



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	32.4	28.75	38.5	PASS
		MCH	32.47	28.83	38.5	PASS
		HCH	32.64	28.98	38.5	PASS
	GSM/TM2	LCH	25.97	22.22	38.5	PASS
		MCH	25.96	22.25	38.5	PASS
		HCH	25.96	22.10	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP[dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.32	29.44	33	PASS
		MCH	30.19	29.43	33	PASS
		HCH	30.1	29.24	33	PASS
	GSM/TM2	LCH	25.92	25.08	33	PASS
		MCH	25.81	25.04	33	PASS
		HCH	25.75	24.83	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:

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

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

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

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	0.13	13	PASS
		MCH	0.13	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.22	13	PASS
		MCH	3.07	13	PASS
		HCH	3.04	13	PASS
GSM1900	GSM/TM1	LCH	0.12	13	PASS
		MCH	0.12	13	PASS
		HCH	0.11	13	PASS
	GSM/TM2	LCH	2.96	13	PASS
		MCH	3.01	13	PASS
		HCH	2.99	13	PASS

3Appendix_C: Modulation Characteristics

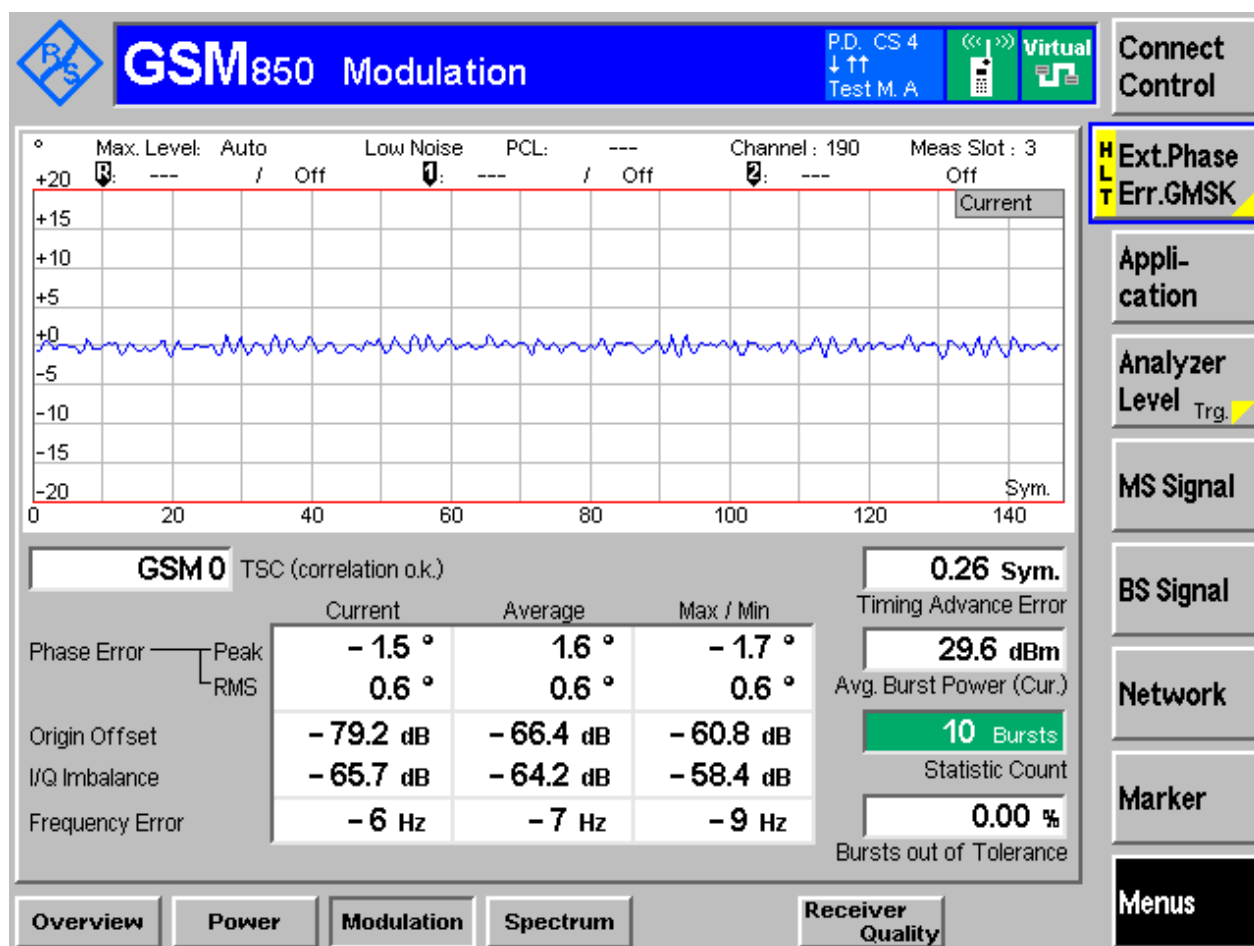
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

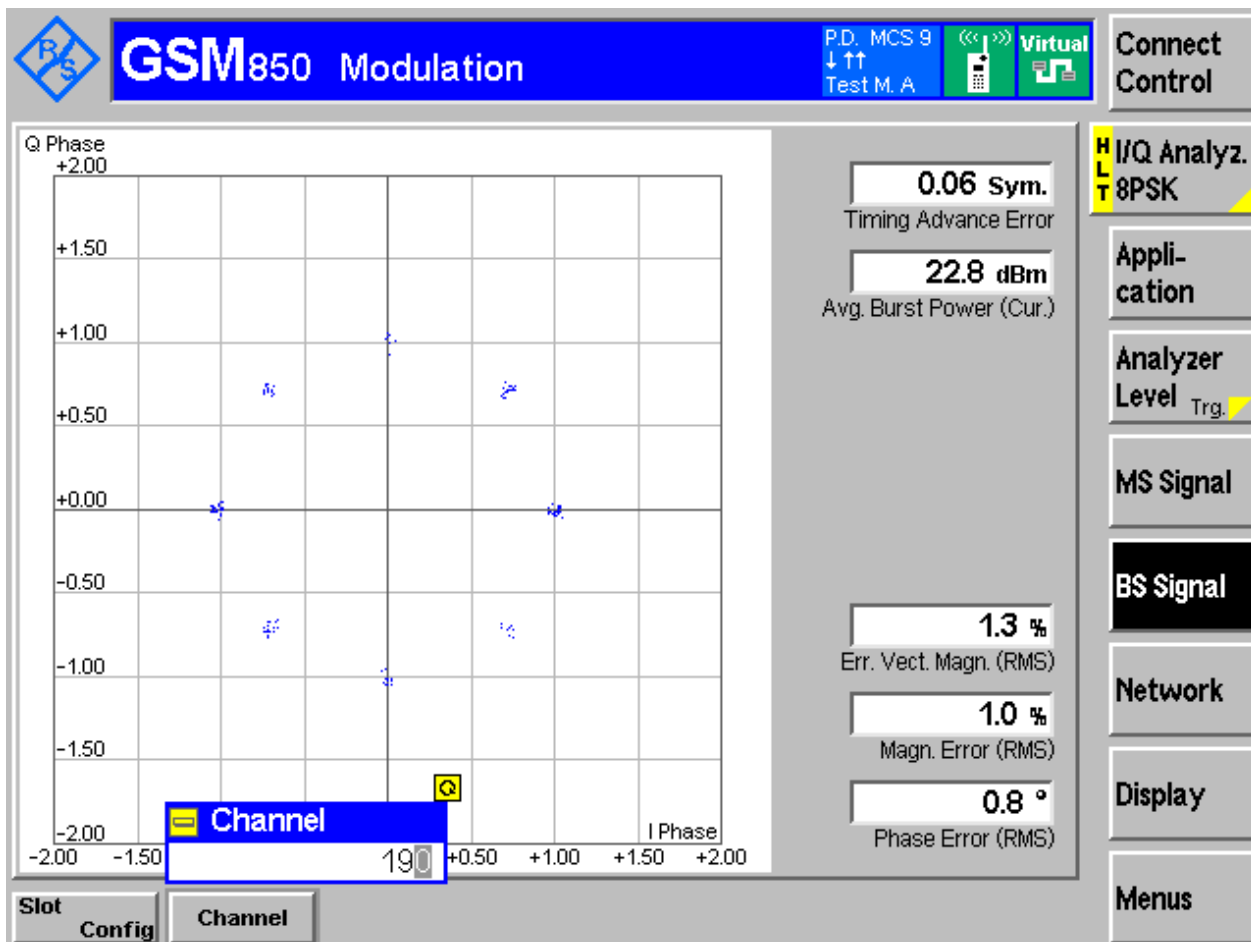
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

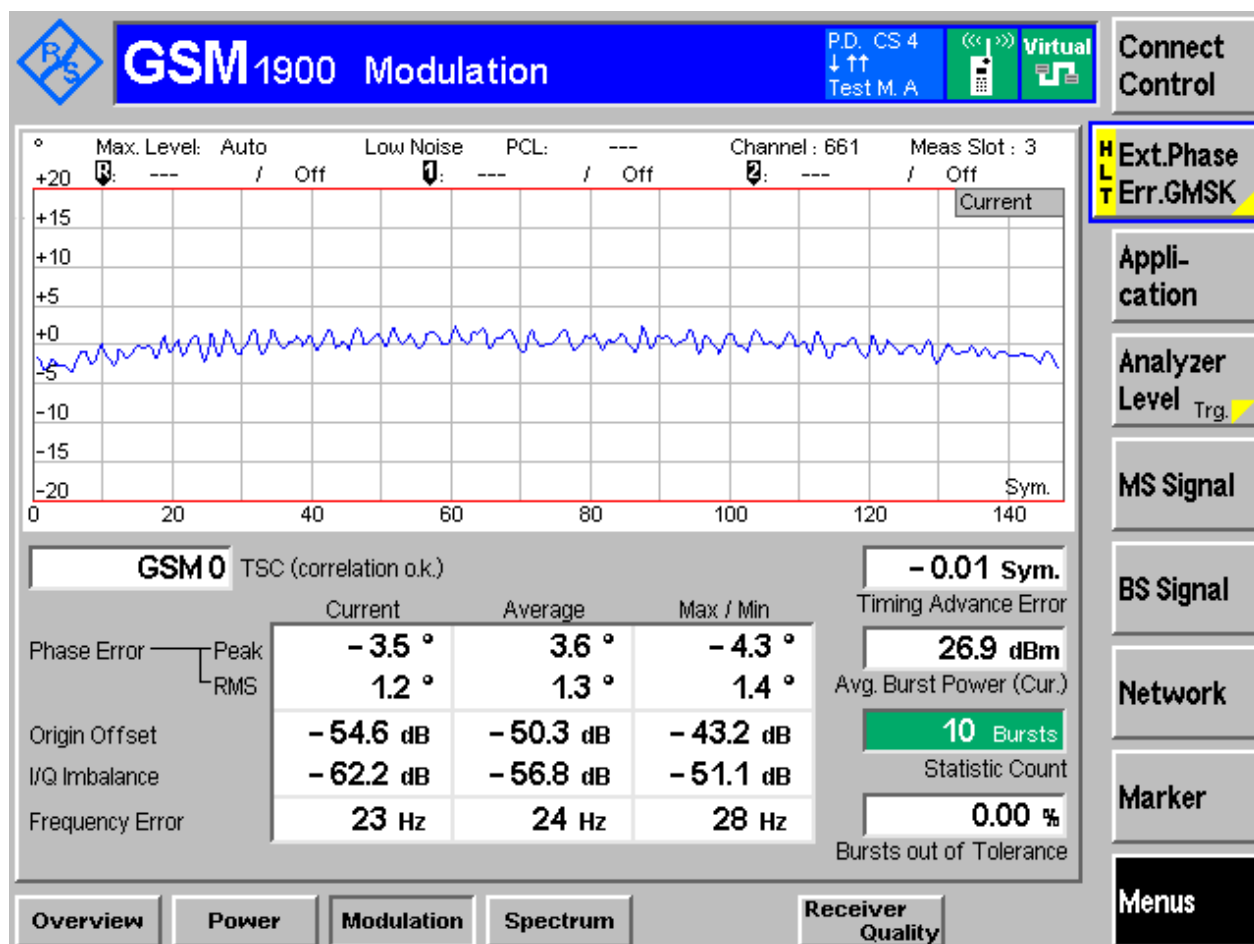
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

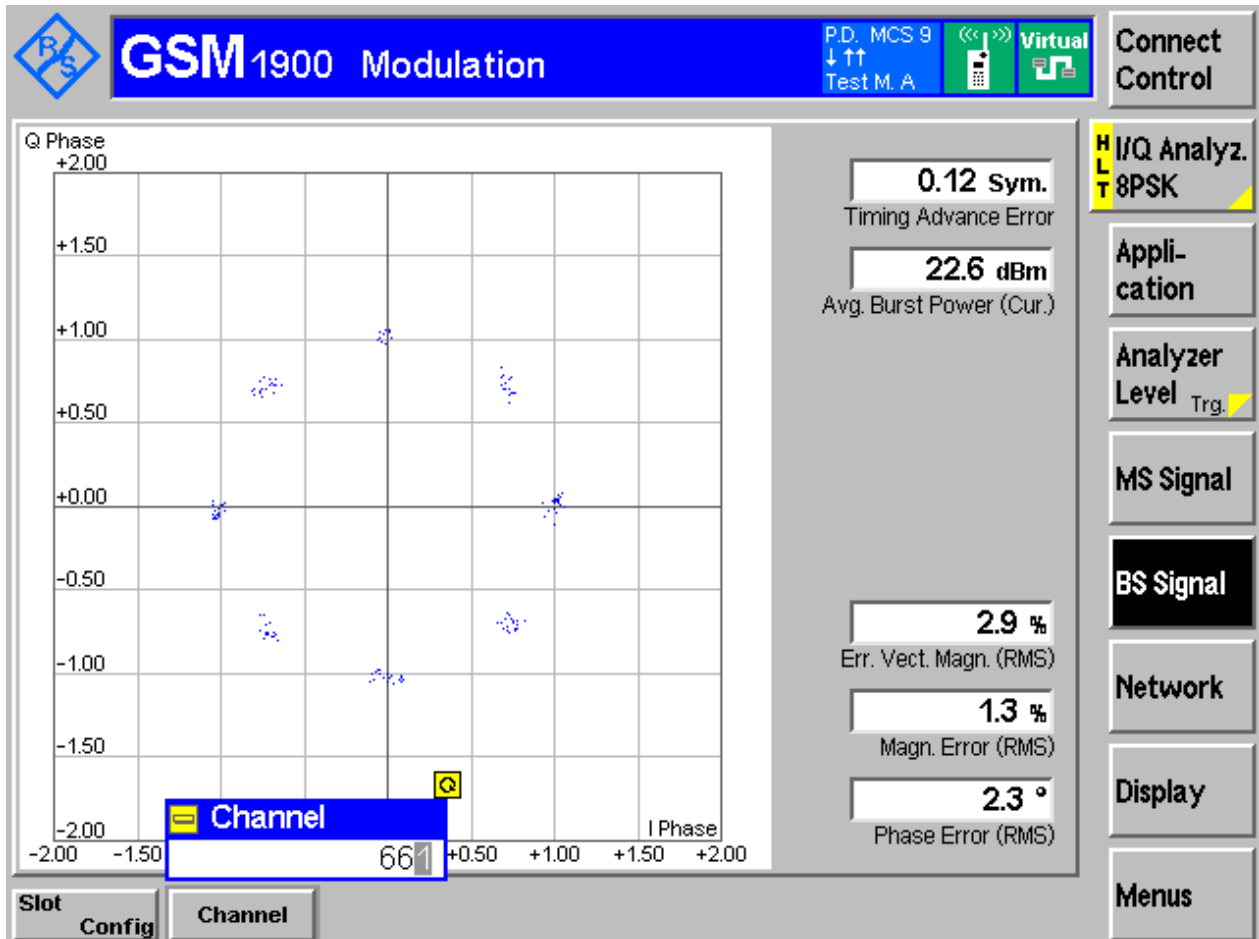
3.1.2.1 Test Mode = GSM/TM1

3.1.2.1.1 Test Channel = MCH



3.1.2.2 Test Mode = GSM/TM2

3.1.2.2.1 Test Channel = MCH





4Appendix_D: Bandwidth

Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
GSM850	GSM/TM1	LCH	244.52	317.21	Pass
		MCH	247.97	319.76	Pass
		HCH	246.33	318.60	Pass
	GSM/TM2	LCH	246.99	315.36	Pass
		MCH	245.73	310.38	Pass
		HCH	245.79	318.30	Pass
GSM1900	GSM/TM1	LCH	244.39	317.70	Pass
		MCH	240.50	319.04	Pass
		HCH	241.67	309.29	Pass
	GSM/TM2	LCH	251.66	324.28	Pass
		MCH	247.01	317.63	Pass
		HCH	249.74	318.74	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





5Appendix_E: Band Edges Compliance

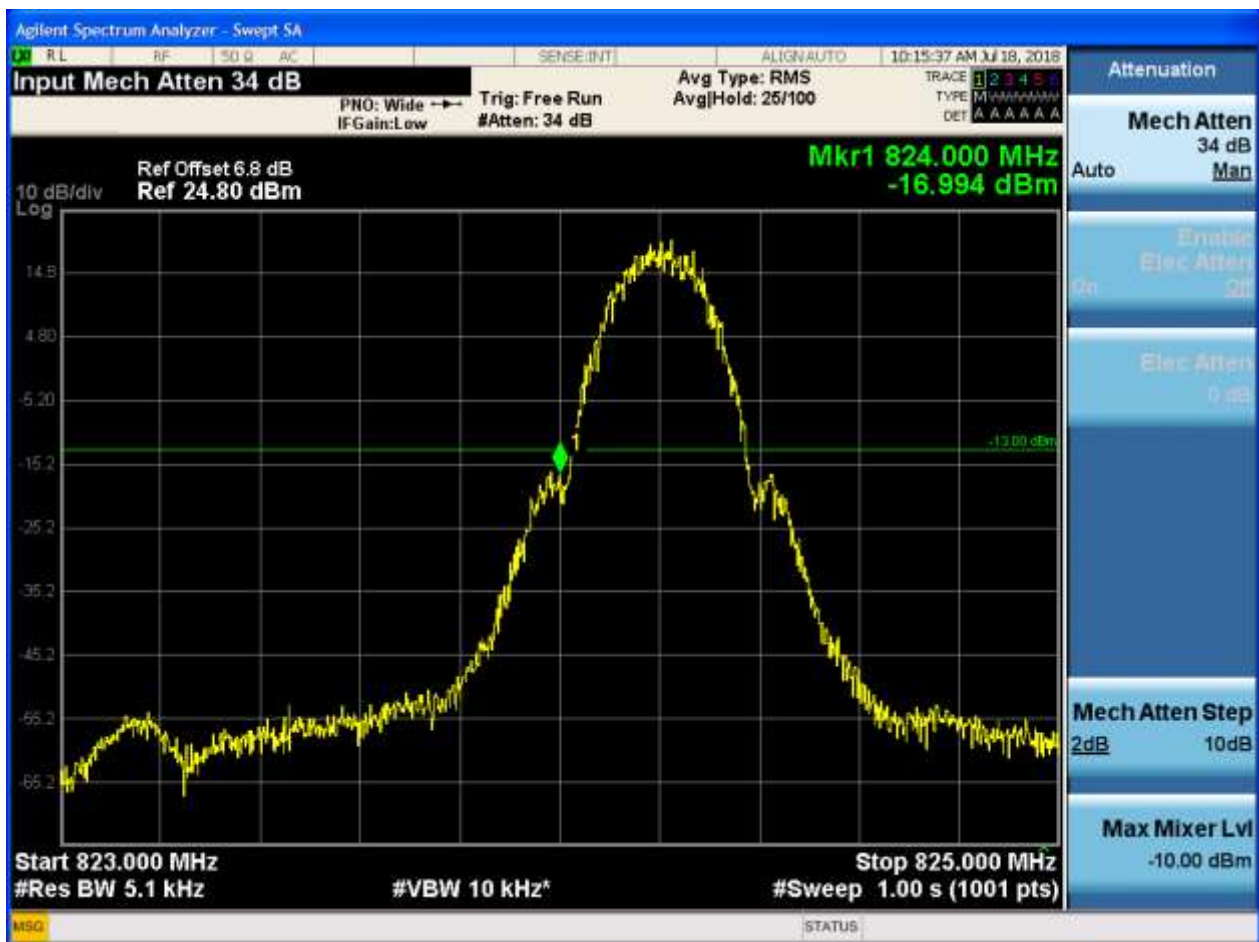
Part I - Test Plots

5.1 For GSM

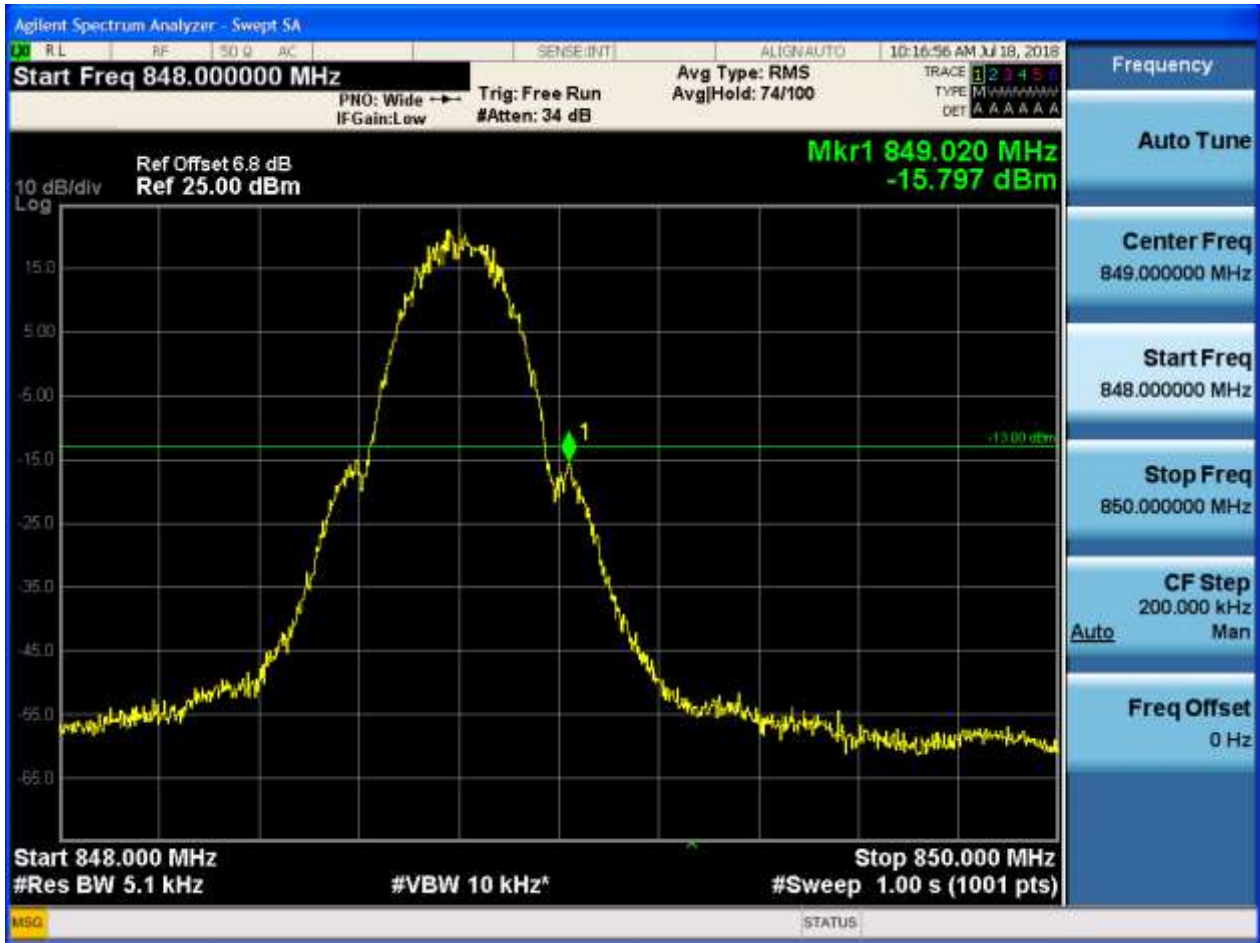
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

