



Appendix for test report



1Appendix_A: Effective (Isotropic) Radiated Power Output Data

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.4	29.58	33	PASS
		MCH	30.17	29.41	33	PASS
		HCH	29.9	29.23	33	PASS
	GSM/TM2	LCH	25.78	24.99	33	PASS
		MCH	25.76	24.92	33	PASS
		HCH	25.77	25.02	33	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	ERP [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	33.28	30.24	38.5	PASS
		MCH	33.32	30.26	38.5	PASS
		HCH	33.3	30.27	38.5	PASS
	GSM/TM2	LCH	26.85	23.87	38.5	PASS
		MCH	26.79	23.75	38.5	PASS
		HCH	26.77	23.92	38.5	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	0.13	13	PASS
		HCH	0.14	13	PASS
	GSM/TM2	LCH	2.85	13	PASS
		MCH	2.84	13	PASS
		HCH	3.04	13	PASS
GSM850	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.14	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.1	13	PASS
		MCH	3.12	13	PASS
		HCH	3.15	13	PASS

3Appendix_C: Modulation Characteristics

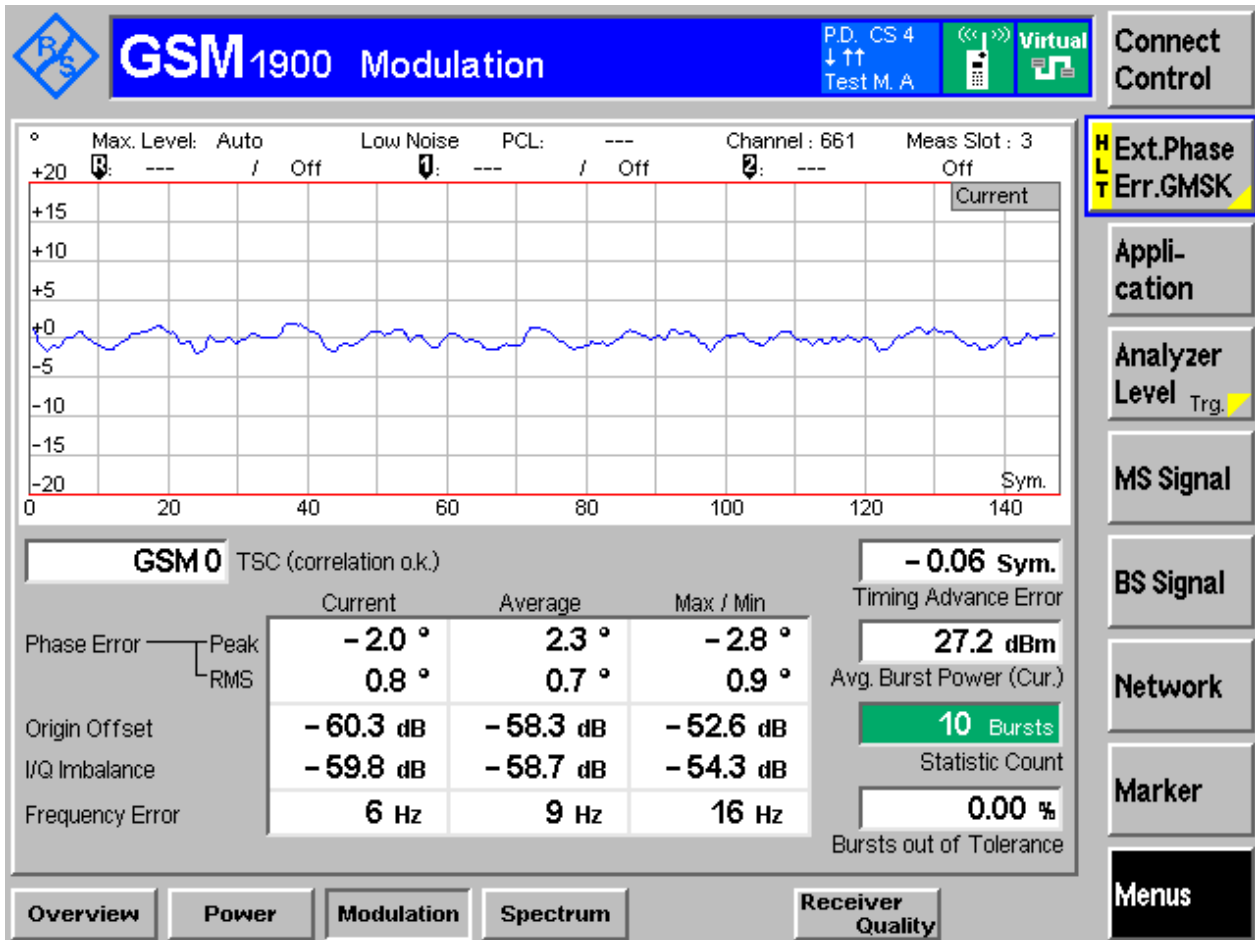
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM1900

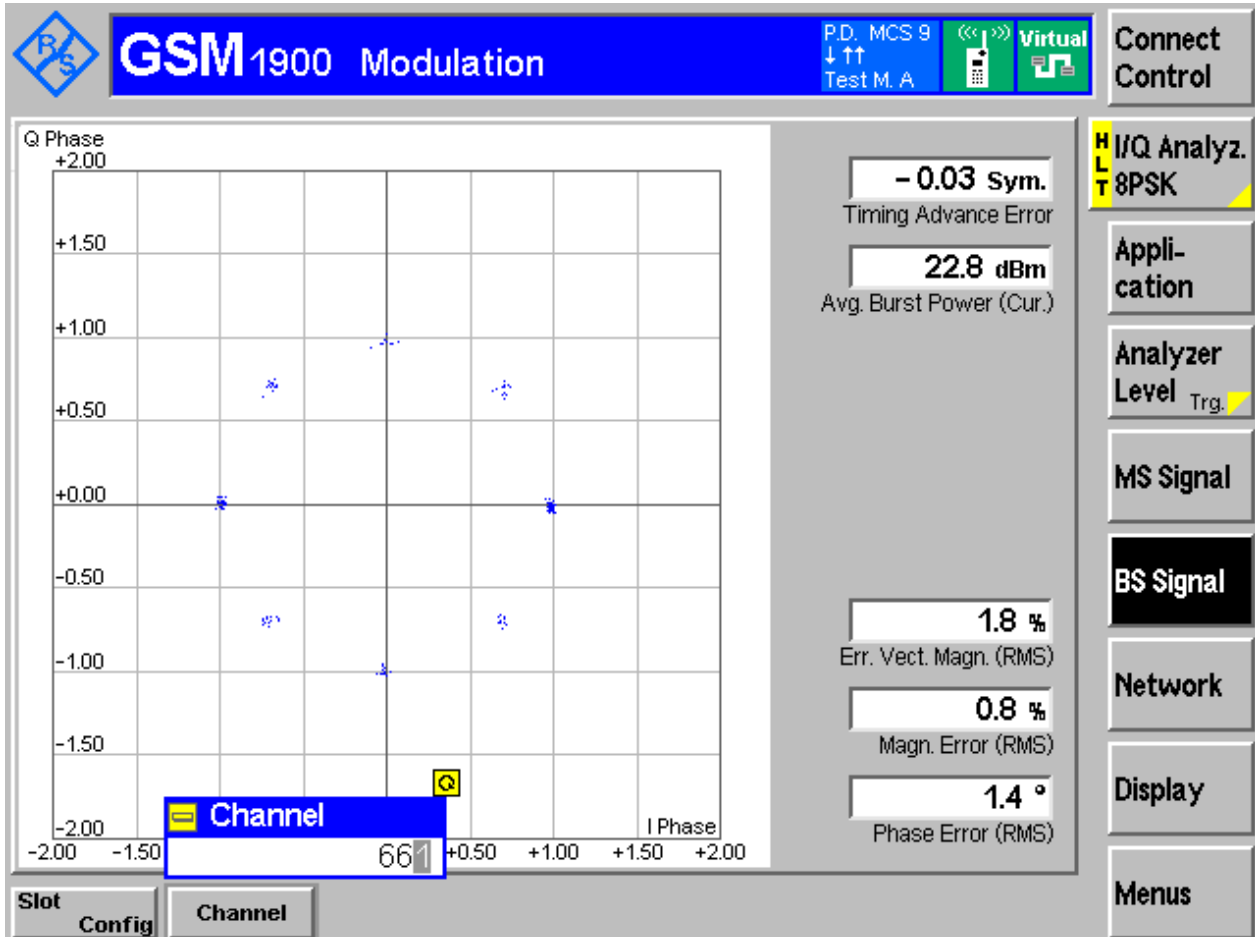
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

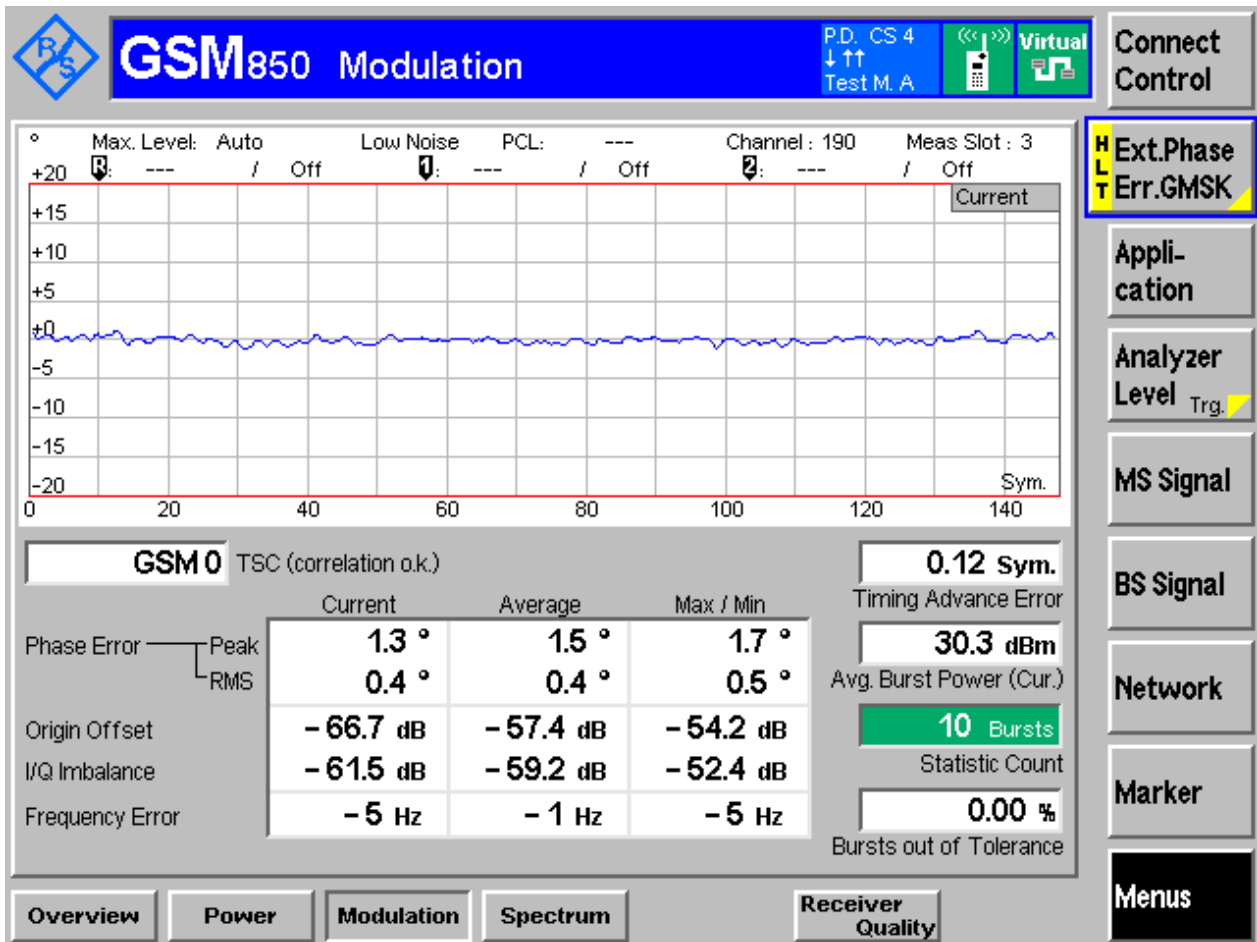
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM850

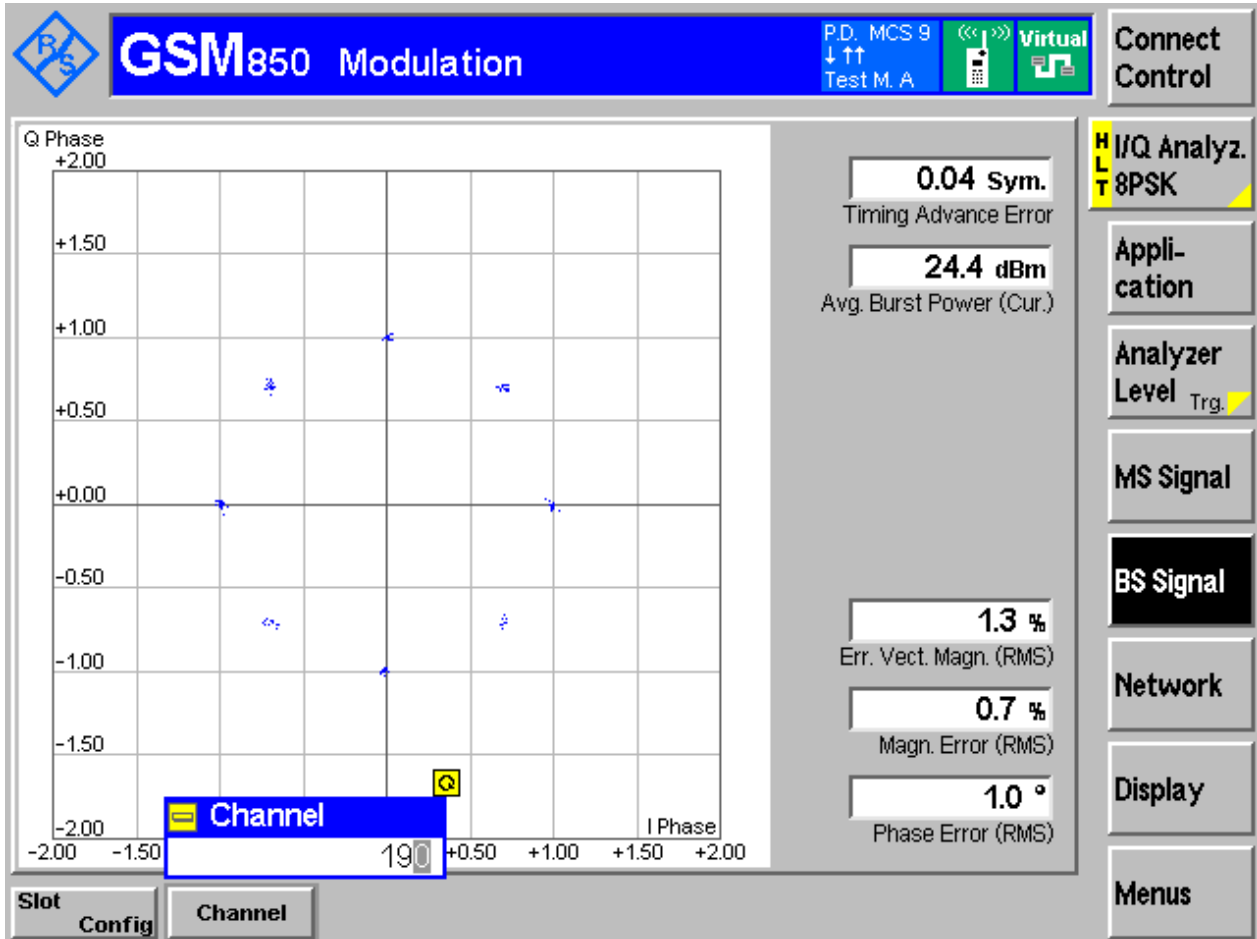
3.1.2.1 Test Mode = GSM/TM1

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
GSM1900	GSM/TM1	LCH	245.62	318.17	Pass
		MCH	245.73	322.21	Pass
		HCH	243.54	313.39	Pass
	GSM/TM2	LCH	250.02	318.68	Pass
		MCH	247.80	320.73	Pass
		HCH	250.24	324.25	Pass
GSM850	GSM/TM1	LCH	245.44	316.07	Pass
		MCH	245.57	318.70	Pass
		HCH	245.24	313.23	Pass
	GSM/TM2	LCH	243.85	320.7	Pass
		MCH	240.45	311.72	Pass
		HCH	240.14	306.83	Pass

Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM1900

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

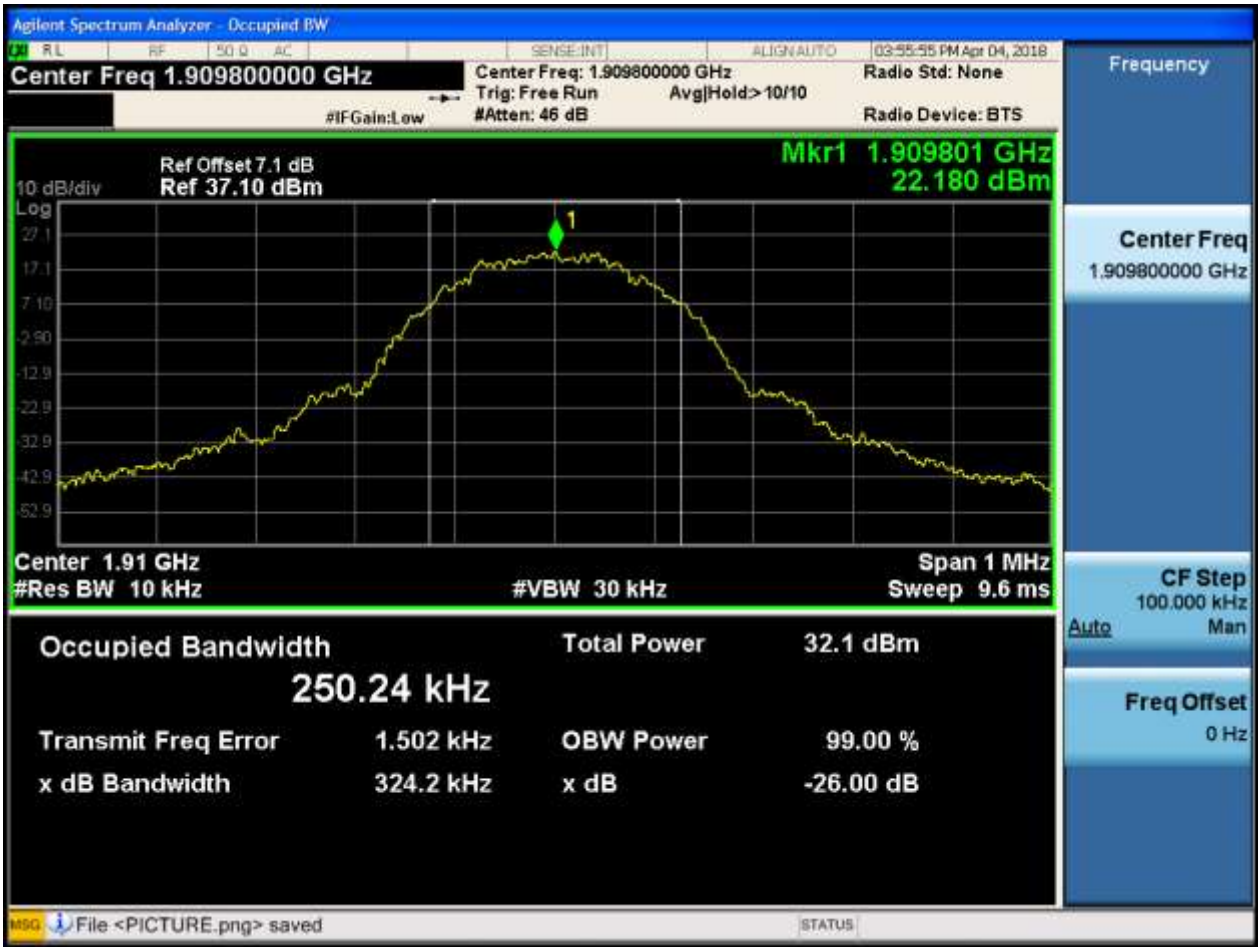
4.1.1.2.1 Test Channel = LCH



4.1.1.2.2 Test Channel = MCH



4.1.1.2.3 Test Channel = HCH



4.1.2 Test Band = GSM850

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

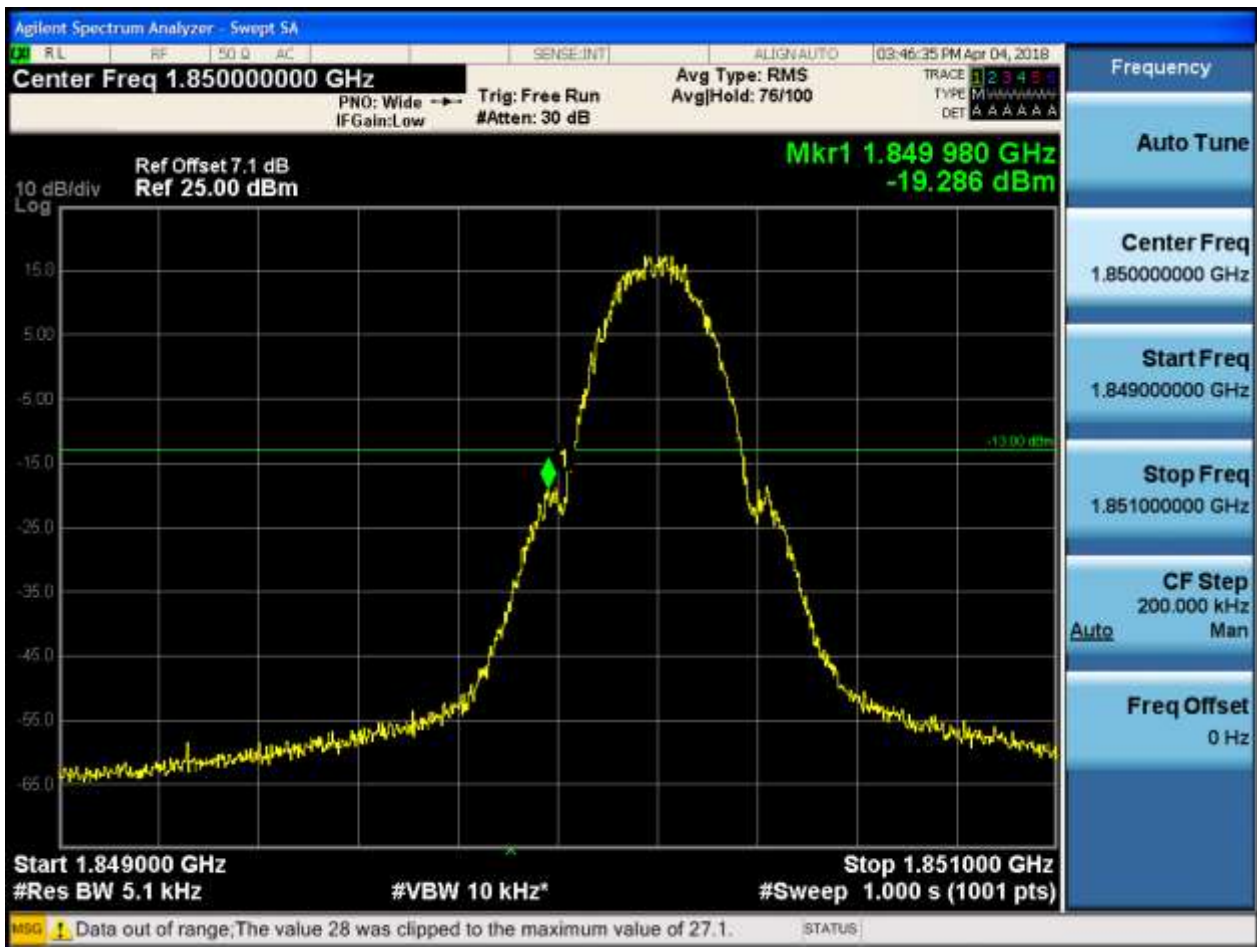
Part I - Test Plots

5.1 For GSM

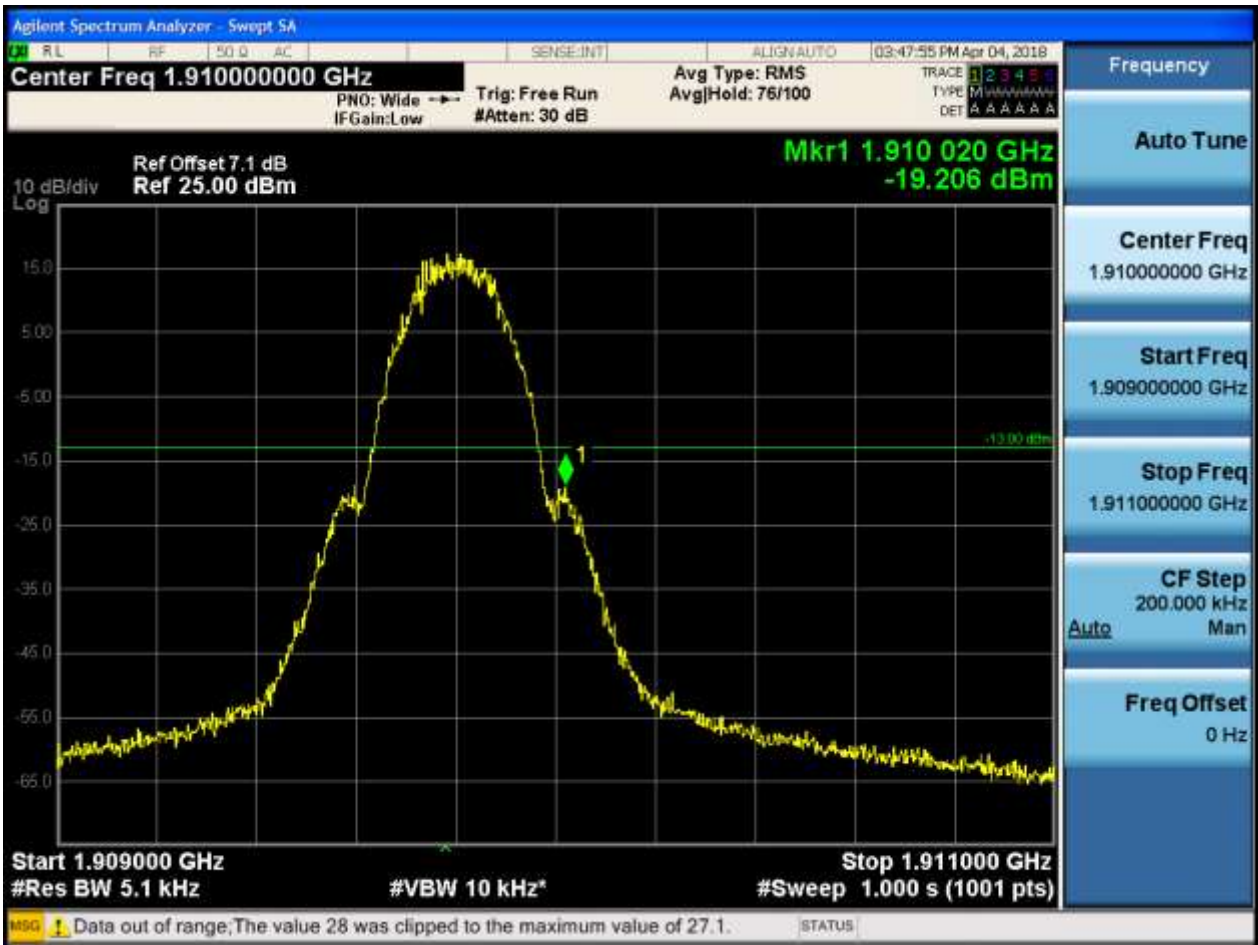
5.1.1 Test Band = GSM1900

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

