



Appendix for test report

1Appendix_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	33.45	29.53	38.5	PASS
		MCH	33.58	29.81	38.5	PASS
		HCH	33.74	30.13	38.5	PASS
	GSM/TM2	LCH	27.13	23.46	38.5	PASS
		MCH	27.08	23.28	38.5	PASS
		HCH	27.07	23.25	38.5	PASS
WCDMA850	UMTS/TM1	LCH	24.12	20.26	38.5	PASS
		MCH	23.97	20.07	38.5	PASS
		HCH	23.86	20.22	38.5	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.97	31.04	33	PASS
		MCH	30.89	31.00	33	PASS

Test Band	Test Mode	Test Channel	Conducted Power [dBm]	EIRP [dBm]	Limit [dBm]	Verdict
		HCH	30.76	30.71	33	PASS
	GSM/TM2	LCH	26.4	26.58	33	PASS
		MCH	26.36	26.51	33	PASS
		HCH	26.34	26.41	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
GSM850	GSM/TM1	LCH	0.16	13	PASS
		MCH	0.18	13	PASS
		HCH	0.17	13	PASS
	GSM/TM2	LCH	3.22	13	PASS
		MCH	3.13	13	PASS
		HCH	3.19	13	PASS
GSM1900	GSM/TM1	LCH	0.17	13	PASS
		MCH	0.17	13	PASS
		HCH	0.17	13	PASS
	GSM/TM2	LCH	3.24	13	PASS
		MCH	3.22	13	PASS
		HCH	3.26	13	PASS
Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA850	UMTS/TM1	LCH	3.18	13	PASS
		MCH	3.22	13	PASS
		HCH	3.19	13	PASS

3Appendix_C: Modulation Characteristics

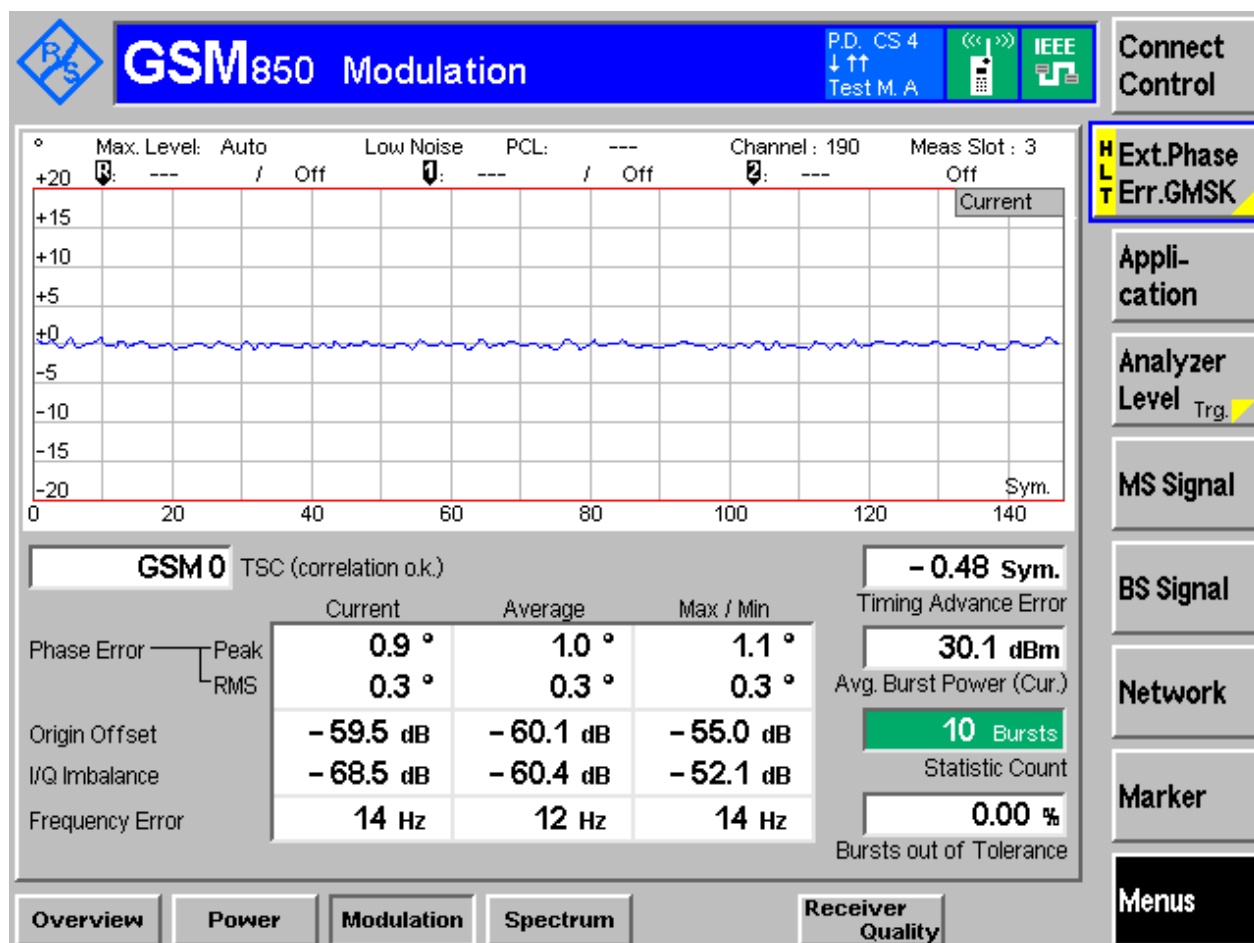
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

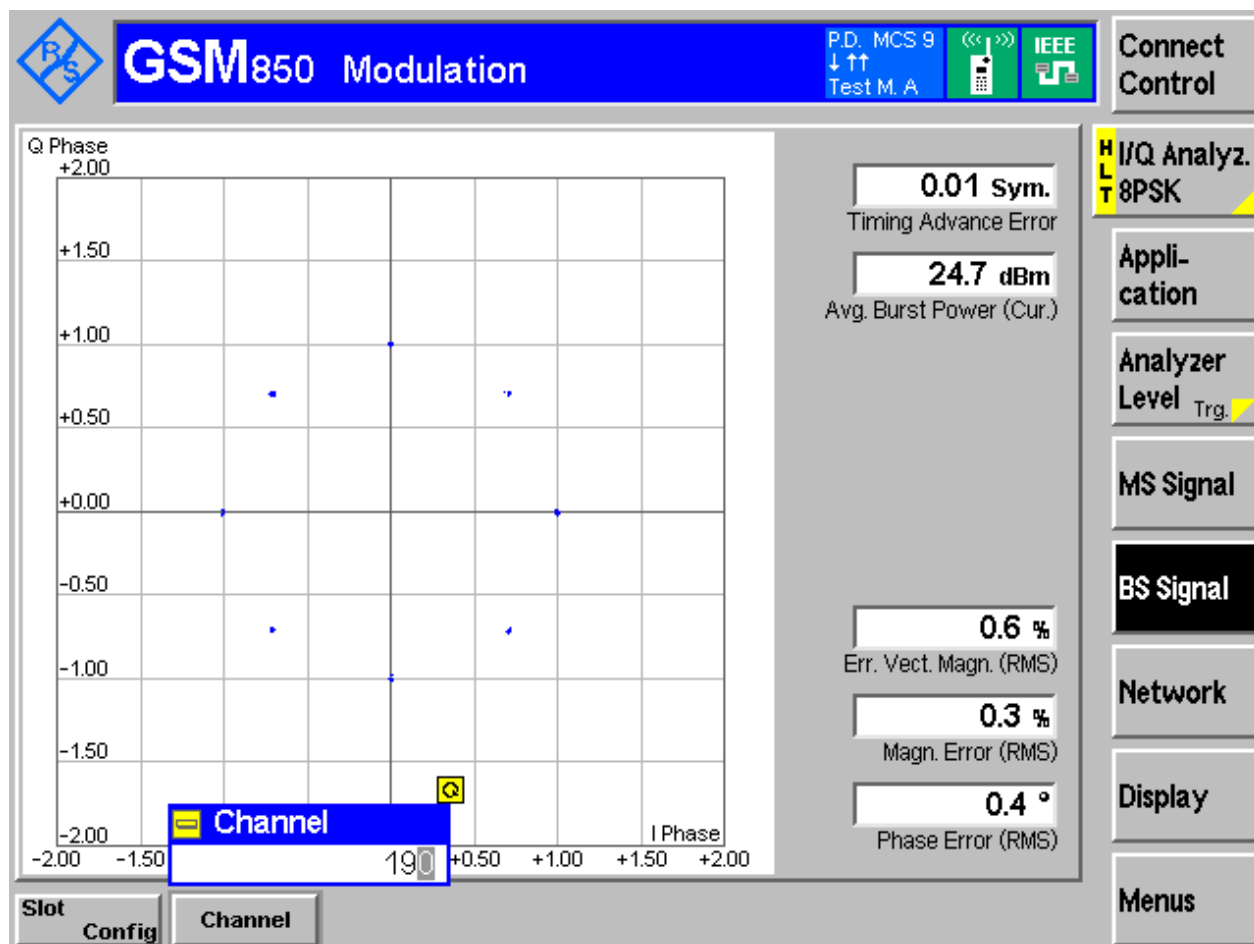
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

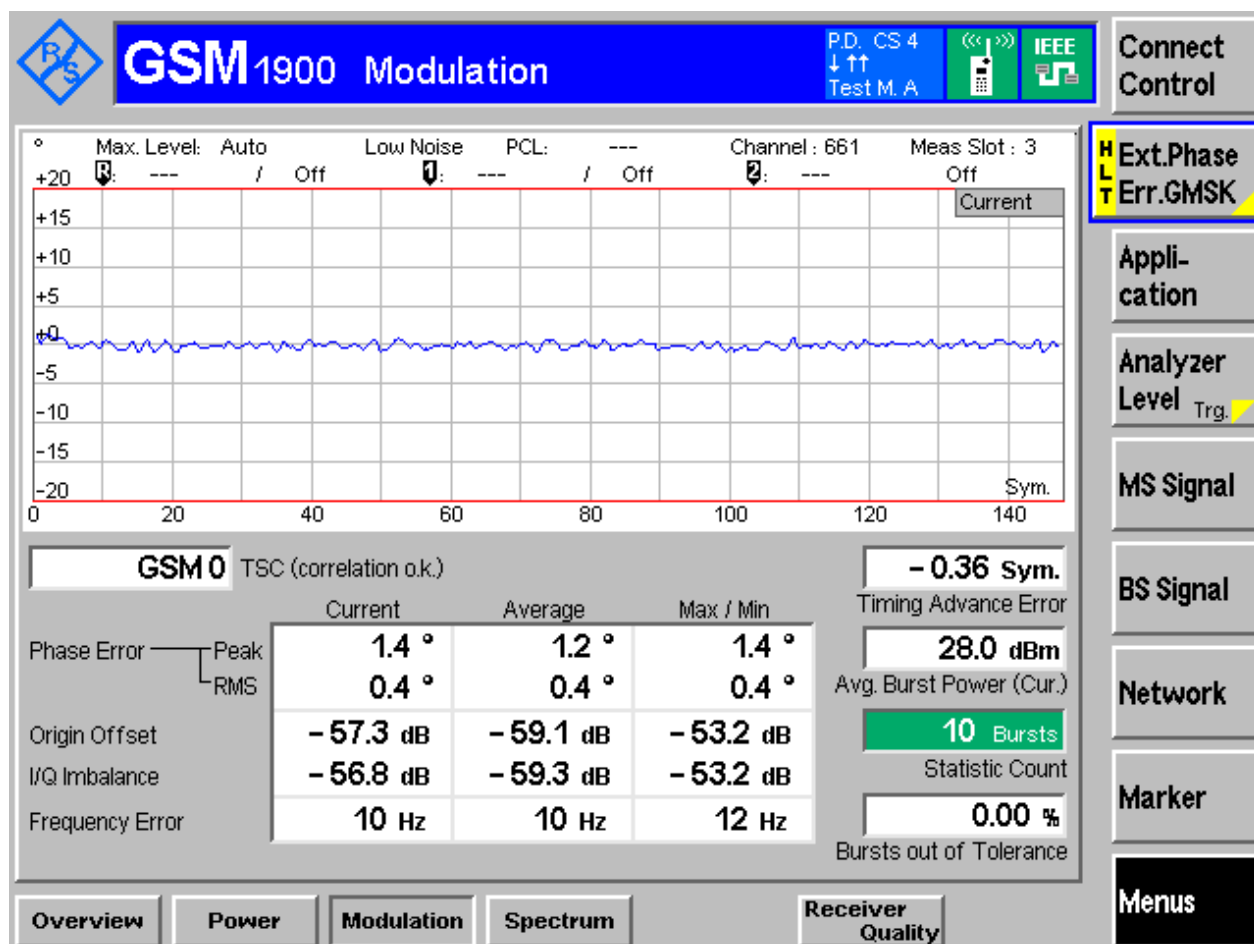
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

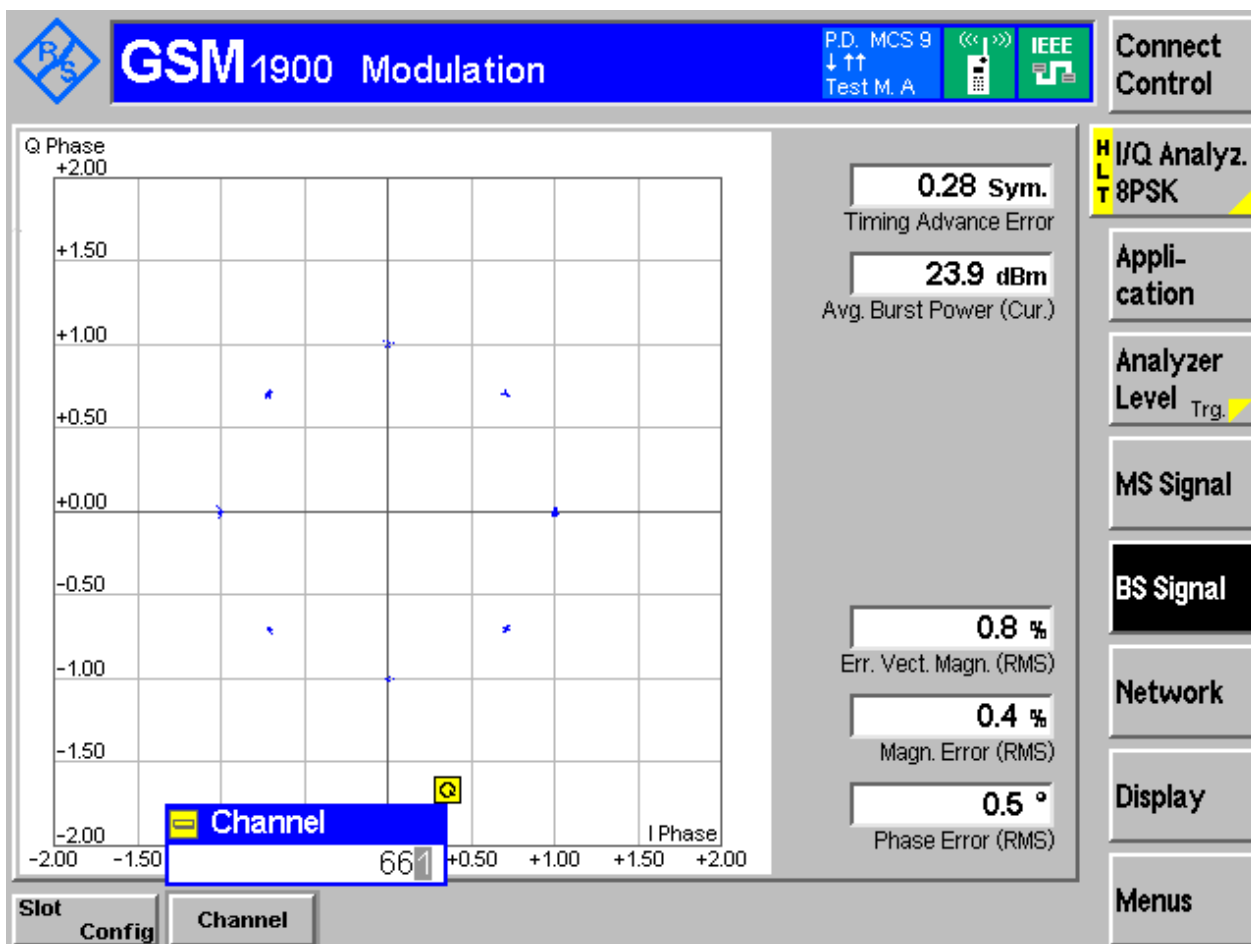
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH

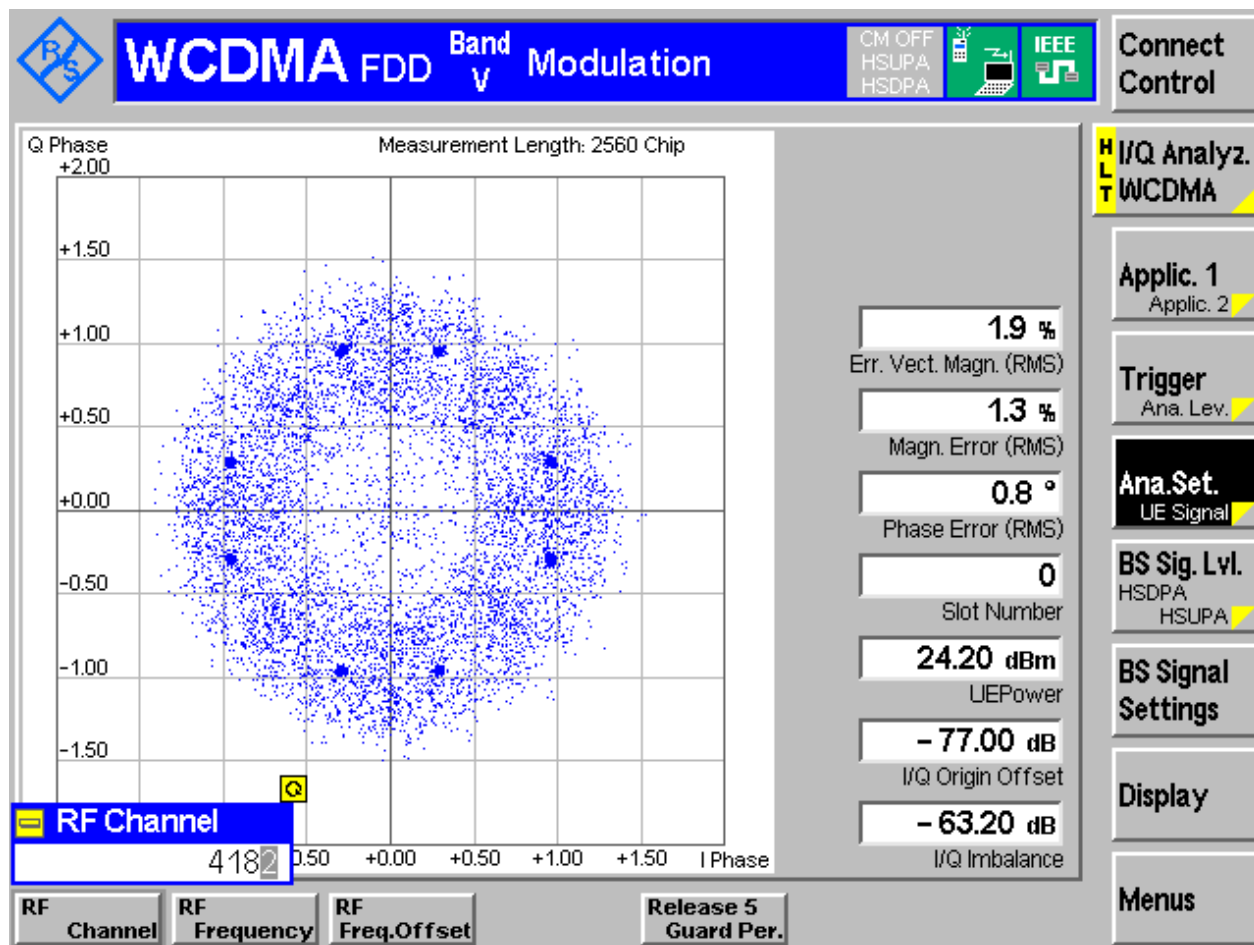


3.2 For UMTS

3.2.1 Test Band = WCDMA850

3.2.1.1 Test Mode = UMTS/TM1

3.2.1.1.1 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	245.72	320.82	Pass
		MCH	243.51	314.29	Pass
		HCH	245.39	310.99	Pass
	GSM/TM2	LCH	241.60	316.89	Pass
		MCH	243.21	315.87	Pass
		HCH	247.13	307.89	Pass
GSM1900	GSM/TM1	LCH	244.58	314.64	Pass
		MCH	246.64	314.75	Pass
		HCH	247.25	314.92	Pass
	GSM/TM2	LCH	242.76	311.16	Pass
		MCH	248.82	309.85	Pass
		HCH	244.28	310.81	Pass
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA850	UMTS/TM1	LCH	4.15	4.73	Pass
		MCH	4.13	4.72	Pass
		HCH	4.14	4.74	Pass

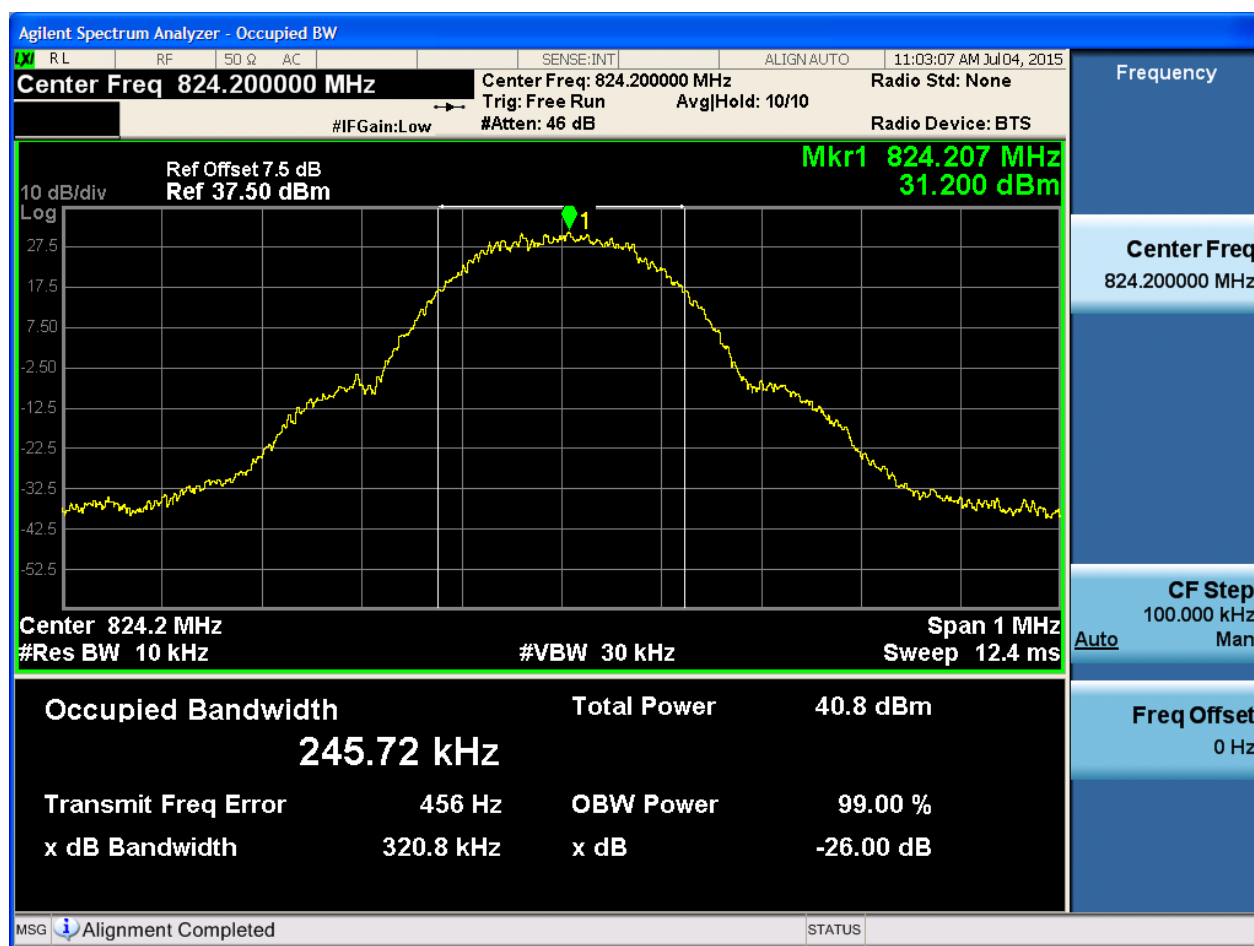
Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

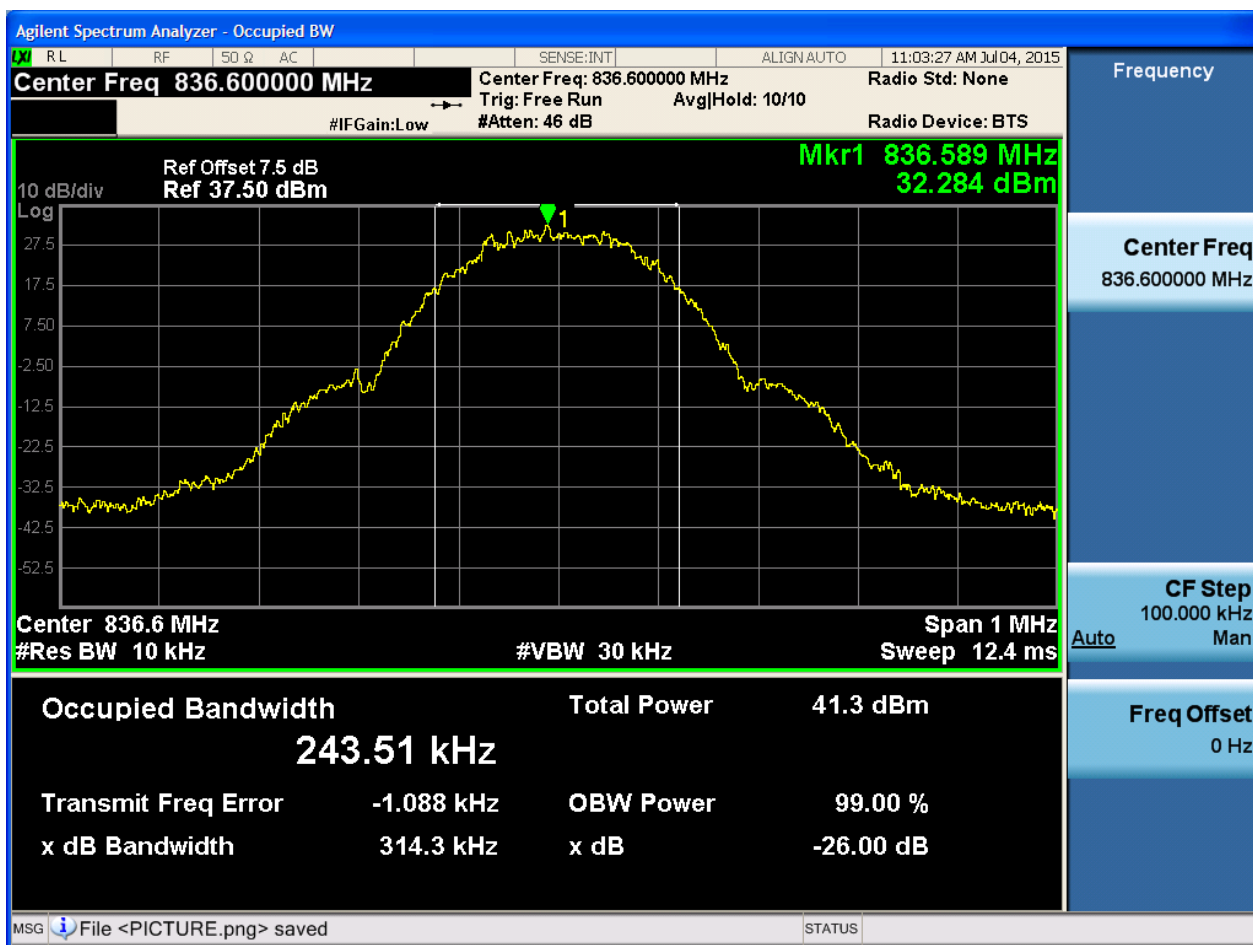
4.1.1.1 Test Mode = GSM/TM1

4.1.1.1.1 Test Channel = LCH



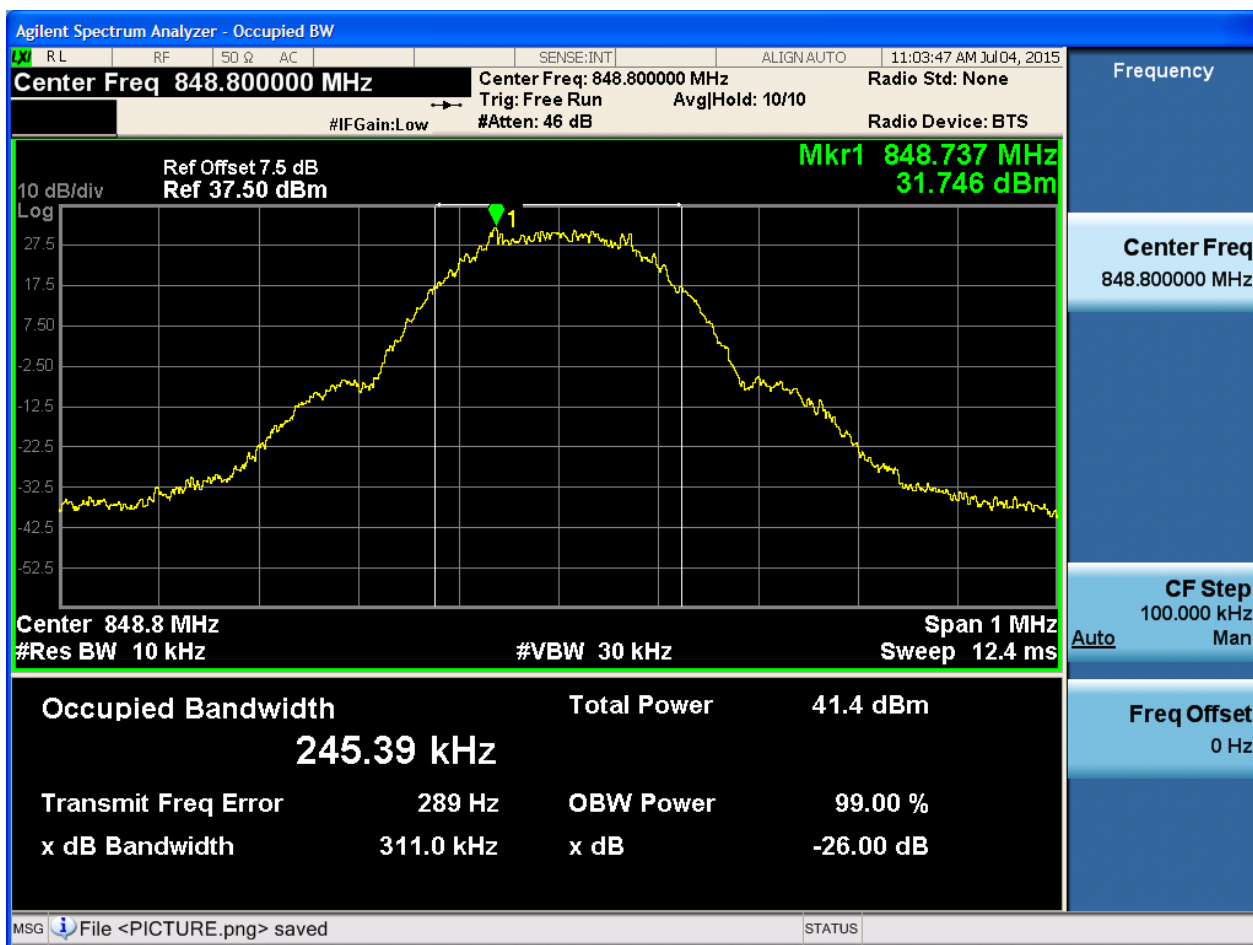


4.1.1.1.2 Test Channel = MCH





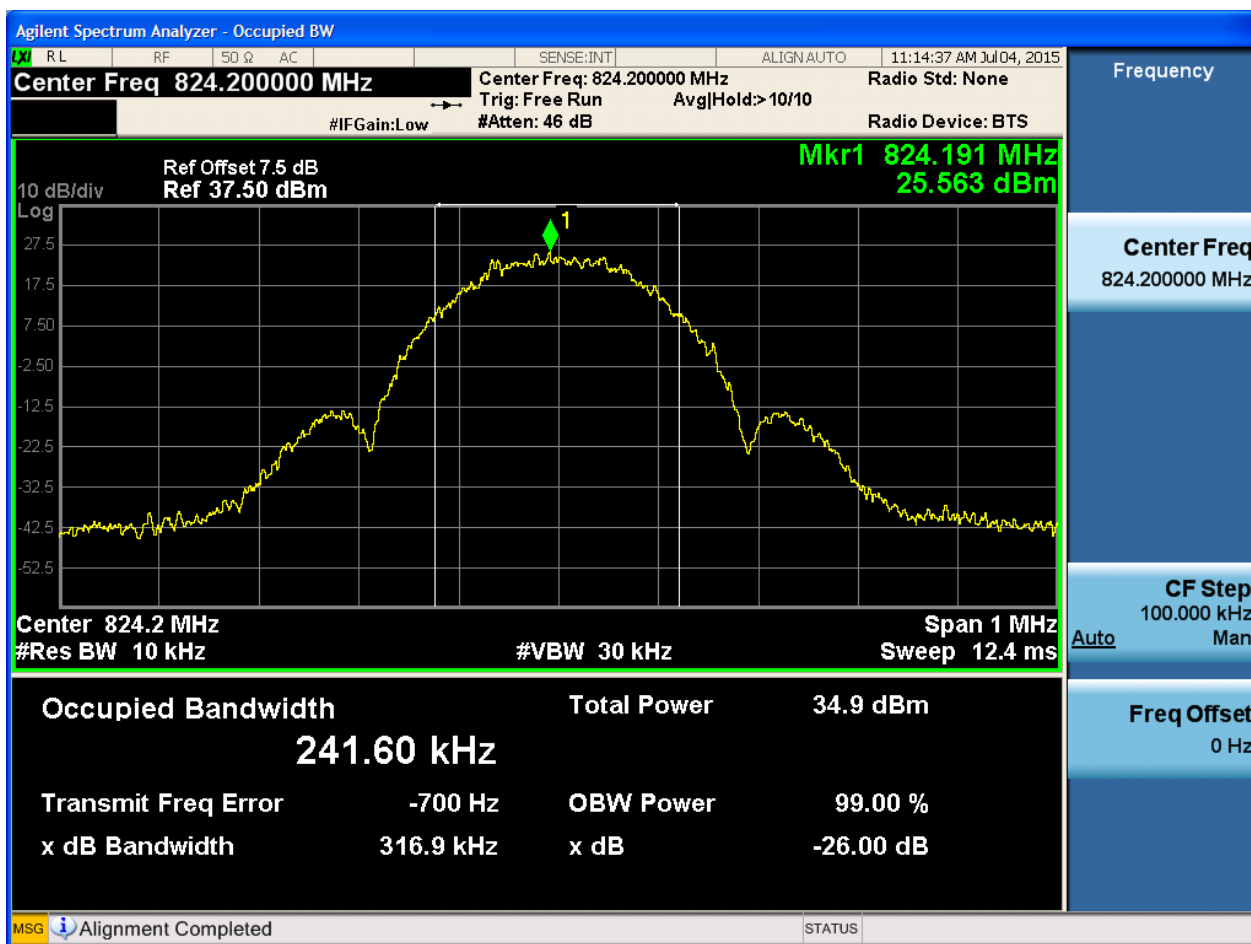
4.1.1.1.3 Test Channel = HCH





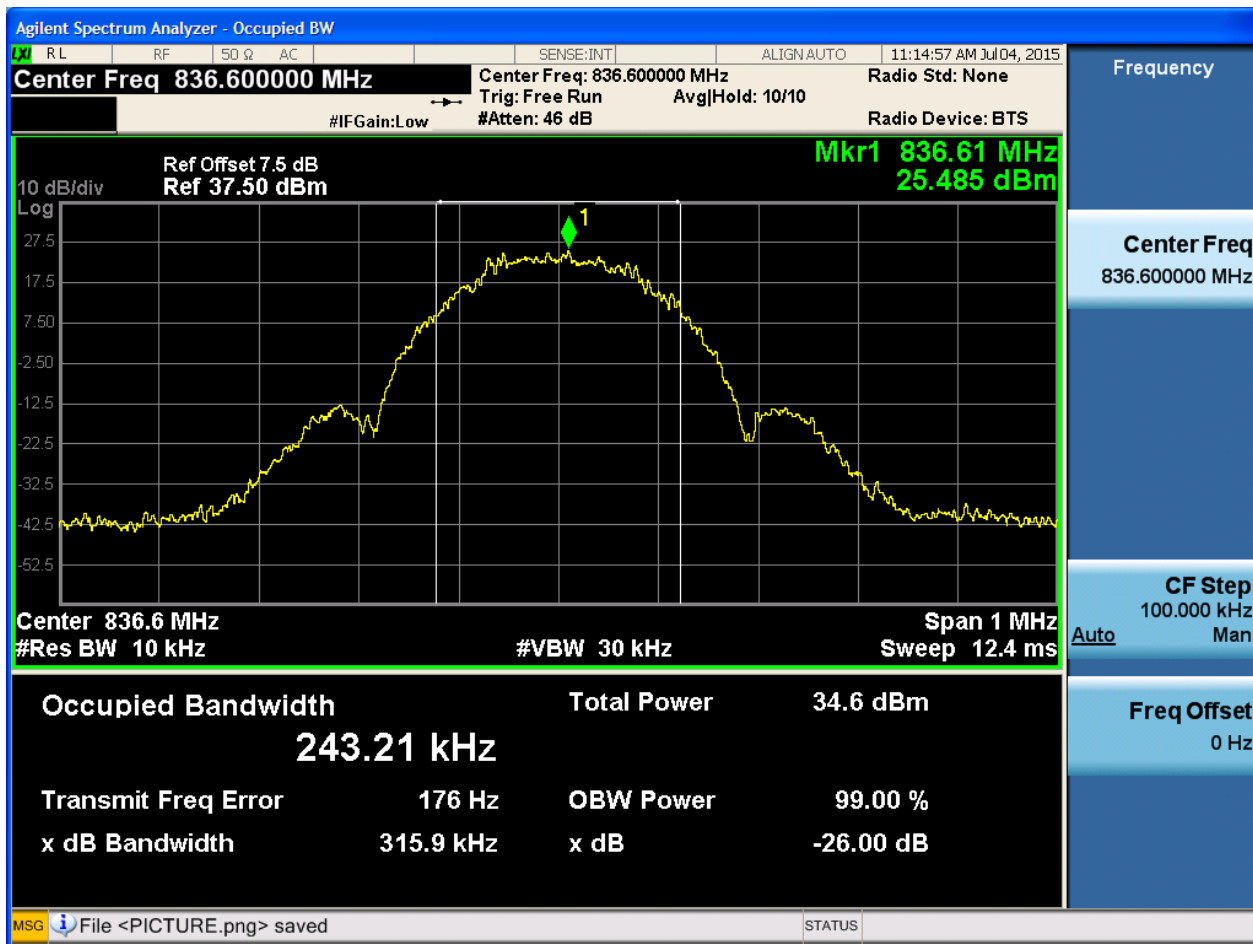
4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



