E8396
Abicom International Limited
Vibtech CAN II
March 2008
FCC CFR 47 Part 15 Subparts B & C

1 Test Information

The results contained within this Test Report only apply to this specific Equipment Under Test.

Test	Emissions
Standards	CFR 47: 2007 PART 15 SUBPART B: Class B CFR 47: 2007 PART 15 SUBPART C Section 15.247

Equipment Under Test (EUT)

Description	802.11b Central Access Node
Manufacturer	Vibration Technology Limited
Model Name	Vibtech CAN II
Serial Number	Production Sample

EUT comprising of:

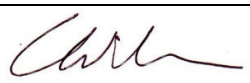
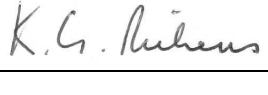
Description	Motherboard
Manufacturer	Vibration Technology Limited
Model Name	VIB-700-0007A0603
Part Reference	VIBTECH CAN II PCB
Serial Number	4371

Description	Transceiver
Manufacturer	Vibration Technology Limited
Model Name	Freecom CPE
Part Number	AP48-ABICOM-03-REV04
Serial Number	4371

Description	Transceiver
Manufacturer	Vibration Technology Limited
Model Name	Freecom CPE
Part Number	AP48-ABICOM-03-REV04
Serial Number	4381

Description	Transceiver
Manufacturer	Vibration Technology Limited
Model Name	Freecom CPE
Part Number	AP48-ABICOM-03-REV04
Serial Number	4344

Manufacturer	Vibration Technology Limited 5 Central Boulevard Central Park Larbert Stirlingshire FK5 4RU United Kingdom
Representative	Dave Edwards
Purchase Order	1658
Test Started	29th October 2007
Test Finished	15th February 2008

Test Engineer	Carl Wilson		02/04/08
Technical Manager	Mark Richens		02/04/08
Technical Director	Keith Richens		02/04/08

5 Results

5.4 Maximum Peak Output Power Test

This test took place between the 30th & 31st October, 2007. The EUT was set up as described in 2.1

Temperature varied between: 11 °C - 16 °C
Humidity varied between: 44 % rh – 47 % rh

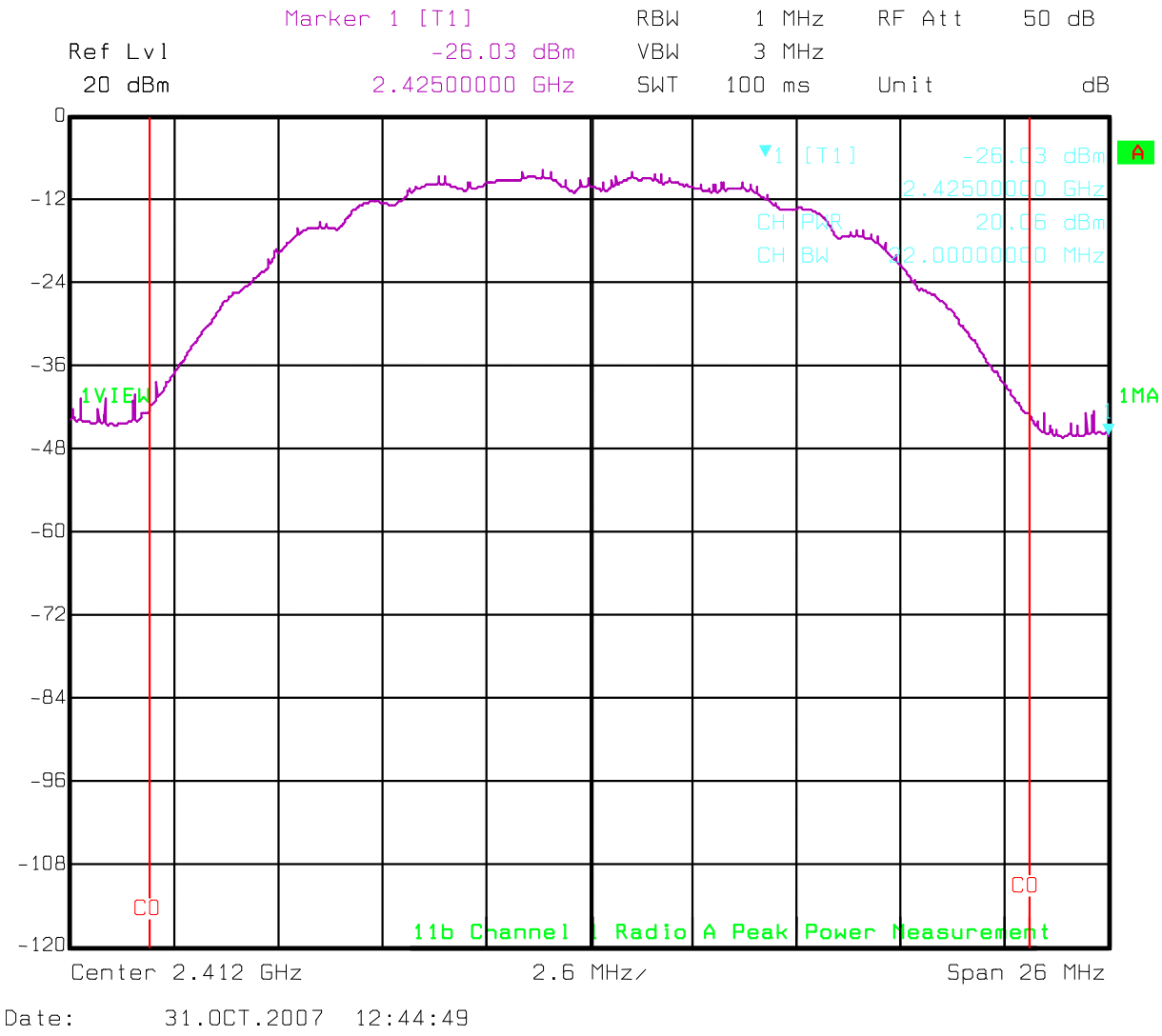
The peak power measurements were measured at the board level connectors using a spectrum analyser for each transceiver in turn, operating on Channels 1, 6 & 11 respectively.

Transceiver	Operating Channel	Peak Power Measured dBm	Corrected Peak Power Limit dB
A	Channel 1	20.06	22.0
	Channel 6	19.75	22.0
	Channel 11	19.79	22.0
B	Channel 1	20.16	22.0
	Channel 6	19.21	22.0
	Channel 11	19.85	22.0
C	Channel 1	20.11	22.0
	Channel 6	19.79	22.0
	Channel 11	20.72	22.0

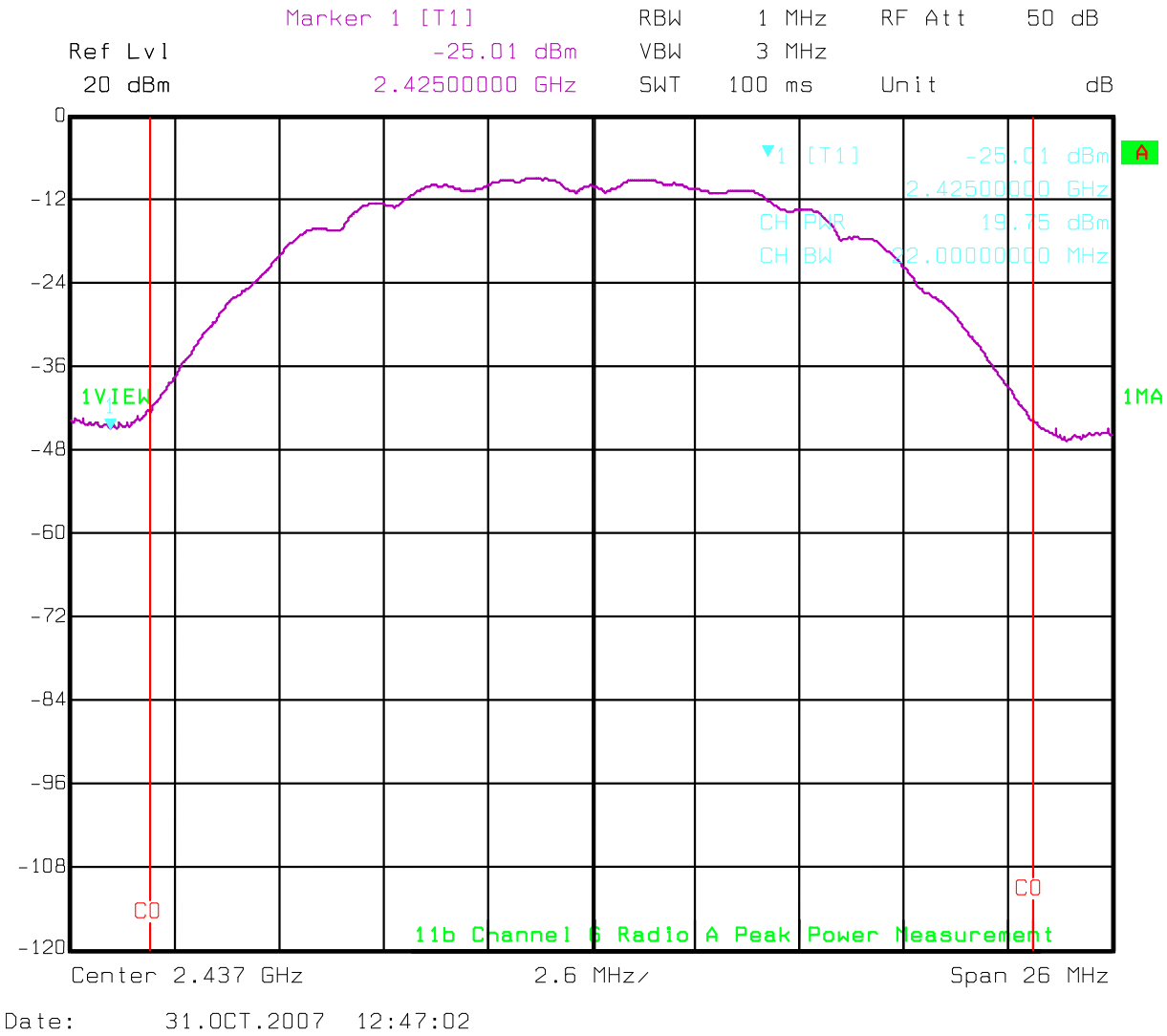
The EUT complies with the requirements as given by CFR 47 Part 15 Subpart C, Section 15.247(b)(4).

5.4.1 Maximum Peak Output Power Plots

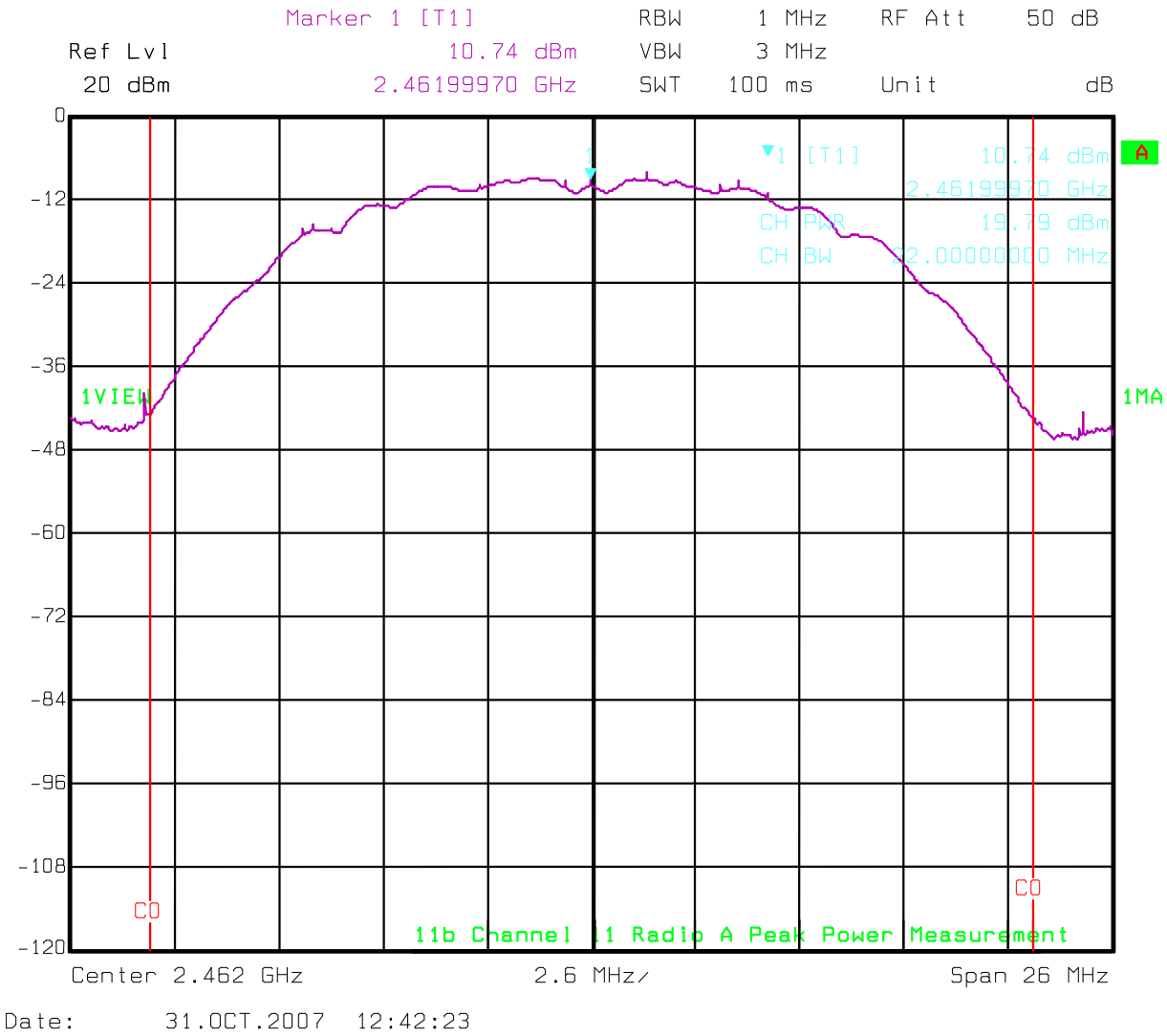
Transceiver A – Channel 1



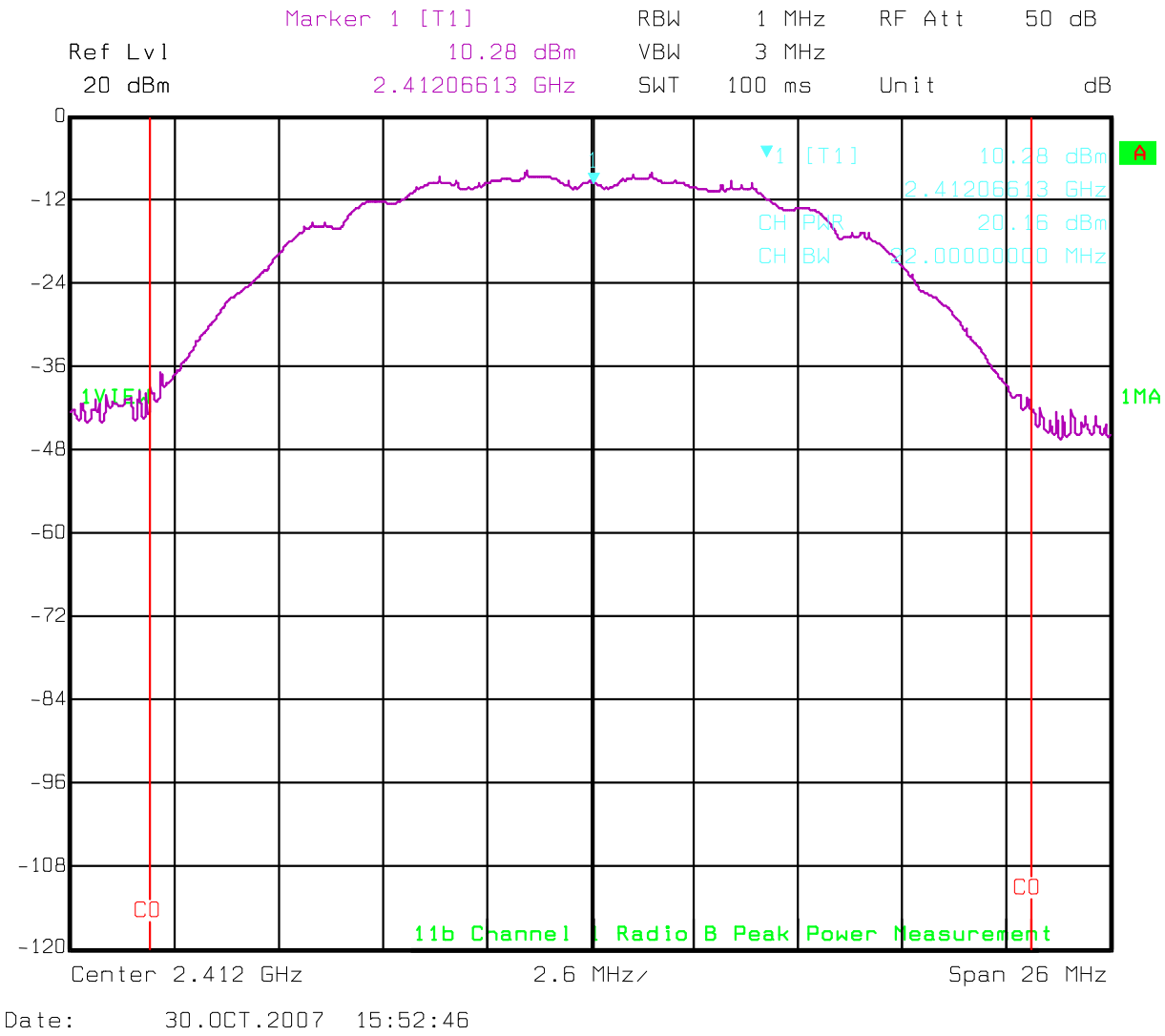
Transceiver A – Channel 6



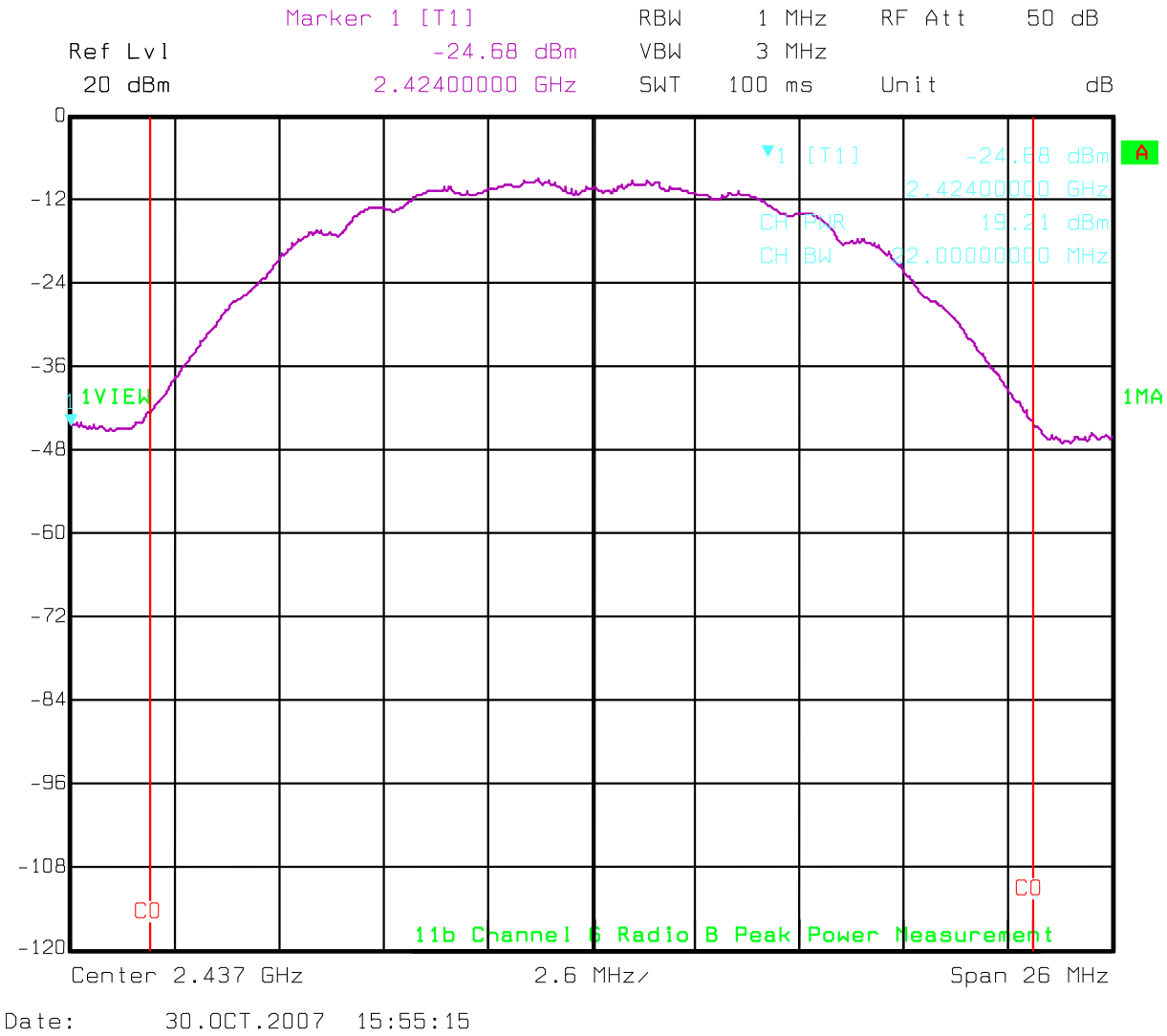
Transceiver A – Channel 11



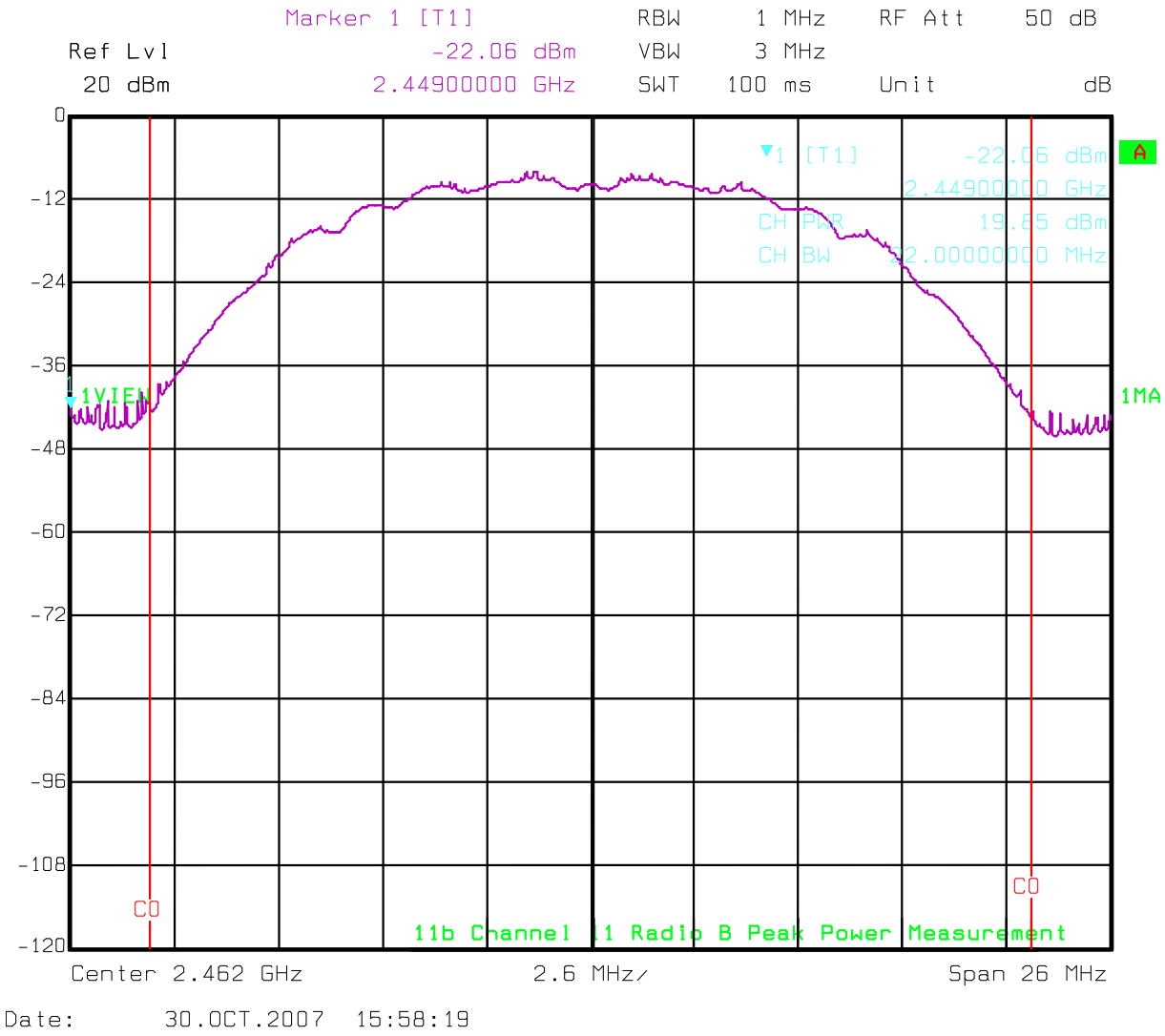
Transceiver B – Channel 1



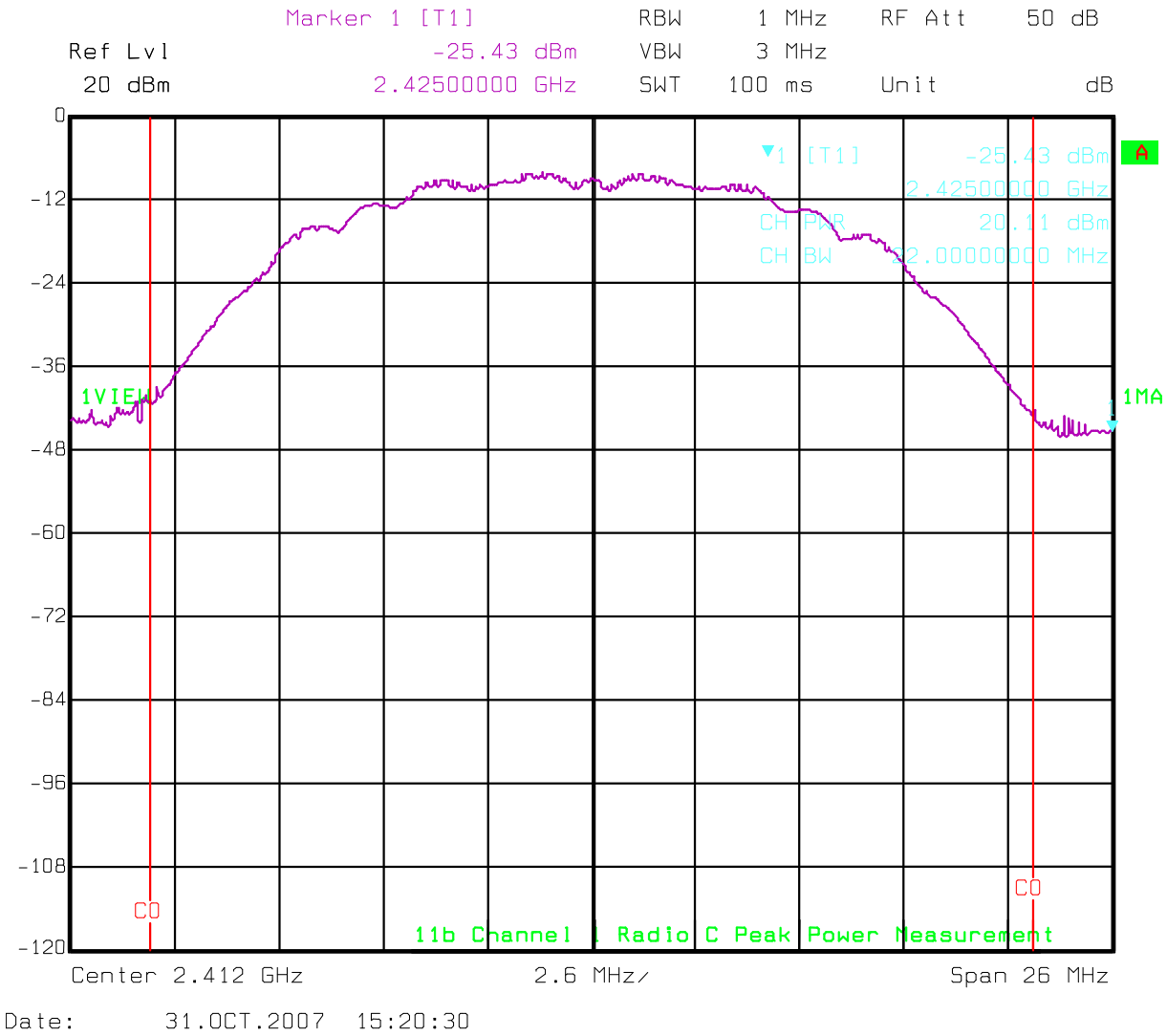
Transceiver B – Channel 6



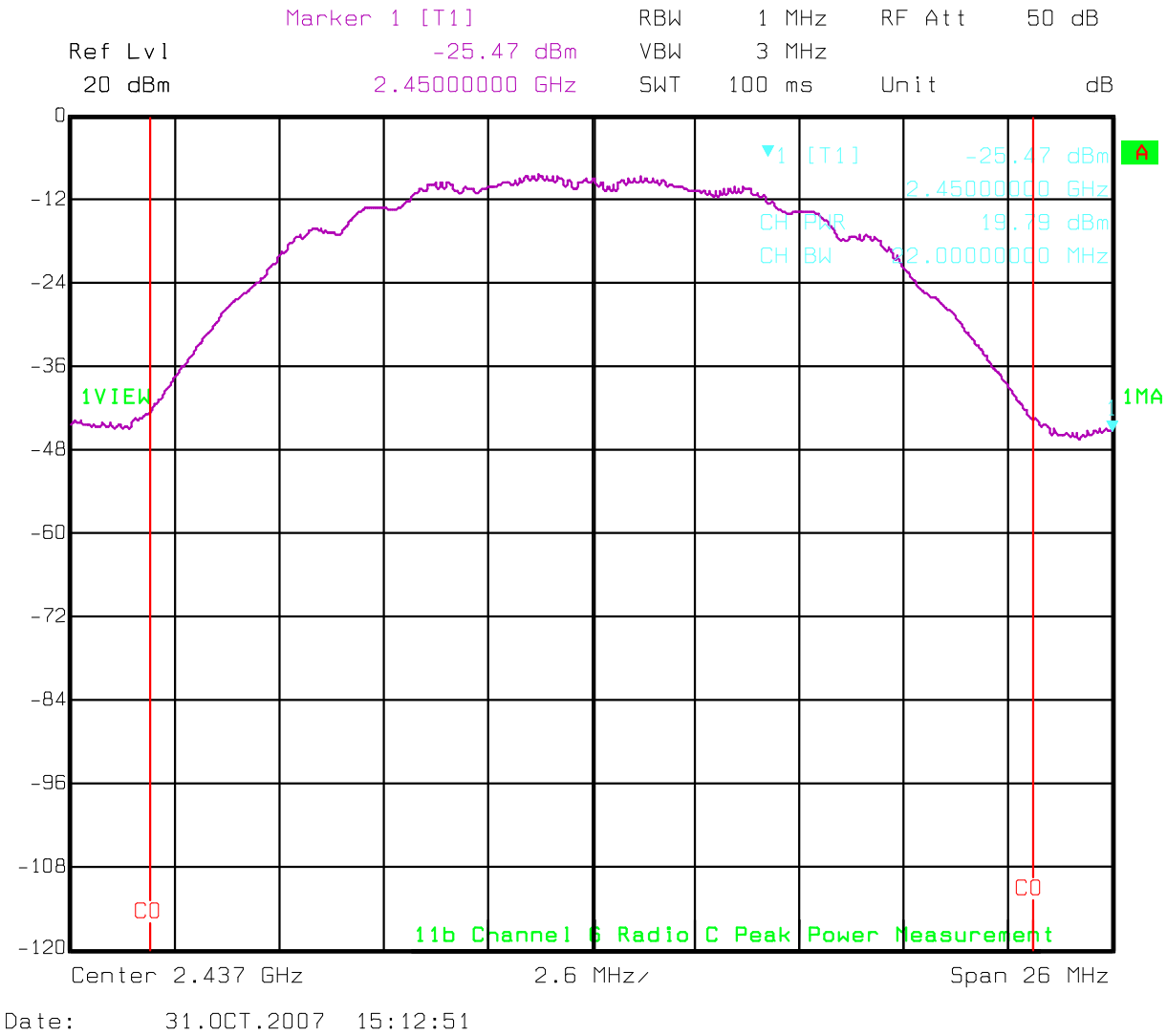
Transceiver B – Channel 11



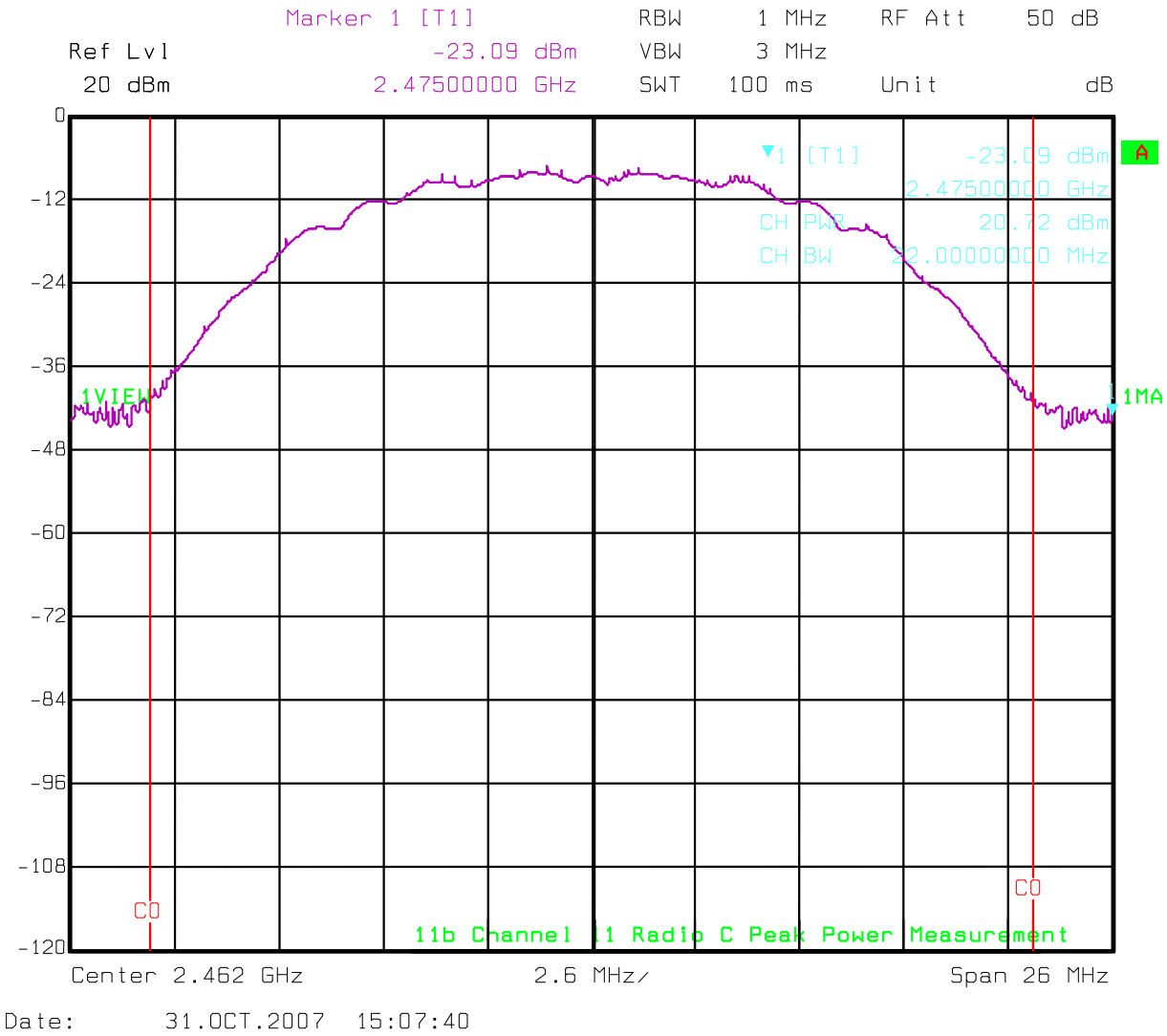
Transceiver C – Channel 1



Transceiver C – Channel 6



Transceiver C – Channel 11



5.5 Maximum Permissible Exposure Calculations & Results

Calculations:

Given $E = \frac{\sqrt{(30*P*G)}}{d}$

And $S = \frac{E^2}{3770}$

Where

E = Field Strength in Volts/metre
P = Power in Watts
G = Numeric Antenna Gain
d = distance in meters
S = Power Density in milliwatts/square centimetre

Combining equations and rearranging the terms to express the distance yields:

$$d = \frac{\sqrt{30 * P * G}}{3770 * S}$$

Changing to units of mW and cm using:

$$P(mW) = \frac{P(W)}{1000}$$

$$d(cm) = 100 * d(m)$$

Yields:

$$d = 100 * \frac{\sqrt{30 * \left(\frac{P}{1000}\right) * G}}{3770 * S}$$

$$d = \frac{0.282 * \sqrt{(P * G)}}{S}$$

Where d = distance in cm
P = Power in mW
G = Numeric Antenna Gain
S = Power Density in mW/cm^2

Substituting the logarithmic form of power and gain using:

$$P(mW) = 10^{\frac{P(dbm)}{10}}$$

$$G(numeric) = 10^{\frac{G(dBi)}{10}}$$

Yields:

$$d = \frac{0.282 * 10^{\left(\frac{P+G}{20}\right)}}{S} \qquad \textbf{Equation (1)}$$

Where d = MPE distance in cm
P = Power in dBm
G = Antenna Gain in dBi
S = Power Density Limit in mW/cm^2

Transposing **Equation (1)** to express S at d = 20cm distance as per FCC requirement;

$$S = \frac{0.282 * 10^{\left(\frac{P+G}{20}\right)}}{d} \qquad \textbf{Equation (2)}$$

From 1.1310 Table 1, the value of S = 1.0mW/cm^2 for uncontrolled exposure in the frequency range 1500-100,000 MHz.

Equation (2) and the measured peak power readings together with the antenna gain are used to calculate the Power Density Level at 20cm distance.

2.4GHz band results

Mode	Power Density Limit (mW/cm^2)	Output Power (dBm)	Antenna Gain (dBi)	Calculated Power Density (S) (mw/cm^2)
802.11b	1.0	20.16	14.0	0.720
		19.21		0.645
		19.85		0.695
		19.79		0.690
		20.06		0.712
		19.75		0.687
		20.72		0.768
		19.79		0.690
		20.11		0.716

The above Power Density levels calculated at distance d = 20cm do not exceed the limit of 1.0mW/cm^2 as given by the Commission's guidelines detailed in 1.1307 (b)(1).

5.6 Conducted Spurious Emissions Test

This test took place between the 30th & 31st October, 2007. The EUT was set up as described in 2.1

Temperature varied between: 11 °C - 16 °C
Humidity varied between: 44 % rh – 47 % rh

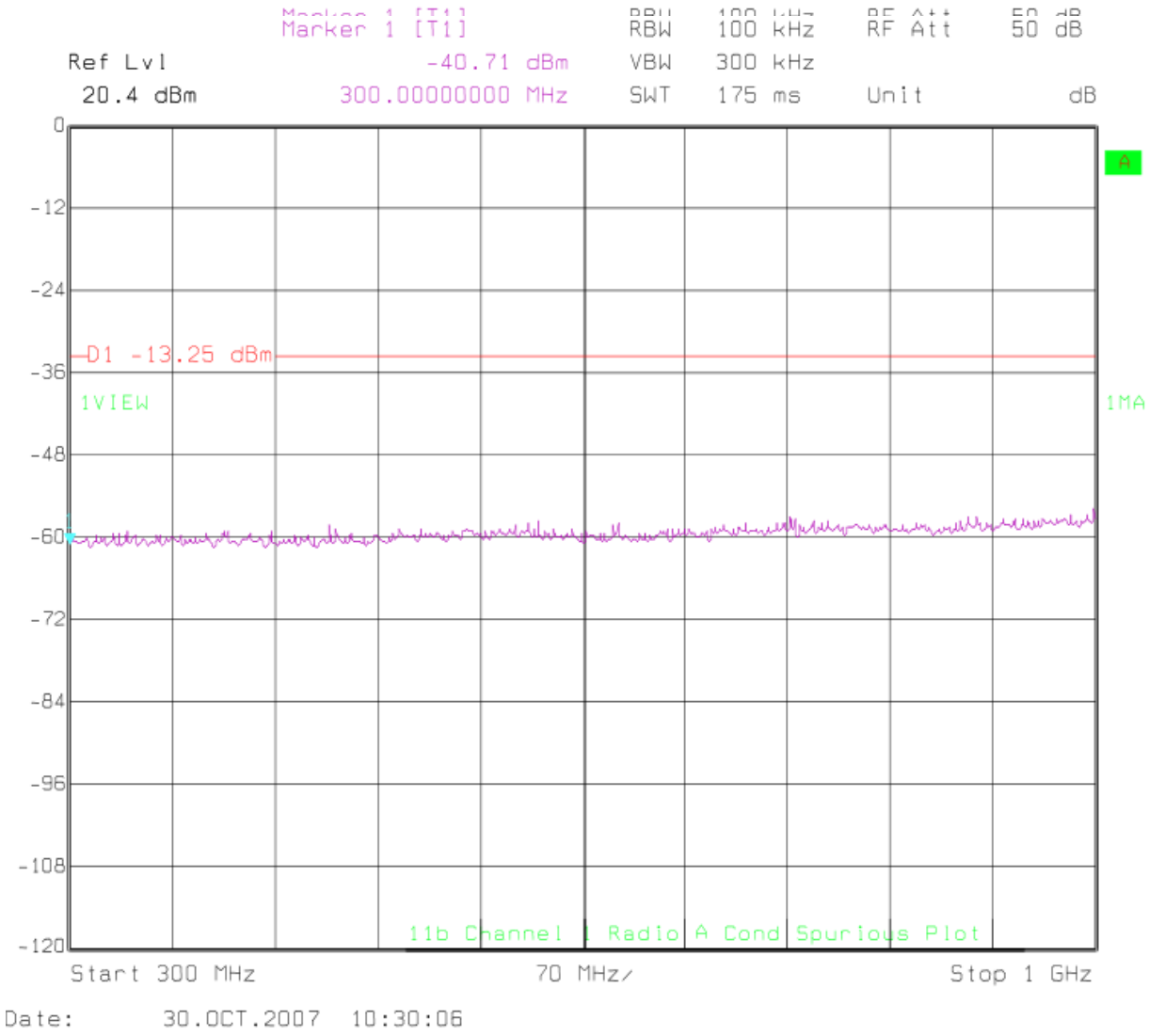
The conducted spurious emissions were measured at the board level connectors using a Spectrum Analyser for each transceiver in turn, operating on Channels 1, 6 & 11 successively.

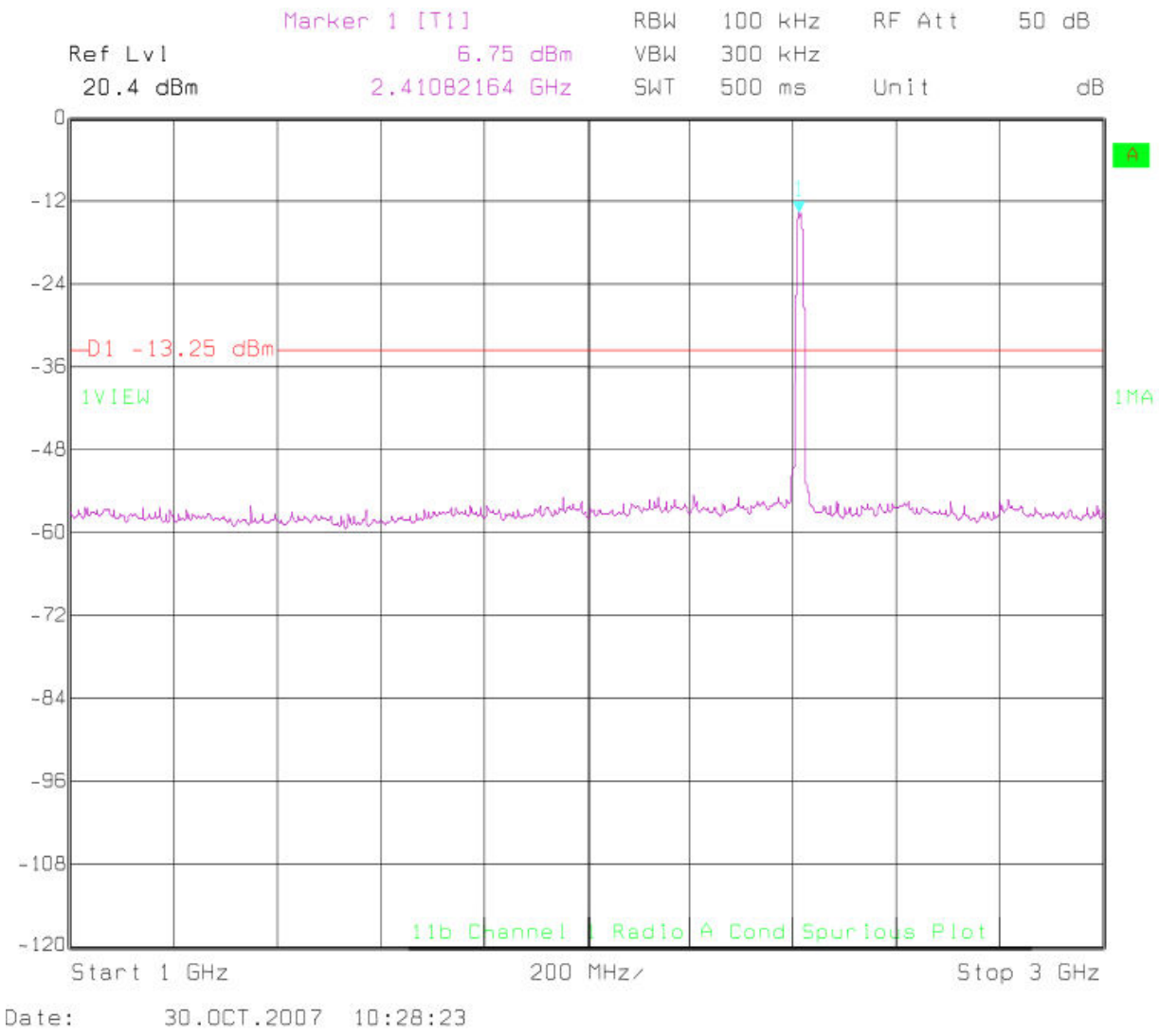
The peak of the fundamental was measured and a display line 20 dB's lower than the fundamental peak value was displayed on the analyzer. No emissions were found to be within 20 dB of the peak fundamental in the frequency band in which the spread spectrum intentional radiator was operating.

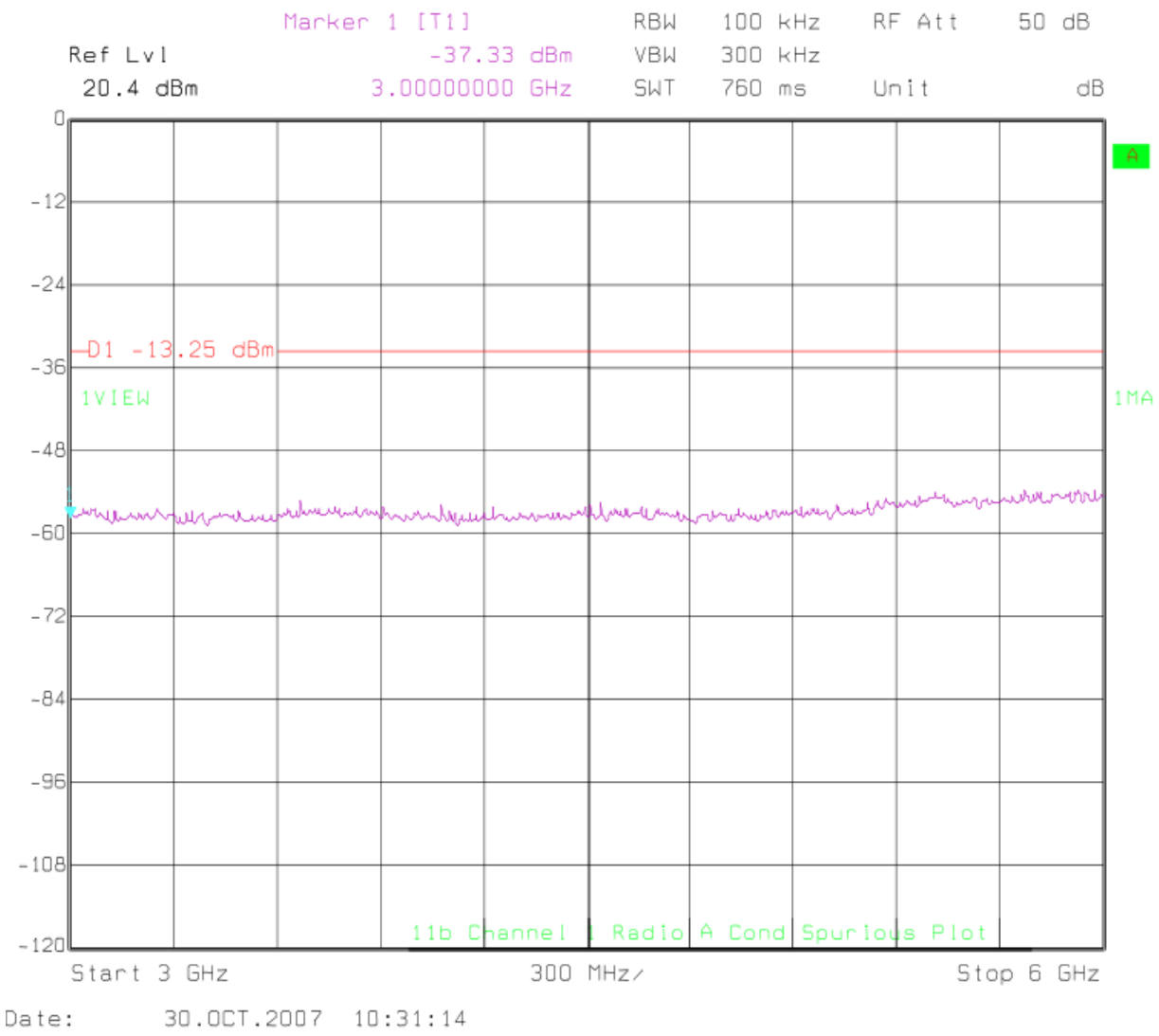
The EUT meets the requirements given by CFR 47 Part 15 Subpart C, Section 15.247(d).

