



# 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	32.73	30.48	38.5	PASS
		MCH	32.66	30.41	38.5	PASS
		HCH	32.61	30.36	38.5	PASS
	GSM/TM2	LCH	26.16	23.91	38.5	PASS
		MCH	26.14	23.89	38.5	PASS
		HCH	26.18	23.93	38.5	PASS
Test Band	Test Mode	Test Channel	Measured[dBm]	EIRP [dBm]	Limit [dBm]	Verdict
PCS1900	GSM/TM1	LCH	29.66	27.76	33	PASS
		MCH	29.63	27.73	33	PASS
		HCH	29.68	27.78	33	PASS
	GSM/TM2	LCH	24.70	22.80	33	PASS
		MCH	24.70	22.80	33	PASS
		HCH	24.71	22.81	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	2.03	13	PASS
		MCH	1.72	13	PASS
		HCH	1.84	13	PASS
	GSM/TM2	LCH	4.89	13	PASS
		MCH	4.96	13	PASS
		HCH	5.04	13	PASS
PCS1900	GSM/TM1	LCH	1.57	13	PASS
		MCH	1.87	13	PASS
		HCH	1.99	13	PASS
	GSM/TM2	LCH	4.98	13	PASS
		MCH	4.89	13	PASS
		HCH	5.07	13	PASS

### 3Appendix\_C: Modulation Characteristics

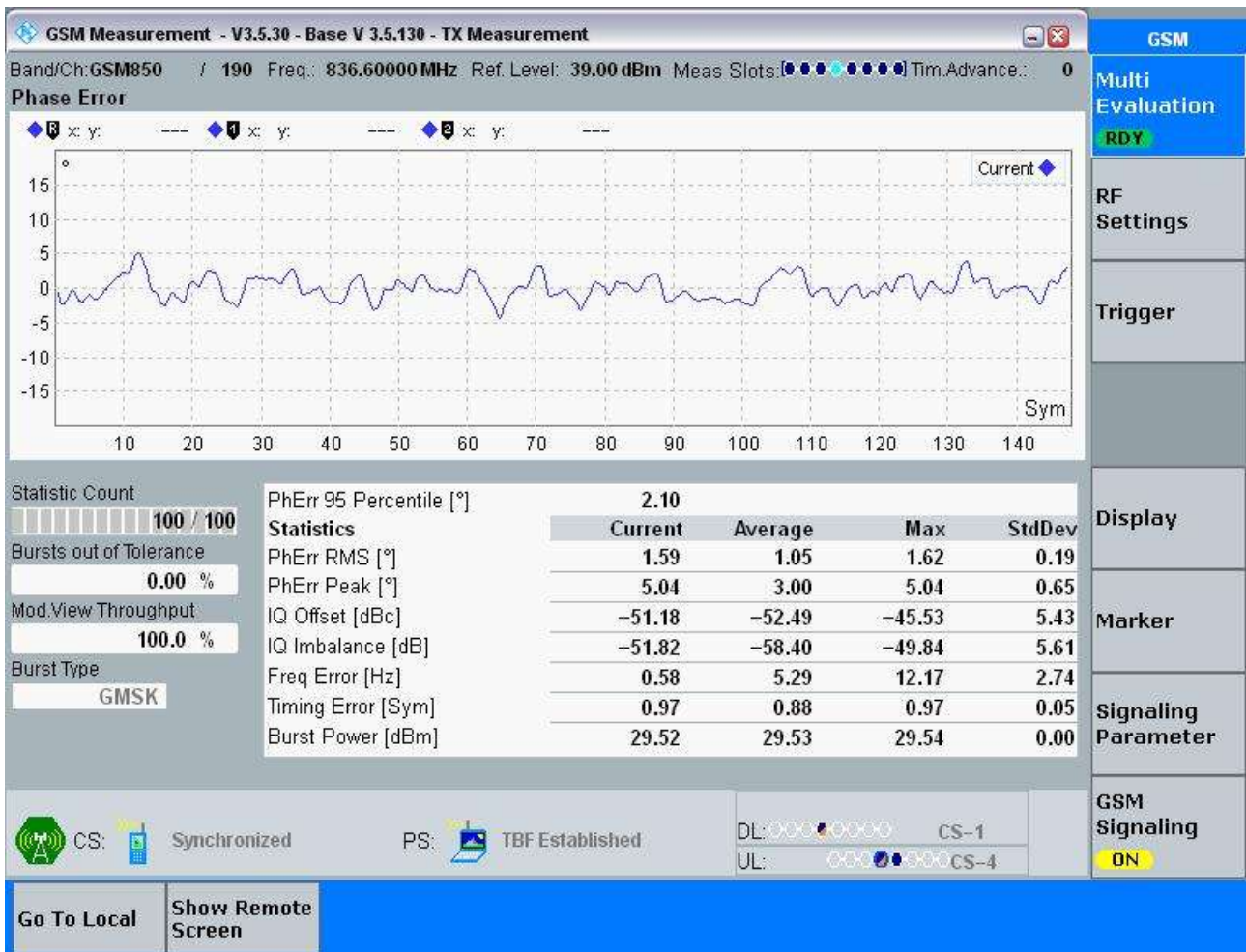
#### Part I - Test Plots

#### 3.1 For GSM

#### 3.1.1 Test Band = GSM850

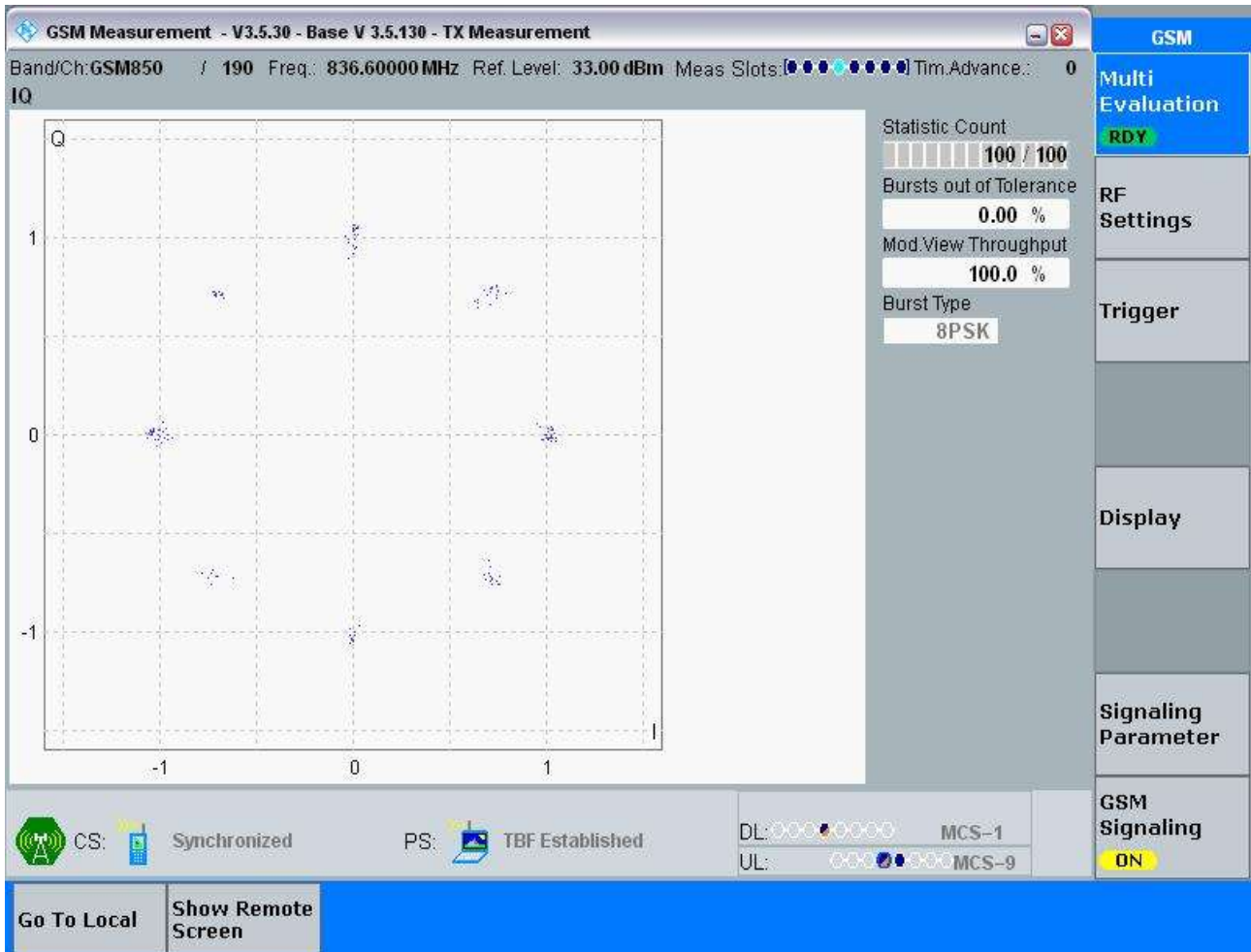
#### 3.1.1.1 Test Mode = GSM/TM1

#### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = GSM/TM2

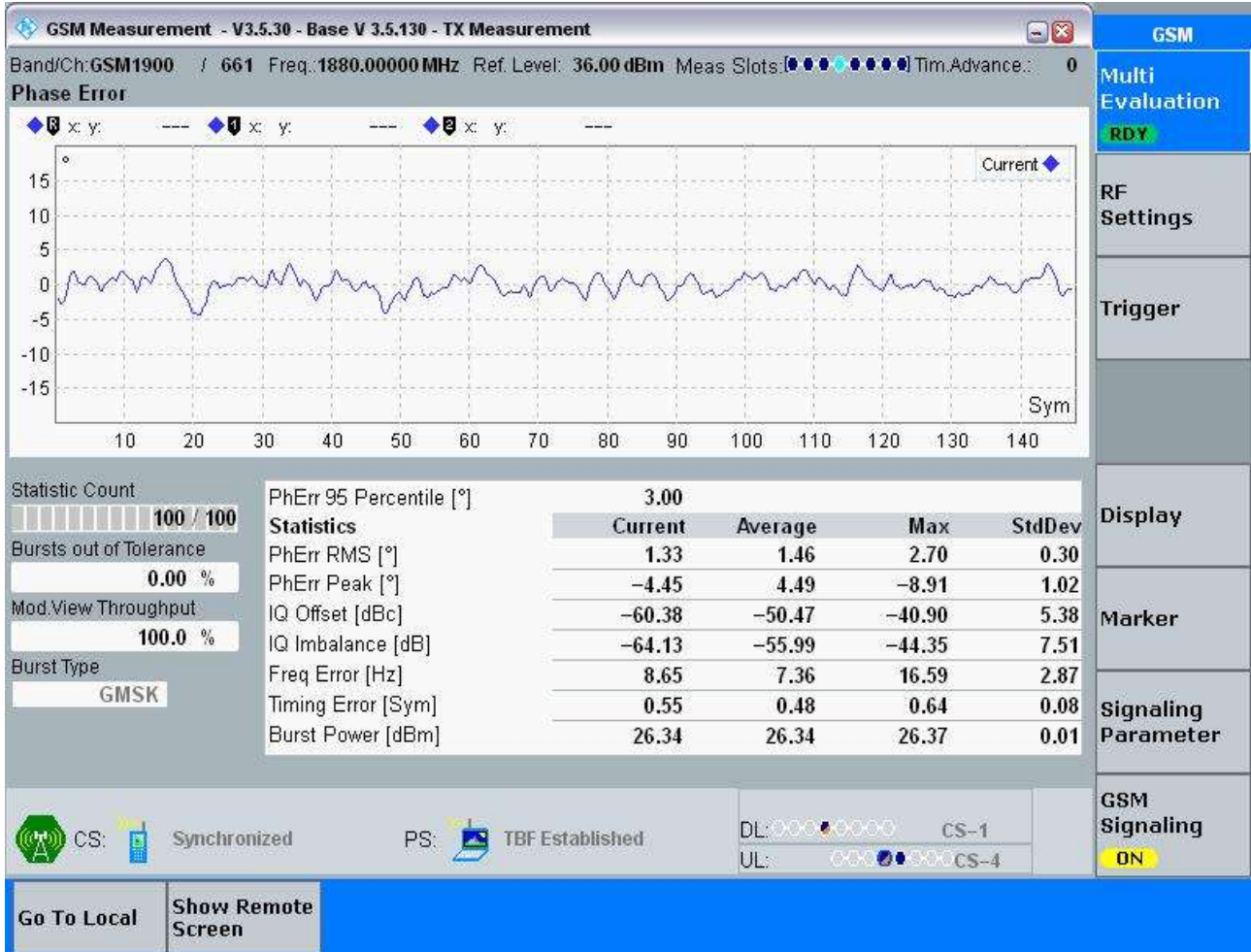
#### 3.1.1.2.1 Test Channel = MCH



3.1.2 Test Band = PCS1900

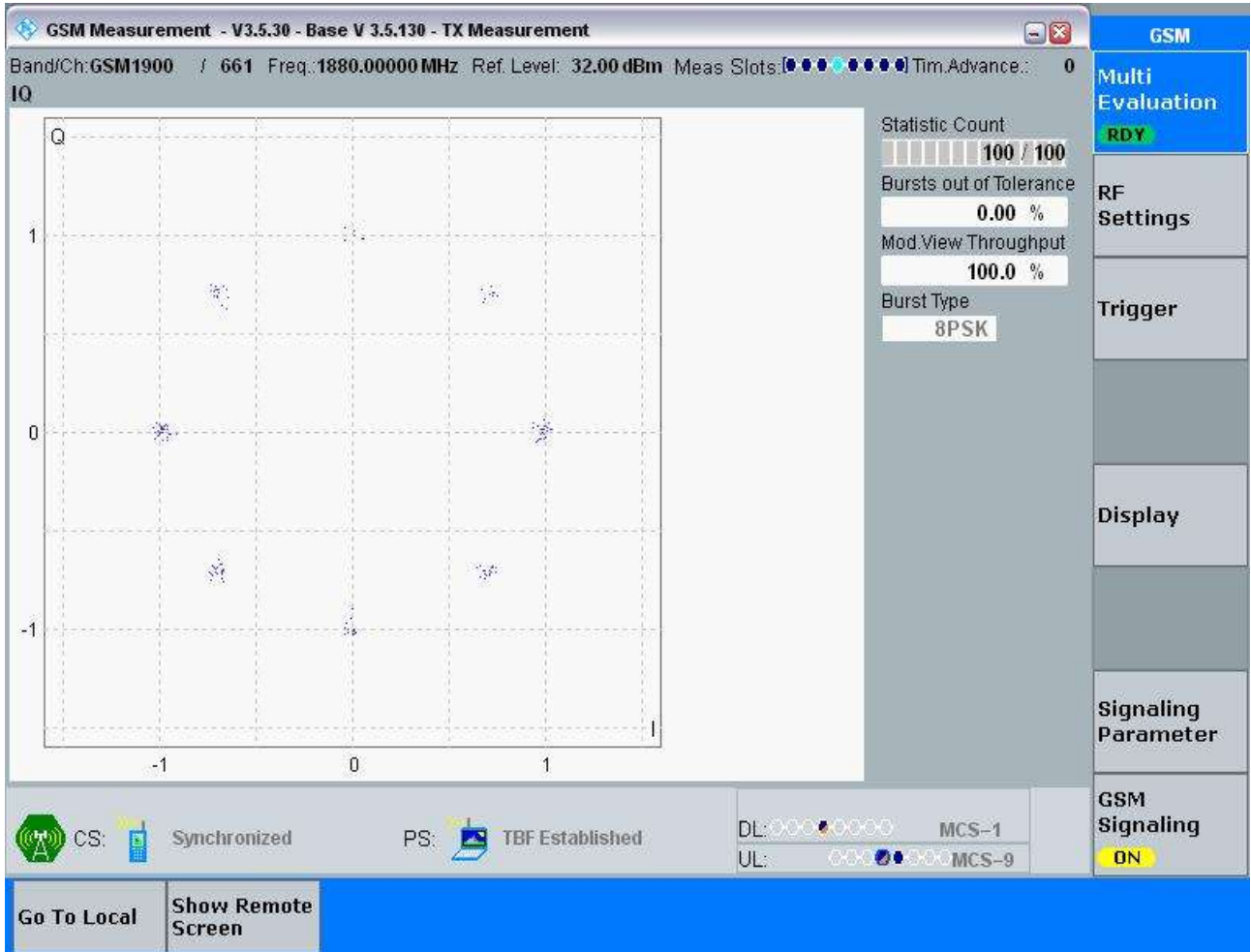
3.1.2.1 Test Mode = GSM/TM1

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	246.54	312.8	Pass
		MCH	246.14	320.1	Pass
		HCH	243.45	313.7	Pass
	GSM/TM2	LCH	250.44	322.2	Pass
		MCH	251.19	318.3	Pass
		HCH	248.30	317.1	Pass
PCS1900	GSM/TM1	LCH	246.75	320.7	Pass
		MCH	248.31	322.9	Pass
		HCH	241.66	316.8	Pass
	GSM/TM2	LCH	249.67	315.0	Pass
		MCH	247.82	314.9	Pass
		HCH	251.26	316.1	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

