SGS-CSTC Standards Technical Services Co., Ltd.
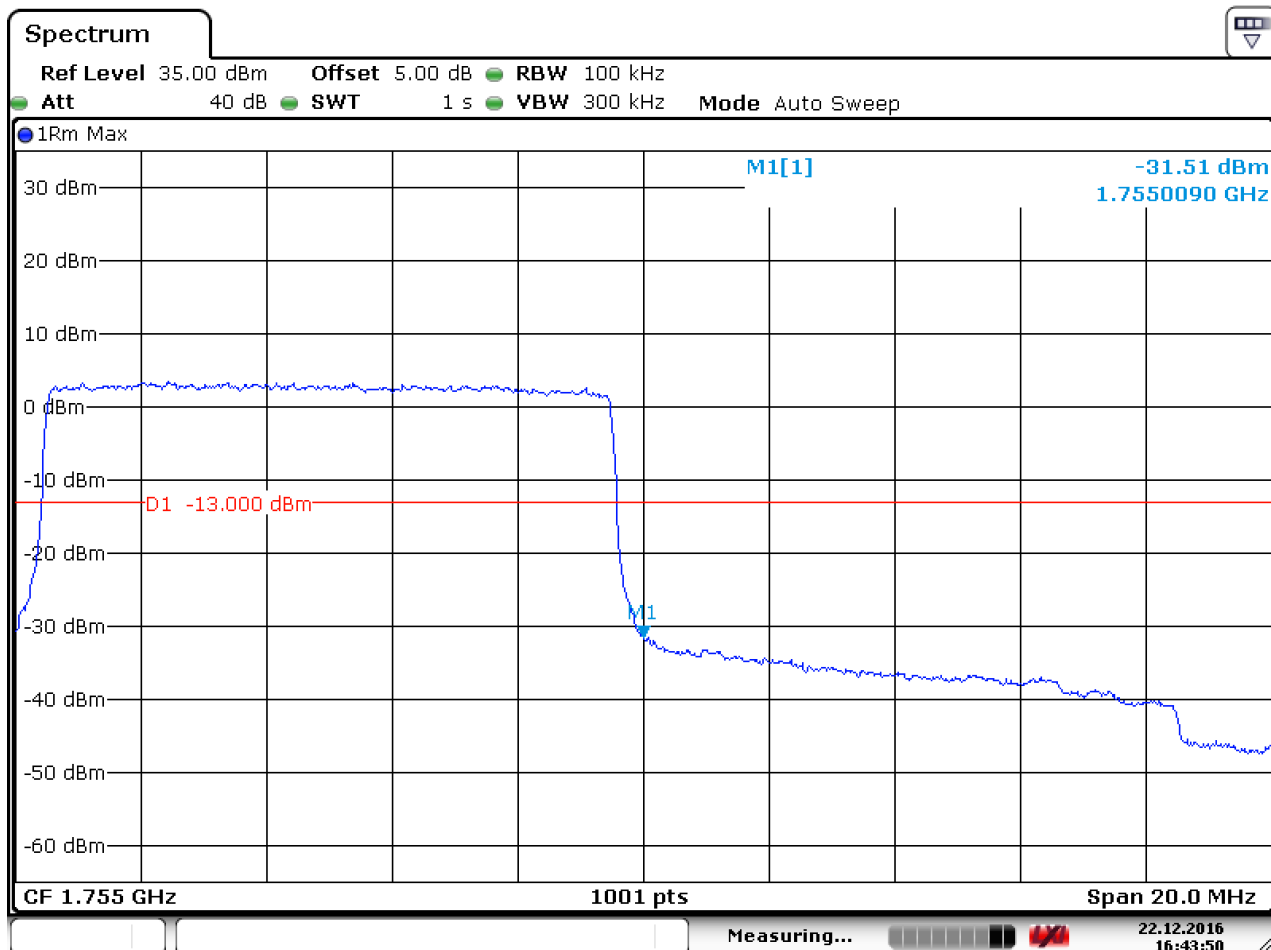Shenzhen Branch
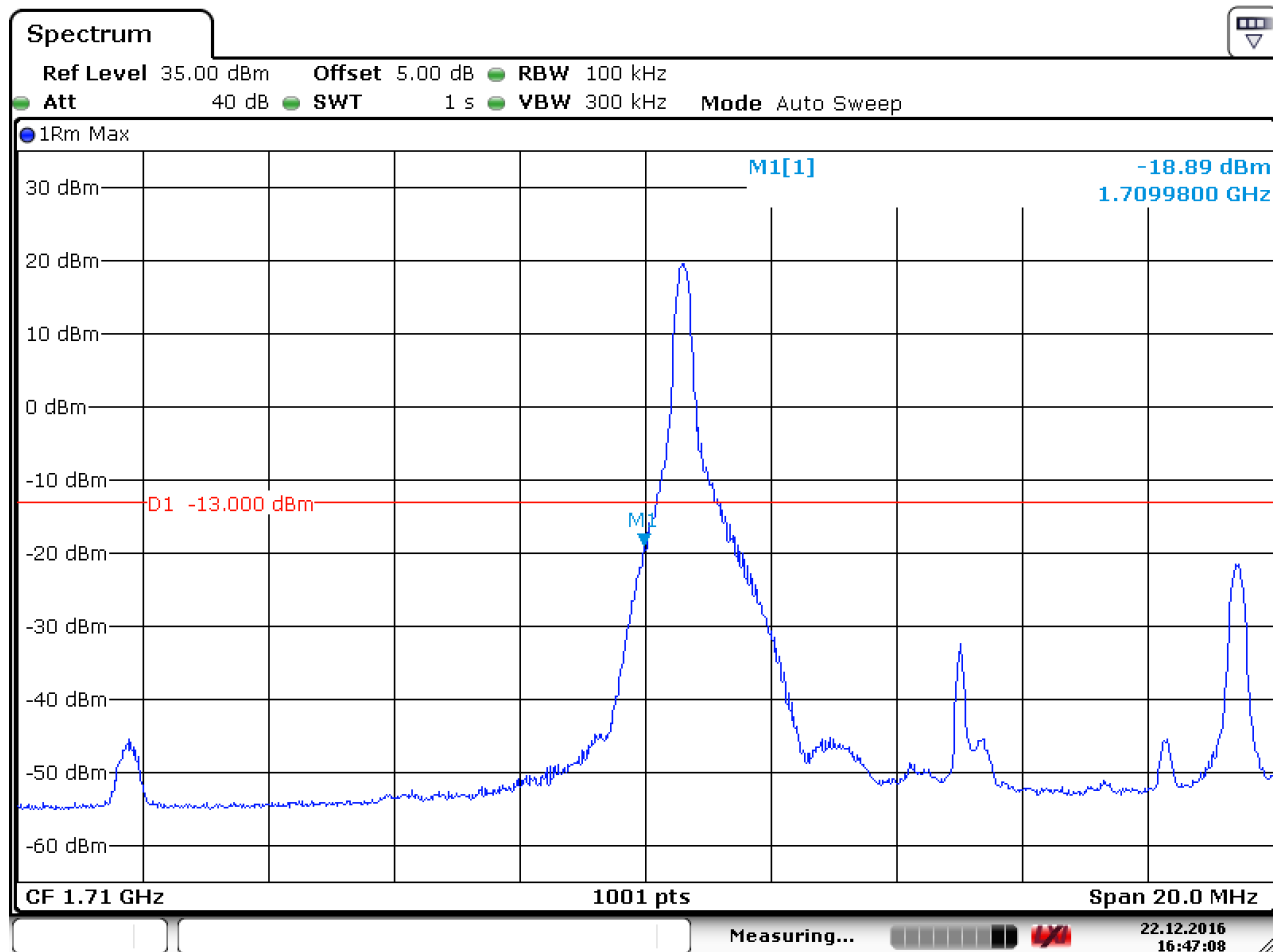
5.1.1.7.2.2 Test RB=50RB

Date: 22.DEC.2016 16:43:51

5.1.1.8   Test Mode = LTE/TM2 10MHz

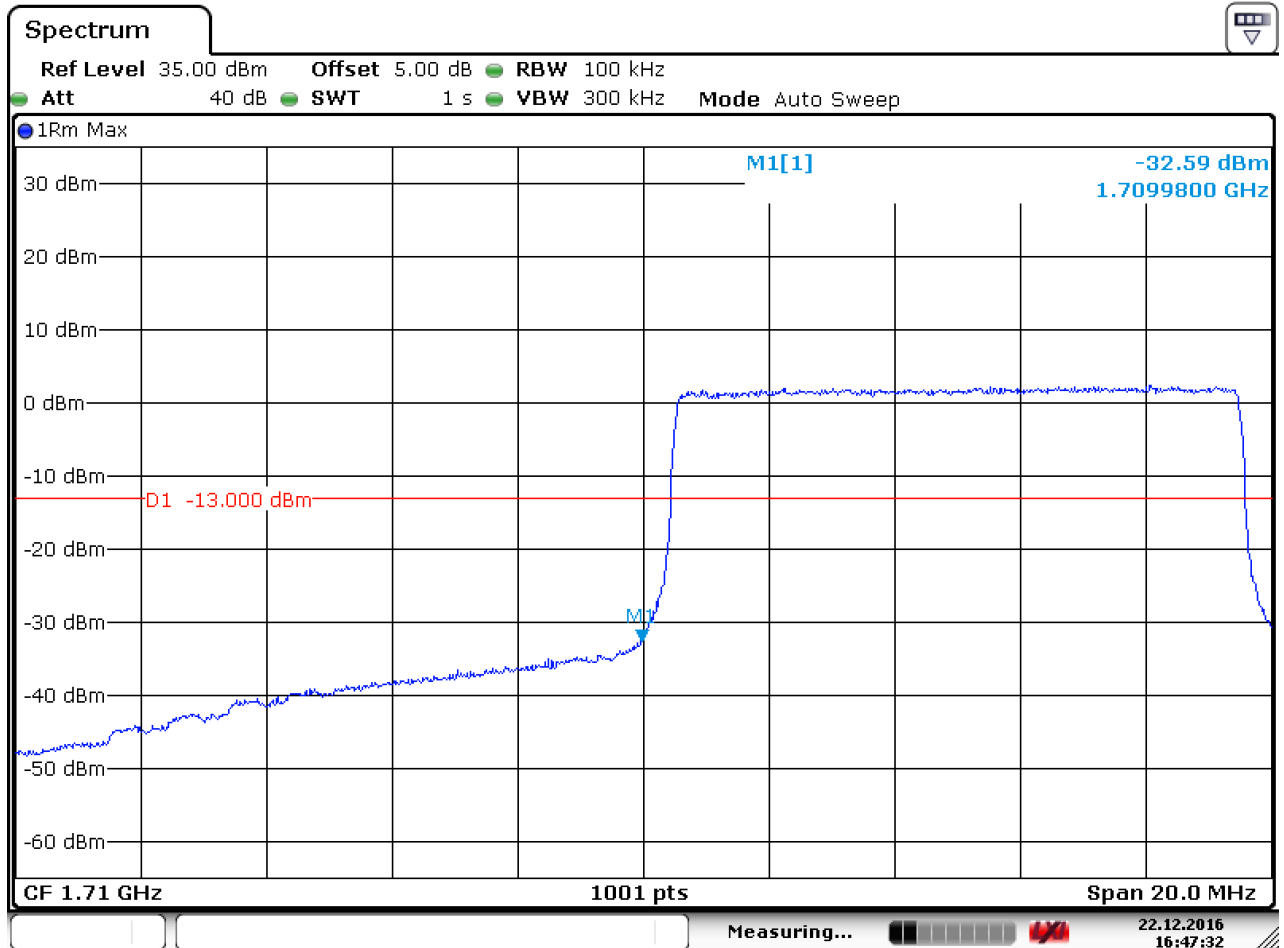#### 5.1.1.8.1   Test Channel = LCH

5.1.1.8.1.1 Test RB=1RB

Date: 22.DEC.2016 16:47:08

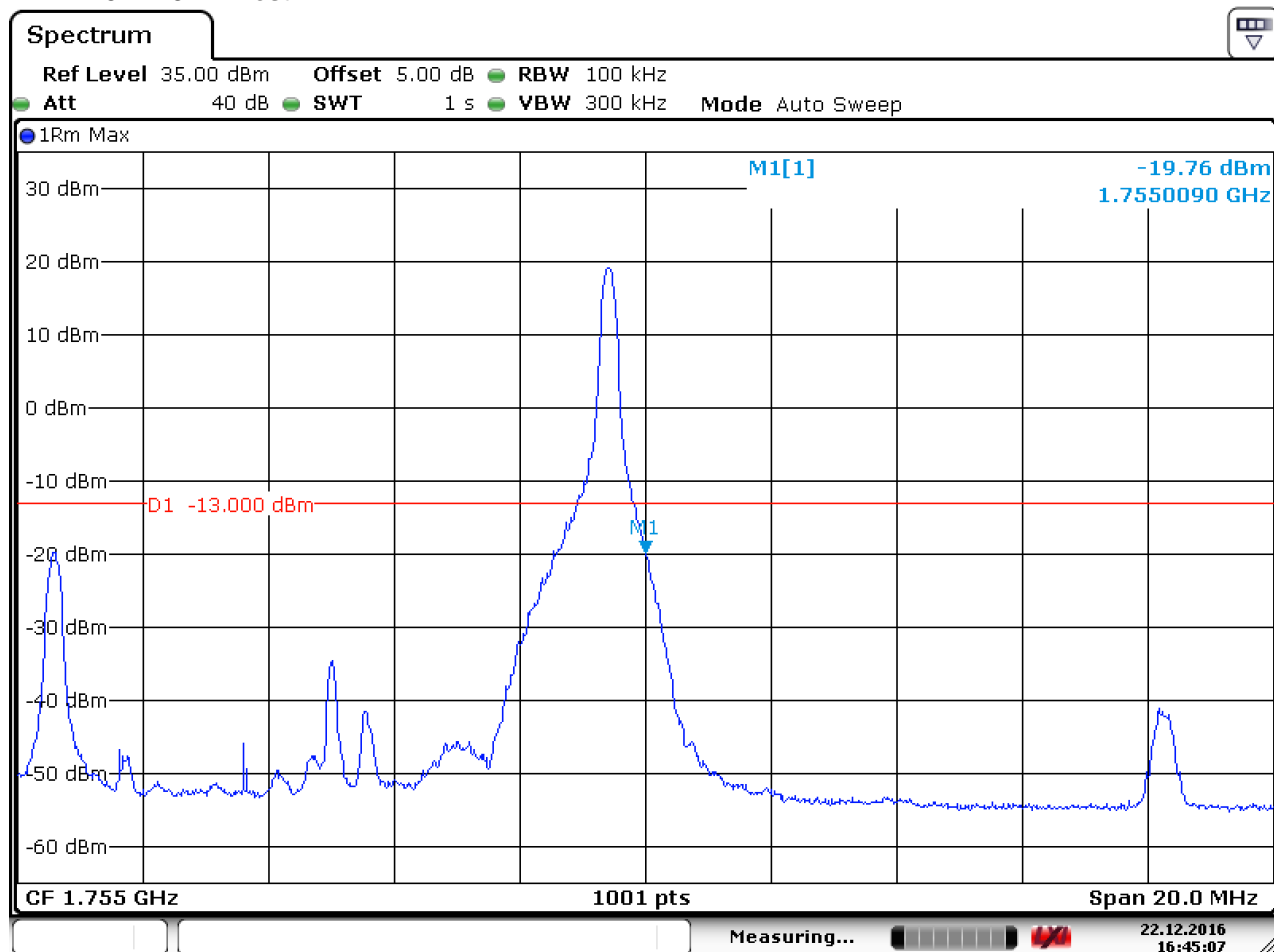### 5.1.1.8.1.2 Test RB=50RB

Date: 22.DEC.2016 16:47:33

5.1.1.8.2   Test Channel = HCH

5.1.1.8.2.1 Test RB=1RB
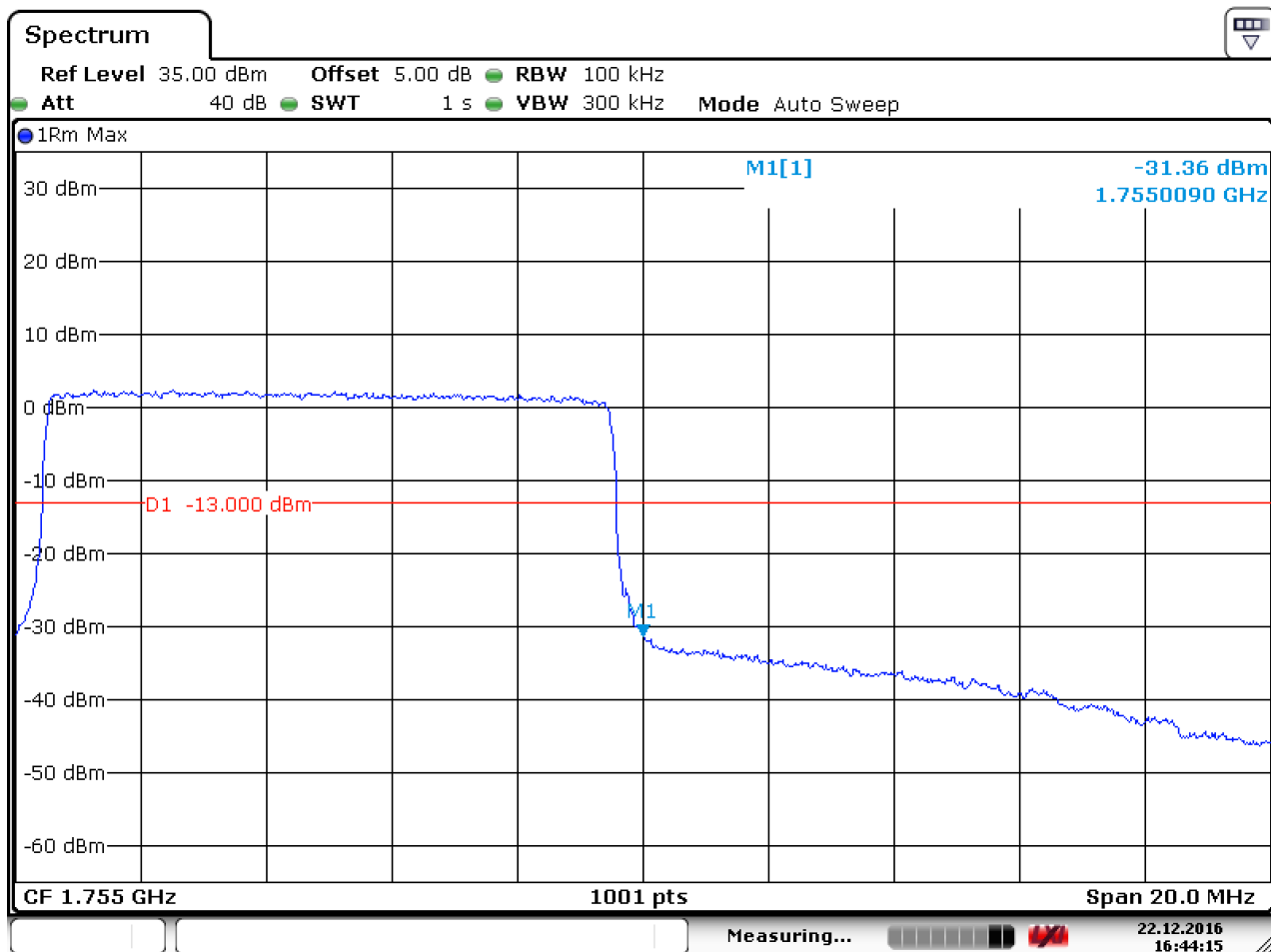

Date: 22.DEC.2016 16:45:08
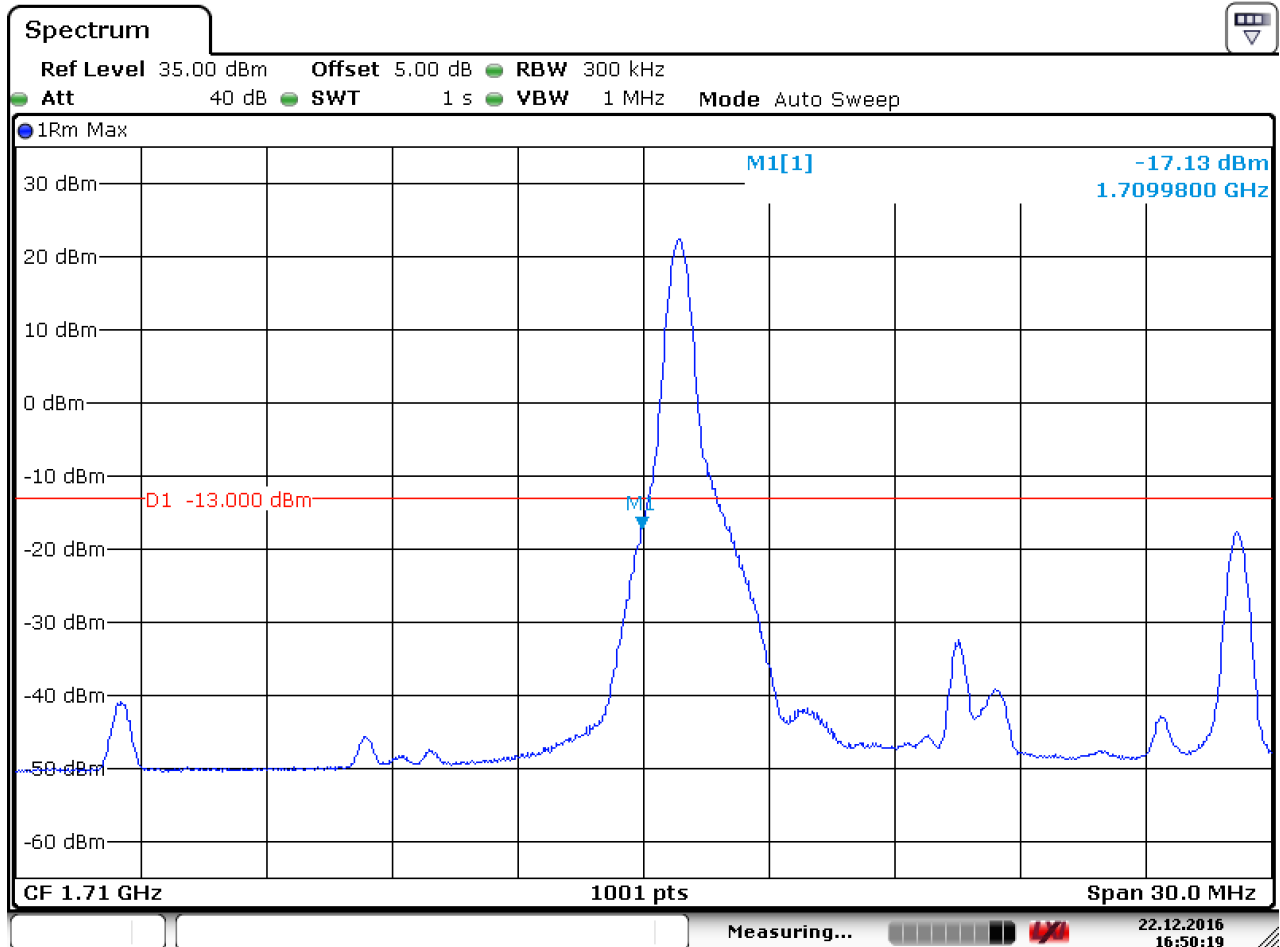
5.1.1.8.2.2 Test RB=50RB

Date: 22.DEC.2016 16:44:14

5.1.1.9   Test Mode = LTE/TM1 15MHz

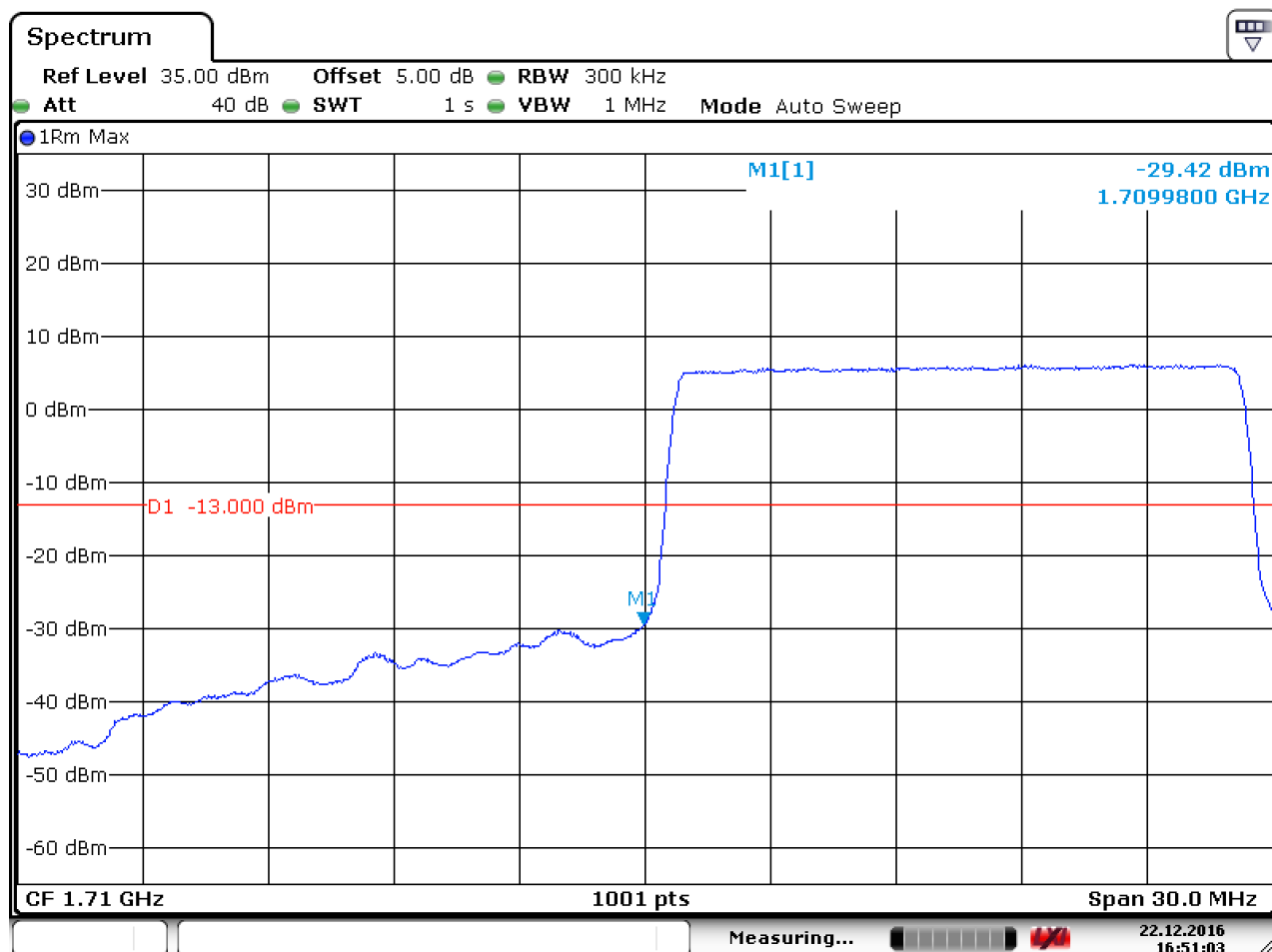#### 5.1.1.9.1   Test Channel = LCH

5.1.1.9.1.1 Test RB=1RB

Date: 22.DEC.2016 16:50:19

5.1.1.9.1.2 Test RB=75RB

Date: 22.DEC.2016 16:51:03

5.1.1.9.2   Test Channel = HCH

5.1.1.9.2.1 Test RB=1RB

Date: 22.DEC.2016 16:53:00

5.1.1.9.2.2 Test RB=75RB

Spectrum		
Ref Level 35.00 dBm	Offset 5.00 dB	● RBW 300 kHz
● Att 40 dB	● SWT 1 s	● VBW 1 MHz	Mode Auto Sweep

● 1Rm Max

M1[1] −28.64 dBm
1.7550300 GHz

30 dBm

20 dBm

10 dBm

0 dBm

−10 dBm

D1 −13.000 dBm

−20 dBm

−30 dBm   M1

−40 dBm

−50 dBm

−60 dBm

CF 1.755 GHz   1001 pts   Span 30.0 MHz

Measuring...   22.12.2016
16:52:31

Date: 22.DEC.2016 16:52:31

5.1.1.10   Test Mode = LTE/TM2 15MHz

5.1.1.10.1   Test Channel = LCH

5.1.1.10.1.1 Test RB=1RB
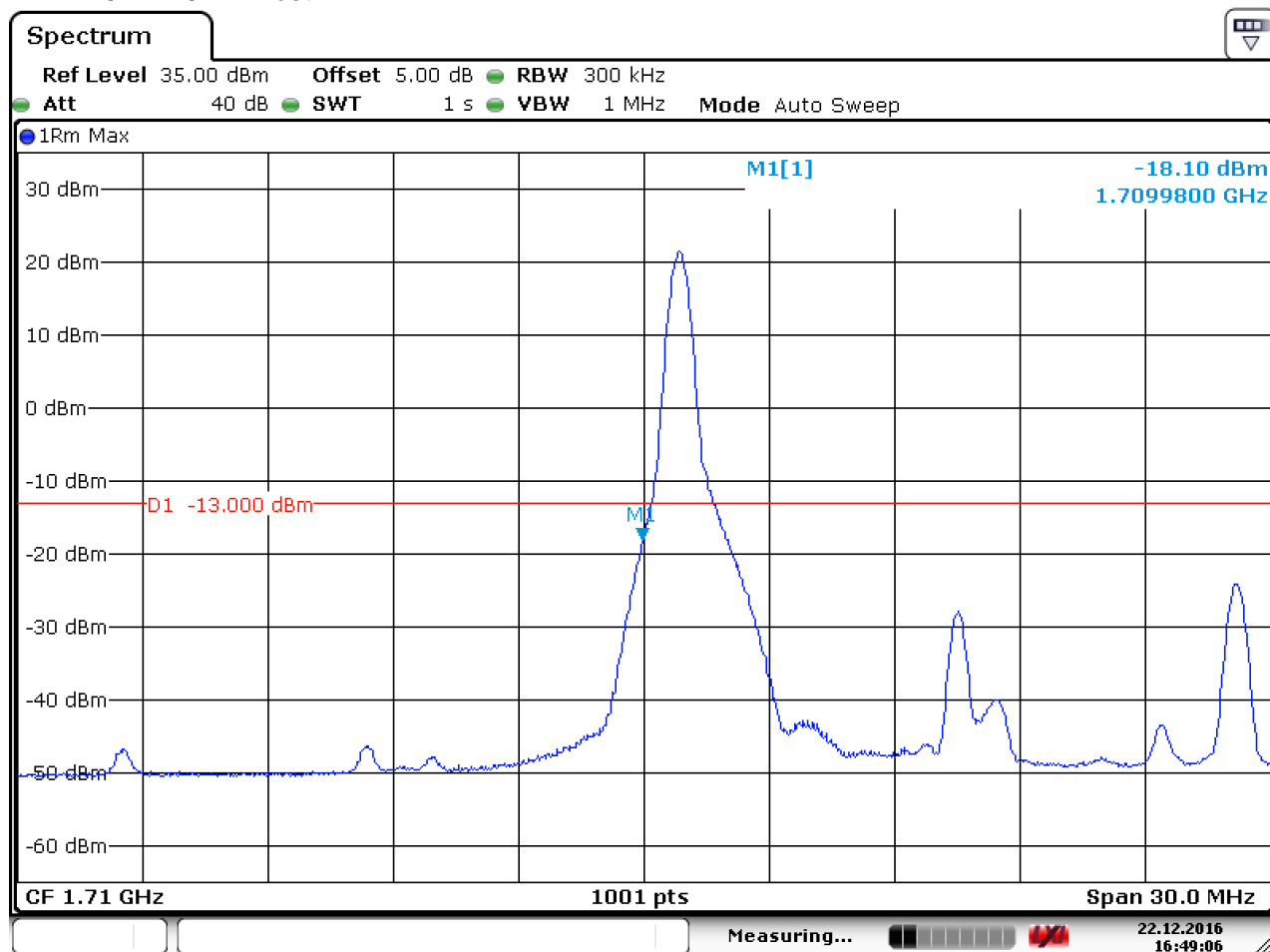
Date: 22.DEC.2016 16:49:06
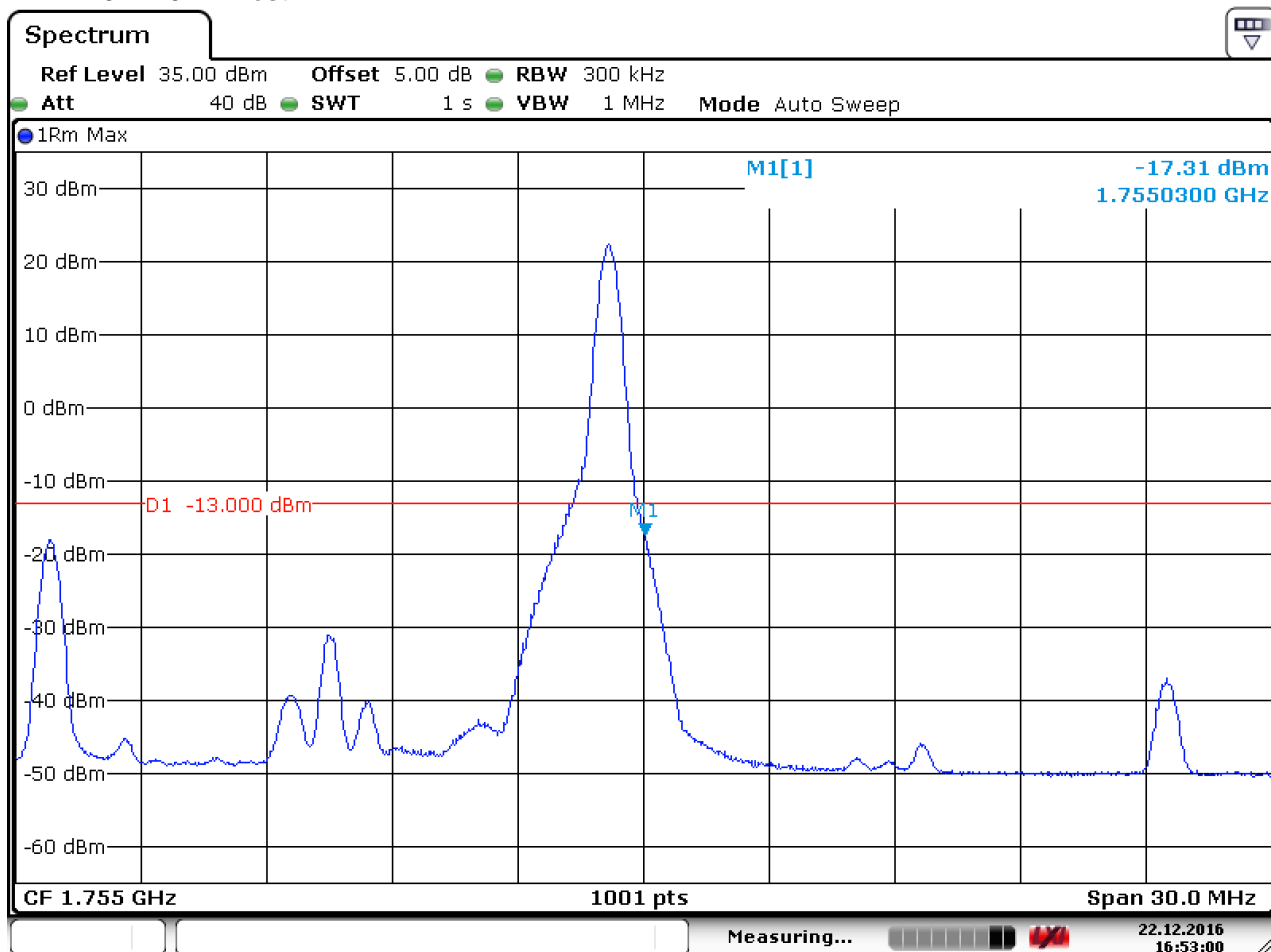
5.1.1.10.1.2 Test RB=75RB