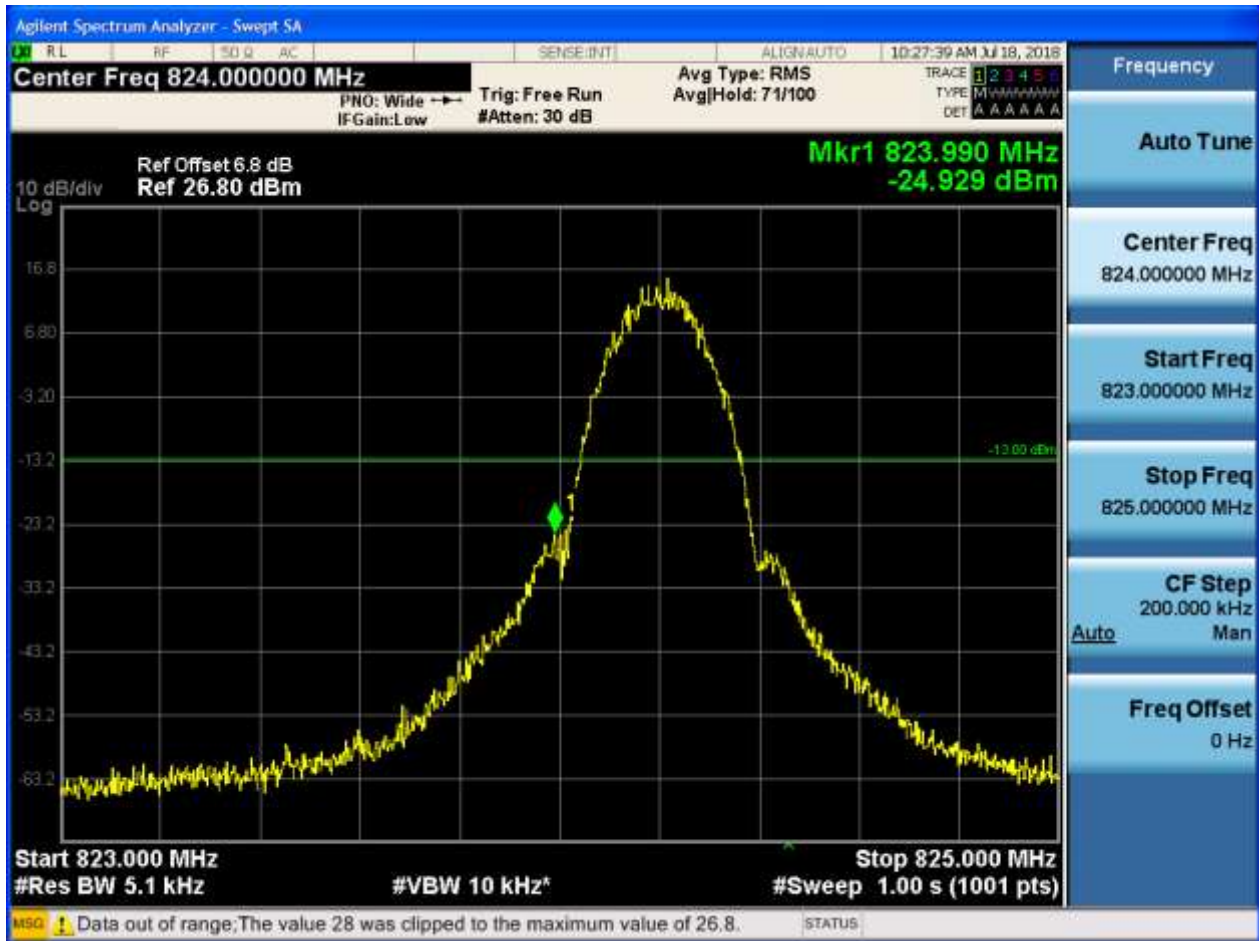


5.1.1.1.2 Test Channel = HCH

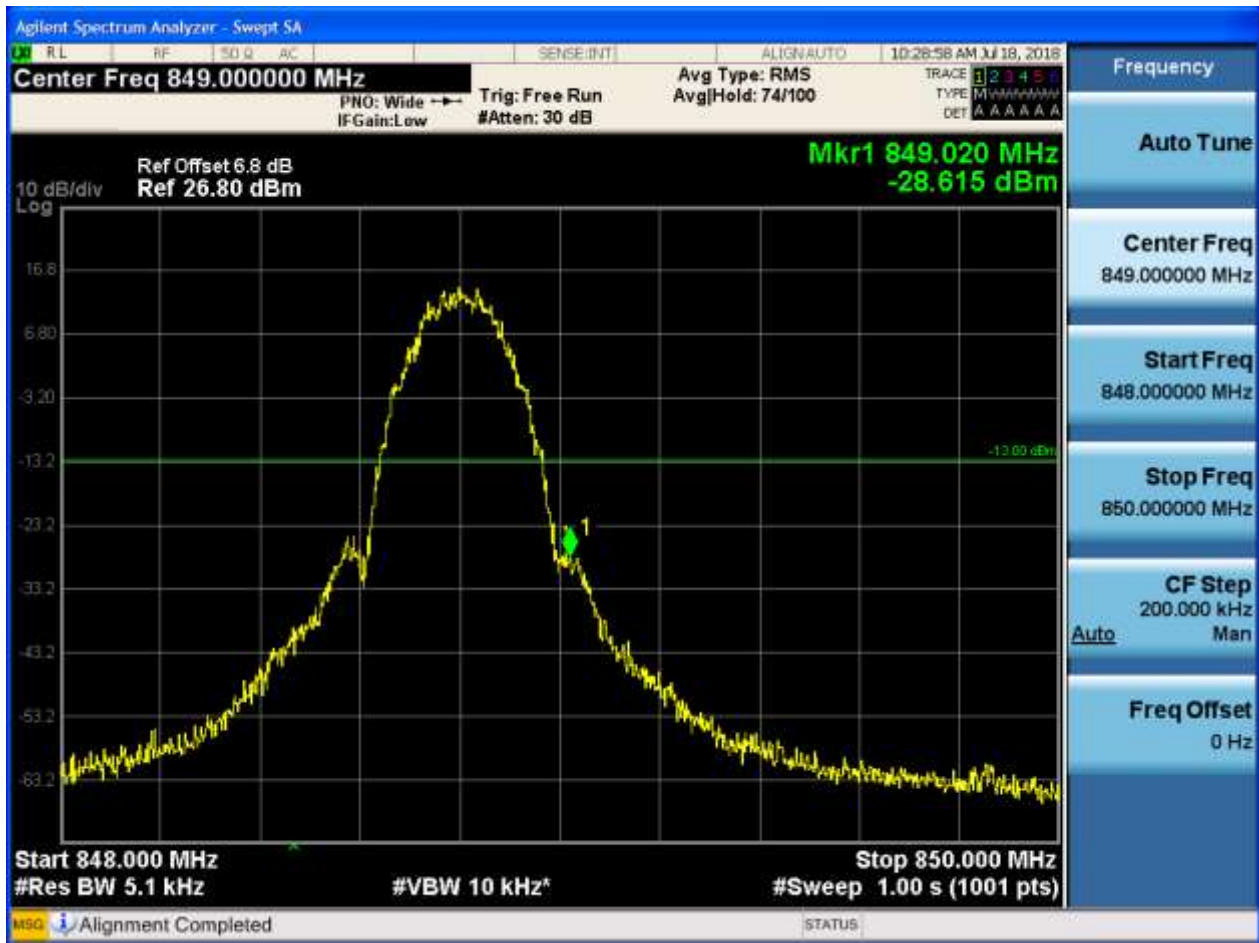


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

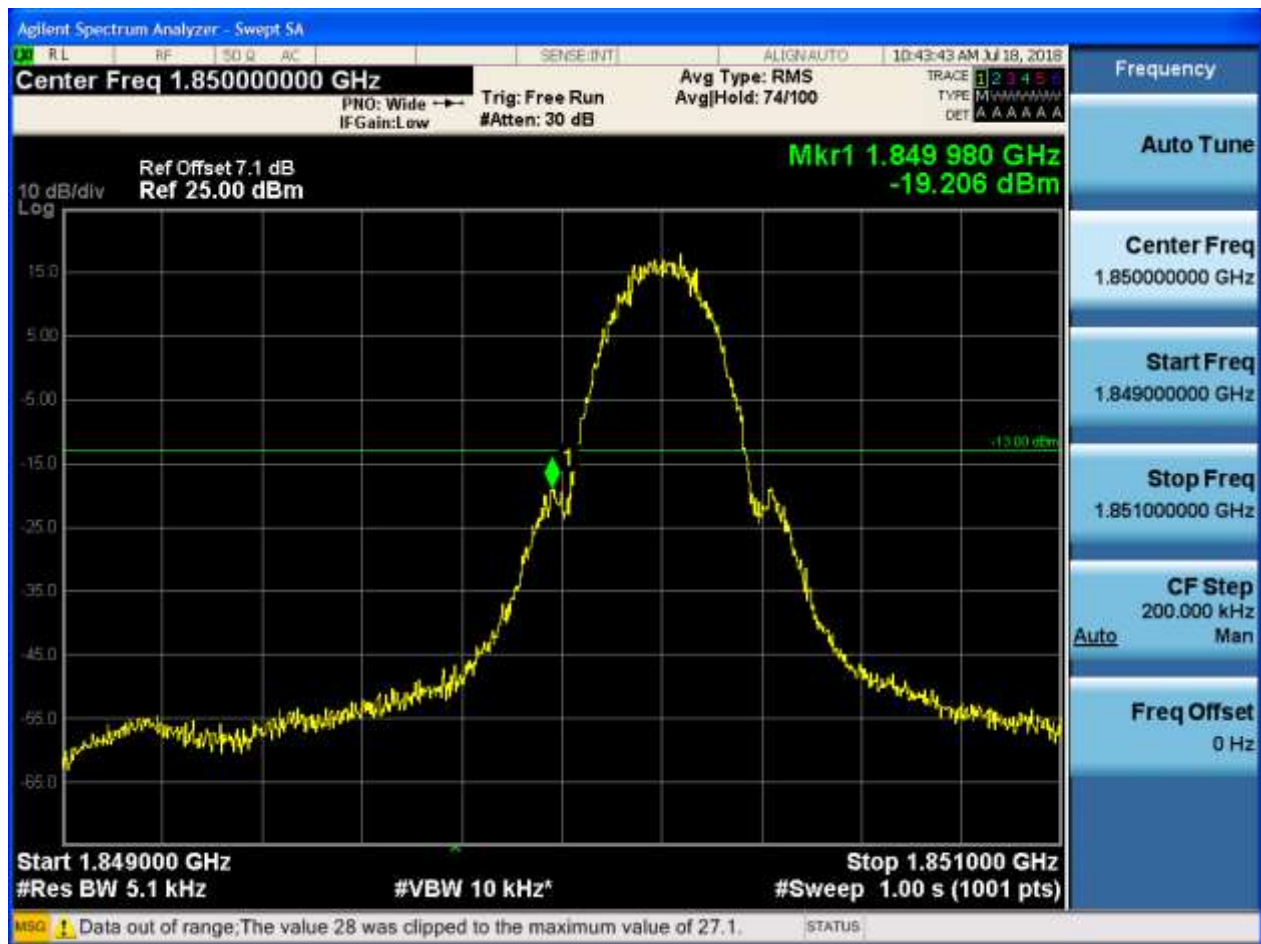




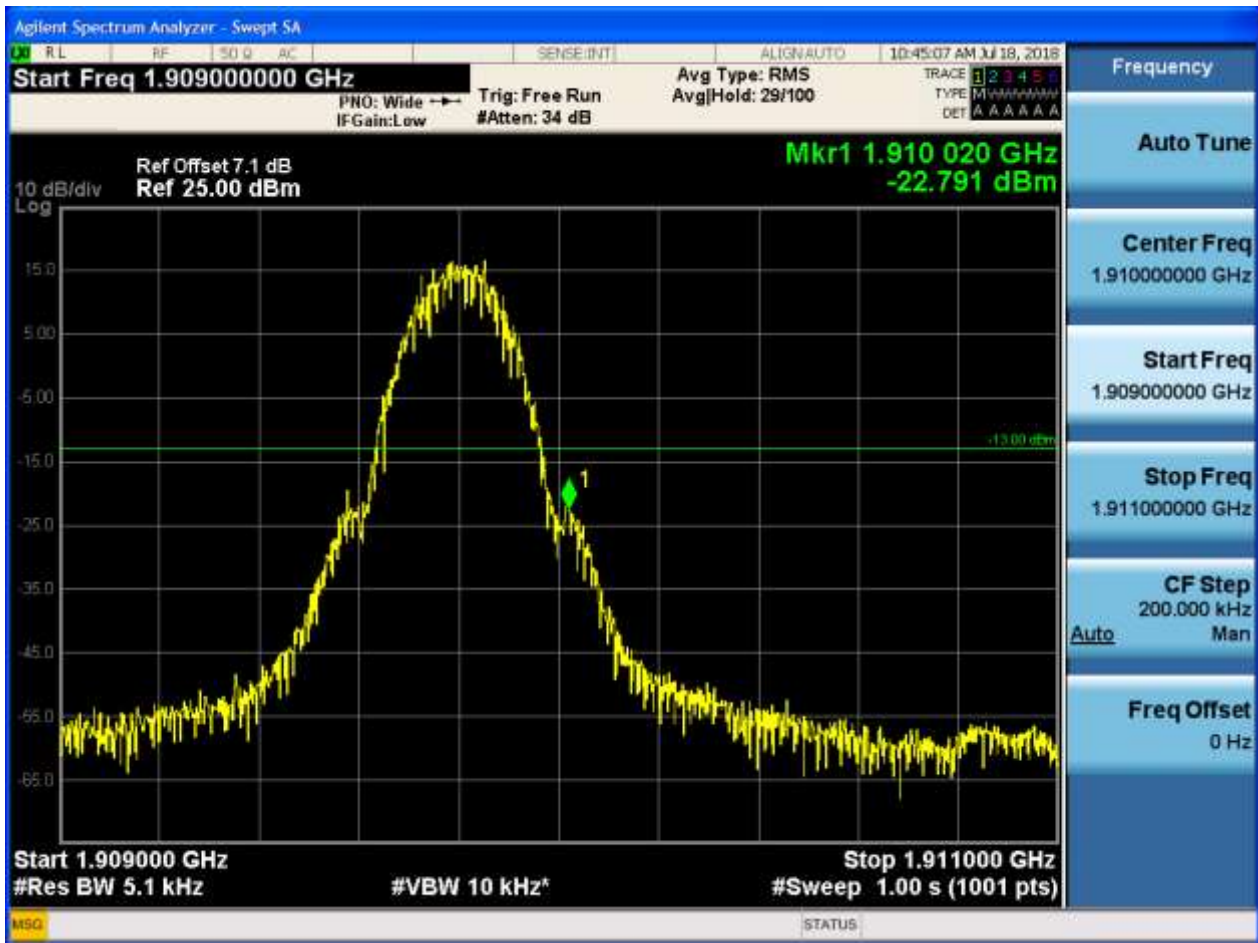
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



