



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	32.87	27.89	38.5	PASS
		MCH	32.89	27.76	38.5	PASS
		HCH	33	27.72	38.5	PASS
	GSM/TM2	LCH	26.38	21.29	38.5	PASS
		MCH	26.08	21.08	38.5	PASS
		HCH	26.02	20.79	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.36	28.39	33	PASS
		MCH	30.08	28.18	33	PASS
		HCH	30.02	28.17	33	PASS
	GSM/TM2	LCH	25.7	23.91	33	PASS
		MCH	25.77	24.05	33	PASS
		HCH	25.62	23.68	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	0.1	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	3.22	13	PASS
		MCH	3.07	13	PASS
		HCH	3.18	13	PASS
GSM1900	GSM/TM1	LCH	0.13	13	PASS
		MCH	0.12	13	PASS
		HCH	0.12	13	PASS
	GSM/TM2	LCH	2.97	13	PASS
		MCH	3	13	PASS
		HCH	2.97	13	PASS

3Appendix_C: Modulation Characteristics

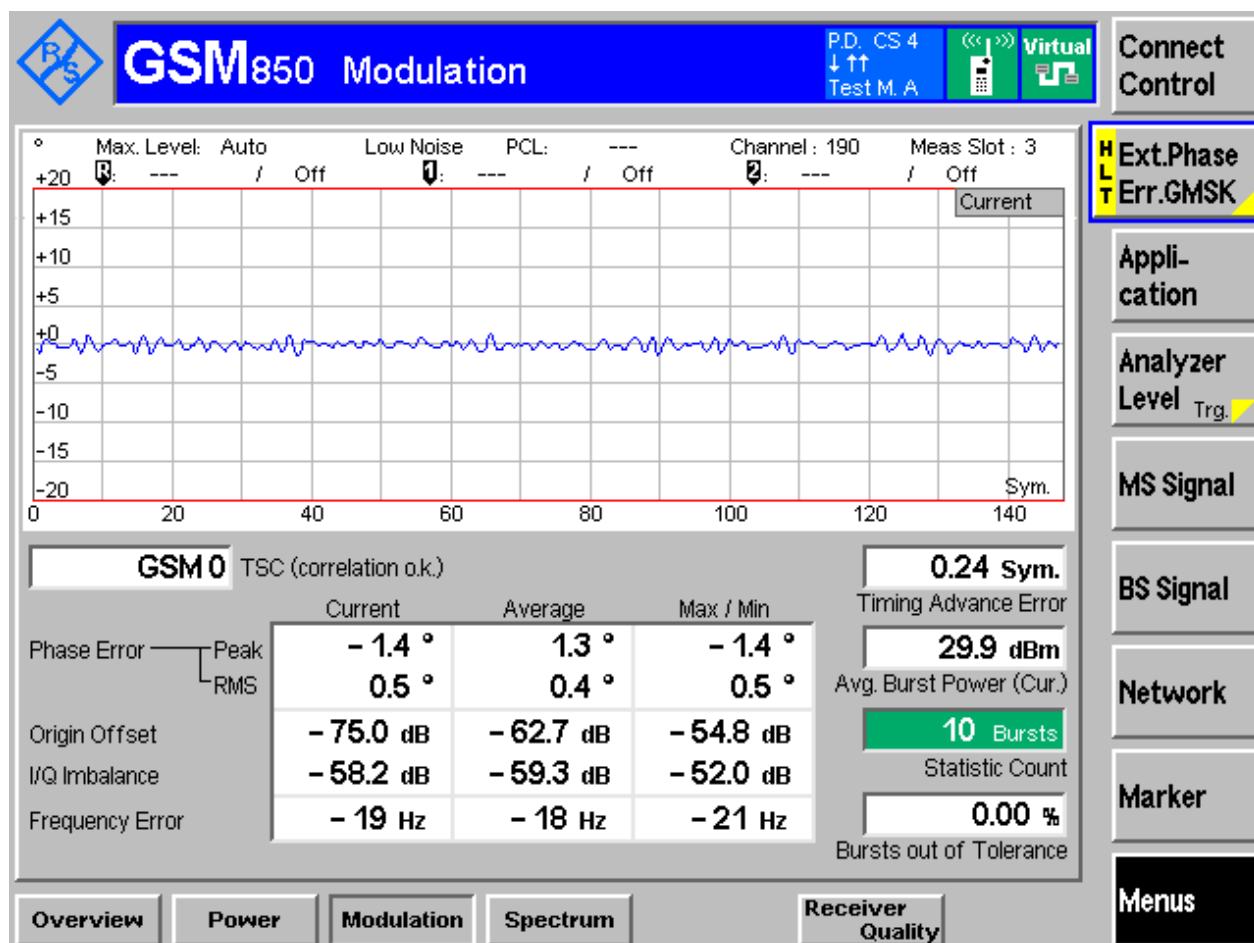
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

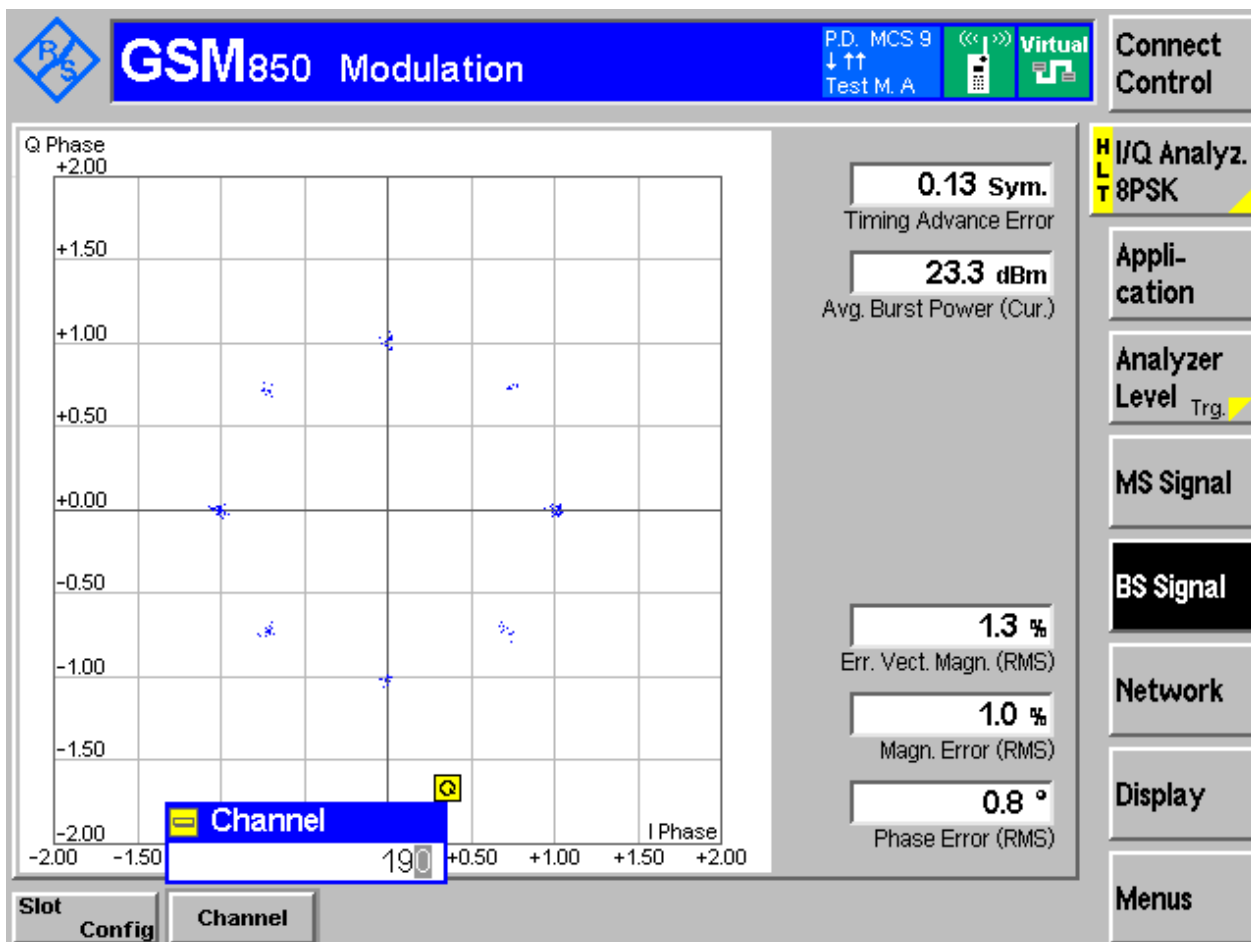
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

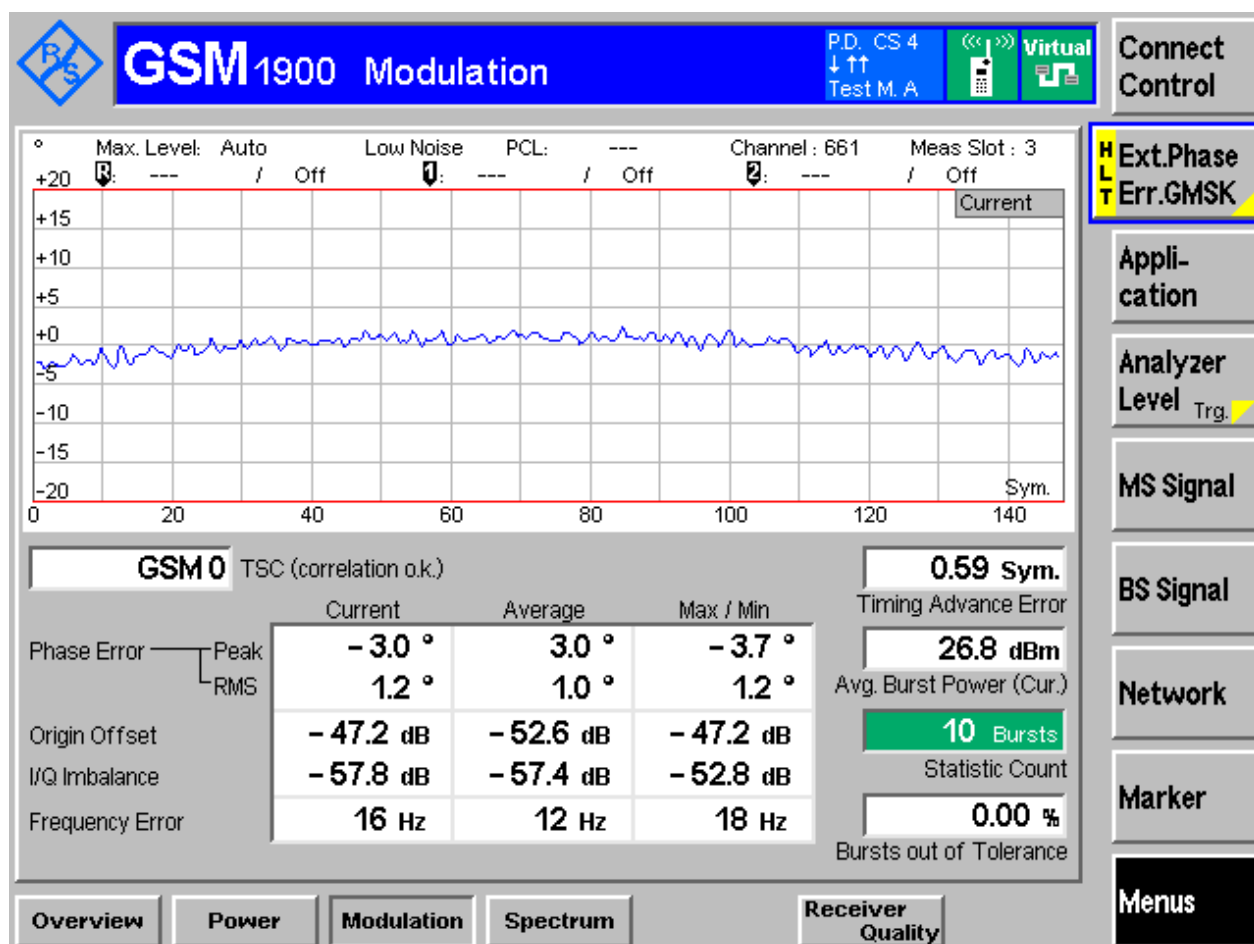
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

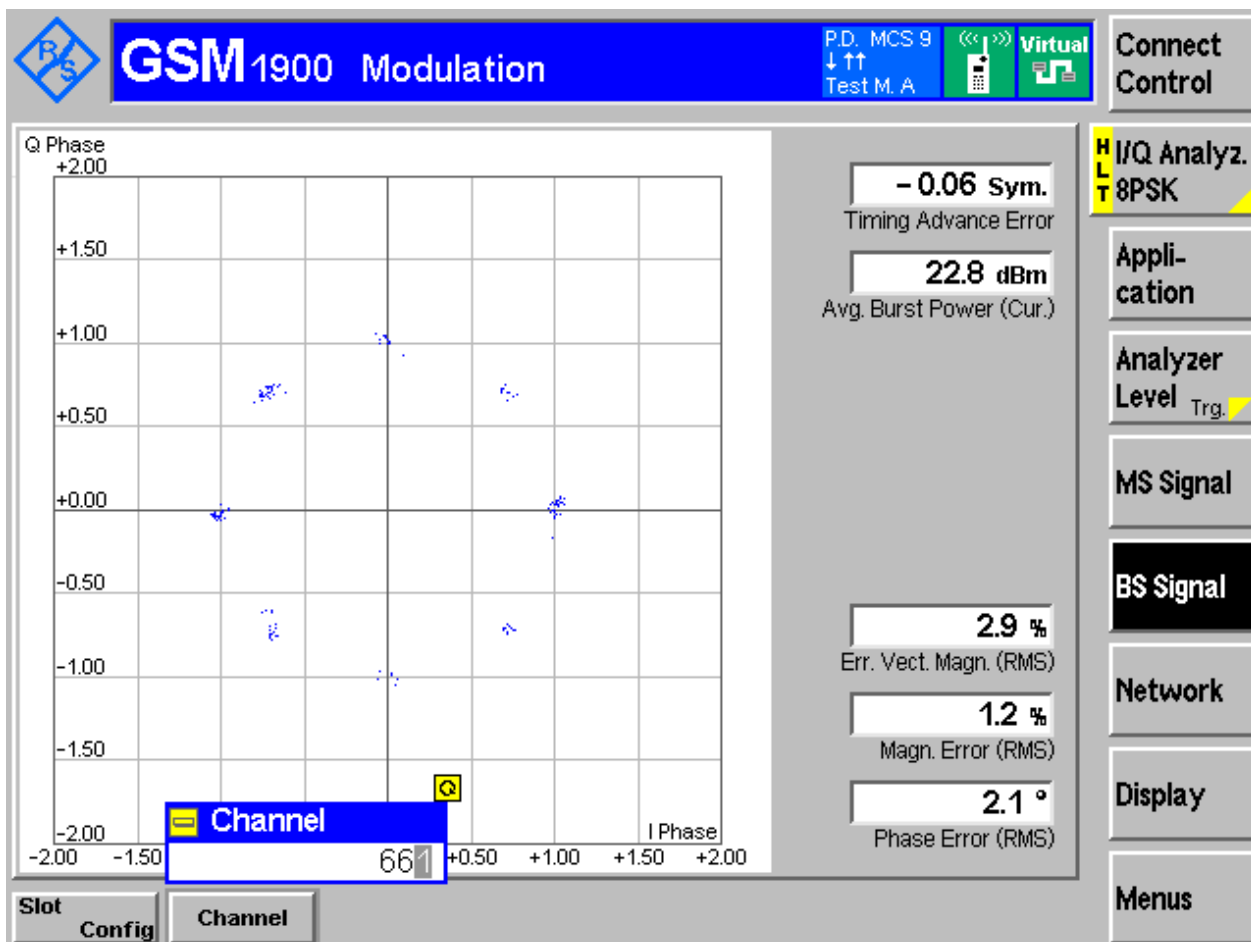
3.1.2.1 Test Mode = GSM/TM1

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	248.44	313.70	Pass
		MCH	245.70	315.00	Pass
		HCH	248.00	319.29	Pass
	GSM/TM2	LCH	252.46	317.64	Pass
		MCH	243.55	316.16	Pass
		HCH	249.03	315.94	Pass
GSM1900	GSM/TM1	LCH	242.37	312.57	Pass
		MCH	243.01	312.63	Pass
		HCH	242.72	317.11	Pass
	GSM/TM2	LCH	252.85	325.31	Pass
		MCH	253.08	322.67	Pass
		HCH	250.73	323.37	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

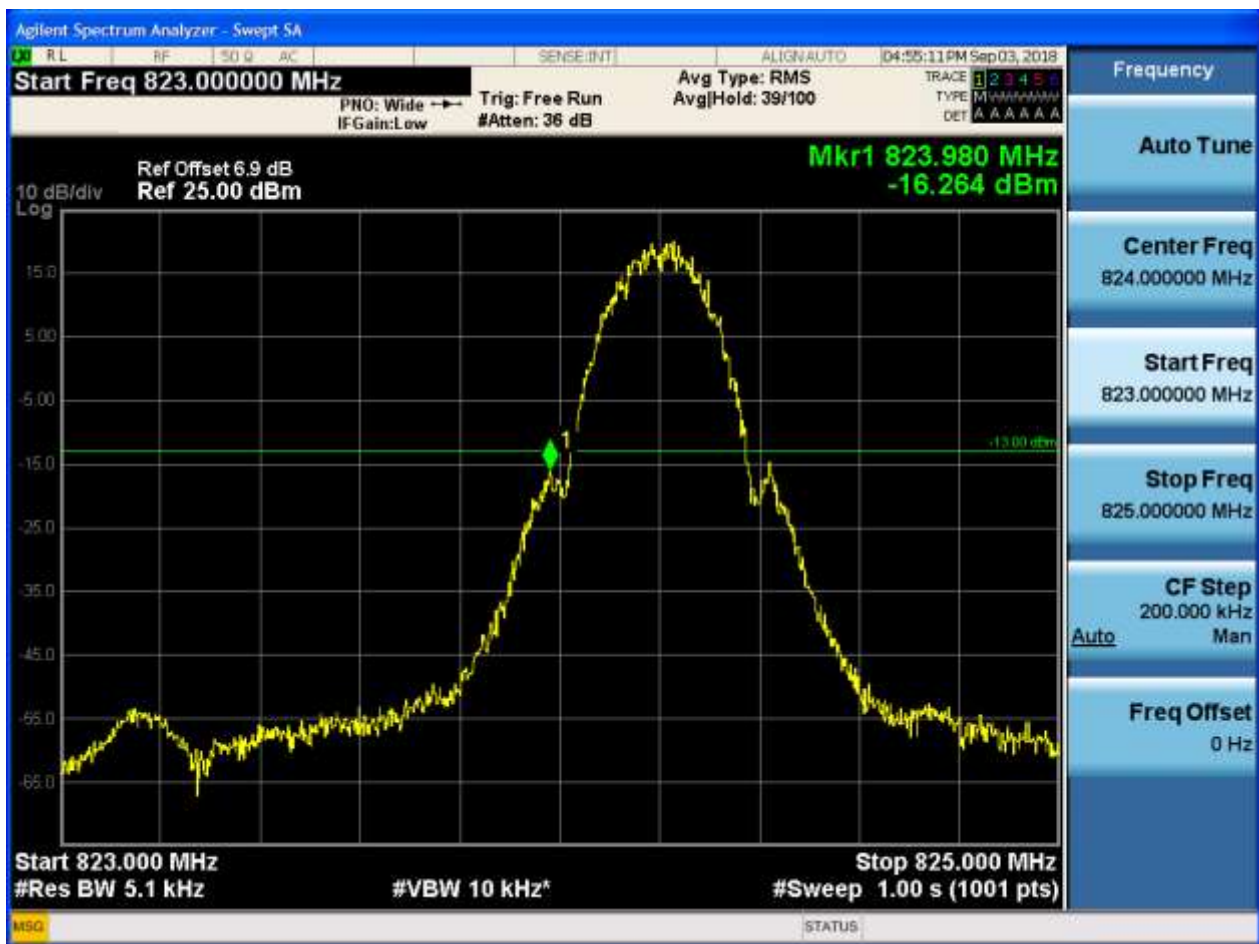
Part I - Test Plots

5.1 For GSM

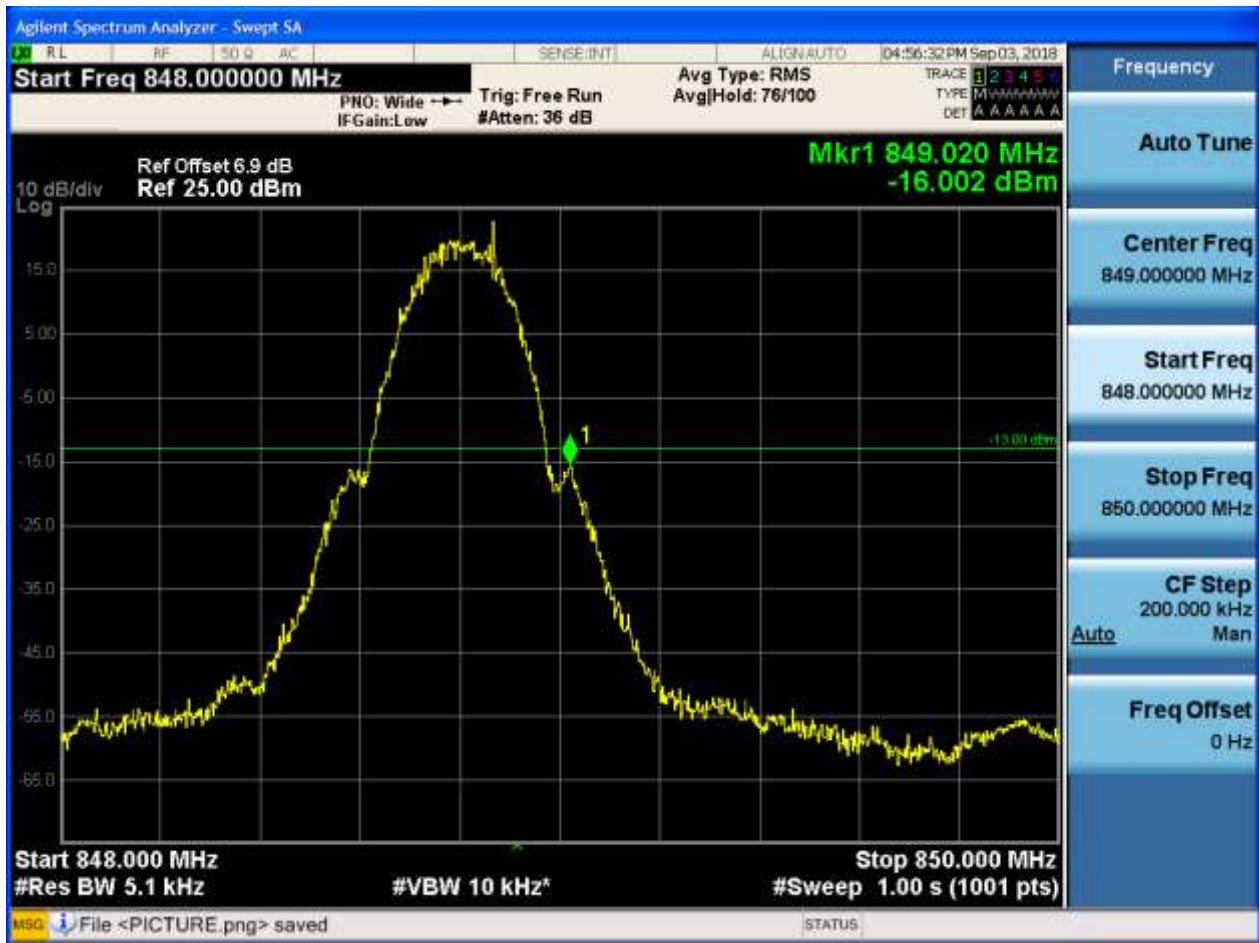
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH



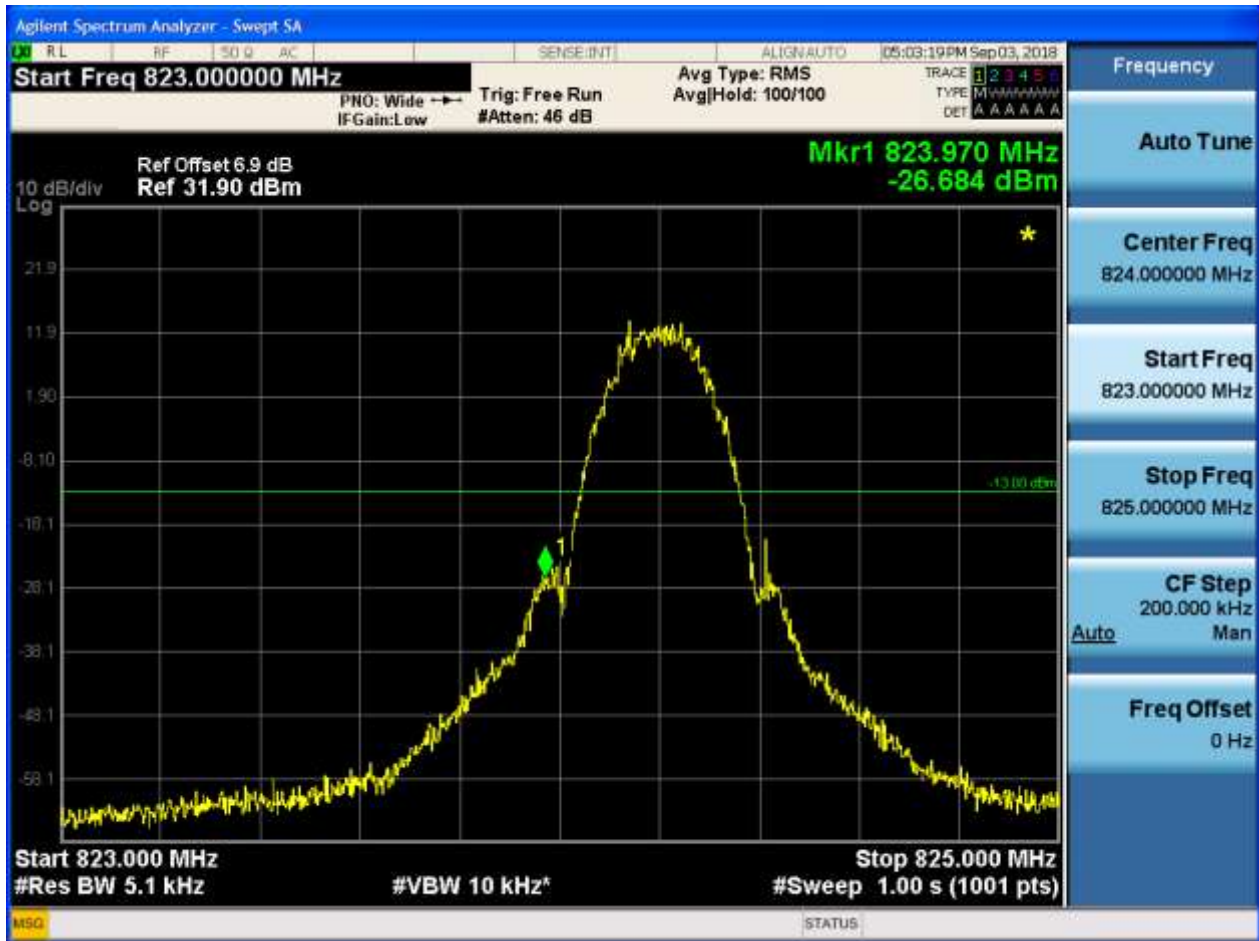
5.1.1.1.2 Test Channel = HCH



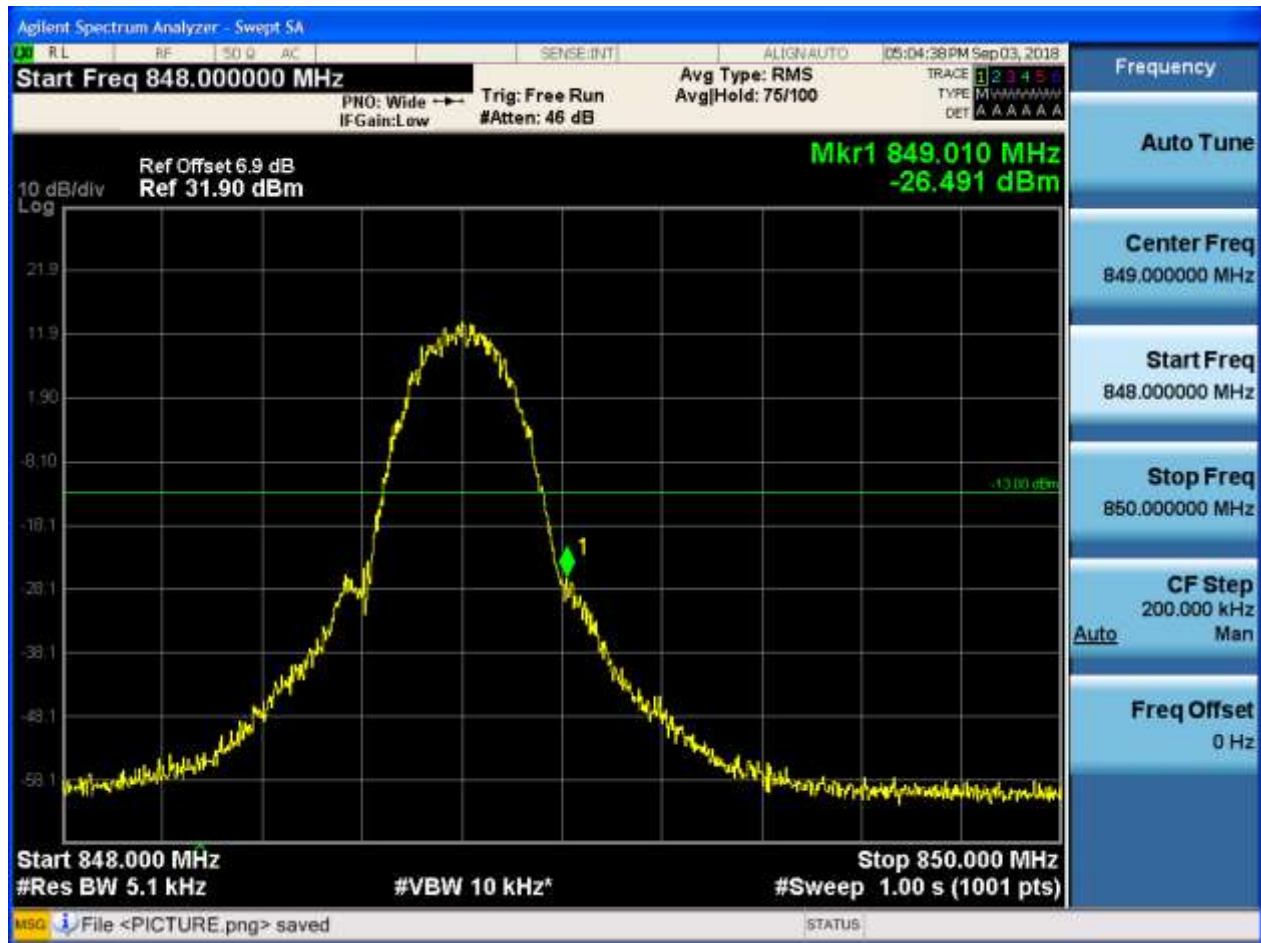


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

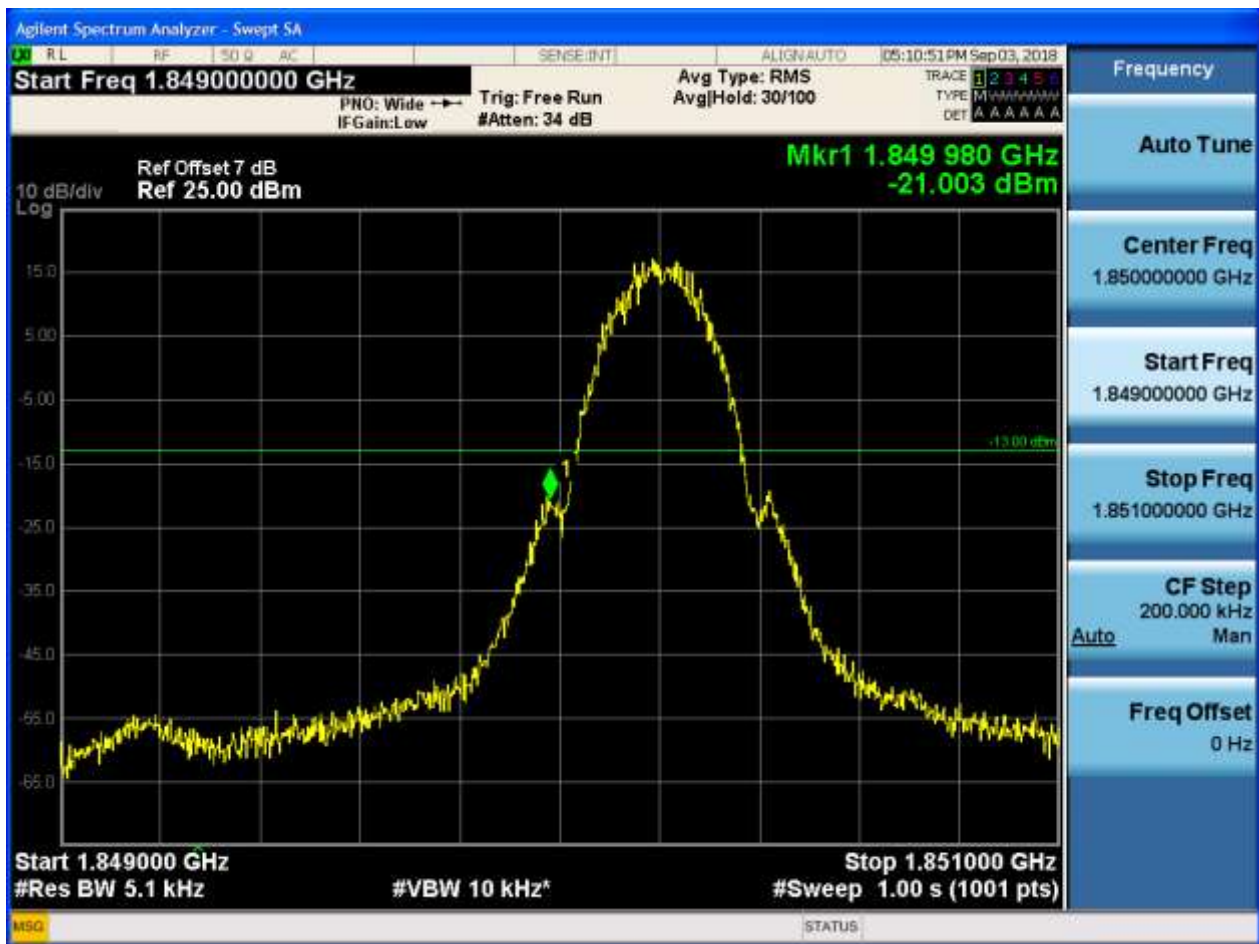




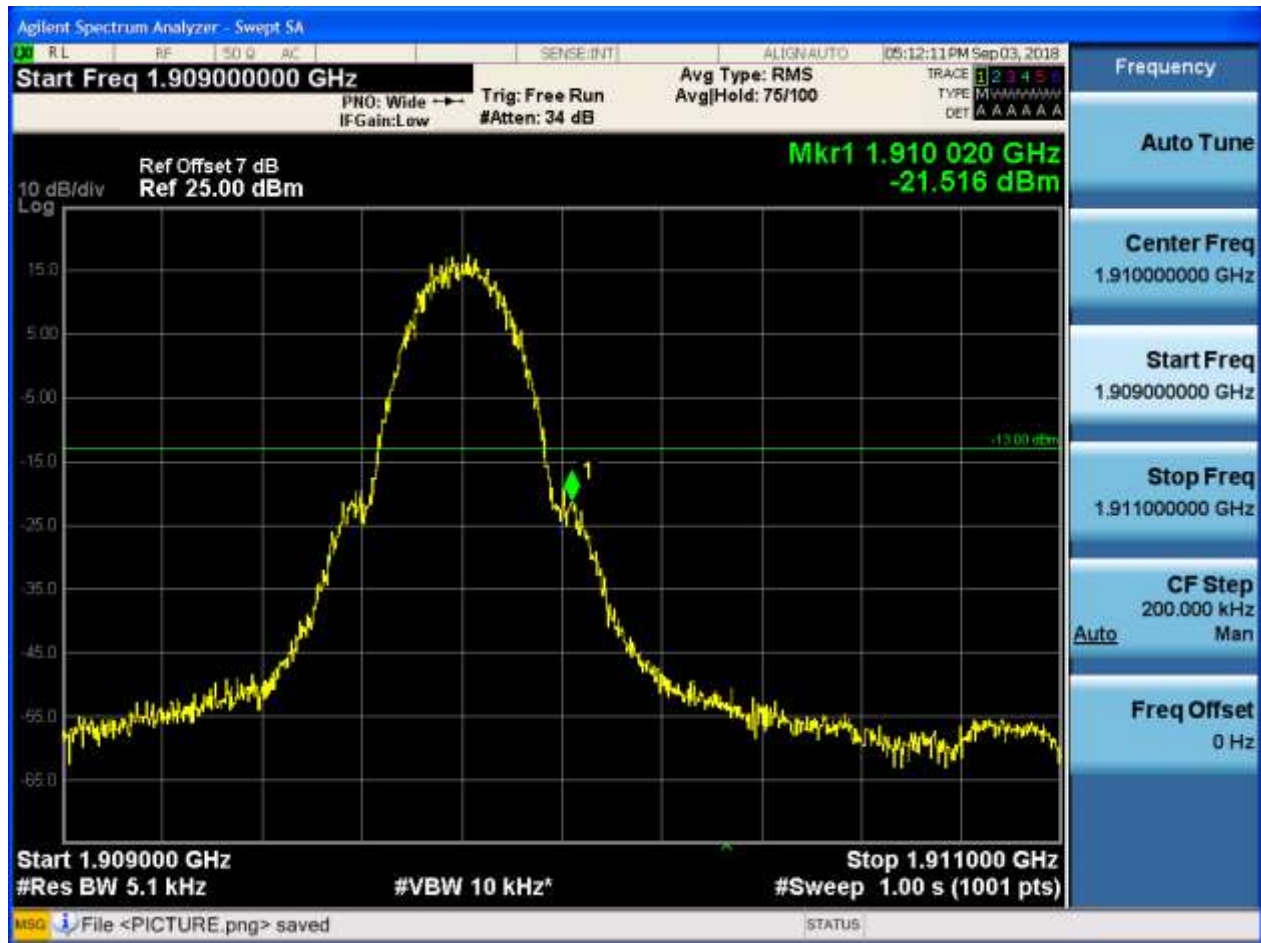
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH



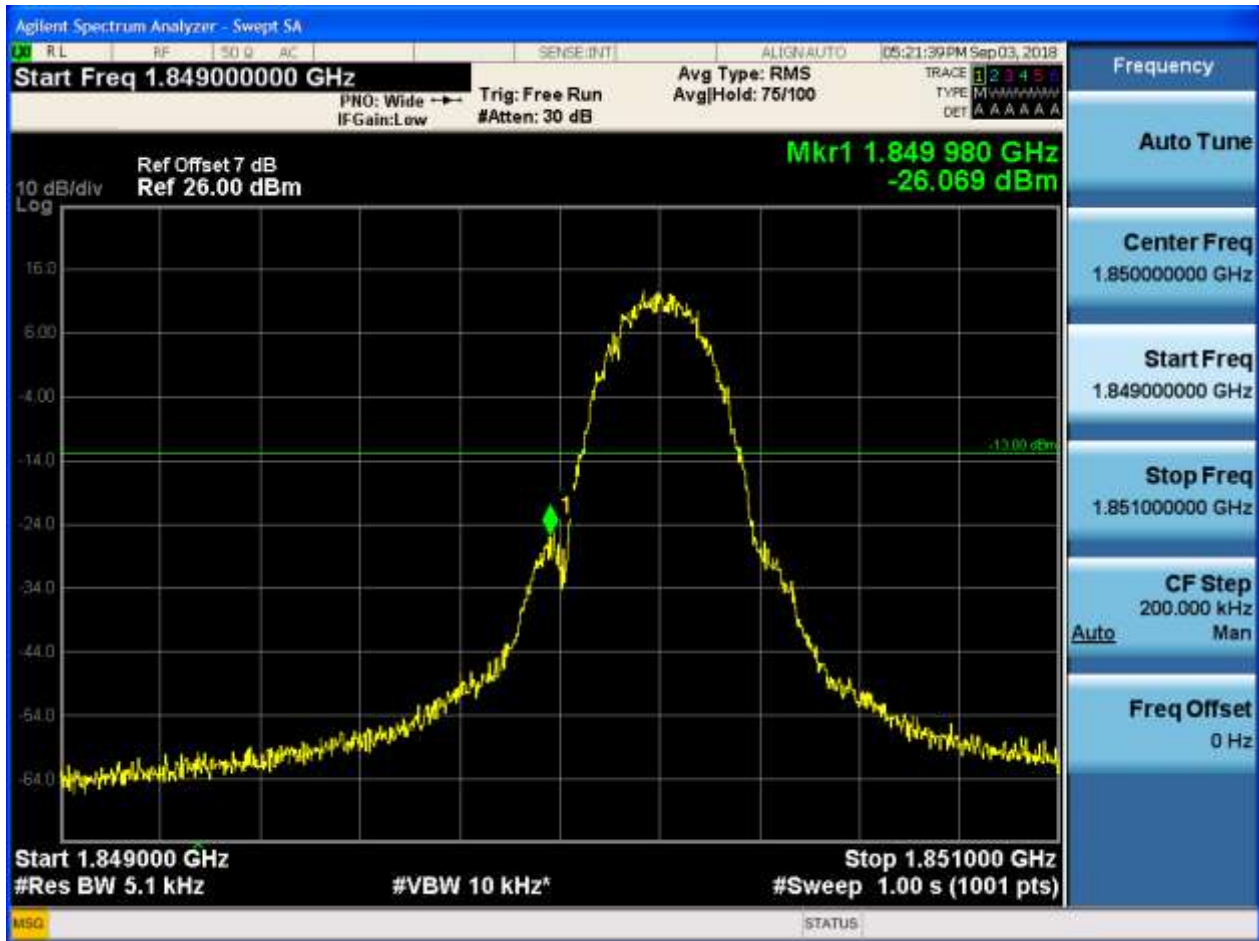
5.1.2.1.2 Test Channel = HCH



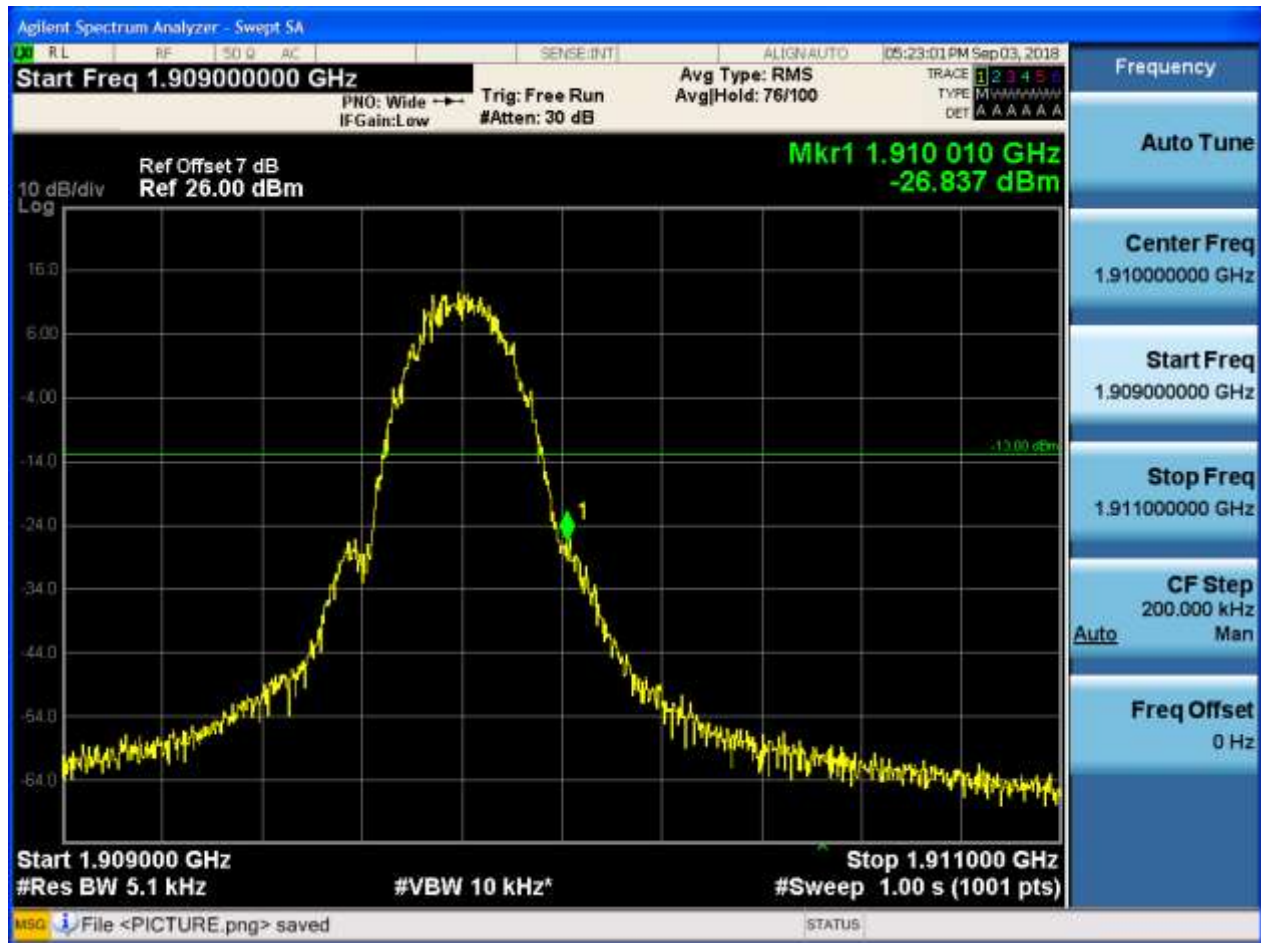


5.1.2.2 Test Mode = GSM/TM2

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

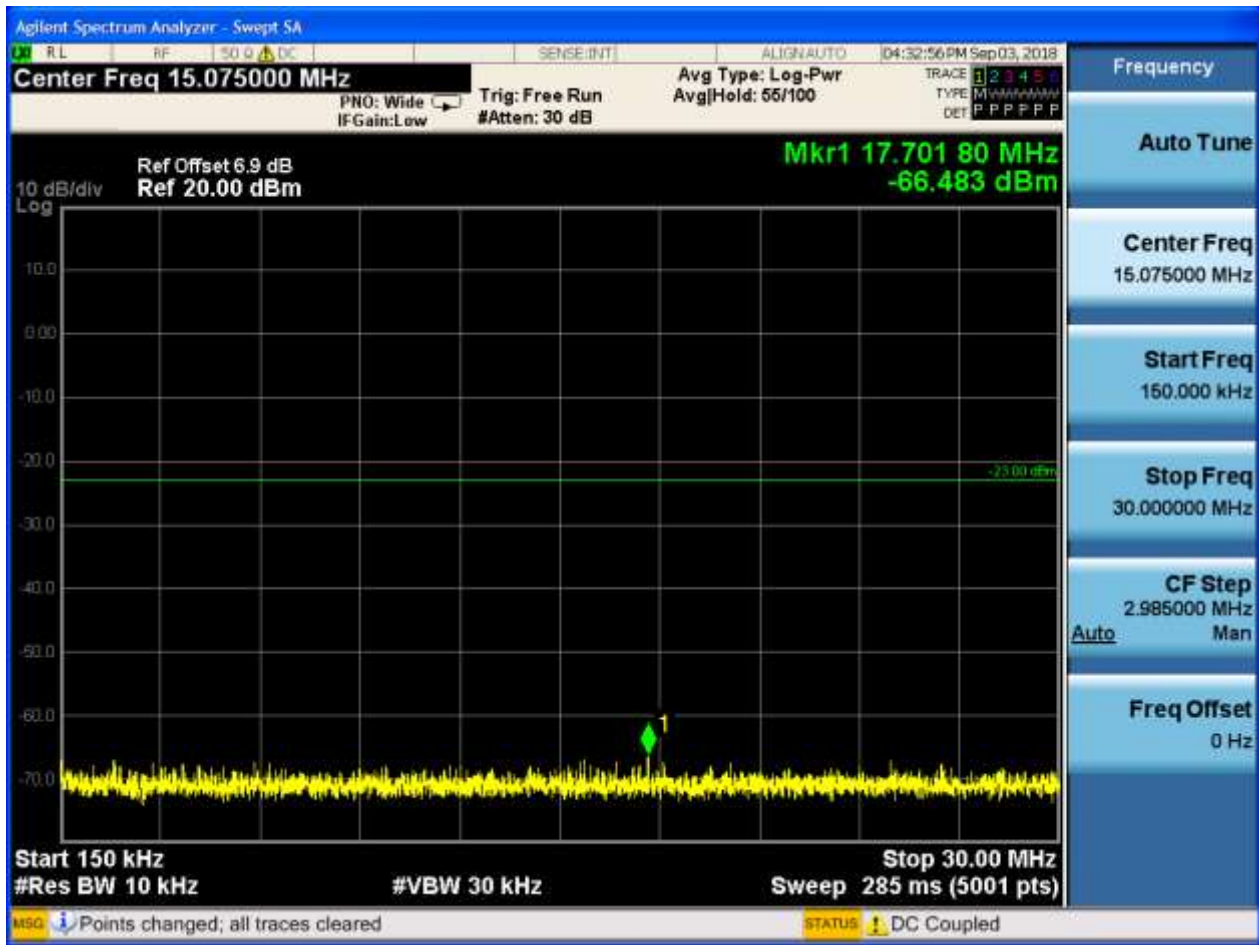
6.1 For GSM

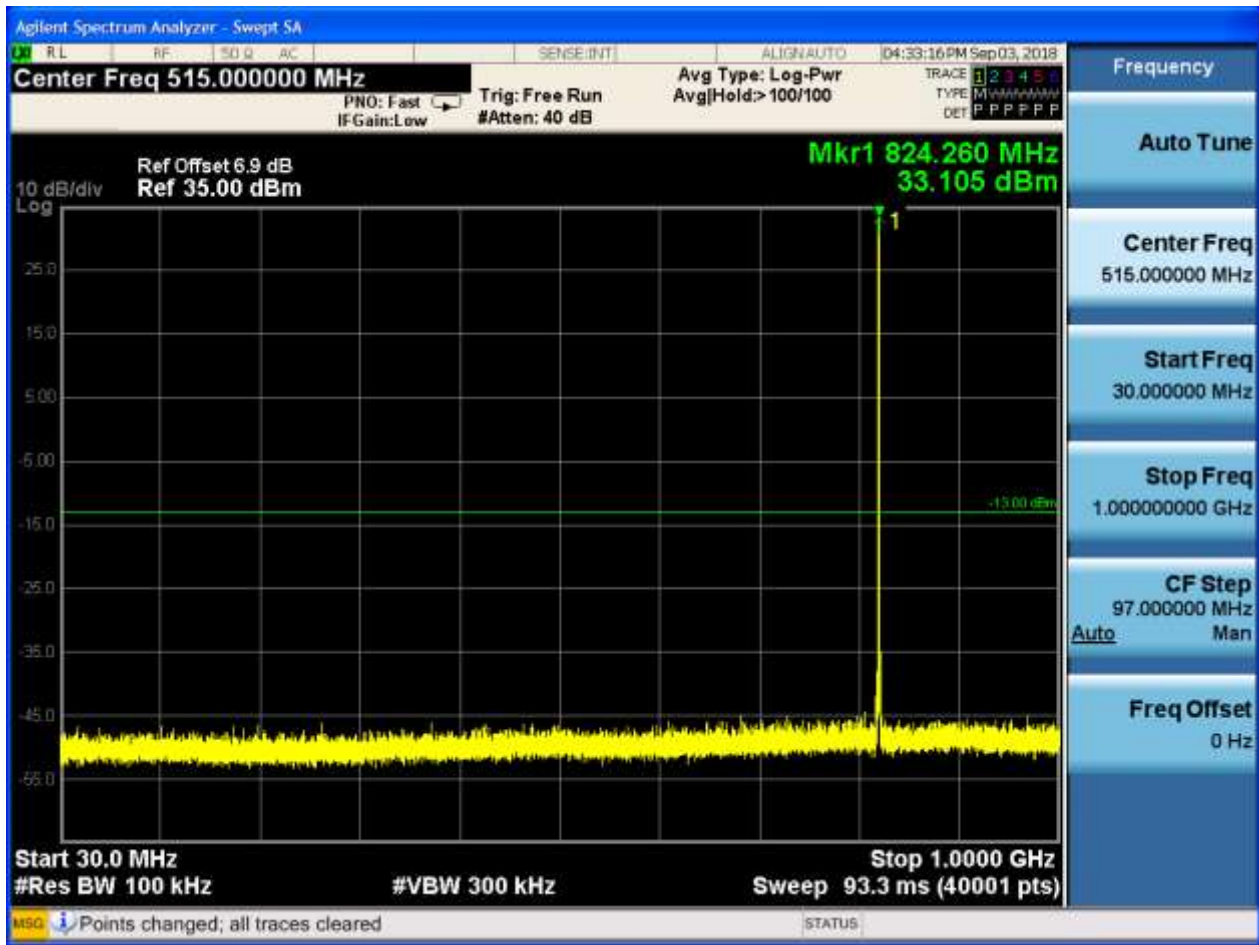
6.1.1 Test Band = GSM850

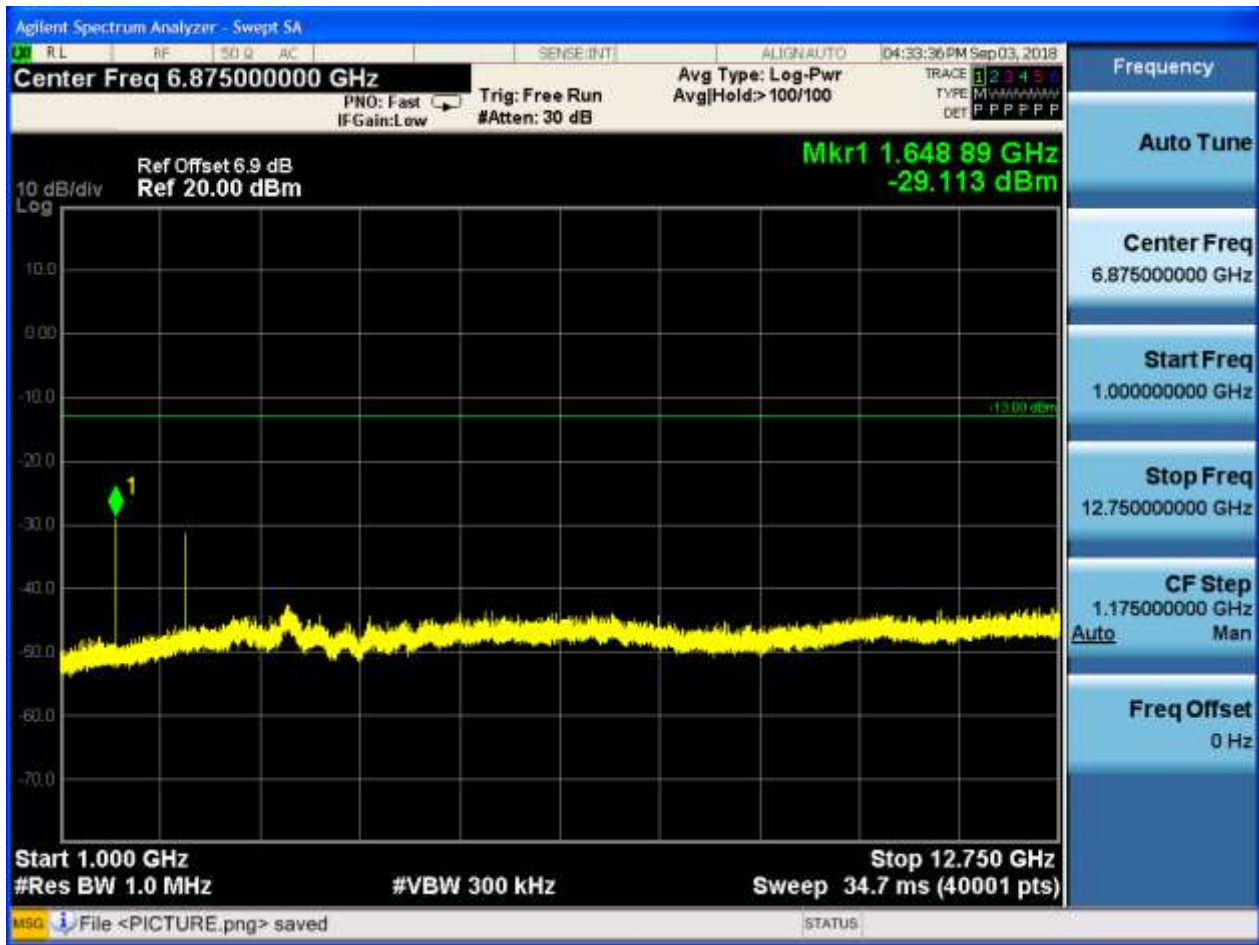
6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



