



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	33.16	26.02	38.5	PASS
		MCH	33.30	26.16	38.5	PASS
		HCH	33.28	26.14	38.5	PASS
	GSM/TM2	LCH	26.45	19.31	38.5	PASS
		MCH	26.48	19.34	38.5	PASS
		HCH	26.48	19.34	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
PCS1900	GSM/TM1	LCH	29.69	27.22	33	PASS
		MCH	29.84	27.37	33	PASS
		HCH	29.86	27.39	33	PASS
	GSM/TM2	LCH	25.39	22.92	33	PASS
		MCH	25.35	22.88	33	PASS
		HCH	25.45	22.98	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	1.98	13	PASS
		MCH	1.86	13	PASS
		HCH	1.86	13	PASS
	GSM/TM2	LCH	4.73	13	PASS
		MCH	4.79	13	PASS
		HCH	4.75	13	PASS
PCS1900	GSM/TM1	LCH	1.96	13	PASS
		MCH	1.94	13	PASS
		HCH	1.69	13	PASS
	GSM/TM2	LCH	4.69	13	PASS
		MCH	4.55	13	PASS
		HCH	4.58	13	PASS

3Appendix_C: Modulation Characteristics

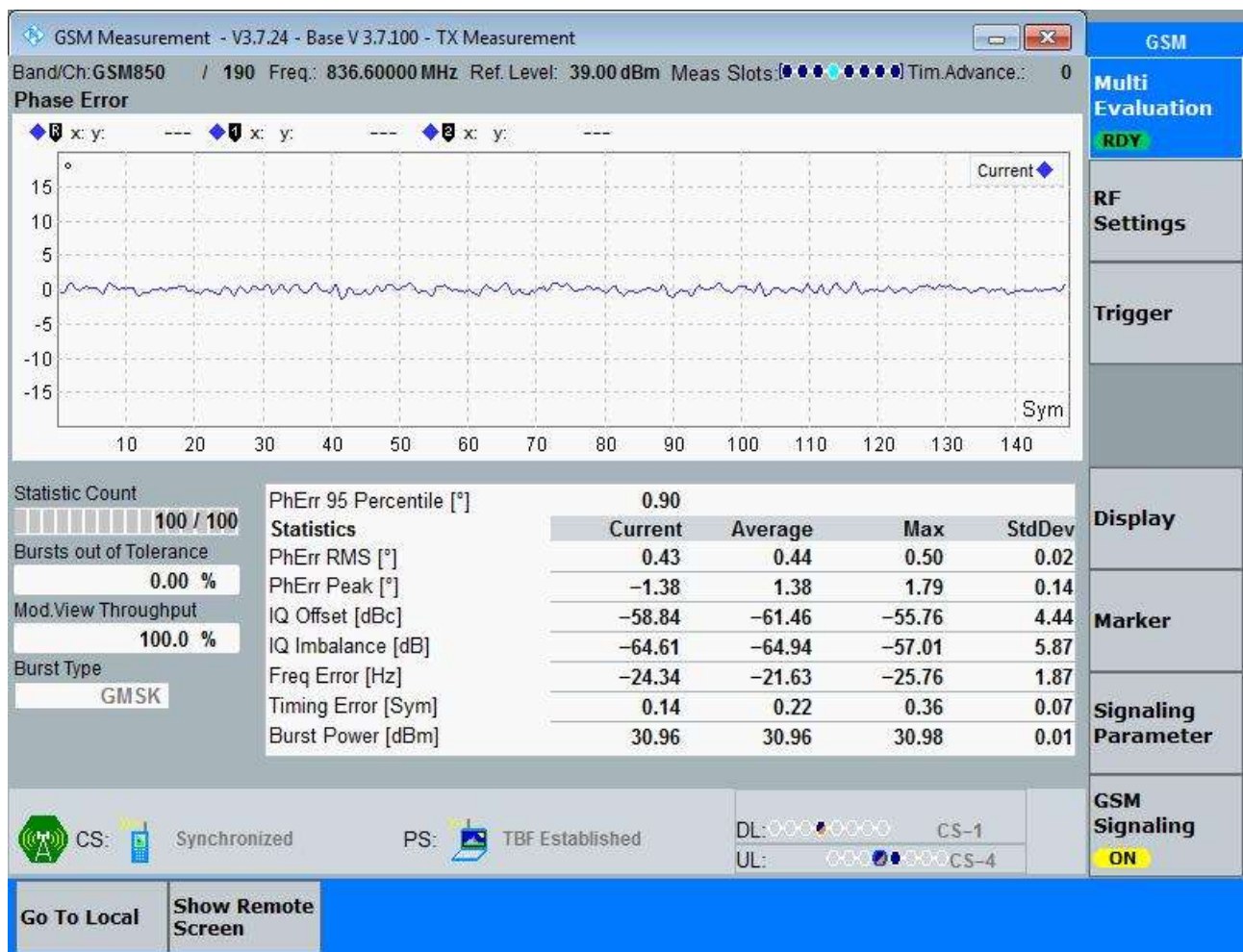
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

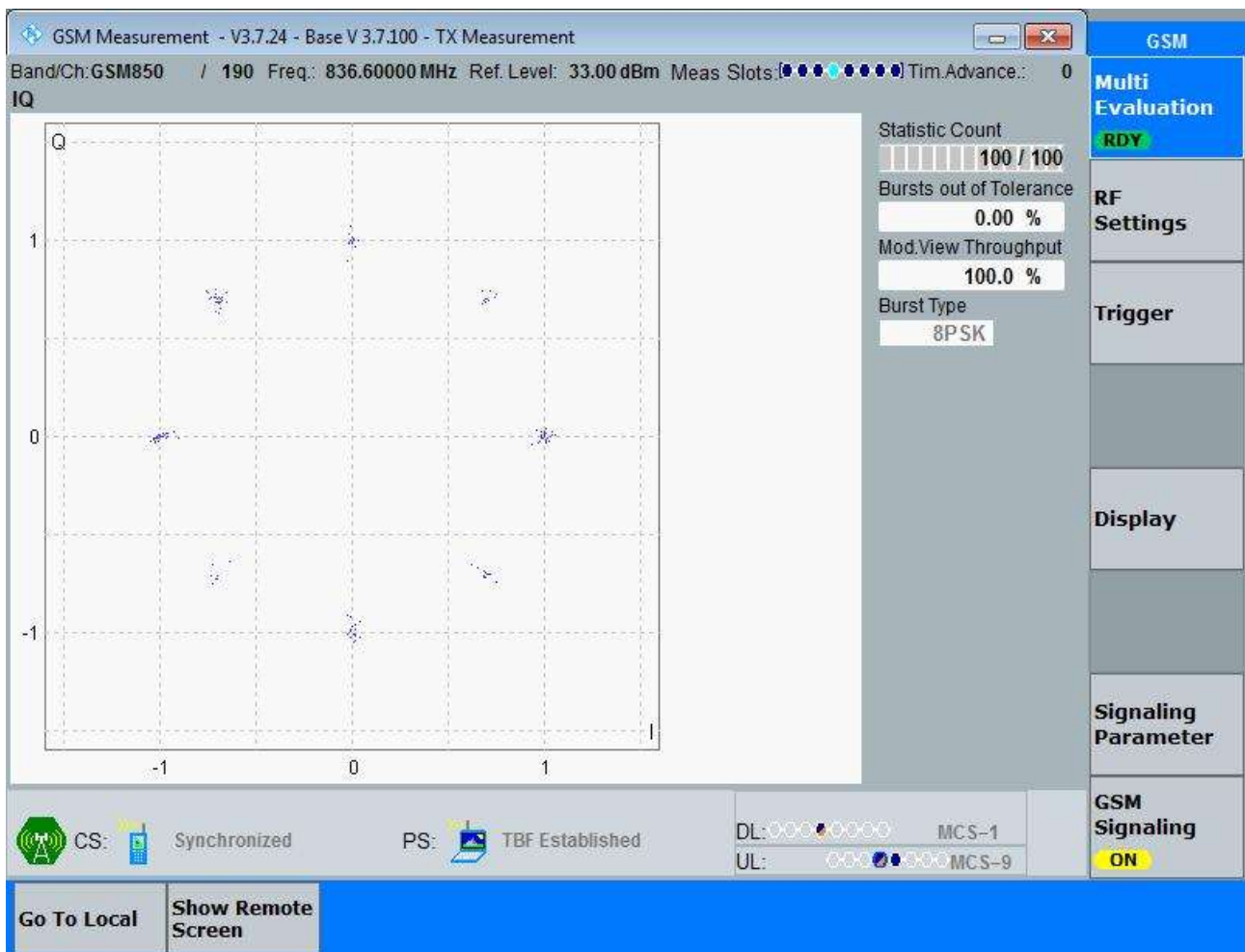
3.1.1.1 Test Mode = GSM/TM1

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

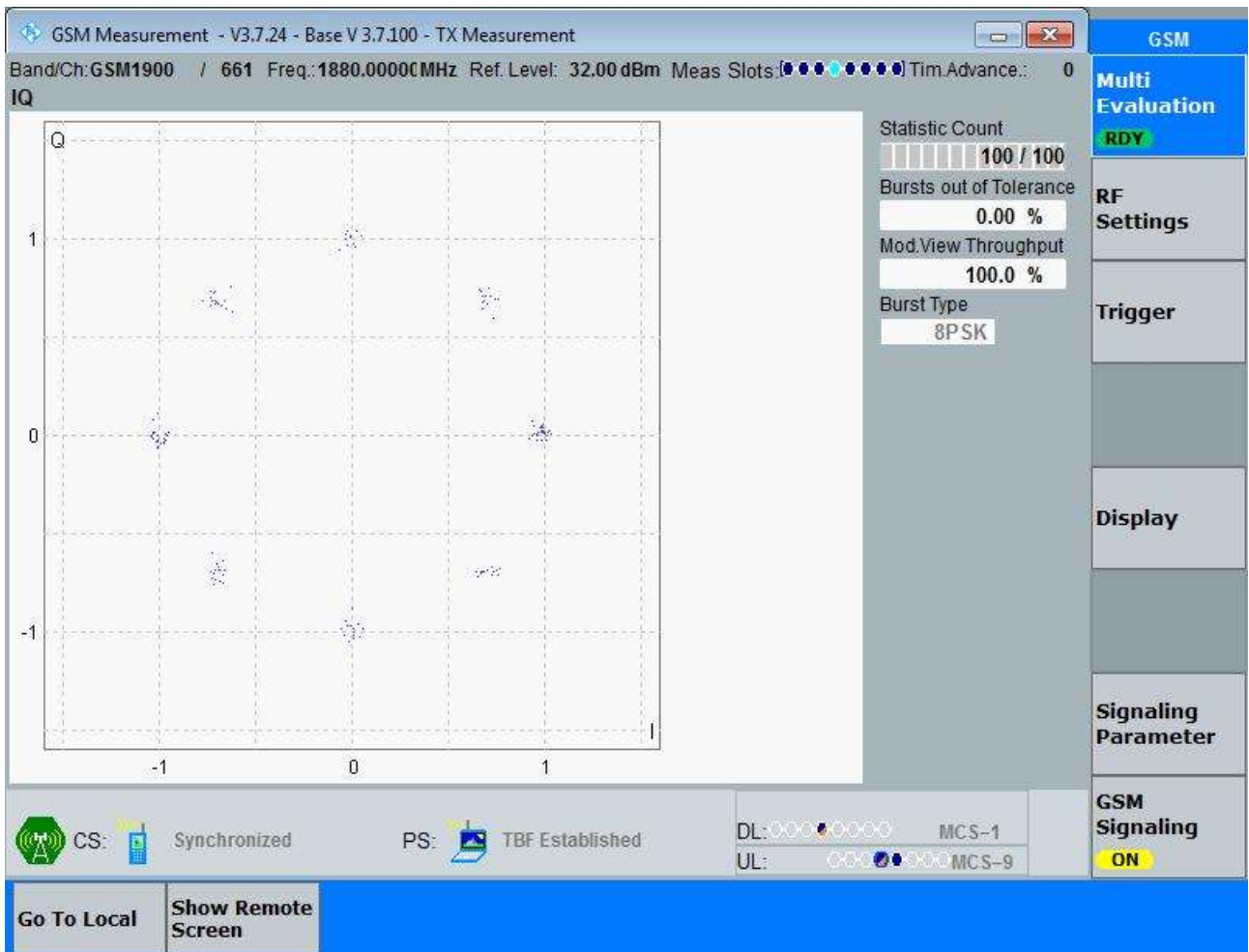
3.1.2.1 Test Mode = GSM/TM1

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	244.25	322.8	Pass
		MCH	243.65	320.6	Pass
		HCH	248.40	320.8	Pass
	GSM/TM2	LCH	248.07	320.2	Pass
		MCH	248.77	321.8	Pass
		HCH	247.28	320.9	Pass
PCS1900	GSM/TM1	LCH	244.28	319.9	Pass
		MCH	246.20	321.5	Pass
		HCH	239.43	315.4	Pass
	GSM/TM2	LCH	249.77	323.0	Pass
		MCH	252.51	316.7	Pass
		HCH	249.93	318.7	Pass

