



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	32.58	25.73	38.5	PASS
		MCH	32.69	25.84	38.5	PASS
		HCH	32.77	25.92	38.5	PASS
	GSM/TM2	LCH	25.21	18.36	38.5	PASS
		MCH	25.24	18.39	38.5	PASS
		HCH	25.17	18.32	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
GSM1900	GSM/TM1	LCH	30.47	26.67	33	PASS
		MCH	30.24	26.44	33	PASS
		HCH	30.16	26.36	33	PASS
	GSM/TM2	LCH	24.89	21.09	33	PASS
		MCH	24.93	21.13	33	PASS
		HCH	24.89	21.09	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	0.11	13	PASS
		MCH	0.13	13	PASS
		HCH	0.13	13	PASS
	GSM/TM2	LCH	3.05	13	PASS
		MCH	2.97	13	PASS
		HCH	3.12	13	PASS
GSM1900	GSM/TM1	LCH	0.14	13	PASS
		MCH	0.11	13	PASS
		HCH	0.11	13	PASS
	GSM/TM2	LCH	2.98	13	PASS
		MCH	3.04	13	PASS
		HCH	2.98	13	PASS

3Appendix_C: Modulation Characteristics

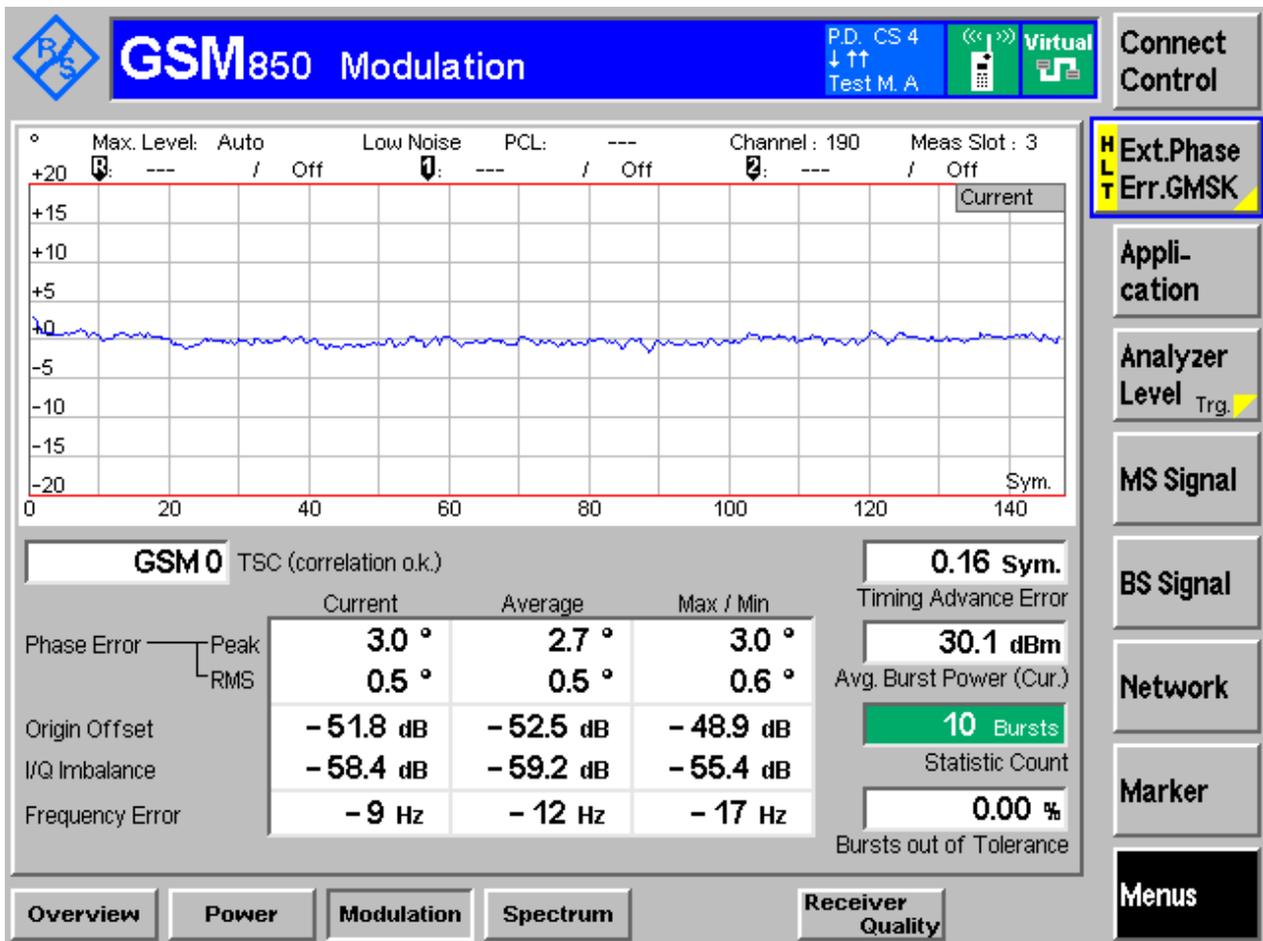
Part I - Test Plots

3.1 For GSM

3.1.1 Test Band = GSM850

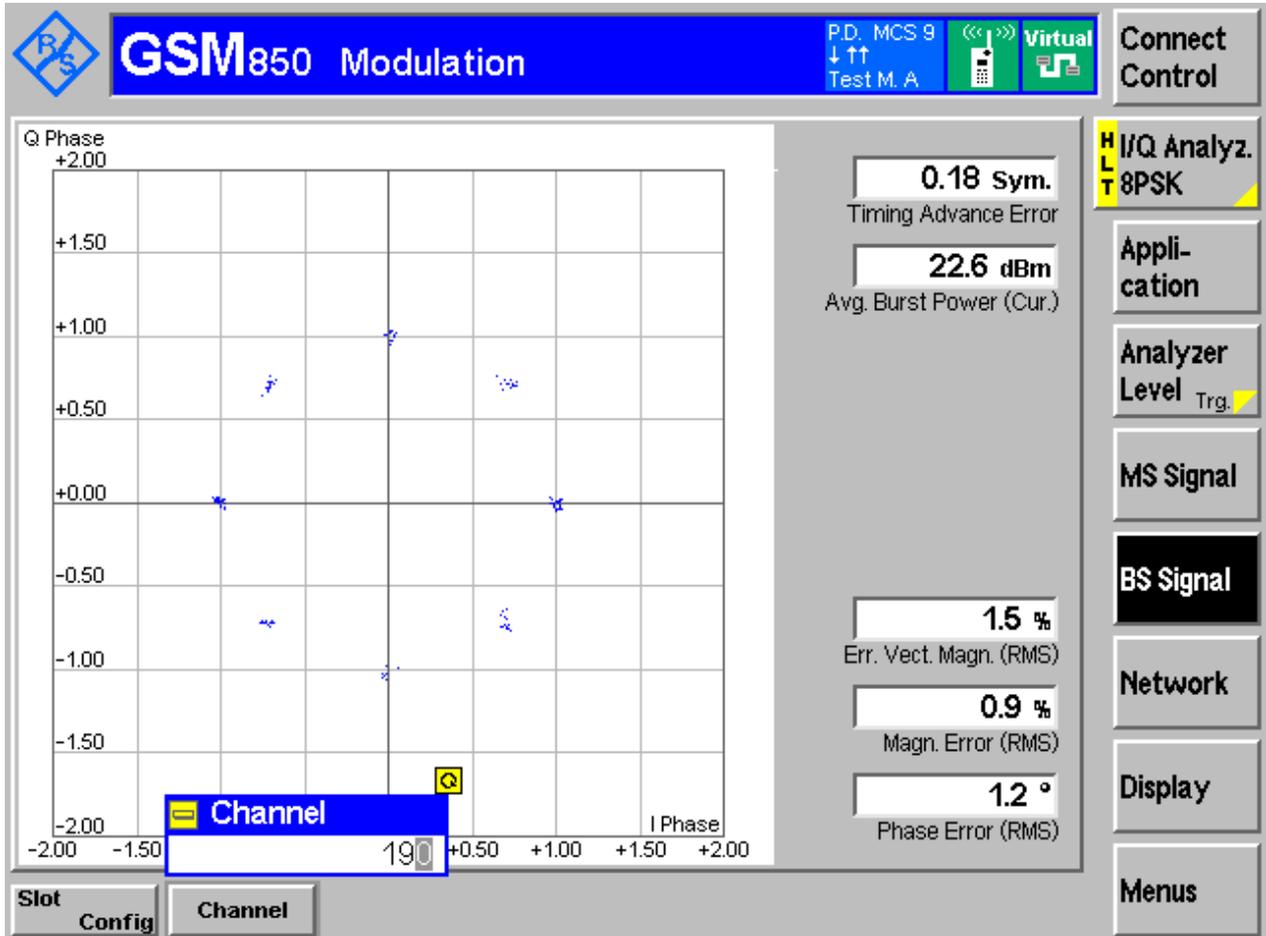
3.1.1.1 Test Mode = GSM/TM1

3.1.1.1.1 Test Channel = MCH



3.1.1.2 Test Mode = GSM/TM2

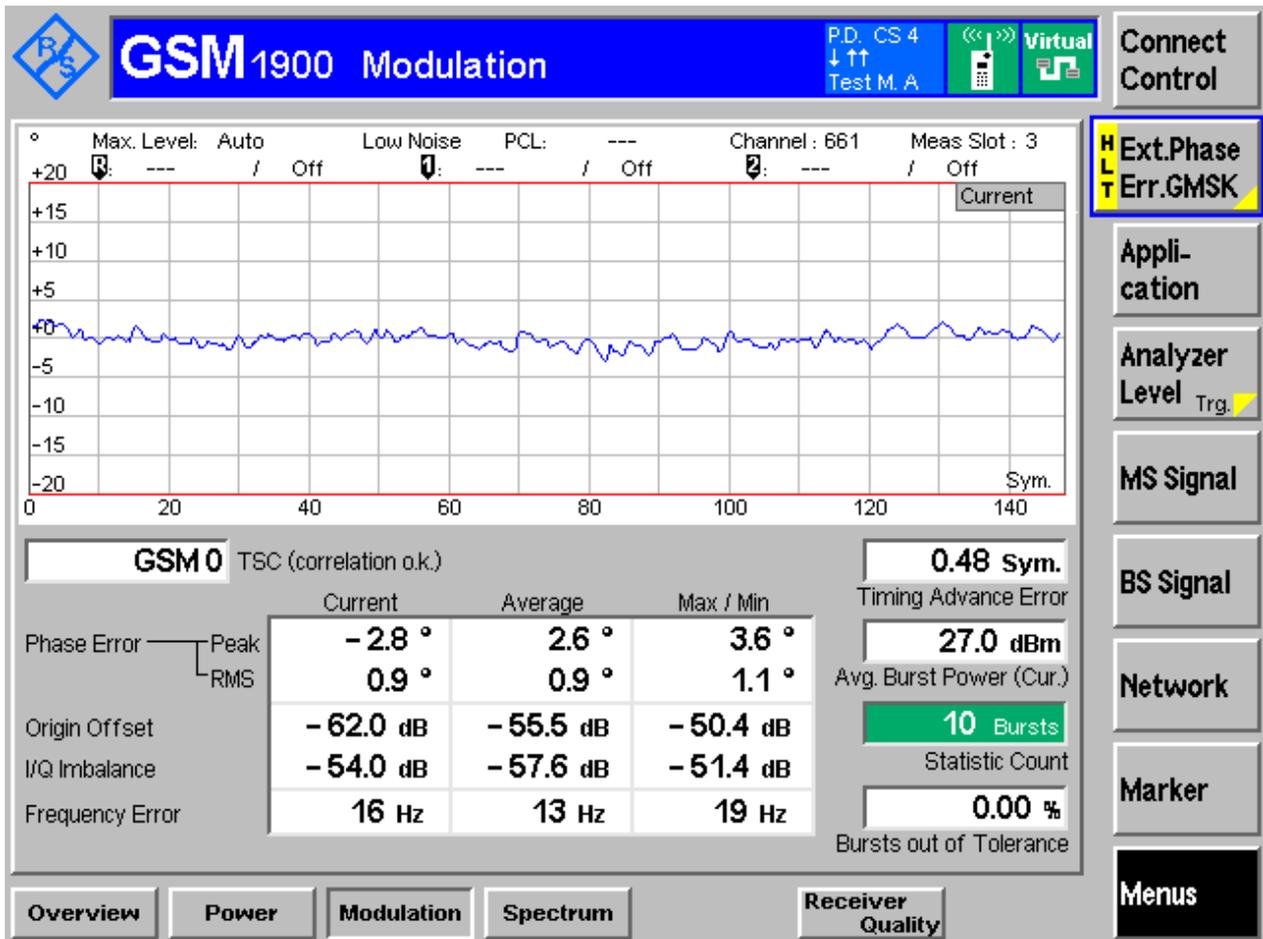
3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

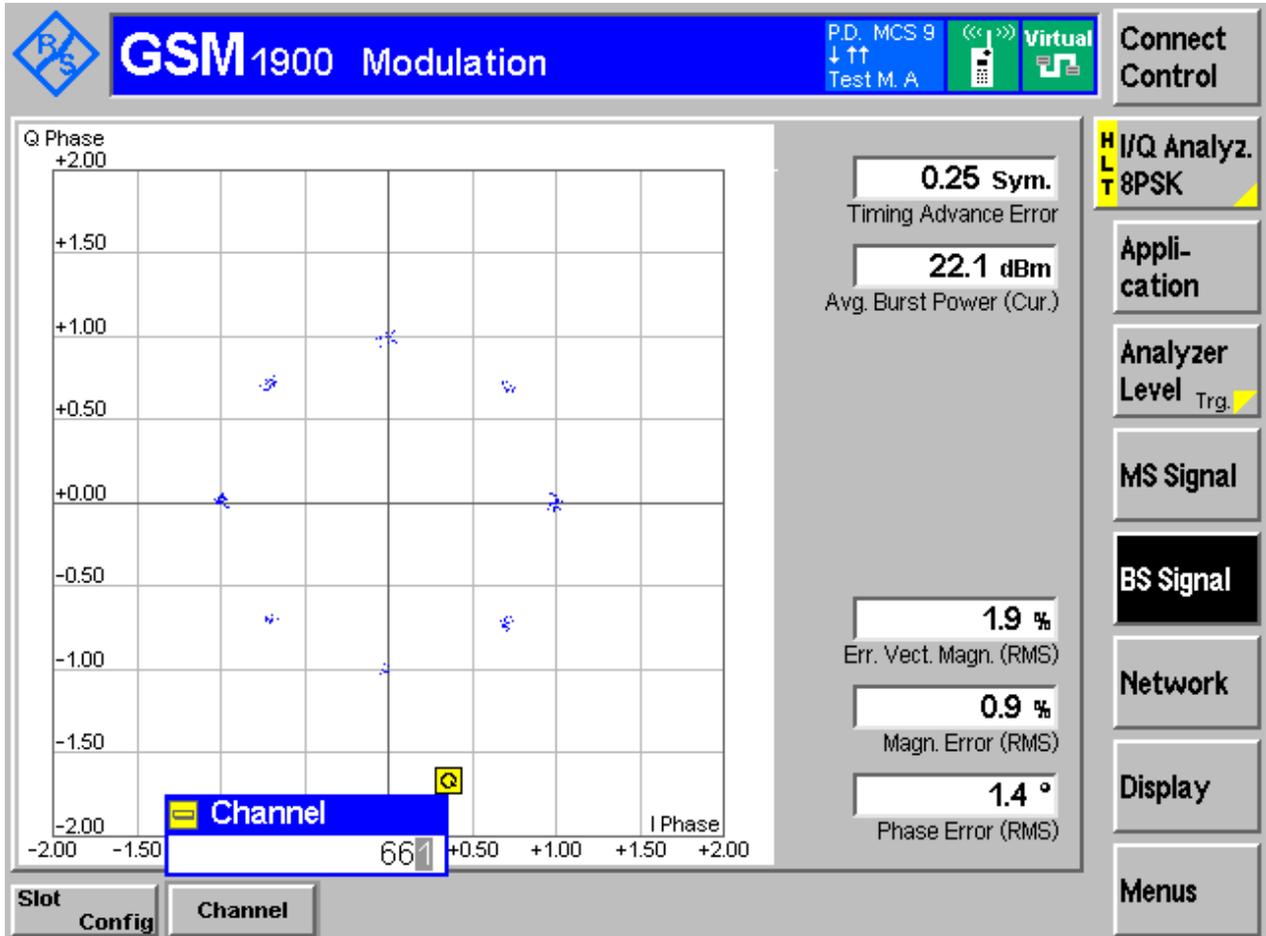
3.1.2.1 Test Mode = GSM/TM1

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	247.66	323.06	Pass
		MCH	244.42	319.57	Pass
		HCH	244.60	316.55	Pass
	GSM/TM2	LCH	247.30	319.47	Pass
		MCH	245.90	319.11	Pass
		HCH	253.09	319.69	Pass
GSM1900	GSM/TM1	LCH	248.37	320.49	Pass
		MCH	247.15	316.73	Pass
		HCH	245.66	313.09	Pass
	GSM/TM2	LCH	249.63	316.28	Pass
		MCH	245.28	321.02	Pass
		HCH	245.78	321.34	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