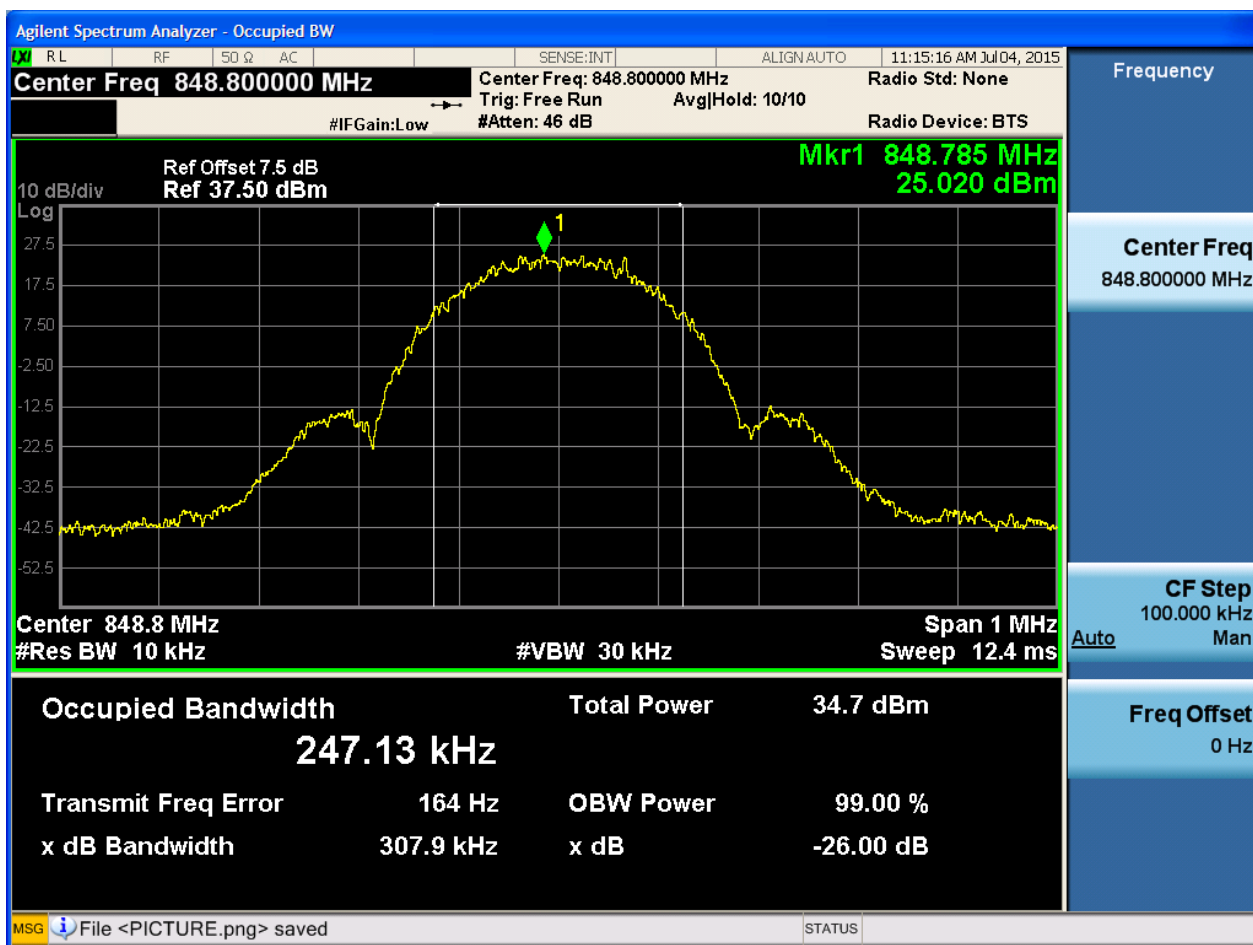


4.1.1.2.2 Test Channel = MCH





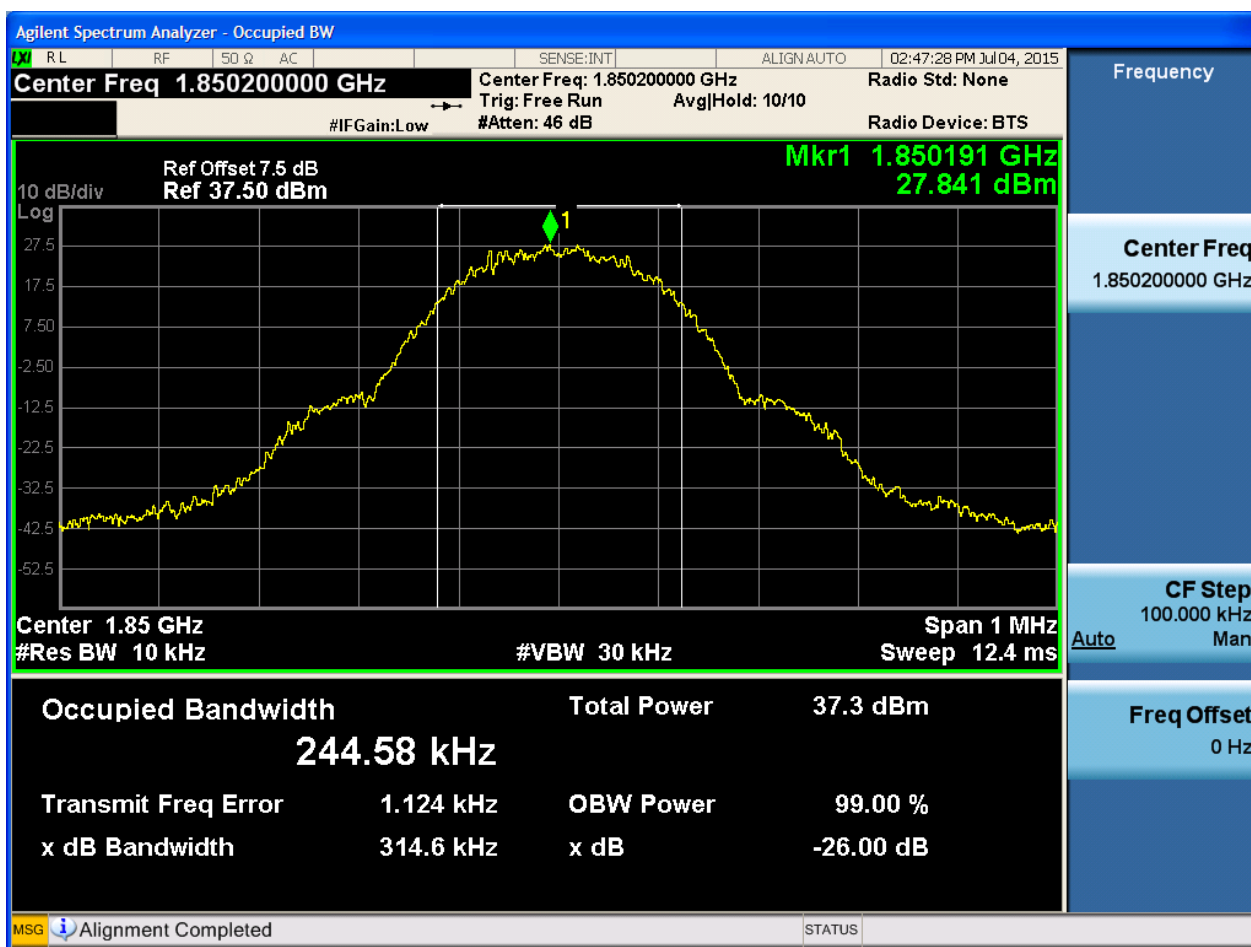
4.1.1.2.3 Test Channel = HCH



4.1.2 Test Band = GSM1900

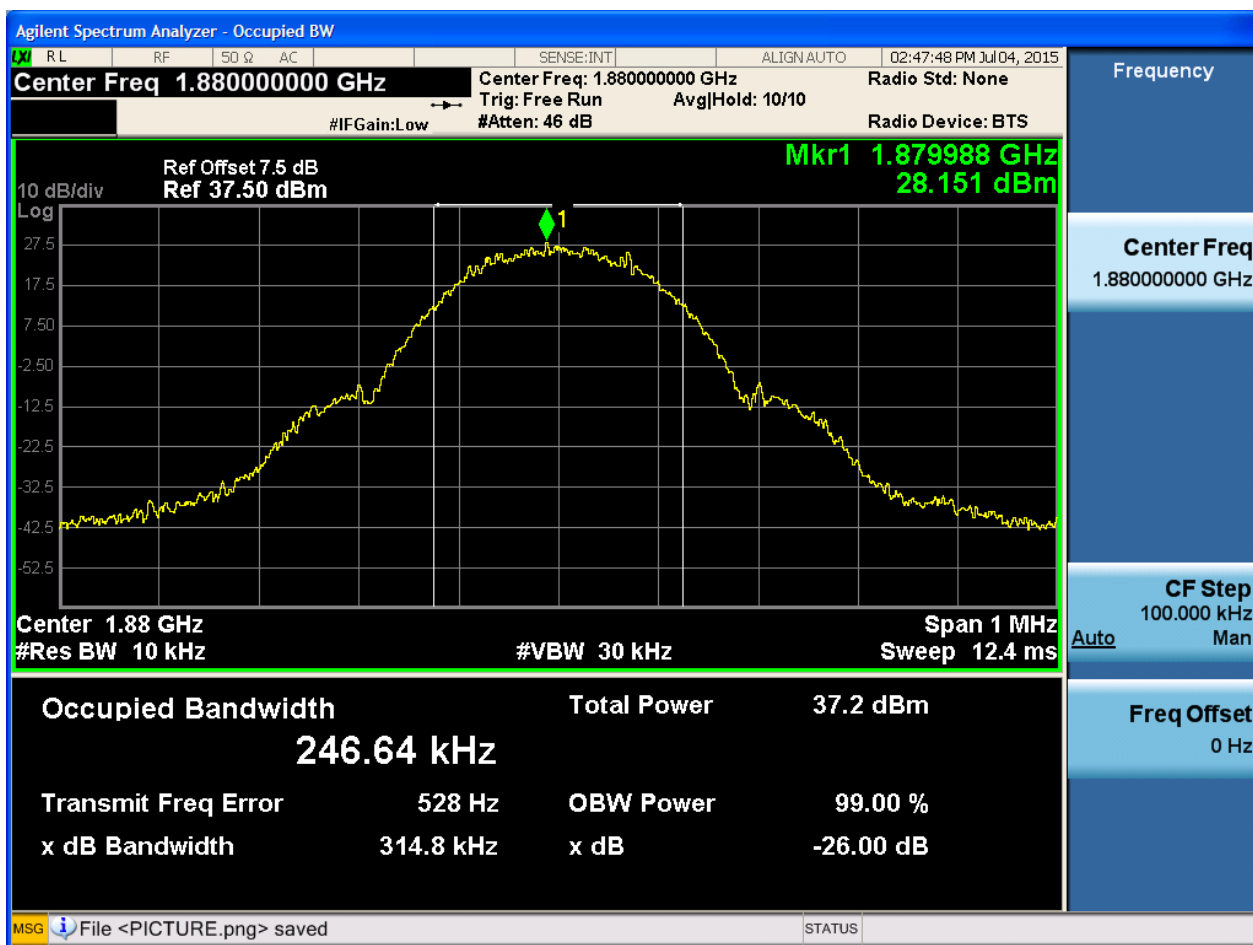
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



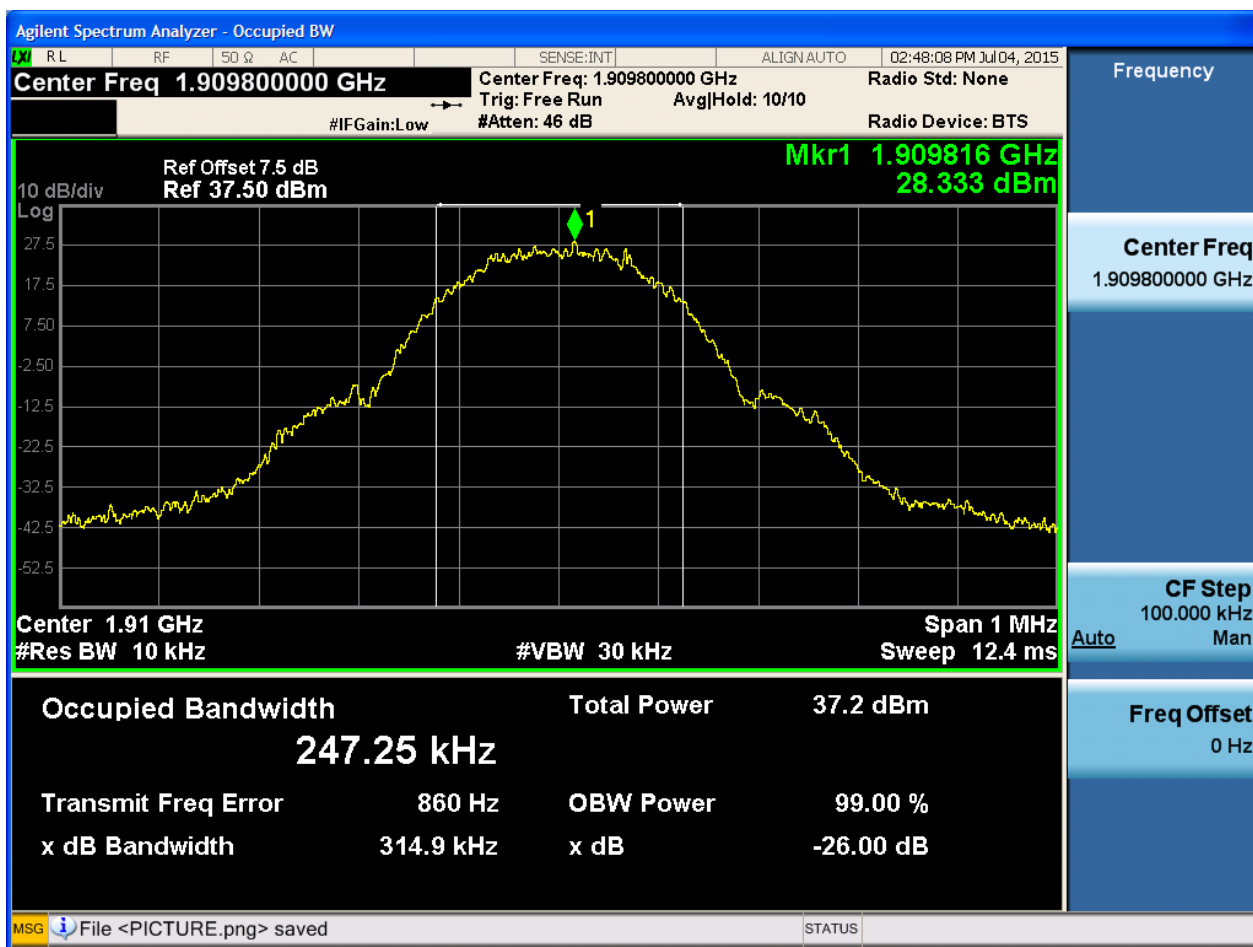


4.1.2.1.2 Test Channel = MCH





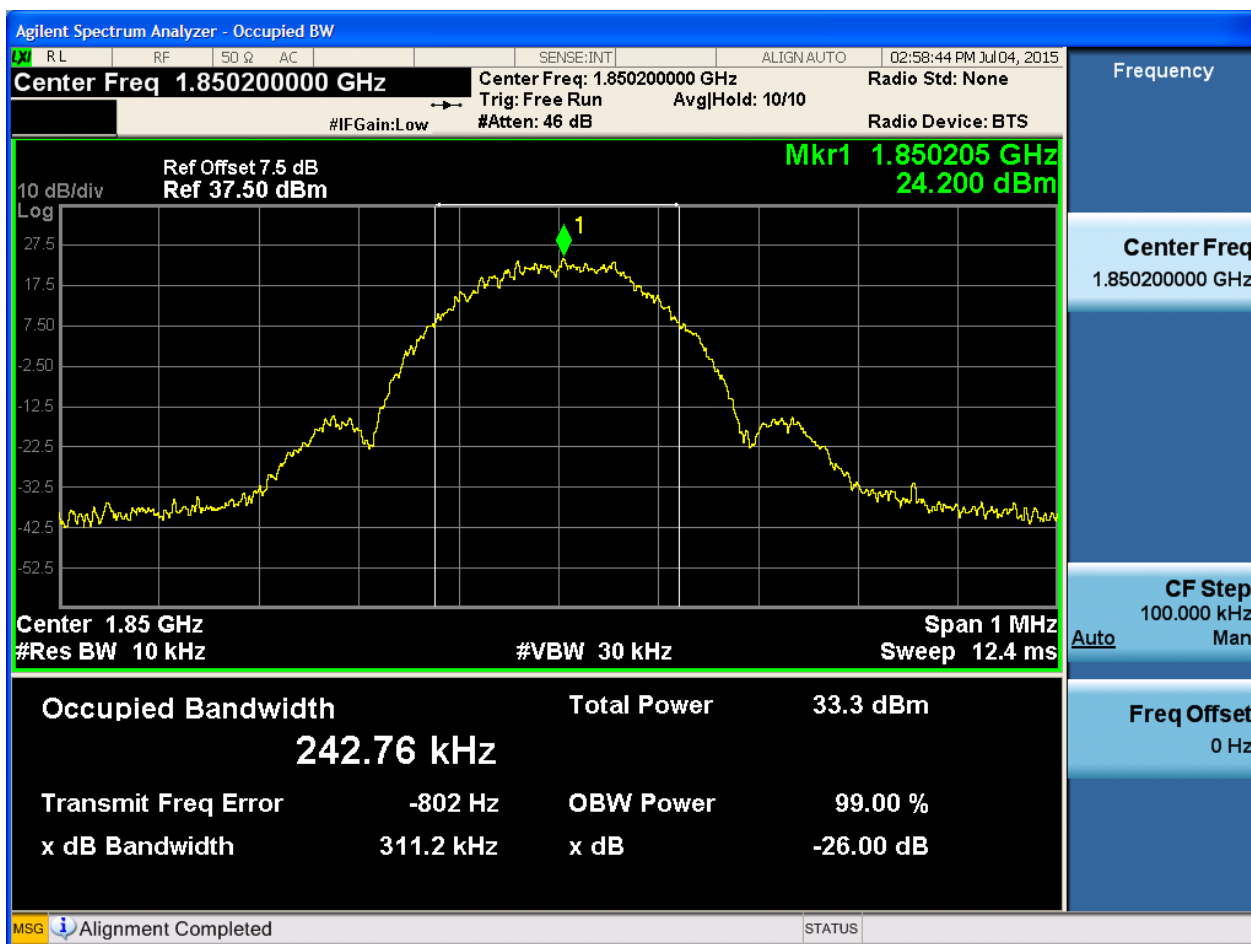
4.1.2.1.3 Test Channel = HCH





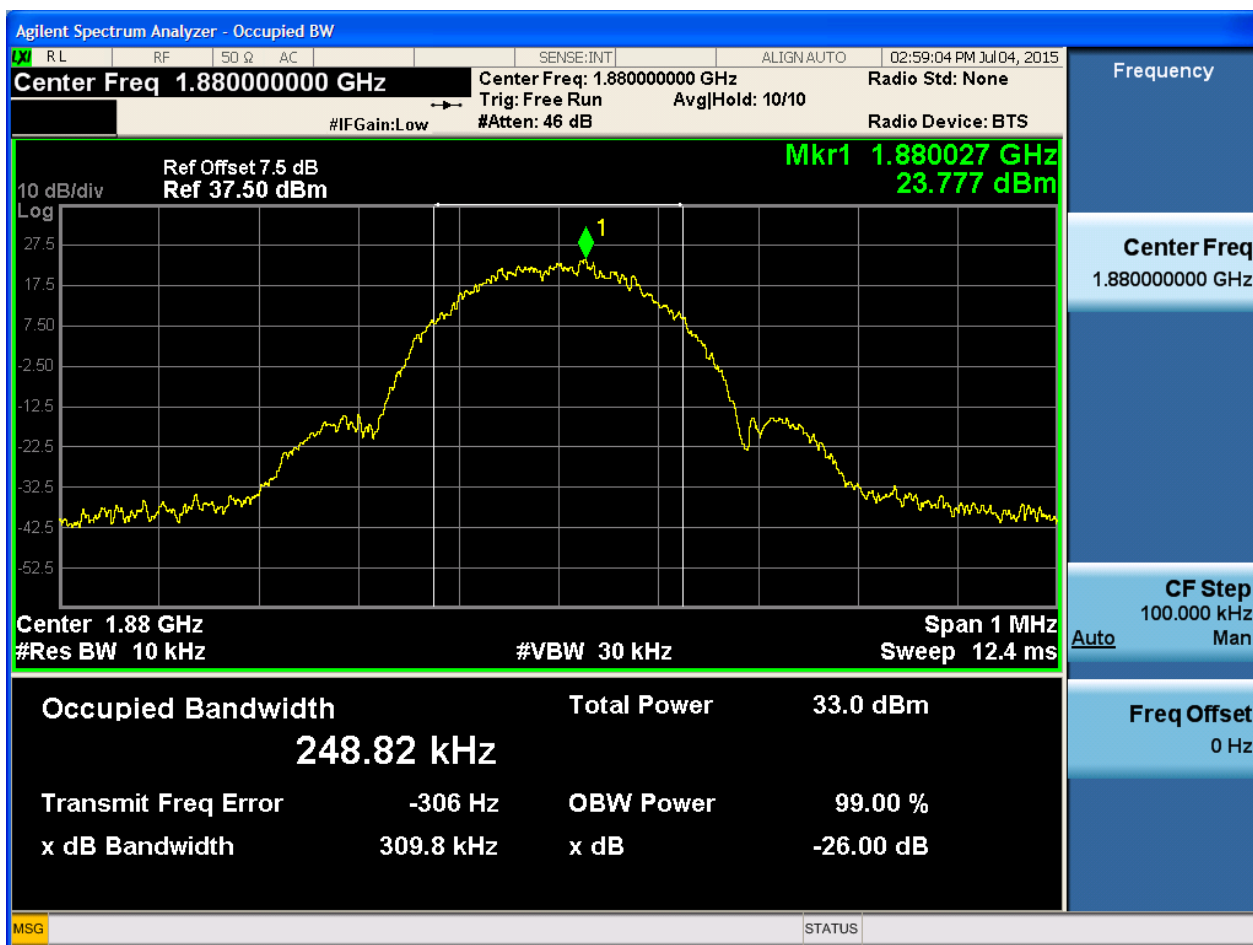
4.1.2.2 Test Mode = GSM/TM2

4.1.2.2.1 Test Channel = LCH



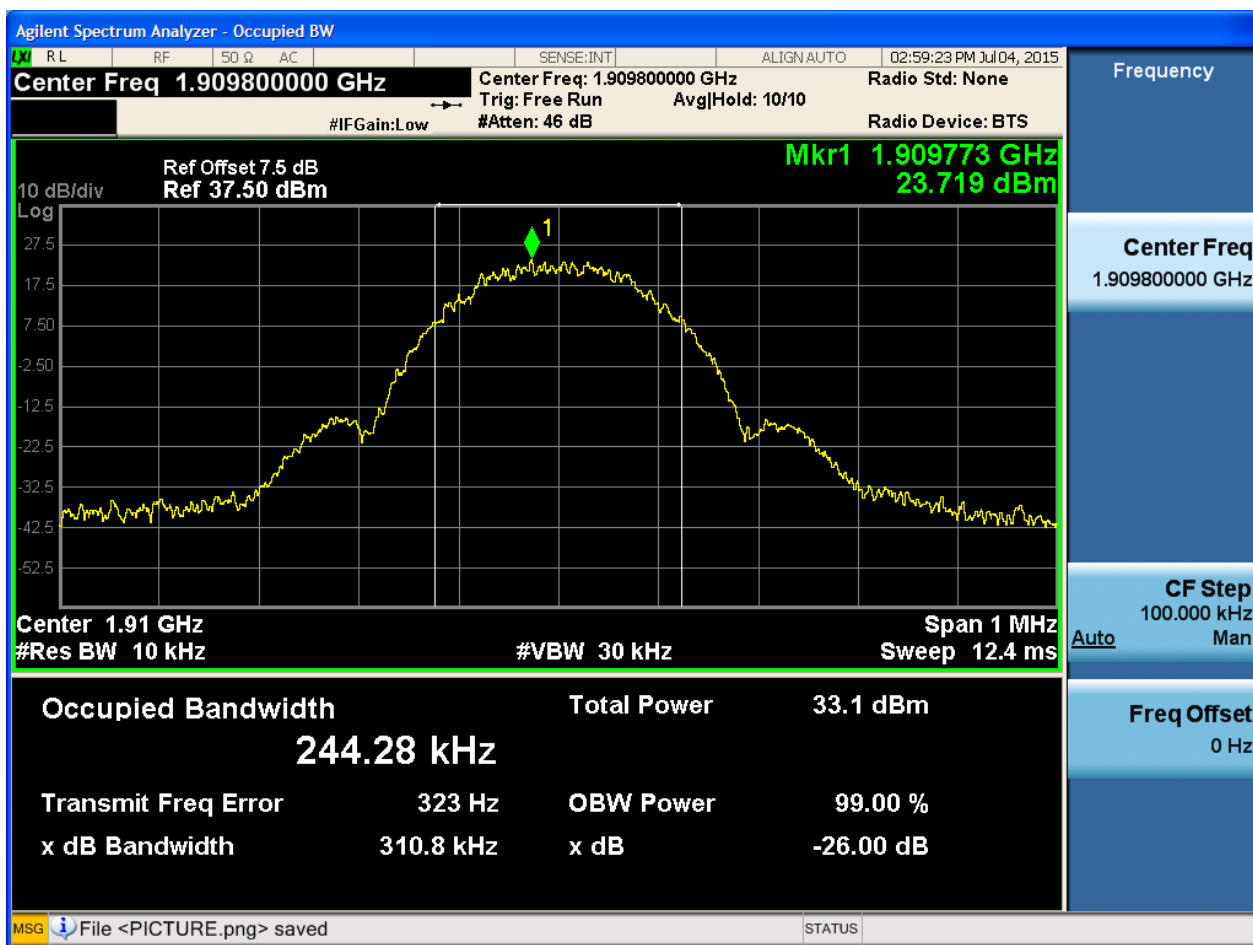


4.1.2.2.2 Test Channel = MCH





4.1.2.2.3 Test Channel = HCH

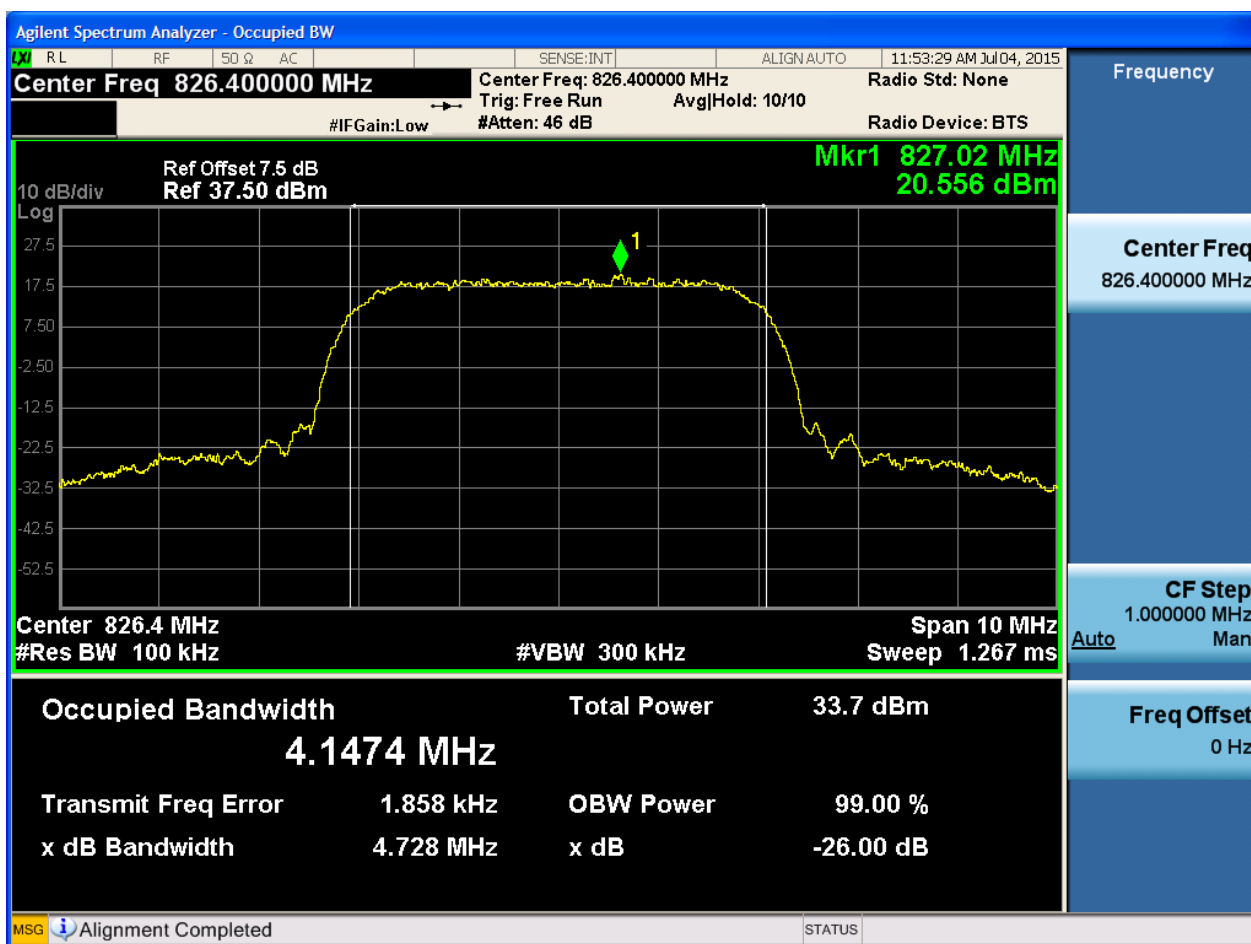


4.2 For UMTS

4.2.1 Test Band = WCDMA850

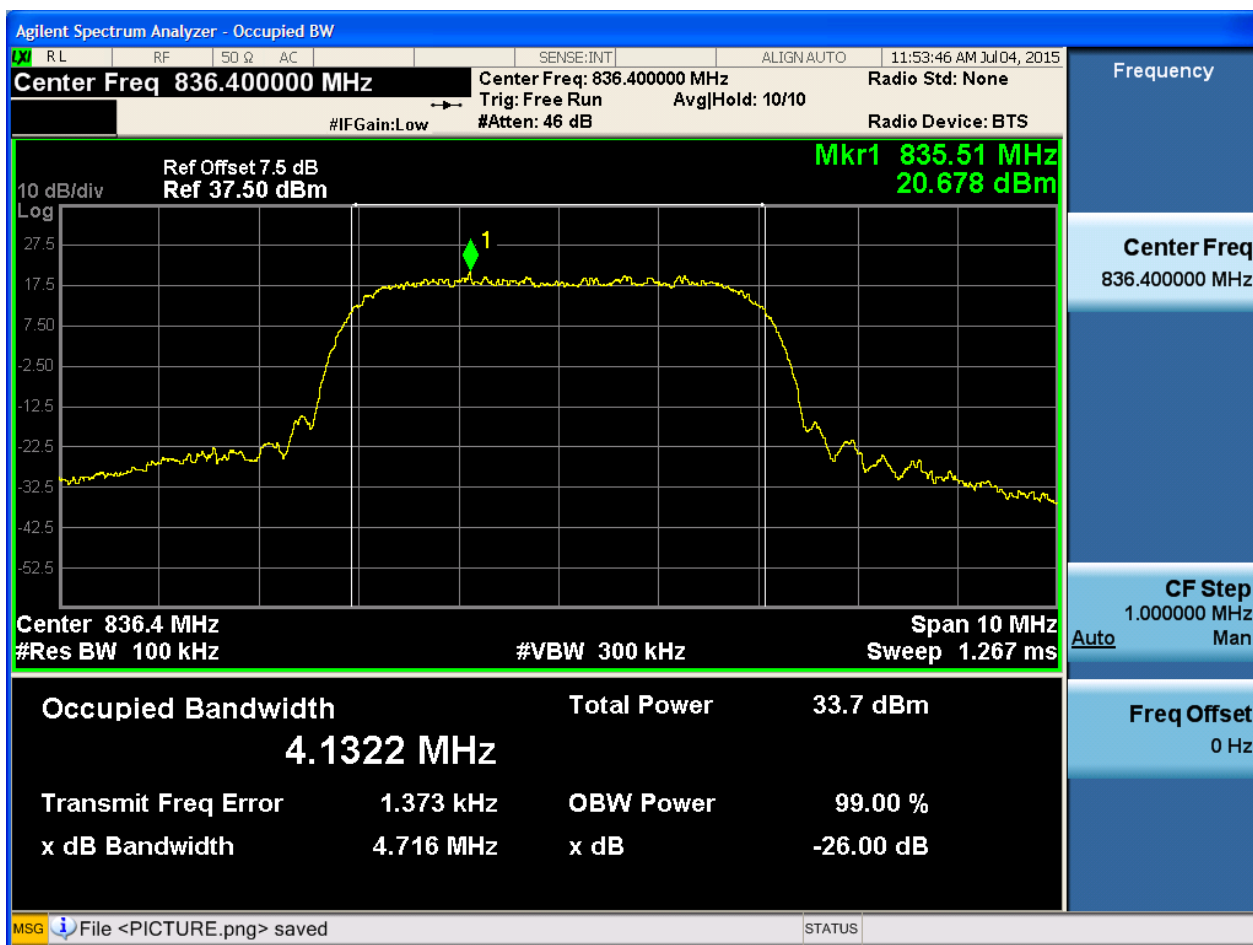
4.2.1.1 Test Mode = UMTS/TM1

4.2.1.1.1 Test Channel = LCH



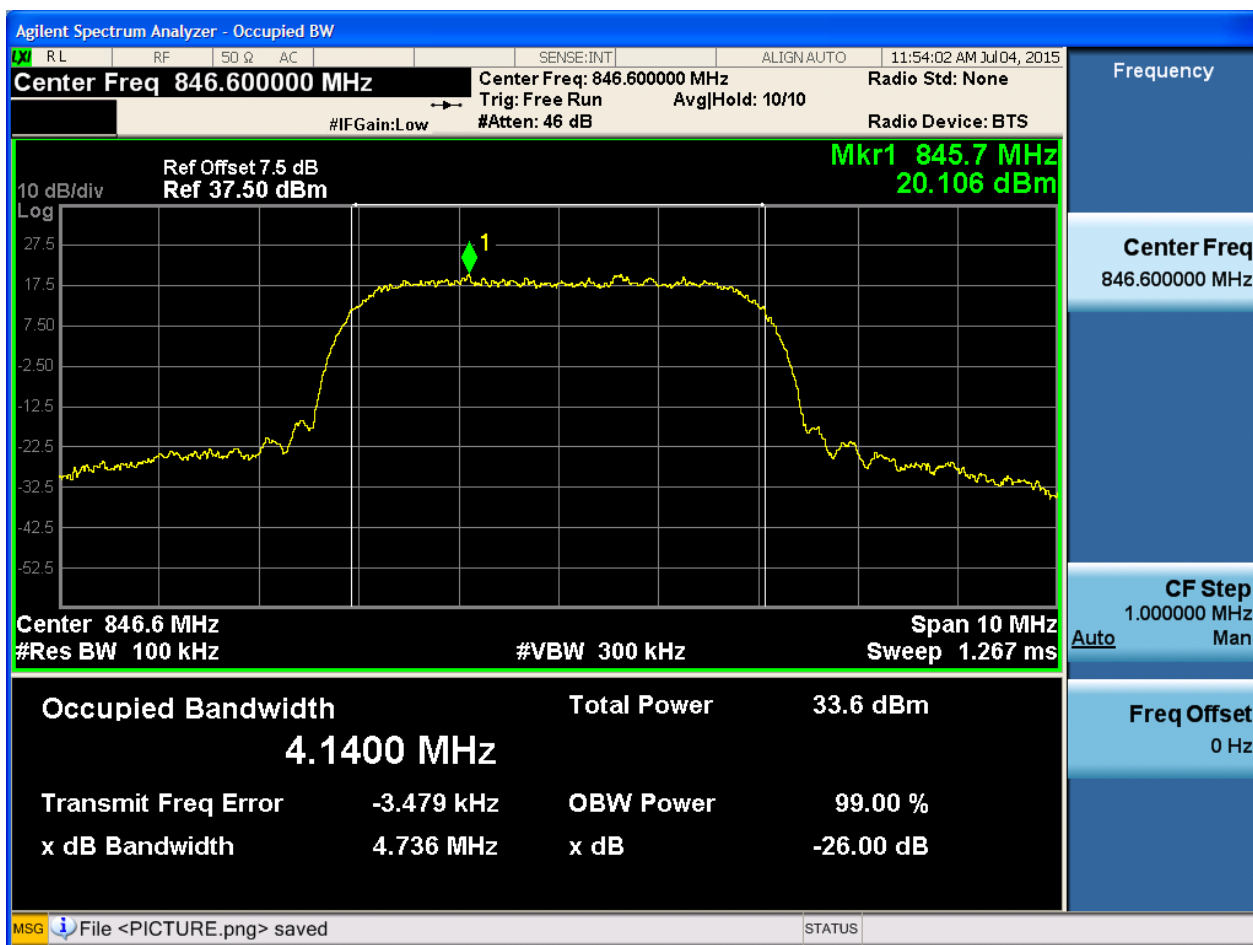


4.2.1.1.2 Test Channel = MCH





4.2.1.1.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

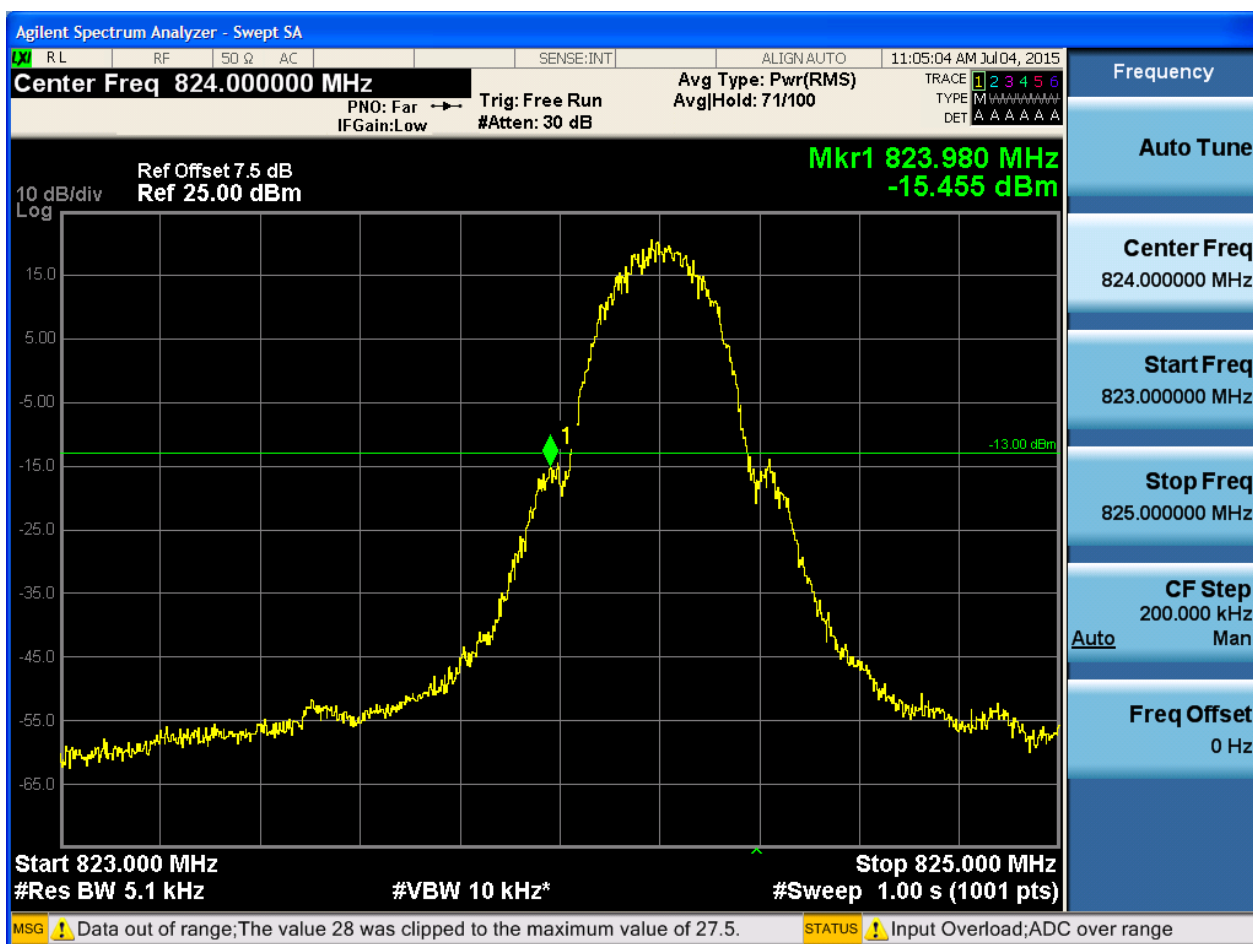
Part I - Test Plots

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





Agilent Spectrum Analyzer - Swept SA

Center Freq 849.000000 MHz

Ref Offset 7.5 dB
Ref 25.00 dBm

10 dB/div
Log

Mkr1 849.020 MHz
-14.041 dBm

Start 848.000 MHz
#Res BW 5.1 kHz

Stop 850.000 MHz
#Sweep 1.00 s (1001 pts)

#VBW 10 kHz*

MSG Data out of range;The value 28 was clipped to the maximum value of 27.5.

