



# Appendix B

## **LTE-NB1 BAND26(814MHz-824MHz)**

## CONTENT

	Page
<b>1 EFFECTIVE (ISOTROPIC) RADIATED POWER OUTPUT DATA.....</b>	<b>3</b>
<b>2 PEAK-TO-AVERAGE RATIO .....</b>	<b>4</b>
2.1 FOR LTE-NB1 .....	4
2.1.1 <i>Test Band = LTE-NB1 BAND26(814MHz-824MHz)</i> .....	4
<b>3 MODULATION CHARACTERISTICS .....</b>	<b>9</b>
3.1 FOR LTE-NB1 .....	9
3.1.1 <i>Test Band = LTE-NB1 BAND26(814MHz-824MHz)</i> .....	9
<b>4 BANDWIDTH .....</b>	<b>11</b>
4.1 FOR LTE-NB1 .....	11
4.1.1 <i>Test Band = LTE-NB1 BAND26(814MHz-824MHz)</i> .....	11
<b>5 EMISSION MASK.....</b>	<b>15</b>
5.1 FOR LTE-NB1 .....	15
5.1.1 <i>Test Band = LTE-NB1 BAND26(814MHz-824MHz)</i> .....	15
<b>6 SPURIOUS EMISSION AT ANTENNA TERMINAL.....</b>	<b>21</b>
6.1 FOR LTE-NB1 .....	21
6.1.1 <i>Test Band = LTE-NB1 BAND26(814MHz-824MHz)</i> .....	21
<b>7 FIELD STRENGTH OF SPURIOUS RADIATION .....</b>	<b>34</b>
7.1 FOR LTE-NB1 .....	34
7.1.1 <i>Test Band = LTE-NB1 BAND26(814MHz-824MHz)</i> .....	34
<b>8 FREQUENCY STABILITY .....</b>	<b>36</b>
8.1 FREQUENCY ERROR VS. VOLTAGE .....	36
8.2 FREQUENCY ERROR VS. TEMPERATURE .....	37

## 1 Effective (Isotropic) Radiated Power Output Data

**Effective Isotropic Radiated Power of Transmitter (EIRP) for LTE-NB1 BAND26**

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Measured (dBm)	ERP (dBm)	limit (dBm)	Verdict
BAND26	TM1	3.75	LCH	1T0	22.29	18.74	50.00	PASS
				1T47	22.36	18.81	50.00	PASS
			MCH	1T0	22.72	19.17	50.00	PASS
				1T47	22.68	19.13	50.00	PASS
			HCH	1T0	22.76	19.21	50.00	PASS
				1T47	22.71	19.16	50.00	PASS
	TM2	3.75	LCH	1T0	22.28	18.73	50.00	PASS
				1T47	22.32	18.77	50.00	PASS
			MCH	1T0	22.67	19.12	50.00	PASS
				1T47	22.67	19.12	50.00	PASS
			HCH	1T0	22.74	19.19	50.00	PASS
				1T47	22.68	19.13	50.00	PASS

Test Band	Test Mode	Sub-carrier Spacing (kHz)	Test channel	Number of T	Measured (dBm)	ERP (dBm)	limit (dBm)	Verdict
BAND26	TM1	15	LCH	1T0	22.04	18.49	50.00	PASS
				1T11	22.03	18.48	50.00	PASS
			MCH	1T0	22.71	19.16	50.00	PASS
				1T11	22.64	19.09	50.00	PASS
			HCH	1T0	22.82	19.27	50.00	PASS
				1T11	22.75	19.2	50.00	PASS
	TM2	15	LCH	1T0	22.13	18.58	50.00	PASS
				1T11	22.02	18.47	50.00	PASS
			MCH	12T0	20.4	16.85	50.00	PASS
				1T0	22.69	19.14	50.00	PASS
				1T11	22.61	19.06	50.00	PASS
			HCH	12T0	20.67	17.12	50.00	PASS
				1T0	22.76	19.21	50.00	PASS
				1T11	22.81	19.26	50.00	PASS
				12T0	20.78	17.23	50.00	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

## 2 Peak-to-Average Ratio

### Part I - Test Results

Test Band	Test Mode	Test Channel	Measured[dB]	Limit [dB]	Verdict
BAND26	TM1/1T	LCH	5.16	13	PASS
		MCH	4.67	13	PASS
		HCH	4.96	13	PASS
	TM2/1T	LCH	4.12	13	PASS
		MCH	4.46	13	PASS
		HCH	5.51	13	PASS
	TM2/Full T	LCH	4.84	13	PASS
		MCH	3.42	13	PASS
		HCH	4.72	13	PASS

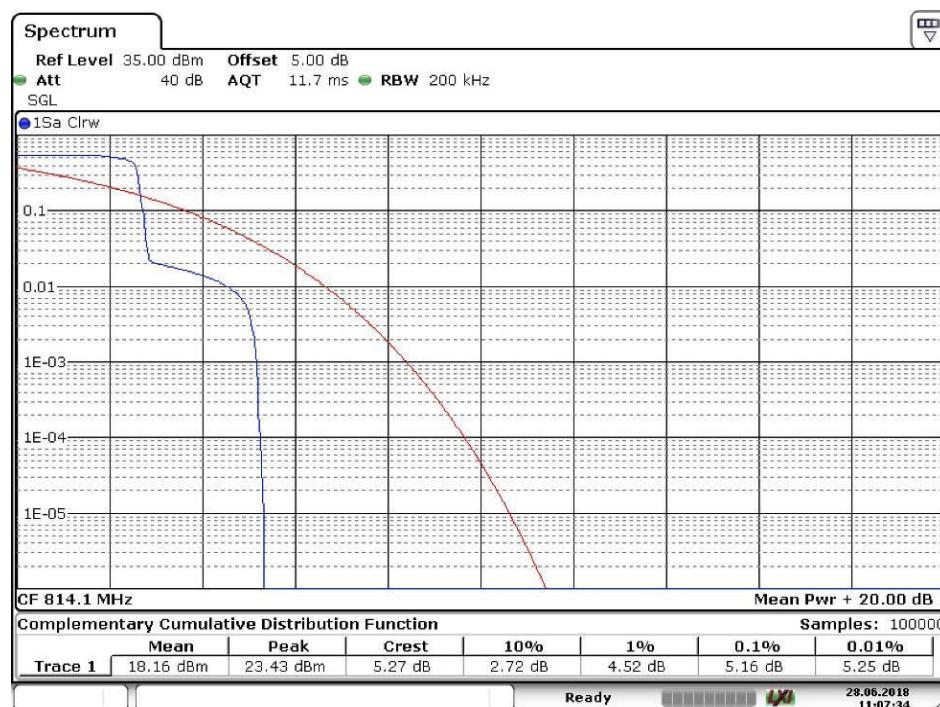
### Part II - Test Plots

#### 2.1 For LTE-NB1

##### 2.1.1 Test Band = LTE-NB1 BAND26(814MHz-824MHz)

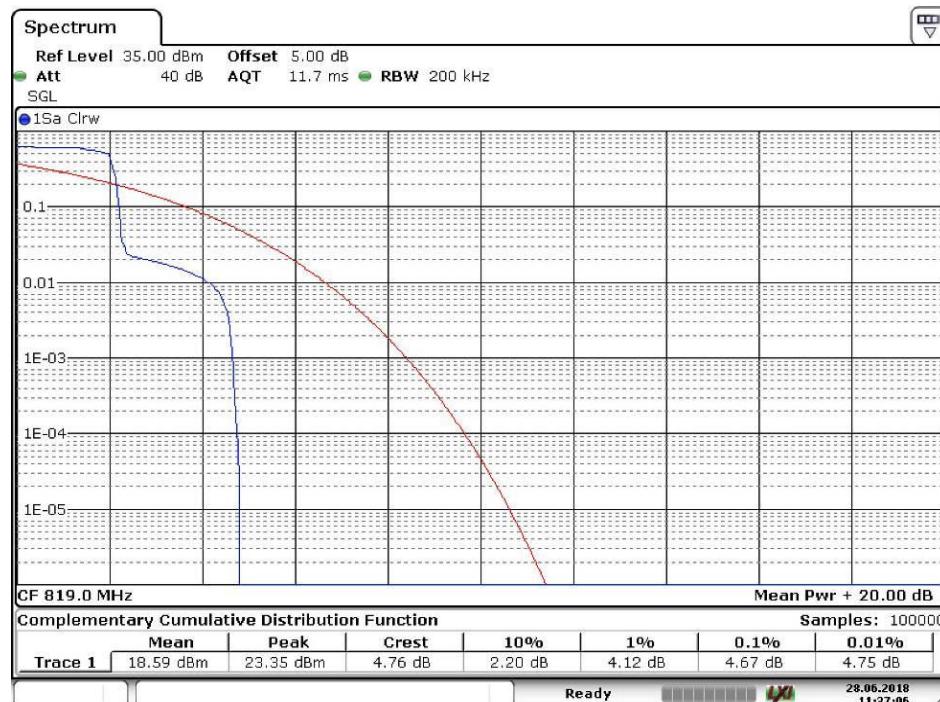
###### 2.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

###### 2.1.1.1.1 Test Channel = LCH



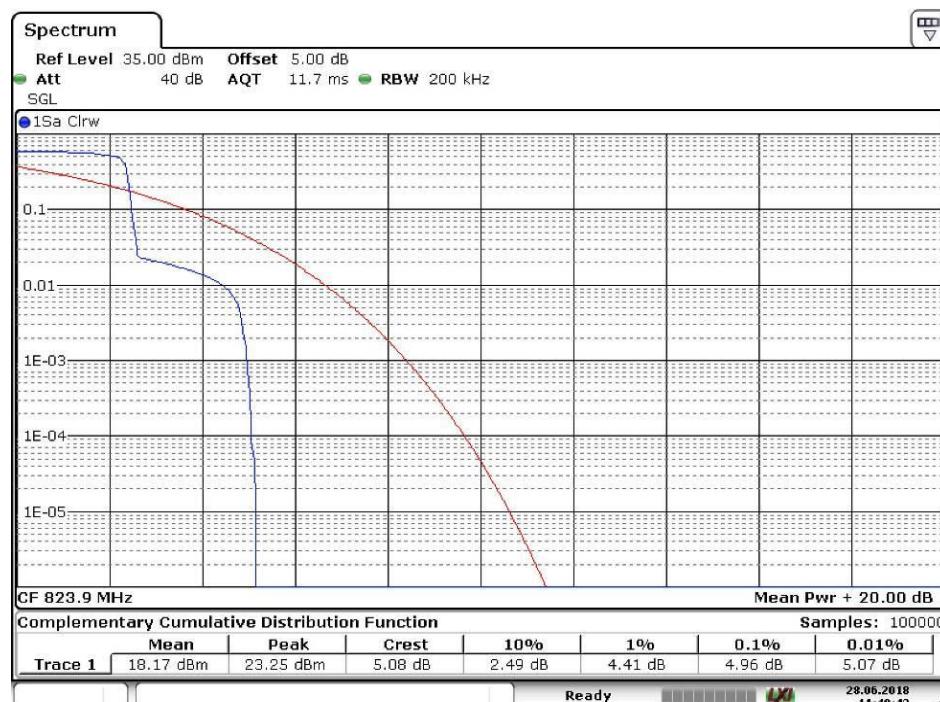
Date: 28.JUN.2018 11:07:35

### 2.1.1.1.2 Test Channel = MCH



Date: 28.JUN.2018 11:37:06

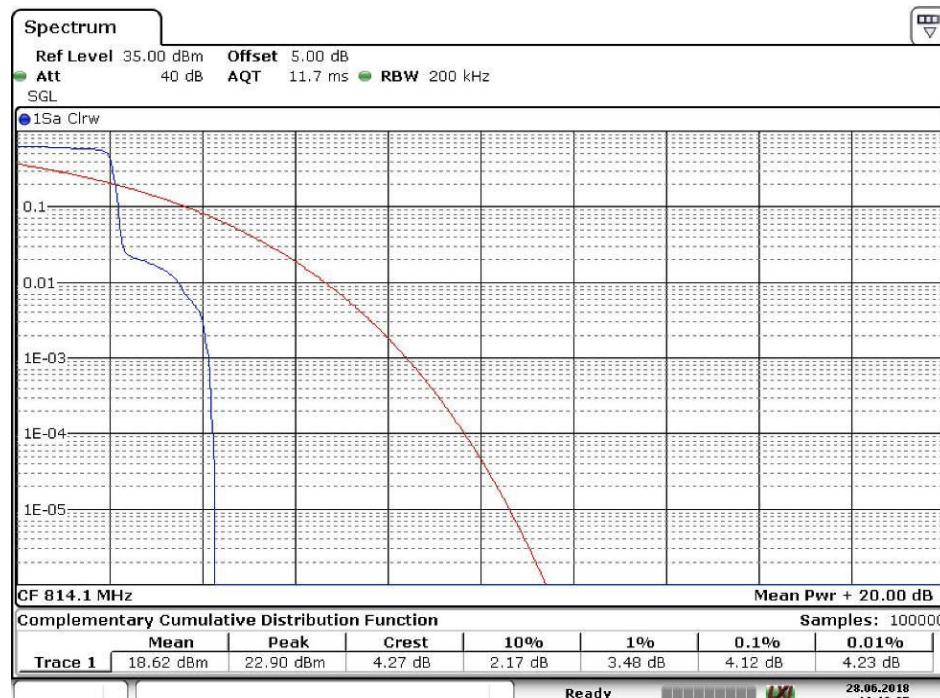
### 2.1.1.1.3 Test Channel = HCH



Date: 28.JUN.2018 11:49:43

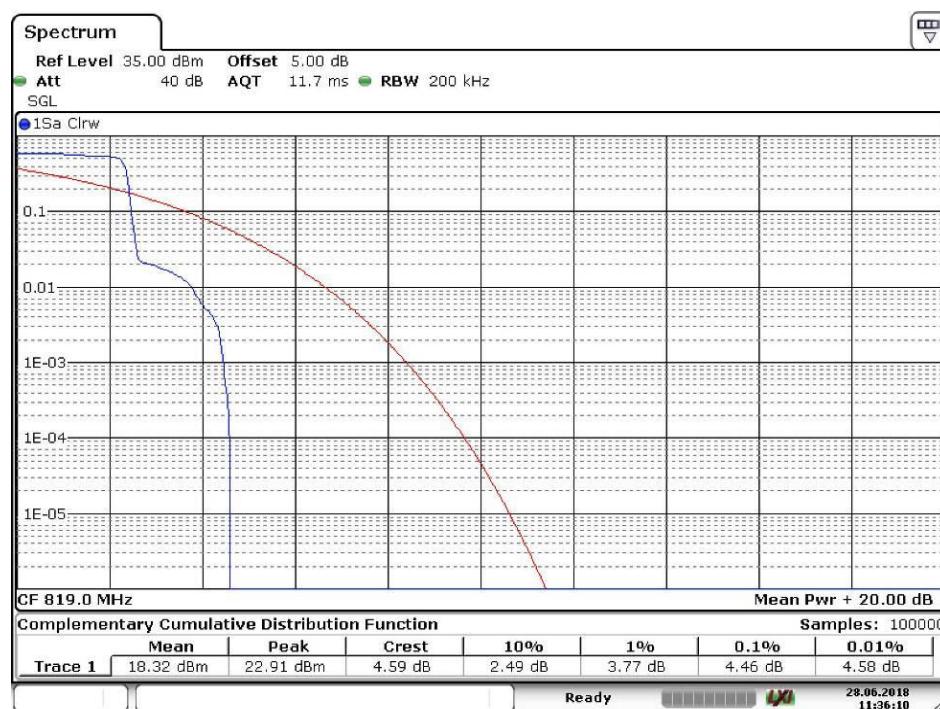
### 2.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=1T0