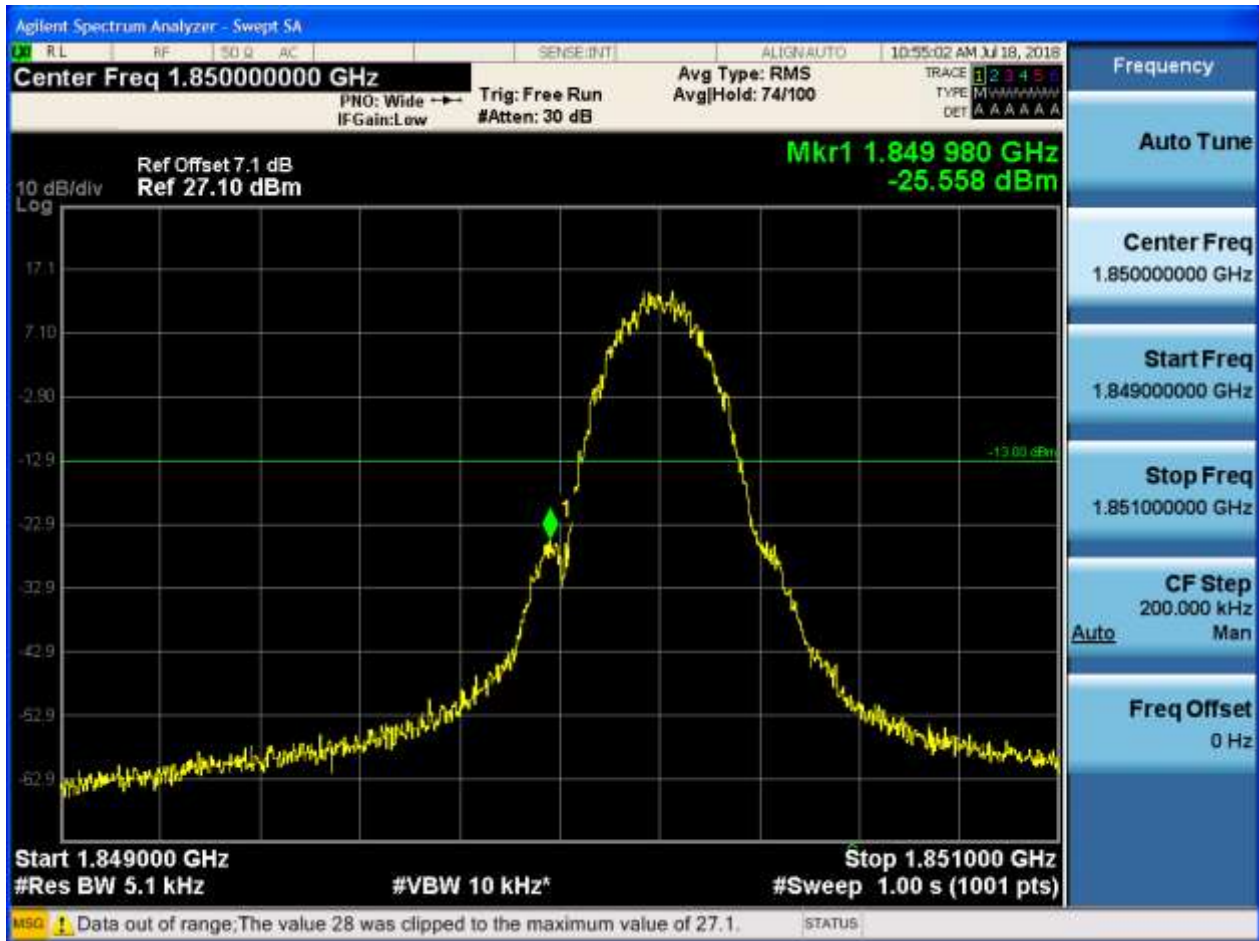
5.1.2.1.2 Test Channel = HCH



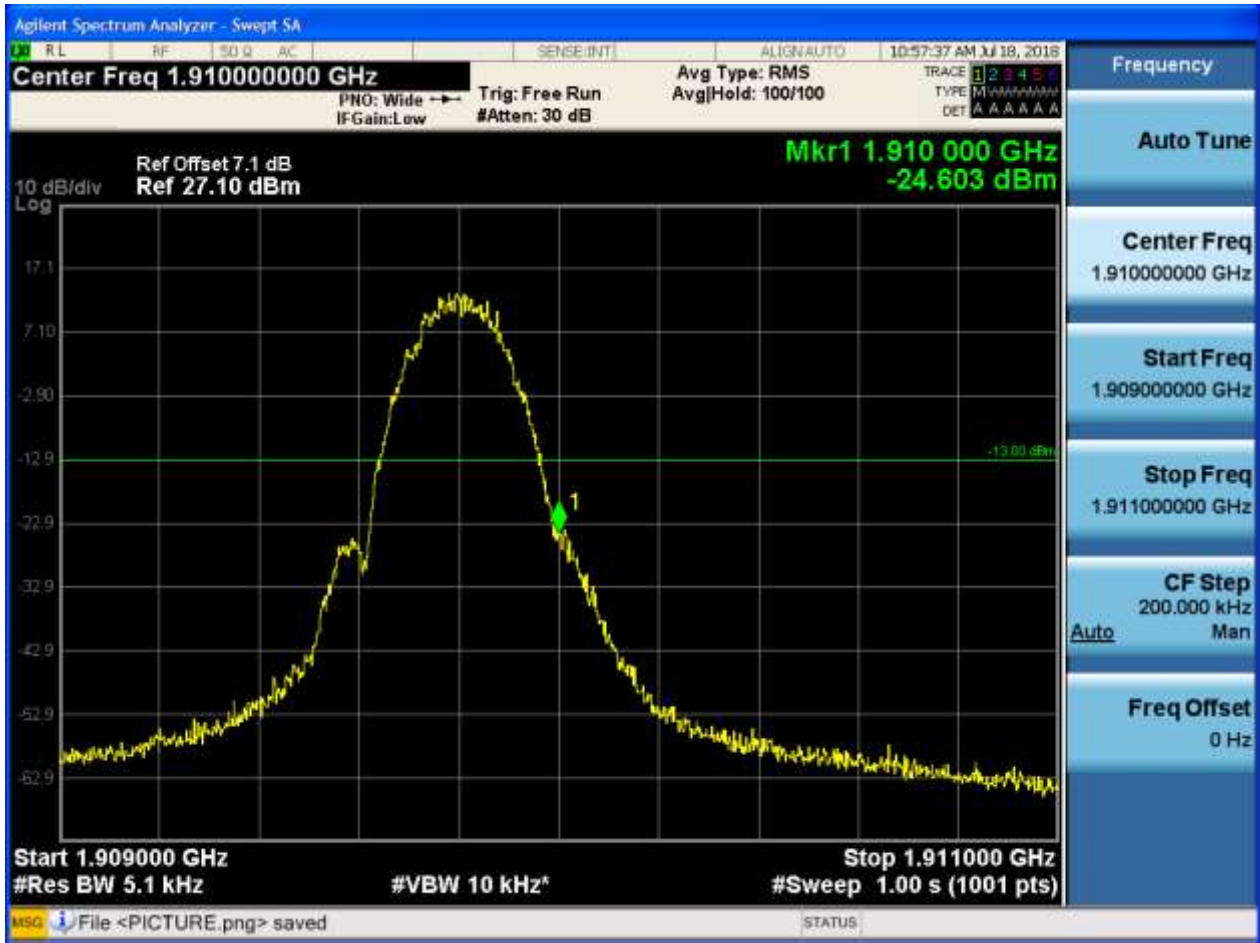


5.1.2.2 Test Mode = GSM/TM2

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

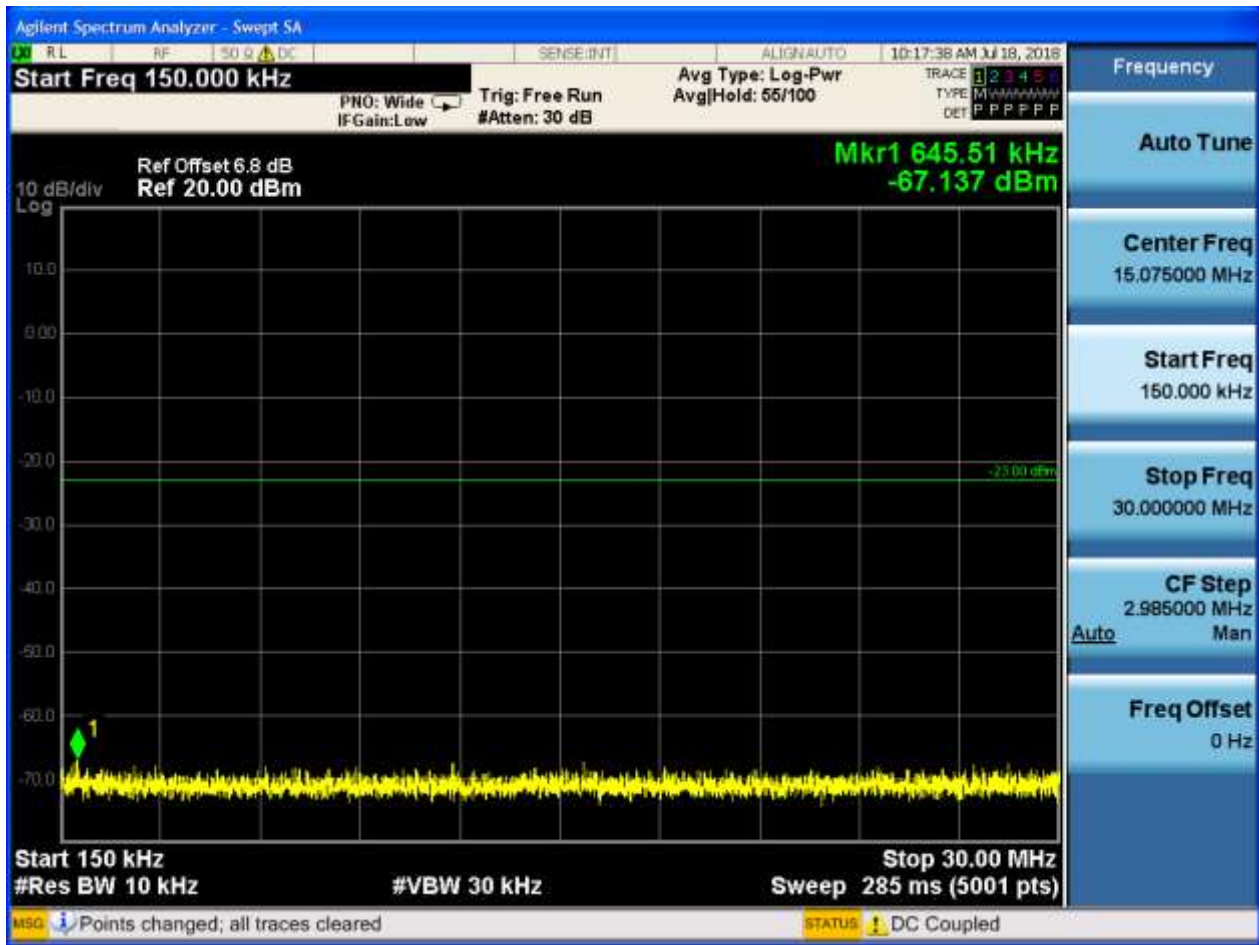
6.1 For GSM

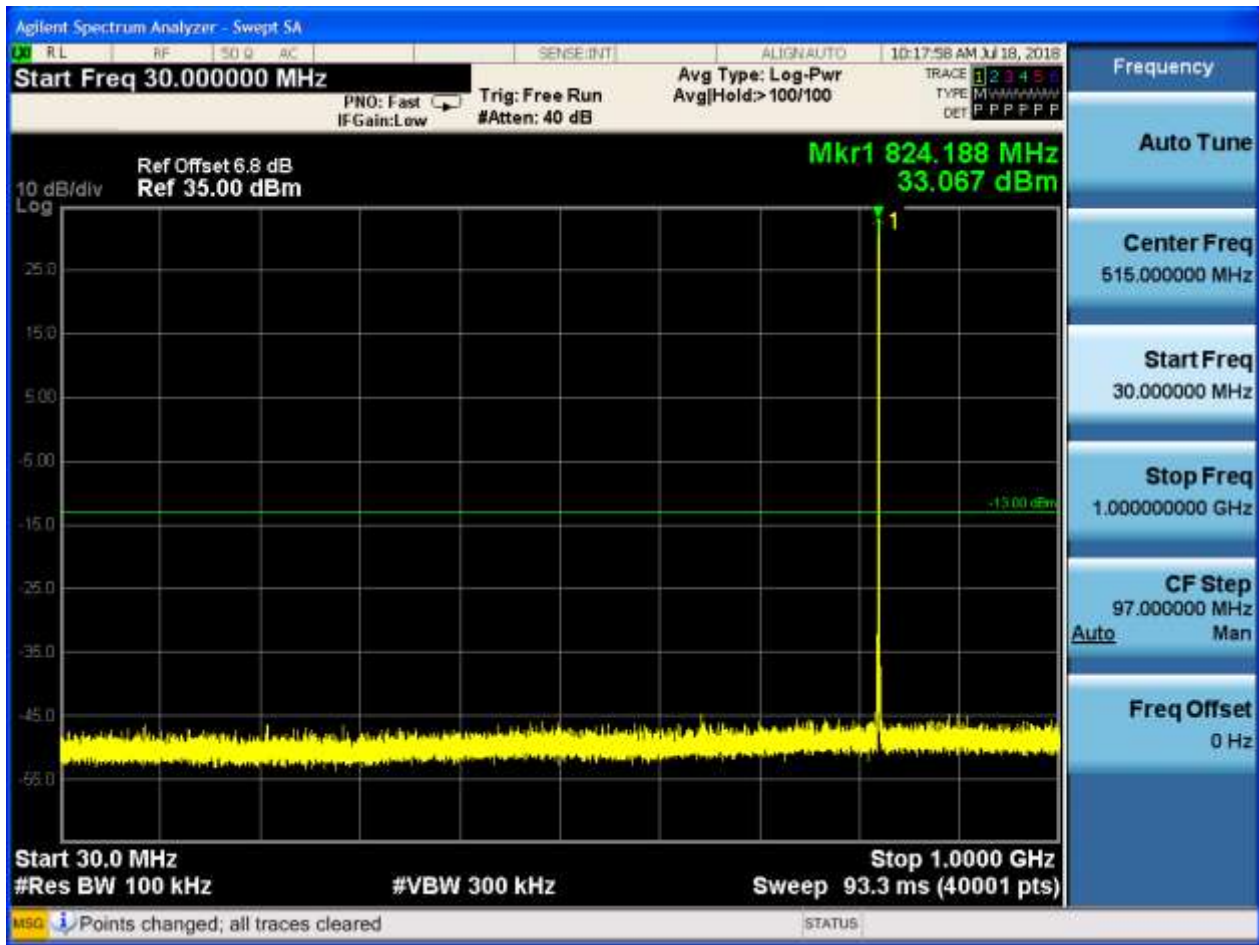
6.1.1 Test Band = GSM850

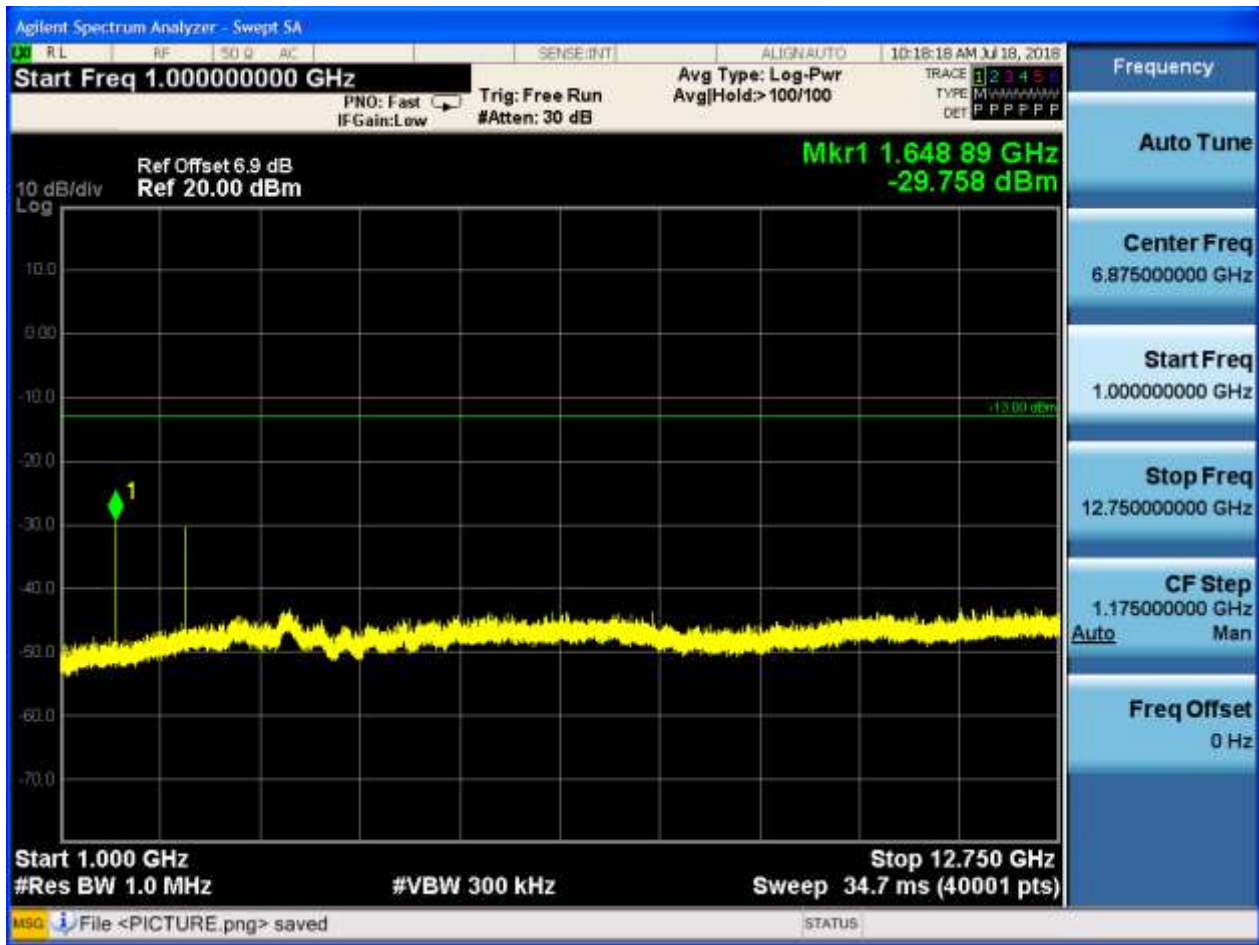
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



