



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	31.58	31.93	38.5	PASS
		MCH	31.36	31.71	38.5	PASS
		HCH	31.47	31.82	38.5	PASS
	GSM/TM2	LCH	24.95	25.3	38.5	PASS
		MCH	24.93	25.28	38.5	PASS
		HCH	24.9	25.25	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
PCS1900	GSM/TM1	LCH	28.92	31.42	33	PASS
		MCH	28.88	31.38	33	PASS
		HCH	28.57	31.07	33	PASS
	GSM/TM2	LCH	25.12	27.62	33	PASS
		MCH	25.15	27.65	33	PASS
		HCH	25.11	27.61	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:

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

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

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

$$\text{SET Sweep time} = \text{auto} - \text{couple.}$$

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	0.22	13	PASS
		MCH	0.25	13	PASS
		HCH	0.25	13	PASS
	GSM/TM2	LCH	2.86	13	PASS
		MCH	2.9	13	PASS
		HCH	2.79	13	PASS
GSM1900	GSM/TM1	LCH	0.19	13	PASS
		MCH	0.2	13	PASS
		HCH	0.2	13	PASS
	GSM/TM2	LCH	3.04	13	PASS
		MCH	3.03	13	PASS
		HCH	2.99	13	PASS

3Appendix_C: Modulation Characteristics

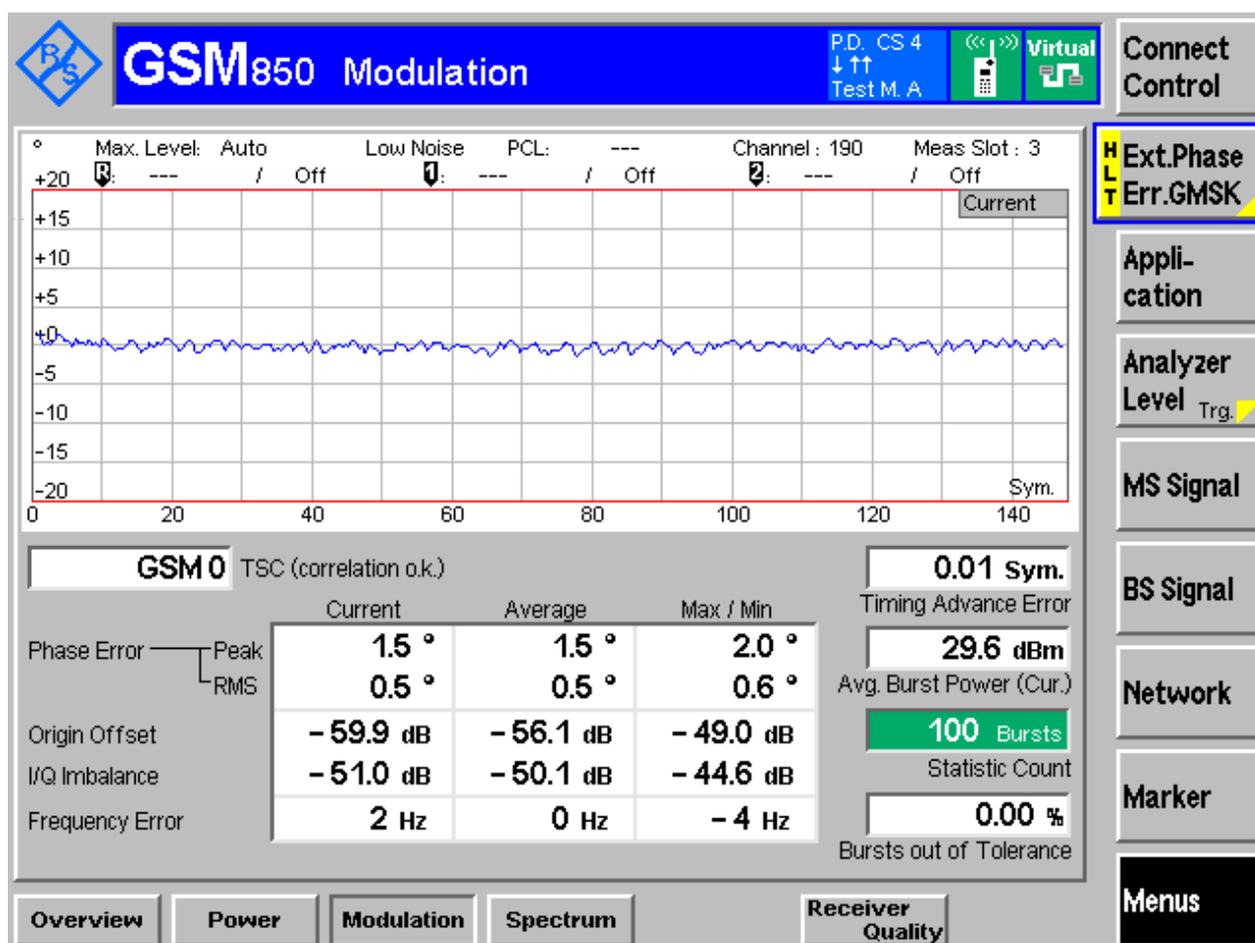
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

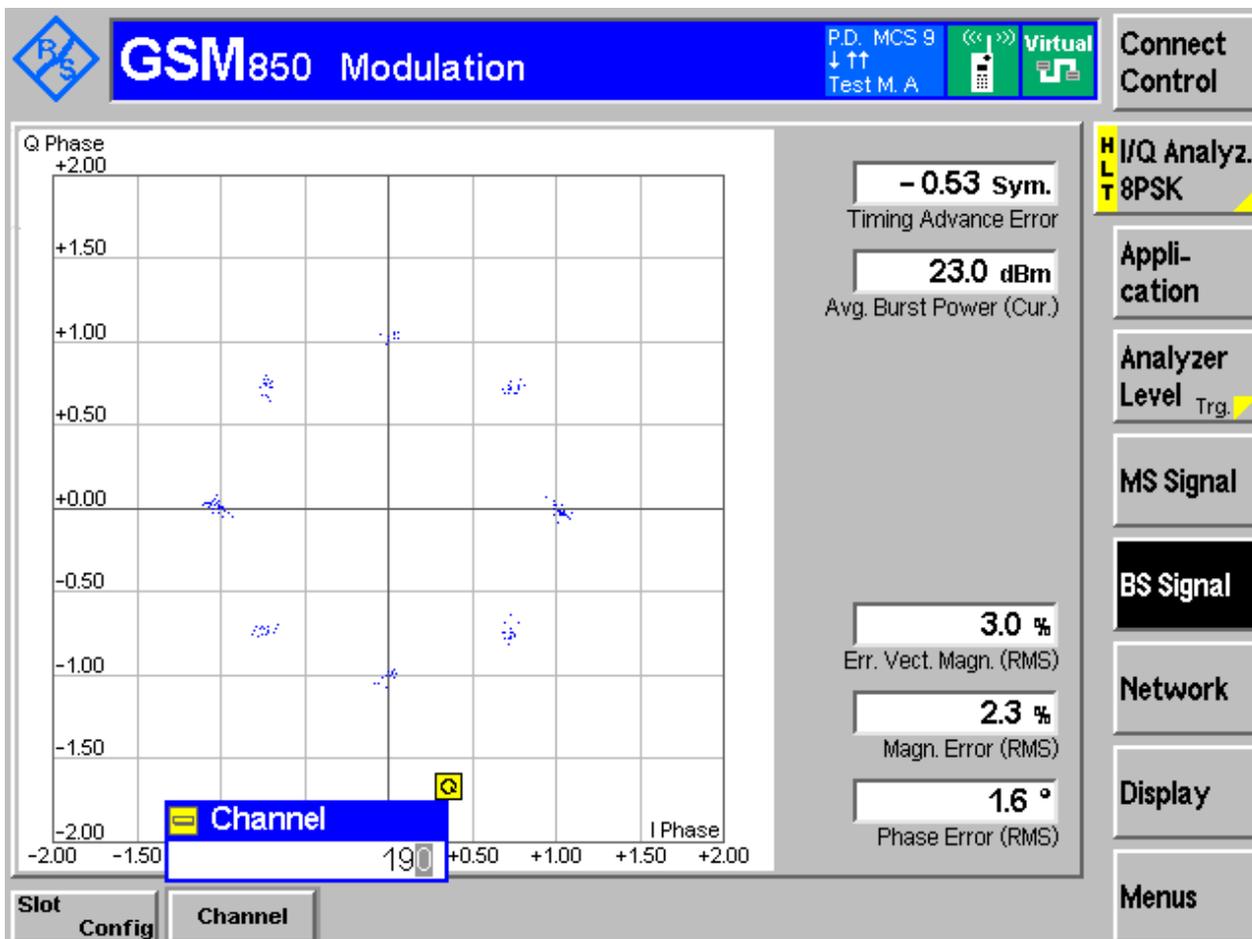
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

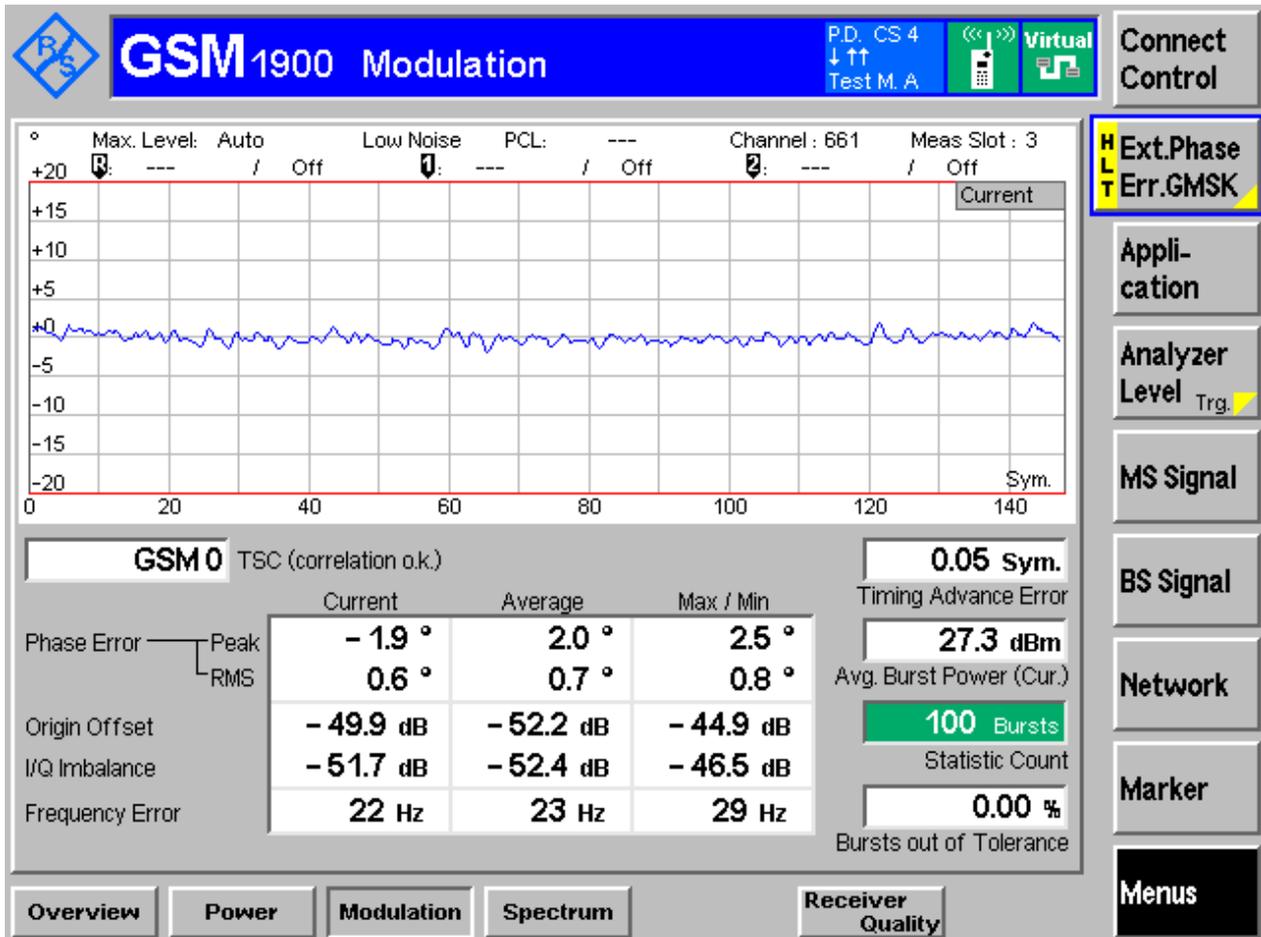
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

