



# 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:

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

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

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

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	0.13	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

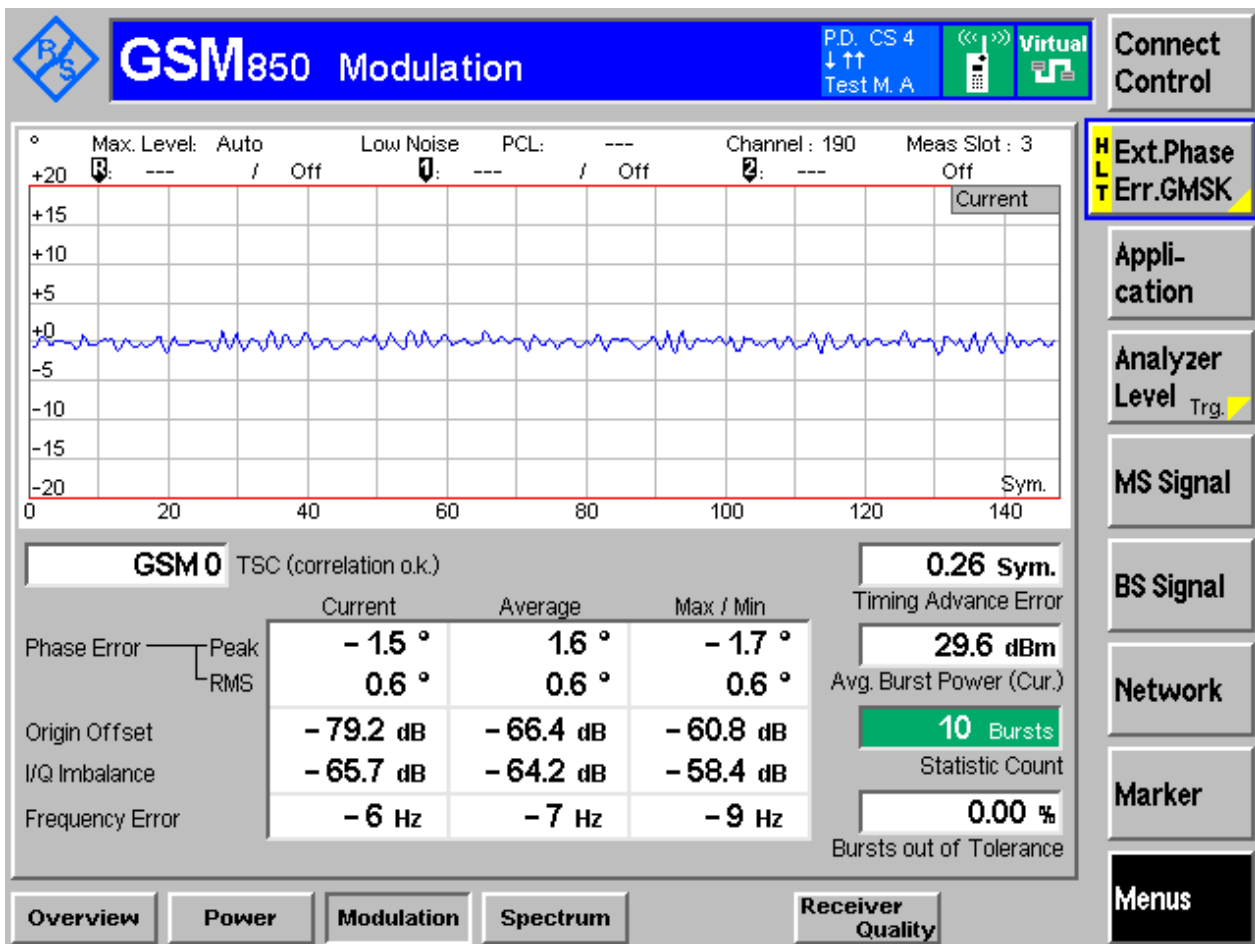
#### Part I - Test Plots

#### 3.1 For GSM

#### 3.1.1 Test Band = GSM850

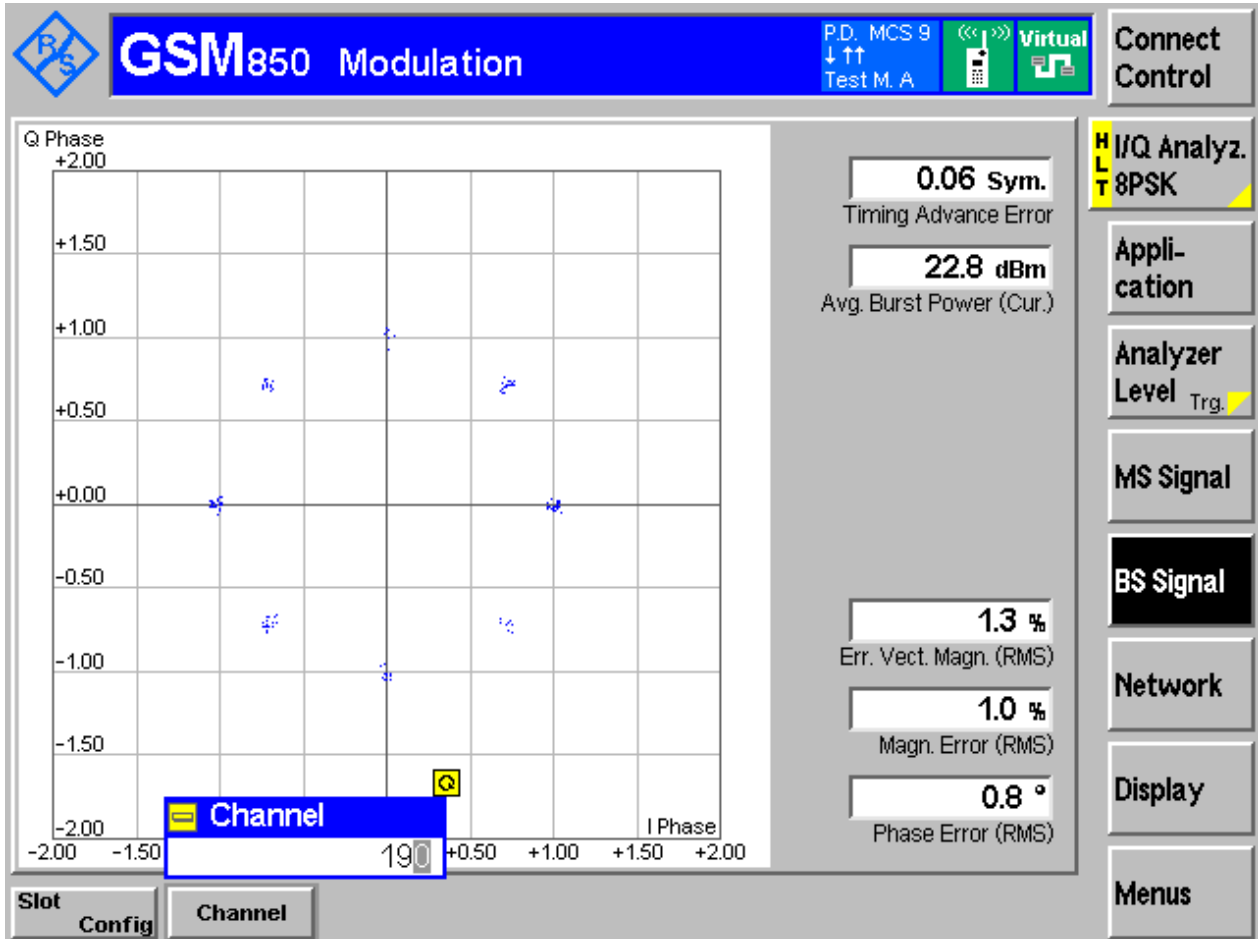
#### 3.1.1.1 Test Mode = GSM/TM1

#### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

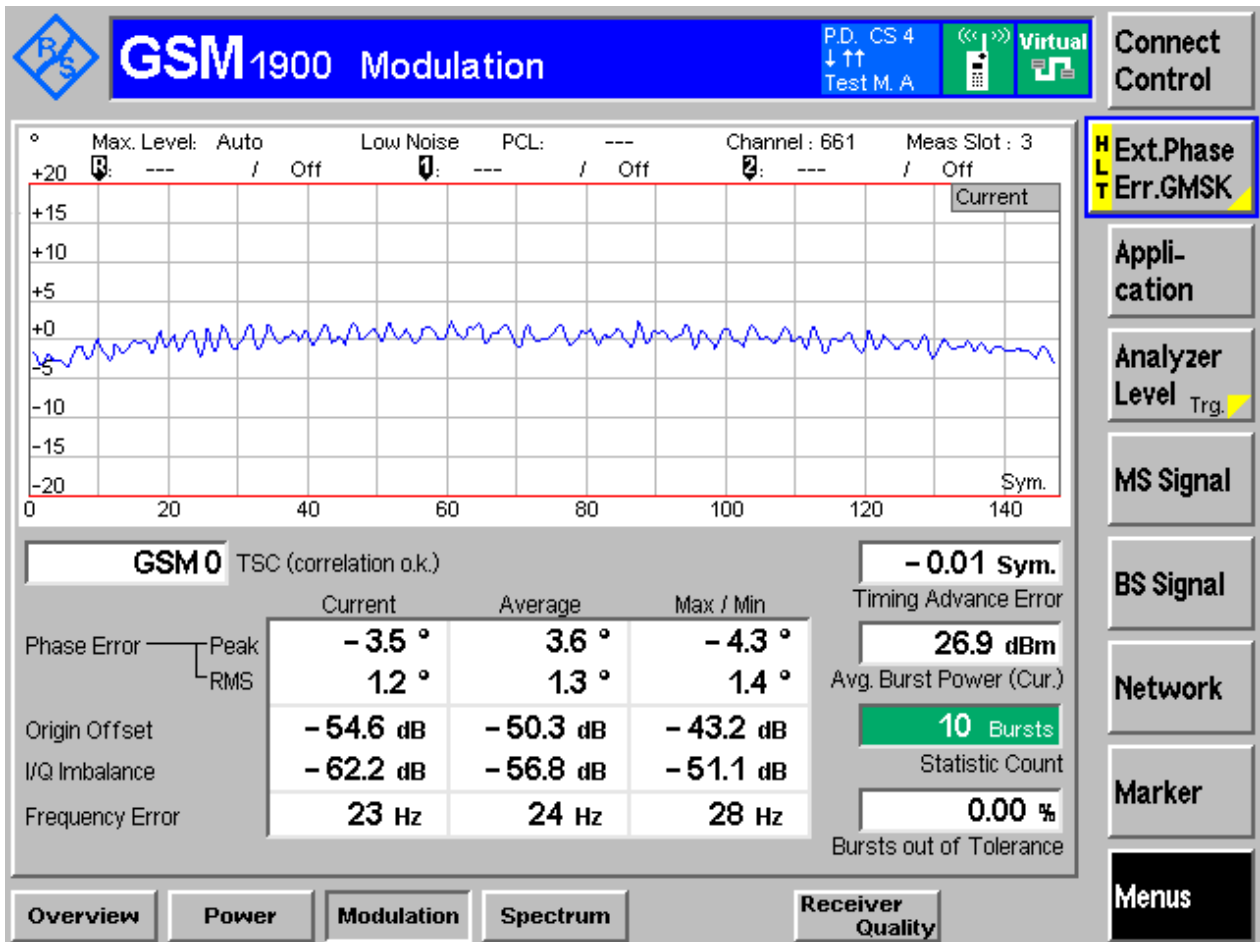
#### 3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = GSM1900