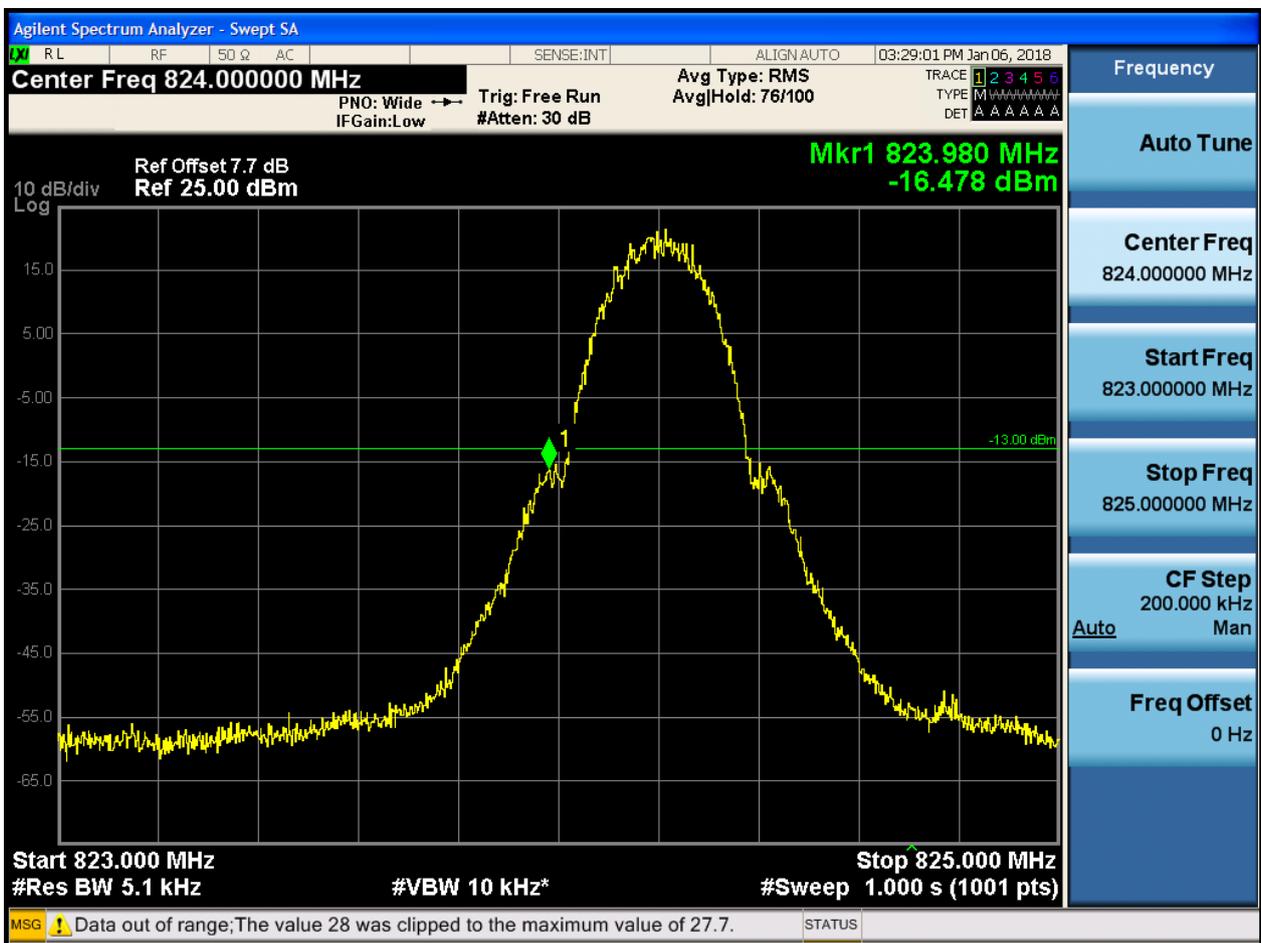
Part I - Test Plots

5.1 For GSM

5.1.1 Test Band = GSM850

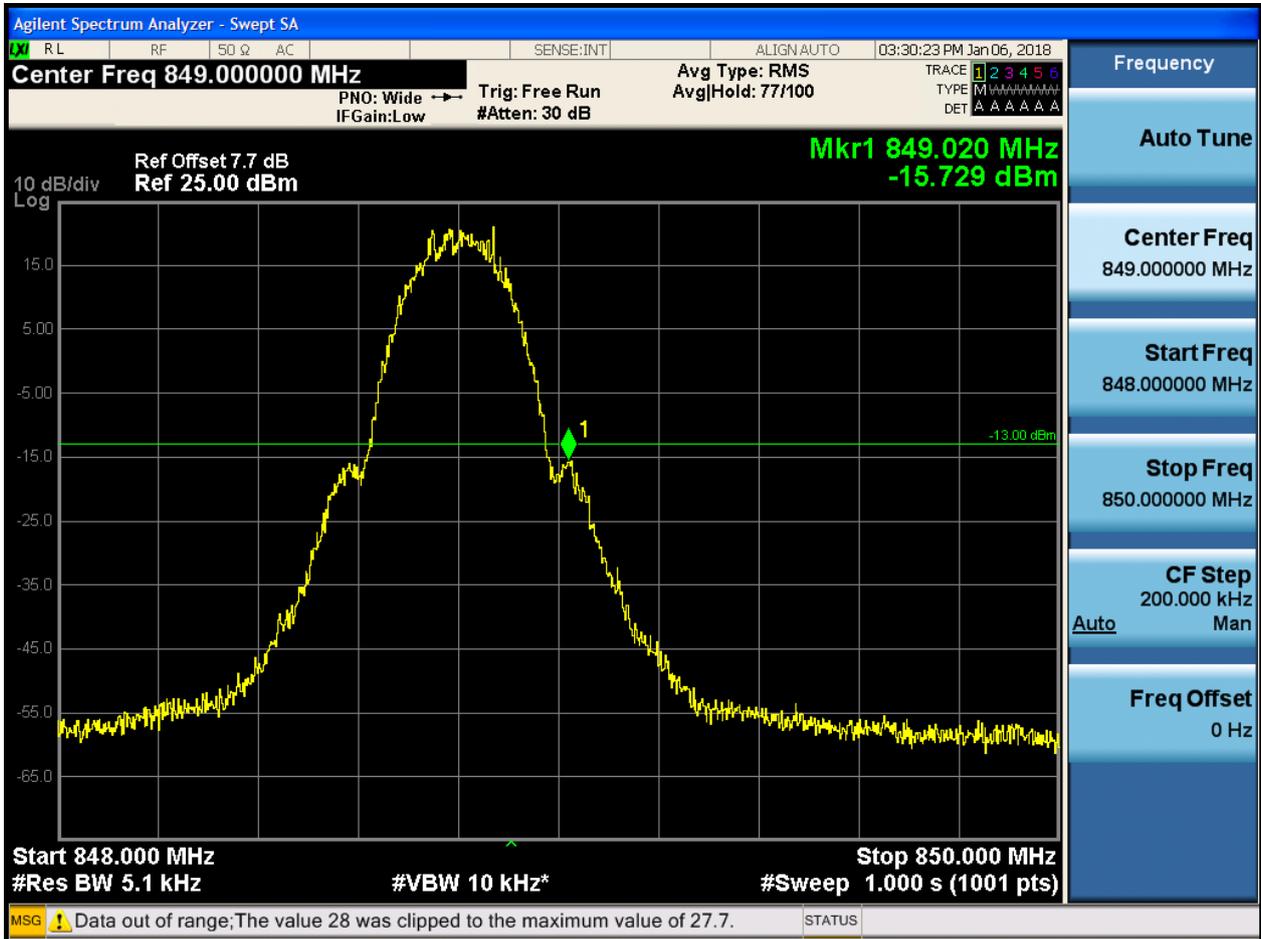
5.1.1.1 Test Mode = GSM/TM1

5.1.1.1.1 Test Channel = LCH





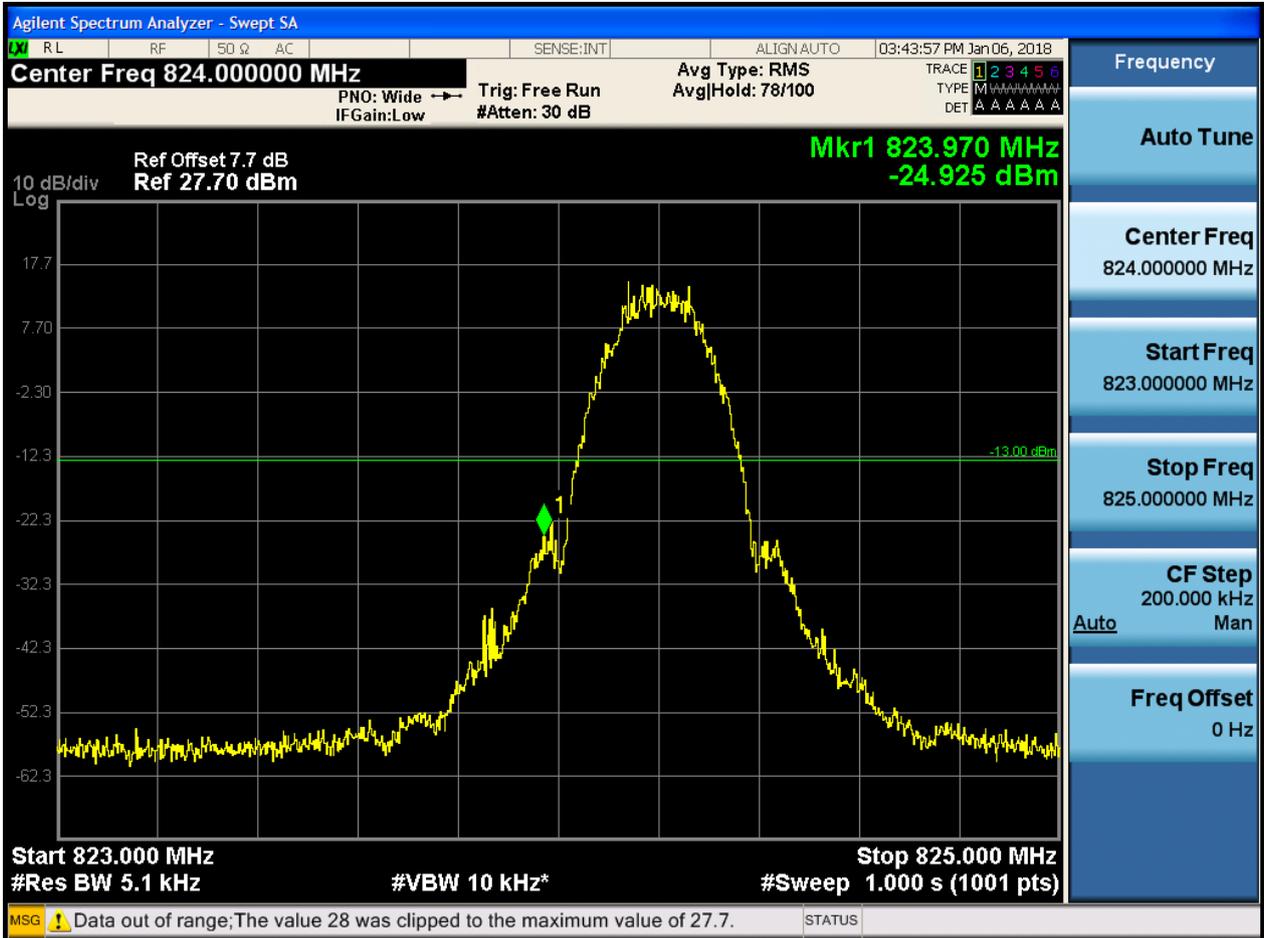
5.1.1.1.2 Test Channel = HCH



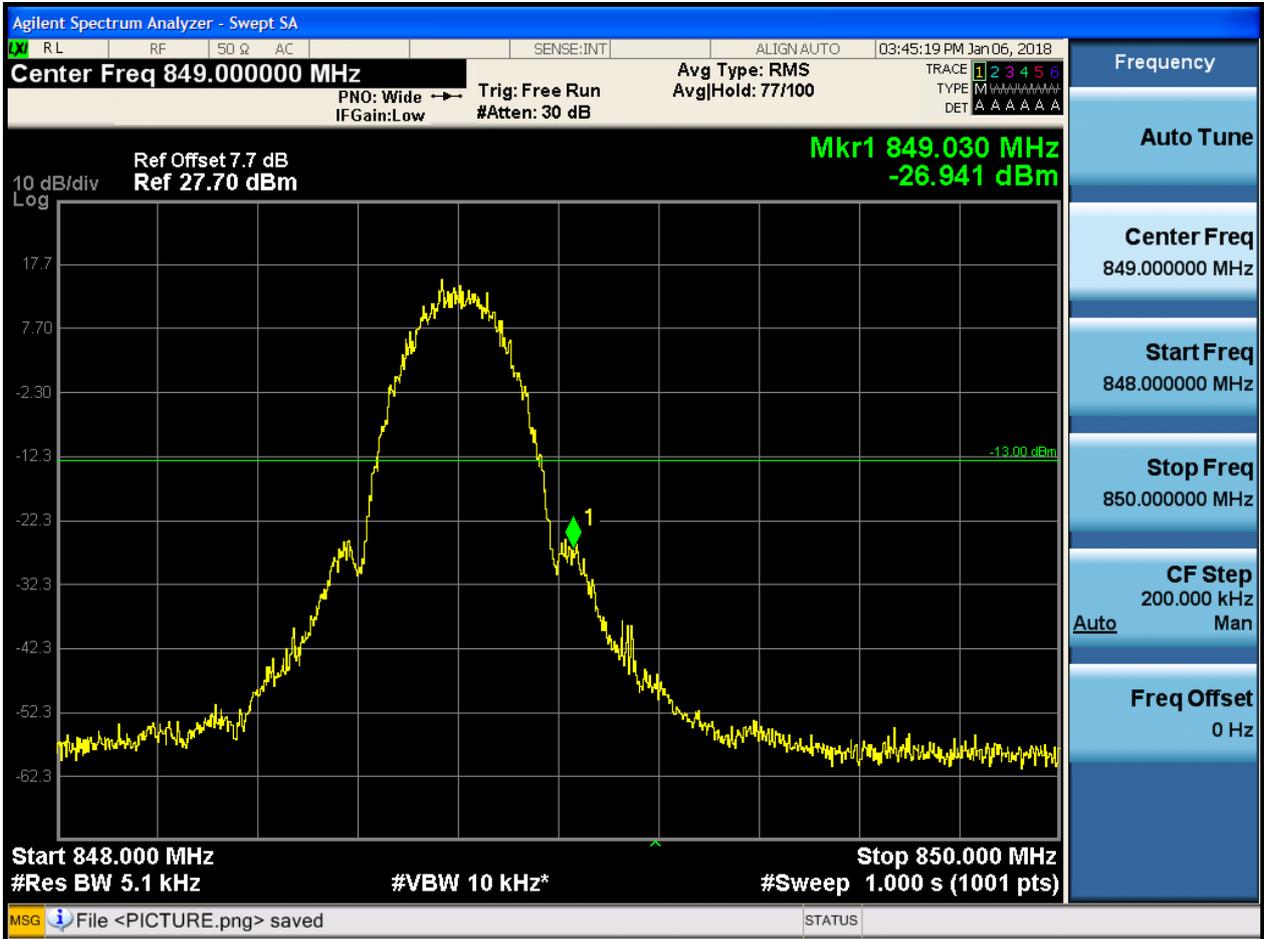


5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH



5.1.1.2.2 Test Channel = HCH

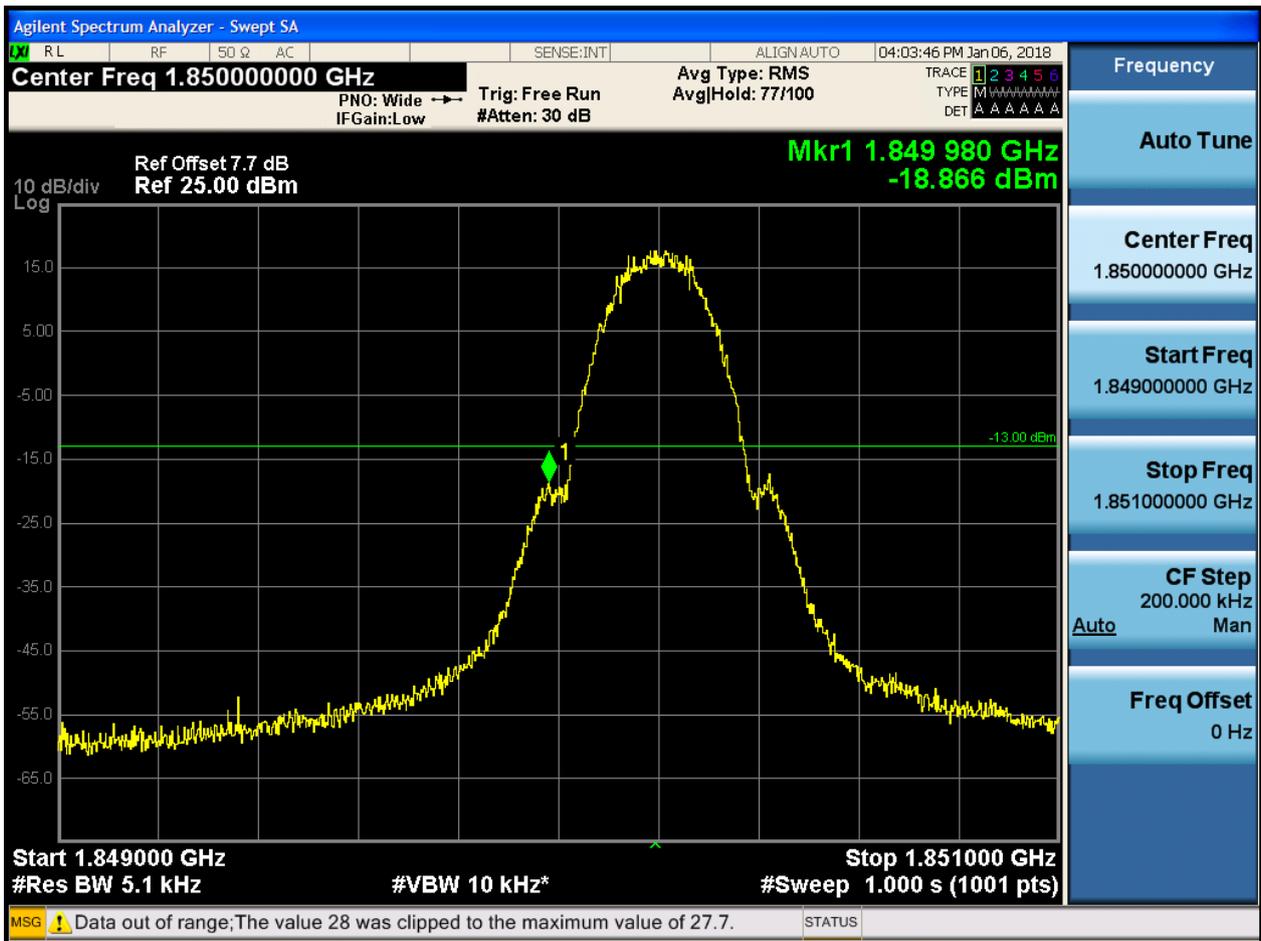




5.1.2 Test Band = GSM1900

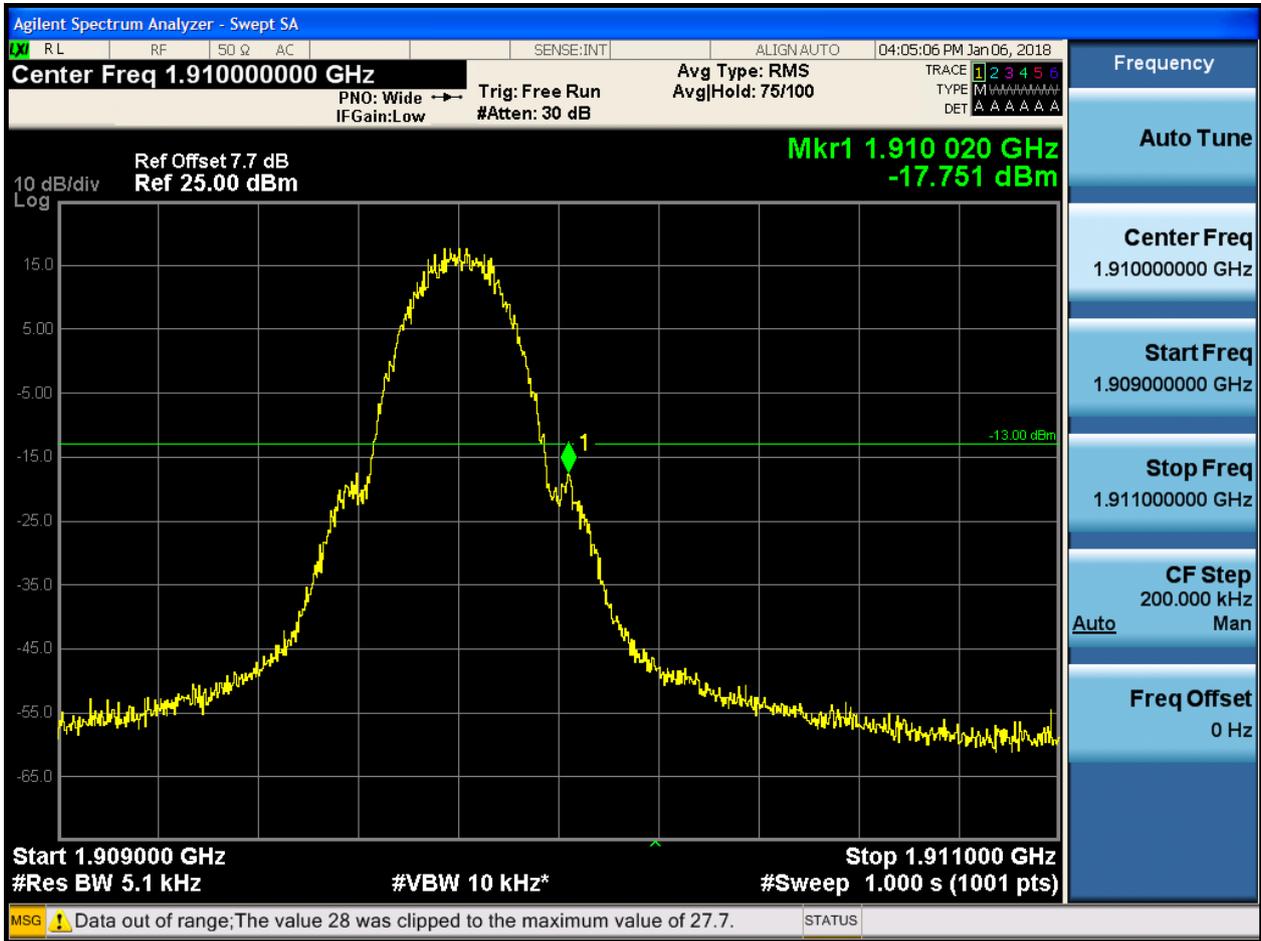
5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH





