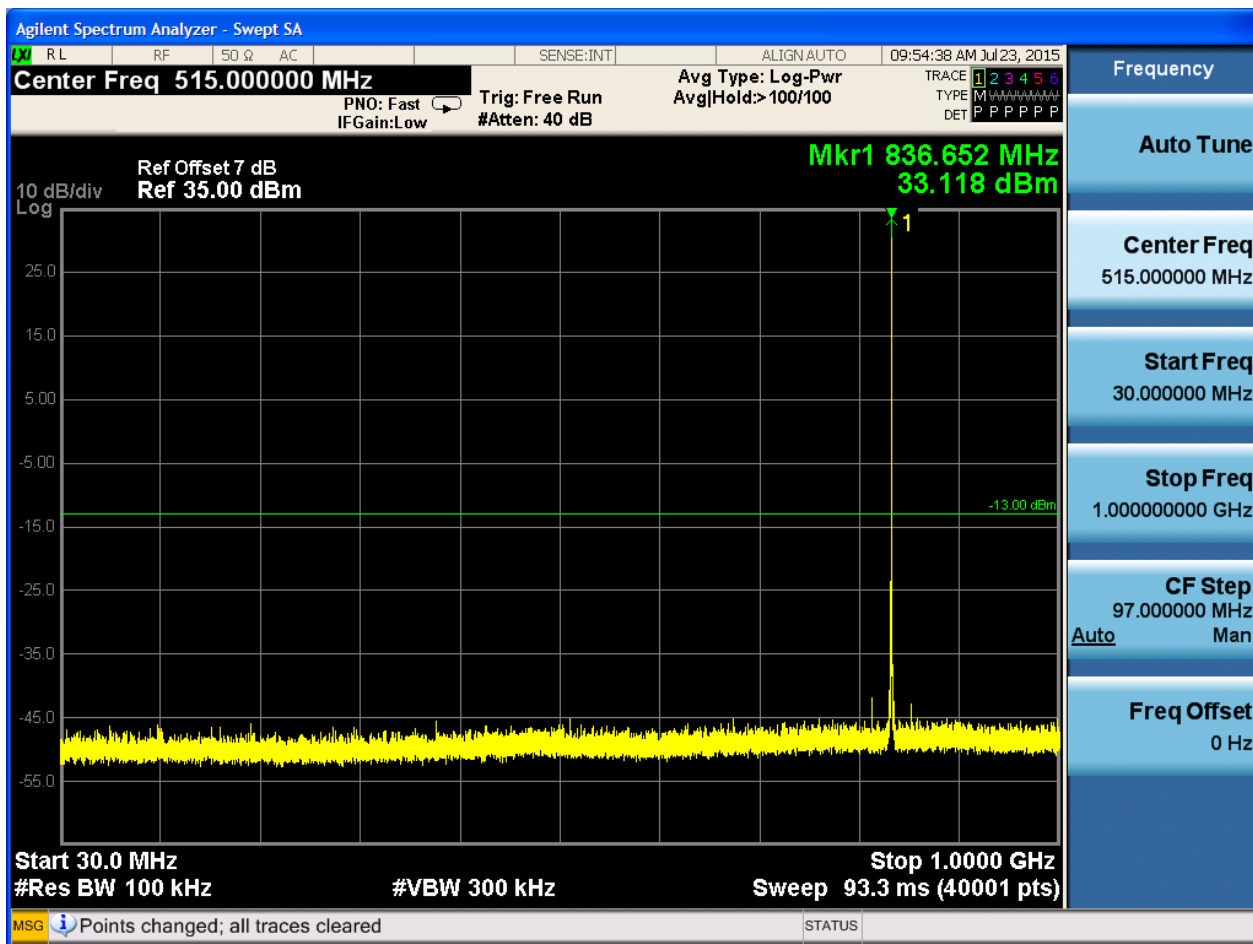


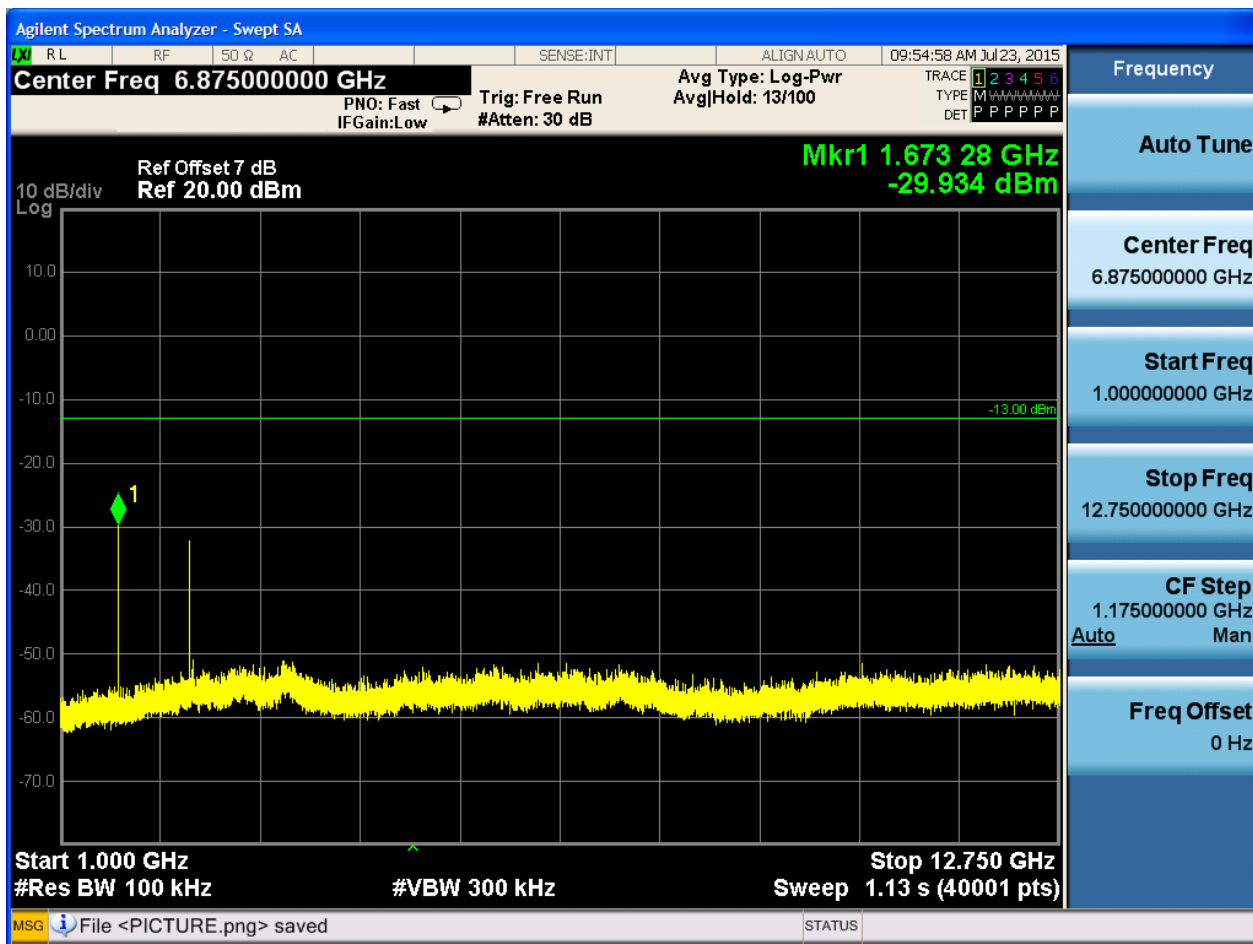


6.1.1.1.2 Test Channel = MCH

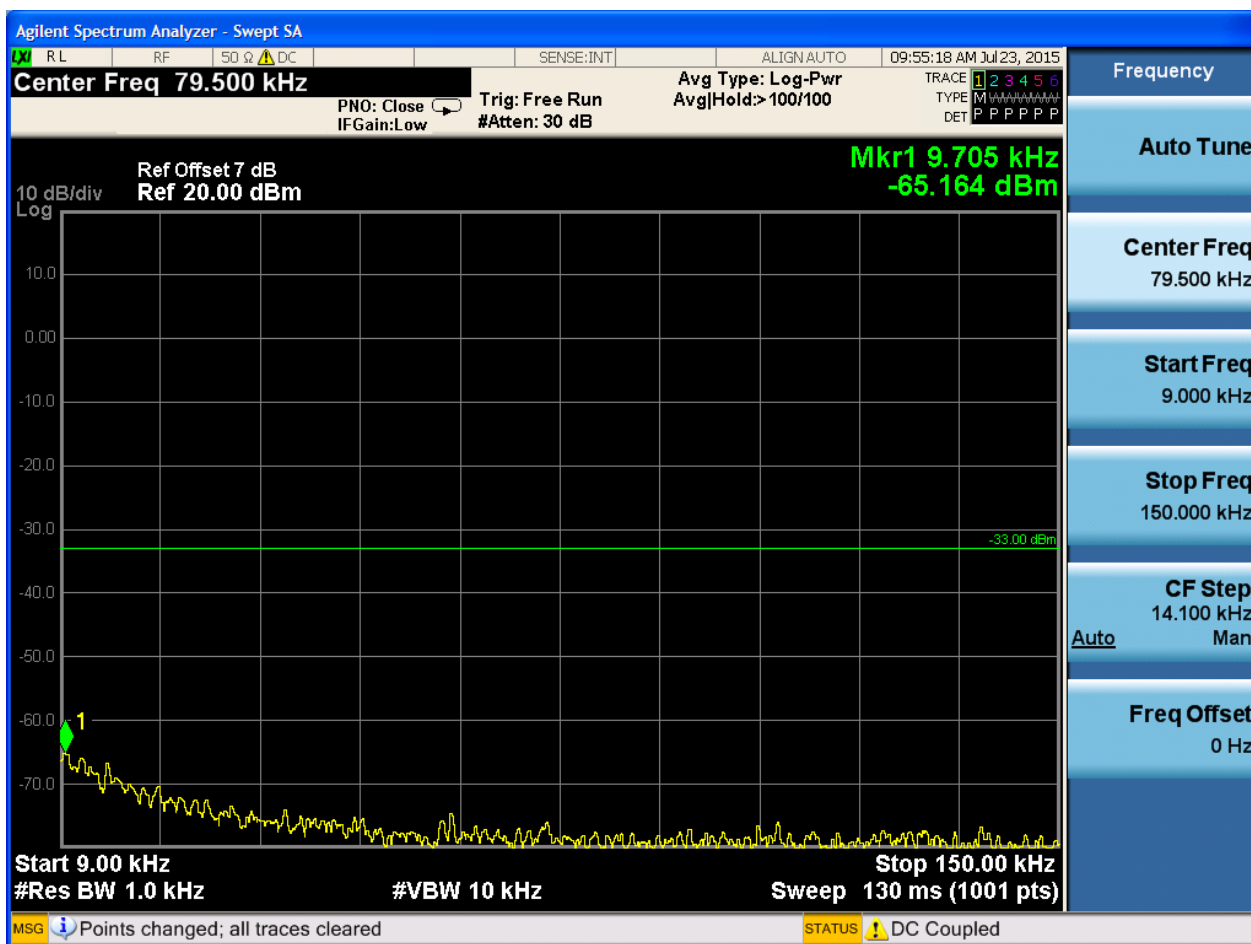


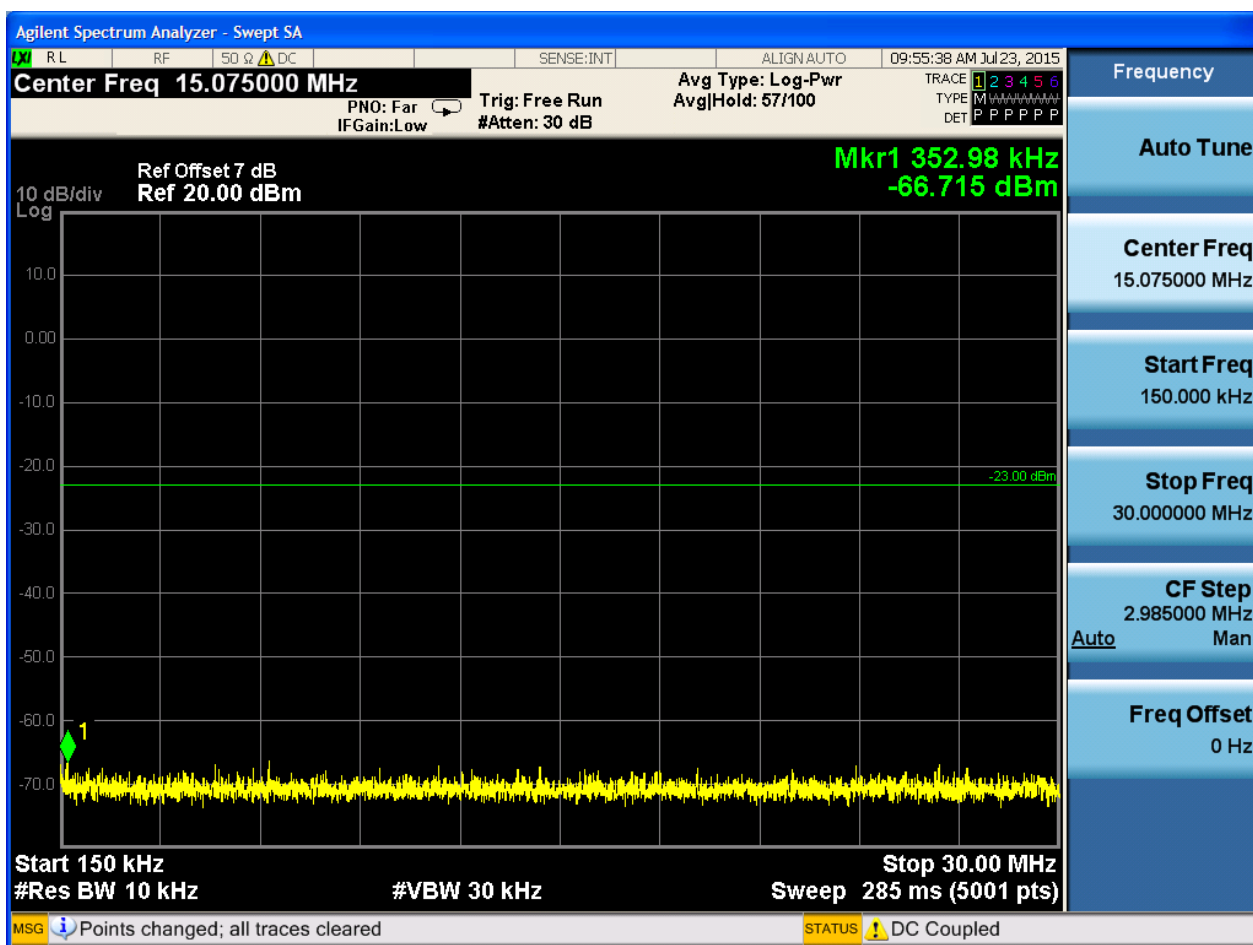


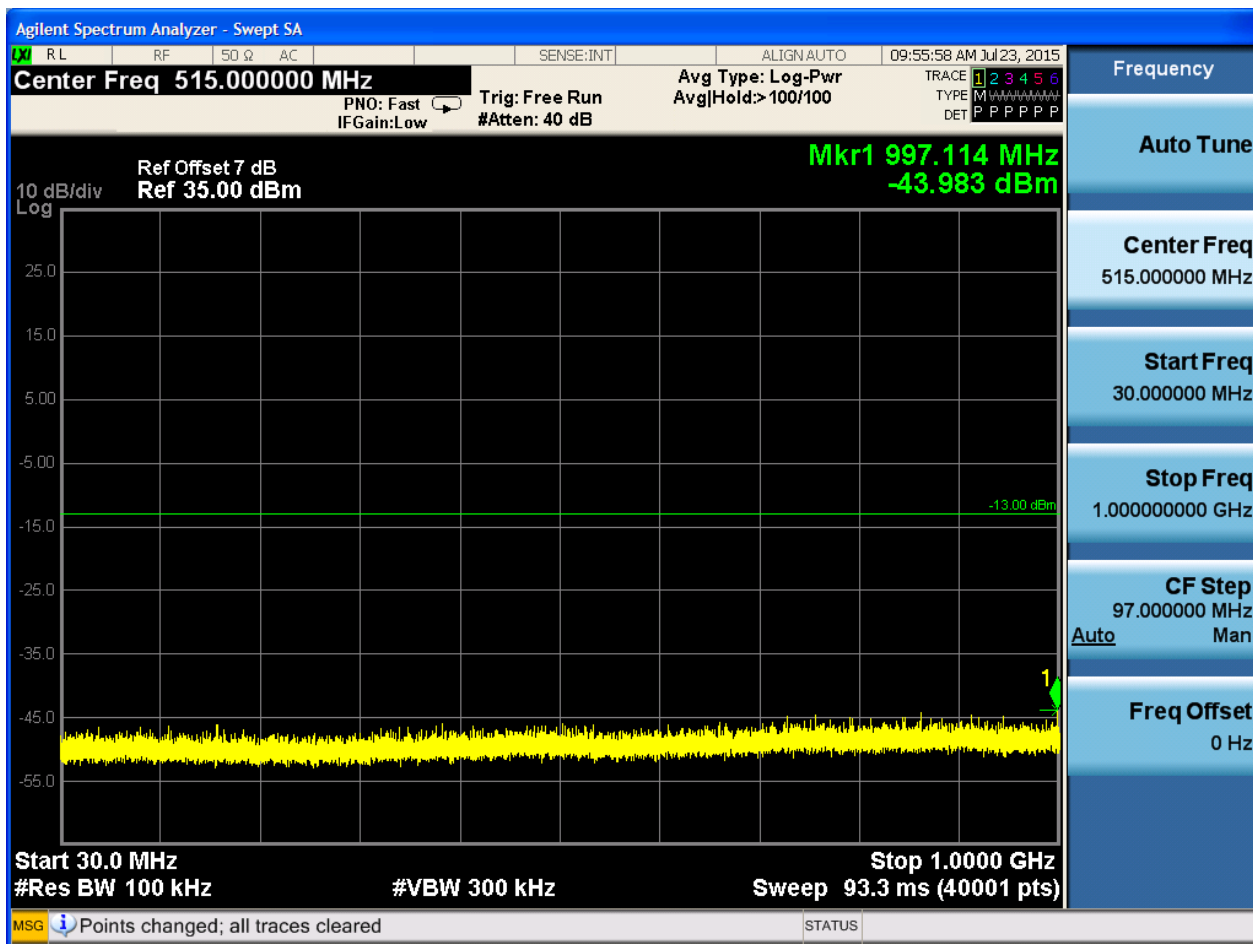


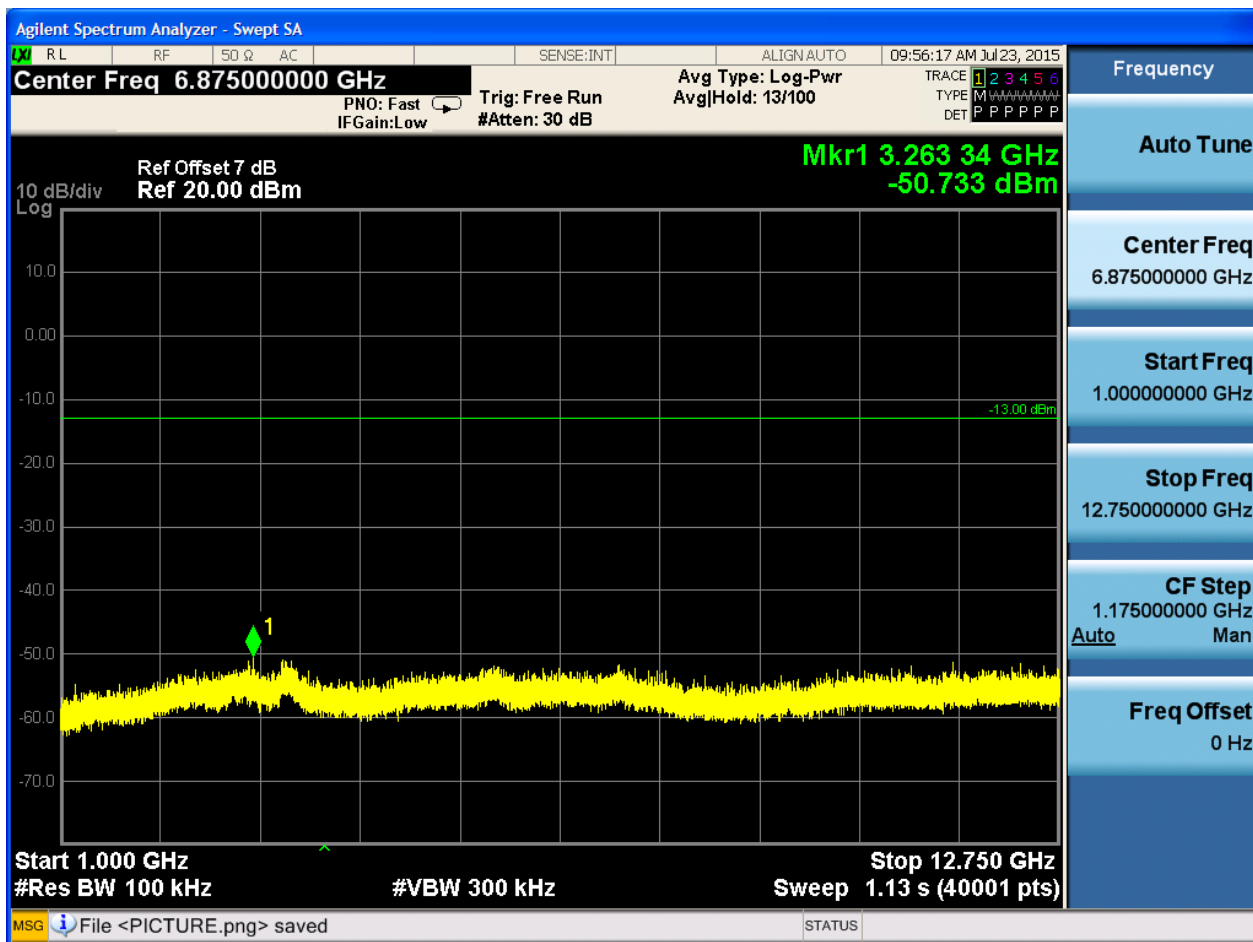