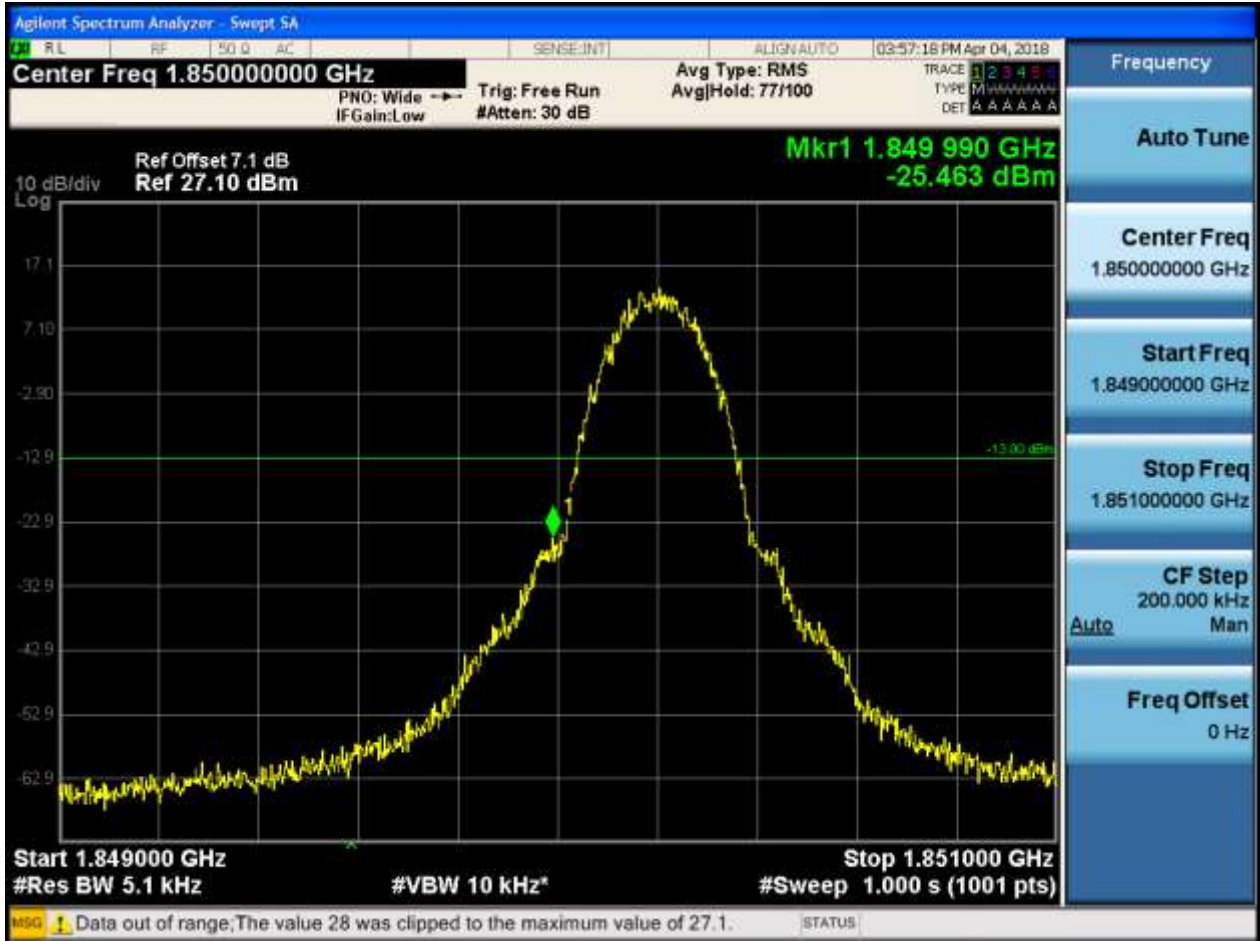


5.1.1.1.2 Test Channel = HCH

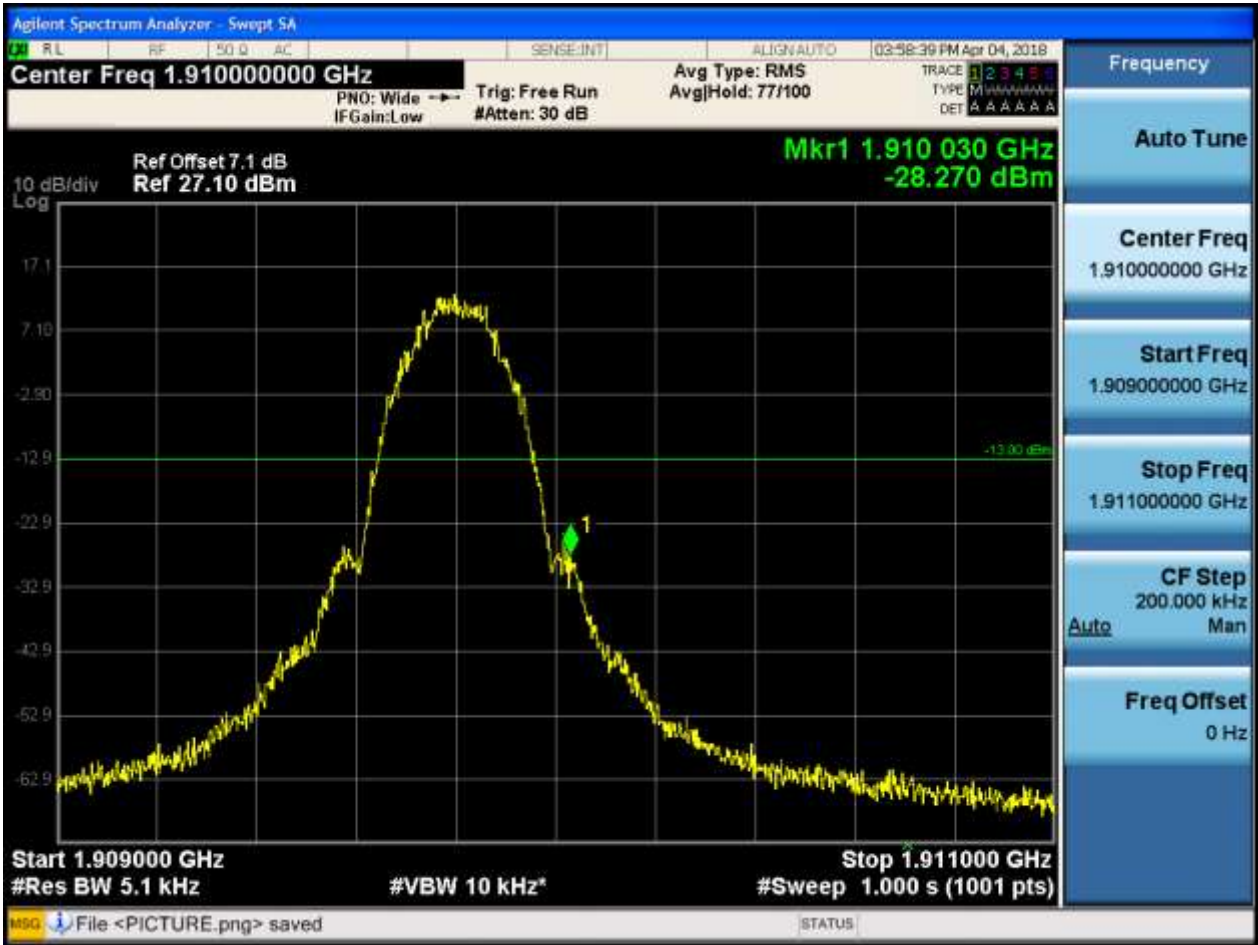


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



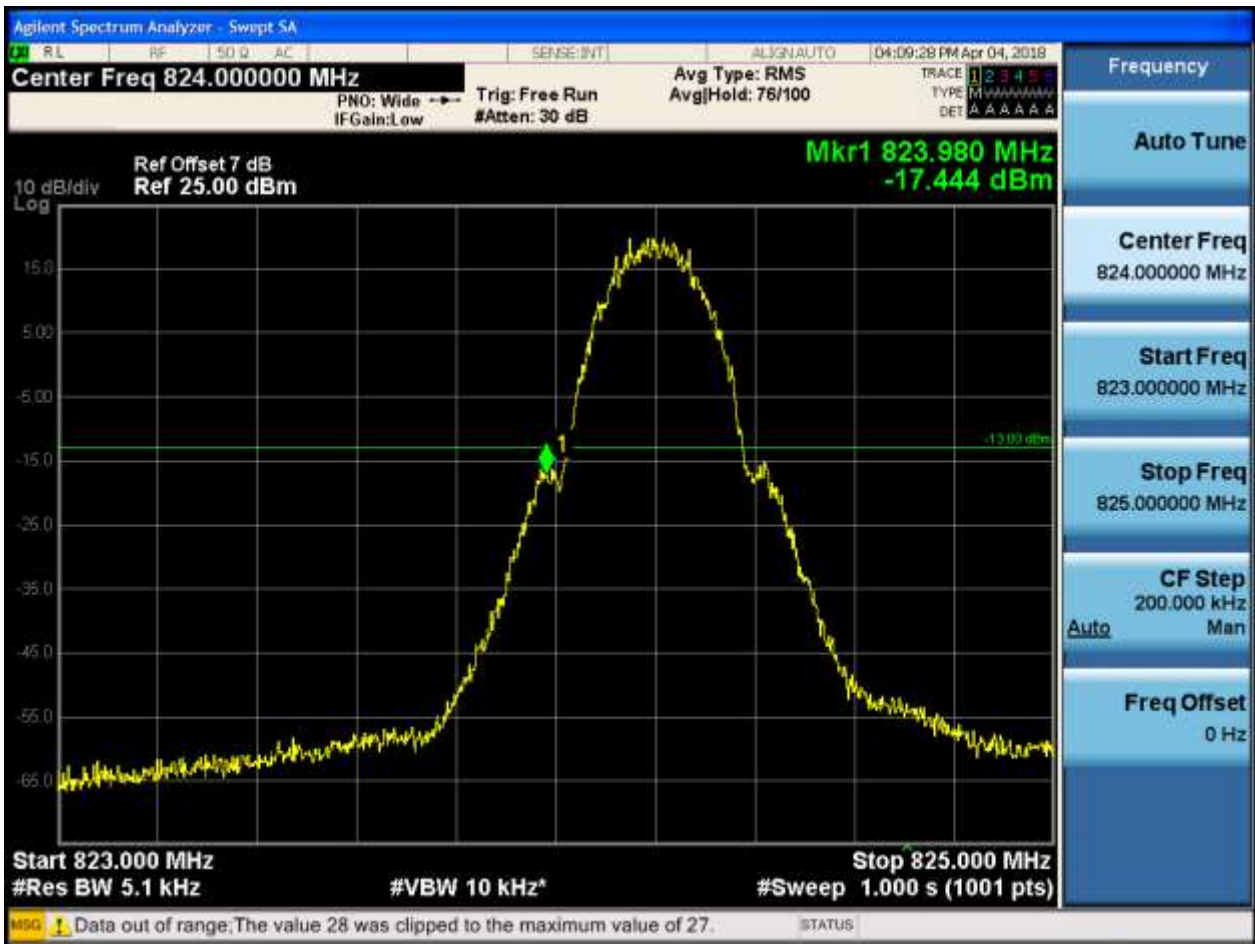
5.1.1.2.2 Test Channel = HCH



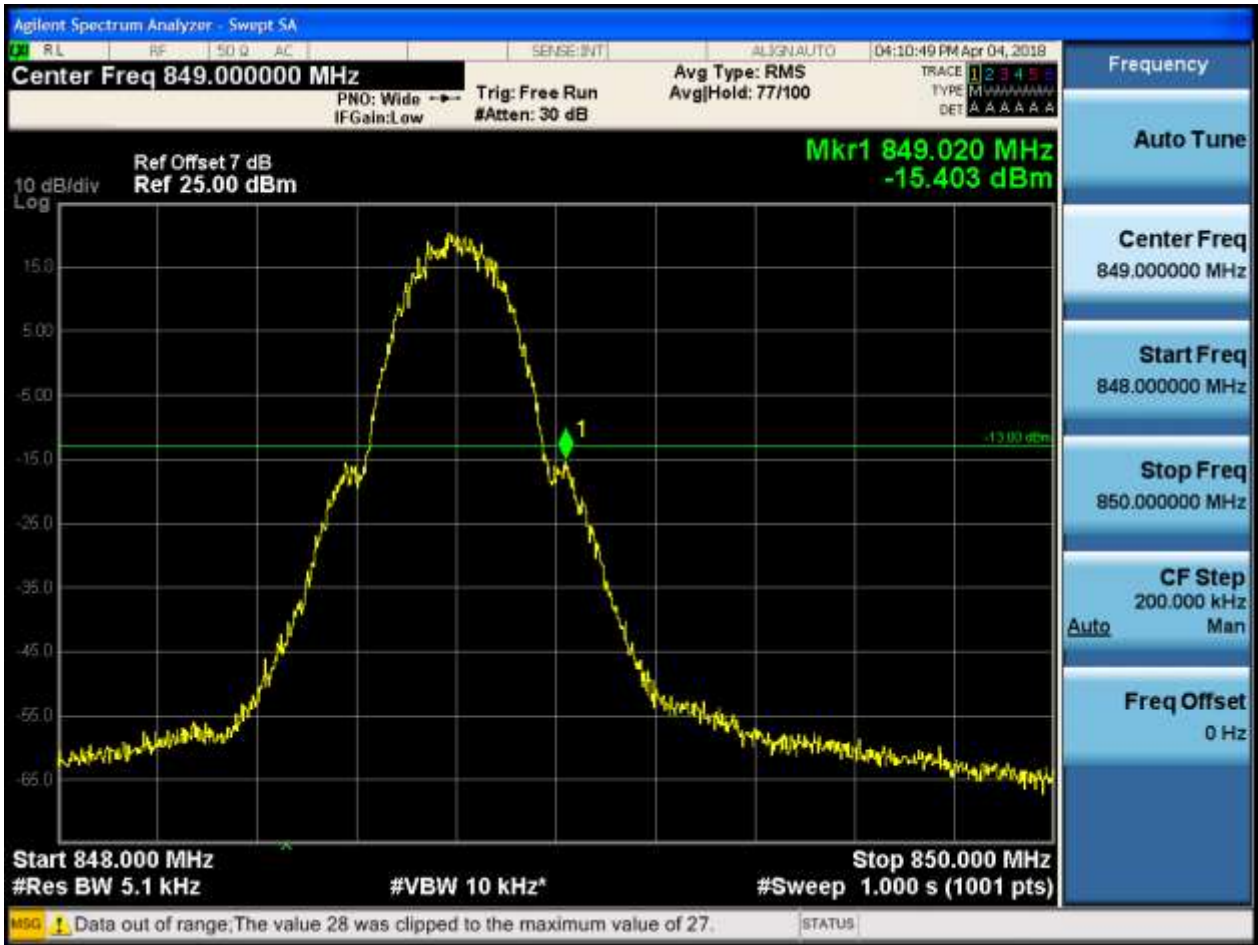
5.1.2 Test Band = GSM850

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

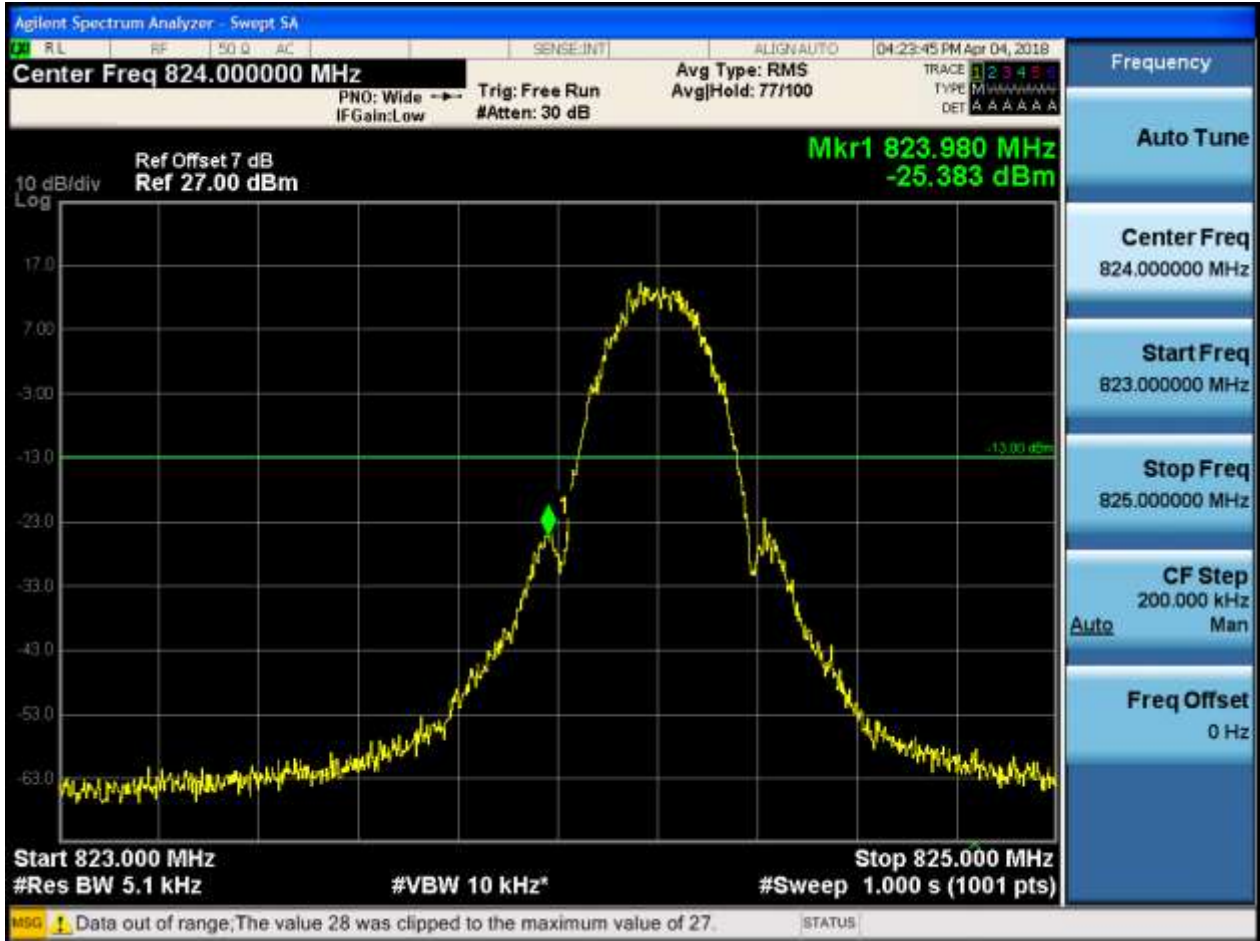


5.1.2.1.2 Test Channel = HCH

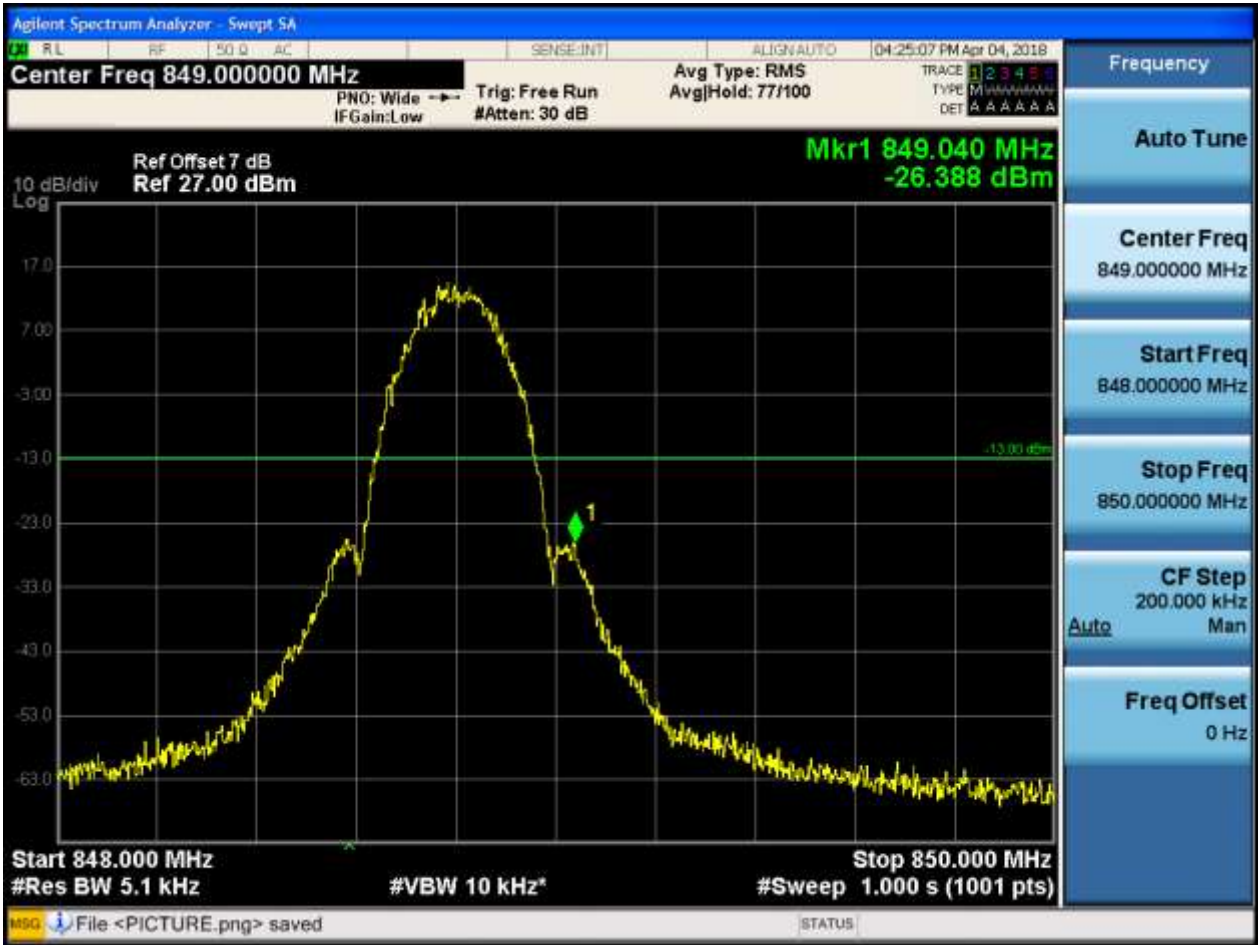


5.1.2.2 Test Mode = GSM/TM2

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.

