



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 [dBm]	Limit [dBm]	Verdict
GSM850	GSM/TM1	LCH	33.25	27.50	38.5	PASS
		MCH	33.09	27.34	38.5	PASS
		HCH	32.92	27.17	38.5	PASS
	GSM/TM2	LCH	26.33	20.58	38.5	PASS
		MCH	26.43	20.68	38.5	PASS
		HCH	26.42	20.67	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
PCS1900	GSM/TM1	LCH	29.98	28.18	33	PASS
		MCH	30.09	28.29	33	PASS
		HCH	30.09	28.29	33	PASS
	GSM/TM2	LCH	25.39	23.59	33	PASS
		MCH	25.19	23.39	33	PASS
		HCH	25.11	23.31	33	PASS

Note1:

a, For getting the ERP (Efficient Radiated Power) or EIRP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b, SGP = Signal Generator Level

Note2:

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

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

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

SET Sweep time = auto - couple.

Detector: RMS

2Appendix_B: Peak-to-Average Ratio

Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
GSM850	GSM/TM1	LCH	1.83	13	PASS
		MCH	1.74	13	PASS
		HCH	1.66	13	PASS
	GSM/TM2	LCH	4.85	13	PASS
		MCH	4.71	13	PASS
		HCH	4.62	13	PASS
PCS1900	GSM/TM1	LCH	1.92	13	PASS
		MCH	1.73	13	PASS
		HCH	1.86	13	PASS
	GSM/TM2	LCH	4.54	13	PASS
		MCH	4.51	13	PASS
		HCH	4.79	13	PASS

3Appendix_C: Modulation Characteristics

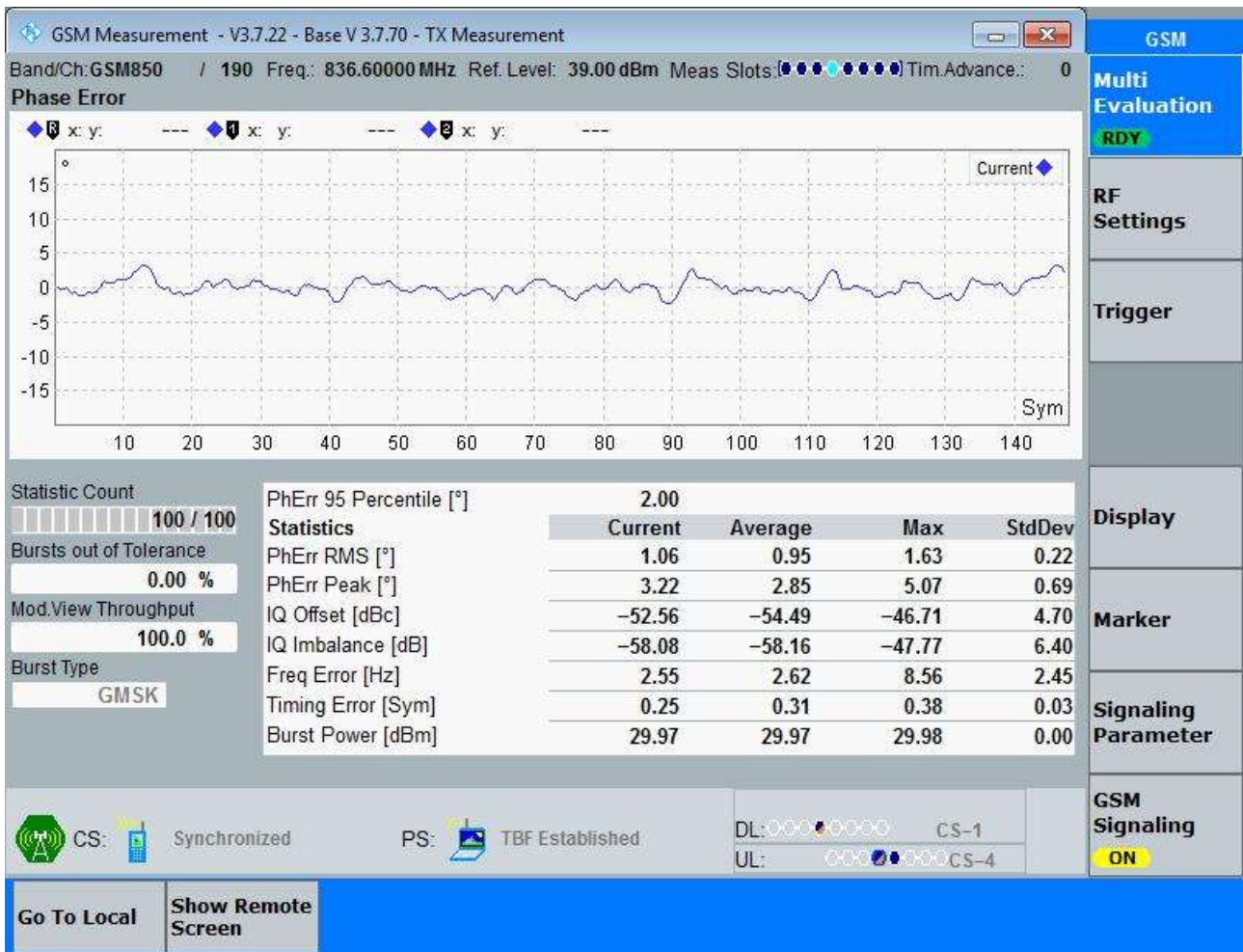
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

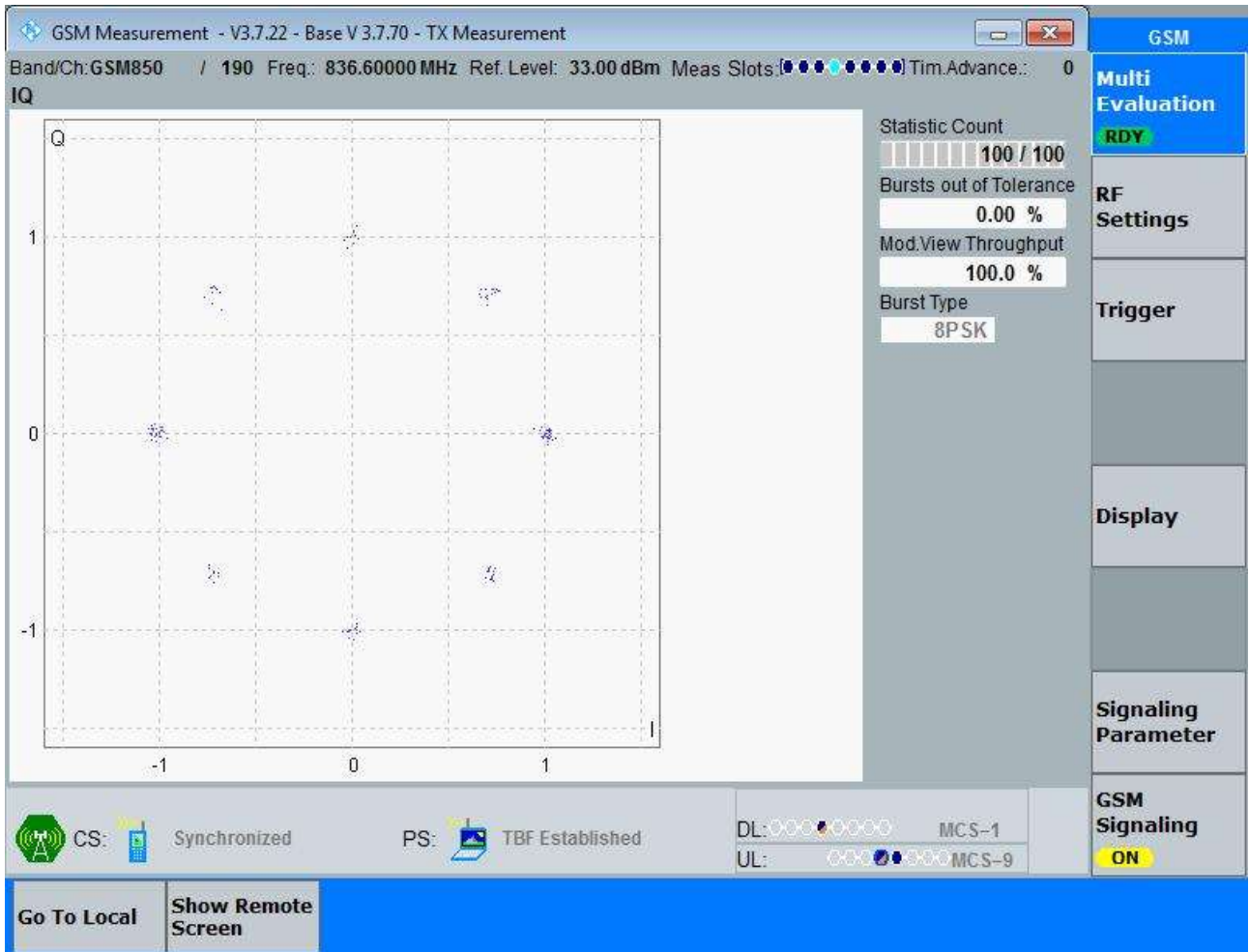
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

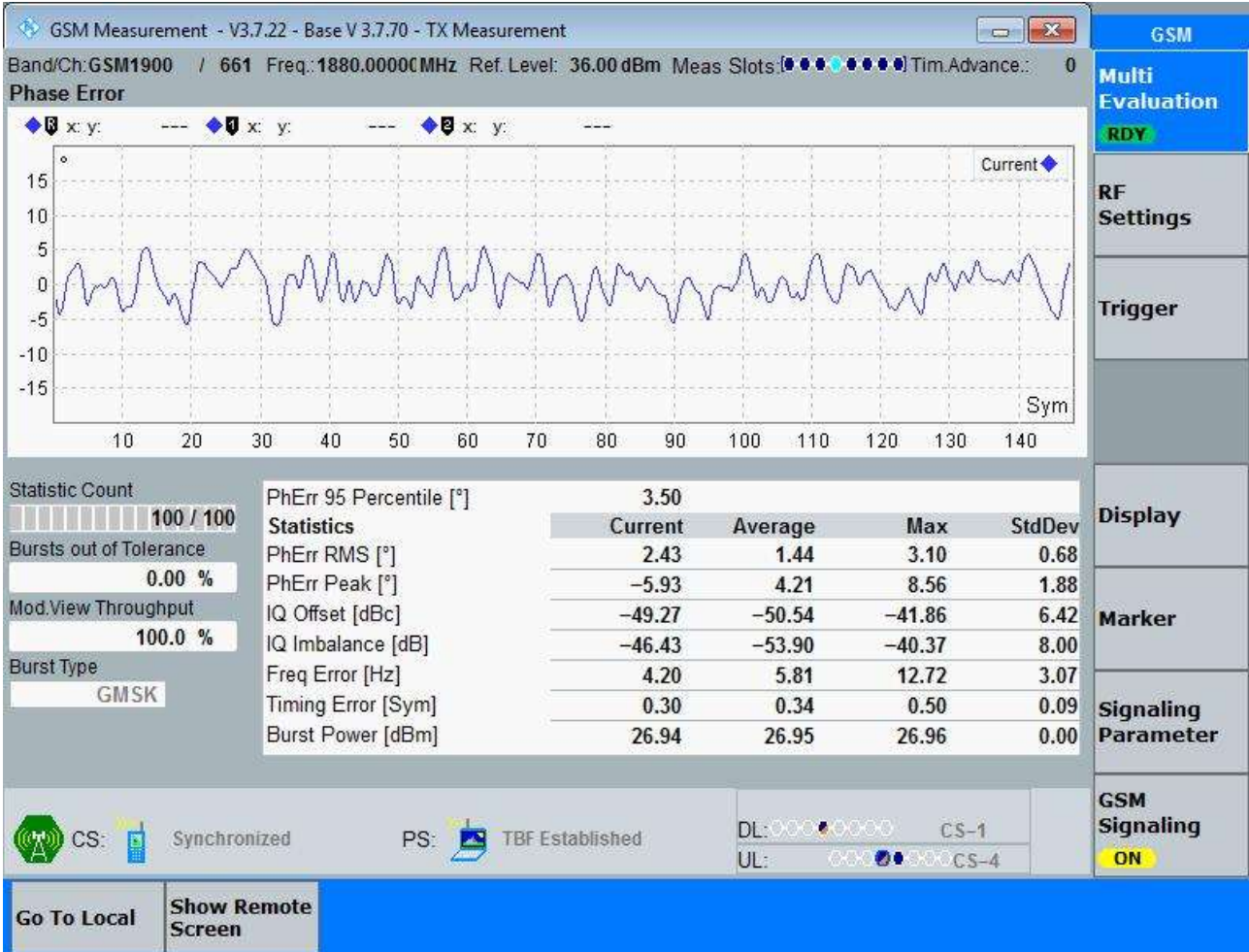
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = PCS1900

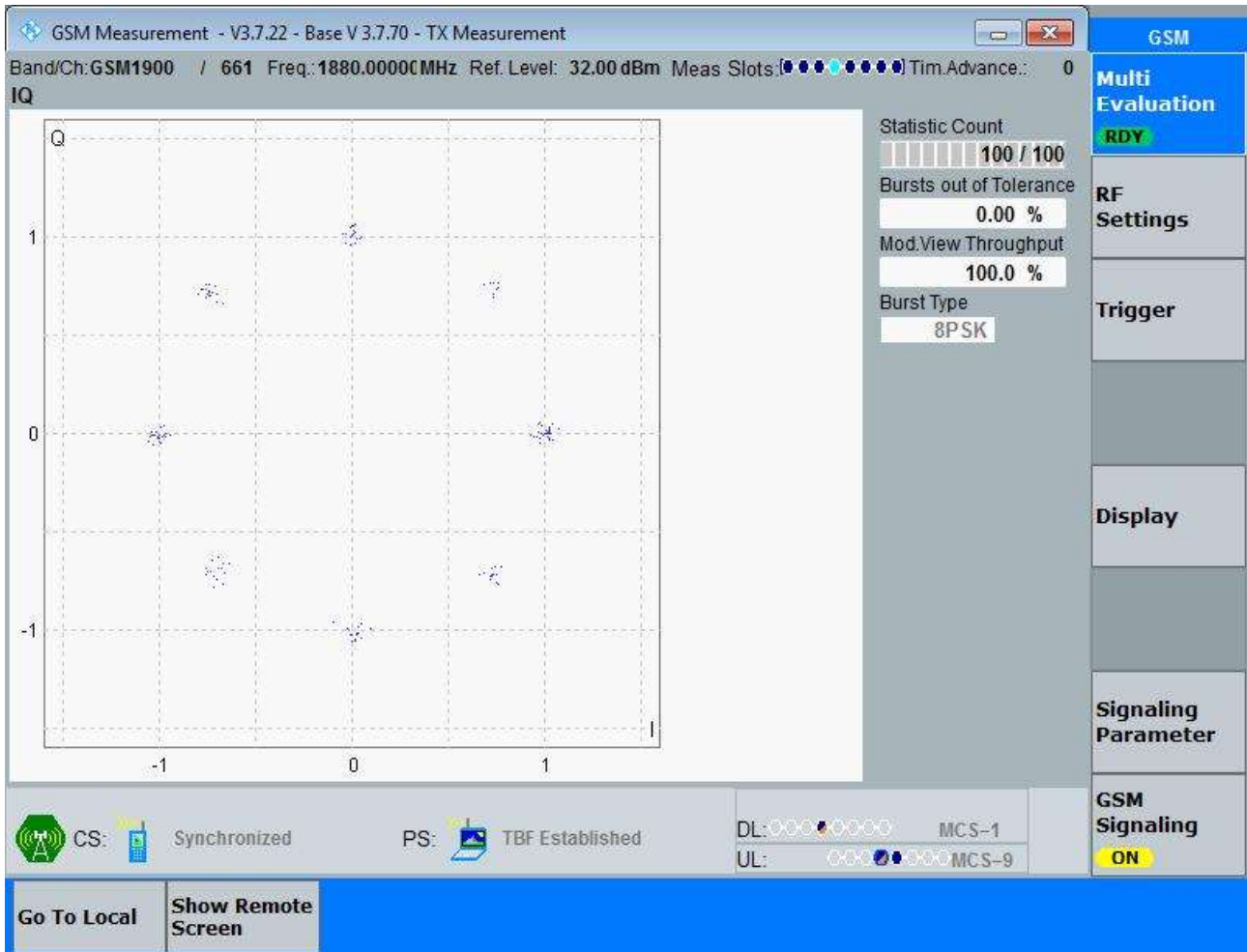
3.1.2.1 Test Mode = GSM/TM1

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	242.84	315.1	Pass
		MCH	245.30	315.0	Pass
		HCH	241.48	314.5	Pass
	GSM/TM2	LCH	245.22	320.0	Pass
		MCH	245.23	317.8	Pass
		HCH	254.25	321.0	Pass
PCS1900	GSM/TM1	LCH	246.70	317.0	Pass
		MCH	249.49	323.1	Pass
		HCH	249.72	320.4	Pass
	GSM/TM2	LCH	255.19	319.6	Pass
		MCH	254.40	327.1	Pass
		HCH	249.36	320.1	Pass