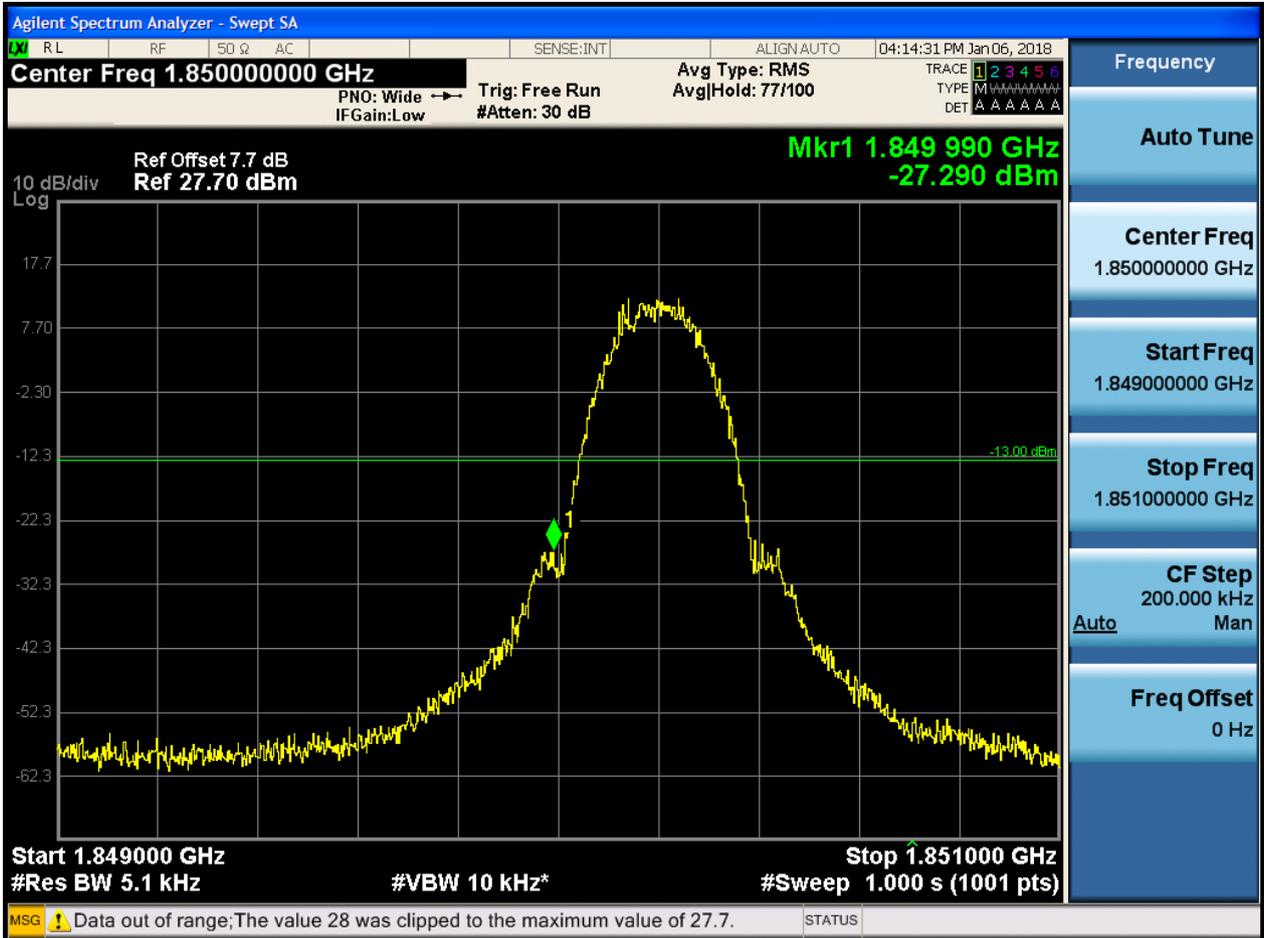
5.1.2.1.2 Test Channel = HCH





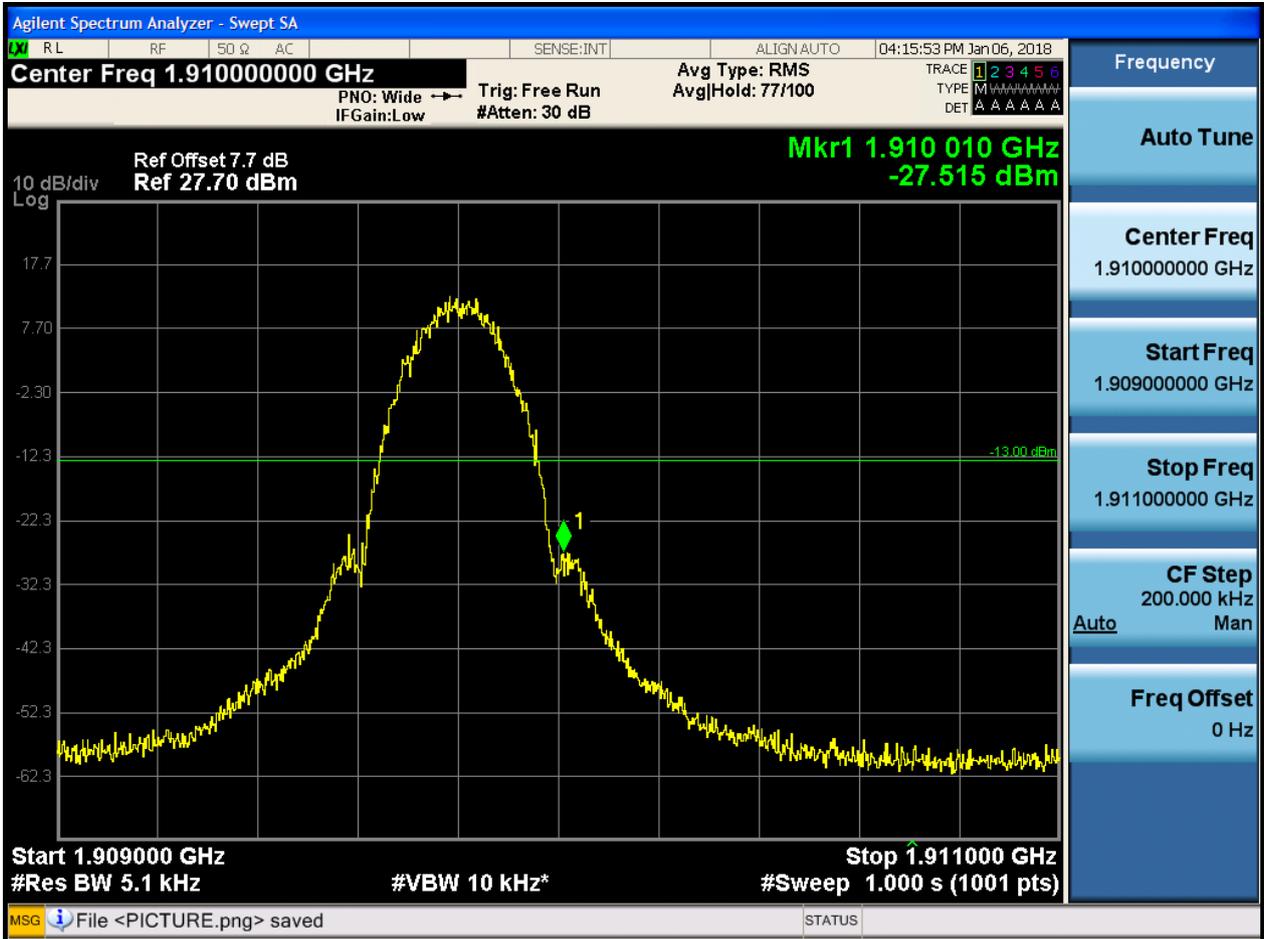
5.1.2.2 Test Mode = GSM/TM2

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

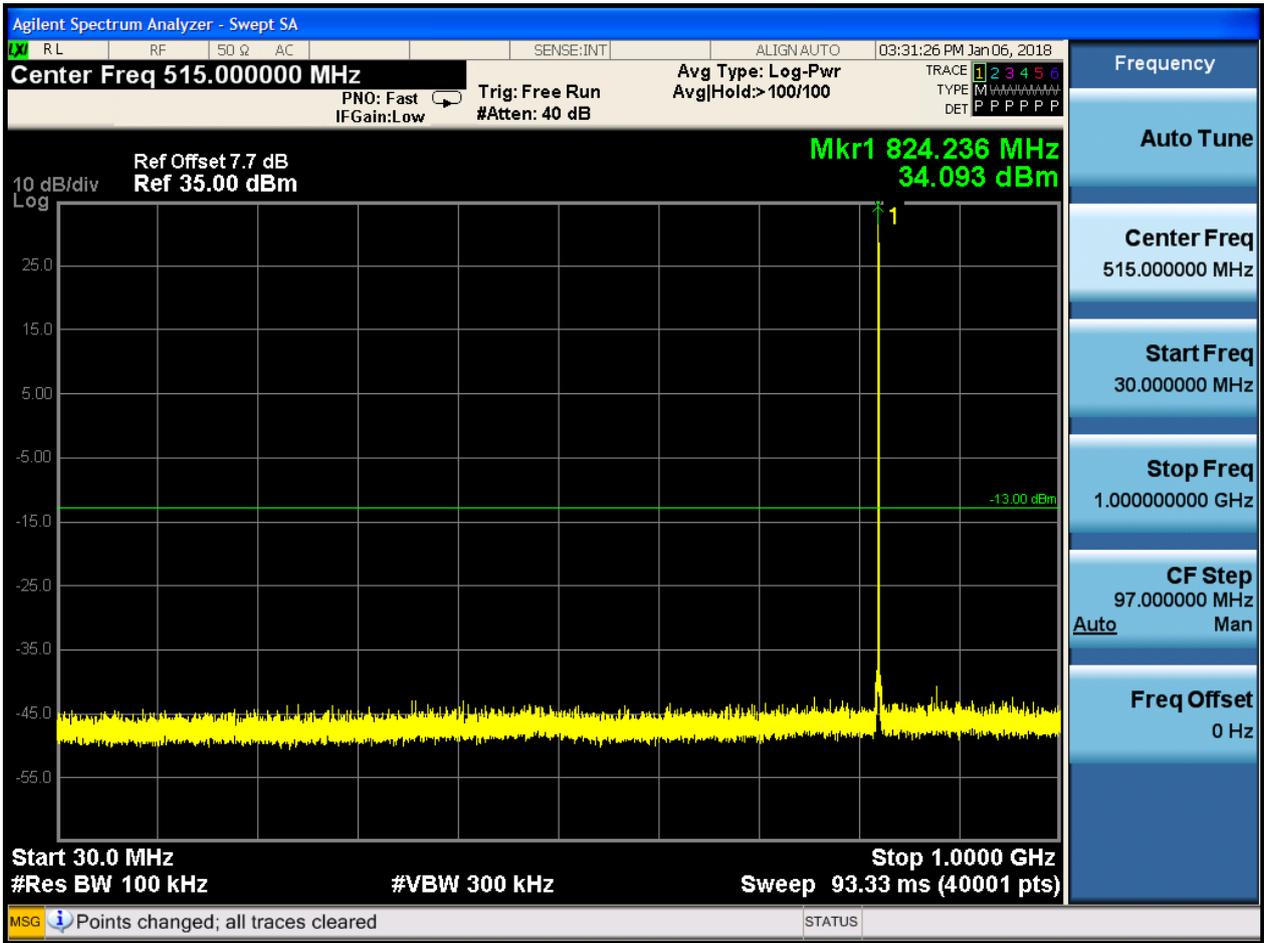
6.1 For GSM

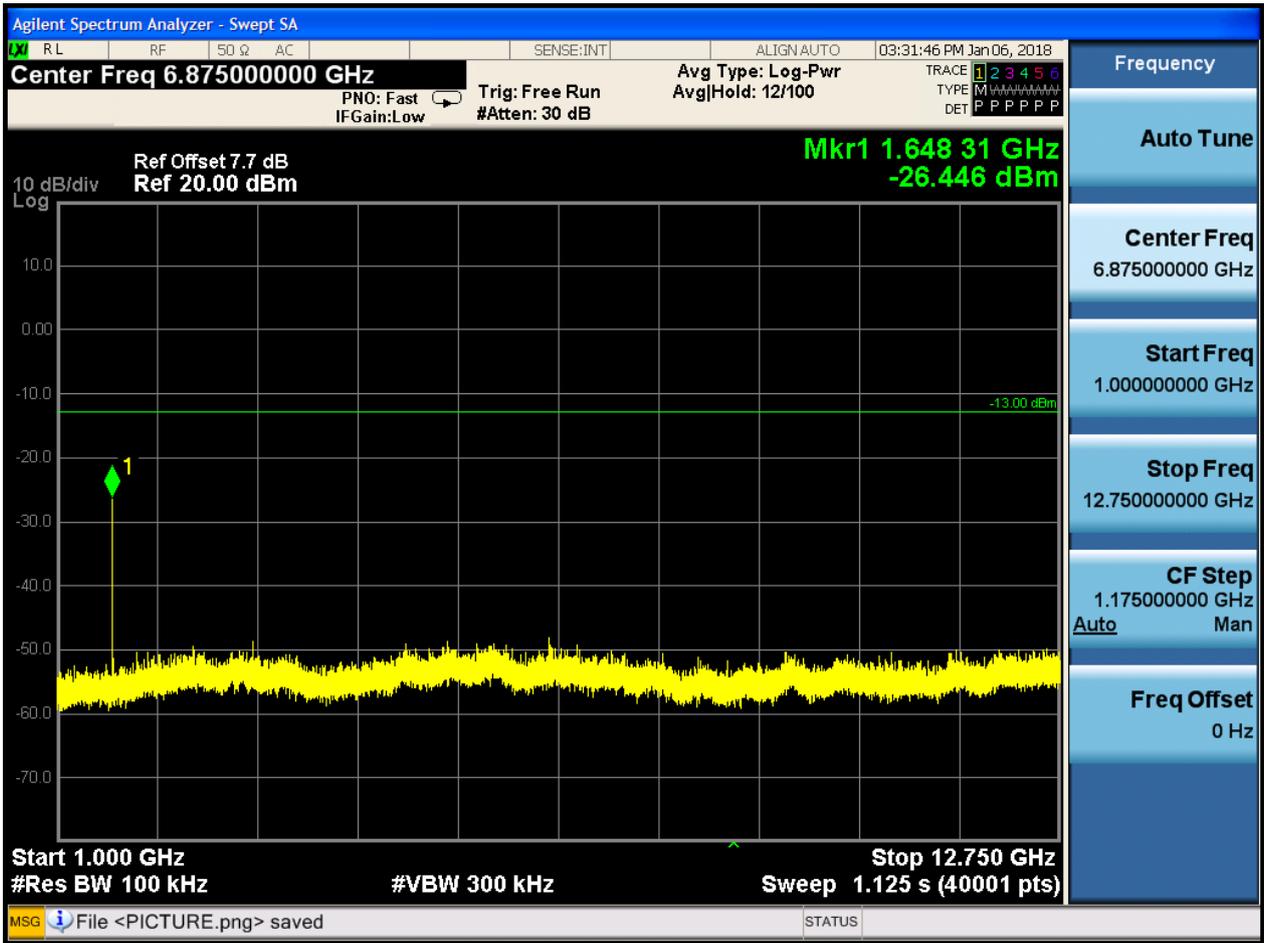
6.1.1 Test Band = GSM850

6.1.1.1 Test Mode = GSM/TM1

6.1.1.1.1 Test Channel = LCH



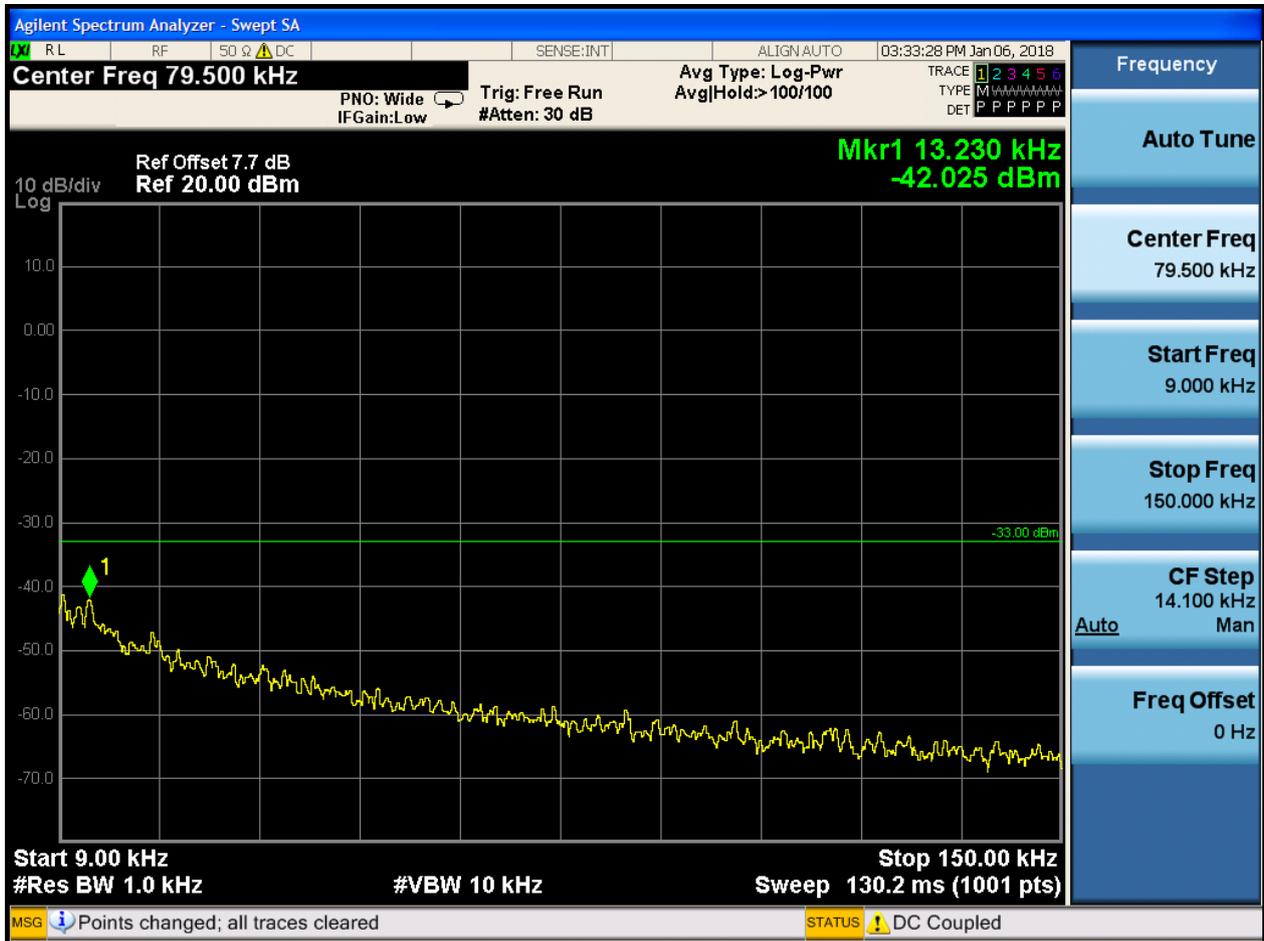


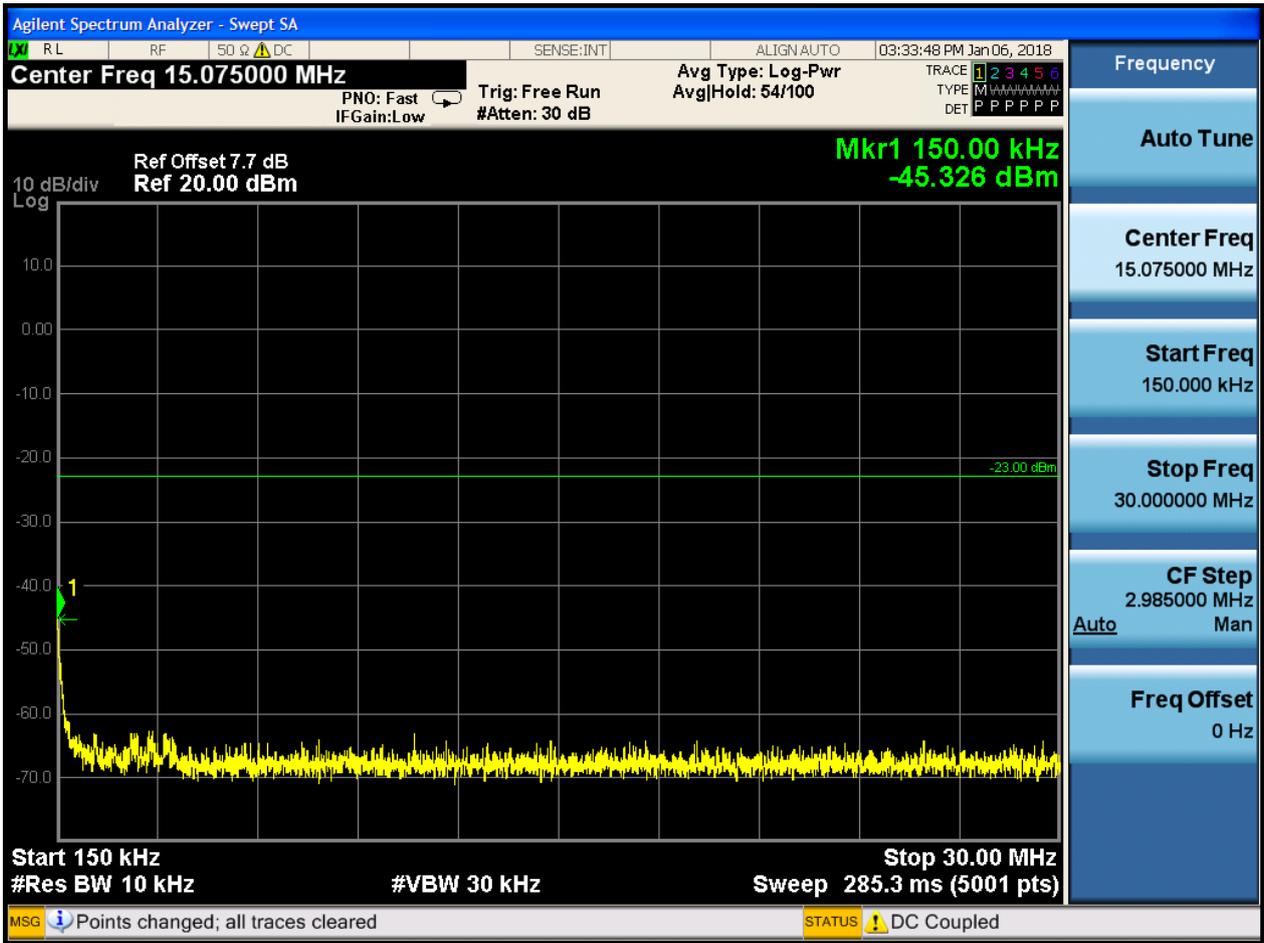


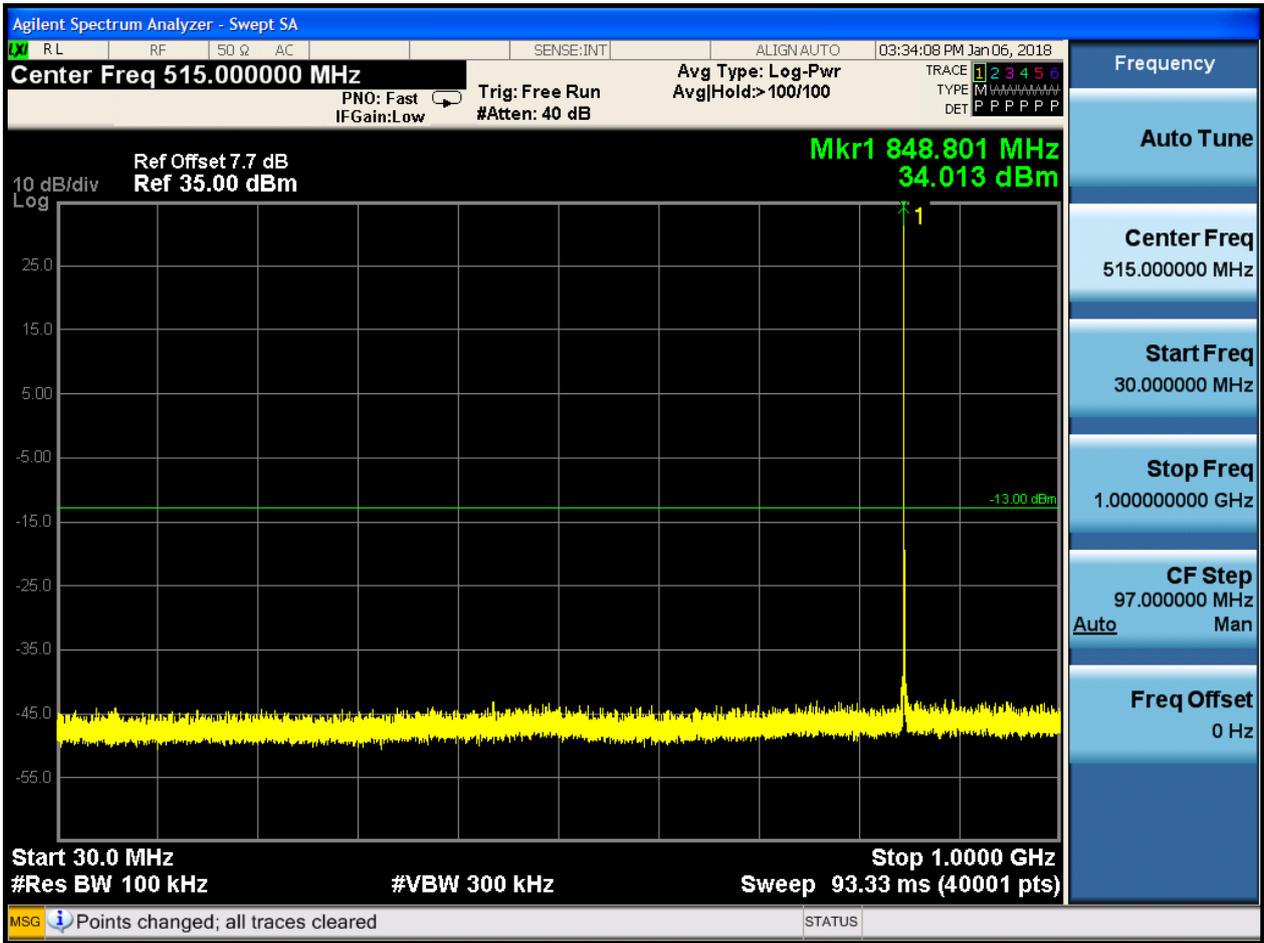
