



# Appendix B

## WCDMA Band 2&4



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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	23.16	22.36	33	PASS
		MCH	23.04	22.24	33	PASS
		HCH	23.12	22.32	33	PASS
WCDMA1700	UMTS/TM1	LCH	22.72	21.72	30	PASS
		MCH	22.88	21.88	30	PASS
		HCH	22.99	21.99	30	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



## 2 Peak-to-Average Ratio

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
WCDMA1900	UMTS/TM1	LCH	2.14	13	PASS
		MCH	2.46	13	PASS
		HCH	2.29	13	PASS
WCDMA1700	UMTS/TM1	LCH	2.06	13	PASS
		MCH	2.81	13	PASS
		HCH	2.29	13	PASS



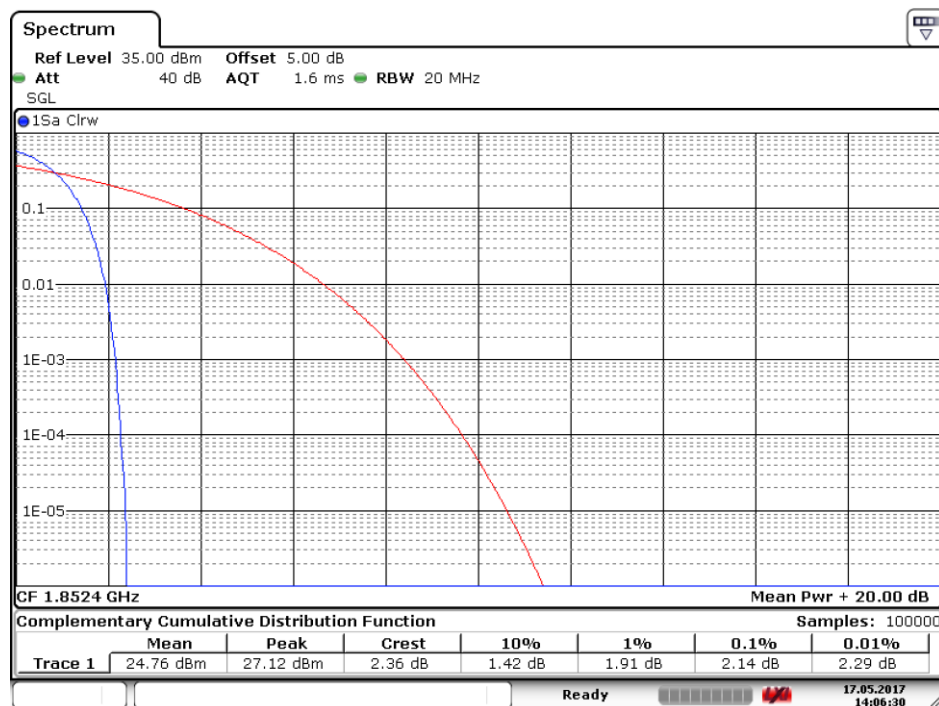
## Part II - Test Plots

### 2.1 For WCDMA

#### 2.1.1 Test Band = WCDMA 1900

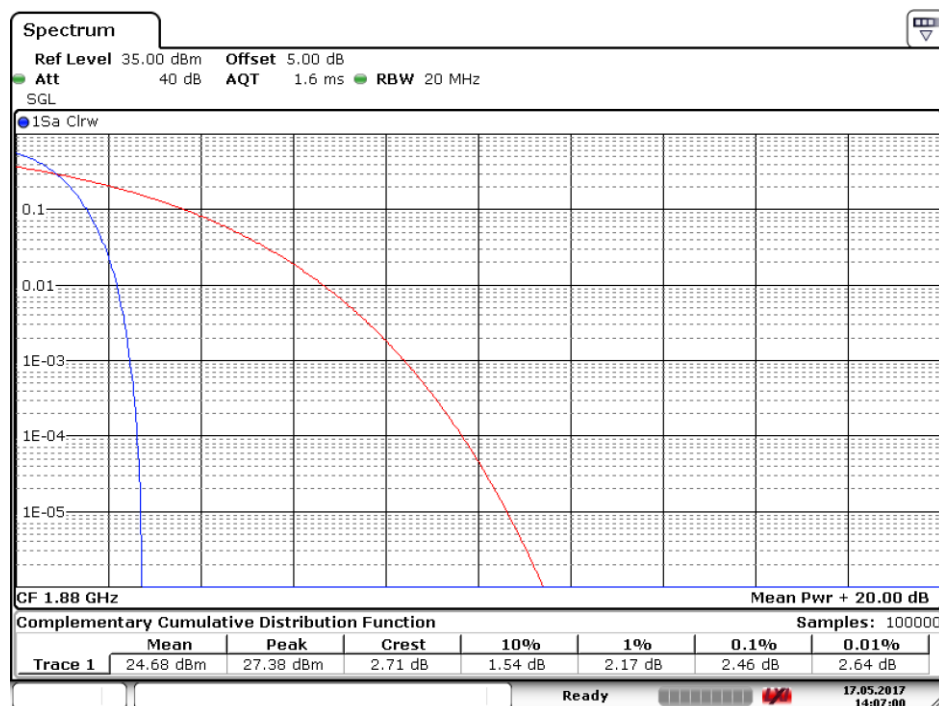
##### 2.1.1.1 Test Mode = UMTS/TM1

##### 2.1.1.1.1 Test Channel = LCH



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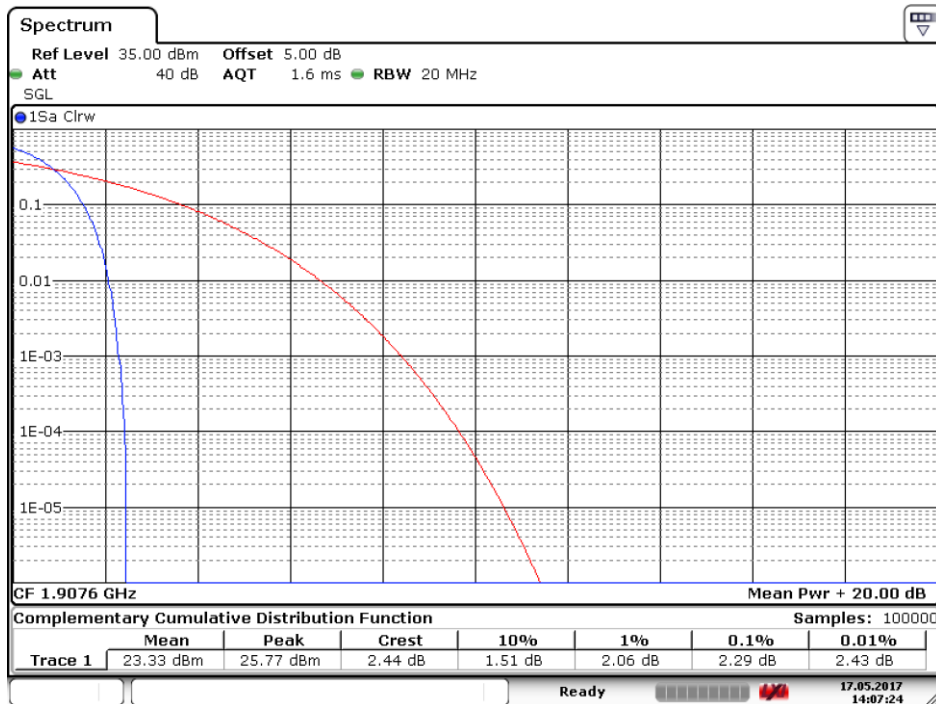
##### 2.1.1.1.2 Test Channel = MCH