STATUS Input Overload;ADC over range

Frequency

Auto Tune

Center Freq
849.000000 MHz

Start Freq
848.000000 MHz

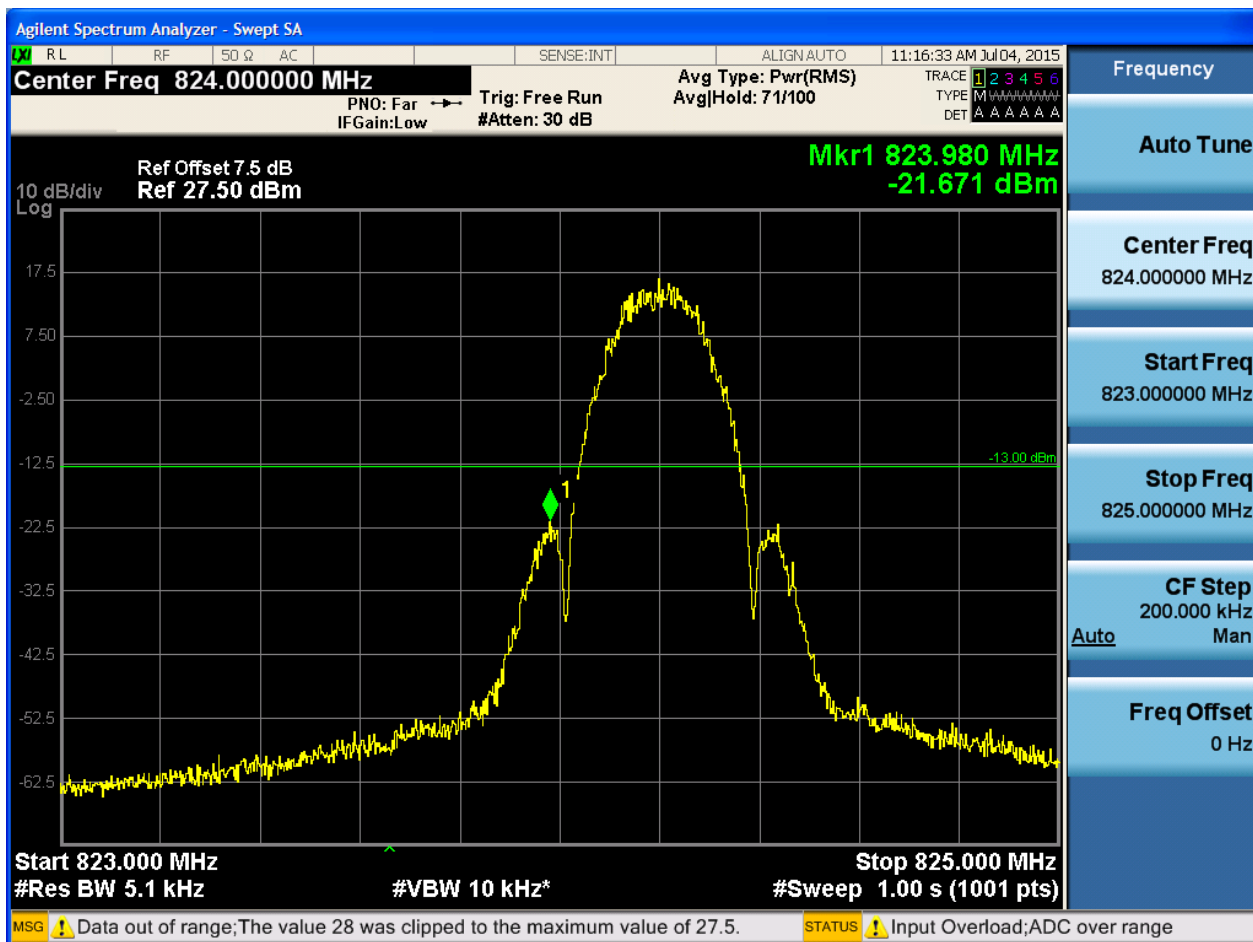
Stop Freq
850.000000 MHz

CF Step
200.000 kHz
Man

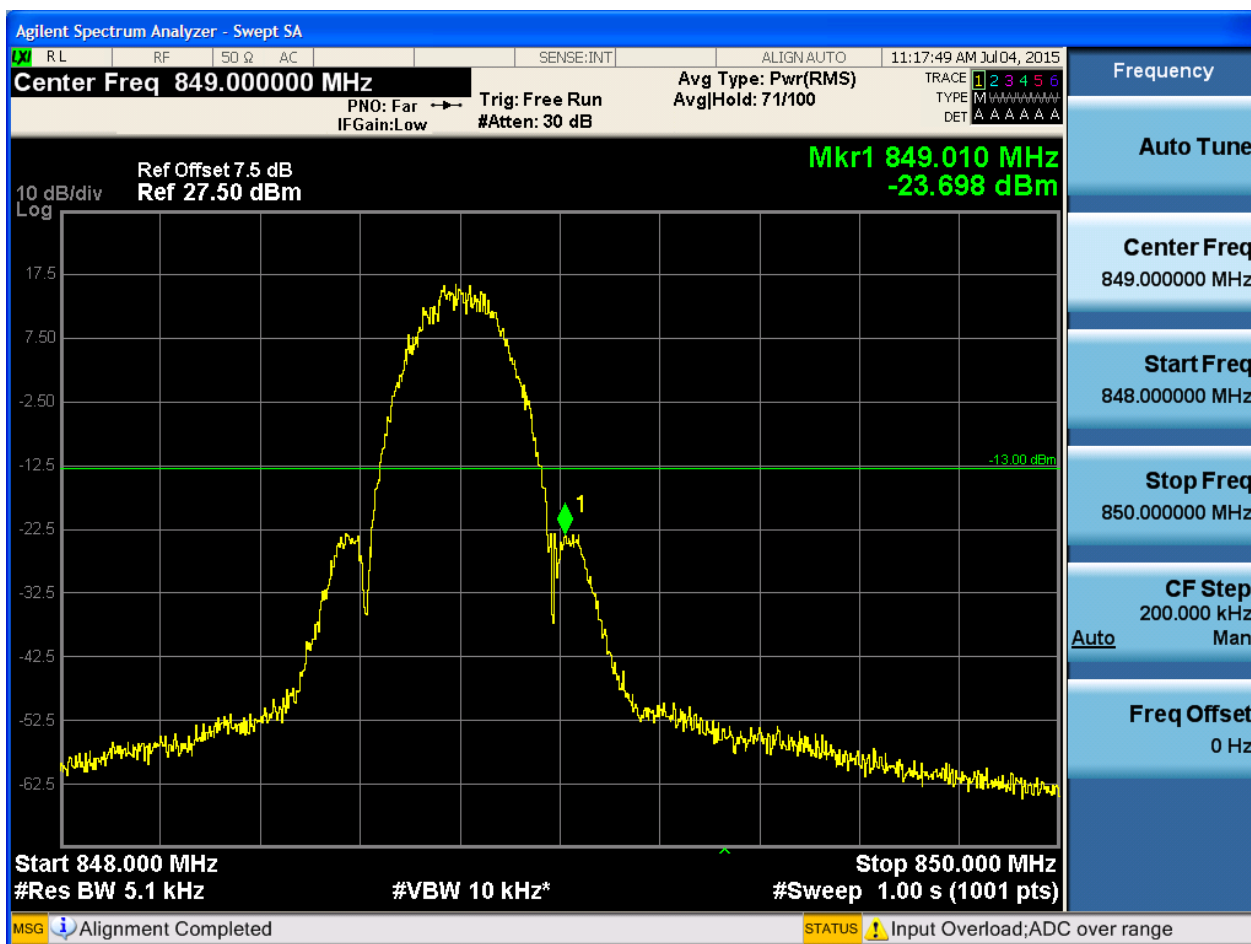
Freq Offset
0 Hz

5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



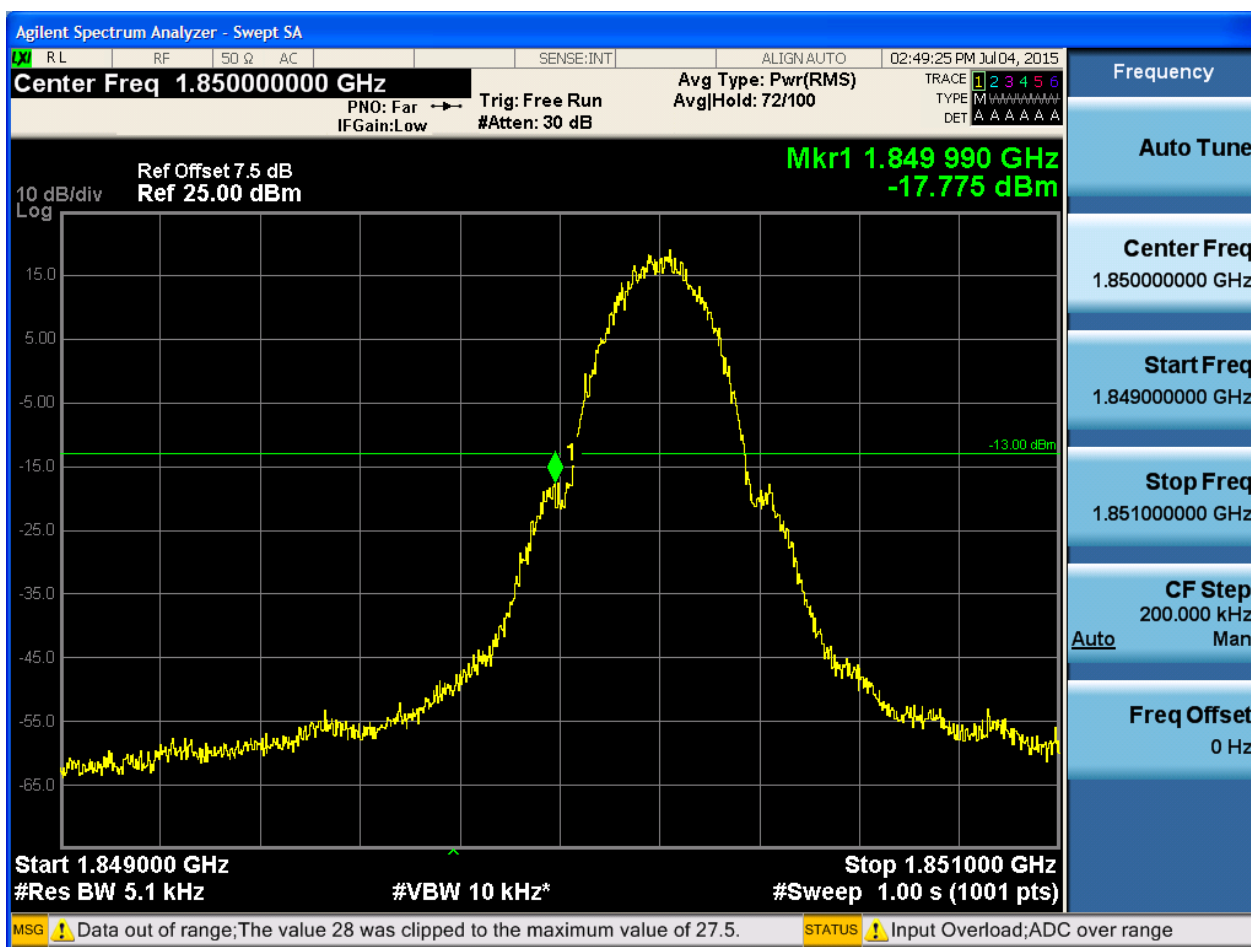
5.1.1.2.2 Test Channel = HCH



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 7.5 dB
Ref 25.00 dBm

10 dB/div
Log

Mkr1 1.910 020 GHz
-19.914 dBm

Start 1.909000 GHz
#Res BW 5.1 kHz

Stop 1.911000 GHz
#Sweep 1.00 s (1001 pts)

#VBW 10 kHz*

MSG Data out of range;The value 28 was clipped to the maximum value of 27.5.

STATUS Input Overload;ADC over range

Frequency

Auto Tune

Center Freq
1.91000000 GHz

Start Freq
1.909000000 GHz

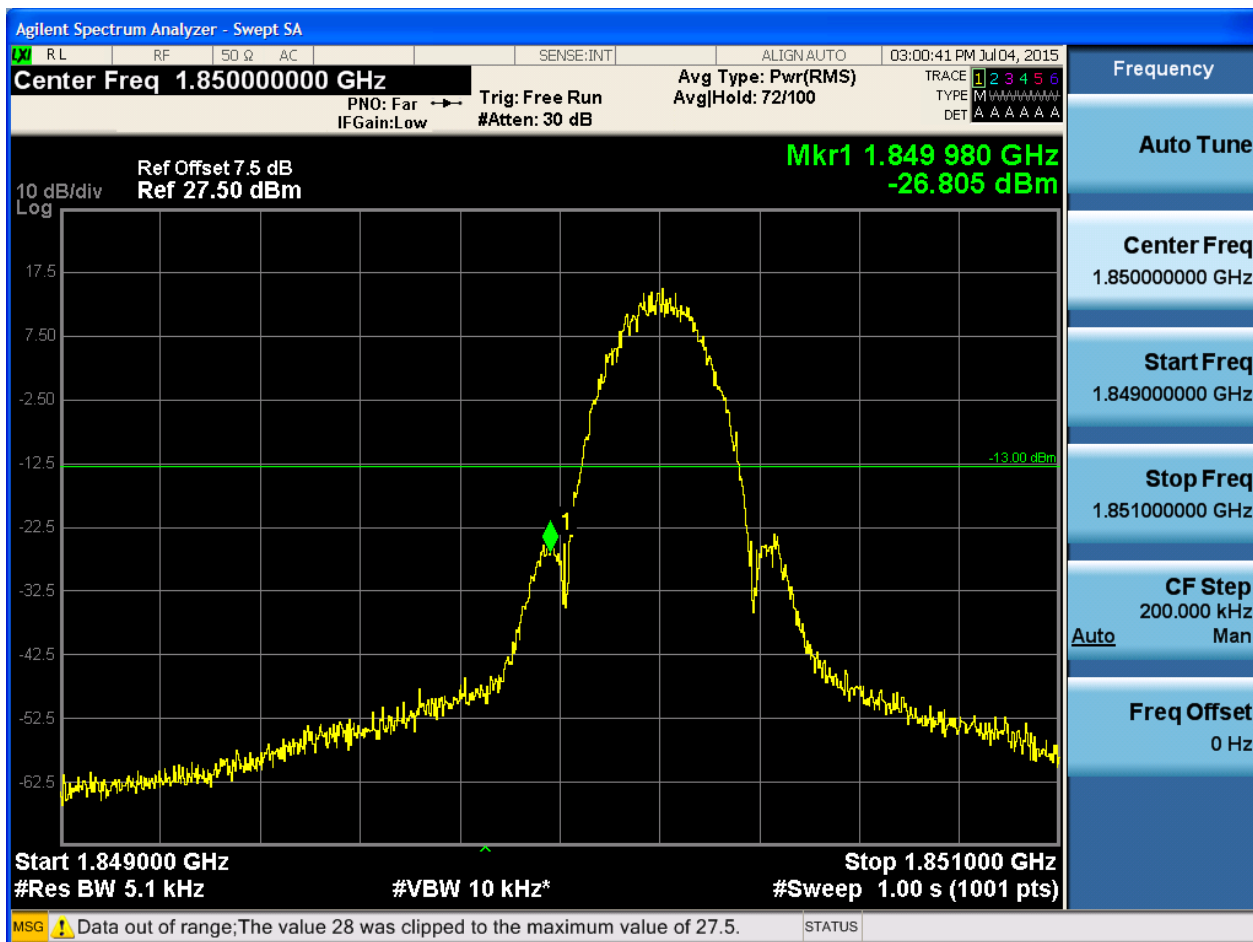
Stop Freq
1.911000000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH





Agilent Spectrum Analyzer - Swept SA

Center Freq 1.91000000 GHz

Ref Offset 7.5 dB
Ref 27.50 dBm

10 dB/div
Log

Mkr1 1.910 020 GHz
-25.318 dBm

Start 1.909000 GHz
#Res BW 5.1 kHz

Stop 1.911000 GHz
#Sweep 1.00 s (1001 pts)

#VBW 10 kHz*

Trig: Free Run
#Atten: 30 dB

PNO: Far
IFGain: Low

Avg Type: Pwr(RMS)
AvgHold: 71/100

TRACE 1 2 3 4 5 6
TYPE [M] [M] [M] [M] [M] [M]
DET A A A A A A

Frequency

Auto Tune

Center Freq
1.91000000 GHz

Start Freq
1.90900000 GHz

Stop Freq
1.91100000 GHz

CF Step
200.000 kHz
Man

Freq Offset
0 Hz

MSG File <PICTURE.png> saved

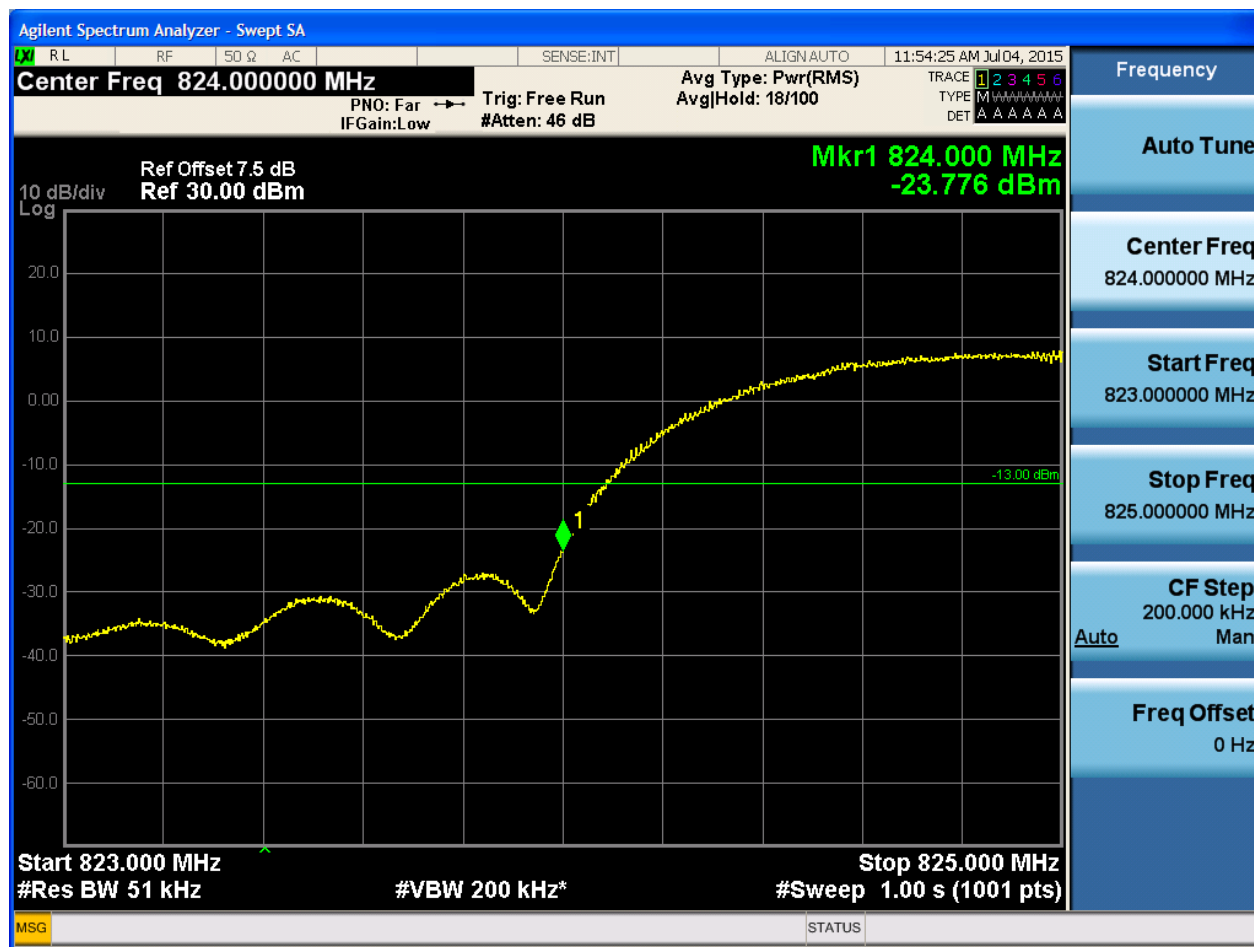
STATUS

5.2 For UMTS

5.2.1 Test Band = WCDMA850

5.2.1.1 Test Mode = UMTS/TM1

5.2.1.1.1 Test Channel = LCH



5.2.1.1.2 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.

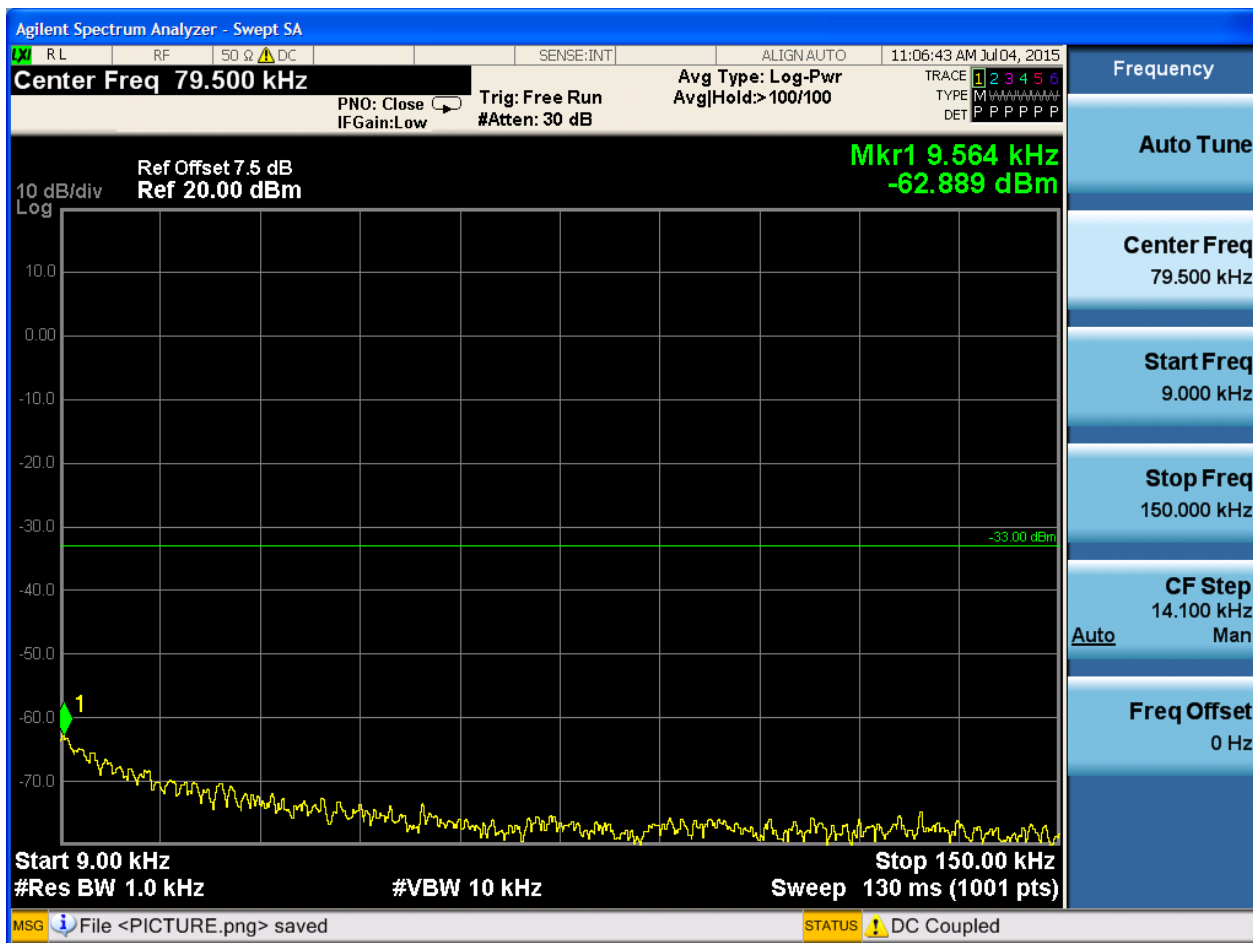
Part I - Test Plots

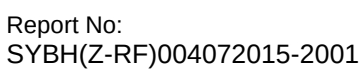
6.1 For GSM

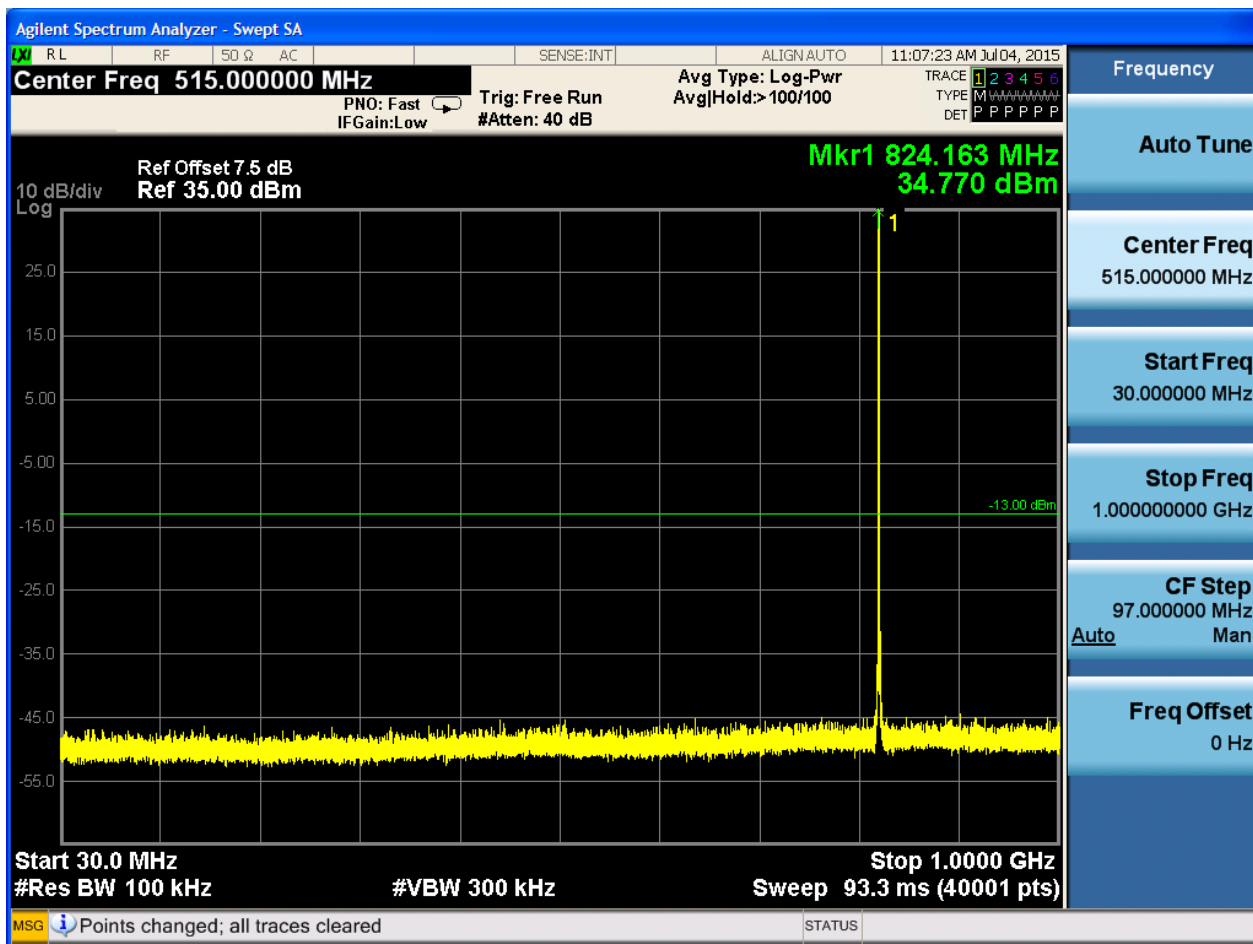
6.1.1 Test Band = GSM850

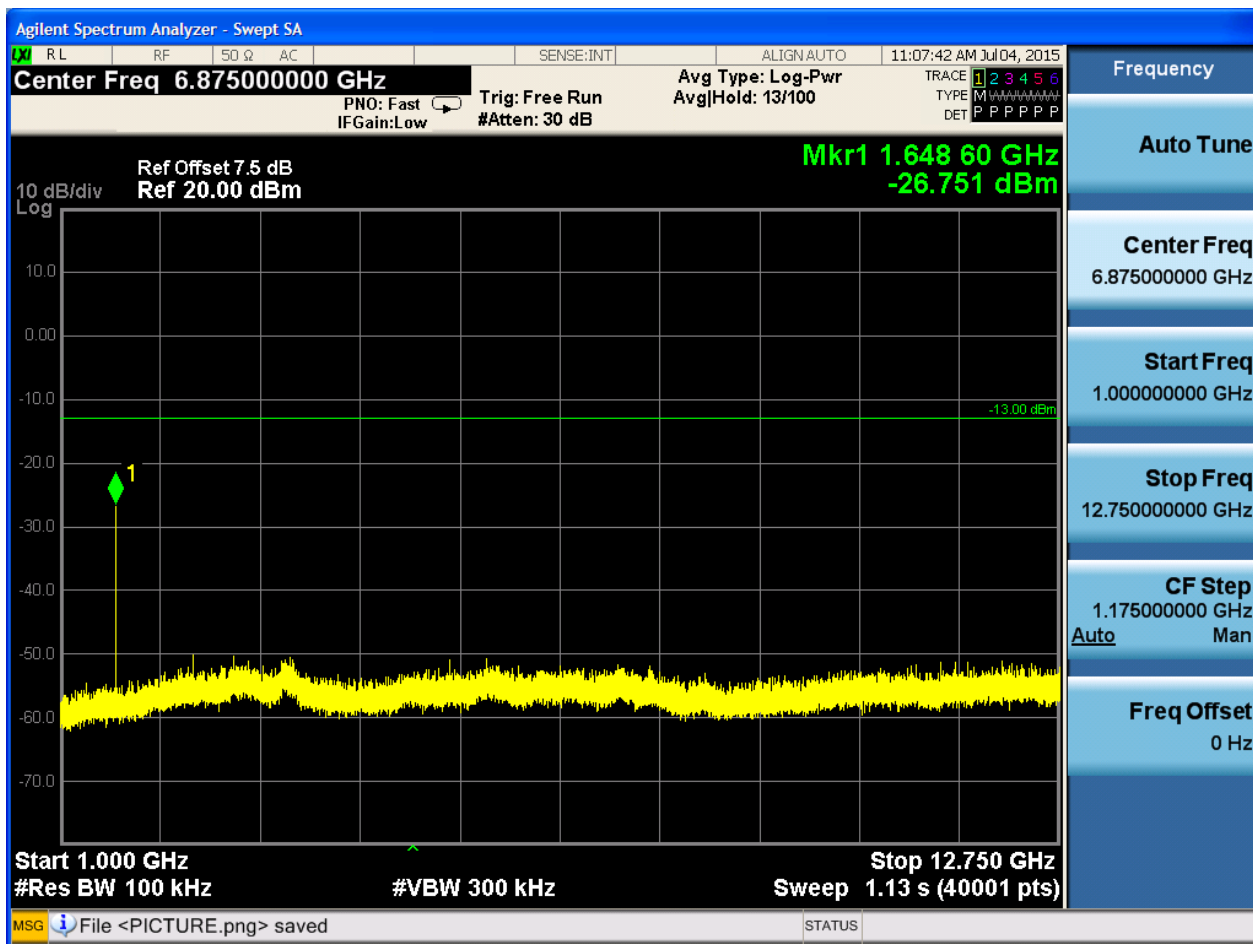
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