Part II - Test Plots

4.1 For GSM

4.1.1 Test Band = GSM850

4.1.1.1 Test Mode = GSM/TM1

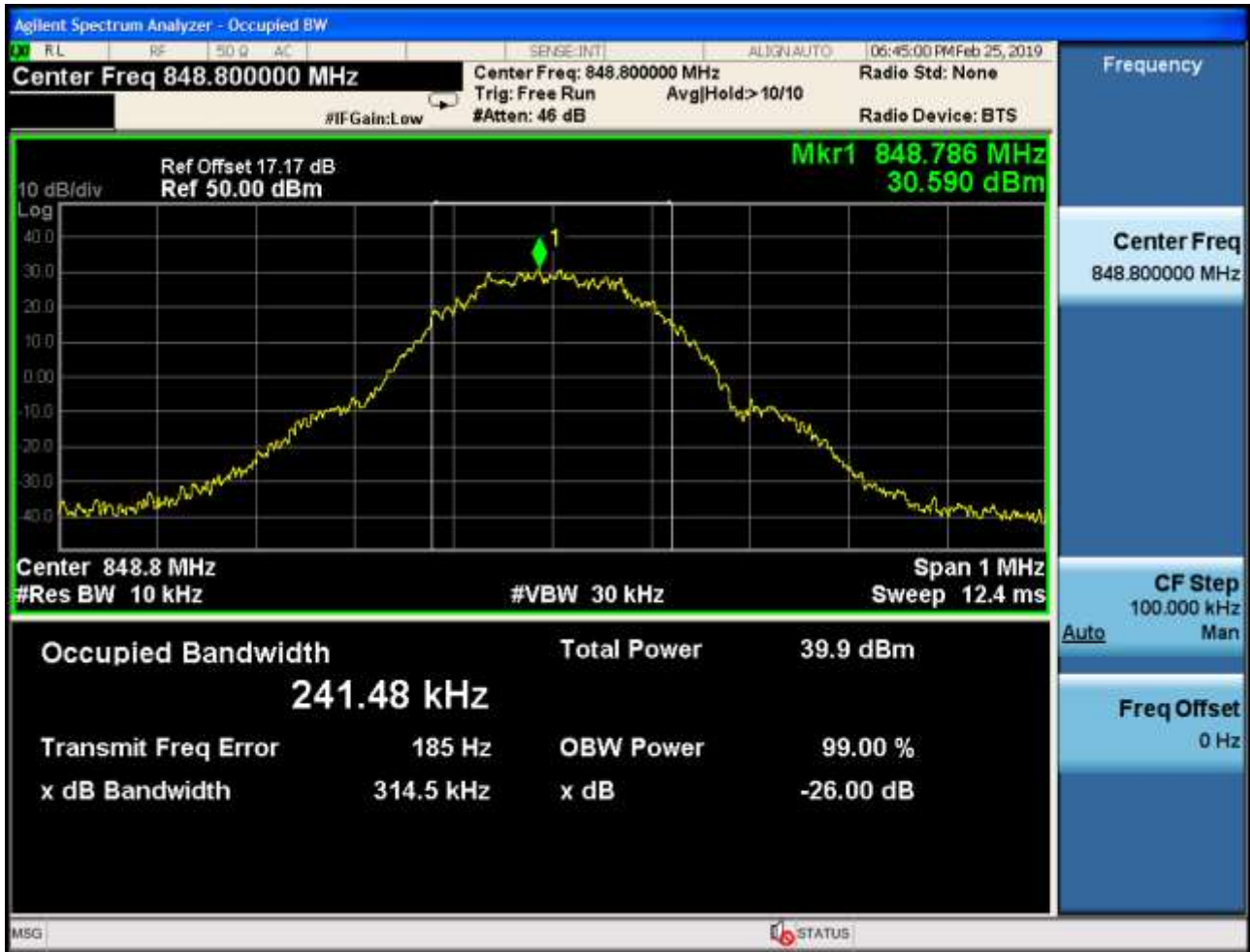
4.1.1.1.1 Test Channel = LCH



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 = PCS1900

4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH



4.1.2.1.2 Test Channel = MCH

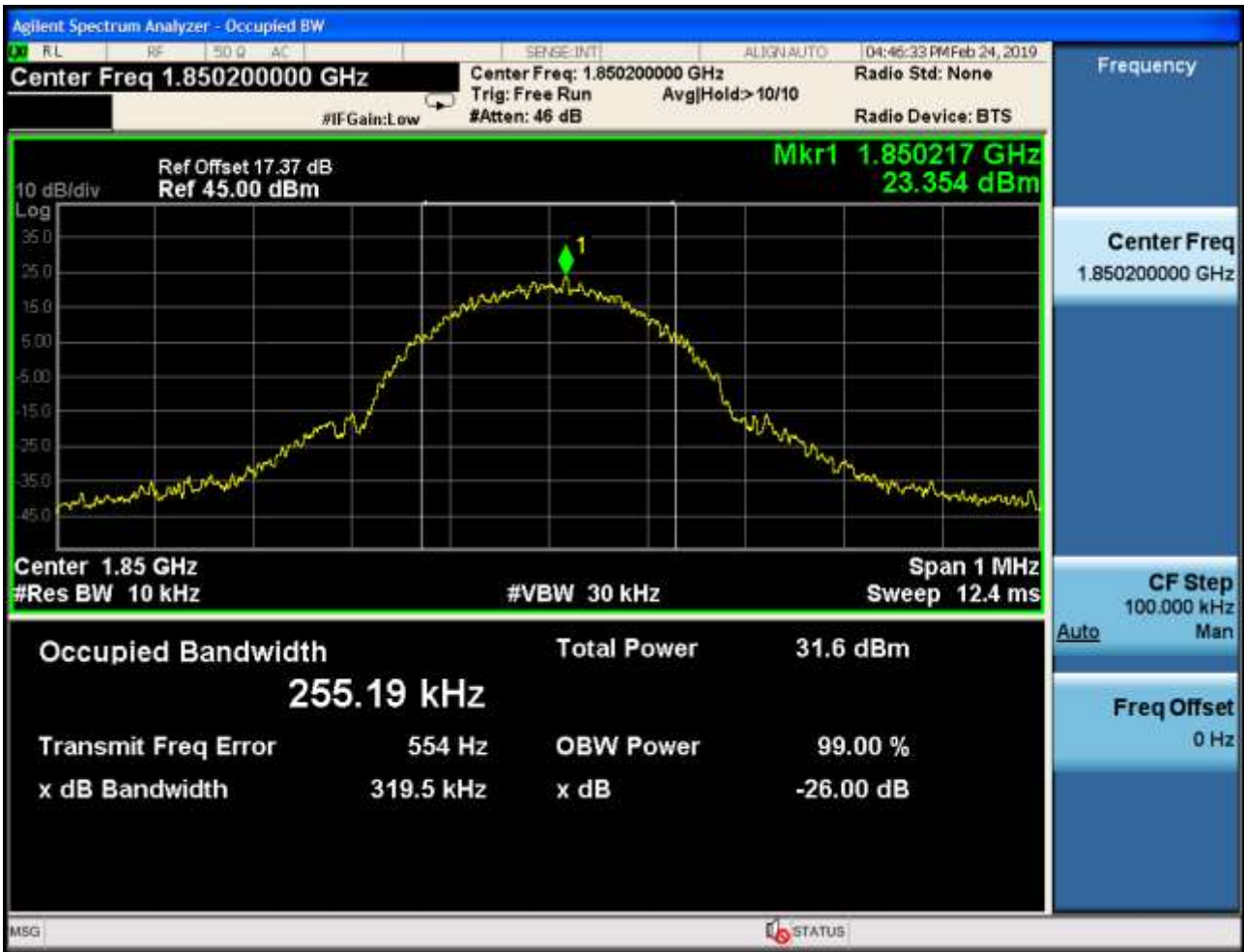


4.1.2.1.3 Test Channel = HCH



4.1.2.2 Test Mode = GSM/TM2

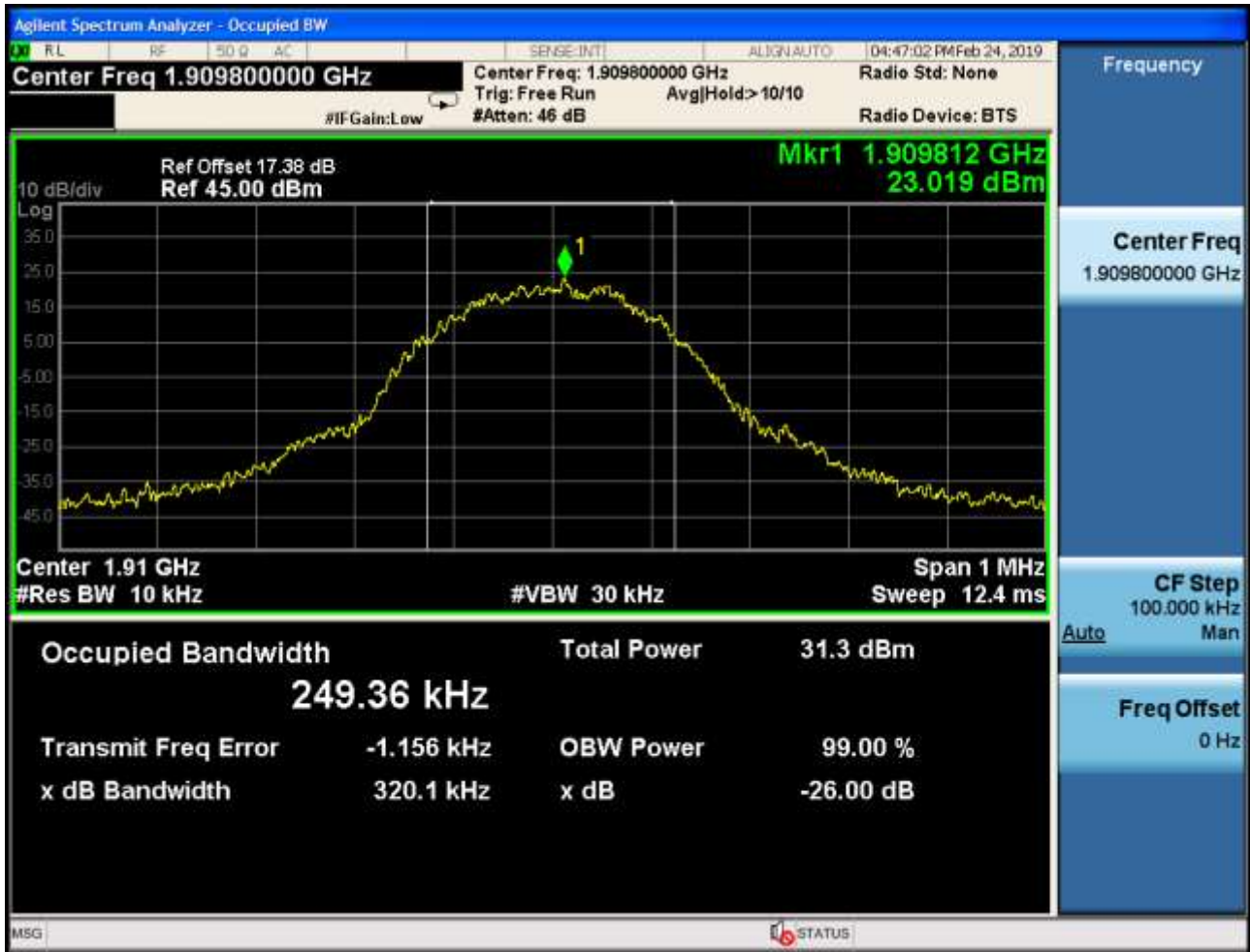
4.1.2.2.1 Test Channel = LCH



4.1.2.2.2 Test Channel = MCH



4.1.2.2.3 Test Channel = HCH



5Appendix_E: Band Edges Compliance

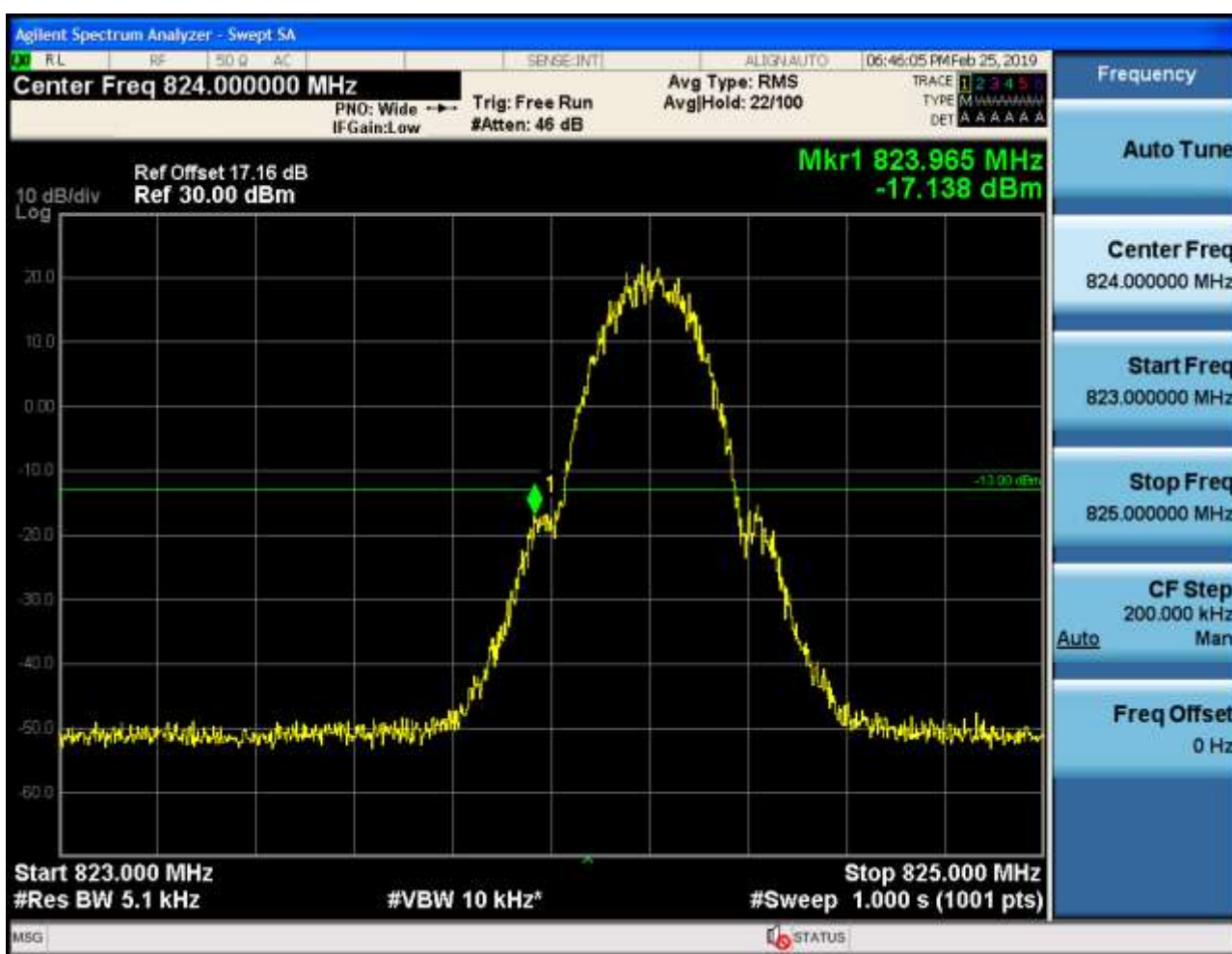
Part I - Test Plots

5.1 For GSM

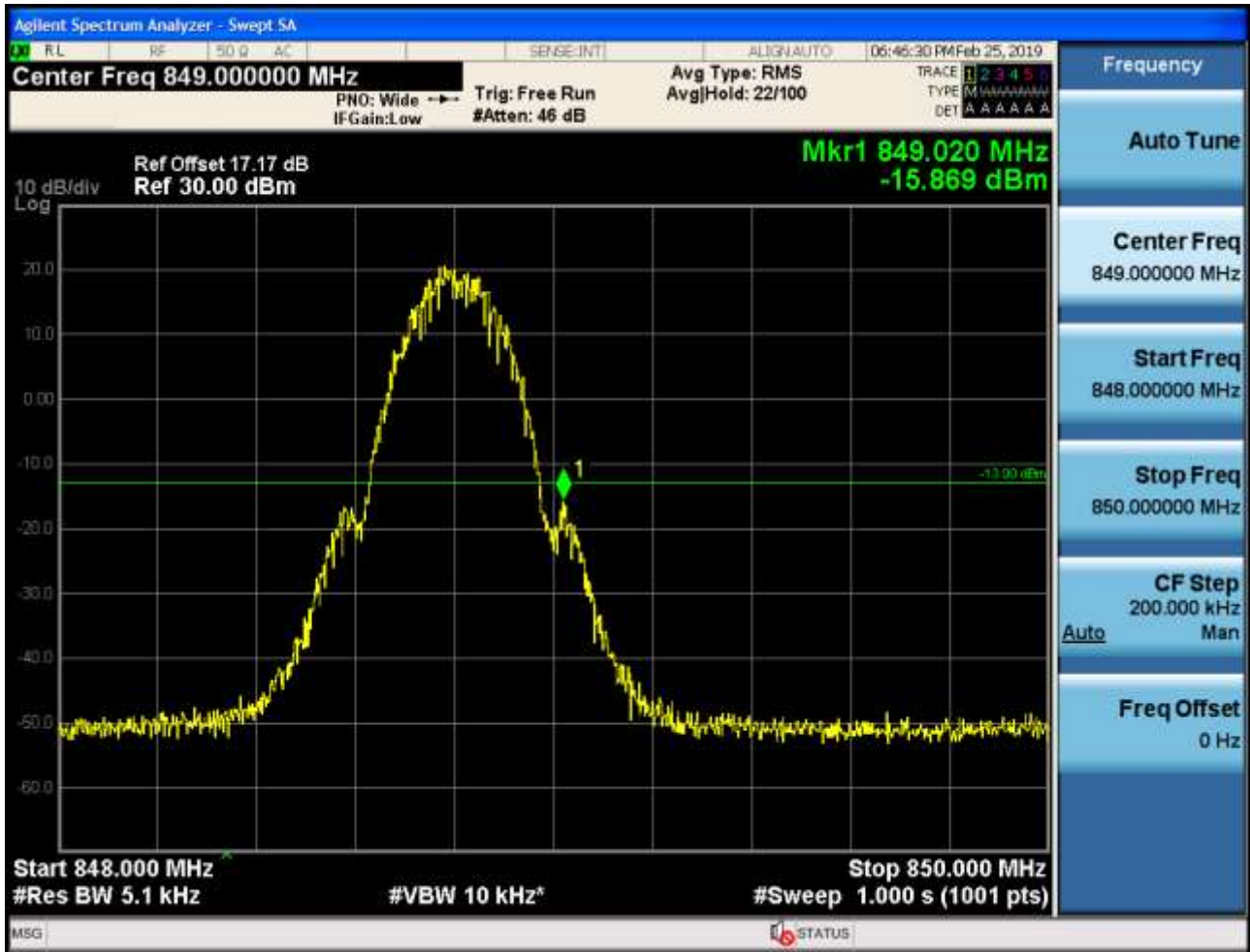
5.1.1 Test Band = GSM850

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



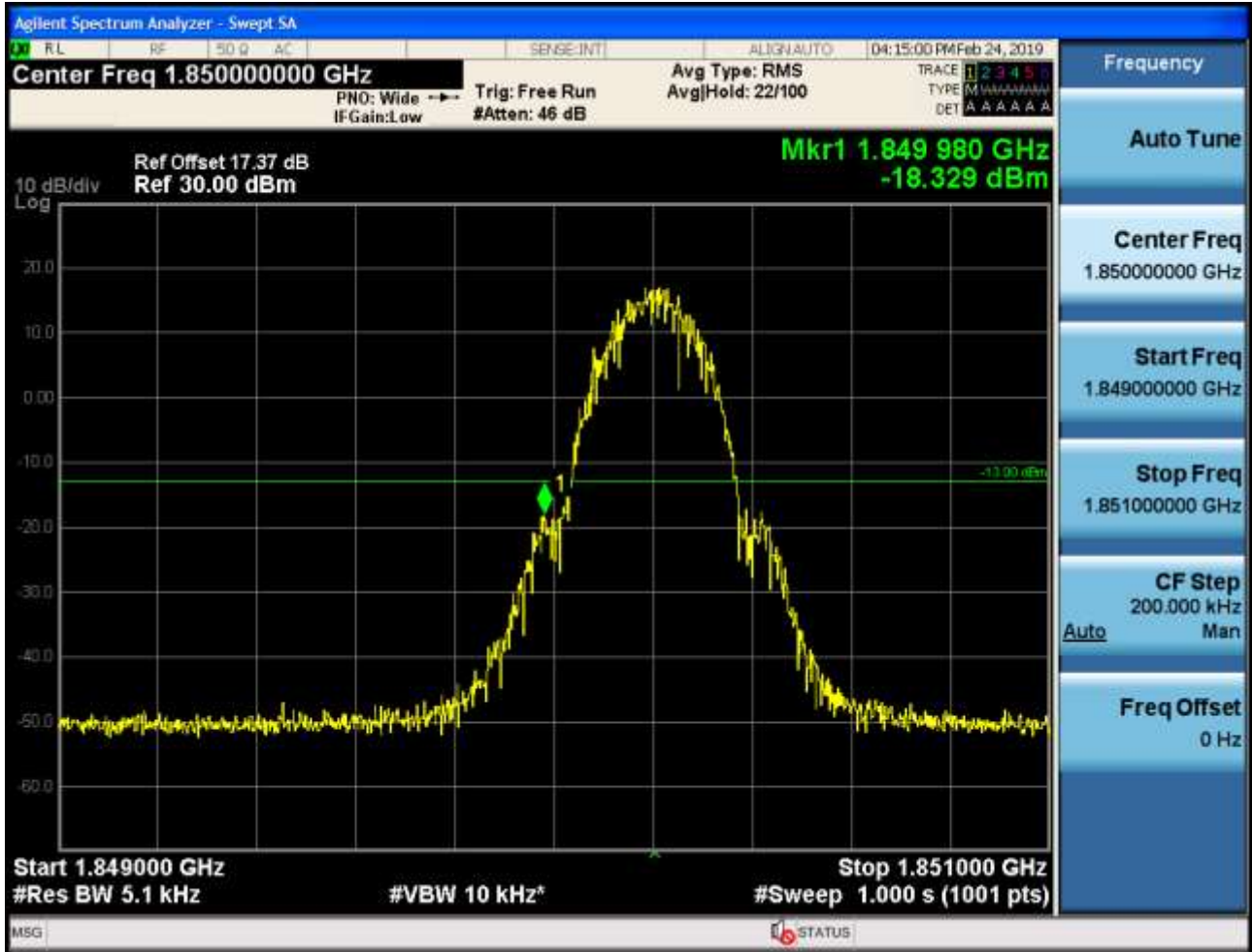
5.1.1.2.2 Test Channel = HCH



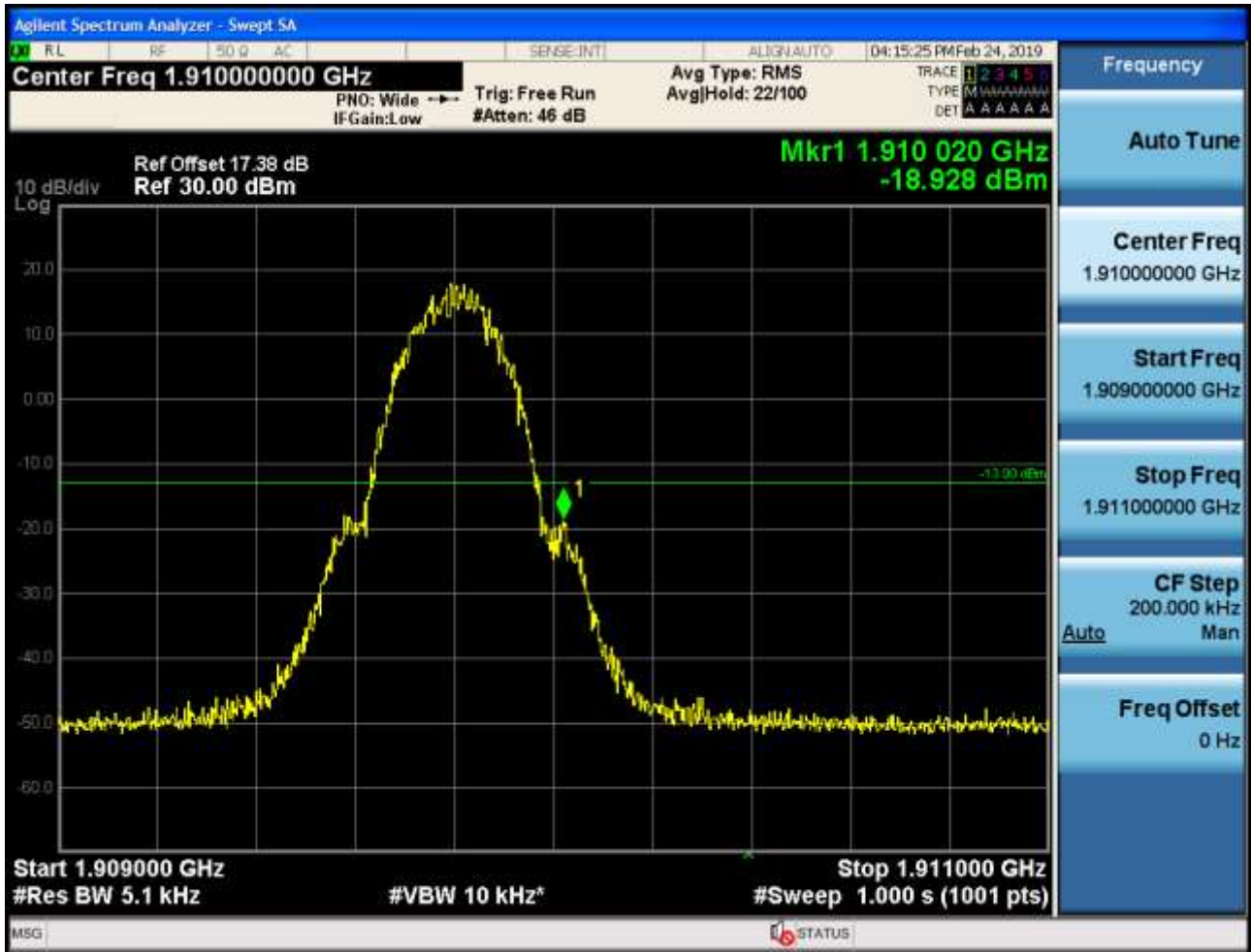
5.1.2 Test Band = PCS1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

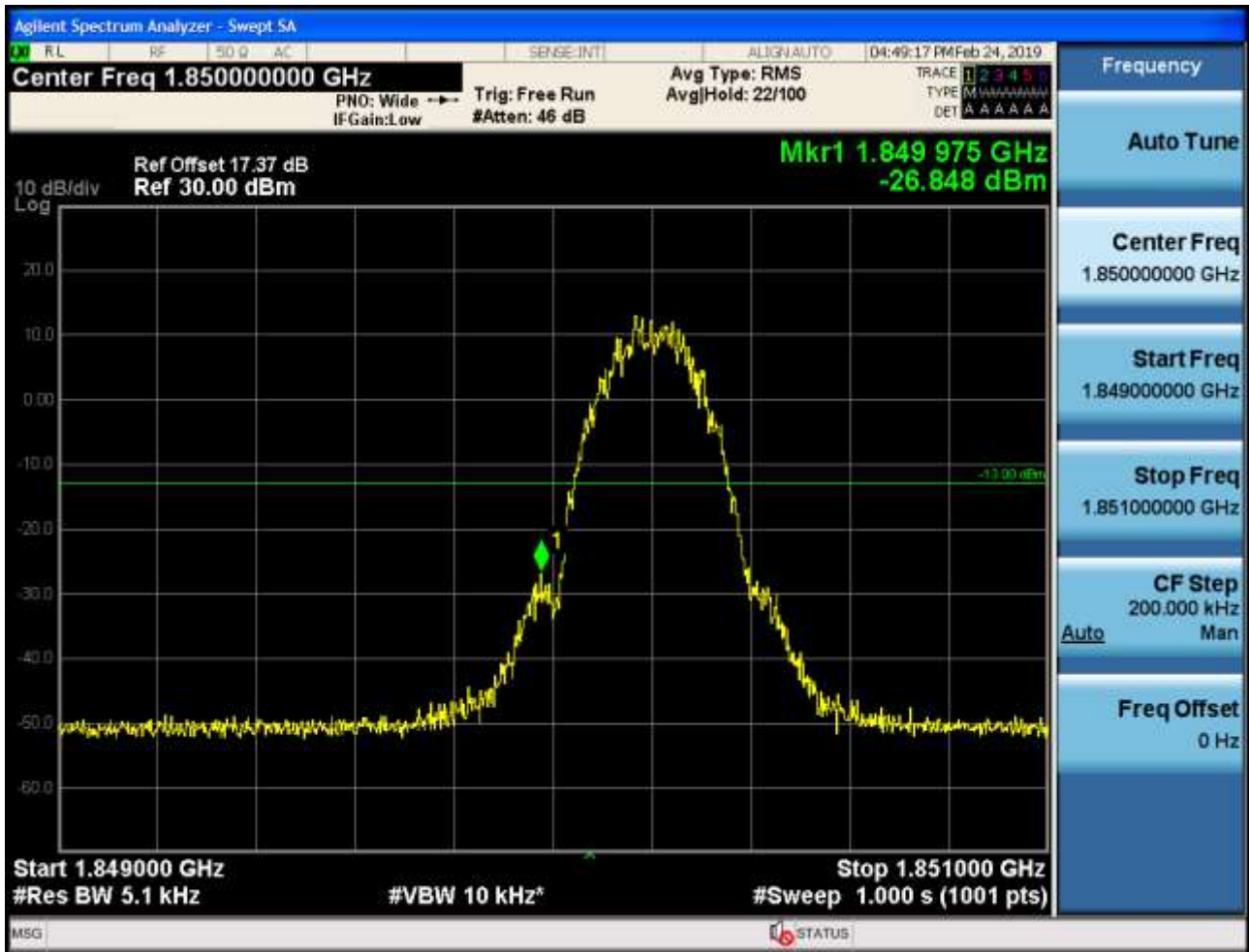


5.1.2.1.2 Test Channel = HCH

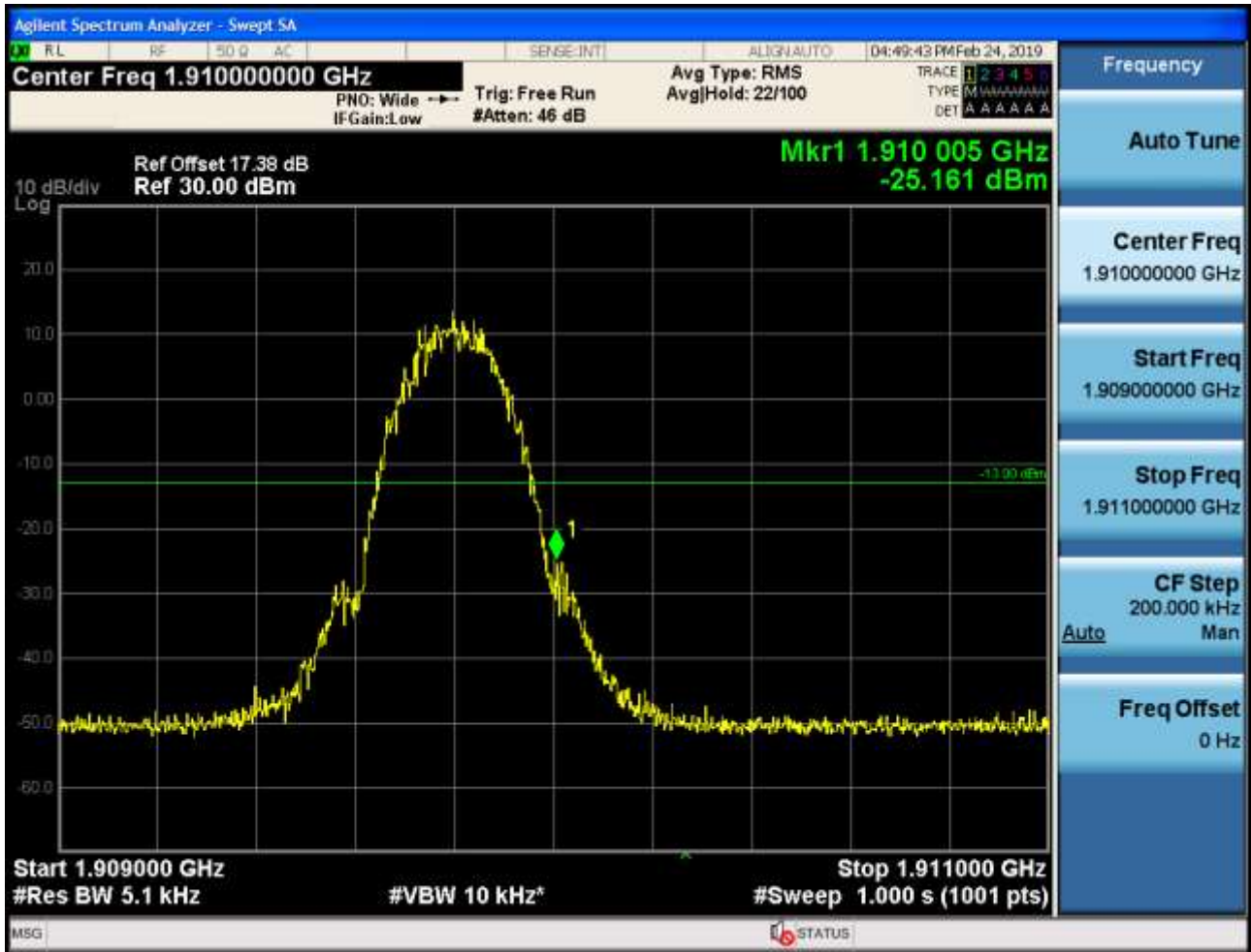


5.1.2.2 Test Mode = GSM/TM2

5.1.2.2.1 Test Channel = LCH



5.1.2.2.2 Test Channel = HCH



6Appendix_F: Spurious Emission at Antenna Terminal

NOTE: For the averaged unwanted emissions measurements, the measurement points in each sweep is greater than twice the Span/RBW in order to ensure bin-to-bin spacing of $< RBW/2$ so that narrowband signals are not lost between frequency bins. As to the present test item, the "Measurement Points = $k * (Span / RBW)$ " with k between 4 and 5, which results in an acceptable level error of less than 0.5 dB.