Date: 22.DEC.2016 16:51:27
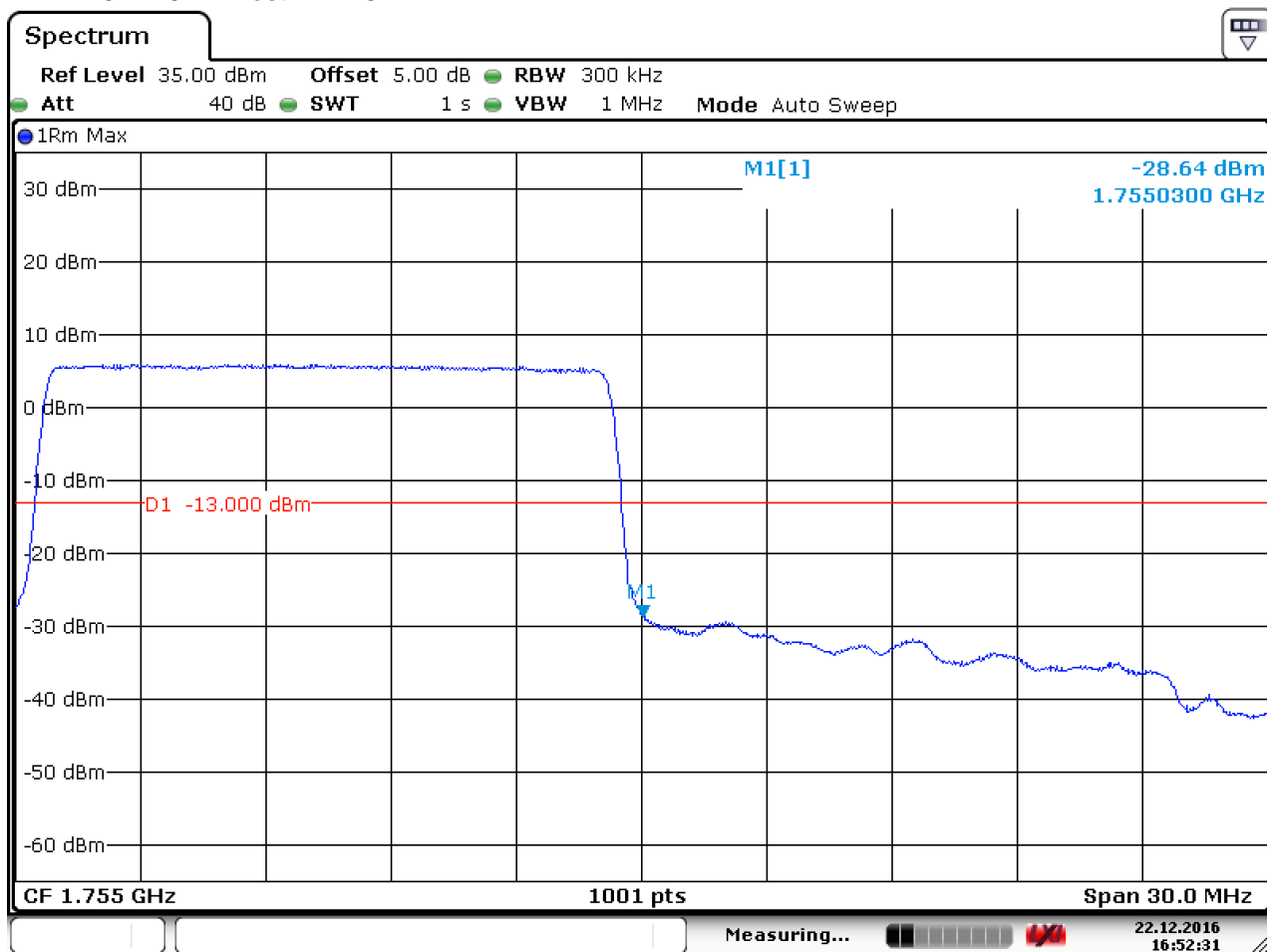
5.1.1.10.2 Test Channel = HCH

5.1.1.10.2.1 Test RB=1RB

Date: 22.DEC.2016 16:53:22

5.1.1.10.2.2 Test RB=75RB
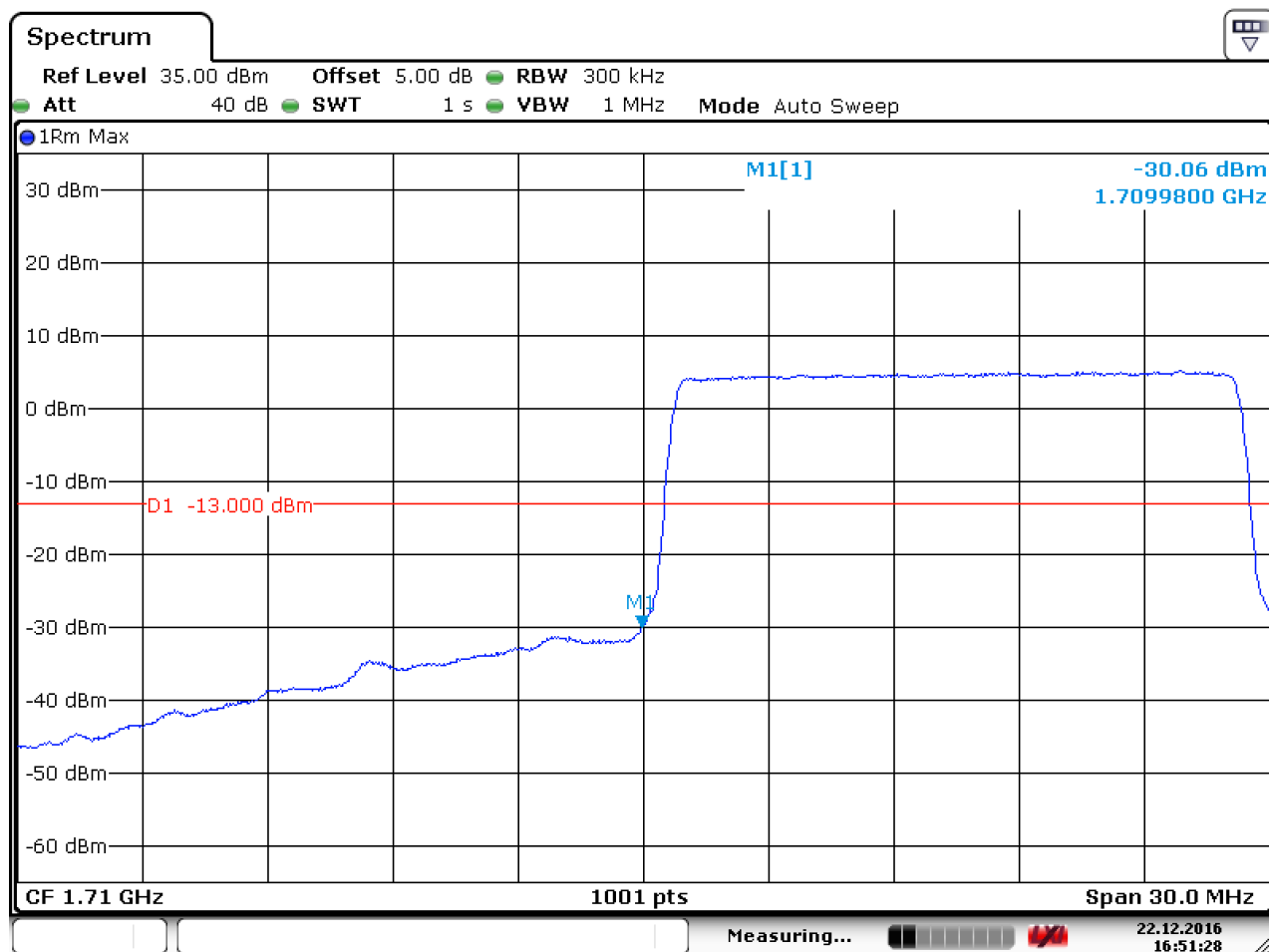

Date: 22.DEC.2016 16:52:05

5.1.1.11 Test Mode = LTE/TM1 20MHz

5.1.1.11.1 Test Channel = LCH

5.1.1.11.1.1 Test RB=1RB

Date: 22.DEC.2016 16:57:05

5.1.1.11.1.2 Test RB=100RB

Spectrum		
Ref Level 35.00 dBm	Offset 5.00 dB ● RBW 300 kHz	
● Att 40 dB ● SWT 1 s ● VBW 1 MHz	Mode Auto Sweep	

●1Rm Max

M1[1]　　　　　　　　　-31.75 dBm
　　　　　　　　　　　　1.7099600 GHz

30 dBm

20 dBm

10 dBm

0 dBm

-10 dBm　　D1 -13.000 dBm

-20 dBm

-30 dBm　　　　　　　　　M1

-40 dBm

-50 dBm

-60 dBm

CF 1.71 GHz　　　　　　　1001 pts　　　　　　Span 40.0 MHz

Measuring...　　　　　22.12.2016 16:57:40

Date: 22.DEC.2016 16:57:40

5.1.1.11.2 Test Channel = HCH

5.1.1.11.2.1 Test RB=1RB

Date: 22.DEC.2016 16:55:05

5.1.1.11.2.2 Test RB=100RB

Date: 22.DEC.2016 16:54:38

5.1.1.12   Test Mode = LTE/TM2 20MHz

5.1.1.12.1   Test Channel = LCH

5.1.1.12.1.1 Test RB=1RB
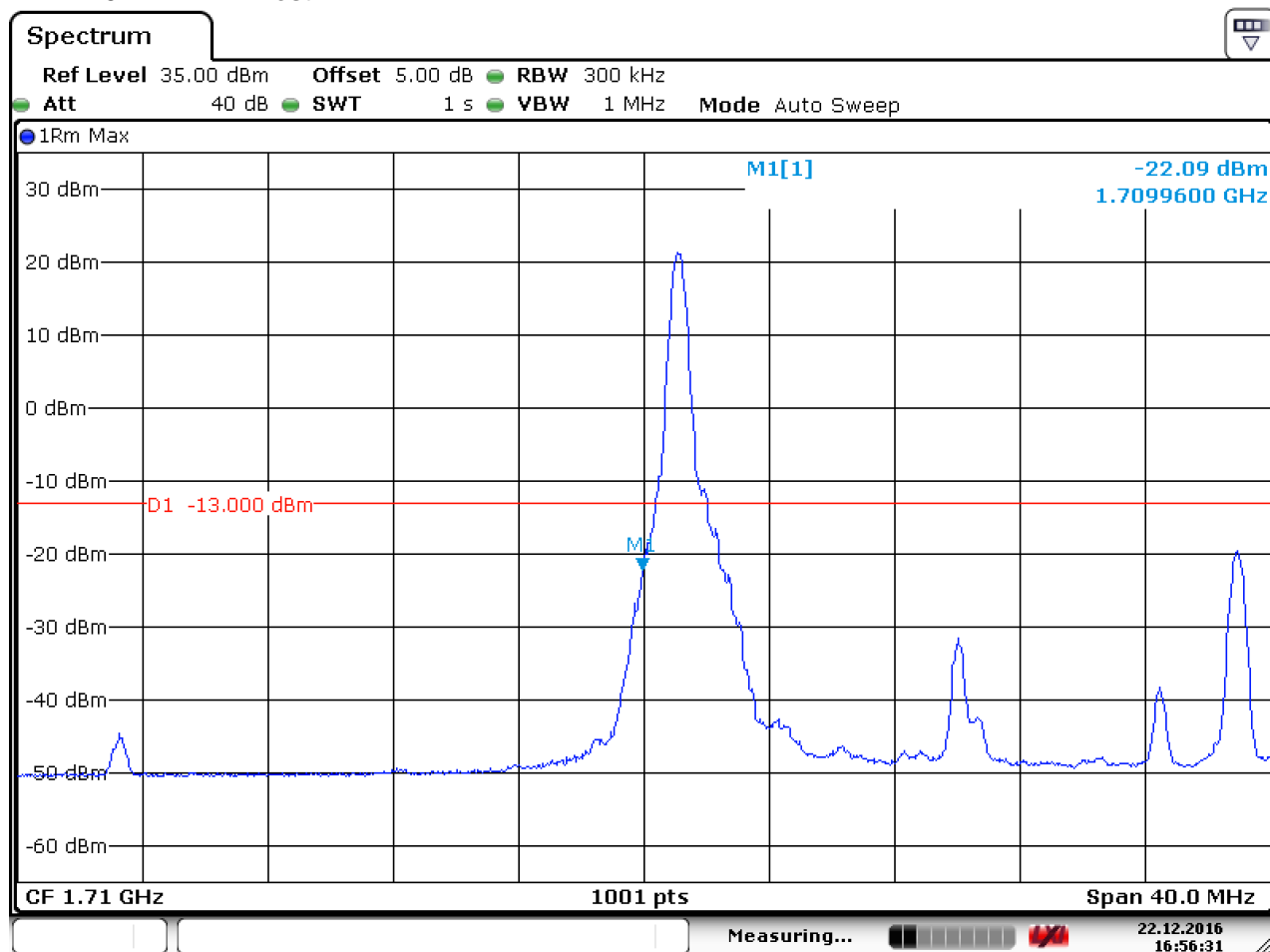
Date: 22.DEC.2016 16:56:31
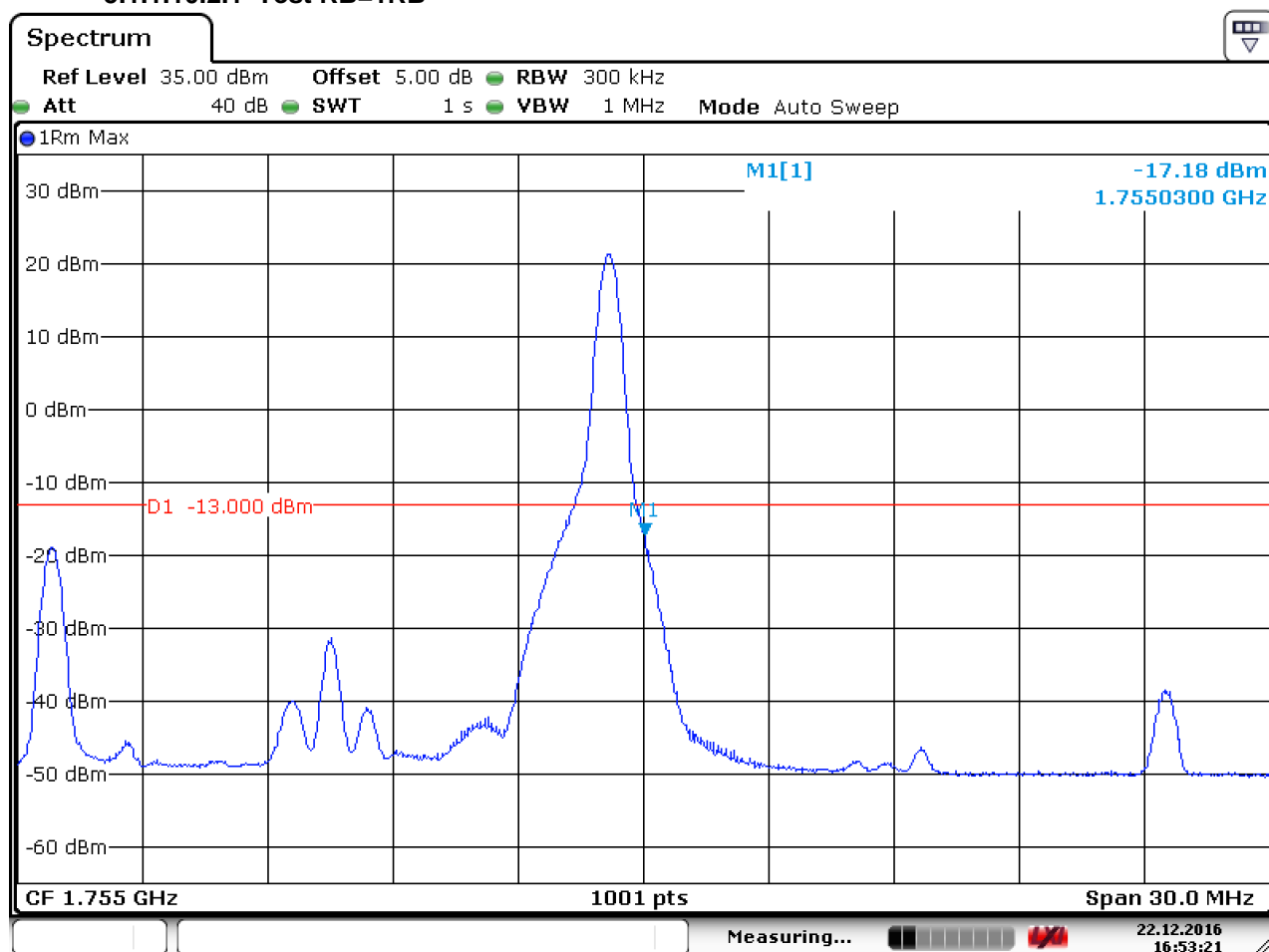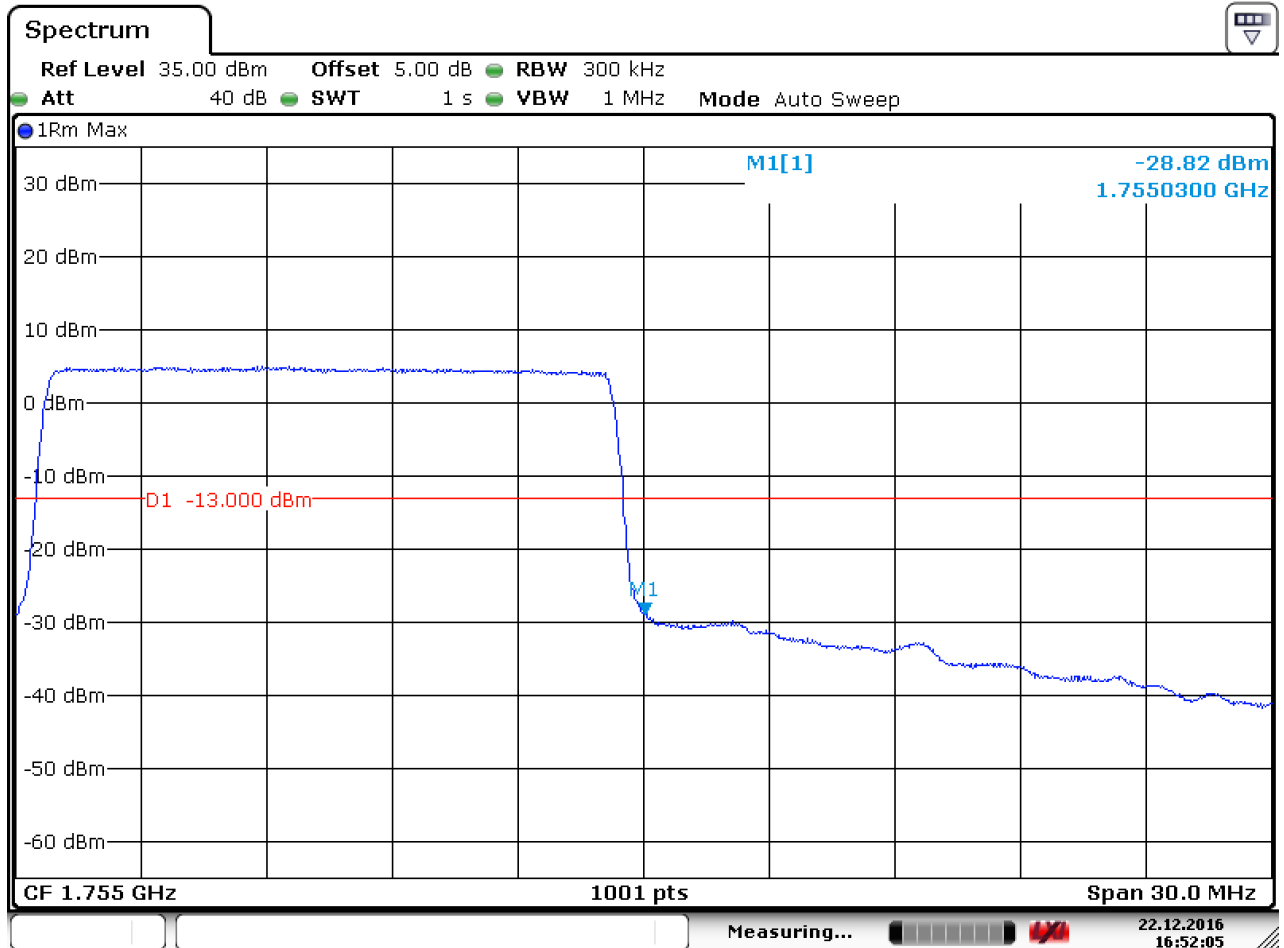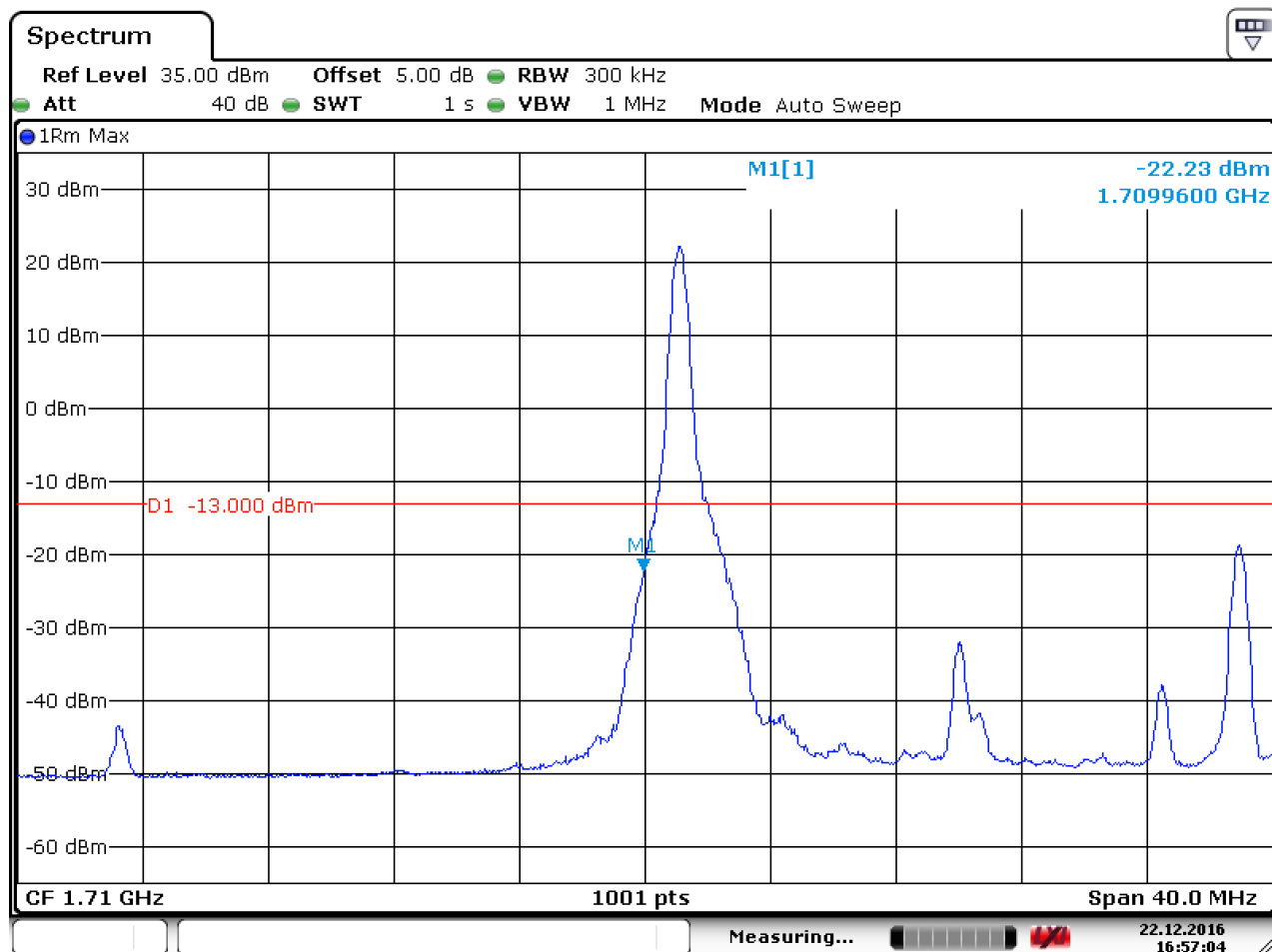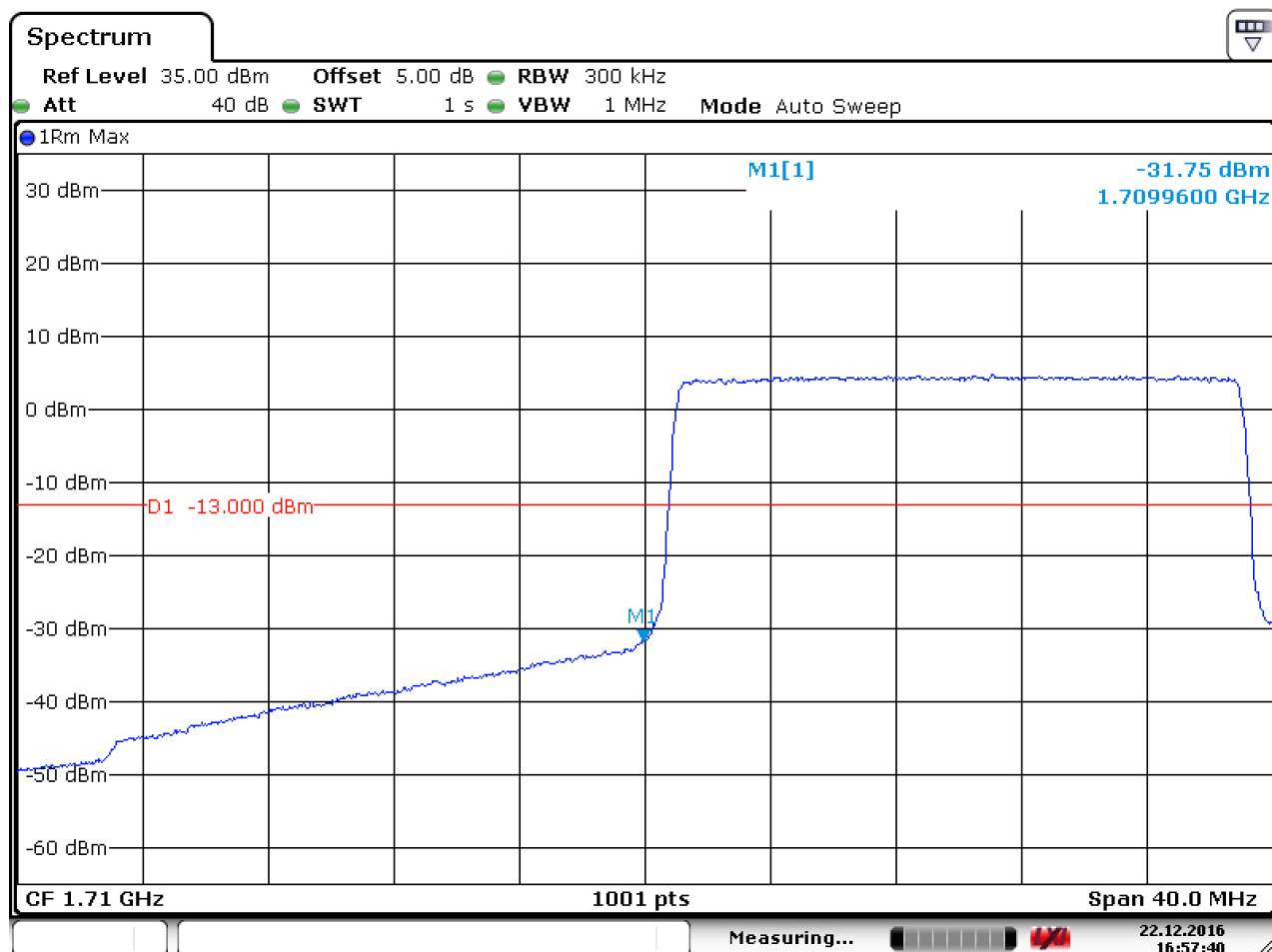
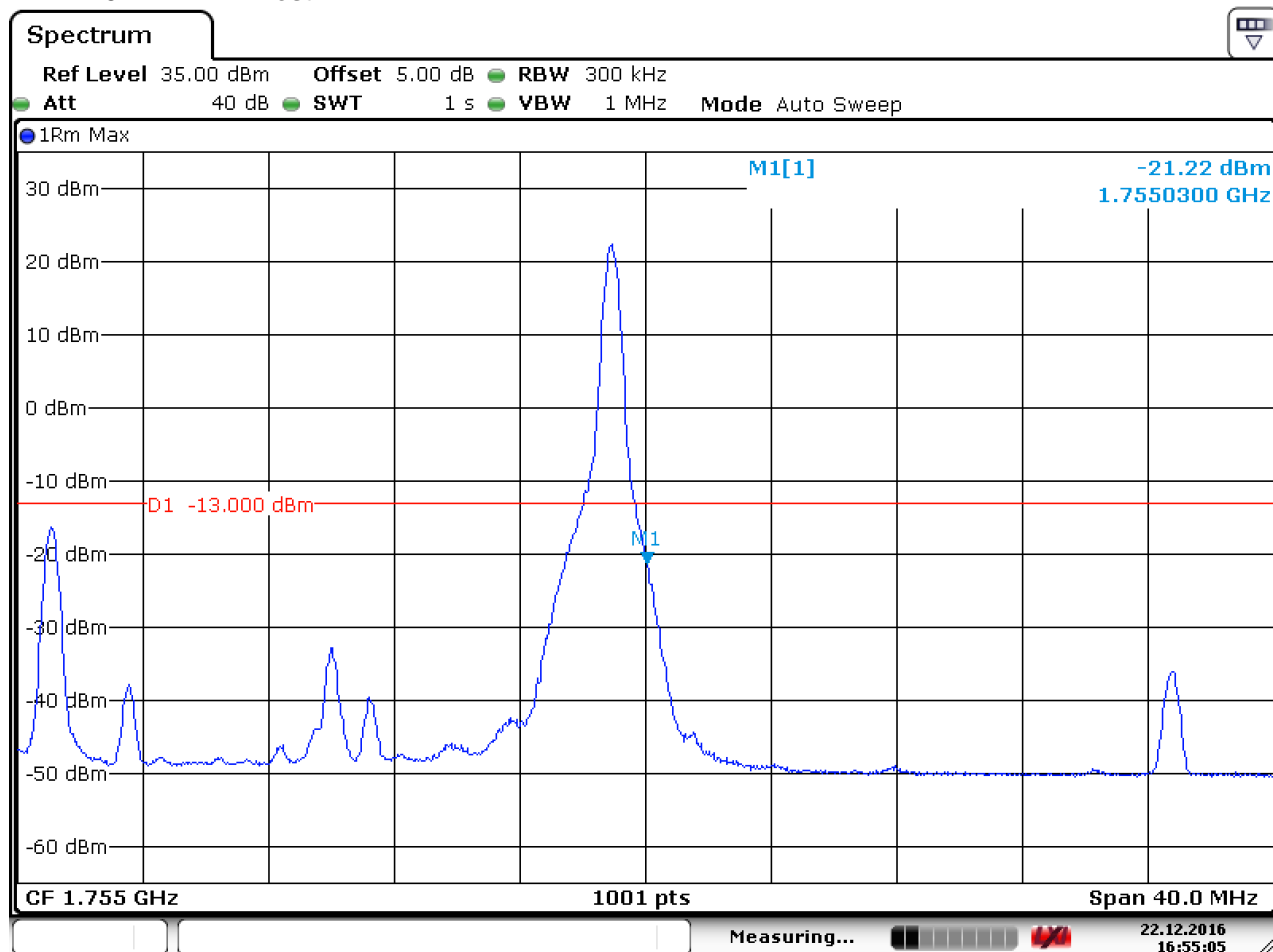**5.1.1.12.1.2 Test RB=100RB**