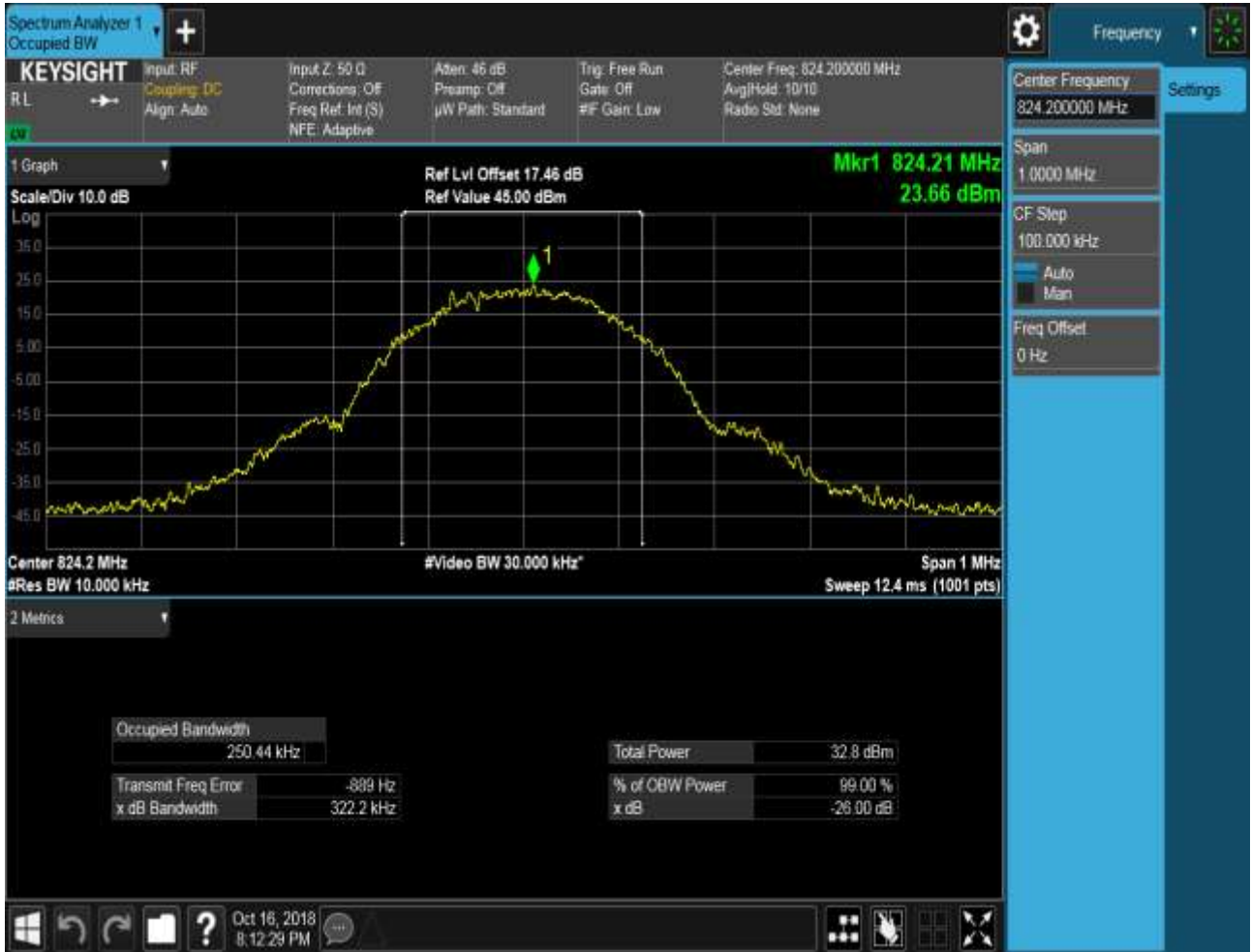


4.1.1.1.3 Test Channel = HCH



#### 4.1.1.2 Test Mode = GSM/TM2

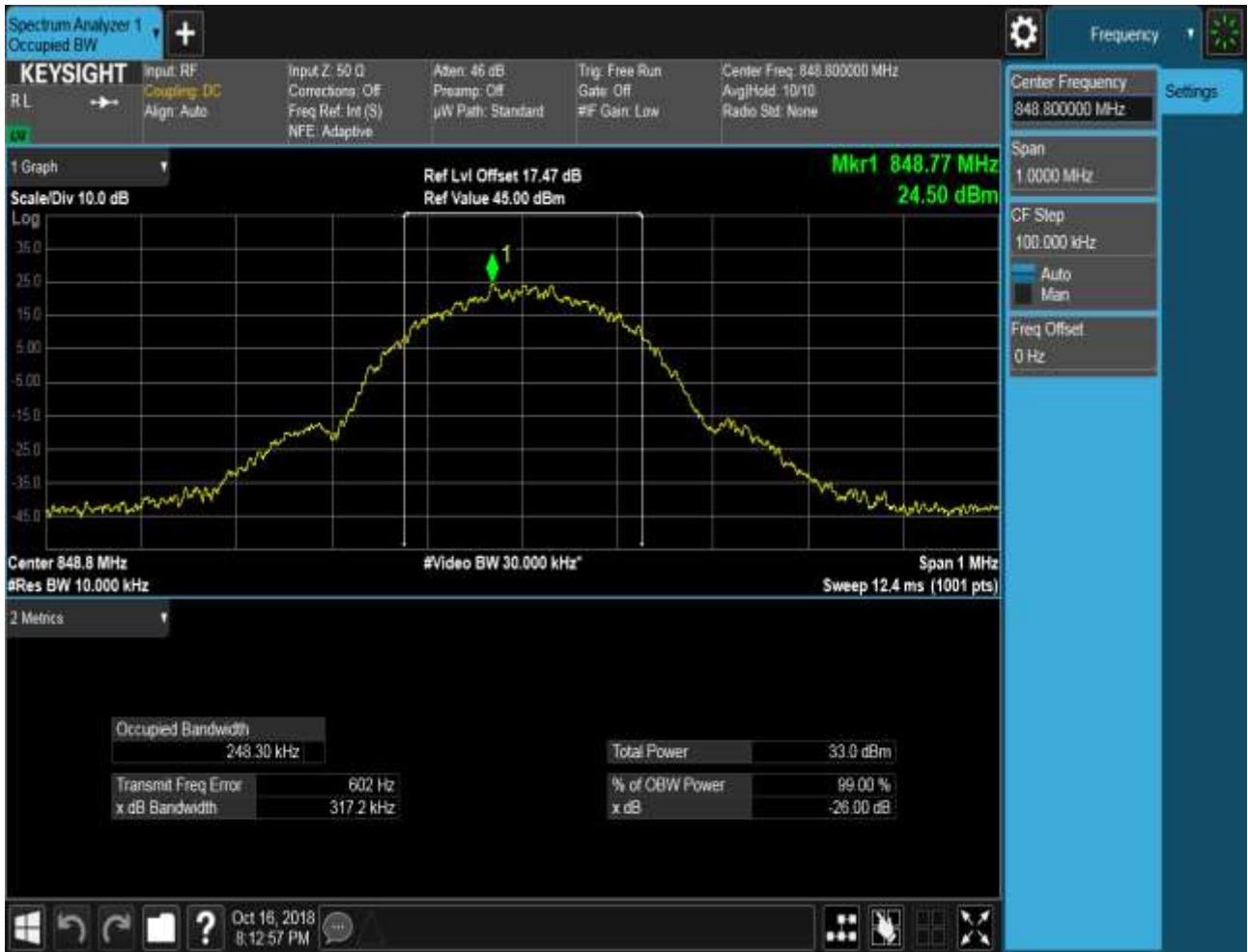
##### 4.1.1.2.1 Test Channel = LCH



## 4.1.1.2.2 Test Channel = MCH



4.1.1.2.3 Test Channel = HCH



4.1.2 Test Band = PCS1900

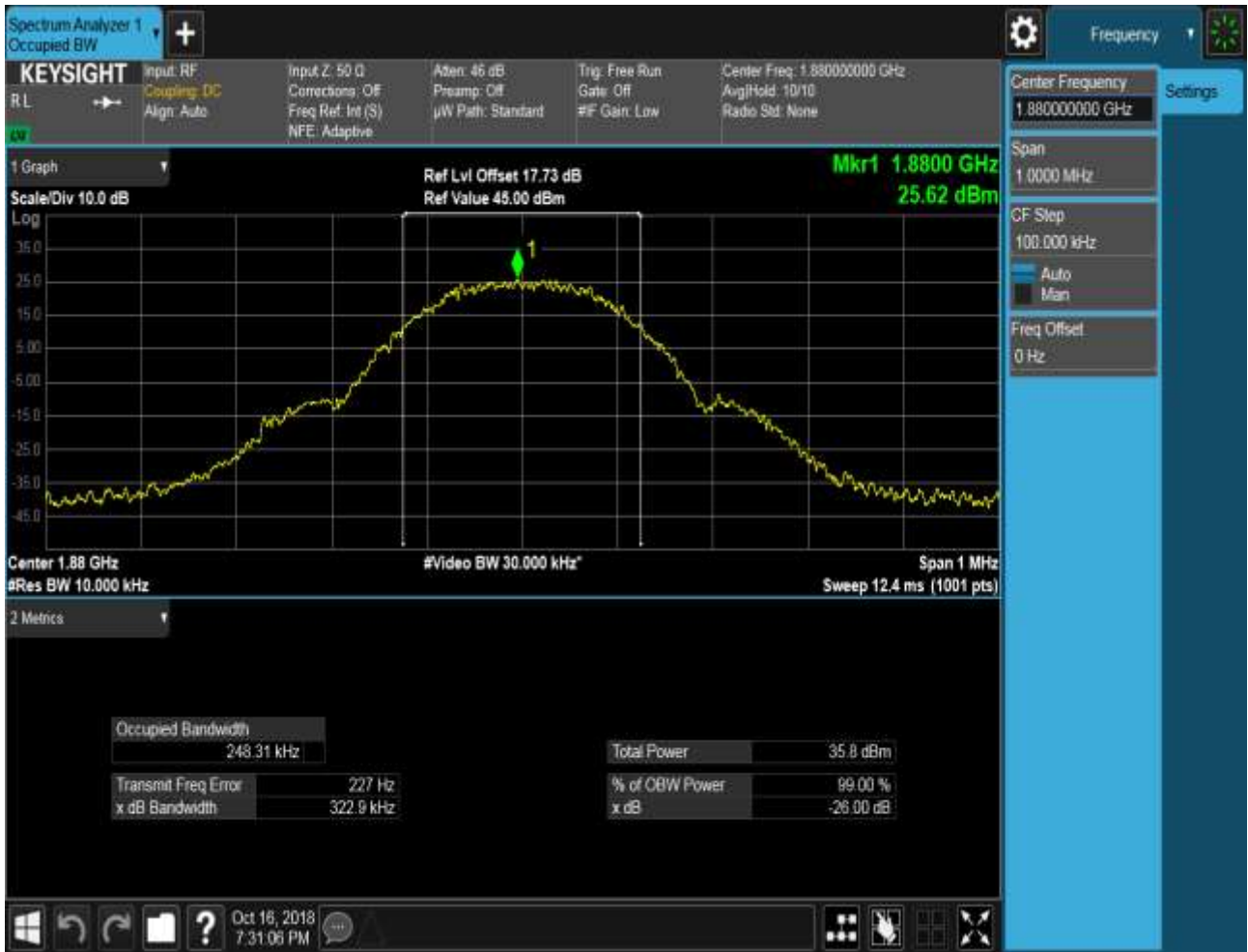
4.1.2.1 Test Mode = GSM/TM1

4.1.2.1.1 Test Channel = LCH

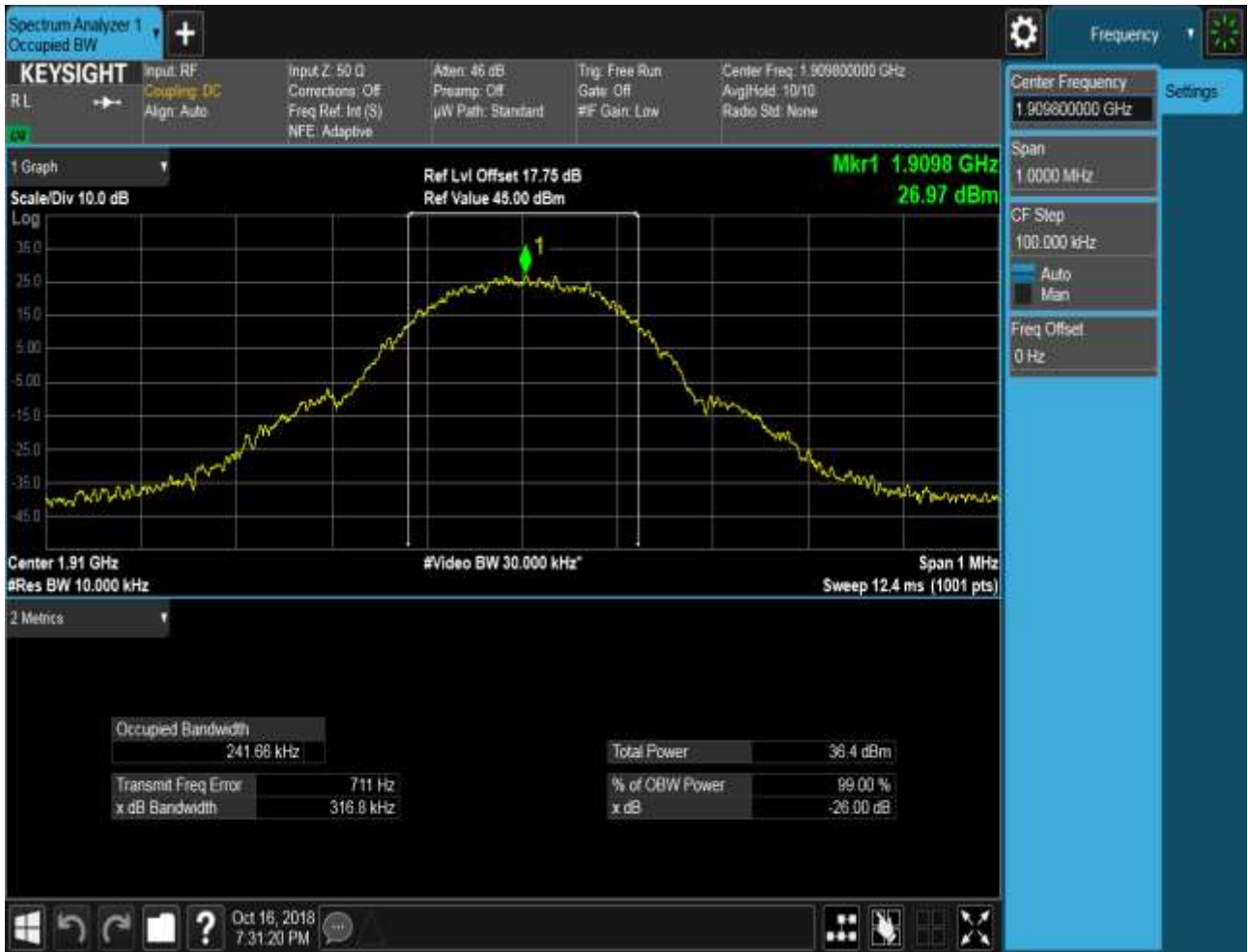




## 4.1.2.1.2 Test Channel = MCH



## 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

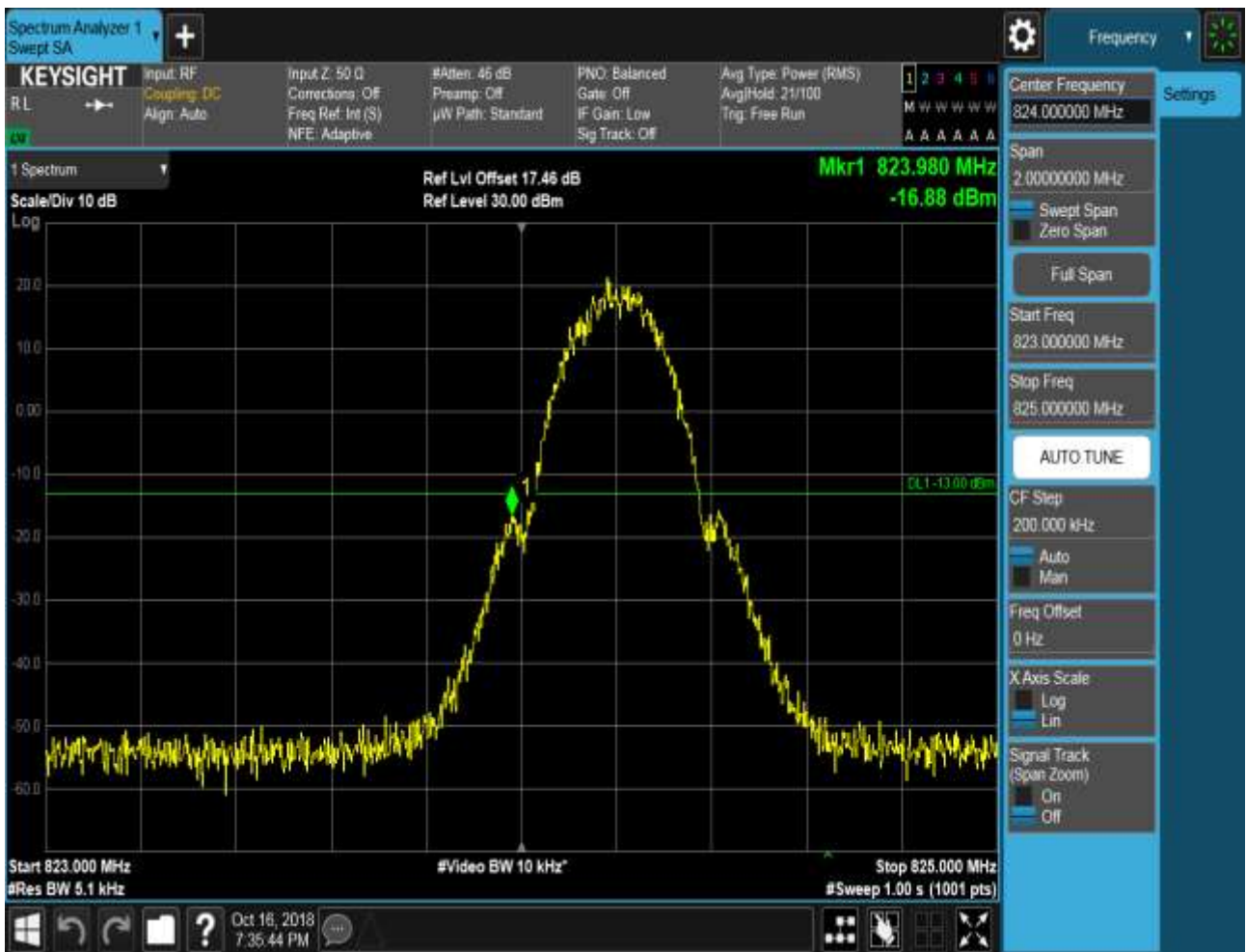
### Part I - Test Plots

#### 5.1 For GSM

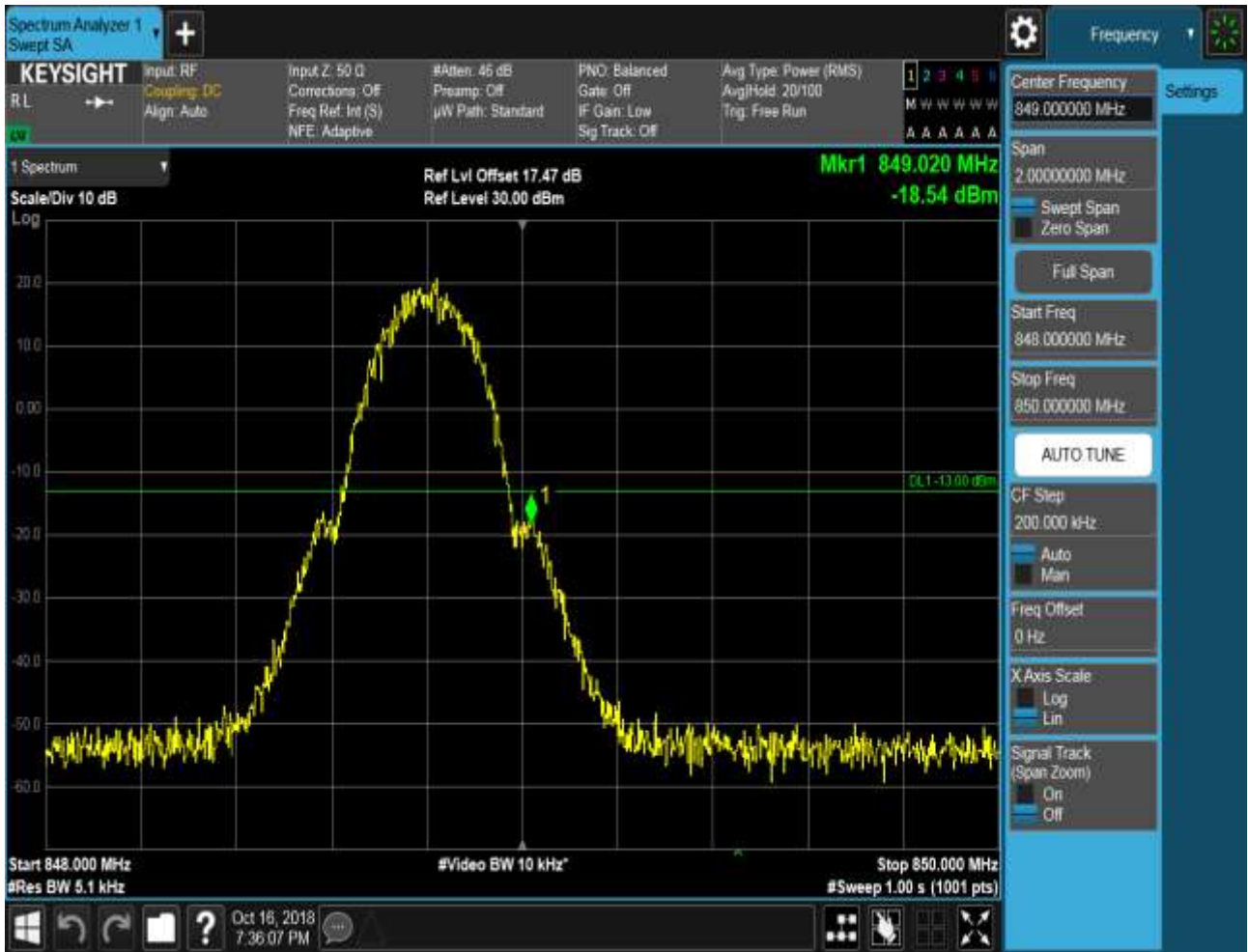
##### 5.1.1 Test Band = GSM850

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

##### 5.1.1.1.1 Test Channel = LCH

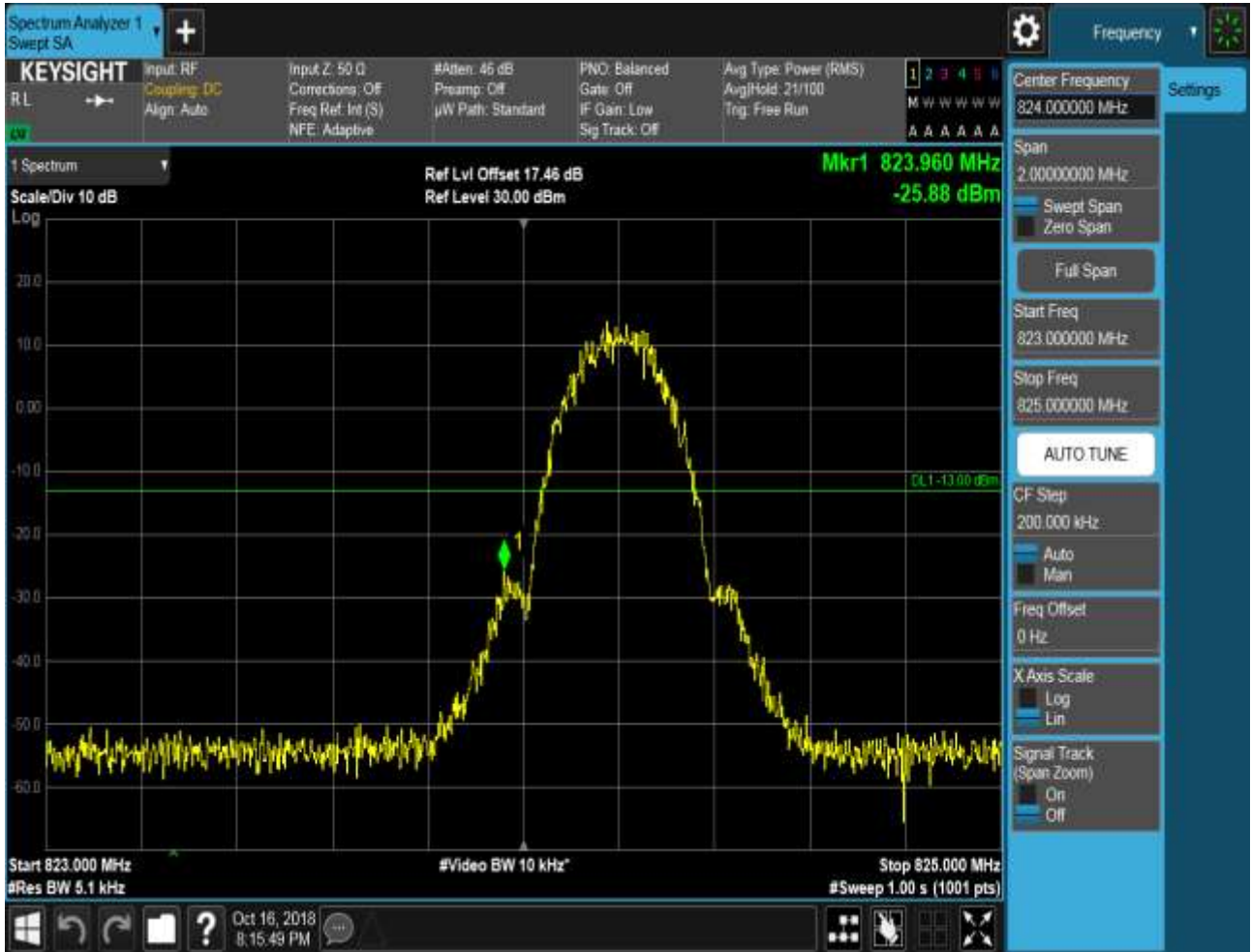


### 5.1.1.1.2 Test Channel = HCH



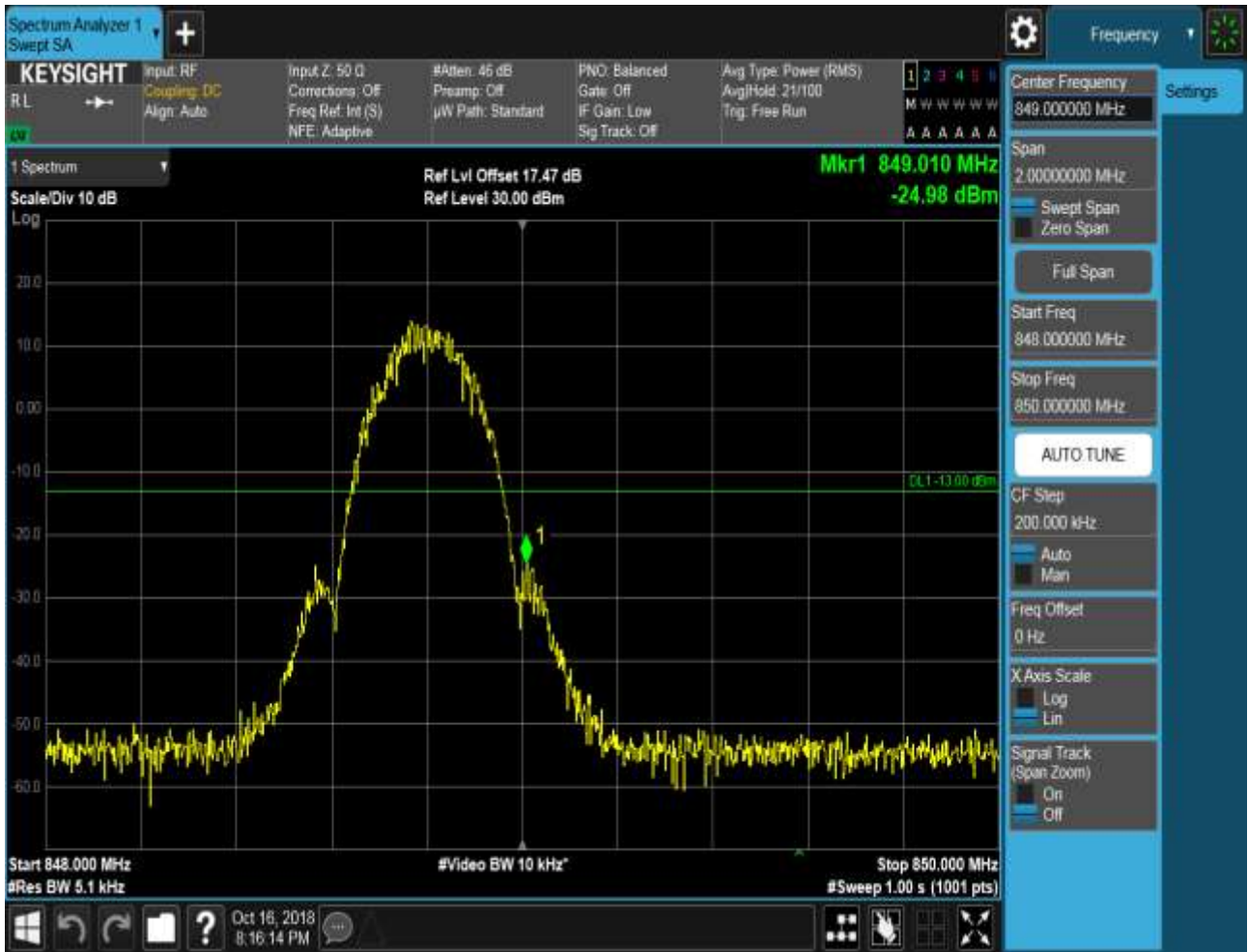
### 5.1.1.2 Test Mode = GSM/TM2

#### 5.1.1.2.1 Test Channel = LCH





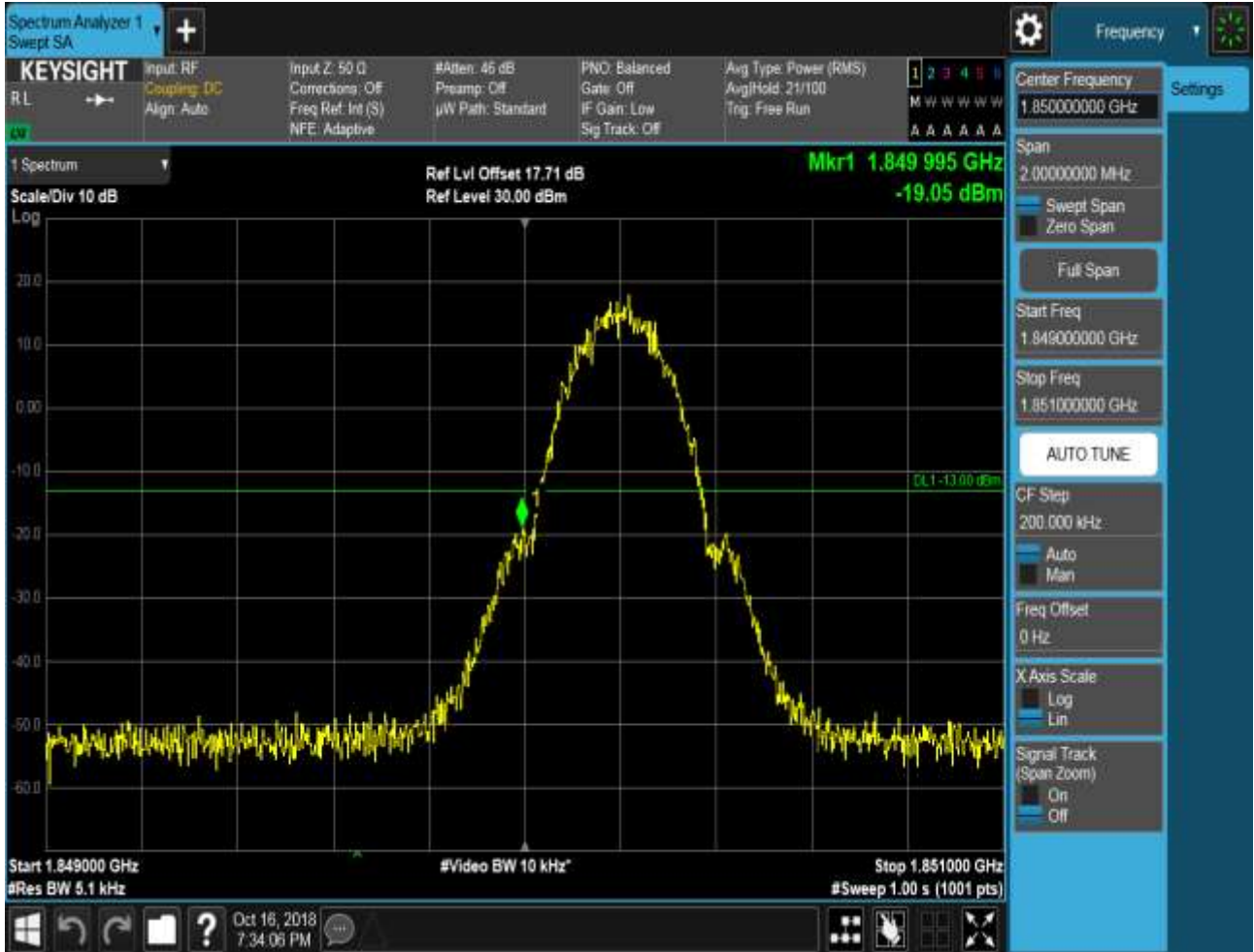
### 5.1.1.2.2 Test Channel = HCH



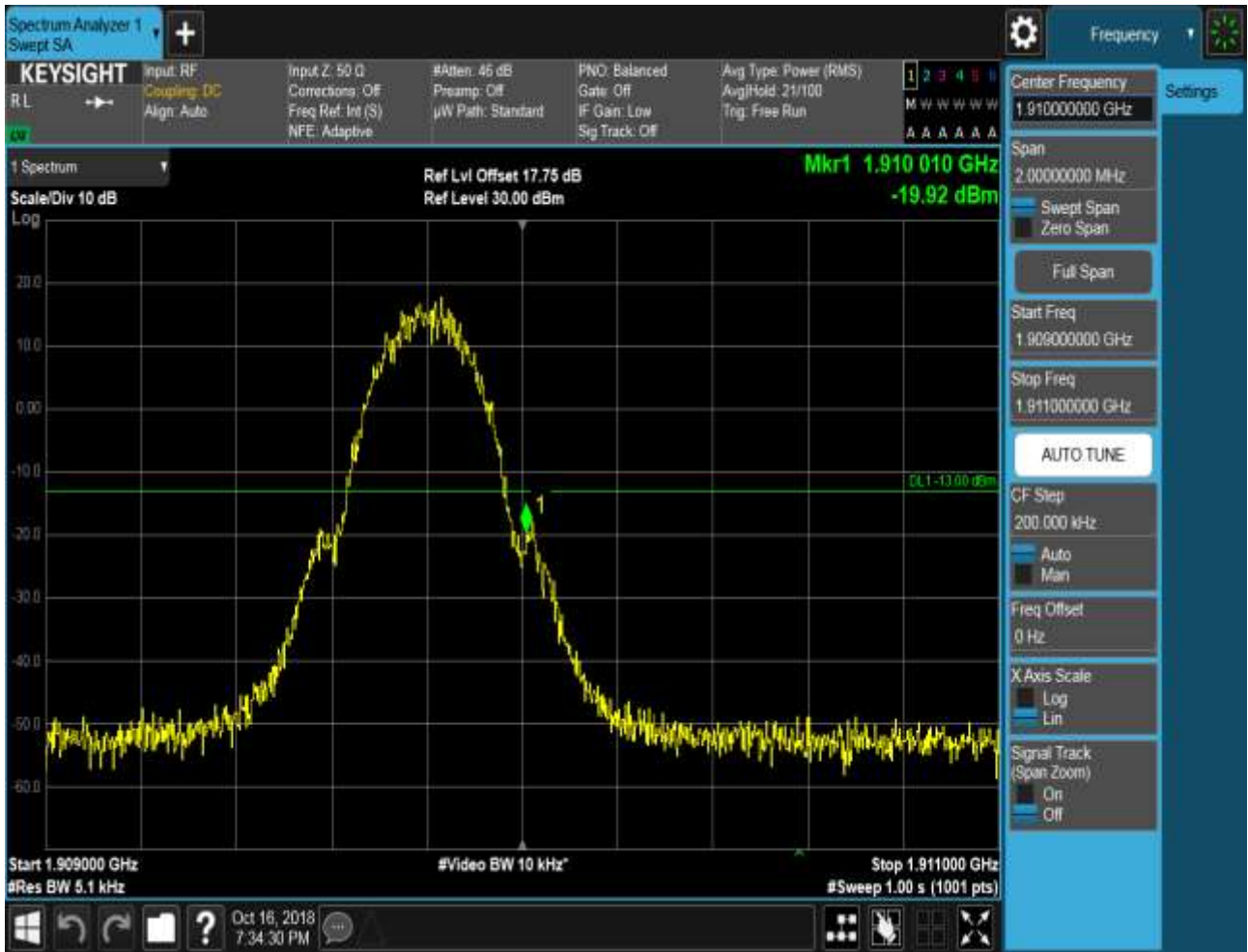
## 5.1.2 Test Band = PCS1900

### 5.1.2.1 Test Mode = GSM/TM1

#### 5.1.2.1.1 Test Channel = LCH

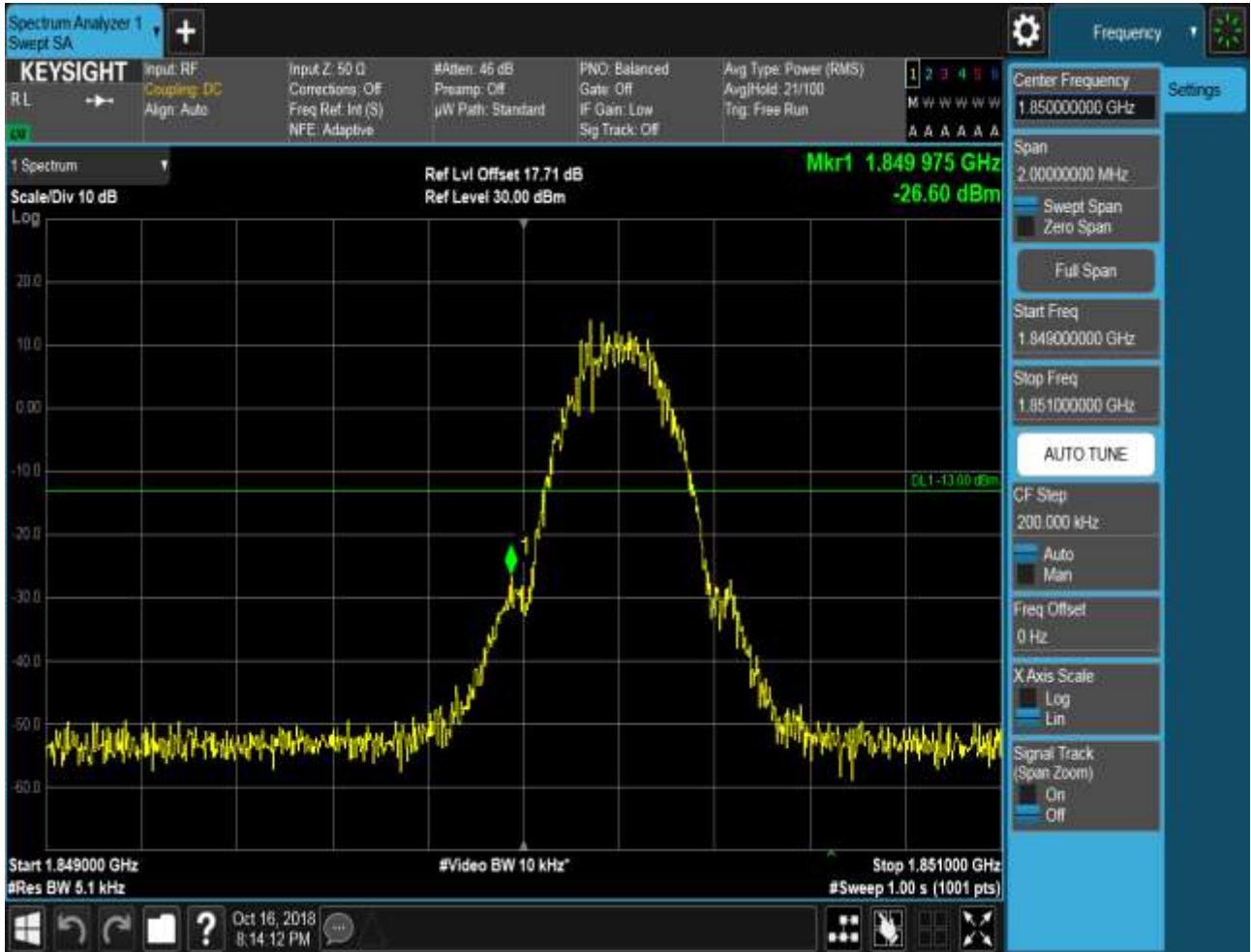


