



Appendix for test report



1 Appendix_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	32.66	27.79	38.5	PASS
		MCH	32.82	27.95	38.5	PASS
		HCH	32.91	28.04	38.5	PASS
	GSM/TM2	LCH	26.4	21.53	38.5	PASS
		MCH	26.38	21.51	38.5	PASS
		HCH	26.41	21.54	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.56	30.42	33	PASS
		MCH	30.61	30.47	33	PASS
		HCH	30.65	30.51	33	PASS
	GSM/TM2	LCH	27.3	27.16	33	PASS
		MCH	27.28	27.14	33	PASS
		HCH	27.26	27.12	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:

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

SET RBW = 1% 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	0.23	13	PASS
		MCH	0.23	13	PASS
		HCH	0.22	13	PASS
	GSM/TM2	LCH	3.05	13	PASS
		MCH	2.81	13	PASS
		HCH	2.84	13	PASS
GSM1900	GSM/TM1	LCH	0.28	13	PASS
		MCH	0.28	13	PASS
		HCH	0.28	13	PASS
	GSM/TM2	LCH	2.91	13	PASS
		MCH	2.71	13	PASS
		HCH	2.91	13	PASS

3Appendix_C: Modulation Characteristics

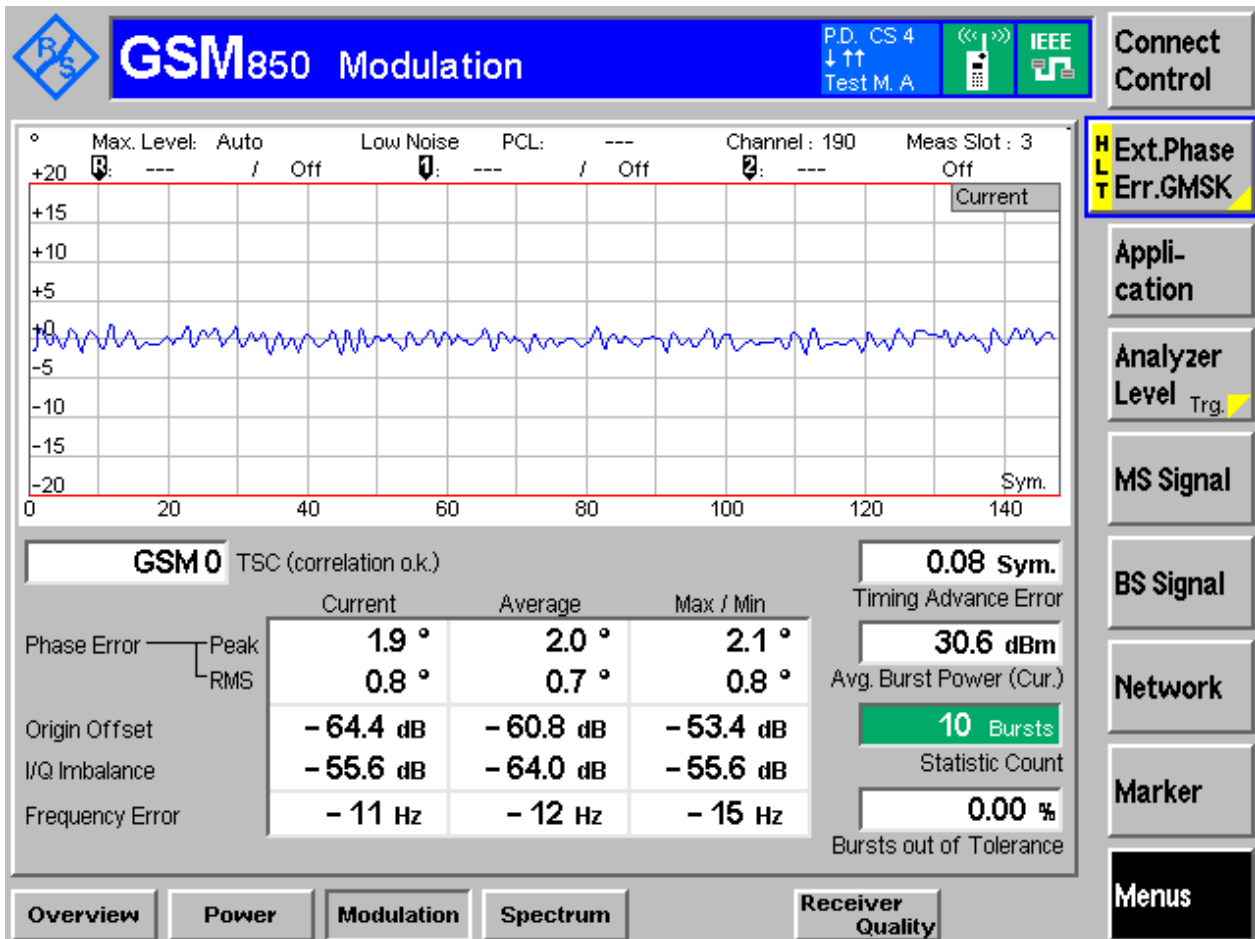
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

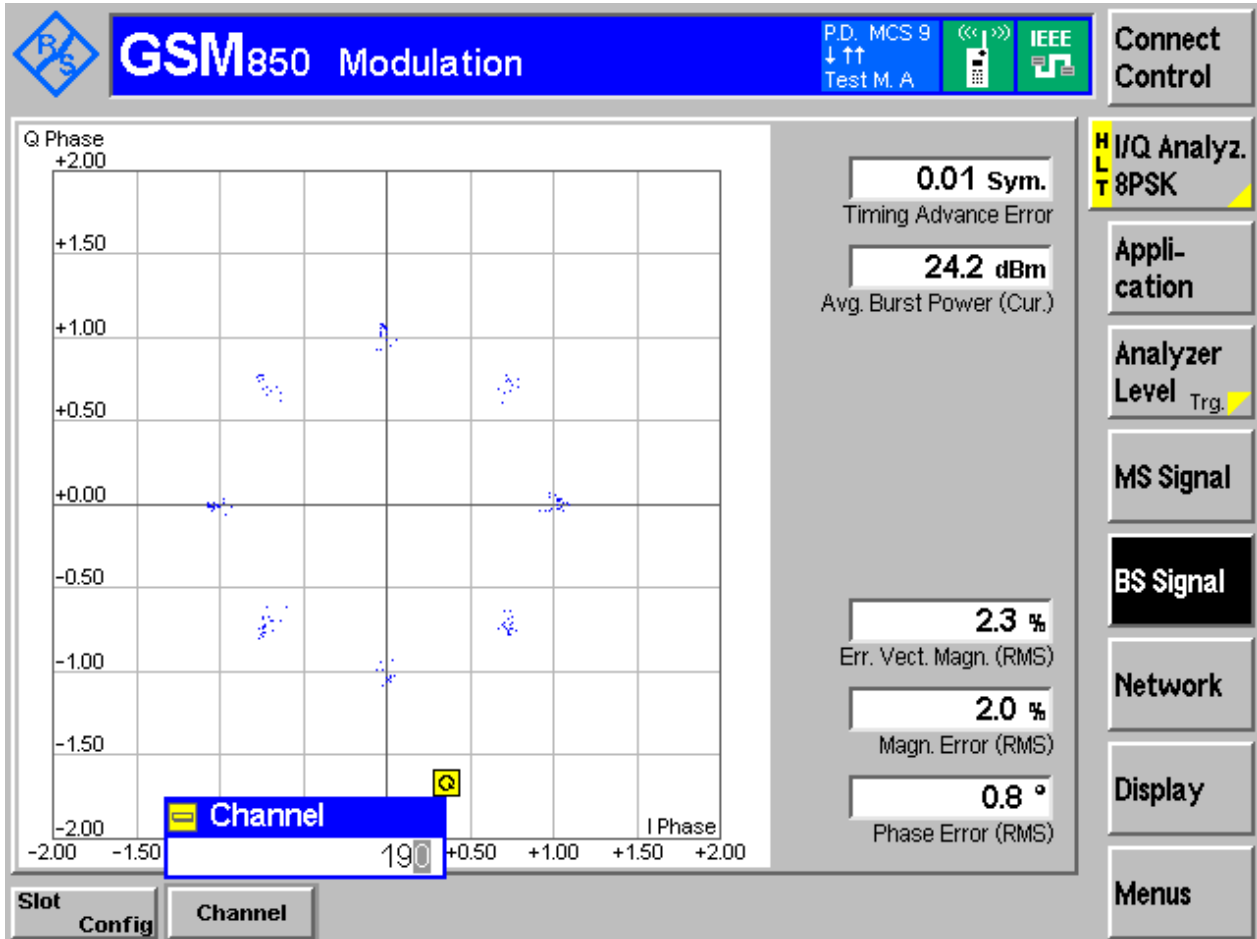
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

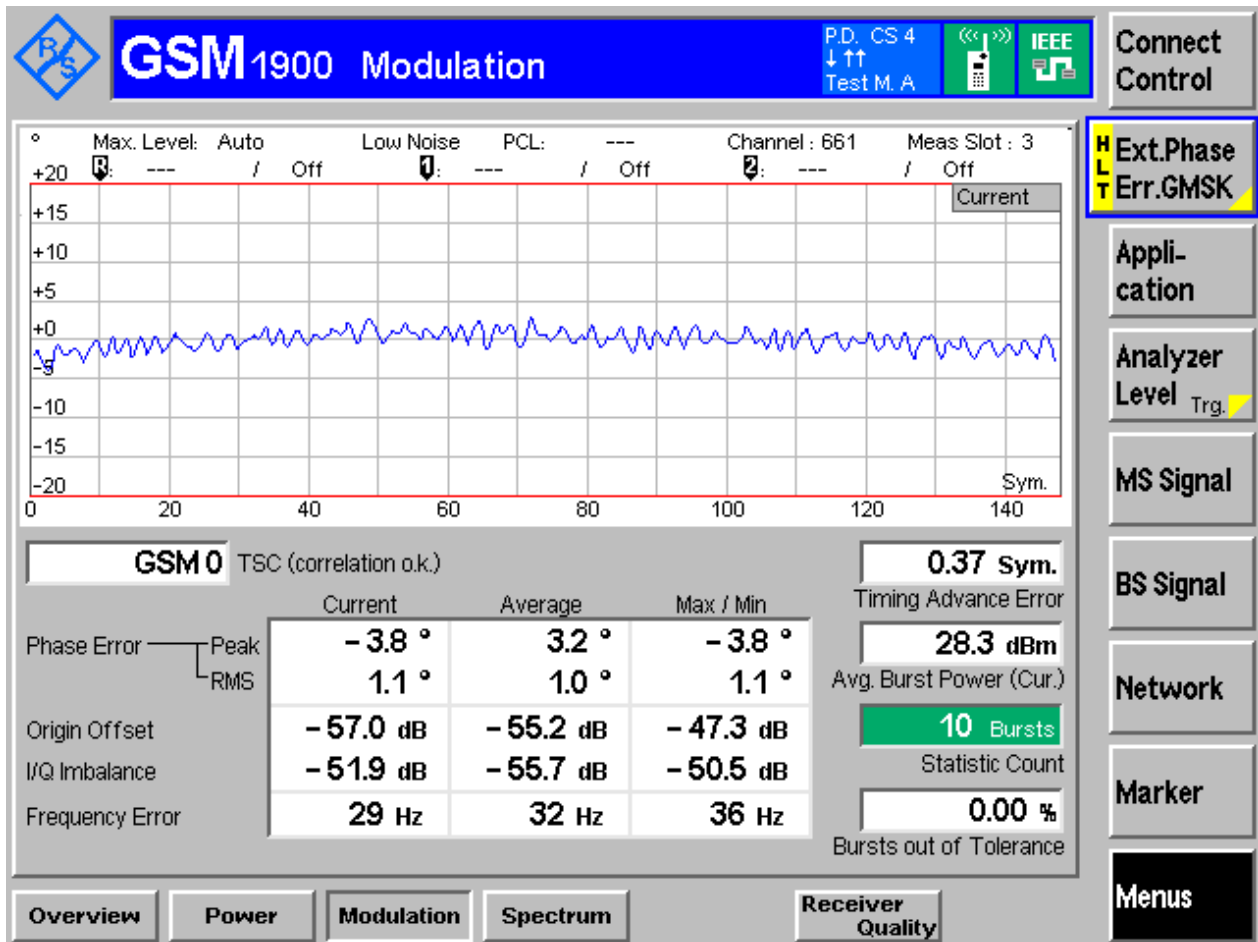
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

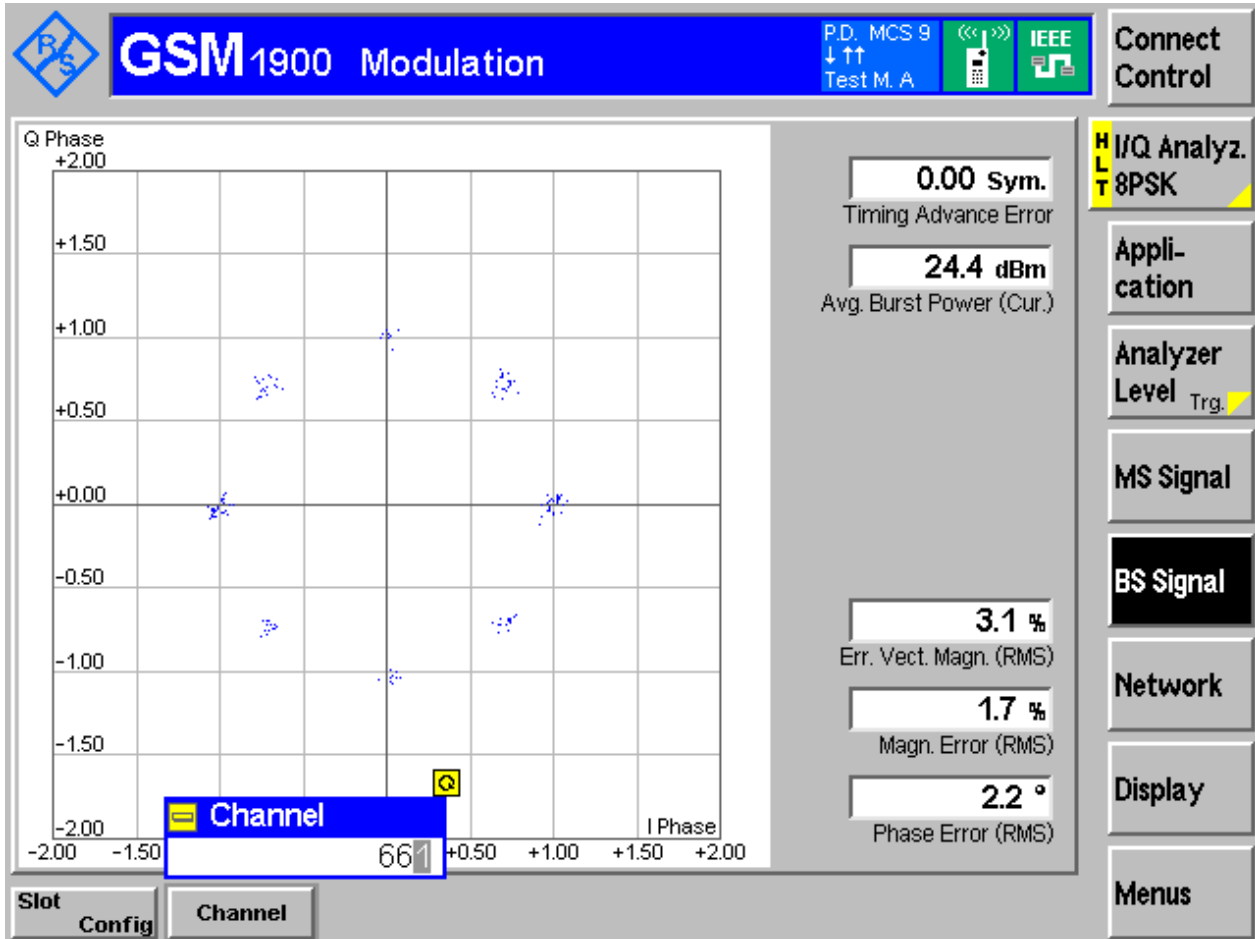
3.1.2.1 Test Mode = GSM/TM1

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	247.70	316.32	Pass
		MCH	247.60	324.38	Pass
		HCH	242.60	317.13	Pass
	GSM/TM2	LCH	256.28	326.46	Pass
		MCH	254.38	326.12	Pass
		HCH	254.17	321.46	Pass
GSM1900	GSM/TM1	LCH	242.56	312.32	Pass
		MCH	242.98	311.55	Pass
		HCH	241.51	312.81	Pass
	GSM/TM2	LCH	250.25	328.83	Pass
		MCH	253.54	322.76	Pass
		HCH	252.49	319.93	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