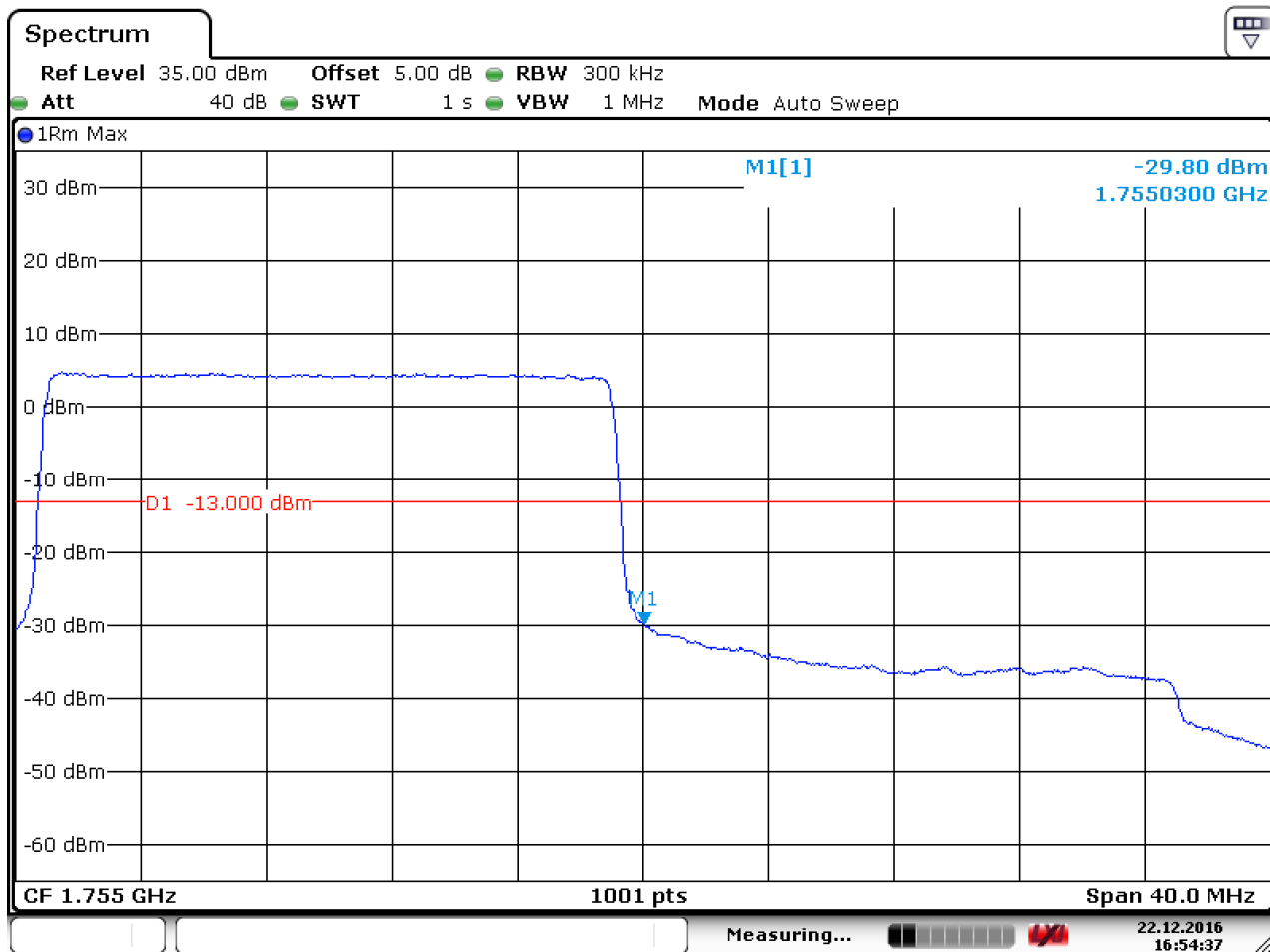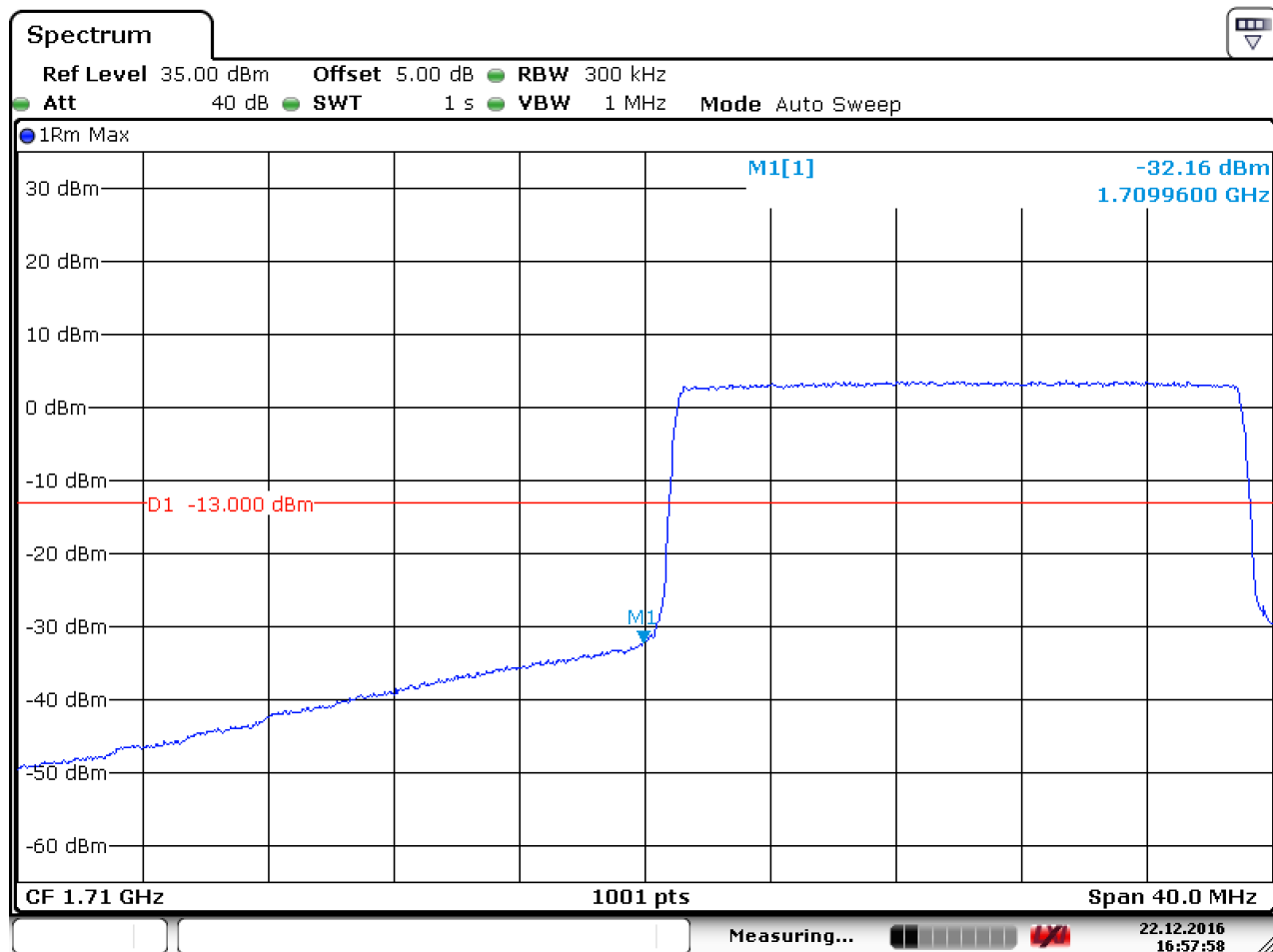Date: 22.DEC.2016 16:57:58

5.1.1.12.2 Test Channel = HCH

5.1.1.12.2.1 Test RB=1RB

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
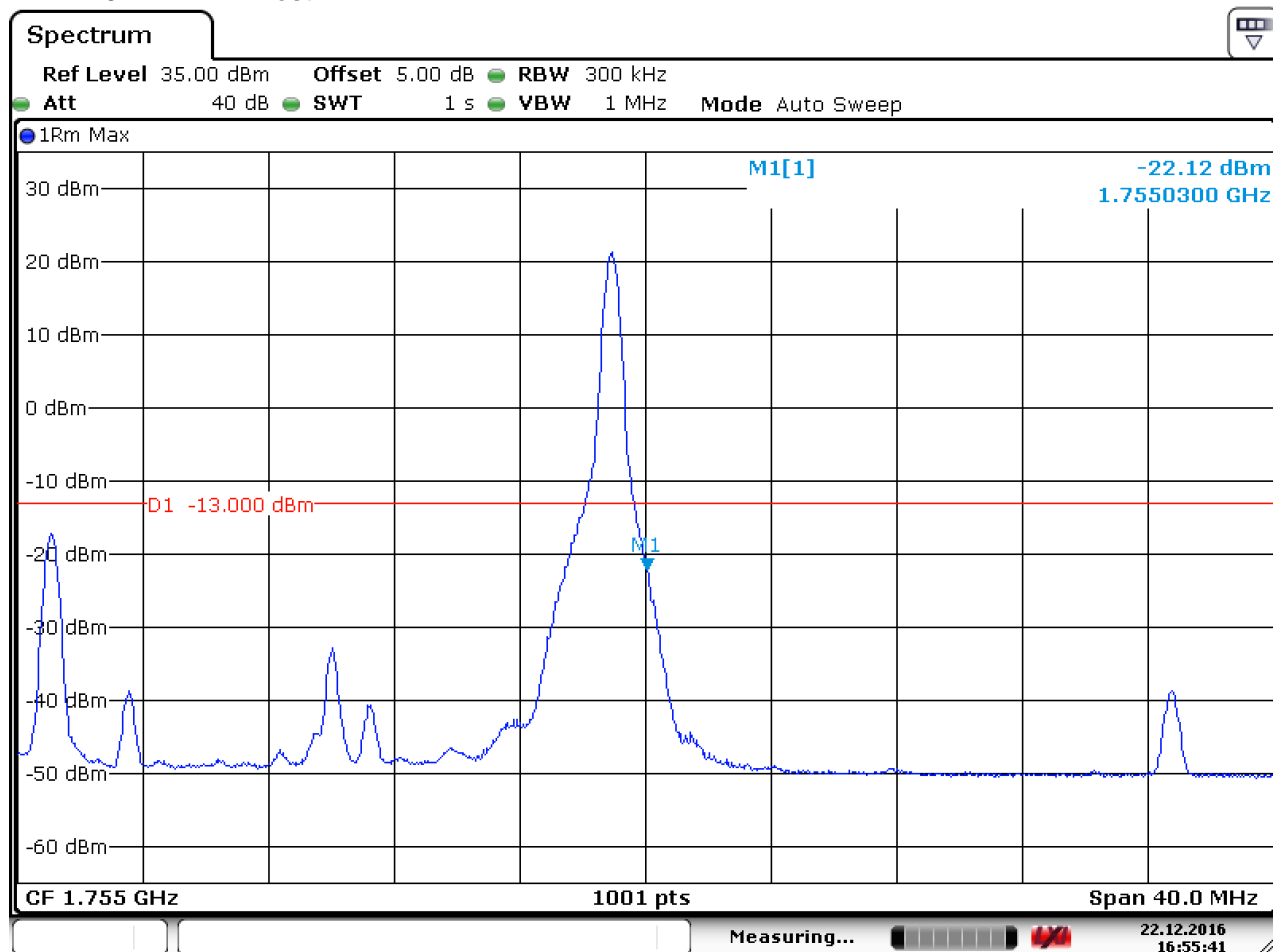
5.1.1.12.2.2 Test RB=100RB
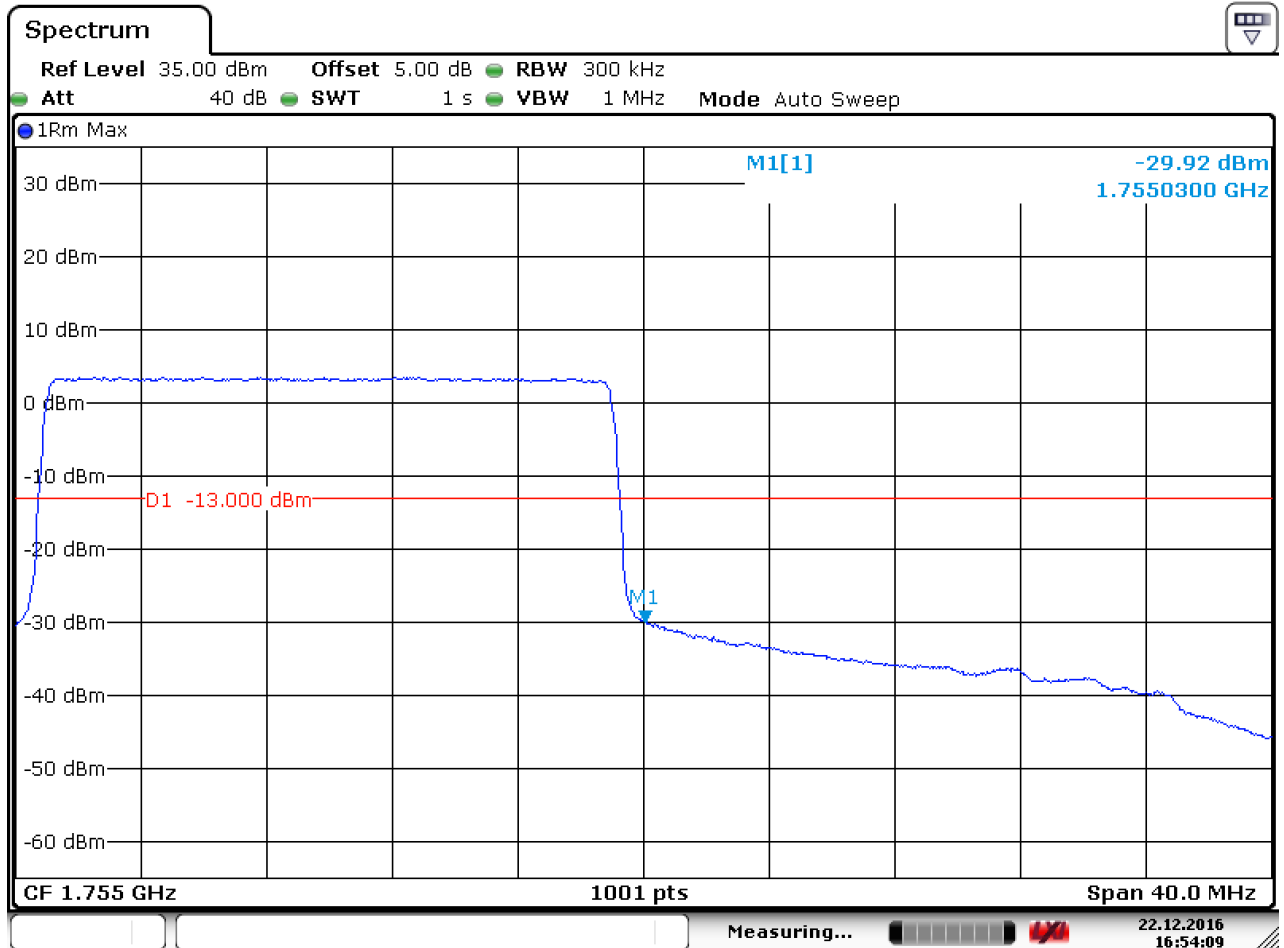
Date: 22.DEC.2016 16:54:09

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 LTE

6.1.1 Test Band = LTE band4

6.1.1.1   Test Mode = LTE / TM1 1.4MHz RB1#0

6.1.1.1.1   Test Channel = LCH

Date: 23.DEC.2016 10:41:51

Spectrum

Ref Level	20.00 dBm	**Offset**	5.00 dB	● **RBW**	1 MHz		
● **Att**	25 dB	**SWT**	27 ms	● **VBW**	3 MHz	**Mode** Auto Sweep	

●1Pk Max

M1[1]   -31.34 dBm
                         2.110770 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm   M1

-40 dBm

-50 dBm

-60 dBm

-70 dBm

Start 1.0 GHz   20001 pts   Stop 10.0 GHz
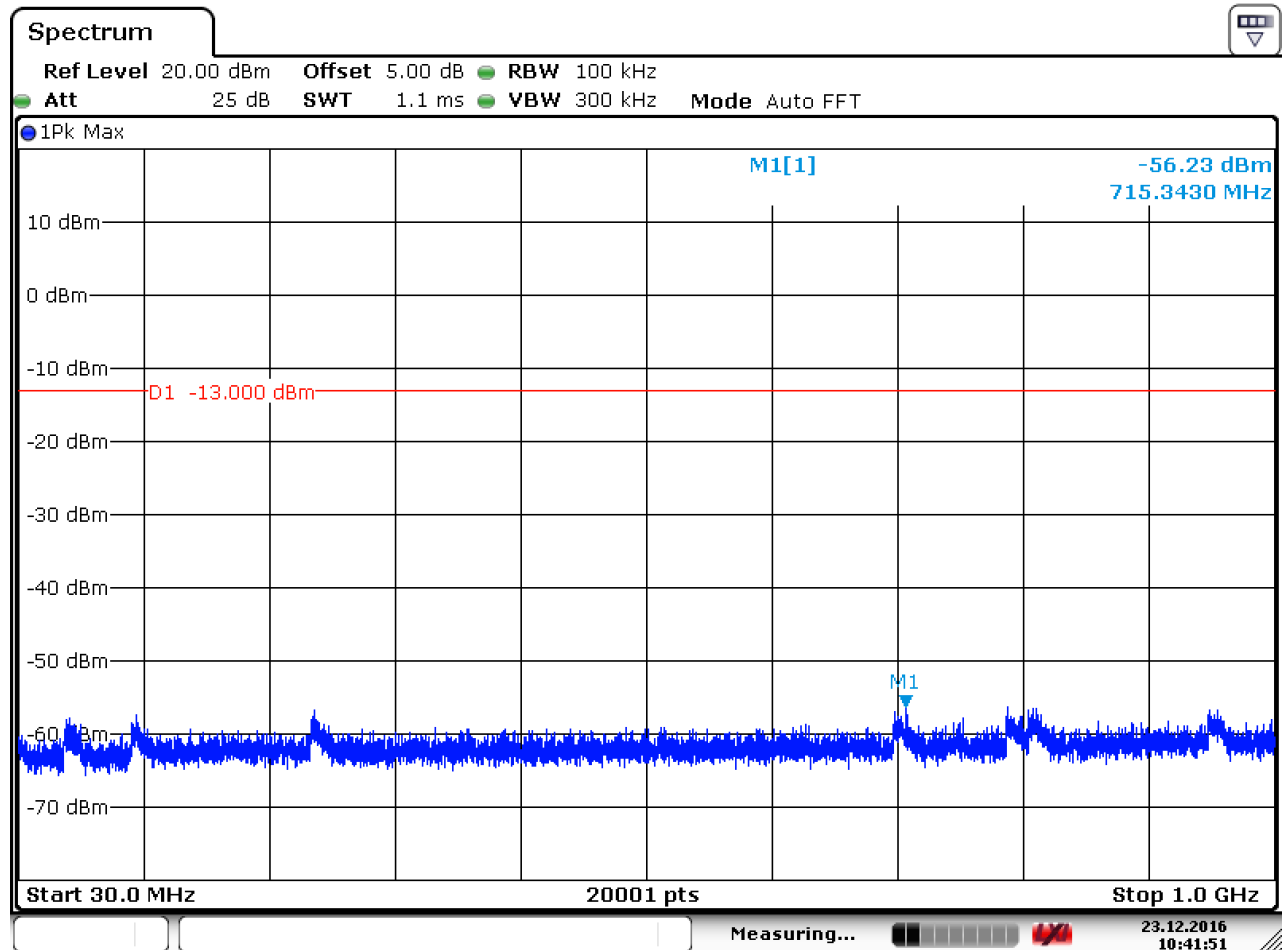
Measuring...   23.12.2016
                        10:11:41
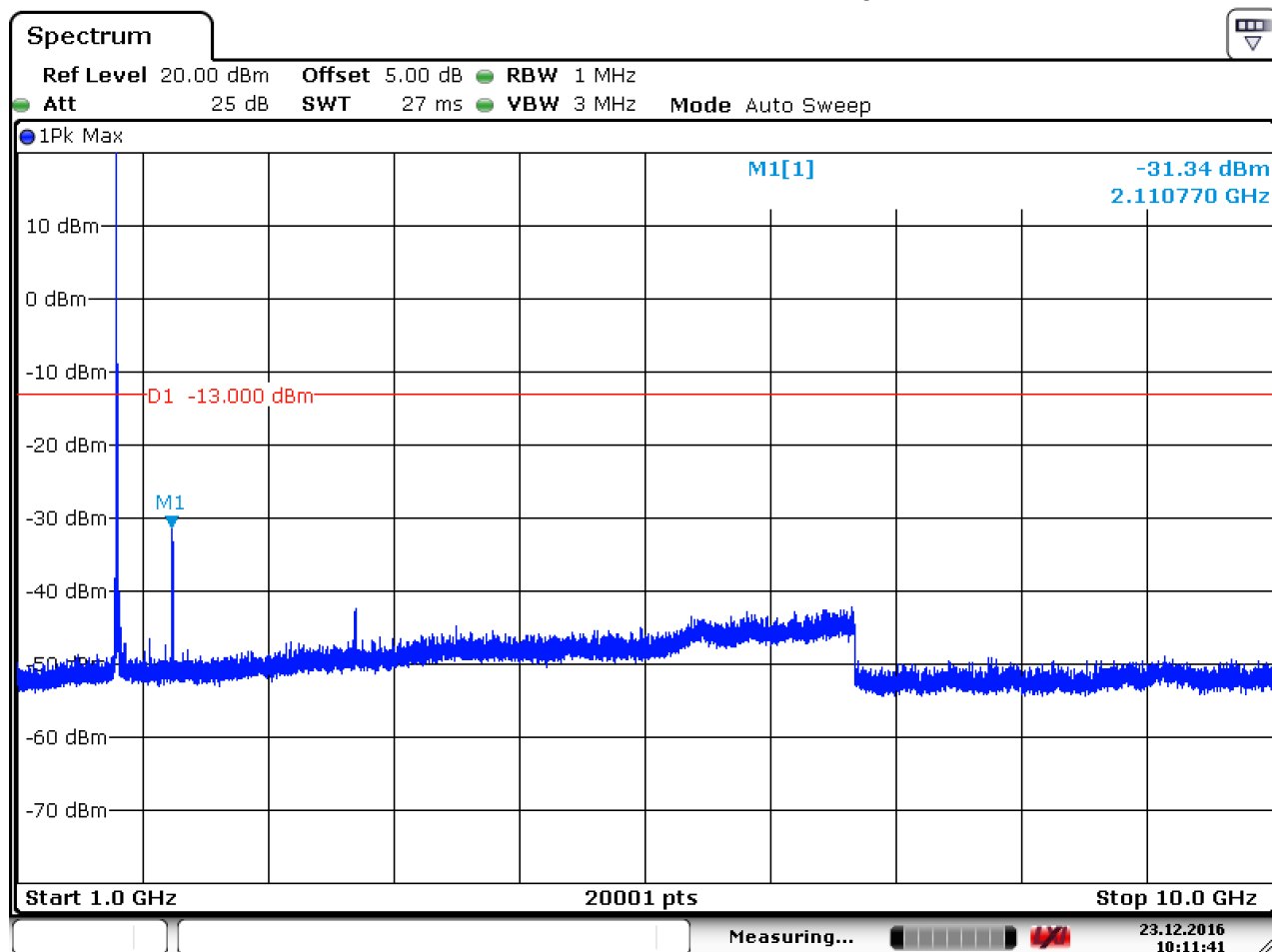
Date: 23.DEC.2016 10:11:41

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Spectrum				
Ref Level	20.00 dBm	Offset 5.00 dB	RBW	1 MHz
Att	25 dB	SWT 30 ms	VBW	3 MHz

Mode Auto Sweep

● 1Pk Max

M1[1] -46.58 dBm 19.818760 GHz

D1 -13.000 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:08:23

Date: 23.DEC.2016 10:08:24

6.1.1.1.2   Test Channel = MCH

Date: 23.DEC.2016 10:42:14

Spectrum

| Ref Level | 20.00 dBm | Offset | 5.00 dB | RBW | 1 MHz |
| Att | 25 dB | SWT | 27 ms | VBW | 3 MHz |

Mode Auto Sweep

1Pk Max

M1[1]   -40.06 dBm
3.464300 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

M1

-40 dBm

-50 dBm

-60 dBm

-70 dBm

Start 1.0 GHz   20001 pts   Stop 10.0 GHz

Measuring...   23.12.2016
10:12:26

Date: 23.DEC.2016 10:12:27

Spectrum		
Ref Level 20.00 dBm	Offset 5.00 dB ● RBW 1 MHz	
● Att 25 dB	SWT 30 ms ● VBW 3 MHz	Mode Auto Sweep

● 1Pk Max

M1[1]   -46.45 dBm
19.957750 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:08:02

Date: 23.DEC.2016 10:08:03

6.1.1.1.3   Test Channel = HCH

Spectrum

Ref Level 20.00 dBm	**Offset** 5.00 dB ● RBW 100 kHz	
● **Att** 25 dB	**SWT** 1.1 ms ● **VBW** 300 kHz	**Mode** Auto FFT

1Pk Max

M1[1]   -56.00 dBm
                         949.2470 MHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

M1

-60 dBm

-70 dBm

Start 30.0 MHz   20001 pts   Stop 1.0 GHz

Measuring...   23.12.2016
                      10:42:37
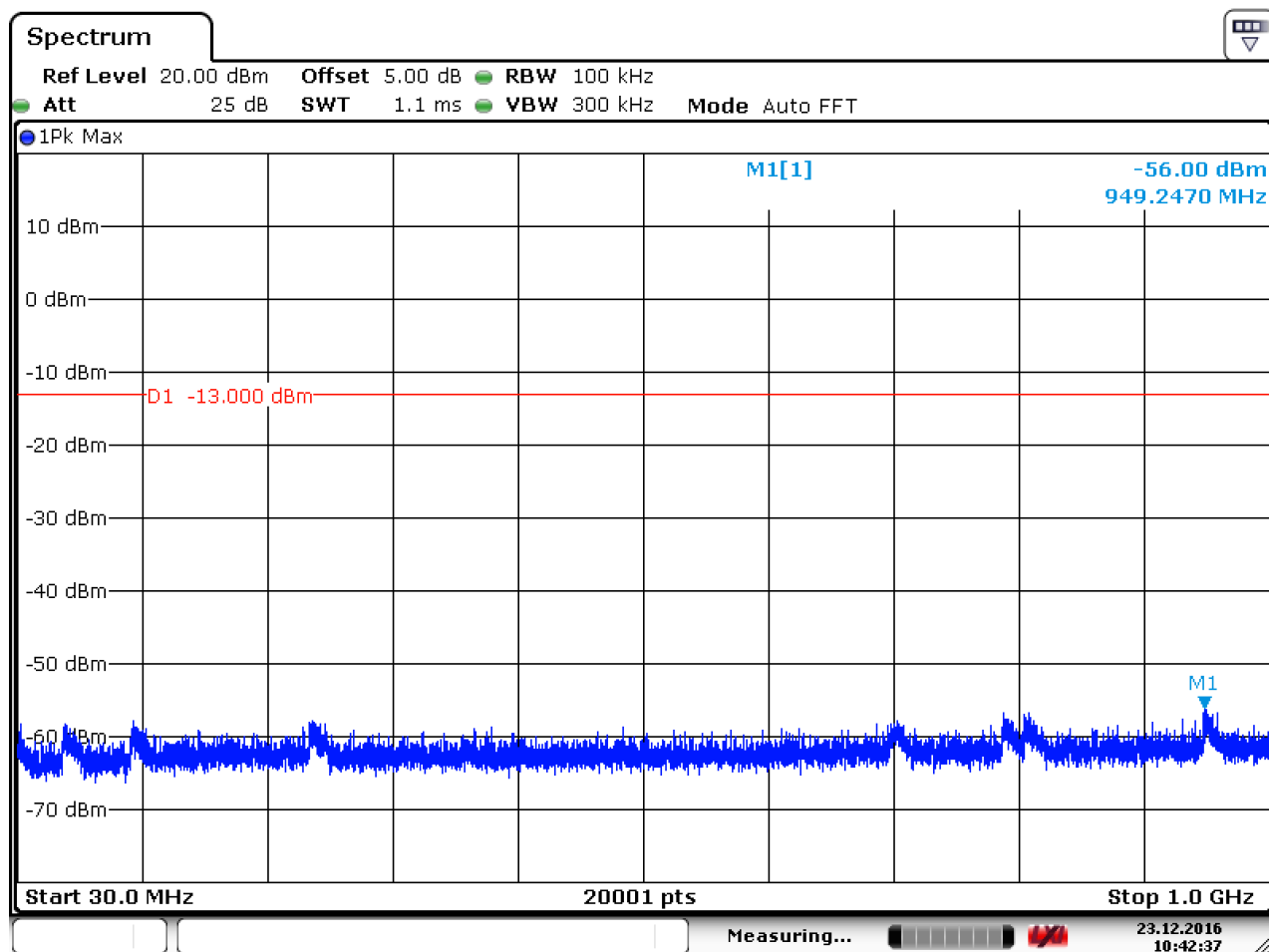
Date: 23.DEC.2016 10:42:37
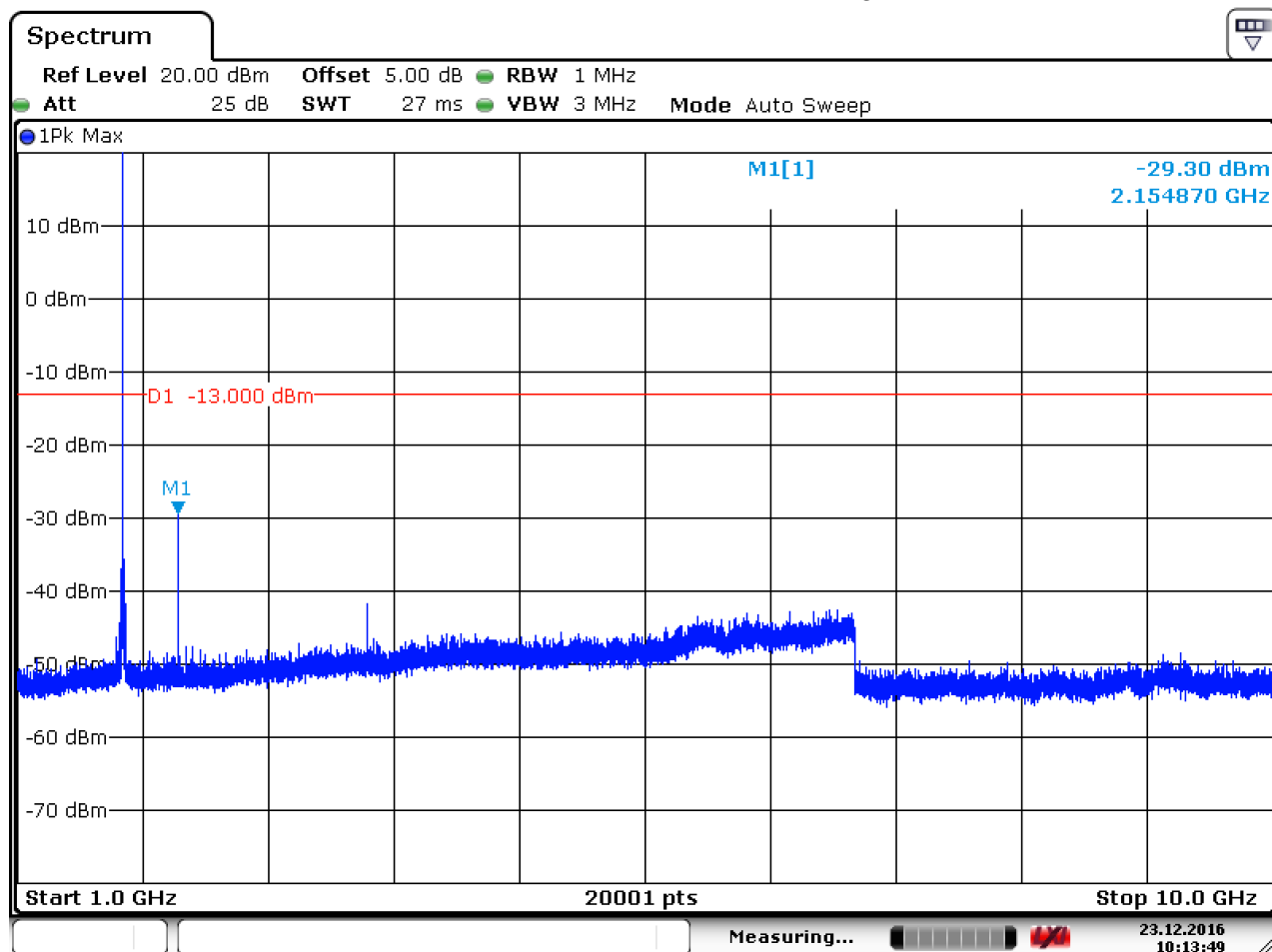
Date: 23.DEC.2016 10:13:50

Date: 23.DEC.2016 10:07:38

6.1.1.2   Test Mode = LTE / TM1 3MHz RB1#0

6.1.1.2.1   Test Channel = LCH

Date: 23.DEC.2016 10:41:06

Date: 23.DEC.2016 10:15:52

Spectrum
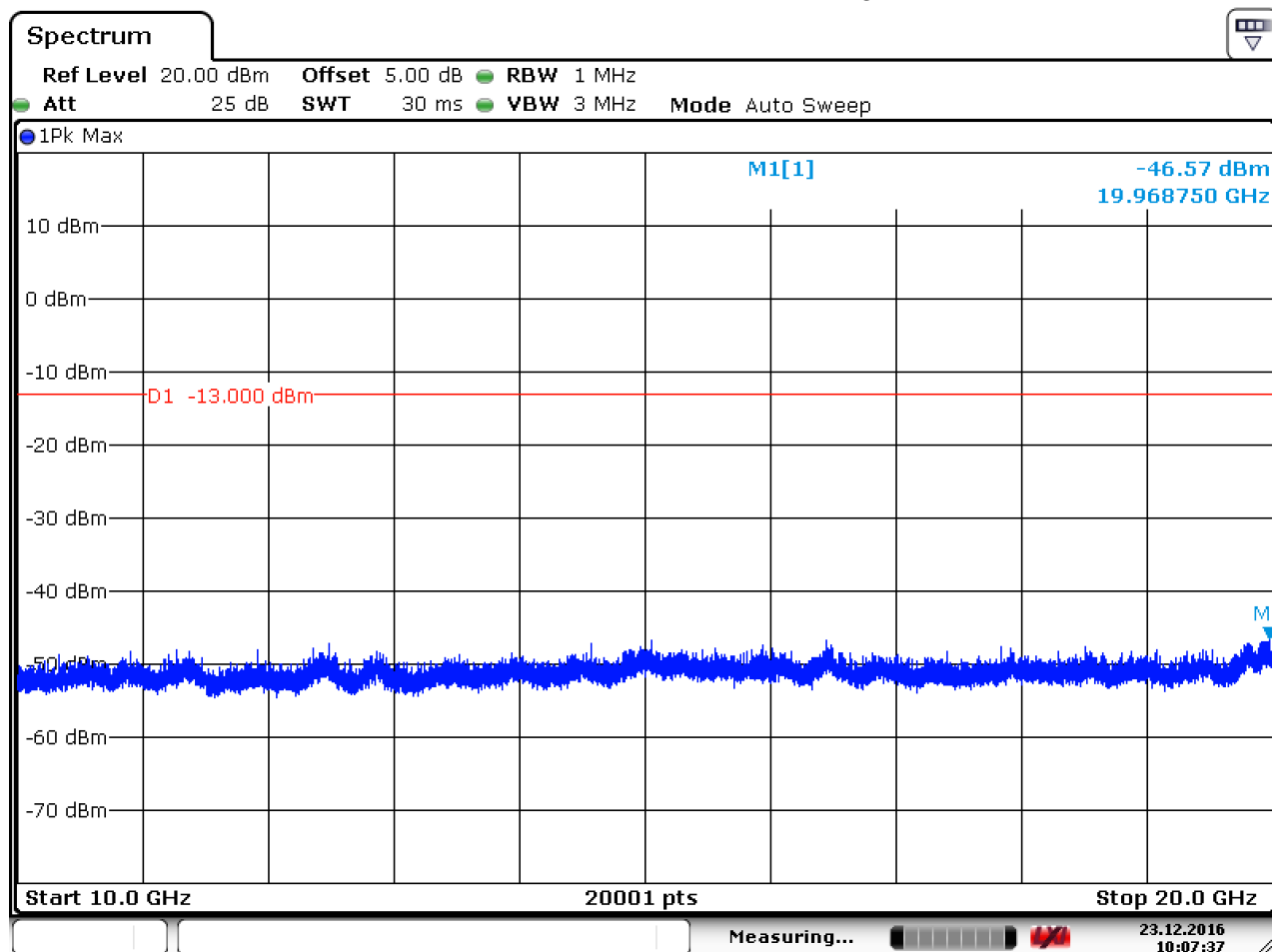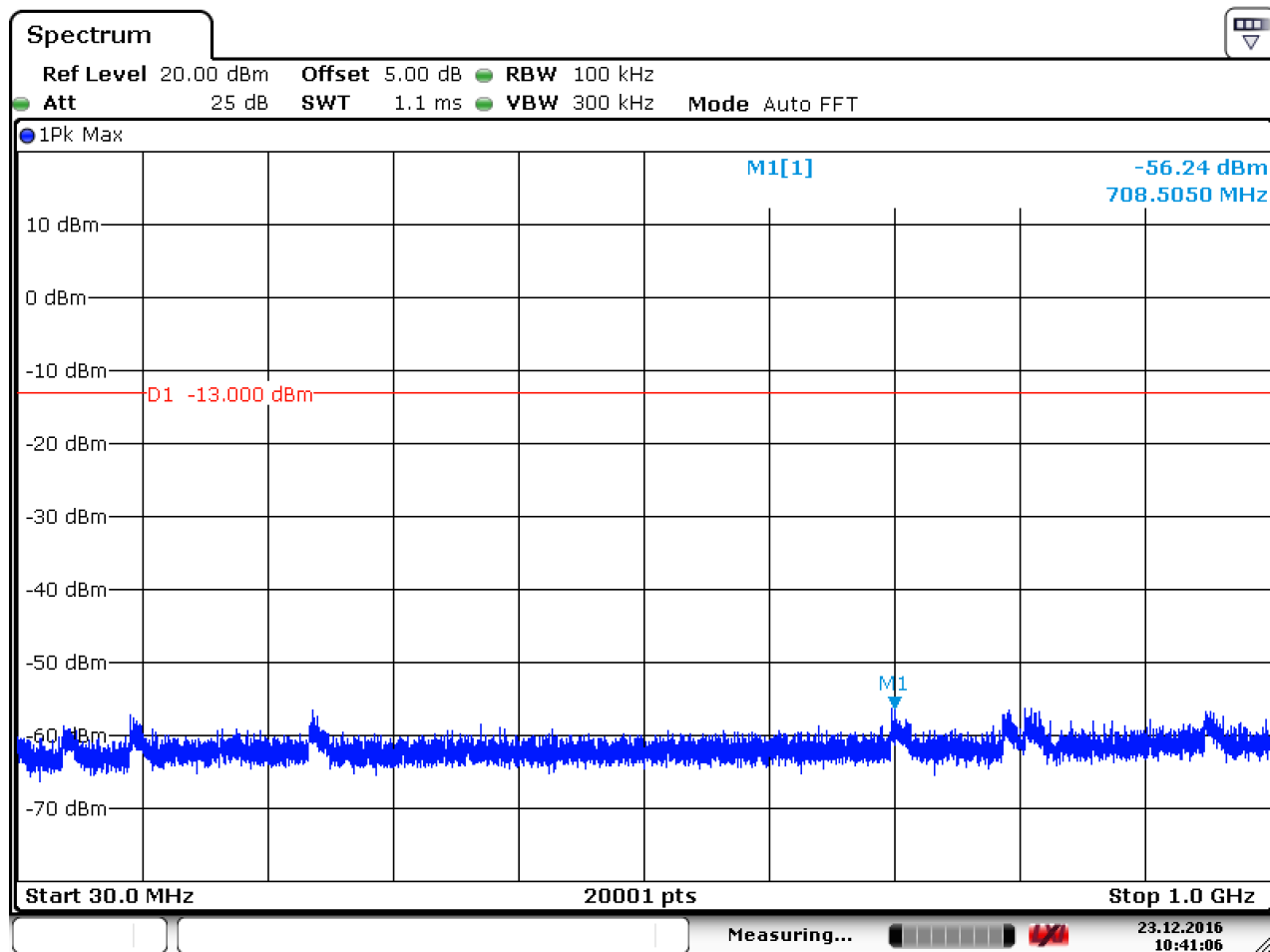
Ref Level	20.00 dBm	Offset	5.00 dB	RBW	1 MHz
Att	25 dB	SWT	30 ms	VBW	3 MHz	Mode Auto Sweep