Date: 17.MAY.2017 14:07:01



### 2.1.1.1.3 Test Channel = HCH

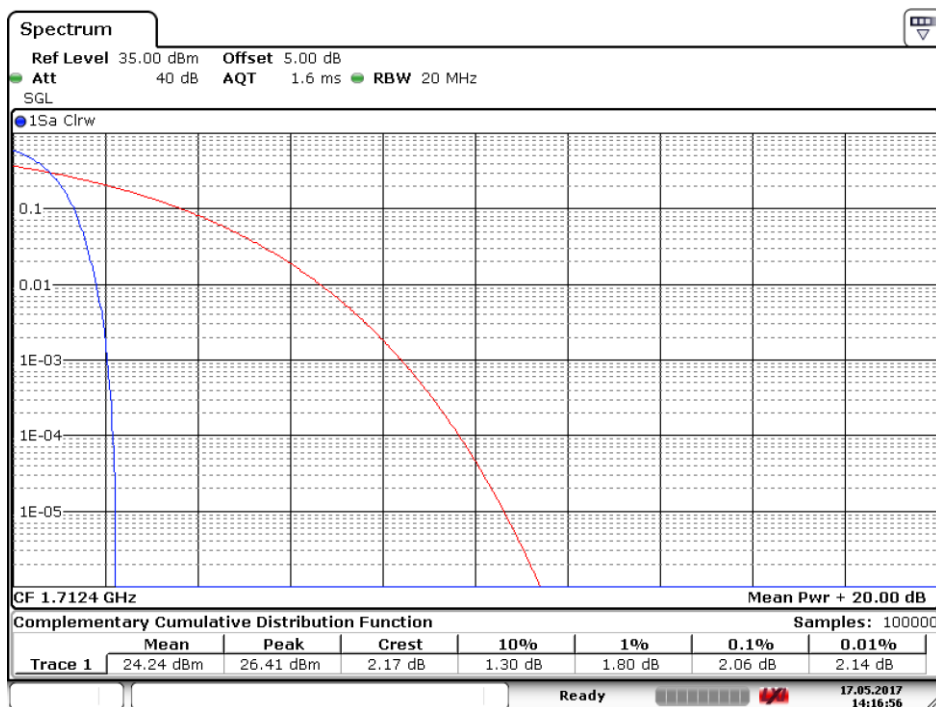


Date: 17.MAY.2017 14:07:24

### 2.1.2 Test Band = WCDMA 1700

#### 2.1.2.1 Test Mode = UMTS/TM1

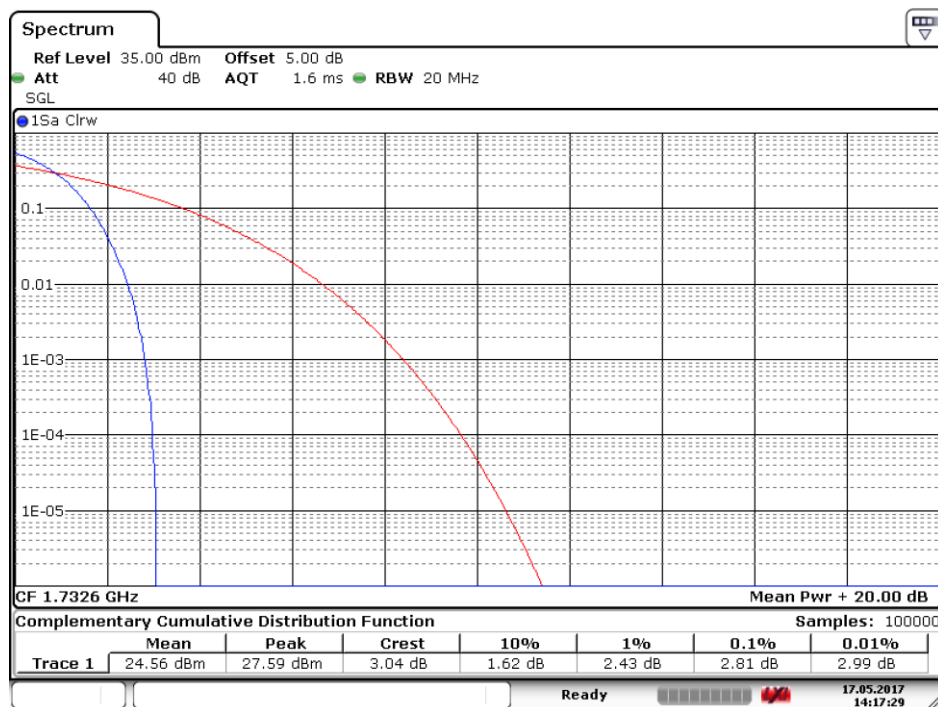
##### 2.1.2.1.1 Test Channel = LCH



Date: 17.MAY.2017 14:16:57

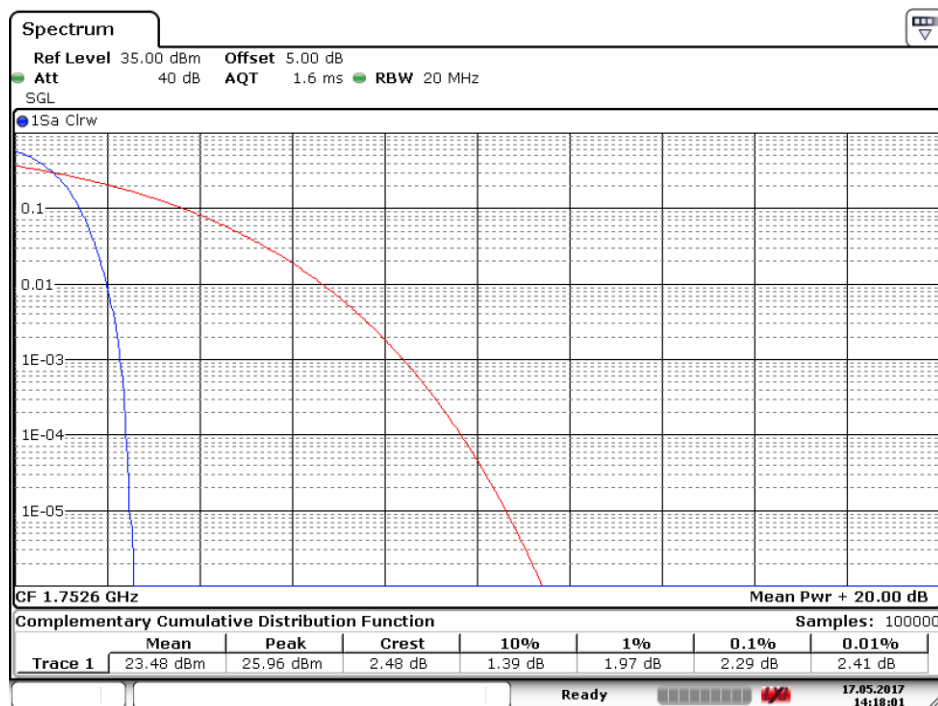


#### 2.1.2.1.2 Test Channel = MCH



Date: 17.MAY.2017 14:17:29

#### 2.1.2.1.3 Test Channel = HCH



Date: 17.MAY.2017 14:18:02



## 3 Modulation Characteristics

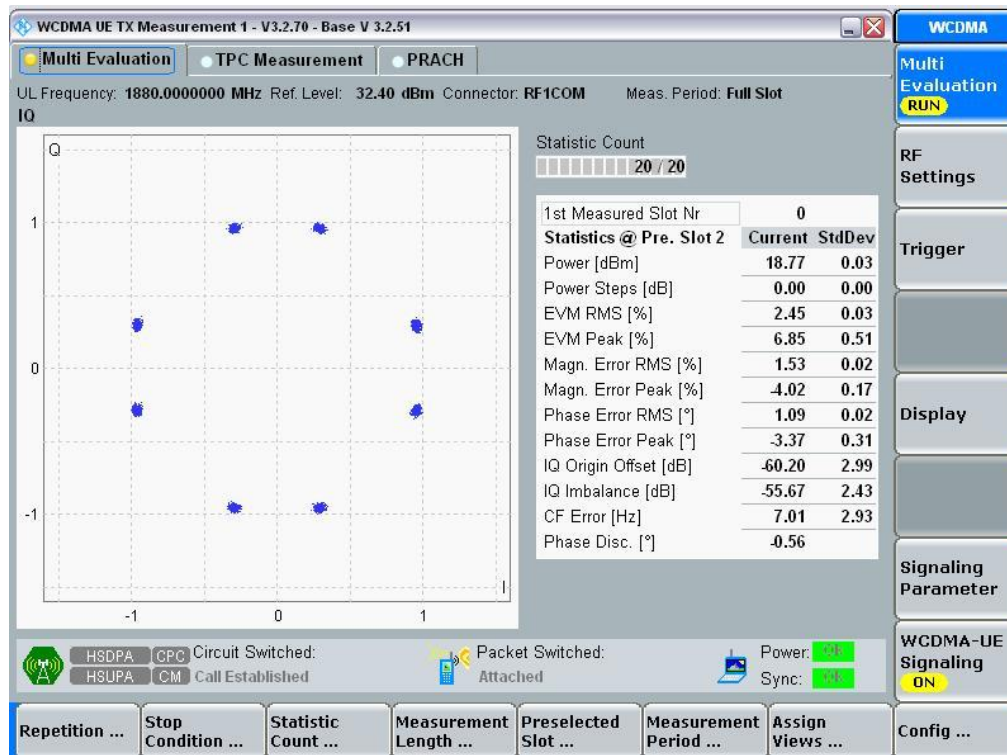
### Part I - Test Plots

### 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



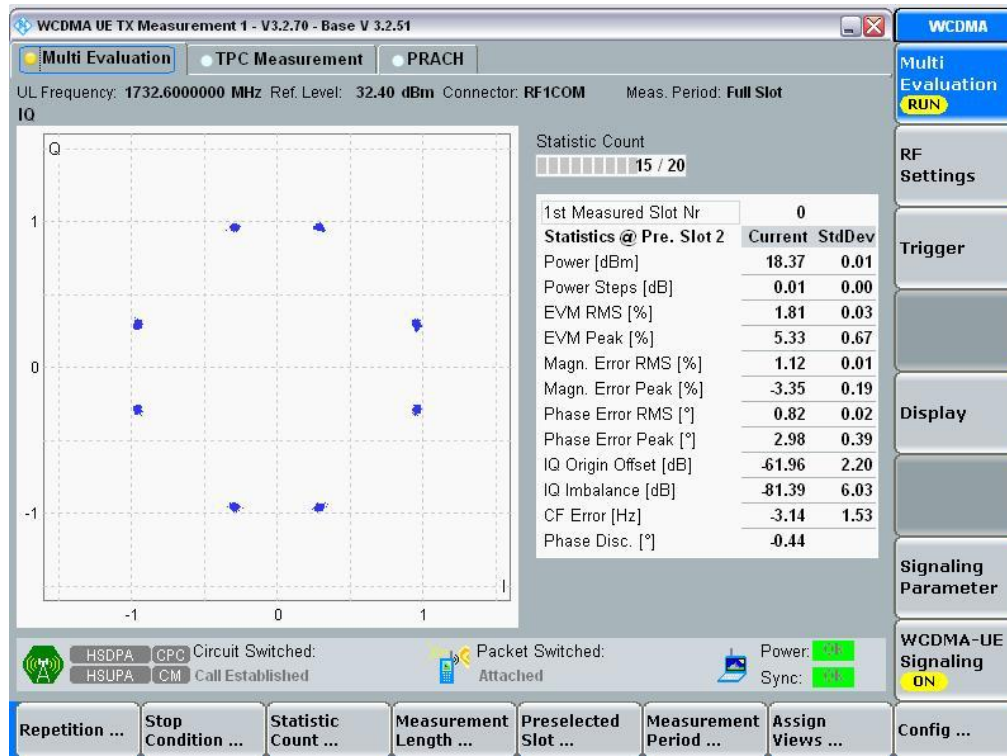




### 3.1.2 Test Band = WCDMA 1700

#### 3.1.2.1 Test Mode = UMTS /TM1

##### 3.1.2.1.1 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	4.17	4.71	PASS
		MCH	4.17	4.70	PASS
		HCH	4.17	4.71	PASS
WCDMA1700	UMTS/TM1	LCH	4.19	4.72	PASS
		MCH	4.15	4.68	PASS
		HCH	4.17	4.71	PASS