#### 2.1.1.2.1 Test Channel = LCH



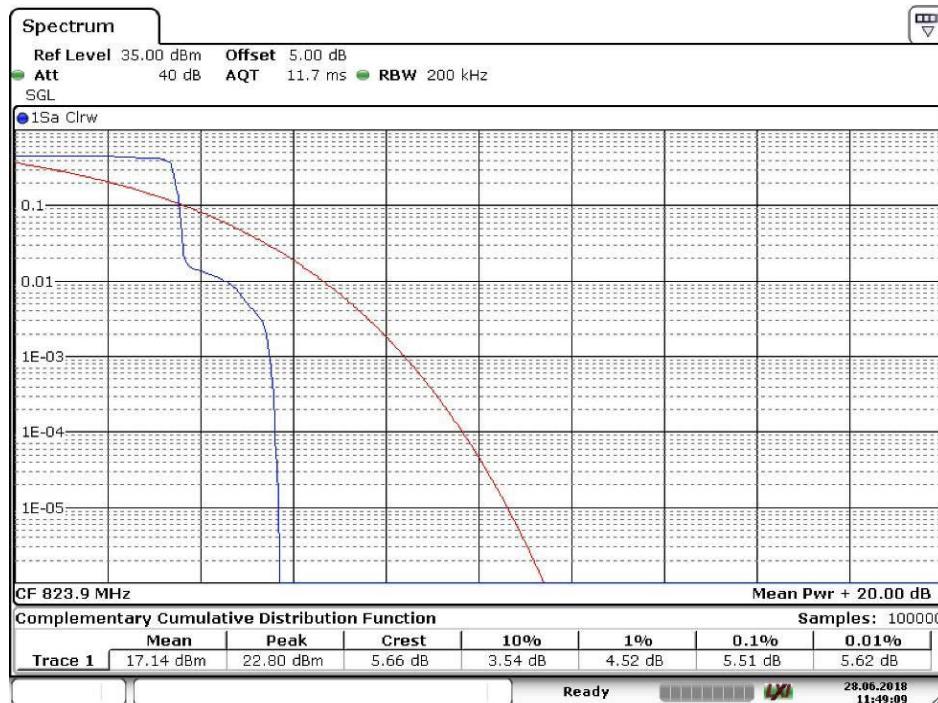
Date: 28.JUN.2018 11:10:05

#### 2.1.1.2.2 Test Channel = MCH



Date: 28.JUN.2018 11:36:10

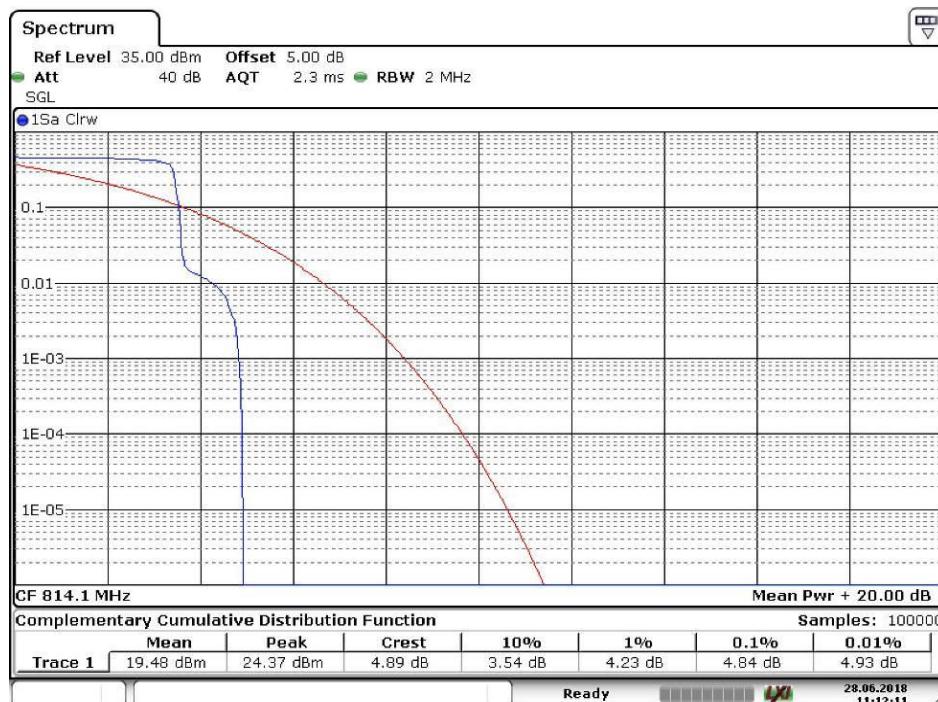
### 2.1.1.2.3 Test Channel = HCH



Date: 28.JUN.2018 11:49:09

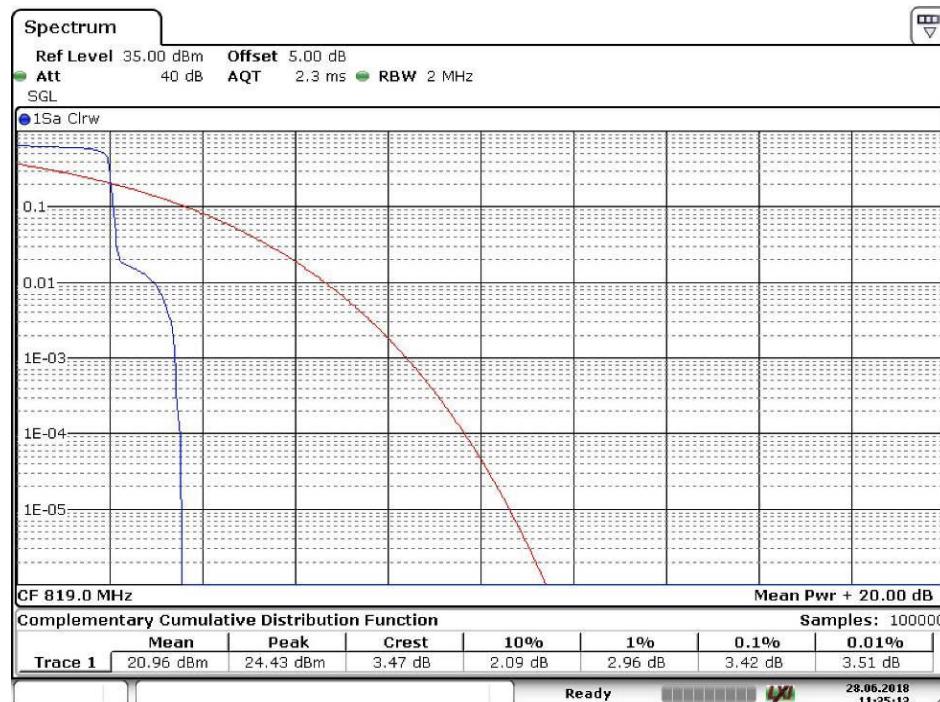
### 2.1.1.3 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0

#### 2.1.1.3.1 Test Channel = LCH



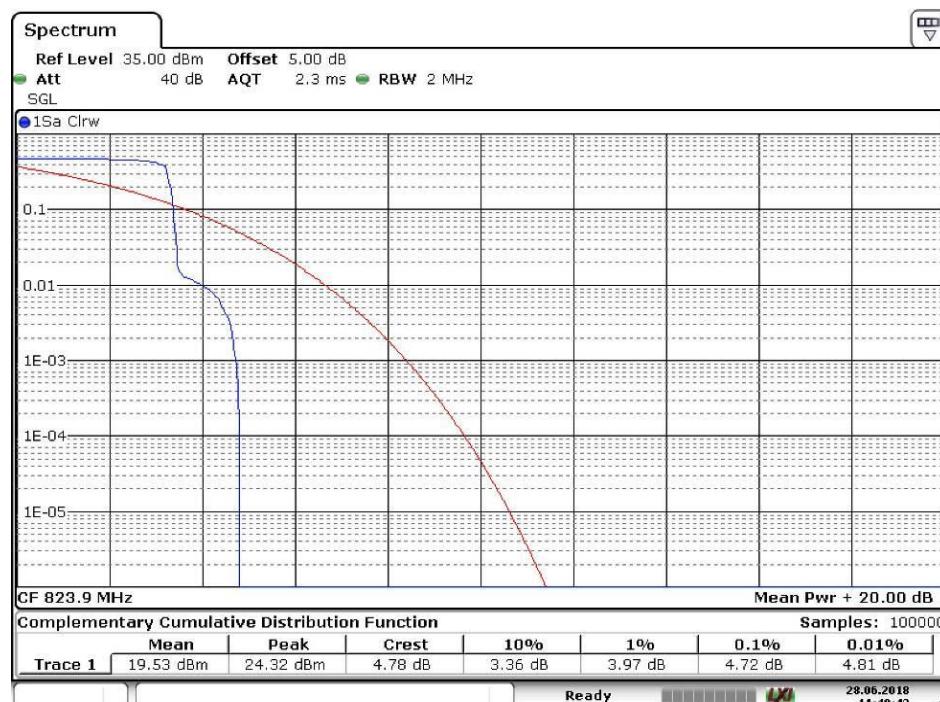
Date: 28.JUN.2018 11:12:11

### 2.1.1.3.2 Test Channel = MCH



Date: 28.JUN.2018 11:35:14

### 2.1.1.3.3 Test Channel = HCH



Date: 28.JUN.2018 11:48:43

### 3 Modulation Characteristics

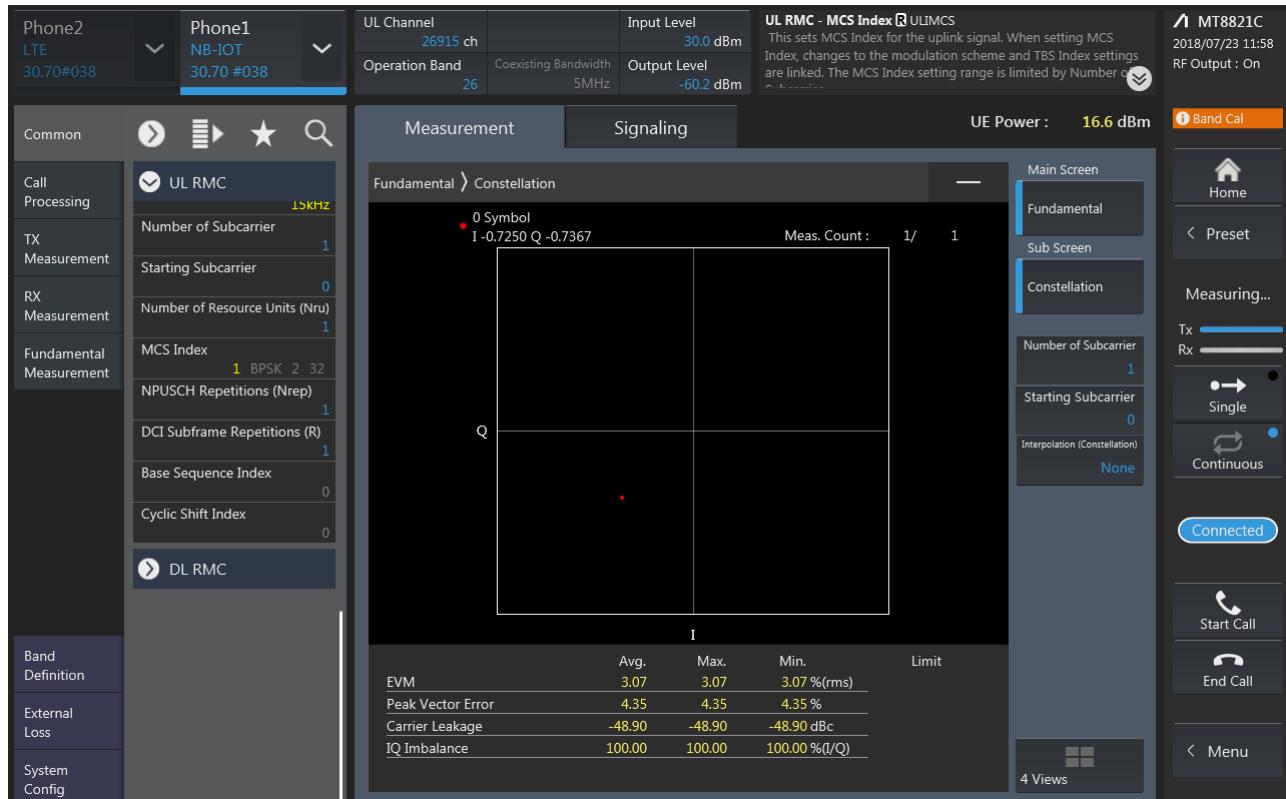
#### Part I - Test Plots

##### 3.1 For LTE-NB1

###### 3.1.1 Test Band = LTE-NB1 BAND26(814MHz-824MHz)

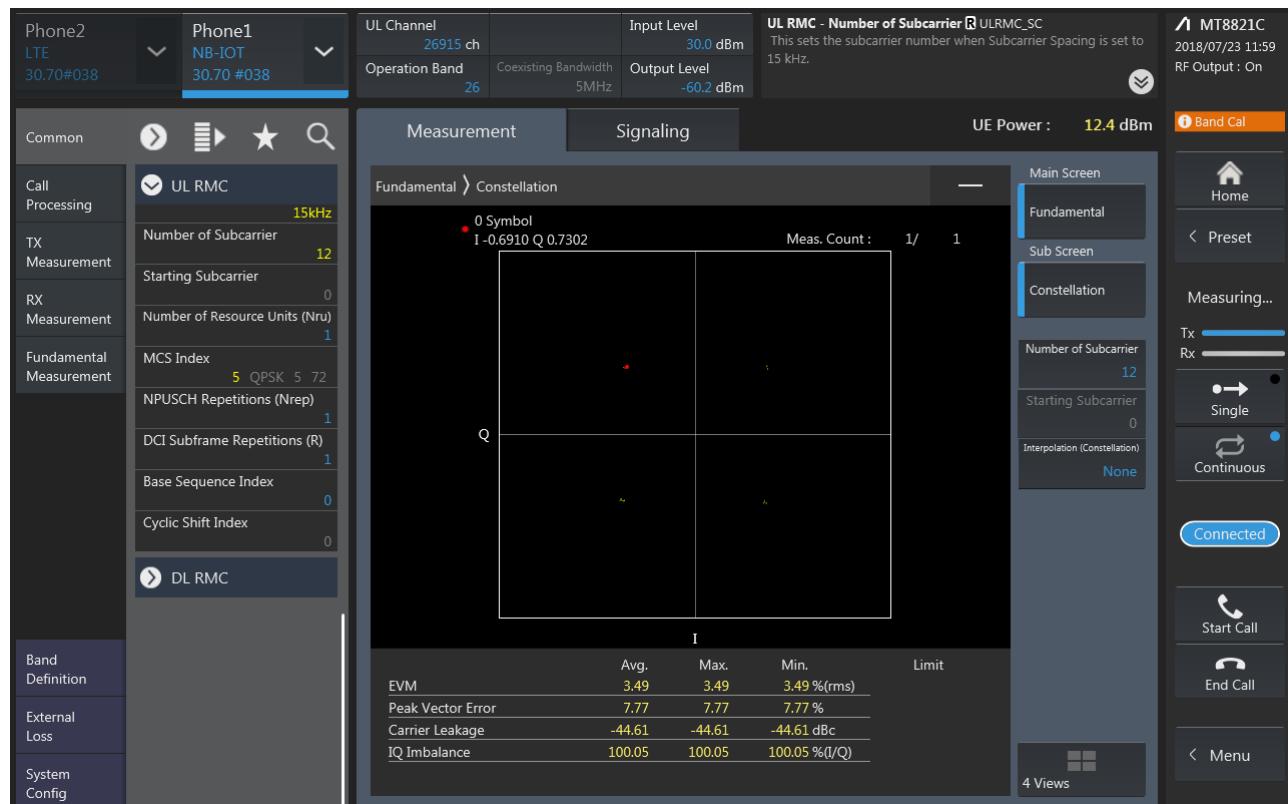
###### 3.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz.T size=1T0

