TEST REPORT

Report Number: 100094986MIN-001
Project Number: G100094986

Testing performed on the
HNAD1A

FCC ID: LHJHNAD1A
Industry Canada ID: 2807E-HNAD1A

to
47 CFR Part 22H:2009
47 CFR Part 24E:2009
RSS-132, Issue 2:2005
RSS-133, Issue 5:2009
47 CFR Part 15:2009, §15.109, Class B
ICES-003, Issue 4, February 2004

For
Continental Automotive Systems Inc.

Test Performed by:	Test Authorized by:
Intertek Testing Services NA, Inc.	Continental Automotive Systems Inc.
7250 Hudson Blvd., Suite 100	21440 West Lake Cook Road
Oakdale, MN 55128	Deer Park, IL, 60010

Prepared by: _____ Date: May 19, 2009
Norman Shpilsher

Reviewed by: _____ Date: May 19, 2009
Uri Spector

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1.0 GENERAL DESCRIPTION

Model:	HNAD
Type of EUT:	GSM/PCS / GPRS / EDGE / HSDPA Module
FCC ID:	LHJHNAD1A
Industry Canada ID:	2807E-HNAD1A
Related Submittal(s) Grants:	N/A
Company:	Continental Automotive Systems Inc.
Customer:	Mrs. Irina Shmagin
Address:	21440 West Lake Cook Road Deer Park, IL, 60010
Phone:	847-862-2420
Fax:	847-862-8015
e-mail:	Irina.shmagin@continental-corporation.com
Test Standards:	☒ 47 CFR, Part 22:2009 ☒ 47 CFR, Part 24:2009 ☒ RSS-132, Issue 2:2005 ☒ RSS-133, Issue 5:2009 ☒ 47 CFR, Part 15:2009, §15.109, Class B ☒ ICES-003, Issue 4, February 2004 ☐ Other
Type of radio:	☐ Stand -alone ☒ Module ☐ Hybrid
Date Sample Submitted:	April 16, 2010
Test Work Started:	April 21, 2010
Test Work Completed:	May 3, 2010
Test Sample Conditions:	☐ Damaged ☐Poor (Usable) ☒ Good

1.1 Product Description; Test Facility

Product Description:	GSM / PCS Radio
Transmitter Type:	☐ FHSS ☒ Digital Modulation ☐ WiFi ☐ Blue Tooth
Operating Frequency / Channels:	GSM850: 824.2 – 848.8MHz / channels 128 – 251 PCS: 1850.2 – 1909.8MHz / channels 512 – 810 HSDPA: 826.4 – 846.6MHz / channel 4132 – 4233 1852.4 – 1907.6MHz / channel 9262 – 9538
Modulation:	GMSK, 8PSK, QPSK
Emission Designator:	300KGXW 300KG7W 4M20F9W
Antenna Gain:	Antenna not specified
Transmitter power configuration:	☐ Internal battery ☒ External power source ☐ 120VAC ☐ 230VAC ☐ 400VAC ☒ 12 VDC ☐ Other: Amp. ☐ 50Hz ☐ 60Hz
Test Facility Accreditation:	A2LA (Certificate No. 1427.01)
Test Methodology:	Measurements performed according to the procedures in ANSI C63.4-2003, ANSI/TIA/EIA-603-A

1.2 EUT Configuration

The equipment under test was operated during the measurement under the following conditions:

☐ - Standby
☒ - Continuous transmissions modulated signal (see details below)
☐ - Continuous transmissions (un-modulated signal)
☐ - Continuous receiving
☐ - Test program (customer specific)
☐ -

Operating modes of the EUT:

No.	Description
1	Continuous communication with Wireless Communication Test Set. Test was performed at low channel, middle channel, and upper channel for each band of operation.

Support equipment/Services:

No.	Item	Description
1	Agilent 8960 Series 10 E5515C s/n GB44052759 calibrated 02/27/2010 cal due 02/27/2011	Wireless Communication Test Set
2	Agilent 8960 Series 10 E5515C s/n GB47200520 calibrated 11/16/2009 cal due 11/16/2010	Wireless Communication Test Set
3	Continental 338359 PCB	Interface Board (with 3G SIM Card) to the Radio
4	MAXRADMDBM800/1900 Antenna	Reference antenna
5	Laptop PC	USB communication with the Interface Board
6	12VDC Power Supply	DC Source

1.3 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

☒ **Normal**

Temperature:	+15 to +35 ° C
Humidity:	20-75 %
Atmospheric pressure:	86-106 kPa

☒ **Extreme**

☒ **Temperature:** -30 to +50 ° C

1.4 Measurement uncertainty

The expanded uncertainty (k = 2) for radiated measurements has been determined to be:
±4 dB at 10m and ±5.4 dB at 3m
The expanded uncertainty (k = 2) for conducted measurements at antenna terminal has been determined to be:
±1.0 dB
The expanded uncertainty (k = 2) for line conducted measurements has been determined to be:
±2.6 dB

1.5 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured emissions reading on the EMI Receiver.
The basic equation with a sample calculation is as follows:
FS = RA + AF + CF - AG

Where: FS = Field Strength in dB(μV/m)
RA = Receiver Amplitude in dB(μV)
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB(m^{-1})
AG = Amplifier Gain in dB

Assume a receiver reading of 48.1 dB(μV) is obtained. The antenna factor of 7.4 dB(m^{-1}) and cable factor of 1.6 dB is added and amplifier gain of 16.0 dB is subtracted giving field strength of 41.1 dB(μV/m).

RA = 48.1 dB(μV)
AF = 7.4 dB(m^{-1})
CF = 1.6 dB
AG = 16.0 dB
FS = RA + AF + CF - AG
FS = 48.1 + 7.4 + 1.6 – 16.0
FS = 41.1 dB(μV/m)

2.0 TEST SUMMARY

Referring to the performance criteria and the operating mode during the tests specified in this report, the equipment complies with the requirements according to the following standards.

TEST SPECIFICATION	TEST PARAMETERS	RESULT
22.913 / RSS-132 24.232 / RSS 133, 6.4	RF output power	Pass
2.1047/RSS-132 / RSS 133	Modulation Characteristics	Pass
2.1049 / RSS-132 / RSS 133	Occupied Bandwidth	Pass
22.917 / RSS-132 24.238 / RSS-133	Antenna Conducted Spurious Emissions	Pass
22.917 / RSS-132 24.238 / RSS-133	Antenna Block Edge Emissions	Pass
22.917 / RSS-132 24.238 / RSS-133	Enclosure Radiated Spurious Emissions	Pass
22.355 / RSS-132 24.235 / RSS 133	Frequency Stability	Pass
1.1310 / 2.1091(c) / RSS- Gen, 5.5	RF Exposure Compliance	Pass
15.109 / ICES-003	Receiver / Digital Device Radiated Emissions	Pass

3.0 TEST CONDITIONS AND RESULTS

3.1 RF Output Power

The HNAD met the RF power output requirements of FCC Part 22H and Part 24E.

Sections 3.1.1, 3.1.2, and 3.1.3 show details of RF power output measurements.

Graphs 3.1.1 to 3.1.6 show GSM/PCS output power.
Graphs 3.1.7 to 3.1.12 show GPRS output power.
Graphs 3.1.13 to 3.1.18 show EDGE output power.
Graphs 3.1.19 to 3.1.24 show WCDMA/HSDPA output power.

Table below shows the summary of conducted RF Output Power.

	Conducted RF Output Power (dBm)					
	Ch. 128	**Ch. 189**	**Ch. 251**	**Ch. 512**	**Ch. 661**	**Ch. 810**
GSM/PCS	**31.5**	**31.9**	**32.3**	**28.2**	**28.3**	**28.4**
GPRS	**31.9**	**31.2**	**31.2**	**27.7**	**27.6**	**27.8**
EDGE	**25.6**	**25.7**	**25.8**	**24.8**	**24.8**	**25.0**
	Ch. 4132	**Ch. 4183**	**Ch. 4233**	**Ch. 9262**	**Ch. 9400**	**Ch. 9538**
HSDPA	**23.4**	**23.1**	**23.9**	**25.2**	**25.7**	**25.1**

3.1.1 RF Output Power ERP, GSM/GPRS/EDGE

Test result: **Pass**

Power Output:	**Conducted**				
Mode	☒ Voice	☒ MS TX Level 5			
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**ERP Limit dBm**	**Max. Ant. Gain dBi**
824.20	15.6	15.9	31.5	38.5	7.0
Middle Frequency MHz					
836.40	16.03	15.9	31.93	38.5	6.6
Upper Frequency MHz					
848.80	16.44	15.9	32.34	38.5	6.2
Mode	☒ GPRS	☒ MS TX Level 5			
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**ERP Limit dBm**	**Max. Ant. Gain dBi**
824.20	20.85	11.05	31.9	38.5	6.6
Middle Frequency MHz					
836.40	20.17	11.05	31.22	38.5	7.3
Upper Frequency MHz					
848.80	20.1	11.05	31.15	38.5	7.4
Mode	☒ EDGE	☒ MS TX Level 8			
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**ERP Limit dBm**	**Max. Ant. Gain dBi**
824.20	14.5	11.05	25.55	38.5	13.0
Middle Frequency MHz					
836.40	14.64	11.05	25.69	38.5	12.8
Upper Frequency MHz					
848.80	14.77	11.05	25.82	38.5	12.7
RBW:	☒ 1MHz	☐ 3MHz	☐ 10MHz		
VBW:	☒ 1MHz	☐ 3MHz	☐ 10MHz		
Total CF:	**RF Cable Insertion Loss + Coupler Insertion Loss**				
Antenna Gain (dBi)	☐ dBi				

3.1.2 RF Output Power EIRP, PCS/GPRS/EDGE

Test result: **Pass**

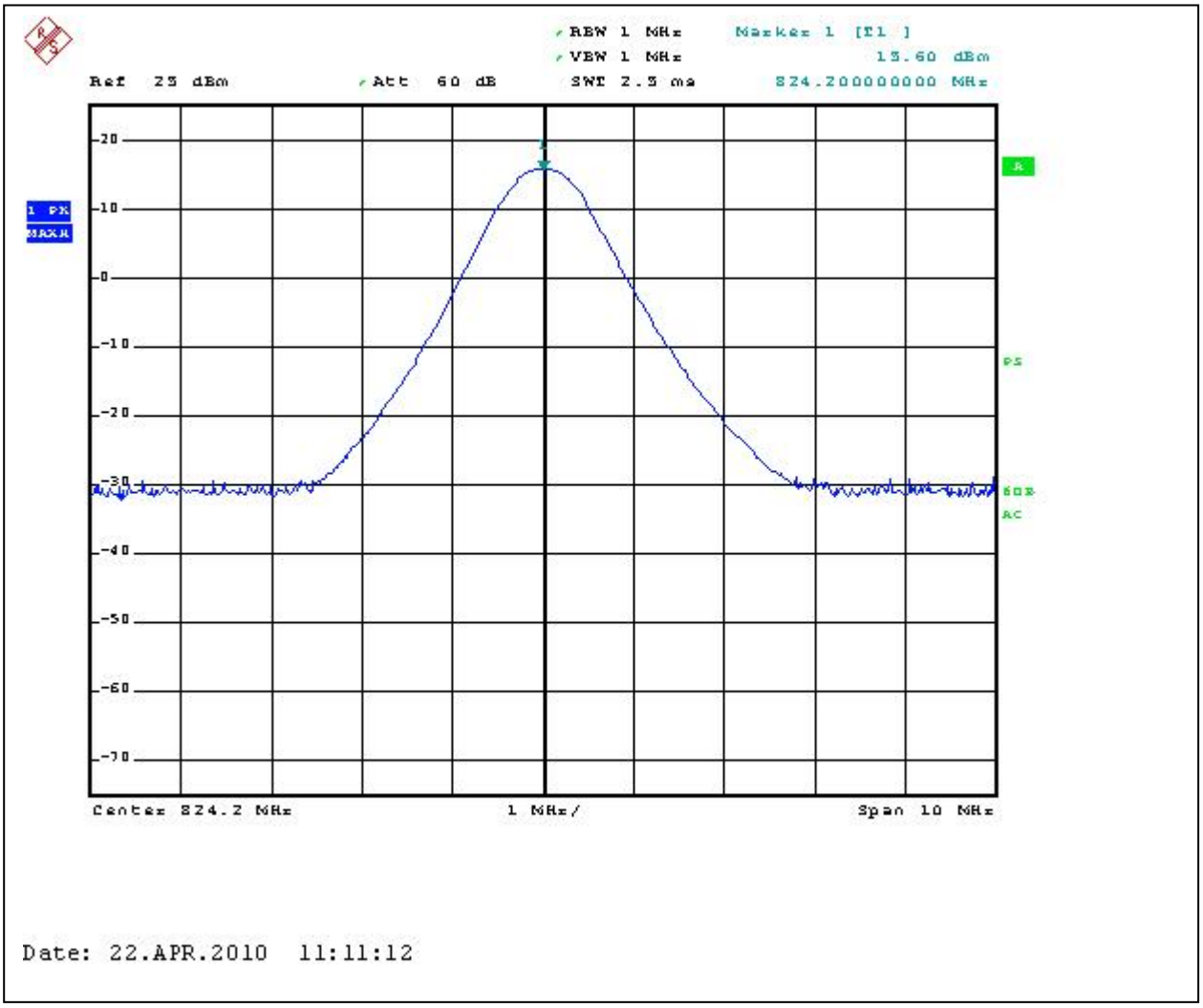
Power Output:	**Conducted**				
Mode	☒ Voice	☒ MS TX Level 0			
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**EIRP Limit dBm**	**Max. Ant. Gain dBi**
1850.20	17.1	11.1	28.2	33.0	4.8
Middle Frequency MHz					
1880.20	17.22	11.1	28.32	33.0	4.7
Upper Frequency MHz					
1909.80	17.33	11.1	28.43	33.0	4.6
Mode	☒ GPRS	☒ MS TX Level 0			
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**EIRP Limit dBm**	**Max. Ant. Gain dBi**
1850.20	16.15	11.55	27.7	33.0	5.3
Middle Frequency MHz					
1880.20	16.07	11.55	27.62	33.0	5.4
Upper Frequency MHz					
1909.80	16.25	11.55	27.8	33.0	5.2
Mode	☒ EDGE	☒ MS TX Level 2			
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**EIRP Limit dBm**	**Max. Ant. Gain dBi**
1850.20	13.26	11.55	24.81	33.0	8.2
Middle Frequency MHz					
1880.20	13.24	11.55	24.79	33.0	8.2
Upper Frequency MHz					
1909.80	13.45	11.55	25.0	33.0	8.0
RBW:	☐ 1MHz	☒ 3MHz	☐ 10MHz		
VBW:	☐ 1MHz	☒ 3MHz	☐ 10MHz		
Total CF:	**RF Cable Insertion Loss + Coupler Insertion Loss**				
Antenna Gain (dBi)	☐ dBi				