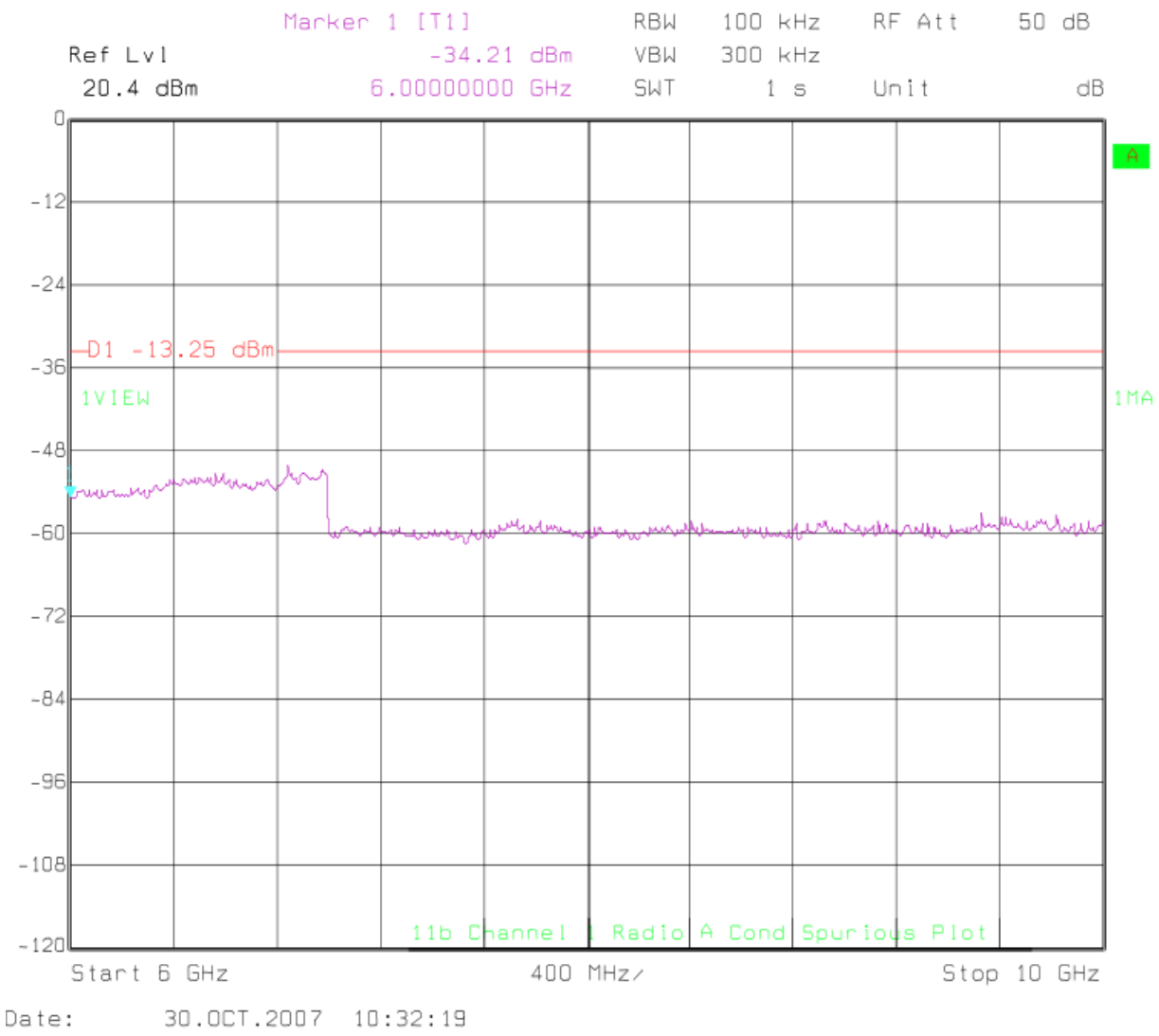
5.6.1 Conducted Spurious Emissions Plots

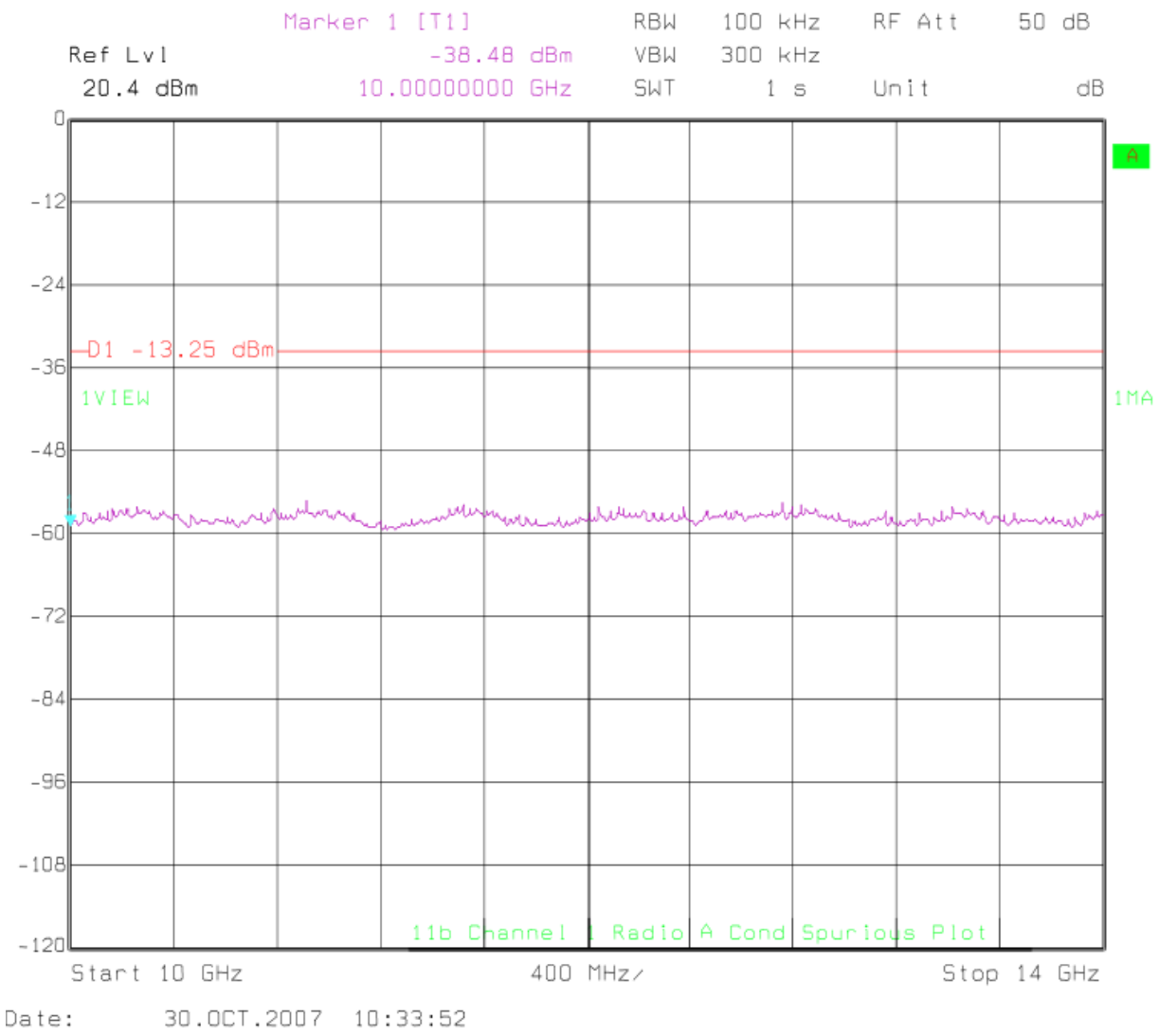
Transceiver A – Channel 1

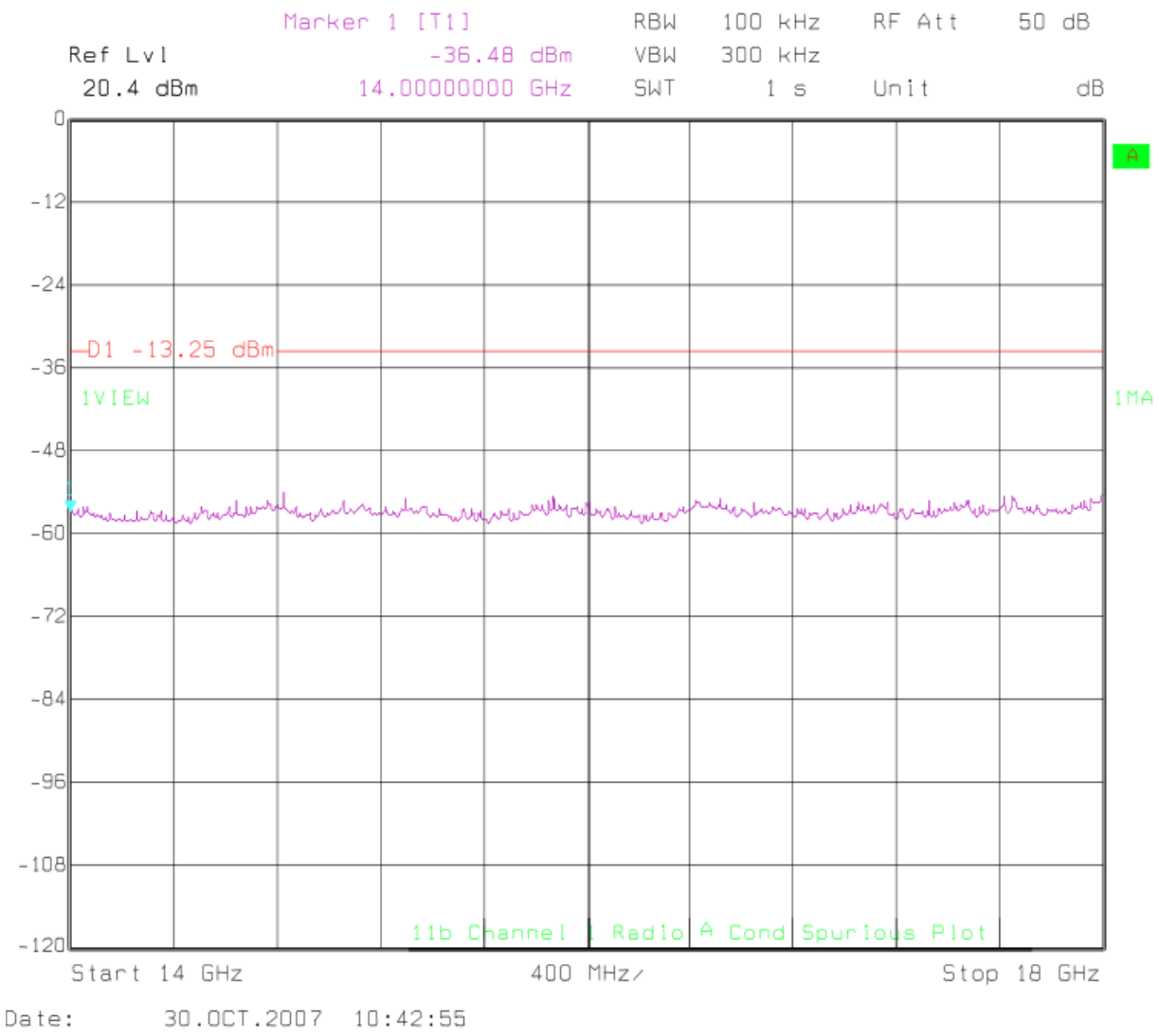


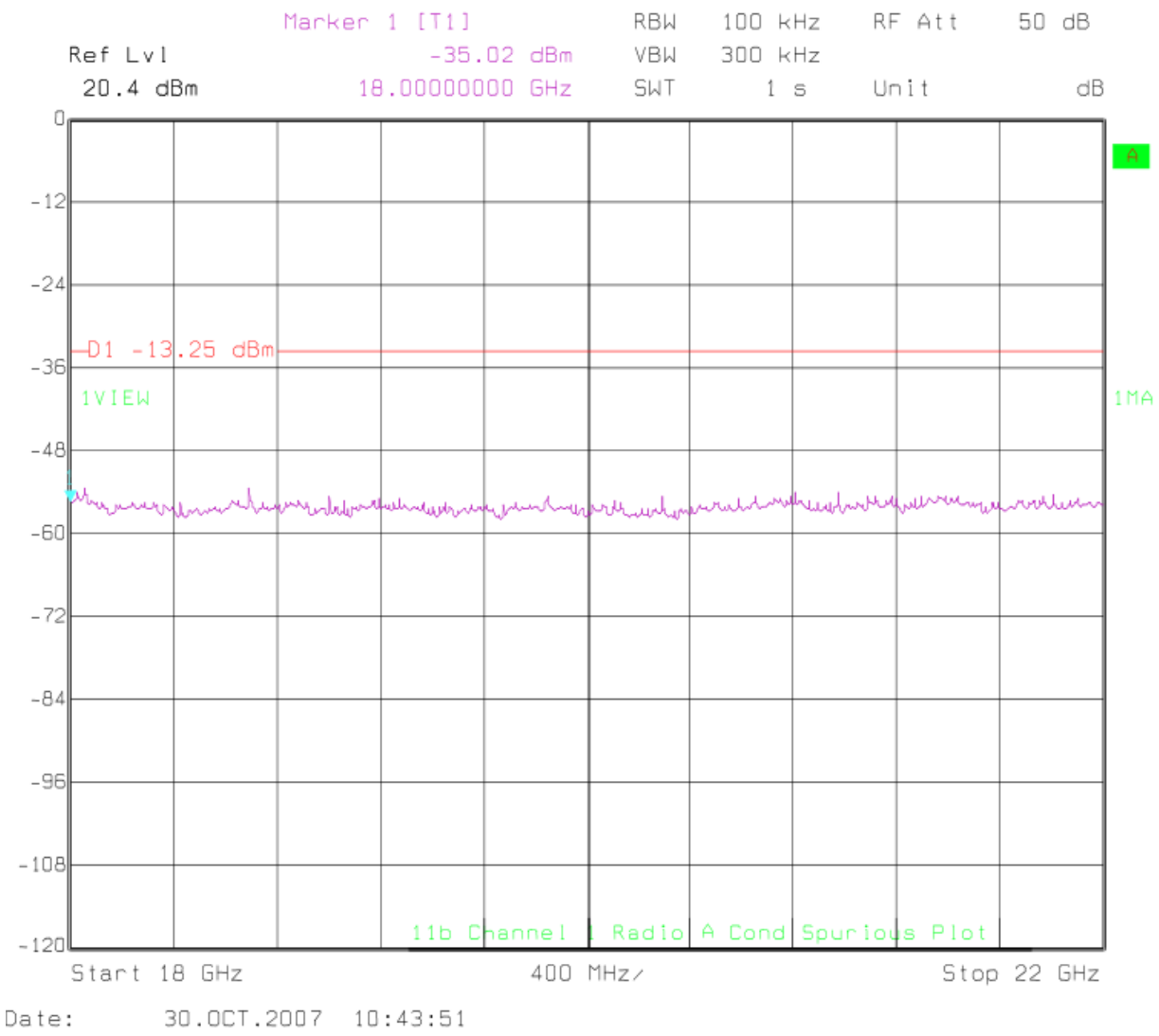

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
6.75 dBm
VBW 300 kHz
20.4 dBm
2.41082164 GHz
SWT 500 ms
Unit dB
0
-12
-24
D1 -13.25 dBm
-36
1VIEW
1MA
-48
-60
-72
-84
-96
-108
-120
11b Channel | Radio A Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 30.OCT.2007 10:28:23

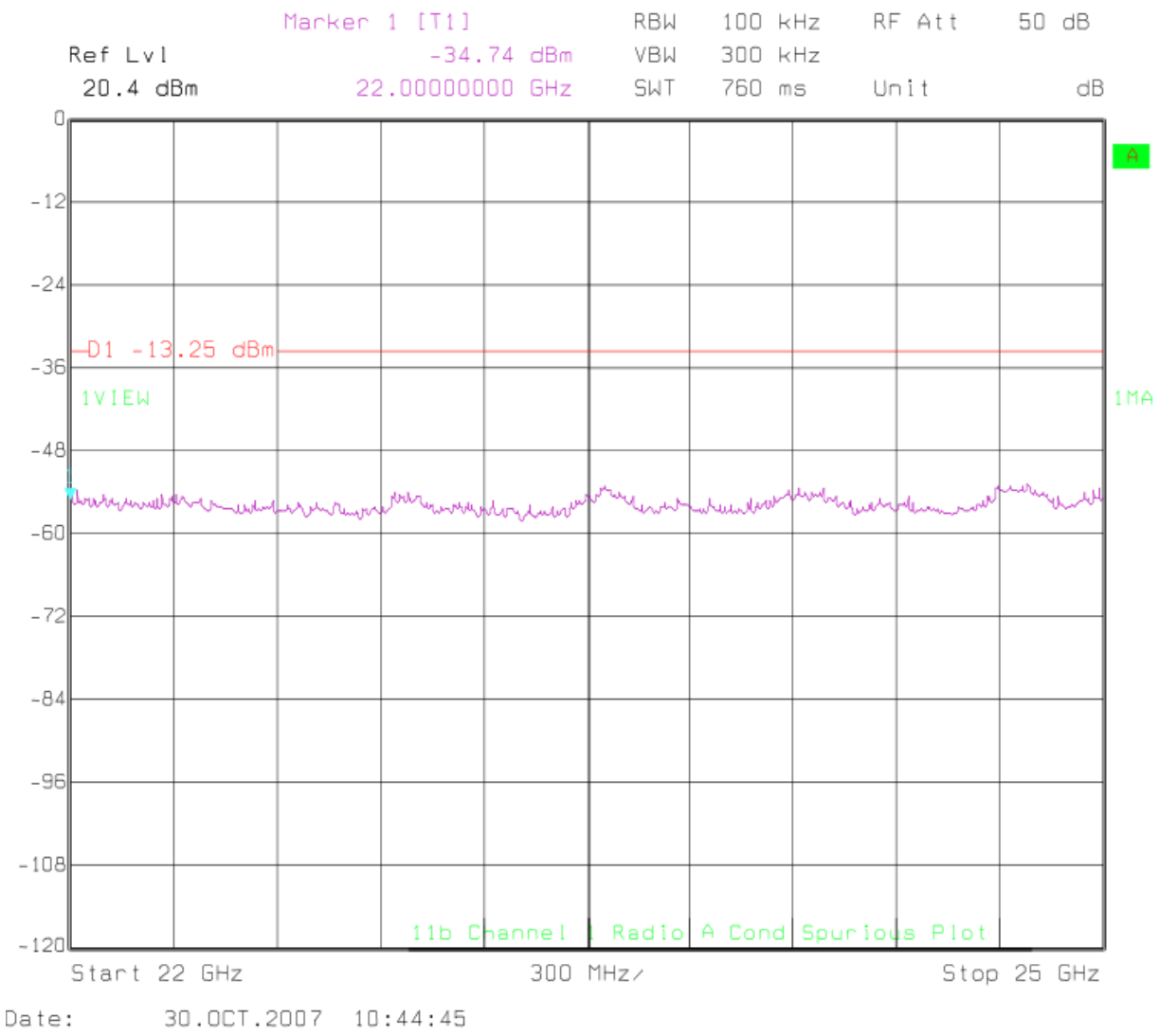

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-37.33 dBm
VBW 300 kHz
20.4 dBm
3.00000000 GHz
SWT 760 ms
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.25 dBm
1VIEW
A
1MA
11b Channel | Radio A Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 30.OCT.2007 10:31:14


Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.21 dBm
VBW 300 kHz
20.4 dBm
6.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.25 dBm
1VIEW
A
1MA
11b Channel | Radio A Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 30.OCT.2007 10:32:19

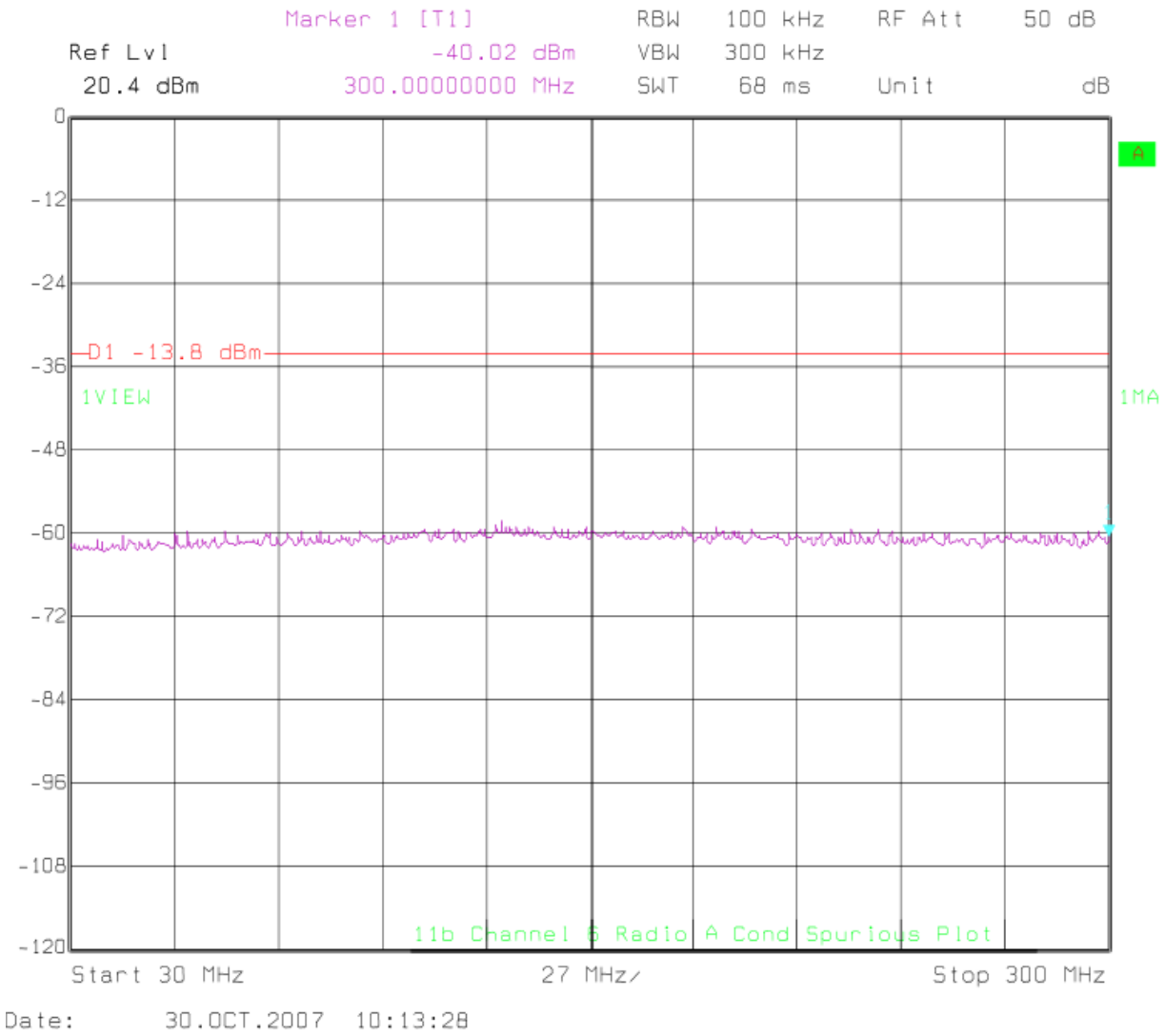

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-38.48 dBm
VBW 300 kHz
20.4 dBm
10.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.25 dBm
1VIEW
A
1MA
11b Channel | Radio A Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 30.OCT.2007 10:33:52

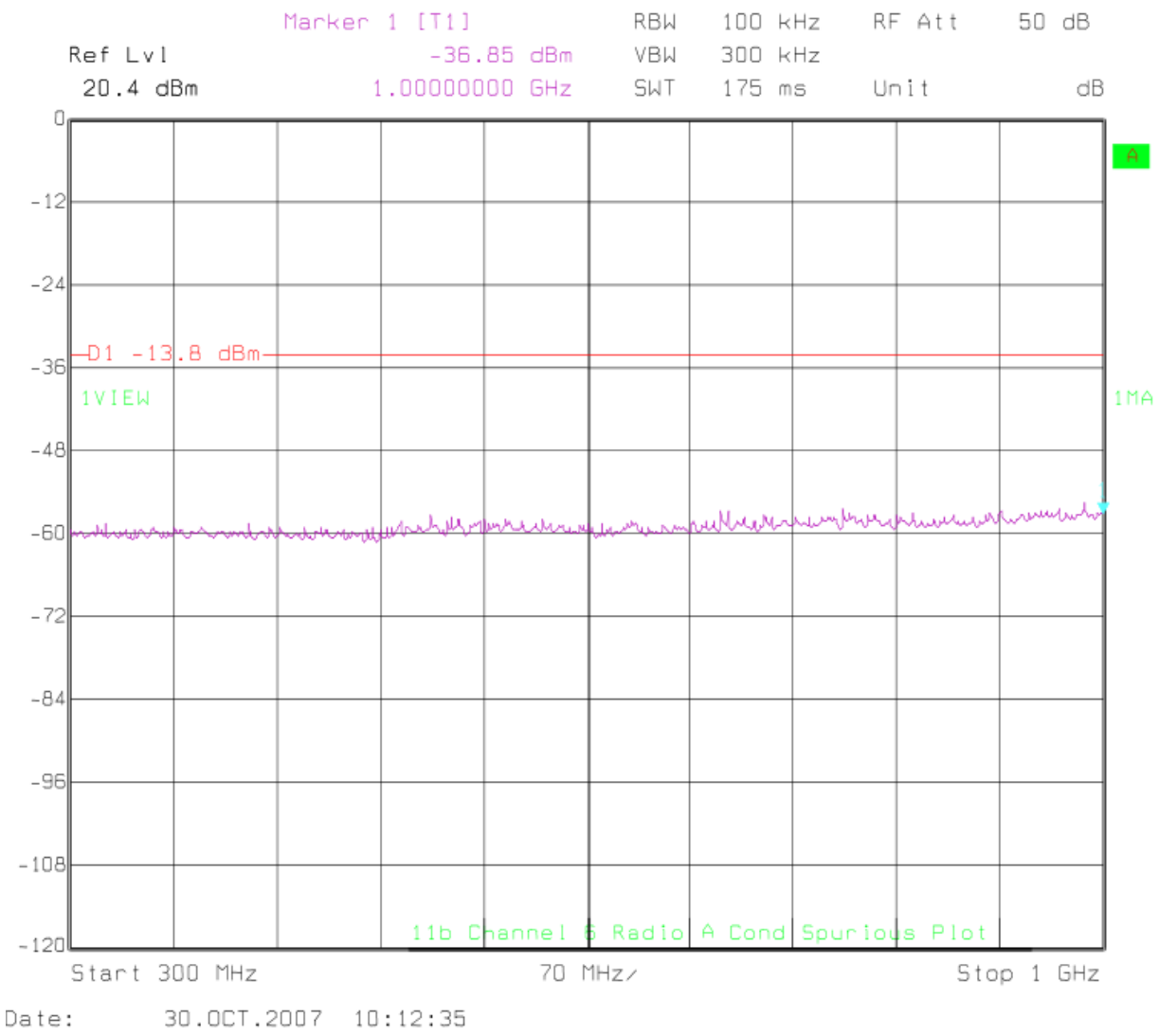

Marker 1 [T1]
-36.48 dBm
14.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20.4 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.25 dBm
1VIEW
1MA
A
11b Channel | Radio A Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 30.OCT.2007 10:42:55

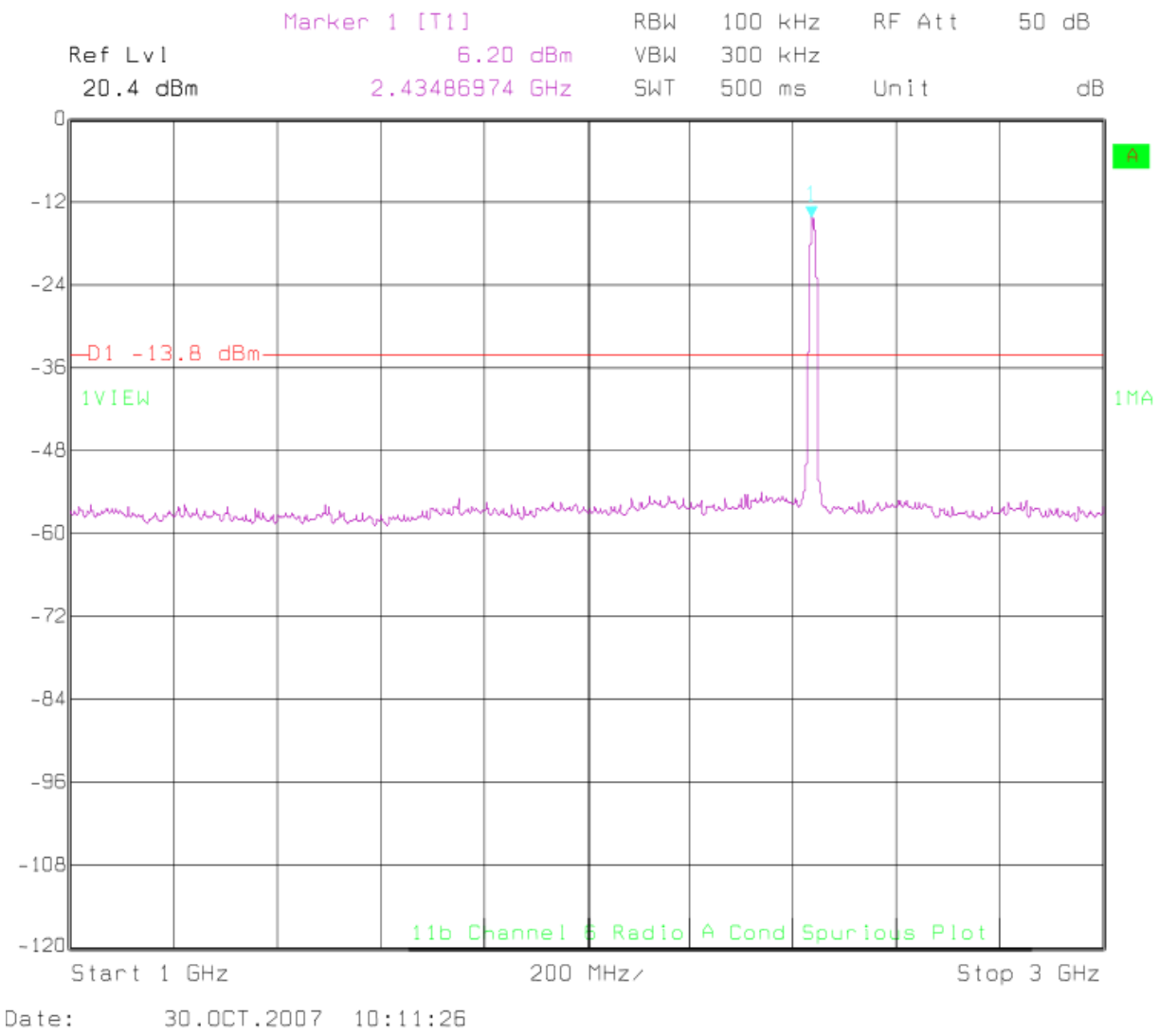

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-35.02 dBm
VBW 300 kHz
20.4 dBm
18.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.25 dBm
1VIEW
A
1MA
11b Channel | Radio A Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 30.OCT.2007 10:43:51

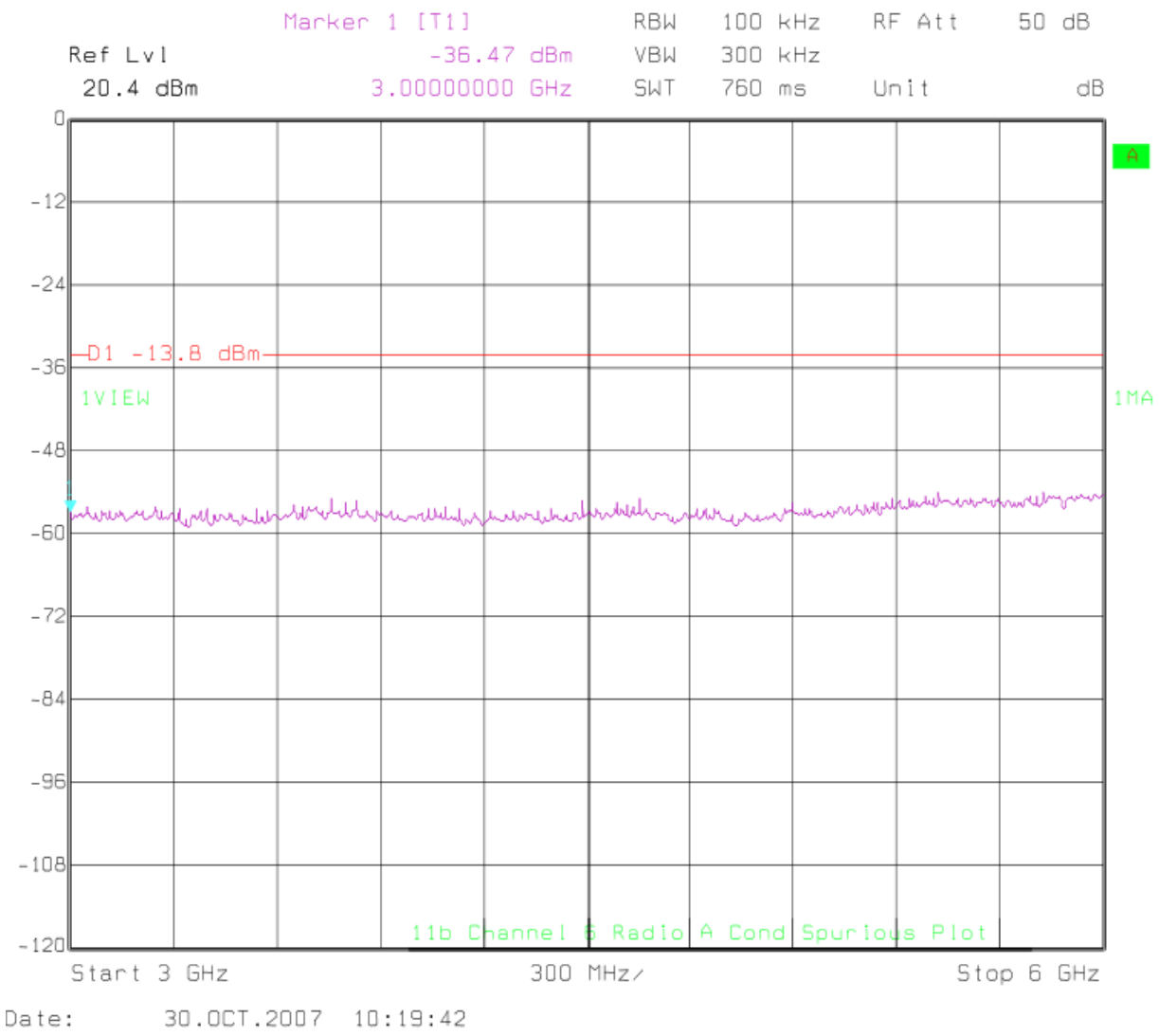

Marker 1 [T1]
-34.74 dBm
22.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20.4 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.25 dBm
1VIEW
A
1MA
11b Channel | Radio A Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 30.OCT.2007 10:44:45

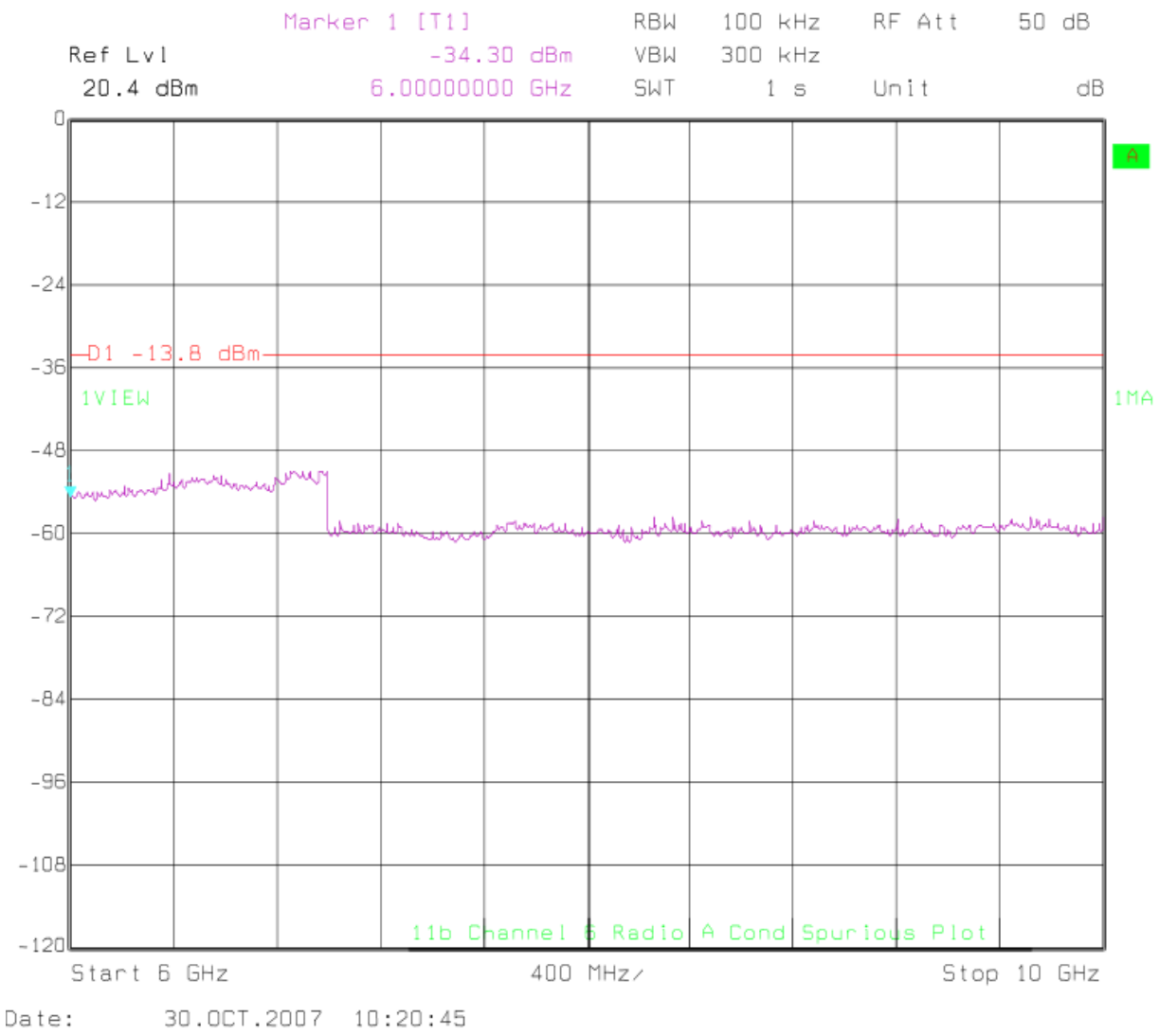
Transceiver A – Channel 6

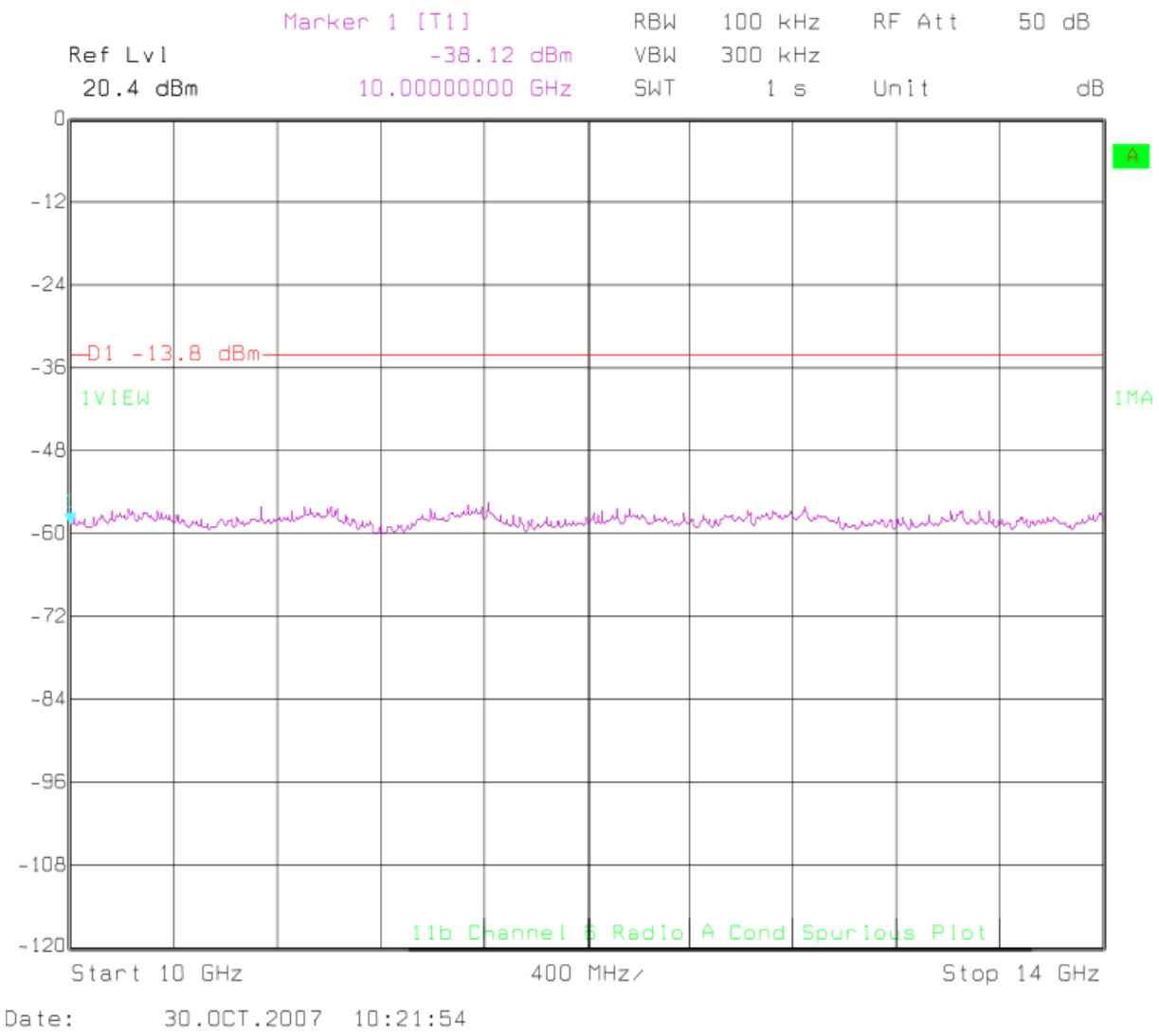


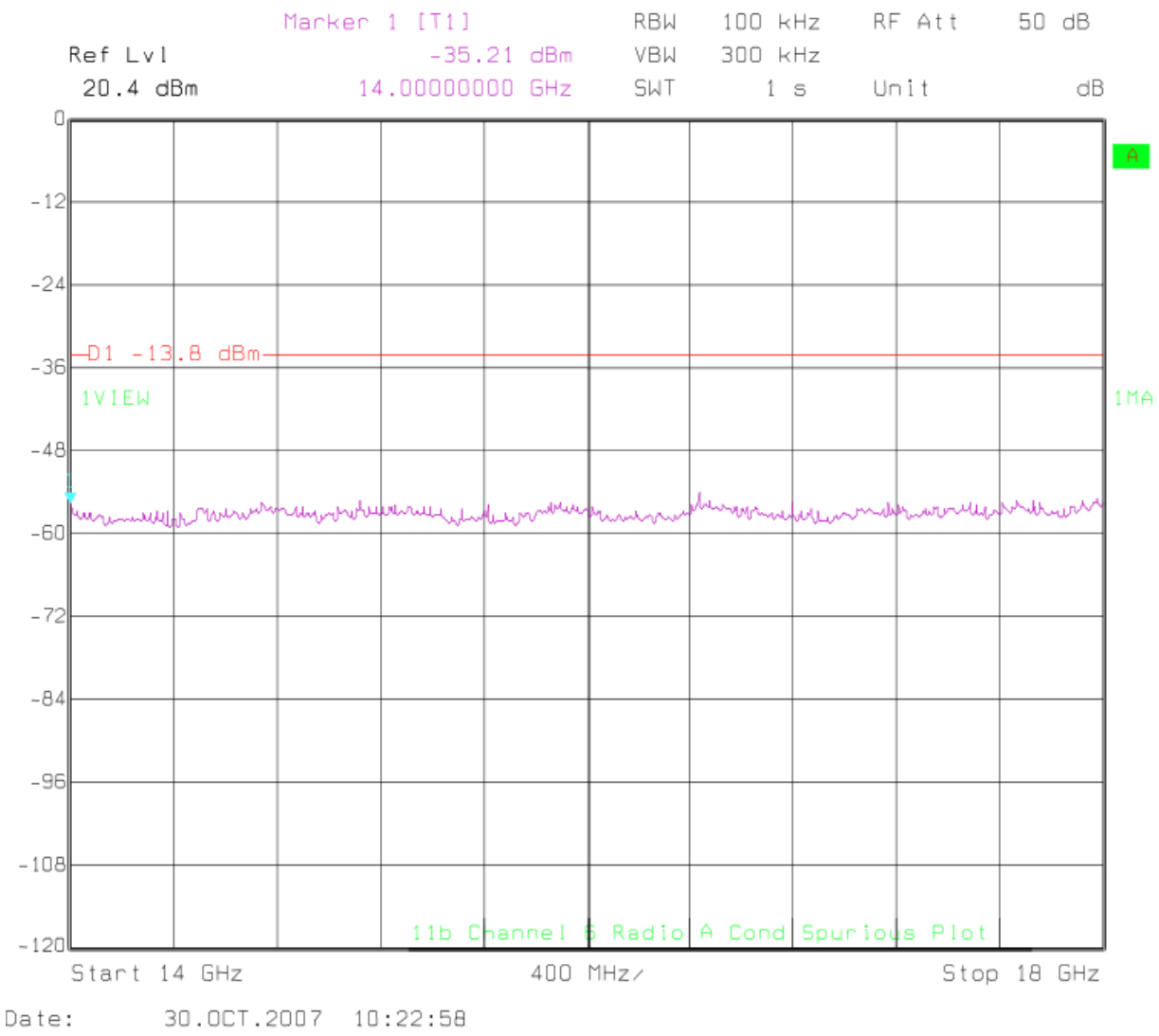

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-36.85 dBm
VBW 300 kHz
20.4 dBm
1.00000000 GHz
SWT 175 ms
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
A
11b Channel 6 Radio A Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 30.OCT.2007 10:12:35

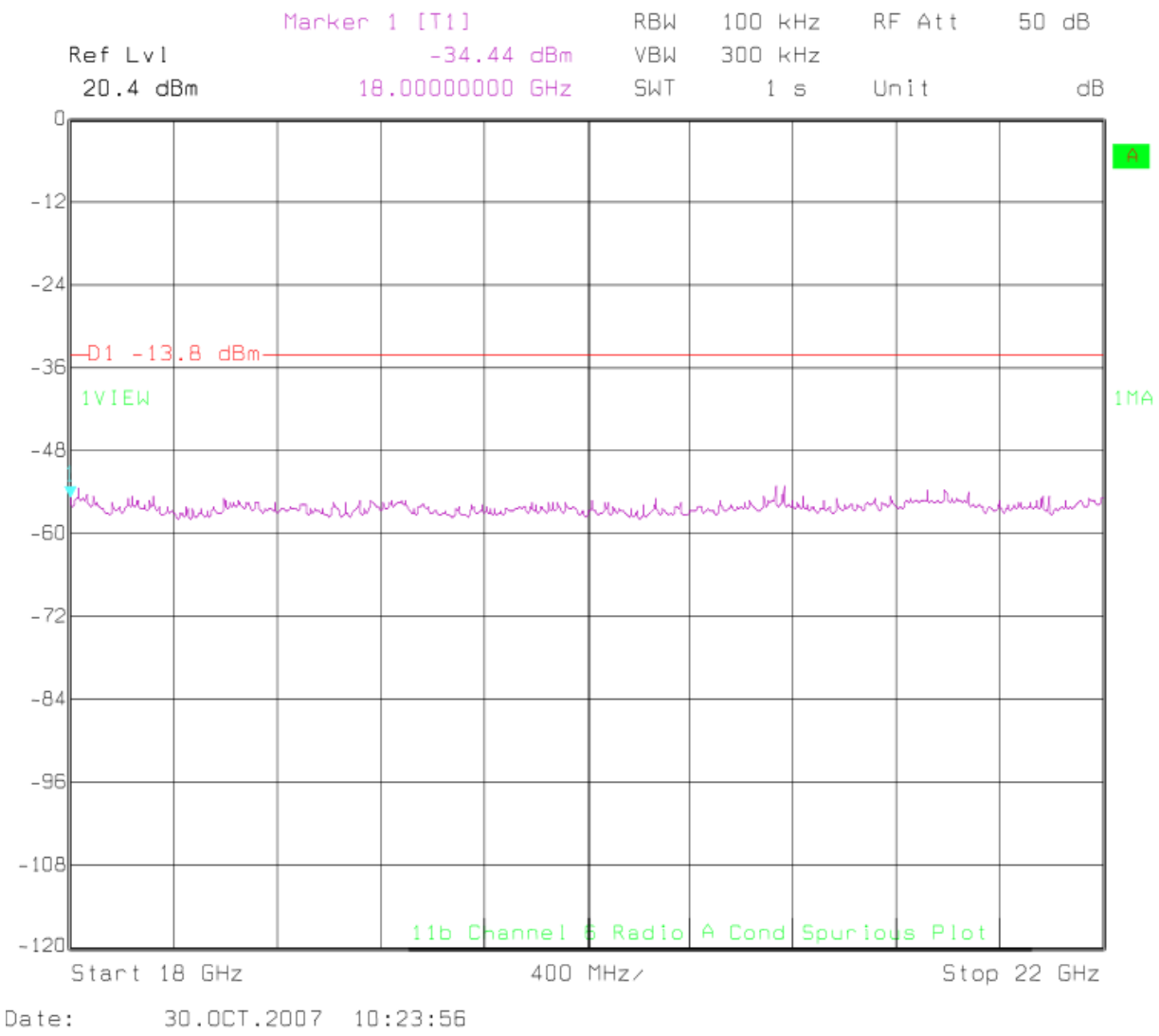

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
6.20 dBm
VBW 300 kHz
20.4 dBm
2.43486974 GHz
SWT 500 ms
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
A
11b Channel 6 Radio A Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 30.OCT.2007 10:11:26

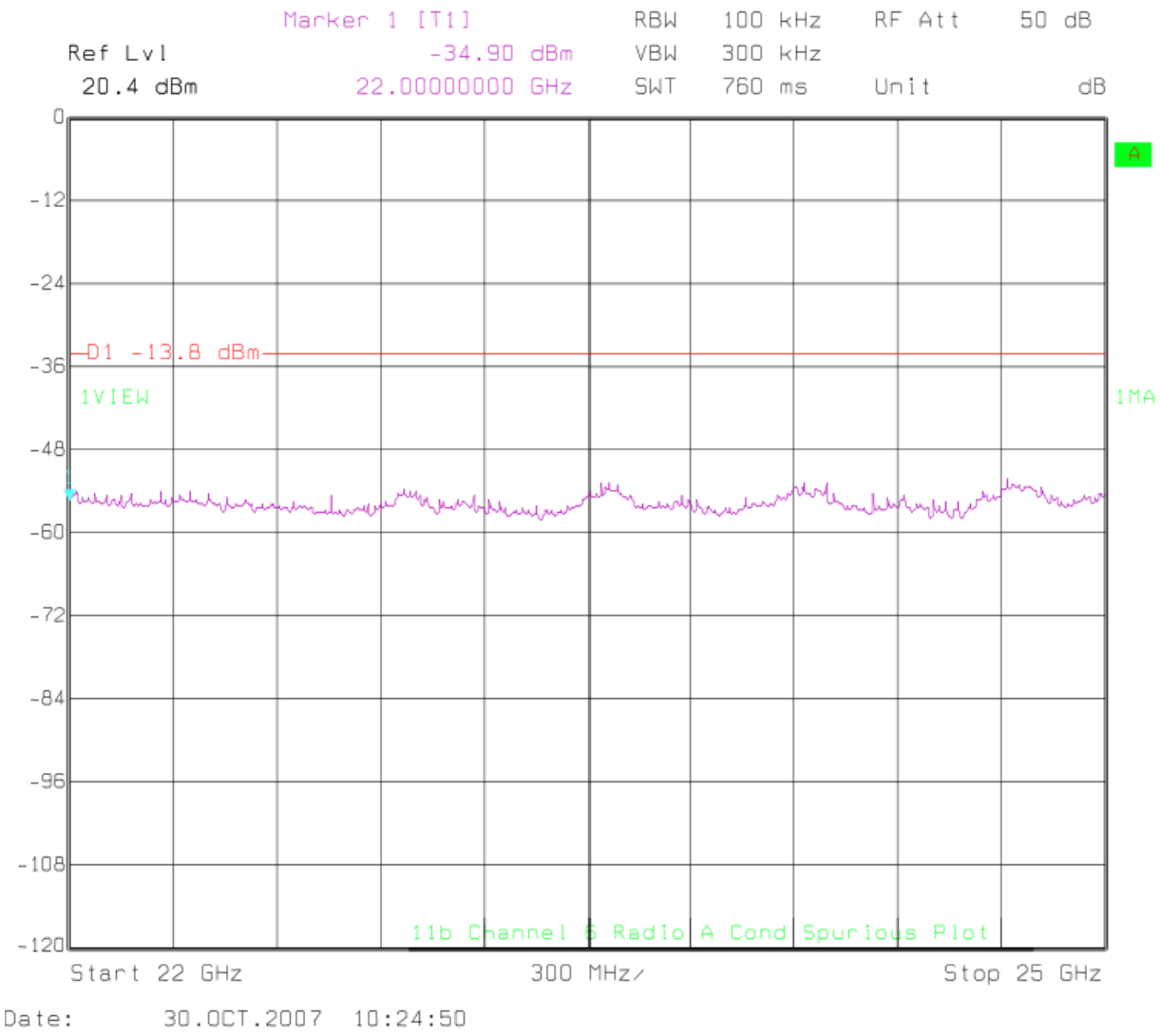

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-36.47 dBm
VBW 300 kHz
20.4 dBm
3.00000000 GHz
SWT 760 ms
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
A
1MA
11b Channel 6 Radio A Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 30.OCT.2007 10:19:42


Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.30 dBm
VBW 300 kHz
20.4 dBm
6.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
A
11b Channel 6 Radio A Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 30.OCT.2007 10:20:45