6.1.1.1.3 Test Channel = HCH





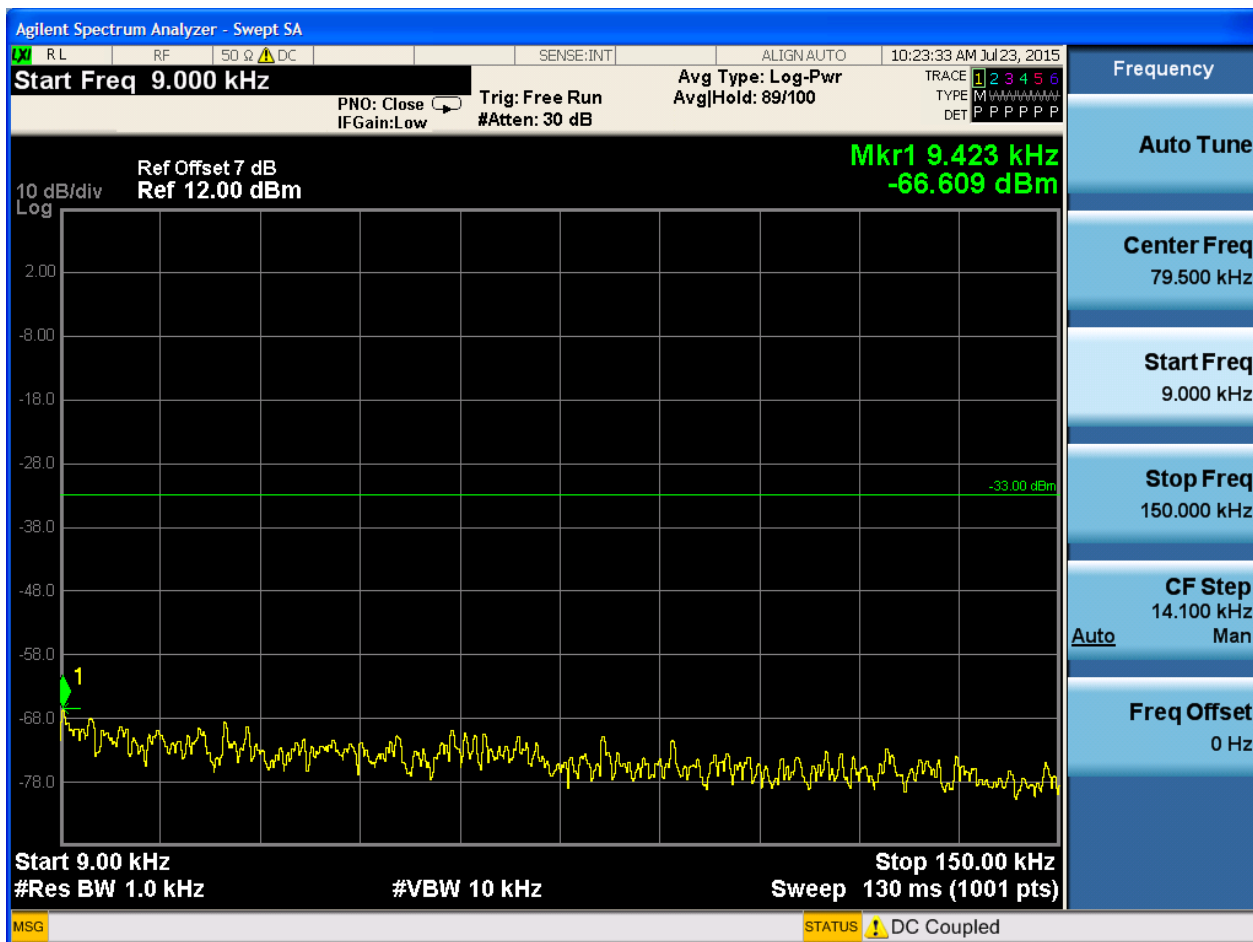


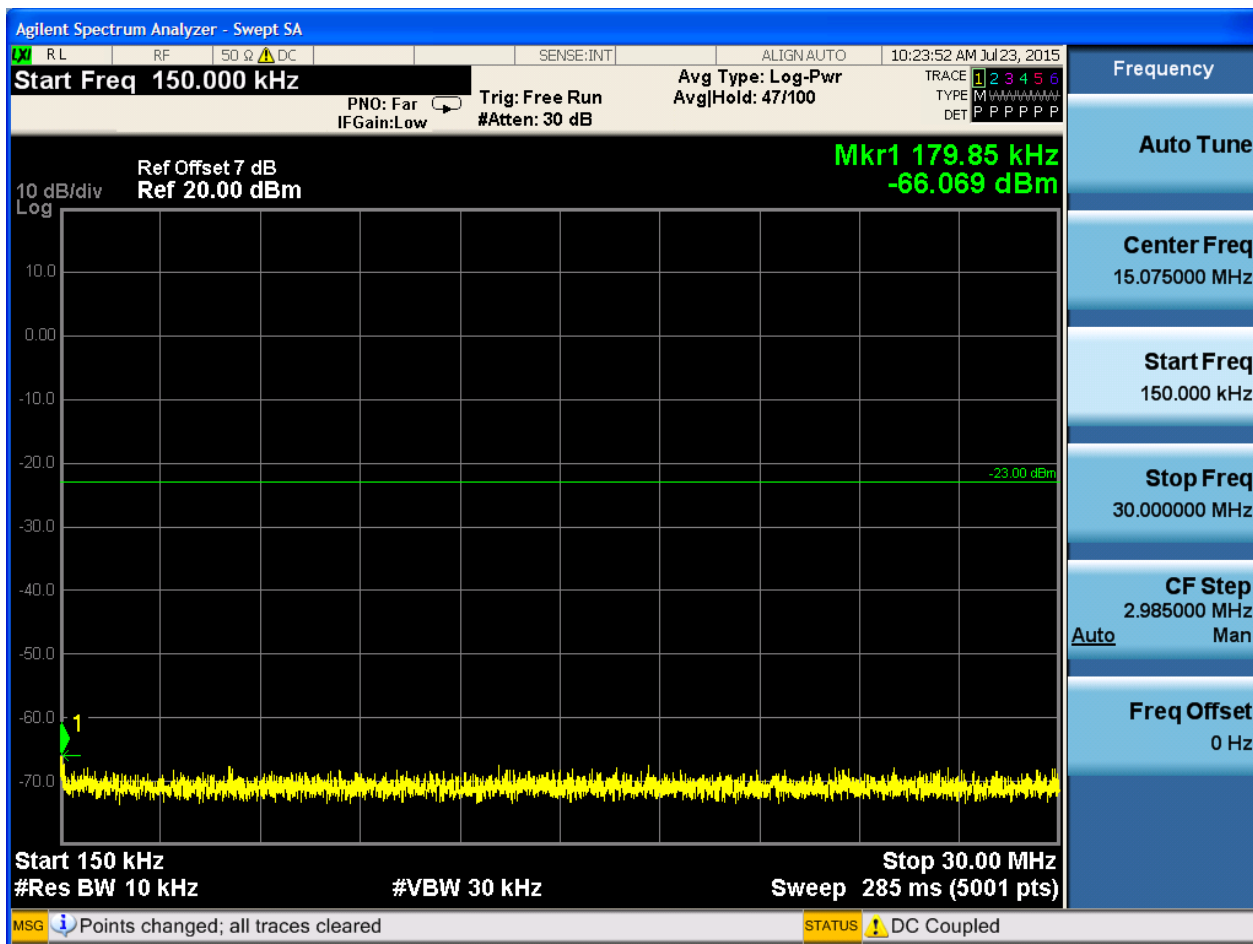


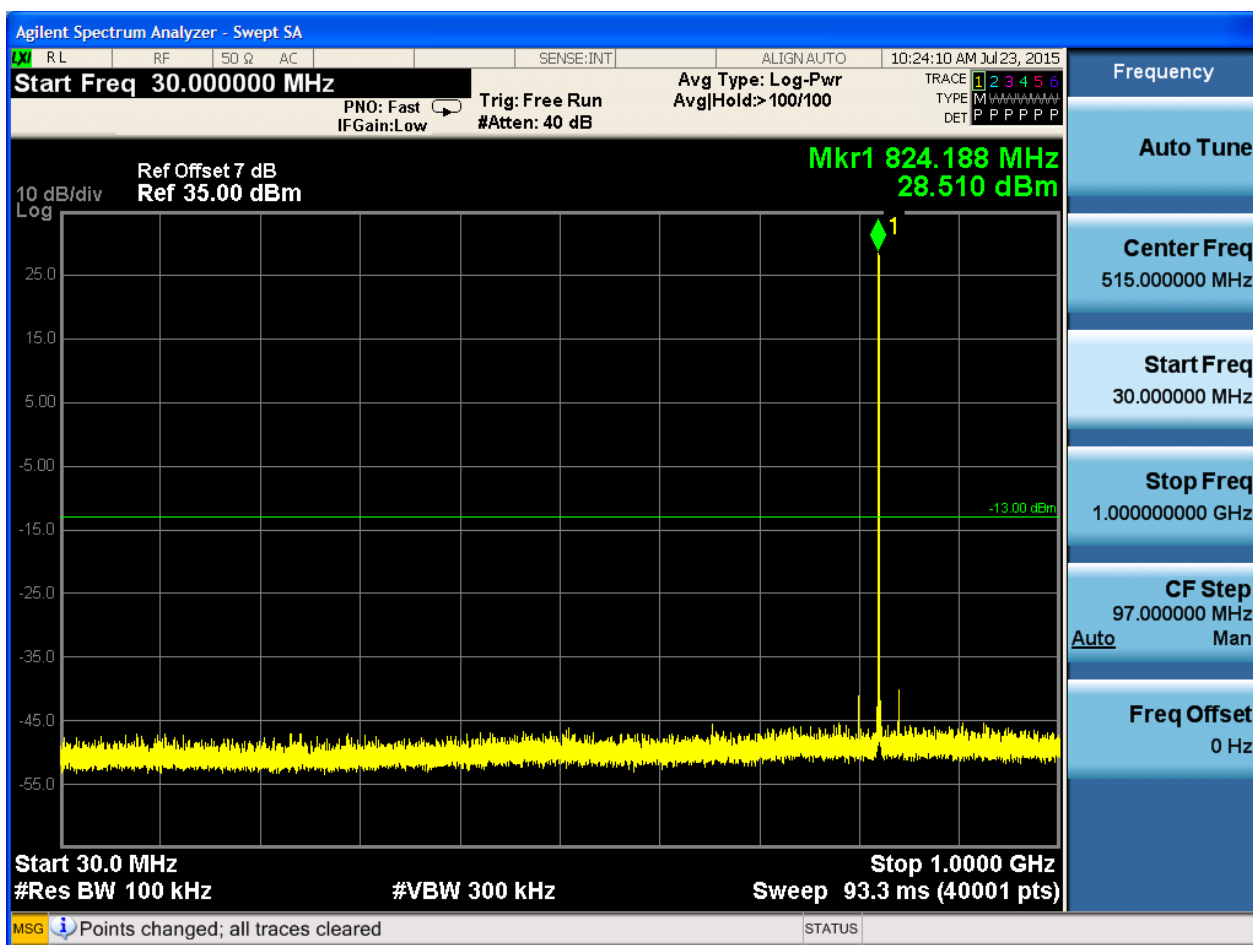


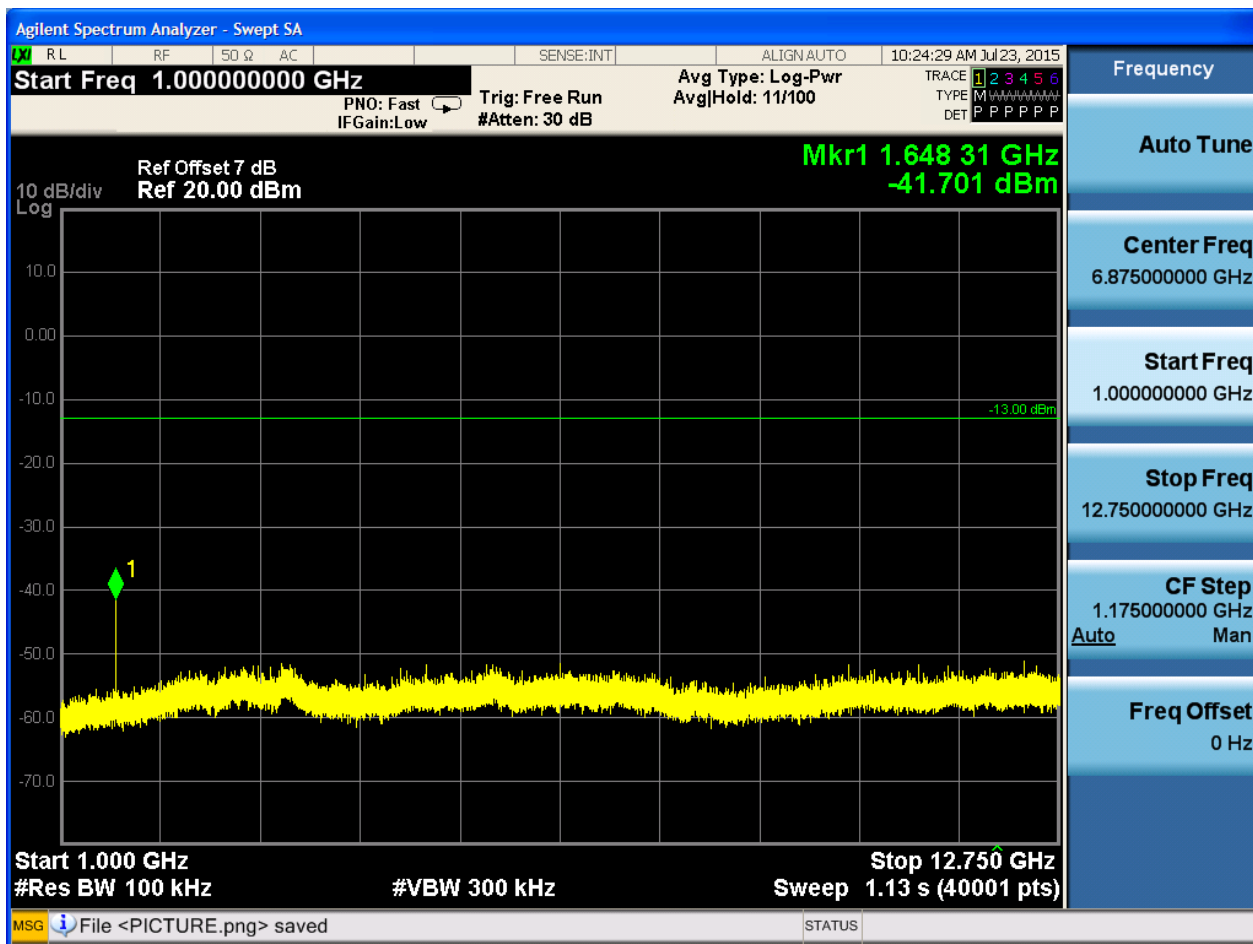
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