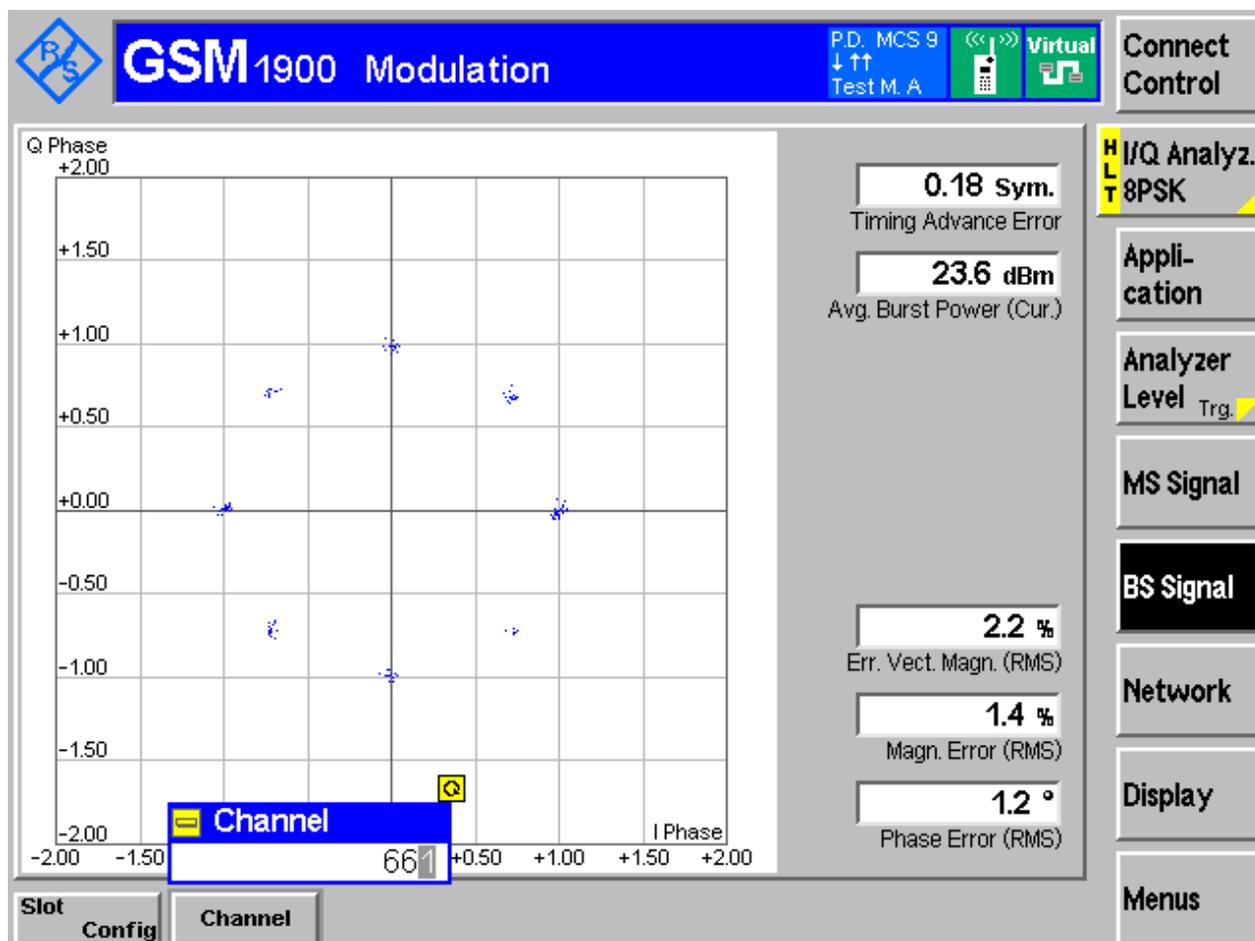
3.1.2.1 Test Mode = GSM/TM1

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	244.60	317.53	Pass
		MCH	242.93	311.55	Pass
		HCH	243.88	316.31	Pass
	GSM/TM2	LCH	250.89	316.69	Pass
		MCH	243.66	317.61	Pass
		HCH	253.88	319.56	Pass
GSM1900	GSM/TM1	LCH	243.26	311.92	Pass
		MCH	246.90	314.76	Pass
		HCH	245.19	309.02	Pass
	GSM/TM2	LCH	240.12	314.98	Pass
		MCH	242.22	315.31	Pass
		HCH	242.51	305.62	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