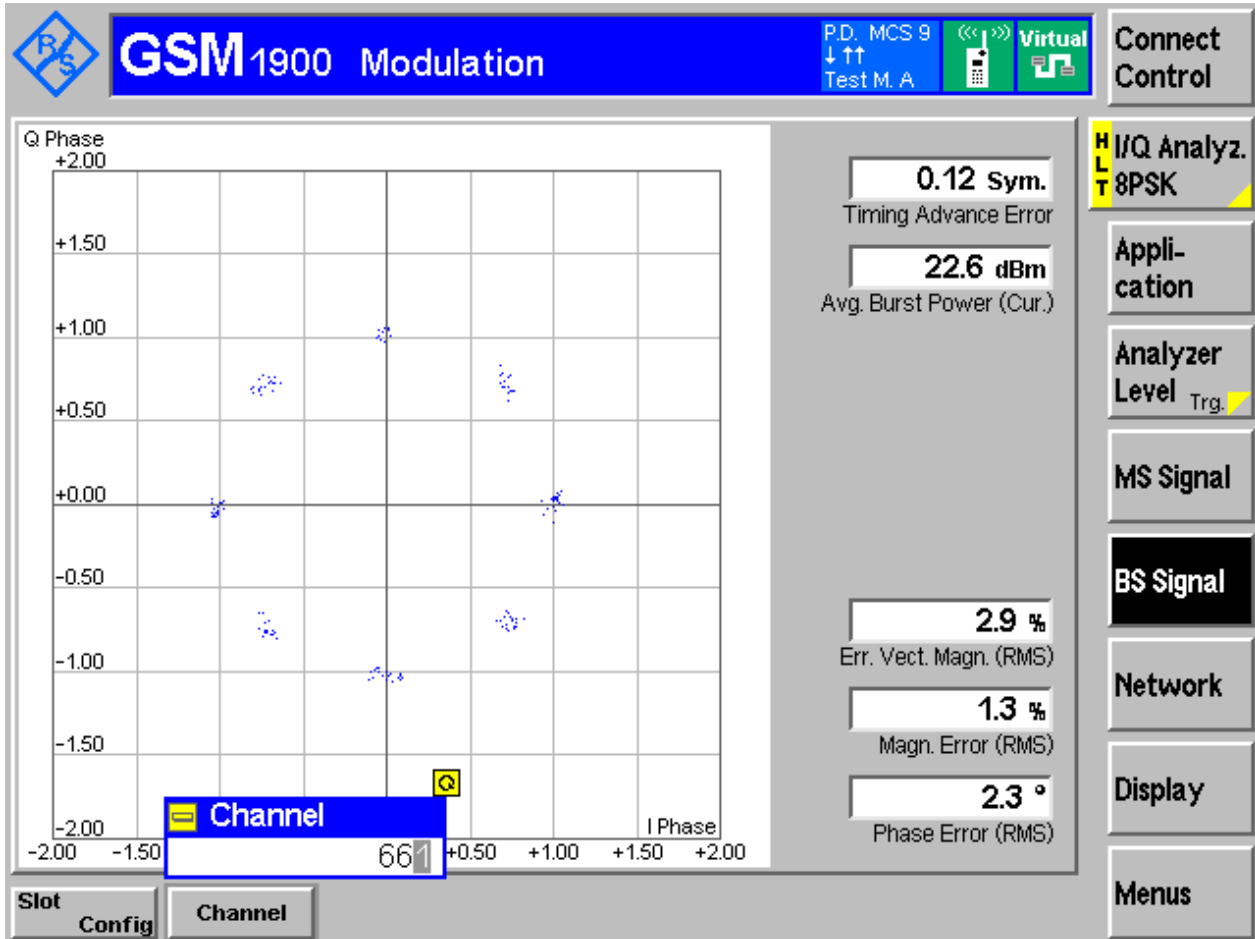
3.1.2.1 Test Mode = GSM/TM1

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





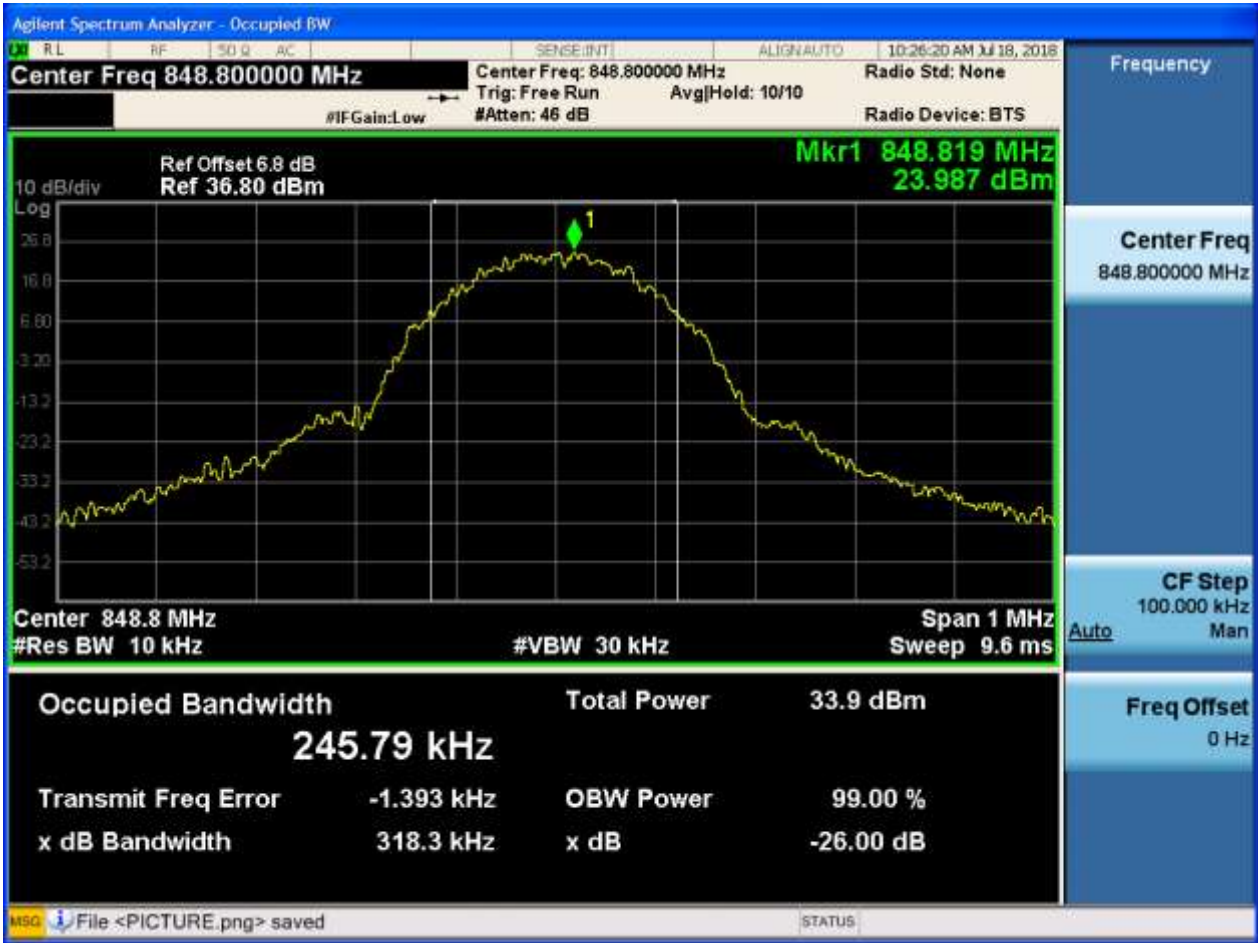
4.1.1.2.2 Test Channel = MCH







4.1.1.2.3 Test Channel = HCH





4.1.2 Test Band = GSM1900

4.1.2.1 Test Mode = GSM/TM1

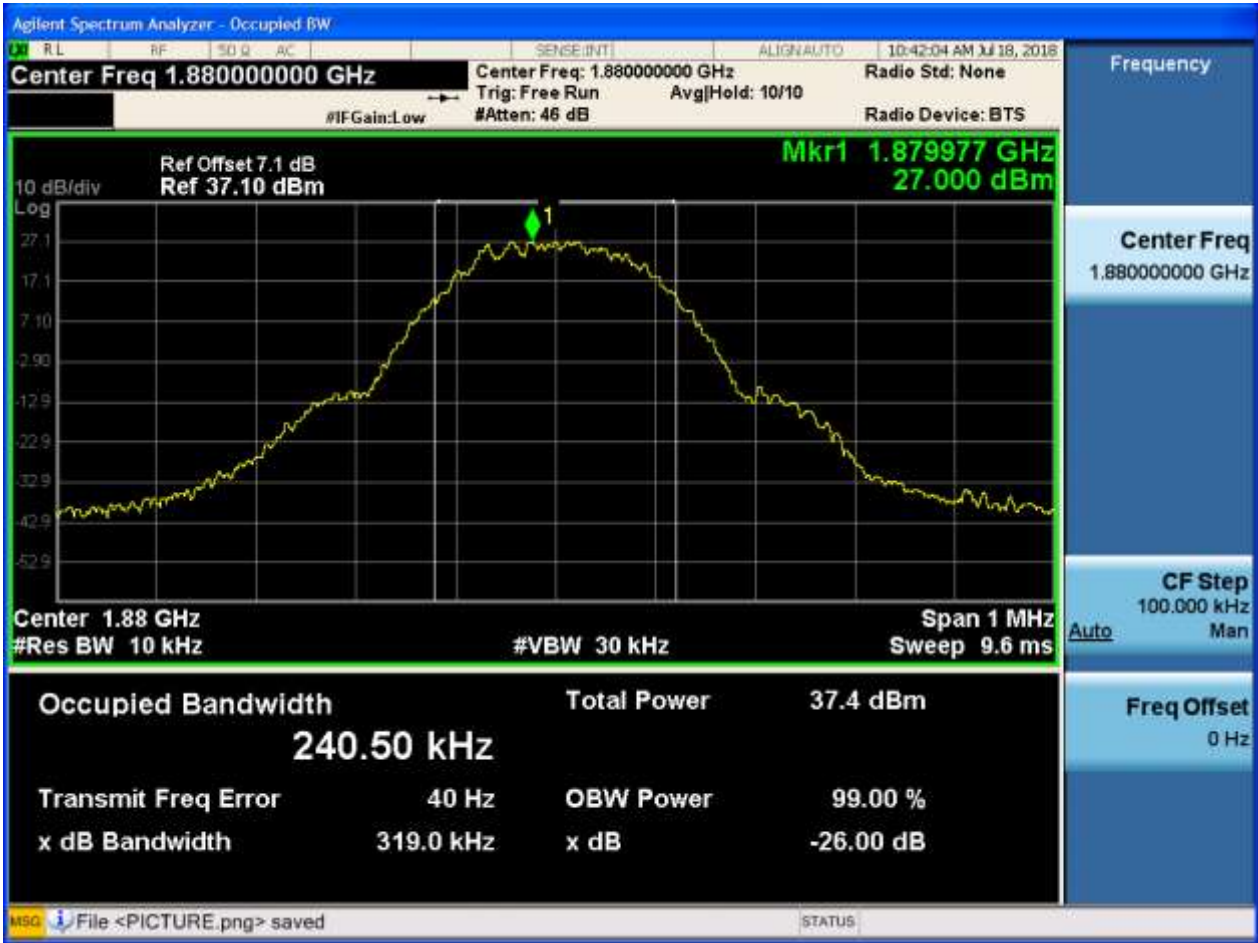
4.1.2.1.1 Test Channel = LCH







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

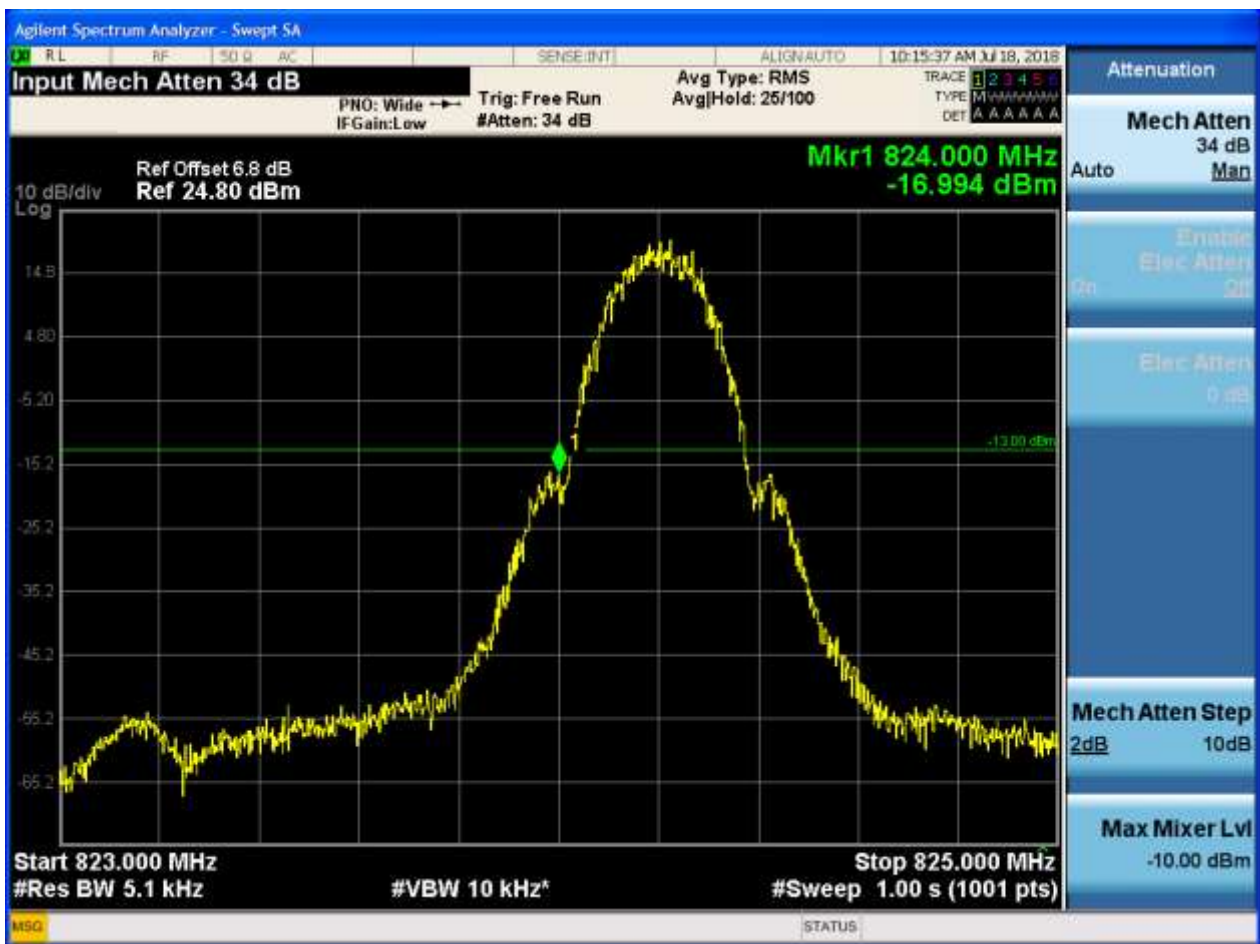
### Part I - Test Plots

#### 5.1 For GSM

##### 5.1.1 Test Band = GSM850

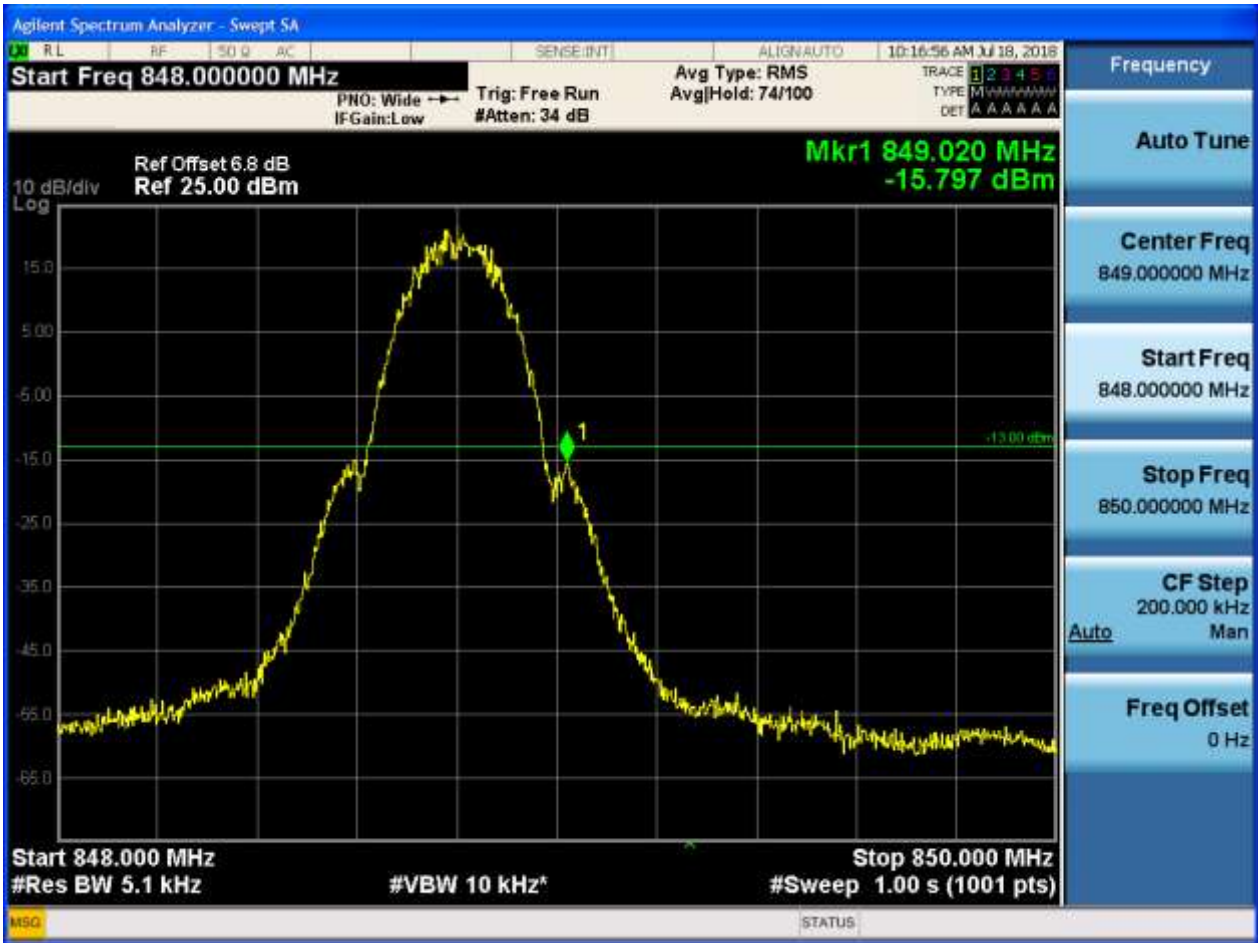