3.1.3 RF Output Power, WCDMA/HSDPA

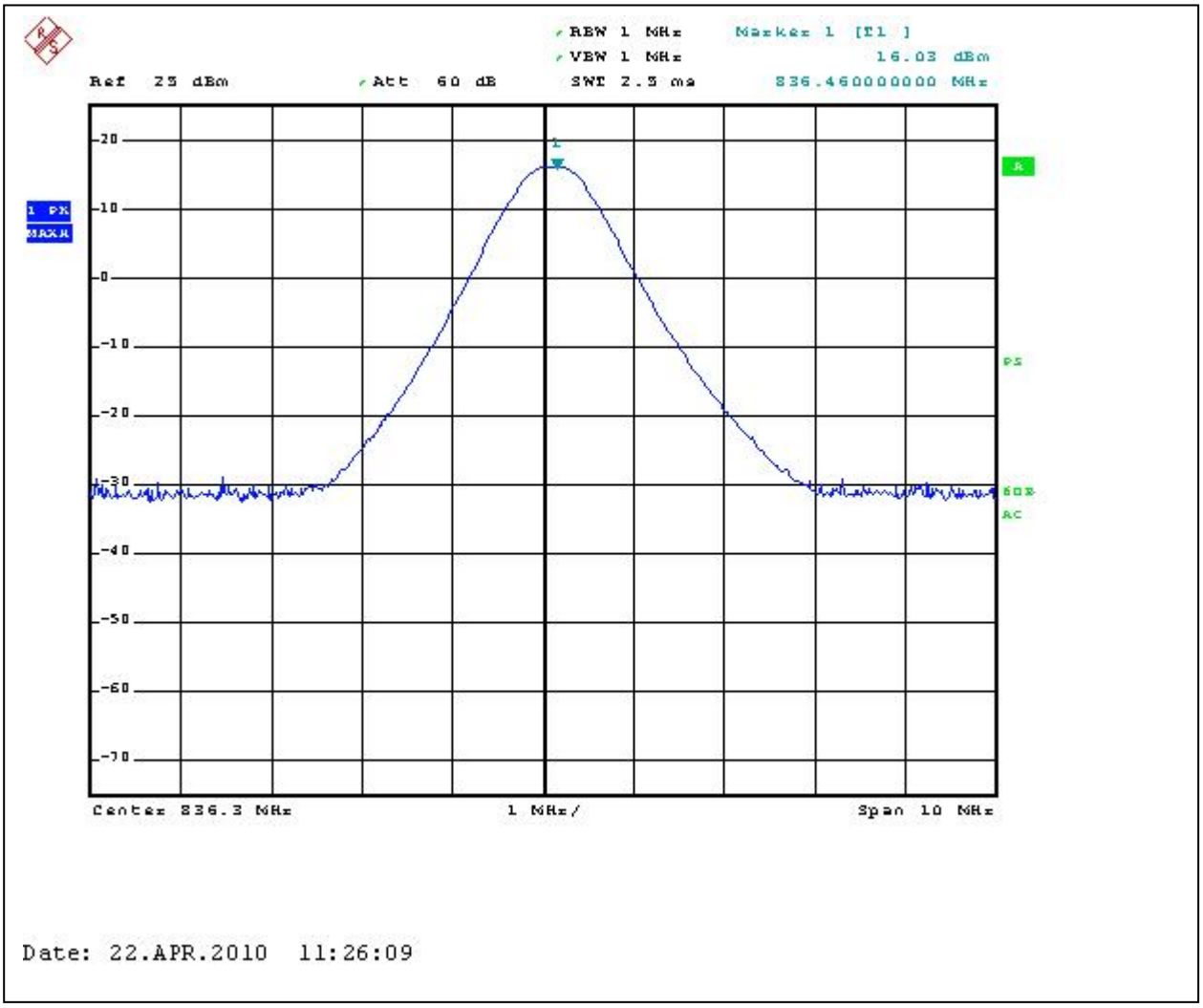
Test result: **Pass**

Power Output:	**Conducted**				
Mode	☒ All Up Bits				
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**EIRP Limit dBm**	**Max. Ant. Gain dBi**
826.40	12.53	10.9	23.43	38.5	15.1
Middle Frequency MHz					
836.60	12.22	10.9	23.12	38.5	15.4
Upper Frequency MHz					
846.60	13.01	10.9	23.91	38.5	14.6
Mode	☒ All Up Bits				
Low Frequency MHz	**Measured power (dBm)**	**Total CF dB**	**RF Output Power dBm**	**EIRP Limit dBm**	**Max. Ant. Gain dBi**
1852.40	13.4	11.8	25.2	33.0	7.8
Middle Frequency MHz					
1880.00	13.86	11.8	25.66	33.0	7.3
Upper Frequency MHz					
1907.60	13.27	11.8	25.07	33.0	7.9
RBW: **VBW:**	☒ 1MHz frequency band ☒ 1MHz 826.4-856.6MHz		☒ 3MHz frequency bands ☒ 3MHz 1852.4-1977.7MHz		☐ 10MHz ☐ 10MHz
Total CF:	**RF Cable Insertion Loss + Coupler Insertion Loss**				
Antenna Gain (dBi)	☐ dBi				

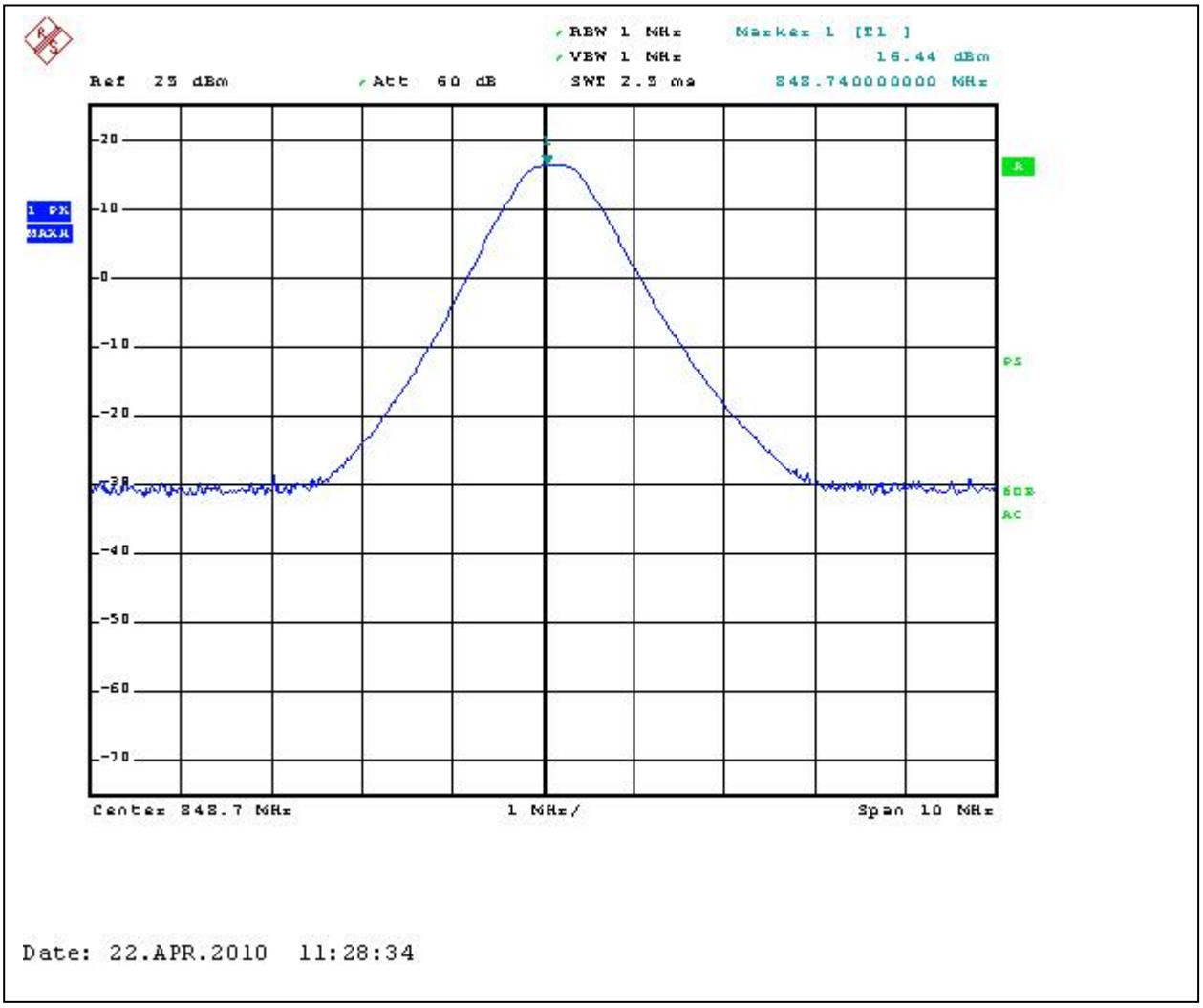
Graph 3.1.1


RBW 1 MHz
VBW 1 MHz
Marker 1 [T1]
13.60 dBm
824.200000000 MHz
Ref 25 dBm
Att 60 dB
SWT 2.5 ms
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 824.2 MHz
1 MHz/
Span 10 MHz
Date: 22.APR.2010 11:11:12

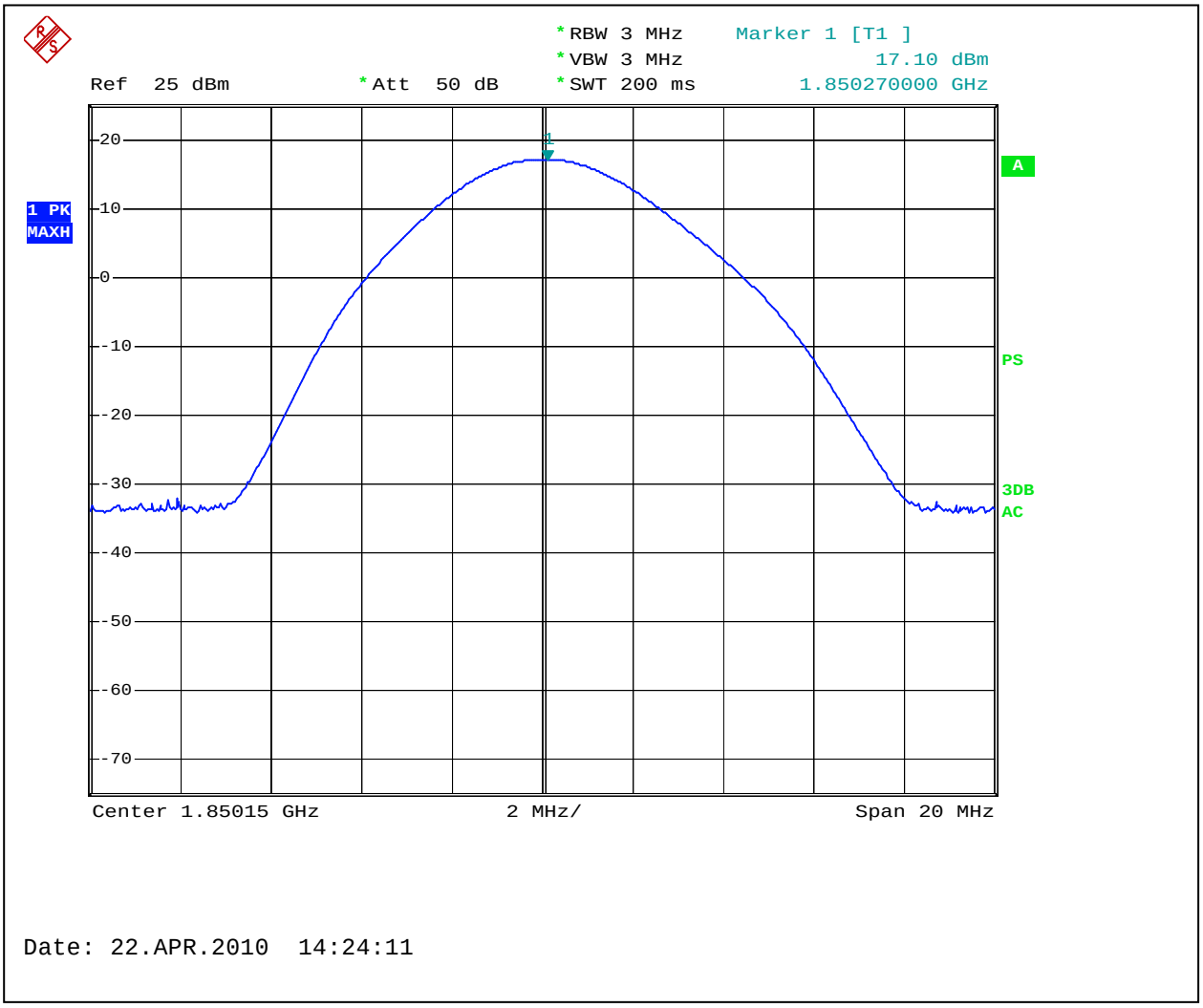
Graph 3.1.2


RBW 1 MHz
VBW 1 MHz
Marker 1 [T1]
16.03 dBm
836.460000000 MHz
Ref 25 dBm
Att 60 dB
SWT 2.5 ms
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 836.3 MHz
1 MHz/
Span 10 MHz
Date: 22.APR.2010 11:26:09