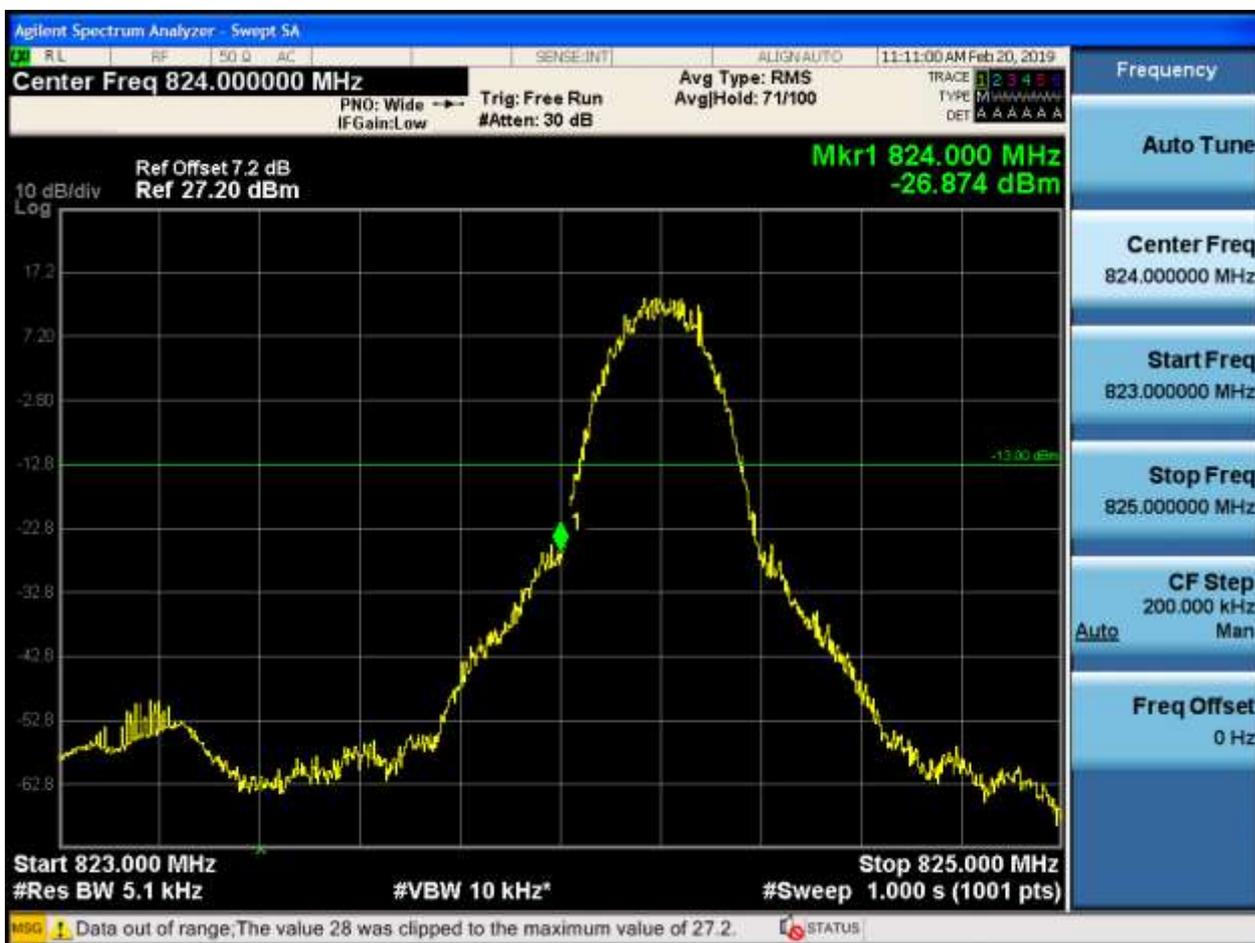


5.1.1.1.2 Test Channel = HCH



5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



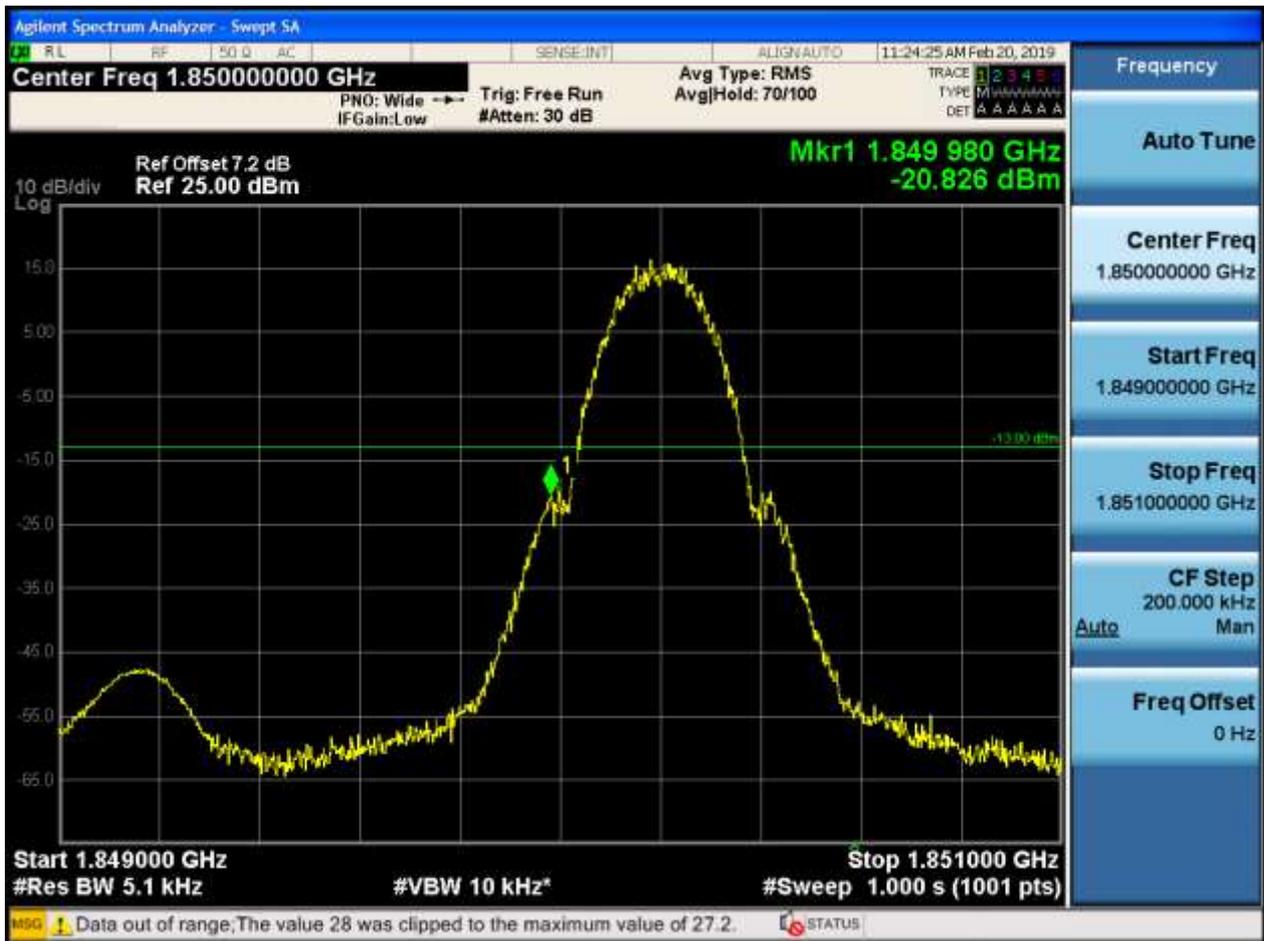
5.1.1.2.2 Test Channel = HCH



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