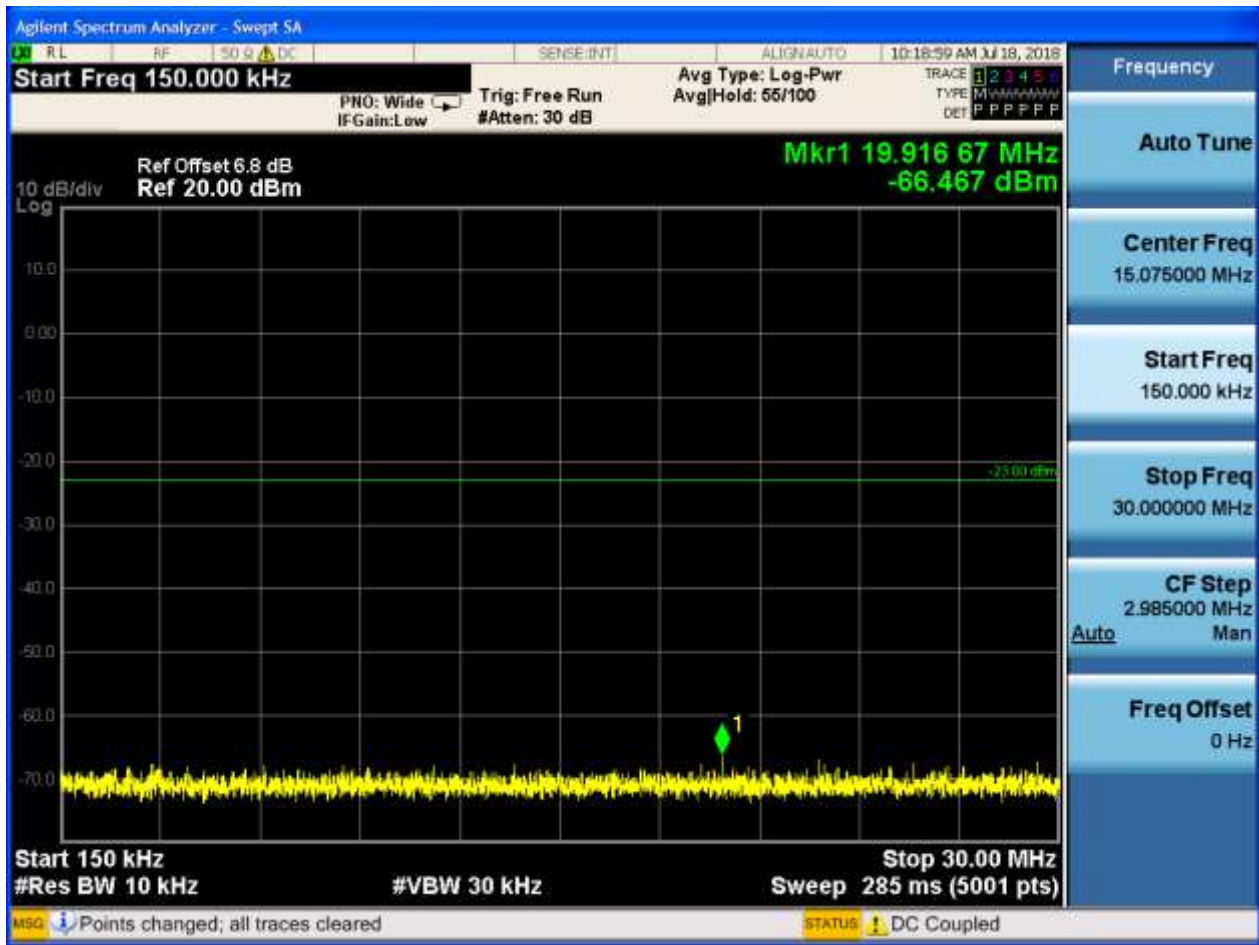


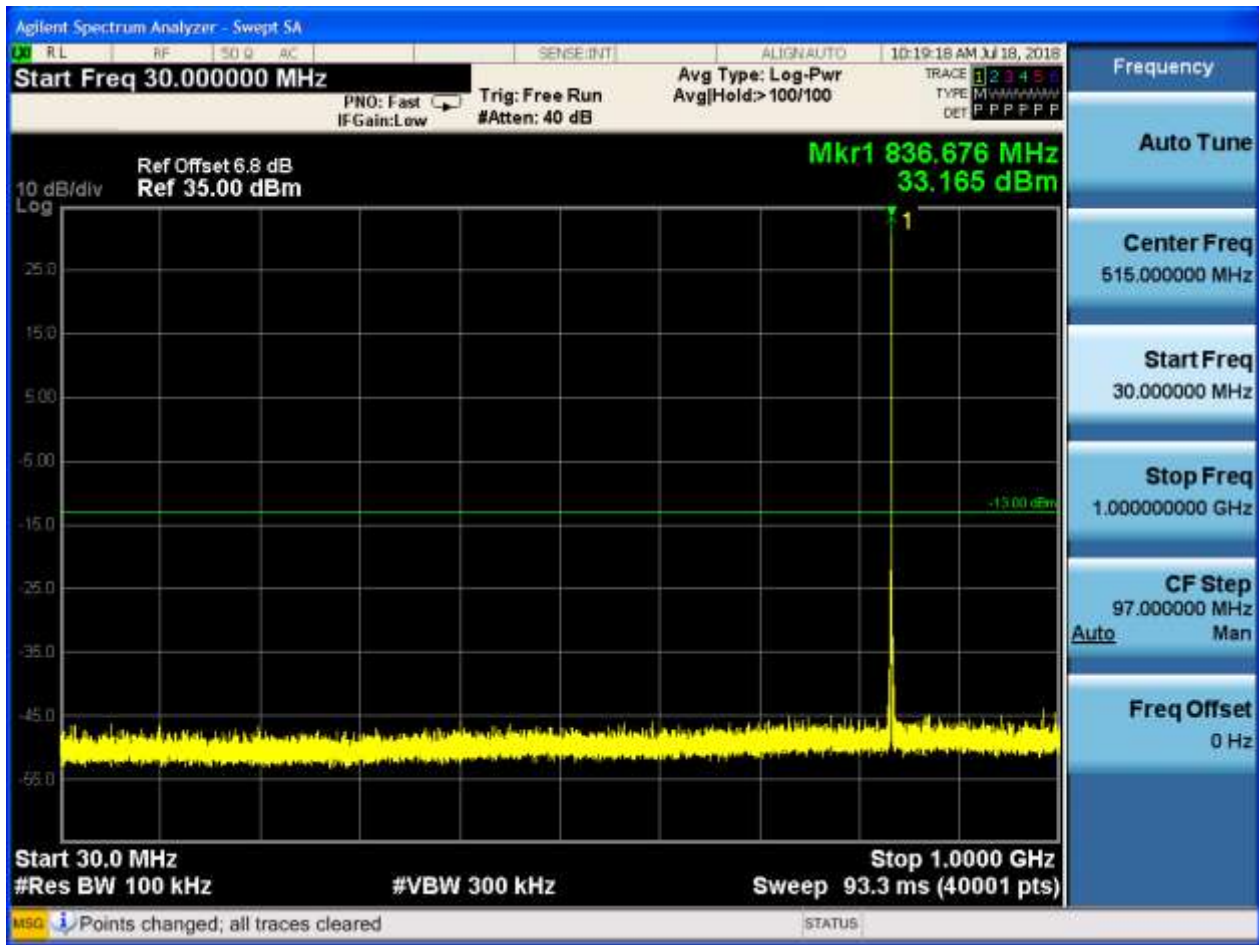


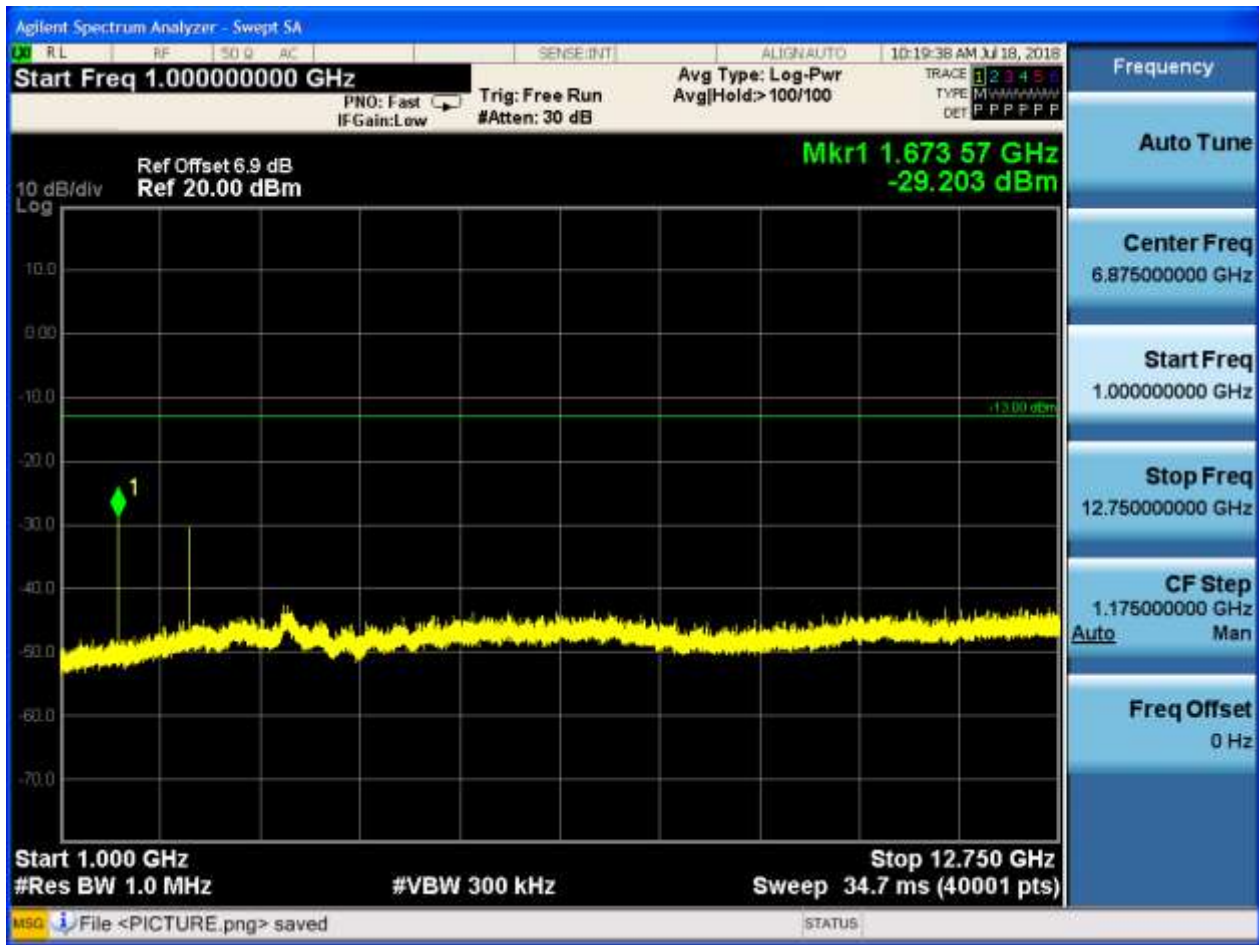


6.1.1.1.2 Test Channel = MCH



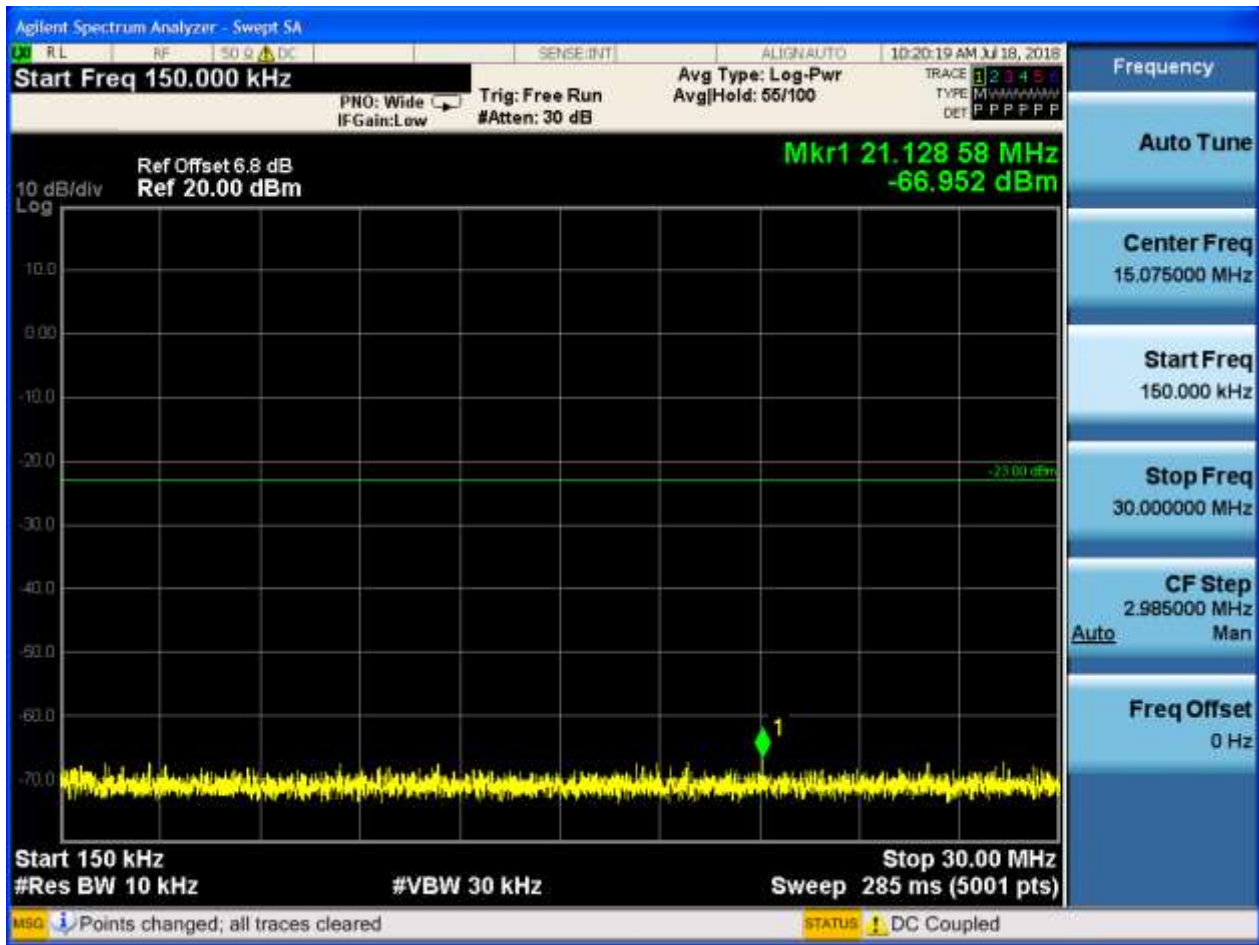


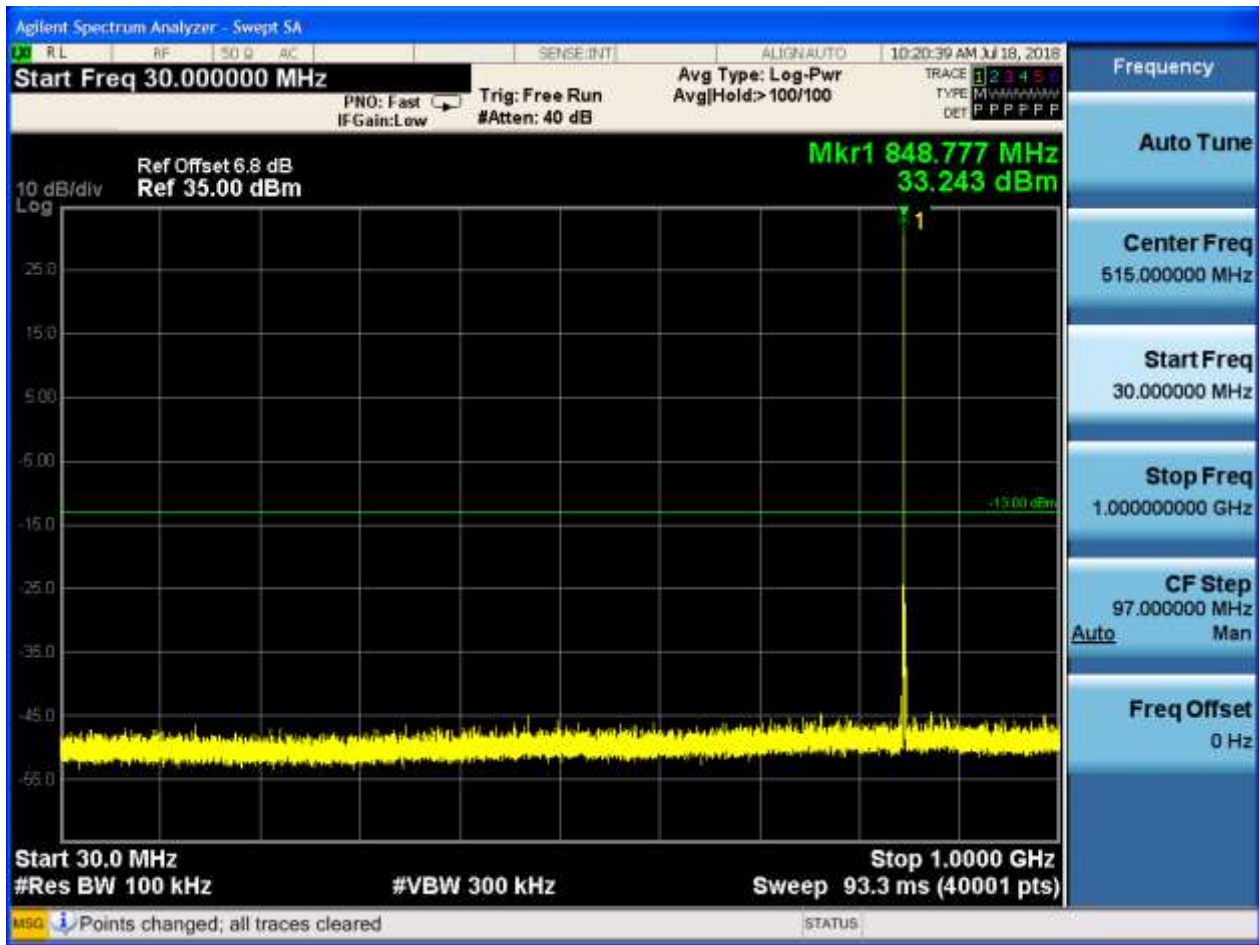


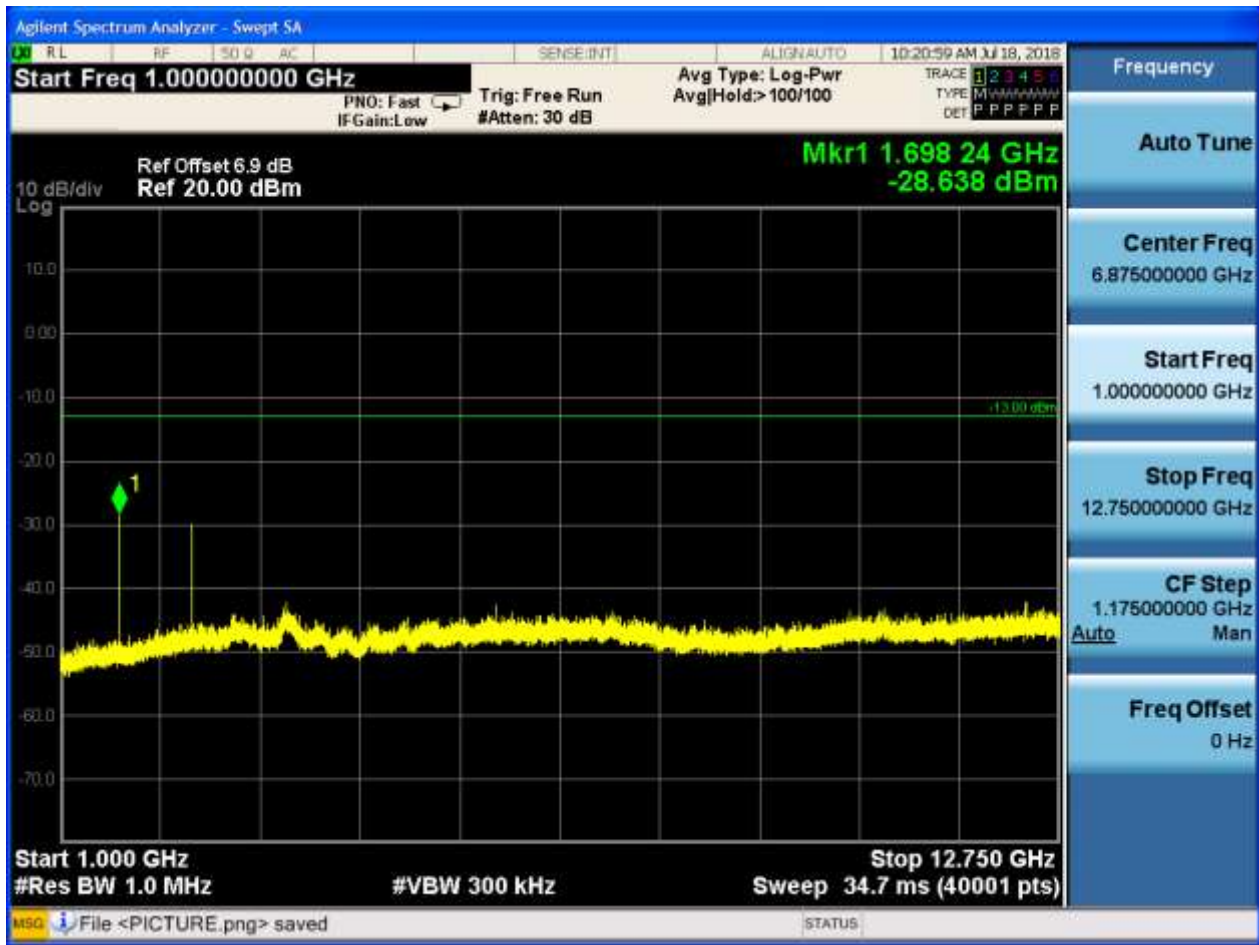


6.1.1.1.3 Test Channel = HCH









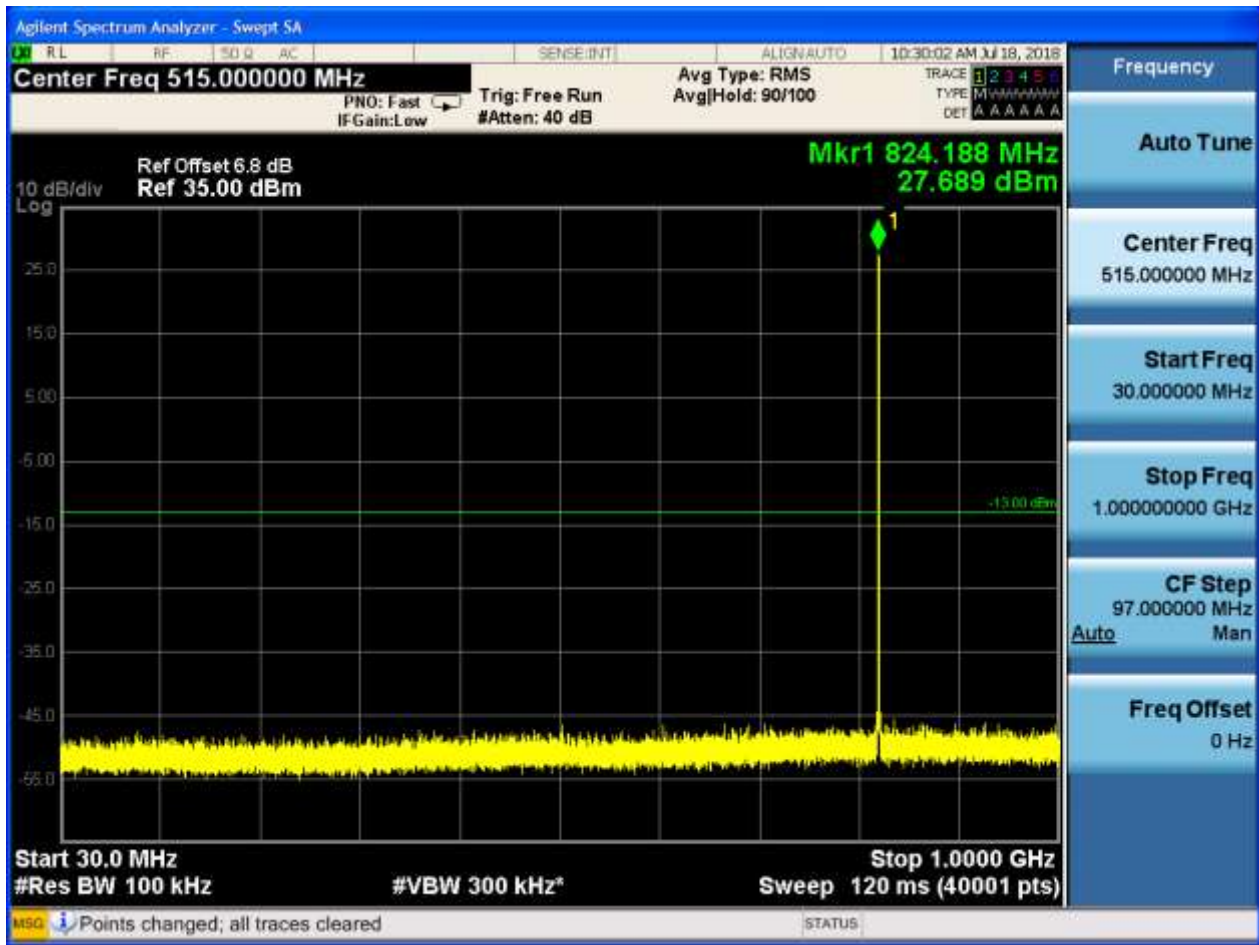


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH





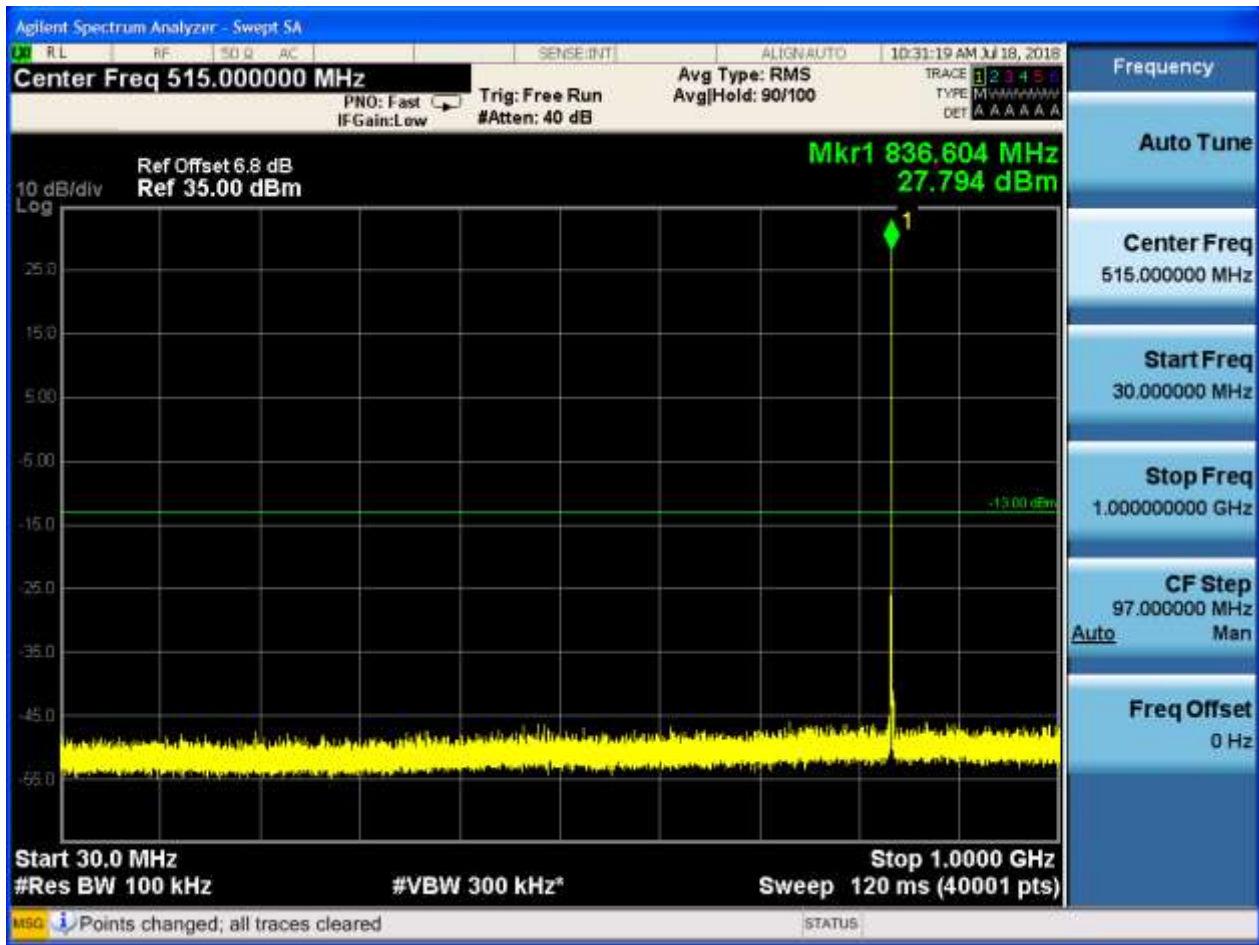


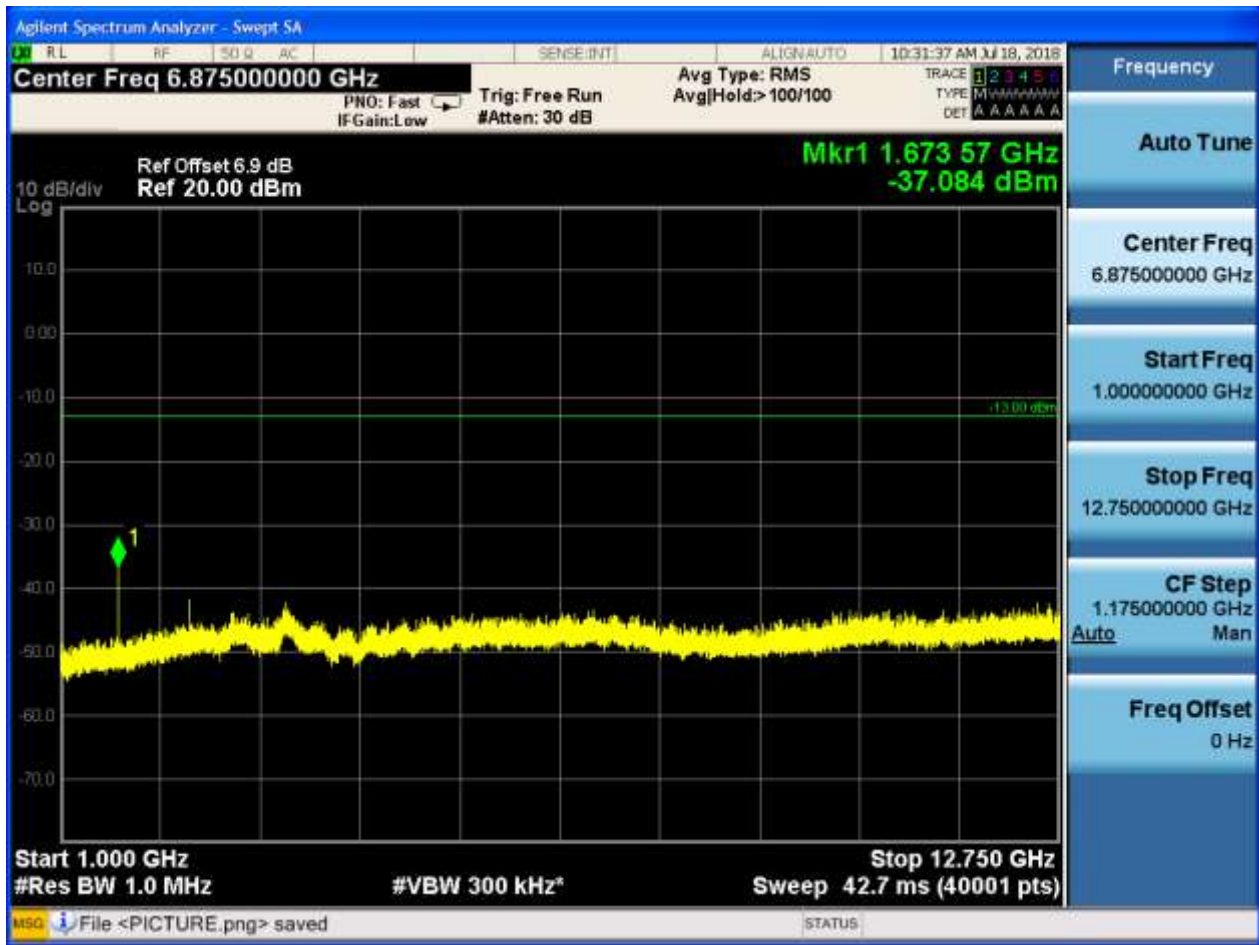