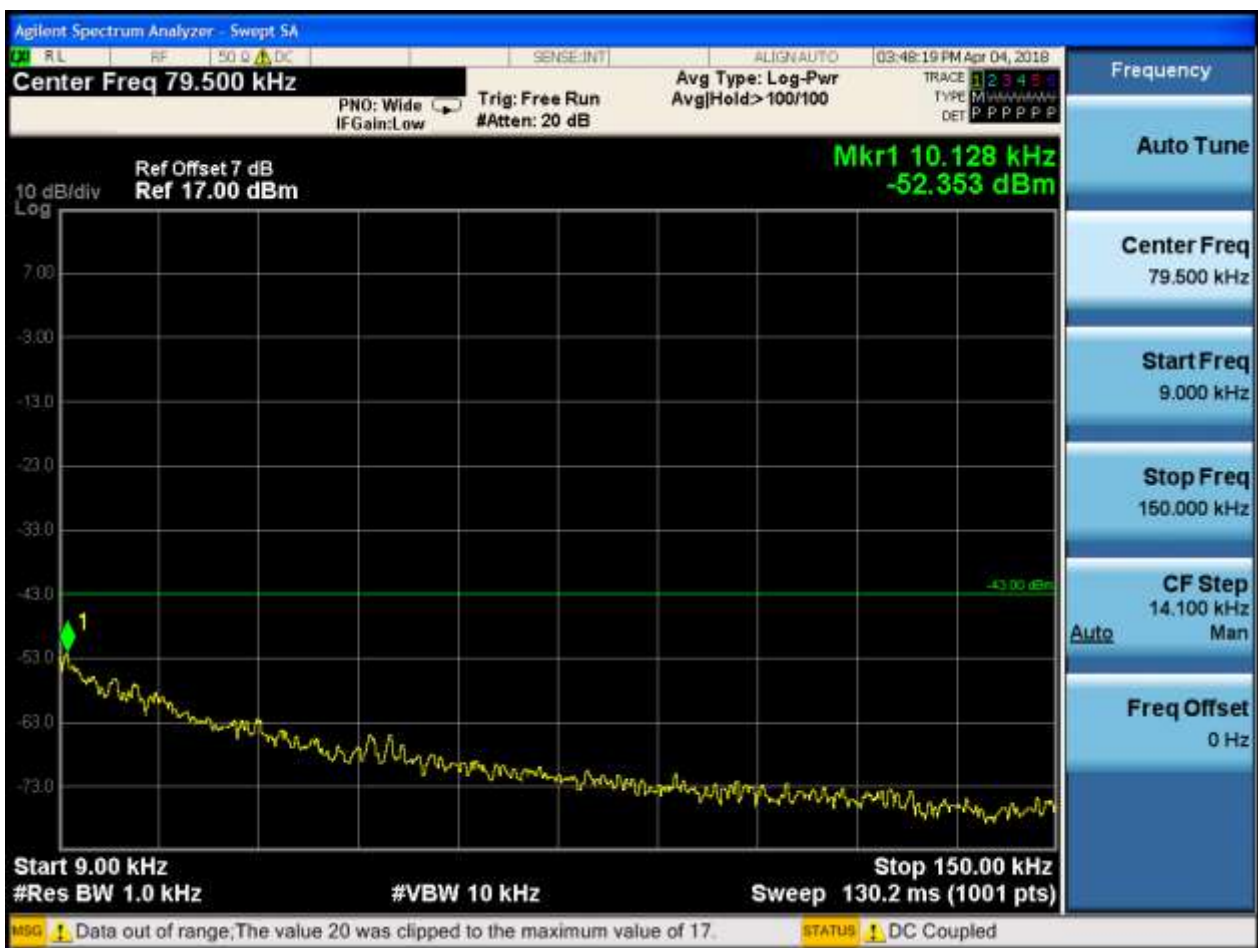
Part I - Test Plots

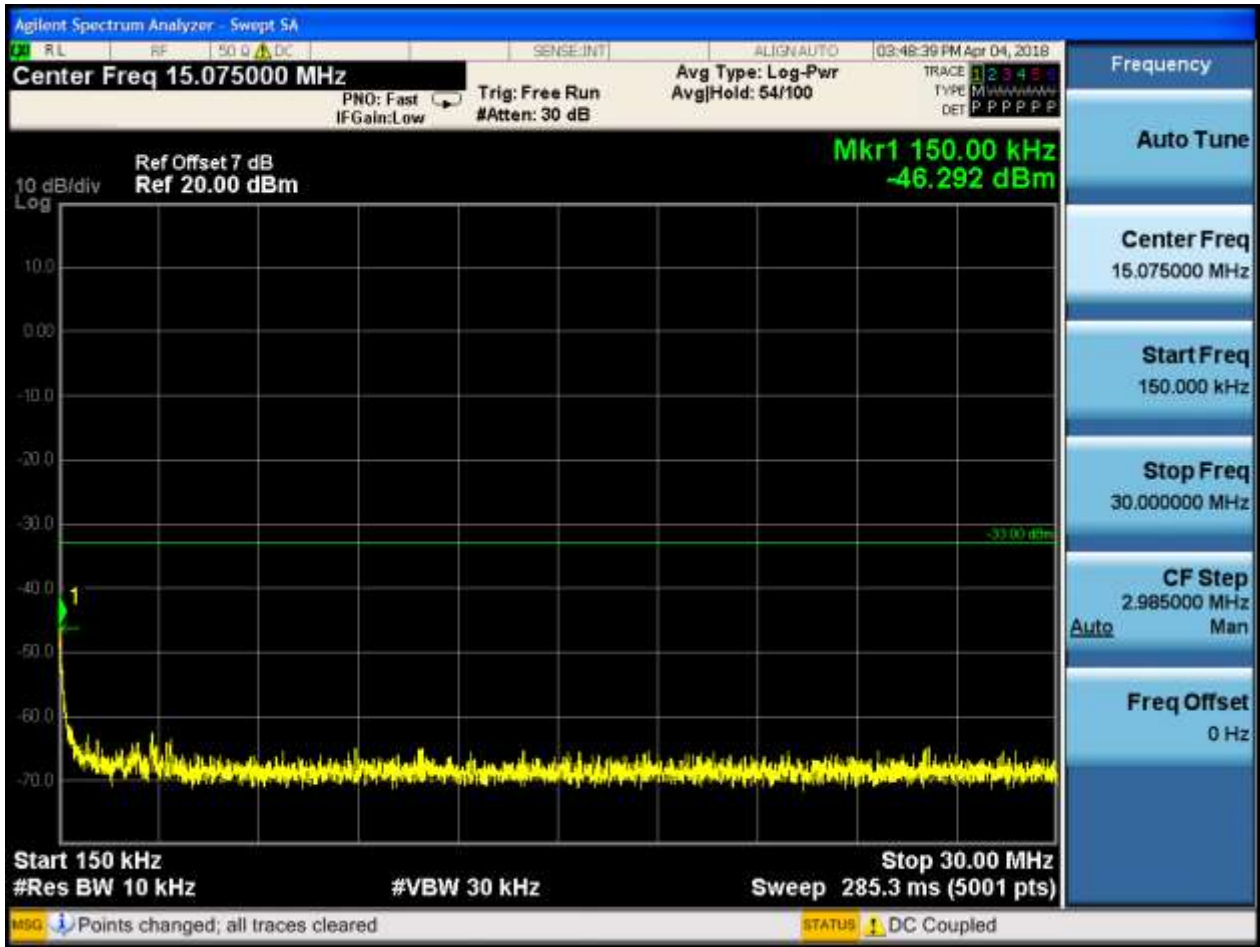
6.1 For GSM

6.1.1 Test Band = GSM1900

6.1.1.1 Test Mode = GSM/TM1

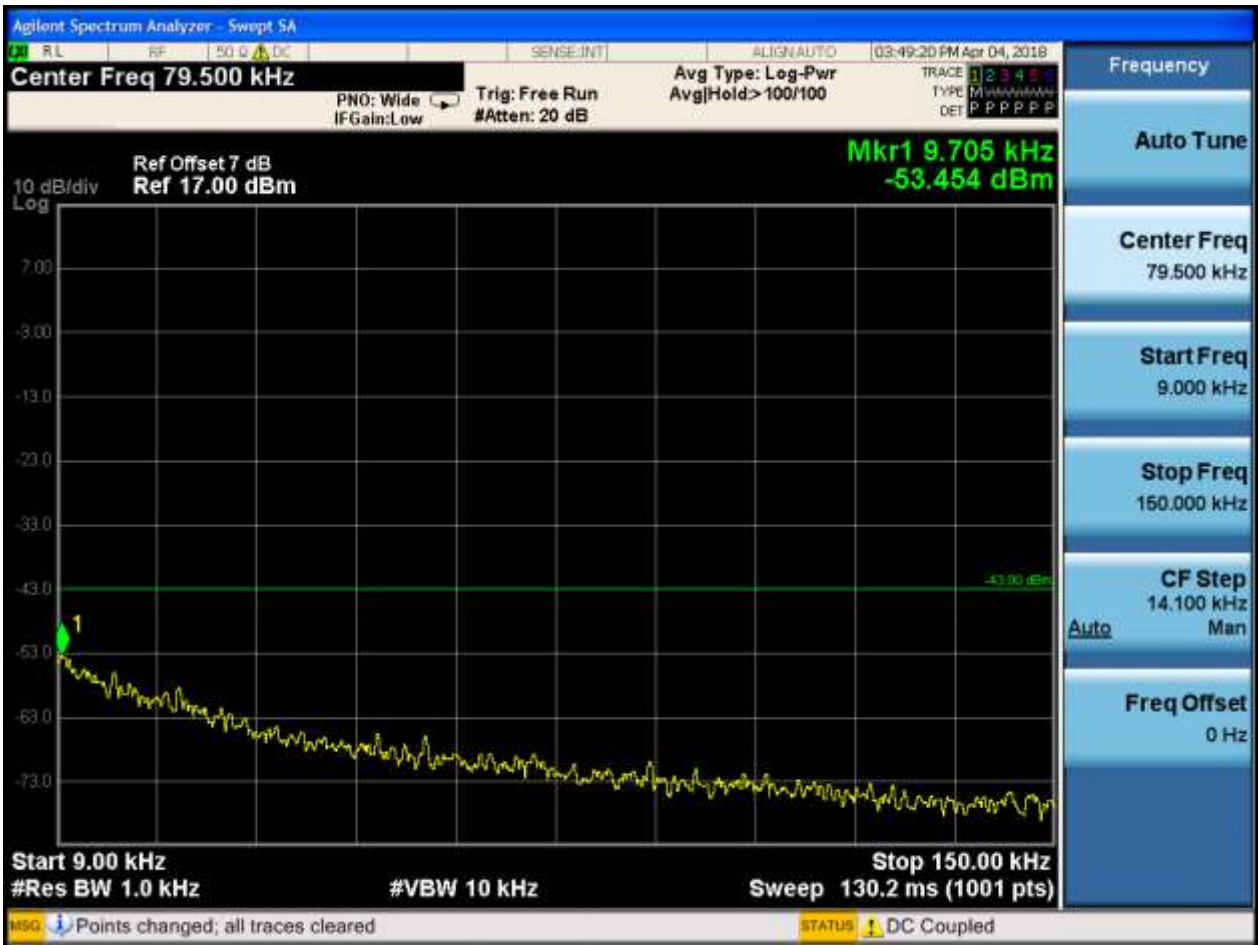
6.1.1.1.1 Test Channel = LCH

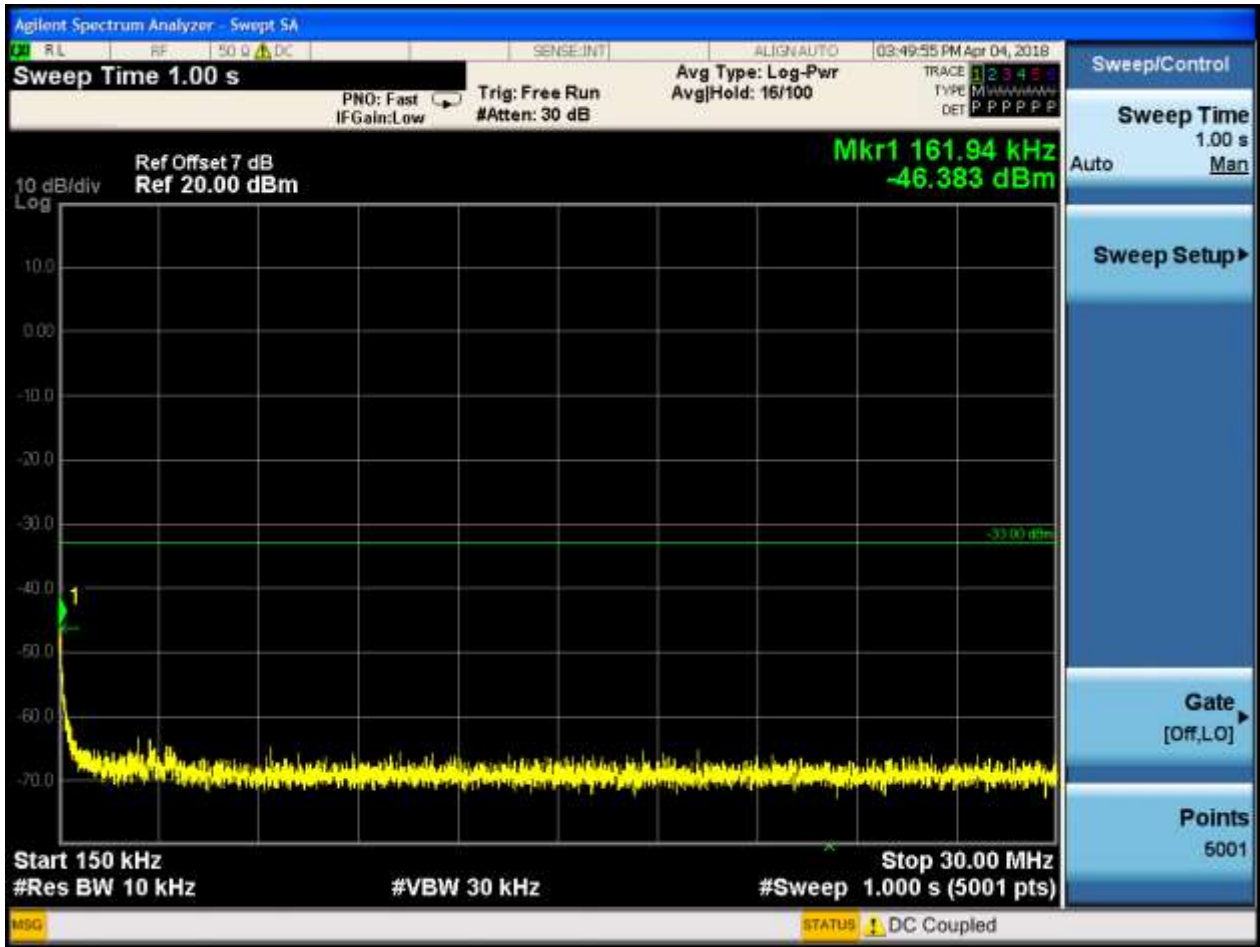






6.1.1.1.2 Test Channel = MCH





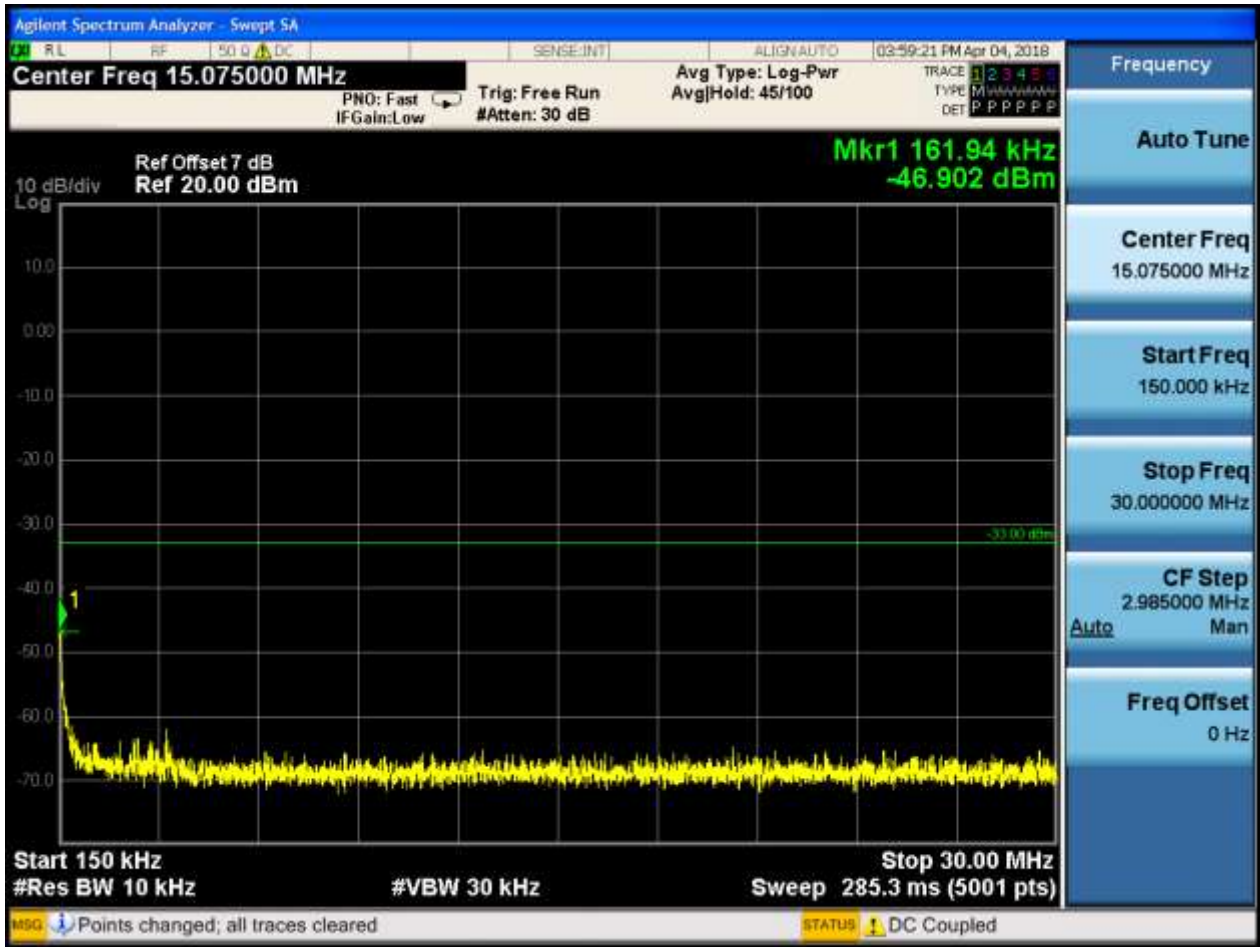
6.1.1.1.3 Test Channel = HCH



6.1.1.2 Test Mode = GSM/TM2

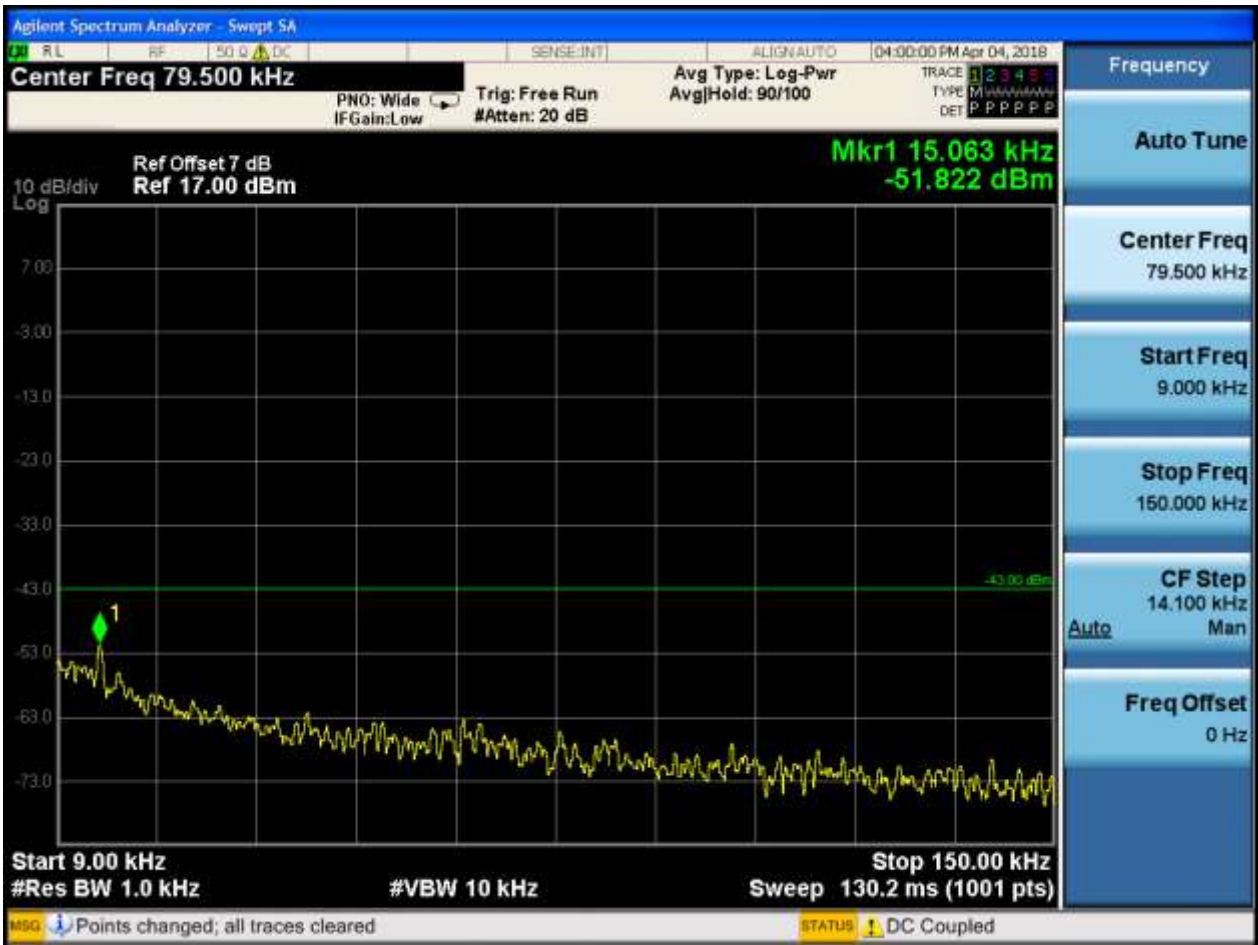
6.1.1.2.1 Test Channel = LCH