6.1.1.1.2 Test Channel = MCH



6.1.1.1.3 Test Channel = HCH



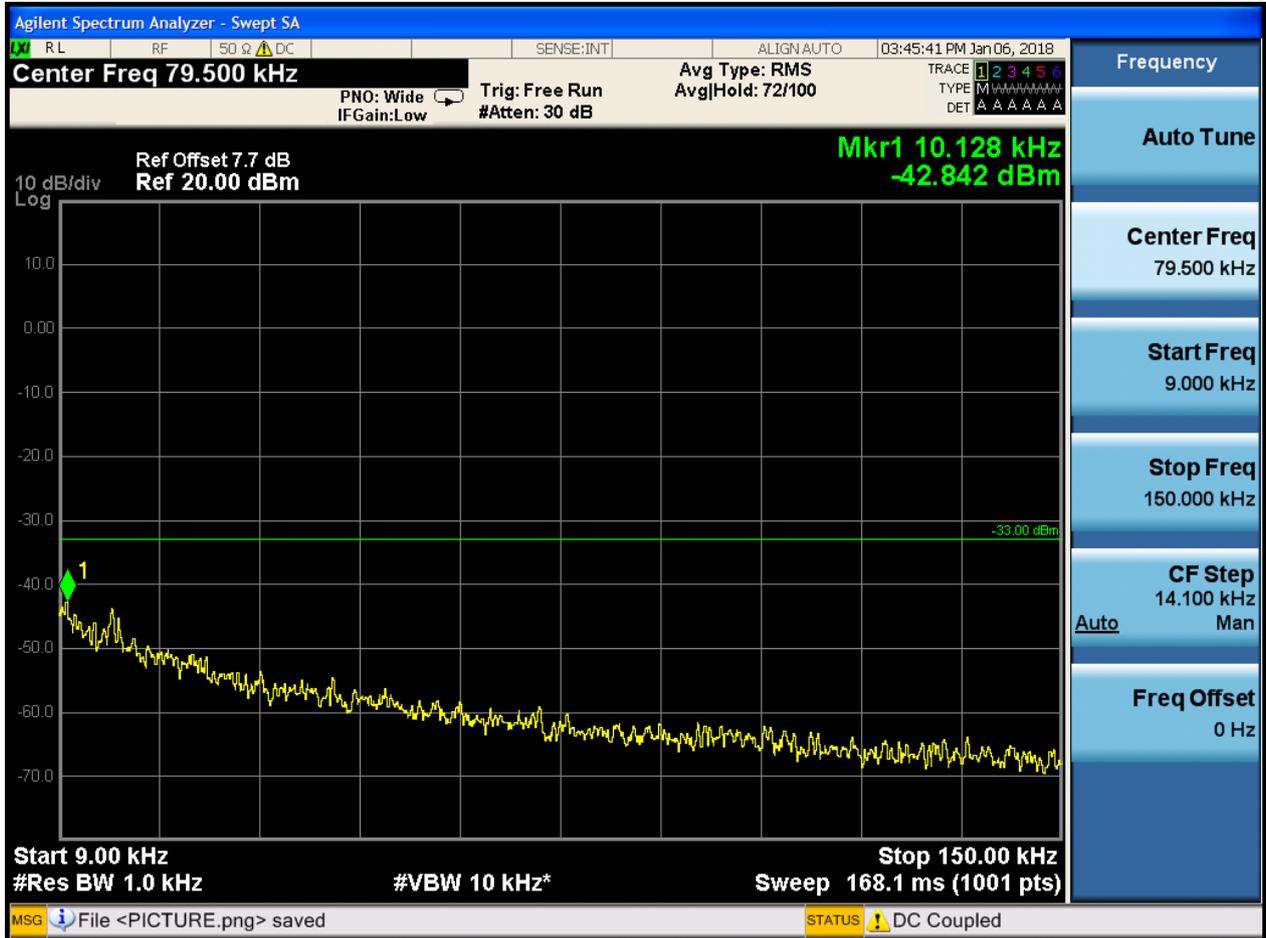


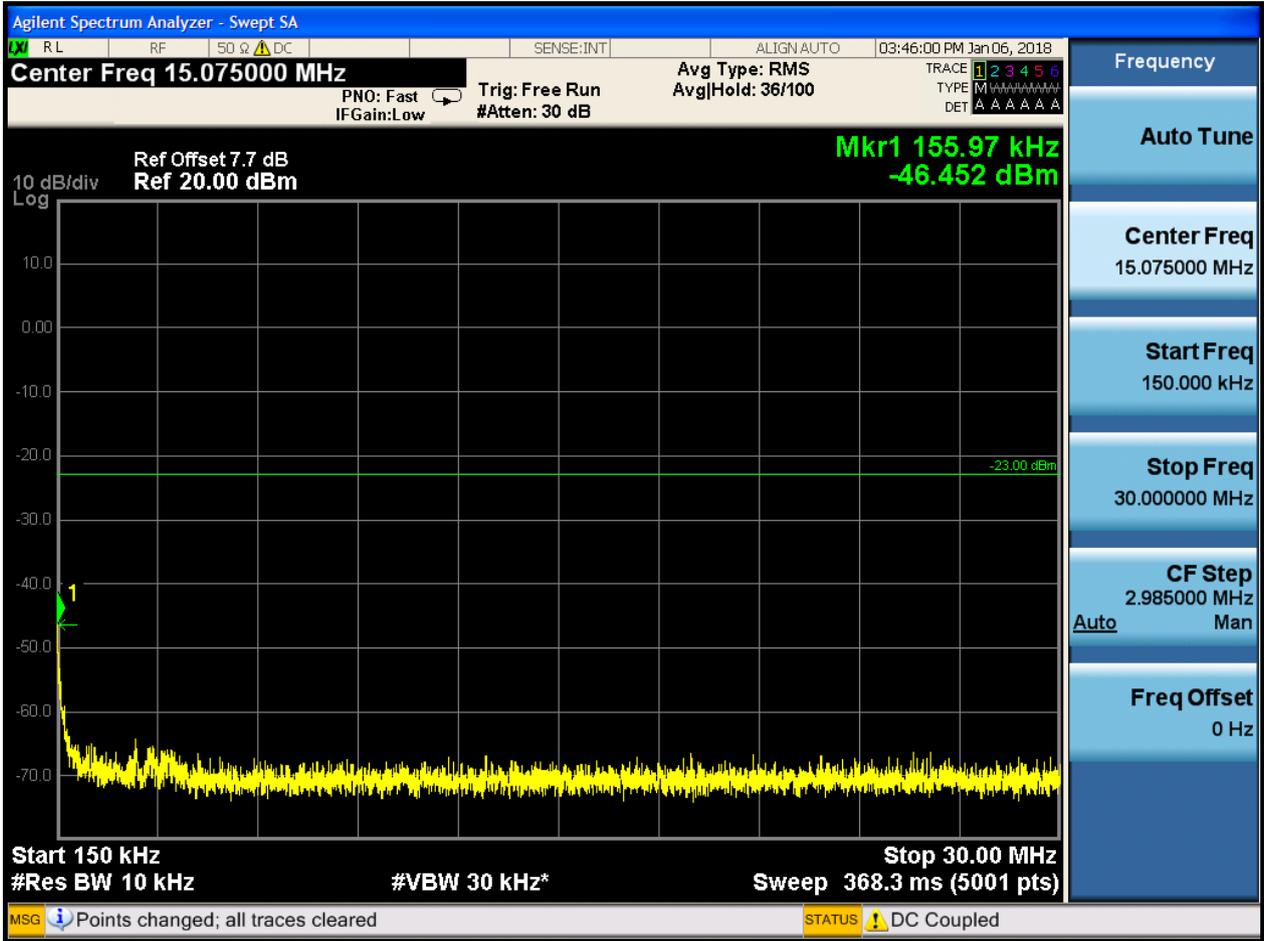


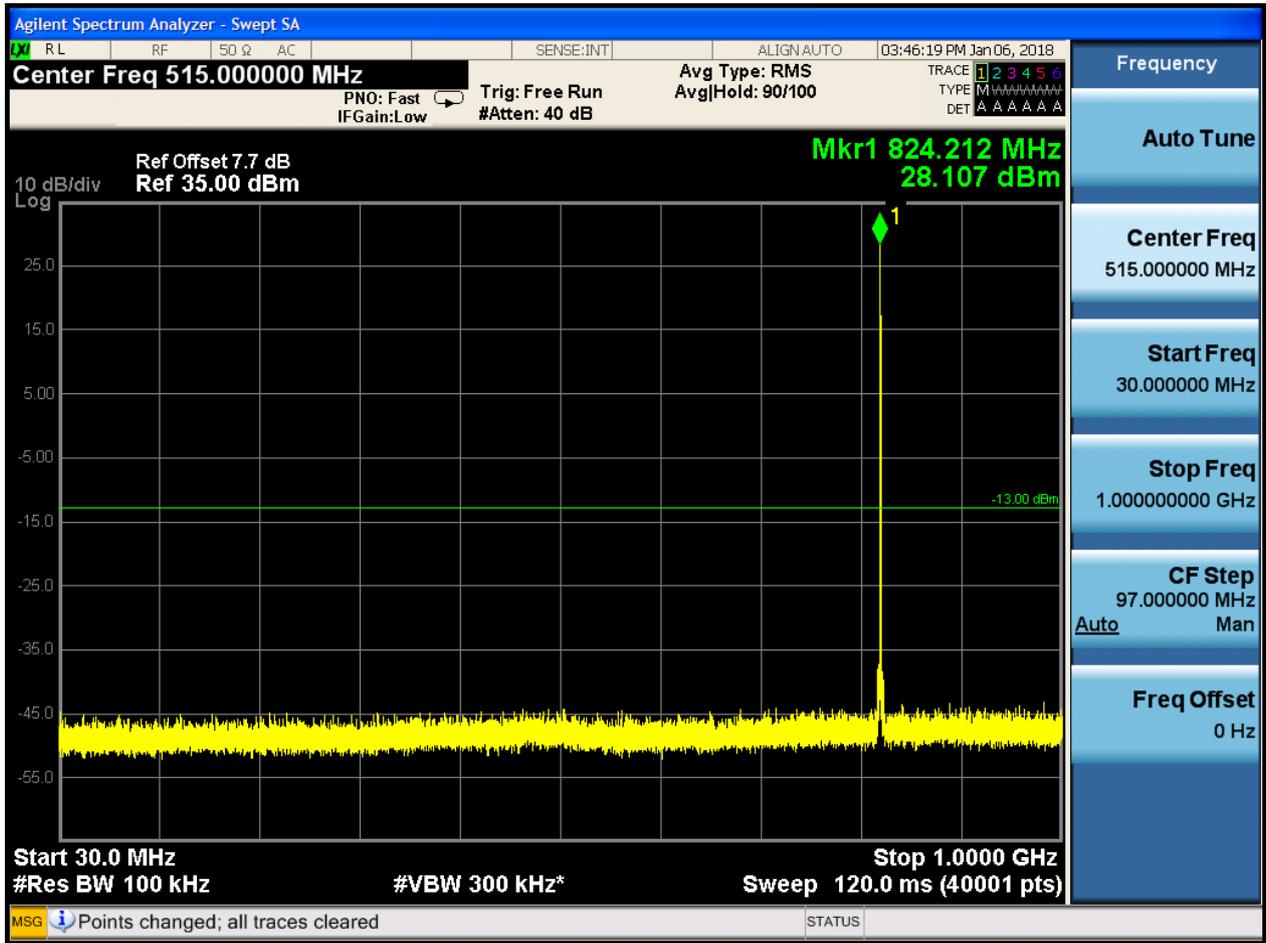


6.1.1.2 Test Mode = GSM/TM2

6.1.1.2.1 Test Channel = LCH

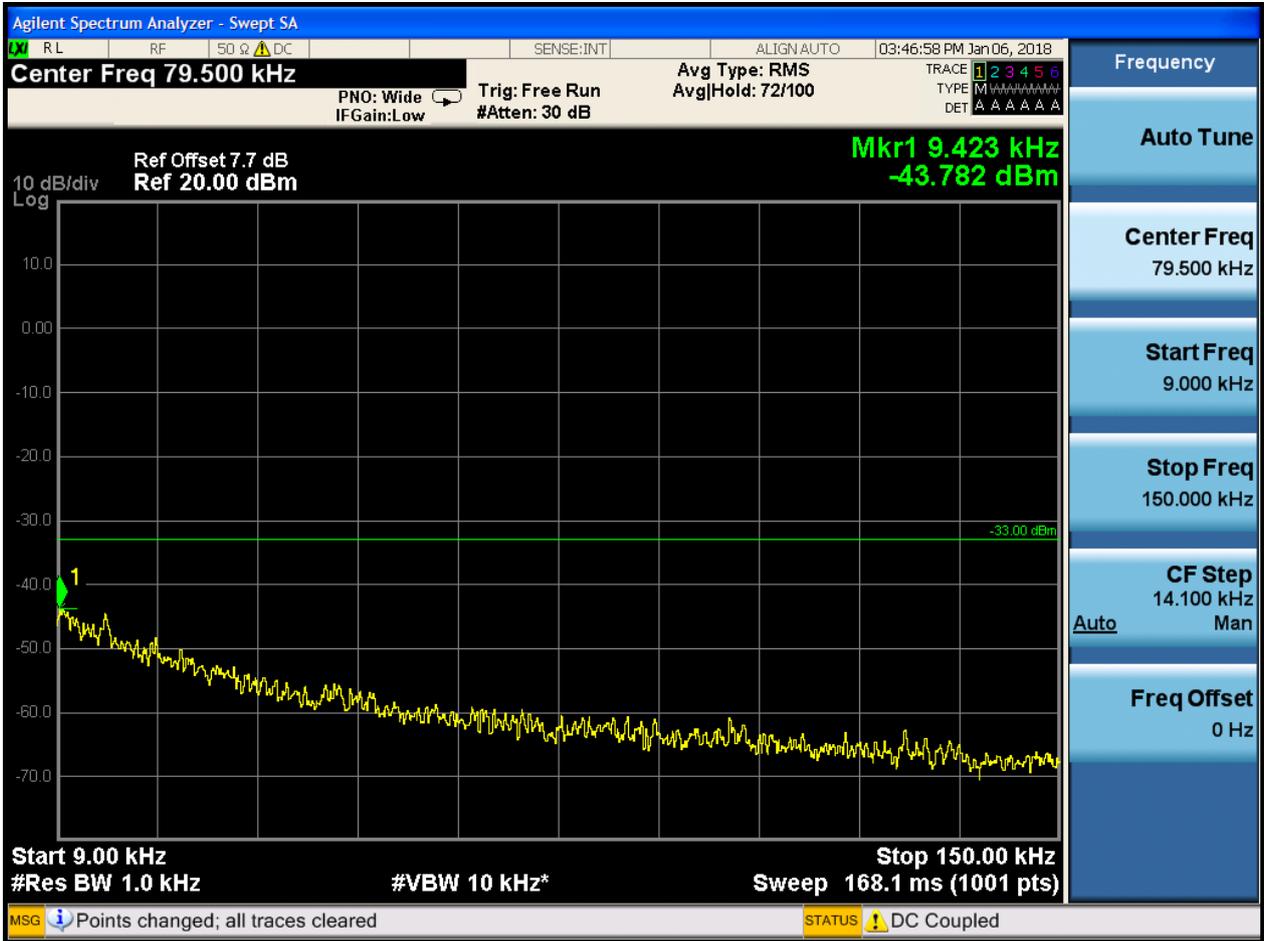


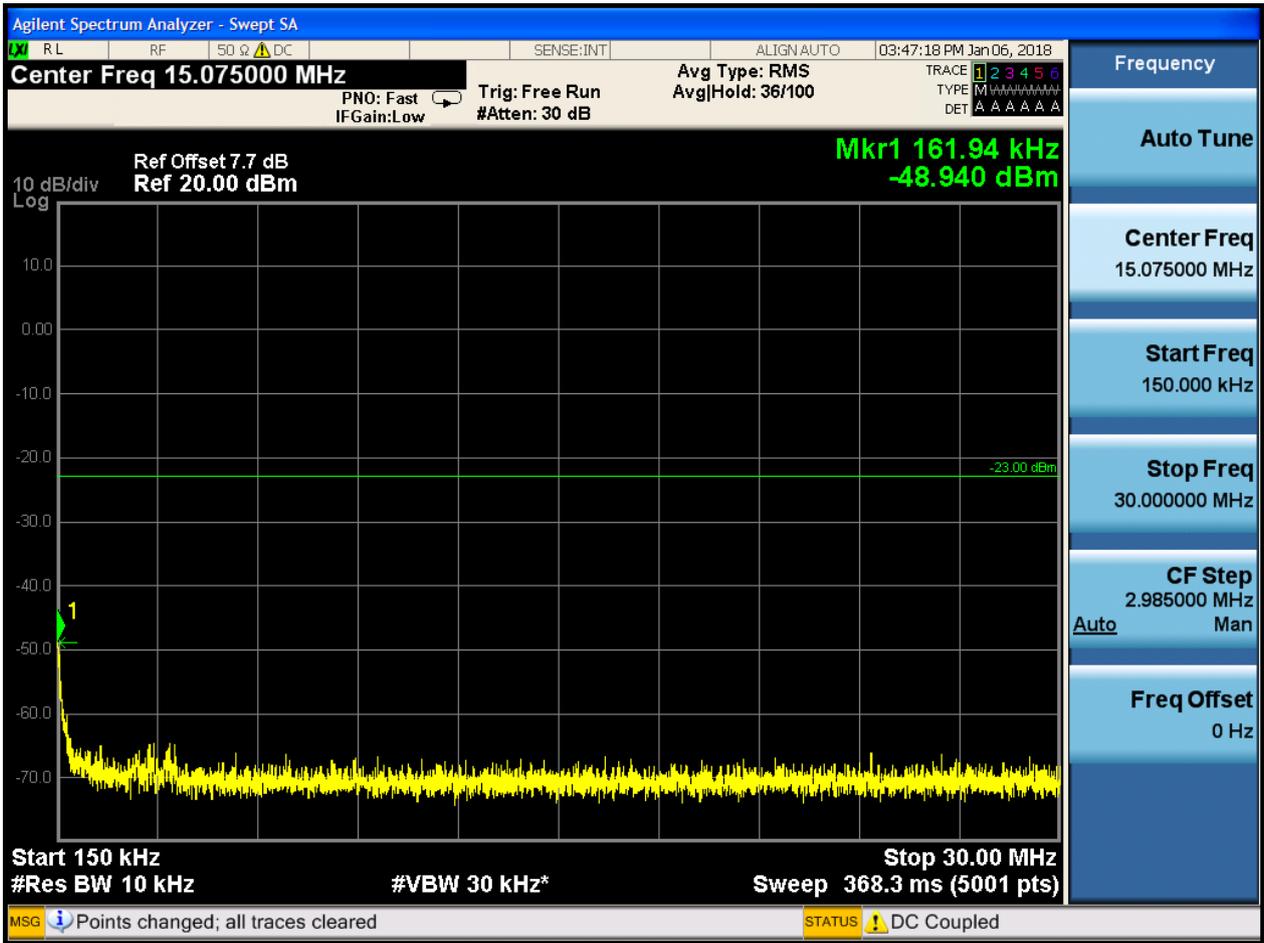


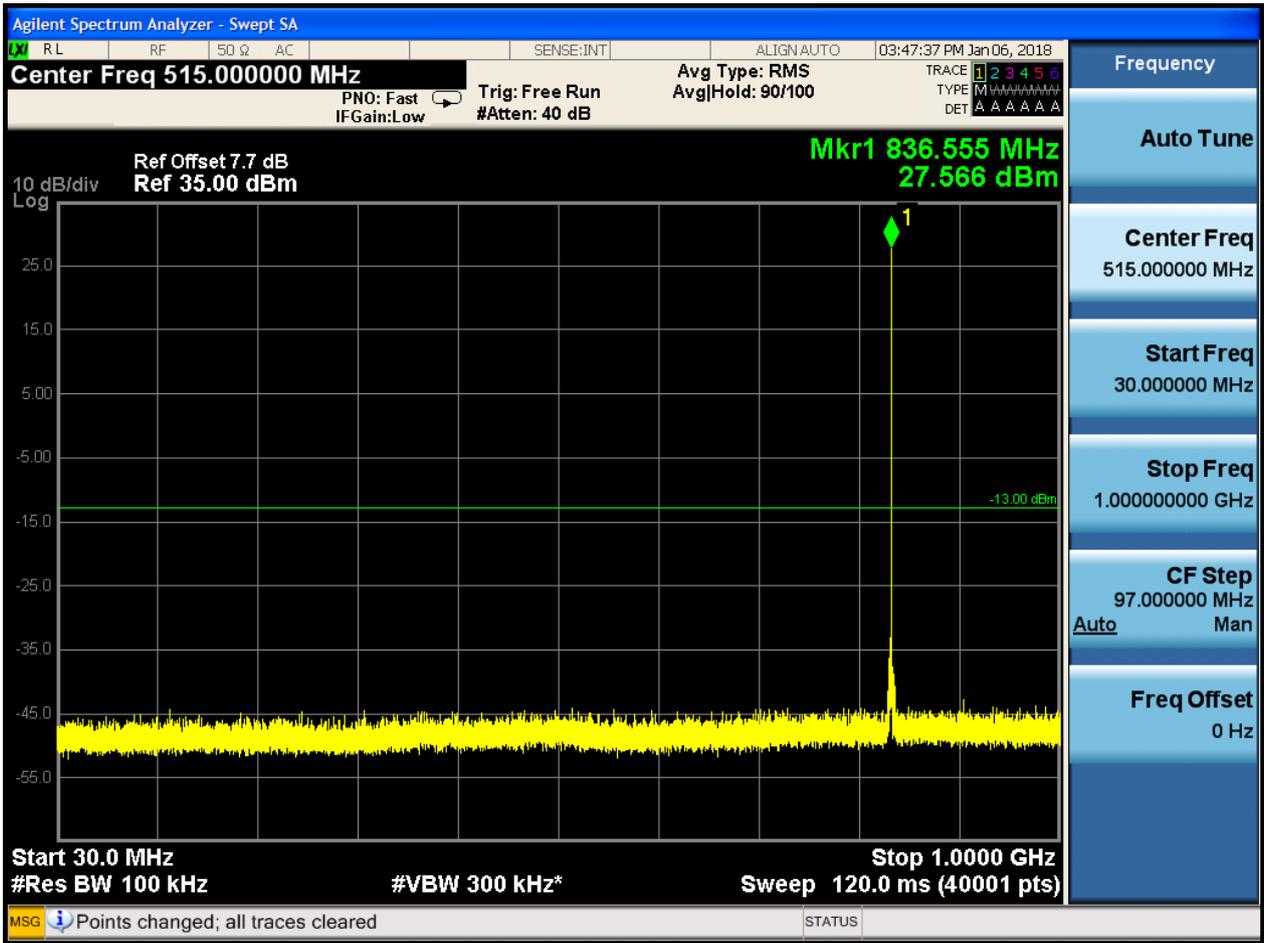


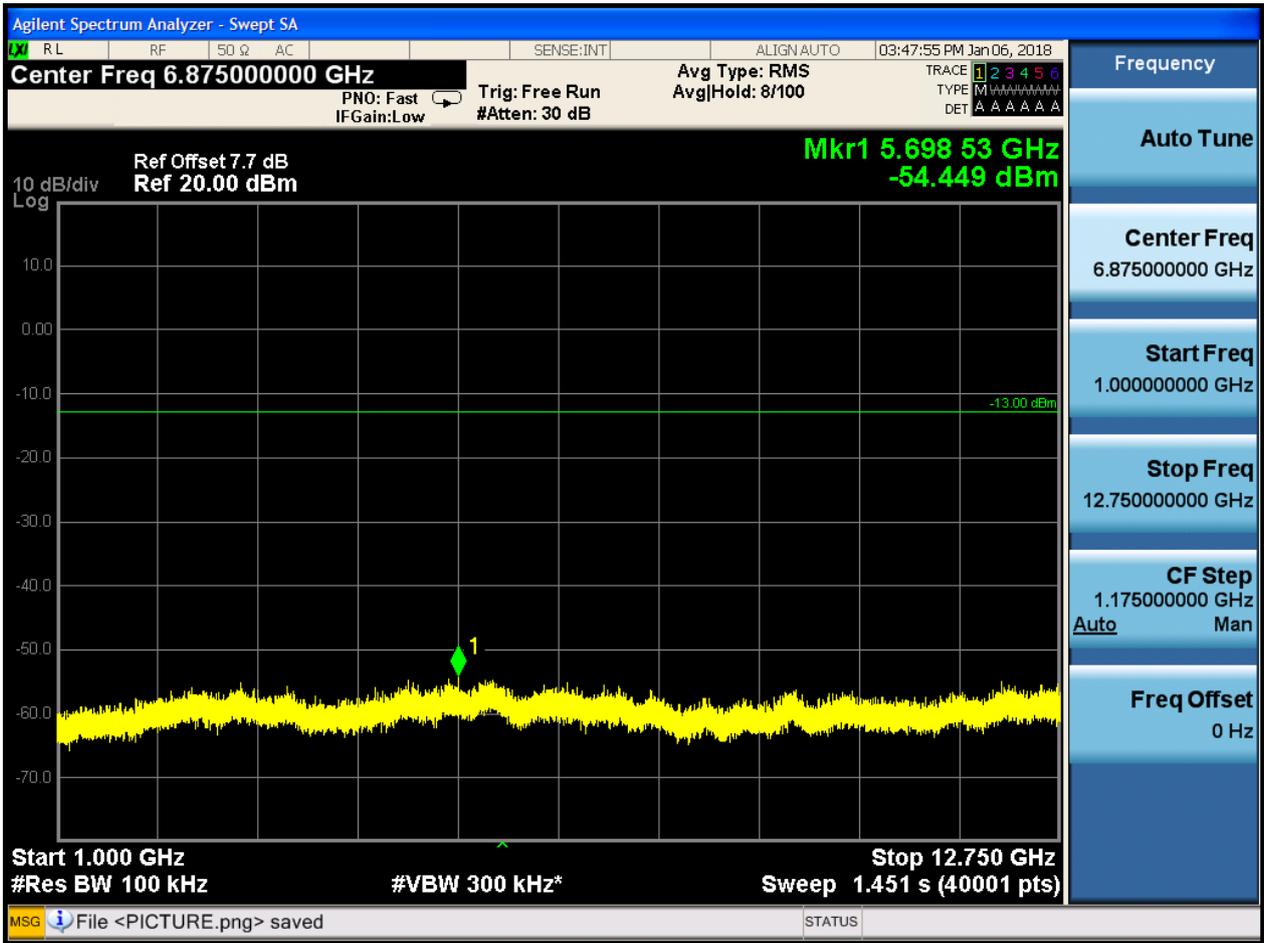


6.1.1.2.2 Test Channel = MCH



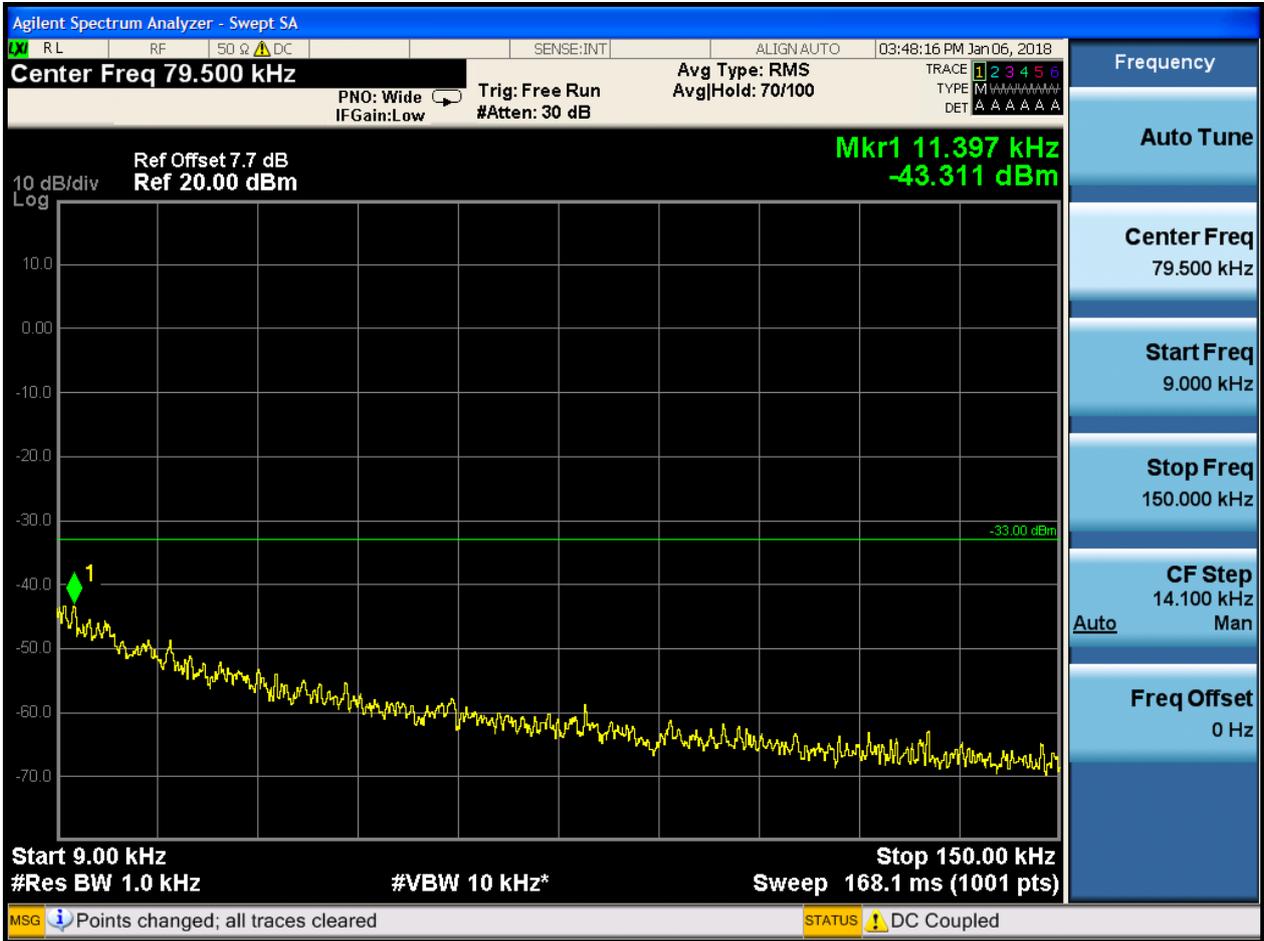


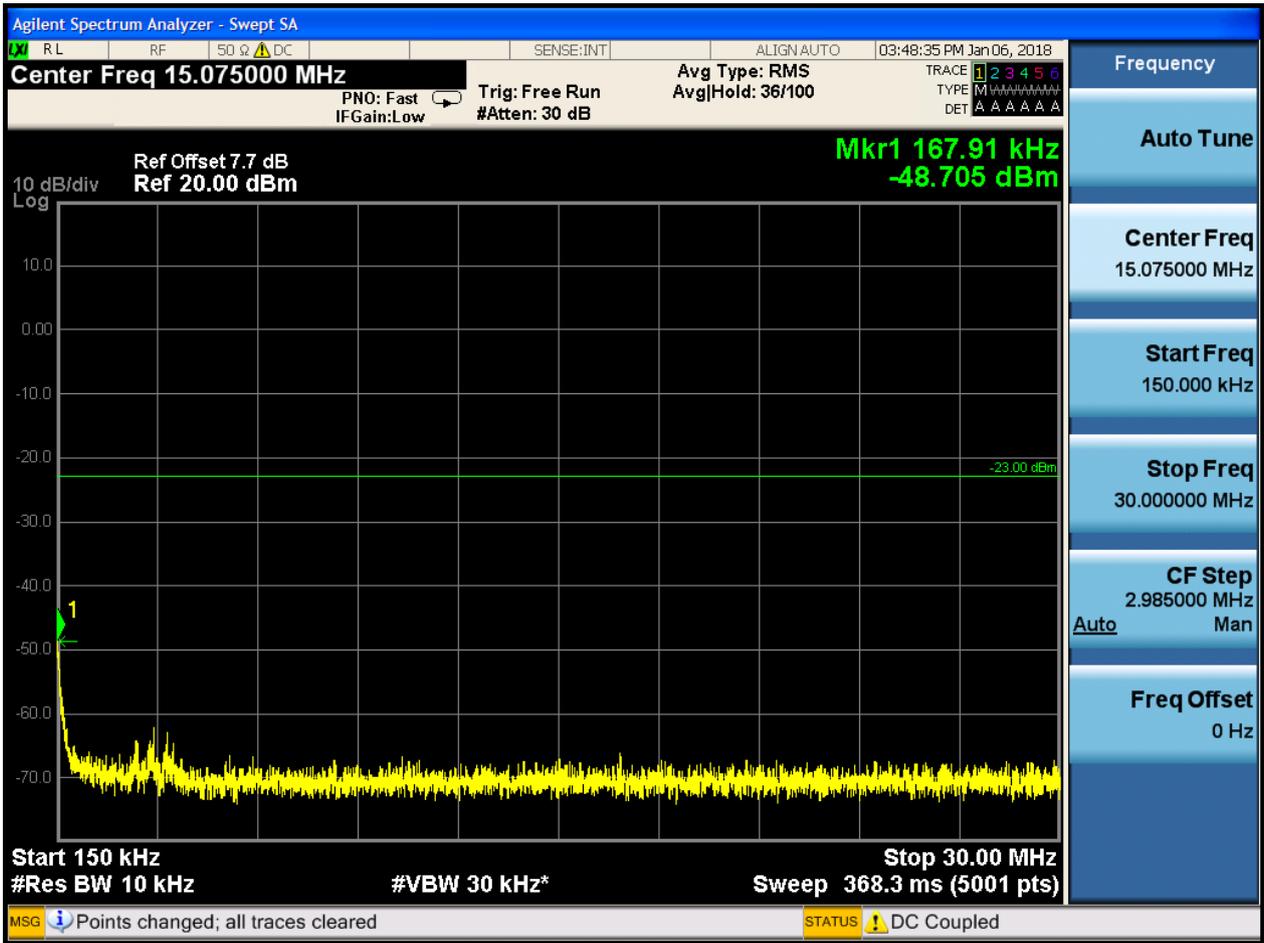