1Pk Max

M1[1]   -45.94 dBm
                     19.967750 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016
                                   10:06:15
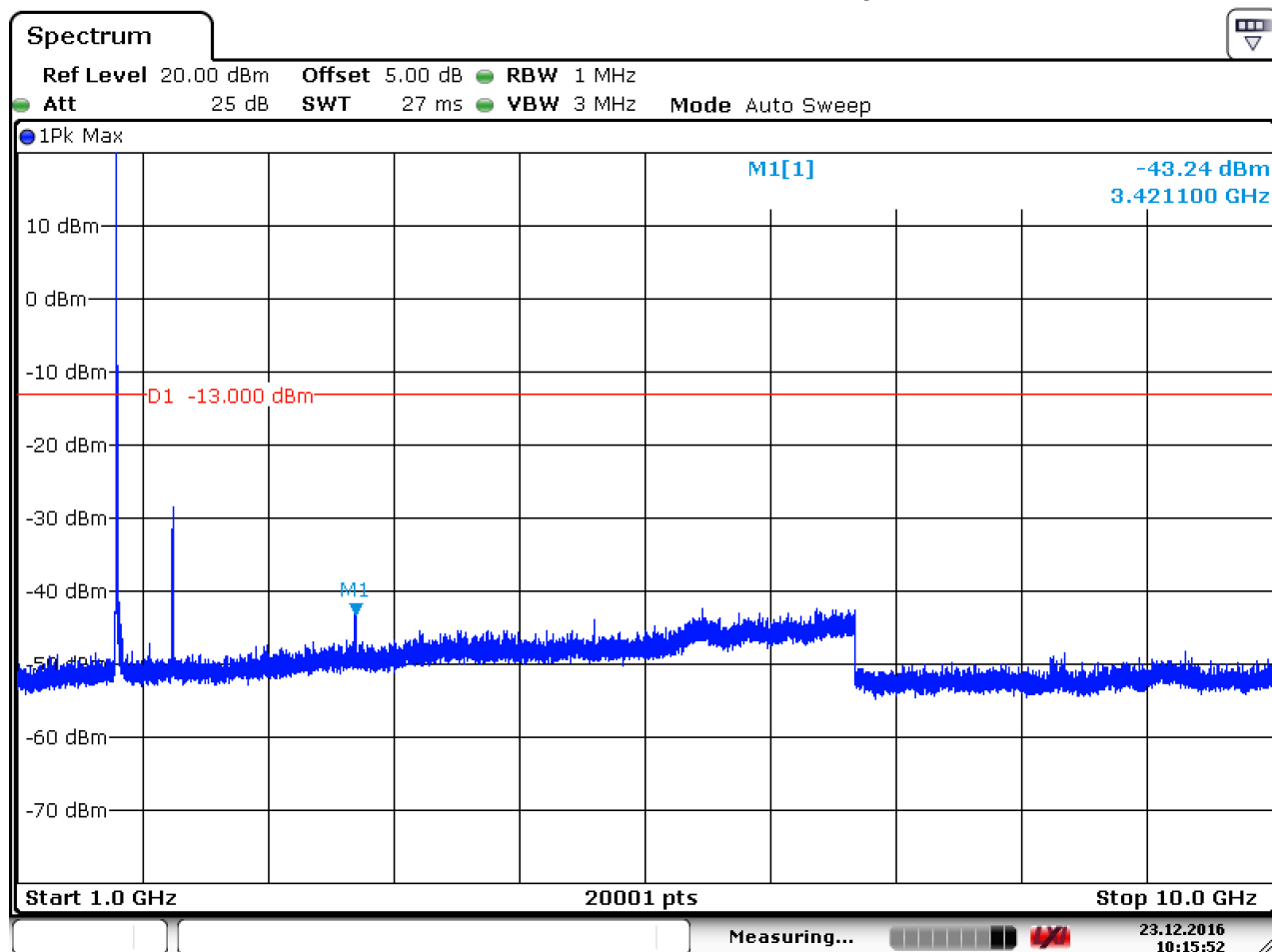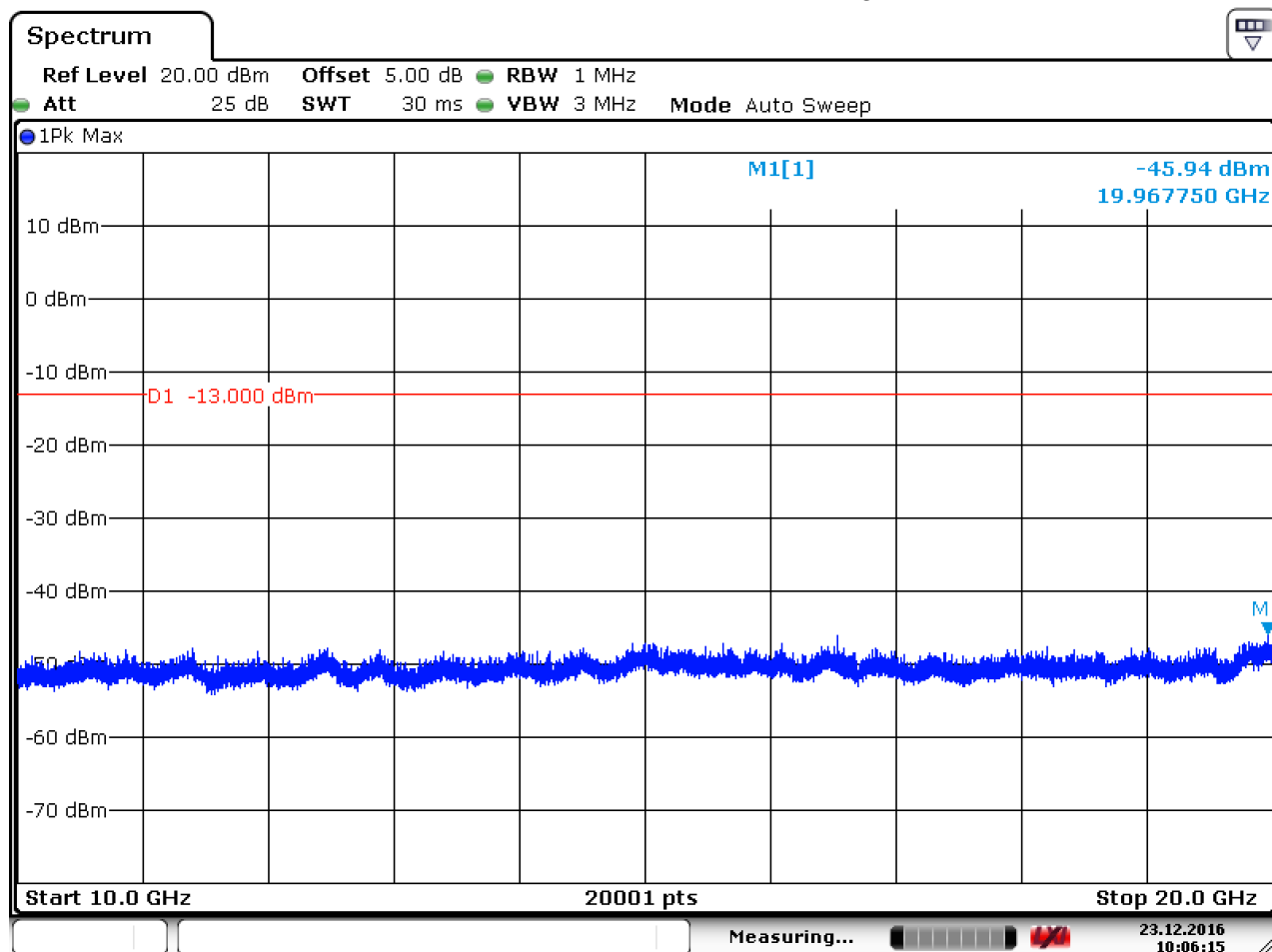
Date: 23.DEC.2016 10:06:15

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6.1.1.2.2   Test Channel = MCH
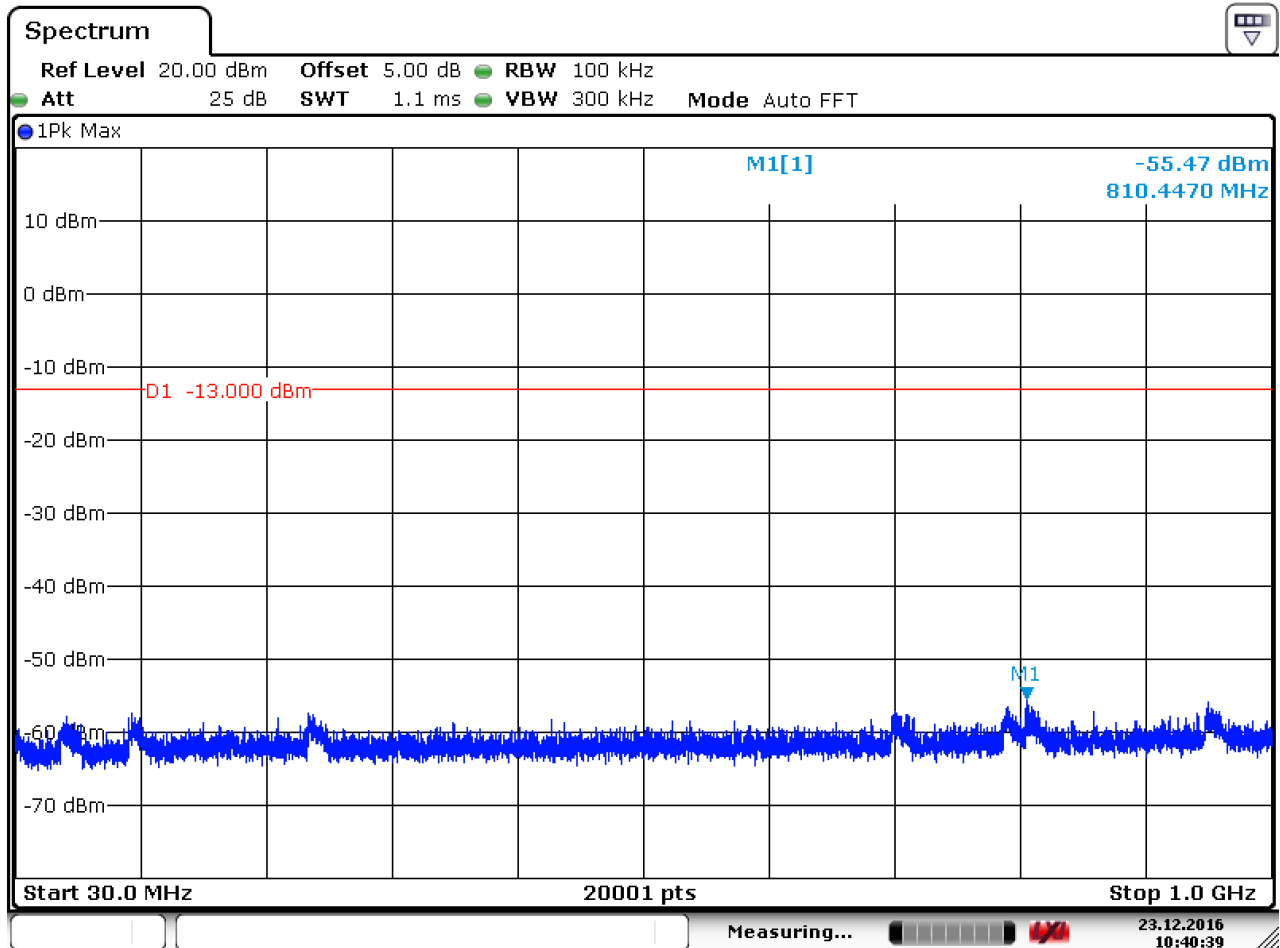
Date: 23.DEC.2016 10:40:39
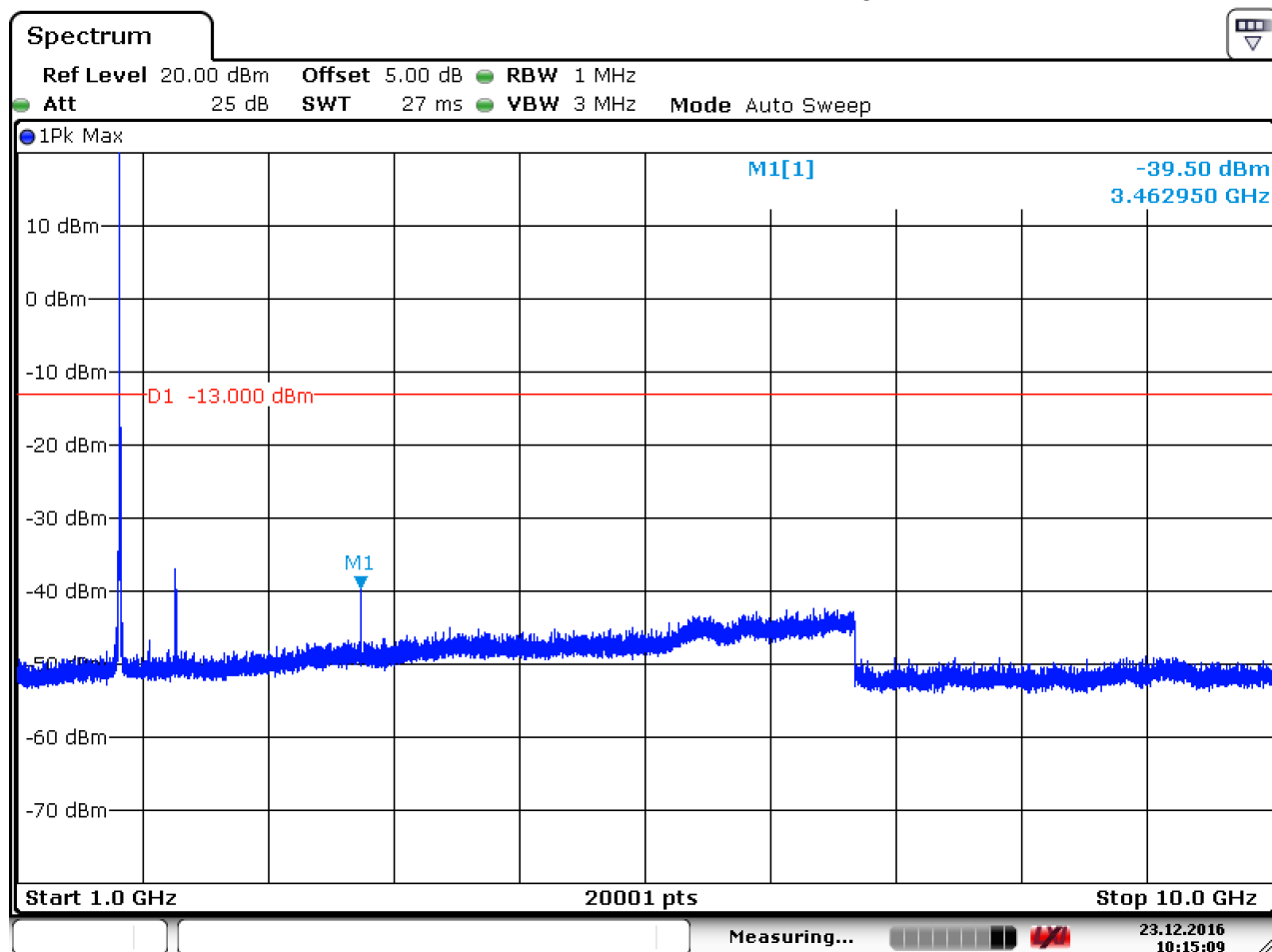
SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Date: 23.DEC.2016 10:15:10

Date: 23.DEC.2016 10:06:46

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
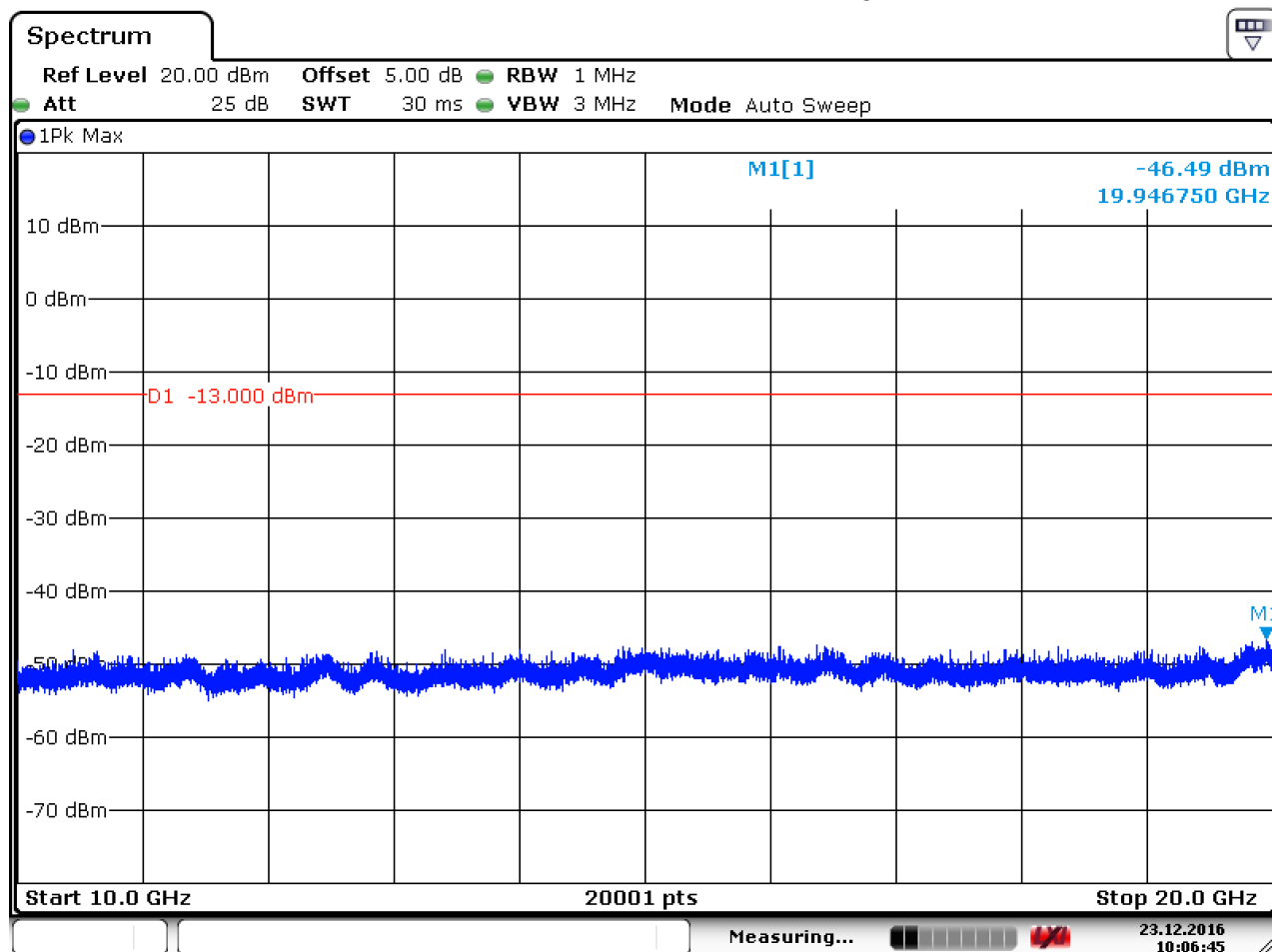
6.1.1.2.3   Test Channel = HCH
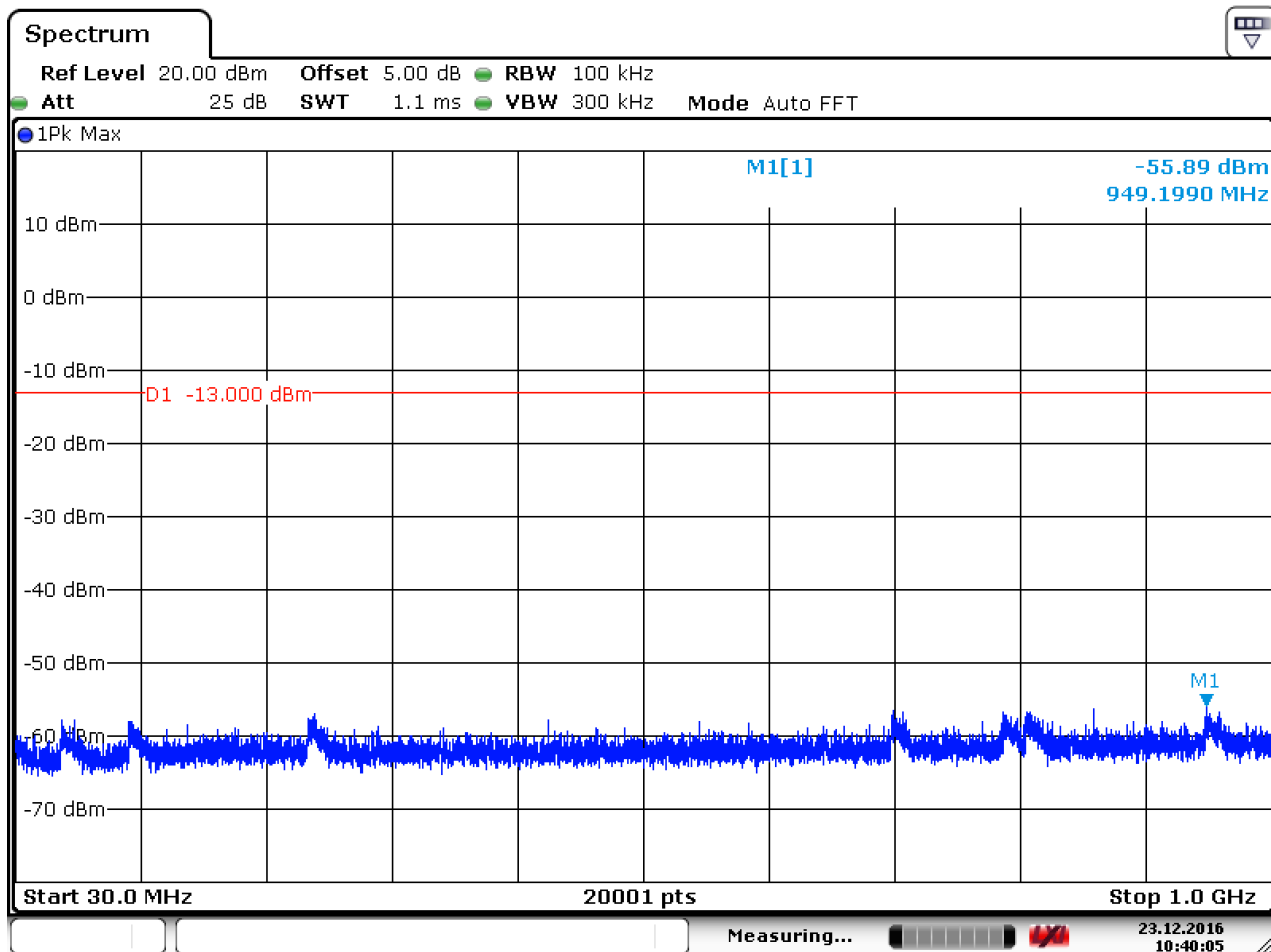
Date: 23.DEC.2016 10:40:06
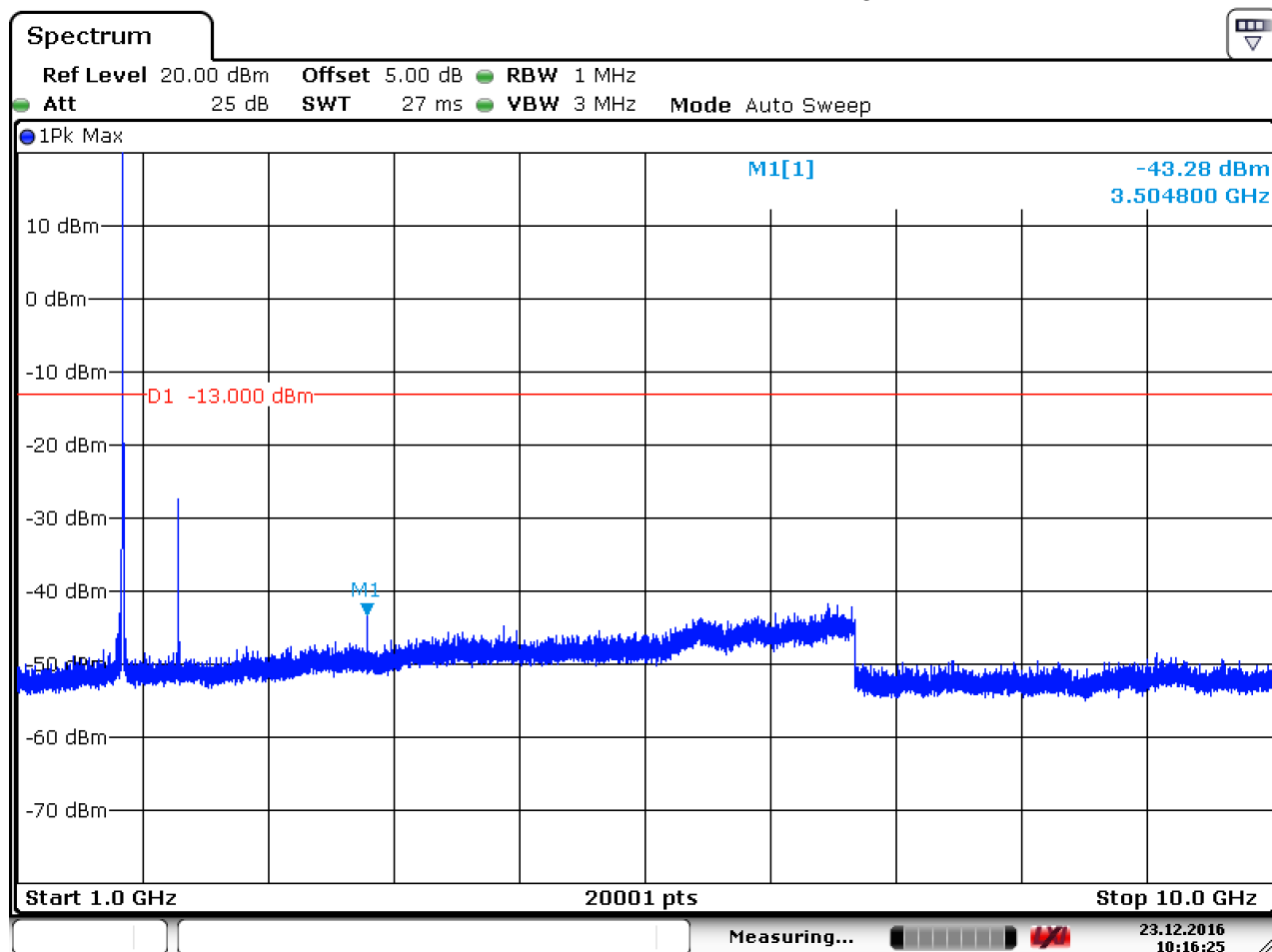
Date: 23.DEC.2016 10:16:25

Date: 23.DEC.2016 10:07:04

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
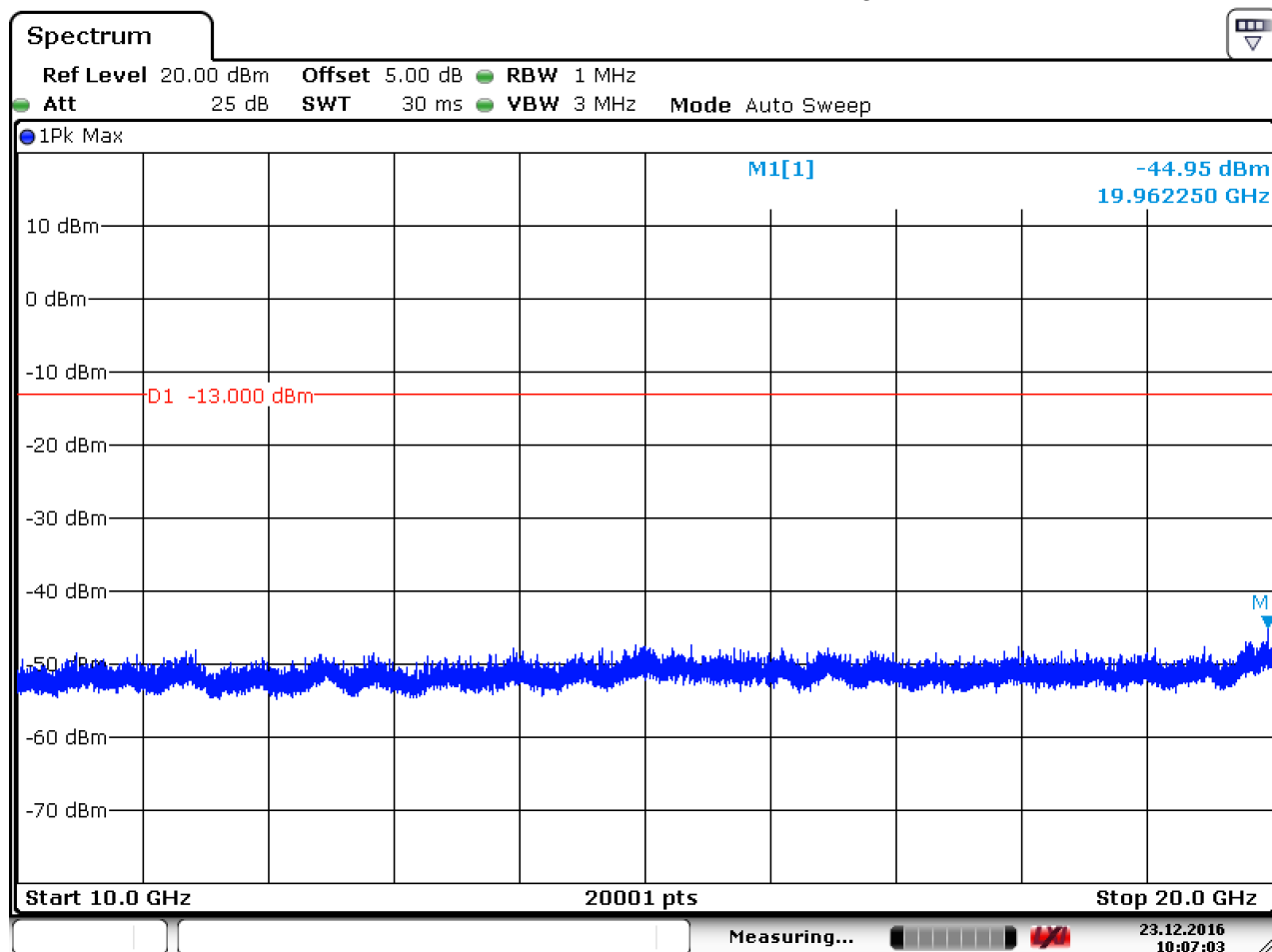
6.1.1.3   Test Mode = LTE / TM1 5MHz RB1#0