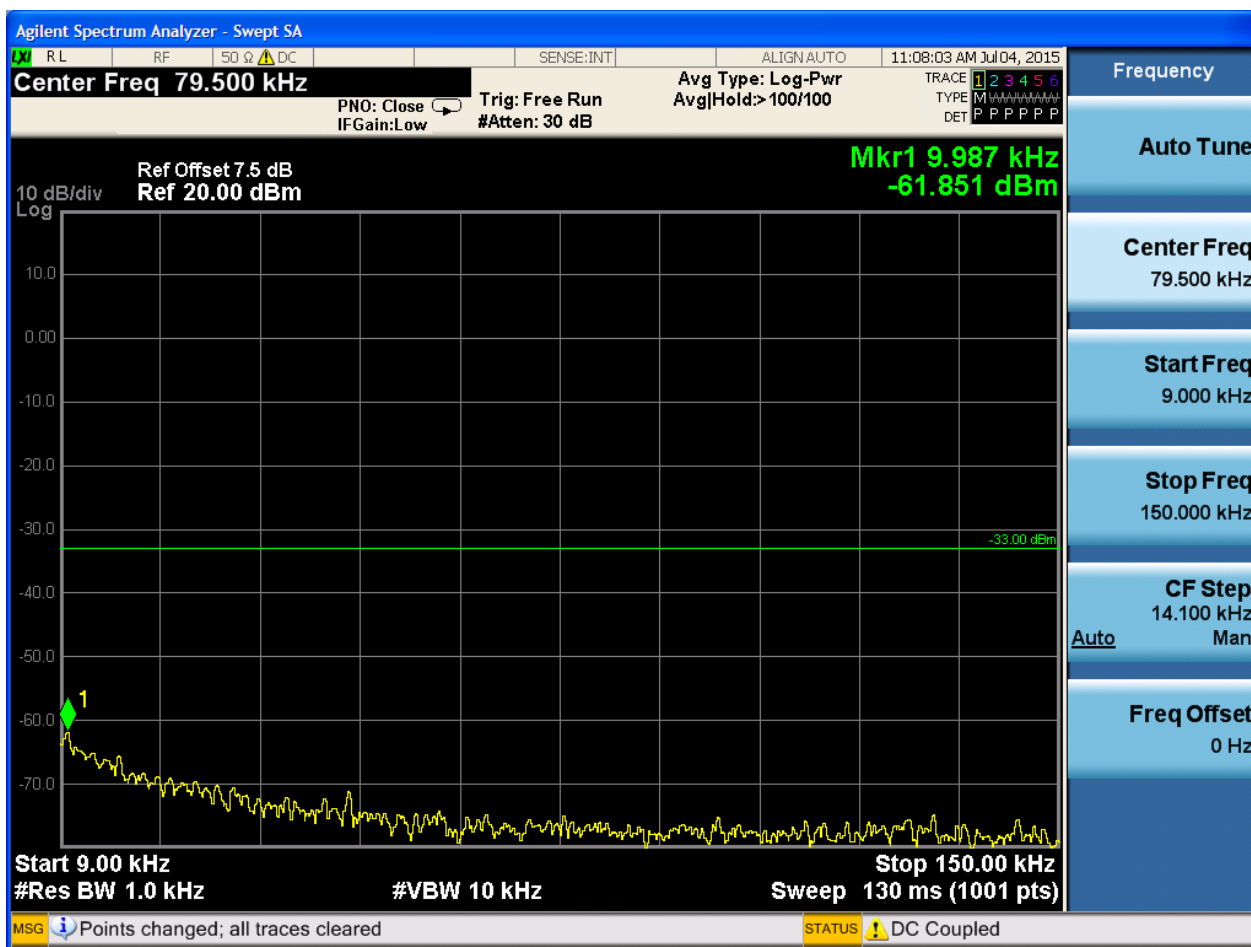


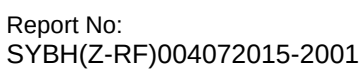


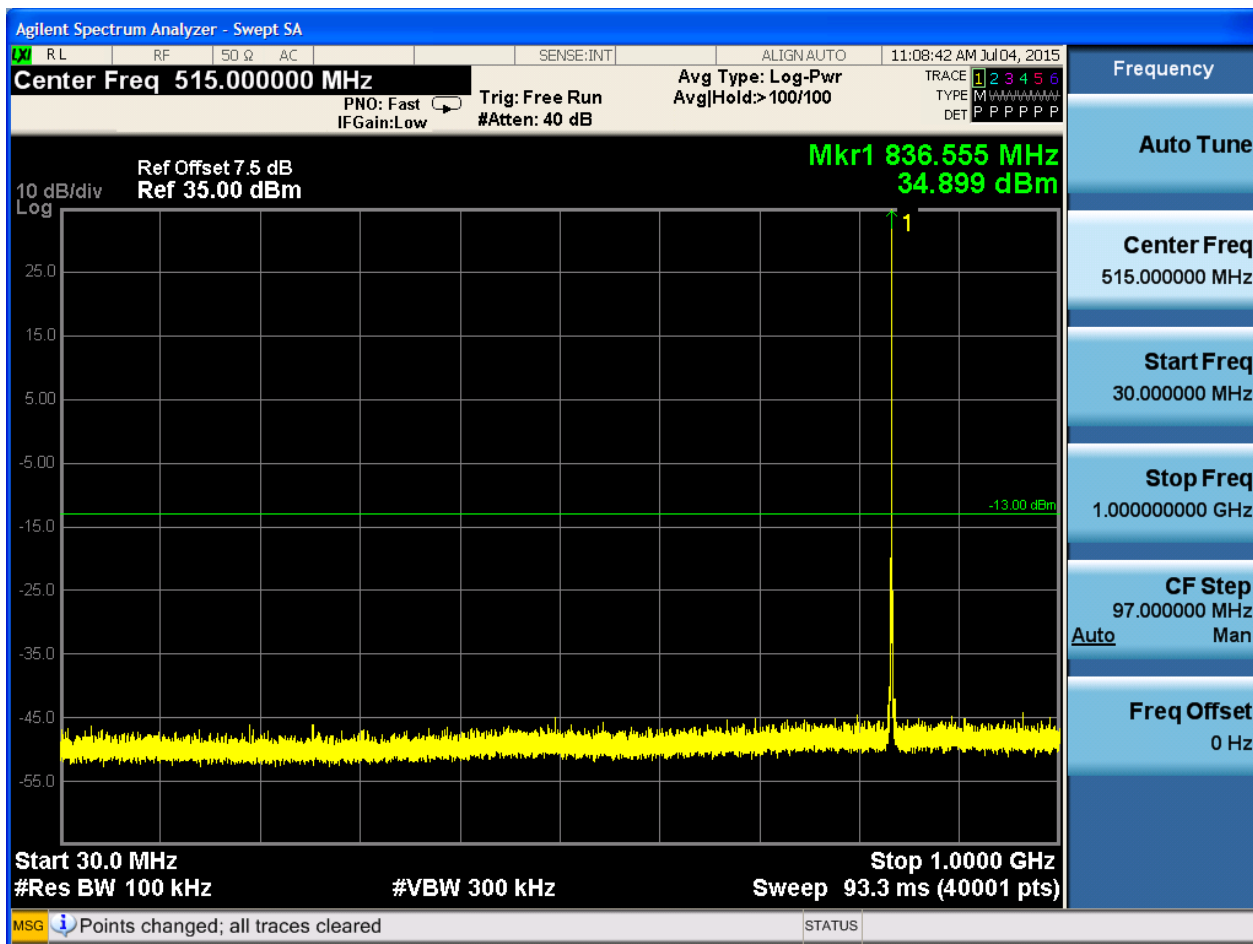


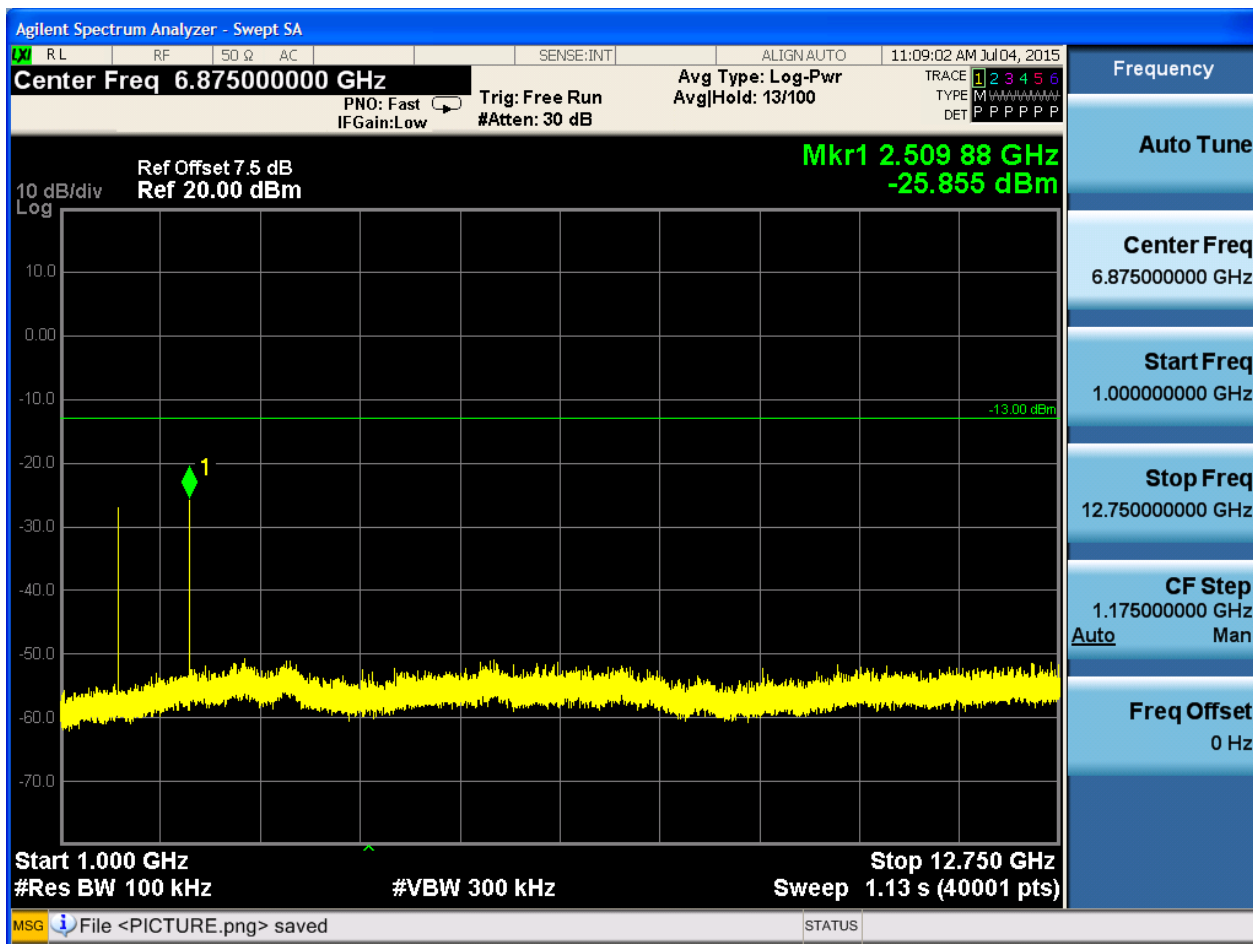


6.1.1.1.2 Test Channel = MCH

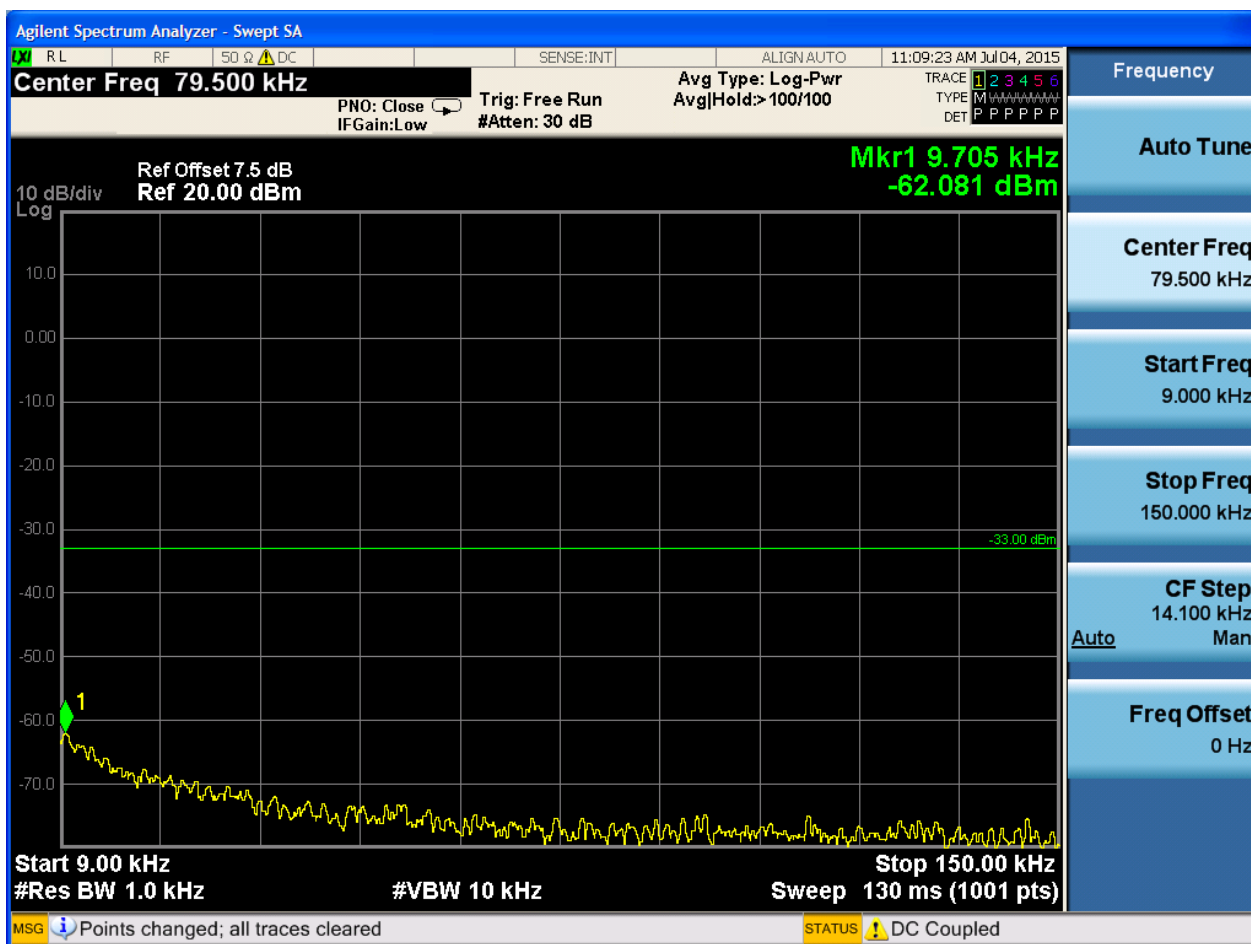


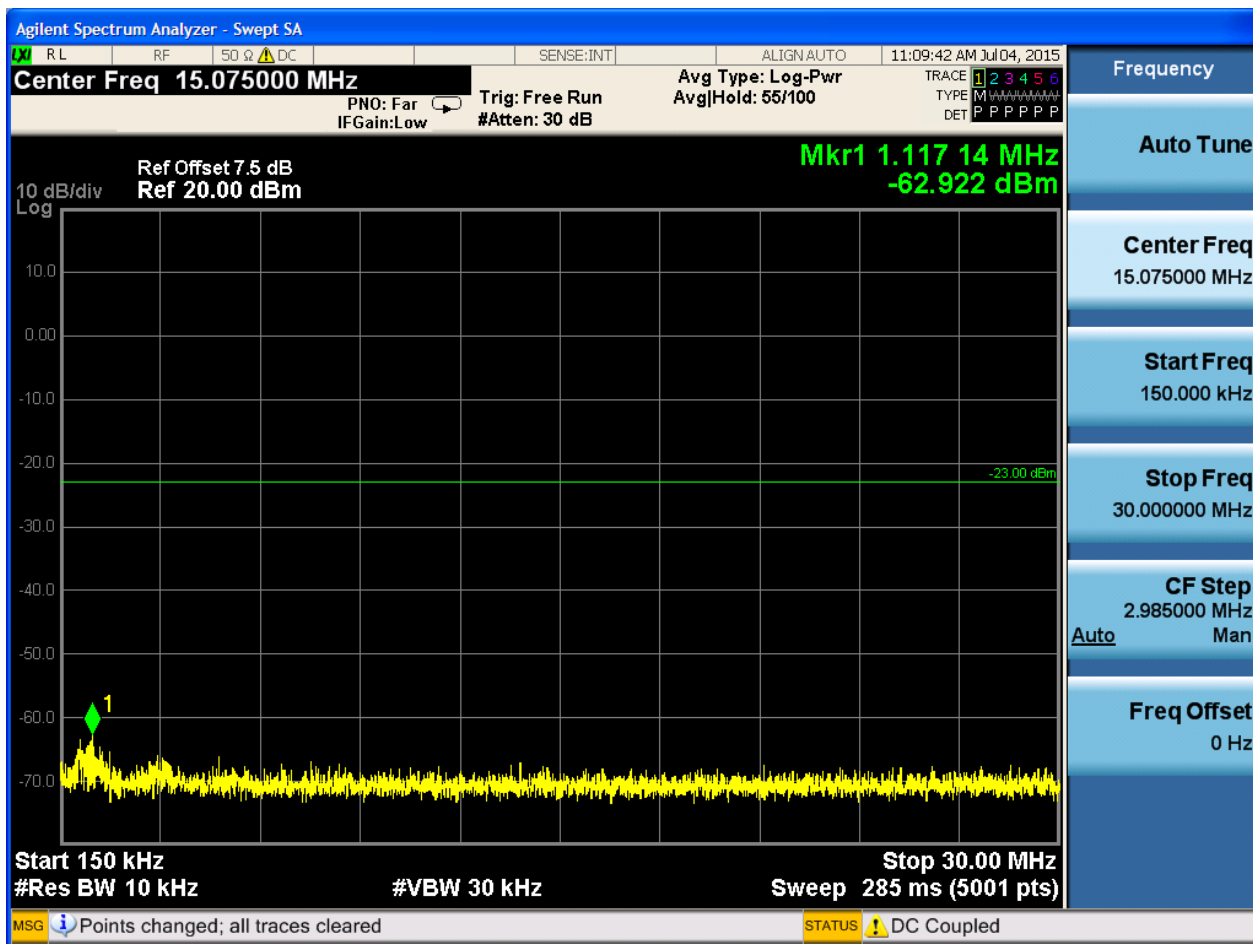


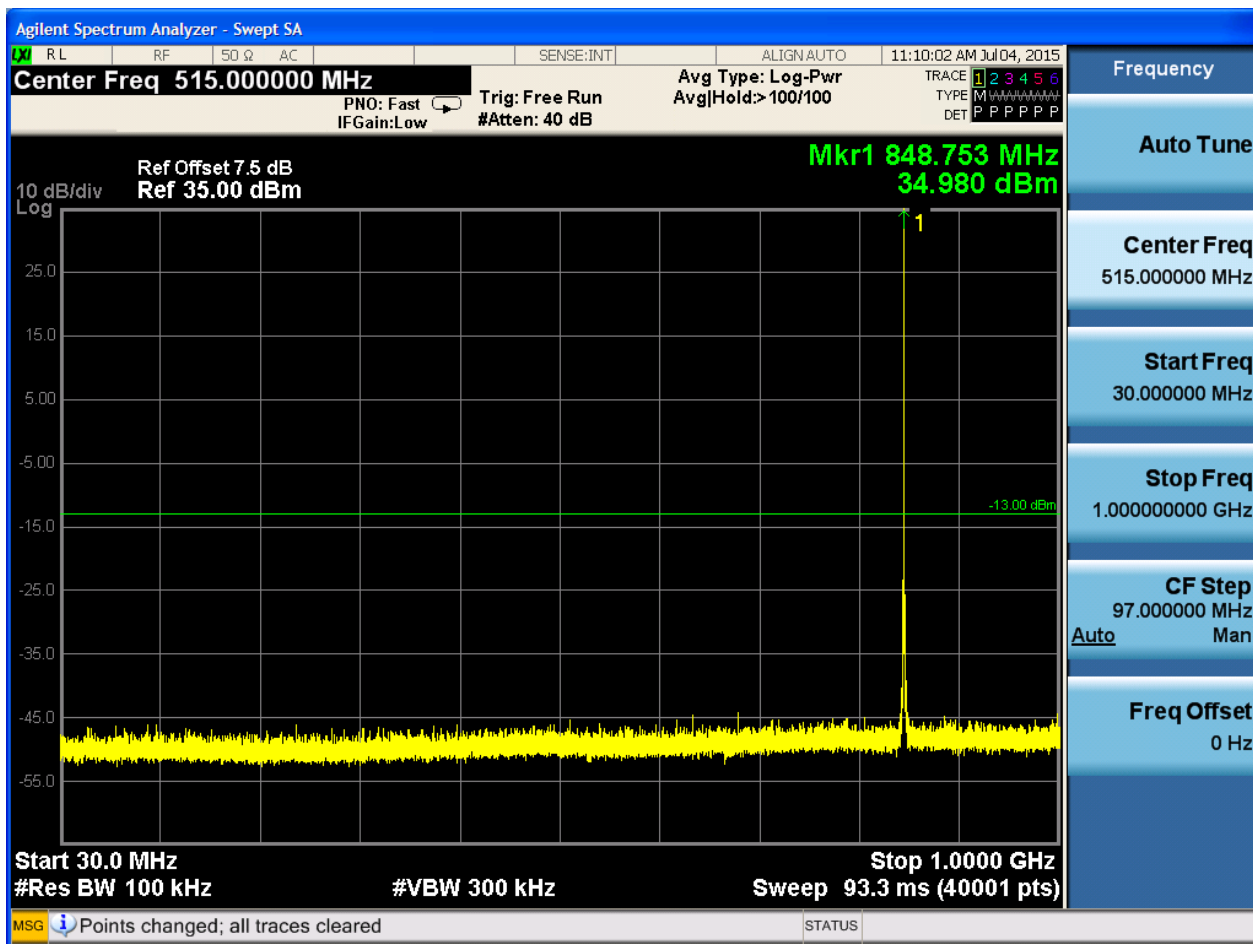


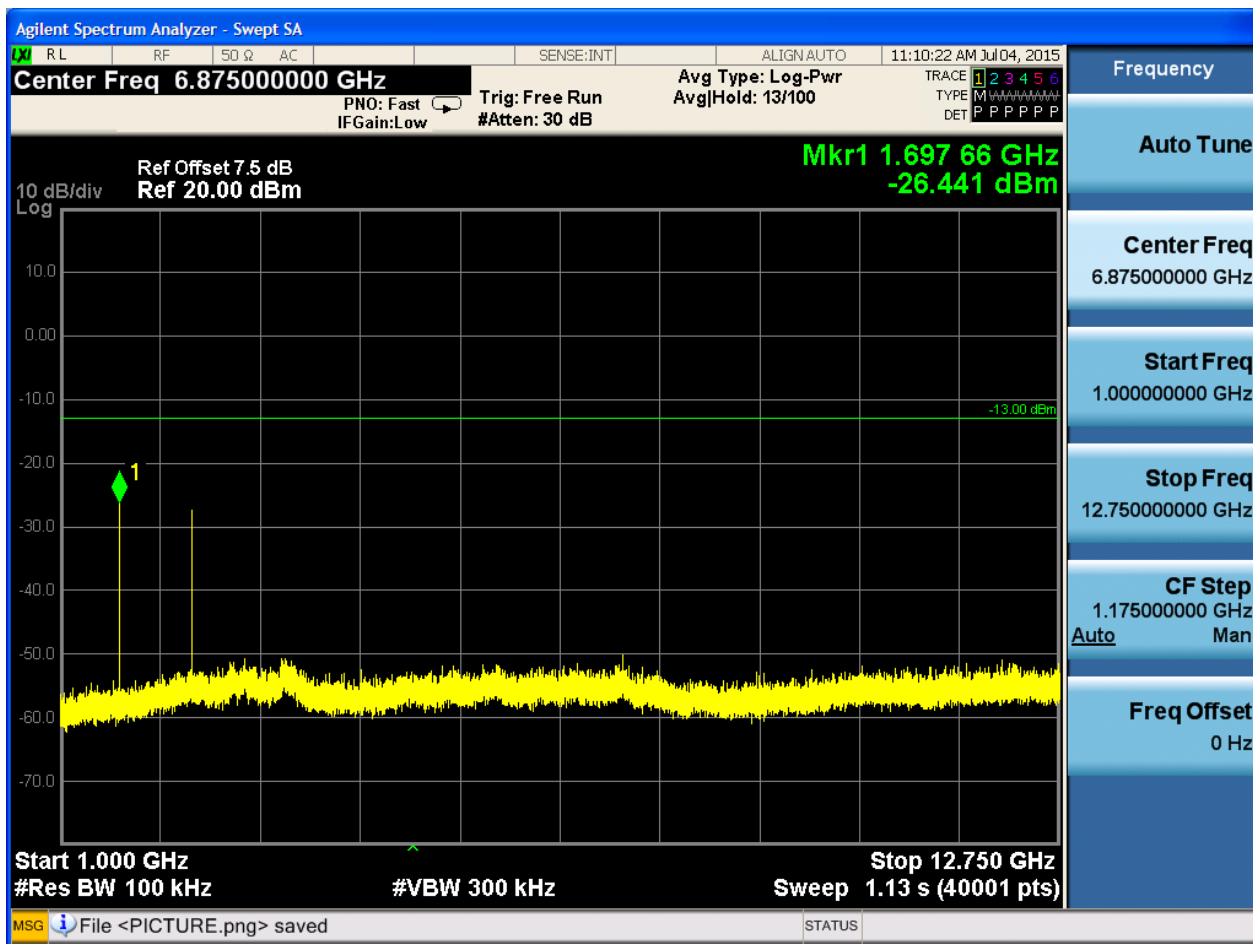


6.1.1.1.3 Test Channel = HCH



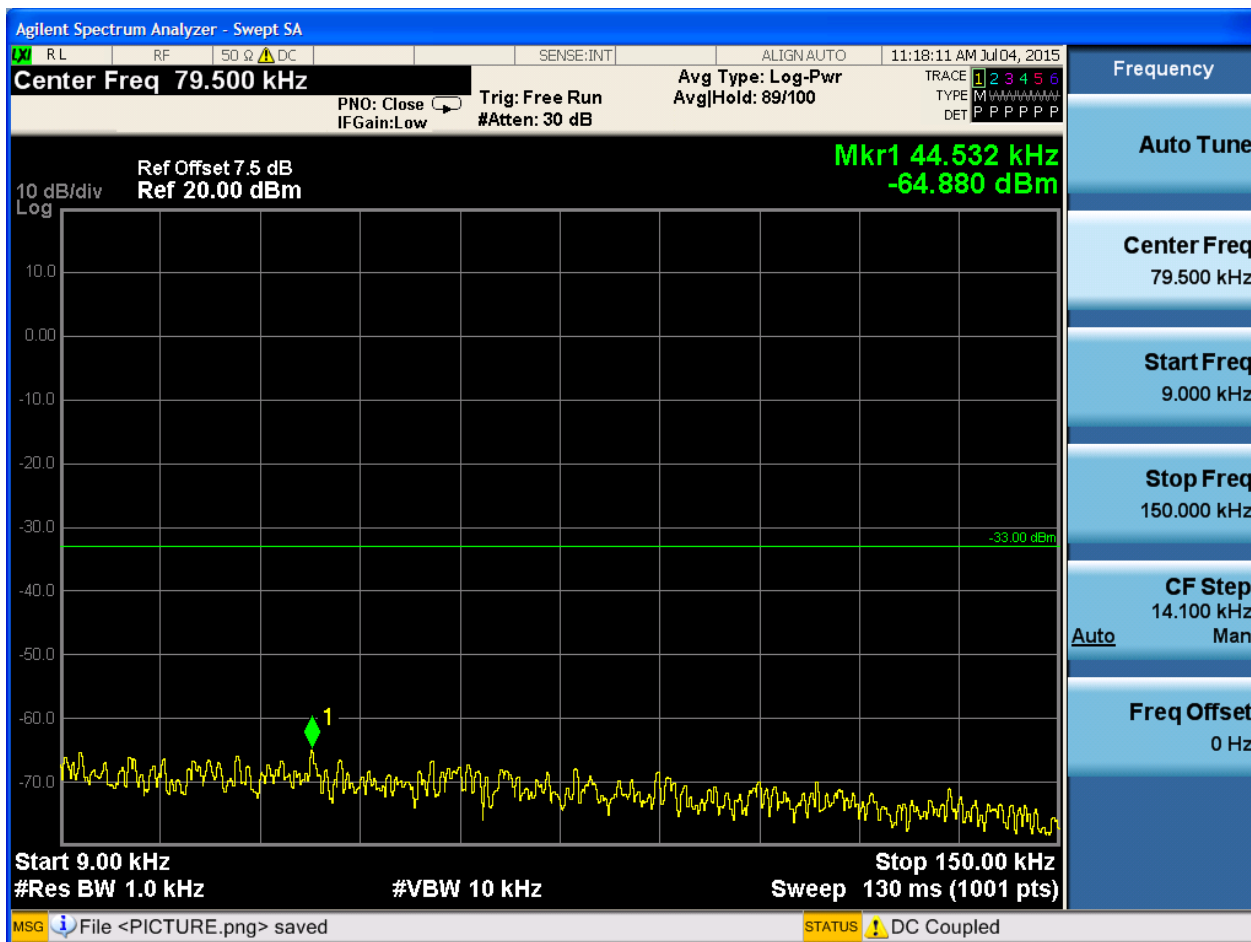


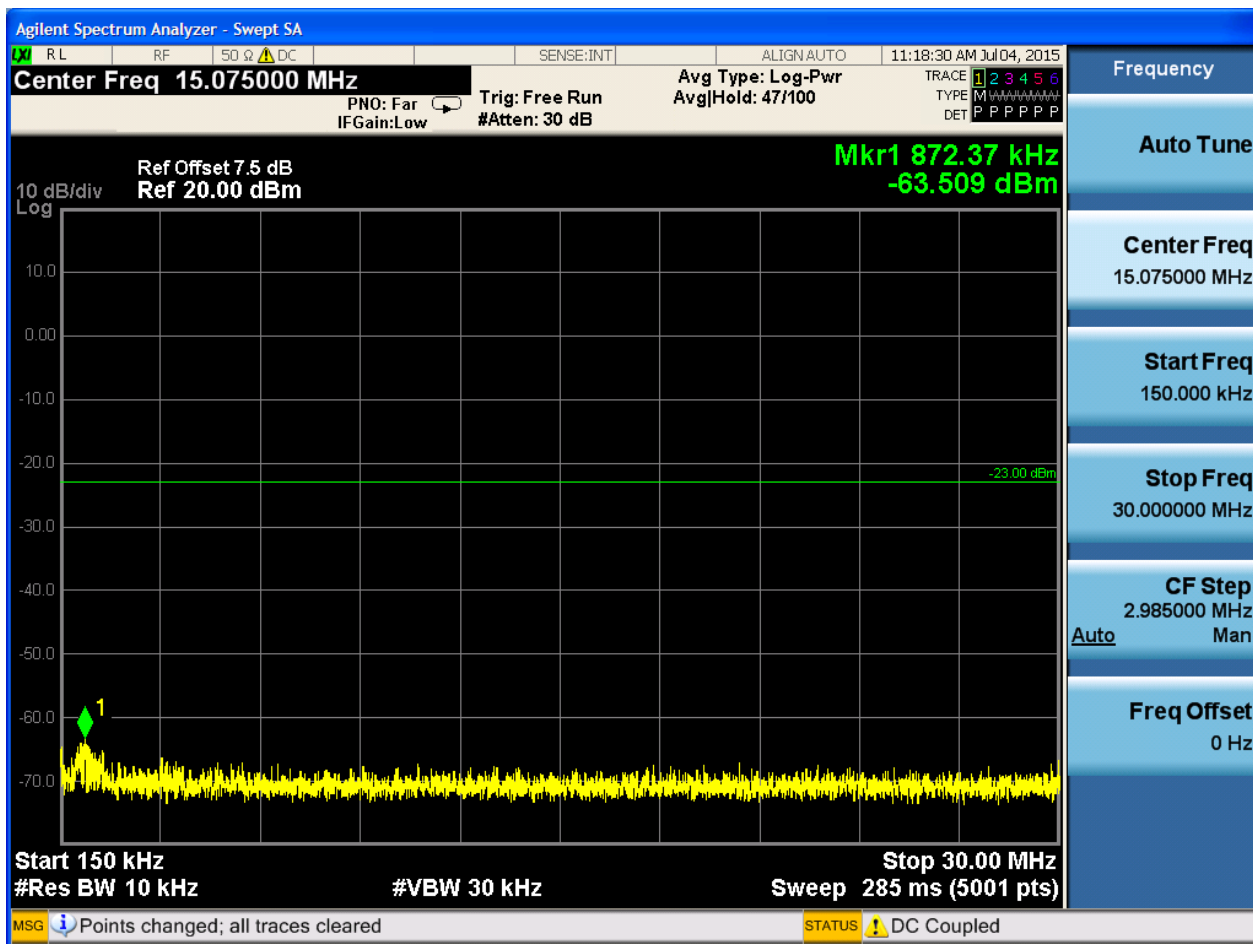


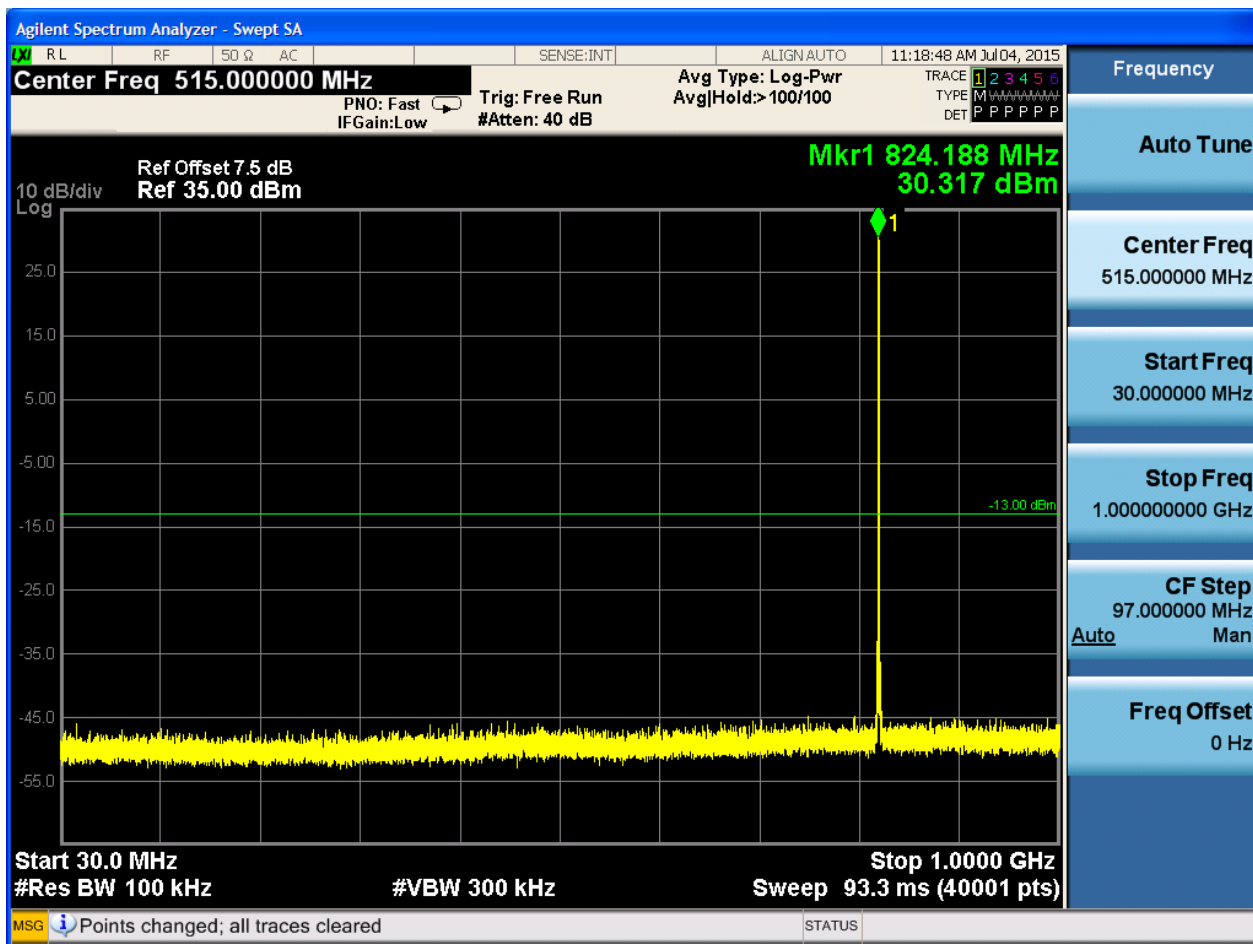


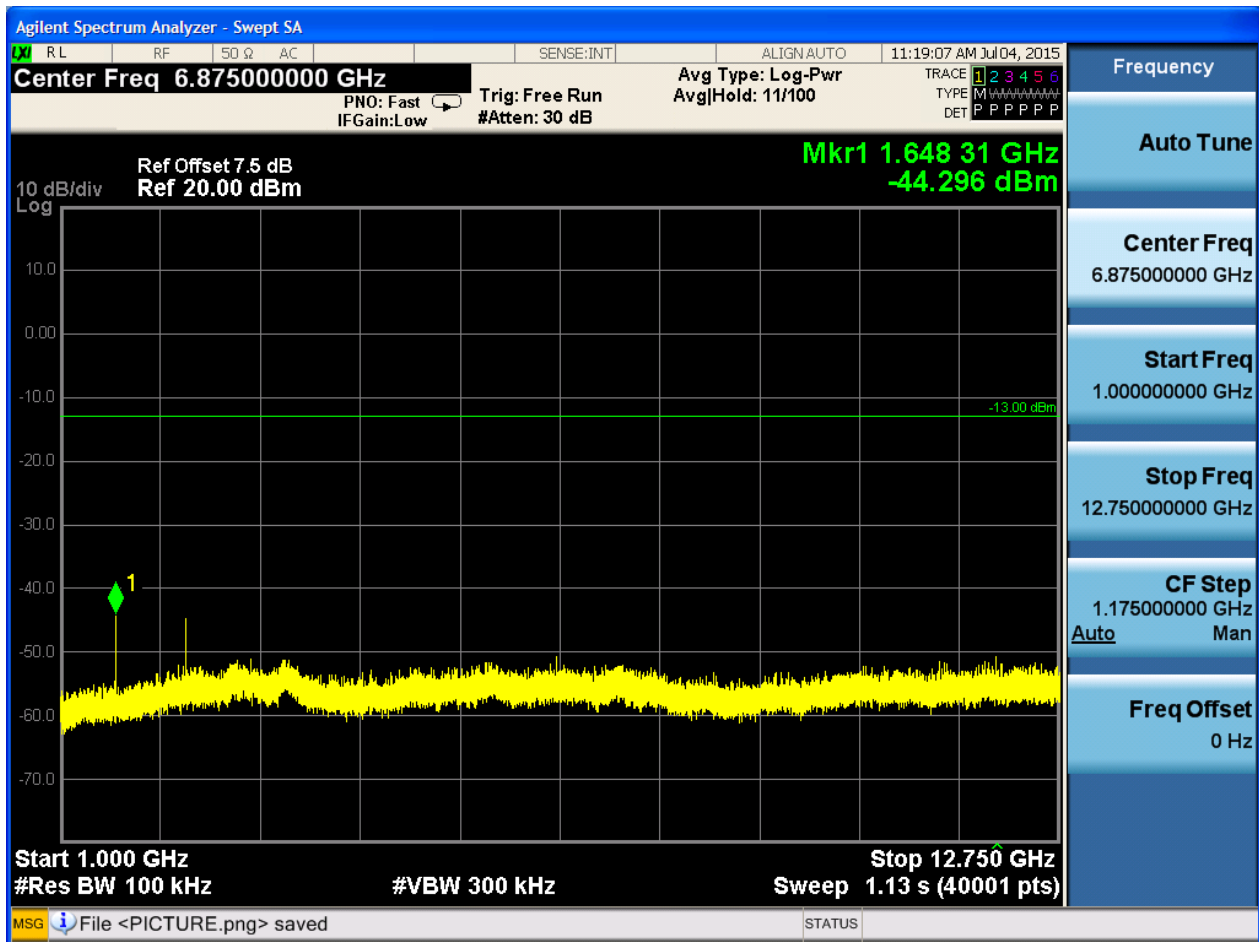
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

