



# Appendix for test report

## 1 Appendix\_A: Effective (Isotropic) Radiated Power Output Data

### Part I - Test Results

Test Band(LTE)	Test Mode	Test Bandwidth	Test Channel	Test RB	Measured [dBm]	EIRP [dBm]
BAND30	LTE/TM1	5	LCH	RB1#0	21.8	22.4
				RB1#13	21.79	22.39
				RB1#24	21.58	22.18
				RB12#0	20.51	21.11
				RB12#6	20.5	21.1
				RB12#13	20.47	21.07
				RB25#0	20.52	21.12
			MCH	RB1#0	21.59	22.19
				RB1#13	21.8	22.4
				RB1#24	21.64	22.24
				RB12#0	20.53	21.13
				RB12#6	20.65	21.25
				RB12#13	20.55	21.15

Test Band(LTE)	Test Mode	Test Bandwidth	Test Channel	Test RB	Measured [dBm]	EIRP [dBm]
		10		RB25#0	20.62	21.22
			HCH	RB1#0	21.82	22.42
				RB1#13	21.82	22.42
				RB1#24	21.65	22.25
				RB12#0	20.54	21.14
				RB12#6	20.73	21.33
				RB12#13	20.63	21.23
				RB25#0	20.67	21.27
			LCH/MCH /HCH	RB1#0	21.78	22.38
				RB1#25	21.62	22.22
				RB1#49	21.6	22.2
				RB25#0	20.67	21.27
				RB25#13	20.56	21.16
				RB25#25	20.53	21.13
			LTE/TM2	5	LCH	RB1#0
	RB1#13	20.84				21.44



Test Band(LTE)	Test Mode	Test Bandwidth	Test Channel	Test RB	Measured [dBm]	EIRP [dBm]
				RB1#24	20.71	21.31
				RB12#0	19.55	20.15
				RB12#6	19.53	20.13
				RB12#13	19.43	20.03
				RB25#0	19.45	20.05
			MCH	RB1#0	20.92	21.52
			MCH	RB1#13	20.98	21.58
			MCH	RB1#24	20.97	21.57
			MCH	RB12#0	19.64	20.24
			MCH	RB12#6	19.65	20.25
			MCH	RB12#13	19.58	20.18
			MCH	RB25#0	19.58	20.18
			HCH	RB1#0	21.05	21.65
			HCH	RB1#13	21.24	21.84
			HCH	RB1#24	20.95	21.55
			HCH	RB12#0	19.63	20.23
			HCH	RB12#6	19.72	20.32



Test Band(LTE)	Test Mode	Test Bandwidth	Test Channel	Test RB	Measured [dBm]	EIRP [dBm]
				RB12#13	19.72	20.32
				RB25#0	19.67	20.27
		10	LCH/MCH /HCH	RB1#0	21.03	21.63
				RB1#25	21.06	21.66
				RB1#49	21.25	21.85
				RB25#0	19.69	20.29
				RB25#13	19.52	20.12
				RB25#25	19.53	20.13
				RB50#0	19.68	20.28

Test Band(LTE)	Test Mode	Test Bandwidth	Test Channel	Test RB	Measured[dBm/5MHz]	EIRP[dBm/5MHz]	Limit [dBm/5MHz]	Verdict
BAND 30	LTE/TM1	5	LCH	RB25#0	20.52	21.12	43	PASS
			MCH	RB25#0	20.62	21.22	43	PASS
			HCH	RB25#0	20.67	21.27	43	PASS
	LTE/TM2	10	LCH/MCH/HCH	RB50#0	20.61	21.21	43	PASS
			5	LCH	RB25#0	19.45	20.05	43
		MCH		RB25#0	19.58	20.18	43	PASS
		HCH		RB25#0	19.67	20.27	43	PASS
		10	LCH/MCH/HCH	RB50#0	19.68	20.28	43	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: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

## 2Appendix\_B: Peak-to-Average Ratio

### Part I - Test Results

Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict
BAND30	LTE/TM1	5	LCH	RB1#0	4.02	13	PASS
				RB1#13	3.99	13	PASS
				RB1#24	3.85	13	PASS
				RB12#0	4.93	13	PASS
				RB12#6	4.78	13	PASS
				RB12#13	4.85	13	PASS
				RB25#0	5.45	13	PASS
			MCH	RB1#0	3.92	13	PASS
				RB1#13	3.65	13	PASS
				RB1#24	3.51	13	PASS
				RB12#0	4.82	13	PASS
				RB12#6	4.54	13	PASS
				RB12#13	4.58	13	PASS
				RB25#0	5.23	13	PASS
		HCH	RB1#0	3.78	13	PASS	
			RB1#13	3.37	13	PASS	
			RB1#24	3.37	13	PASS	
			RB12#0	4.6	13	PASS	
			RB12#6	4.35	13	PASS	
			RB12#13	4.38	13	PASS	
			RB25#0	4.97	13	PASS	
	10	LCH	RB1#0	4.11	13	PASS	
			RB1#25	3.8	13	PASS	
			RB1#49	3.44	13	PASS	
			RB25#0	4.83	13	PASS	
			RB25#13	4.67	13	PASS	
			RB25#25	4.54	13	PASS	
			RB50#0	4.84	13	PASS	
LTE/TM2	5	LCH	RB1#0	5.05	13	PASS	
			RB1#13	4.88	13	PASS	



Test Band(For LTE)	Test Mode	Test Bandwidth (MHz)	Test Channel	Test RB	Measured[dB]	Limit [dB]	Verdict
				RB1#24	4.79	13	PASS
				RB12#0	5.78	13	PASS
				RB12#6	5.72	13	PASS
				RB12#13	5.75	13	PASS
				RB25#0	6.38	13	PASS
			MCH	RB1#0	4.92	13	PASS
				RB1#13	4.52	13	PASS
				RB1#24	4.3	13	PASS
				RB12#0	5.62	13	PASS
				RB12#6	5.5	13	PASS
				RB12#13	5.47	13	PASS
				RB25#0	6.13	13	PASS
			HCH	RB1#0	4.56	13	PASS
				RB1#13	4	13	PASS
				RB1#24	4.08	13	PASS
				RB12#0	5.41	13	PASS
				RB12#6	5.24	13	PASS
		RB12#13		5.24	13	PASS	
		RB25#0		6.02	13	PASS	
		10	LCH	RB1#0	5.08	13	PASS
				RB1#25	4.9	13	PASS
				RB1#49	4.46	13	PASS
				RB25#0	5.83	13	PASS
				RB25#13	5.57	13	PASS
				RB25#25	5.52	13	PASS
				RB50#0	6.49	13	PASS

## 3Appendix\_C: Modulation Characteristics

### Part I - Test Plots

#### 3.1 For LTE

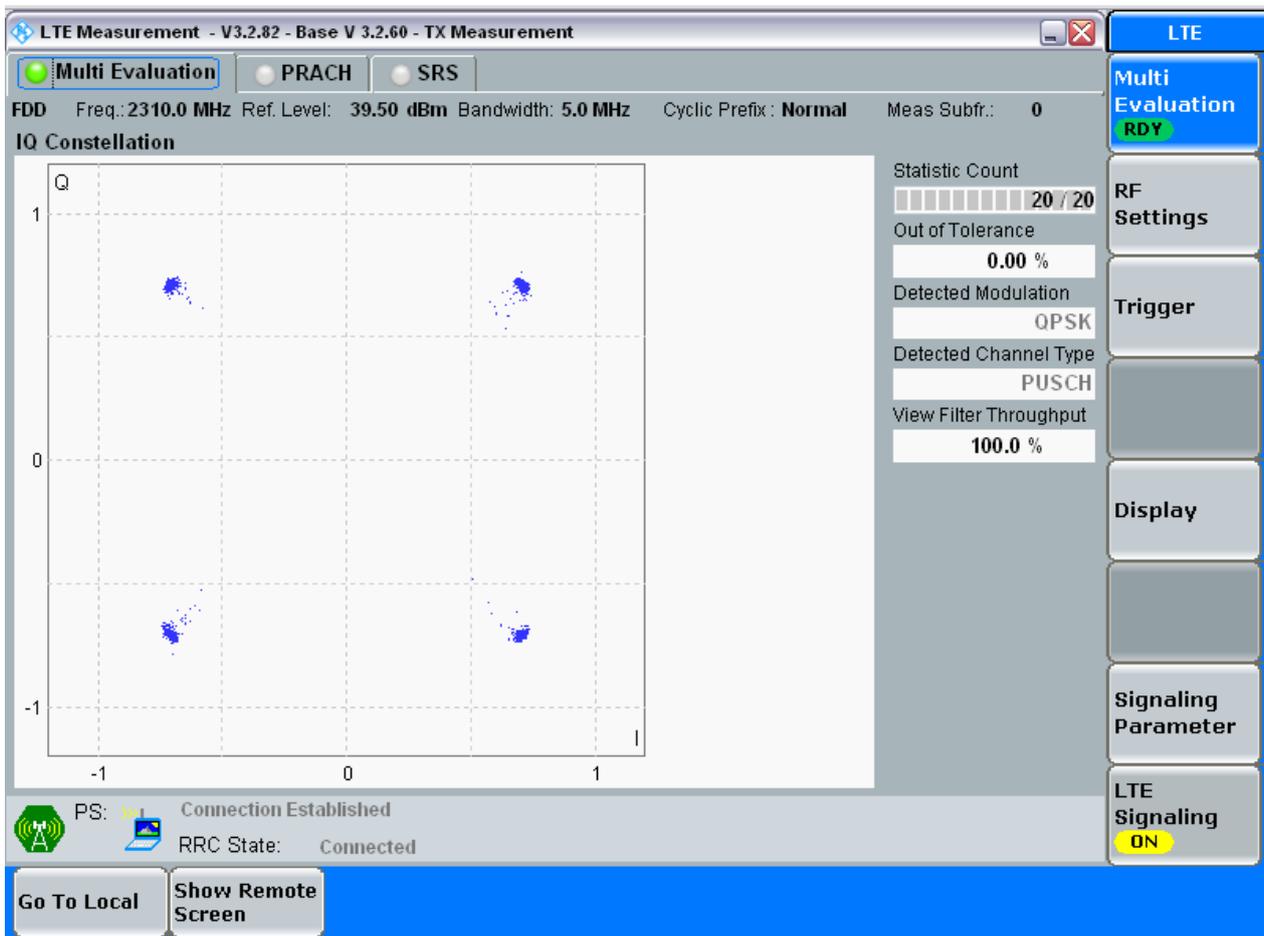
##### 3.1.1 Test Band = BAND30

##### 3.1.1.1 Test Mode = LTE/TM1

##### 3.1.1.1.1 Test Bandwidth = 5

##### 3.1.1.1.1.1 Test Channel = MCH

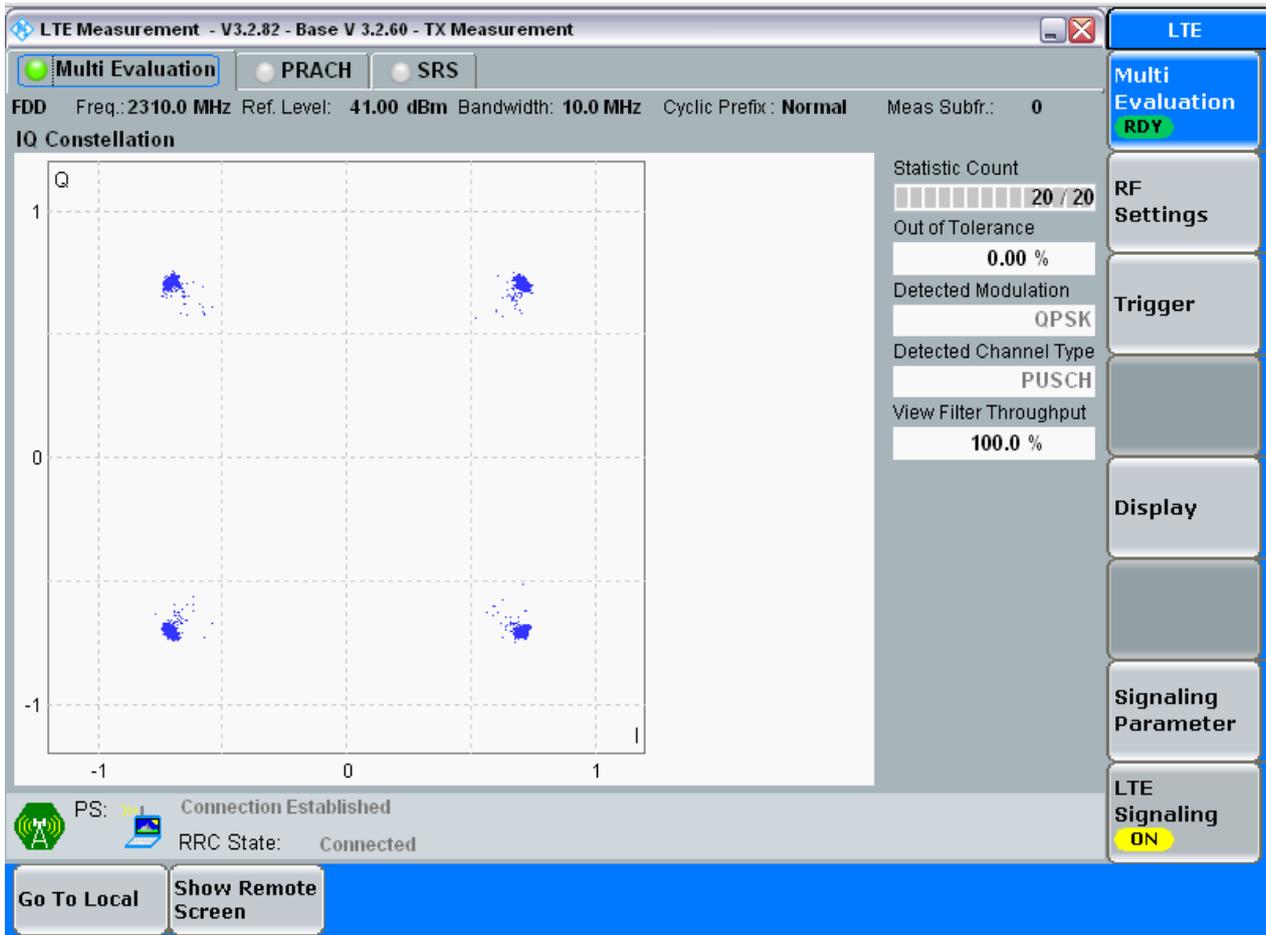
##### 3.1.1.1.1.1.1 Test RB = RB25#0



### 3.1.1.1.2 Test Bandwidth = 10

#### 3.1.1.1.2.1 Test Channel = MCH

##### 3.1.1.1.2.1.1 Test RB = RB50#0

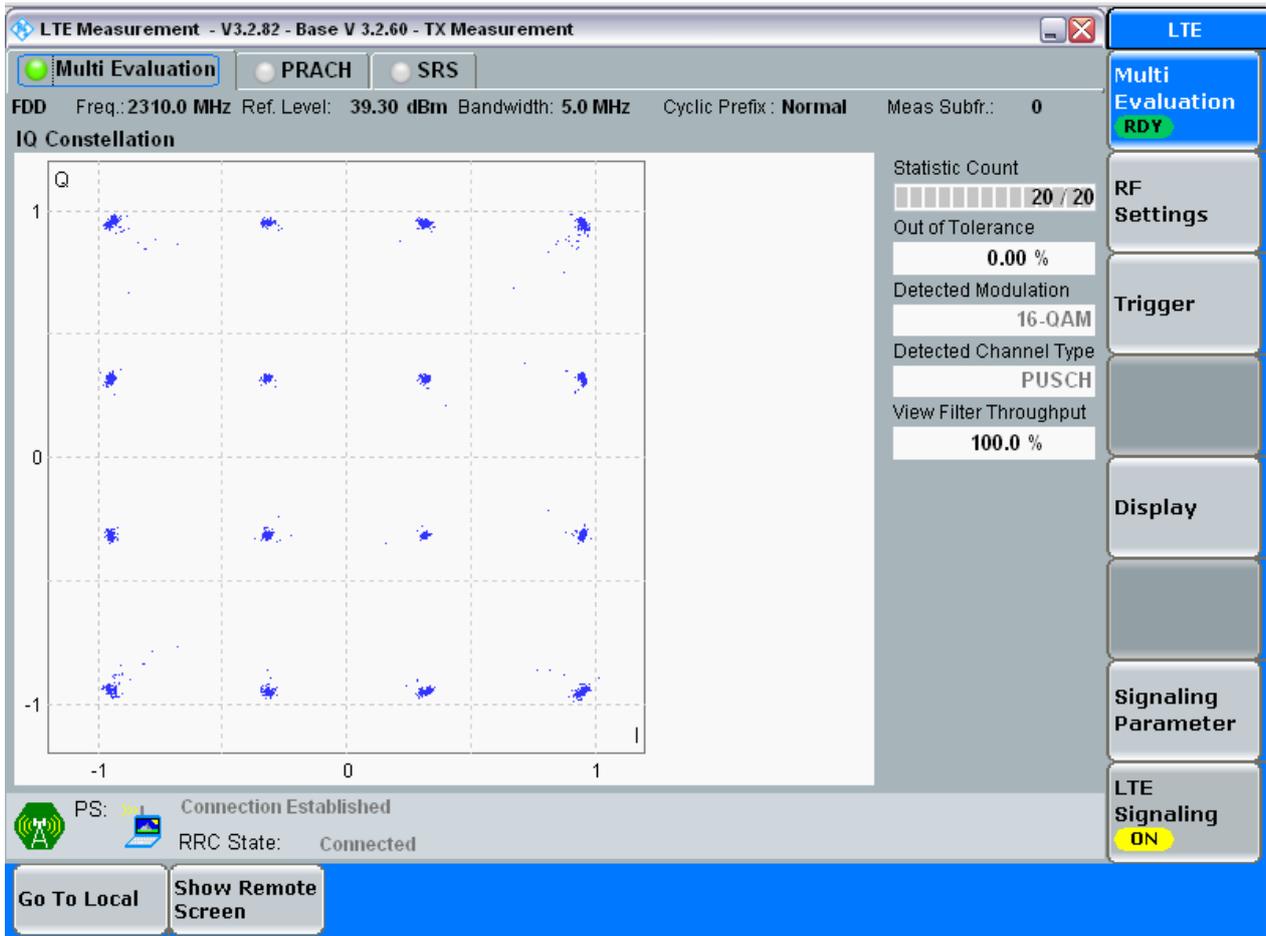


3.1.1.2 Test Mode = LTE/TM2

3.1.1.2.1 Test Bandwidth = 5

3.1.1.2.1.1 Test Channel = MCH

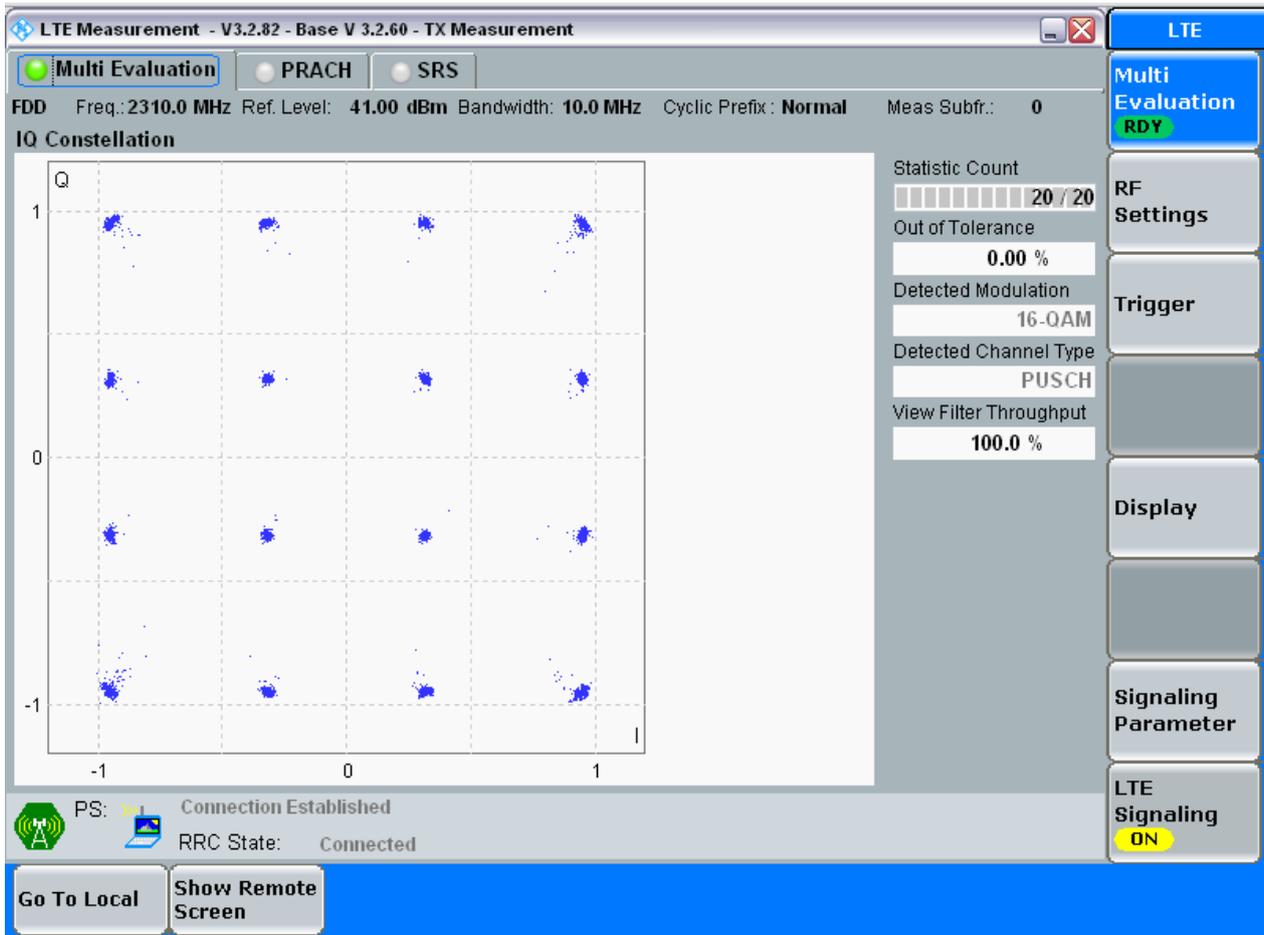
3.1.1.2.1.1.1 Test RB = RB25#0



### 3.1.1.2.2 Test Bandwidth = 10

#### 3.1.1.2.2.1 Test Channel = MCH

##### 3.1.1.2.2.1.1 Test RB = RB50#0



## 4Appendix\_D: Bandwidth

### Part I - Test Results

Test Band	Test Mode	Test Bandwidth	Test Channel	Test RB	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
BAND30	LTE/TM1	5	LCH	RB25#0	4.50	4.88	Pass
			MCH	RB25#0	4.50	4.84	Pass
			HCH	RB25#0	4.50	4.87	Pass
		10	LCH	RB50#0	8.96	9.57	Pass
			MCH	RB50#0	8.97	9.55	Pass
			HCH	RB50#0	8.97	9.55	Pass
	LTE/TM2	5	LCH	RB25#0	4.50	4.84	Pass
			MCH	RB25#0	4.50	4.85	Pass
			HCH	RB25#0	4.50	4.86	Pass
		10	LCH	RB50#0	8.96	9.58	Pass
			MCH	RB50#0	8.96	9.56	Pass
			HCH	RB50#0	8.96	9.58	Pass