Part II - Test Plots

4.1 For GSM

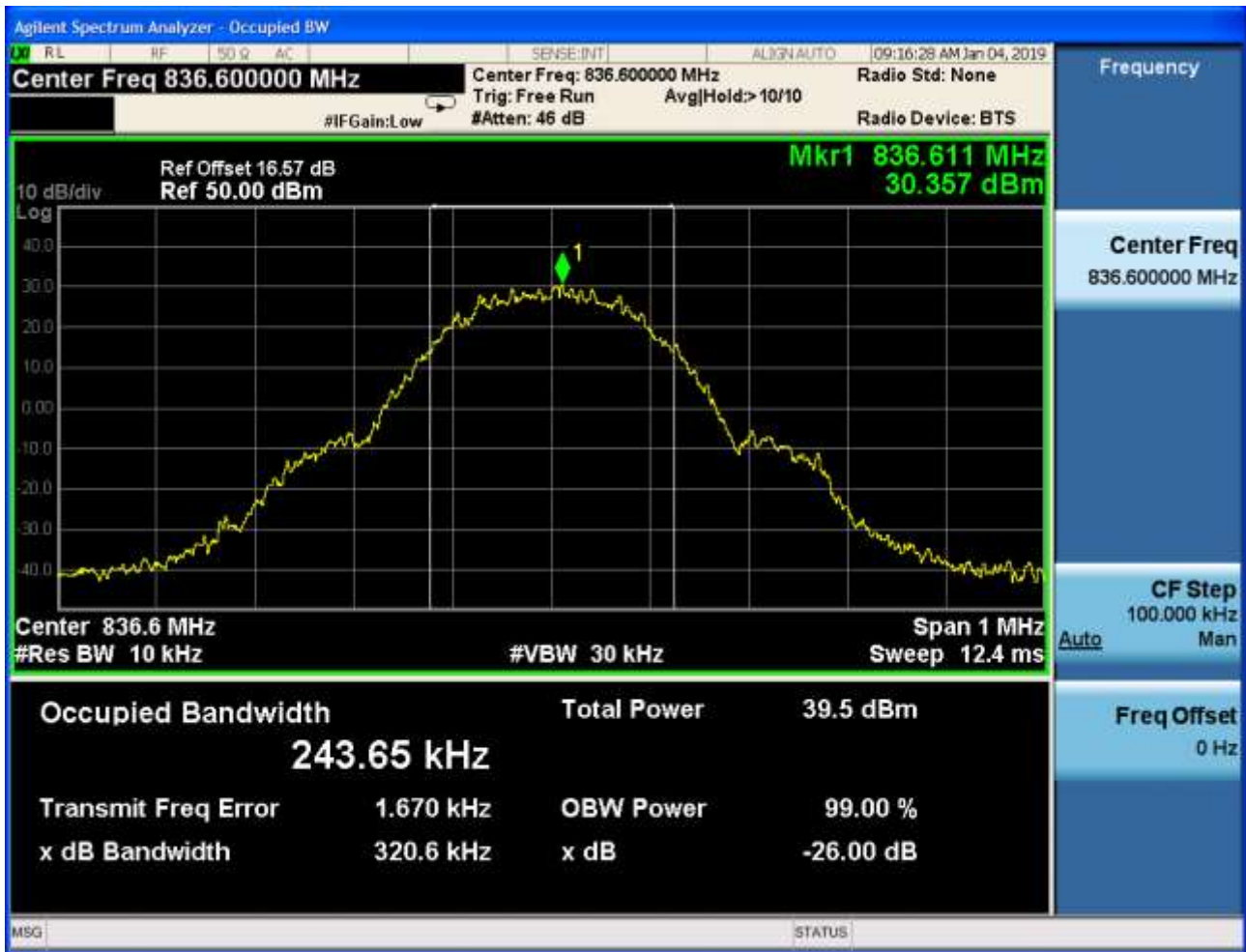
4.1.1 Test Band = GSM850

4.1.1.1 Test Mode = GSM/TM1

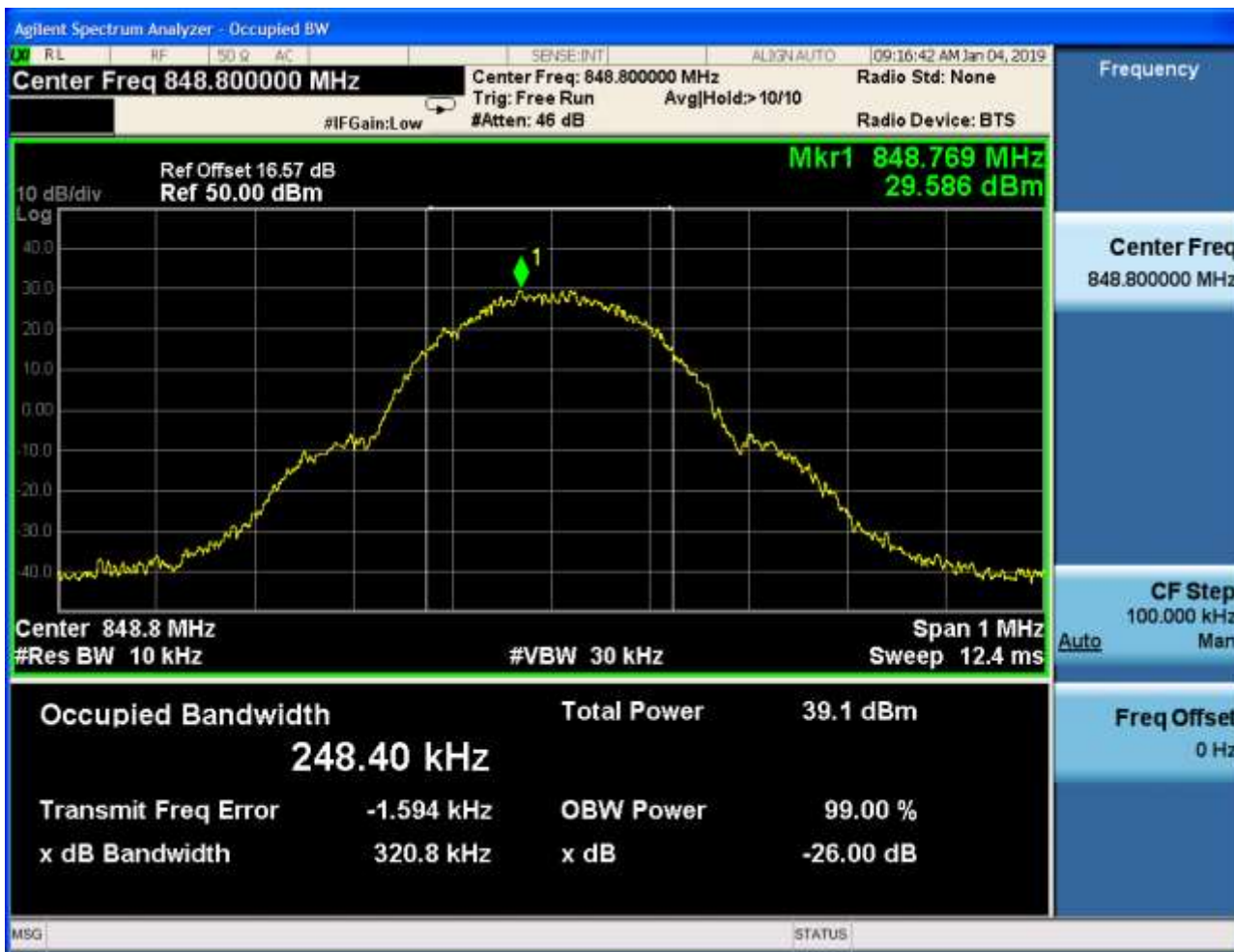
4.1.1.1.1 Test Channel = LCH



4.1.1.1.2 Test Channel = MCH



4.1.1.1.3 Test Channel = HCH

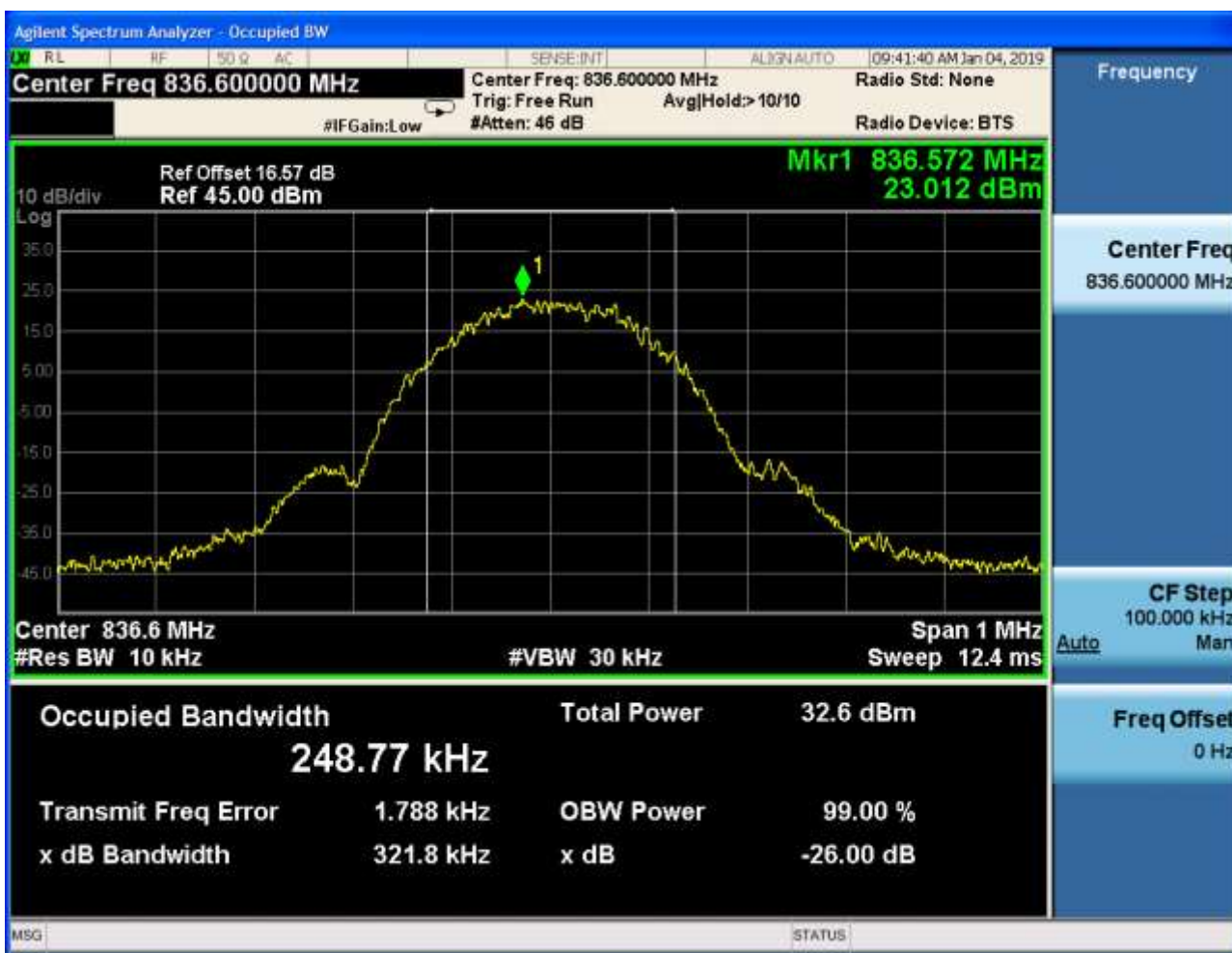


4.1.1.2 Test Mode = GSM/TM2

4.1.1.2.1 Test Channel = LCH



4.1.1.2.2 Test Channel = MCH



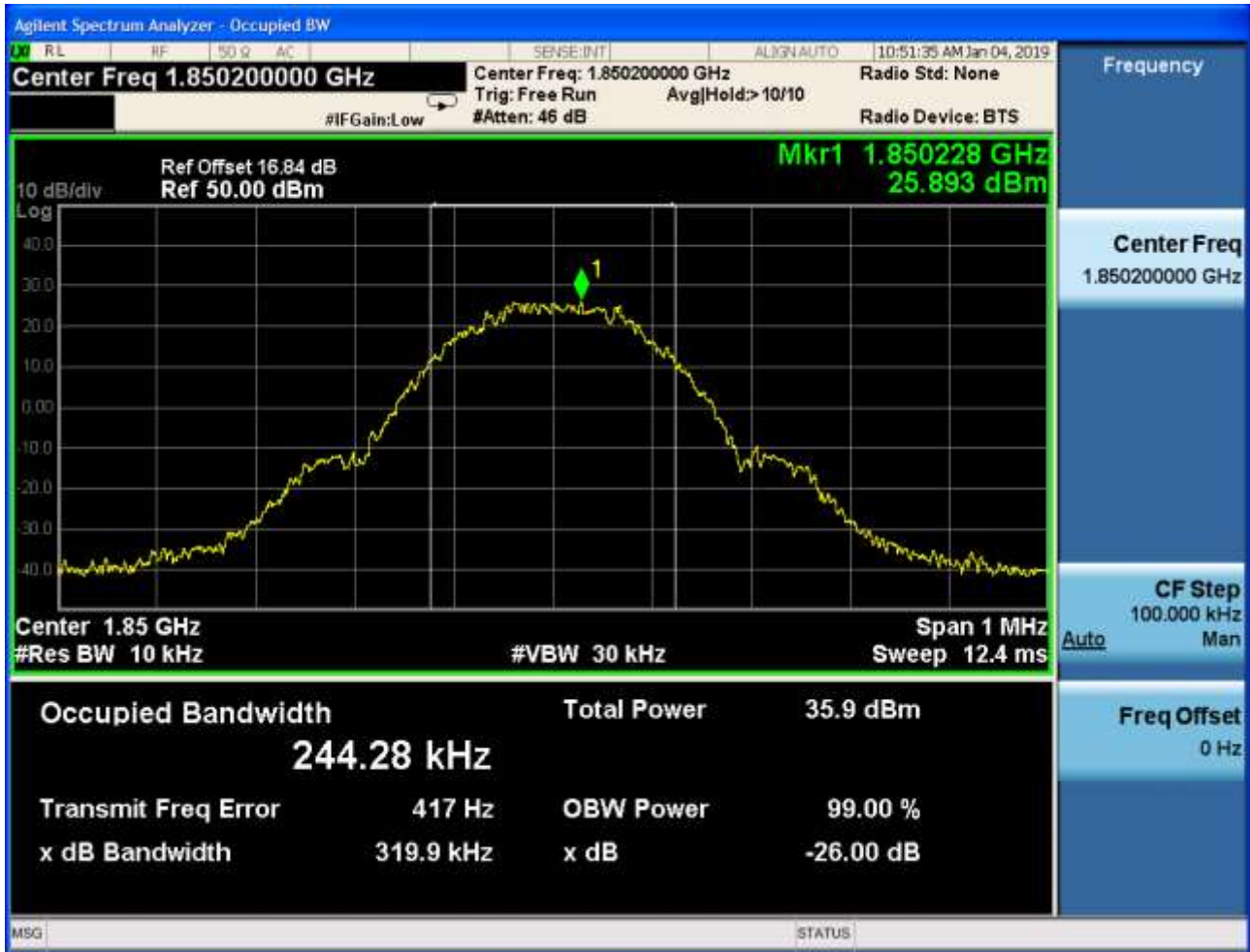
4.1.1.2.3 Test Channel = HCH



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

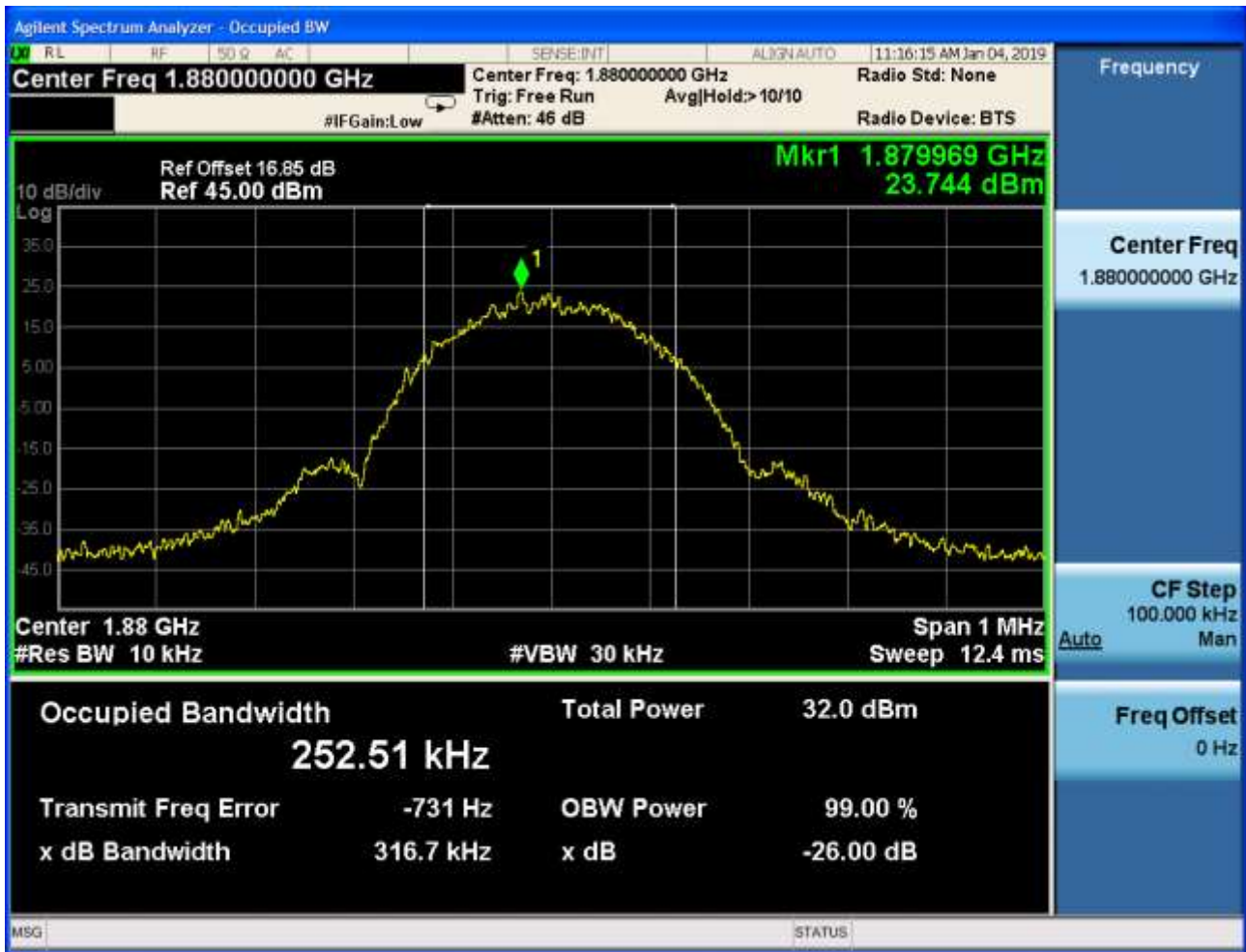


4.1.2.2 Test Mode = GSM/TM2