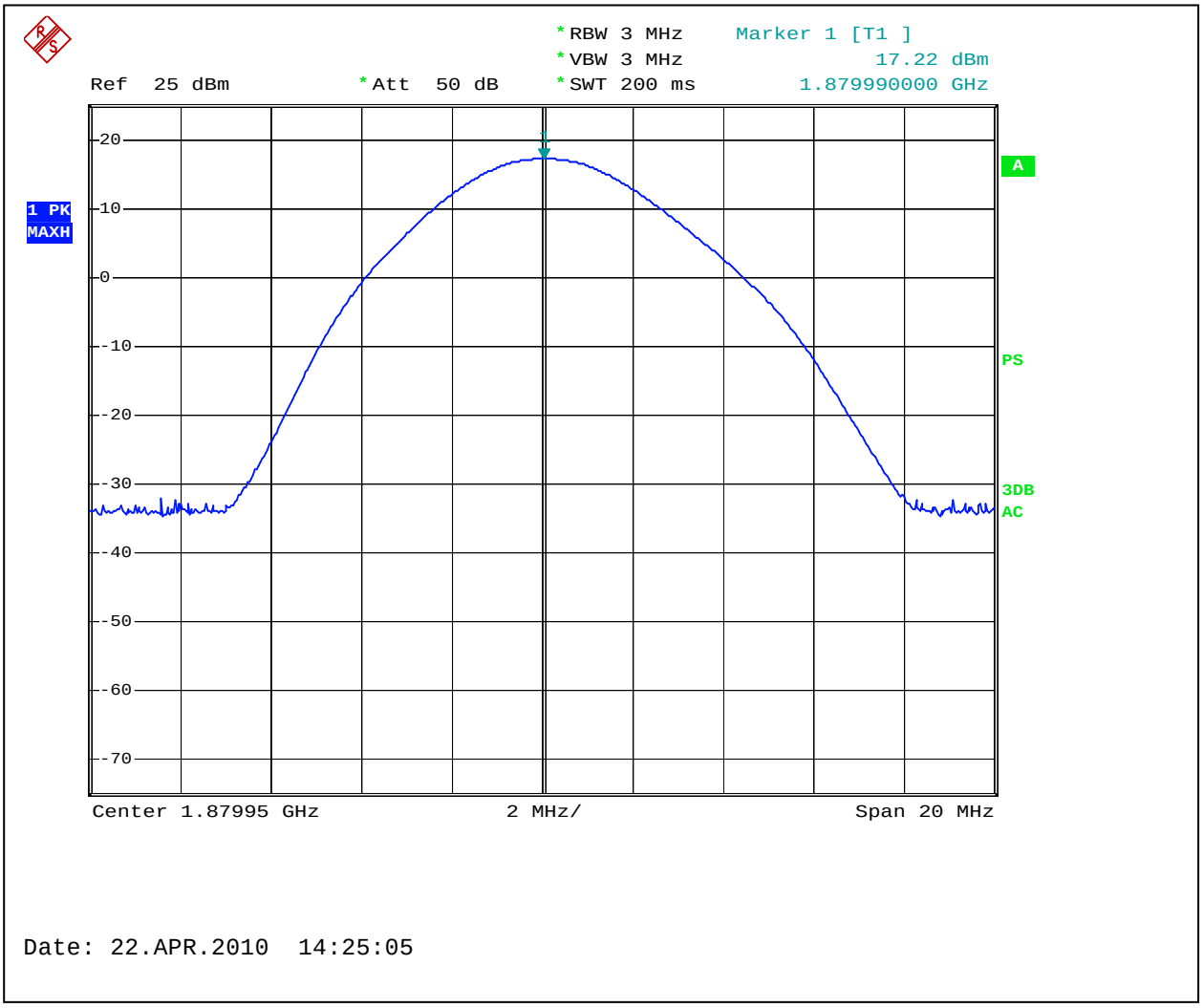
Graph 3.1.3


RBW 1 MHz
VBW 1 MHz
Marker 1 [T1]
16.44 dBm
848.740000000 MHz
Ref 25 dBm
Att 60 dB
SWT 2.5 ms
1 PK
MAXH
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 848.7 MHz
1 MHz/
Span 10 MHz
Date: 22.APR.2010 11:28:34

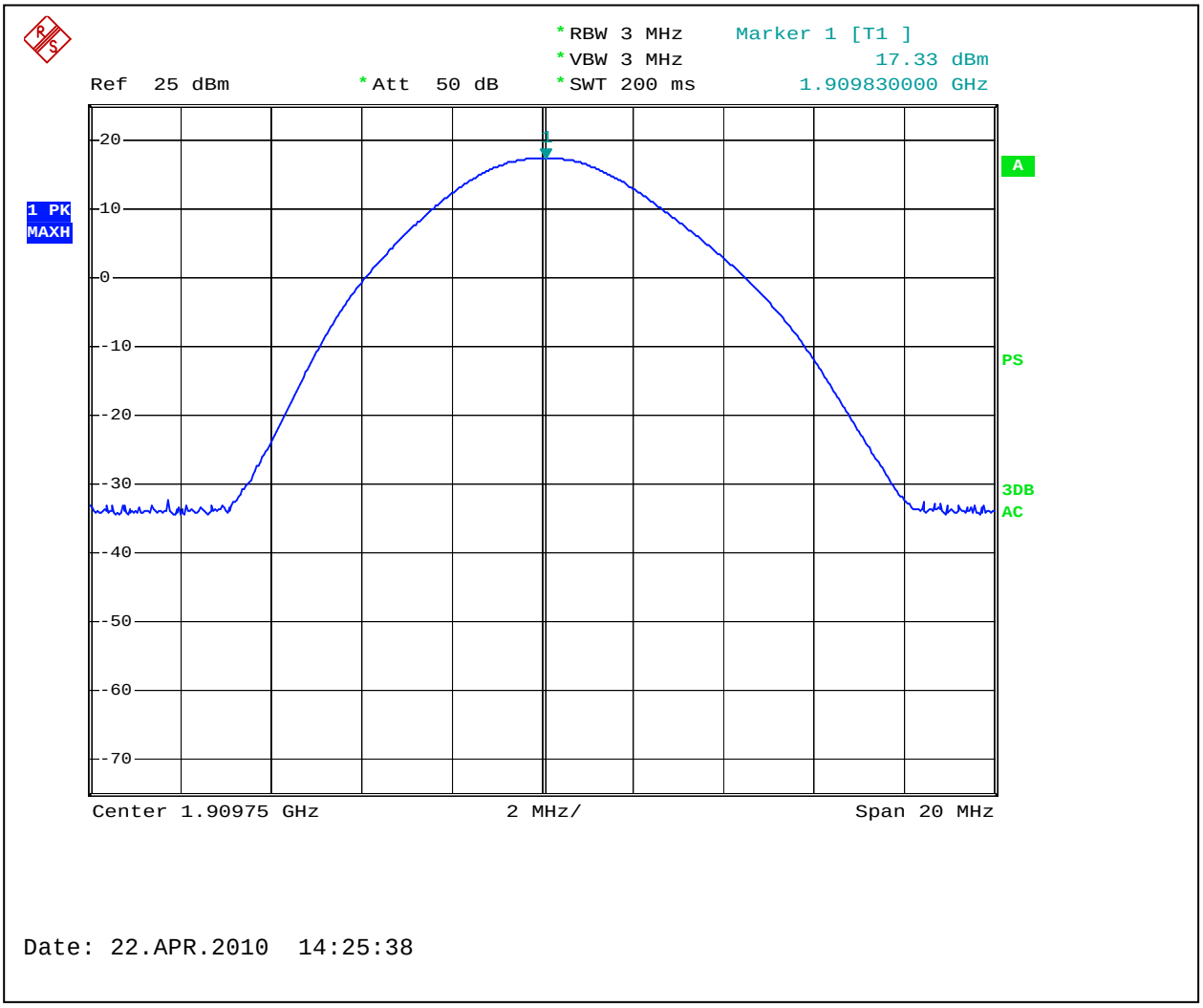
Graph 3.1.4


*RBW 3 MHz
*VBW 3 MHz
*SWT 200 ms
Marker 1 [T1]
17.10 dBm
1.850270000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.85015 GHz
2 MHz/
Span 20 MHz
Date: 22.APR.2010 14:24:11

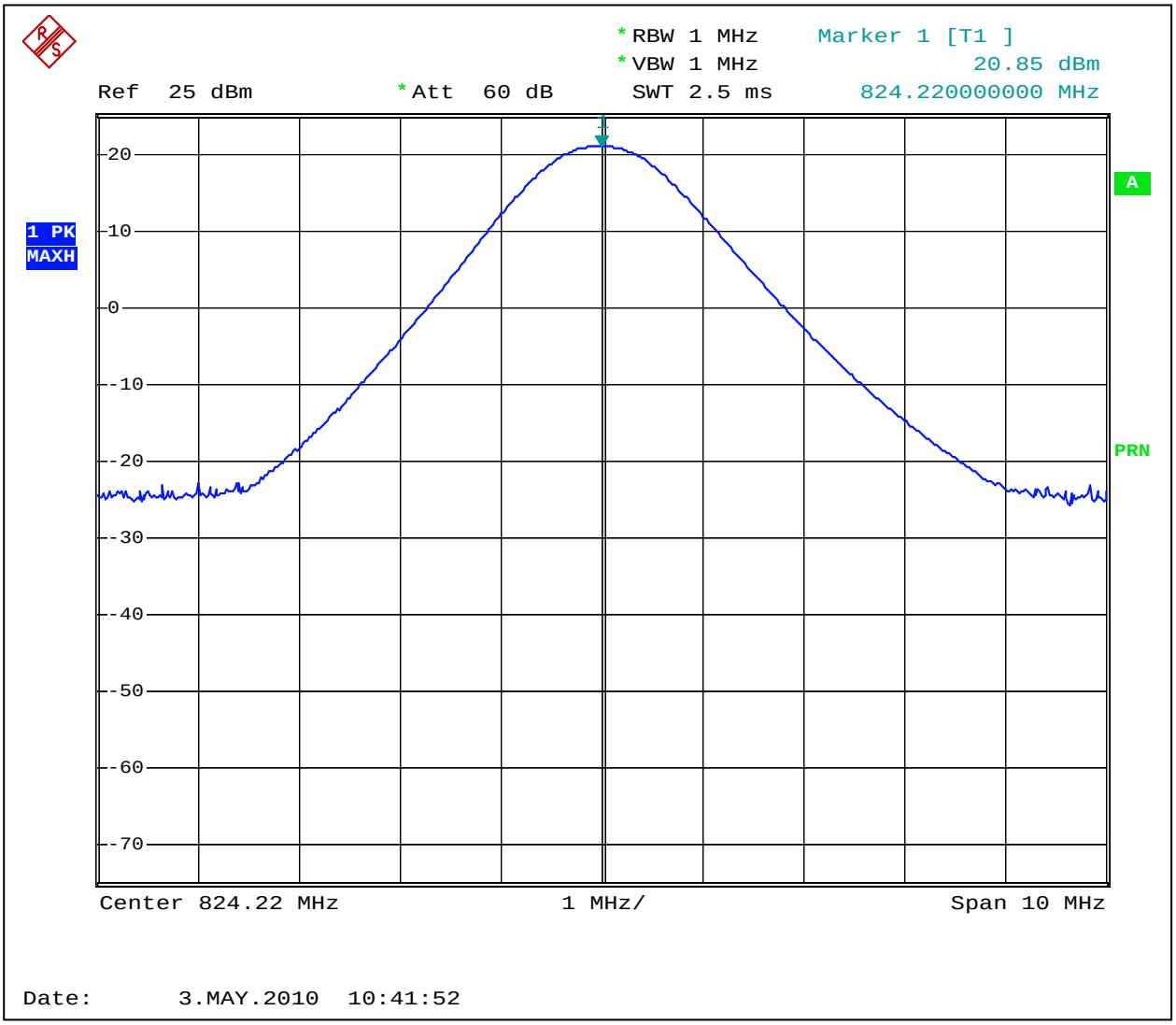
Graph 3.1.5


*RBW 3 MHz
*VBW 3 MHz
*SWT 200 ms
Marker 1 [T1]
17.22 dBm
1.879990000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.87995 GHz
2 MHz/
Span 20 MHz
Date: 22.APR.2010 14:25:05