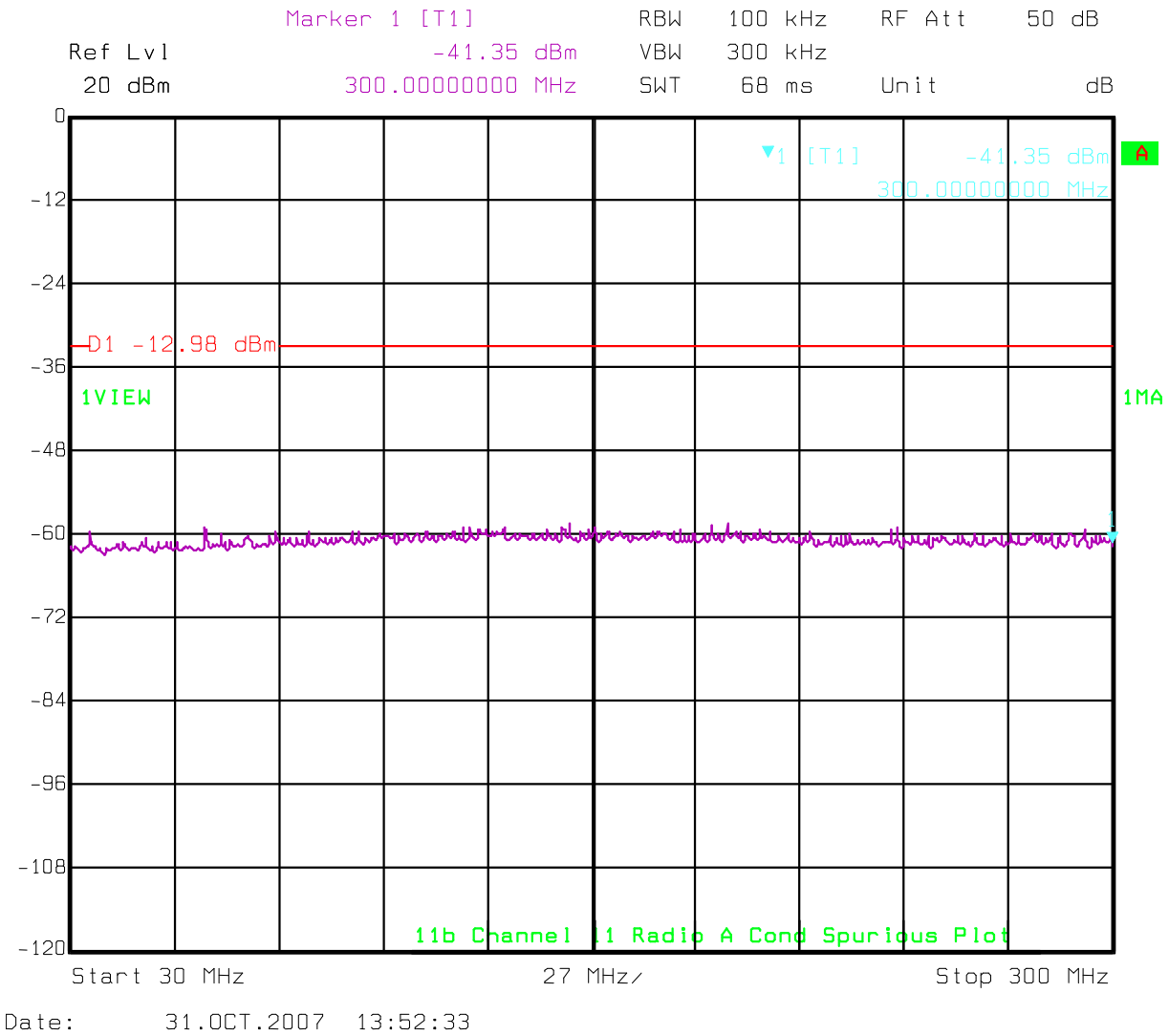

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-38.12 dBm
VBW 300 kHz
20.4 dBm
10.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
A
11b Channel 6 Radio A Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 30.OCT.2007 10:21:54

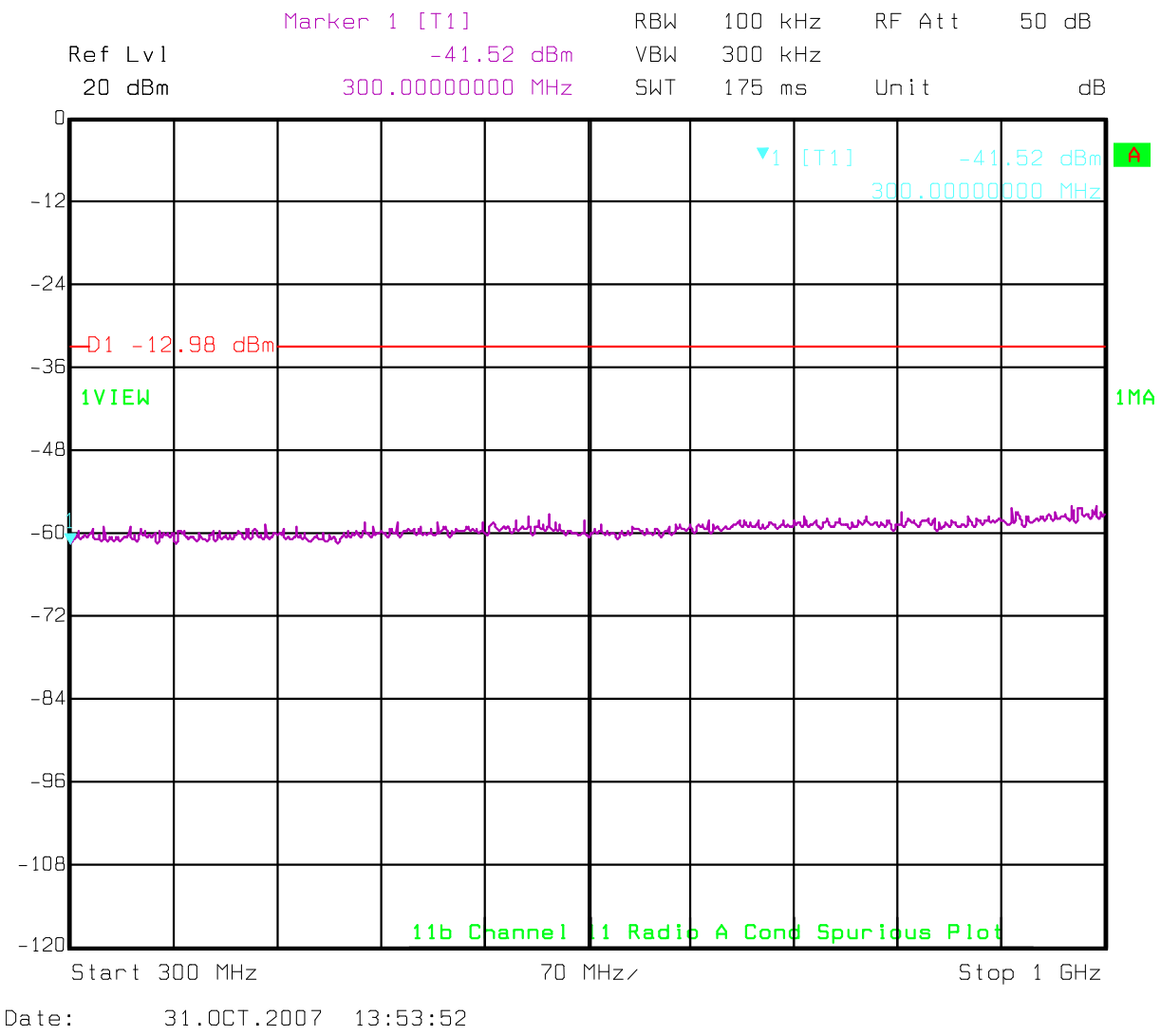

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-35.21 dBm
VBW 300 kHz
20.4 dBm
14.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
A
11b Channel 6 Radio A Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 30.OCT.2007 10:22:58

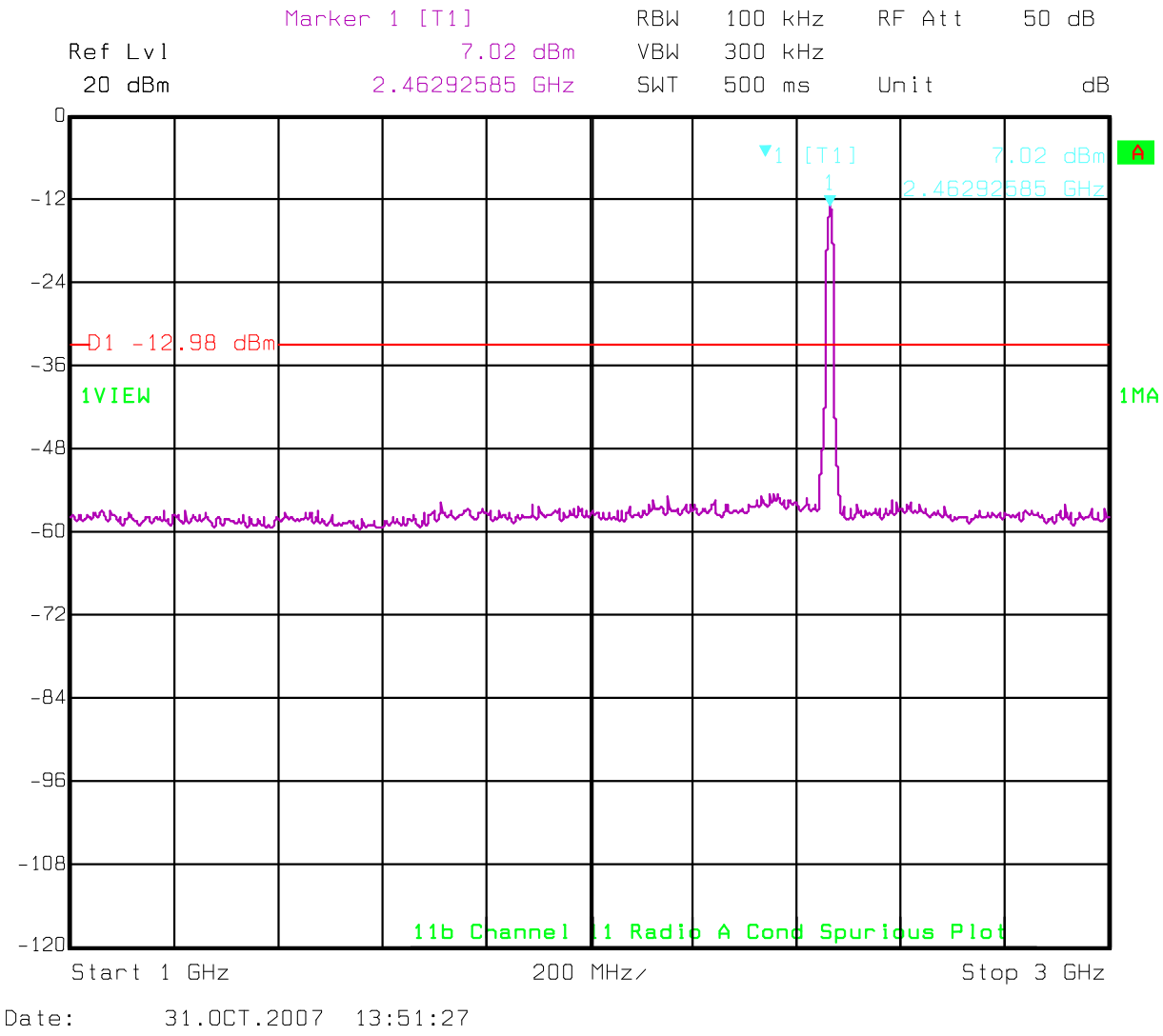

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.44 dBm
VBW 300 kHz
20.4 dBm
18.00000000 GHz
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
A
1MA
11b Channel 6 Radio A Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 30.OCT.2007 10:23:56

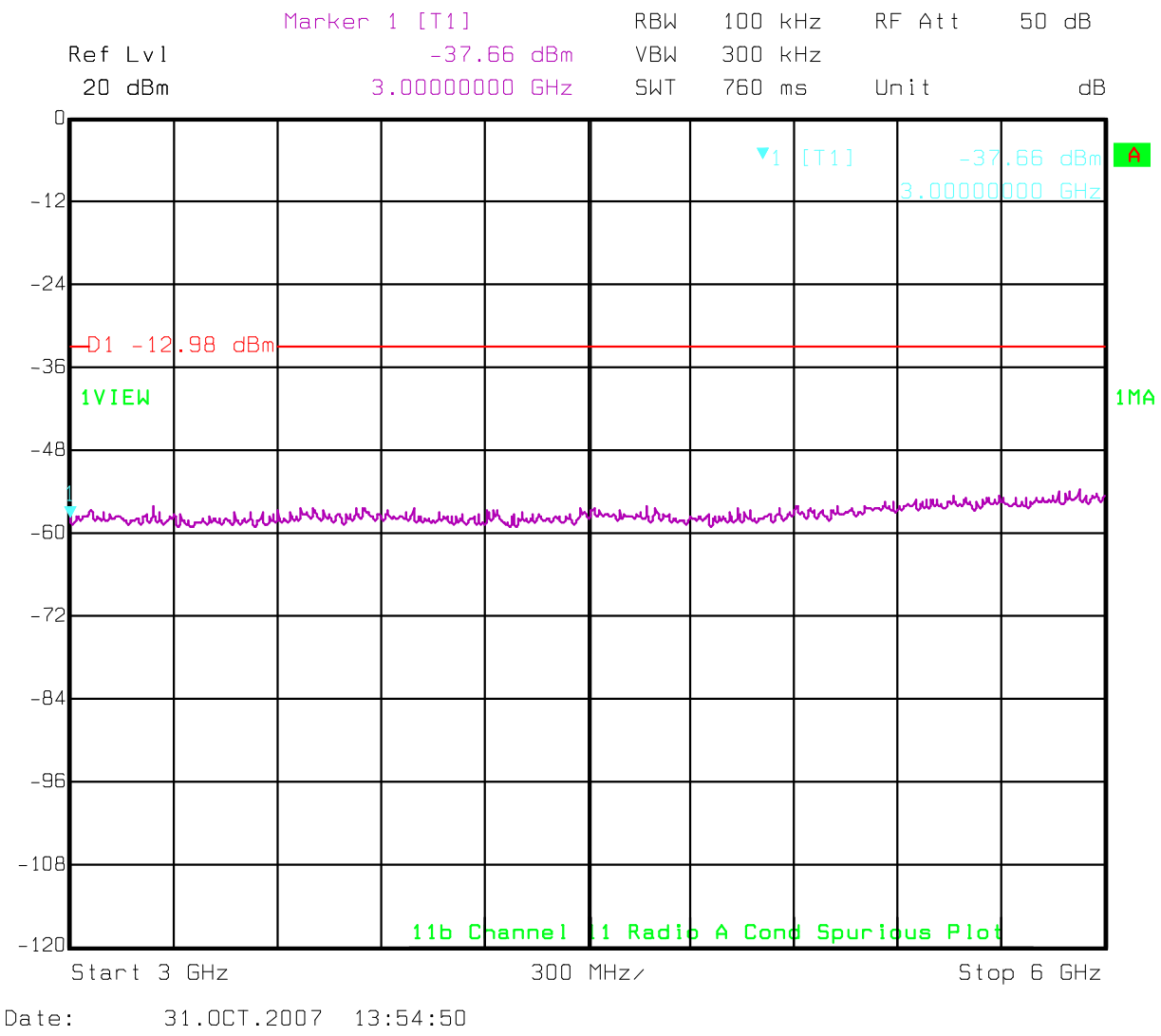

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.90 dBm
VBW 300 kHz
20.4 dBm
22.00000000 GHz
SWT 760 ms
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
A
11b Channel 6 Radio A Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 30.OCT.2007 10:24:50

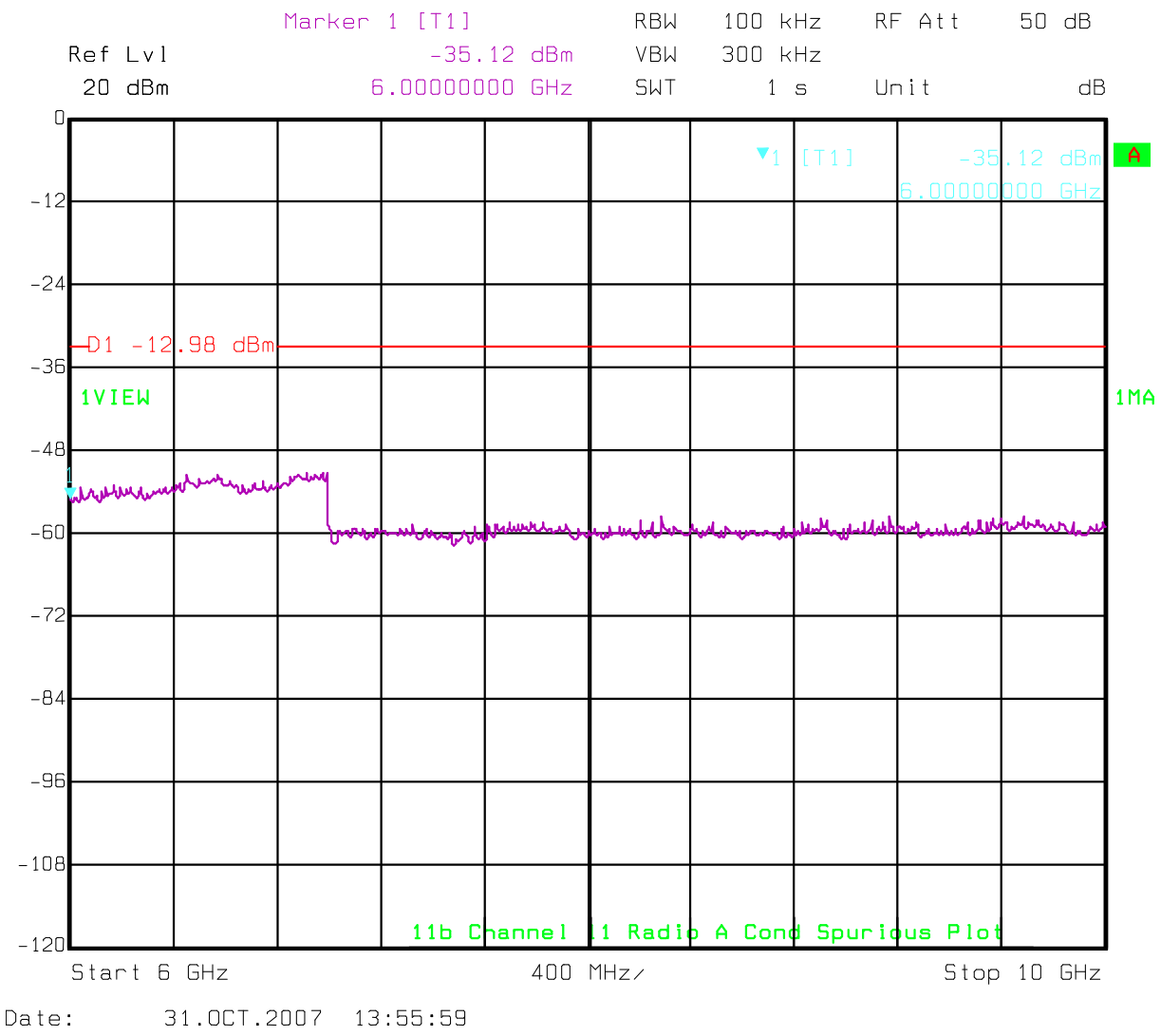
Transceiver A – Channel 11

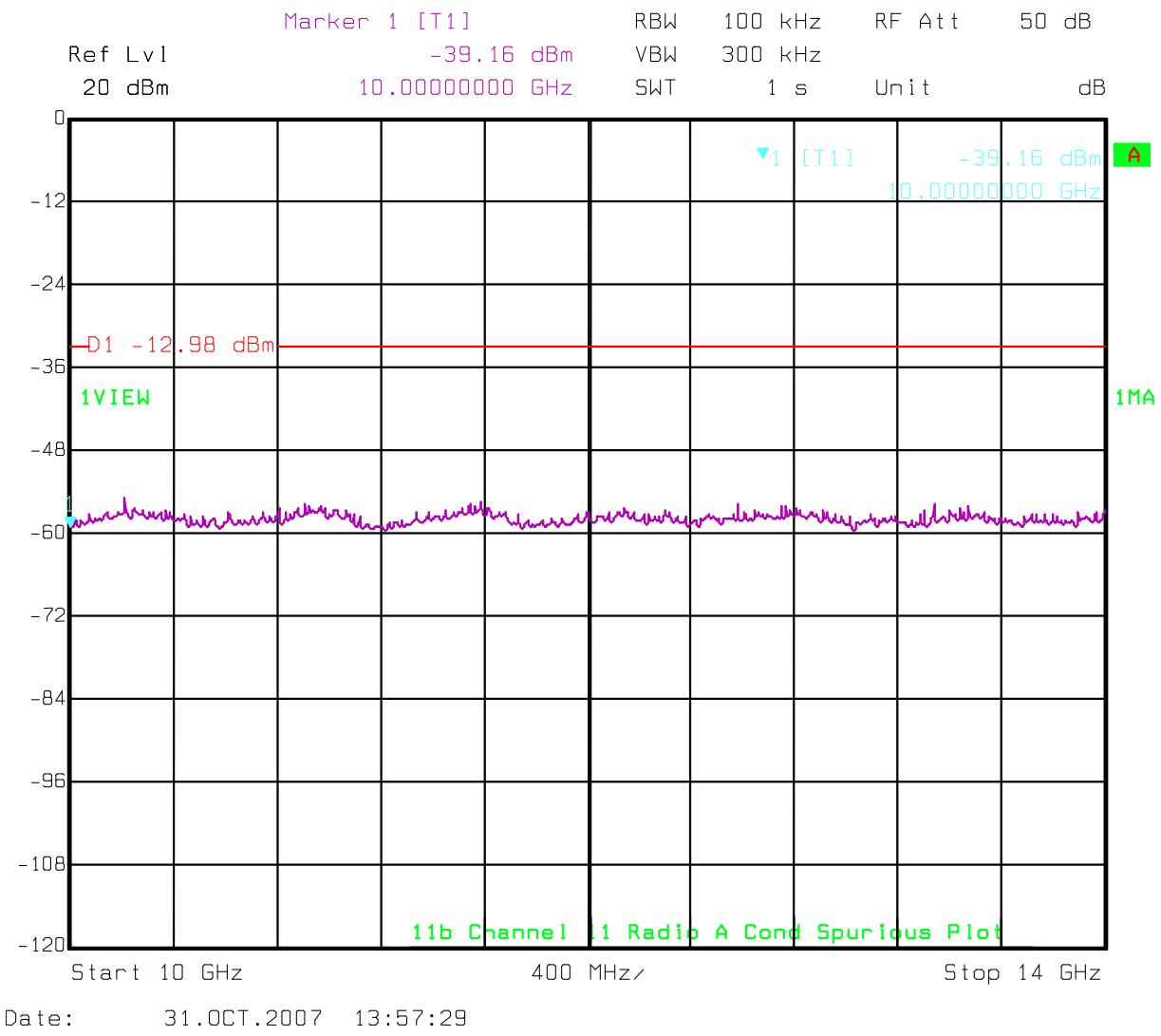


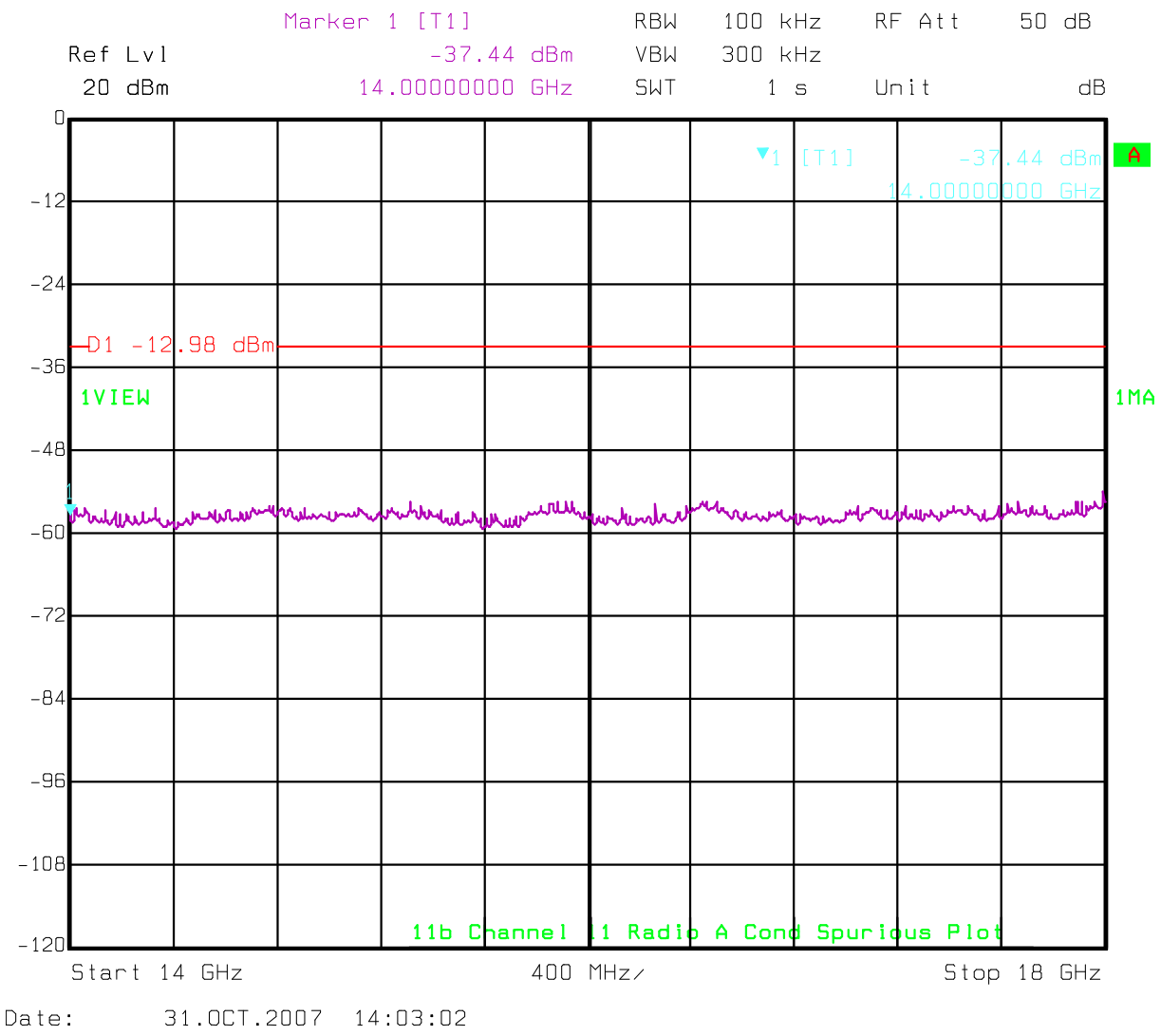

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-41.52 dBm
VBW 300 kHz
20 dBm
300.00000000 MHz
SWT 175 ms
Unit dB
1 [T1] -41.52 dBm
300.00000000 MHz
A
0
-12
-24
D1 -12.98 dBm
-36
1VIEW
1MA
-48
-60
-72
-84
-96
-108
-120
11b Channel 11 Radio A Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 31.OCT.2007 13:53:52

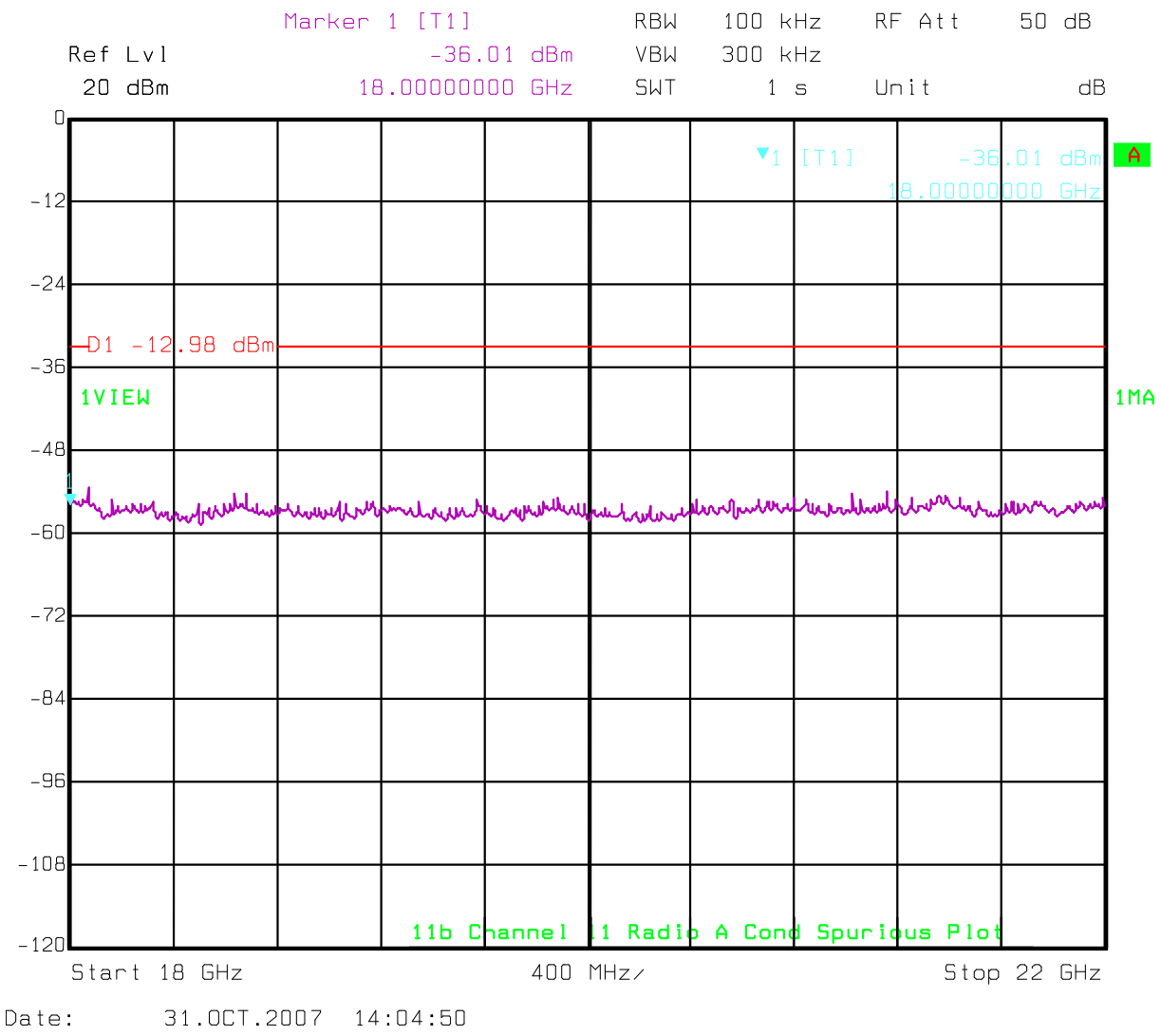

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
7.02 dBm
VBW 300 kHz
20 dBm
2.46292585 GHz
SWT 500 ms
Unit dB
1 [T1]
7.02 dBm
2.46292585 GHz
A
D1 -12.98 dBm
1VIEW
1MA
11b Channel 11 Radio A Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 31.OCT.2007 13:51:27

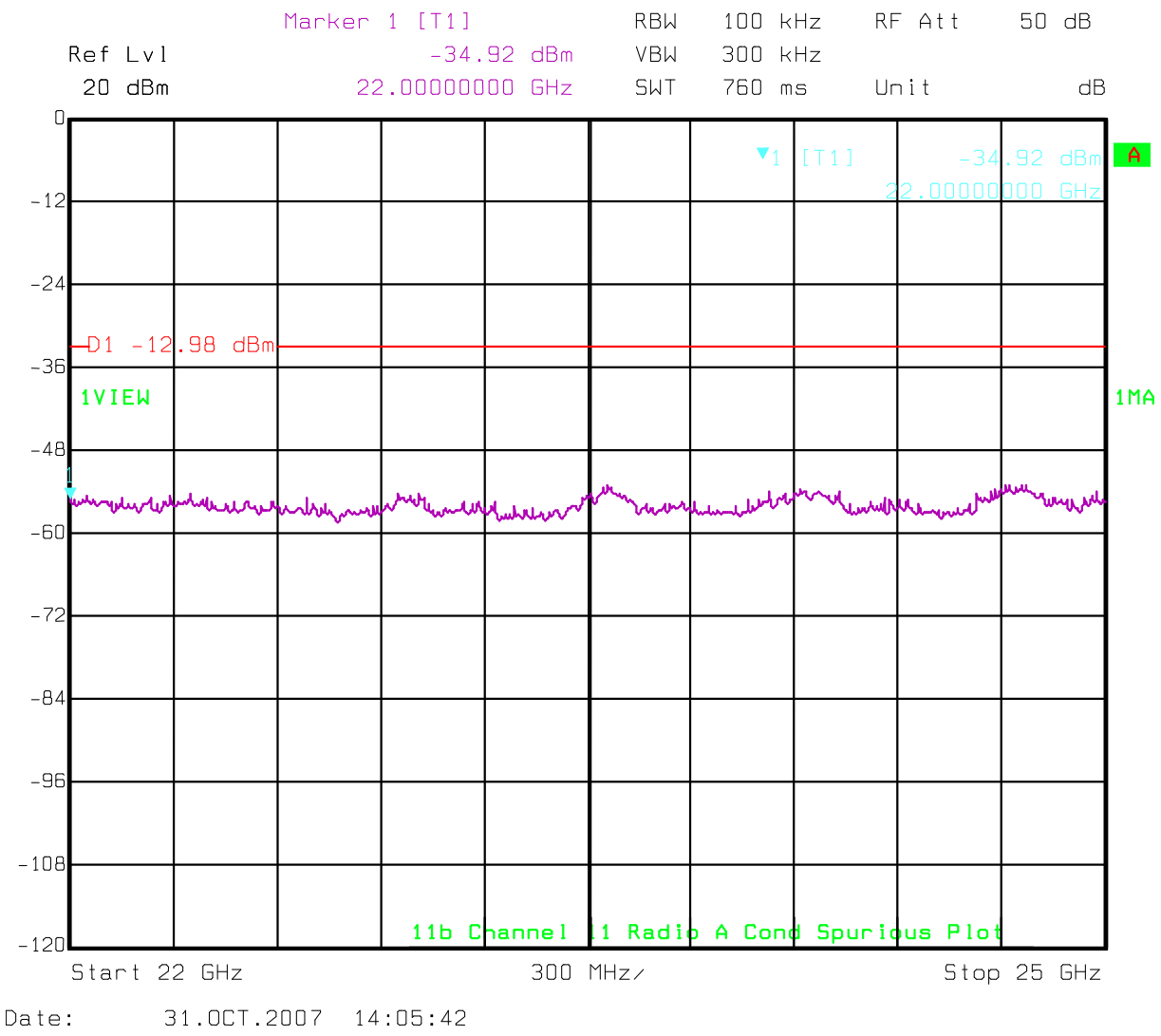

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-37.66 dBm
VBW 300 kHz
20 dBm
3.00000000 GHz
SWT 760 ms
Unit dB
1 [T1]
-37.66 dBm
3.00000000 GHz
A
D1 -12.98 dBm
1VIEW
1MA
11b Channel 11 Radio A Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 31.OCT.2007 13:54:50


Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-35.12 dBm
VBW 300 kHz
20 dBm
6.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-35.12 dBm
6.00000000 GHz
A
0
-12
-24
D1 -12.98 dBm
-36
1VIEW
1MA
-48
-60
-72
-84
-96
-108
-120
11b Channel 11 Radio A Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 31.OCT.2007 13:55:59

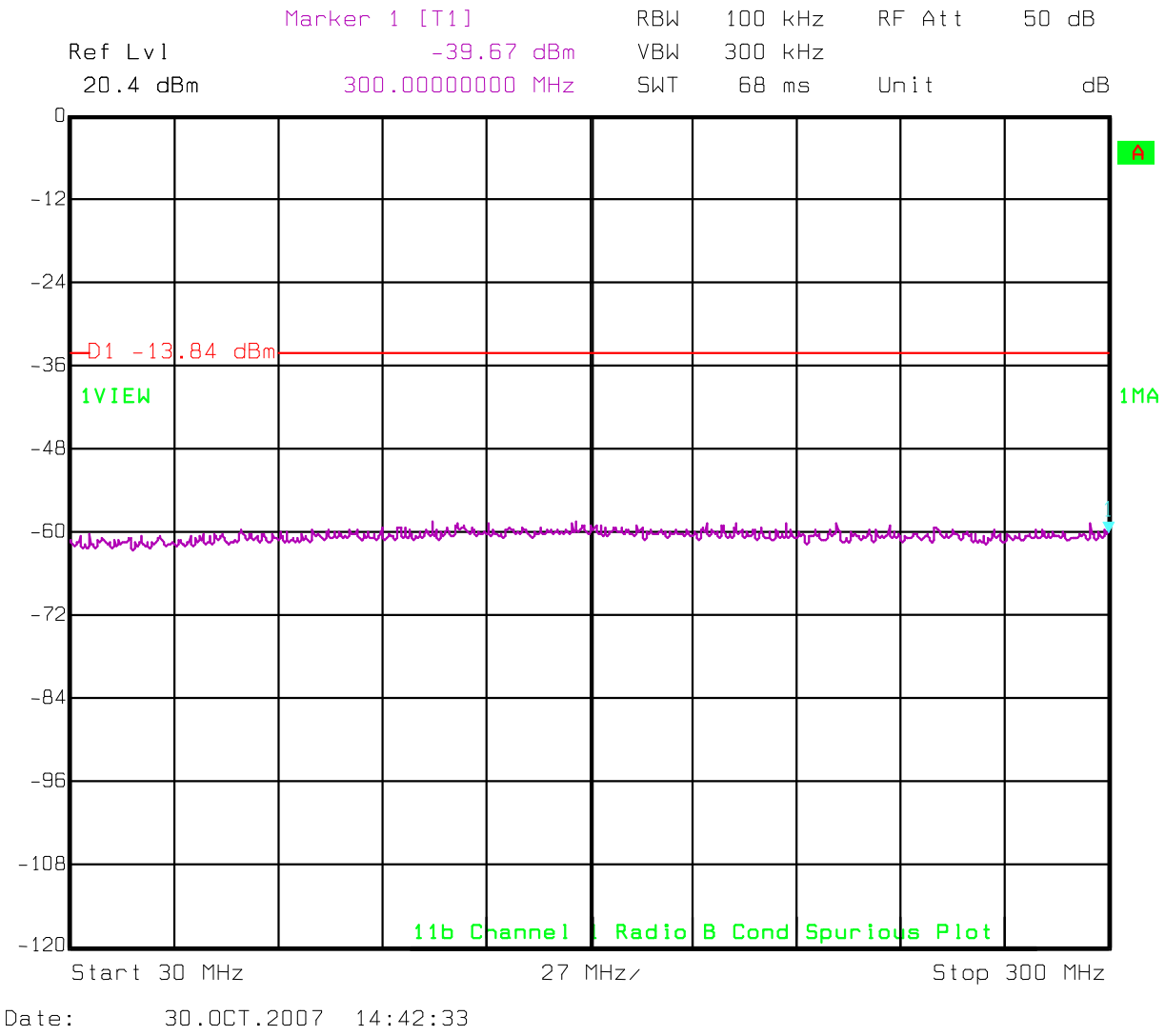

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-39.16 dBm
VBW 300 kHz
20 dBm
10.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-39.16 dBm
10.00000000 GHz
A
D1 -12.98 dBm
1VIEW
1MA
11b Channel 11 Radio A Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 31.OCT.2007 13:57:29

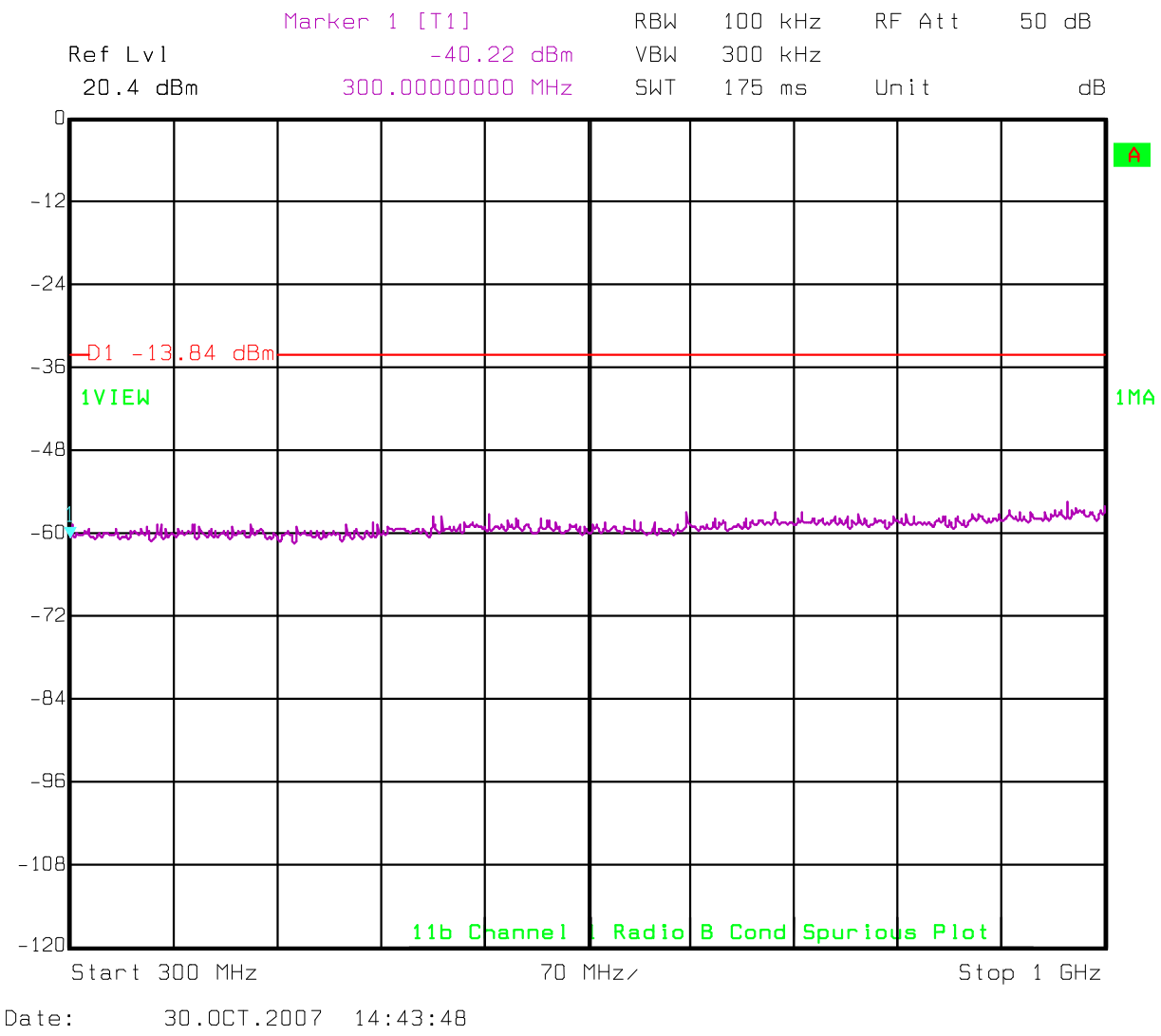

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-37.44 dBm
VBW 300 kHz
20 dBm
14.00000000 GHz
SWT 1 s
Unit dB
1 [T1] -37.44 dBm
14.00000000 GHz
A
D1 -12.98 dBm
1VIEW
1MA
11b Channel 11 Radio A Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 31.OCT.2007 14:03:02

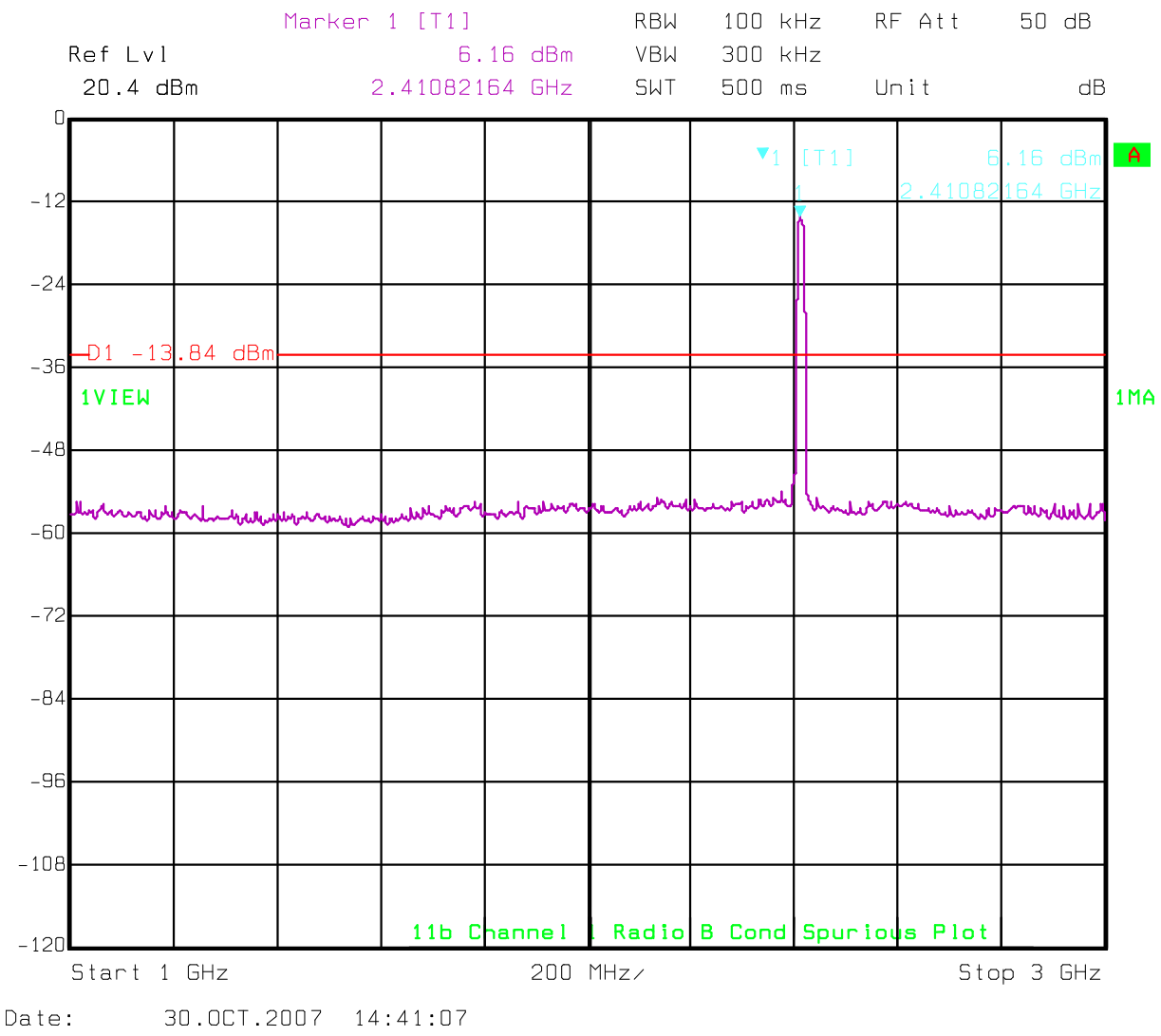

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-36.01 dBm
VBW 300 kHz
20 dBm
18.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-36.01 dBm
18.00000000 GHz
A
D1 -12.98 dBm
1VIEW
1MA
11b Channel 11 Radio A Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 31.OCT.2007 14:04:50

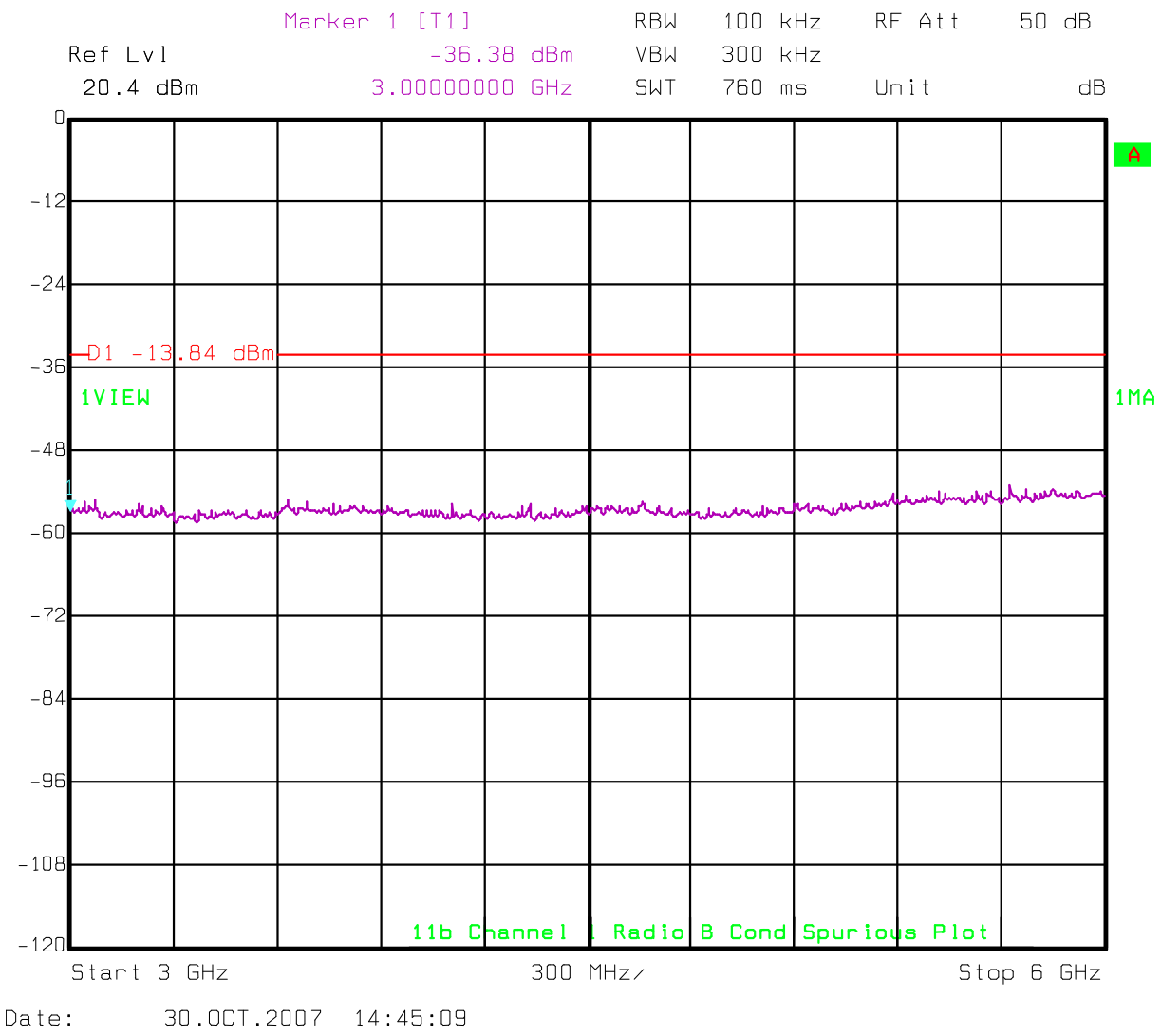

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.92 dBm
VBW 300 kHz
20 dBm
22.00000000 GHz
SWT 760 ms
Unit dB
1 [T1] -34.92 dBm
22.00000000 GHz
A
0
-12
-24
D1 -12.98 dBm
-36
1VIEW
1MA
-48
-60
-72
-84
-96
-108
-120
11b Channel 11 Radio A Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 31.OCT.2007 14:05:42