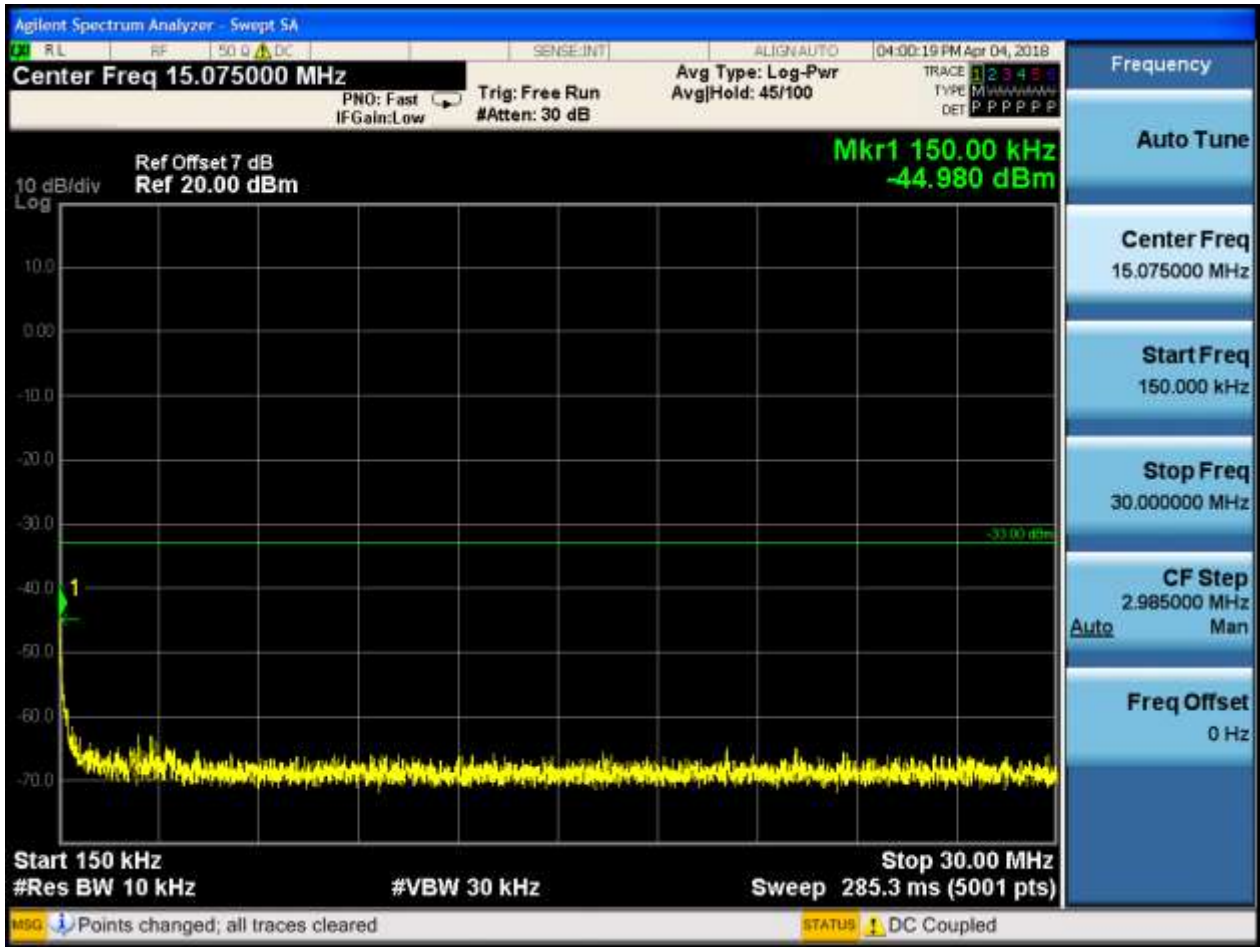






6.1.1.2.2 Test Channel = MCH

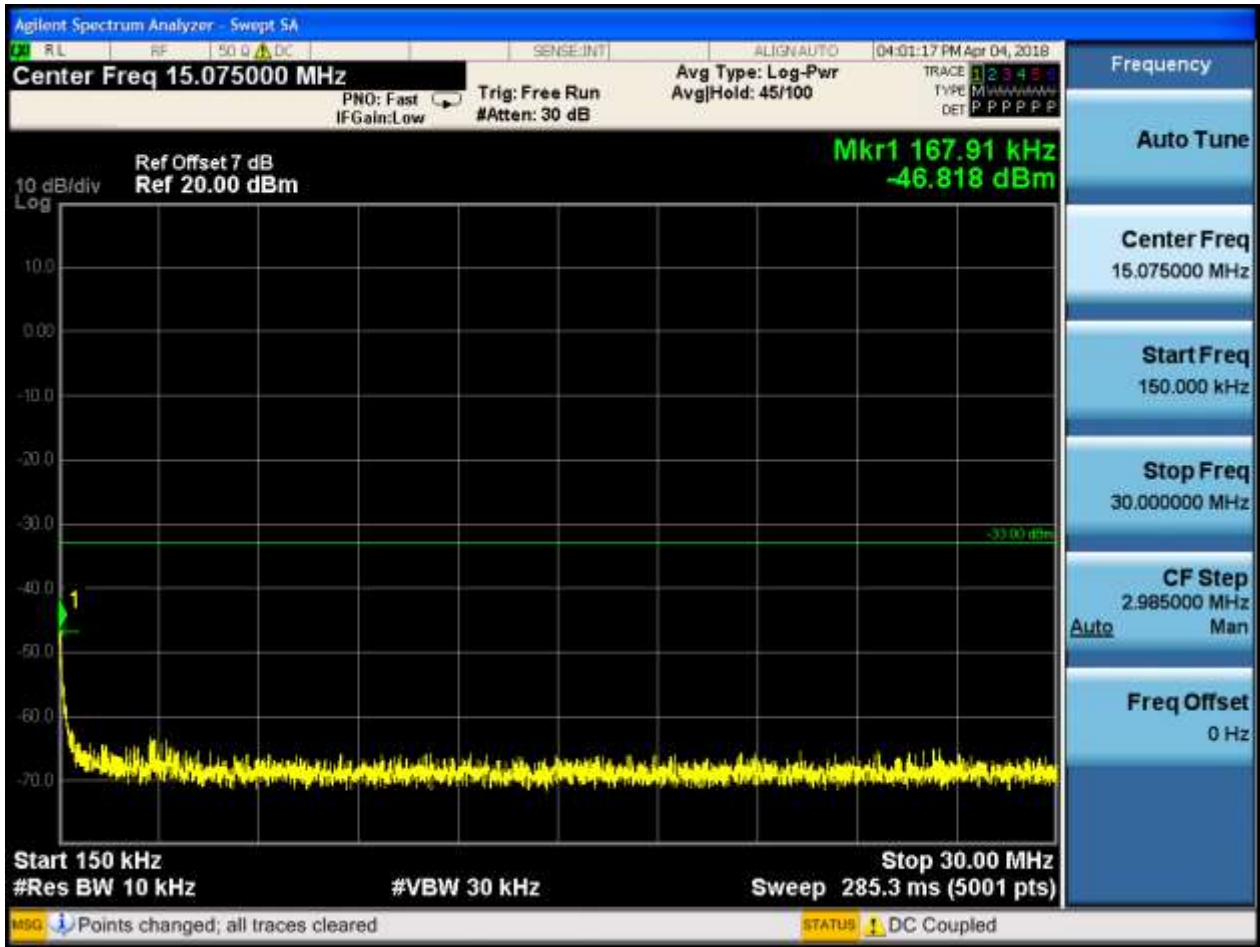






6.1.1.2.3 Test Channel = HCH





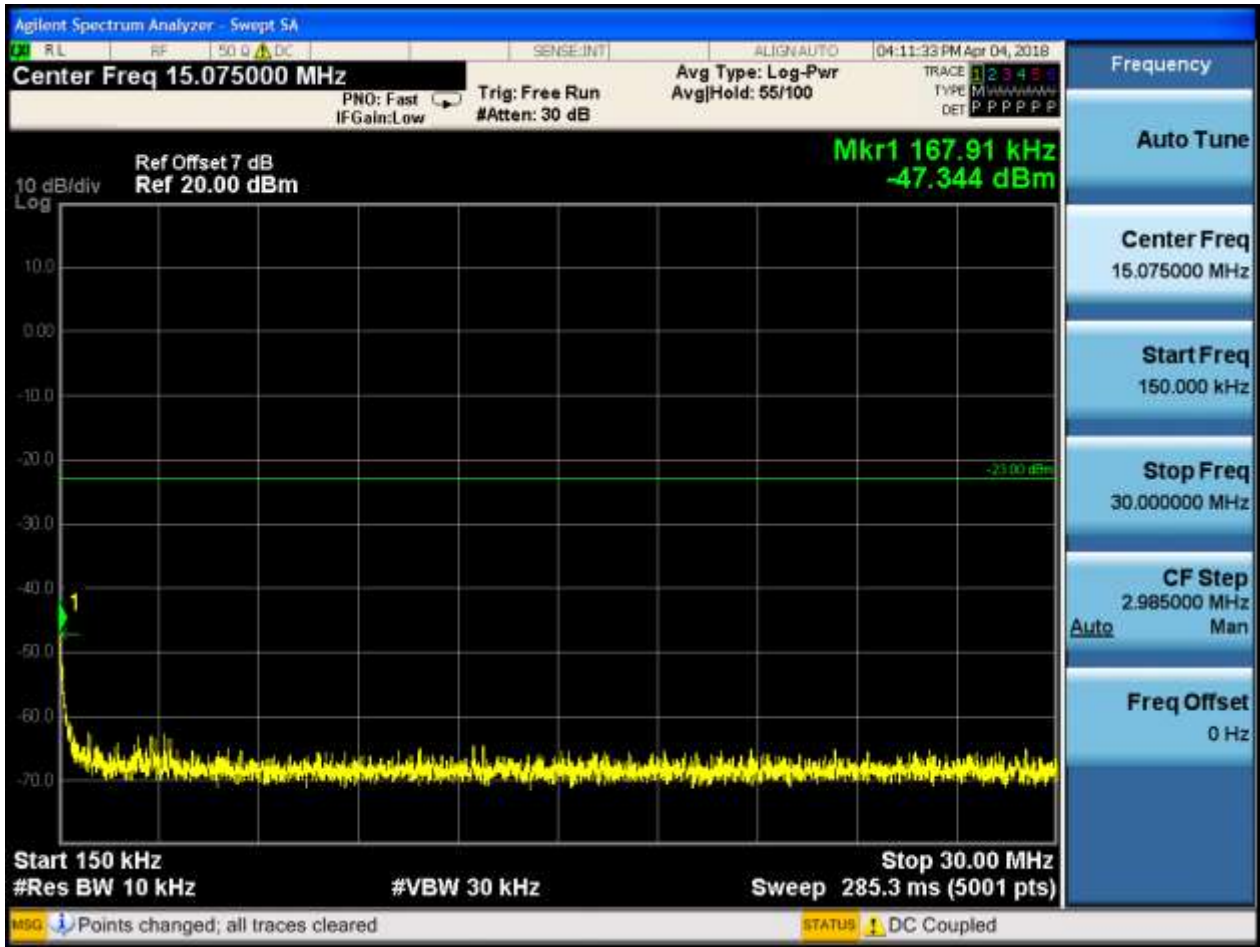


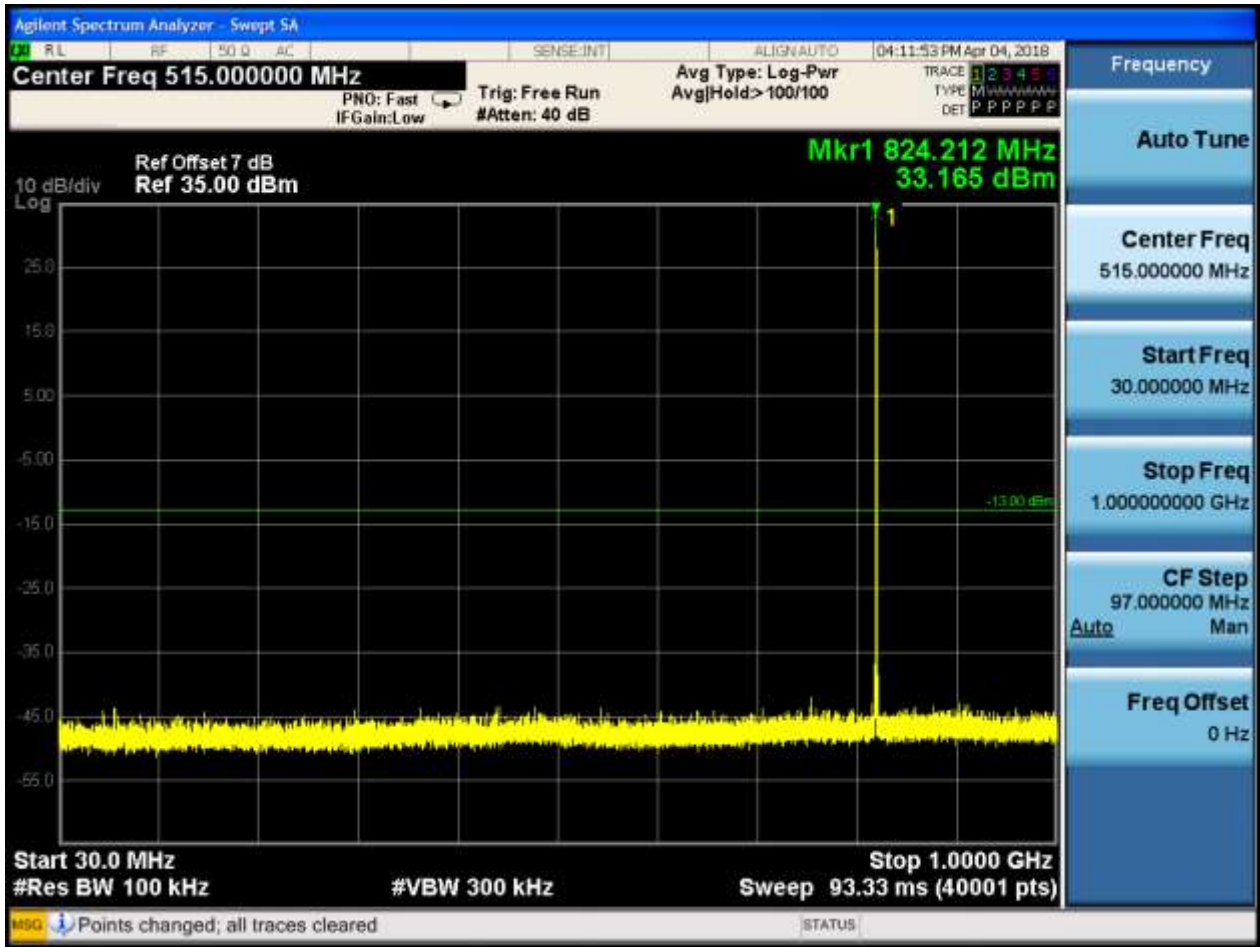
6.1.2 Test Band = GSM850

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

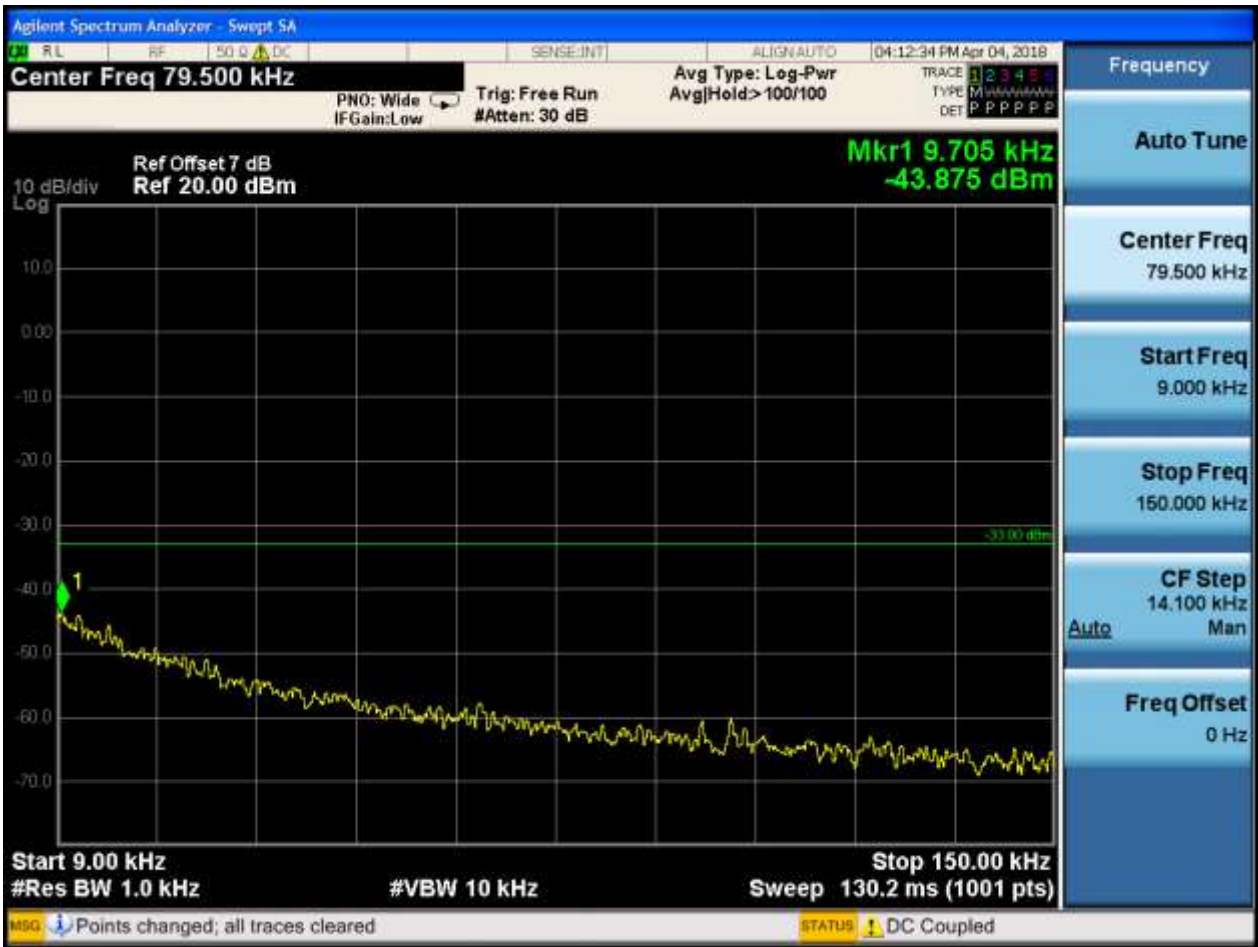


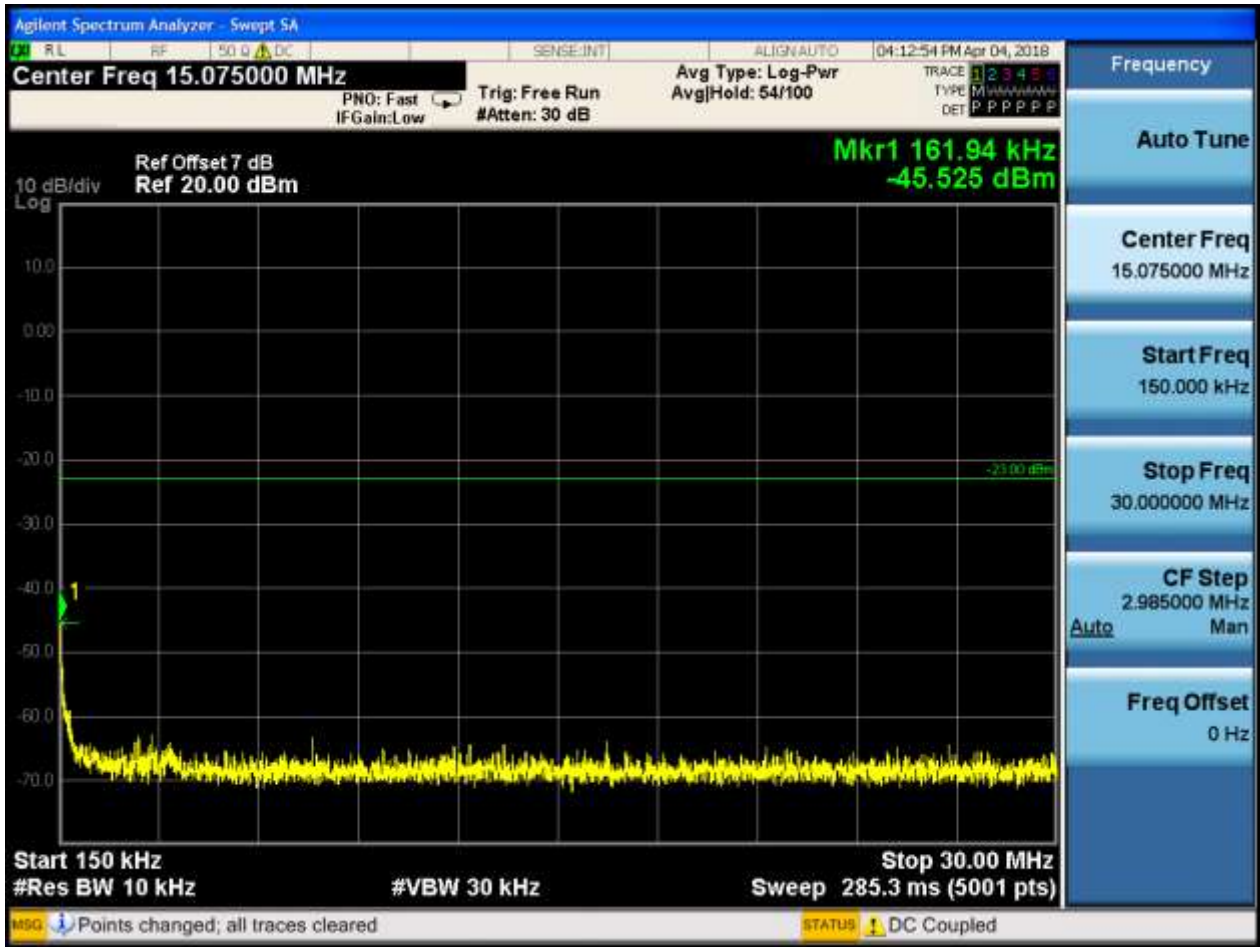


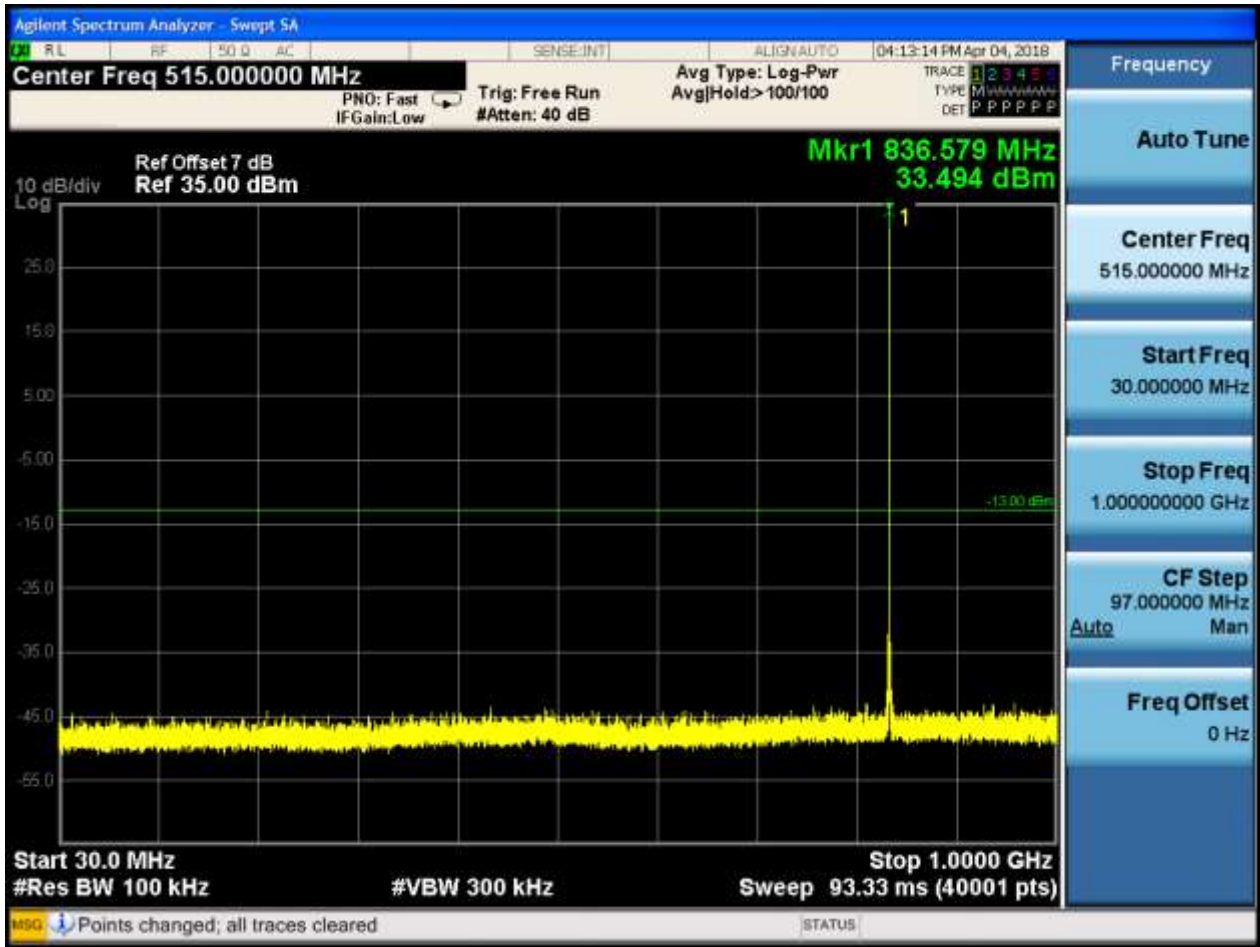




6.1.2.1.2 Test Channel = MCH