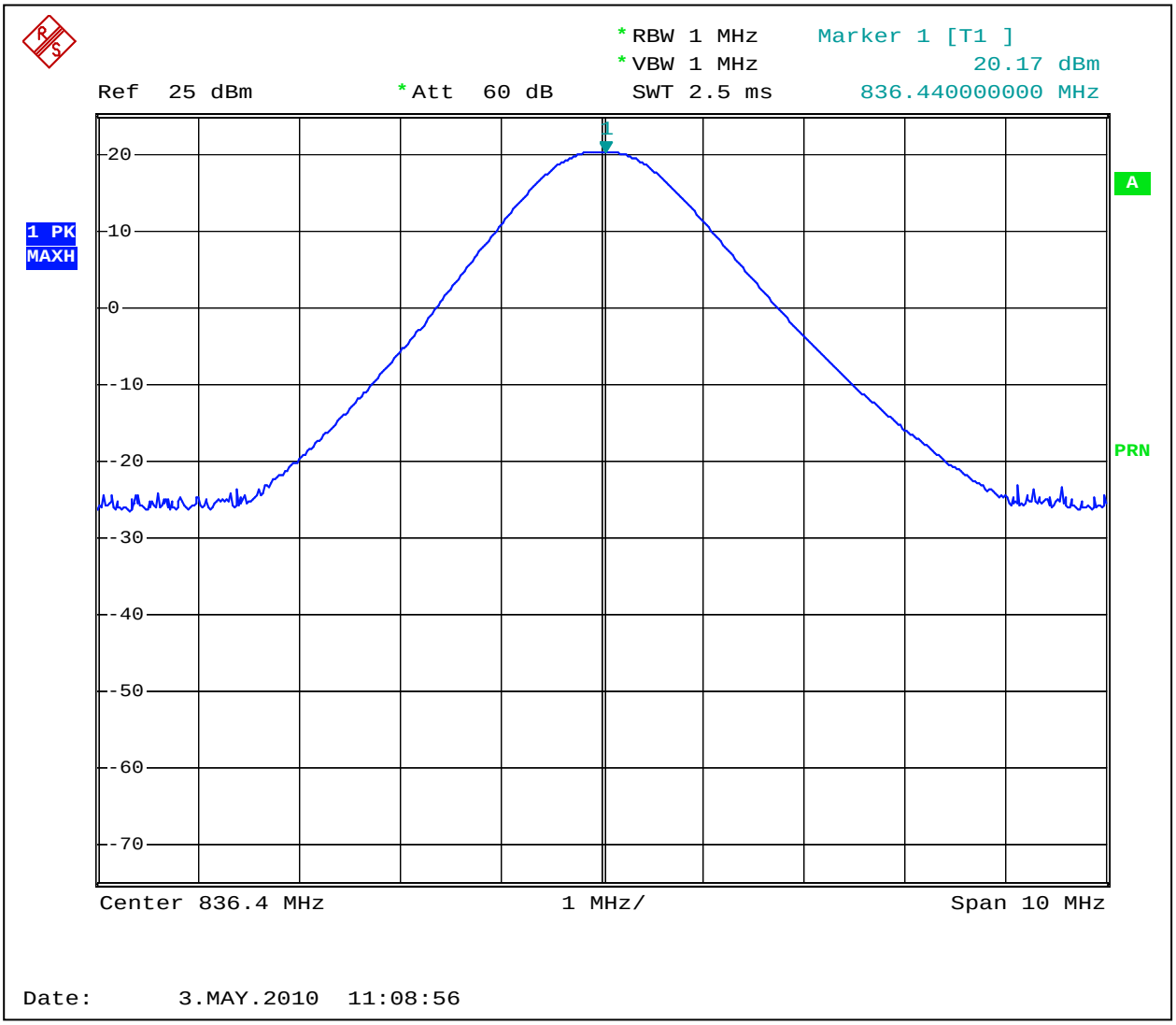
Graph 3.1.6


*RBW 3 MHz
*VBW 3 MHz
*SWT 200 ms
Marker 1 [T1]
17.33 dBm
1.909830000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.90975 GHz
2 MHz/
Span 20 MHz
Date: 22.APR.2010 14:25:38

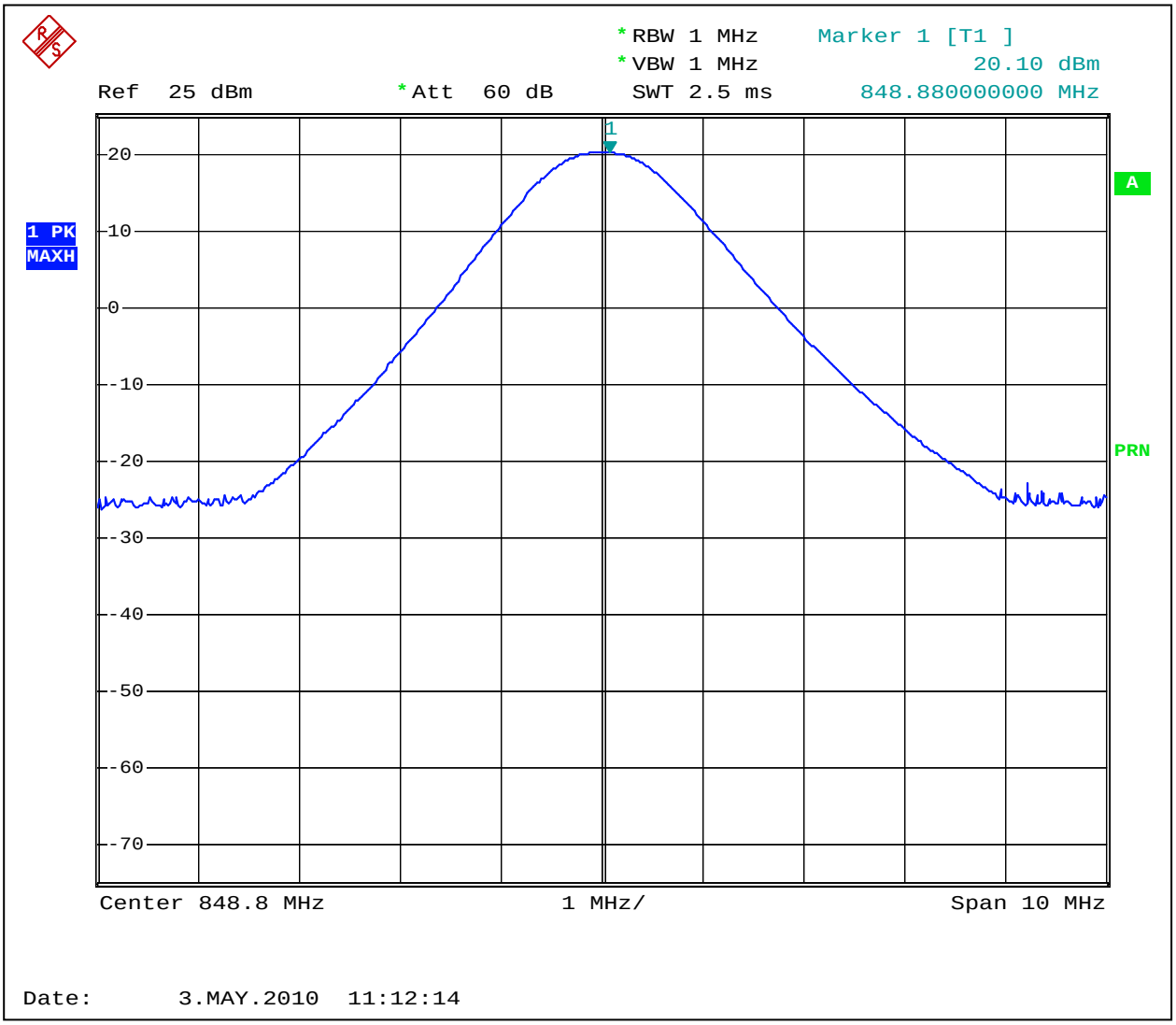
Graph 3.1.7


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
20.85 dBm
824.220000000 MHz
Ref 25 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 824.22 MHz
1 MHz/
Span 10 MHz
Date: 3.MAY.2010 10:41:52

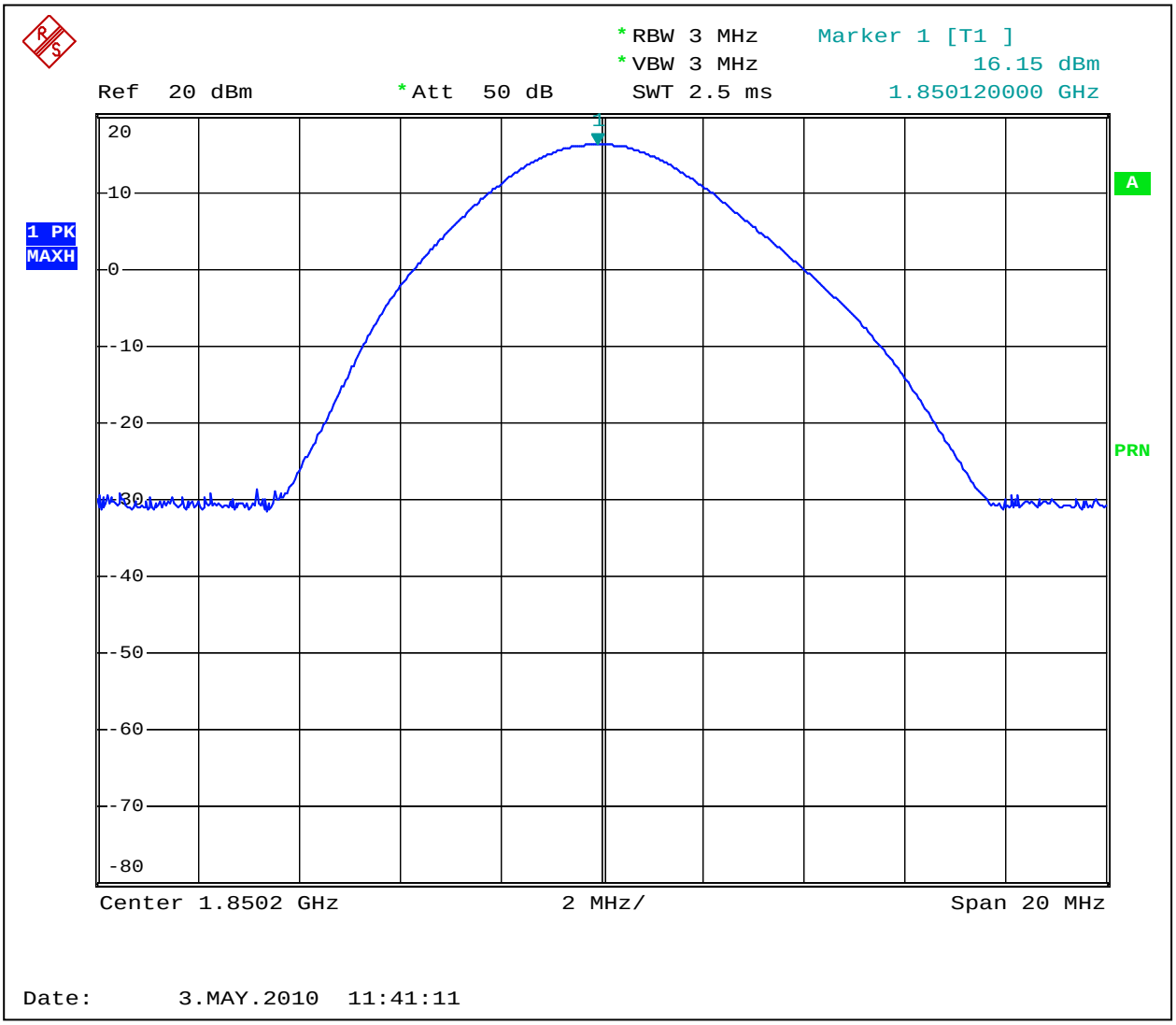
Graph 3.1.8


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
20.17 dBm
836.440000000 MHz
Ref 25 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 836.4 MHz
1 MHz/
Span 10 MHz
Date: 3.MAY.2010 11:08:56