Part II - Test Plots

4.1 For LTE

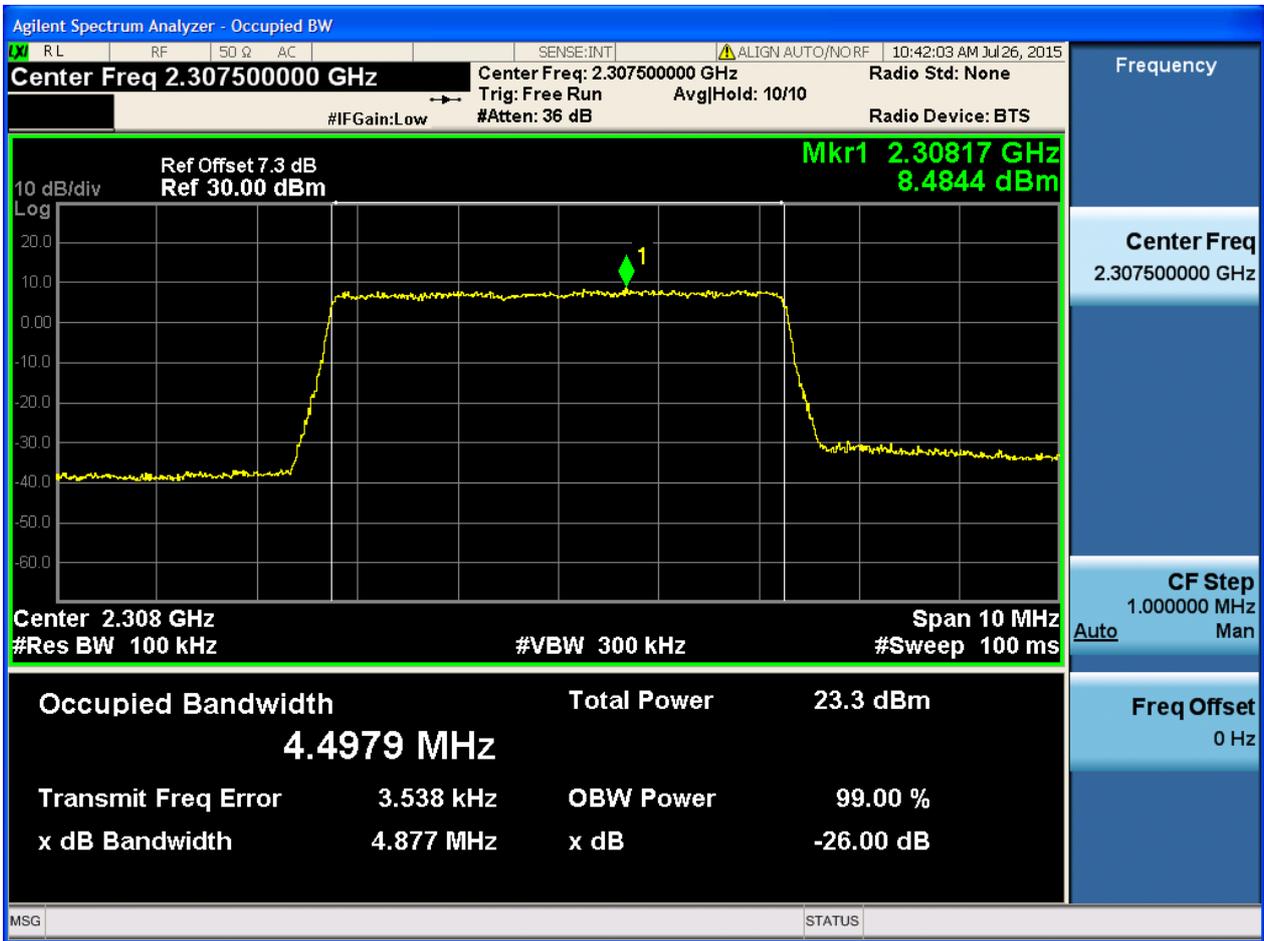
4.1.1 Test Band = BAND30

4.1.1.1 Test Mode = LTE/TM1

4.1.1.1.1 Test Bandwidth = 5

4.1.1.1.1.1 Test Channel = LCH

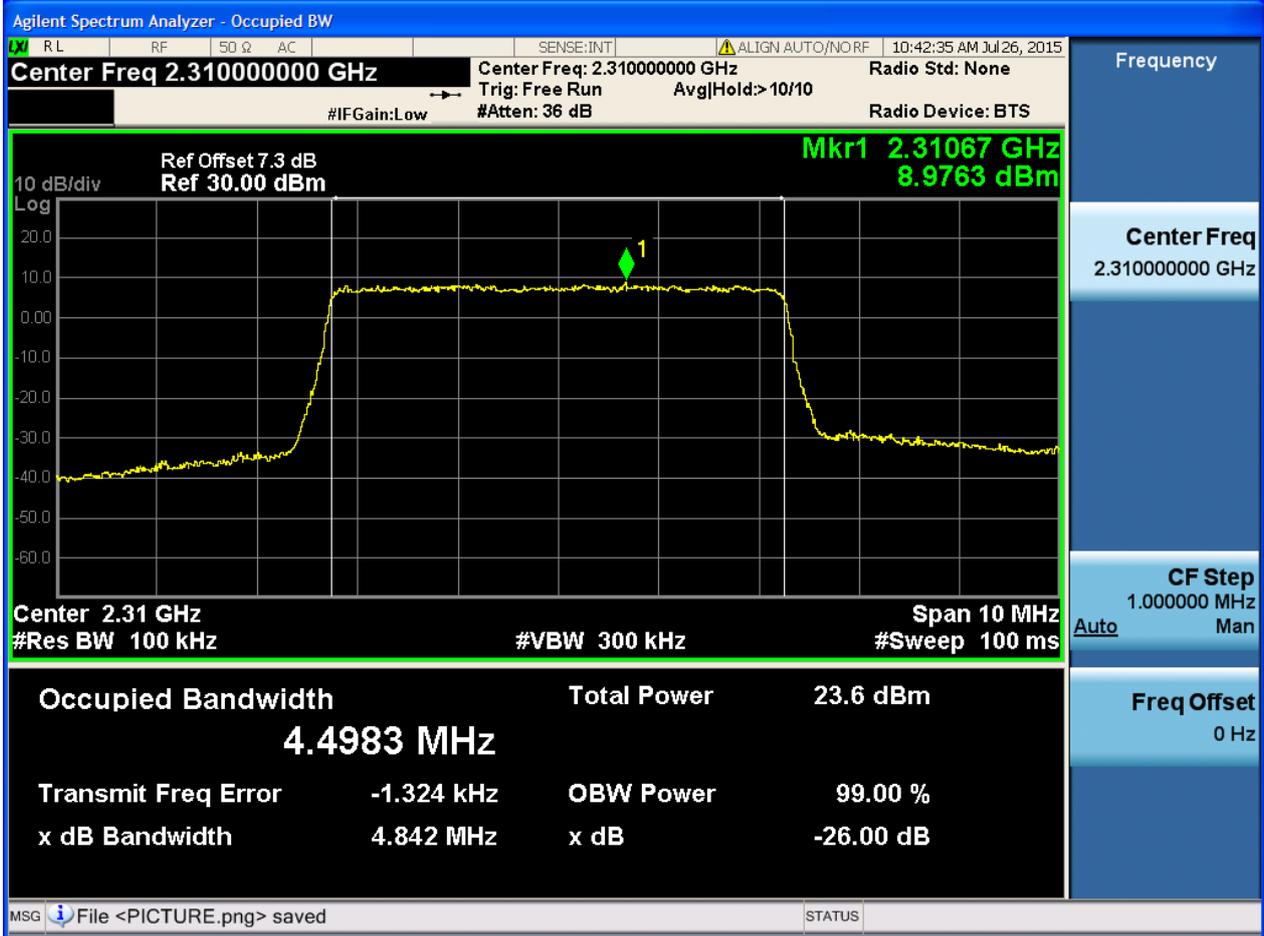
4.1.1.1.1.1.1 Test RB = RB25#0





4.1.1.1.2 Test Channel = MCH

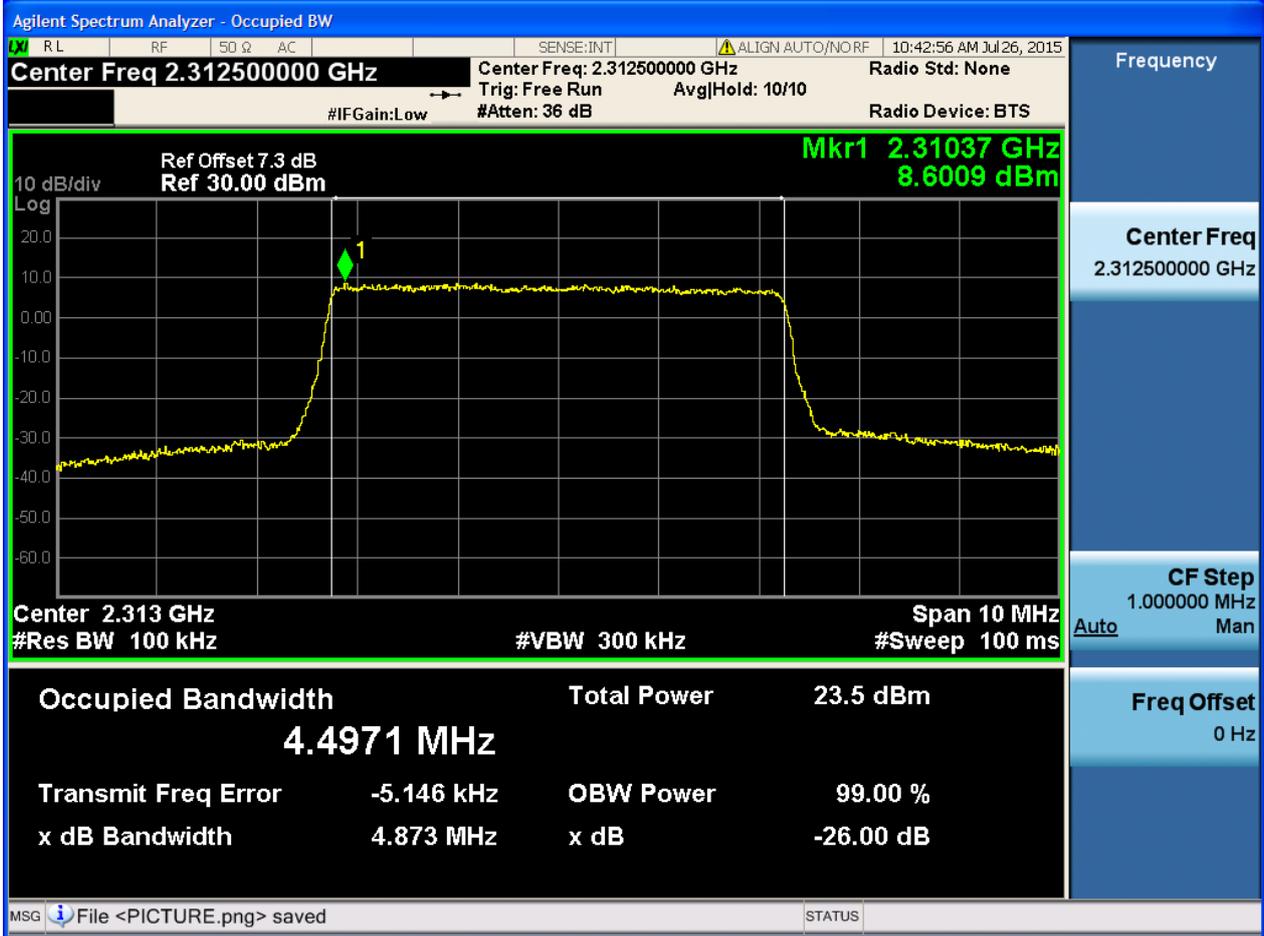
4.1.1.1.2.1 Test RB = RB25#0





4.1.1.1.1.3 Test Channel = HCH

4.1.1.1.1.3.1 Test RB = RB25#0

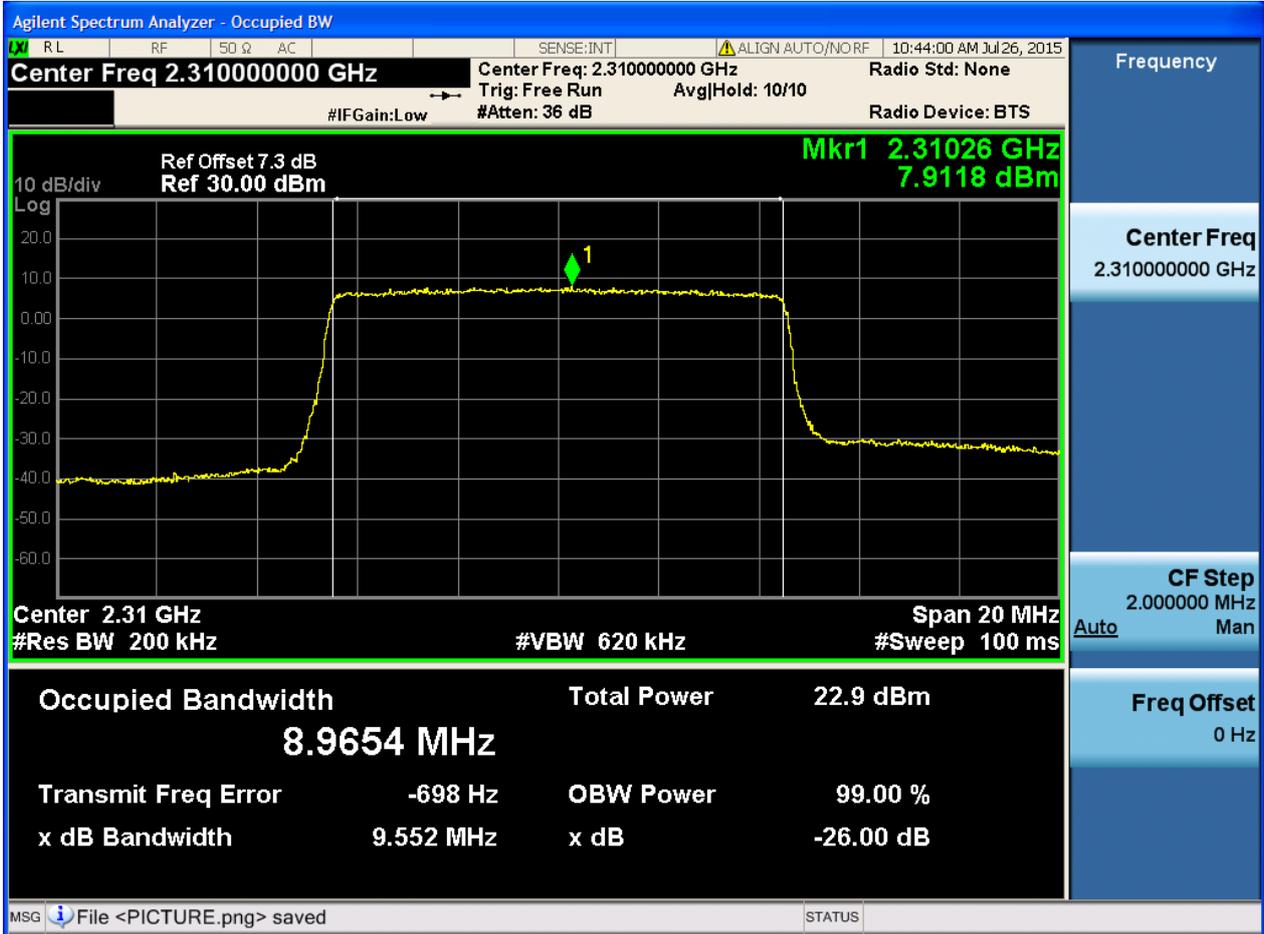




4.1.1.1.2 Test Bandwidth = 10

4.1.1.1.2.1 Test Channel = LCH

4.1.1.1.2.1.1 Test RB = RB50#0



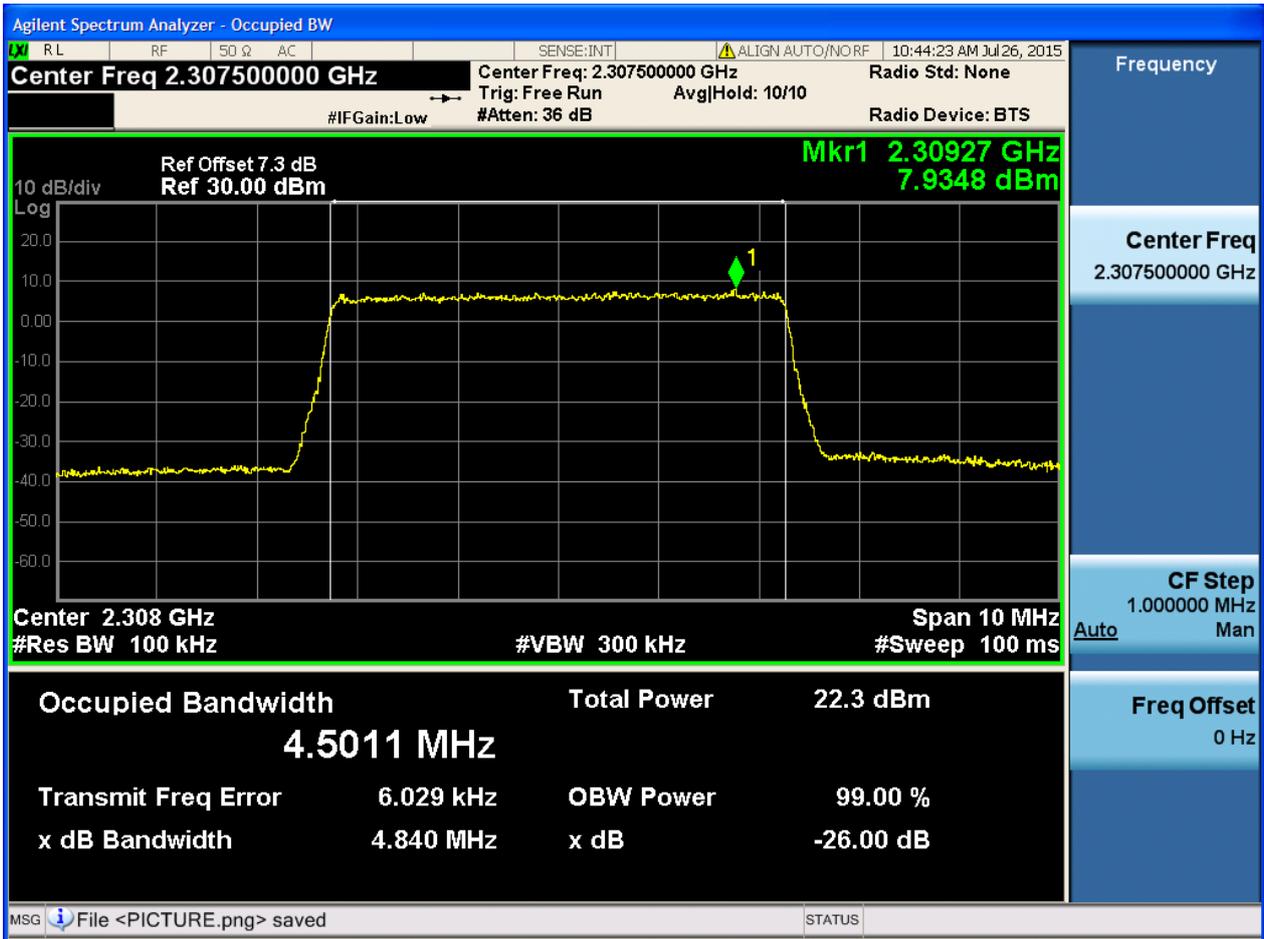


4.1.1.2 Test Mode = LTE/TM2

4.1.1.2.1 Test Bandwidth = 5

4.1.1.2.1.1 Test Channel = LCH

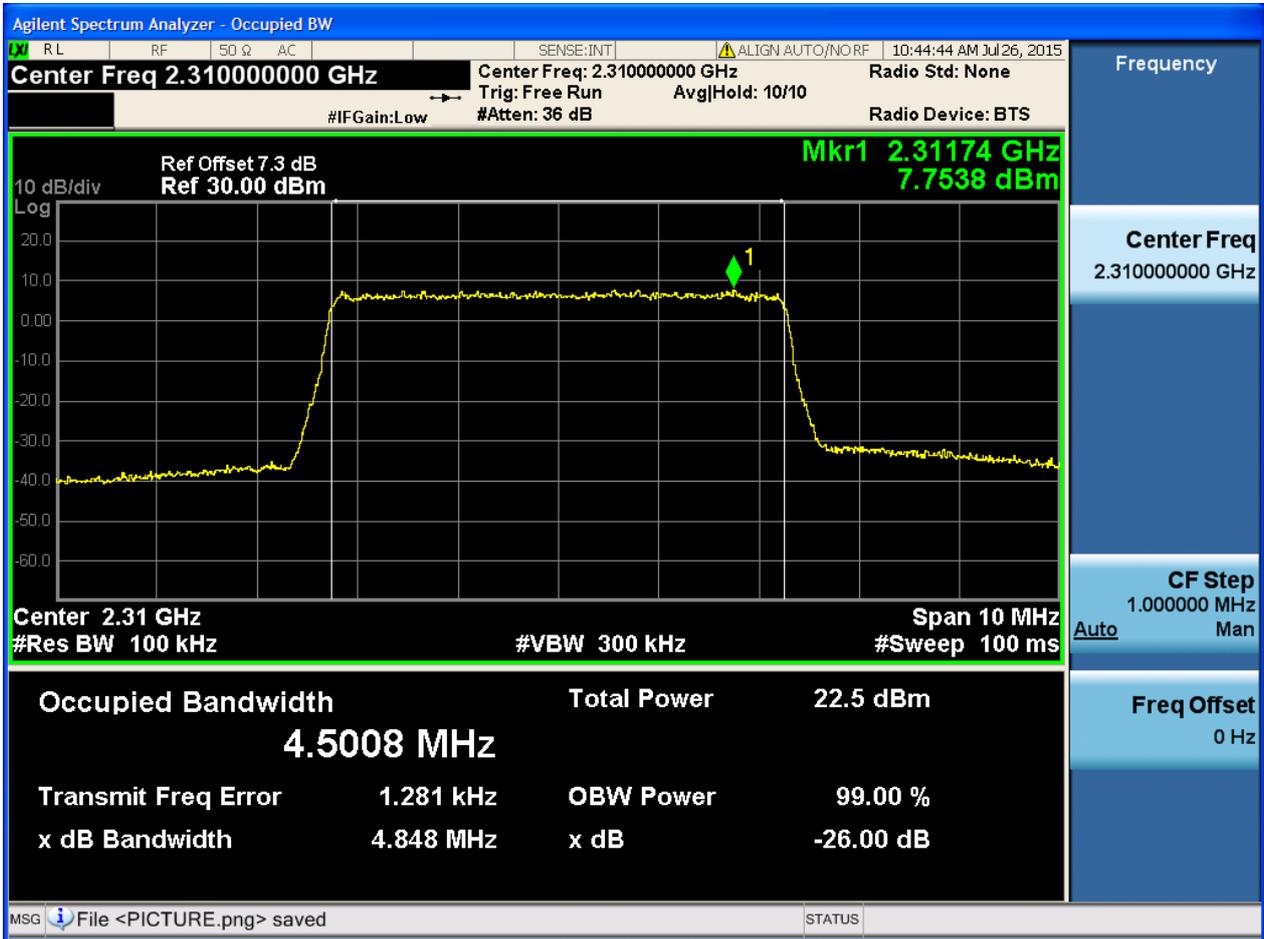
4.1.1.2.1.1.1 Test RB = RB25#0





4.1.1.2.1.2 Test Channel = MCH