6.1.1.3.1   Test Channel = LCH
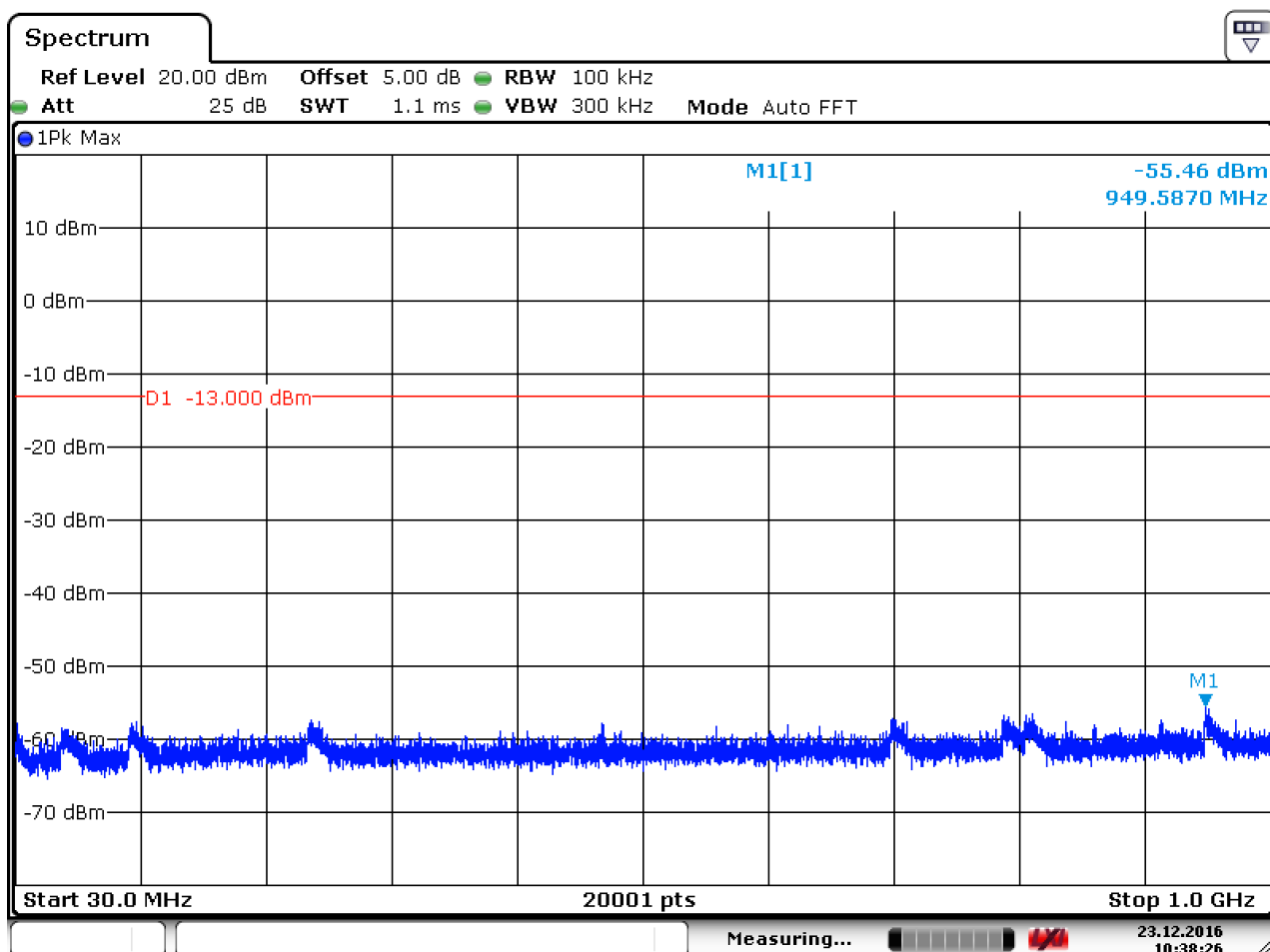
Date: 23.DEC.2016 10:38:27
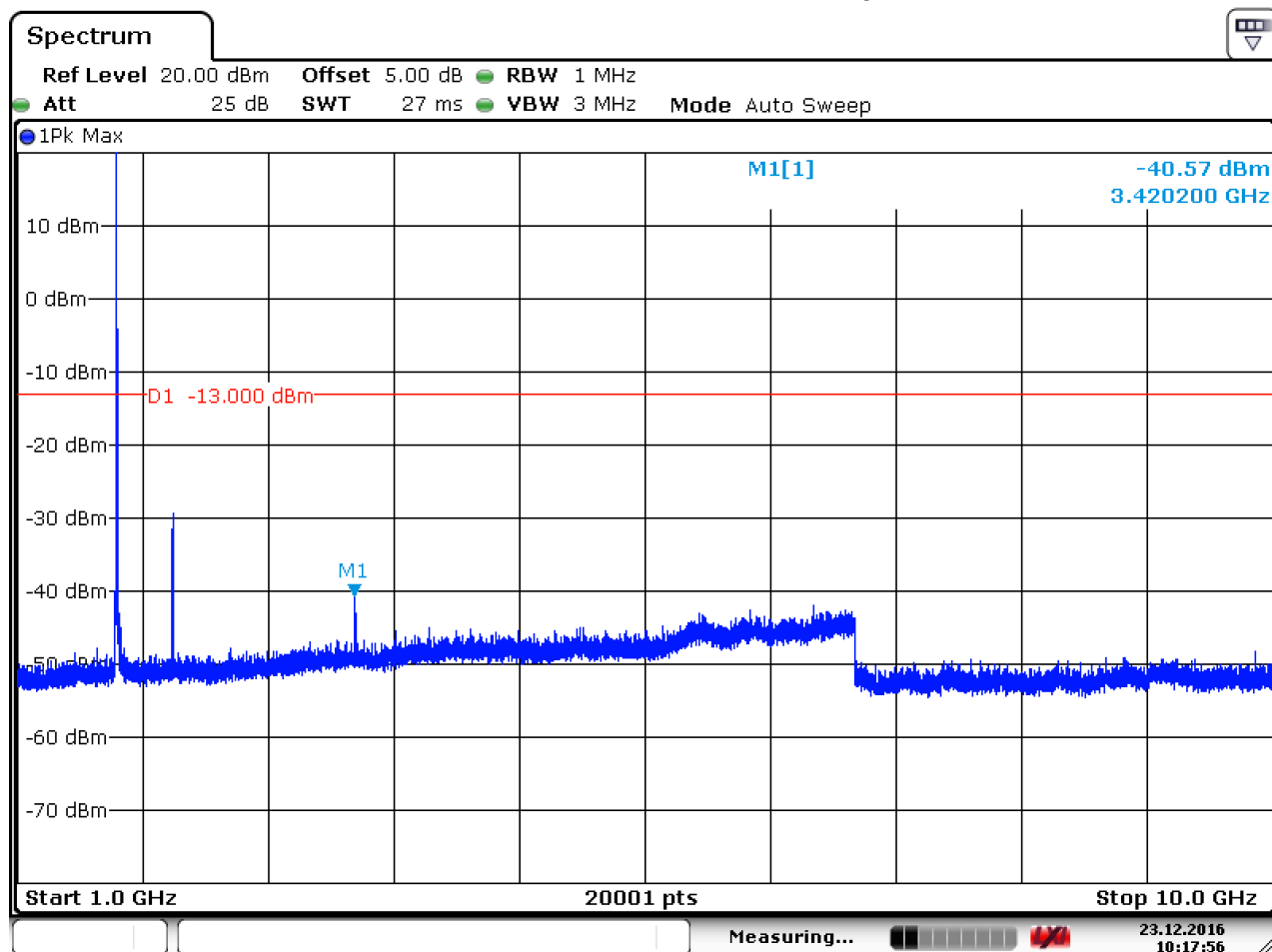
Date: 23.DEC.2016 10:17:56

Spectrum

Ref Level 20.00 dBm	Offset 5.00 dB	● RBW 1 MHz	
● Att 25 dB	SWT 30 ms	● VBW 3 MHz	Mode Auto Sweep

● 1Pk Max

M1[1]   -46.33 dBm
                                         19.795260 GHz

10 dBm —

0 dBm —

-10 dBm —
D1 -13.000 dBm

-20 dBm —

-30 dBm —

-40 dBm —
                                                        M1

-60 dBm —

-70 dBm —

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016
                        10:05:27
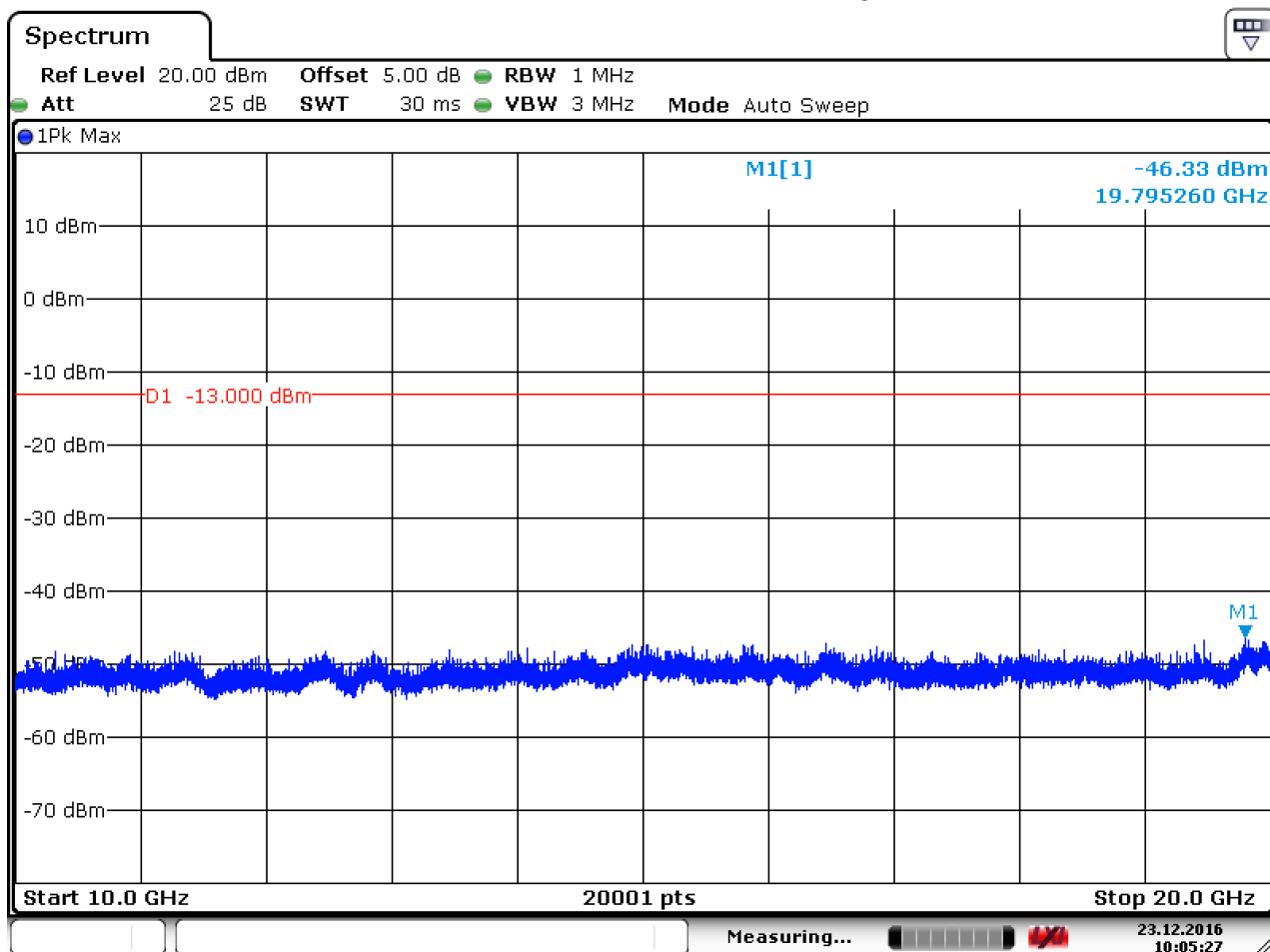
Date: 23.DEC.2016 10:05:27

6.1.1.3.2   Test Channel = MCH

Spectrum

| Ref Level | 20.00 dBm | Offset | 5.00 dB | ● RBW | 100 kHz | |
| Att | 25 dB | SWT | 1.1 ms | ● VBW | 300 kHz | Mode Auto FFT |

● 1Pk Max

M1[1]   -56.52 dBm
                                                953.5150 MHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

M1

-60 dBm

-70 dBm

Start 30.0 MHz   20001 pts   Stop 1.0 GHz

Measuring...   23.12.2016
                      10:38:54

Date: 23.DEC.2016 10:38:54

Date: 23.DEC.2016 10:17:07

Spectrum		
Ref Level 20.00 dBm	Offset 5.00 dB ● RBW 1 MHz	
● Att 25 dB	SWT 30 ms ● VBW 3 MHz	Mode Auto Sweep

1Pk Max

M1[1]   -46.76 dBm
                         14.930500 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

M1

-50 dBm

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:05:06
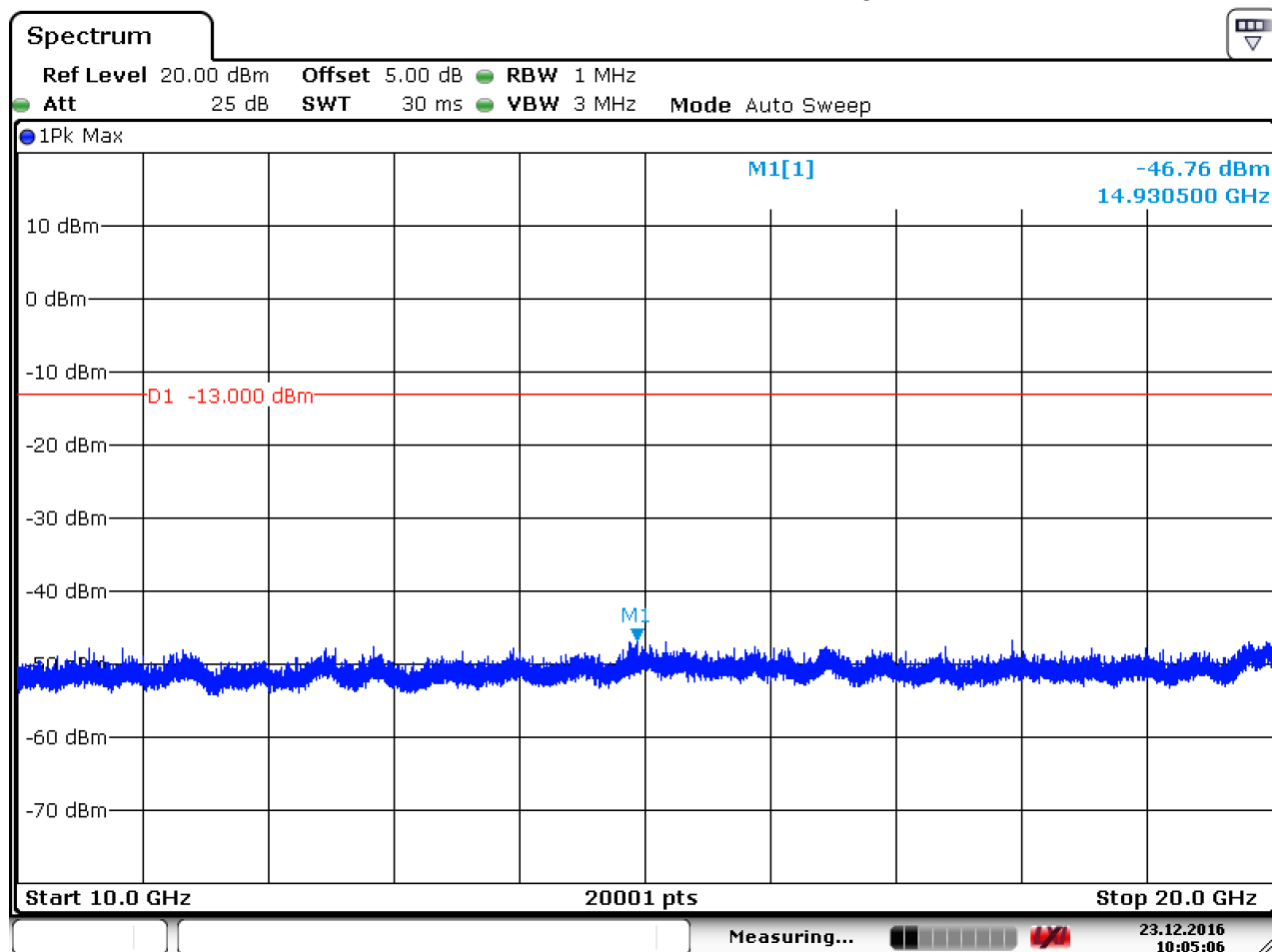
Date: 23.DEC.2016 10:05:06

6.1.1.3.3 Test Channel = HCH

Date: 23.DEC.2016 10:39:23

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

Date: 23.DEC.2016 10:19:17
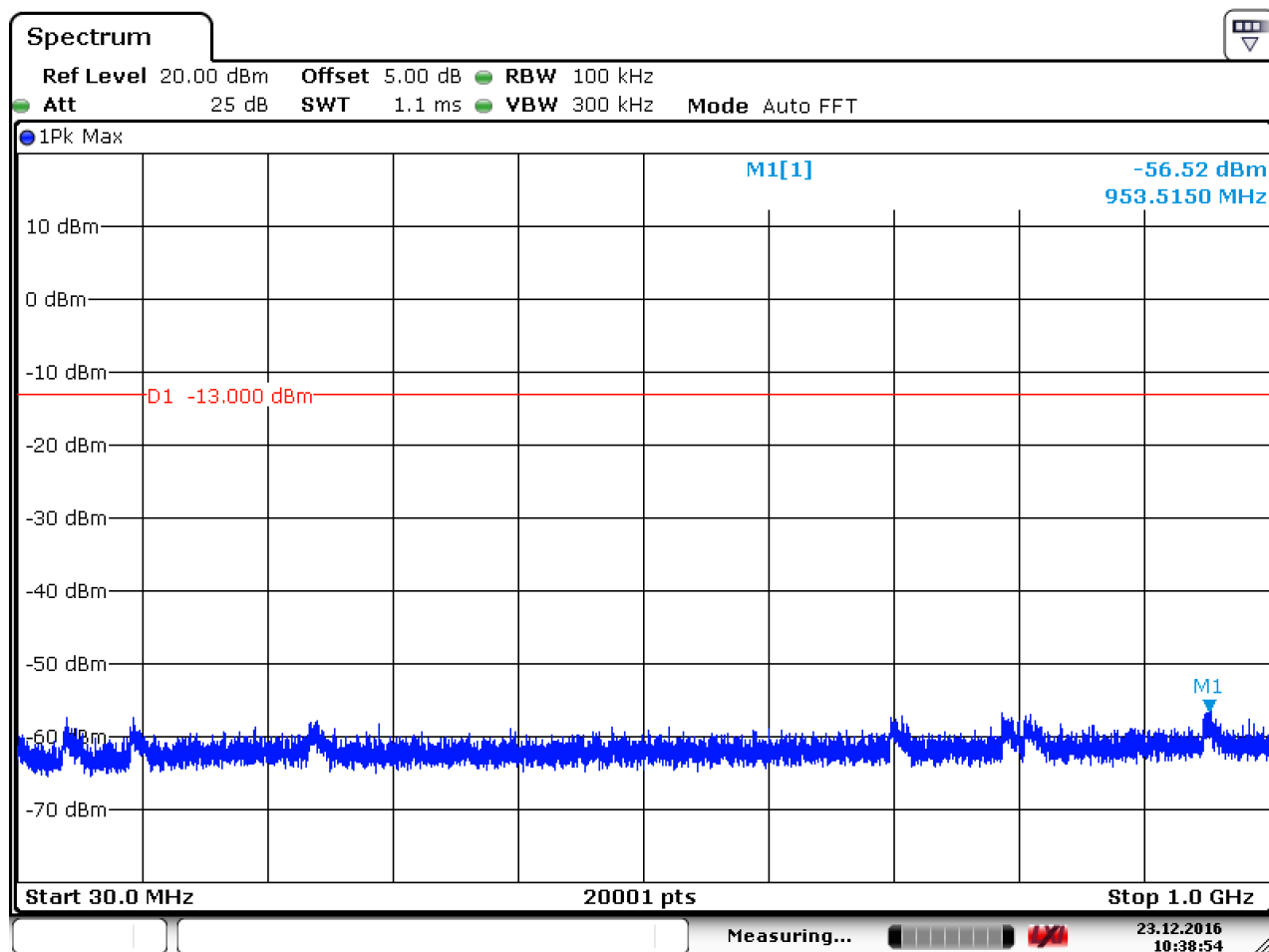
Spectrum

| Ref Level 20.00 dBm | Offset 5.00 dB | ● RBW 1 MHz |
| Att 25 dB | SWT 30 ms | ● VBW 3 MHz | Mode Auto Sweep |

● 1Pk Max

M1[1]   -46.21 dBm
                         19.946250 GHz

10 dBm —

0 dBm —

-10 dBm —

D1 -13.000 dBm

-20 dBm —

-30 dBm —

-40 dBm —

-50 dBm —

-60 dBm —

-70 dBm —

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:04:28
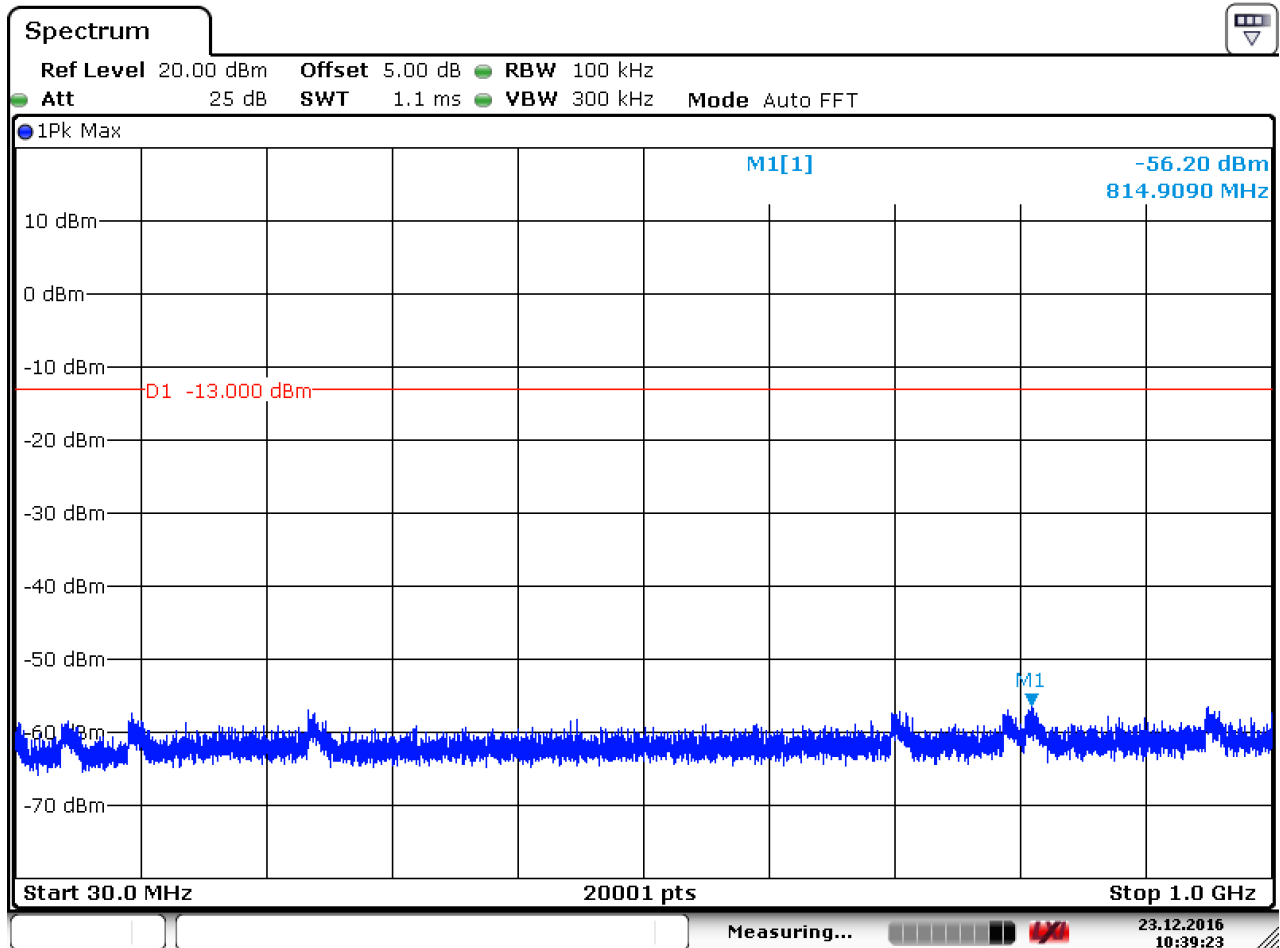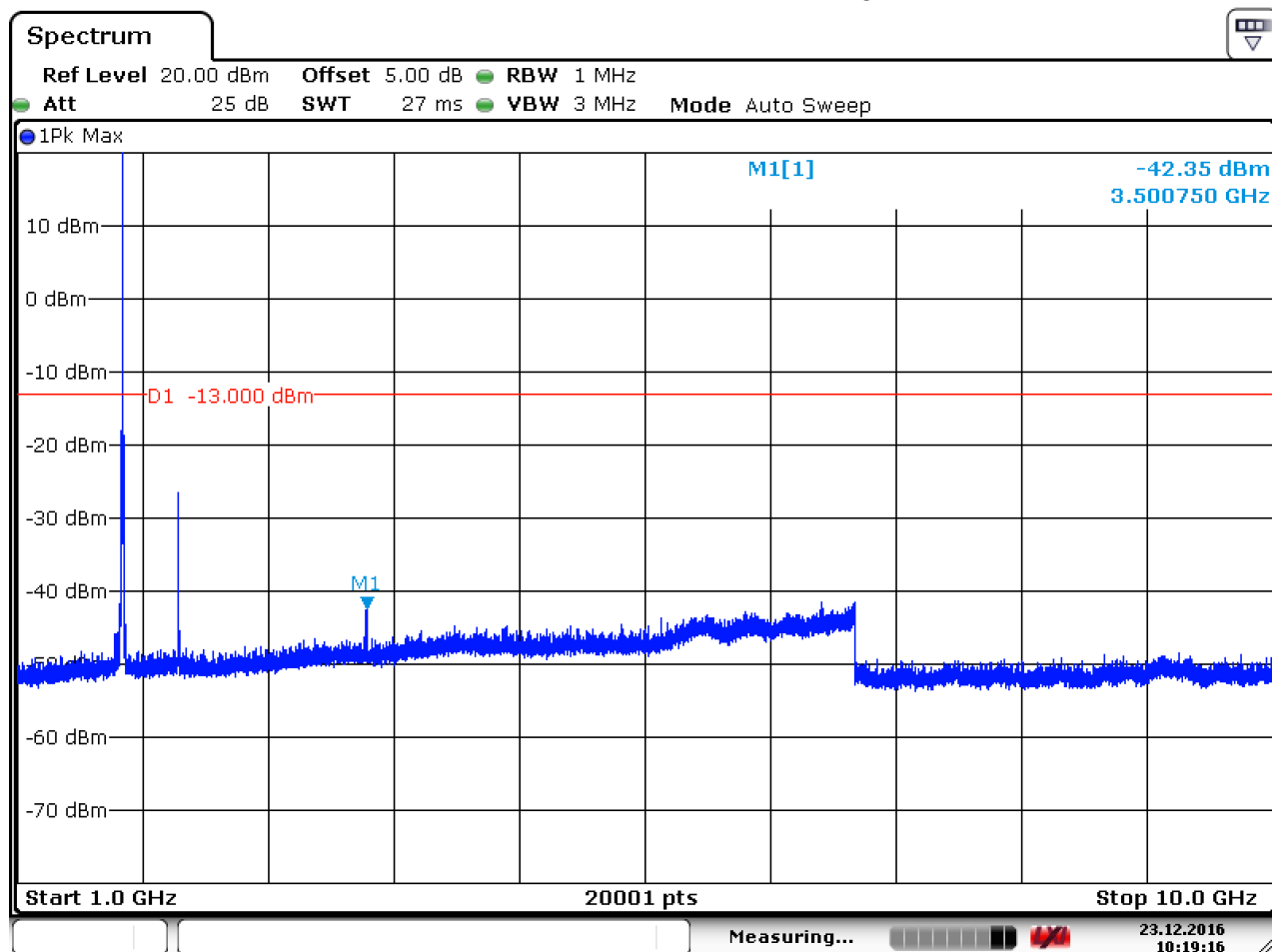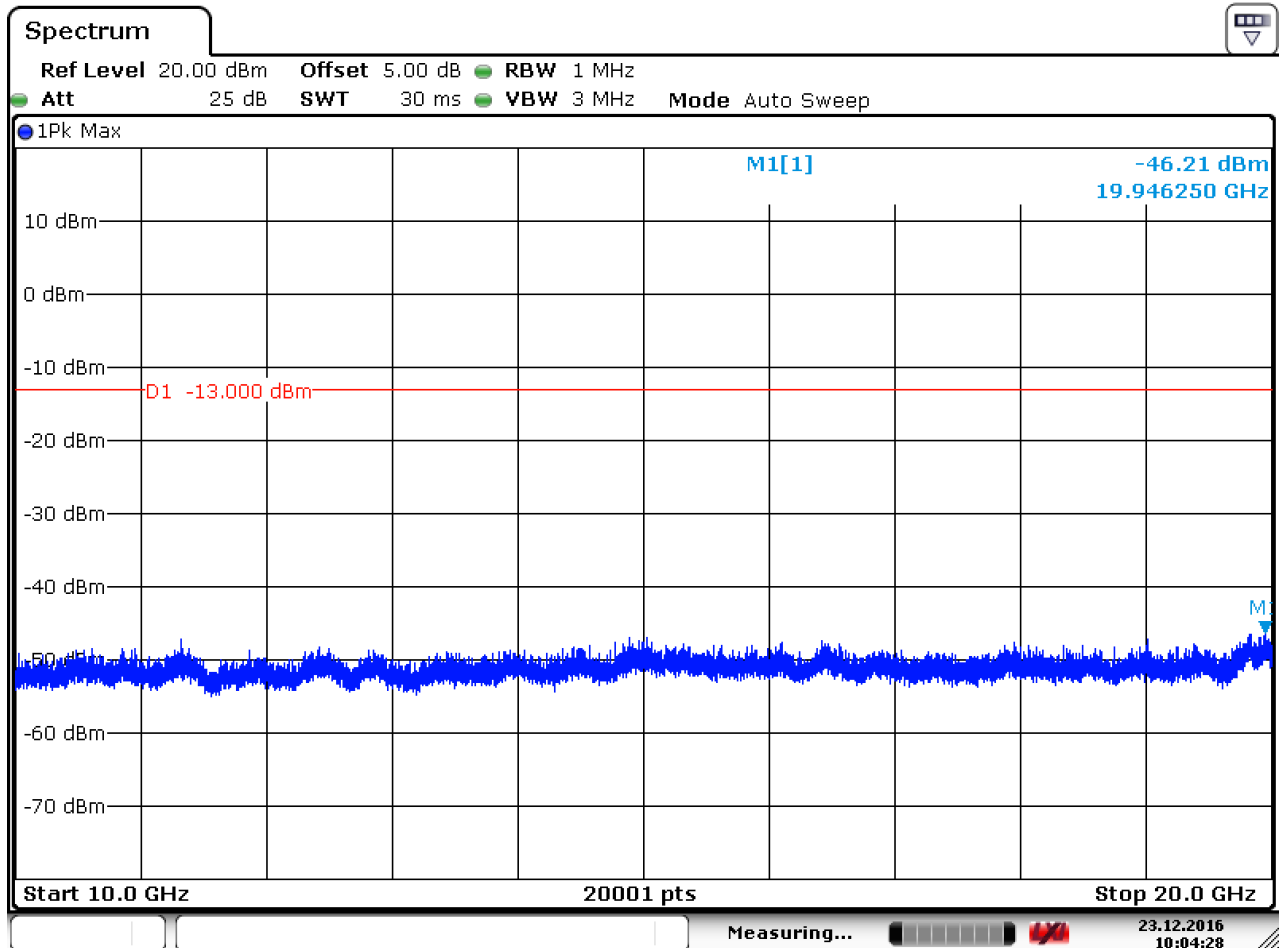
Date: 23.DEC.2016 10:04:29

6.1.1.4 Test Mode = LTE / TM1 10MHz RB1#0

6.1.1.4.1 Test Channel = LCH

Date: 23.DEC.2016 10:37:27

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

Spectrum					
Ref Level 20.00 dBm	Offset 5.00 dB	● RBW 1 MHz			
● Att 25 dB	SWT 30 ms	● VBW 3 MHz	Mode Auto Sweep		

● 1Pk Max

M1[1] -46.02 dBm
19.951750 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:03:06

Date: 23.DEC.2016 10:03:06

6.1.1.4.2   Test Channel = MCH

Date: 23.DEC.2016 10:36:56

Date: 23.DEC.2016 10:23:47

Spectrum

| Ref Level | 20.00 dBm | Offset | 5.00 dB | ● | RBW | 1 MHz |
| Att | 25 dB | SWT | 30 ms | ● | VBW | 3 MHz | Mode Auto Sweep |

●1Pk Max

M1[1] -45.56 dBm
19.819260 GHz

D1 -13.000 dBm

M1

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:03:33
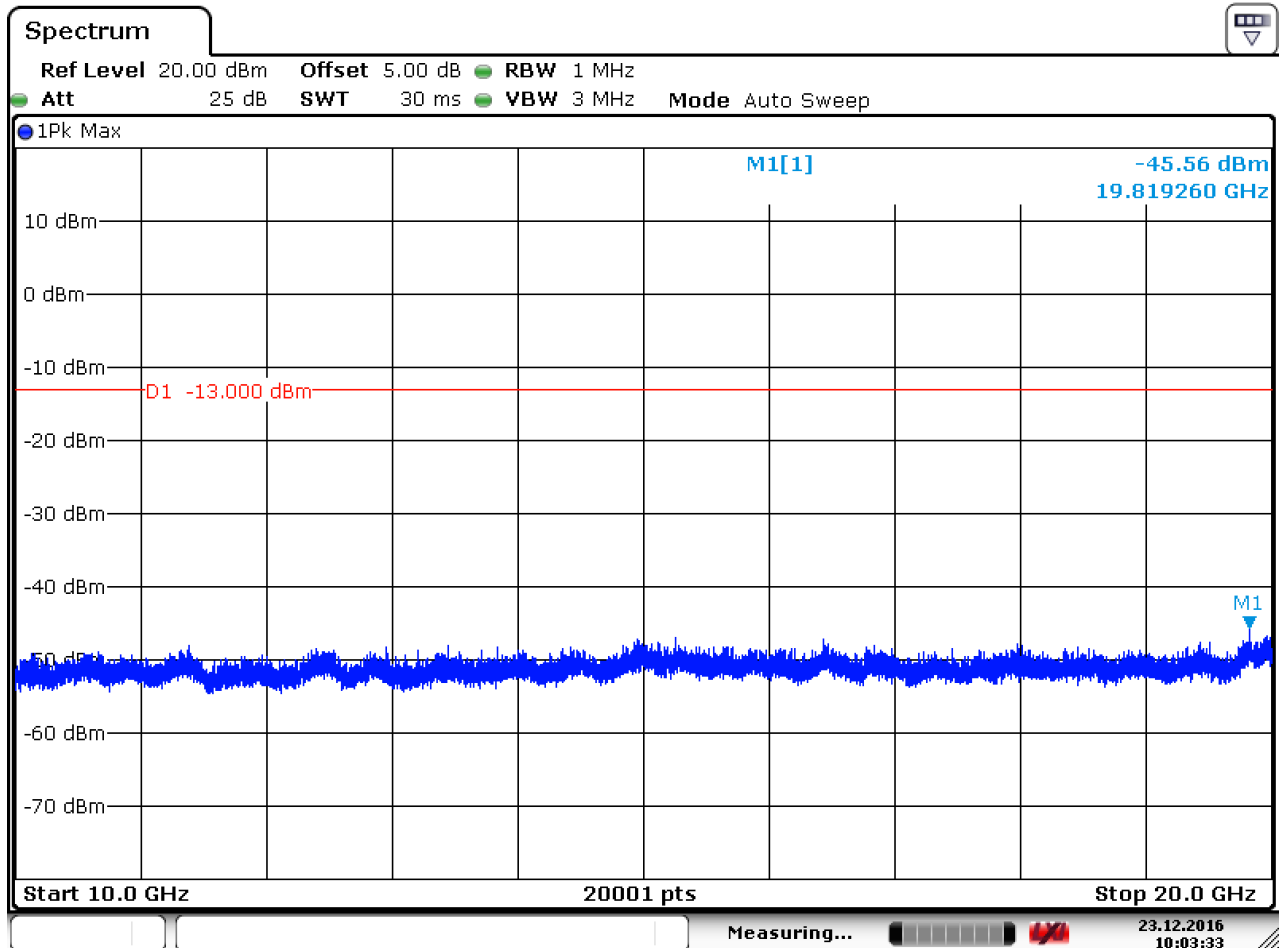
Date: 23.DEC.2016 10:03:34