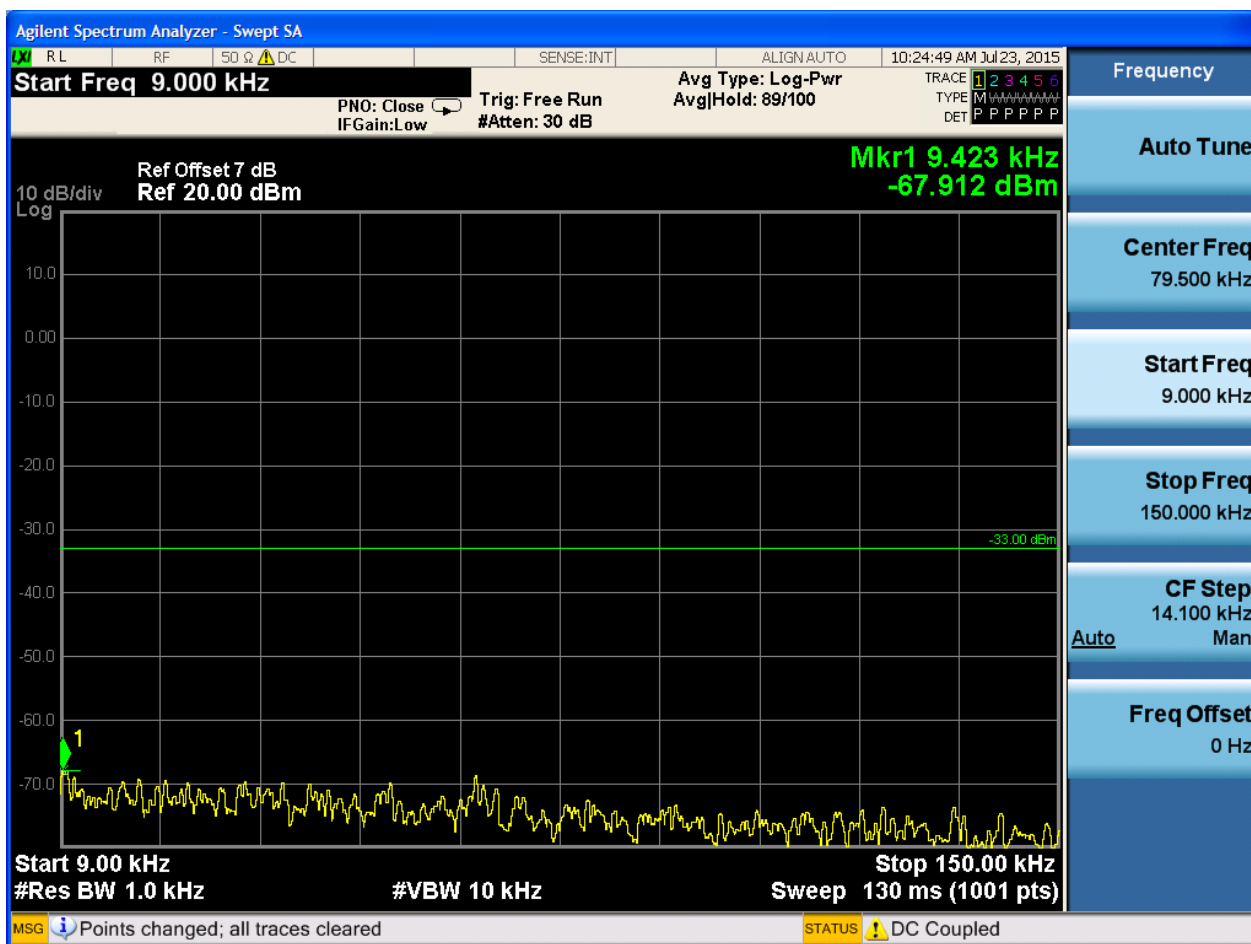


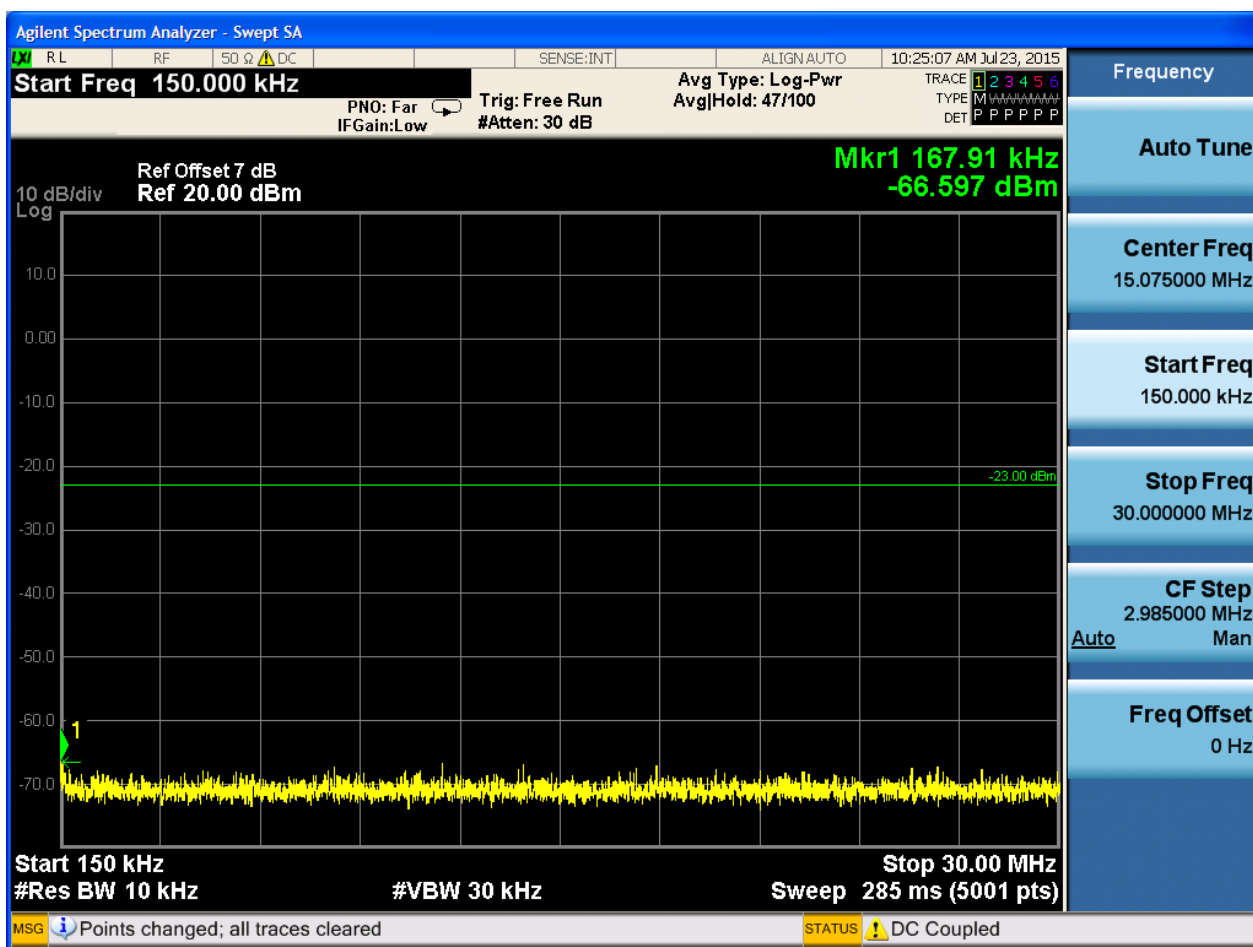


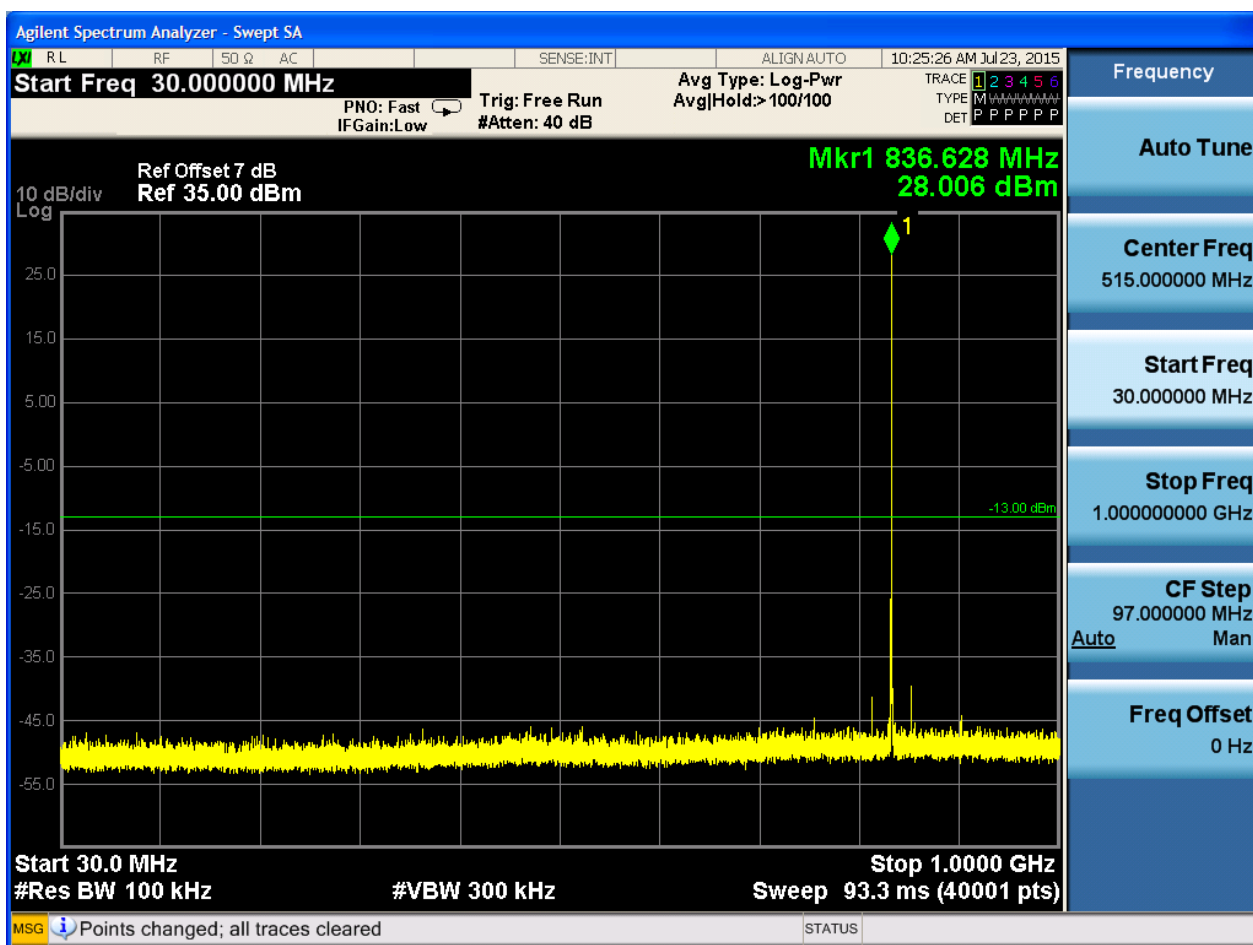


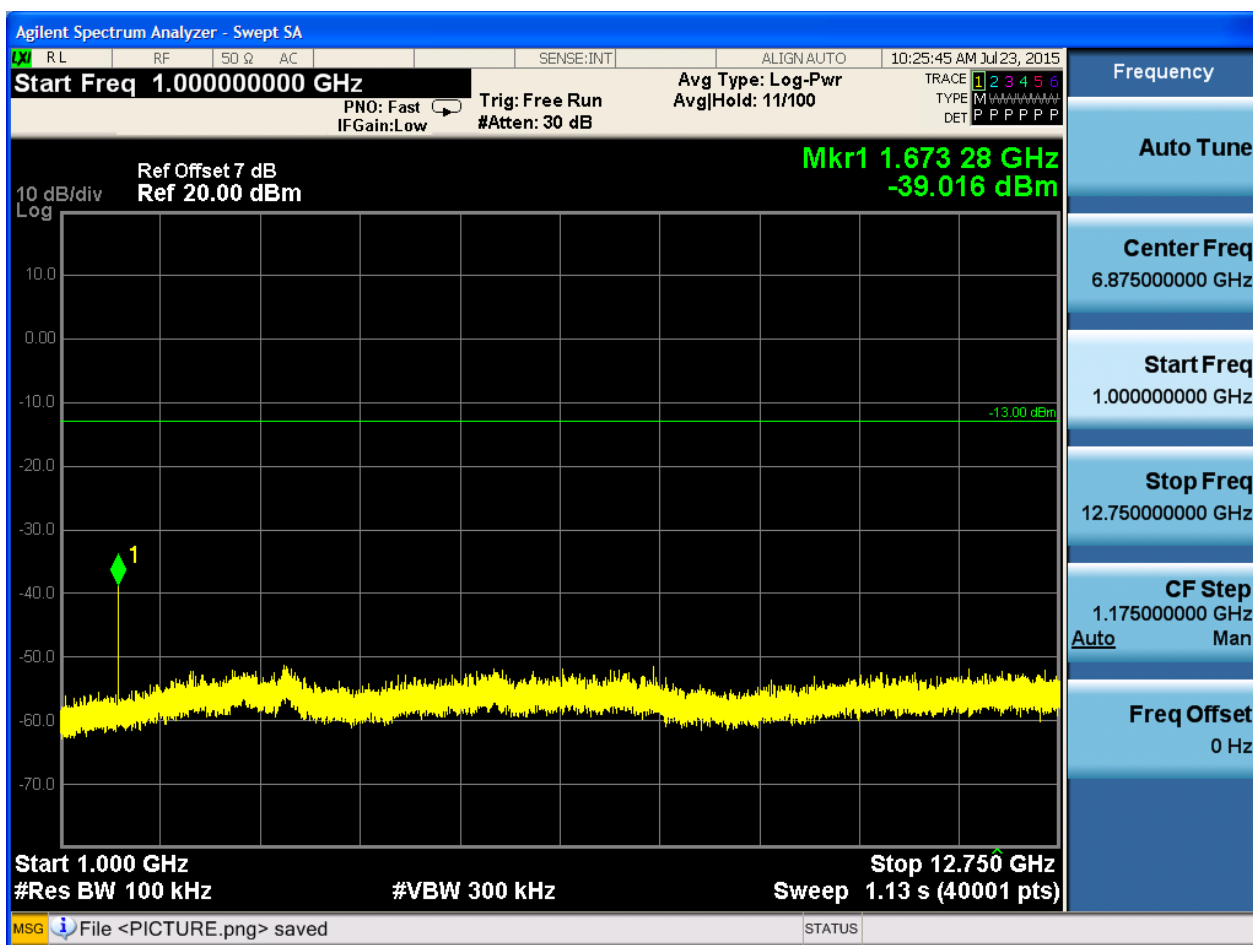


6.1.1.2.2 Test Channel = MCH



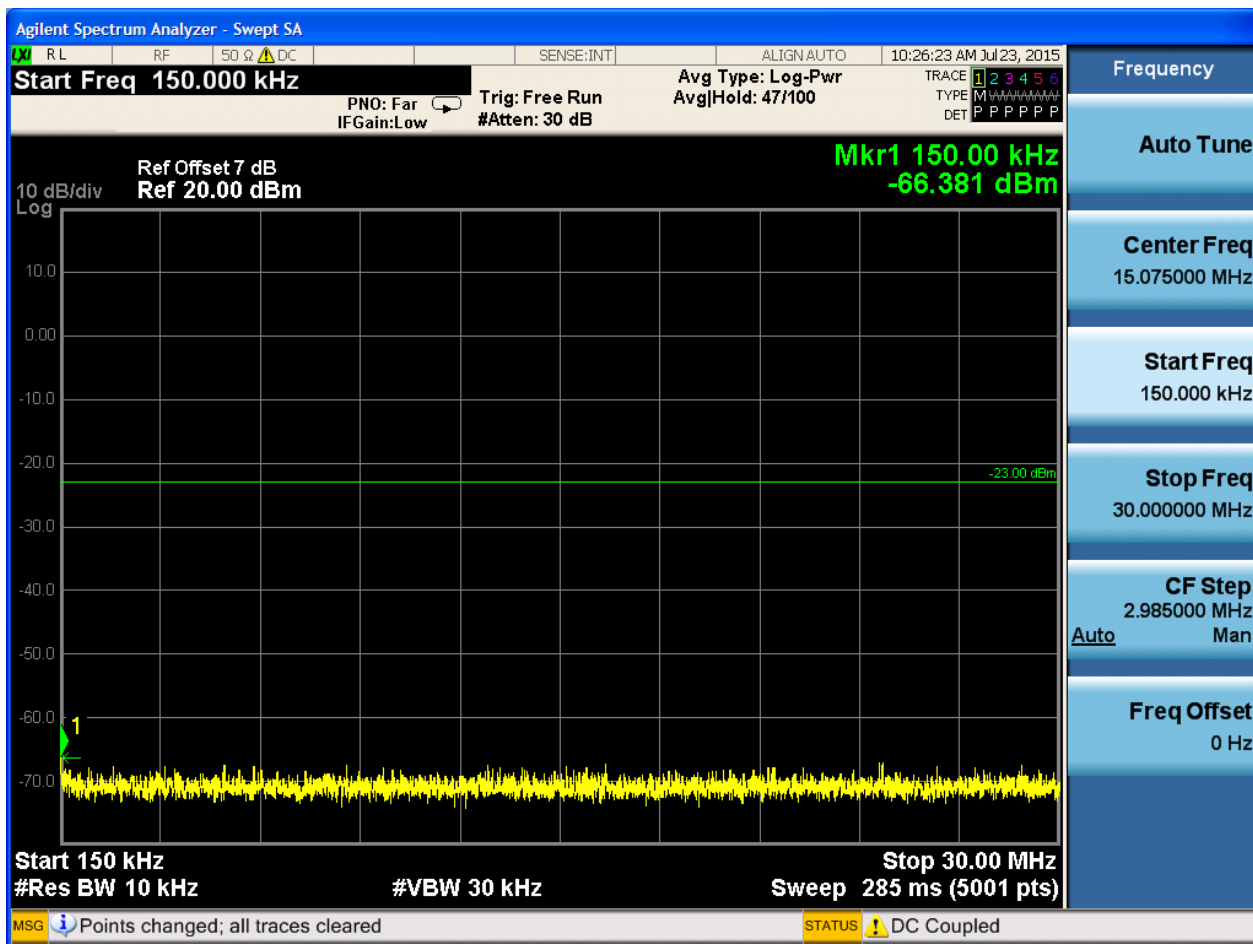


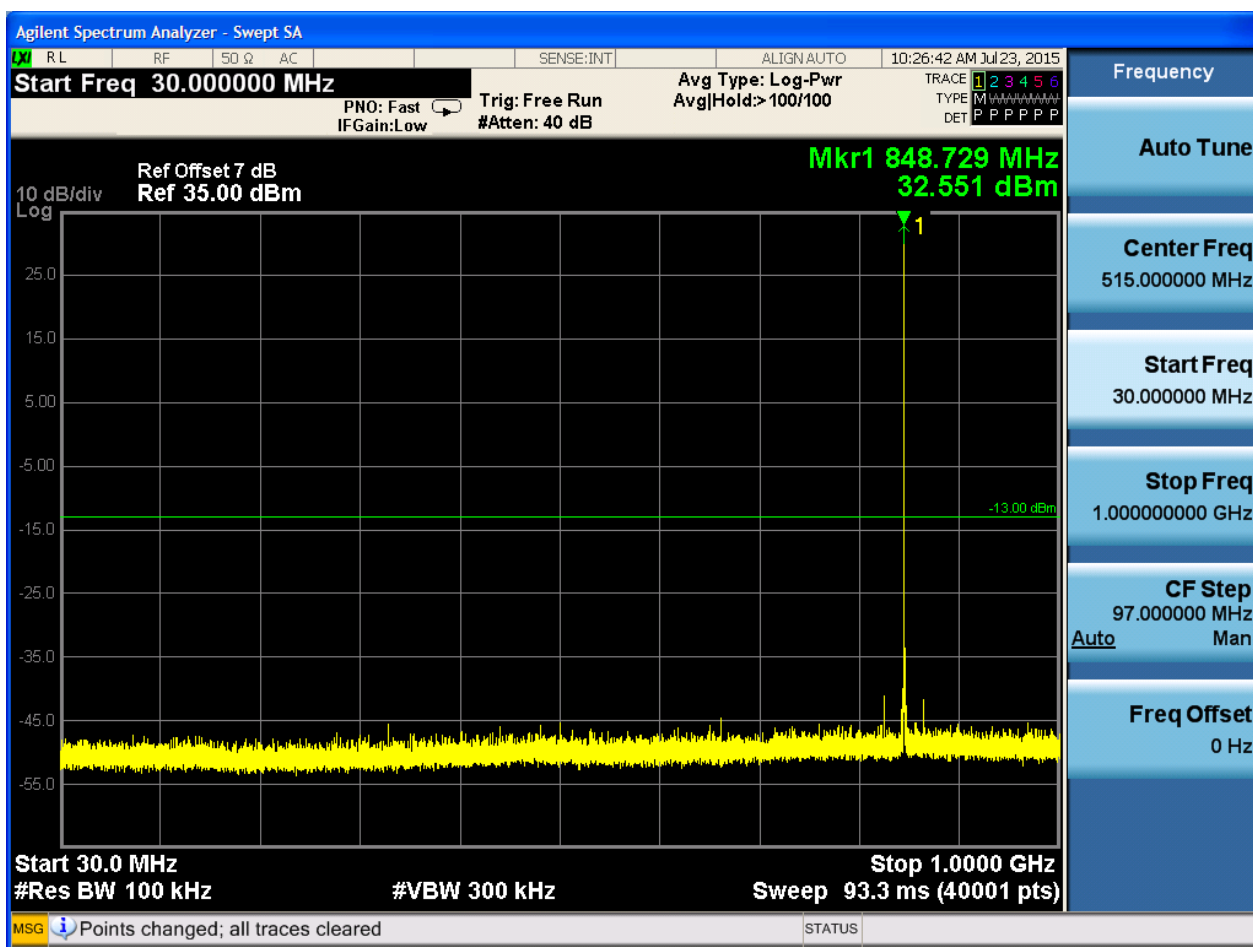