###### 3.1.1.1.1 Test Channel = MCH



### 3.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0

#### 3.1.1.2.1 Test Channel = MCH



## 4 Bandwidth

### Part I - Test Results

Test Band	Test Mode	Test Channel	Occupied Bandwidth [kHz]	Emission Bandwidth [kHz]	Verdict
BAND26	TM2/15kHz	LCH	184.61	243.76	PASS
		MCH	185.01	243.76	PASS
		HCH	185.01	242.96	PASS

### 4.1 For LTE-NB1

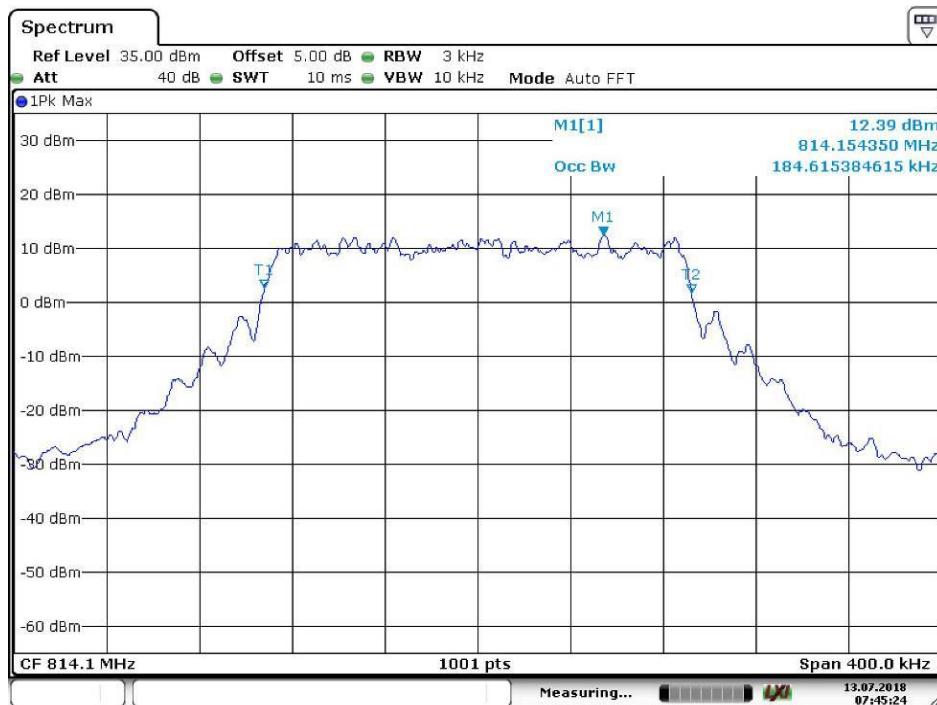
#### 4.1.1 Test Band = LTE-NB1 BAND26(814MHz-824MHz)