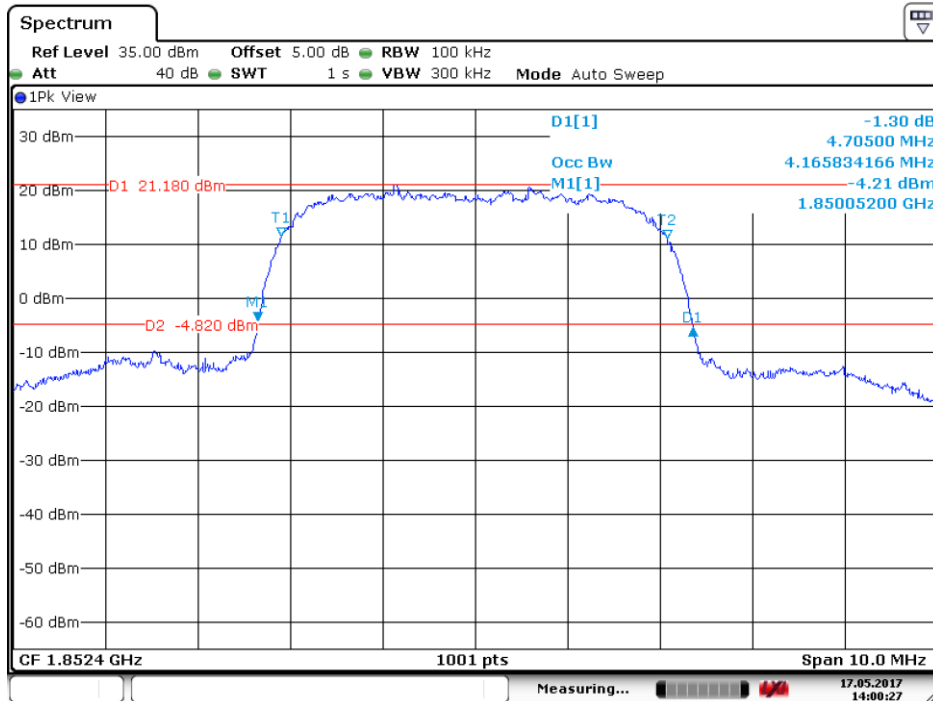


## 4.1 For WCDMA

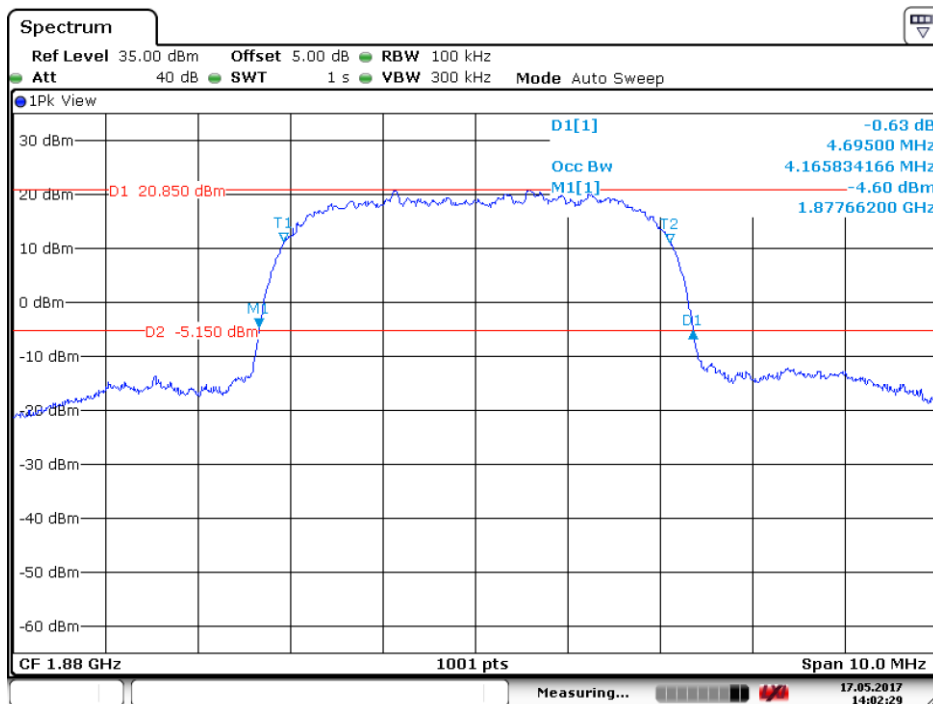
### 4.1.1 Test Band = WCDMA 1900

#### 4.1.1.1 Test Mode = UMTS/TM1

##### 4.1.1.1.1 Test Channel = LCH

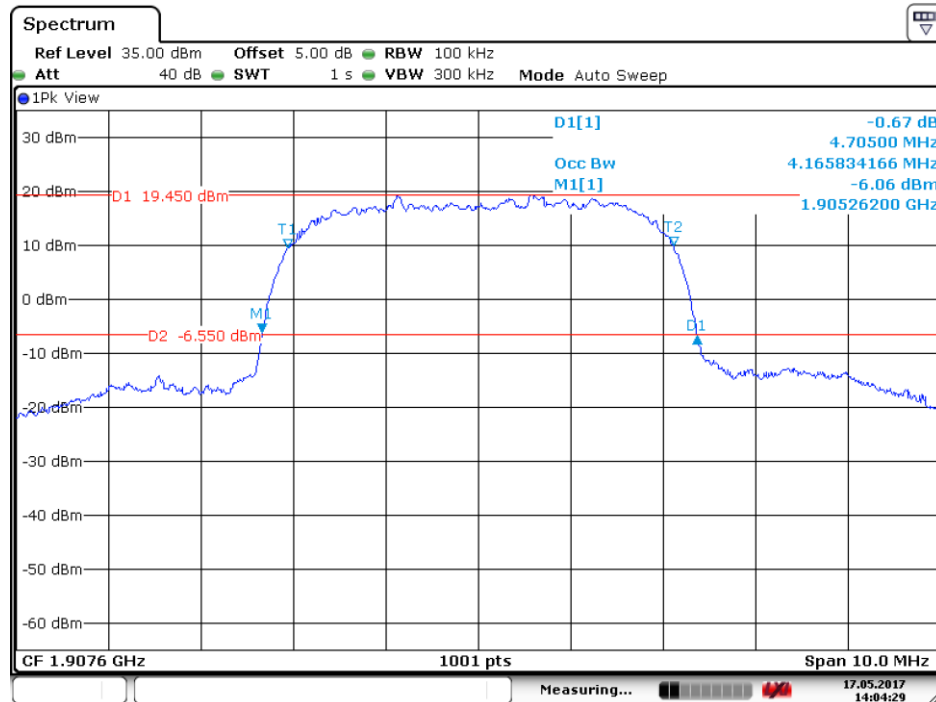


##### 4.1.1.1.2 Test Channel = MCH





#### 4.1.1.1.3 Test Channel = HCH

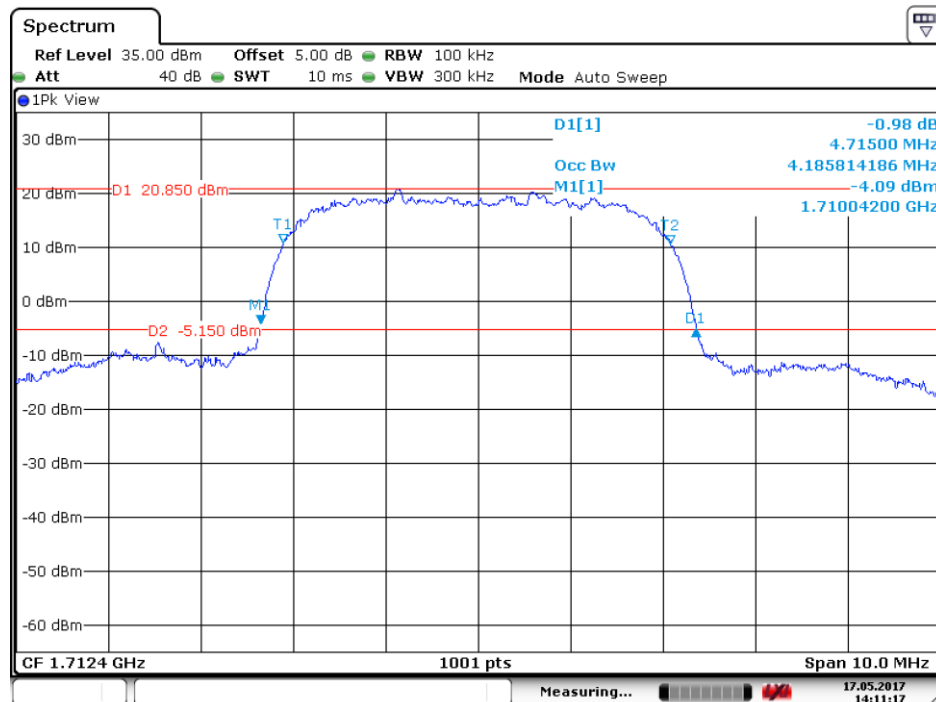


Date: 17.MAY.2017 14:04:29

#### 4.1.2 Test Band = WCDMA 1700

##### 4.1.2.1 Test Mode = UMTS/TM1

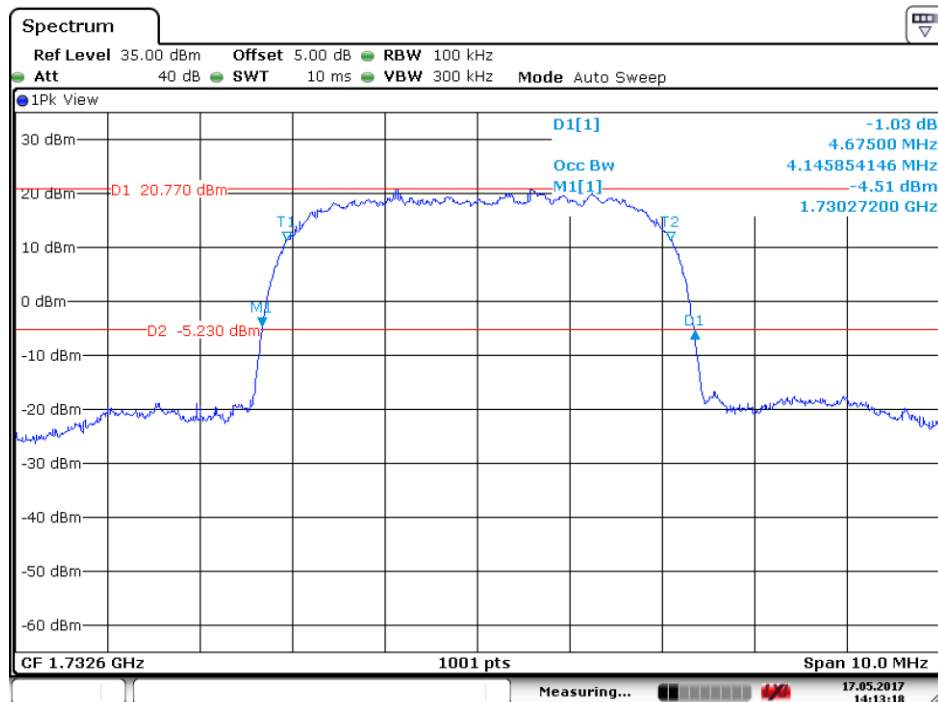
##### 4.1.2.1.1 Test Channel = LCH



Date: 17.MAY.2017 14:11:17

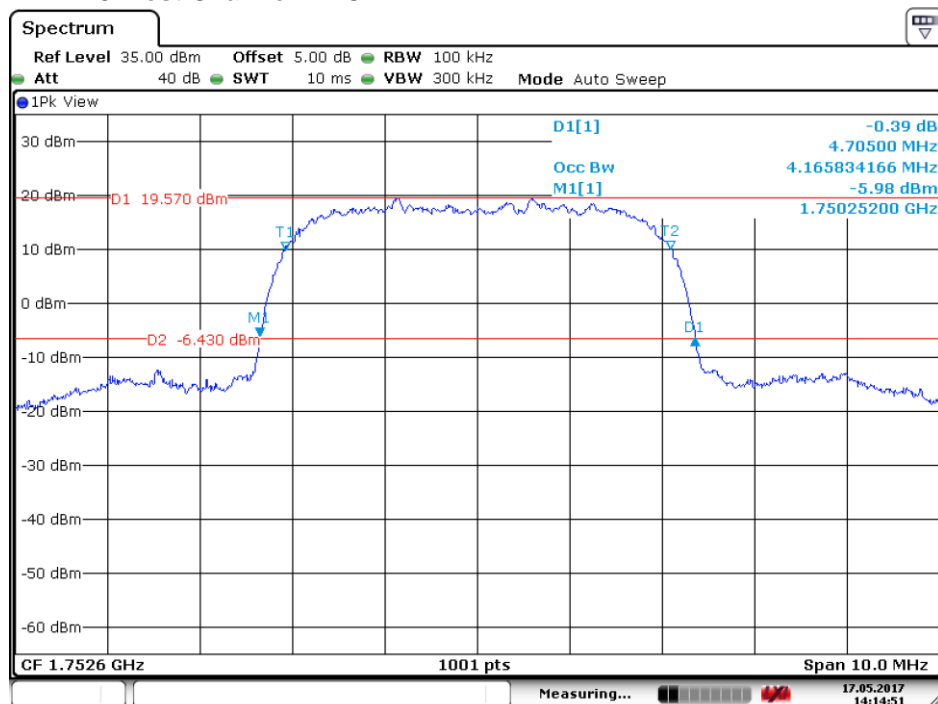


