



# Appendix B

## WCDMA Band 2&5



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# 1 Effective (Isotropic) Radiated Power Output Data

## Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	EIRP[dB]	Limit[dBm]	Verdict
WCDMA1900	UMTS/TM1	LCH	23.63	24.28	33	PASS
		MCH	23.89	24.54	33	PASS
		HCH	23.92	24.57	33	PASS
	UMTS/TM2	LCH	22.49	23.11	33	PASS
		MCH	22.72	23.37	33	PASS
		HCH	22.65	23.30	33	PASS

Note:

a: For getting the ERP (Efficient Isotropic Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{EIRP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBi]}$$

b: SGP=Signal Generator Level

c: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS

Test Band	Test Mode	Test Channel	Measured[dB]	ERP[dB]	Limit[dBm]	Verdict
WCDMA850	UMTS/TM1	LCH	22.95	19.27	38.45	PASS
		MCH	22.85	19.17	38.45	PASS
		HCH	22.87	19.19	38.45	PASS
	UMTS/TM2	LCH	22.19	18.51	38.45	PASS
		MCH	22.26	18.58	38.45	PASS
		HCH	22.32	18.64	38.45	PASS

Note:

a: For getting the ERP (Efficient Radiated Power) in substitution method, the following formula should be taken to calculate it,

$$\text{ERP [dBm]} = \text{SGP [dBm]} - \text{Cable Loss [dB]} + \text{Gain [dBd]}$$

b: SGP=Signal Generator Level

c: RBW > emission bandwidth, VBW > 3 x RBW.

Detector: RMS



## 2 Peak-to-Average Ratio

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	2.38	13	PASS
		MCH	2.61	13	PASS
		HCH	2.17	13	PASS
	UMTS/TM2	LCH	2.14	13	PASS
		MCH	2.43	13	PASS
		HCH	2.29	13	PASS
WCDMA850	UMTS/TM1	LCH	2.87	13	PASS
		MCH	2.72	13	PASS
		HCH	2.26	13	PASS
	UMTS/TM2	LCH	2.78	13	PASS
		MCH	2.87	13	PASS
		HCH	2.61	13	PASS