### 5.1.2.1.2 Test Channel = HCH

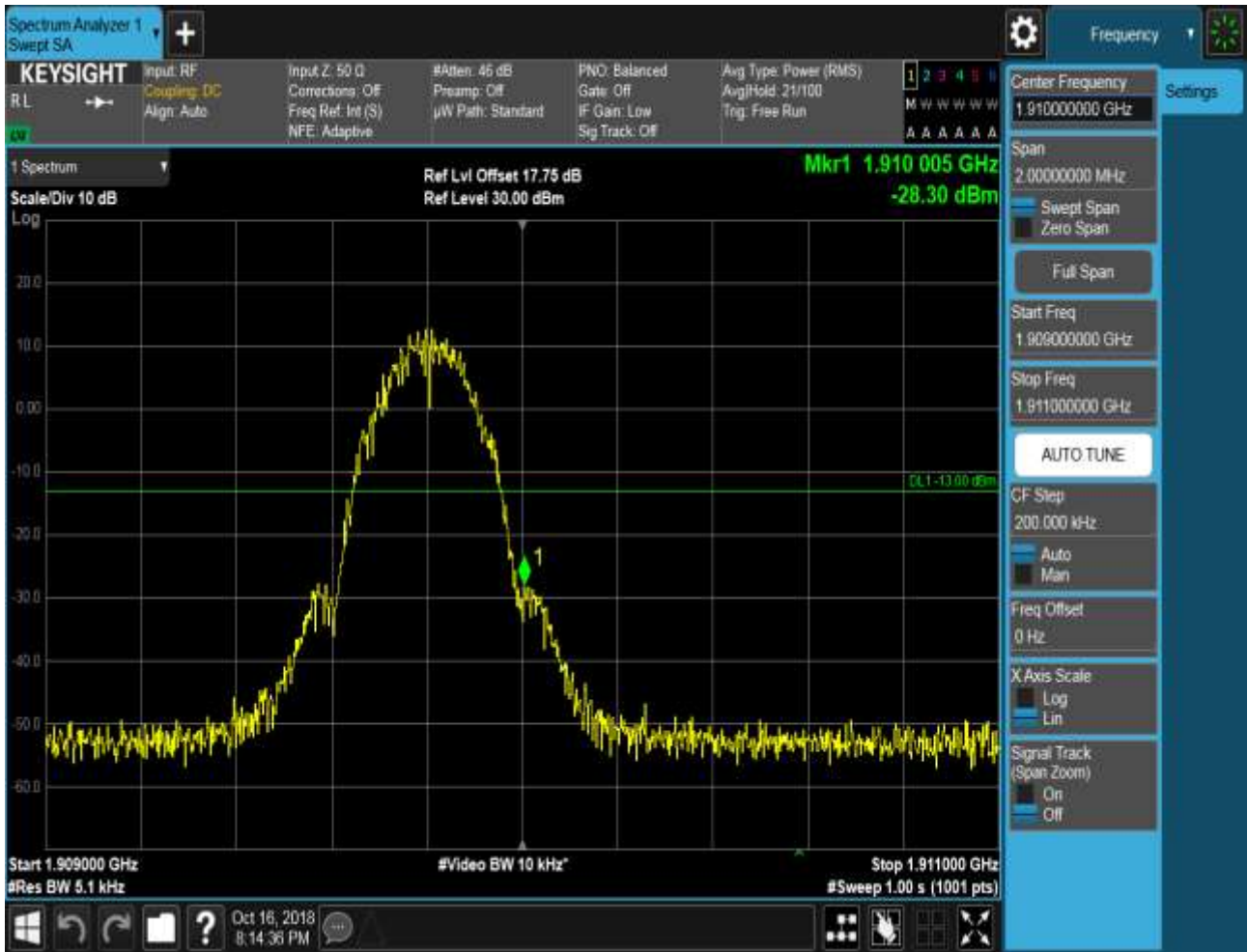


### 5.1.2.2 Test Mode = GSM/TM2

#### 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

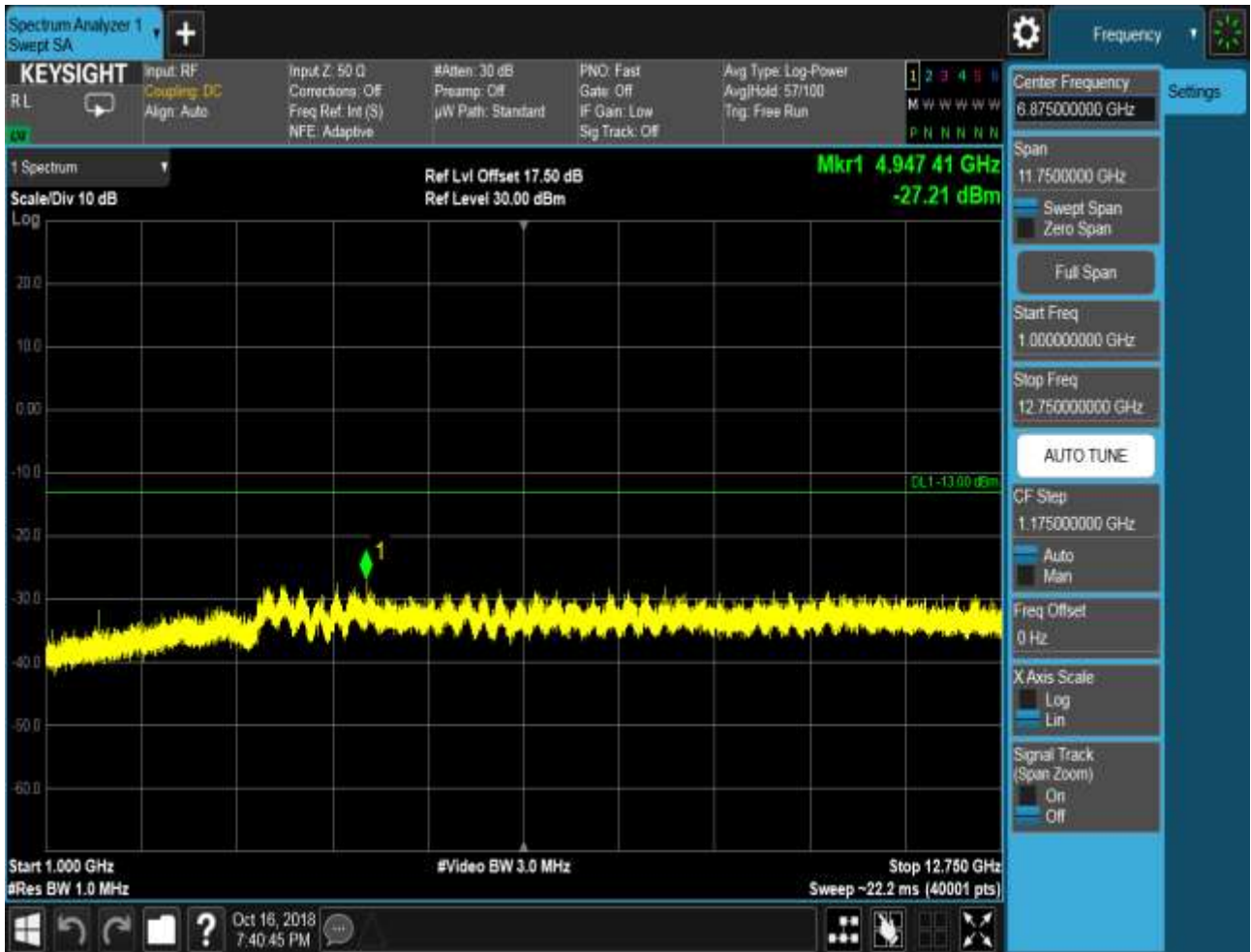
##### 6.1.1.1.1 Test Channel = LCH







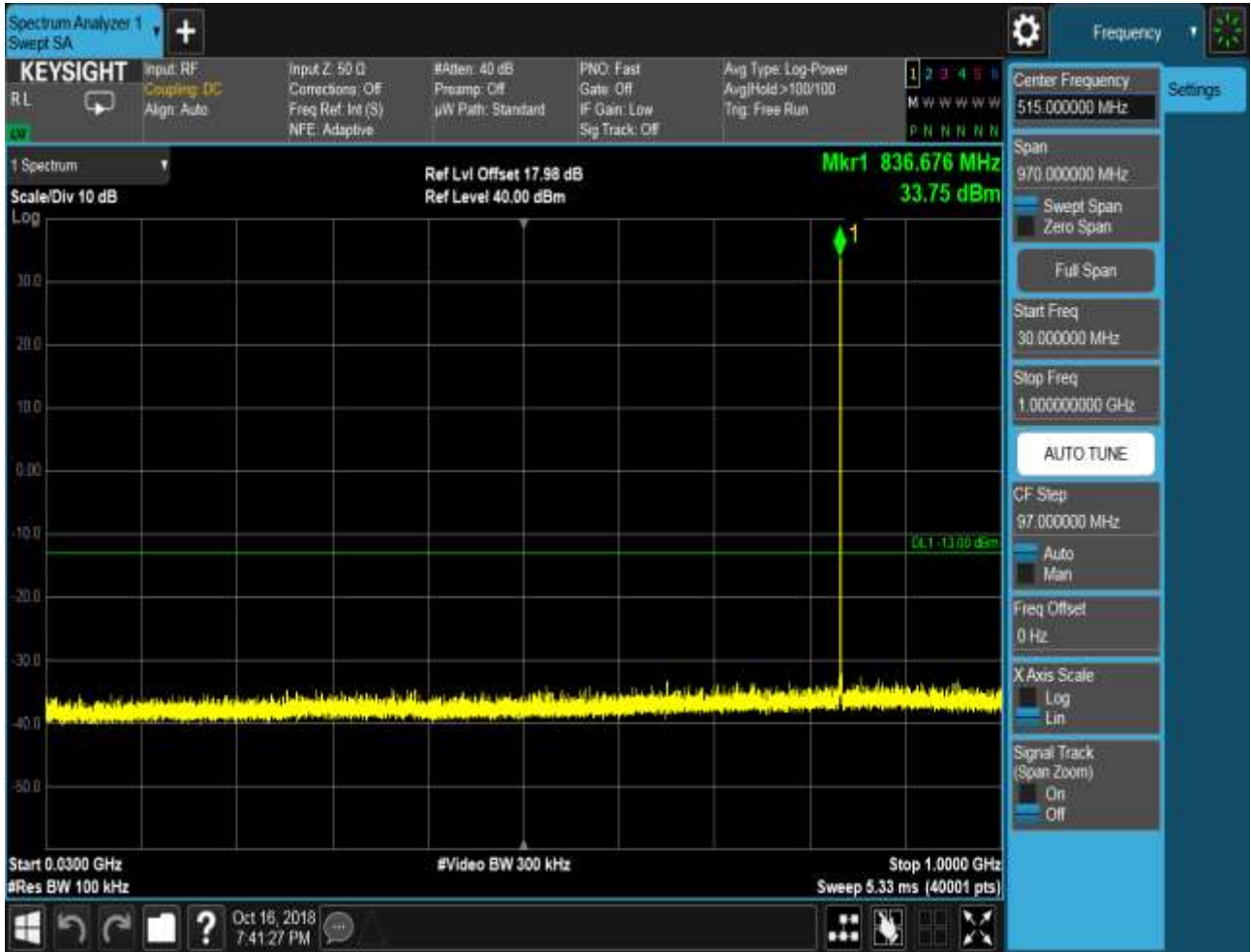


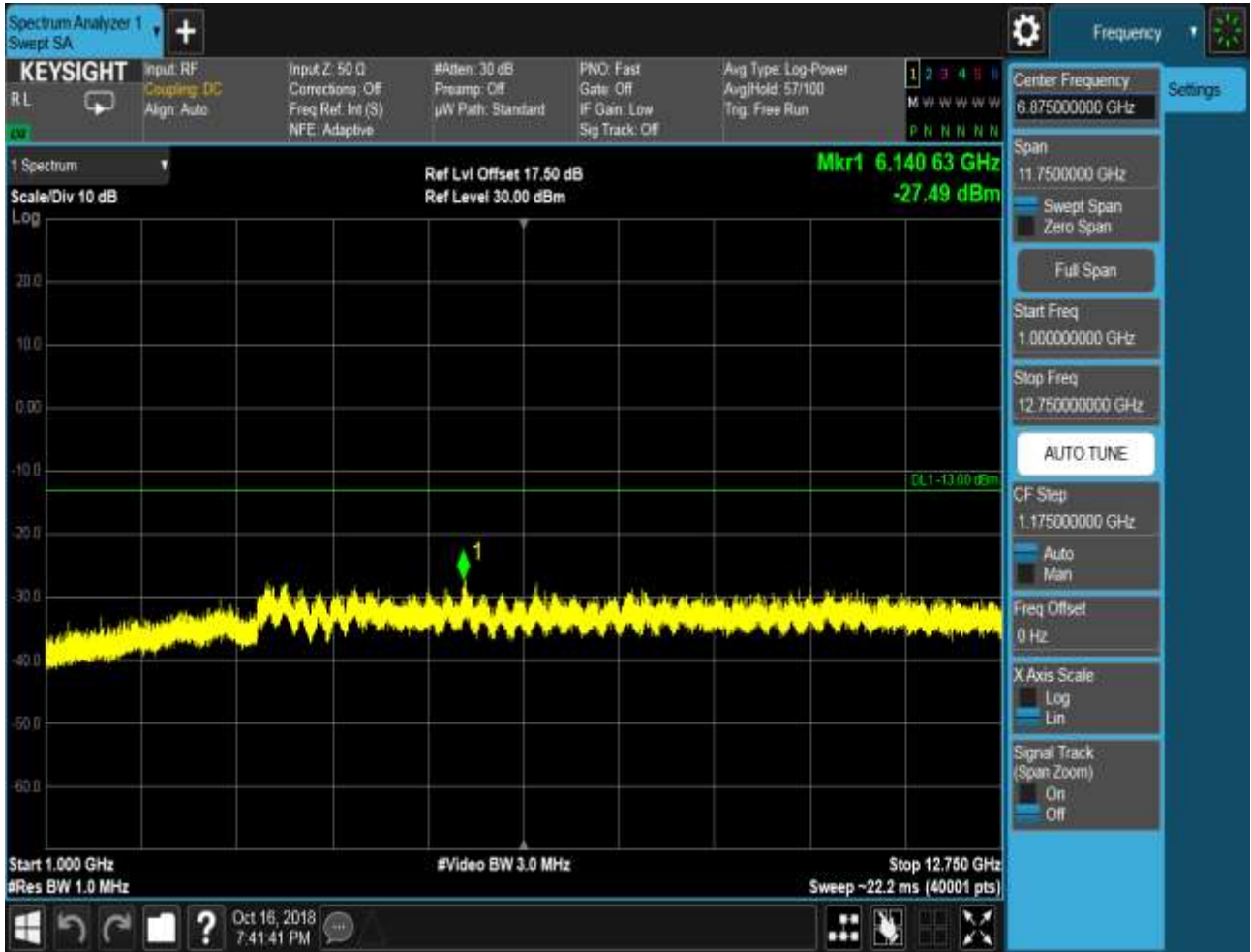


### 6.1.1.1.2 Test Channel = MCH





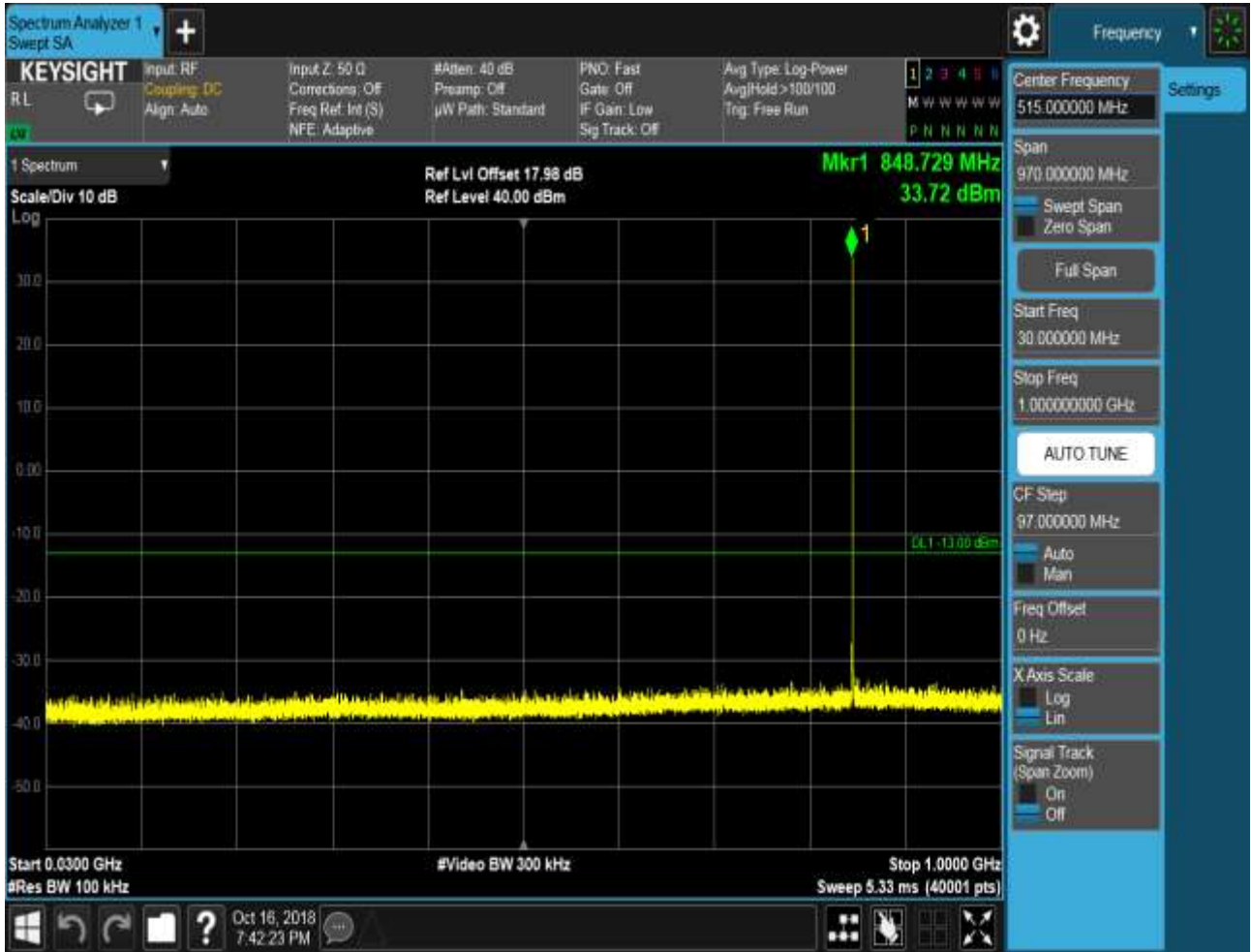




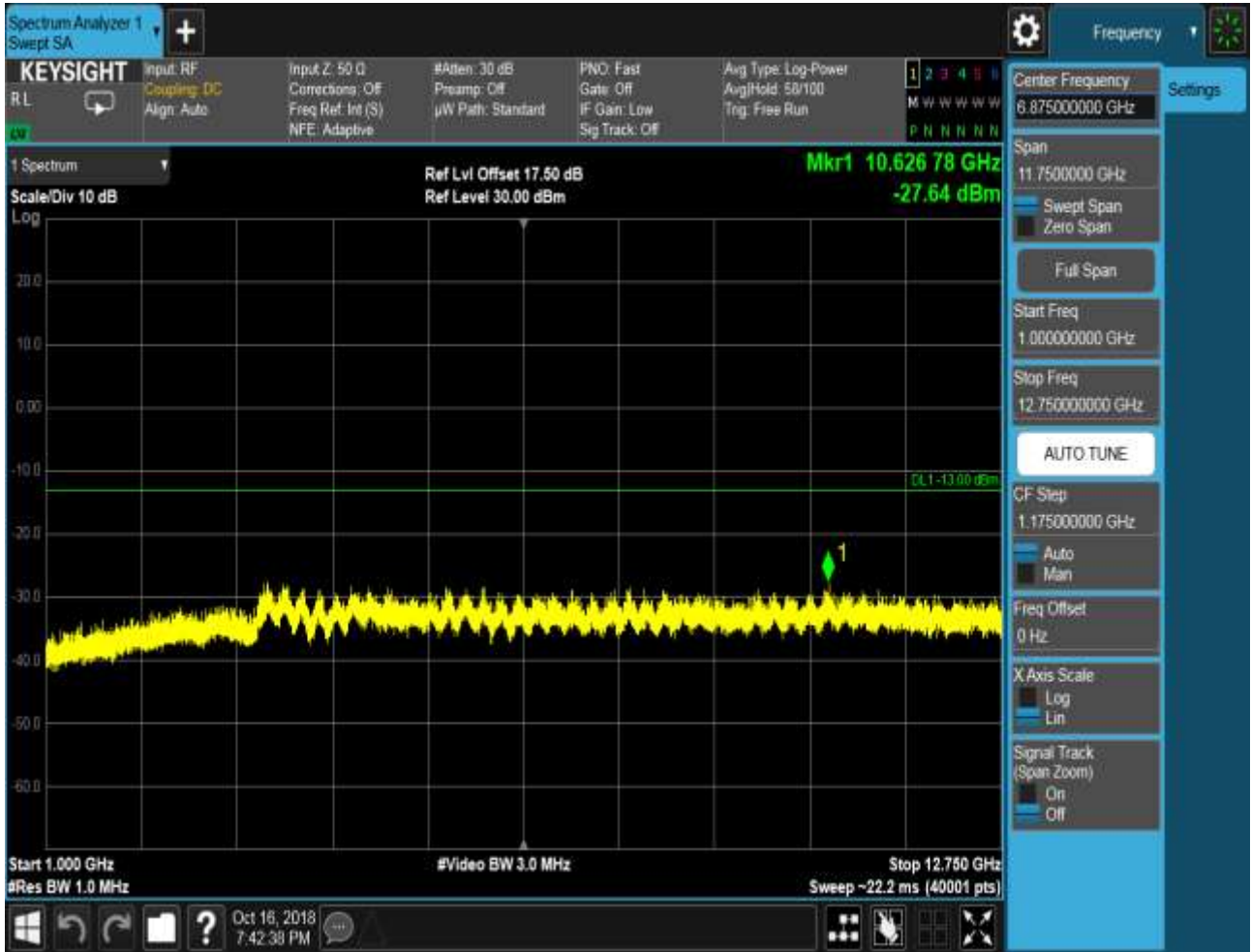
### 6.1.1.1.3 Test Channel = HCH











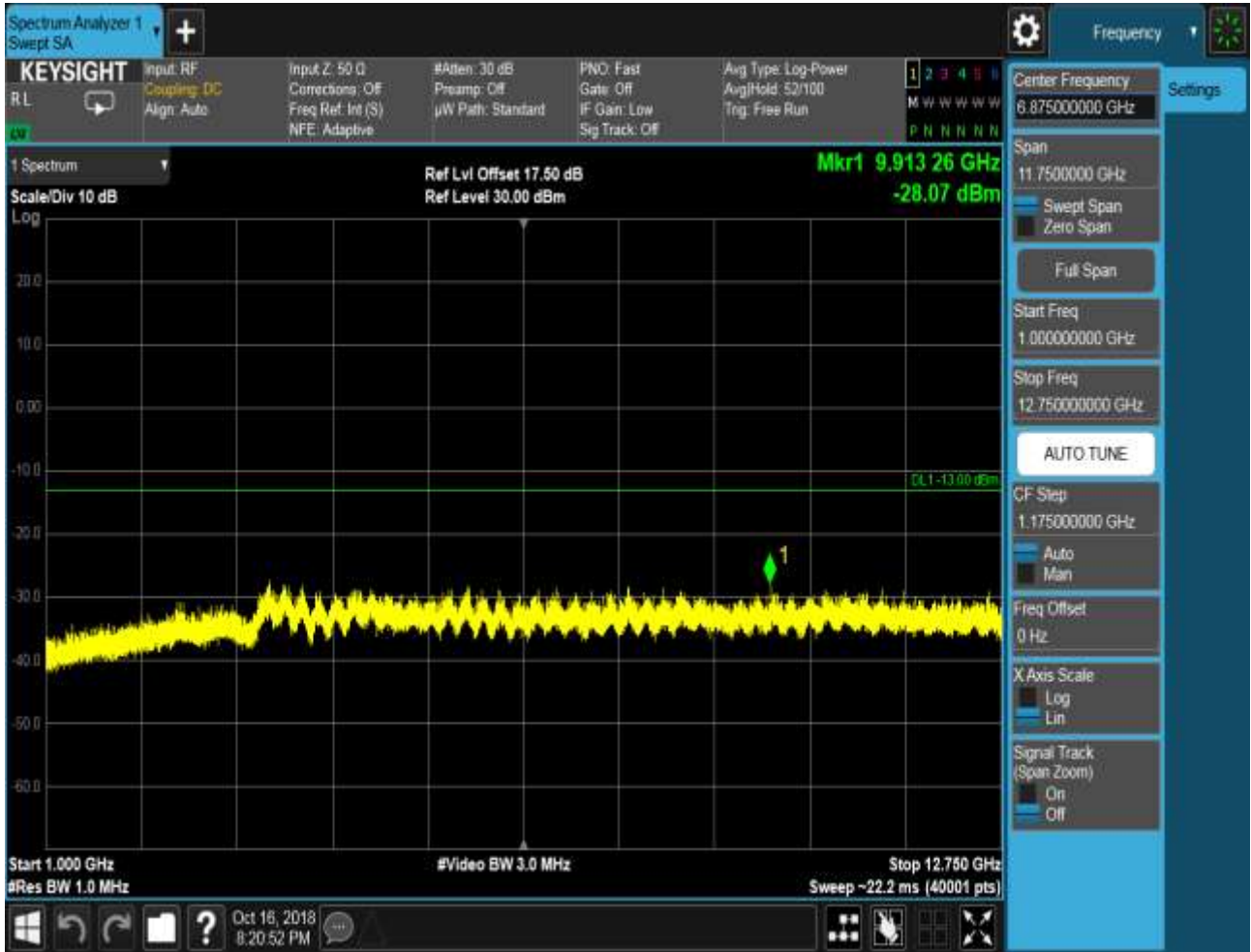
### 6.1.1.2 Test Mode = GSM/TM2

#### 6.1.1.2.1 Test Channel = LCH









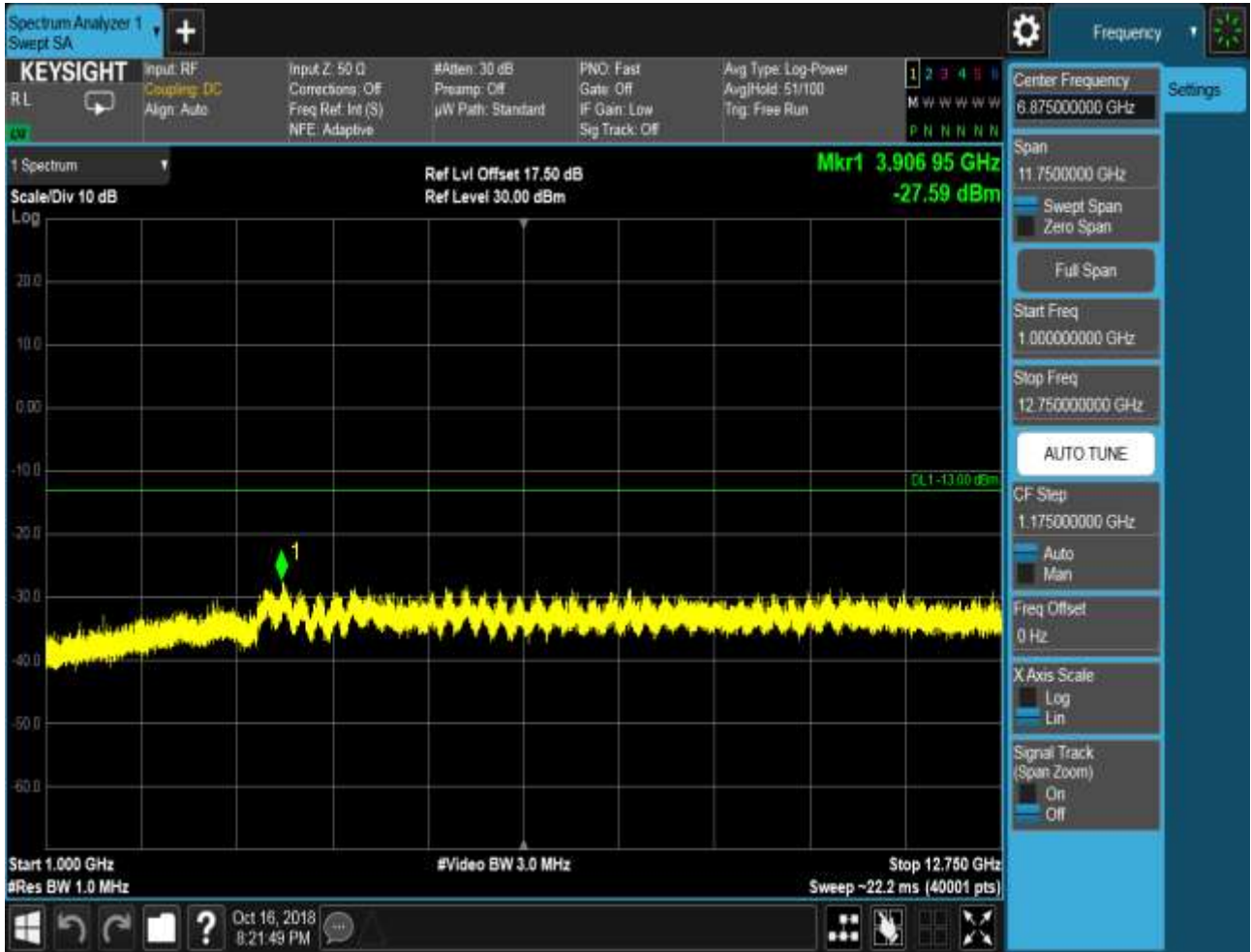
### 6.1.1.2.2 Test Channel = MCH







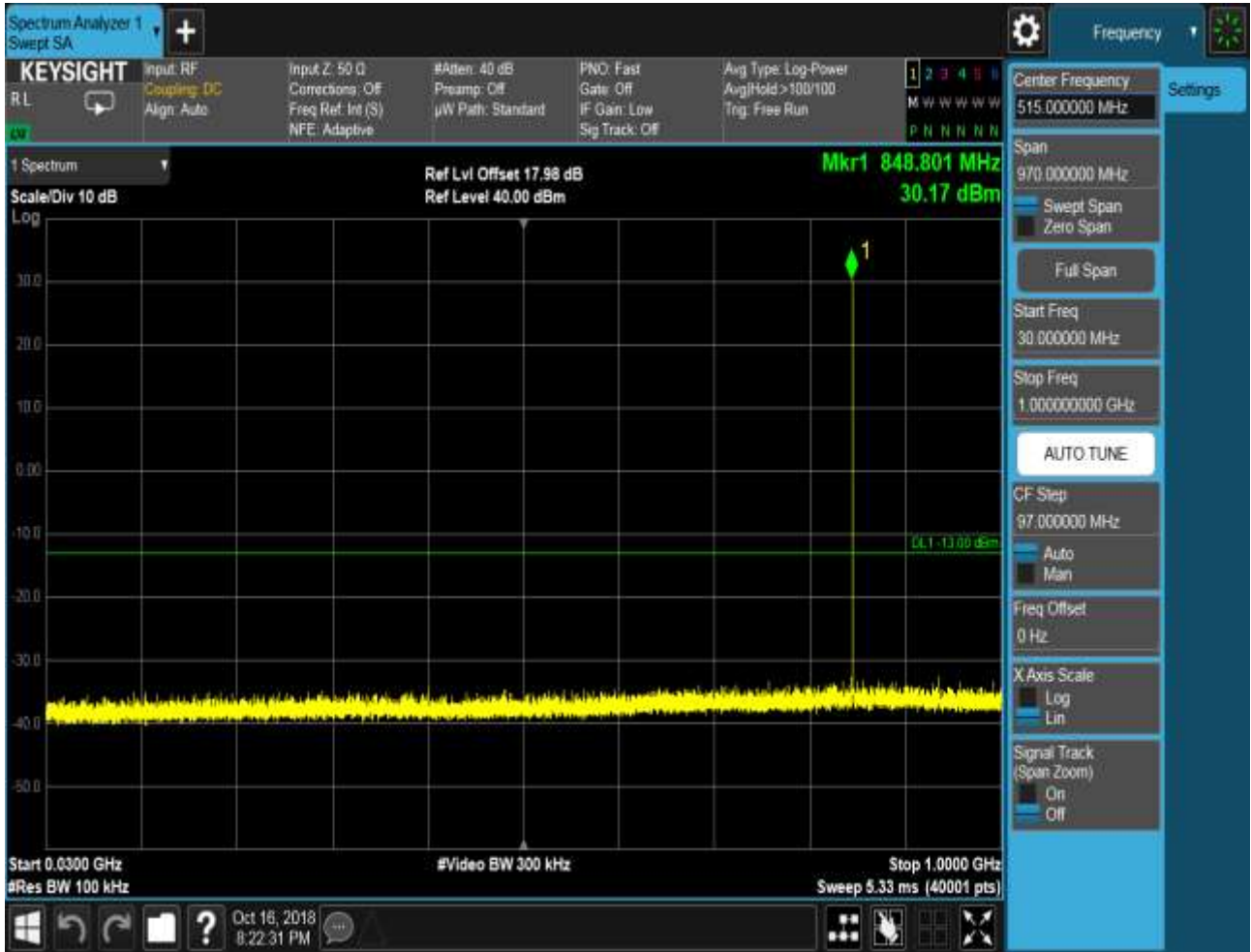




### 6.1.1.2.3 Test Channel = HCH









## 6.1.2 Test Band = PCS1900

### 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



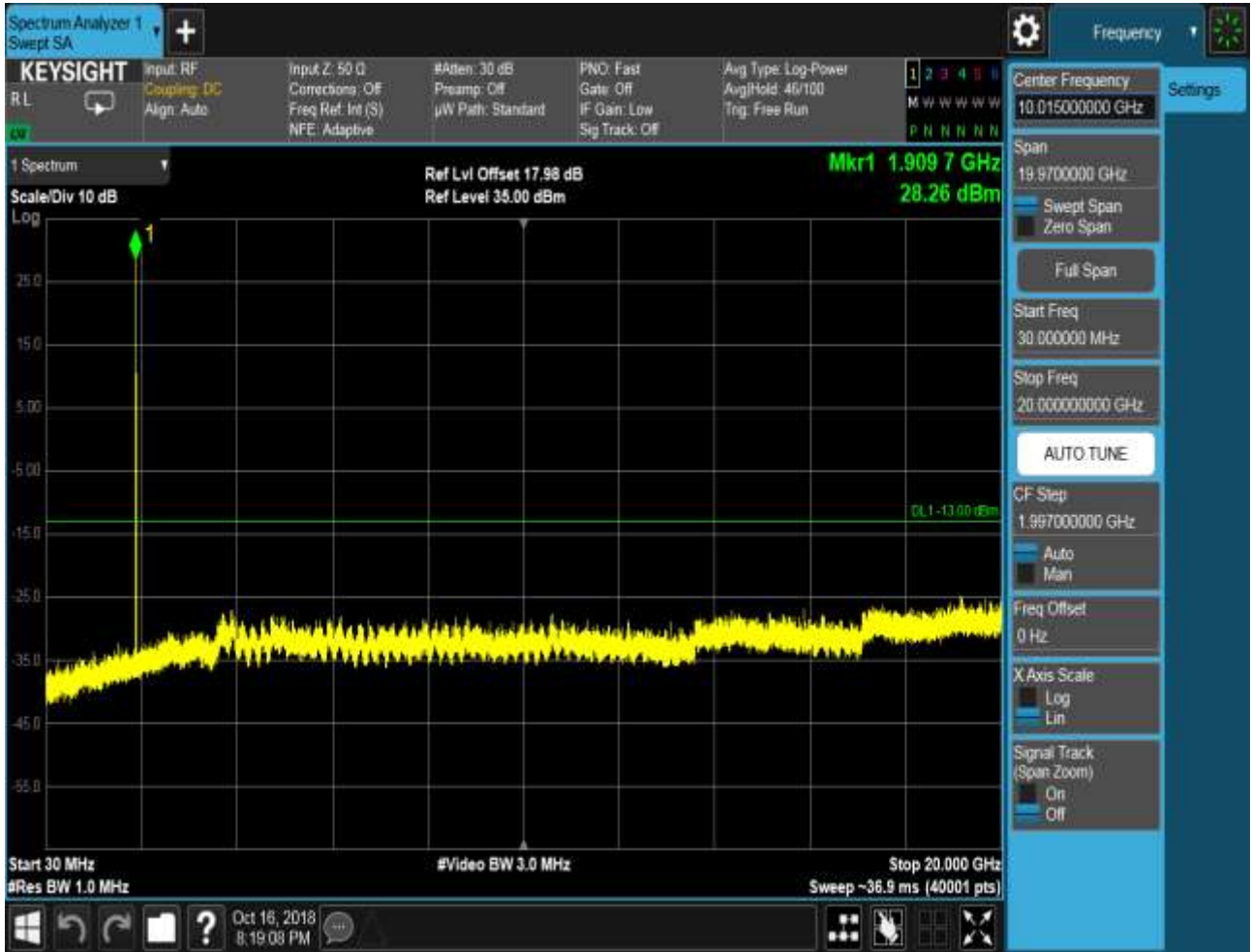




### 6.1.2.2.3 Test Channel = HCH









## 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 = 30 kHz, 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

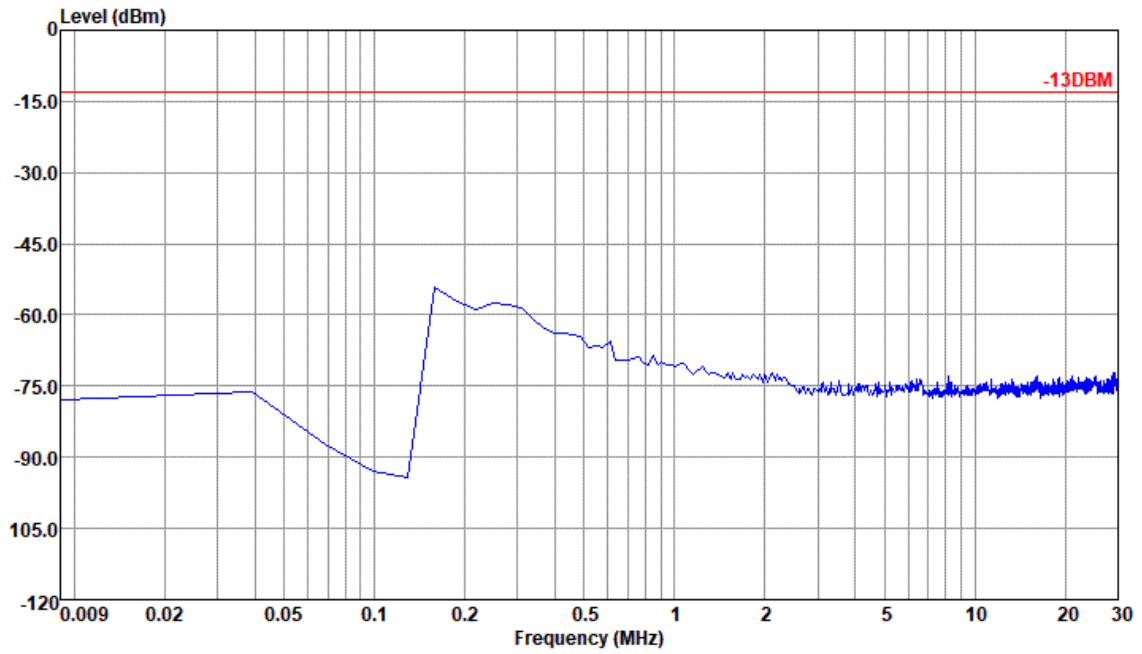