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

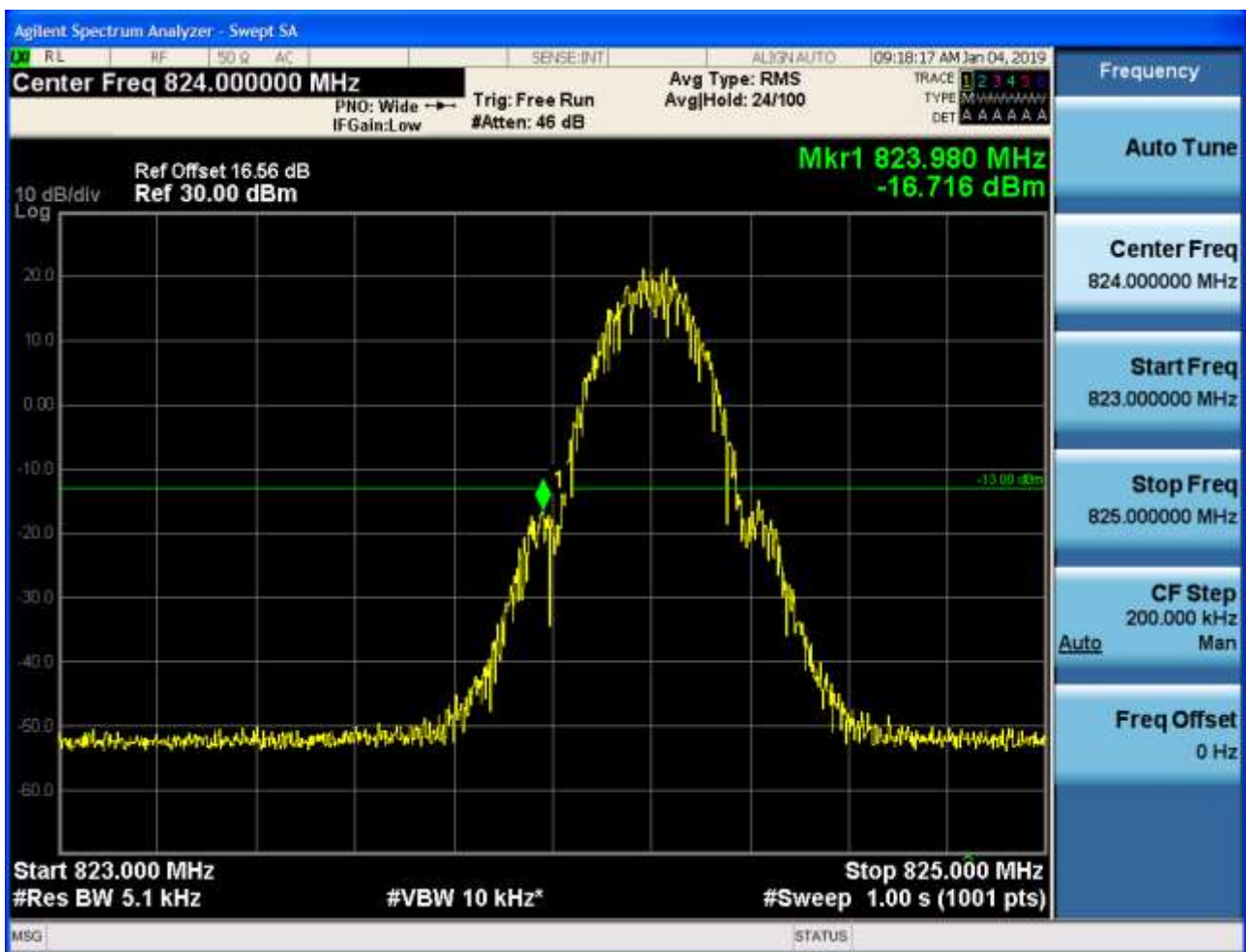
Part I - Test Plots

5.1 For GSM

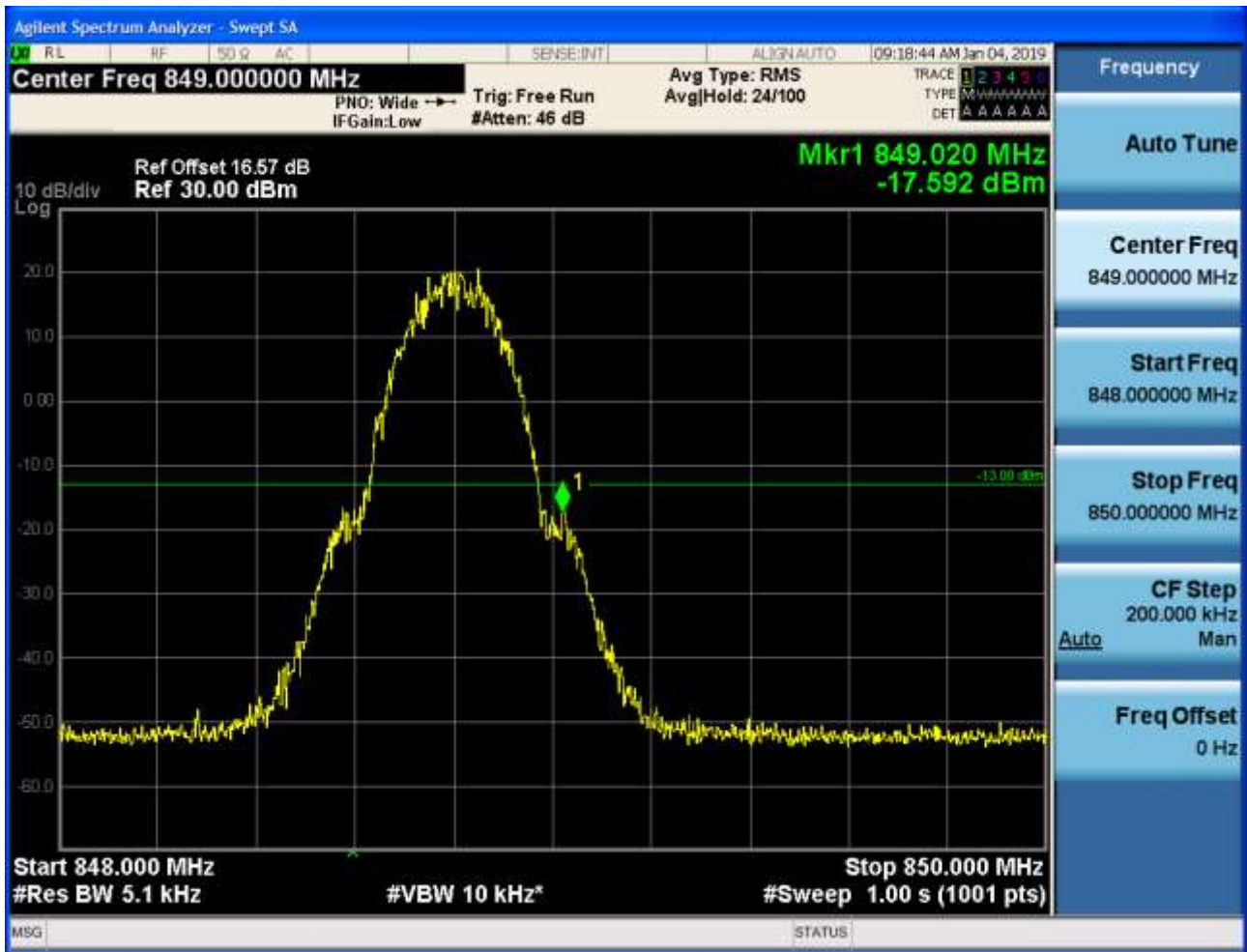
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

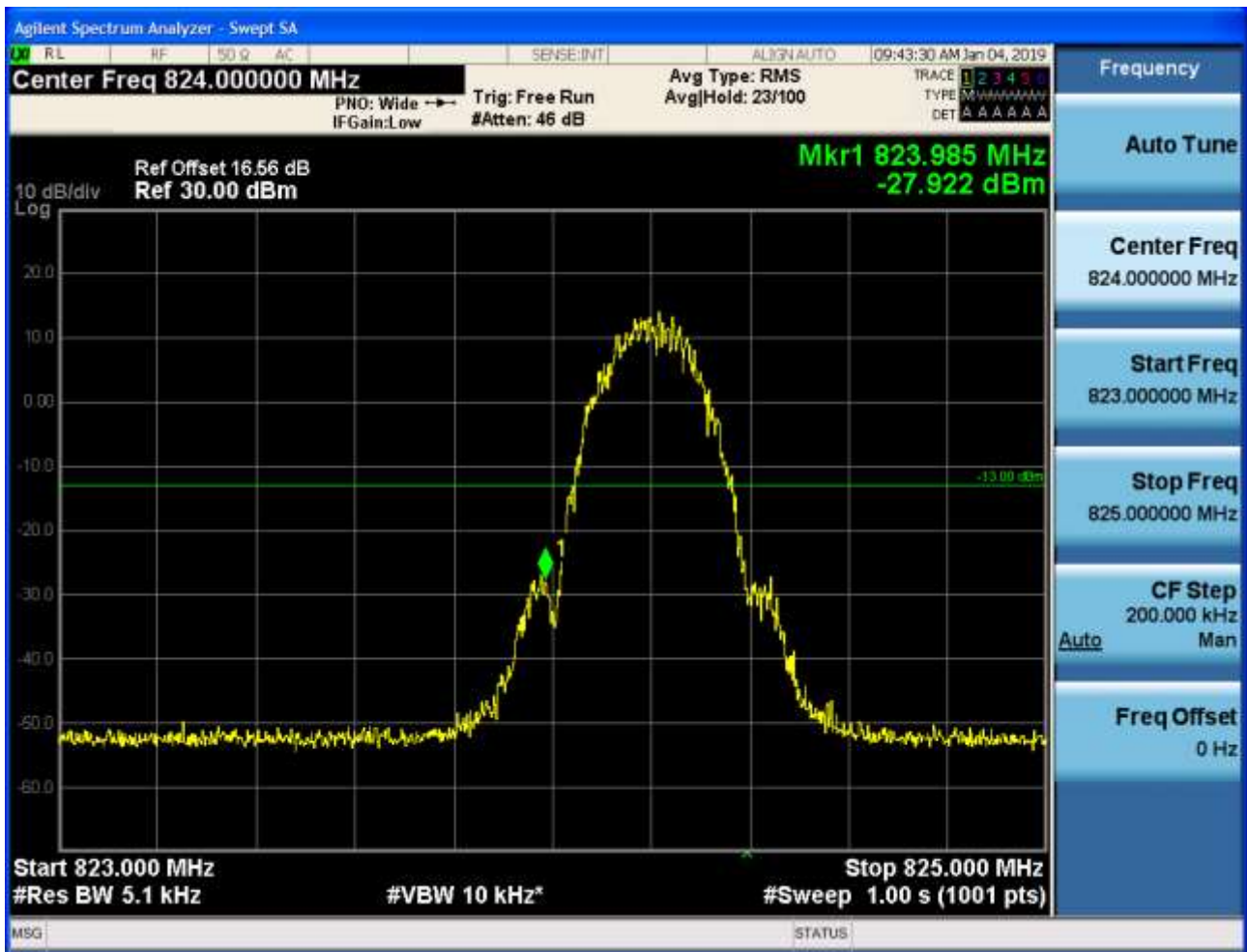


5.1.1.1.2 Test Channel = HCH

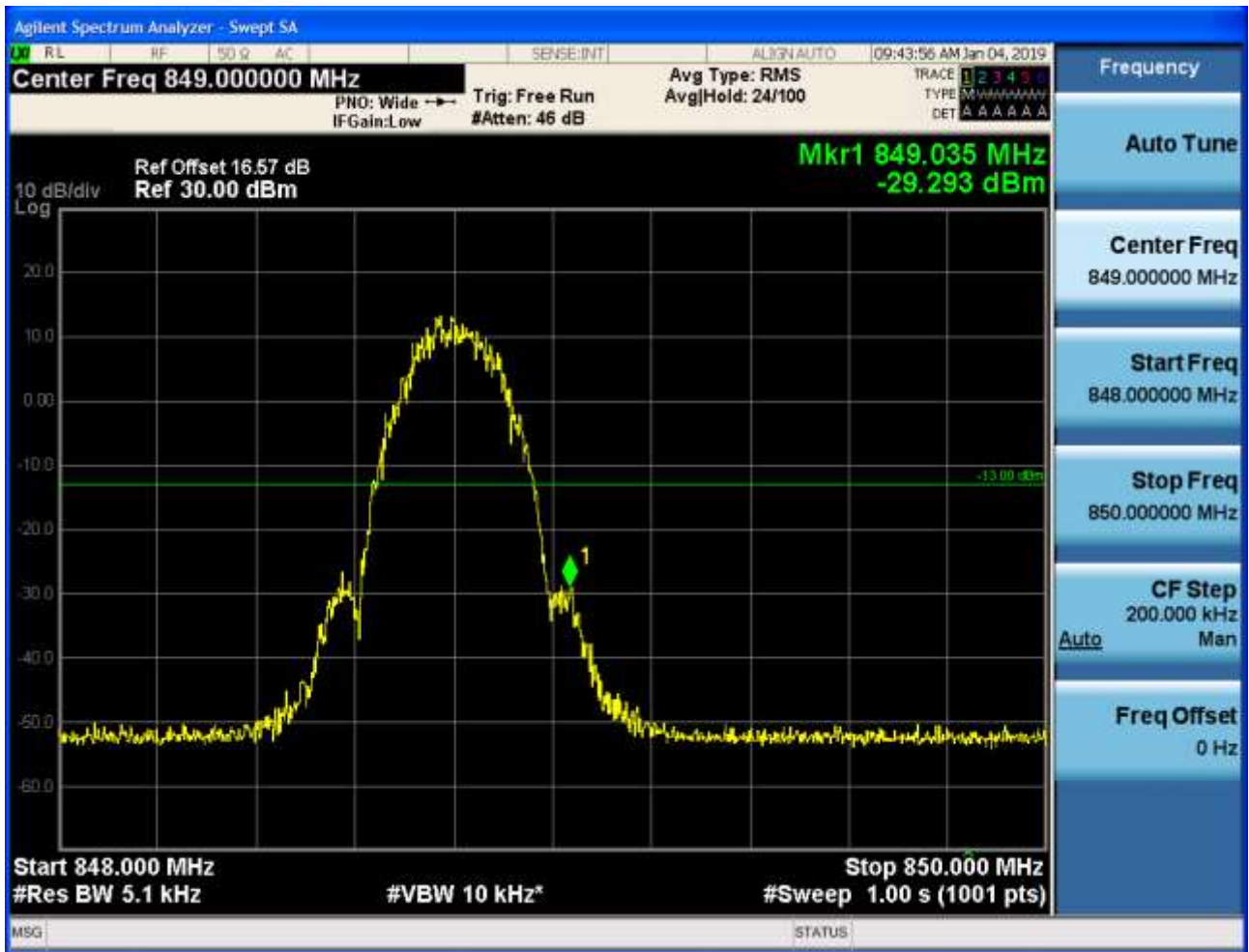


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



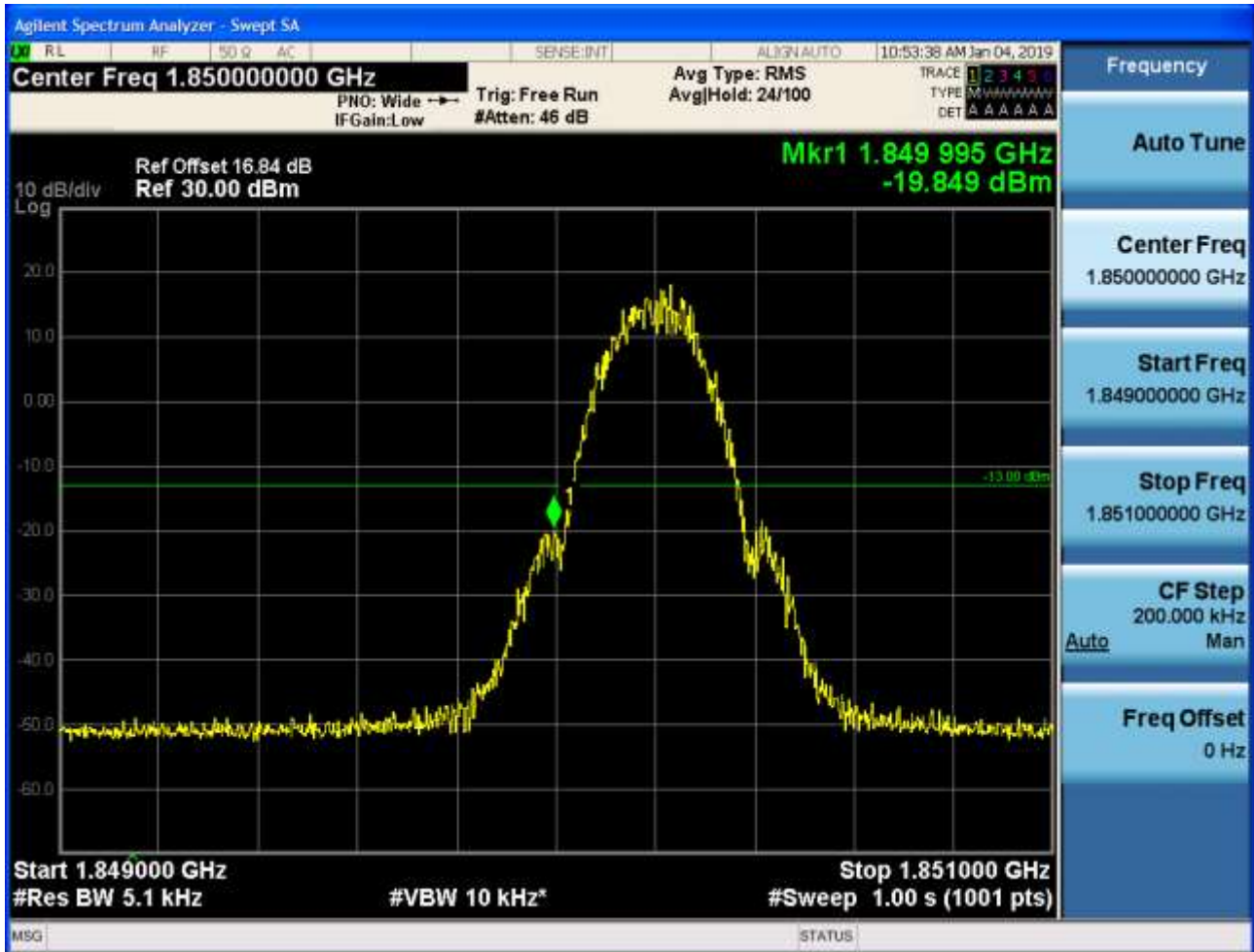
5.1.1.2.2 Test Channel = HCH



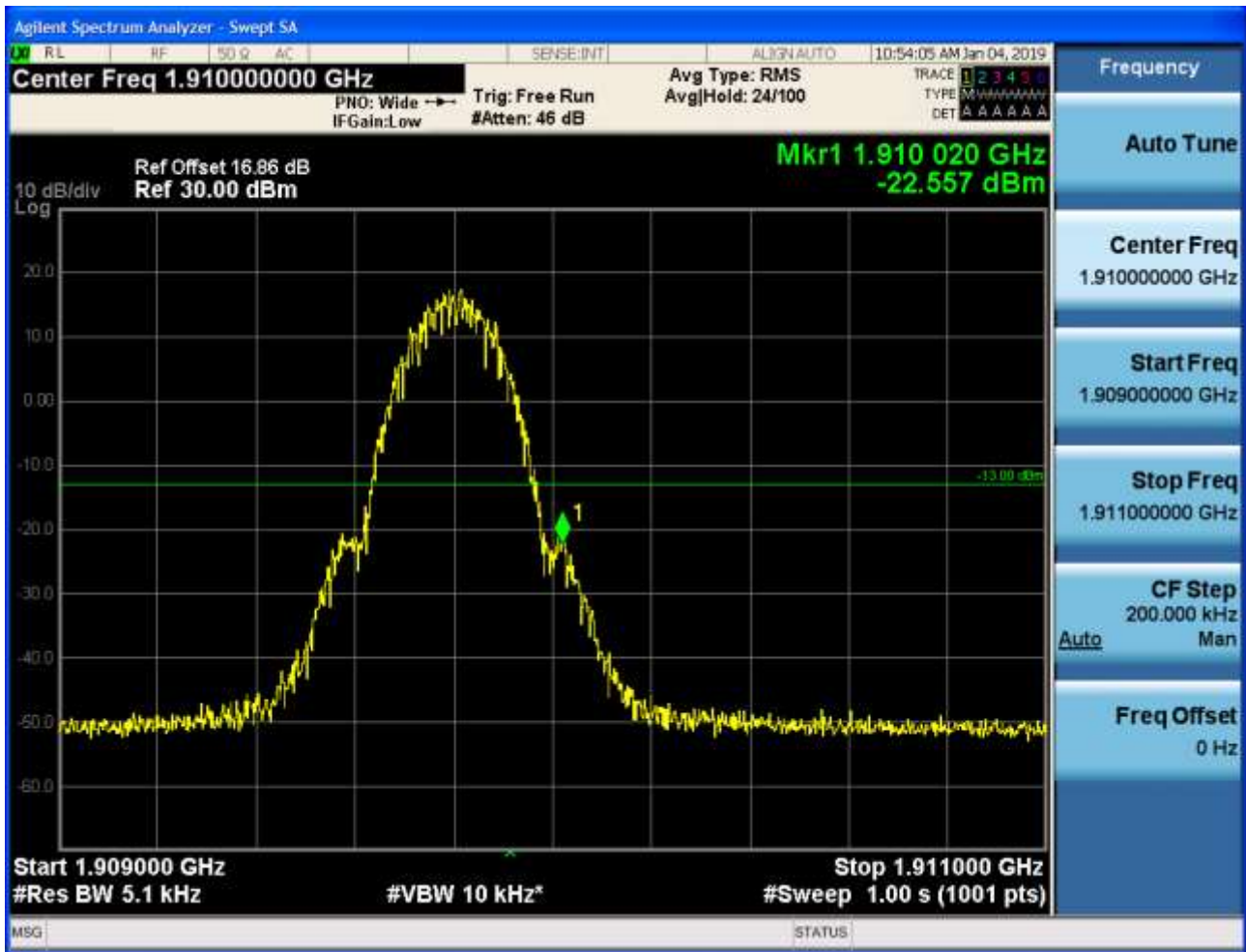
5.1.2 Test Band = PCS1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