**Part II - Test Plots**

**2.1 For WCDMA**

**2.1.1 Test Band = WCDMA 1900**

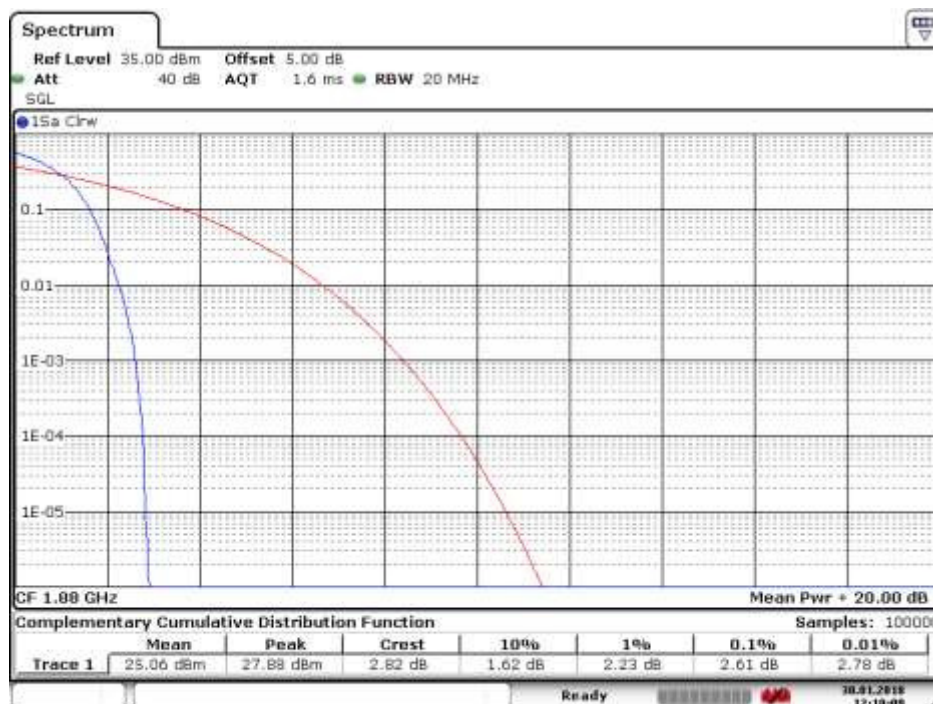
**2.1.1.1 Test Mode = UMTS/TM1**

**2.1.1.1.1 Test Channel = LCH**



Date: 30 JAN 2018 12:10:29

**2.1.1.1.2 Test Channel = MCH**



Date: 30 JAN 2018 12:10:10

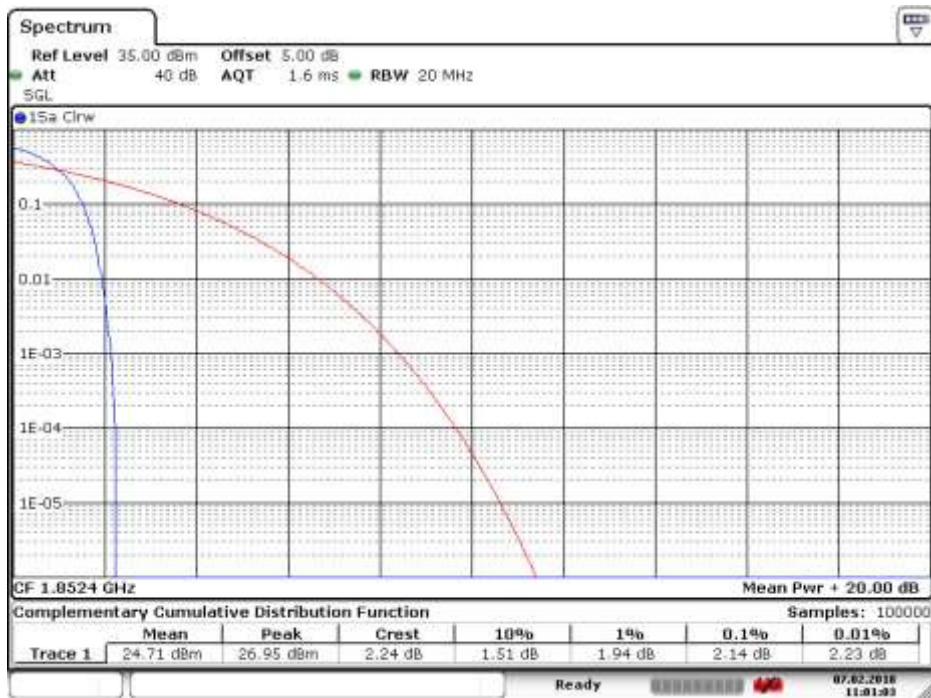
**2.1.1.1.3 Test Channel = HCH**



Date: 30 JAN 2018 12:09:46

**2.1.1.2 Test Mode = UMTS/TM2**

**2.1.1.2.1 Test Channel = LCH**





2.1.1.2.2 Test Channel = MCH



2.1.1.2.3 Test Channel = HCH

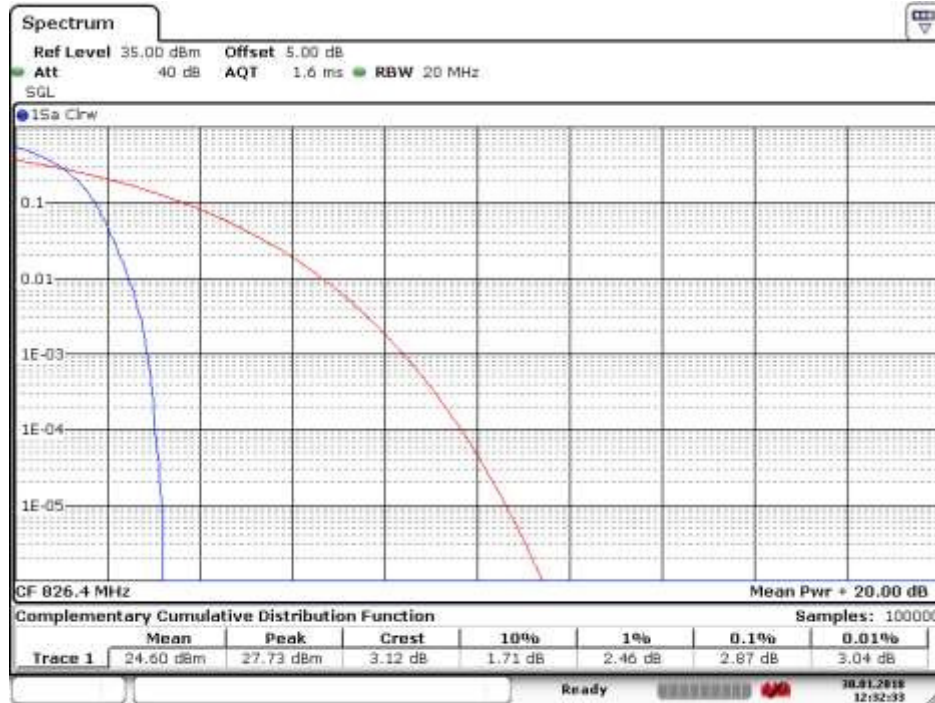




## 2.1.2 Test Band = WCDMA 850

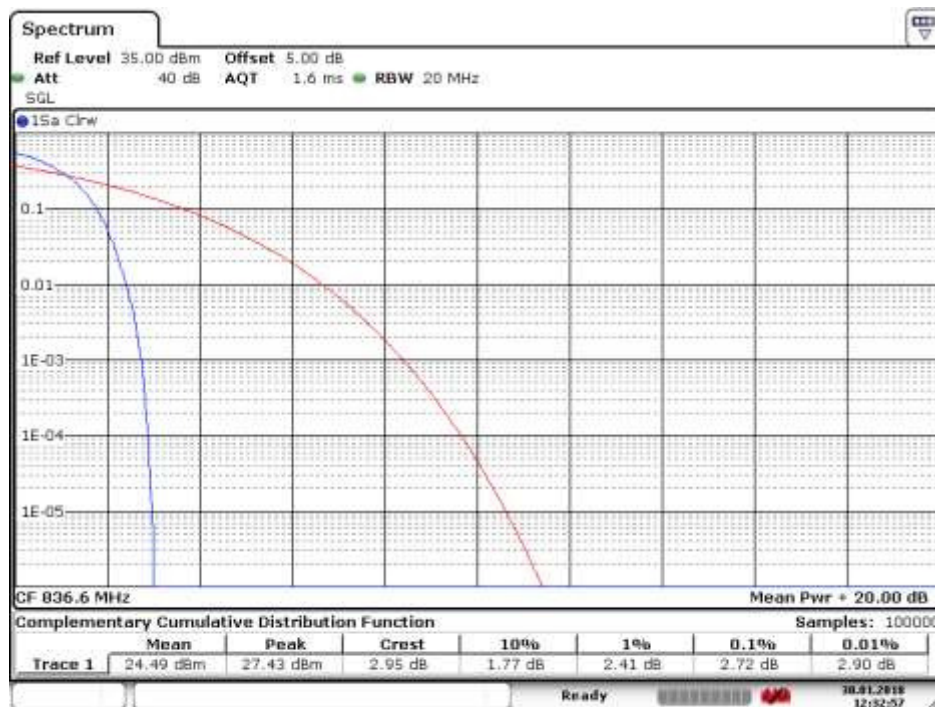
### 2.1.2.1 Test Mode = UMTS/TM1

#### 2.1.2.1.1 Test Channel = LCH



Date: 30.JAN.2018 12:32:33

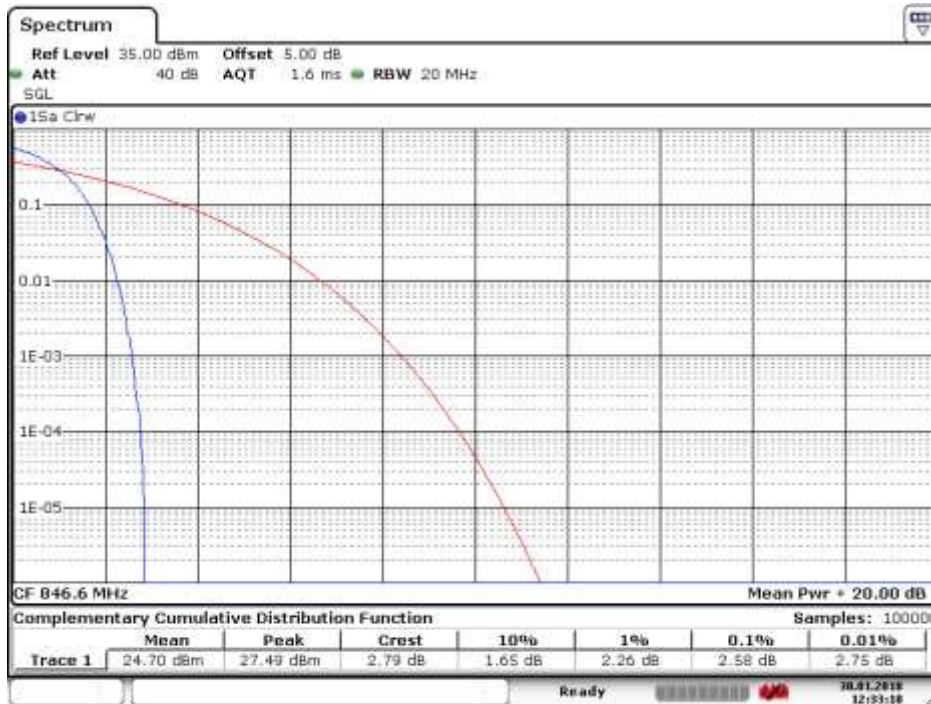
#### 2.1.2.1.2 Test Channel = MCH



Date: 30.JAN.2018 12:32:57



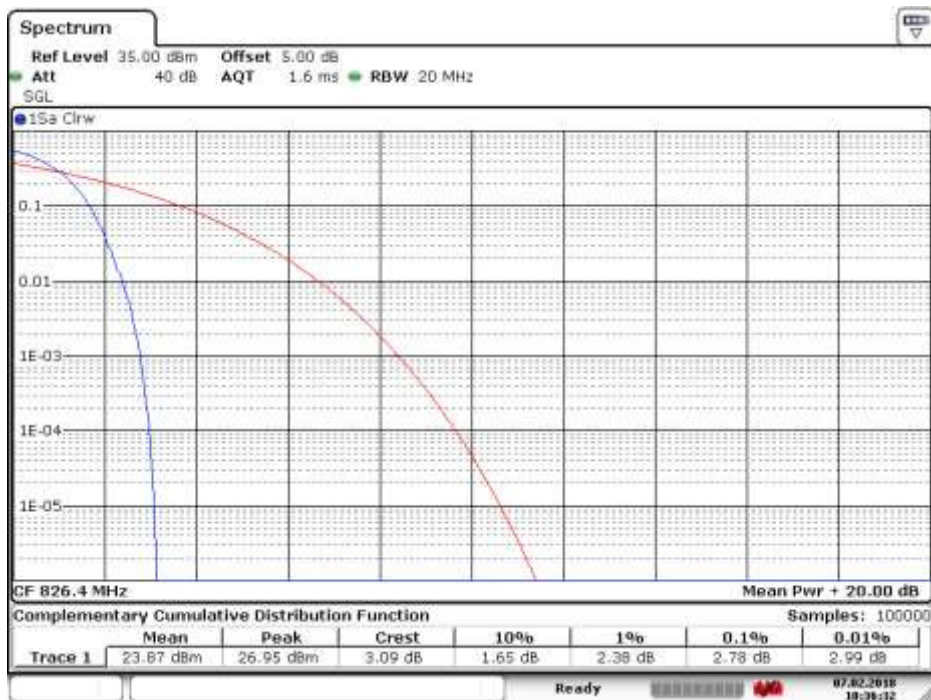
**2.1.2.1.3 Test Channel = HCH**



Date: 30 JAN 2018 12:33:18

**2.1.2.2 Test Mode = UMTS/TM2**

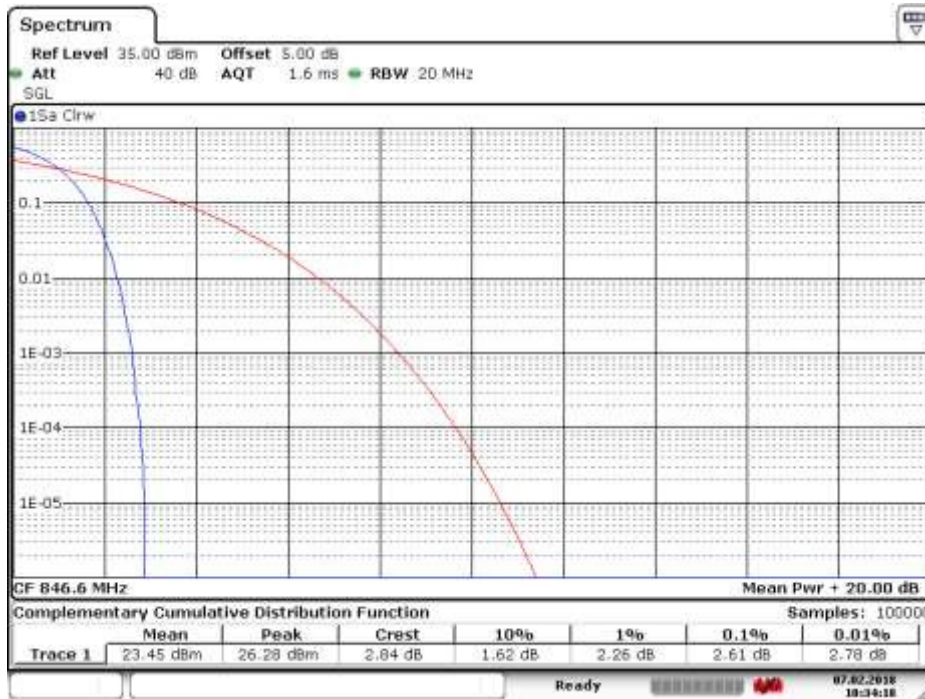
**2.1.2.2.1 Test Channel = LCH**



**2.1.2.2.2 Test Channel = MCH**



**2.1.2.2.3 Test Channel = HCH**



### 3 Modulation Characteristics

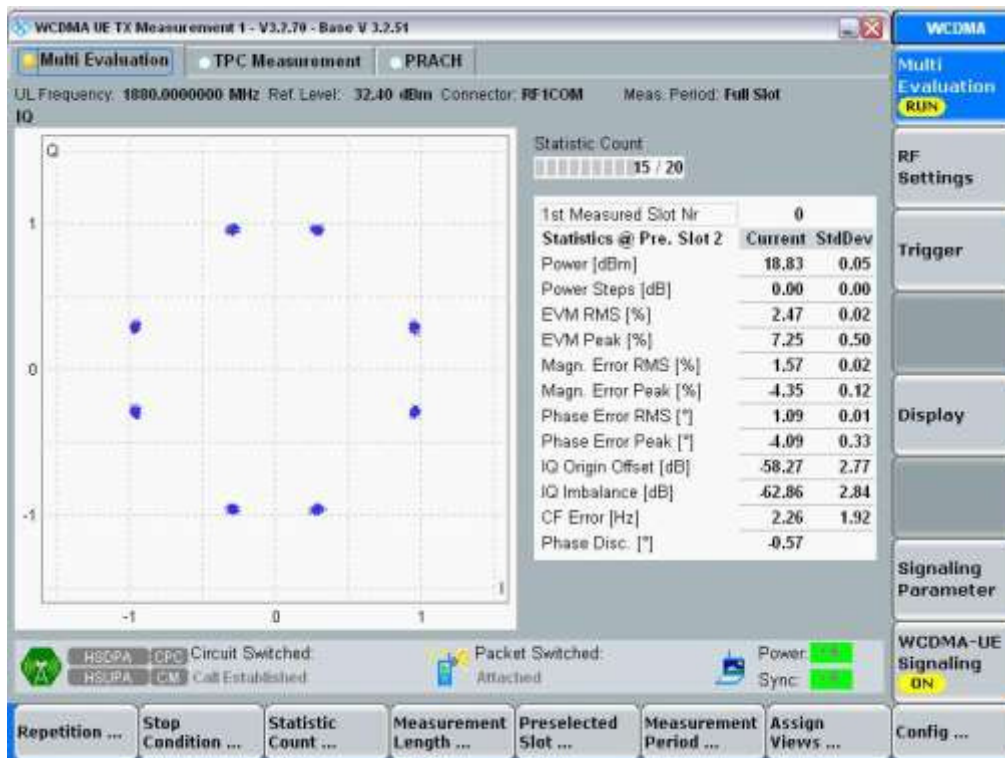
#### Part I - Test Plots

#### 3.1 For WCDMA

##### 3.1.1 Test Band = WCDMA 1900

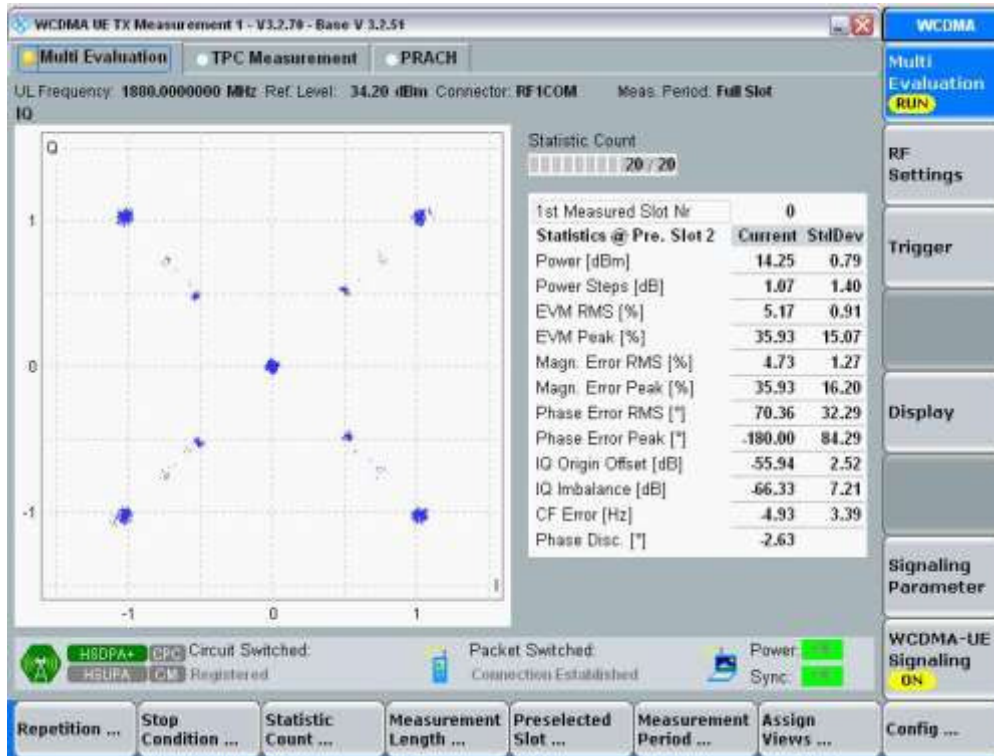
##### 3.1.1.1 Test Mode = UMTS/TM1

##### 3.1.1.1.1 Test Channel = MCH



**3.1.1.2 Test Mode = UMTS/TM2**

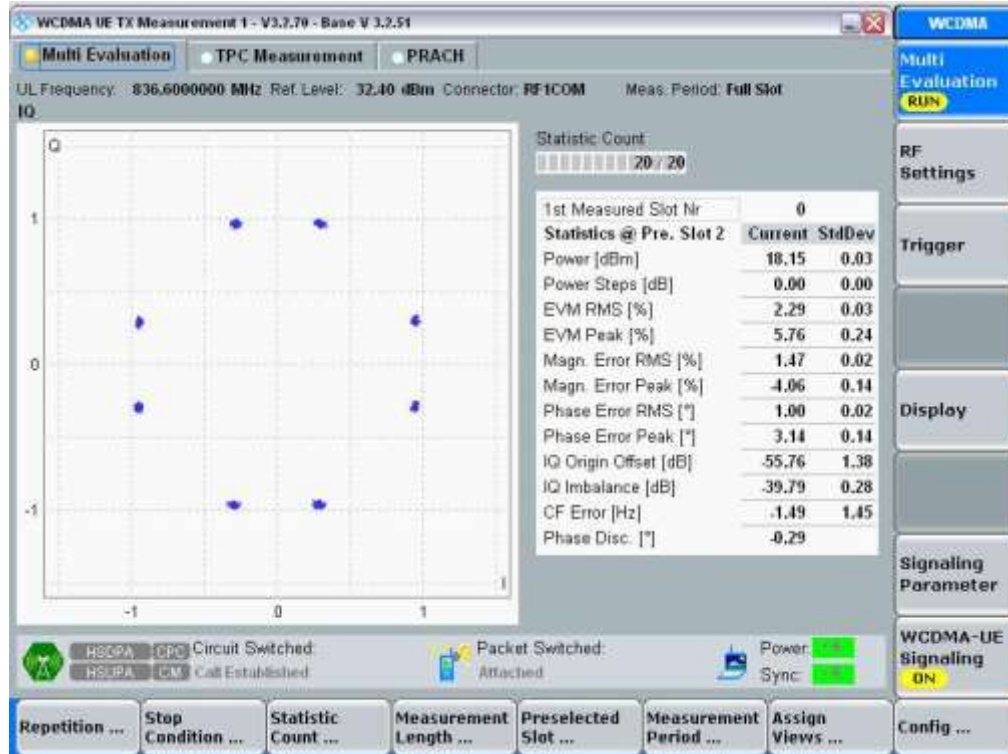
**3.1.1.2.1 Test Channel = MCH**



### 3.1.2 Test Band = WCDMA 850

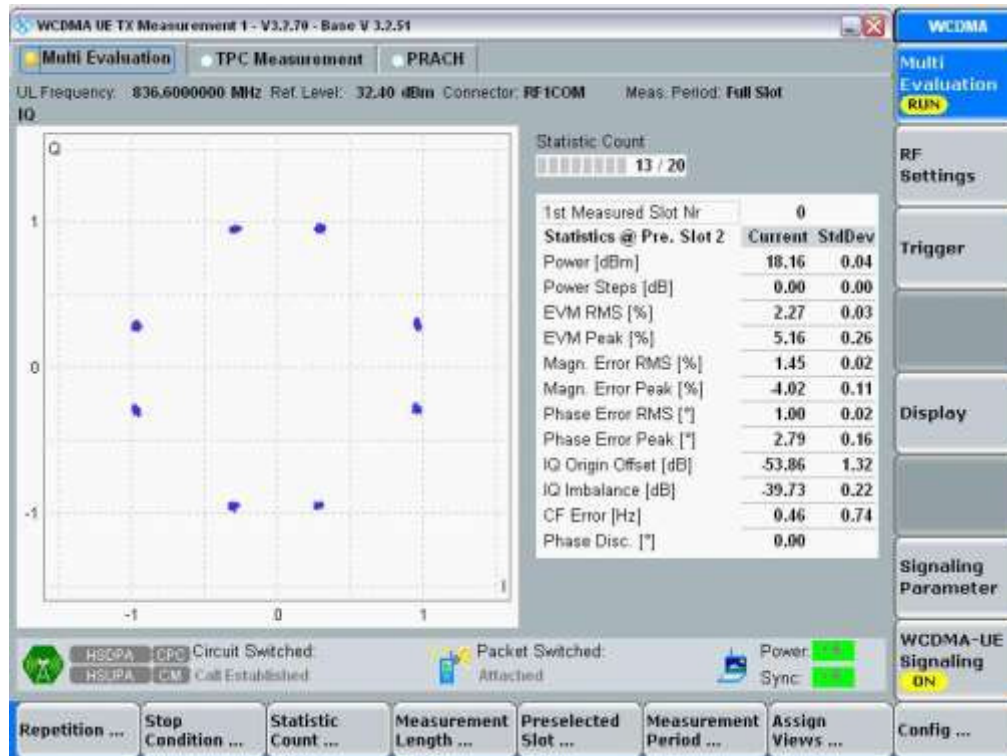
#### 3.1.2.1 Test Mode = UMTS /TM1

##### 3.1.2.1.1 Test Channel = MCH



**3.1.2.2 Test Mode = UMTS /TM1**

**3.1.2.2.1 Test Channel = MCH**





## 4 Bandwidth

### Part I - Test Results

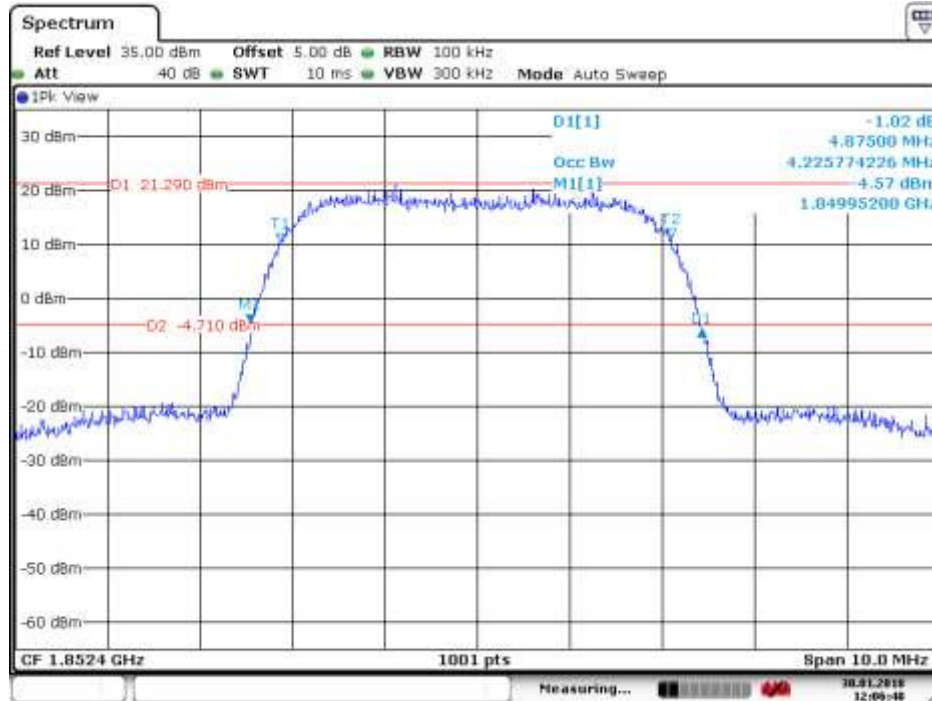
Test Band	Test Mode	Test Channel	Occupied Bandwidth [MHz]	Emission Bandwidth [MHz]	Verdict
WCDMA1900	UMTS/TM1	LCH	4.23	4.88	PASS
		MCH	4.21	4.88	PASS
		HCH	4.22	4.86	PASS
	UMTS/TM2	LCH	4.22	4.90	PASS
		MCH	4.21	4.90	PASS
		HCH	4.23	4.89	PASS
WCDMA850	UMTS/TM1	LCH	4.21	4.85	PASS
		MCH	4.22	4.86	PASS
		HCH	4.20	4.88	PASS
	UMTS/TM2	LCH	4.19	4.88	PASS
		MCH	4.20	4.88	PASS
		HCH	4.20	4.86	PASS