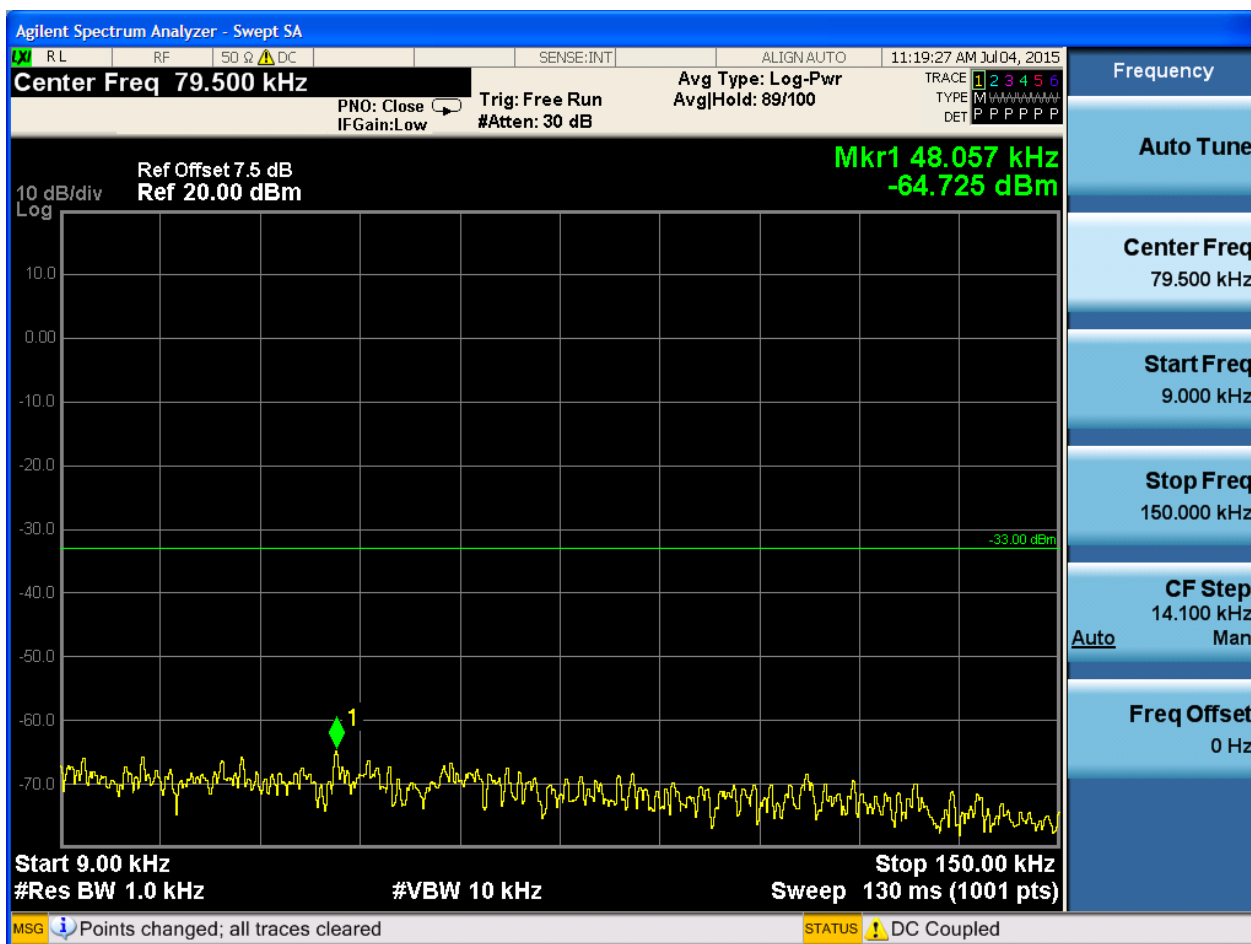


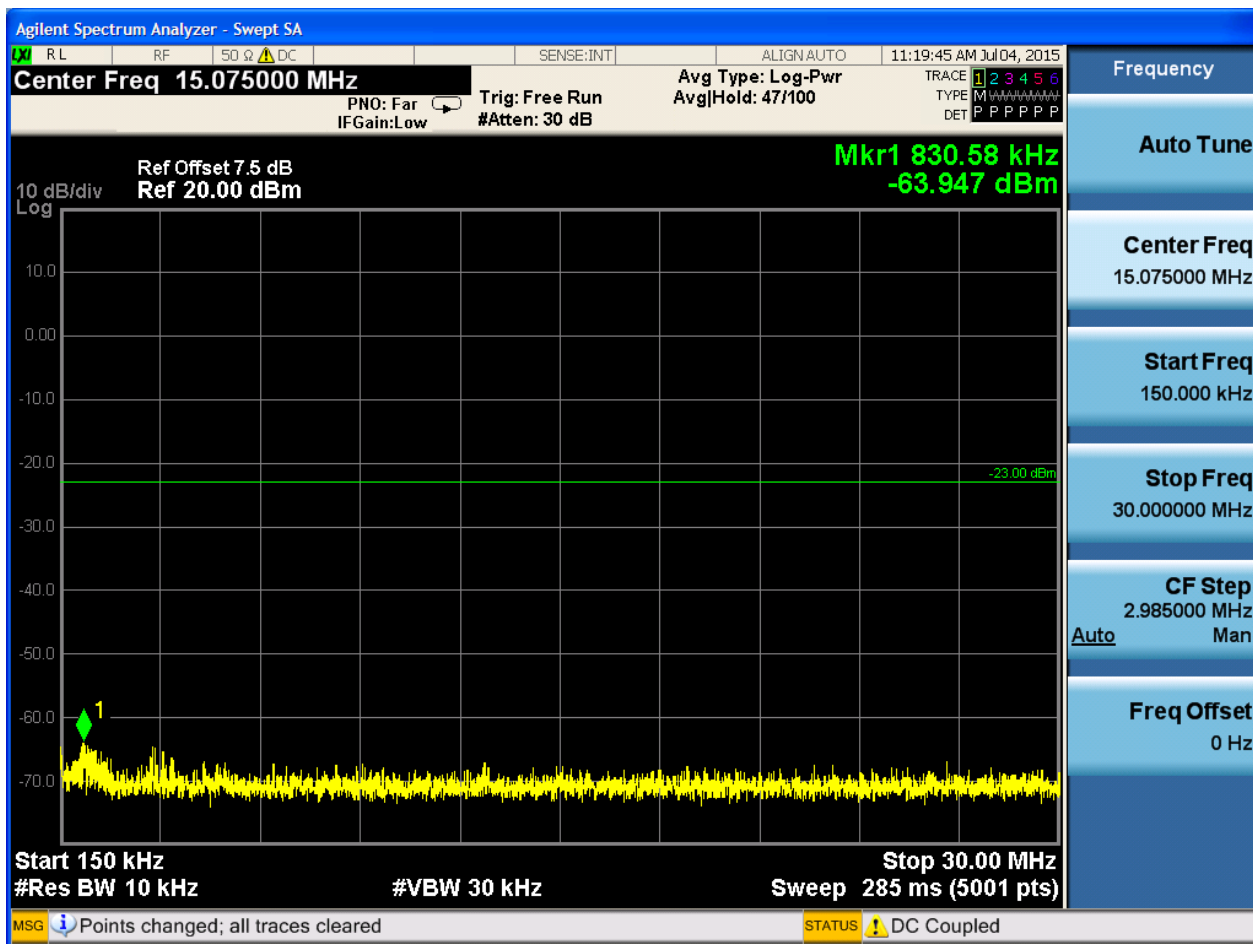


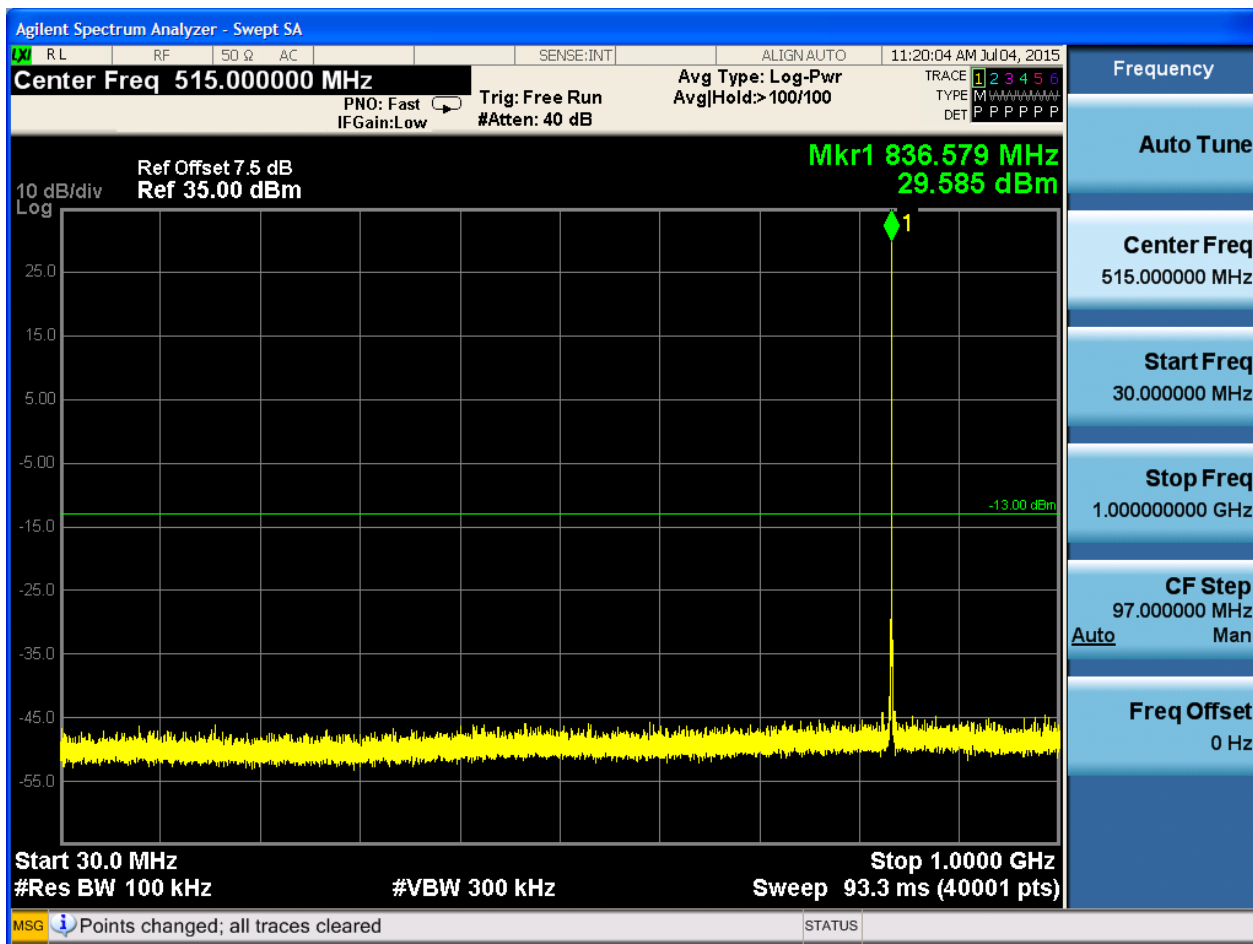


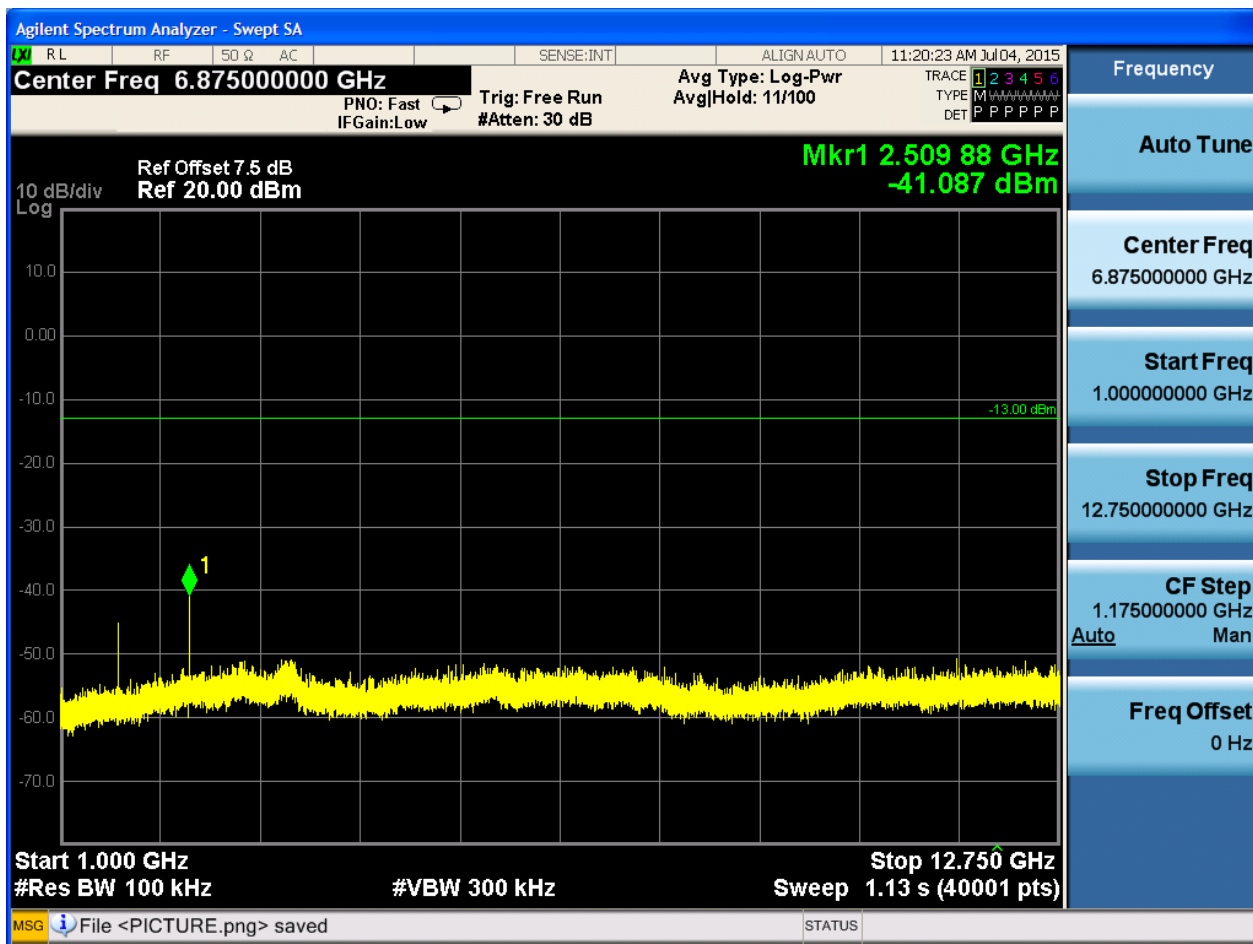


6.1.1.2.2 Test Channel = MCH



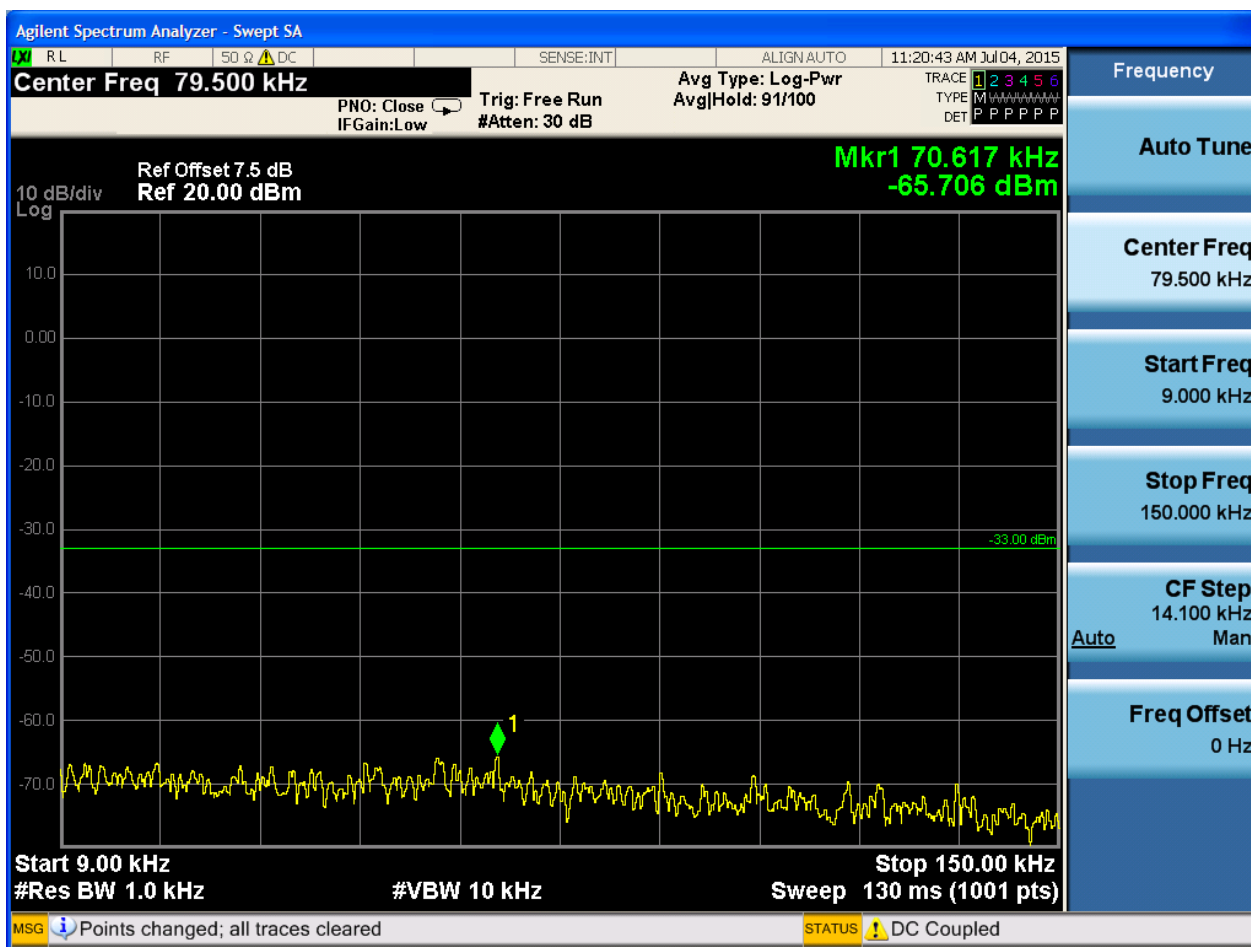


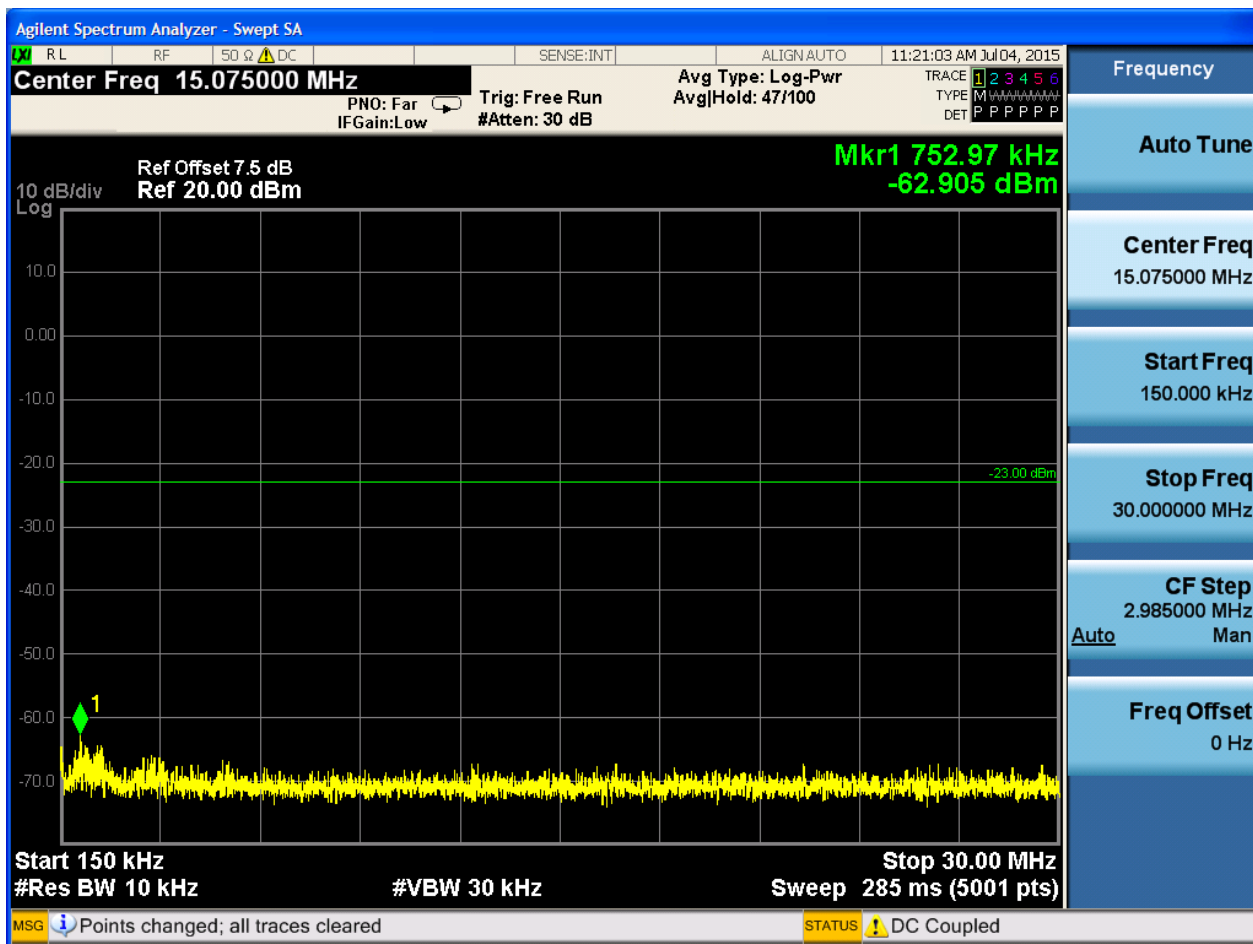


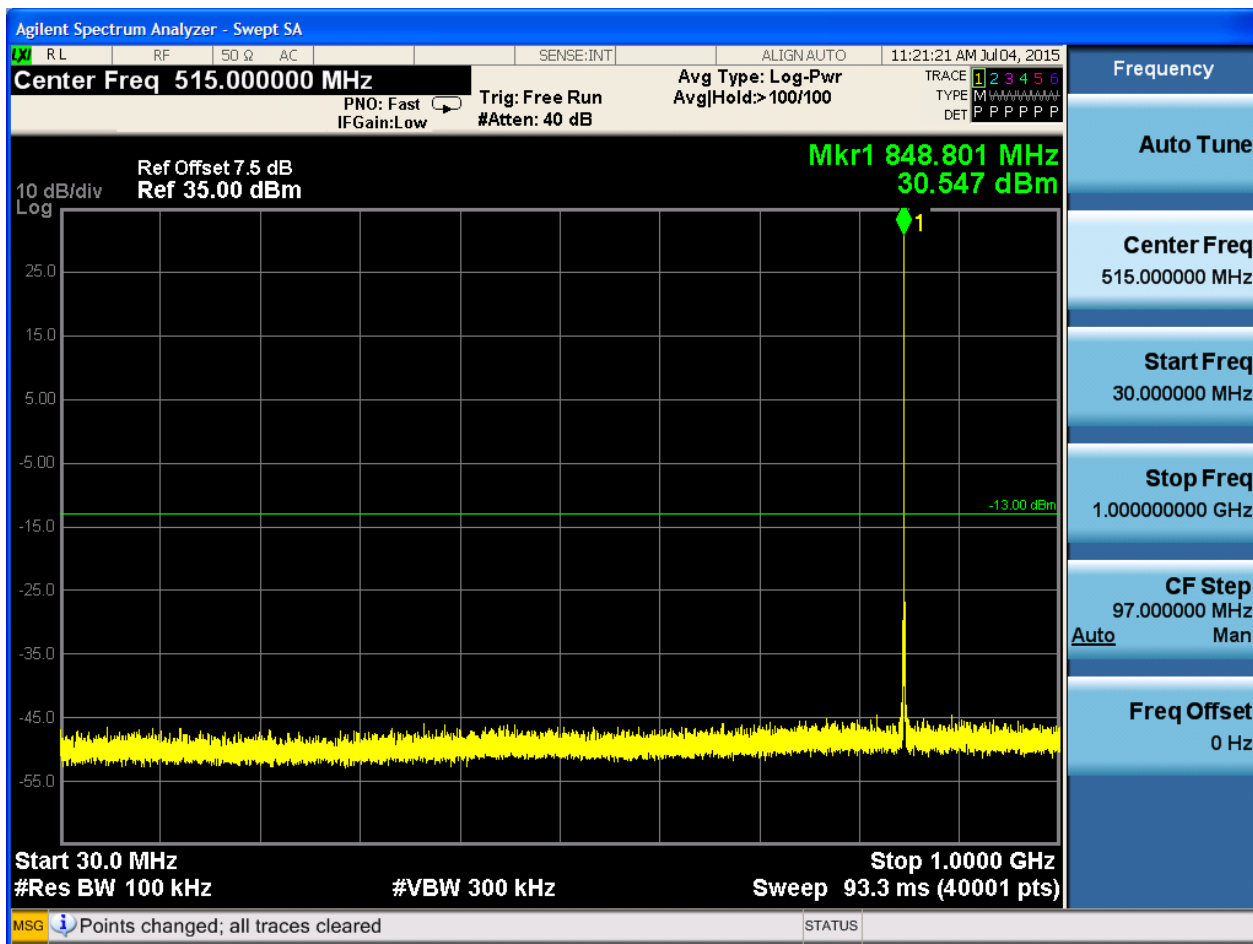


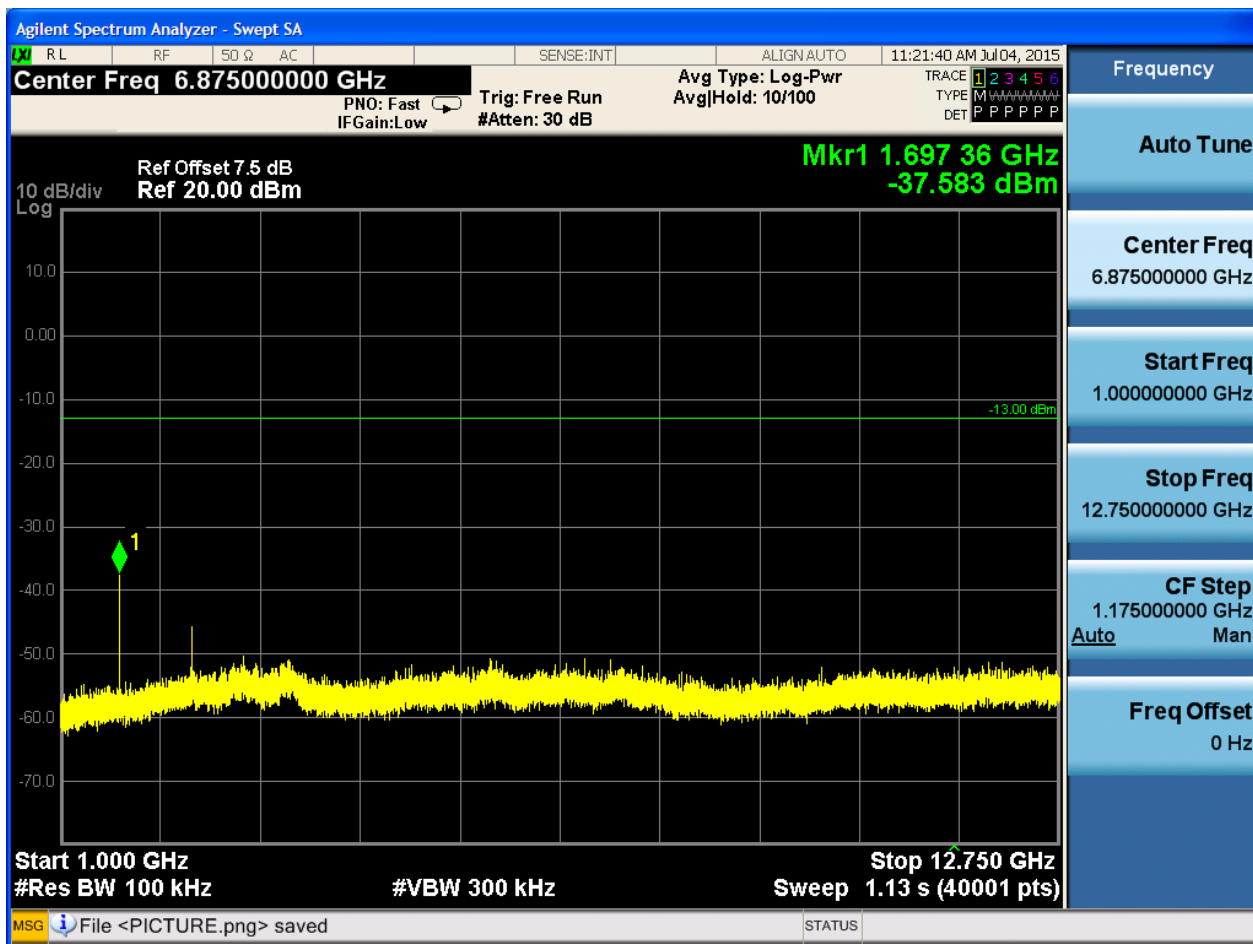


6.1.1.2.3 Test Channel = HCH





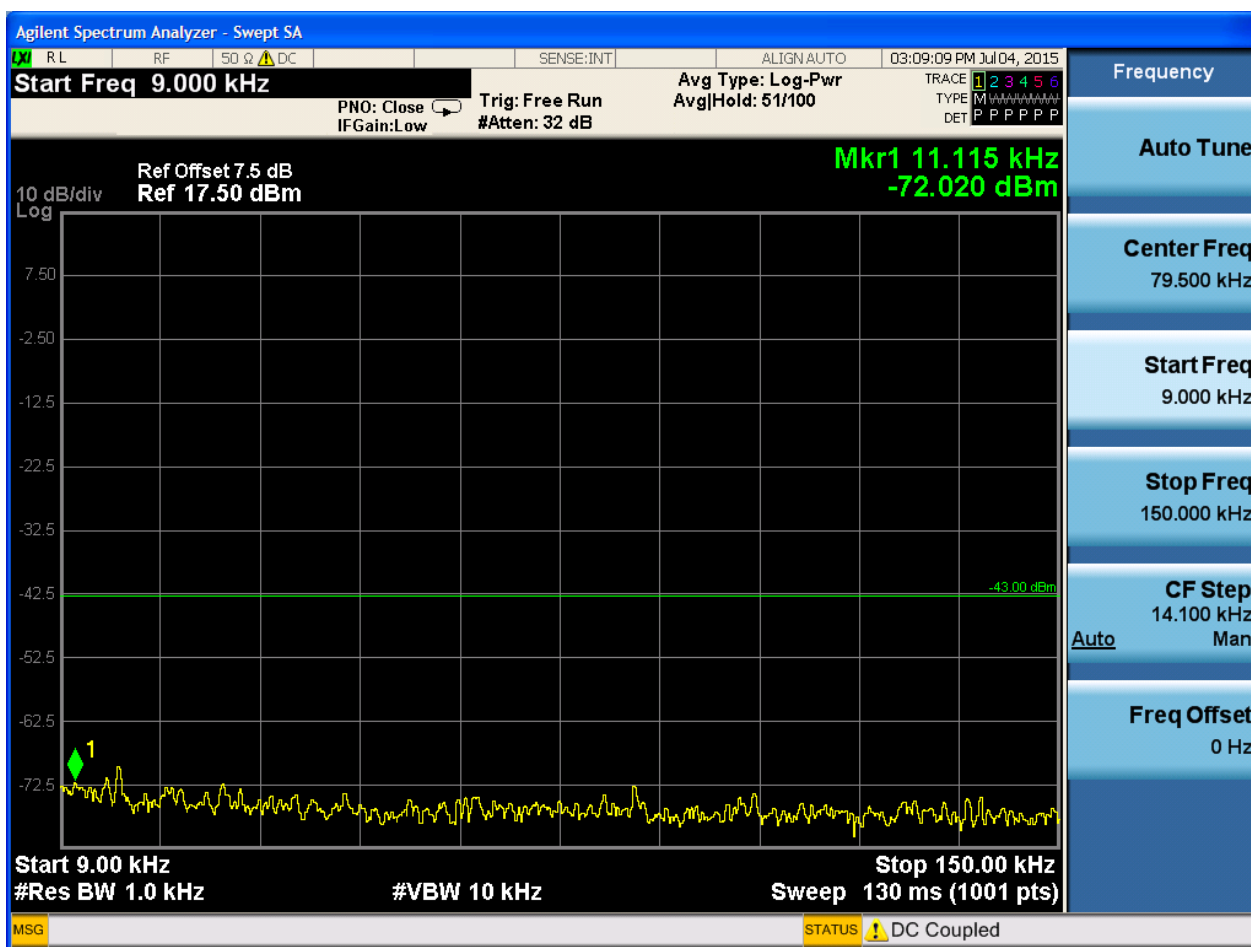


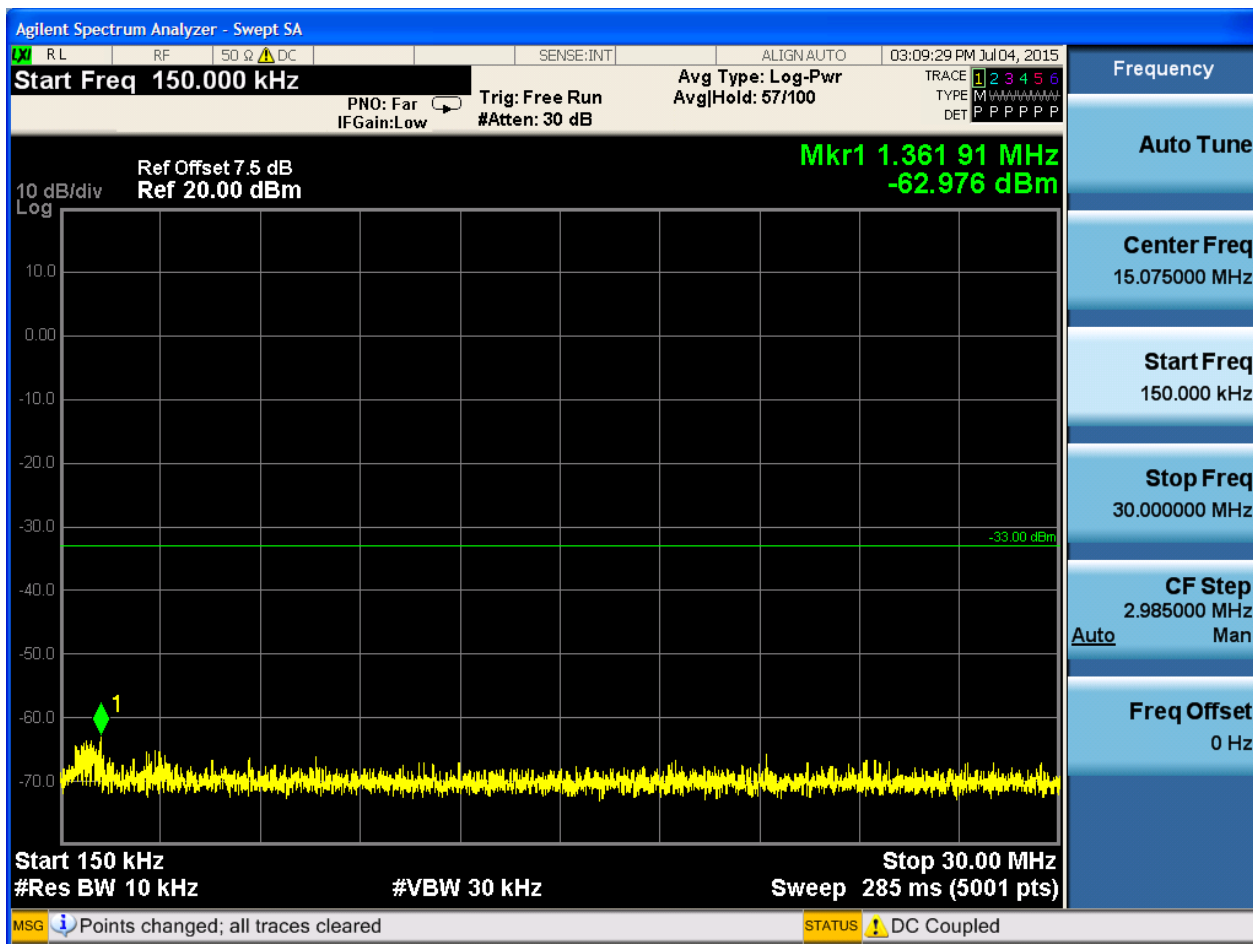


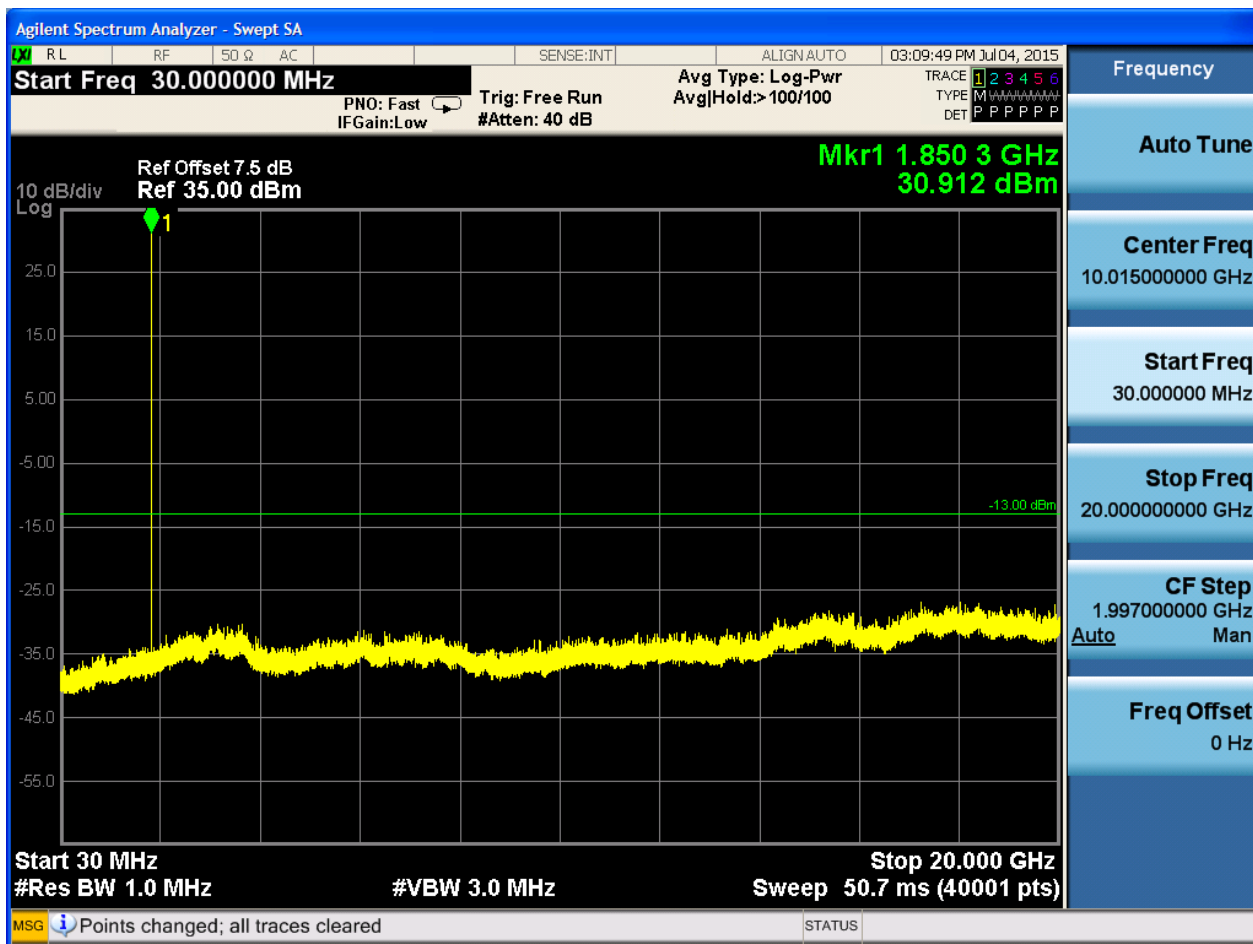
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