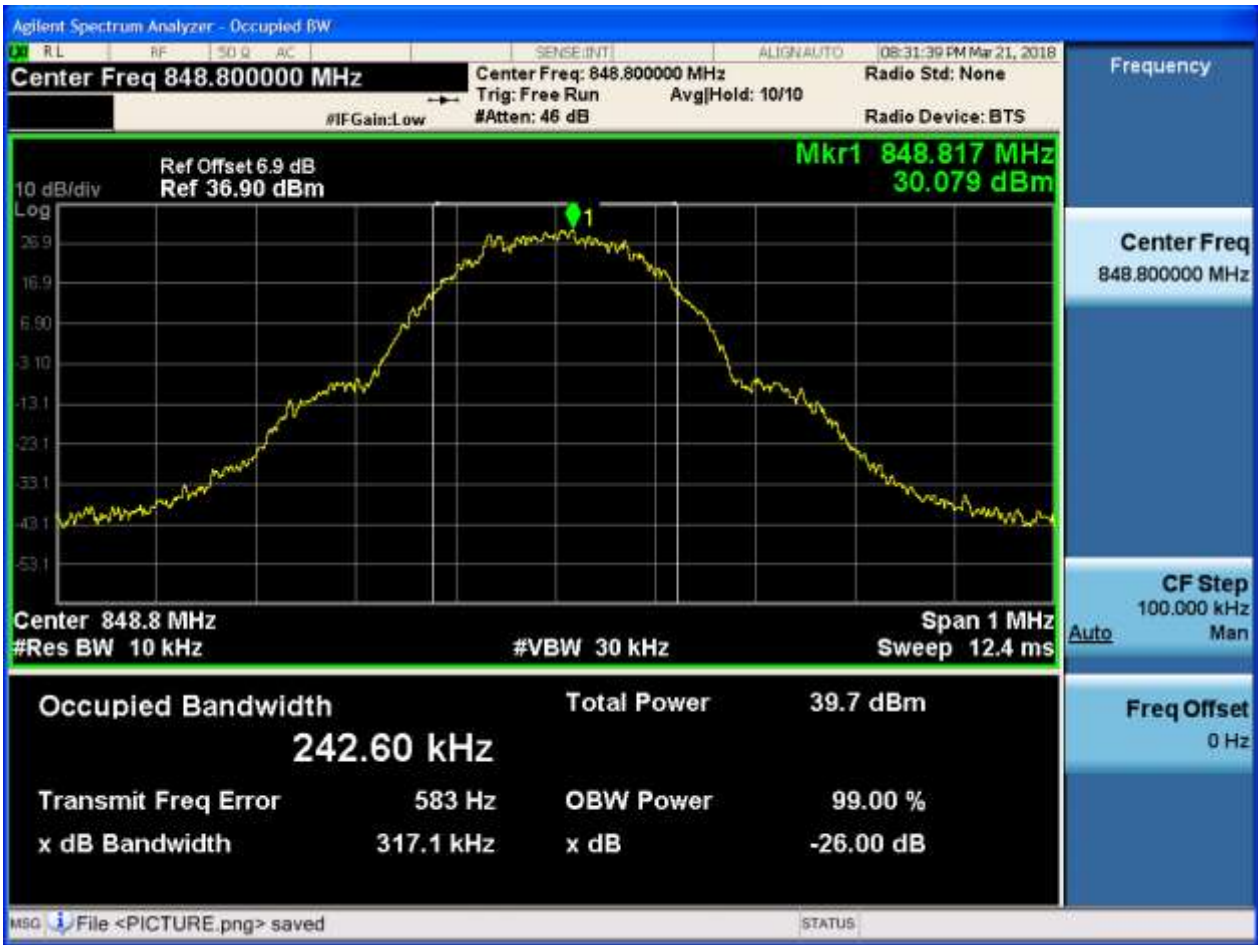


4.1.1.1.2 Test Channel = MCH





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





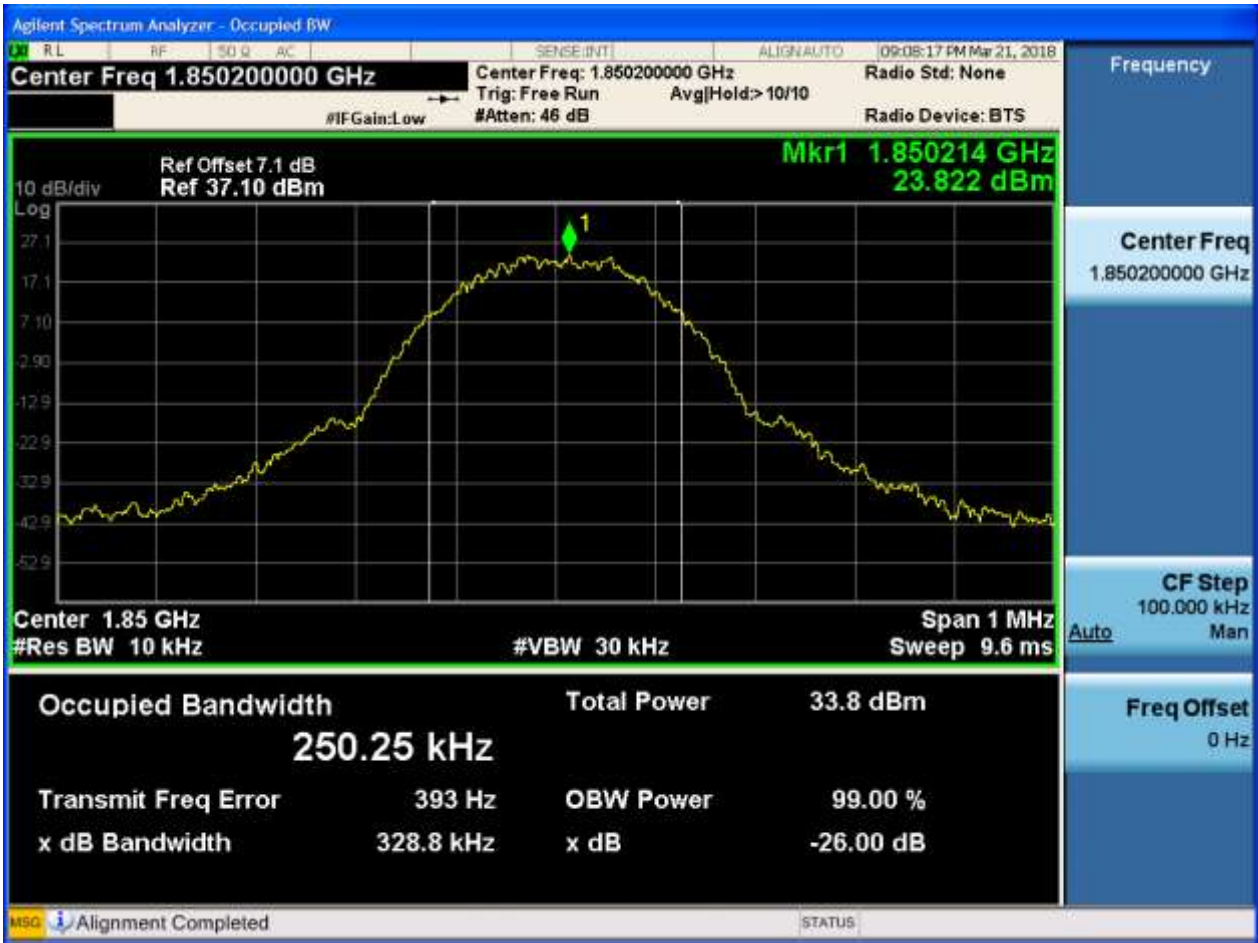
4.1.2.1.3 Test Channel = HCH





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

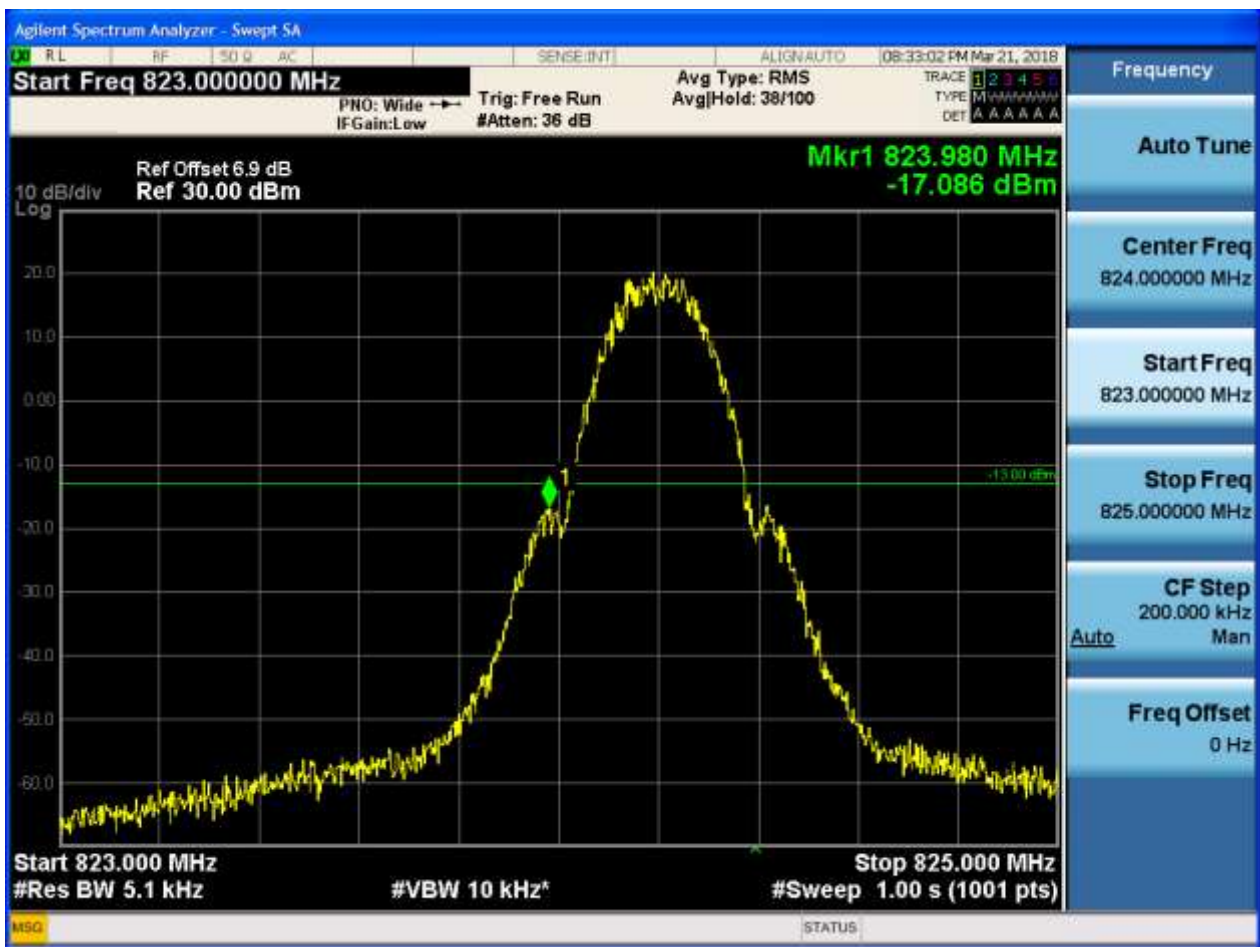
Part I - Test Plots

5.1 For GSM

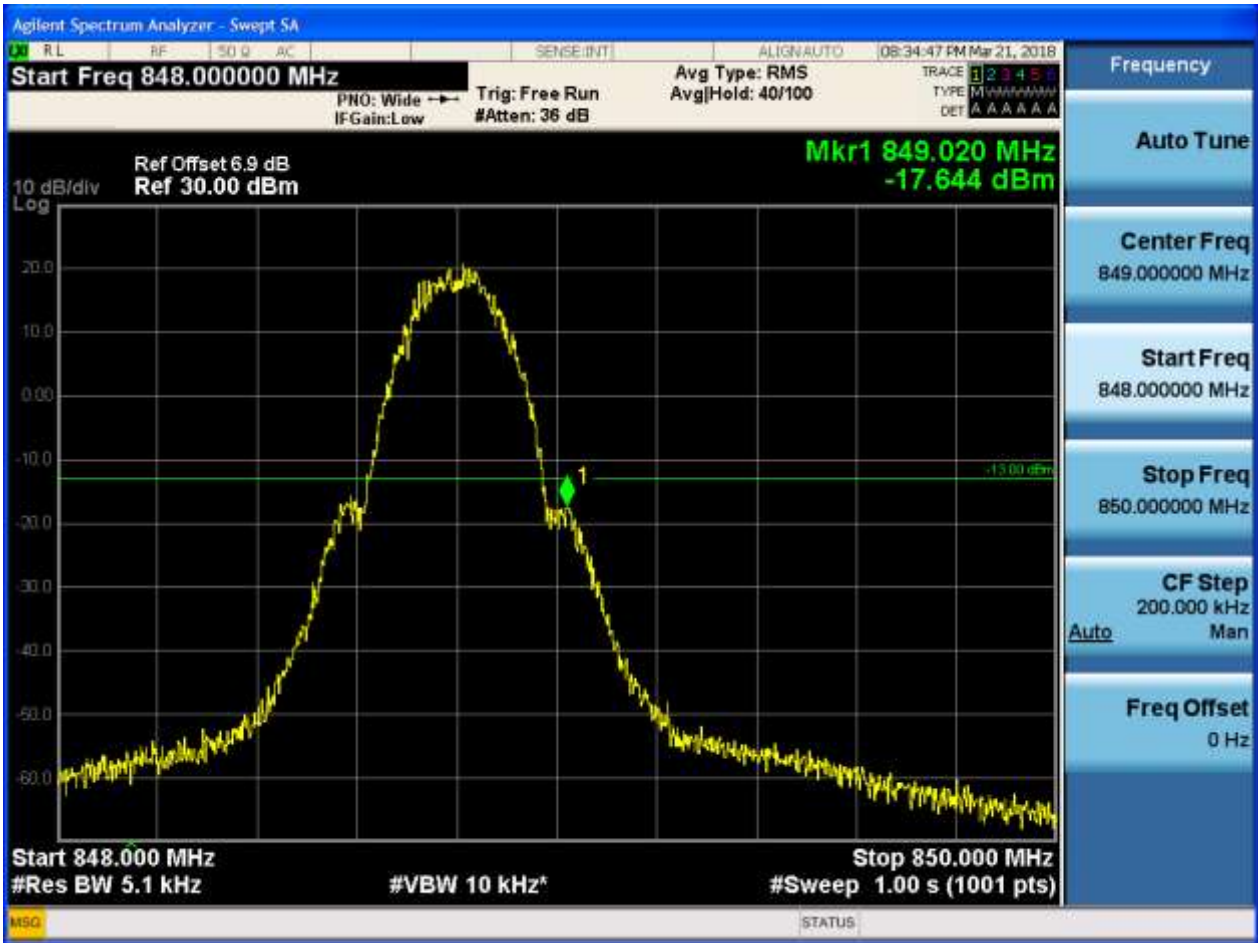
5.1.1 Test Band = GSM850

5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH

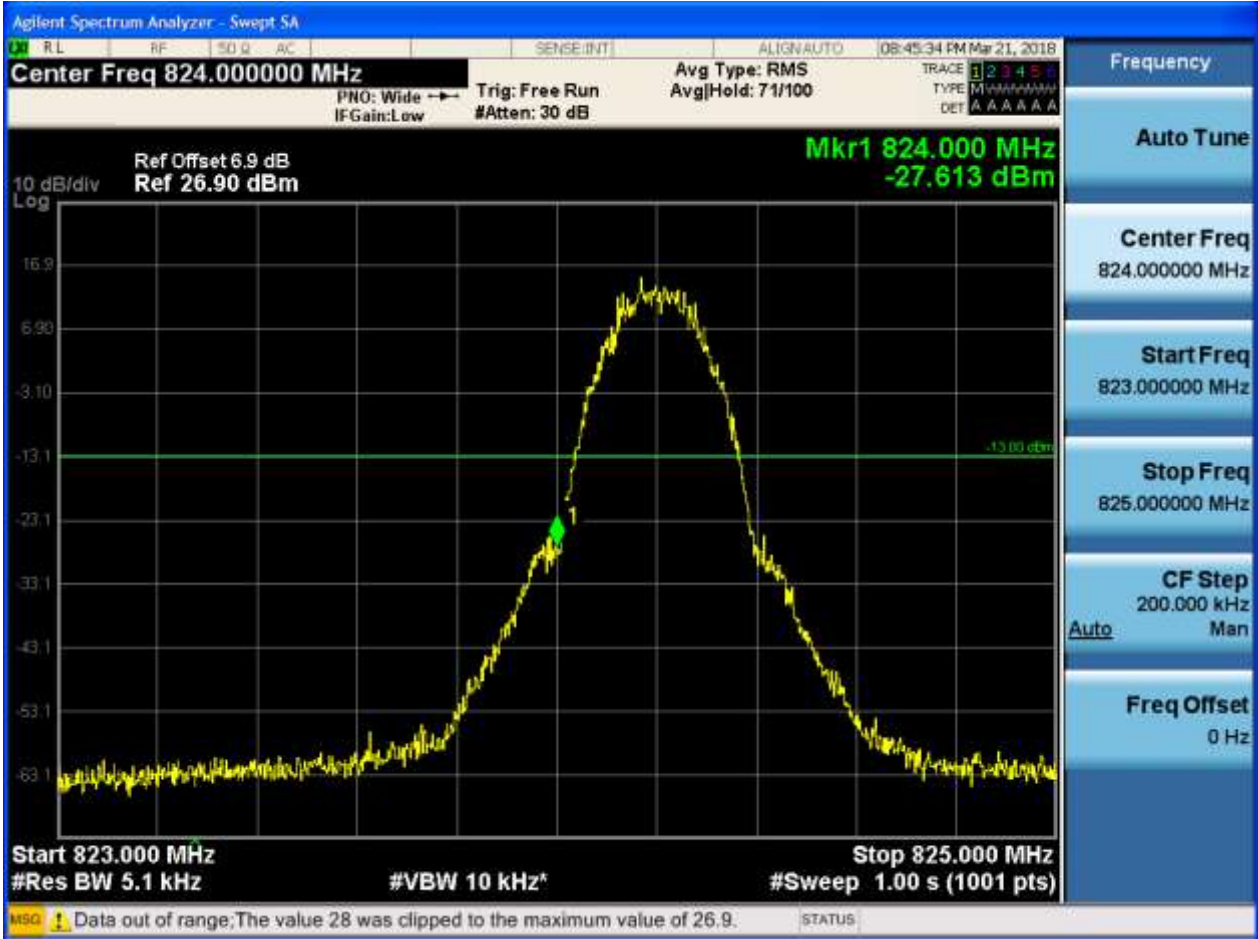


5.1.1.1.2 Test Channel = HCH

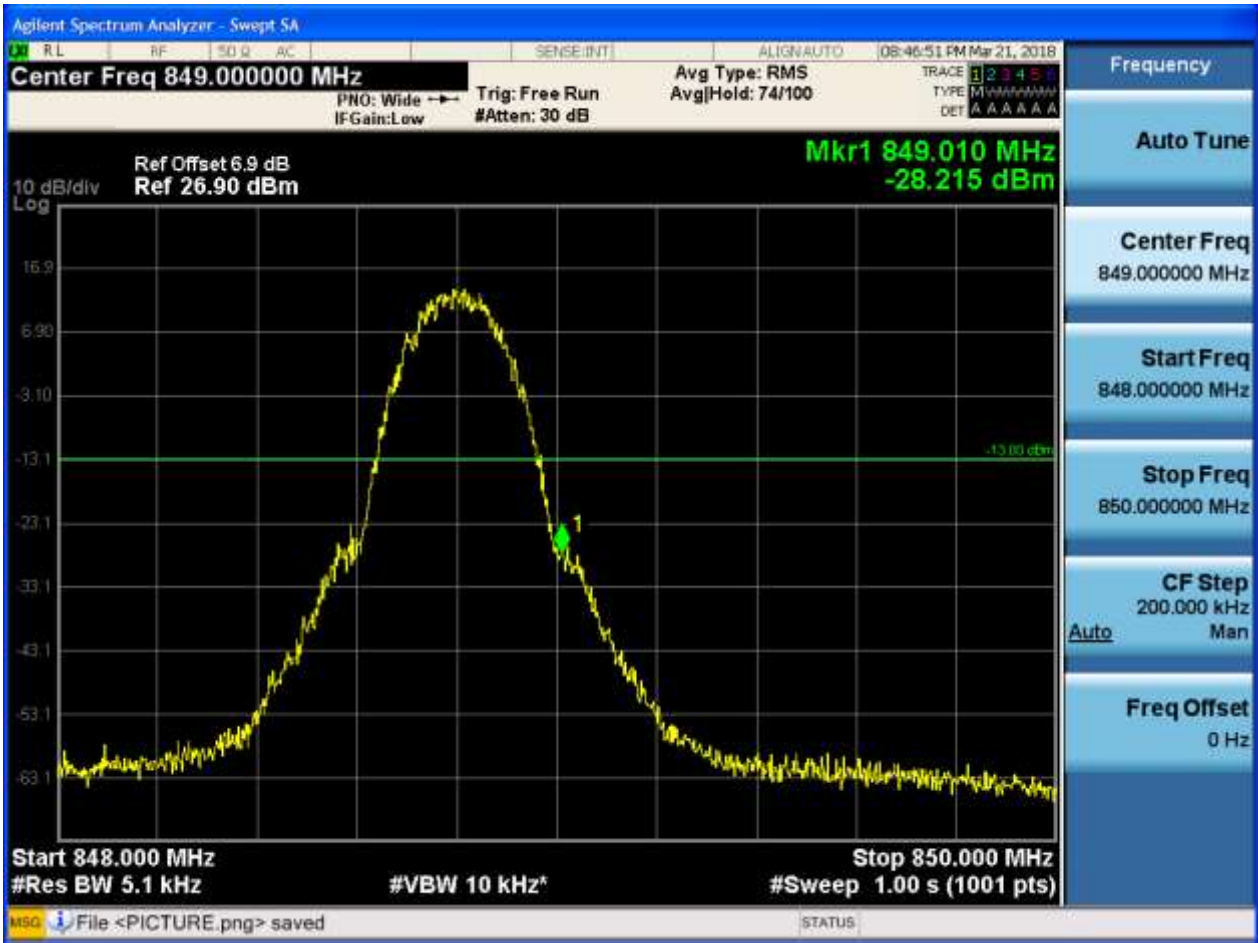


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

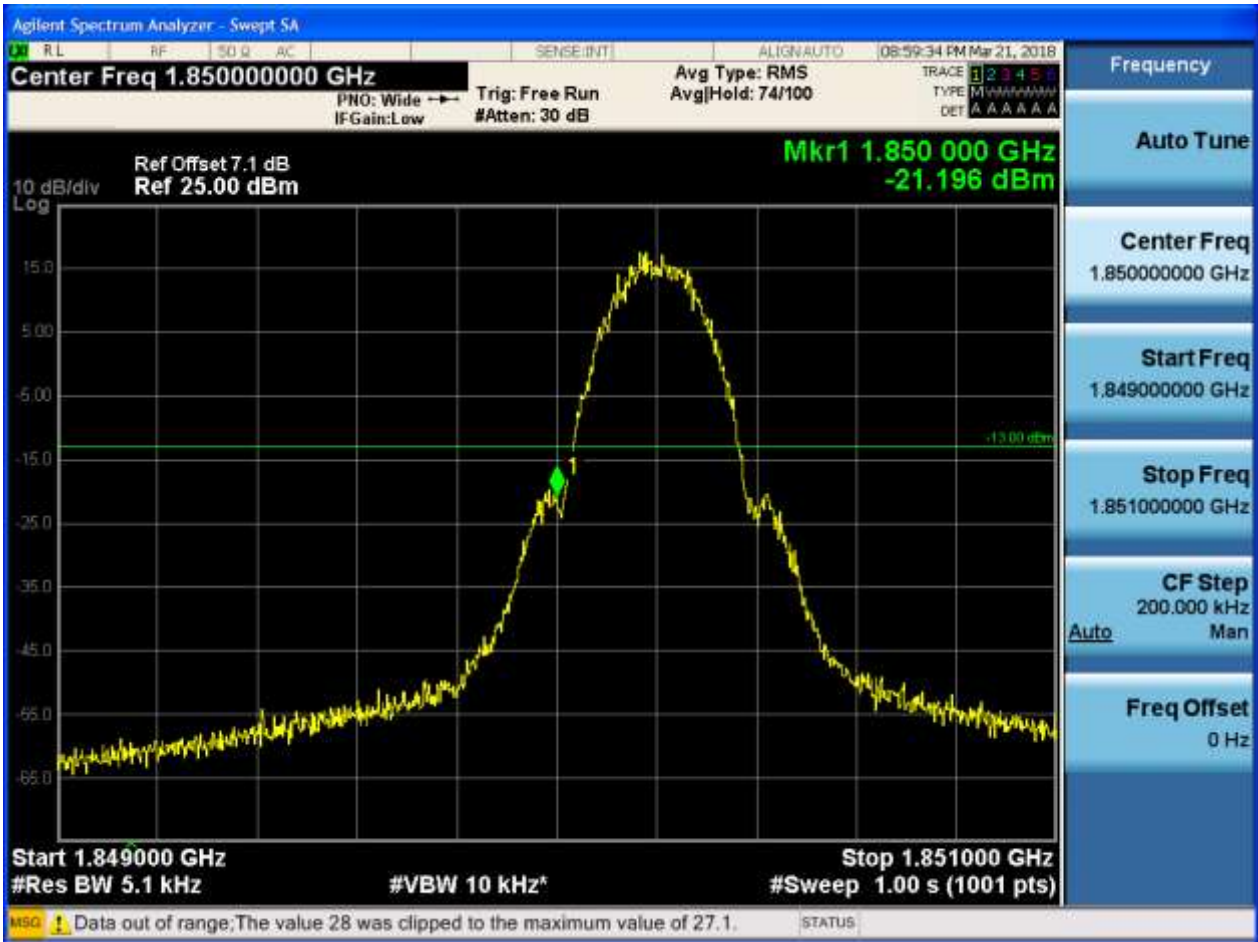




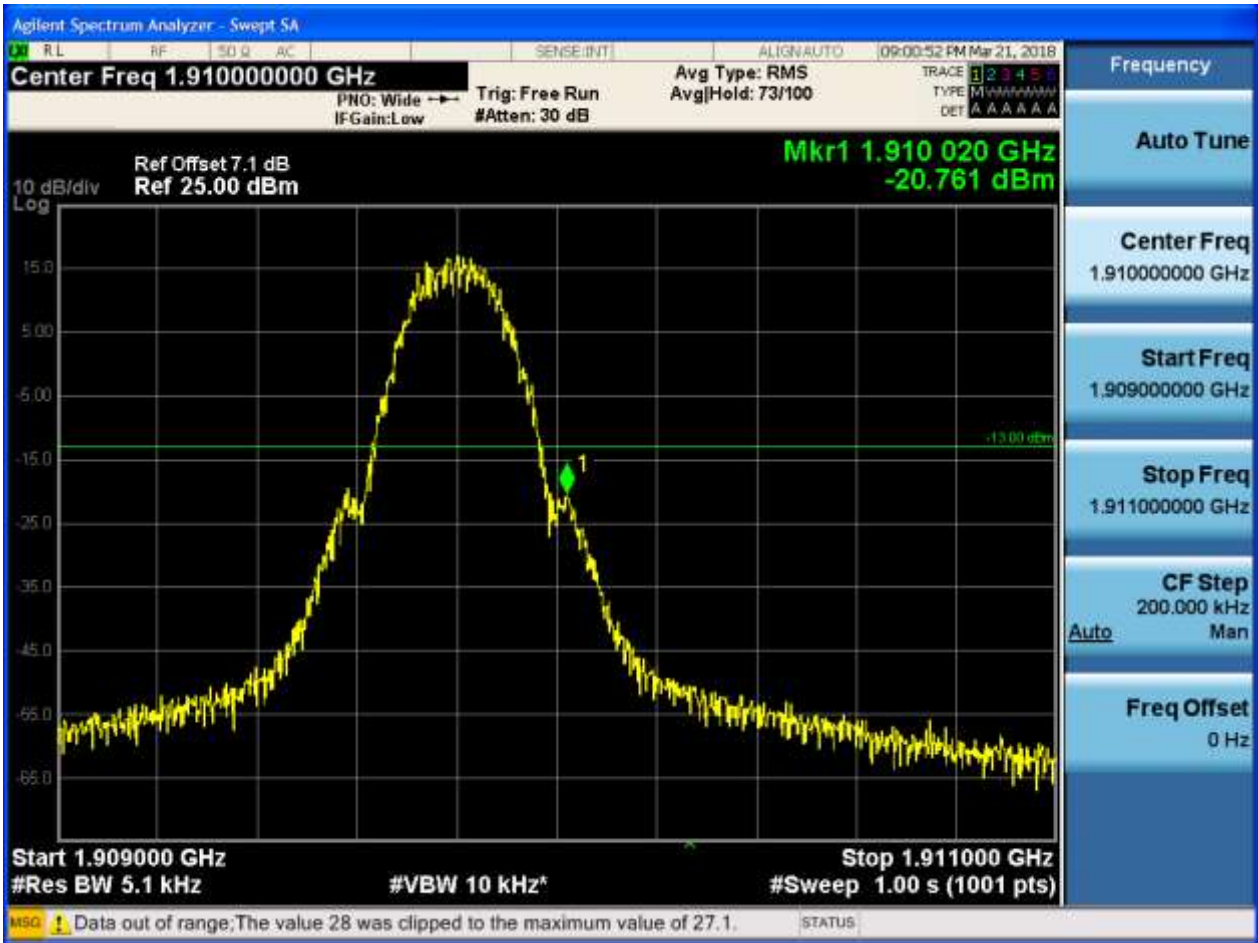
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