6.1.1.4.3   Test Channel = HCH

Date: 23.DEC.2016 10:36:33
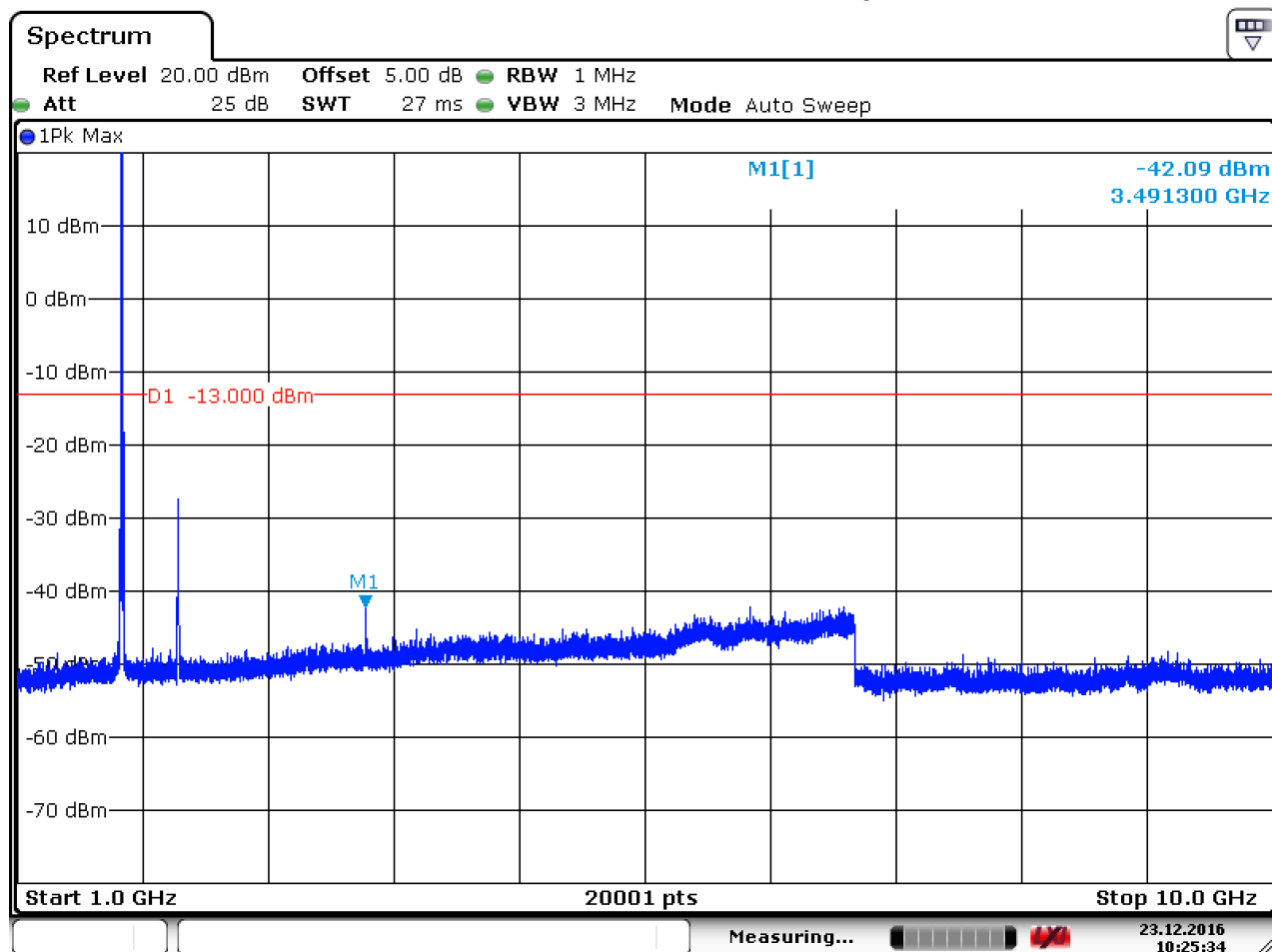
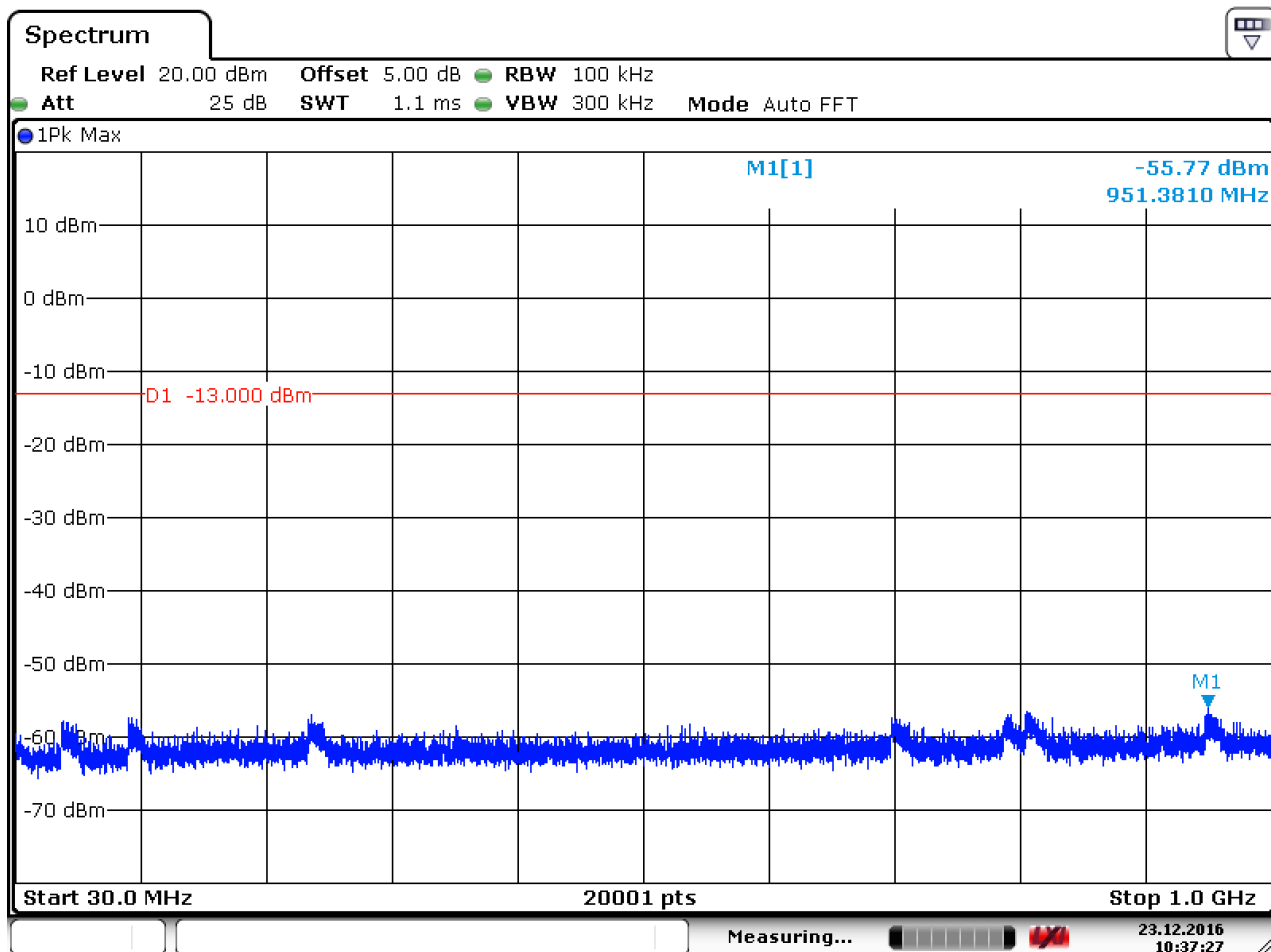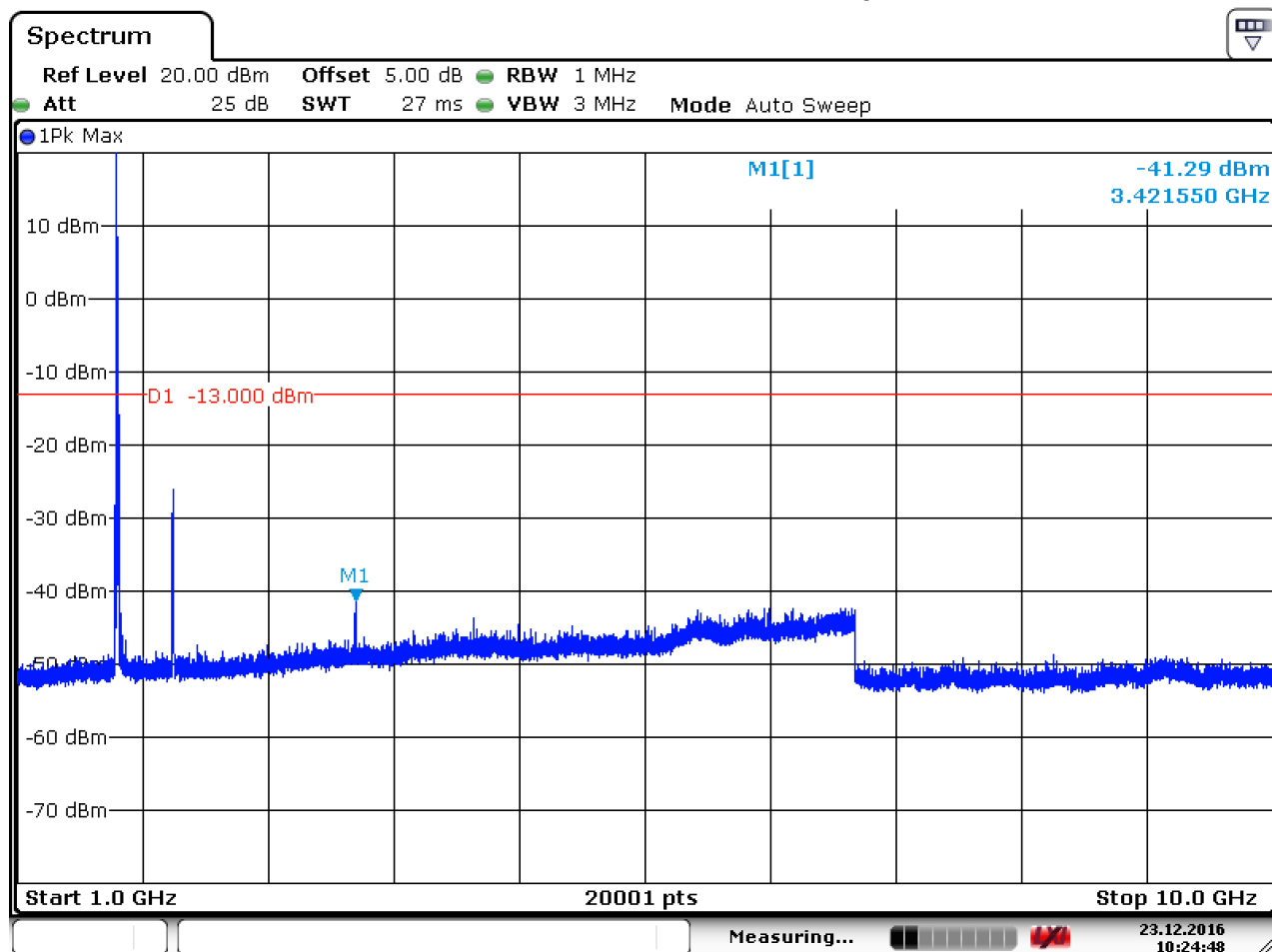Date: 23.DEC.2016 10:25:34
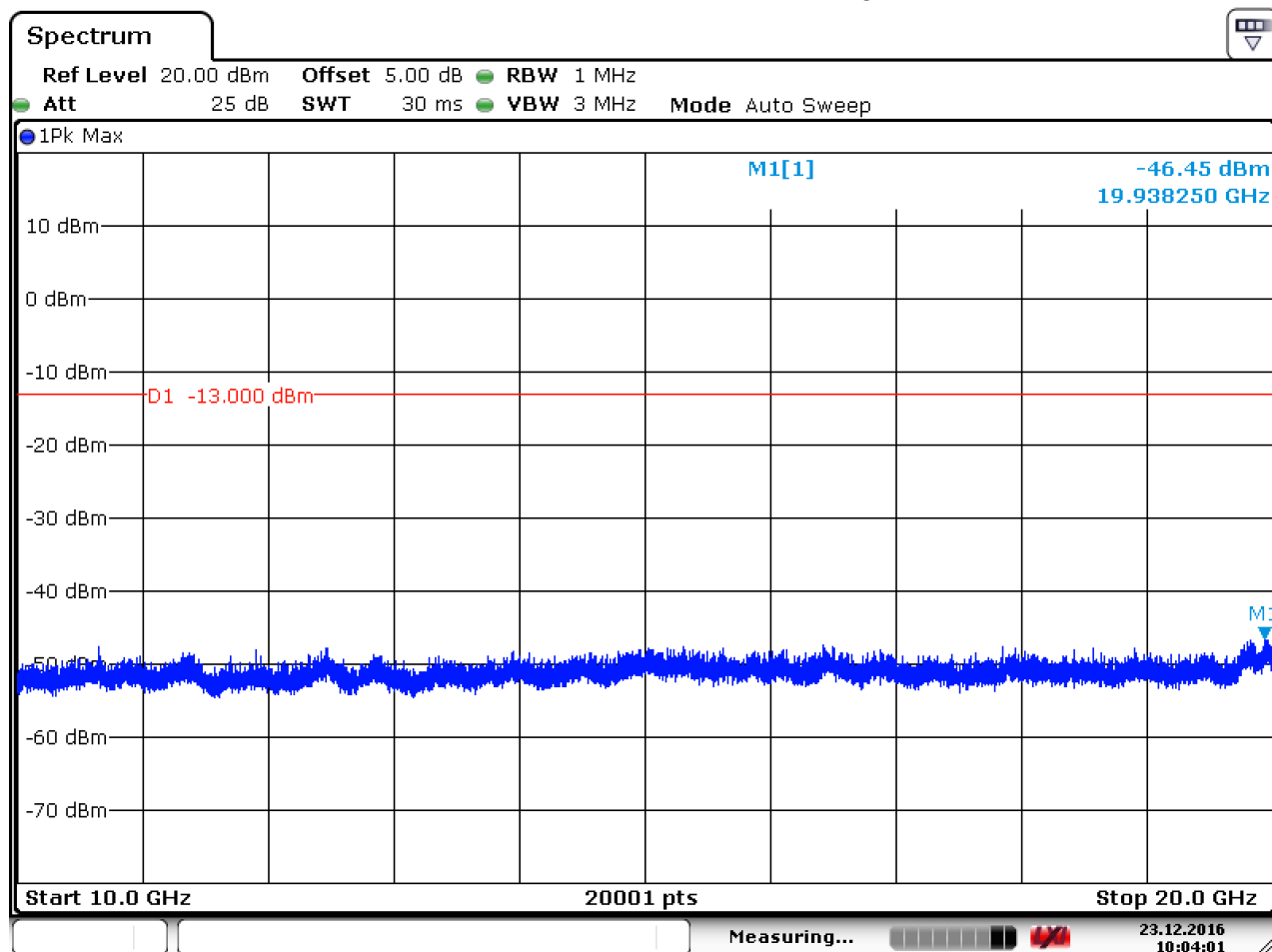
Date: 23.DEC.2016 10:04:01

6.1.1.5   Test Mode = LTE / TM1 15MHz RB1#0

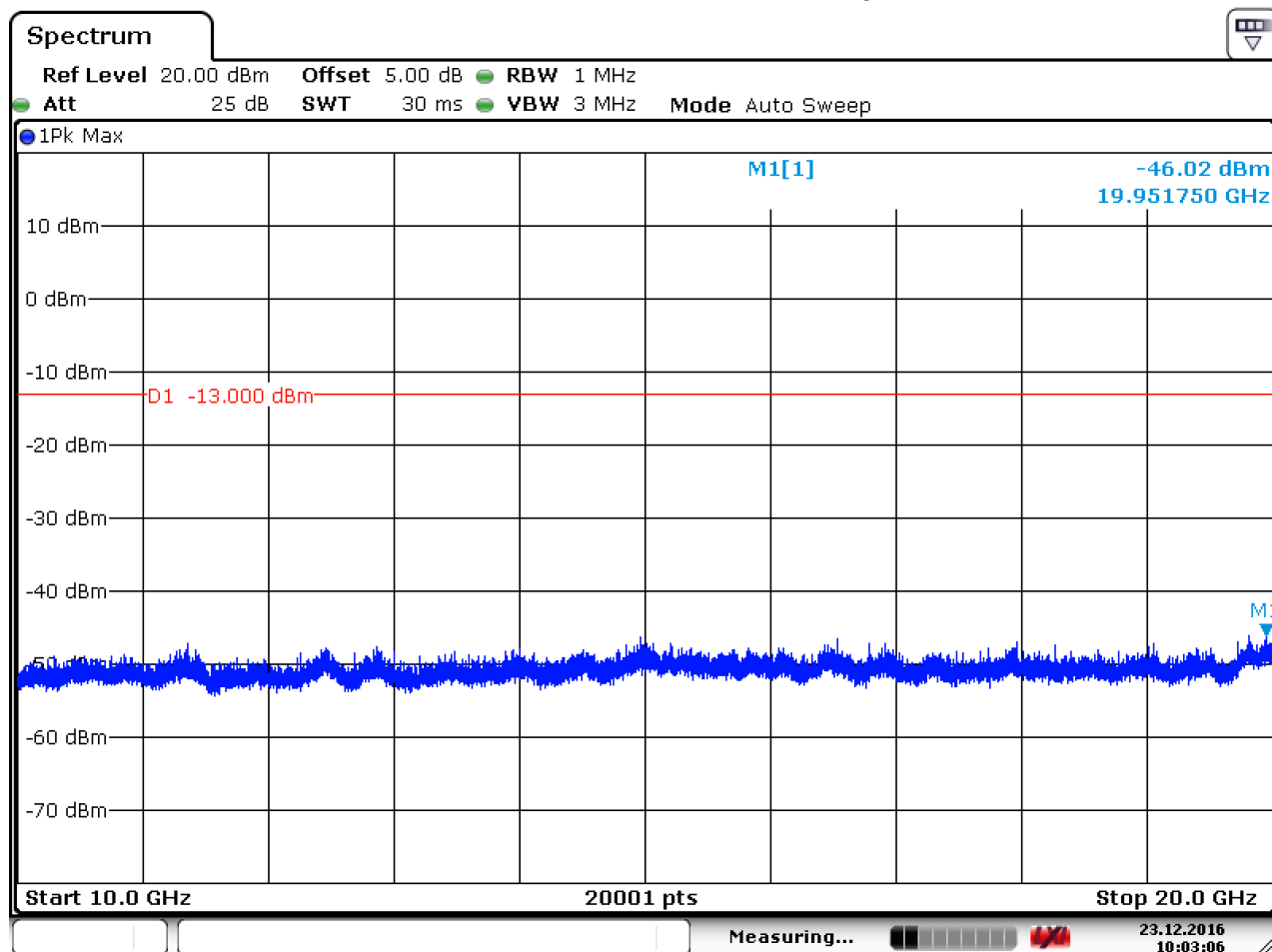#### 6.1.1.5.1   Test Channel = LCH
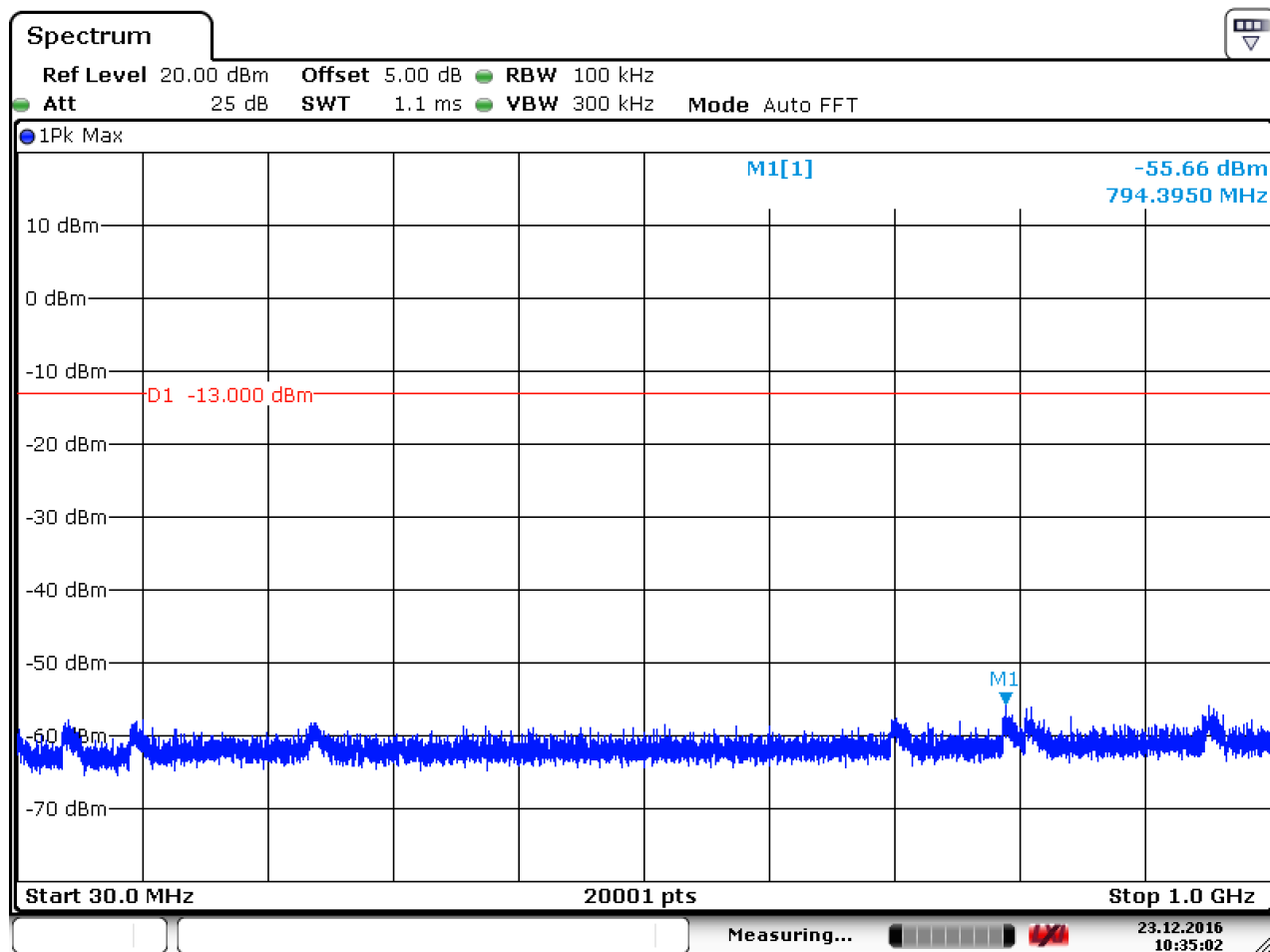
Date: 23.DEC.2016 10:35:02
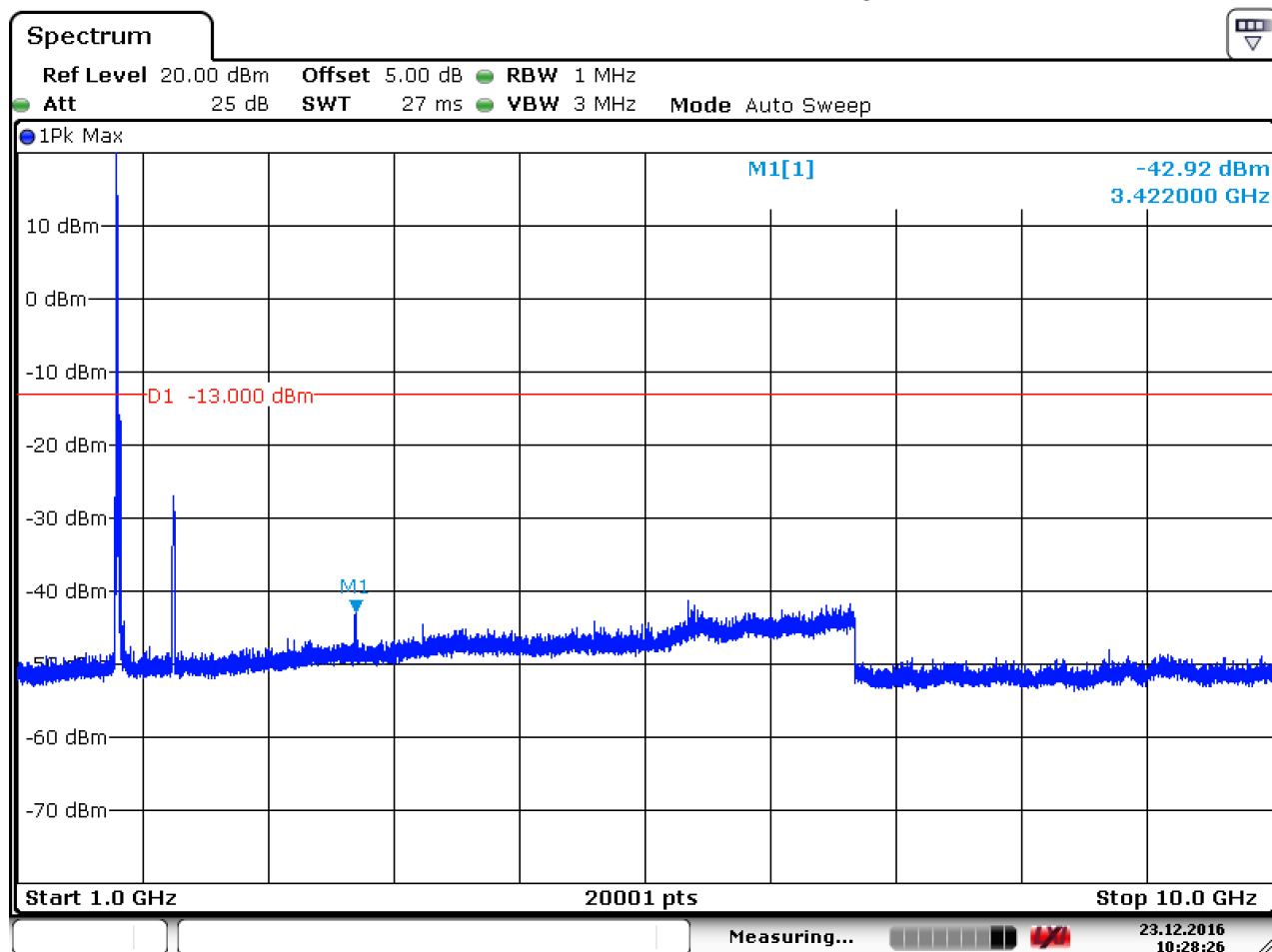
Date: 23.DEC.2016 10:28:27

Spectrum

Ref Level 20.00 dBm	Offset 5.00 dB ● RBW 1 MHz		
● Att 25 dB	SWT 30 ms ● VBW 3 MHz	Mode Auto Sweep	

● 1Pk Max

M1[1]   -46.72 dBm
              19.961750 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016
                      10:02:30
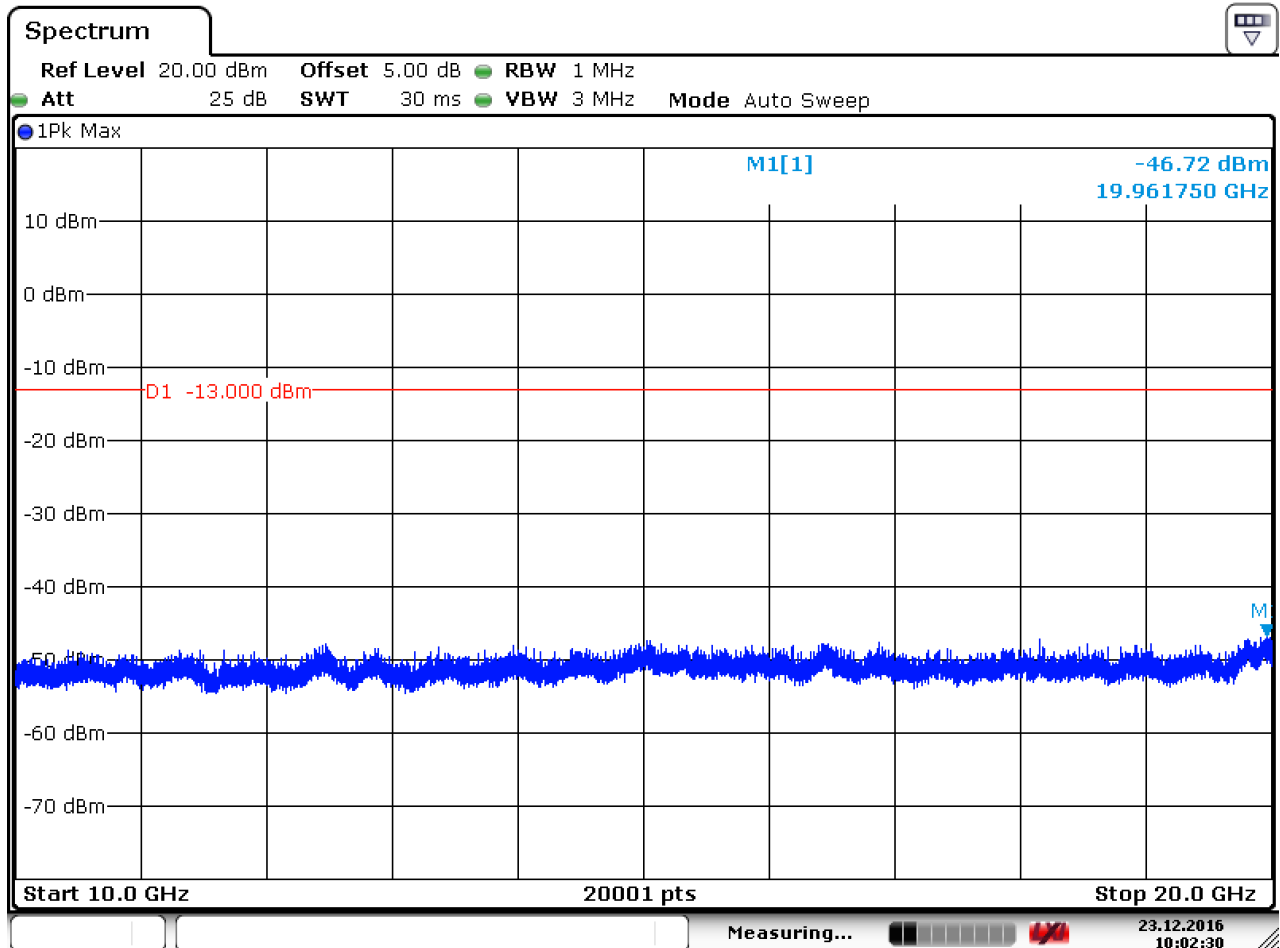
Date: 23.DEC.2016 10:02:29