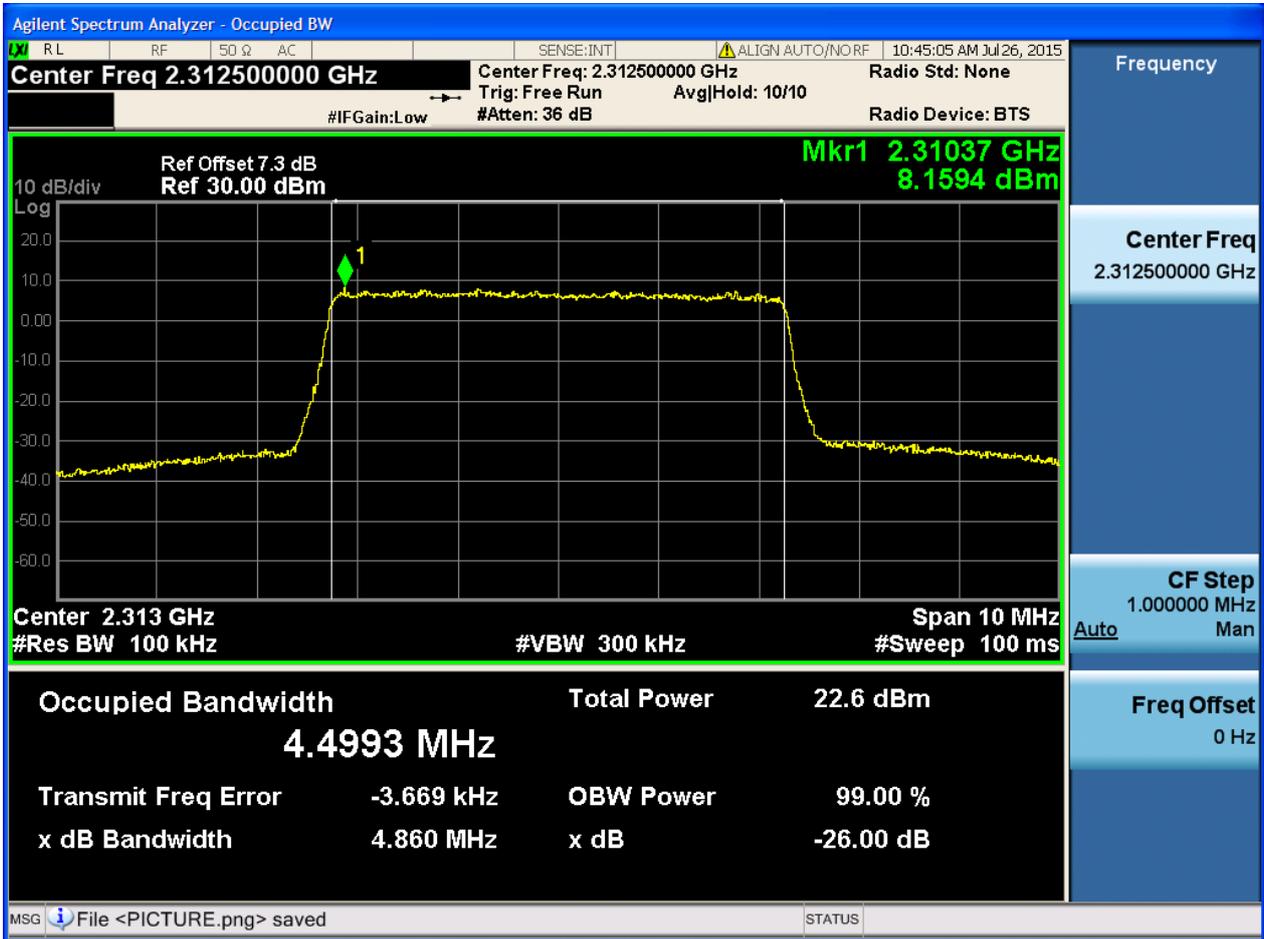
4.1.1.2.1.2.1 Test RB = RB25#0





4.1.1.2.1.3 Test Channel = HCH

4.1.1.2.1.3.1 Test RB = RB25#0





4.1.1.2.2 Test Bandwidth = 10

4.1.1.2.2.1 Test Channel = LCH//MCH/HCH

4.1.1.2.2.1.1 Test RB = RB50#0





## 5Appendix\_E: Band Edges Compliance

### Part I - Test Plots

#### 5.1 For LTE

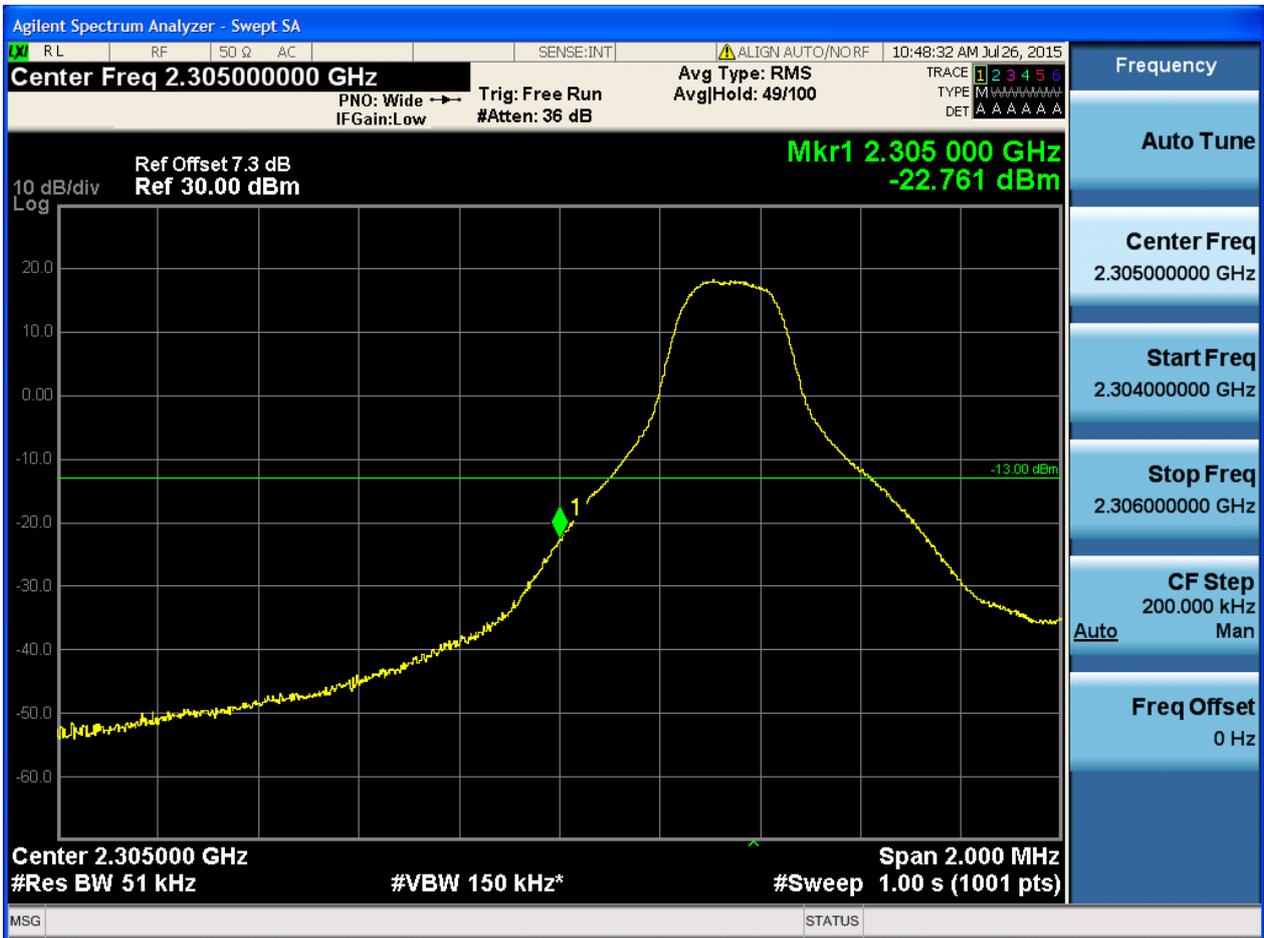
##### 5.1.1 Test Band = BAND30

##### 5.1.1.1 Test Mode = LTE/TM1

##### 5.1.1.1.1 Test Bandwidth = 5

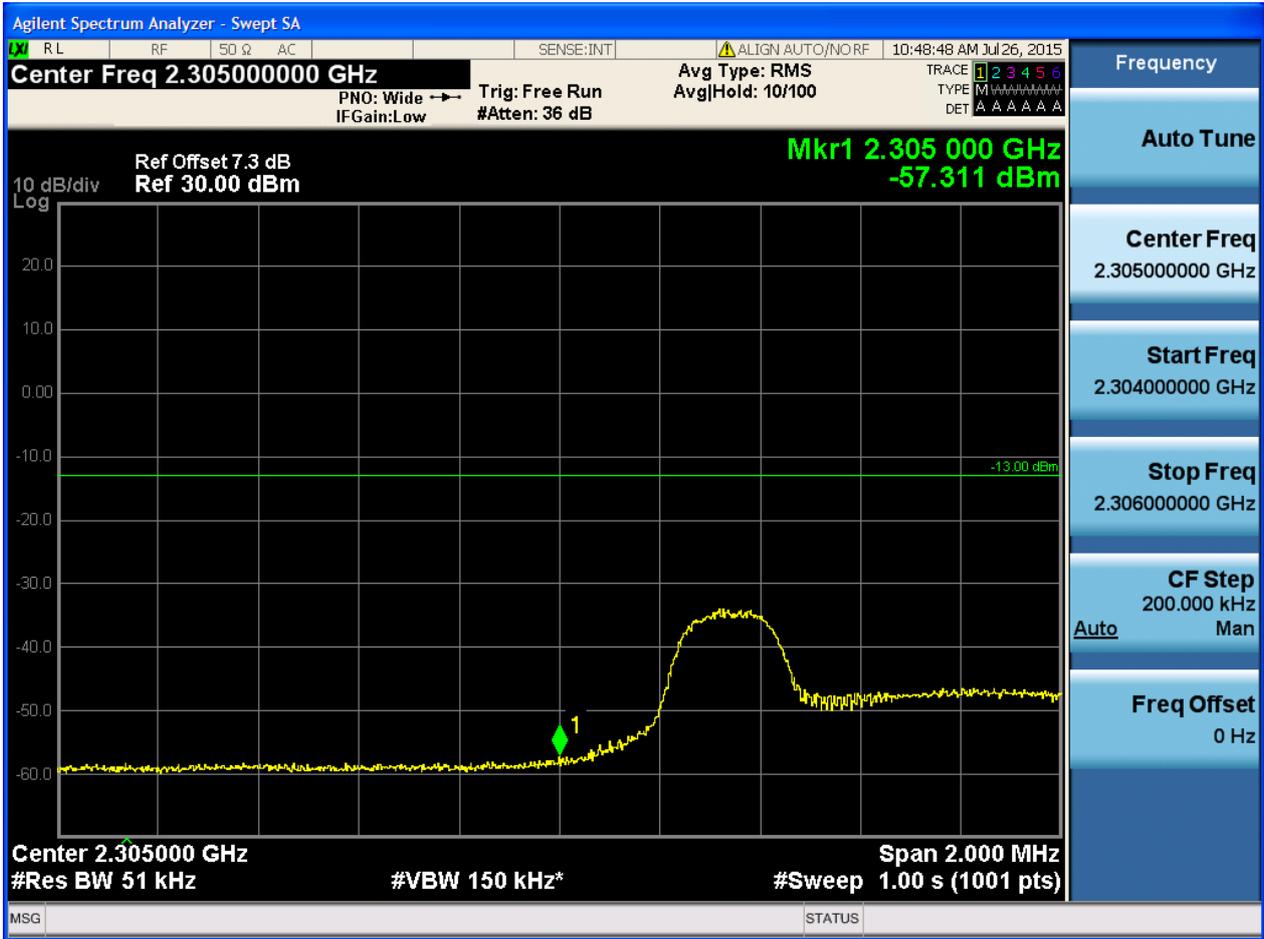
##### 5.1.1.1.1.1 Test Channel = LCH

##### 5.1.1.1.1.1.1 Test RB = RB1#0





5.1.1.1.1.2 Test RB = RB1#24





5.1.1.1.1.3 Test RB = RB12#6





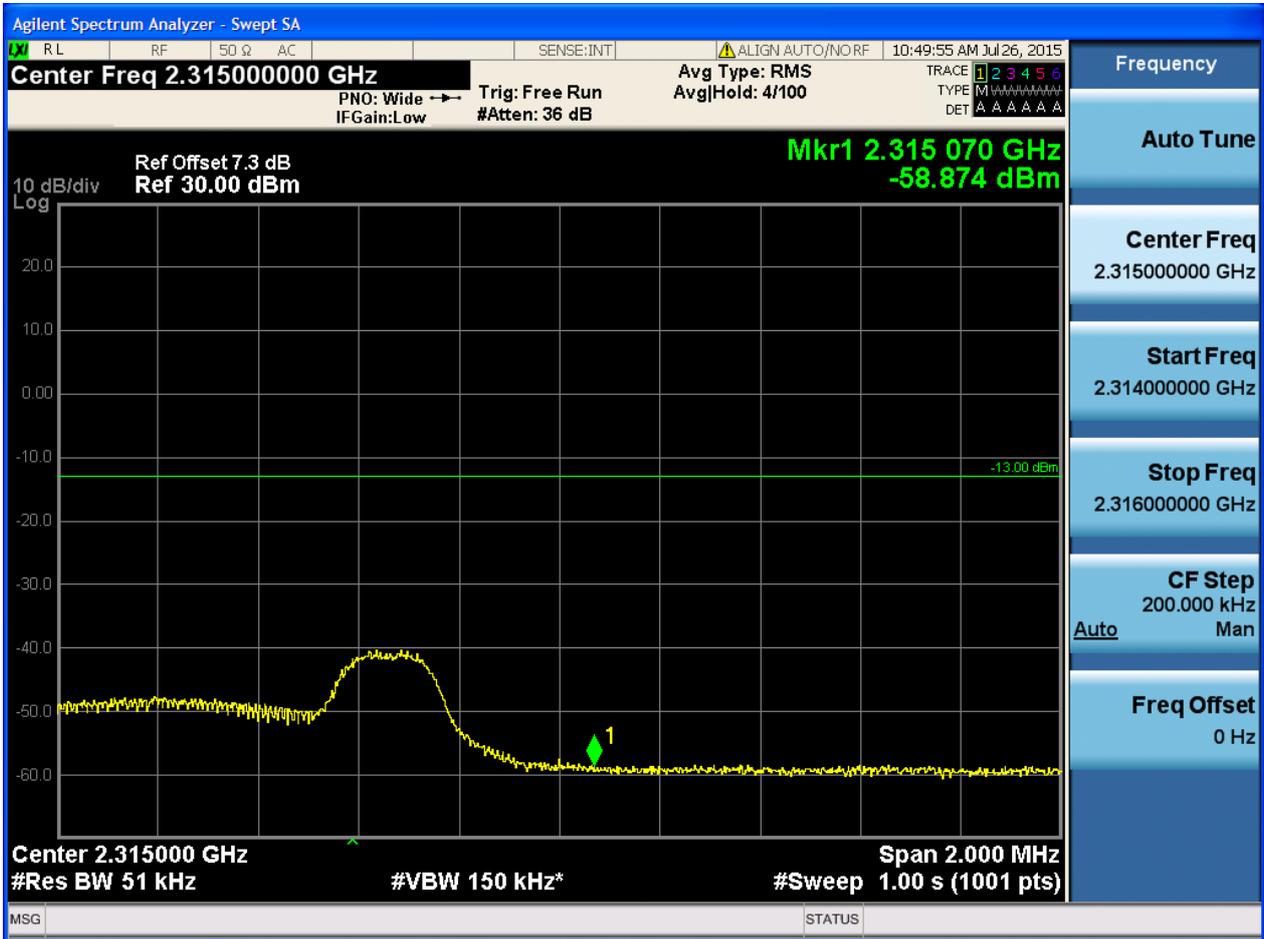
5.1.1.1.1.4 Test RB = RB25#0





5.1.1.1.1.2 Test Channel = HCH

5.1.1.1.1.2.1 Test RB = RB1#0