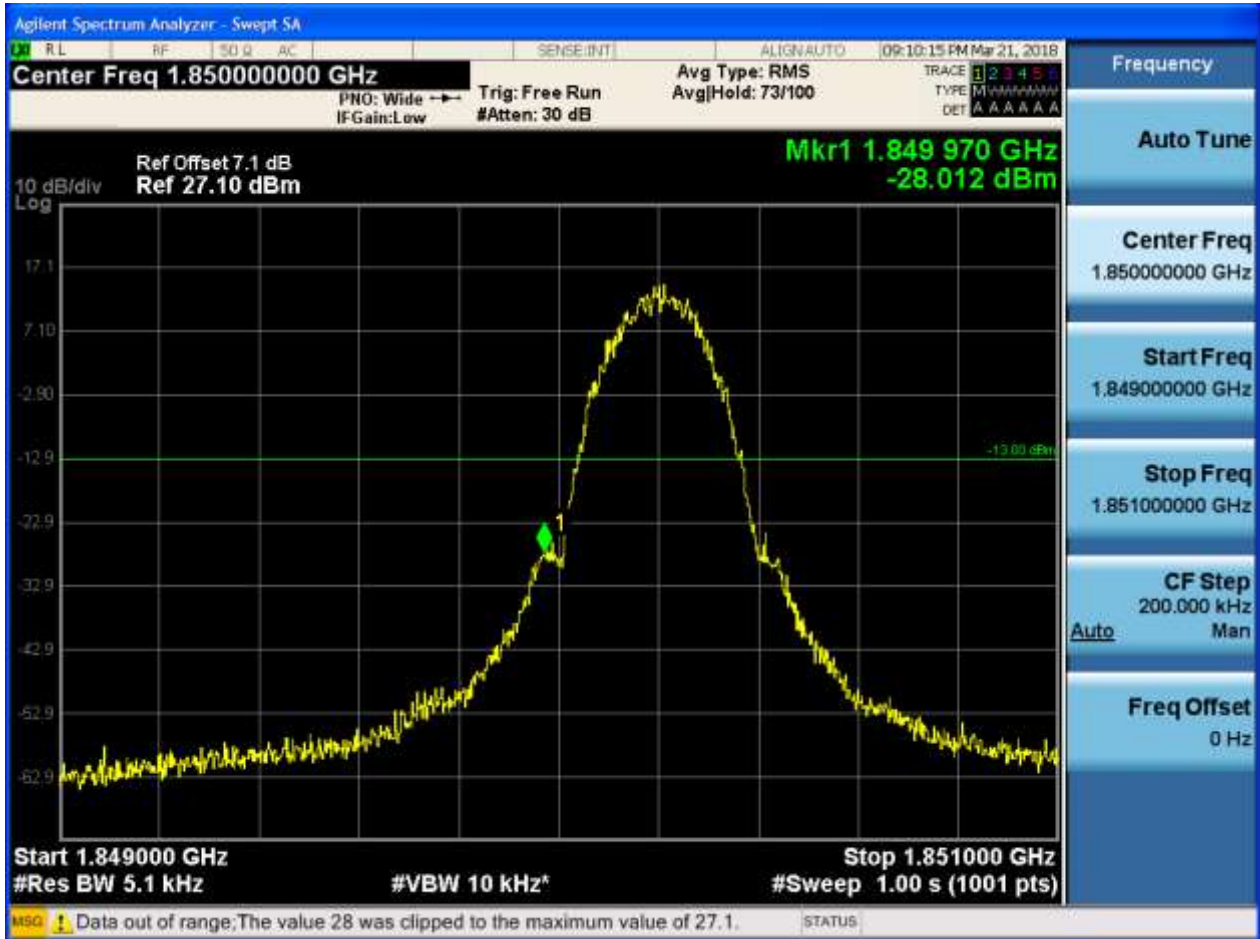


5.1.2.1.2 Test Channel = HCH

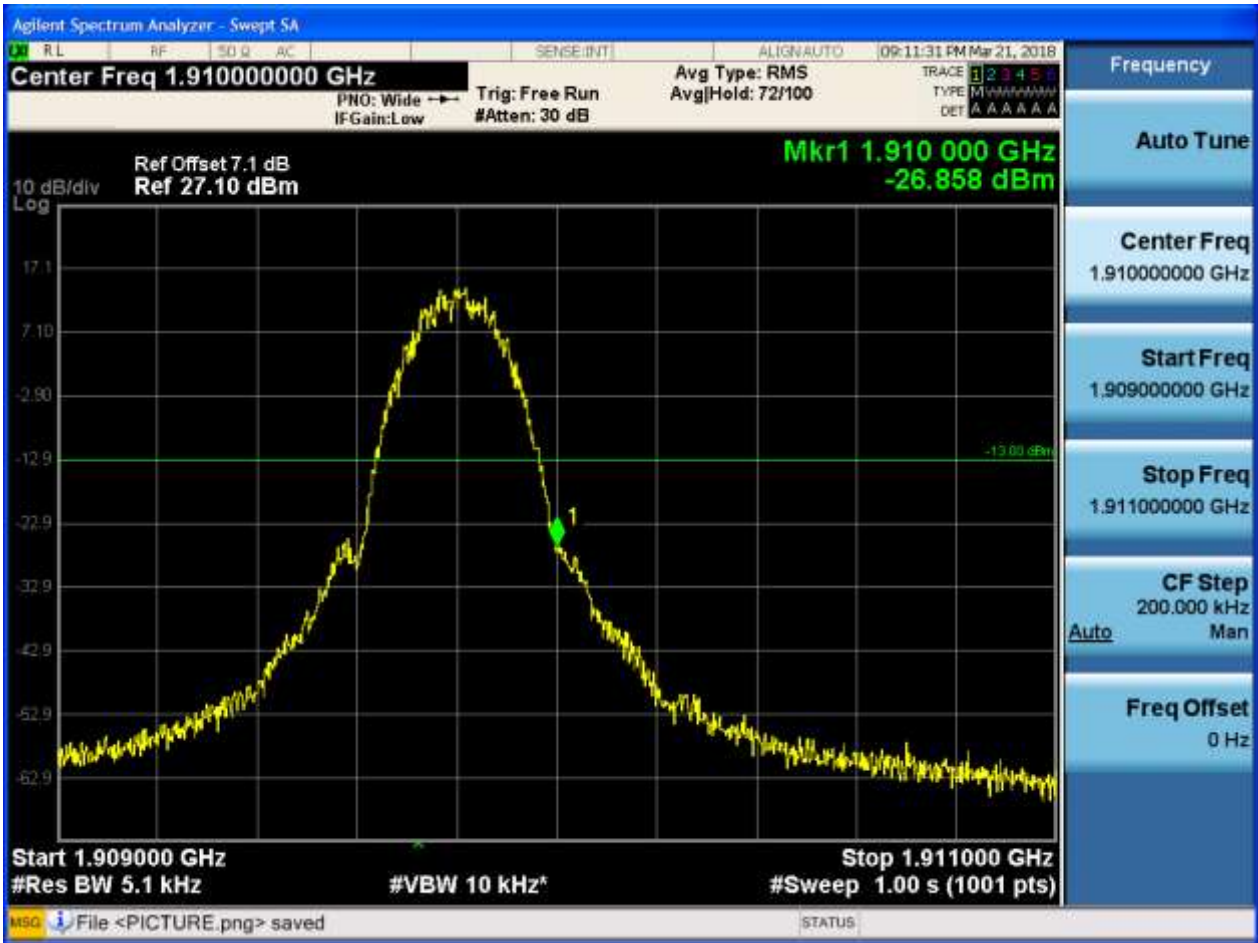


5.1.2.2 Test Mode = GSM/TM2

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

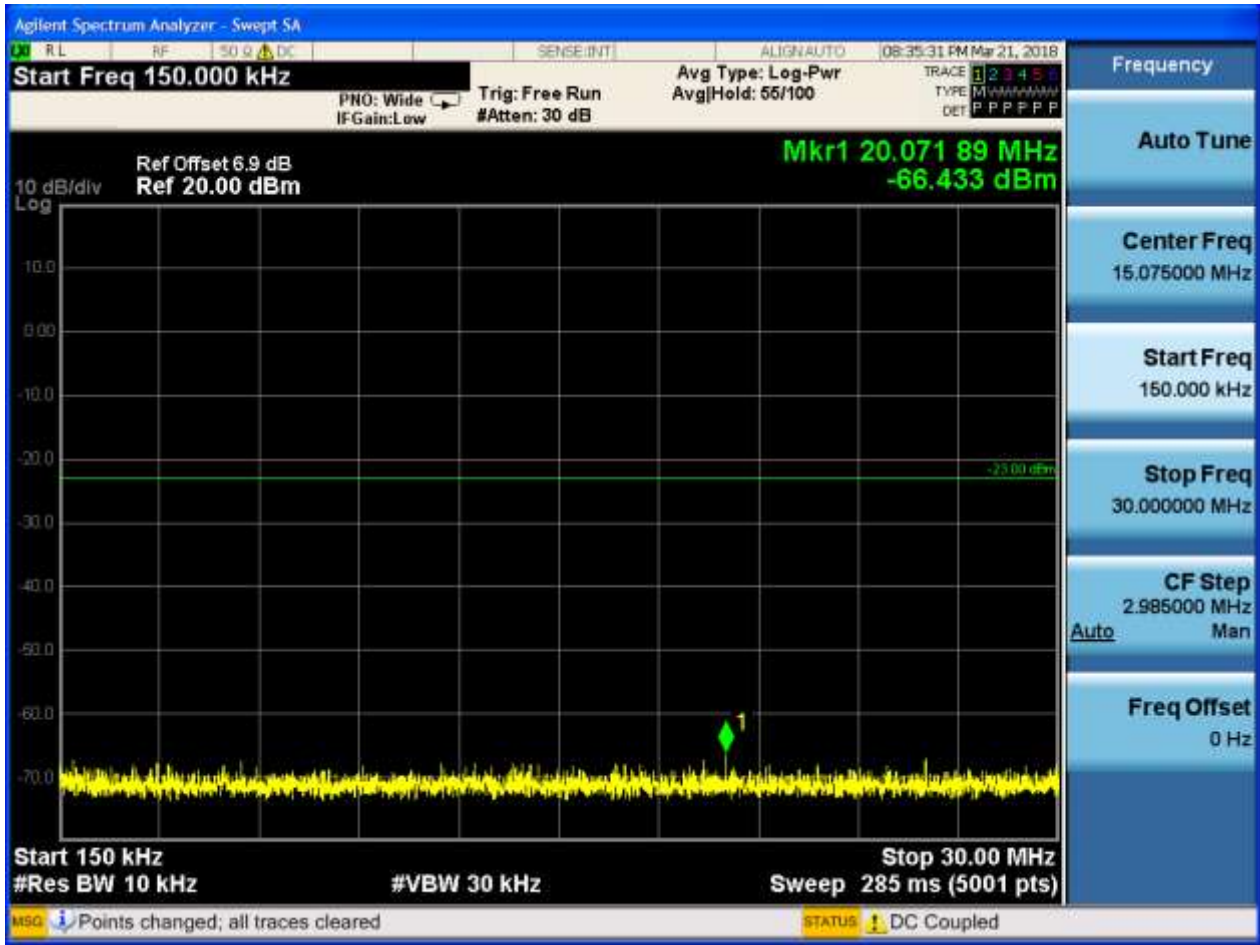
6.1 For GSM

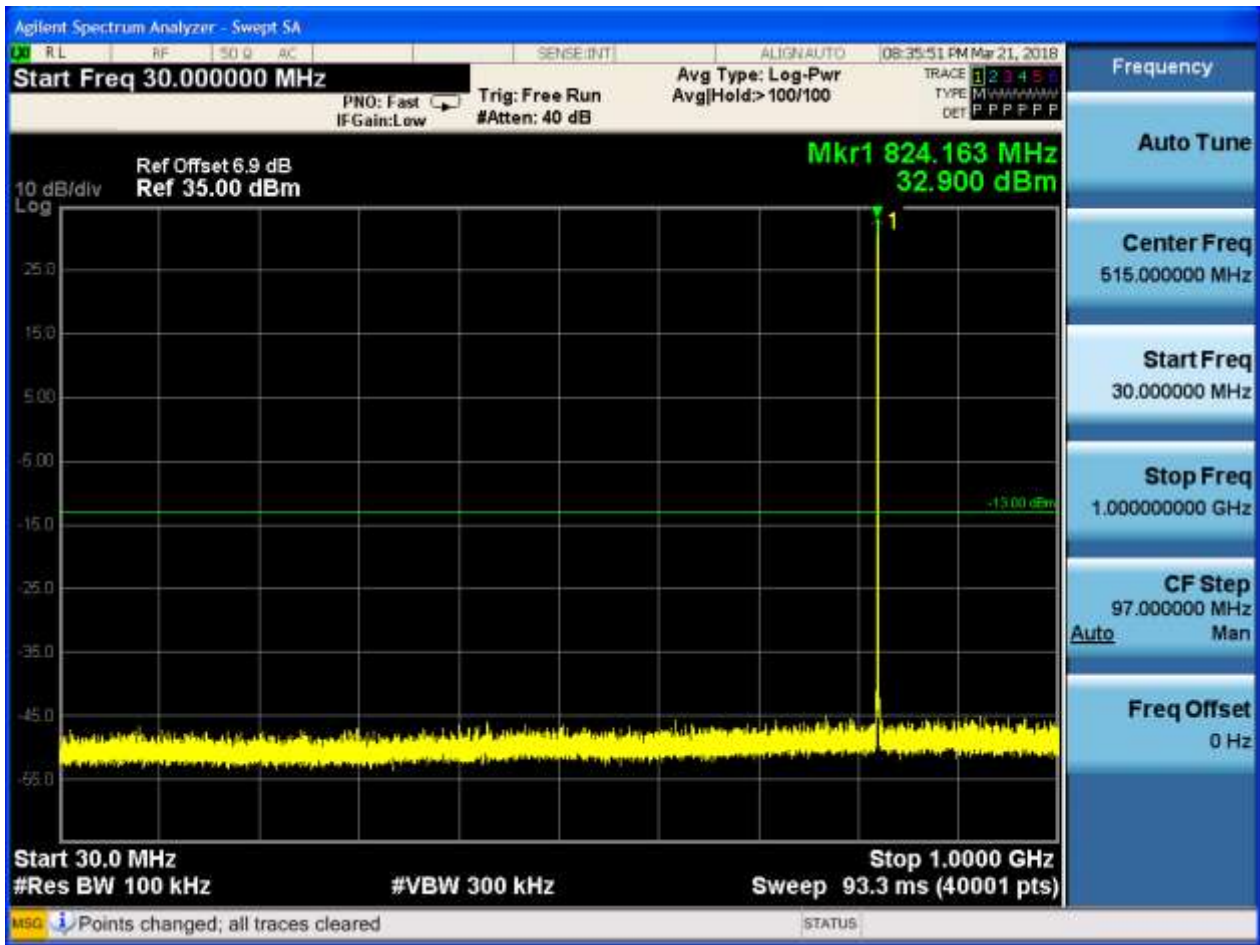
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