#### 4.1.2.1.2 Test Channel = MCH



Date: 17.MAY.2017 14:13:19

#### 4.1.2.1.3 Test Channel = HCH



Date: 17.MAY.2017 14:14:51



## 5 Band Edges Compliance

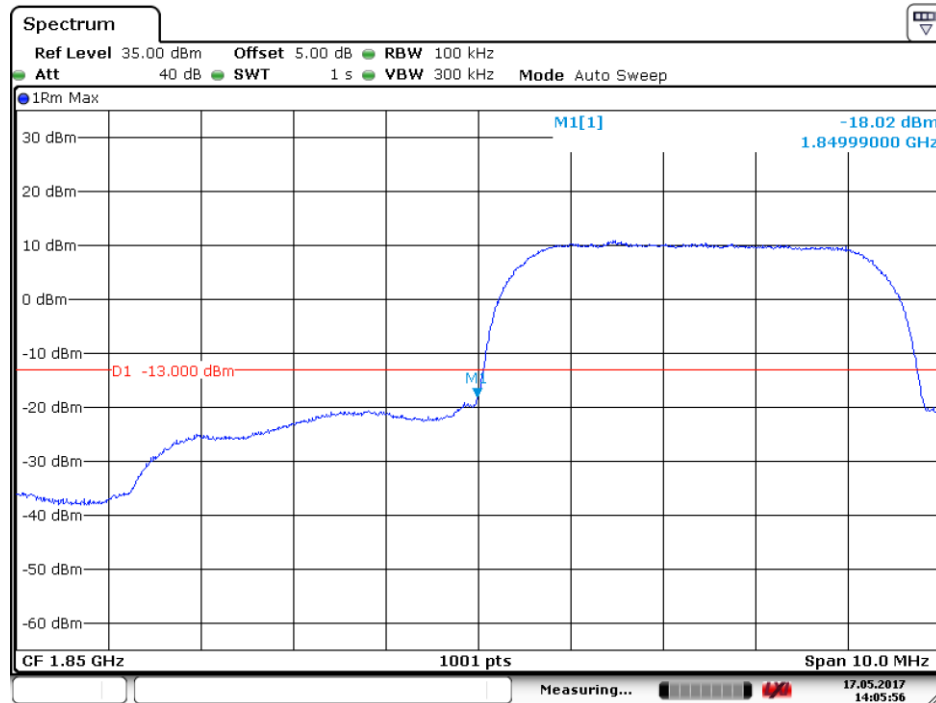
### Part I - Test Plots

#### 5.1 For WCDMA

##### 5.1.1 Test Band = WCDMA 1900

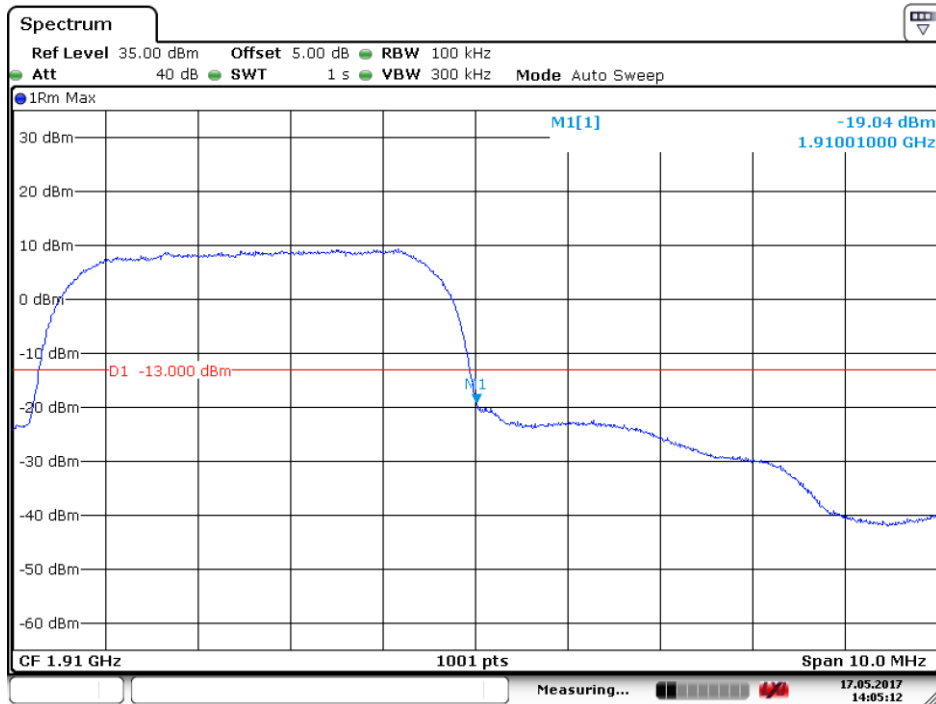
##### 5.1.1.1 Test Mode = UMTS/TM1

##### 5.1.1.1.1 Test Channel = LCH



Date: 17.MAY.2017 14:05:56

#### 5.1.1.1.2 Test Channel = HCH

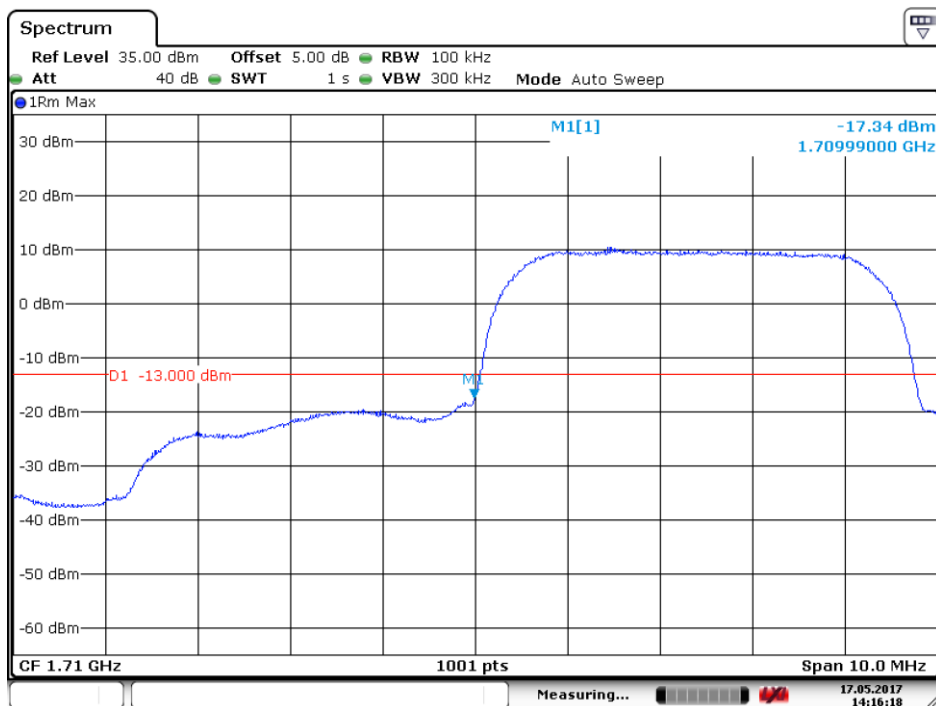


Date: 17.MAY.2017 14:05:13

#### 5.1.2 Test Band = WCDMA 1700

##### 5.1.2.1 Test Mode = UMTS/TM1

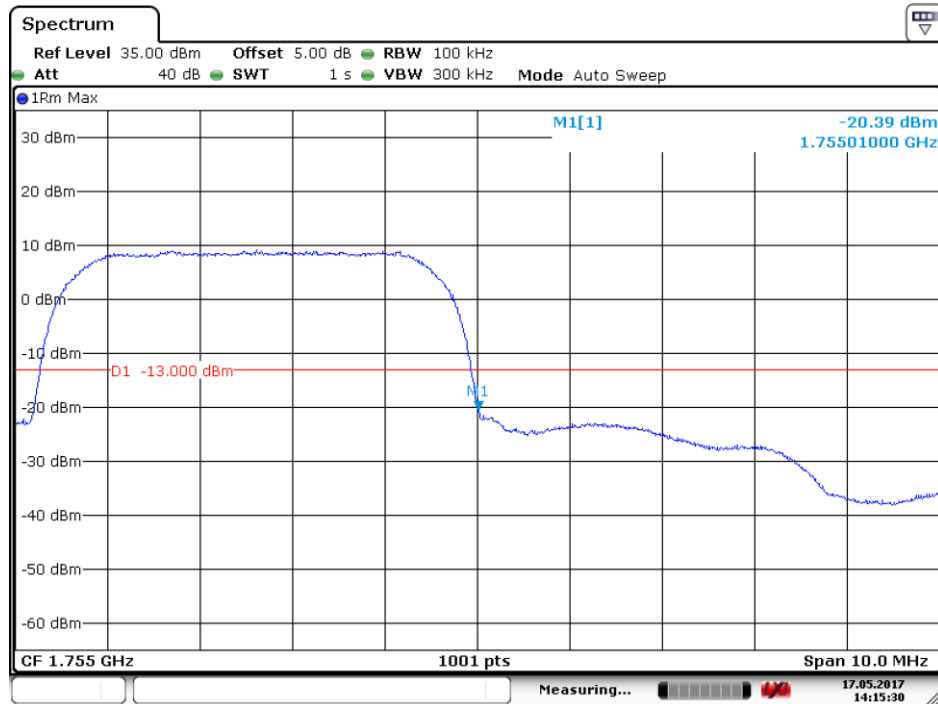