6.1.1.5.2   Test Channel = MCH
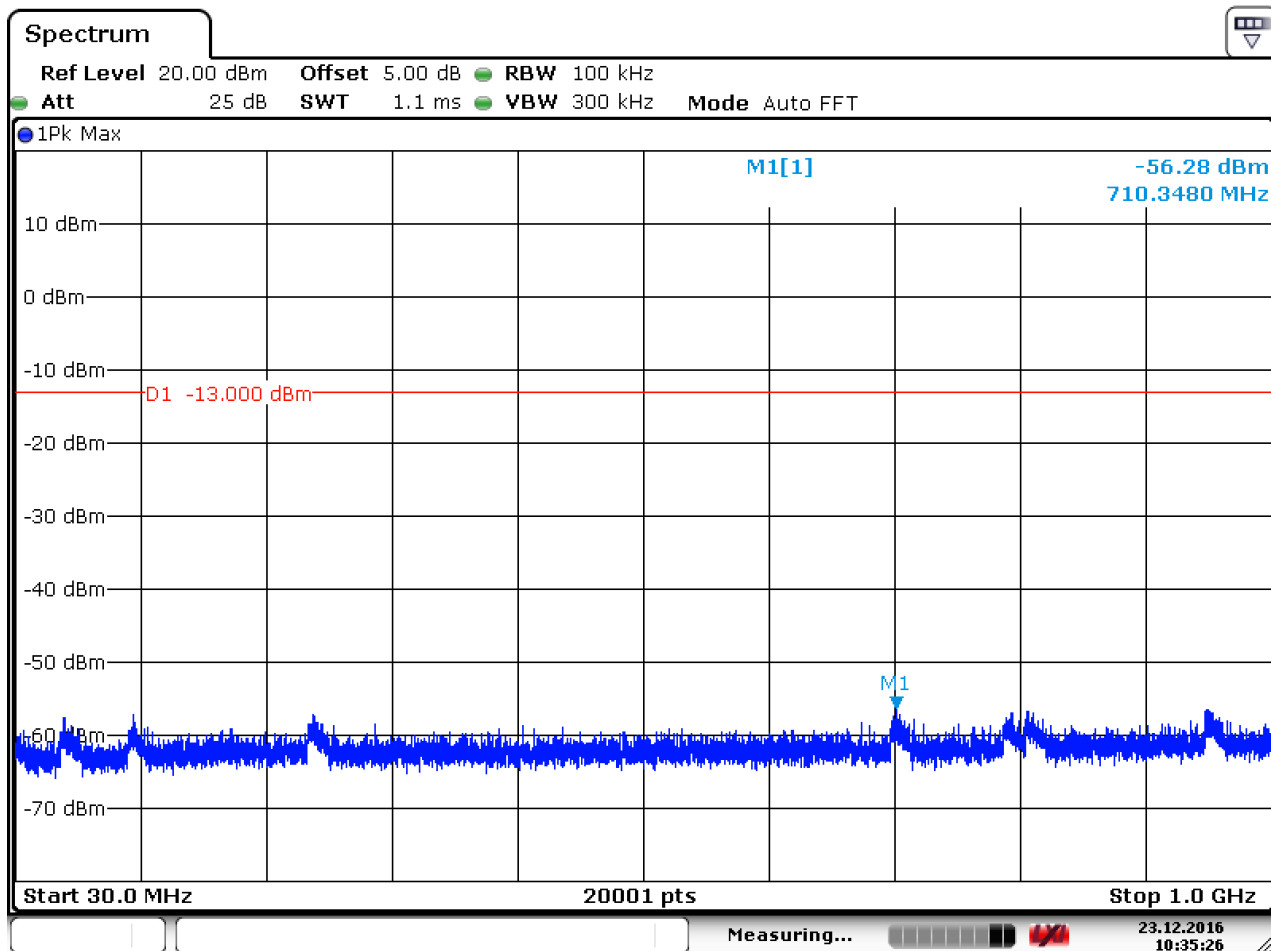
Date: 23.DEC.2016 10:35:26
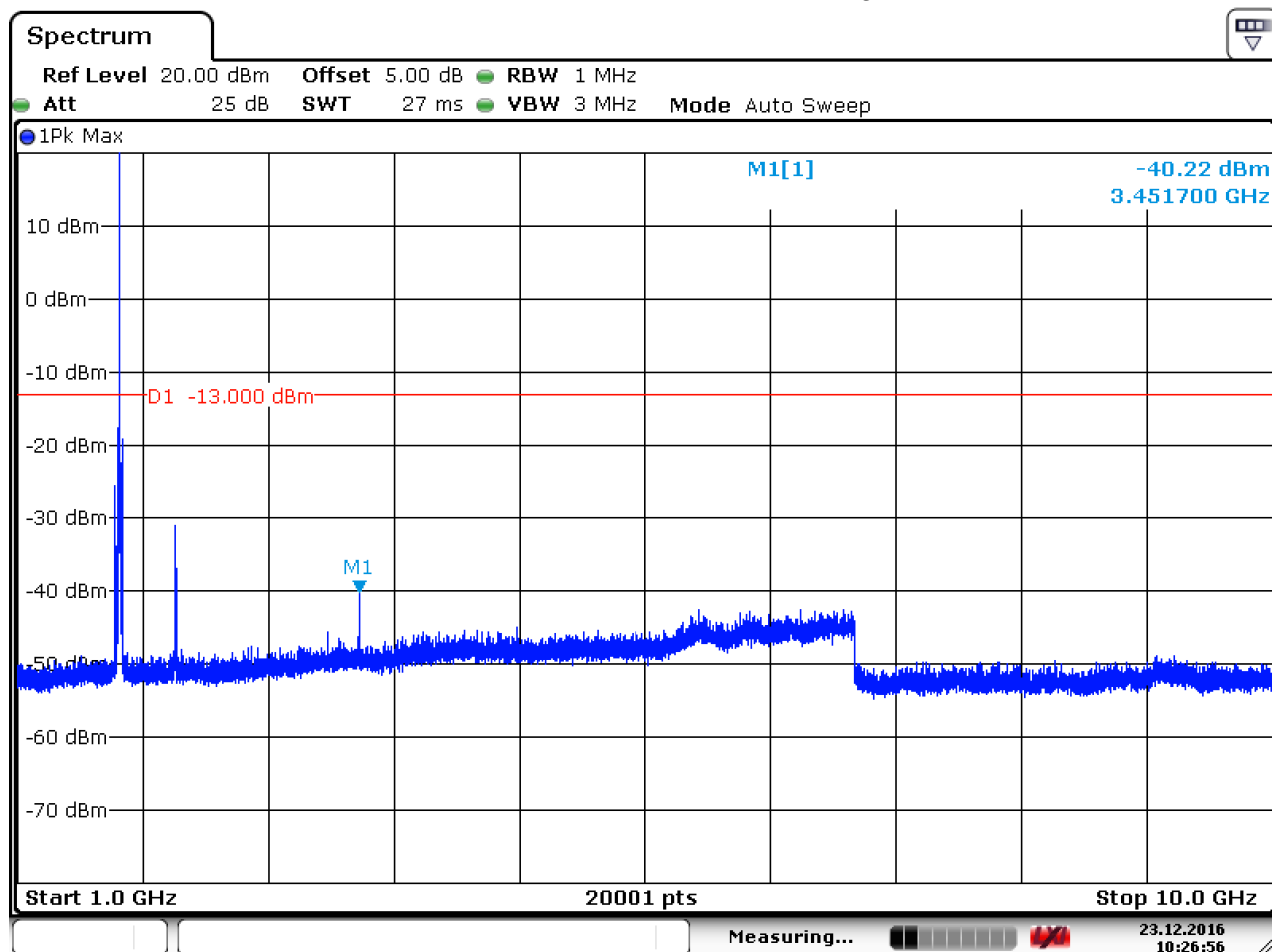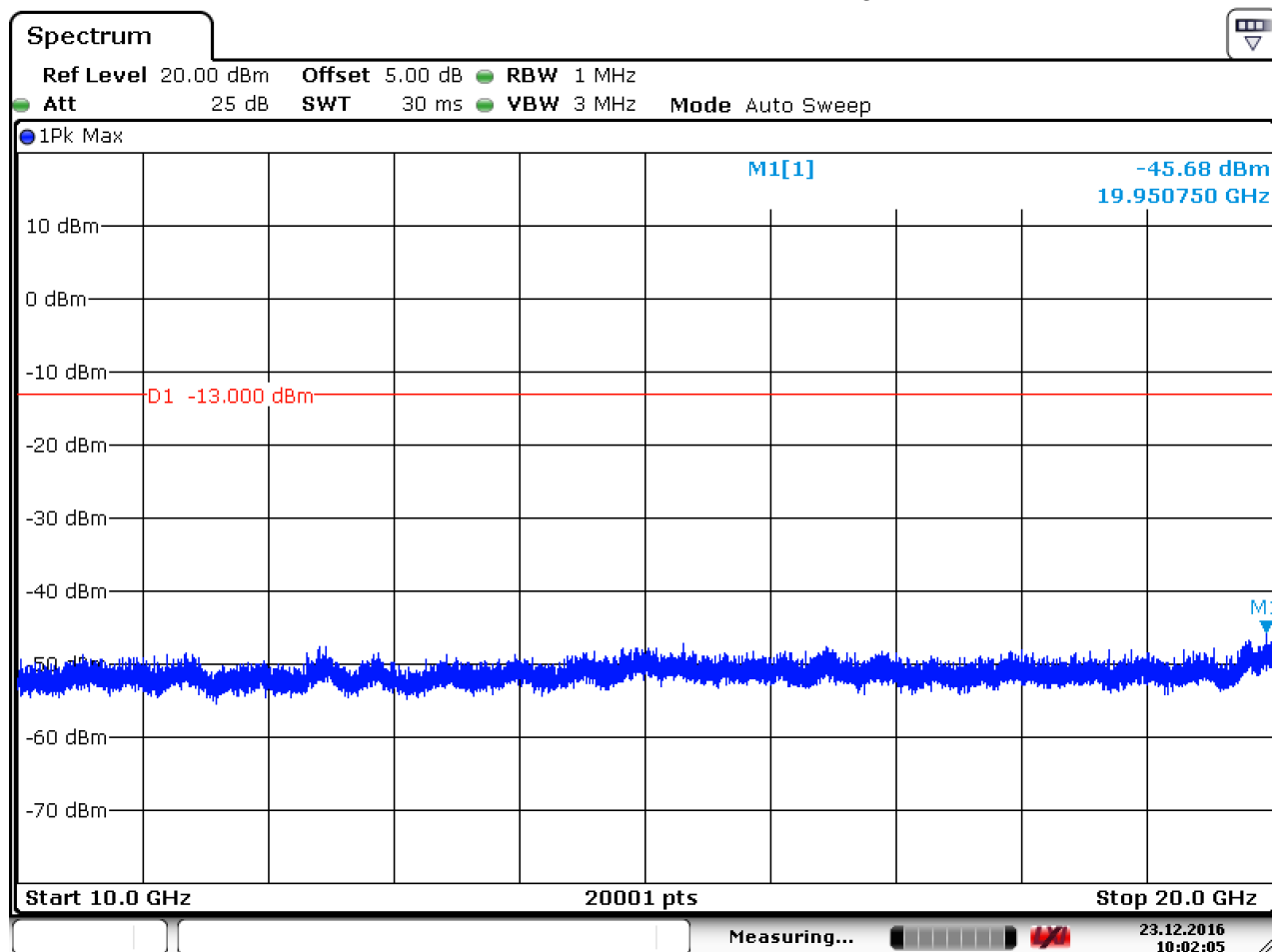
Date: 23.DEC.2016 10:02:05

6.1.1.5.3   Test Channel = HCH
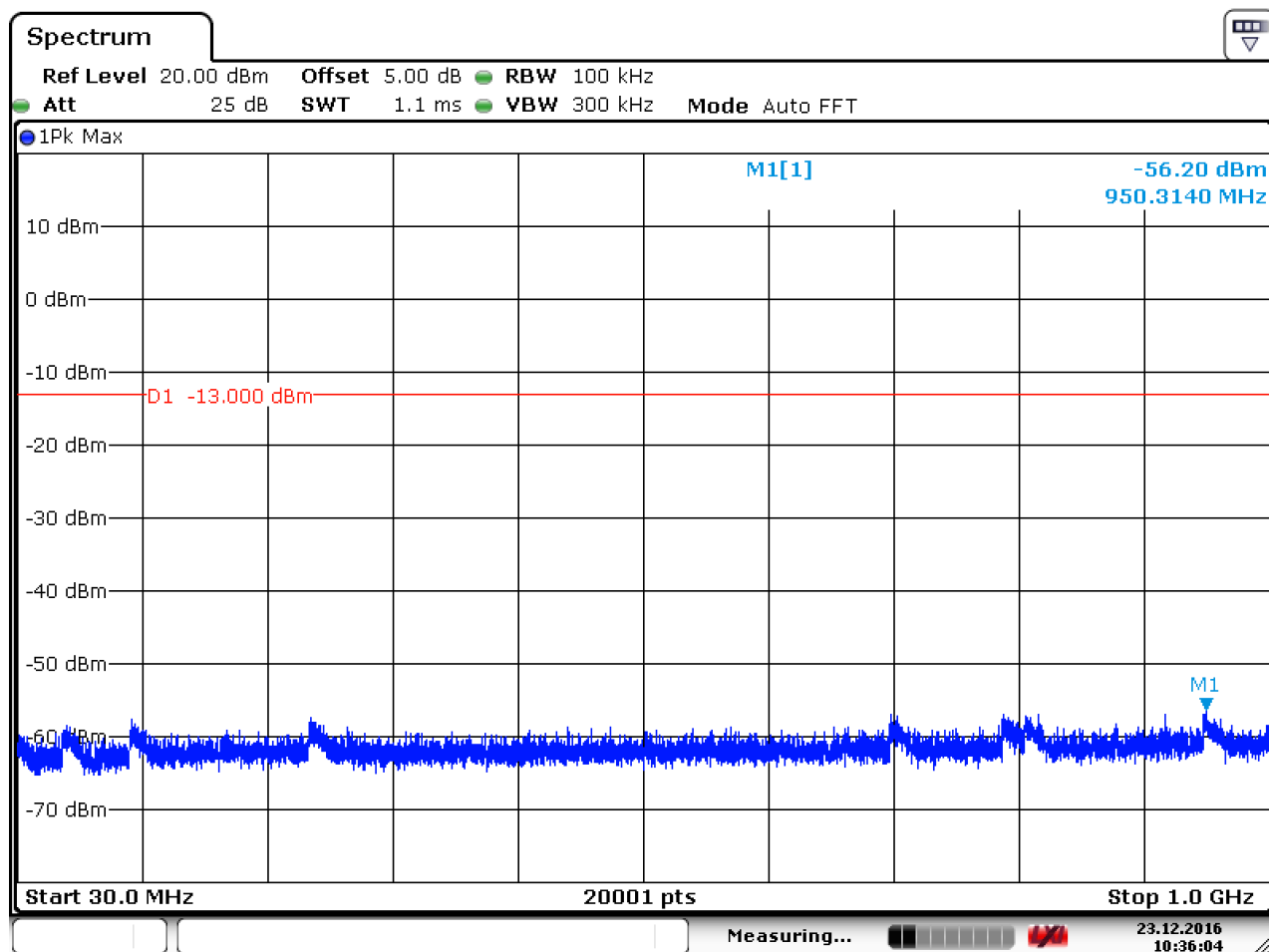
Date: 23.DEC.2016 10:36:05

Date: 23.DEC.2016 10:29:20

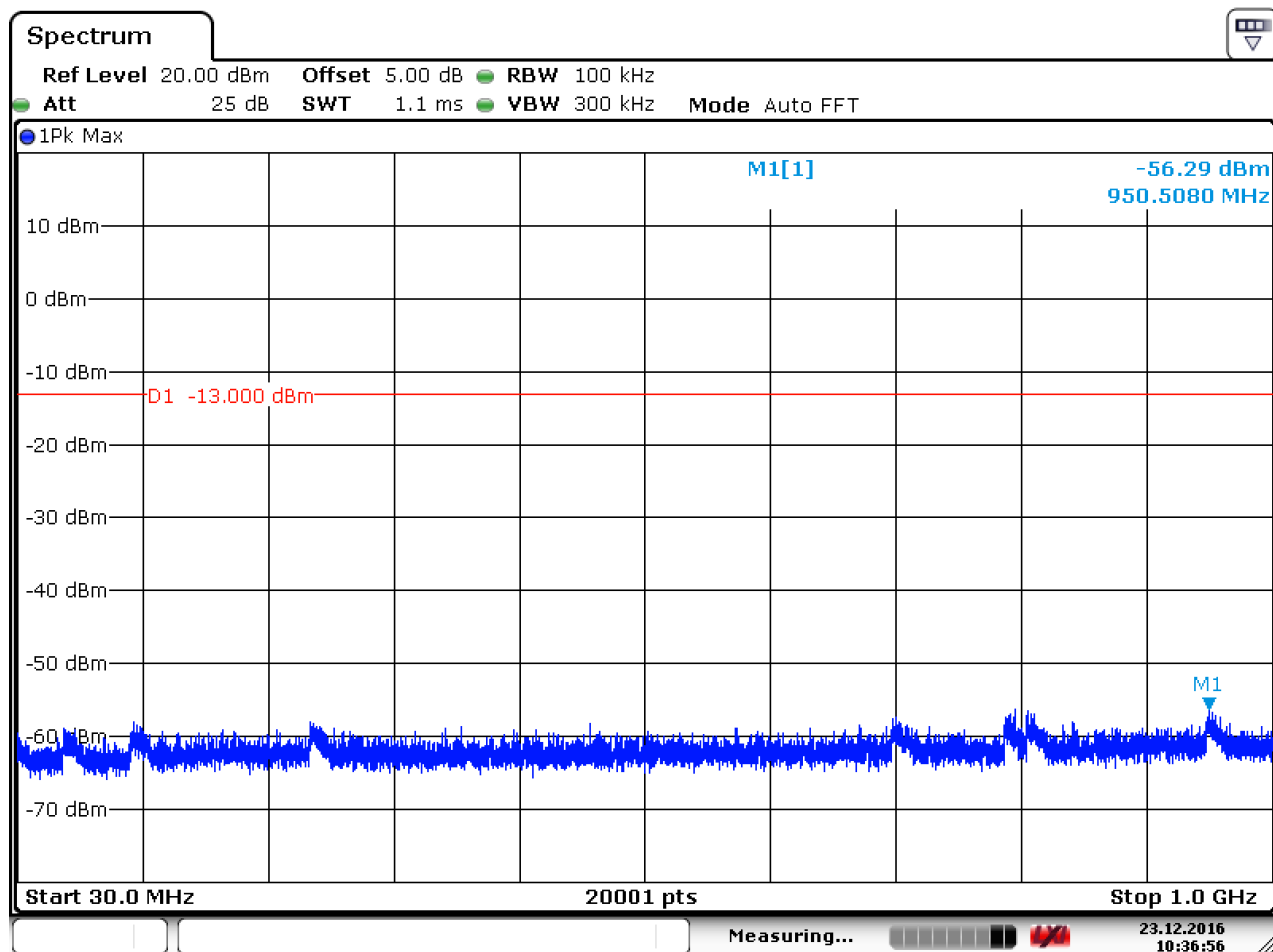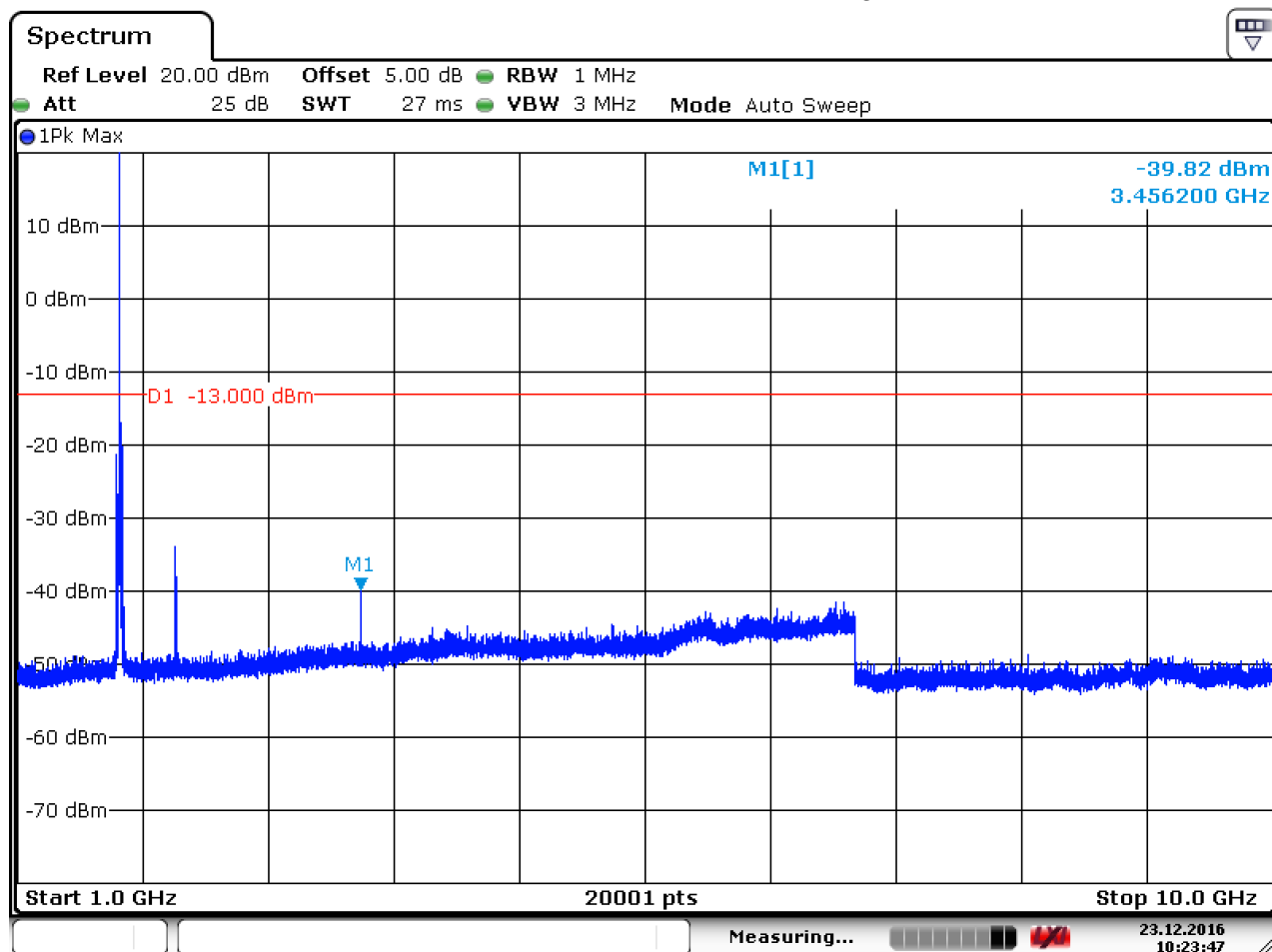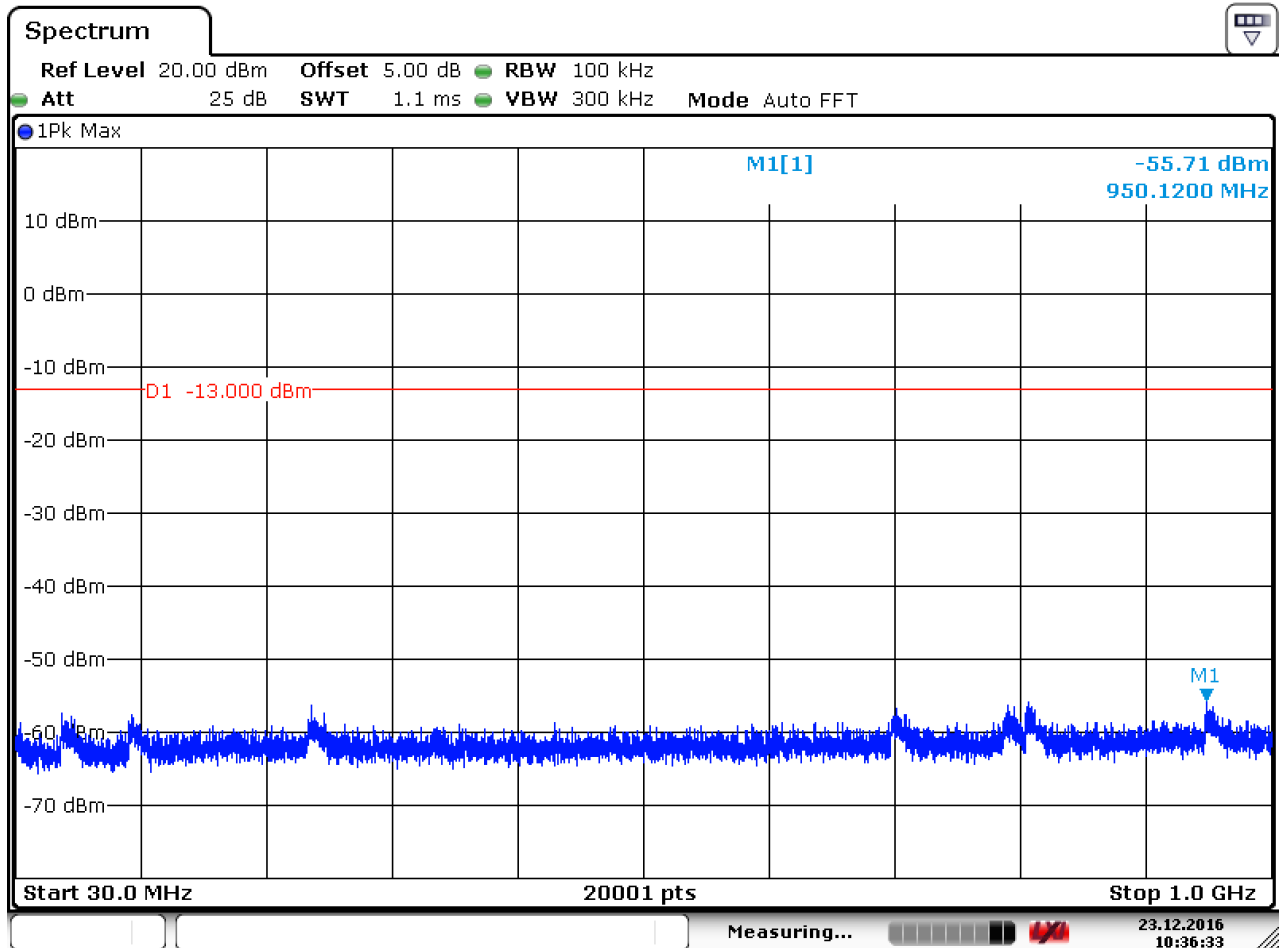## SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

Spectrum						
Ref Level 20.00 dBm	Offset 5.00 dB	● RBW 1 MHz				
● Att 25 dB	SWT 30 ms	● VBW 3 MHz	Mode Auto Sweep			

● 1Pk Max

M1[1]   -46.15 dBm
                                         19.843760 GHz

10 dBm

0 dBm

-10 dBm
D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm
                                                                            M1

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016 10:01:37
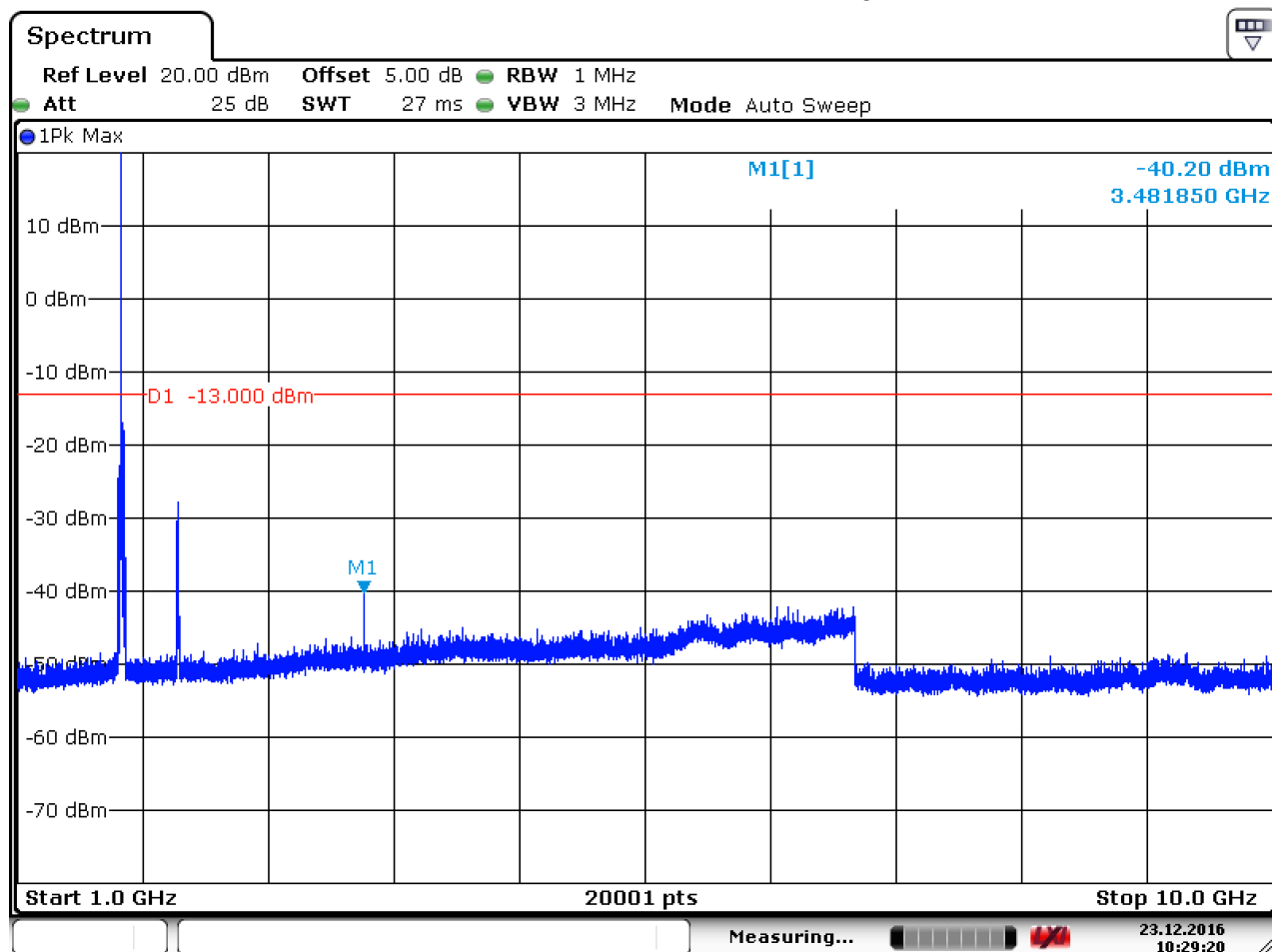
Date: 23.DEC.2016 10:01:37

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6.1.1.6   Test Mode = LTE / TM1 20MHz RB1#0

6.1.1.6.1   Test Channel = LCH
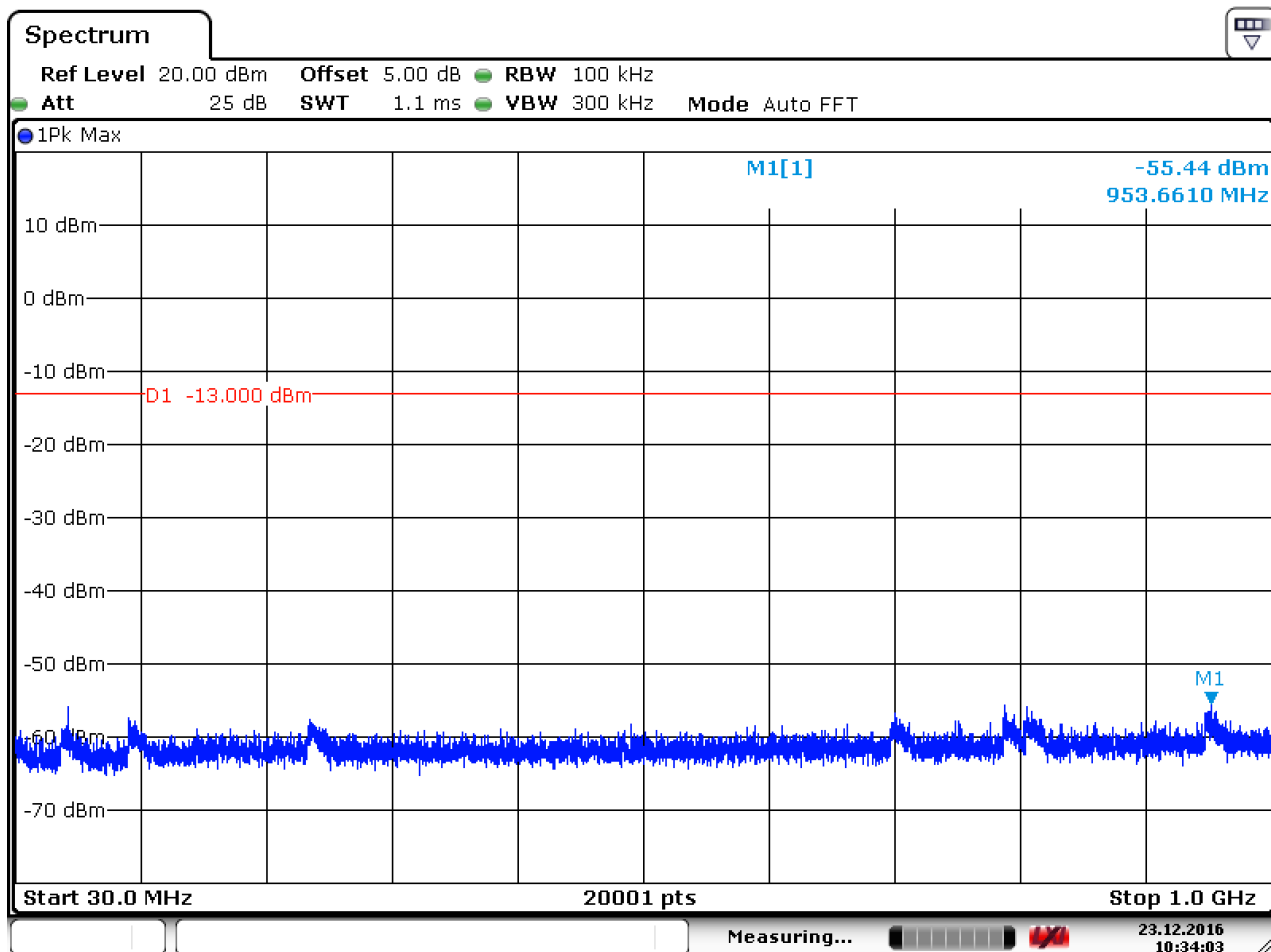
Date: 23.DEC.2016 10:34:03
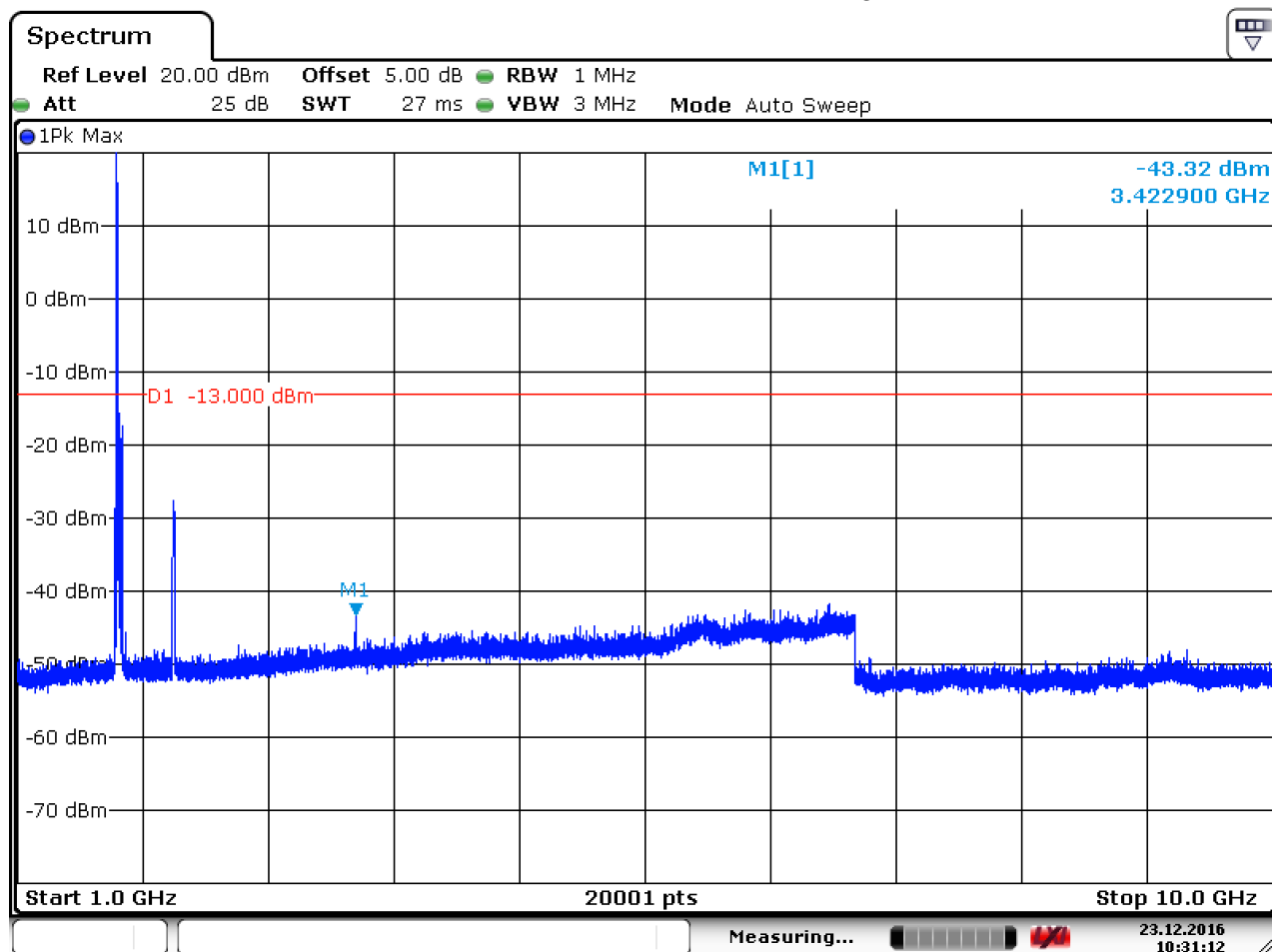
Spectrum

| Ref Level 20.00 dBm | Offset 5.00 dB ● RBW 1 MHz |
| Att   25 dB | SWT   27 ms ● VBW 3 MHz   Mode Auto Sweep |