6.1.1.2.2 Test Channel = MCH

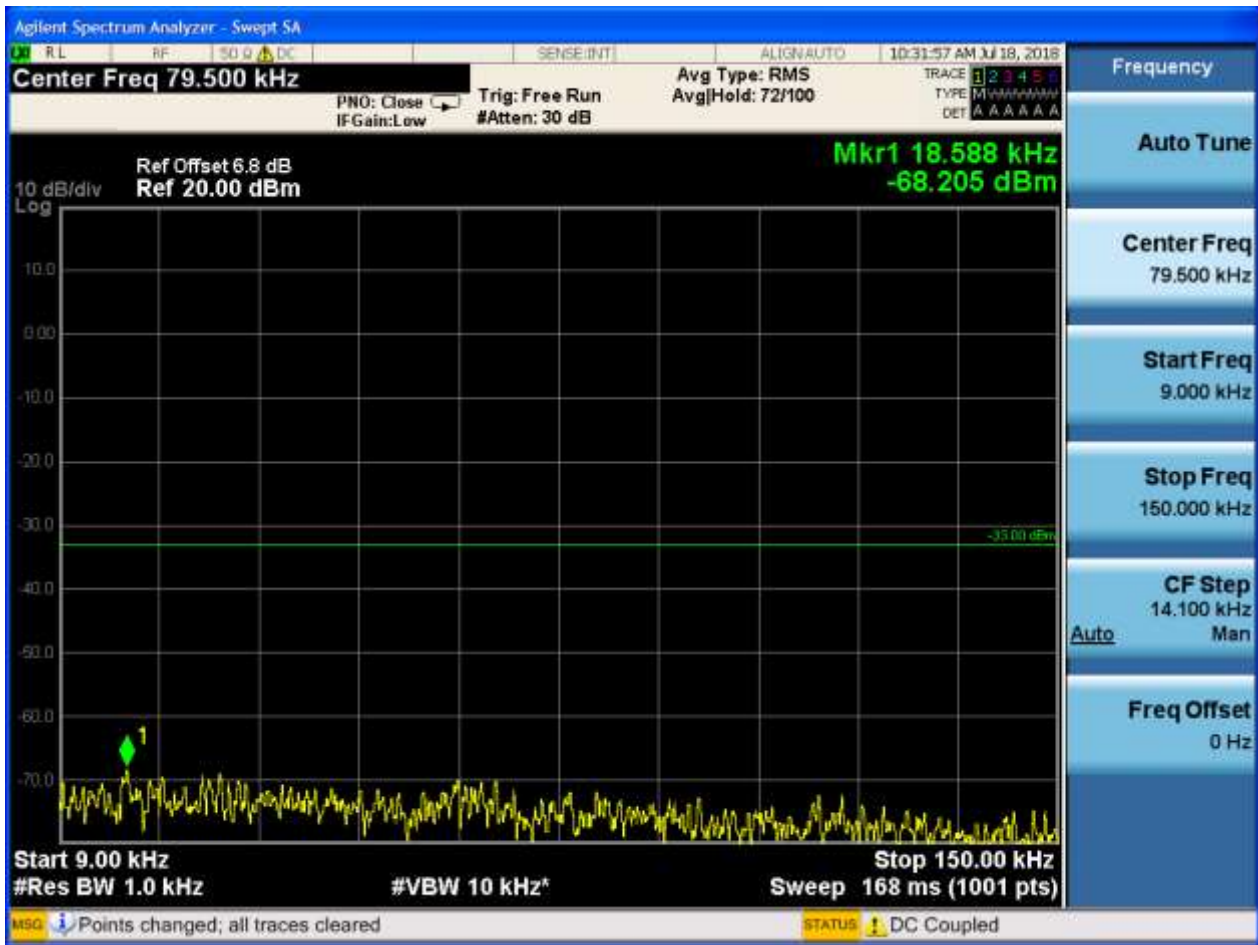


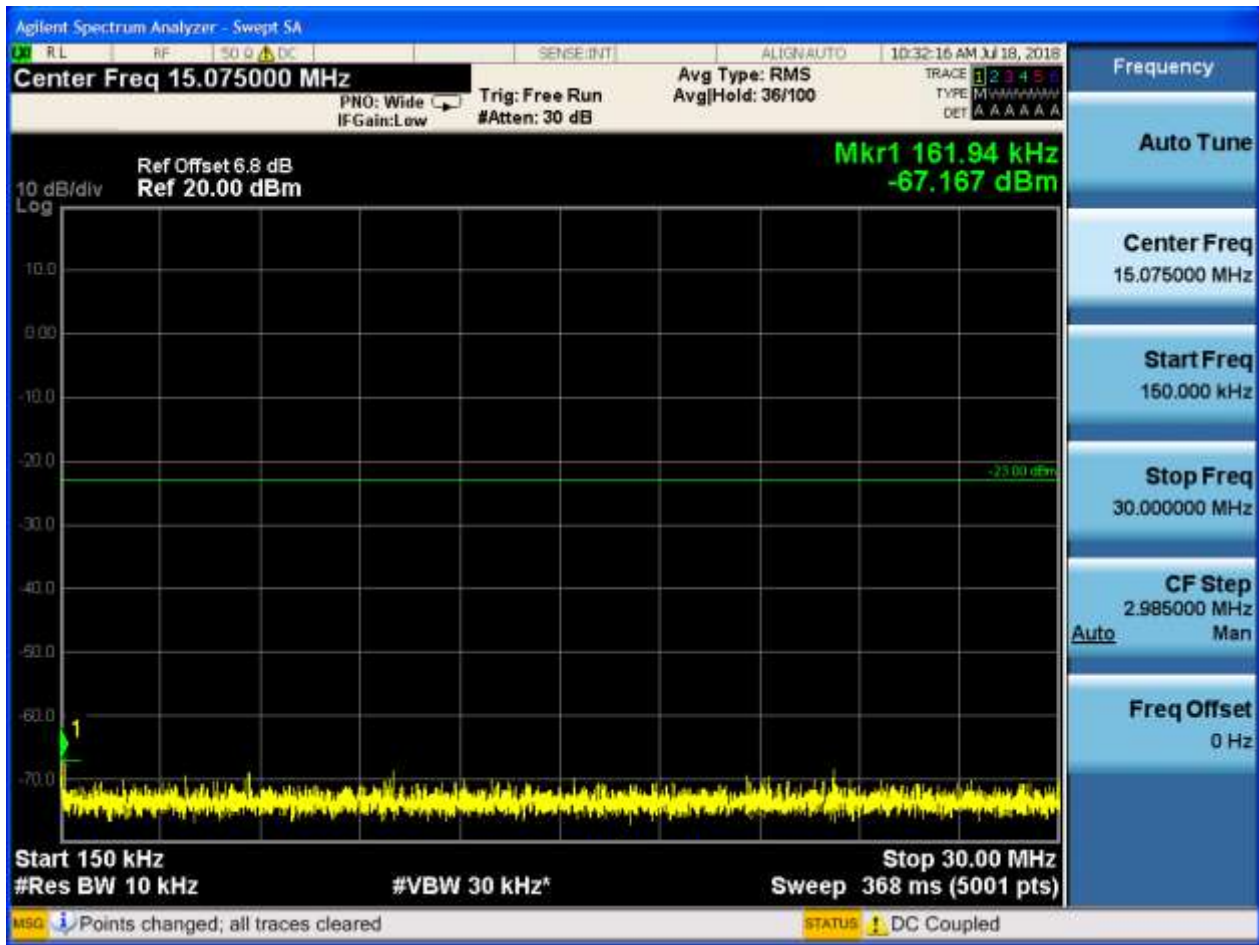


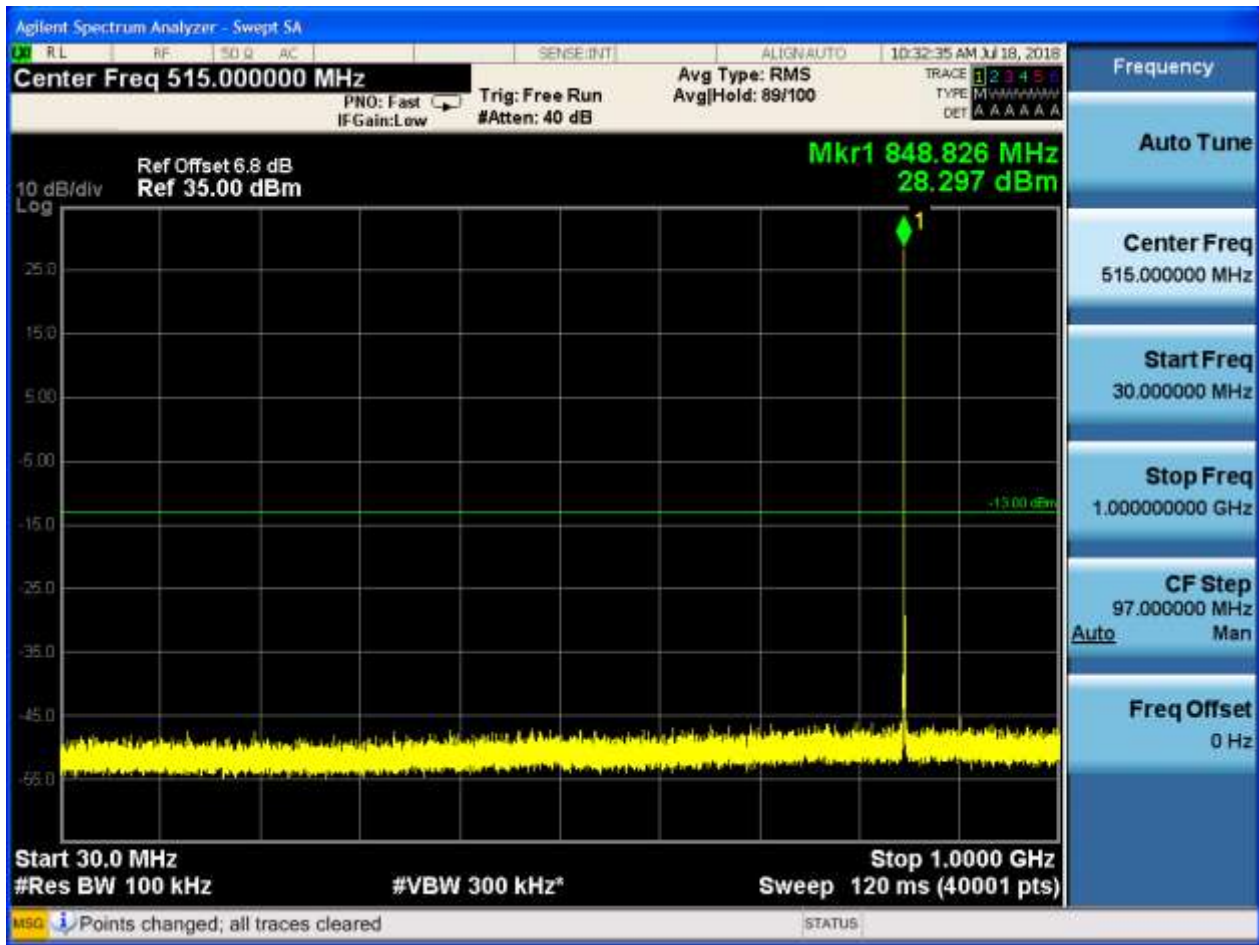


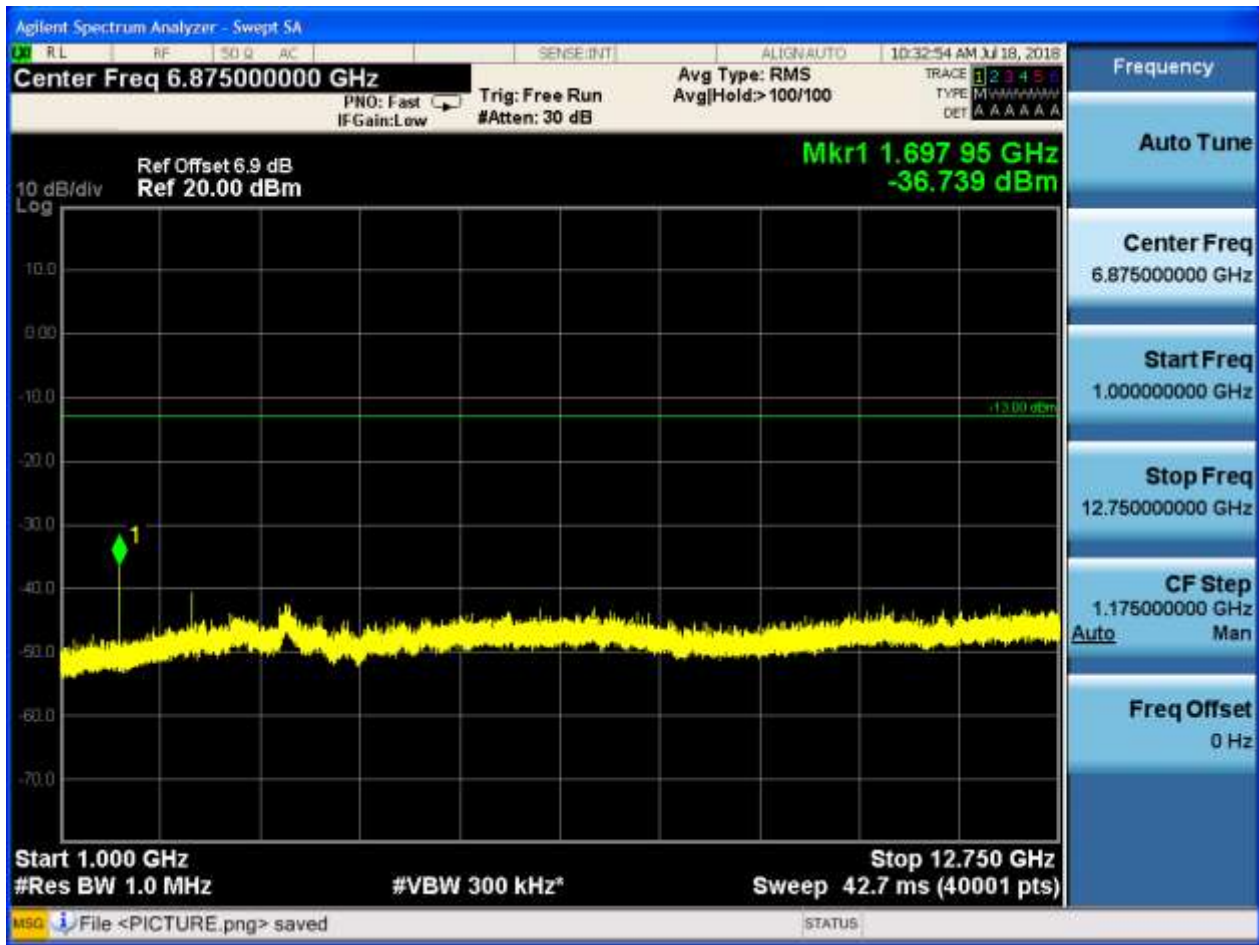


6.1.1.2.3 Test Channel = HCH









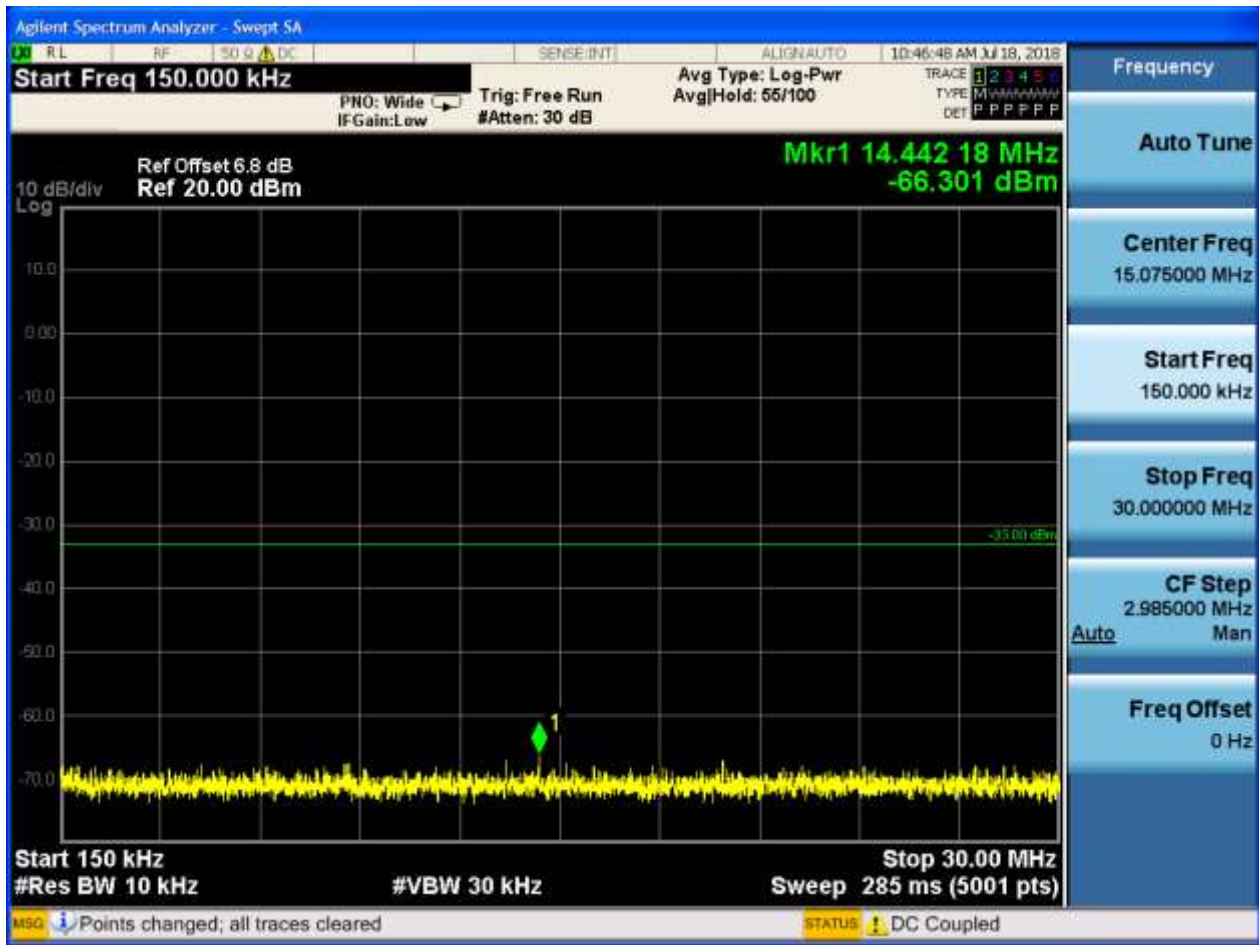


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

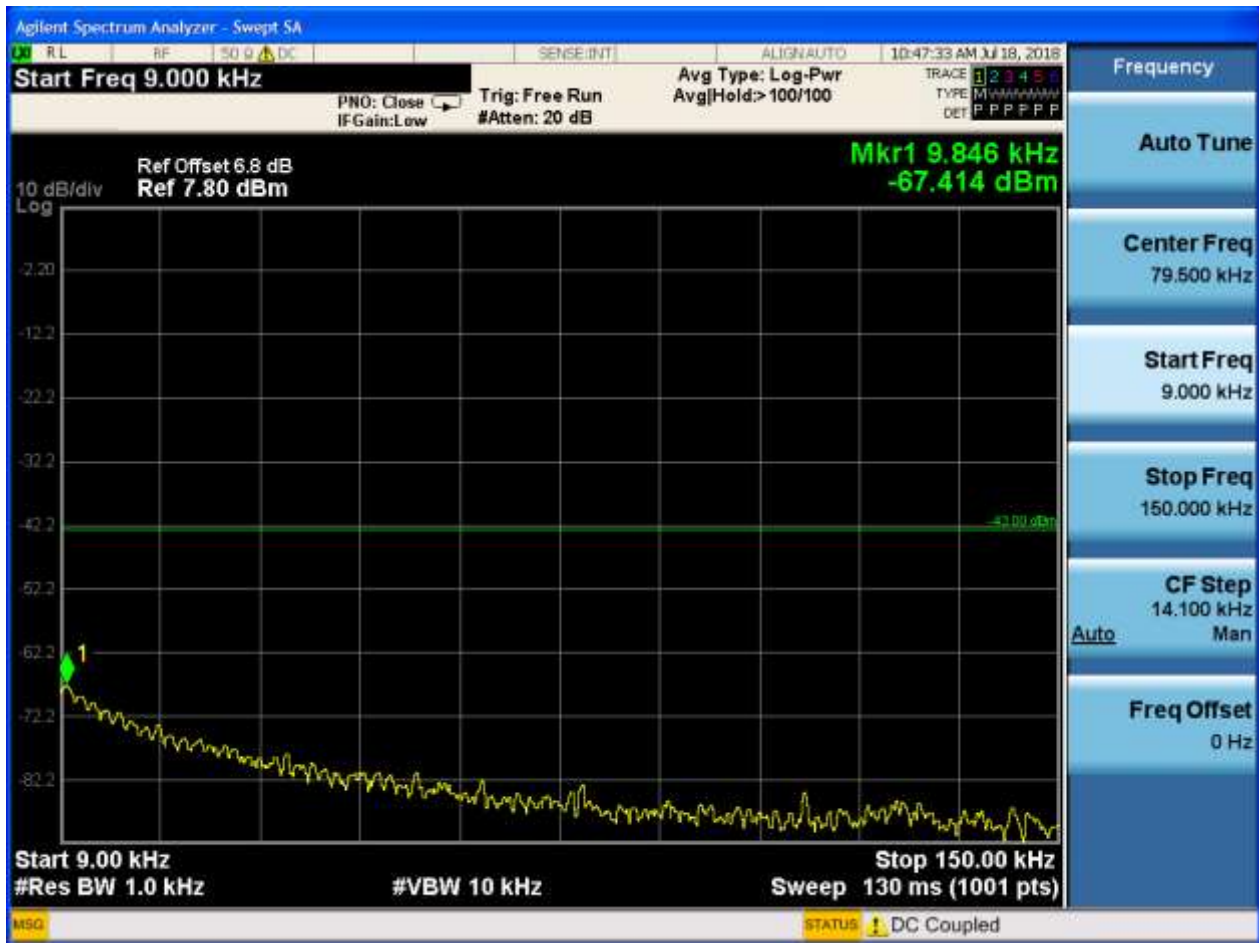


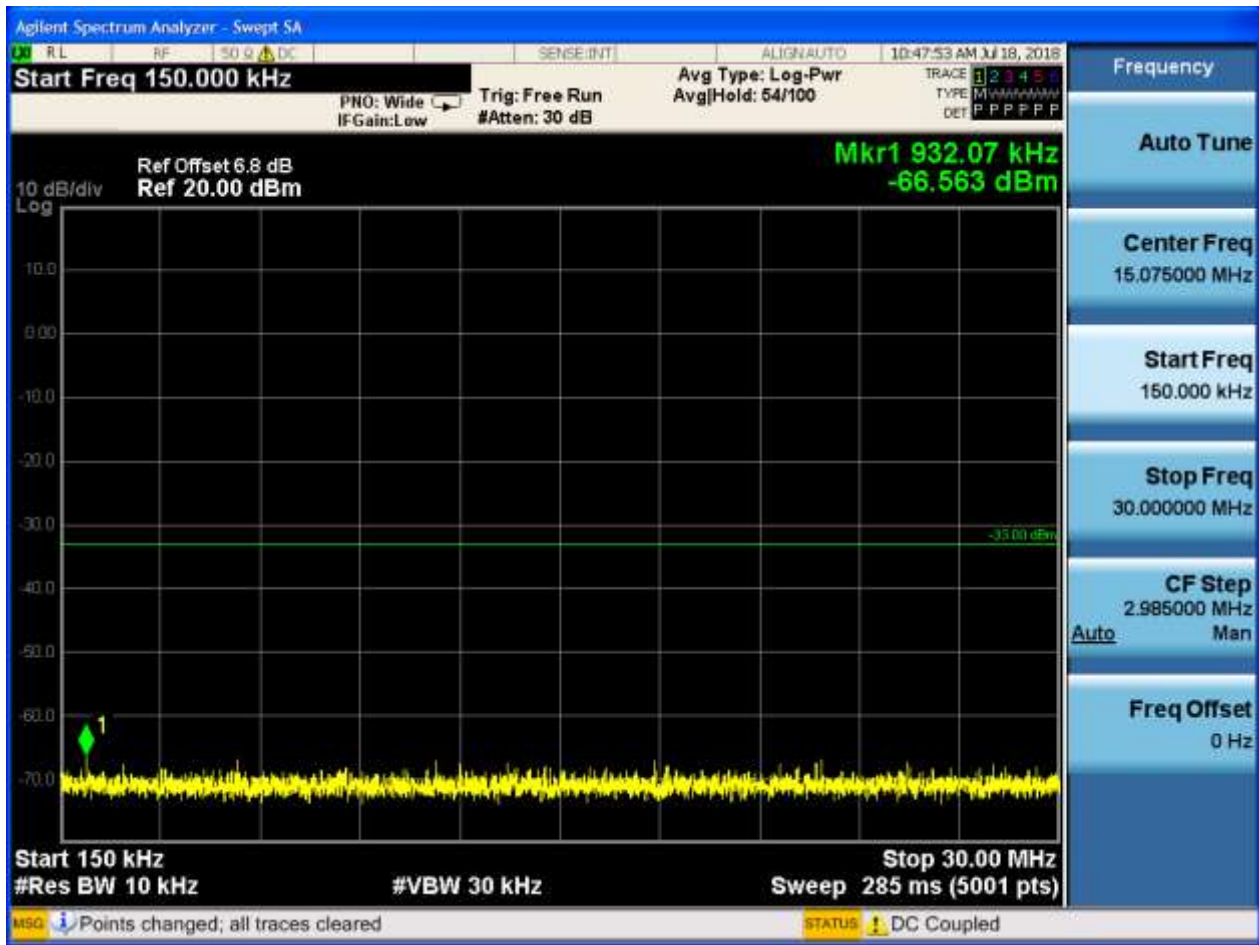






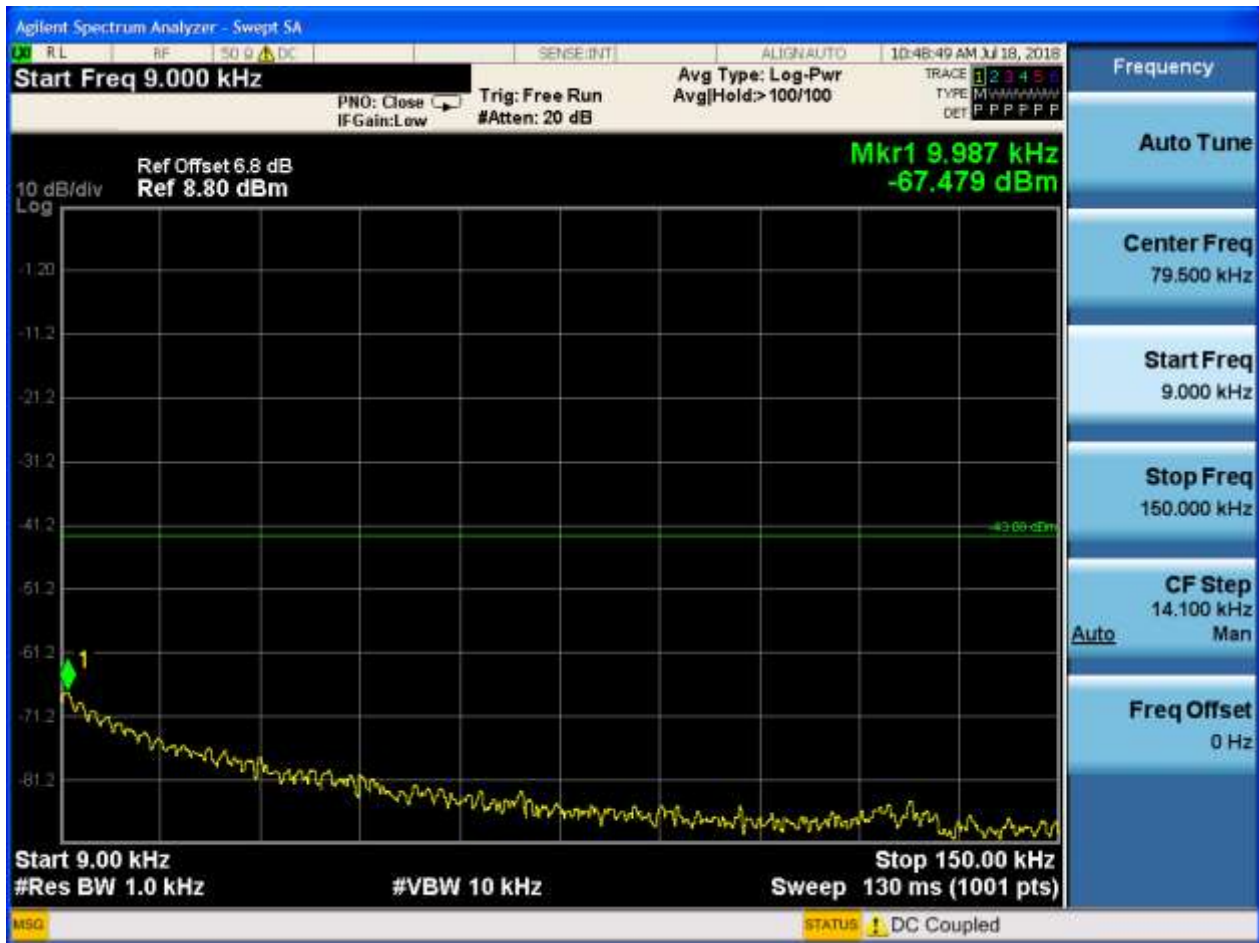
6.1.2.1.2 Test Channel = MCH