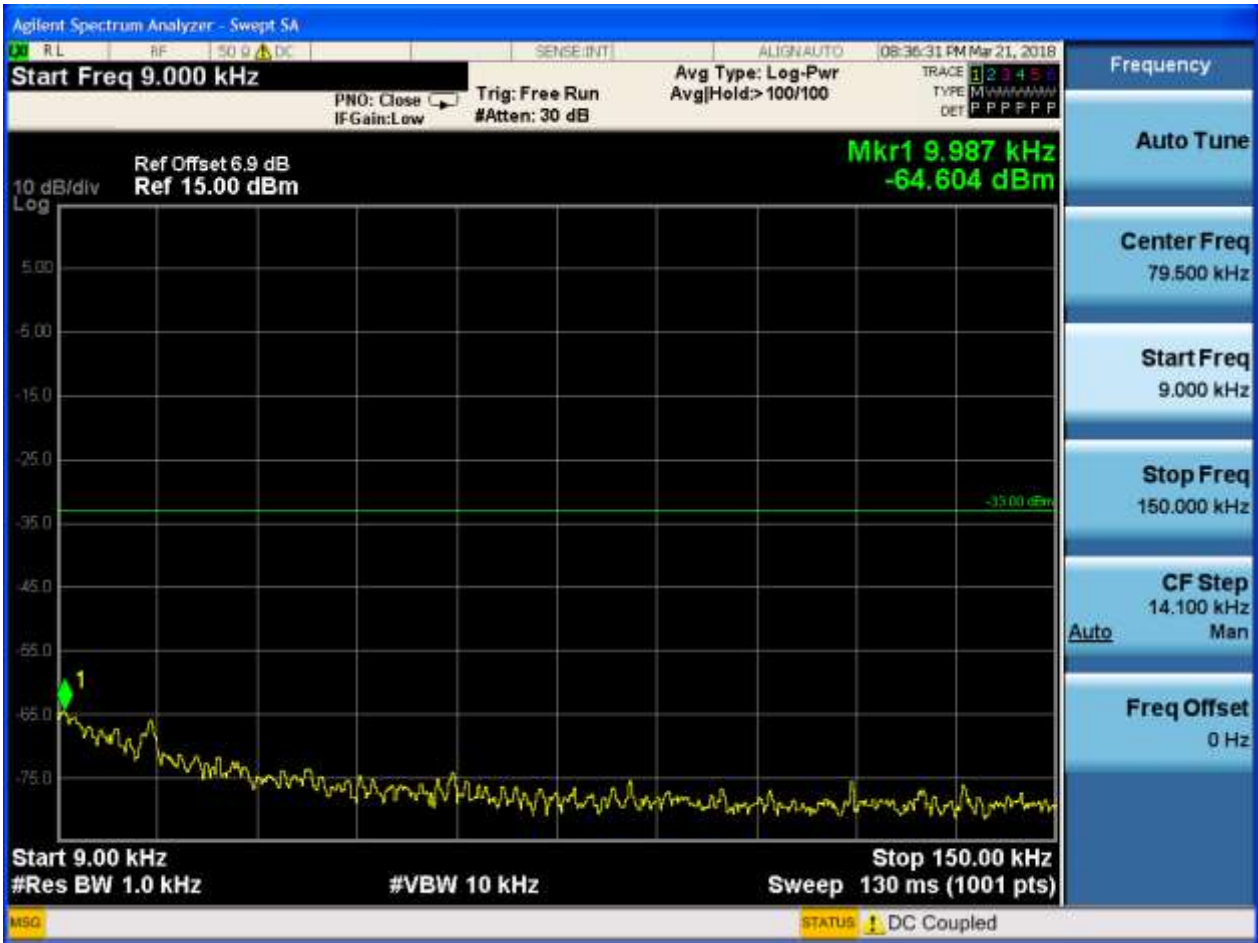


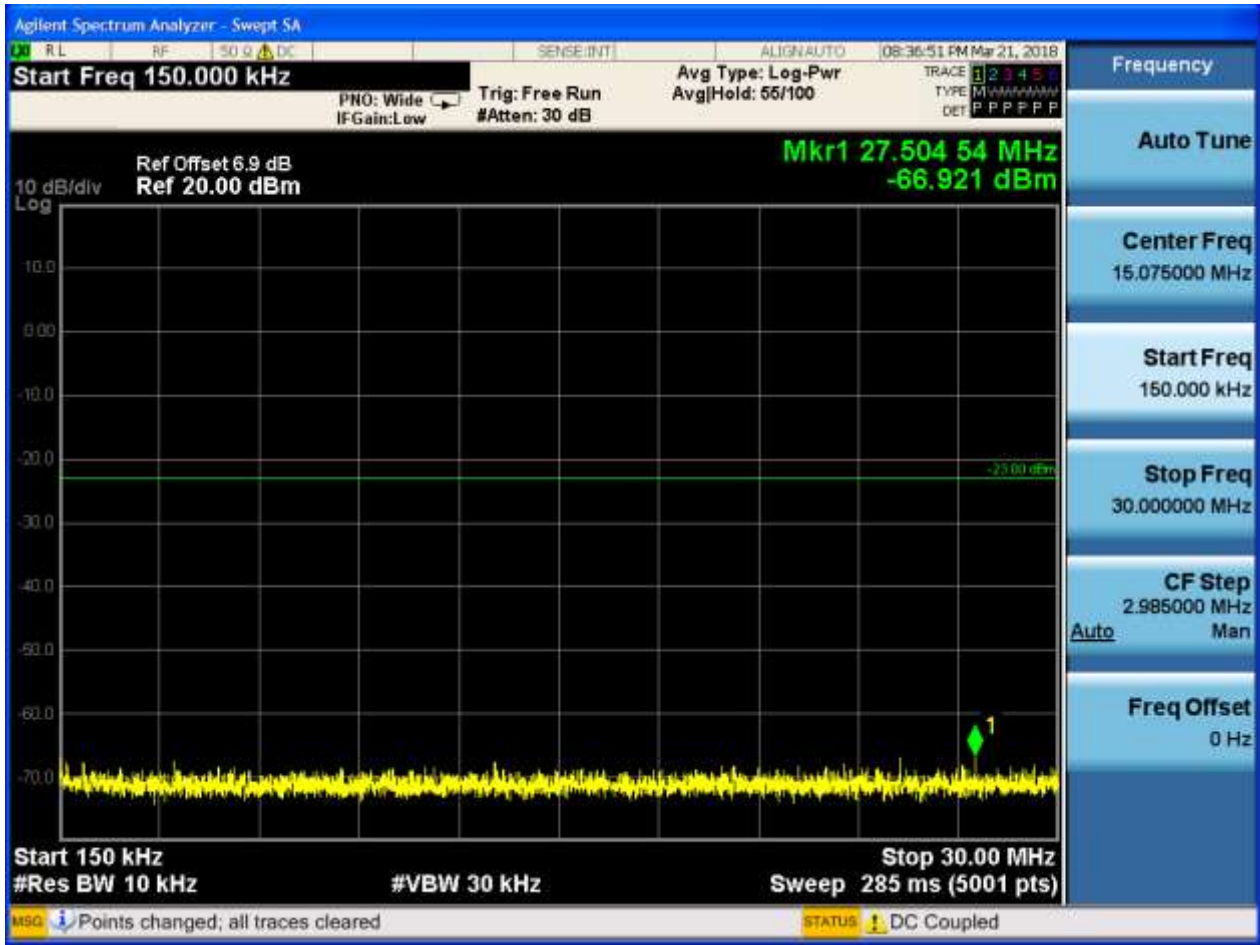


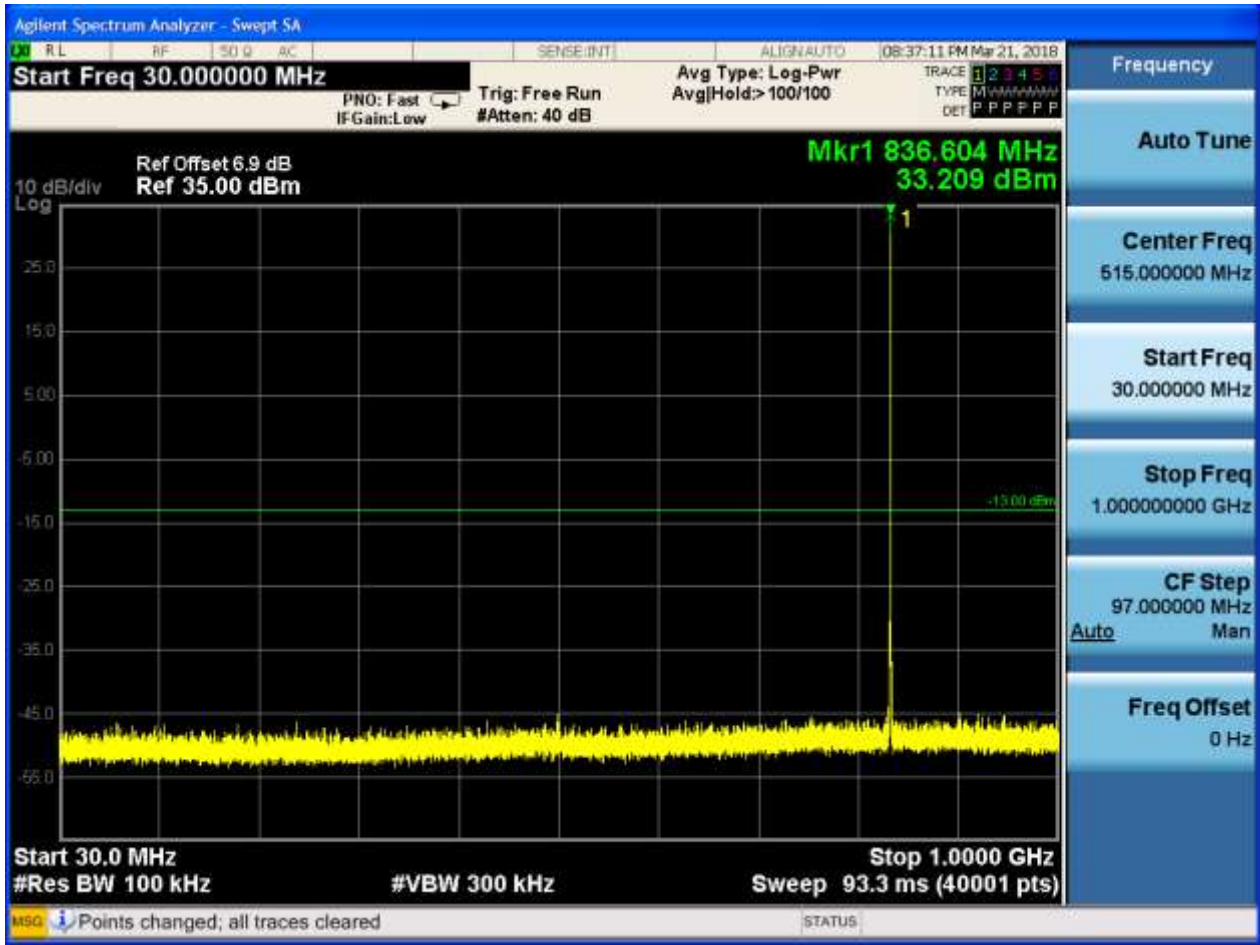




6.1.1.1.2 Test Channel = MCH



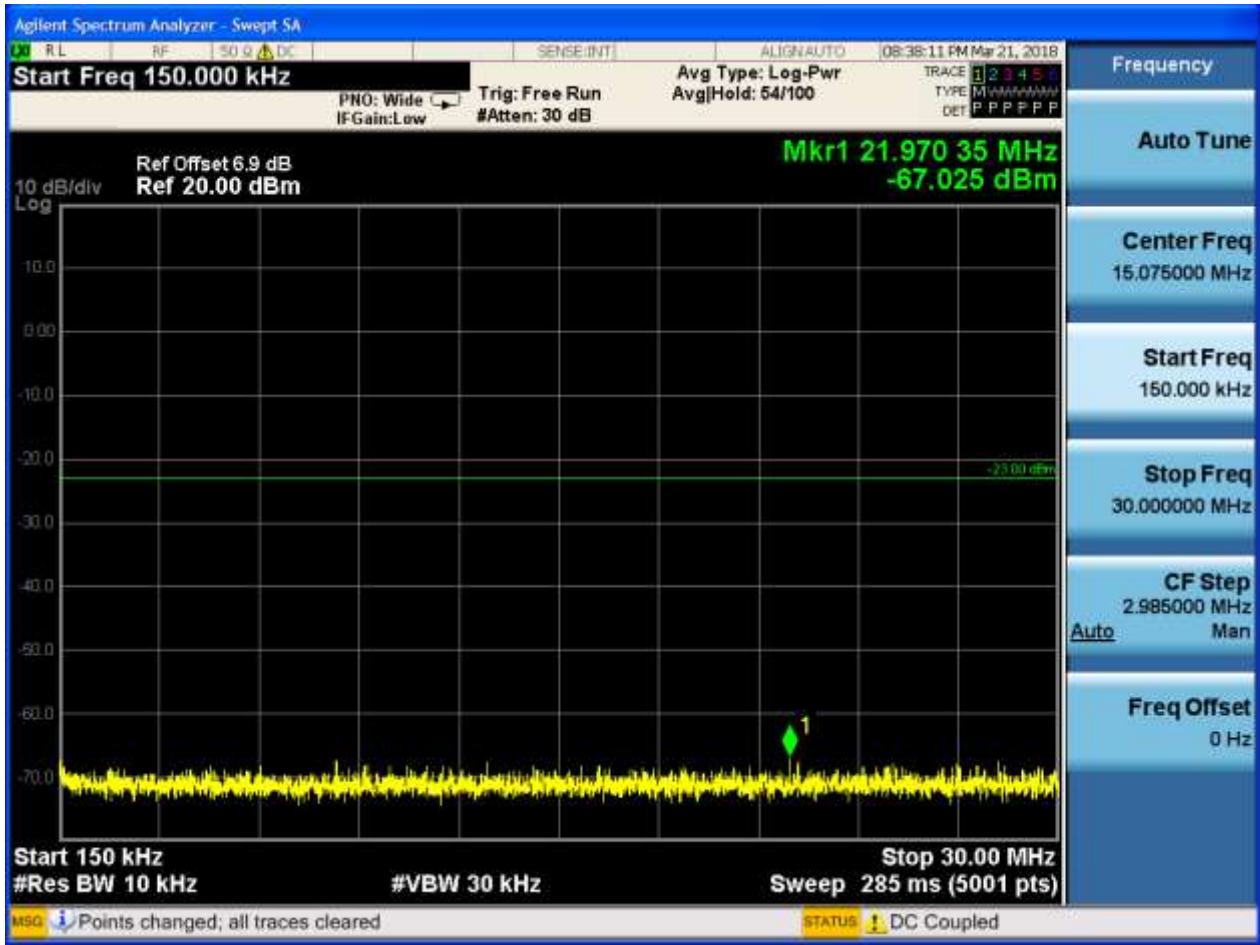


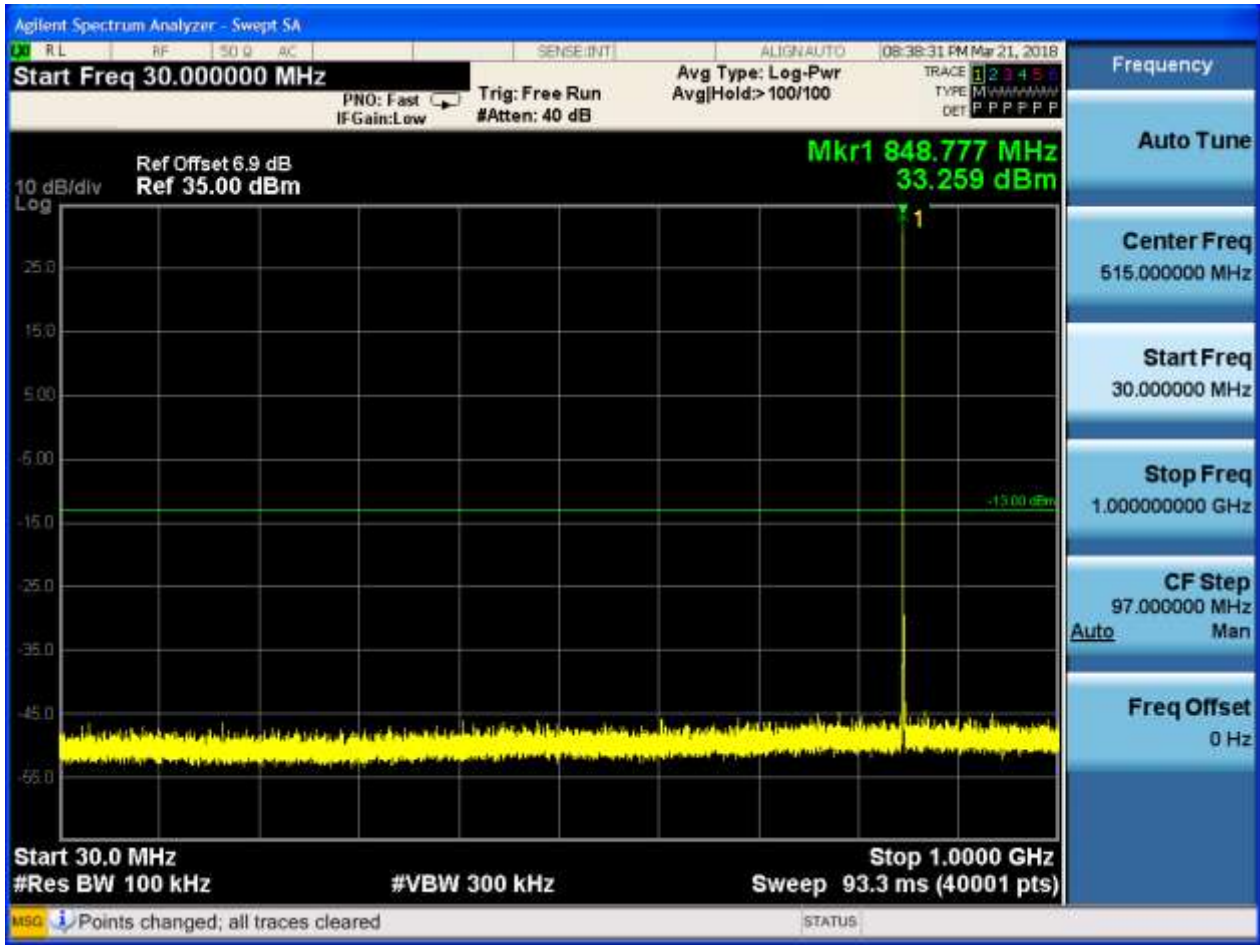




6.1.1.1.3 Test Channel = HCH



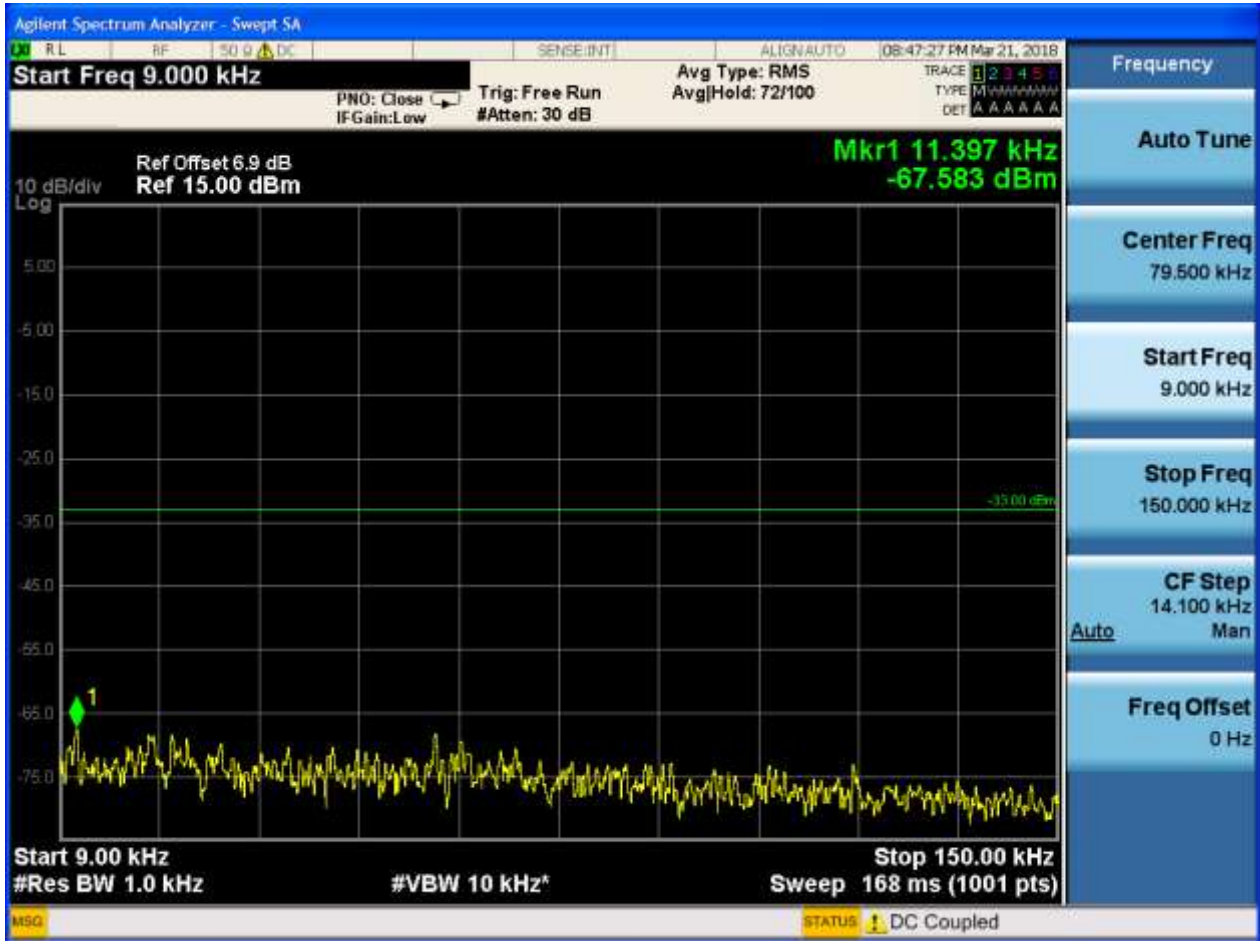


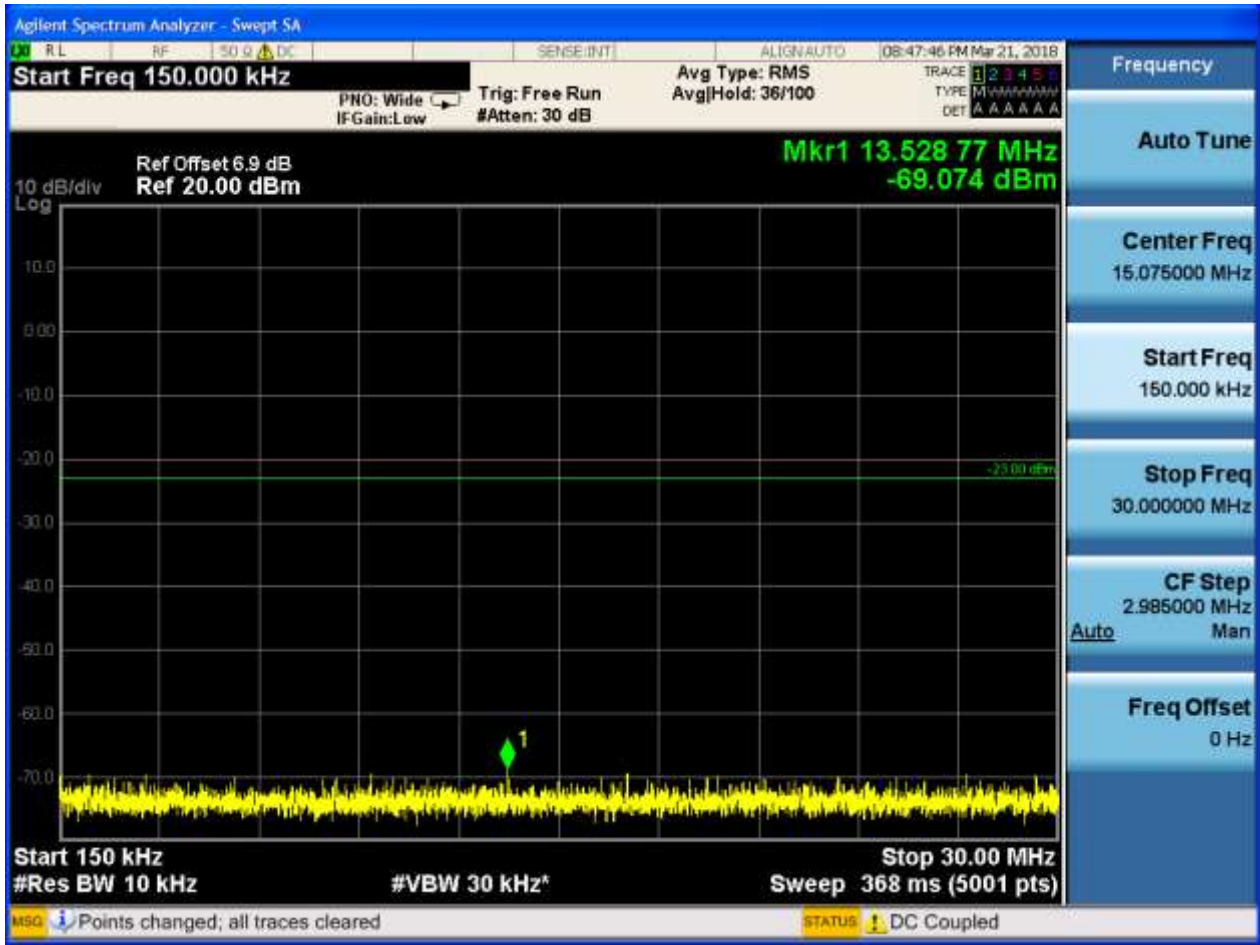


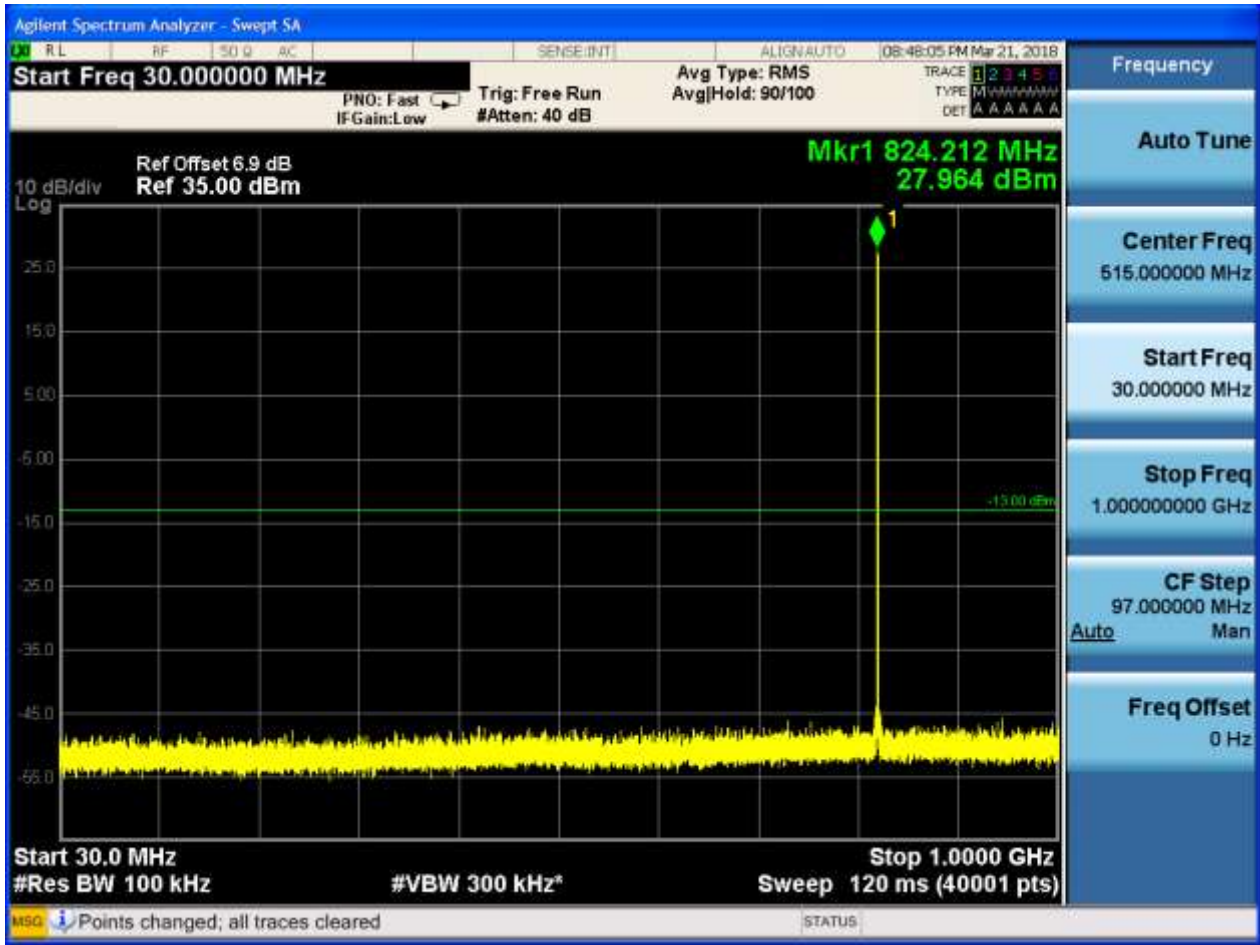


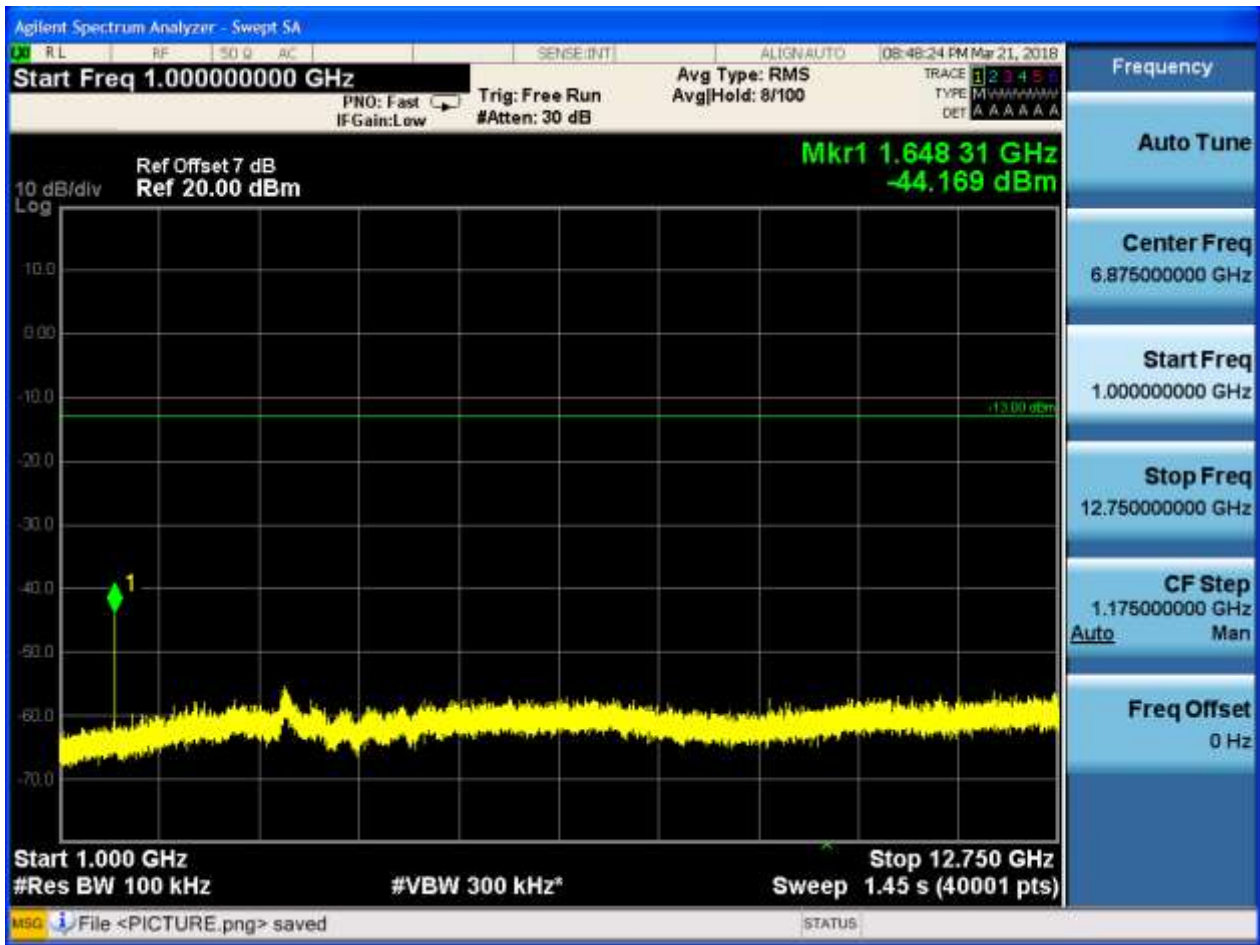
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH



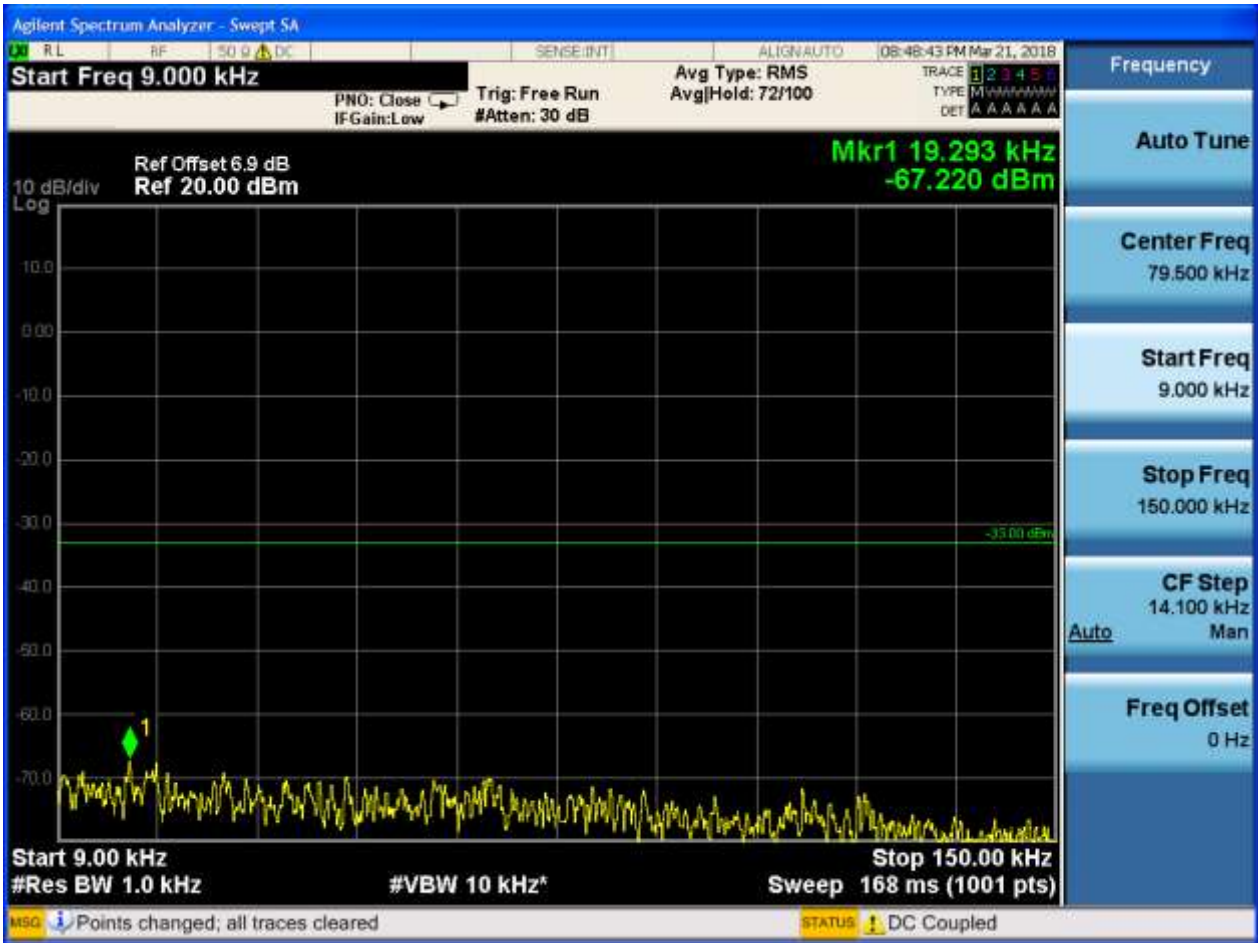


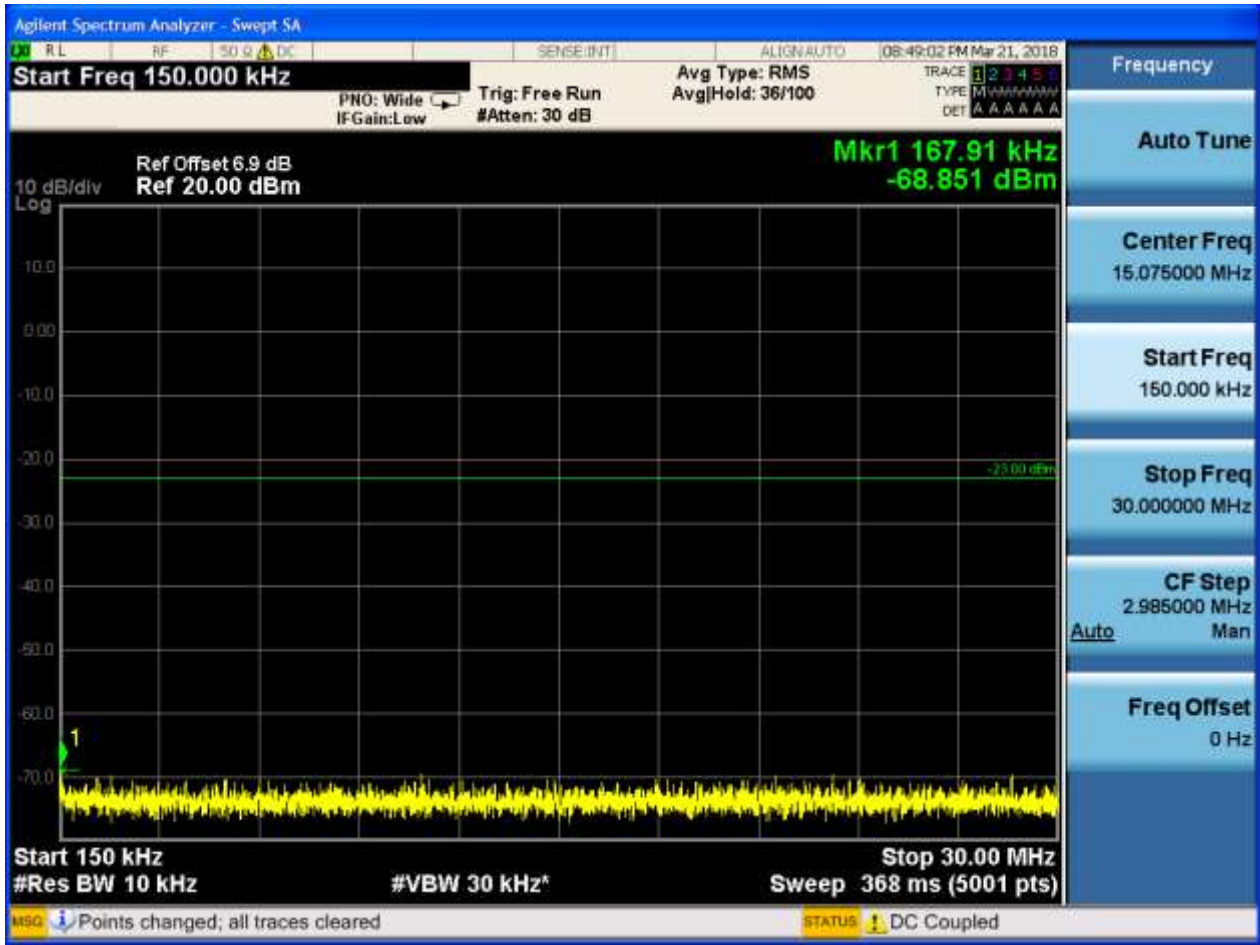


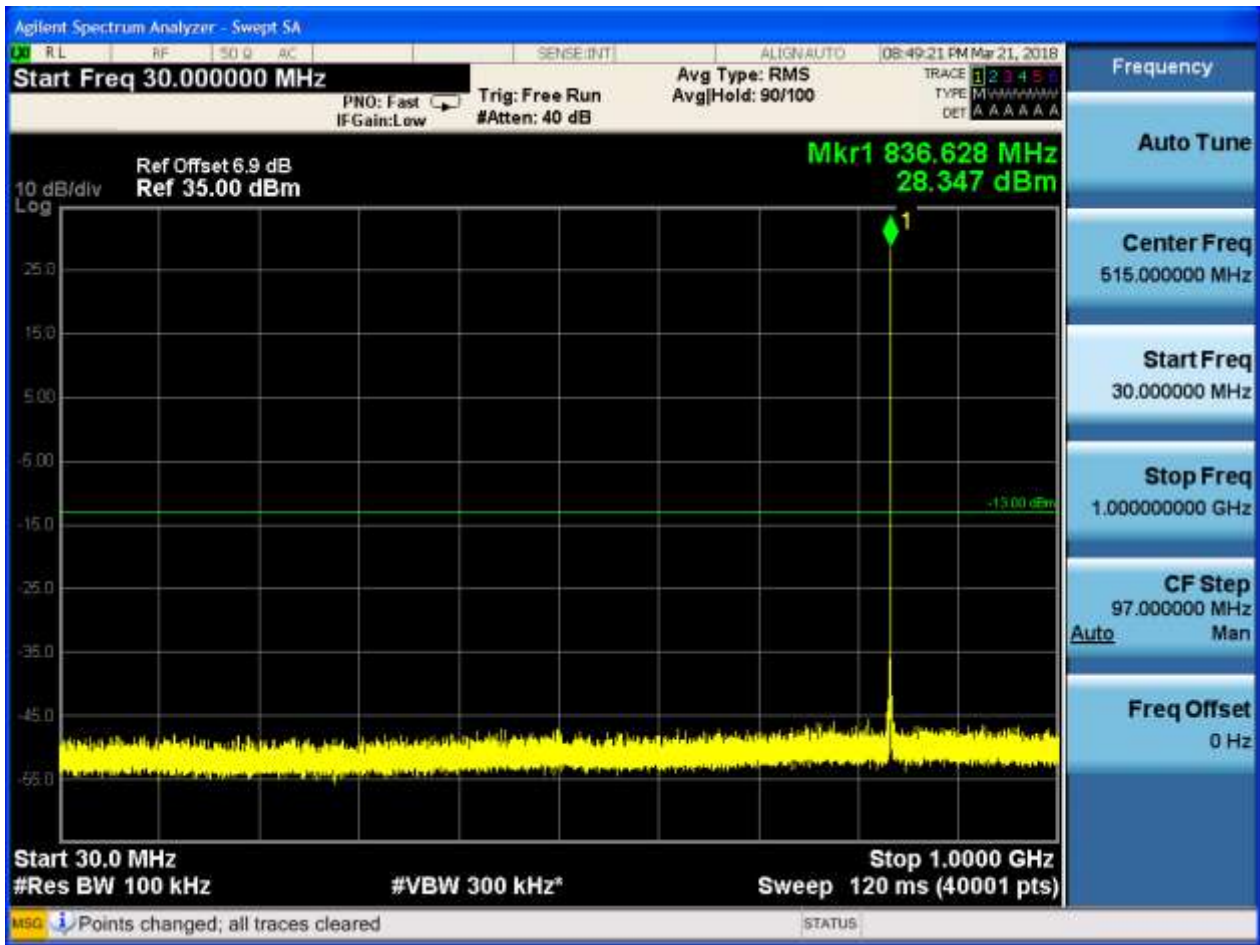


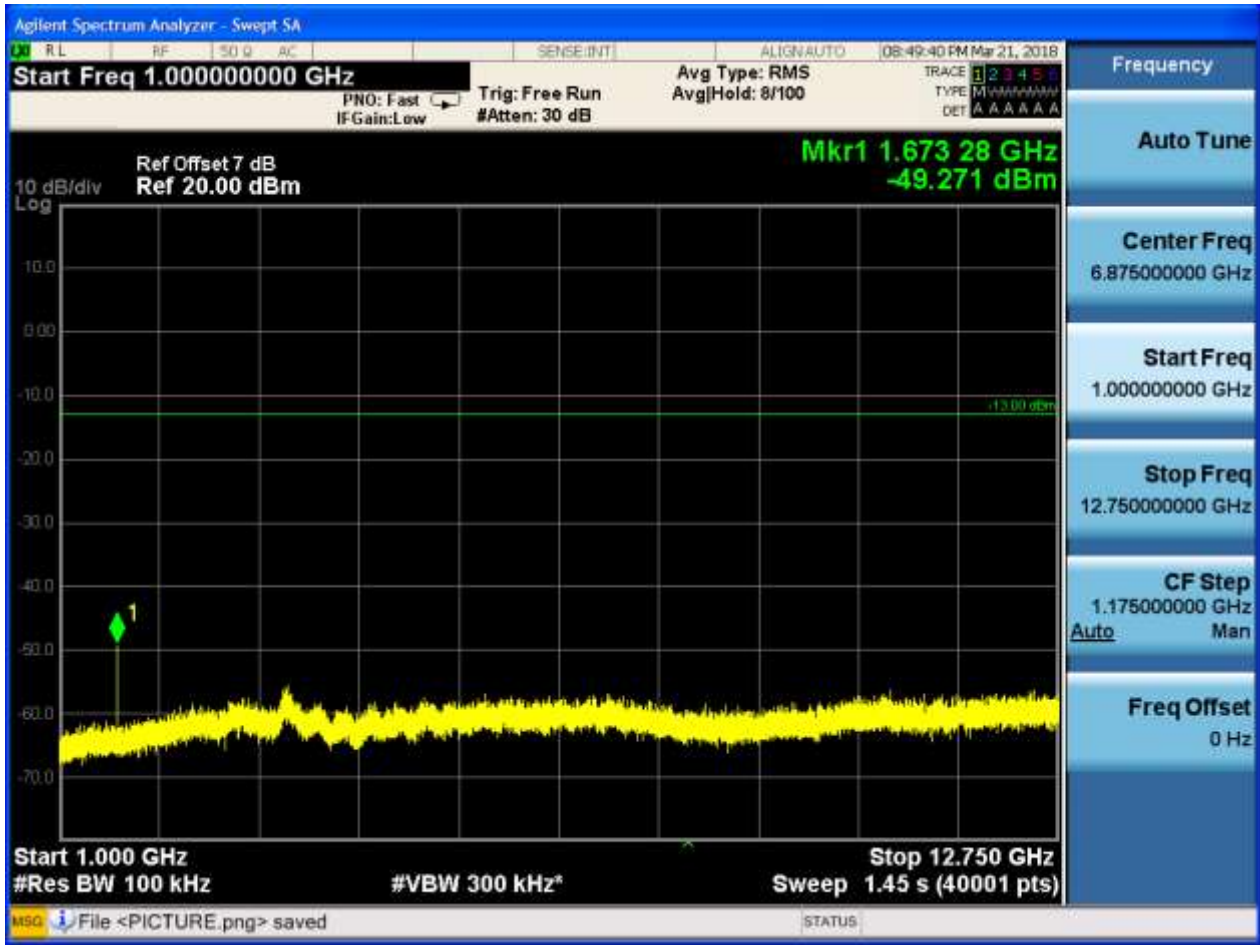


6.1.1.2.2 Test Channel = MCH

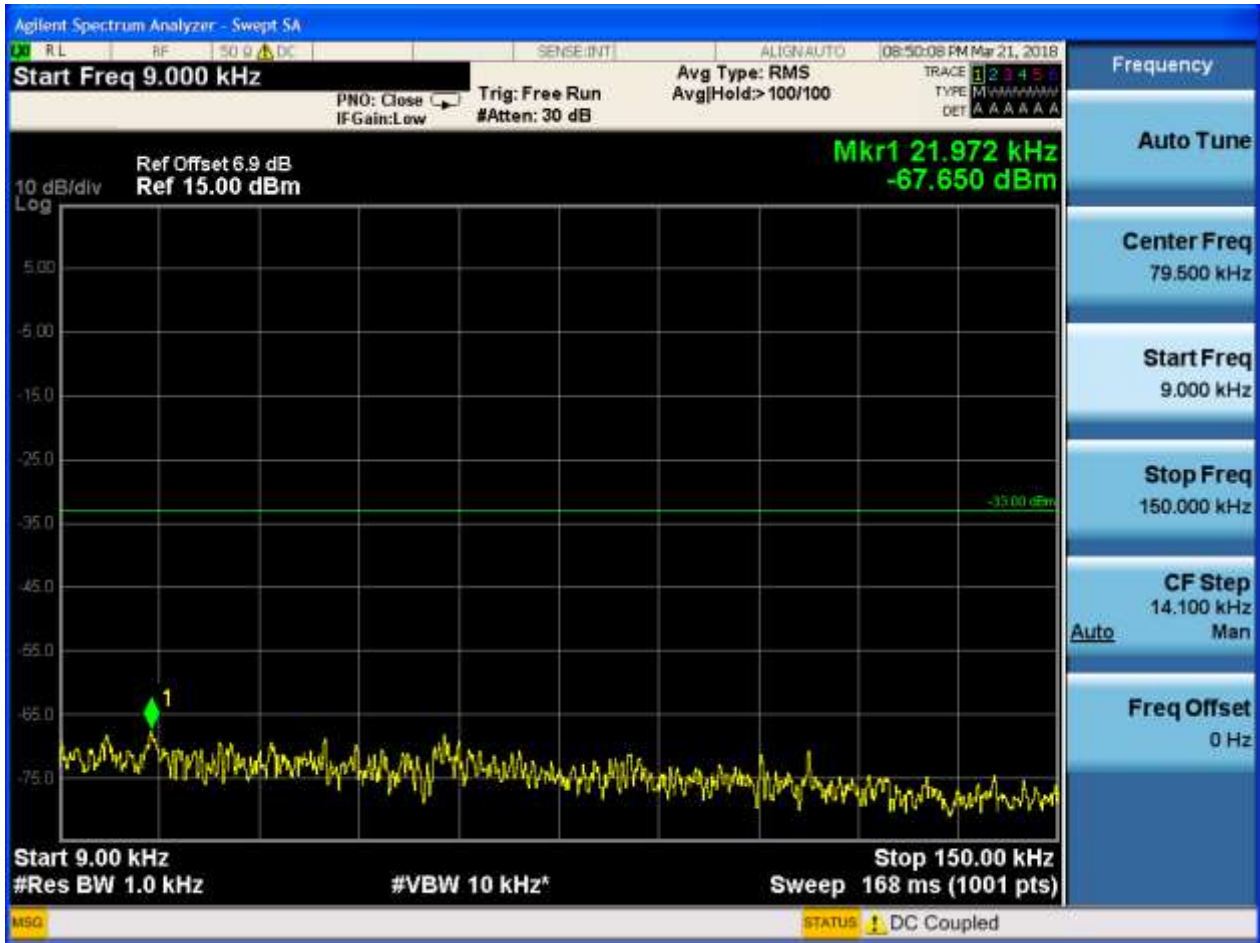


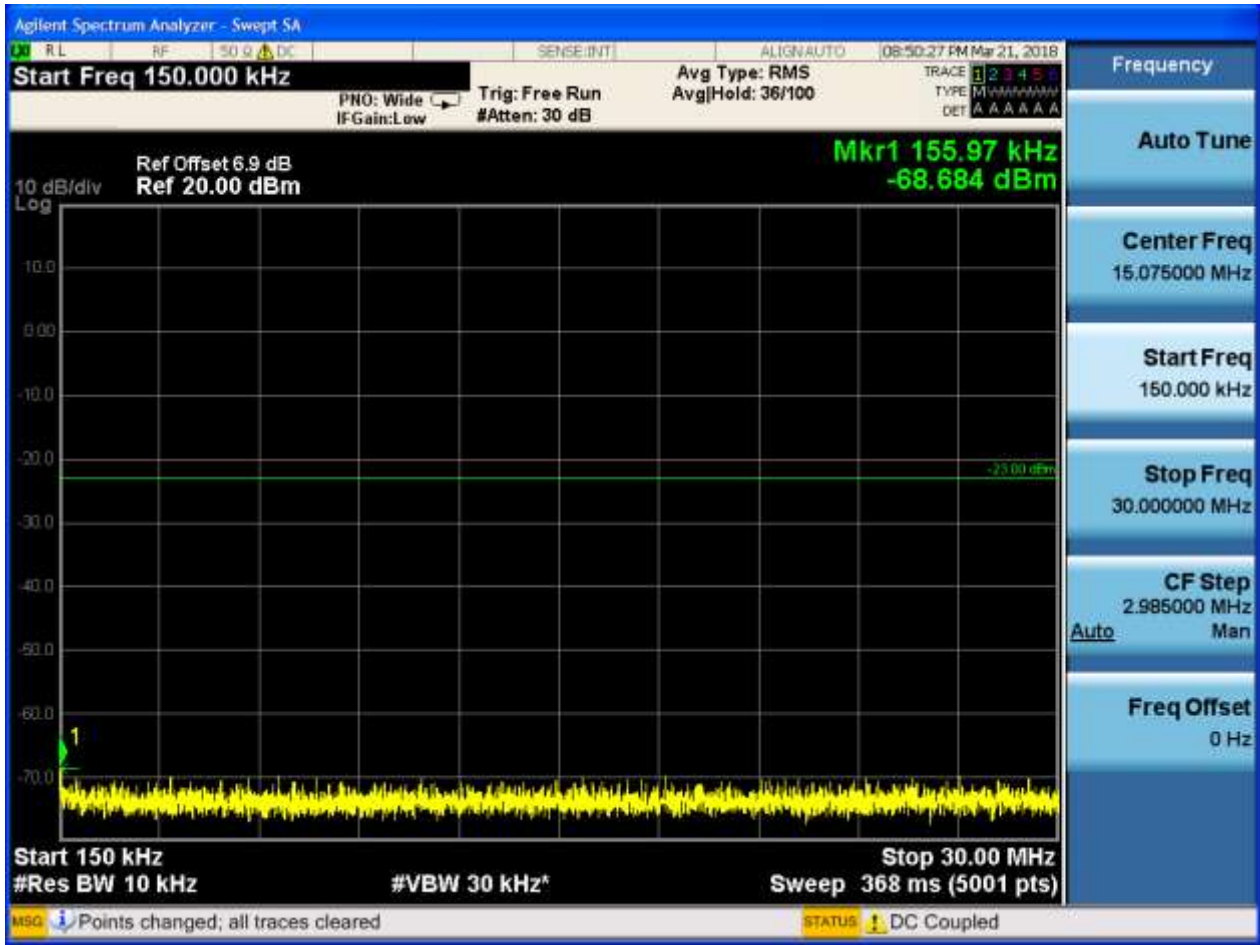


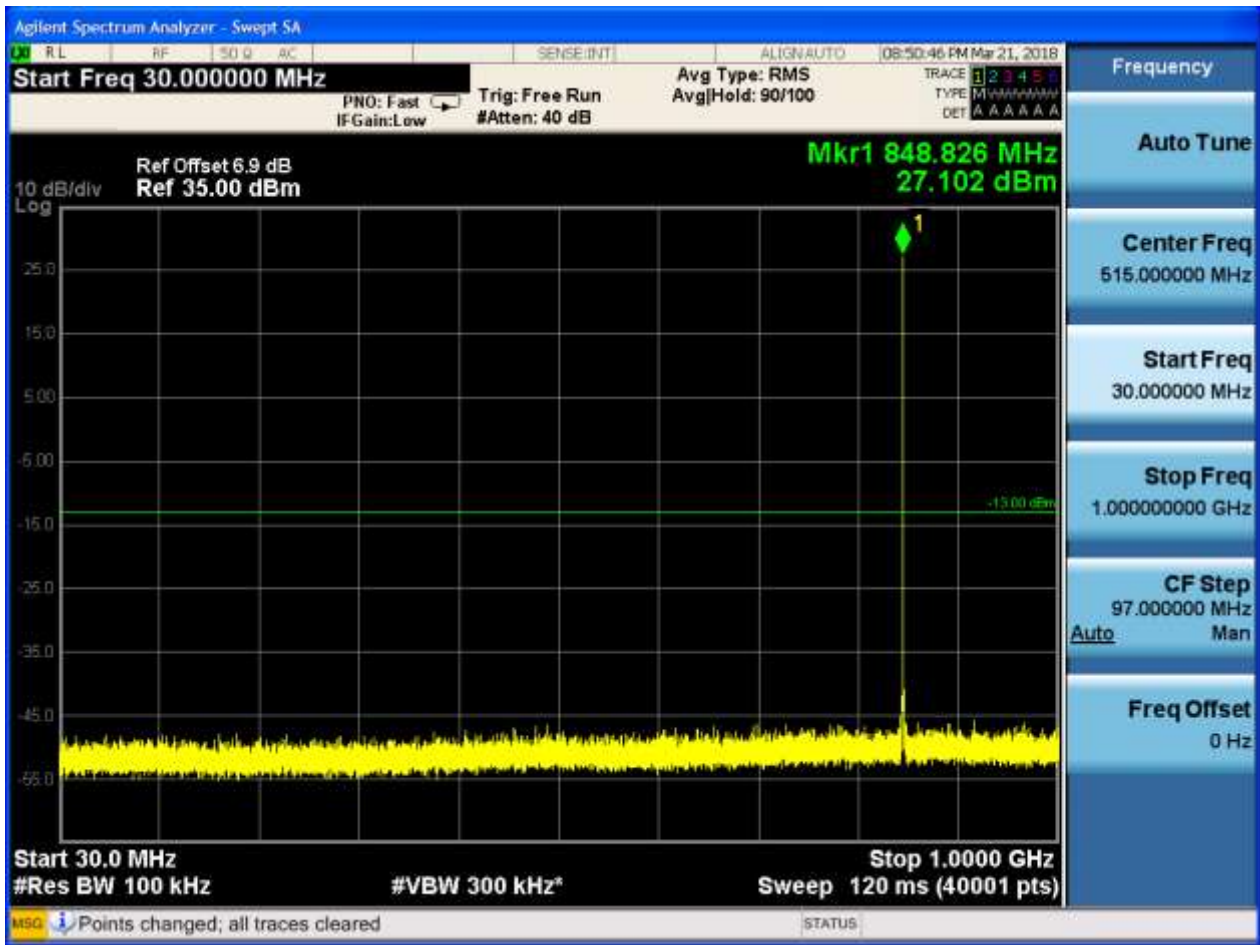


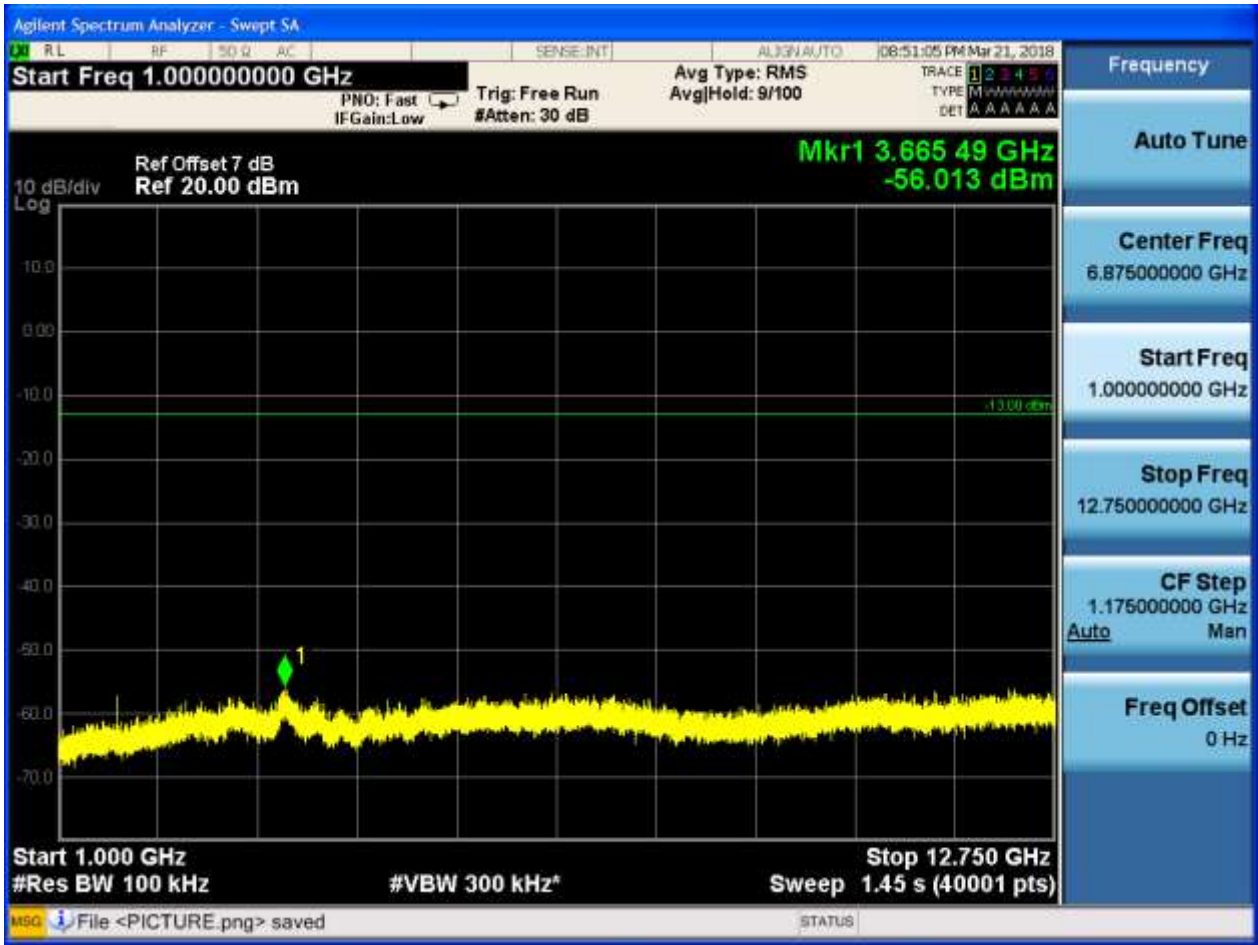


6.1.1.2.3 Test Channel = HCH









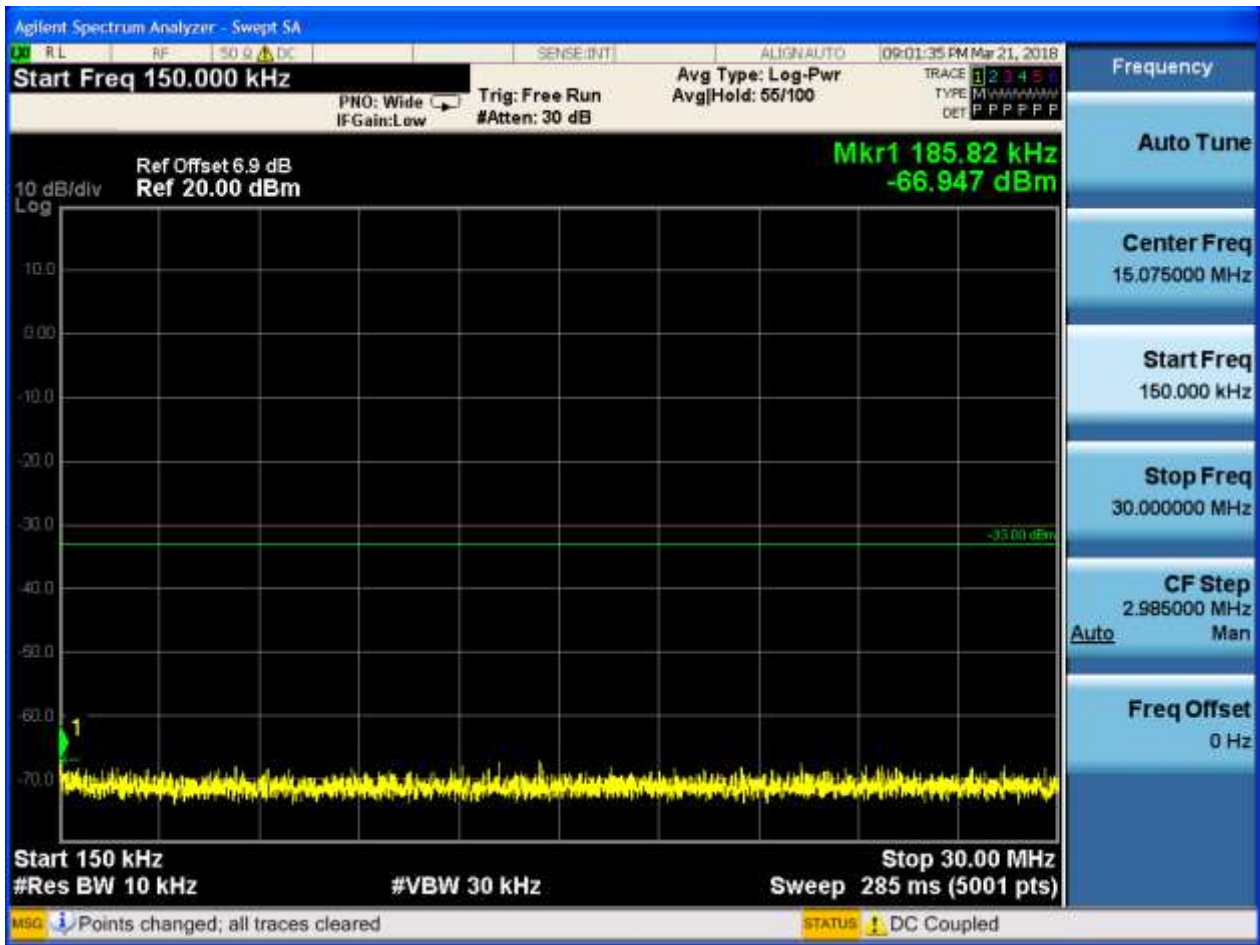


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

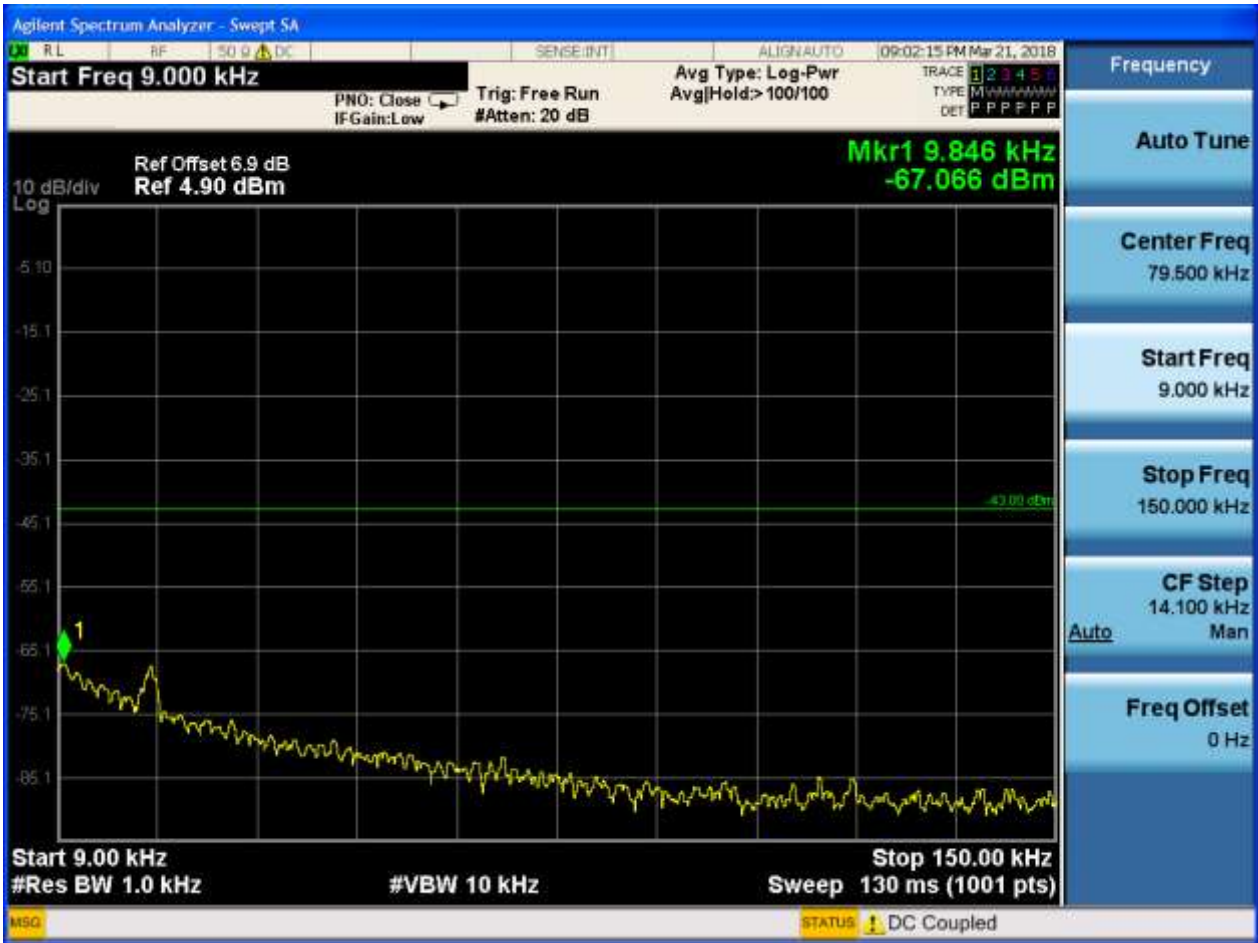


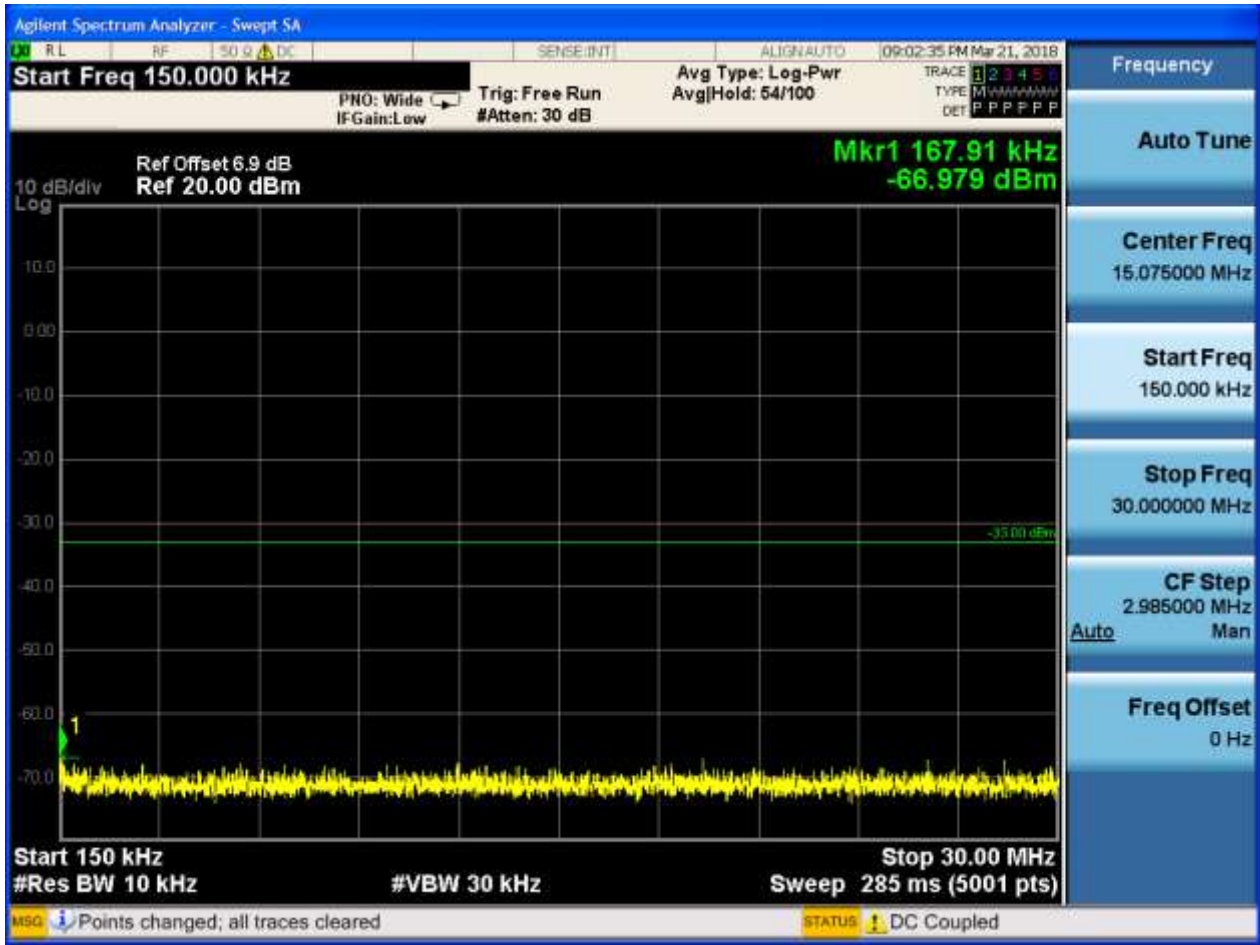