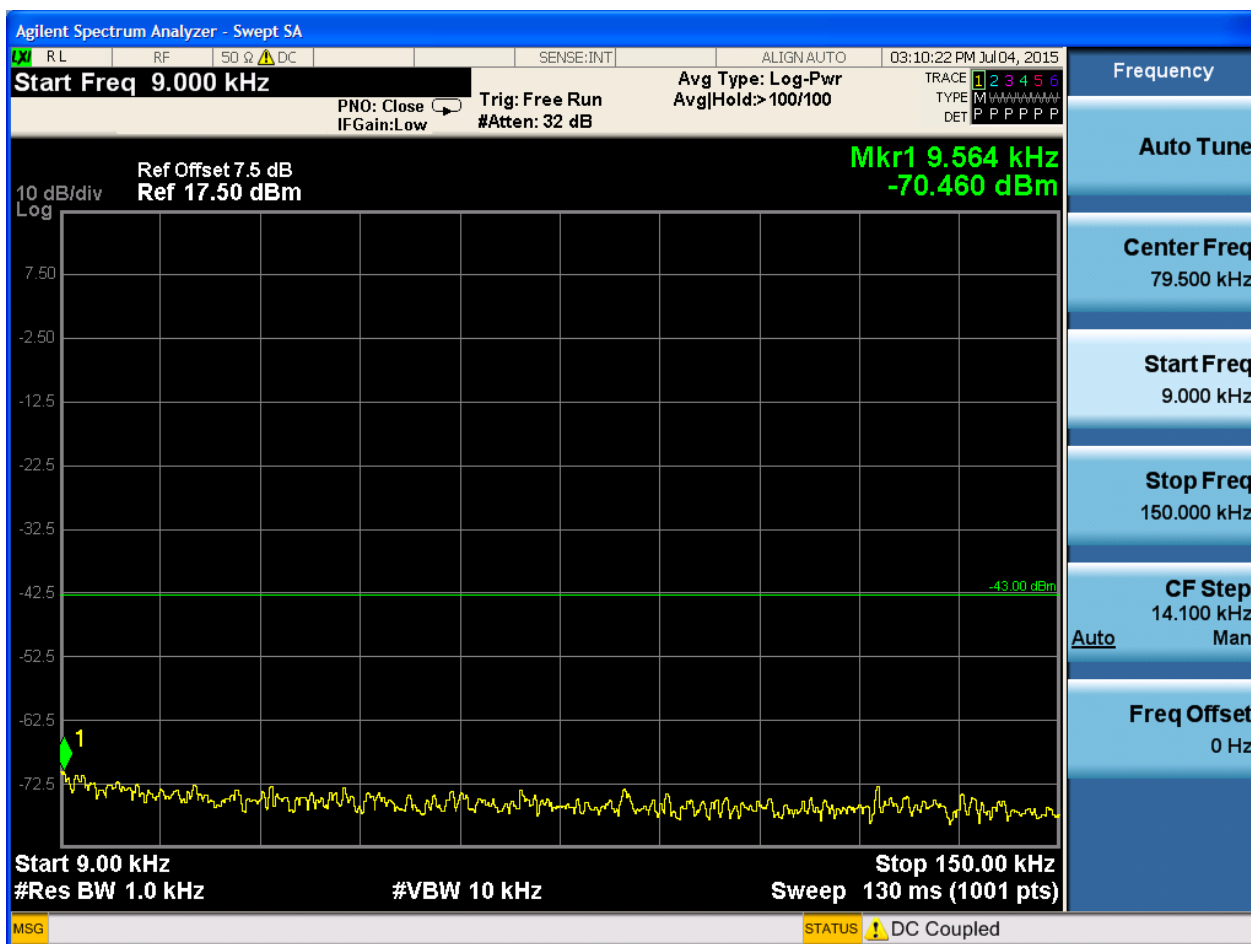
6.1.2.1.1 Test Channel = LCH

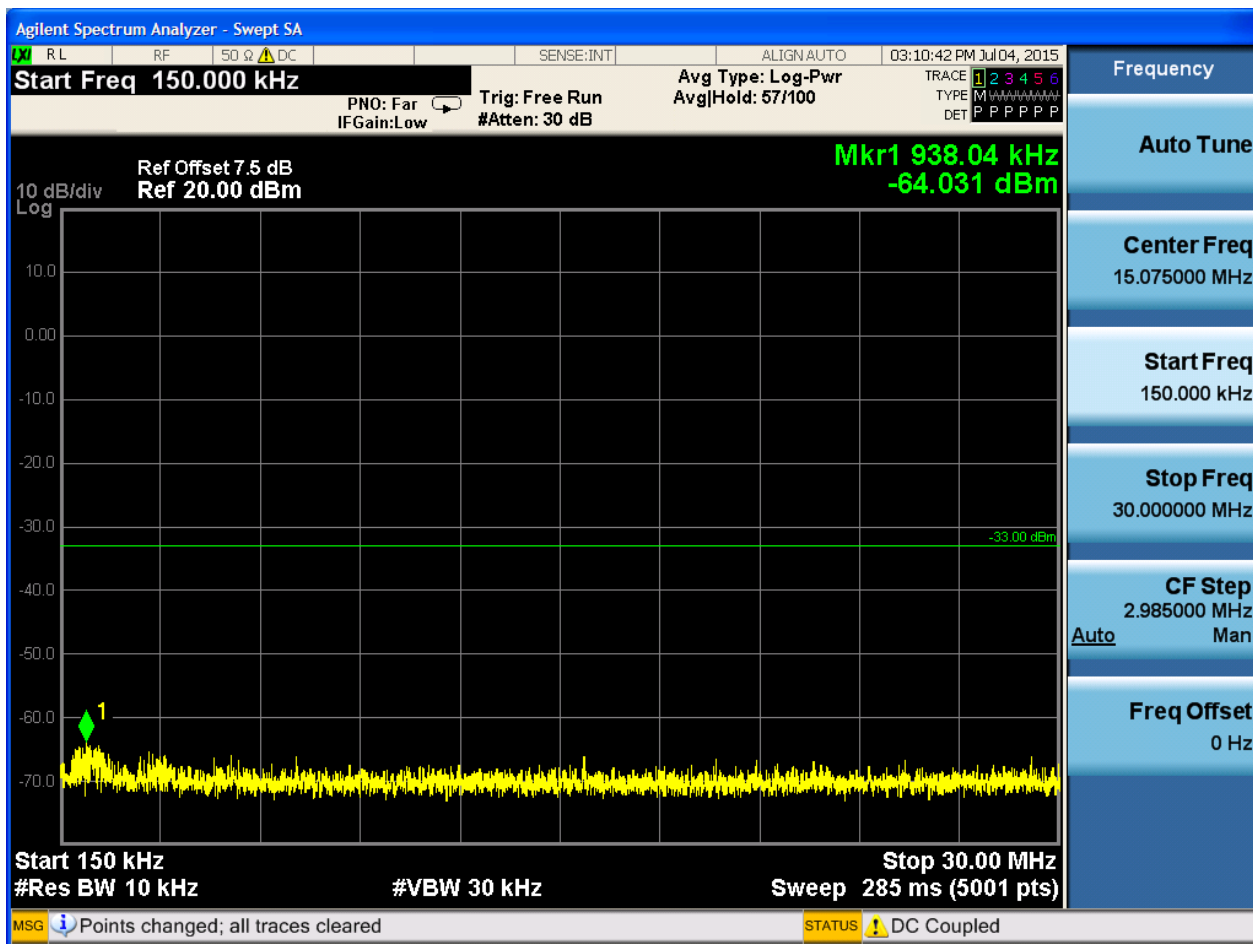


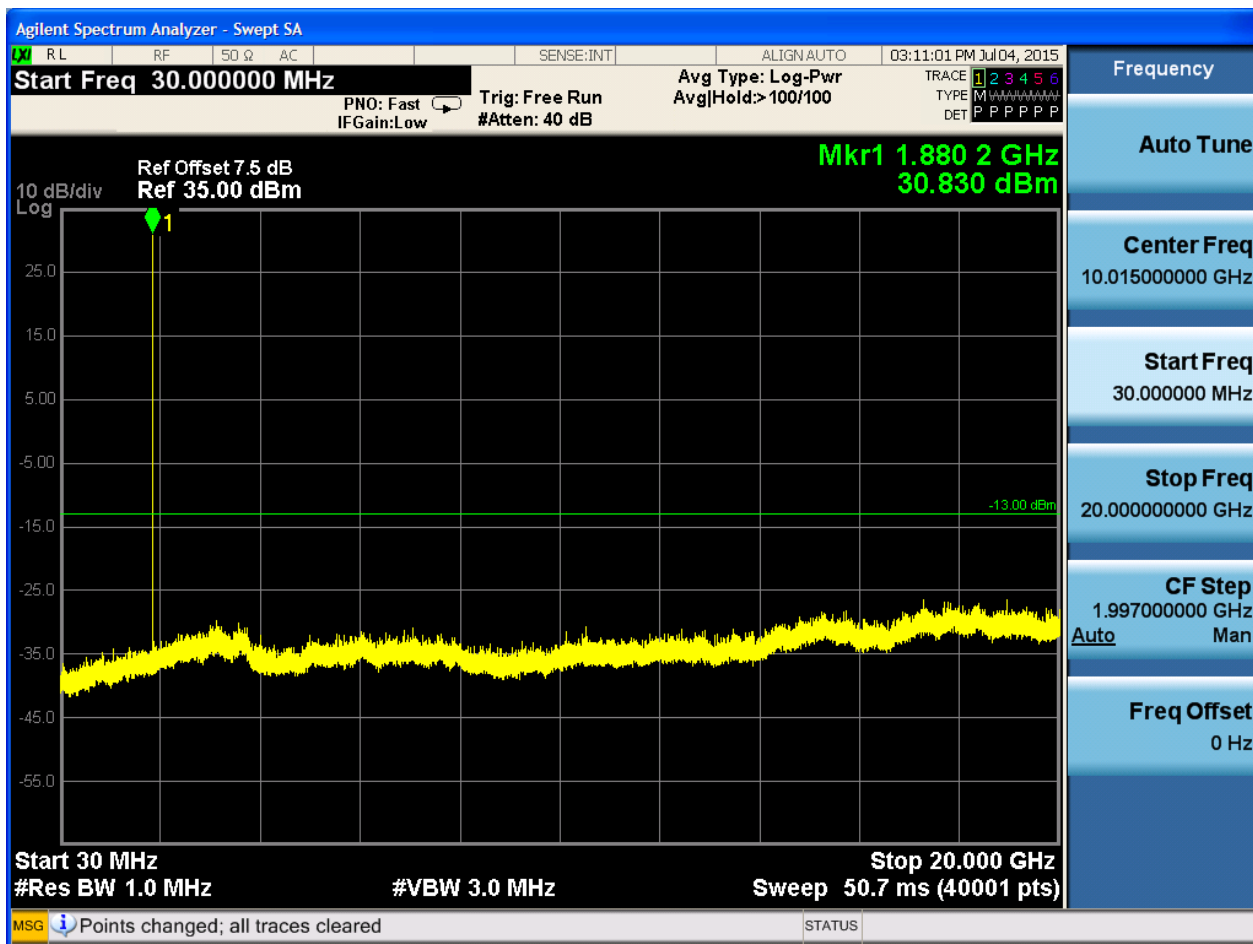




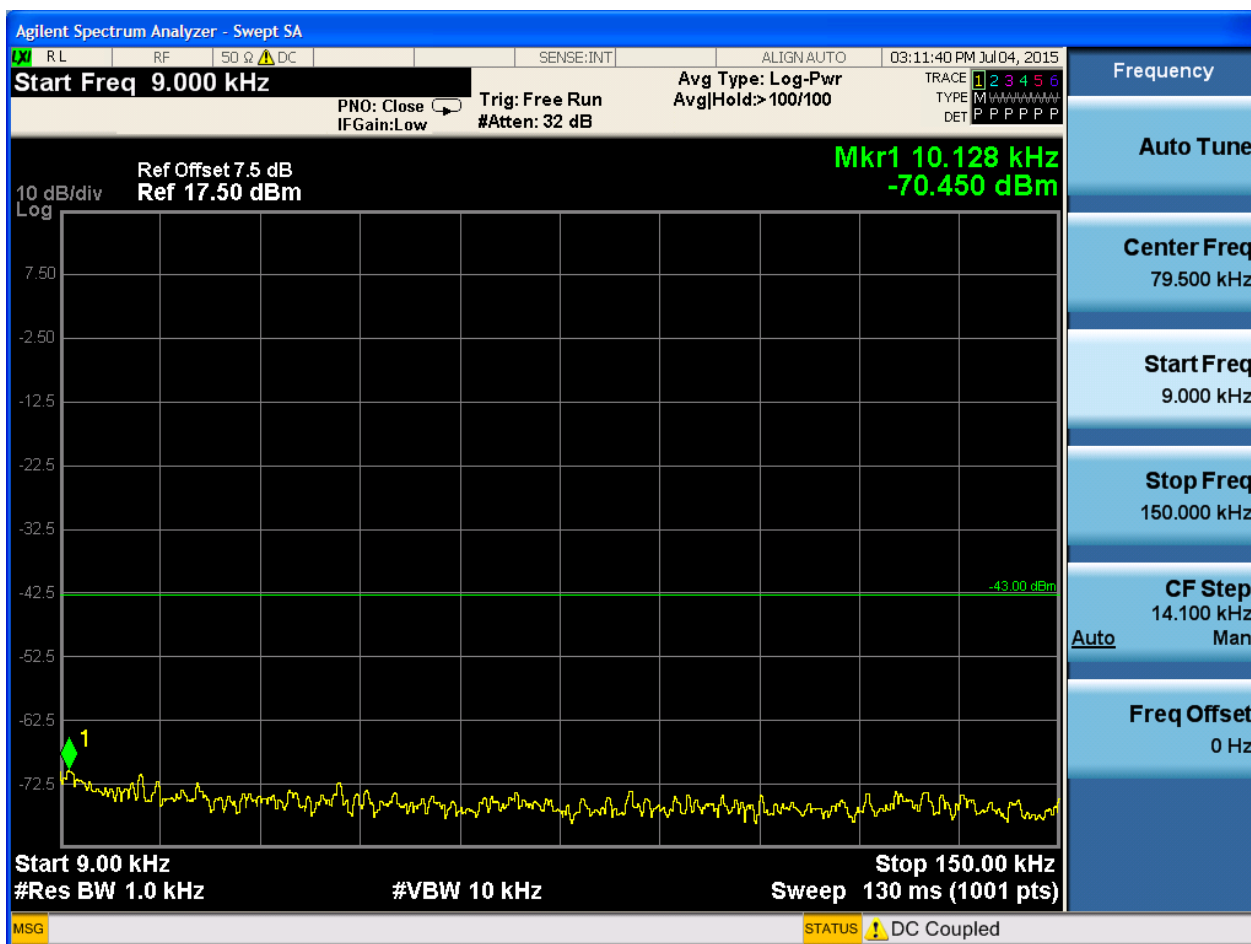
6.1.2.1.2 Test Channel = MCH

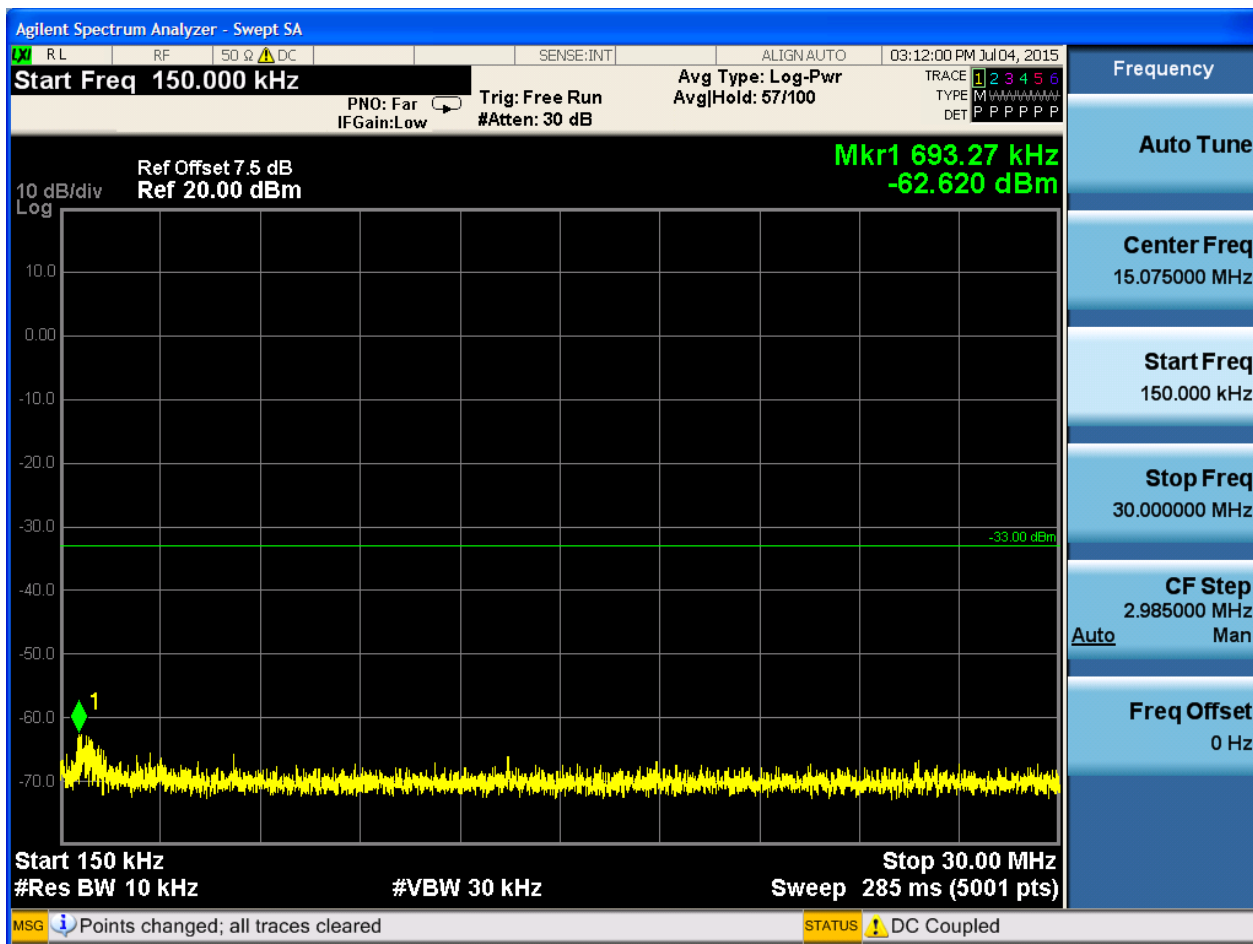


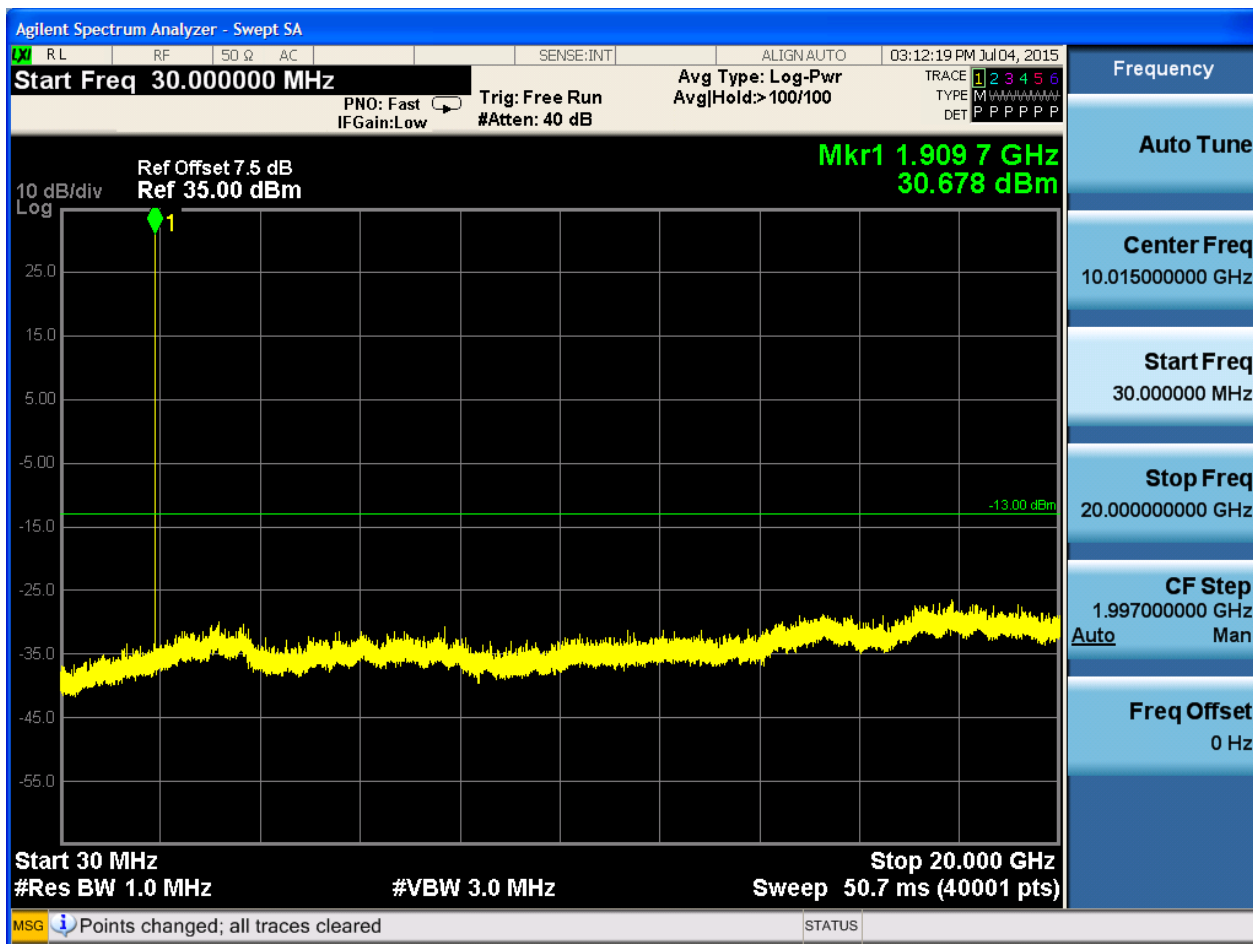




6.1.2.1.3 Test Channel = HCH



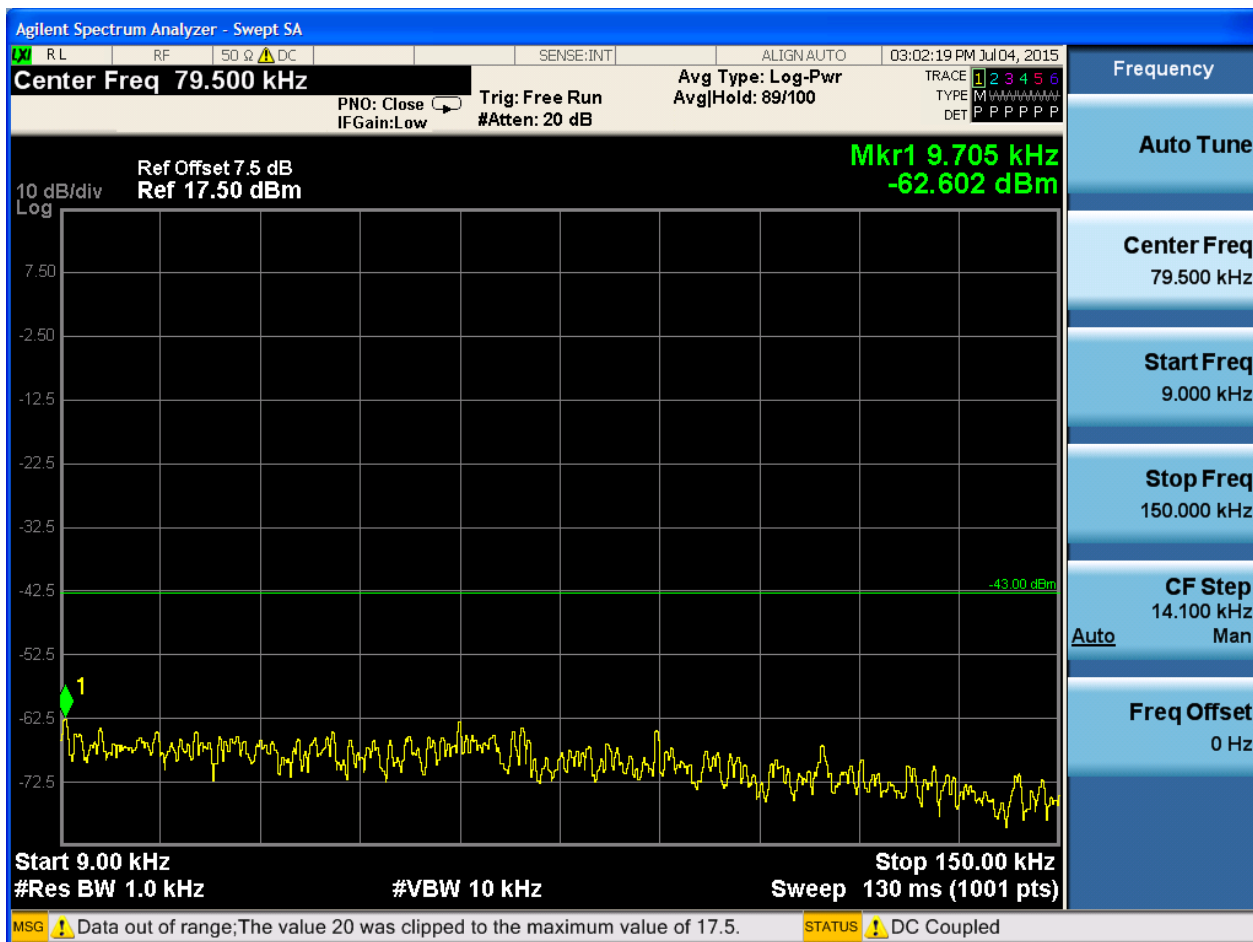


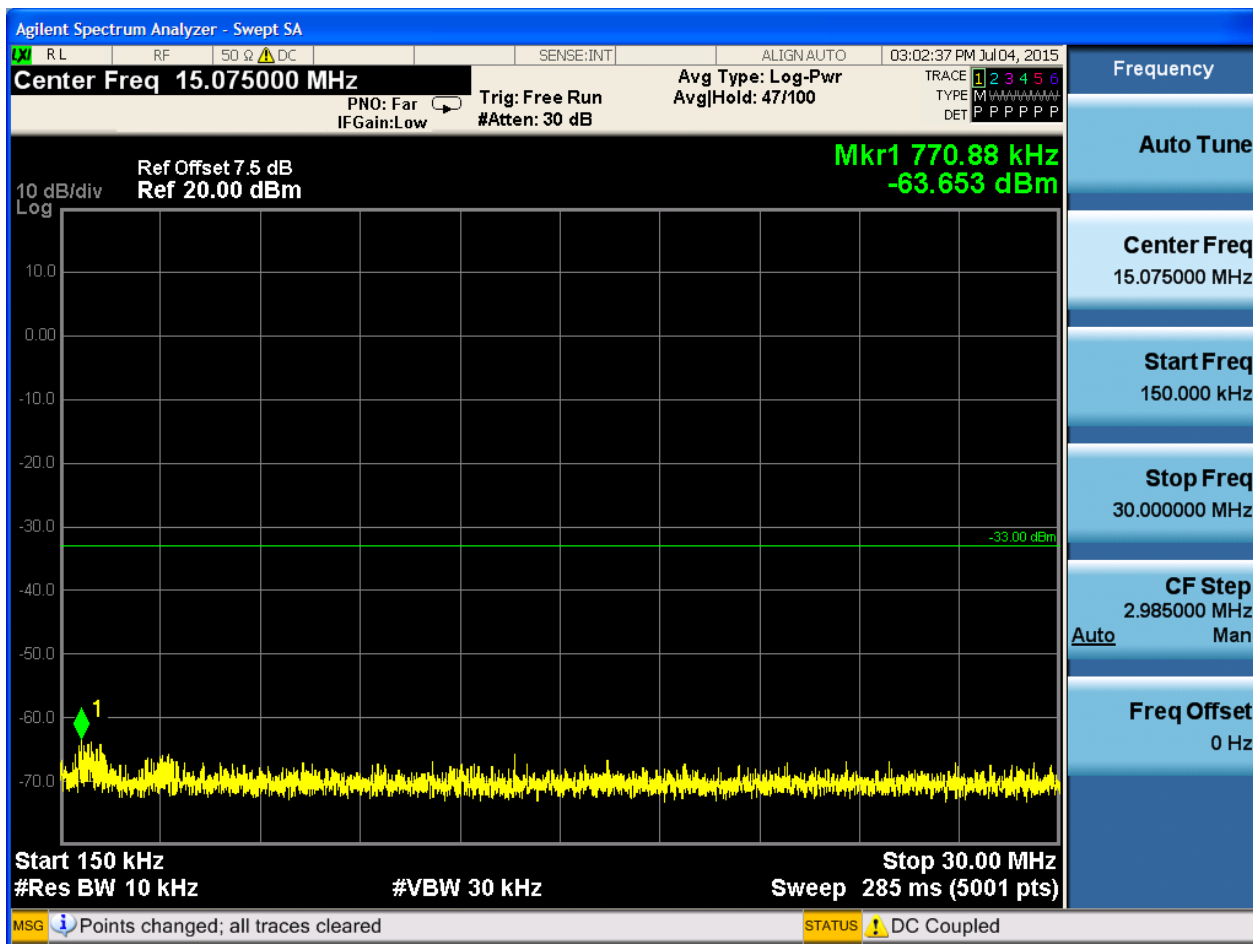


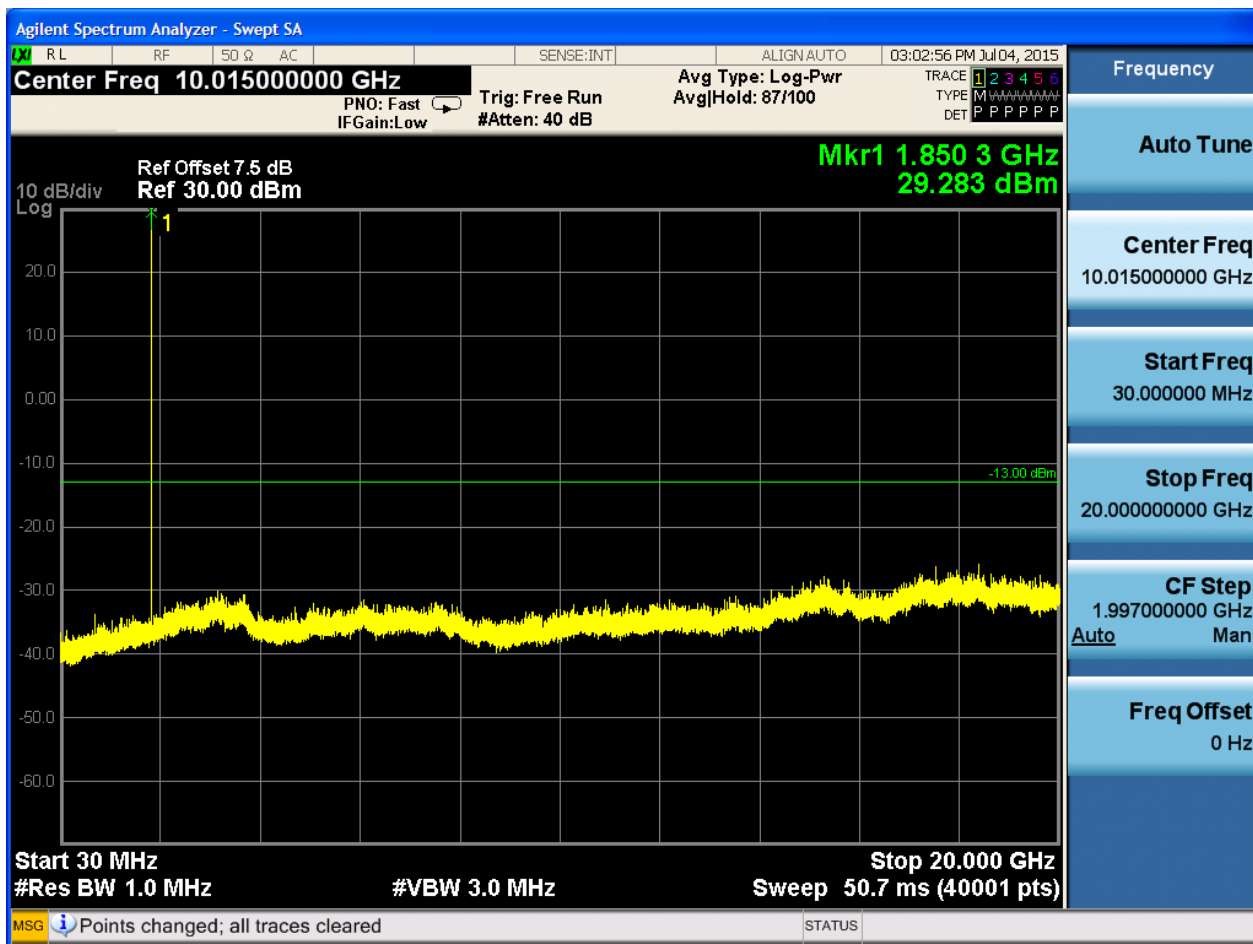


6.1.2.2 Test Mode = GSM/TM2

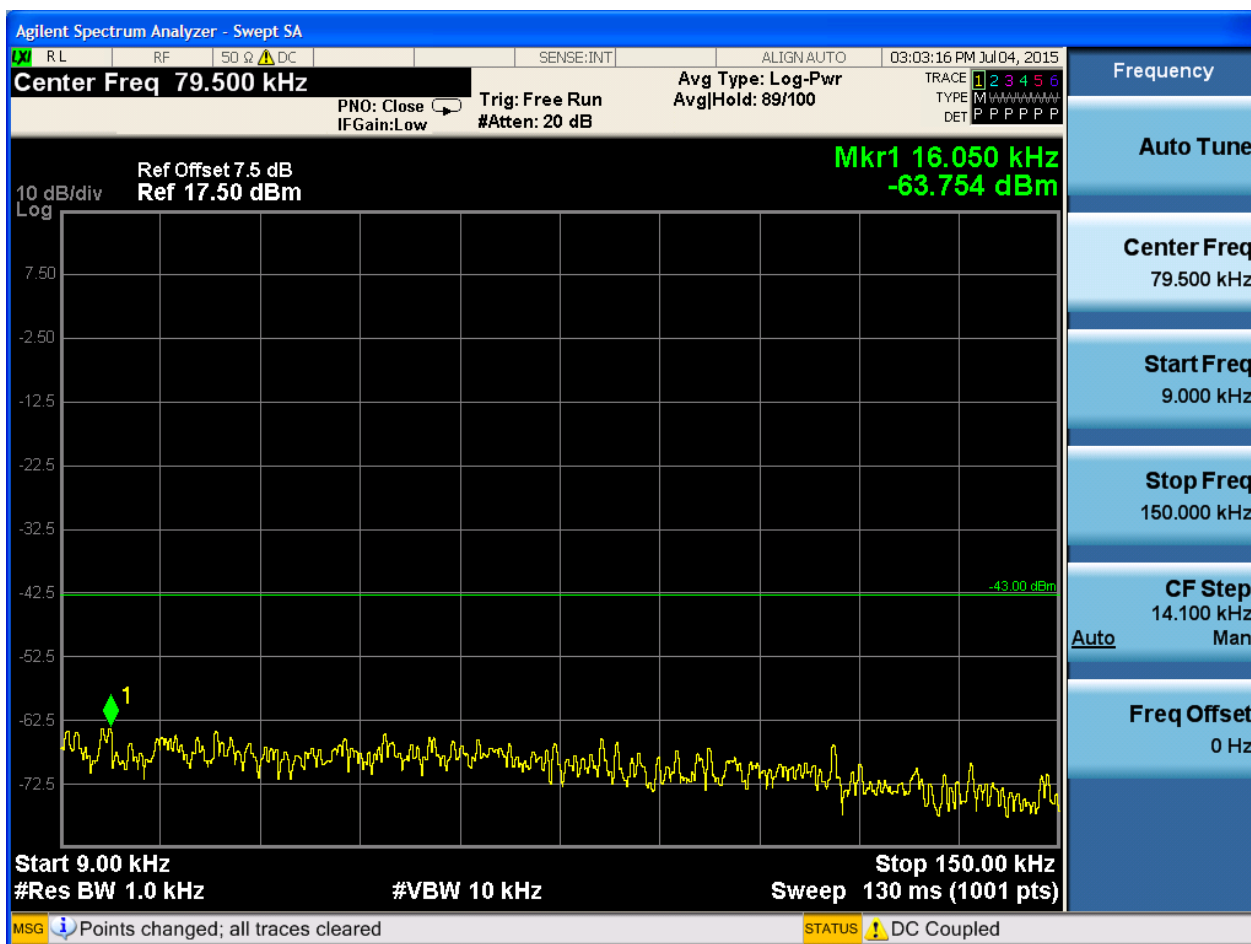
6.1.2.2.1 Test Channel = LCH

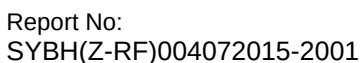


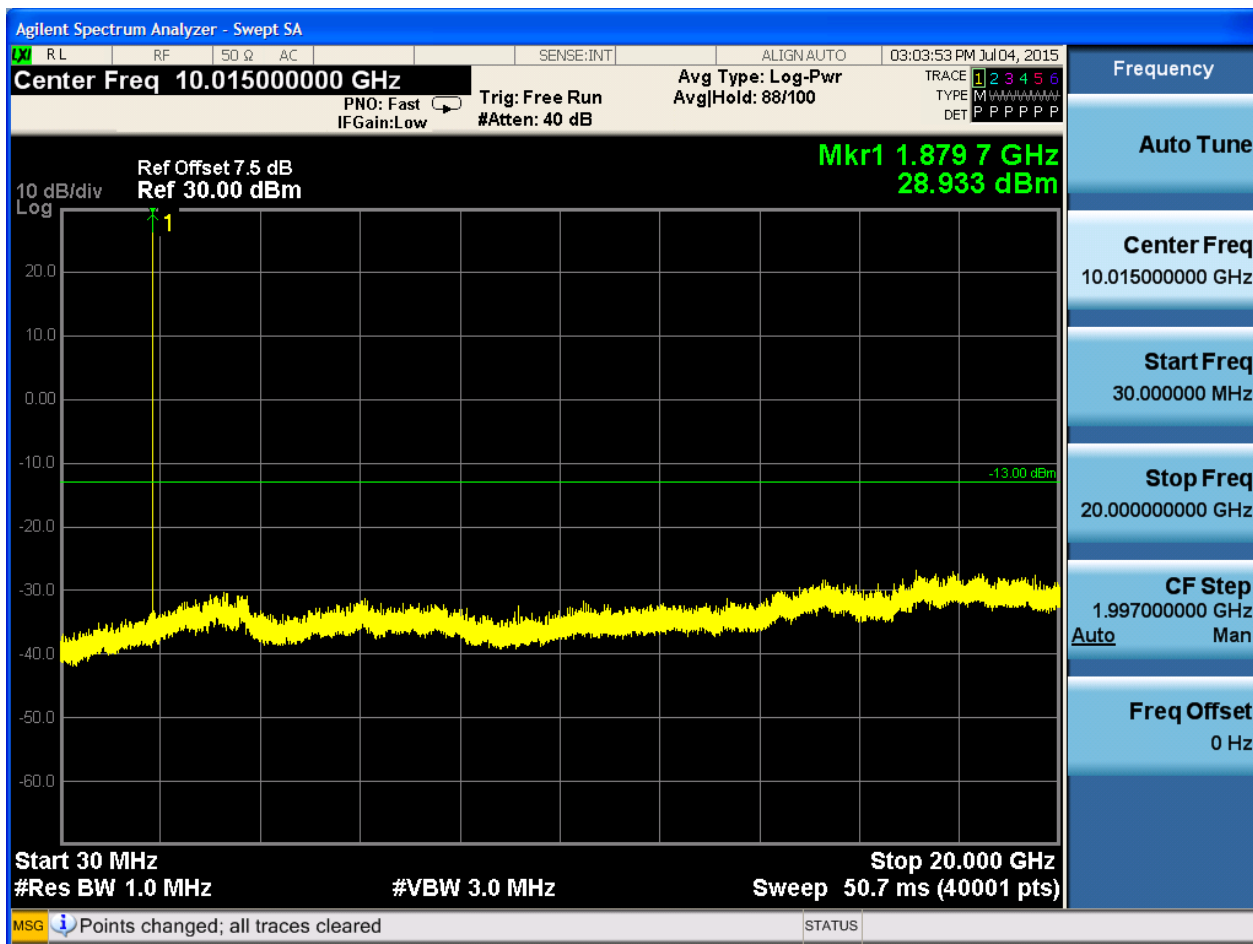




6.1.2.2.2 Test Channel = MCH

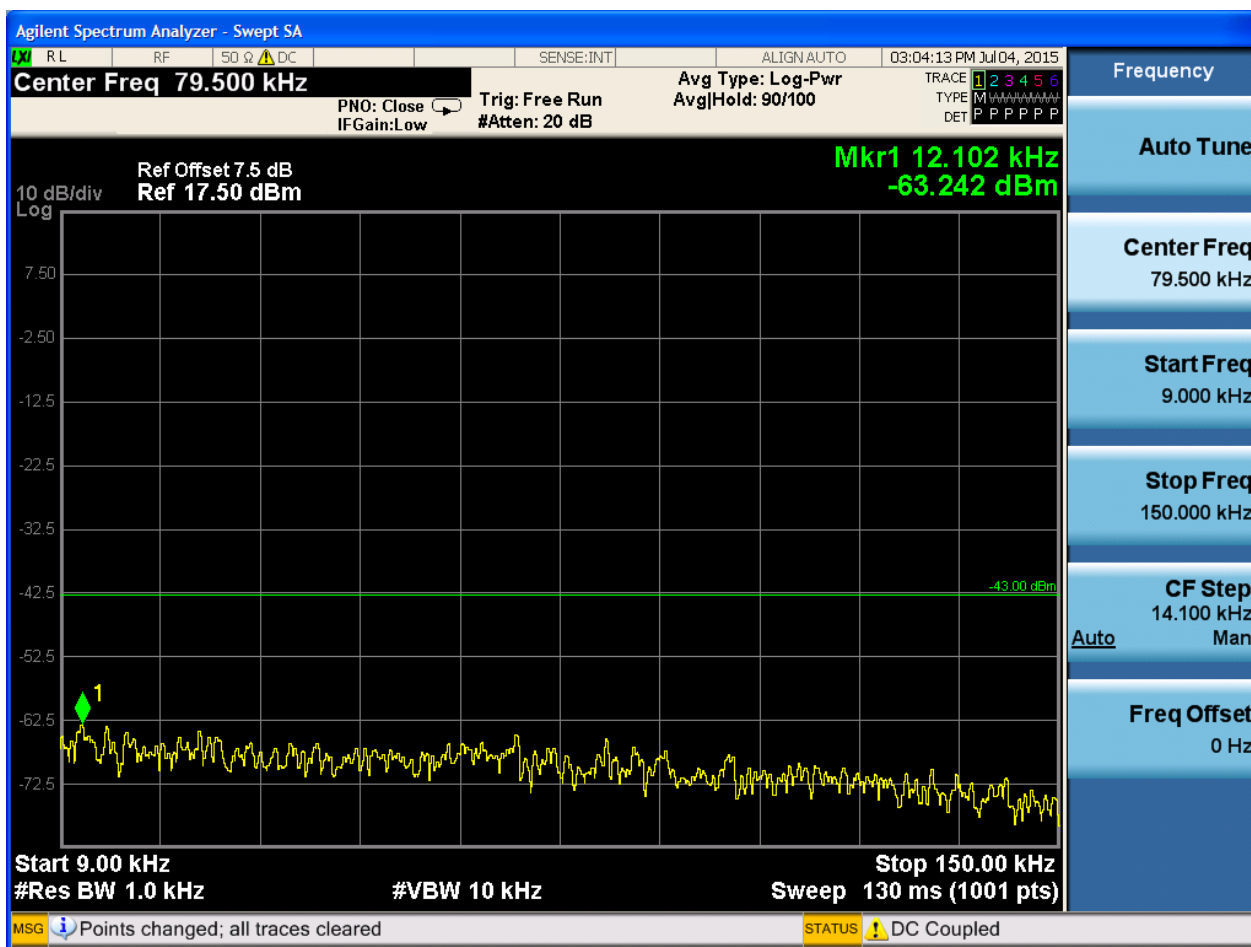


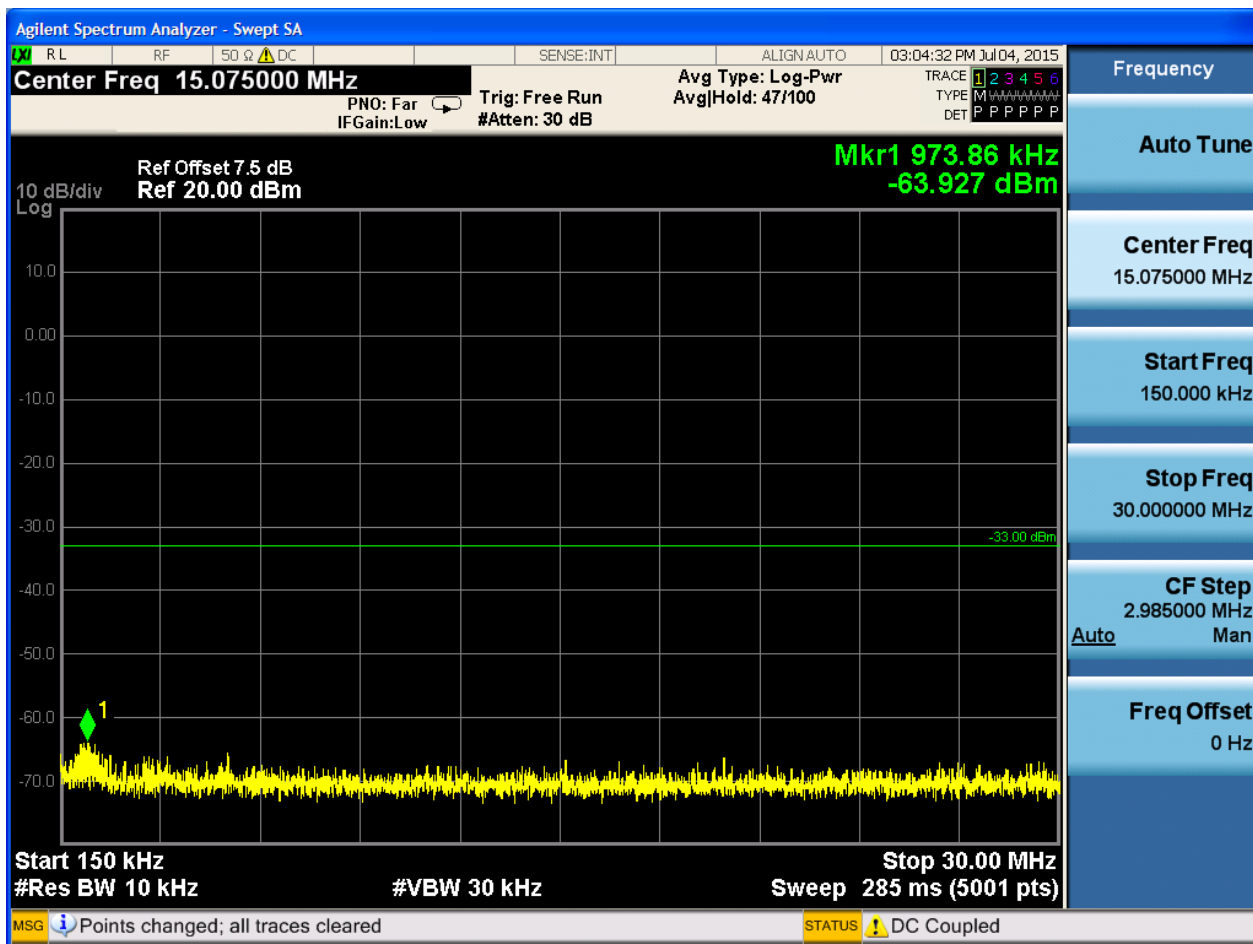


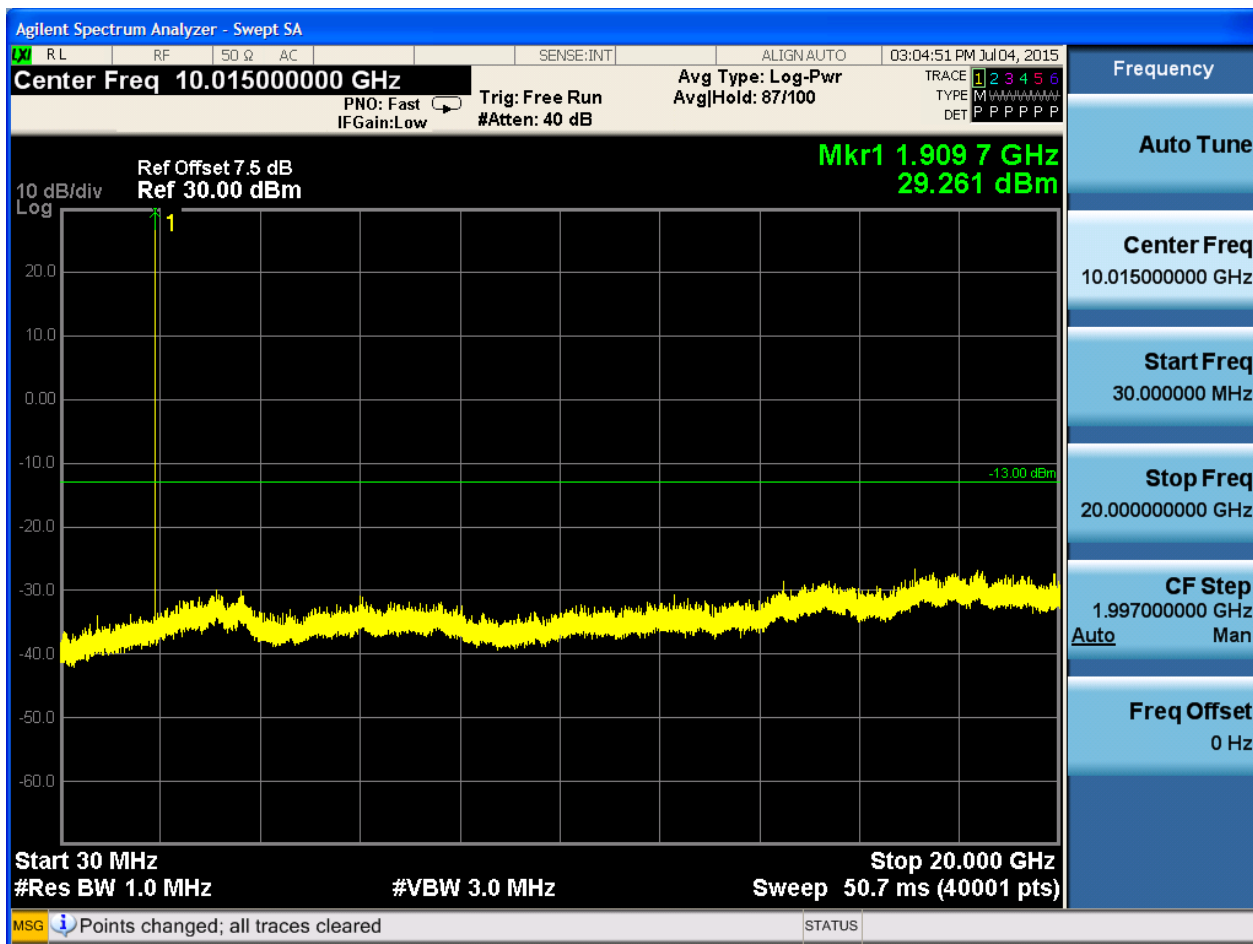




6.1.2.2.3 Test Channel = HCH







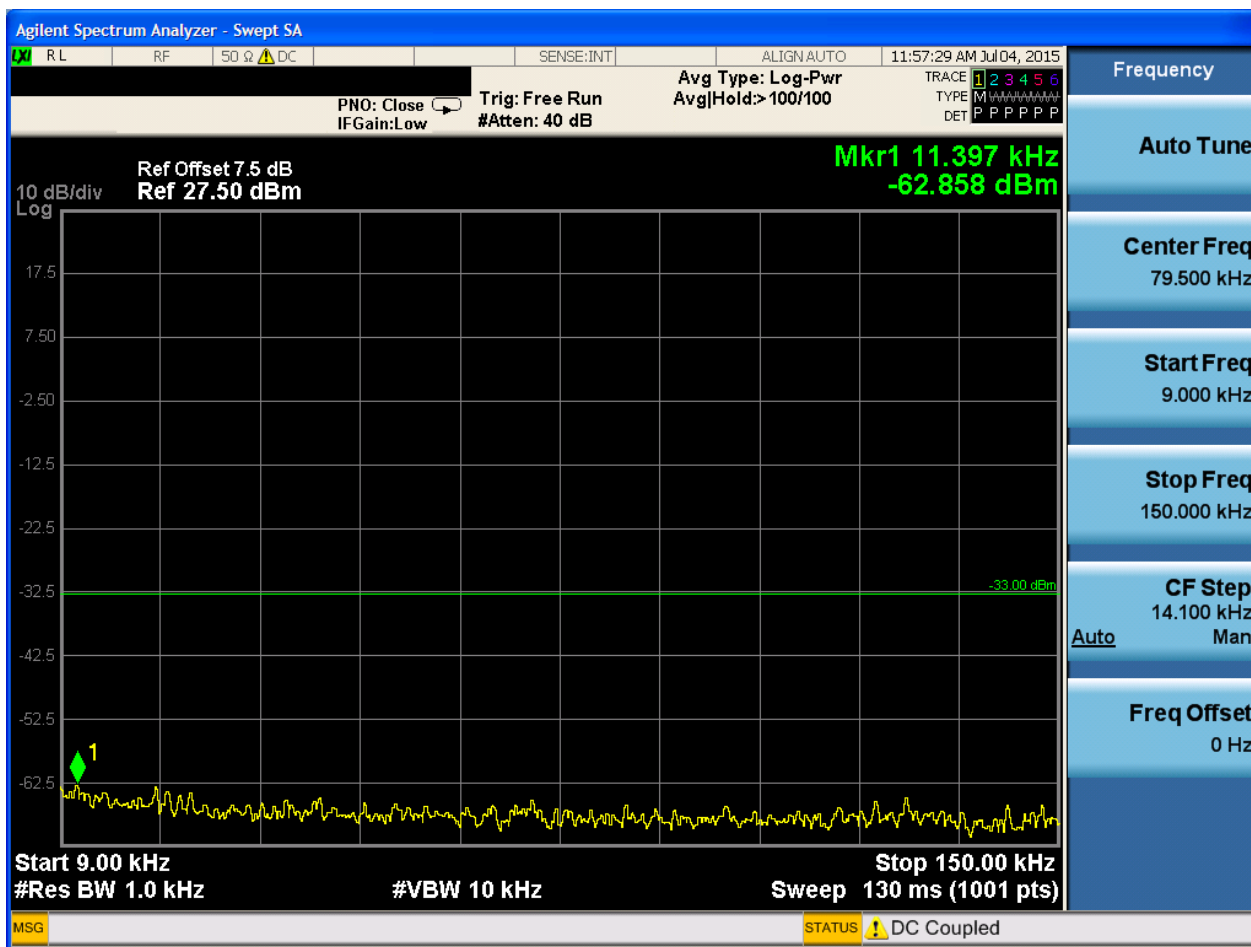


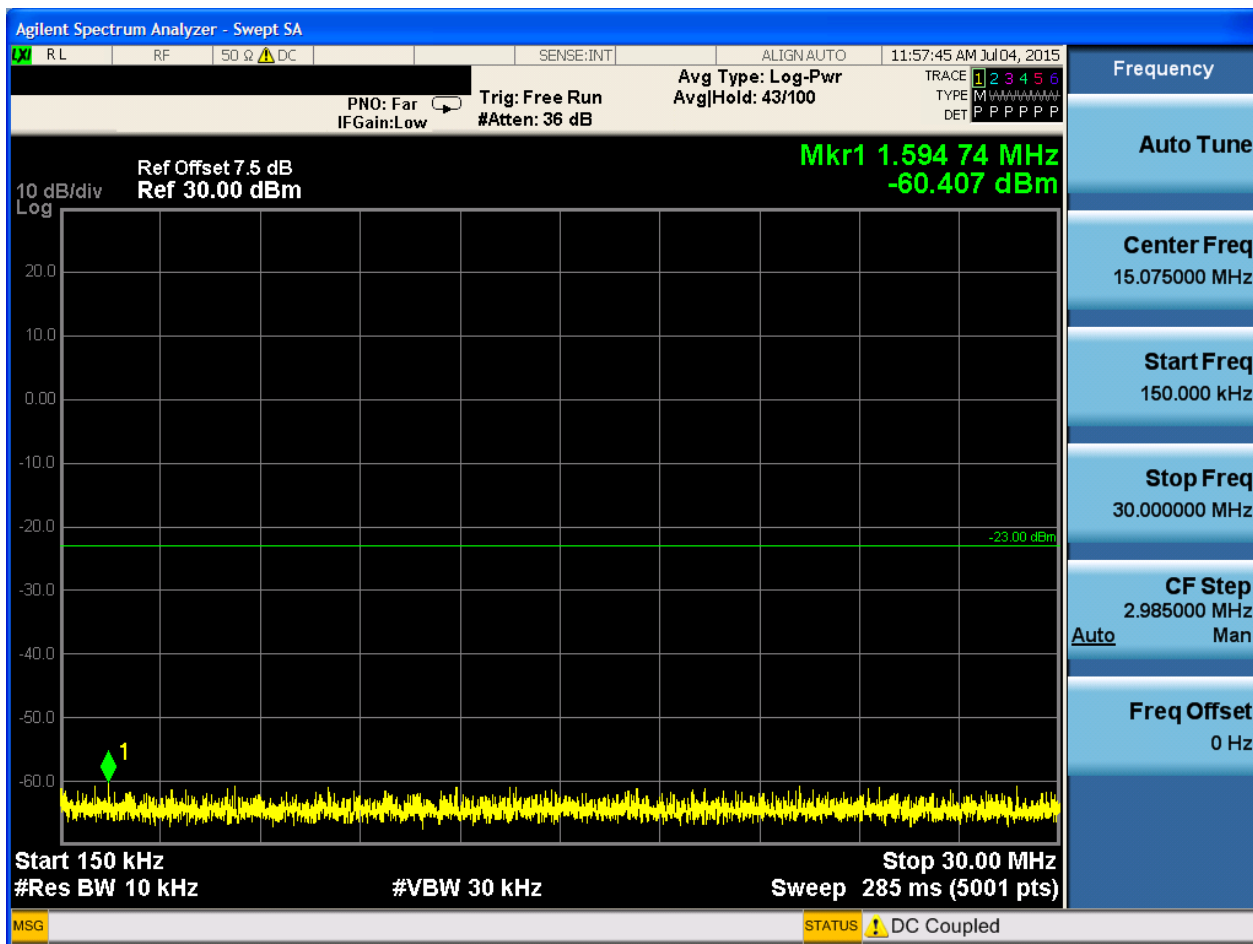
6.2 For UMTS

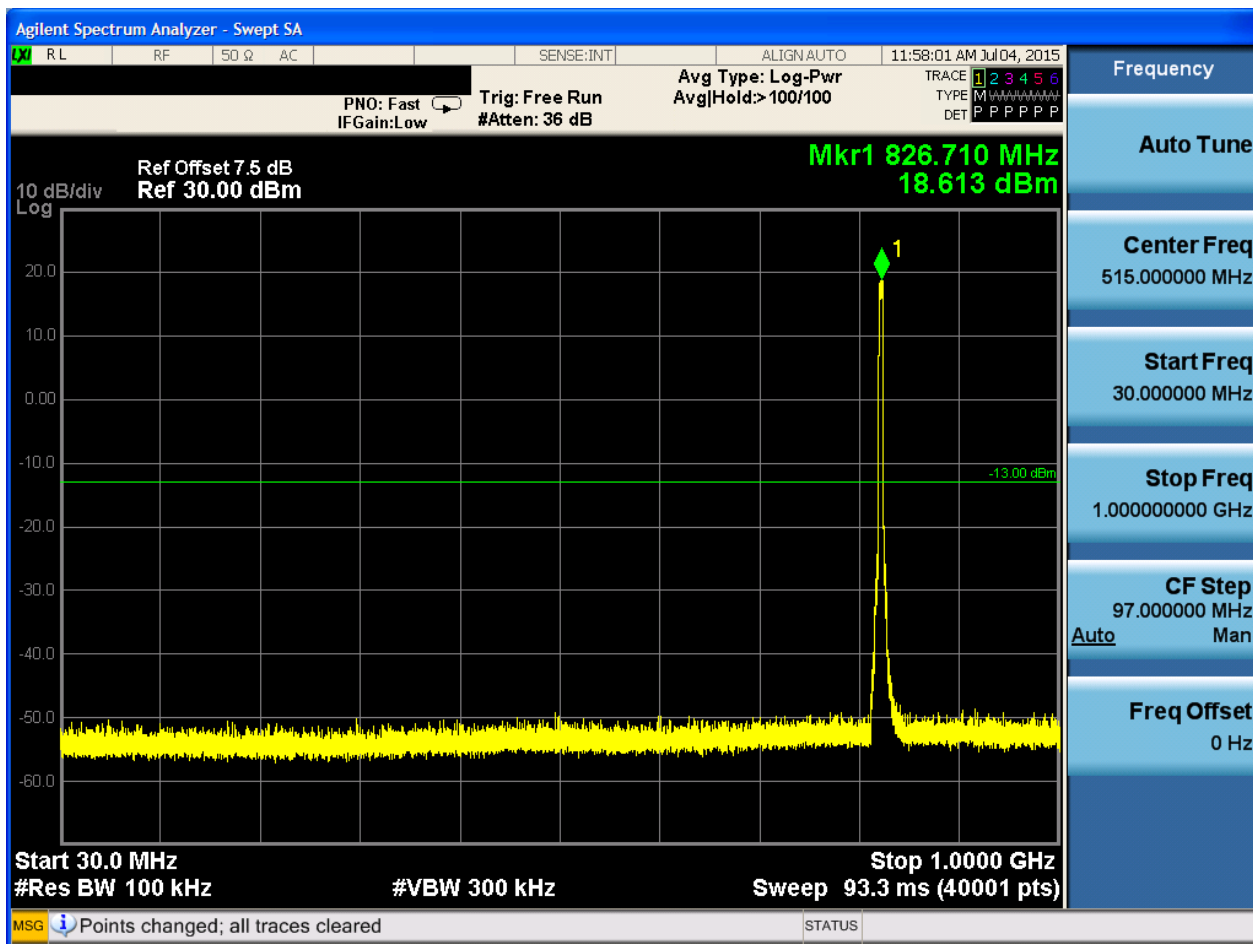
6.2.1 Test Band = WCDMA850

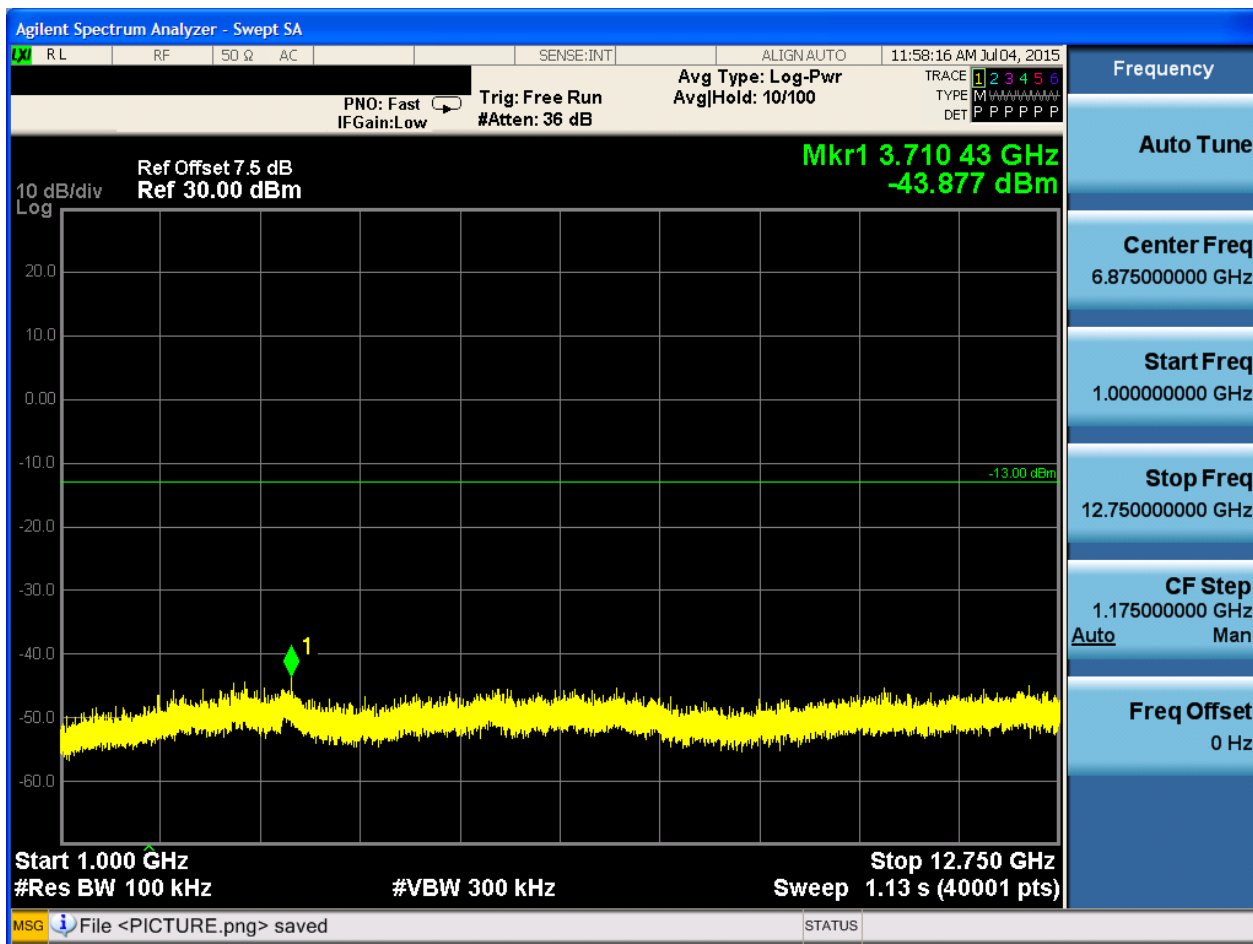
6.2.1.1 Test Mode = UMTS/TM1

6.2.1.1.1 Test Channel = LCH



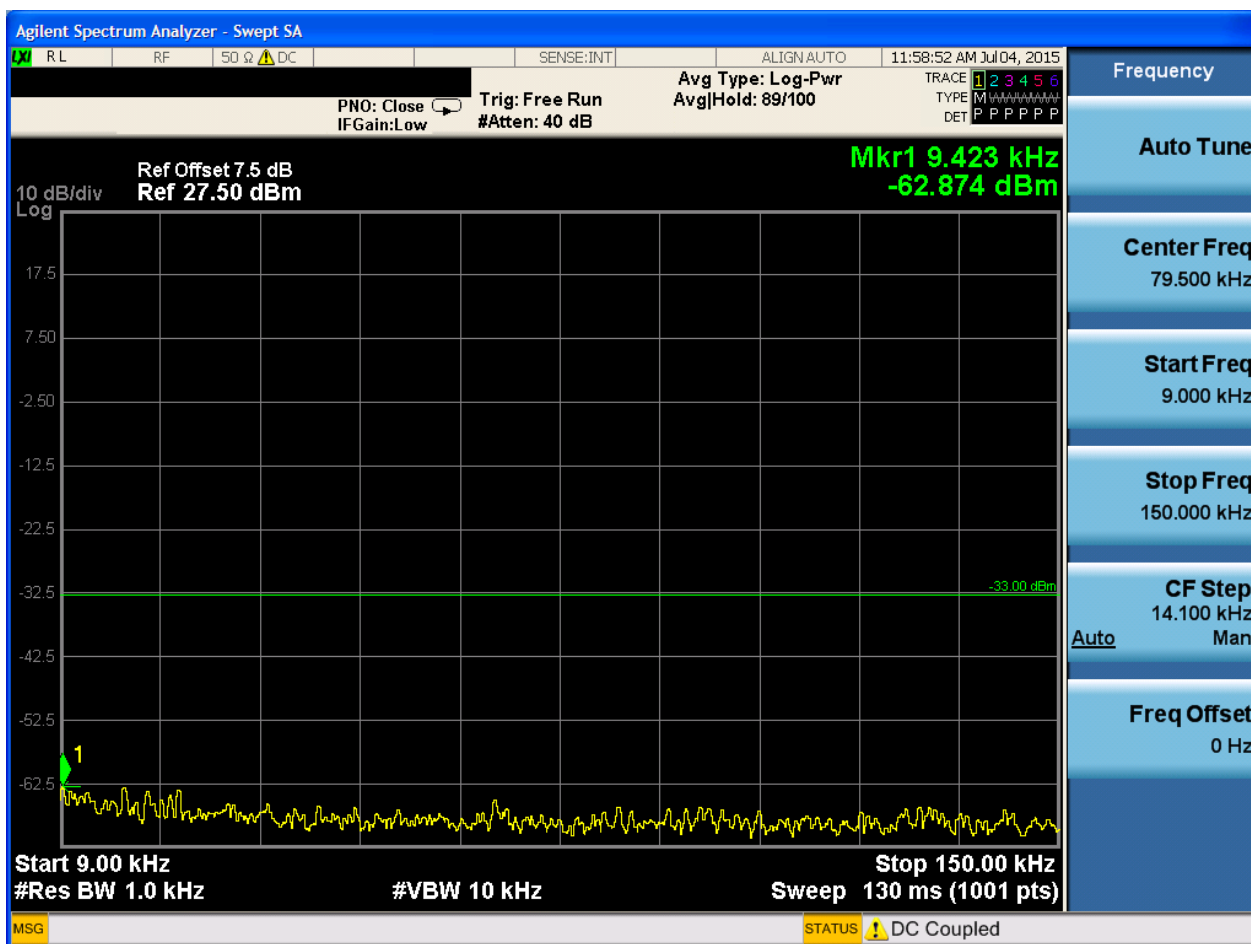


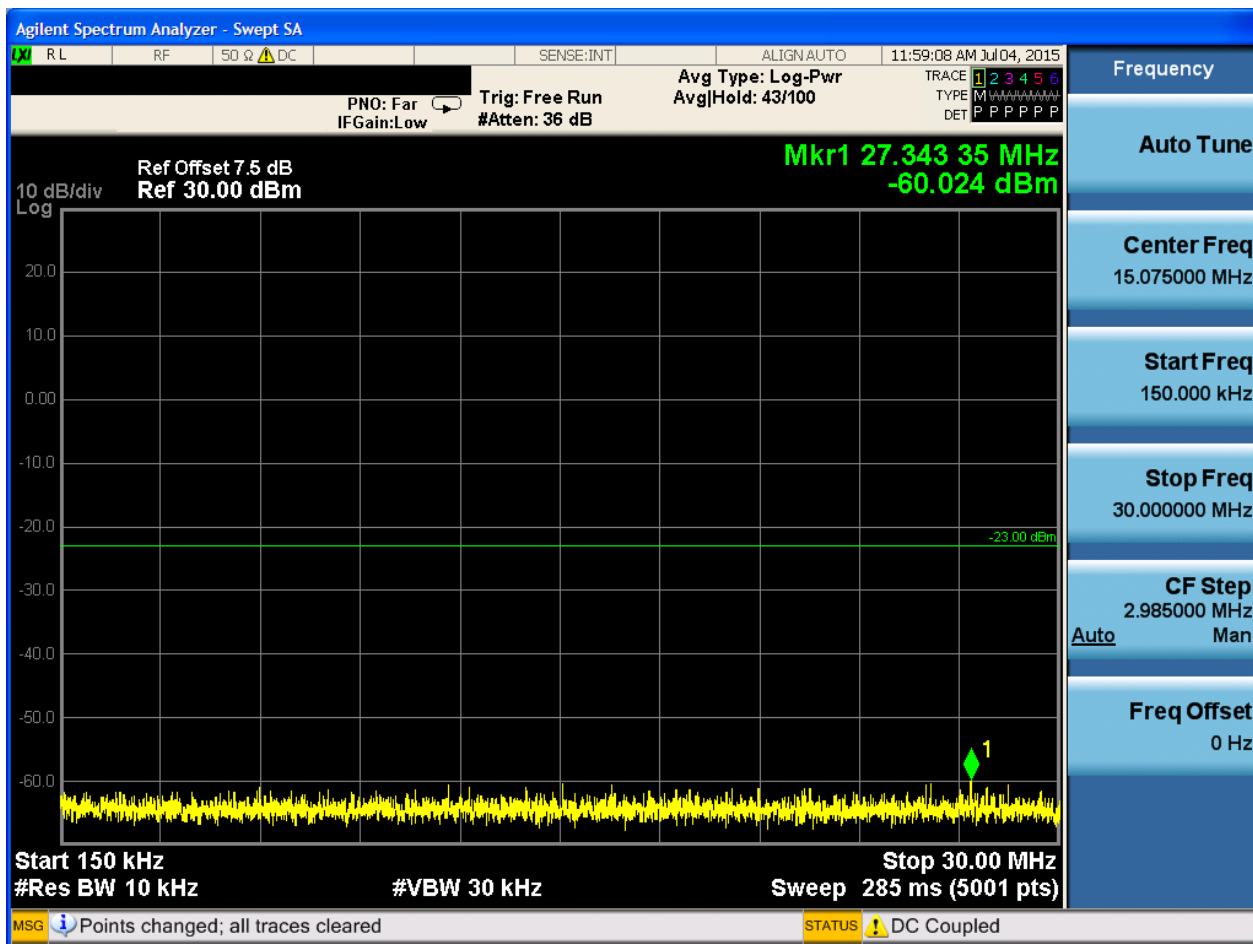


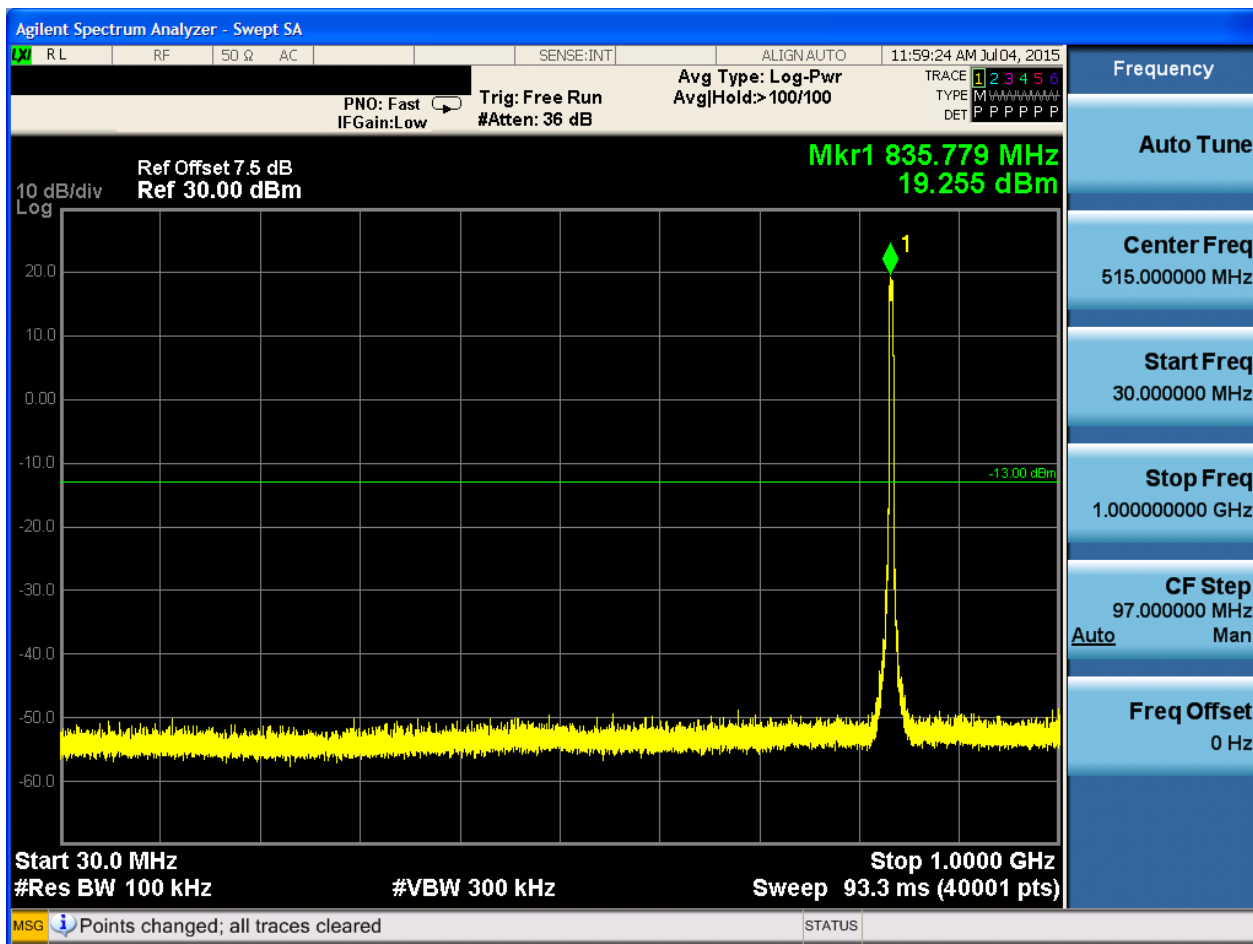


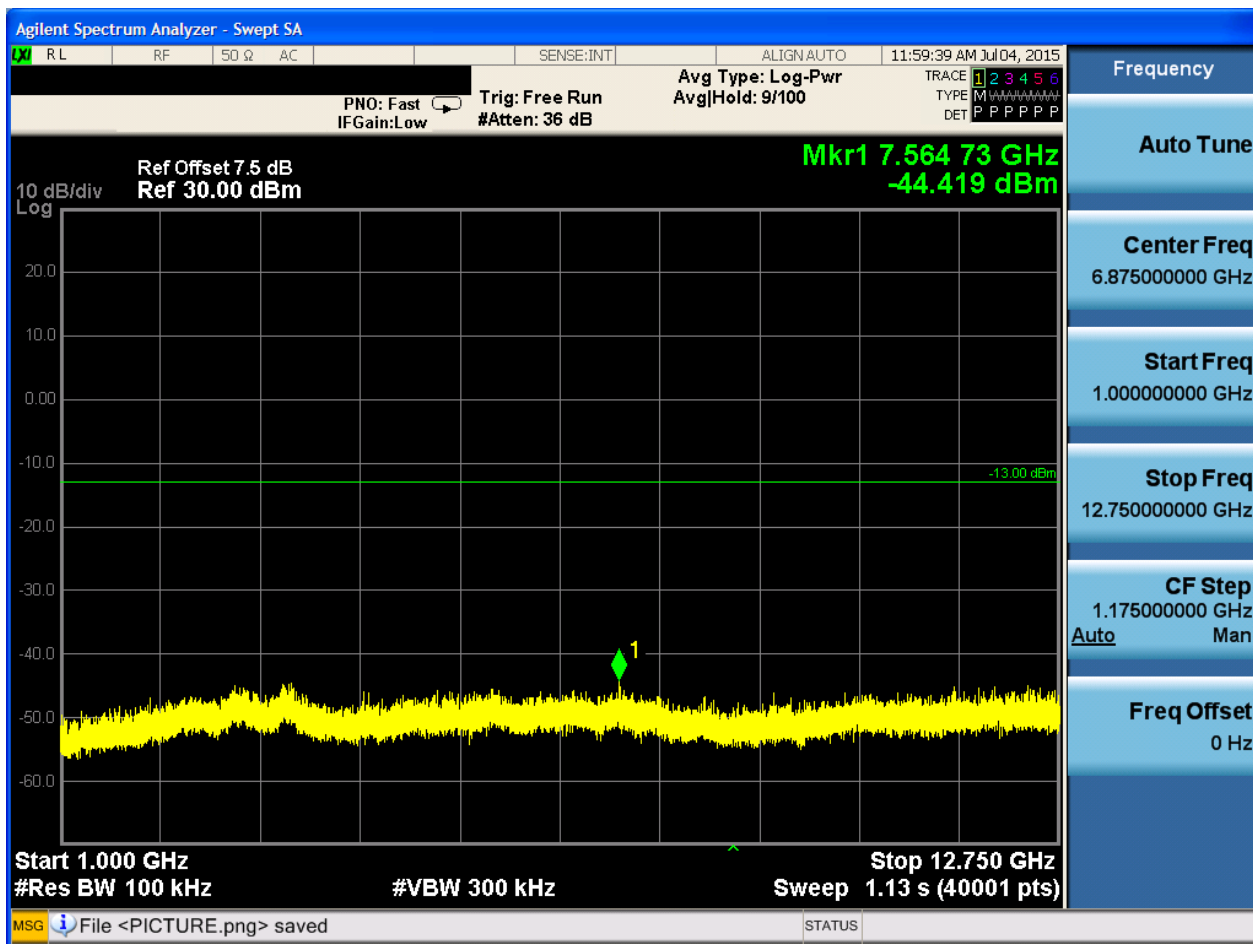


6.2.1.1.2 Test Channel = MCH

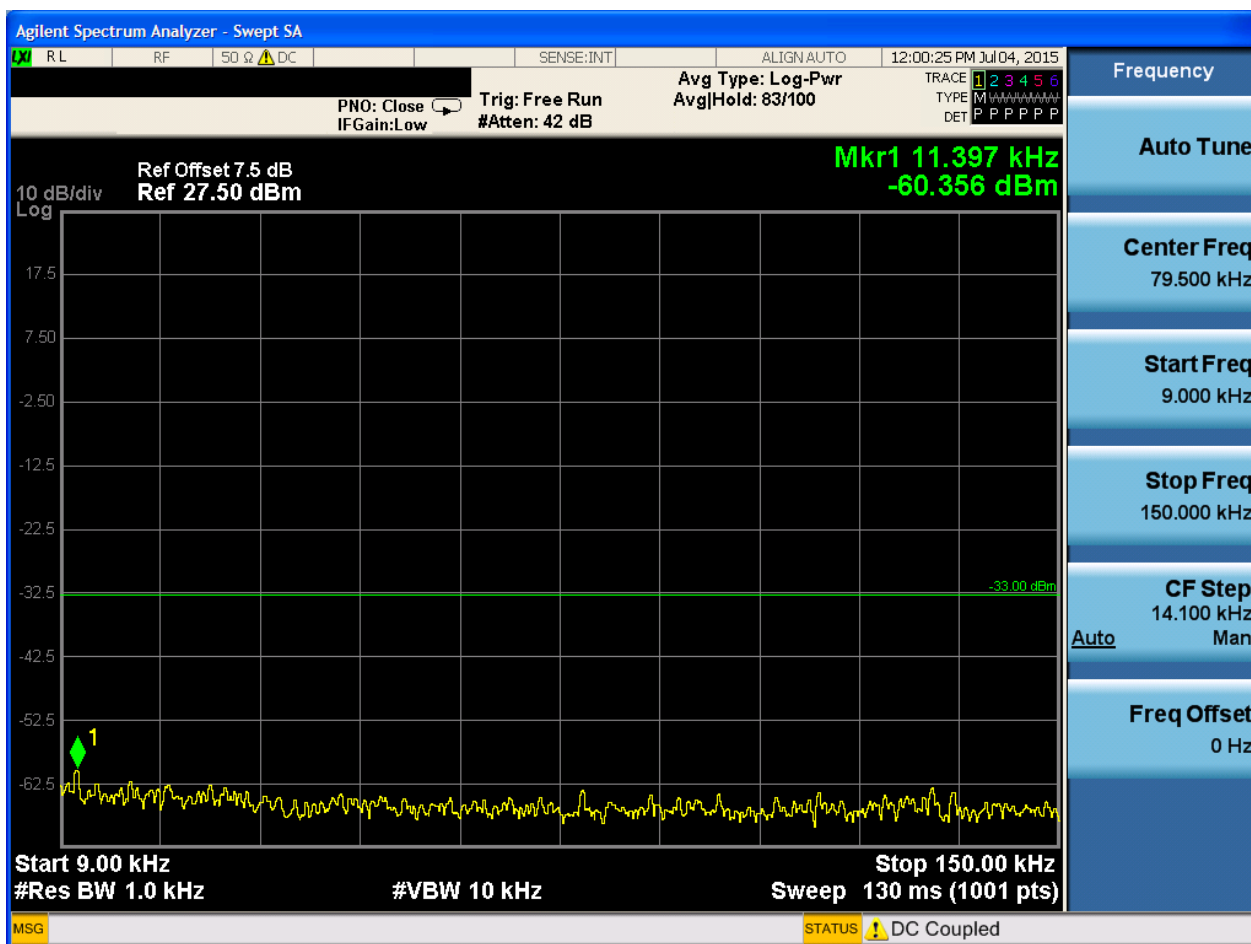


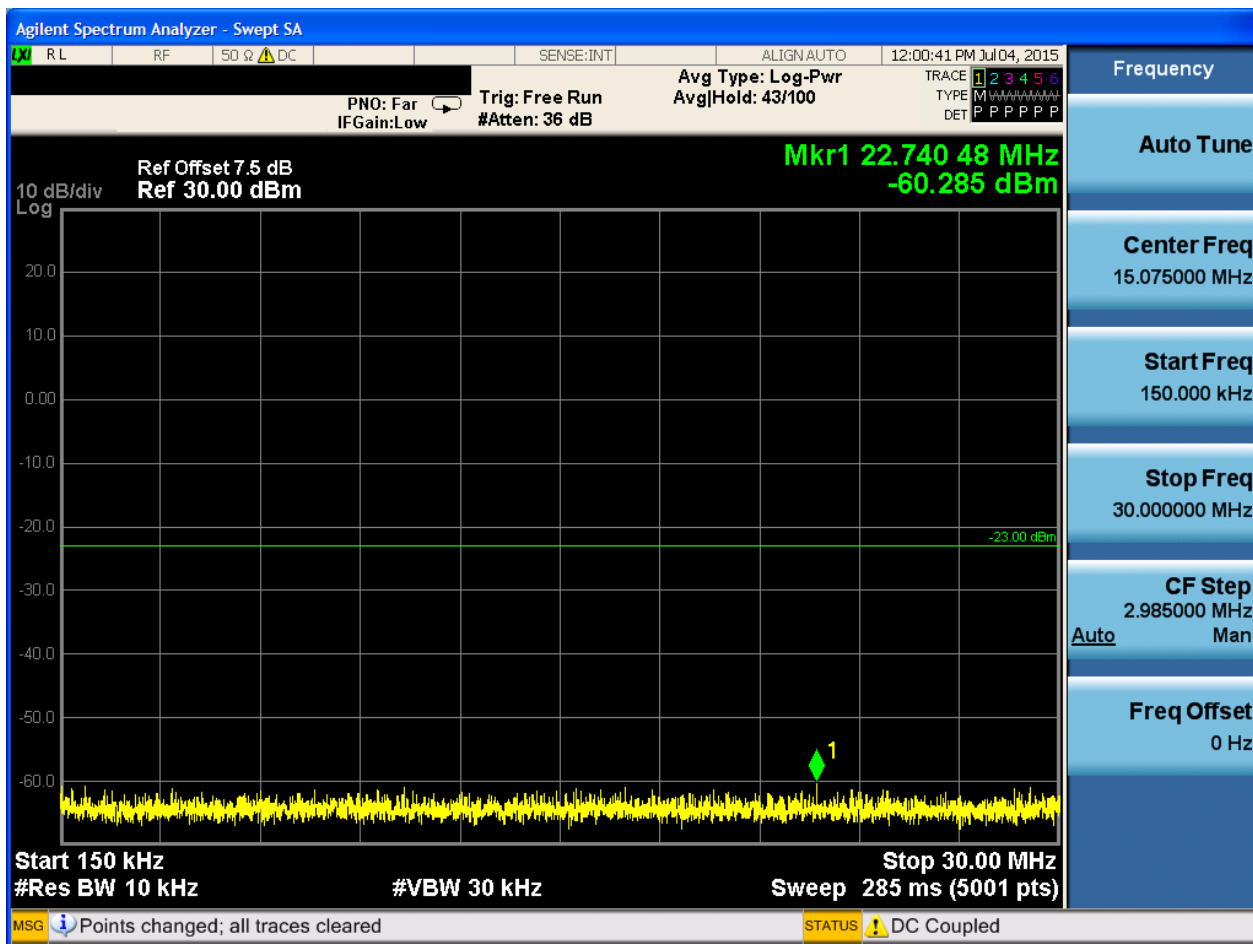


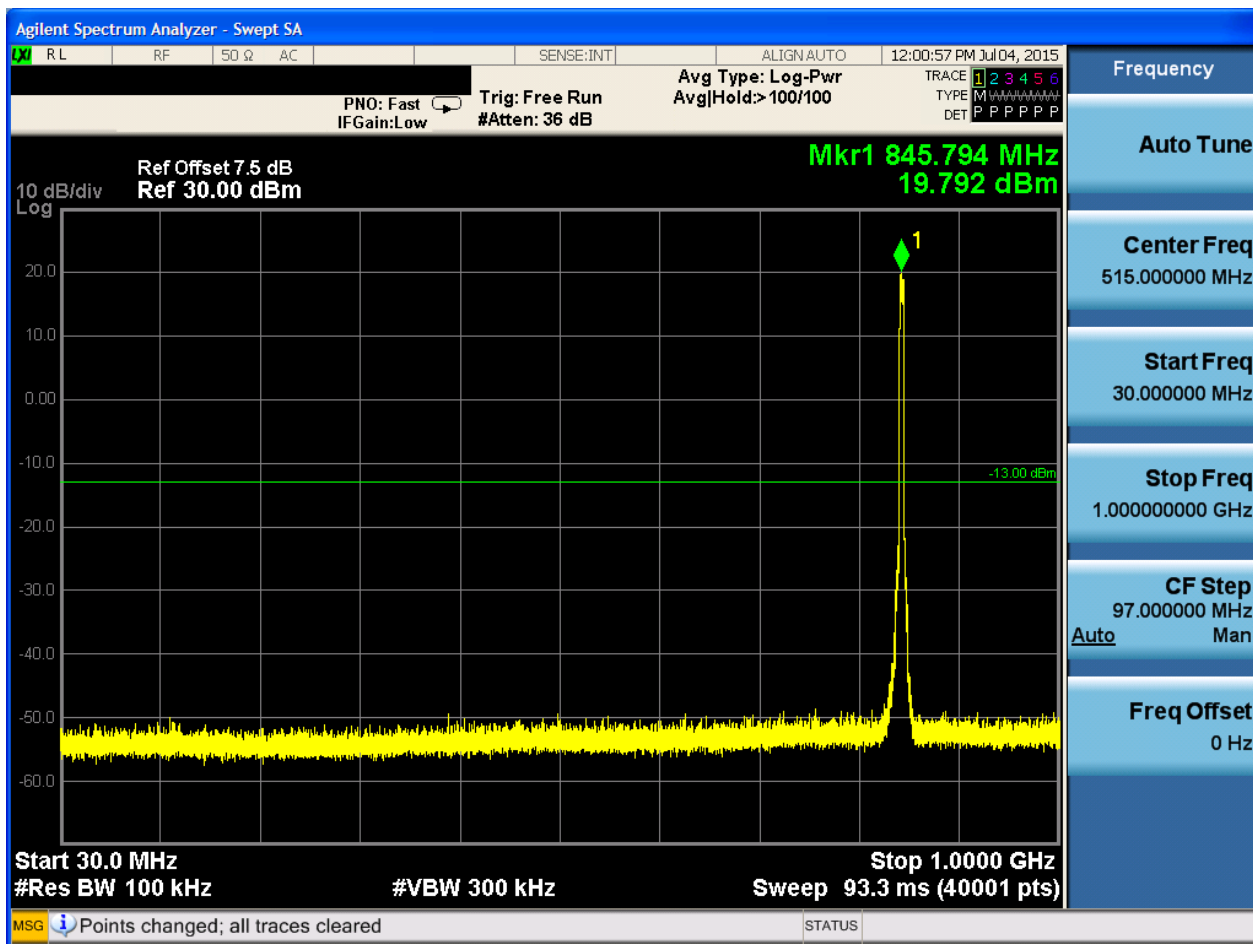


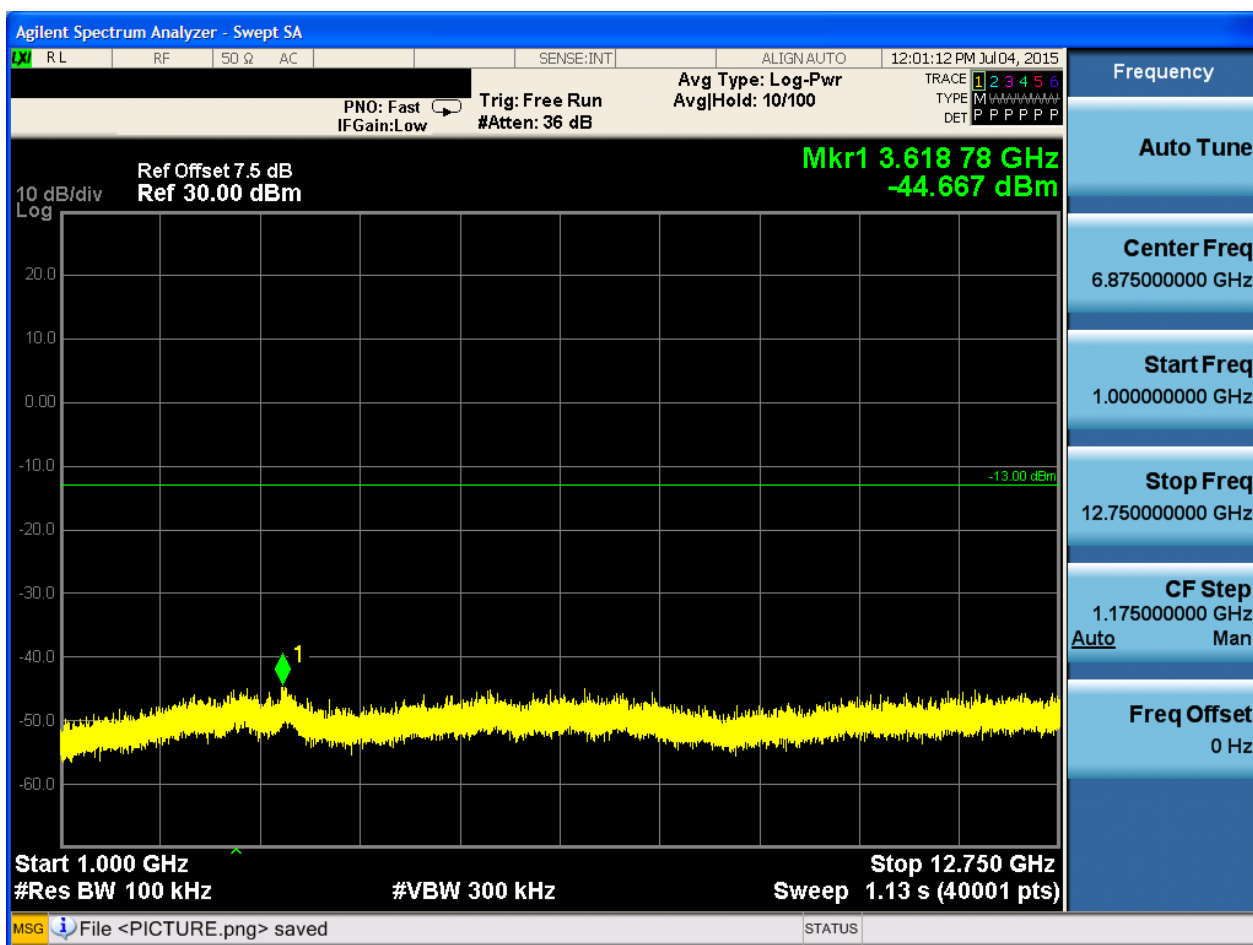


6.2.1.1.3 Test Channel = HCH









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

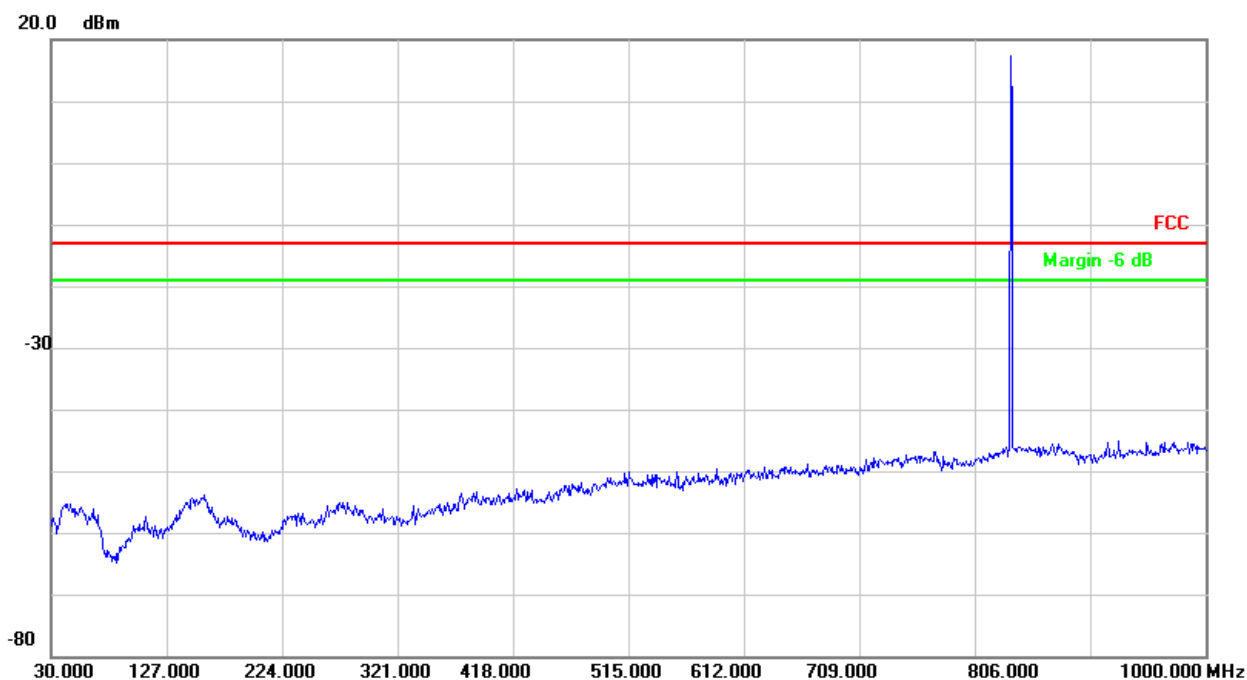
NOTE1: No peak found in the Test Range of “9 kHz to 30MHz”

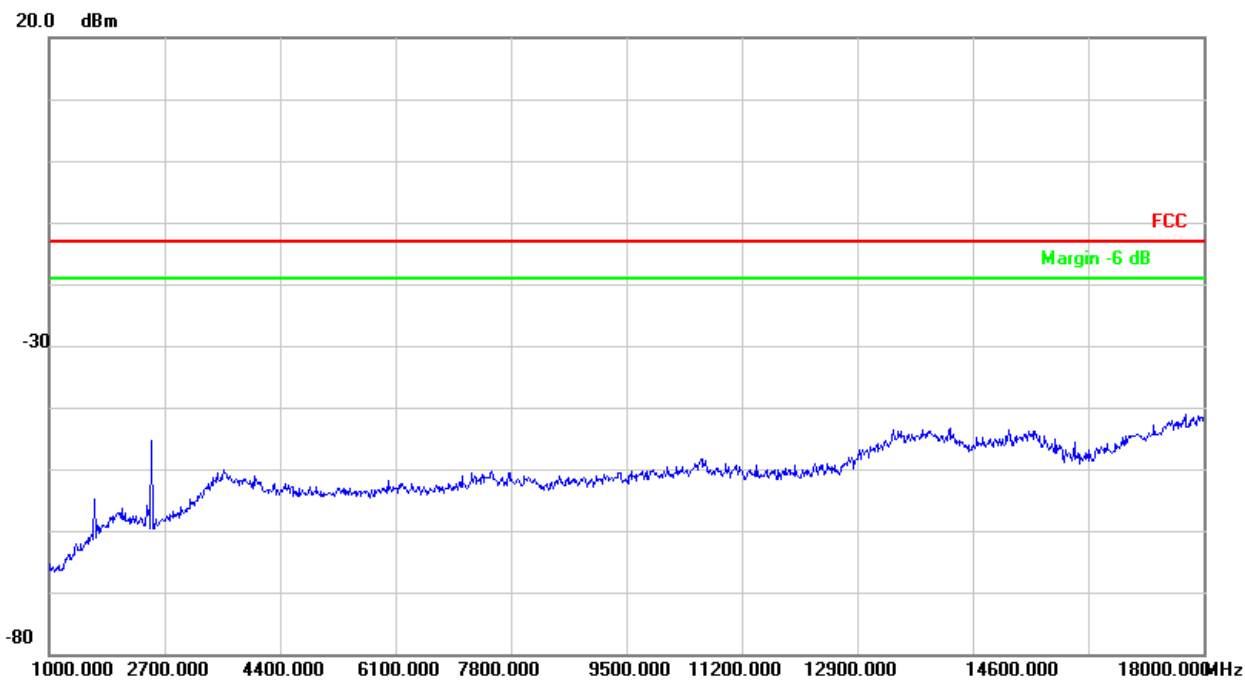
NOTE2: We tested all modes, but the data presented below is the worst case.

Part I - Test Plots

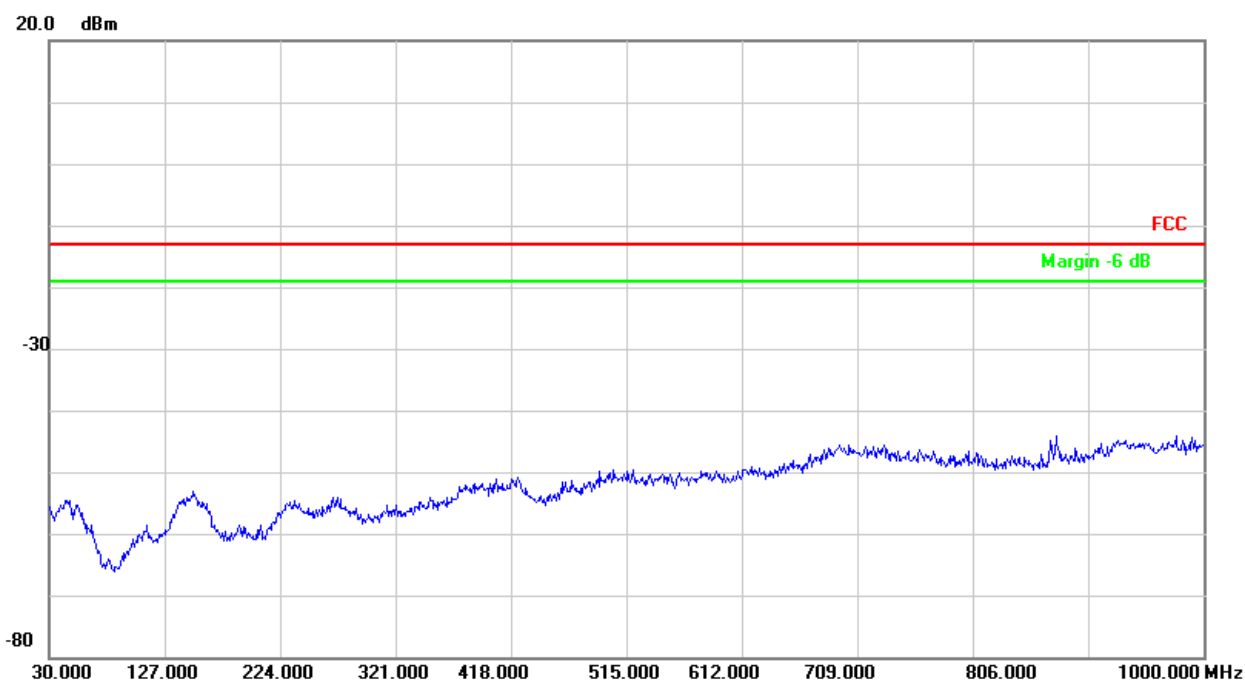
7.1 For GSM

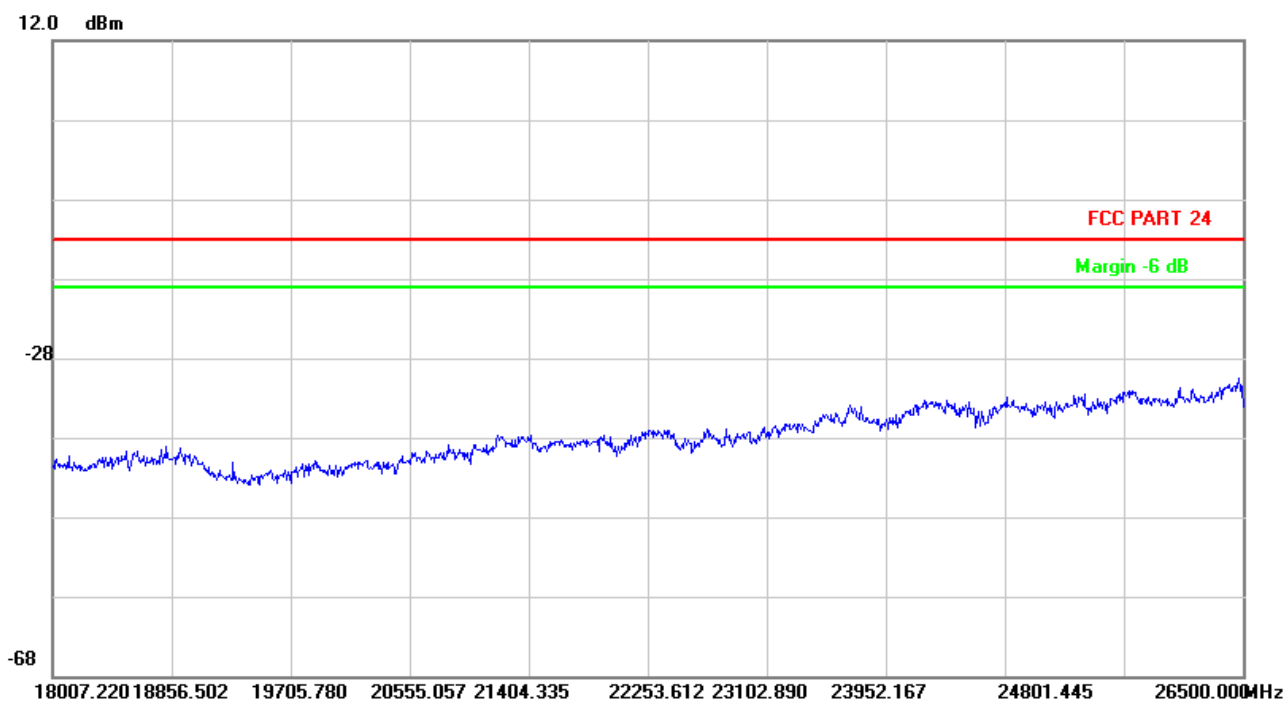
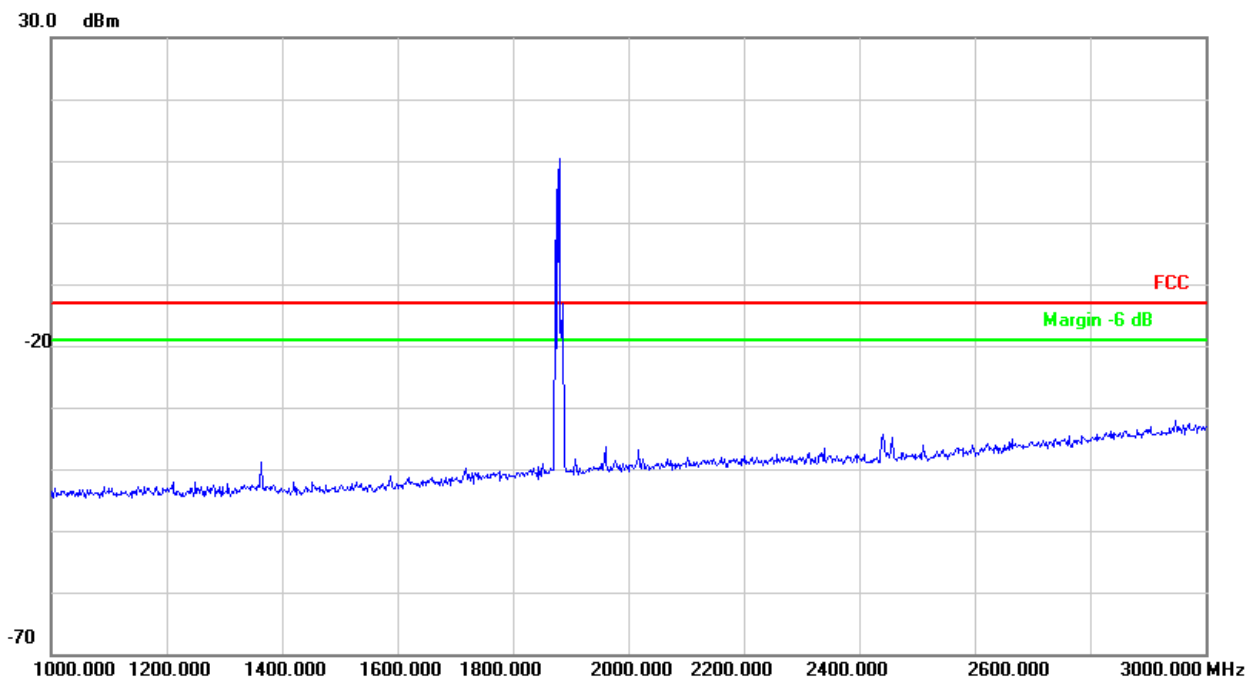
7.1.1 Test Band = GSM850





7.1.2 Test Band = GSM1900

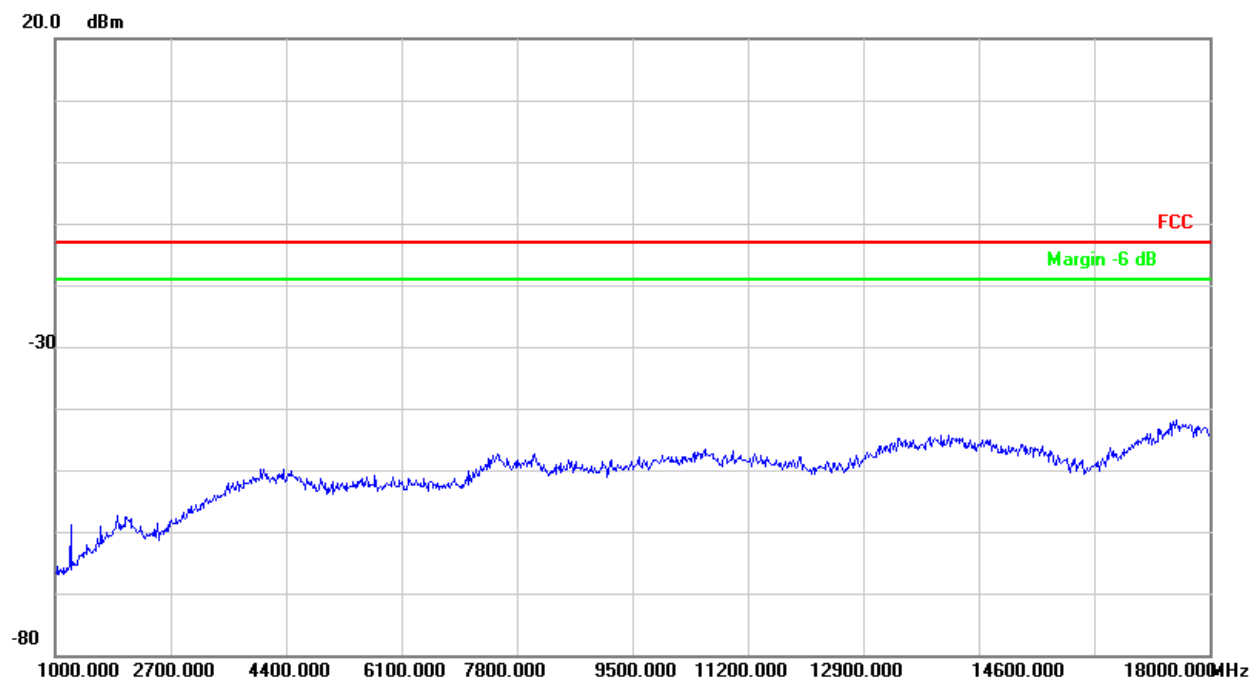
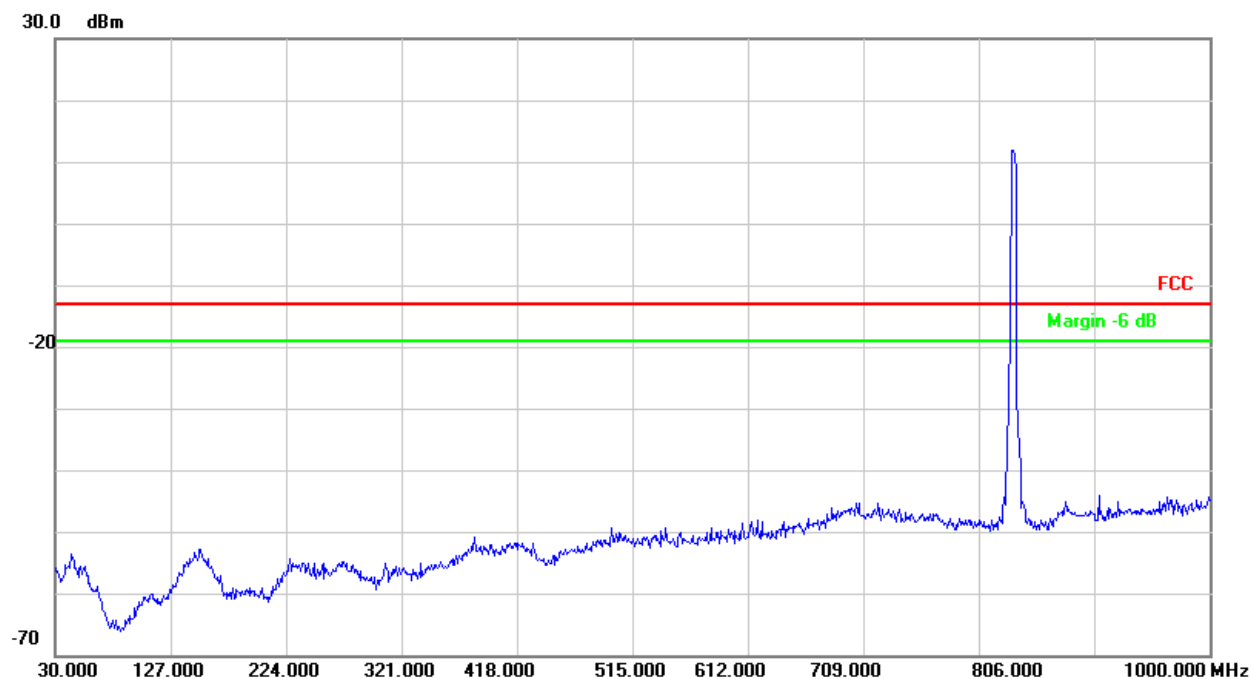




7.2 For UMTS

7.2.1 Test Band = WCDMA850

7.2.1.1 Test Mode = UMTS/TM1



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	10.85	0.01316	PASS
				VN	7.75	0.0094	PASS
				VH	7.43	0.00901	PASS
		MCH	TN	VL	13.24	0.01583	PASS
				VN	13.62	0.01628	PASS
				VH	10.65	0.01273	PASS
		HCH	TN	VL	9.23	0.01087	PASS
				VN	8.2	0.00966	PASS
				VH	8.39	0.00988	PASS