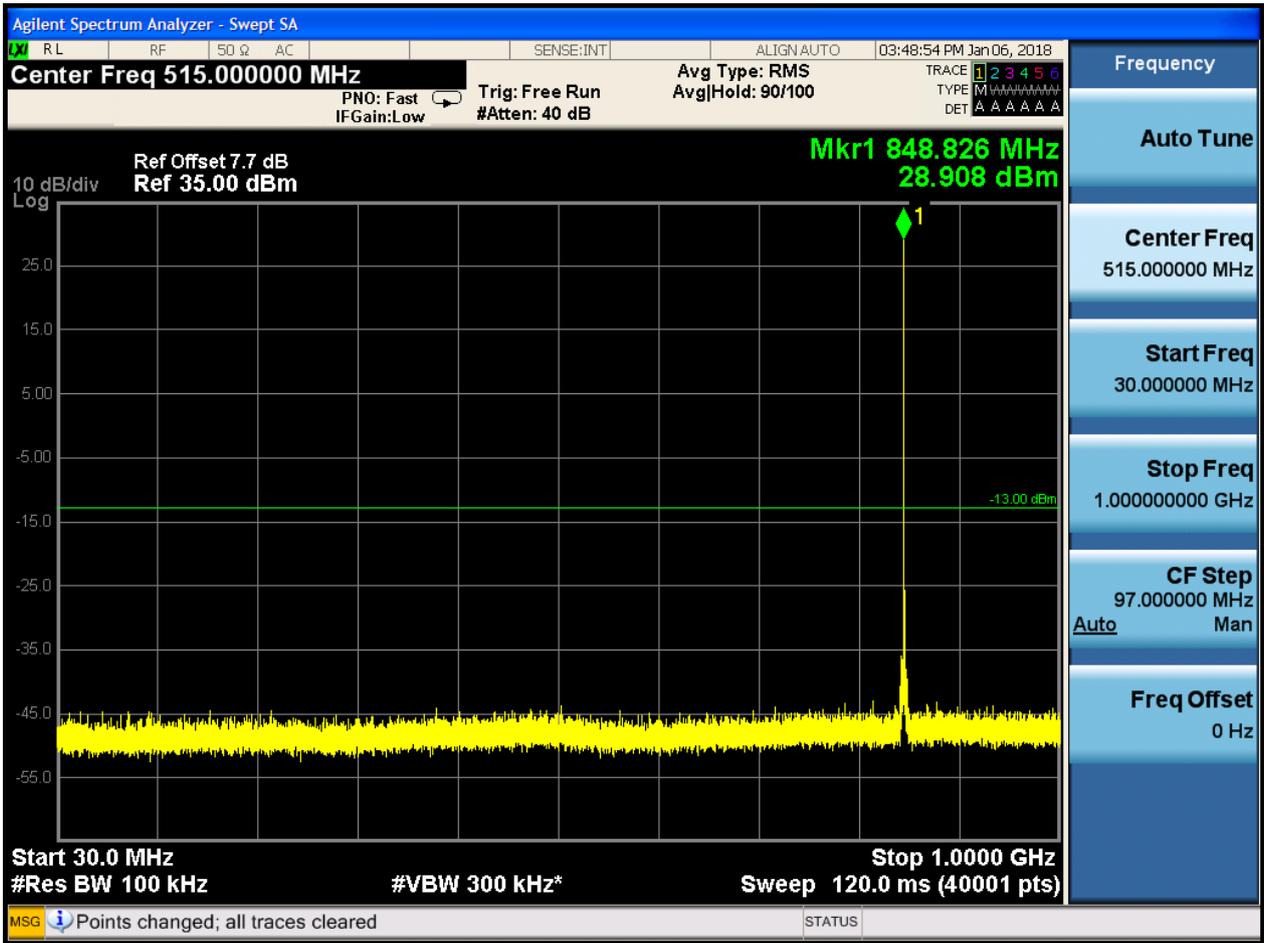


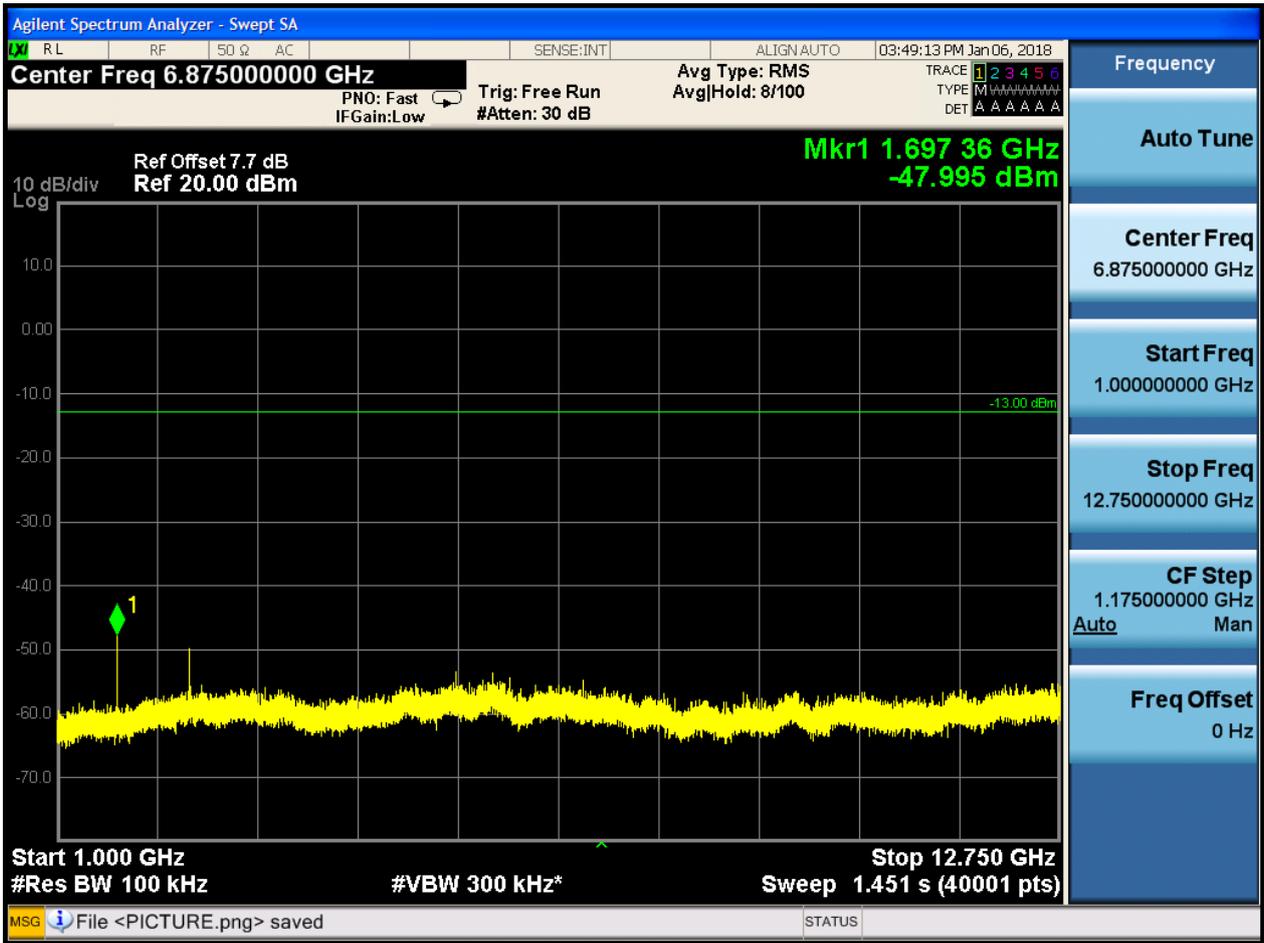


6.1.1.2.3 Test Channel = HCH









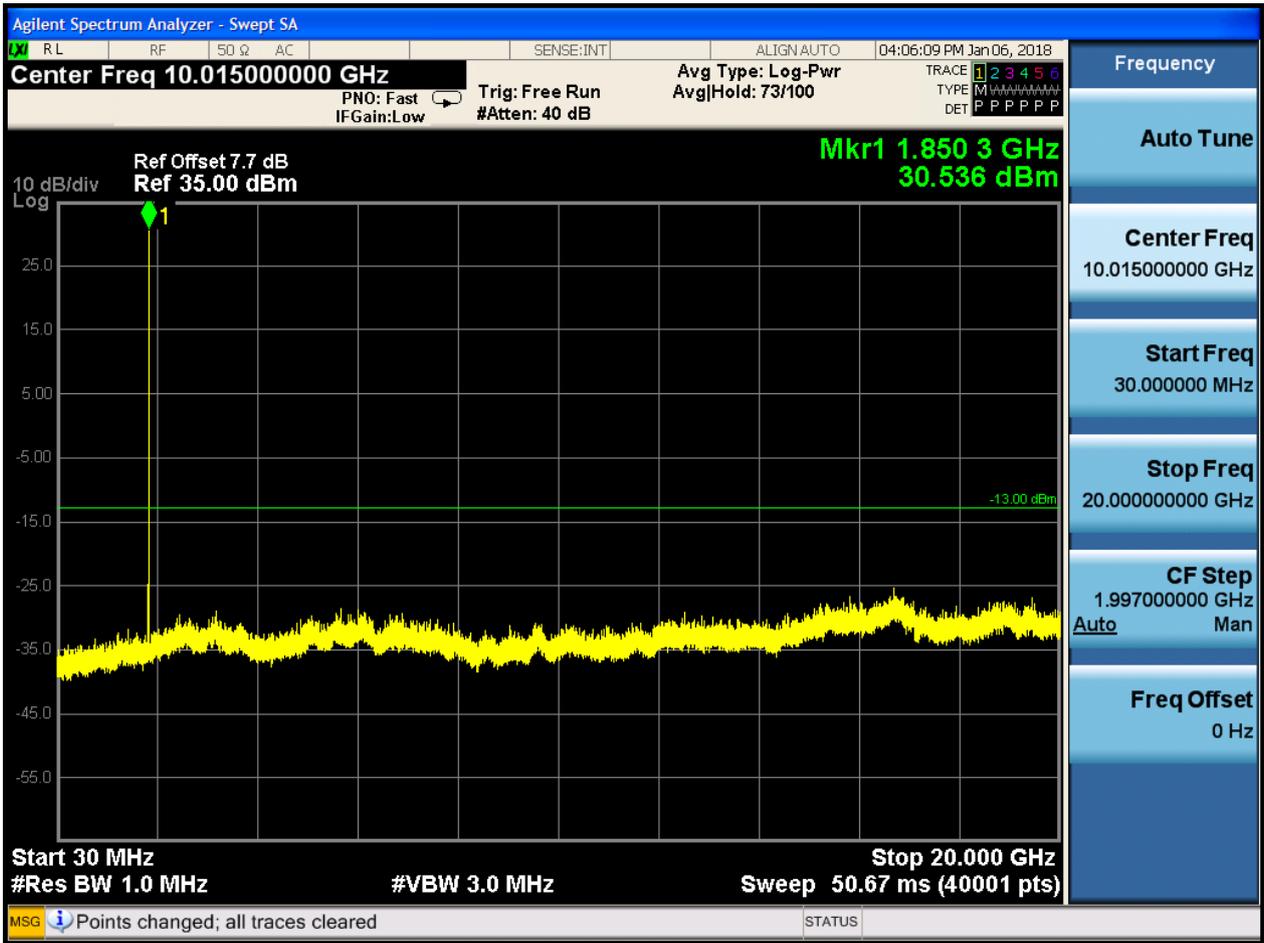


6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH







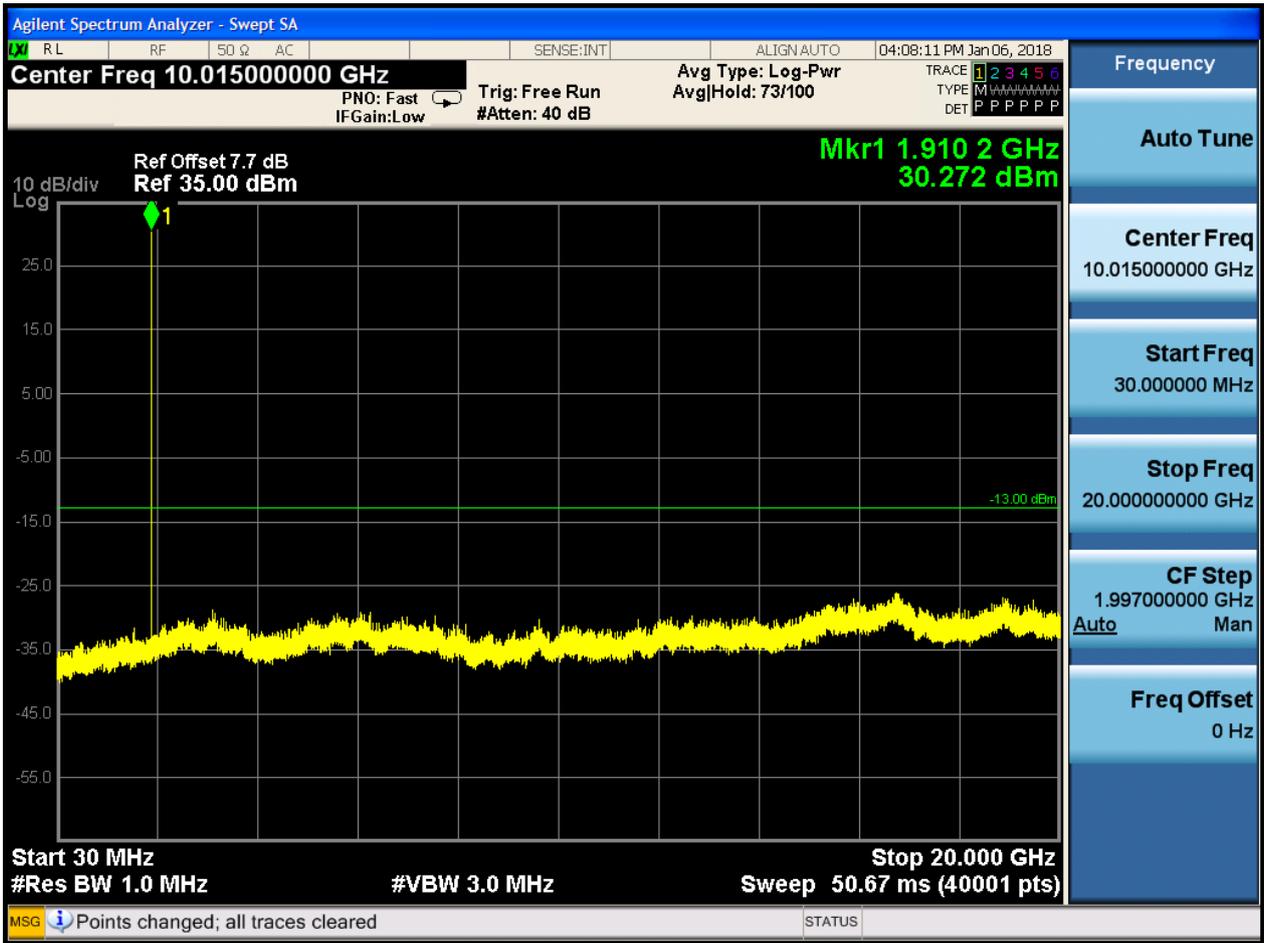
6.1.2.1.2 Test Channel = MCH





6.1.2.1.3 Test Channel = HCH

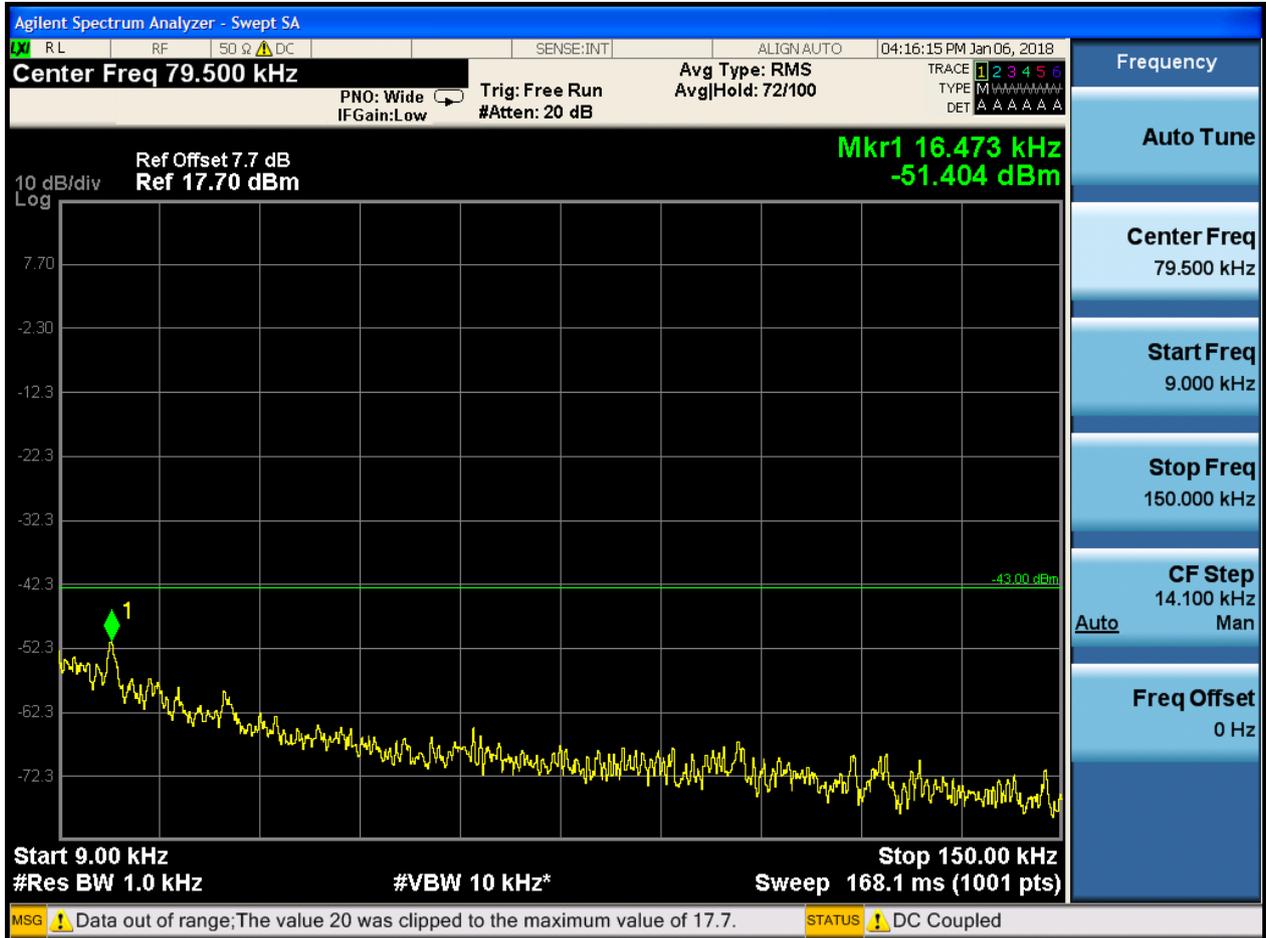


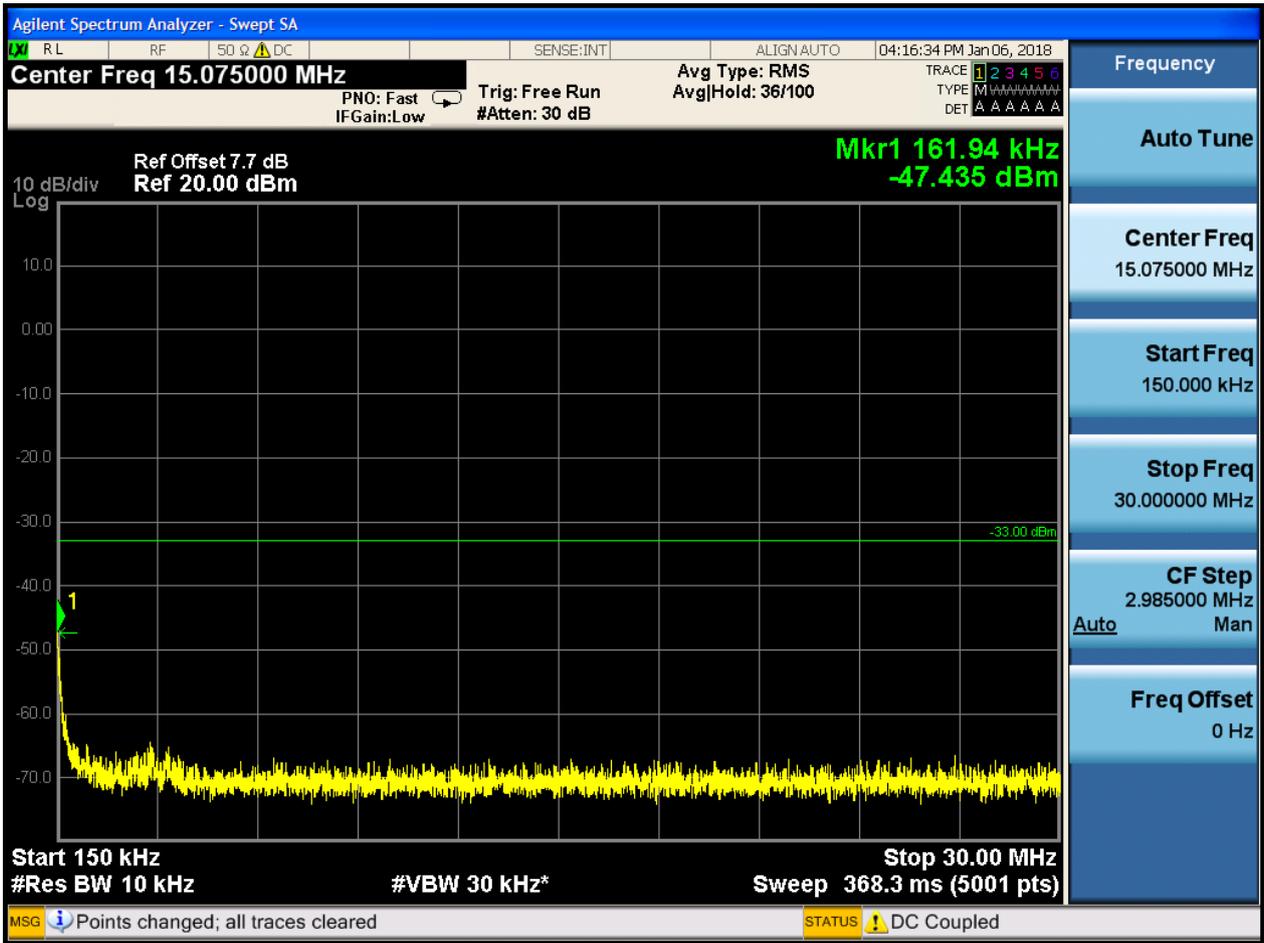


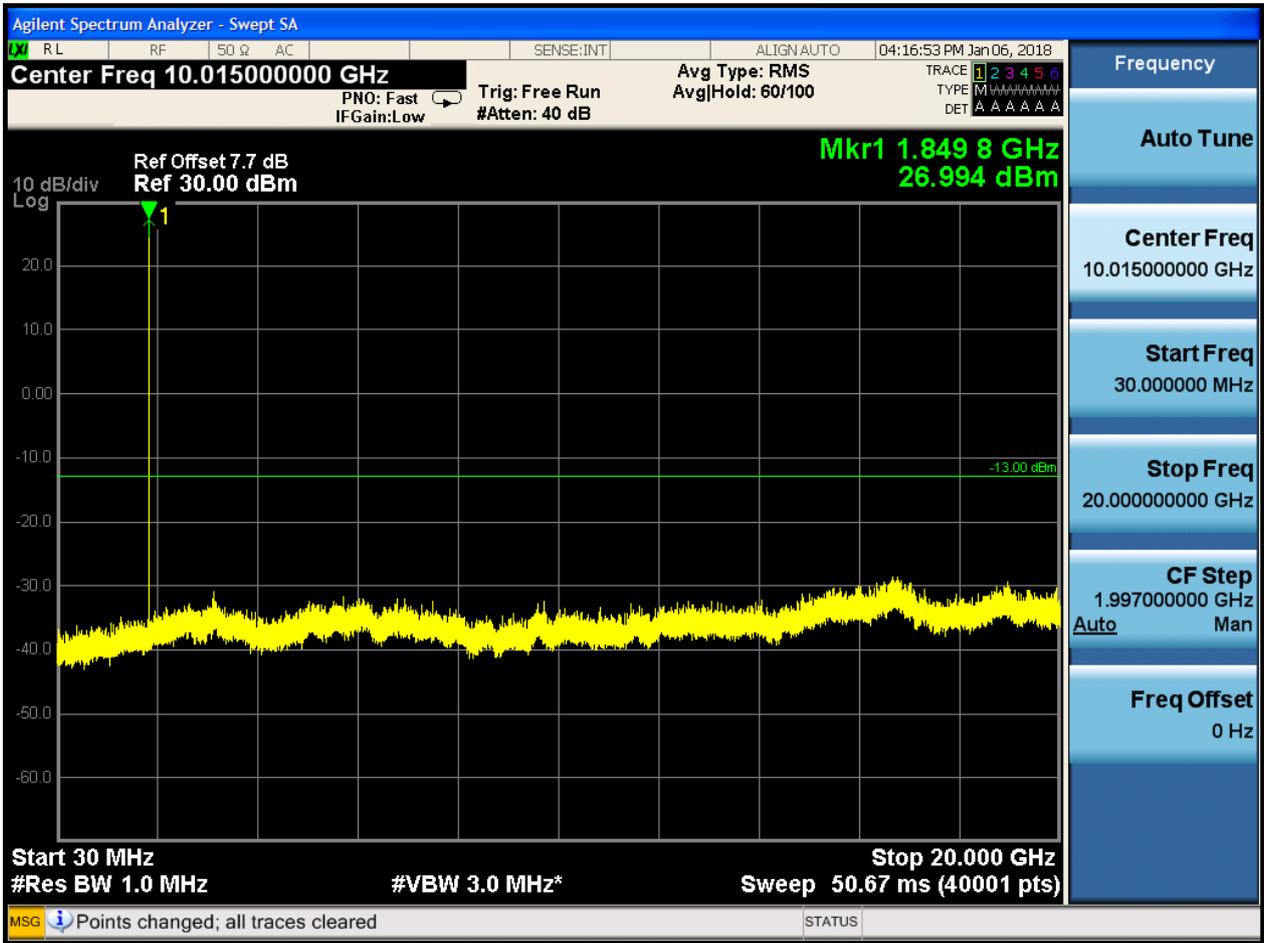


6.1.2.2 Test Mode = GSM/TM2

6.1.2.2.1 Test Channel = LCH