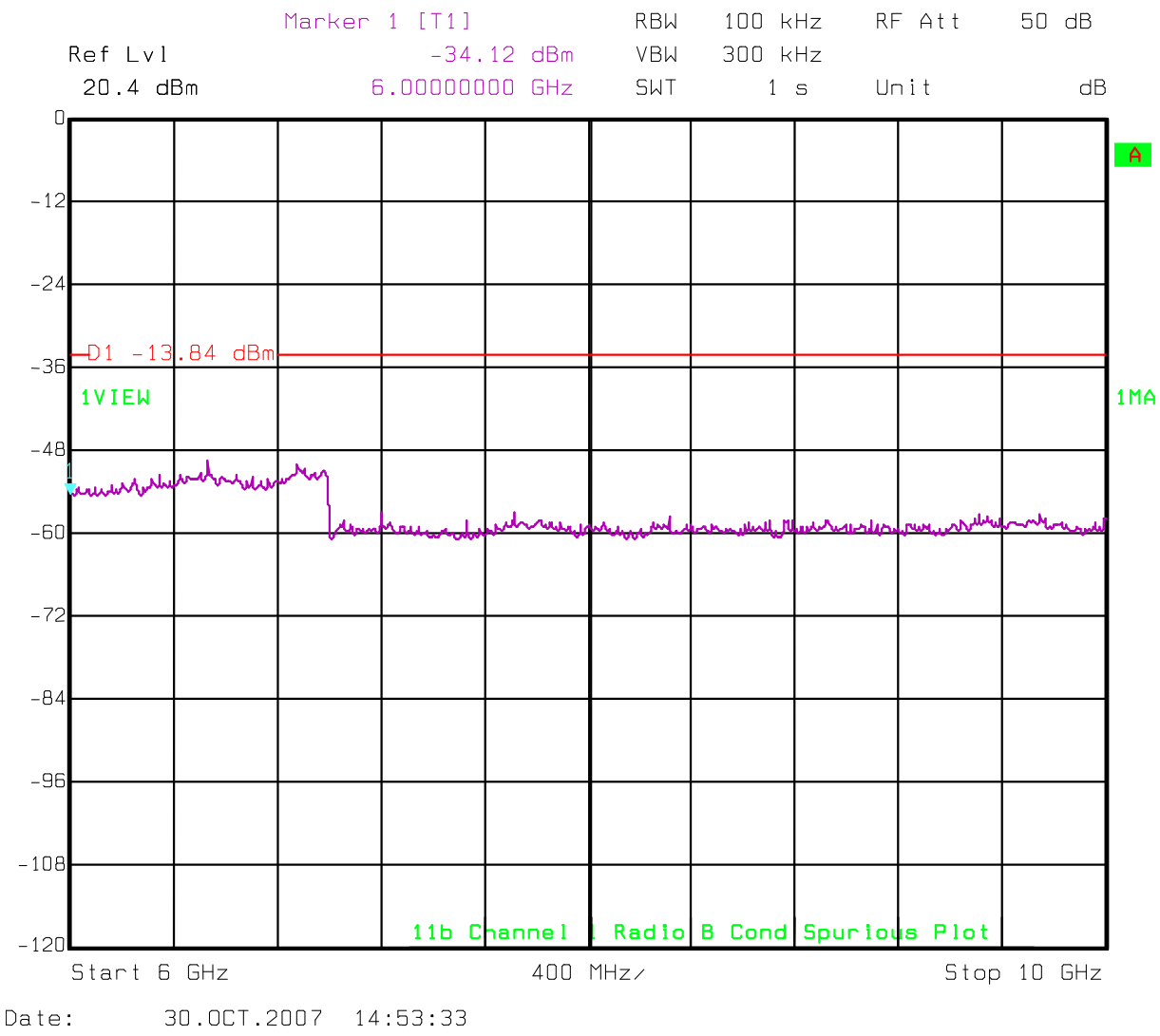
Transceiver B – Channel 1

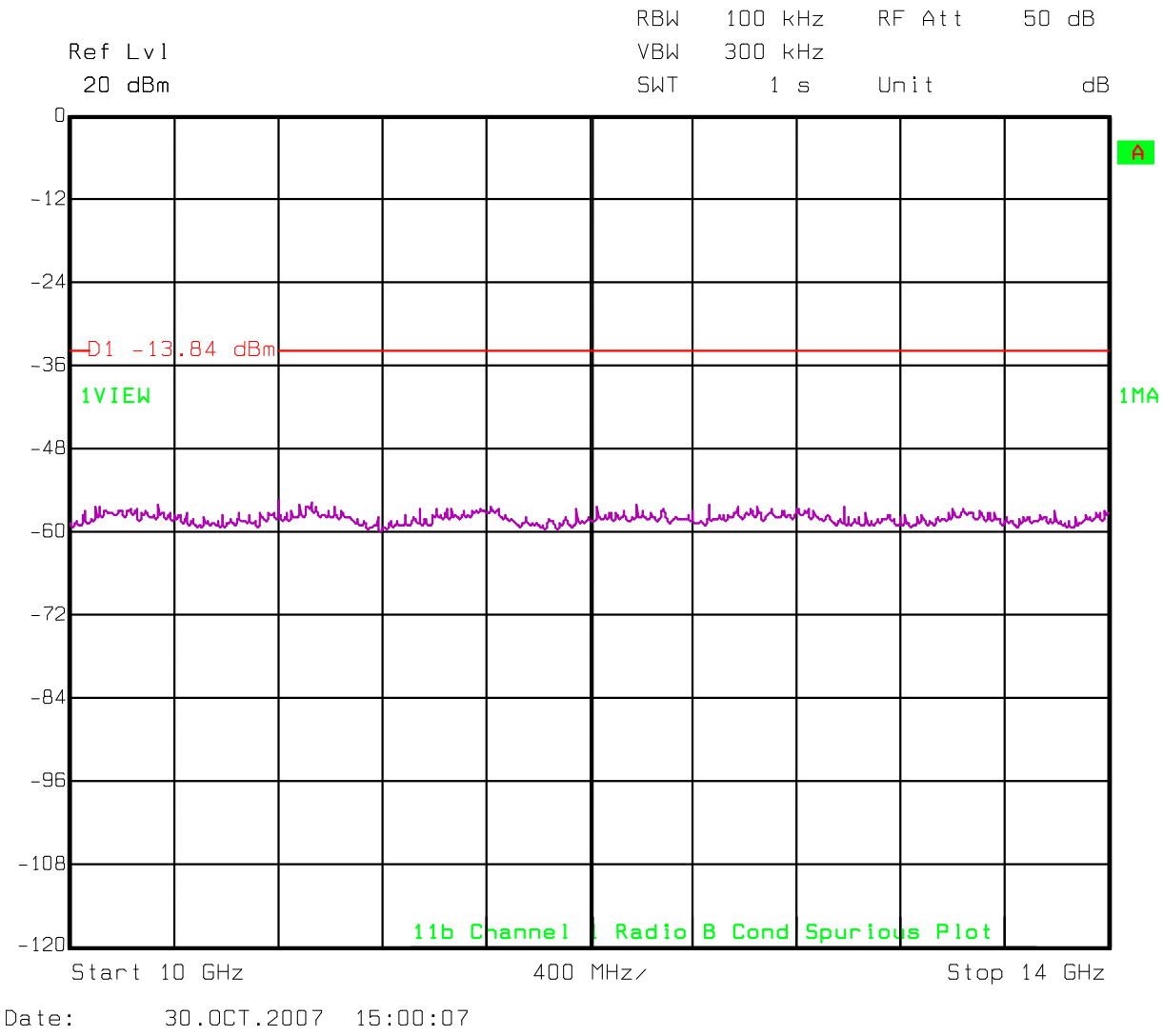


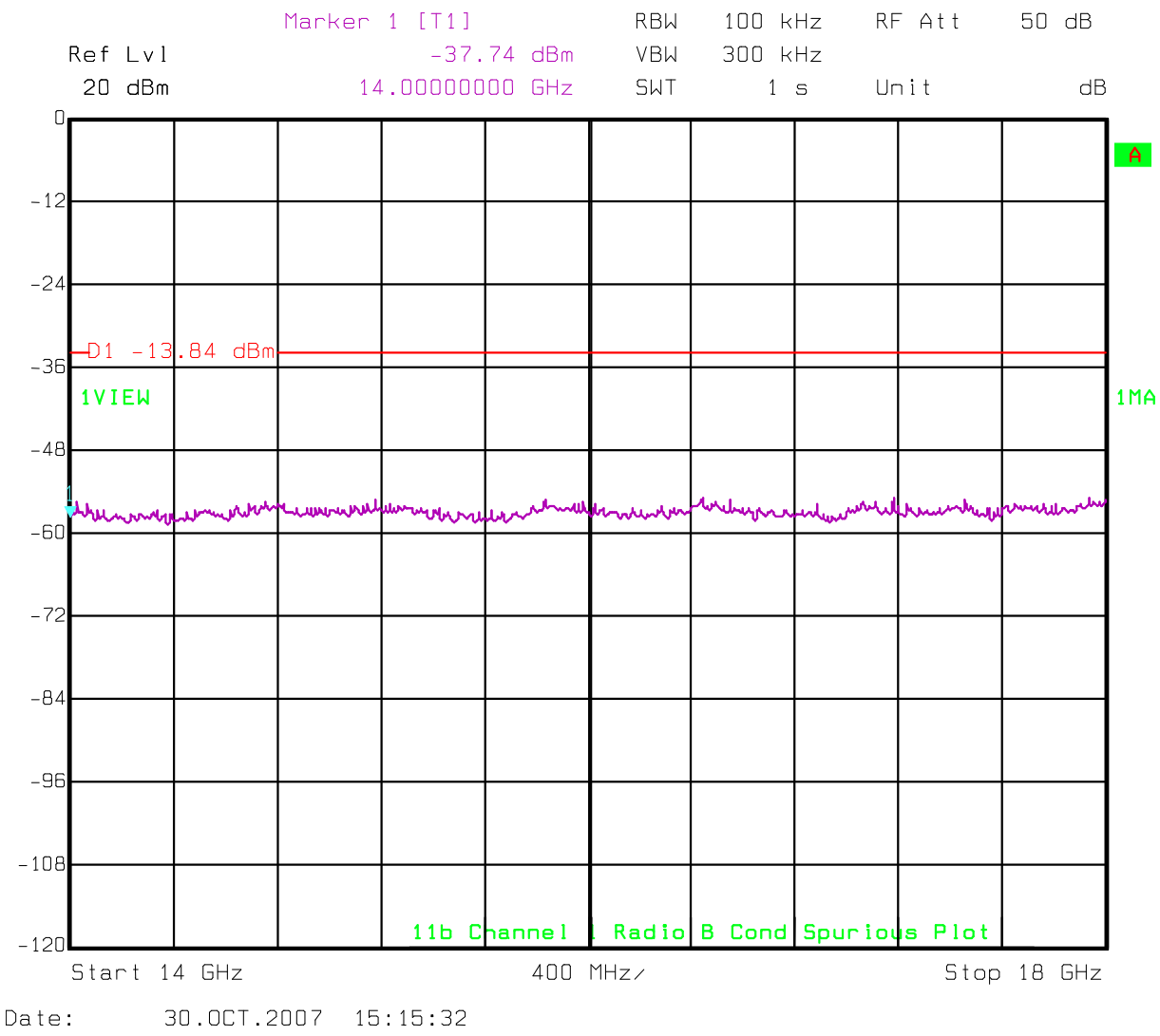

Marker 1 [T1]
-40.22 dBm
300.00000000 MHz
RBW 100 kHz
VBW 300 kHz
SWT 175 ms
RF Att 50 dB
Unit dB
Ref Lvl
20.4 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.84 dBm
1VIEW
1MA
A
11b Channel | Radio B Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 30.OCT.2007 14:43:48

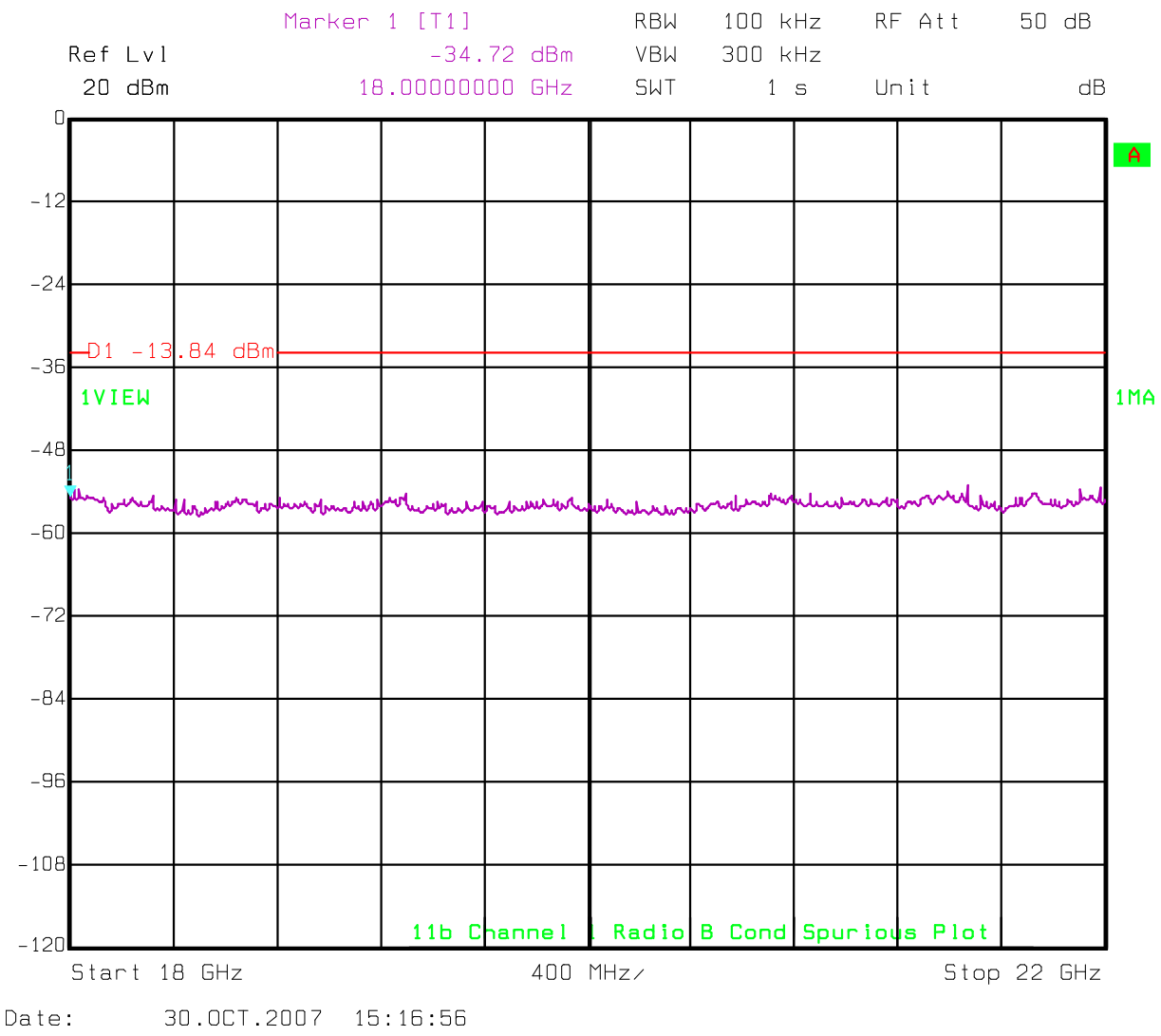

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
6.16 dBm
VBW 300 kHz
20.4 dBm
2.41082164 GHz
SWT 500 ms
Unit dB
1 [T1]
6.16 dBm
2.41082164 GHz
A
D1 -13.84 dBm
1VIEW
1MA
11b Channel | Radio B Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 30.OCT.2007 14:41:07

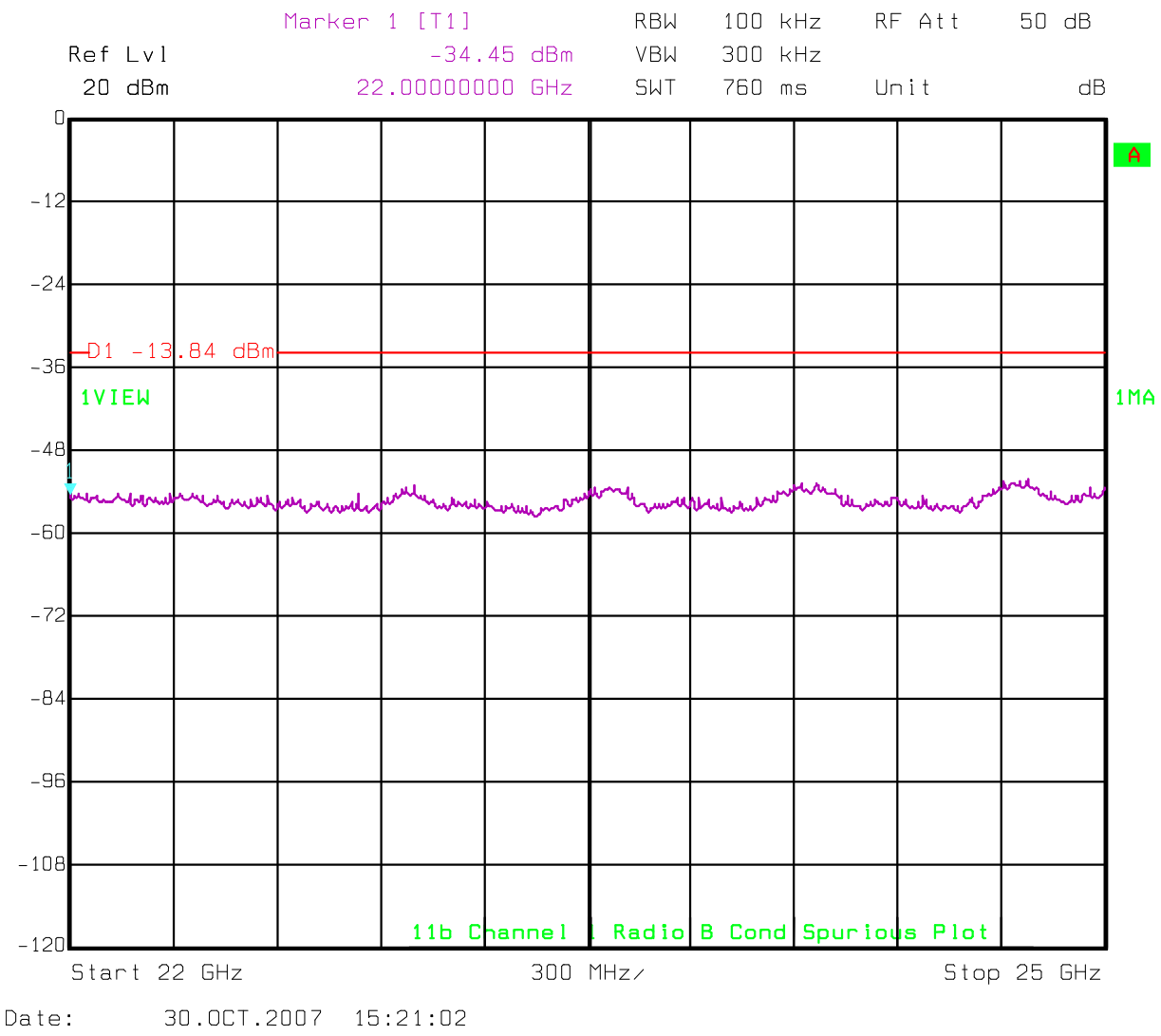

Marker 1 [T1]
-36.38 dBm
3.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20.4 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.84 dBm
1VIEW
A
1MA
11b Channel | Radio B Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 30.OCT.2007 14:45:09


Marker 1 [T1]
-34.12 dBm
6.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20.4 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.84 dBm
1VIEW
1MA
A
11b Channel | Radio B Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 30.OCT.2007 14:53:33

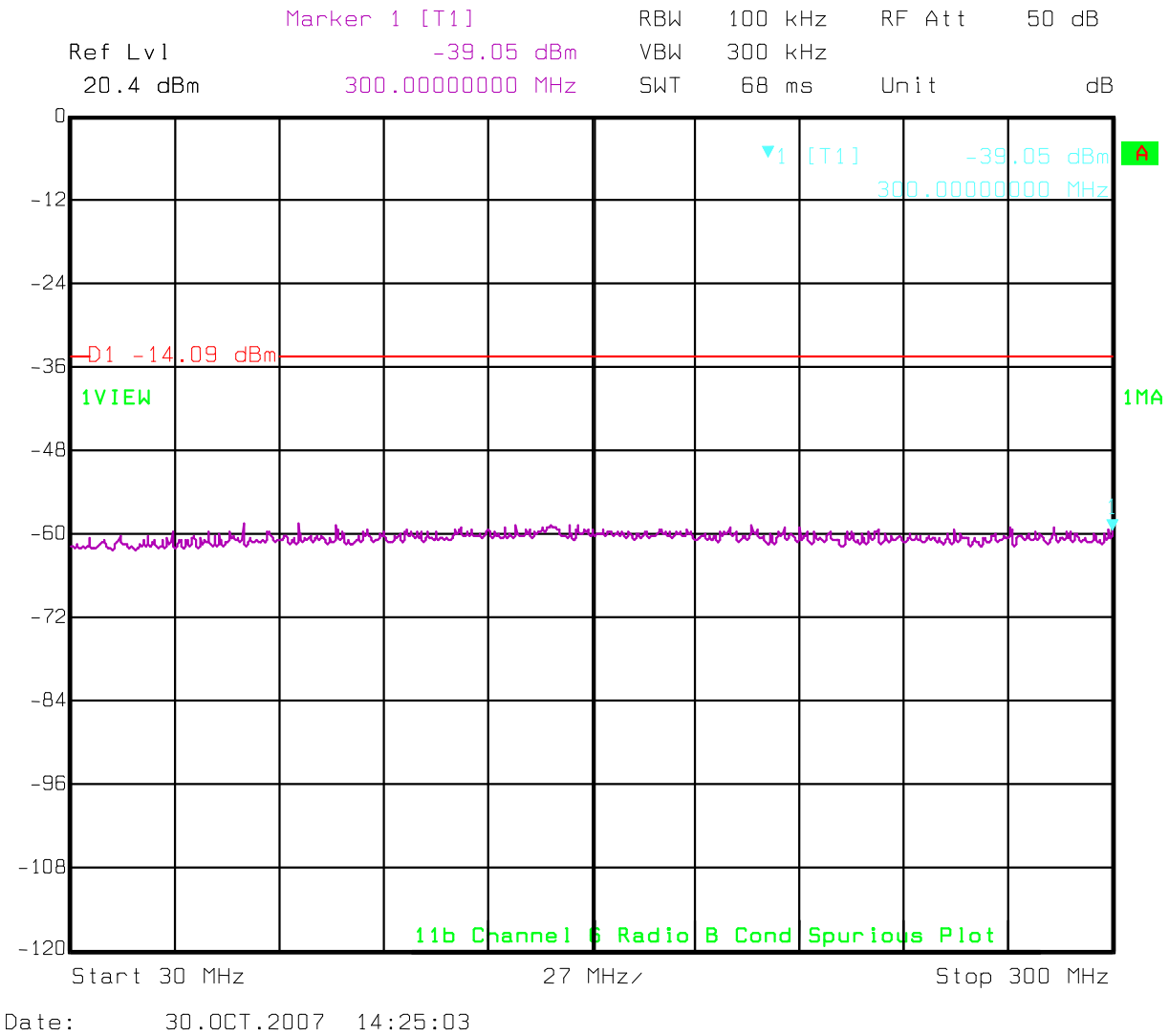

RBW 100 kHz
RF Att 50 dB
Ref Lvl
VBW 300 kHz
20 dBm
SWT 1 s
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
A
D1 -13.84 dBm
1VIEW
1MA
11b Channel | Radio B Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 30.OCT.2007 15:00:07

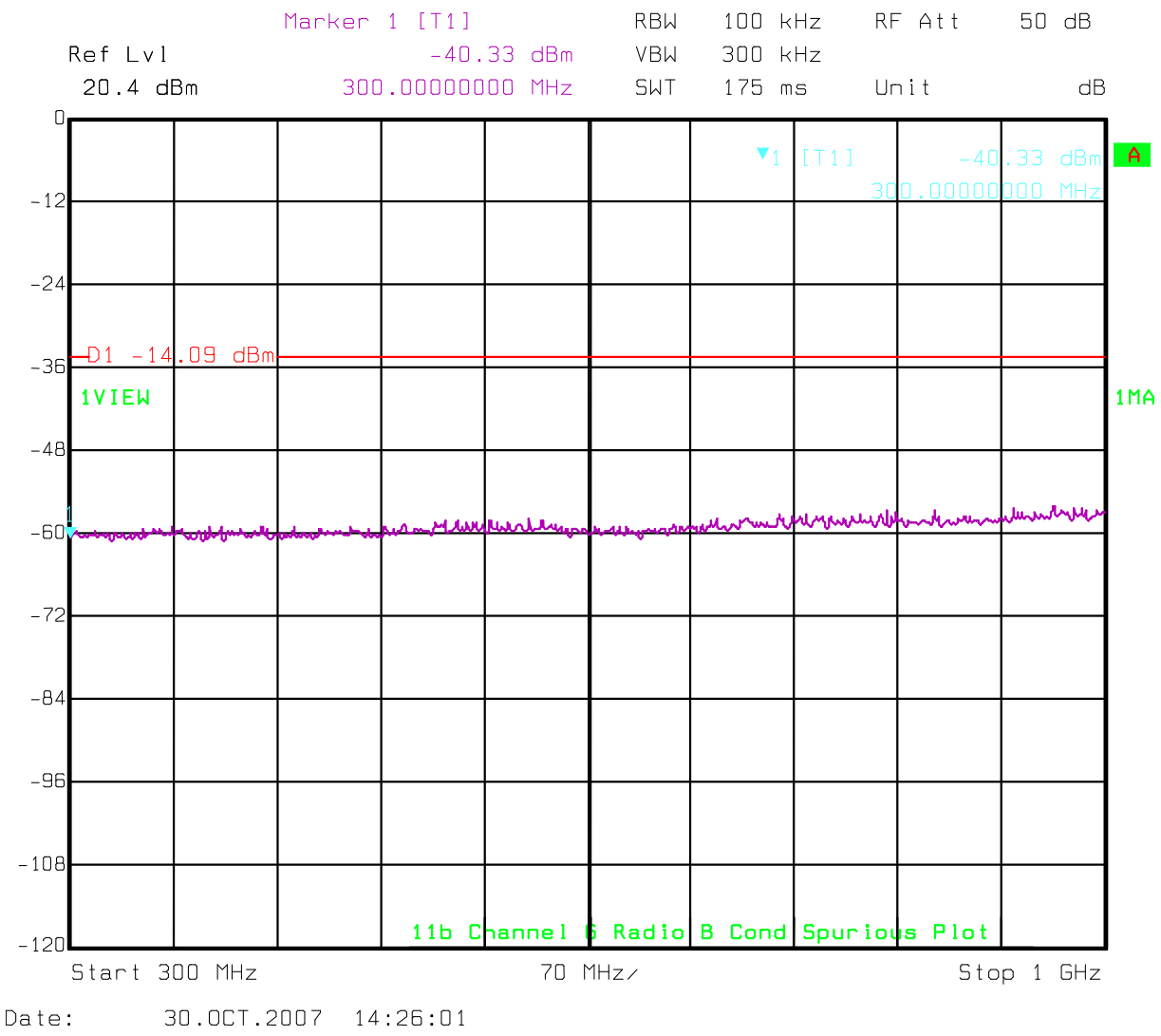

Marker 1 [T1]
-37.74 dBm
14.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.84 dBm
1VIEW
1MA
A
11b Channel | Radio B Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 30.OCT.2007 15:15:32

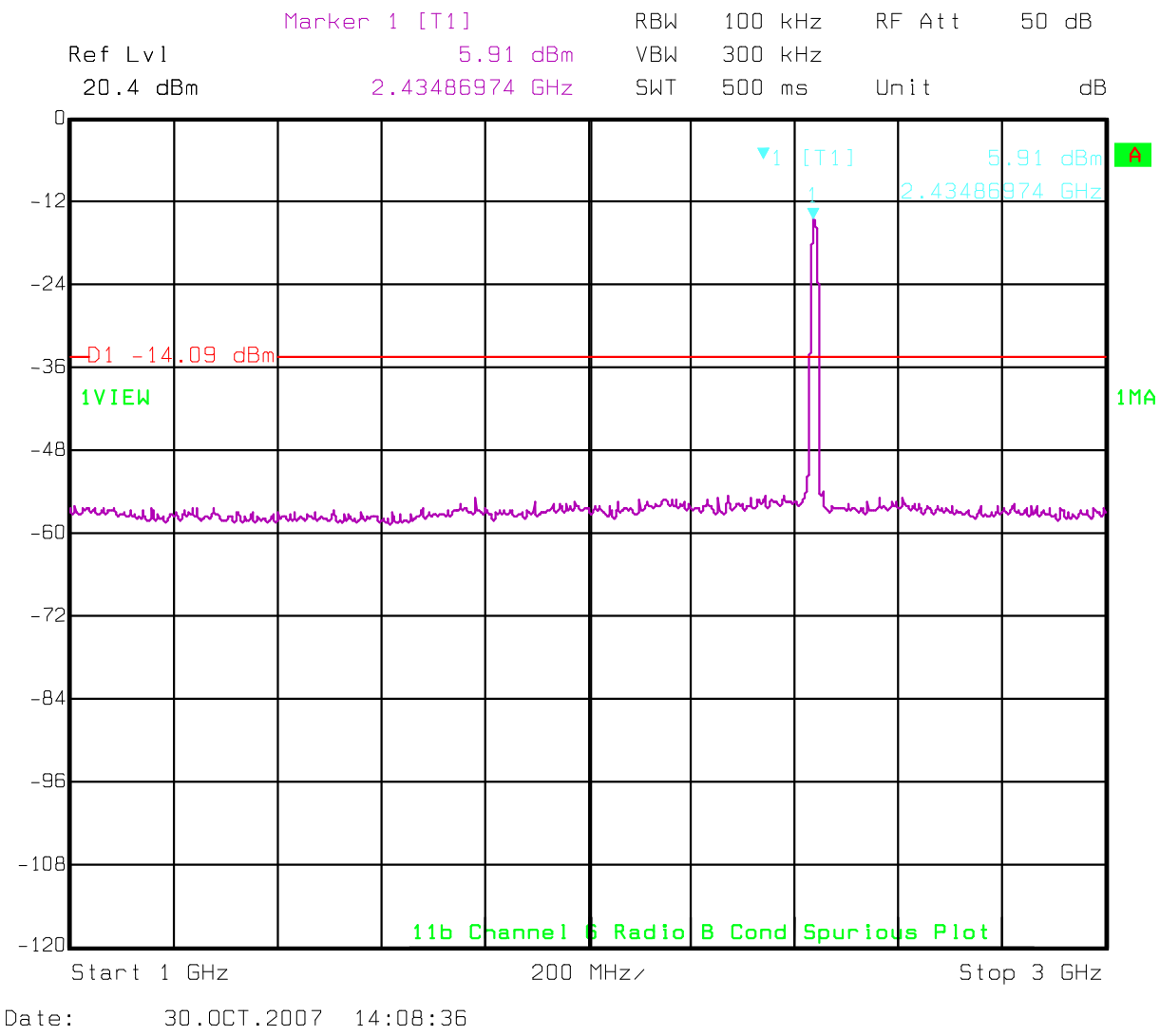

Marker 1 [T1]
-34.72 dBm
18.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.84 dBm
1VIEW
1MA
A
11b Channel | Radio B Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 30.OCT.2007 15:16:56

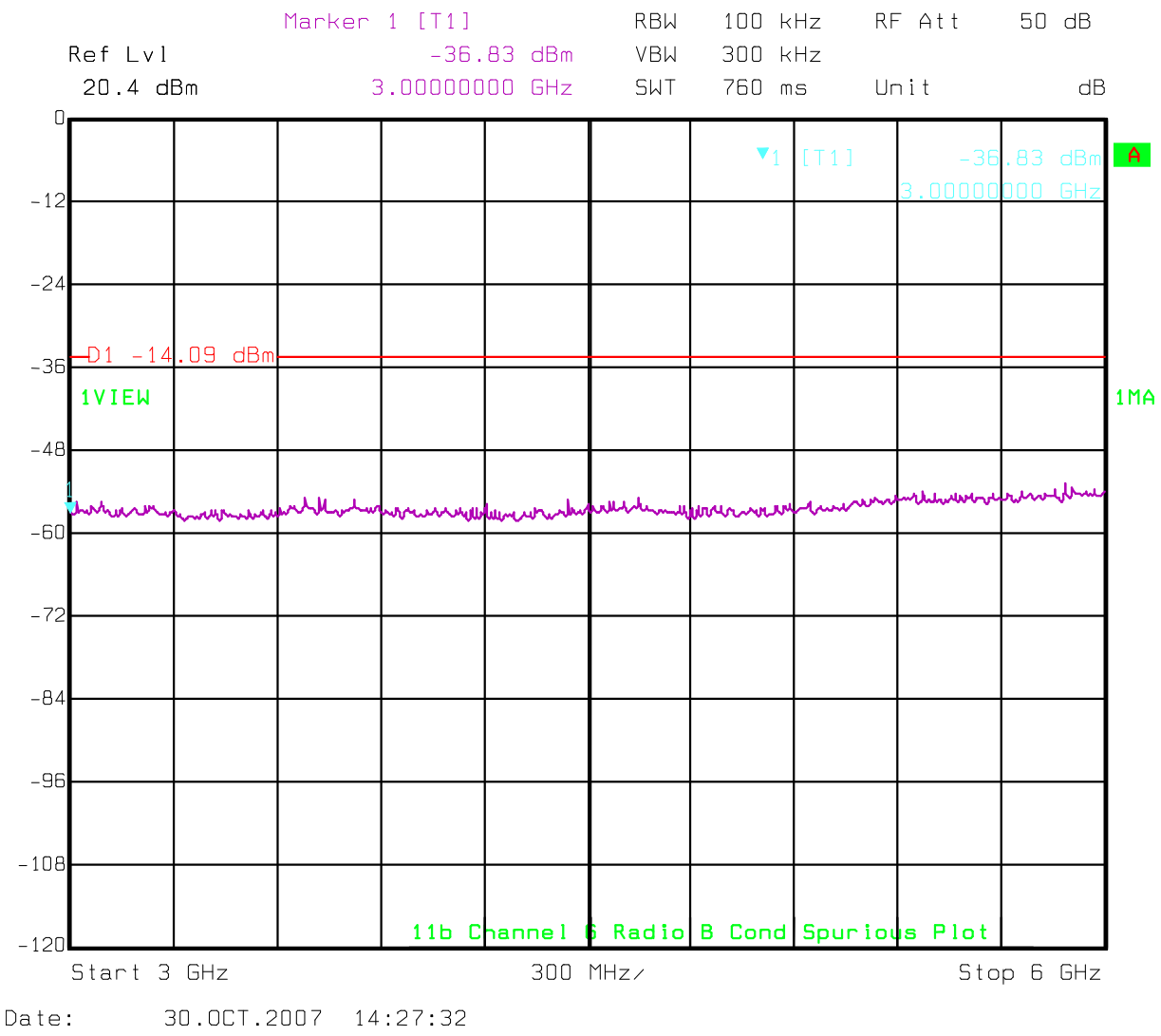

Marker 1 [T1]
-34.45 dBm
22.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.84 dBm
1VIEW
1MA
A
11b Channel | Radio B Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 30.OCT.2007 15:21:02

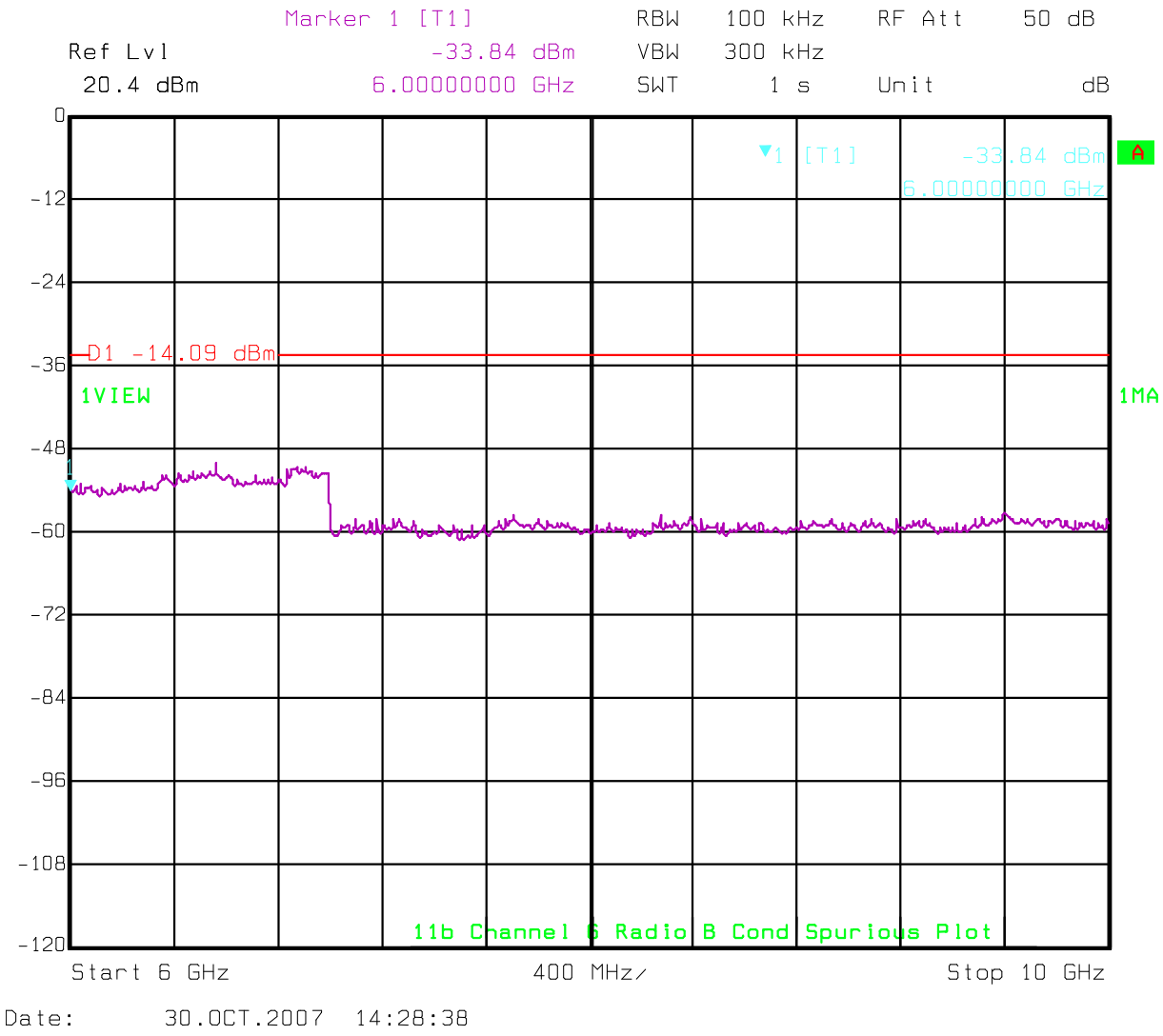
Transceiver B – Channel 6

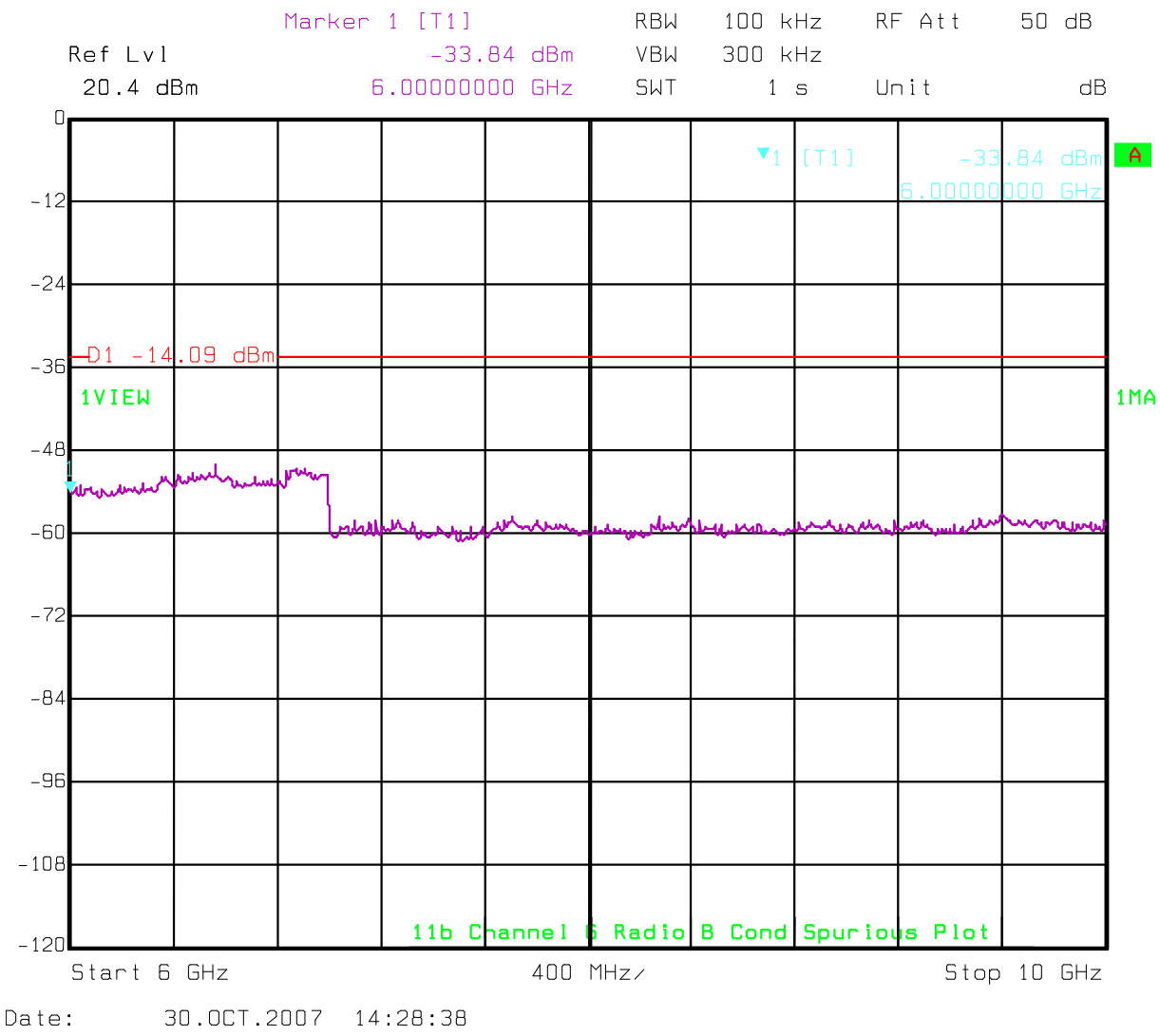


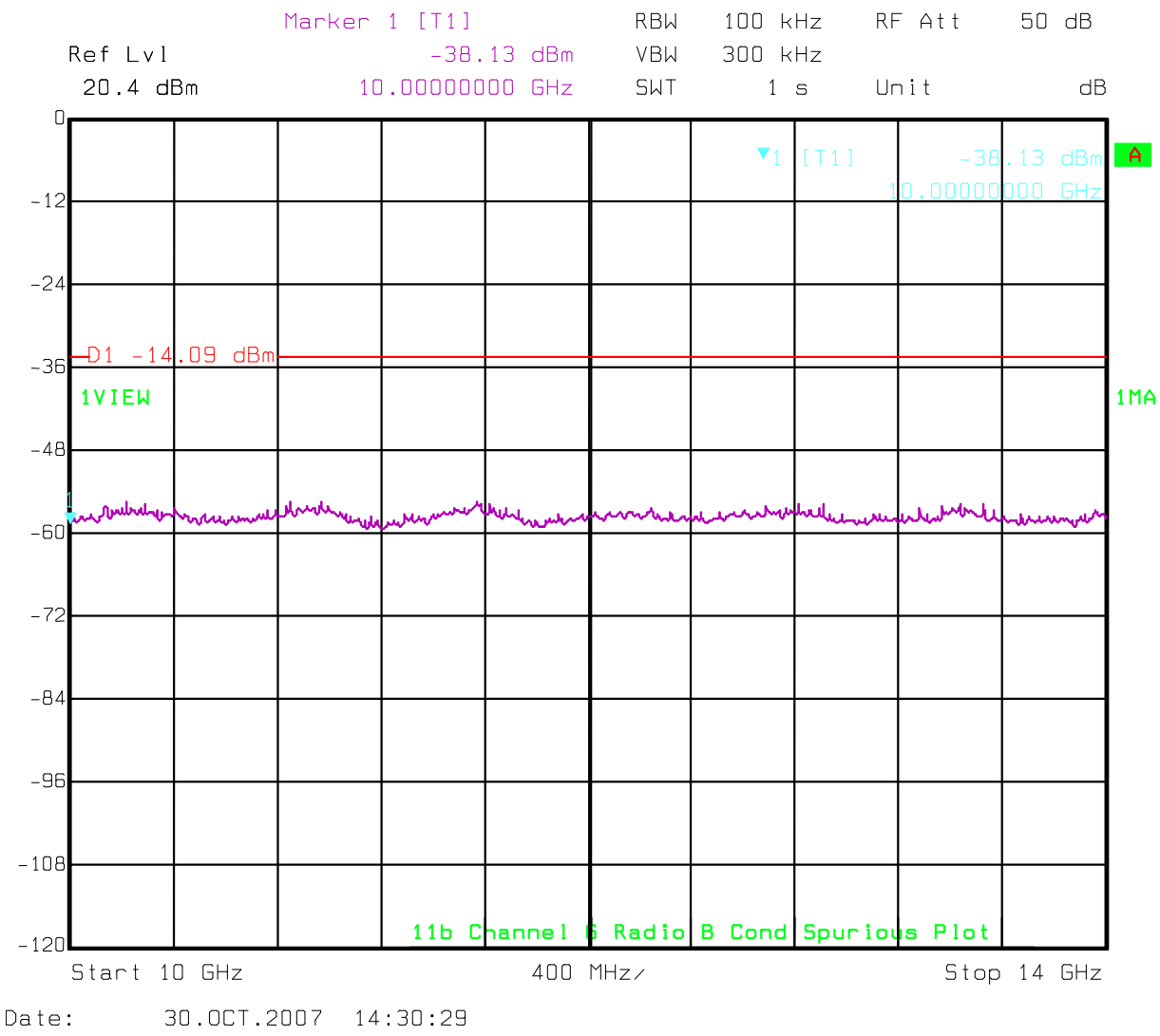

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-40.33 dBm
VBW 300 kHz
20.4 dBm
300.00000000 MHz
SWT 175 ms
Unit dB
1 [T1] -40.33 dBm
300.00000000 MHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 30.OCT.2007 14:26:01

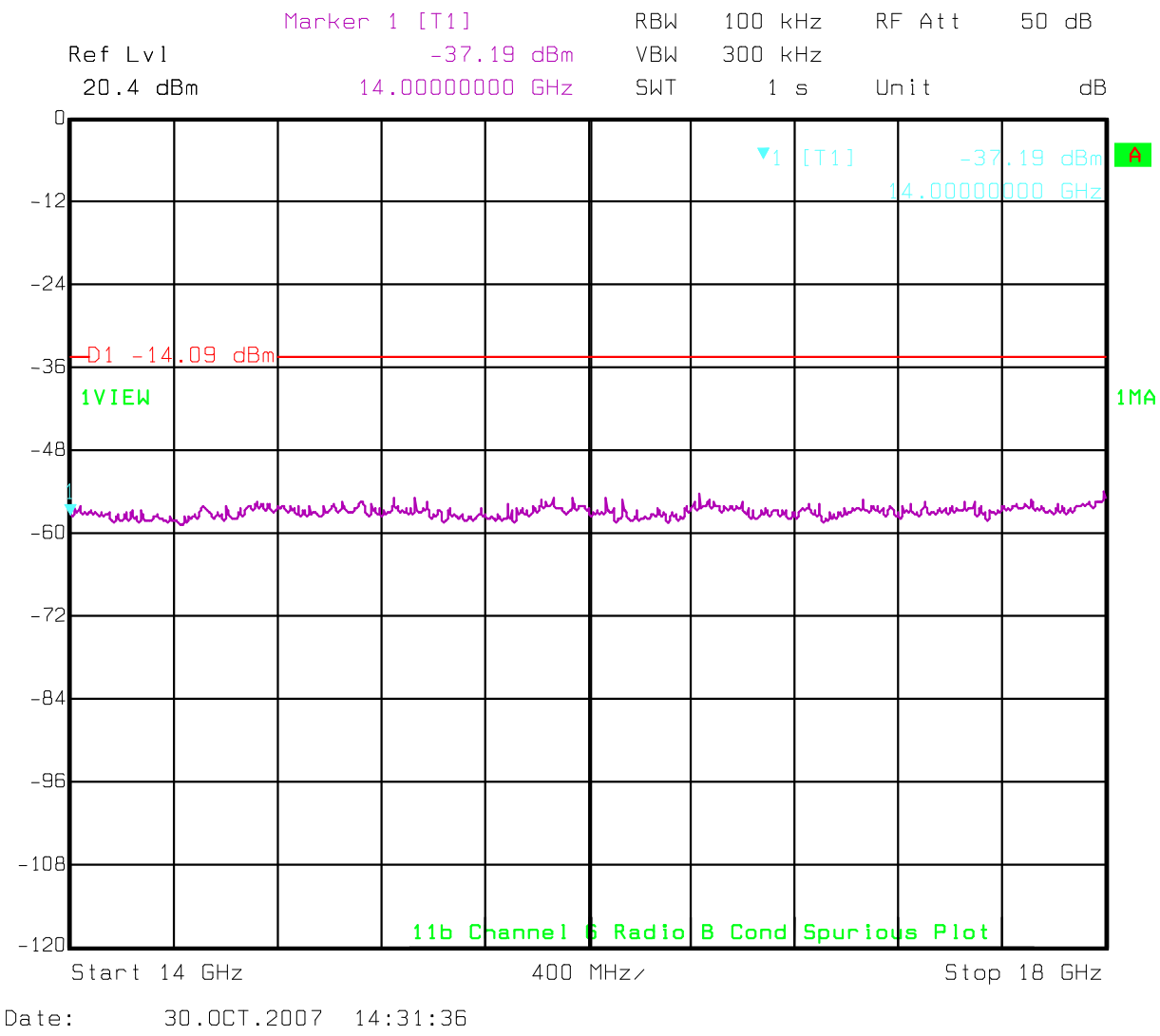

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
5.91 dBm
VBW 300 kHz
20.4 dBm
2.43486974 GHz
SWT 500 ms
Unit dB
1 [T1]
5.91 dBm
2.43486974 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 30.OCT.2007 14:08:36

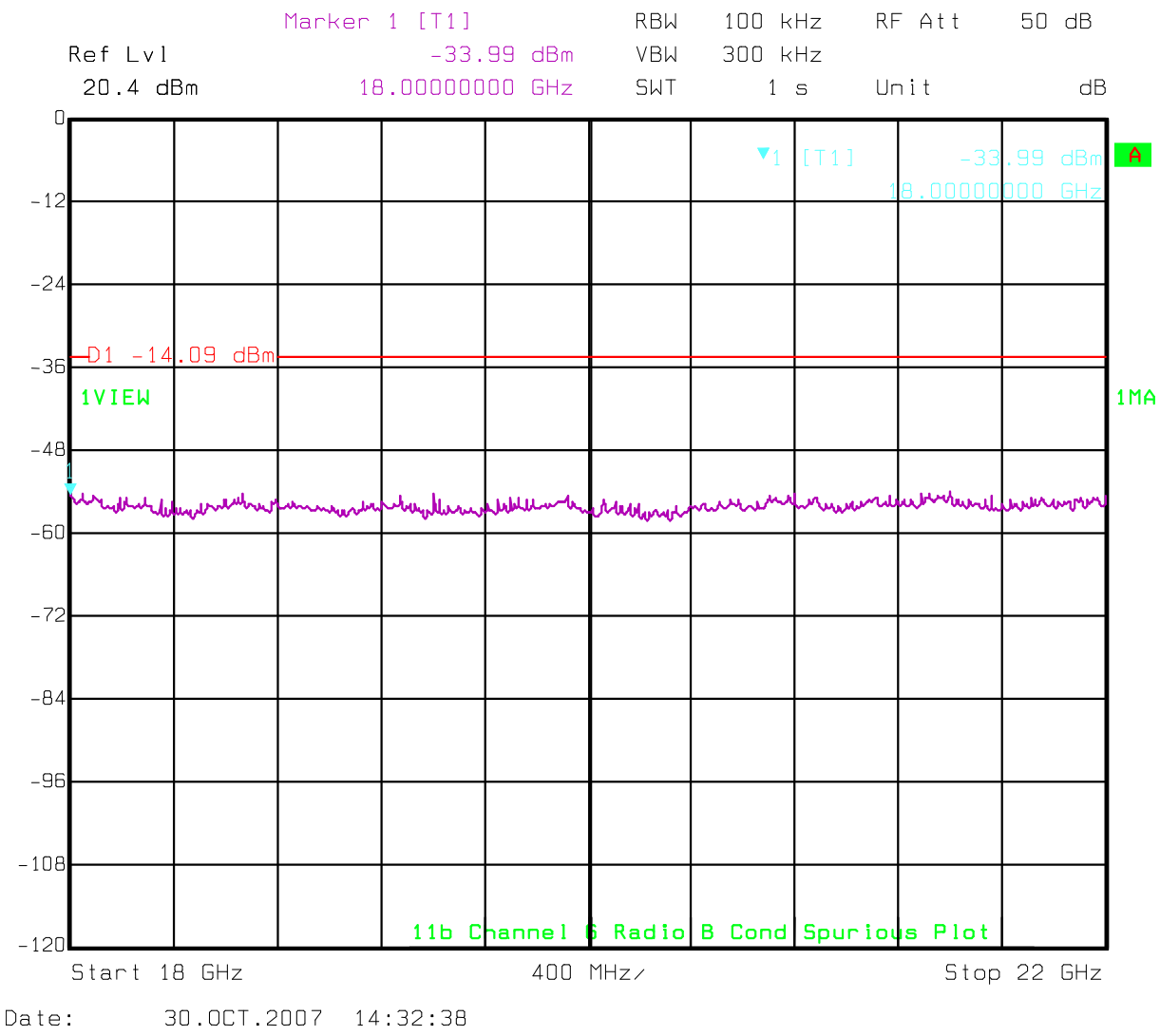

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-36.83 dBm
VBW 300 kHz
20.4 dBm
3.00000000 GHz
SWT 760 ms
Unit dB
1 [T1]
-36.83 dBm
3.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 30.OCT.2007 14:27:32