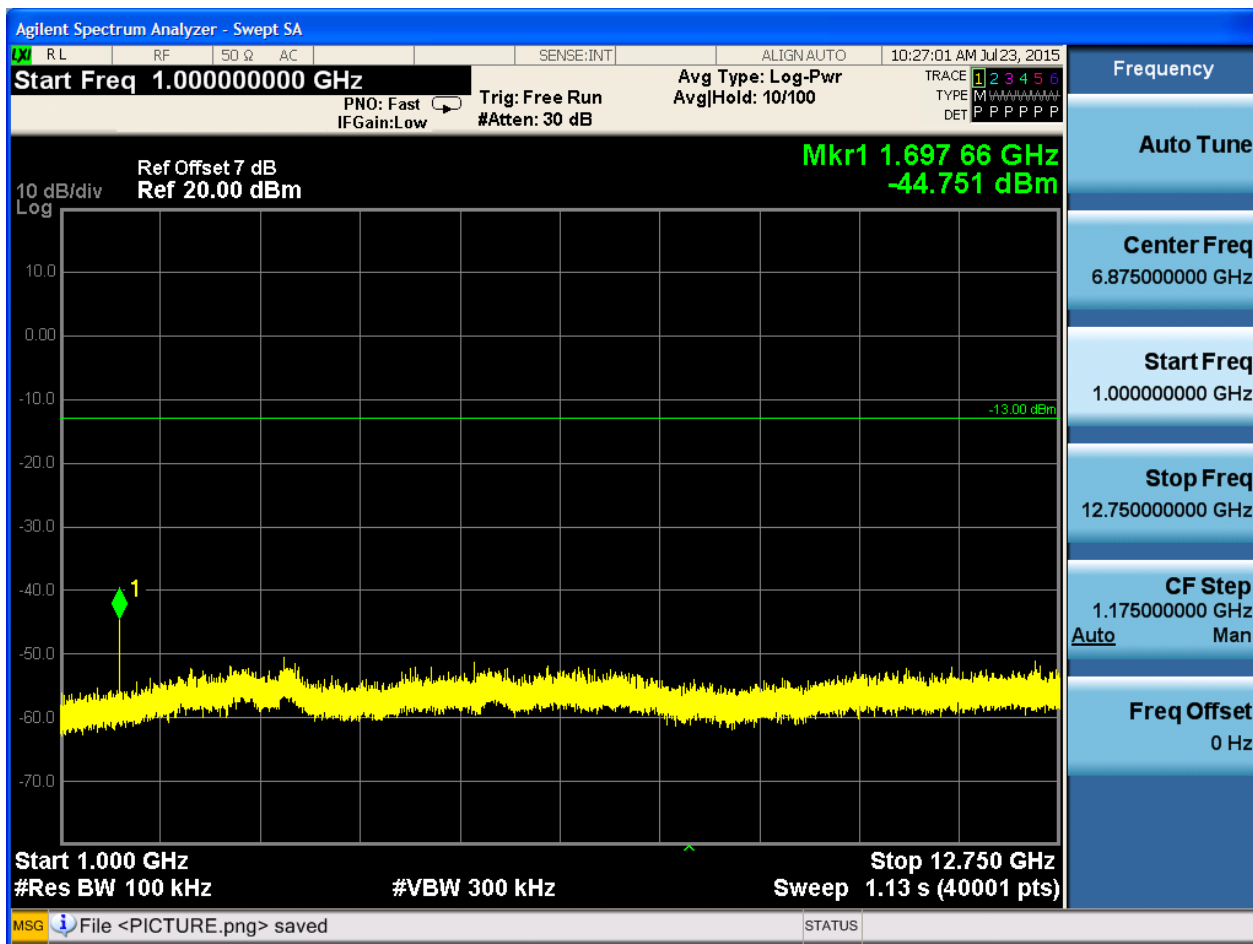


6.1.1.2.3 Test Channel = HCH





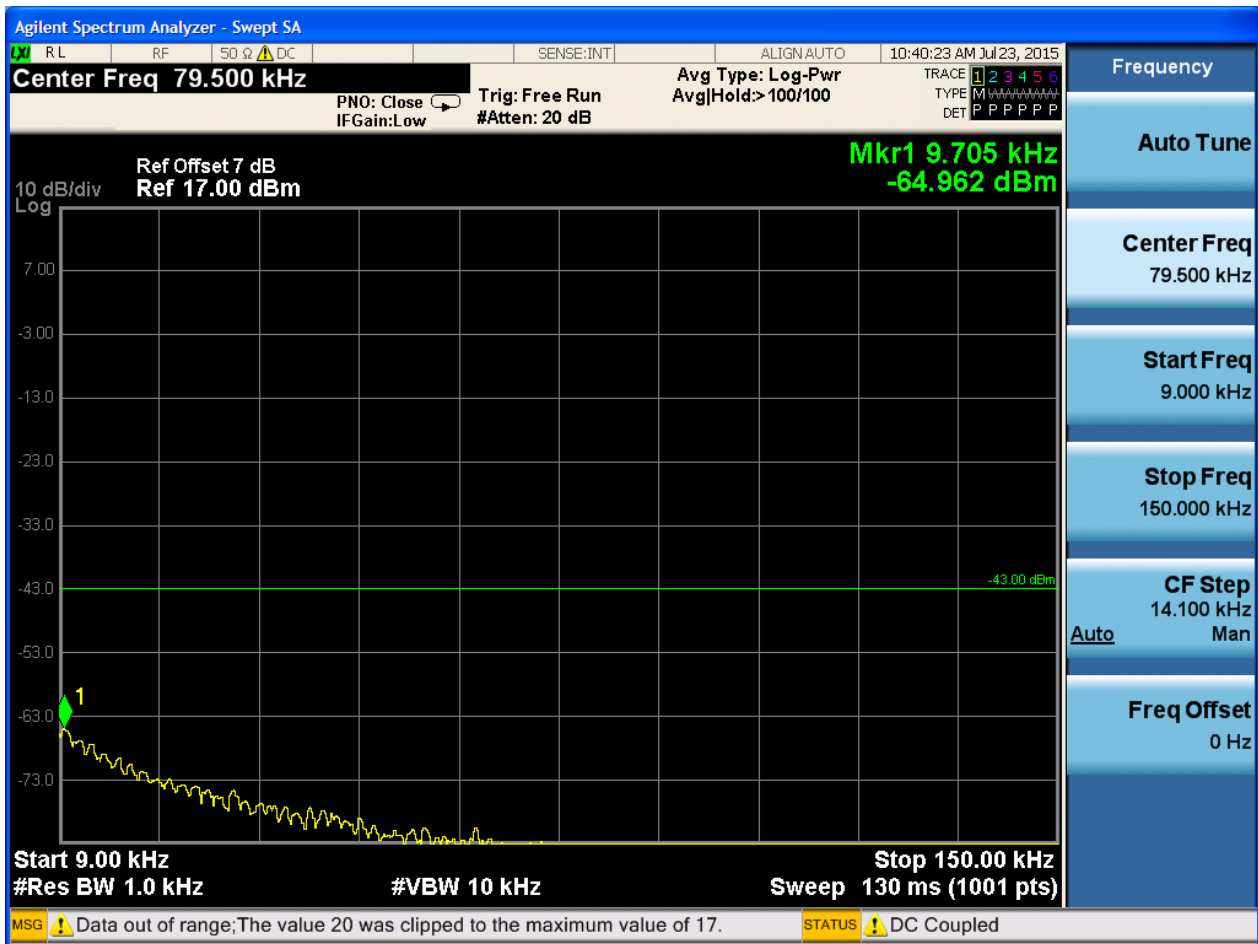


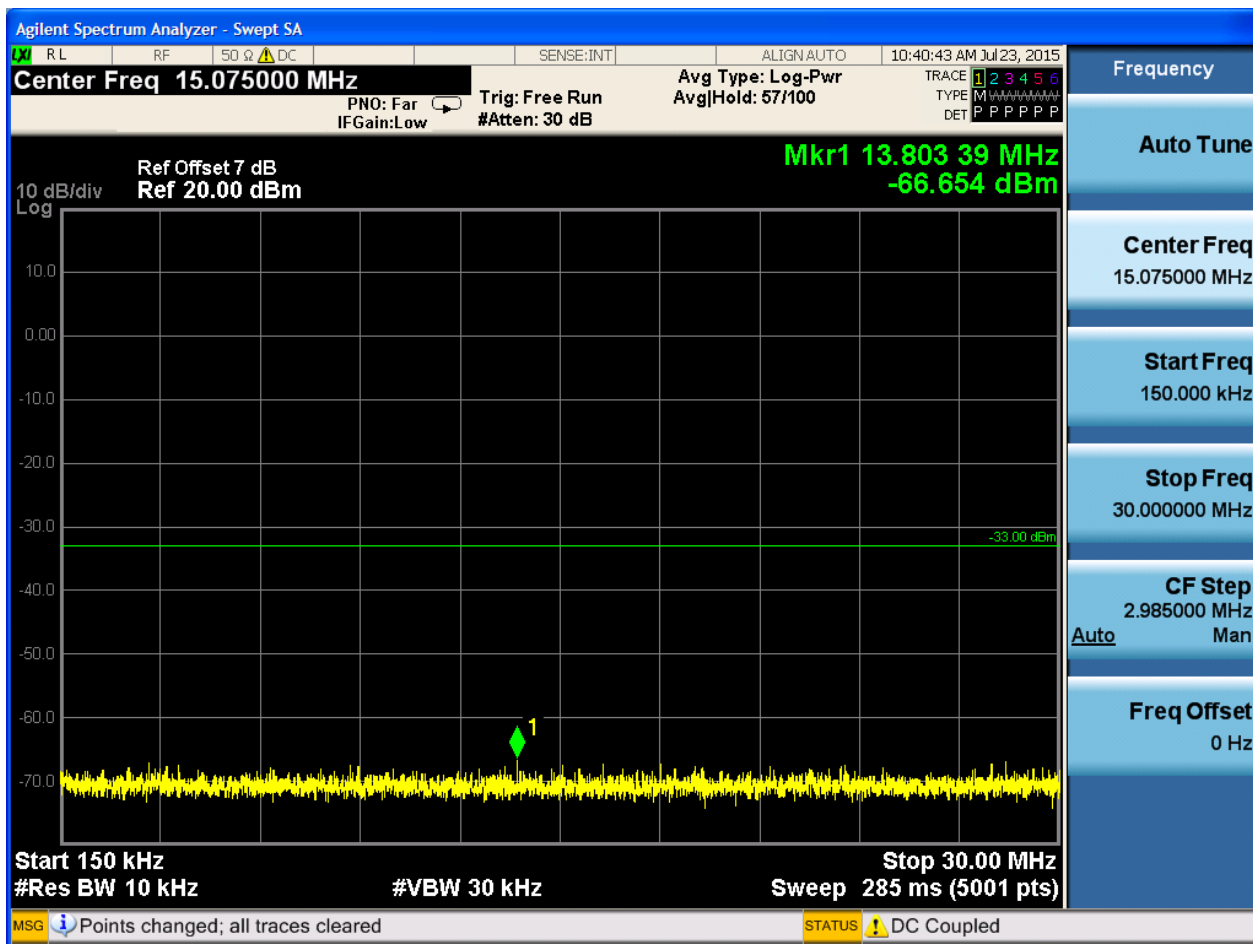


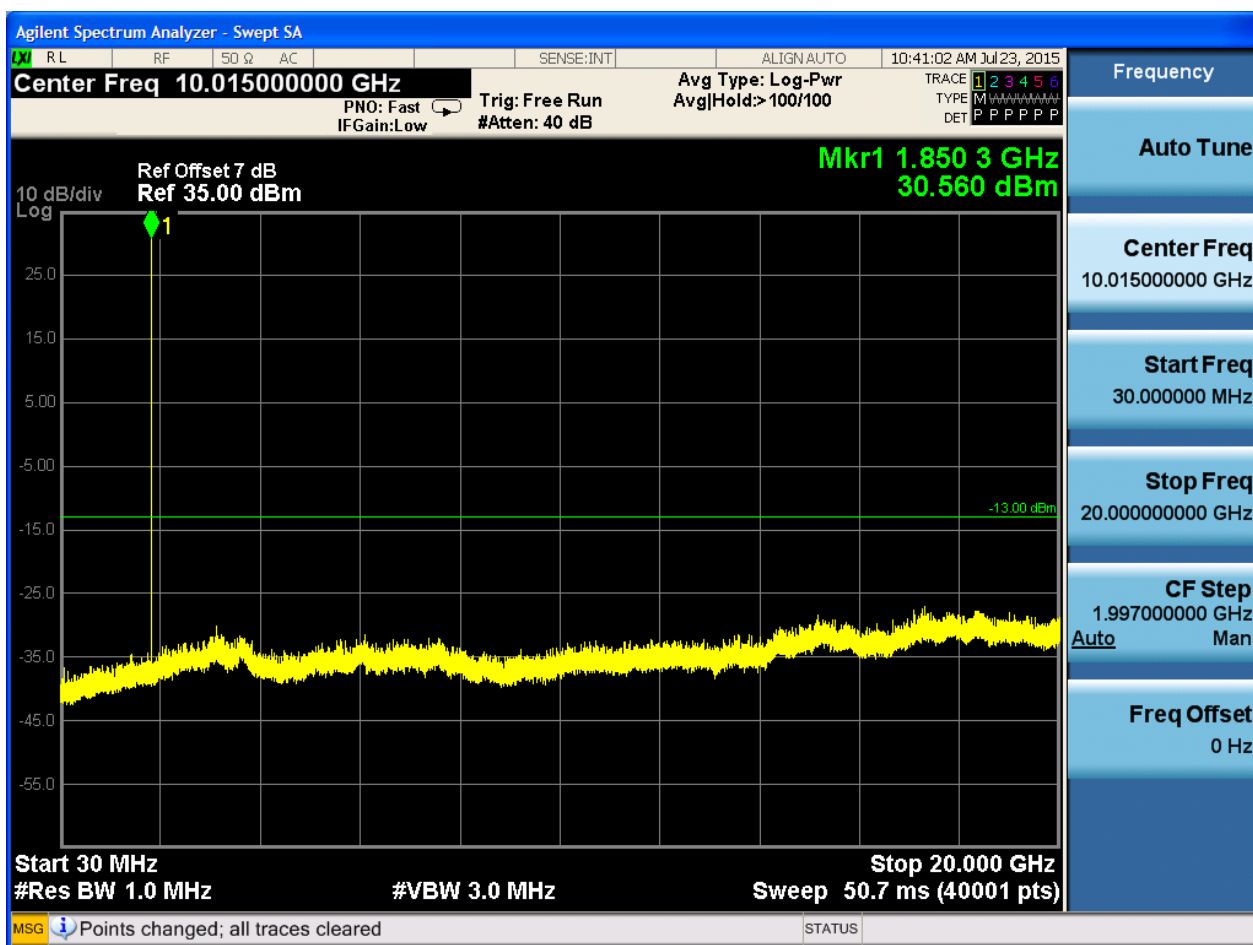
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