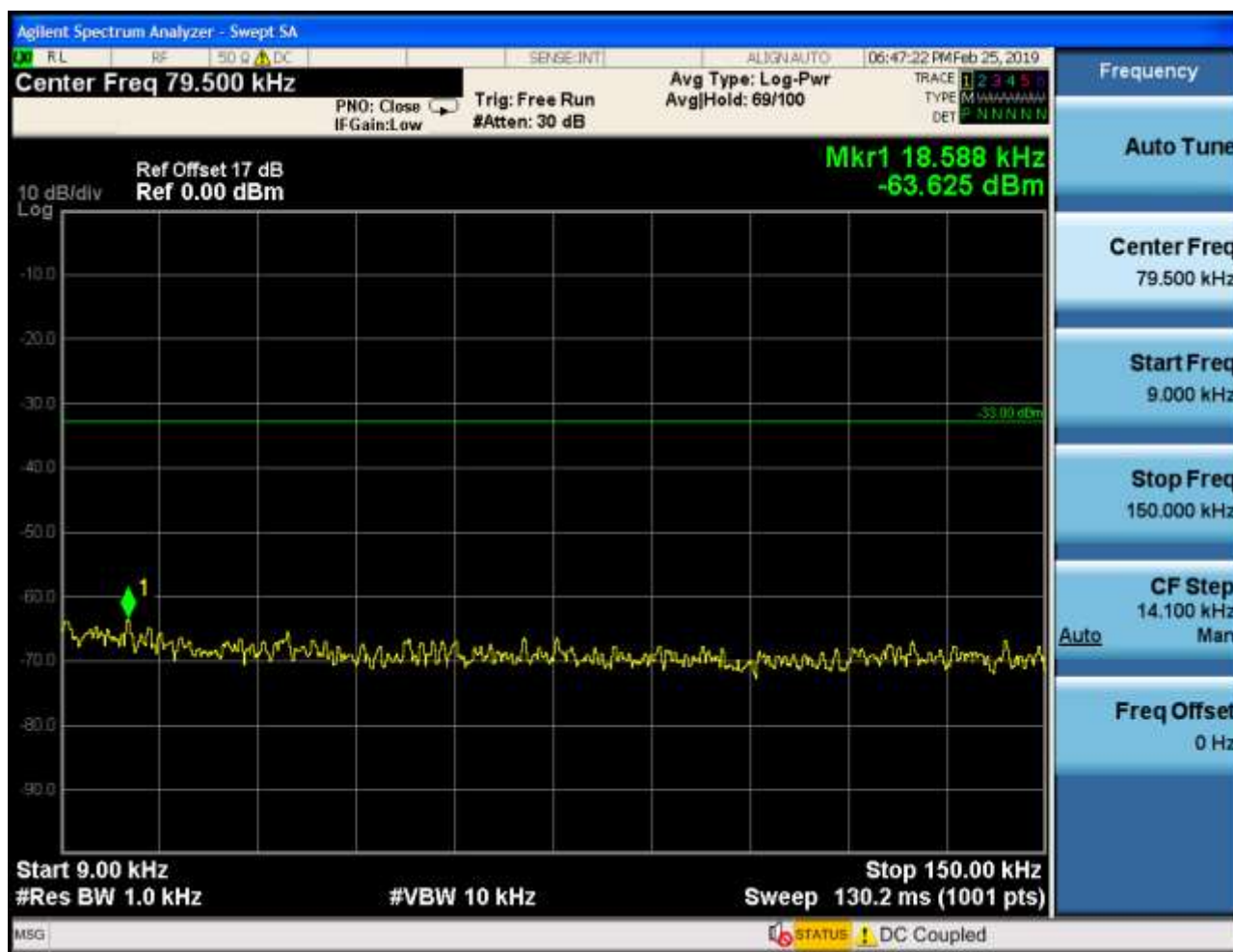
Part I - Test Plots

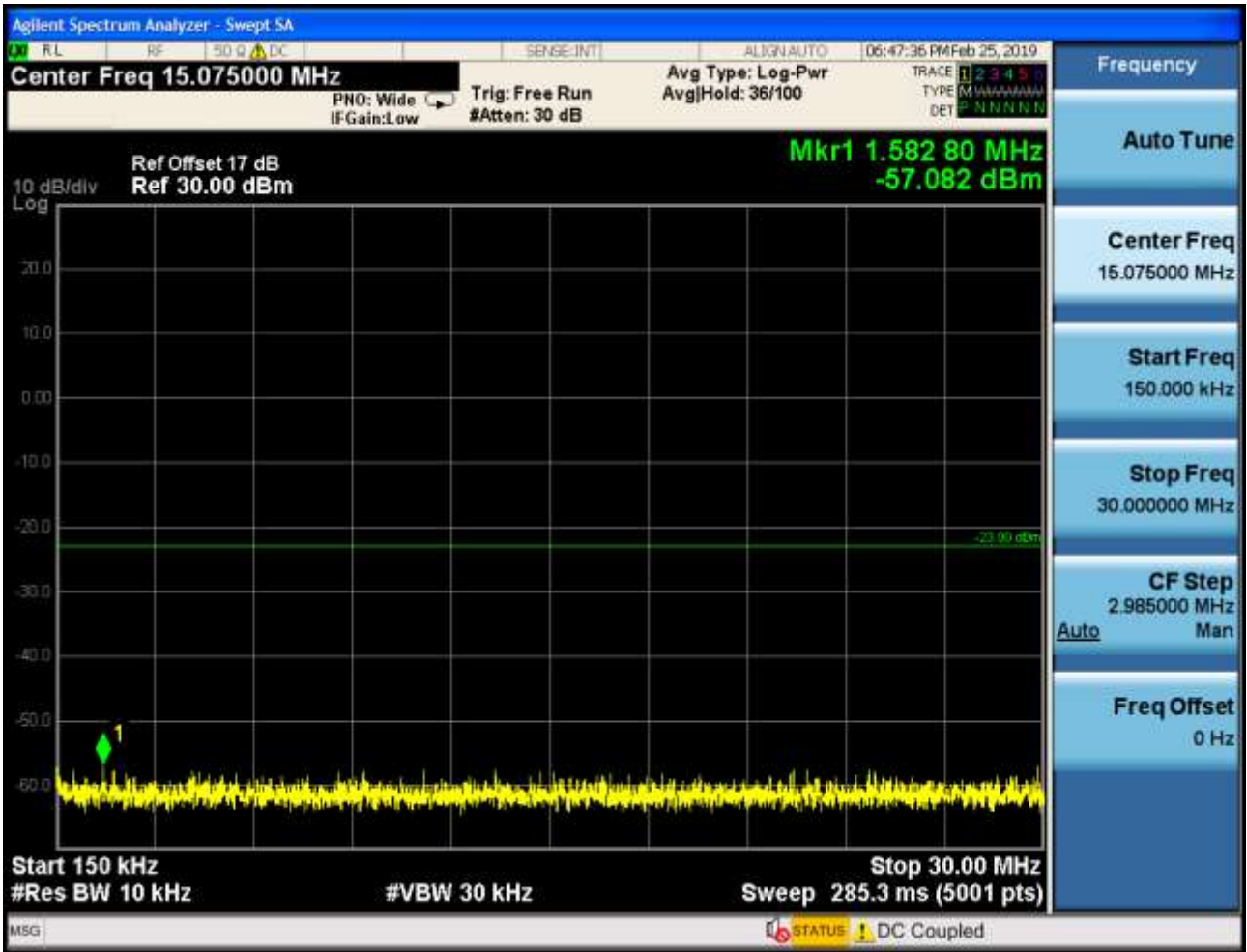
6.1 For GSM

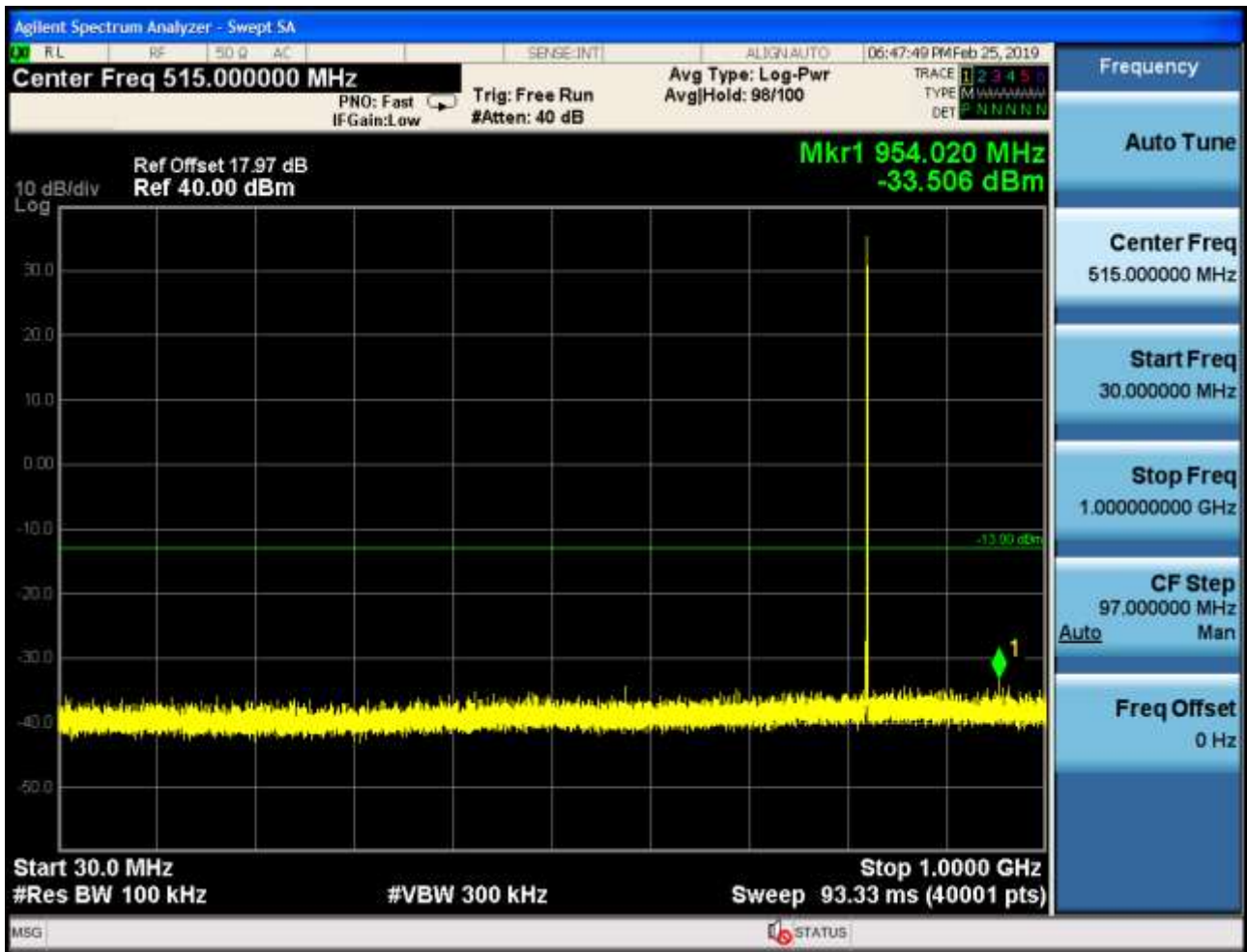
6.1.1 Test Band = GSM850

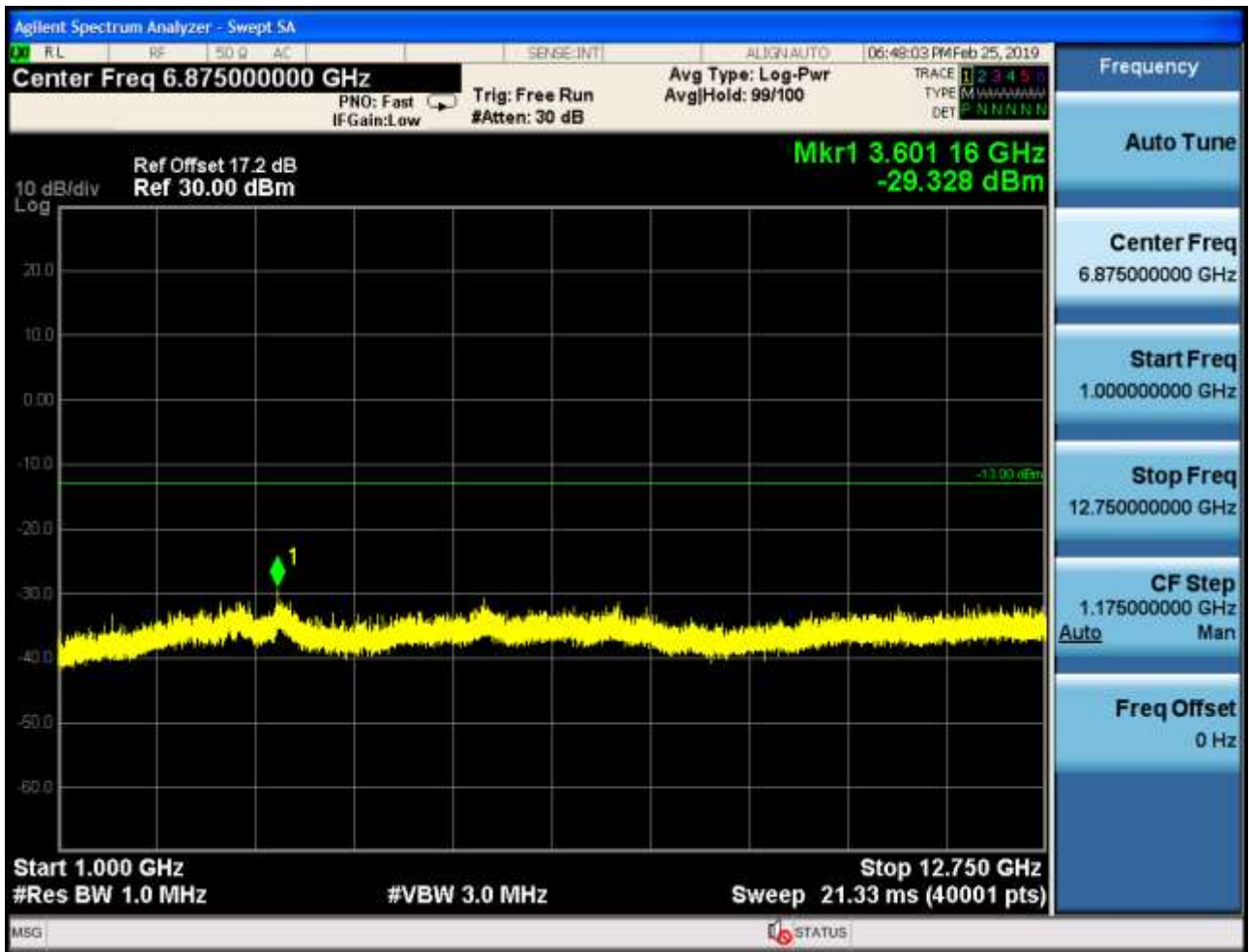
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