5.1.1.1.2.2 Test RB = RB1#24





5.1.1.1.2.3 Test RB = RB12#6





5.1.1.1.2.4 Test RB = RB25#0

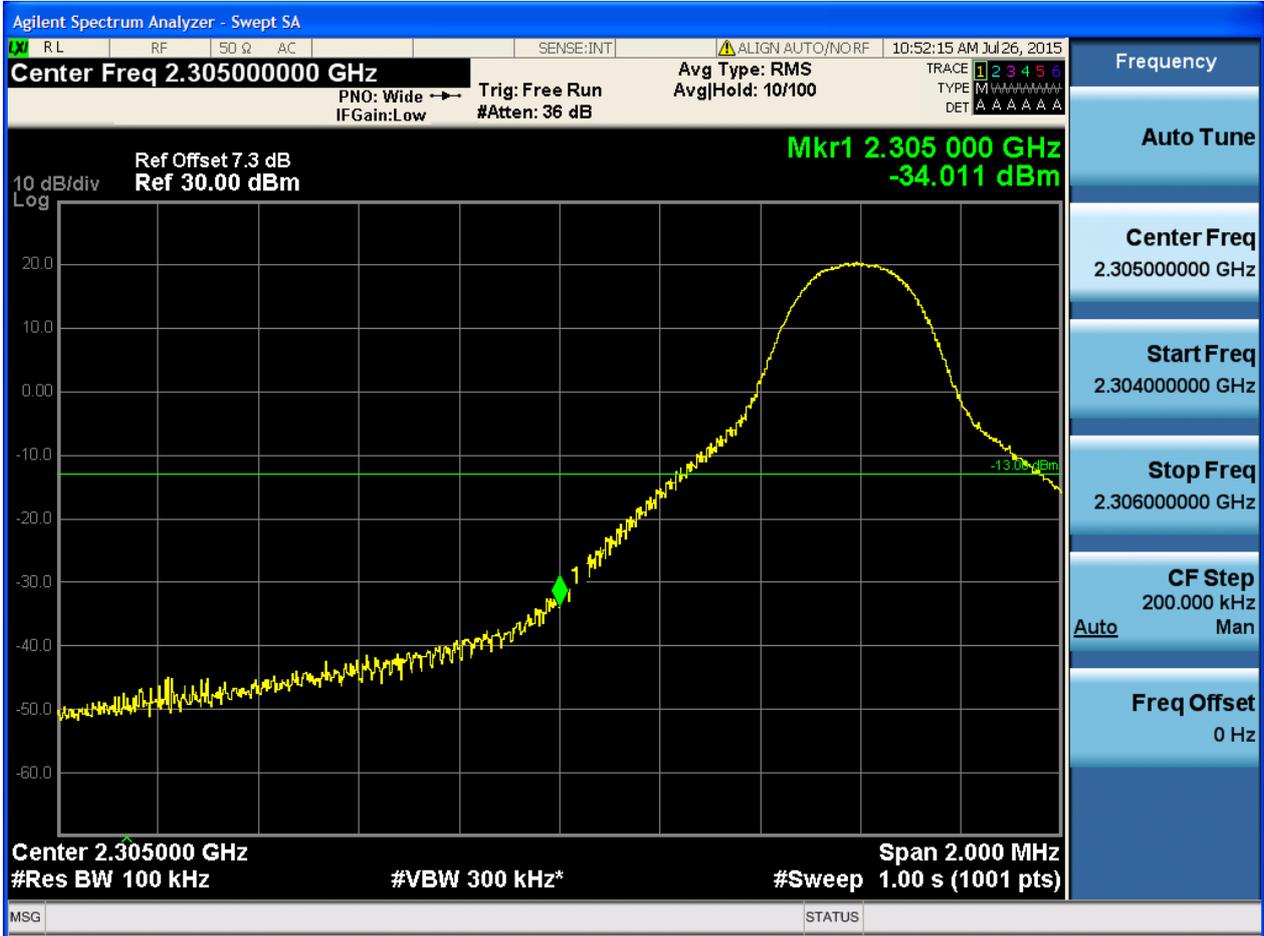




5.1.1.1.2 Test Bandwidth = 10

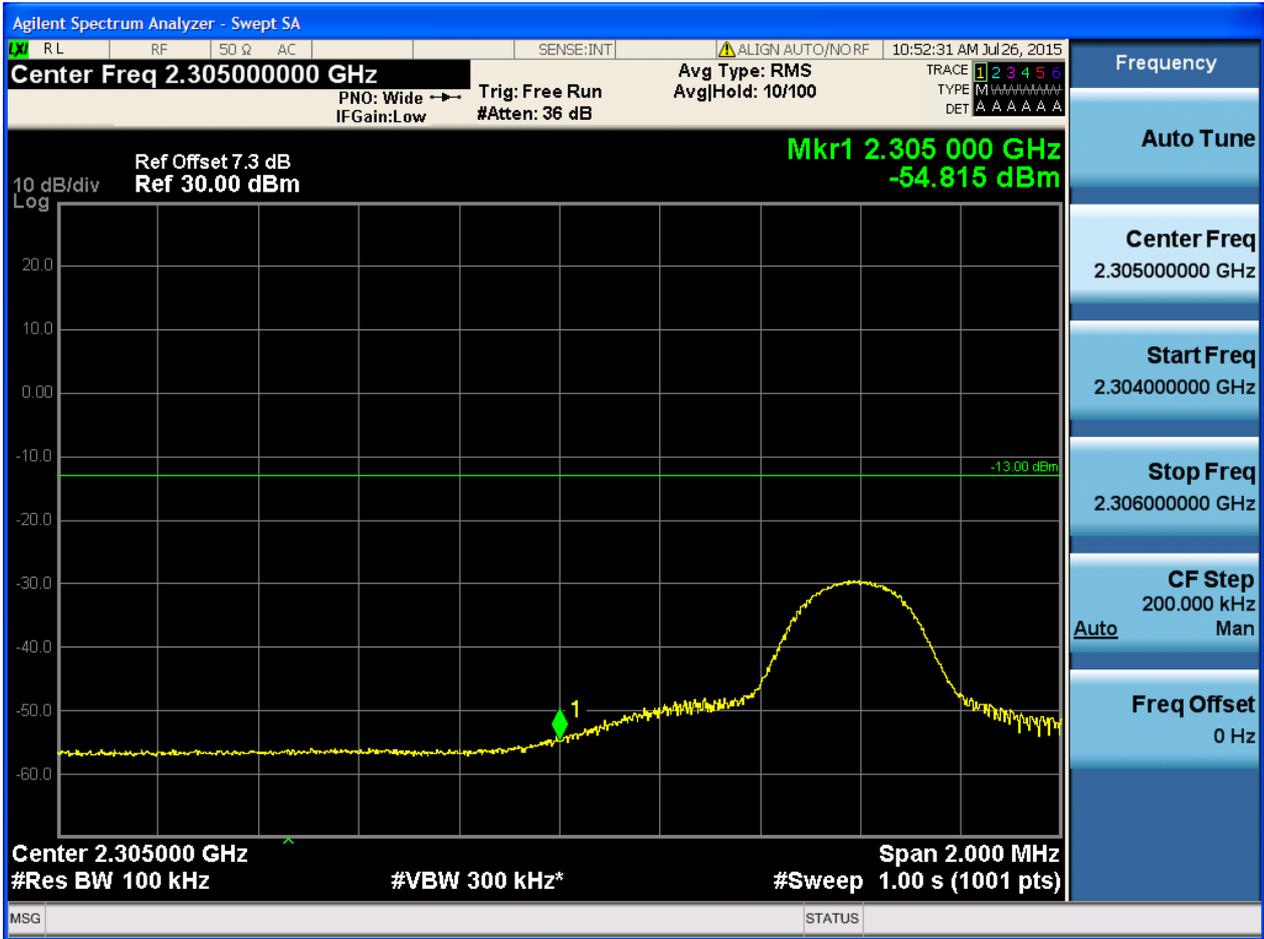
5.1.1.1.2.1 Test Channel = LCH

5.1.1.1.2.1.1 Test RB = RB1#0





5.1.1.1.2.1.2 Test RB = RB1#49





5.1.1.1.2.1.3 Test RB = RB25#13





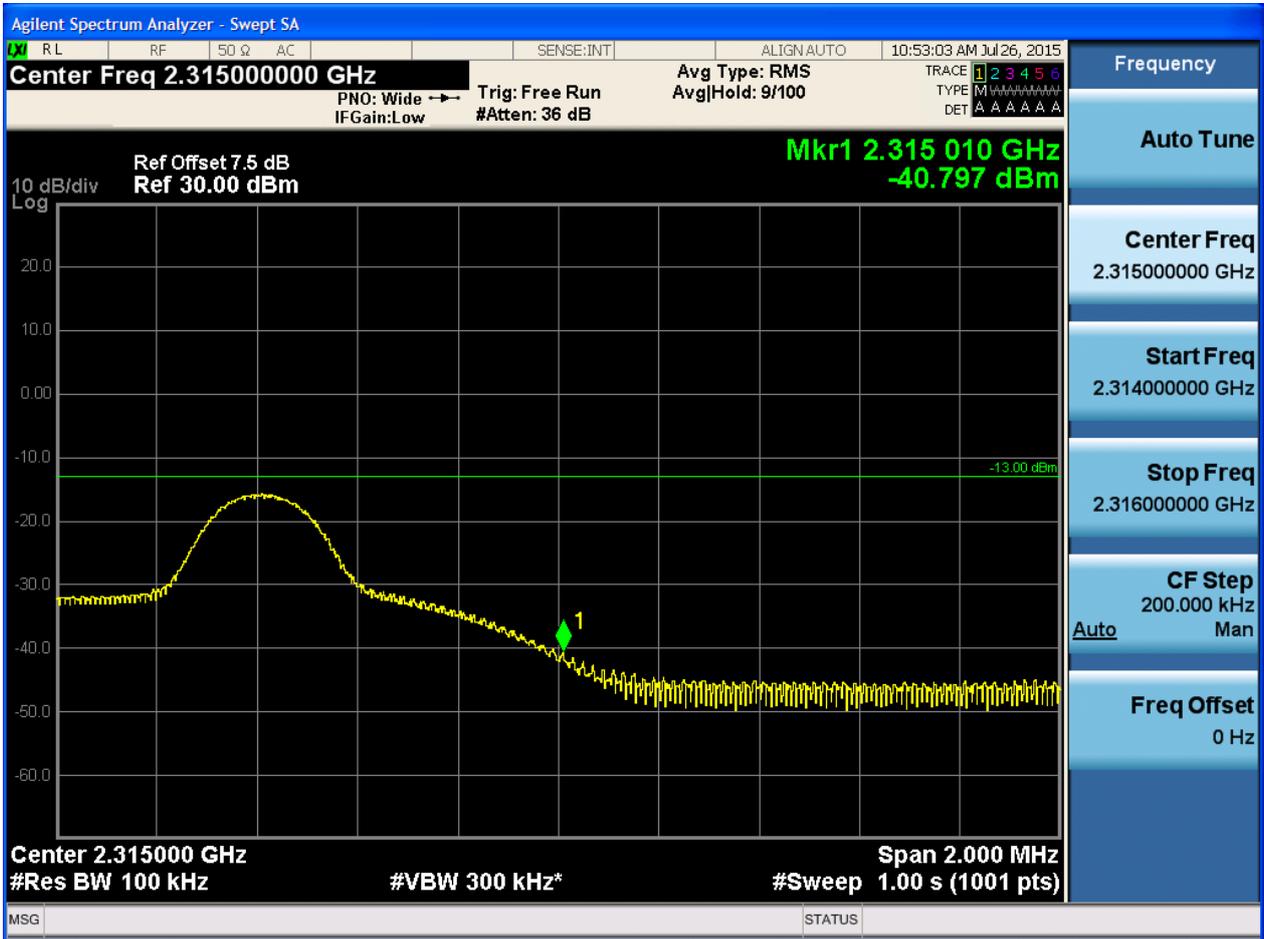
5.1.1.1.2.1.4 Test RB = RB50#0





5.1.1.1.2.2 Test Channel = HCH

5.1.1.1.2.2.1 Test RB = RB1#0





5.1.1.1.2.2 Test RB = RB1#49



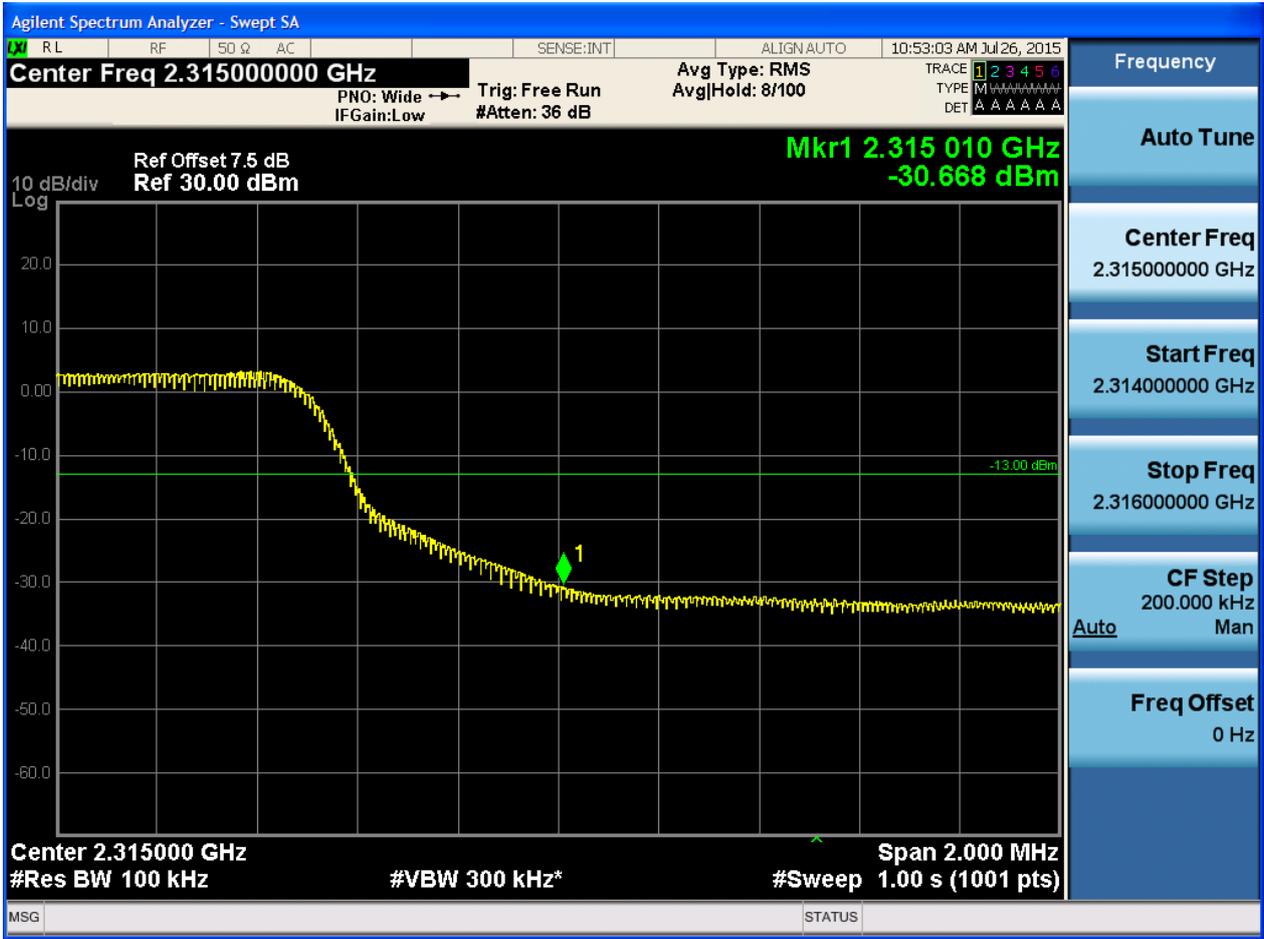


5.1.1.1.2.2.3 Test RB = RB25#13





5.1.1.1.2.2.4 Test RB = RB50#0



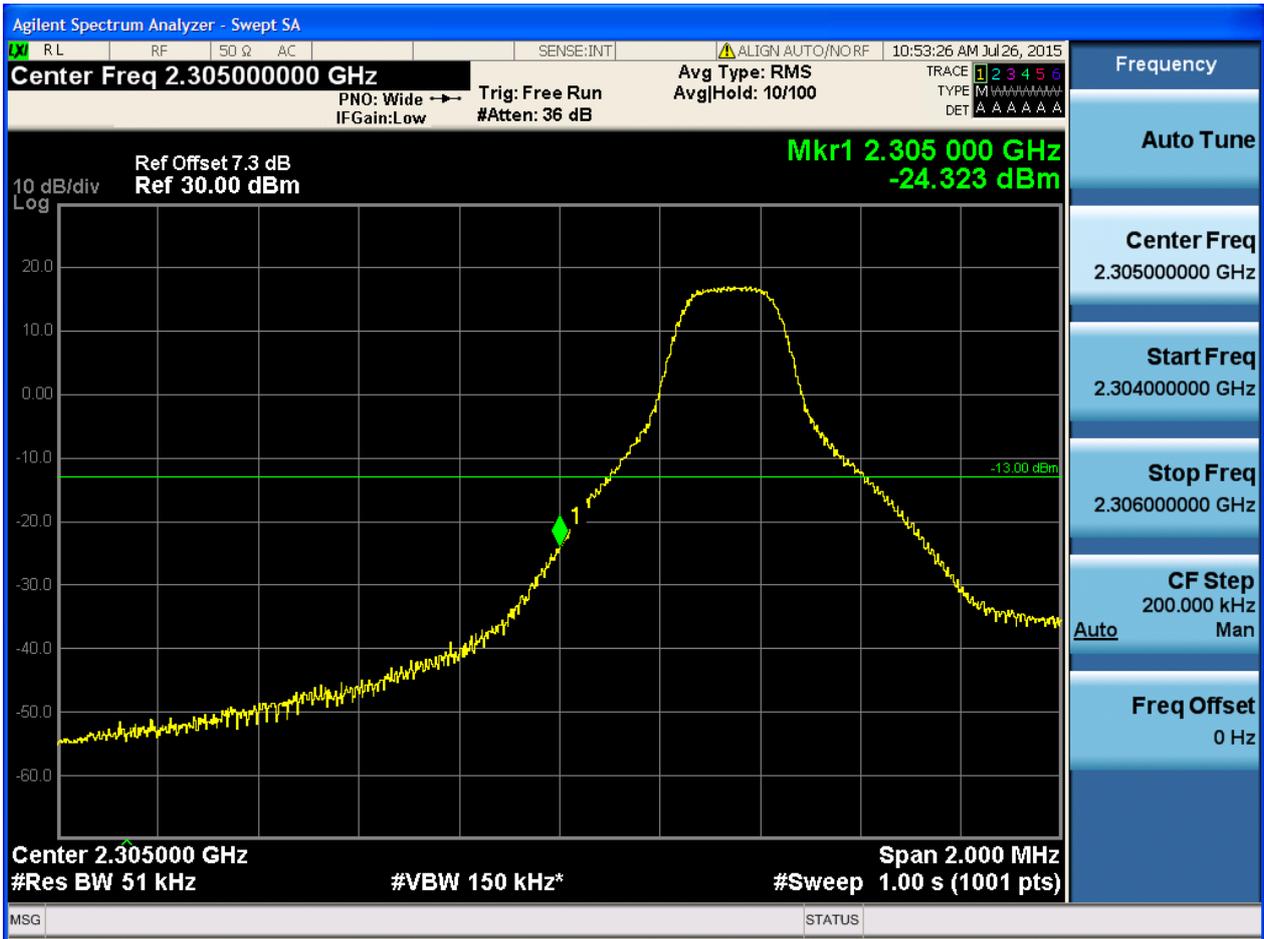


5.1.1.2 Test Mode = LTE/TM2

5.1.1.2.1 Test Bandwidth = 5

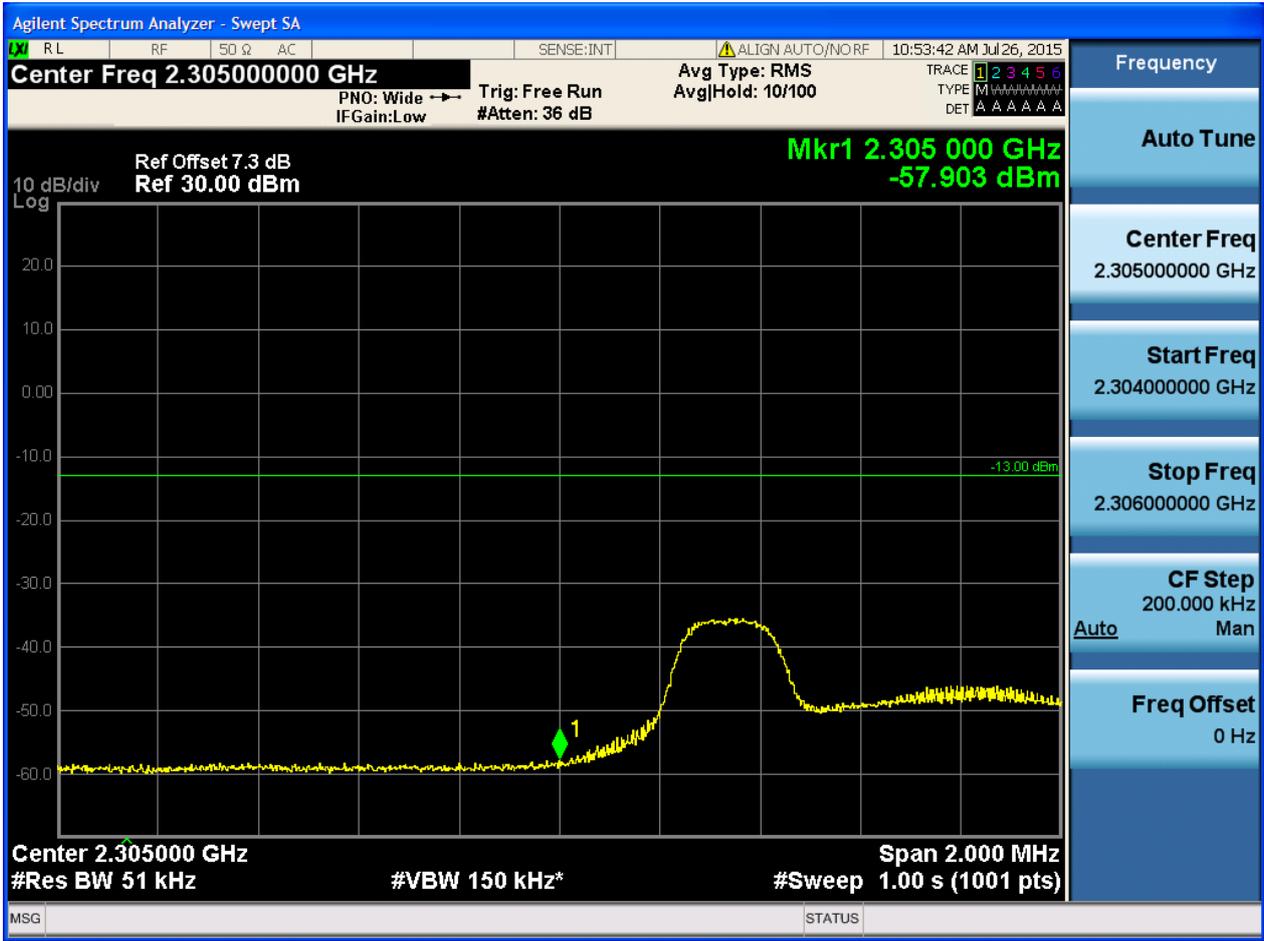