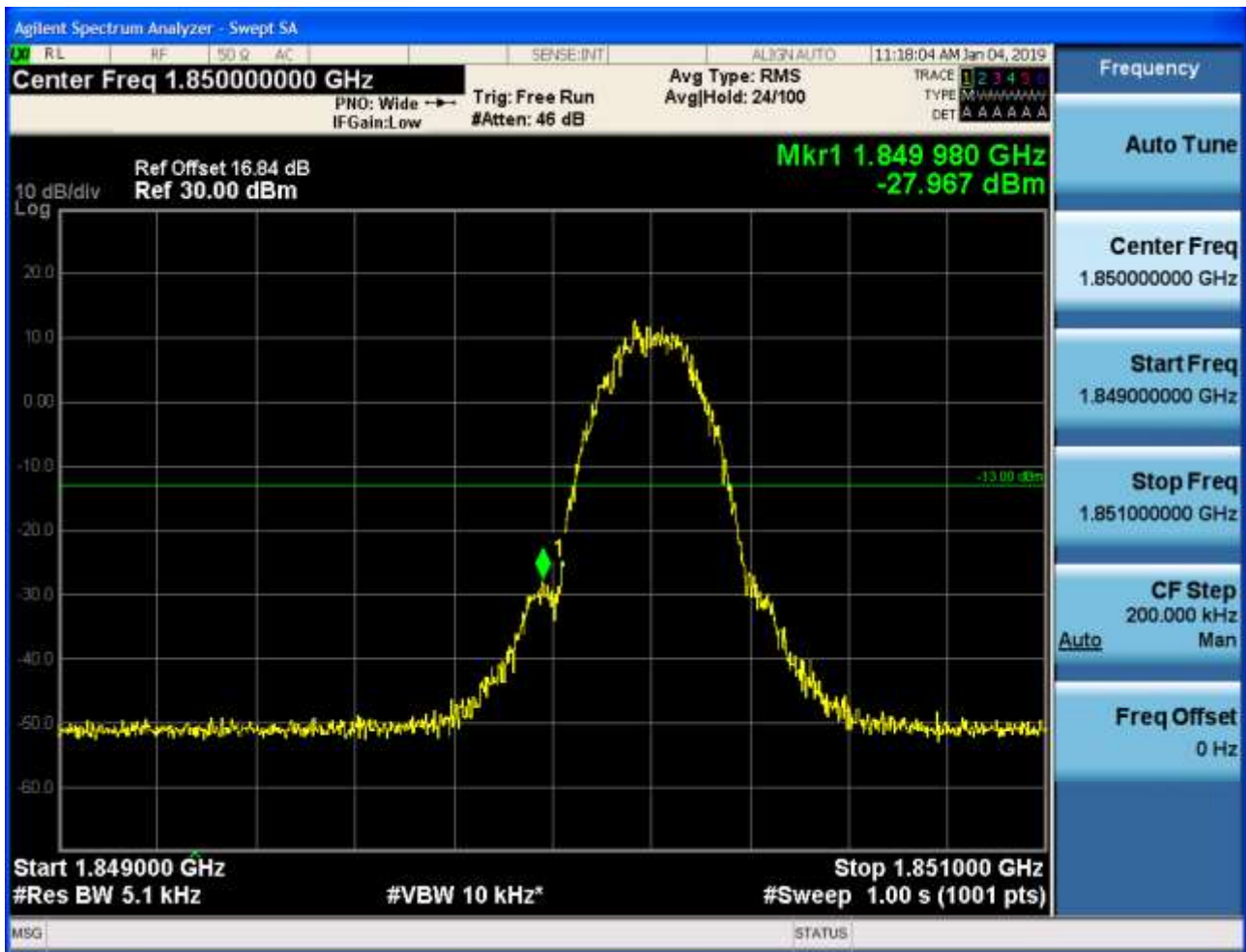


5.1.2.1.2 Test Channel = HCH

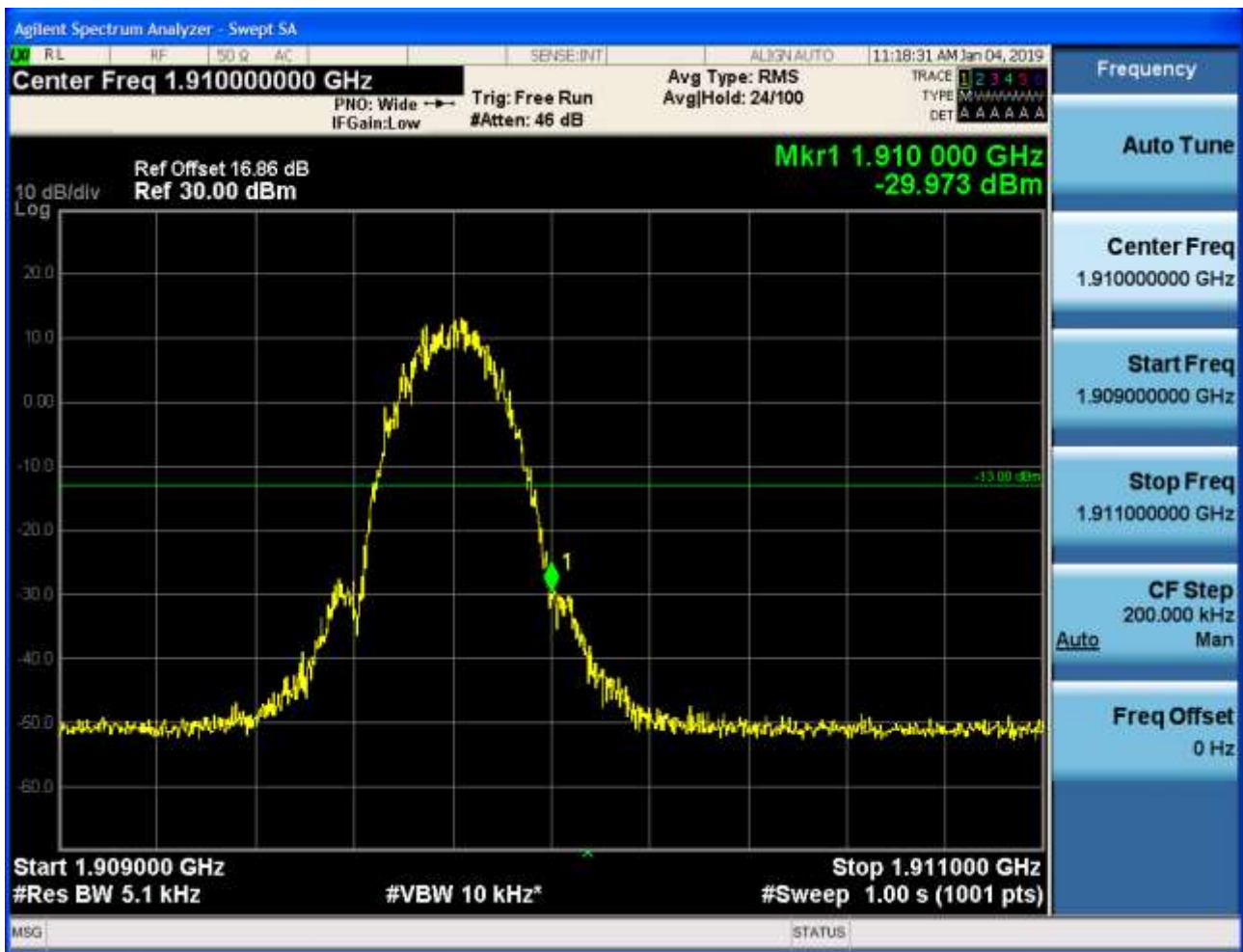


5.1.2.2 Test Mode = GSM/TM2

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.

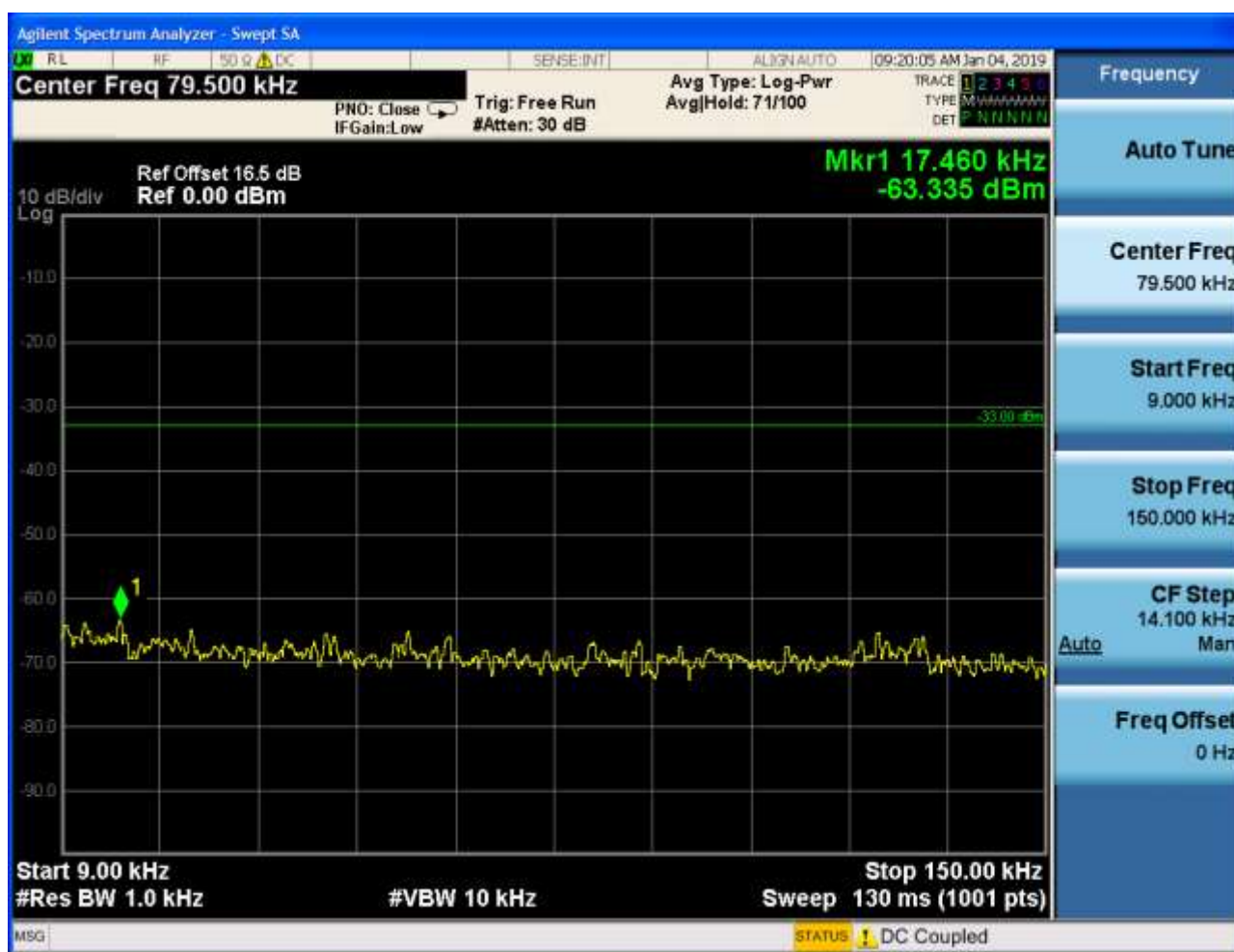
Part I - Test Plots

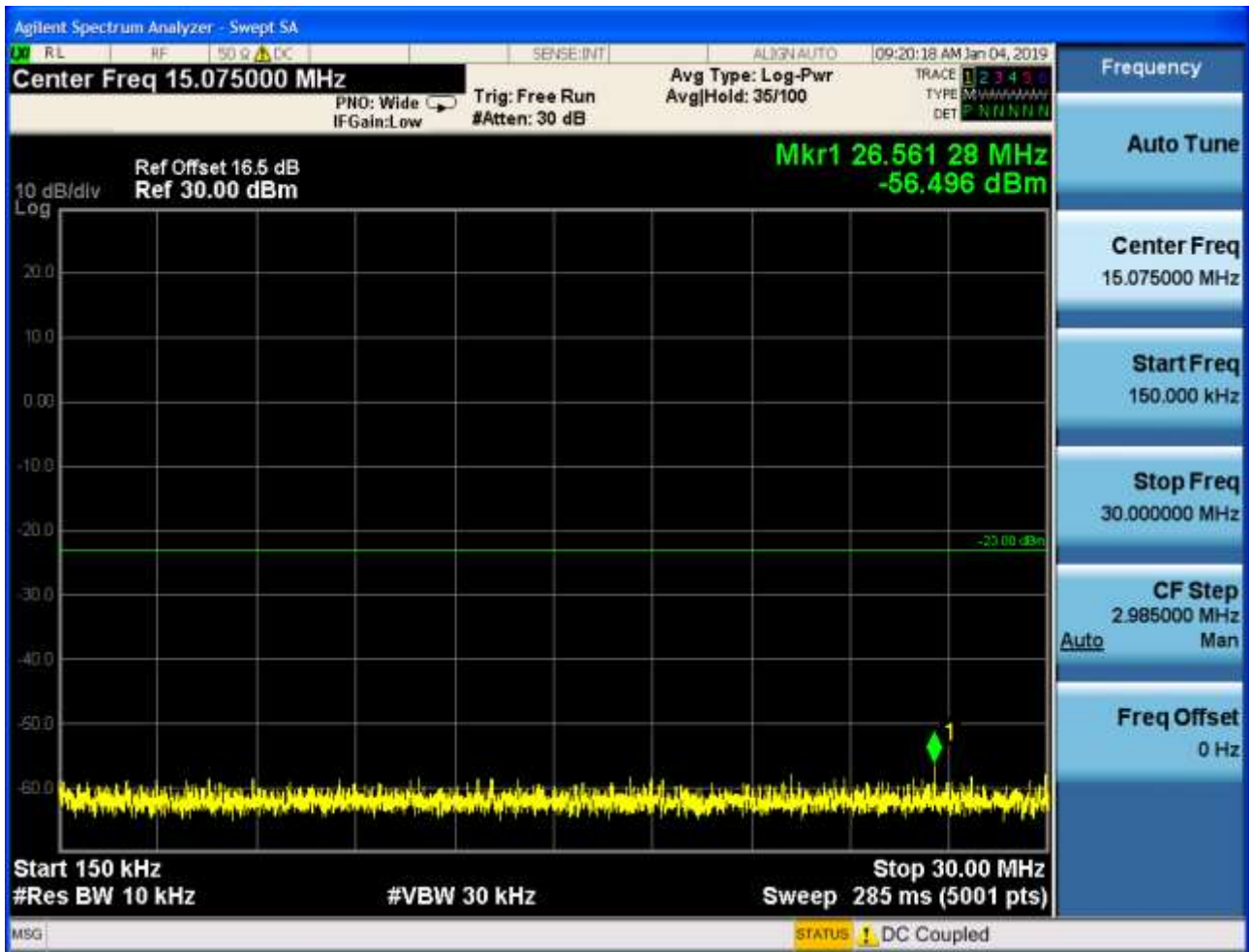
6.1 For GSM

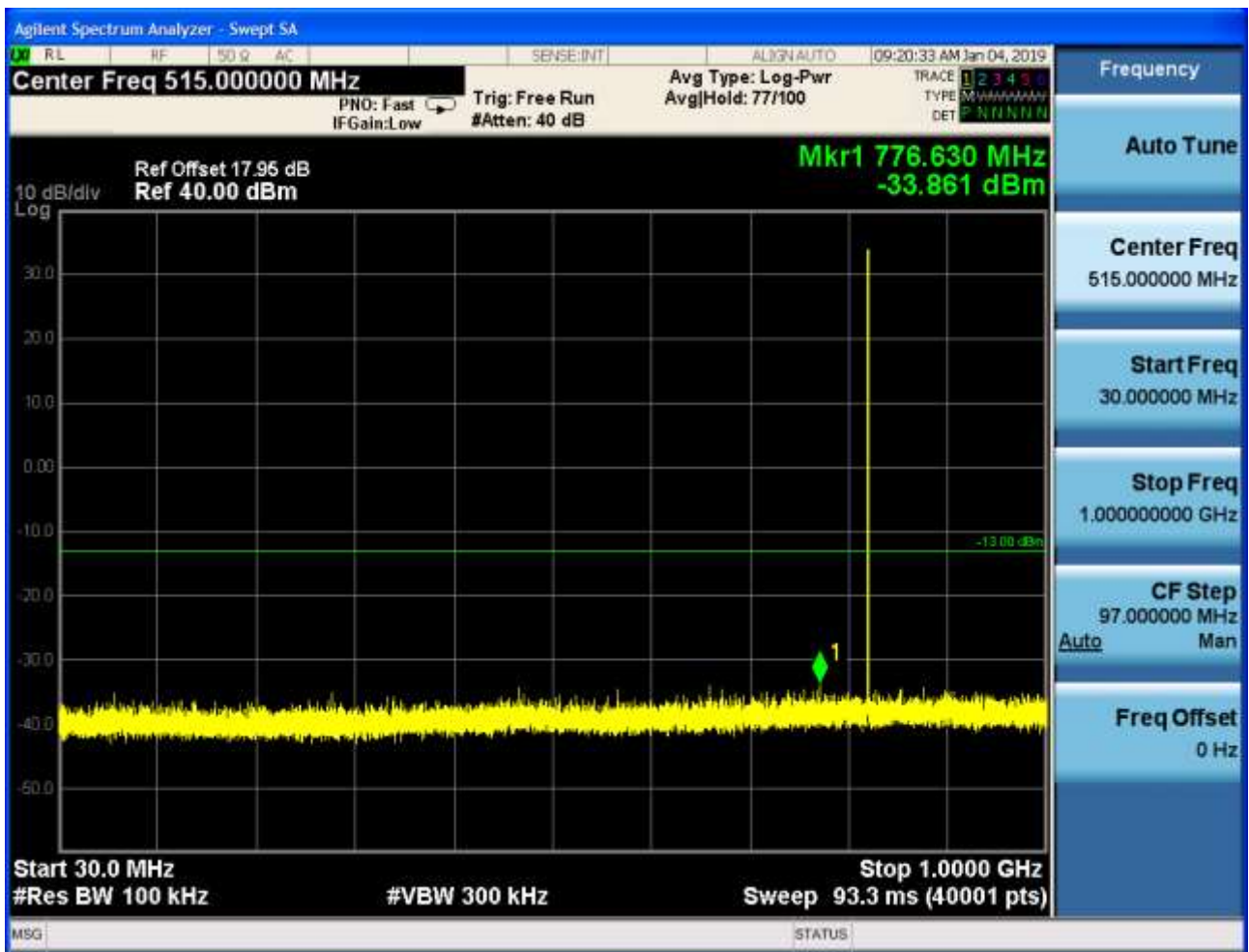
6.1.1 Test Band = GSM850

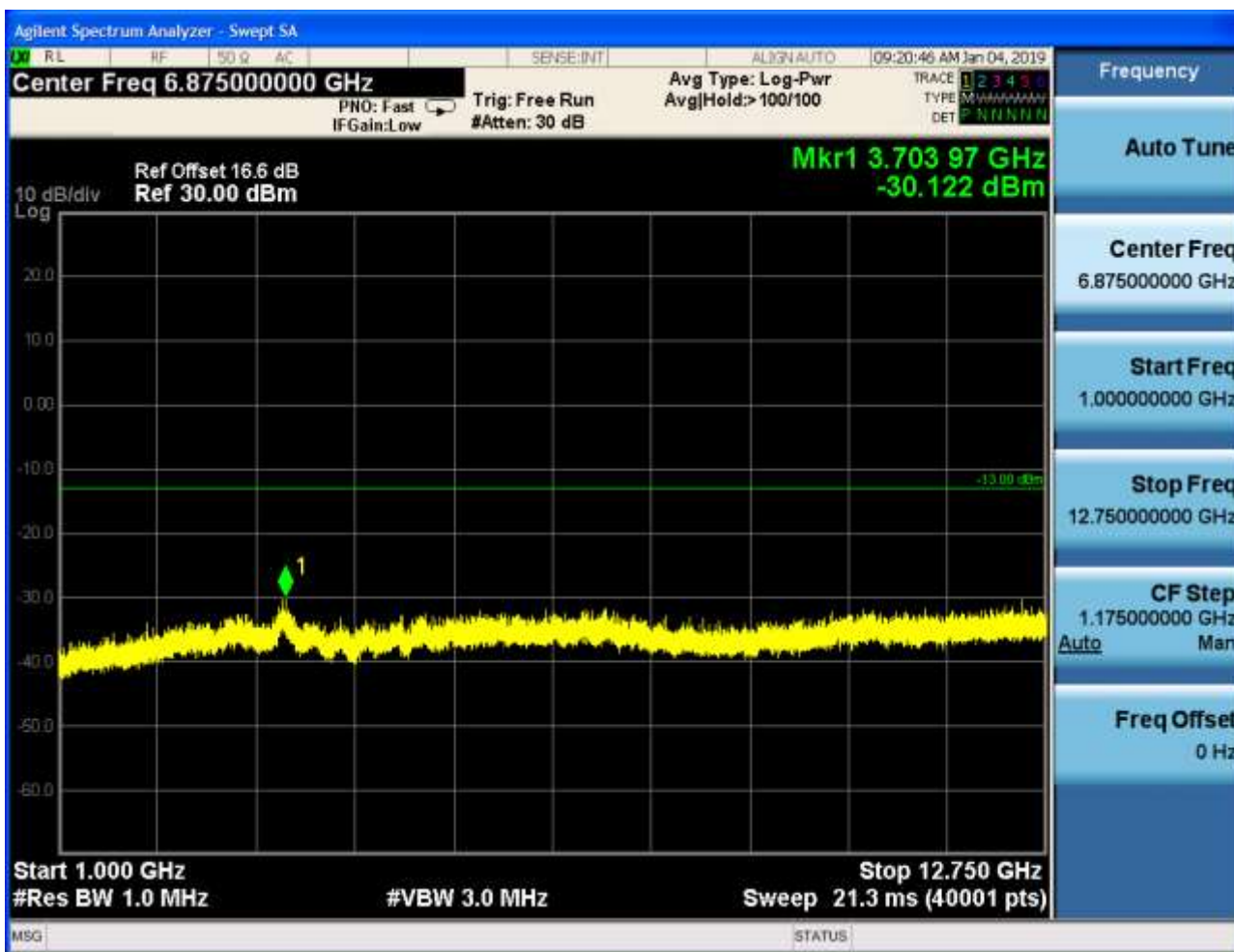
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH

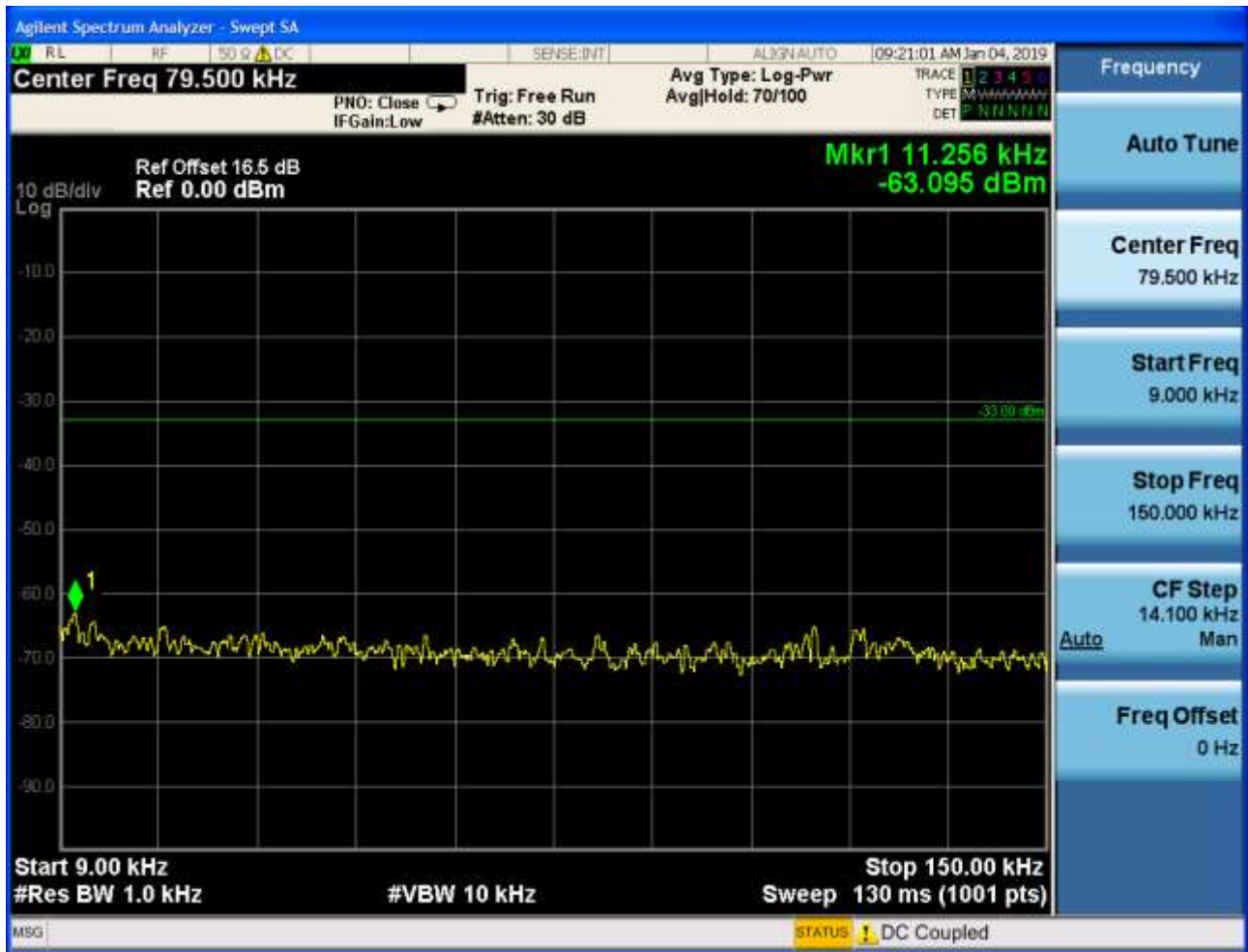


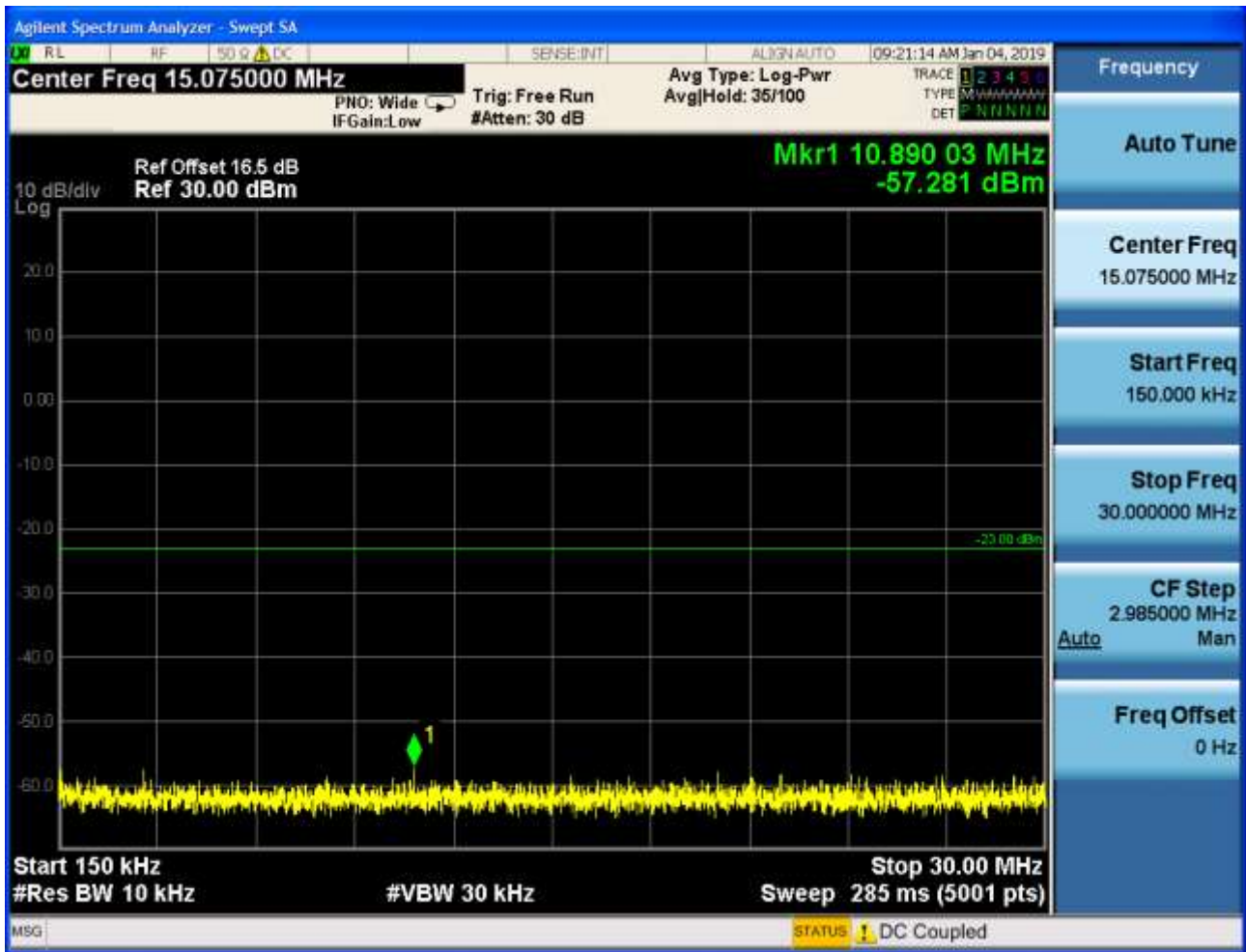




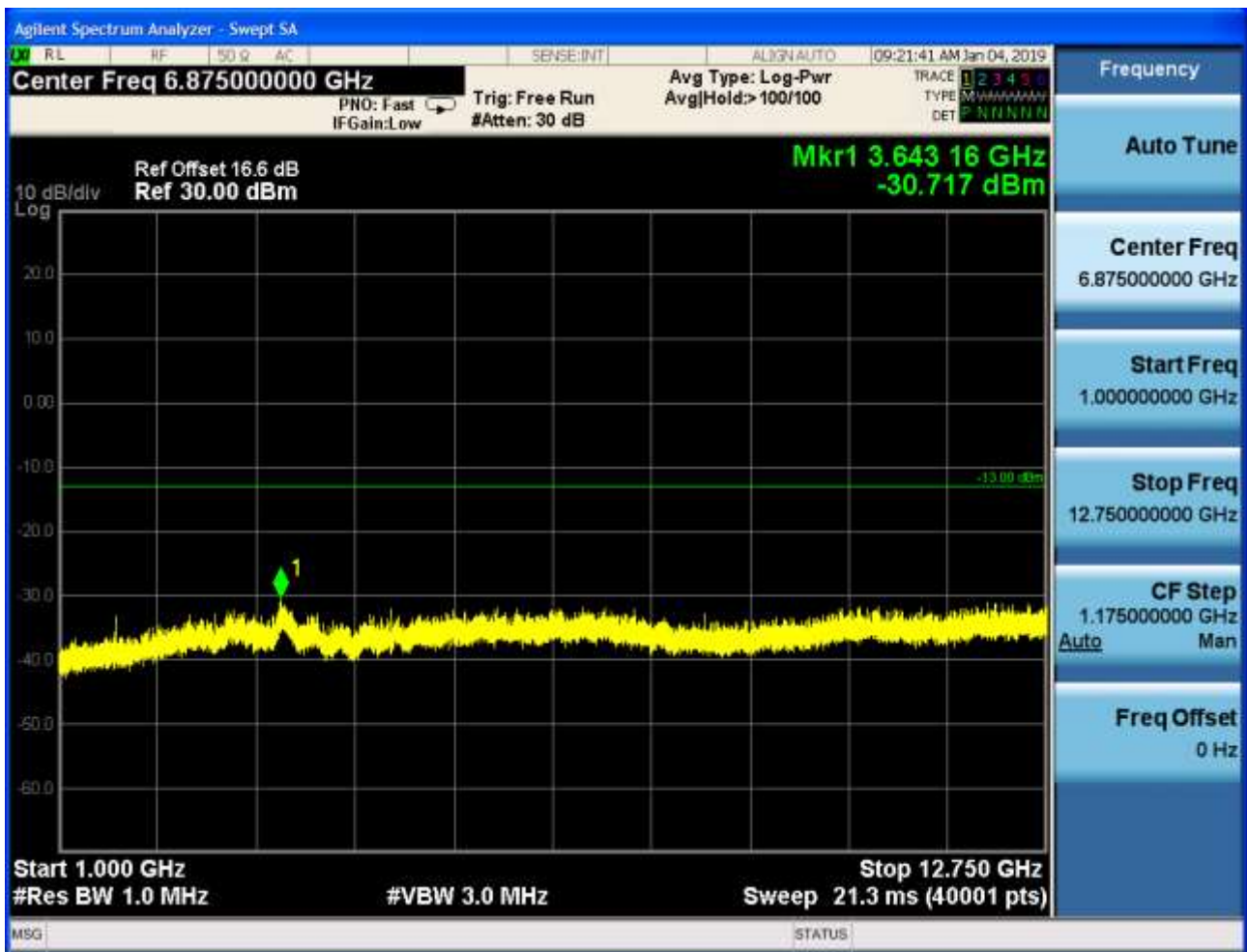


6.1.1.1.2 Test Channel = MCH



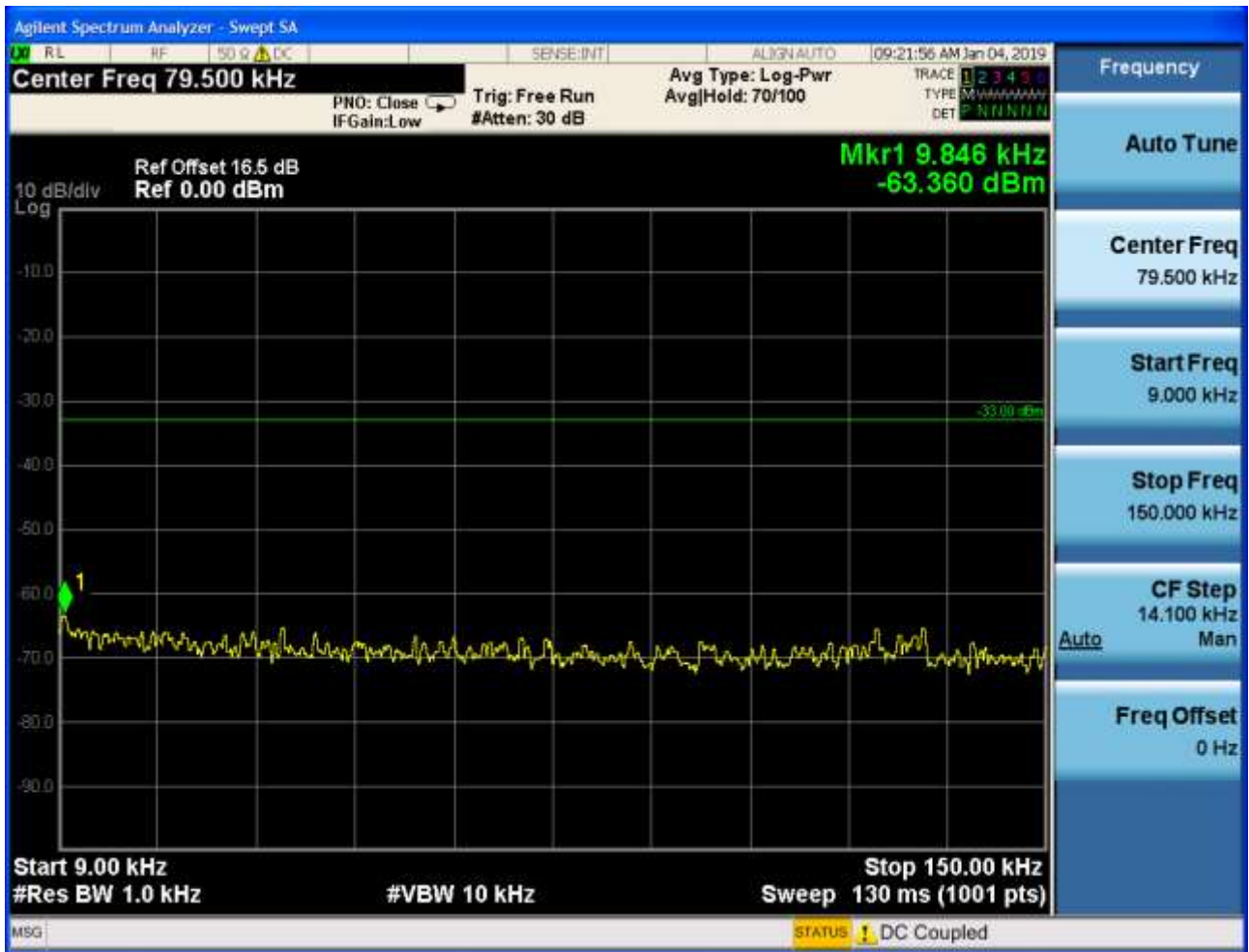


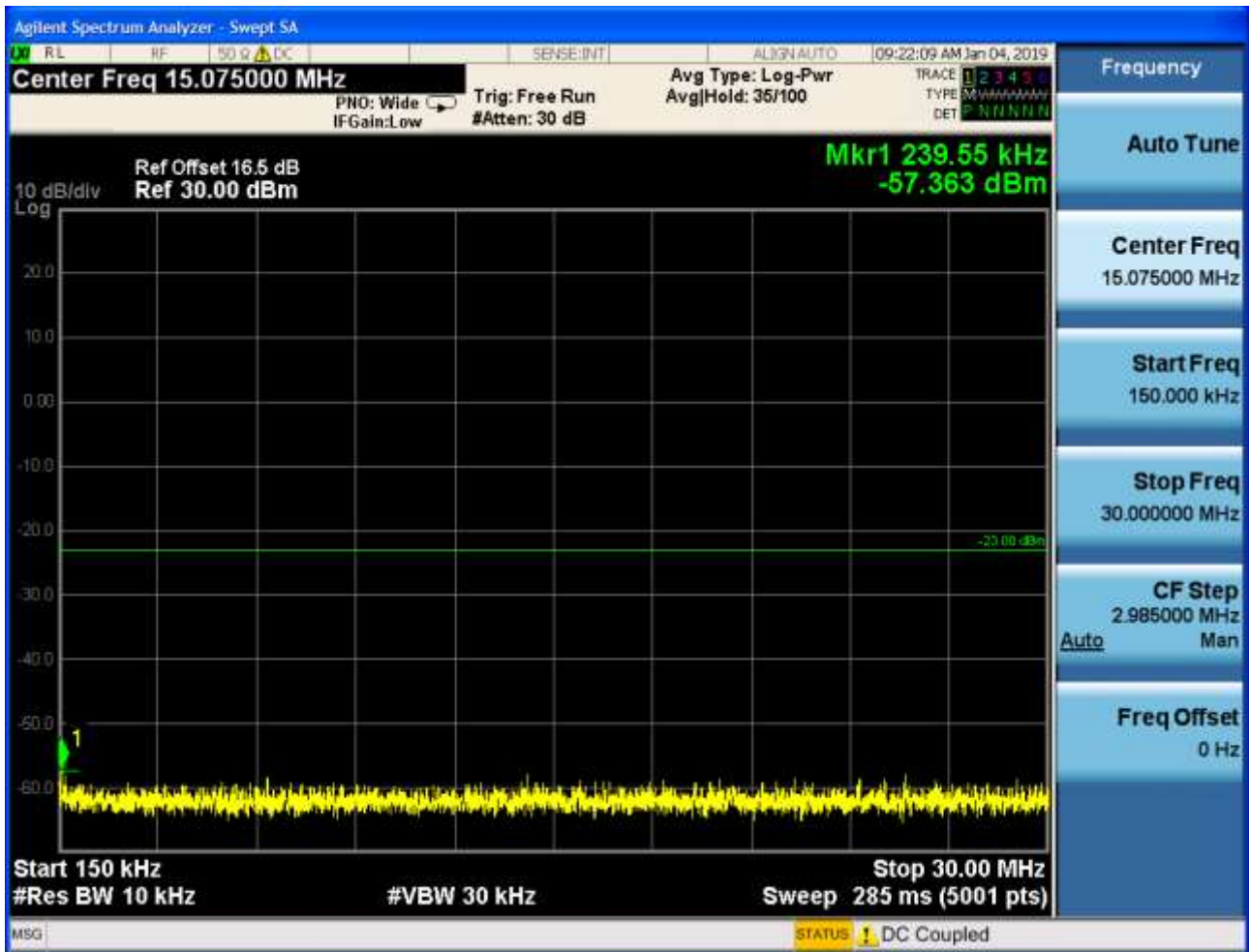


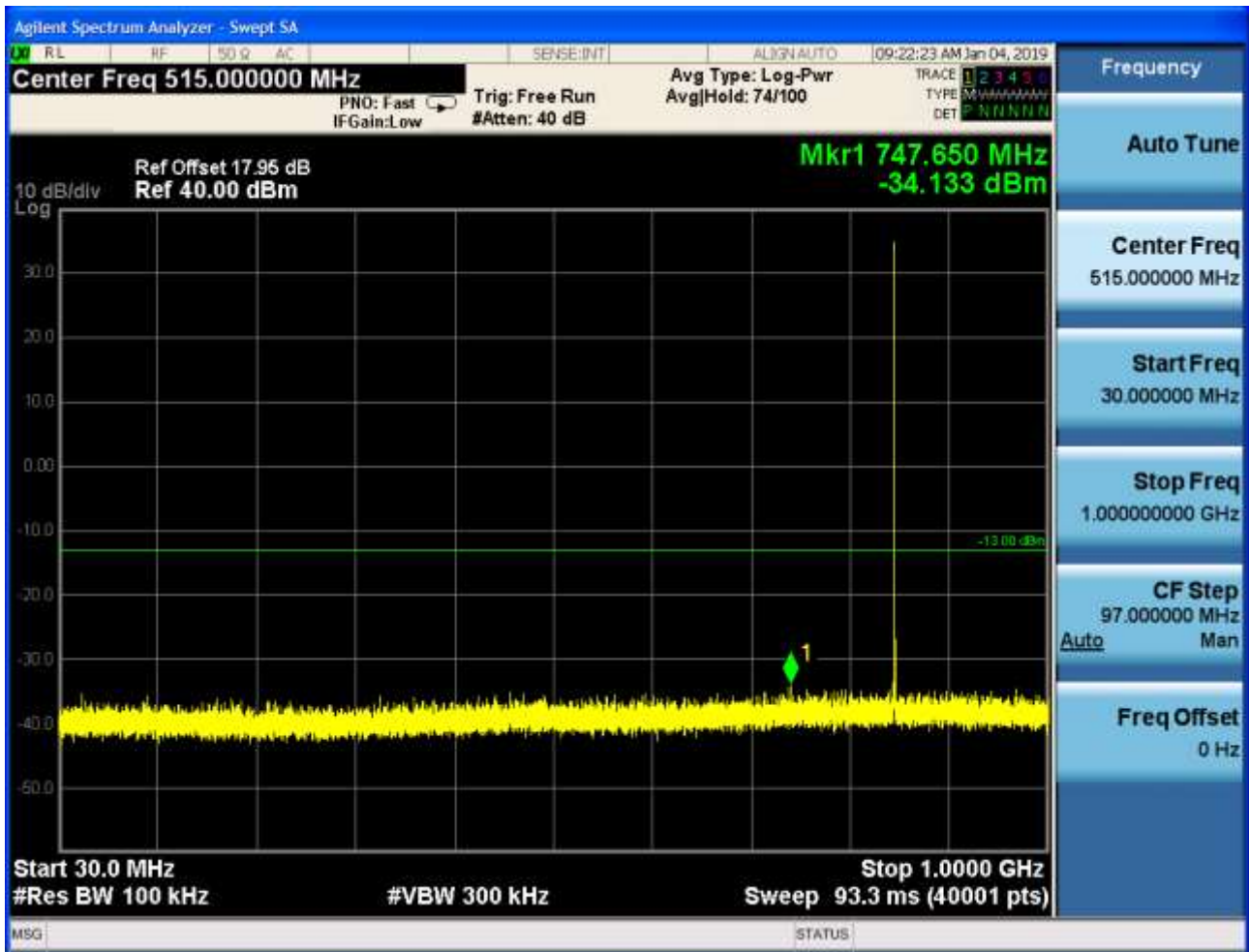




6.1.1.1.3 Test Channel = HCH





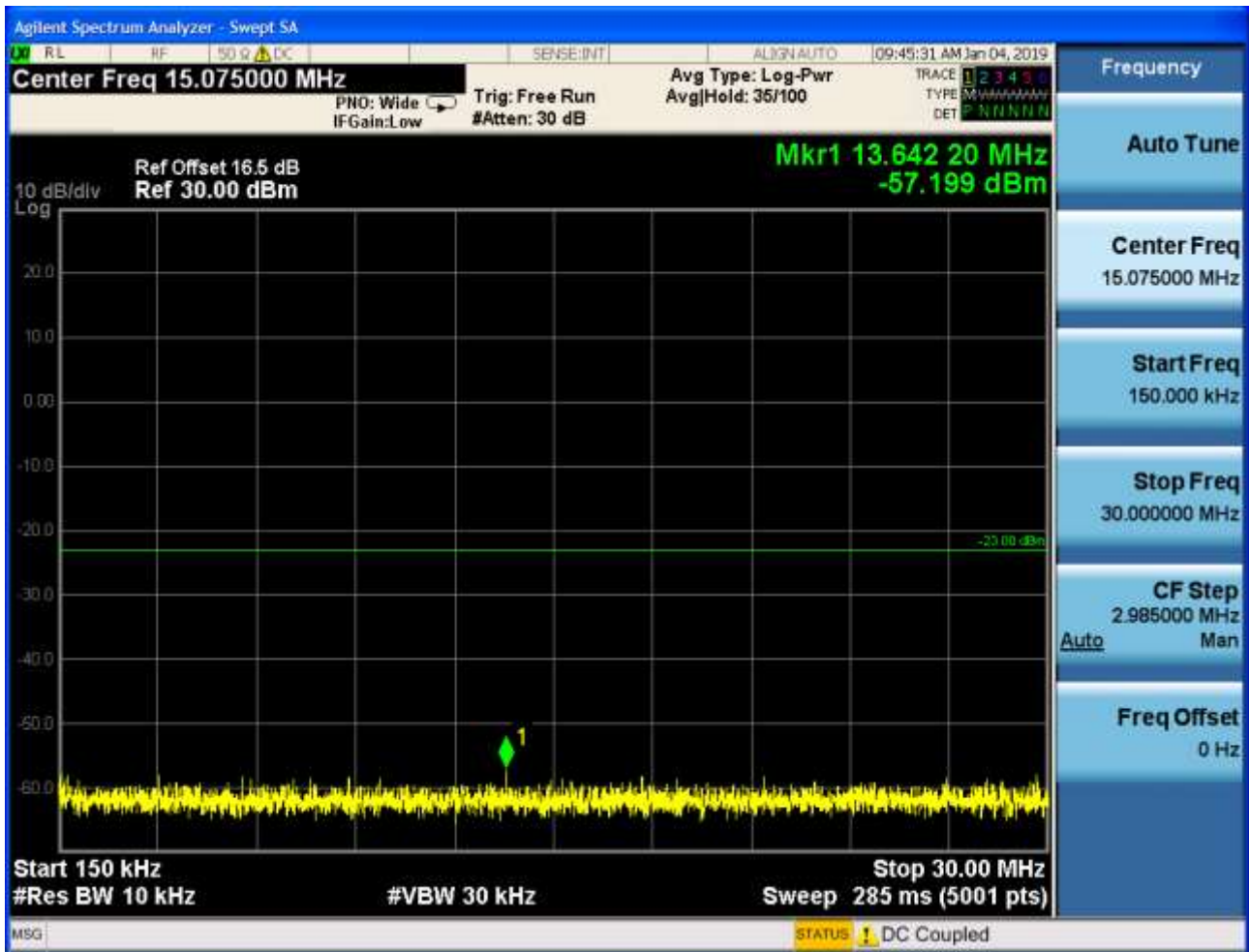


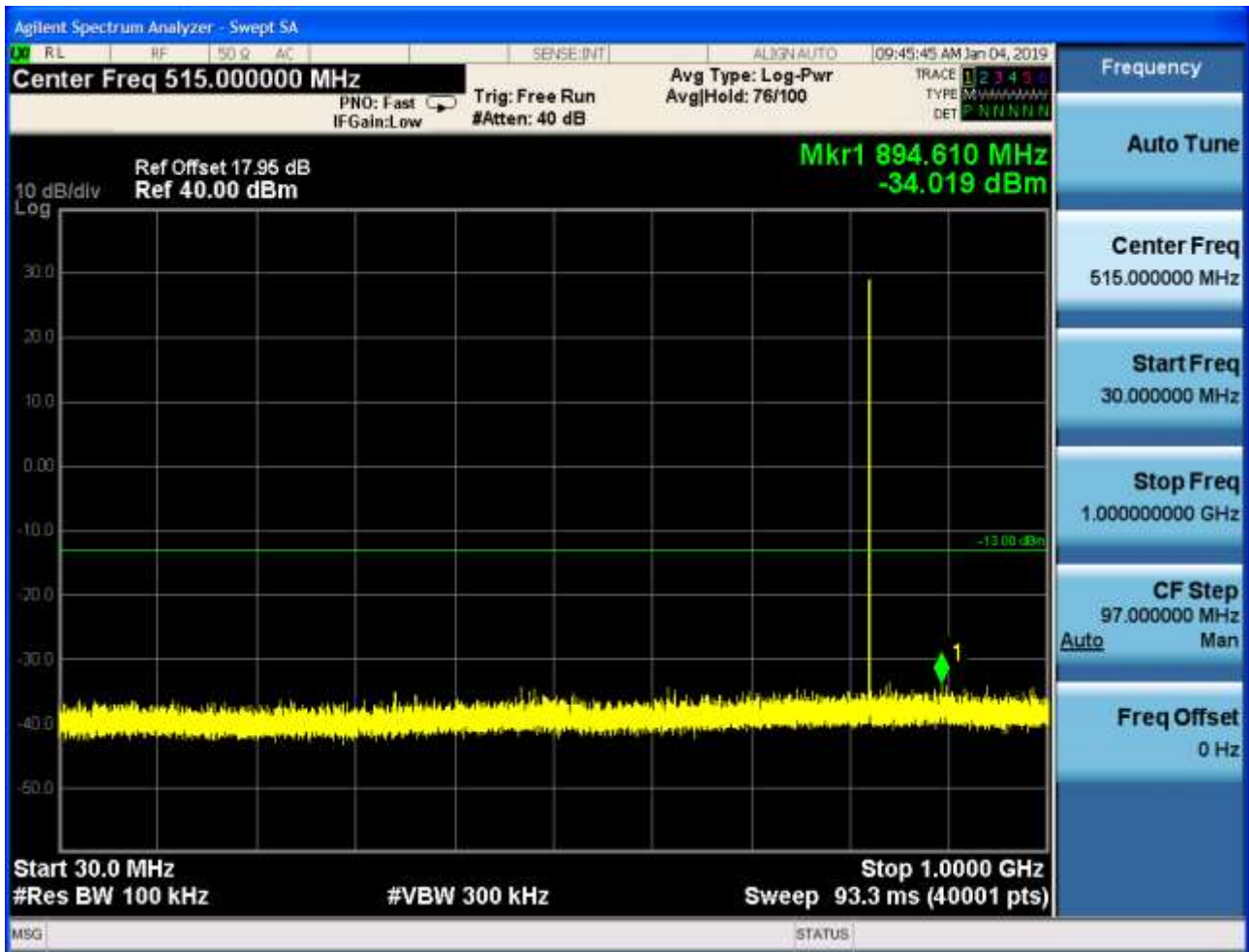


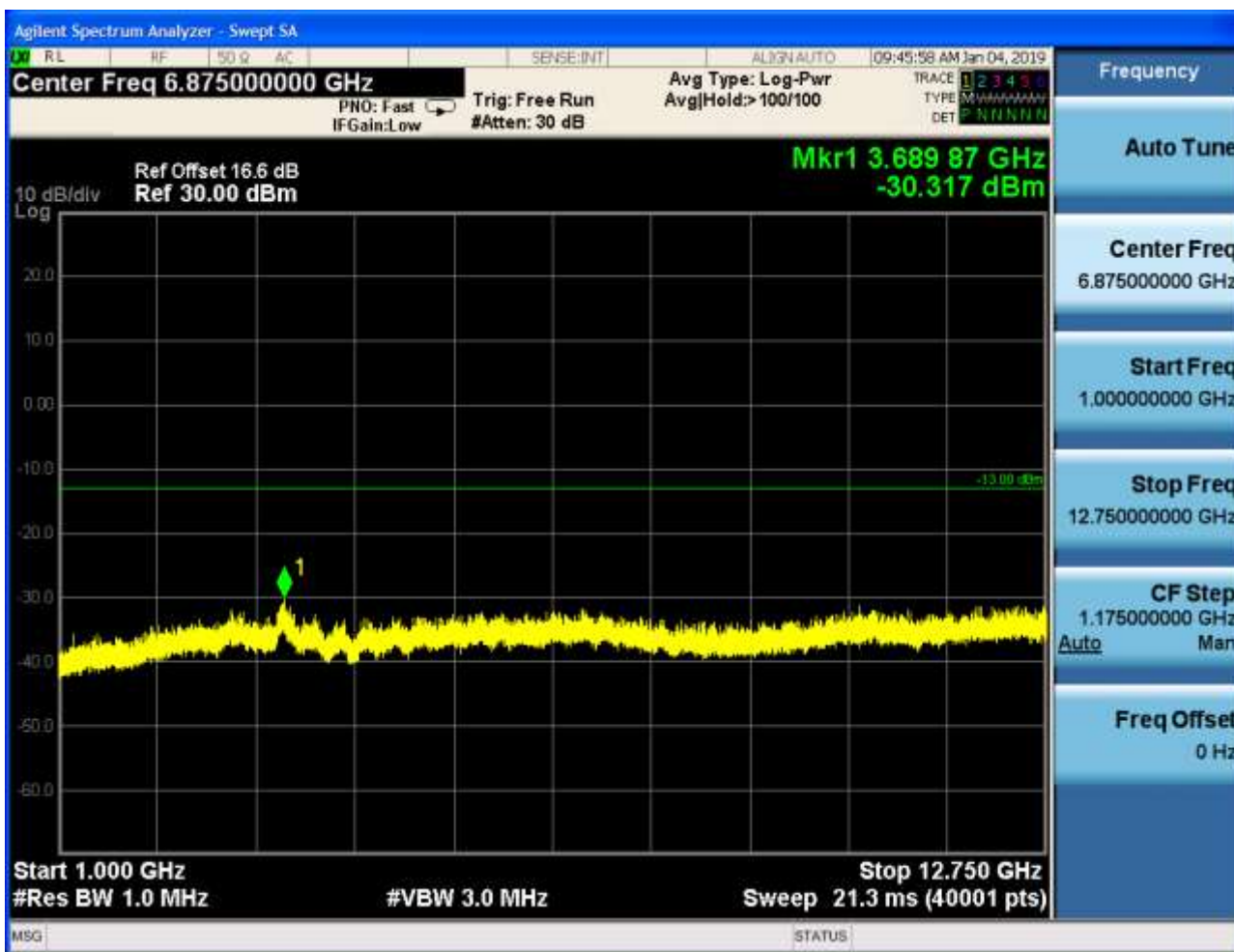
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH





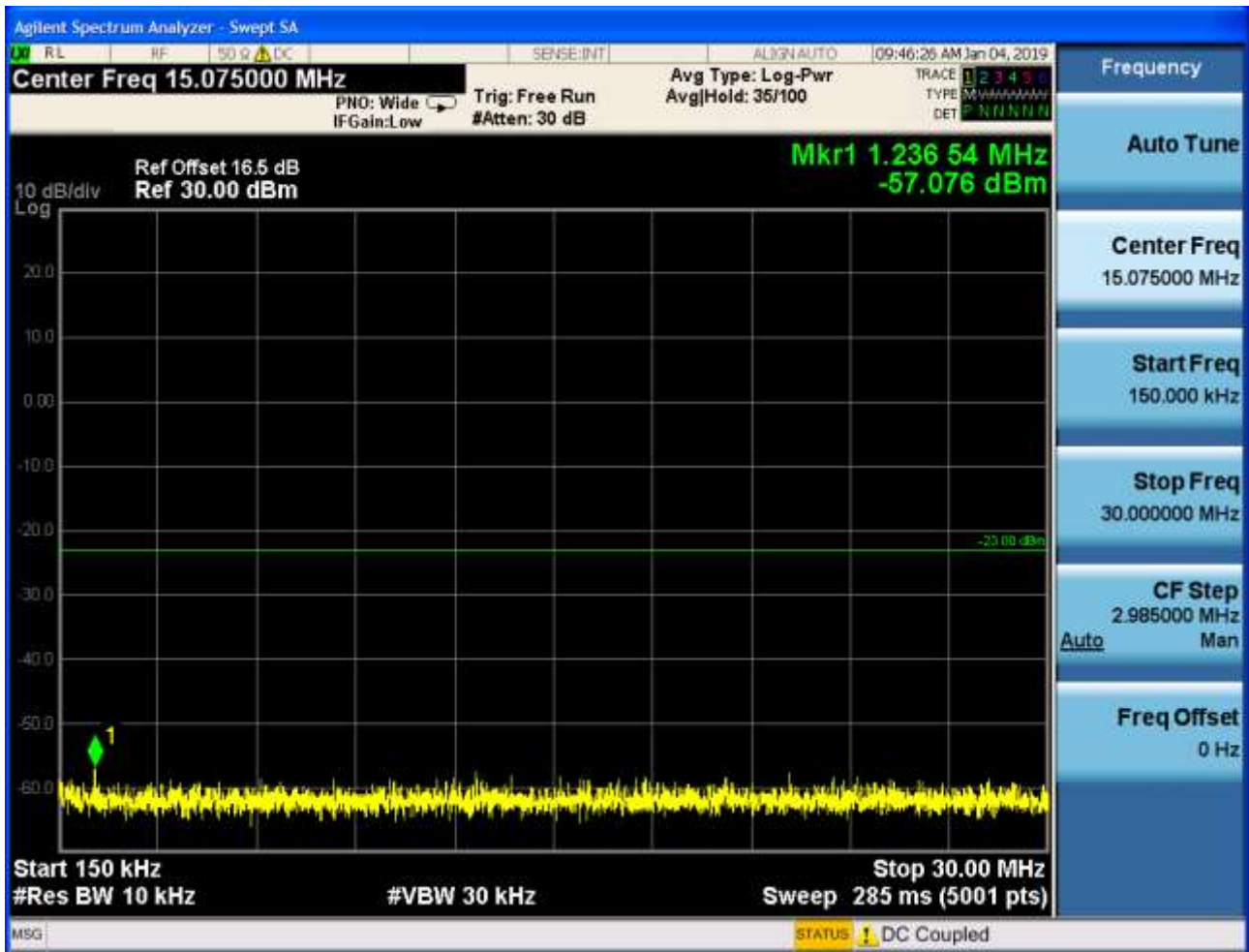


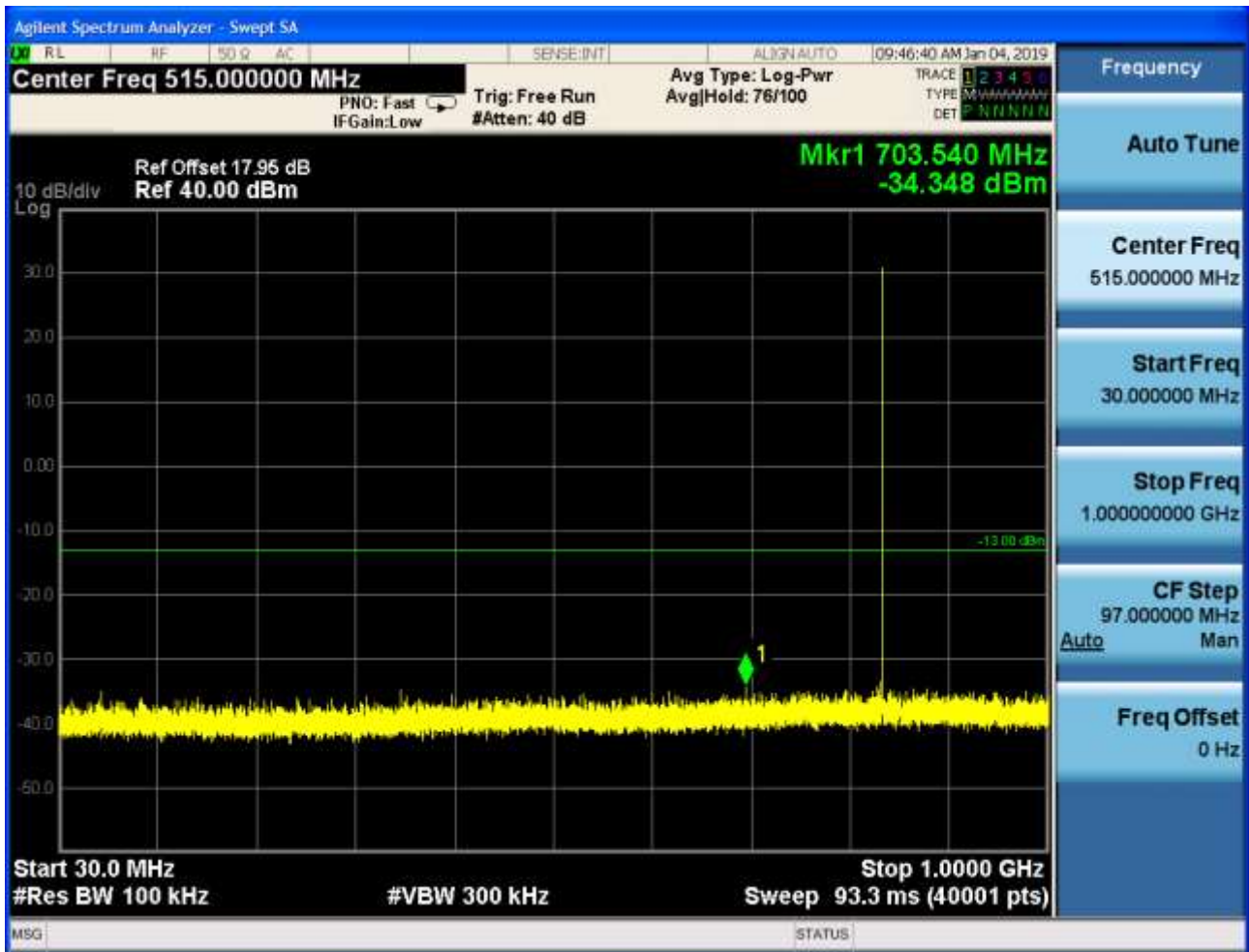


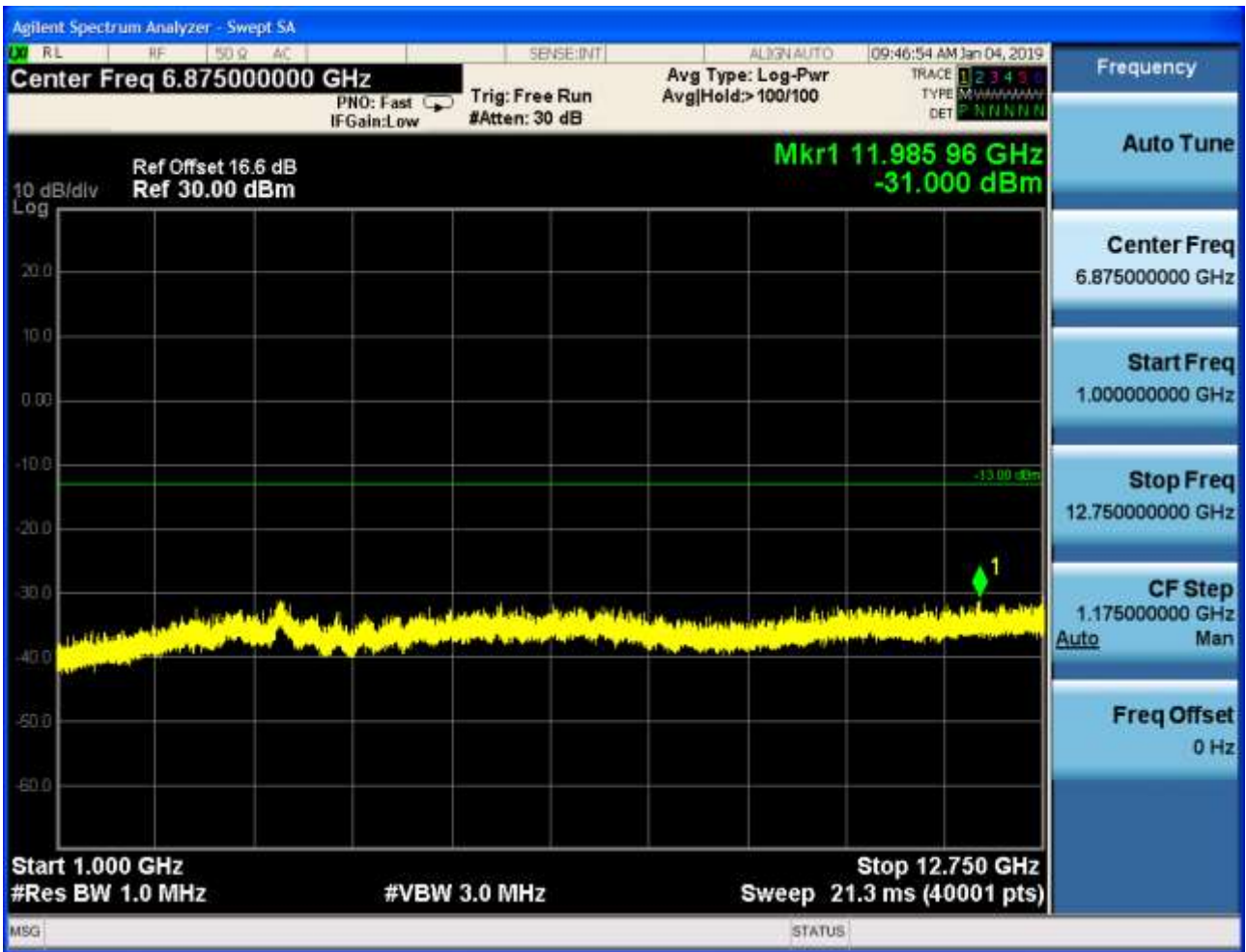


6.1.1.2.2 Test Channel = MCH





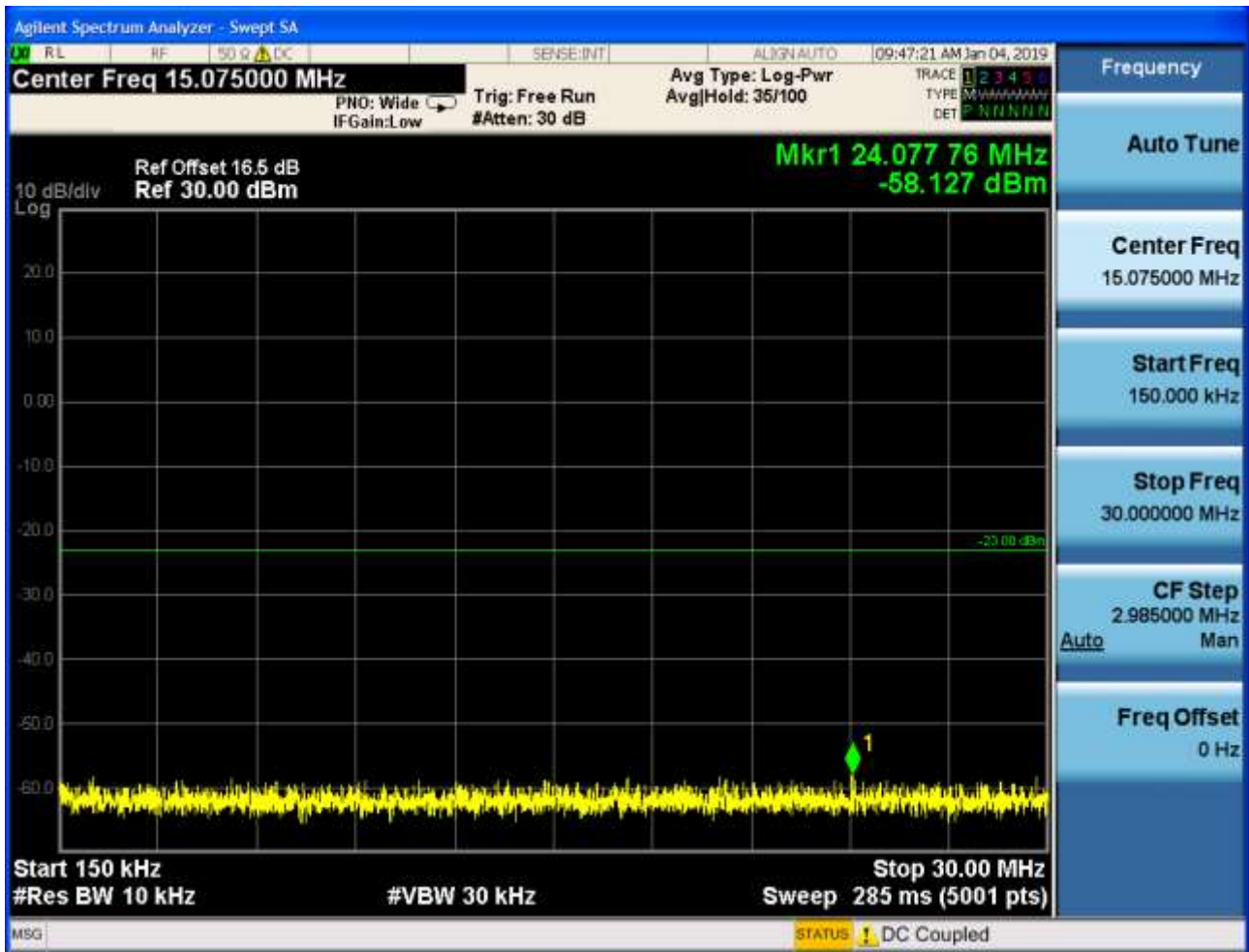


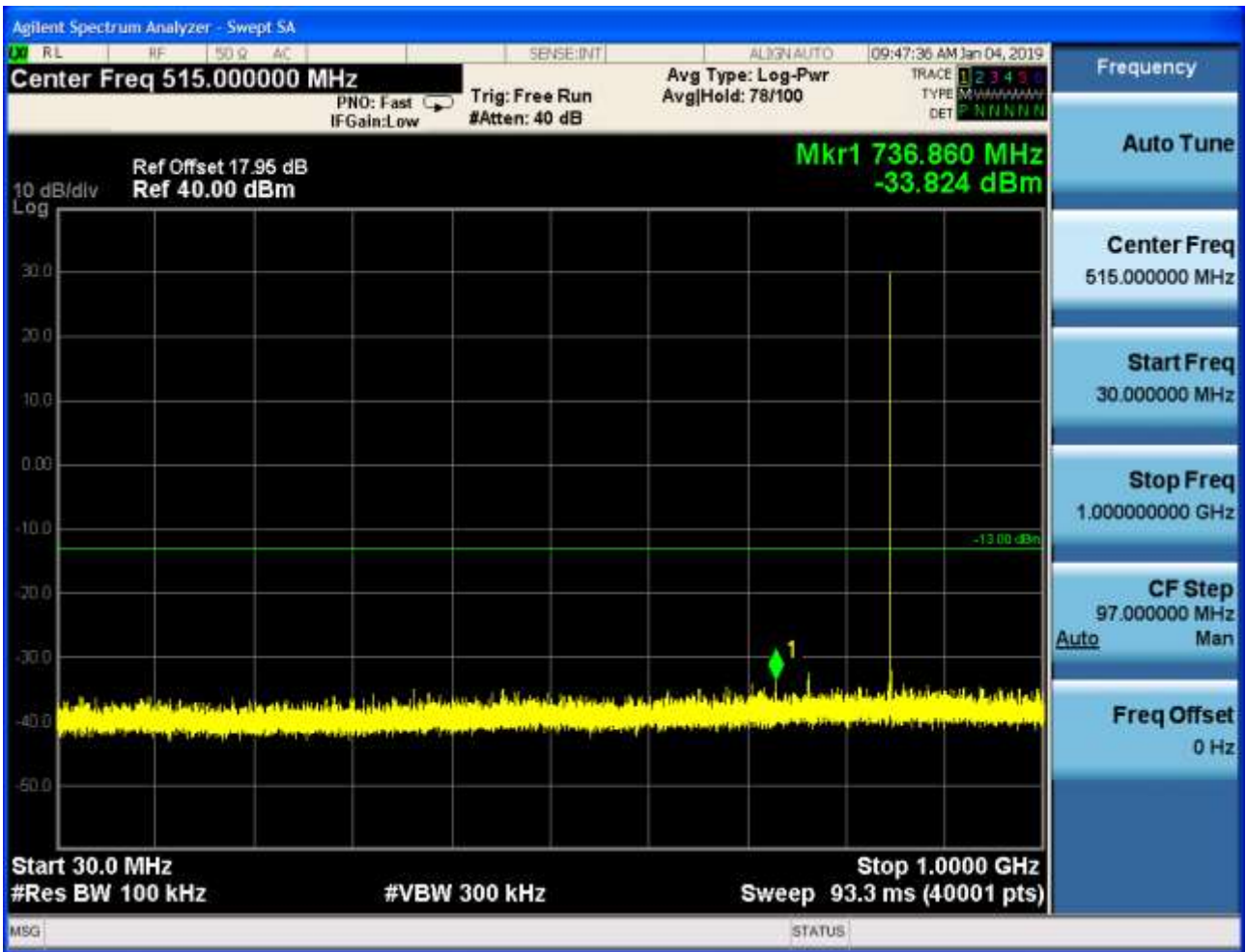




6.1.1.2.3 Test Channel = HCH





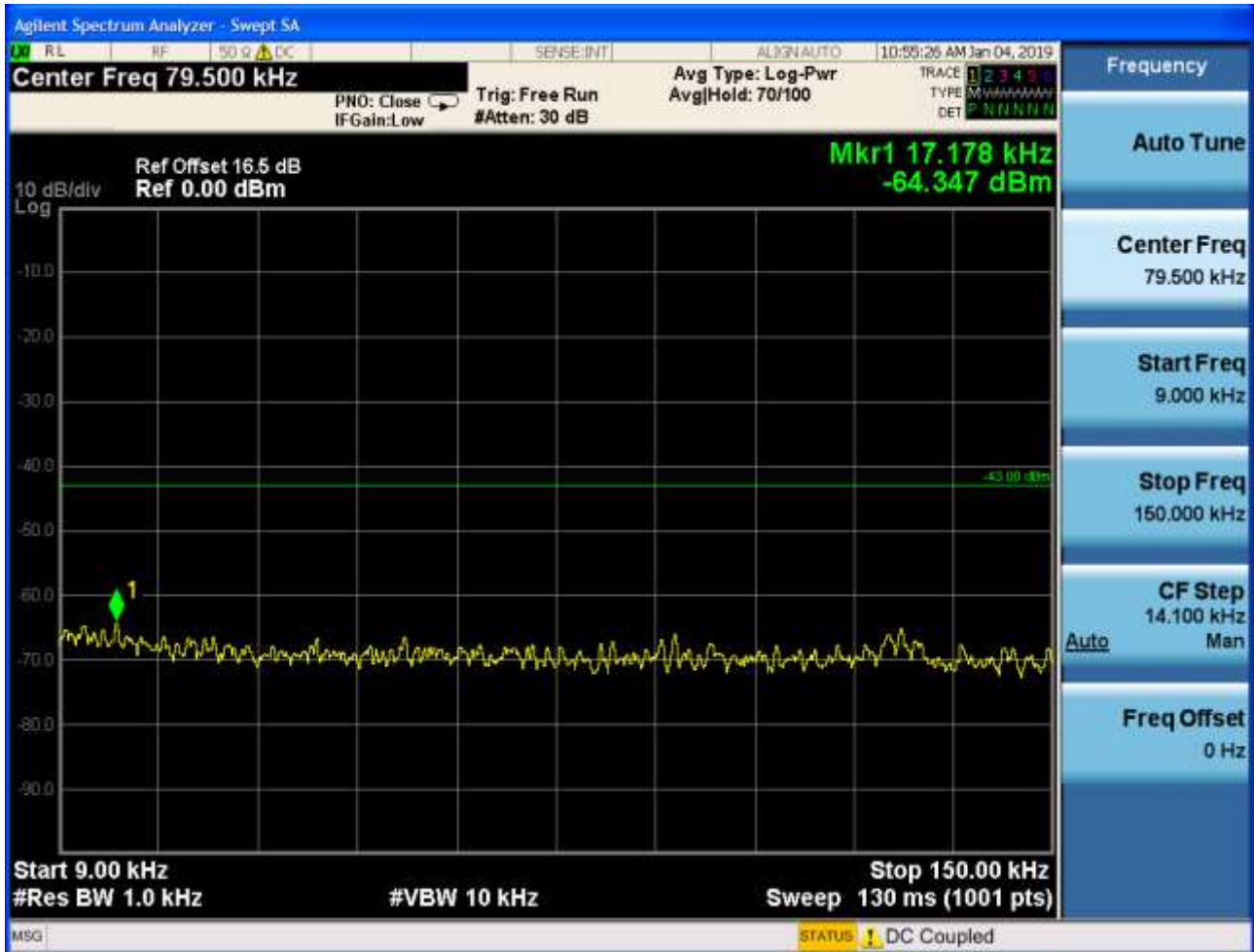


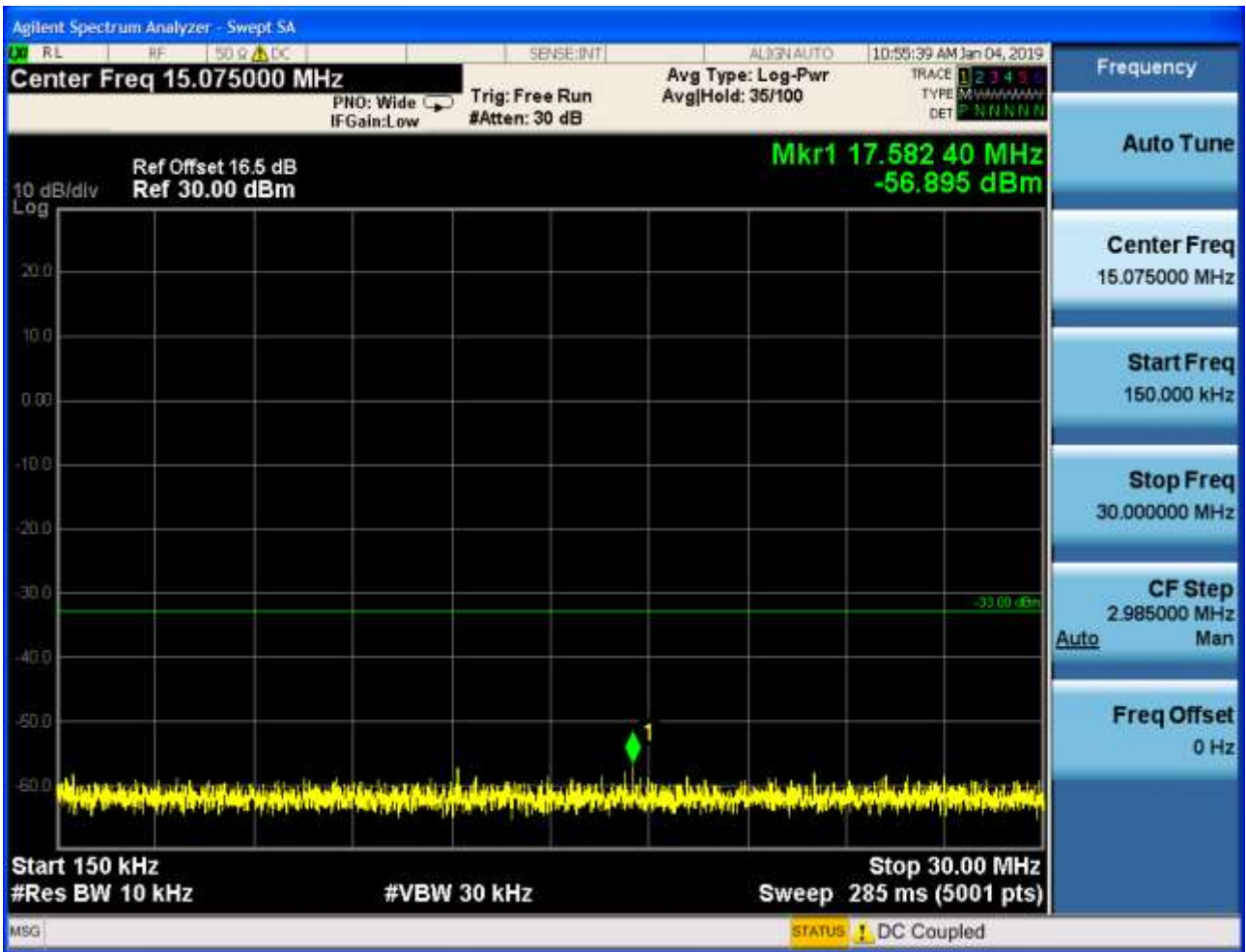


6.1.2 Test Band = PCS1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

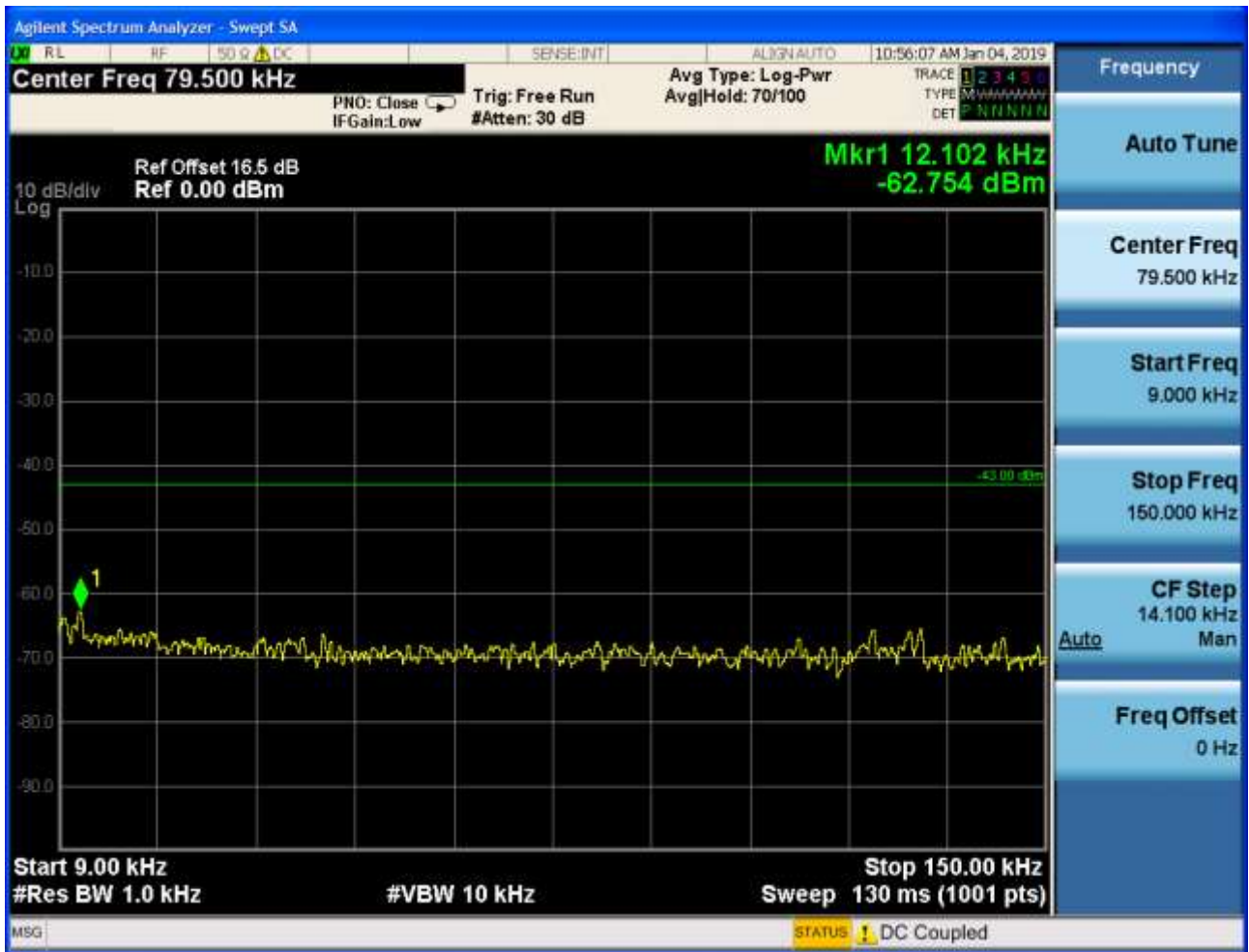


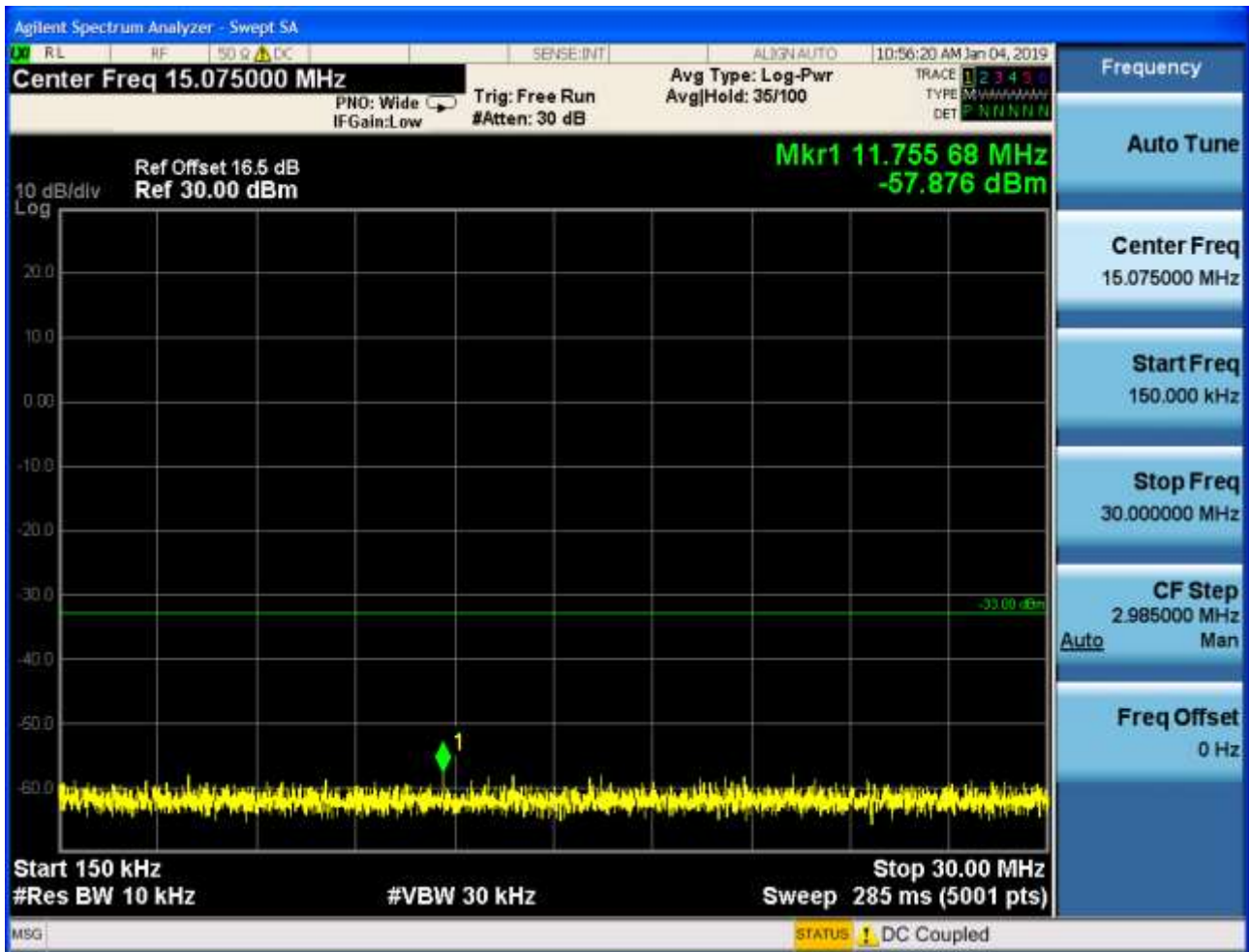






6.1.2.1.2 Test Channel = MCH



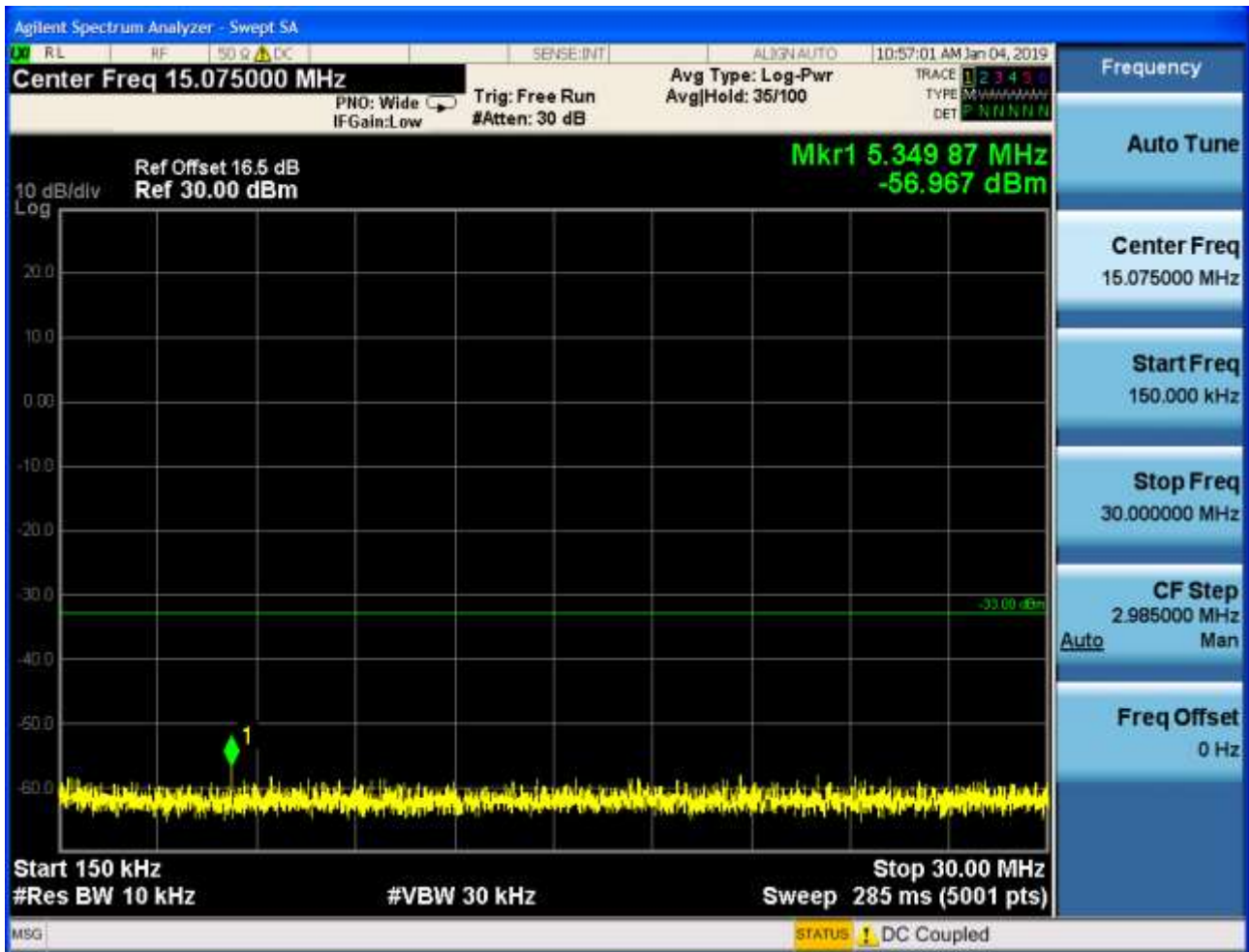






6.1.2.1.3 Test Channel = HCH

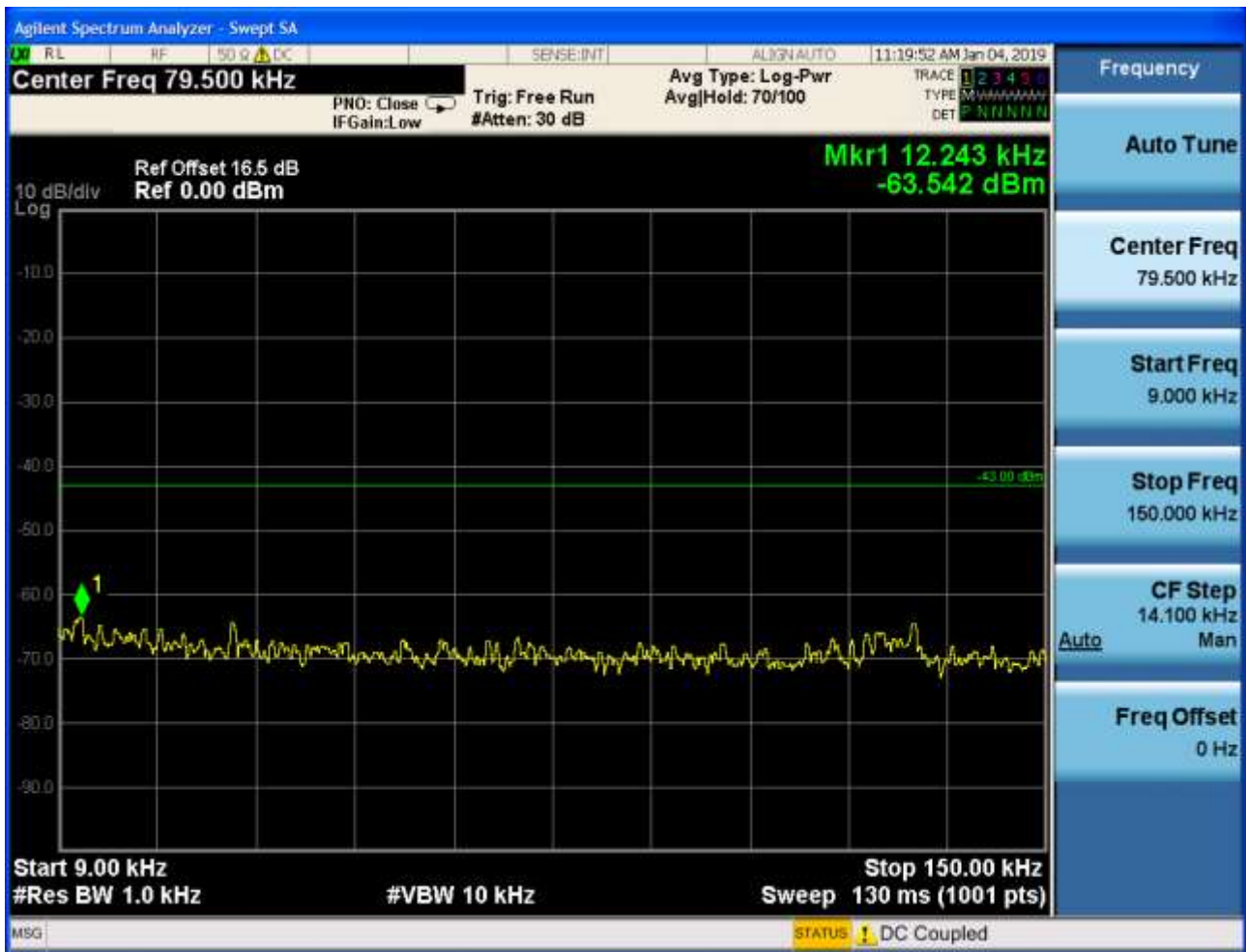


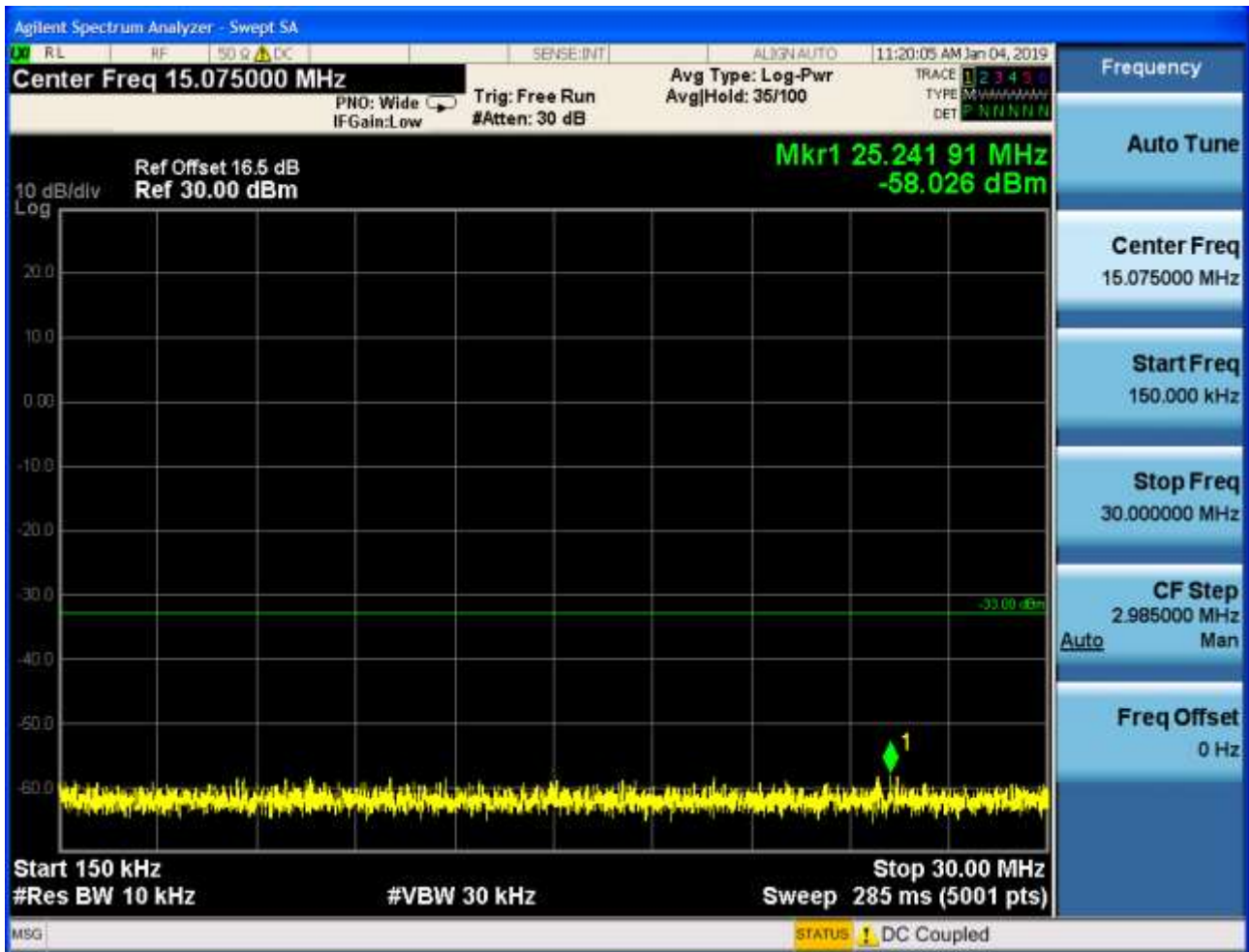




6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