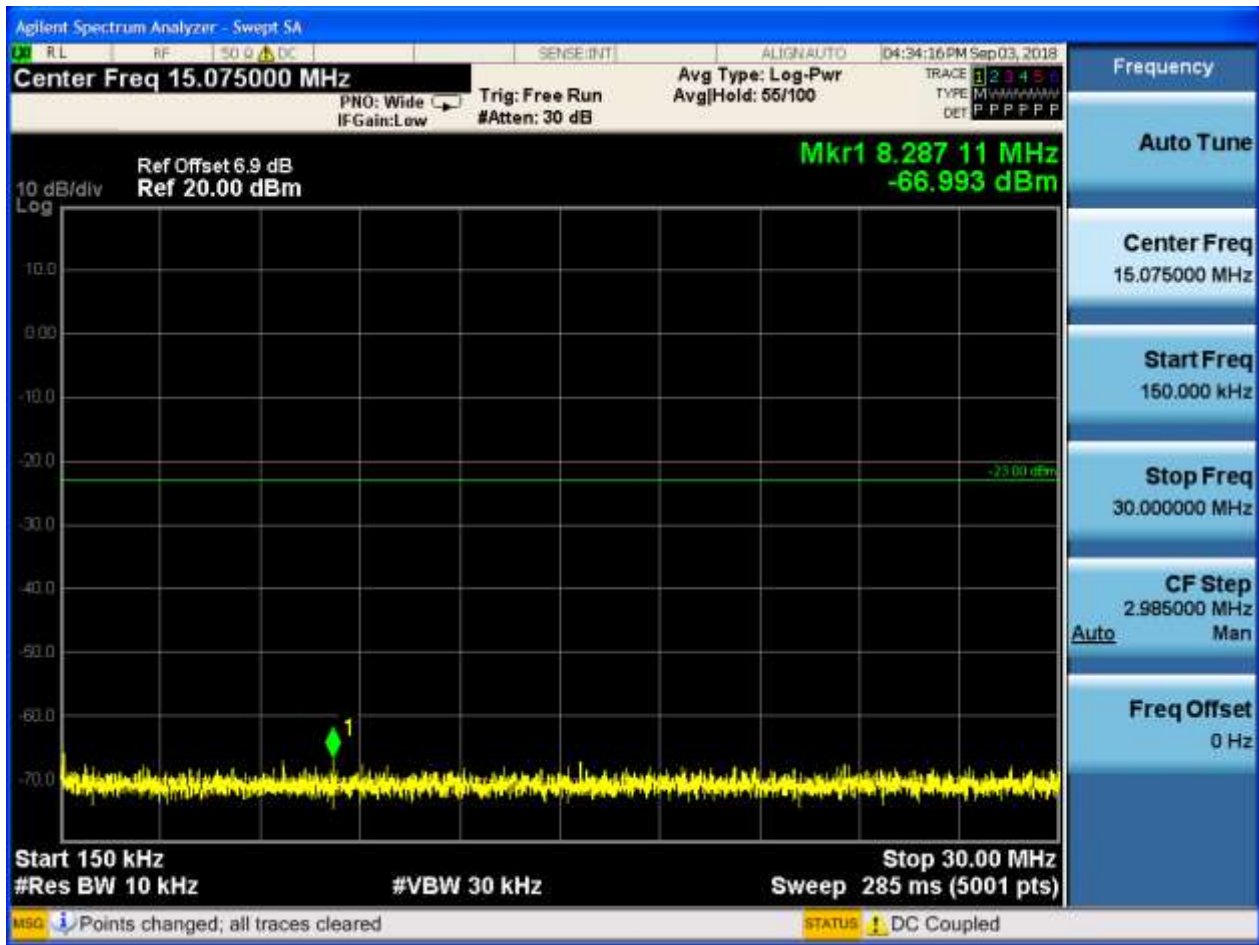


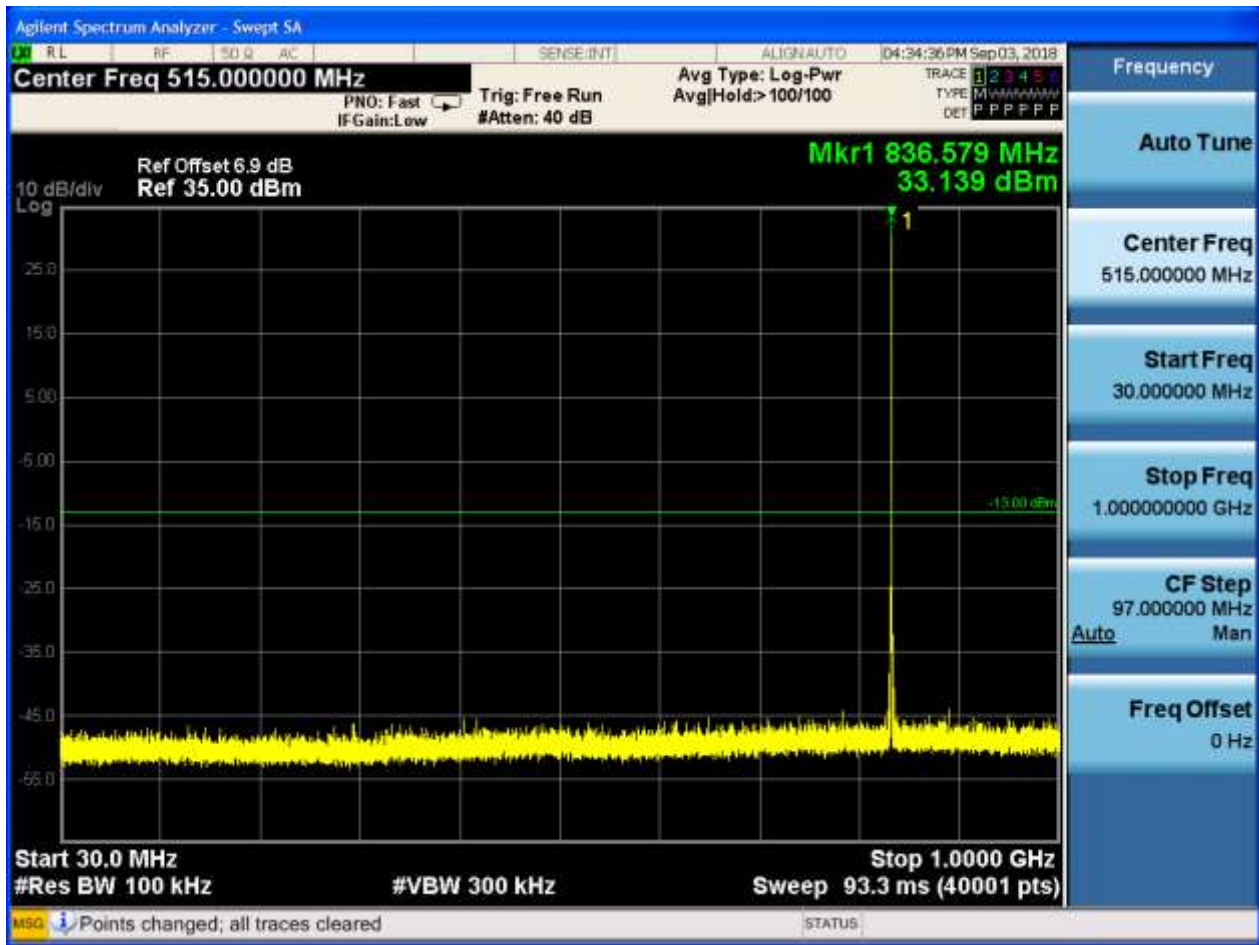




6.1.1.1.2 Test Channel = MCH

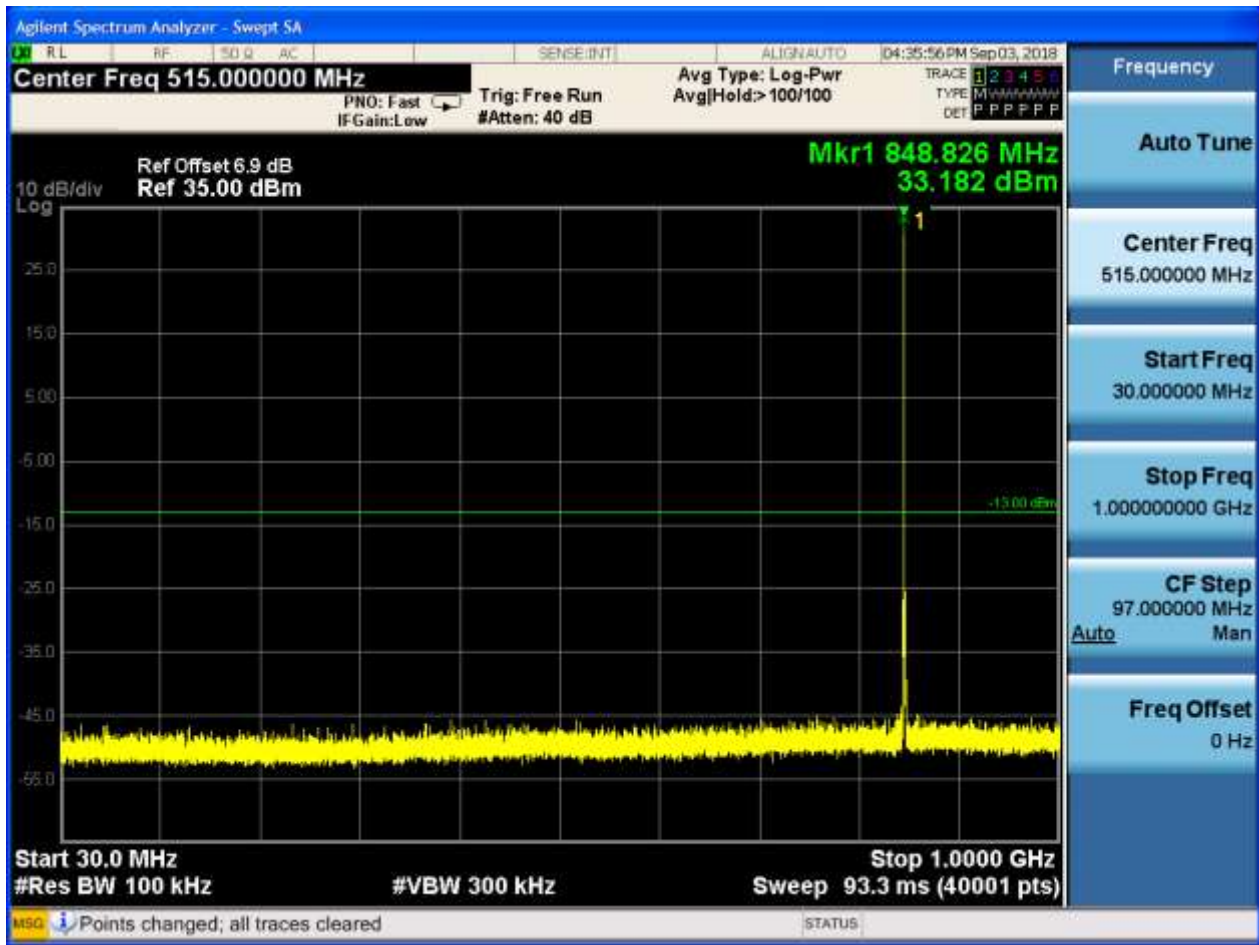






6.1.1.1.3 Test Channel = HCH





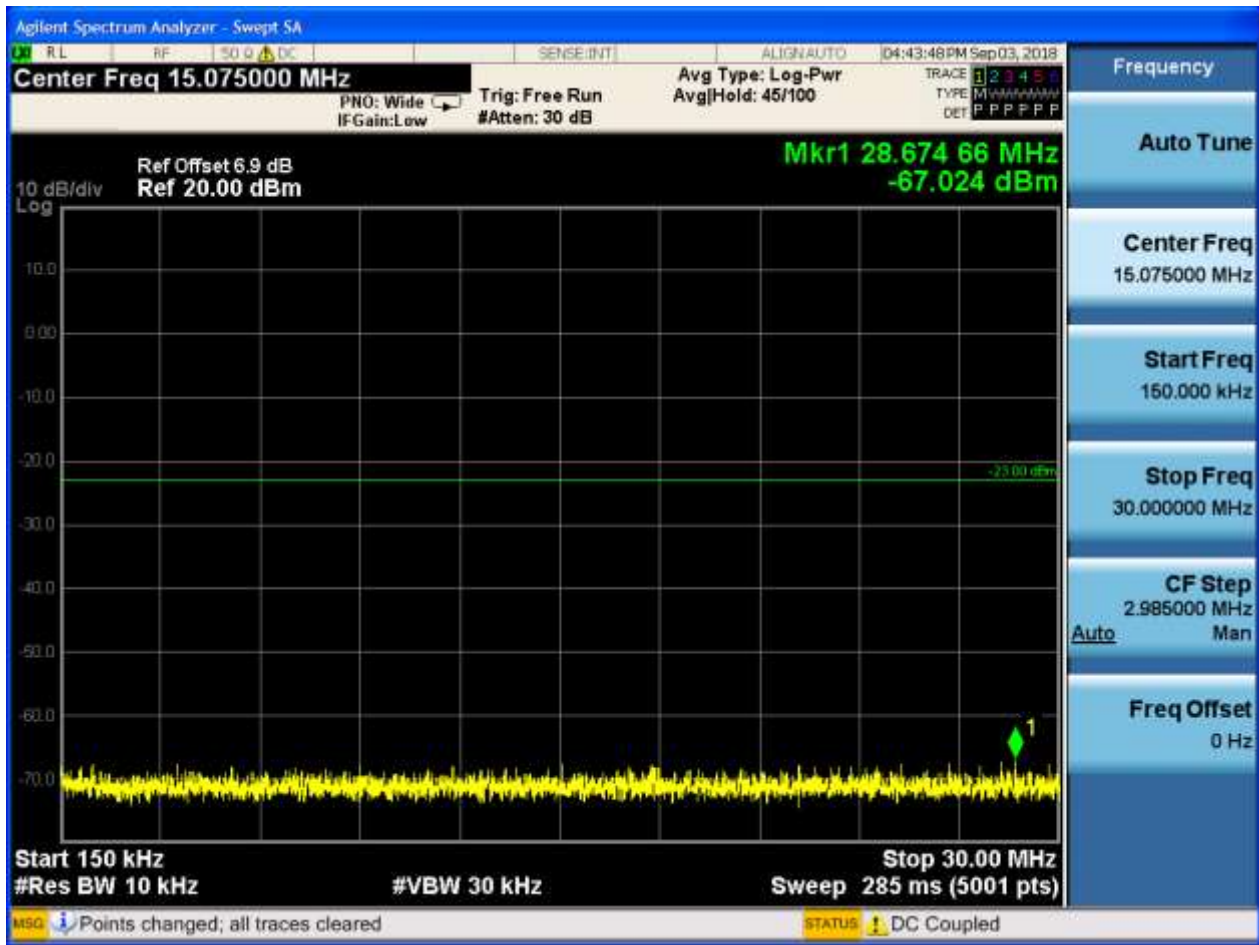


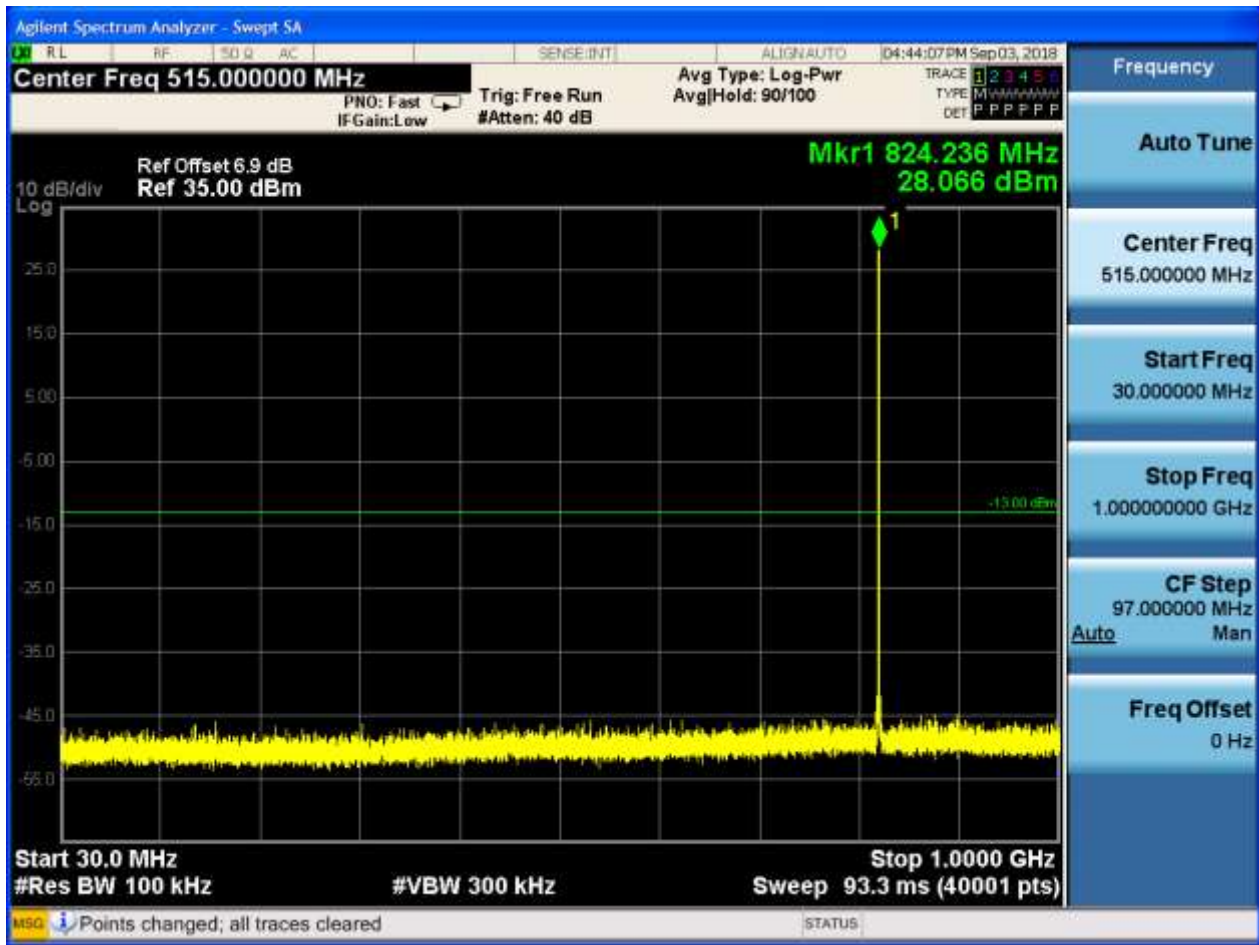


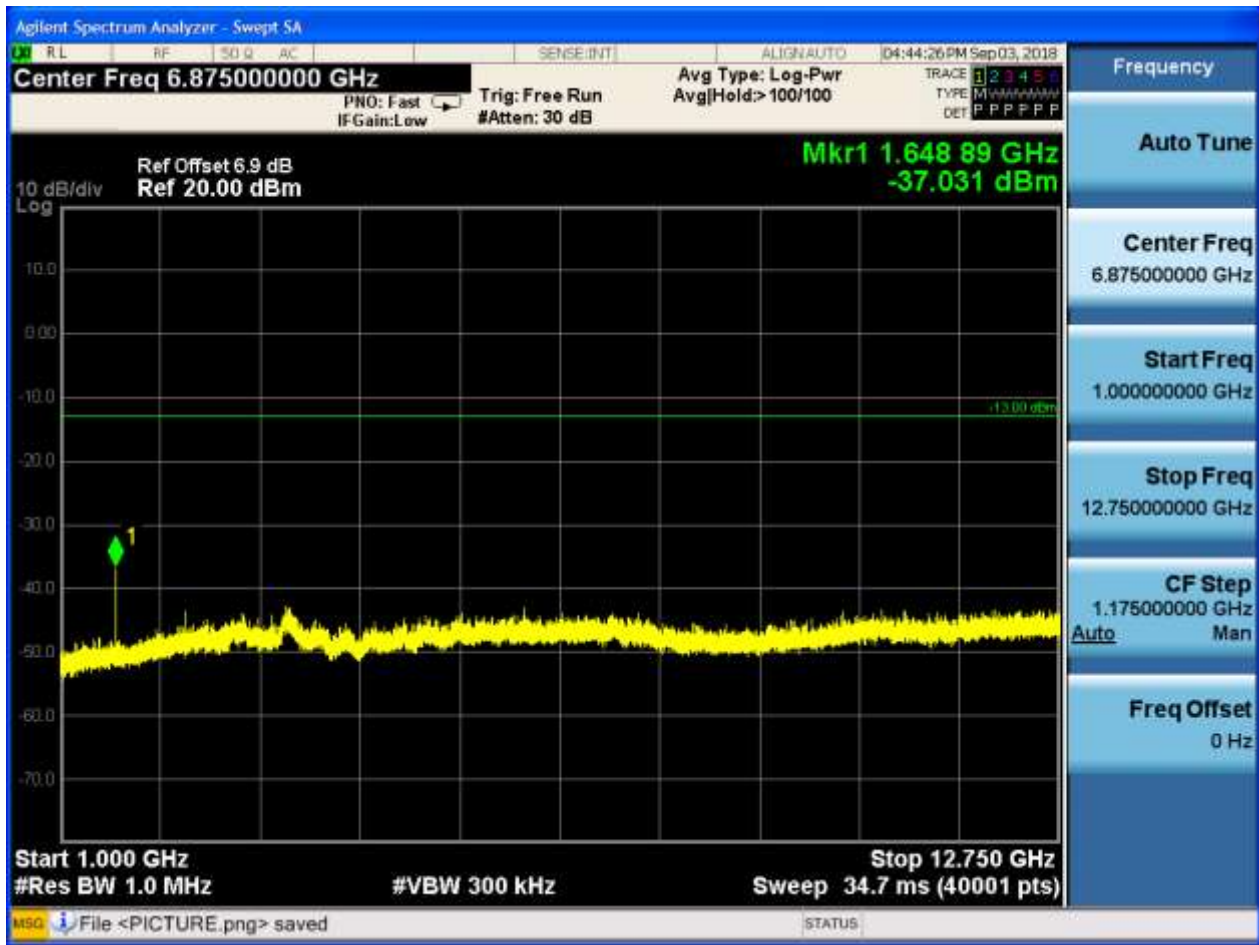
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH