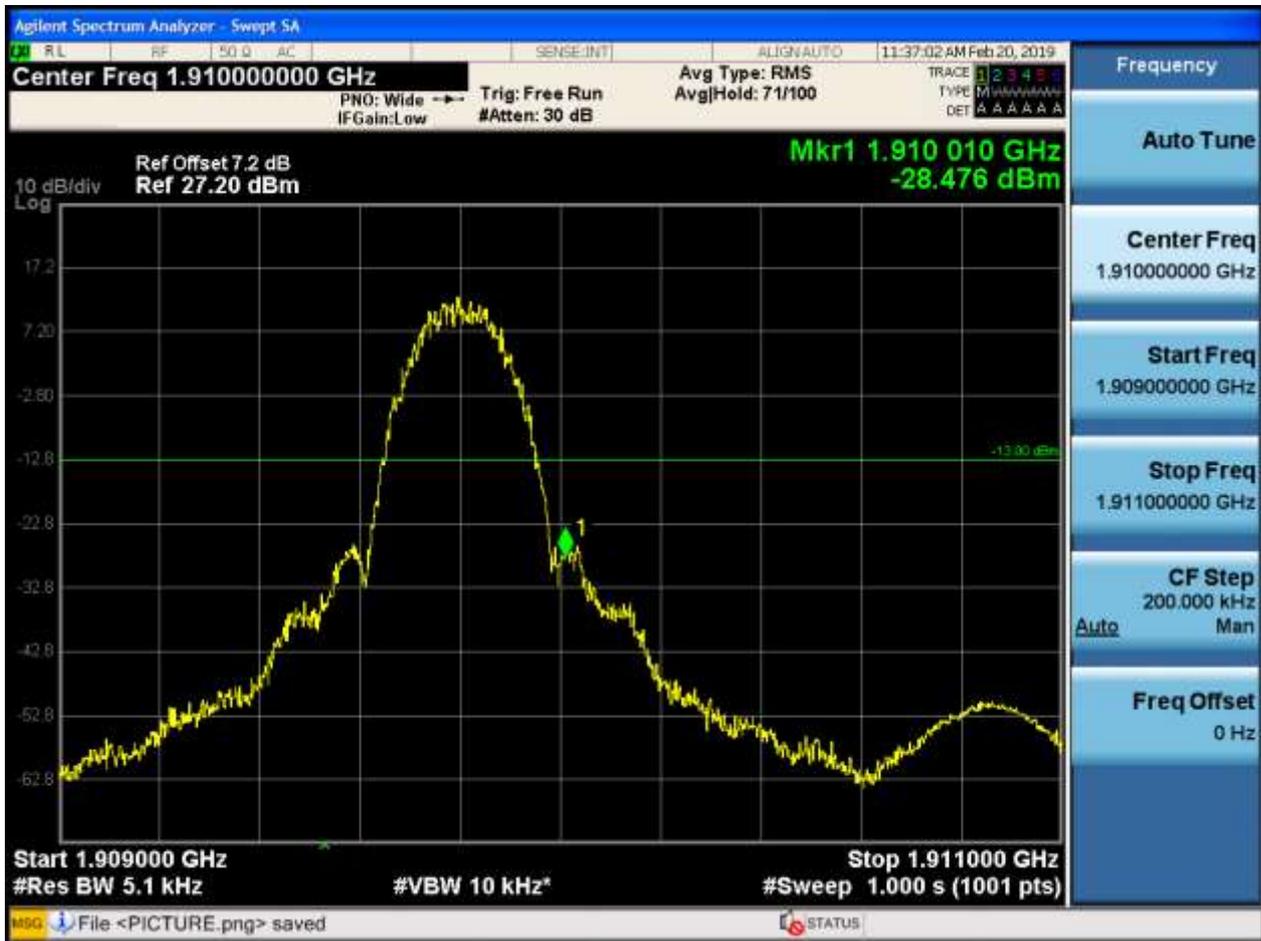


5.1.2.2 Test Mode = GSM/TM2

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

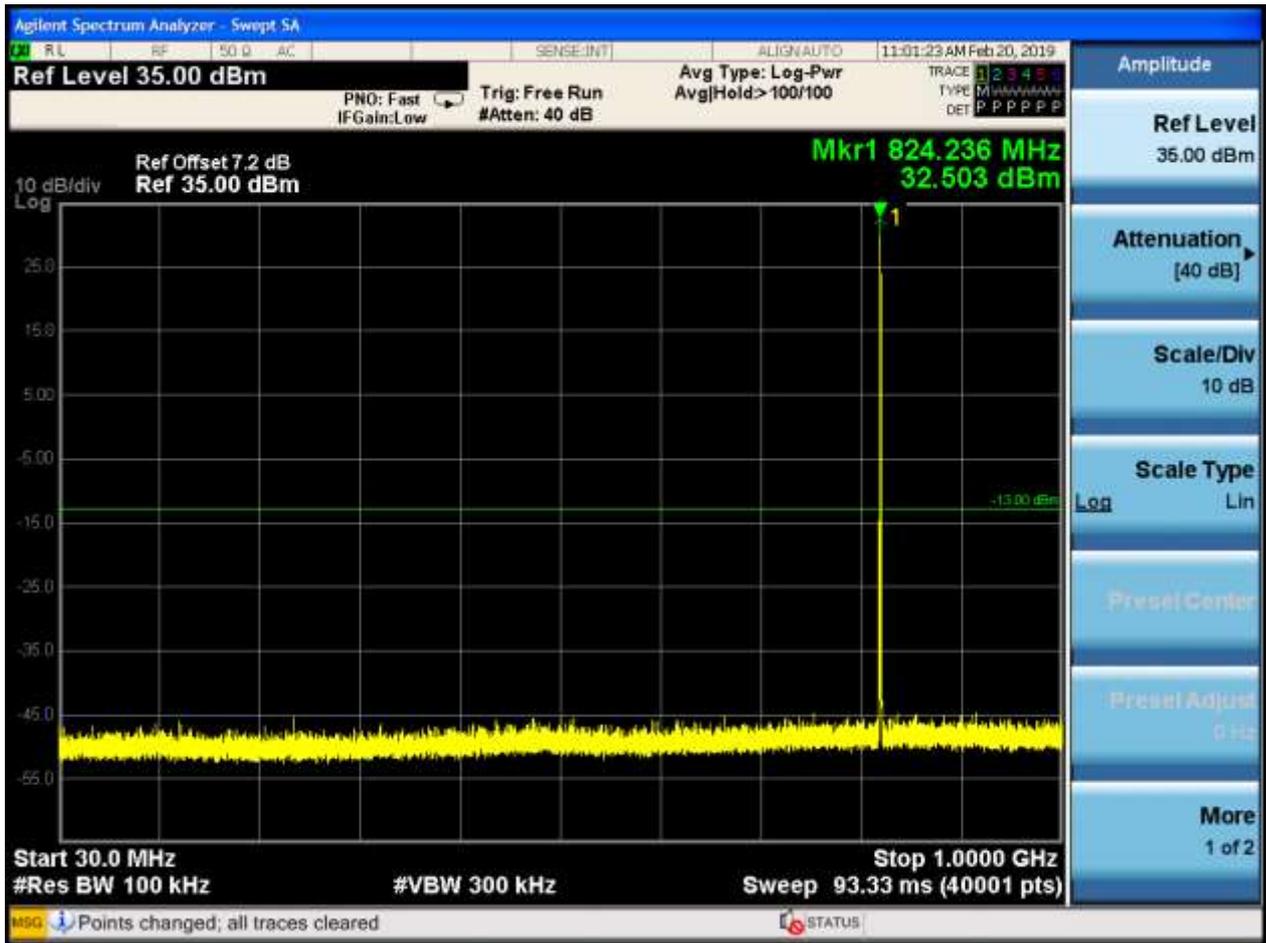
6.1 For GSM

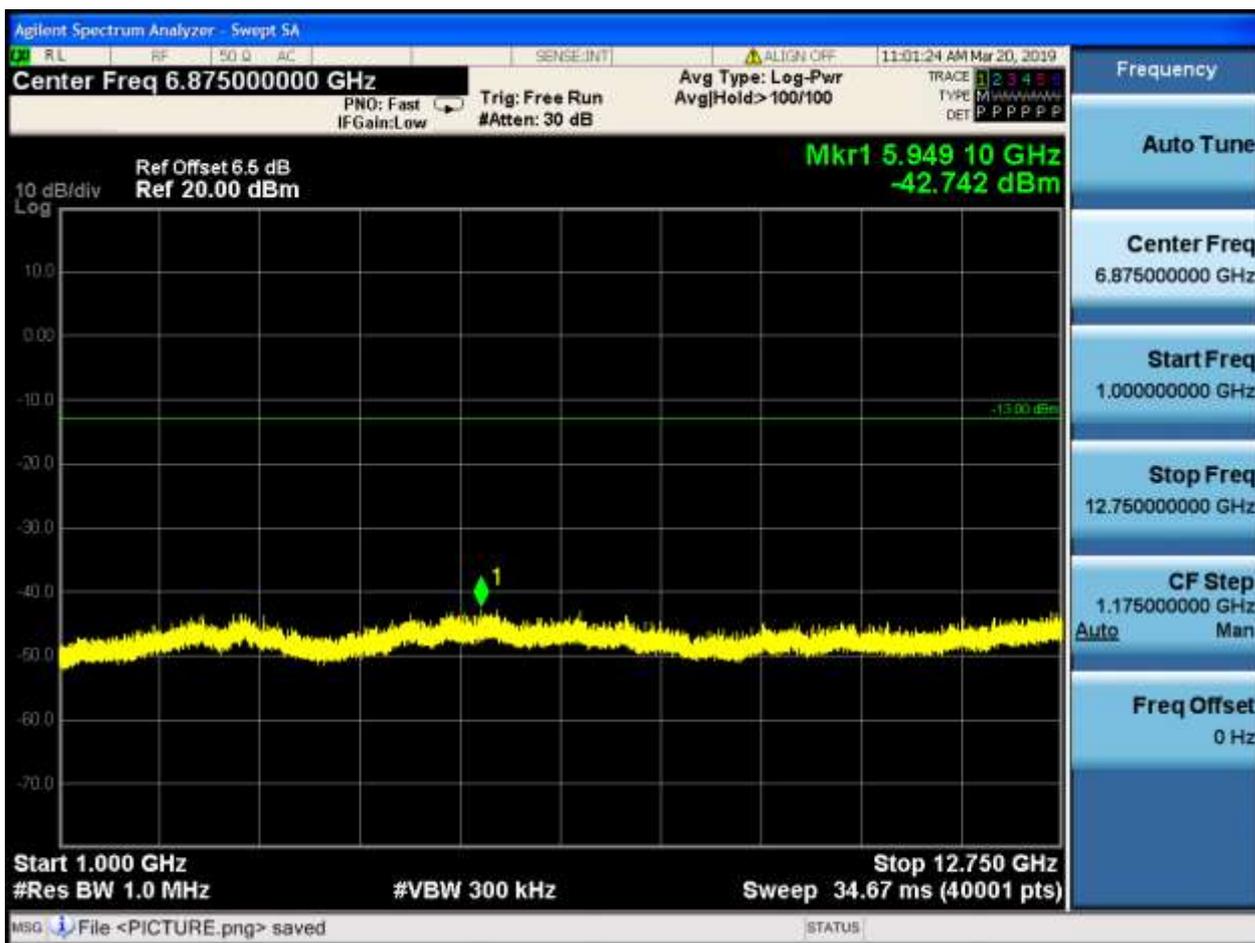
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