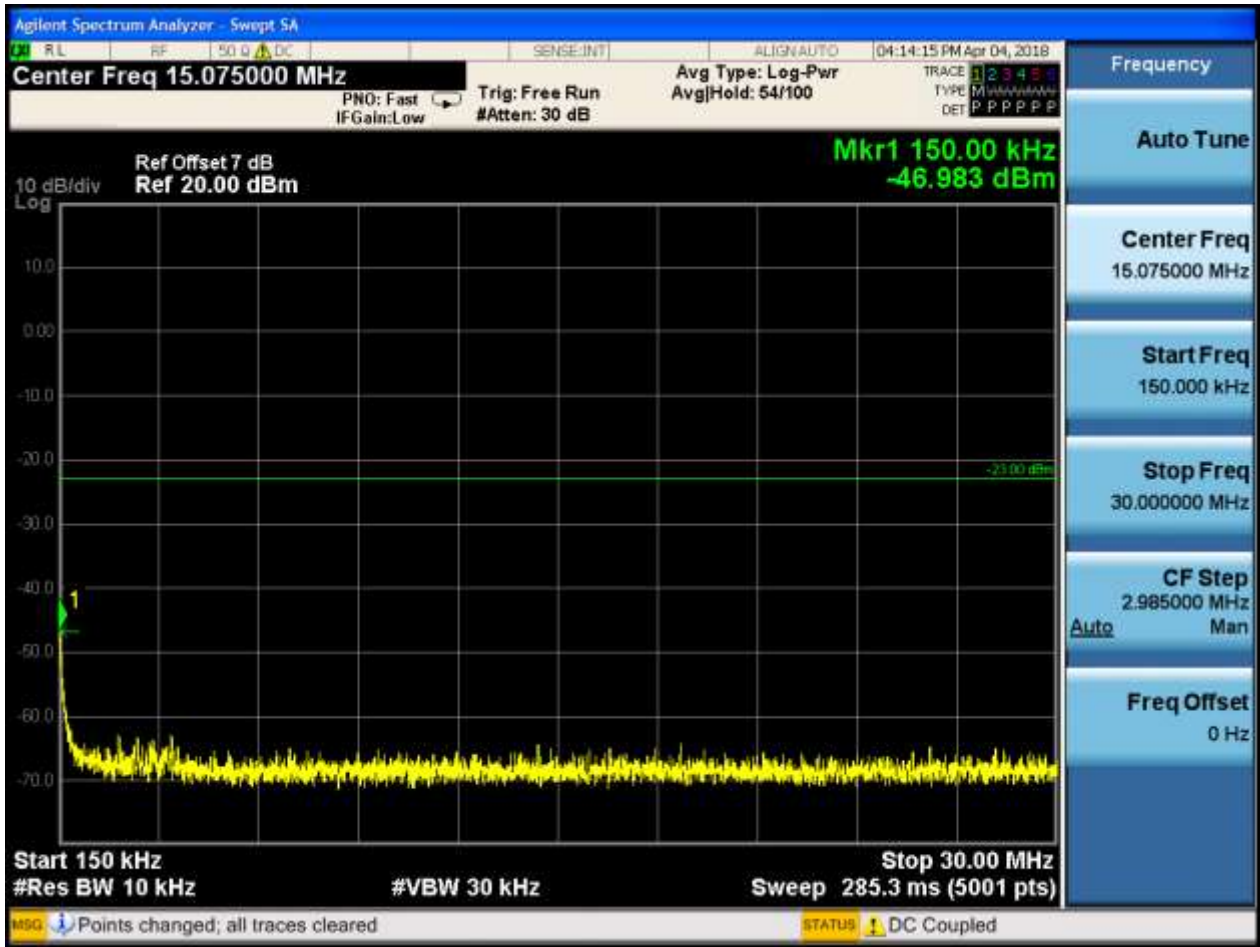


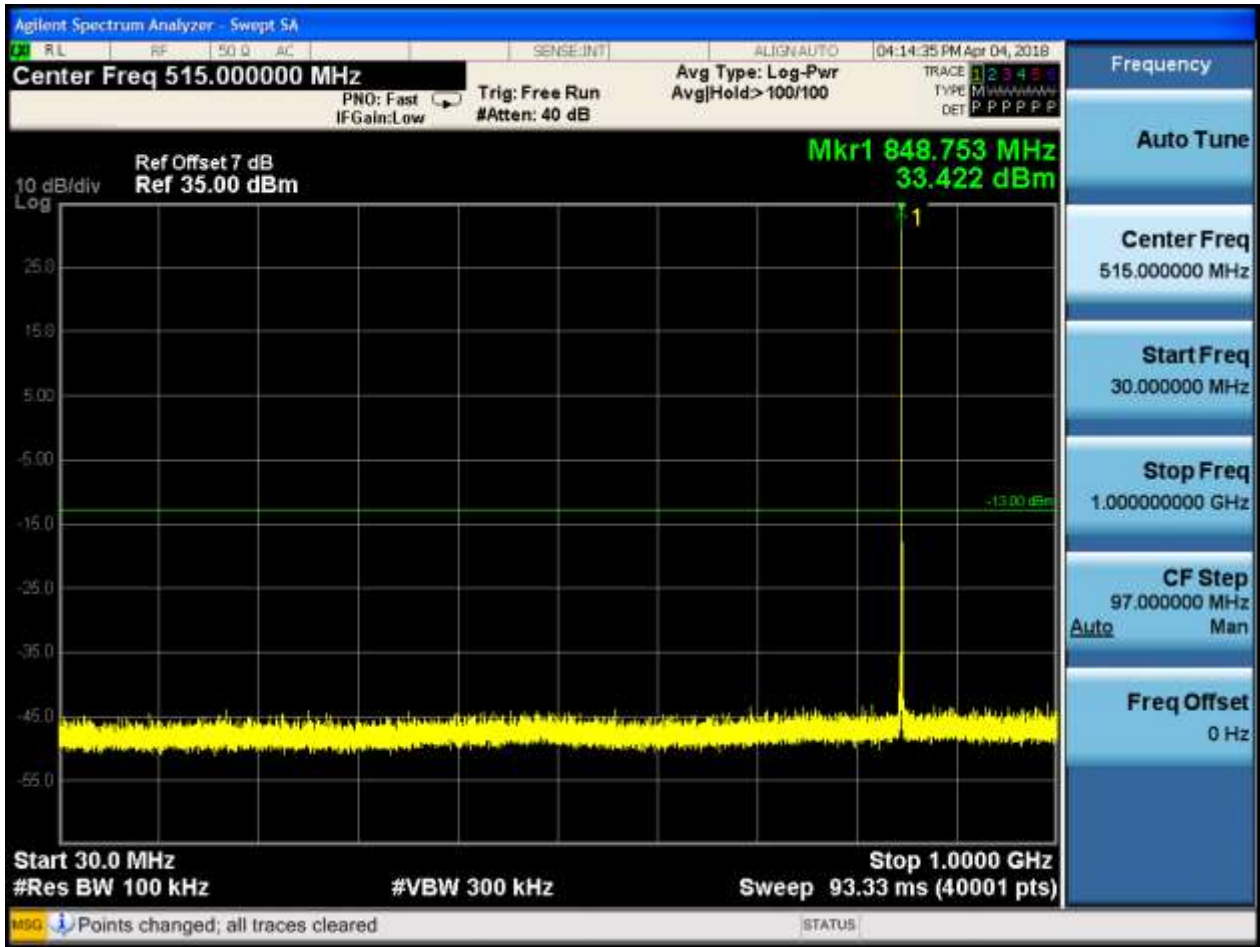




6.1.2.1.3 Test Channel = HCH





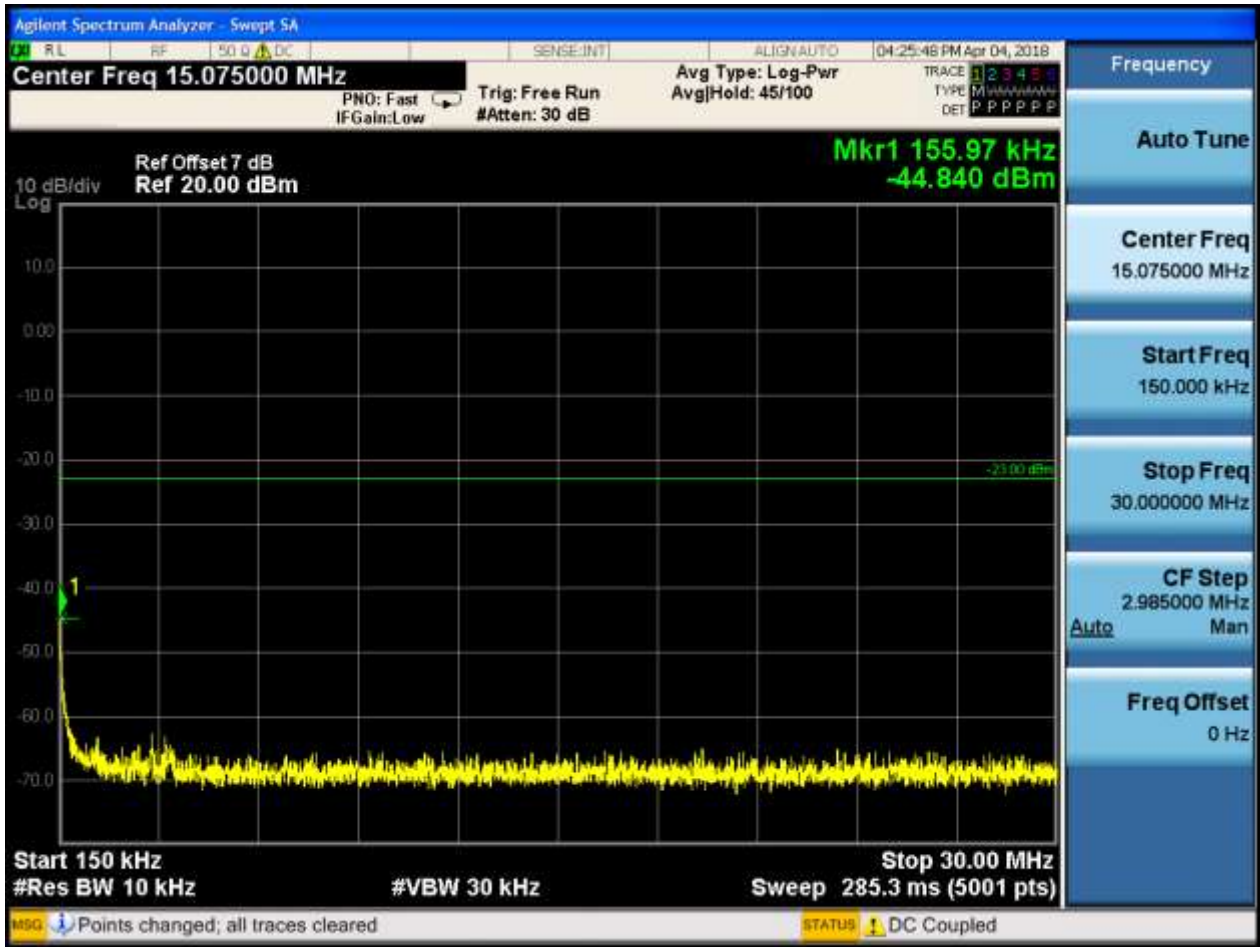


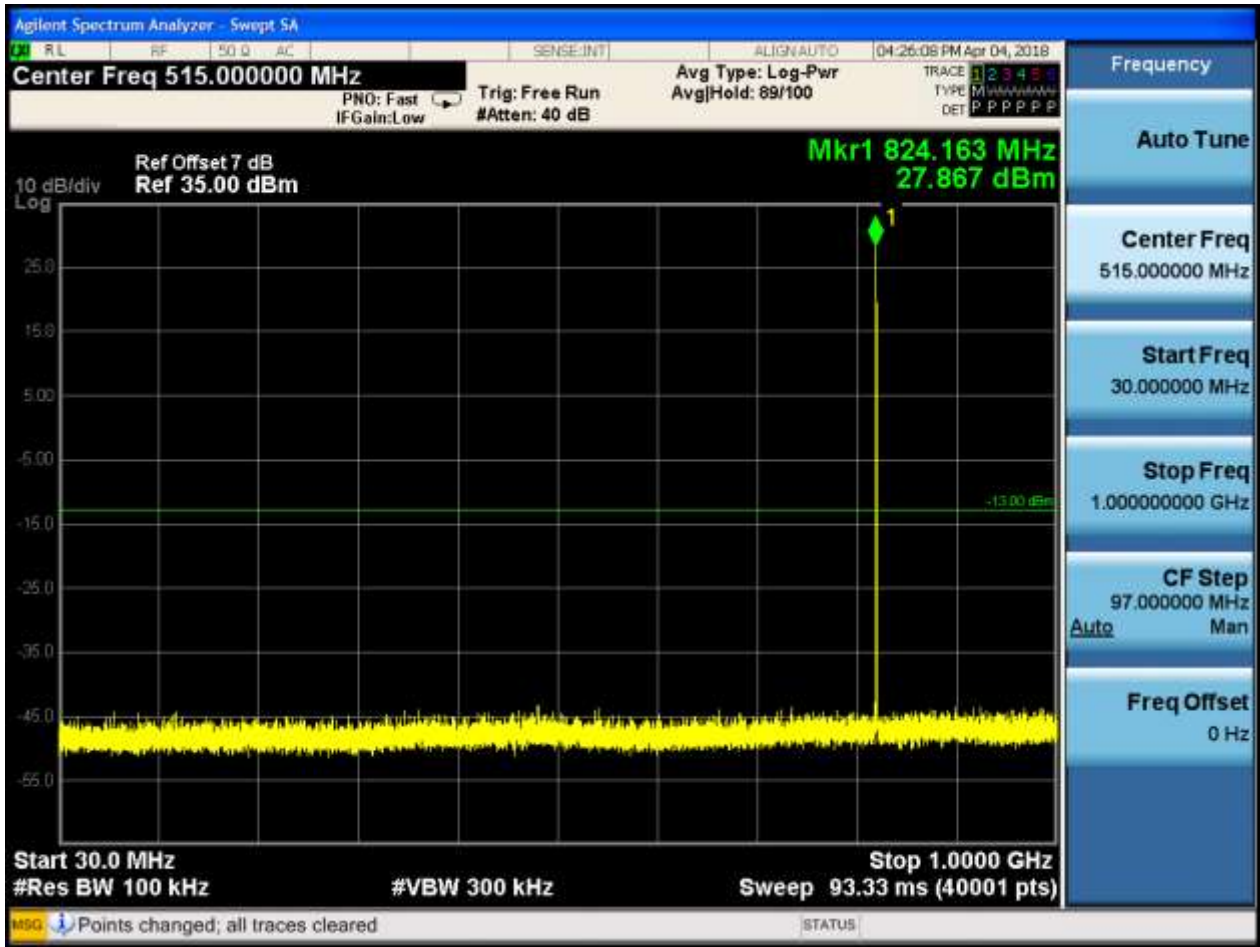


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH



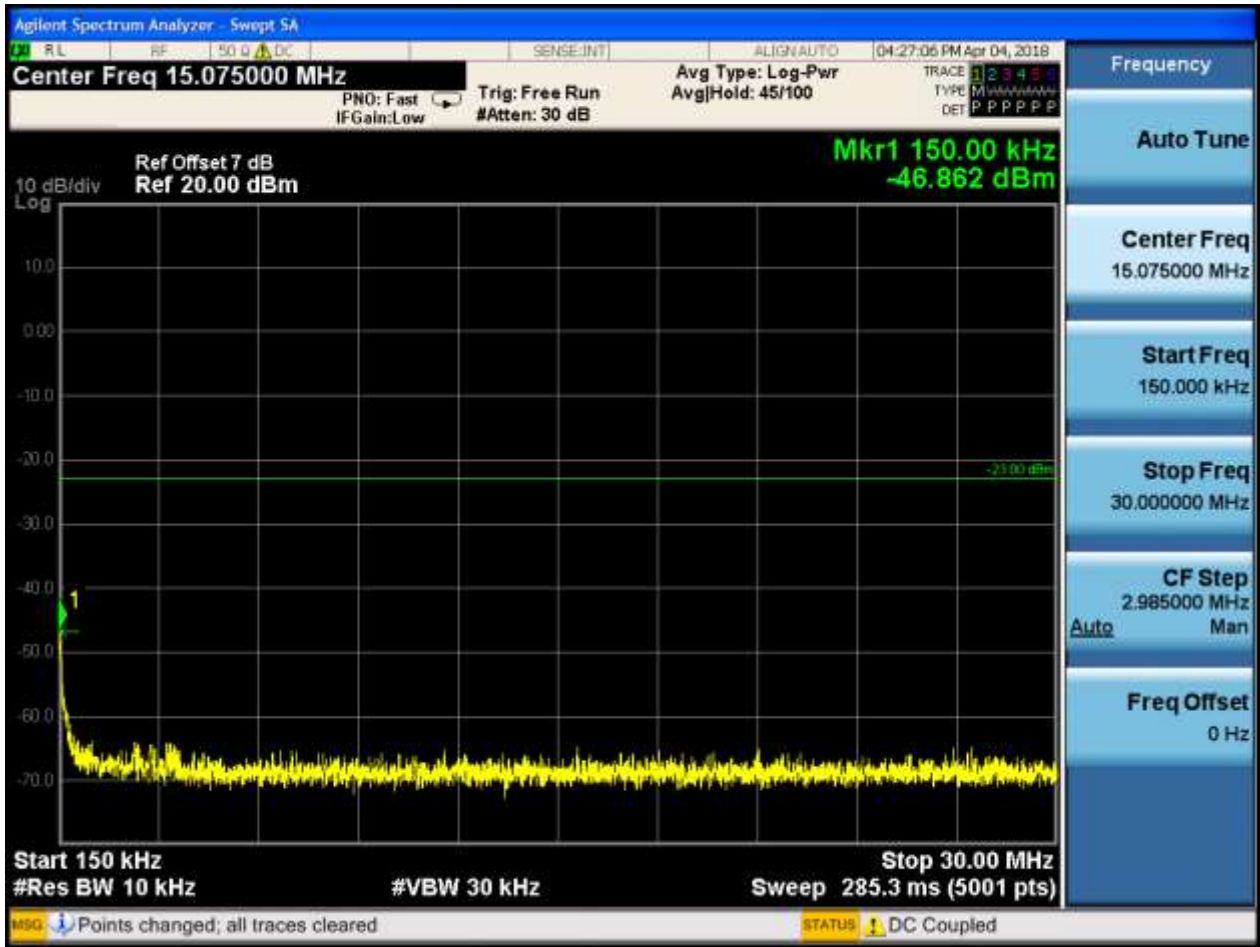


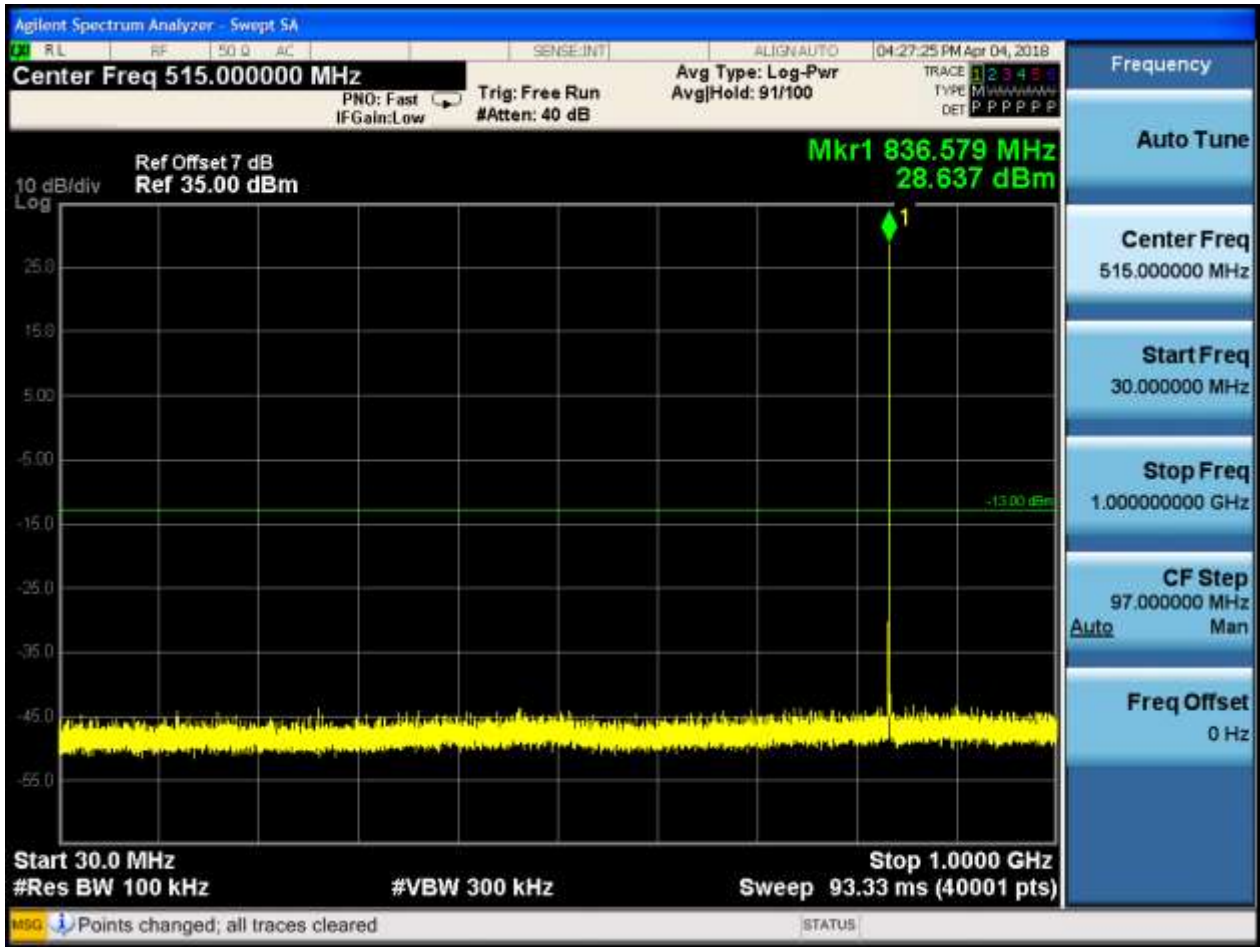


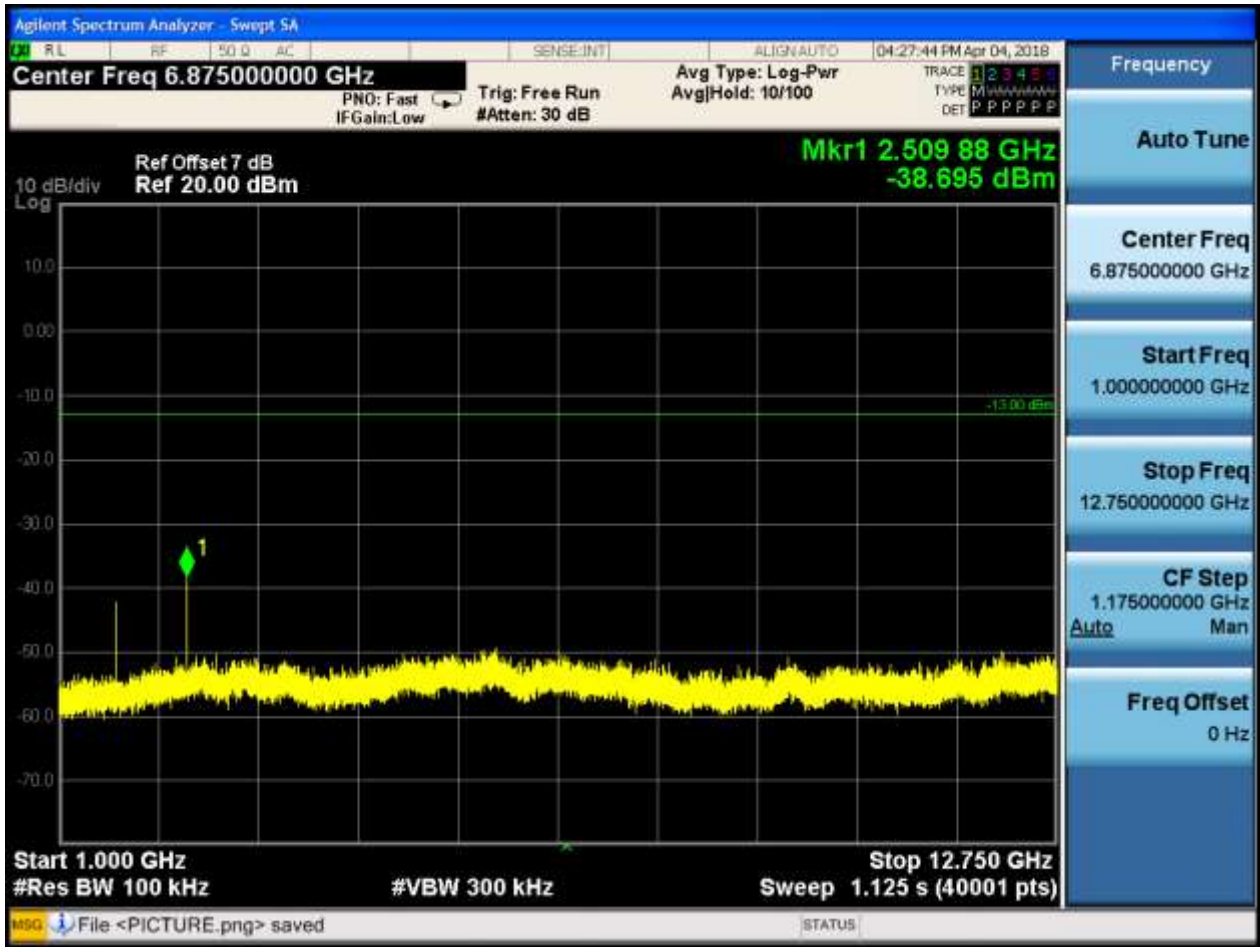


6.1.2.2.2 Test Channel = MCH

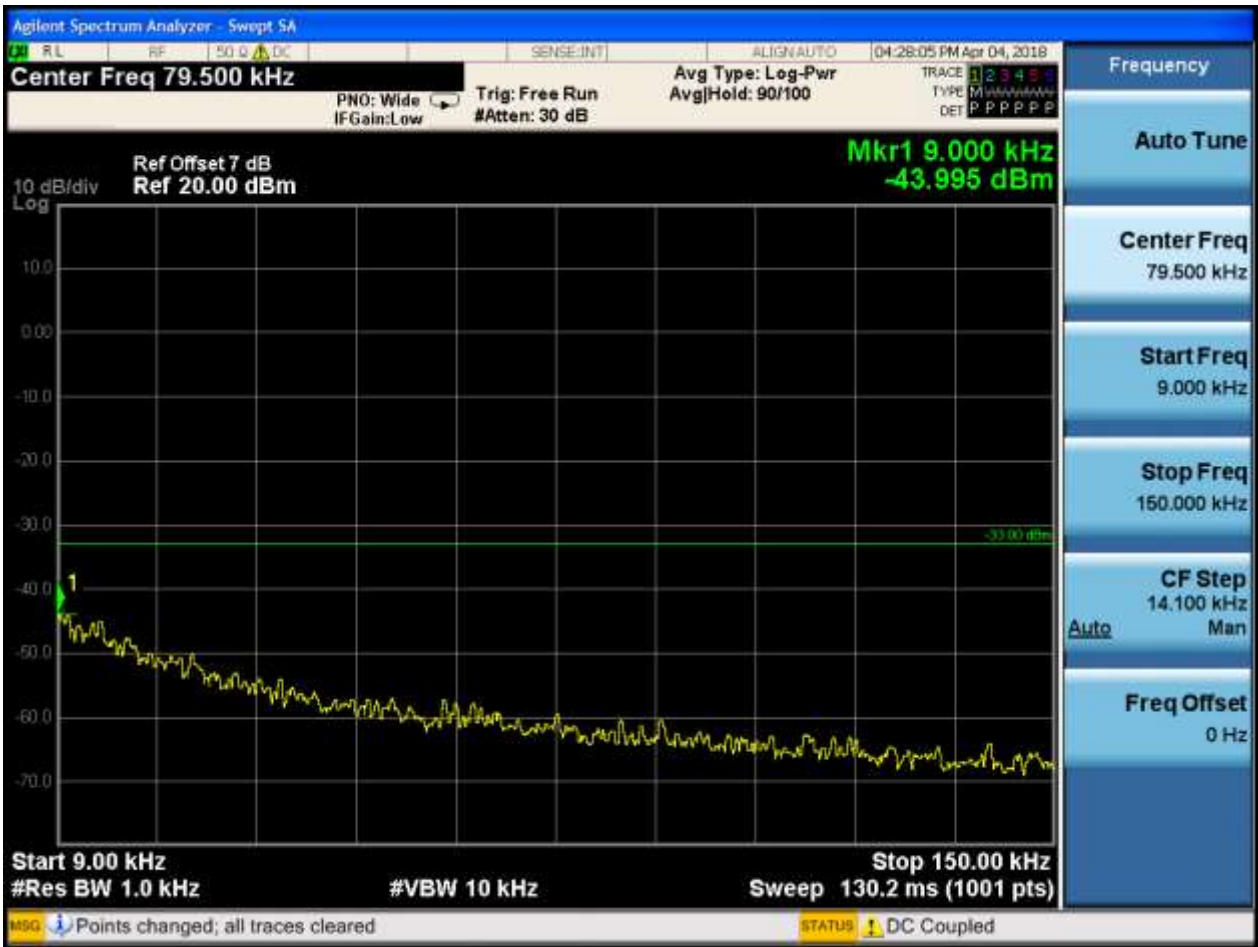