● 1Pk Max

M1[1]   -43.32 dBm
                        3.422900 GHz

D1 -13.000 dBm

M1

Start 1.0 GHz   20001 pts   Stop 10.0 GHz

Measuring...   23.12.2016
                      10:31:12

Date: 23.DEC.2016 10:31:13
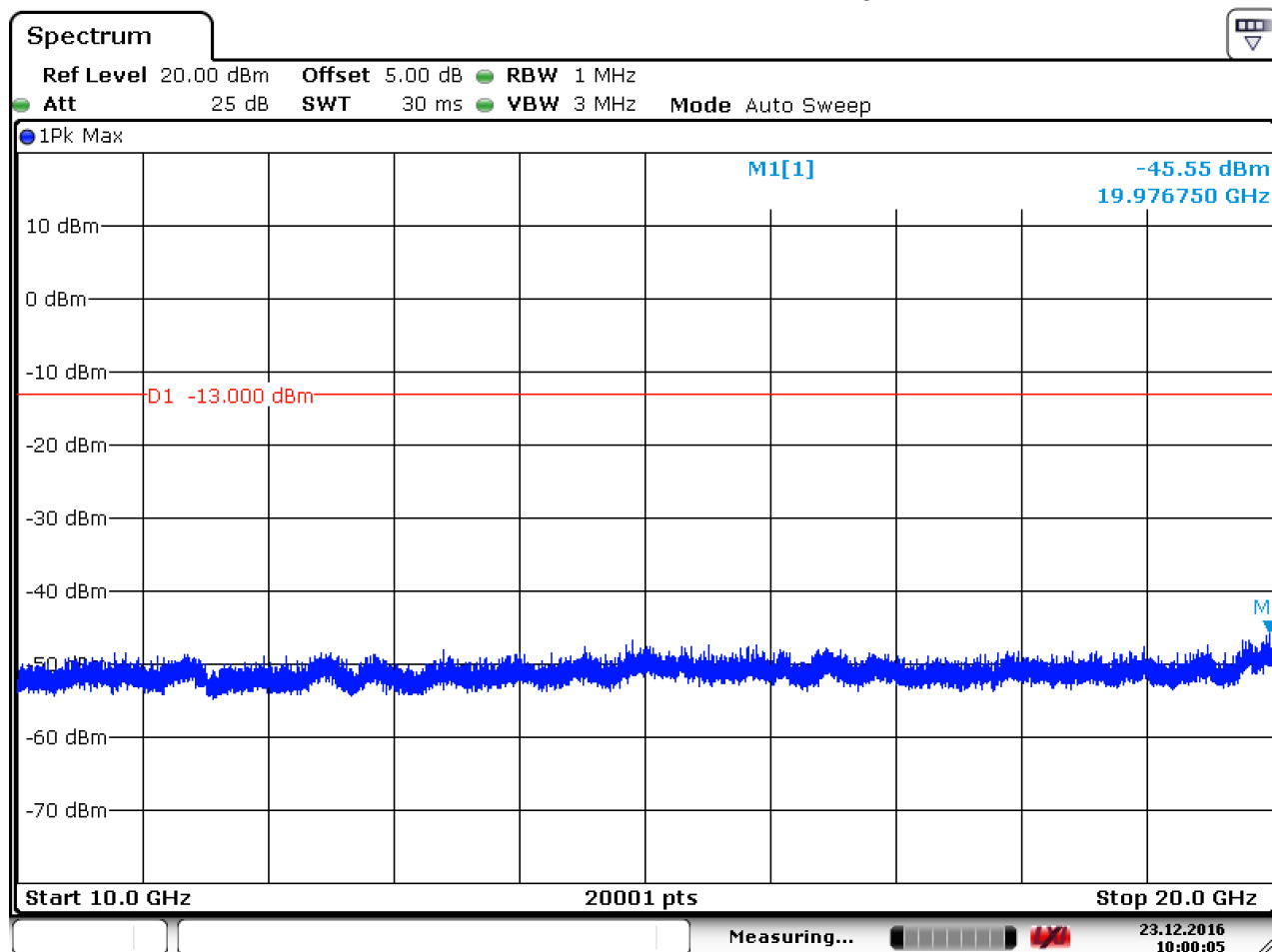
Date: 23.DEC.2016 10:00:05

6.1.1.6.2 Test Channel = MCH
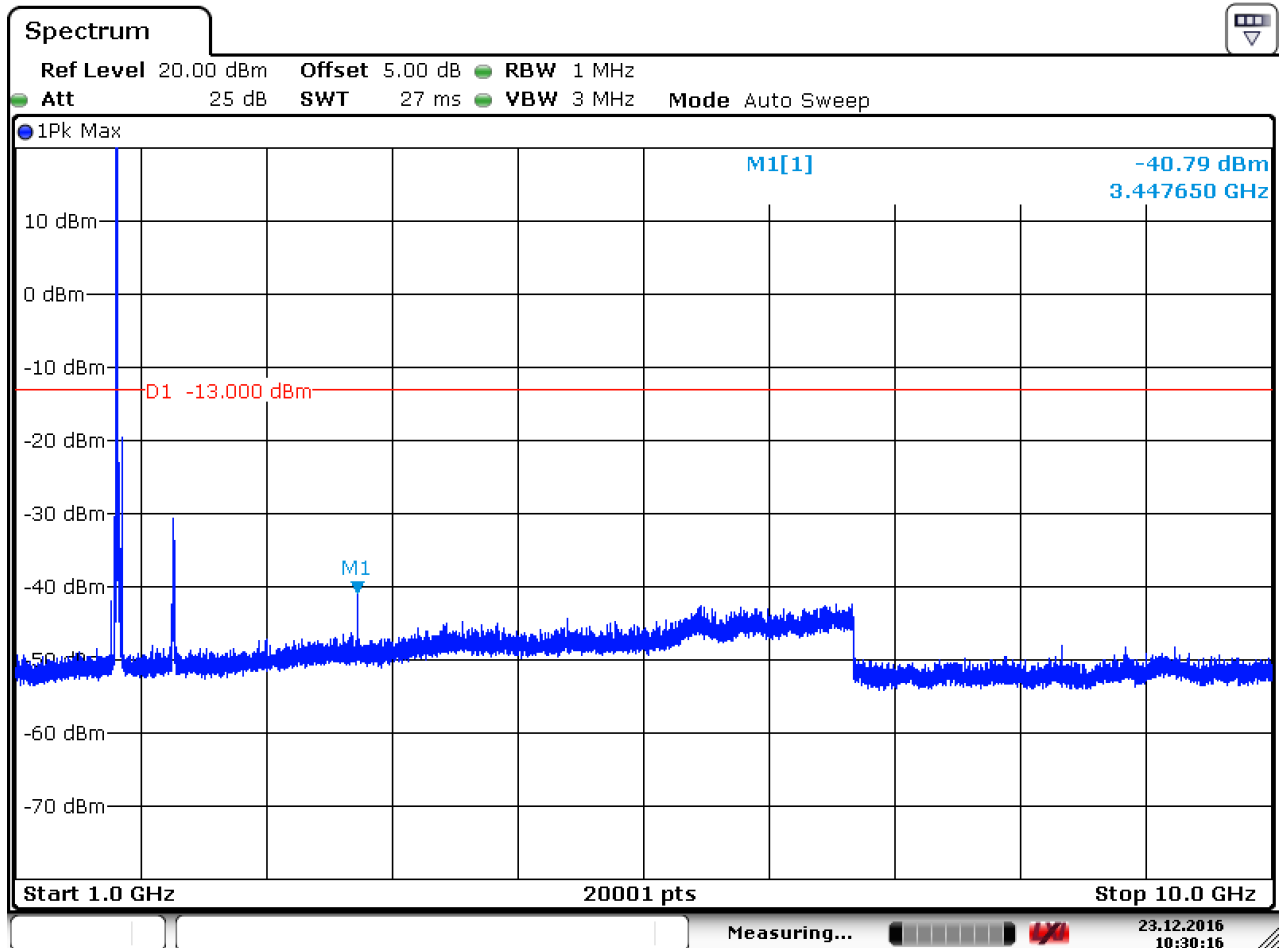
Spectrum

| Ref Level | 20.00 dBm | Offset | 5.00 dB | ⬤ | RBW | 100 kHz | | |
| Att | 25 dB | SWT | 1.1 ms | ⬤ | VBW | 300 kHz | Mode | Auto FFT |

●1Pk Max

M1[1]   -55.81 dBm
              952.4970 MHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-50 dBm

                                                    M1

-60 dBm

-70 dBm

Start 30.0 MHz   20001 pts   Stop 1.0 GHz

Measuring...   23.12.2016
                      10:33:16

Date: 23.DEC.2016 10:33:17

Date: 23.DEC.2016 10:30:16

Spectrum						
Ref Level 20.00 dBm		Offset 5.00 dB	● RBW 1 MHz			
● Att	25 dB	SWT 30 ms	● VBW 3 MHz	Mode Auto Sweep		

● 1Pk Max

M1[1]   -45.69 dBm
                                          19.952750 GHz

10 dBm

0 dBm

-10 dBm

D1 -13.000 dBm

-20 dBm

-30 dBm

-40 dBm

-60 dBm

-70 dBm

Start 10.0 GHz   20001 pts   Stop 20.0 GHz

Measuring...   23.12.2016
                      10:00:53
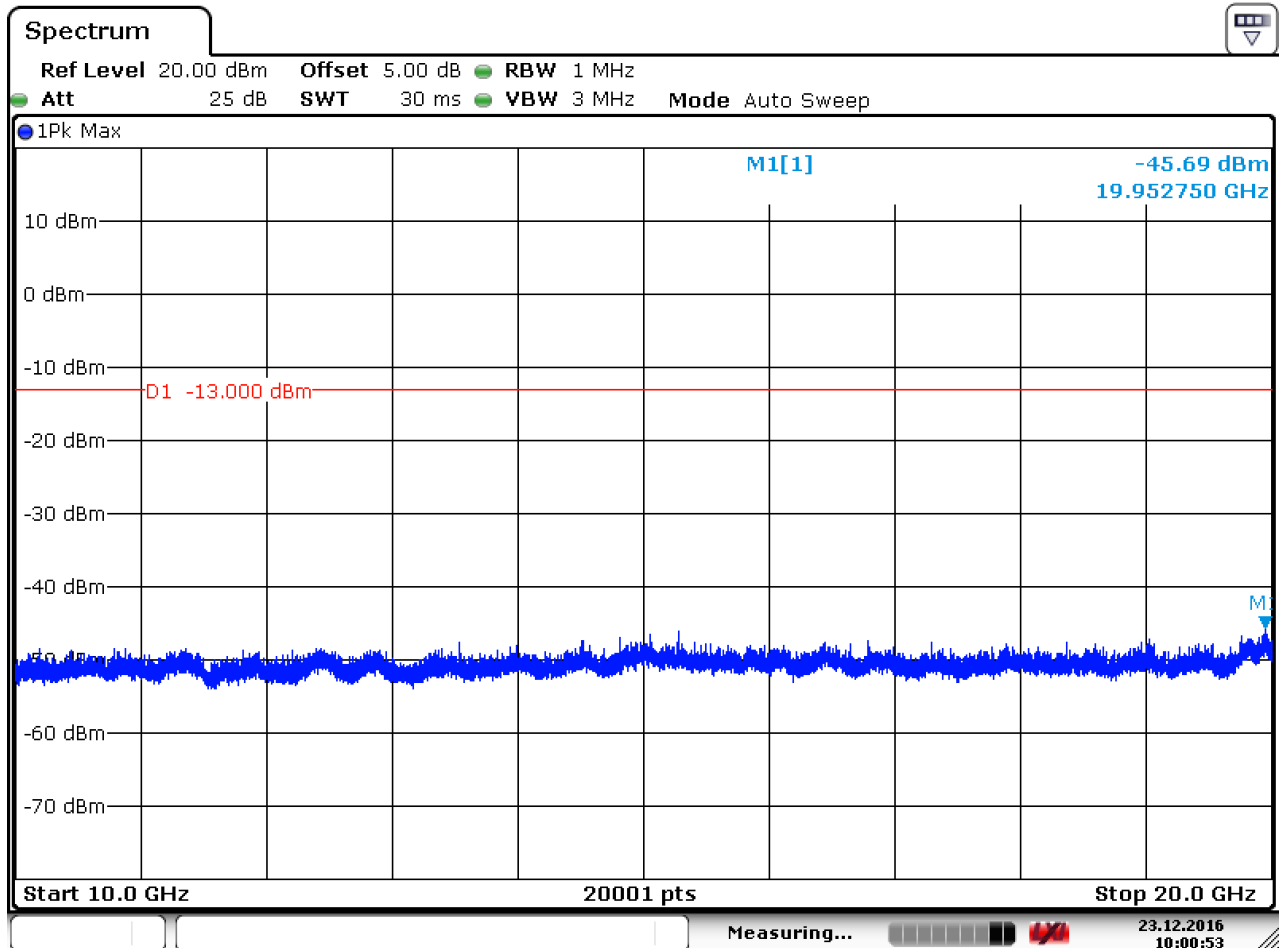
Date: 23.DEC.2016 10:00:54

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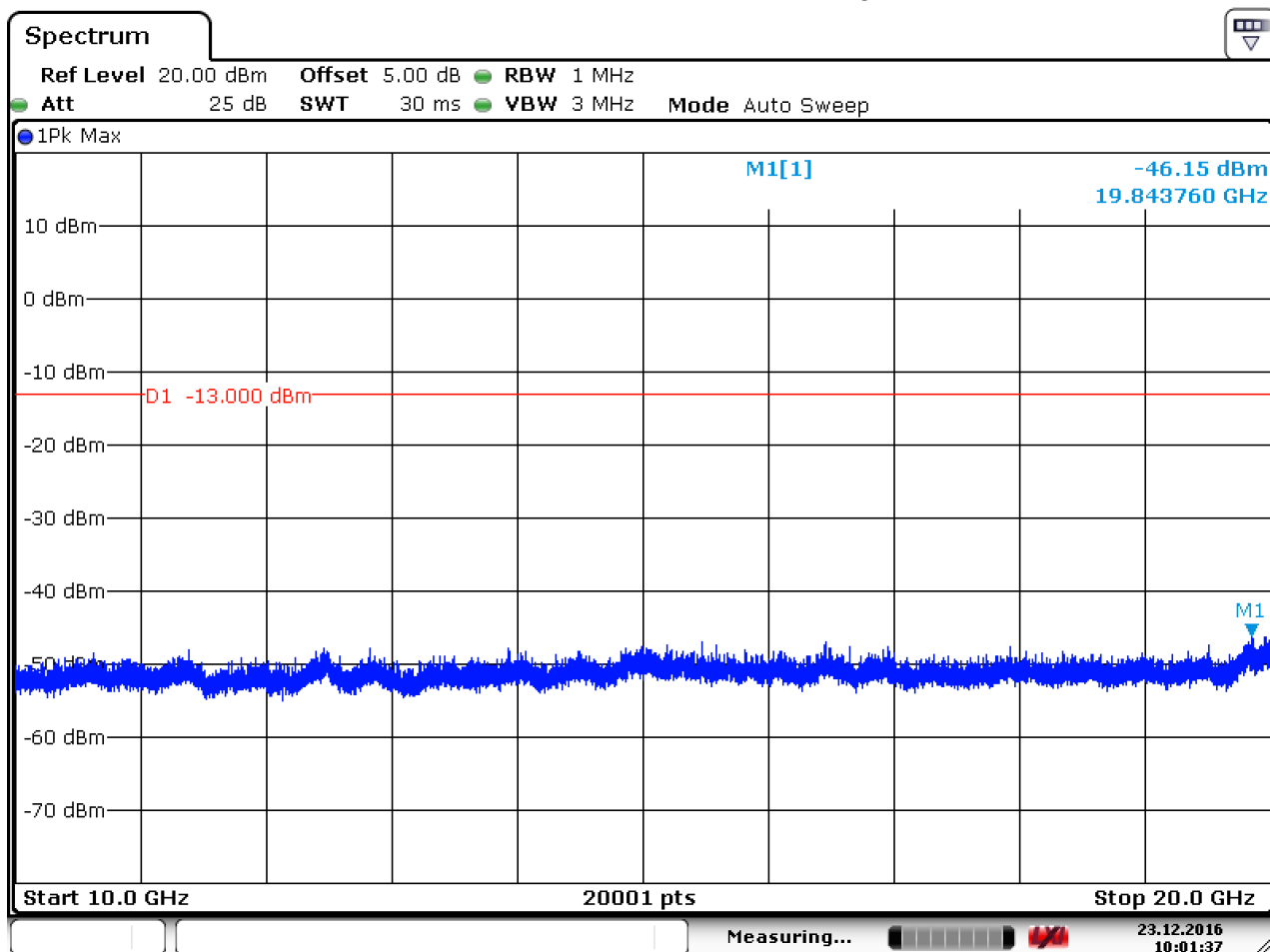### 6.1.1.6.3   Test Channel = HCH
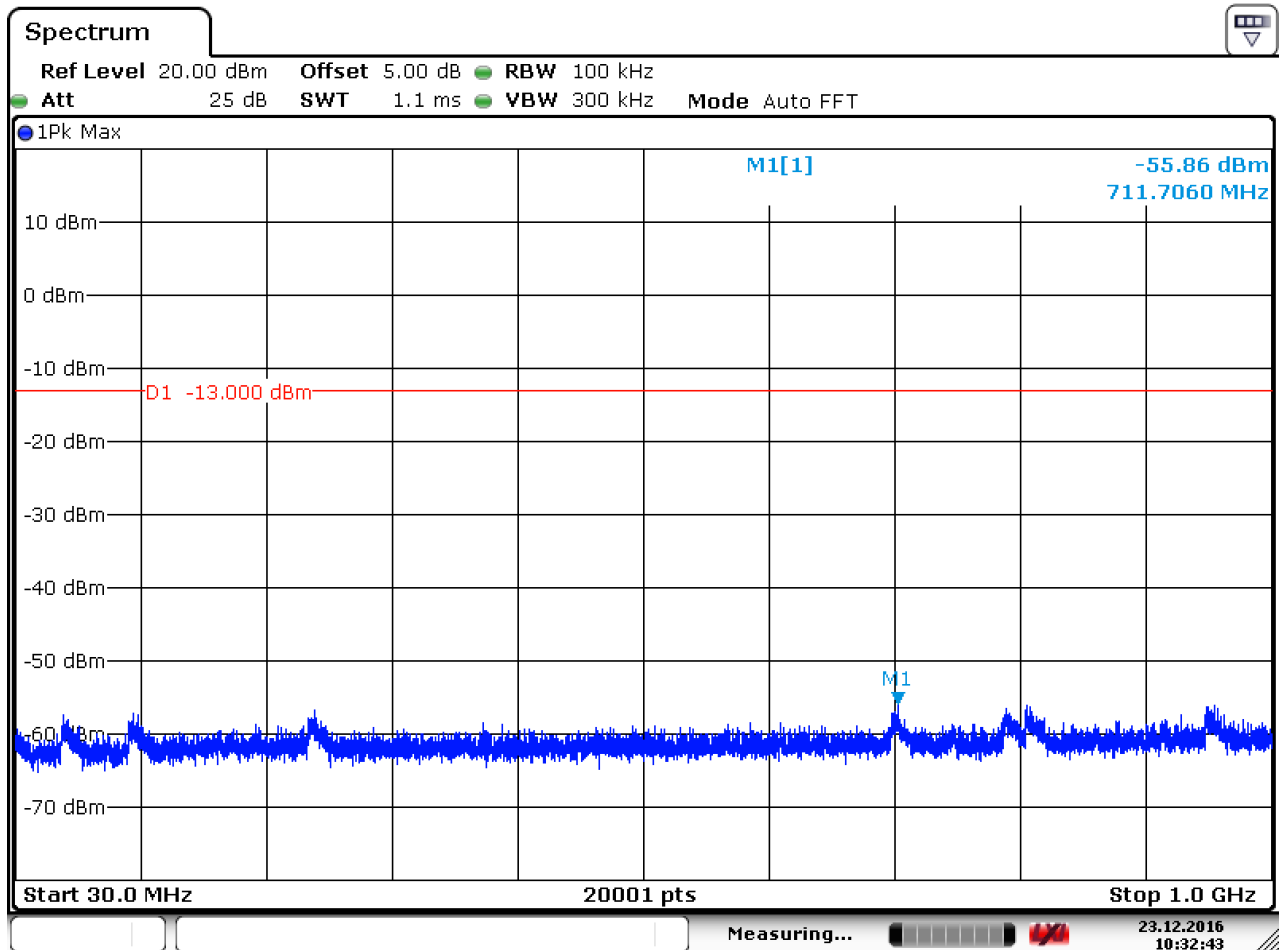
Date: 23.DEC.2016 10:32:43
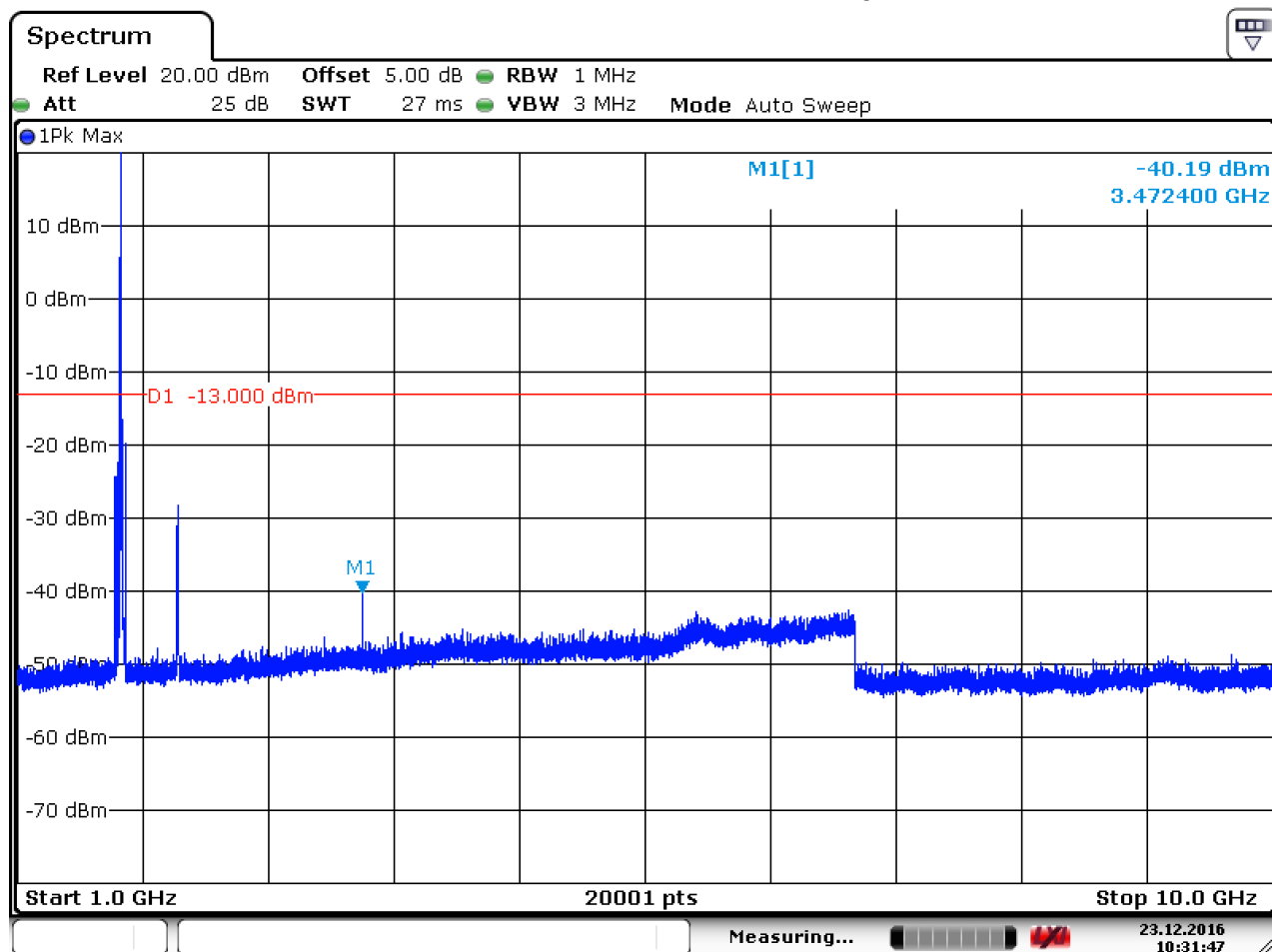
Date: 23.DEC.2016 10:31:48

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
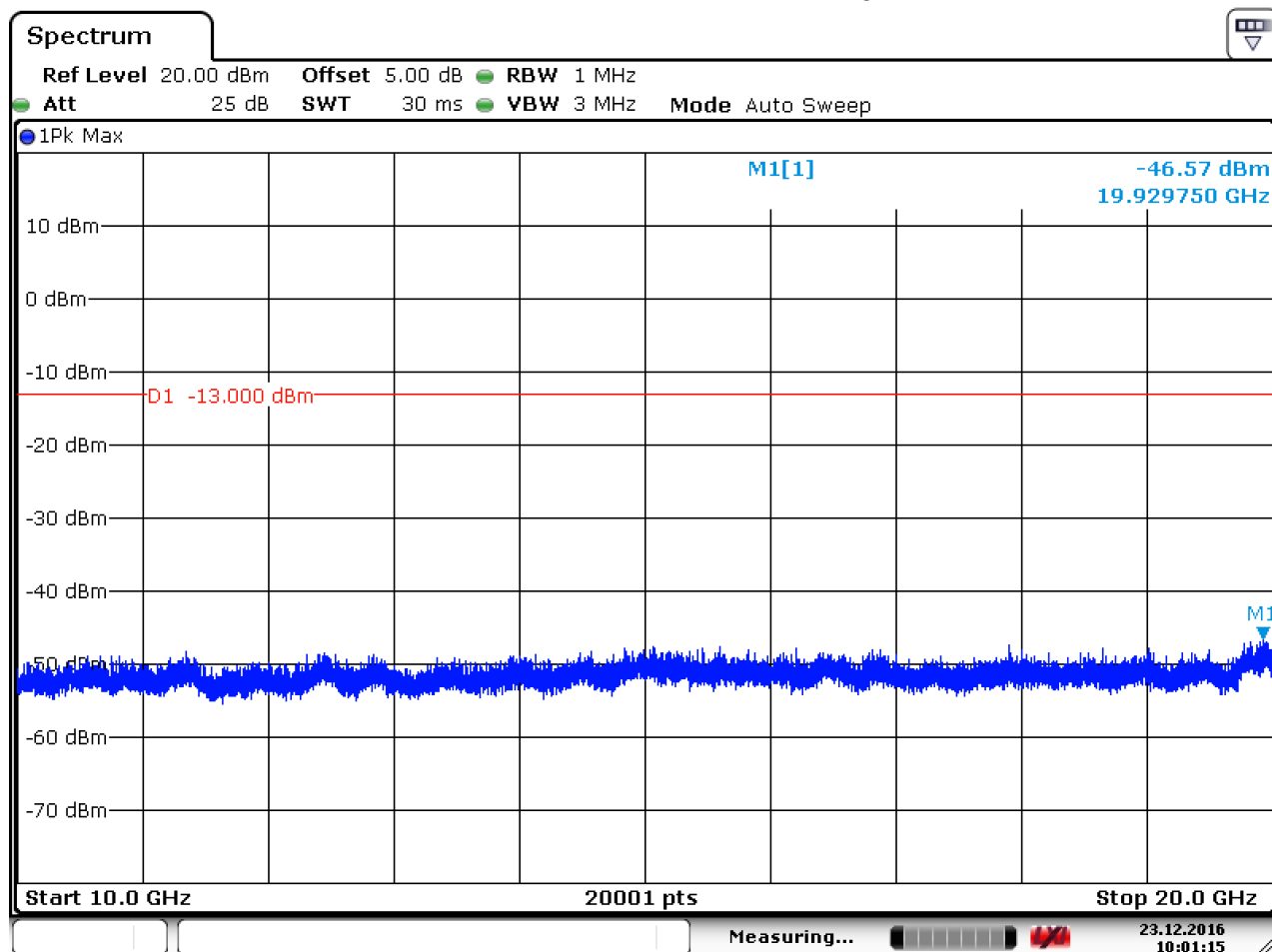
Date: 23.DEC.2016 10:01:15
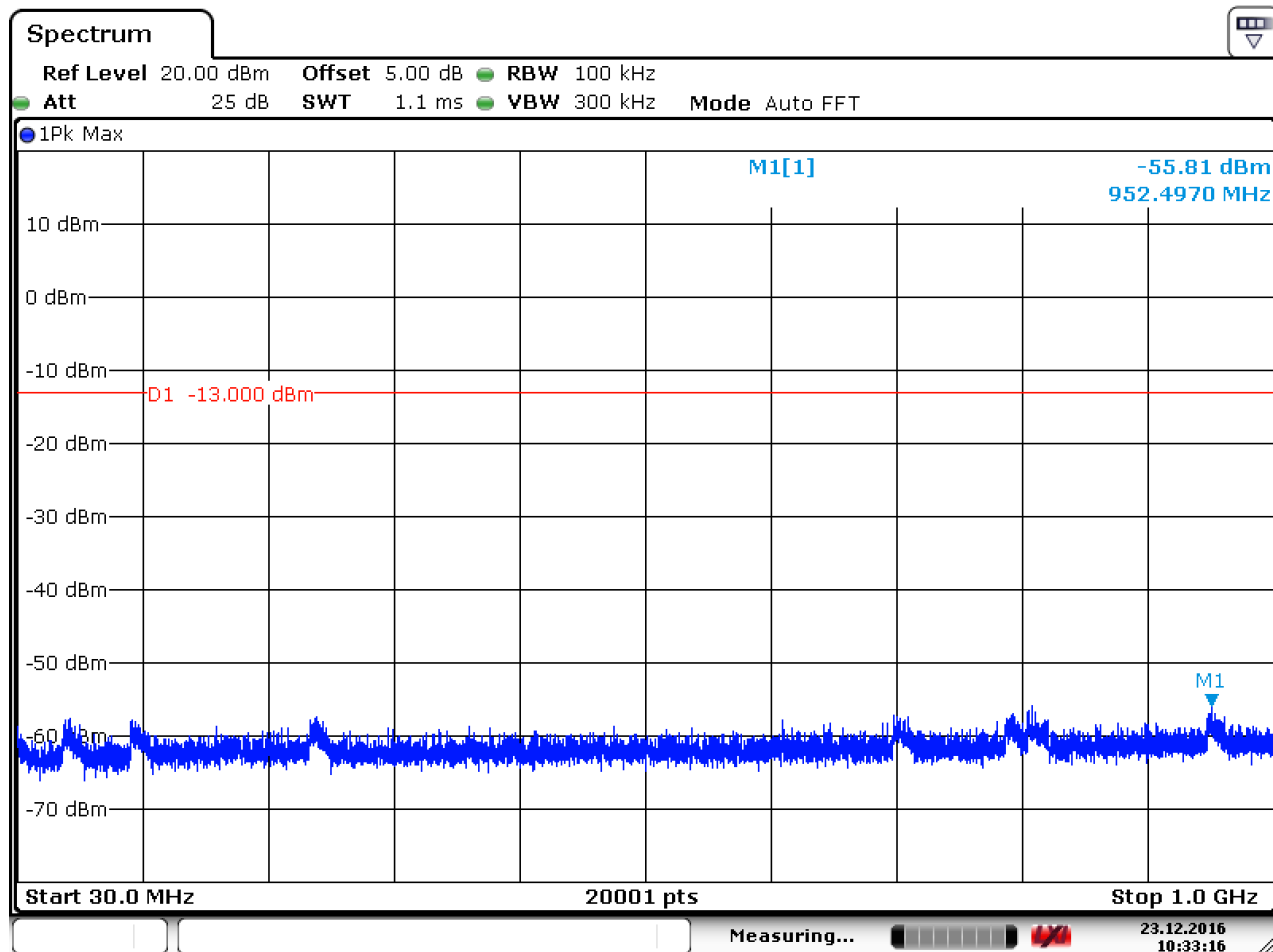
7   Field Strength of Spurious Radiation

7.1 For LTE

7.1.1 Test Band = LTE band4

7.1.1.1.1   Test Channel = HCH

Frequency (MHz)	Level (dBm)	Limit Line (dBm)	Over Limit (dB)	Polarization
1199.000	-66.05	-13.00	-53.05	Vertical
5047.500	-66.58	-13.00	-53.58	Vertical
7972.500	-63.55	-13.00	-50.55	Vertical
1210.000	-66.75	-13.00	-53.75	Horizontal
4657.500	-67.05	-13.00	-54.05	Horizontal
6705.000	-65.42	-13.00	-52.42	Horizontal

NOTE:

1) All modes are tested,but the data presented above is the worst case.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
LTE band 4	LTE/TM1 20MHz	LCH	TN	VL	-3.03	-0.00176	PASS
				VN	1.46	0.00085	PASS
				VH	-4.73	-0.00275	PASS
		MCH	TN	VL	2.49	0.00144	PASS
				VN	-3.84	-0.00222	PASS
				VH	2.22	0.00128	PASS
		HCH	TN	VL	-3.56	-0.00204	PASS
				VN	-5.07	-0.00291	PASS
				VH	-1.39	-0.00080	PASS
	LTE/TM2 20MHz	LCH	TN	VL	-4.08	-0.00237	PASS
				VN	-2.95	-0.00172	PASS
				VH	-3.06	-0.00178	PASS
		MCH	TN	VL	3.56	0.00205	PASS
				VN	-5.25	-0.00303	PASS
				VH	2.54	0.00147	PASS
		HCH	TN	VL	-3.38	-0.00194	PASS
				VN	-7.10	-0.00407	PASS
				VH	1.45	0.00083	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
LTEband4	LTE/TM1 20MHz	LCH	VN	-30	-3.40	-0.00198	PASS
				-20	-1.24	-0.00072	PASS
				-10	3.38	0.00197	PASS
				0	-3.75	-0.00218	PASS
				10	1.65	0.00096	PASS
				20	2.15	0.00125	PASS
				30	-0.71	-0.00041	PASS
				40	-4.14	-0.00241	PASS
				50	1.69	0.00098	PASS
		MCH	VN	-30	-2.80	-0.00162	PASS
				-20	-3.95	-0.00228	PASS
				-10	-7.29	-0.00421	PASS
				0	-5.32	-0.00307	PASS
				10	-0.44	-0.00025	PASS
				20	-3.94	-0.00227	PASS
				30	-5.66	-0.00327	PASS
				40	-2.43	-0.00140	PASS
				50	-6.92	-0.00399	PASS
		HCH	VN	-30	2.24	0.00128	PASS
				-20	-1.49	-0.00085	PASS
				-10	1.65	0.00095	PASS
				0	-2.83	-0.00162	PASS
				10	1.60	0.00092	PASS
				20	-3.57	-0.00205	PASS
				30	-2.09	-0.00120	PASS
				40	-5.53	-0.00317	PASS
				50	-4.90	-0.00281	PASS

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Test Band	Test Mode	Test Channel	Test Volt.	Test Temp.	Freq. Error [Hz]	Freq. vs. rated [ppm]	Verdict
LTEband4	LTE/TM2 20MHz	LCH	VN	-30	-2.52	-0.00147	PASS
				-20	-2.45	-0.00142	PASS
				-10	3.18	0.00185	PASS
				0	-2.64	-0.00153	PASS
				10	1.60	0.00093	PASS
				20	-0.23	-0.00013	PASS
				30	-2.44	-0.00142	PASS
				40	5.34	0.00310	PASS
				50	4.73	0.00275	PASS
		MCH	VN	-30	-3.80	-0.00219	PASS
				-20	-5.38	-0.00311	PASS
				-10	-7.19	-0.00415	PASS
				0	-4.32	-0.00249	PASS
				10	-2.34	-0.00135	PASS
				20	1.74	0.00100	PASS
				30	-5.67	-0.00327	PASS
				40	-2.32	-0.00134	PASS
				50	-3.41	-0.00197	PASS
		HCH	VN	-30	3.84	0.00220	PASS
				-20	-2.55	-0.00146	PASS
				-10	1.59	0.00091	PASS
				0	-3.73	-0.00214	PASS
				10	-2.34	-0.00134	PASS
				20	-1.47	-0.00084	PASS
				30	-2.89	-0.00166	PASS
				40	-4.39	-0.00252	PASS
				50	-5.60	-0.00321	PASS

The End