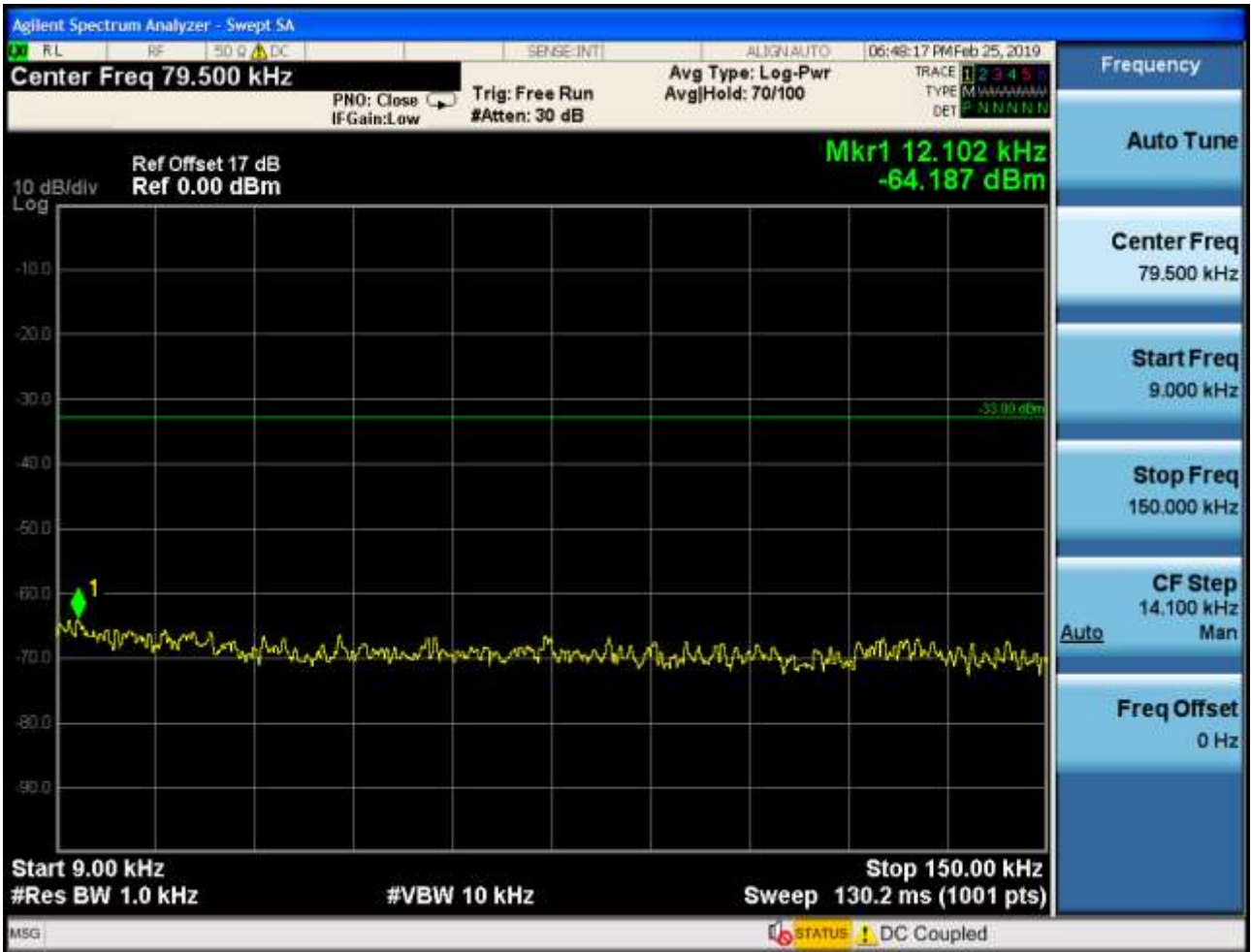


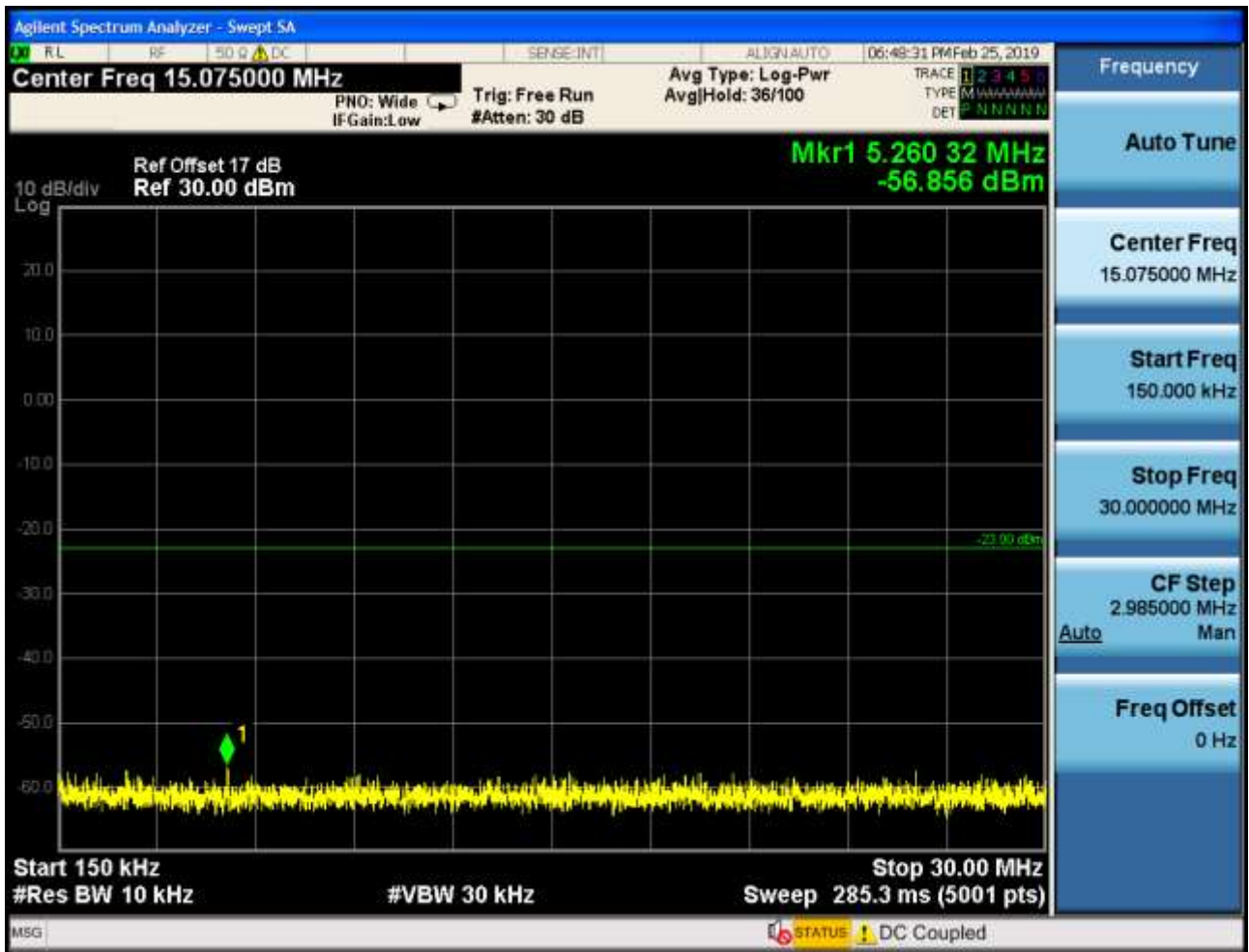


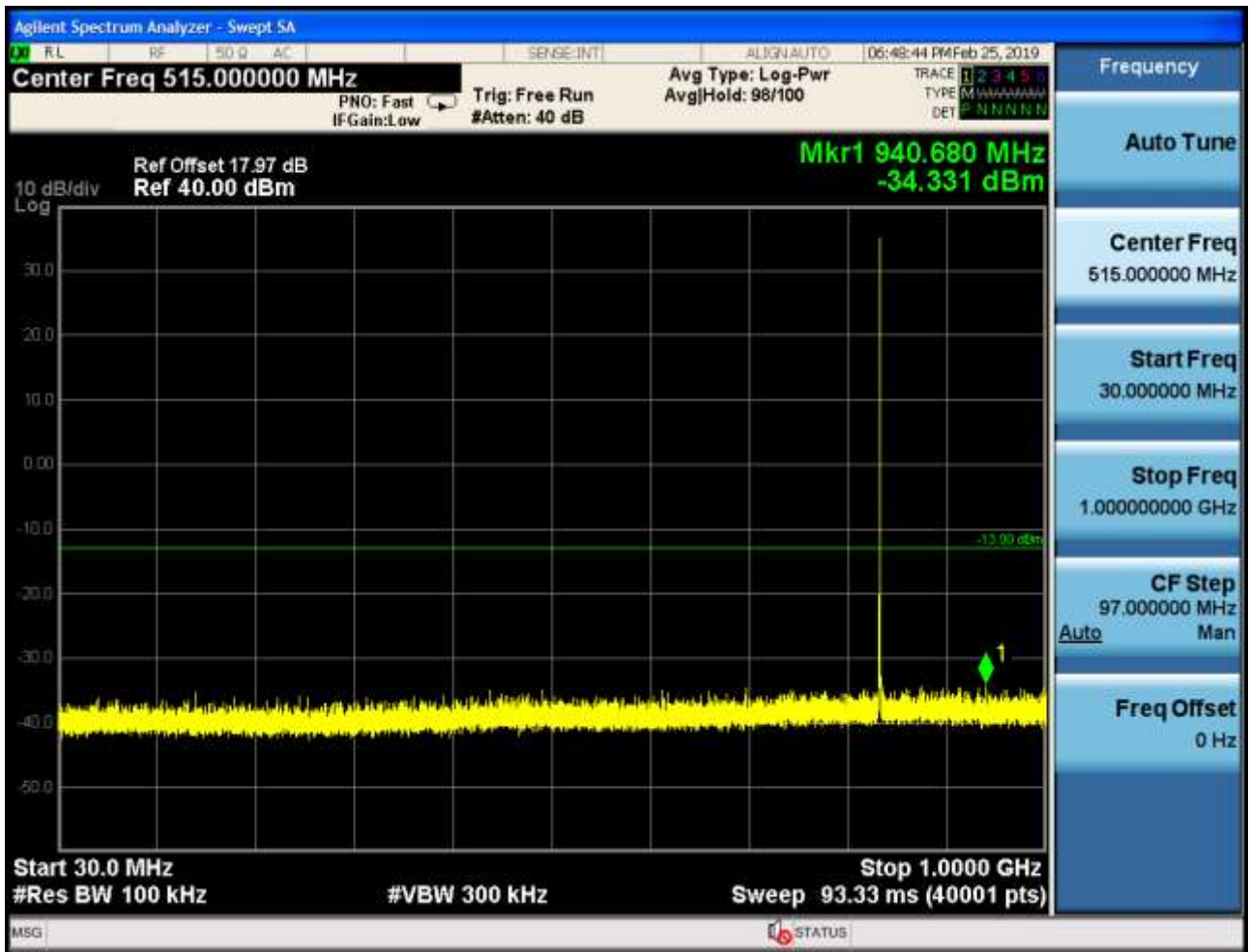


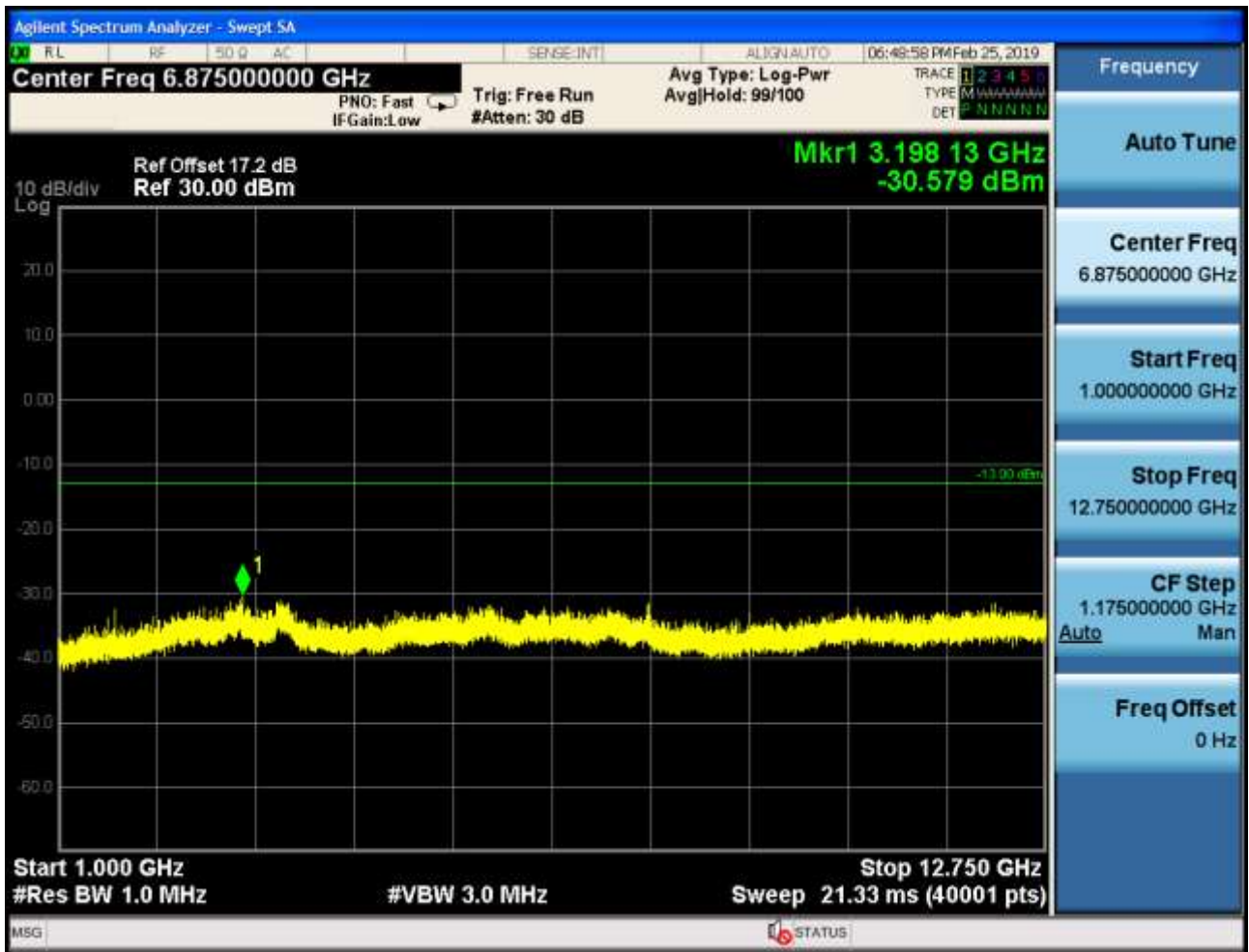


6.1.1.1.2 Test Channel = MCH



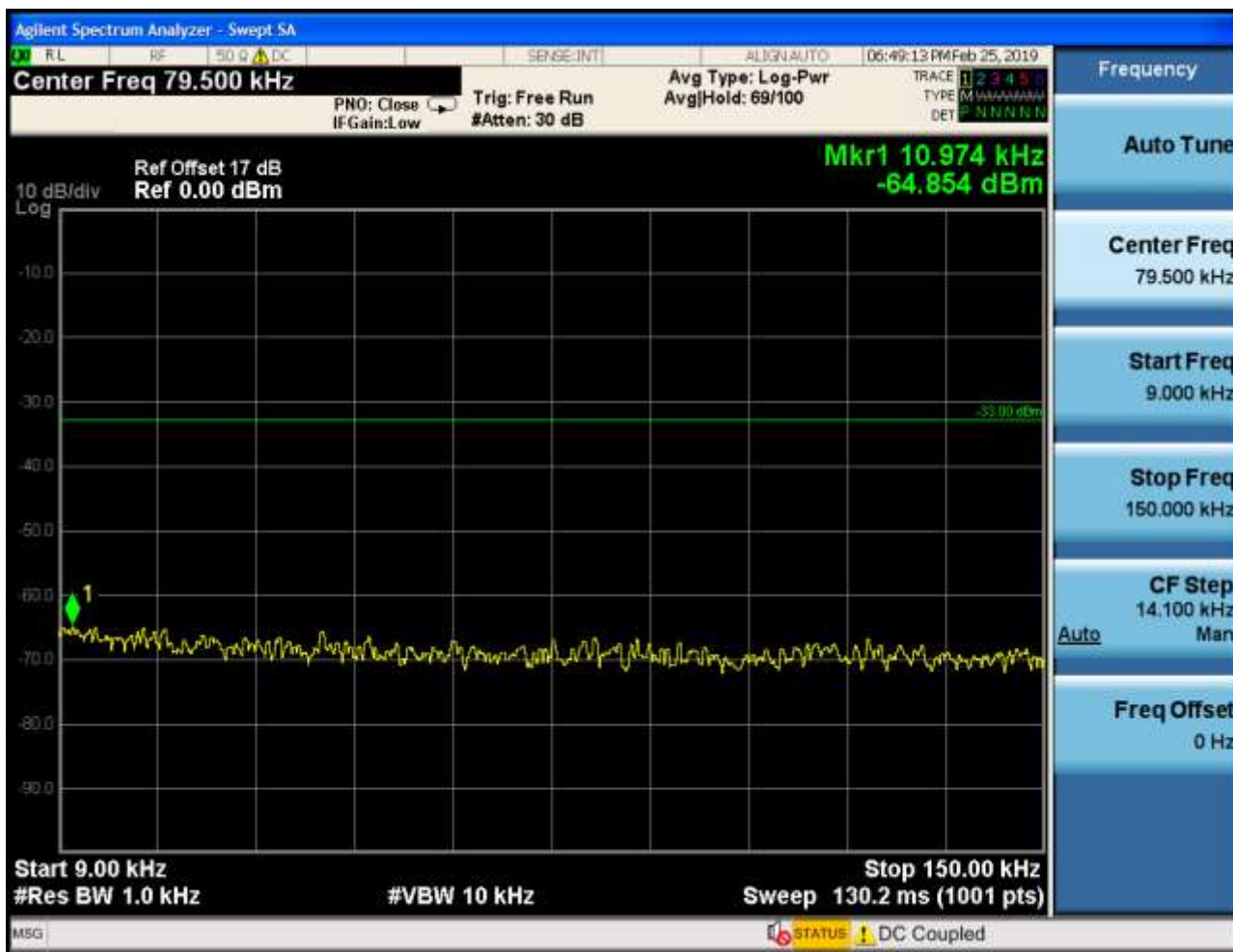


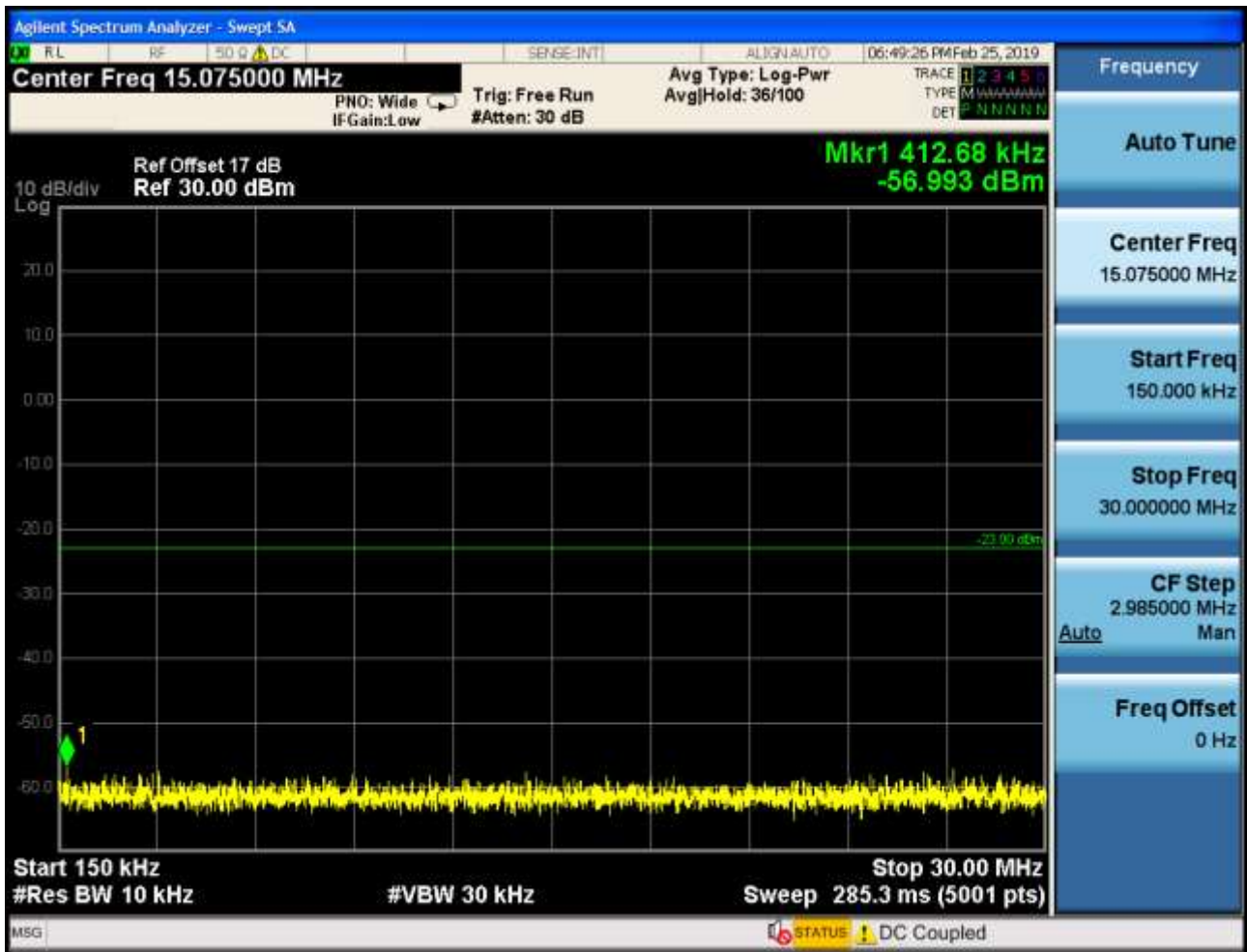


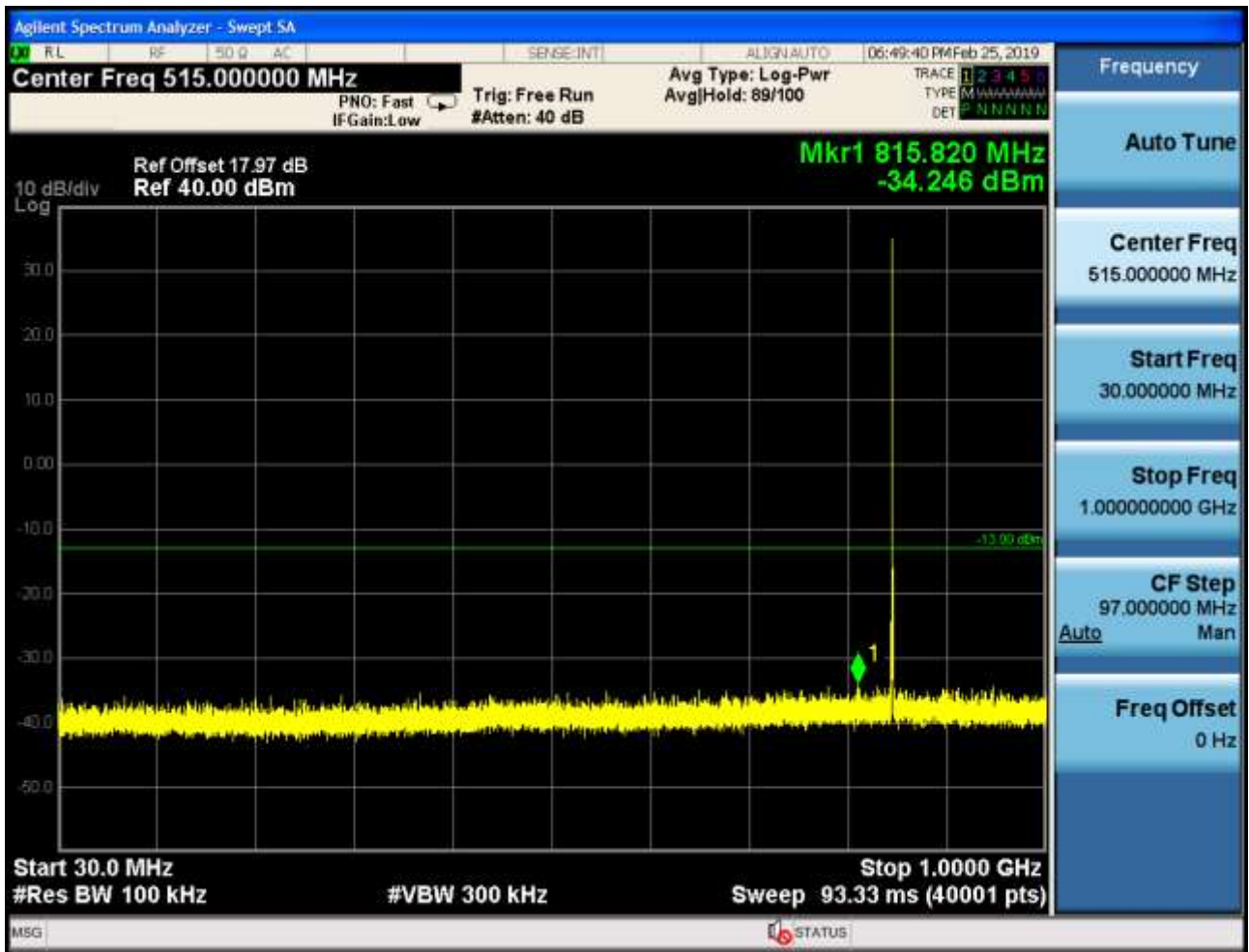




6.1.1.1.3 Test Channel = HCH



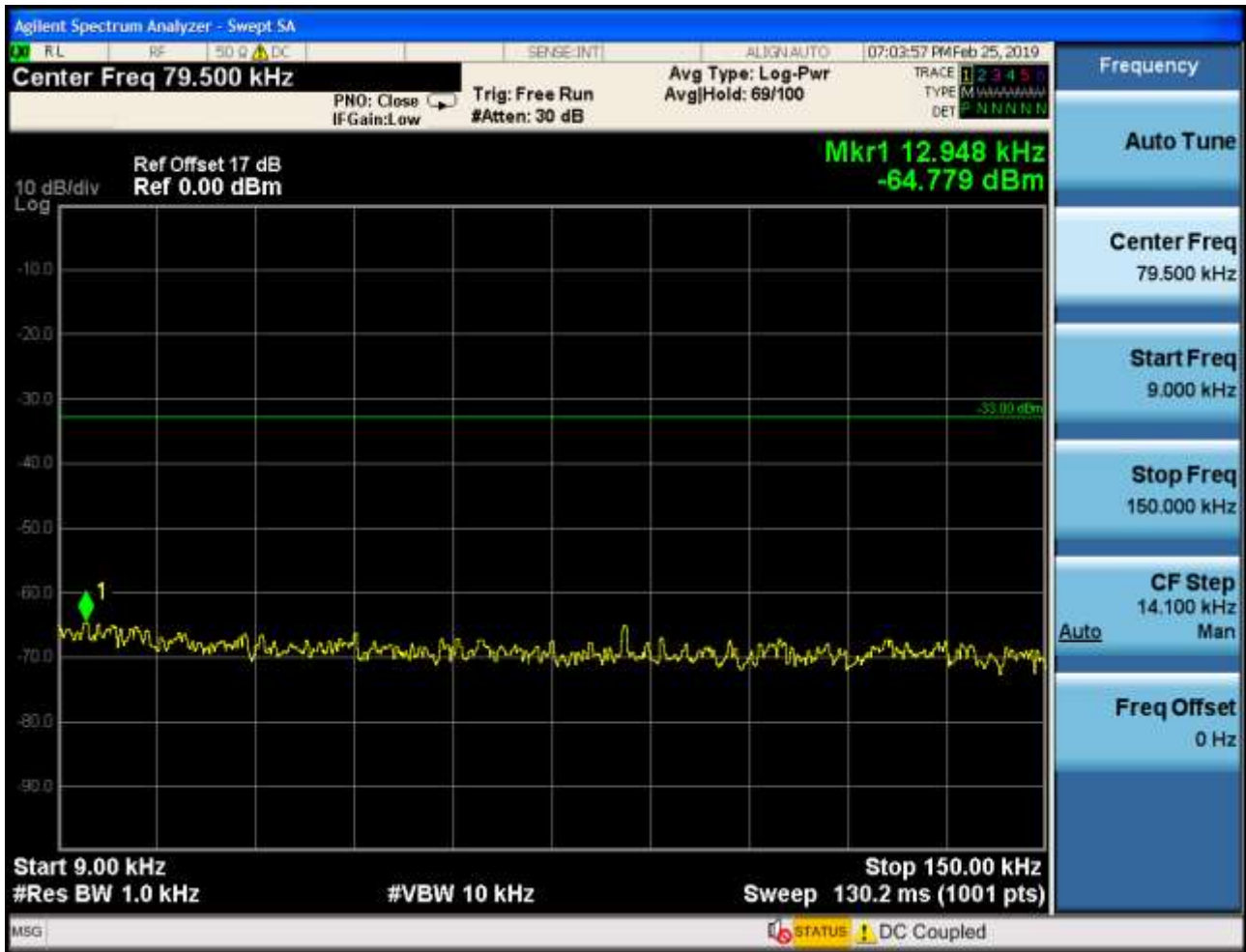


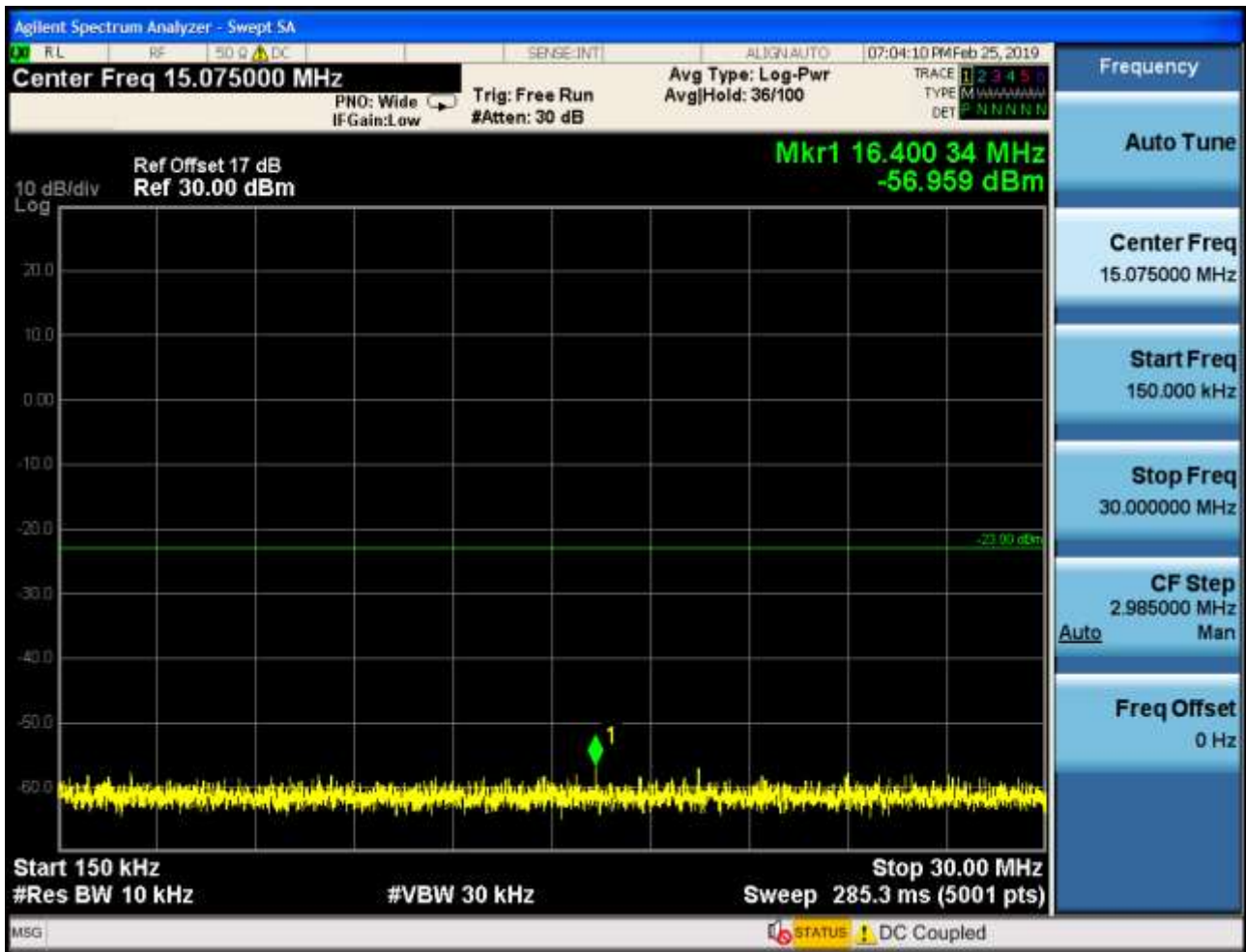


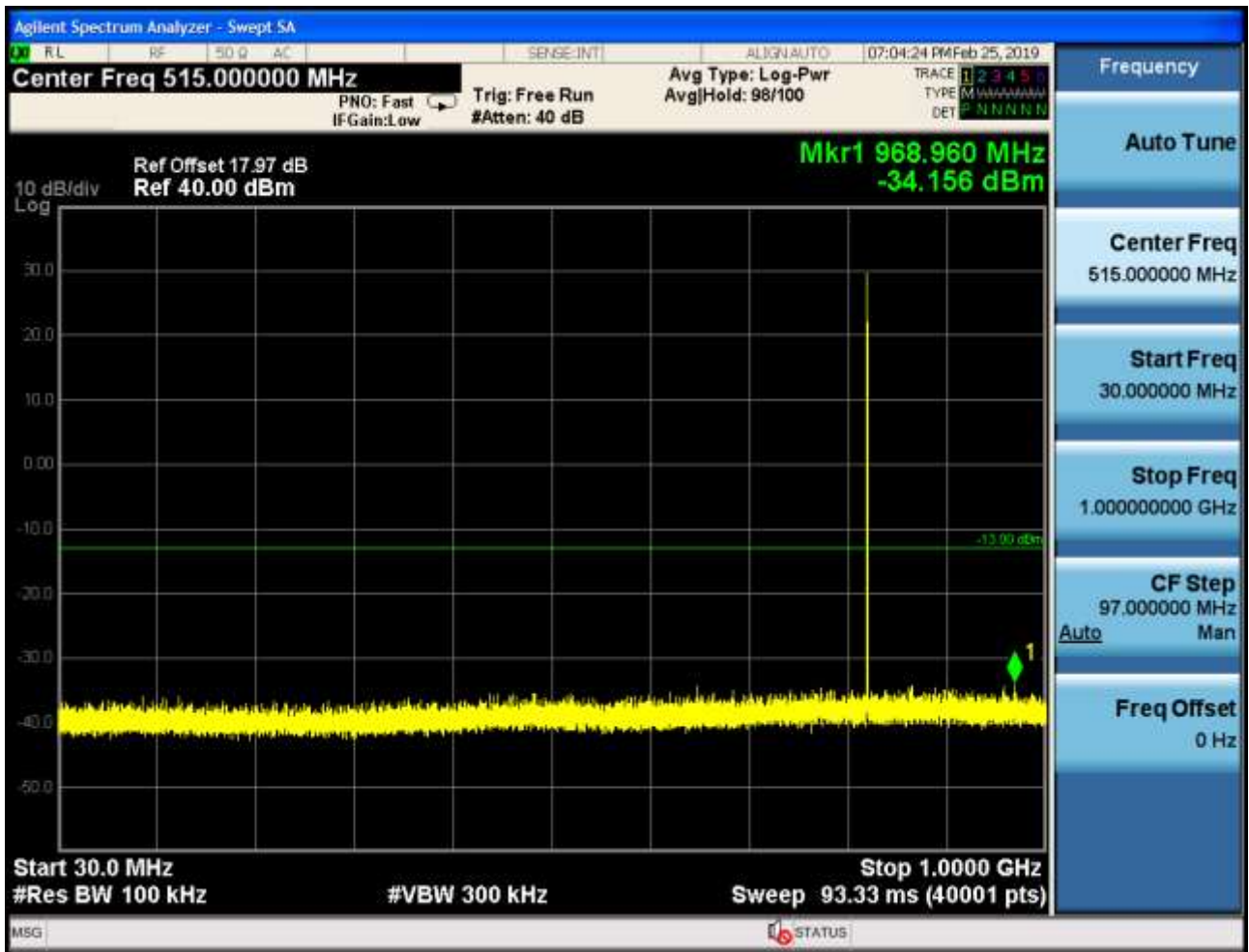