##### 4.1.1.1 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz.T size=12T0

###### 4.1.1.1.1 Test Channel = LCH



Date: 13.JUL.2018 07:45:51

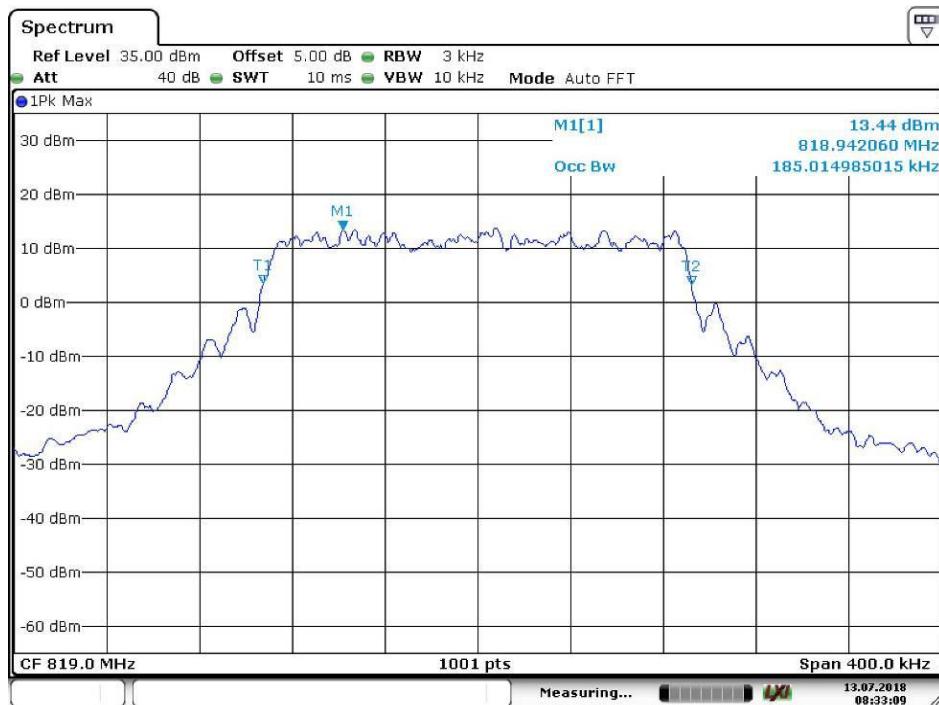


Date: 13.JUL.2018 07:45:24

#### 4.1.1.1.2 Test Channel = MCH

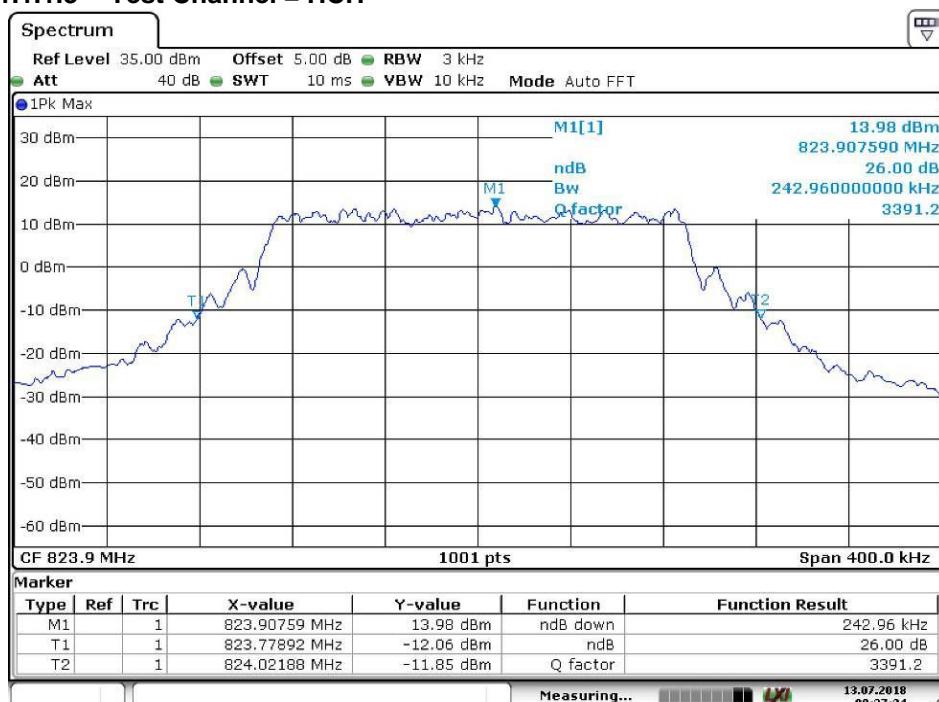


Date: 13.JUL.2018 08:33:35

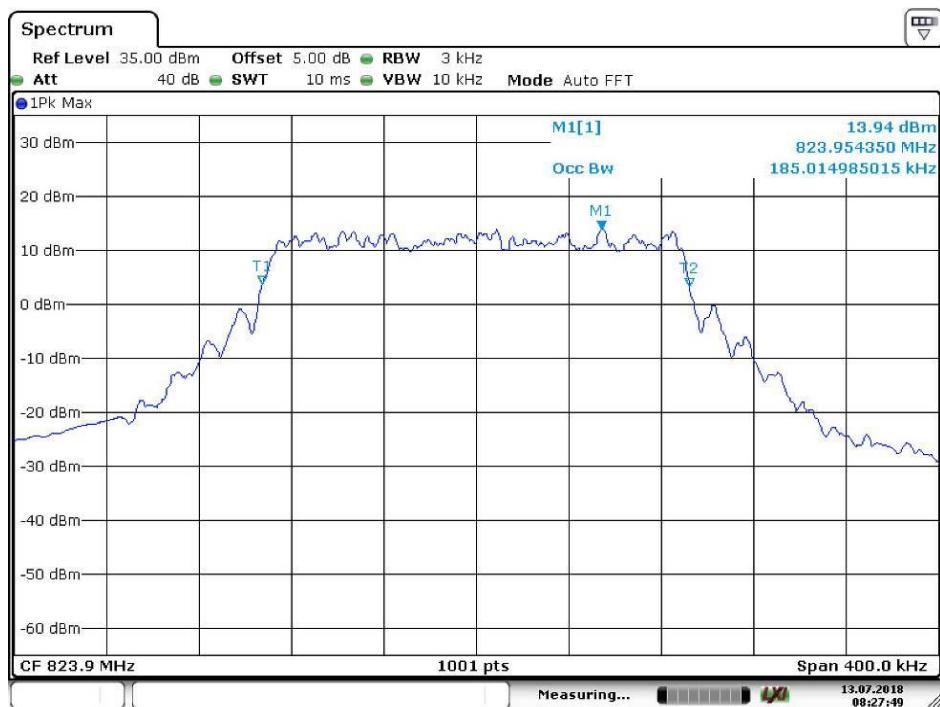


Date: 13.JUL.2018 08:33:10

#### 4.1.1.1.3 Test Channel = HCH



Date: 13.JUL.2018 08:27:34



Date: 13.JUL.2018 08:27:50

## 5 Emission Mask

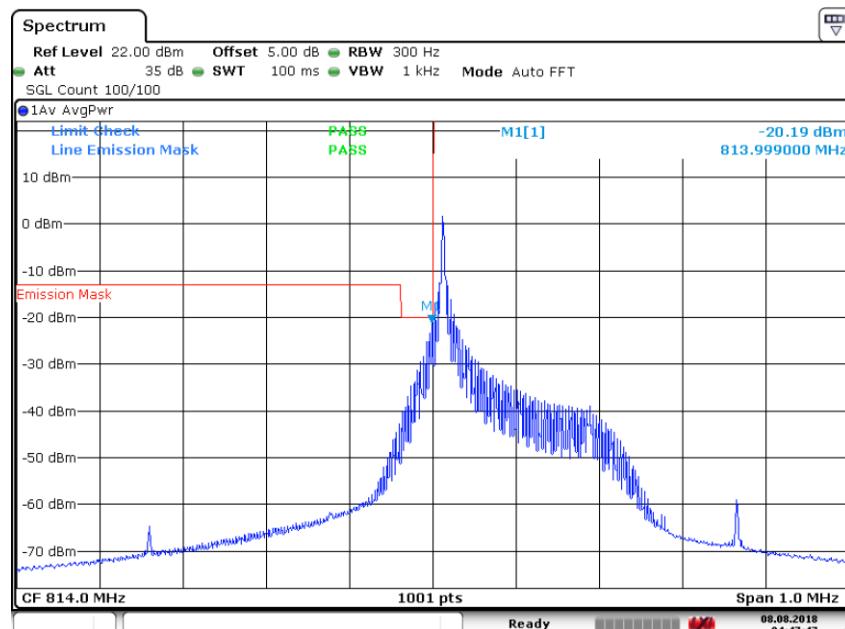
### 5.1 For LTE-NB1

#### 5.1.1 Test Band = LTE-NB1 BAND26(814MHz-824MHz)

##### 5.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=3.75kHz

###### 5.1.1.1.1 Test Channel = LCH

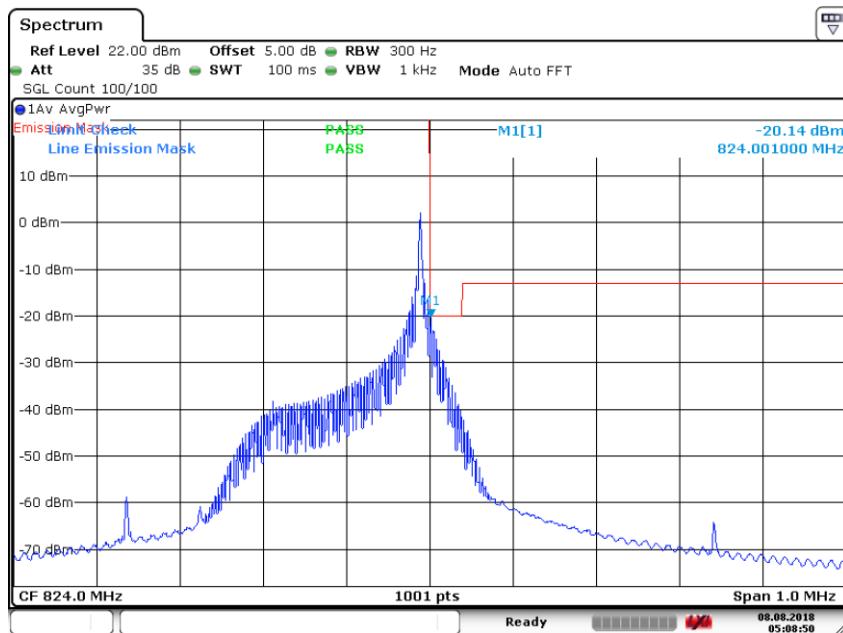
###### 5.1.1.1.1.1 Test T size=1T



Date: 8.AUG.2018 04:47:48

### 5.1.1.1.2 Test Channel = HCH

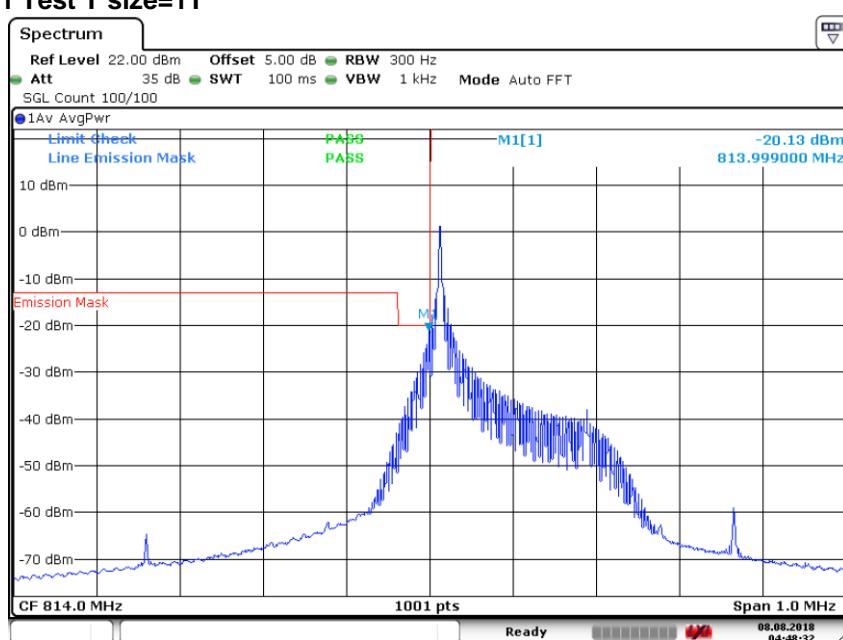
#### 5.1.1.1.2.1 Test T size=1T



### 5.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=3.75kHz

#### 5.1.1.2.1 Test Channel = LCH

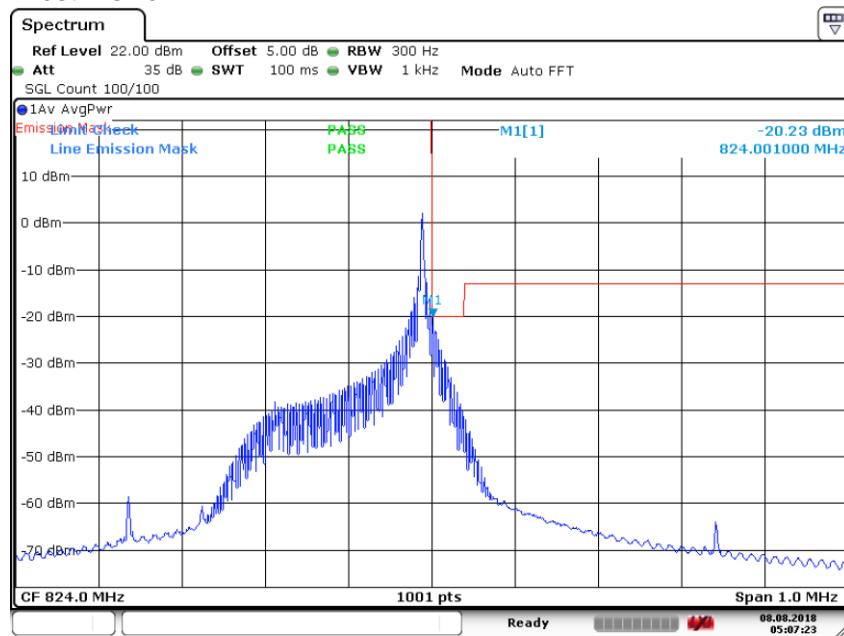
##### 5.1.1.2.1.1 Test T size=1T



Date: 08.AUG.2018 04:48:33

### 5.1.1.2.2 Test Channel = HCH

#### 5.1.1.2.2.1 Test T size=1T

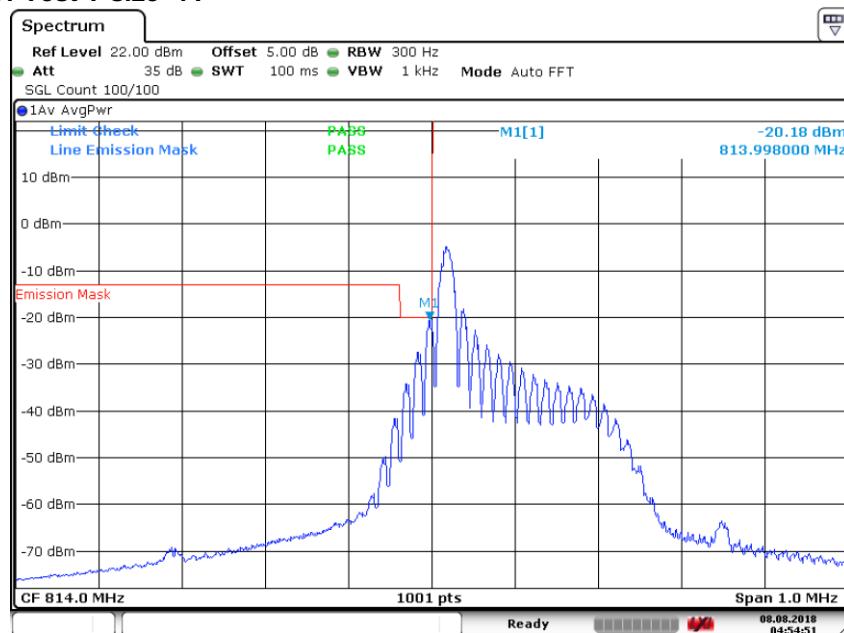


Date: 8.AUG.2018 05:07:24

### 5.1.1.3 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz

#### 5.1.1.3.1 Test Channel = LCH

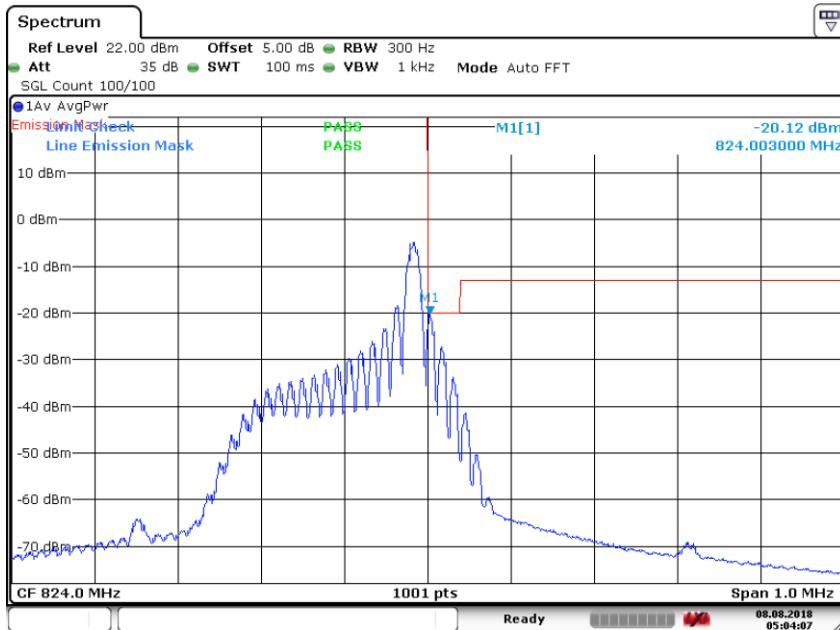
##### 5.1.1.3.1.1 Test T size=1T



Date: 8.AUG.2018 04:54:51

### 5.1.1.3.2 Test Channel = HCH

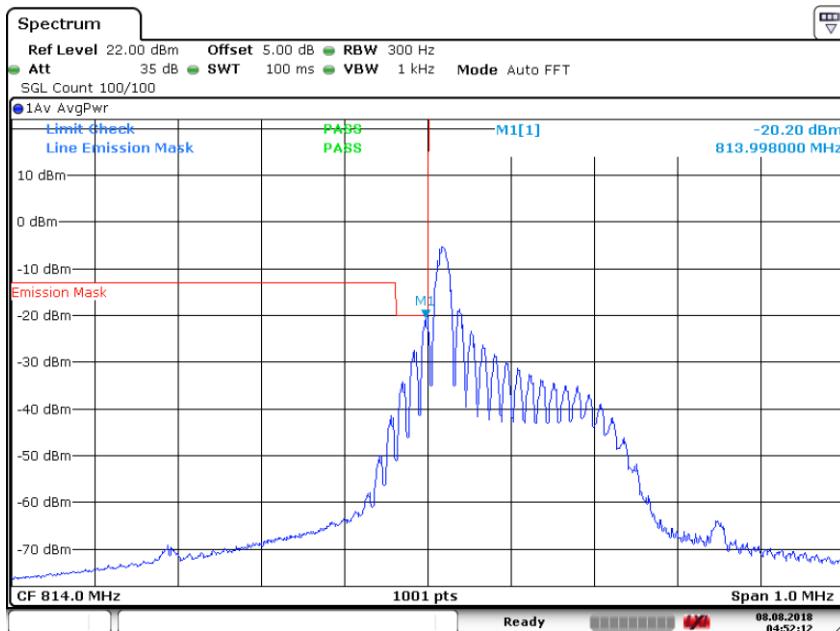
#### 5.1.1.3.2.1 Test T size=1T



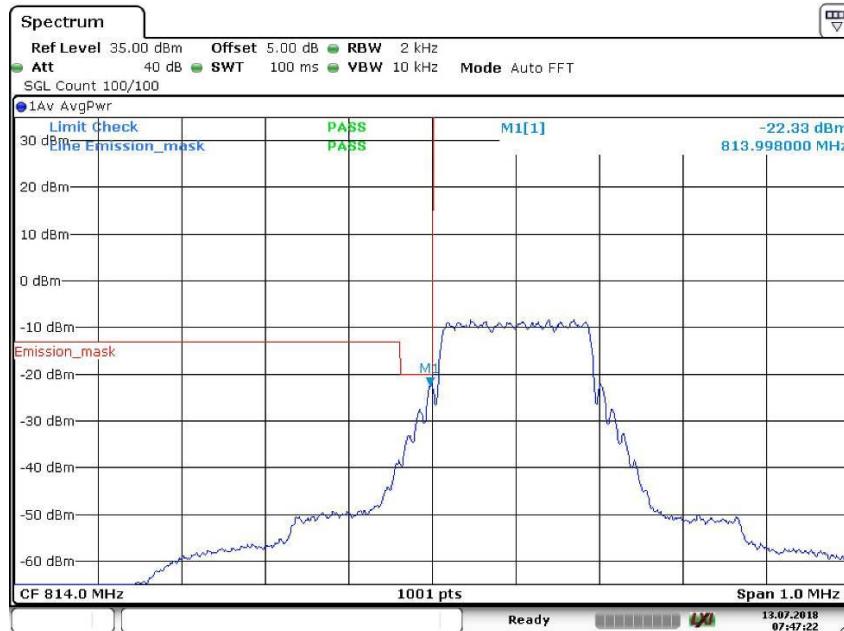
### 5.1.1.4 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz

#### 5.1.1.4.1 Test Channel = LCH

##### 5.1.1.4.1.1 Test T size=1T

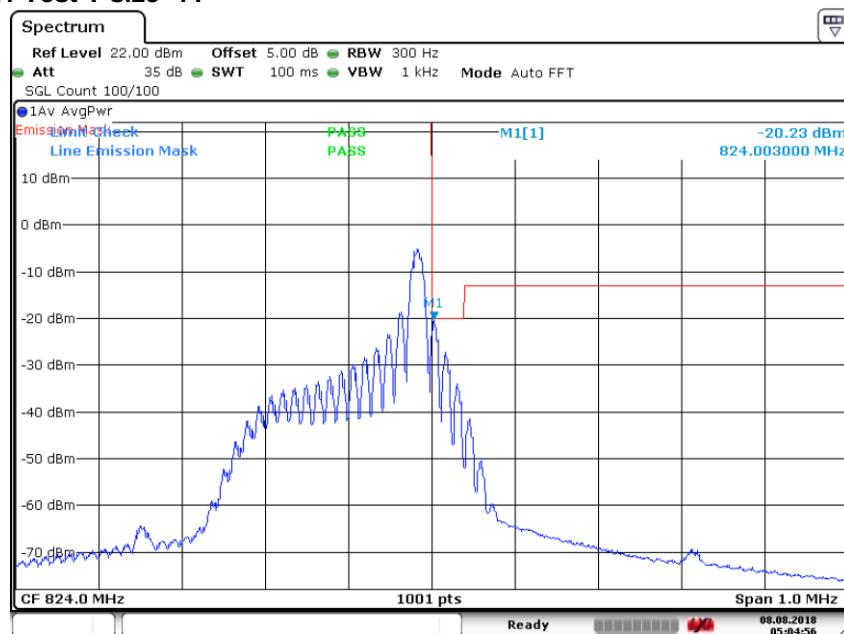


### 5.1.1.4.1.2 Test T size=Full T



### 5.1.1.4.2 Test Channel = HCH

#### 5.1.1.4.2.1 Test T size=1T



#### 5.1.1.4.2.2 Test T size=Full T



## 6 Spurious Emission at Antenna Terminal

NOTE1: 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.

NOTE2: only the worst case data displayed in this report.