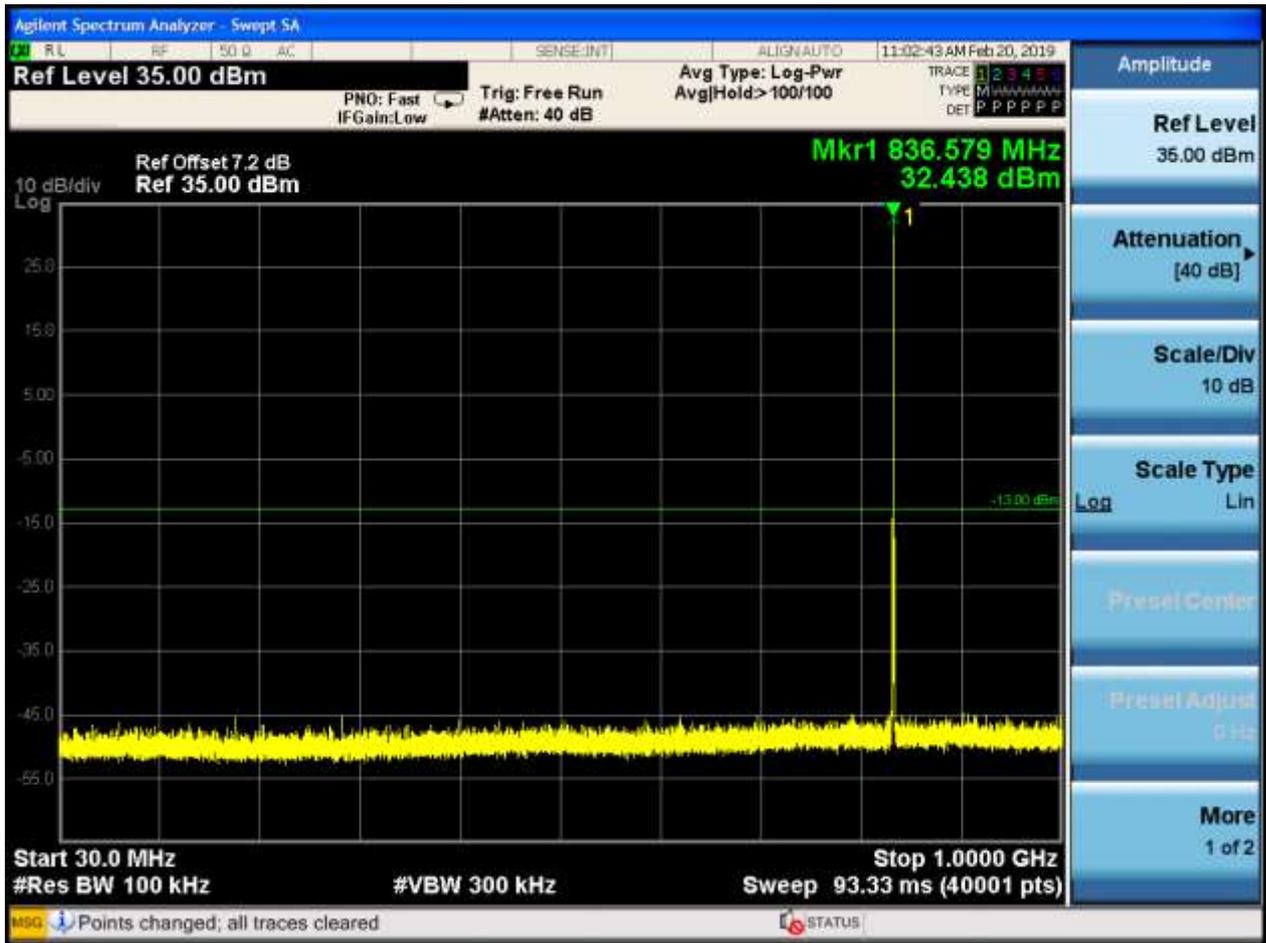




6.1.1.1.2 Test Channel = MCH





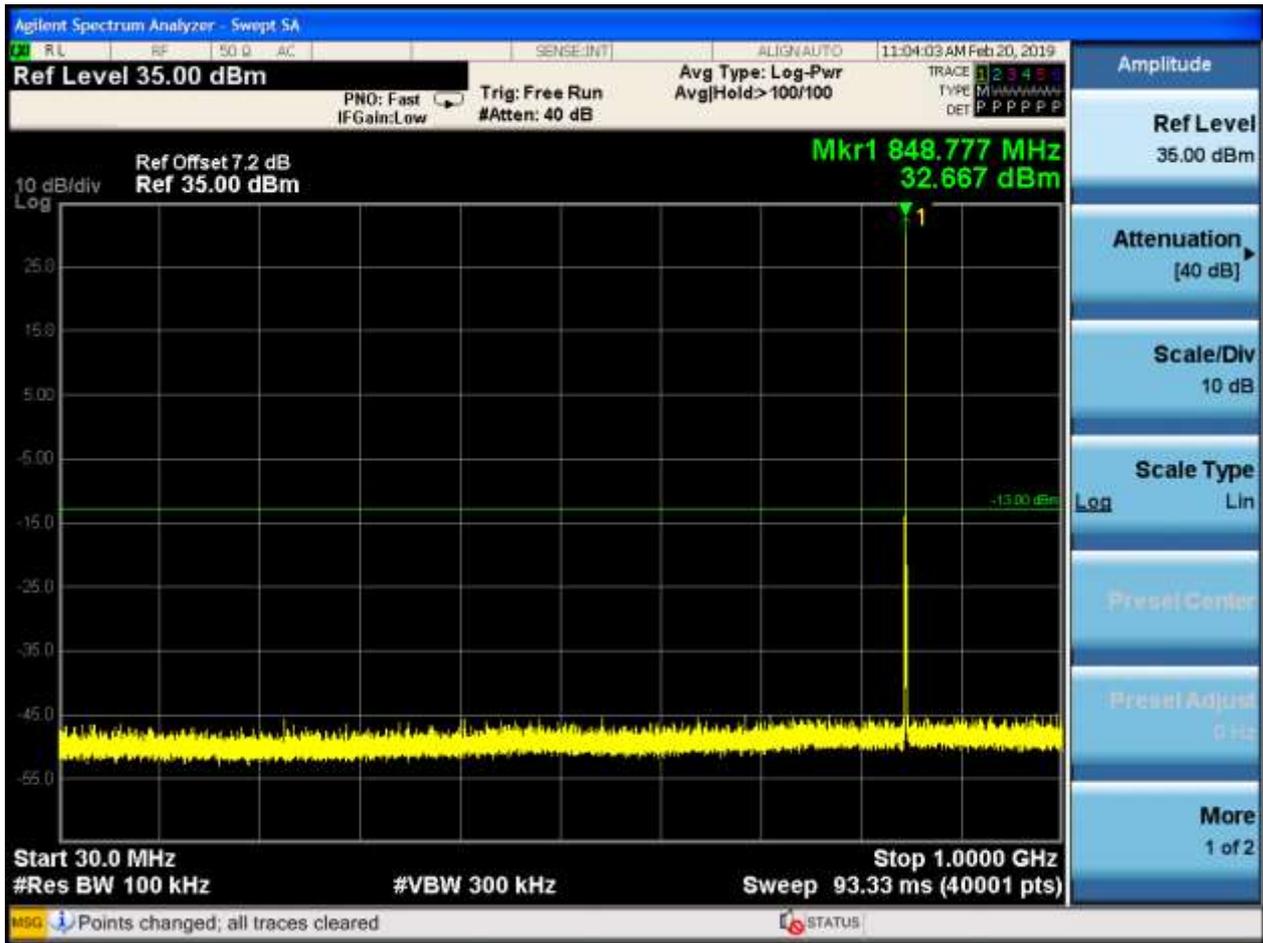




6.1.1.1.3 Test Channel = HCH



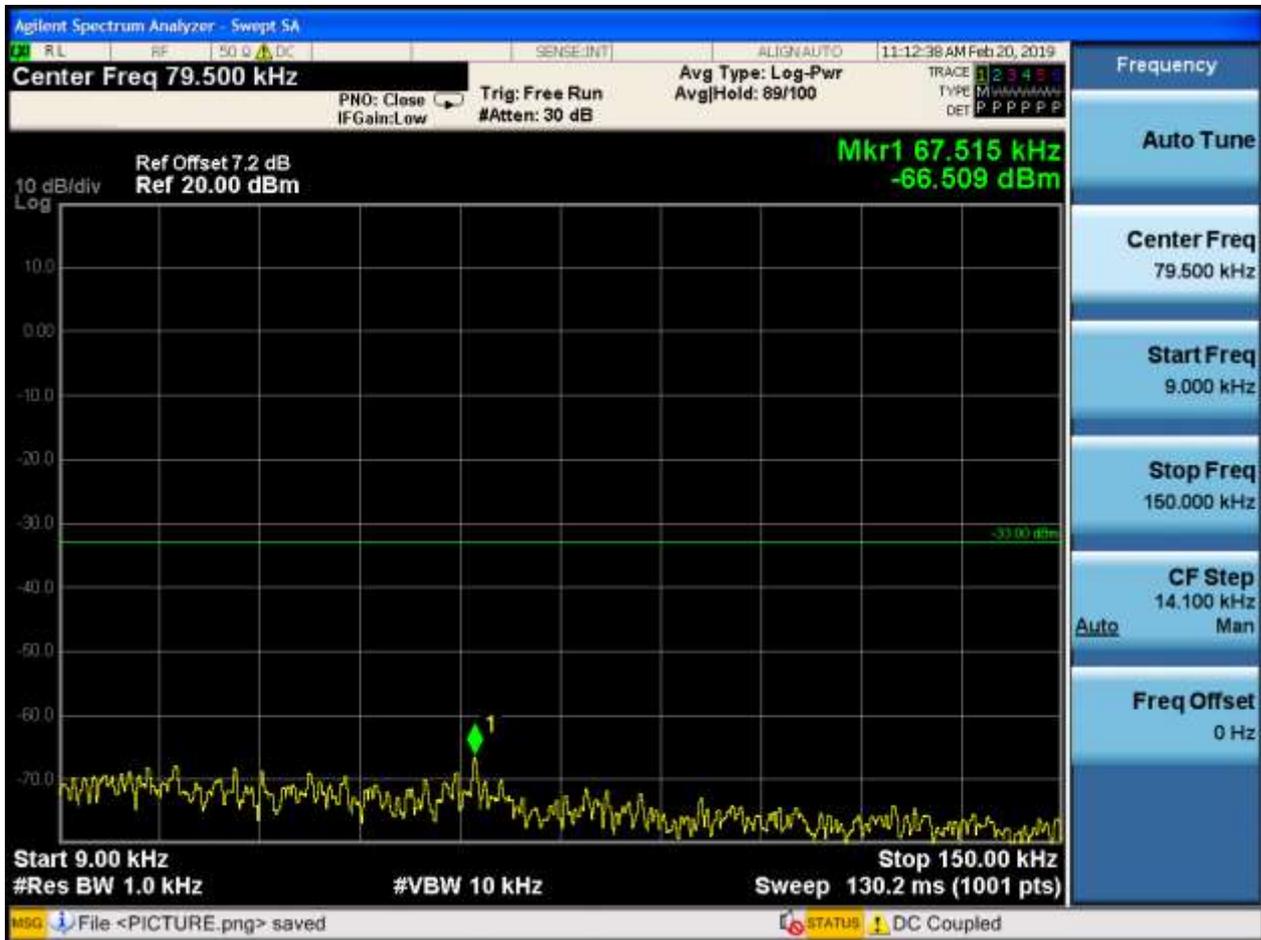




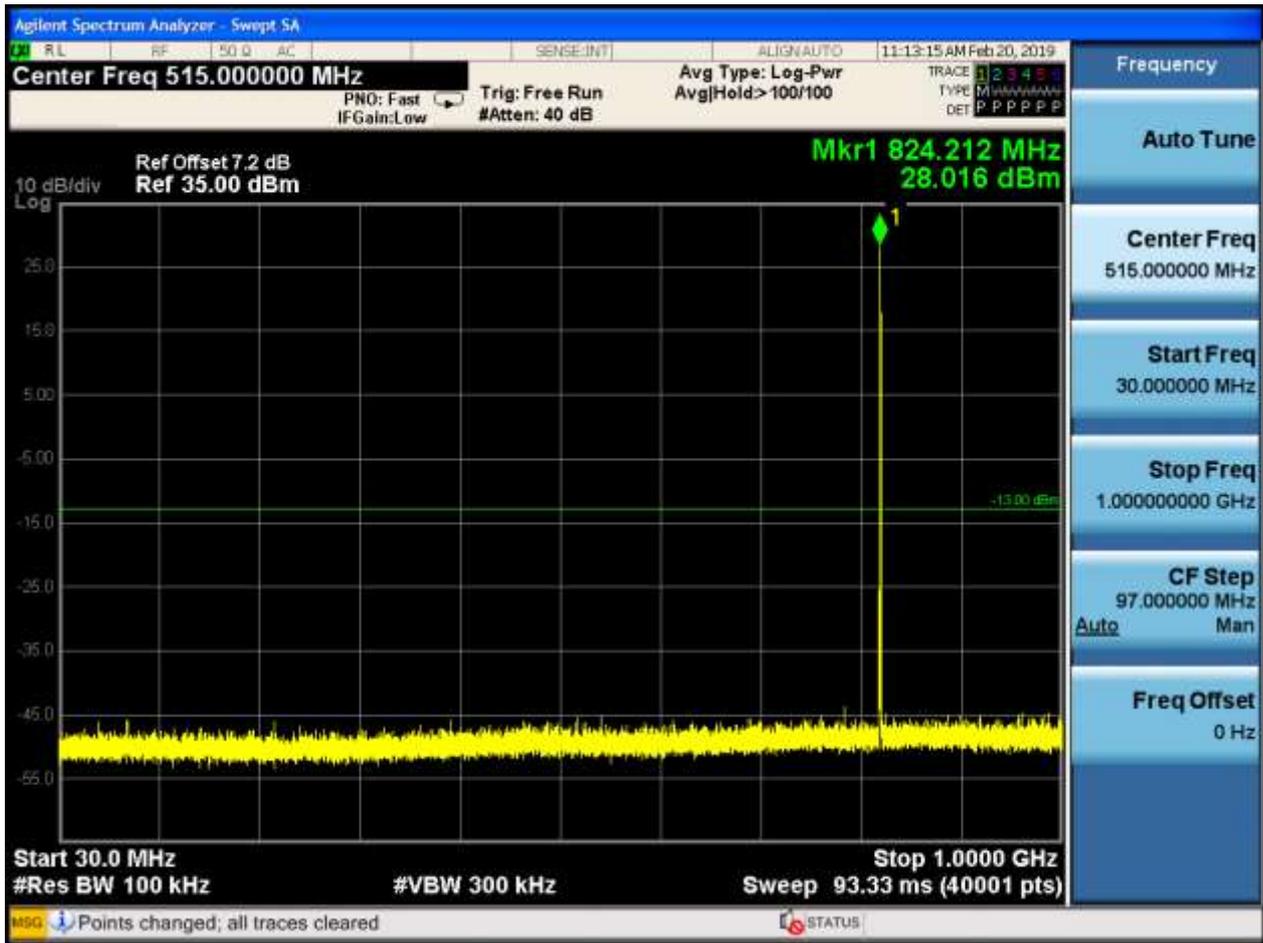


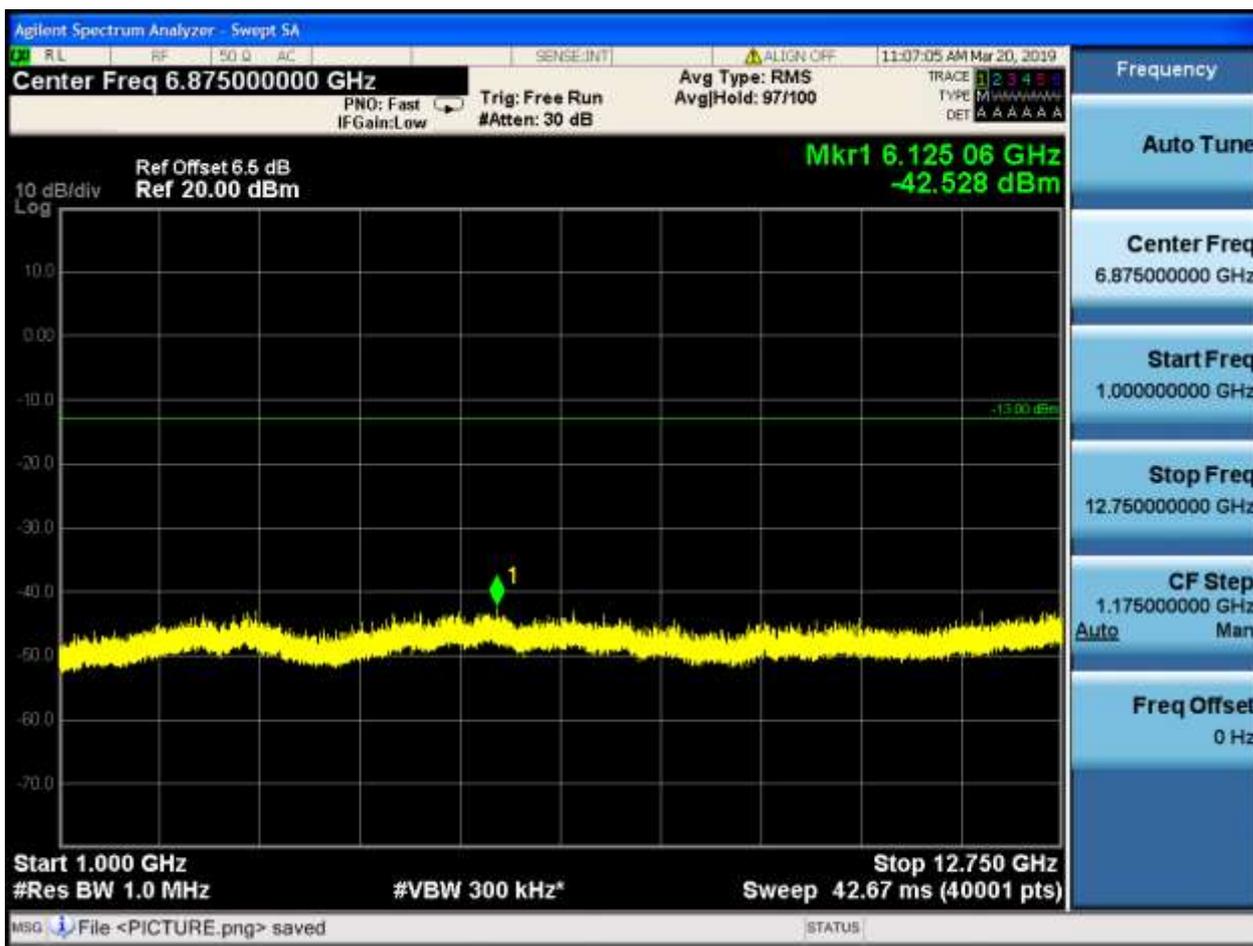
6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH





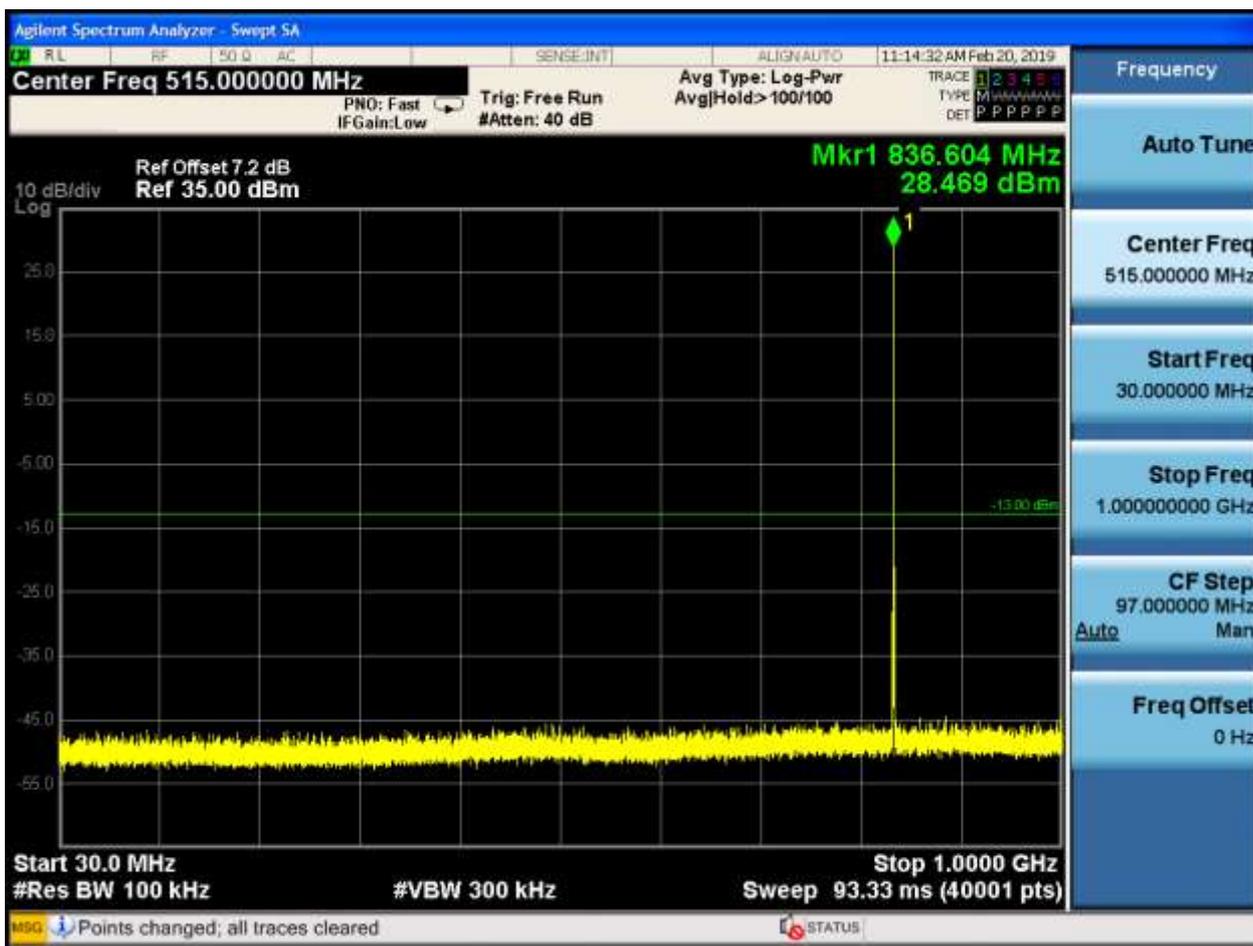




6.1.1.2.2 Test Channel = MCH

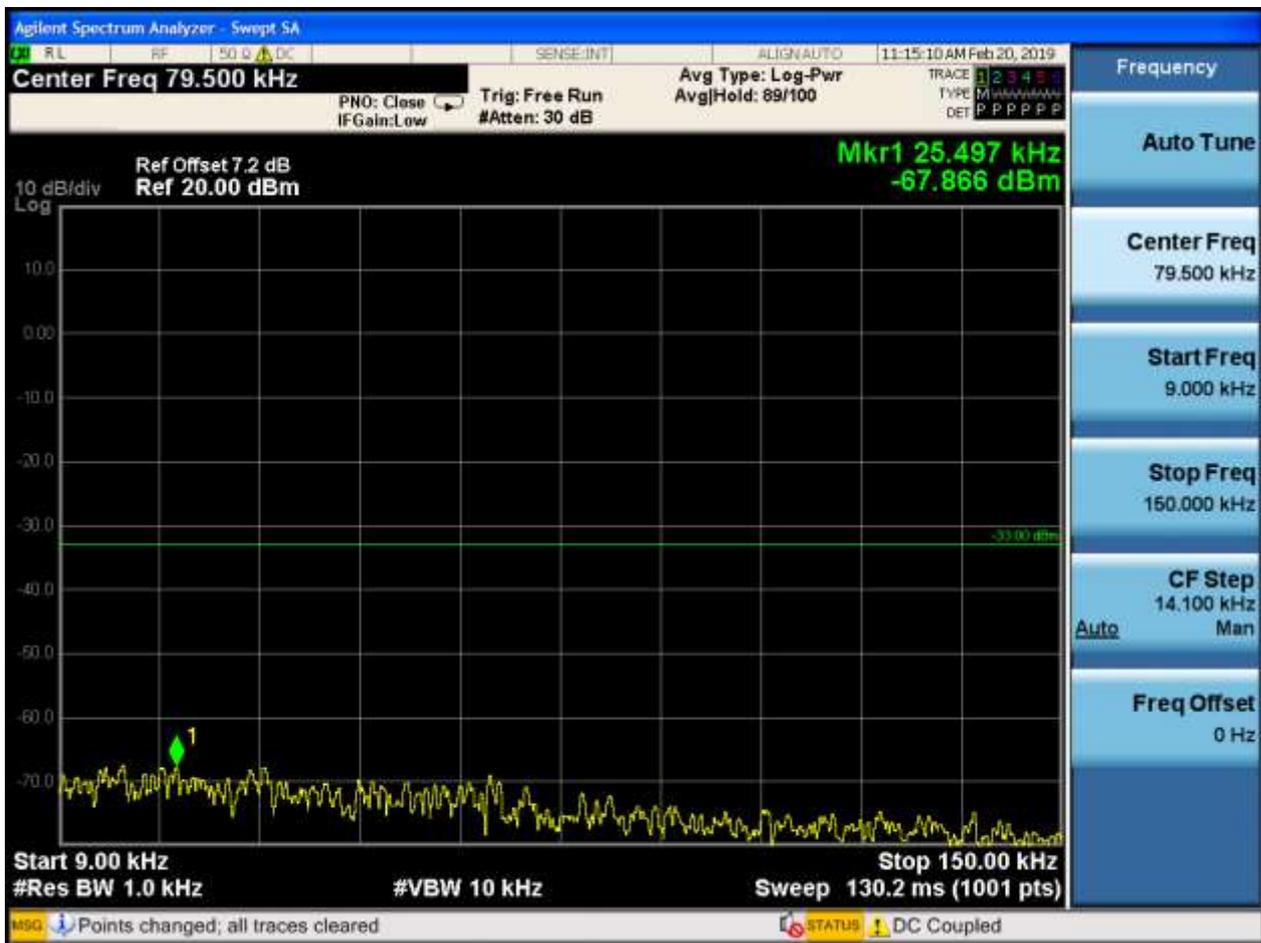






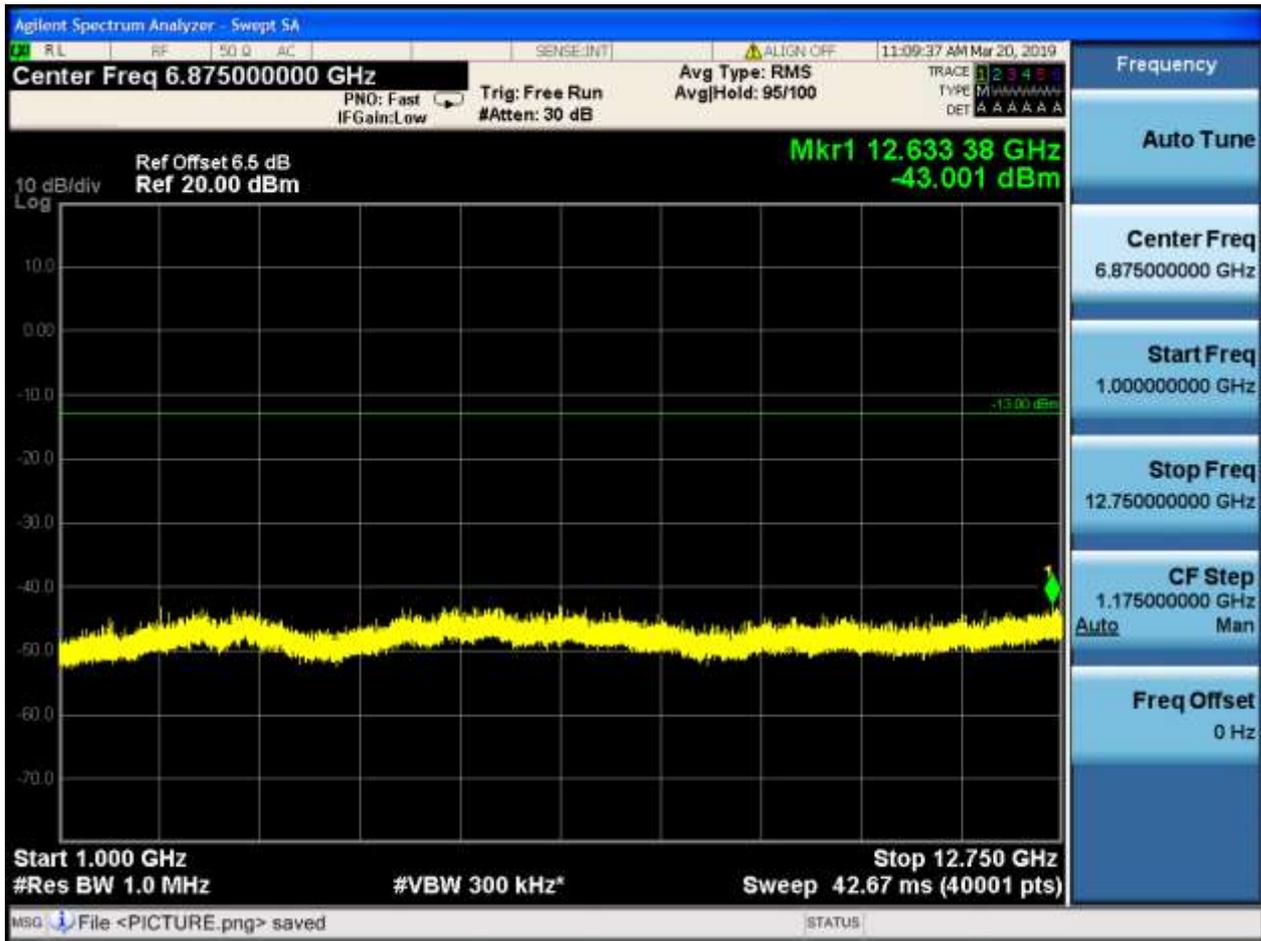


6.1.1.2.3 Test Channel = HCH









6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH

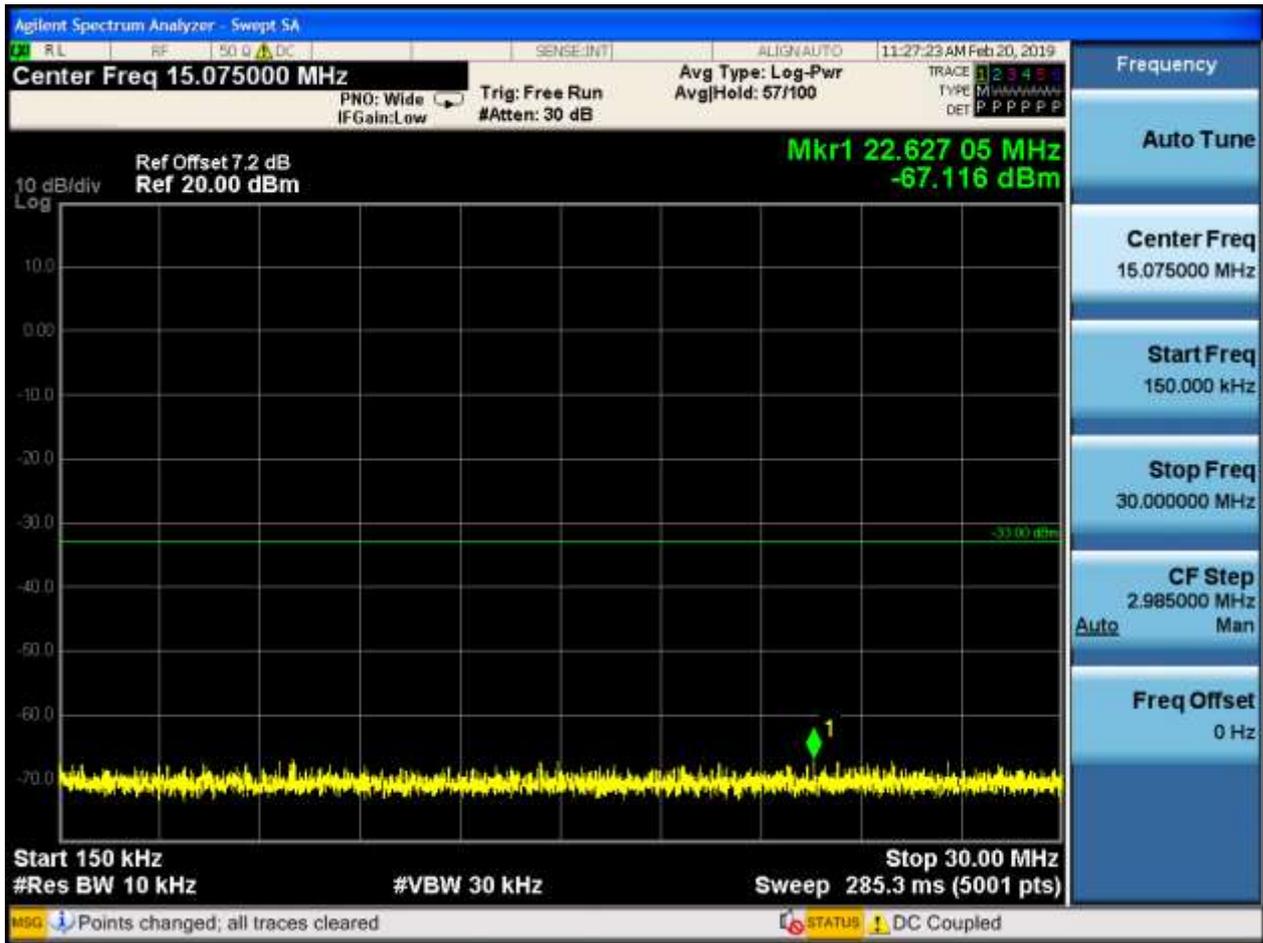




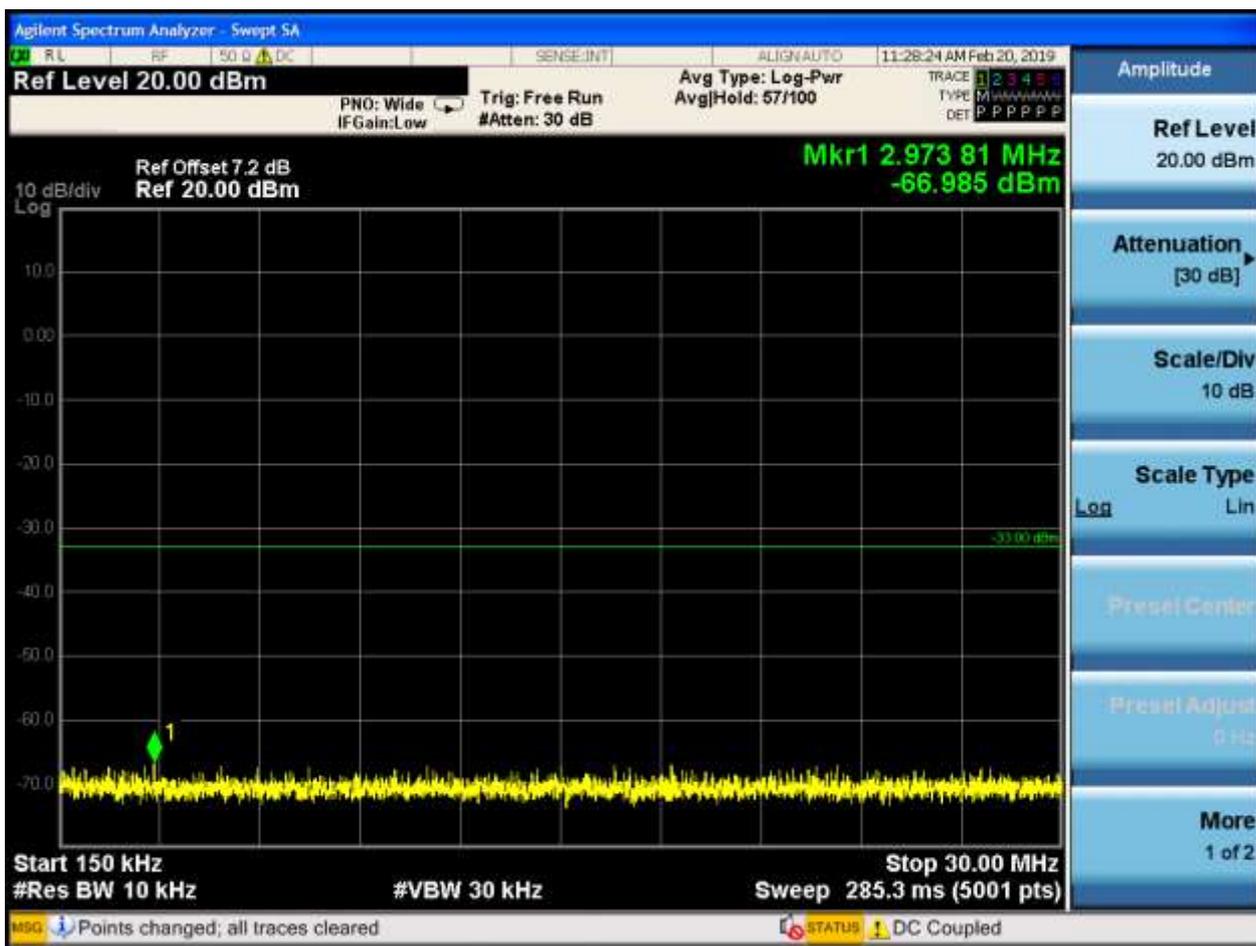


6.1.2.1.2 Test Channel = MCH











6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