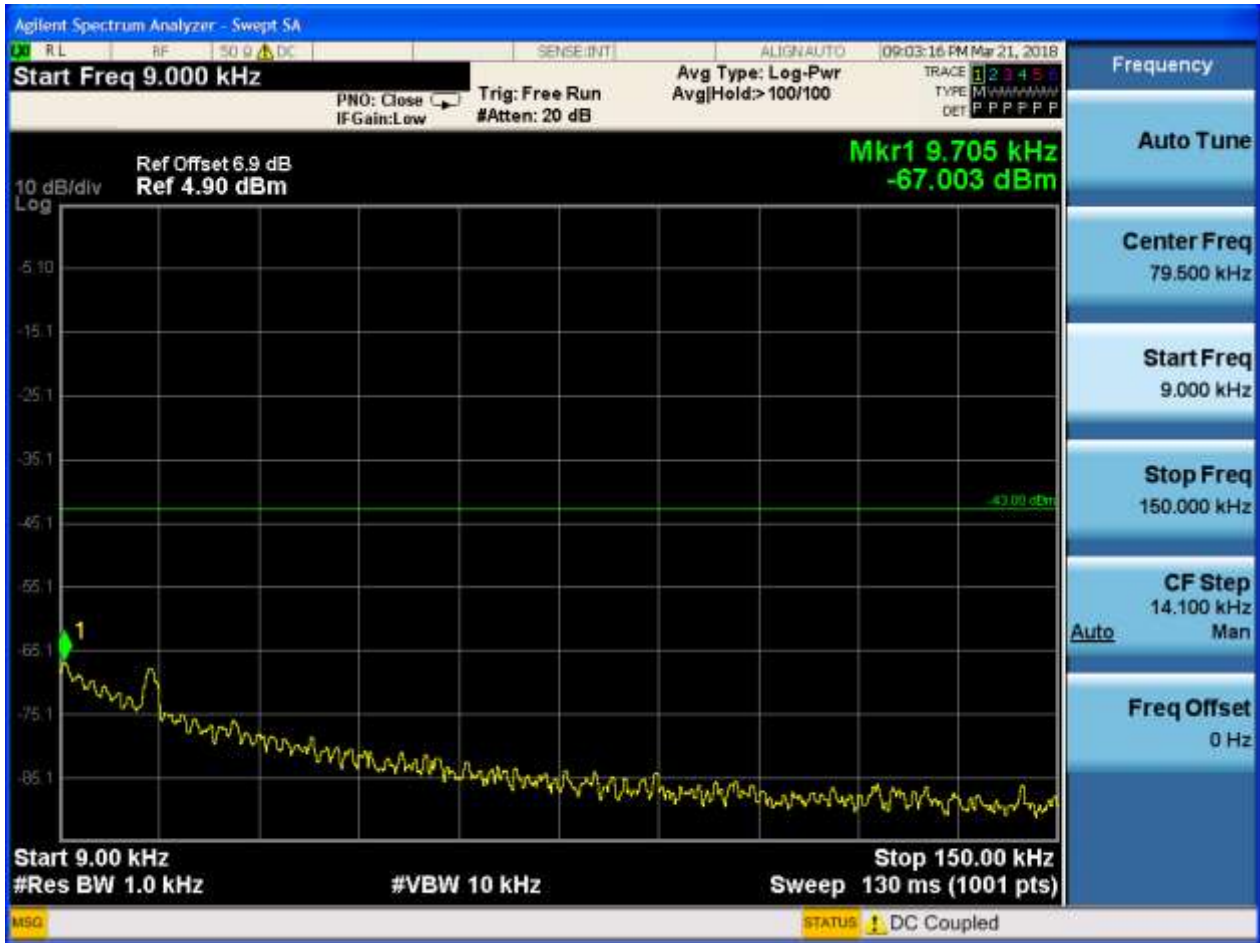
6.1.2.1.2 Test Channel = MCH

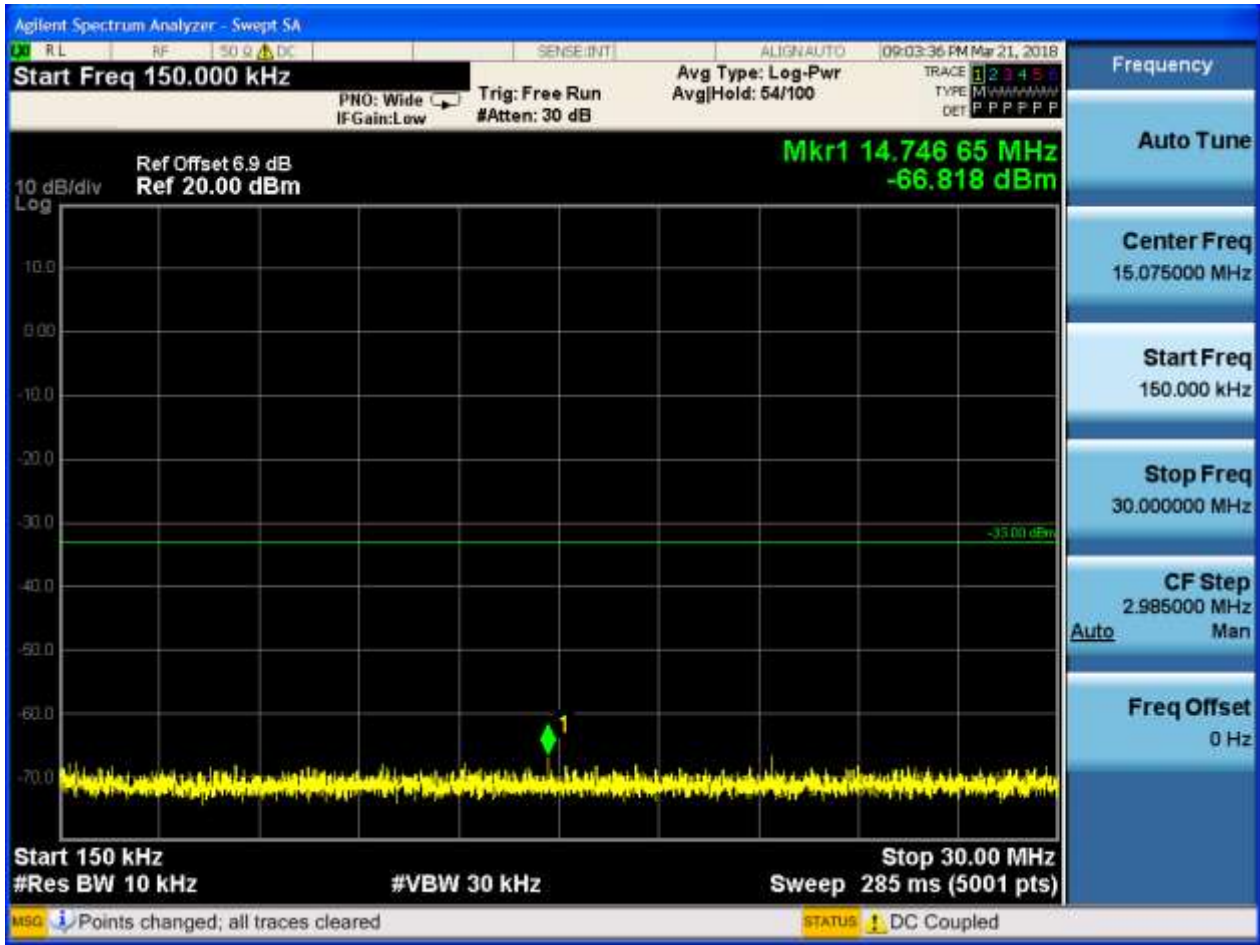






6.1.2.1.3 Test Channel = HCH

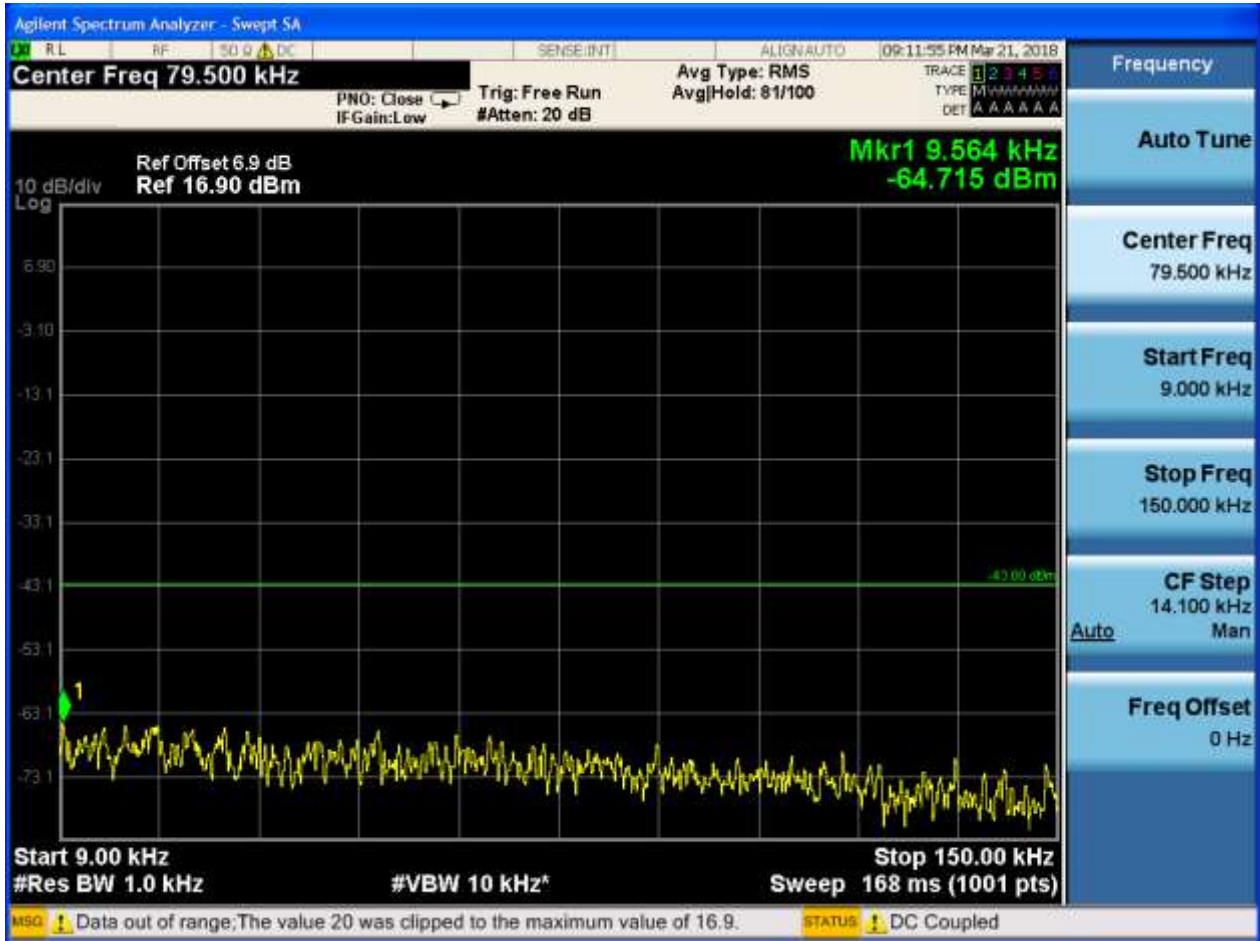


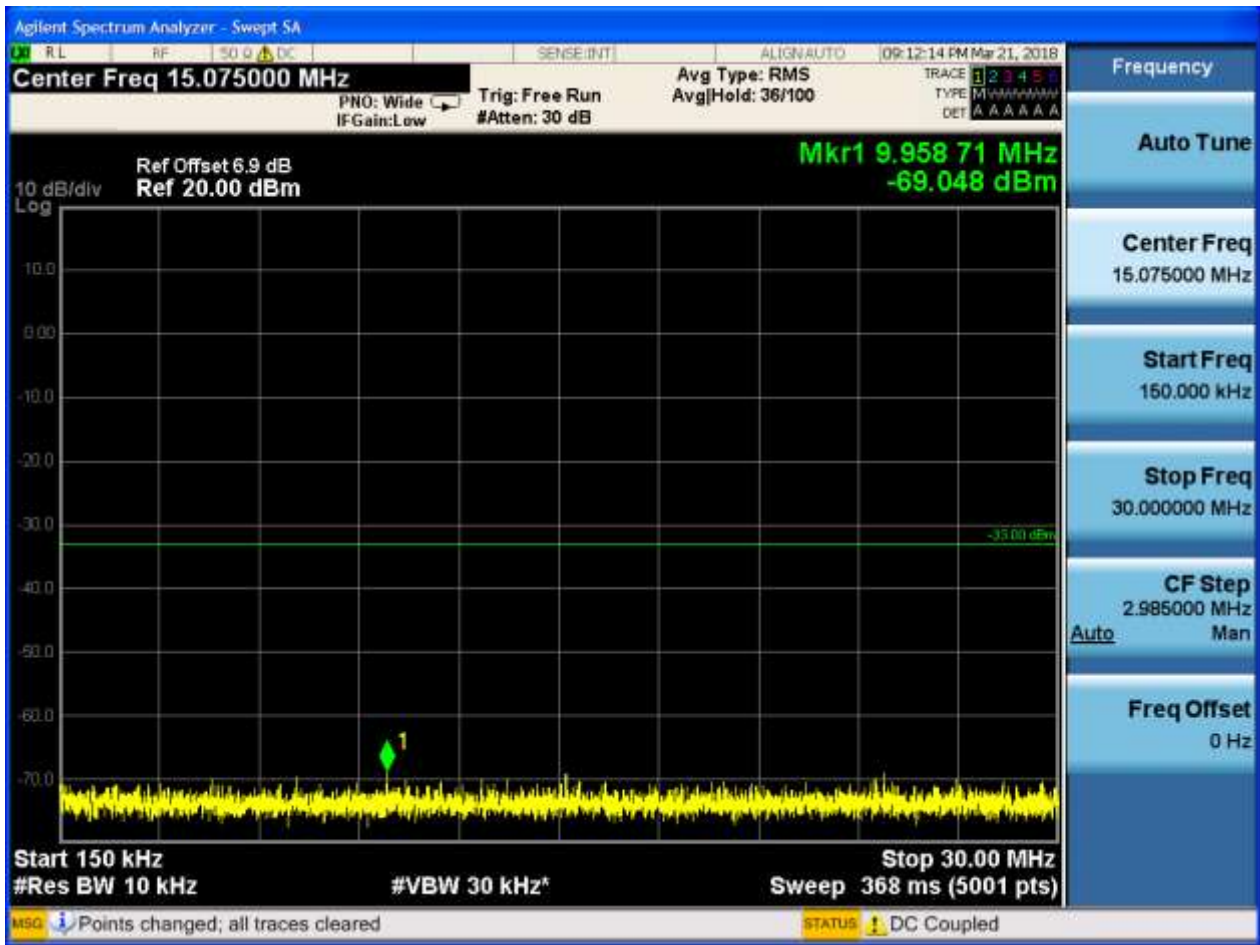




6.1.2.2 Test Mode = GSM/TM2

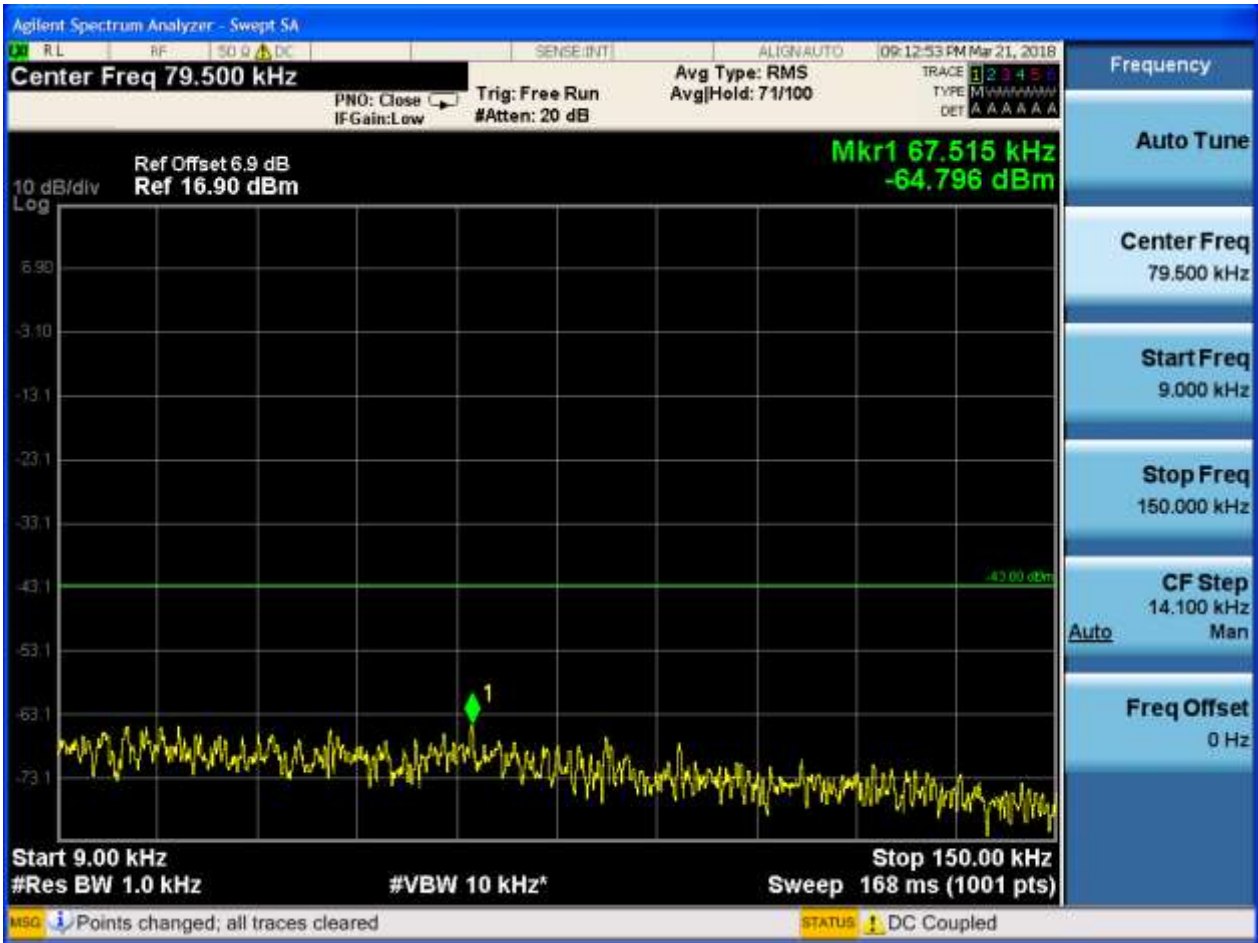
6.1.2.2.1 Test Channel = LCH

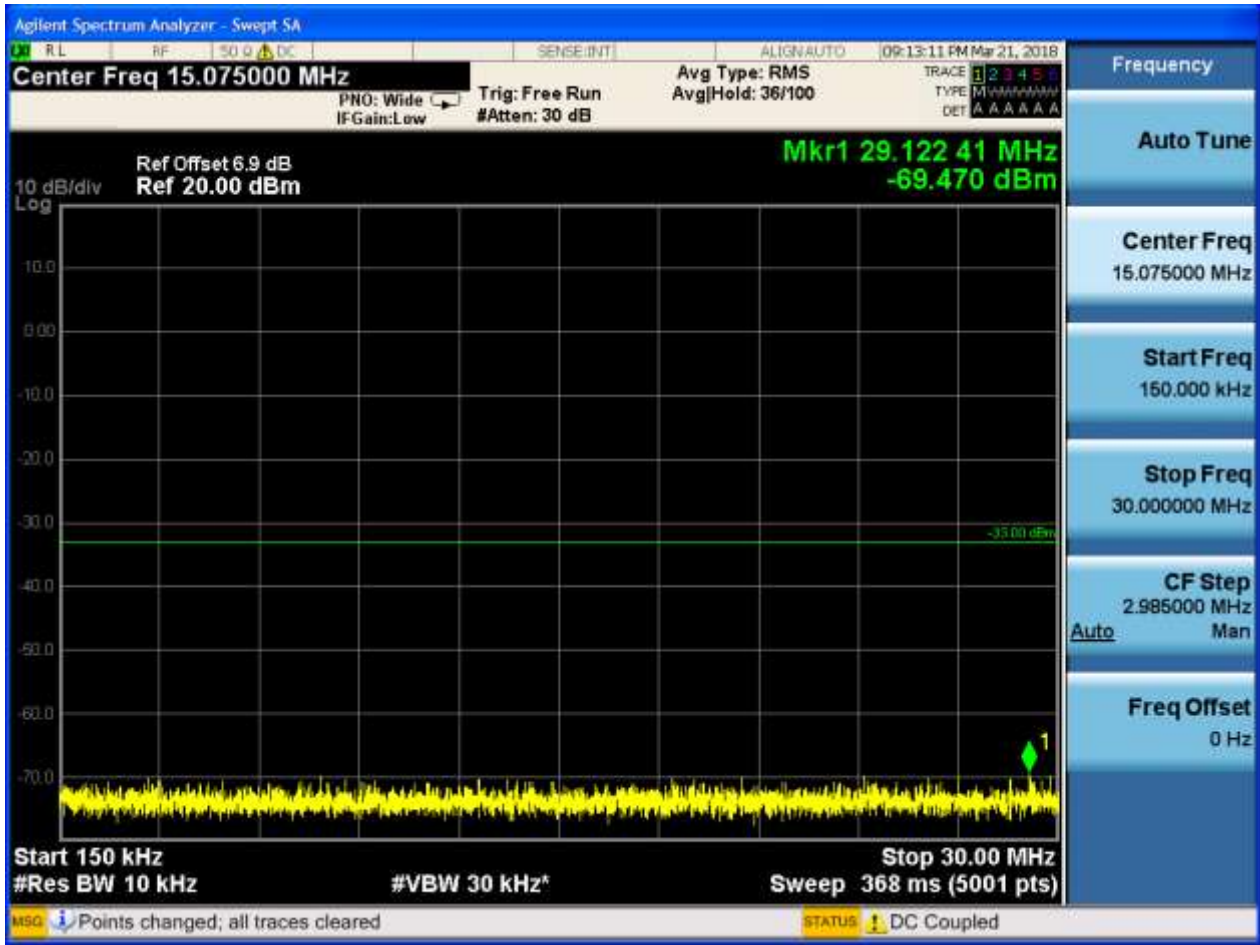






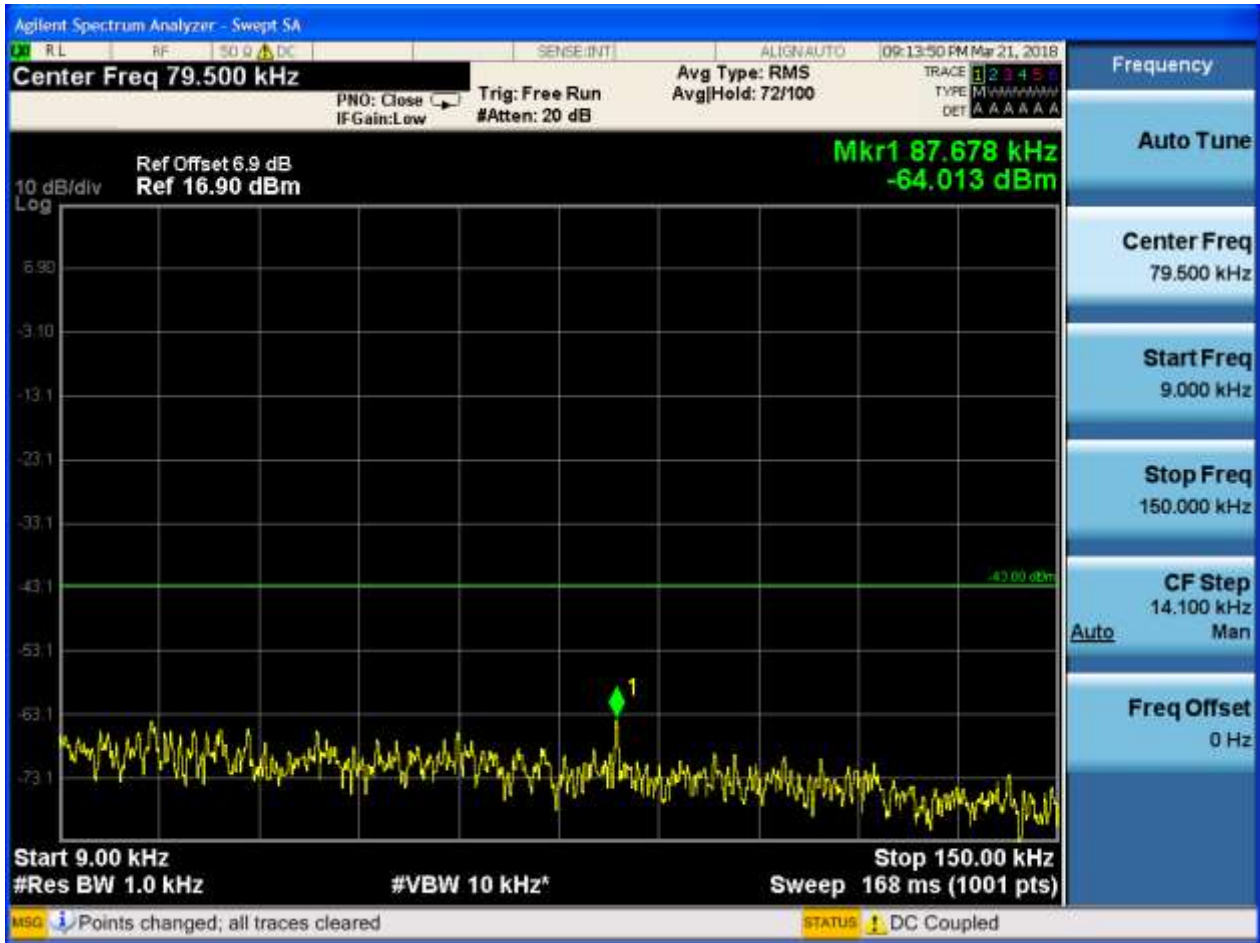
6.1.2.2.2 Test Channel = MCH

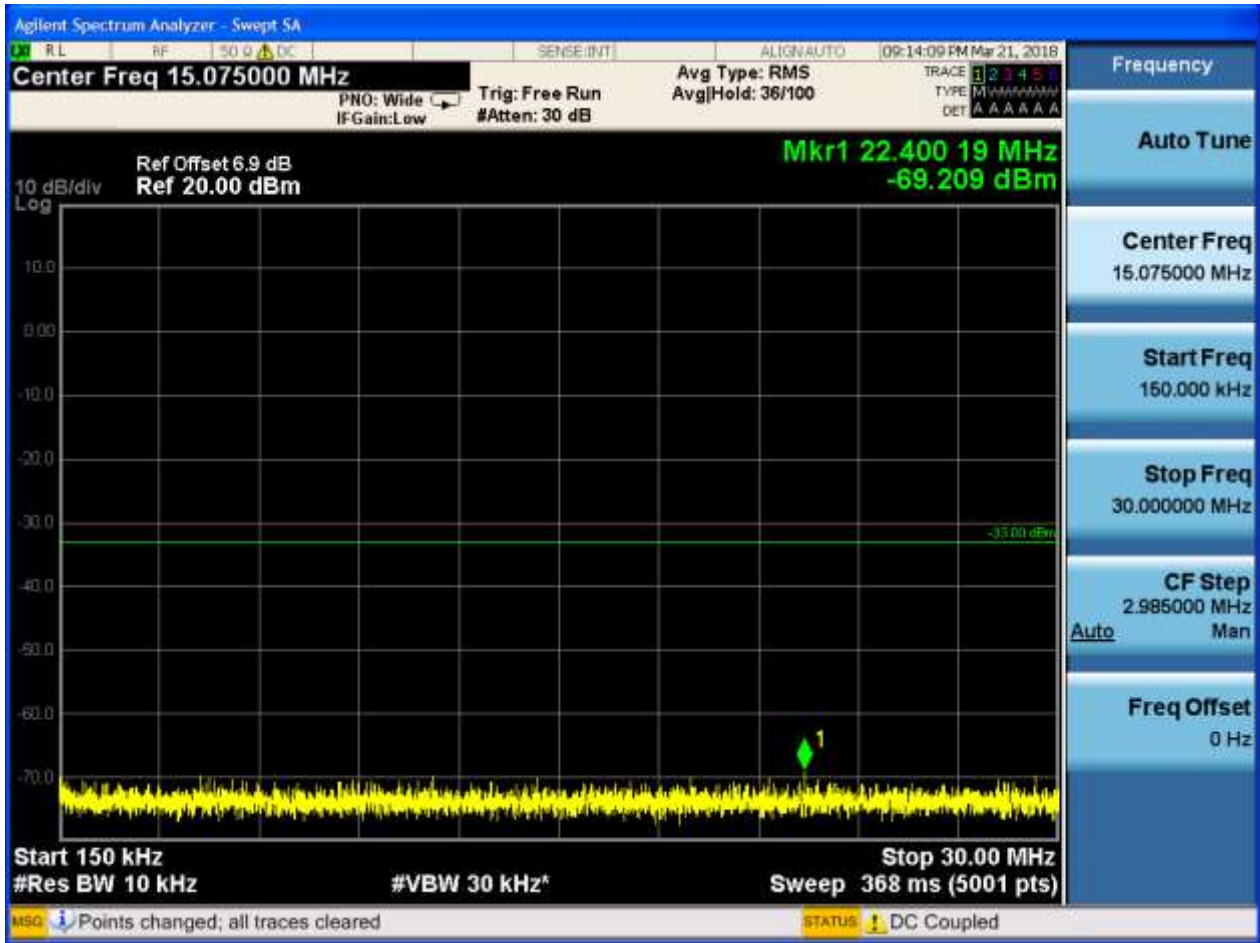






6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

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

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