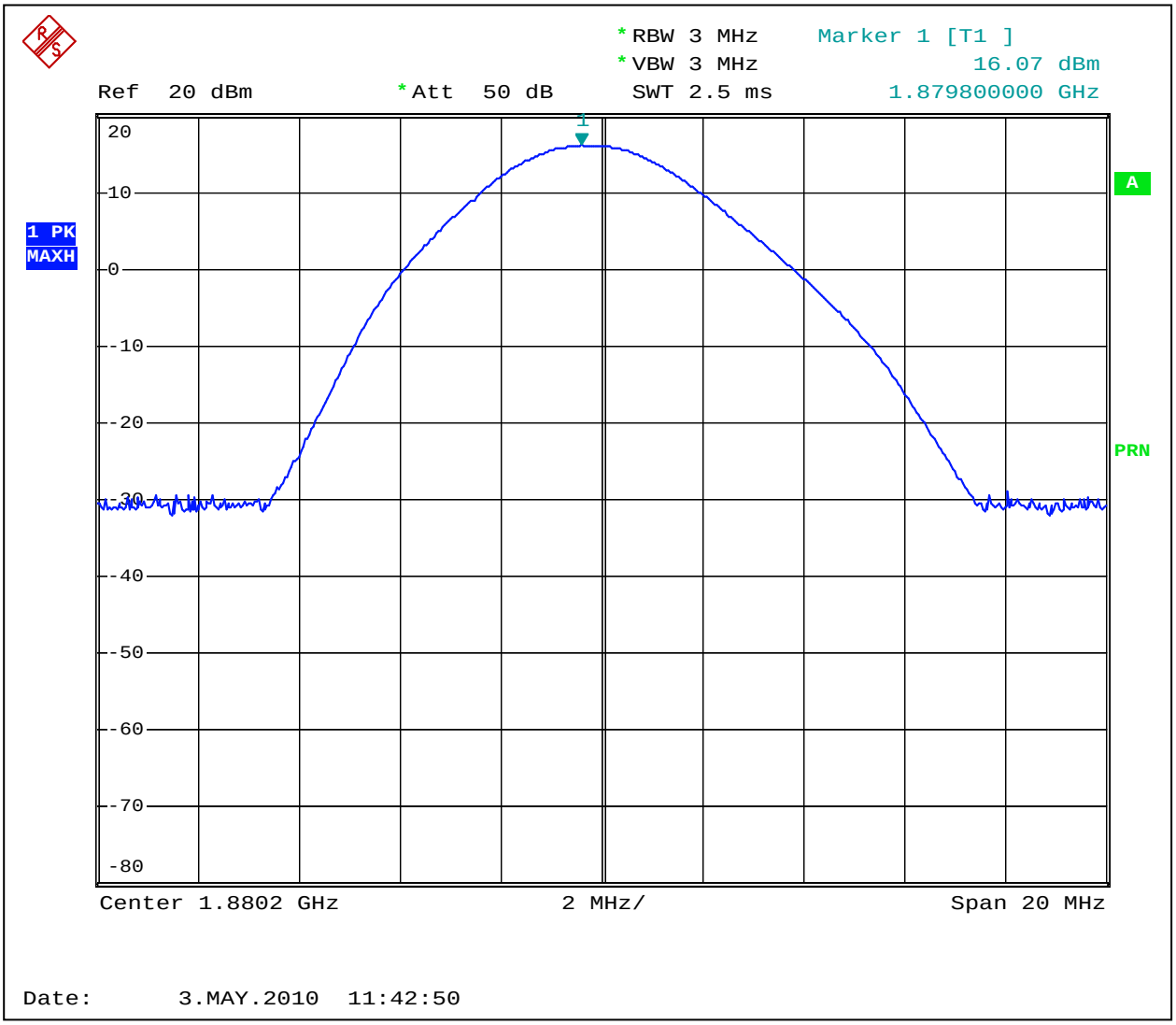
Graph 3.1.9


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
20.10 dBm
848.880000000 MHz
Ref 25 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 848.8 MHz
1 MHz/
Span 10 MHz
Date: 3.MAY.2010 11:12:14

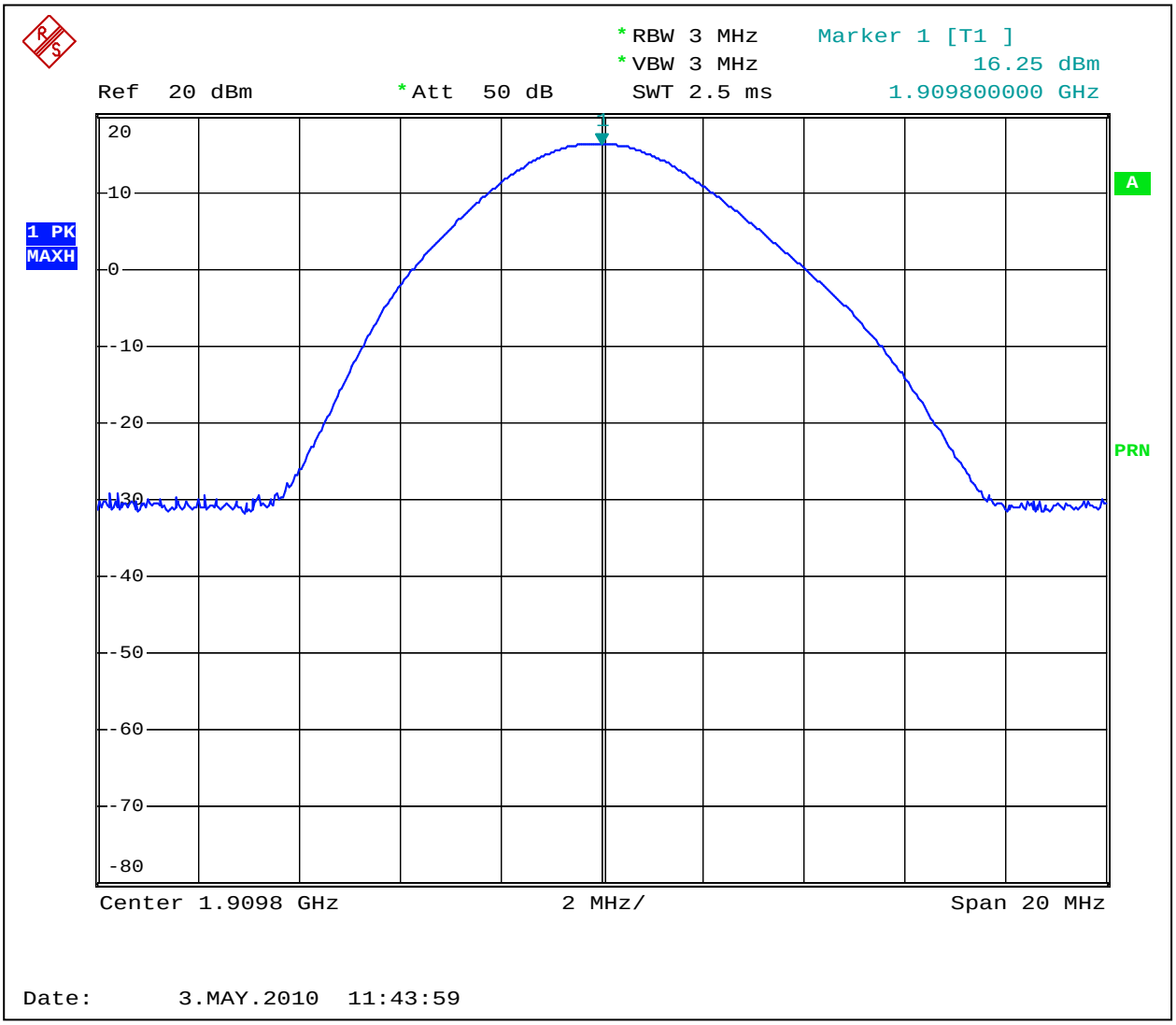
Graph 3.1.10


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
16.15 dBm
1.850120000 GHz
Ref 20 dBm
*Att 50 dB
SWT 2.5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.8502 GHz
2 MHz/
Span 20 MHz
Date: 3.MAY.2010 11:41:11

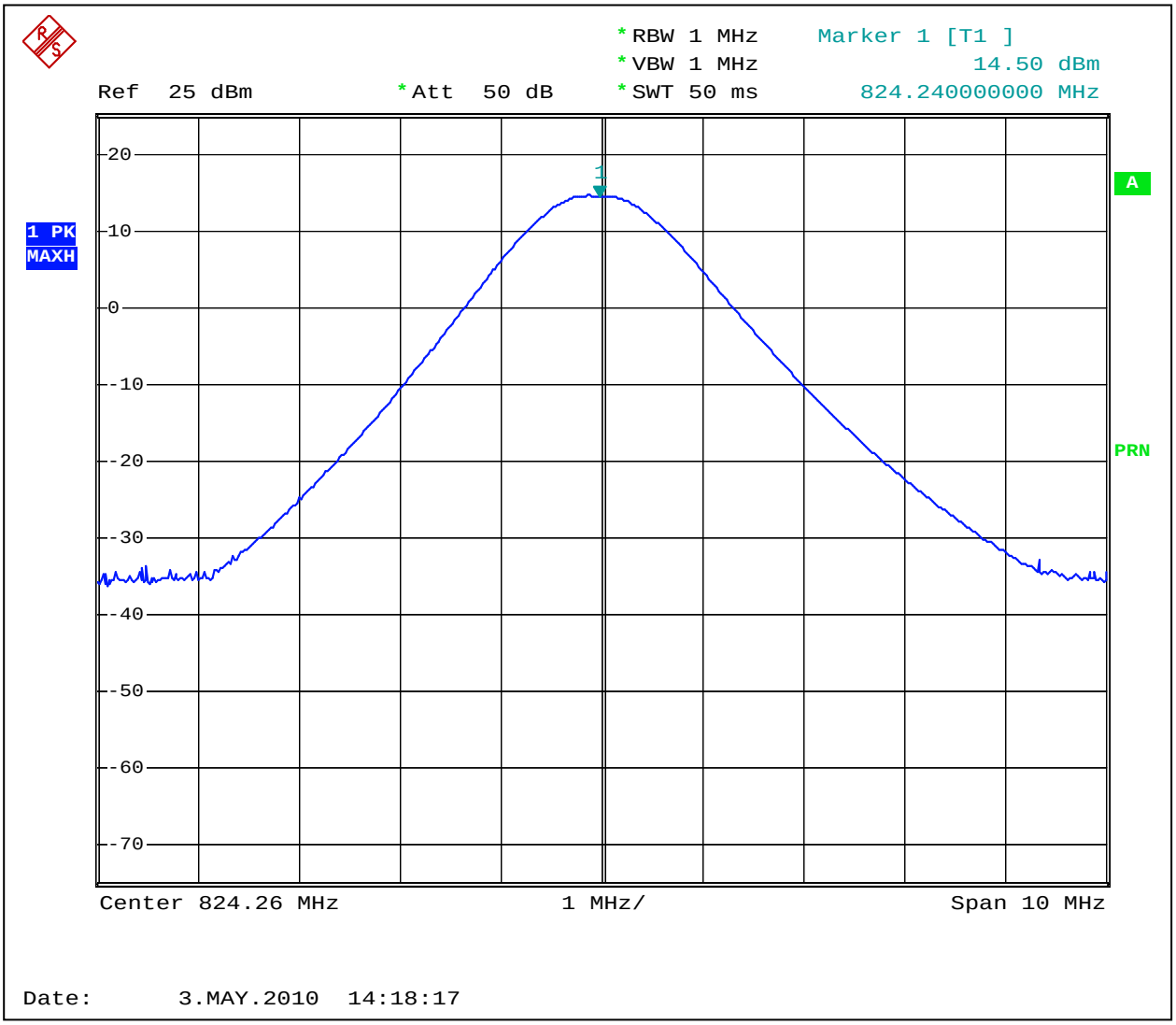
Graph 3.1.11


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
16.07 dBm
1.879800000 GHz
Ref 20 dBm
*Att 50 dB
SWT 2.5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.8802 GHz
2 MHz/
Span 20 MHz
Date: 3.MAY.2010 11:42:50