##### 5.1.1.1 Test Mode = GSM/TM1

##### 5.1.1.1.1 Test Channel = LCH



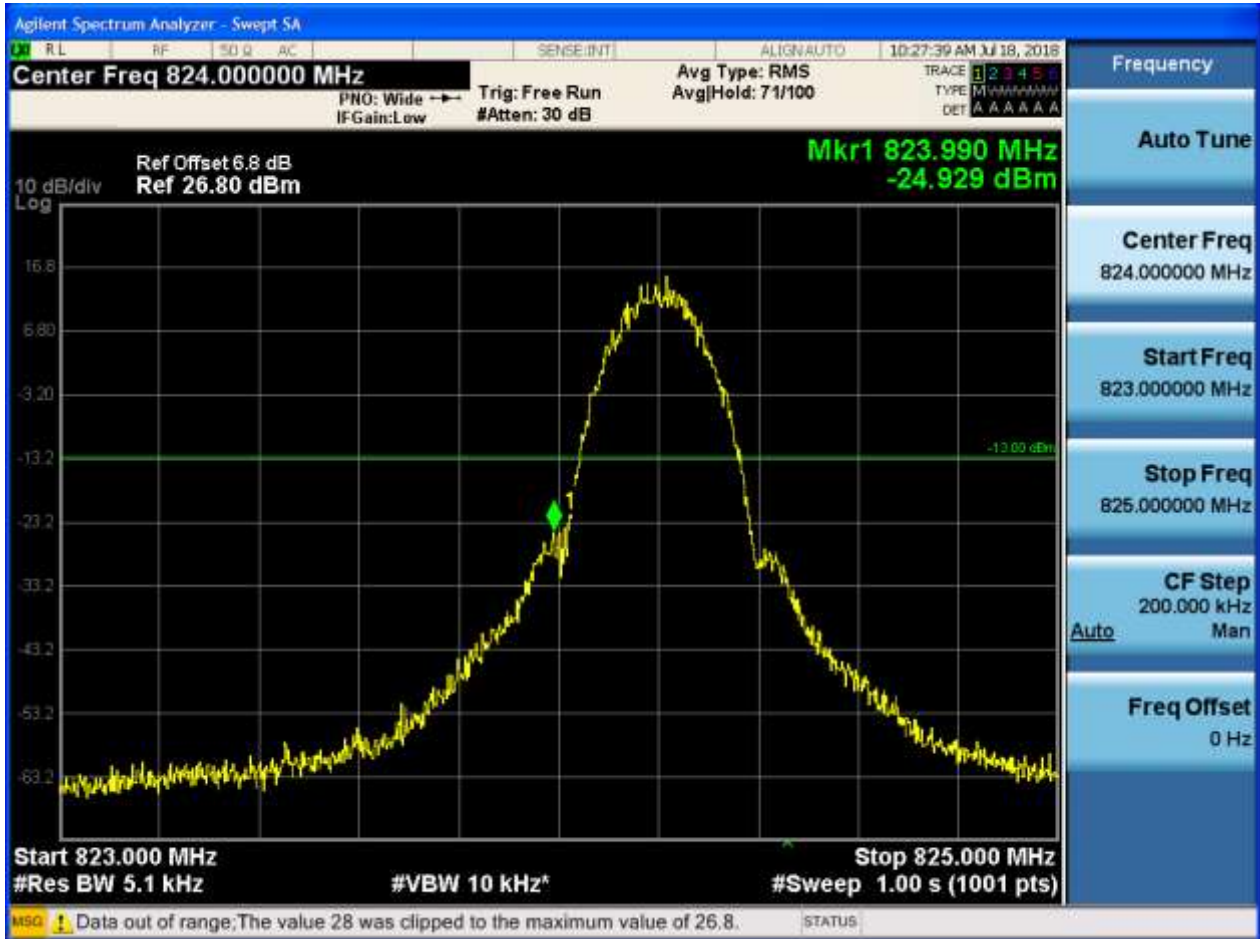


5.1.1.1.2 Test Channel = HCH



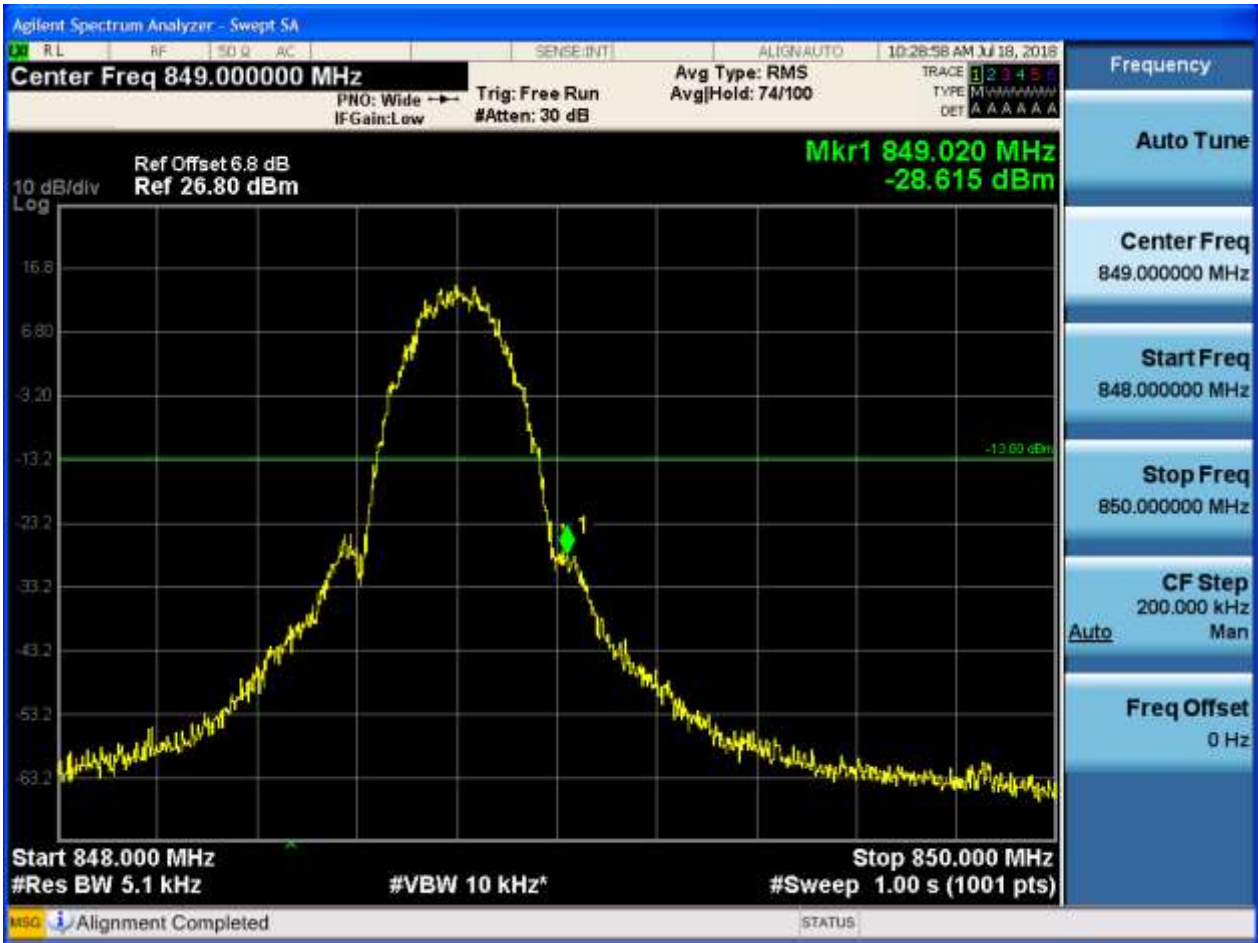
5.1.1.2 Test Mode = GSM/TM2

5.1.1.2.1 Test Channel = LCH





5.1.1.2.2 Test Channel = HCH

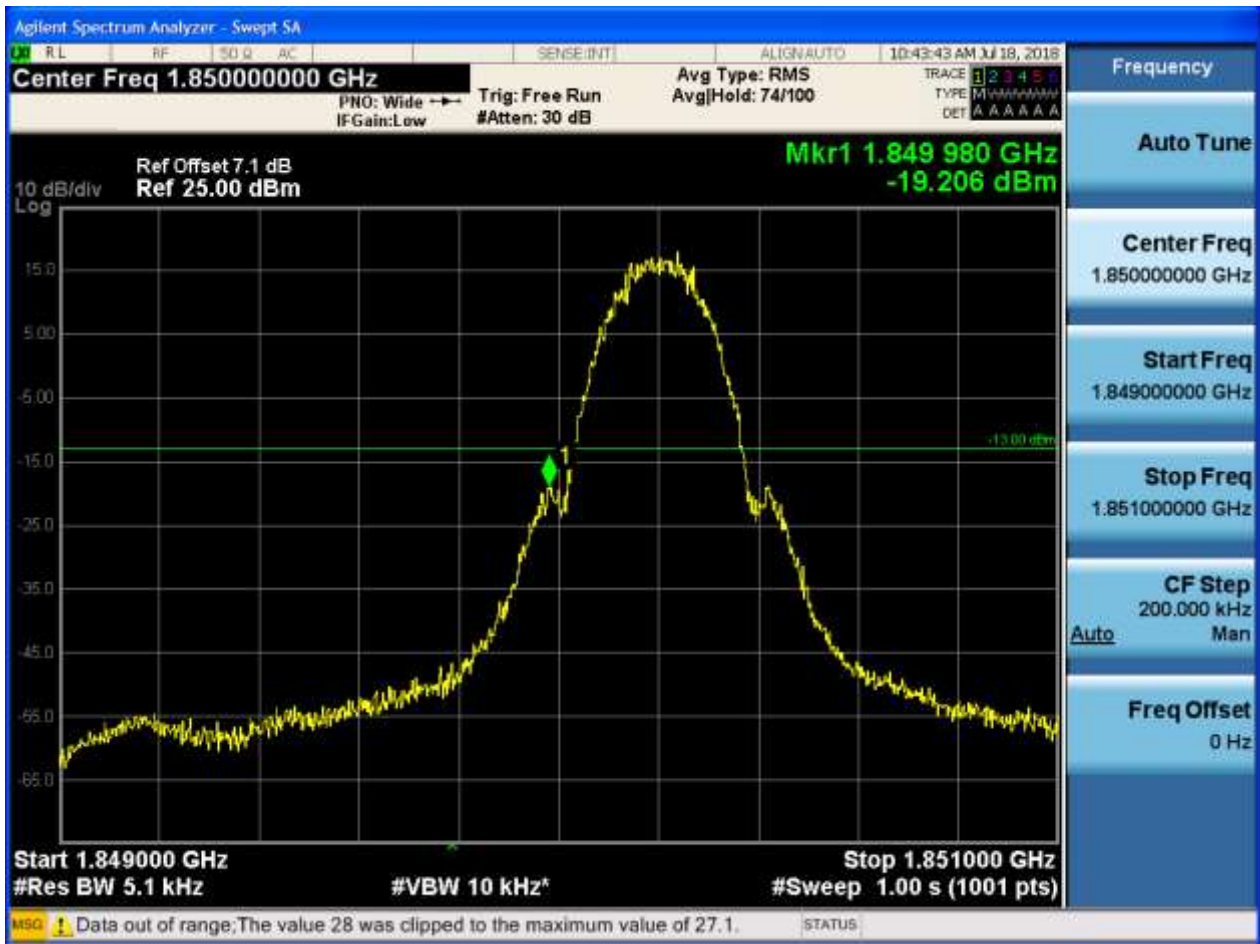




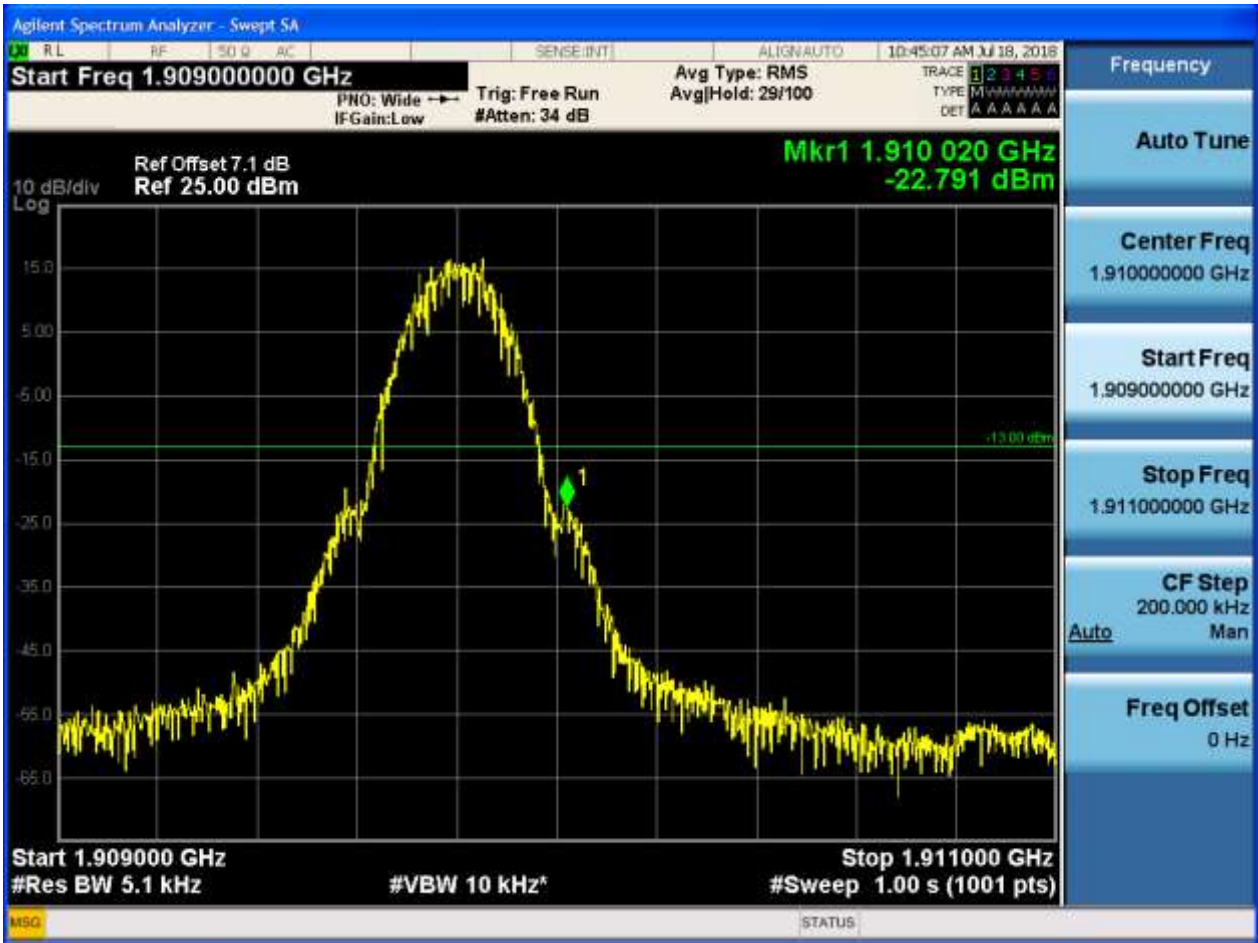
5.1.2 Test Band = GSM1900

5.1.2.1 Test Mode = GSM/TM1

5.1.2.1.1 Test Channel = LCH

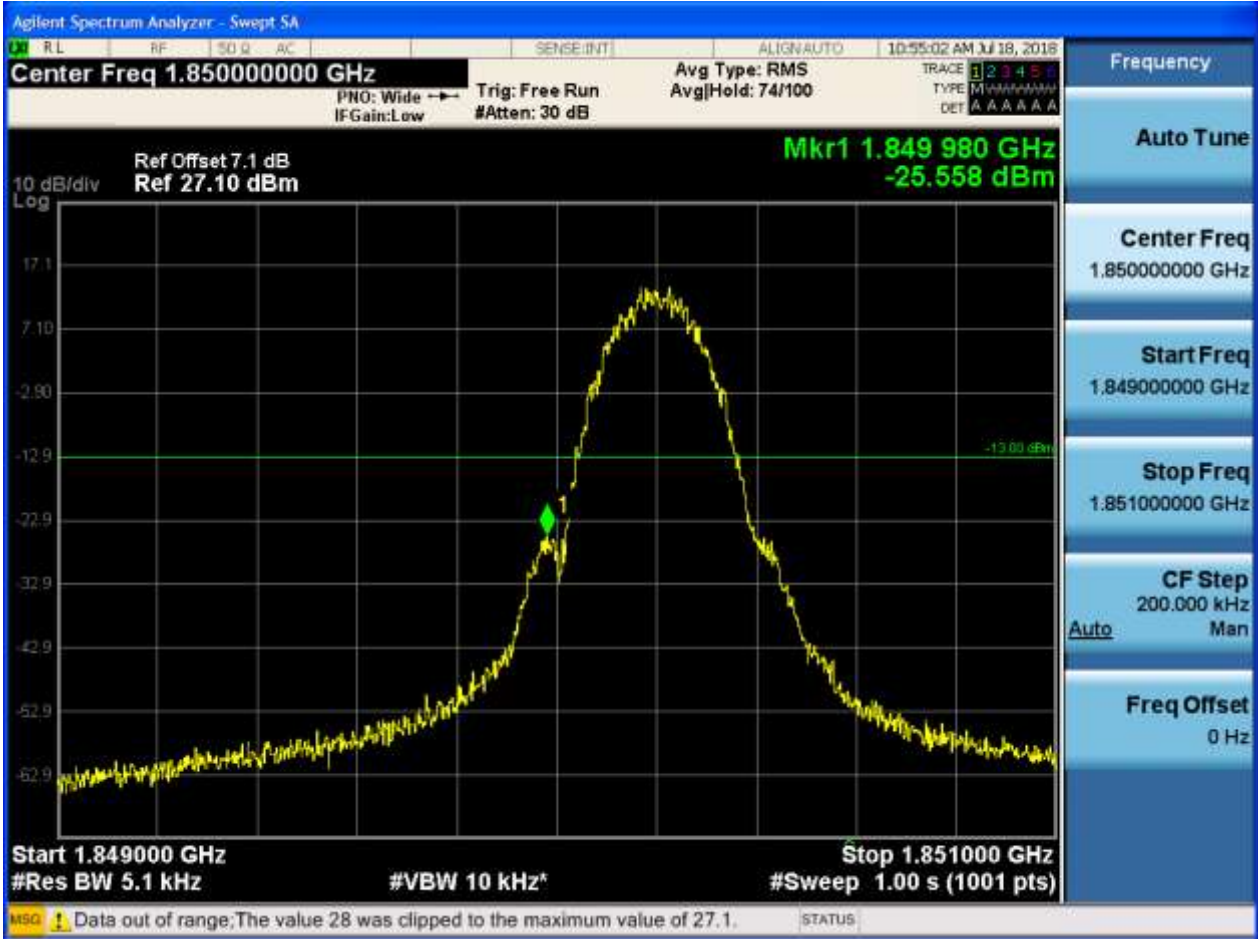