## 4.1 For WCDMA

### 4.1.1 Test Band = WCDMA 1900

#### 4.1.1.1 Test Mode = UMTS/TM1

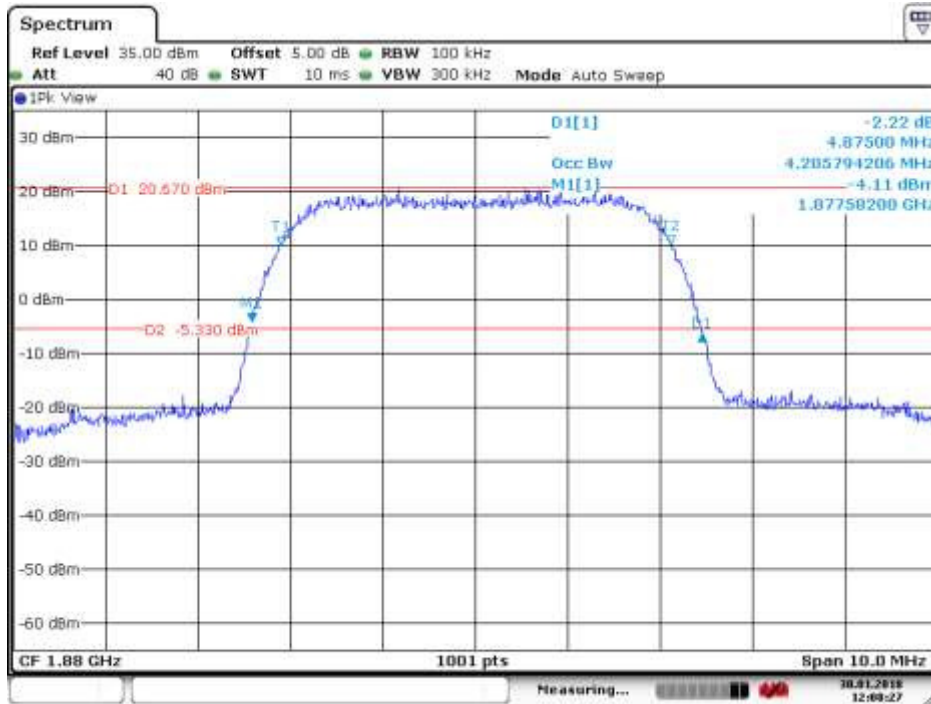
##### 4.1.1.1.1 Test Channel = LCH



Date: 30. JAN 2018 12:06:48

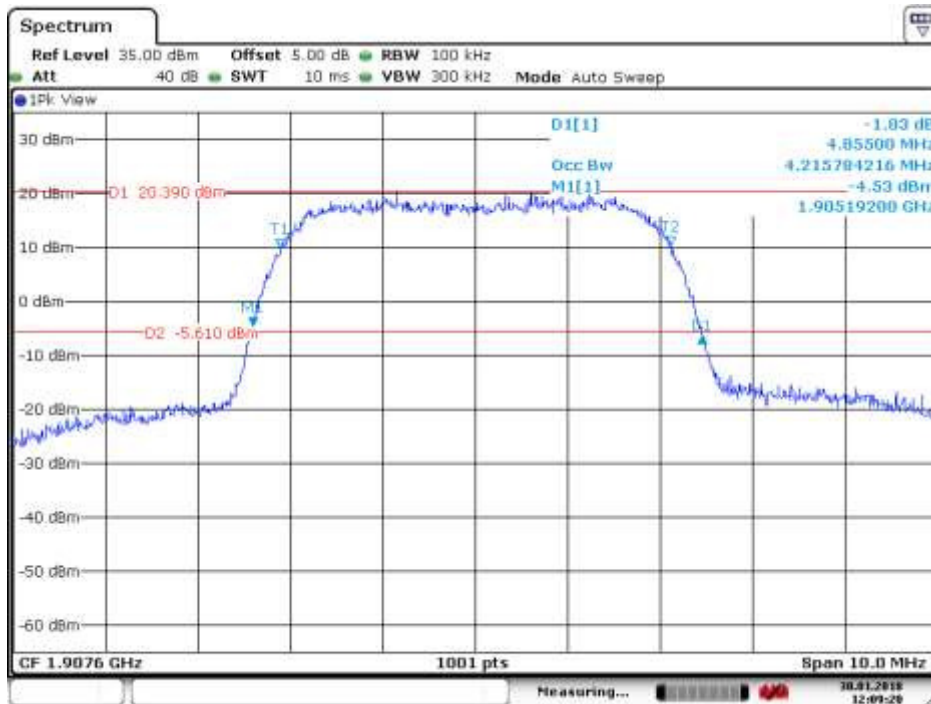


4.1.1.1.2 Test Channel = MCH



Date: 30 JAN 2018 12:08:28

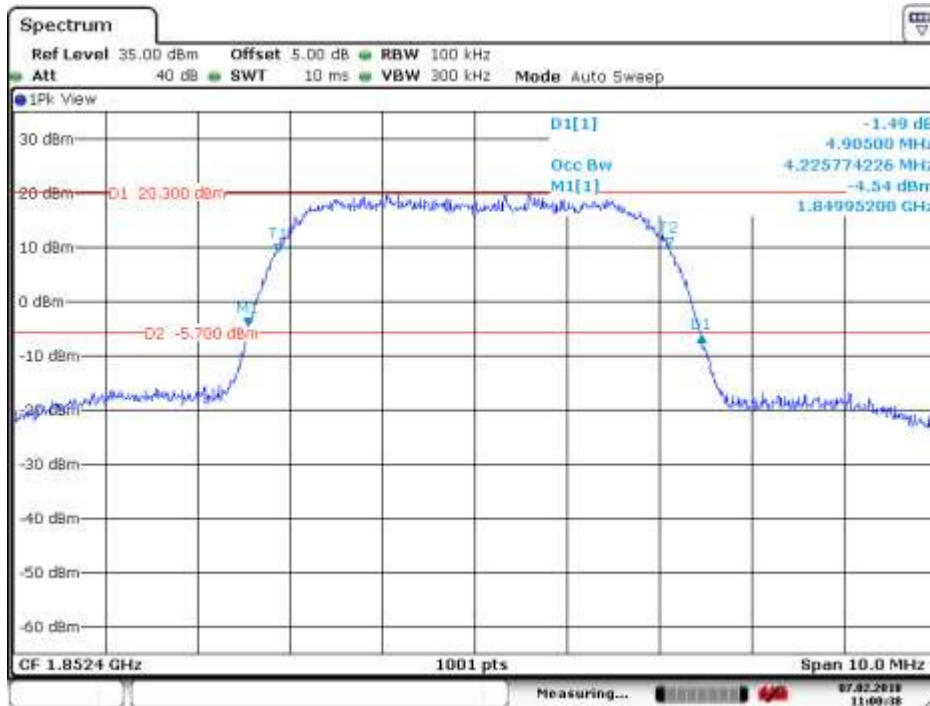
4.1.1.1.3 Test Channel = HCH



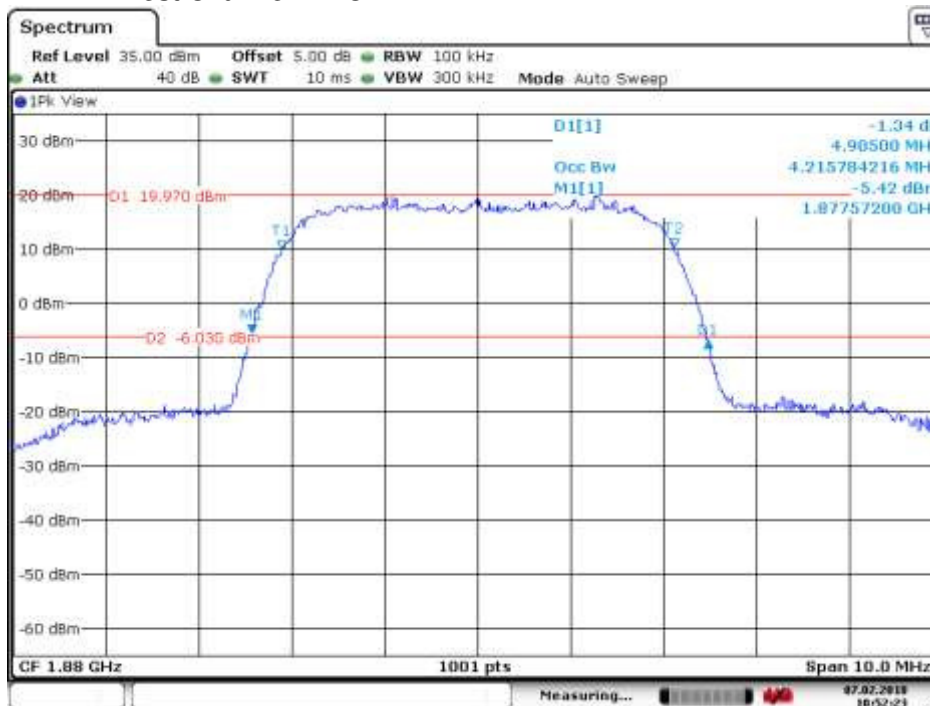
Date: 30 JAN 2018 12:09:20

**4.1.1.2 Test Mode = UMTS/TM2**

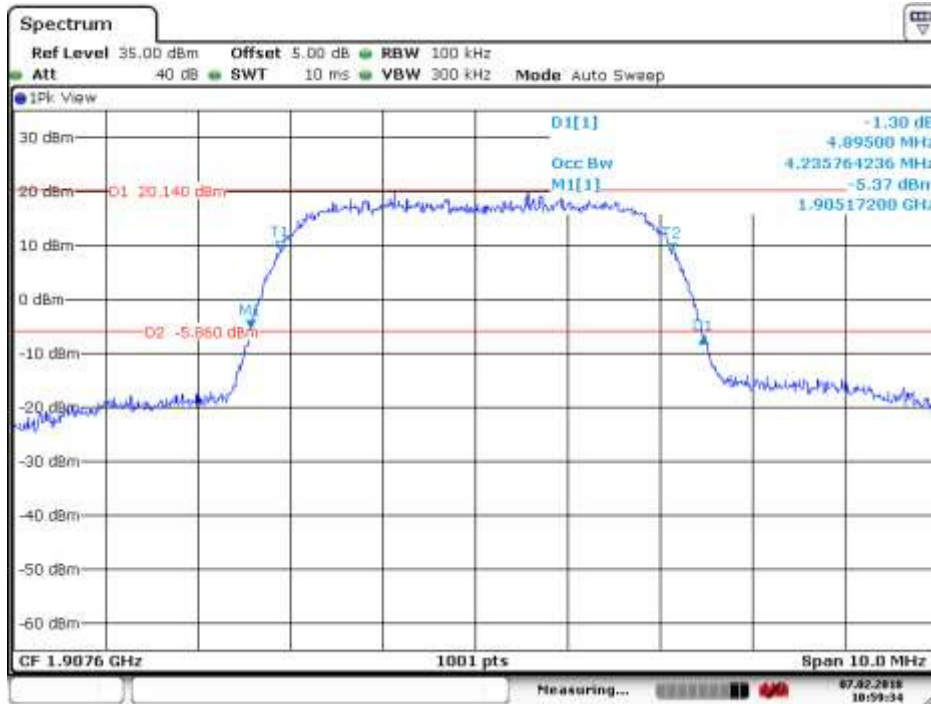
**4.1.1.2.1 Test Channel = LCH**



**4.1.1.2.2 Test Channel = MCH**



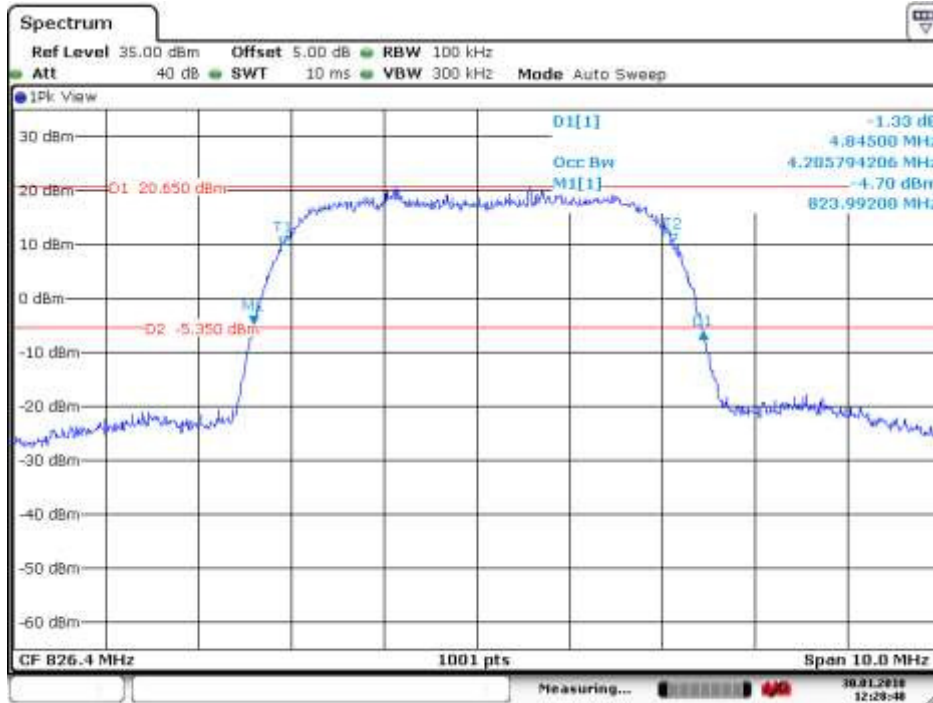
4.1.1.2.3 Test Channel = HCH



### 4.1.2 Test Band = WCDMA 850

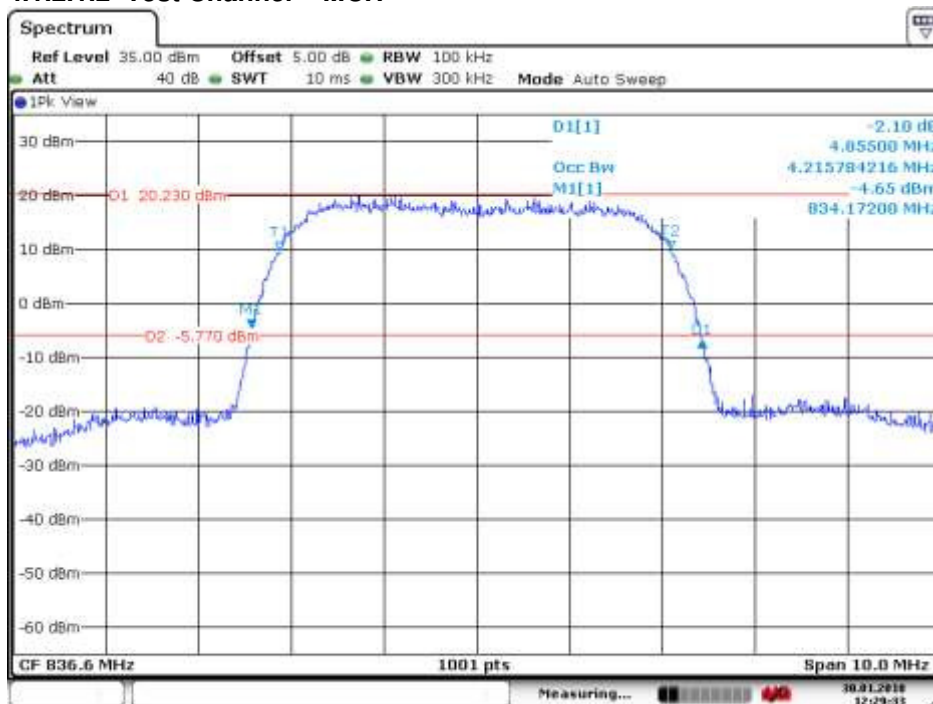
#### 4.1.2.1 Test Mode = UMTS/TM1

##### 4.1.2.1.1 Test Channel = LCH



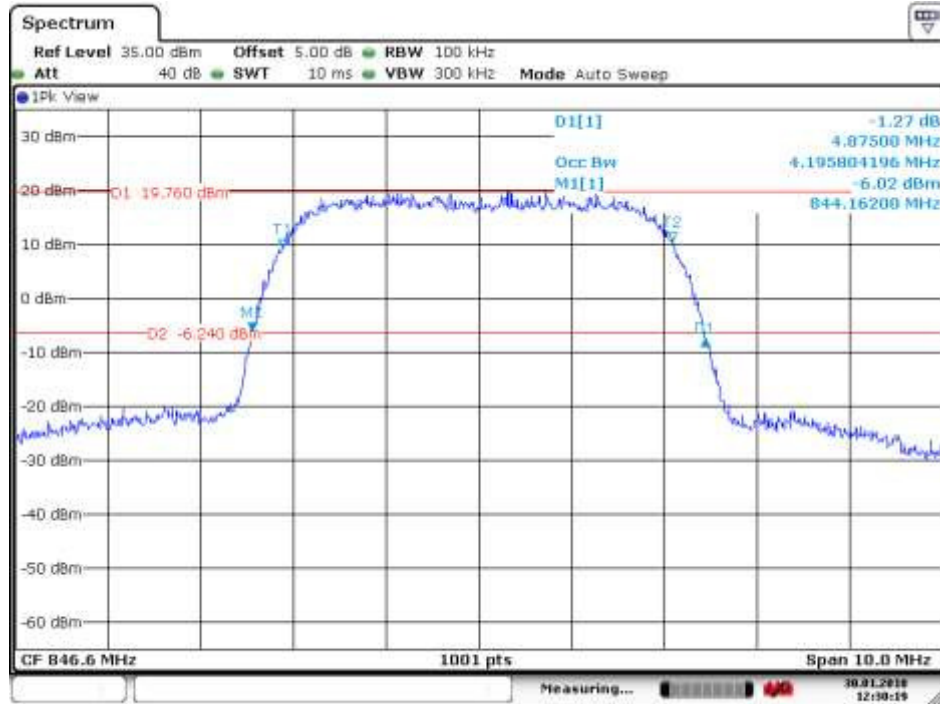
Date: 30.JAN.2018 12:28:48