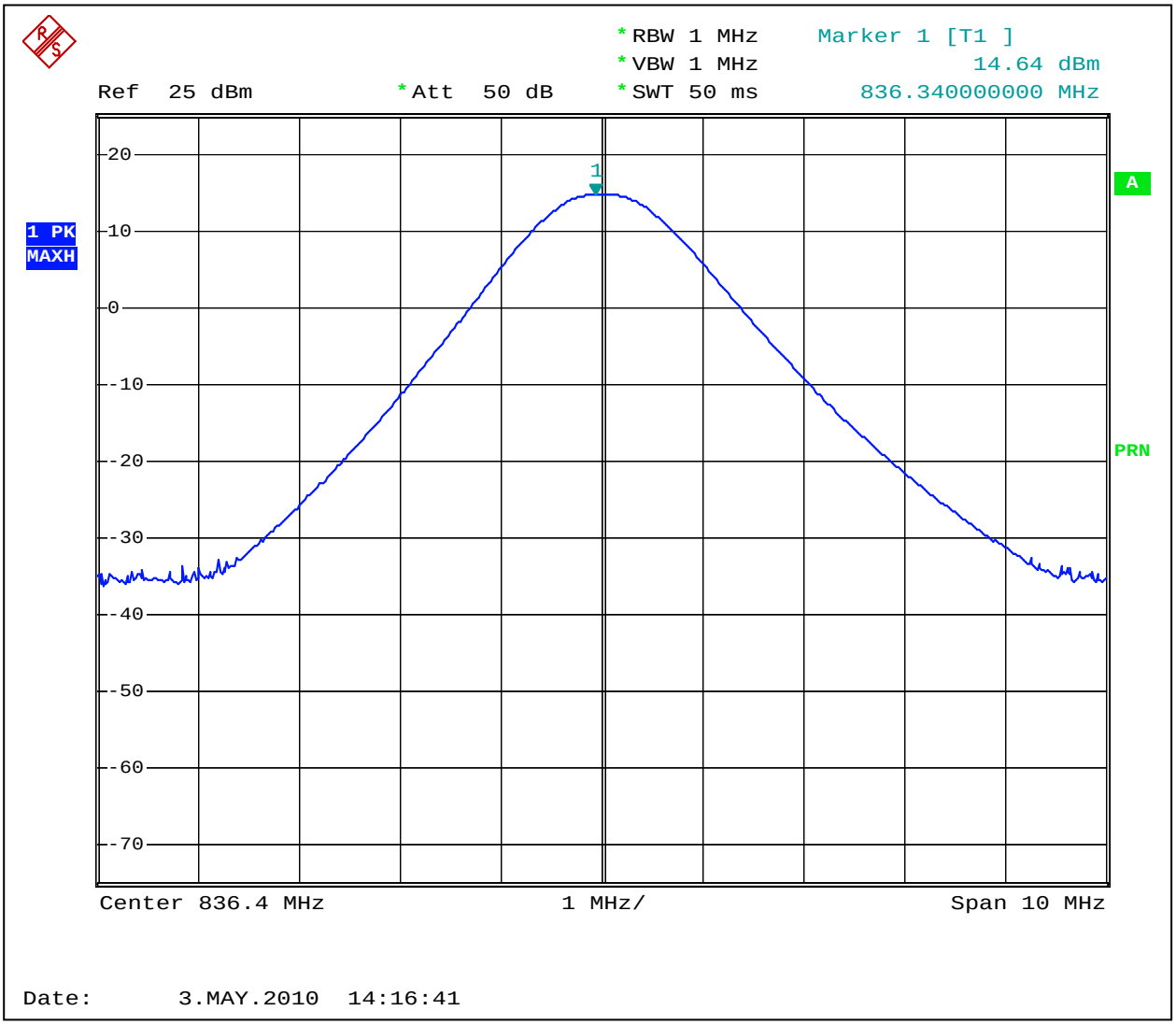
Graph 3.1.12


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
16.25 dBm
1.909800000 GHz
Ref 20 dBm
*Att 50 dB
SWT 2.5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.9098 GHz
2 MHz/
Span 20 MHz
Date: 3.MAY.2010 11:43:59

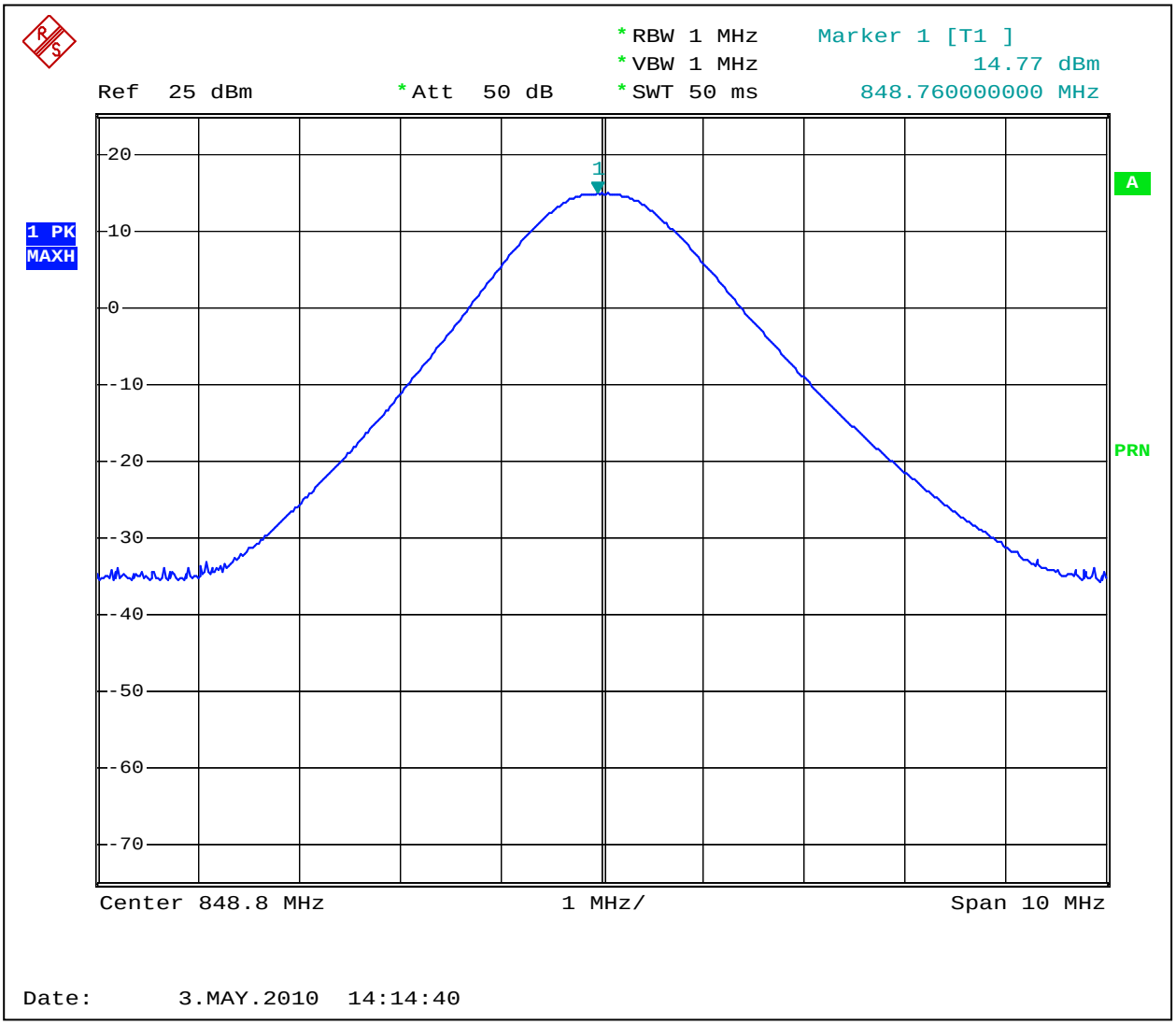
Graph 3.1.13


*RBW 1 MHz
*VBW 1 MHz
*SWT 50 ms
Marker 1 [T1]
14.50 dBm
824.240000000 MHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 824.26 MHz
1 MHz/
Span 10 MHz
Date: 3.MAY.2010 14:18:17

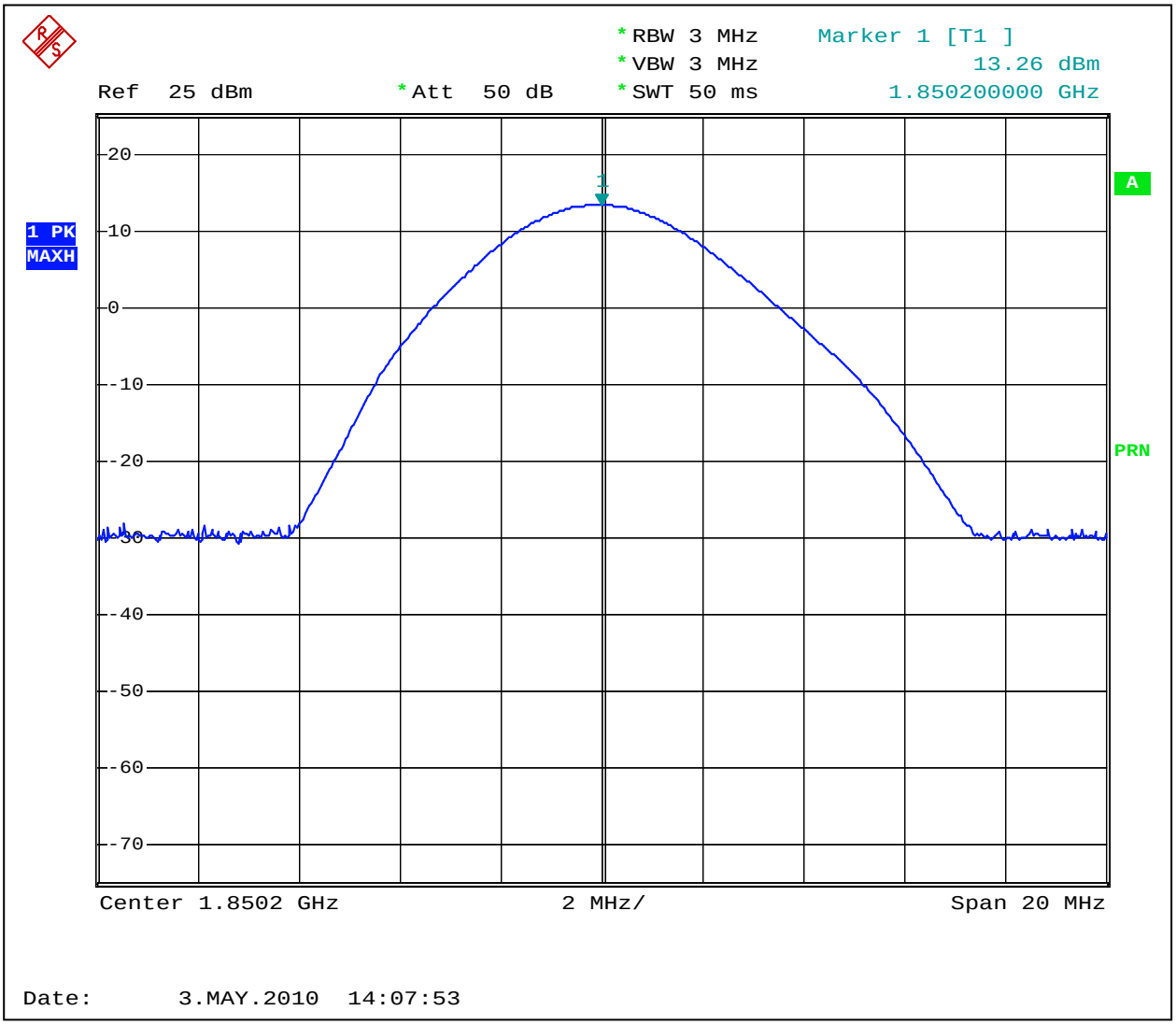
Graph 3.1.14


*RBW 1 MHz
*VBW 1 MHz
*SWT 50 ms
Marker 1 [T1]
14.64 dBm
836.340000000 MHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 836.4 MHz
1 MHz/
Span 10 MHz
Date: 3.MAY.2010 14:16:41