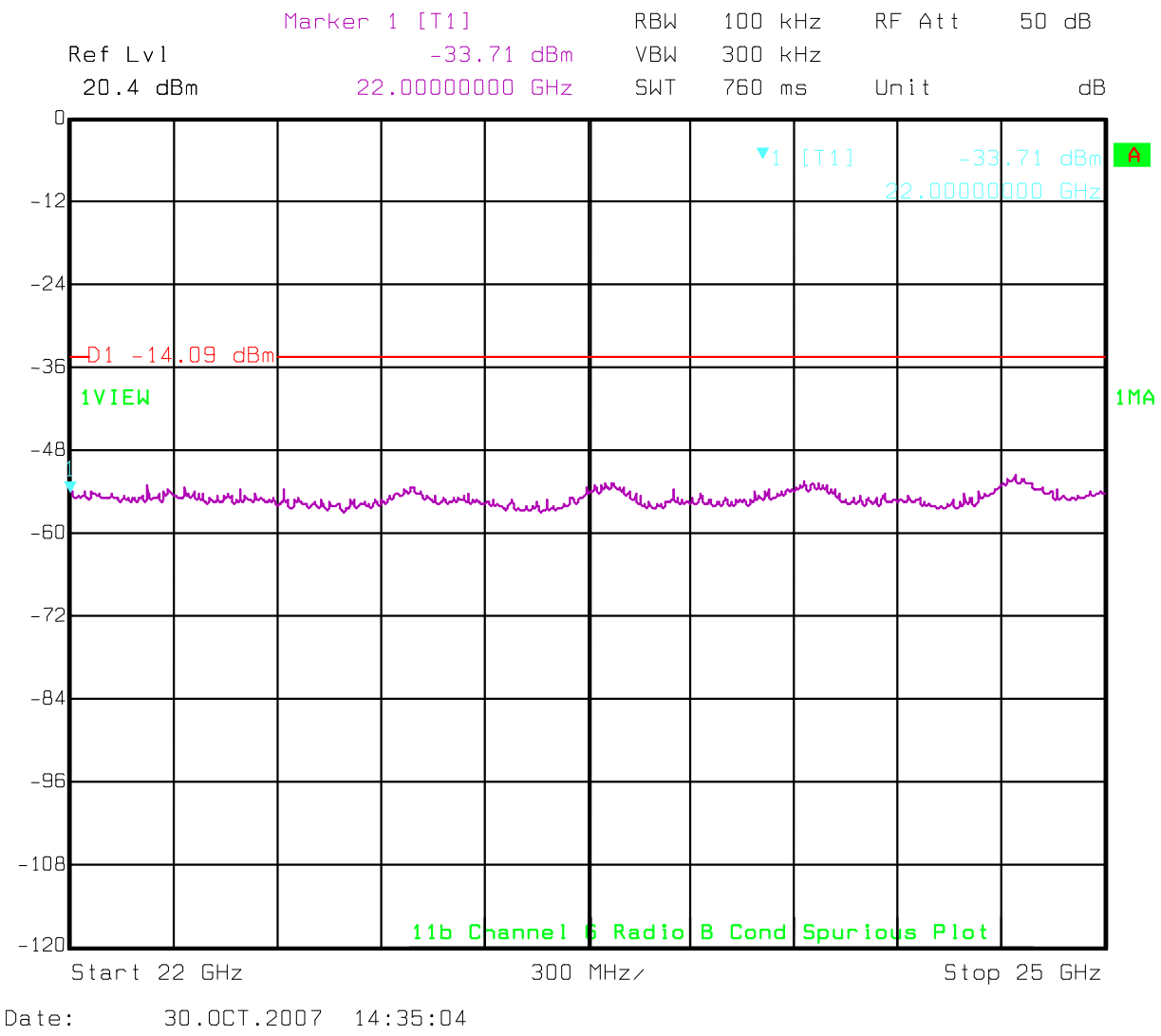

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-33.84 dBm
VBW 300 kHz
20.4 dBm
6.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-33.84 dBm
6.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
11b Channel 6 Radio B Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 30.OCT.2007 14:28:38


Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-33.84 dBm
VBW 300 kHz
20.4 dBm
6.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-33.84 dBm
6.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 30.OCT.2007 14:28:38

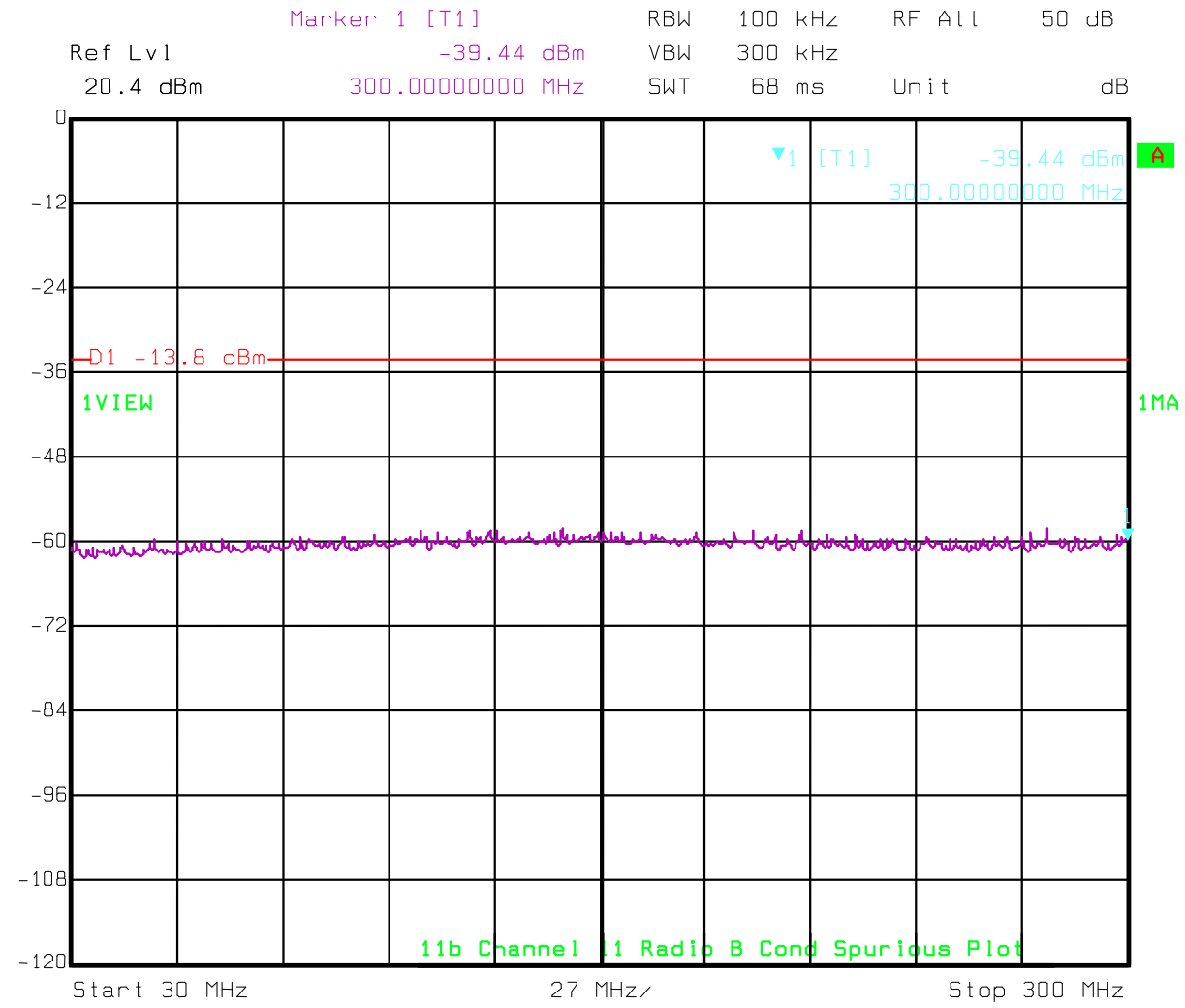

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-38.13 dBm
VBW 300 kHz
20.4 dBm
10.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-38.13 dBm
10.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 30.OCT.2007 14:30:29

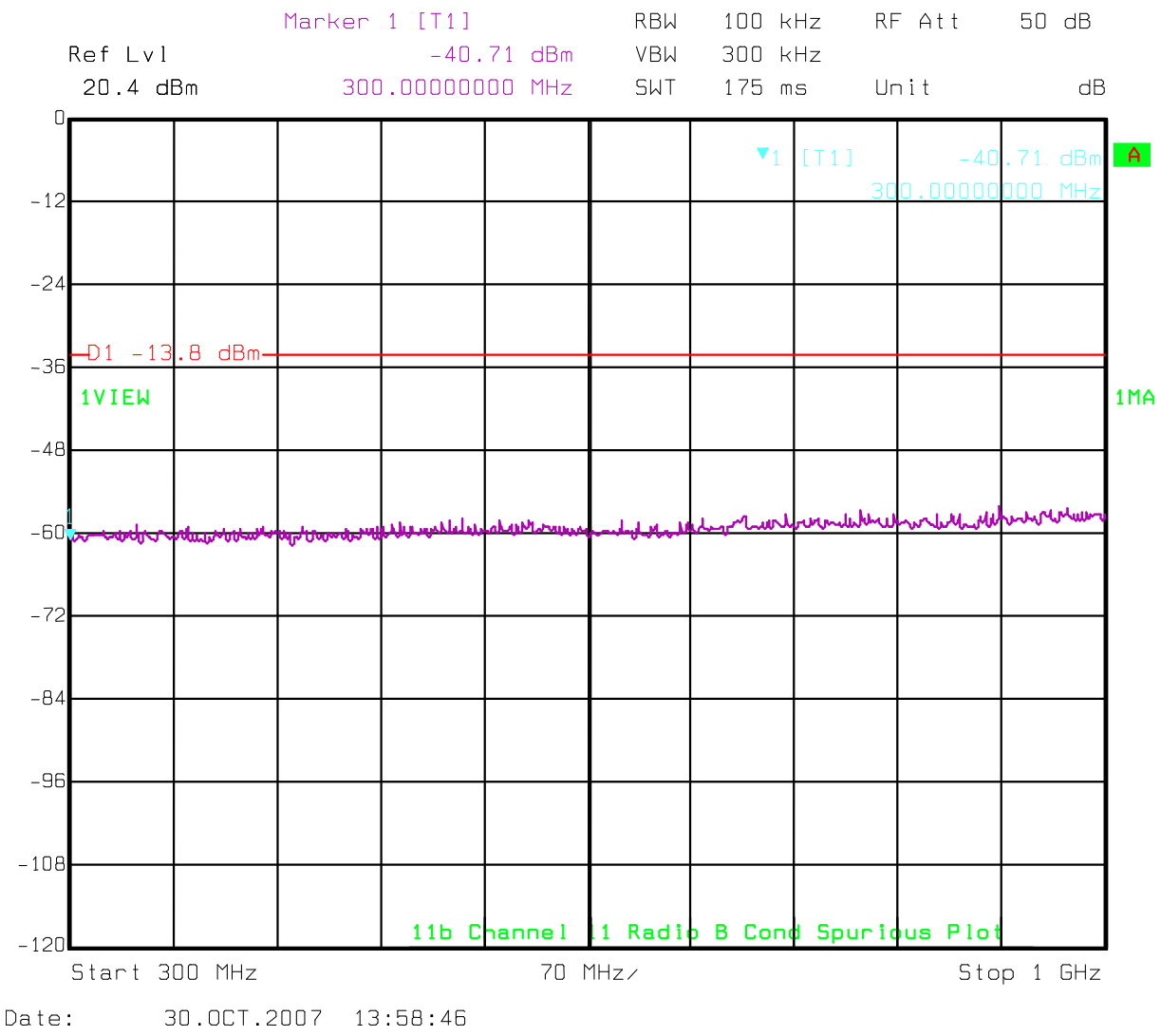

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-37.19 dBm
VBW 300 kHz
20.4 dBm
14.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-37.19 dBm
14.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 30.OCT.2007 14:31:36

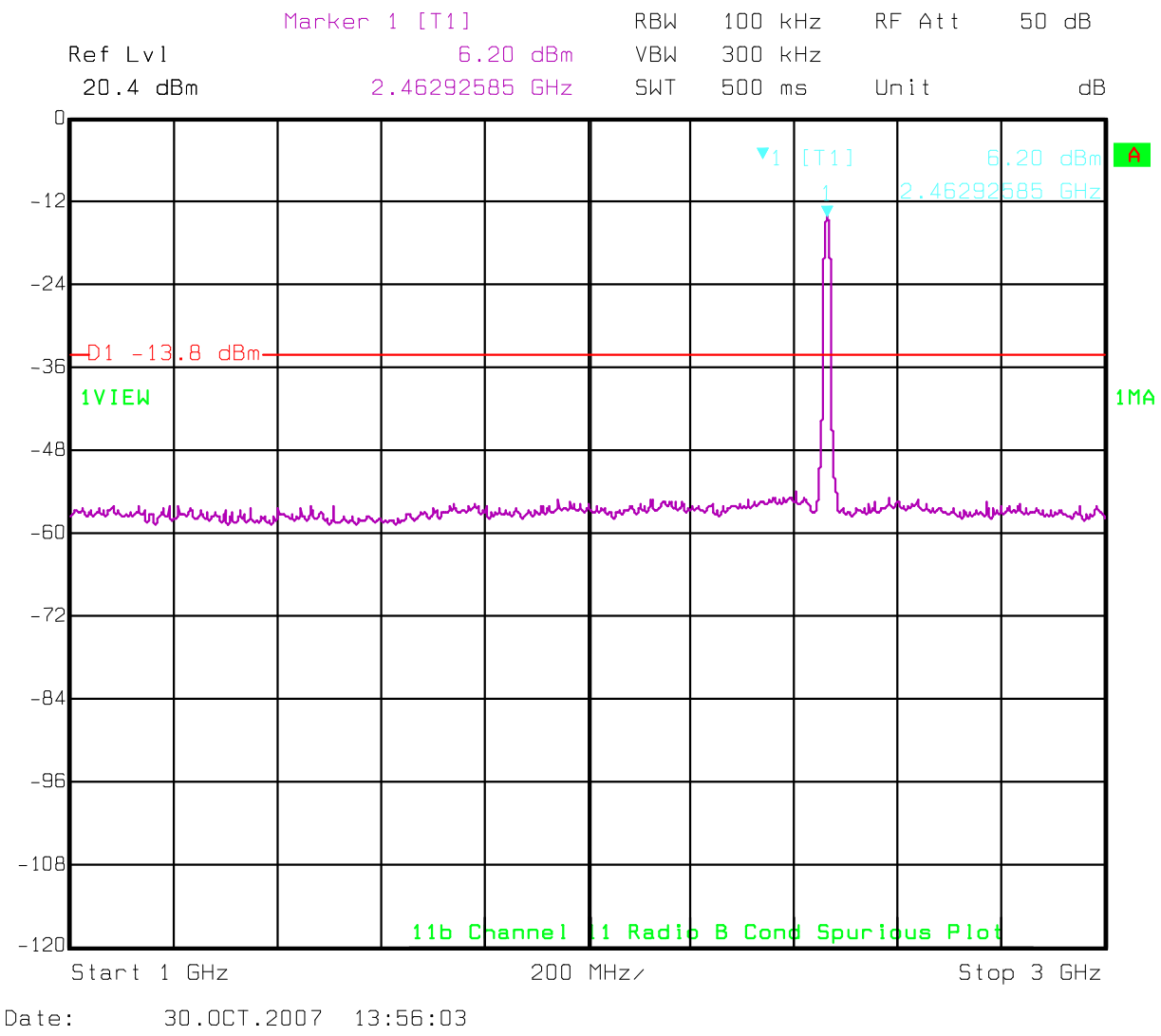

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-33.99 dBm
VBW 300 kHz
20.4 dBm
18.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-33.99 dBm
18.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 30.OCT.2007 14:32:38

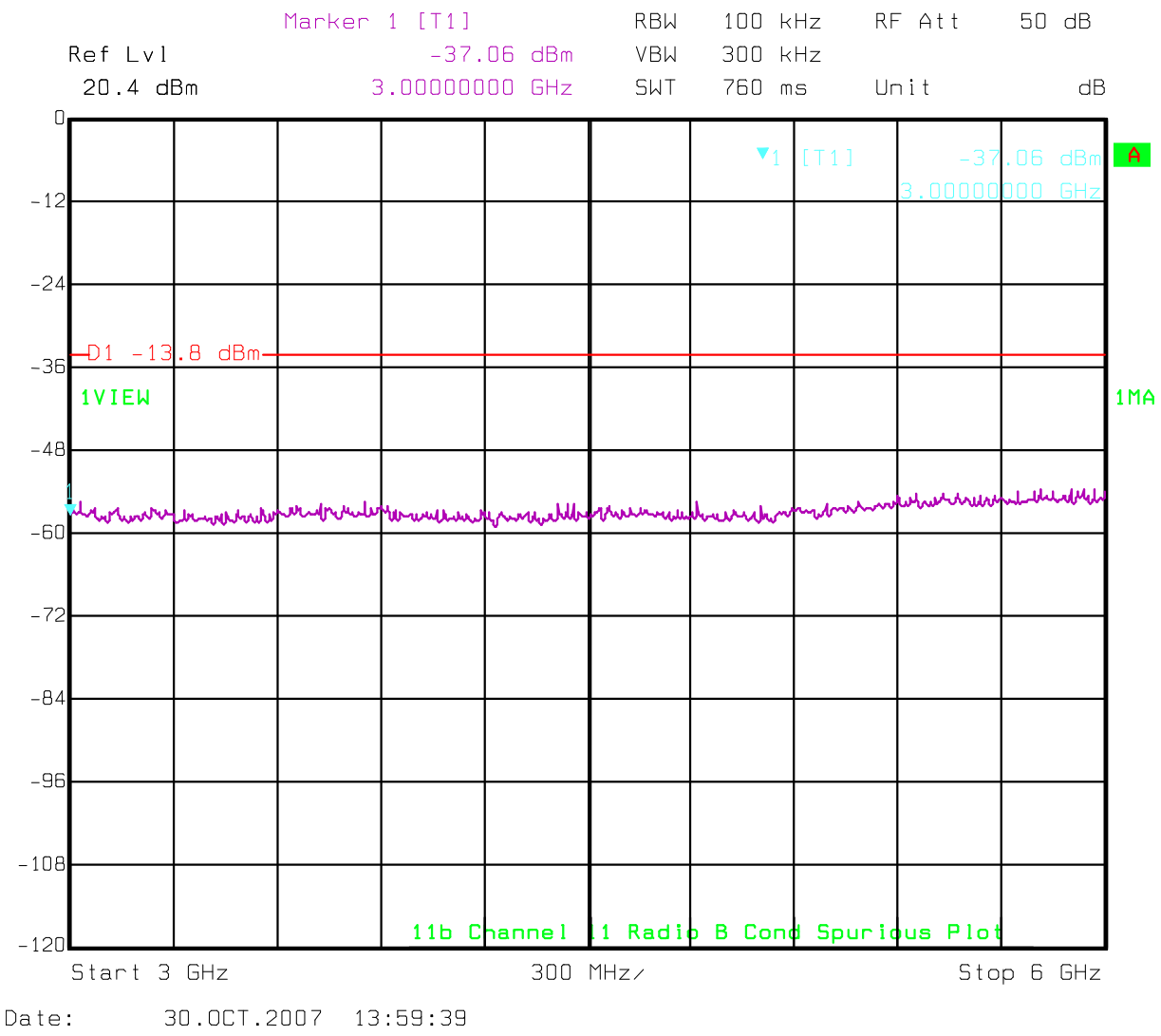

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-33.71 dBm
VBW 300 kHz
20.4 dBm
22.00000000 GHz
SWT 760 ms
Unit dB
1 [T1]
-33.71 dBm
22.00000000 GHz
A
D1 -14.09 dBm
1VIEW
1MA
11b Channel 6 Radio B Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 30.OCT.2007 14:35:04

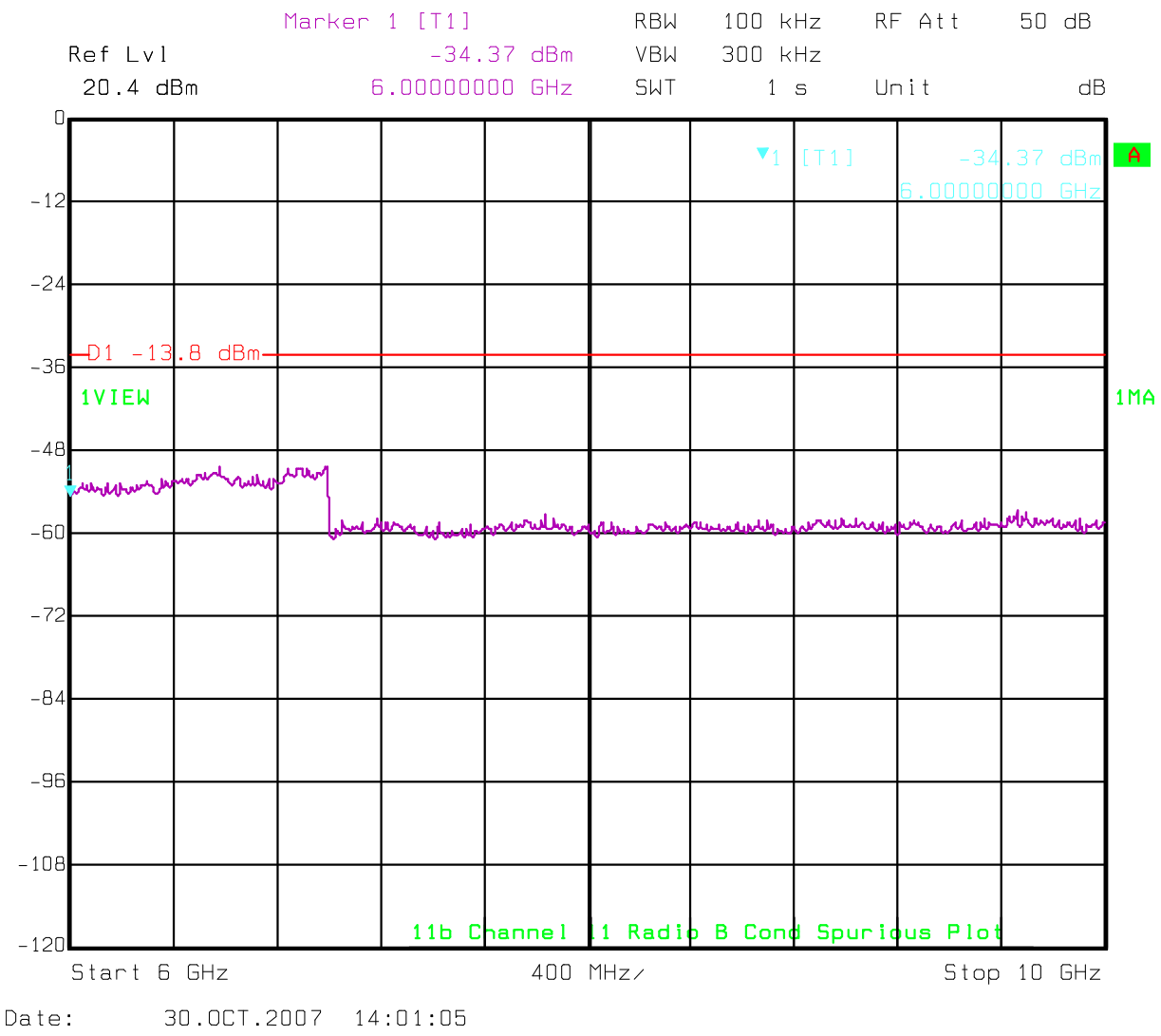
Transceiver B – Channel 11

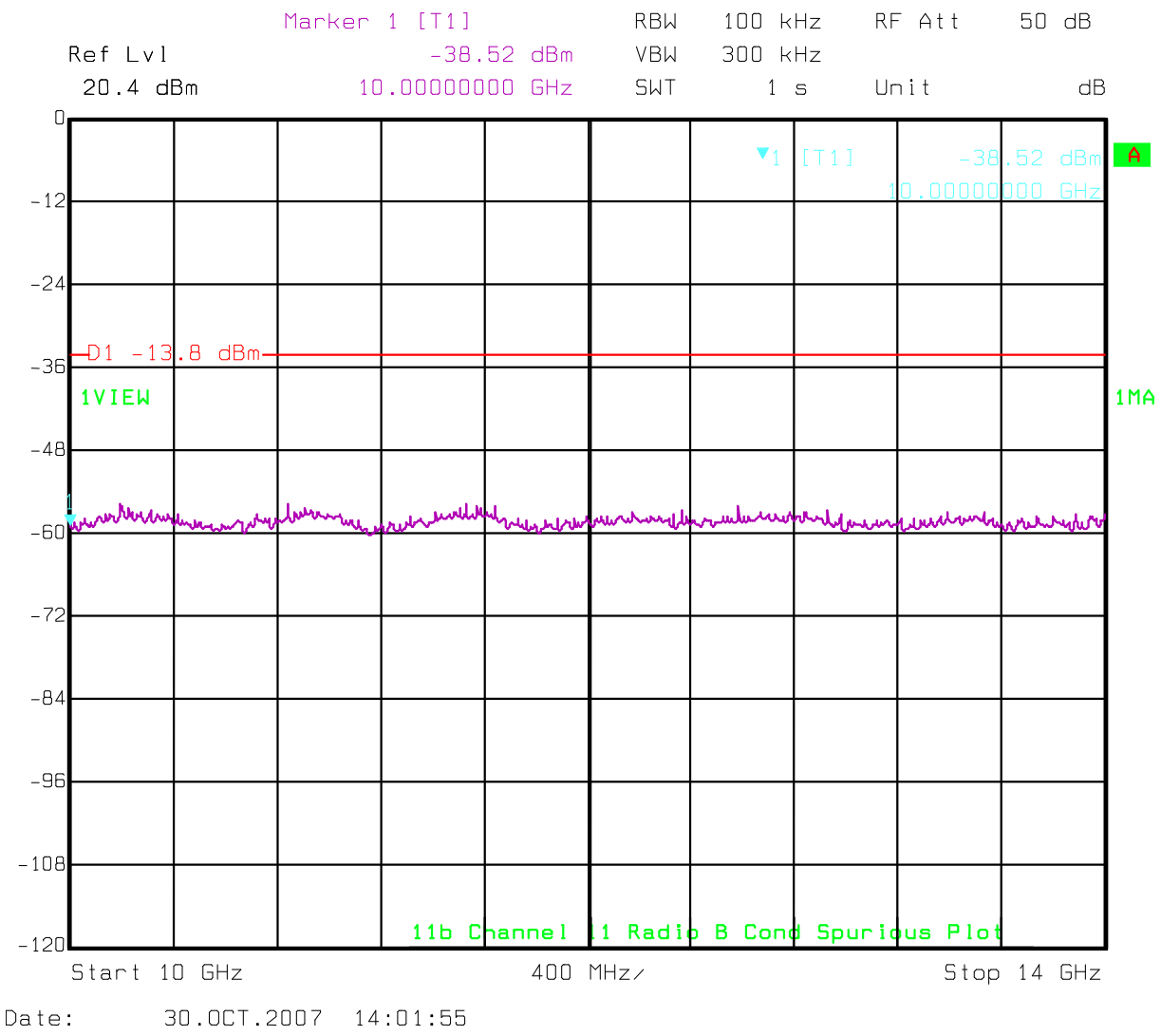


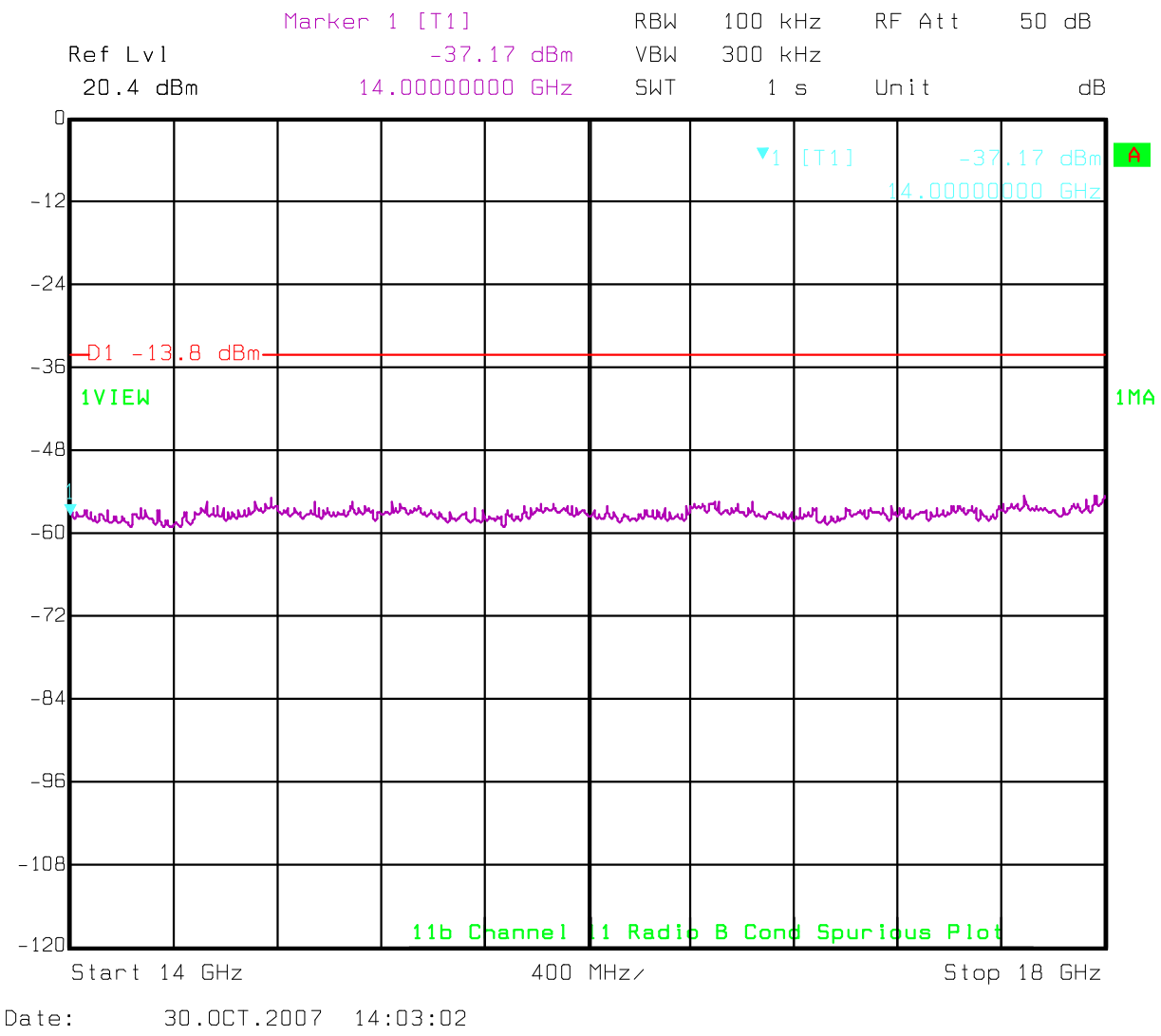

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-40.71 dBm
VBW 300 kHz
20.4 dBm
300.00000000 MHz
SWT 175 ms
Unit dB
1 [T1] -40.71 dBm
300.00000000 MHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 30.OCT.2007 13:58:46

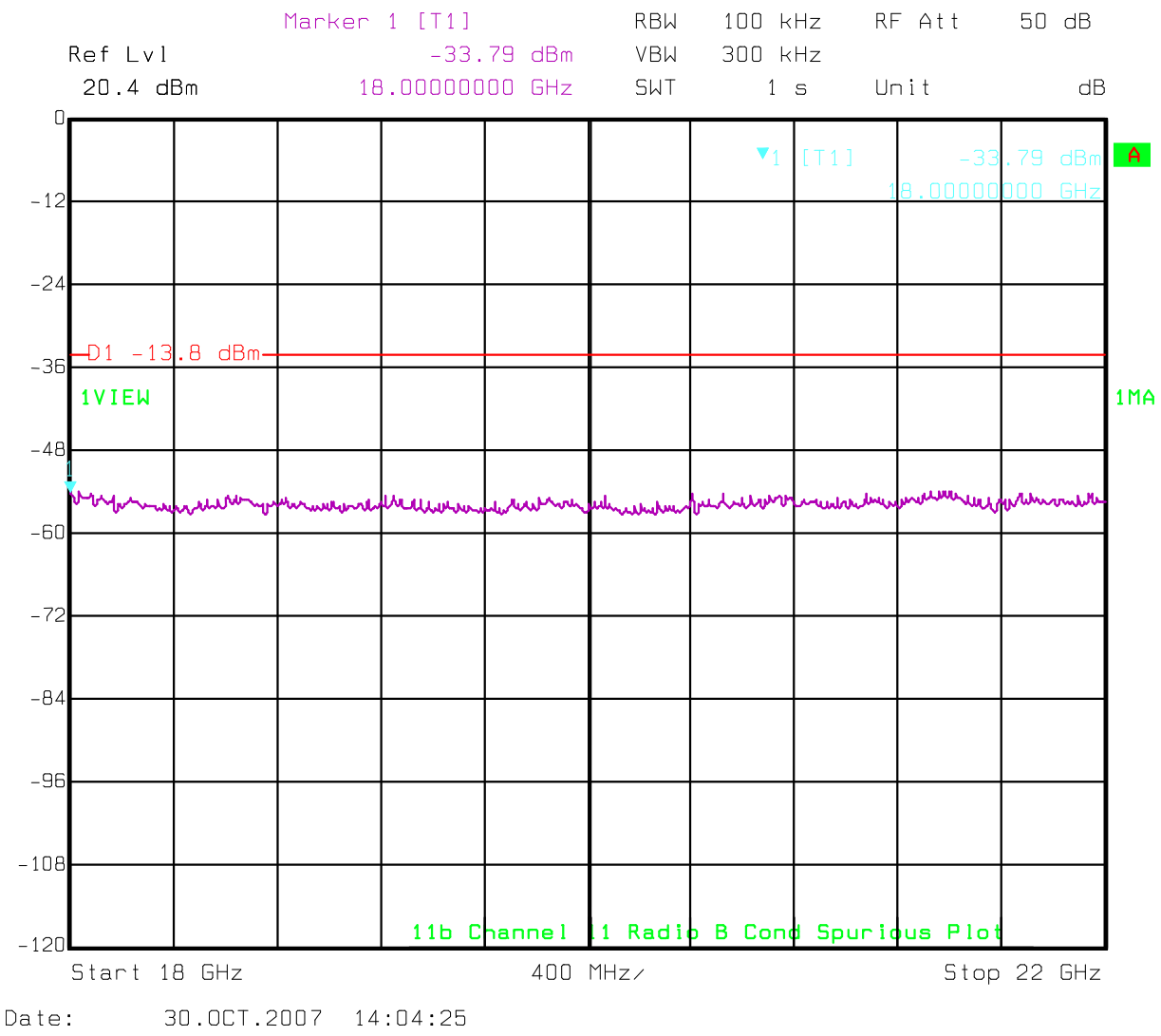

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
6.20 dBm
VBW 300 kHz
20.4 dBm
2.46292585 GHz
SWT 500 ms
Unit dB
1 [T1]
6.20 dBm
2.46292585 GHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 30.OCT.2007 13:56:03

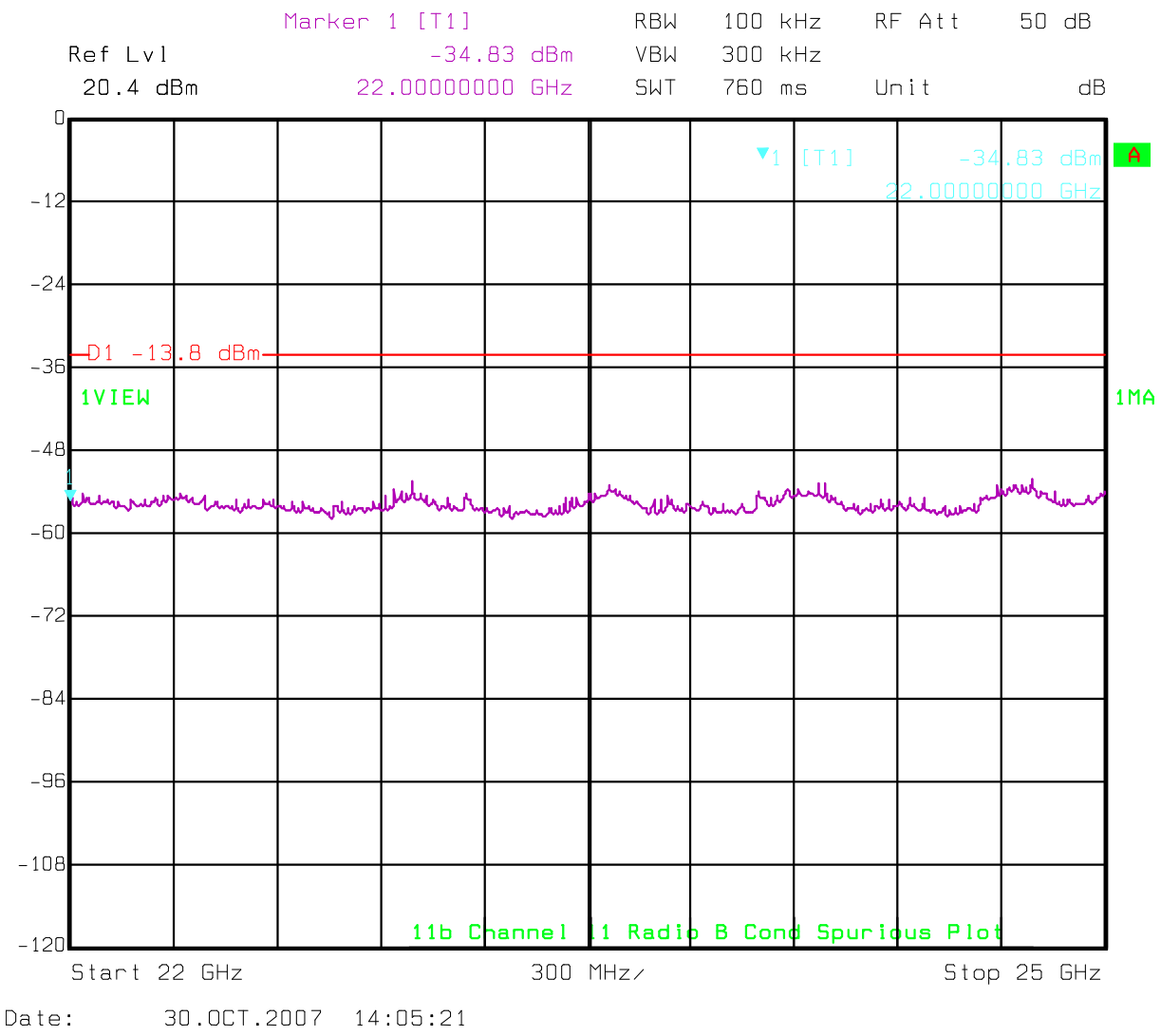

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-37.06 dBm
VBW 300 kHz
20.4 dBm
3.00000000 GHz
SWT 760 ms
Unit dB
1 [T1]
-37.06 dBm
3.00000000 GHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 30.OCT.2007 13:59:39


Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.37 dBm
VBW 300 kHz
20.4 dBm
6.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-34.37 dBm
6.00000000 GHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 30.OCT.2007 14:01:05

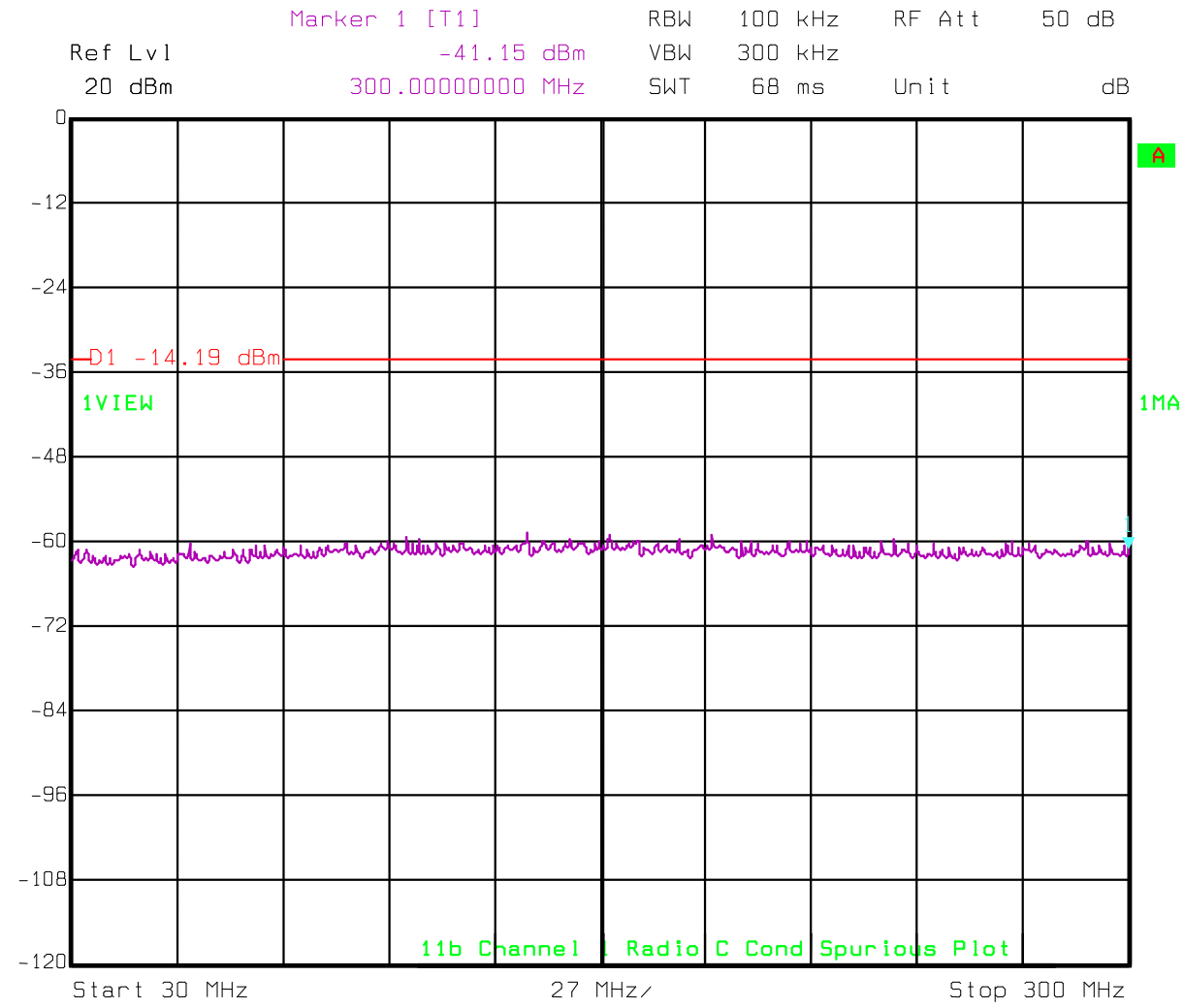

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-38.52 dBm
VBW 300 kHz
20.4 dBm
10.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-38.52 dBm
10.00000000 GHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 30.OCT.2007 14:01:55

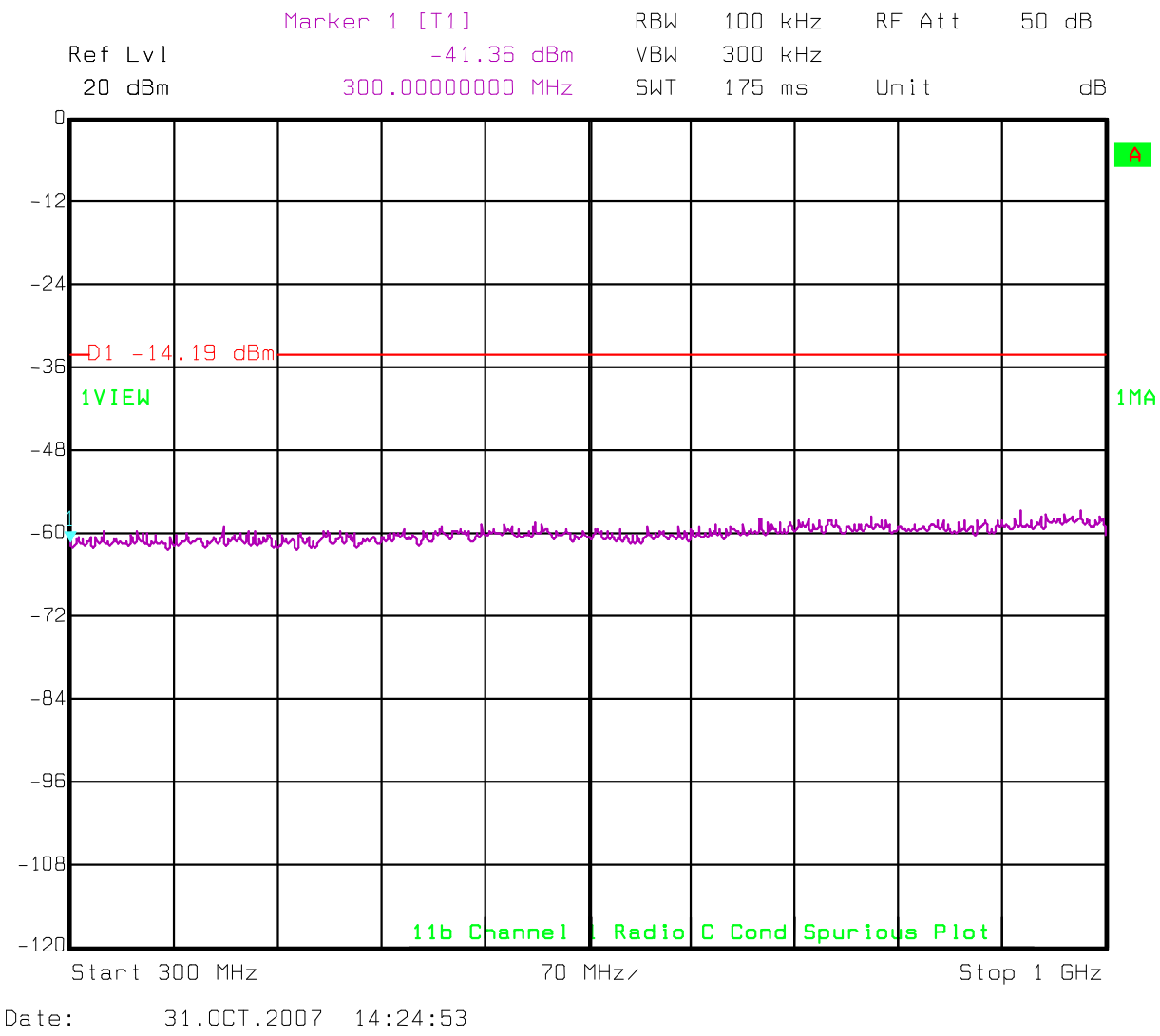

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-37.17 dBm
VBW 300 kHz
20.4 dBm
14.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-37.17 dBm
14.00000000 GHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 30.OCT.2007 14:03:02

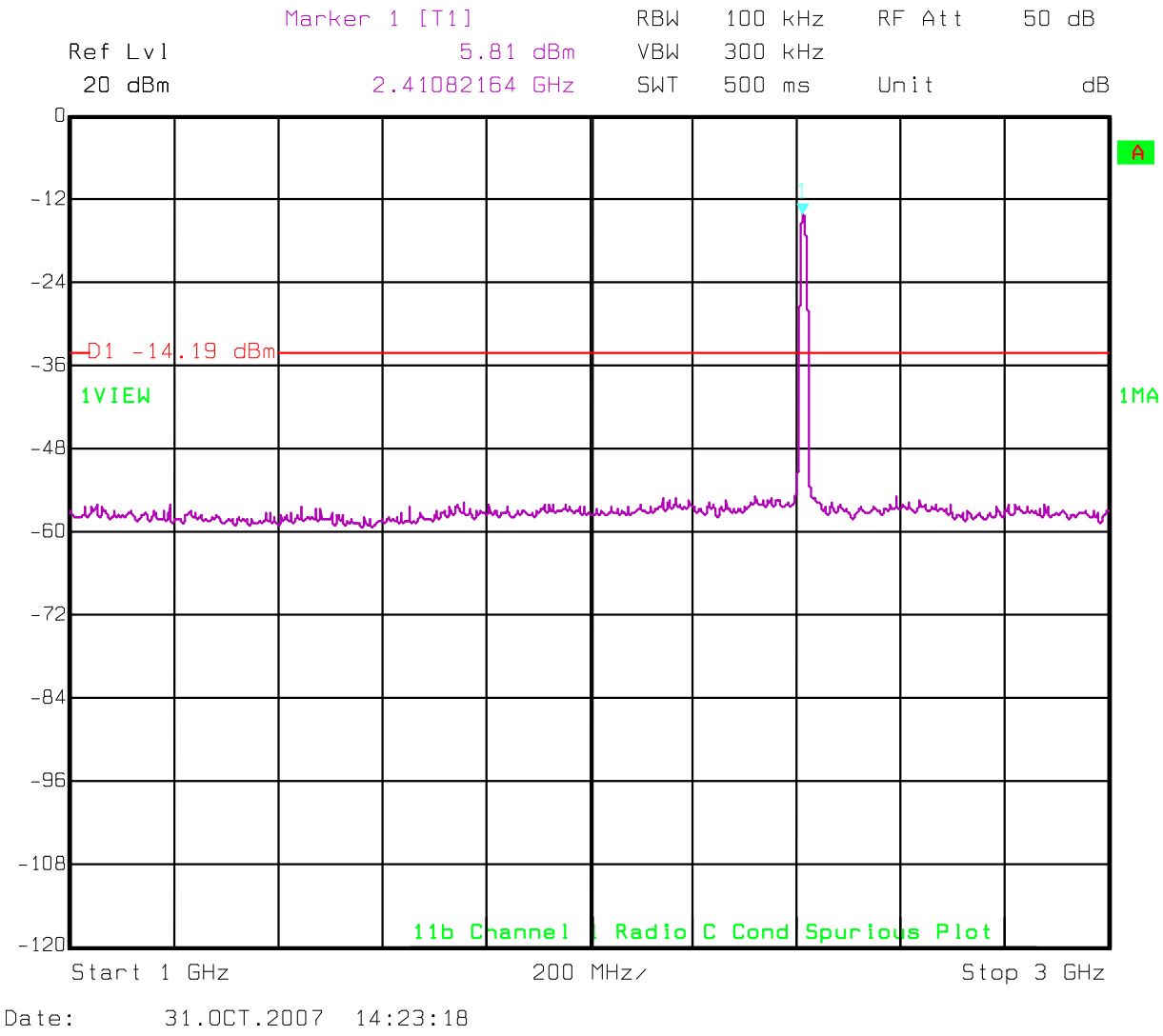

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-33.79 dBm
VBW 300 kHz
20.4 dBm
18.00000000 GHz
SWT 1 s
Unit dB
1 [T1]
-33.79 dBm
18.00000000 GHz
A
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 30.OCT.2007 14:04:25

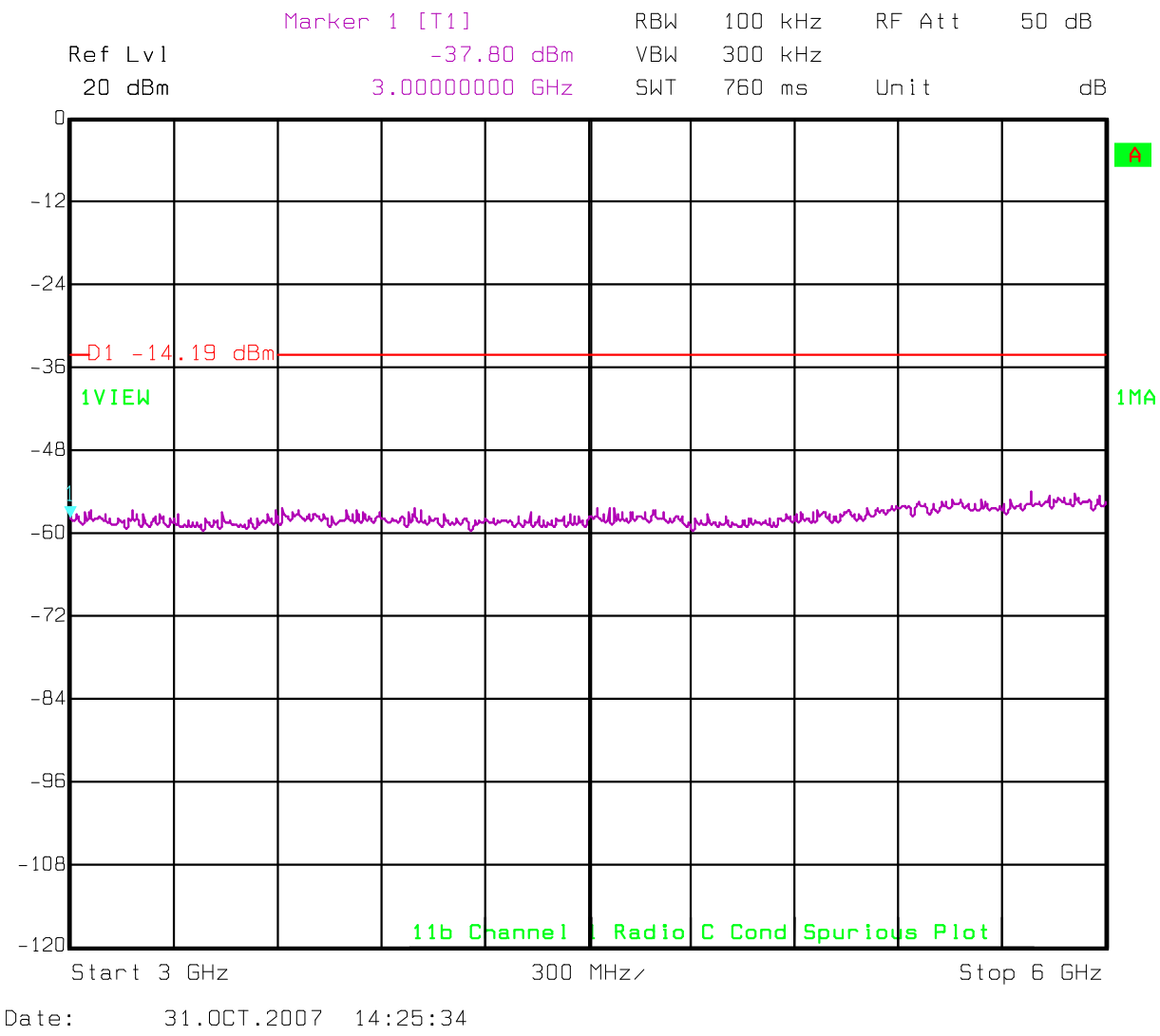

Marker 1 [T1]
RBW 100 kHz
RF Att 50 dB
Ref Lvl
-34.83 dBm
VBW 300 kHz
20.4 dBm
22.00000000 GHz
SWT 760 ms
Unit dB
1 [T1] -34.83 dBm
22.00000000 GHz
A
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.8 dBm
1VIEW
1MA
11b Channel 11 Radio B Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 30.OCT.2007 14:05:21