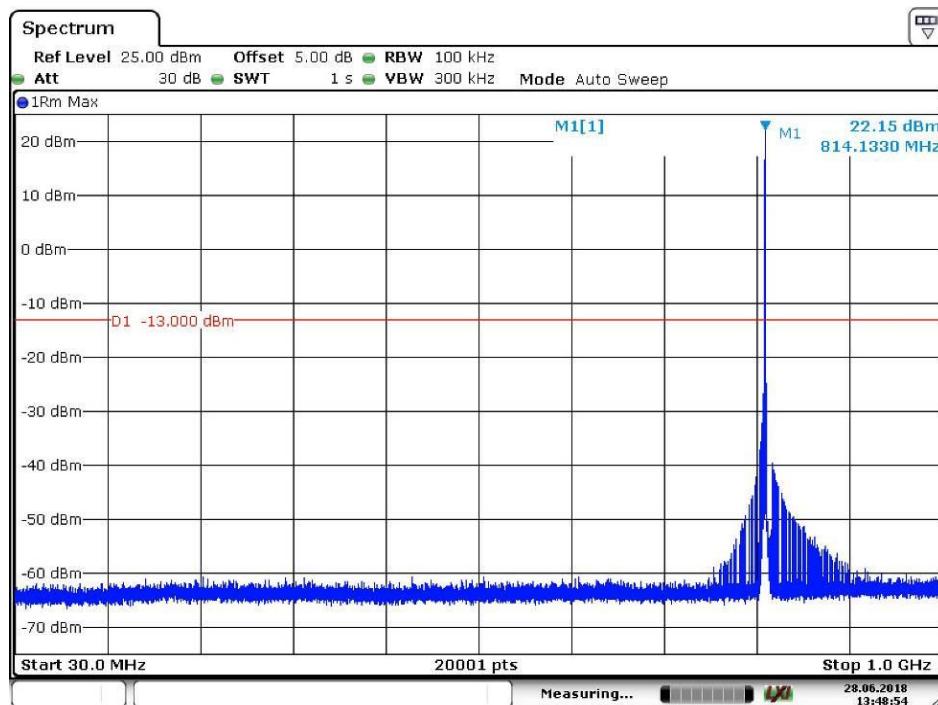
Part I - Test Plots

### 6.1 For LTE-NB1

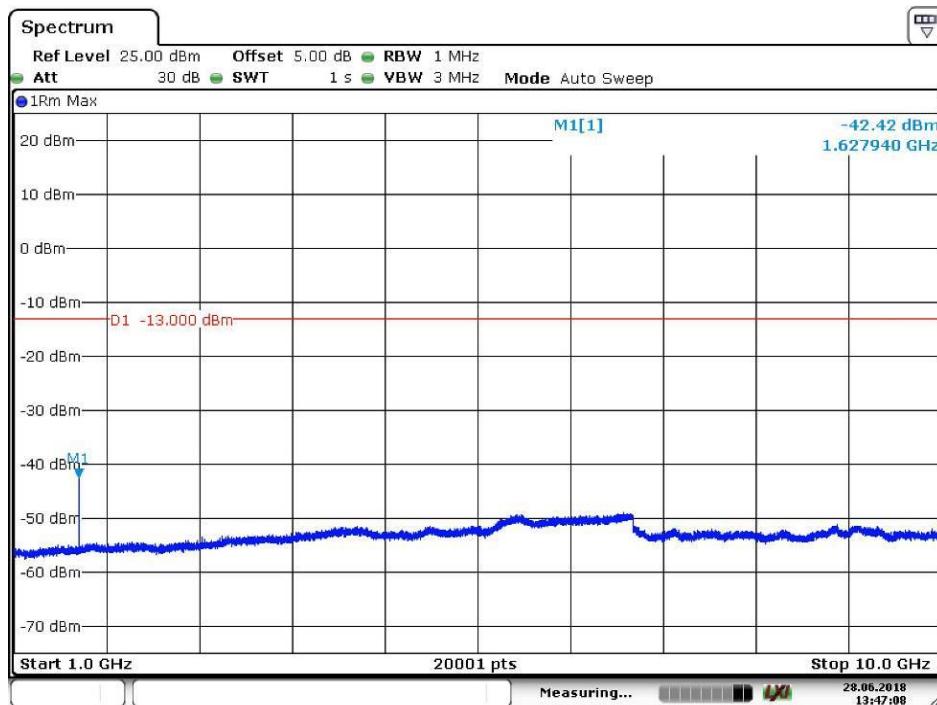
#### 6.1.1 Test Band = LTE-NB1 BAND26(814MHz-824MHz)