##### 4.1.2.1.2 Test Channel = MCH



Date: 30.JAN.2018 12:29:33

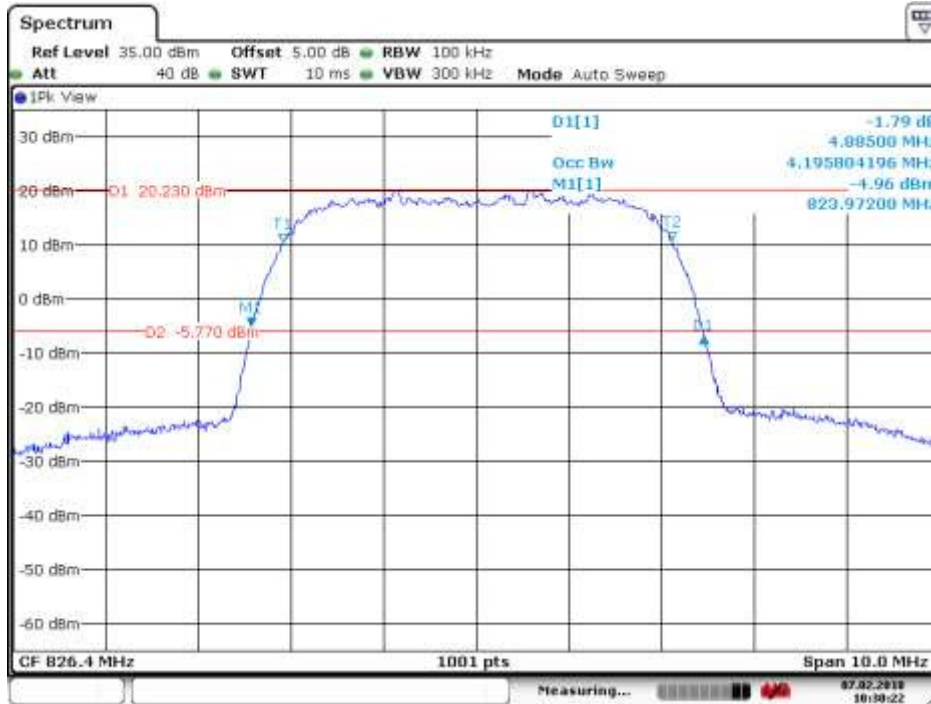
**4.1.2.1.3 Test Channel = HCH**



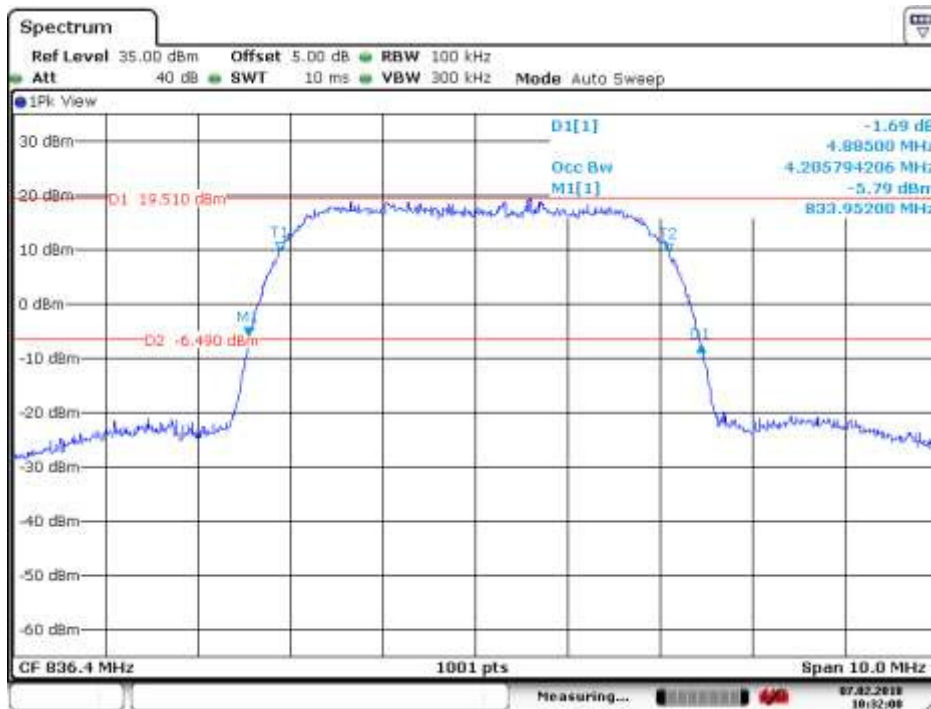
Date: 30.JAN.2018 12:30:19

**4.1.2.2 Test Mode = UMTS/TM2**

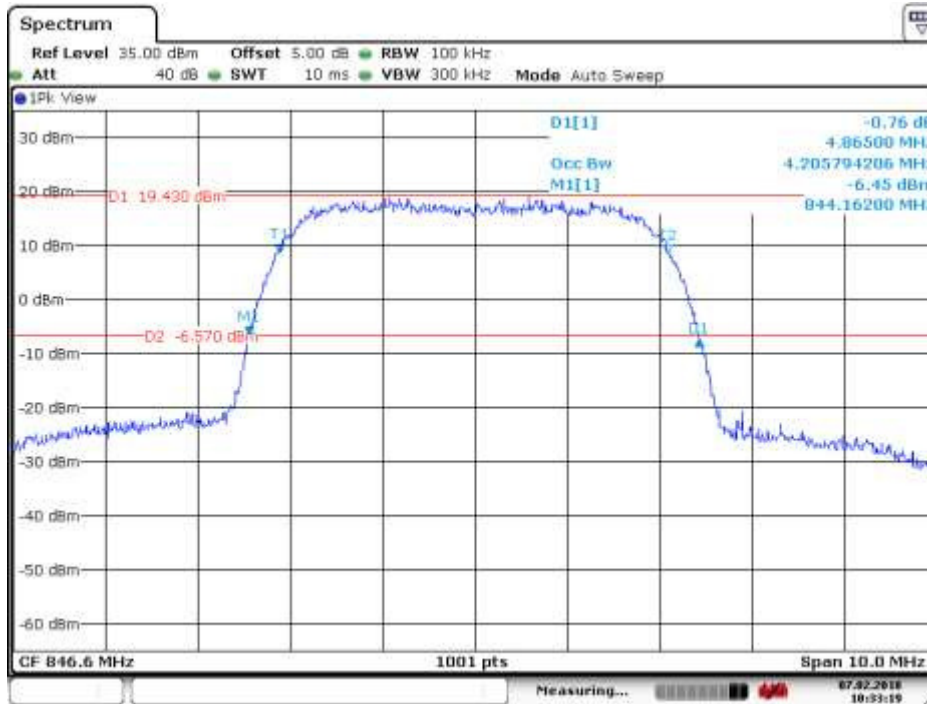
**4.1.2.2.1 Test Channel = LCH**



**4.1.2.2.2 Test Channel = MCH**



4.1.2.2.3 Test Channel = HCH



## 5 Band Edges Compliance

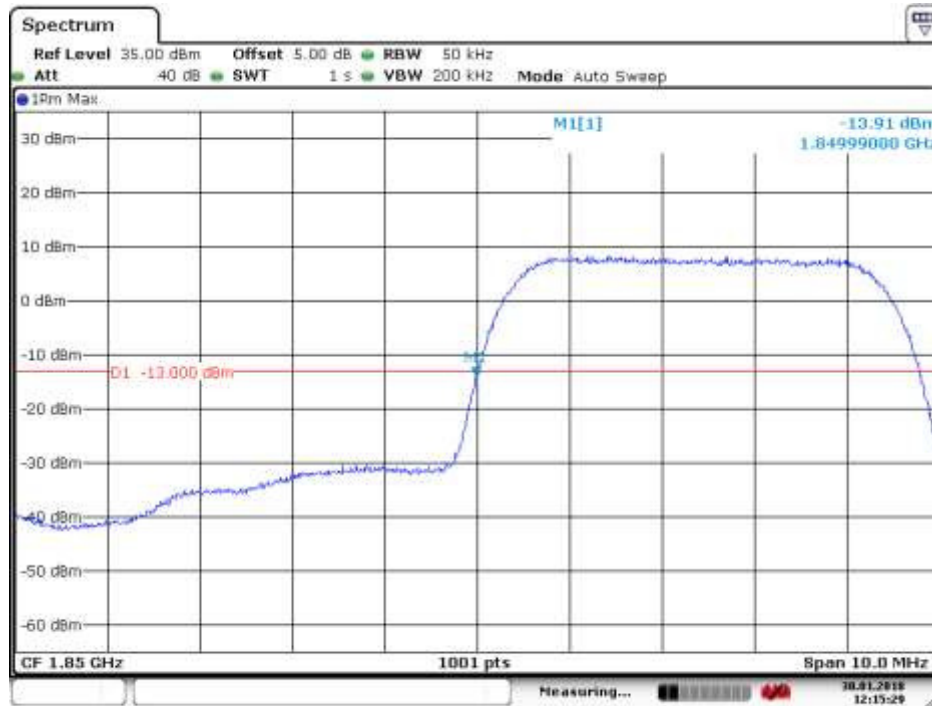
Part I - Test Plots

### 5.1 For WCDMA

#### 5.1.1 Test Band = WCDMA 1900

##### 5.1.1.1 Test Mode = UMTS/TM1

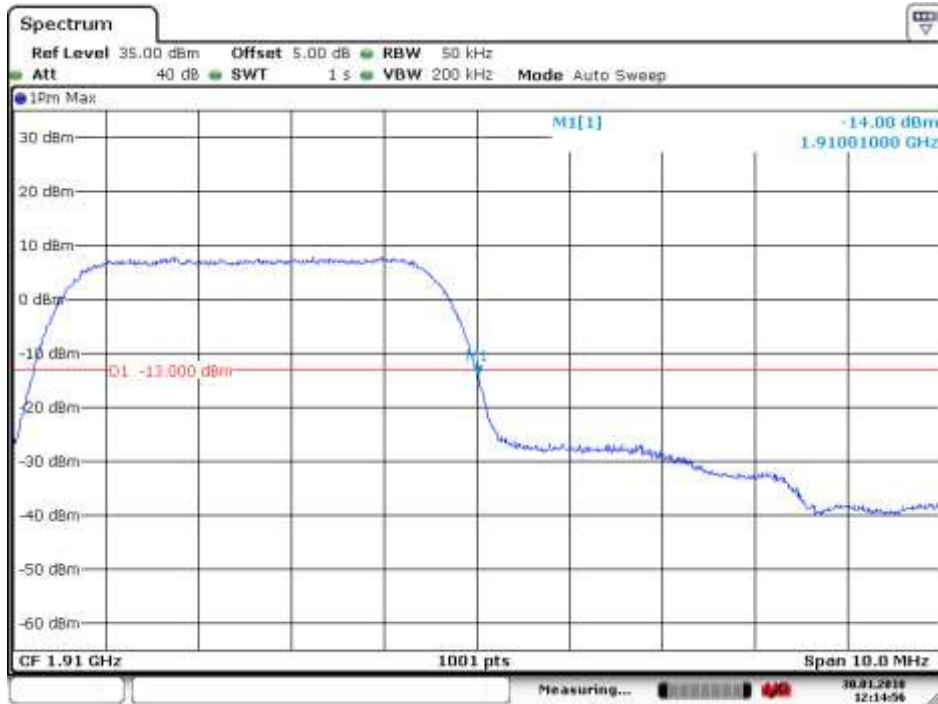
##### 5.1.1.1.1 Test Channel = LCH



Date: 30. JAN 2018 12:15:29



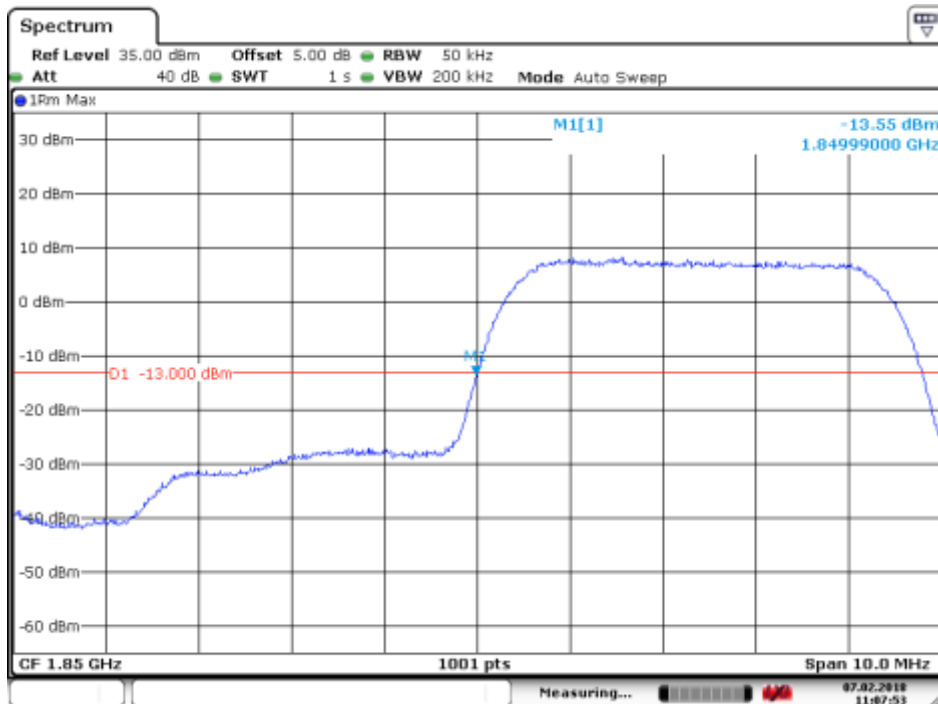
**5.1.1.1.2 Test Channel = HCH**



Date: 30.JAN 2018 12:14:56

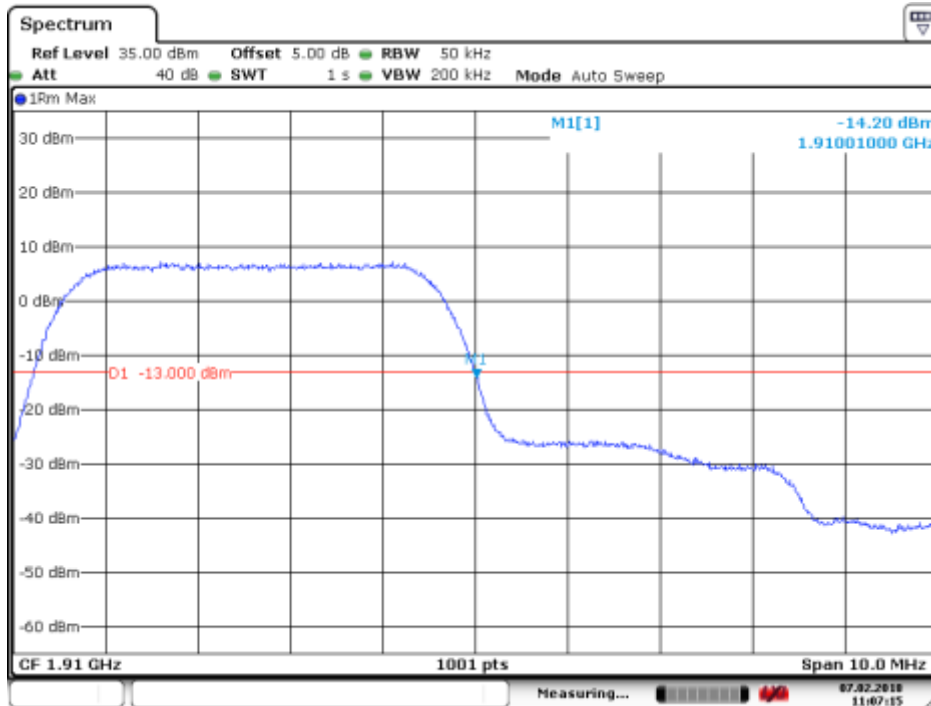
**5.1.1.2 Test Mode = UMTS/TM2**

**5.1.1.2.1 Test Channel = LCH**





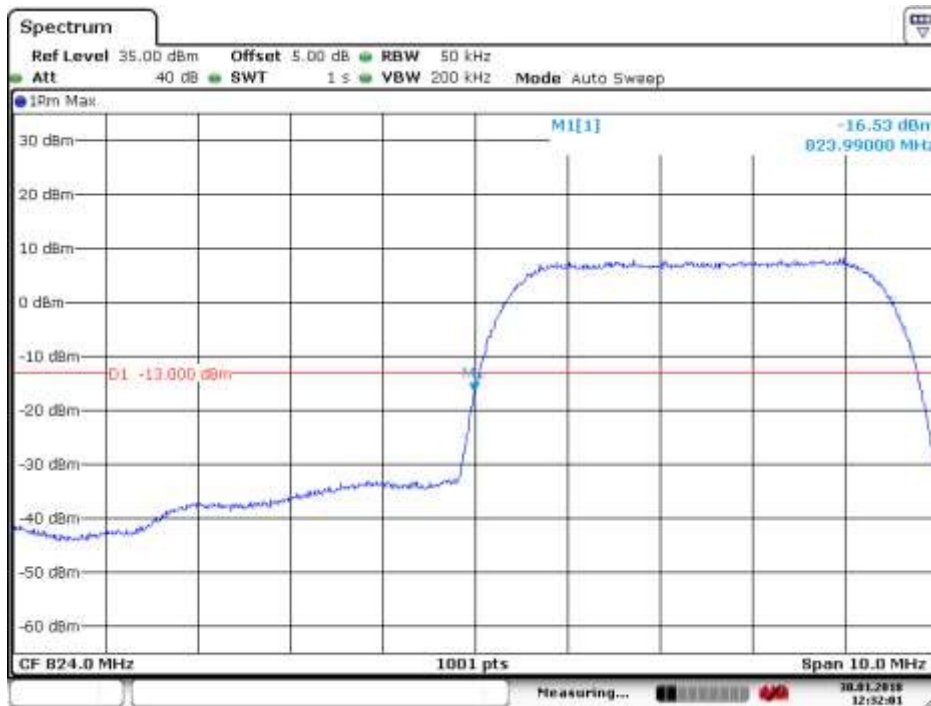