##### 7.1.1 Test Band = GSM850

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

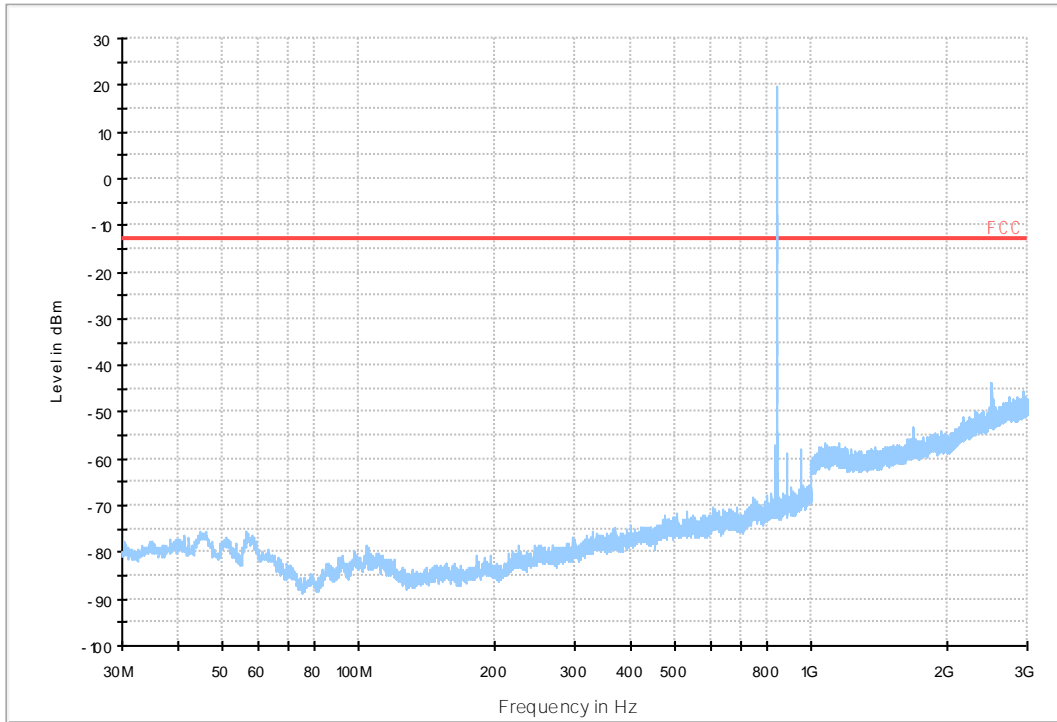




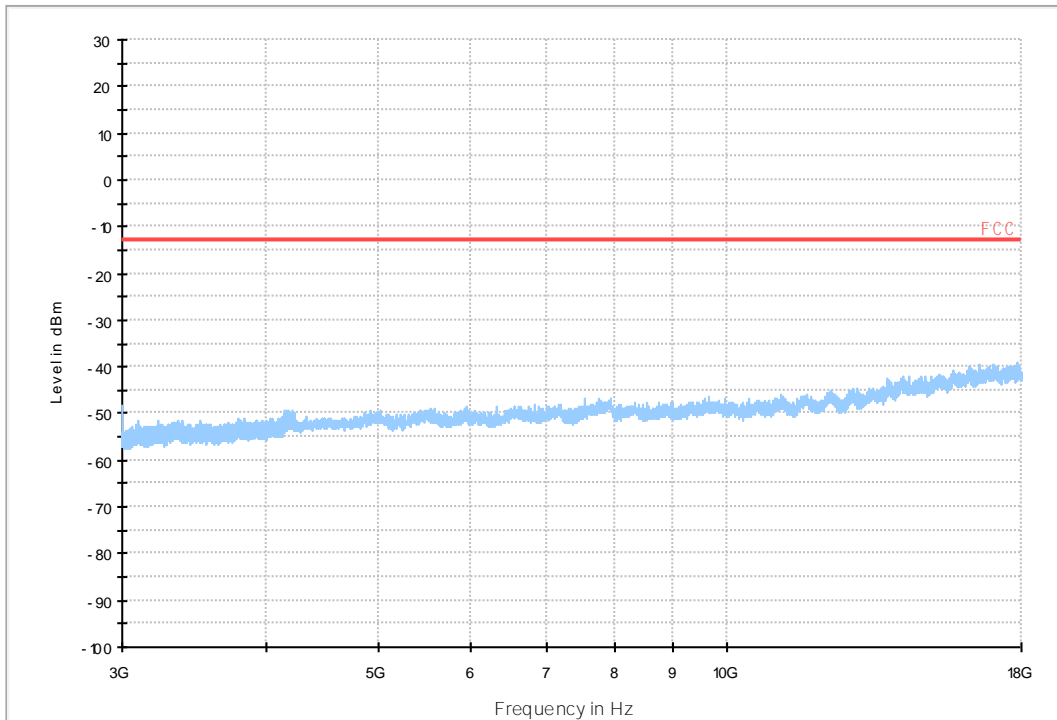
Data: 21



04 FCC PART 22 GSM850\_L



03 FCC PART 22 GSM850\_H

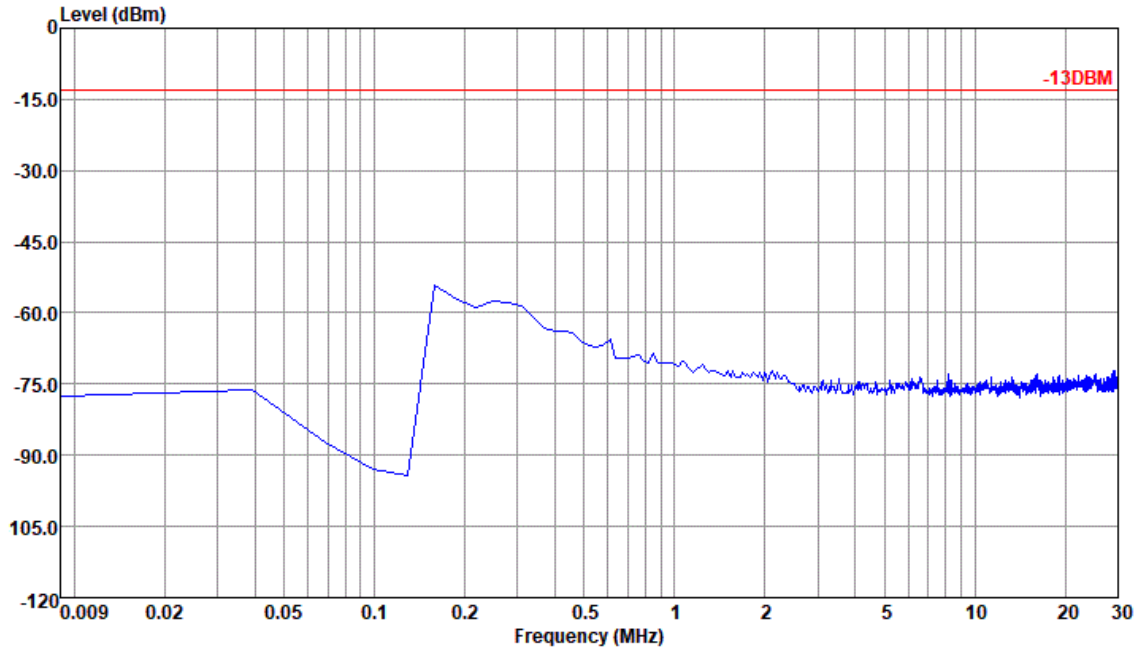


### 7.1.2 Test Band = PCS1900

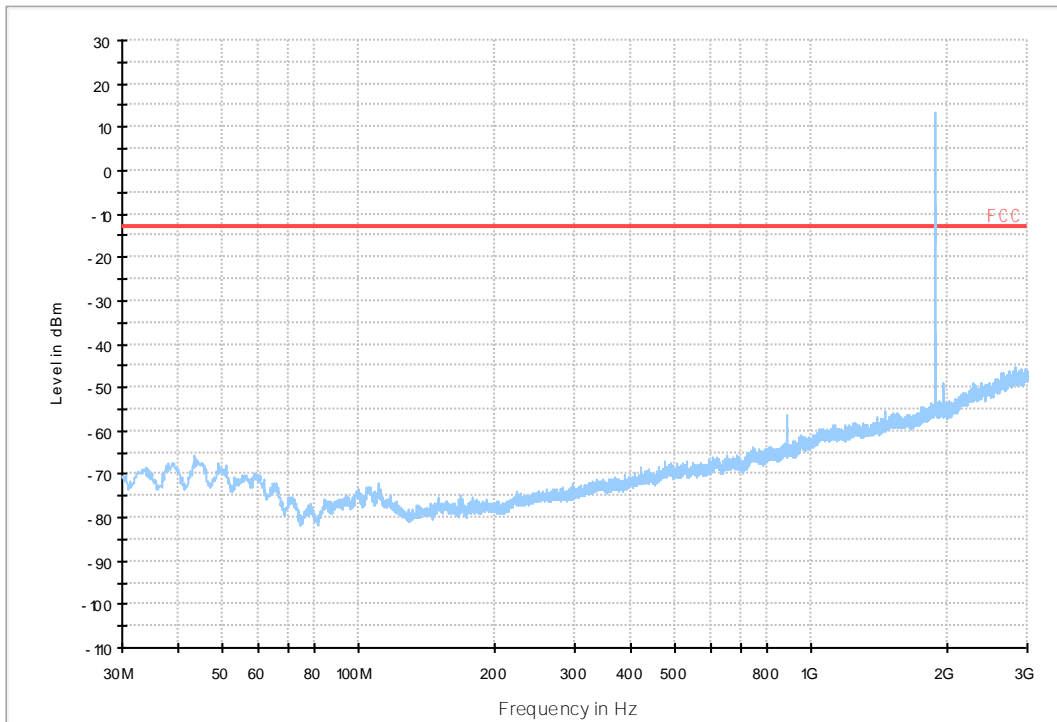
#### 7.1.2.1 Test Mode = GSM/TM1



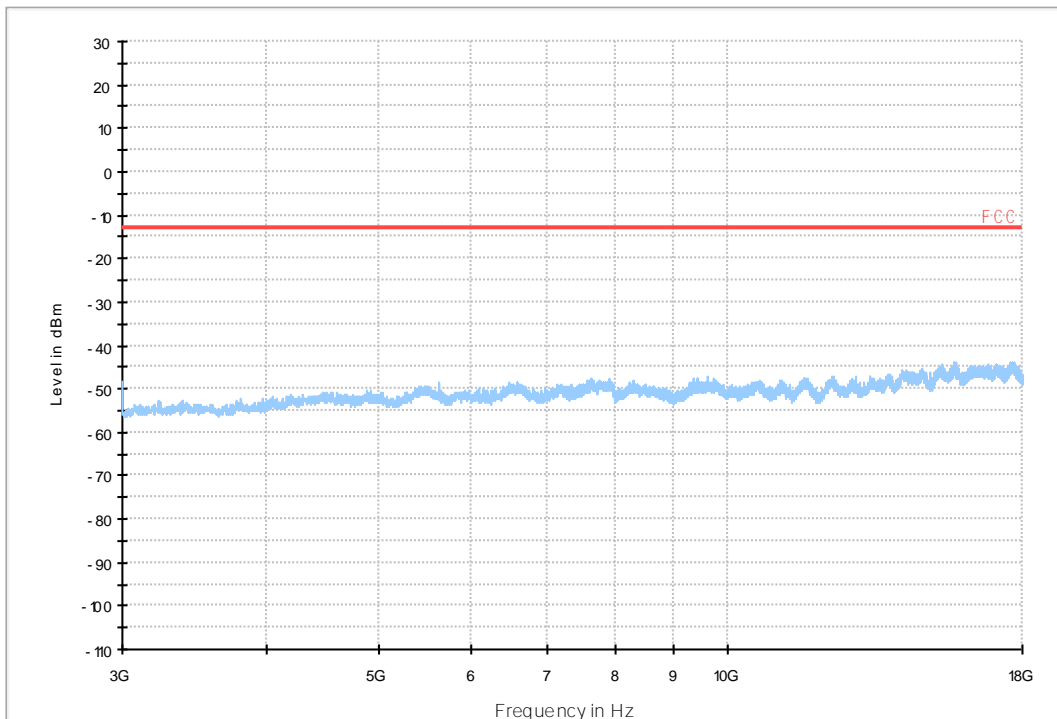
Data: 23



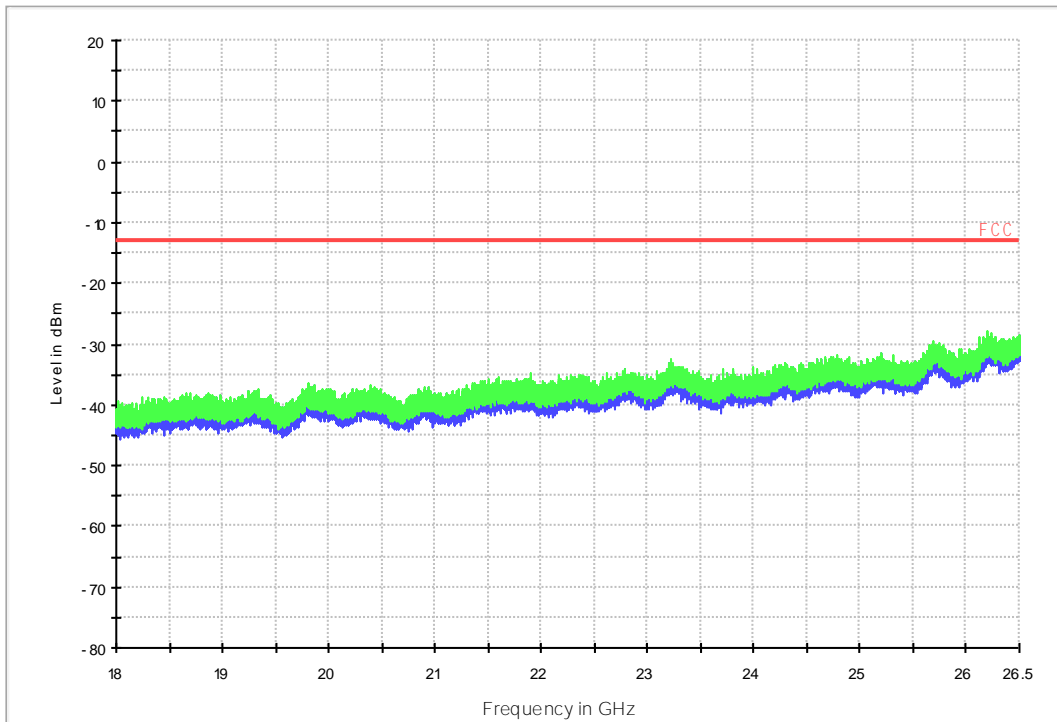
10 FCC PART 24 GSM1900\_L



09 FCC PART 24 GSM1900\_H



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



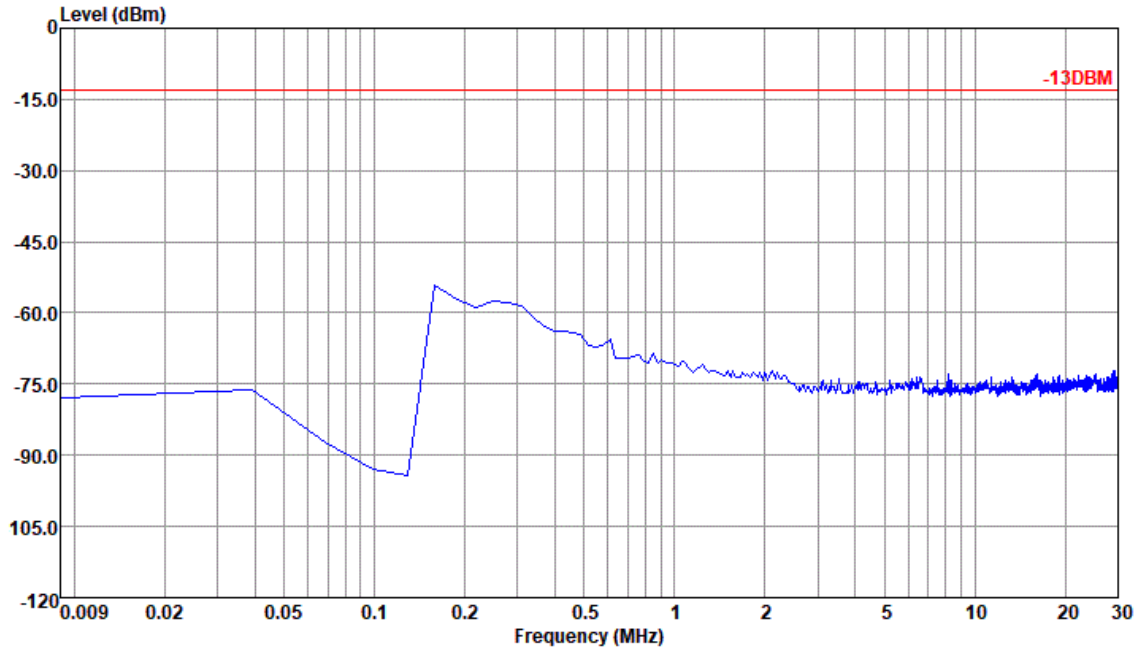
## 7.2 For GSM\_ANT2

### 7.2.1 Test Band = GSM850

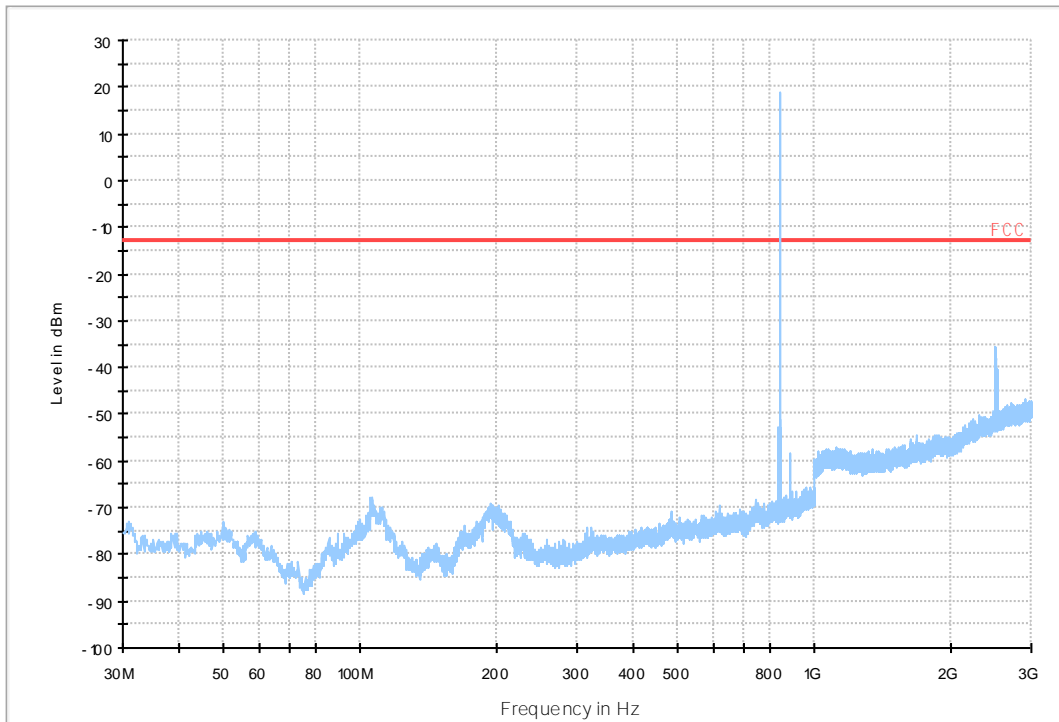
#### 7.2.1.1 Test Mode = GSM/TM1



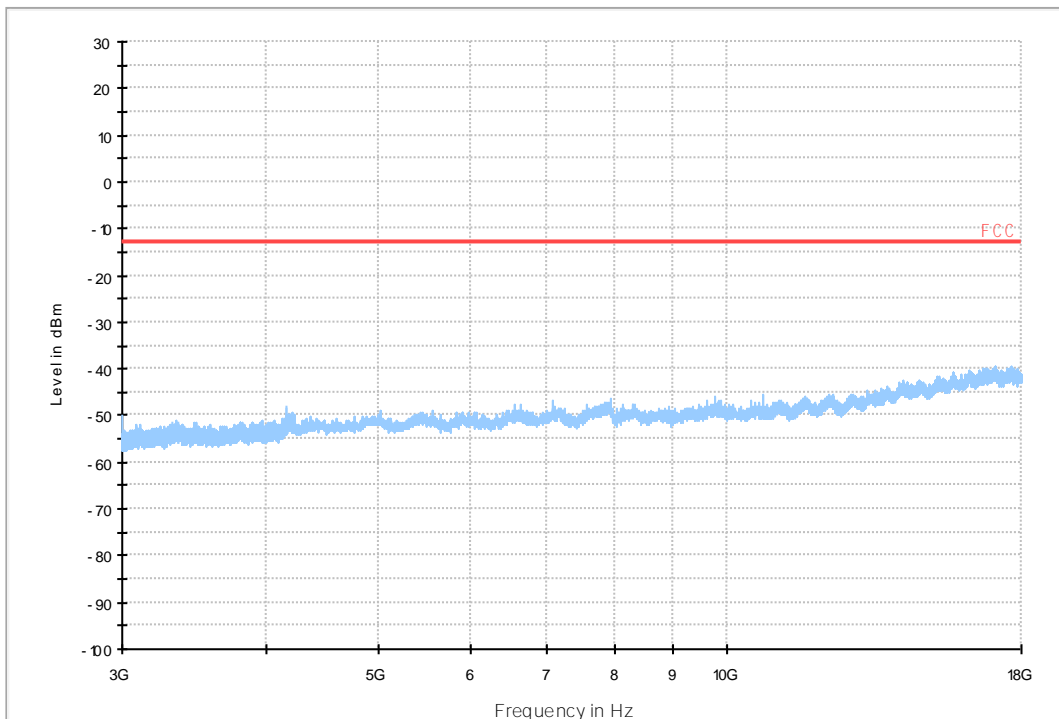
Data: 22



04 FCC PART 22 GSM850\_L



03 FCC PART 22 GSM850\_H

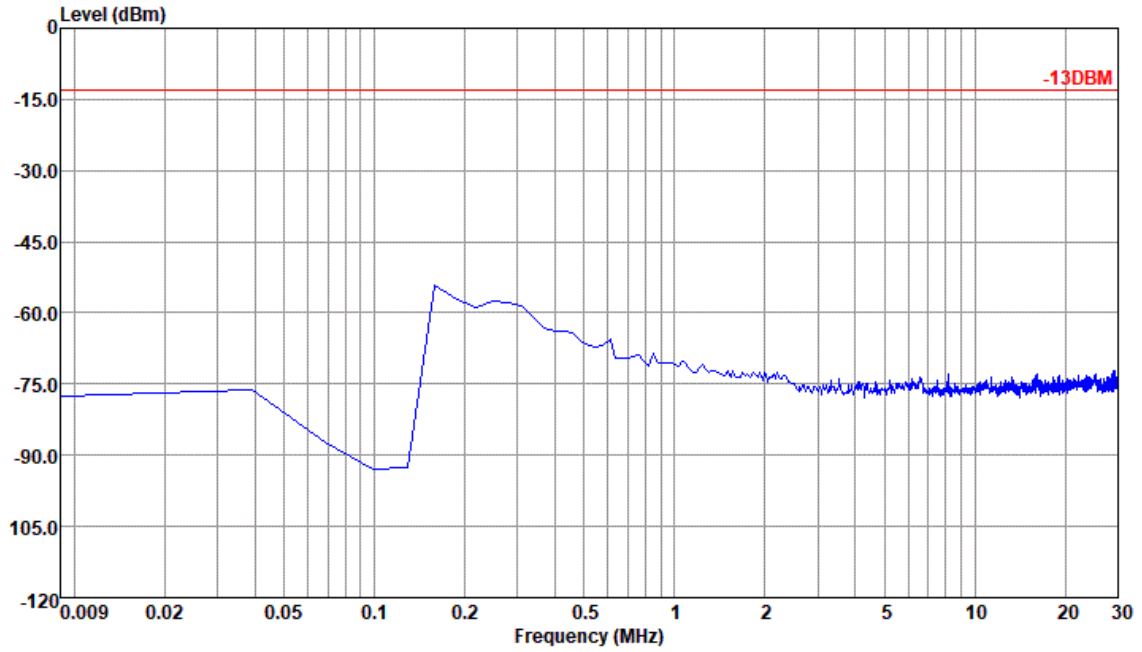


## 7.2.2 Test Band = PCS1900

### 7.2.2.1 Test Mode = GSM/TM1

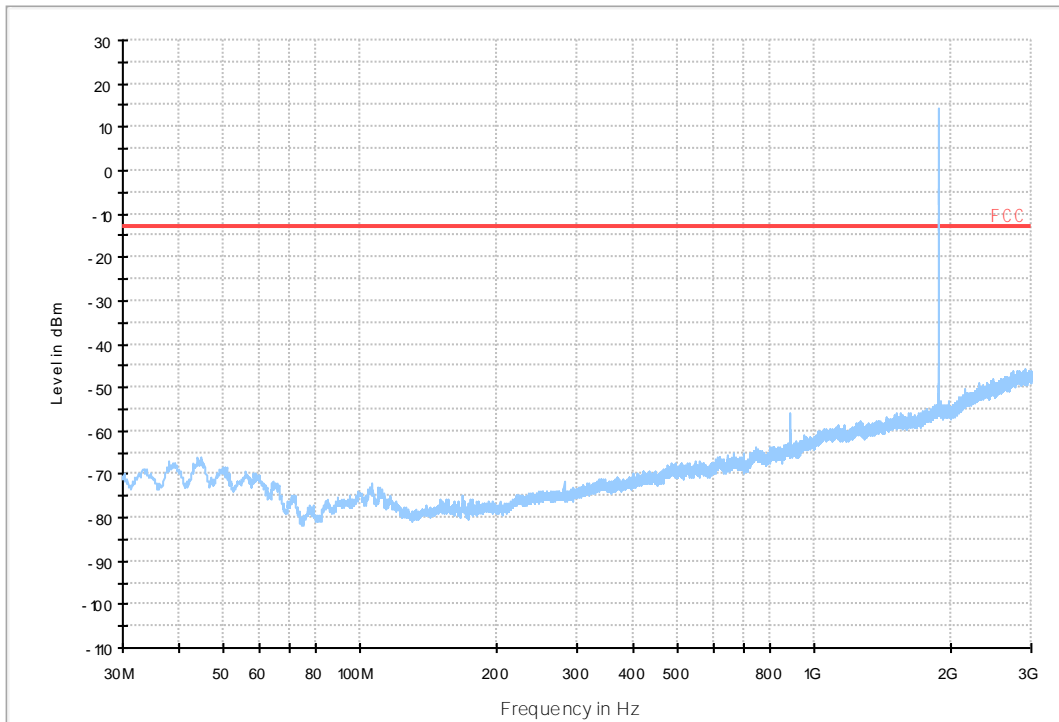


Data: 24

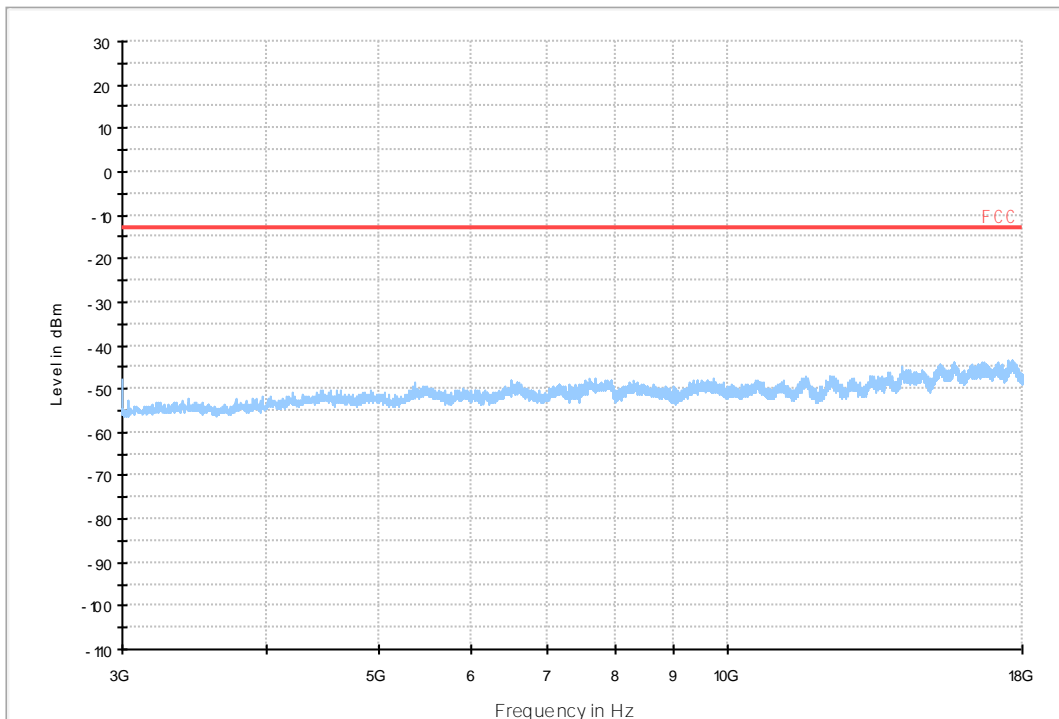




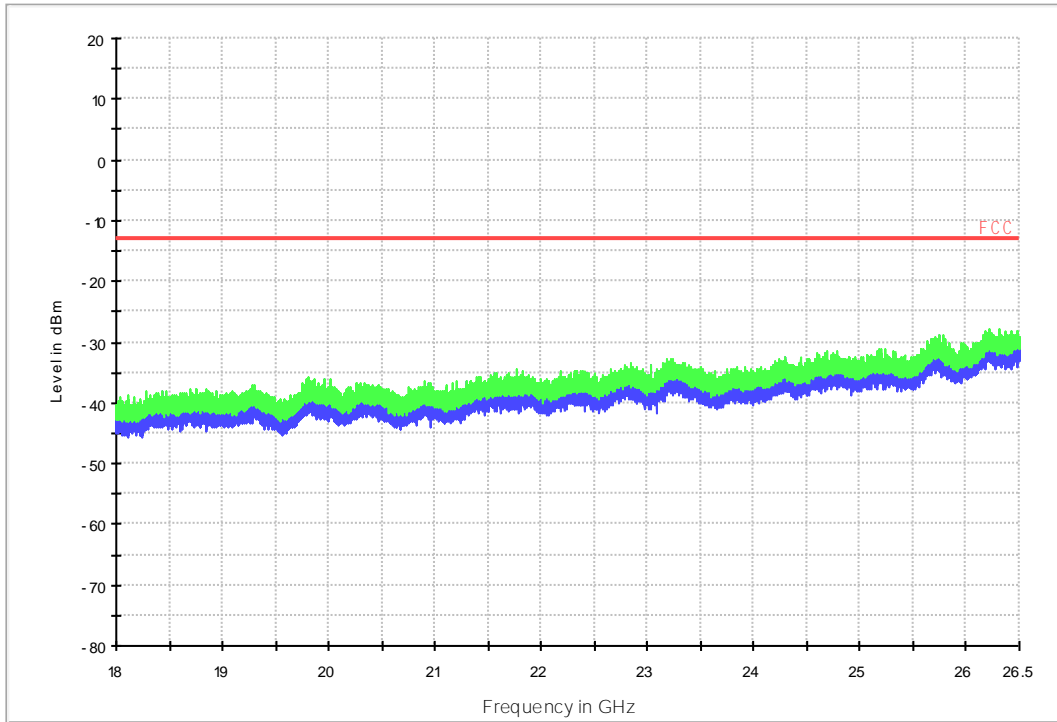
10 FCC PART 24 GSM1900\_L



09 FCC PART 24 GSM1900\_H