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

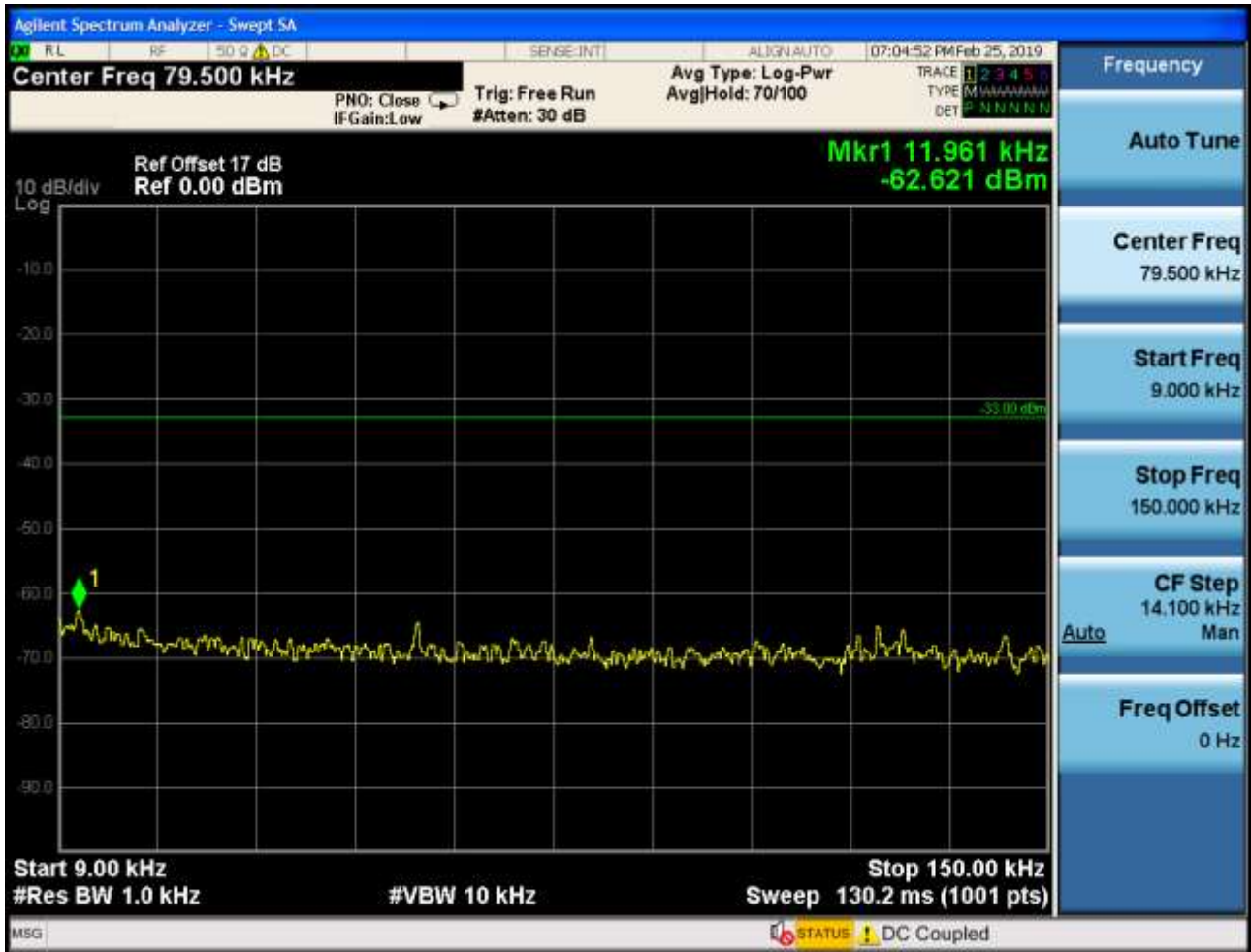


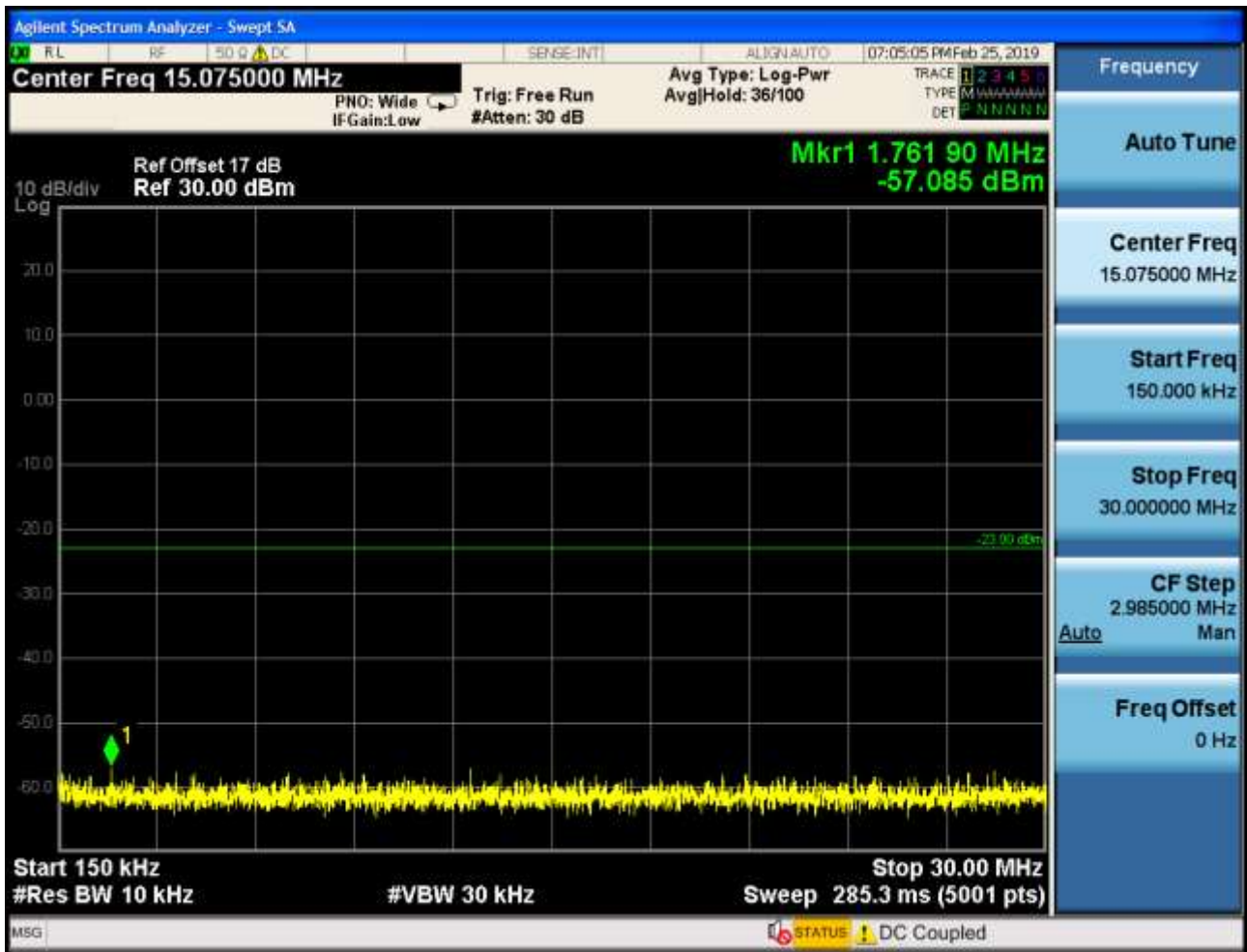


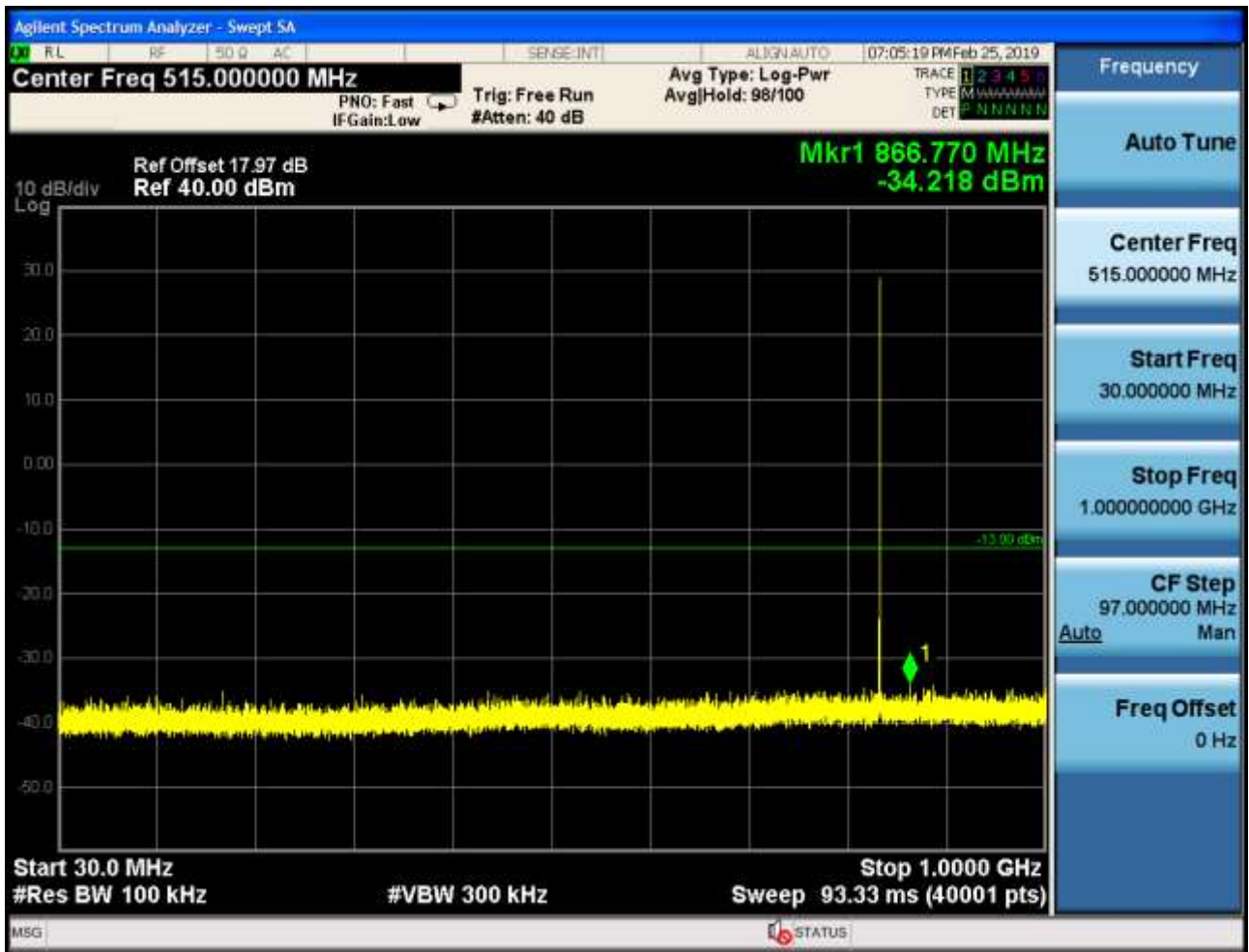




6.1.1.2.2 Test Channel = MCH

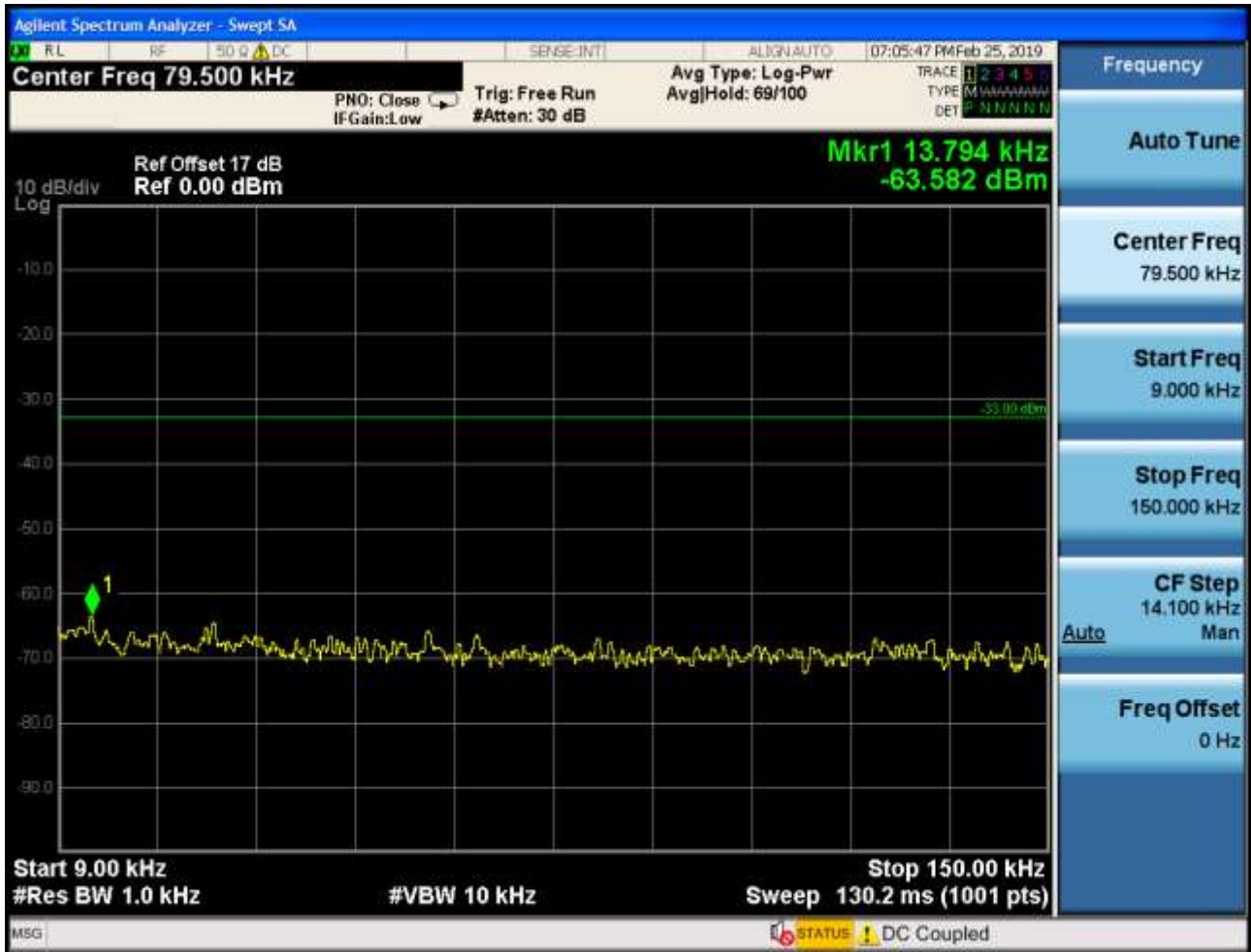








6.1.1.2.3 Test Channel = HCH



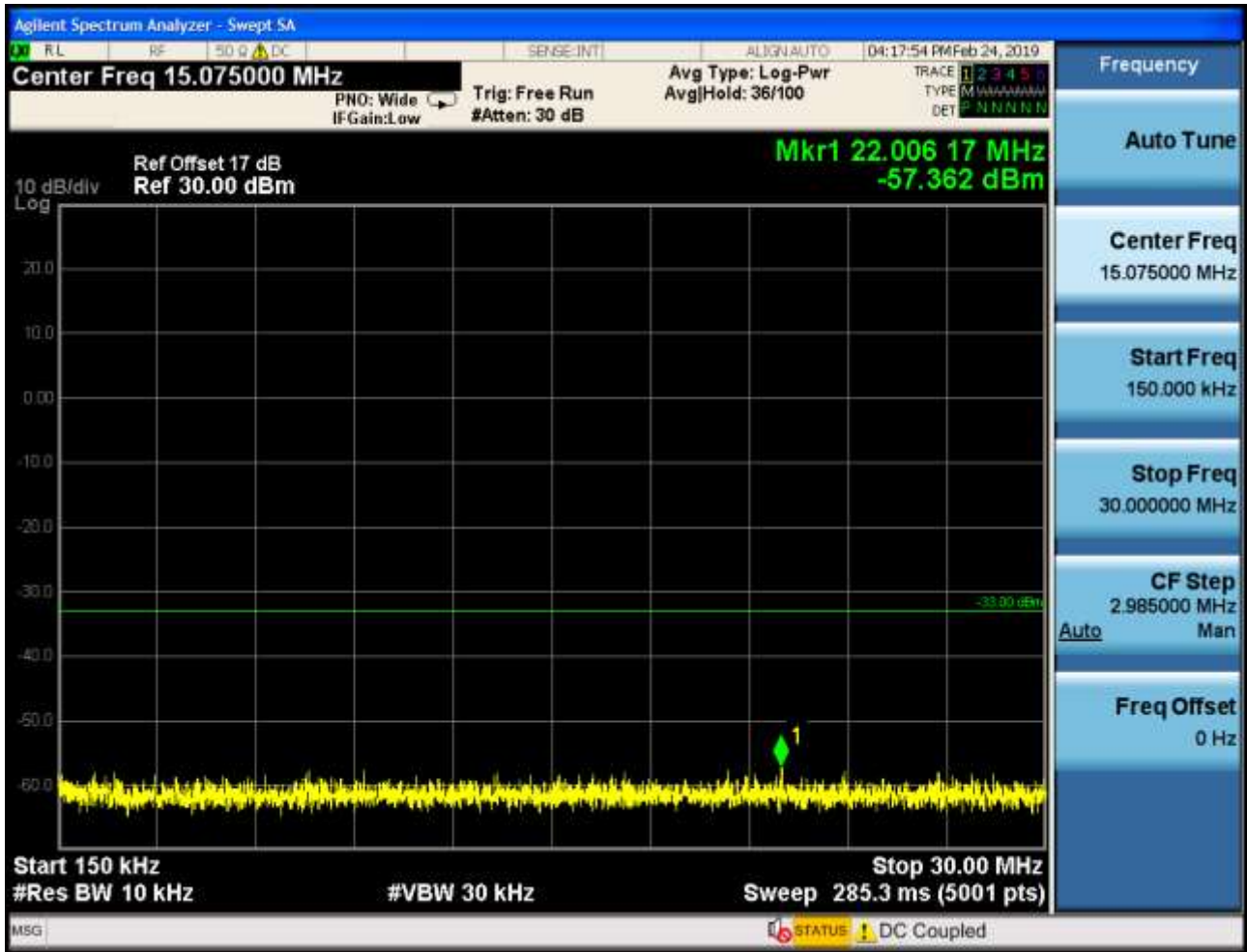


6.1.2 Test Band = PCS1900

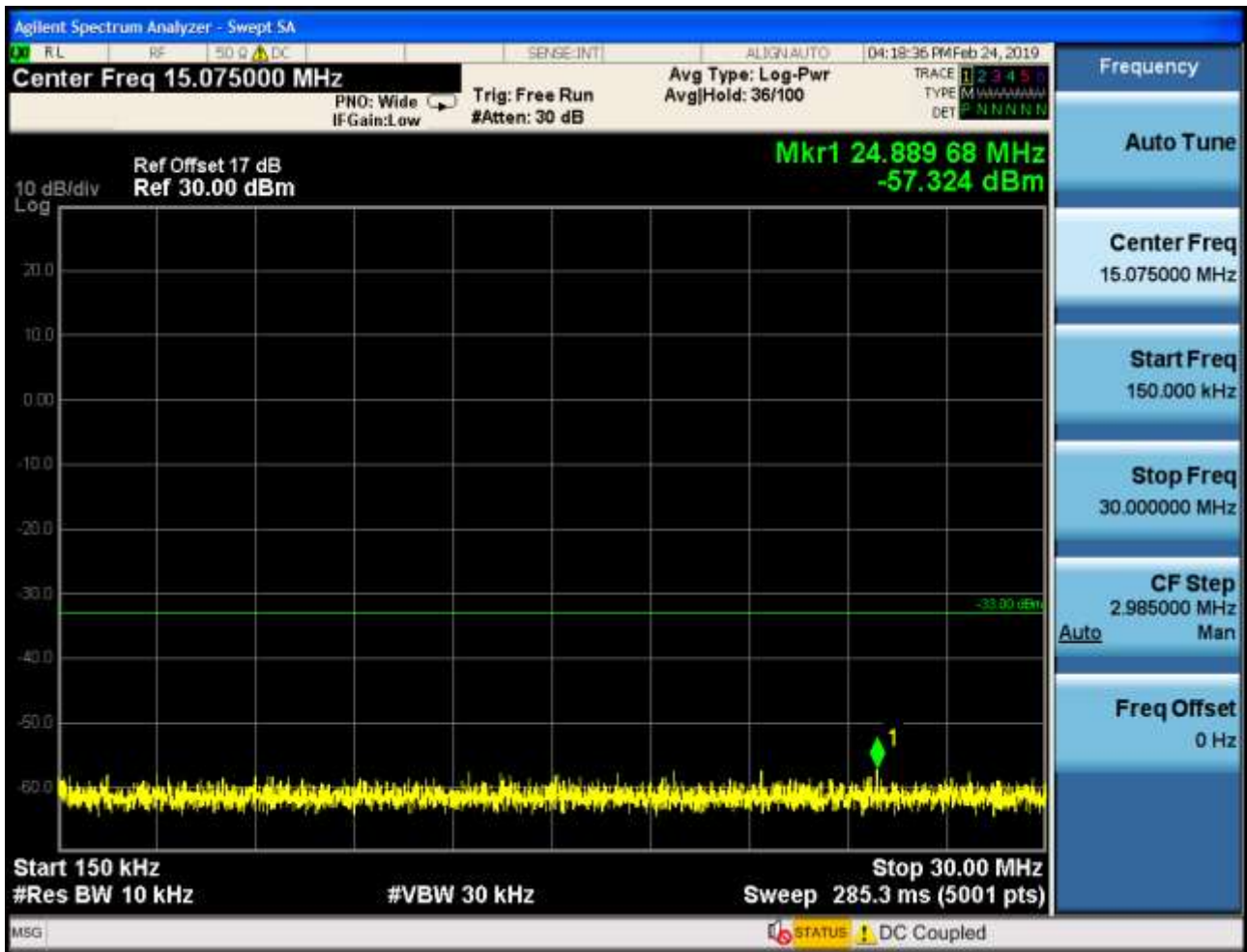
6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH