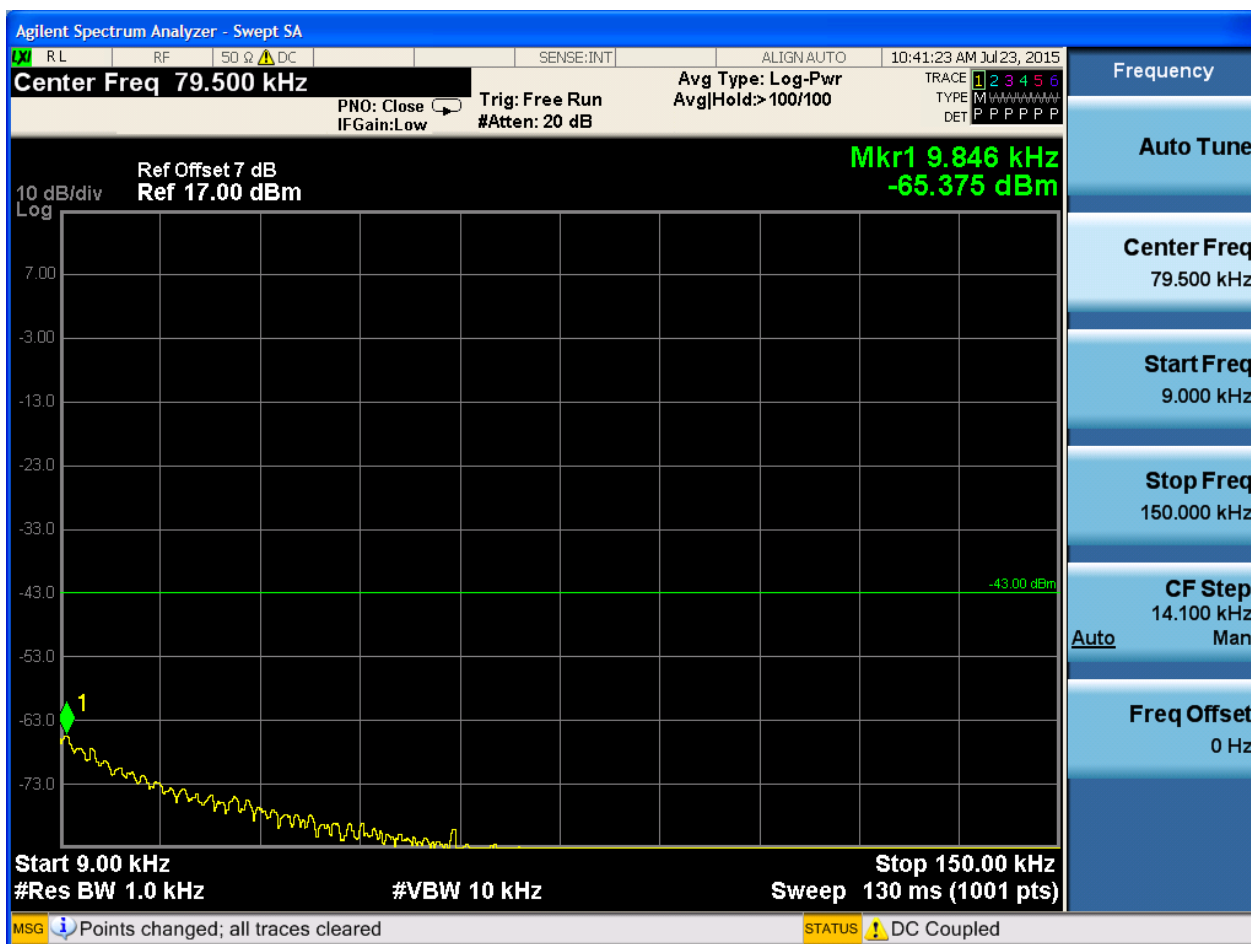
6.1.2.1.1 Test Channel = LCH

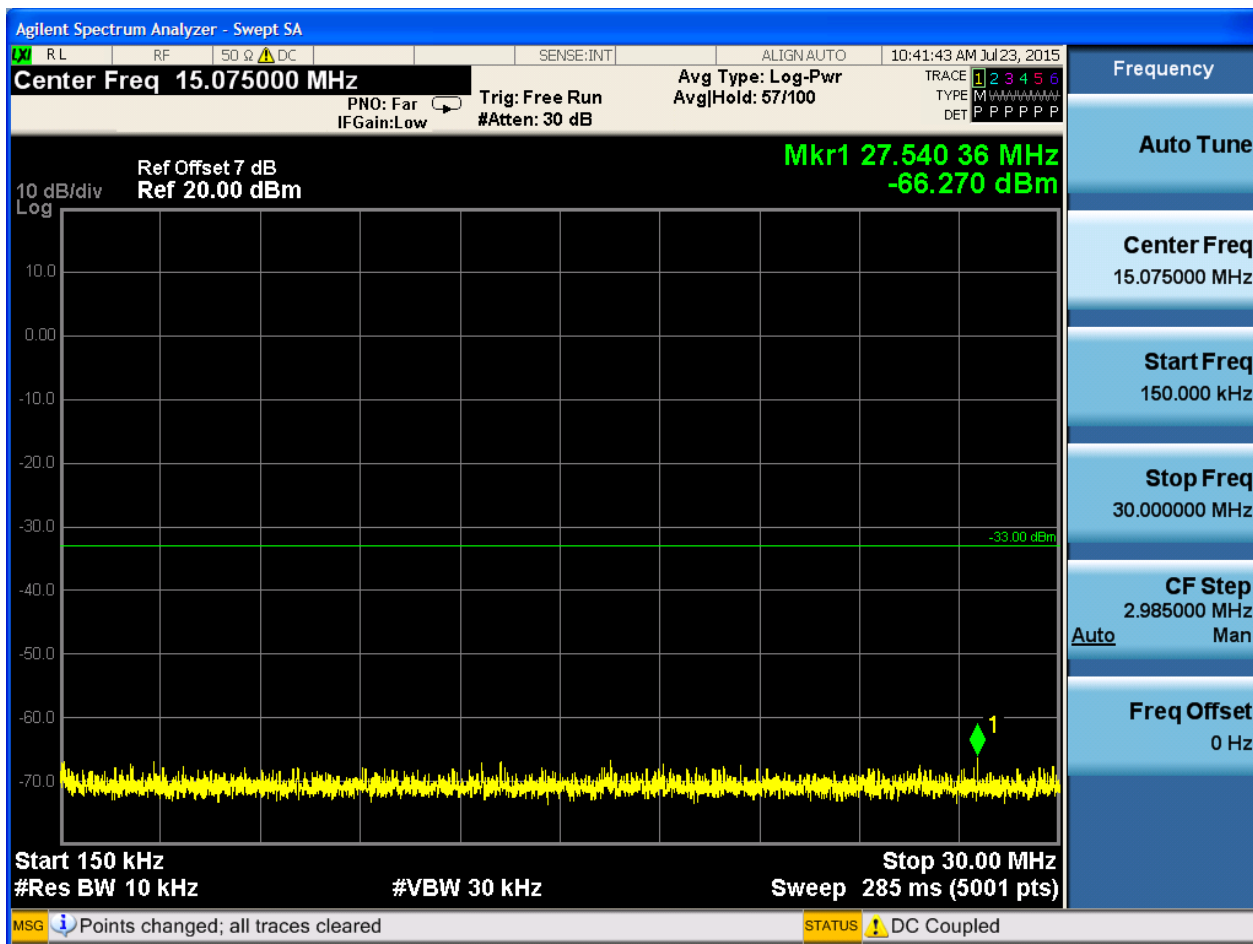


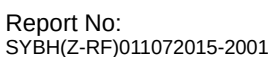




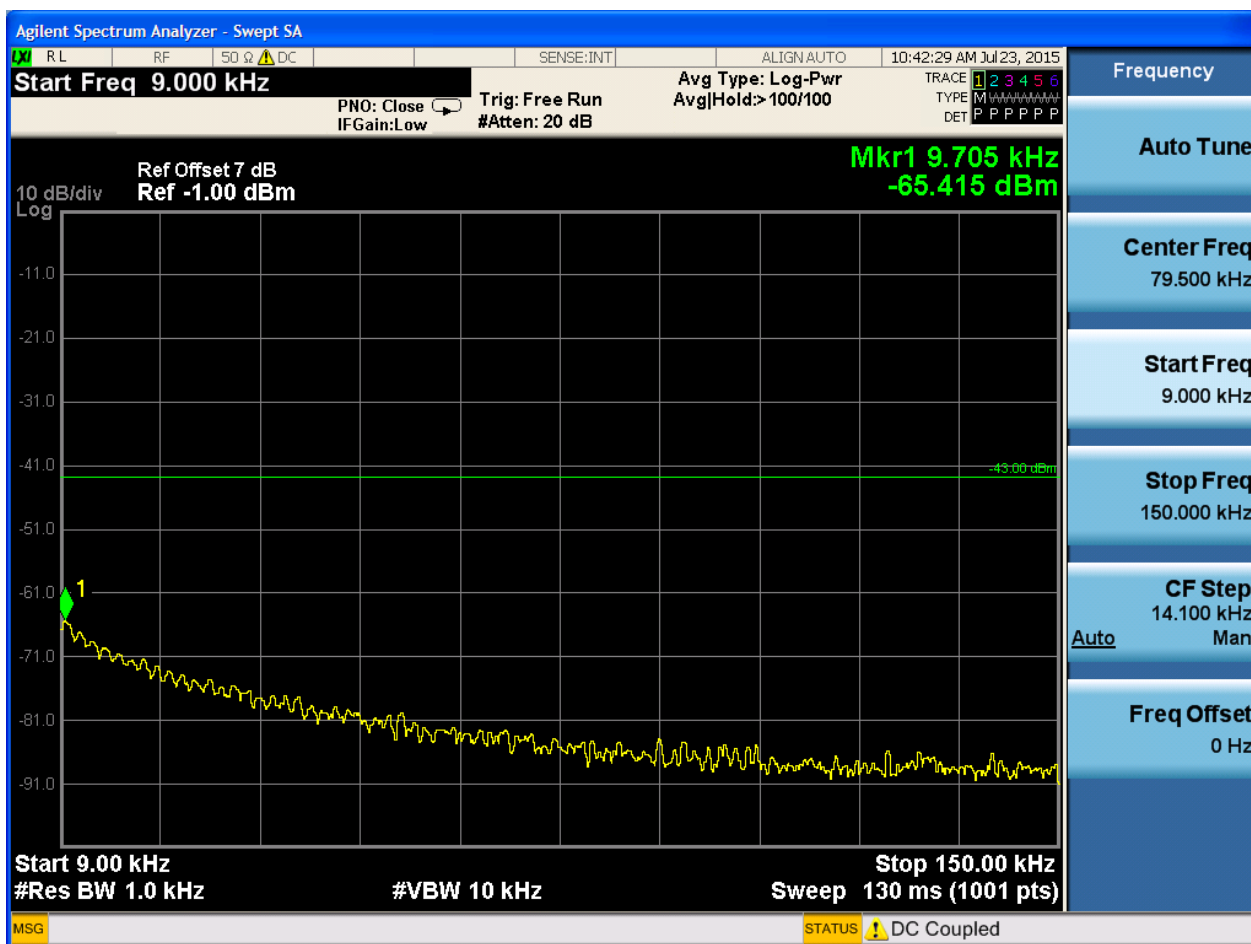
6.1.2.1.2 Test Channel = MCH

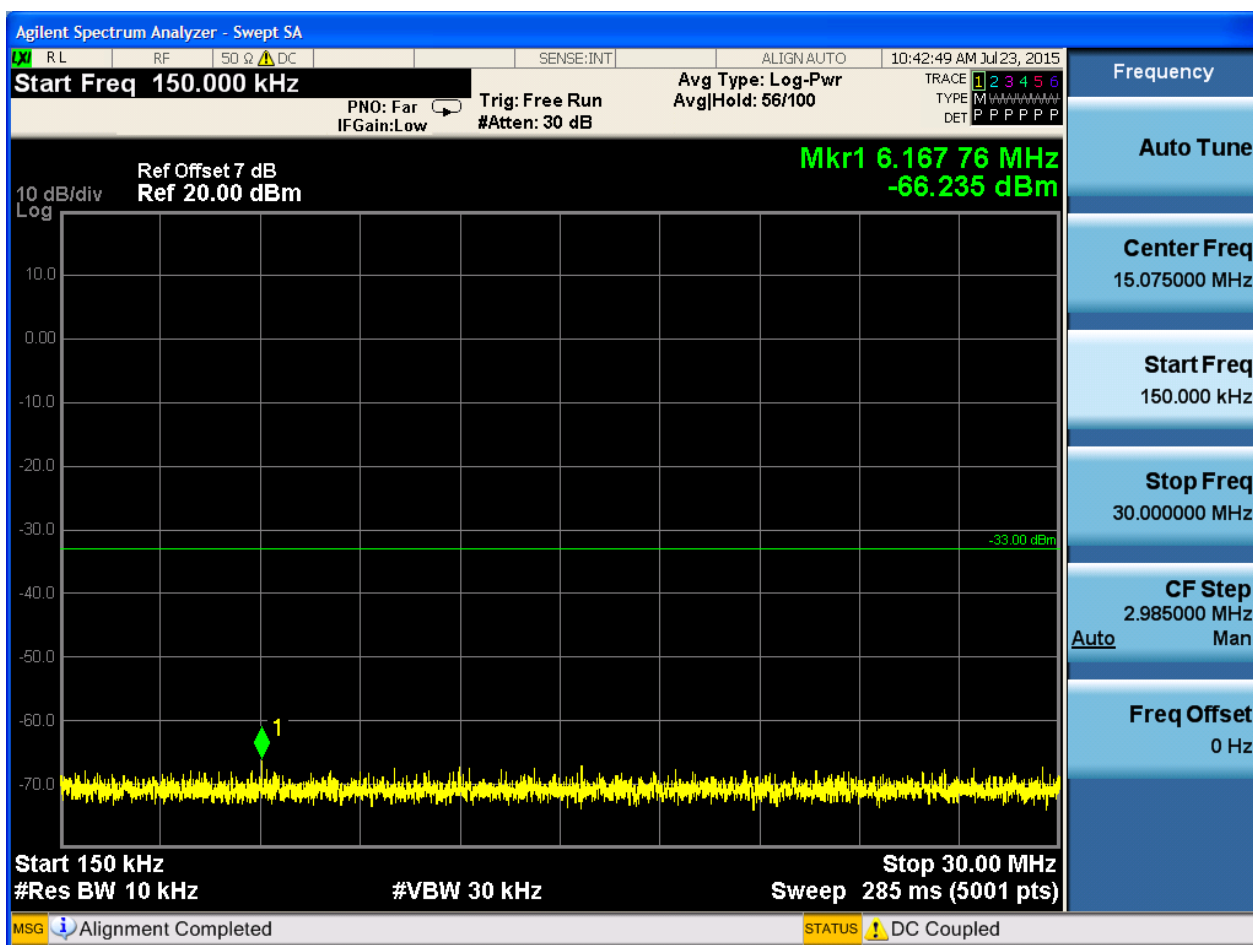


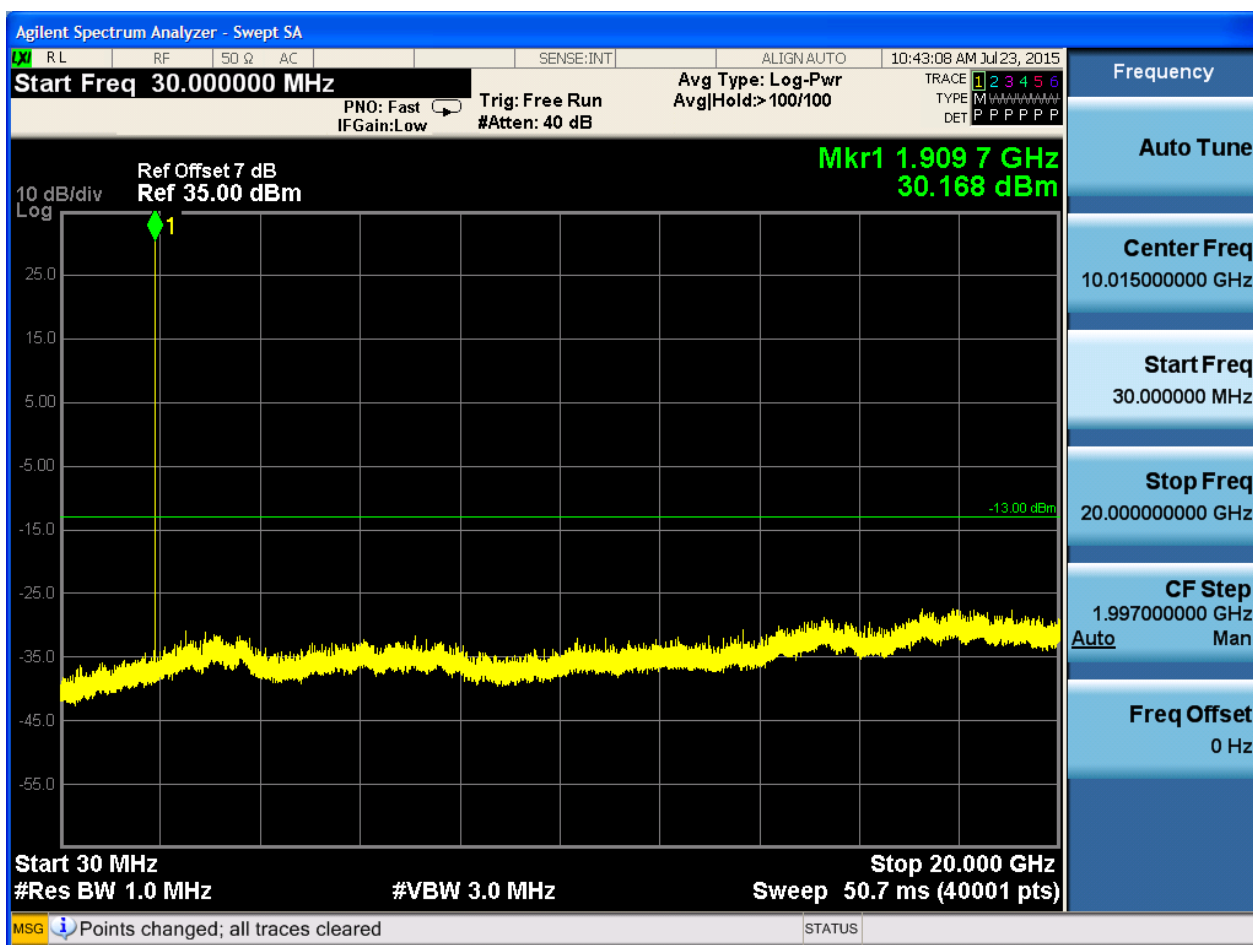




6.1.2.1.3 Test Channel = HCH