5.1.1.2.1.1 Test Channel = LCH

5.1.1.2.1.1.1 Test RB = RB1#0





5.1.1.2.1.1.2 Test RB = RB1#24







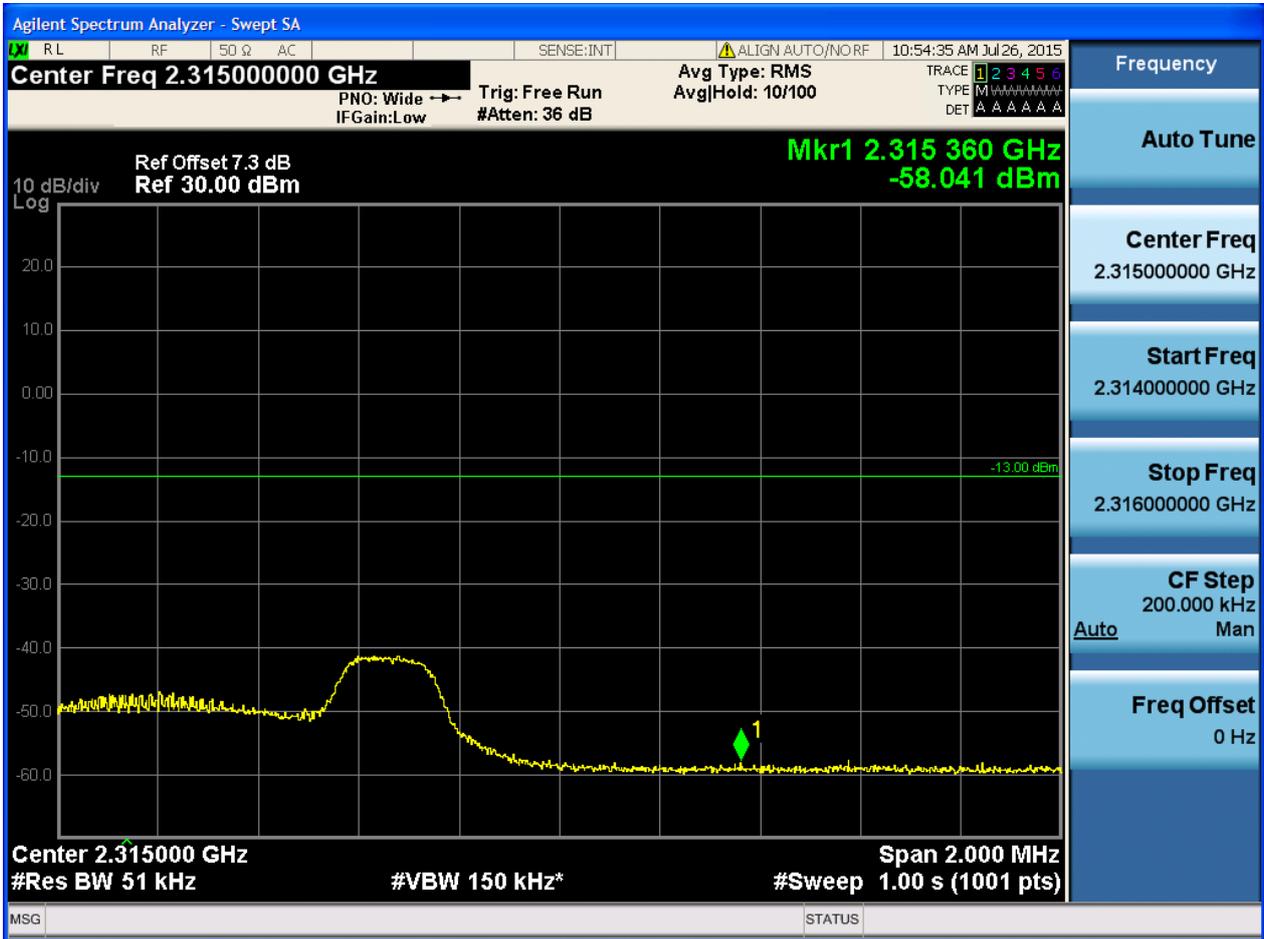
5.1.1.2.1.1.4 Test RB = RB25#0





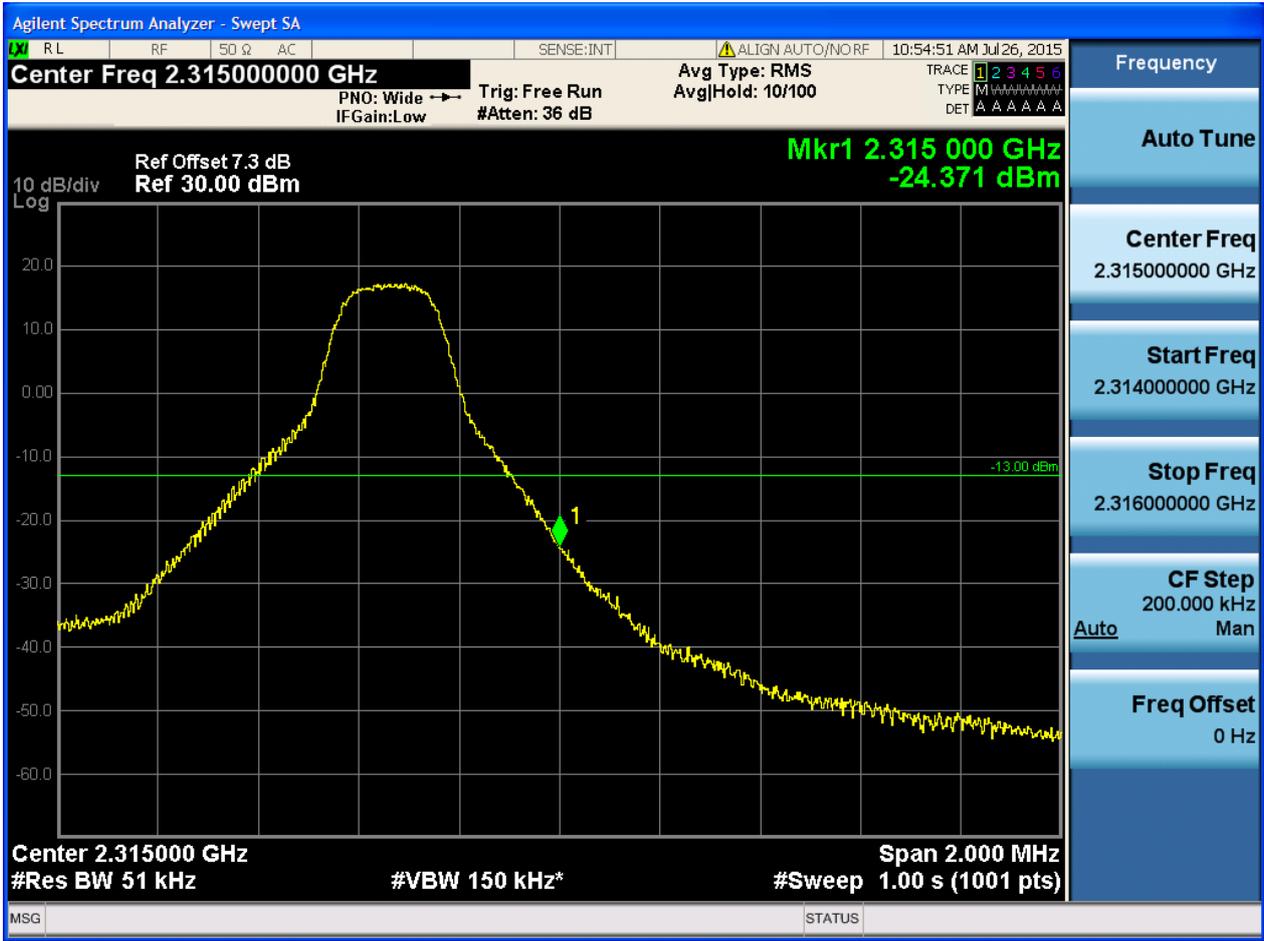
5.1.1.2.1.2 Test Channel = HCH

5.1.1.2.1.2.1 Test RB = RB1#0





5.1.1.2.1.2.2 Test RB = RB1#24





5.1.1.2.1.2.3 Test RB = RB12#6





5.1.1.2.1.2.4 Test RB = RB25#0

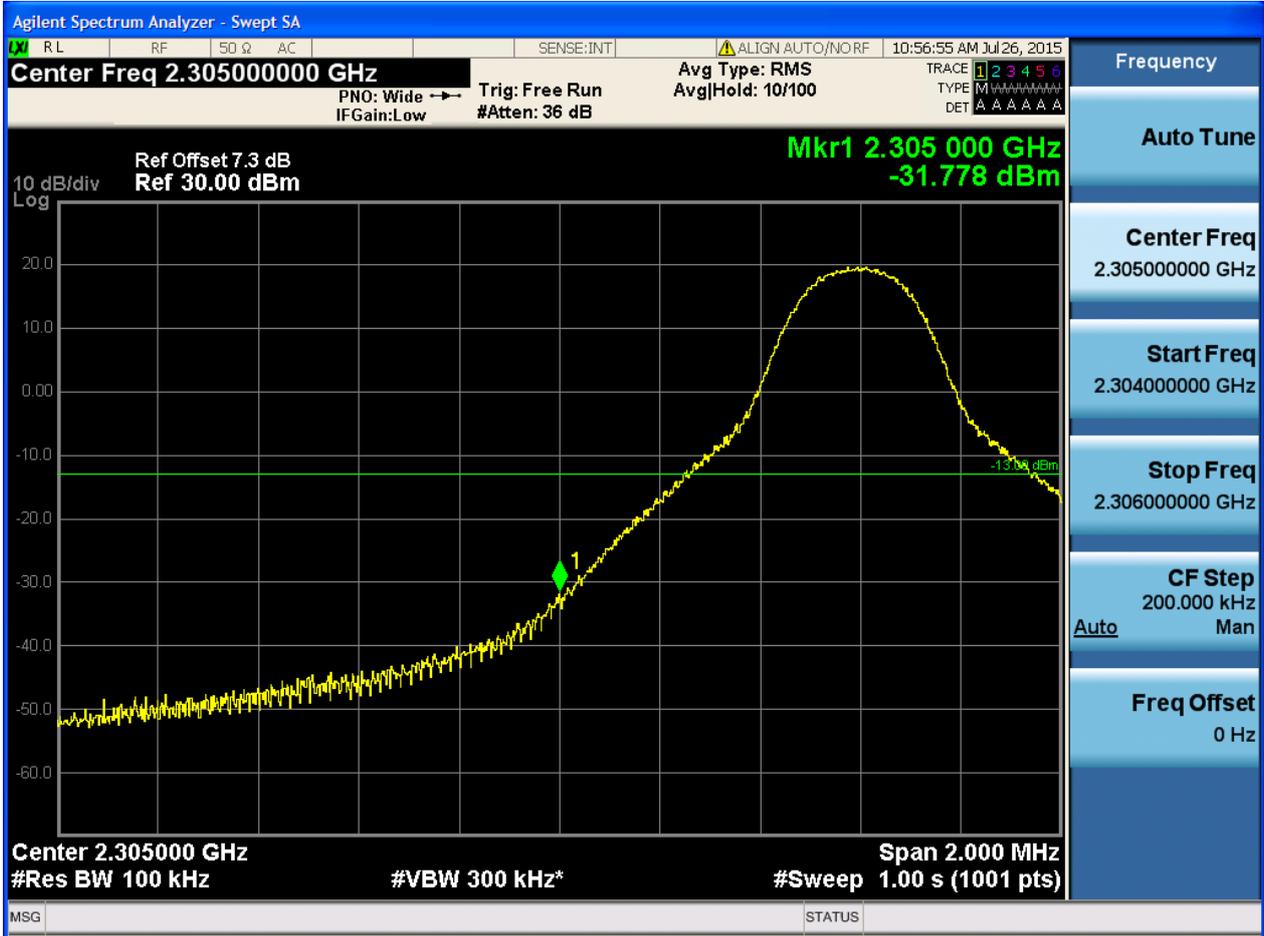




5.1.1.2.2 Test Bandwidth = 10

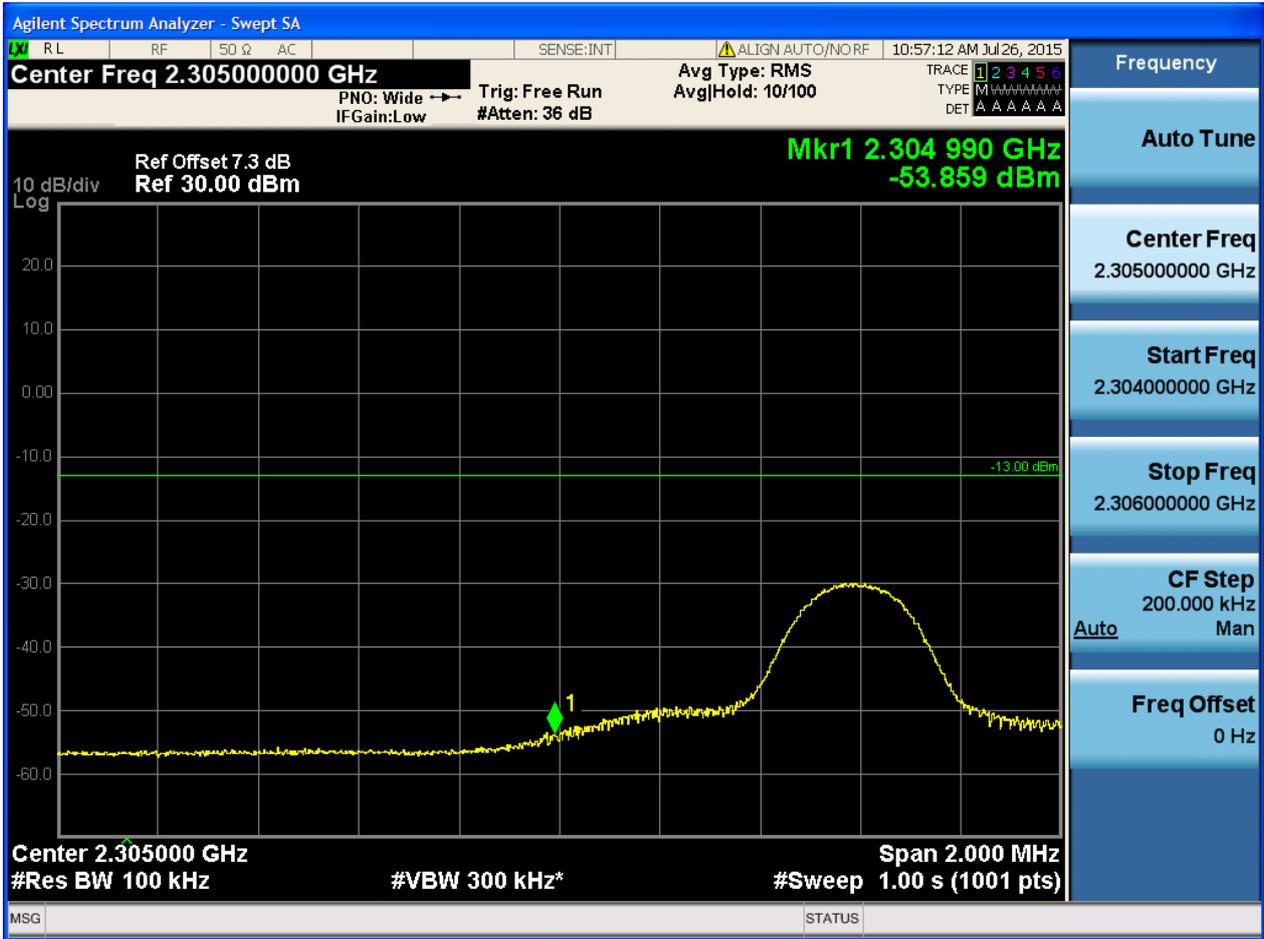
5.1.1.2.2.1 Test Channel = LCH

5.1.1.2.2.1.1 Test RB = RB1#0





5.1.1.2.2.1.2 Test RB = RB1#49





5.1.1.2.2.1.3 Test RB = RB25#13





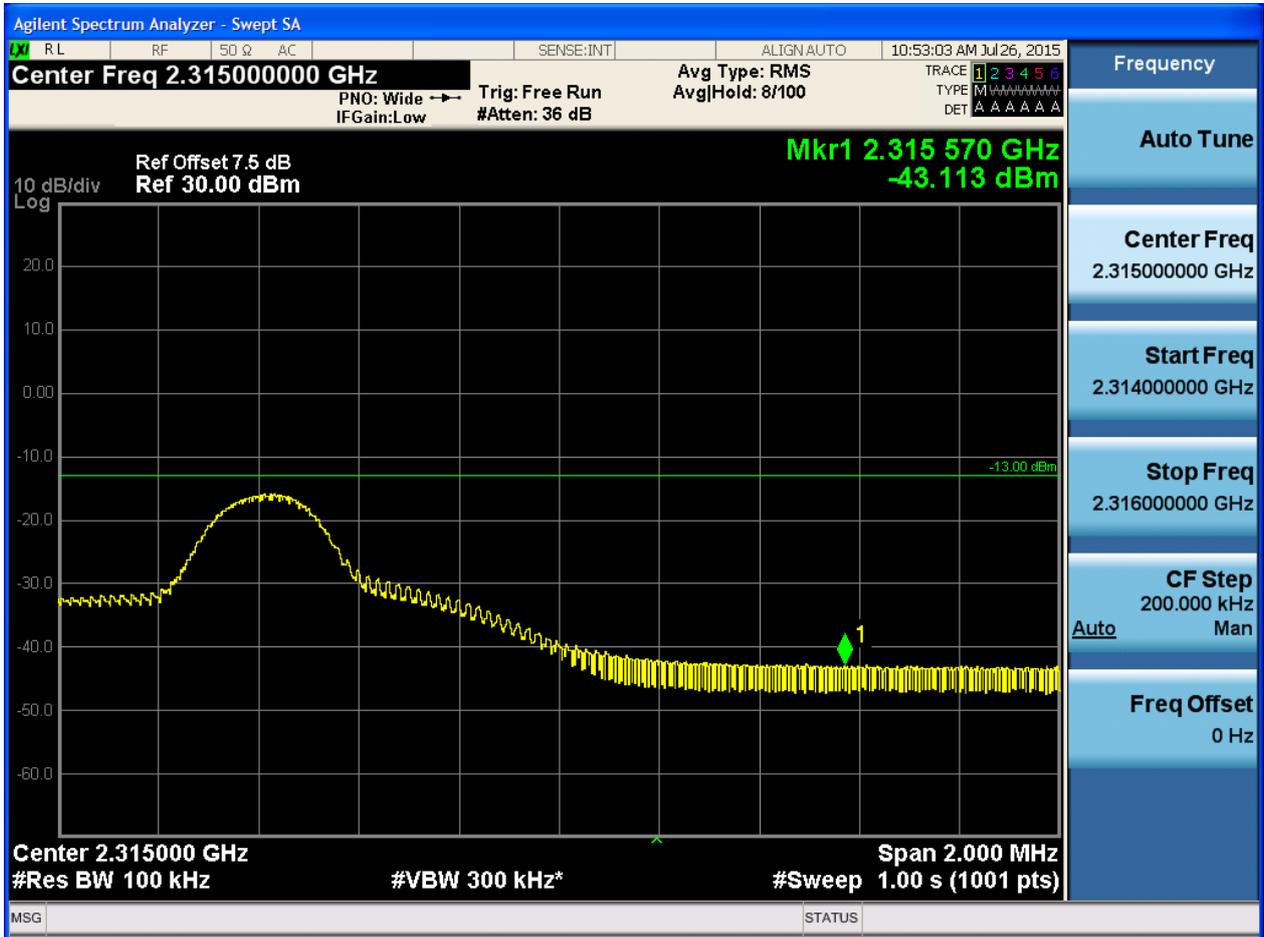
5.1.1.2.2.1.4 Test RB = RB50#0





5.1.1.2.2.2 Test Channel = HCH

5.1.1.2.2.2.1 Test RB = RB1#0



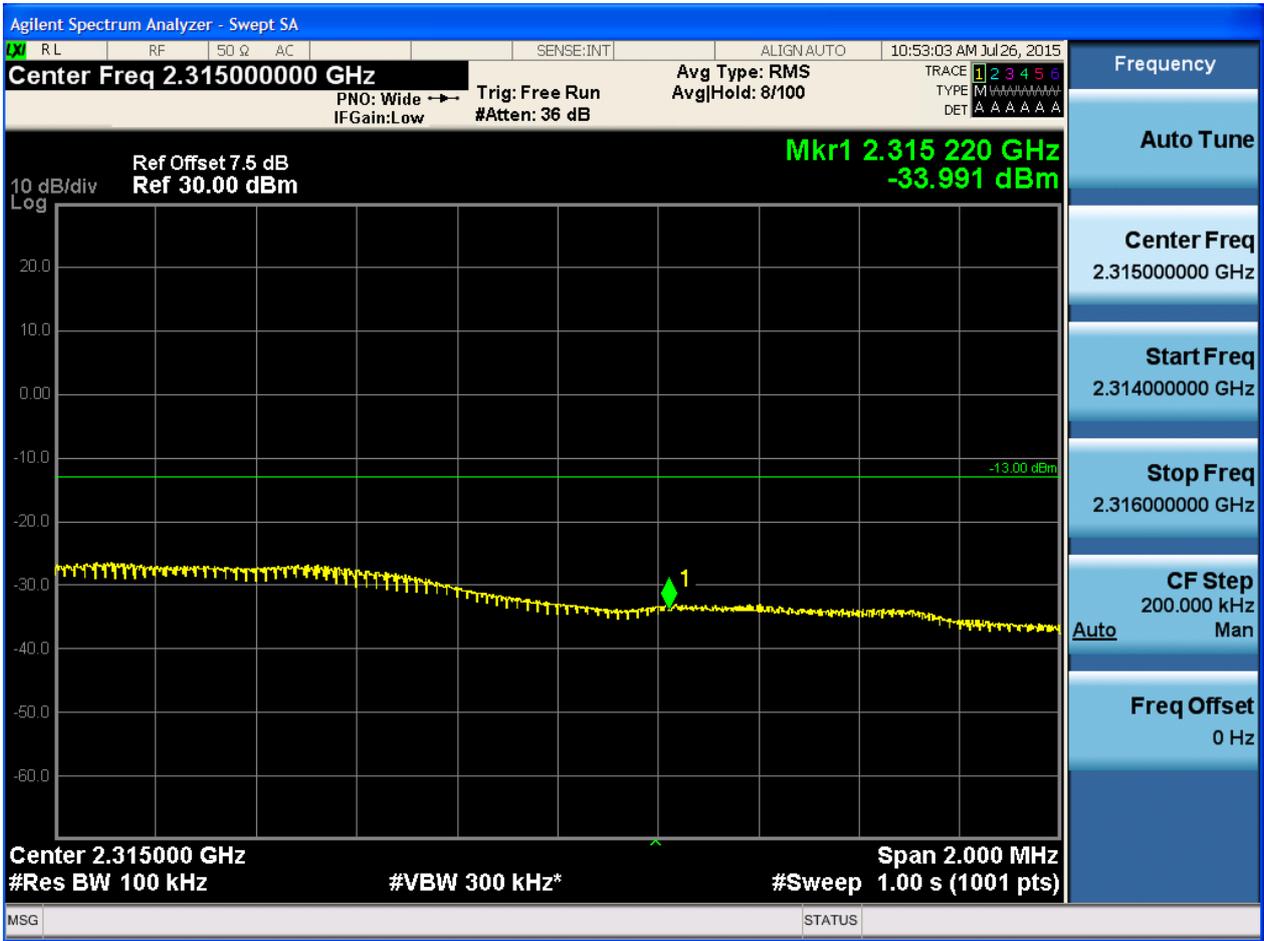