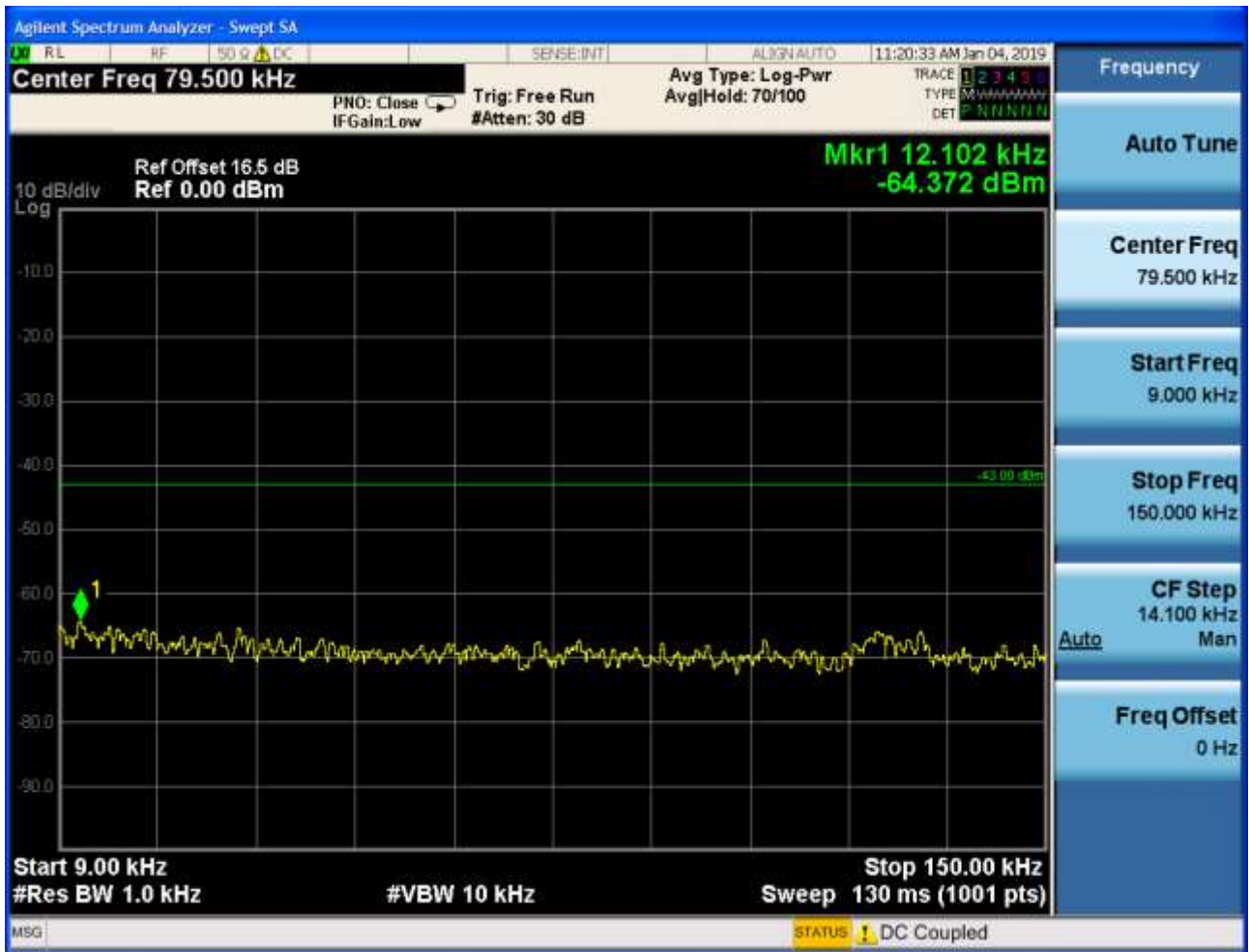


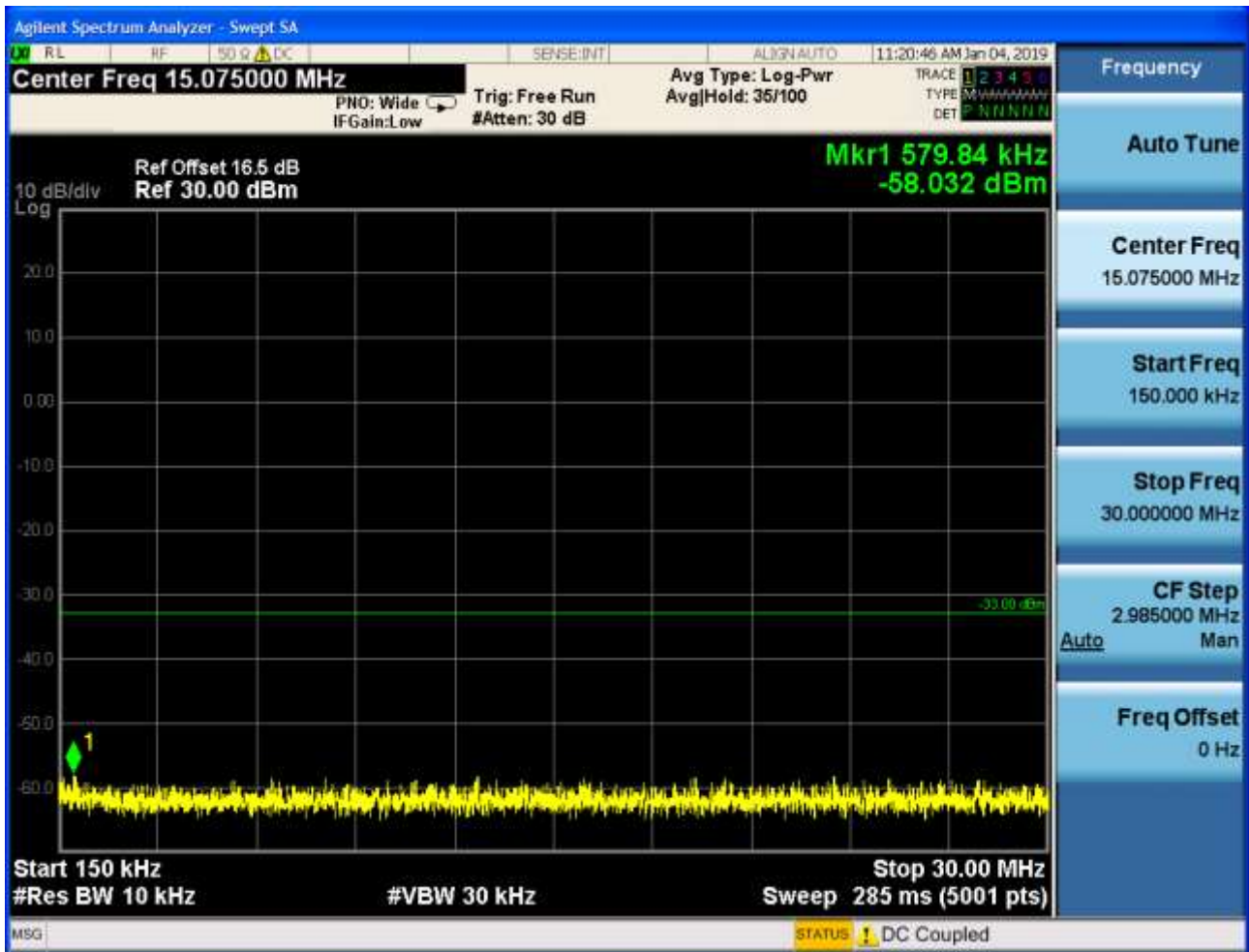






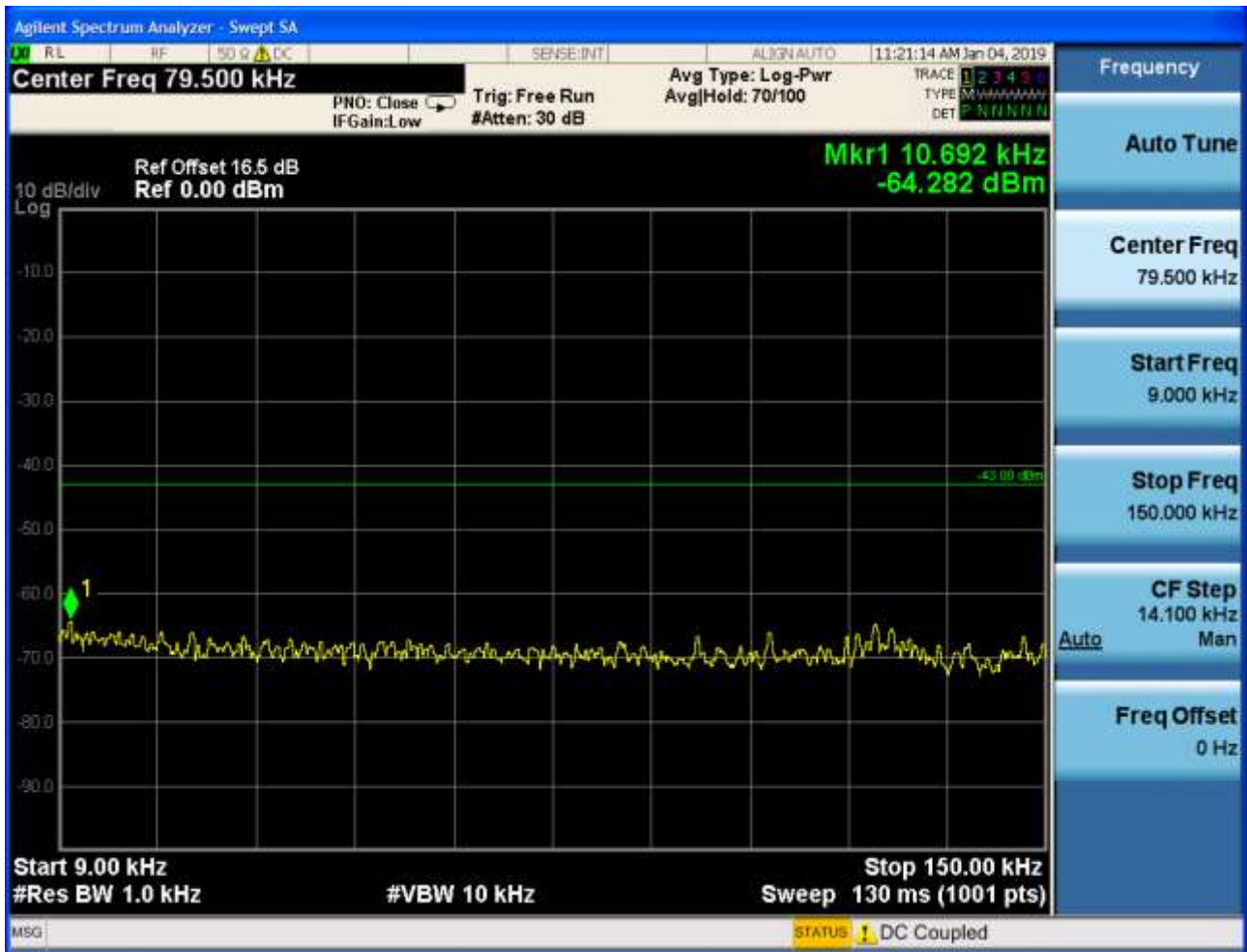
6.1.2.2.2 Test Channel = MCH

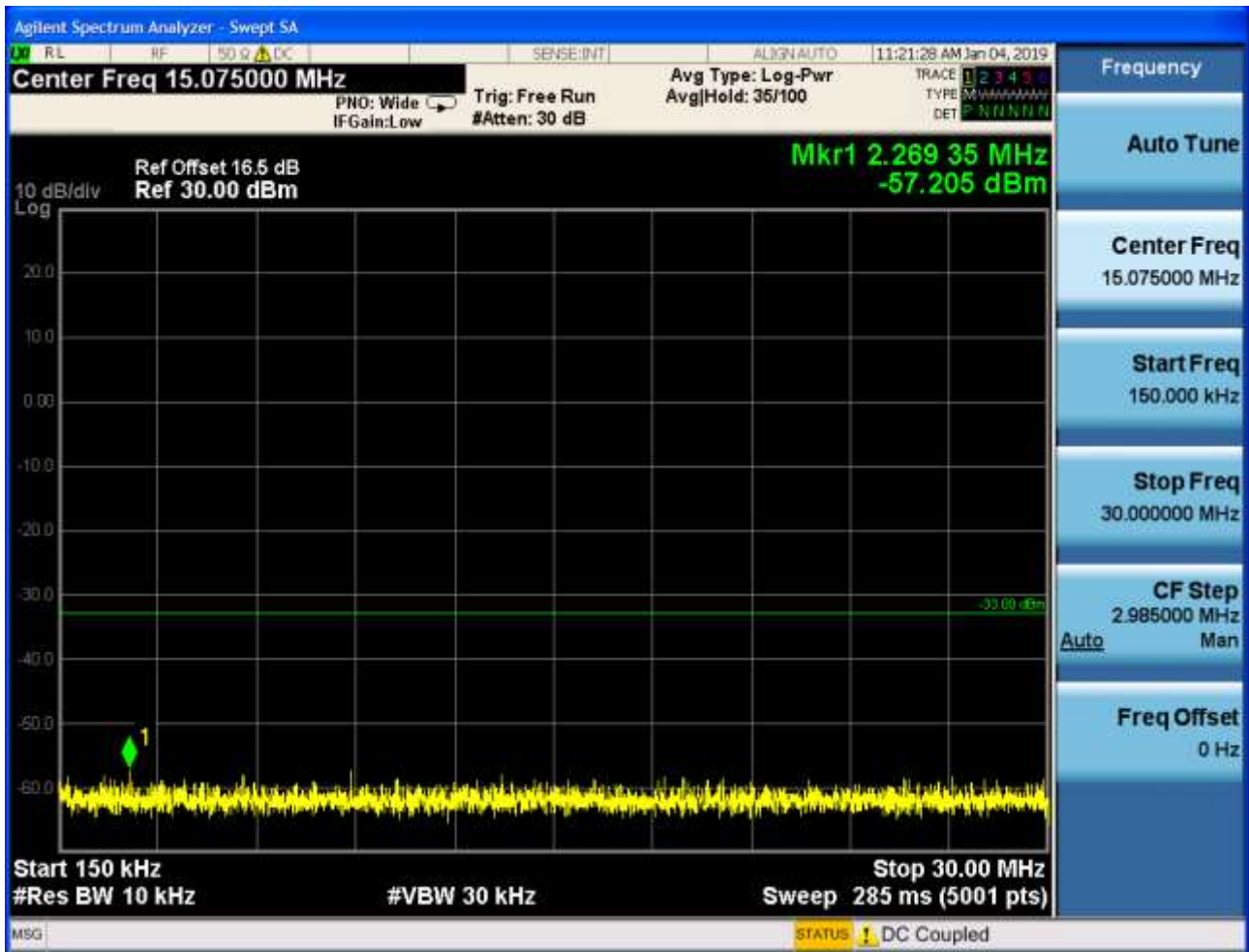






6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

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

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

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

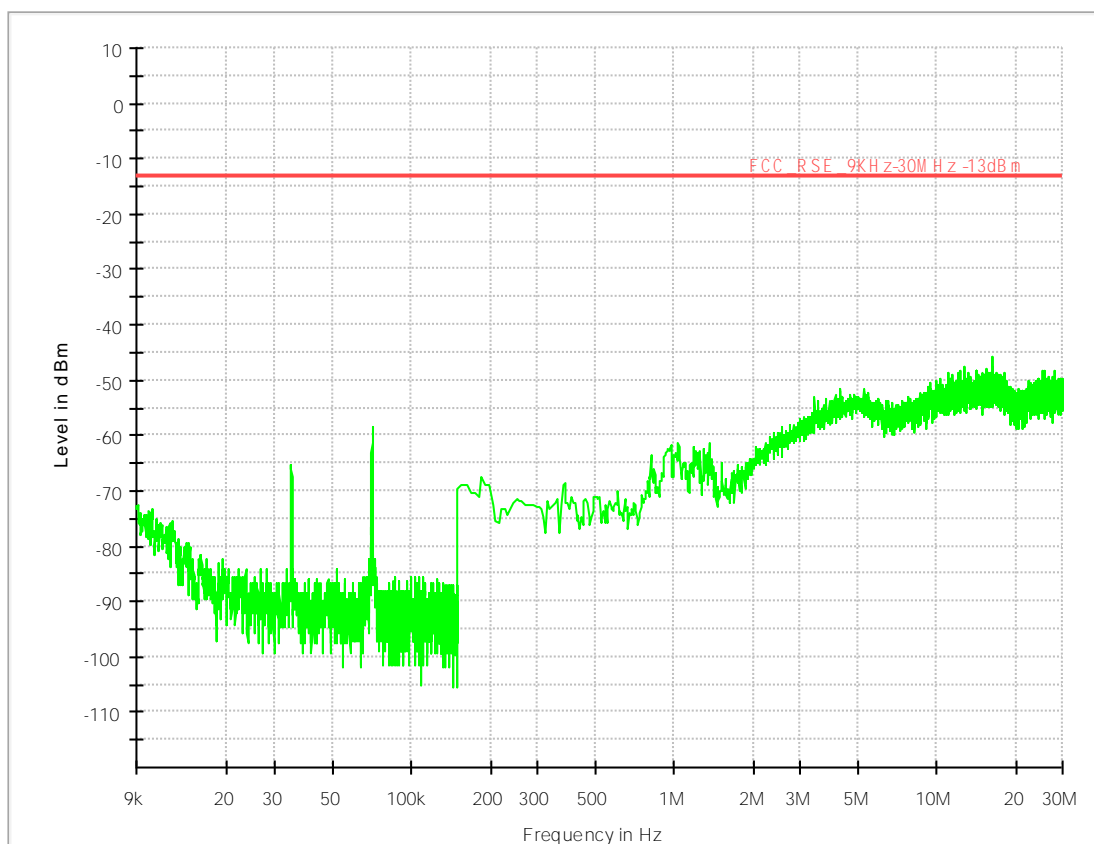
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz Detector: PK

Part I - Test Plots

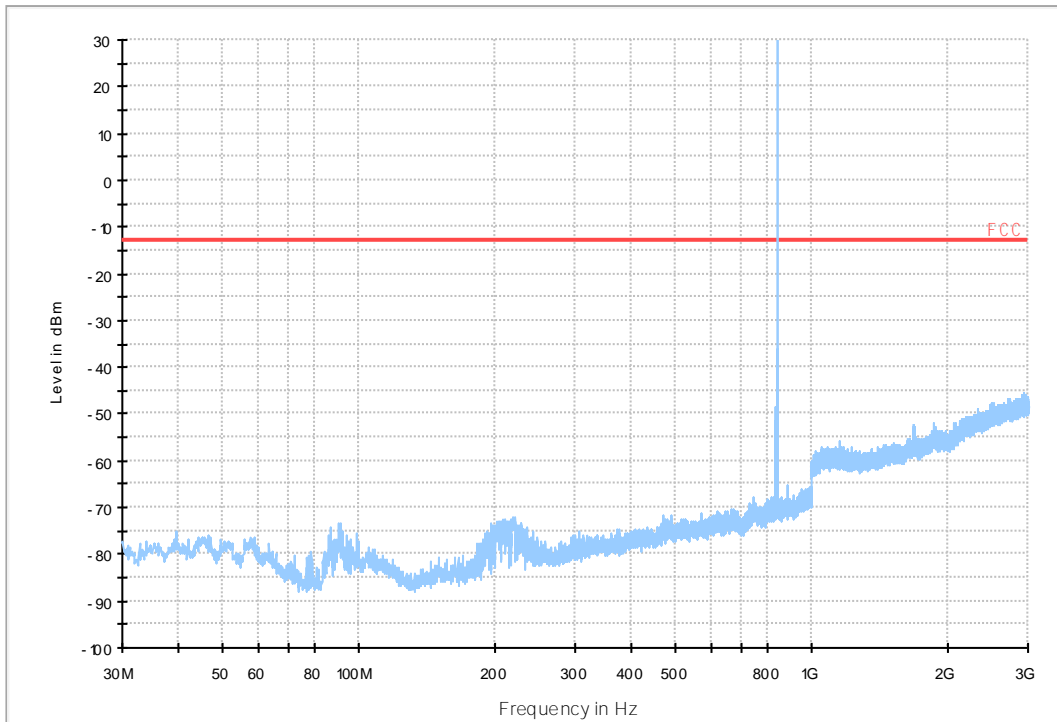
7.1 For GSM_ANT1

7.1.1 Test Band = GSM850

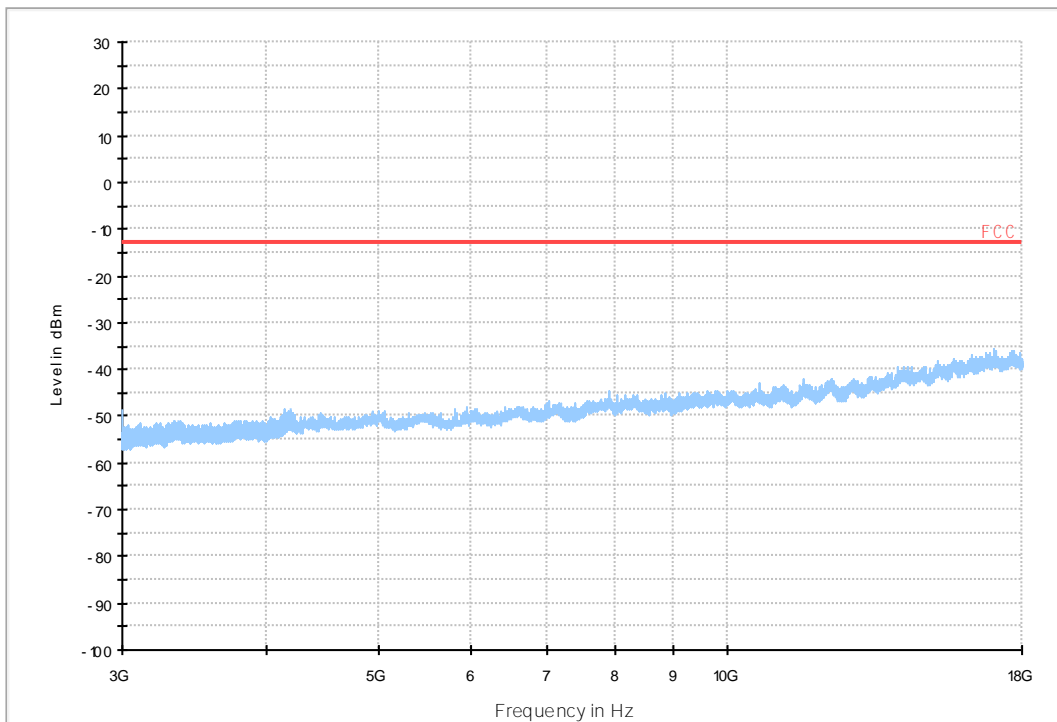
7.1.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