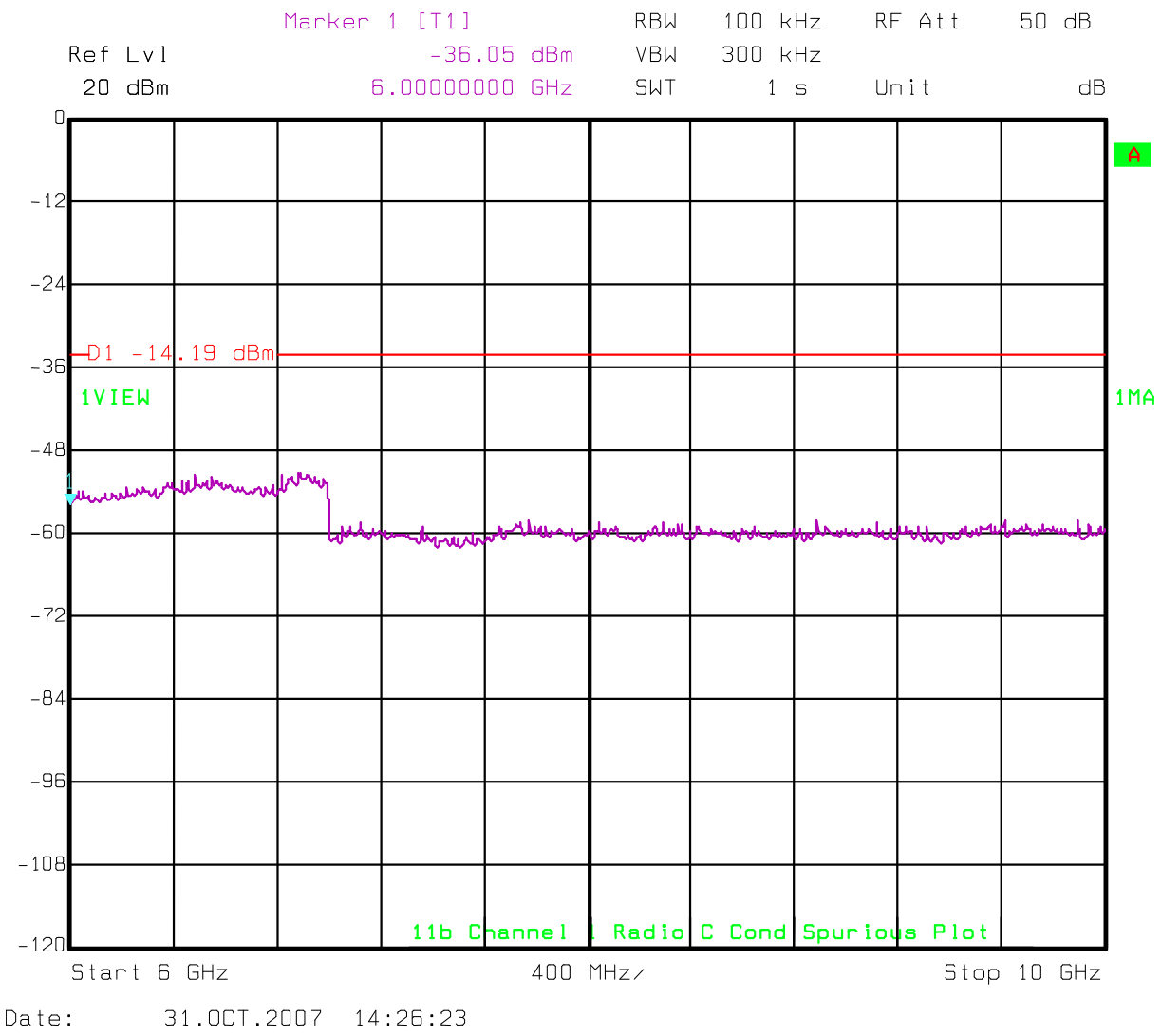
Transceiver C – Channel 1

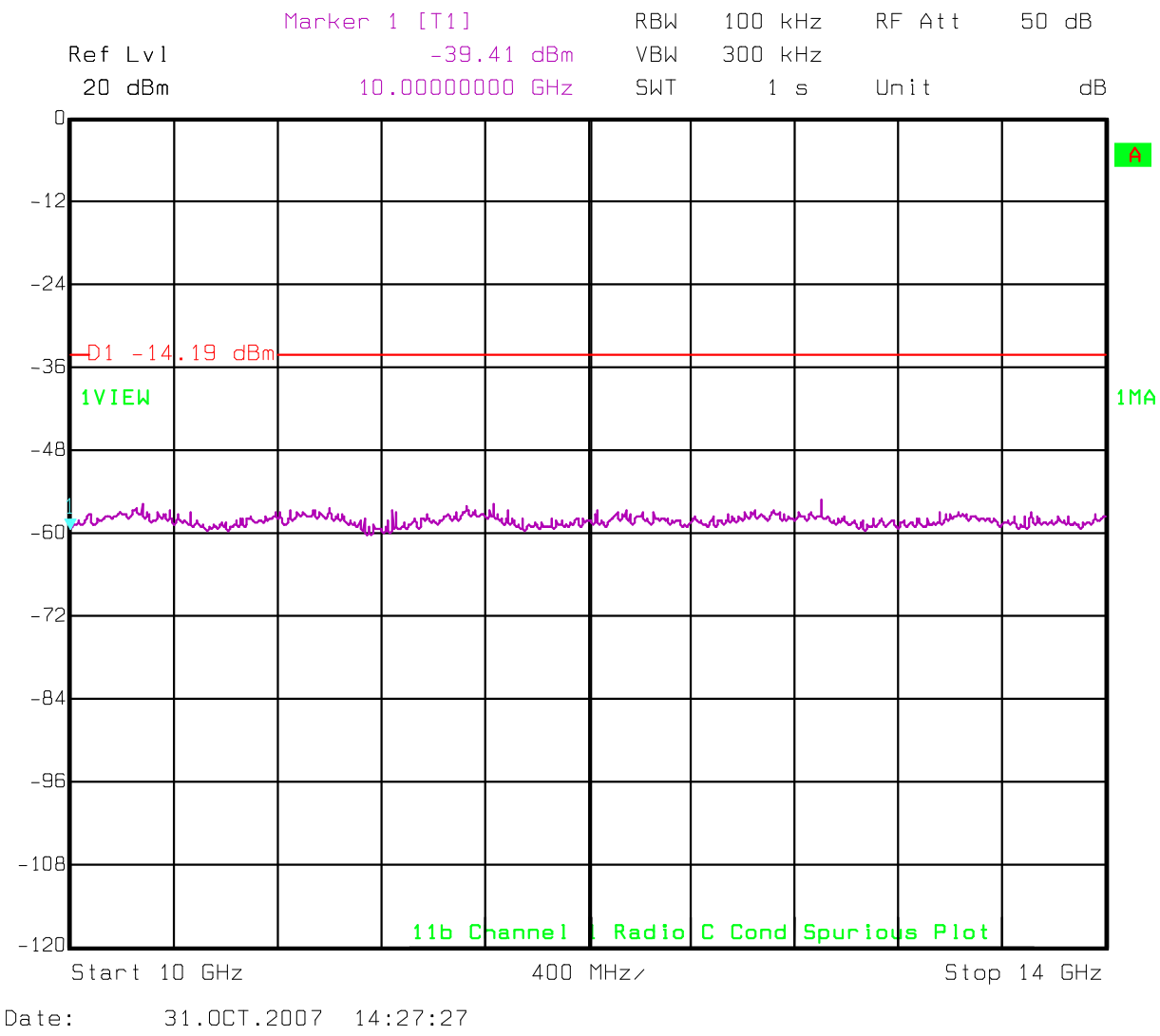


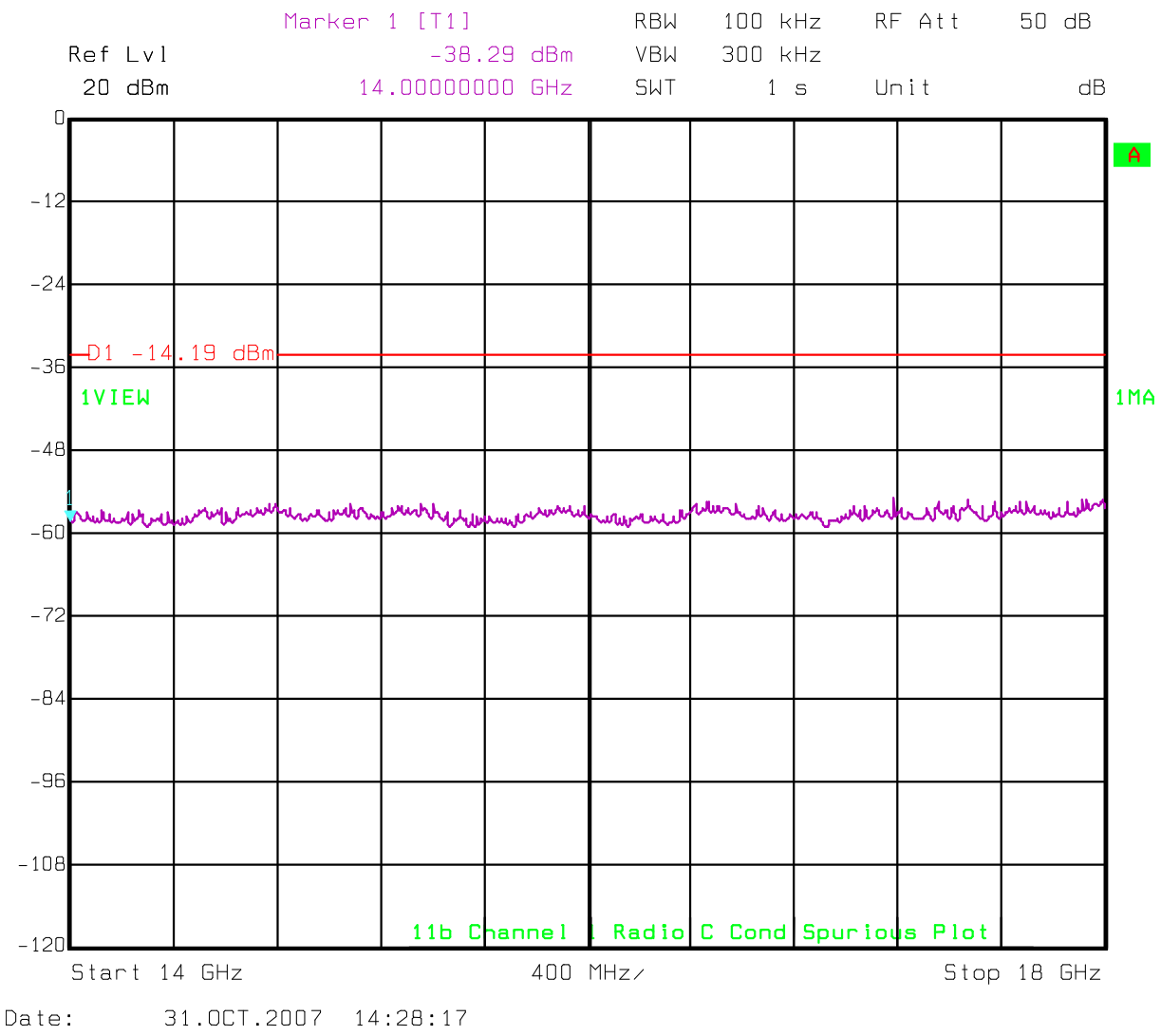

Marker 1 [T1]
-41.36 dBm
300.00000000 MHz
RBW 100 kHz
VBW 300 kHz
SWT 175 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 31.OCT.2007 14:24:53

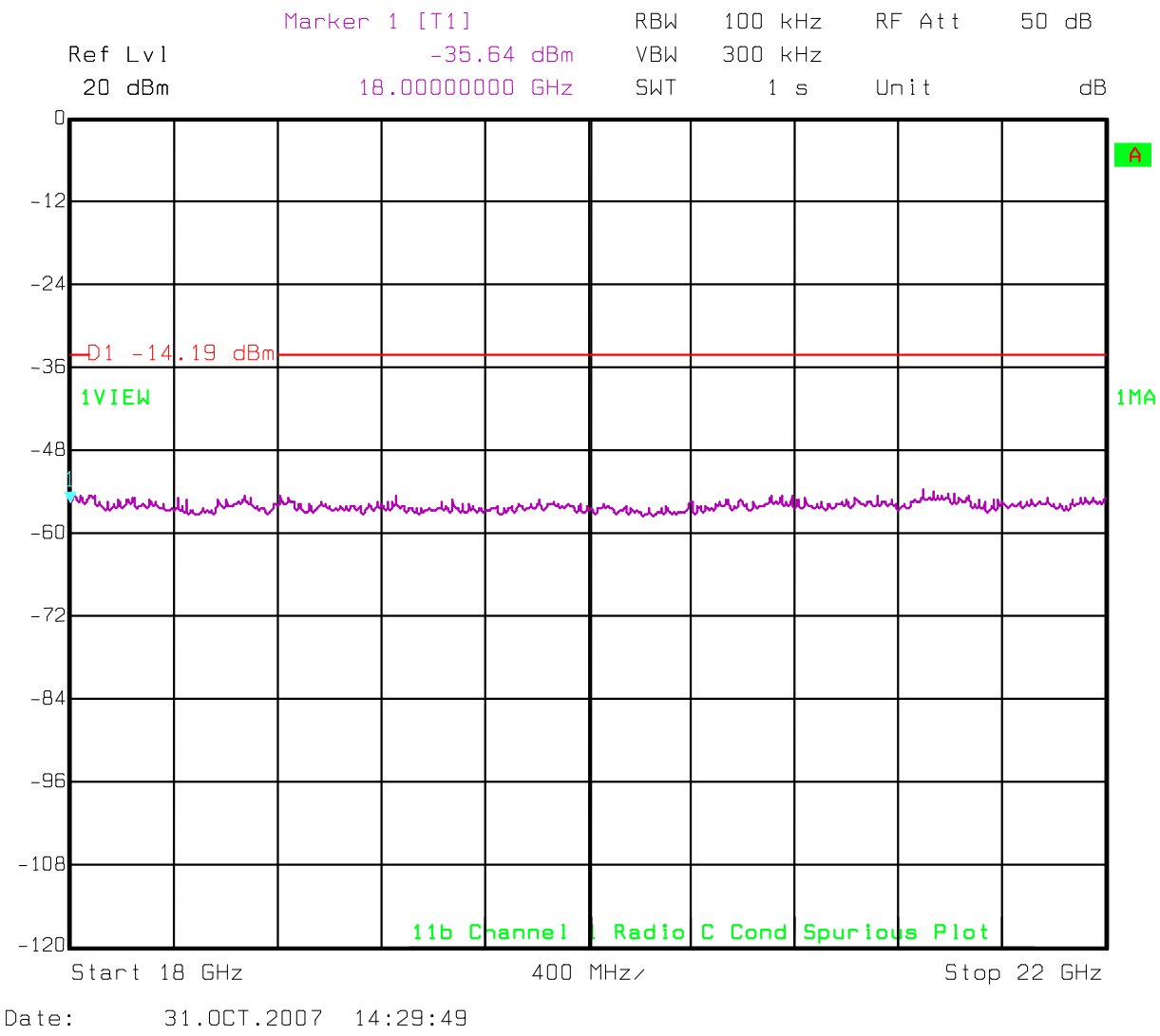

Marker 1 [T1]
5.81 dBm
2.41082164 GHz
RBW 100 kHz
VBW 300 kHz
SWT 500 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 31.OCT.2007 14:23:18

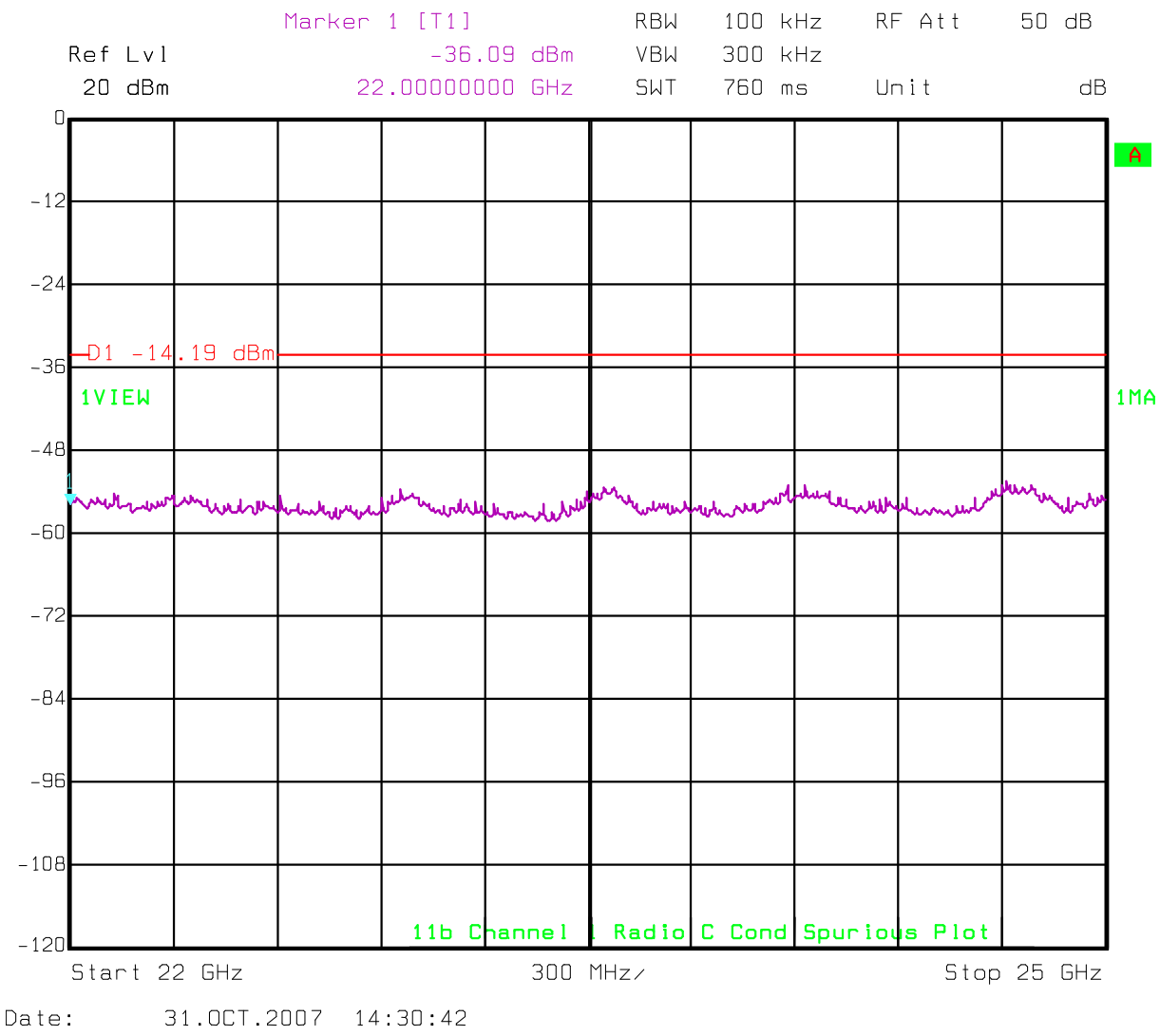

Marker 1 [T1]
-37.80 dBm
3.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
A
1MA
11b Channel | Radio C Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 31.OCT.2007 14:25:34


Marker 1 [T1]
-36.05 dBm
6.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 31.OCT.2007 14:26:23

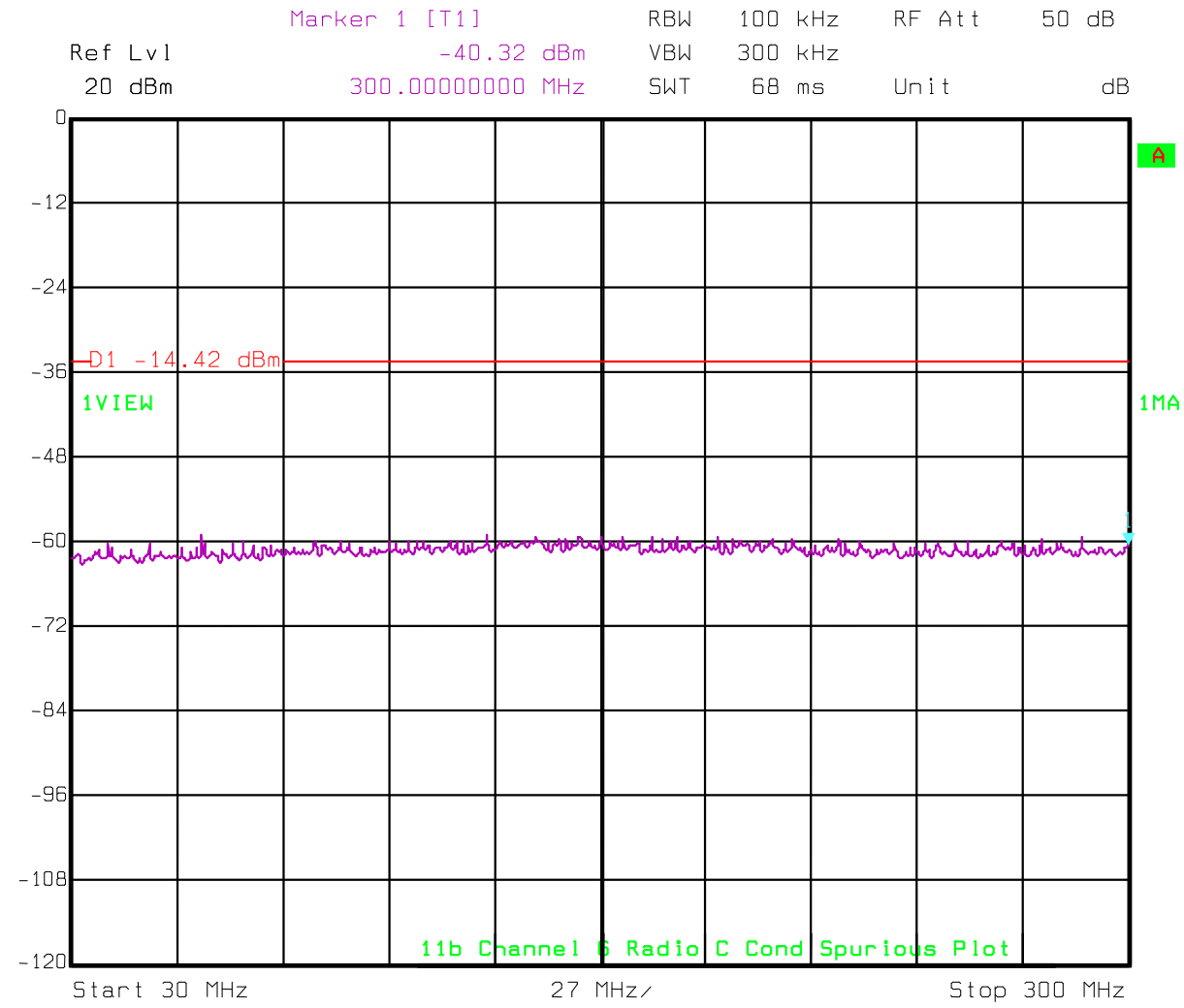

Marker 1 [T1]
-39.41 dBm
10.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 31.OCT.2007 14:27:27

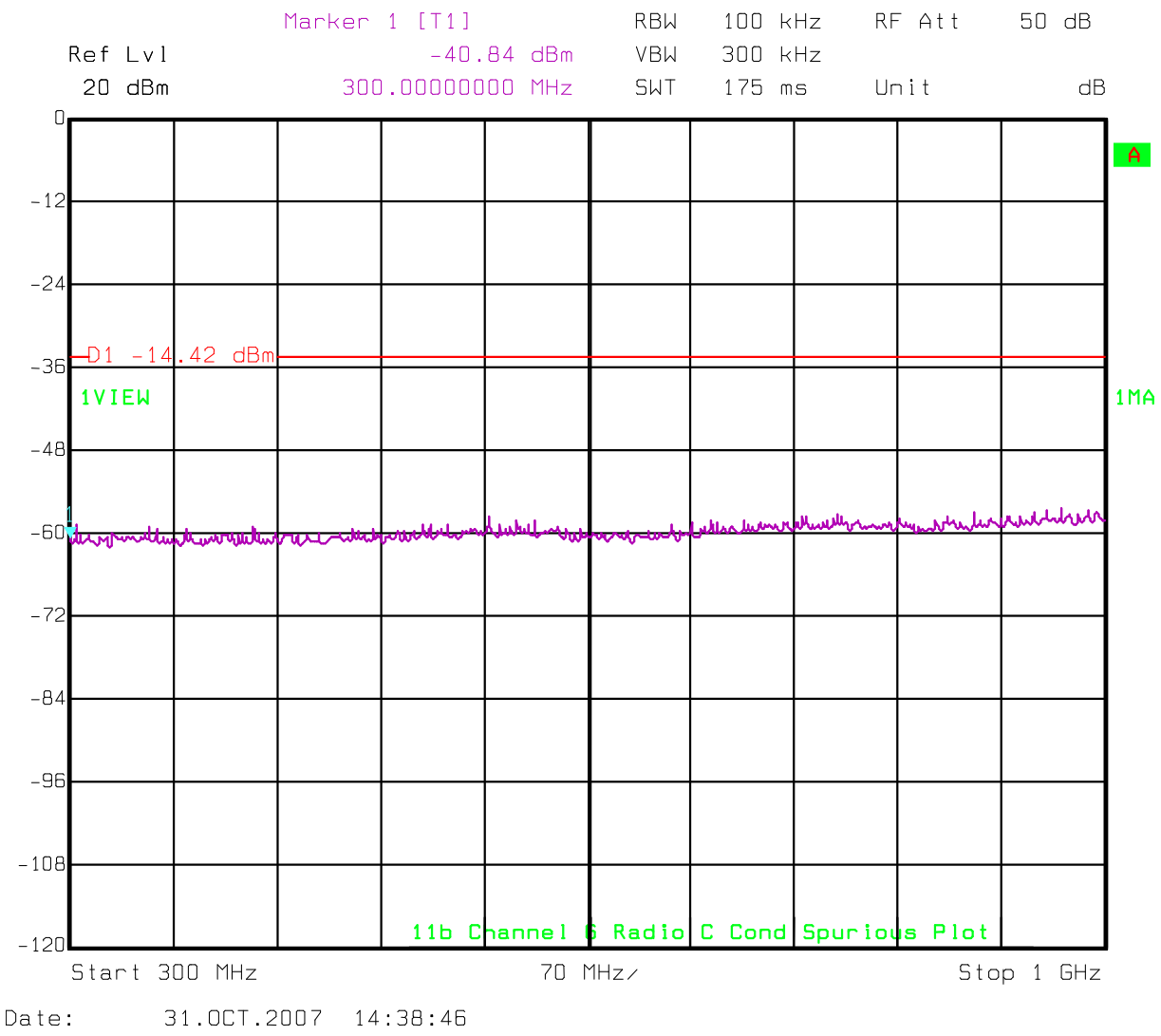

Marker 1 [T1]
-38.29 dBm
14.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 31.OCT.2007 14:28:17

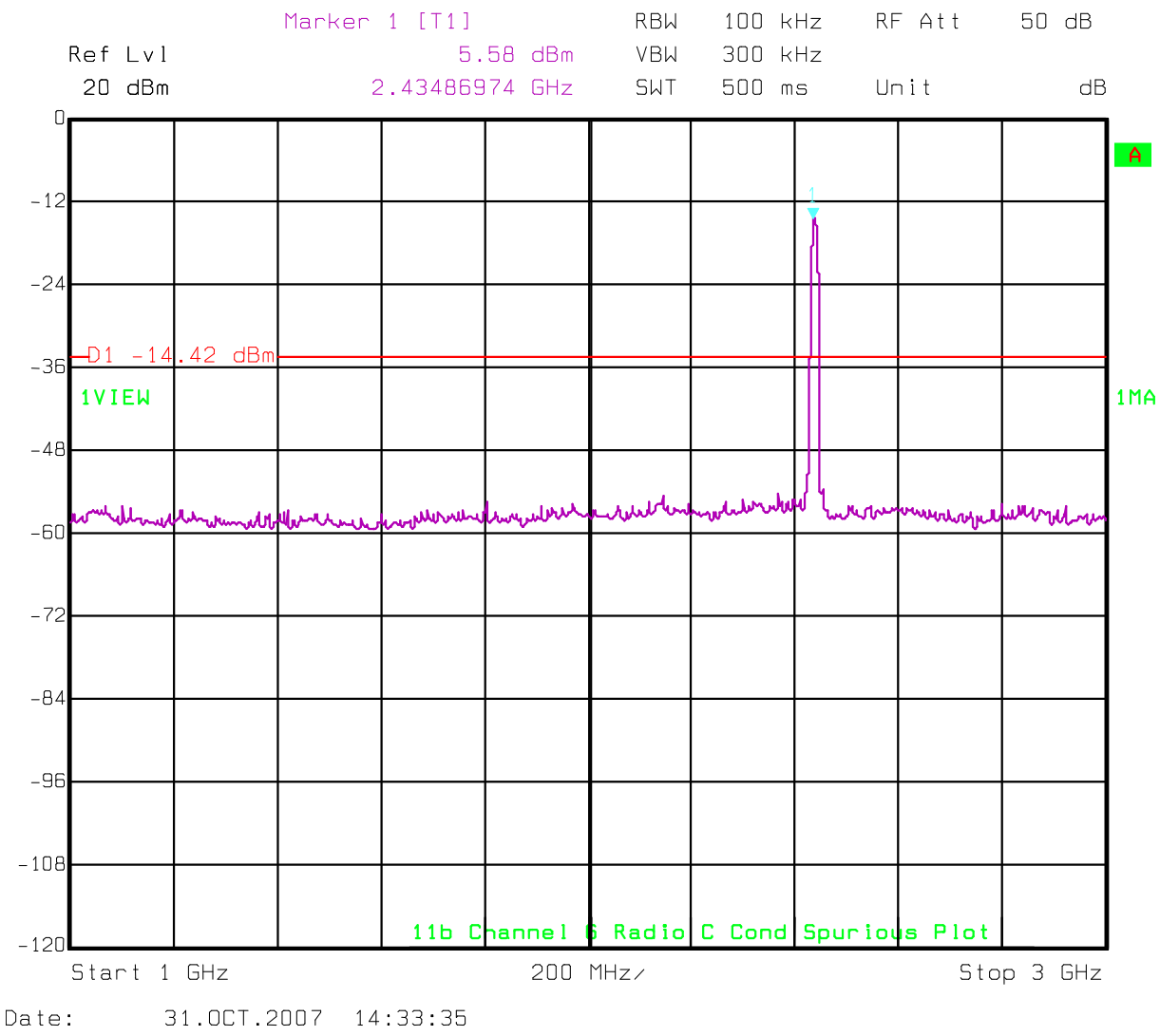

Marker 1 [T1]
-35.64 dBm
18.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 31.OCT.2007 14:29:49

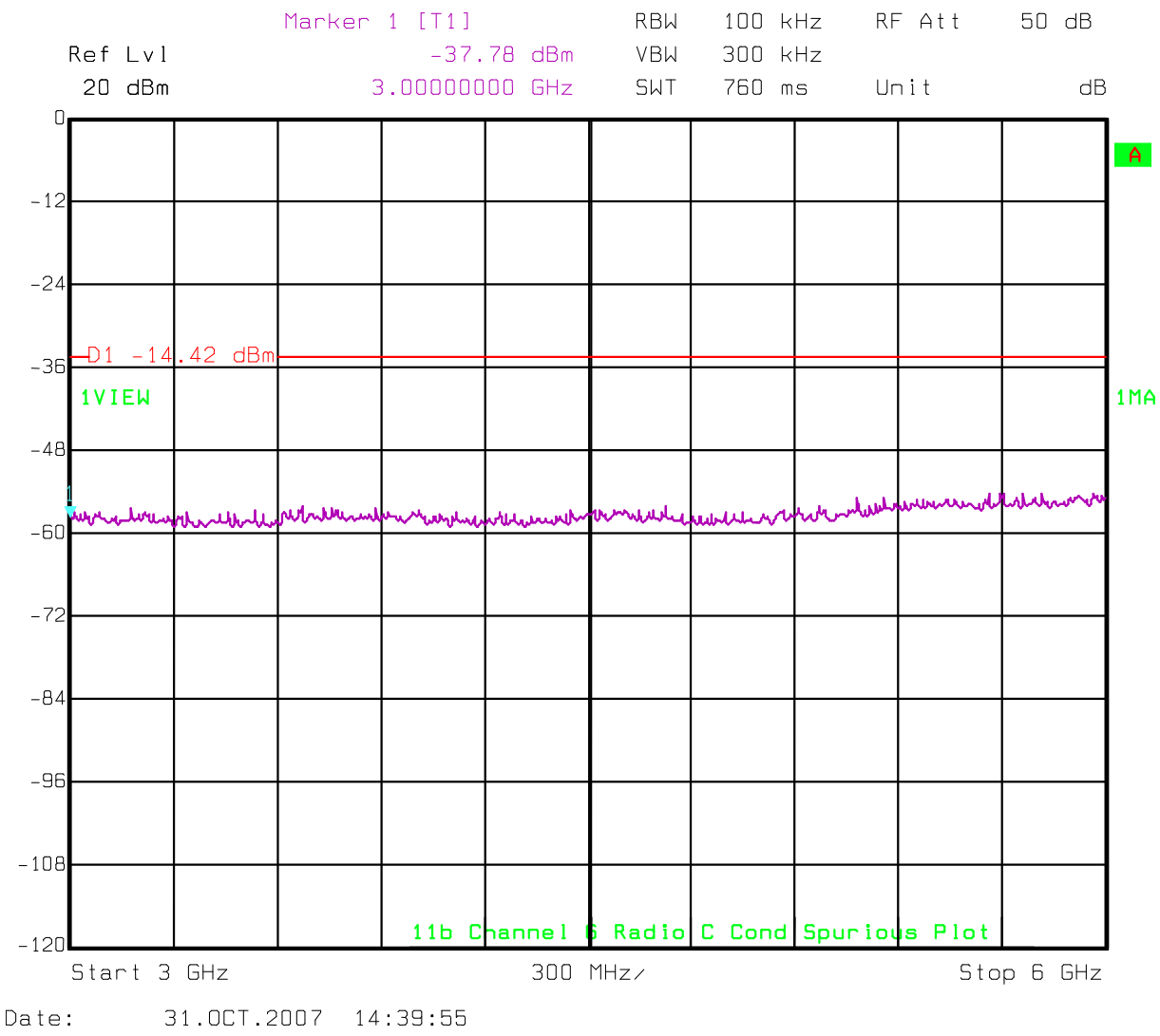

Marker 1 [T1]
-36.09 dBm
22.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.19 dBm
1VIEW
1MA
A
11b Channel | Radio C Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 31.OCT.2007 14:30:42

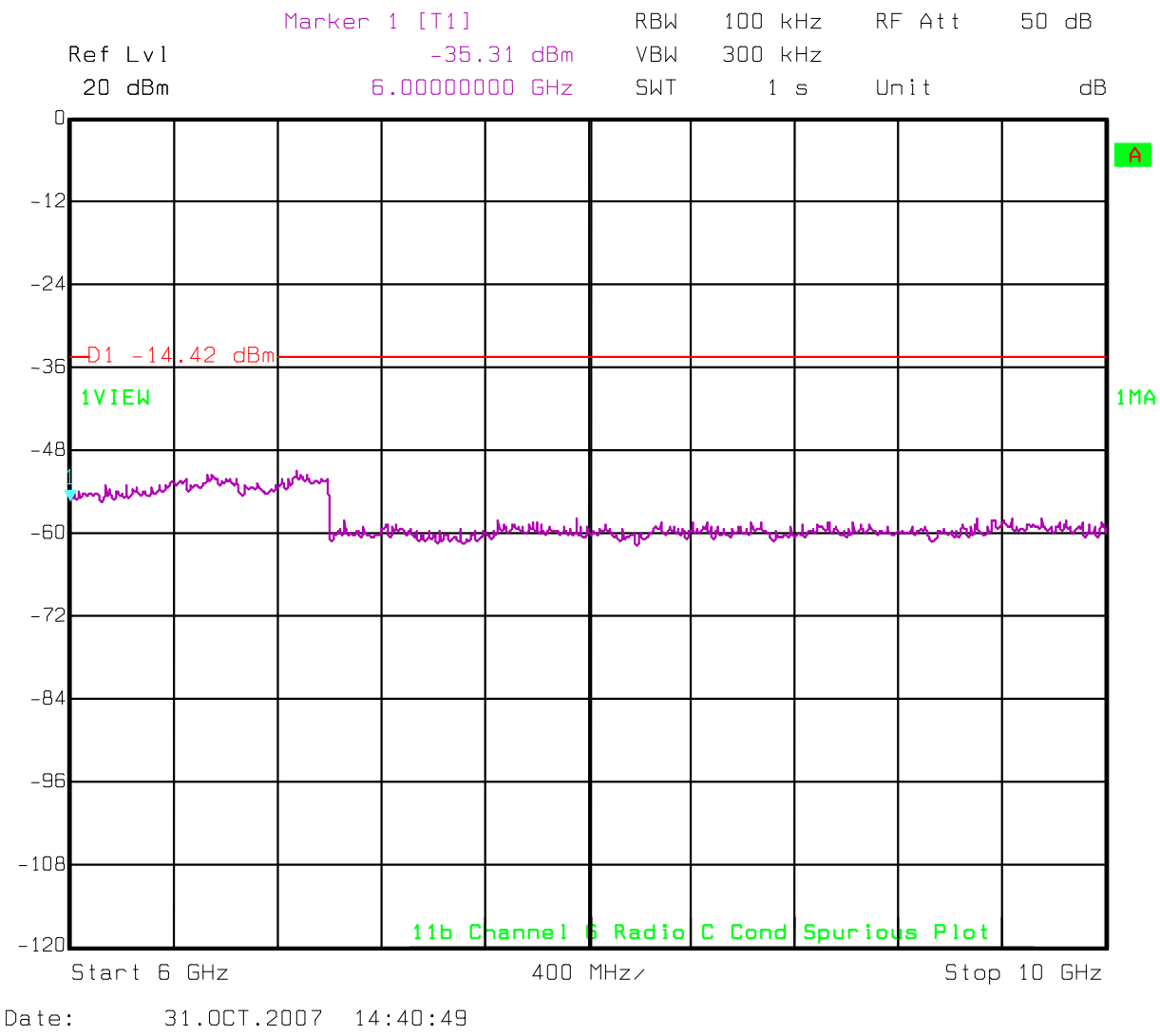
Transceiver C – Channel 6

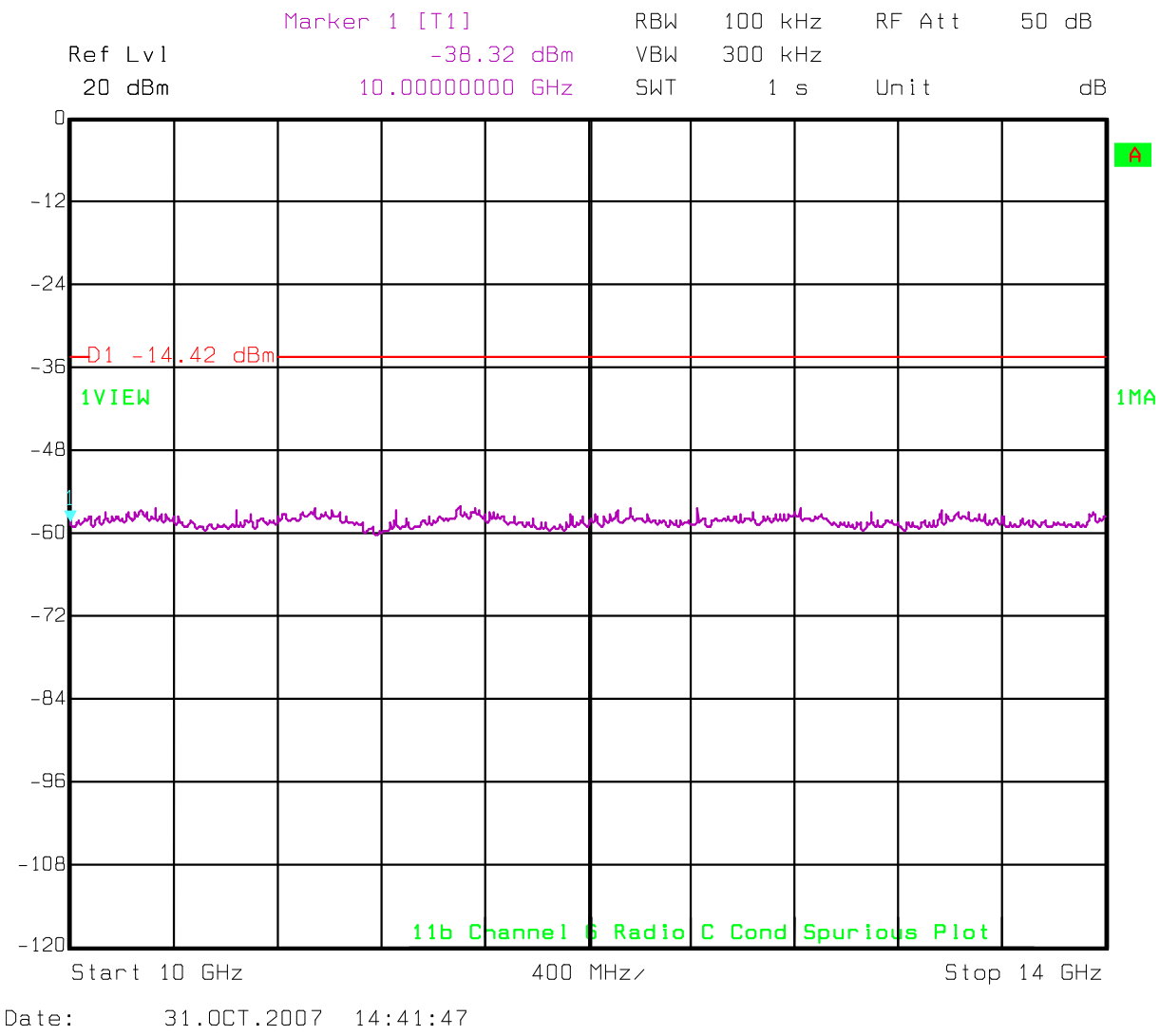


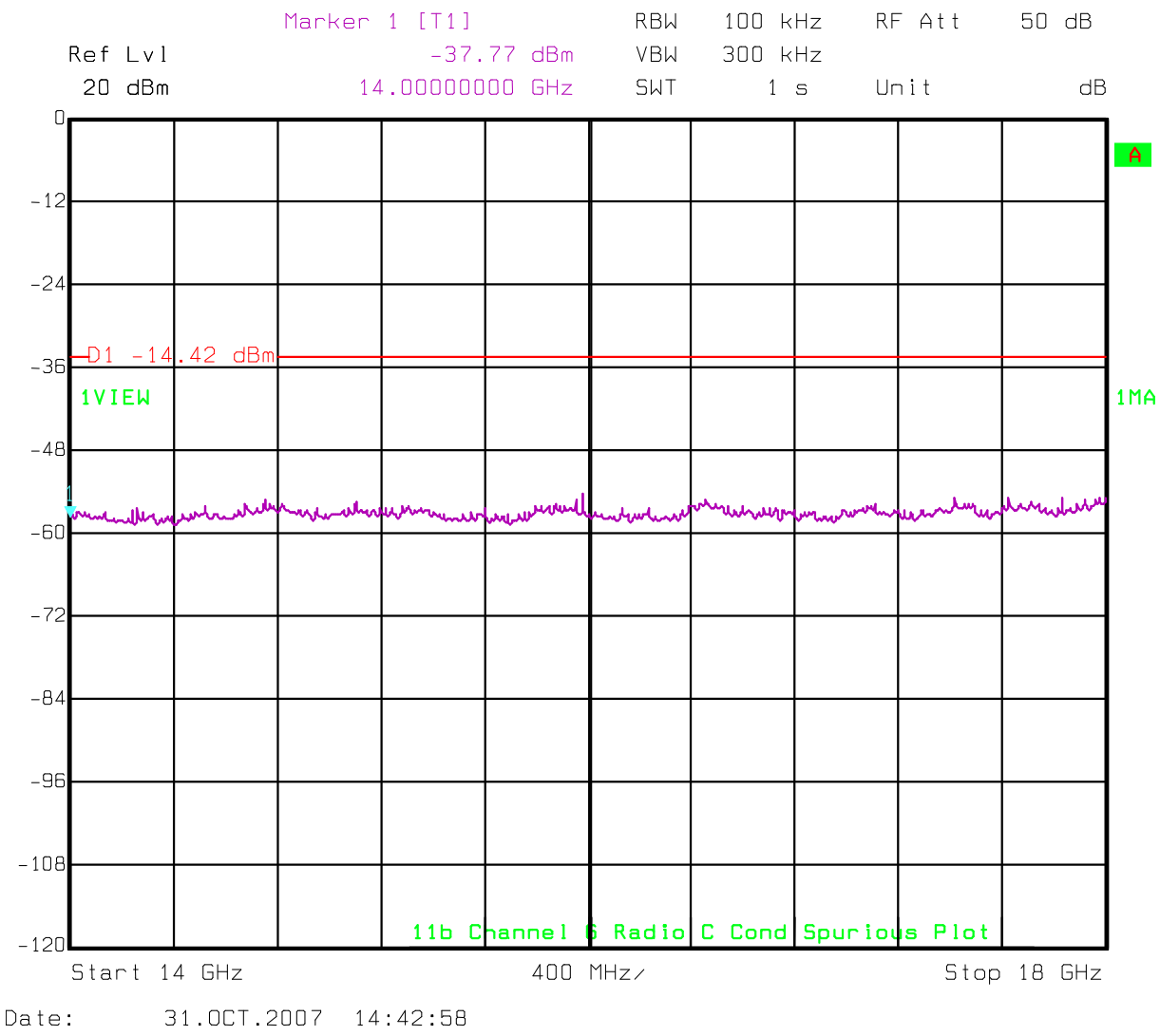

Marker 1 [T1]
-40.84 dBm
300.00000000 MHz
RBW 100 kHz
VBW 300 kHz
SWT 175 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
1MA
A
11b Channel 6 Radio C Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 31.OCT.2007 14:38:46

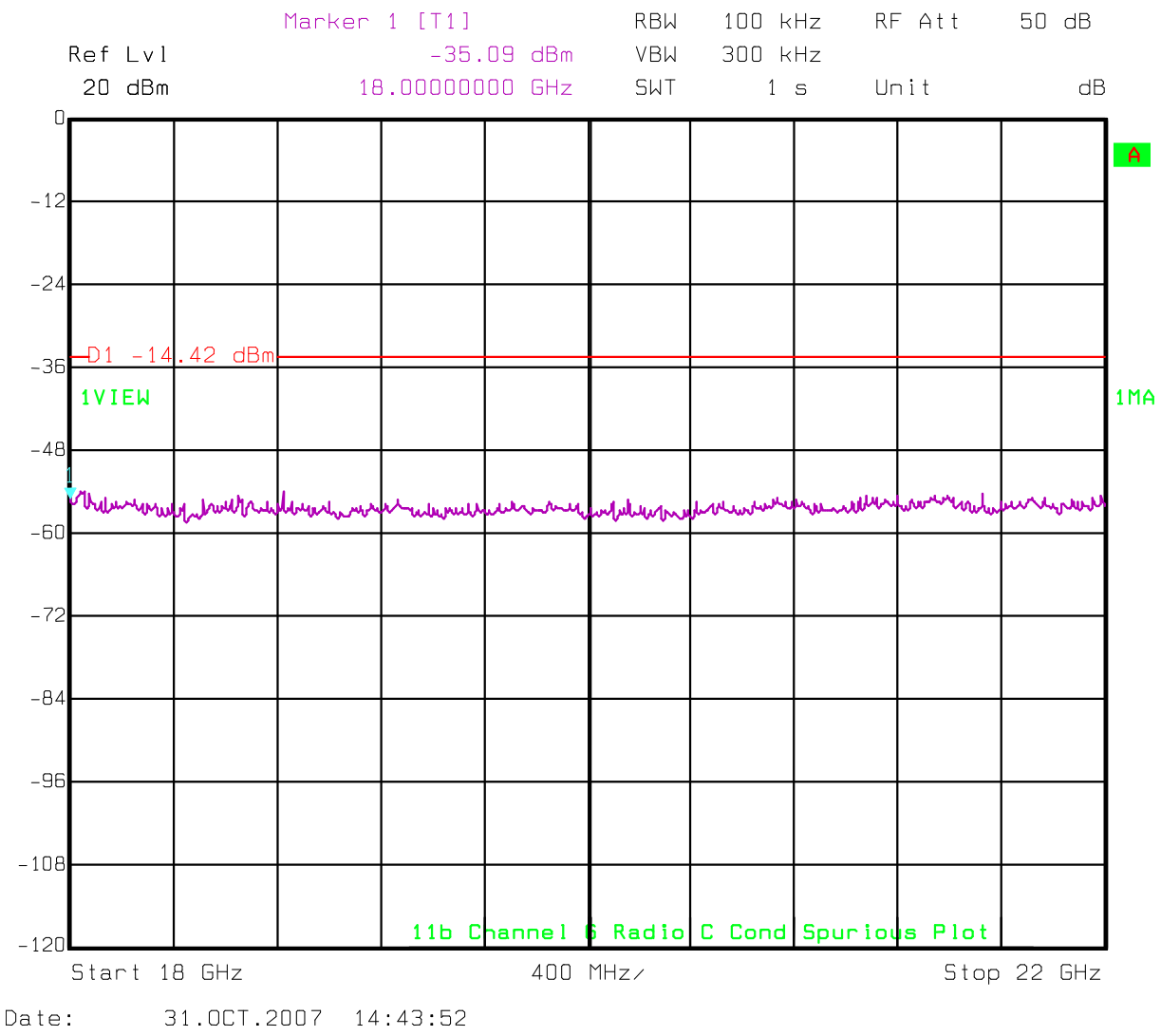

Marker 1 [T1]
5.58 dBm
2.43486974 GHz
RBW 100 kHz
VBW 300 kHz
SWT 500 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
1MA
A
11b Channel 6 Radio C Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 31.OCT.2007 14:33:35