5.1.1.2.2.2 Test RB = RB1#49





5.1.1.2.2.3 Test RB = RB25#13





5.1.1.2.2.4 Test RB = RB50#0





## 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

#### 6.3 For LTE

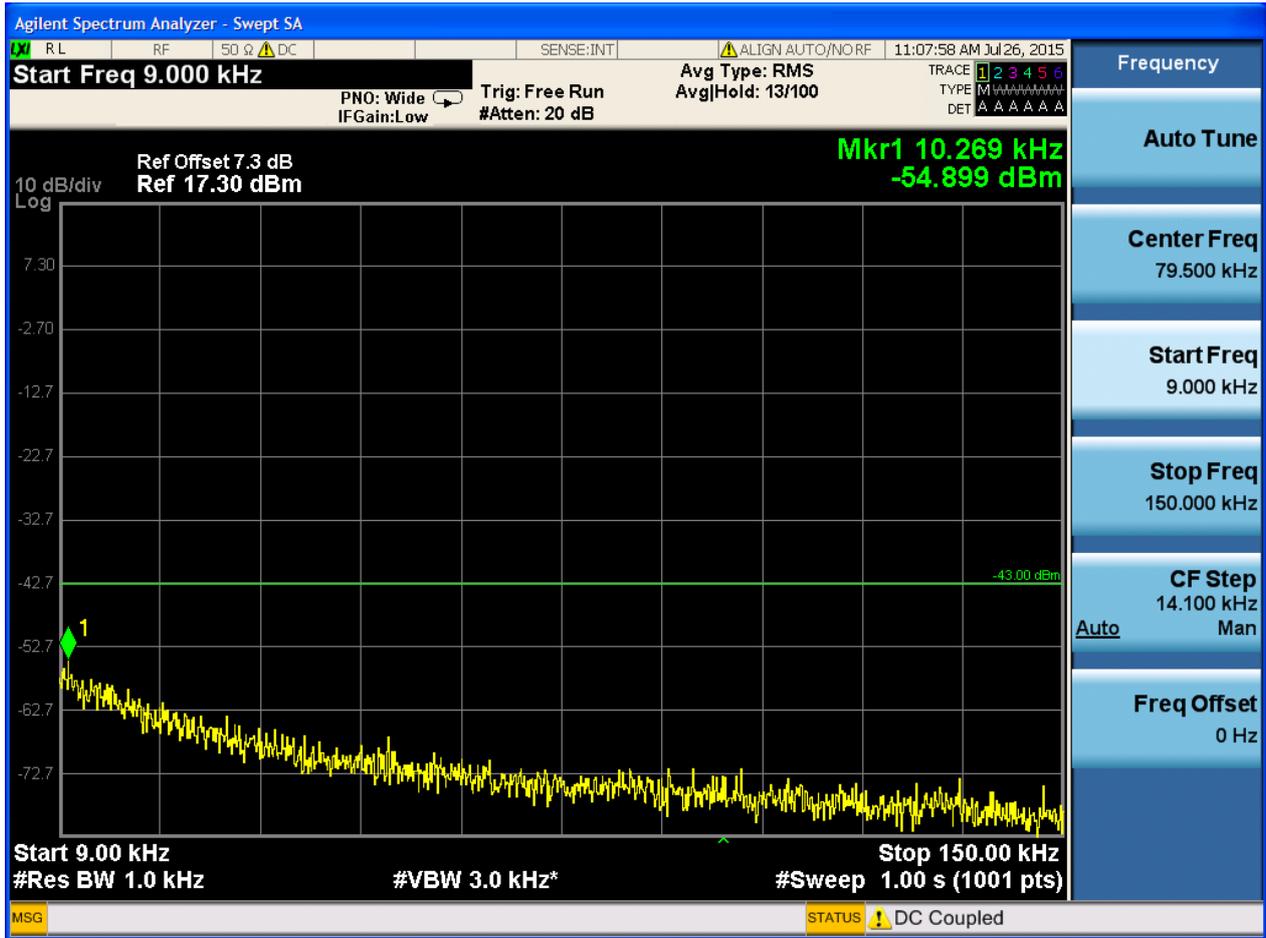
##### 6.3.1 Test Band = BAND30

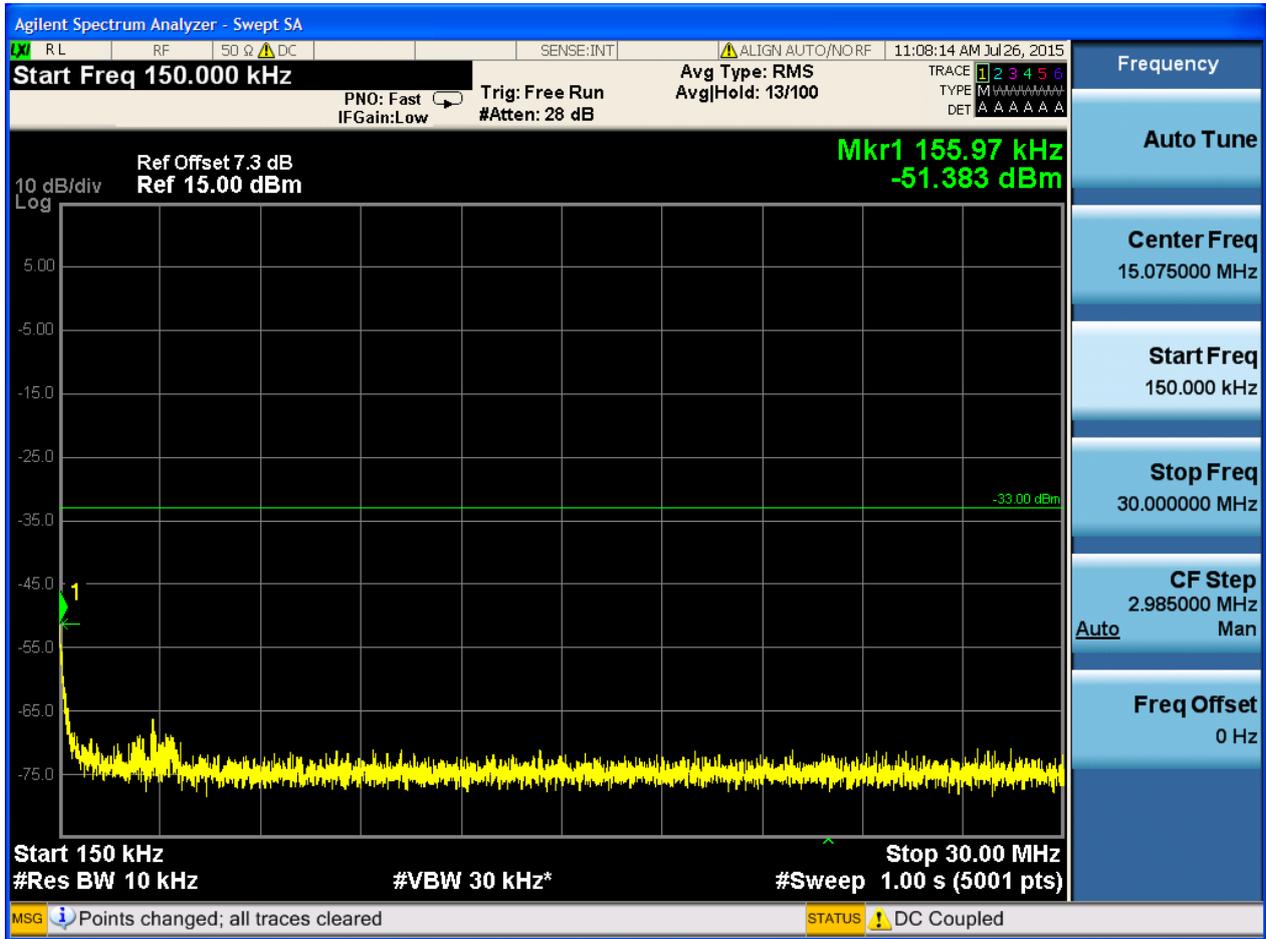
##### 6.3.1.1 Test Mode = LTE/TM1

##### 6.3.1.1.1 Test Bandwidth = 5

##### 6.3.1.1.1.1 Test Channel = LCH

##### 6.3.1.1.1.1.1 Test RB = RB1#0







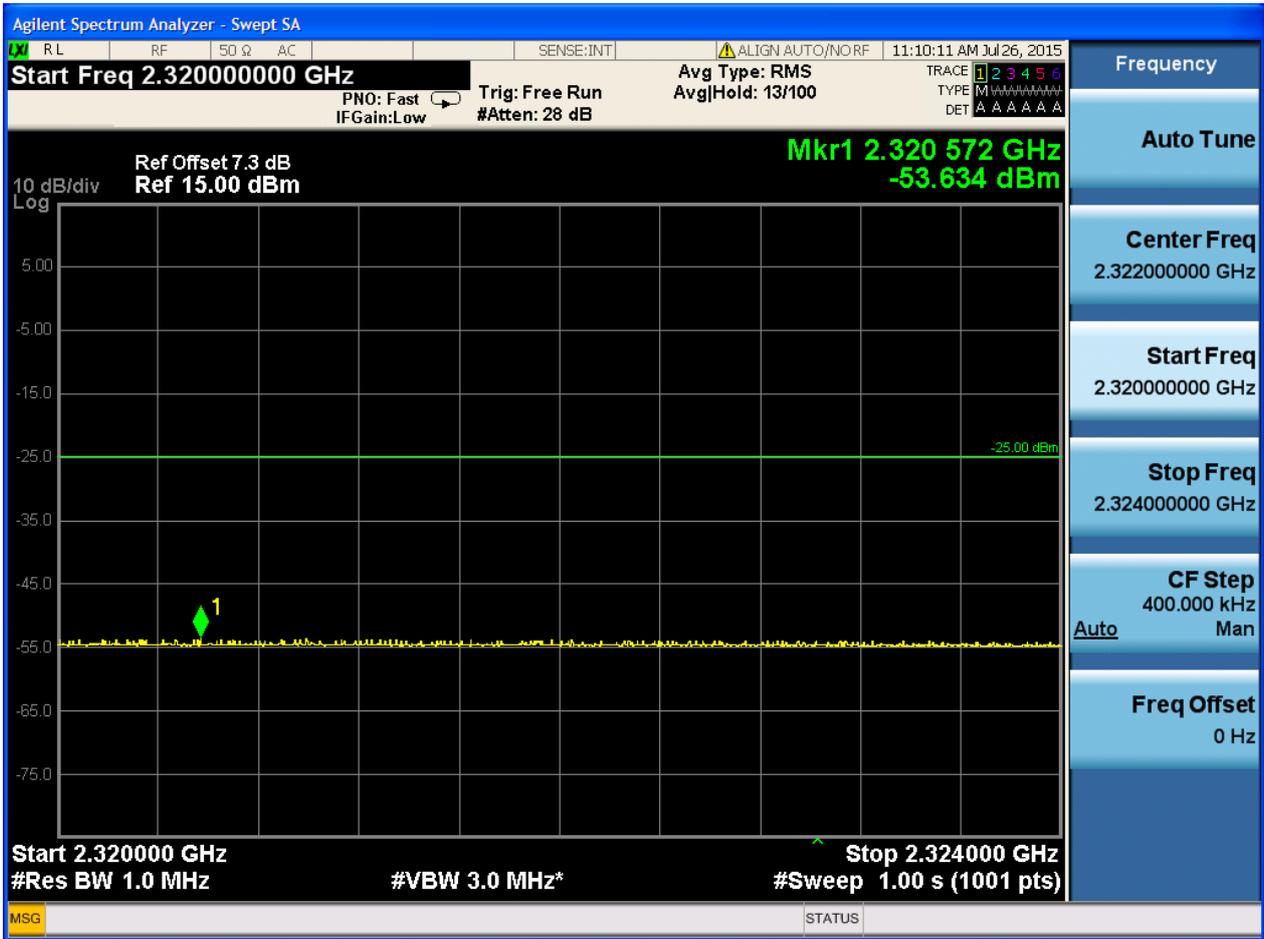


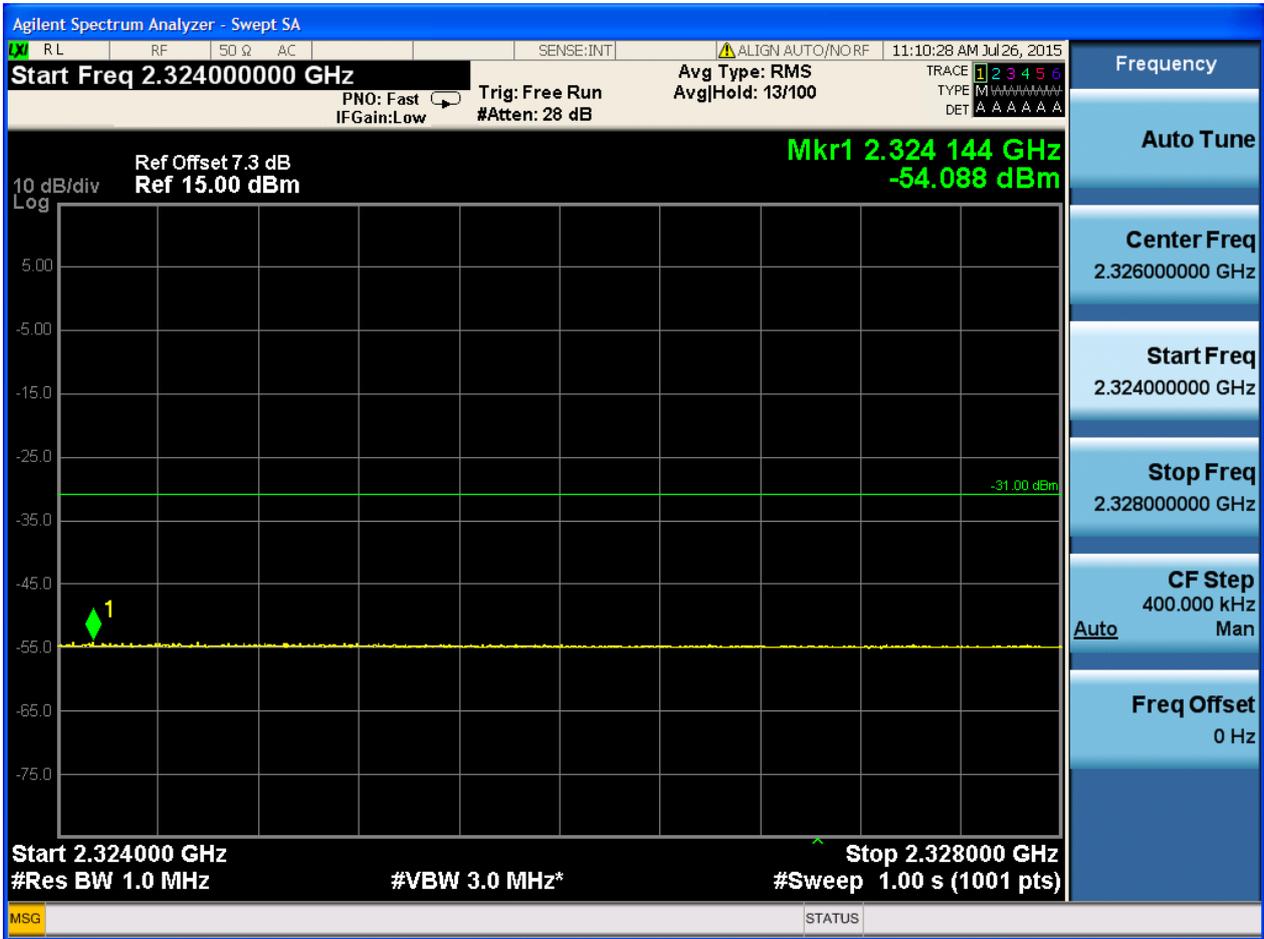




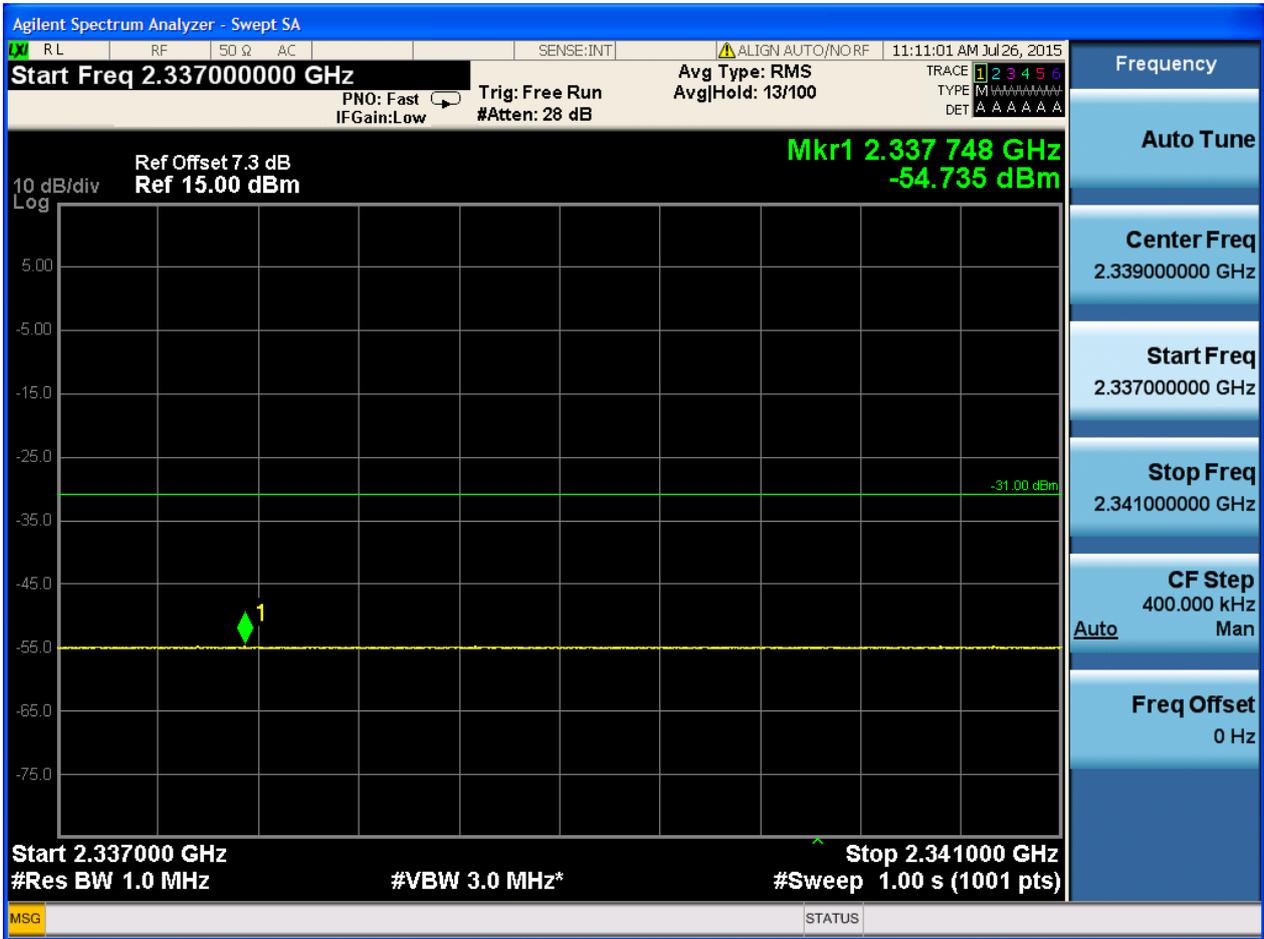
















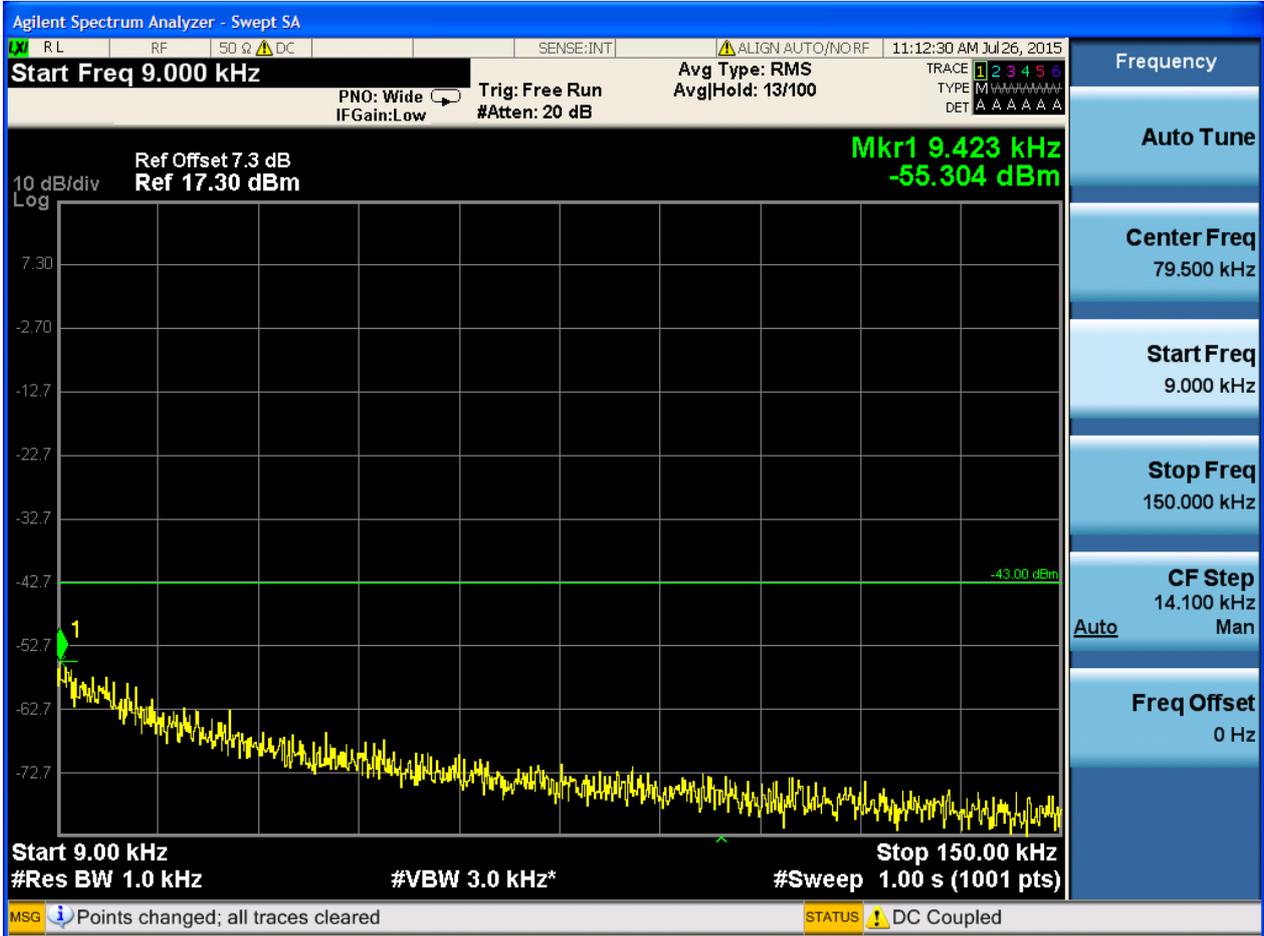


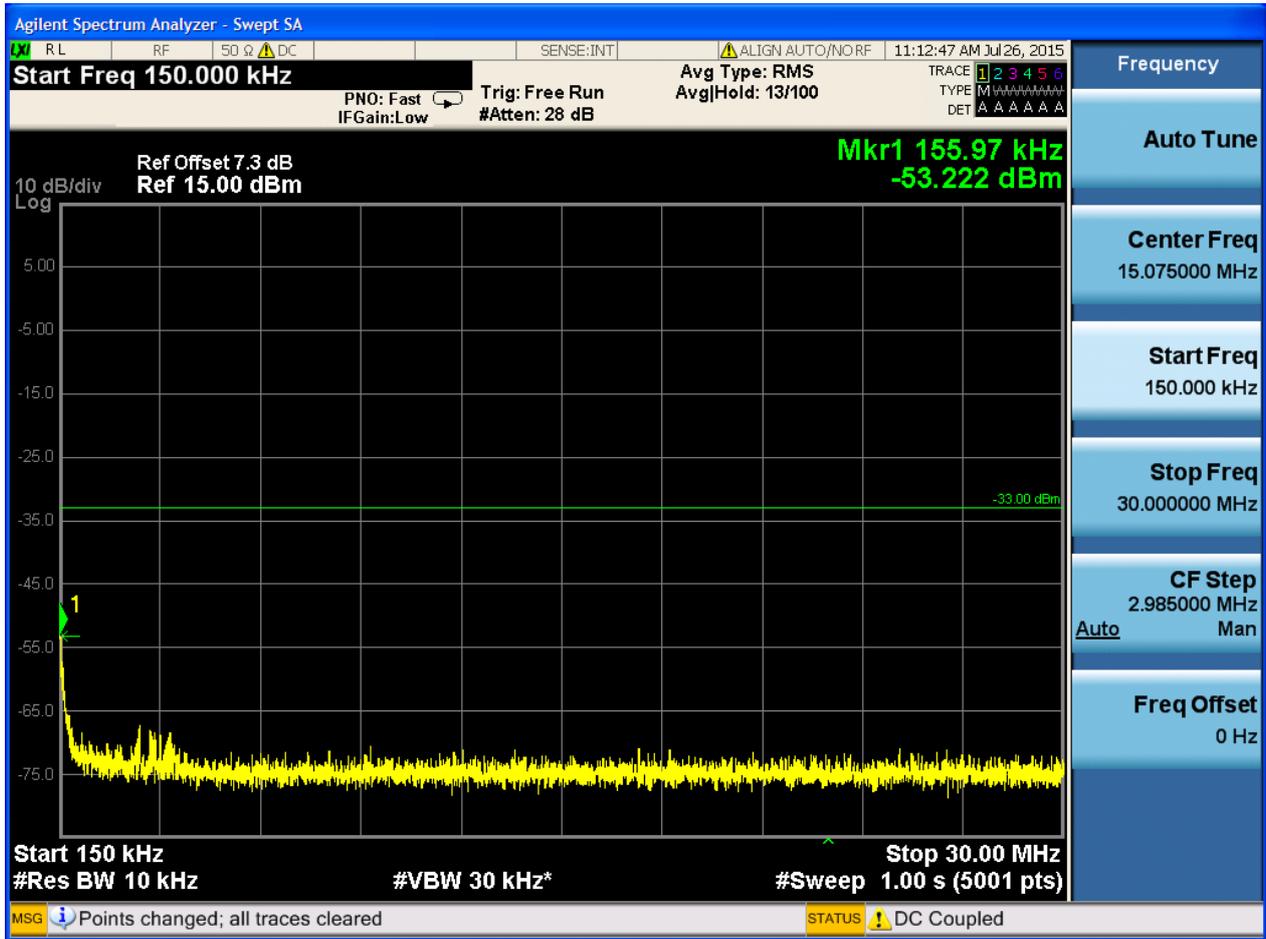


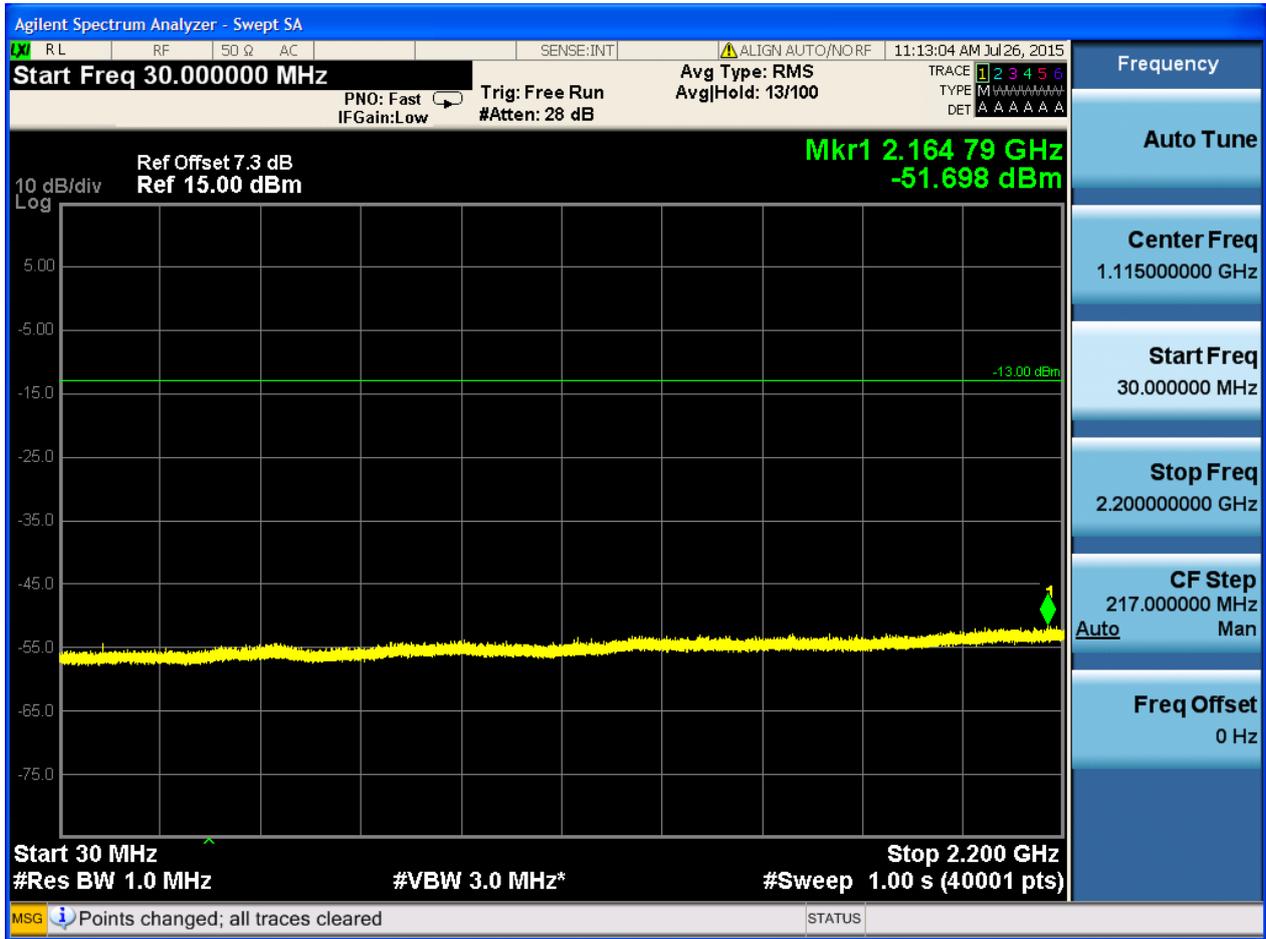


6.3.1.1.1.2 Test Channel = MCH

6.3.1.1.1.2.1 Test RB = RB1#0