5.1.2.1.2 Test Channel = HCH

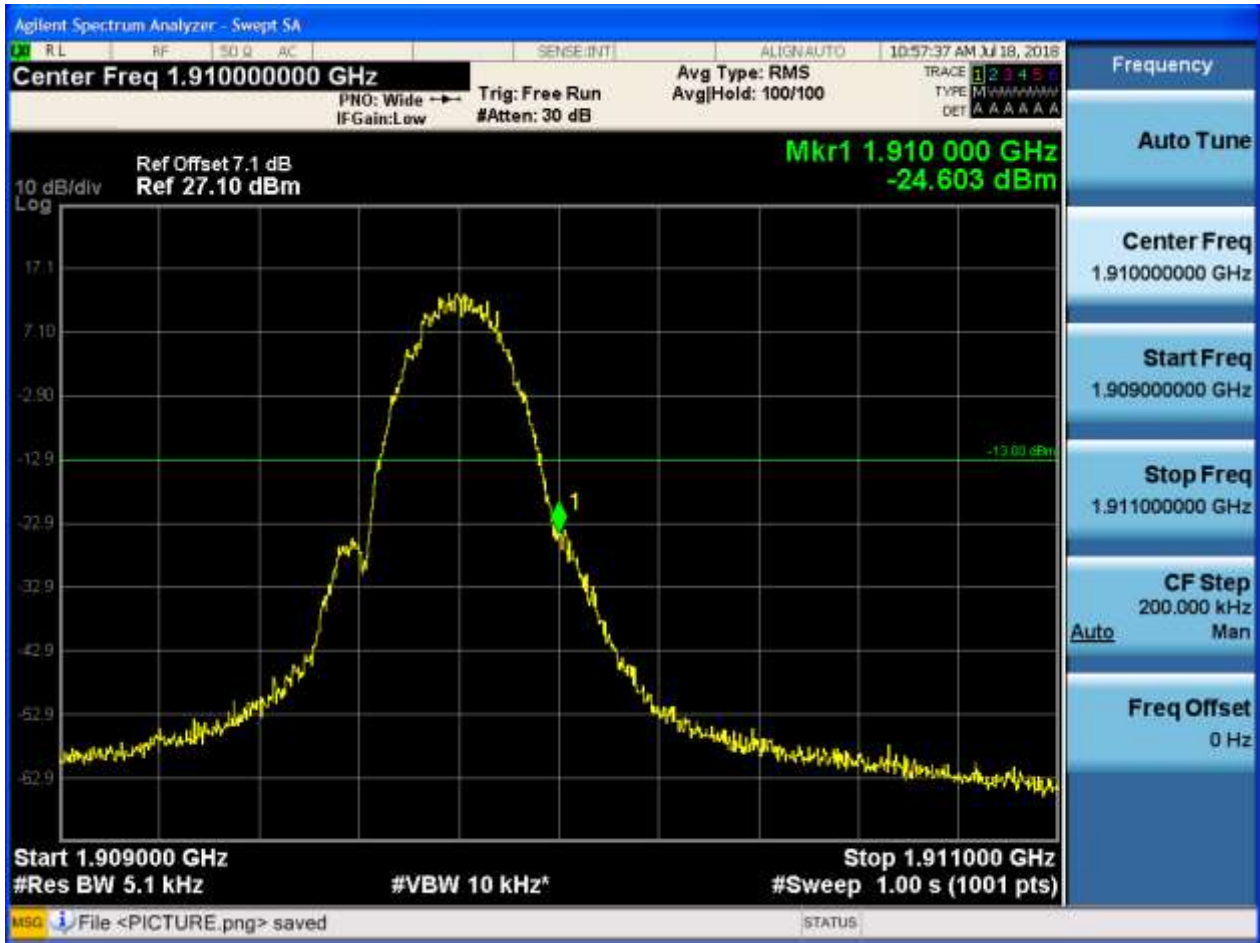


5.1.2.2 Test Mode = GSM/TM2

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

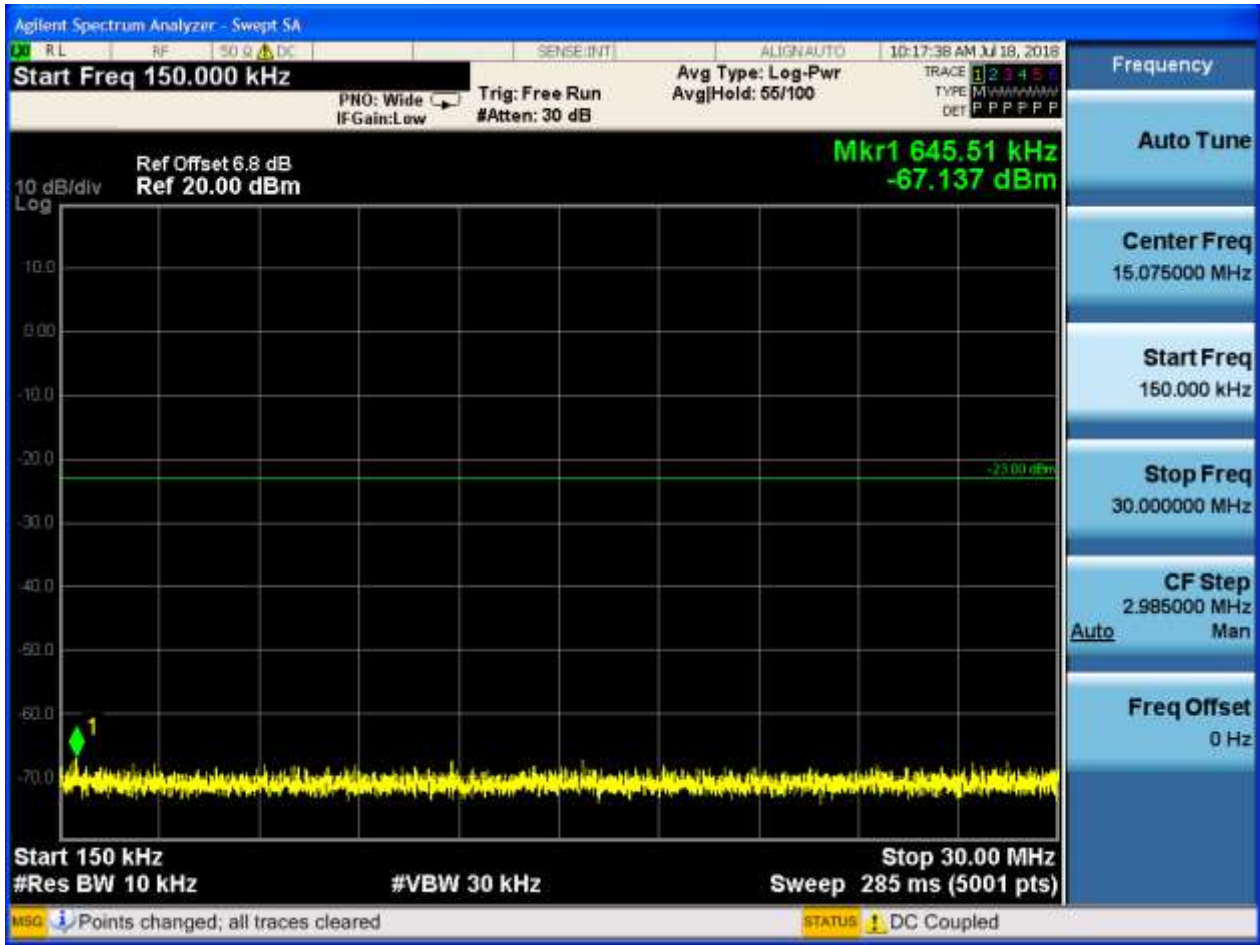
#### 6.1 For GSM

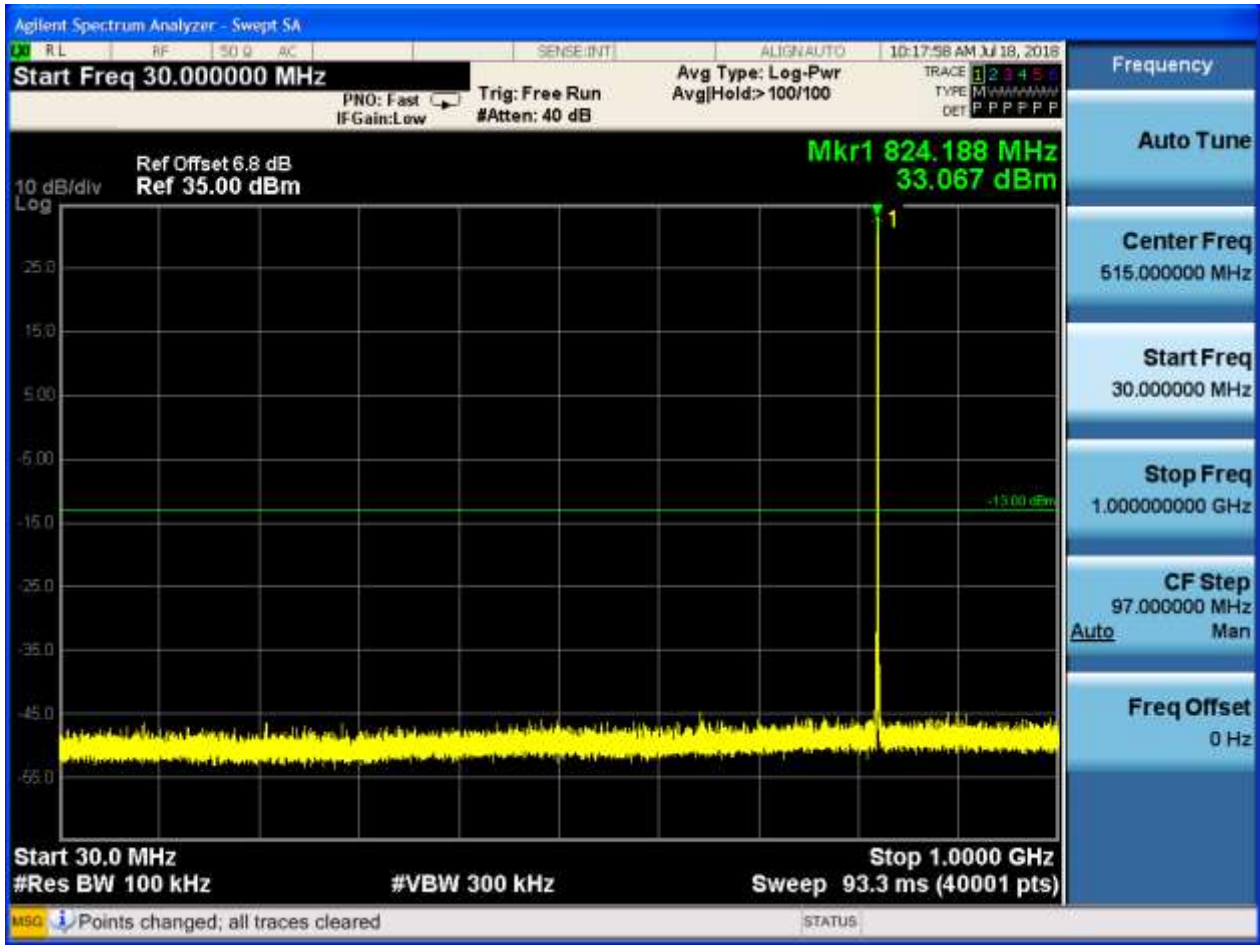
##### 6.1.1 Test Band = GSM850

##### 6.1.1.1 Test Mode = GSM/TM1

##### 6.1.1.1.1 Test Channel = LCH





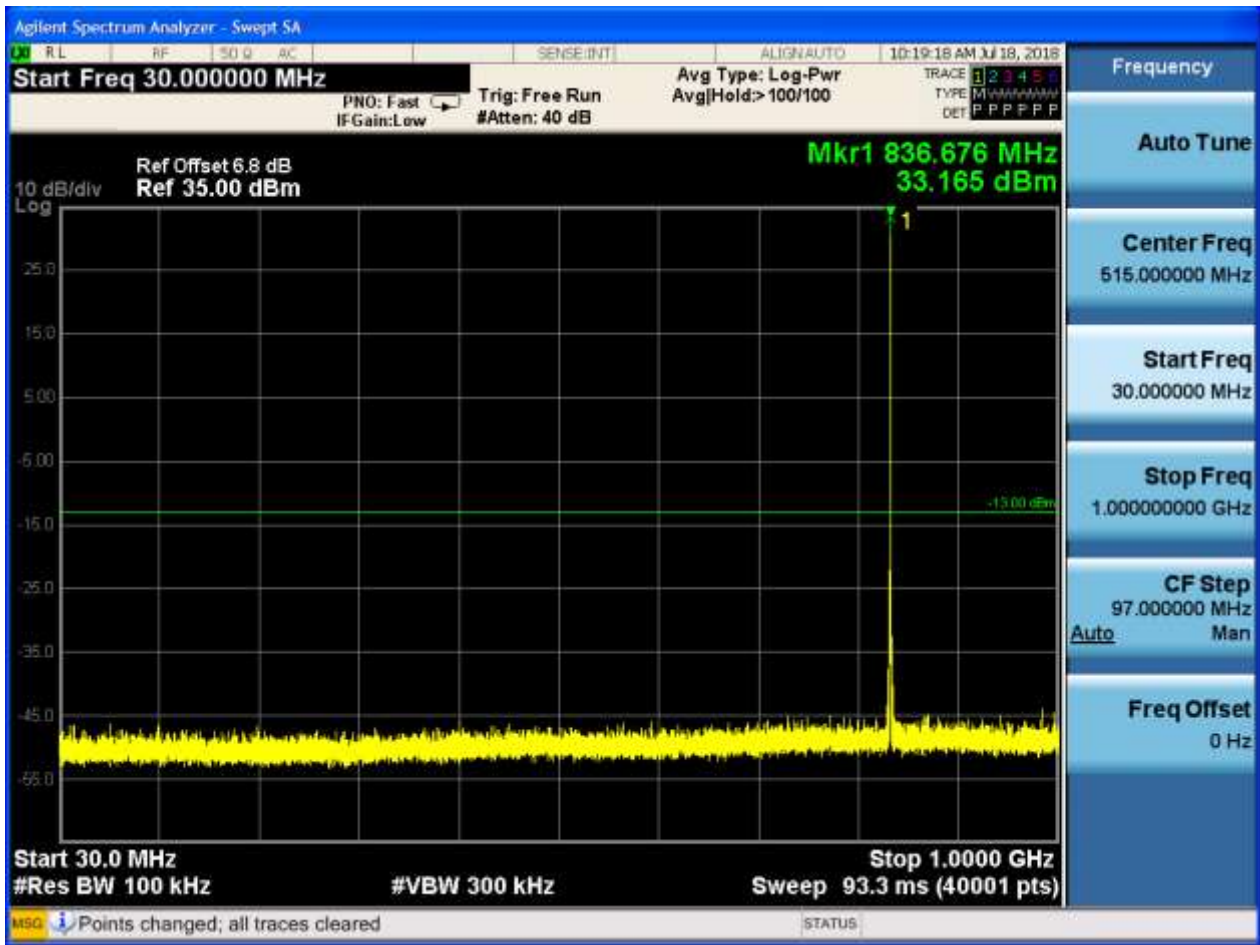


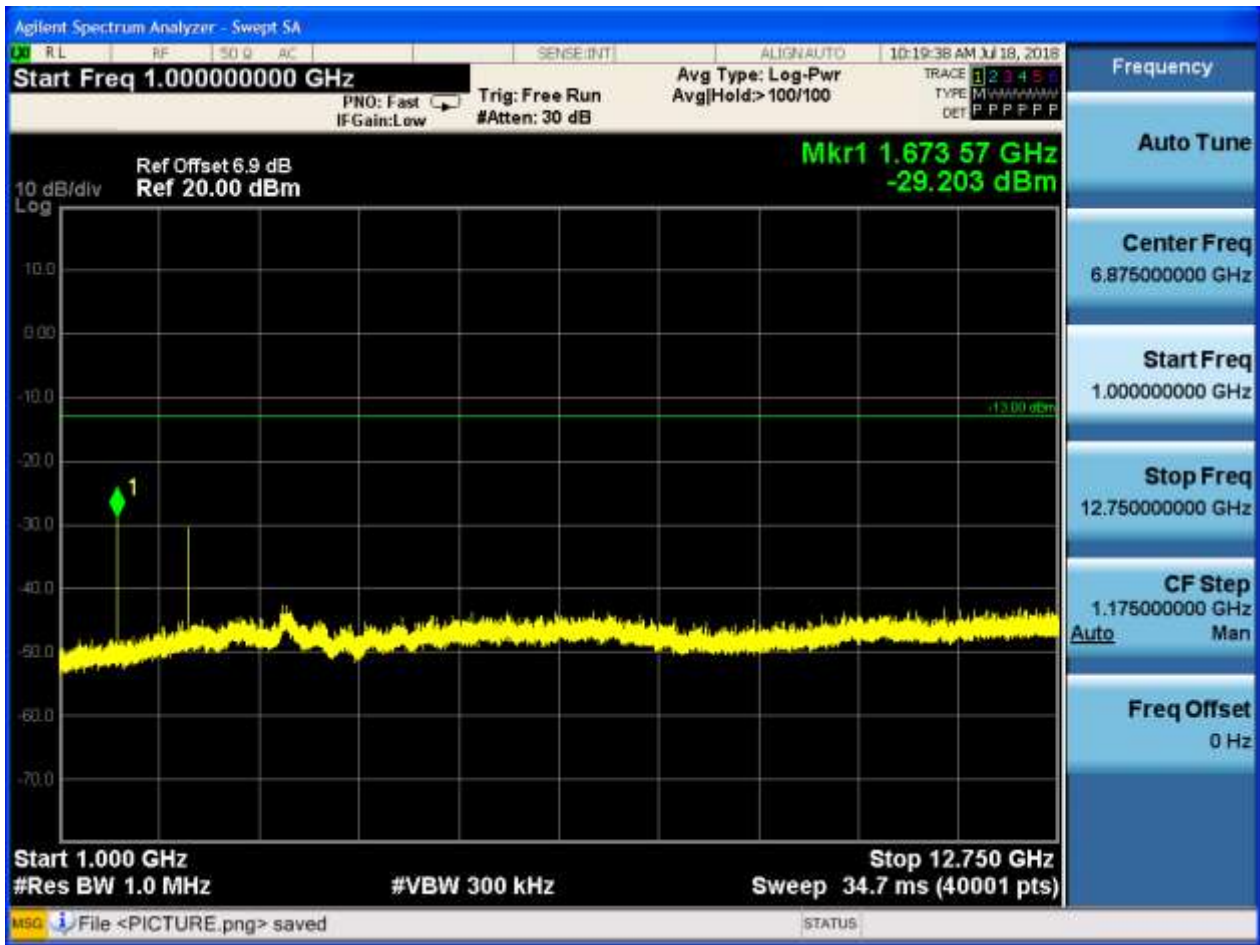










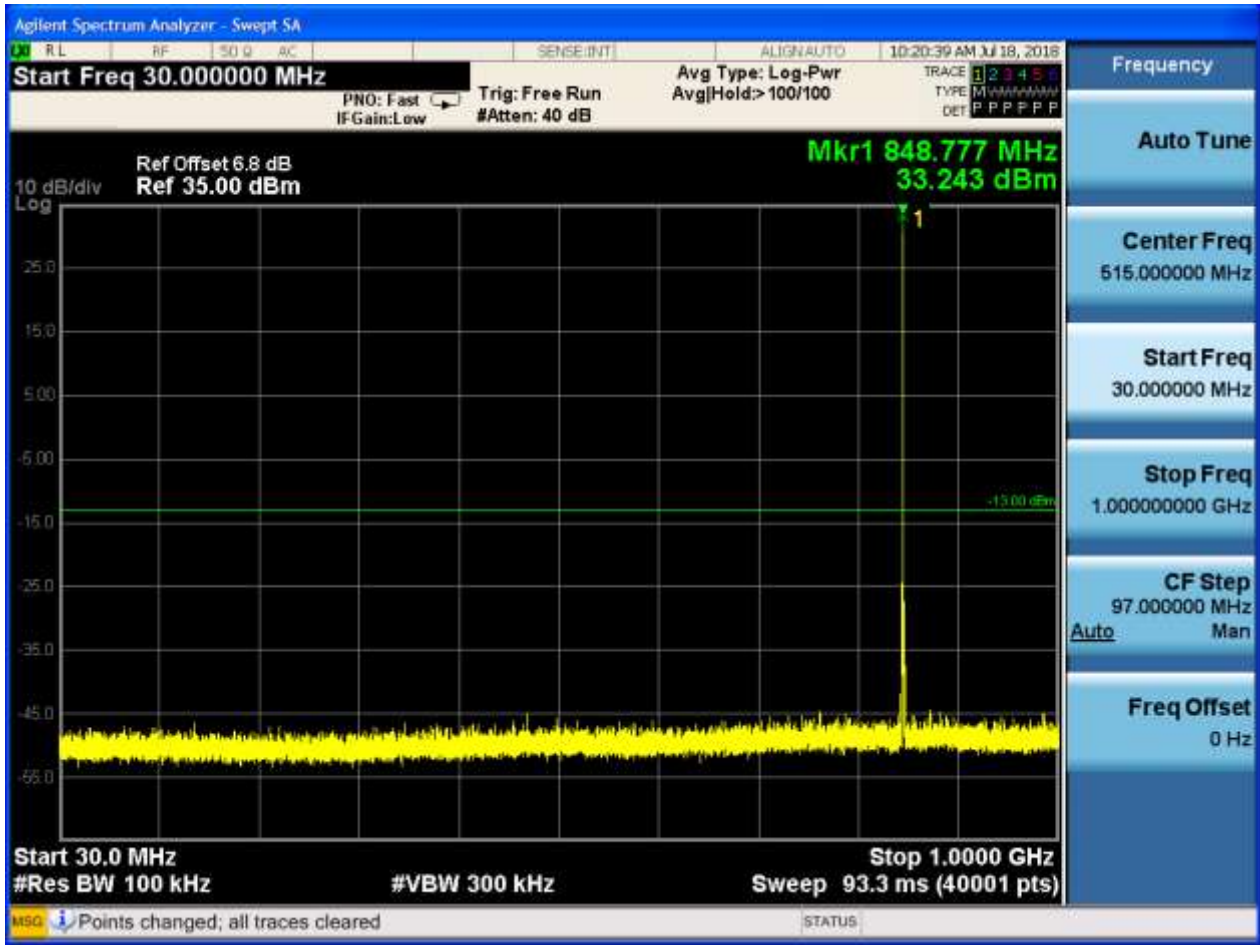