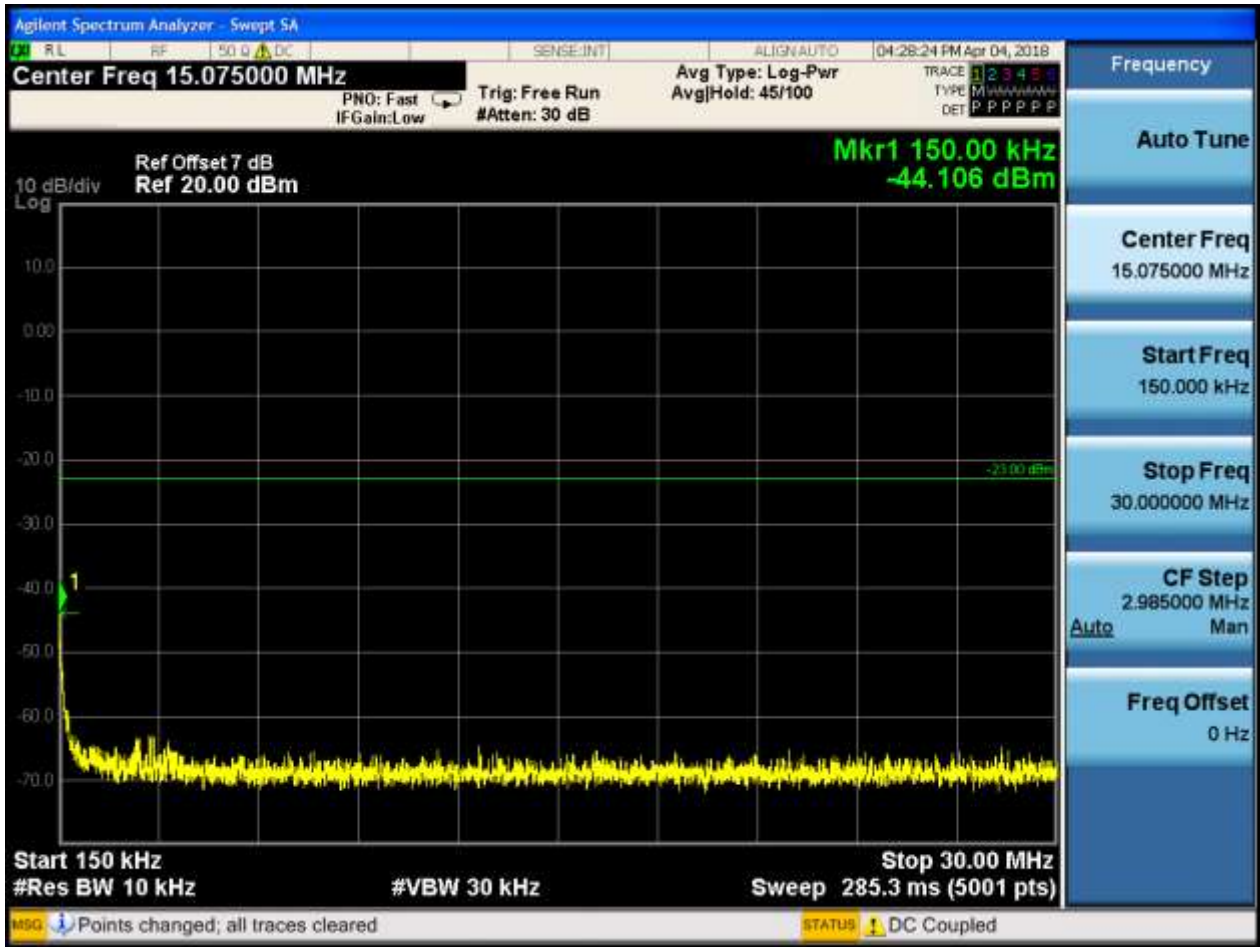


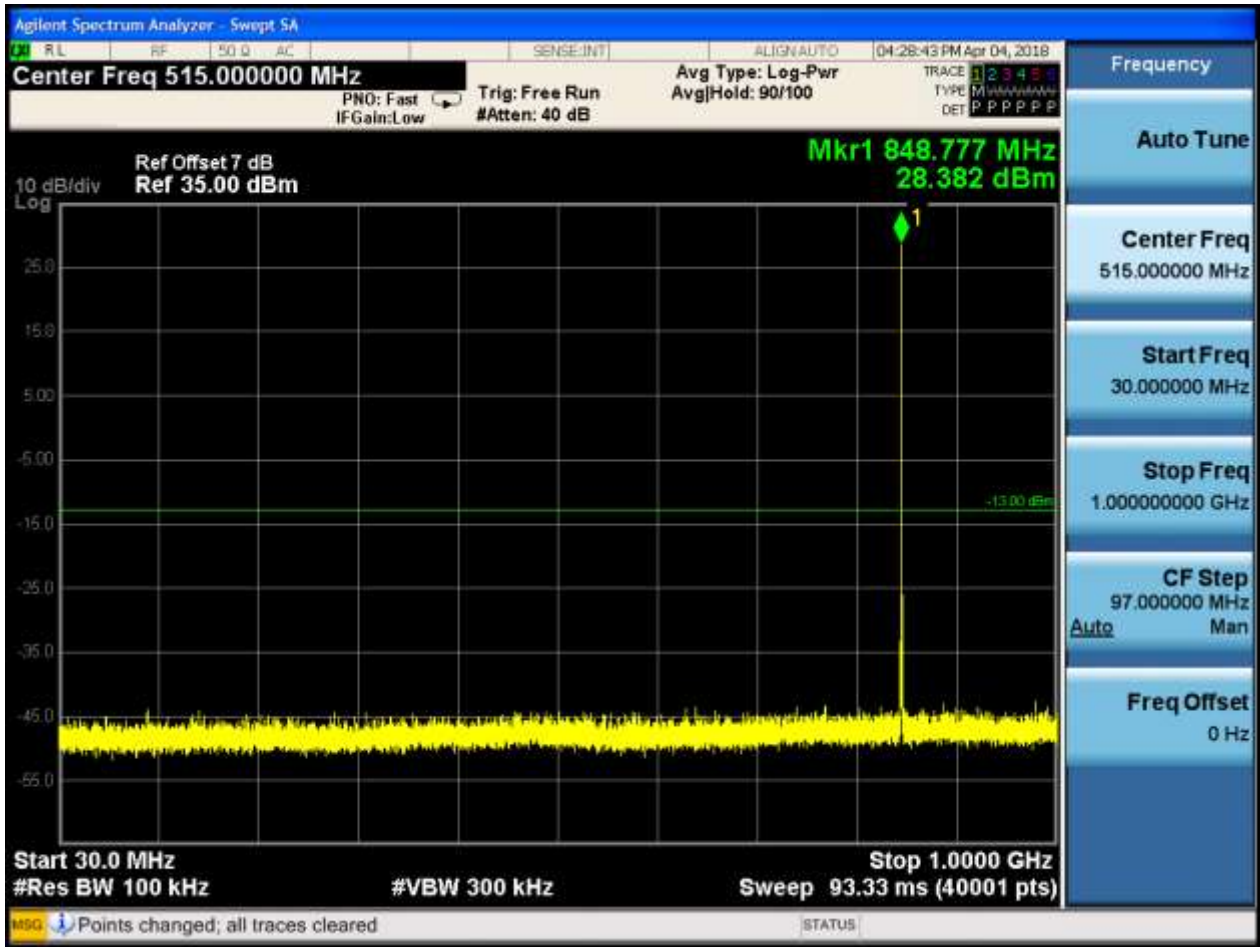




6.1.2.2.3 Test Channel = HCH











7Appendix_G: Field Strength of Spurious Radiation

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

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

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

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

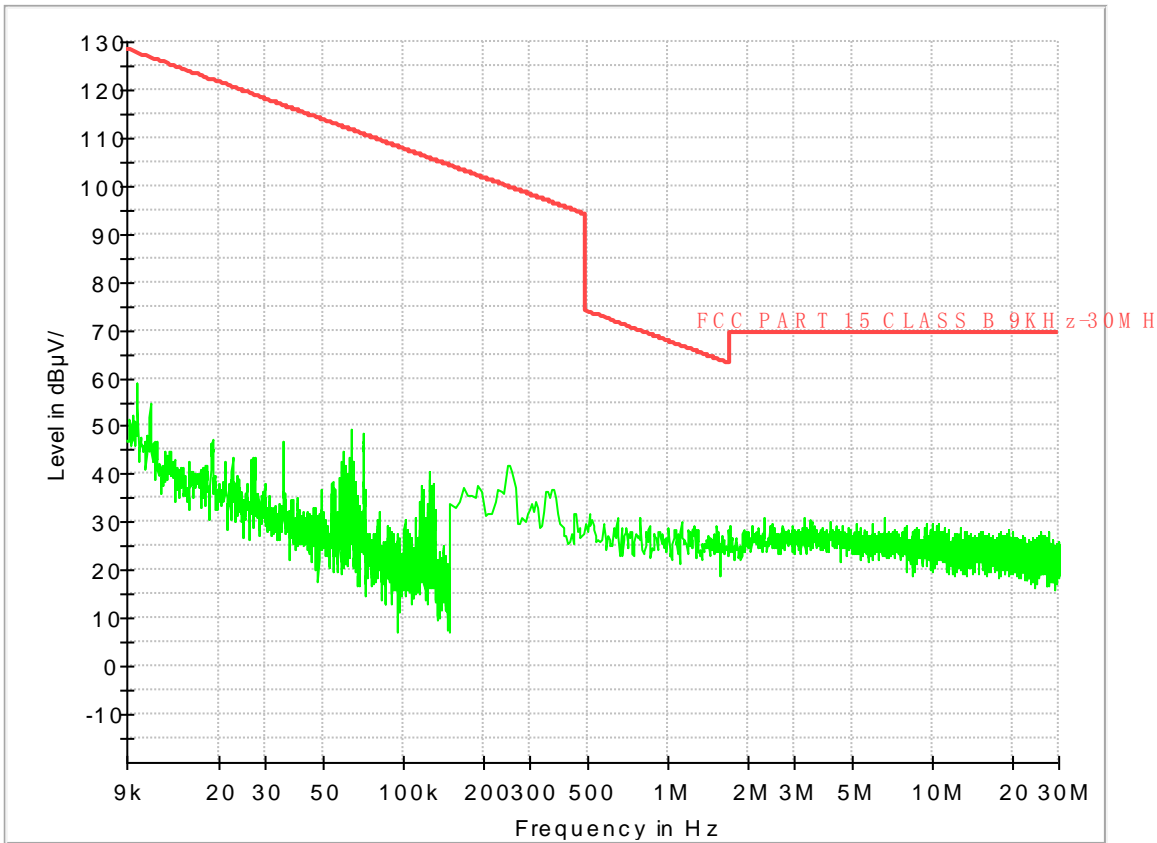
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