### 5.1.1.2.2 Test Channel = HCH



### 5.1.2 est Band = WCDMA 850

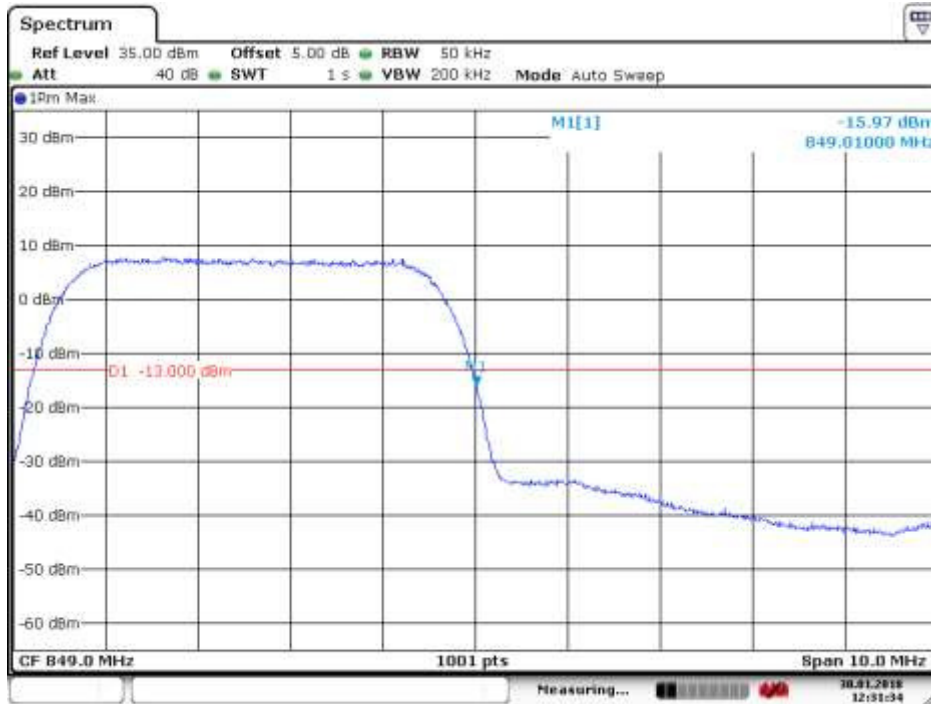
#### 5.1.2.1 Test Mode = UMTS/TM1

##### 5.1.2.1.1 Test Channel = LCH



Date: 30.JAN.2018 12:32:01

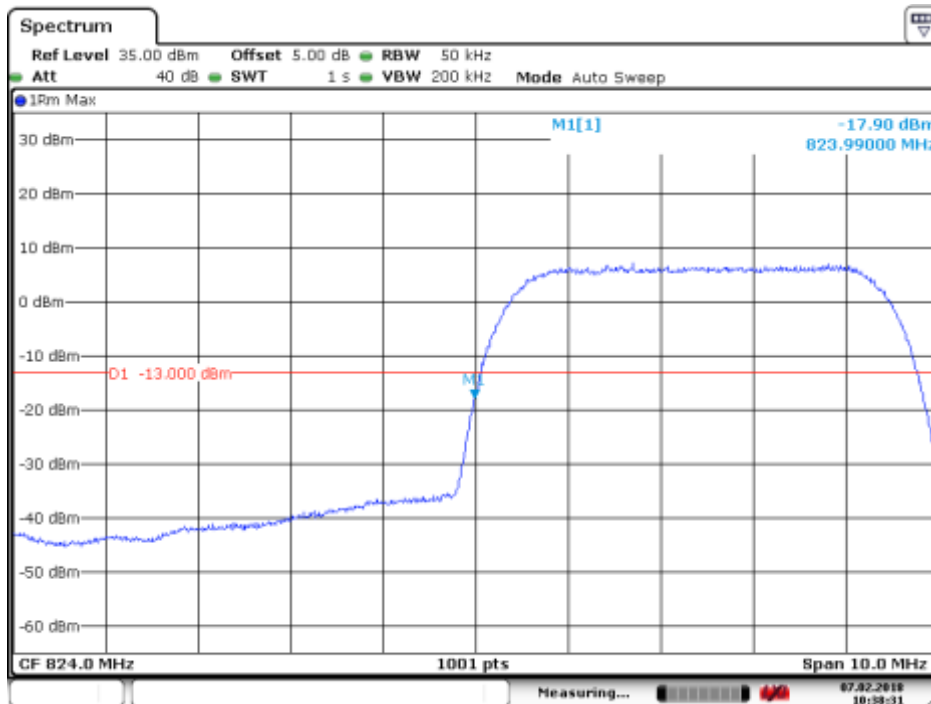
**5.1.2.1.2 Test Channel = HCH**



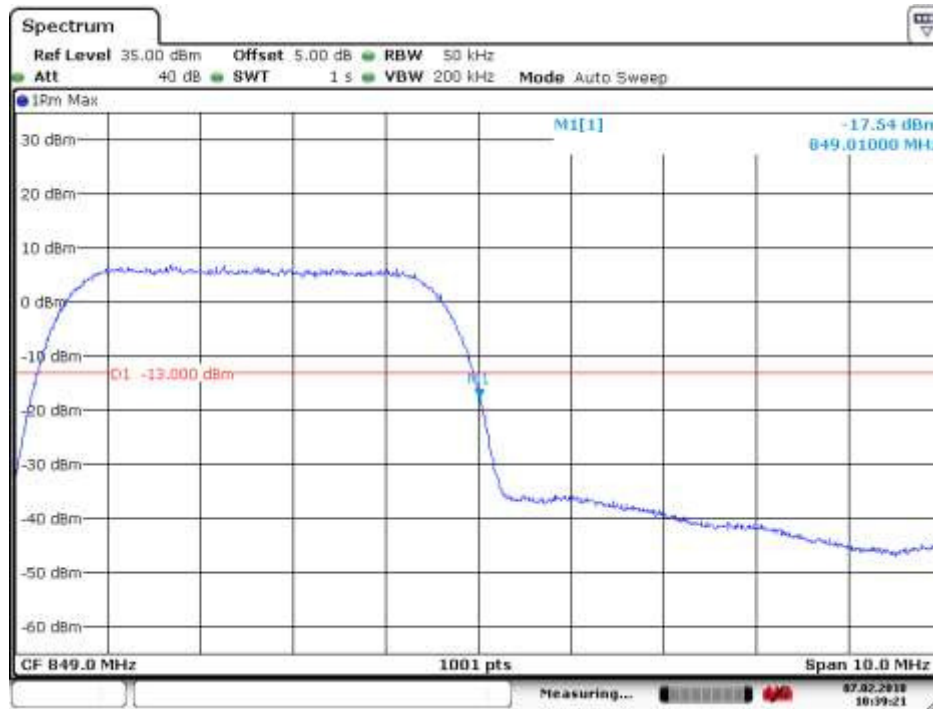
Date: 30. JAN 2018 12:31:35

**5.1.2.2 Test Mode = UMTS/TM2**

**5.1.2.2.1 Test Channel = LCH**



**5.1.2.2.2 Test Channel = HCH**



## 6 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.

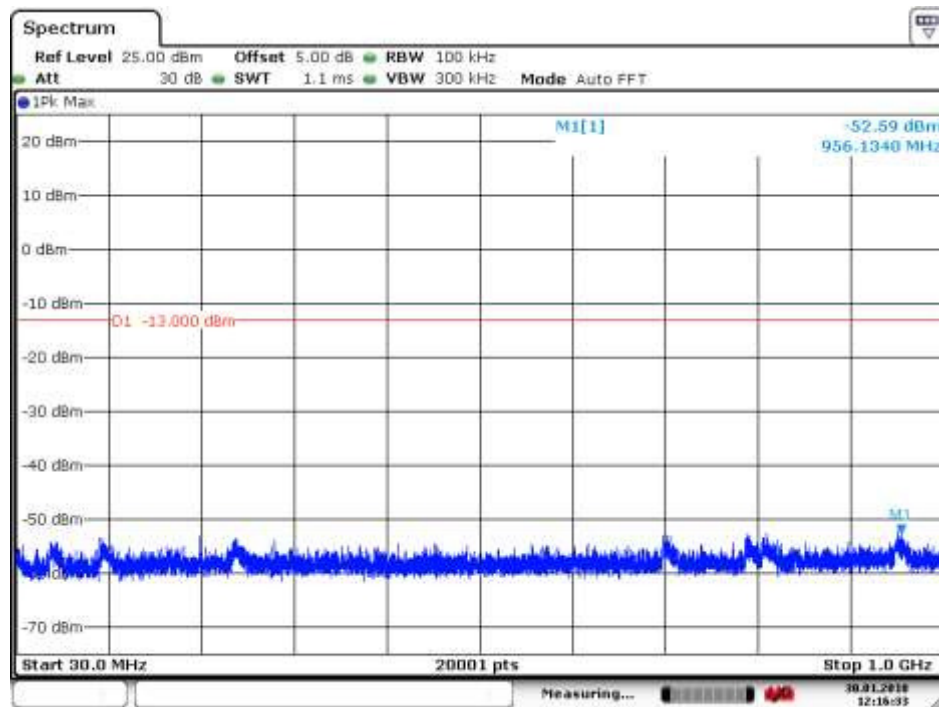
Part I - Test Plots

### 6.1 For WCDMA

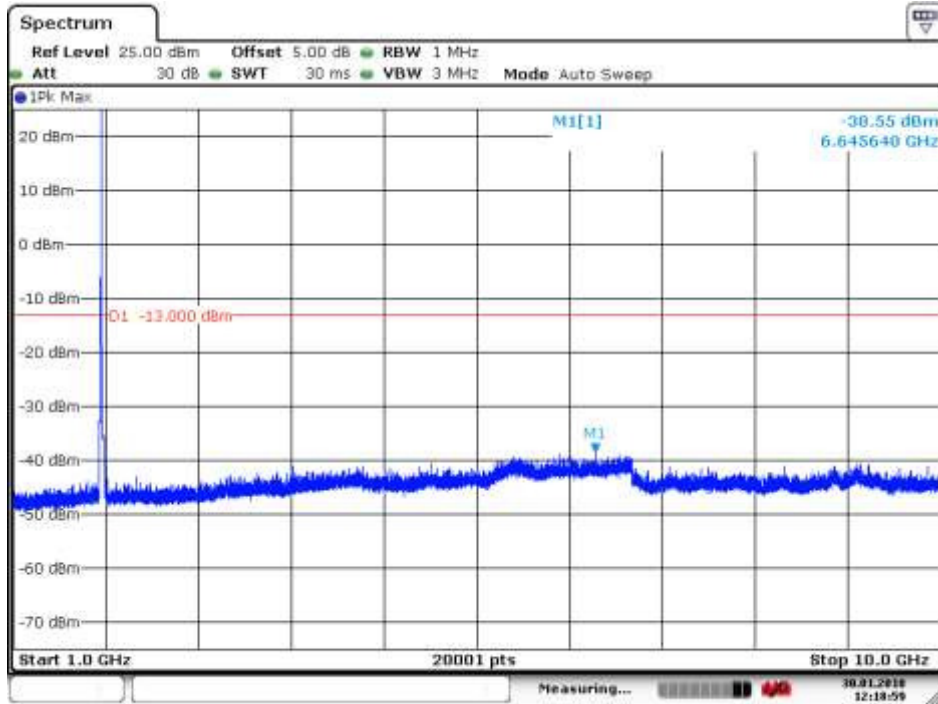
#### 6.1.1 Test Band = WCDMA 1900

##### 6.1.1.1 Test Mode = UMTS/TM1

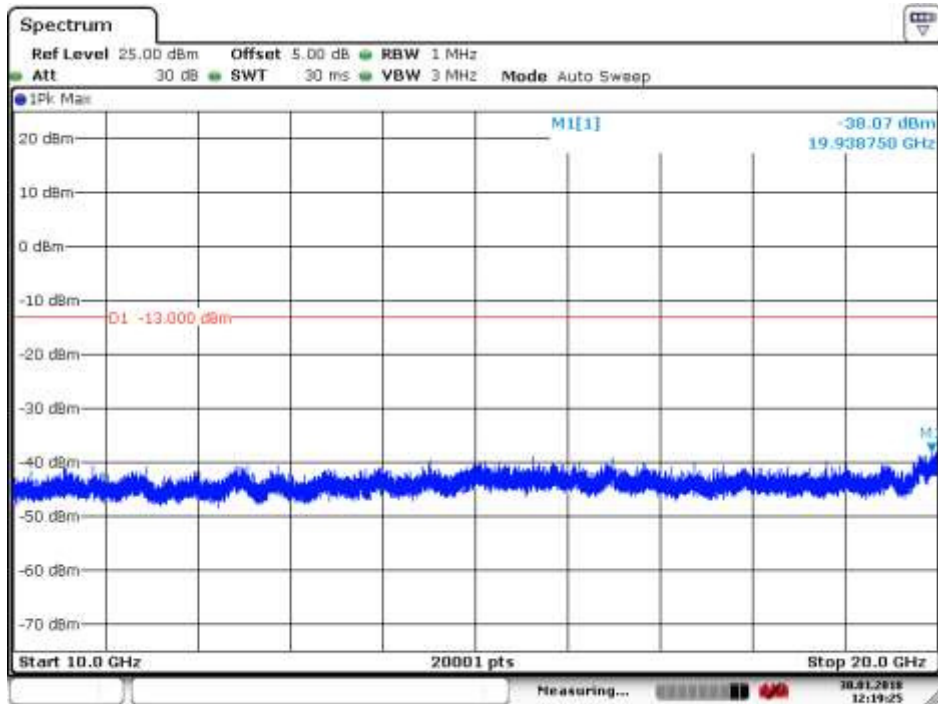
##### 6.1.1.1.1 Test Channel = LCH



Date: 30.JAN 2018 12:18:33



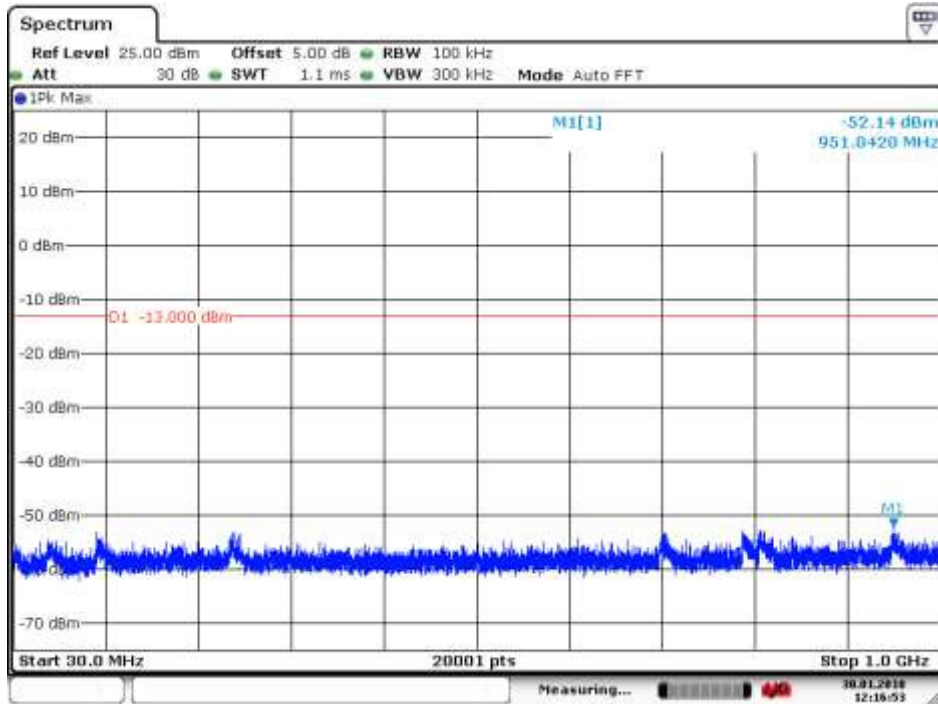