## 6.1.1.1.3 Test Channel = HCH

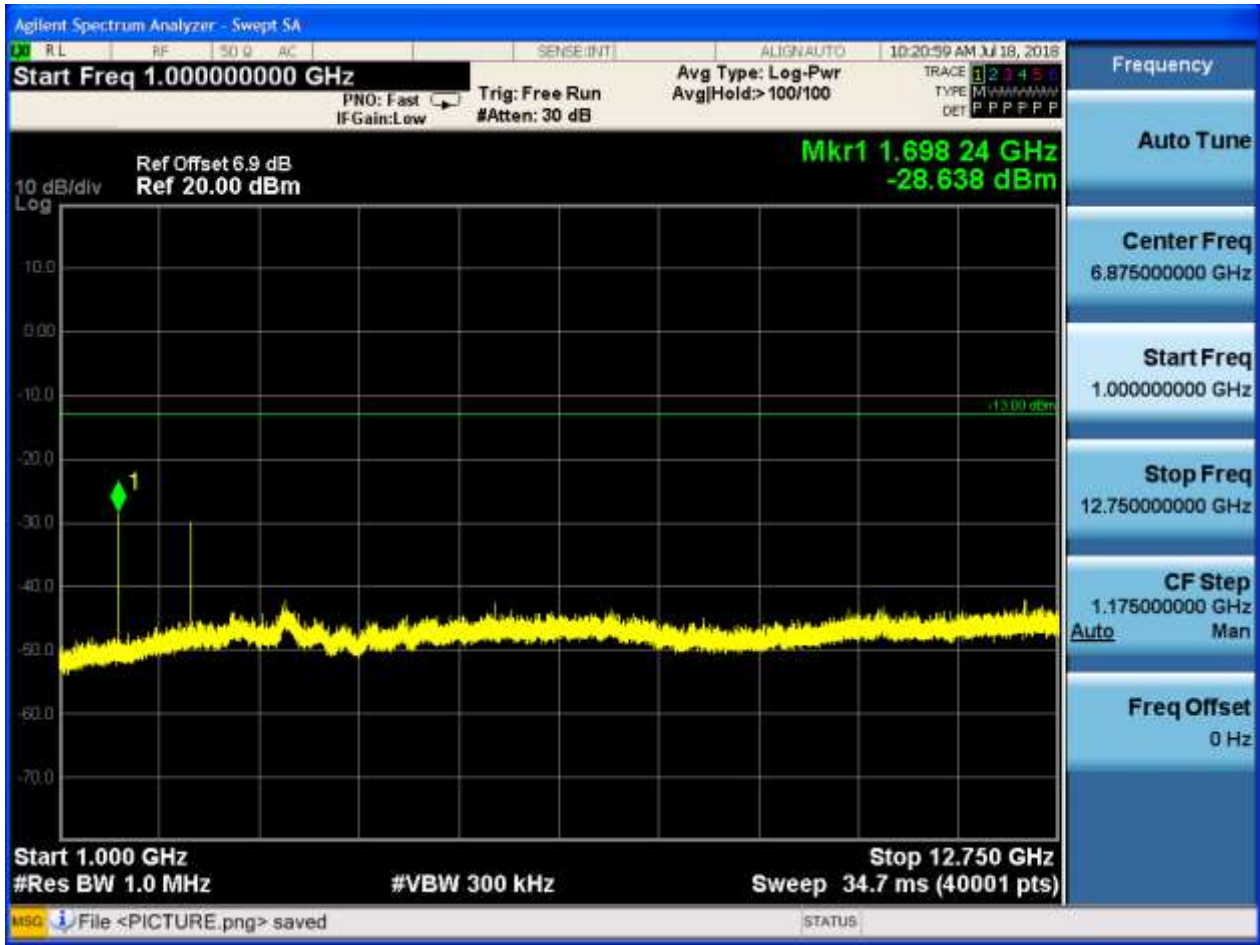








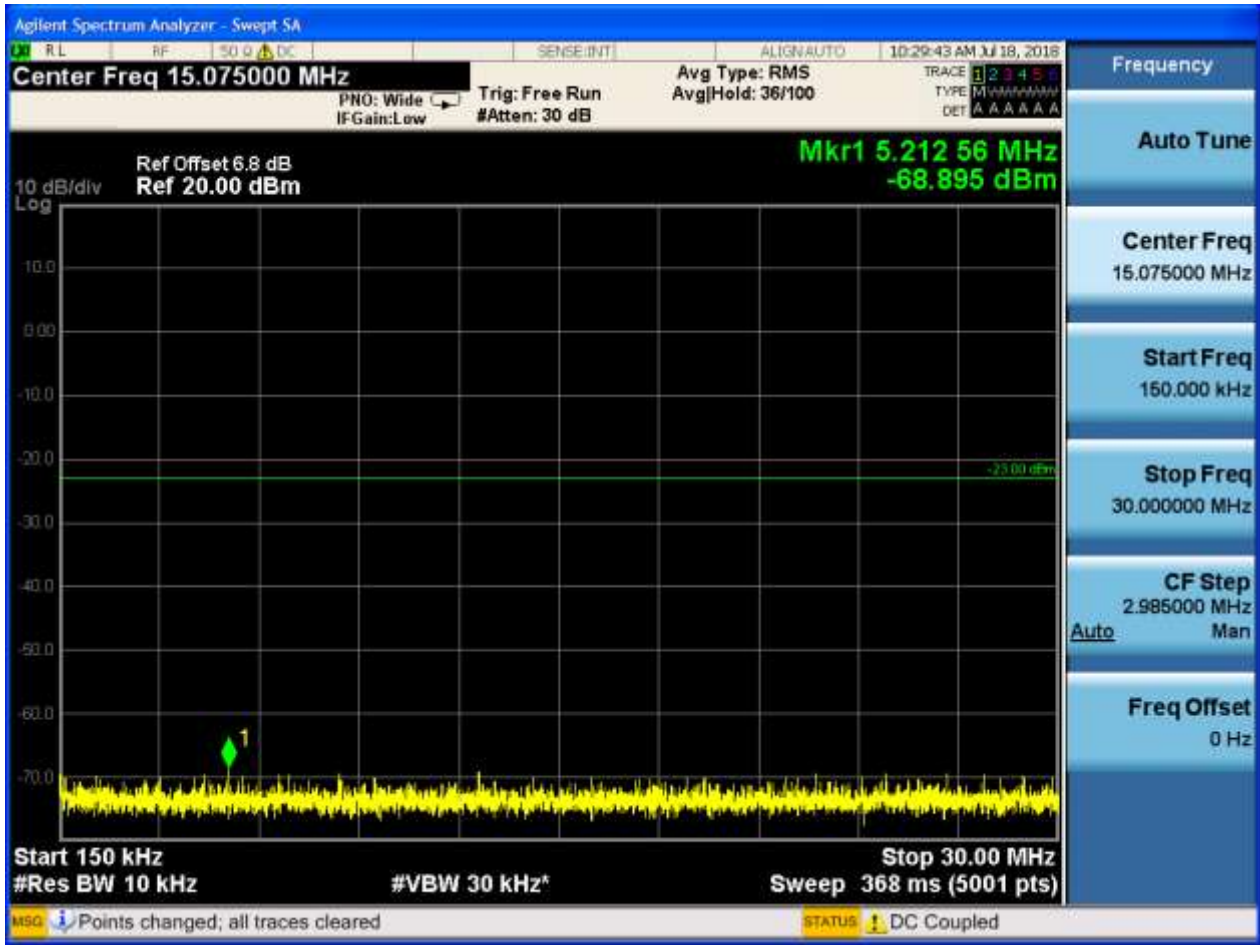


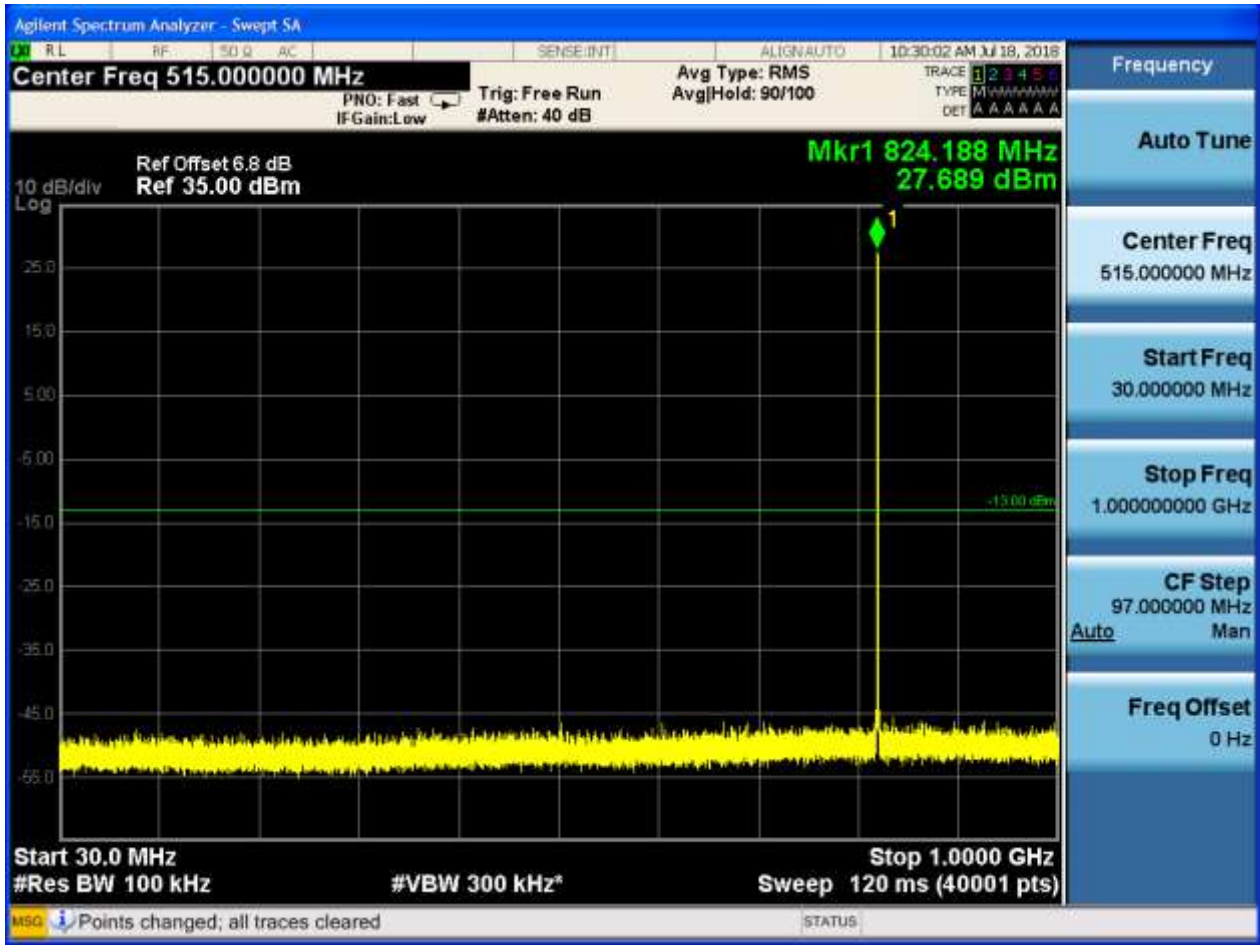


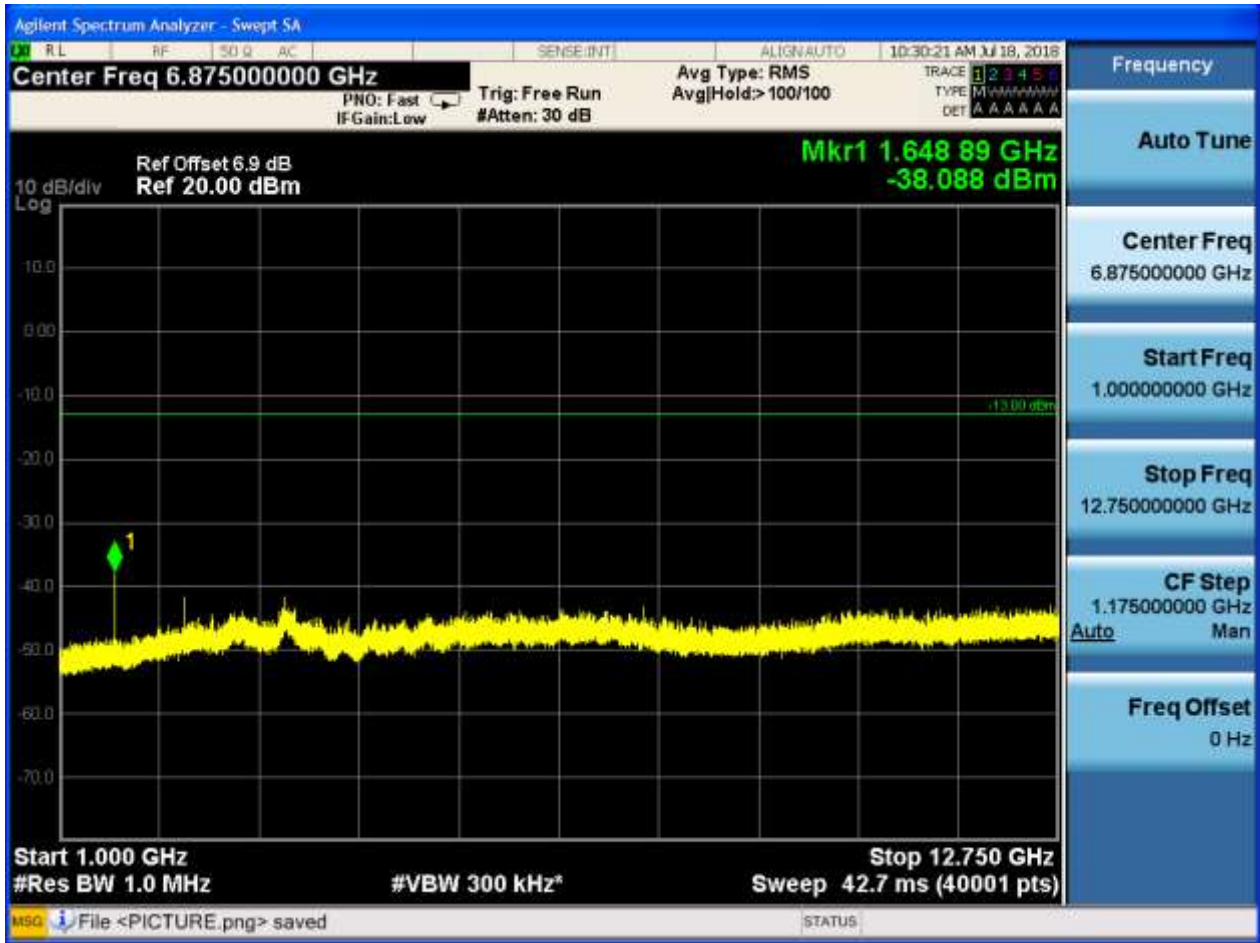
### 6.1.1.2 Test Mode = GSM/TM2

#### 6.1.1.2.1 Test Channel = LCH









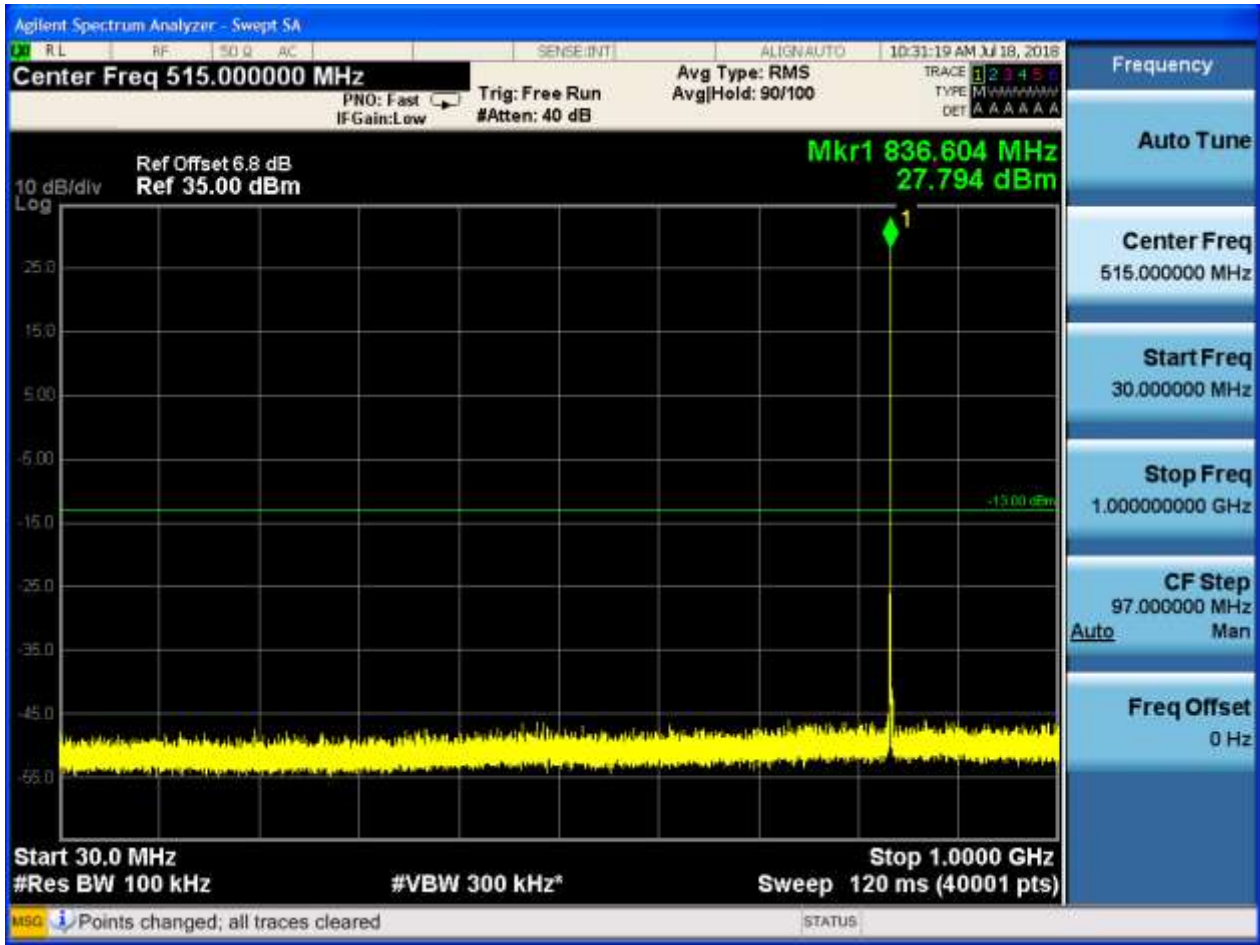
6.1.1.2.2 Test Channel = MCH

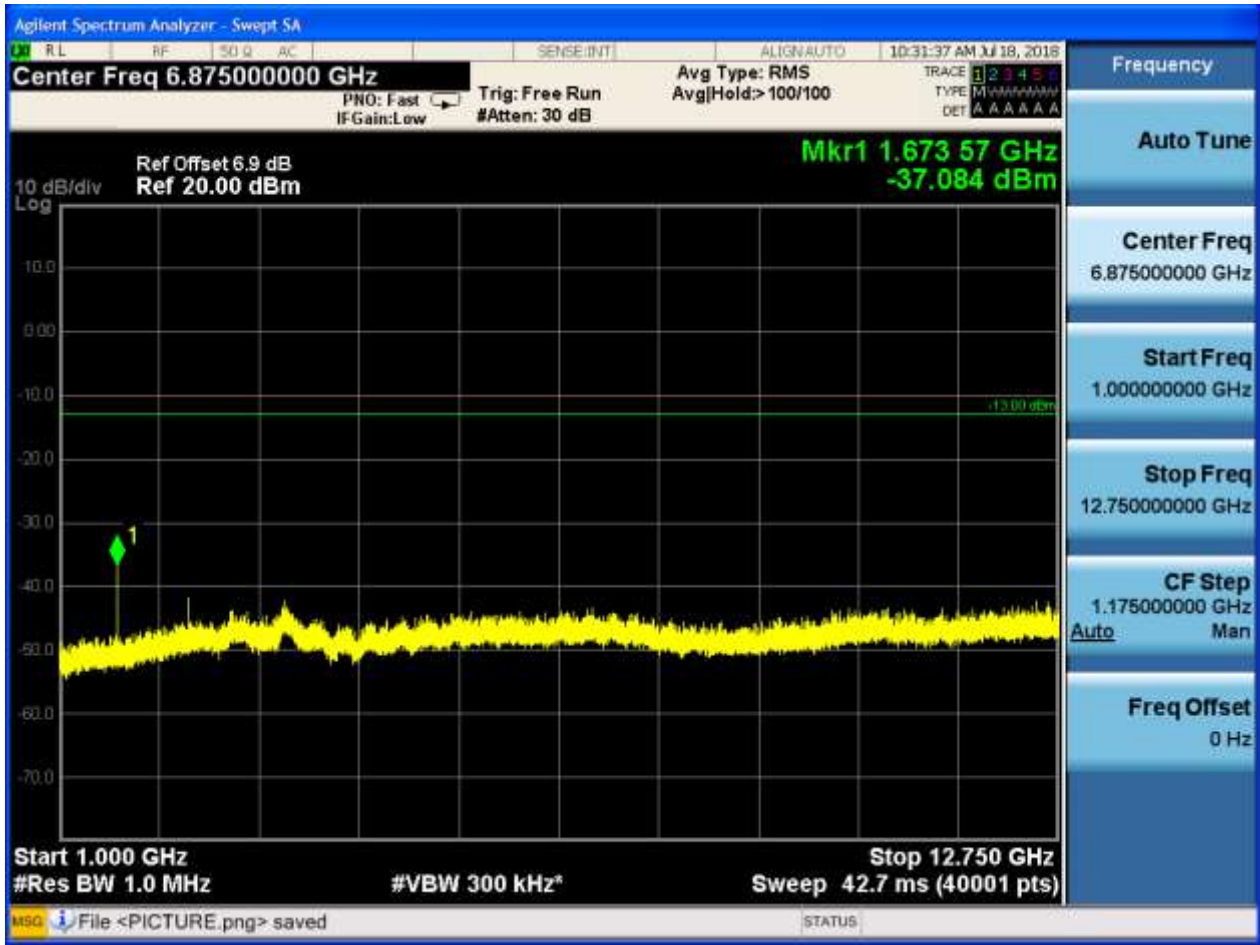






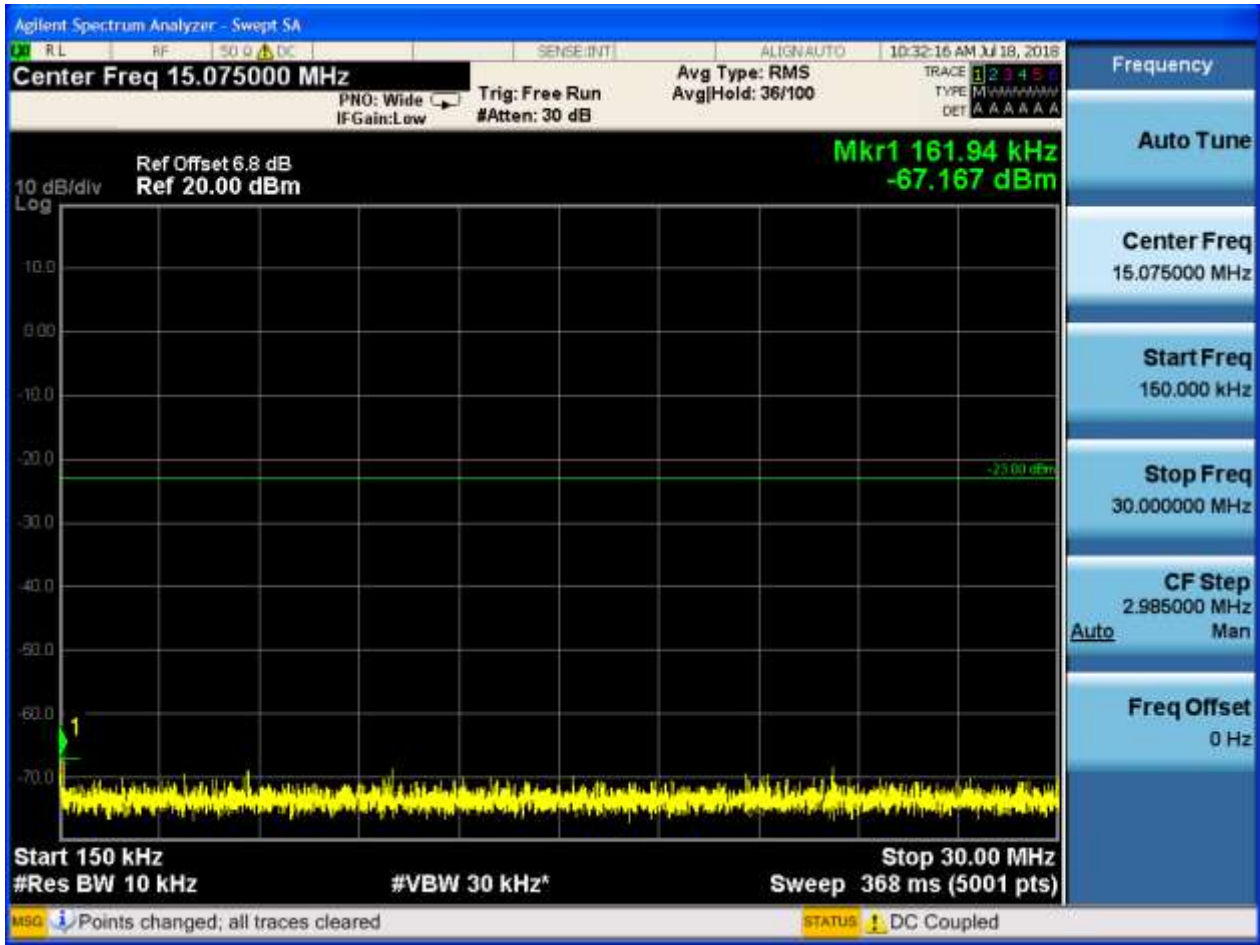


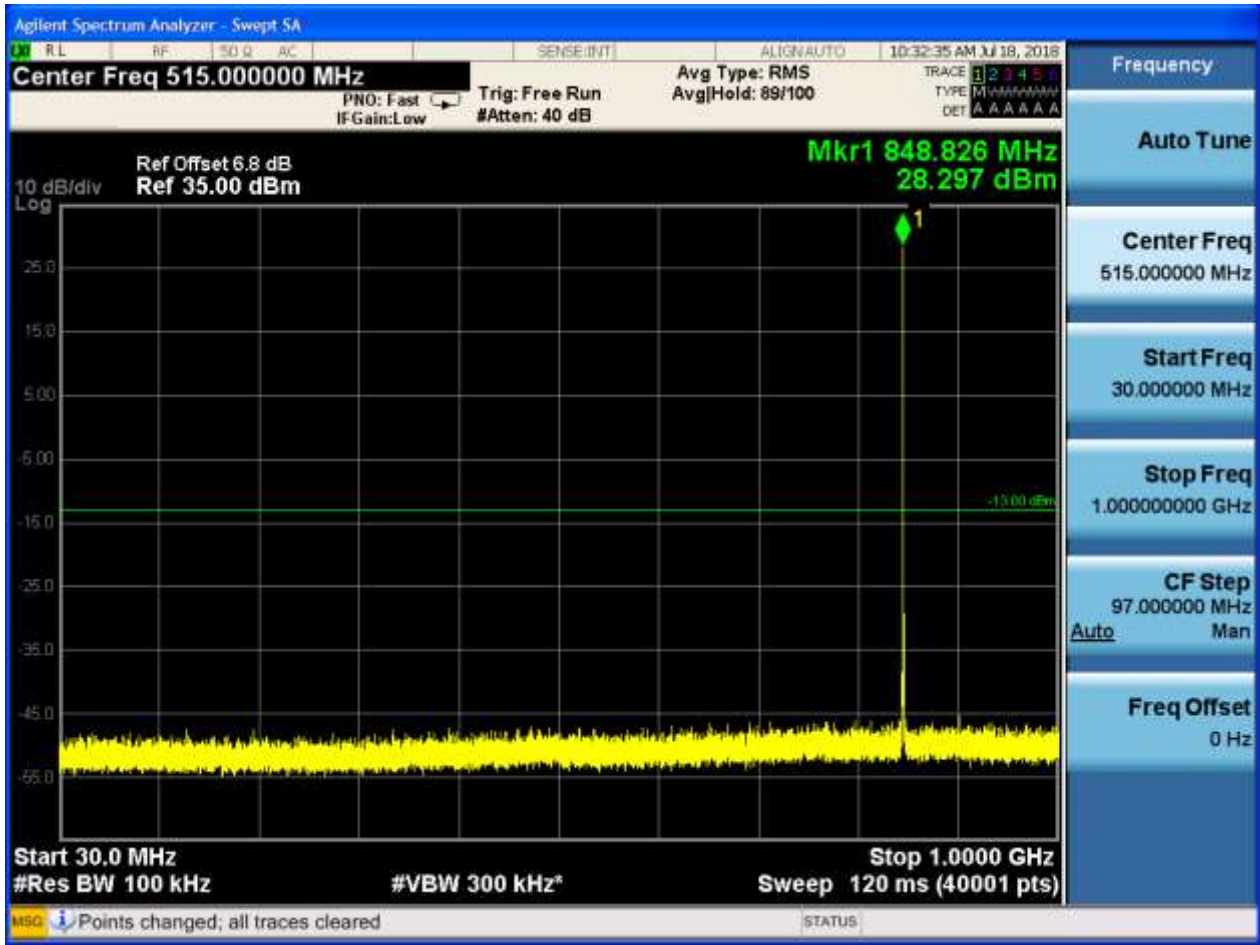


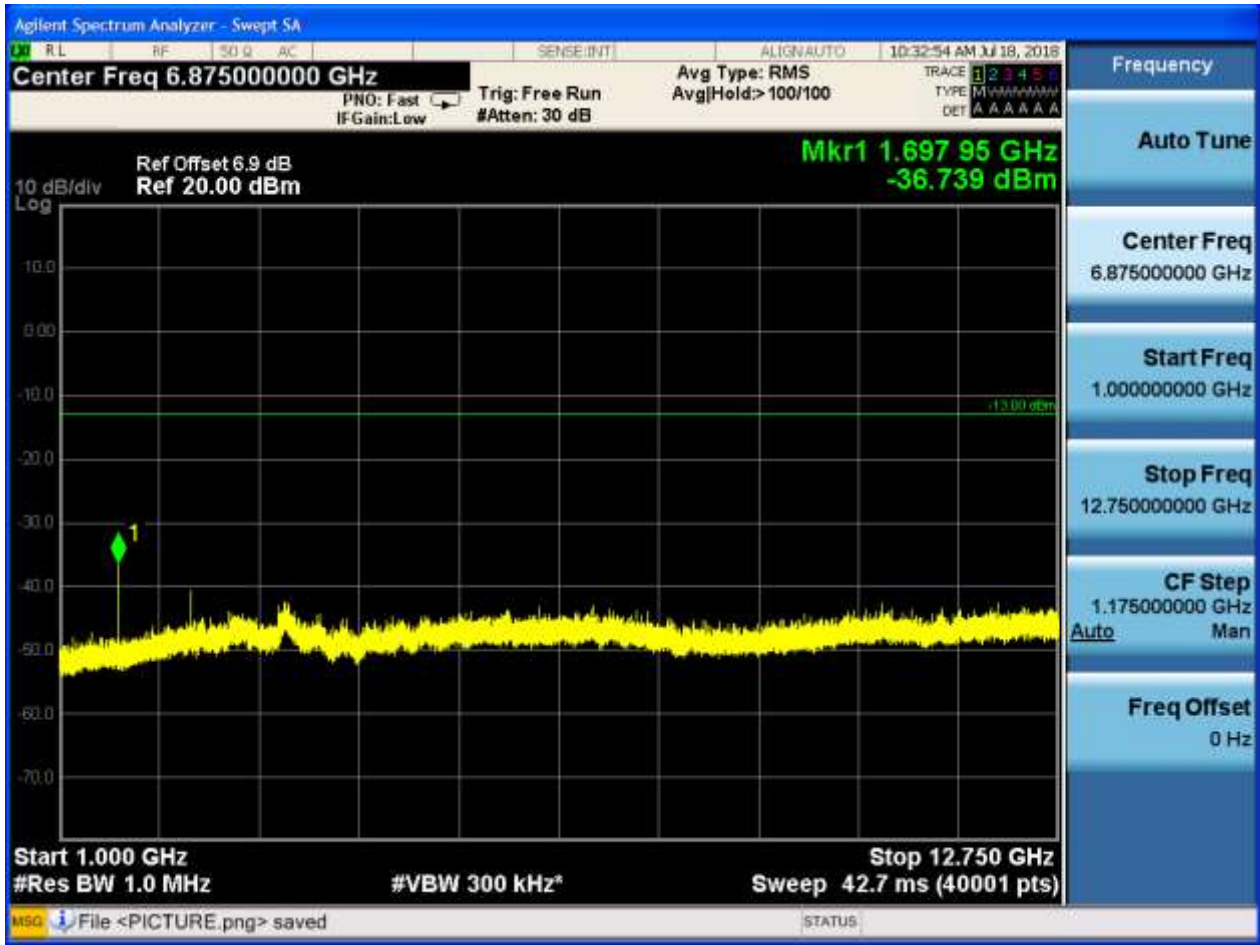


6.1.1.2.3 Test Channel = HCH