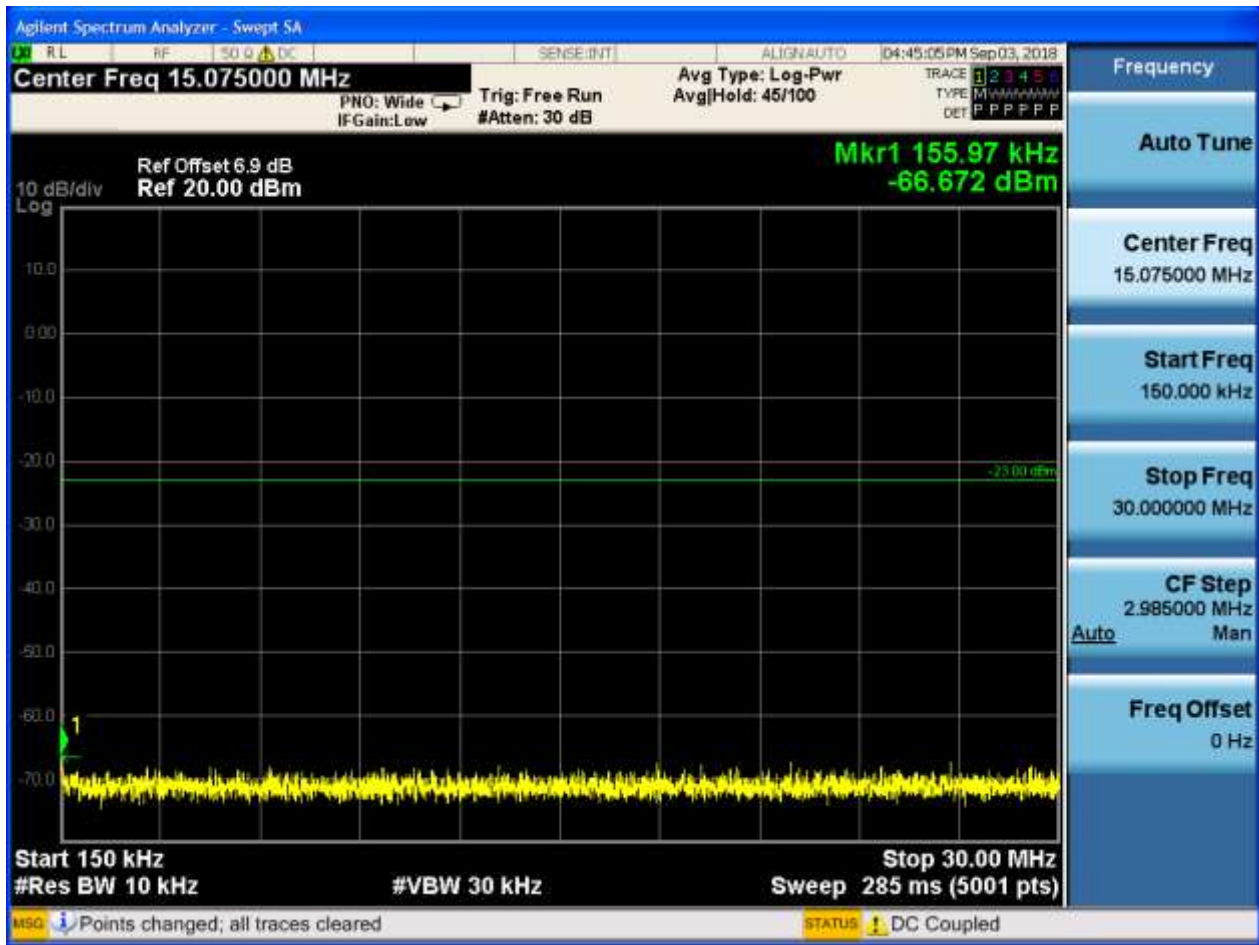


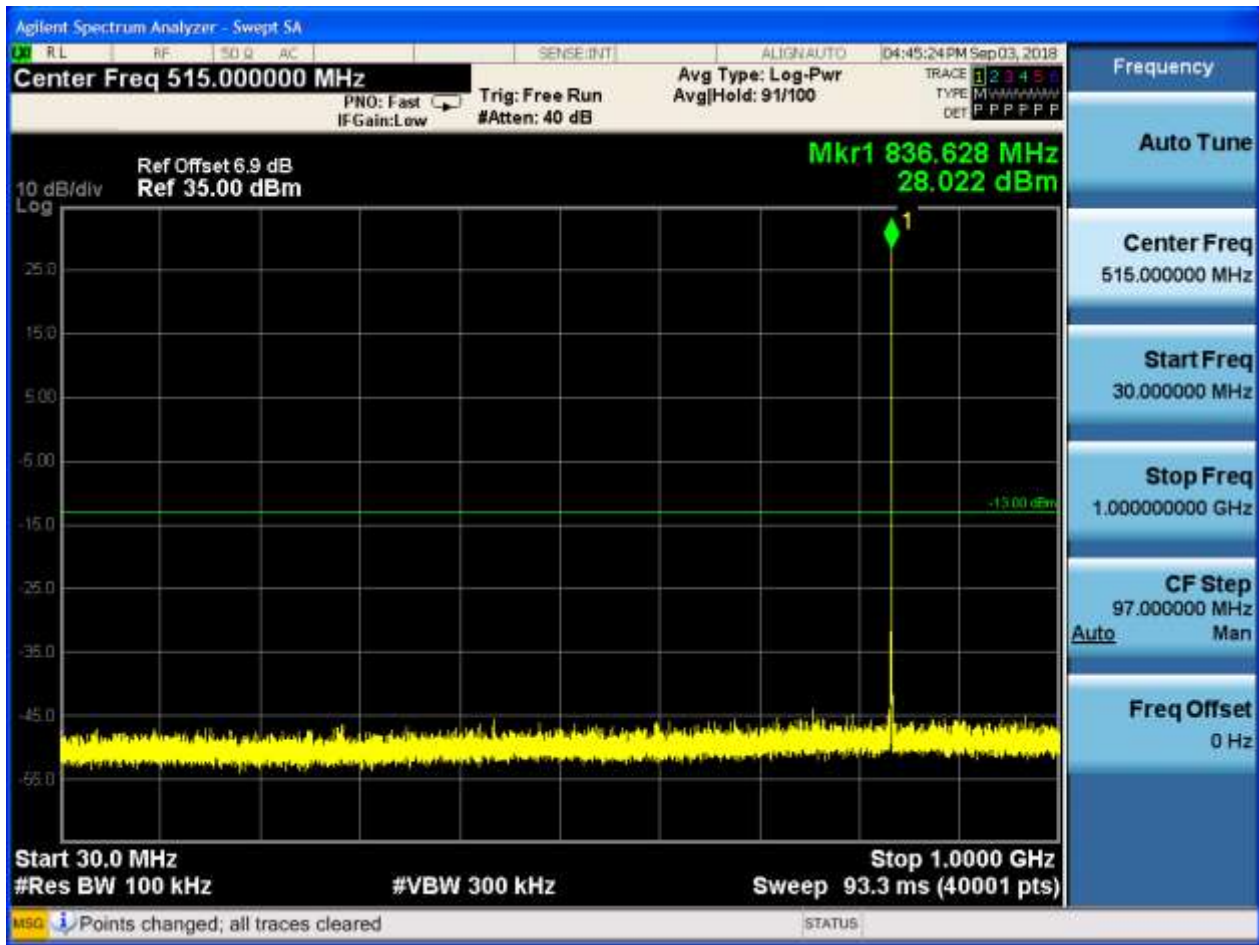


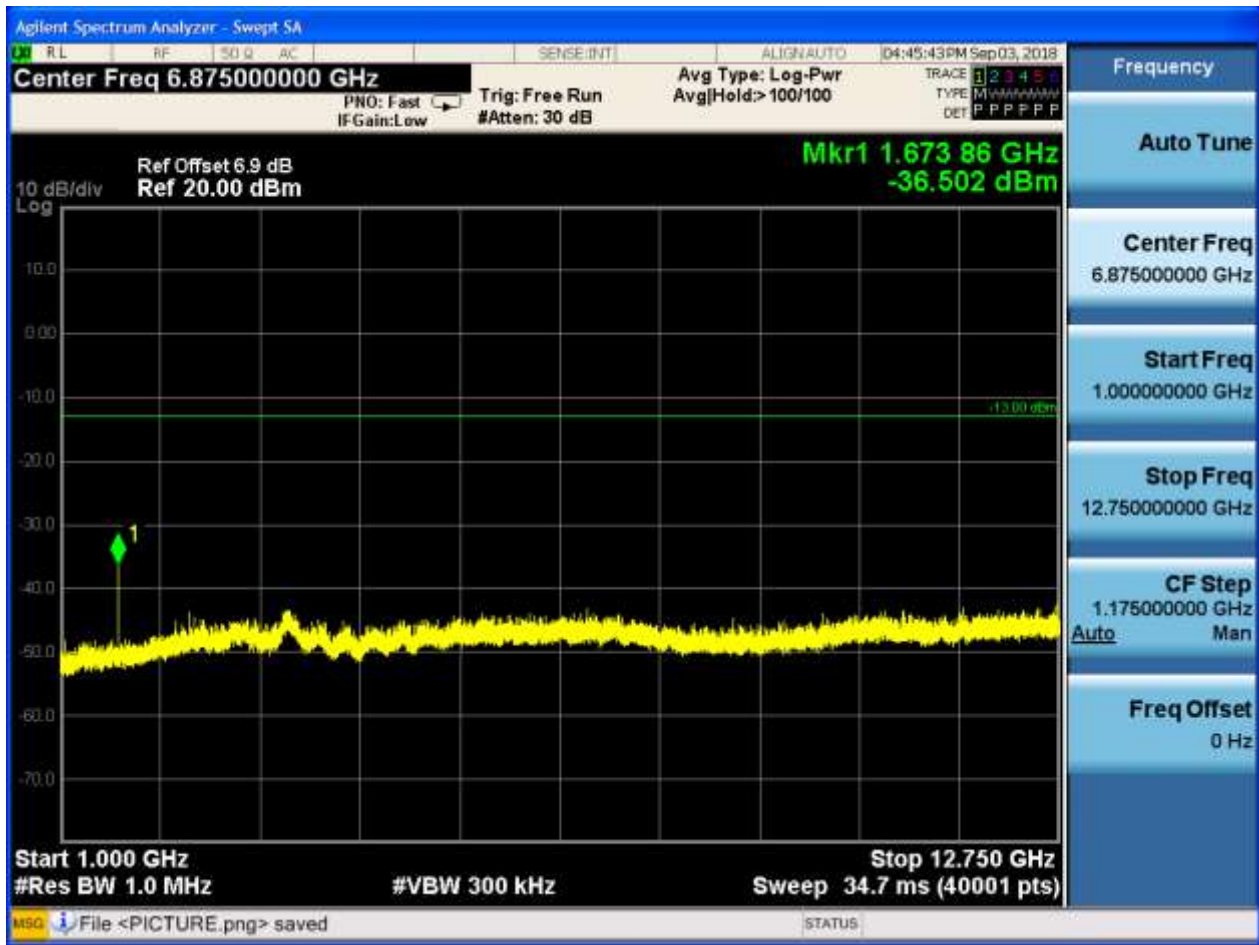


6.1.1.2.2 Test Channel = MCH





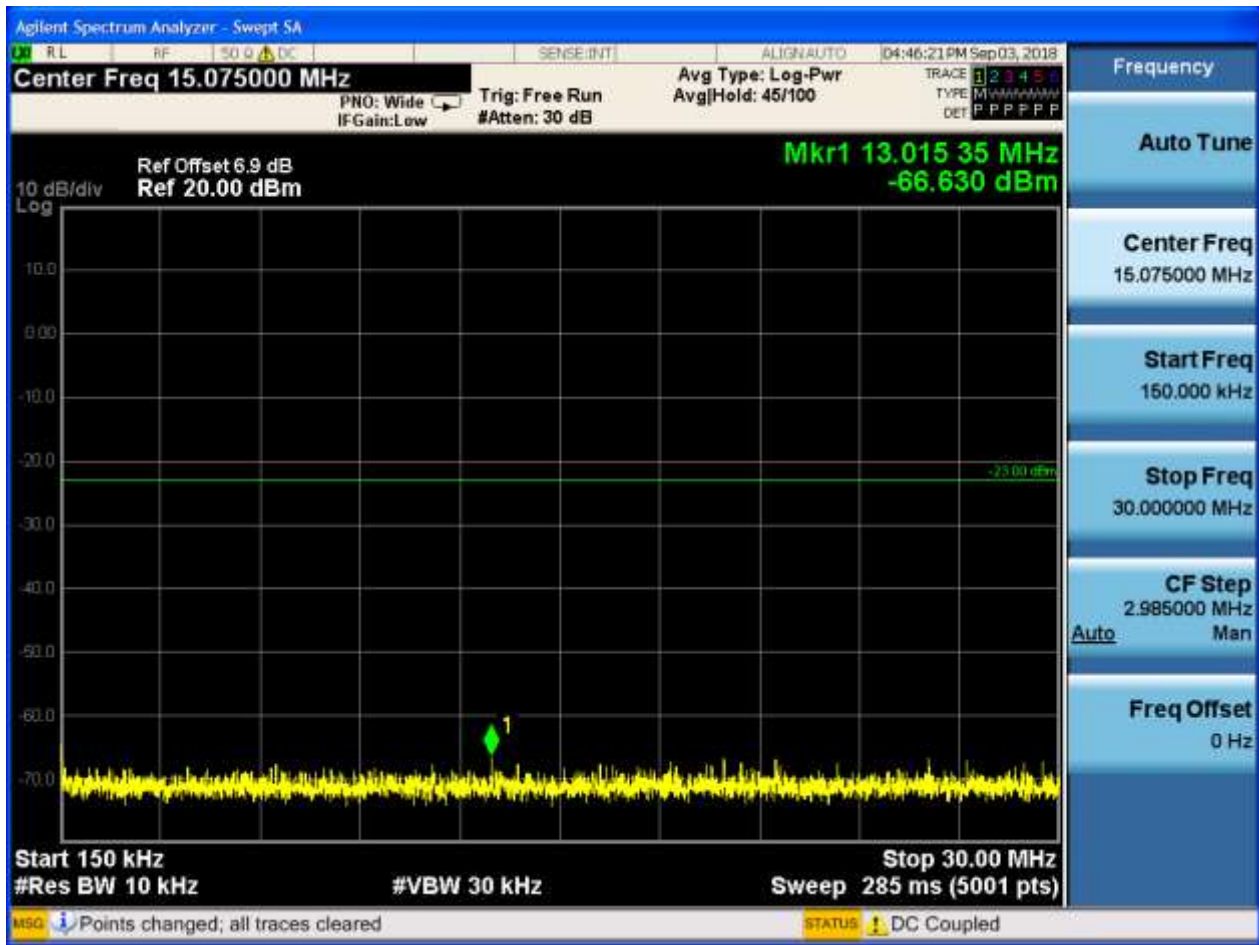


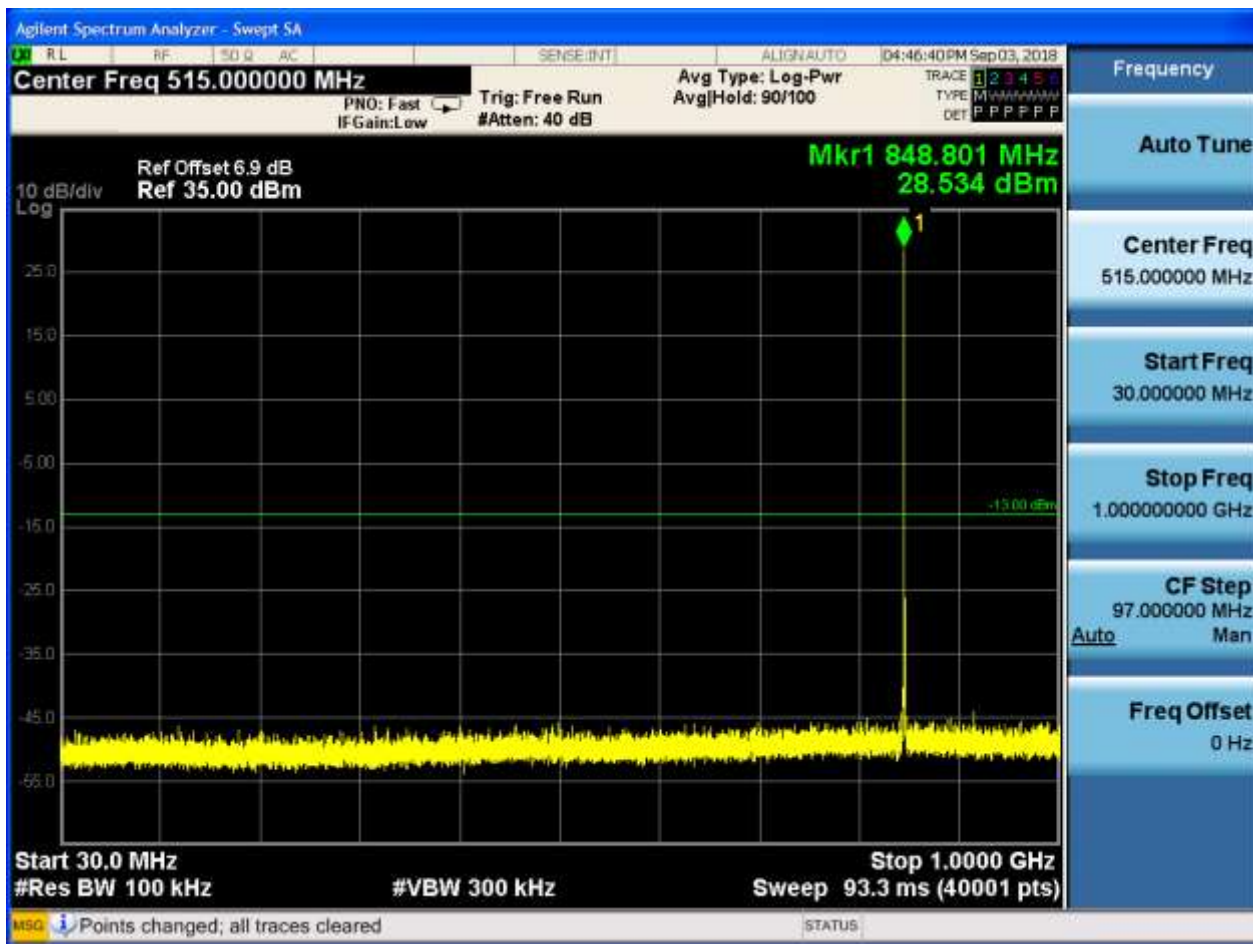


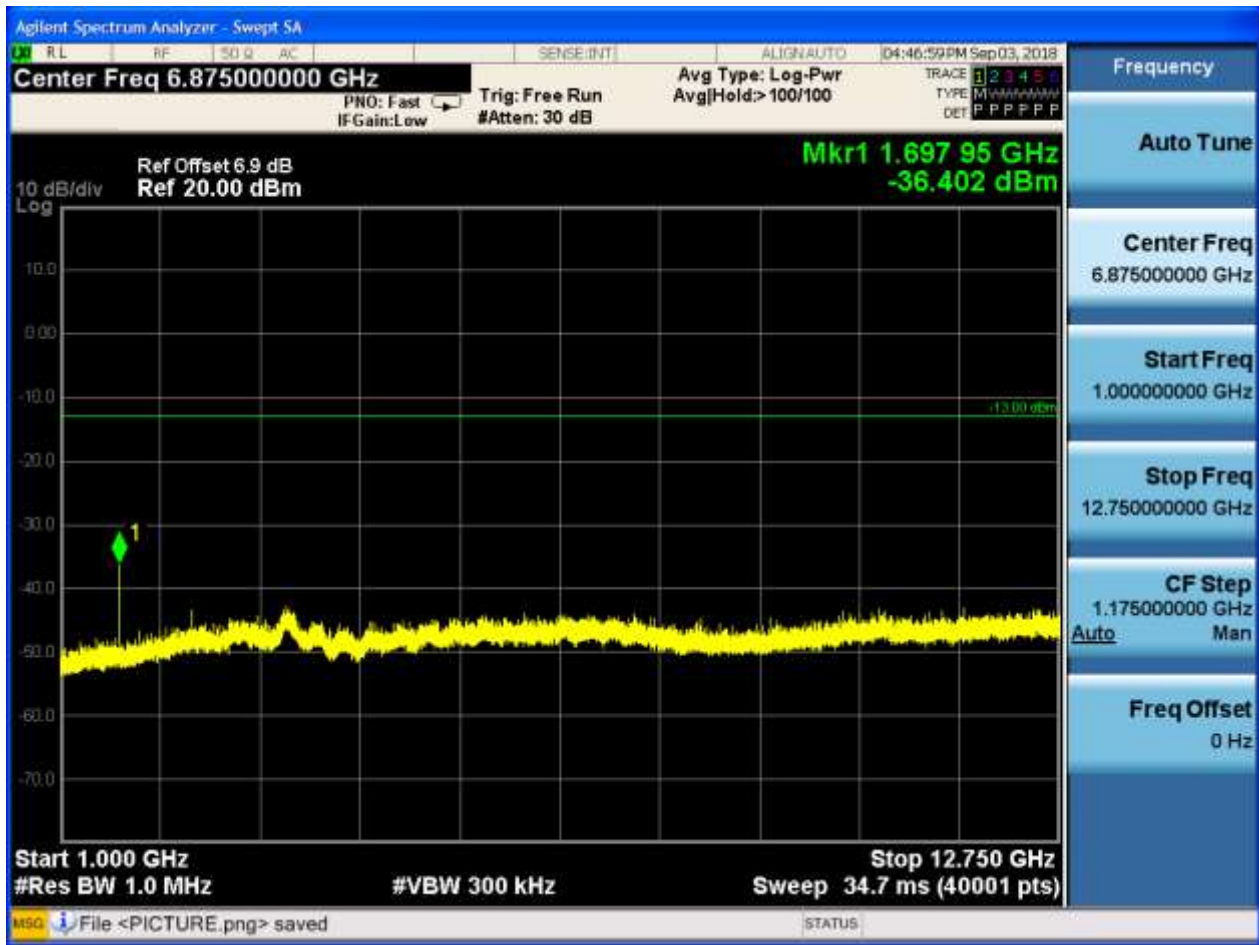


6.1.1.2.3 Test Channel = HCH







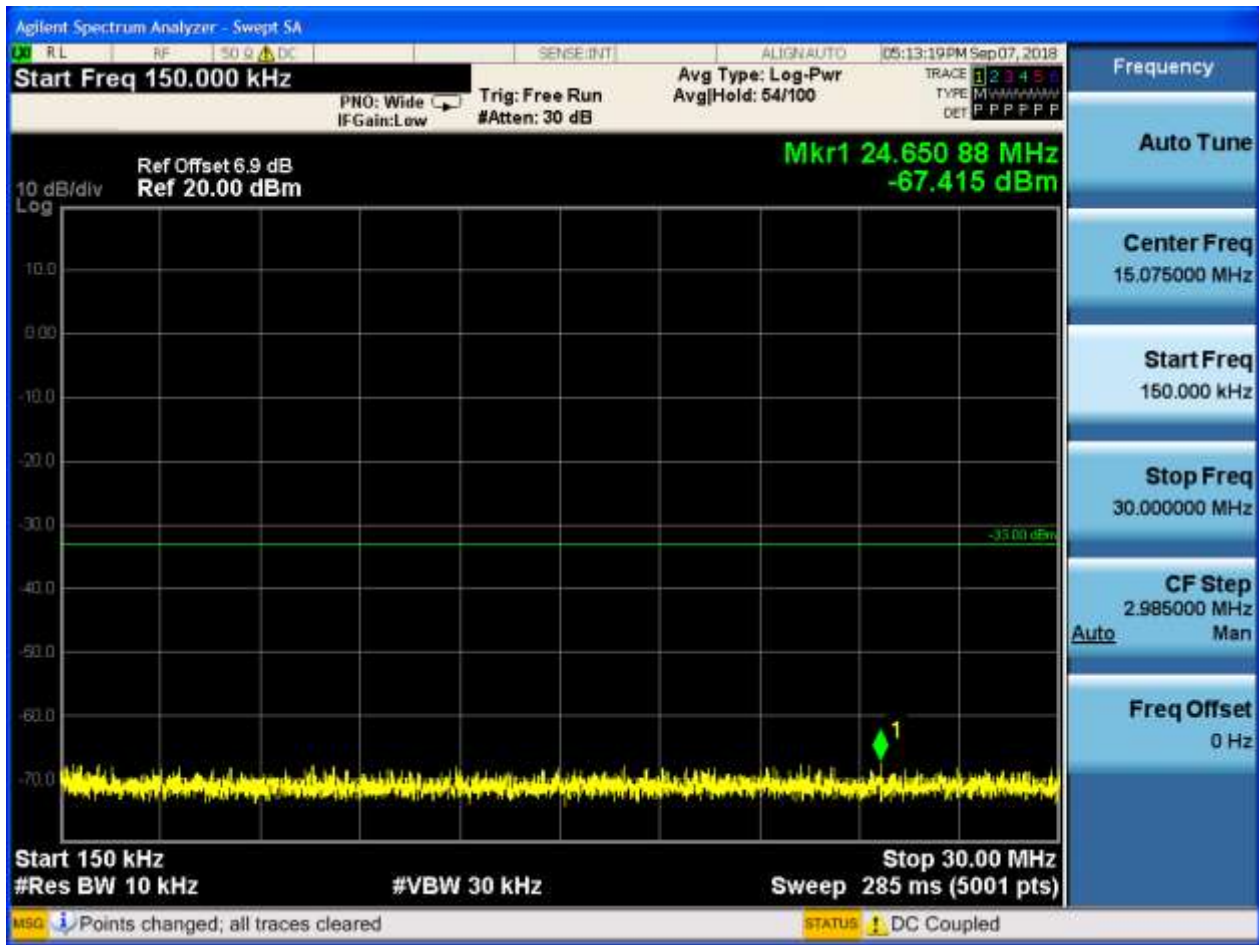


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

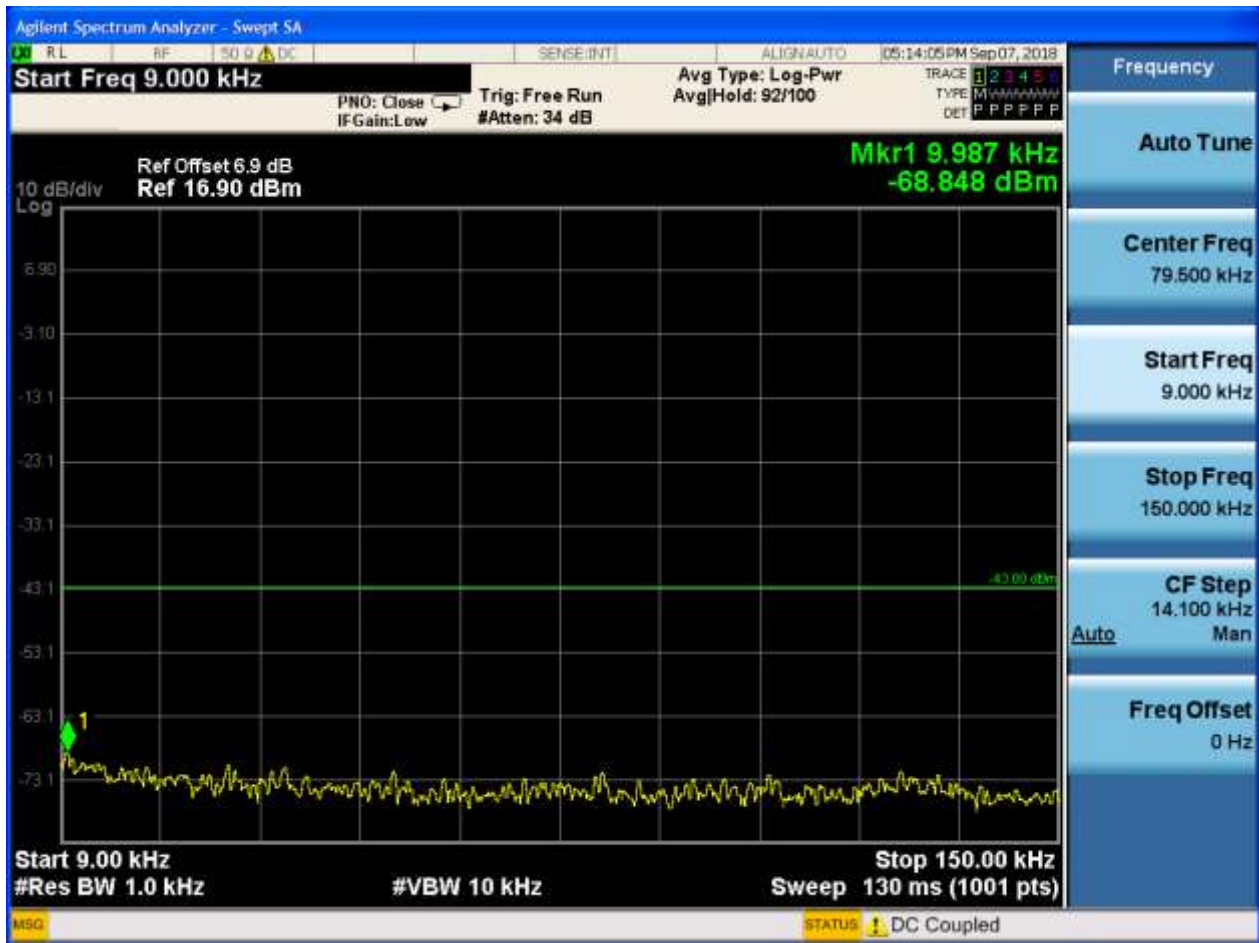
6.1.2.1.1 Test Channel = LCH