Date: 30 JAN 2018 12:18:59



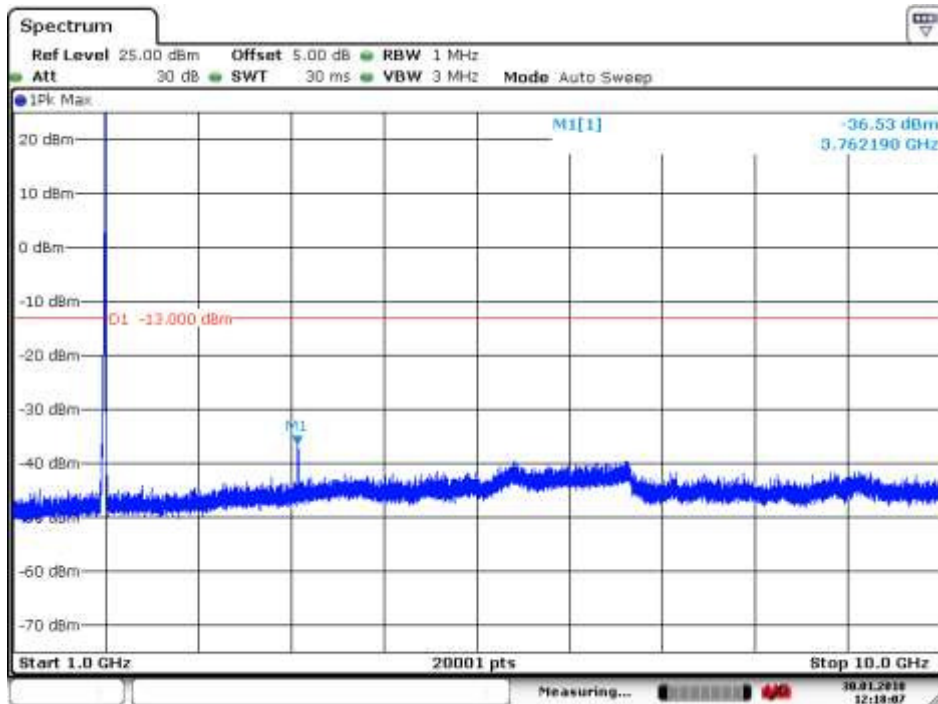
Date: 30 JAN 2018 12:19:25



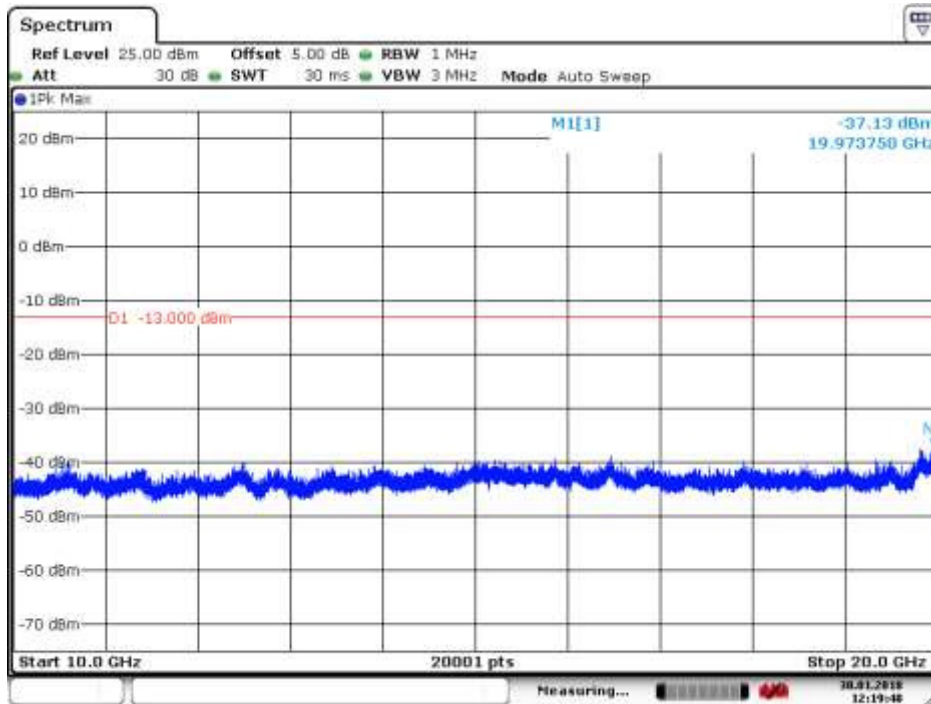
6.1.1.1.2 Test Channel = MCH



Date: 30.JAN.2018 12:16:53

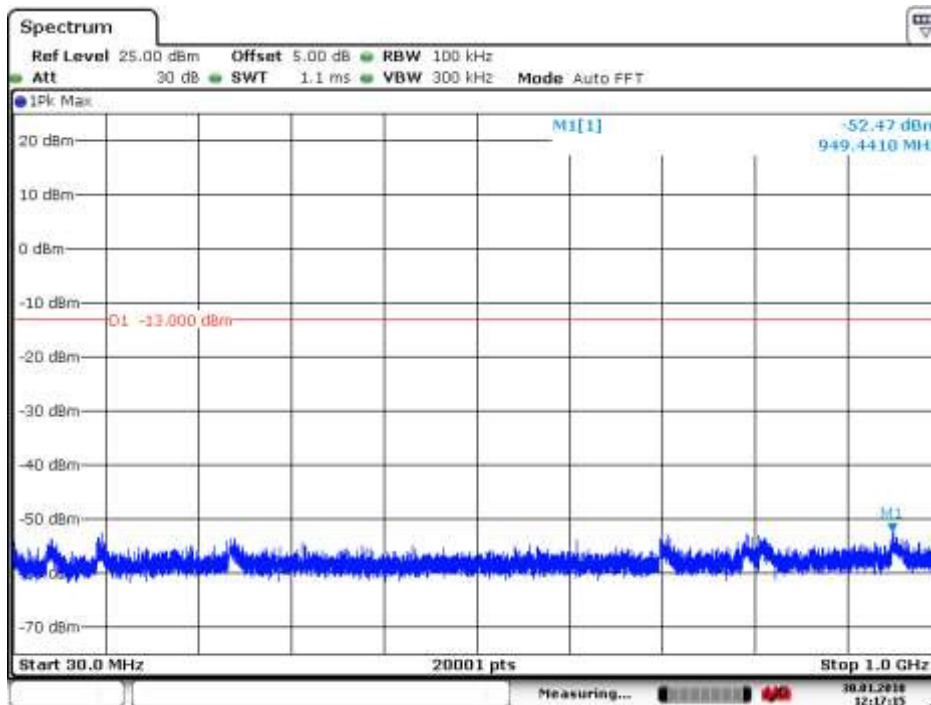


Date: 30.JAN.2018 12:18:08



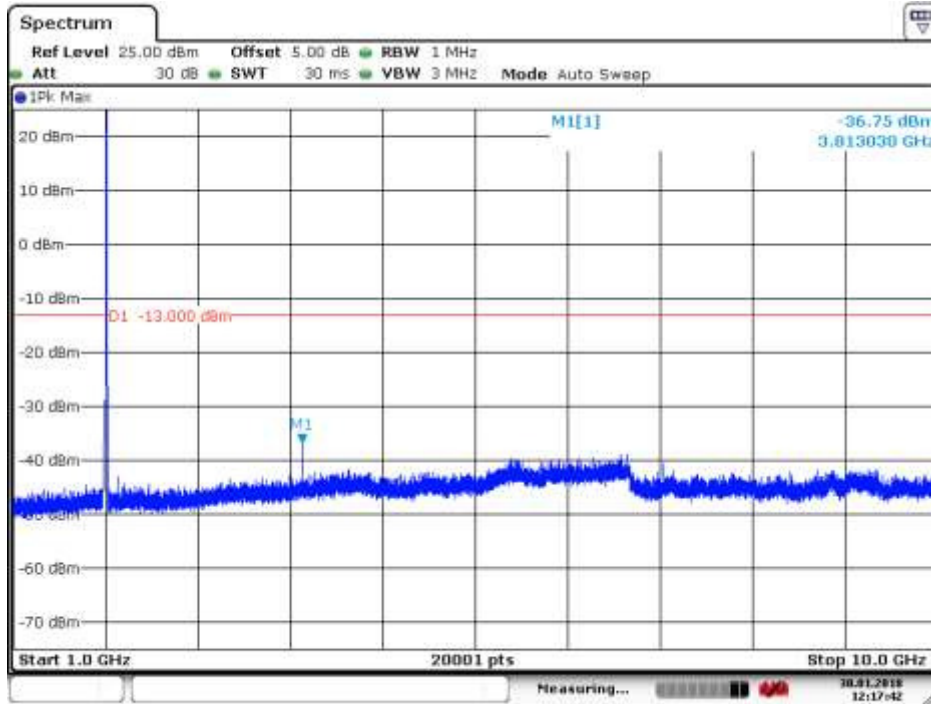
Date: 30.JAN.2018 12:19:48

### 6.1.1.1.3 Test Channel = HCH

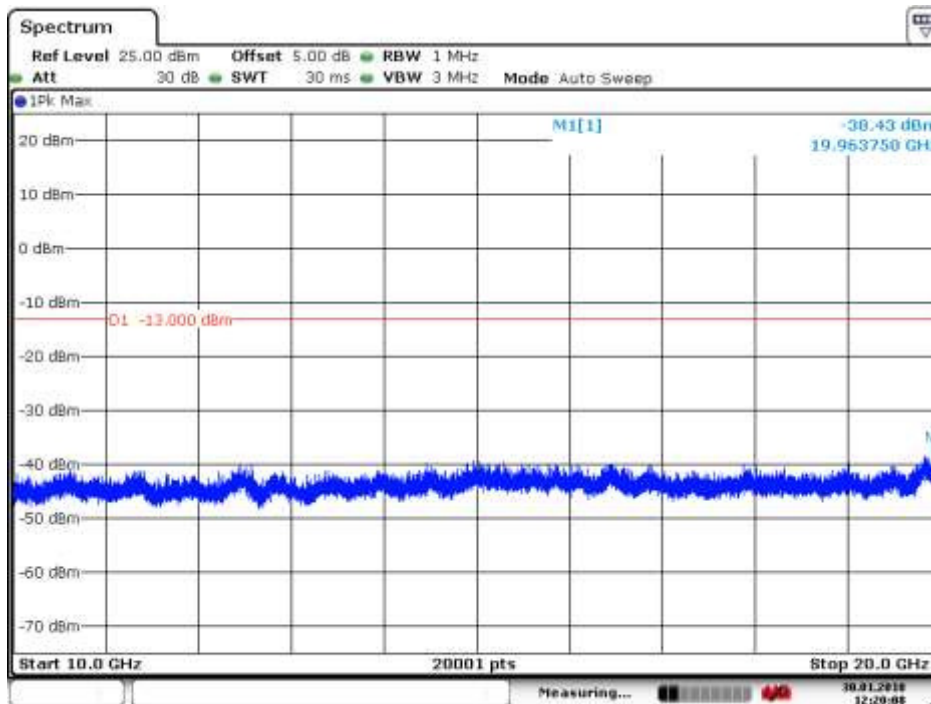


Date: 30.JAN.2018 12:17:15





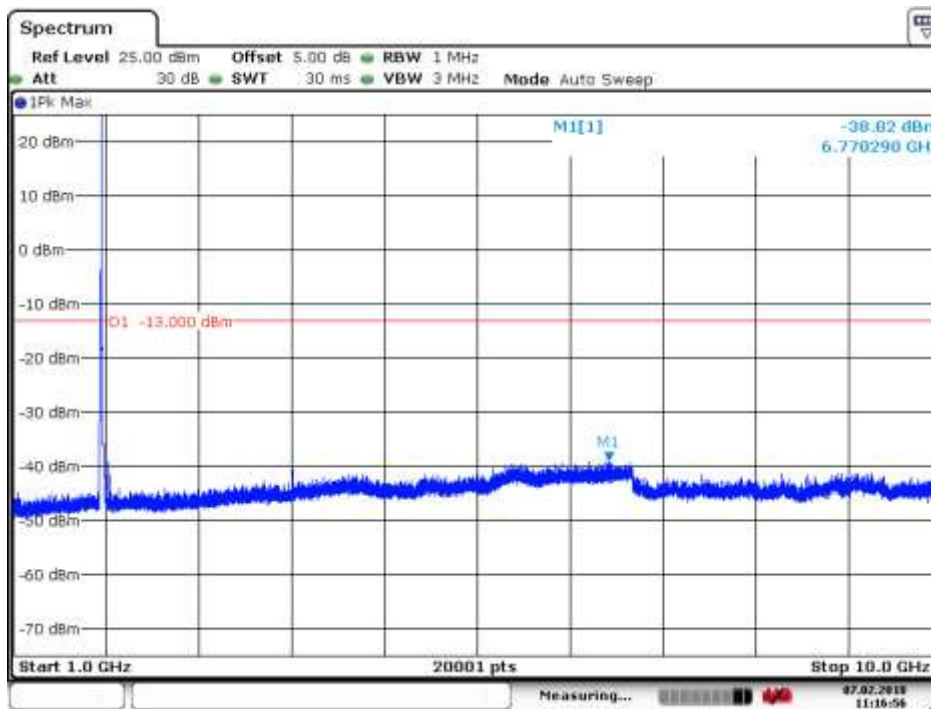
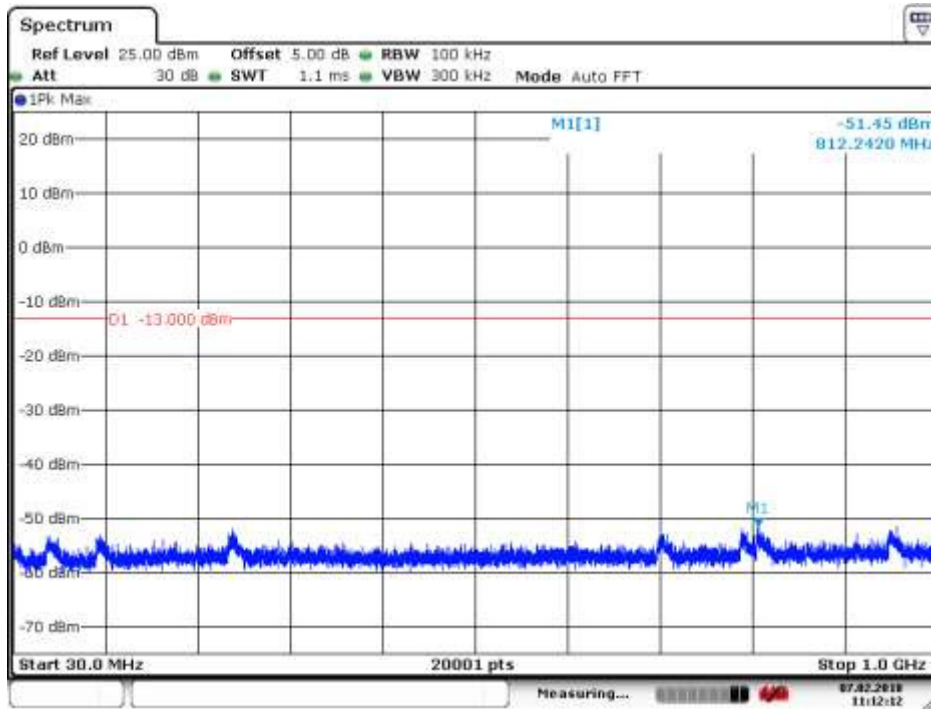
Date: 30 JAN 2018 12:17:42

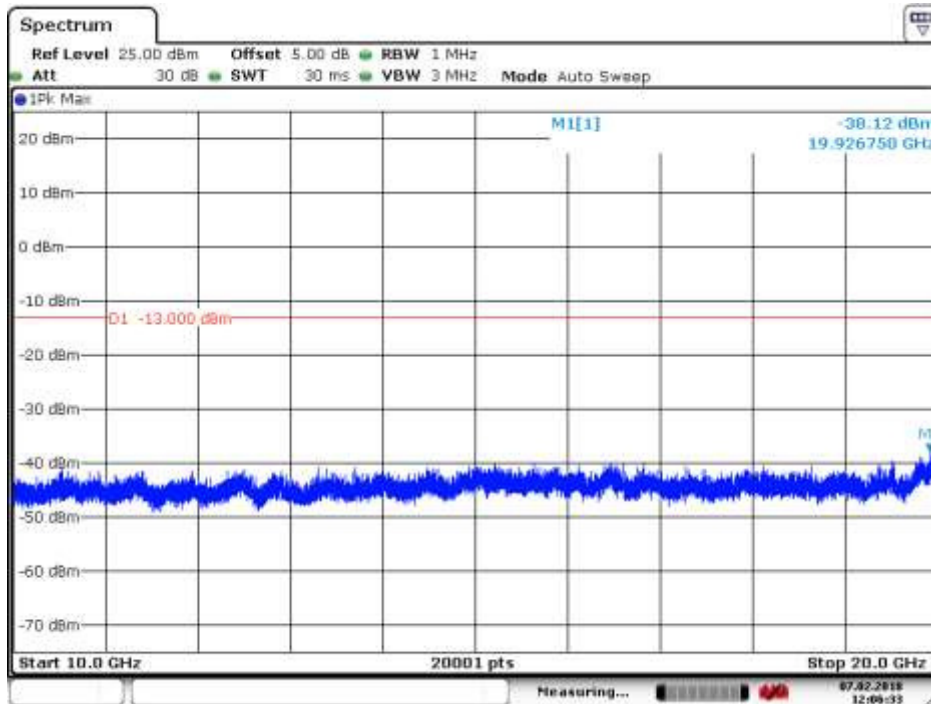


Date: 30 JAN 2018 12:20:08

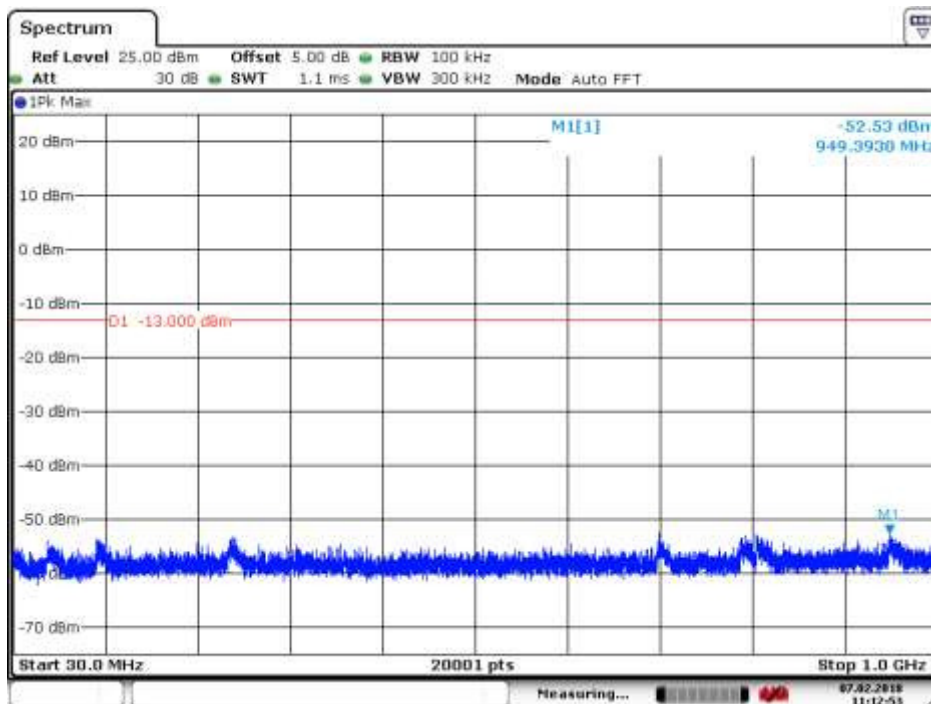
**6.1.1.2 Test Mode = UMTS/TM2**

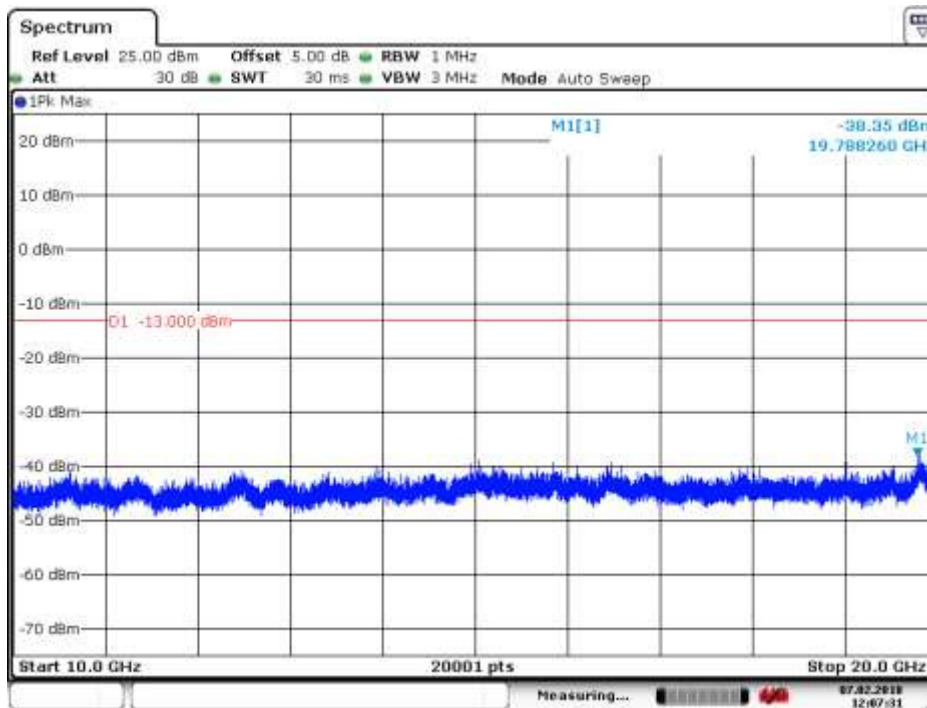
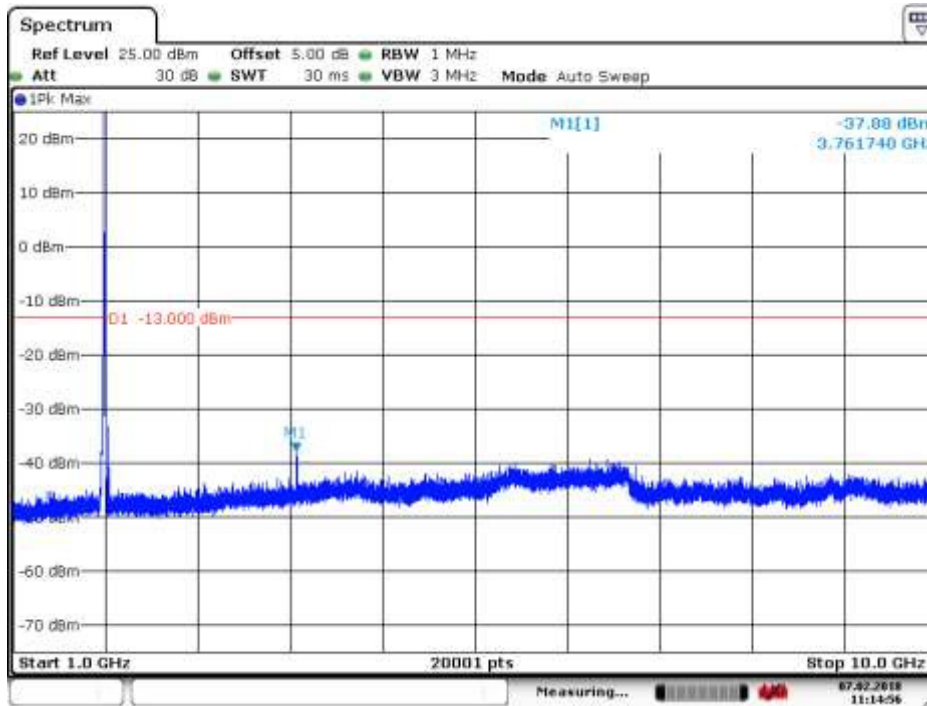
**6.1.1.2.1 Test Channel = LCH**



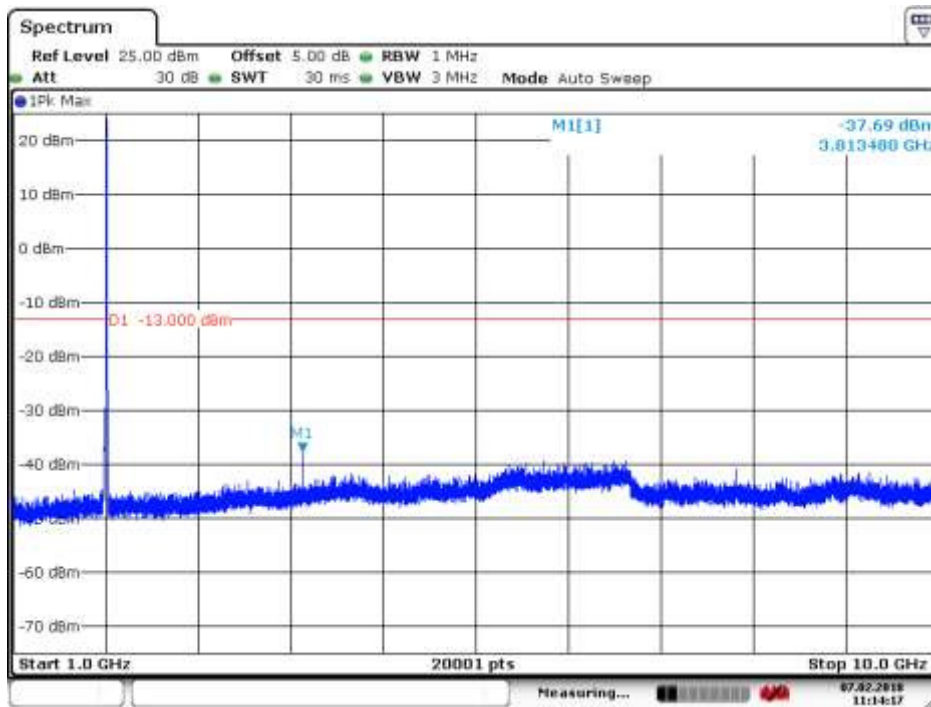
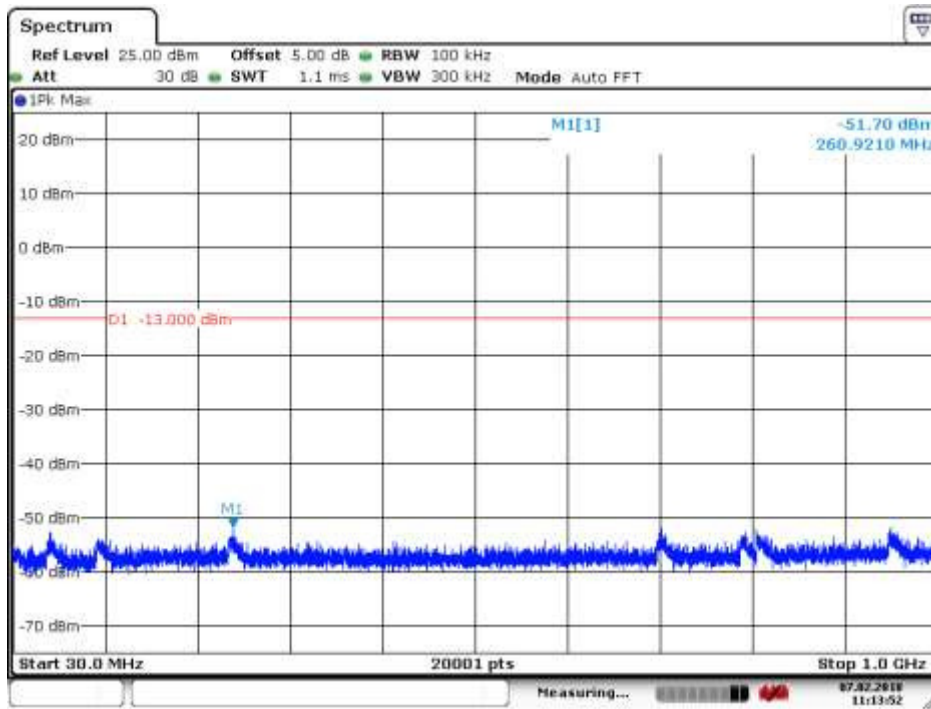