##### 5.1.2.1.1 Test Channel = LCH



Date: 17.MAY.2017 14:16:19



#### 5.1.2.1.2 Test Channel = HCH



Date: 17.MAY.2017 14:15:31



## 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.

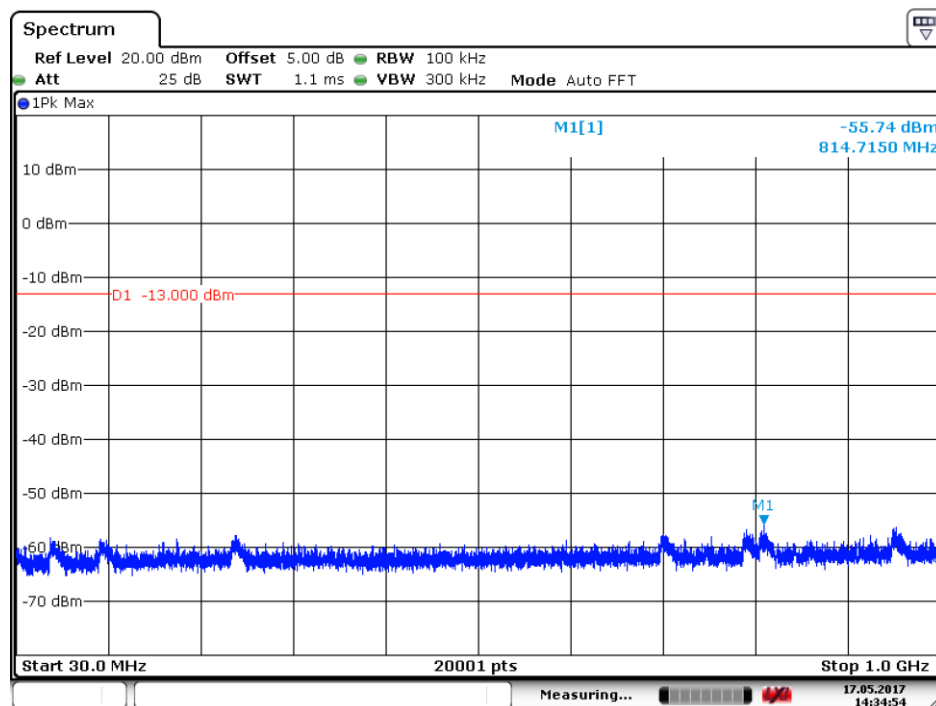
Part I - Test Plots

### 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



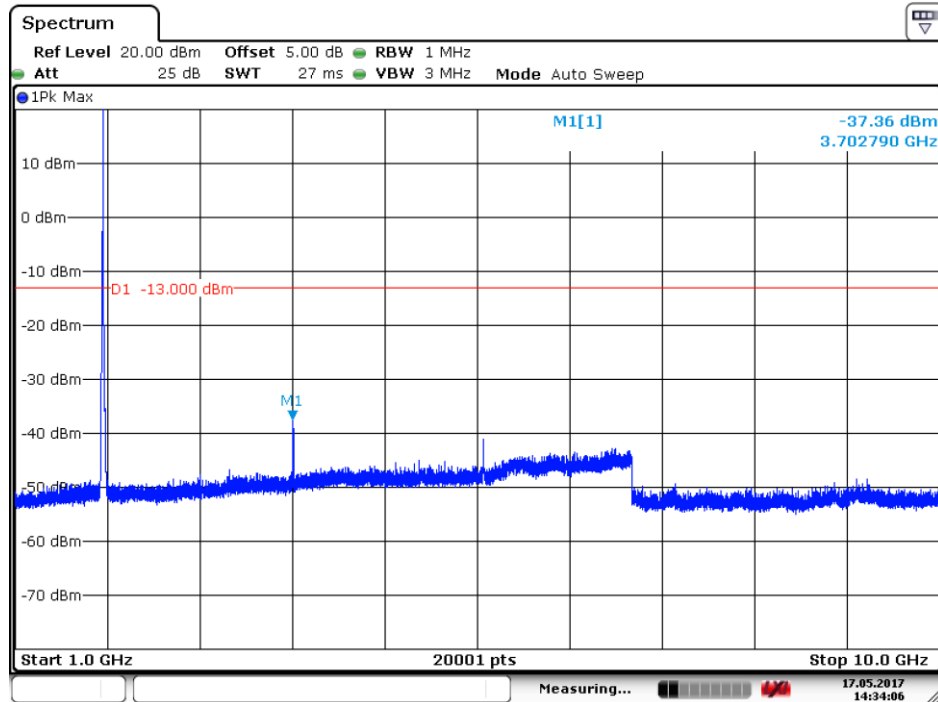
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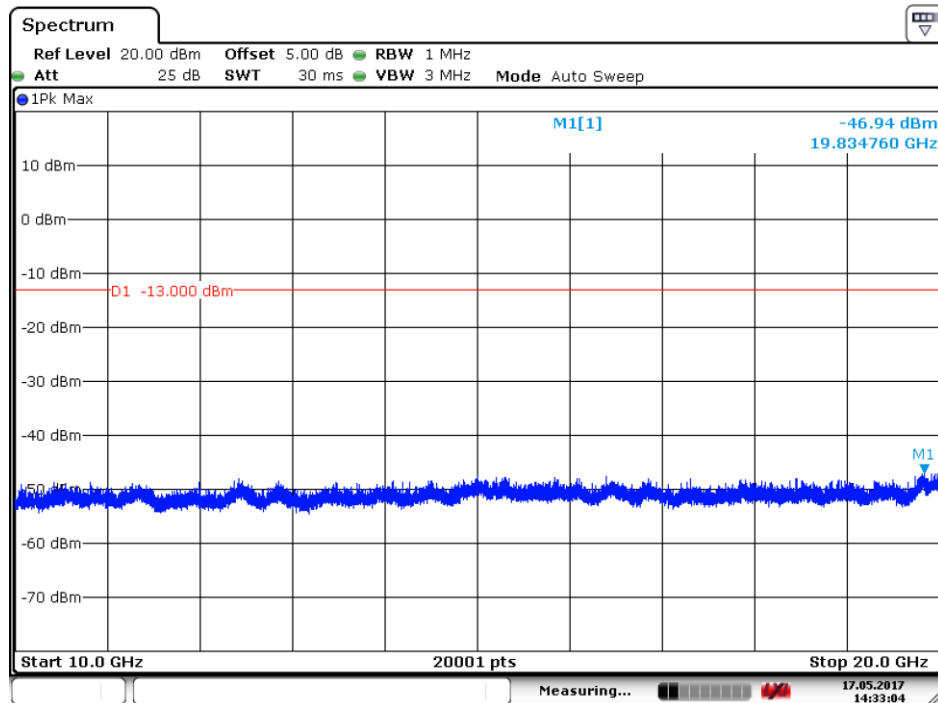
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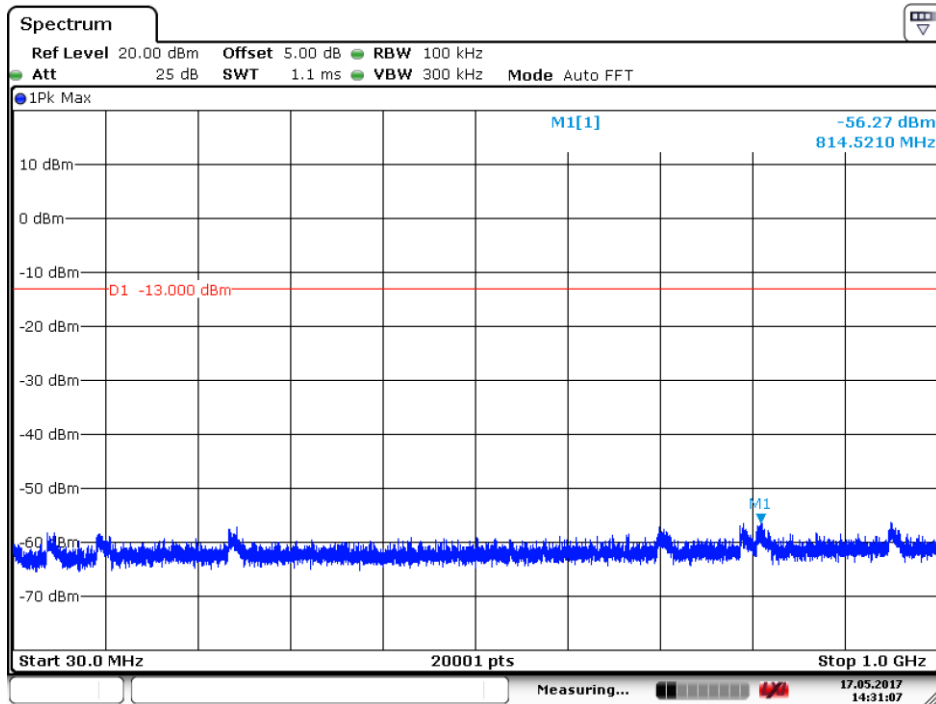
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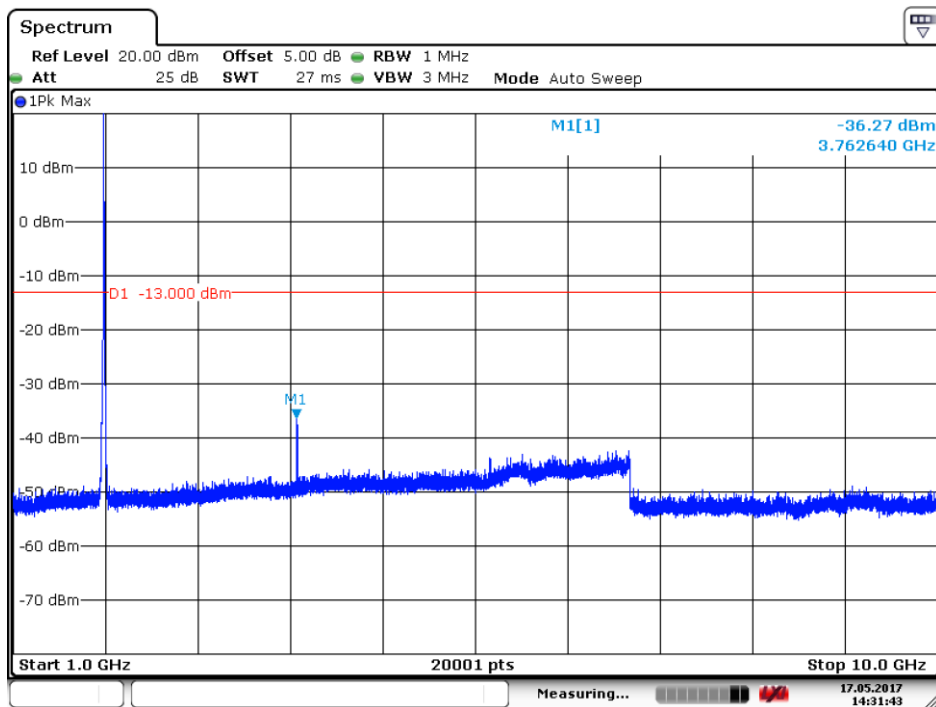
Date: 17.MAY.2017 14:33:04