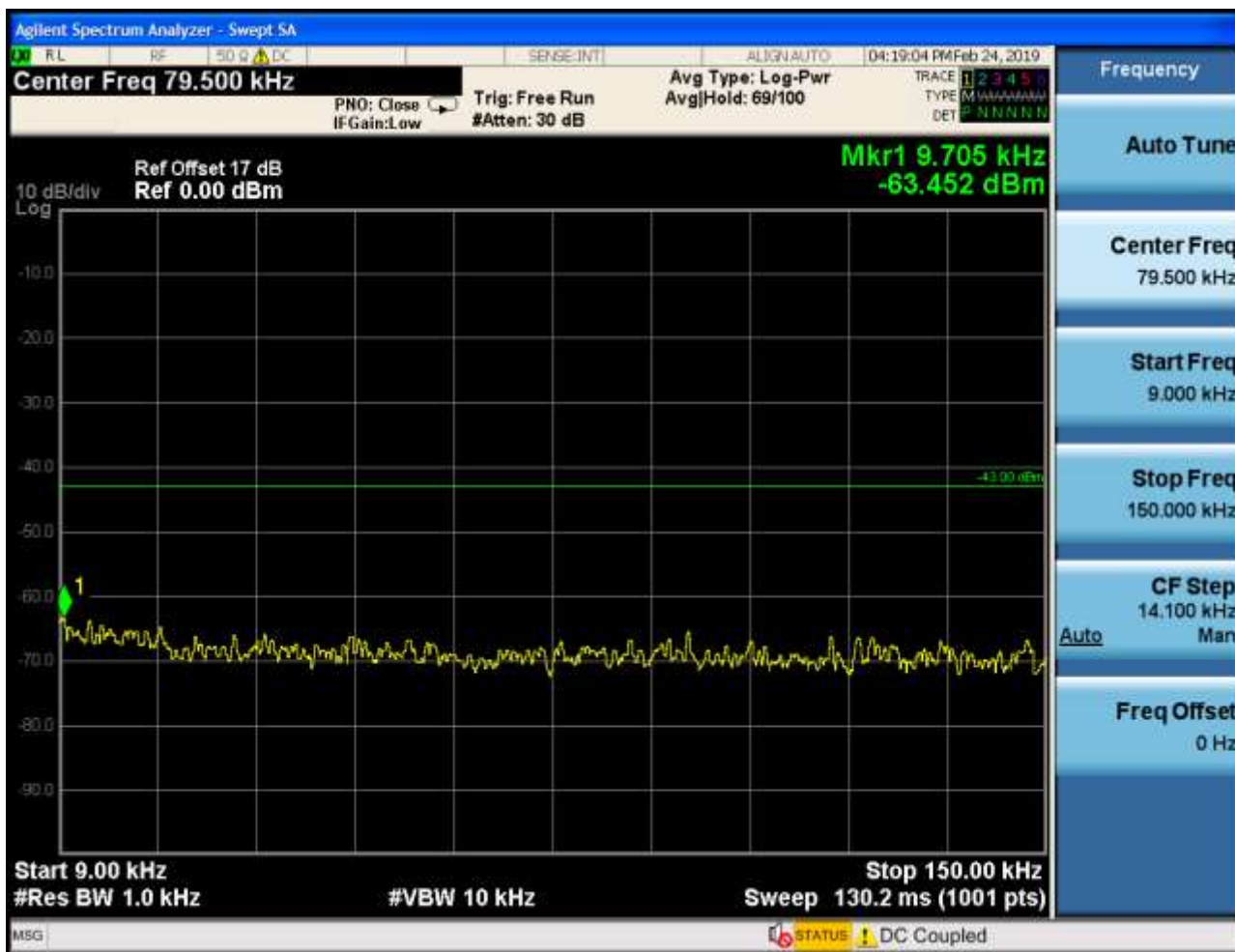


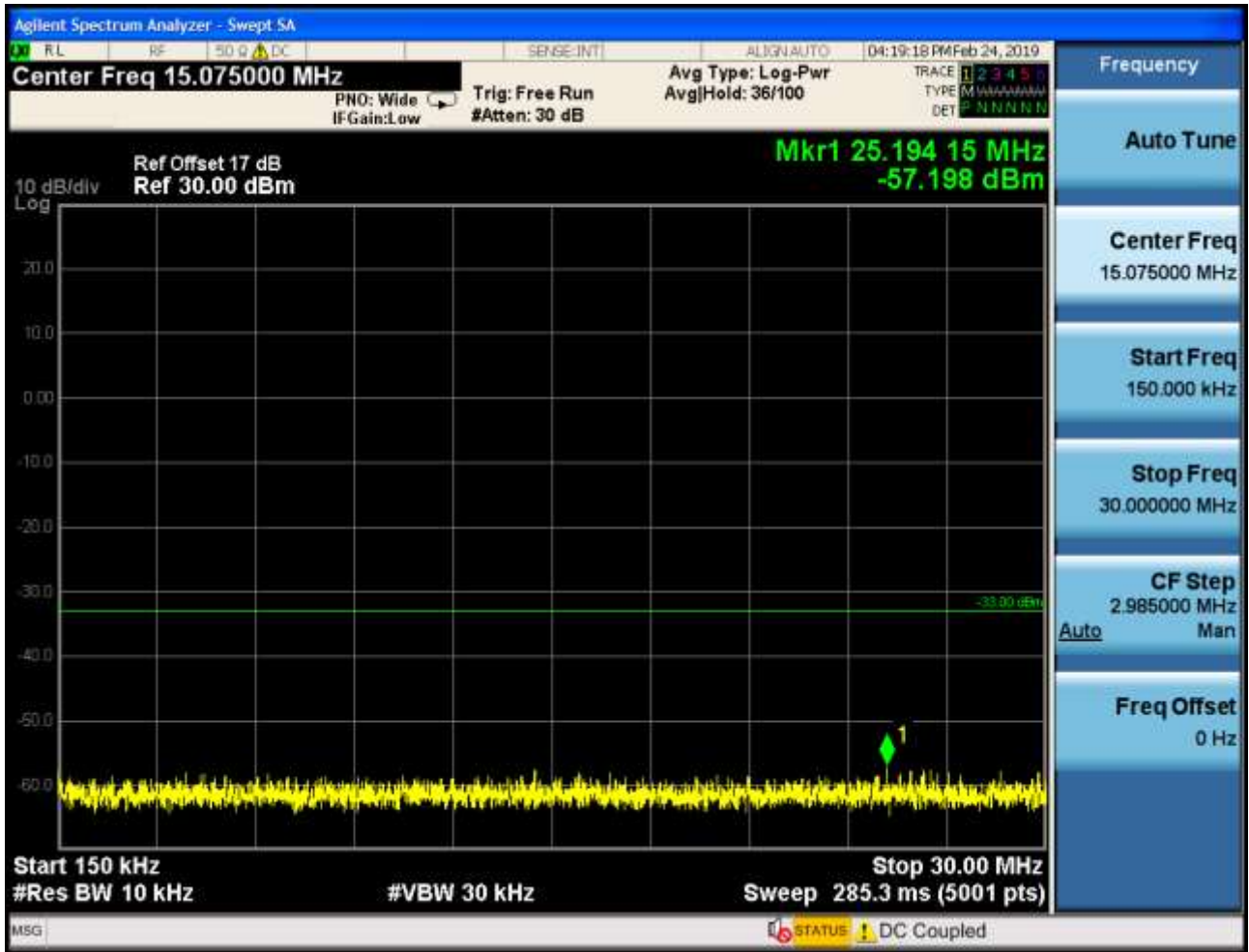


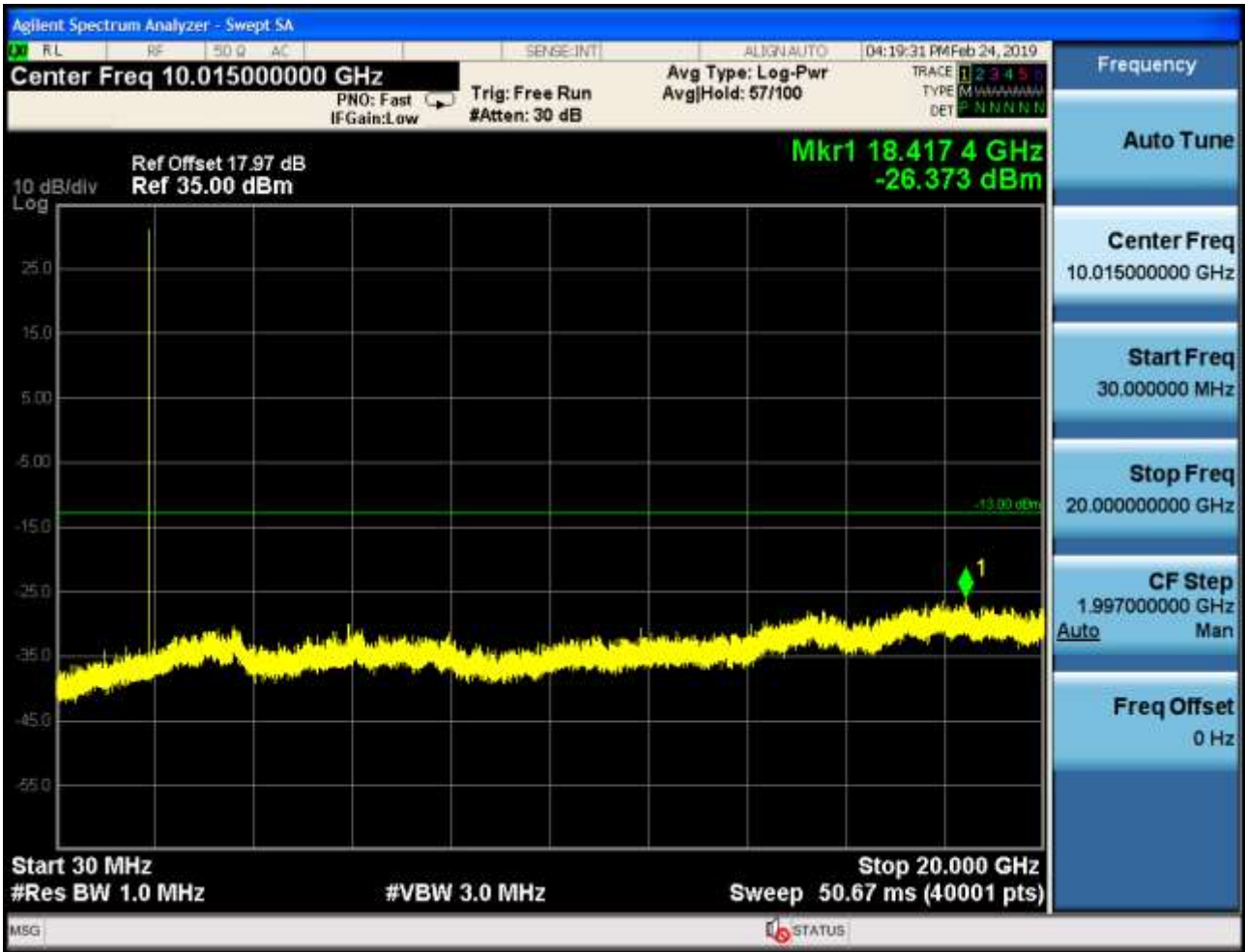




6.1.2.1.3 Test Channel = HCH



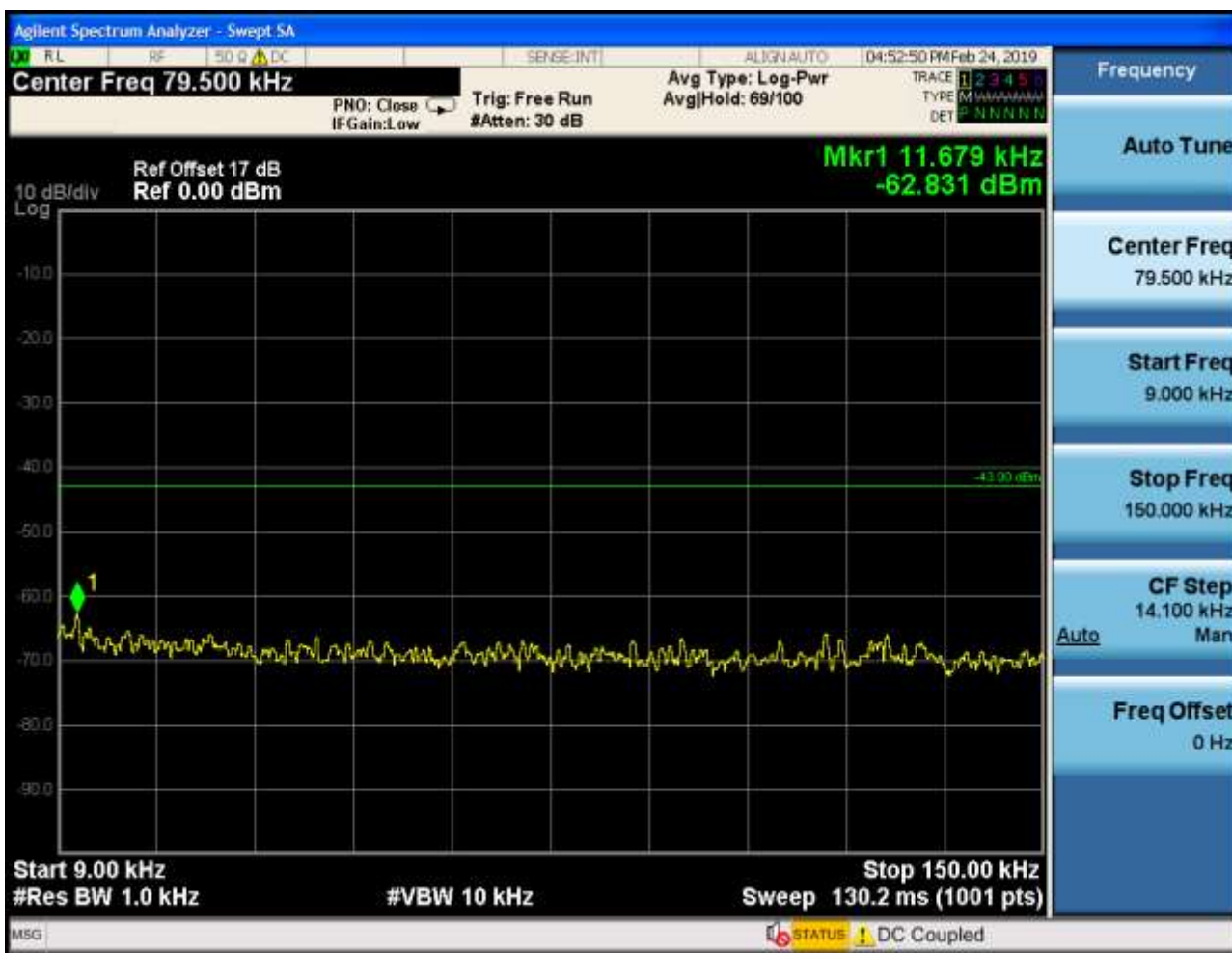






6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

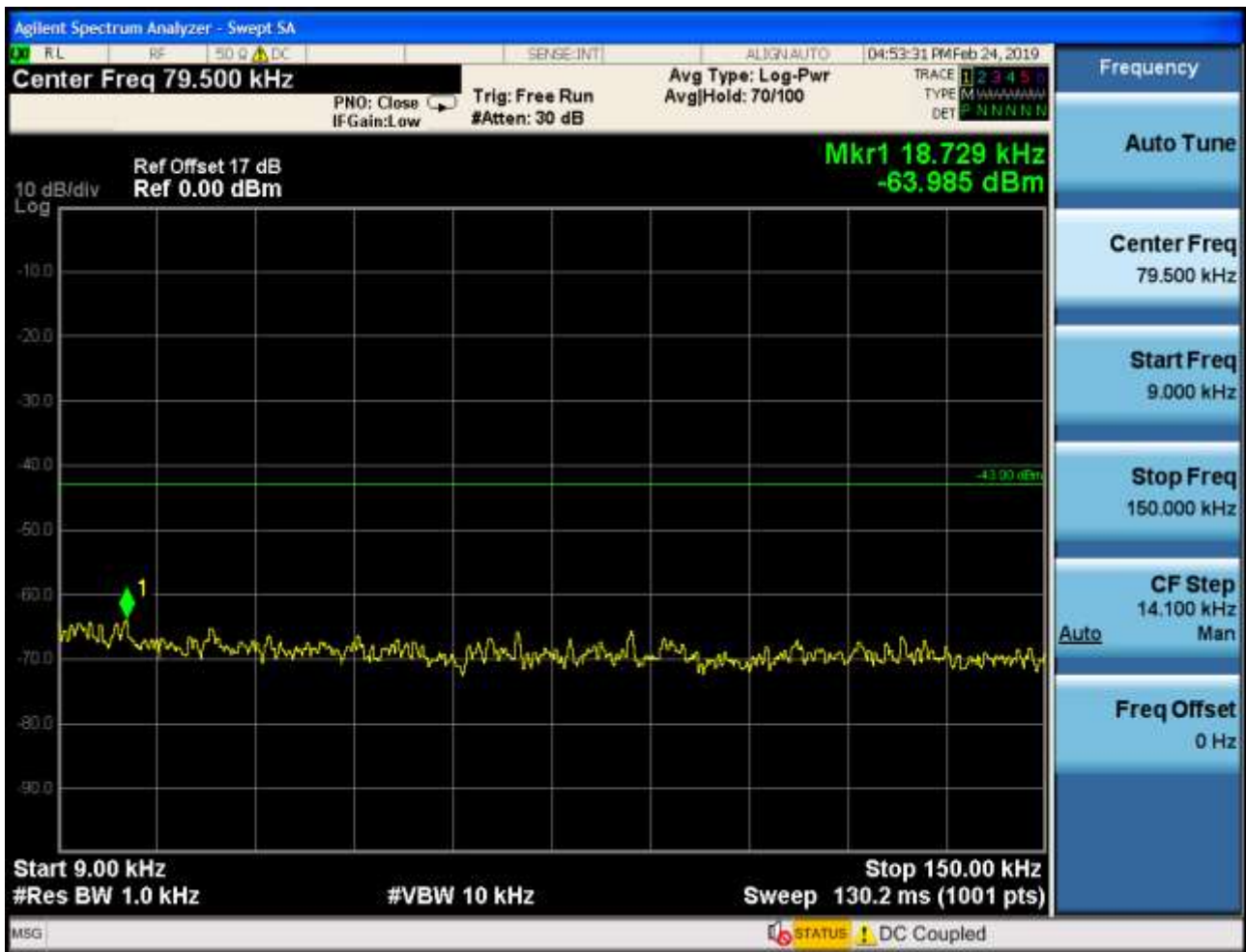






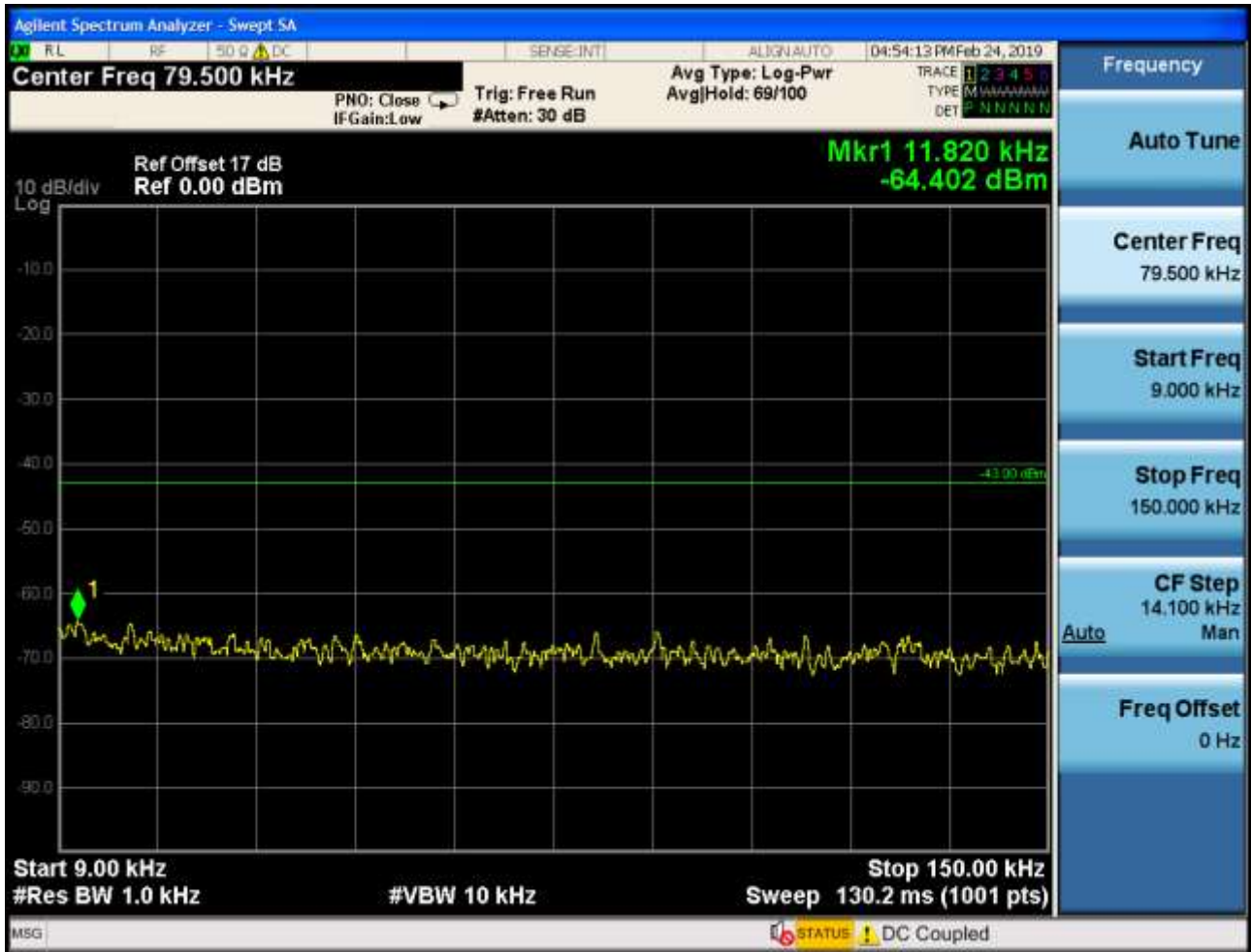


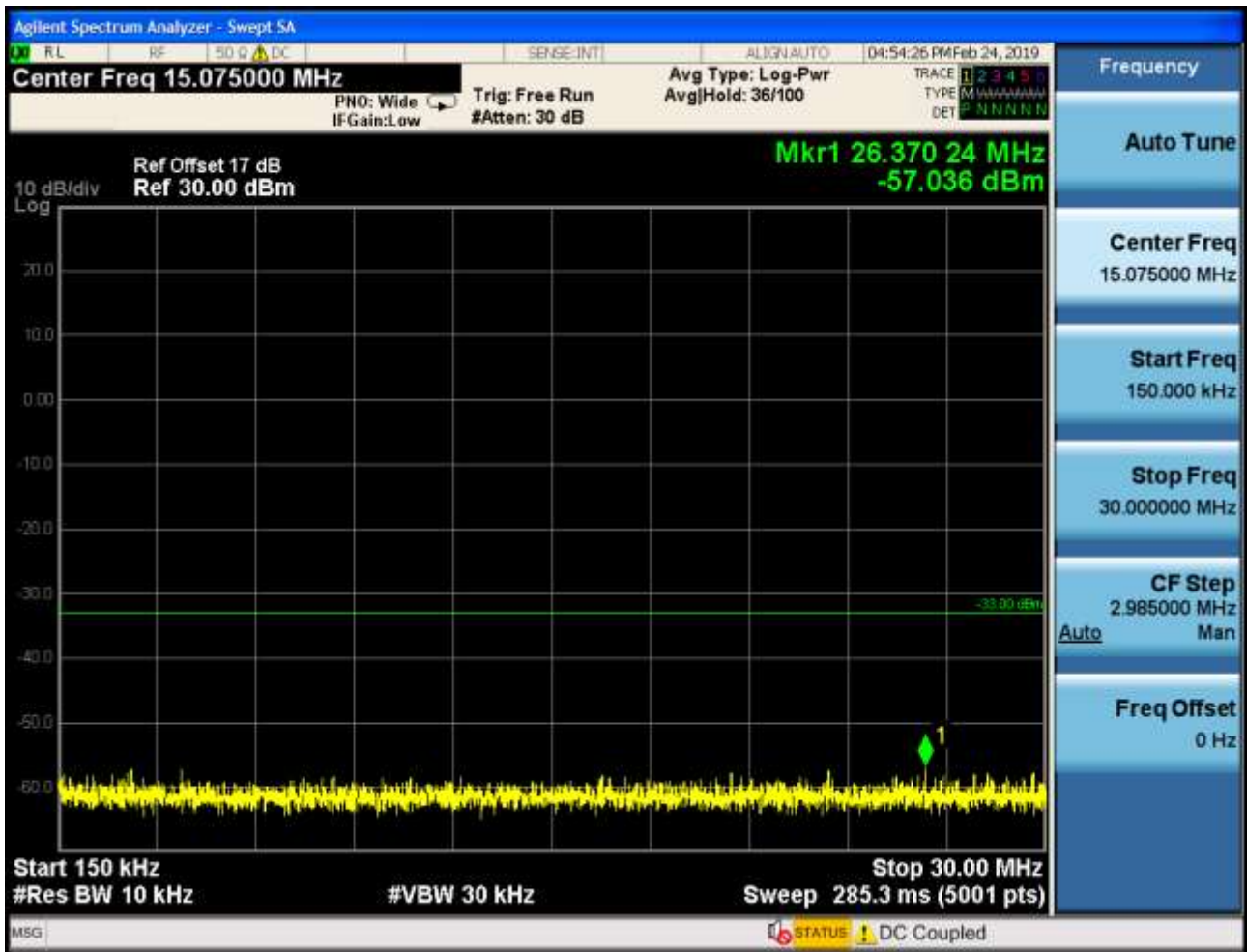
6.1.2.2.2 Test Channel = MCH





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