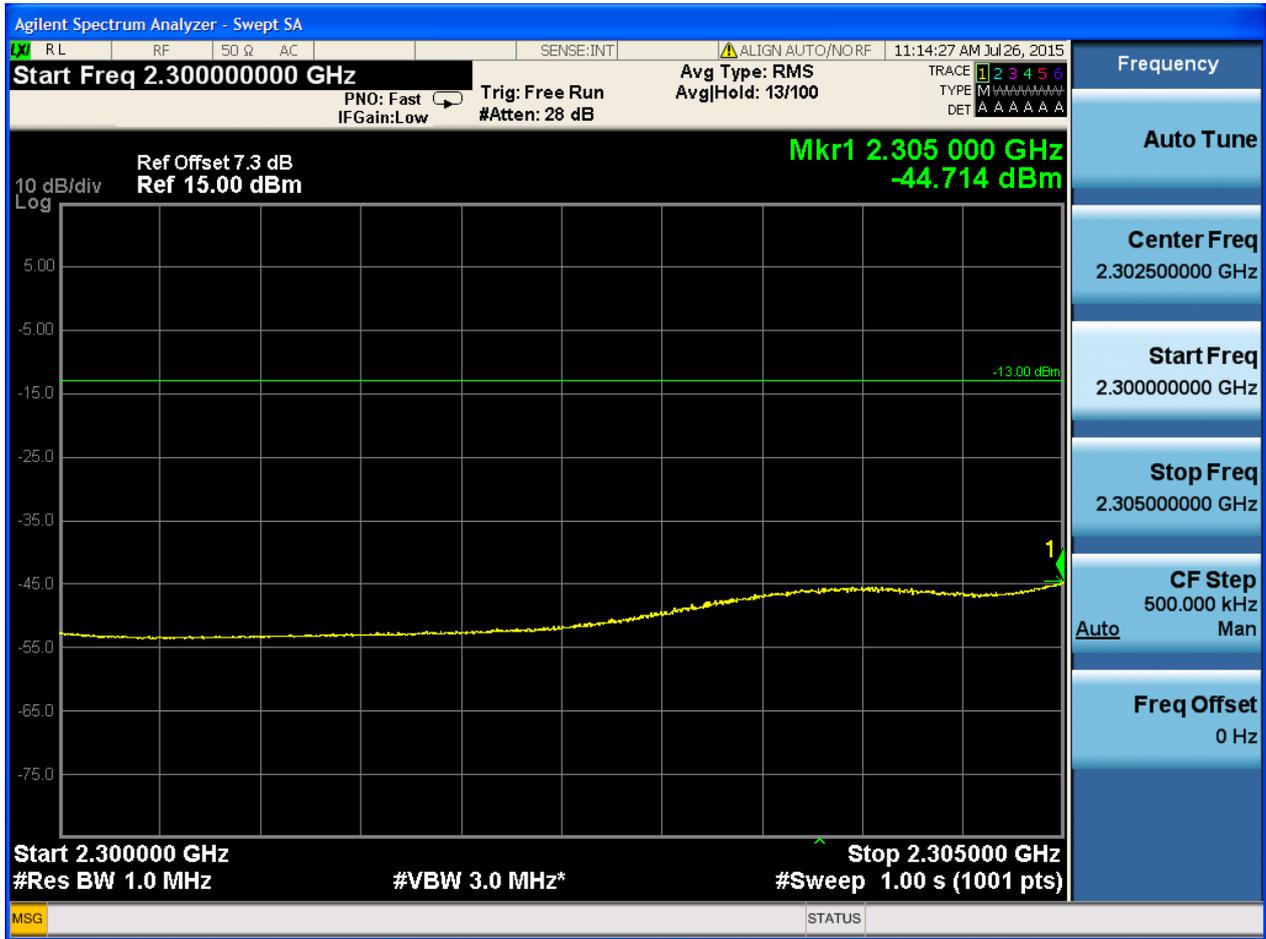
























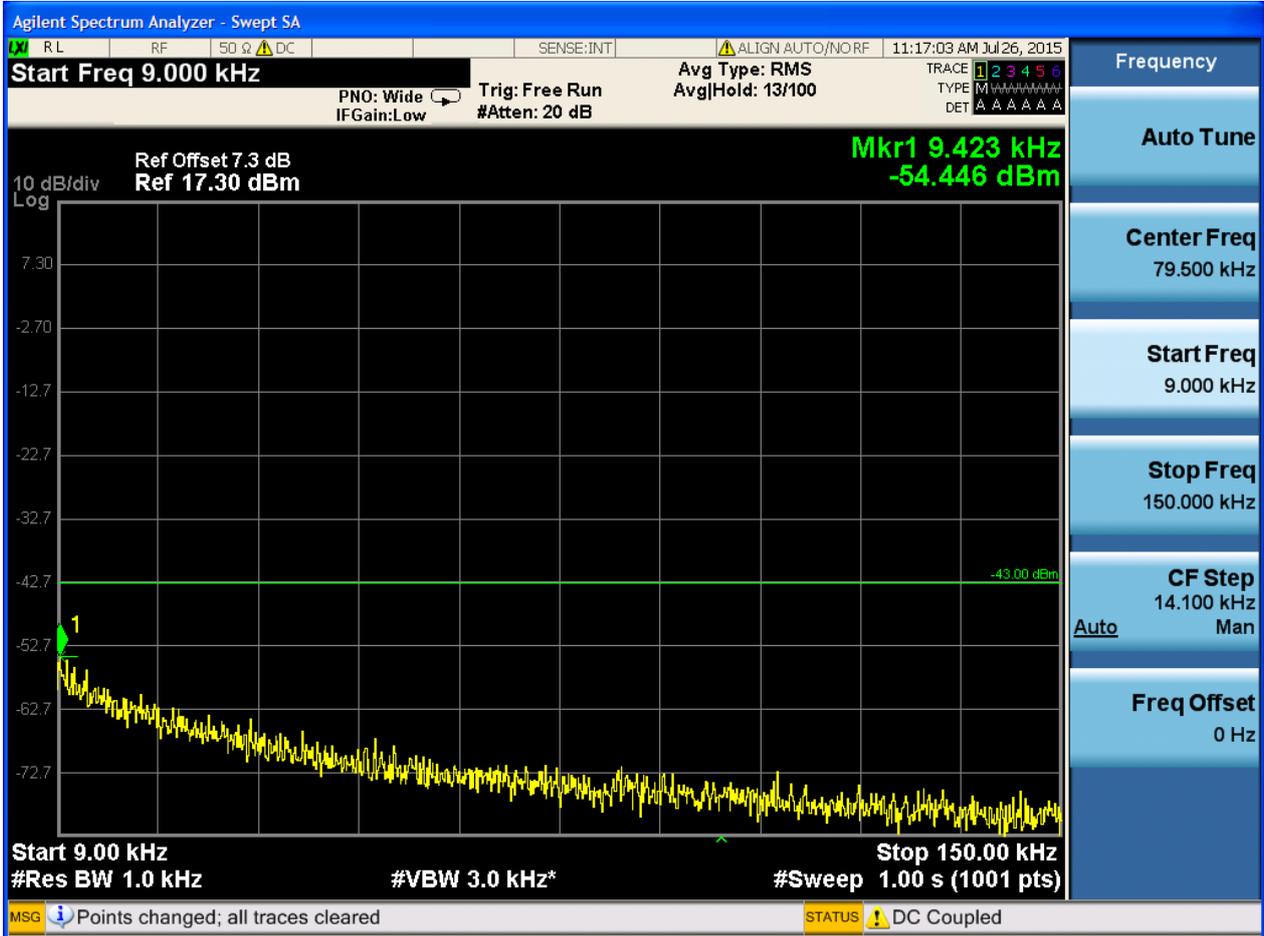


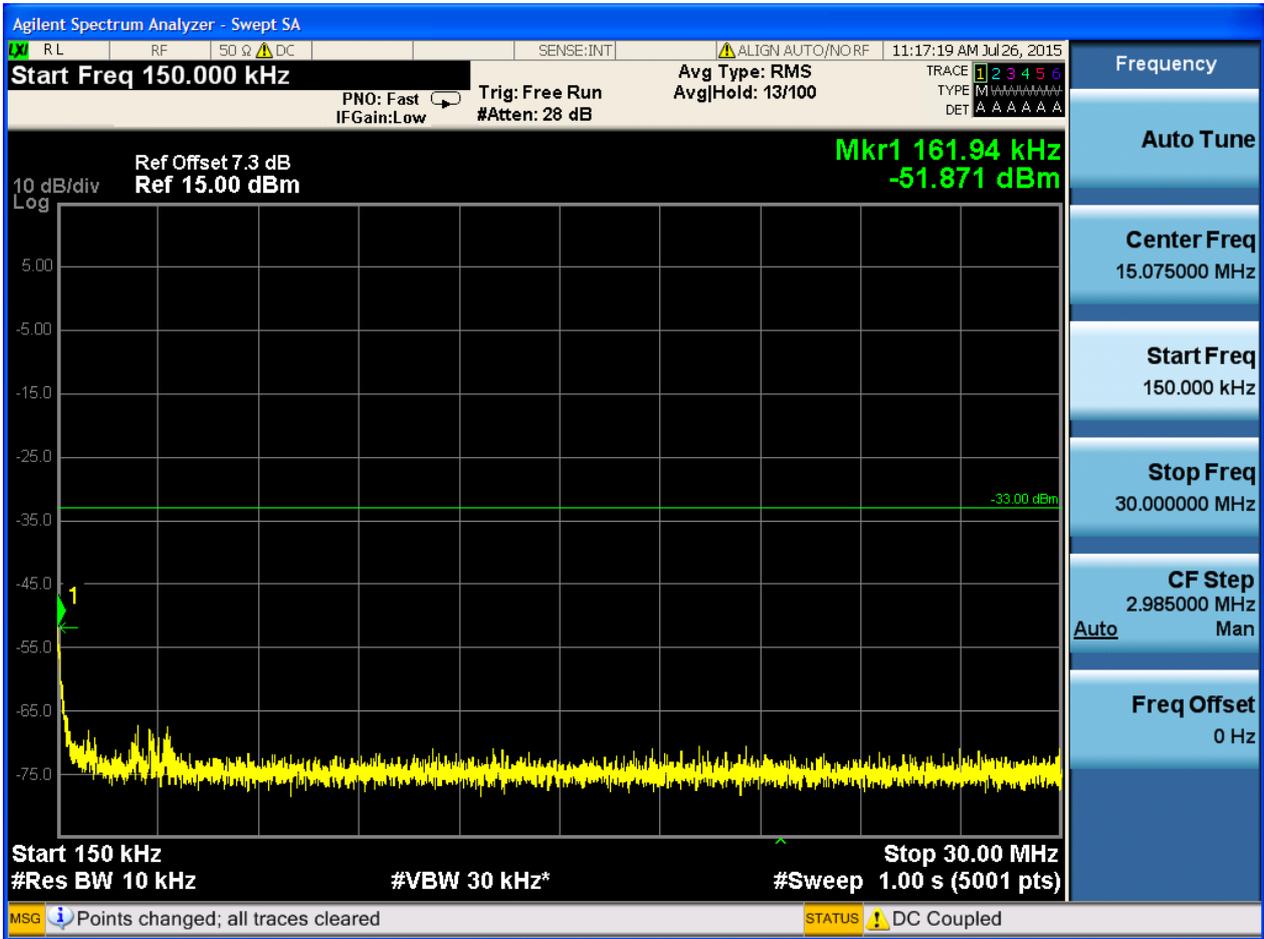




6.3.1.1.1.3 Test Channel = HCH

6.3.1.1.1.3.1 Test RB = RB1#0







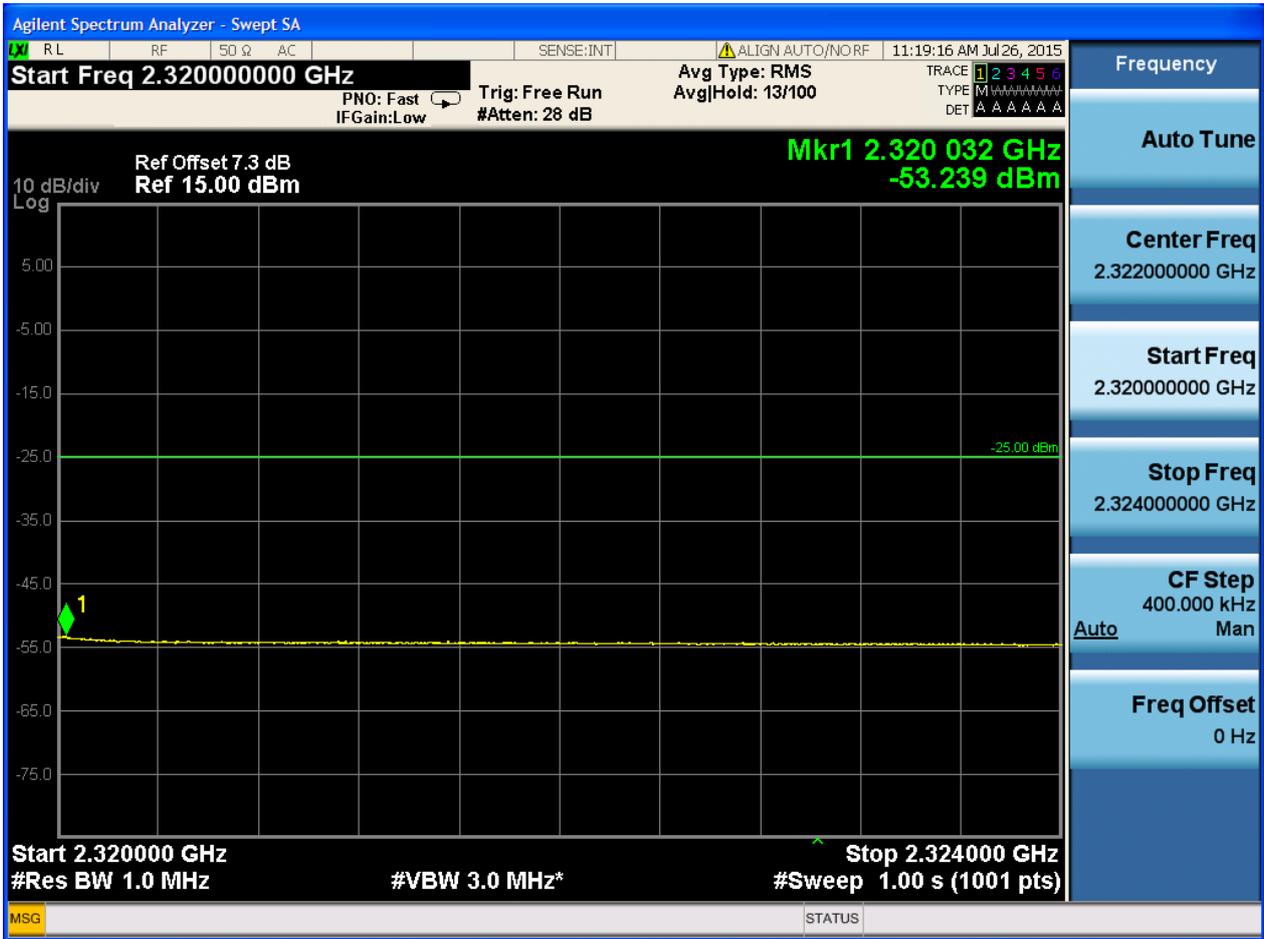


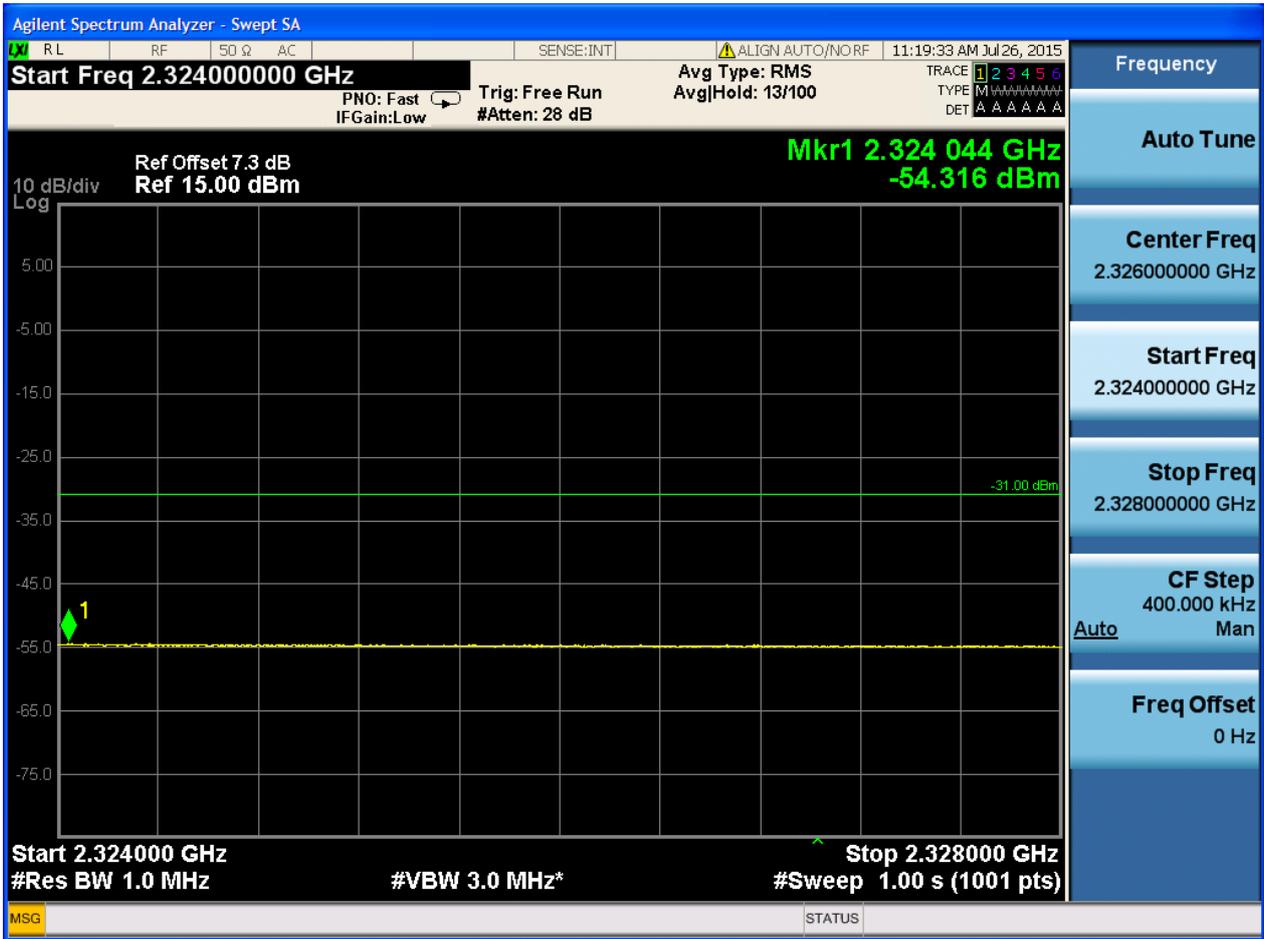




















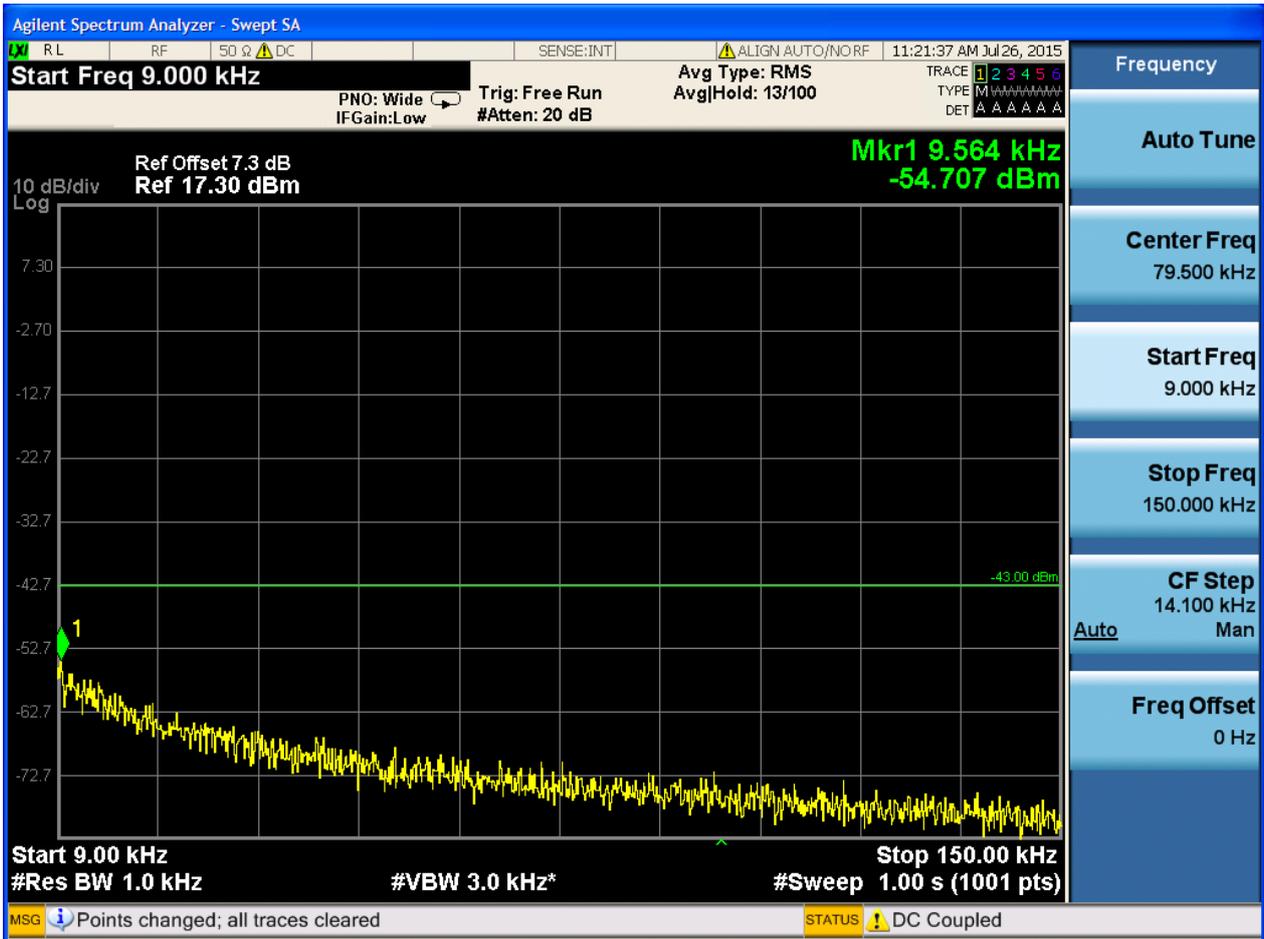


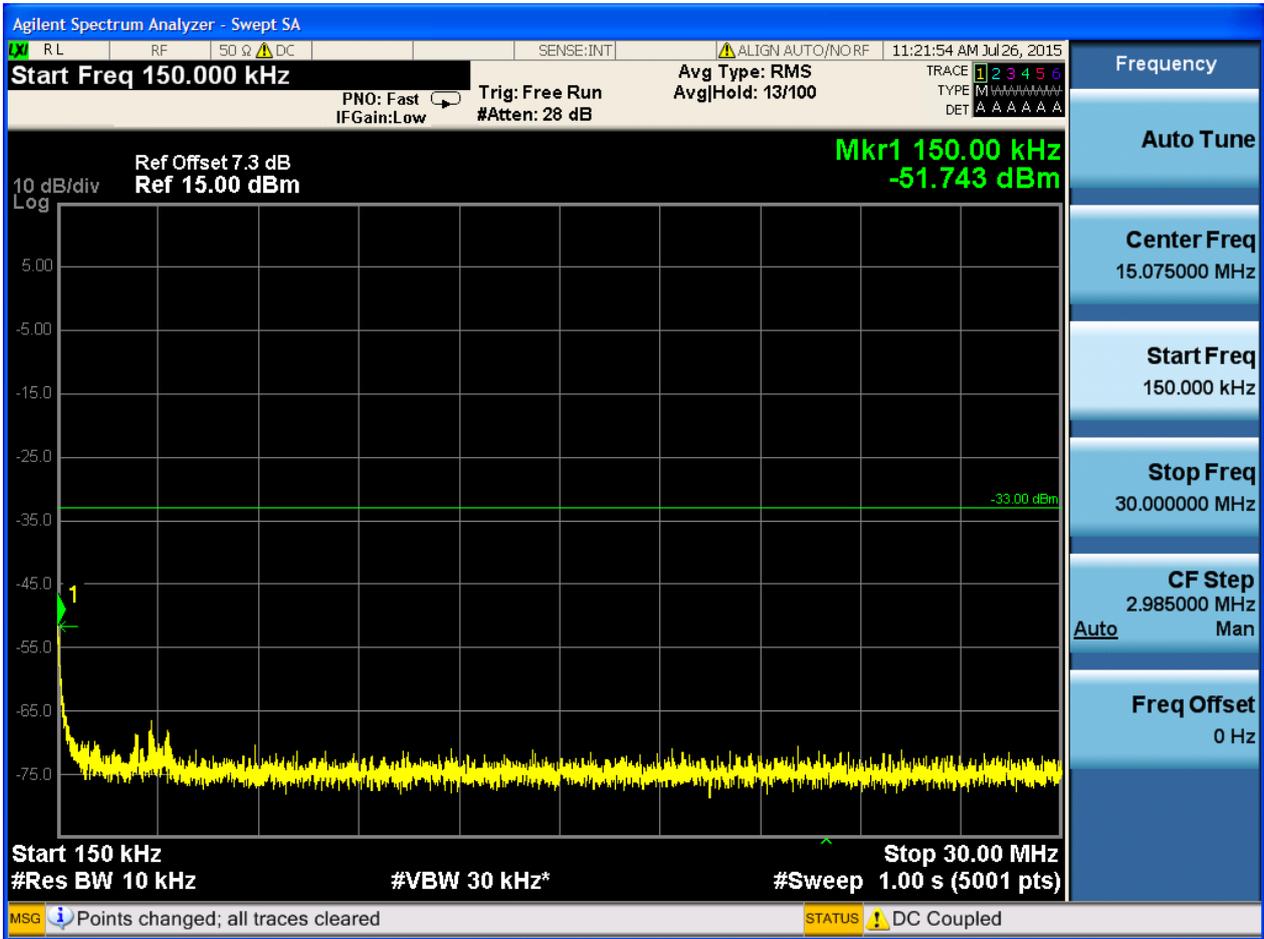


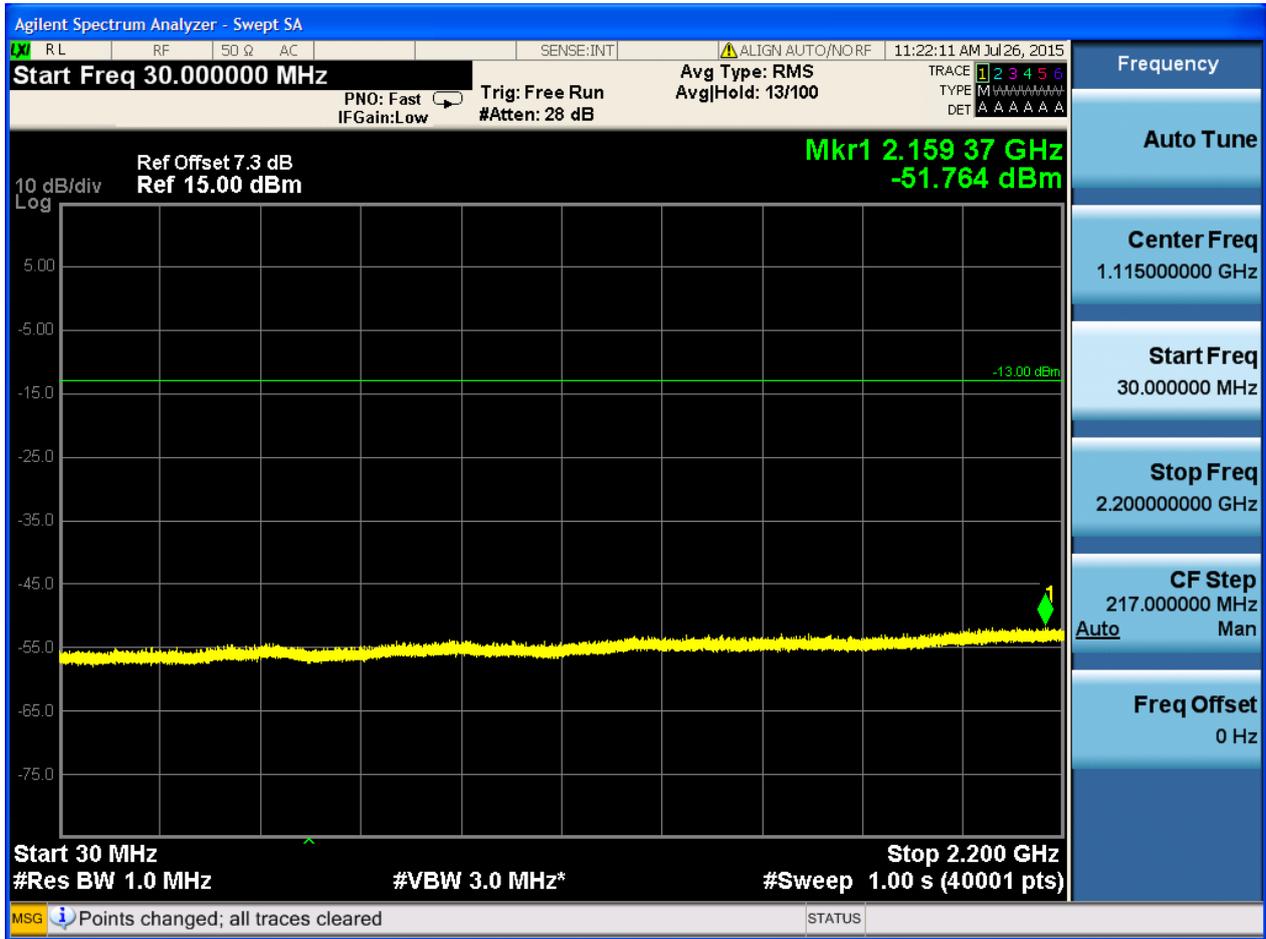
6.3.1.1.2 Test Bandwidth = 10

6.3.1.1.2.1 Test Channel = LCH/MCH/HCH

6.3.1.1.2.1.1 Test RB = RB1#0

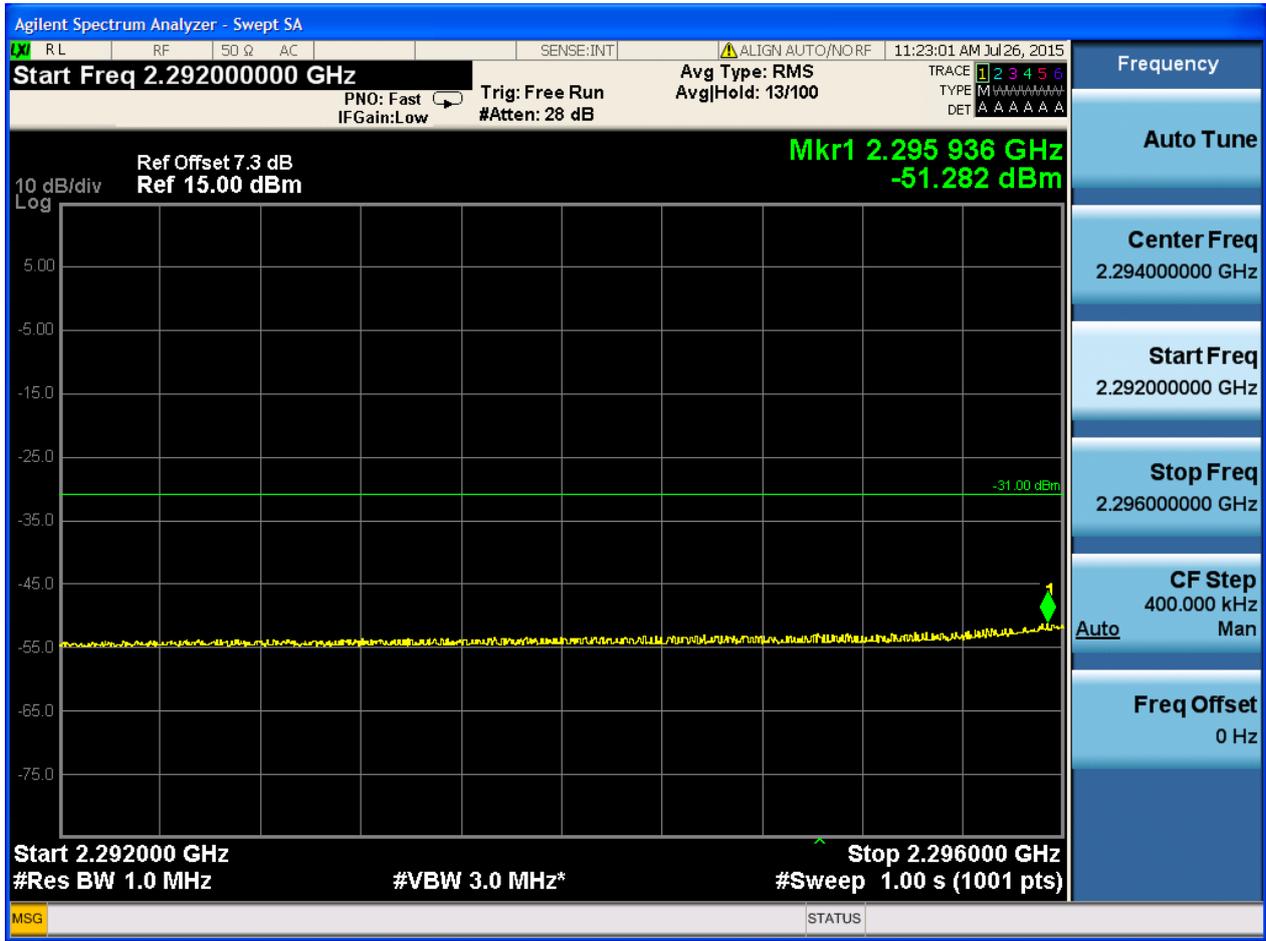


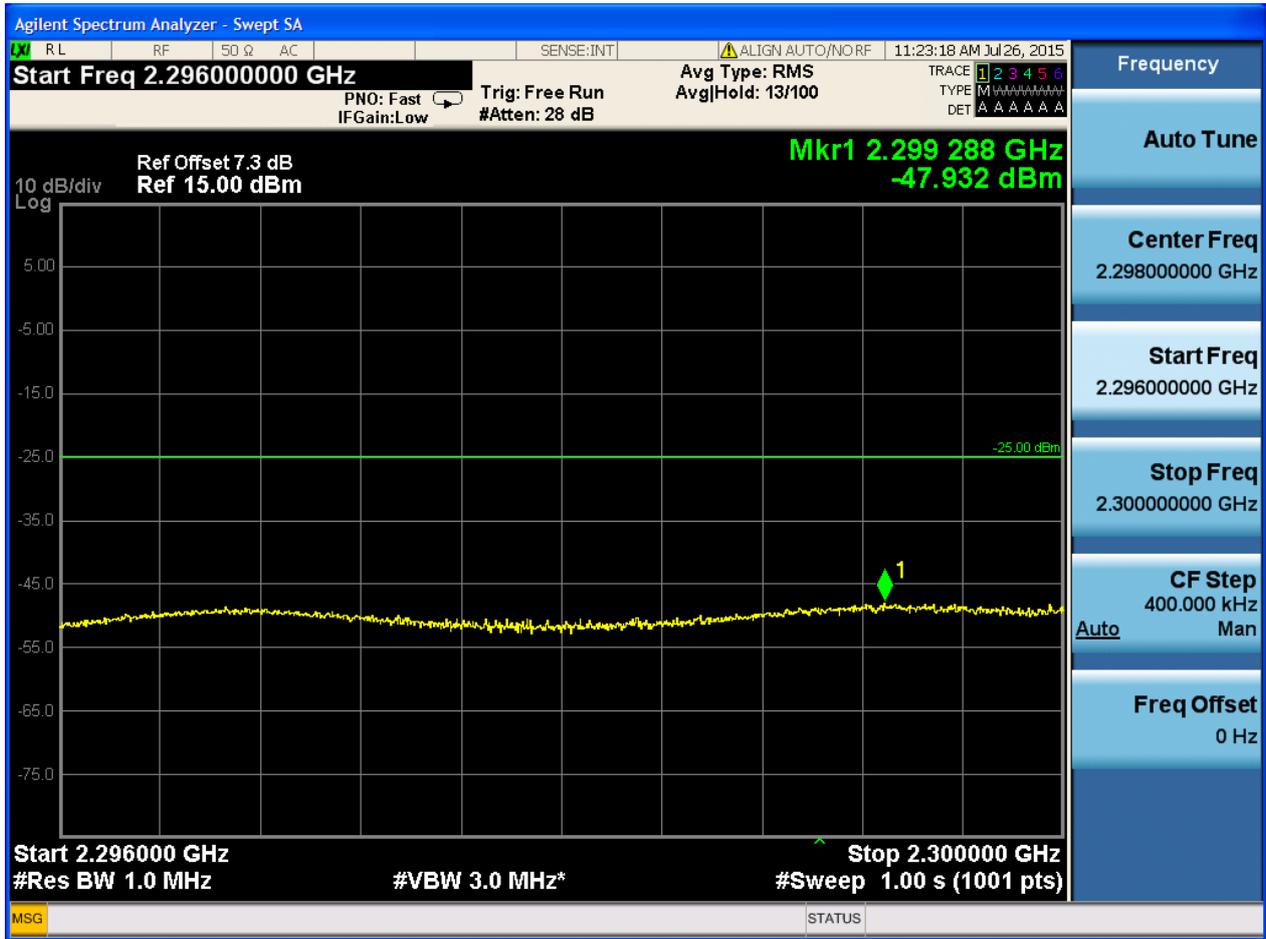




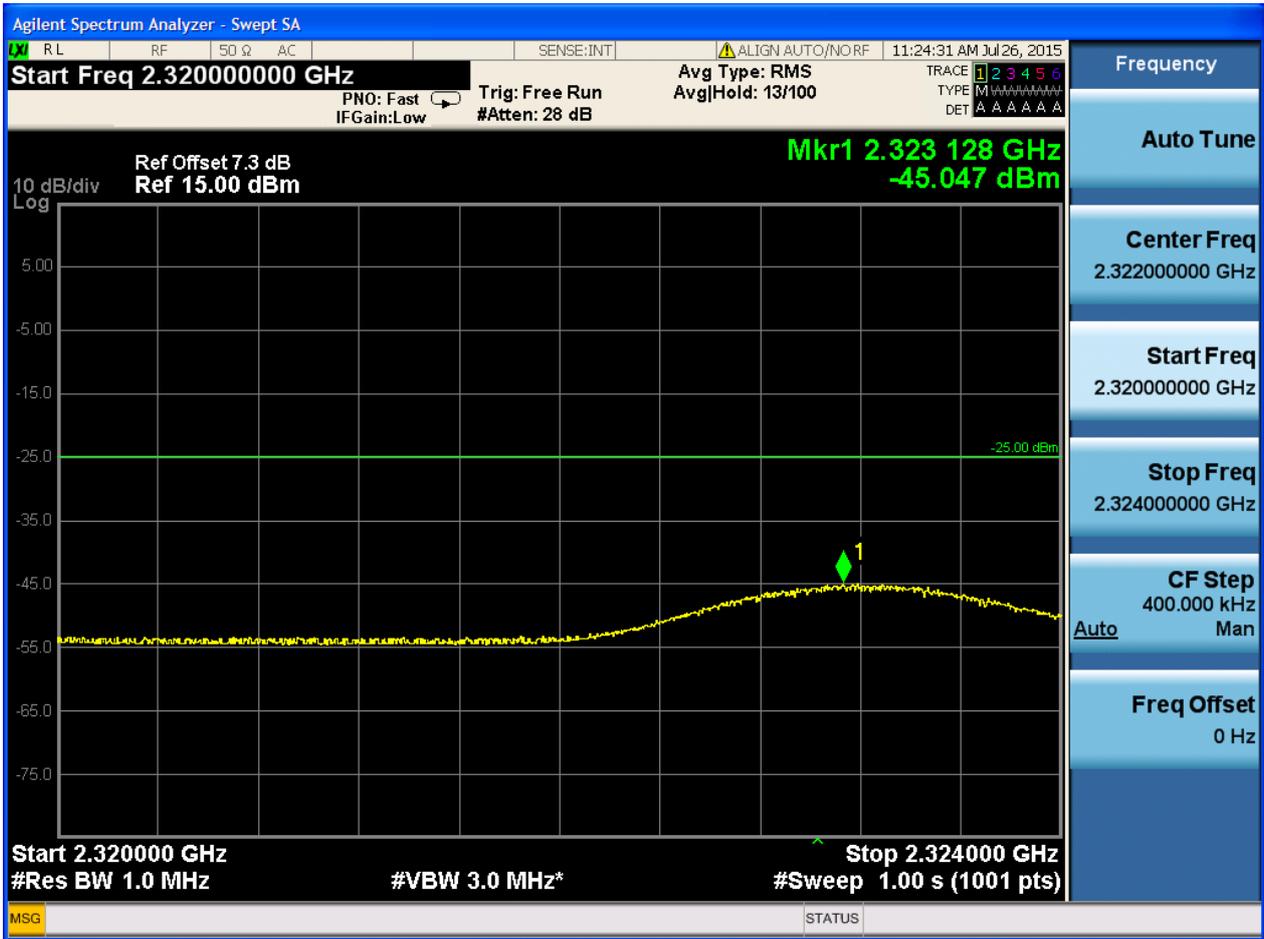






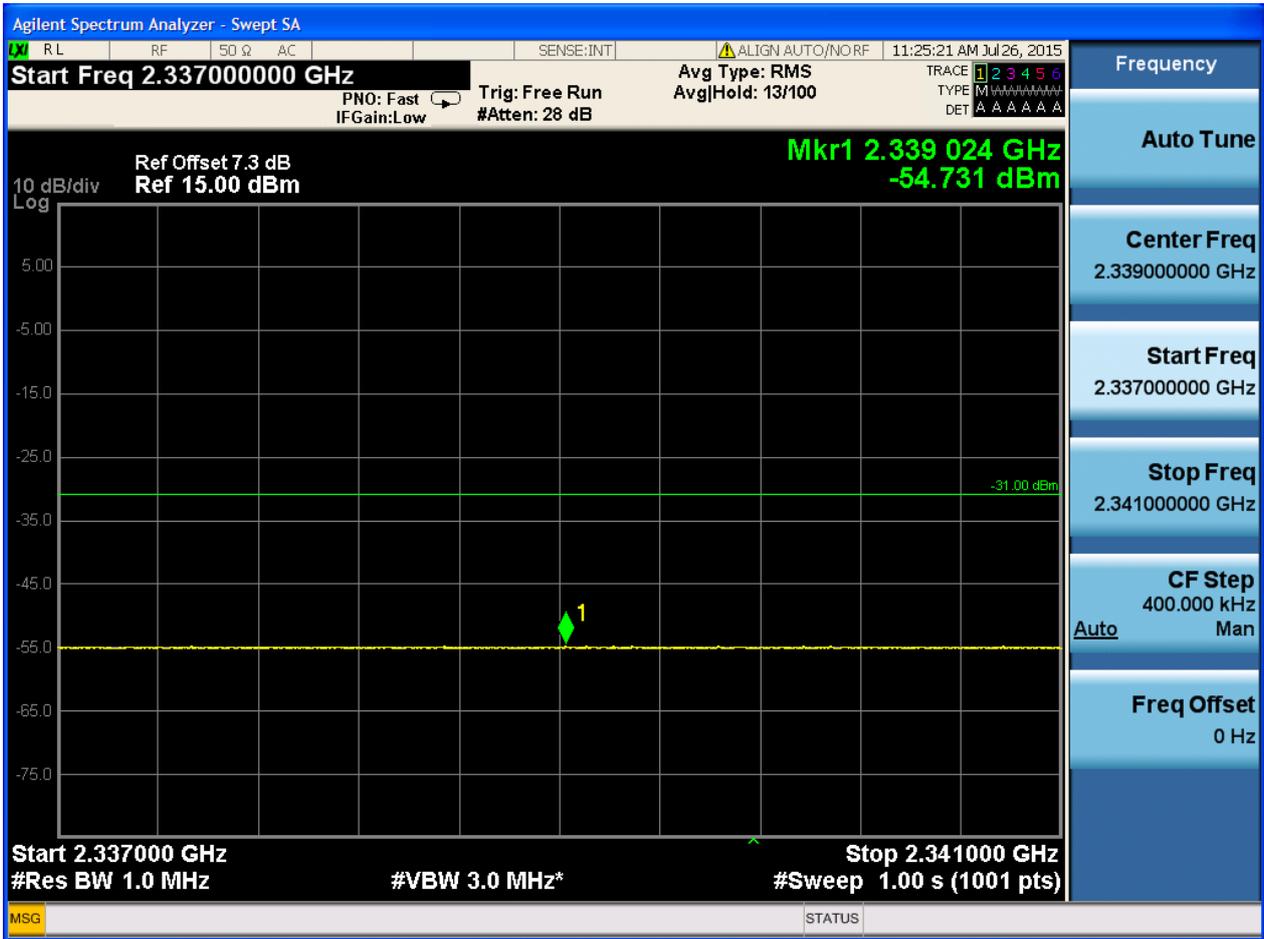




















## 7Appendix\_G: Field Strength of Spurious Radiation

Note:

9kHz~150kHz, VBW = 200Hz, VBW = 600 Hz, Detector: PK

150kHz~30MHz, VBW = 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

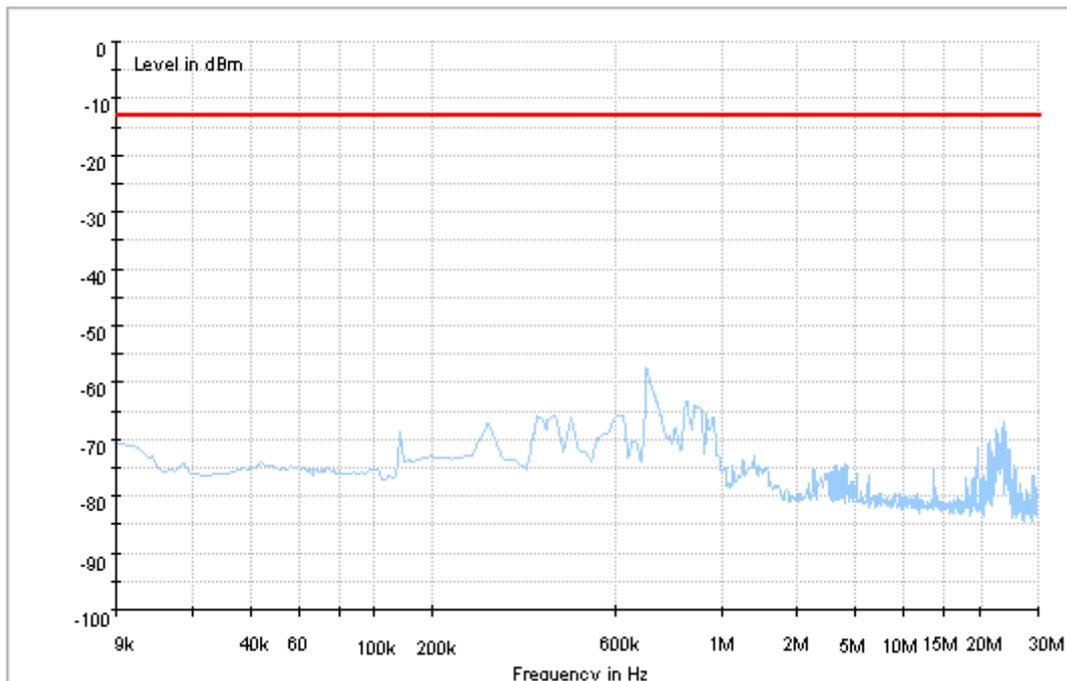
We tested all modes, but the data presented below is the worst case.

### Part I - Test Plots

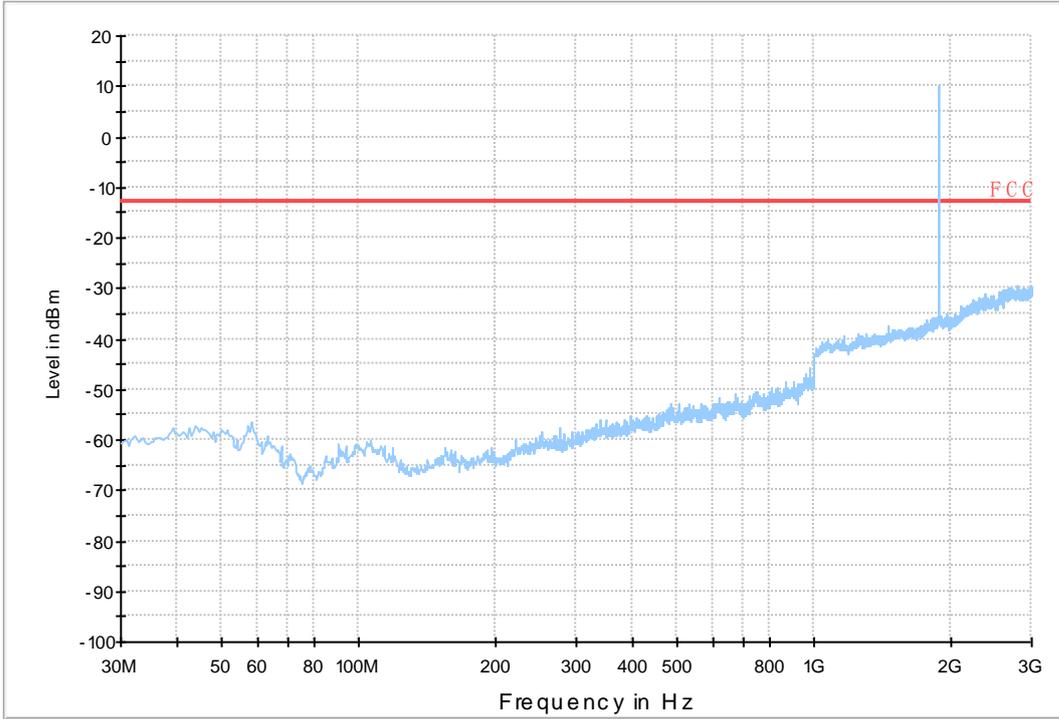
#### 7.1 For LTE

##### 7.1.1 Test Band = BAND40

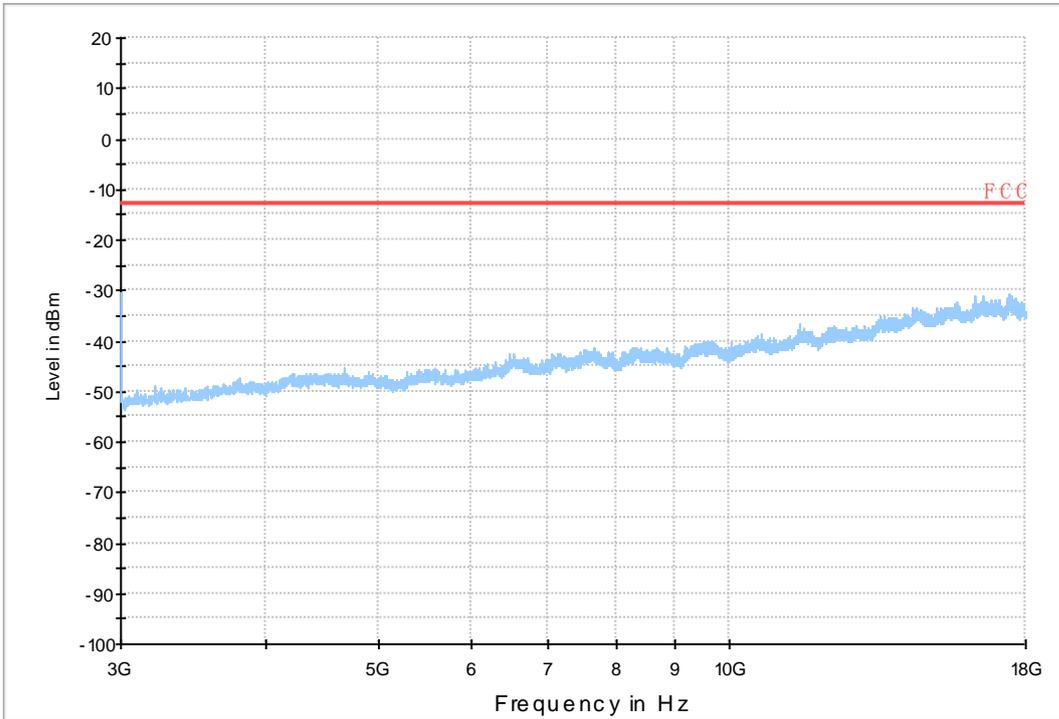
##### 7.1.1.1 Test Bandwidth = 5

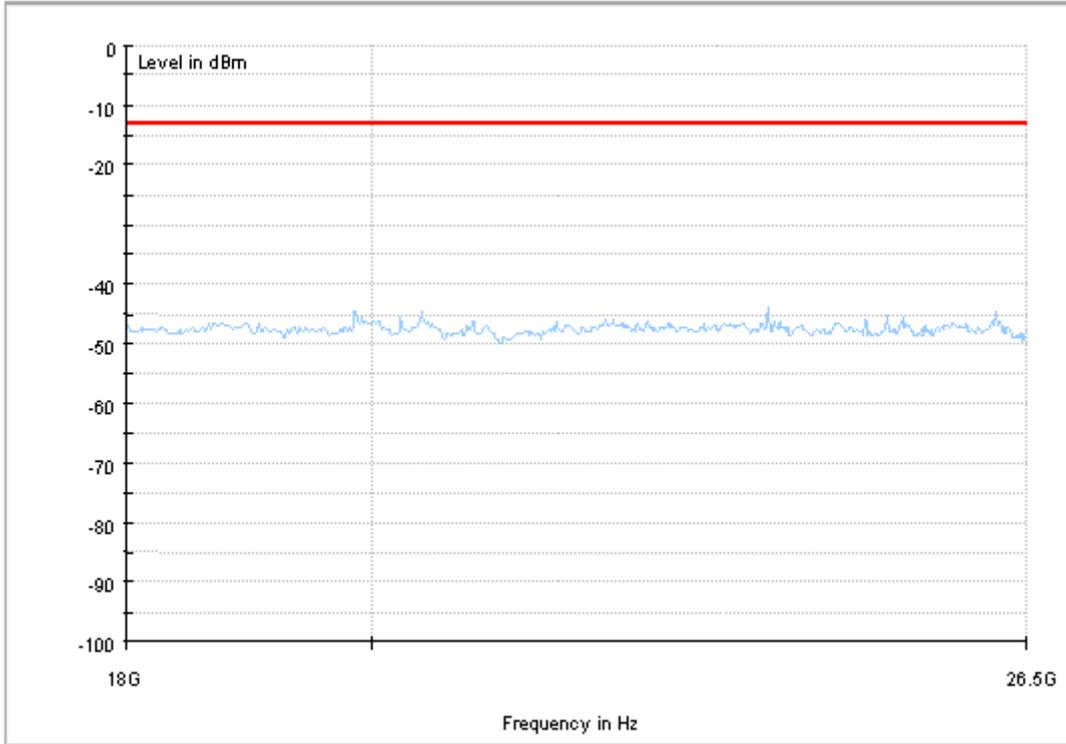


Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_L

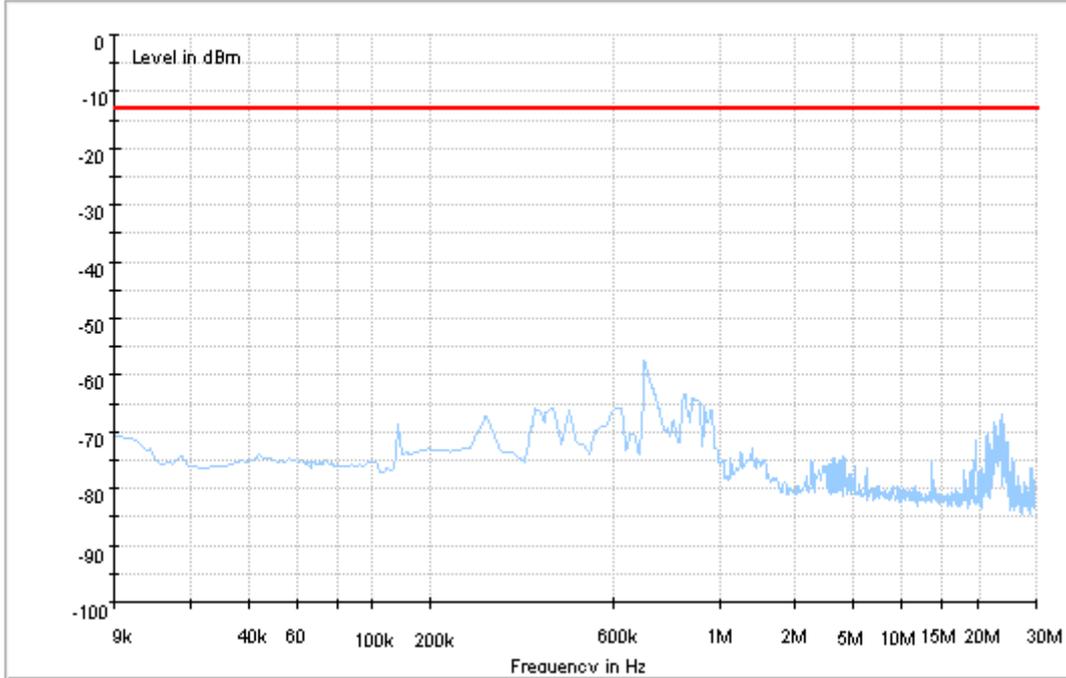


Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_H

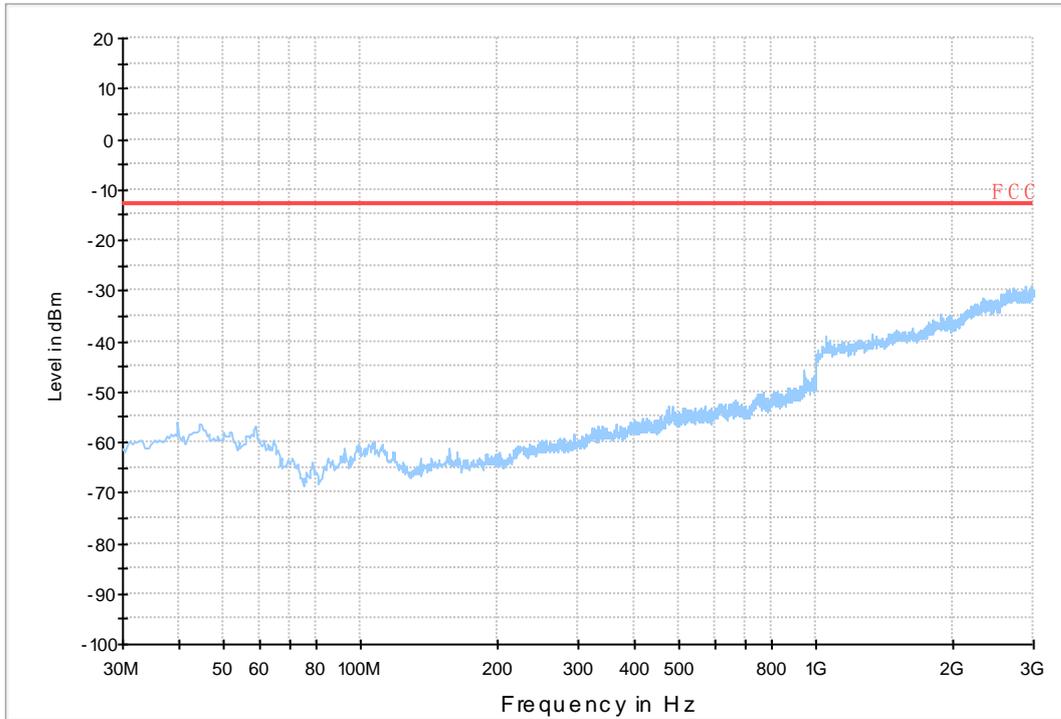




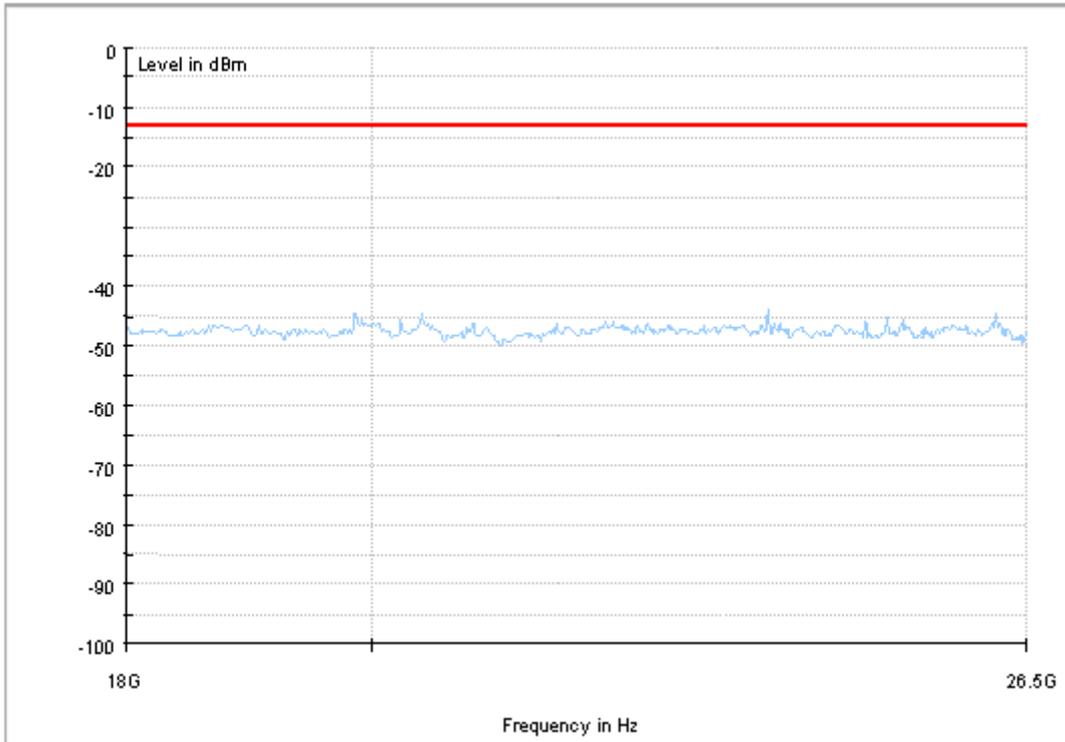
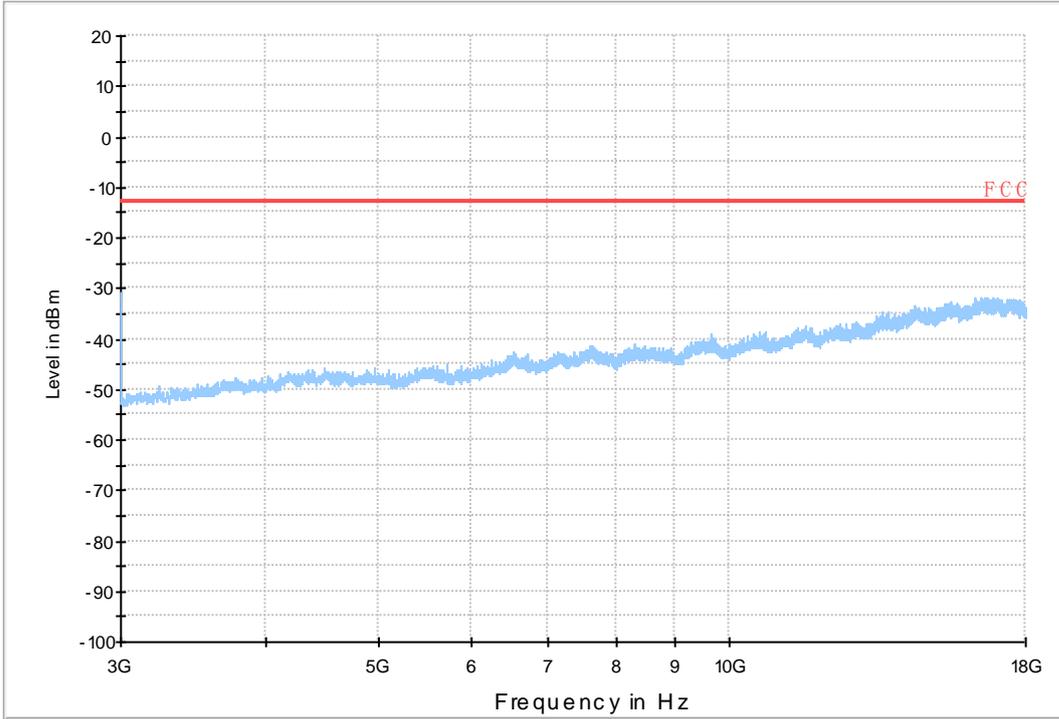
### 7.1.1.2 Test Bandwidth = 10



Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_L



Copy of RSE-TX-DIRECTOR ABOVE 1.5G\_H





## 8Appendix\_H: Frequency Stability

**8.1 For LTE**
**8.1.1 Frequency Error vs. Voltage:**

Test Band	Test Mode	Test Bandwidth (MHz)	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict			
BAND30	LTE/TM1	5	LCH	TN	VL	4.76	0.00206	PASS			
					VN	5.21	0.00226	PASS			
					VH	0.84	0.00036	PASS			
			MCH	TN	VL	-3.1	-0.00134	PASS			
					VN	-1.07	-0.00046	PASS			
					VH	-4.08	-0.00177	PASS			
		HCH	TN	VL	3.32	0.00144	PASS				
				VN	2.45	0.00106	PASS				
				VH	1.97	0.00085	PASS				
		10	LCH/MCH /HCH	TN	VL	-3.76	-0.00163	PASS			
					VN	0.17	0.00007	PASS			
					VH	-1.7	-0.00074	PASS			
	LTE/TM2				5	LCH	TN	VL	4.98	0.00216	PASS
								VN	4.18	0.00181	PASS
								VH	2.66	0.00115	PASS
		MCH	TN	VL		-2.05	-0.00089	PASS			
				VN		-0.77	-0.00033	PASS			
				VH		-1.27	-0.00055	PASS			
	HCH	TN	VL	0.93	0.0004	PASS					
			VN	-0.3	-0.00013	PASS					
			VH	2.78	0.0012	PASS					
	10	LCH/MCH /HCH	TN	VL	0.03	0.00001	PASS				
				VN	-1.95	-0.00084	PASS				
				VH	-4.11	-0.00178	PASS				

**8.1.2 Frequency Error vs. Temperature:**

Test Band	Test Mode	Test Bandwidth (MHz)	Test Channel	Test Volt.	Test Temp .	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BAND30	LTE/TM1	5	LCH	VN	-30	9.6	0.00416	PASS
					-20	6.11	0.00265	PASS
					-10	7.51	0.00325	PASS
					0	-0.07	-0.00003	PASS
					10	4.95	0.00215	PASS
					20	4.36	0.00189	PASS
					30	5.95	0.00258	PASS
					40	2.39	0.00104	PASS
					50	8.34	0.00361	PASS
			MCH	VN	-30	5.49	0.00238	PASS
					-20	7.45	0.00323	PASS
					-10	9.31	0.00403	PASS
					0	-1.9	-0.00082	PASS
					10	12.47	0.0054	PASS
					20	4.08	0.00177	PASS
		30			8.73	0.00378	PASS	
		40			6.18	0.00268	PASS	
		50			7.75	0.00335	PASS	
		HCH	VN	-30	5.52	0.00239	PASS	
				-20	-5.39	-0.00233	PASS	
				-10	3.81	0.00165	PASS	
				0	4.56	0.00197	PASS	
				10	9.16	0.00396	PASS	
				20	3.13	0.00135	PASS	
				30	6.28	0.00272	PASS	
				40	3.68	0.00159	PASS	
				50	5.14	0.00222	PASS	
		10	LCH/MCH /HCH	VN	-30	6.28	0.00272	PASS
					-20	6.49	0.00281	PASS
					-10	5.64	0.00244	PASS
0	4.96				0.00215	PASS		
10	10.99				0.00476	PASS		
20	6.74				0.00292	PASS		
30	7.52				0.00326	PASS		
40	8.68				0.00376	PASS		



Test Band	Test Mode	Test Bandwidth (MHz)	Test Channel	Test Volt.	Test Temp .	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
	LTE/TM2	5	LCH	VN	50	10.67	0.00462	PASS
					-30	4.08	0.00177	PASS
					-20	7.68	0.00333	PASS
					-10	5.99	0.0026	PASS
					0	7.25	0.00314	PASS
					10	5.14	0.00223	PASS
					20	4.94	0.00214	PASS
					30	2.63	0.00114	PASS
			40	6.04	0.00262	PASS		
			50	-0.9	-0.00039	PASS		
			MCH	VN	-30	7.75	0.00335	PASS
					-20	7.44	0.00322	PASS
					-10	10.27	0.00445	PASS
					0	1.56	0.00068	PASS
					10	5.91	0.00256	PASS
					20	9.87	0.00427	PASS
					30	1.76	0.00076	PASS
					40	7.7	0.00333	PASS
			50	9.18	0.00397	PASS		
			HCH	VN	-30	9.37	0.00405	PASS
					-20	6.75	0.00292	PASS
					-10	4.51	0.00195	PASS
					0	12.83	0.00555	PASS
					10	5.16	0.00223	PASS
		20			6.19	0.00268	PASS	
		30			7.18	0.0031	PASS	
		40			8.25	0.00357	PASS	
		50	6.01	0.0026	PASS			
		10	LCH/MCH /HCH	VN	-30	5.56	0.00241	PASS
					-20	5.29	0.00229	PASS
					-10	6.65	0.00288	PASS
					0	4.48	0.00194	PASS
					10	5.94	0.00257	PASS
					20	5.29	0.00229	PASS
					30	8.41	0.00364	PASS
40	8.84				0.00383	PASS		
50	8.55	0.0037	PASS					

END