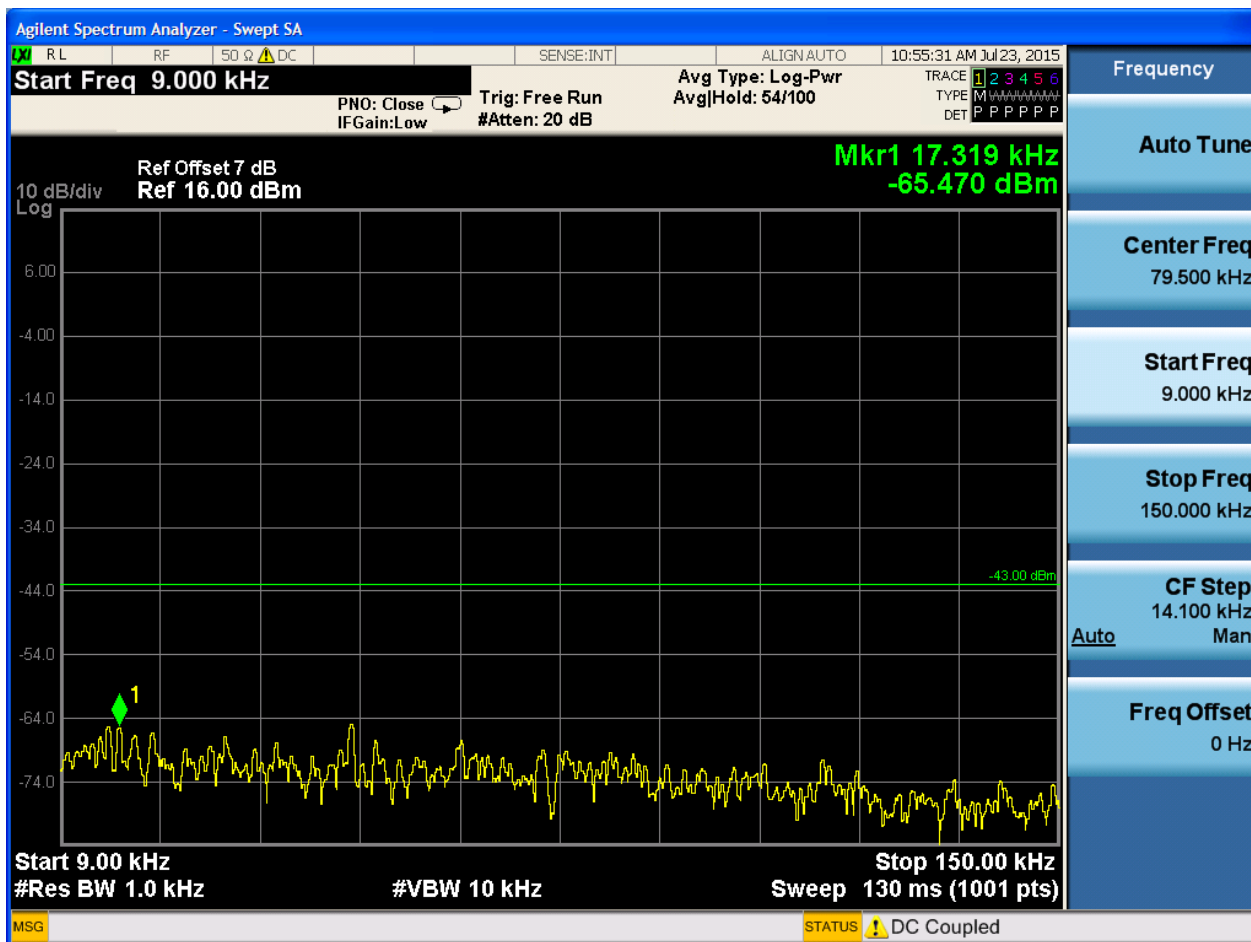


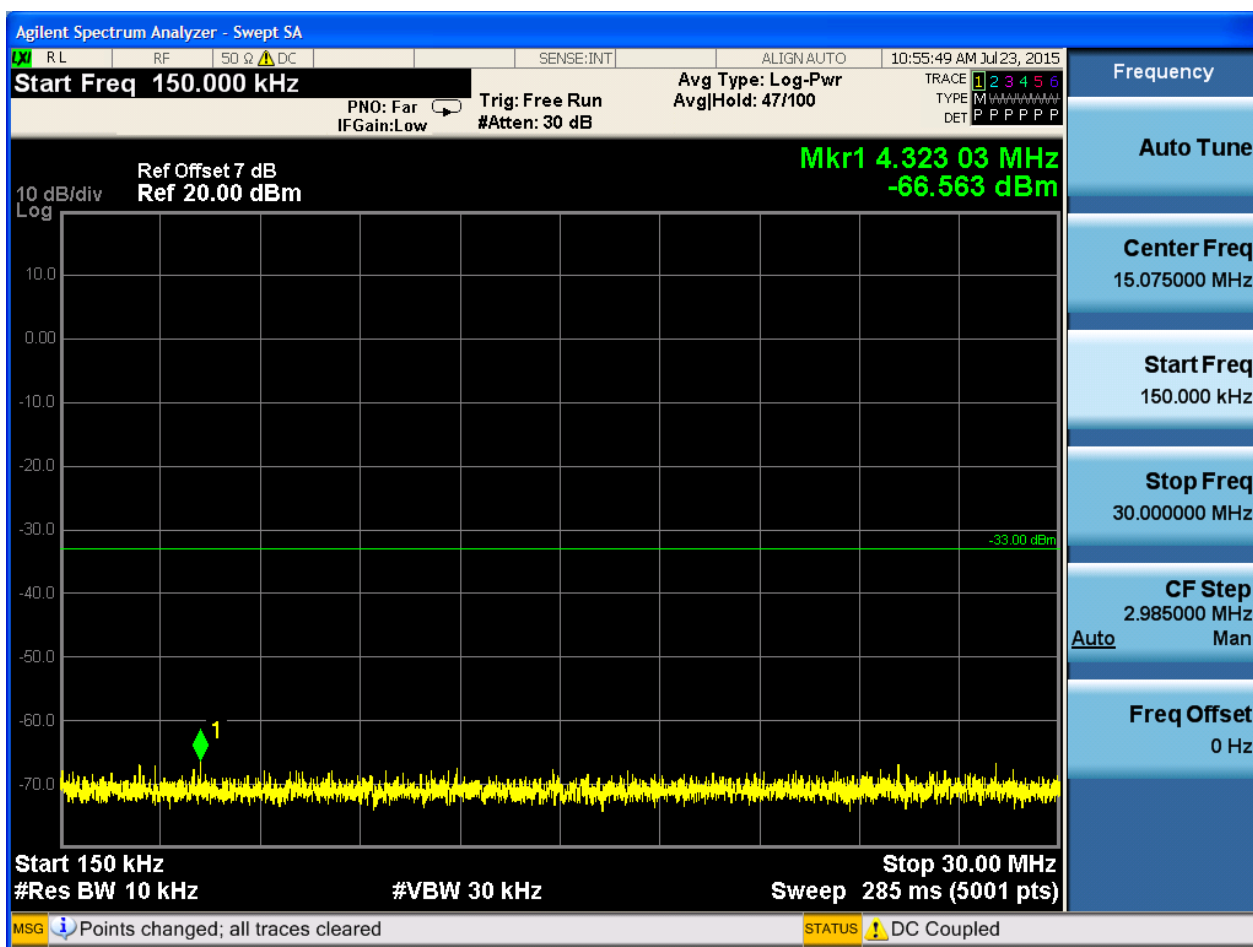


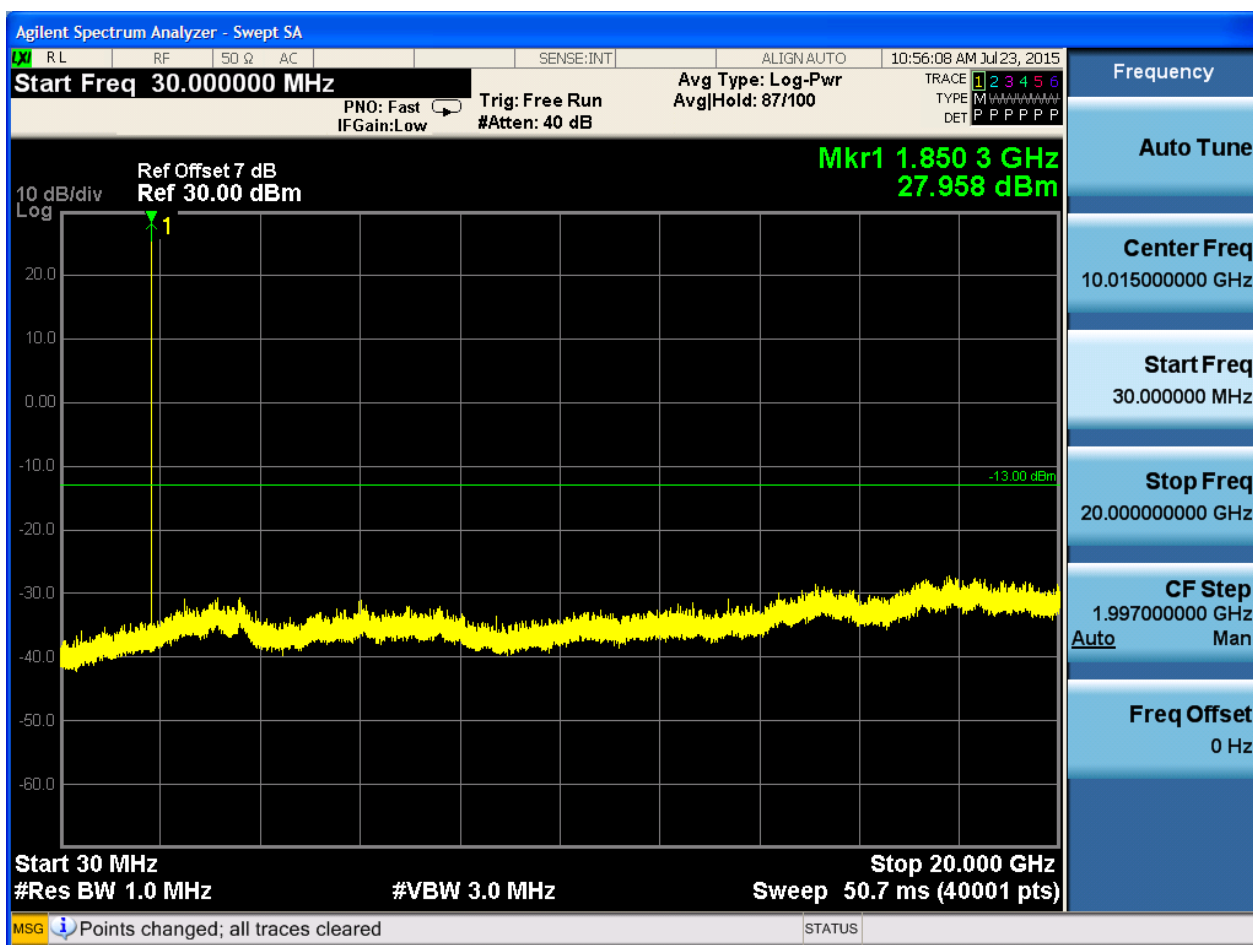


6.1.2.2 Test Mode = GSM/TM2

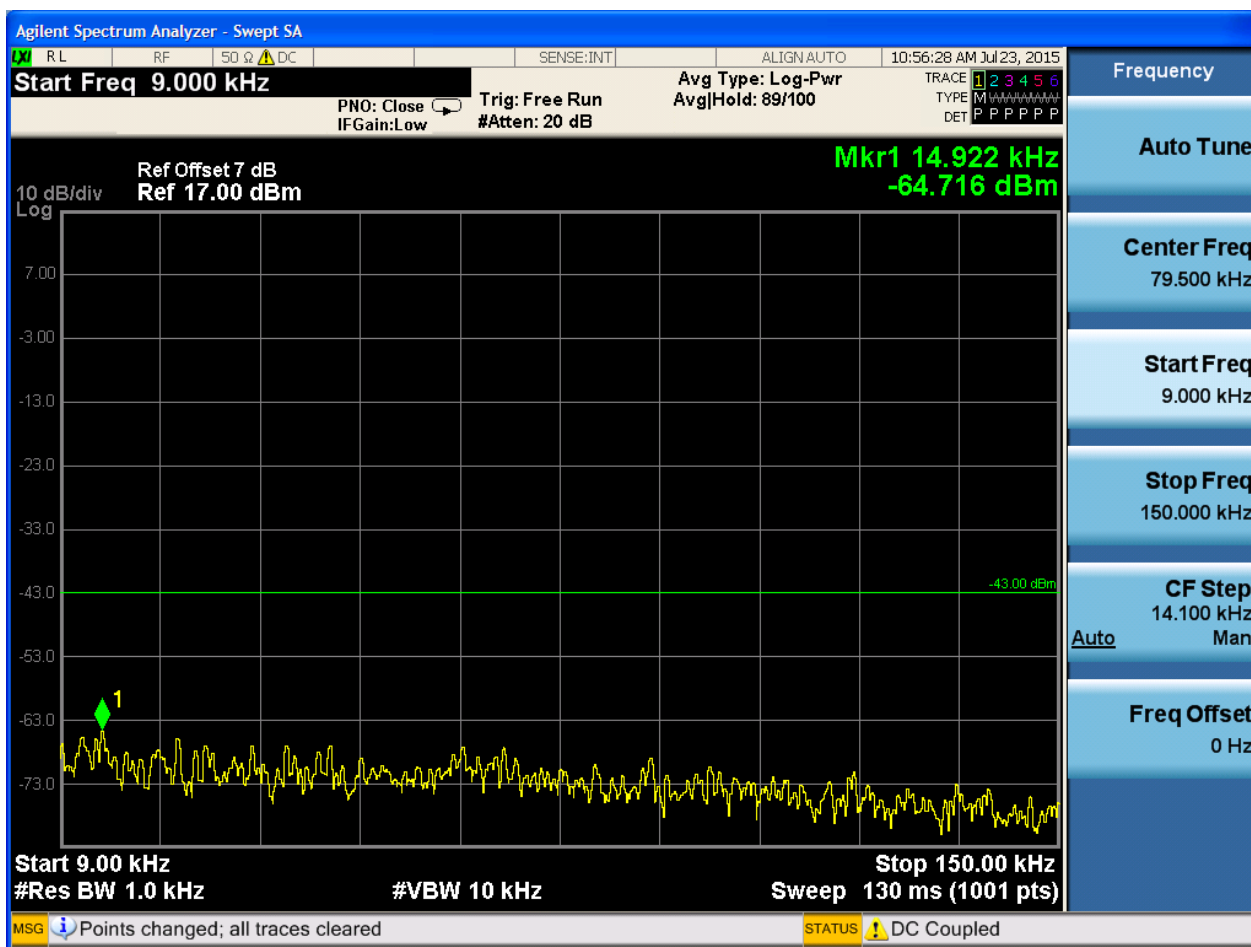
6.1.2.2.1 Test Channel = LCH

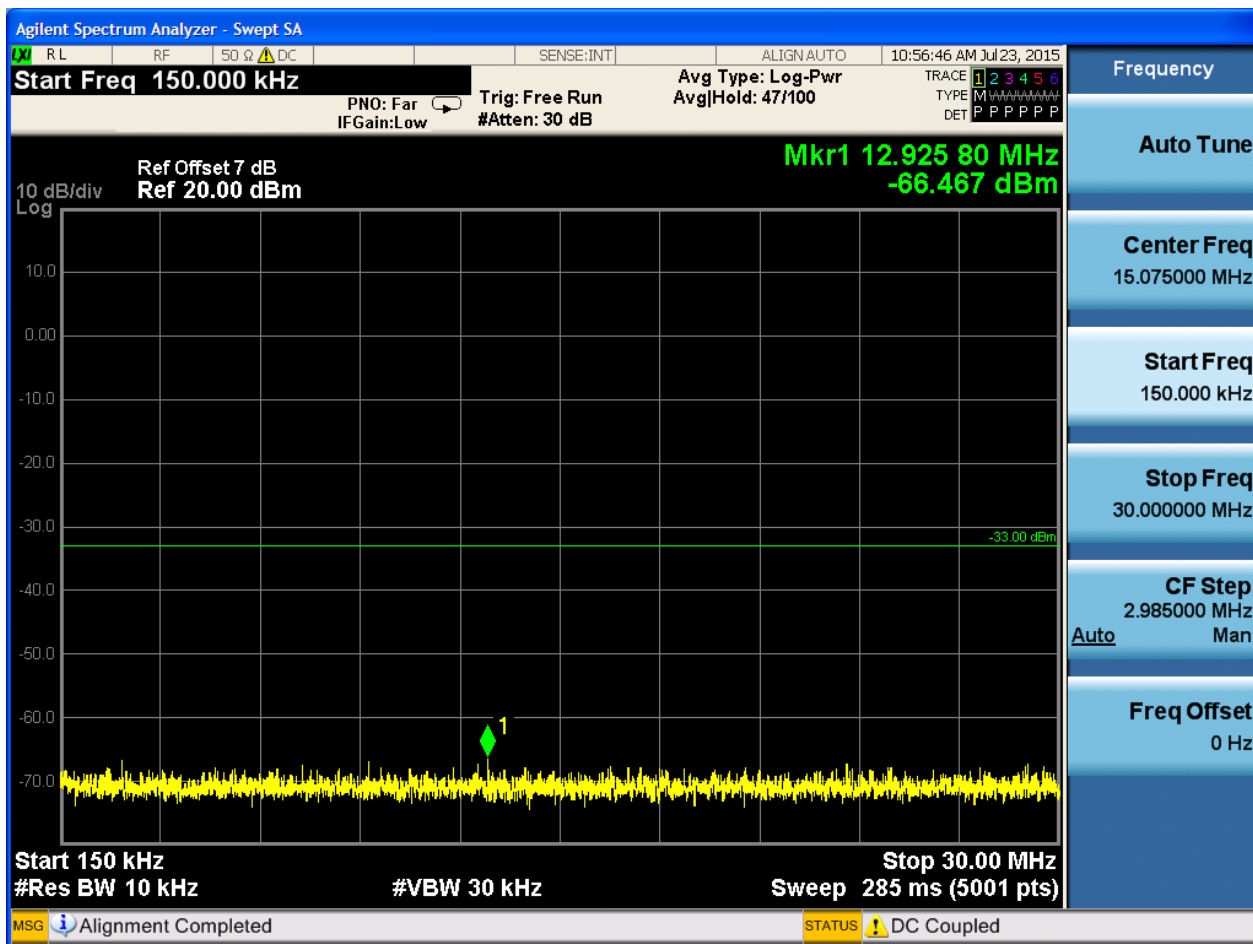


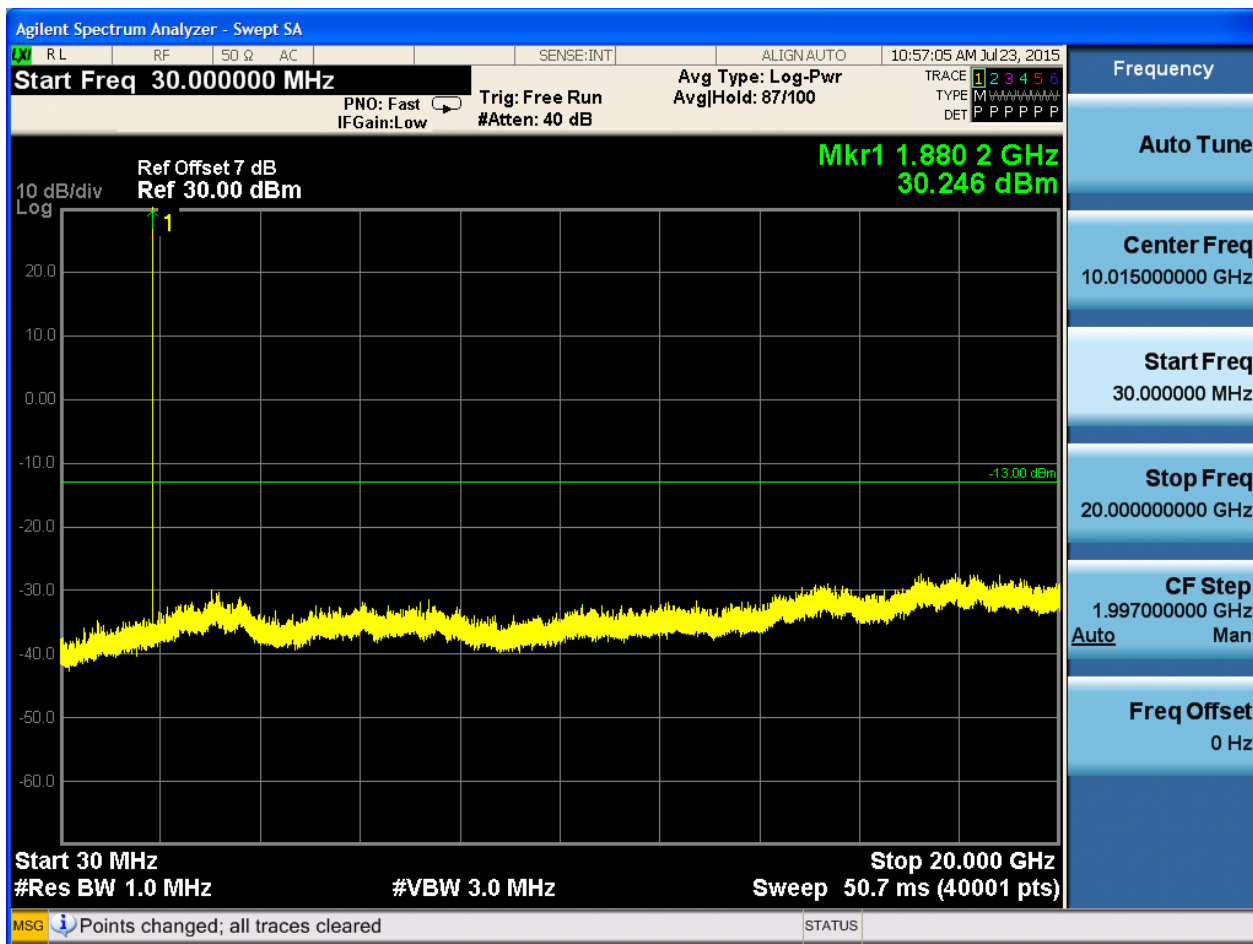