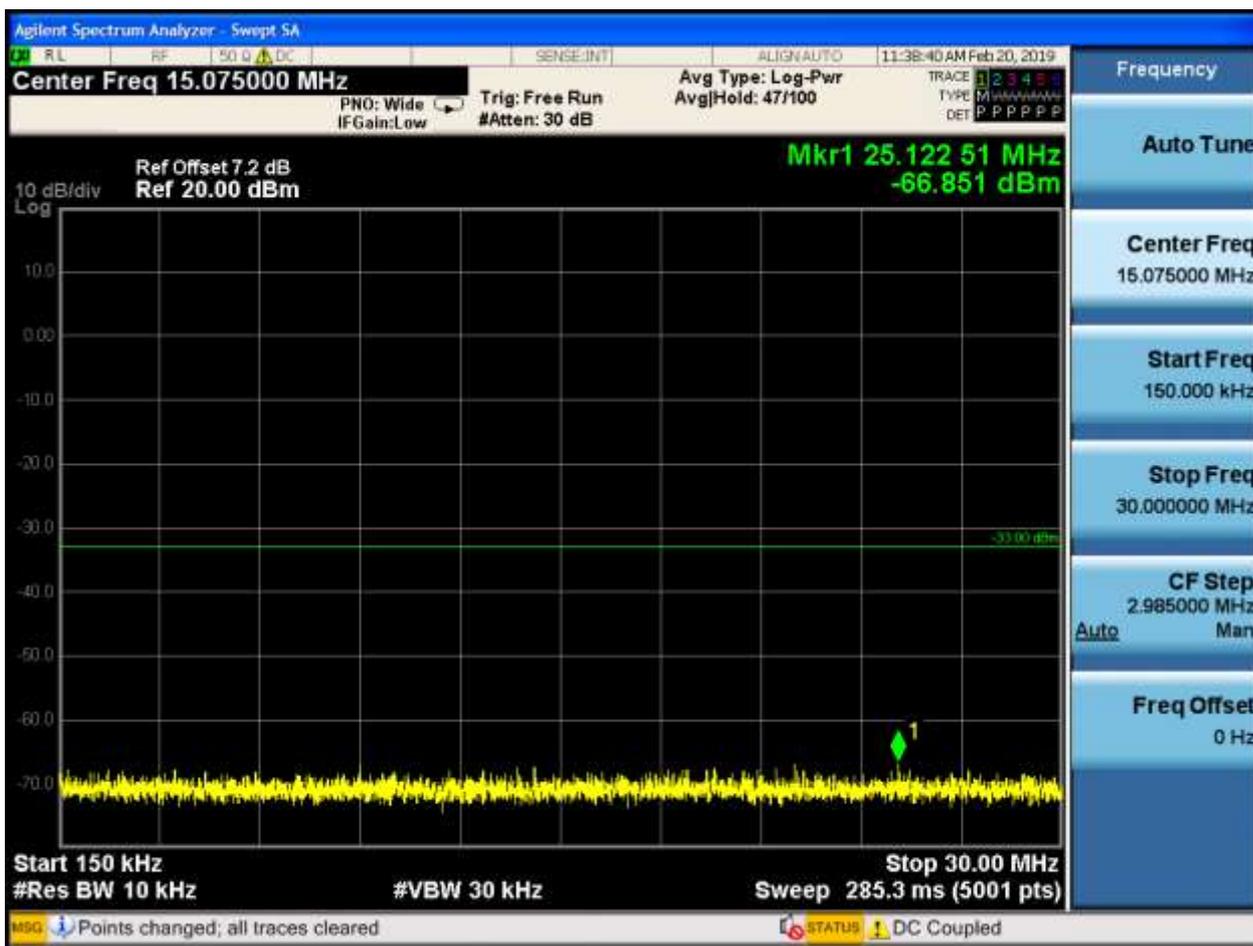






6.1.2.2.2 Test Channel = MCH







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

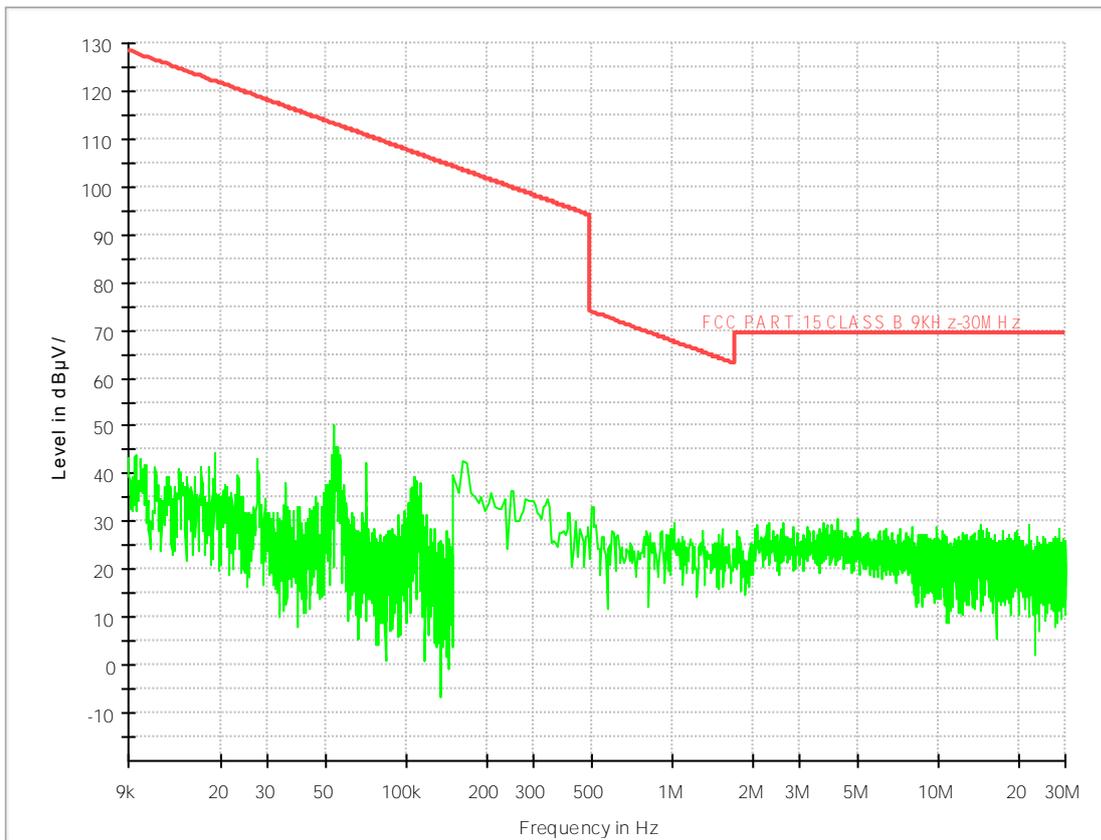
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

Part I - Test Plots

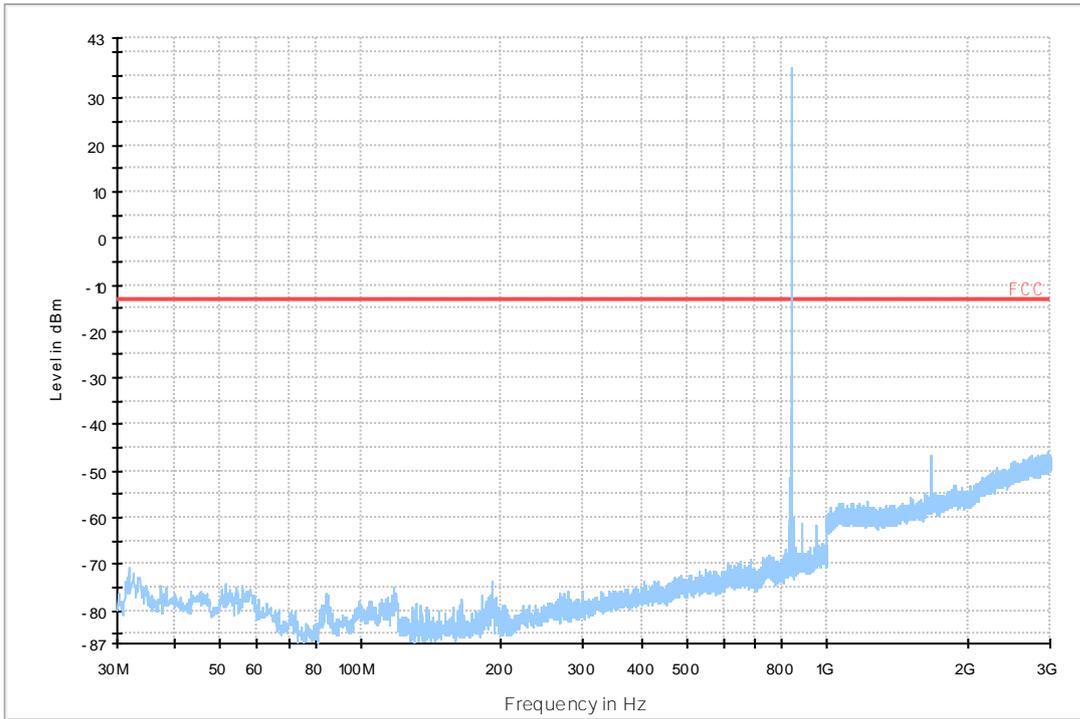
7.1 For GSM_ANT1

7.1.1 Test Band = GSM850

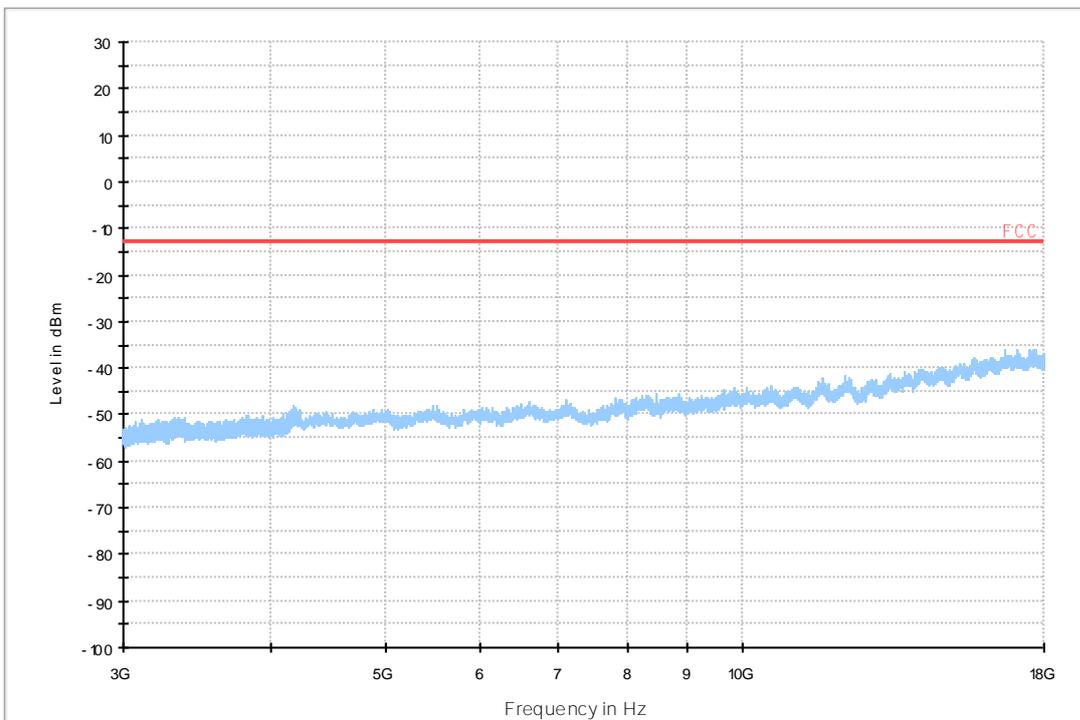
7.1.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850_L