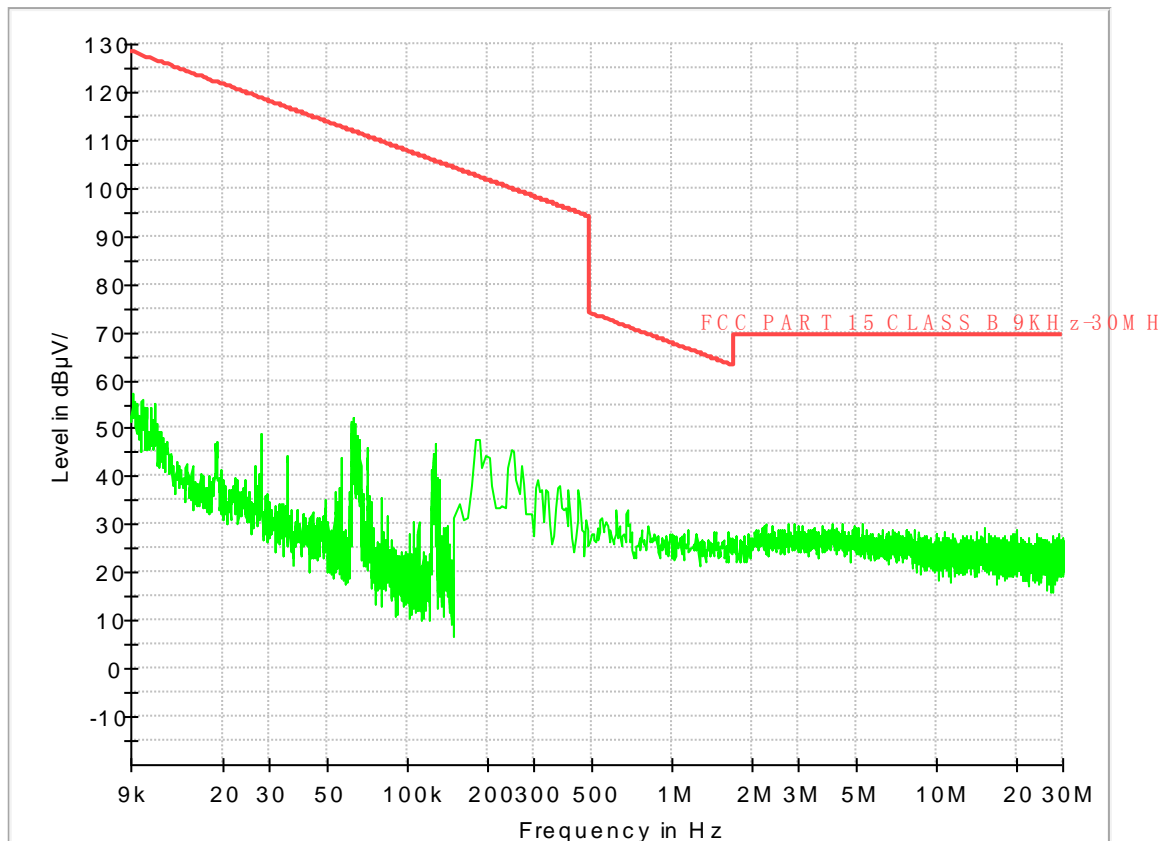
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

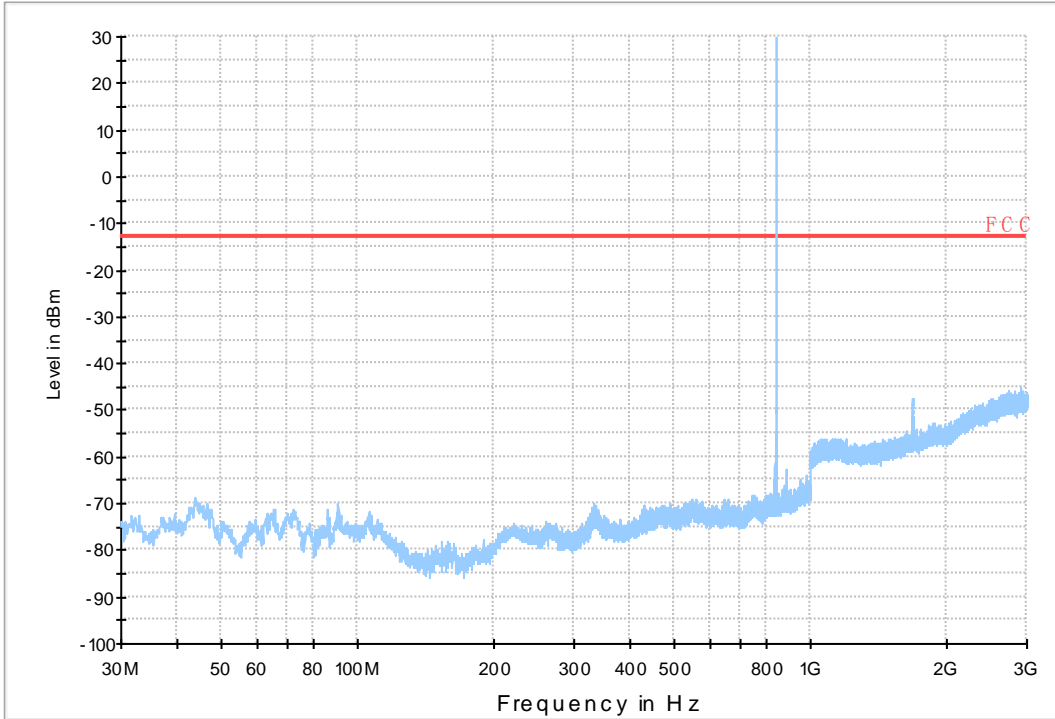
7.1 For GSM_ANT1

7.1.1 Test Band = GSM850

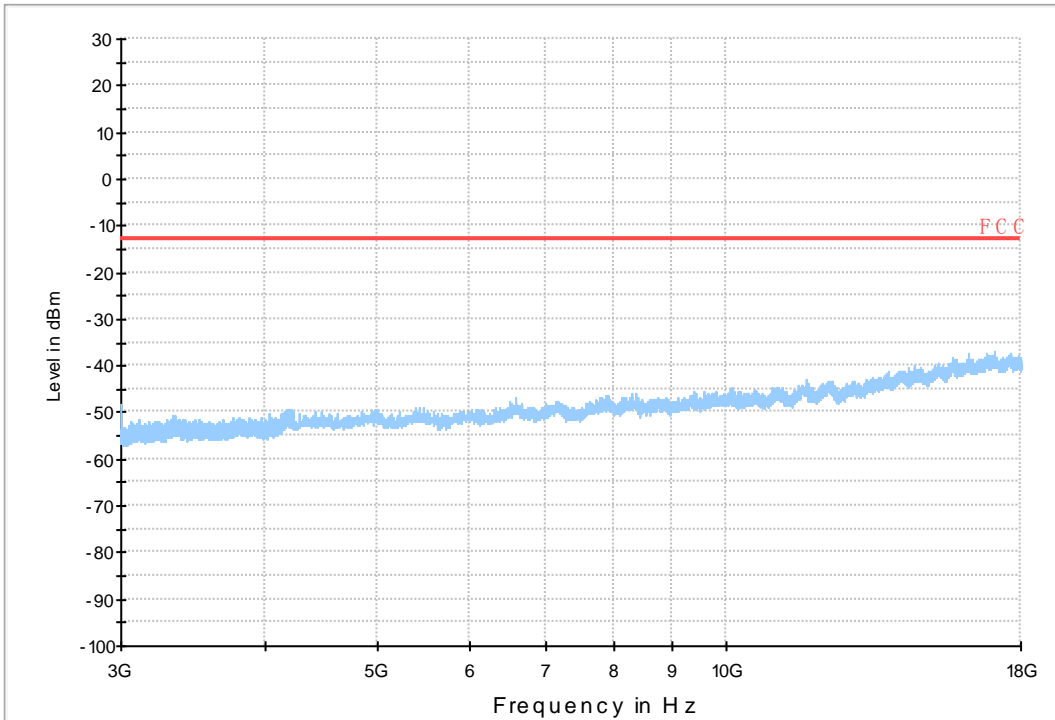
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L



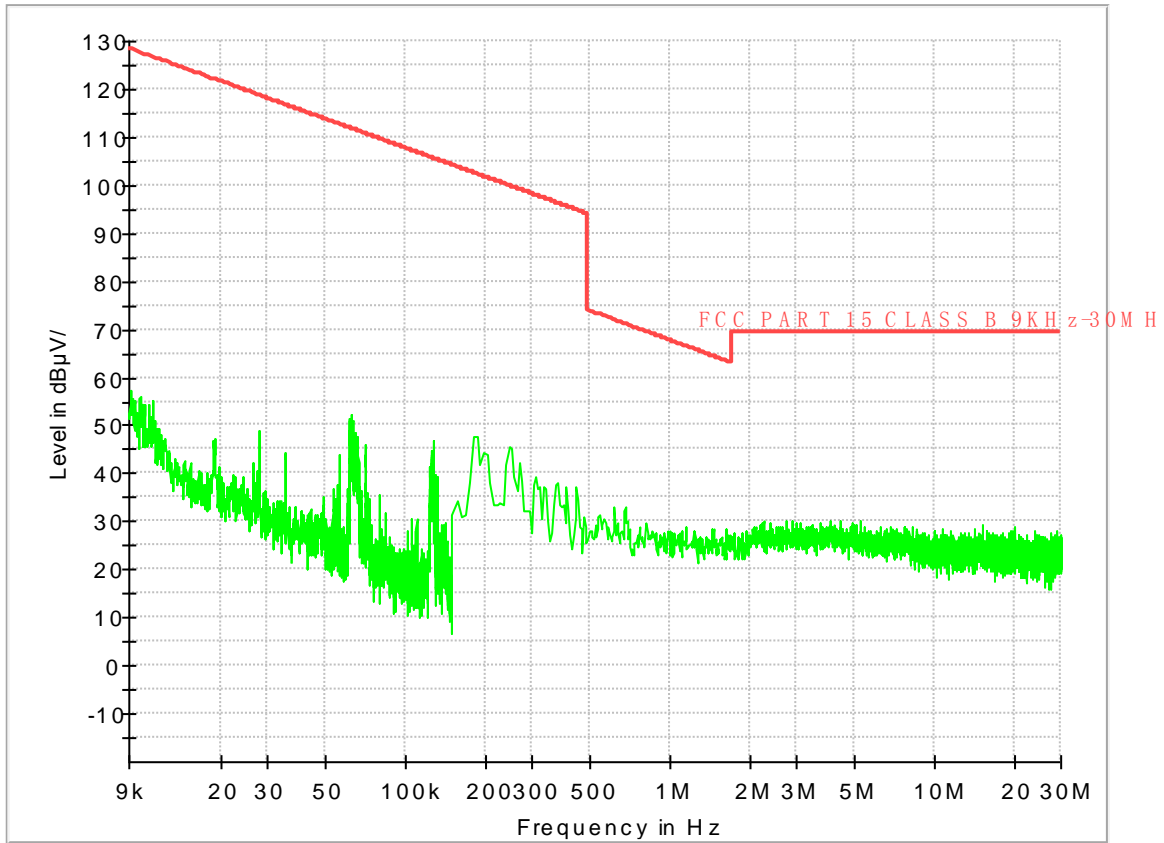
Copy of FCC PART22 GSM850_H



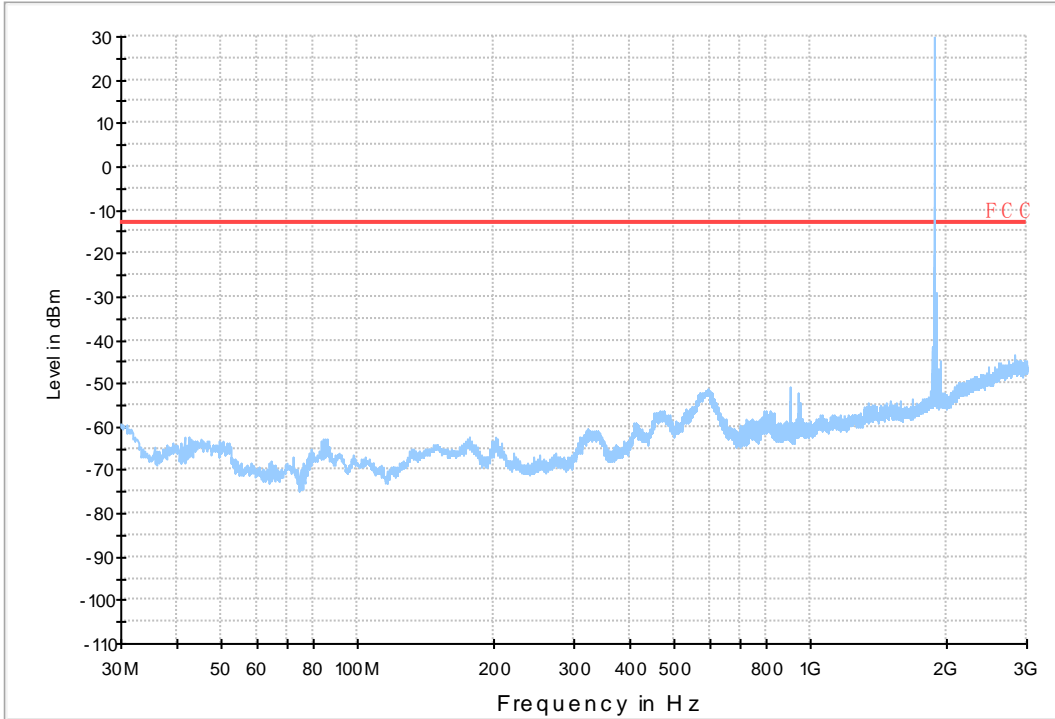


7.1.2 Test Band = GSM1900

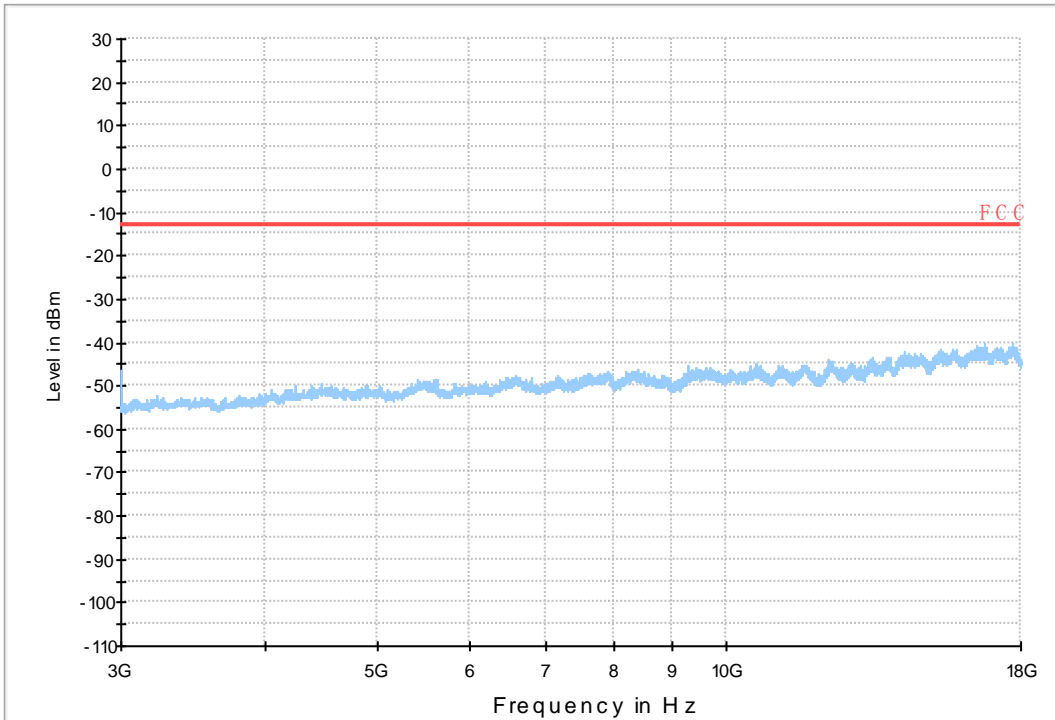
7.1.2.1 Test Mode = GSM/TM1



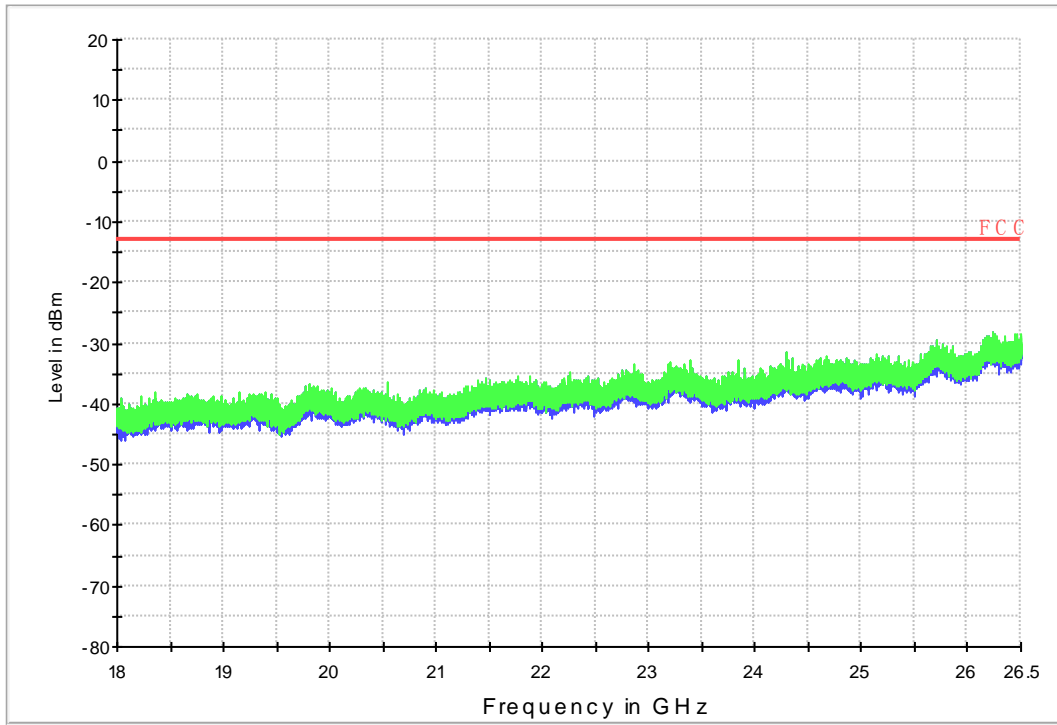
Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H