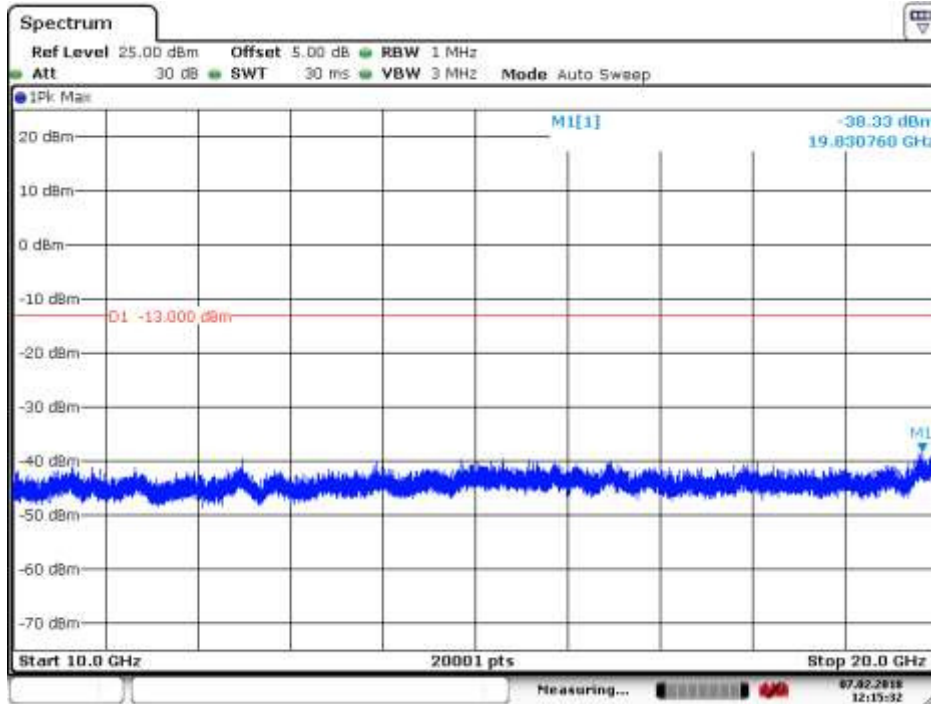
#### 6.1.1.2.2 Test Channel = MCH





**6.1.1.2.3 Test Channel = HCH**

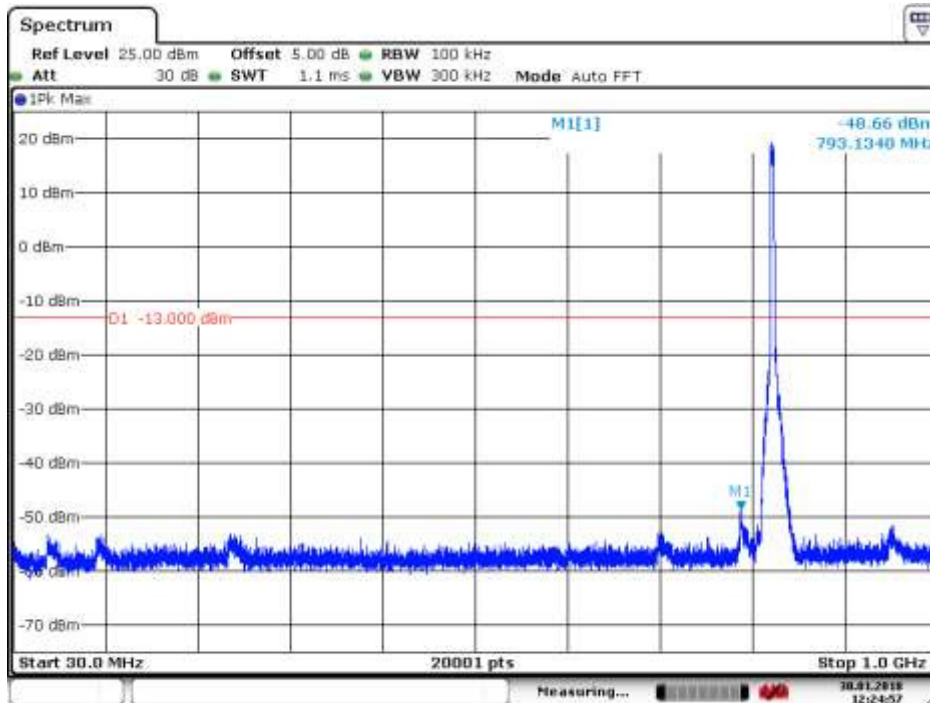




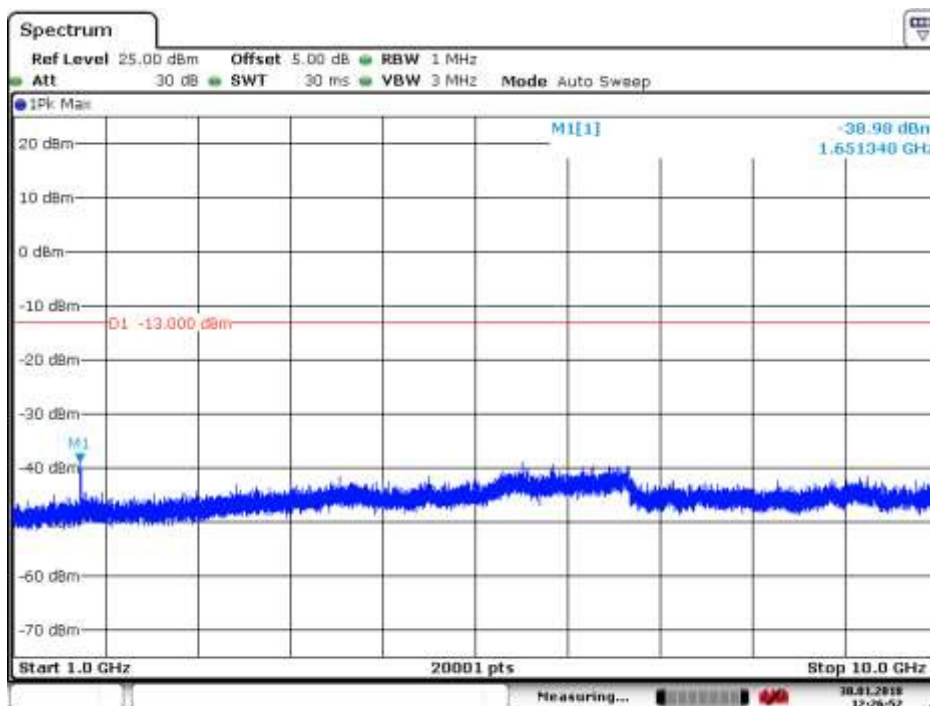
### 6.1.2 Test Band = WCDMA 850

#### 6.1.2.1 Test Mode = UMTS/TM1

##### 6.1.2.1.1 Test Channel = LCH



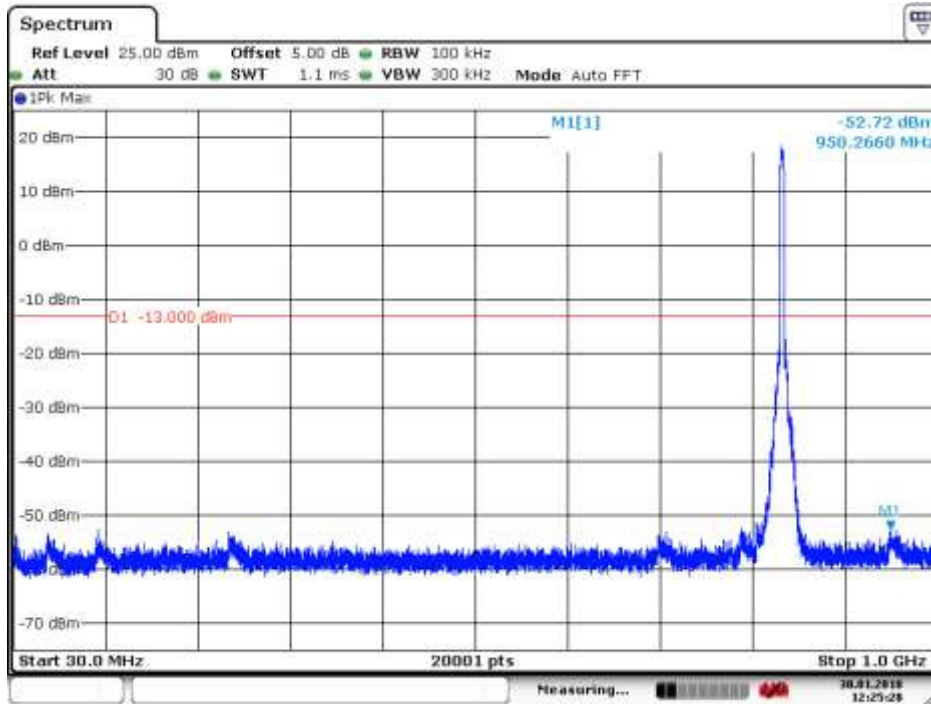
Date: 30. JAN 2018 12:24:57



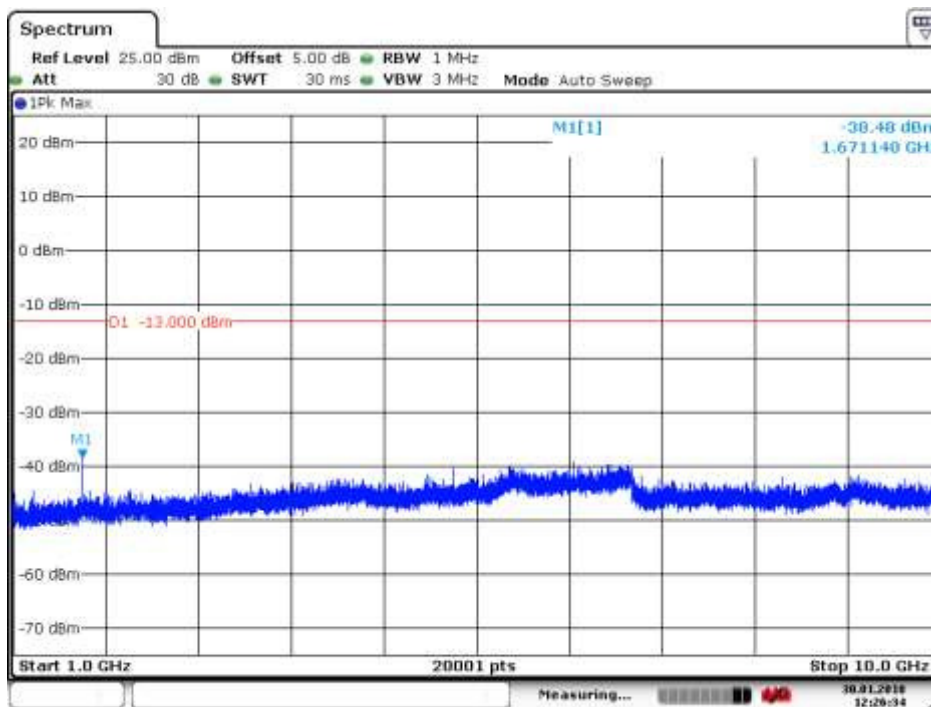
Date: 30. JAN 2018 12:26:53



6.1.2.1.2 Test Channel = MCH



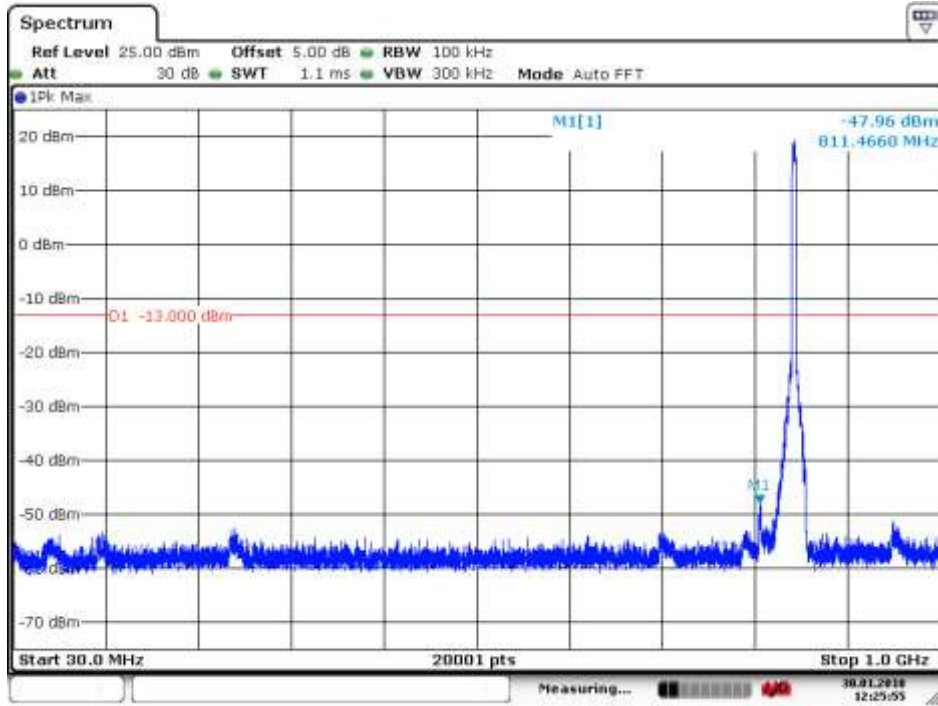
Date: 30.JAN.2018 12:25:28



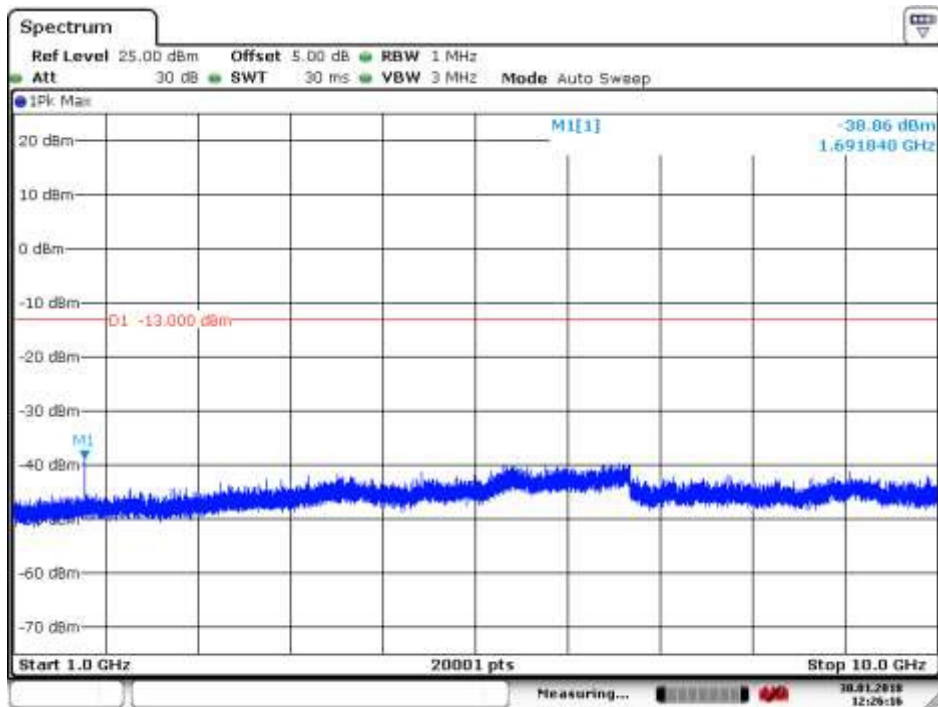
Date: 30.JAN.2018 12:26:35



**6.1.2.1.3 Test Channel = HCH**



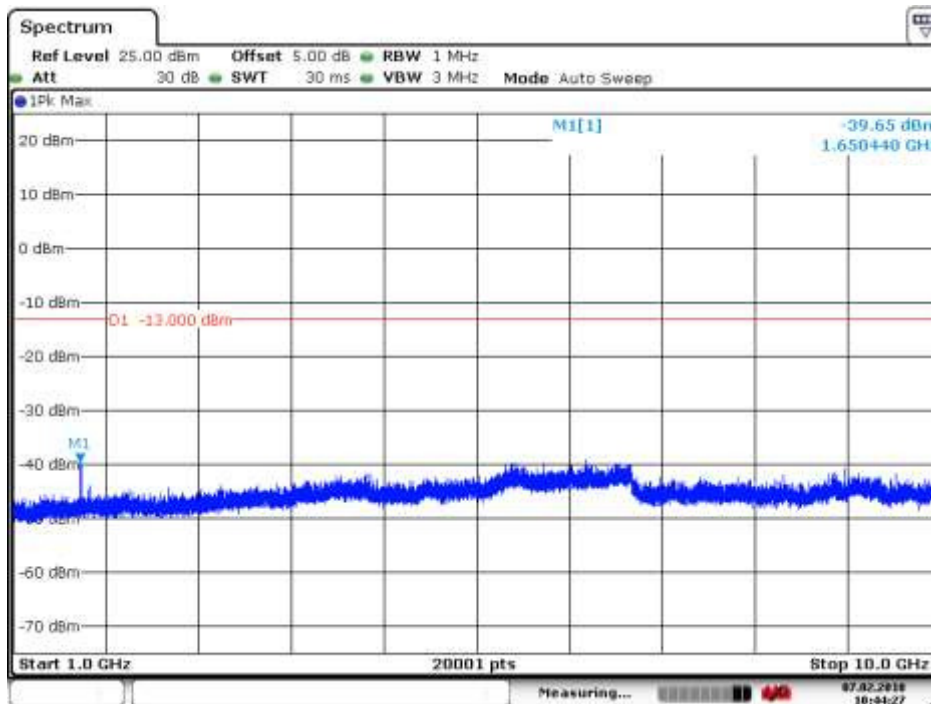
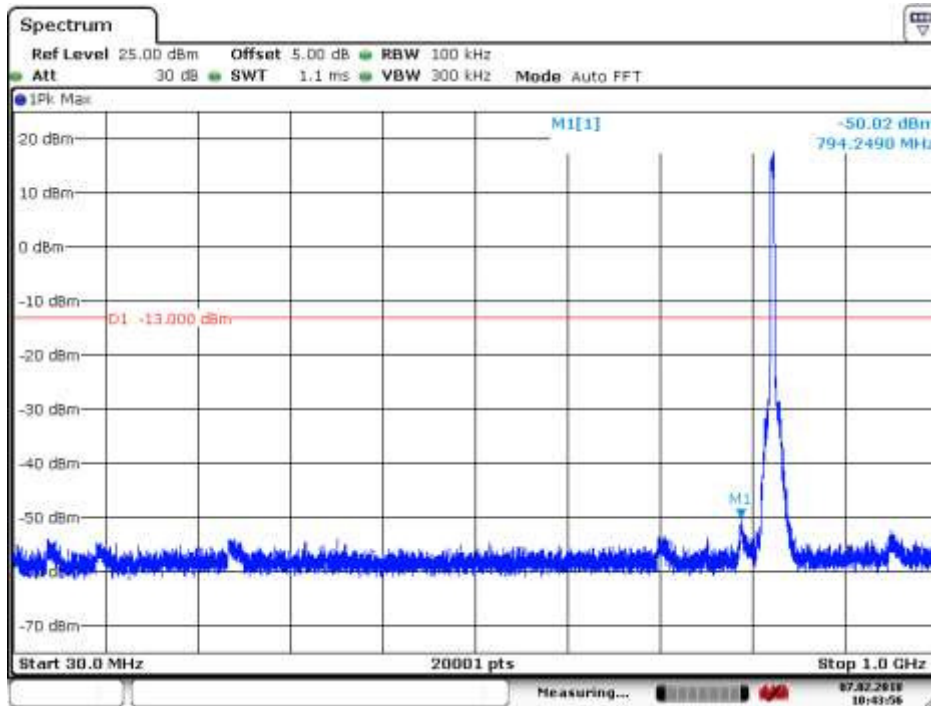
Date: 30.JAN.2018 12:25:55