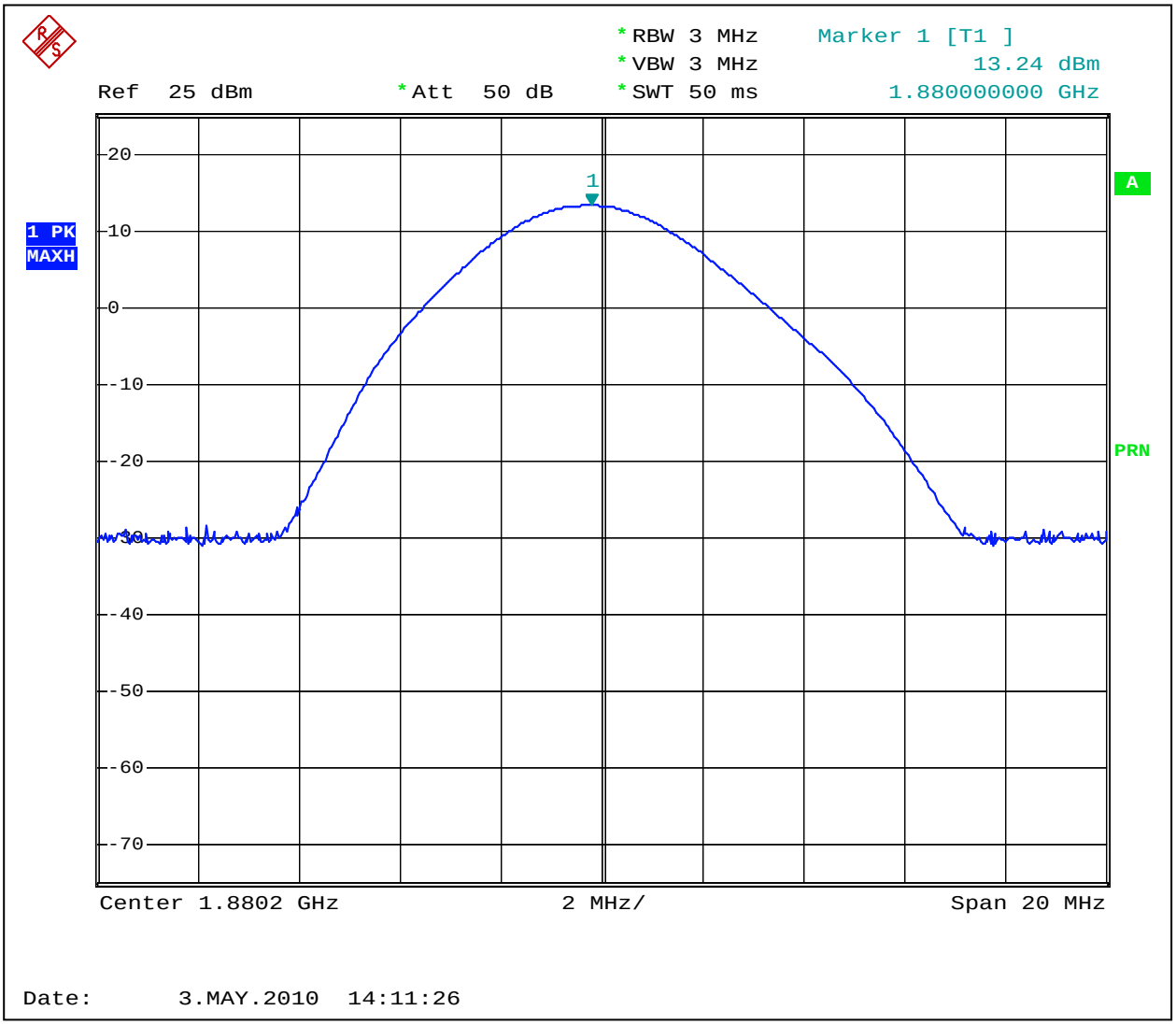
Graph 3.1.15


*RBW 1 MHz
*VBW 1 MHz
*SWT 50 ms
Marker 1 [T1]
14.77 dBm
848.760000000 MHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 848.8 MHz
1 MHz/
Span 10 MHz
Date: 3.MAY.2010 14:14:40

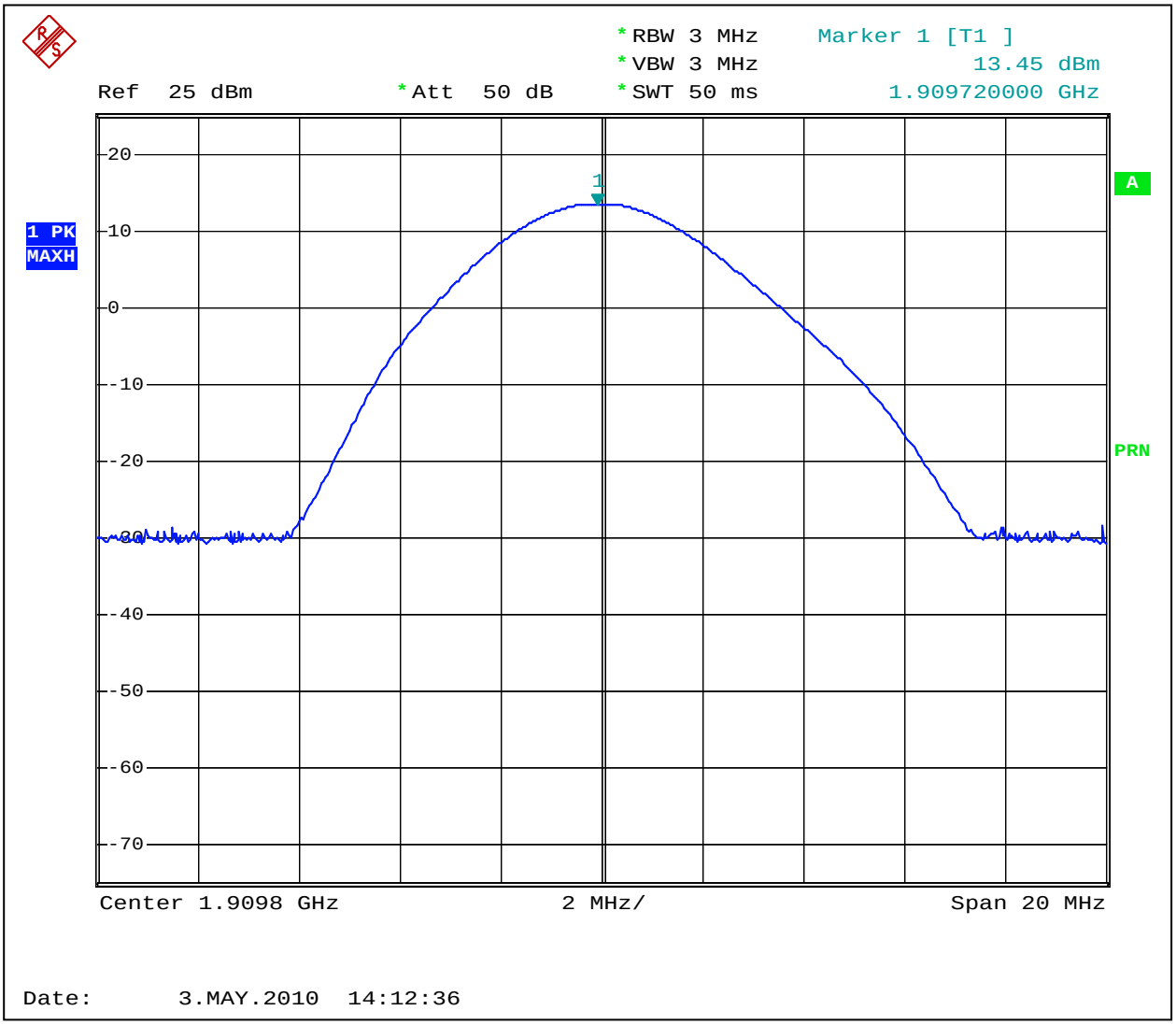
Graph 3.1.16


*RBW 3 MHz
*VBW 3 MHz
*SWT 50 ms
Marker 1 [T1]
13.26 dBm
1.850200000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.8502 GHz
2 MHz/
Span 20 MHz
Date: 3.MAY.2010 14:07:53

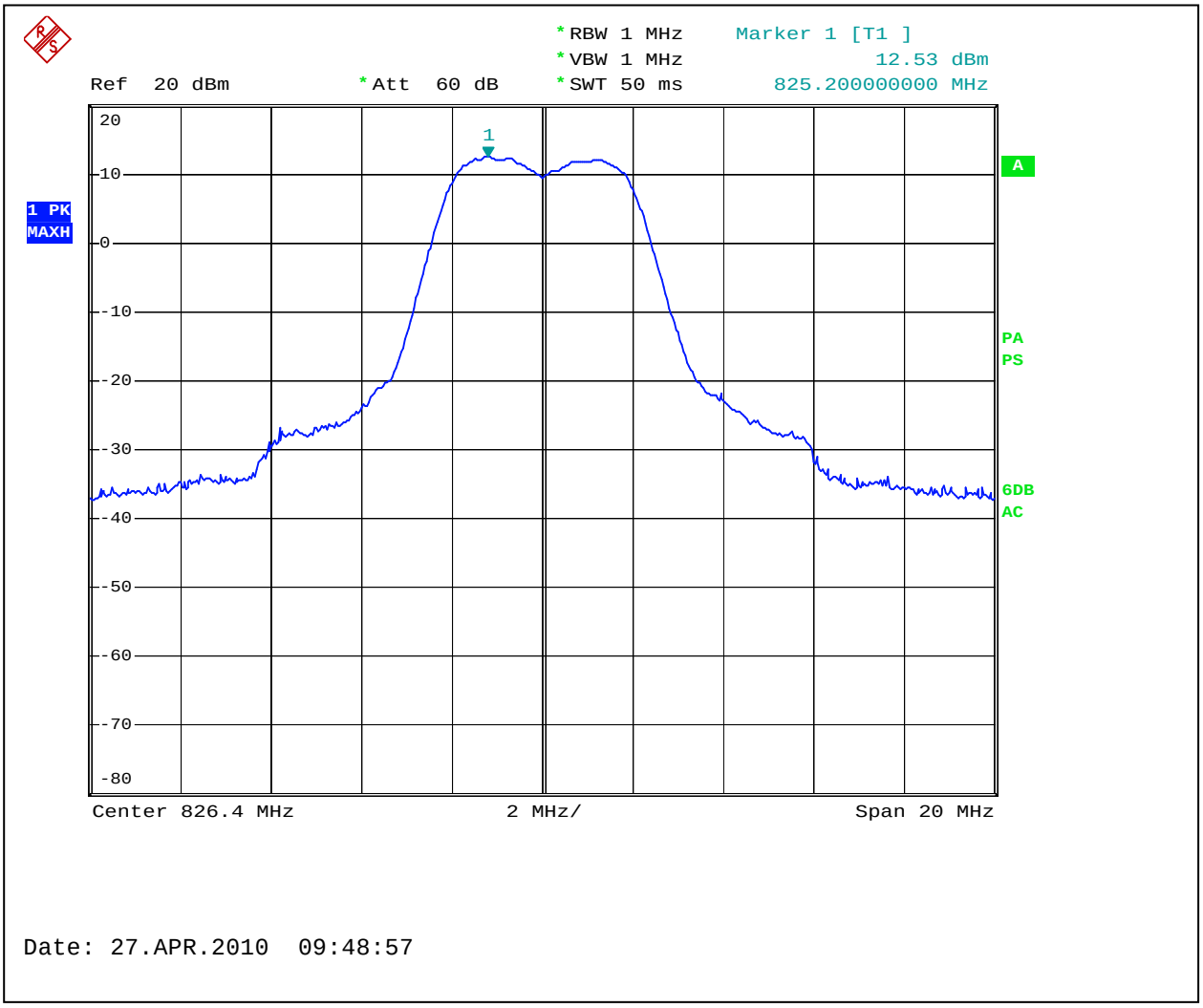
Graph 3.1.17


*RBW 3 MHz
*VBW 3 MHz
*SWT 50 ms
Marker 1 [T1]
13.24 dBm
1.880000000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.8802 GHz
2 MHz/
Span 20 MHz
Date: 3.MAY.2010 14:11:26

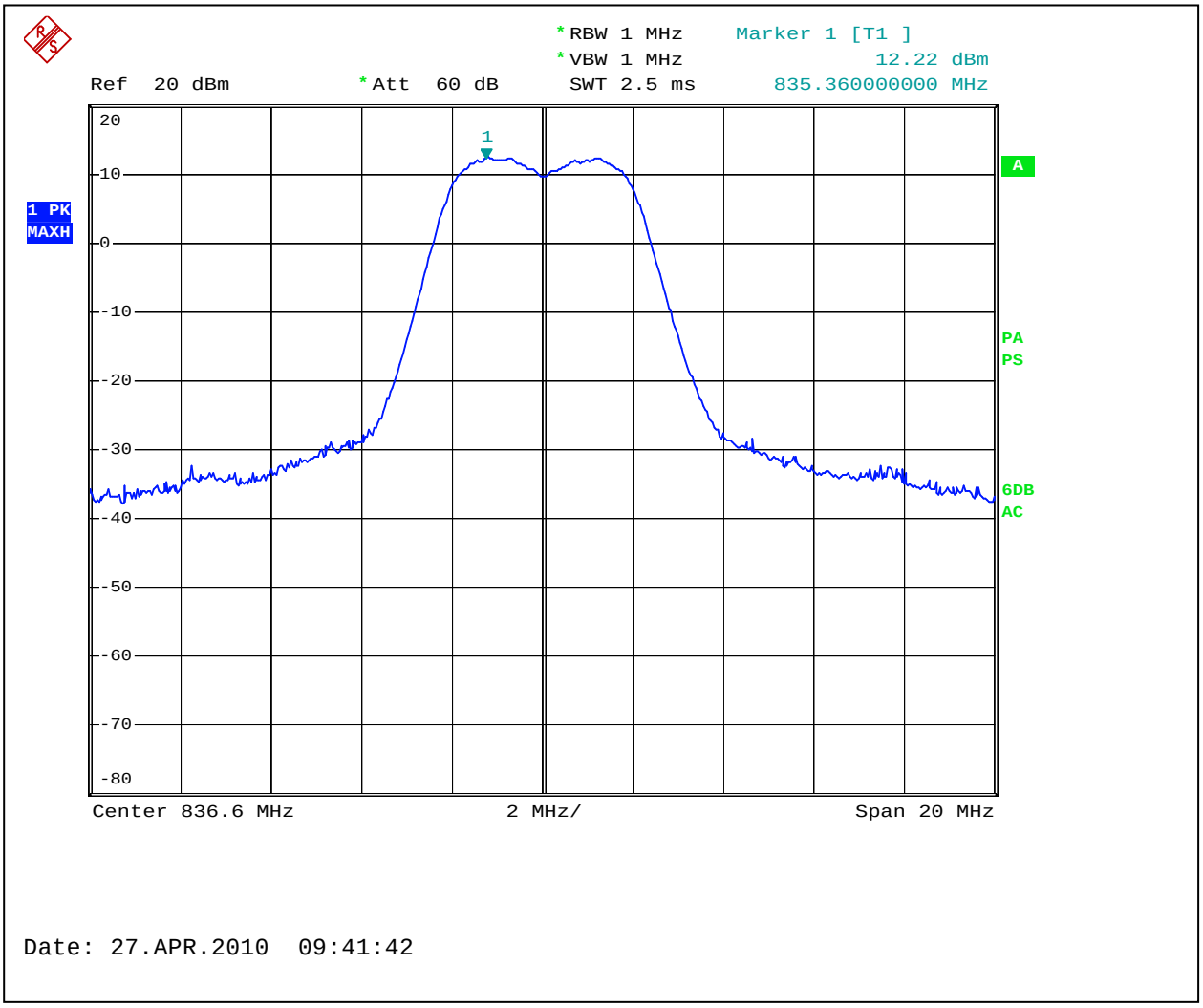
Graph 3.1.18


*RBW 3 MHz
*VBW 3 MHz
*SWT 50 ms
Marker 1 [T1]
13.45 dBm
1.909720000 GHz
Ref 25 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.9098 GHz
2 MHz/
Span 20 MHz
Date: 3.MAY.2010 14:12:36