##### 6.1.1.1 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=3.75kHz

###### 6.1.1.1.1 Test Channel = LCH

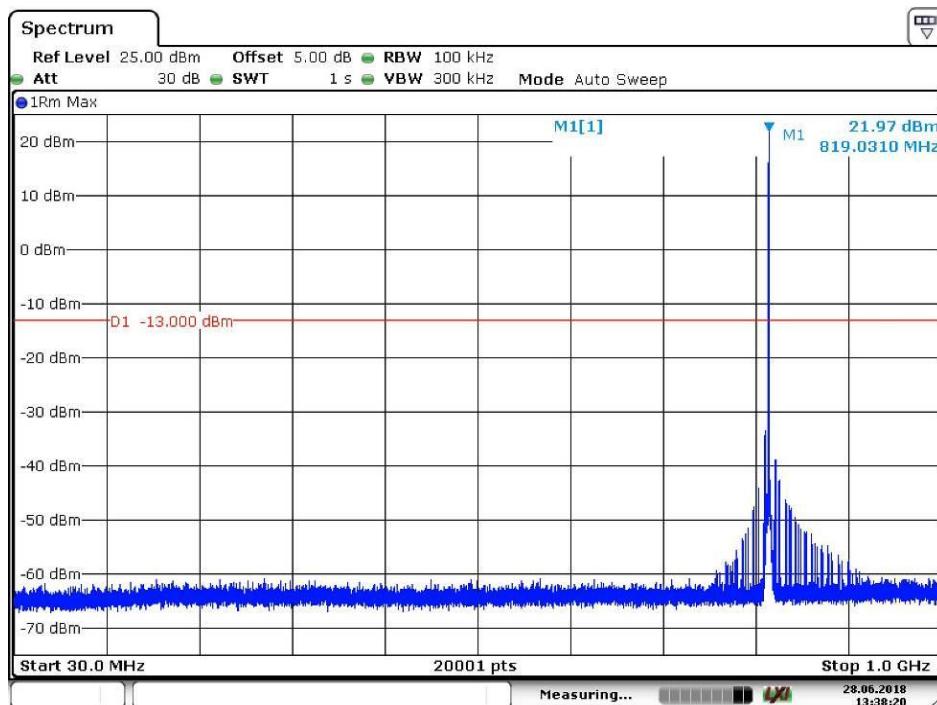


Date: 28.JUN.2018 13:48:54

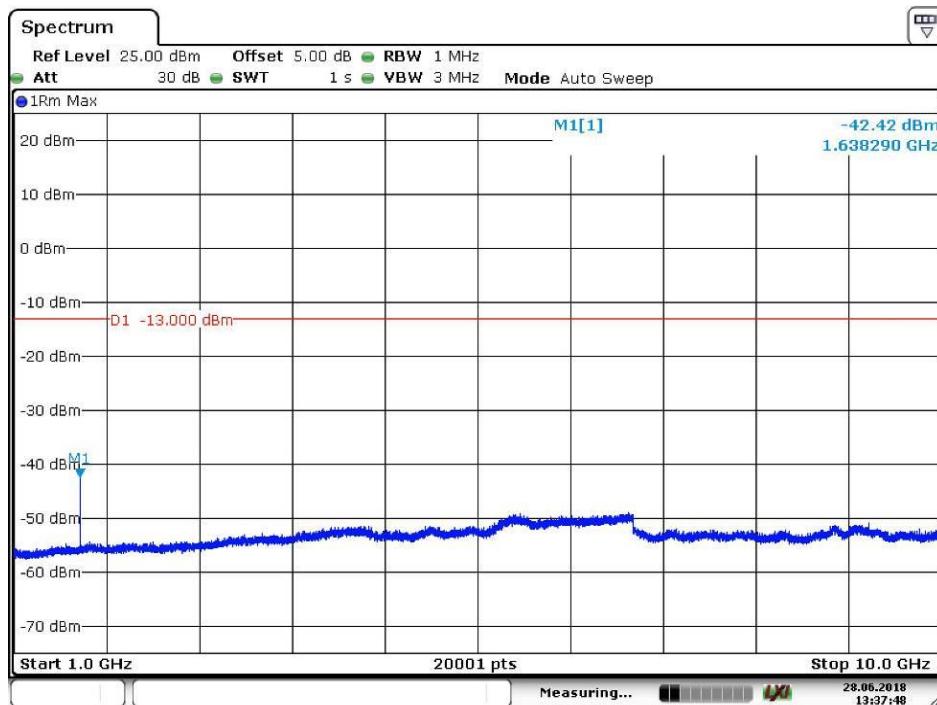


Date: 28.JUN.2018 13:47:09

#### 6.1.1.1.2 Test Channel = MCH

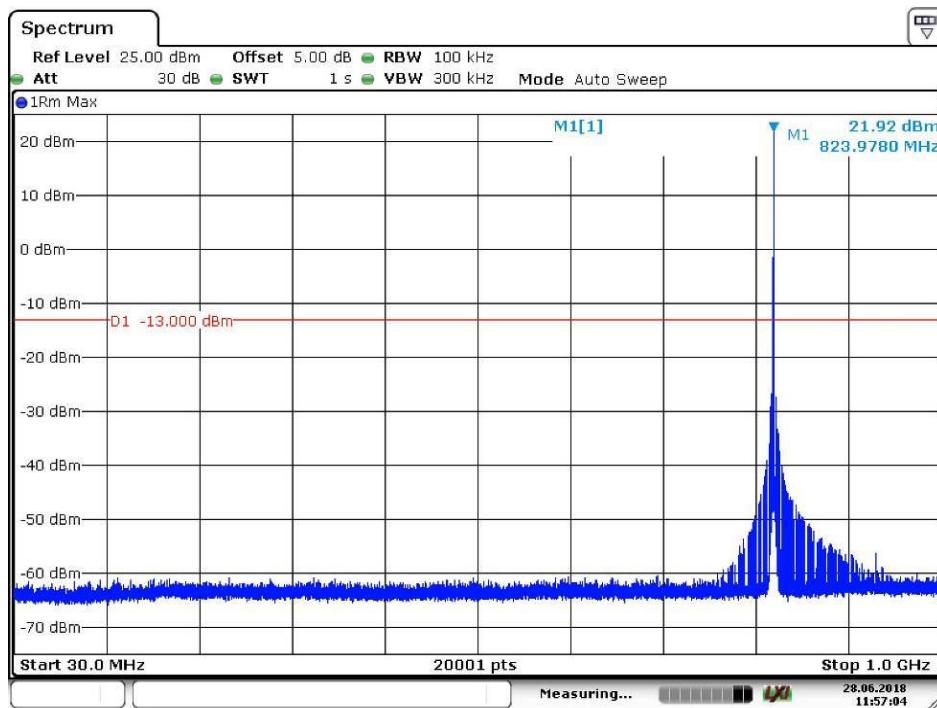


Date: 28.JUN.2018 13:38:20

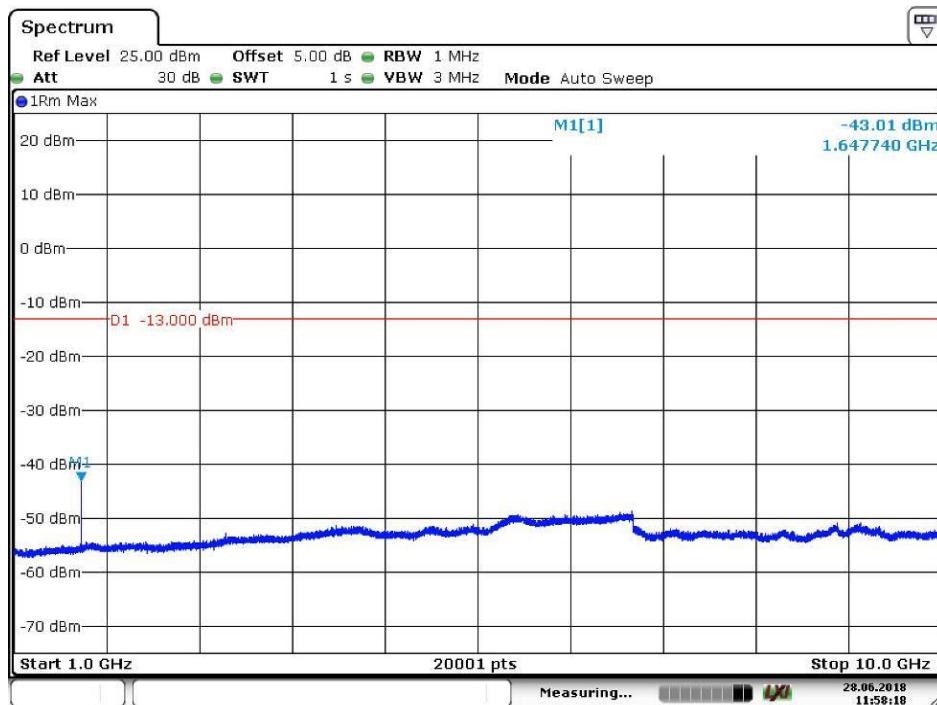


Date: 28.JUN.2018 13:37:48

#### 6.1.1.1.3 Test Channel = HCH



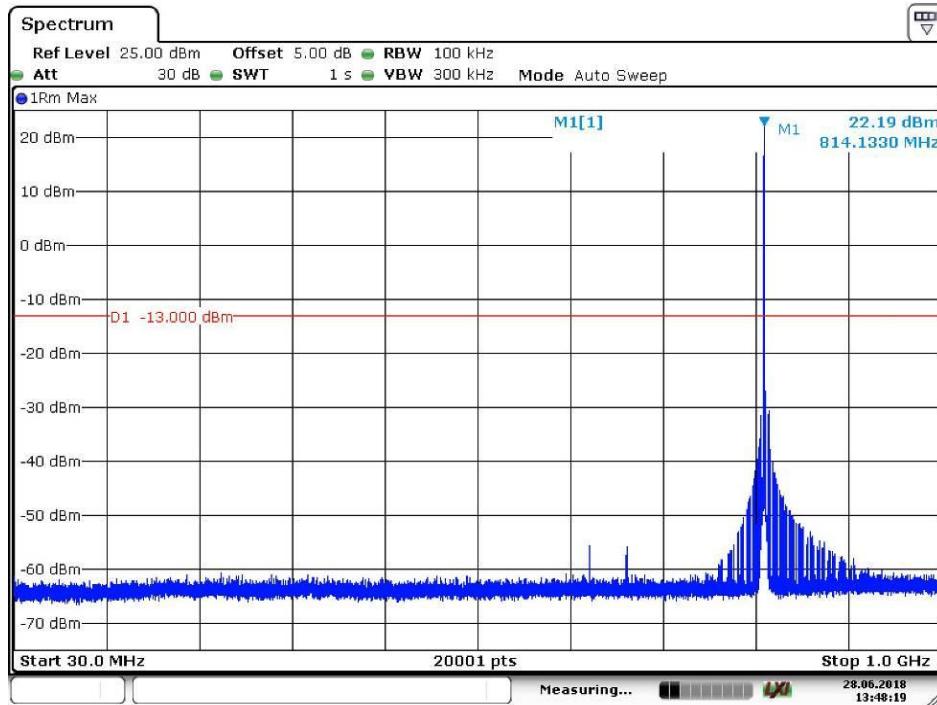
Date: 28.JUN.2018 11:57:05



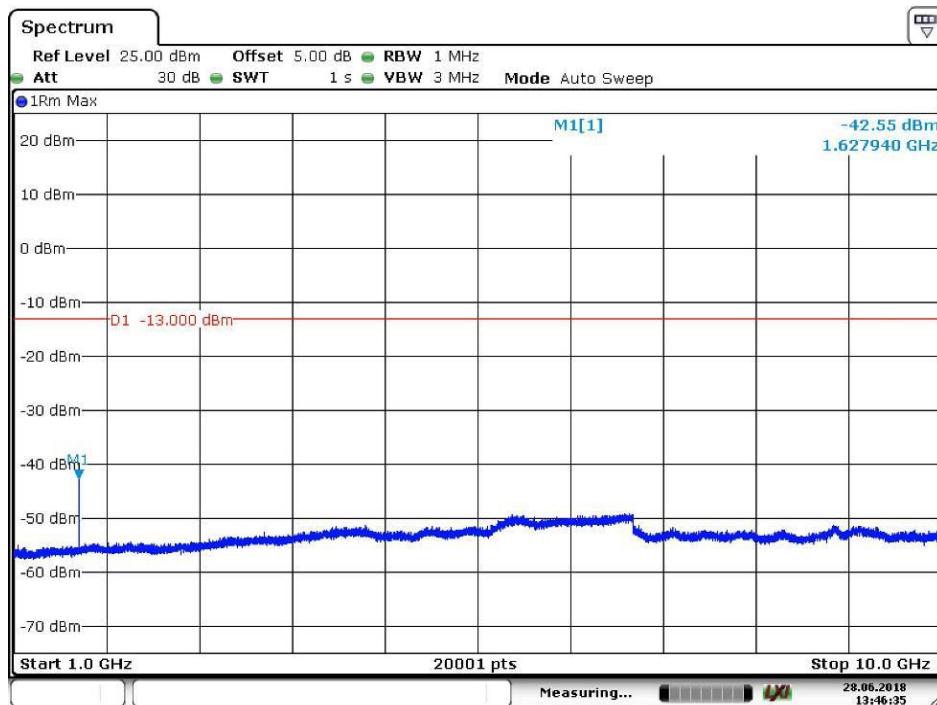
Date: 28.JUN.2018 11:58:18

### 6.1.1.2 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=3.75kHz

#### 6.1.1.2.1 Test Channel = LCH

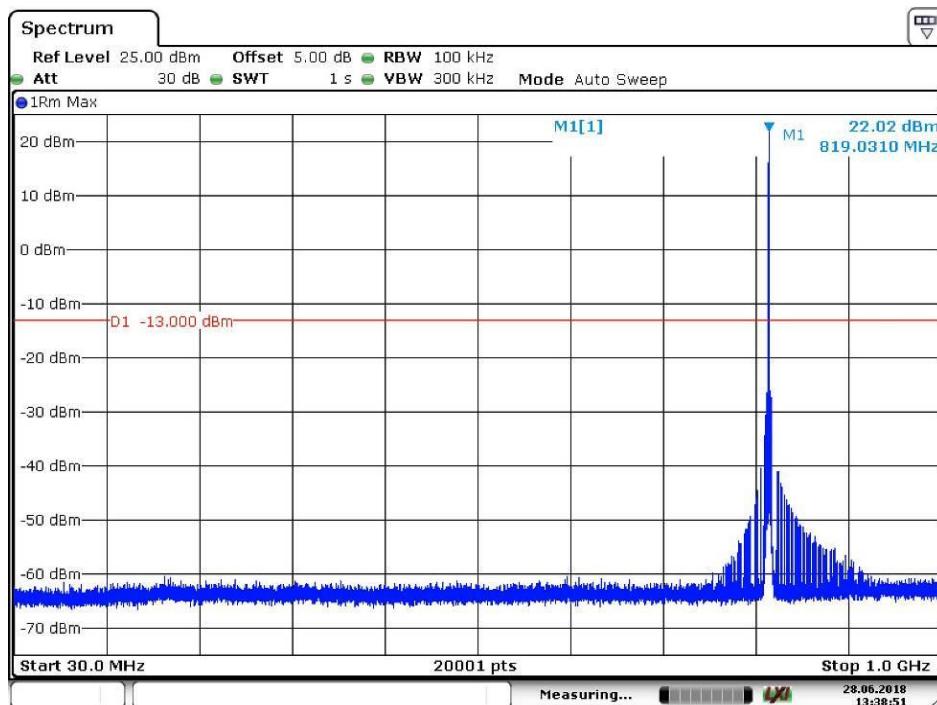


Date: 28.JUN.2018 13:48:20

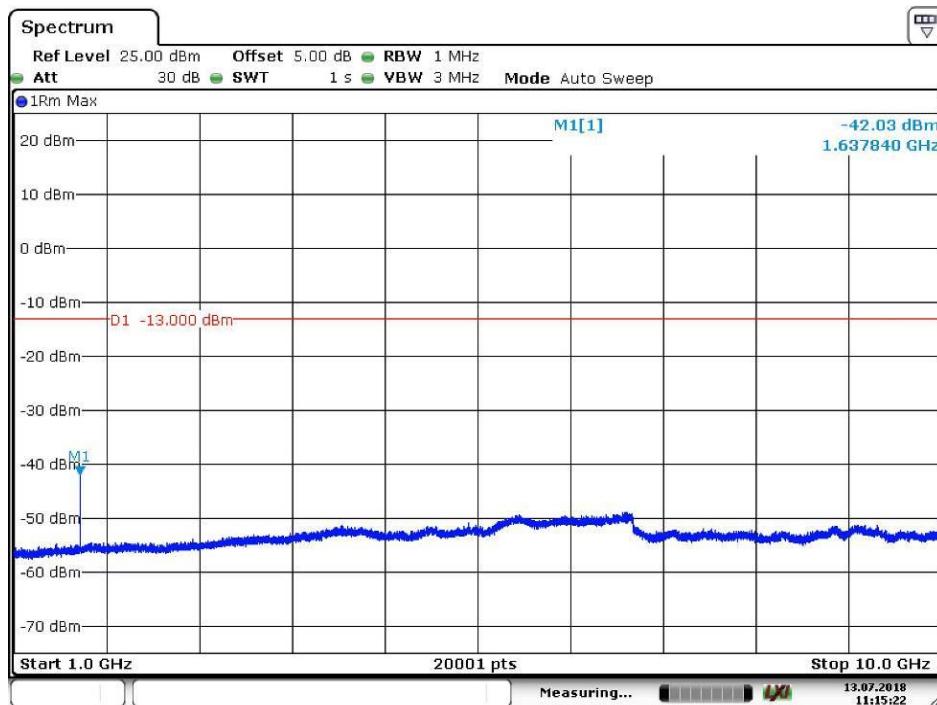


Date: 28.JUN.2018 13:46:35

#### 6.1.1.2.2 Test Channel = MCH

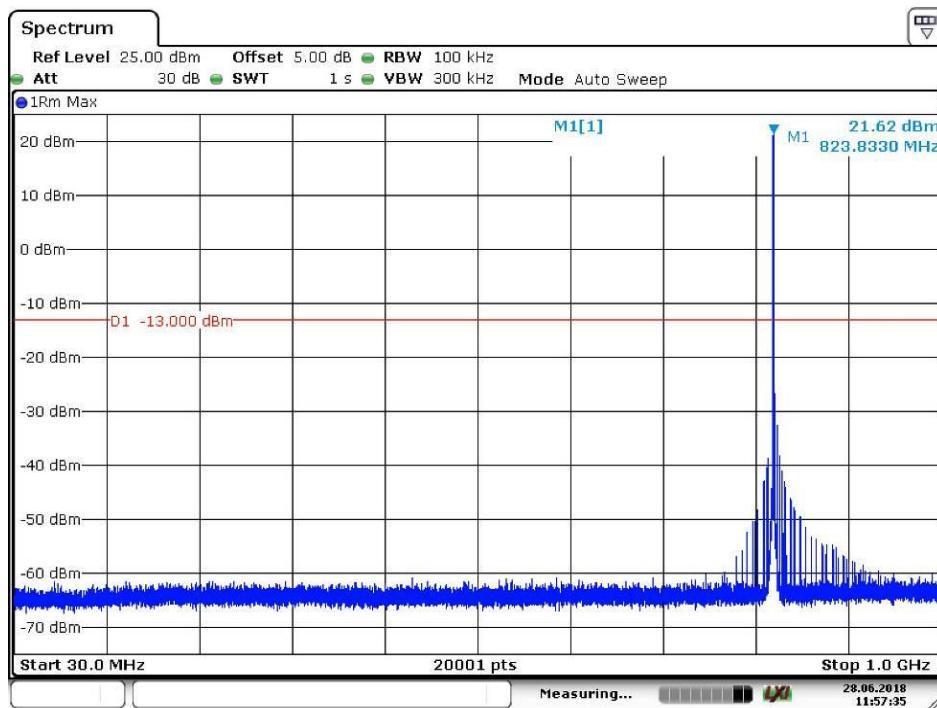


Date: 28.JUN.2018 13:38:51

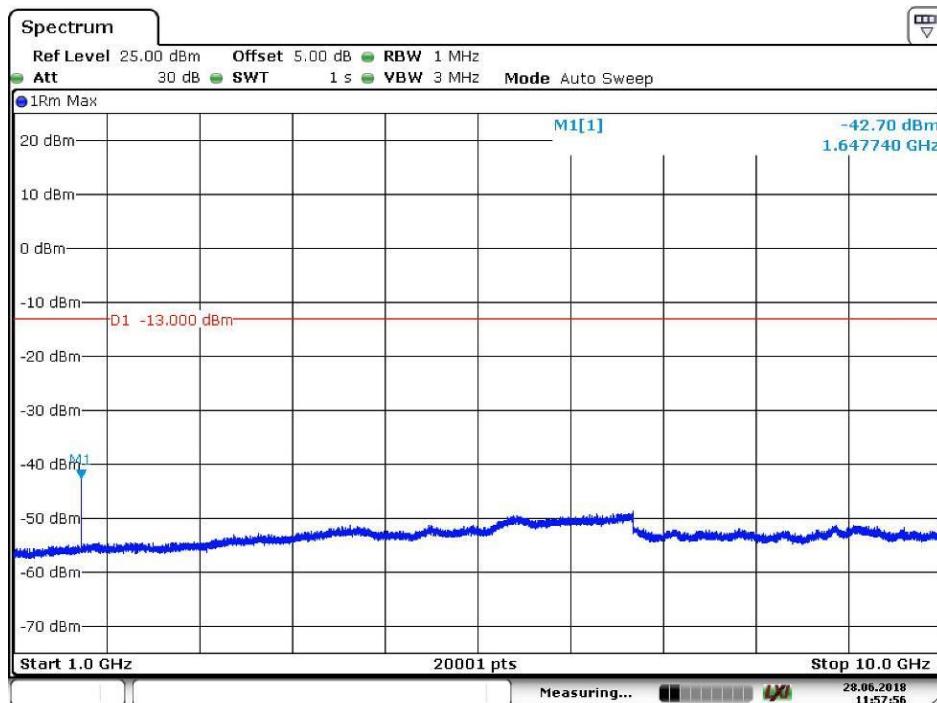


Date: 13.JUL.2018 11:15:22

#### 6.1.1.2.3 Test Channel = HCH



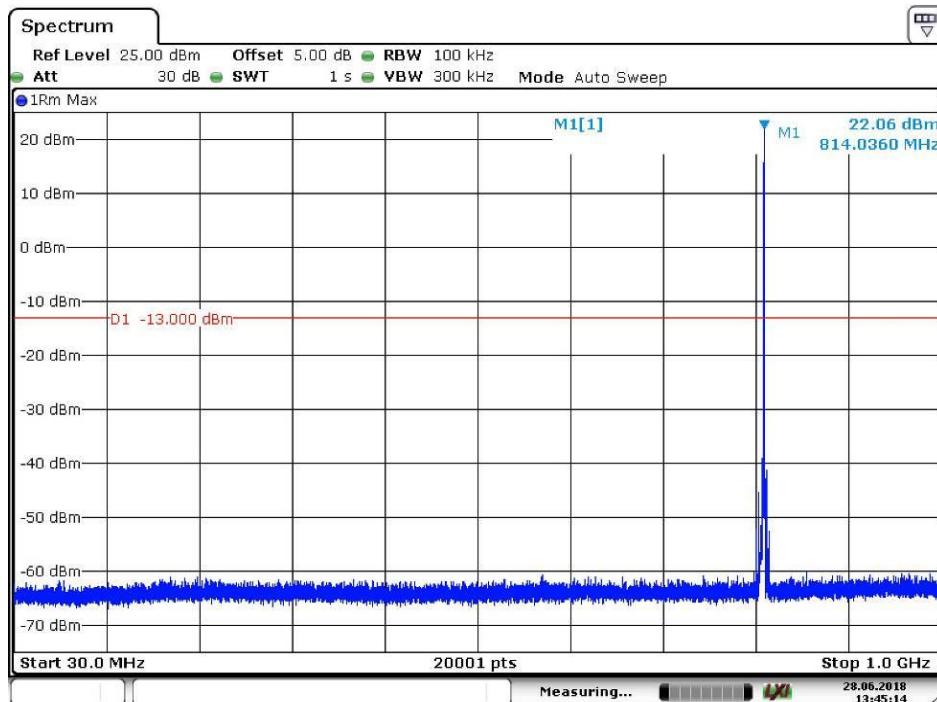
Date: 28.JUN.2018 11:57:35



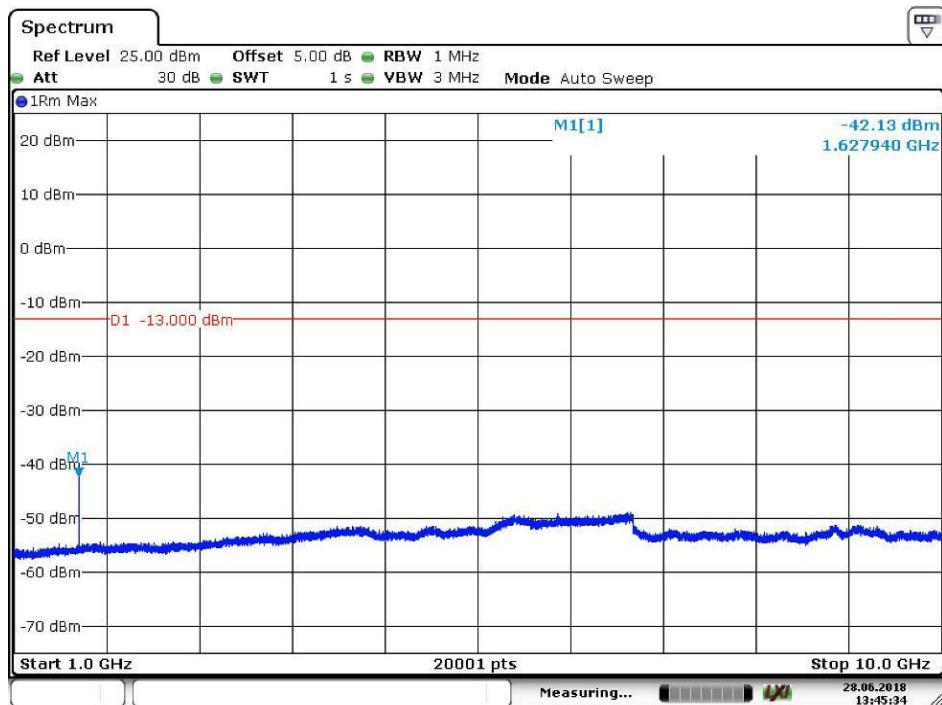
Date: 28.JUN.2018 11:57:56

### 6.1.1.3 Test Mode = LTE-NB1/TM1.Sub-carrier spacing=15kHz

#### 6.1.1.3.1 Test Channel = LCH

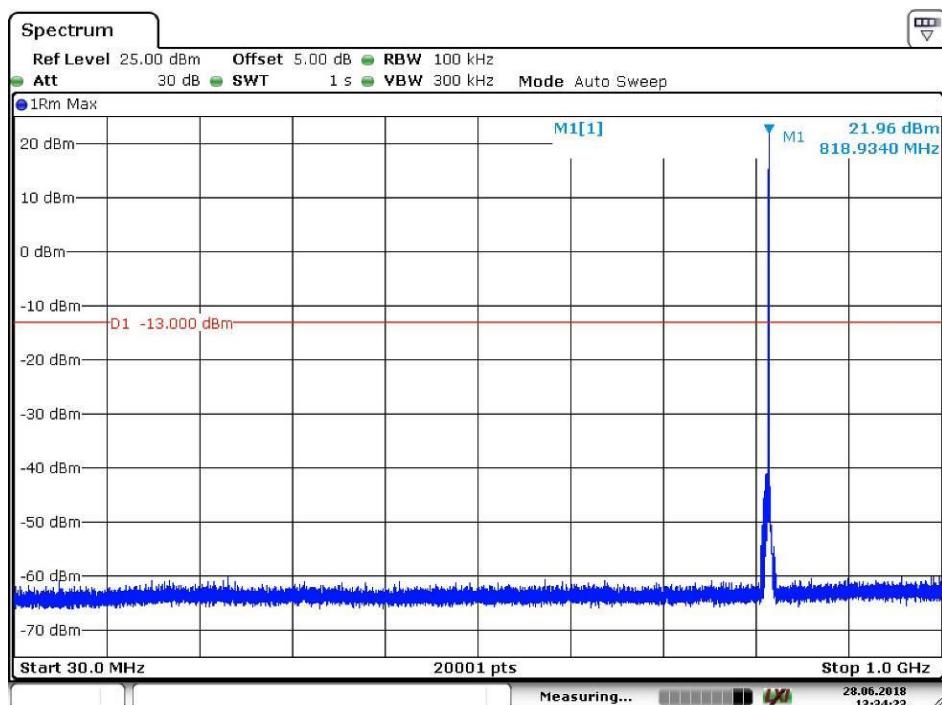


Date: 28.JUN.2018 13:45:14

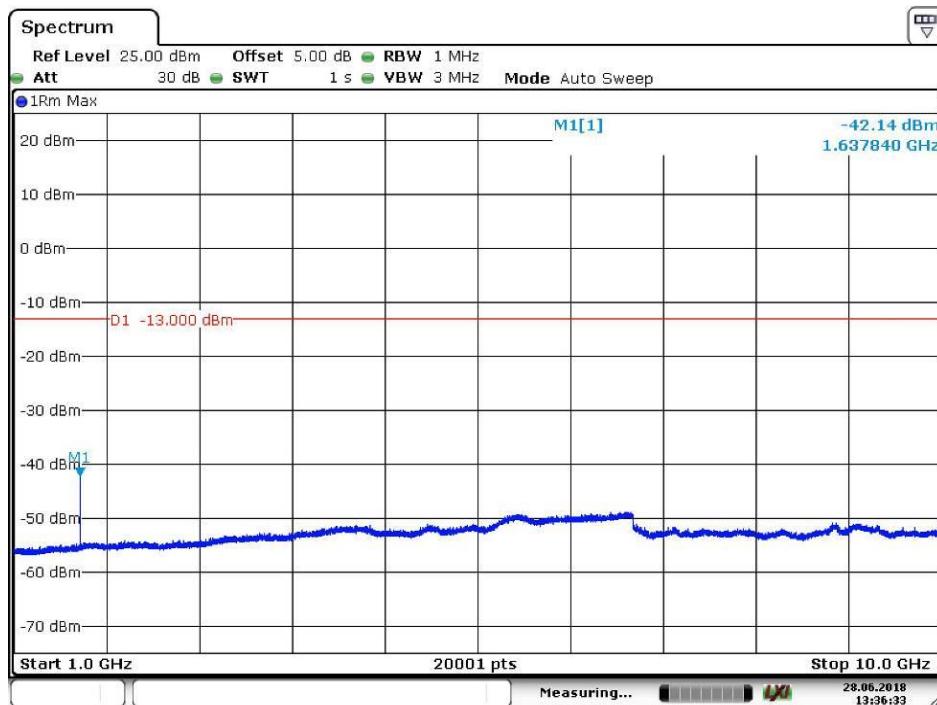


Date: 28.JUN.2018 13:45:34

#### 6.1.1.3.2 Test Channel = MCH

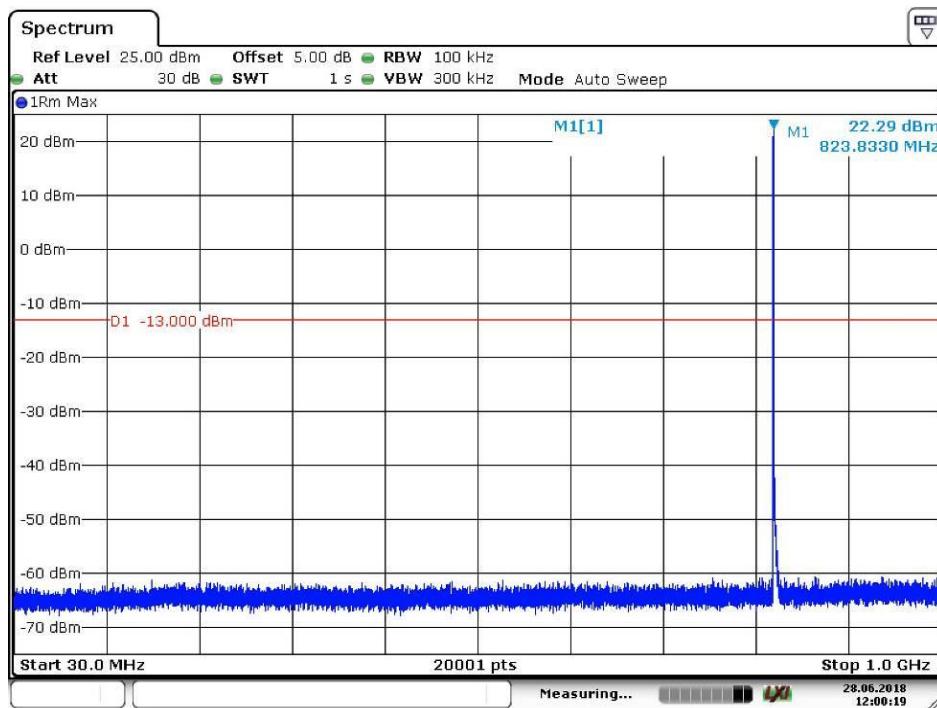


Date: 28.JUN.2018 13:34:24

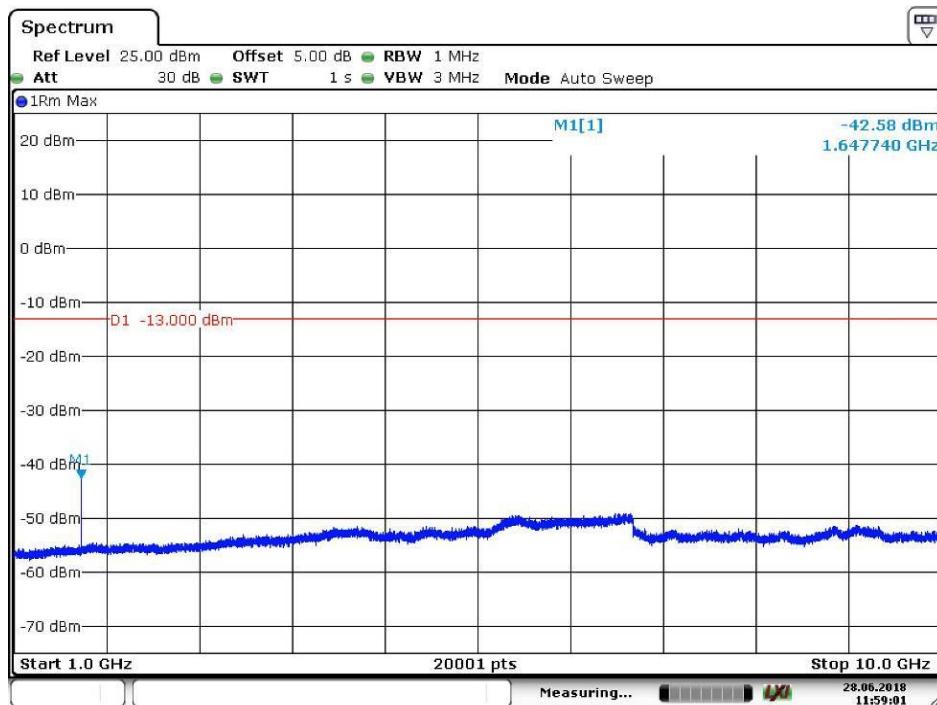


Date: 28.JUN.2018 13:36:33

#### 6.1.1.3.3 Test Channel = HCH



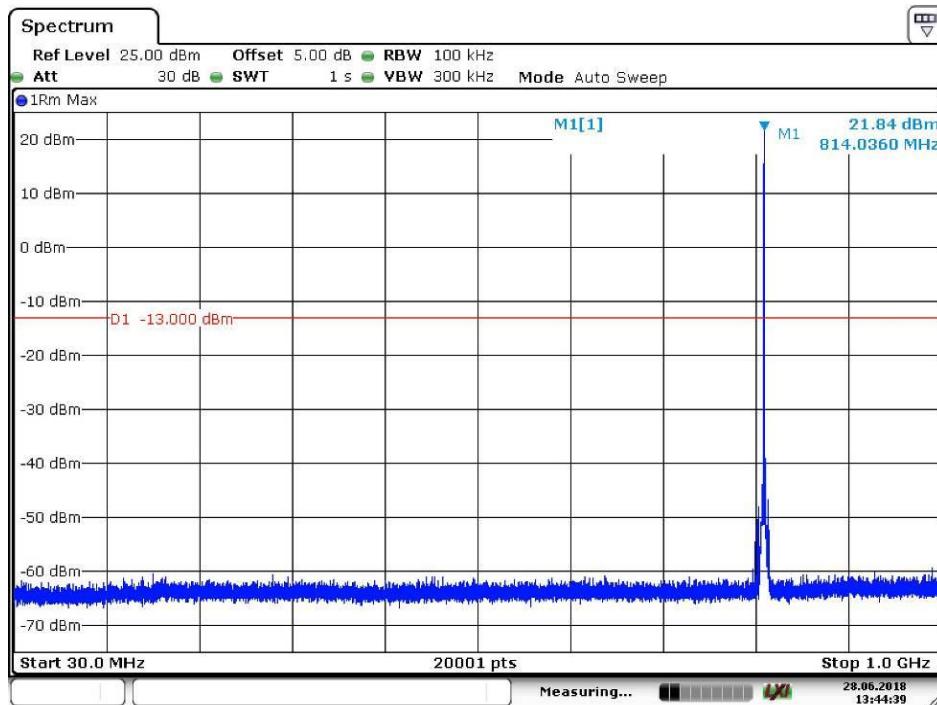
Date: 28.JUN.2018 12:00:19



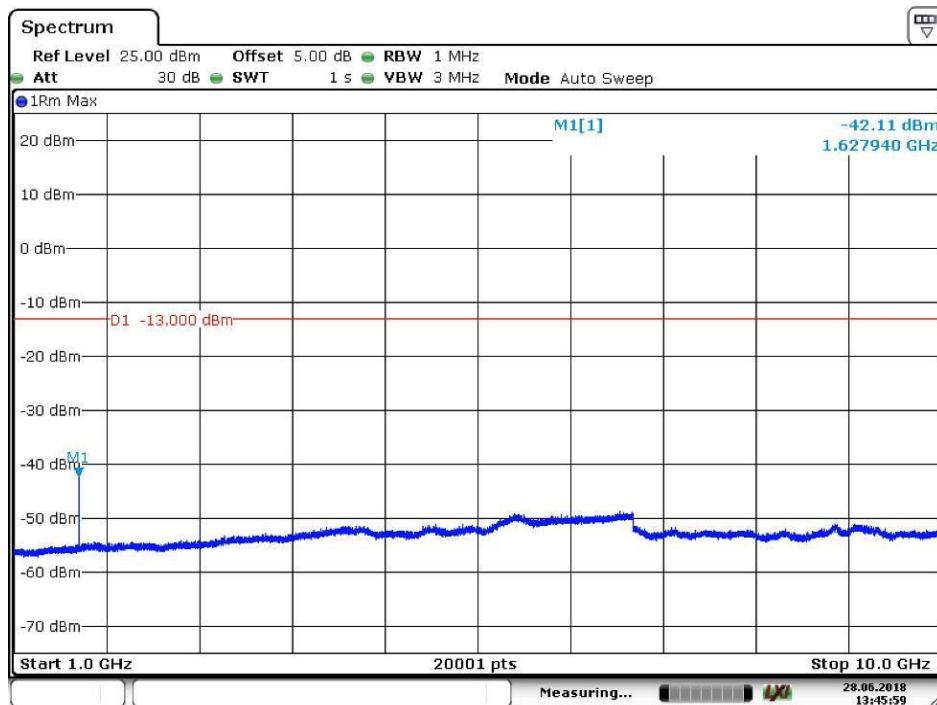
Date: 28.JUN.2018 11:59:01

#### 6.1.1.4 Test Mode = LTE-NB1/TM2.Sub-carrier spacing=15kHz

##### 6.1.1.4.1 Test Channel = LCH

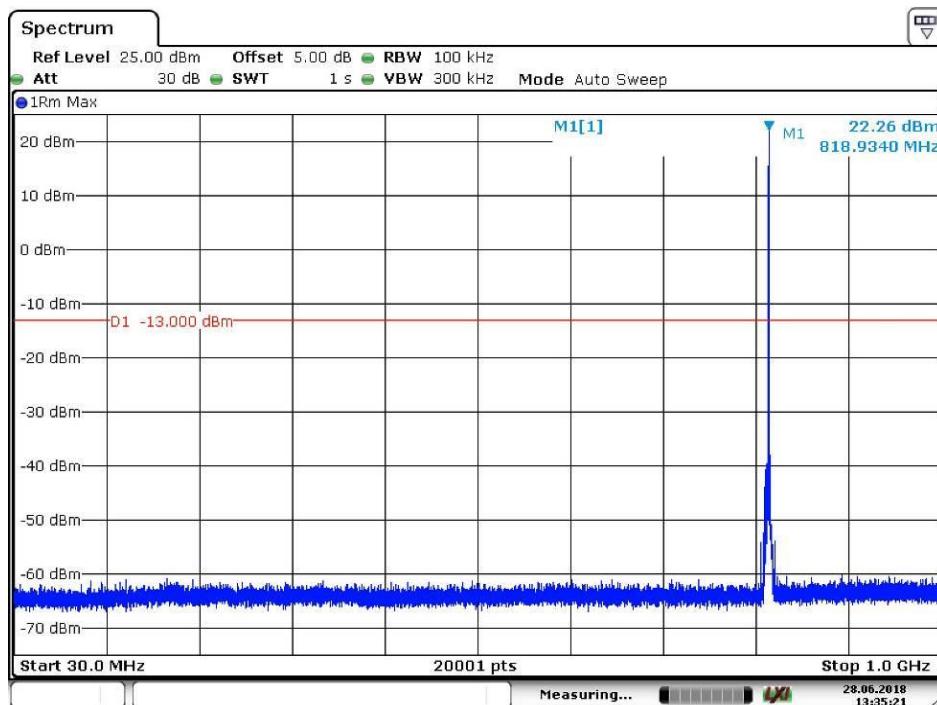


Date: 28.JUN.2018 13:44:40

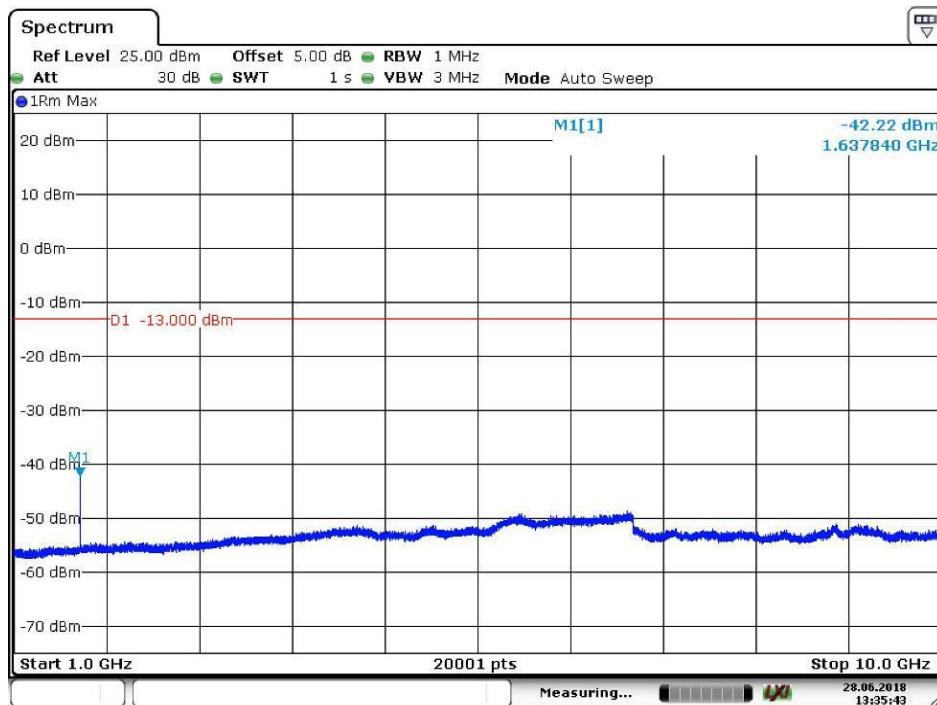


Date: 28.JUN.2018 13:46:00

#### 6.1.1.4.2 Test Channel = MCH

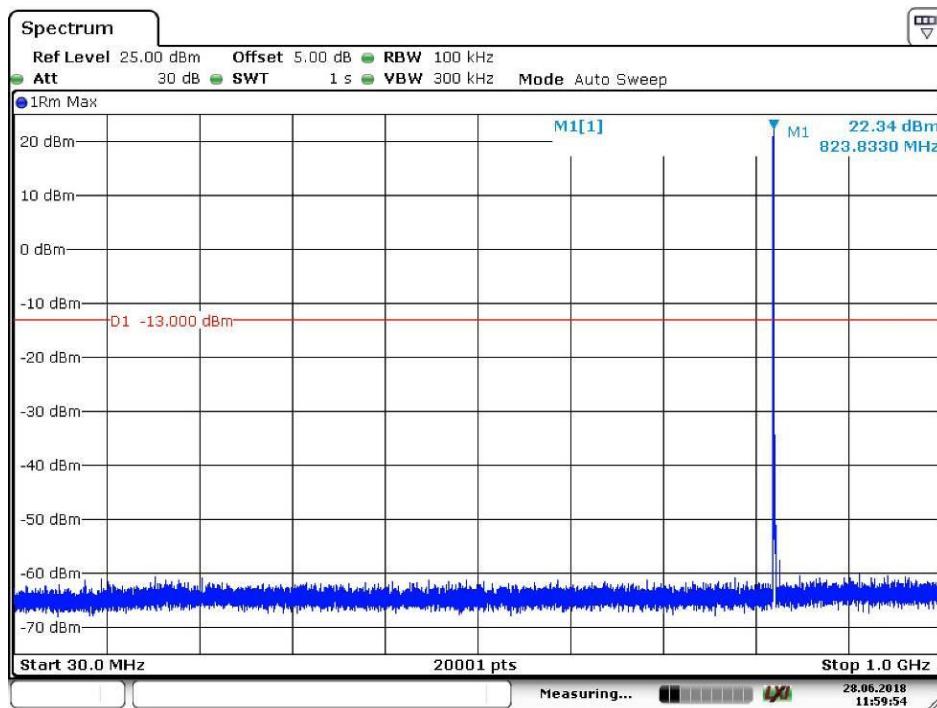


Date: 28.JUN.2018 13:35:21

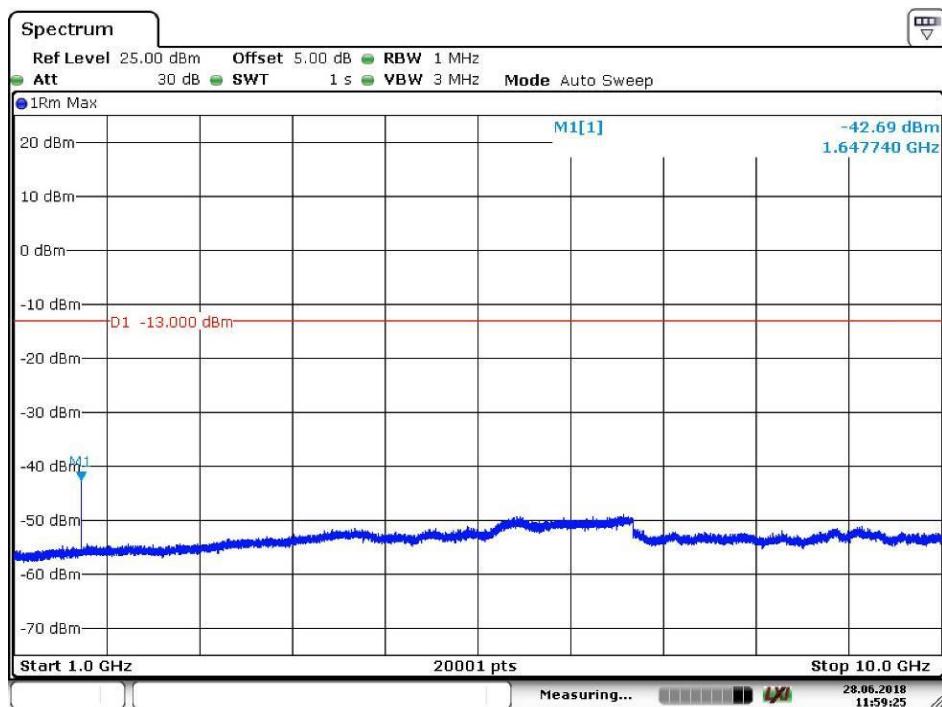


Date: 28.JUN.2018 13:35:43