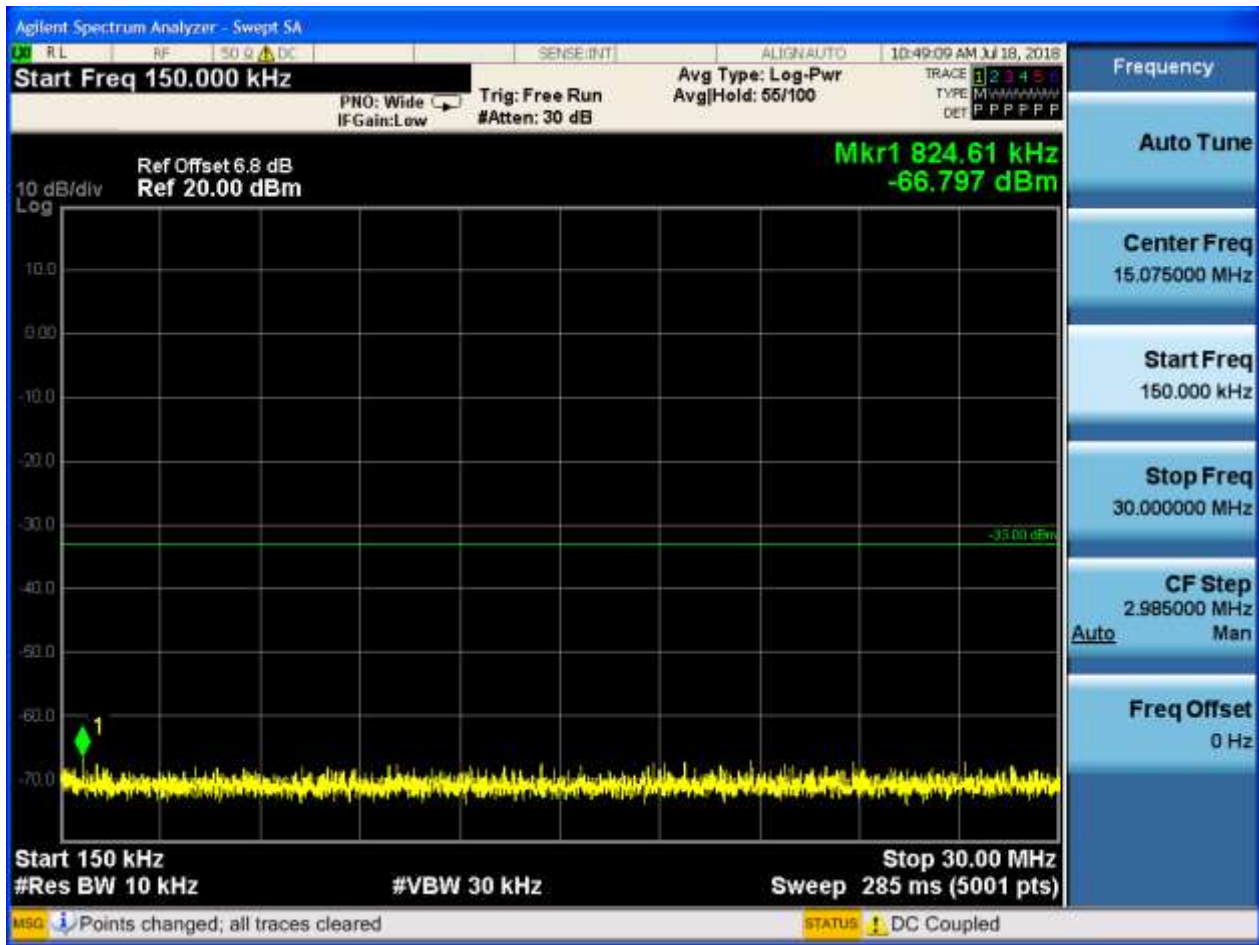






6.1.2.1.3 Test Channel = HCH



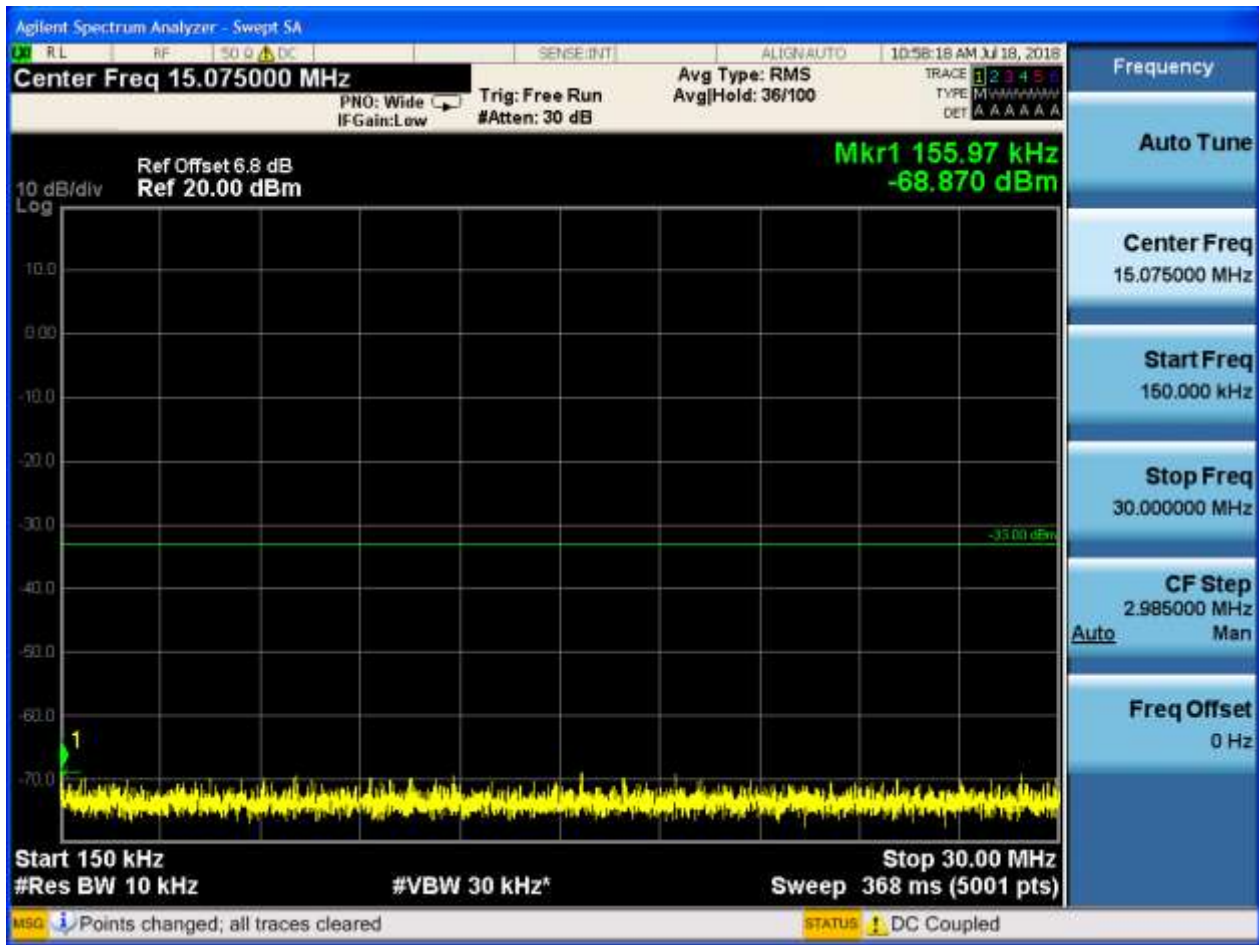




6.1.2.2 Test Mode = GSM/TM2

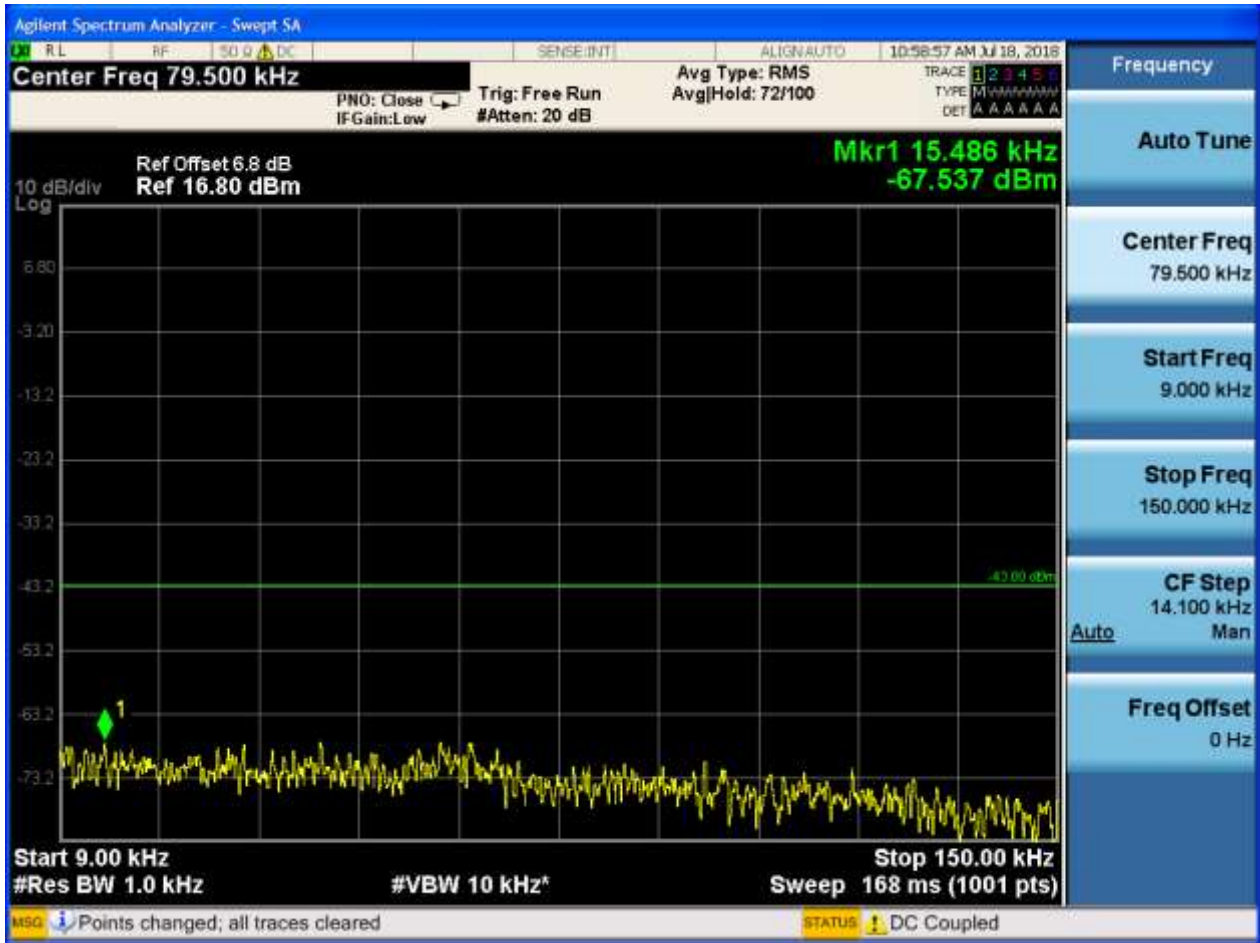
6.1.2.2.1 Test Channel = LCH







6.1.2.2.2 Test Channel = MCH

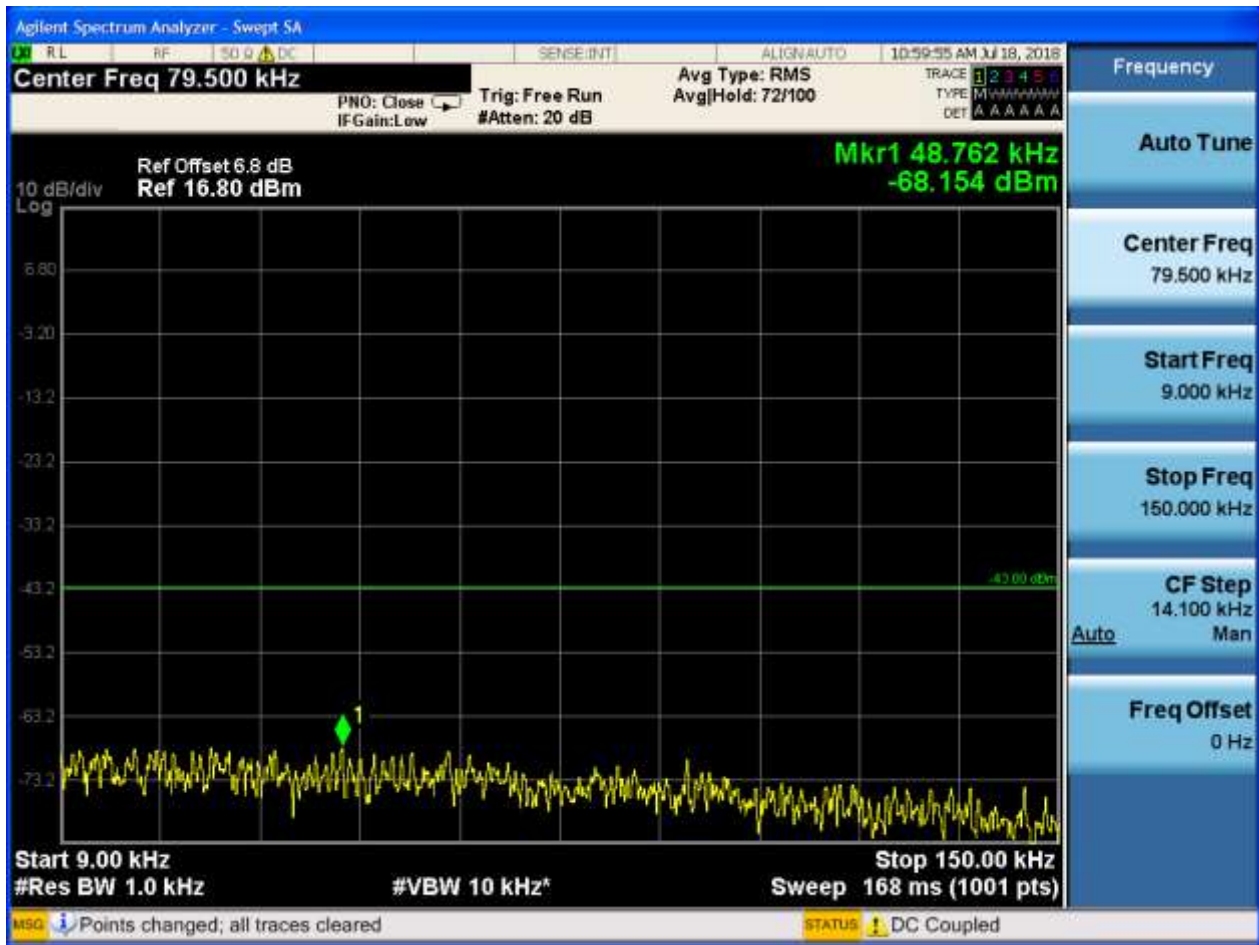


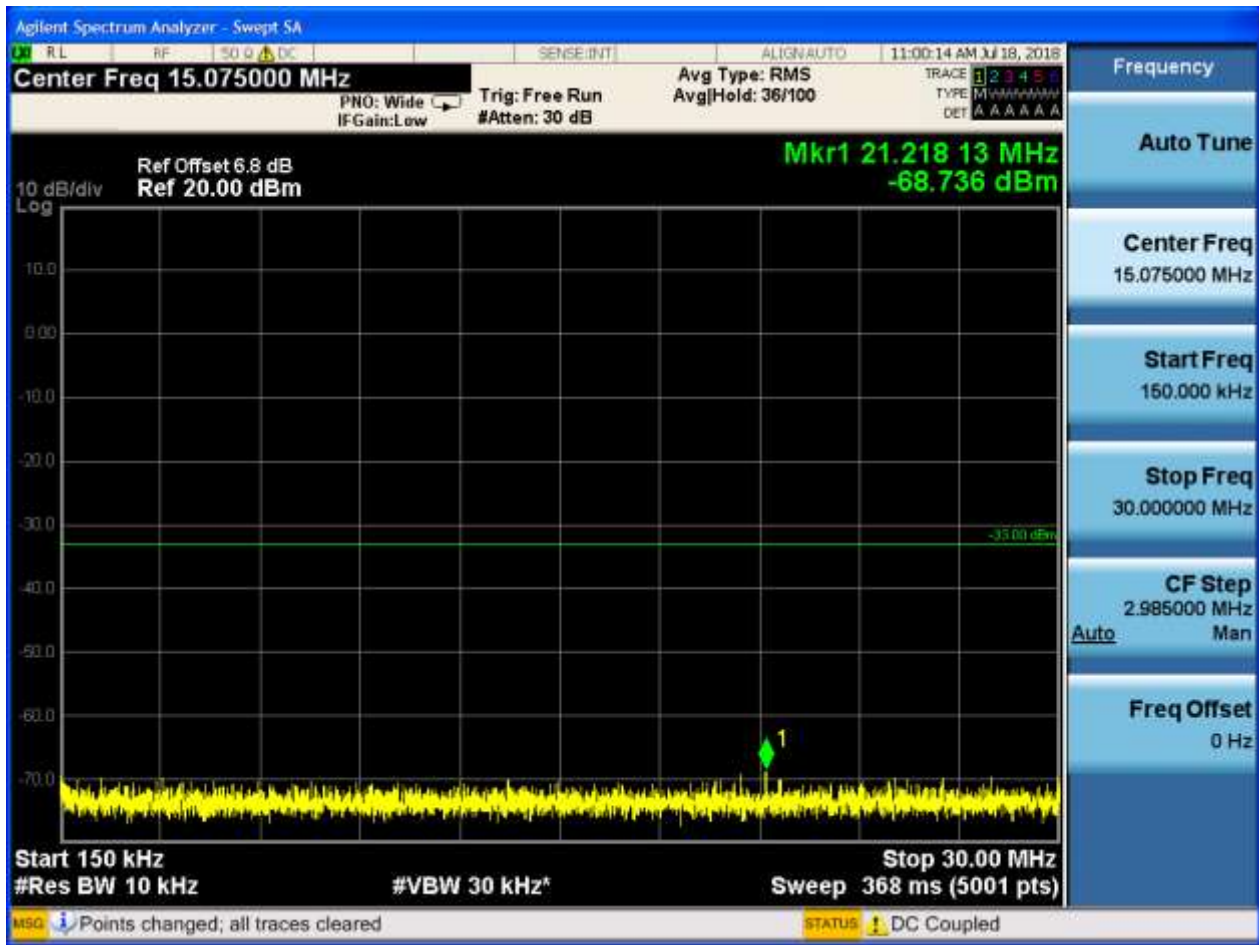






6.1.2.2.3 Test Channel = HCH









7Appendix_G: Field Strength of Spurious Radiation

Note: 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