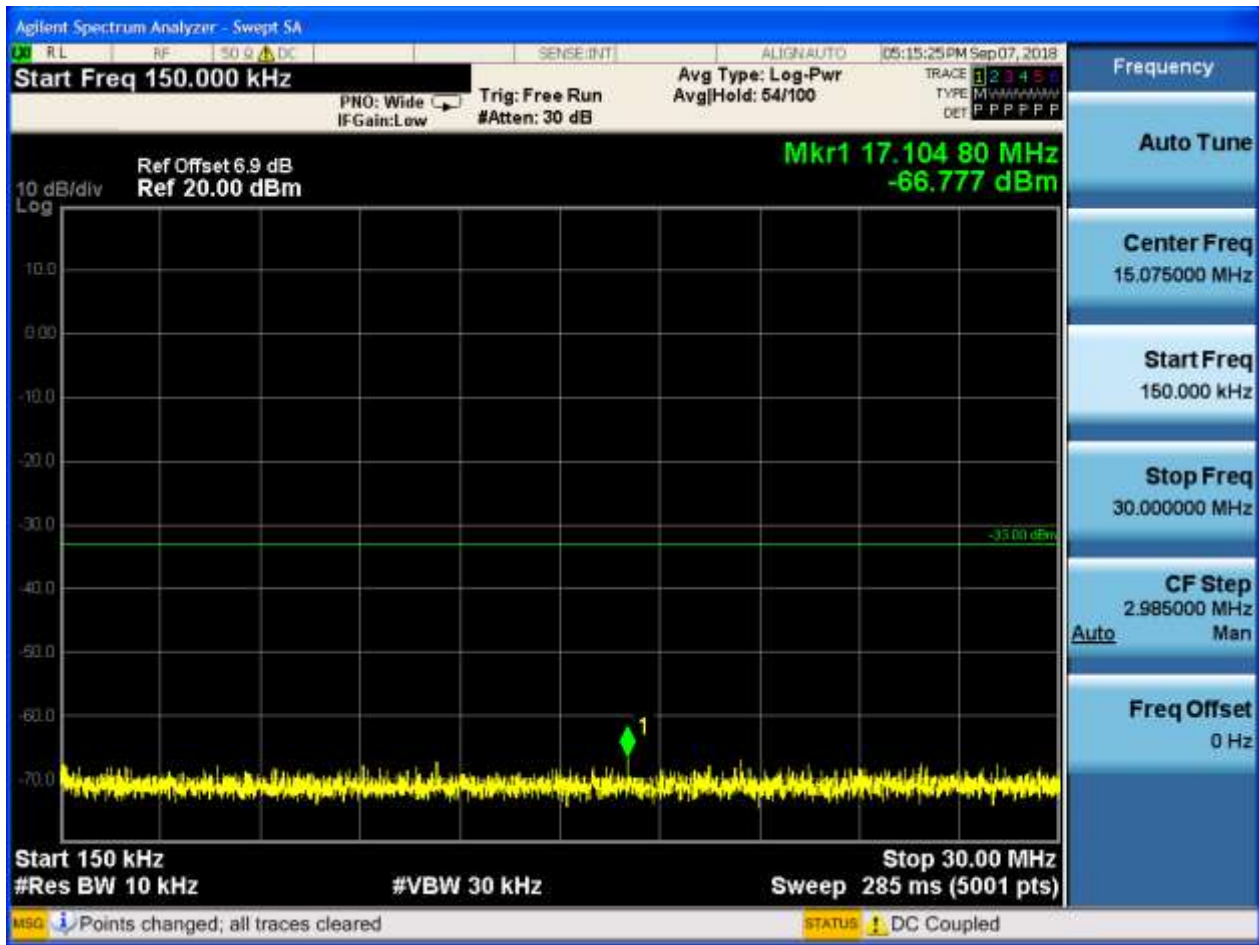
6.1.1.1.2 Test Channel = MCH





6.1.1.1.3 Test Channel = HCH





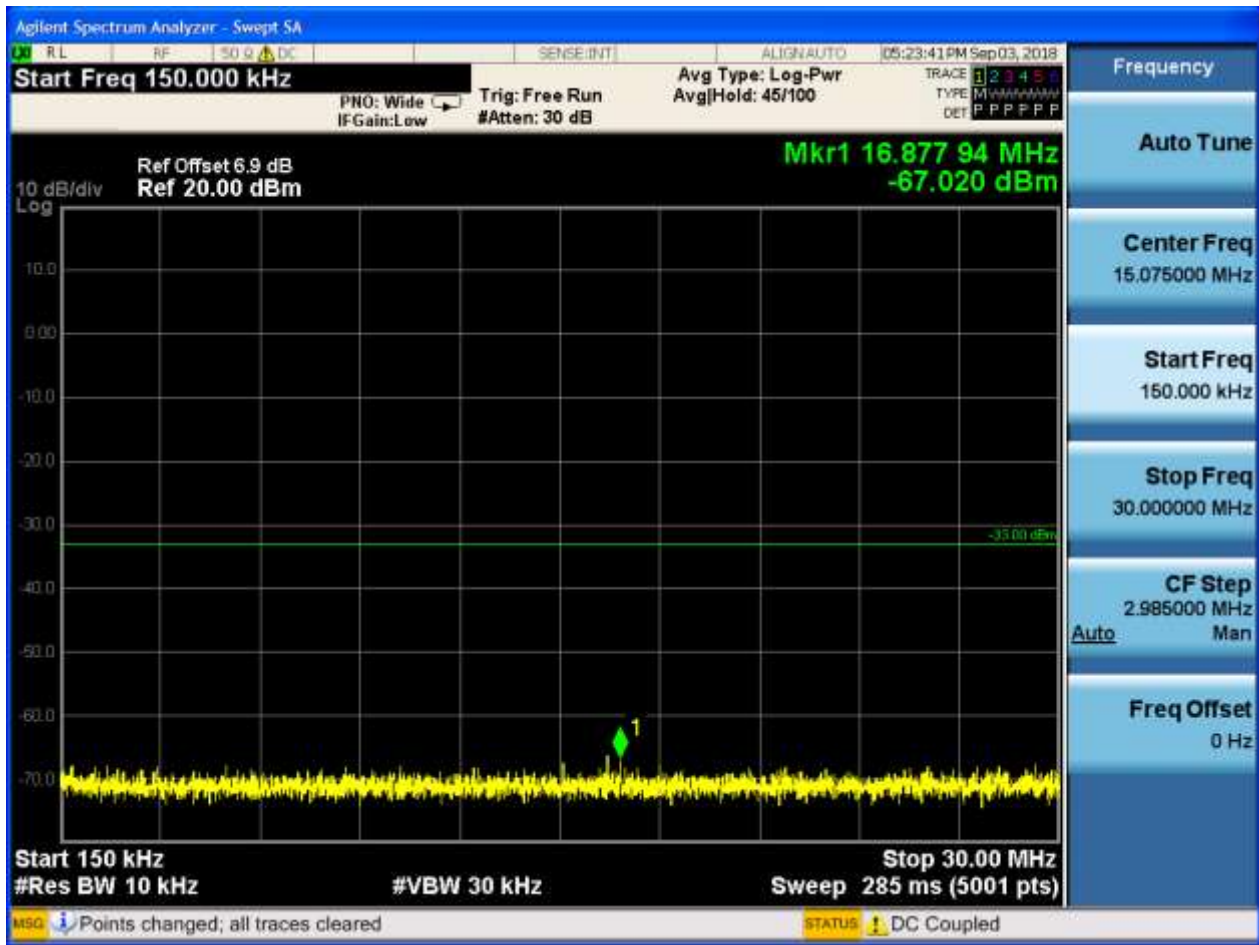




6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

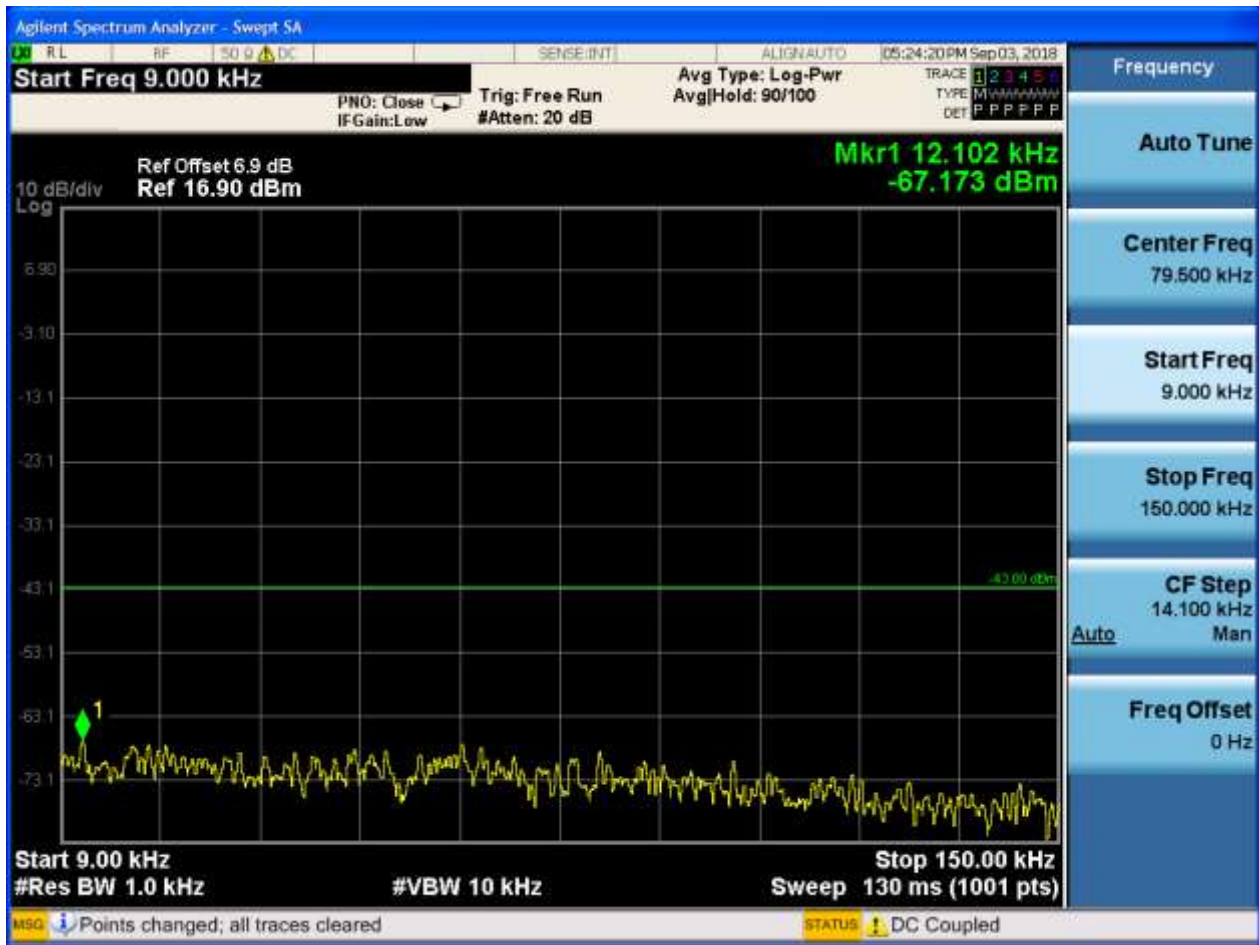






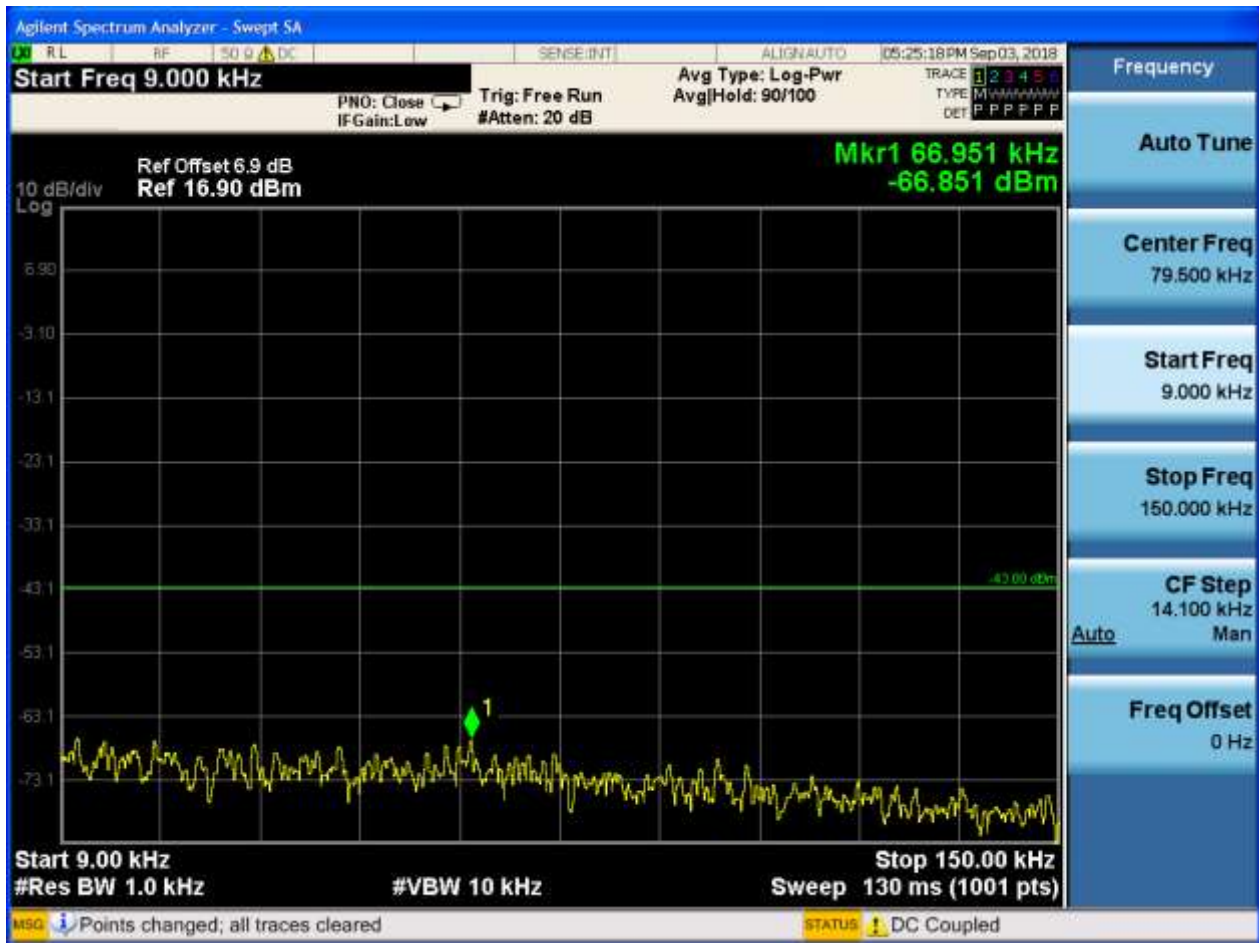


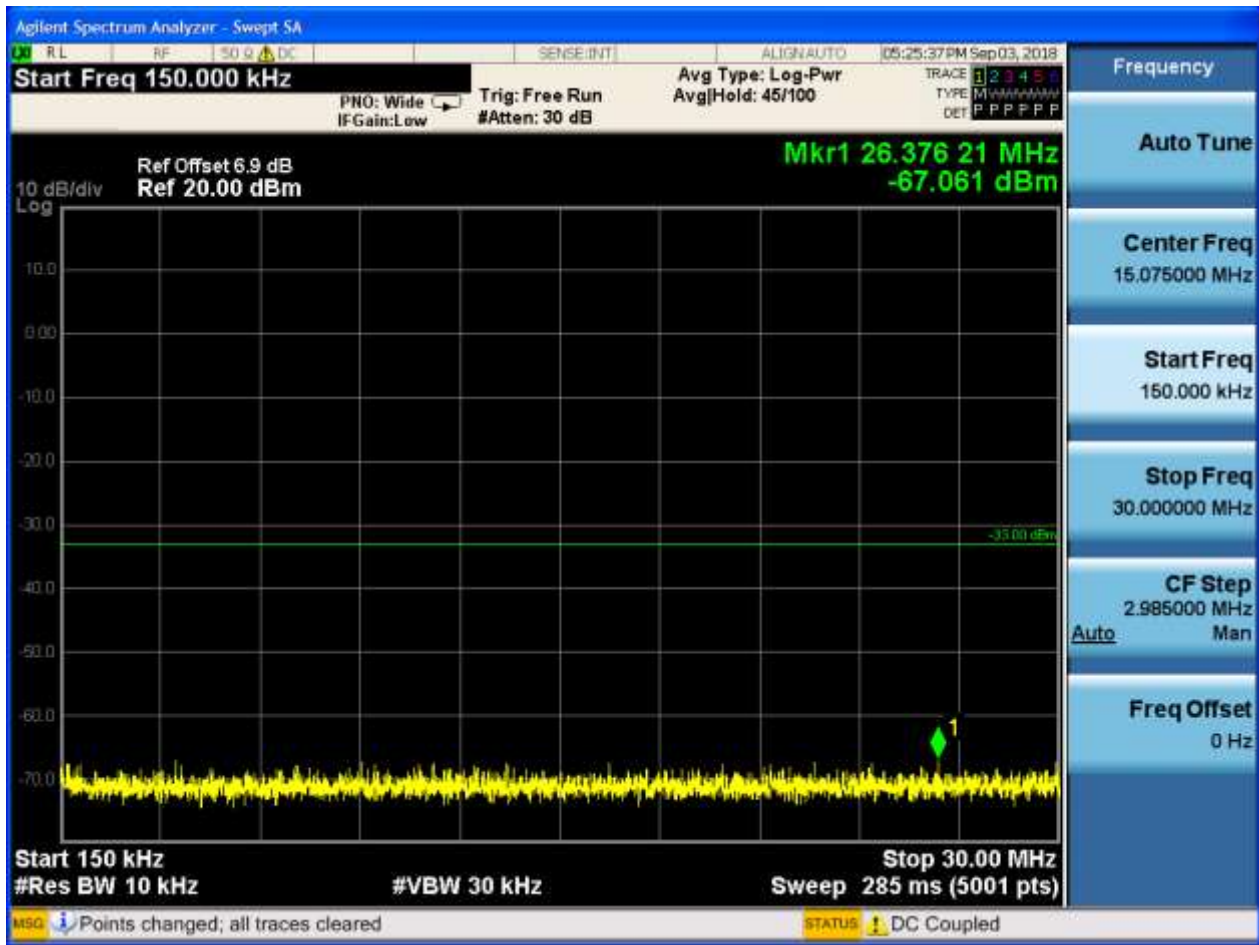
6.1.2.2.2 Test Channel = MCH





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

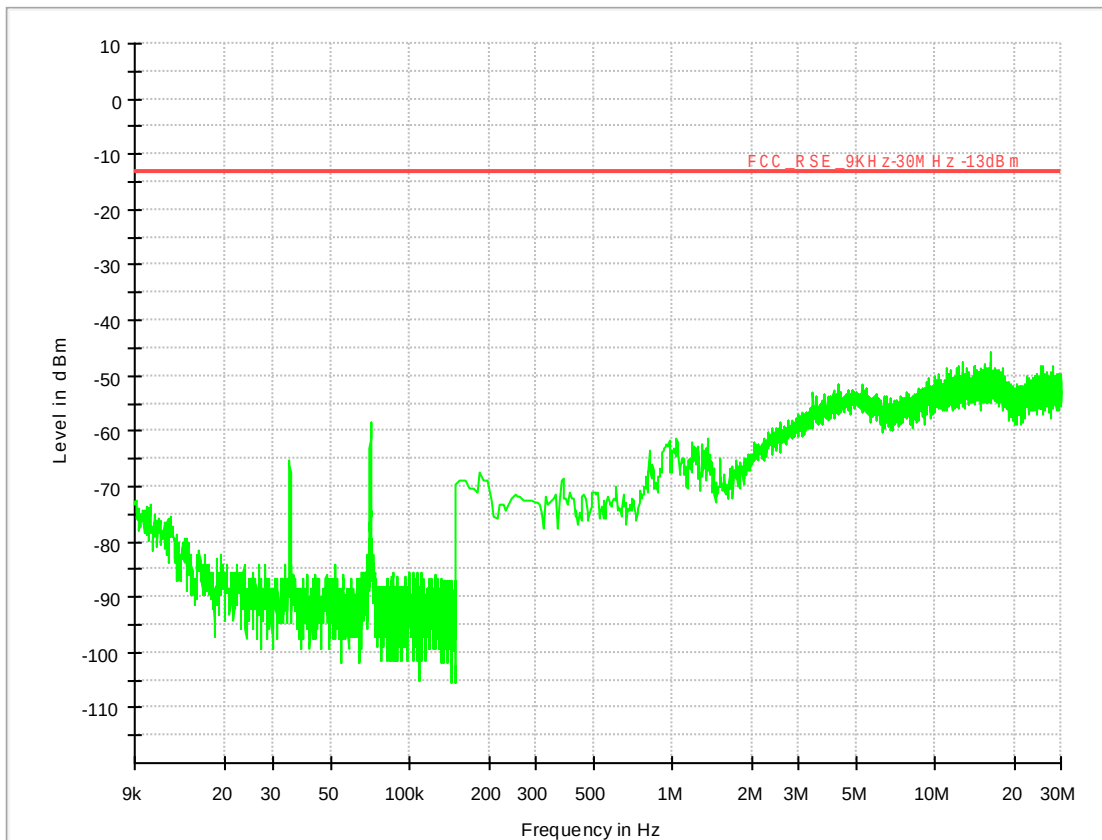
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