	GSM/TM2	LCH	TN	VL	12.01	0.01457	PASS
				VN	14.01	0.017	PASS
				VH	14.11	0.01712	PASS
		MCH	TN	VL	16.95	0.02026	PASS
				VN	17.5	0.02092	PASS
				VH	18.21	0.02177	PASS
		HCH	TN	VL	13.98	0.01647	PASS
				VN	14.85	0.0175	PASS
				VH	17.31	0.02039	PASS
GSM1900	GSM/TM1	LCH	TN	VL	18.02	0.00974	PASS
				VN	15.76	0.00852	PASS
				VH	18.47	0.00998	PASS
		MCH	TN	VL	12.66	0.00673	PASS
				VN	13.82	0.00735	PASS
				VH	13.82	0.00735	PASS
		HCH	TN	VL	14.59	0.00764	PASS
				VN	16.72	0.00875	PASS
				VH	11.56	0.00605	PASS
	GSM/TM2	LCH	TN	VL	23.12	0.0125	PASS
				VN	20.24	0.01094	PASS
				VH	20.02	0.01082	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	13.82	0.00735	PASS
				VN	16.56	0.00881	PASS
				VH	18.98	0.0101	PASS
		HCH	TN	VL	19.15	0.01003	PASS
				VN	20.11	0.01053	PASS
				VH	17.85	0.00935	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	5.88	0.00713	PASS
				-20	12.2	0.0148	PASS
				-10	15.11	0.01833	PASS
				0	3.87	0.0047	PASS
				10	9.3	0.01128	PASS
				20	17.24	0.02092	PASS
				30	17.43	0.02115	PASS
				40	5.81	0.00705	PASS
				50	7.1	0.00861	PASS
		MCH	VN	-30	12.4	0.01482	PASS
				-20	21.95	0.02624	PASS
				-10	16.79	0.02007	PASS
				0	25.12	0.03003	PASS
				10	16.98	0.0203	PASS
				20	23.63	0.02825	PASS
				30	9.62	0.0115	PASS
				40	16.08	0.01922	PASS
				50	16.66	0.01991	PASS
		HCH	VN	-30	8.72	0.01027	PASS
				-20	10.01	0.01179	PASS
				-10	7.04	0.00829	PASS
				0	10.72	0.01263	PASS
				10	5.75	0.00677	PASS
				20	8.59	0.01012	PASS
				30	7.17	0.00845	PASS
				40	5.36	0.00631	PASS
				50	3.81	0.00449	PASS
	GSM/TM2	LCH	VN	-30	13.82	0.01677	PASS
				-20	13.75	0.01668	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-10	16.11	0.01955	PASS
				0	16.34	0.01983	PASS
				10	15.5	0.01881	PASS
				20	12.43	0.01508	PASS
				30	16.14	0.01958	PASS
				40	13.88	0.01684	PASS
				50	14.4	0.01747	PASS
		MCH	VN	-30	19.95	0.02385	PASS
				-20	11.46	0.0137	PASS
				-10	30.32	0.03624	PASS
				0	16.43	0.01964	PASS
				10	20.79	0.02485	PASS
				20	16.69	0.01995	PASS
				30	18.5	0.02211	PASS
				40	27.02	0.0323	PASS
				50	19.98	0.02388	PASS
		HCH	VN	-30	14.56	0.01715	PASS
				-20	16.11	0.01898	PASS
				-10	15.05	0.01773	PASS
				0	17.98	0.02118	PASS
				10	17.89	0.02108	PASS
				20	18.24	0.02149	PASS
				30	16.82	0.01982	PASS
				40	16.82	0.01982	PASS
				50	16.11	0.01898	PASS
GSM1900	GSM/TM1	LCH	VN	-30	20.99	0.01134	PASS
				-20	25.38	0.01372	PASS
				-10	20.99	0.01134	PASS
				0	21.24	0.01148	PASS
				10	18.79	0.01016	PASS
				20	20.47	0.01106	PASS