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

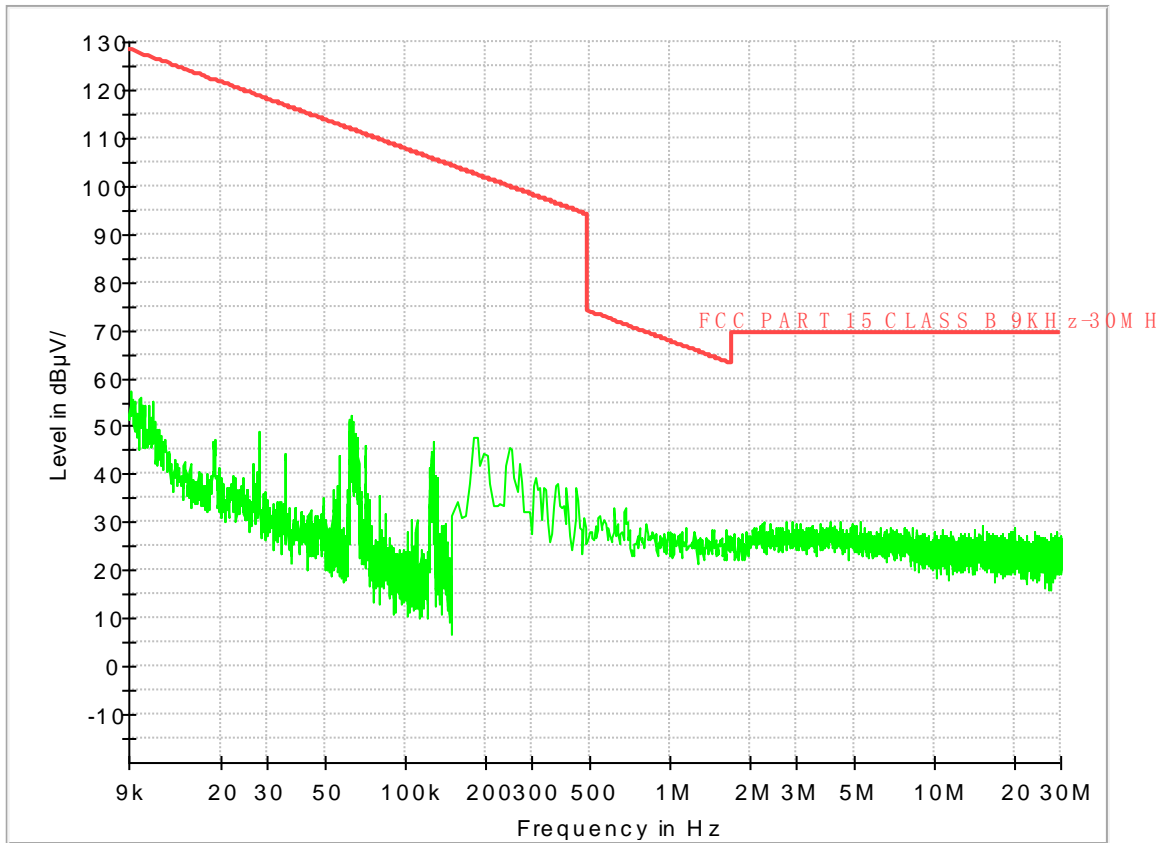




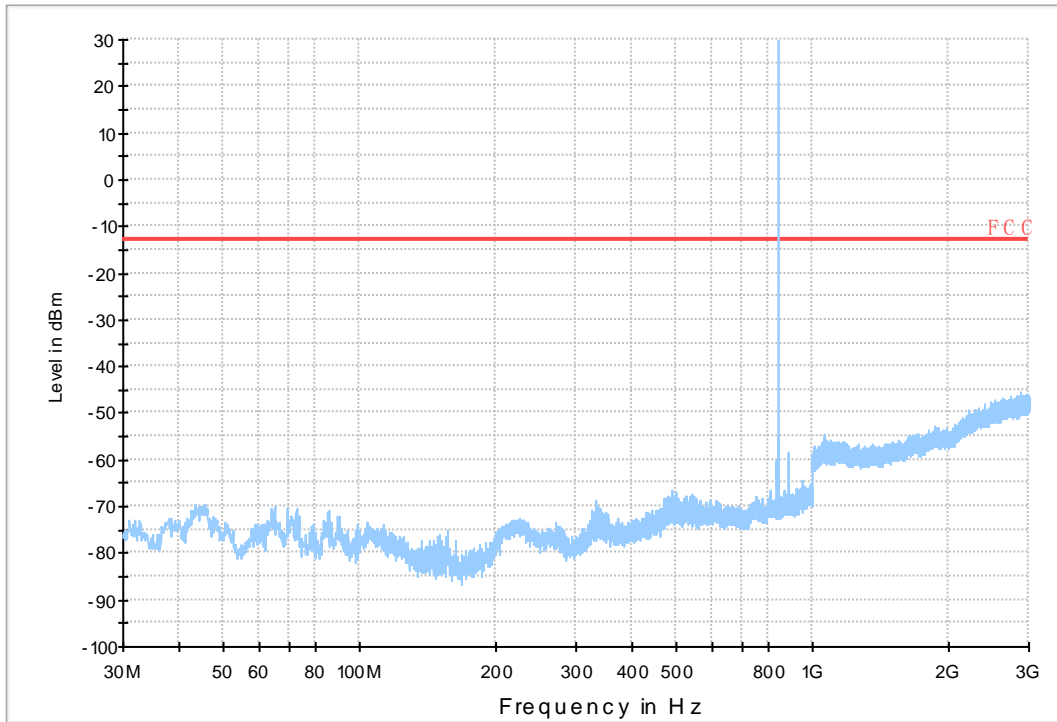
7.2 For GSM_ANT2

7.2.1 Test Band = GSM850

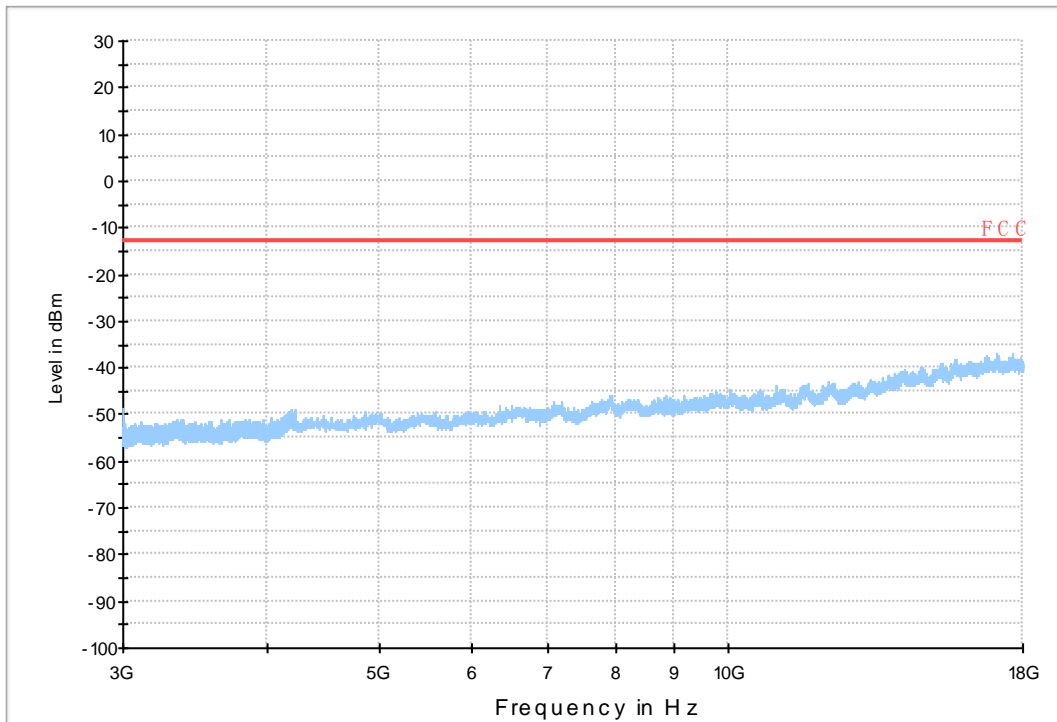
7.2.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

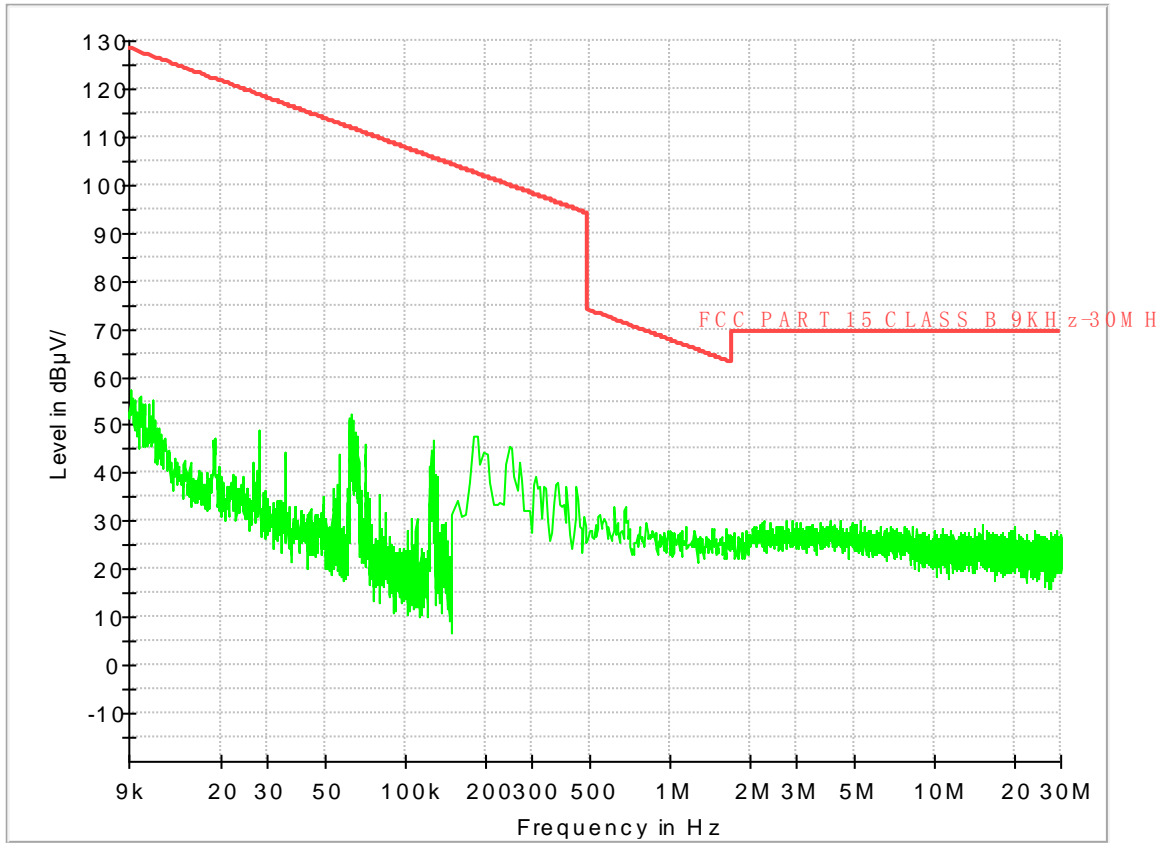


Copy of FCC PART22 GSM850_H

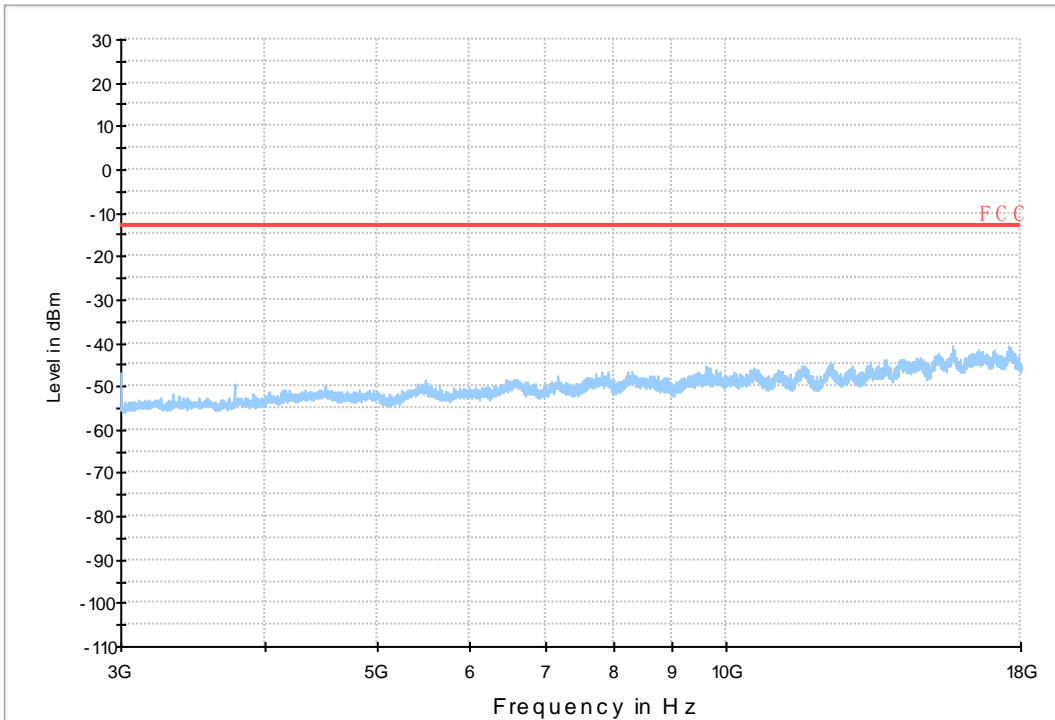


7.2.2 Test Band = GSM1900

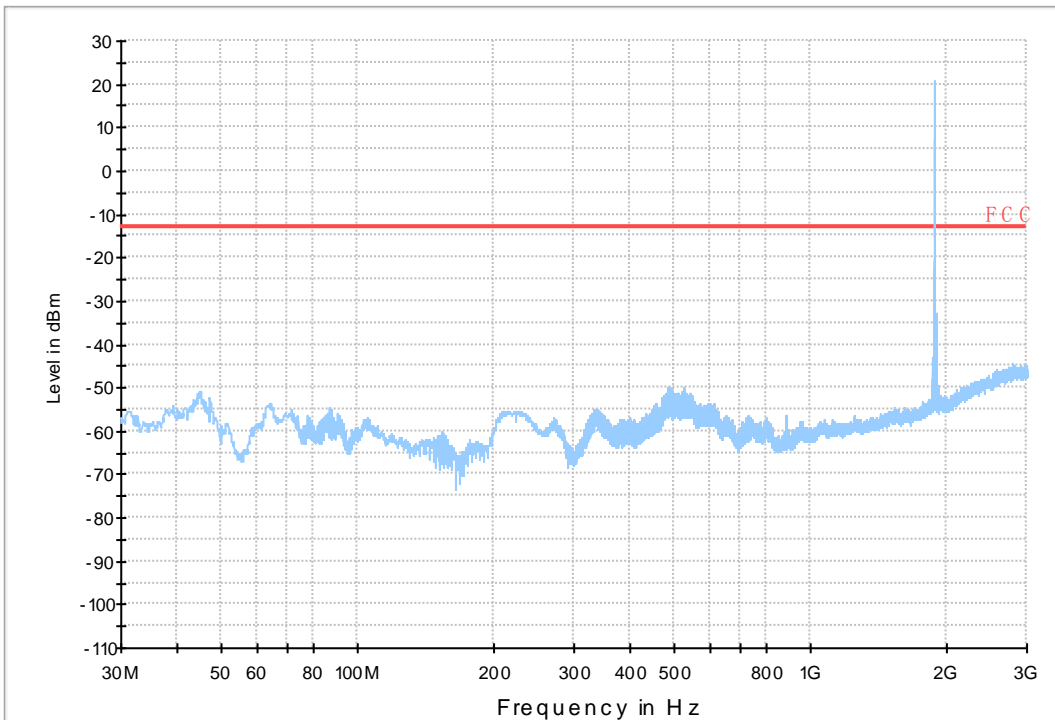
7.2.2.1 Test Mode = GSM/TM1



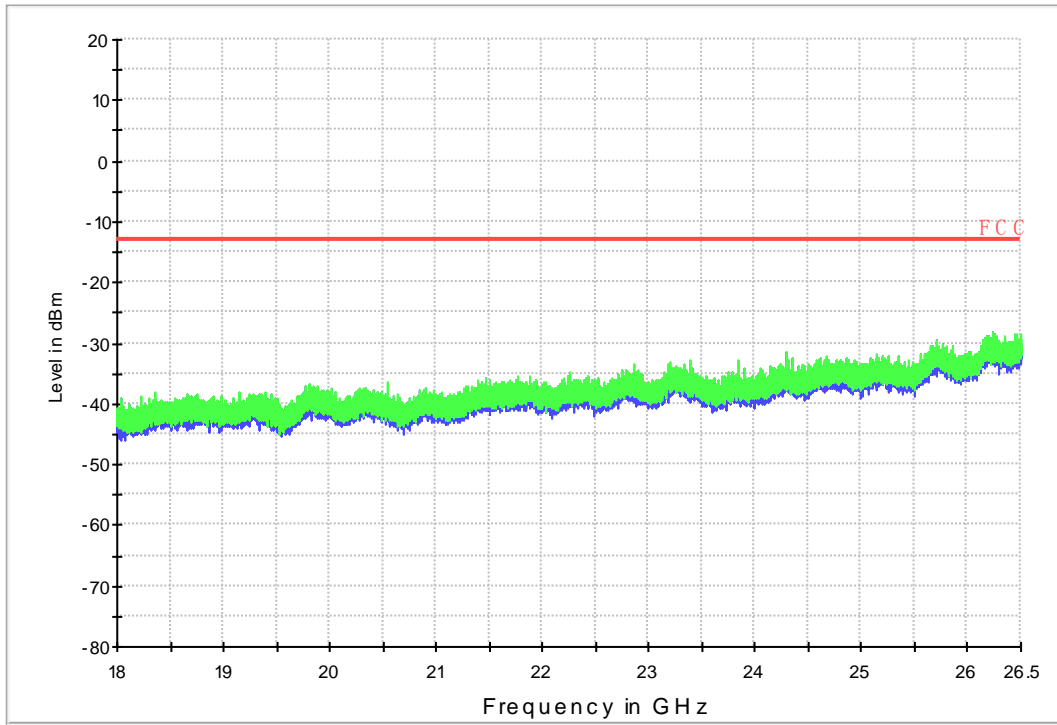
Copy of FCC PART24 GSM1900_H



Copy of FCC PART24 GSM1900_L



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



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	-8.85	-0.01074	PASS
				VN	-6.33	-0.00768	PASS
				VH	-7.94	-0.00963	PASS
		MCH	TN	VL	-12.66	-0.01513	PASS
				VN	-12.53	-0.01498	PASS
				VH	-11.04	-0.0132	PASS
		HCH	TN	VL	-11.82	-0.01393	PASS
				VN	-12.01	-0.01415	PASS
				VH	-12.53	-0.01476	PASS
	GSM/TM2	LCH	TN	VL	2.13	0.00258	PASS
				VN	-8.85	-0.01074	PASS
				VH	0.13	0.00016	PASS
		MCH	TN	VL	-12.79	-0.01529	PASS
				VN	-8.01	-0.00957	PASS
				VH	-5.42	-0.00648	PASS
		HCH	TN	VL	-12.69	-0.01495	PASS
				VN	-6.55	-0.00772	PASS
				VH	-7.68	-0.00905	PASS
GSM1900	GSM/TM1	LCH	TN	VL	-17.89	-0.00967	PASS
				VN	-21.63	-0.01169	PASS
				VH	-14.66	-0.00792	PASS
		MCH	TN	VL	37.84	0.02013	PASS
				VN	37.39	0.01989	PASS
				VH	33.51	0.01782	PASS
		HCH	TN	VL	35.64	0.01866	PASS
				VN	25.25	0.01322	PASS
				VH	21.18	0.01109	PASS
	GSM/TM2	LCH	TN	VL	-2.81	-0.00152	PASS
				VN	-4.29	-0.00232	PASS
				VH	3.13	0.00169	PASS
		MCH	TN	VL	53.89	0.02866	PASS
				VN	45.1	0.02399	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	48.88	0.026	PASS
		HCH	TN	VL	43.81	0.02294	PASS
				VN	45.2	0.02367	PASS
				VH	42.04	0.02201	PASS

8.1.2 Frequency Error vs. Temperature:

Test Band	Test Temp.	Test Mode	Test Channel	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
GSM850	-30	GSM/TM1	LCH	VN	-4.00	-0.00485	PASS
			MCH	VN	-13.43	-0.01605	PASS
			HCH	VN	-13.43	-0.01582	PASS
	-20	GSM/TM1	LCH	VN	-5.88	-0.00713	PASS
			MCH	VN	-11.24	-0.01344	PASS
			HCH	VN	-14.66	-0.01727	PASS
	-10	GSM/TM1	LCH	VN	-3.75	-0.00455	PASS
			MCH	VN	-13.37	-0.01598	PASS
			HCH	VN	-11.88	-0.014	PASS
	0	GSM/TM1	LCH	VN	-5.49	-0.00666	PASS
			MCH	VN	-11.43	-0.01366	PASS
			HCH	VN	-11.24	-0.01324	PASS
	10	GSM/TM1	LCH	VN	-4.71	-0.00571	PASS
			MCH	VN	-12.79	-0.01529	PASS
			HCH	VN	-12.33	-0.01453	PASS
	20	GSM/TM1	LCH	VN	-5.17	-0.00627	PASS
			MCH	VN	-14.79	-0.01768	PASS
			HCH	VN	-11.11	-0.01309	PASS
	30	GSM/TM1	LCH	VN	-5.29	-0.00642	PASS
			MCH	VN	-11.04	-0.0132	PASS
			HCH	VN	-11.43	-0.01347	PASS
	40	GSM/TM1	LCH	VN	-2.26	-0.00274	PASS
			MCH	VN	-13.24	-0.01583	PASS
			HCH	VN	-10.27	-0.0121	PASS
	50	GSM/TM1	LCH	VN	-5.62	-0.00682	PASS
			MCH	VN	-8.65	-0.01034	PASS
			HCH	VN	-15.88	-0.01871	PASS
	-30	GSM/TM2	LCH	VN	-6.36	-0.00772	PASS
			MCH	VN	-18.14	-0.02168	PASS
			HCH	VN	-3.91	-0.00461	PASS
-20	GSM/TM2	LCH	VN	-3.39	-0.00411	PASS	



			MCH	VN	-7.75	-0.00926	PASS
			HCH	VN	-8.65	-0.01019	PASS
	-10	GSM/TM2	LCH	VN	-4.94	-0.00599	PASS
			MCH	VN	-21.73	-0.02597	PASS
			HCH	VN	-4.16	-0.0049	PASS
	0	GSM/TM2	LCH	VN	-6.13	-0.00744	PASS
			MCH	VN	-11.82	-0.01413	PASS
			HCH	VN	-5.62	-0.00662	PASS
	10	GSM/TM2	LCH	VN	-0.77	-0.00093	PASS
			MCH	VN	-12.24	-0.01463	PASS
			HCH	VN	-4.62	-0.00544	PASS
	20	GSM/TM2	LCH	VN	-2.16	-0.00262	PASS
			MCH	VN	-17.05	-0.02038	PASS
			HCH	VN	-8.65	-0.01019	PASS
	30	GSM/TM2	LCH	VN	-1.52	-0.00184	PASS
			MCH	VN	-9.72	-0.01162	PASS
			HCH	VN	-6.91	-0.00814	PASS
	40	GSM/TM2	LCH	VN	-5.29	-0.00642	PASS
MCH			VN	-12.98	-0.01552	PASS	
HCH			VN	-10.36	-0.01221	PASS	
50	GSM/TM2	LCH	VN	-1.45	-0.00176	PASS	
		MCH	VN	-10.65	-0.01273	PASS	
		HCH	VN	-5.49	-0.00647	PASS	
GSM1900	-30	GSM/TM1	LCH	VN	-24.02	-0.01298	PASS
			MCH	VN	37.77	0.02009	PASS
			HCH	VN	27.06	0.01417	PASS
	-20	GSM/TM1	LCH	VN	-15.11	-0.00817	PASS
			MCH	VN	34.35	0.01827	PASS
			HCH	VN	32.54	0.01704	PASS
	-10	GSM/TM1	LCH	VN	-28.22	-0.01525	PASS
			MCH	VN	35.45	0.01886	PASS
			HCH	VN	26.28	0.01376	PASS
	0	GSM/TM1	LCH	VN	-20.08	-0.01085	PASS
			MCH	VN	32.41	0.01724	PASS
			HCH	VN	21.44	0.01123	PASS
	10	GSM/TM1	LCH	VN	-26.54	-0.01434	PASS
			MCH	VN	32.54	0.01731	PASS
			HCH	VN	29.19	0.01528	PASS
	20	GSM/TM1	LCH	VN	-16.53	-0.00893	PASS
			MCH	VN	30.48	0.01621	PASS
			HCH	VN	31.32	0.0164	PASS
30	GSM/TM1	LCH	VN	-10.72	-0.00579	PASS	



			MCH	VN	37.84	0.02013	PASS
			HCH	VN	29.51	0.01545	PASS
	40	GSM/TM1	LCH	VN	-17.63	-0.00953	PASS
			MCH	VN	38.81	0.02064	PASS
			HCH	VN	30.93	0.0162	PASS
	50	GSM/TM1	LCH	VN	-15.82	-0.00855	PASS
			MCH	VN	35.19	0.01872	PASS
			HCH	VN	29.25	0.01532	PASS
	-30	GSM/TM2	LCH	VN	2.71	0.00146	PASS
			MCH	VN	57.15	0.0304	PASS
			HCH	VN	44.17	0.02313	PASS
	-20	GSM/TM2	LCH	VN	-5.78	-0.00312	PASS
			MCH	VN	53.40	0.0284	PASS
			HCH	VN	48.04	0.02515	PASS
	-10	GSM/TM2	LCH	VN	-0.61	-0.00033	PASS
			MCH	VN	50.14	0.02667	PASS
			HCH	VN	41.52	0.02174	PASS
	0	GSM/TM2	LCH	VN	-3.87	-0.00209	PASS
			MCH	VN	45.72	0.02432	PASS
			HCH	VN	46.27	0.02423	PASS
	10	GSM/TM2	LCH	VN	-12.56	-0.00679	PASS
			MCH	VN	54.50	0.02899	PASS
			HCH	VN	41.16	0.02155	PASS
	20	GSM/TM2	LCH	VN	2.13	0.00115	PASS
			MCH	VN	53.27	0.02834	PASS
			HCH	VN	35.13	0.01839	PASS
	30	GSM/TM2	LCH	VN	-1.16	-0.00063	PASS
			MCH	VN	48.11	0.02559	PASS
			HCH	VN	47.62	0.02493	PASS
	40	GSM/TM2	LCH	VN	0.74	0.0004	PASS
MCH			VN	52.24	0.02779	PASS	
HCH			VN	45.20	0.02367	PASS	
50	GSM/TM2	LCH	VN	-0.42	-0.00023	PASS	
		MCH	VN	49.98	0.02659	PASS	
		HCH	VN	49.91	0.02613	PASS	

END