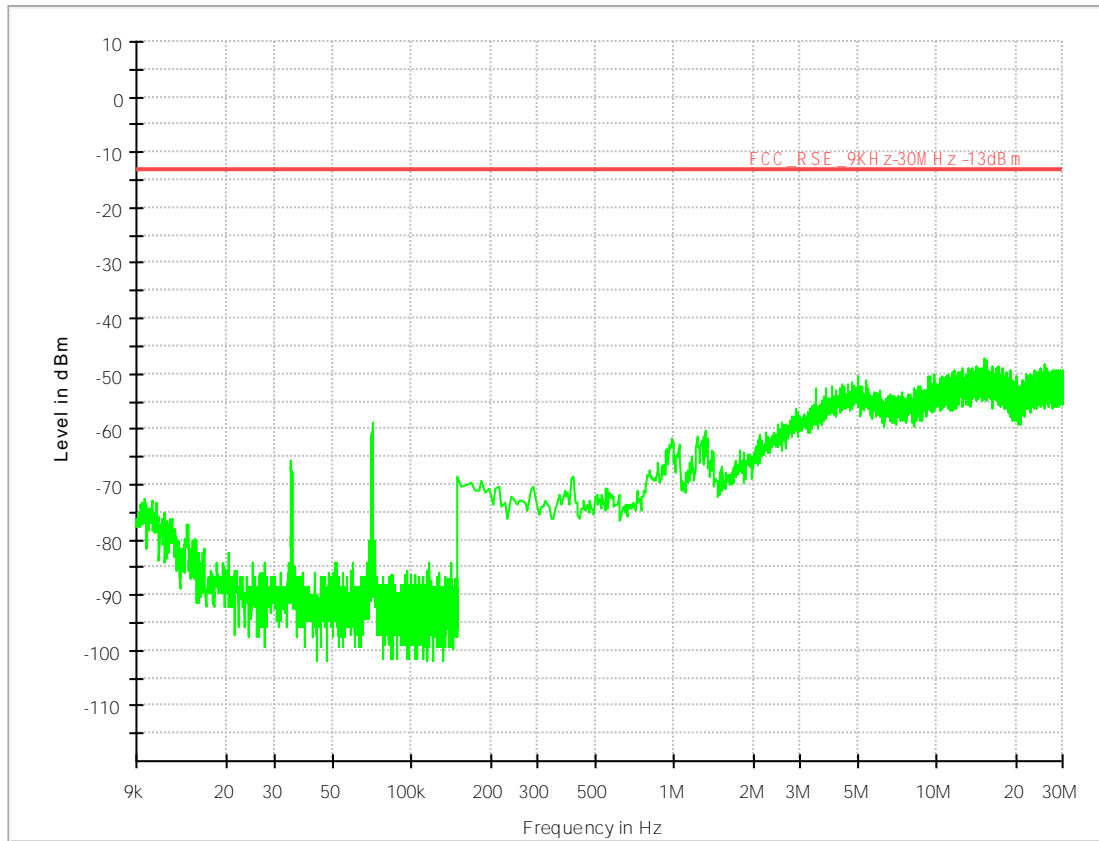


03 FCC PART 22 GSM850_H

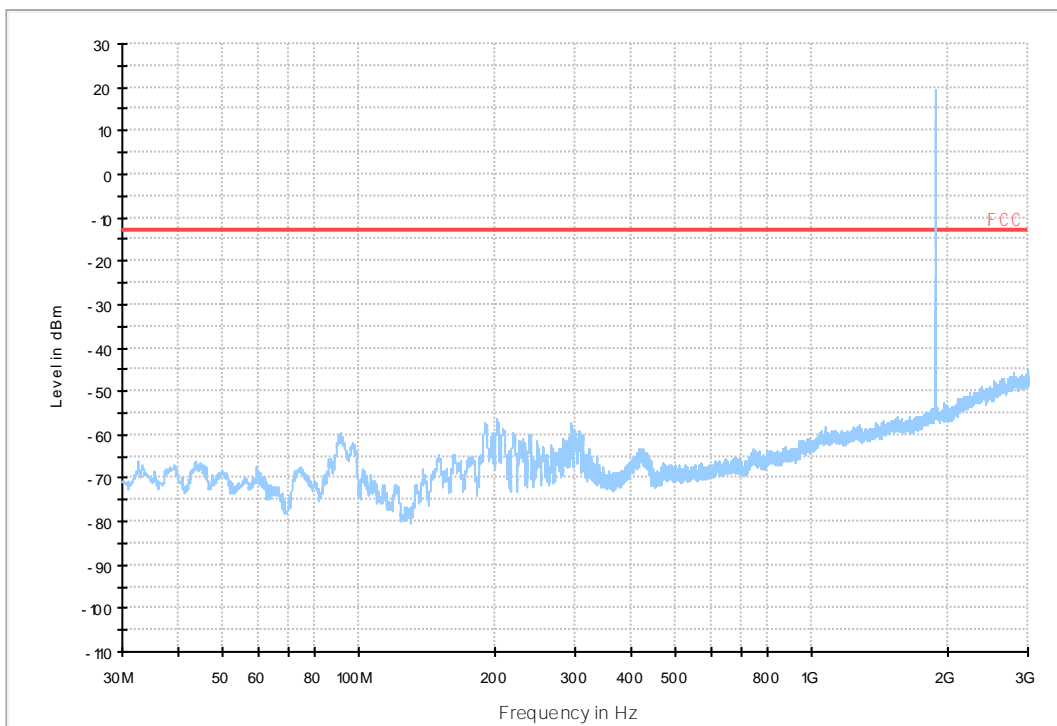


7.1.2 Test Band = PCS1900

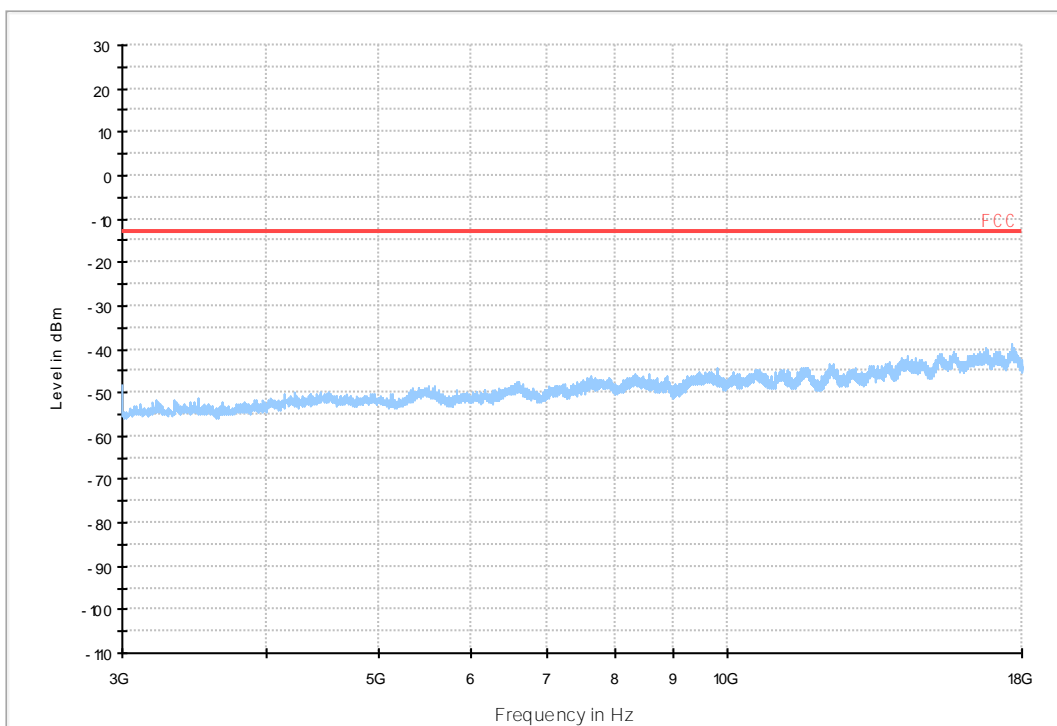
7.1.2.1 Test Mode = GSM/TM1



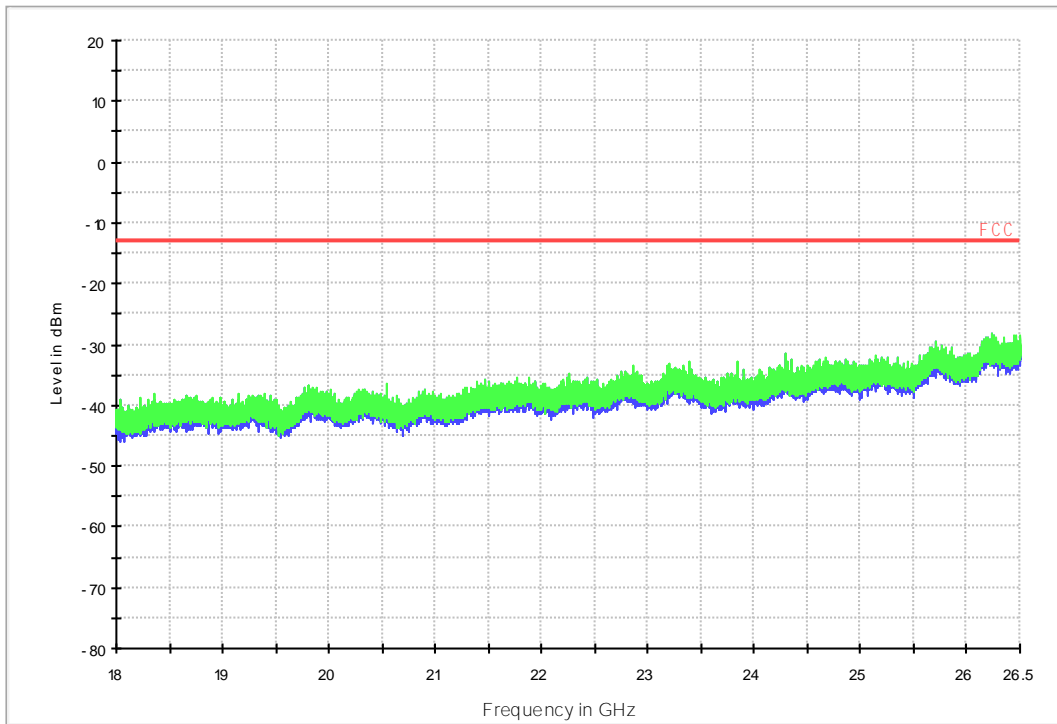
10 FCC PART 24 GSM1900_L



09 FCC PART 24 GSM1900_H



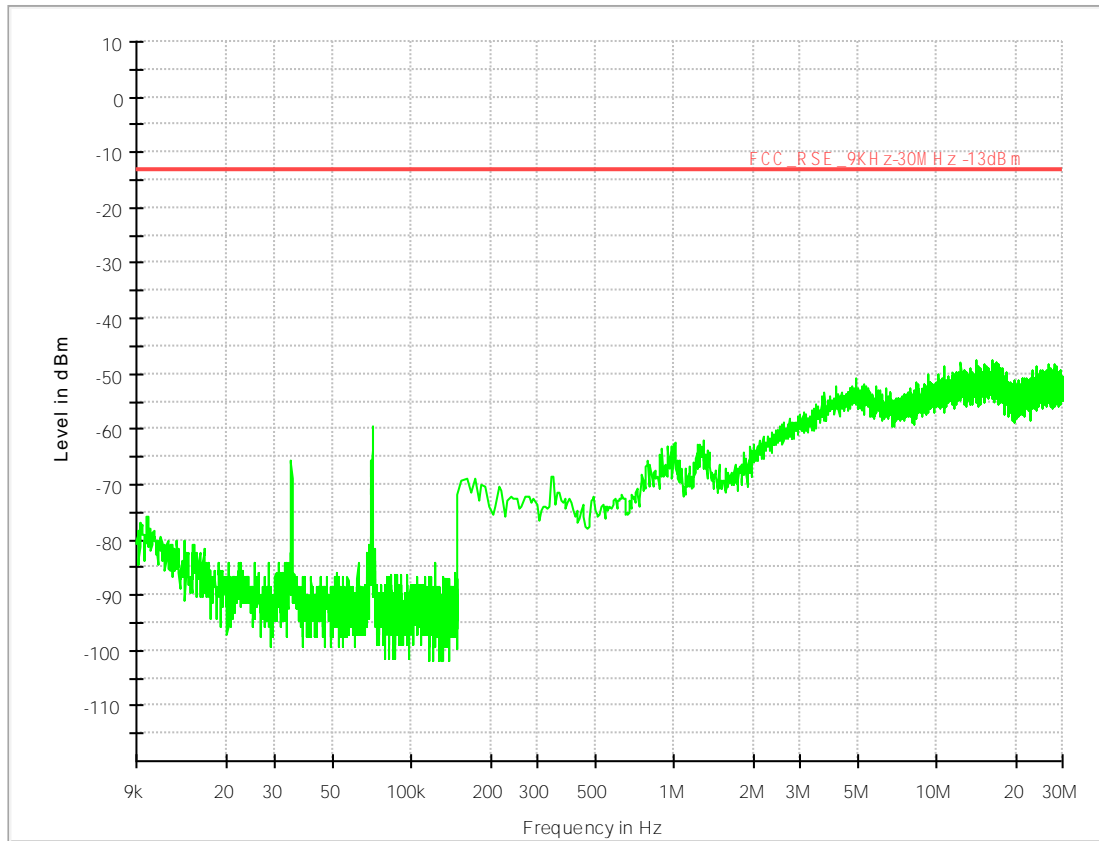
18G- 26.5G R SE-TX-DIRECT OR ABOVE 1.5G PK



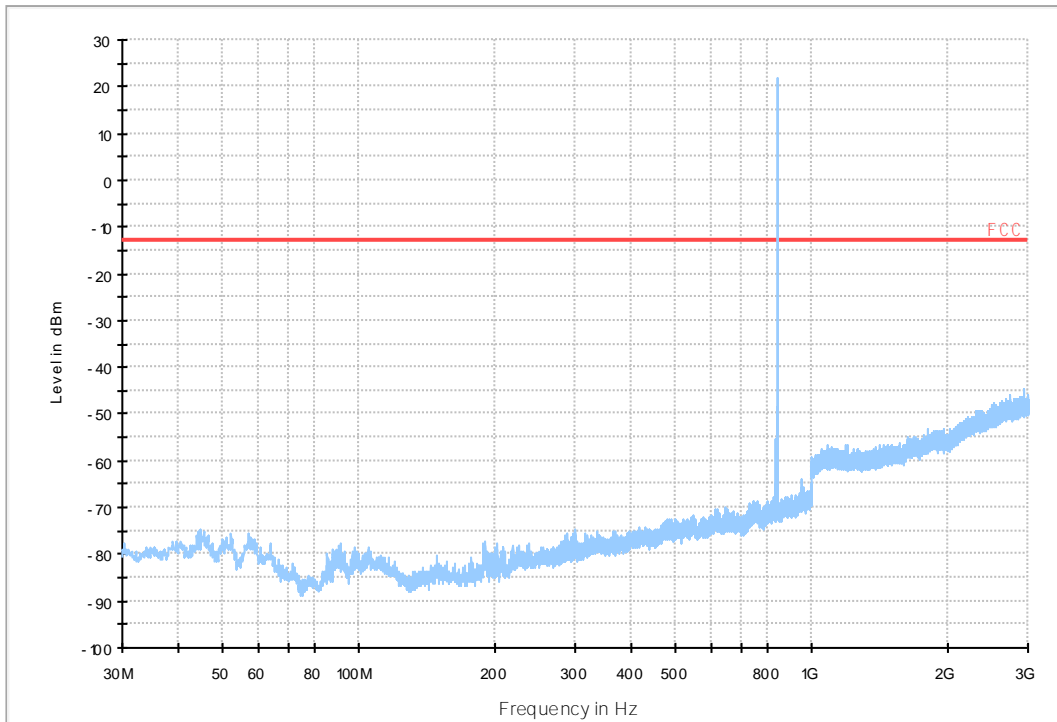
7.2 For GSM_ANT2

7.2.1 Test Band = GSM850

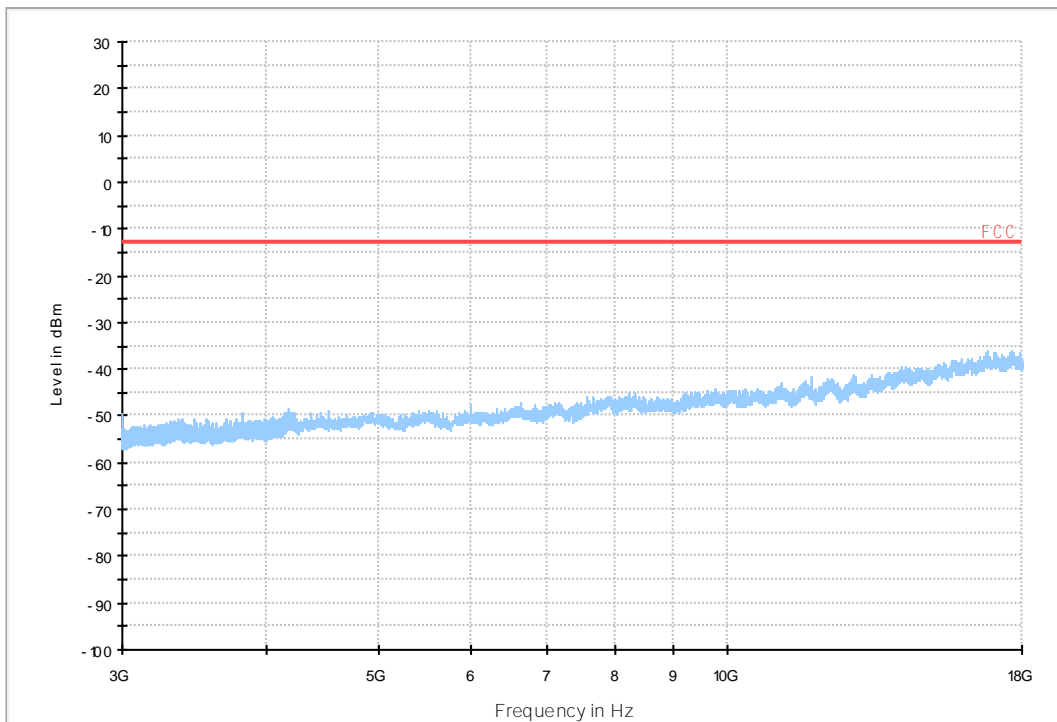
7.2.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

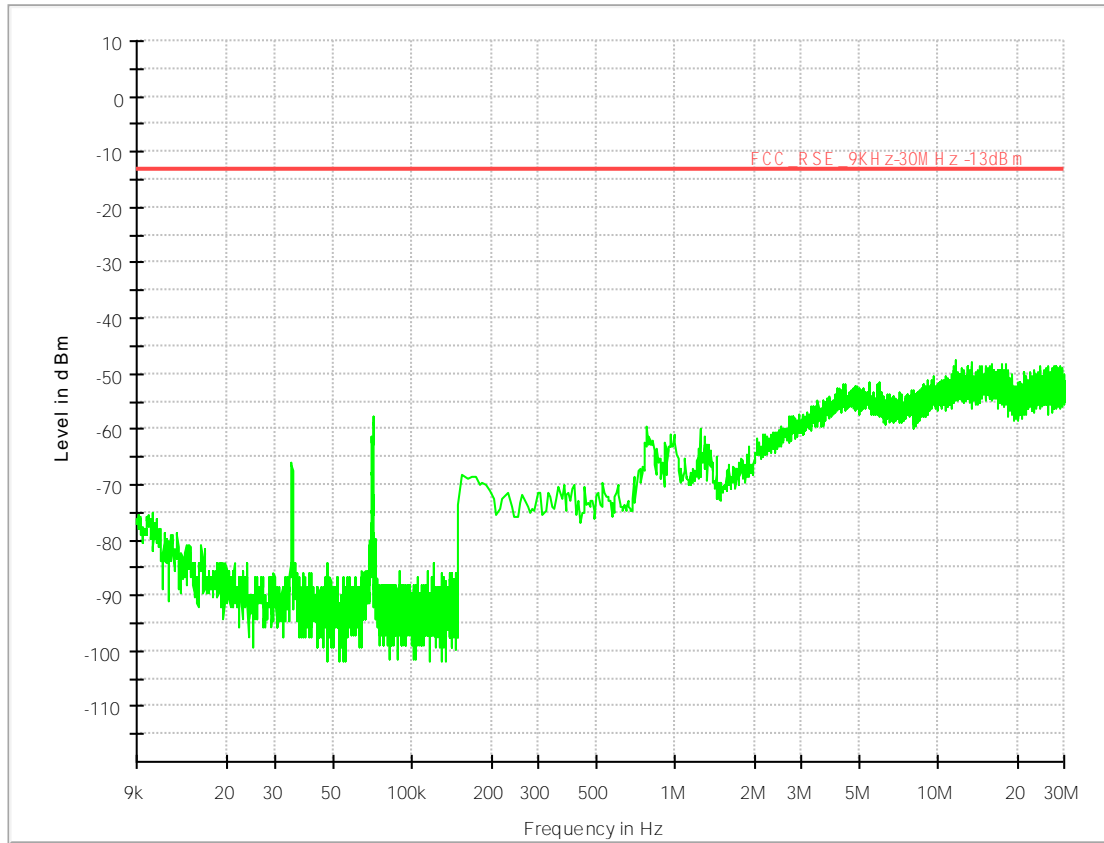


03 FCC PART 22 GSM850_H

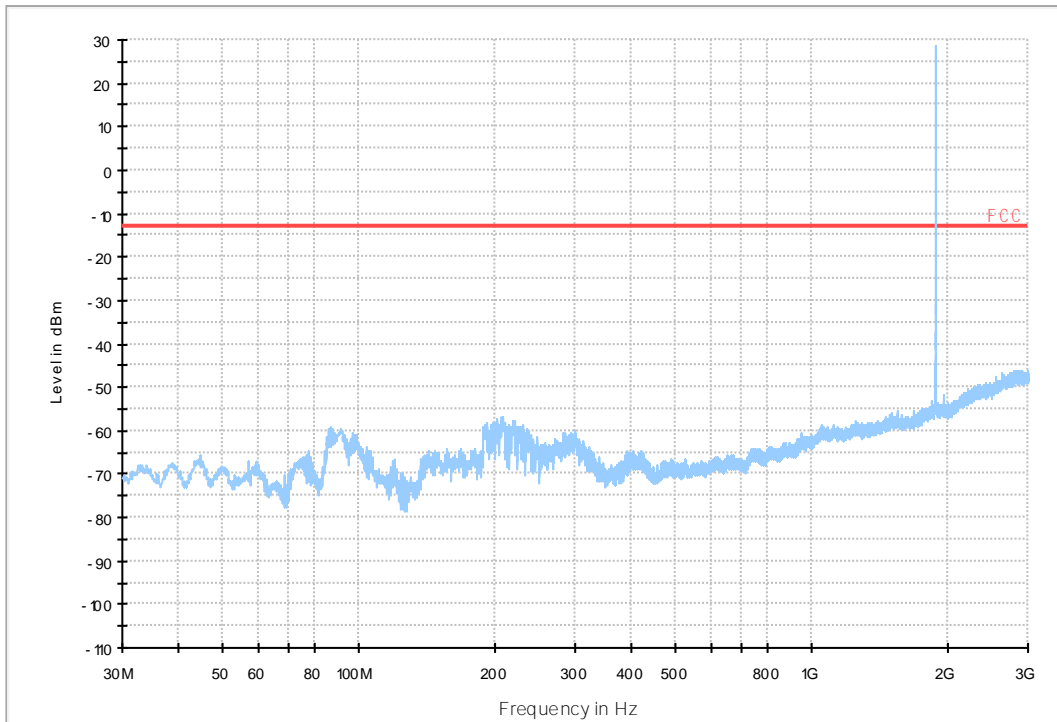


7.2.2 Test Band = PCS1900

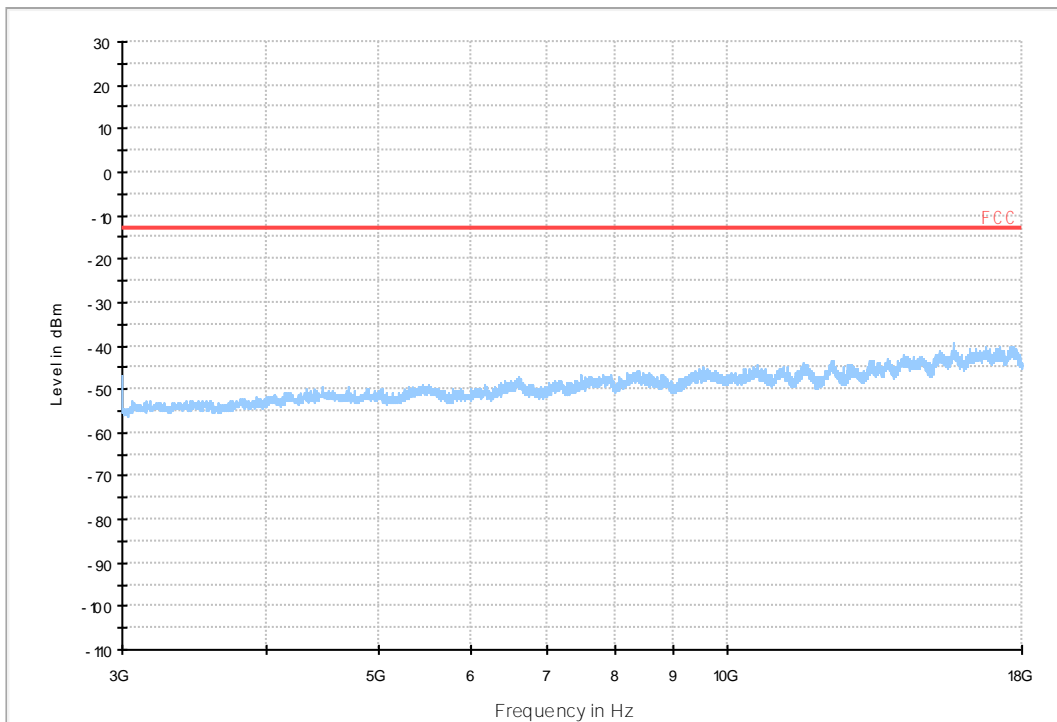
7.2.2.1 Test Mode = GSM/TM1



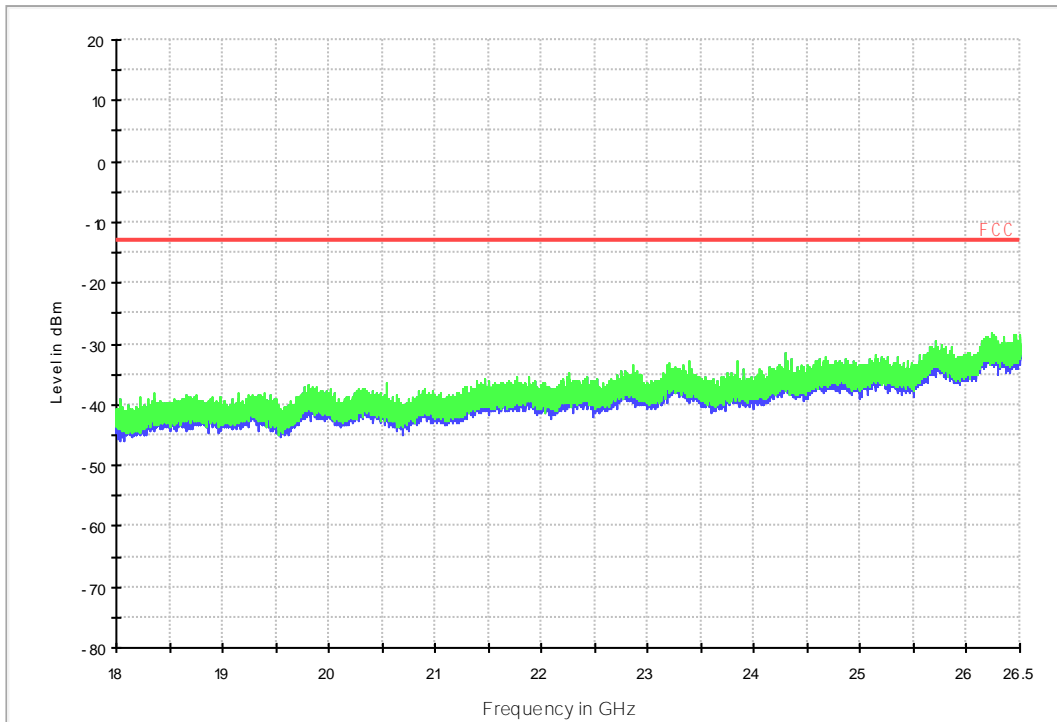
10 FCC PART 24 GSM1900_L



09 FCC PART 24 GSM1900_H



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



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	-22.72924	-0.02758	PASS
				VN	-19.79123	-0.02401	PASS
				VH	-22.60009	-0.02742	PASS
		MCH	TN	VL	-25.86097	-0.03091	PASS
				VN	-22.85838	-0.02732	PASS
				VH	-26.50668	-0.03168	PASS
		HCH	TN	VL	-17.85407	-0.02103	PASS
				VN	-14.20577	-0.01674	PASS
				VH	-17.66036	-0.02081	PASS
	GSM/TM2	LCH	TN	VL	-16.88550	-0.02049	PASS
				VN	-18.27379	-0.02217	PASS
				VH	-17.07921	-0.02072	PASS
		MCH	TN	VL	-18.72579	-0.02238	PASS
				VN	-21.69609	-0.02593	PASS
				VH	-18.98408	-0.02269	PASS
		HCH	TN	VL	-11.17090	-0.01316	PASS
				VN	-11.68748	-0.01377	PASS
				VH	-10.88033	-0.01282	PASS
PCS1900	GSM/TM1	LCH	TN	VL	-11.23548	-0.00607	PASS
				VN	-11.65519	-0.00630	PASS
				VH	-15.40035	-0.00832	PASS
		MCH	TN	VL	-0.03229	-0.00002	PASS
				VN	5.68231	0.00302	PASS
				VH	1.09772	0.00058	PASS
		HCH	TN	VL	-12.23634	-0.00607	PASS
				VN	-9.84718	-0.00630	PASS
				VH	-13.36634	-0.00832	PASS
	GSM/TM2	LCH	TN	VL	-10.39604	-0.00562	PASS
				VN	-10.78347	-0.00583	PASS
				VH	-9.10461	-0.00492	PASS
		MCH	TN	VL	7.58718	0.00404	PASS
				VN	8.42661	0.00448	PASS
				VH	7.36117	0.00392	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VL	-9.91176	-0.00562	PASS
				VN	-11.52605	-0.00583	PASS
				VH	-8.23289	-0.00492	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	-18.59665	-0.02256	PASS
				-20	-20.82437	-0.02527	PASS
				-10	-17.82179	-0.02162	PASS
				0	-21.34095	-0.02589	PASS
				10	-17.91865	-0.02174	PASS
				20	-19.79123	-0.02401	PASS
				30	-19.04865	-0.02311	PASS
				40	-19.85580	-0.02409	PASS
		50	-19.85580	-0.02409	PASS		
		MCH	VN	-30	-19.30694	-0.02308	PASS
				-20	-23.43953	-0.02802	PASS
				-10	-20.56609	-0.02458	PASS
				0	-22.24495	-0.02659	PASS
				10	-20.04951	-0.02397	PASS
				20	-22.85838	-0.02732	PASS
				30	-21.37323	-0.02555	PASS
				40	-19.85580	-0.02373	PASS
		50	-19.43608	-0.02323	PASS		
		HCH	VN	-30	-12.23634	-0.01442	PASS
				-20	-13.14034	-0.01548	PASS
				-10	-12.33319	-0.01453	PASS
				0	-15.23892	-0.01795	PASS
				10	-11.75205	-0.01385	PASS
				20	-14.20577	-0.01674	PASS
	30			-10.71890	-0.01263	PASS	
	40			-11.88119	-0.01400	PASS	
	50	-11.20319	-0.01320	PASS			
	GSM/TM2	LCH	VN	-30	-19.50065	-0.02366	PASS
				-20	-21.69609	-0.02632	PASS
				-10	-18.46751	-0.02241	PASS
				0	-19.37151	-0.02350	PASS
				10	-16.30435	-0.01978	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				20	-18.27379	-0.02217	PASS		
				30	-17.82179	-0.02162	PASS		
				40	-18.62894	-0.02260	PASS		
				50	-18.98408	-0.02303	PASS		
		MCH	VN			-30	-22.18038	-0.02651	PASS
						-20	-21.50238	-0.02570	PASS
						-10	-21.11495	-0.02524	PASS
						0	-21.88981	-0.02617	PASS
						10	-19.82351	-0.02370	PASS
						20	-21.69609	-0.02593	PASS
						30	-20.69523	-0.02474	PASS
						40	-18.17693	-0.02173	PASS
						50	-22.37409	-0.02674	PASS
						HCH	VN		
		-20	-11.94576	-0.01407	PASS				
		-10	-11.33233	-0.01335	PASS				
		0	-12.46234	-0.01468	PASS				
		10	-10.20233	-0.01202	PASS				
		20	-11.68748	-0.01377	PASS				
		30	-9.68576	-0.01141	PASS				
		40	-9.97633	-0.01175	PASS				
		50	-10.81576	-0.01274	PASS				
		PCS1900	GSM/TM1	LCH	VN	-30	-13.20491	-0.00714	PASS
						-20	-14.30263	-0.00773	PASS
						-10	-13.81834	-0.00747	PASS
						0	-12.88205	-0.00696	PASS
						10	-11.78433	-0.00637	PASS
						20	-11.65519	-0.00630	PASS
30	-12.52691					-0.00677	PASS		
40	-11.59062					-0.00626	PASS		
50	-13.39863					-0.00724	PASS		
MCH	VN							-30	4.03573
				-20	2.58287			0.00137	PASS
				-10	3.61601			0.00192	PASS
				0	5.29488			0.00282	PASS
				10	3.64830			0.00194	PASS
				20	5.68231			0.00302	PASS
				30	4.06802			0.00216	PASS
				40	8.07146			0.00429	PASS
				50	6.42488			0.00342	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
		HCH	VN	-30	-12.39777	-0.00649	PASS	
				-20	-14.17349	-0.00742	PASS	
				-10	-12.68834	-0.00664	PASS	
				0	-11.26776	-0.00590	PASS	
				10	-12.49462	-0.00654	PASS	
				20	-9.84718	-0.00516	PASS	
				30	-13.88292	-0.00727	PASS	
				40	-10.07318	-0.00527	PASS	
				50	-13.78606	-0.00722	PASS	
		GSM/TM2	LCH	VN	-30	-9.84718	-0.00532	PASS
					-20	-11.49376	-0.00621	PASS
					-10	-12.04262	-0.00651	PASS
					0	-12.55920	-0.00679	PASS
					10	-11.17090	-0.00604	PASS
					20	-10.78347	-0.00583	PASS
					30	-8.87861	-0.00480	PASS
					40	-8.26518	-0.00447	PASS
					50	-10.78347	-0.00583	PASS
	MCH		VN	-30	9.10461	0.00484	PASS	
				-20	8.71718	0.00464	PASS	
				-10	10.13776	0.00539	PASS	
				0	7.00603	0.00373	PASS	
				10	8.65261	0.00460	PASS	
				20	8.42661	0.00448	PASS	
				30	12.30091	0.00654	PASS	
				40	10.26690	0.00546	PASS	
				50	9.26604	0.00493	PASS	
	HCH	VN	-30	-8.20061	-0.00429	PASS		
			-20	-11.75205	-0.00615	PASS		
			-10	-10.91262	-0.00571	PASS		
			0	-12.43005	-0.00651	PASS		
			10	-11.39690	-0.00597	PASS		
			20	-11.52605	-0.00604	PASS		
			30	-8.87861	-0.00465	PASS		
			40	-8.10375	-0.00424	PASS		
			50	-11.36462	-0.00595	PASS		

END