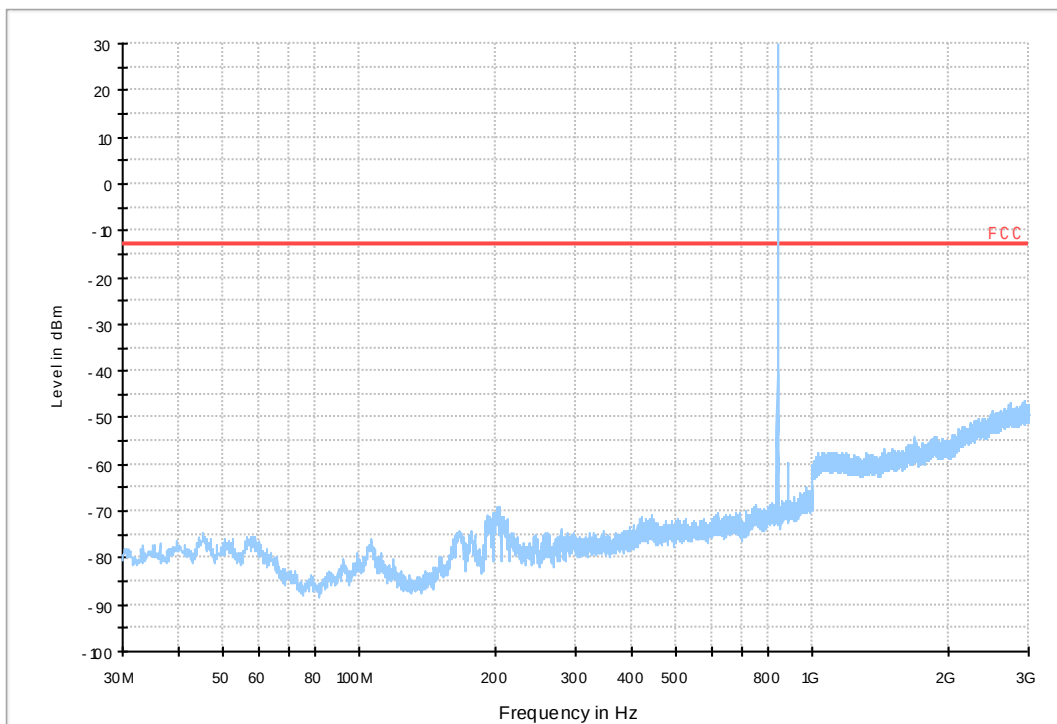
7.1 For GSM_ANT1

7.1.1 Test Band = GSM850

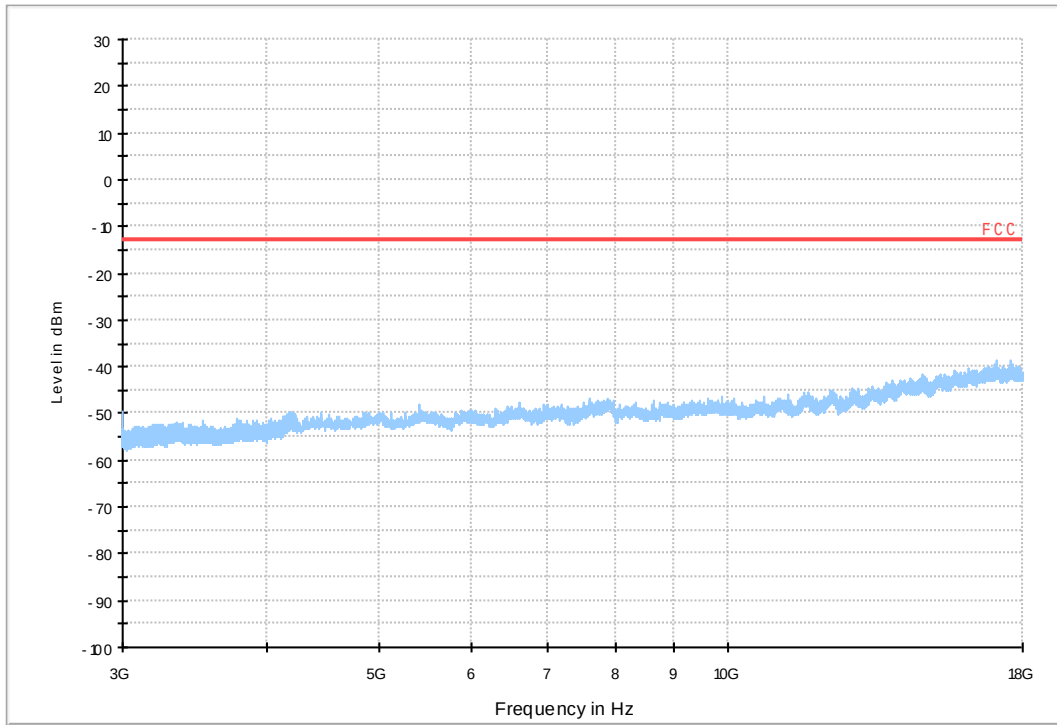
7.1.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