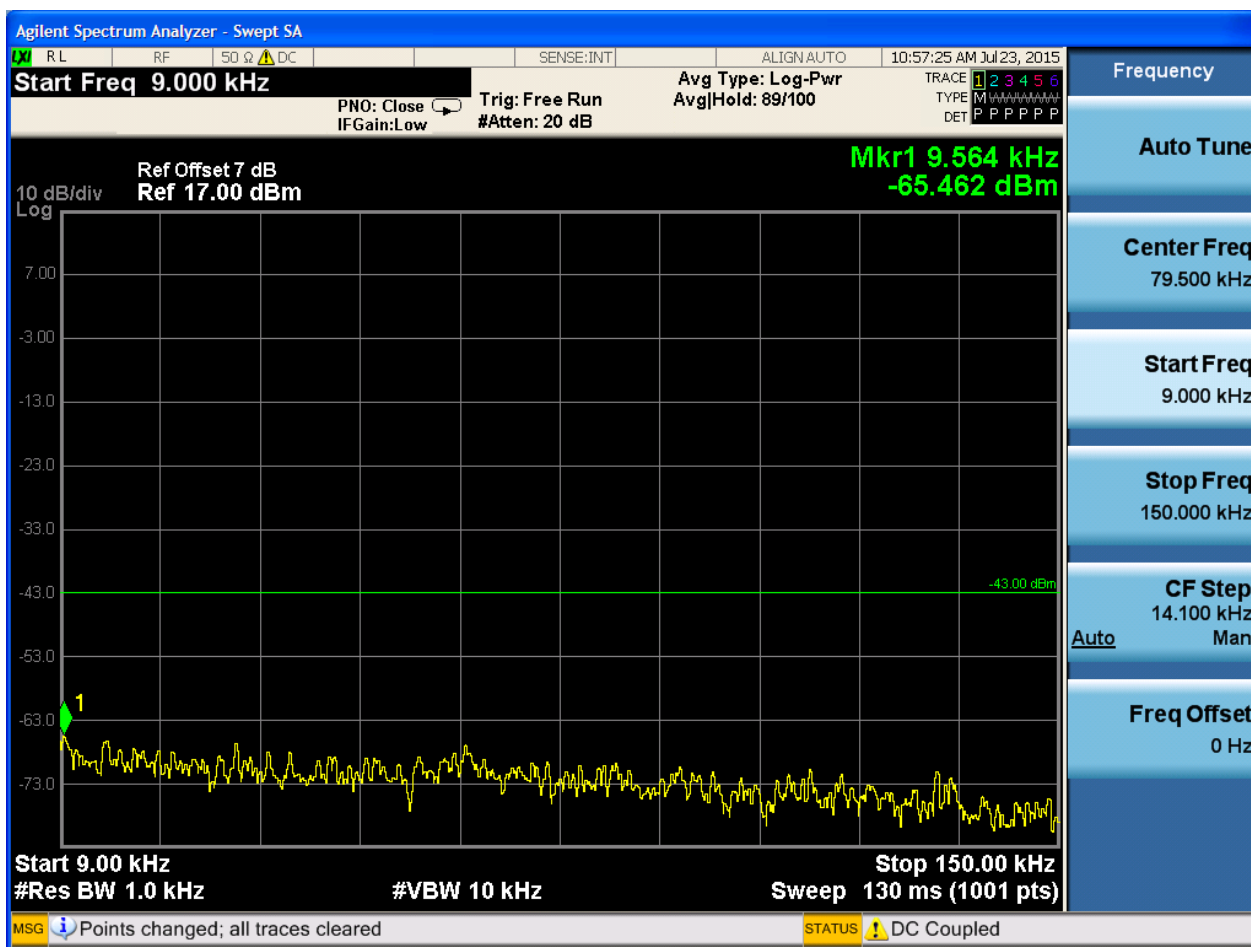
6.1.2.2.2 Test Channel = MCH

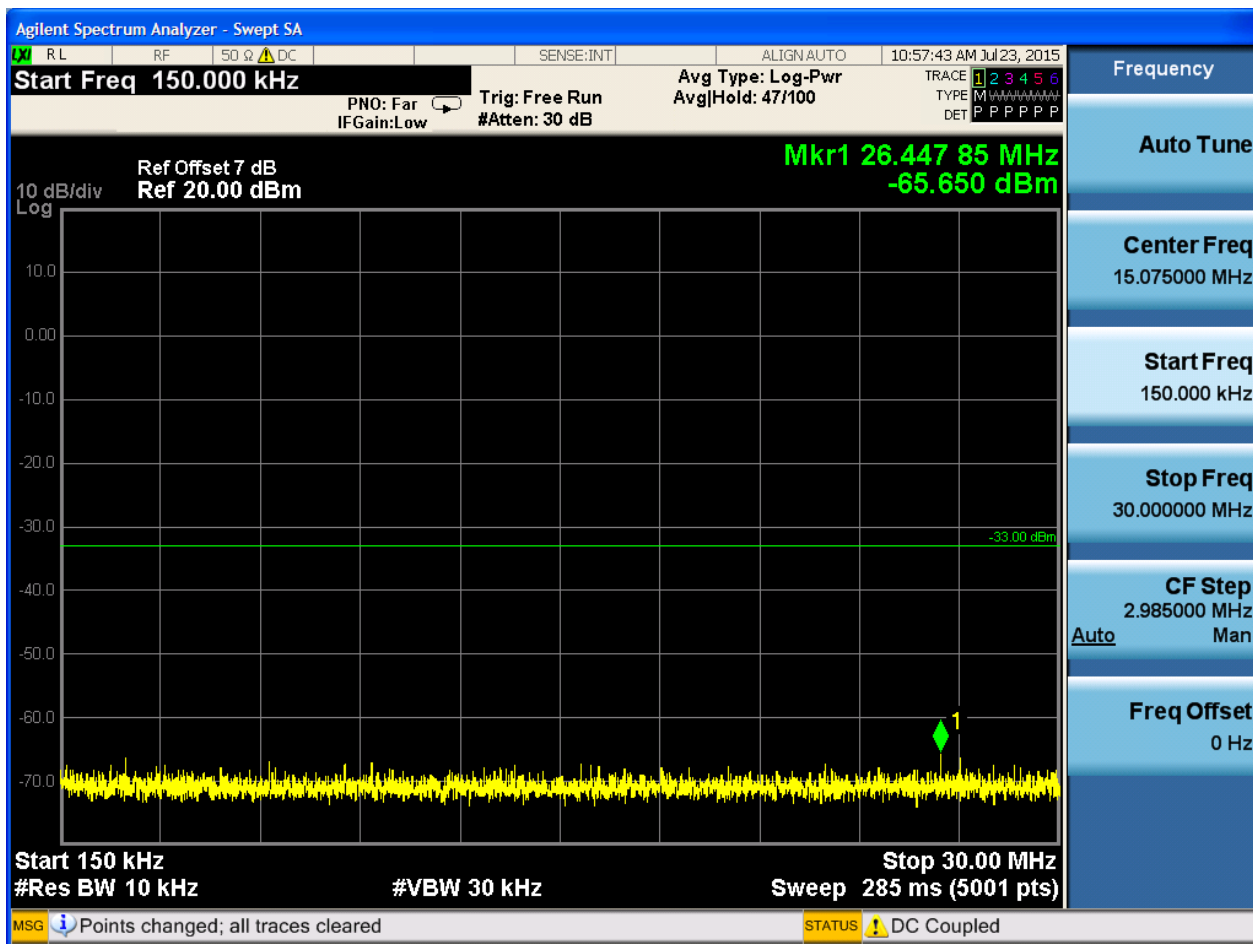


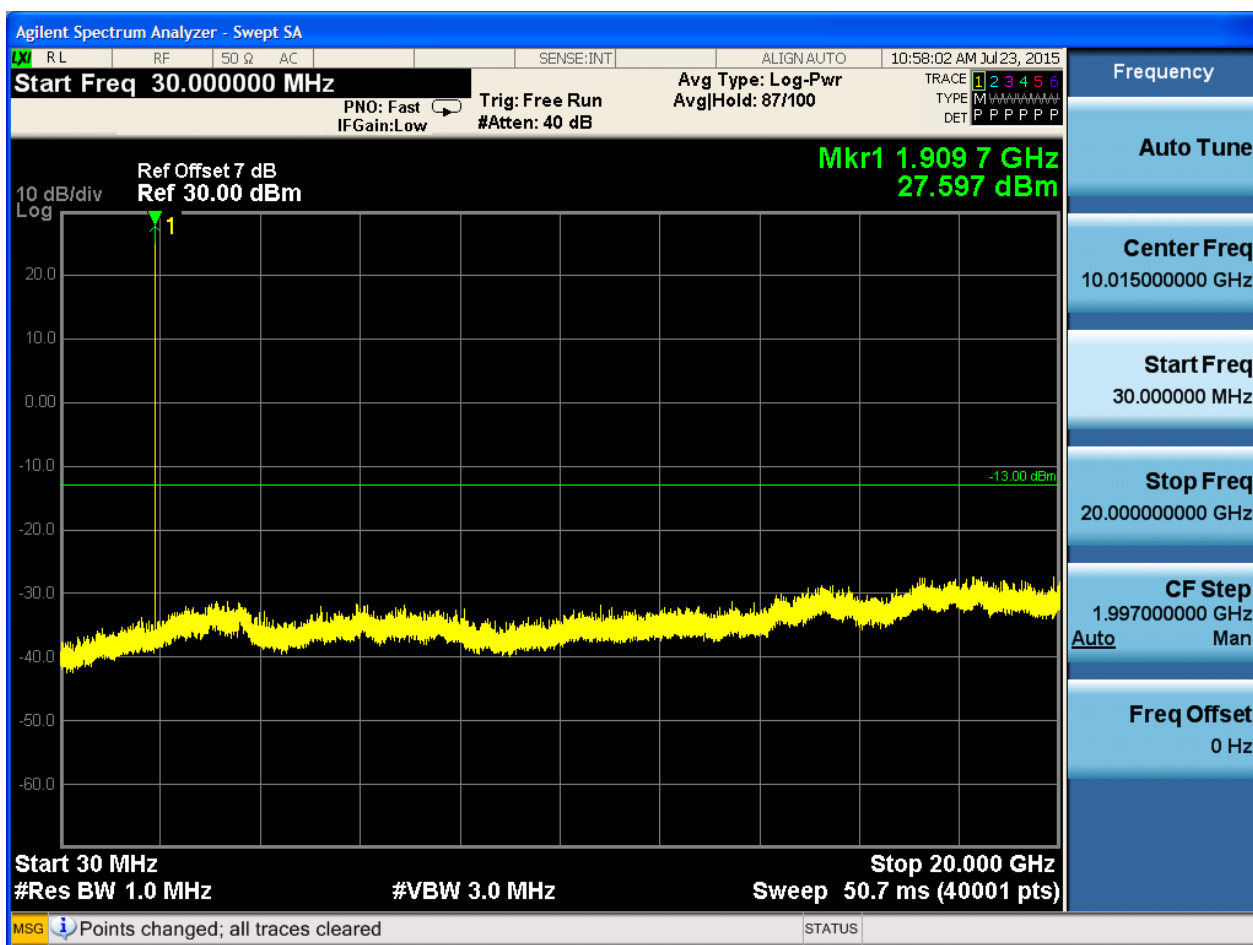




6.1.2.2.3 Test Channel = HCH







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

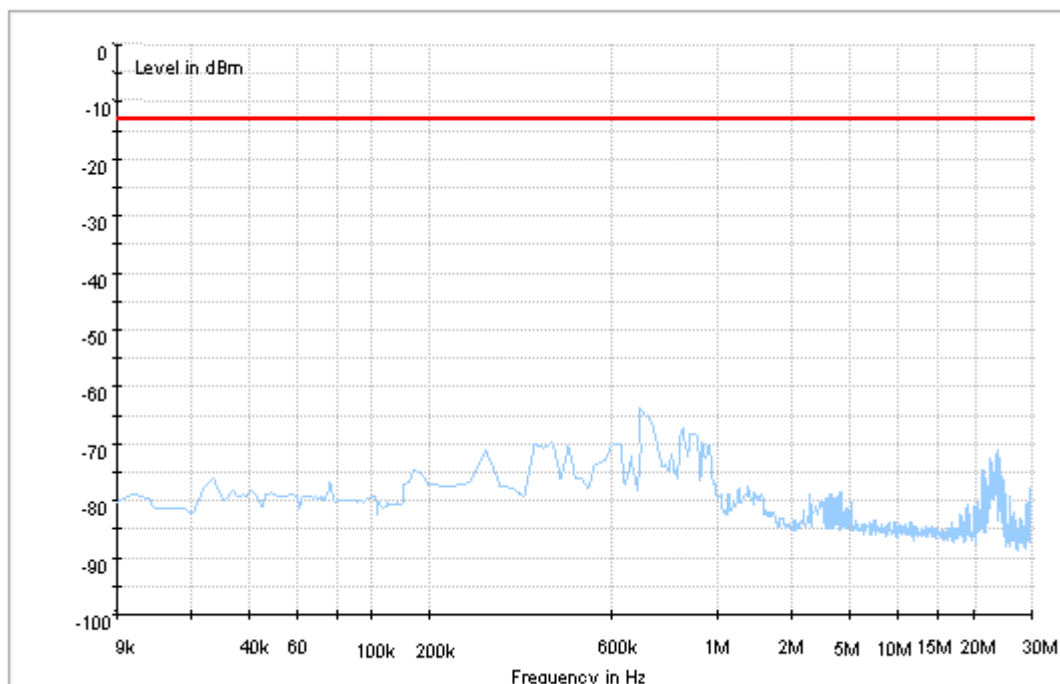
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