				30	20.6	0.01113	PASS
				40	21.18	0.01145	PASS
				50	25.7	0.01389	PASS
		MCH	VN	-30	17.69	0.00941	PASS
				-20	15.76	0.00838	PASS
				-10	16.66	0.00886	PASS
				0	15.24	0.00811	PASS
				10	14.14	0.00752	PASS
				20	14.14	0.00752	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				30	18.27	0.00972	PASS
				40	13.95	0.00742	PASS
				50	17.5	0.00931	PASS
		HCH	VN	-30	14.92	0.00781	PASS
				-20	11.3	0.00592	PASS
				-10	12.33	0.00646	PASS
				0	15.88	0.00832	PASS
				10	10.59	0.00555	PASS
				20	14.66	0.00768	PASS
				30	14.14	0.0074	PASS
				40	6.46	0.00338	PASS
				50	8.72	0.00457	PASS
	GSM/TM2	LCH	VN	-30	28.25	0.01527	PASS
				-20	25.86	0.01398	PASS
				-10	25.7	0.01389	PASS
				0	23.76	0.01284	PASS
				10	27.93	0.0151	PASS
				20	24.5	0.01324	PASS
				30	24.92	0.01347	PASS
				40	24.7	0.01335	PASS
				50	26.83	0.0145	PASS
		MCH	VN	-30	18.21	0.00969	PASS
				-20	18.98	0.0101	PASS
				-10	14.3	0.00761	PASS
				0	20.18	0.01073	PASS
				10	19.21	0.01022	PASS
				20	22.05	0.01173	PASS
				30	26.22	0.01395	PASS
				40	19.79	0.01053	PASS
				50	21.66	0.01152	PASS
		HCH	VN	-30	16.76	0.00878	PASS
				-20	16.01	0.00838	PASS
				-10	14.75	0.00772	PASS
				0	15.43	0.00808	PASS
				10	15.76	0.00825	PASS
				20	16.37	0.00857	PASS
				30	17.56	0.00919	PASS
				40	19.02	0.00996	PASS
				50	19.47	0.01019	PASS

8.2 For UMTS

8.2.1 Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	TN	VL	0.61	0.00074	PASS
				VN	1.74	0.00211	PASS
				VH	2.52	0.00305	PASS
		MCH	TN	VL	-1.68	-0.00201	PASS
				VN	0.5	0.0006	PASS
				VH	1.21	0.00145	PASS
		HCH	TN	VL	-3.28	-0.00387	PASS
				VN	-0.69	-0.00082	PASS
				VH	-4.49	-0.0053	PASS

8.2.2 Frequency Error vs. Temperature:

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA850	UMTS/TM1	LCH	VN	-30	0.85	0.00103	PASS
				-20	1.63	0.00197	PASS
				-10	3.6	0.00436	PASS
				0	2.73	0.0033	PASS
				10	2	0.00242	PASS
				20	0.52	0.00063	PASS
				30	0.89	0.00108	PASS
				40	2.47	0.00299	PASS
				50	3.22	0.0039	PASS
		MCH	VN	-30	-0.75	-0.0009	PASS
				-20	-0.9	-0.00108	PASS
				-10	0.2	0.00024	PASS
				0	-2.85	-0.00341	PASS
				10	0.76	0.00091	PASS
				20	0.32	0.00038	PASS
				30	0.47	0.00056	PASS
				40	-0.6	-0.00072	PASS
				50	0.84	0.001	PASS
		HCH	VN	-30	-1.86	-0.0022	PASS
				-20	-2.18	-0.00258	PASS
				-10	-0.08	-0.00009	PASS
				0	-1.91	-0.00226	PASS
				10	-3.51	-0.00415	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				20	1.22	0.00144	PASS
				30	-2.66	-0.00314	PASS
				40	-0.93	-0.0011	PASS
				50	-3.51	-0.00415	PASS

END