#### 6.1.1.1.2 Test Channel = MCH



Date: 17.MAY.2017 14:31:08



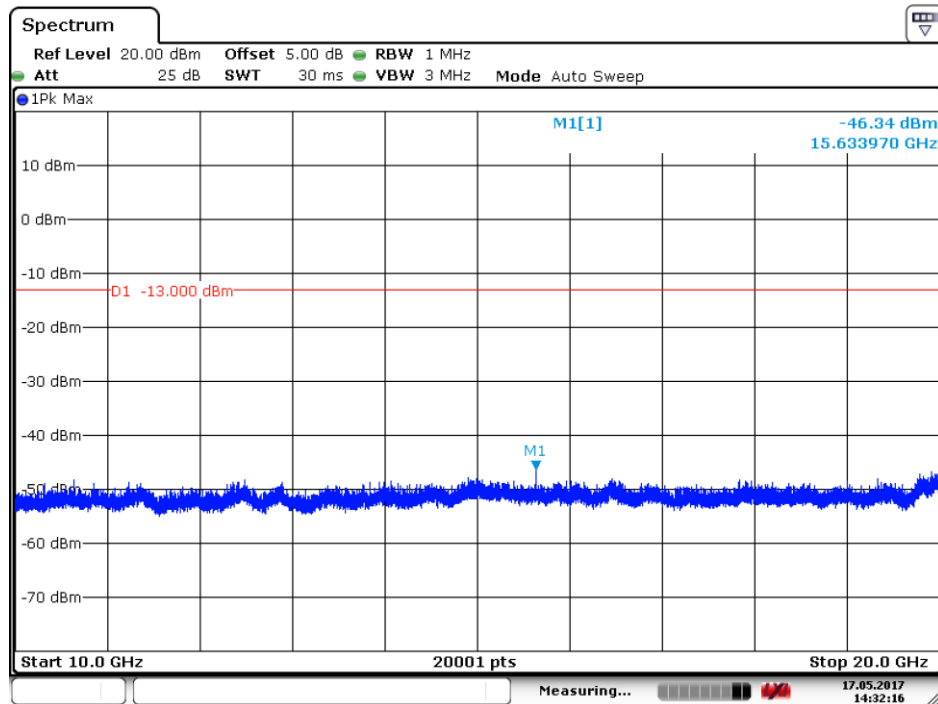
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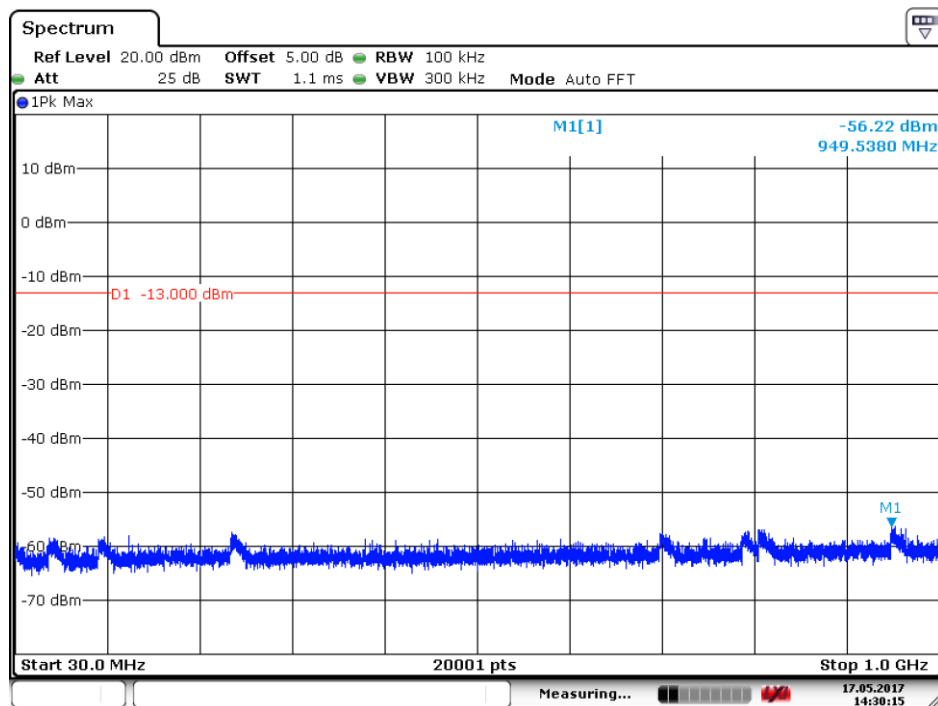
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Date: 17.MAY.2017 14:32:16

## 6.1.1.1.3 Test Channel = HCH



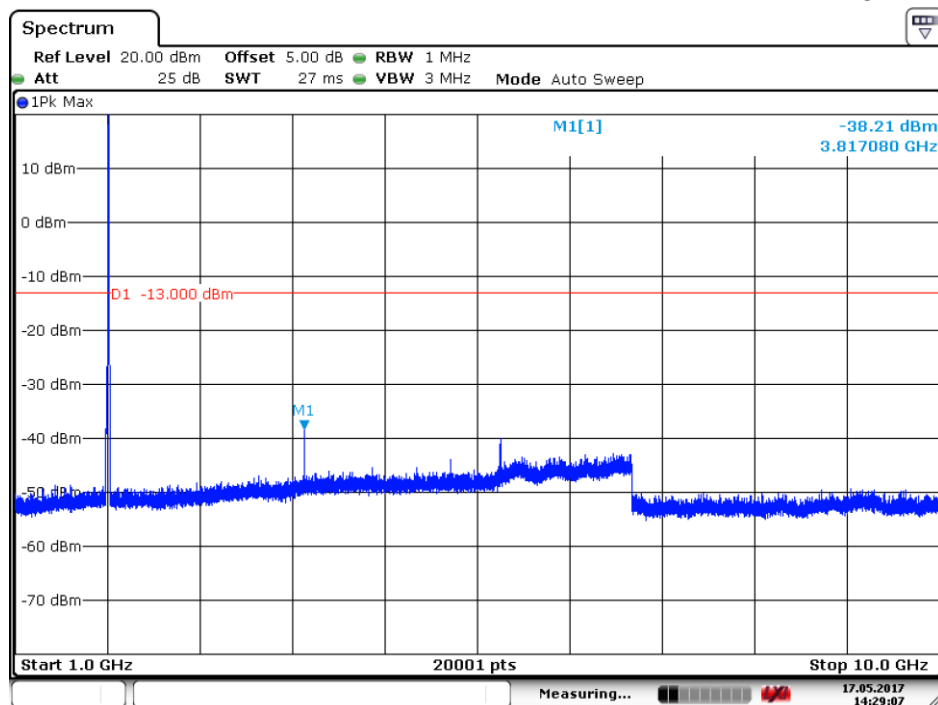
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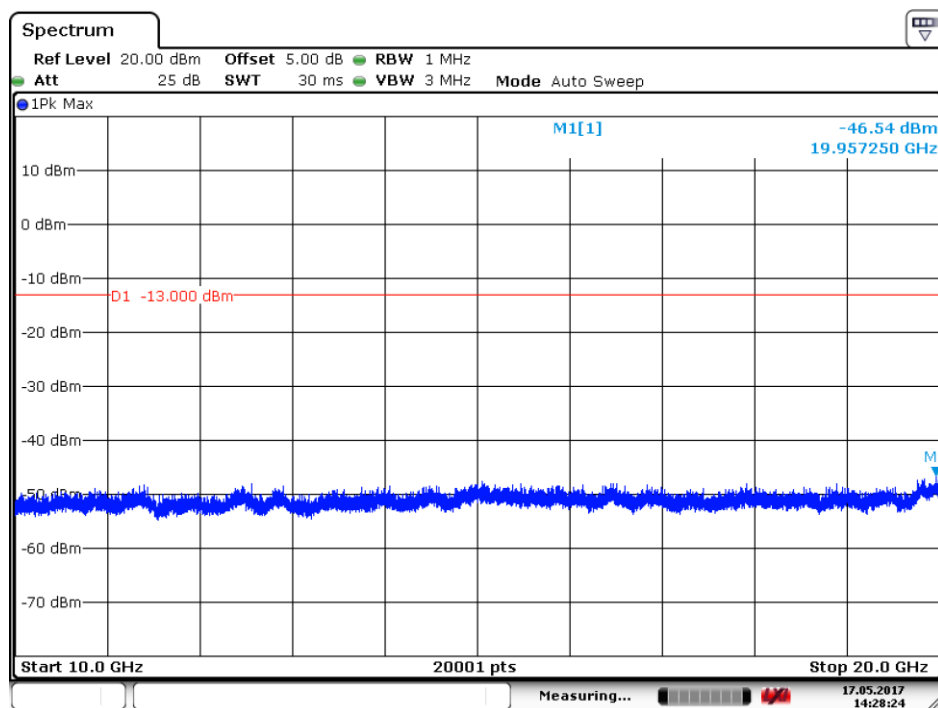
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Date: 17.MAY.2017 14:29:07



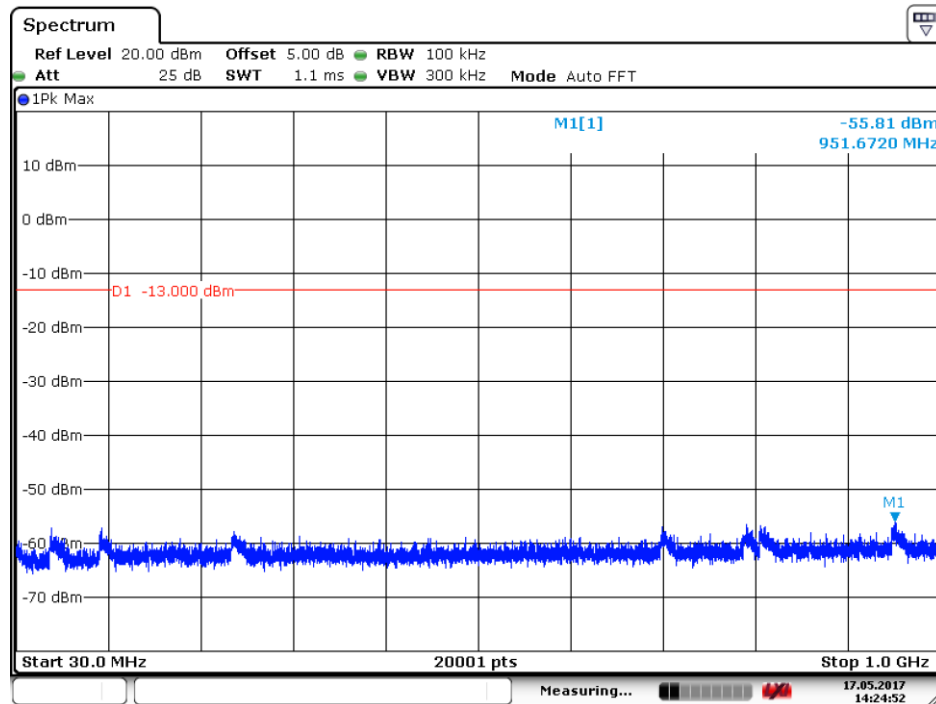
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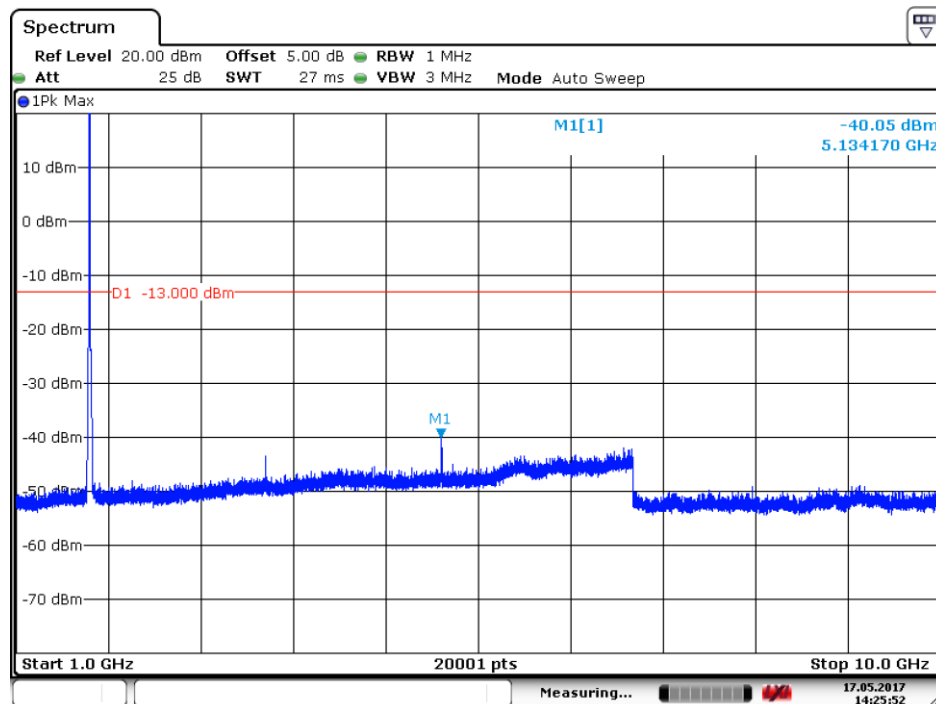
## 6.1.2 Test Band = WCDMA 1700