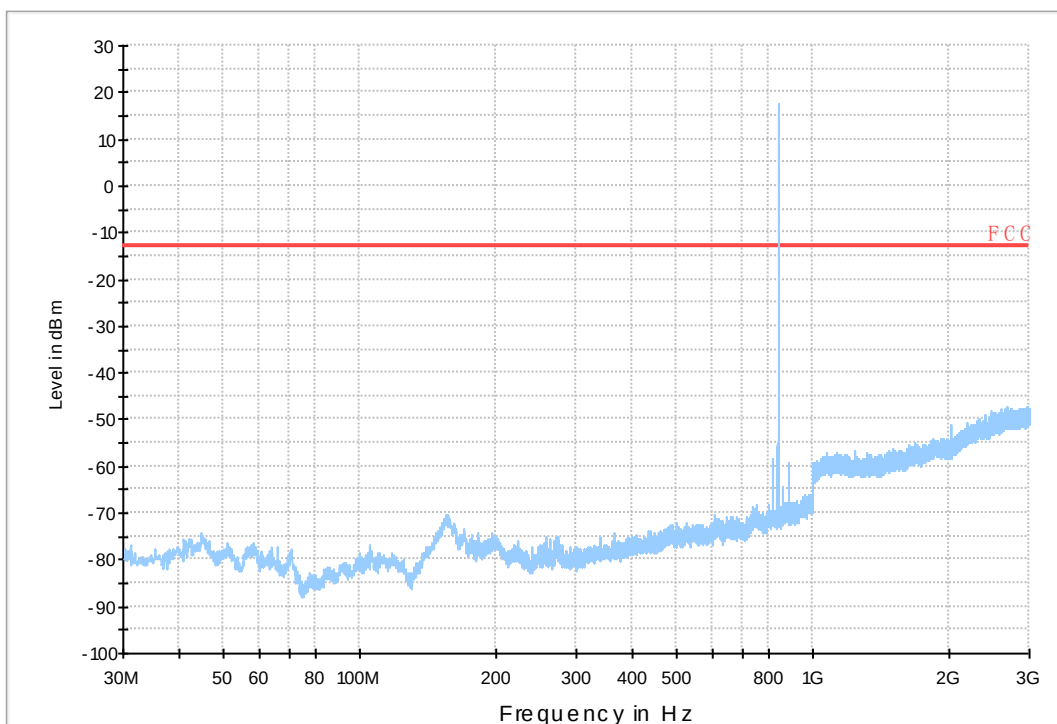
7.1 For GSM

7.1.1 Test Band = GSM850

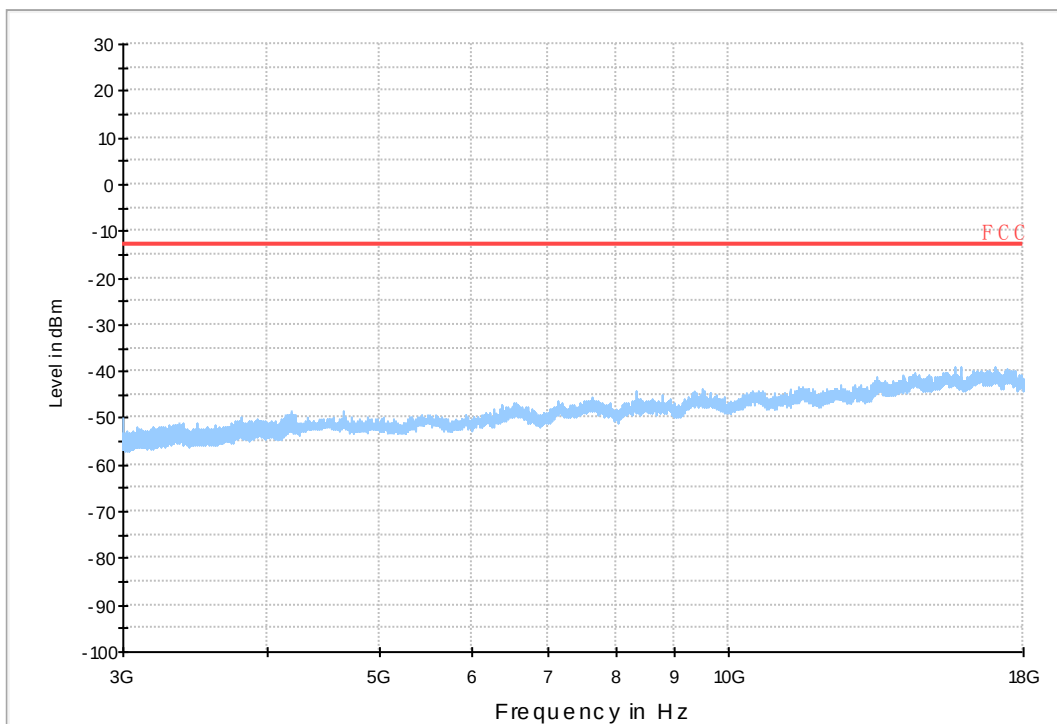
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 G SM850_L

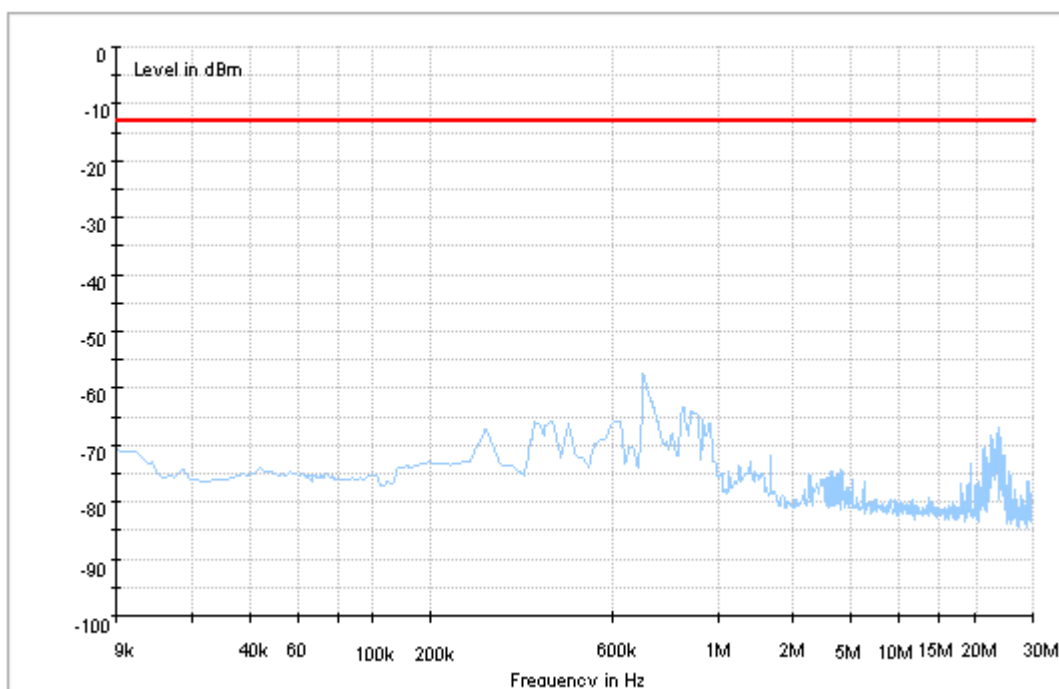


Copy of FCC PART22 G SM850_H

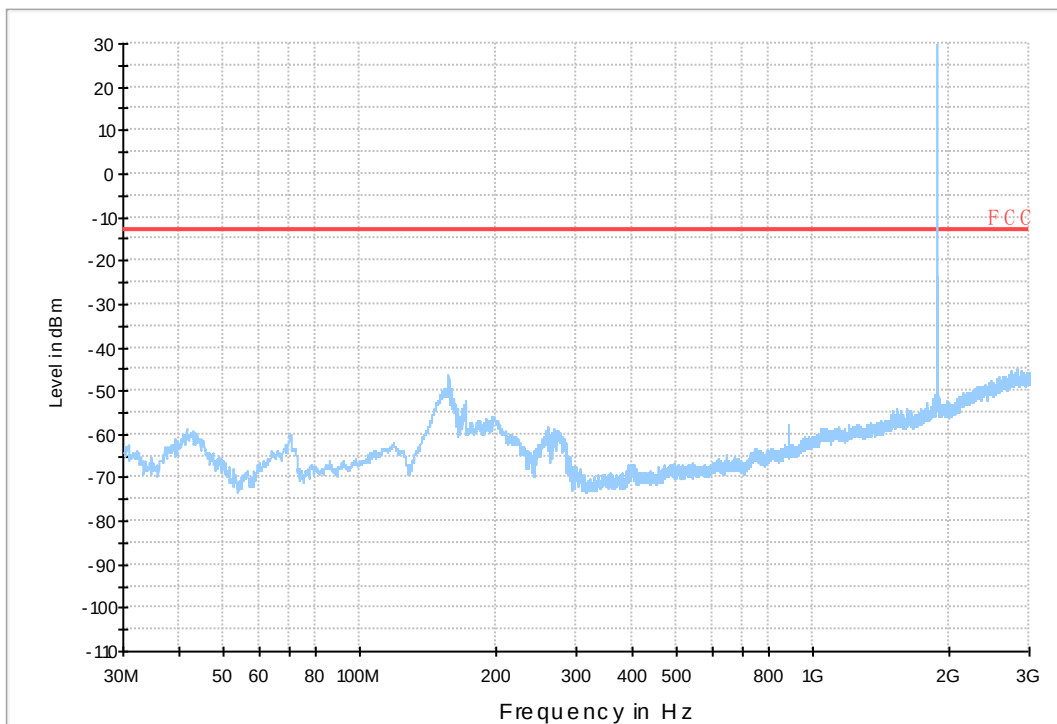


7.1.2 Test Band = GSM1900

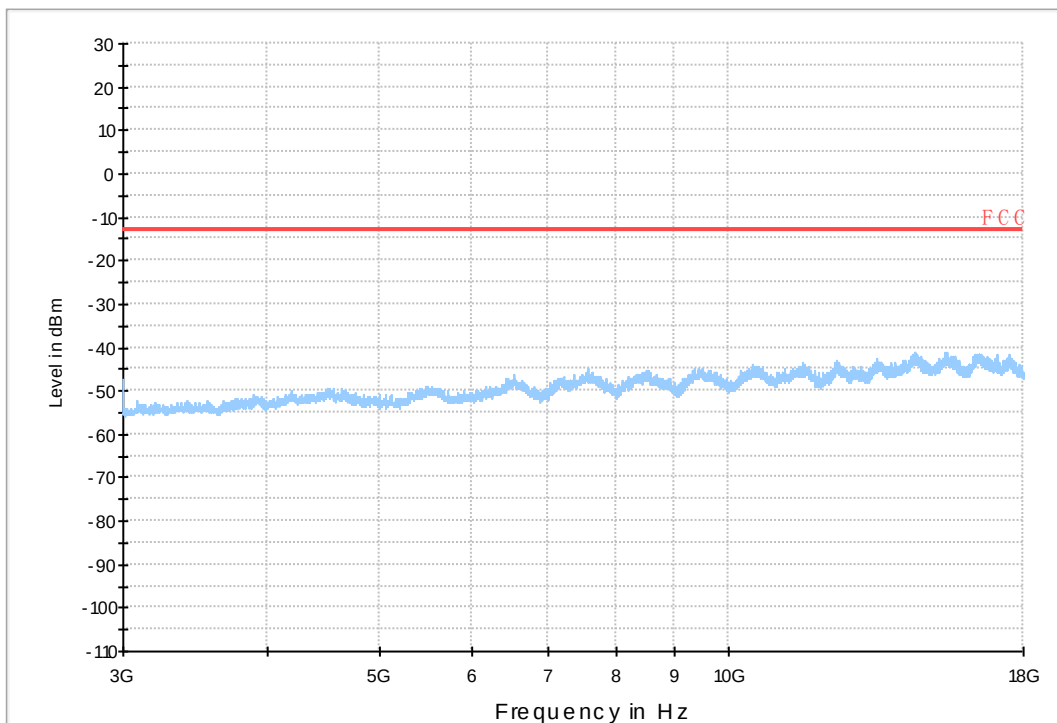
7.1.2.1 Test Mode = GSM/TM1

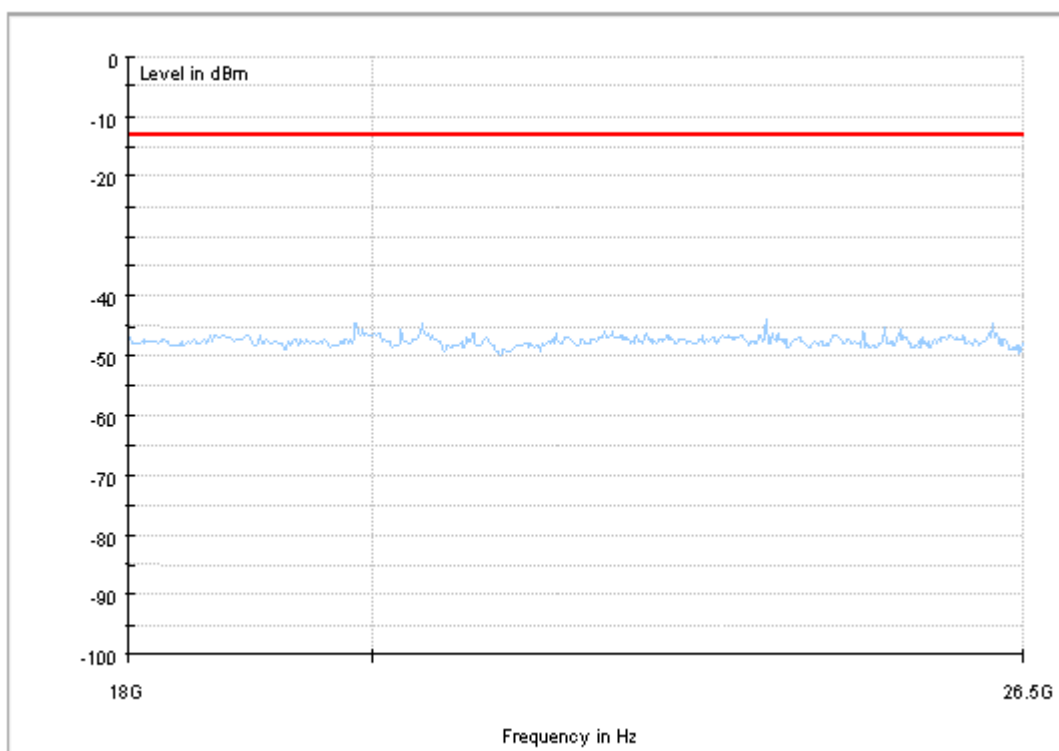


Copy of FCC PART24 GSM 1900_L



Copy of FCC PART24 GSM 1900_H





8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1Frequency 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	11.62	0.0141	PASS
				VN	3.94	0.00478	PASS
				VH	10.2	0.01238	PASS
		MCH	TN	VL	10.07	0.01204	PASS
				VN	8.14	0.00973	PASS
				VH	9.23	0.01103	PASS
		HCH	TN	VL	5.42	0.00639	PASS
				VN	7.49	0.00882	PASS
				VH	6.01	0.00708	PASS
	GSM/TM2	LCH	TN	VL	11.91	0.01445	PASS
				VN	12.3	0.01492	PASS
				VH	11.04	0.01339	PASS
		MCH	TN	VL	14.69	0.01756	PASS
				VN	15.59	0.01863	PASS
				VH	17.85	0.02134	PASS
		HCH	TN	VL	12.01	0.01415	PASS
				VN	8.36	0.00985	PASS
				VH	8.2	0.00966	PASS
GSM1900	GSM/TM1	LCH	TN	VL	24.6	0.0133	PASS
				VN	45.65	0.02467	PASS
				VH	24.86	0.01344	PASS
		MCH	TN	VL	32.48	0.01728	PASS
				VN	32.87	0.01748	PASS
				VH	35	0.01862	PASS
		HCH	TN	VL	20.4	0.01068	PASS
				VN	18.92	0.00991	PASS
				VH	19.37	0.01014	PASS
	GSM/TM2	LCH	TN	VL	19.98	0.0108	PASS
				VN	22.02	0.0119	PASS
				VH	43.1	0.02329	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	44.97	0.02392	PASS
				VN	32.83	0.01746	PASS
				VH	27.35	0.01455	PASS
		HCH	TN	VL	26.15	0.01369	PASS
				VN	45.07	0.0236	PASS
				VH	16.18	0.00847	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	6.91	0.00838	PASS
				-20	10.78	0.01308	PASS
				-10	9.23	0.0112	PASS
				0	9.94	0.01206	PASS
				10	7.3	0.00886	PASS
				20	8.33	0.01011	PASS
				30	11.11	0.01348	PASS
				40	12.98	0.01575	PASS
				50	11.04	0.01339	PASS
		MCH	VN	-30	13.62	0.01628	PASS
				-20	10.85	0.01297	PASS
				-10	9.17	0.01096	PASS
				0	13.3	0.0159	PASS
				10	13.75	0.01644	PASS
				20	9.56	0.01143	PASS
				30	13.17	0.01574	PASS
				40	14.14	0.0169	PASS
				50	8.07	0.00965	PASS
		HCH	VN	-30	2.07	0.00244	PASS
				-20	3.55	0.00418	PASS
				-10	14.27	0.01681	PASS
				0	6.59	0.00776	PASS
				10	3.68	0.00434	PASS
				20	4.78	0.00563	PASS
				30	4.39	0.00517	PASS
				40	13.82	0.01628	PASS
				50	15.37	0.01811	PASS
	GSM/TM2	LCH	VN	-30	11.43	0.01387	PASS
				-20	14.85	0.01802	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	10.46	0.01269	PASS
				0	11.17	0.01355	PASS
				10	11.62	0.0141	PASS
				20	13.5	0.01638	PASS
				30	10.46	0.01269	PASS
				40	12.3	0.01492	PASS
				50	12.4	0.01504	PASS
		MCH	VN	-30	18.4	0.02199	PASS
				-20	17.76	0.02123	PASS
				-10	14.85	0.01775	PASS
				0	18.05	0.02158	PASS
				10	14.92	0.01783	PASS
				20	15.5	0.01853	PASS
				30	18.31	0.02189	PASS
				40	11.33	0.01354	PASS
				50	15.56	0.0186	PASS
		HCH	VN	-30	10.53	0.01241	PASS
				-20	14.14	0.01666	PASS
				-10	12.07	0.01422	PASS
				0	13.3	0.01567	PASS
				10	10.04	0.01183	PASS
				20	16.3	0.0192	PASS
				30	10.94	0.01289	PASS
				40	9.36	0.01103	PASS
				50	12.11	0.01427	PASS
GSM1900	GSM/TM1	LCH	VN	-30	41.13	0.02223	PASS
				-20	19.31	0.01044	PASS
				-10	45.2	0.02443	PASS
				0	41.97	0.02268	PASS
				10	19.82	0.01071	PASS
				20	18.85	0.01019	PASS
				30	24.6	0.0133	PASS
				40	19.82	0.01071	PASS
				50	50.3	0.02719	PASS
		MCH	VN	-30	35.32	0.01879	PASS
				-20	35	0.01862	PASS
				-10	37.65	0.02003	PASS
				0	34.8	0.01851	PASS
				10	32.8	0.01745	PASS
				20	32.61	0.01735	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	34.09	0.01813	PASS
				40	28.22	0.01501	PASS
				50	28.35	0.01508	PASS
		HCH	VN	-30	23.37	0.01224	PASS
				-20	26.86	0.01406	PASS
				-10	18.14	0.0095	PASS
				0	20.99	0.01099	PASS
				10	18.92	0.00991	PASS
				20	19.57	0.01025	PASS
				30	18.08	0.00947	PASS
				40	16.79	0.00879	PASS
				50	22.28	0.01167	PASS
	GSM/TM2	LCH	VN	-30	51.5	0.02783	PASS
				-20	29.77	0.01609	PASS
				-10	48.62	0.02628	PASS
				0	47.78	0.02582	PASS
				10	25.57	0.01382	PASS
				20	50.17	0.02712	PASS
				30	26.6	0.01438	PASS
				40	22.15	0.01197	PASS
				50	19.02	0.01028	PASS
		MCH	VN	-30	36.19	0.01925	PASS
				-20	36.74	0.01954	PASS
				-10	31.96	0.017	PASS
				0	36.84	0.0196	PASS
				10	33.74	0.01795	PASS
				20	32.93	0.01752	PASS
				30	35	0.01862	PASS
				40	45.04	0.02396	PASS
				50	37.77	0.02009	PASS
		HCH	VN	-30	33.84	0.01772	PASS
				-20	29.51	0.01545	PASS
				-10	27.77	0.01454	PASS
				0	19.31	0.01011	PASS
				10	31.25	0.01636	PASS
				20	31.35	0.01642	PASS
				30	24.25	0.0127	PASS
				40	21.24	0.01112	PASS
				50	29.22	0.0153	PASS



END