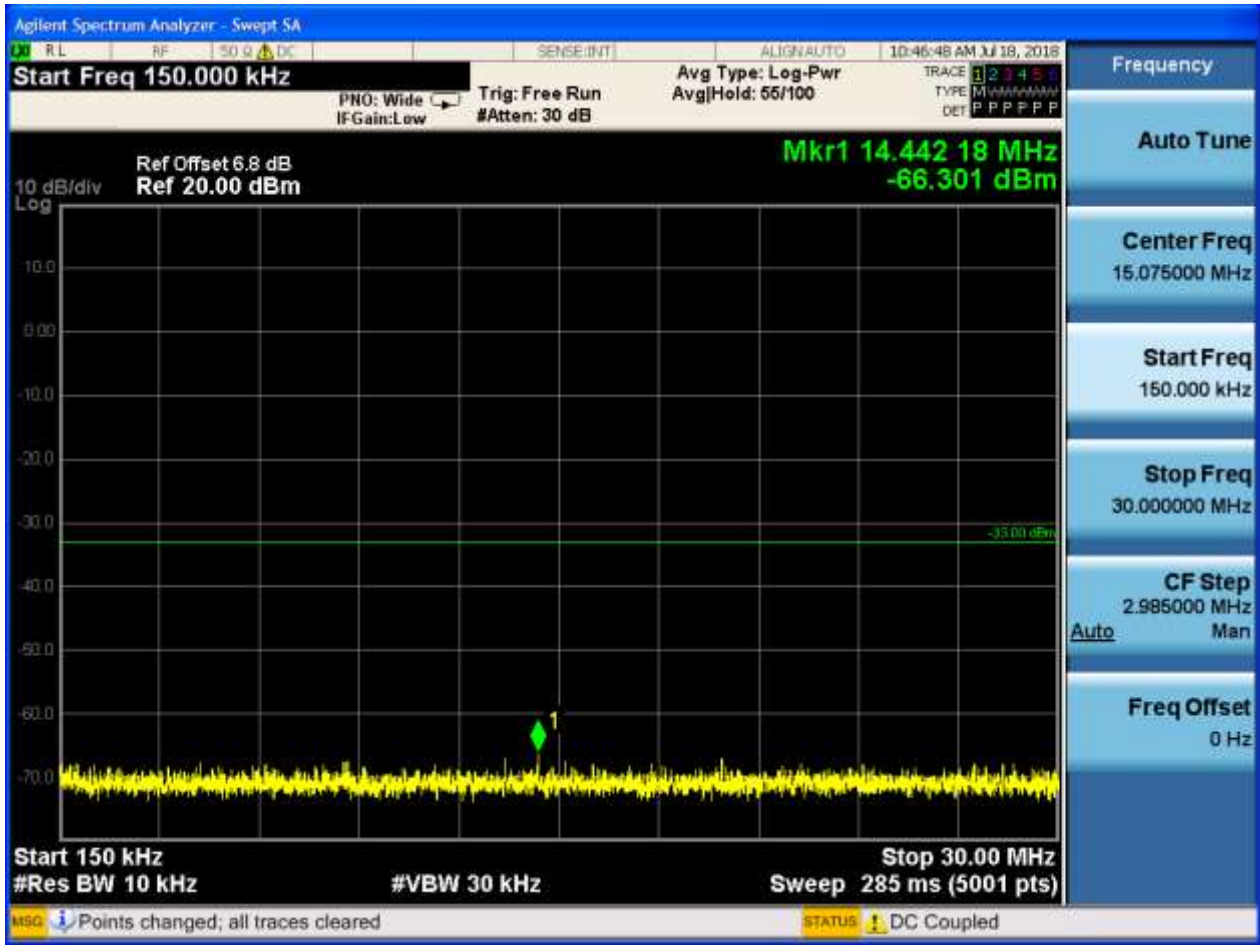
6.1.2 Test Band = GSM1900

6.1.2.1 Test Mode = GSM/TM1

6.1.2.1.1 Test Channel = LCH



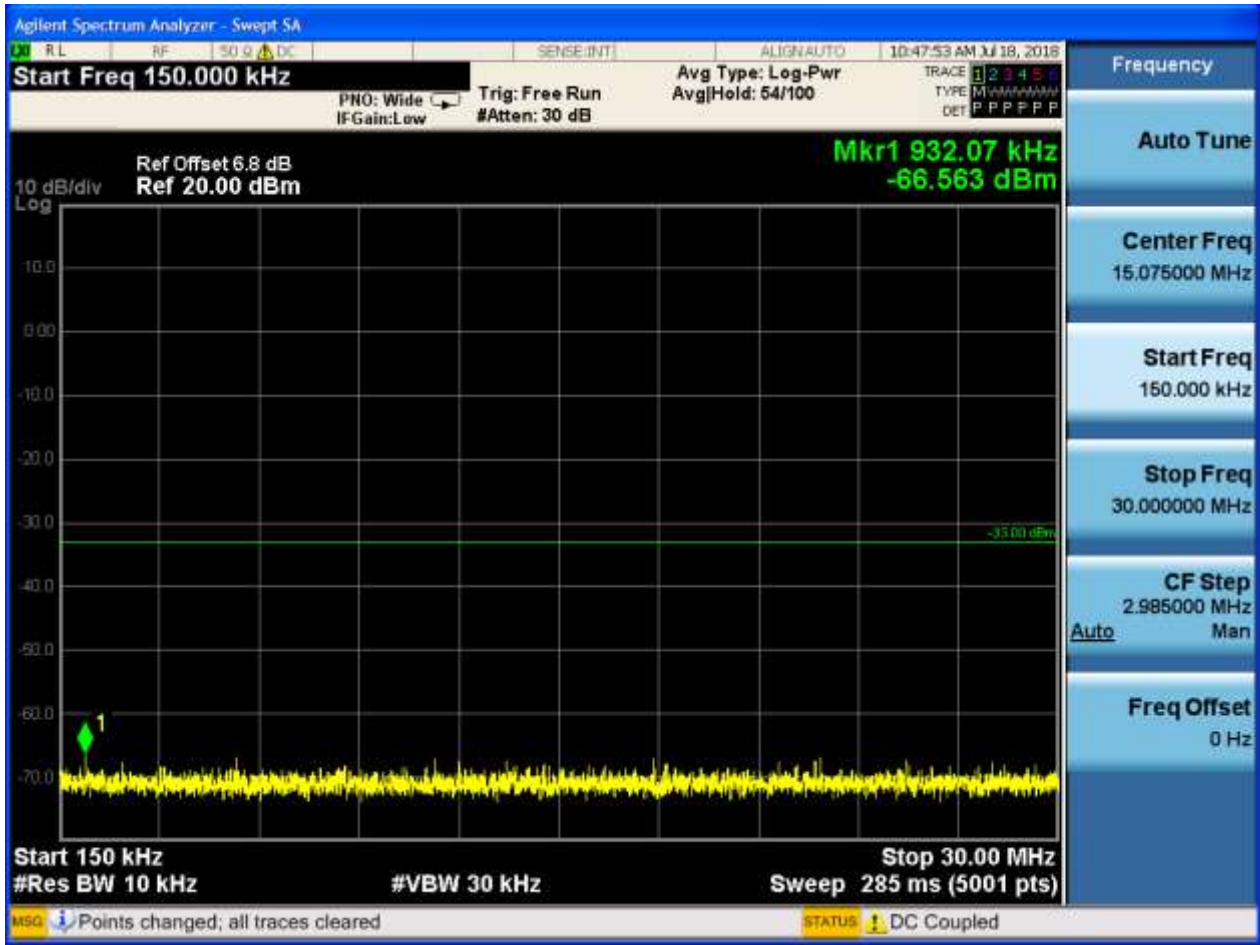






6.1.2.1.2 Test Channel = MCH



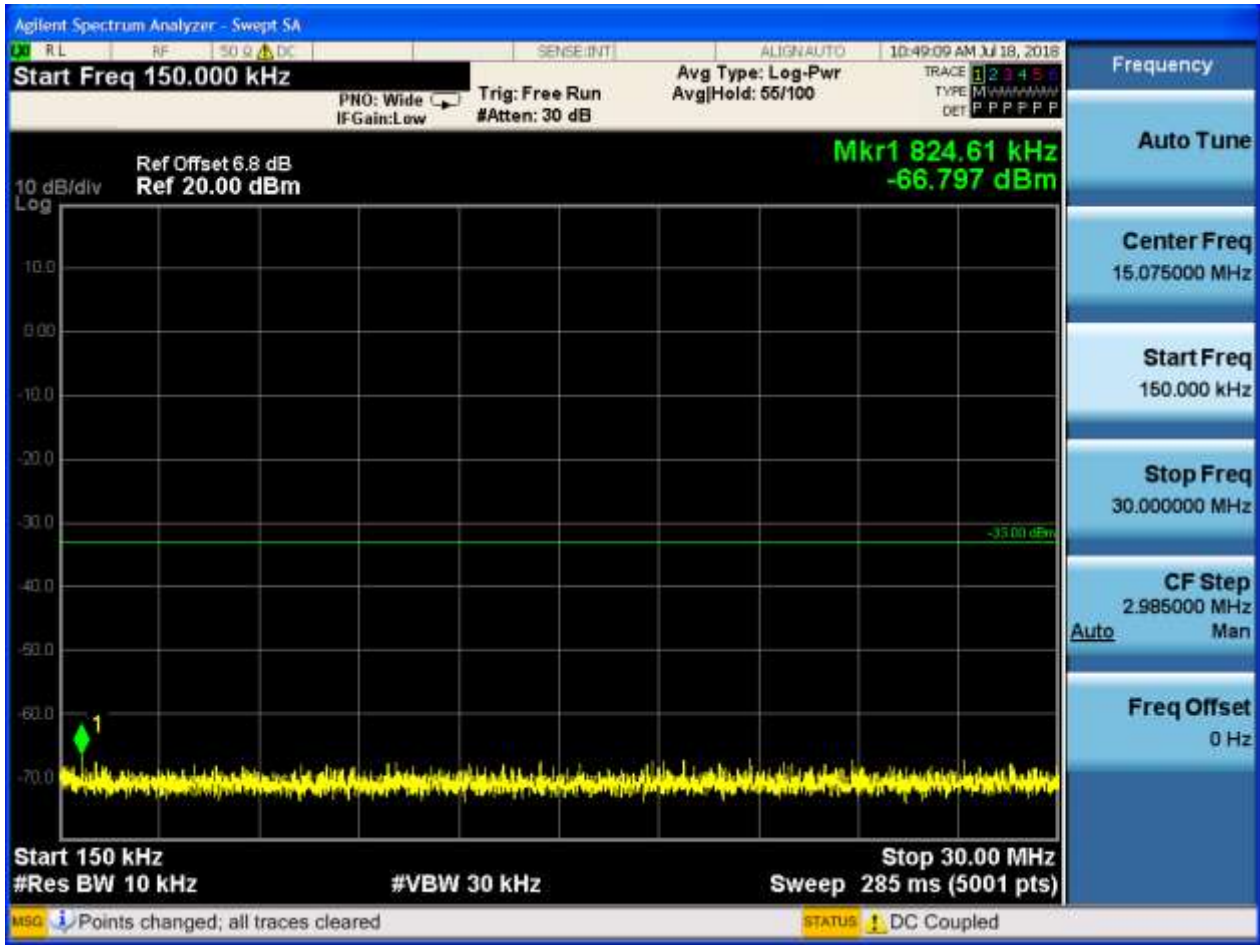




## 6.1.2.1.3 Test Channel = HCH





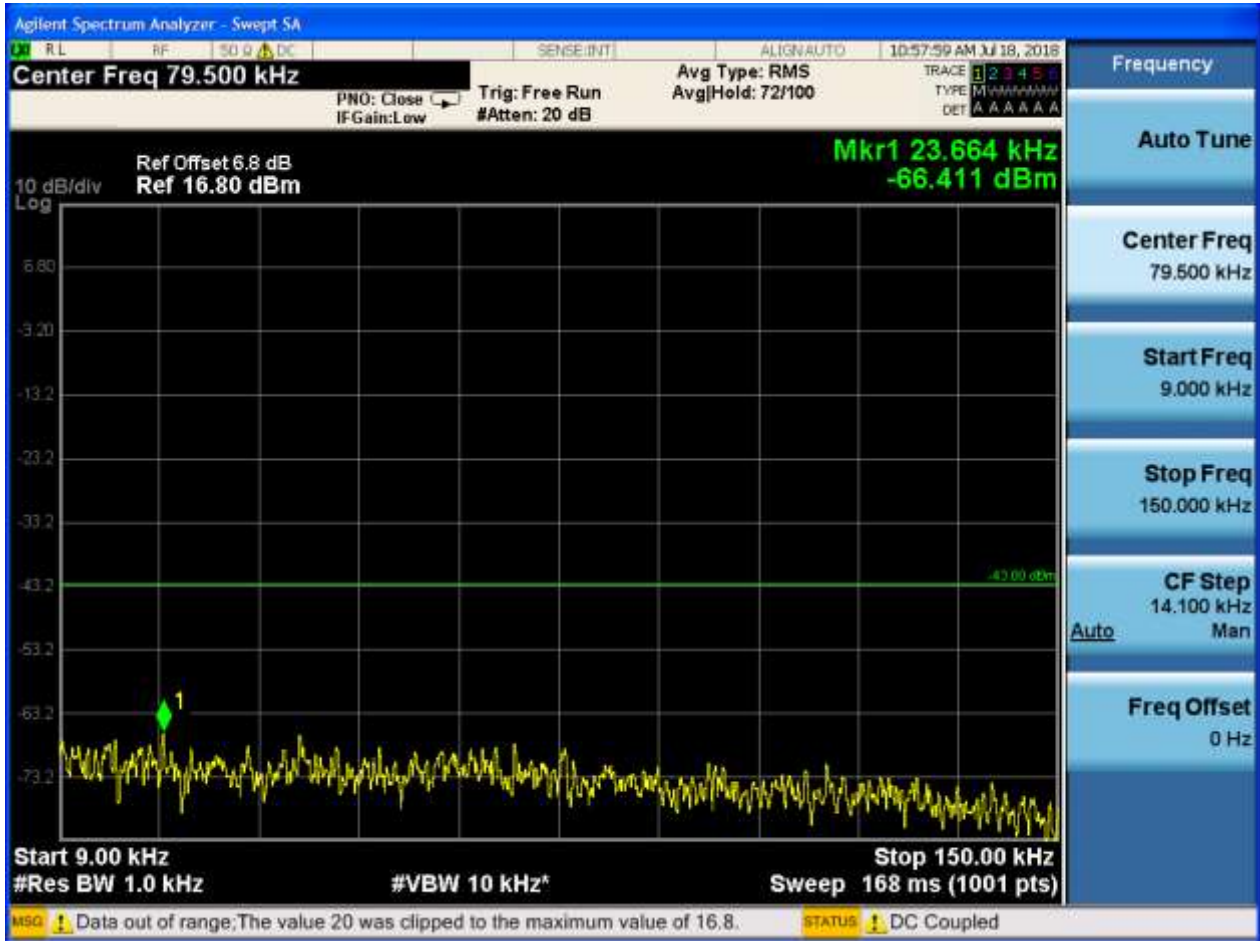


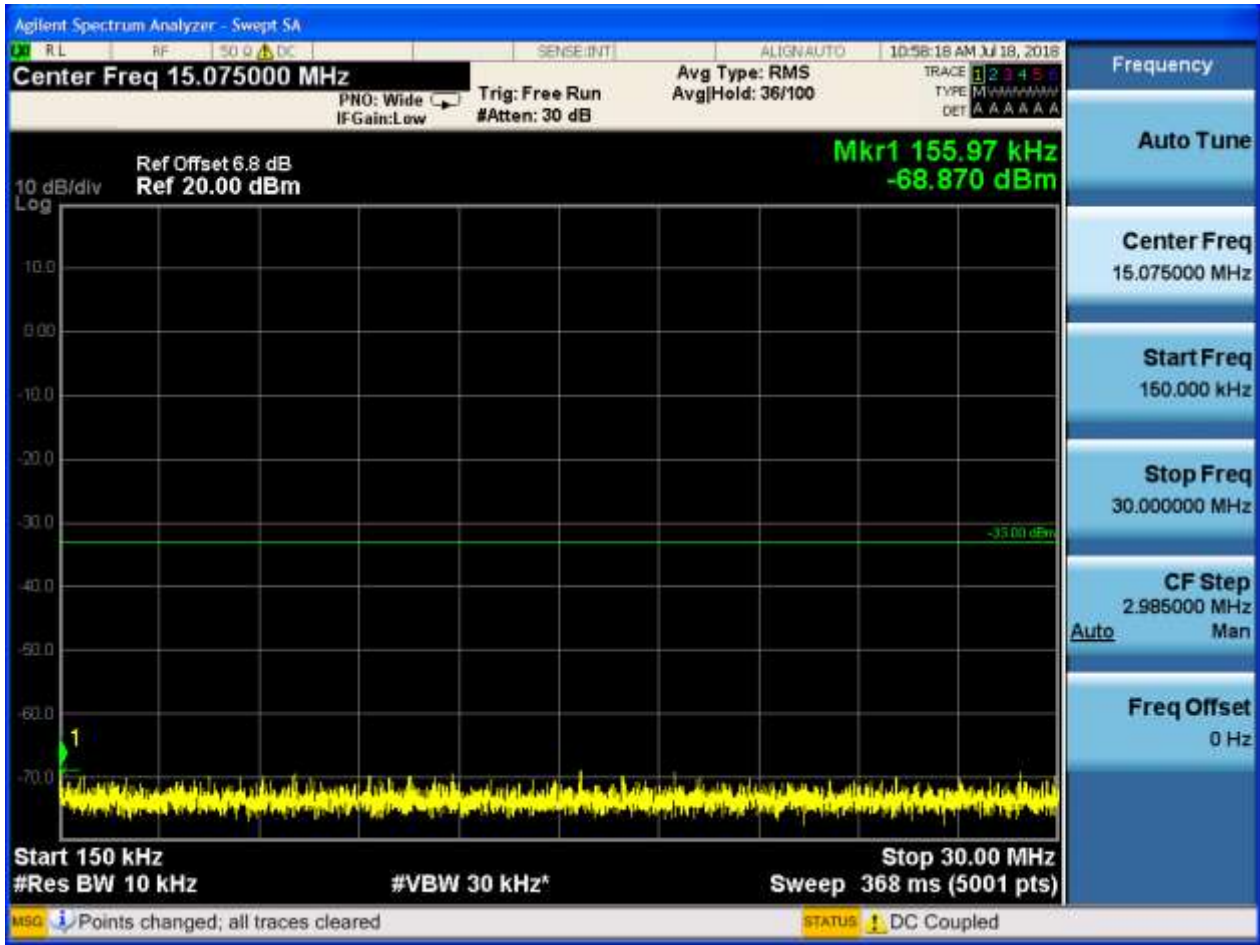




6.1.2.2 Test Mode = GSM/TM2

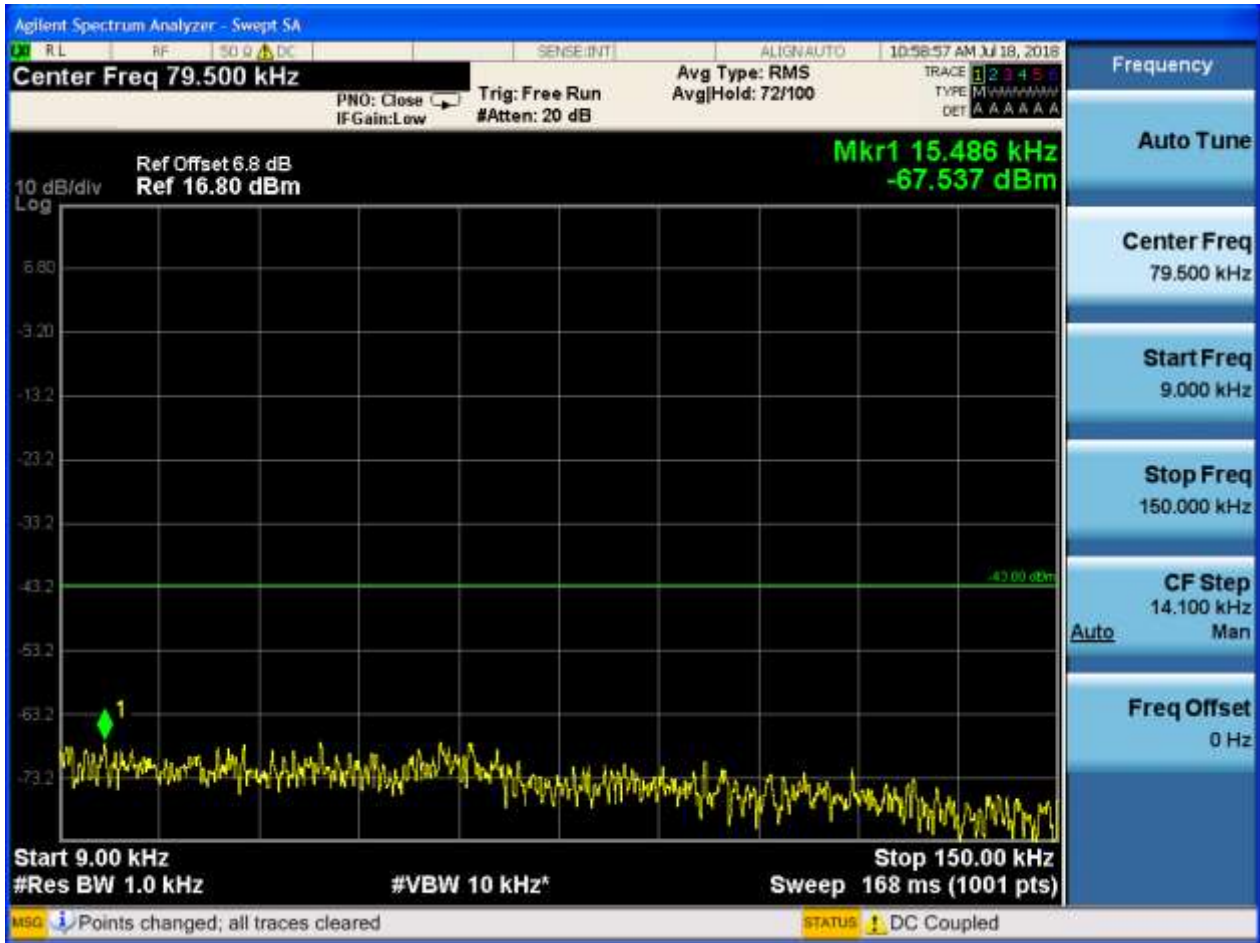
6.1.2.2.1 Test Channel = LCH

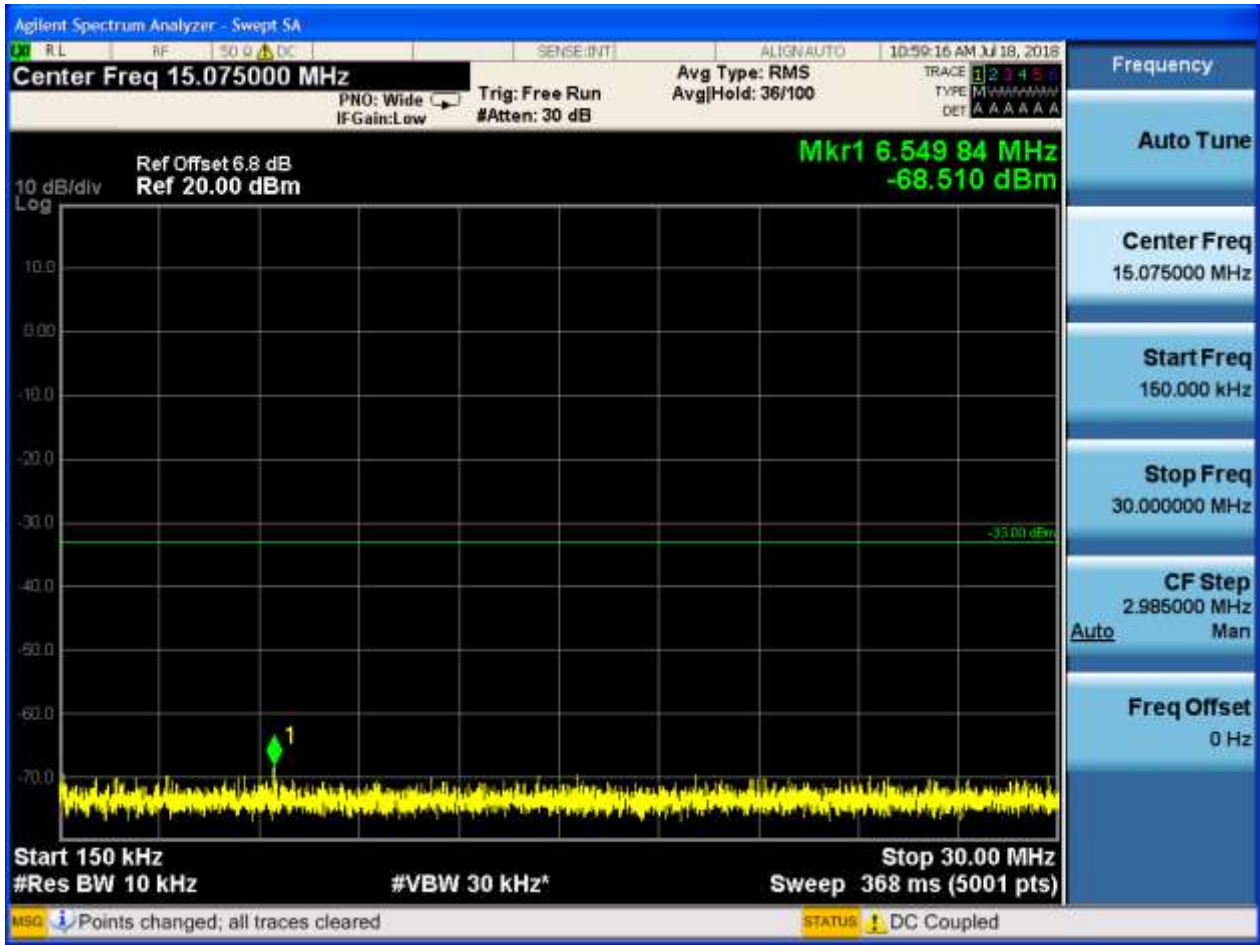