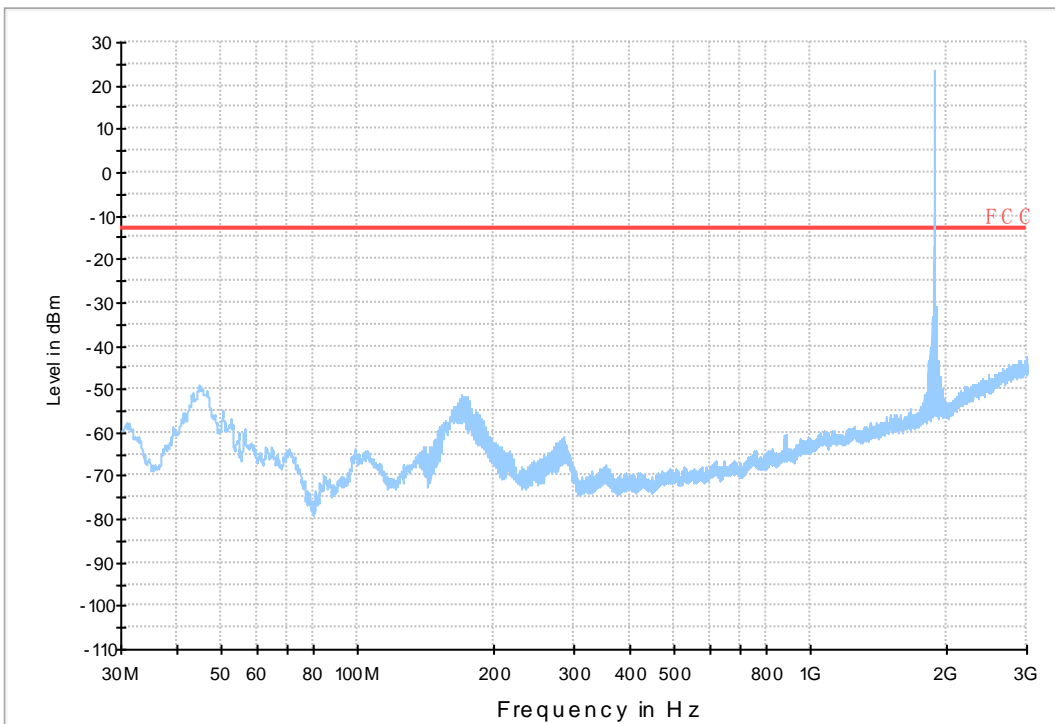
7.1 For GSM

7.1.1 Test Band = GSM1900

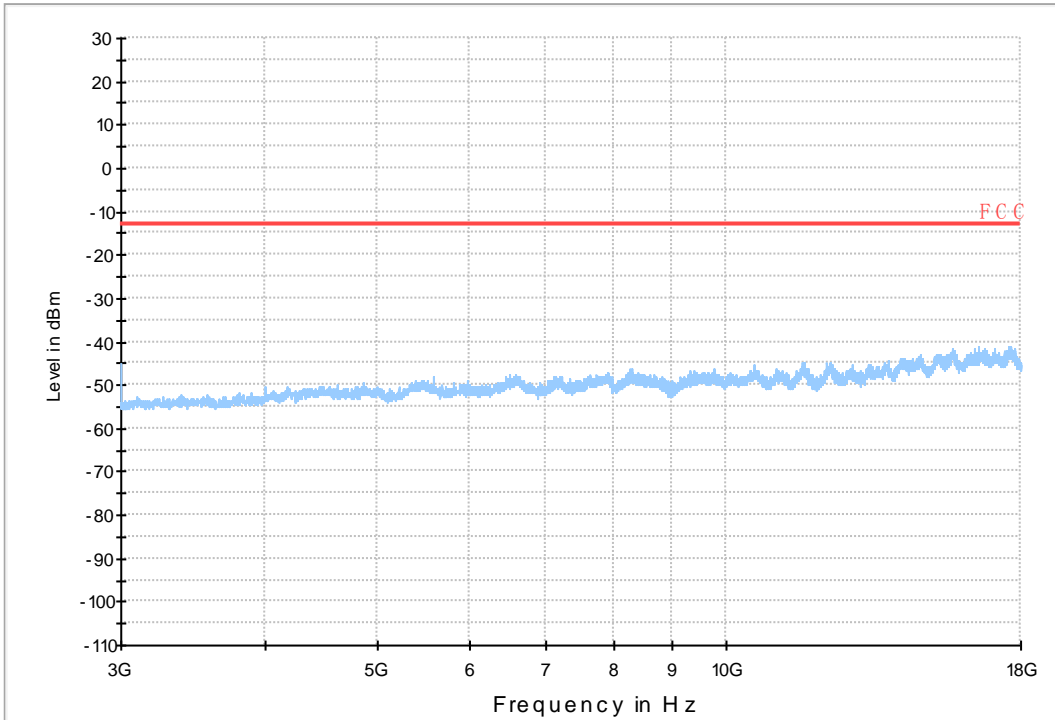
7.1.1.1 Test Mode = GSM/TM1



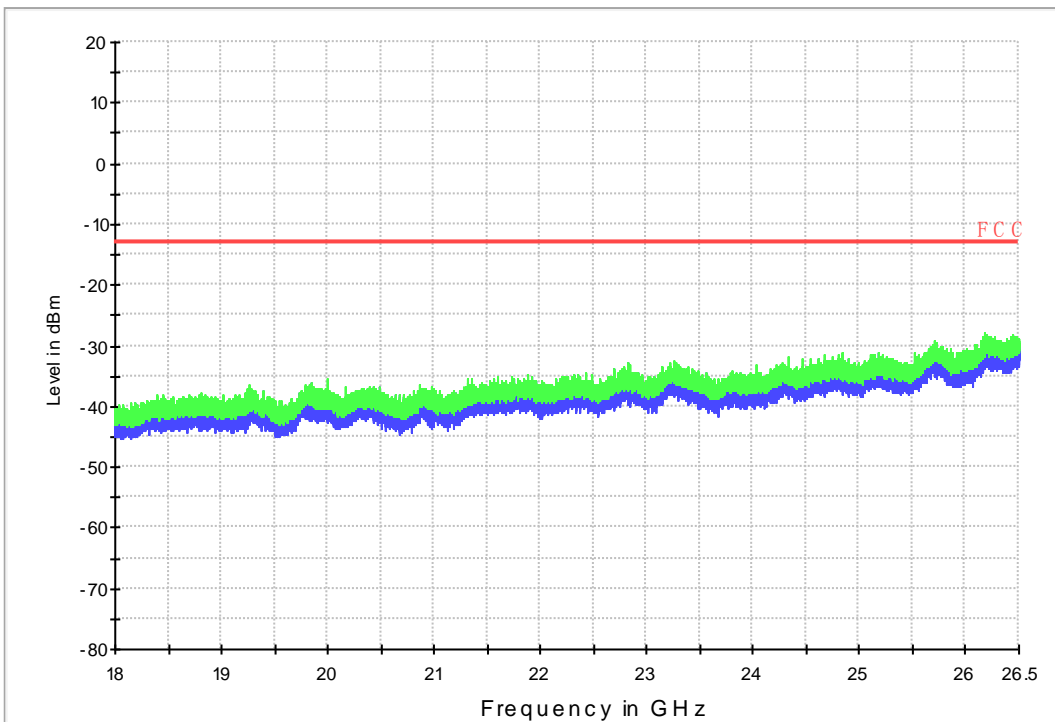
Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H

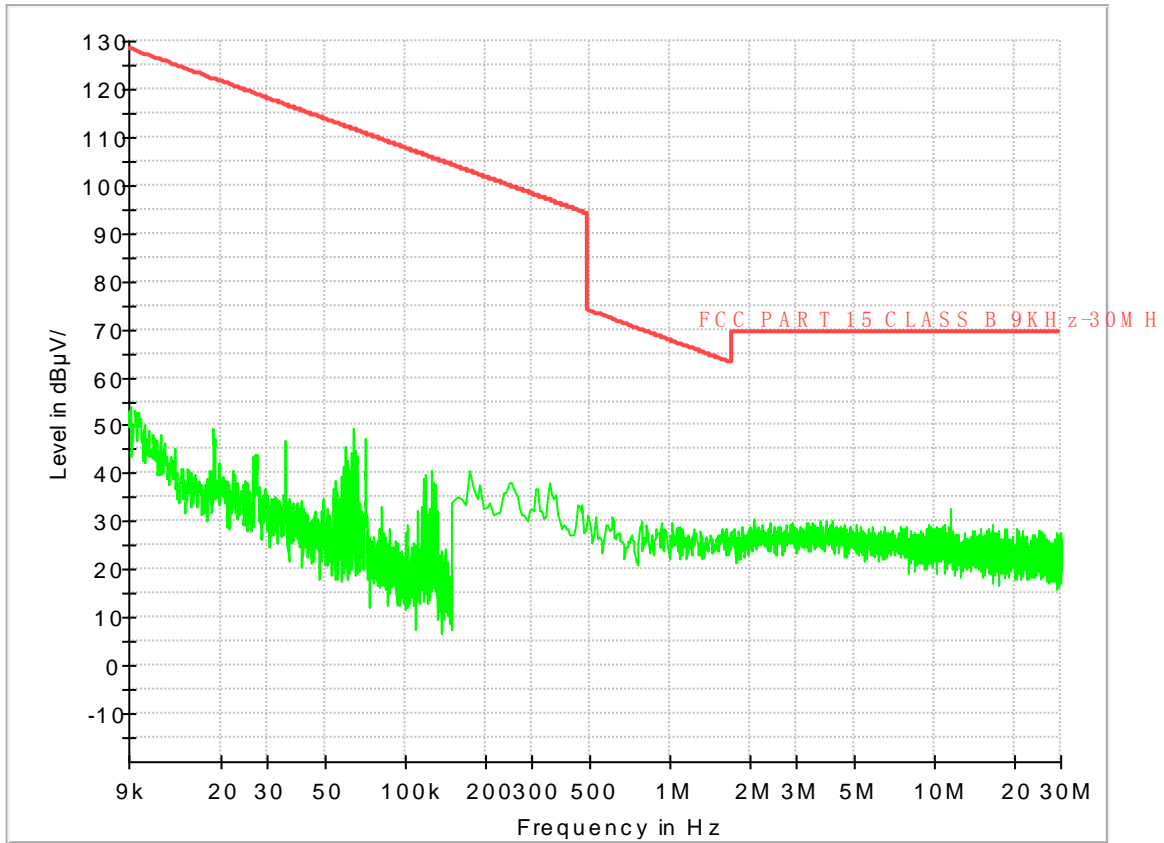


18G~26.5G RSE-TX-DIRECTOR ABOVE 1.5G PK

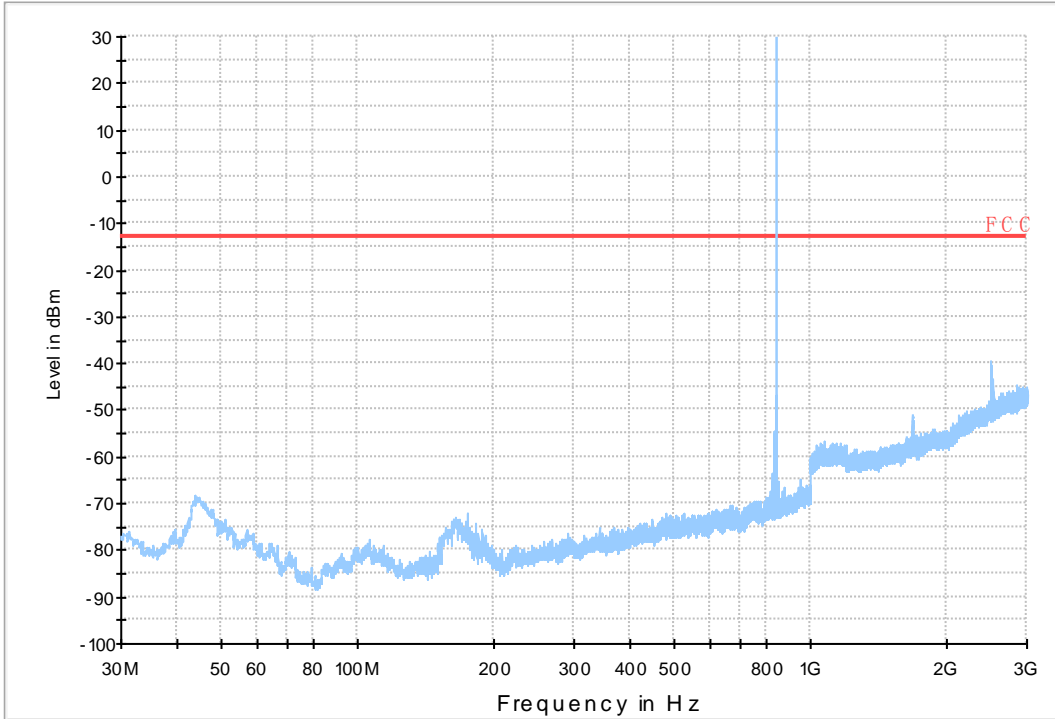


7.1.2 Test Band = GSM850

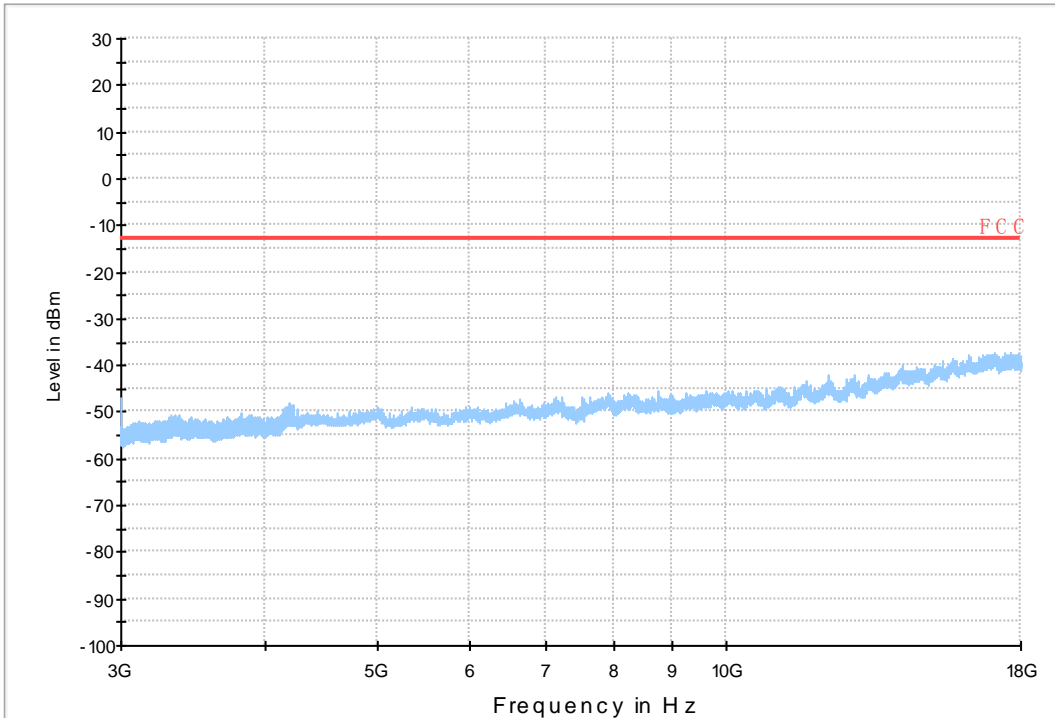
7.1.2.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L



Copy of FCC PART22 GSM850_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
GSM1900	GSM/TM1	LCH	TN	VL	19.44	0.01051	PASS
				VN	13.75	0.00743	PASS
				VH	16.79	0.00907	PASS
		MCH	TN	VL	19.11	0.01016	PASS
				VN	18.73	0.00996	PASS
				VH	12.07	0.00642	PASS
		HCH	TN	VL	22.15	0.0116	PASS
				VN	21.11	0.01105	PASS
				VH	24.73	0.01295	PASS
	GSM/TM2	LCH	TN	VL	15.85	0.00857	PASS
				VN	30.09	0.01626	PASS
				VH	21.24	0.01148	PASS
		MCH	TN	VL	25.22	0.01341	PASS
				VN	29.83	0.01587	PASS
				VH	23.54	0.01252	PASS
HCH	TN	VL	20.53	0.01075	PASS		
		VN	25.63	0.01342	PASS		
		VH	23.76	0.01244	PASS		
GSM850	GSM/TM1	LCH	TN	VL	-0.65	-0.00079	PASS
				VN	-1.68	-0.00204	PASS
				VH	5.23	0.00635	PASS
		MCH	TN	VL	0.52	0.00062	PASS
				VN	3.62	0.00433	PASS
				VH	0.90	0.00108	PASS
		HCH	TN	VL	0.13	0.00015	PASS
				VN	0.32	0.00038	PASS
				VH	9.23	0.01087	PASS
	GSM/TM2	LCH	TN	VL	11.85	0.01438	PASS
				VN	13.75	0.01668	PASS
				VH	16.47	0.01998	PASS



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		MCH	TN	VL	6.17	0.00738	PASS
				VN	9.72	0.01162	PASS
				VH	6.59	0.00788	PASS
		HCH	TN	VL	11.91	0.01403	PASS
				VN	18.79	0.02214	PASS
				VH	9.27	0.01092	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
GSM1900	GSM/TM1	LCH	VN	-30	18.27	0.00987	PASS
				-20	10.53	0.00569	PASS
				-10	13.62	0.00736	PASS
				0	16.59	0.00897	PASS
				10	15.69	0.00848	PASS
				20	17.43	0.00942	PASS
				30	10.91	0.0059	PASS
				40	12.79	0.00691	PASS
				50	12.14	0.00656	PASS
		MCH	VN	-30	15.43	0.00821	PASS
				-20	18.34	0.00976	PASS
				-10	18.08	0.00962	PASS
				0	22.02	0.01171	PASS
				10	13.62	0.00724	PASS
				20	22.08	0.01174	PASS
				30	27.70	0.01473	PASS
				40	20.79	0.01106	PASS
				50	17.76	0.00945	PASS
		HCH	VN	-30	21.76	0.01139	PASS
				-20	18.34	0.0096	PASS
				-10	20.08	0.01051	PASS
				0	14.79	0.00774	PASS
				10	20.79	0.01089	PASS
				20	13.17	0.0069	PASS
				30	22.99	0.01204	PASS
				40	10.65	0.00558	PASS
				50	14.53	0.00761	PASS
	GSM/TM2	LCH	VN	-30	25.67	0.01387	PASS
				-20	25.18	0.01361	PASS
				-10	26.47	0.01431	PASS
				0	24.31	0.01314	PASS
				10	23.12	0.0125	PASS
				20	16.21	0.00876	PASS
				30	13.72	0.00742	PASS
				40	15.34	0.00829	PASS
				50	23.67	0.01279	PASS
MCH		VN	-30	24.18	0.01286	PASS	



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-20	24.15	0.01285	PASS
				-10	21.08	0.01121	PASS
				0	19.34	0.01029	PASS
				10	24.41	0.01298	PASS
				20	16.66	0.00886	PASS
				30	18.60	0.00989	PASS
				40	16.66	0.00886	PASS
				50	28.25	0.01503	PASS
		HCH	VN	-30	19.21	0.01006	PASS
				-20	20.18	0.01057	PASS
				-10	19.40	0.01016	PASS
				0	23.70	0.01241	PASS
				10	21.86	0.01145	PASS
				20	24.12	0.01263	PASS
				30	16.66	0.00872	PASS
				40	21.70	0.01136	PASS
				50	12.56	0.00658	PASS
				GSM850	GSM/TM1	LCH	VN
-20	-0.26	-0.00032	PASS				
-10	0.71	0.00086	PASS				
0	4.46	0.00541	PASS				
10	2.07	0.00251	PASS				
20	2.45	0.00297	PASS				
30	3.81	0.00462	PASS				
40	-0.45	-0.00055	PASS				
50	2.26	0.00274	PASS				
MCH	VN	-30	1.10			0.00131	PASS
		-20	2.52			0.00301	PASS
		-10	0.13			0.00016	PASS
		0	1.81			0.00216	PASS
		10	-0.19			-0.00023	PASS
		20	0.71			0.00085	PASS
		30	2.58			0.00308	PASS
		40	3.49			0.00417	PASS
		50	4.78			0.00571	PASS
HCH	VN	-30	0.45			0.00053	PASS
		-20	0.13			0.00015	PASS
		-10	2.52			0.00297	PASS
		0	1.10			0.0013	PASS
		10	0.71			0.00084	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				20	-2.45	-0.00289	PASS		
				30	-0.71	-0.00084	PASS		
				40	3.75	0.00442	PASS		
				50	7.88	0.00928	PASS		
	GSM/TM2	LCH	VN	-30	16.76	0.02033	PASS		
				-20	13.56	0.01645	PASS		
				-10	19.57	0.02374	PASS		
				0	13.11	0.01591	PASS		
				10	7.07	0.00858	PASS		
				20	16.18	0.01963	PASS		
				30	5.94	0.00721	PASS		
				40	12.20	0.0148	PASS		
				50	12.95	0.01571	PASS		
				MCH	VN	-30	7.68	0.00918	PASS
						-20	11.75	0.01404	PASS
						-10	12.46	0.01489	PASS
						0	5.13	0.00613	PASS
						10	6.97	0.00833	PASS
						20	6.26	0.00748	PASS
						30	3.33	0.00398	PASS
		40	7.55			0.00902	PASS		
		HCH	VN	-30	16.08	0.01894	PASS		
				-20	13.53	0.01594	PASS		
				-10	15.17	0.01787	PASS		
				0	15.63	0.01841	PASS		
				10	11.85	0.01396	PASS		
				20	7.88	0.00928	PASS		
				30	9.27	0.01092	PASS		
				40	11.07	0.01304	PASS		
					50	11.04	0.01301	PASS	

END