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



## 8Appendix\_H: Frequency Stability

### 8.1 For GSM

#### 8.1.1 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	4.48773	0.00544	PASS
				VN	1.29143	0.00157	PASS
				VH	3.13173	0.00380	PASS
		MCH	TN	VL	3.61601	0.00432	PASS
				VN	2.84116	0.00340	PASS
				VH	2.61515	0.00313	PASS
		HCH	TN	VL	2.93801	0.00346	PASS
				VN	0.90400	0.00107	PASS
				VH	1.51744	0.00179	PASS
	GSM/TM2	LCH	TN	VL	6.61860	0.00803	PASS
				VN	8.45889	0.01026	PASS
				VH	10.84805	0.01316	PASS
		MCH	TN	VL	7.42575	0.00888	PASS
				VN	7.81318	0.00934	PASS
				VH	9.36290	0.01119	PASS
		HCH	TN	VL	6.94146	0.00818	PASS
				VN	7.81318	0.00920	PASS
				VH	6.55403	0.00772	PASS
PCS1900	GSM/TM1	LCH	TN	VL	8.71718	0.00471	PASS
				VN	3.93887	0.00213	PASS
				VH	5.87603	0.00318	PASS
		MCH	TN	VL	9.71804	0.00517	PASS
				VN	4.84288	0.00258	PASS
				VH	5.13345	0.00273	PASS
		HCH	TN	VL	5.90831	0.00471	PASS
				VN	-0.38743	0.00213	PASS
				VH	-0.06457	0.00318	PASS
	GSM/TM2	LCH	TN	VL	6.29574	0.00340	PASS
				VN	0.58115	0.00031	PASS
				VH	4.19716	0.00227	PASS
		MCH	TN	VL	4.61688	0.00246	PASS
				VN	4.39088	0.00234	PASS
				VH	3.06716	0.00163	PASS



Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
		HCH	TN	VL	1.00086	0.00340	PASS
				VN	-1.51744	0.00031	PASS
				VH	-0.90400	0.00227	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	1.38829	0.00168	PASS
				-20	3.29316	0.00400	PASS
				-10	2.45372	0.00298	PASS
				0	3.55144	0.00431	PASS
				10	3.84202	0.00466	PASS
				20	4.48773	0.00544	PASS
				30	5.45631	0.00662	PASS
				40	4.42316	0.00537	PASS
		50	5.23031	0.00635	PASS		
		MCH	VN	-30	2.51830	0.00301	PASS
				-20	2.48601	0.00297	PASS
				-10	4.00345	0.00479	PASS
				0	3.80973	0.00455	PASS
				10	5.45631	0.00652	PASS
				20	3.61601	0.00432	PASS
				30	6.84460	0.00818	PASS
				40	4.03573	0.00482	PASS
		50	5.90831	0.00706	PASS		
		HCH	VN	-30	2.03401	0.00240	PASS
				-20	2.32458	0.00274	PASS
				-10	2.90573	0.00342	PASS
				0	3.84202	0.00453	PASS
				10	3.61601	0.00426	PASS
				20	2.93801	0.00346	PASS
	30			4.68145	0.00552	PASS	
	40			0.19372	0.00023	PASS	
	50	1.29143	0.00152	PASS			
	GSM/TM2	LCH	VN	-30	10.26690	0.01246	PASS
				-20	9.42747	0.01144	PASS
				-10	11.68748	0.01418	PASS
				0	10.20233	0.01238	PASS
				10	6.68317	0.00811	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict		