## 6.1.2.2.2 Test Channel = MCH



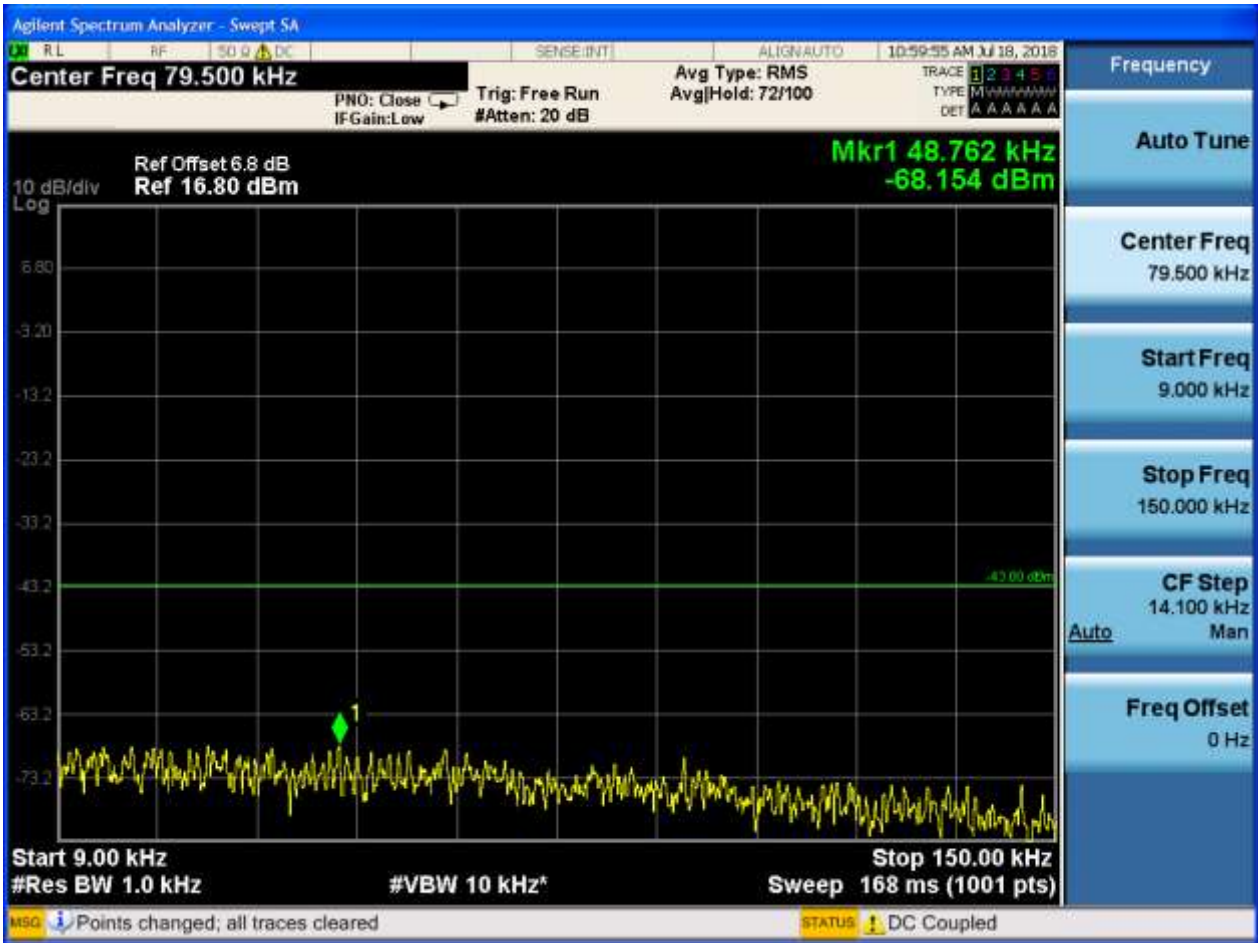


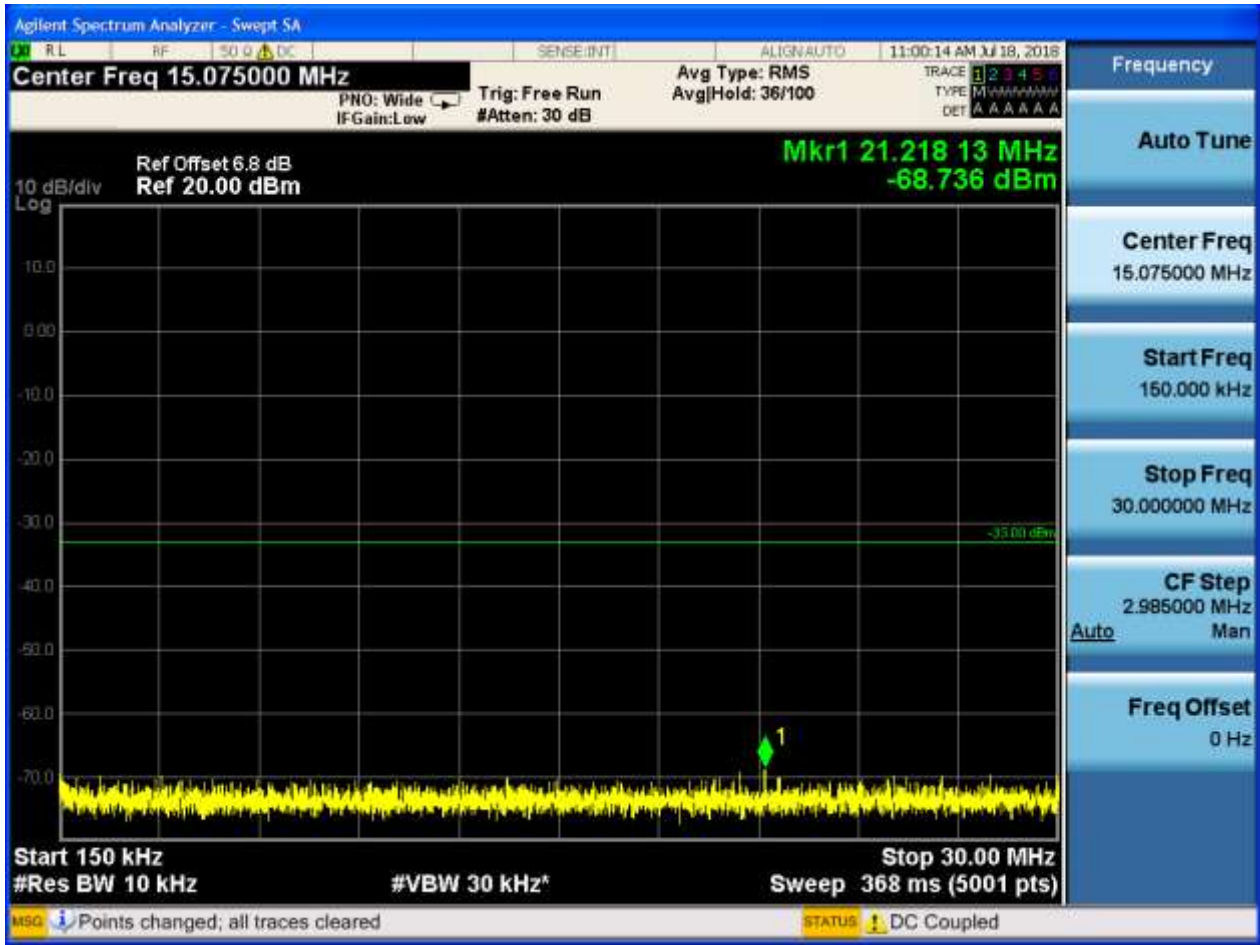






6.1.2.2.3 Test Channel = HCH









## 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

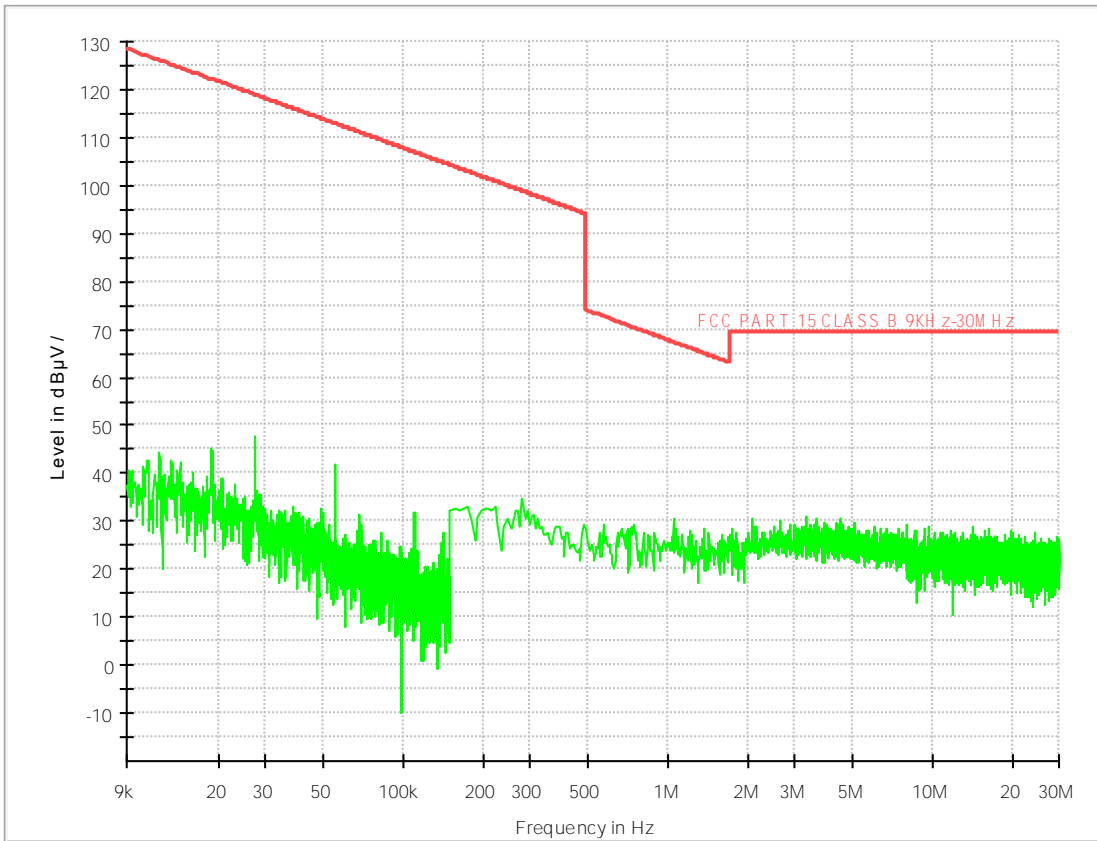
Above 1GHz, RBW = 1 MHz, VBW = 3 MHz. Detector: PK

### Part I - Test Plots

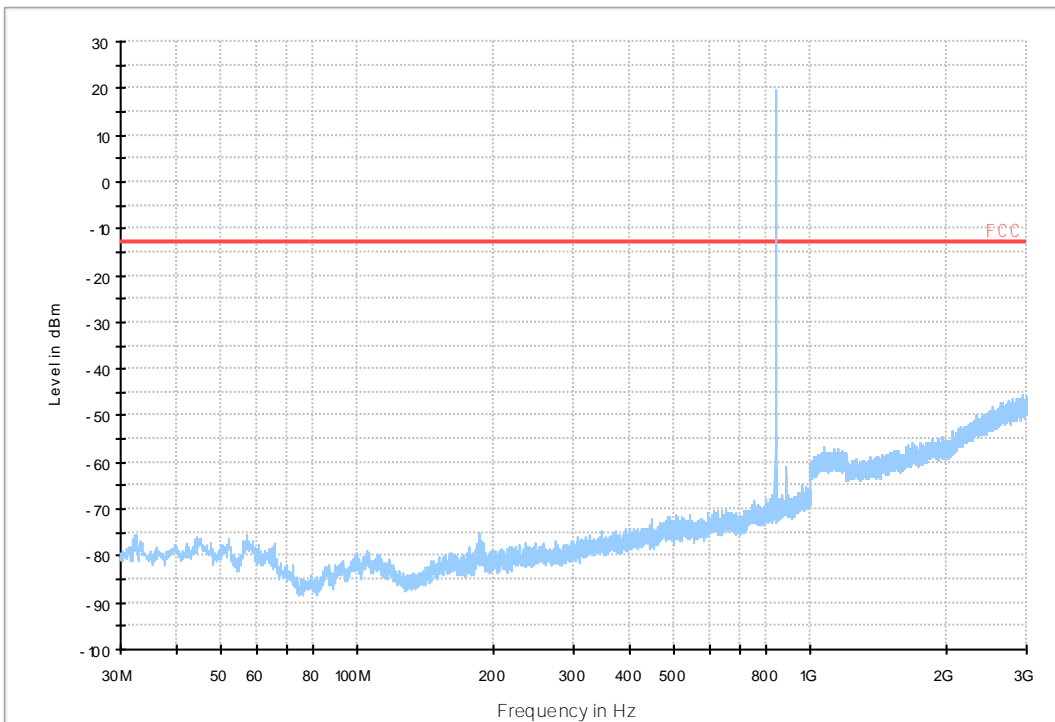
#### 7.1 For GSM

##### 7.1.1 Test Band = GSM850-Ant1

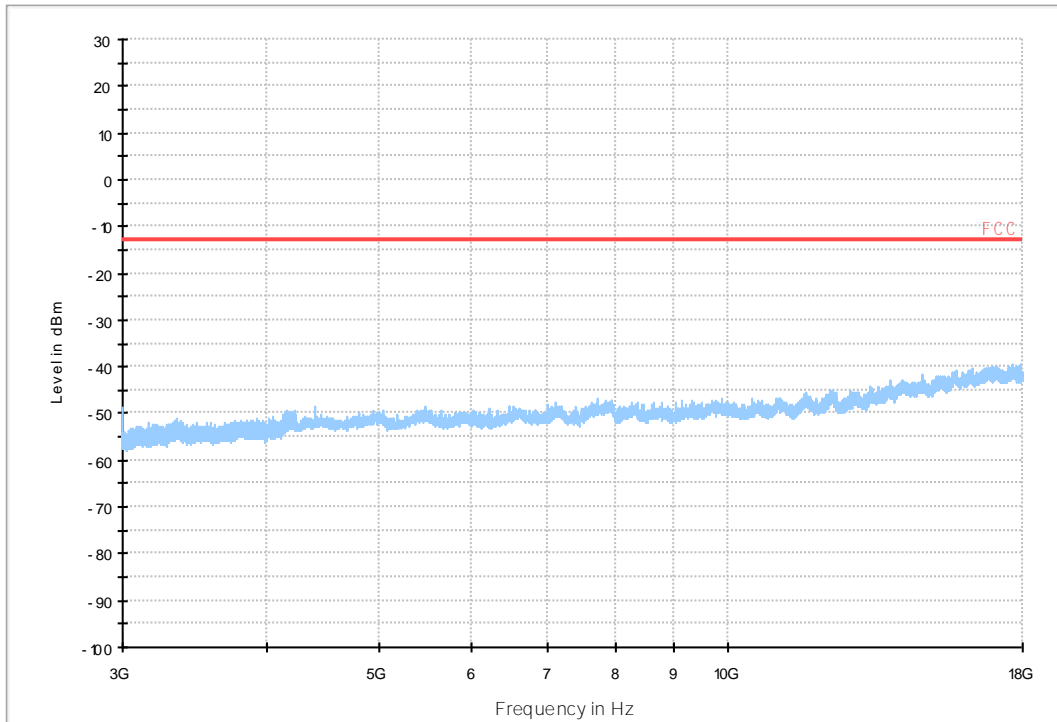
##### 7.1.1.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850\_L