#### 6.1.1.4.3 Test Channel = HCH



Date: 28.JUN.2018 11:59:54



## 7 Field Strength of Spurious Radiation

### 7.1 For LTE-NB1

#### 7.1.1 Test Band = LTE-NB1 BAND26(814MHz-824MHz)

##### 7.1.1.1 Test Mode =LTE-NB1/ Sub-carrier spacing=3.75kHz

###### 7.1.1.1.1 Test Channel = LCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
64.393333	-82.04	-13.00	-69.04	Vertical
104.246667	-77.99	-13.00	-64.99	Vertical
979.787500	-66.10	-13.00	-53.10	Vertical
1633.000000	-57.74	-13.00	-44.74	Vertical
3265.200000	-66.86	-13.00	-53.86	Vertical
6487.575000	-65.14	-13.00	-52.14	Vertical
63.926667	-78.91	-13.00	-65.91	Horizontal
104.293333	-83.98	-13.00	-70.98	Horizontal
633.929167	-70.21	-13.00	-57.21	Horizontal
979.741667	-60.82	-13.00	-47.82	Horizontal
1632.500000	-54.26	-13.00	-41.26	Horizontal
3265.200000	-67.17	-13.00	-54.17	Horizontal

###### 7.1.1.1.2 Test Channel = MCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
63.553333	-82.18	-13.00	-69.18	Vertical
104.293333	-77.43	-13.00	-64.43	Vertical
925.245833	-69.22	-13.00	-56.22	Vertical
1638.000000	-56.24	-13.00	-43.24	Vertical
3275.925000	-65.61	-13.00	-52.61	Vertical
6550.950000	-65.09	-13.00	-52.09	Vertical
63.693333	-78.37	-13.00	-65.37	Horizontal
104.293333	-82.71	-13.00	-69.71	Horizontal
655.150000	-61.43	-13.00	-48.43	Horizontal
1638.000000	-53.34	-13.00	-40.34	Horizontal
3456.300000	-68.28	-13.00	-55.28	Horizontal
5937.187500	-66.29	-13.00	-53.29	Horizontal

**7.1.1.1.3 Test Channel = HCH**

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
63.786667	-82.59	-13.00	-69.59	Vertical
124.966667	-86.93	-13.00	-73.93	Vertical
359.420000	-86.29	-13.00	-73.29	Vertical
1643.000000	-61.74	-13.00	-48.74	Vertical
3465.562500	-67.38	-13.00	-54.38	Vertical
7044.300000	-64.79	-13.00	-51.79	Vertical
63.086667	-77.78	-13.00	-64.78	Horizontal
104.293333	-86.72	-13.00	-73.72	Horizontal
657.120833	-65.79	-13.00	-52.79	Horizontal
1643.000000	-56.56	-13.00	-43.56	Horizontal
3286.162500	-65.57	-13.00	-52.57	Horizontal
3465.562500	-67.10	-13.00	-54.10	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.
- 2) We have tested all modulation and all bandwidth, but only the worst case data presented in this report.

## 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
BAND26	TM1/15k	LCH	TN	VL	7.83	0.009599	PASS