				20	6.61860	0.00803	PASS		
				30	9.49204	0.01152	PASS		
				40	12.43005	0.01508	PASS		
				50	10.36376	0.01257	PASS		
		MCH	VN			-30	10.04090	0.01200	PASS
						-20	9.42747	0.01127	PASS
						-10	12.65605	0.01513	PASS
						0	8.68489	0.01038	PASS
						10	9.13690	0.01092	PASS
						20	7.42575	0.00888	PASS
						30	11.68748	0.01397	PASS
						40	10.52519	0.01258	PASS
						50	10.36376	0.01239	PASS
						HCH	VN		
		-20	9.58890	0.01130	PASS				
		-10	9.78261	0.01153	PASS				
		0	6.74774	0.00795	PASS				
		10	7.39346	0.00871	PASS				
		20	6.94146	0.00818	PASS				
		30	7.74860	0.00913	PASS				
		40	9.10461	0.01073	PASS				
		50	7.61946	0.00898	PASS				
		PCS1900	GSM/TM1	LCH	VN	-30	6.42488	0.00347	PASS
						-20	10.58976	0.00572	PASS
-10	9.10461					0.00492	PASS		
0	9.87947					0.00534	PASS		
10	10.46062					0.00565	PASS		
20	8.71718					0.00471	PASS		
30	8.42661					0.00455	PASS		
40	9.10461					0.00492	PASS		
50	7.00603					0.00379	PASS		
MCH	VN							-30	7.10289
				-20	8.36204			0.00445	PASS
				-10	10.36376			0.00551	PASS
				0	8.55575			0.00455	PASS
				10	10.46062			0.00556	PASS
				20	9.71804			0.00517	PASS
				30	10.17004			0.00541	PASS
				40	7.65175			0.00407	PASS



Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict	
		HCH	VN	50	6.19888	0.00330	PASS	
				-30	4.45545	0.00233	PASS	
				-20	7.10289	0.00372	PASS	
				-10	6.32803	0.00331	PASS	
				0	5.87603	0.00308	PASS	
				10	5.58545	0.00292	PASS	
				20	5.90831	0.00309	PASS	
				30	7.39346	0.00387	PASS	
				40	5.13345	0.00269	PASS	
				50	2.13087	0.00112	PASS	
		GSM/TM2	LCH	VN	-30	5.06888	0.00274	PASS
					-20	4.64916	0.00251	PASS
					-10	3.16401	0.00171	PASS
					0	5.45631	0.00295	PASS
					10	1.67886	0.00091	PASS
					20	6.29574	0.00340	PASS
					30	5.06888	0.00274	PASS
					40	2.97030	0.00161	PASS
					50	6.26346	0.00339	PASS
			MCH	VN	-30	4.32630	0.00230	PASS
					-20	4.93973	0.00263	PASS
					-10	3.29316	0.00175	PASS
					0	5.06888	0.00270	PASS
					10	1.74344	0.00093	PASS
					20	4.61688	0.00246	PASS
					30	4.52002	0.00240	PASS
					40	3.77744	0.00201	PASS
					50	4.58459	0.00244	PASS
		HCH	VN	-30	-1.61429	-0.00085	PASS	
				-20	-0.32286	-0.00017	PASS	
				-10	0.22600	0.00012	PASS	
				0	2.87344	0.00150	PASS	
				10	-1.42058	-0.00074	PASS	
				20	1.00086	0.00052	PASS	
				30	0.87172	0.00046	PASS	
				40	2.71201	0.00142	PASS	
50				2.77658	0.00145	PASS		

END