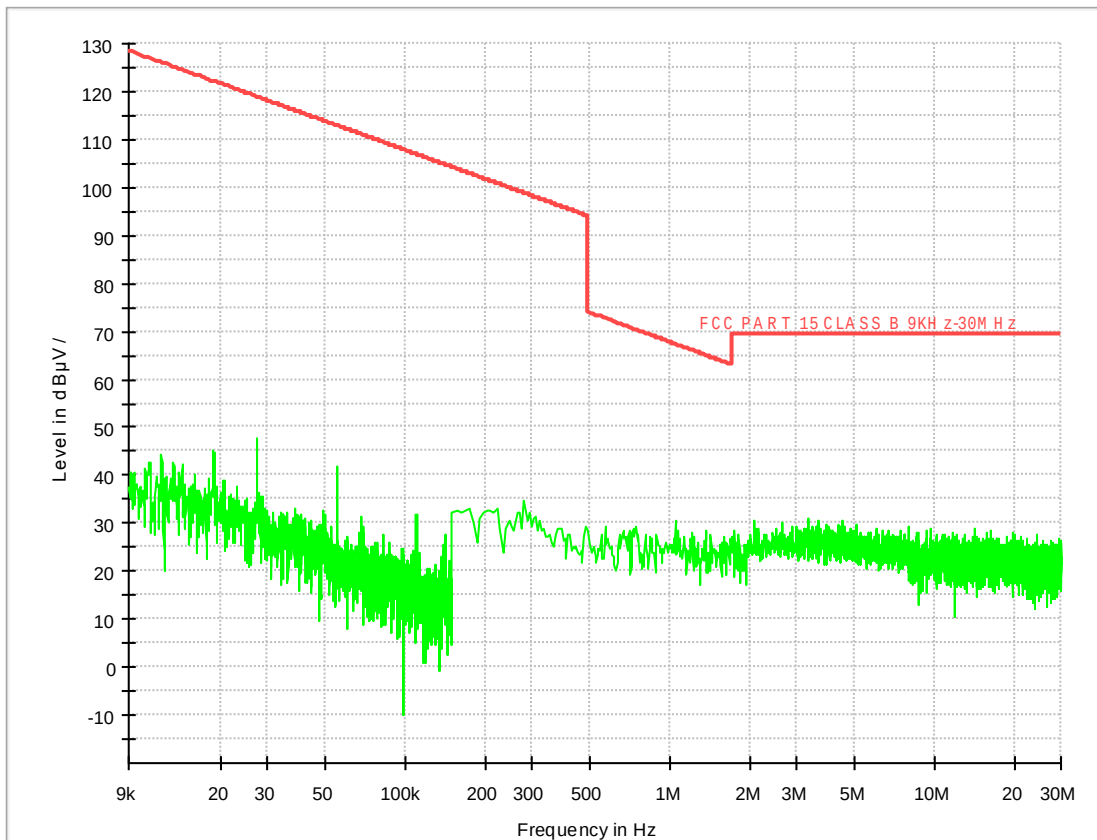
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

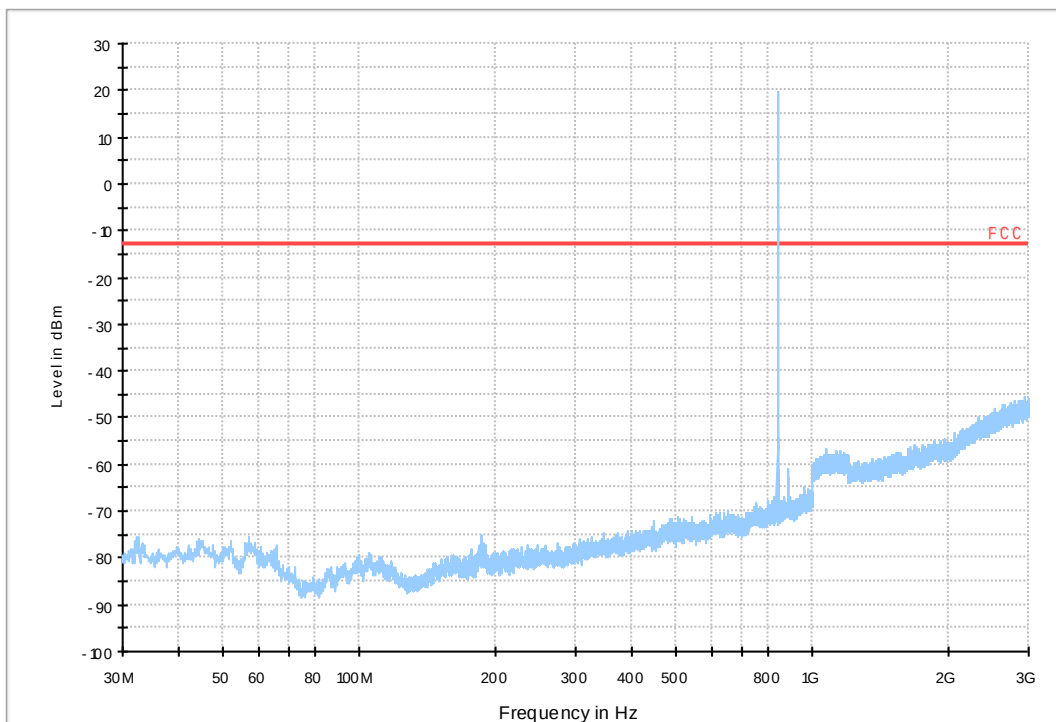
7.1 For GSM

7.1.1 Test Band = GSM850-Ant1

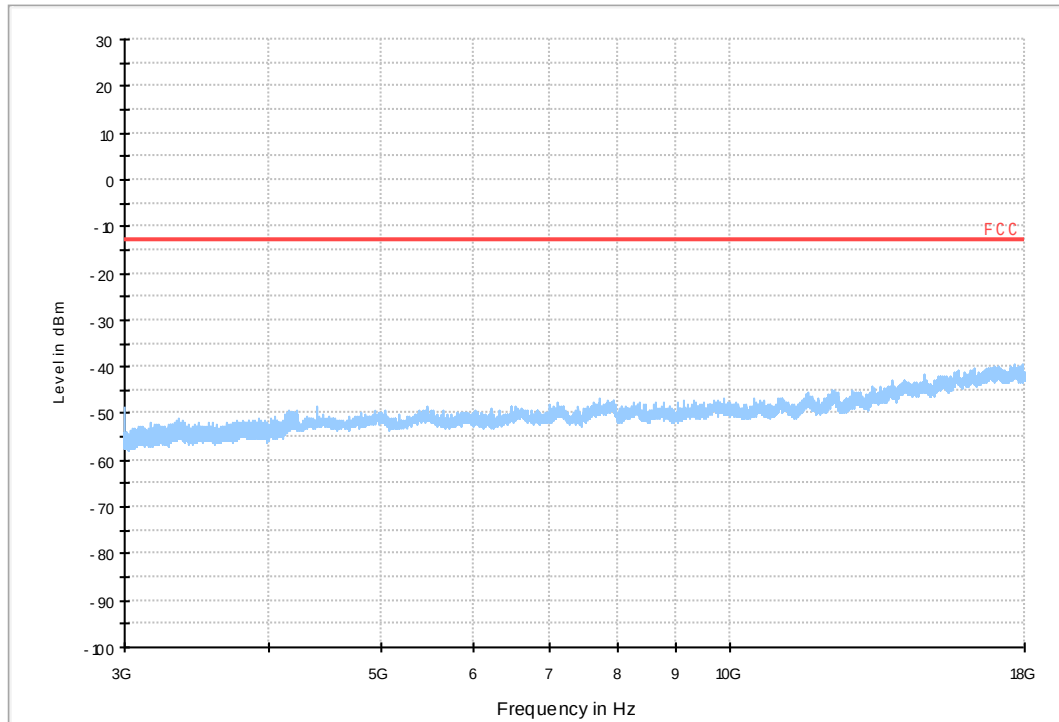
7.1.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

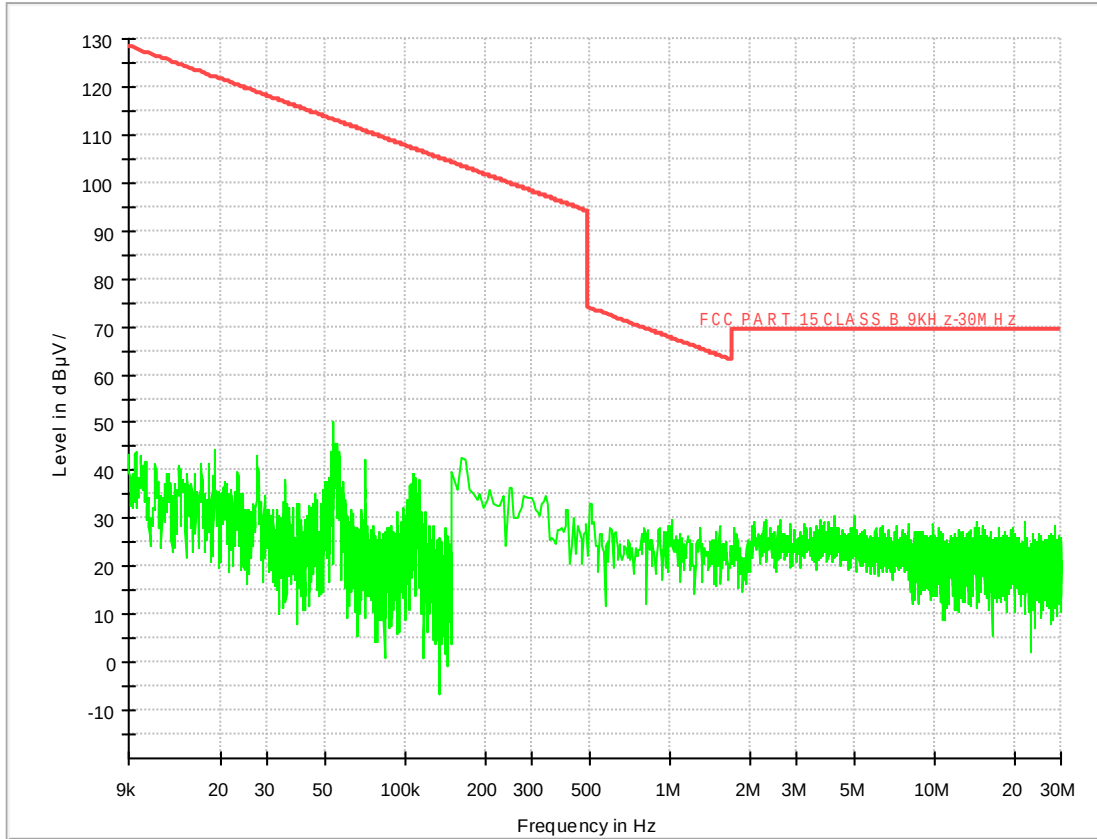


03 FCC PART 22 GSM850_H

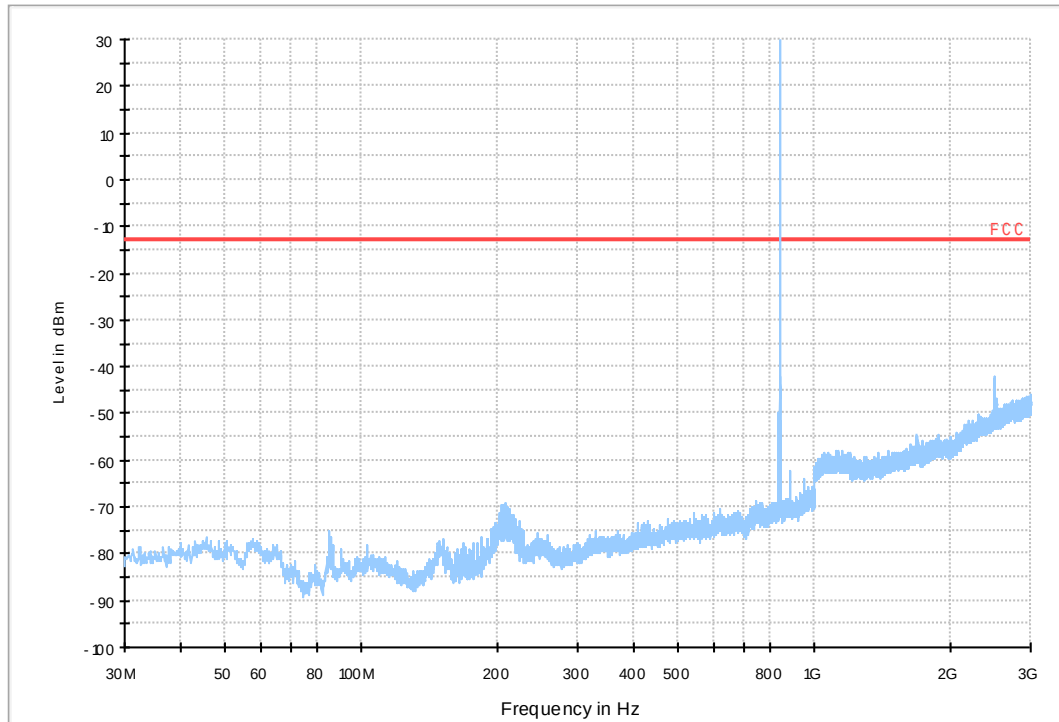


7.1.2 Test Band = GSM850-Ant2

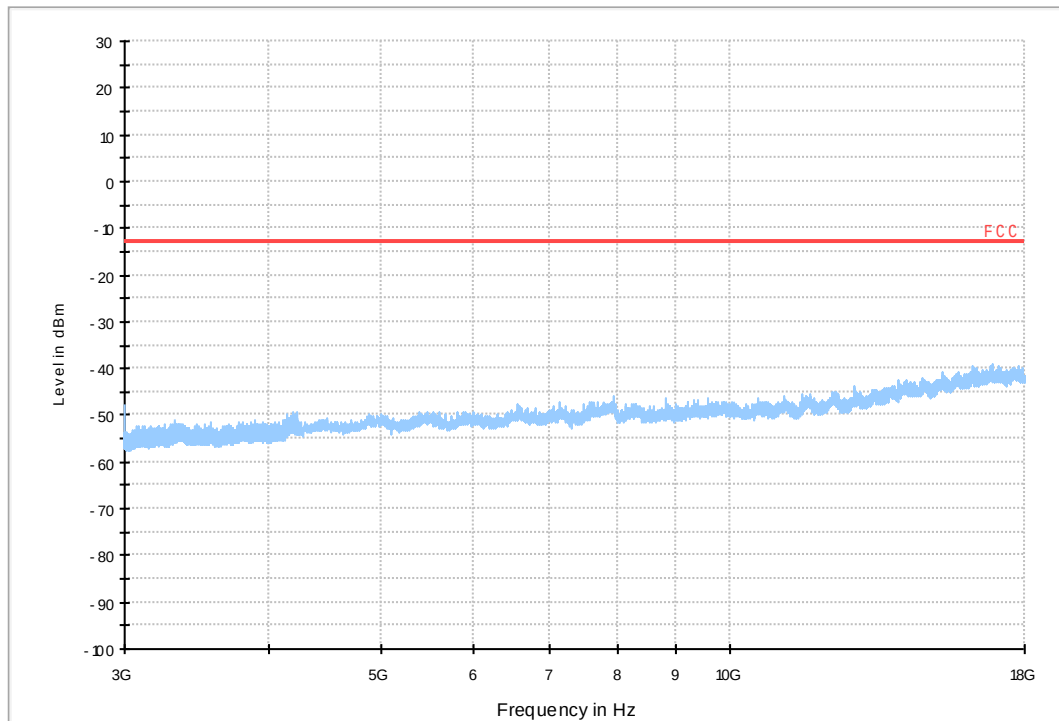
7.1.2.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