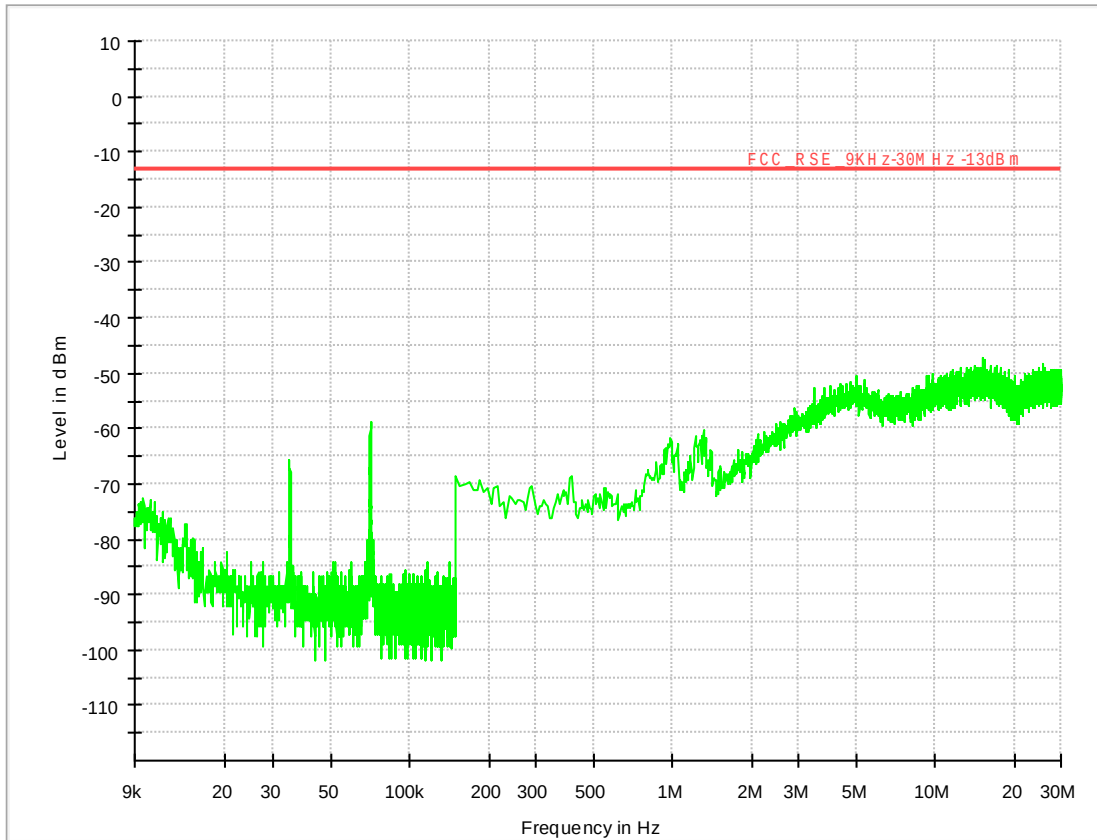


03 FCC PART 22 GSM850_H

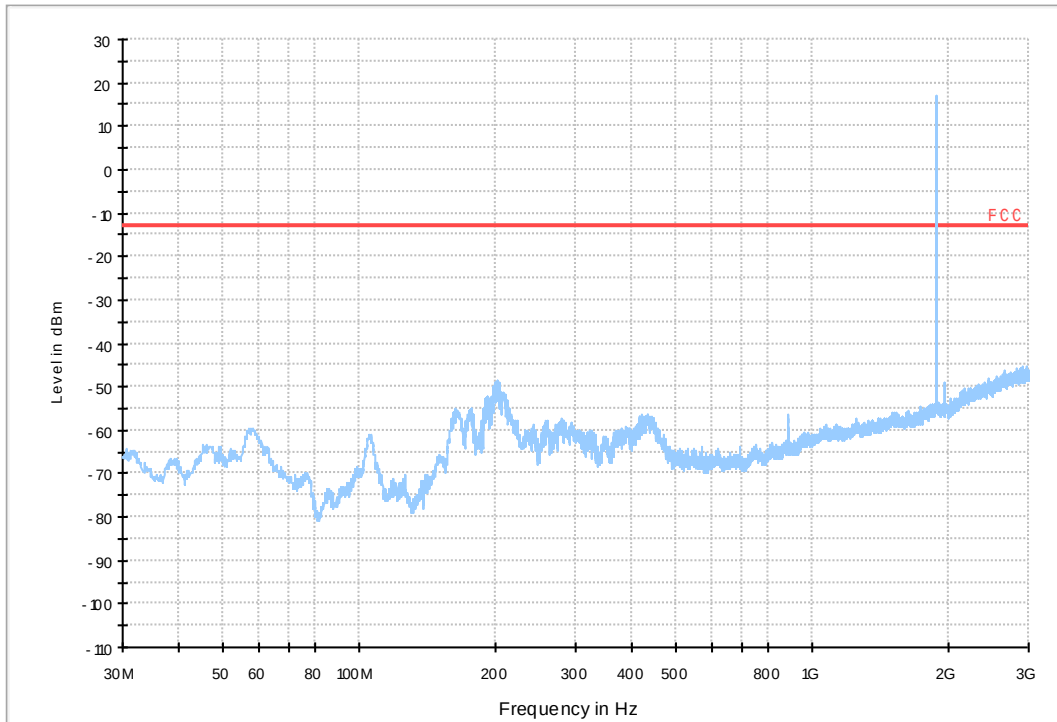


7.1.2 Test Band = PCS1900

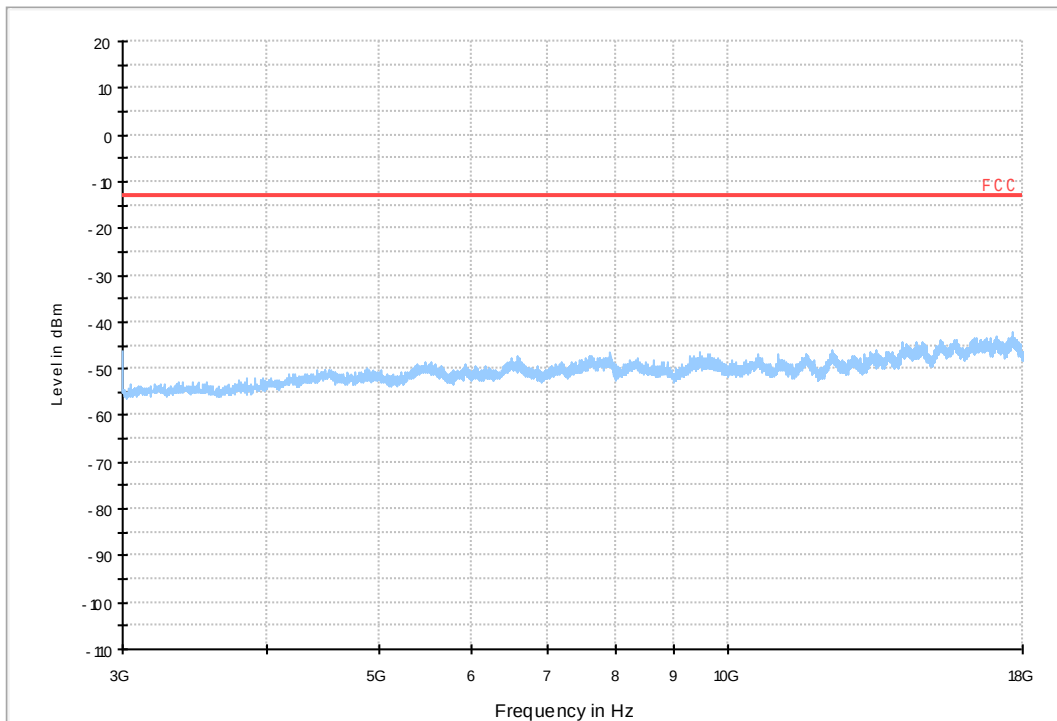
7.1.2.1 Test Mode = GSM/TM1



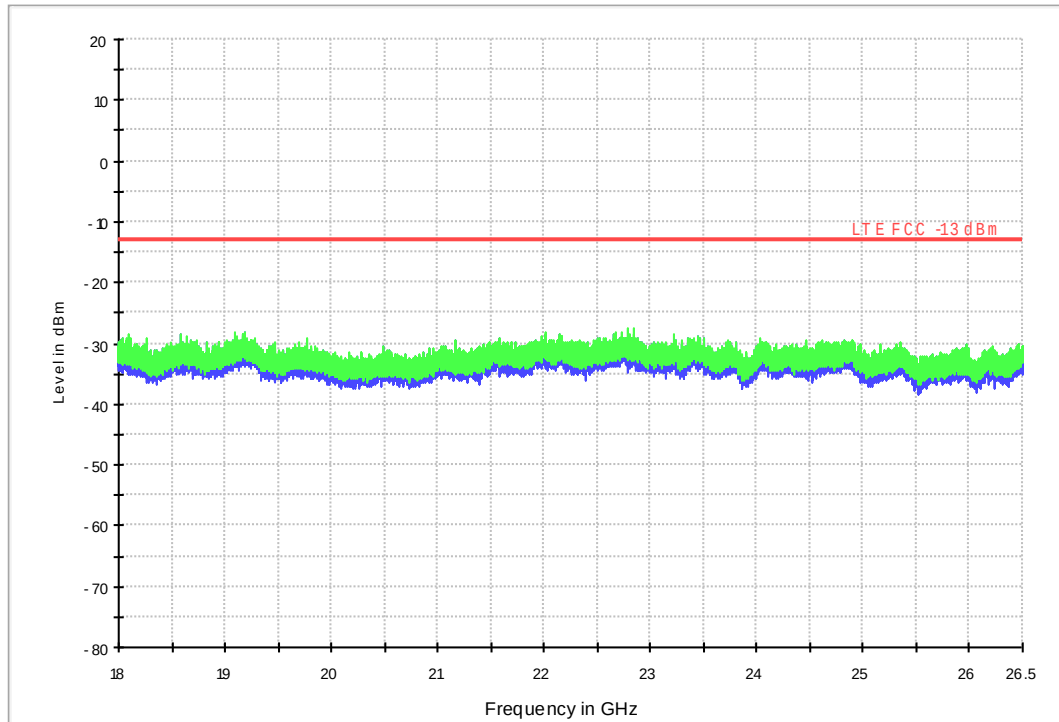
10 FCC PART 24 GSM1900_L



11 FCC PART 24 WCDMA1900_H



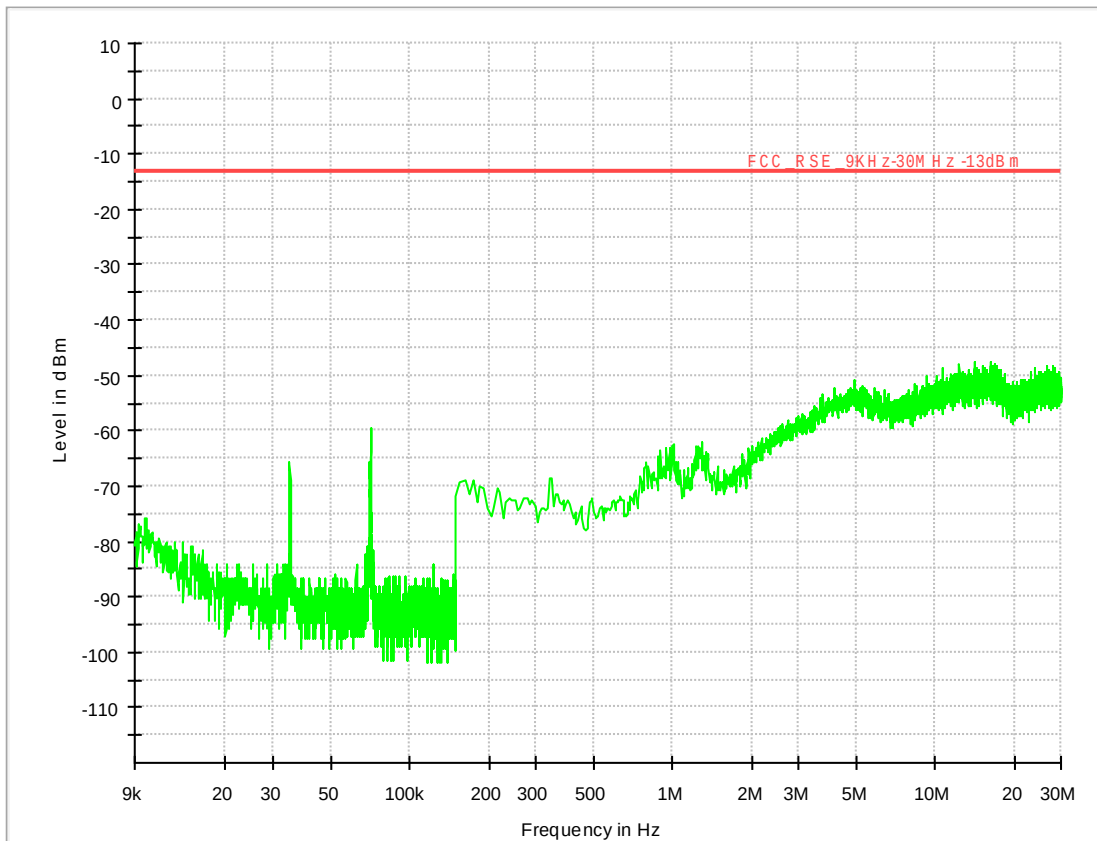
18G~26.5G RSE-TX-DIRECTOR ABOVE 1.5G PK



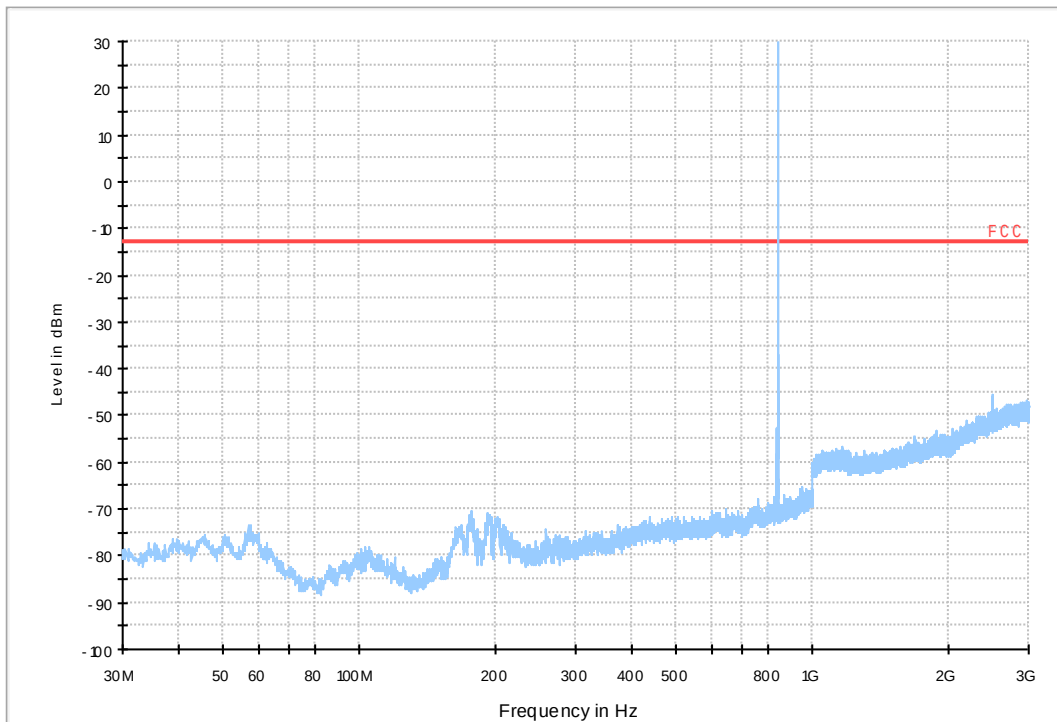
7.2 For GSM_ANT2

7.2.1 Test Band = GSM850

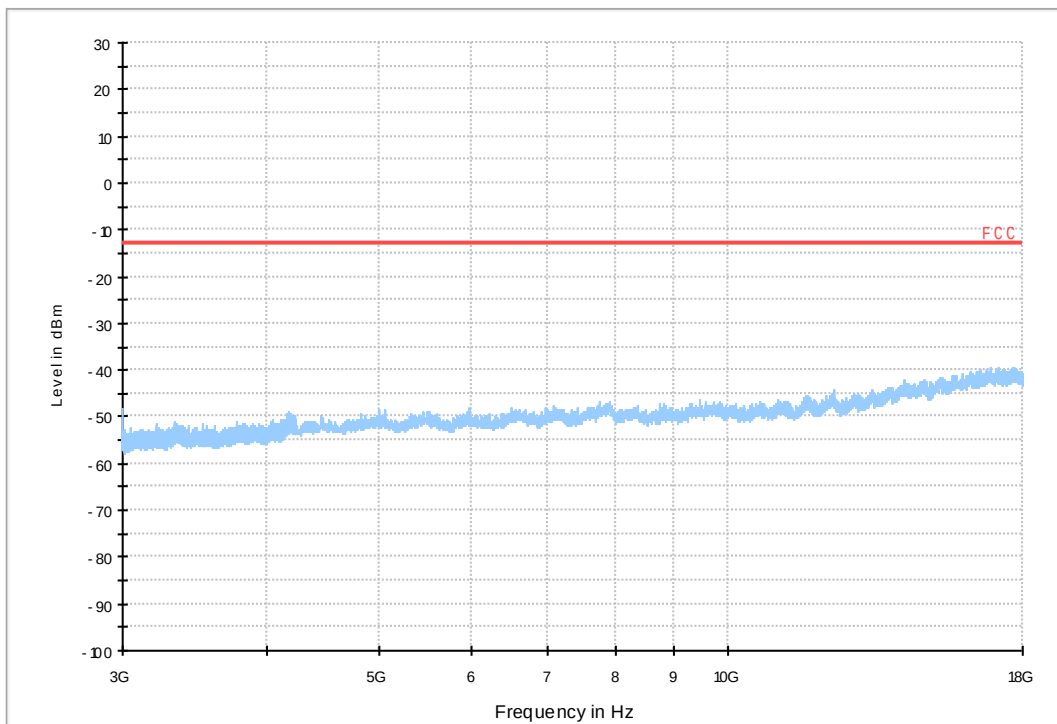
7.2.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

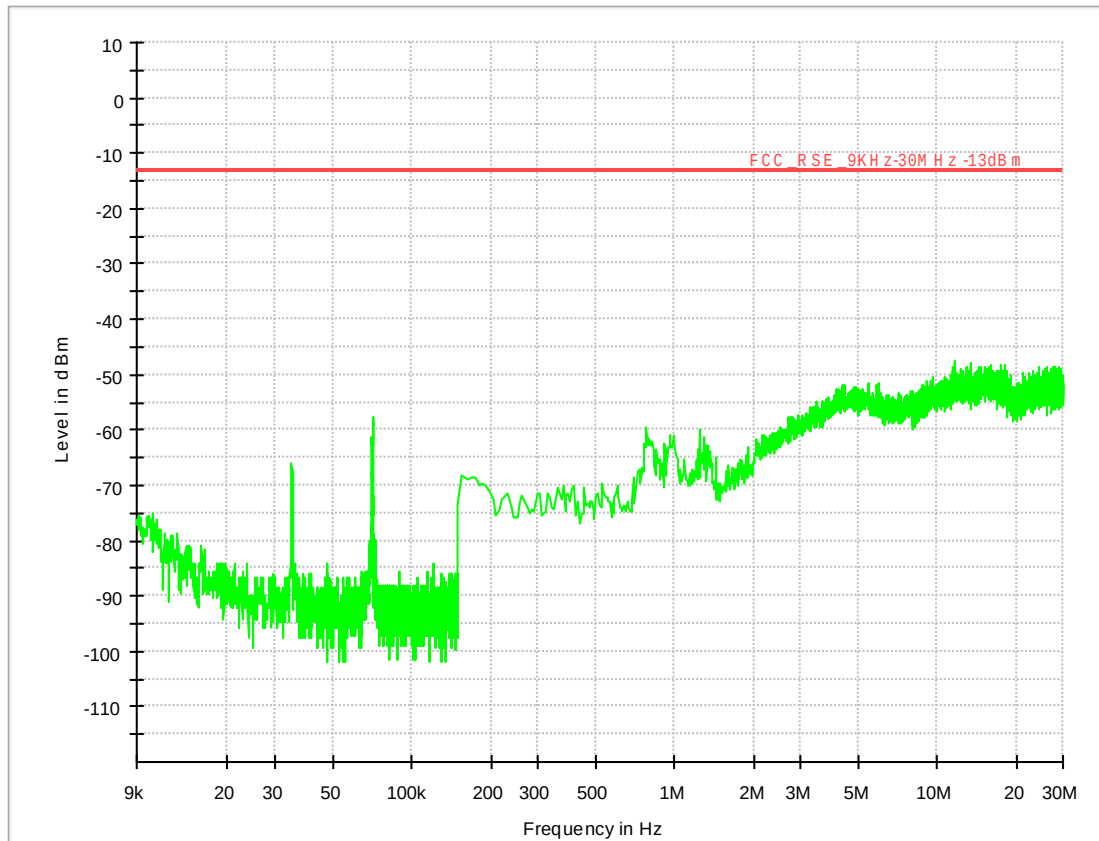


03 FCC PART 22 GSM850_H

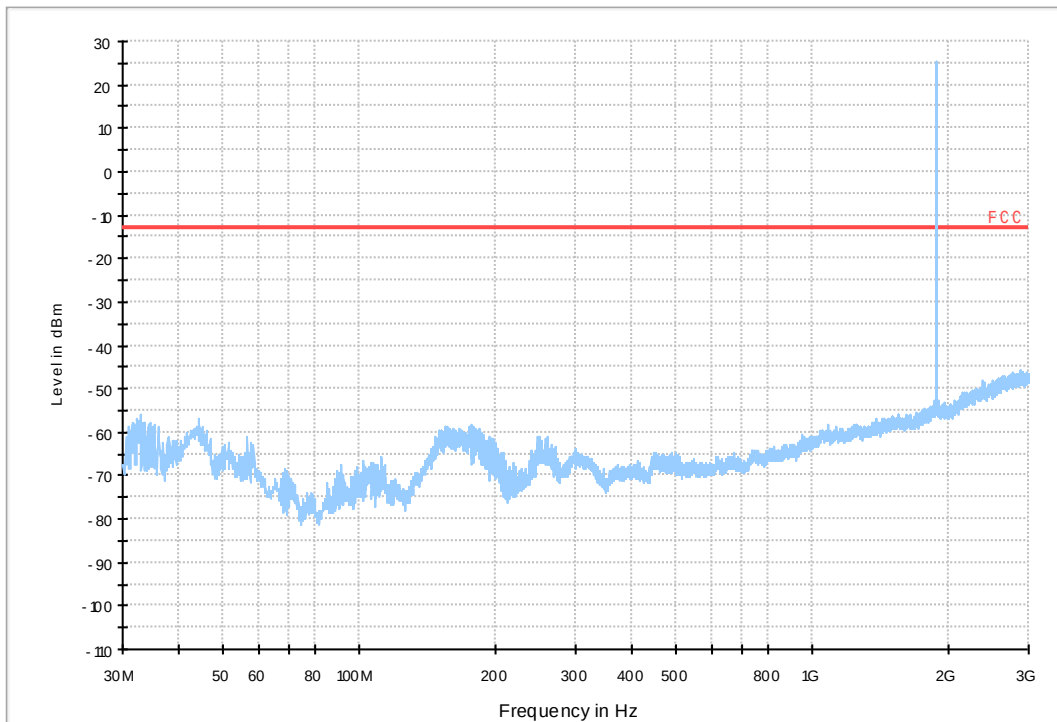


7.2.2 Test Band = PCS1900

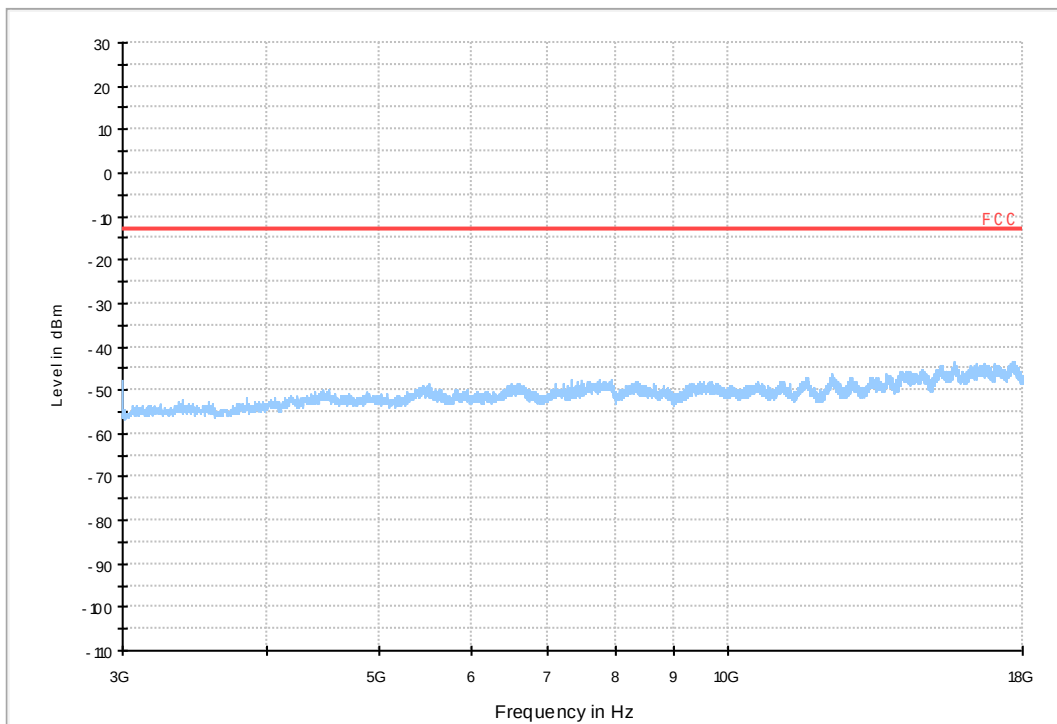
7.2.2.1 Test Mode = GSM/TM1



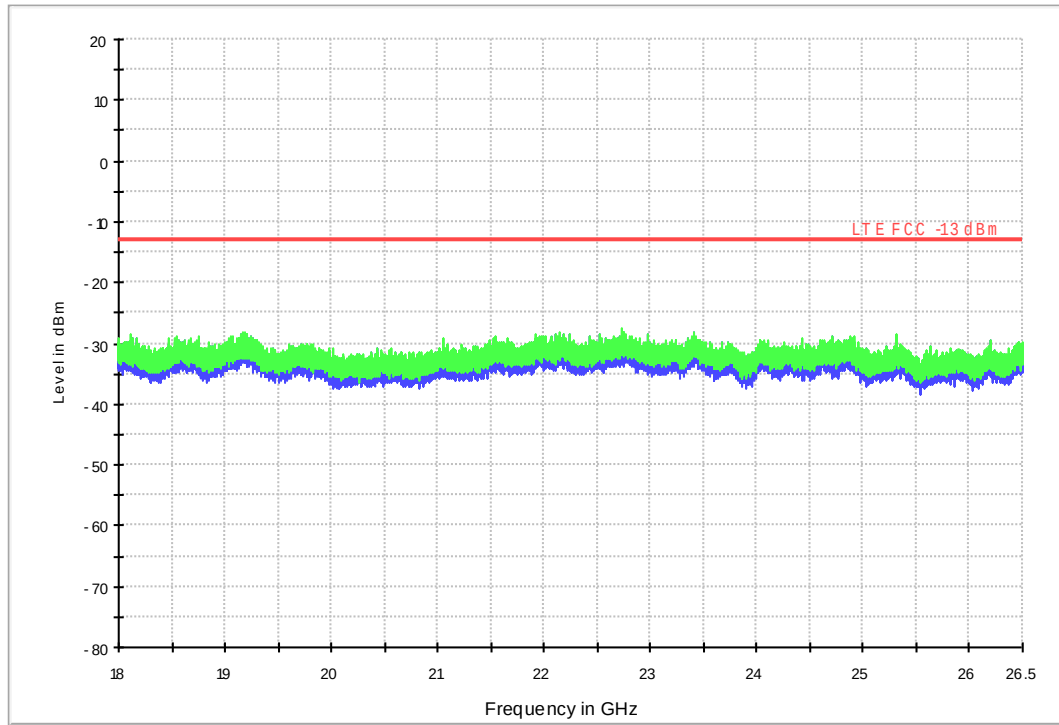
10 FCC PART 24 GSM1900_L



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	-17.50	-0.02123	PASS
				VN	-18.02	-0.02186	PASS
				VH	-17.56	-0.02131	PASS
		MCH	TN	VL	-19.18	-0.02293	PASS
				VN	-19.31	-0.02308	PASS
				VH	-20.08	-0.024	PASS
		HCH	TN	VL	-9.04	-0.01065	PASS
				VN	-11.04	-0.01301	PASS
				VH	-9.04	-0.01065	PASS
	GSM/TM2	LCH	TN	VL	-2.52	-0.00306	PASS
				VN	-6.68	-0.0081	PASS
				VH	-5.13	-0.00622	PASS
		MCH	TN	VL	-5.65	-0.00675	PASS
				VN	-12.17	-0.01455	PASS
				VH	-14.75	-0.01763	PASS
		HCH	TN	VL	-0.97	-0.00114	PASS
				VN	-1.03	-0.00121	PASS
				VH	-4.29	-0.00505	PASS
GSM1900	GSM/TM1	LCH	TN	VL	1.03	0.00056	PASS
				VN	1.49	0.00081	PASS
				VH	7.17	0.00388	PASS
		MCH	TN	VL	11.11	0.00591	PASS
				VN	11.56	0.00615	PASS
				VH	12.72	0.00677	PASS
		HCH	TN	VL	3.87	0.00203	PASS
				VN	8.07	0.00423	PASS
				VH	6.84	0.00358	PASS
	GSM/TM2	LCH	TN	VL	19.57	0.01058	PASS
				VN	19.76	0.01068	PASS
				VH	22.76	0.0123	PASS
		MCH	TN	VL	21.70	0.01154	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VN	30.64	0.0163	PASS
				VH	32.77	0.01743	PASS
		HCH	TN	VL	35.48	0.01858	PASS
				VN	28.77	0.01506	PASS
				VH	33.96	0.01778	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	-19.69	-0.02389	PASS
				-20	-19.50	-0.02366	PASS
				-10	-19.44	-0.02359	PASS
				0	-18.02	-0.02186	PASS
				10	-16.79	-0.02037	PASS
				20	-15.37	-0.01865	PASS
				30	-20.02	-0.02429	PASS
				40	-17.37	-0.02107	PASS
				50	-18.34	-0.02225	PASS
		MCH	VN	-30	-19.57	-0.02339	PASS
				-20	-19.37	-0.02315	PASS
				-10	-19.50	-0.02331	PASS
				0	-18.53	-0.02215	PASS
				10	-17.43	-0.02083	PASS
				20	-18.98	-0.02269	PASS
				30	-19.24	-0.023	PASS
				40	-22.34	-0.0267	PASS
				50	-20.53	-0.02454	PASS
		HCH	VN	-30	-11.62	-0.01369	PASS
				-20	-7.30	-0.0086	PASS
				-10	-9.10	-0.01072	PASS
				0	-10.78	-0.0127	PASS
				10	-8.85	-0.01043	PASS
				20	-10.78	-0.0127	PASS
				30	-8.85	-0.01043	PASS
				40	-6.84	-0.00806	PASS
				50	-6.91	-0.00814	PASS
	GSM/TM2	LCH	VN	-30	-14.08	-0.01708	PASS
				-20	-7.39	-0.00897	PASS
				-10	-6.75	-0.00819	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				0	-8.07	-0.00979	PASS
				10	-9.04	-0.01097	PASS
				20	-12.27	-0.01489	PASS
				30	-9.07	-0.011	PASS
				40	-12.72	-0.01543	PASS
				50	-10.23	-0.01241	PASS
		MCH	VN	-30	-17.40	-0.0208	PASS
				-20	-4.23	-0.00506	PASS
				-10	-15.56	-0.0186	PASS
				0	-9.23	-0.01103	PASS
				10	-12.69	-0.01517	PASS
				20	-11.36	-0.01358	PASS
				30	-9.17	-0.01096	PASS
				40	-13.62	-0.01628	PASS
				50	-10.75	-0.01285	PASS
		HCH	VN	-30	-4.20	-0.00495	PASS
				-20	-0.71	-0.00084	PASS
				-10	-1.26	-0.00148	PASS
				0	-4.55	-0.00536	PASS
				10	-1.58	-0.00186	PASS
				20	0.97	0.00114	PASS
				30	0.52	0.00061	PASS
				40	-8.43	-0.00993	PASS
				50	-0.71	-0.00084	PASS
GSM1900	GSM/TM1	LCH	VN	-30	4.13	0.00223	PASS
				-20	-2.97	-0.00161	PASS
				-10	5.17	0.00279	PASS
				0	1.87	0.00101	PASS
				10	-0.19	-0.0001	PASS
				20	3.16	0.00171	PASS
				30	0.26	0.00014	PASS
				40	3.36	0.00182	PASS
				50	6.65	0.00359	PASS
		MCH	VN	-30	12.46	0.00663	PASS
				-20	10.98	0.00584	PASS
				-10	8.01	0.00426	PASS
				0	22.08	0.01174	PASS
				10	8.72	0.00464	PASS
				20	13.95	0.00742	PASS
				30	14.46	0.00769	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				40	15.24	0.00811	PASS
				50	14.98	0.00797	PASS
		HCH	VN	-30	12.53	0.00656	PASS
				-20	13.75	0.0072	PASS
				-10	6.72	0.00352	PASS
				0	12.79	0.0067	PASS
				10	17.82	0.00933	PASS
				20	9.49	0.00497	PASS
				30	9.75	0.00511	PASS
				40	12.07	0.00632	PASS
				50	13.43	0.00703	PASS
				-30	24.31	0.01314	PASS
				-20	26.57	0.01436	PASS
				-10	23.92	0.01293	PASS
				0	23.63	0.01277	PASS
	GSM/TM2	LCH	VN	10	25.89	0.01399	PASS
				20	19.05	0.0103	PASS
				30	22.28	0.01204	PASS
				40	19.60	0.01059	PASS
				50	23.60	0.01276	PASS
		MCH	VN	-30	21.18	0.01127	PASS
				-20	29.38	0.01563	PASS
				-10	33.13	0.01762	PASS
				0	33.25	0.01769	PASS
				10	28.93	0.01539	PASS
				20	32.35	0.01721	PASS
				30	30.41	0.01618	PASS
				40	28.73	0.01528	PASS
				50	30.15	0.01604	PASS
		HCH	VN	-30	33.67	0.01763	PASS
				-20	29.15	0.01526	PASS
				-10	35.84	0.01877	PASS
				0	34.90	0.01827	PASS
				10	32.51	0.01702	PASS
				20	26.99	0.01413	PASS
				30	24.25	0.0127	PASS
				40	23.05	0.01207	PASS
				50	30.19	0.01581	PASS

END