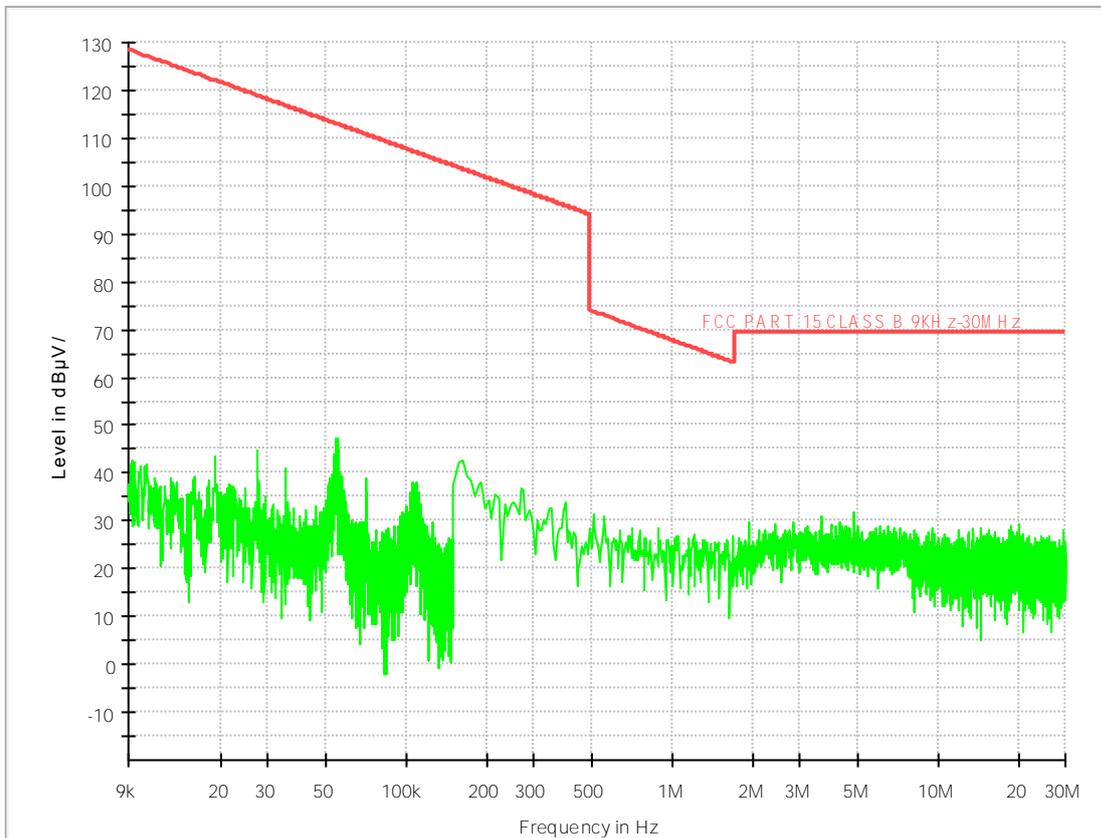


03 FCC PART 22 GSM850_H

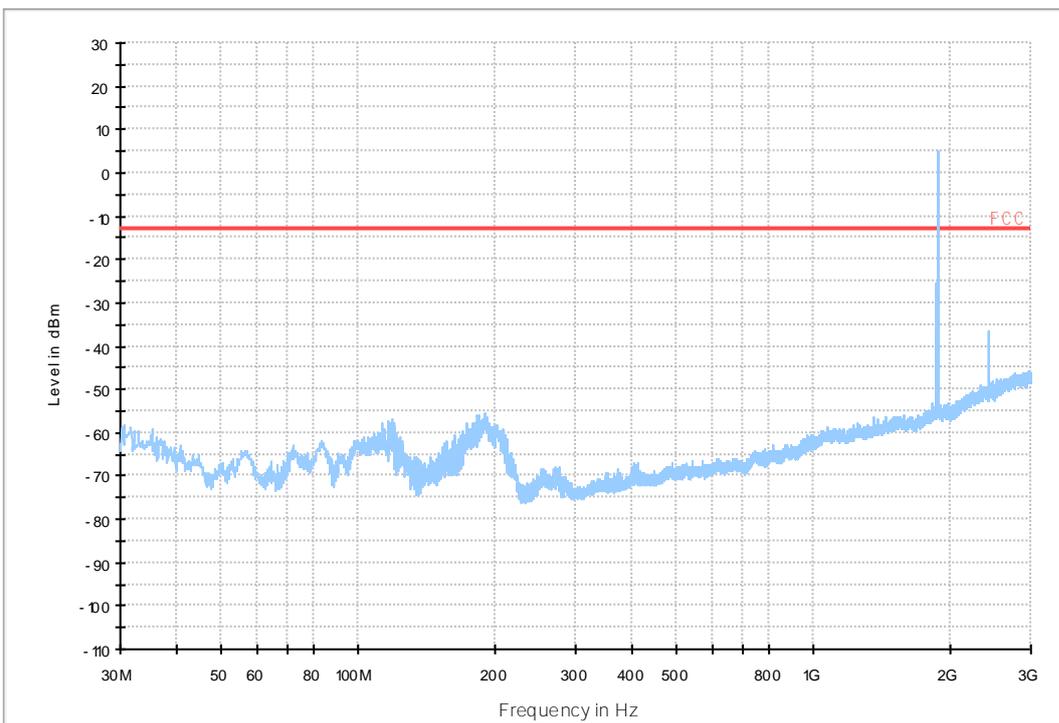


7.1.2 Test Band = PCS1900

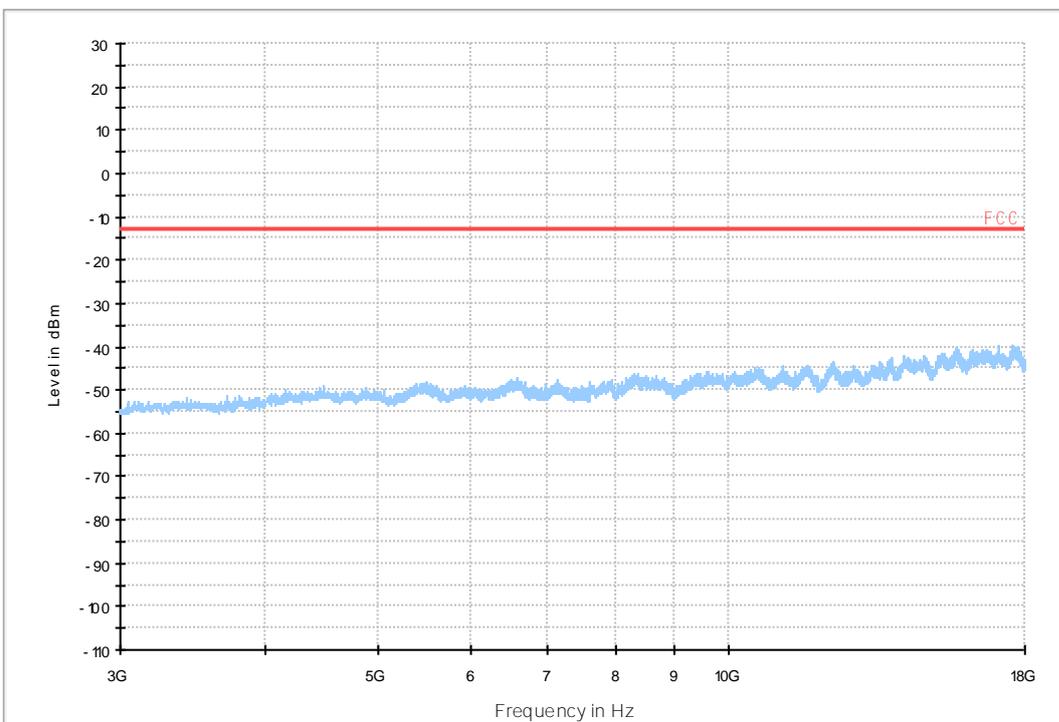
7.1.2.1 Test Mode = GSM/TM1



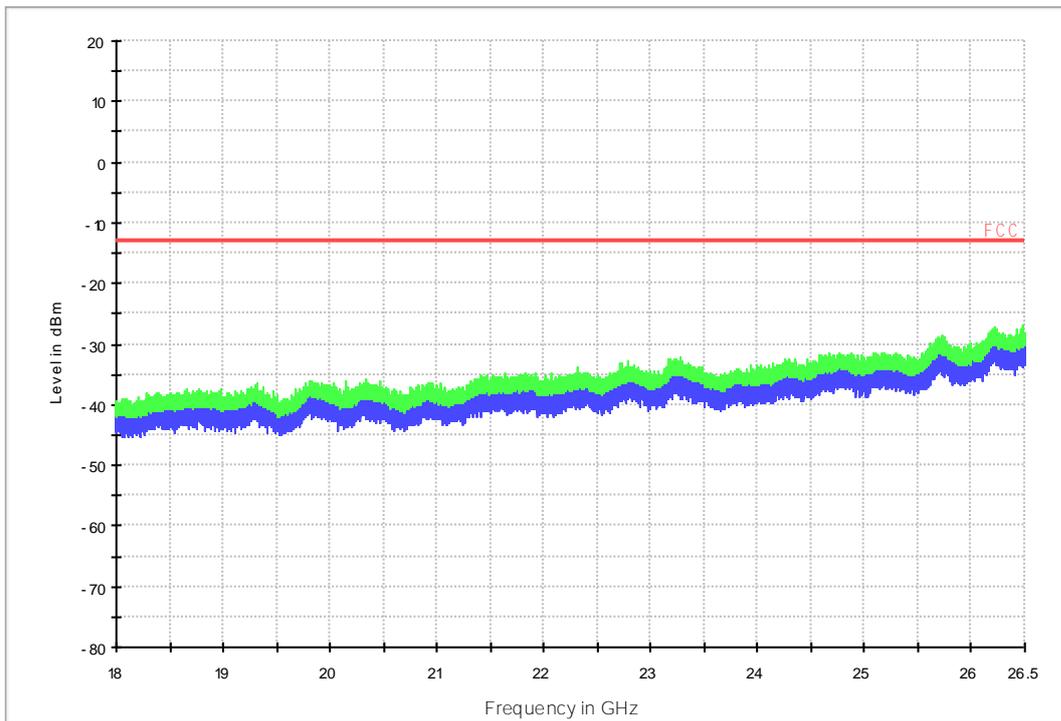
10 FCC PART 24 GSM1900_L



09 FCC PART 24 GSM1900_H



18G-26.5G RSE-TX-DIRECT OR 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	-16.59	-0.02013	PASS
				VN	-15.37	-0.01865	PASS
				VH	-16.27	-0.01974	PASS
		MCH	TN	VL	-13.04	-0.01559	PASS
				VN	-13.95	-0.01667	PASS
				VH	-16.72	-0.01999	PASS
		HCH	TN	VL	-11.62	-0.01369	PASS
				VN	-12.59	-0.01483	PASS
				VH	-14.01	-0.01651	PASS
	GSM/TM2	LCH	TN	VL	-24.44	-0.02965	PASS
				VN	-22.50	-0.0273	PASS
				VH	-18.18	-0.02206	PASS
		MCH	TN	VL	-24.25	-0.02899	PASS
				VN	-22.83	-0.02729	PASS
				VH	-15.30	-0.01829	PASS
		HCH	TN	VL	-21.53	-0.02537	PASS
				VN	-17.98	-0.02118	PASS
				VH	-19.53	-0.02301	PASS
GSM1900	GSM/TM1	LCH	TN	VL	25.70	0.01389	PASS
				VN	24.54	0.01326	PASS
				VH	27.06	0.01463	PASS
		MCH	TN	VL	27.96	0.01487	PASS
				VN	25.25	0.01343	PASS
				VH	28.35	0.01508	PASS
		HCH	TN	VL	29.44	0.01542	PASS
				VN	24.99	0.01309	PASS
				VH	24.21	0.01268	PASS
	GSM/TM2	LCH	TN	VL	28.12	0.0152	PASS
				VN	23.73	0.01283	PASS
				VH	22.54	0.01218	PASS
		MCH	TN	VL	12.24	0.00651	PASS
				VN	14.82	0.00788	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	17.08	0.00909	PASS
		HCH	TN	VL	13.79	0.00722	PASS
				VN	25.54	0.01337	PASS
				VH	28.51	0.01493	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	-16.27	-0.01974	PASS
				-20	-13.88	-0.01684	PASS
				-10	-15.24	-0.01849	PASS
				0	-16.66	-0.02021	PASS
				10	-13.69	-0.01661	PASS
				20	-16.66	-0.02021	PASS
				30	-18.14	-0.02201	PASS
				40	-16.85	-0.02044	PASS
		50	-15.95	-0.01935	PASS		
		MCH	VN	-30	-13.04	-0.01559	PASS
				-20	-14.14	-0.0169	PASS
				-10	-14.98	-0.01791	PASS
				0	-12.91	-0.01543	PASS
				10	-12.27	-0.01467	PASS
				20	-14.79	-0.01768	PASS
				30	-14.98	-0.01791	PASS
				40	-12.27	-0.01467	PASS
		50	-12.14	-0.01451	PASS		
		HCH	VN	-30	-14.01	-0.01651	PASS
				-20	-12.91	-0.01521	PASS
				-10	-13.11	-0.01545	PASS
				0	-14.85	-0.0175	PASS
				10	-13.43	-0.01582	PASS
				20	-14.79	-0.01742	PASS
	30			-14.08	-0.01659	PASS	
	40			-11.82	-0.01393	PASS	
	50	-14.33	-0.01688	PASS			
	GSM/TM2	LCH	VN	-30	-14.40	-0.01747	PASS
				-20	-20.50	-0.02487	PASS
				-10	-16.01	-0.01942	PASS
				0	-17.50	-0.02123	PASS
				10	-14.82	-0.01798	PASS

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict						
				20	-22.50	-0.0273	PASS						
				30	-14.66	-0.01779	PASS						
				40	-15.72	-0.01907	PASS						
				50	-20.31	-0.02464	PASS						
		MCH	VN			-30	-22.34	-0.0267	PASS				
						-20	-17.08	-0.02042	PASS				
						-10	-12.20	-0.01458	PASS				
						0	-14.95	-0.01787	PASS				
						10	-16.72	-0.01999	PASS				
						20	-13.59	-0.01624	PASS				
						30	-18.31	-0.02189	PASS				
						40	-16.43	-0.01964	PASS				
		HCH	VN			50	-20.44	-0.02443	PASS				
						-30	-22.44	-0.02644	PASS				
						-20	-17.85	-0.02103	PASS				
						-10	-22.02	-0.02594	PASS				
						0	-18.27	-0.02152	PASS				
						10	-17.92	-0.02111	PASS				
						20	-20.57	-0.02423	PASS				
						30	-15.08	-0.01777	PASS				
		GSM1900	GSM/TM1	LCH	VN					40	-18.37	-0.02164	PASS
										50	-13.43	-0.01582	PASS
										-30	25.70	0.01389	PASS
										-20	28.61	0.01546	PASS
-10	28.15									0.01521	PASS		
0	23.05									0.01246	PASS		
10	31.19									0.01686	PASS		
20	26.35									0.01424	PASS		
MCH	VN					30	29.44	0.01591	PASS				
						40	28.09	0.01518	PASS				
						50	27.83	0.01504	PASS				
						-30	26.99	0.01436	PASS				
						-20	22.21	0.01181	PASS				
						-10	23.76	0.01264	PASS				
						0	17.76	0.00945	PASS				
						10	21.89	0.01164	PASS				
				20	22.41	0.01192	PASS						
				30	26.93	0.01432	PASS						
				40	29.64	0.01577	PASS						
				50	30.41	0.01618	PASS						

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
		HCH	VN	-30	25.18	0.01318	PASS	
				-20	21.95	0.01149	PASS	
				-10	28.41	0.01488	PASS	
				0	18.27	0.00957	PASS	
				10	18.92	0.00991	PASS	
				20	26.99	0.01413	PASS	
				30	21.11	0.01105	PASS	
				40	20.53	0.01075	PASS	
				50	25.89	0.01356	PASS	
		GSM/TM2	LCH	VN	-30	22.12	0.01196	PASS
					-20	36.97	0.01998	PASS
					-10	24.70	0.01335	PASS
					0	24.99	0.01351	PASS
					10	23.89	0.01291	PASS
					20	22.60	0.01221	PASS
					30	21.21	0.01146	PASS
					40	24.67	0.01333	PASS
					50	23.79	0.01286	PASS
	MCH		VN	-30	19.92	0.0106	PASS	
				-20	29.80	0.01585	PASS	
				-10	17.56	0.00934	PASS	
				0	25.60	0.01362	PASS	
				10	27.86	0.01482	PASS	
				20	25.25	0.01343	PASS	
				30	26.31	0.01399	PASS	
				40	31.54	0.01678	PASS	
				50	27.31	0.01453	PASS	
	HCH	VN	-30	17.27	0.00904	PASS		
			-20	25.89	0.01356	PASS		
			-10	15.59	0.00816	PASS		
			0	16.18	0.00847	PASS		
			10	20.31	0.01063	PASS		
			20	18.37	0.00962	PASS		
			30	22.60	0.01183	PASS		
			40	20.21	0.01058	PASS		
			50	18.66	0.00977	PASS		

END