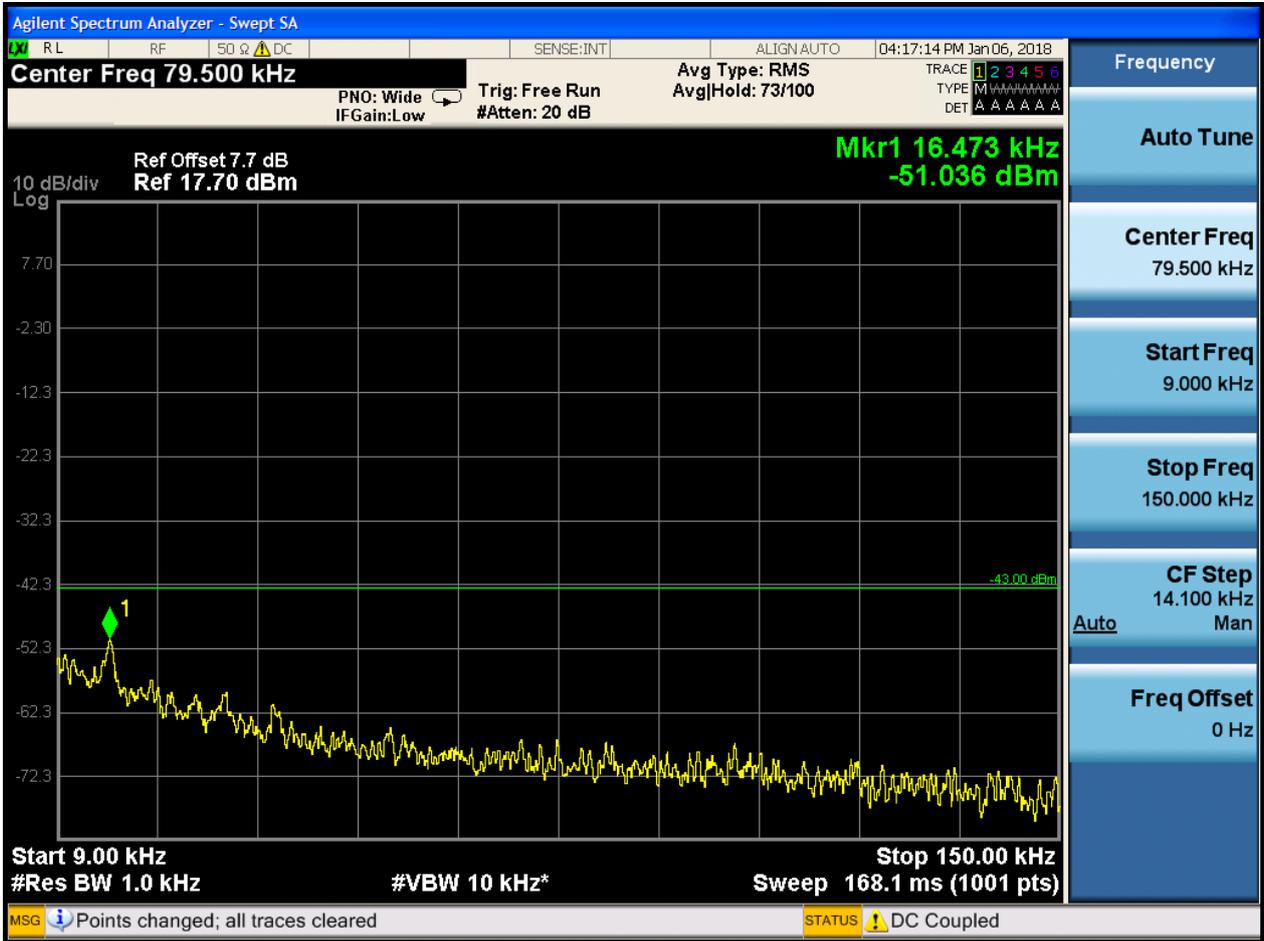


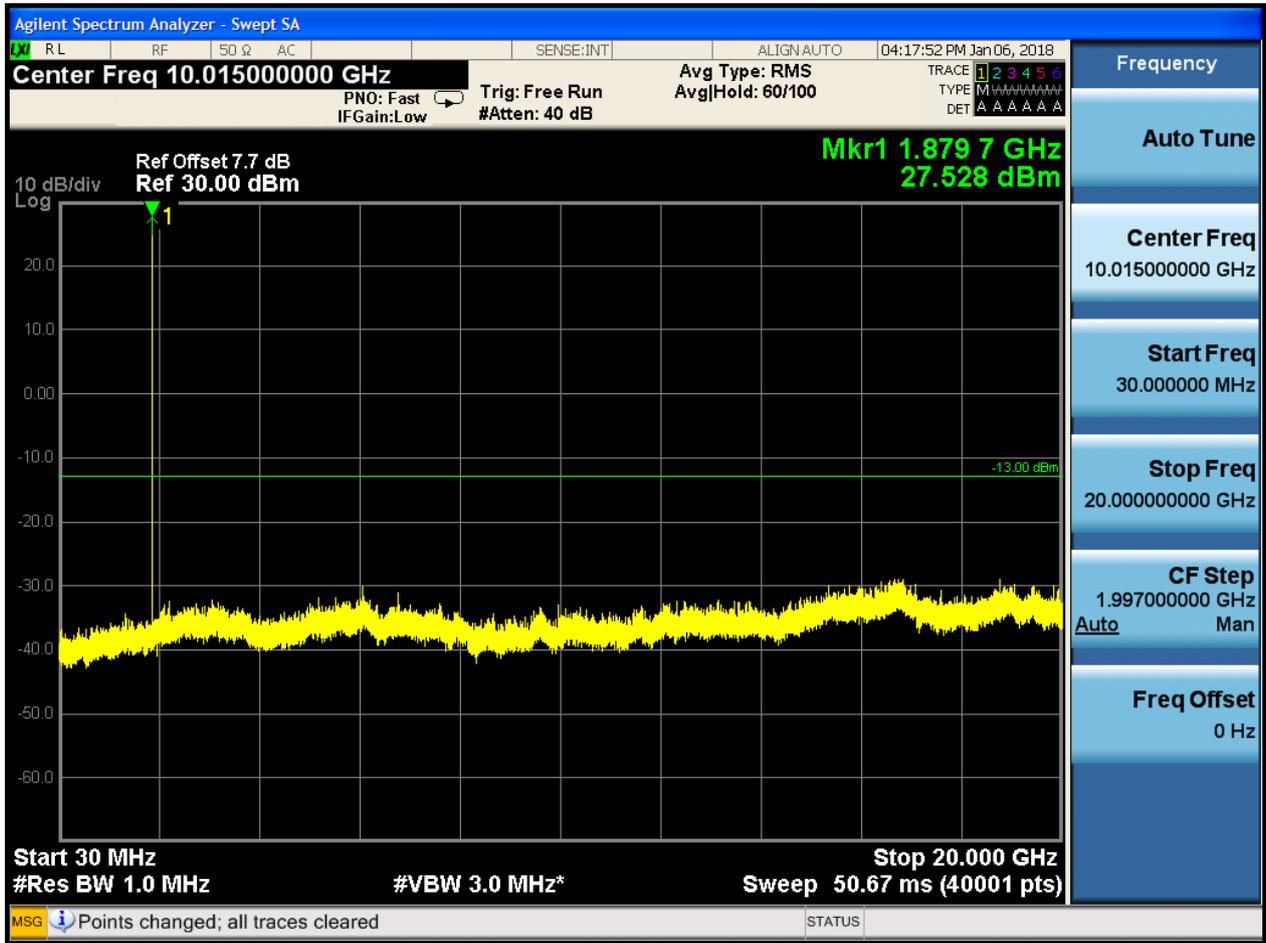






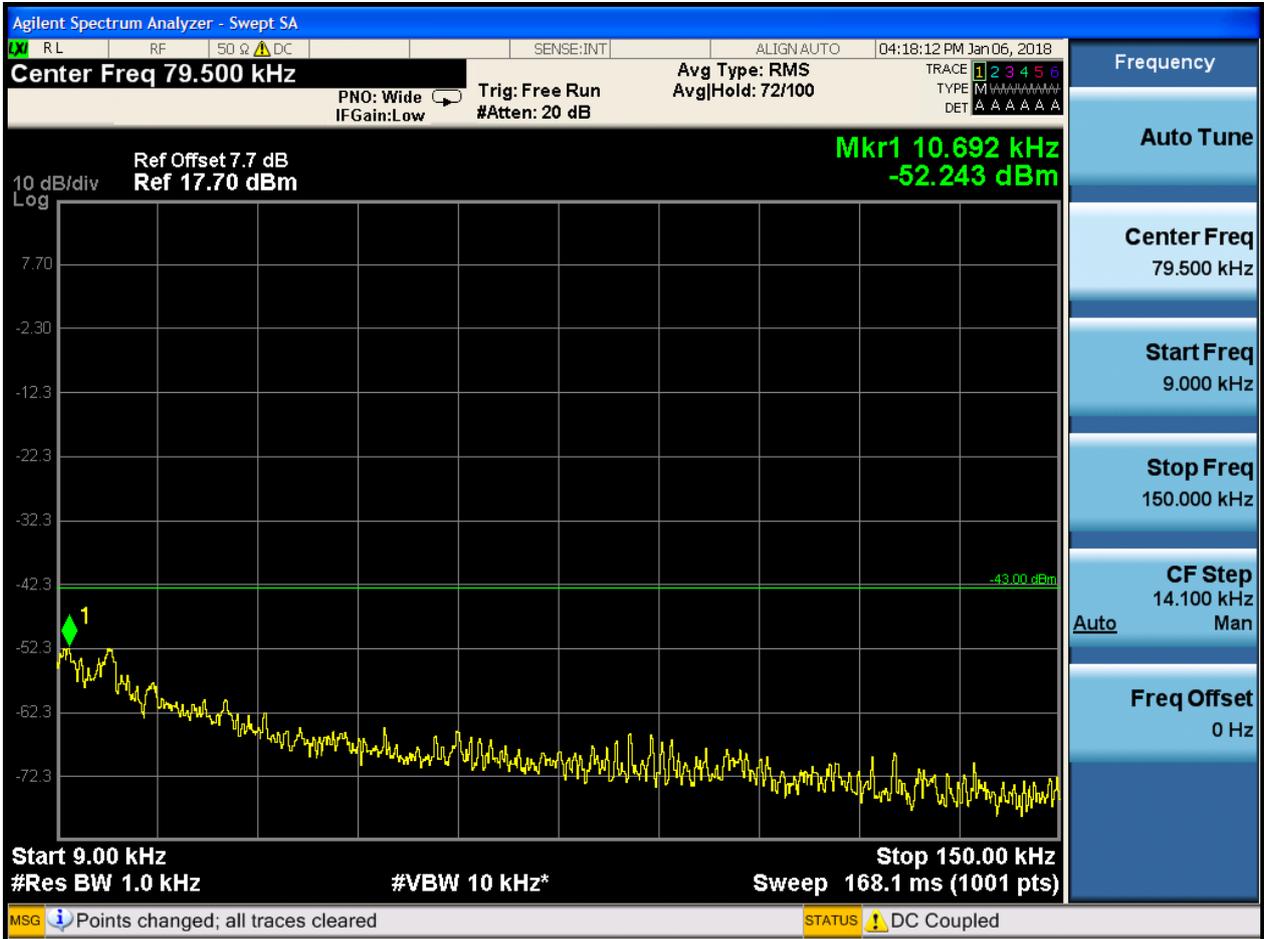
6.1.2.2.2 Test Channel = MCH

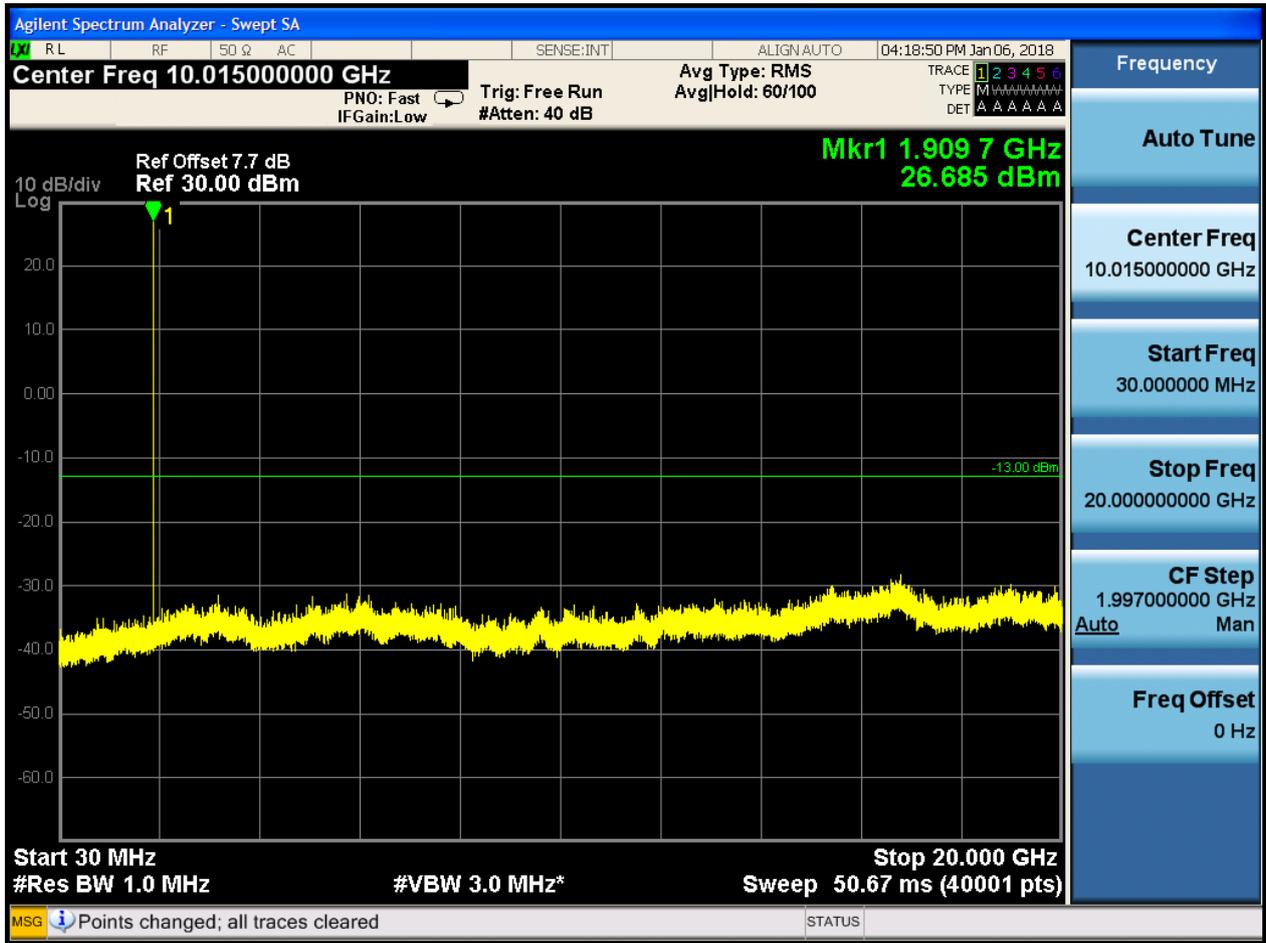






6.1.2.2.3 Test Channel = HCH







7Appendix_G: Field Strength of Spurious Radiation

Note:

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

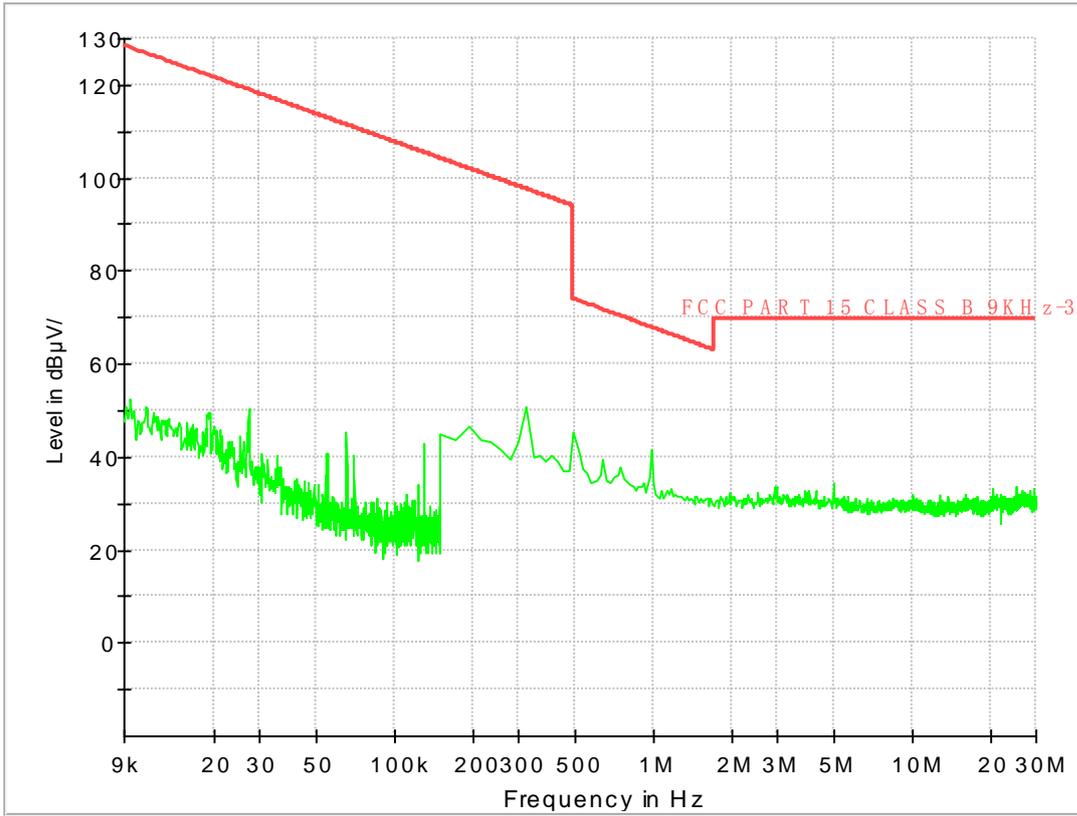
We tested all modes, but the data presented below is the worst case.

Part I - Test Plots

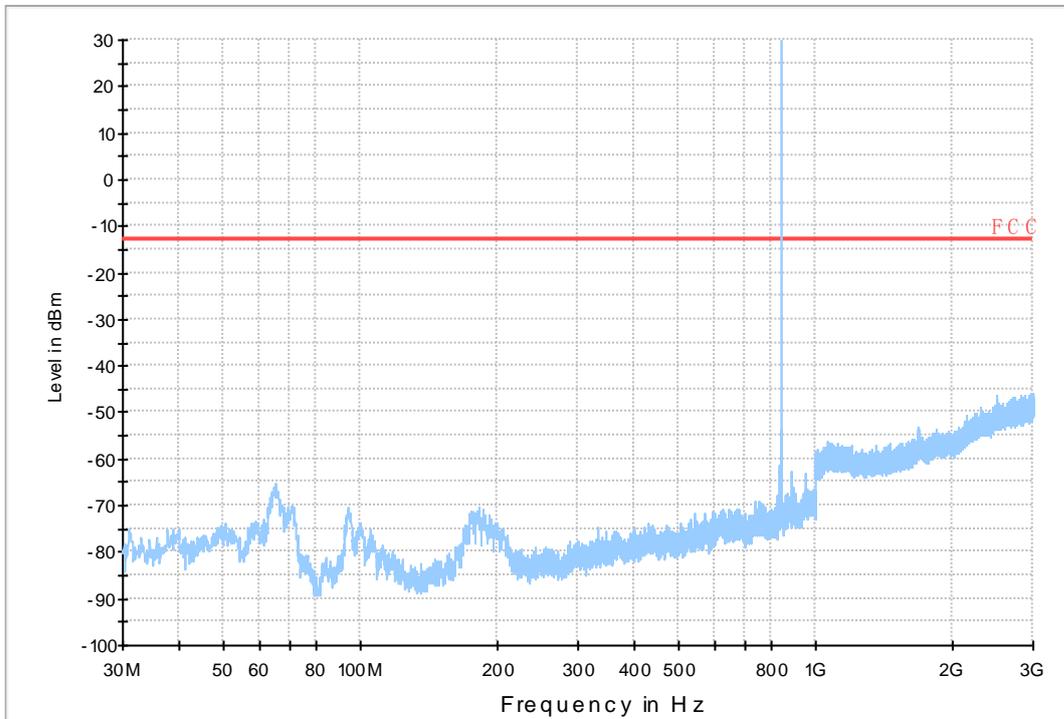