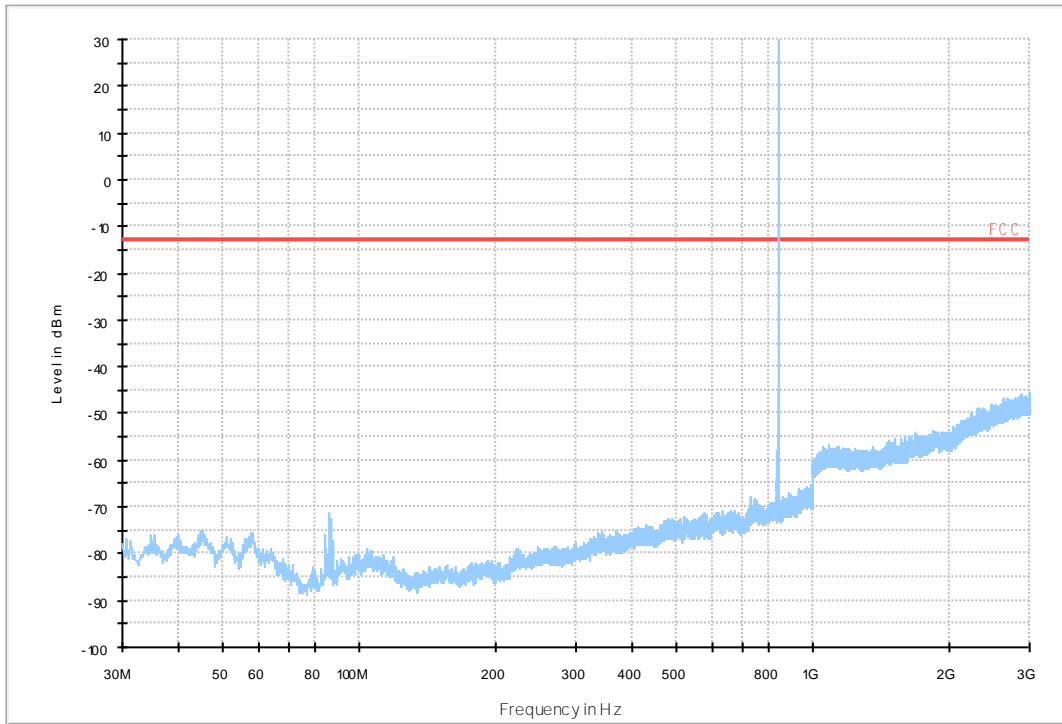
Part I - Test Plots

7.1 For GSM_ANT1

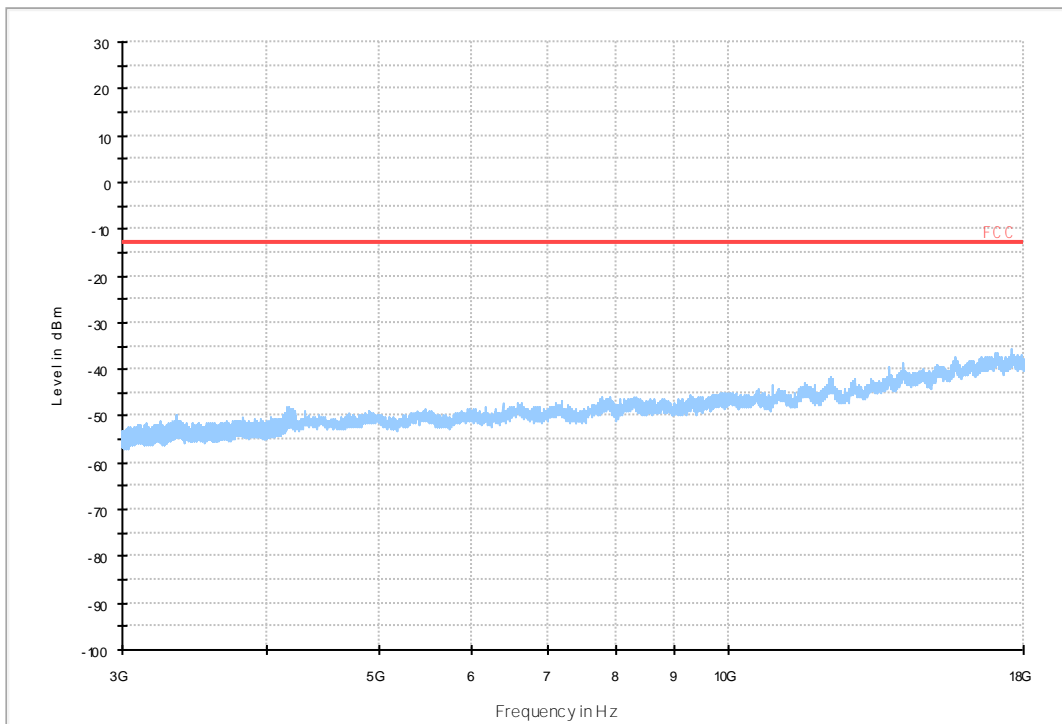
7.1.1 Test Band = GSM850



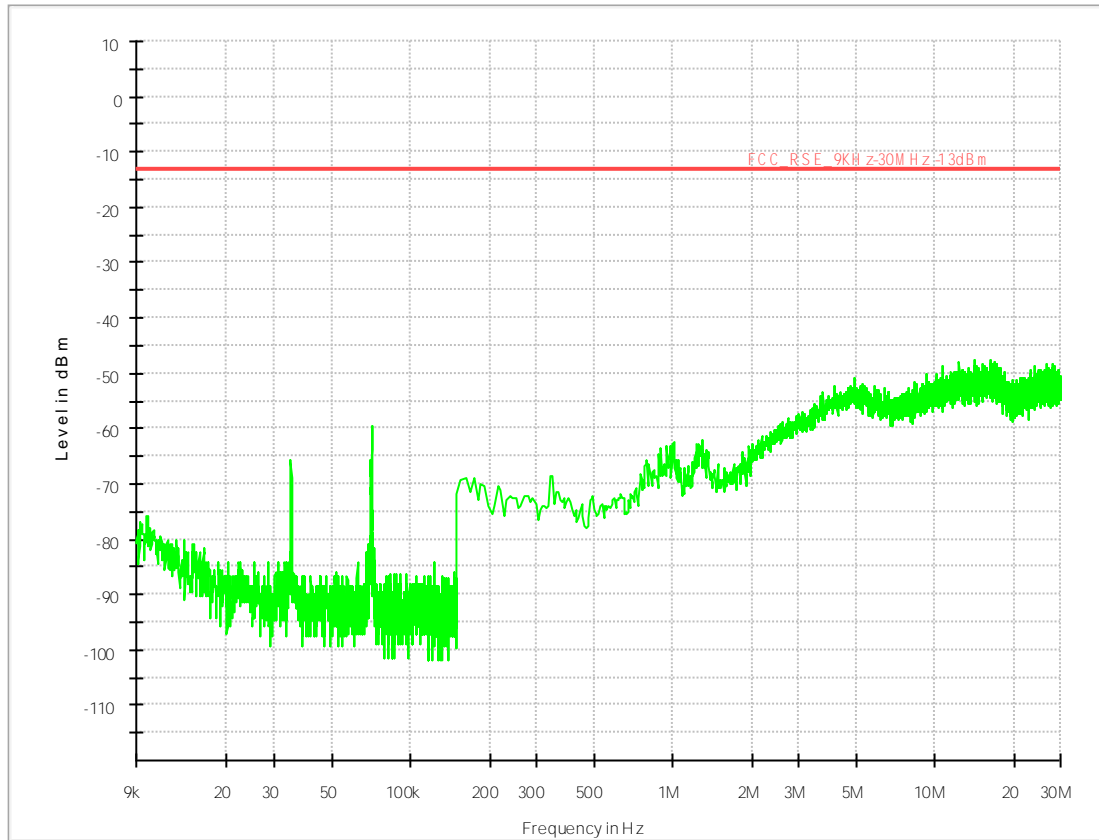
04 FCC PART22 GSM850_L



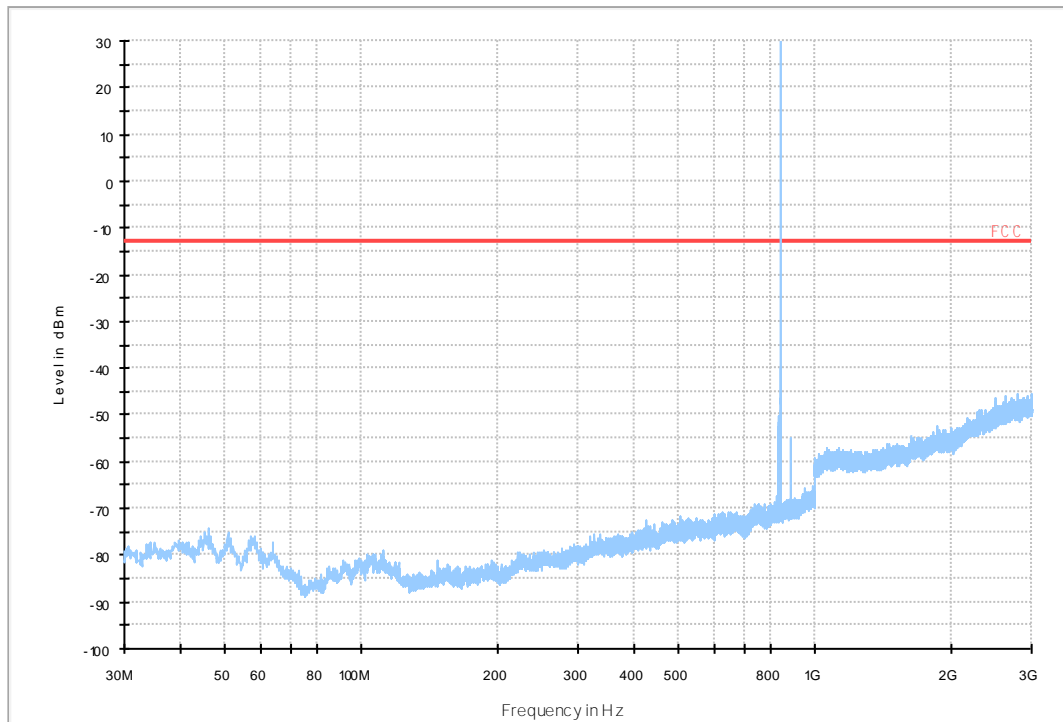
03 FCC PART22 GSM850_H

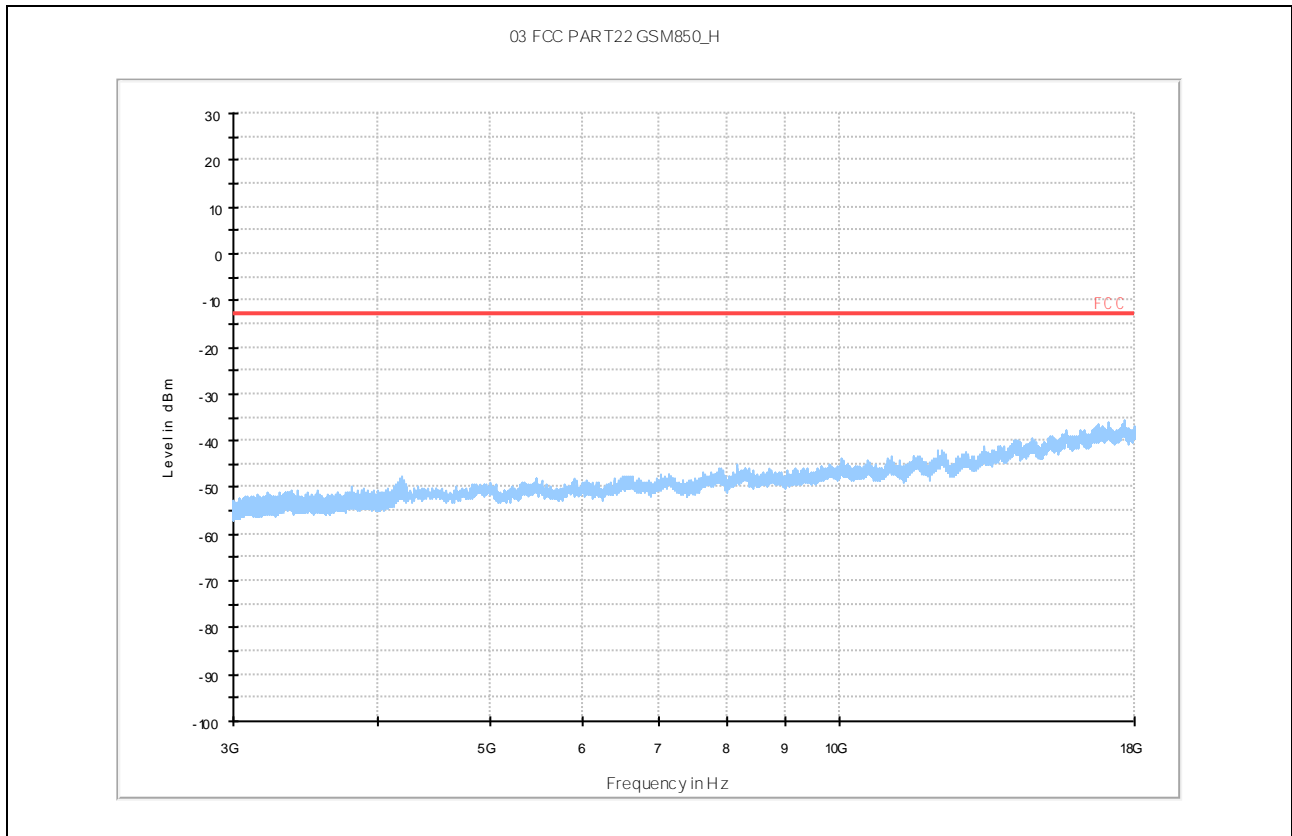


GSM850/TM1_Ant2

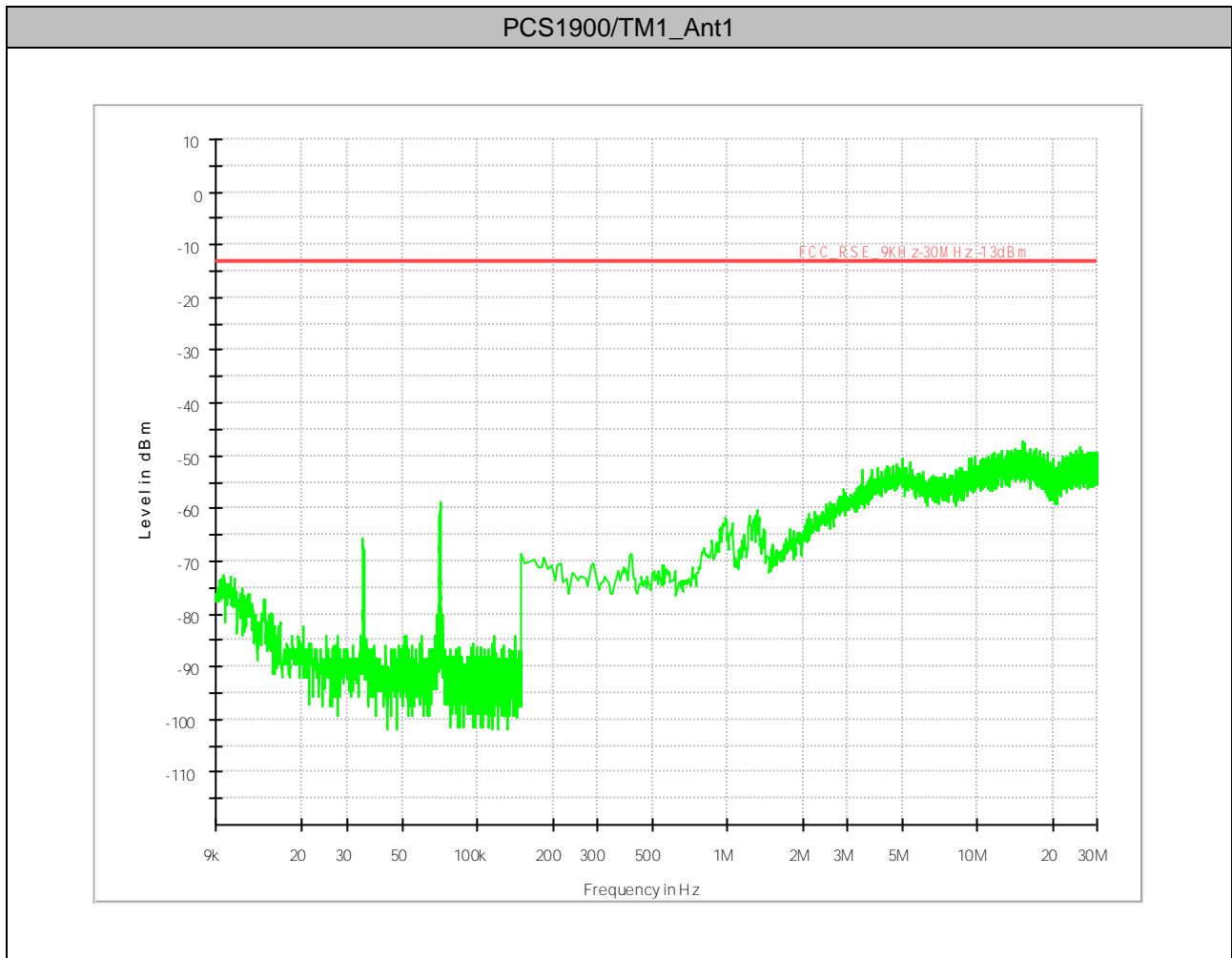


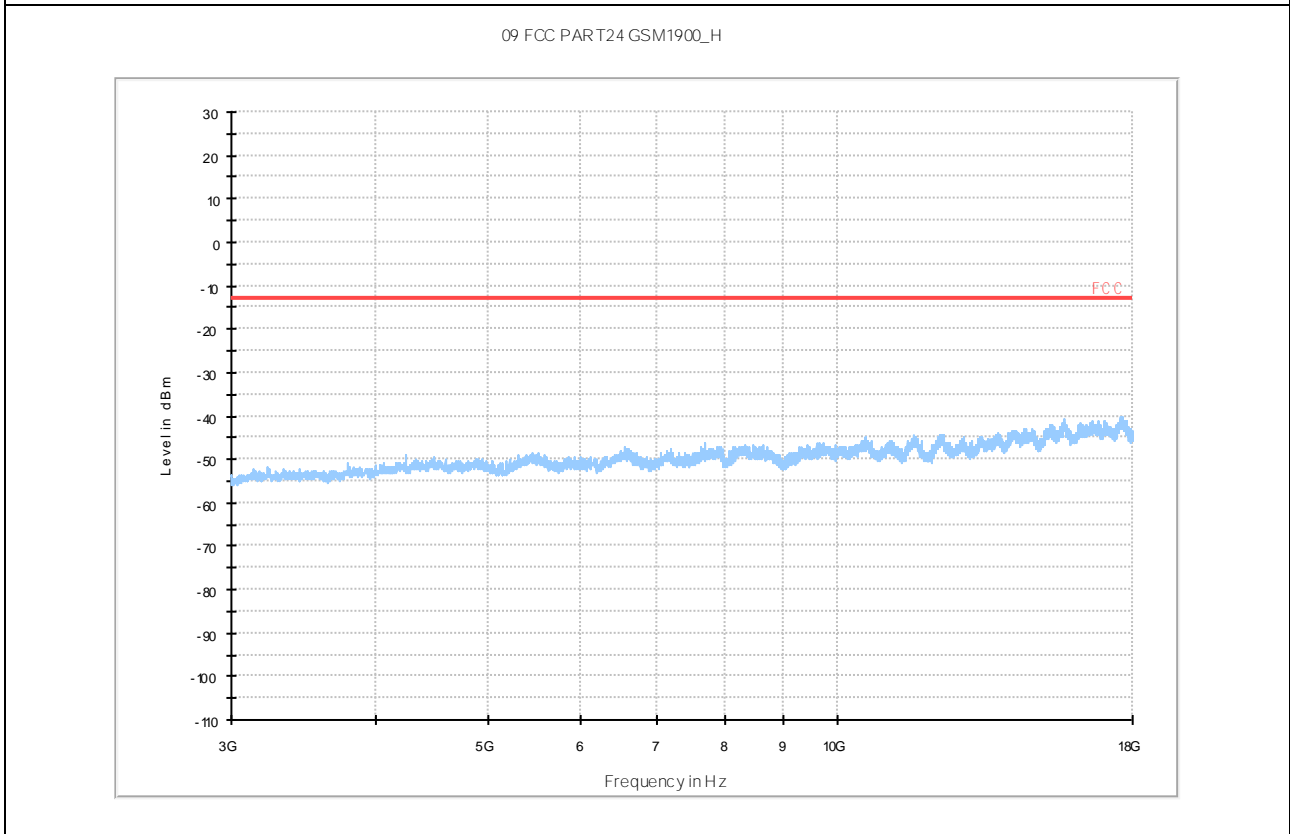
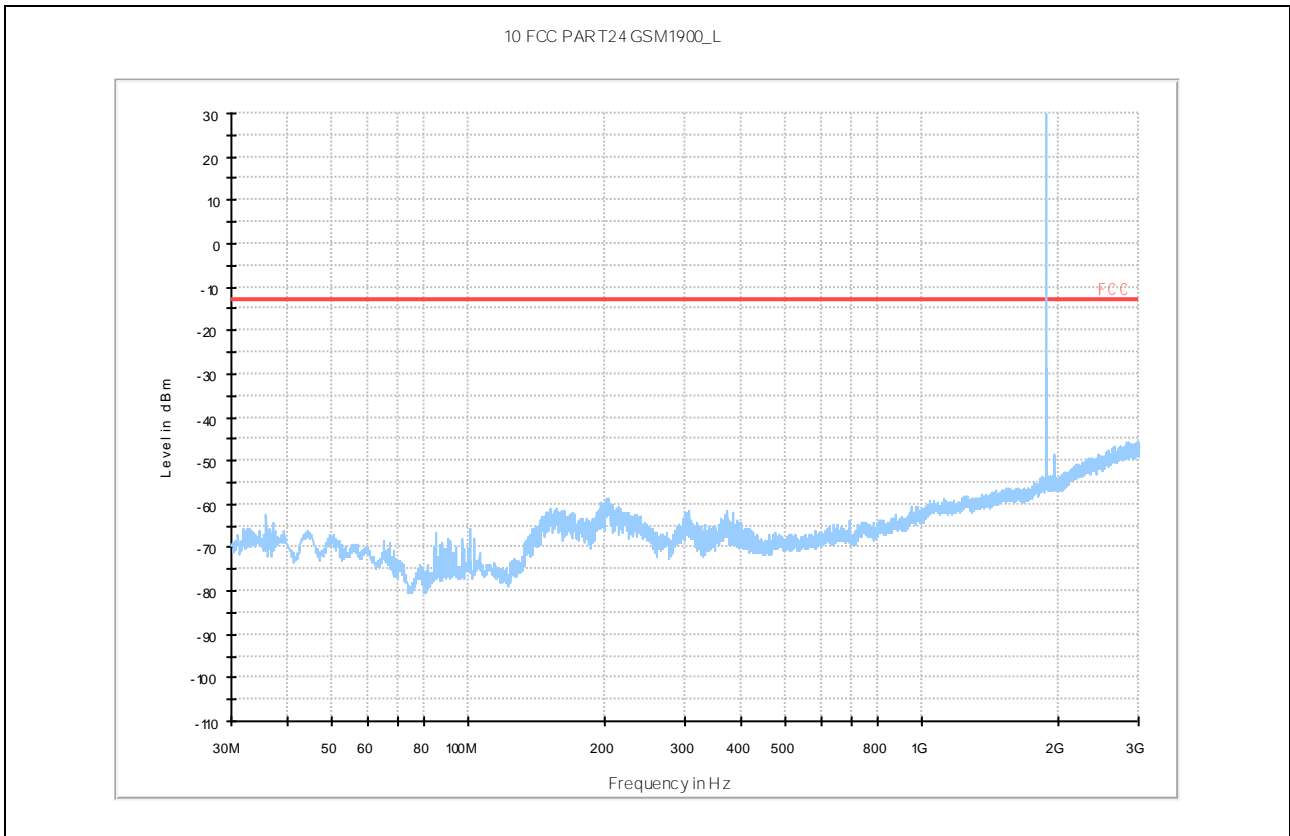
04 FCC PART22 GSM850_L