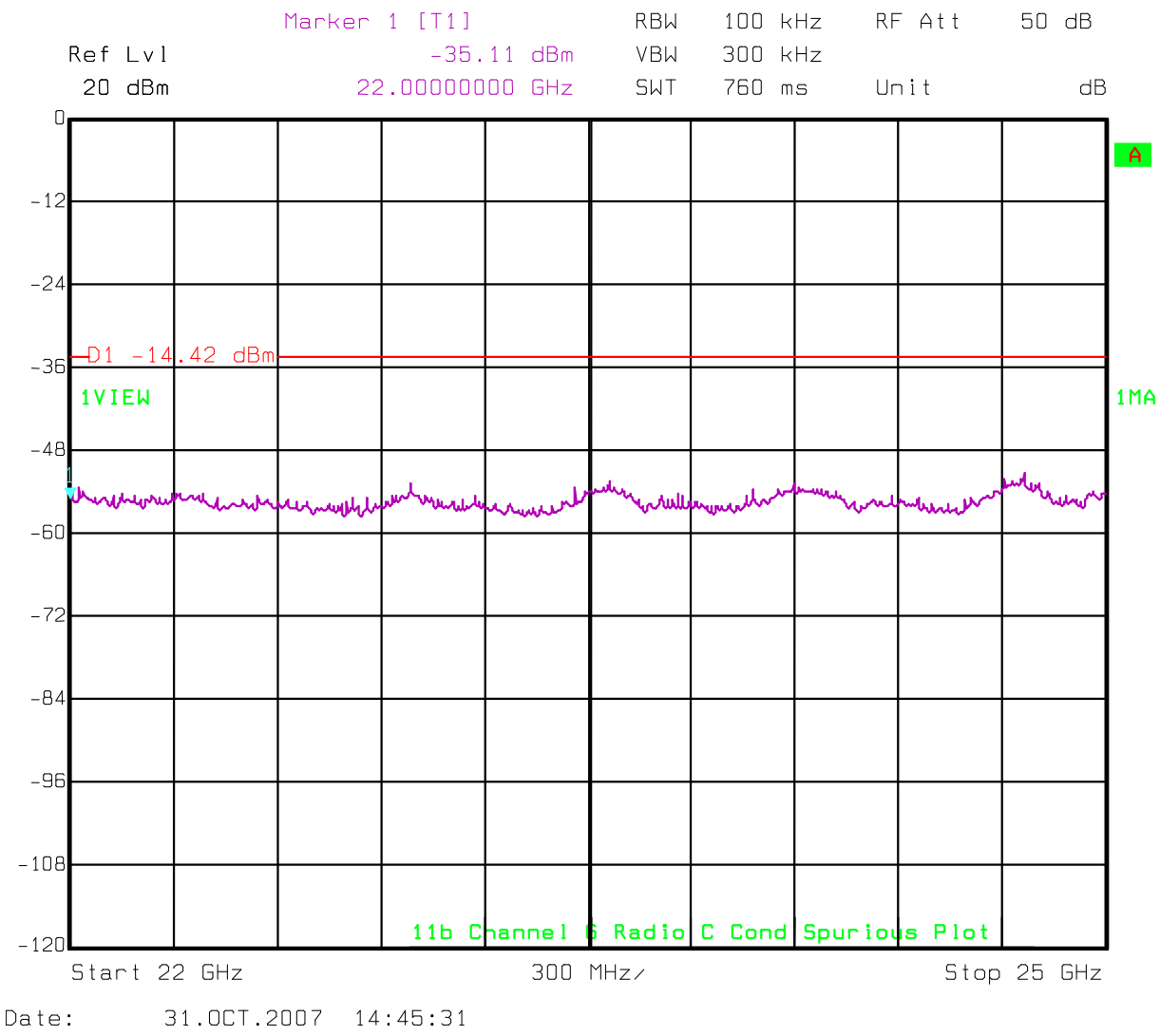

Marker 1 [T1]
-37.78 dBm
3.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
A
1MA
11b Channel 6 Radio C Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 31.OCT.2007 14:39:55


Marker 1 [T1]
-35.31 dBm
6.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
1MA
A
11b Channel 6 Radio C Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 31.OCT.2007 14:40:49

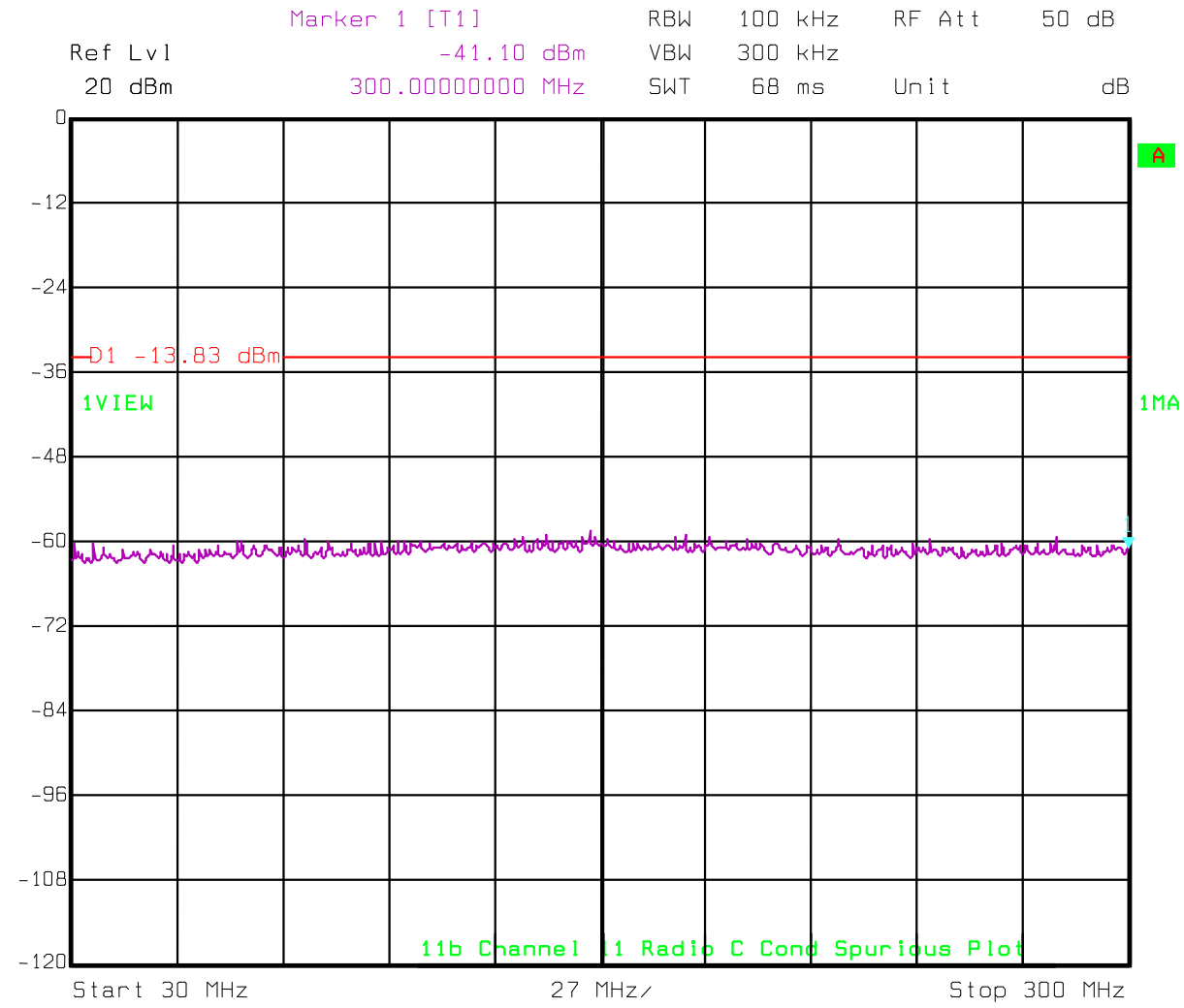

Marker 1 [T1]
-38.32 dBm
10.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
A
1MA
11b Channel 6 Radio C Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 31.OCT.2007 14:41:47

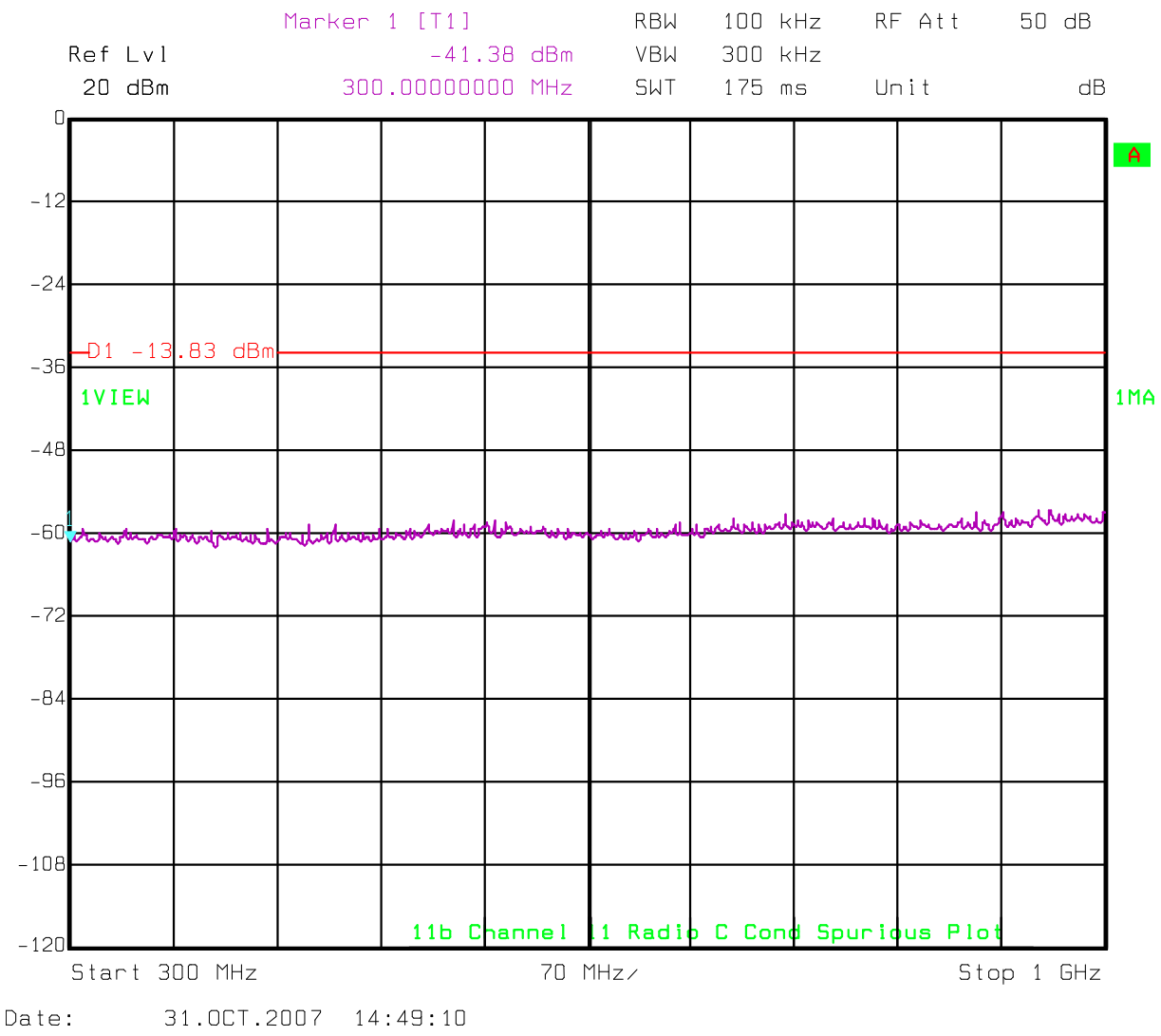

Marker 1 [T1]
-37.77 dBm
14.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
1MA
A
11b Channel 6 Radio C Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 31.OCT.2007 14:42:58

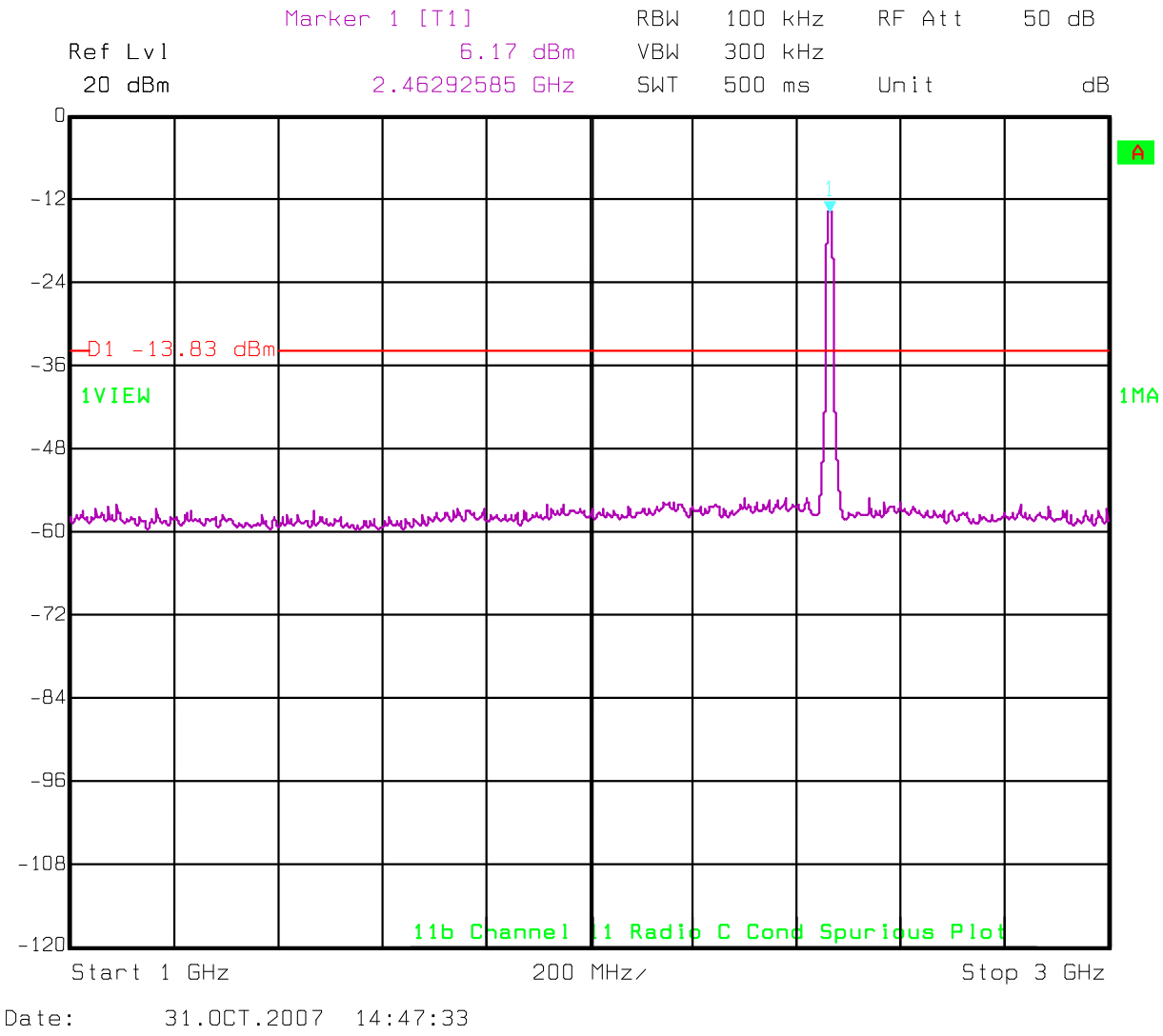

Marker 1 [T1]
-35.09 dBm
18.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
1MA
A
11b Channel 6 Radio C Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 31.OCT.2007 14:43:52

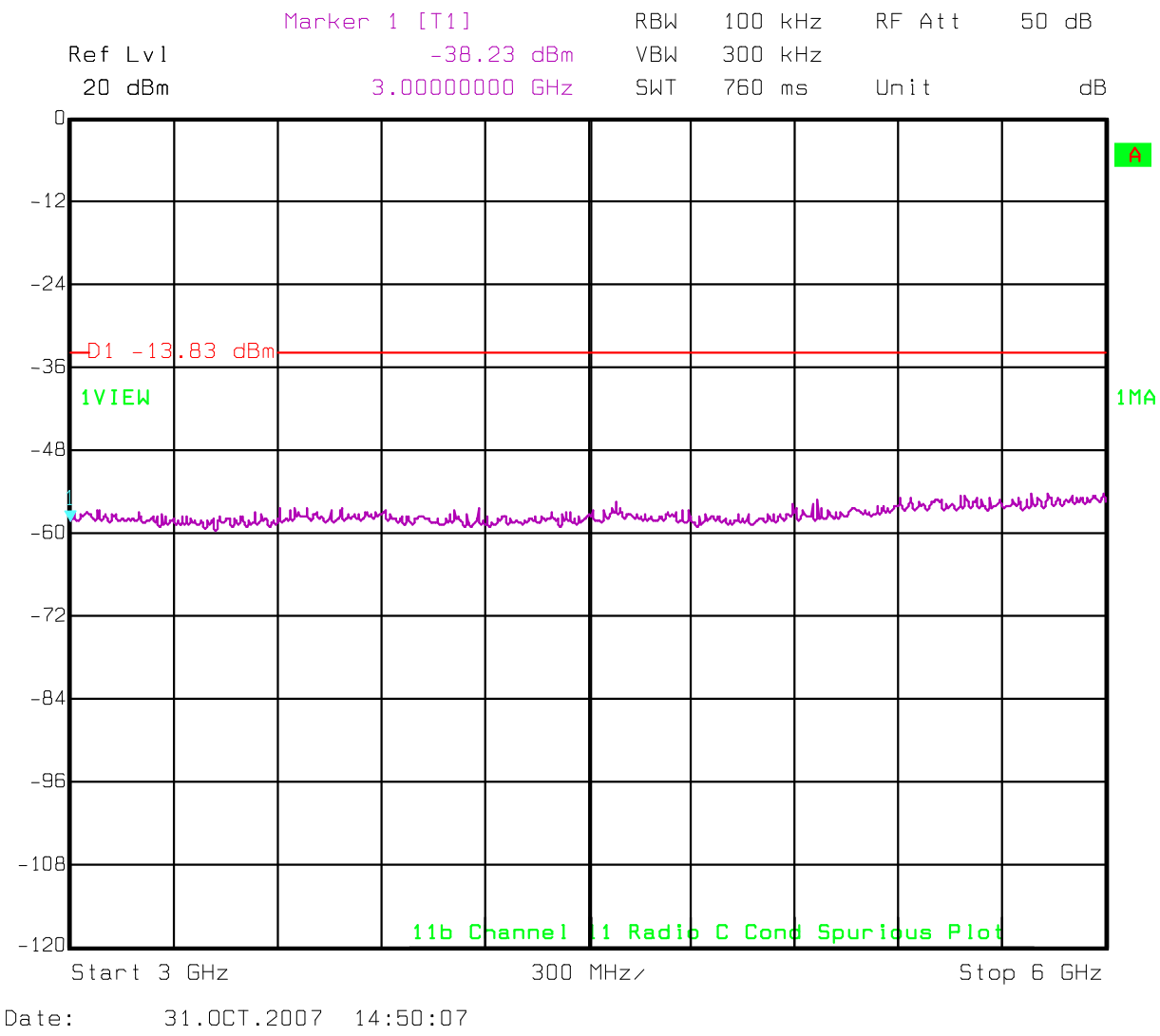

Marker 1 [T1]
-35.11 dBm
22.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -14.42 dBm
1VIEW
1MA
A
11b Channel 6 Radio C Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 31.OCT.2007 14:45:31

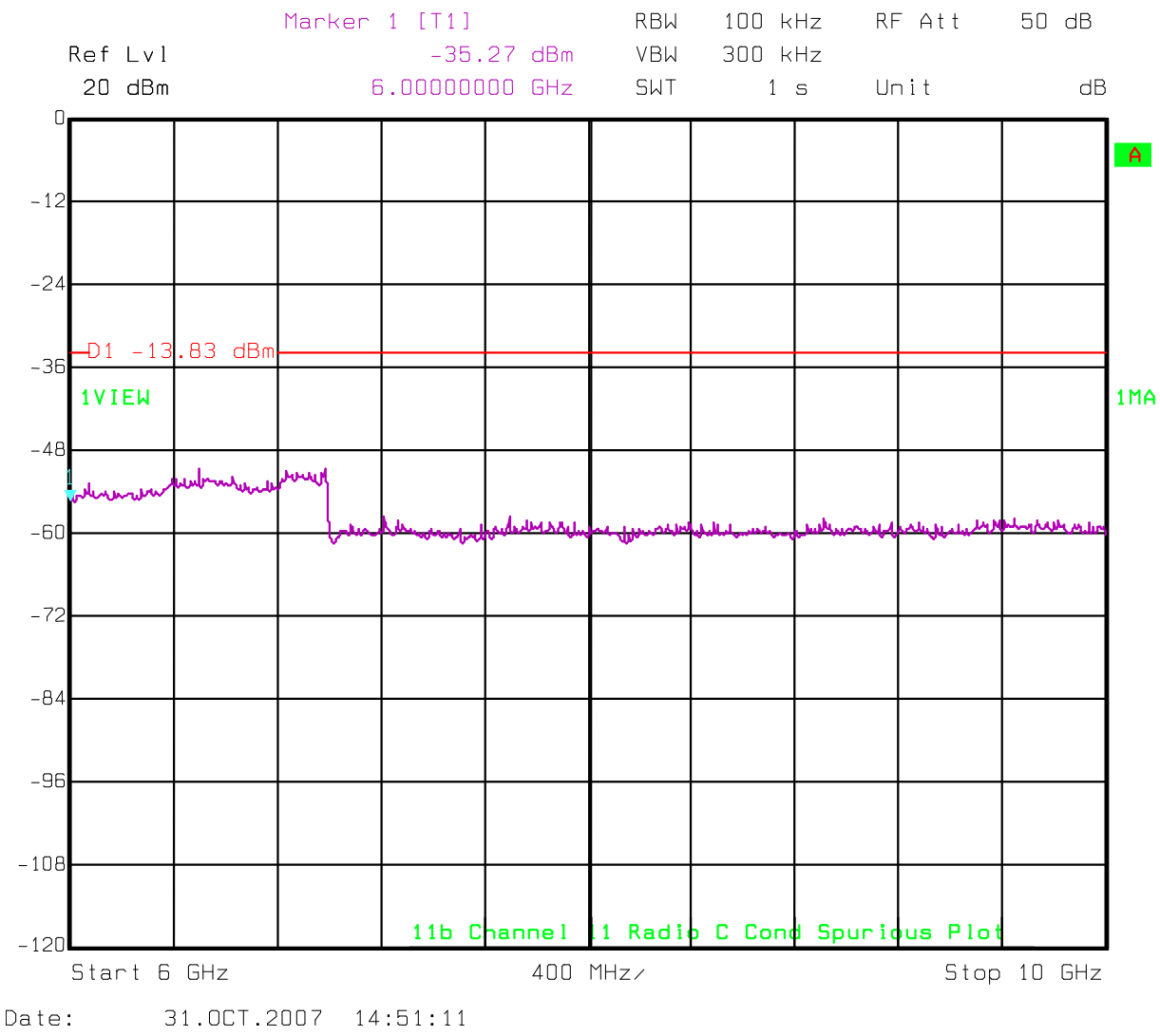
Transceiver C – Channel 11

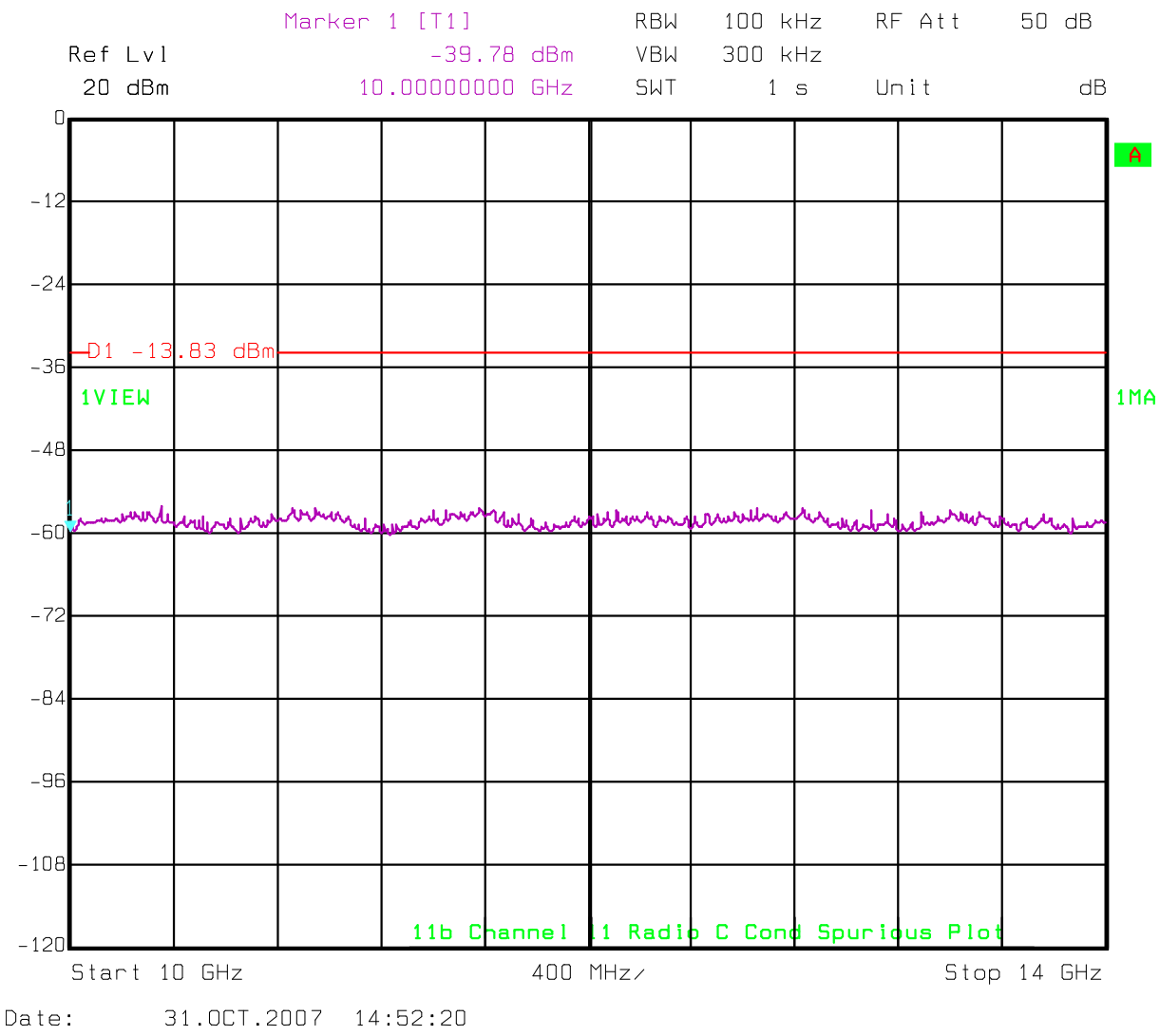


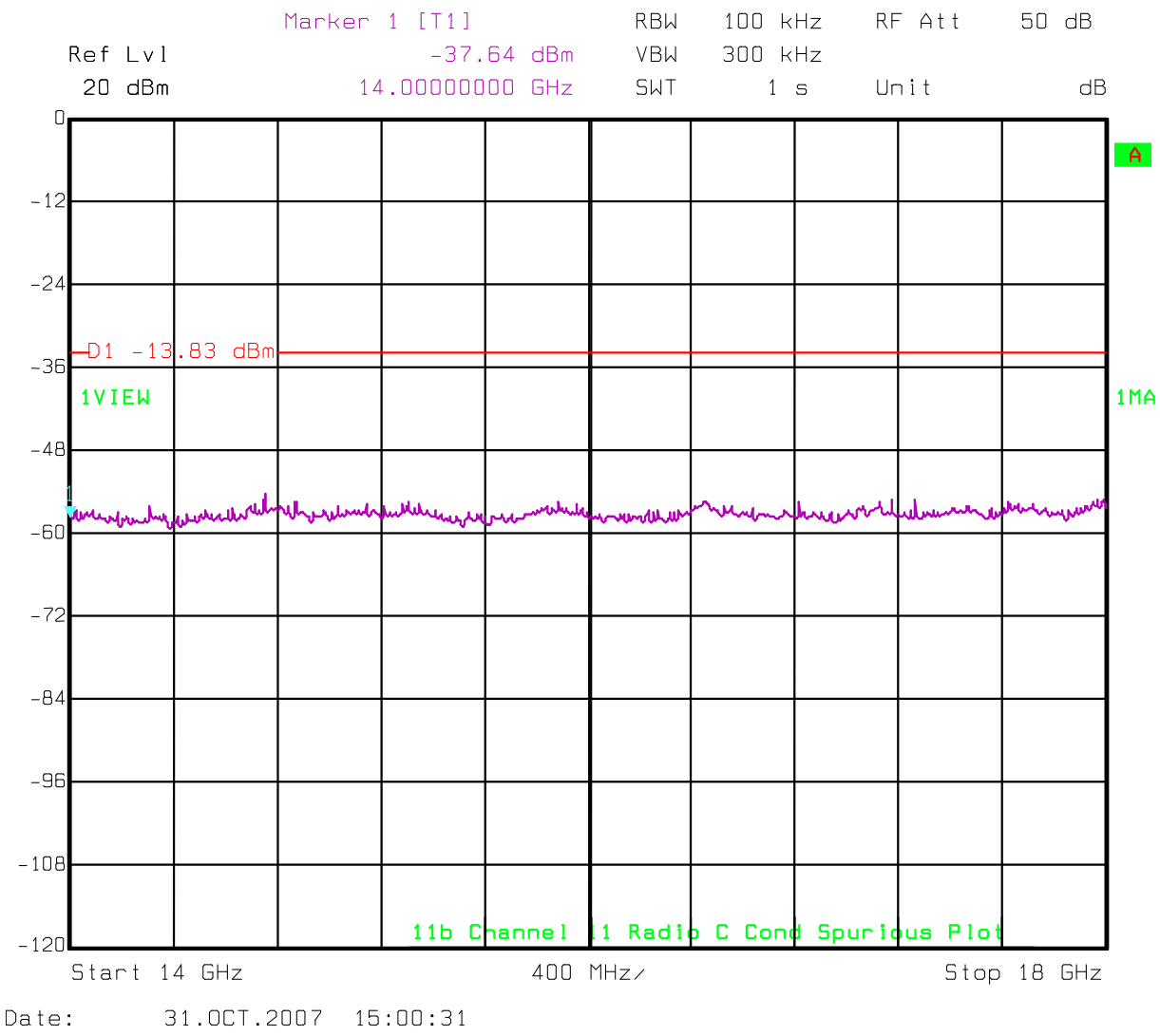

Marker 1 [T1]
-41.38 dBm
300.00000000 MHz
RBW 100 kHz
VBW 300 kHz
SWT 175 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
A
1MA
11b Channel 11 Radio C Cond Spurious Plot
Start 300 MHz
70 MHz/
Stop 1 GHz
Date: 31.OCT.2007 14:49:10

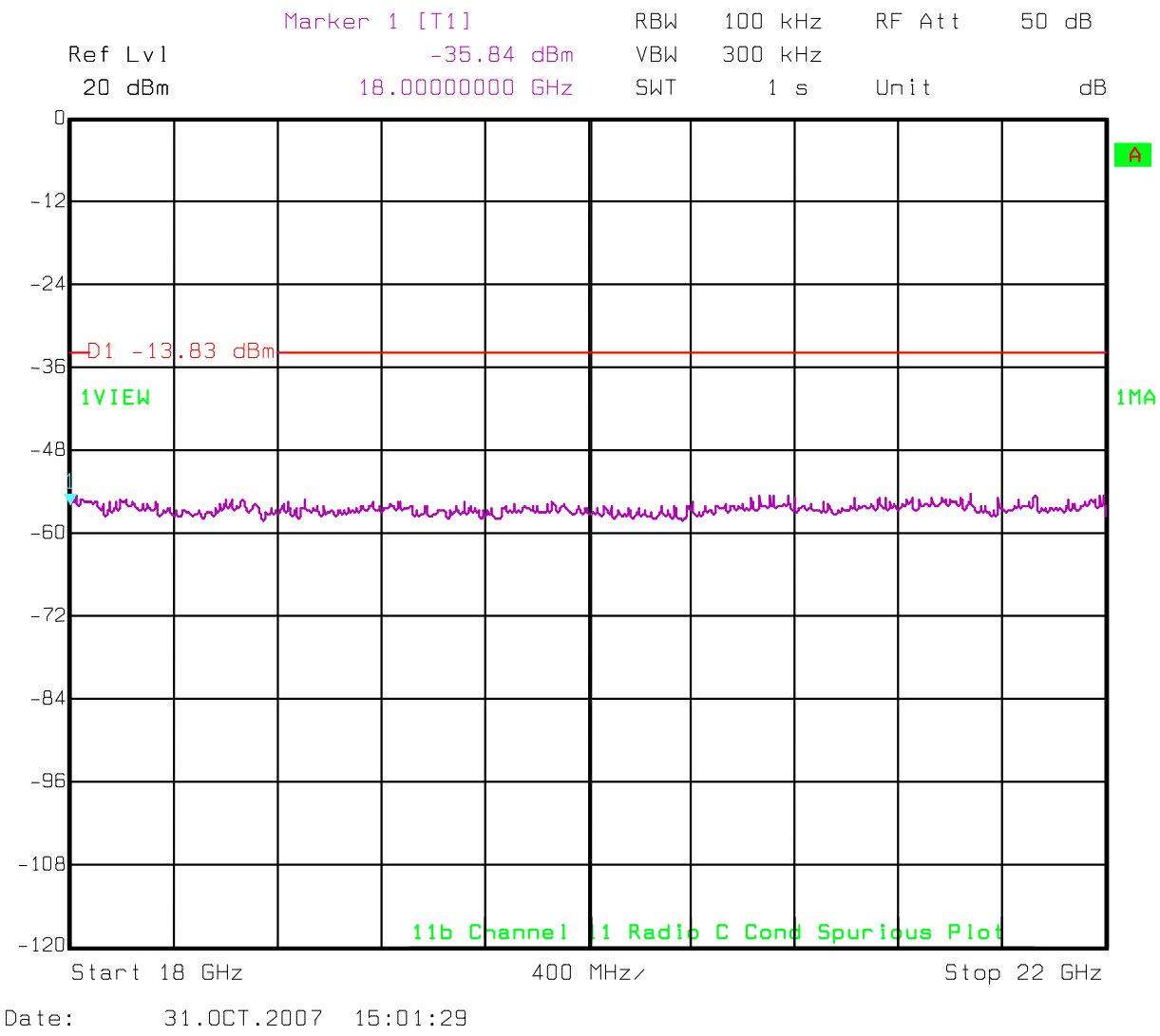

Marker 1 [T1]
Ref Lvl
20 dBm
6.17 dBm
2.46292585 GHz
RBW 100 kHz
VBW 300 kHz
SWT 500 ms
RF Att 50 dB
Unit dB
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
A
1MA
11b Channel 11 Radio C Cond Spurious Plot
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 31.OCT.2007 14:47:33

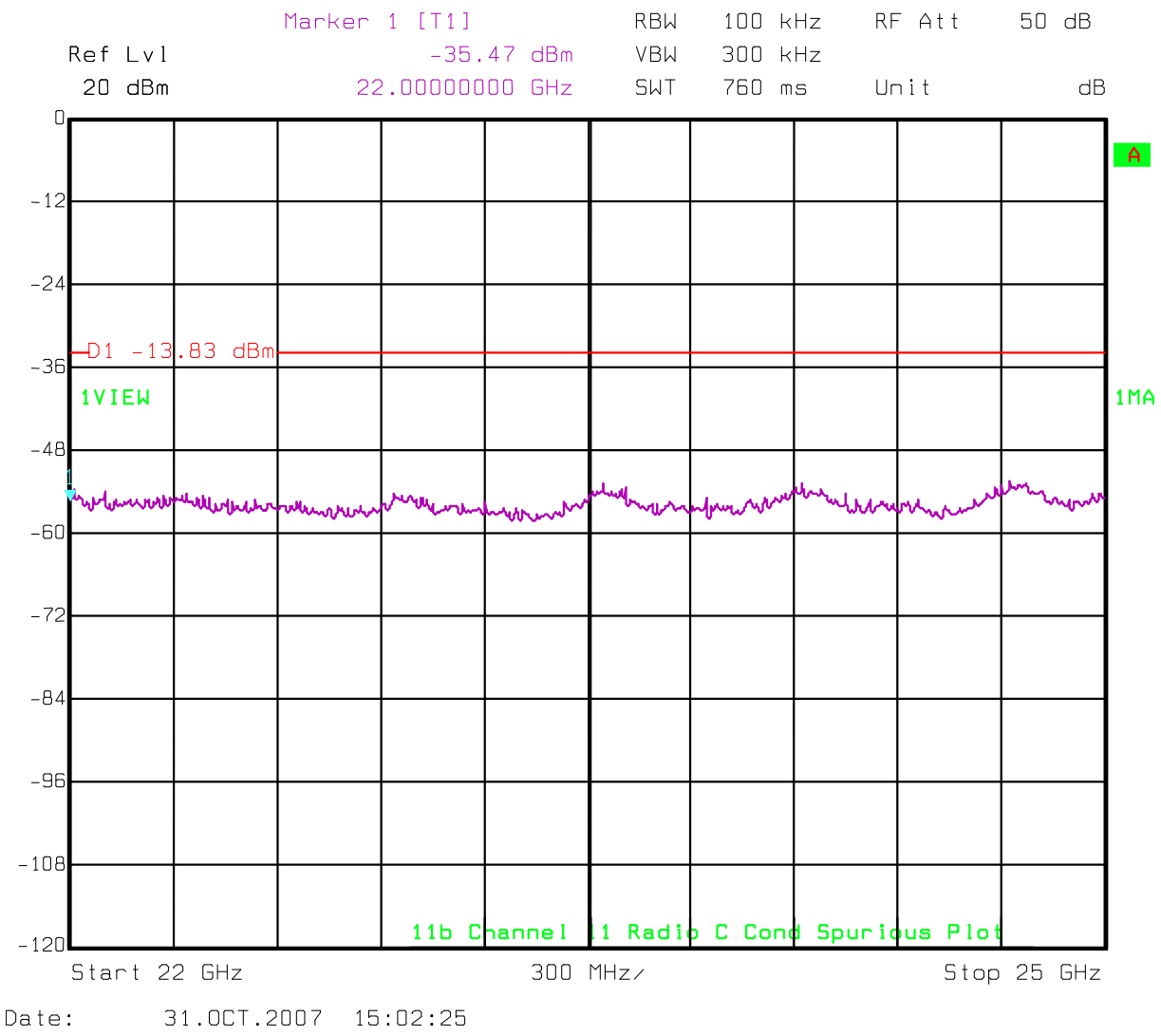

Marker 1 [T1]
-38.23 dBm
3.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
1MA
A
11b Channel 11 Radio C Cond Spurious Plot
Start 3 GHz
300 MHz/
Stop 6 GHz
Date: 31.OCT.2007 14:50:07


Marker 1 [T1]
-35.27 dBm
6.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
1MA
A
11b Channel 11 Radio C Cond Spurious Plot
Start 6 GHz
400 MHz/
Stop 10 GHz
Date: 31.OCT.2007 14:51:11


Marker 1 [T1]
-39.78 dBm
10.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
A
1MA
11b Channel 11 Radio C Cond Spurious Plot
Start 10 GHz
400 MHz/
Stop 14 GHz
Date: 31.OCT.2007 14:52:20


Marker 1 [T1]
-37.64 dBm
14.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
A
1MA
11b Channel 11 Radio C Cond Spurious Plot
Start 14 GHz
400 MHz/
Stop 18 GHz
Date: 31.OCT.2007 15:00:31


Marker 1 [T1]
-35.84 dBm
18.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 1 s
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
1MA
A
11b Channel 11 Radio C Cond Spurious Plot
Start 18 GHz
400 MHz/
Stop 22 GHz
Date: 31.OCT.2007 15:01:29


Marker 1 [T1]
-35.47 dBm
22.00000000 GHz
RBW 100 kHz
VBW 300 kHz
SWT 760 ms
RF Att 50 dB
Unit dB
Ref Lvl
20 dBm
0
-12
-24
-36
-48
-60
-72
-84
-96
-108
-120
D1 -13.83 dBm
1VIEW
1MA
A
11b Channel 11 Radio C Cond Spurious Plot
Start 22 GHz
300 MHz/
Stop 25 GHz
Date: 31.OCT.2007 15:02:25

5.7 Power Spectral Density Results

This test took place on the 31st October, 2007. The EUT was set up as described in 2.1

Temperature: 16 °C
Humidity: 47 % rh

The peak power spectral density measurements were conducted at the board level connectors using the in-built functions of the R&S Spectrum Analyser for each transceiver in turn, operating on Channels 1, 6 & 11 successively.

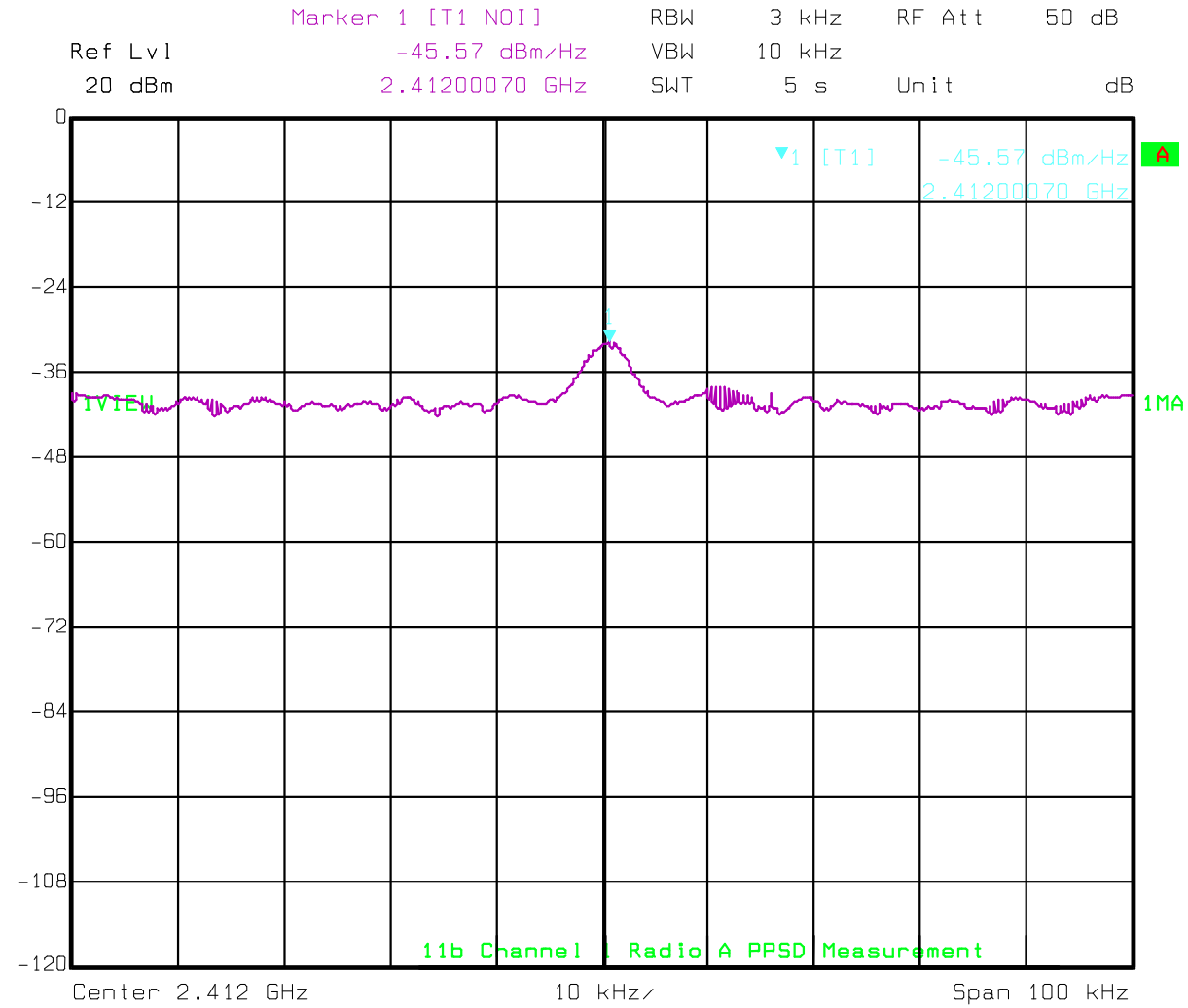
The Spectrum Analyser takes the measurement with reference to 1 Hz, adding a correction of 35 dB to the measurements made provides a corrected reading with reference to 3 kHz.

Transceiver	Operating Channel	PPSD Measurement dBm/Hz	PPSD Normalised correction to 3 kHz	Corrected PPSD reading dB	Limit dB
A	Channel 1	- 45.57	+ 35 dB	- 10.57	+ 8.0
	Channel 6	- 40.77	+ 35 dB	- 5.77	+ 8.0
	Channel 11	- 46.16	+ 35 dB	- 11.16	+ 8.0
B	Channel 1	- 46.19	+ 35 dB	- 11.19	+ 8.0
	Channel 6	- 48.21	+ 35 dB	- 13.21	+ 8.0
	Channel 11	- 47.27	+ 35 dB	- 12.27	+ 8.0
C	Channel 1	- 37.79	+ 35 dB	- 2.79	+ 8.0
	Channel 6	- 37.97	+ 35 dB	- 2.97	+ 8.0
	Channel 11	- 36.15	+ 35 dB	- 1.15	+ 8.0

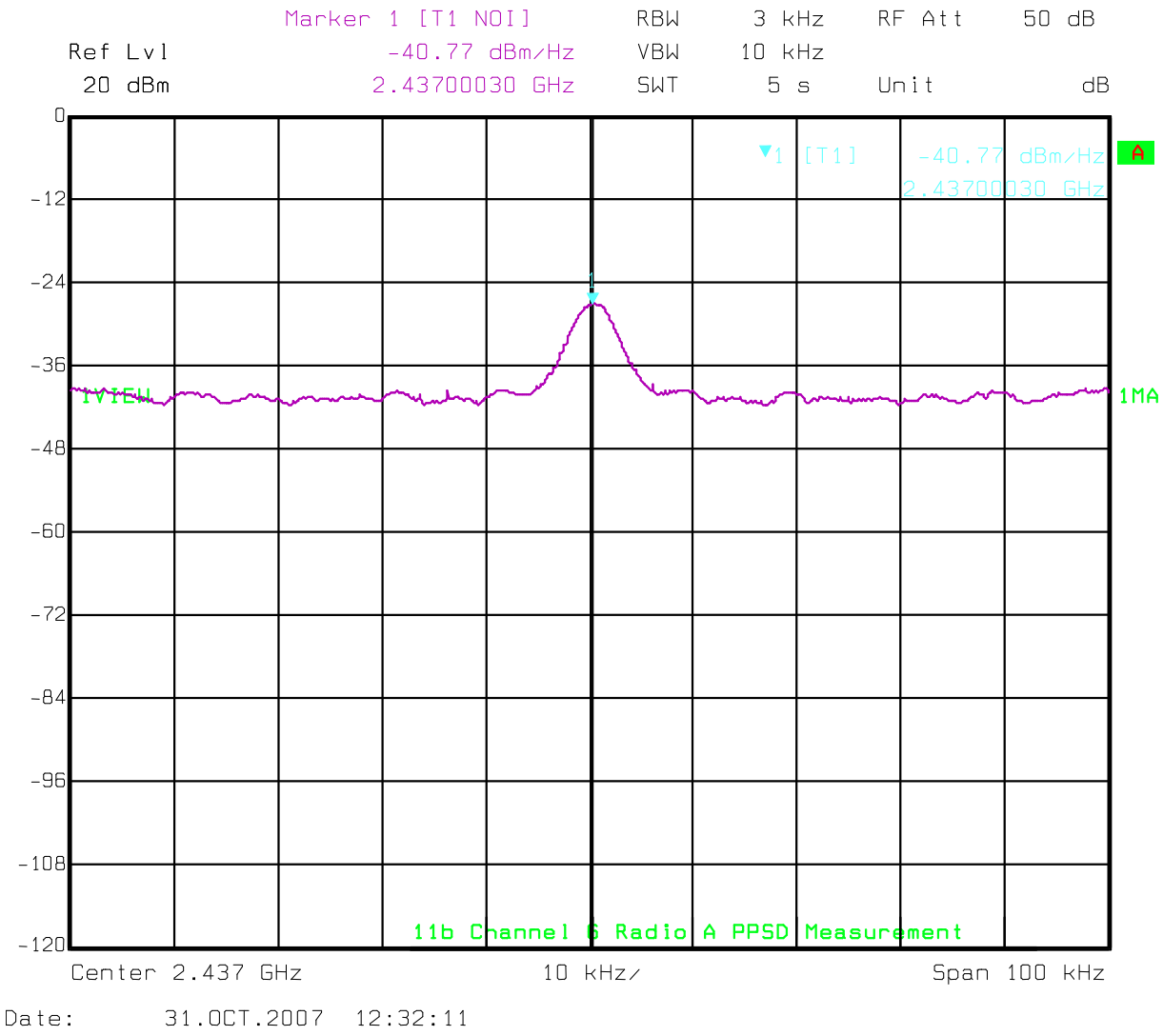
The EUT meets the requirement of CFR 47 Part 15 Subpart C, Section 15.247(e).