7.1 For GSM_ANT1

7.1.1 Test Band = GSM850

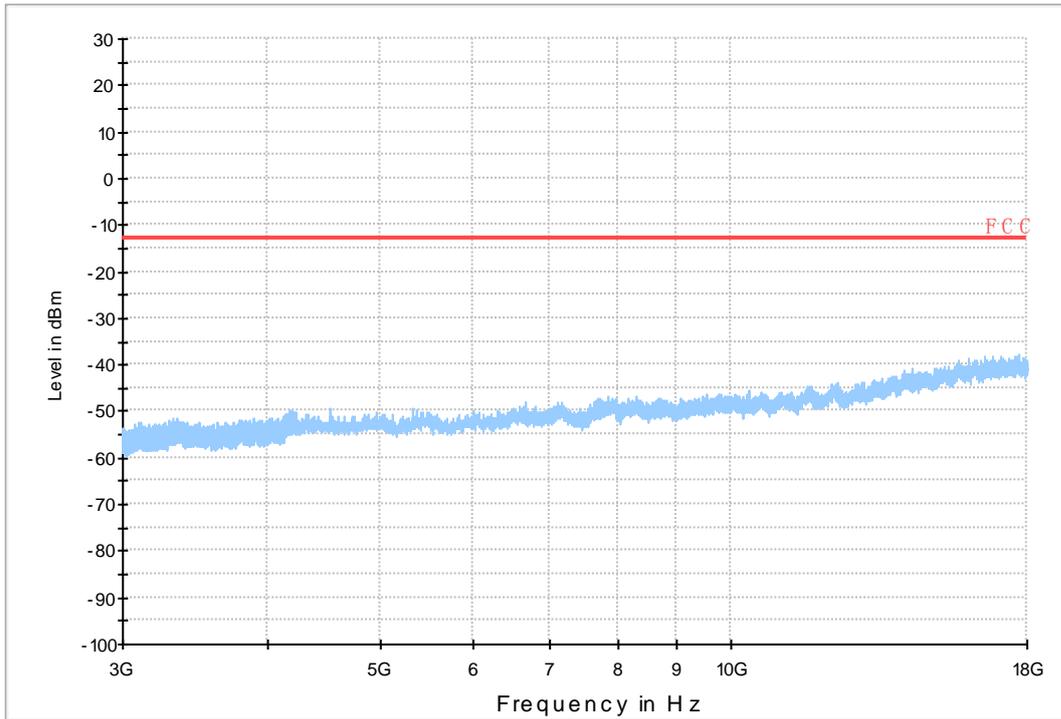
7.1.1.1 Test Mode = GSM/TM1



Copy of FCC PART22 GSM850_L

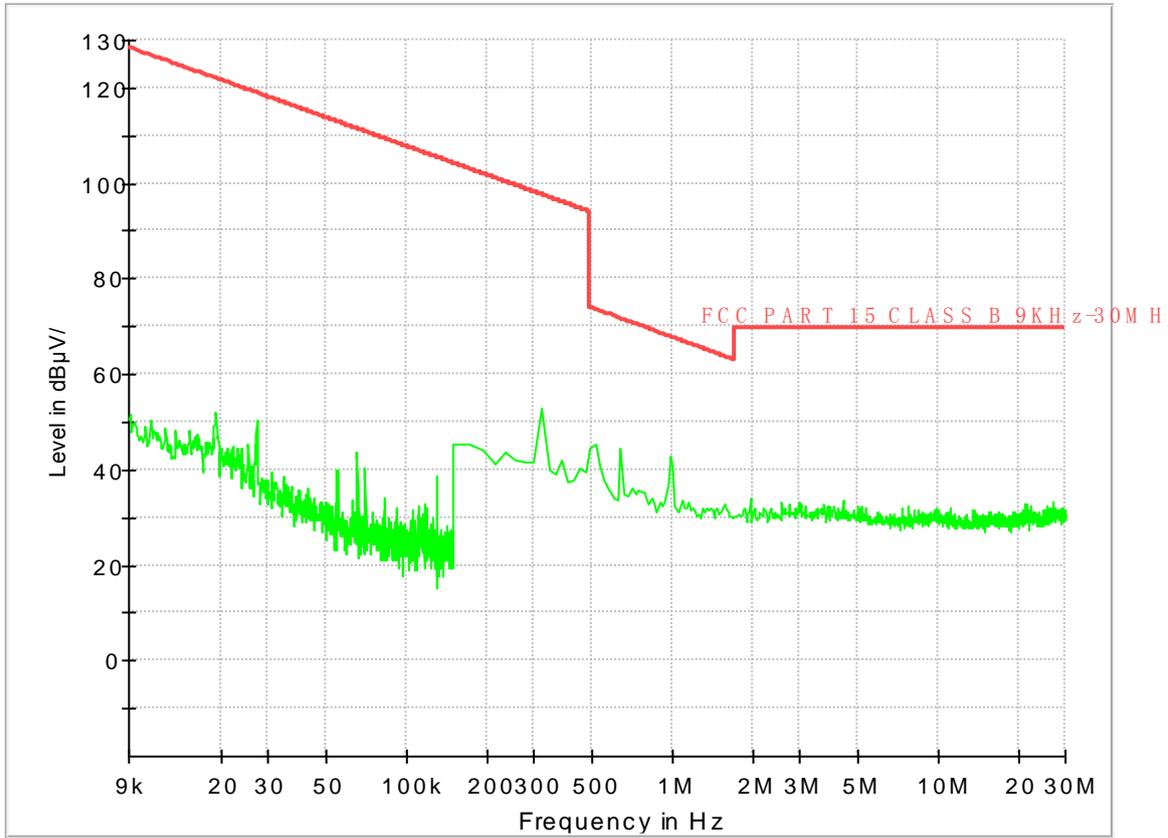


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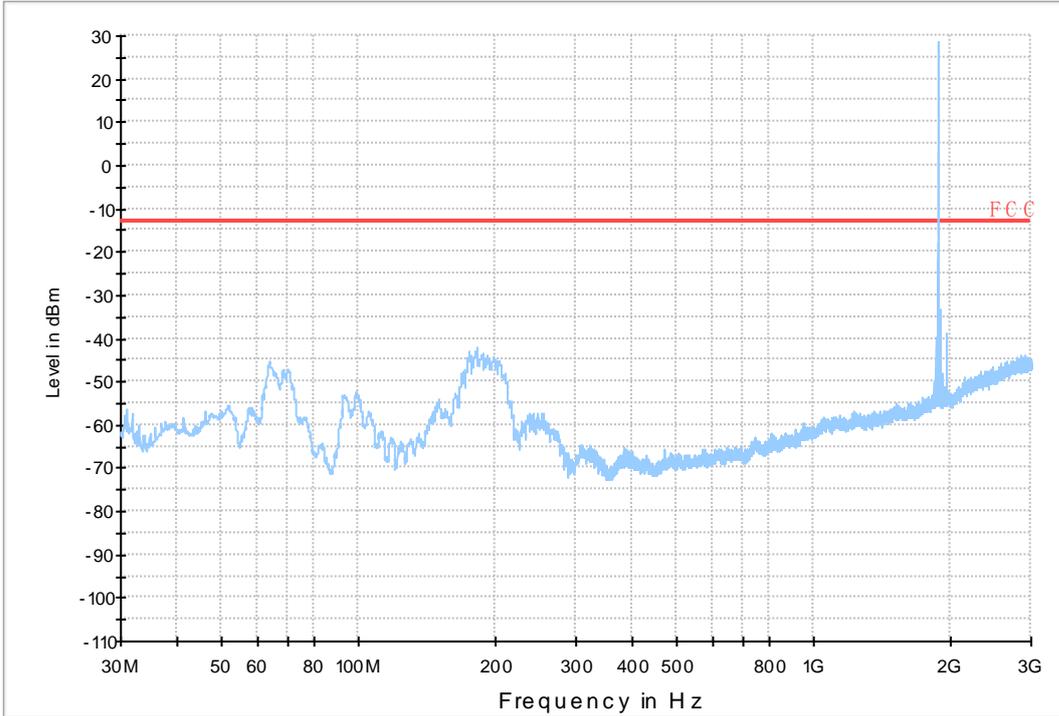


7.1.2 Test Band = GSM1900

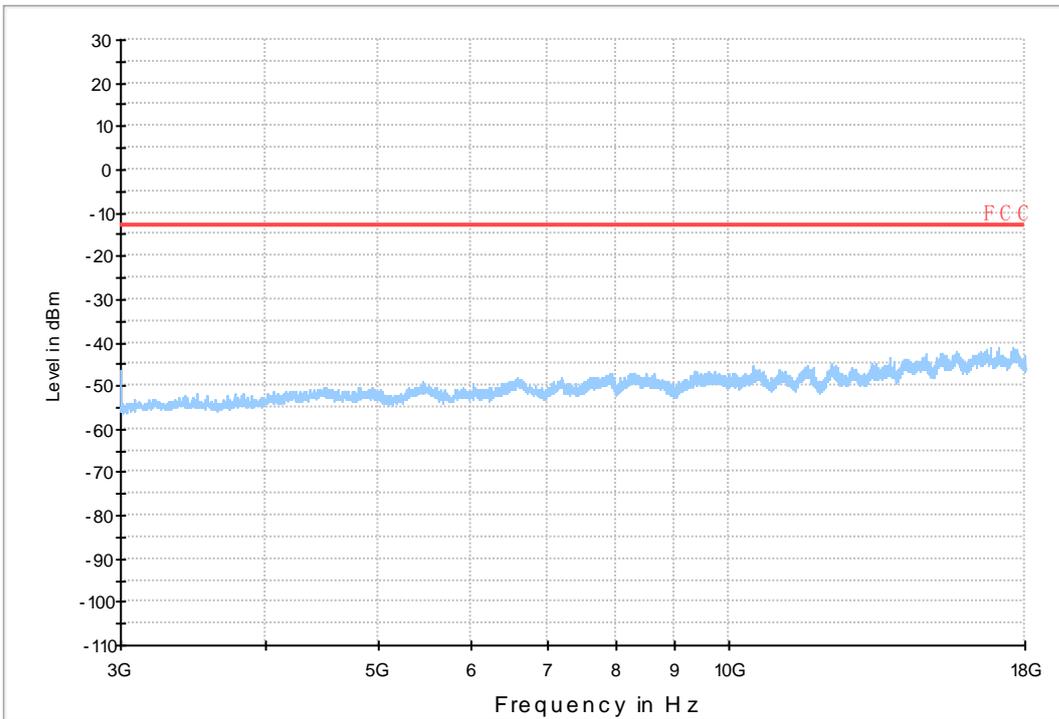
7.1.2.1 Test Mode = GSM/TM1

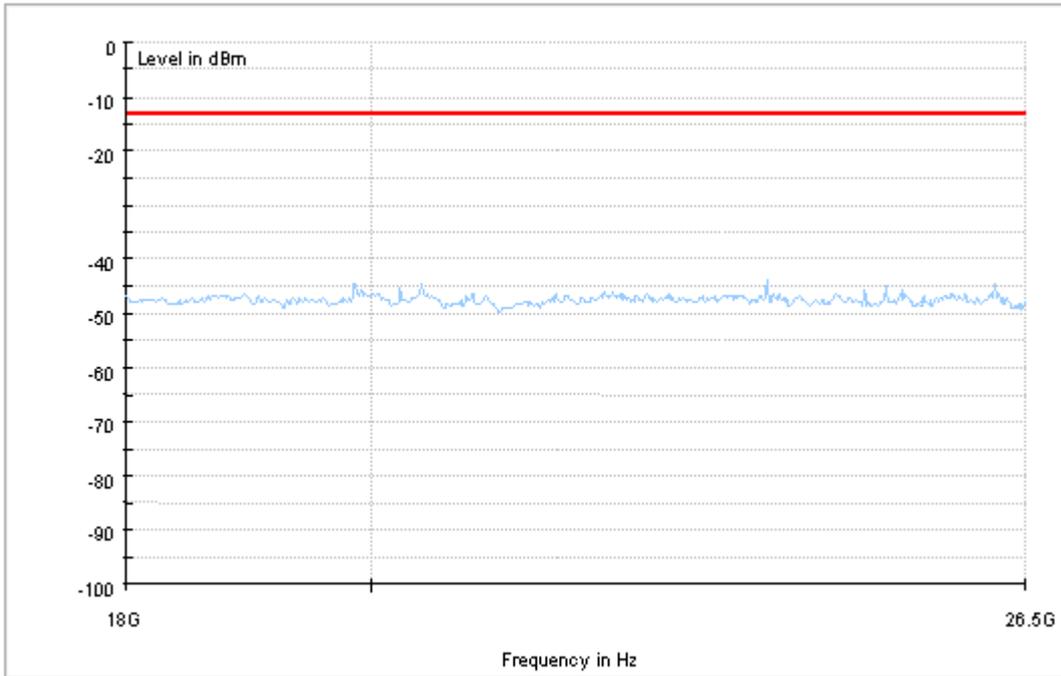


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Copy of FCC PART24 GSM1900_H