				VN	0.34	0.000417	PASS
				VH	-4.73	-0.005805	PASS
		MCH	TN	VL	8.10	0.009891	PASS
				VN	-6.52	-0.007966	PASS
				VH	9.28	0.011327	PASS
		HCH	TN	VL	-1.51	-0.001830	PASS
				VN	3.73	0.004523	PASS
				VH	-2.67	-0.003238	PASS
	TM2/15k	LCH	TN	VL	4.72	0.005787	PASS
				VN	-9.30	-0.011410	PASS
				VH	-4.20	-0.005146	PASS
		MCH	TN	VL	-2.65	-0.003232	PASS
				VN	-8.08	-0.009867	PASS
				VH	-9.32	-0.011378	PASS
		HCH	TN	VL	-7.20	-0.008737	PASS
				VN	-1.00	-0.001218	PASS
				VH	2.68	0.003250	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
BAND26	TM1 15kHz	LCH	VN	-30	-1.98	-0.002429	PASS
				-20	1.84	0.002256	PASS
				-10	3.55	0.004358	PASS
				0	-6.92	-0.008487	PASS
				10	7.65	0.009379	PASS
				20	-4.35	-0.005330	PASS
				30	-4.37	-0.005354	PASS
				40	-7.46	-0.009151	PASS
				50	3.56	0.004371	PASS
		MCH	VN	-30	3.26	0.003983	PASS
				-20	9.77	0.011930	PASS
				-10	5.67	0.006921	PASS
				0	-2.89	-0.003528	PASS
				10	6.73	0.008218	PASS
				20	-3.37	-0.004116	PASS
				30	-2.86	-0.003493	PASS
				40	-7.42	-0.009063	PASS
				50	-9.53	-0.011642	PASS
		HCH	VN	-30	5.37	0.006518	PASS
				-20	0.07	0.000081	PASS
				-10	4.89	0.005934	PASS
				0	-3.55	-0.004313	PASS
				10	9.95	0.012082	PASS
				20	5.55	0.006730	PASS
				30	3.22	0.003911	PASS
				40	4.05	0.004918	PASS
				50	-0.05	-0.000062	PASS



**SGS-CSTC Standards Technical Services Co., Ltd.  
Shenzhen Branch**

Report No.: SZEM180400321702

Page: 38 of 38

Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
BAND26	TM2 15kHz	LCH	VN	-30	-1.03	-0.001264	PASS
				-20	-7.85	-0.009630	PASS
				-10	5.83	0.007153	PASS
				0	-8.71	-0.010678	PASS
				10	-1.11	-0.001367	PASS
				20	0.36	0.000446	PASS
				30	9.46	0.011606	PASS
				40	-7.23	-0.008867	PASS
				50	-8.09	-0.009922	PASS
		MCH	VN	-30	0.38	0.000466	PASS
				-20	1.63	0.001994	PASS
				-10	-7.23	-0.008823	PASS
				0	9.26	0.011305	PASS
				10	-8.66	-0.010577	PASS
				20	4.12	0.005036	PASS
				30	-3.08	-0.003762	PASS
				40	-9.39	-0.011466	PASS
				50	2.30	0.002804	PASS
		HCH	VN	-30	-1.00	-0.001215	PASS
				-20	-1.62	-0.001968	PASS
				-10	7.14	0.008666	PASS
				0	4.86	0.005905	PASS
				10	5.25	0.006377	PASS
				20	-7.02	-0.008522	PASS
				30	-0.30	-0.000364	PASS
				40	4.57	0.005547	PASS
				50	-8.52	-0.010341	PASS

---

The End