5.7.1 Power Spectral Density Plots

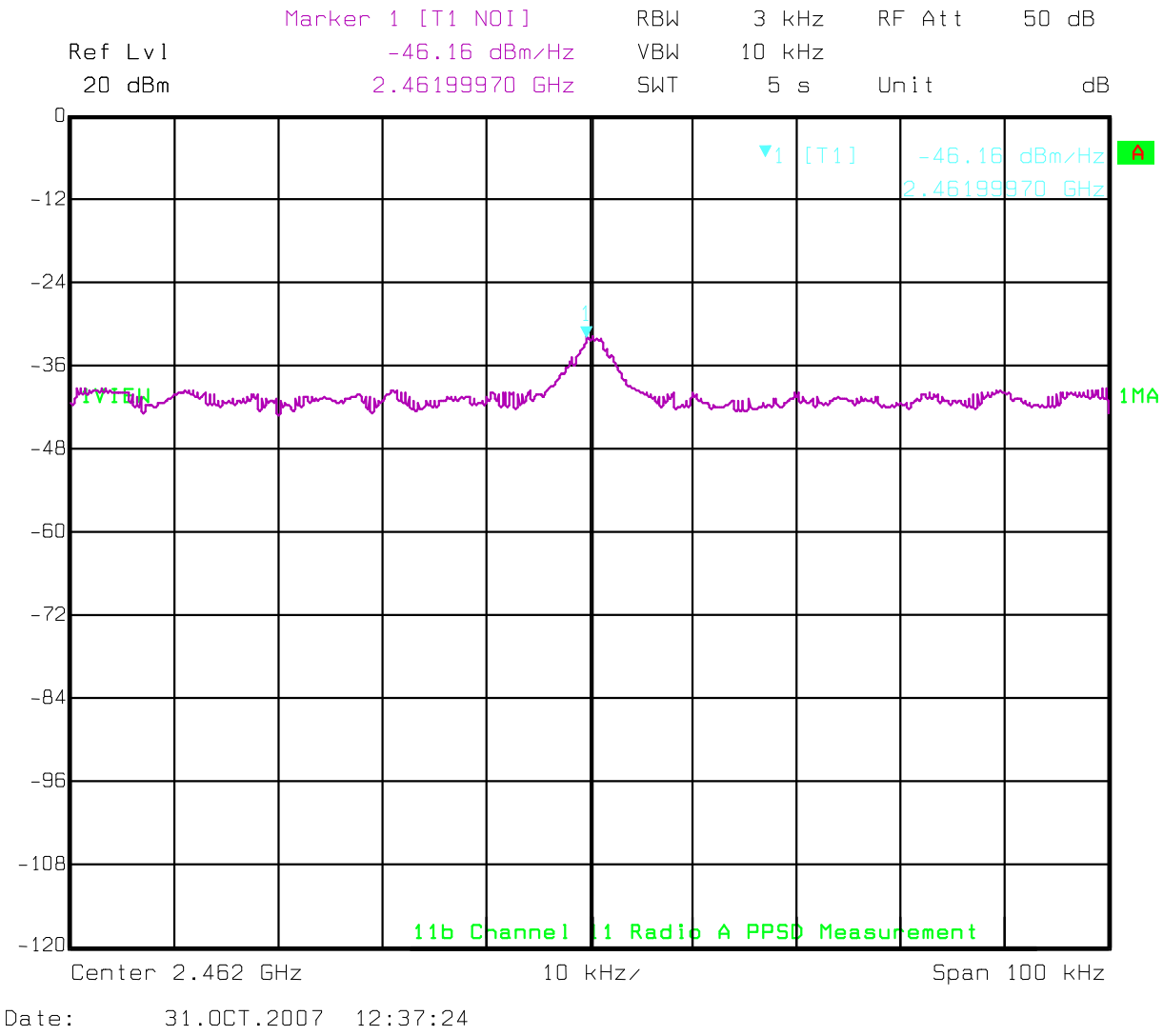
Transceiver A – Channel 1



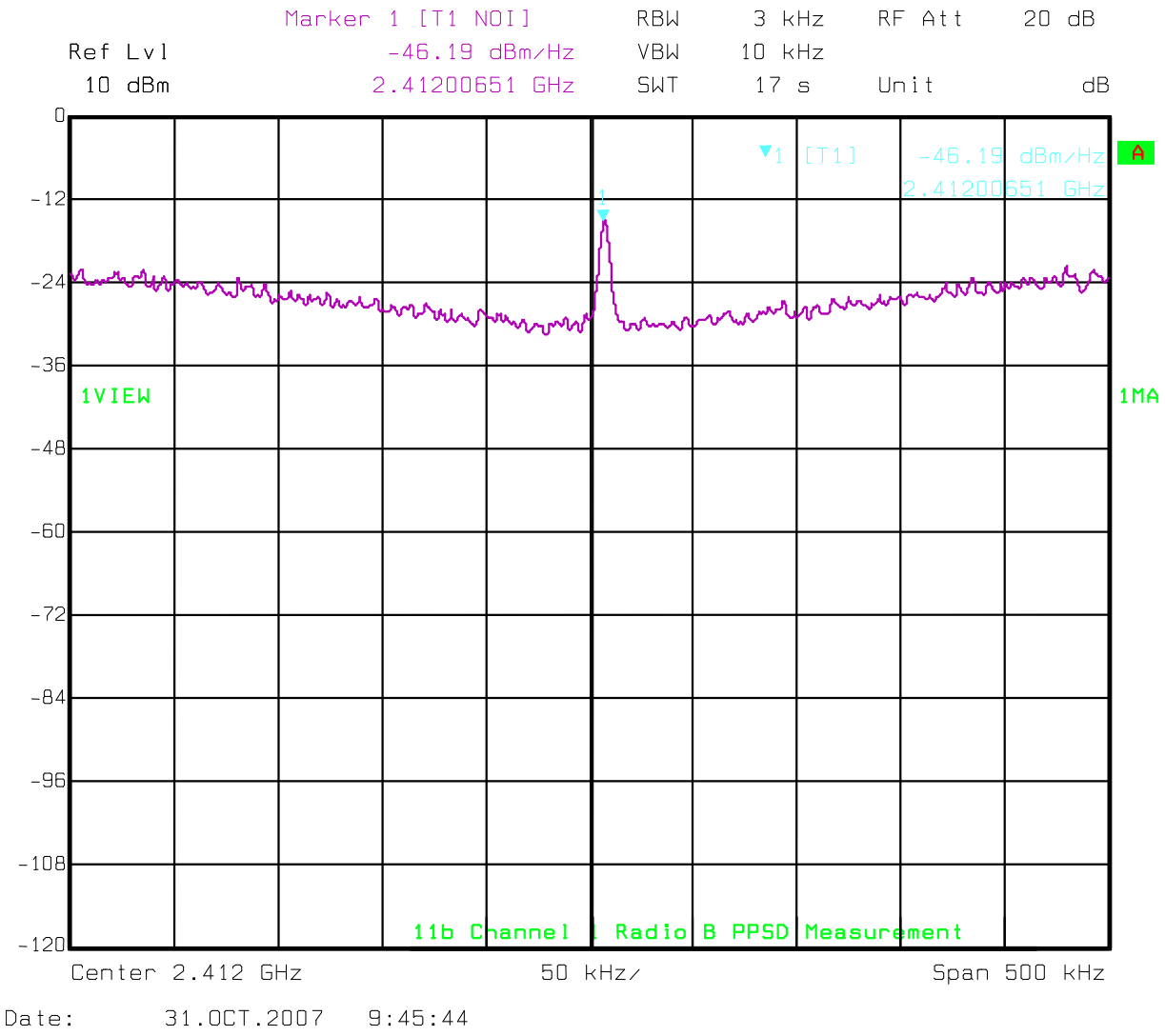
Transceiver A – Channel 6



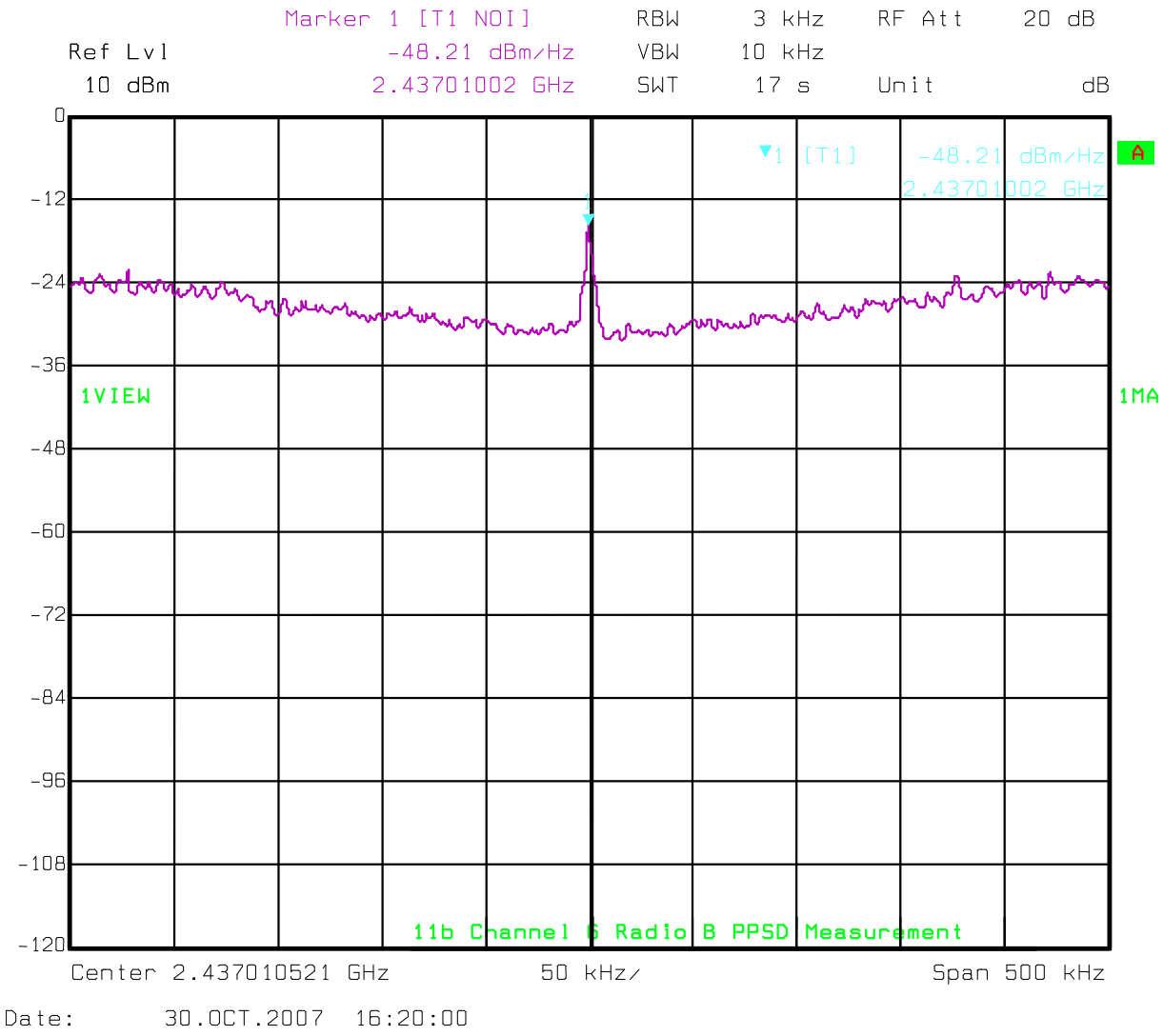
Transceiver A – Channel 11



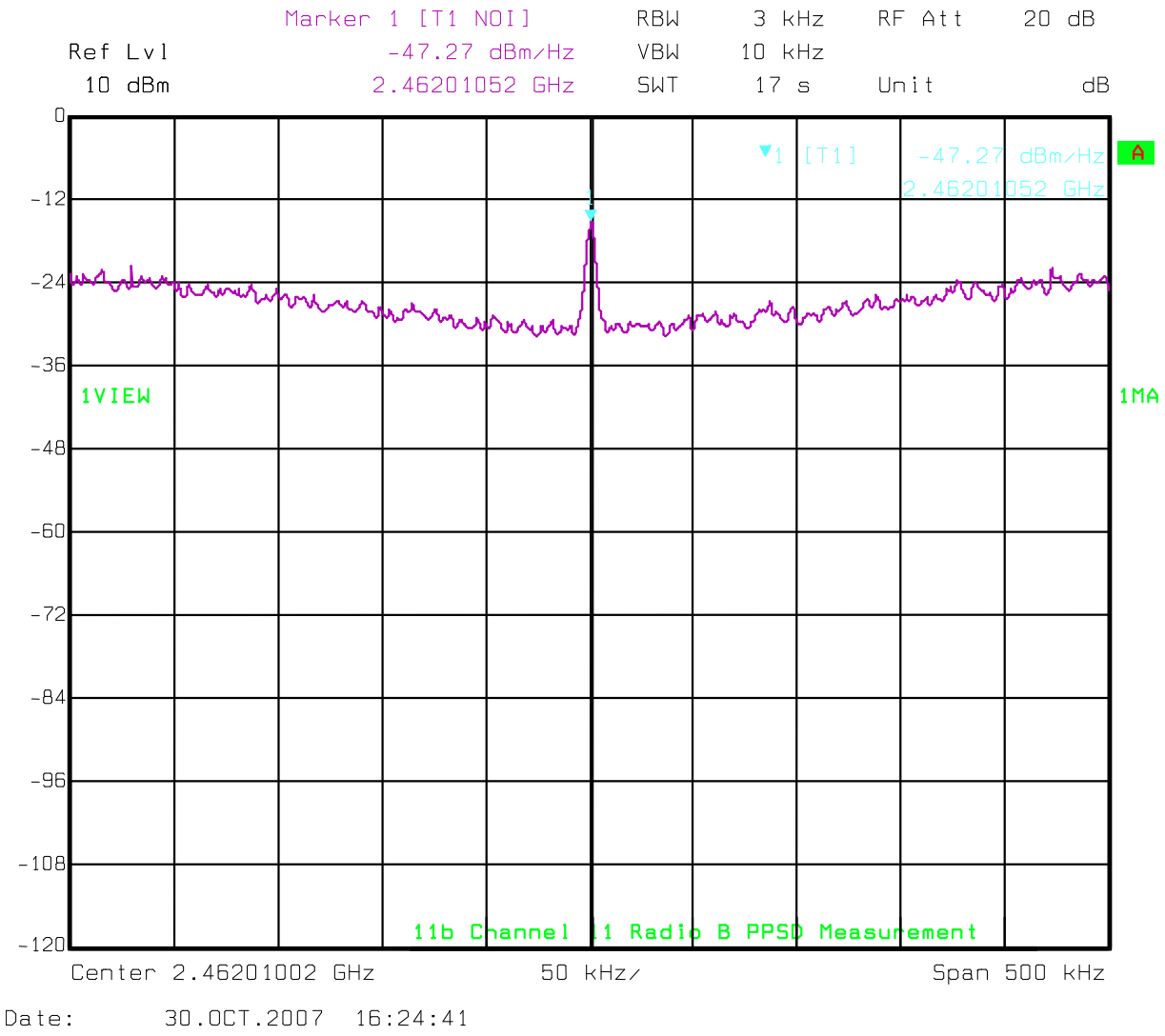
Transceiver B – Channel 1



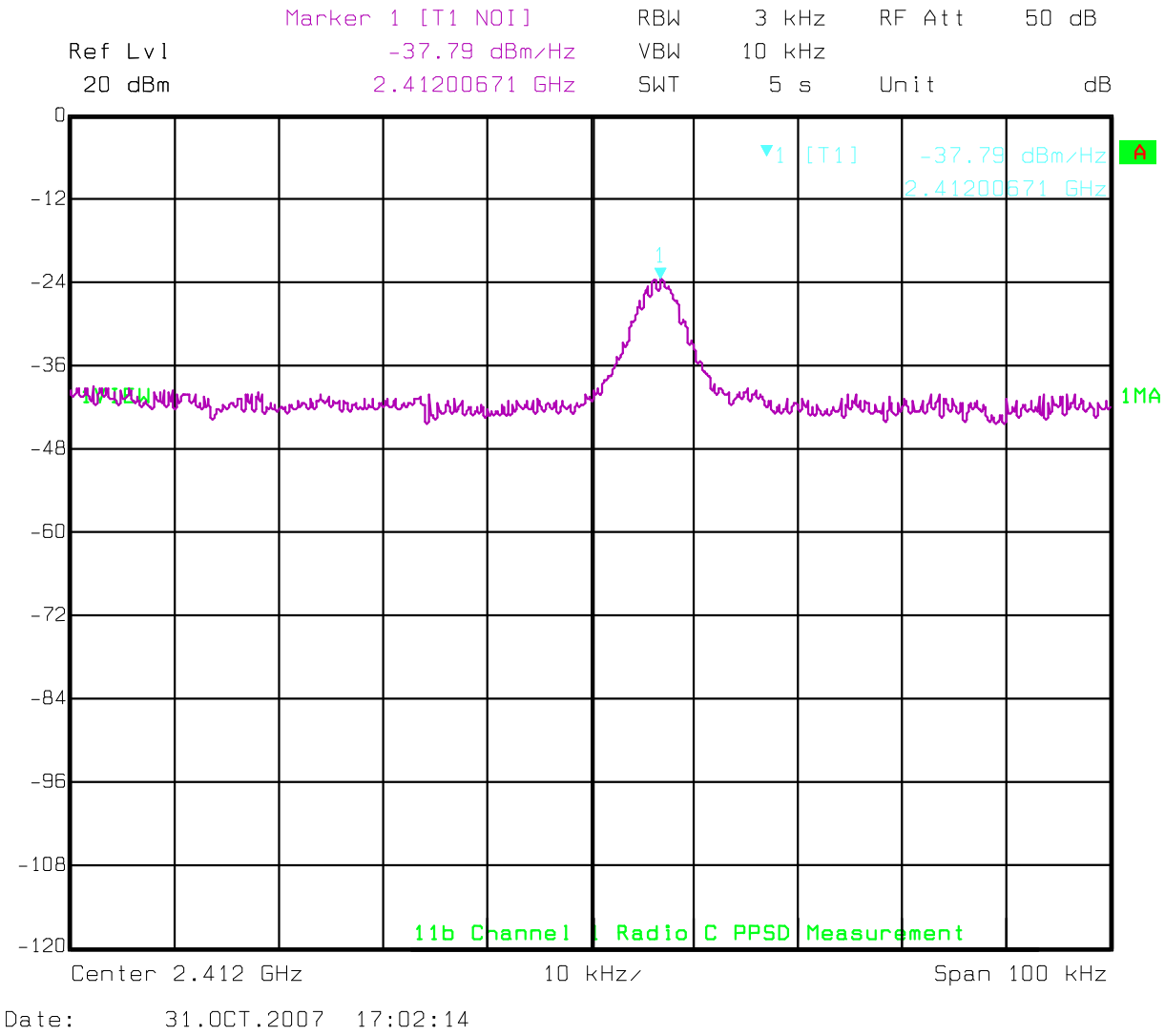
Transceiver B – Channel 6



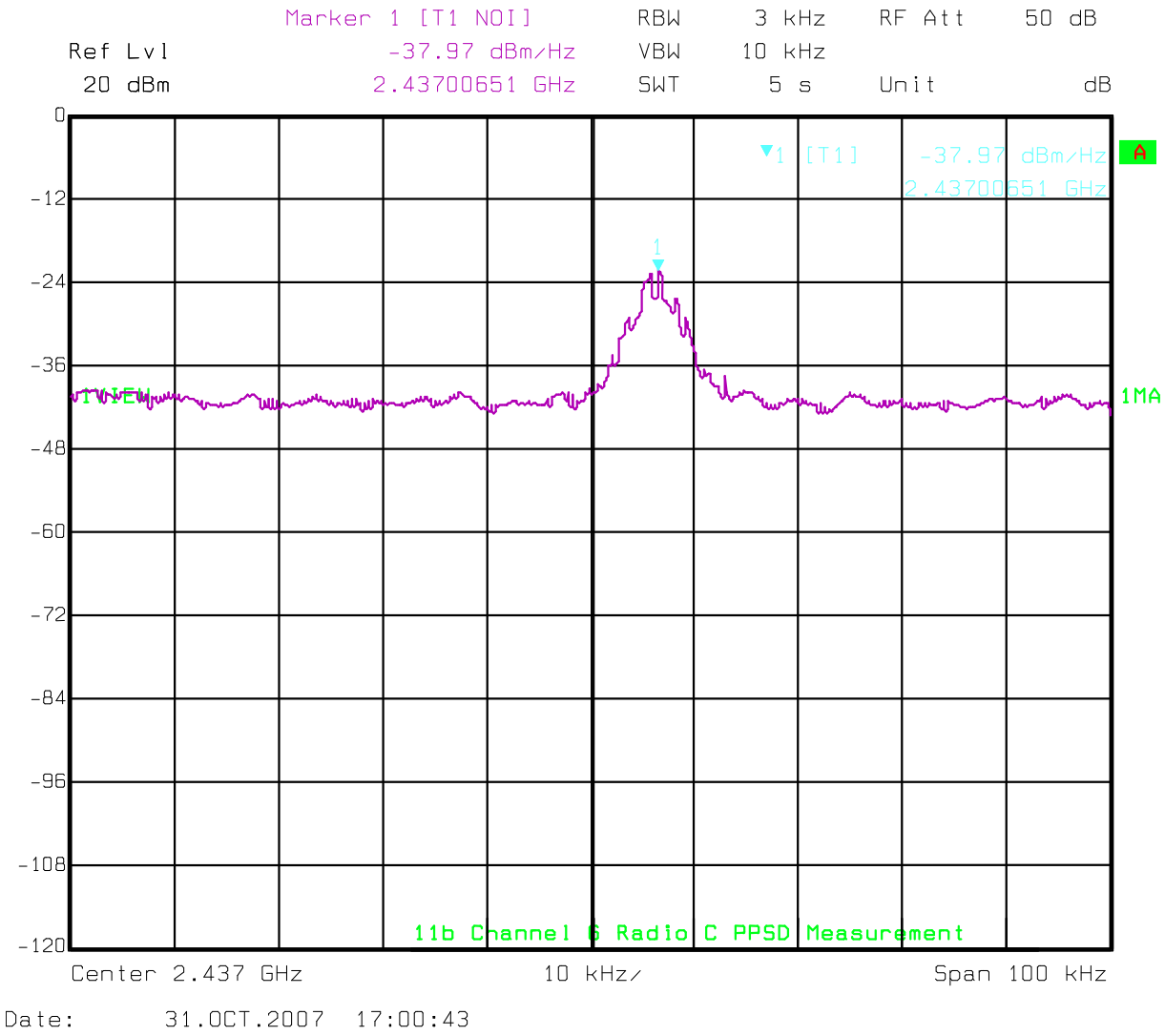
Transceiver B – Channel 11



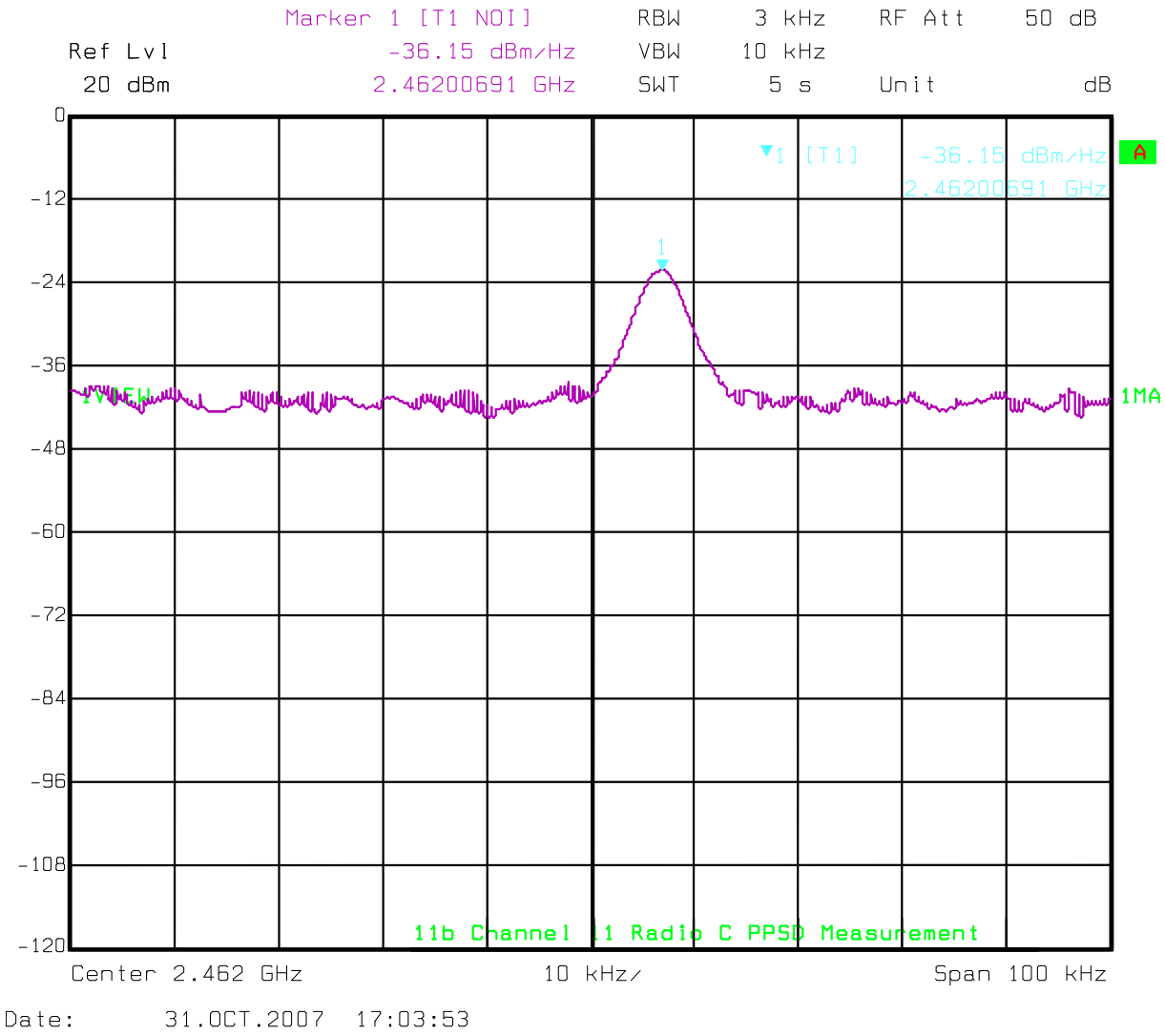
Transceiver C – Channel 1



Transceiver C – Channel 6



Transceiver C – Channel 11



5.8 Occupied Bandwidth Test

This test took place between the 30th - 31st October, 2007. The EUT was set up as described in 2.1

Temperature varied between: 11°C - 16 °C
Humidity varied between: 44% - 47 % rh

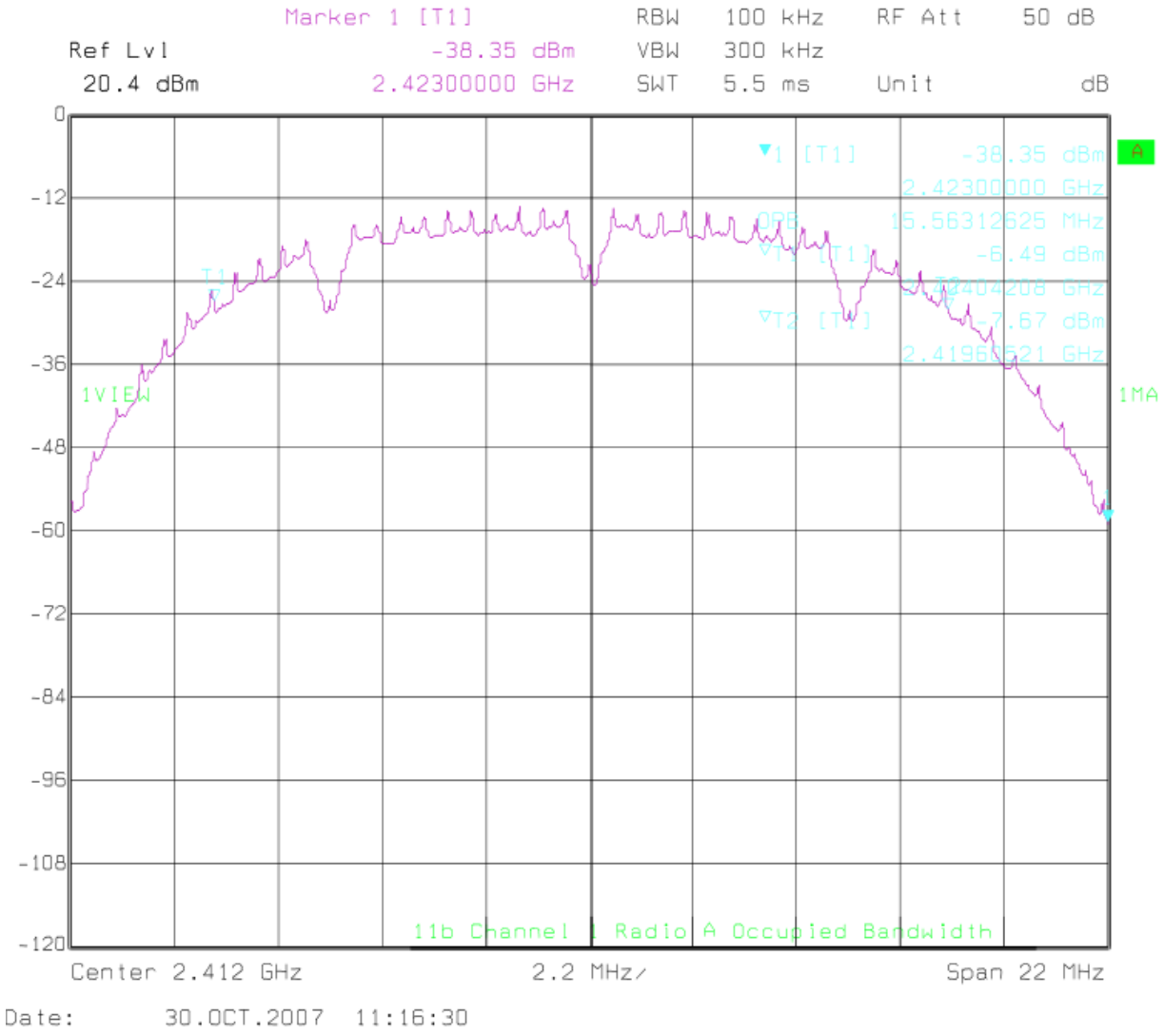
The occupied bandwidth measurements were performed as requested by the customer. The measurements were performed at the board level connectors using the in-built functions of the R&S Spectrum Analyser for each transceiver in turn, operating on Channels 1, 6 & 11 successively.

5.8.1 Occupied Bandwidth Results

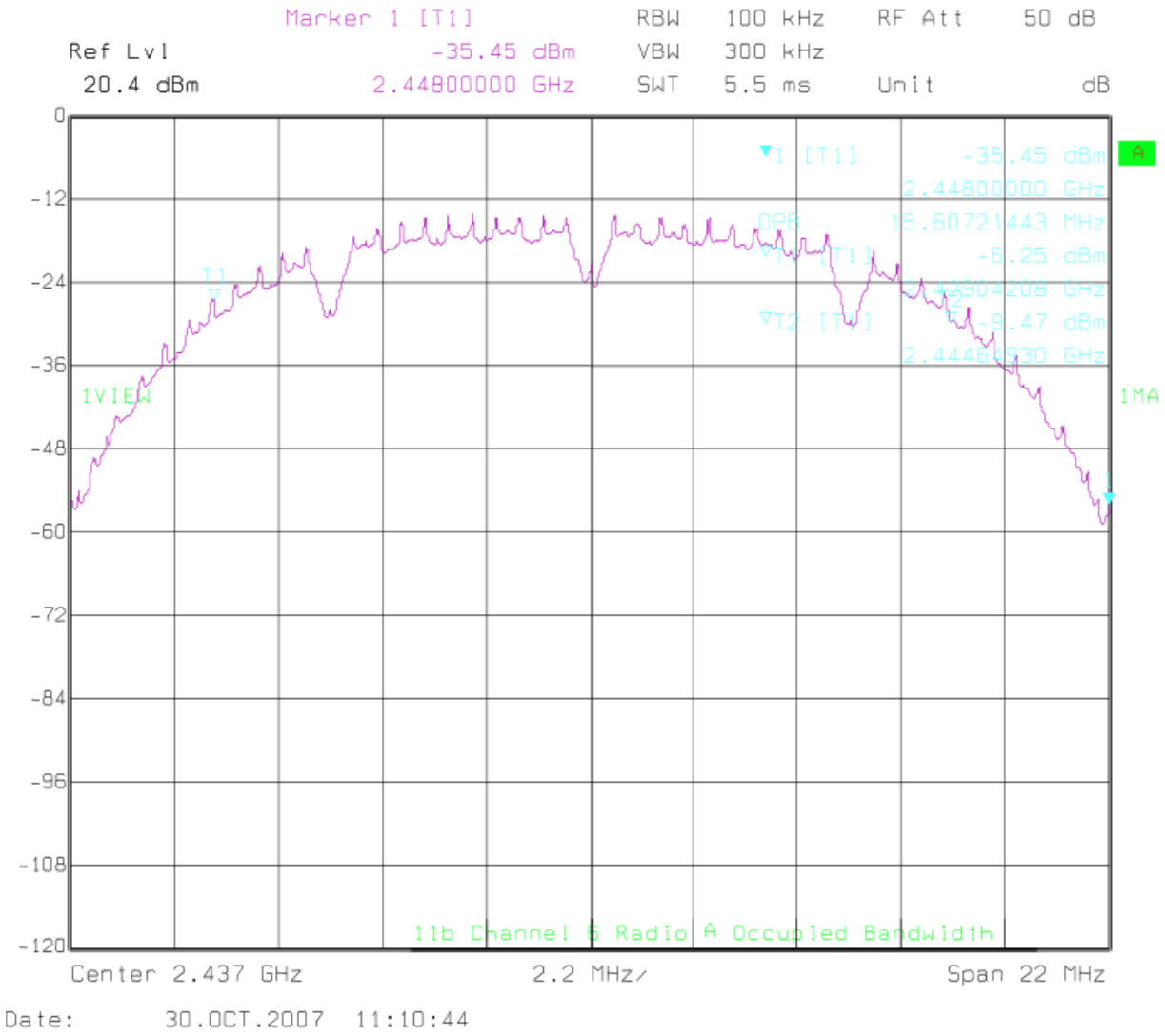
Transceiver	Operating Channel	Measured Occupied Bandwidth (MHz)
A	Channel 1	15.56
	Channel 6	15.61
	Channel 11	15.65
B	Channel 1	15.56
	Channel 6	15.56
	Channel 11	15.61
C	Channel 1	15.56
	Channel 6	15.61
	Channel 11	15.65

5.8.2 Occupied Bandwidth Plots

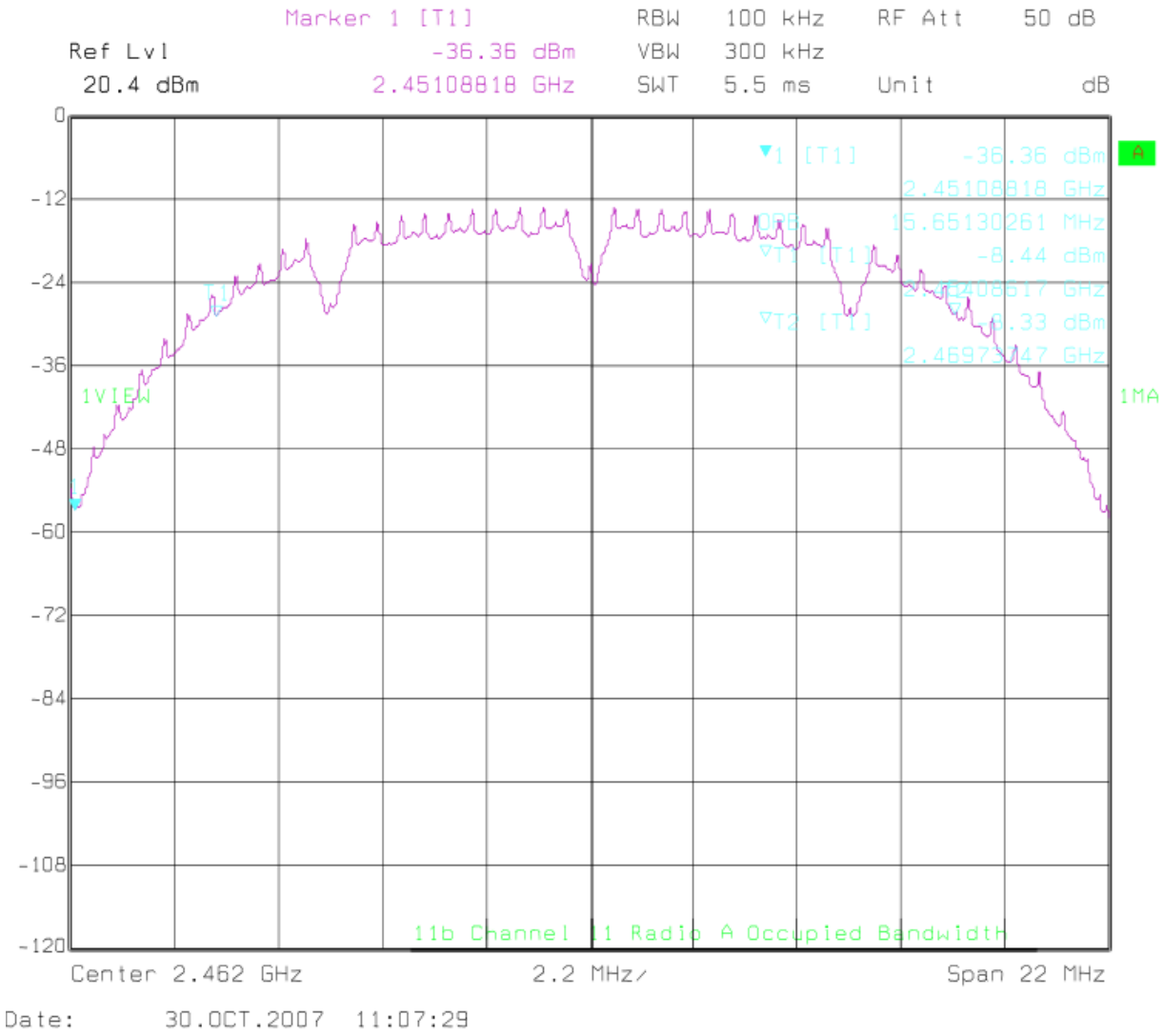
Transceiver A – Channel 1



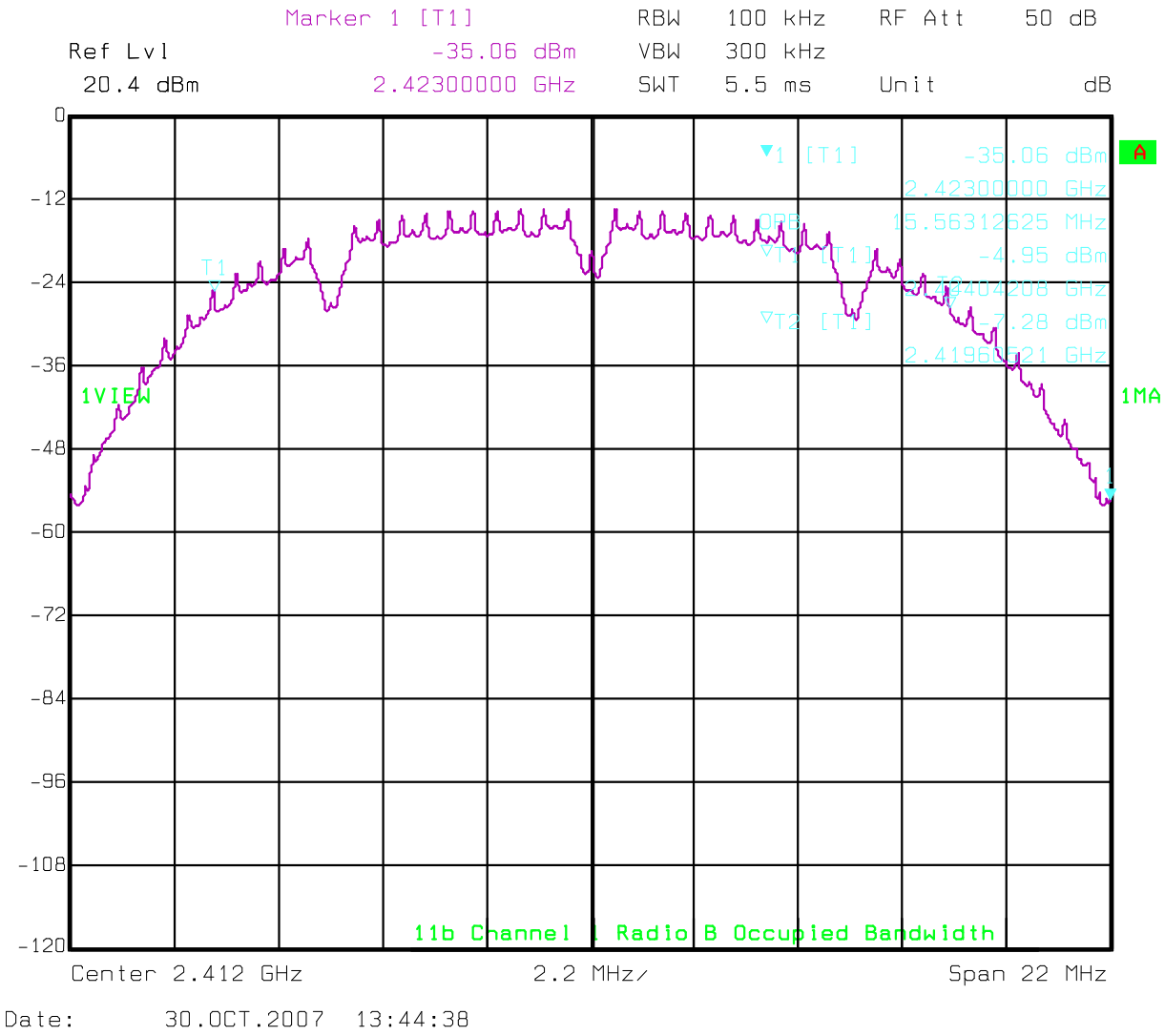
Transceiver A – Channel 6



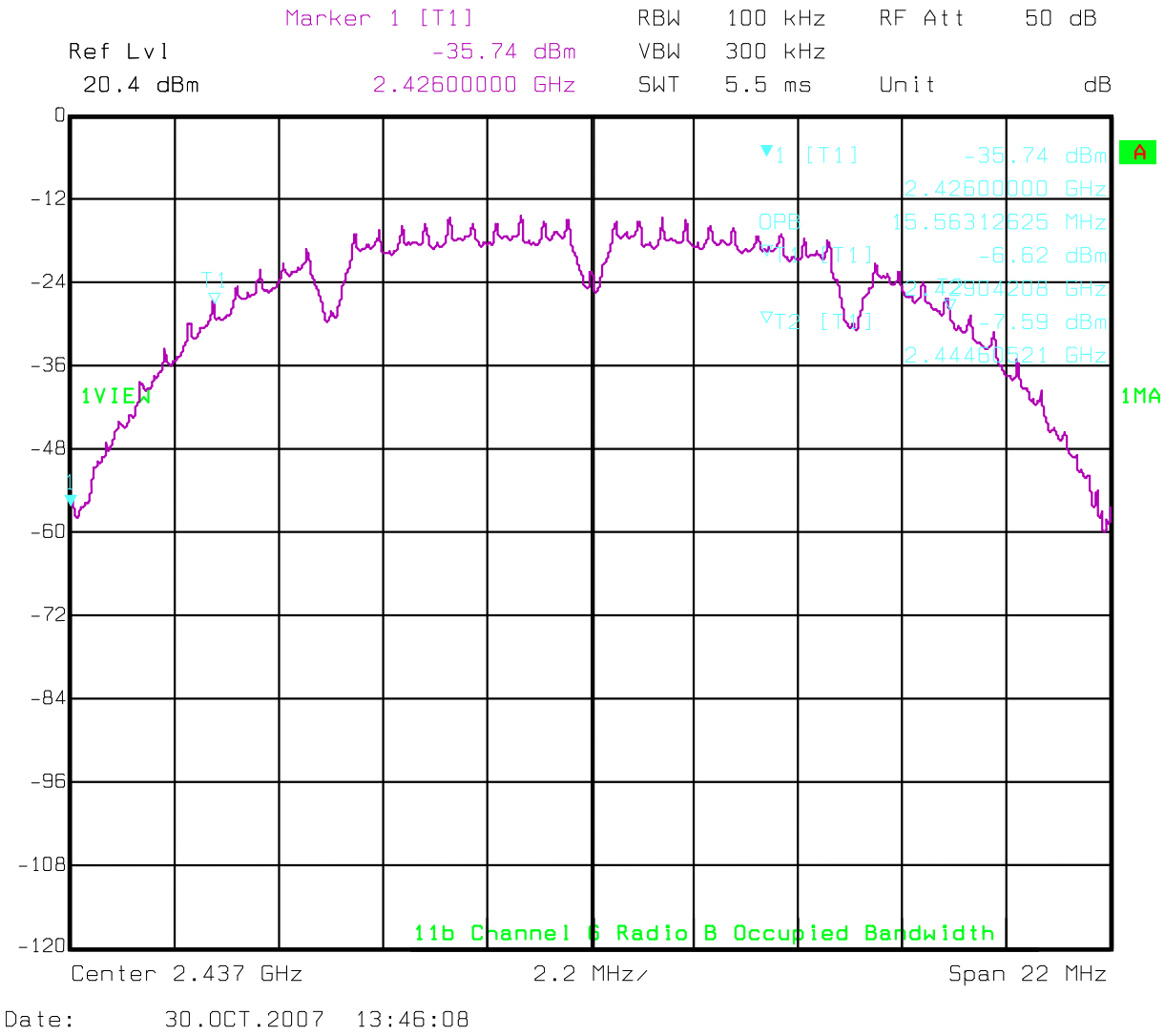
Transceiver A – Channel 11



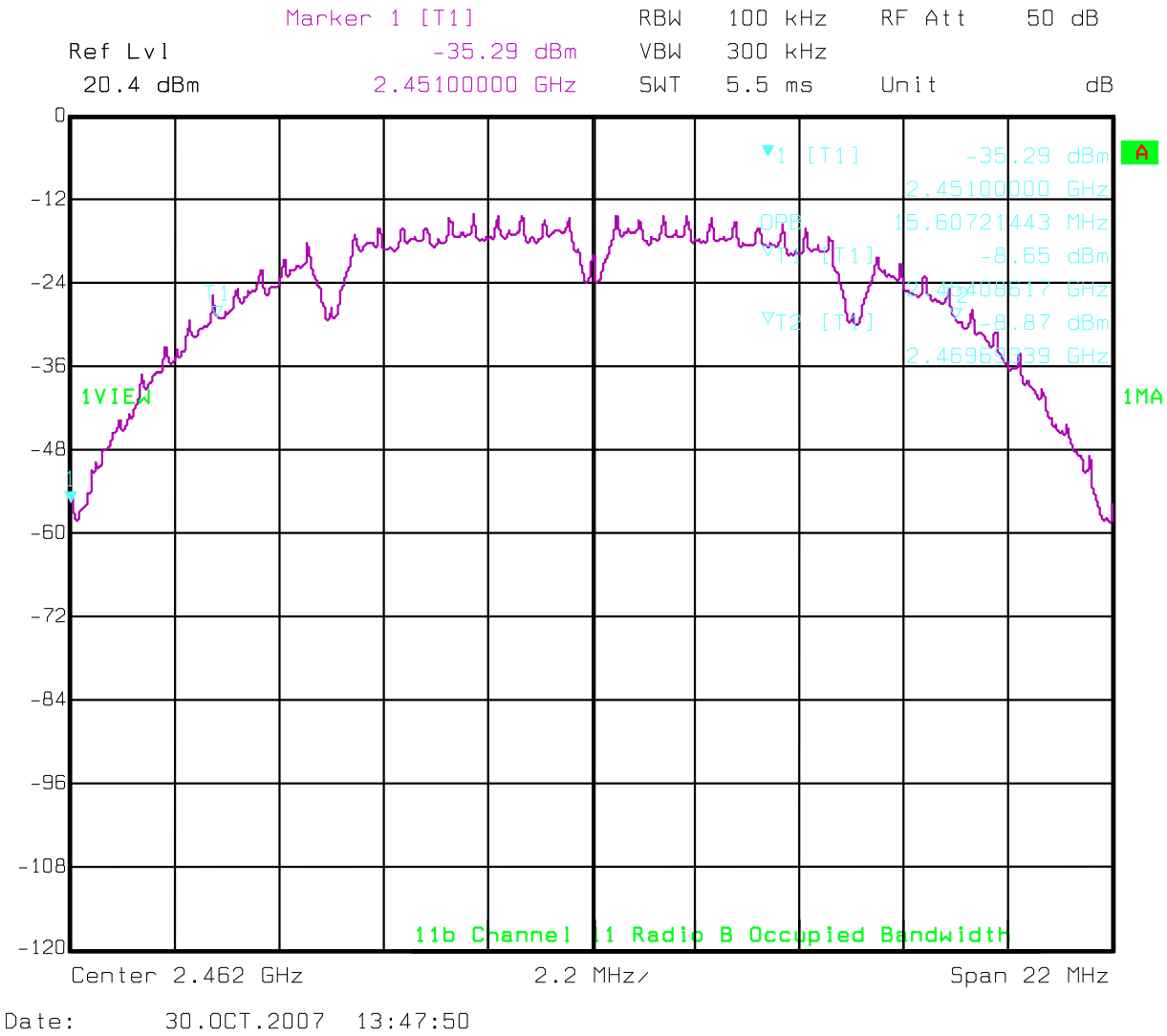
Transceiver B – Channel 1



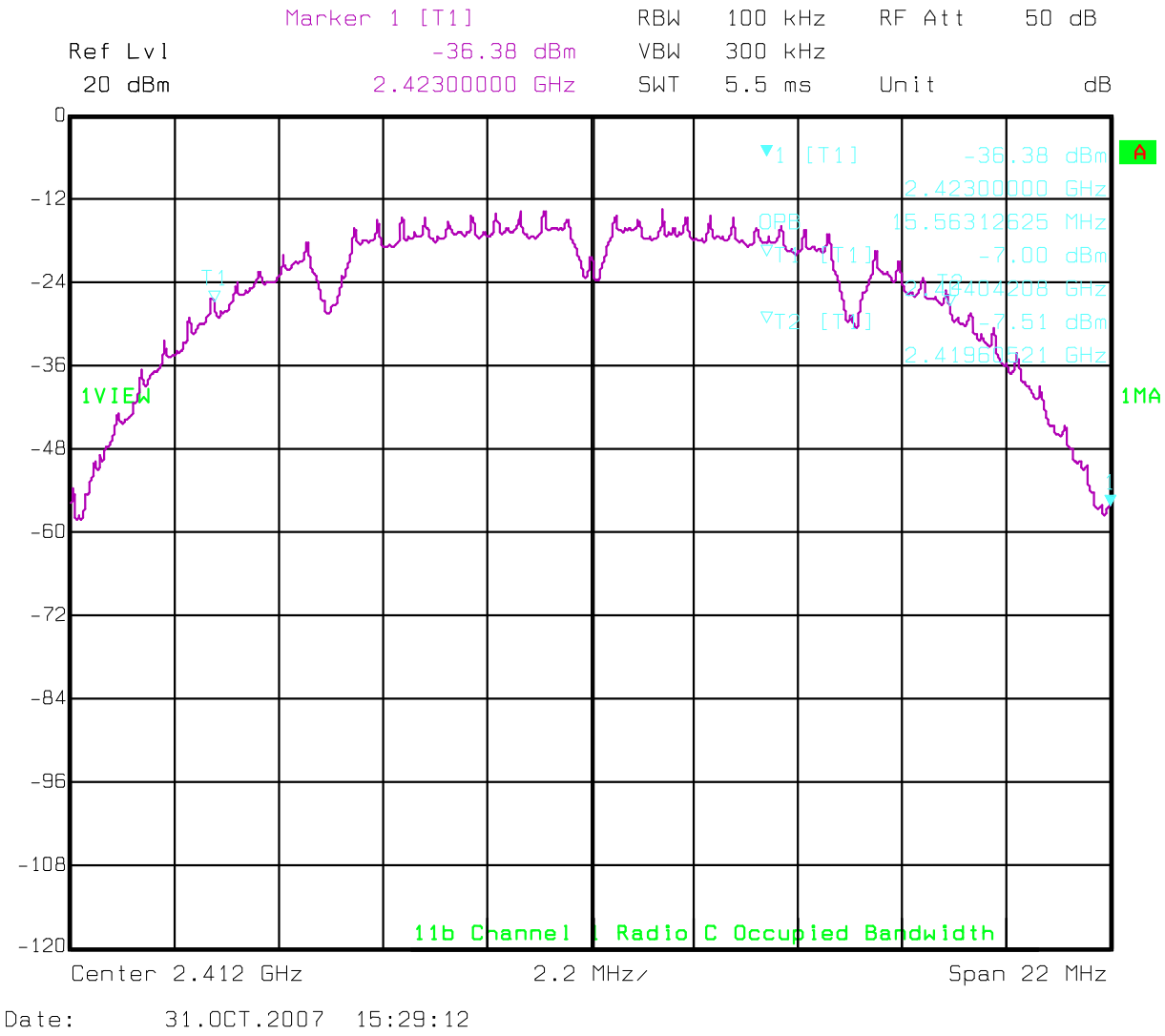
Transceiver B – Channel 6



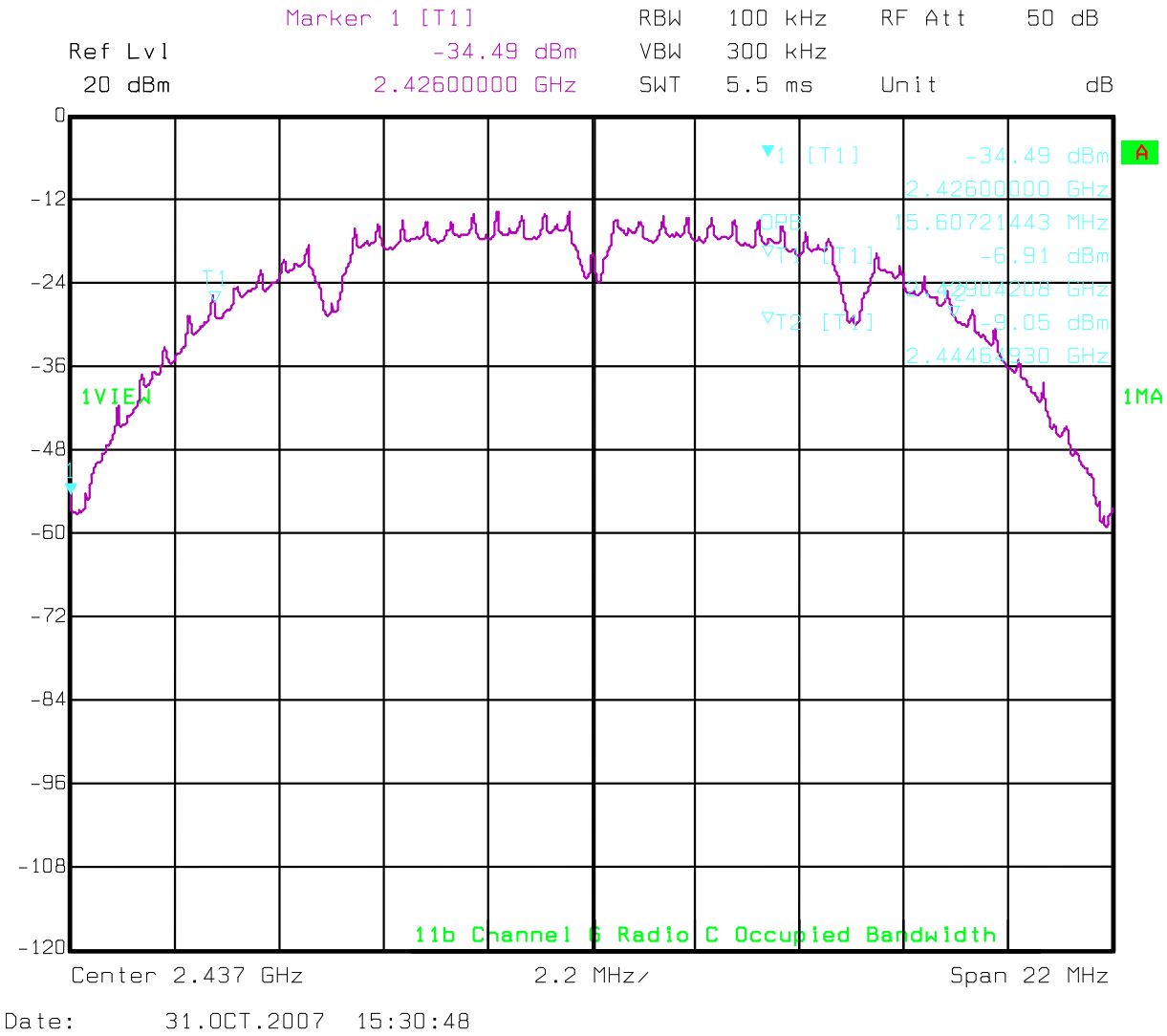
Transceiver B – Channel 11



Transceiver C – Channel 1



Transceiver C – Channel 6



Transceiver C – Channel 11