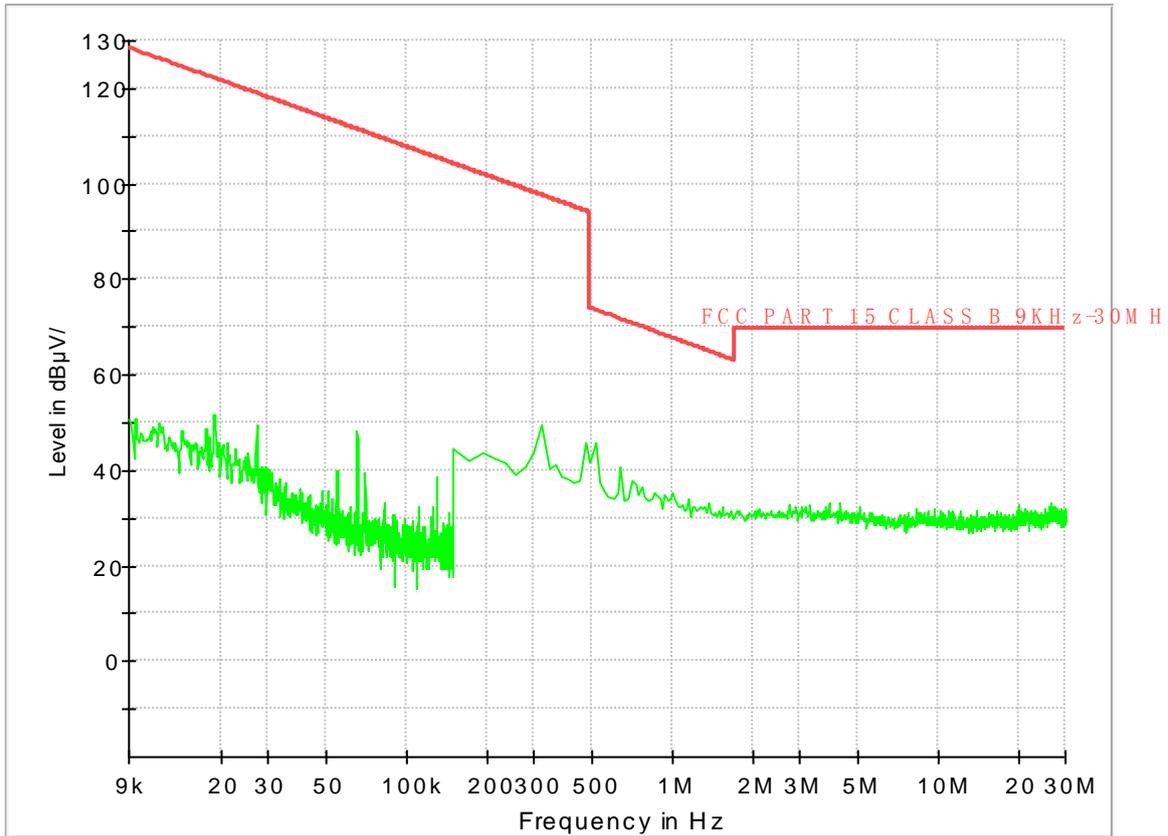




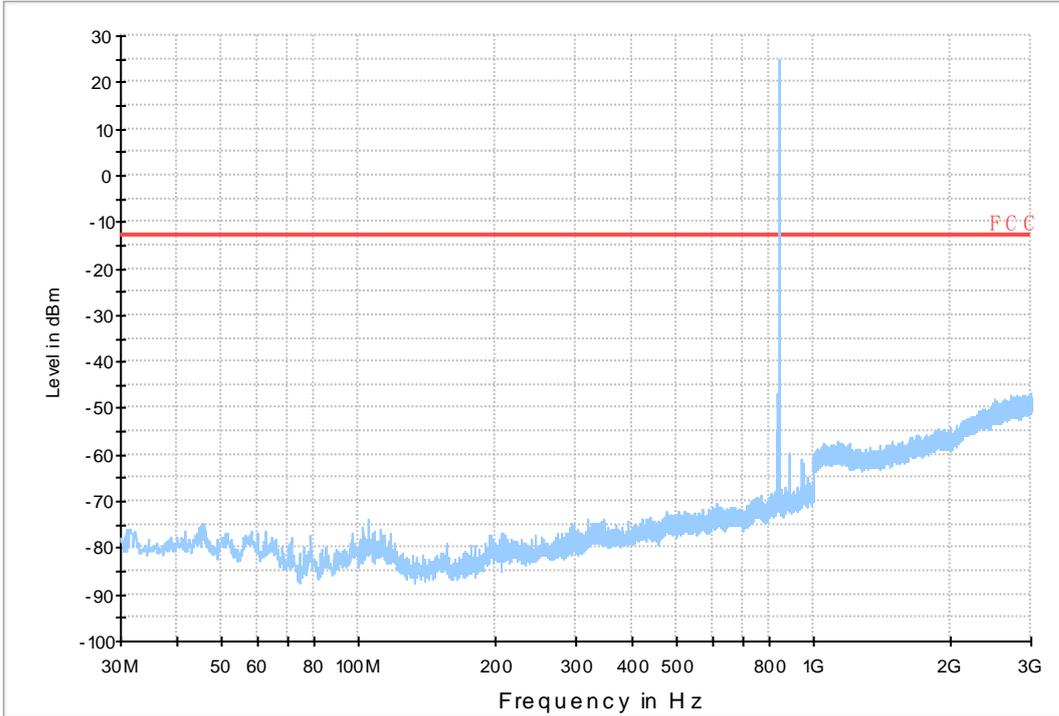
7.2 For GSM_ANT2

7.2.1 Test Band = GSM850

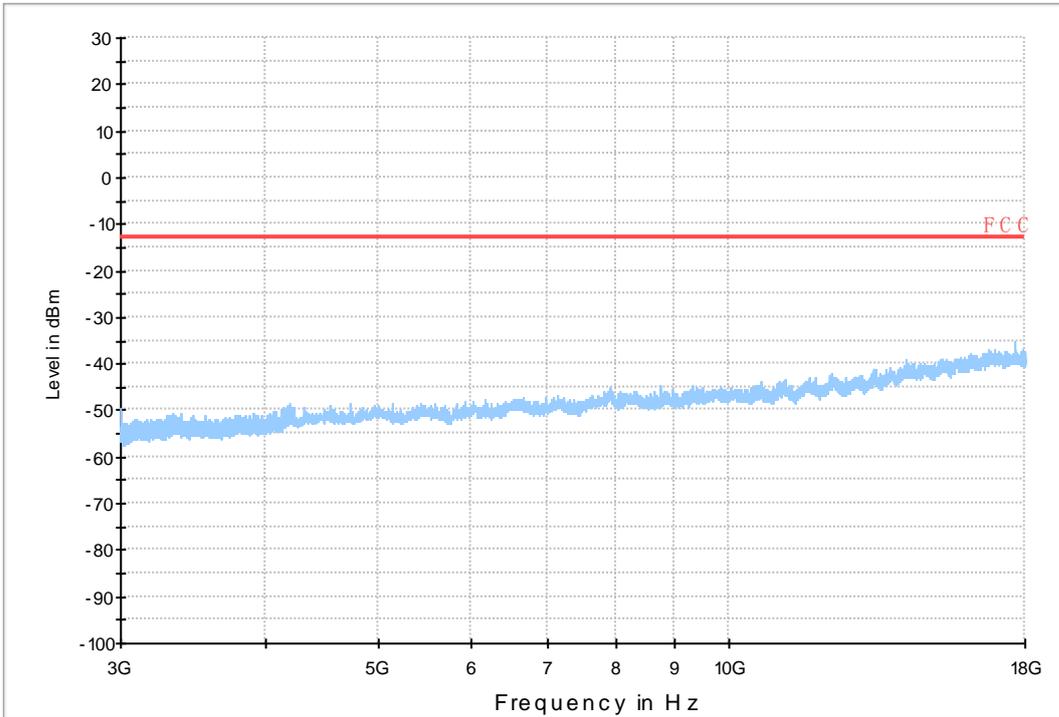
7.2.1.1 Test Mode = GSM/TM1



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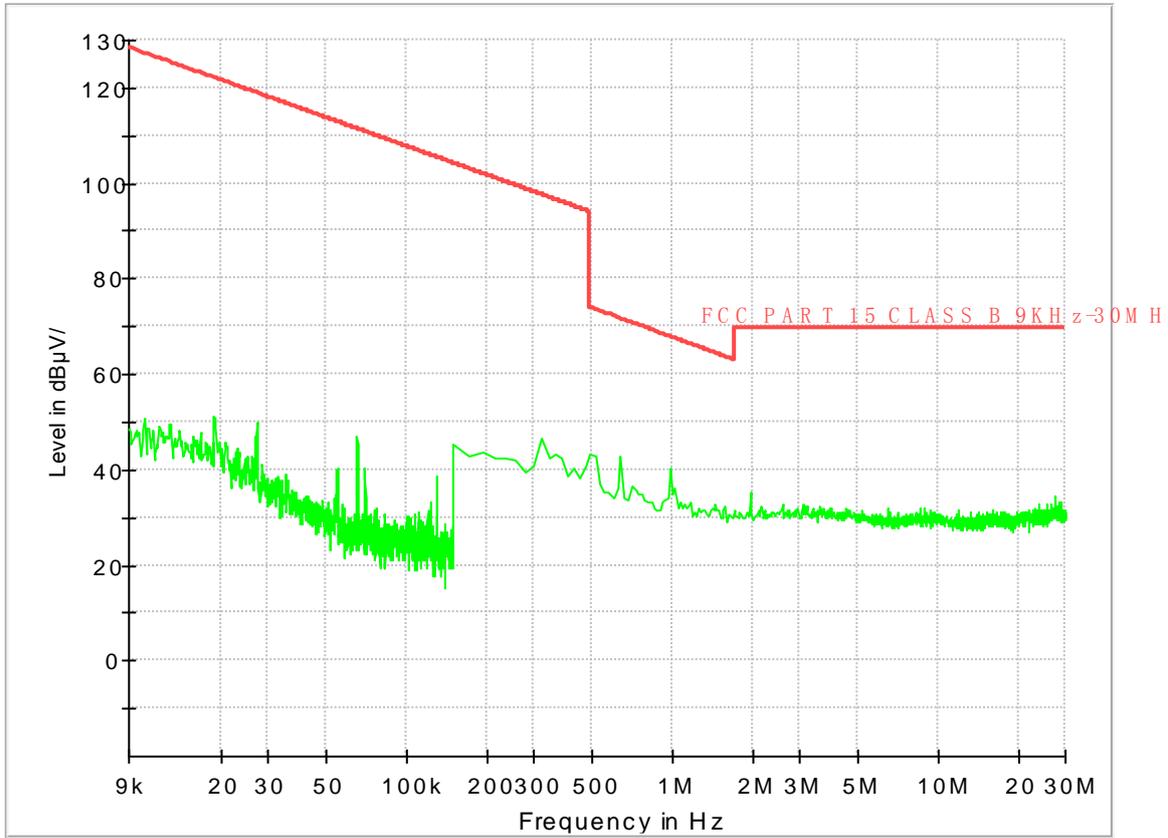


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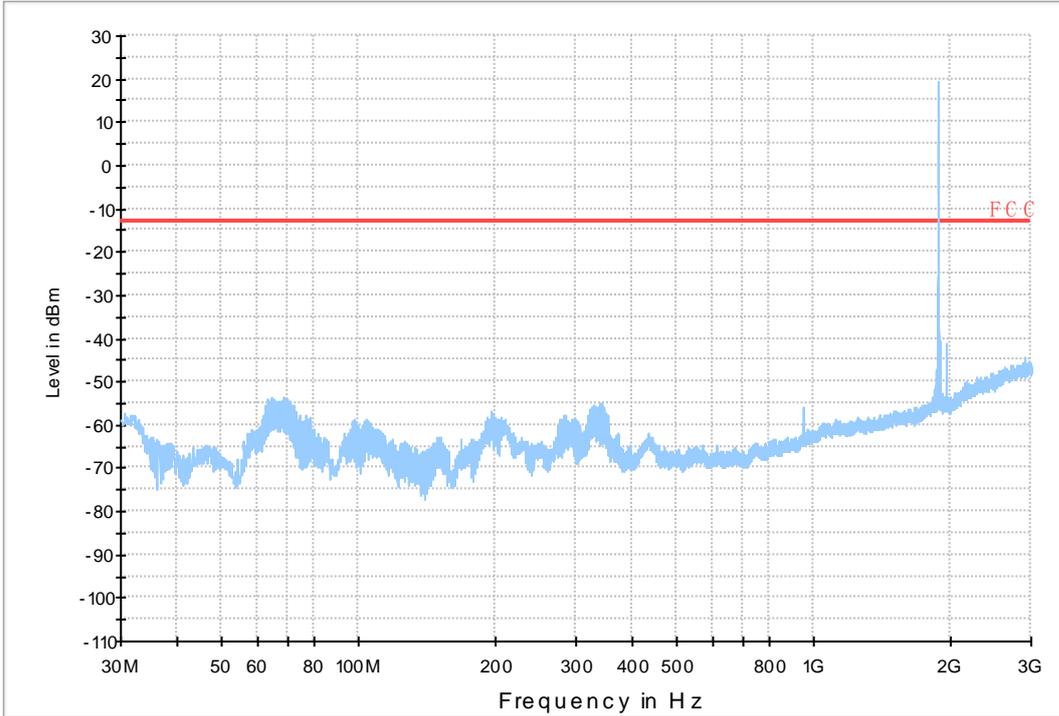


7.2.2 Test Band = GSM1900

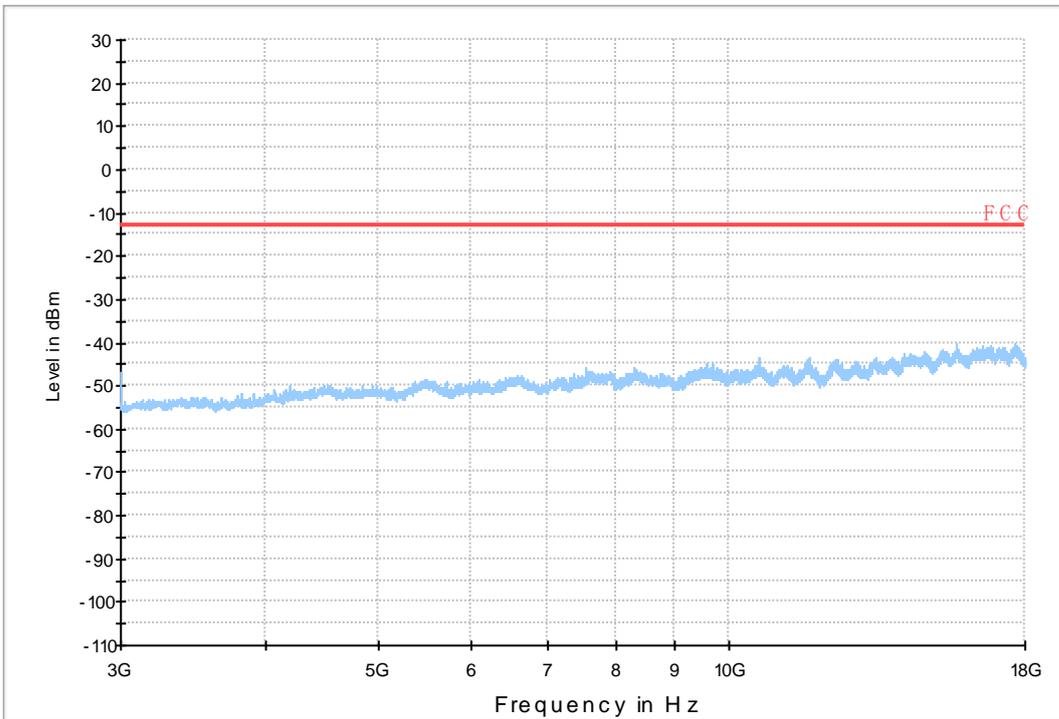
7.2.2.1 Test Mode = GSM/TM1

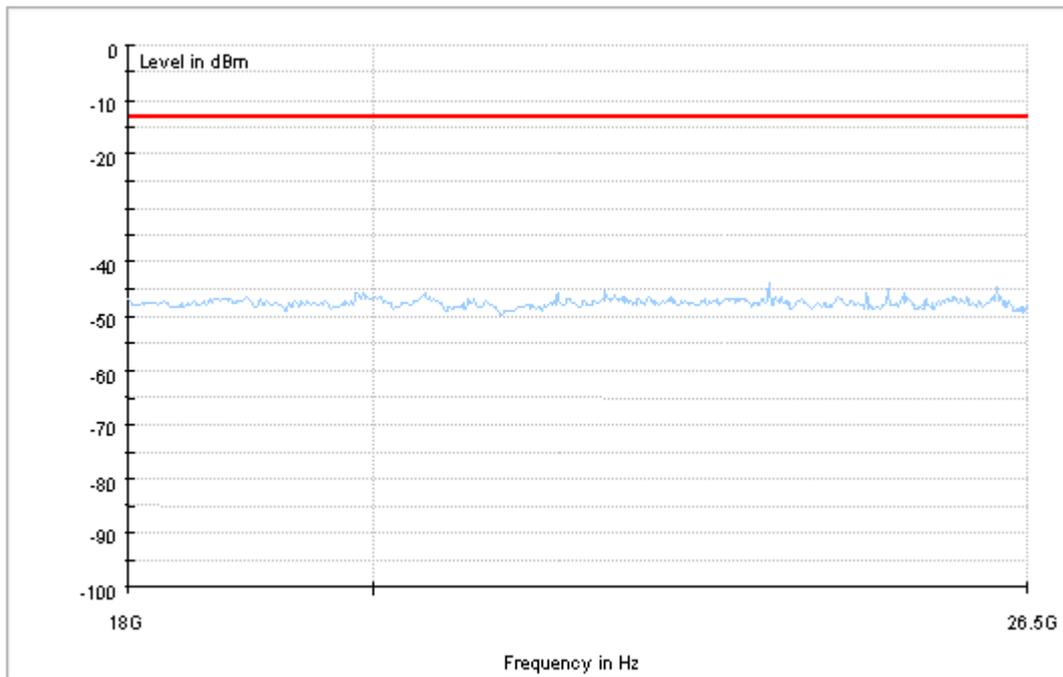


Copy of FCC PART24 GSM1900_L



Copy of FCC PART24 GSM1900_H





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	-12.72	-0.01543	PASS
				VN	-15.43	-0.01872	PASS
				VH	-11.75	-0.01426	PASS
		MCH	TN	VL	-16.66	-0.01991	PASS
				VN	-10.91	-0.01304	PASS
				VH	-13.75	-0.01644	PASS
		HCH	TN	VL	-9.56	-0.01126	PASS
				VN	-10.27	-0.0121	PASS
				VH	-14.08	-0.01659	PASS
	GSM/TM2	LCH	TN	VL	-8.07	-0.00979	PASS
				VN	-9.36	-0.01136	PASS
				VH	-6.65	-0.00807	PASS
		MCH	TN	VL	-11.85	-0.01416	PASS
				VN	-10.69	-0.01278	PASS
				VH	-6.26	-0.00748	PASS
		HCH	TN	VL	-9.72	-0.01145	PASS
				VN	-8.23	-0.0097	PASS
				VH	-9.65	-0.01137	PASS
GSM1900	GSM/TM1	LCH	TN	VL	6.2	0.00335	PASS
				VN	13.24	0.00716	PASS
				VH	16.59	0.00897	PASS
		MCH	TN	VL	13.56	0.00721	PASS
				VN	24.21	0.01288	PASS
				VH	19.95	0.01061	PASS
		HCH	TN	VL	24.21	0.01268	PASS
				VN	23.31	0.01221	PASS
				VH	23.7	0.01241	PASS
	GSM/TM2	LCH	TN	VL	-2.2	-0.00119	PASS
				VN	5.55	0.003	PASS
				VH	3.42	0.00185	PASS
		MCH	TN	VL	0.42	0.00022	PASS
				VN	1.94	0.00103	PASS
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	10.65	0.00566	PASS
		HCH	TN	VL	1.97	0.00103	PASS
				VN	21.08	0.01104	PASS
				VH	5.65	0.00296	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	-7.81	-0.00948	PASS
				-20	-13.5	-0.01638	PASS
				-10	-17.37	-0.02107	PASS
				0	-12.33	-0.01496	PASS
				10	-16.47	-0.01998	PASS
				20	-12.2	-0.0148	PASS
				30	-14.79	-0.01794	PASS
				40	-14.98	-0.01818	PASS
		50	-14.66	-0.01779	PASS		
		MCH	VN	-30	-15.24	-0.01822	PASS
				-20	-15.63	-0.01868	PASS
				-10	-9.1	-0.01088	PASS
				0	-9.56	-0.01143	PASS
				10	-15.43	-0.01844	PASS
				20	-9.36	-0.01119	PASS
				30	-13.17	-0.01574	PASS
				40	-9.88	-0.01181	PASS
		50	-9.43	-0.01127	PASS		
		HCH	VN	-30	-12.66	-0.01492	PASS
				-20	-9.88	-0.01164	PASS
				-10	-10.33	-0.01217	PASS
				0	-12.27	-0.01446	PASS
				10	-15.05	-0.01773	PASS
				20	-11.49	-0.01354	PASS
	30			-15.24	-0.01795	PASS	
	40			-13.75	-0.0162	PASS	
	50	-12.98	-0.01529	PASS			
	GSM/TM2	LCH	VN	-30	-10.85	-0.01316	PASS
				-20	-7.75	-0.0094	PASS
				-10	-5.36	-0.0065	PASS
				0	-3.75	-0.00455	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				10	-14.59	-0.0177	PASS		
				20	-16.5	-0.02002	PASS		
				30	-9.23	-0.0112	PASS		
				40	-13.85	-0.0168	PASS		
				50	-8.91	-0.01081	PASS		
		MCH	VN	-30	-12.95	-0.01548	PASS		
				-20	-8.88	-0.01061	PASS		
				-10	-10.98	-0.01312	PASS		
				0	-11.43	-0.01366	PASS		
				10	-6.13	-0.00733	PASS		
				20	-8.36	-0.00999	PASS		
				30	-12.11	-0.01448	PASS		
				40	-11.82	-0.01413	PASS		
				50	-5.62	-0.00672	PASS		
				HCH	VN	-30	-6.72	-0.00792	PASS
		-20	-1			-0.00118	PASS		
		-10	-8.36			-0.00985	PASS		
		0	-8.52			-0.01004	PASS		
		10	-7.97			-0.00939	PASS		
		20	-8.98			-0.01058	PASS		
		30	-7.39			-0.00871	PASS		
		40	-10.04			-0.01183	PASS		
		50	-2.36	-0.00278	PASS				
		GSM1900	GSM/TM1	LCH	VN	-30	1.74	0.00094	PASS
						-20	7.17	0.00388	PASS
						-10	5.04	0.00272	PASS
						0	13.5	0.0073	PASS
						10	21.5	0.01162	PASS
20	12.66					0.00684	PASS		
30	15.17					0.0082	PASS		
40	3.62					0.00196	PASS		
50	9.3					0.00503	PASS		
MCH	VN			-30	17.56	0.00934	PASS		
				-20	9.75	0.00519	PASS		
				-10	12.33	0.00656	PASS		
				0	14.85	0.0079	PASS		
				10	12.14	0.00646	PASS		
				20	3.87	0.00206	PASS		
				30	28.15	0.01497	PASS		
				40	21.89	0.01164	PASS		



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	VN	50	20.28	0.01079	PASS
				-30	14.66	0.00768	PASS
				-20	27.83	0.01457	PASS
				-10	35.13	0.01839	PASS
				0	22.73	0.0119	PASS
				10	25.44	0.01332	PASS
				20	23.7	0.01241	PASS
				30	37.65	0.01971	PASS
				40	27.06	0.01417	PASS
				50	33.32	0.01745	PASS
	GSM/TM2	LCH	VN	-30	7.43	0.00402	PASS
				-20	-5.42	-0.00293	PASS
				-10	-5.88	-0.00318	PASS
				0	11.17	0.00604	PASS
				10	0.58	0.00031	PASS
				20	3.1	0.00168	PASS
				30	2.87	0.00155	PASS
				40	6.3	0.00341	PASS
				50	9.65	0.00522	PASS
				MCH	VN	-30	5.55
		-20	5.81			0.00309	PASS
		-10	6.55			0.00348	PASS
		0	13.4			0.00713	PASS
		10	4.71			0.00251	PASS
		20	2.26			0.0012	PASS
		30	-3.84			-0.00204	PASS
		40	17.92			0.00953	PASS
		50	8.43			0.00448	PASS
		HCH	VN			-30	-3.03
				-20	20.86	0.01092	PASS
				-10	18.05	0.00945	PASS
				0	14.5	0.00759	PASS
				10	13.3	0.00696	PASS
				20	20.63	0.0108	PASS
				30	-0.23	-0.00012	PASS
				40	17.5	0.00916	PASS
50	13.33	0.00698	PASS				

END