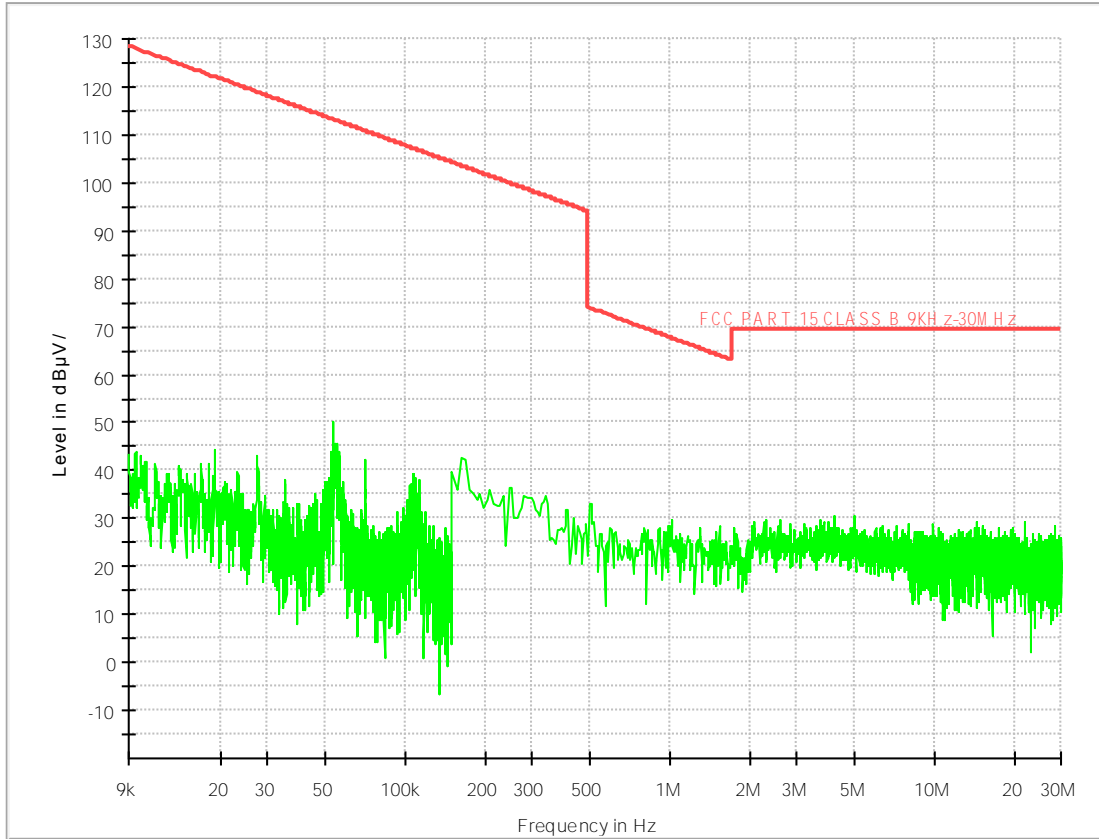
## 03 FCC PART 22 GSM850\_H



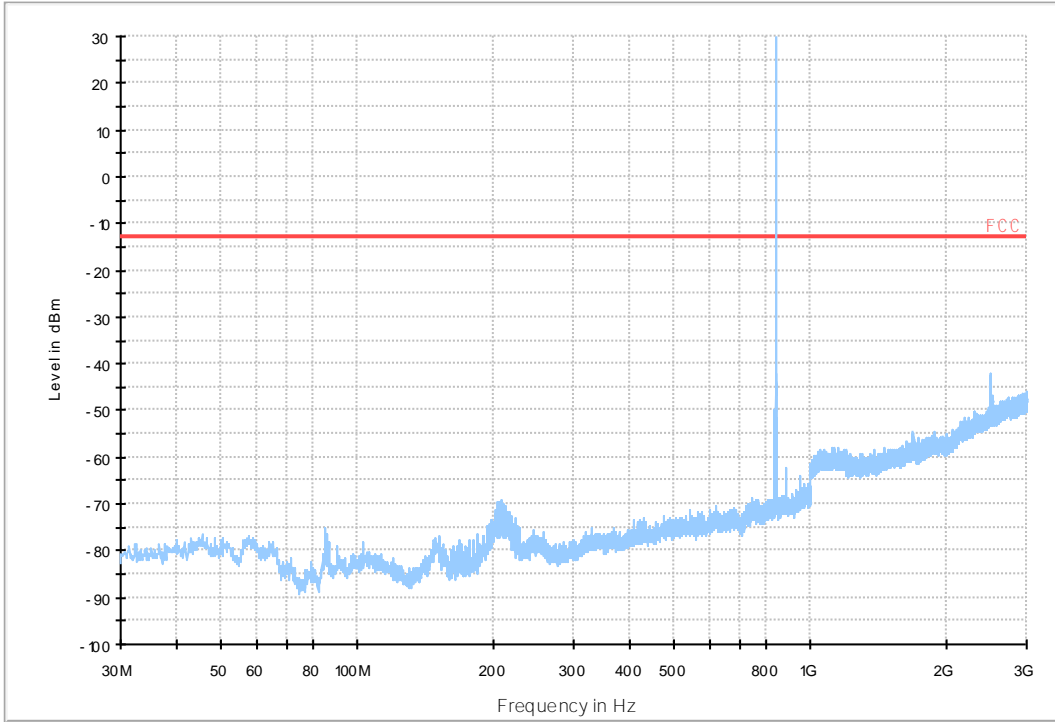


### 7.1.2 Test Band = GSM850-Ant2

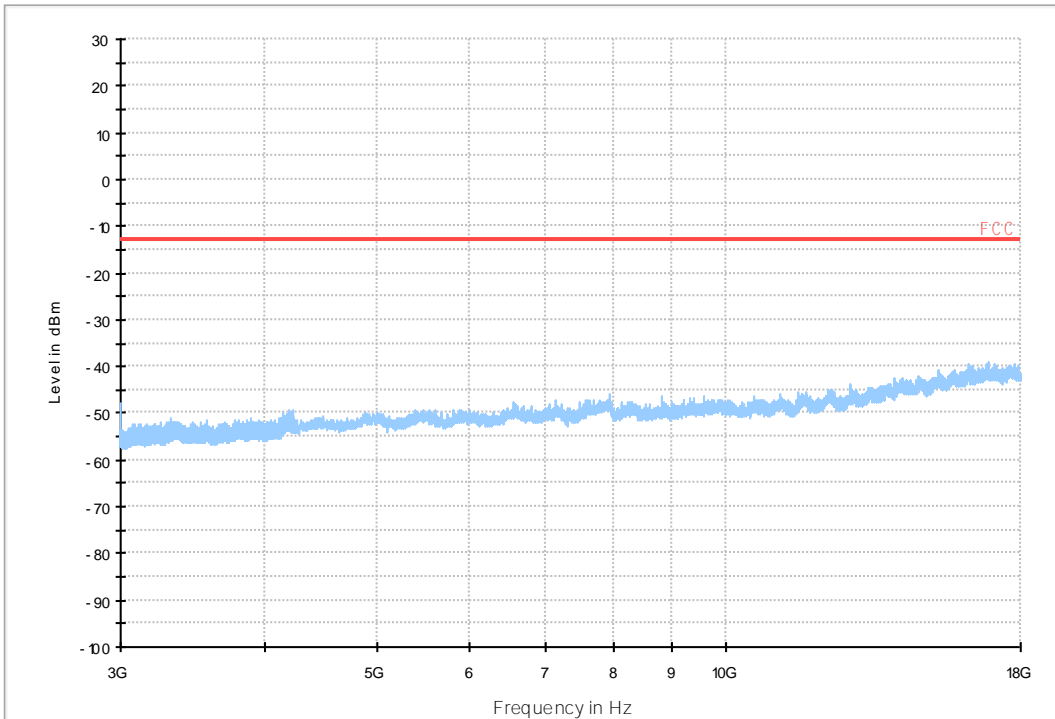
#### 7.1.2.1 Test Mode = GSM/TM1



04 FCC PART 22 GSM850\_L



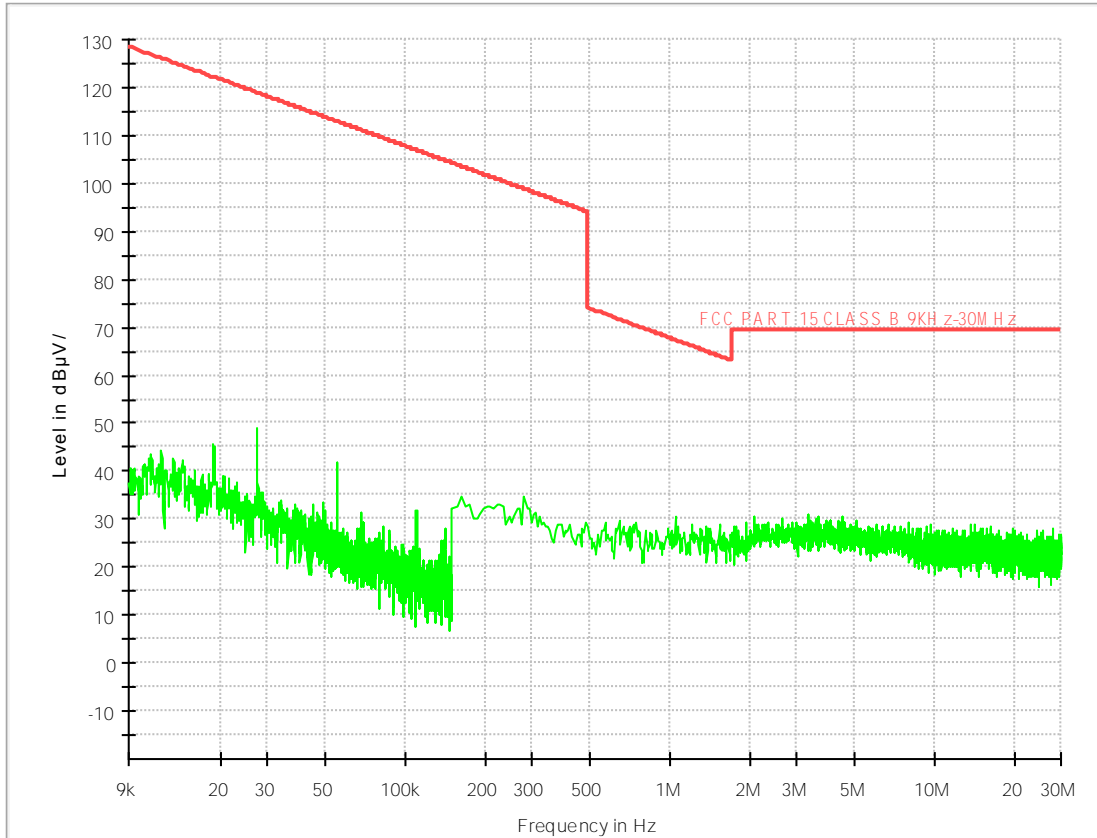
03 FCC PART 22 GSM850\_H



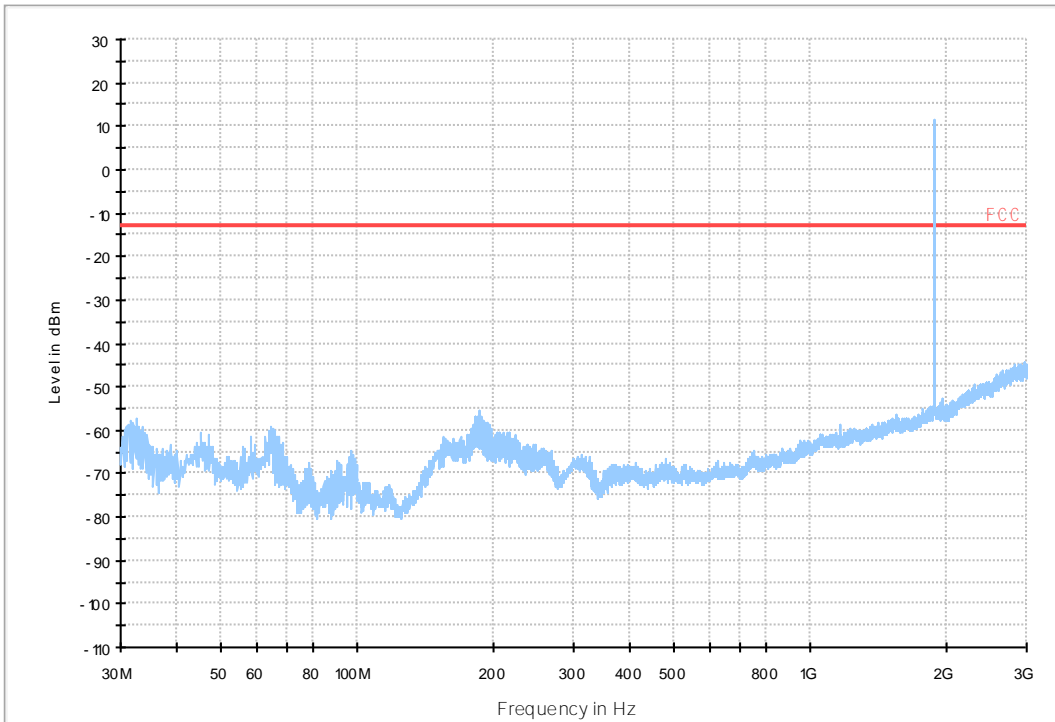


### 7.1.3 Test Band = GSM1900

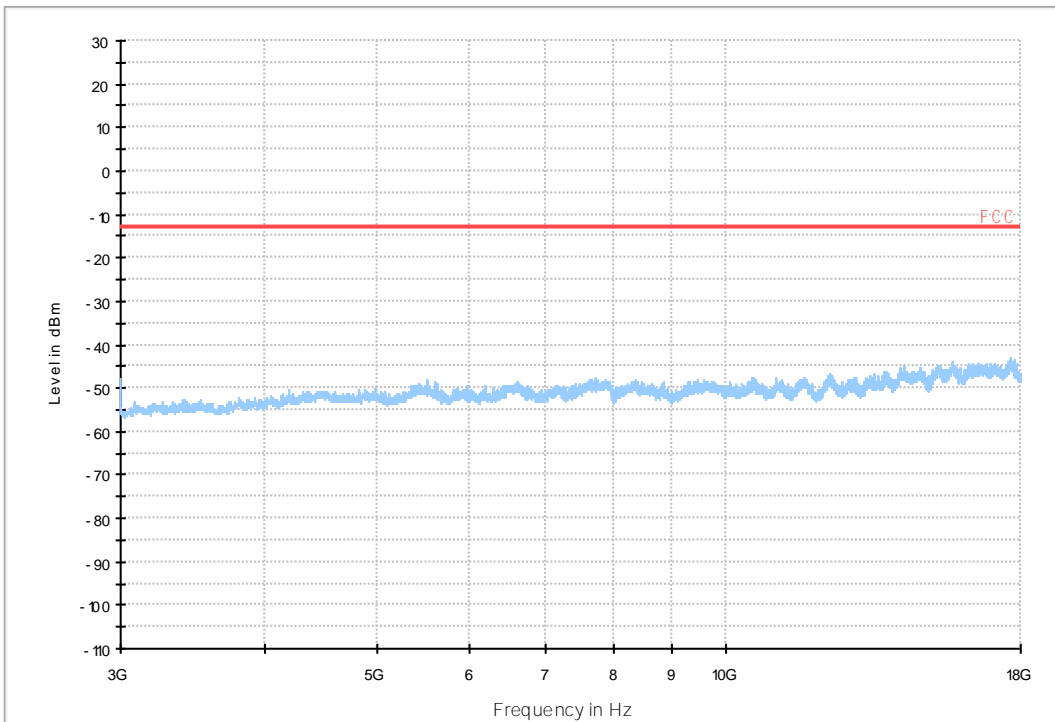
#### 7.1.3.1 Test Mode = GSM/TM1



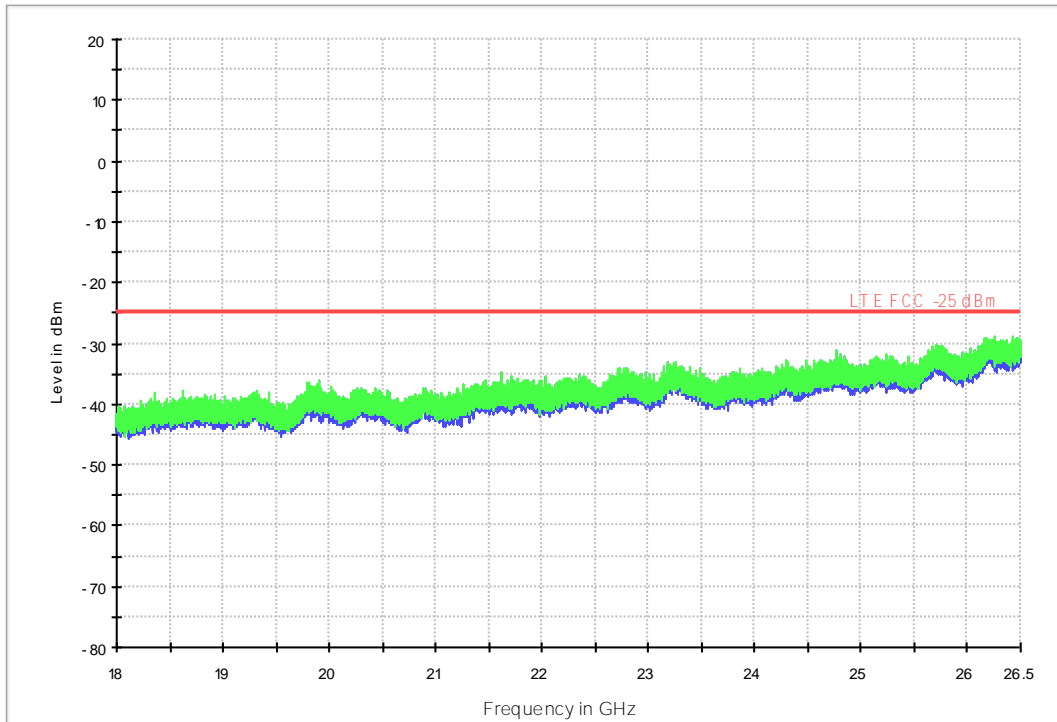
10 FCC PART 24 GSM1900\_L



09 FCC PART 24 GSM1900\_H

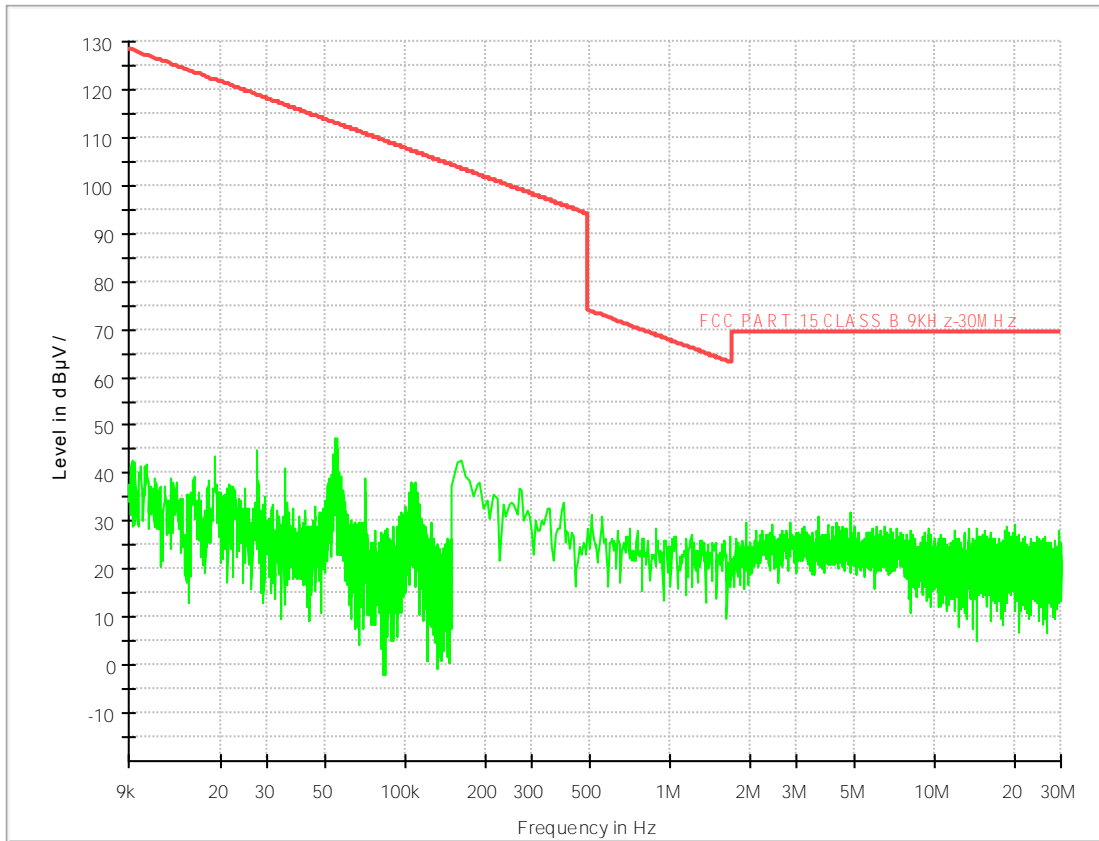


18G-26.5G RSE-TX-DIRECT OR ABOVE 1.5G PK

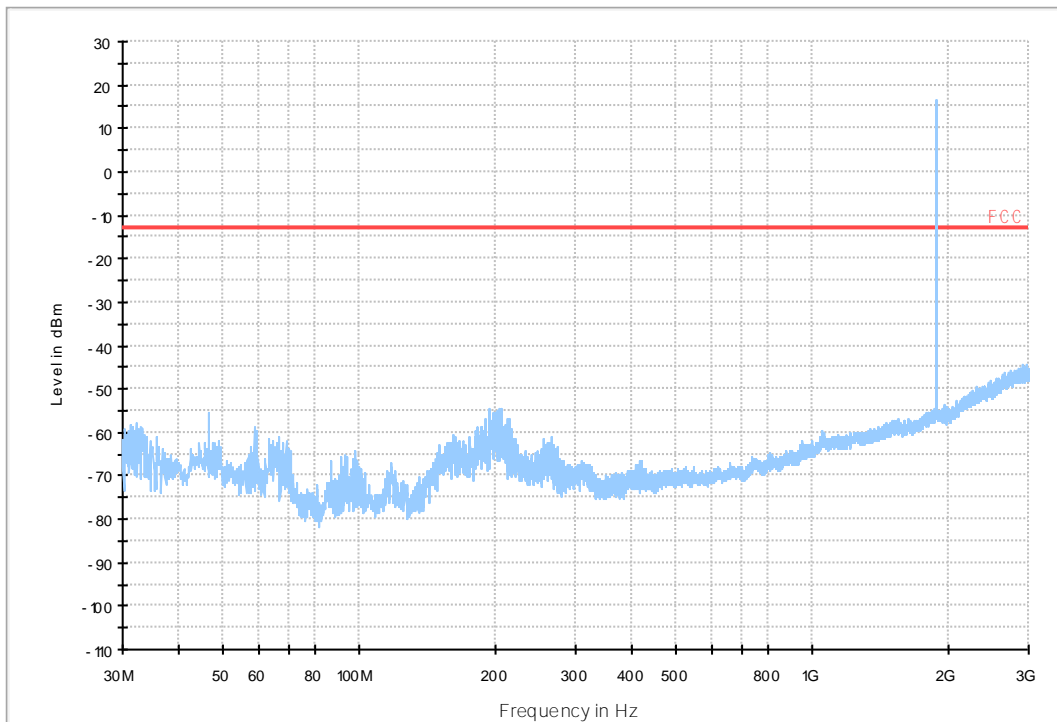


#### 7.1.4 Test Band = GSM1900-Ant2

##### 7.1.4.1 Test Mode = GSM/TM1

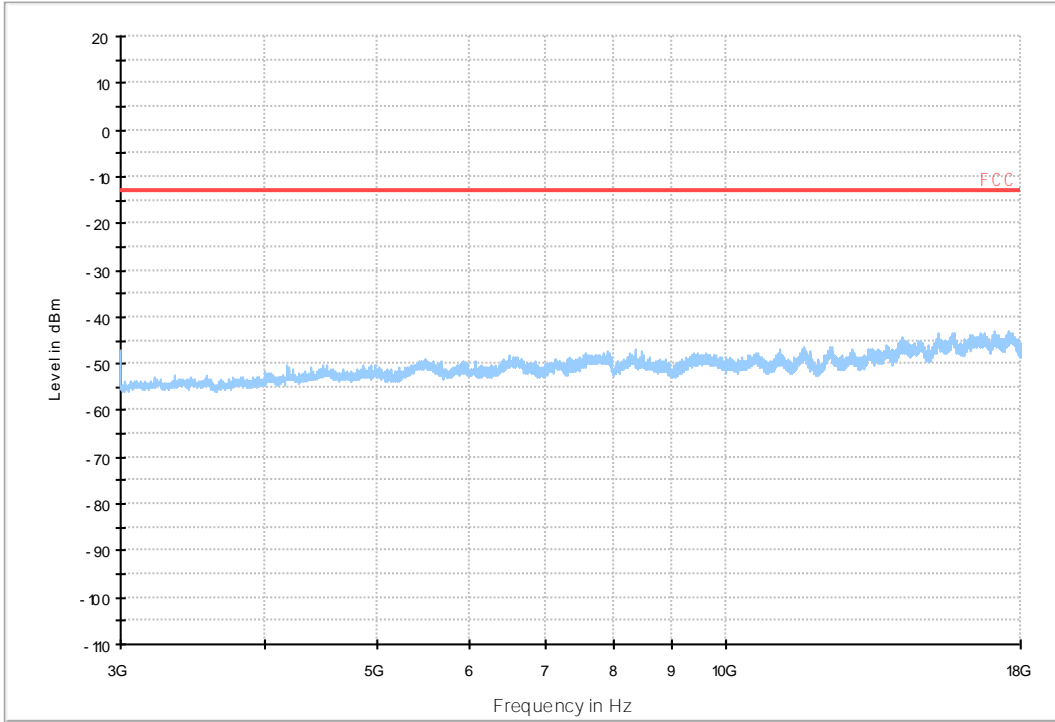


10 FCC PART 24 GSM1900\_L

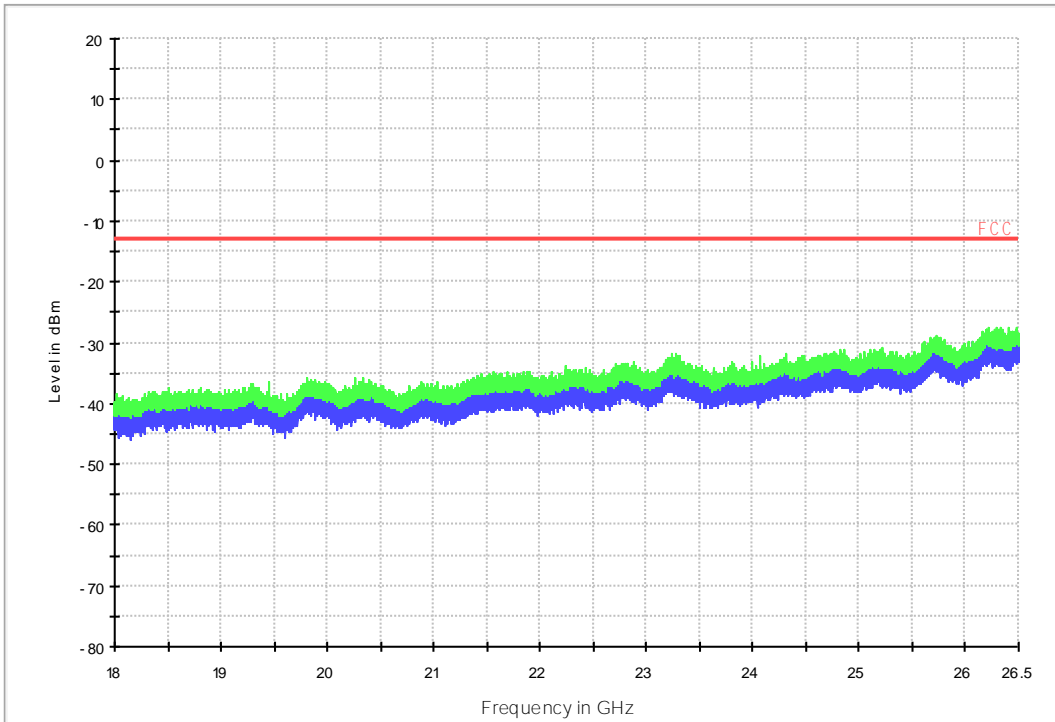




11 FCC PART 24 WCDMA1900\_H



18G~26.5G 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	-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
				VH			

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
				VH	34.19	0.01819	PASS
		HCH	TN	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
		-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
				-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