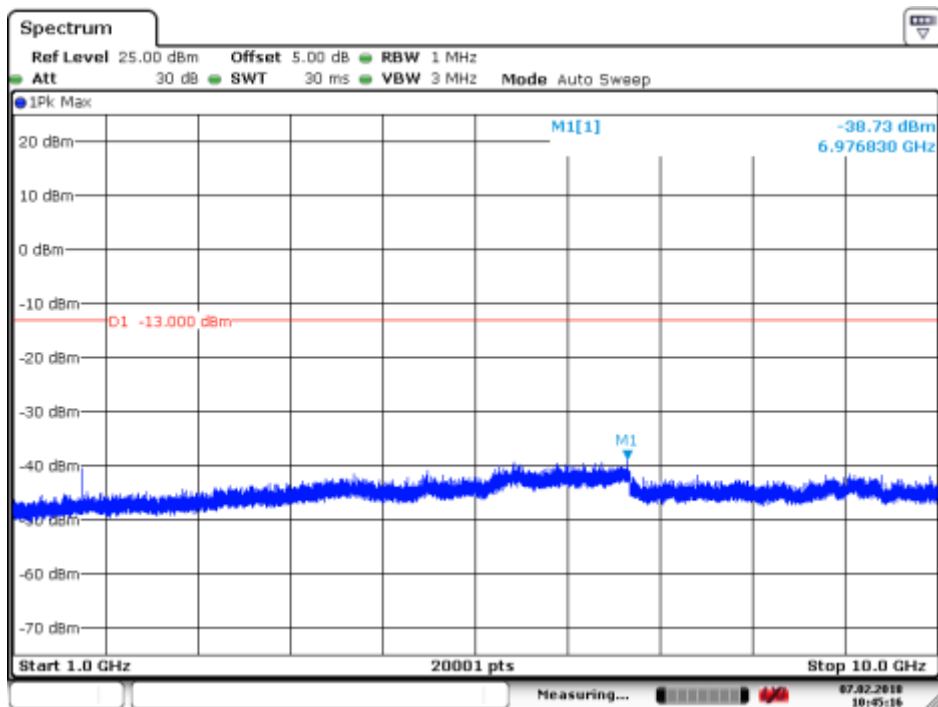
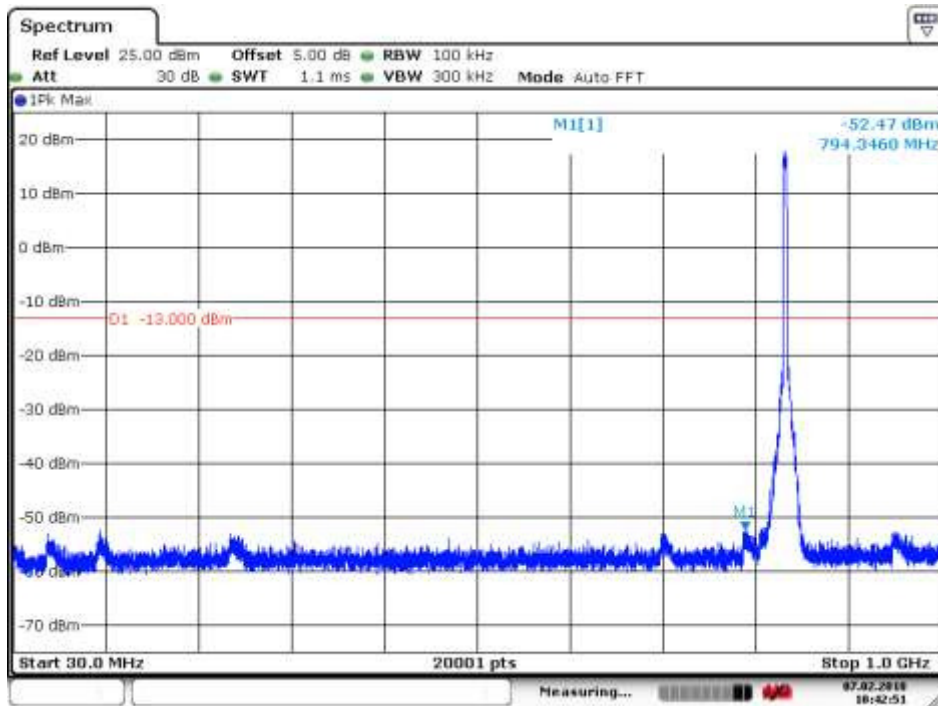
Date: 30.JAN.2018 12:26:17

**6.1.2.2 Test Mode = UMTS/TM2**

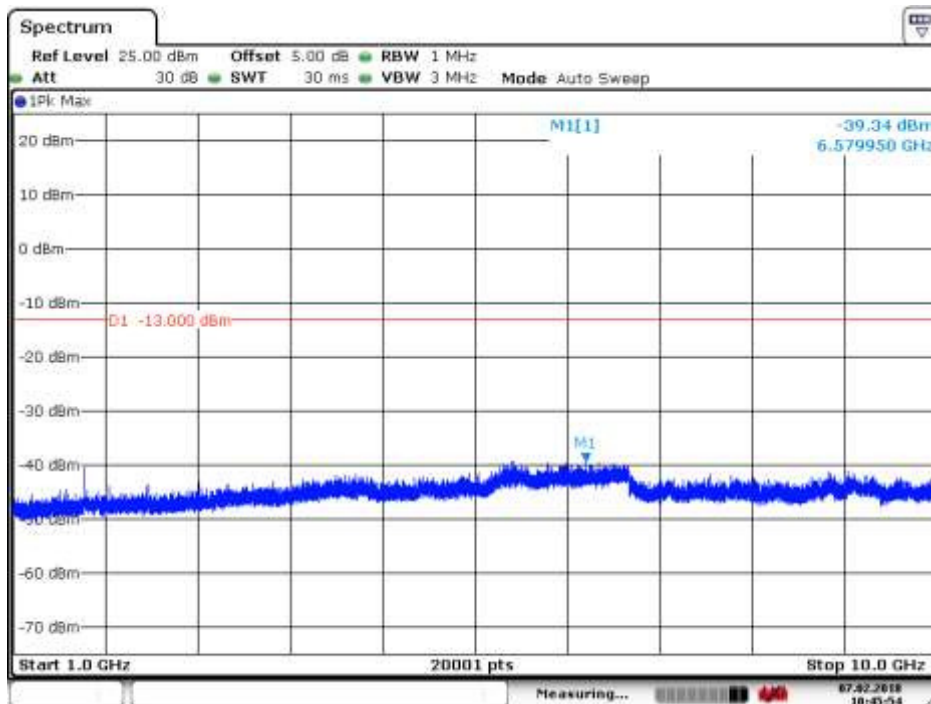
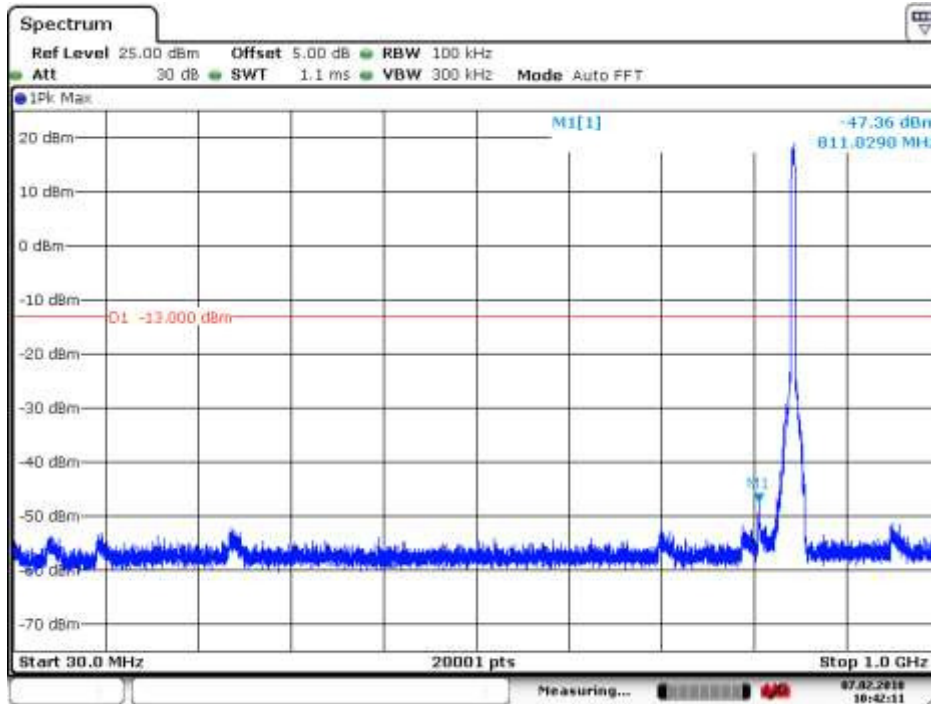
**6.1.2.2.1 Test Channel = LCH**



**6.1.2.2.2 Test Channel = MCH**



6.1.2.2.3 Test Channel = HCH





## 7 Field Strength of Spurious Radiation

### Part I - Test Plots

#### 7.1 For WCDMA

##### 7.1.1 Test Band = WCDMA 1900

###### 7.1.1.1 Test Mode = UMTS/TM1

###### 7.1.1.1.1 Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1281.500	-48.93	-13.00	35.93	Vertical
2789.500	-43.78	-13.00	30.78	Vertical
7086.713	-51.82	-13.00	38.82	Vertical
1525.000	-48.69	-13.00	35.69	Horizontal
2672.500	-44.96	-13.00	31.96	Horizontal
8000.288	-50.83	-13.00	37.83	Horizontal

###### 7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1633.000	-47.50	-13.00	34.50	Vertical
2608.500	-44.70	-13.00	31.70	Vertical
6291.113	-51.86	-13.00	38.86	Vertical
1652.000	-47.59	-13.00	34.59	Horizontal
2773.500	-44.30	-13.00	31.30	Horizontal
7808.700	-51.89	-13.00	38.89	Horizontal

###### 7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1671.500	-47.09	-13.00	34.09	Vertical
2613.500	-45.71	-13.00	32.71	Vertical
9264.375	-50.85	-13.00	37.85	Vertical
2648.000	-45.46	-13.00	32.46	Horizontal
6531.938	-51.73	-13.00	38.73	Horizontal
7949.588	-51.49	-13.00	38.49	Horizontal



## 7.1.2 Test Band = WCDMAband 850

### 7.1.2.1 Test Mode = UMTS/TM1

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1710.500	-46.87	-13.00	33.87	Vertical
2426.500	-43.78	-13.00	30.78	Vertical
7992.000	-51.47	-13.00	38.47	Vertical
1591.000	-48.34	-13.00	35.34	Horizontal
2584.000	-44.93	-13.00	31.93	Horizontal
8653.538	-51.32	-13.00	38.32	Horizontal

### 7.1.2.1.1 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
2678.000	-44.09	-13.00	31.09	Vertical
6055.163	-51.78	-13.00	38.78	Vertical
9242.438	-50.93	-13.00	37.93	Vertical
1365.000	-50.88	-13.00	37.88	Horizontal
1708.000	-46.49	-13.00	33.49	Horizontal
2426.000	-44.88	-13.00	31.88	Horizontal

### 7.1.2.1.2 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1754.000	-47.50	-13.00	34.50	Vertical
2661.000	-44.21	-13.00	31.21	Vertical
8097.300	-51.82	-13.00	38.82	Vertical
1534.500000	-48.37	-13.00	35.37	Horizontal
7881.337500	-51.45	-13.00	38.45	Horizontal
9619.275000	-51.18	-13.00	38.18	Horizontal

#### NOTE:

- 1) The disturbance above 10GHz and below 1GHz was very low, and the above harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.



## 8 Frequency Stability

### 8.1 Frequency Error VS. Voltage

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 1900	UMTS/TM1	LCH	TN	VL	2.53	0.00137	PASS
				VN	-0.32	-0.00017	PASS
				VH	0.42	0.00023	PASS
		MCH	TN	VL	1.81	0.00096	PASS
				VN	0.76	0.00040	PASS
				VH	-1.39	-0.00074	PASS
		HCH	TN	VL	1.66	0.00087	PASS
				VN	-2.68	-0.00140	PASS
				VH	-4.33	-0.00227	PASS
	UMTS/TM2	LCH	TN	VL	-5.53	-0.00299	PASS
				VN	-6.24	-0.00337	PASS
				VH	-3.48	-0.00188	PASS
		MCH	TN	VL	-5.23	-0.00278	PASS
				VN	-2.12	-0.00113	PASS
				VH	-6.24	-0.00332	PASS
		HCH	TN	VL	1.33	0.00070	PASS
				VN	-4.73	-0.00248	PASS
				VH	-6.11	-0.00320	PASS



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Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 850	UMTS/TM1	LCH	TN	VL	-3.34	-0.00404	PASS
				VN	-0.42	-0.00051	PASS
				VH	2.38	0.00288	PASS
		MCH	TN	VL	-3.83	-0.00458	PASS
				VN	0.39	0.00047	PASS
				VH	-2.46	-0.00294	PASS
		HCH	TN	VL	1.78	0.00210	PASS
				VN	-4.63	-0.00547	PASS
				VH	2.88	0.00340	PASS
	UMTS/TM2	LCH	TN	VL	-4.63	-0.00560	PASS
				VN	-5.35	-0.00647	PASS
				VH	-2.09	-0.00253	PASS
		MCH	TN	VL	-4.38	-0.00524	PASS
				VN	-1.69	-0.00202	PASS
				VH	-5.72	-0.00684	PASS
		HCH	TN	VL	2.31	0.00273	PASS
				VN	-3.18	-0.00376	PASS
				VH	-4.23	-0.00500	PASS





## 8.2 Frequency Error VS. Temperature

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 1900	UMTS/TM1	LCH	VN	-30	-4.73	-0.00255	PASS
				-20	1.65	0.00089	PASS
				-10	0.17	0.00009	PASS
				0	-2.48	-0.00134	PASS
				10	0.26	0.00014	PASS
				20	-4.90	-0.00265	PASS
				30	1.60	0.00086	PASS
				40	-0.44	-0.00024	PASS
				50	-6.21	-0.00335	PASS
		MCH	VN	-30	-3.00	-0.00160	PASS
				-20	-5.48	-0.00291	PASS
				-10	-0.79	-0.00042	PASS
				0	-3.38	-0.00180	PASS
				10	1.71	0.00091	PASS
				20	2.32	0.00123	PASS
				30	1.51	0.00080	PASS
				40	0.23	0.00012	PASS
				50	-4.85	-0.00258	PASS
		HCH	VN	-30	-0.87	-0.00046	PASS
				-20	3.98	0.00209	PASS
				-10	2.35	0.00123	PASS
				0	-5.12	-0.00268	PASS
				10	1.87	0.00098	PASS
				20	-2.38	-0.00125	PASS
				30	3.84	0.00201	PASS
				40	-0.23	-0.00012	PASS
				50	-4.10	-0.00215	PASS



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 1900	UMTS/TM2	LCH	VN	-30	-2.59	-0.00140	PASS
				-20	1.26	0.00068	PASS
				-10	-4.97	-0.00268	PASS
				0	0.88	0.00048	PASS
				10	-5.35	-0.00289	PASS
				20	-4.11	-0.00222	PASS
				30	-3.96	-0.00214	PASS
				40	-5.31	-0.00287	PASS
				50	-2.74	-0.00148	PASS
		MCH	VN	-30	-1.98	-0.00105	PASS
				-20	1.29	0.00069	PASS
				-10	-4.34	-0.00231	PASS
				0	1.76	0.00094	PASS
				10	-5.40	-0.00287	PASS
				20	-3.33	-0.00177	PASS
				30	-2.13	-0.00113	PASS
				40	-3.08	-0.00164	PASS
				50	-2.50	-0.00133	PASS
		HCH	VN	-30	-3.25	-0.00170	PASS
				-20	-6.14	-0.00322	PASS
				-10	-3.73	-0.00196	PASS
				0	-5.84	-0.00306	PASS
				10	1.07	0.00056	PASS
				20	-2.03	-0.00106	PASS
				30	-3.12	-0.00164	PASS
				40	-2.84	-0.00149	PASS
				50	-4.17	-0.00219	PASS



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 850	UMTS/TM1	LCH	VN	-30	0.24	0.00029	PASS
				-20	4.65	0.00563	PASS
				-10	2.15	0.00260	PASS
				0	-2.97	-0.00359	PASS
				10	5.52	0.00668	PASS
				20	1.34	0.00162	PASS
				30	-5.89	-0.00713	PASS
				40	2.65	0.00321	PASS
				50	3.29	0.00398	PASS
		MCH	VN	-30	1.34	0.00160	PASS
				-20	5.73	0.00685	PASS
				-10	-2.84	-0.00340	PASS
				0	4.28	0.00512	PASS
				10	1.84	0.00220	PASS
				20	2.67	0.00319	PASS
				30	-4.45	-0.00532	PASS
				40	-2.83	-0.00338	PASS
				50	1.29	0.00154	PASS
		HCH	VN	-30	7.94	0.00938	PASS
				-20	3.52	0.00416	PASS
				-10	4.72	0.00558	PASS
				0	-3.90	-0.00461	PASS
				10	2.84	0.00335	PASS
				20	3.37	0.00398	PASS
30	-2.87			-0.00339	PASS		
40	1.36			0.00161	PASS		
50	2.03			0.00240	PASS		



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 850	UMTS/TM2	LCH	VN	-30	-4.23	-0.00512	PASS
				-20	1.38	0.00167	PASS
				-10	0.32	0.00039	PASS
				0	-4.94	-0.00598	PASS
				10	1.45	0.00175	PASS
				20	-3.24	-0.00392	PASS
				30	-5.32	-0.00644	PASS
				40	-1.35	-0.00163	PASS
				50	0.53	0.00064	PASS
		MCH	VN	-30	1.34	0.00160	PASS
				-20	-5.54	-0.00662	PASS
				-10	2.01	0.00240	PASS
				0	3.21	0.00384	PASS
				10	-0.43	-0.00051	PASS
				20	1.65	0.00197	PASS
				30	4.22	0.00504	PASS
				40	-3.08	-0.00368	PASS
				50	2.47	0.00295	PASS
		HCH	VN	-30	3.22	0.00380	PASS
				-20	-4.08	-0.00482	PASS
				-10	2.34	0.00276	PASS
				0	1.77	0.00209	PASS
				10	3.06	0.00361	PASS
				20	-4.28	-0.00506	PASS
				30	1.45	0.00171	PASS
				40	-2.34	-0.00276	PASS
				50	-5.75	-0.00679	PASS

The End