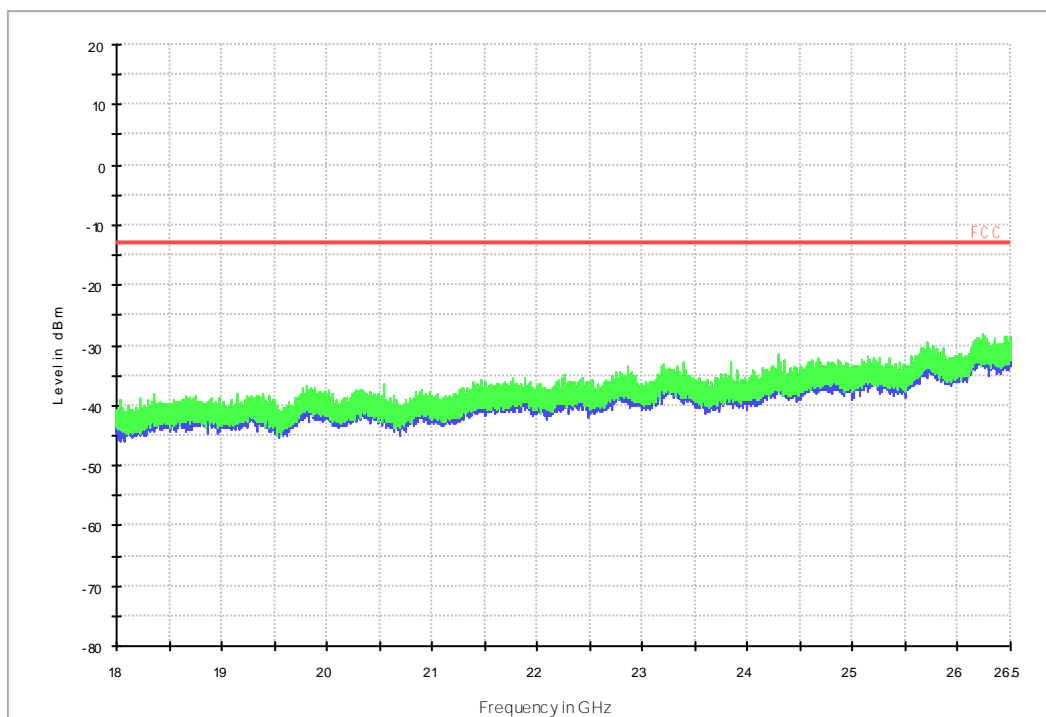


7.1.2 Test Band = PCS1900

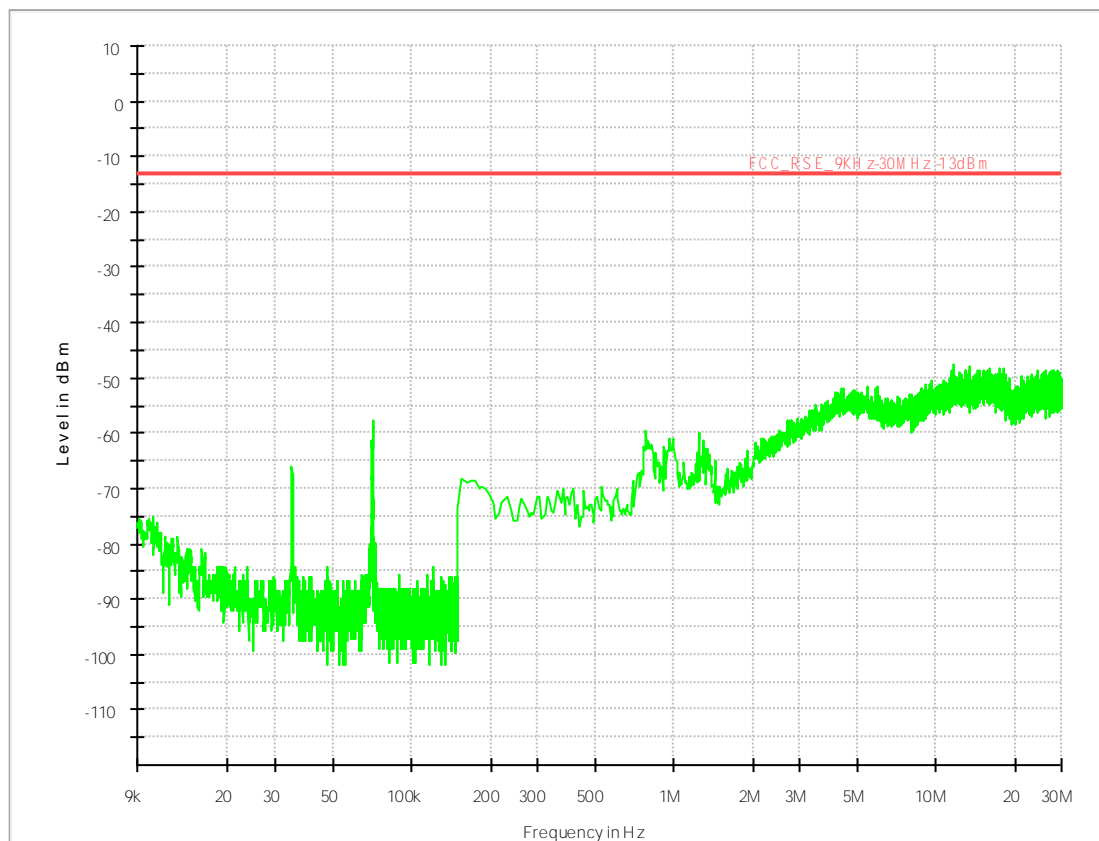


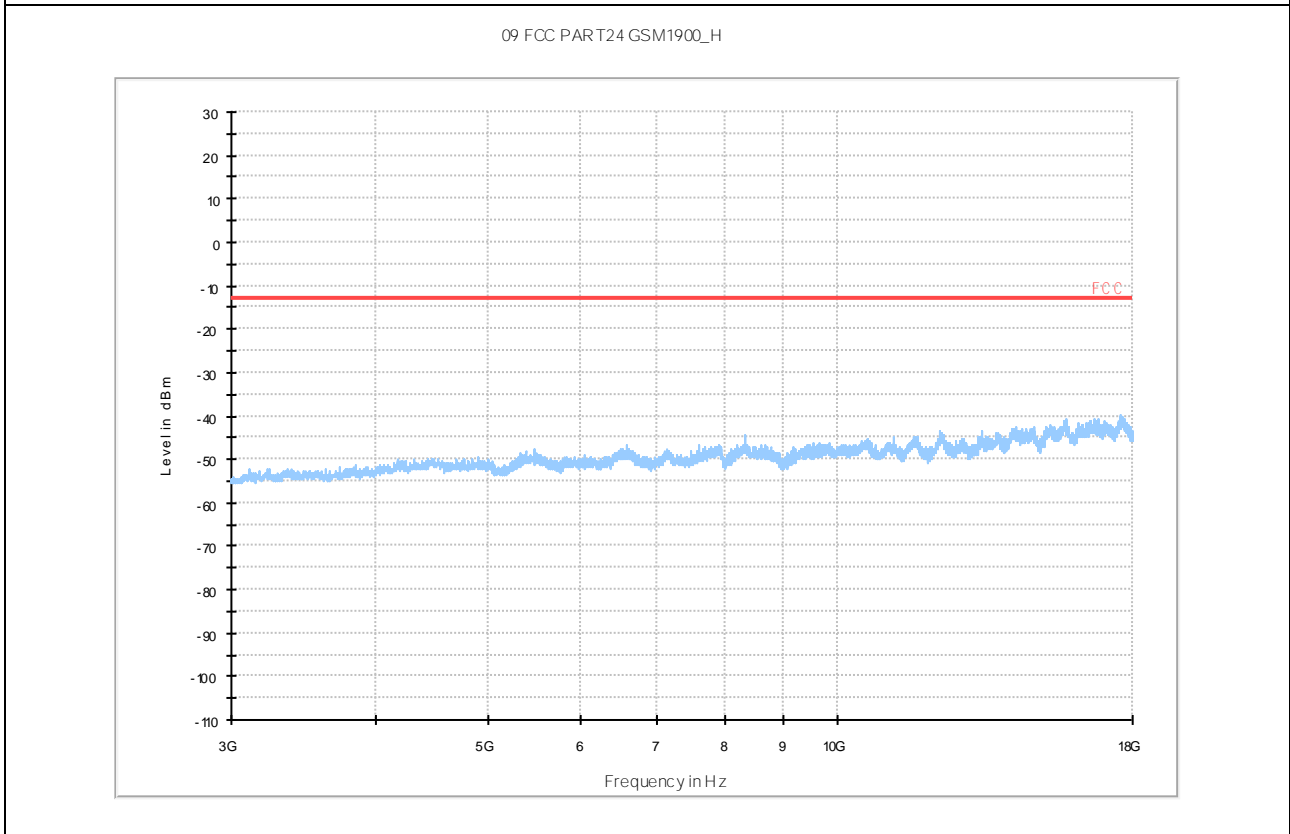
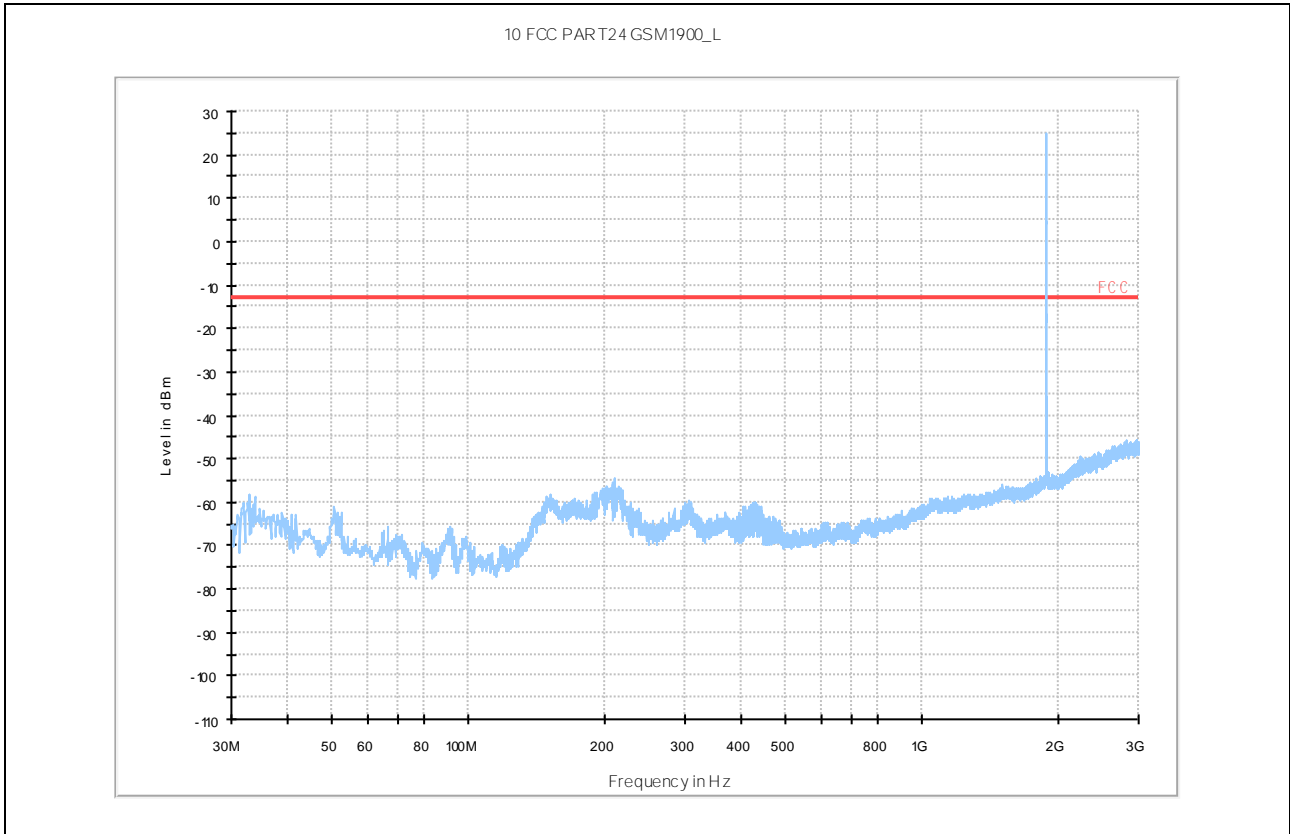


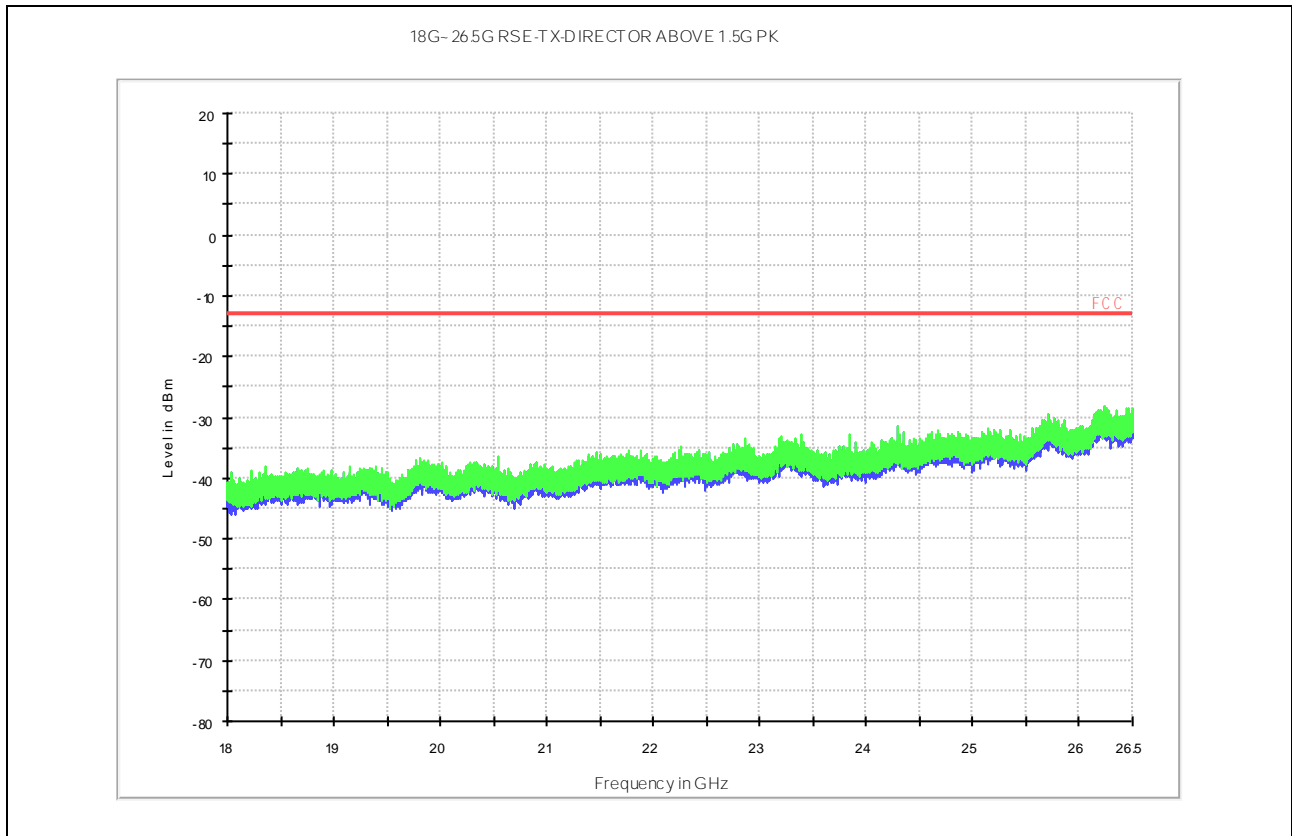
18G- 26.5G RSE-TX-DIRECTOR ABOVE 1.5G PK



PCS1900/TM1_Ant2







8Appendix_H: Frequency Stability

8.1 For GSM

8.1.1 Frequency Error vs. Voltage:

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	GSM/TM1	LCH	TN	VL	-0.93629	-0.00114	PASS
				VN	2.93801	0.00356	PASS
				VH	-0.45200	-0.00055	PASS
		MCH	TN	VL	-2.45372	-0.00293	PASS
				VN	5.52088	0.00660	PASS
				VH	-0.09686	-0.00012	PASS
		HCH	TN	VL	1.35601	0.00160	PASS
				VN	3.13173	0.00369	PASS
				VH	-0.16143	-0.00019	PASS
	GSM/TM2	LCH	TN	VL	4.32630	0.00525	PASS
				VN	1.67886	0.00204	PASS
				VH	3.71287	0.00450	PASS
		MCH	TN	VL	3.87430	0.00463	PASS
				VN	0.45200	0.00054	PASS
				VH	3.16401	0.00378	PASS
		HCH	TN	VL	2.03401	0.00240	PASS
				VN	1.16229	0.00137	PASS
				VH	2.51830	0.00297	PASS
PCS1900	GSM/TM1	LCH	TN	VL	5.68231	0.00307	PASS
				VN	4.77831	0.00258	PASS
				VH	7.97461	0.00431	PASS
		MCH	TN	VL	3.84202	0.00204	PASS
				VN	4.26173	0.00227	PASS
				VH	5.71460	0.00304	PASS
		HCH	TN	VL	2.90573	0.00307	PASS
				VN	3.22858	0.00258	PASS
				VH	2.13087	0.00431	PASS
	GSM/TM2	LCH	TN	VL	4.32630	0.00234	PASS
				VN	4.93973	0.00267	PASS
				VH	2.38915	0.00129	PASS
		MCH	TN	VL	2.64744	0.00141	PASS
				VN	6.03745	0.00321	PASS
				VH	4.84288	0.00258	PASS
		HCH	TN	VL	2.84116	0.00234	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VN	2.64744	0.00267	PASS
				VH	0.67800	0.00129	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	4.55230	0.00552	PASS
				-20	5.35945	0.00650	PASS
				-10	4.58459	0.00556	PASS
				0	5.74688	0.00697	PASS
				10	4.93973	0.00599	PASS
				20	2.93801	0.00356	PASS
				30	5.42402	0.00658	PASS
				40	0.41972	0.00051	PASS
				50	1.51744	0.00184	PASS
		MCH	VN	-30	3.55144	0.00425	PASS
				-20	1.22686	0.00147	PASS
				-10	2.97030	0.00355	PASS
				0	2.77658	0.00332	PASS
				10	3.35773	0.00401	PASS
				20	5.52088	0.00660	PASS
				30	4.84288	0.00579	PASS
				40	0.74257	0.00089	PASS
				50	1.48515	0.00178	PASS
		HCH	VN	-30	3.80973	0.00449	PASS
				-20	3.80973	0.00449	PASS
				-10	2.64744	0.00312	PASS
				0	3.06716	0.00361	PASS
				10	-0.22600	-0.00027	PASS
				20	3.13173	0.00369	PASS
	30			5.87603	0.00692	PASS	
	40			0.58115	0.00068	PASS	
	50			0.74257	0.00087	PASS	
	GSM/TM2	LCH	VN	-30	6.16660	0.00748	PASS
				-20	4.68145	0.00568	PASS
				-10	3.42230	0.00415	PASS
0				5.74688	0.00697	PASS	
10				4.52002	0.00548	PASS	
20				1.67886	0.00204	PASS	



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				30	2.38915	0.00290	PASS						
				40	4.39088	0.00533	PASS						
				50	2.71201	0.00329	PASS						
		MCH	VN			-30	4.39088	0.00525	PASS				
						-20	5.45631	0.00652	PASS				
						-10	3.84202	0.00459	PASS				
						0	4.77831	0.00571	PASS				
						10	3.45459	0.00413	PASS				
						20	0.45200	0.00054	PASS				
						30	-0.58115	-0.00069	PASS				
						40	2.90573	0.00347	PASS				
						50	0.16143	0.00019	PASS				
						HCH	VN			-30	5.42402	0.00639	PASS
										-20	3.06716	0.00361	PASS
		-10	1.74344	0.00205	PASS								
		0	2.35687	0.00278	PASS								
		10	1.87258	0.00221	PASS								
		20	1.16229	0.00137	PASS								
		30	2.16315	0.00255	PASS								
		40	3.77744	0.00445	PASS								
		PCS1900	GSM/TM1	LCH	VN					-30	9.26604	0.00501	PASS
										-20	6.87689	0.00372	PASS
										-10	3.93887	0.00213	PASS
										0	2.80887	0.00152	PASS
										10	6.78003	0.00366	PASS
										20	4.77831	0.00258	PASS
										30	6.10203	0.00330	PASS
40	8.55575									0.00462	PASS		
50	7.84546									0.00424	PASS		
MCH	VN									-30	3.39001	0.00180	PASS
										-20	7.81318	0.00416	PASS
										-10	3.87430	0.00206	PASS
										0	6.26346	0.00333	PASS
										10	9.16918	0.00488	PASS
										20	4.26173	0.00227	PASS
										30	7.32889	0.00390	PASS
										40	9.16918	0.00488	PASS
										50	2.38915	0.00127	PASS
HCH	VN					-30	5.65002	0.00296	PASS				



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				-20	2.74430	0.00144	PASS
				-10	2.48601	0.00130	PASS
				0	-1.67886	-0.00088	PASS
				10	1.67886	0.00088	PASS
				20	3.22858	0.00169	PASS
				30	3.74516	0.00196	PASS
				40	1.87258	0.00098	PASS
				50	3.00258	0.00157	PASS
	GSM/TM2	LCH	VN	-30	7.45803	0.00403	PASS
				-20	6.32803	0.00342	PASS
				-10	3.80973	0.00206	PASS
				0	7.03831	0.00380	PASS
				10	7.23203	0.00391	PASS
				20	4.93973	0.00267	PASS
				30	5.00431	0.00270	PASS
				40	6.06974	0.00328	PASS
				50	4.68145	0.00253	PASS
				MCH	VN	-30	7.84546
		-20	8.20061			0.00436	PASS
		-10	5.42402			0.00289	PASS
		0	8.52346			0.00453	PASS
		10	5.71460			0.00304	PASS
		20	6.03745			0.00321	PASS
		30	4.81059			0.00256	PASS
		40	5.65002			0.00301	PASS
		HCH	VN	-30	1.51744	0.00079	PASS
				-20	2.77658	0.00145	PASS
				-10	0.48429	0.00025	PASS
				0	1.80801	0.00095	PASS
				10	5.71460	0.00299	PASS
20				2.64744	0.00139	PASS	
30				4.52002	0.00237	PASS	
40				4.64916	0.00243	PASS	
50		2.80887	0.00147	PASS			

END