### 6.1.2.1 Test Mode = UMTS/TM1

#### 6.1.2.1.1 Test Channel = LCH



Date: 17.MAY.2017 14:24:52



Date: 17.MAY.2017 14:25:53

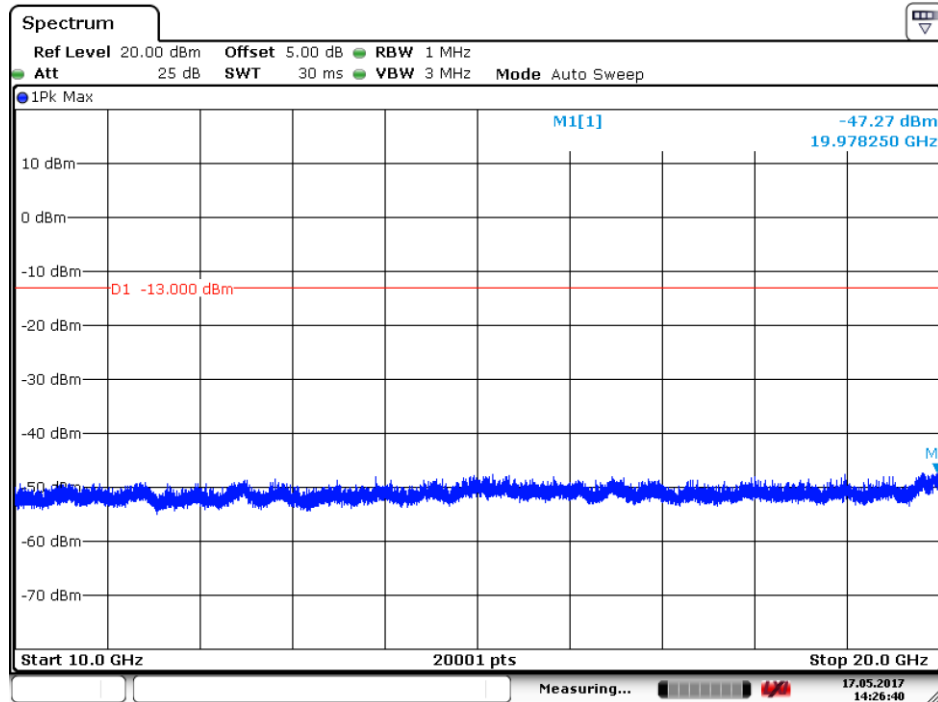




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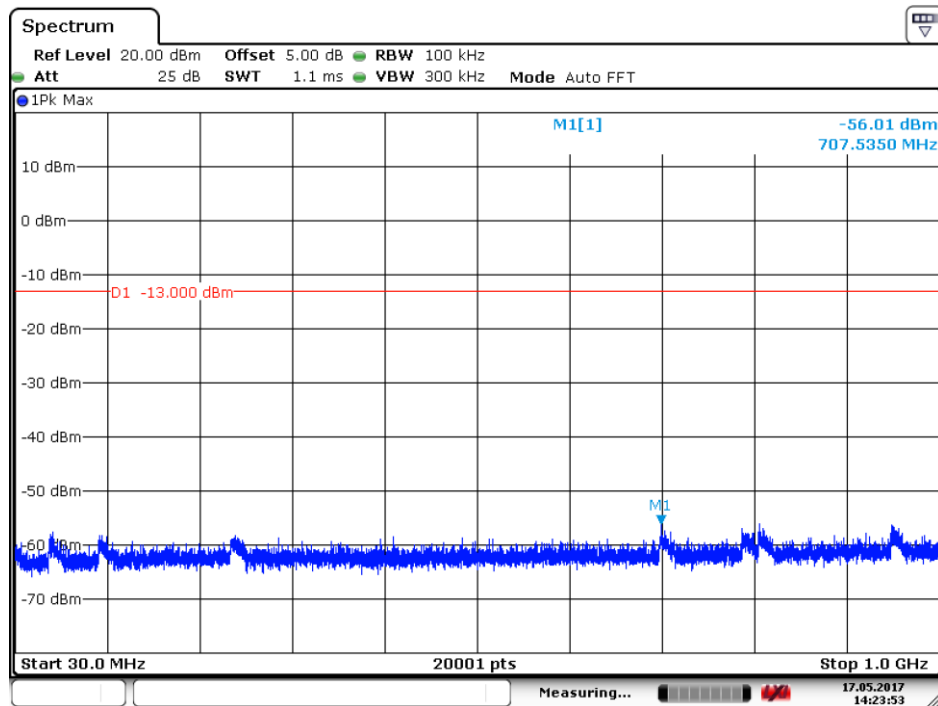
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Date: 17.MAY.2017 14:26:41

## 6.1.2.1.2 Test Channel = MCH



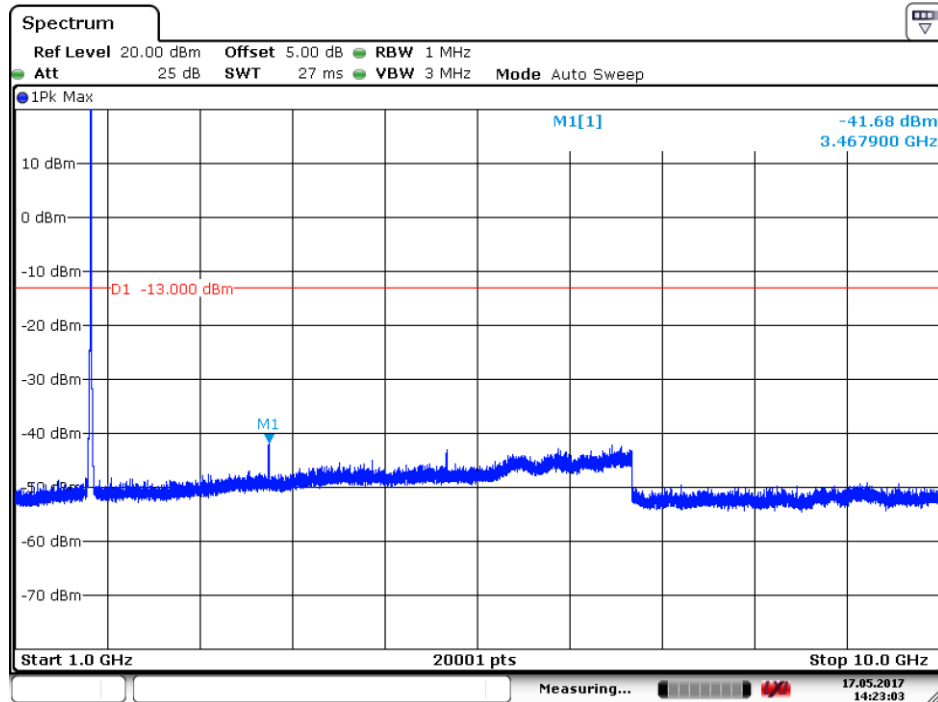
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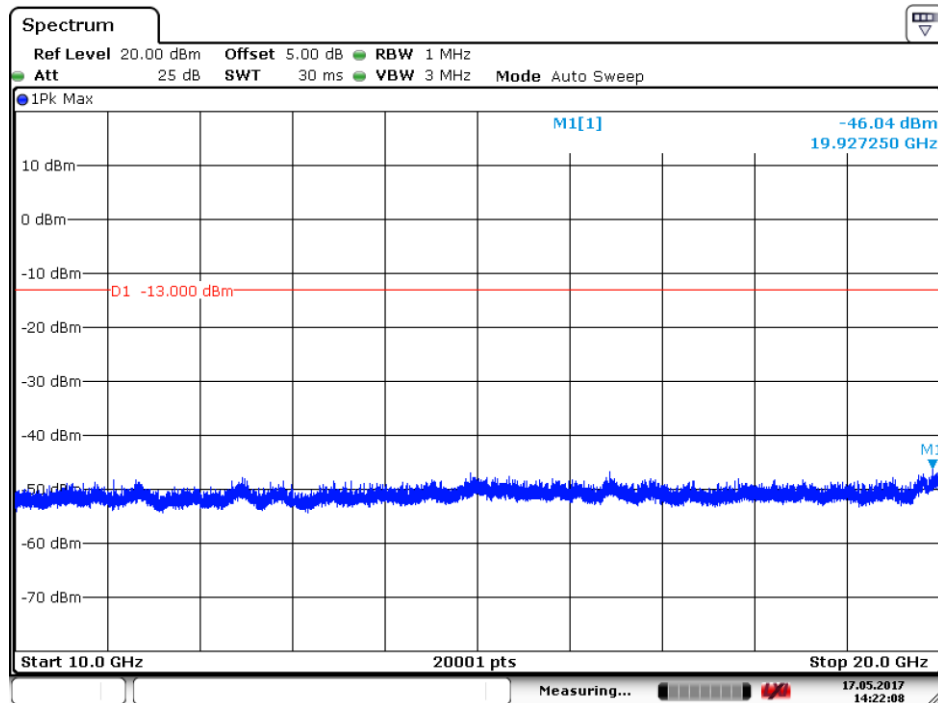
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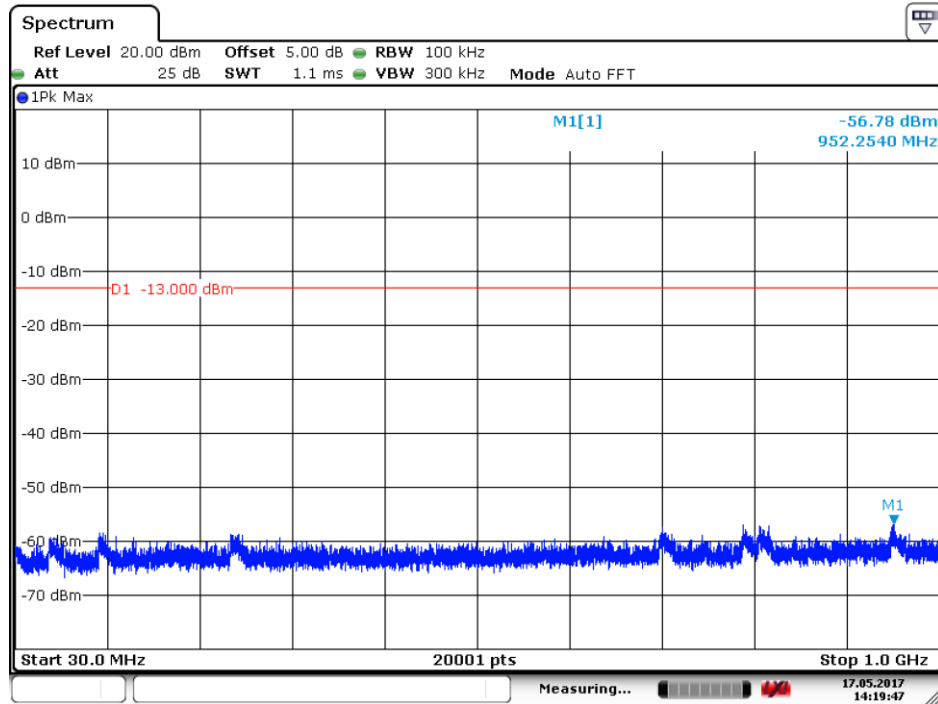
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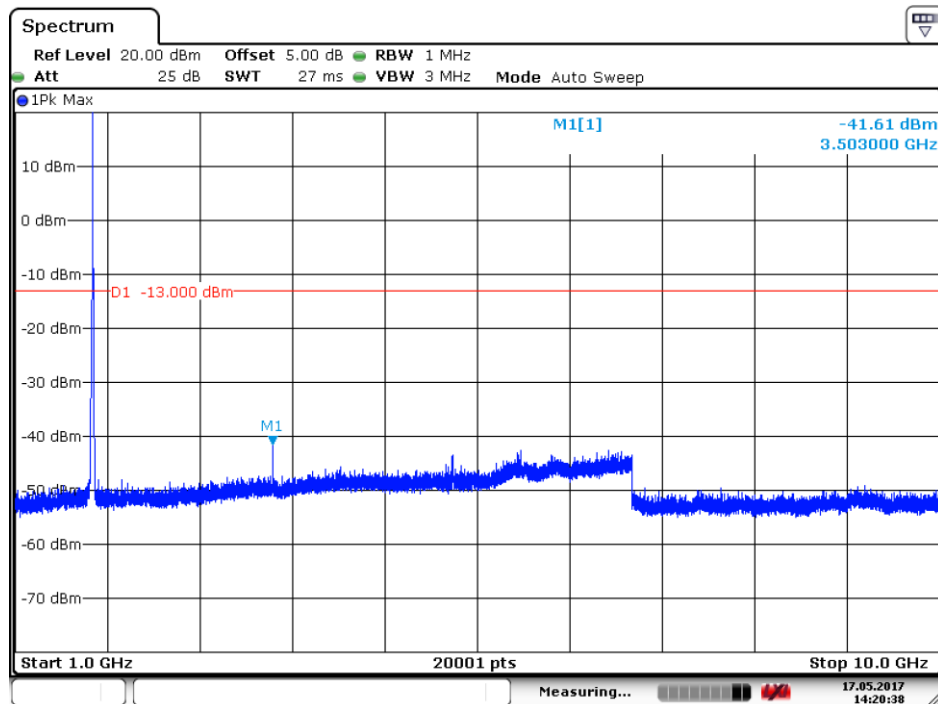
Date: 17.MAY.2017 14:22:08