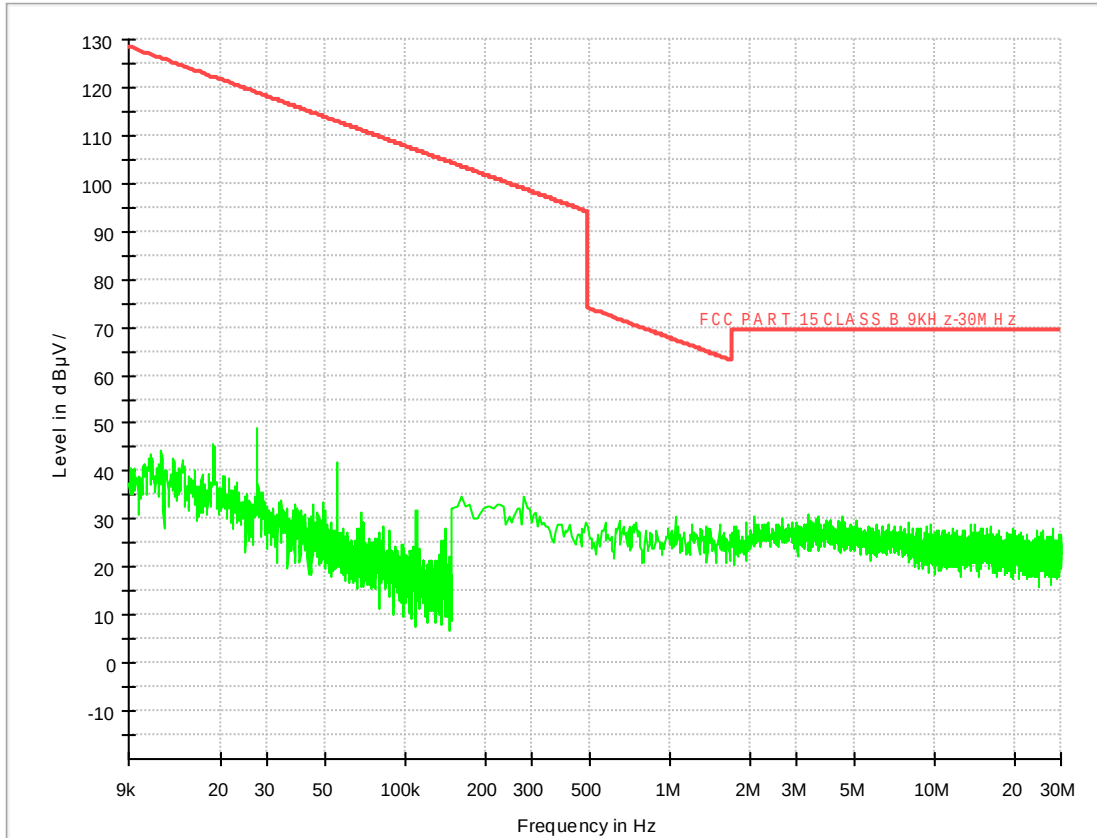


03 FCC PART 22 GSM850_H

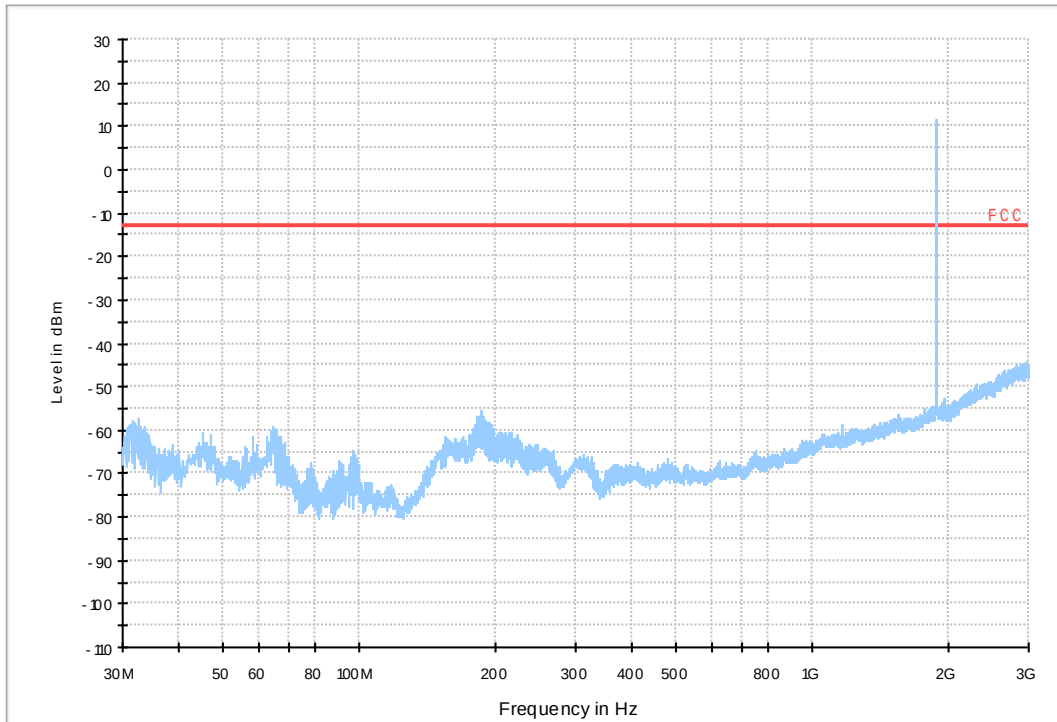


7.1.3 Test Band = GSM1900

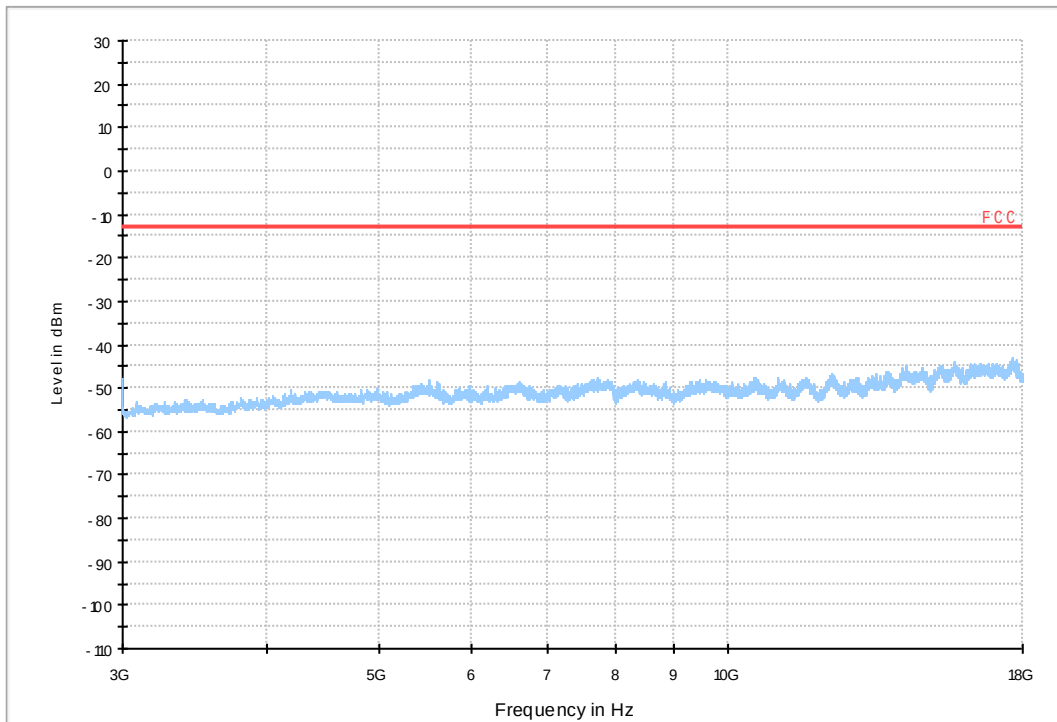
7.1.3.1 Test Mode = GSM/TM1



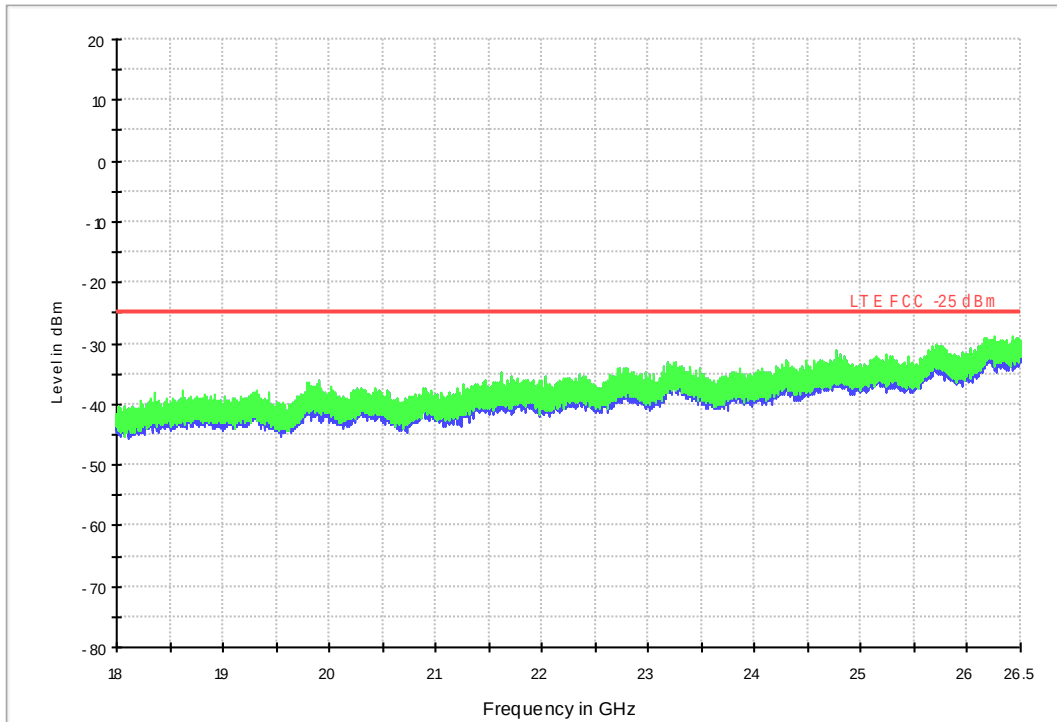
10 FCC PART 24 GSM1900_L



09 FCC PART 24 GSM1900_H

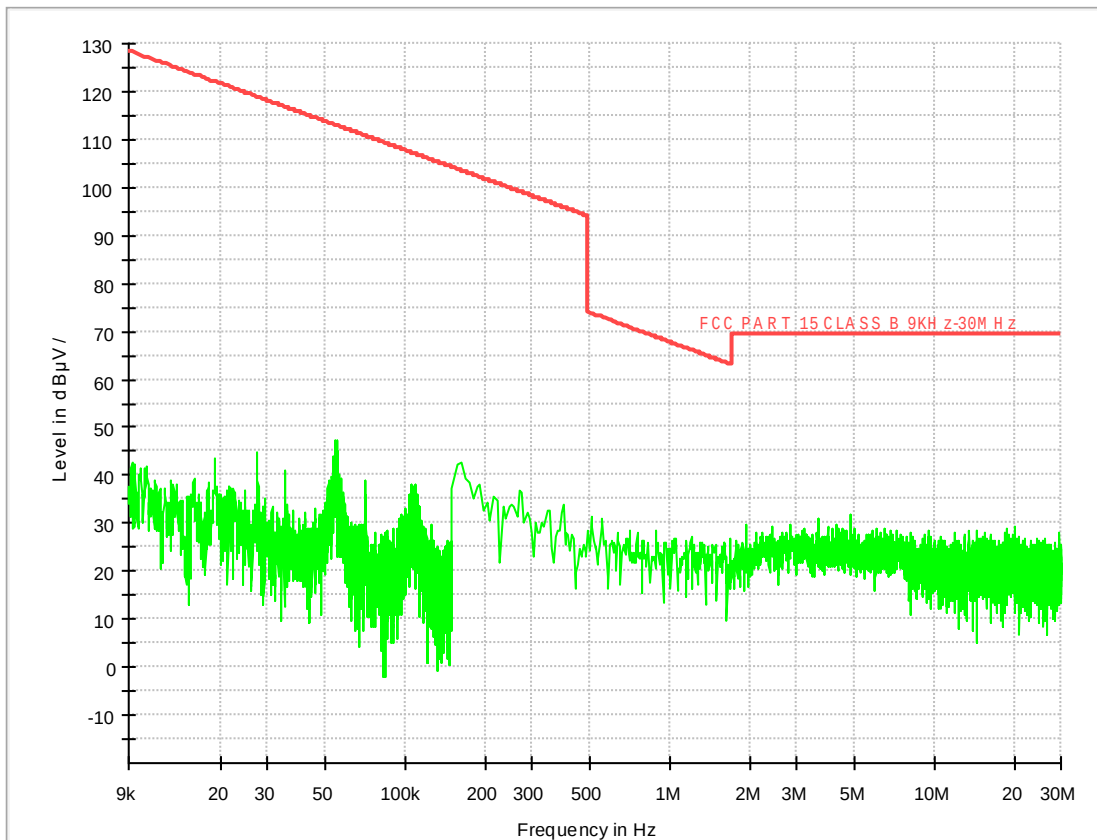


18G~26.5G RSE-TX-DIRECTOR ABOVE 1.5G PK

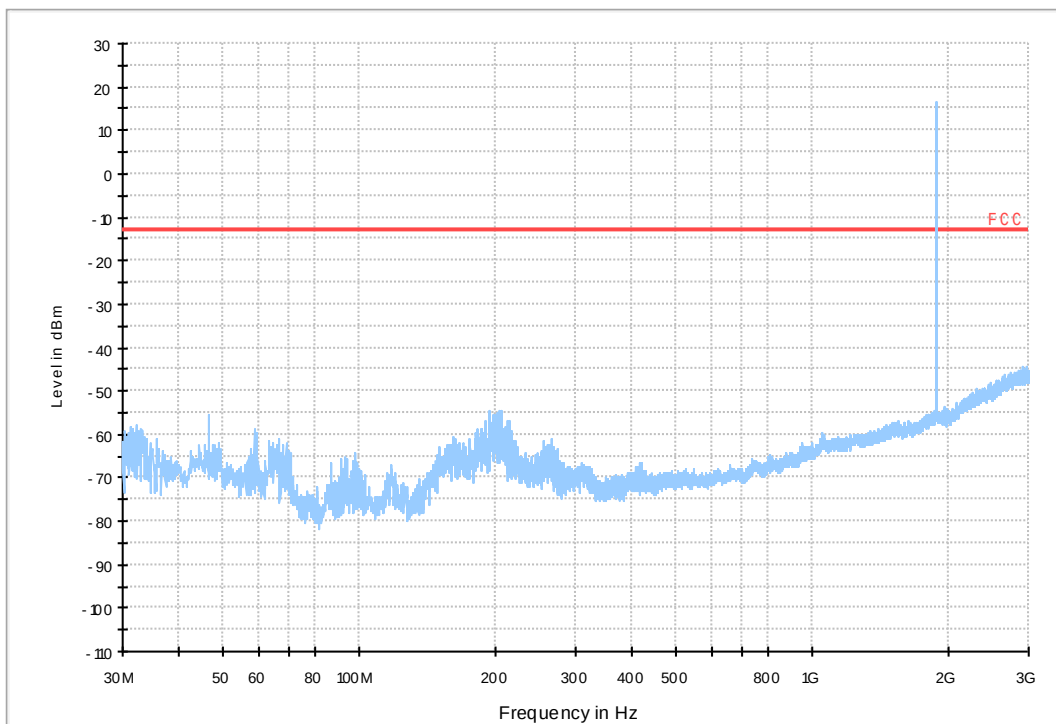


7.1.4 Test Band = GSM1900-Ant2

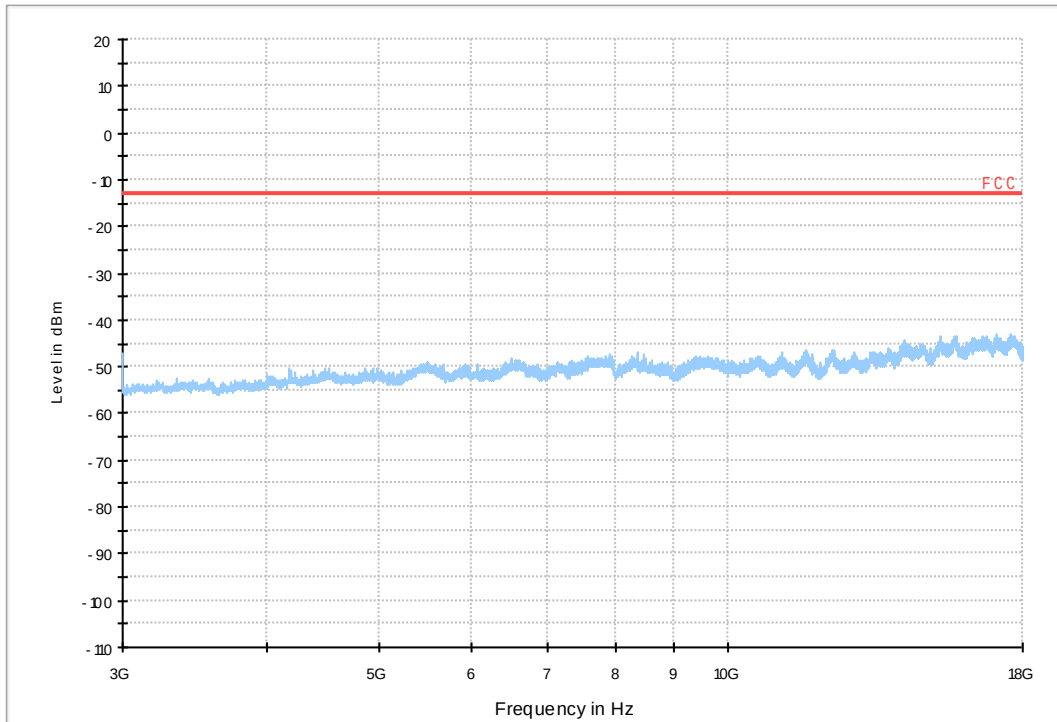
7.1.4.1 Test Mode = GSM/TM1



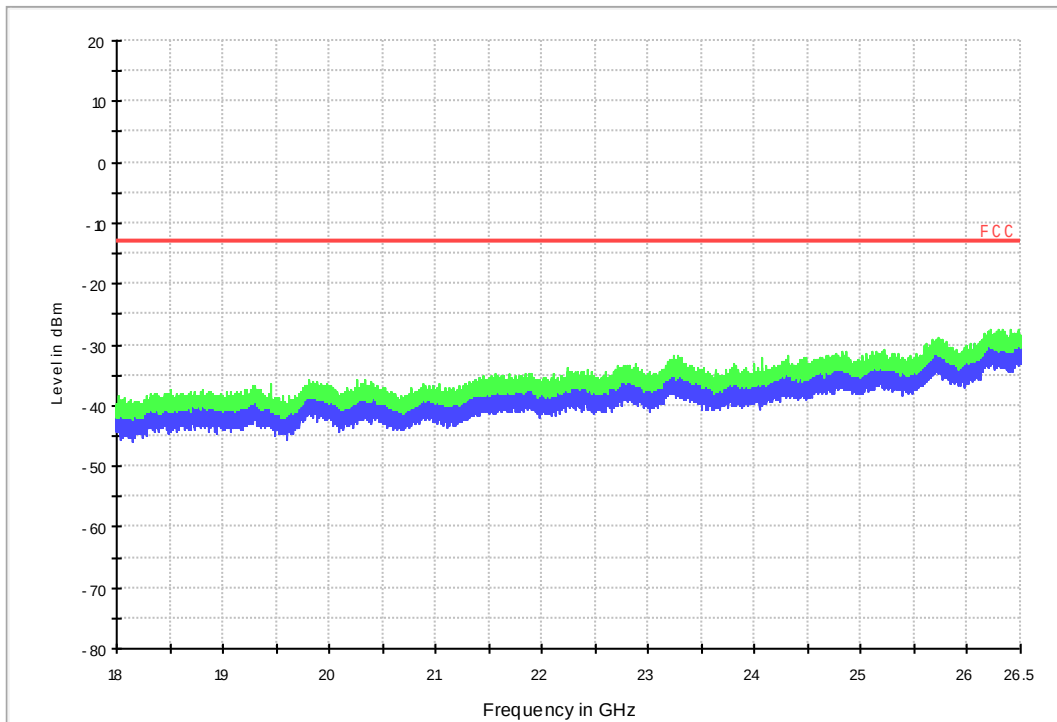
10 FCC PART 24 GSM1900_L



11 FCC PART 24 WCDMA1900_H



18G~26.5G R SE-TX-DIRECT OR 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	-17.24	-0.02092	PASS
				VN	-14.59	-0.0177	PASS
				VH	-14.21	-0.01724	PASS
		MCH	TN	VL	-6.26	-0.00748	PASS
				VN	-7.88	-0.00942	PASS
				VH	-5.75	-0.00687	PASS
		HCH	TN	VL	-8.52	-0.01004	PASS
				VN	-9.17	-0.0108	PASS
				VH	-5.42	-0.00639	PASS
	GSM/TM2	LCH	TN	VL	-4.23	-0.00513	PASS
				VN	-8.75	-0.01062	PASS
				VH	-2.81	-0.00341	PASS
		MCH	TN	VL	-6.33	-0.00757	PASS
				VN	-0.19	-0.00023	PASS
				VH	1.49	0.00178	PASS
		HCH	TN	VL	3.62	0.00426	PASS
				VN	1.68	0.00198	PASS
				VH	0.52	0.00061	PASS
GSM1900	GSM/TM1	LCH	TN	VL	13.50	0.0073	PASS
				VN	23.44	0.01267	PASS
				VH	20.21	0.01092	PASS
		MCH	TN	VL	26.41	0.01405	PASS
				VN	26.54	0.01412	PASS
				VH	20.15	0.01072	PASS
		HCH	TN	VL	26.15	0.01369	PASS
				VN	21.18	0.01109	PASS
				VH	24.02	0.01258	PASS
	GSM/TM2	LCH	TN	VL	29.38	0.01588	PASS
				VN	23.76	0.01284	PASS
				VH	38.23	0.02066	PASS
		MCH	TN	VL	45.36	0.02413	PASS
				VN	34.00	0.01809	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VH	34.19	0.01819	PASS
				VL	38.97	0.02041	PASS
				VN	39.87	0.02088	PASS
				VH	36.58	0.01915	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	-14.79	-0.01794	PASS
				-20	-15.63	-0.01896	PASS
				-10	-15.69	-0.01904	PASS
				0	-18.21	-0.02209	PASS
				10	-15.37	-0.01865	PASS
				20	-16.27	-0.01974	PASS
				30	-12.53	-0.0152	PASS
				40	-16.34	-0.01983	PASS
				50	-13.69	-0.01661	PASS
		MCH	VN	-30	-7.43	-0.00888	PASS
				-20	-9.69	-0.01158	PASS
				-10	-4.97	-0.00594	PASS
				0	-4.91	-0.00587	PASS
				10	-6.91	-0.00826	PASS
				20	-5.04	-0.00602	PASS
				30	-8.33	-0.00996	PASS
				40	-7.36	-0.0088	PASS
				50	-7.17	-0.00857	PASS
		HCH	VN	-30	-8.46	-0.00997	PASS
				-20	-8.98	-0.01058	PASS
				-10	-6.20	-0.0073	PASS
				0	-8.72	-0.01027	PASS
				10	-8.20	-0.00966	PASS
				20	-8.91	-0.0105	PASS
				30	-8.14	-0.00959	PASS
				40	-7.30	-0.0086	PASS
				50	-6.97	-0.00821	PASS
	GSM/TM2	LCH	VN	-30	-6.13	-0.00744	PASS
				-20	-2.97	-0.0036	PASS
				-10	-6.26	-0.0076	PASS
				0	-4.71	-0.00571	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				10	-3.07	-0.00372	PASS
				20	-0.39	-0.00047	PASS
				30	-2.42	-0.00294	PASS
				40	-1.52	-0.00184	PASS
				50	-6.07	-0.00736	PASS
		MCH	VN	-30	-1.55	-0.00185	PASS
				-20	-3.97	-0.00475	PASS
				-10	-0.61	-0.00073	PASS
				0	-1.71	-0.00204	PASS
				10	-2.29	-0.00274	PASS
				20	2.52	0.00301	PASS
				30	-0.77	-0.00092	PASS
				40	-2.68	-0.0032	PASS
				50	1.07	0.00128	PASS
		HCH	VN	-30	-1.81	-0.00213	PASS
				-20	7.43	0.00875	PASS
				-10	-0.36	-0.00042	PASS
				0	2.97	0.0035	PASS
				10	3.49	0.00411	PASS
				20	0.42	0.00049	PASS
				30	4.10	0.00483	PASS
				40	0.58	0.00068	PASS
				50	-2.36	-0.00278	PASS
GSM1900	GSM/TM1	LCH	VN	-30	16.92	0.00914	PASS
				-20	16.72	0.00904	PASS
				-10	19.11	0.01033	PASS
				0	21.24	0.01148	PASS
				10	21.83	0.0118	PASS
				20	19.11	0.01033	PASS
				30	10.33	0.00558	PASS
				40	18.73	0.01012	PASS
				50	15.50	0.00838	PASS
		MCH	VN	-30	28.48	0.01515	PASS
				-20	18.92	0.01006	PASS
				-10	18.08	0.00962	PASS
				0	19.57	0.01041	PASS
				10	23.96	0.01274	PASS
				20	19.05	0.01013	PASS
				30	27.57	0.01466	PASS
				40	18.60	0.00989	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	28.93	0.01539	PASS
				-30	21.44	0.01123	PASS
				-20	22.08	0.01156	PASS
				-10	25.63	0.01342	PASS
				0	24.47	0.01281	PASS
				10	29.32	0.01535	PASS
				20	27.70	0.0145	PASS
				30	22.54	0.0118	PASS
				40	20.92	0.01095	PASS
				50	19.69	0.01031	PASS
	GSM/TM2	LCH	VN	-30	38.94	0.02105	PASS
				-20	38.81	0.02098	PASS
				-10	36.87	0.01993	PASS
				0	31.32	0.01693	PASS
				10	39.00	0.02108	PASS
				20	24.47	0.01323	PASS
				30	39.74	0.02148	PASS
				40	35.51	0.01919	PASS
				50	31.54	0.01705	PASS
		MCH	VN	-30	34.58	0.01839	PASS
				-20	38.42	0.02044	PASS
				-10	50.37	0.02679	PASS
				0	45.10	0.02399	PASS
				10	33.64	0.01789	PASS
				20	43.46	0.02312	PASS
				30	43.94	0.02337	PASS
				40	40.87	0.02174	PASS
				50	40.29	0.02143	PASS
		HCH	VN	-30	46.46	0.02433	PASS
				-20	28.22	0.01478	PASS
				-10	37.97	0.01988	PASS
				0	36.42	0.01907	PASS
				10	32.09	0.0168	PASS
				20	43.17	0.0226	PASS
				30	34.87	0.01826	PASS
				40	35.16	0.01841	PASS
				50	46.46	0.02433	PASS

END