6.1.2.1.3 Test Channel = HCH



Date: 17.MAY.2017 14:19:48



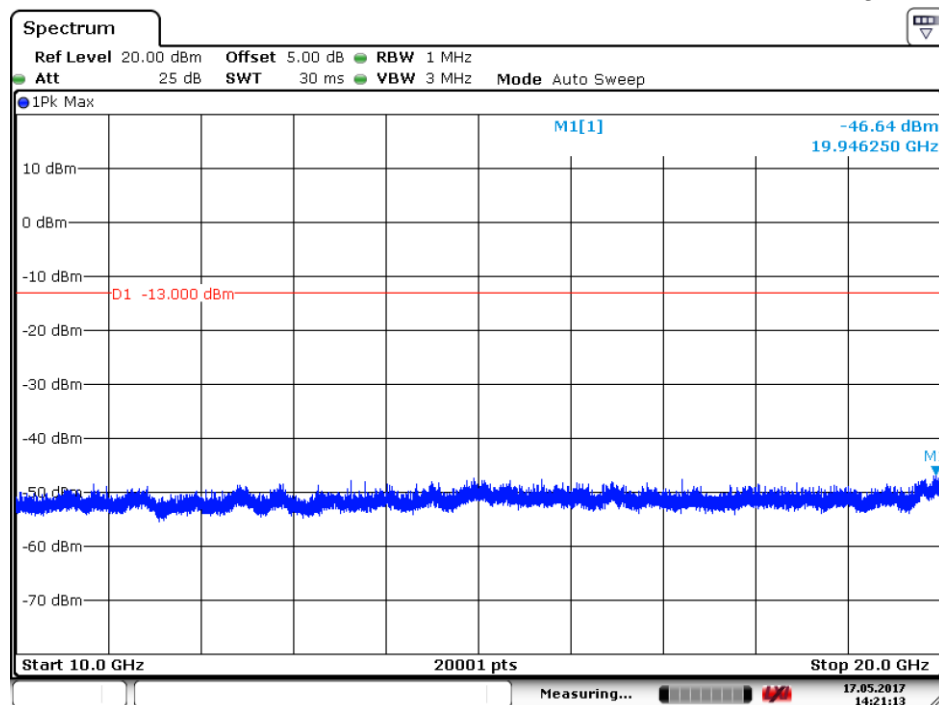
Date: 17.MAY.2017 14:20:39



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Date: 17.MAY.2017 14:21:13



## 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
1189.500	-49.13	-13.00	-36.13	Vertical
5083.575	-55.51	-13.00	-42.51	Vertical
7724.362	-52.28	-13.00	-39.28	Vertical
1200.500	-49.11	-13.00	-36.11	Horizontal
4412.287	-54.45	-13.00	-41.45	Horizontal
7868.662	-51.55	-13.00	-38.55	Horizontal

###### 7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1206.500	-49.10	-13.00	-36.10	Vertical
4442.025	-54.69	-13.00	-41.69	Vertical
6974.587	-52.41	-13.00	-39.41	Vertical
1265.000	-49.95	-13.00	-36.95	Horizontal
4763.775	-54.17	-13.00	-41.17	Horizontal
7734.600	-52.39	-13.00	-39.39	Horizontal

###### 7.1.1.1.3 Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1207.000	-49.03	-13.00	-36.03	Vertical
4716.487	-54.50	-13.00	-41.50	Vertical
7873.050	-51.43	-13.00	-38.43	Vertical
1203.500	-49.82	-13.00	-36.82	Horizontal
4721.362	-55.44	-13.00	-42.44	Horizontal
7918.387	-51.25	-13.00	-38.25	Horizontal



## **7.1.2 Test Band = WCDMAband 1700**

### **7.1.2.1 Test Mode = UMTS/TM1**

<b>Frequency (MHz)</b>	<b>Level (dBm)</b>	<b>Limit Line (dBm)</b>	<b>Over Limit (dB)</b>	<b>Polarization</b>
1205.000	-48.17	-13.00	-35.17	Vertical
5301.487	-55.02	-13.00	-42.02	Vertical
7864.275	-51.60	-13.00	-38.60	Vertical
4154.400	-55.47	-13.00	-42.47	Horizontal
7088.175	-52.86	-13.00	-39.86	Horizontal
1236.000	-49.44	-13.00	-36.44	Horizontal

#### **7.1.2.1.1 Test Channel = MCH**

<b>Frequency (MHz)</b>	<b>Level (dBm)</b>	<b>Limit Line (dBm)</b>	<b>Over Limit (dB)</b>	<b>Polarization</b>
1294.500	-49.35	-13.00	-36.35	Vertical
2675.000	-44.37	-13.00	-31.37	Vertical
4927.087	-54.04	-13.00	-41.04	Vertical
1417.500	-51.16	-13.00	-38.16	Horizontal
4808.625	-54.11	-13.00	-41.11	Horizontal
9194.175	-51.80	-13.00	-38.80	Horizontal

#### **7.1.2.1.2 Test Channel = HCH**

<b>Frequency (MHz)</b>	<b>Level (dBm)</b>	<b>Limit Line (dBm)</b>	<b>Over Limit (dB)</b>	<b>Polarization</b>
1279.500	-49.23	-13.00	-36.23	Vertical
4260.675	-53.75	-13.00	-40.75	Vertical
7862.812	-52.06	-13.00	-39.06	Vertical
1254.500	-49.19	-13.00	-36.19	Horizontal
2774.000	-44.45	-13.00	-31.45	Horizontal
7317.787	-52.38	-13.00	-39.38	Horizontal

#### **NOTE:**

- 1) The disturbance above 13GHz and below 30MHz 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	2.28	0.00123	PASS
				VN	-3.37	-0.00182	PASS
				VH	4.02	0.00217	PASS
		MCH	TN	VL	1.83	0.00097	PASS
				VN	3.75	0.00199	PASS
				VH	-1.35	-0.00072	PASS
		HCH	TN	VL	1.55	0.00081	PASS
				VN	-2.64	-0.00138	PASS
				VH	-4.72	-0.00247	PASS

Test Band	Test Mode	Test Channel	Test Temp.	Test Volt.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 1700	UMTS/TM1	LCH	TN	VL	-3.30	-0.00193	PASS
				VN	-3.48	-0.00203	PASS
				VH	2.32	0.00135	PASS
		MCH	TN	VL	-5.84	-0.00337	PASS
				VN	1.36	0.00078	PASS
				VH	-2.45	-0.00141	PASS
		HCH	TN	VL	1.75	0.00100	PASS
				VN	-4.61	-0.00263	PASS
				VH	2.82	0.00161	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	-4.76	-0.00257	PASS
				-20	1.60	0.00086	PASS
				-10	2.47	0.00133	PASS
				0	-2.68	-0.00145	PASS
				10	1.56	0.00084	PASS
				20	-4.80	-0.00259	PASS
				30	1.65	0.00089	PASS
				40	-2.04	-0.00110	PASS
				50	-6.21	-0.00335	PASS
		MCH	VN	-30	-3.80	-0.00202	PASS
				-20	-5.28	-0.00281	PASS
				-10	-0.39	-0.00021	PASS
				0	-3.38	-0.00180	PASS
				10	1.77	0.00094	PASS
				20	2.72	0.00145	PASS
				30	1.61	0.00086	PASS
				40	4.13	0.00220	PASS
				50	-4.32	-0.00230	PASS
		HCH	VN	-30	-4.17	-0.00219	PASS
				-20	3.68	0.00193	PASS
				-10	2.55	0.00134	PASS
				0	-5.36	-0.00281	PASS
				10	1.57	0.00082	PASS
				20	-2.78	-0.00146	PASS
				30	3.64	0.00191	PASS
				40	-1.28	-0.00067	PASS
				50	-4.60	-0.00241	PASS



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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
WCDMA 1700	UMTS/TM1	LCH	VN	-30	-3.43	-0.00200	PASS
				-20	-4.48	-0.00262	PASS
				-10	1.98	0.00116	PASS
				0	-3.35	-0.00196	PASS
				10	-0.58	-0.00034	PASS
				20	1.68	0.00098	PASS
				30	-3.84	-0.00224	PASS
				40	-5.31	-0.00310	PASS
				50	-4.34	-0.00253	PASS
		MCH	VN	-30	-4.92	-0.00284	PASS
				-20	1.27	0.00073	PASS
				-10	-2.63	-0.00152	PASS
				0	4.84	0.00279	PASS
				10	-3.25	-0.00188	PASS
				20	-6.29	-0.00363	PASS
				30	-3.27	-0.00189	PASS
				40	-8.03	-0.00463	PASS
				50	-5.11	-0.00295	PASS
		HCH	VN	-30	-3.35	-0.00191	PASS
				-20	3.63	0.00207	PASS
				-10	1.85	0.00106	PASS
				0	-0.37	-0.00021	PASS
				10	-3.18	-0.00181	PASS
				20	-4.16	-0.00237	PASS
				30	1.31	0.00075	PASS
				40	-2.92	-0.00167	PASS
				50	-4.24	-0.00242	PASS

The End