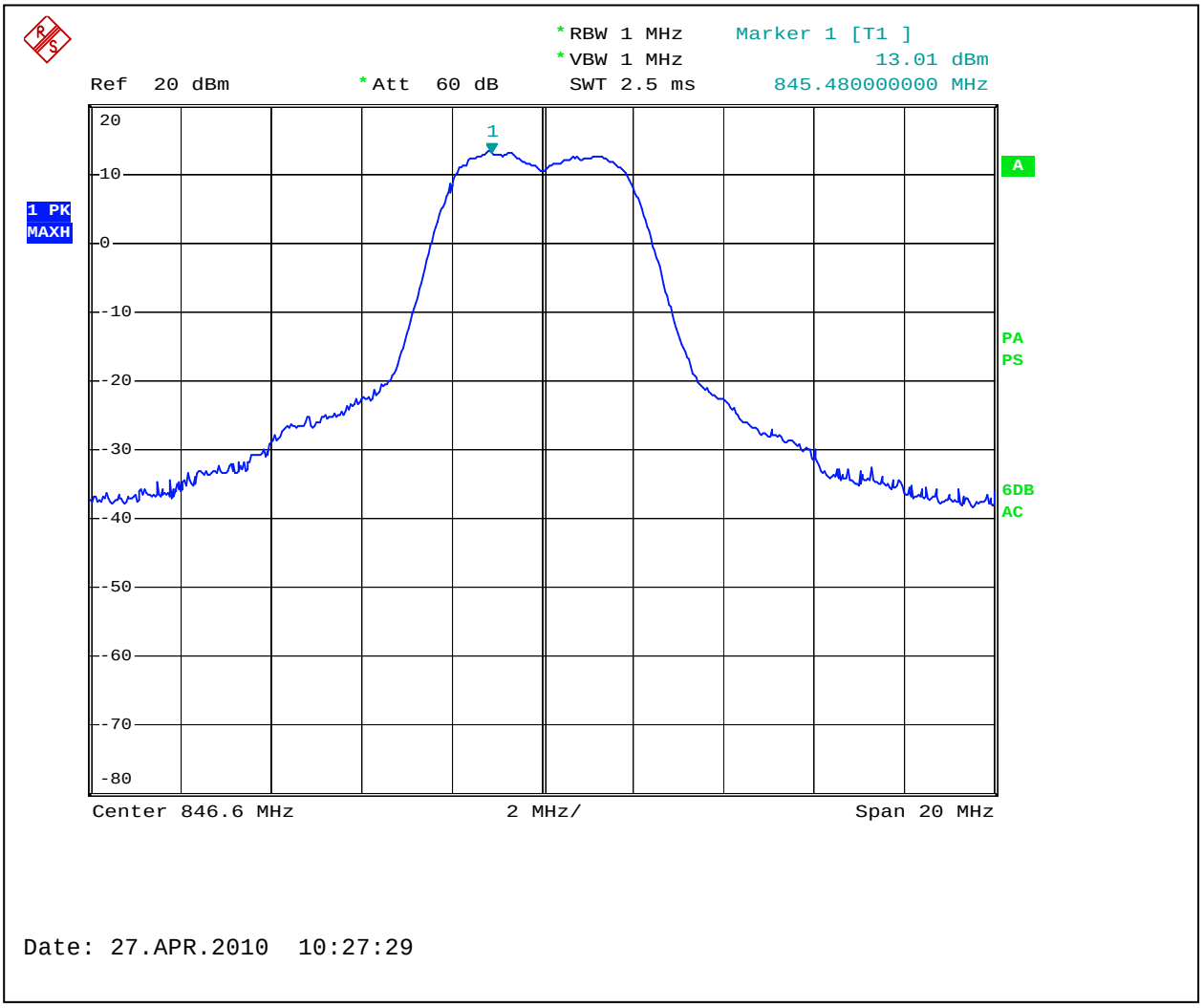
Graph 3.1.19


*RBW 1 MHz
*VBW 1 MHz
*SWT 50 ms
Marker 1 [T1]
12.53 dBm
825.200000000 MHz
Ref 20 dBm
*Att 60 dB
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 826.4 MHz
2 MHz/
Span 20 MHz
Date: 27.APR.2010 09:48:57

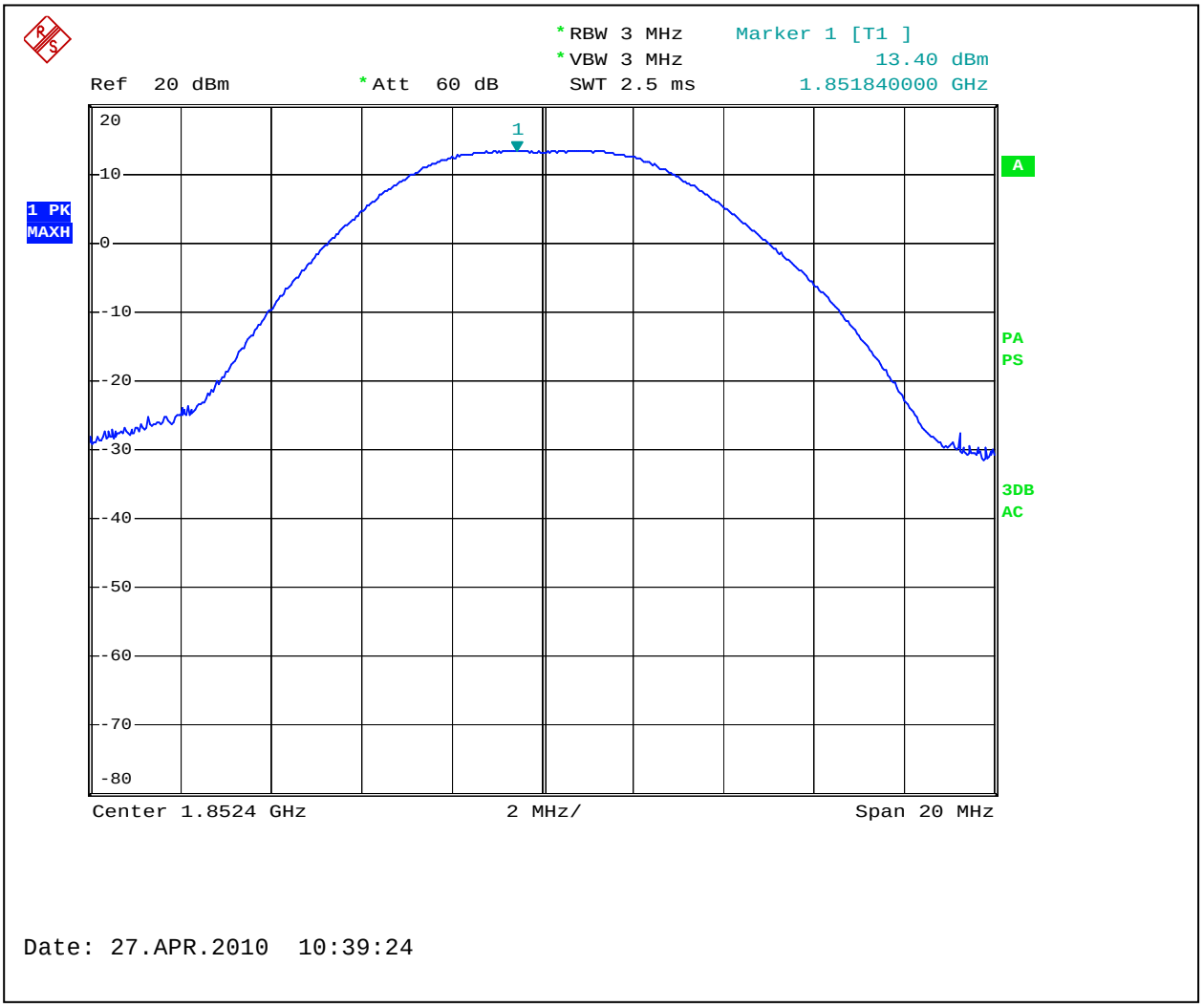
Graph 3.1.20


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
12.22 dBm
835.360000000 MHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 836.6 MHz
2 MHz/
Span 20 MHz
Date: 27.APR.2010 09:41:42

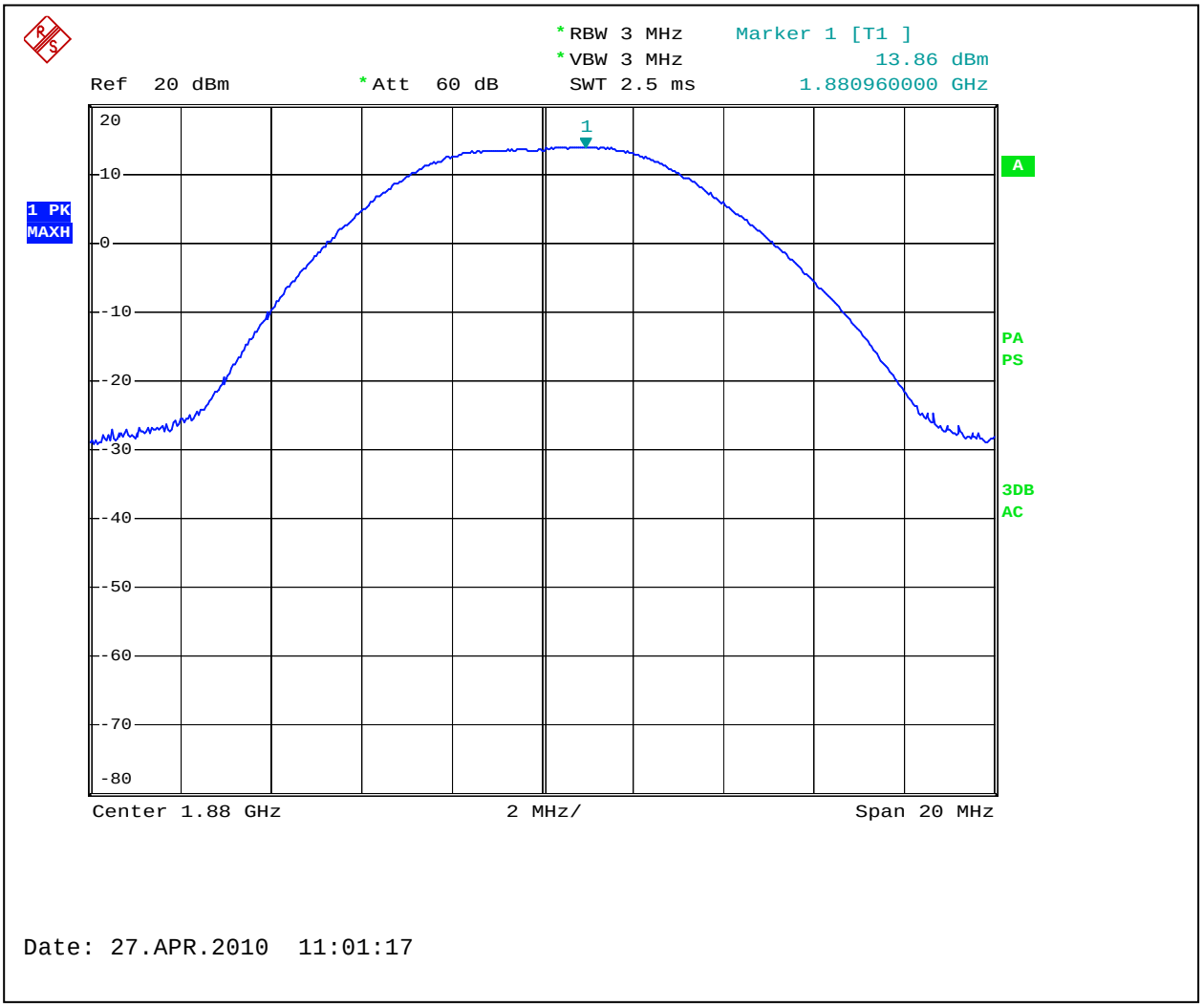
Graph 3.1.21


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
13.01 dBm
845.480000000 MHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 846.6 MHz
2 MHz/
Span 20 MHz
Date: 27.APR.2010 10:27:29

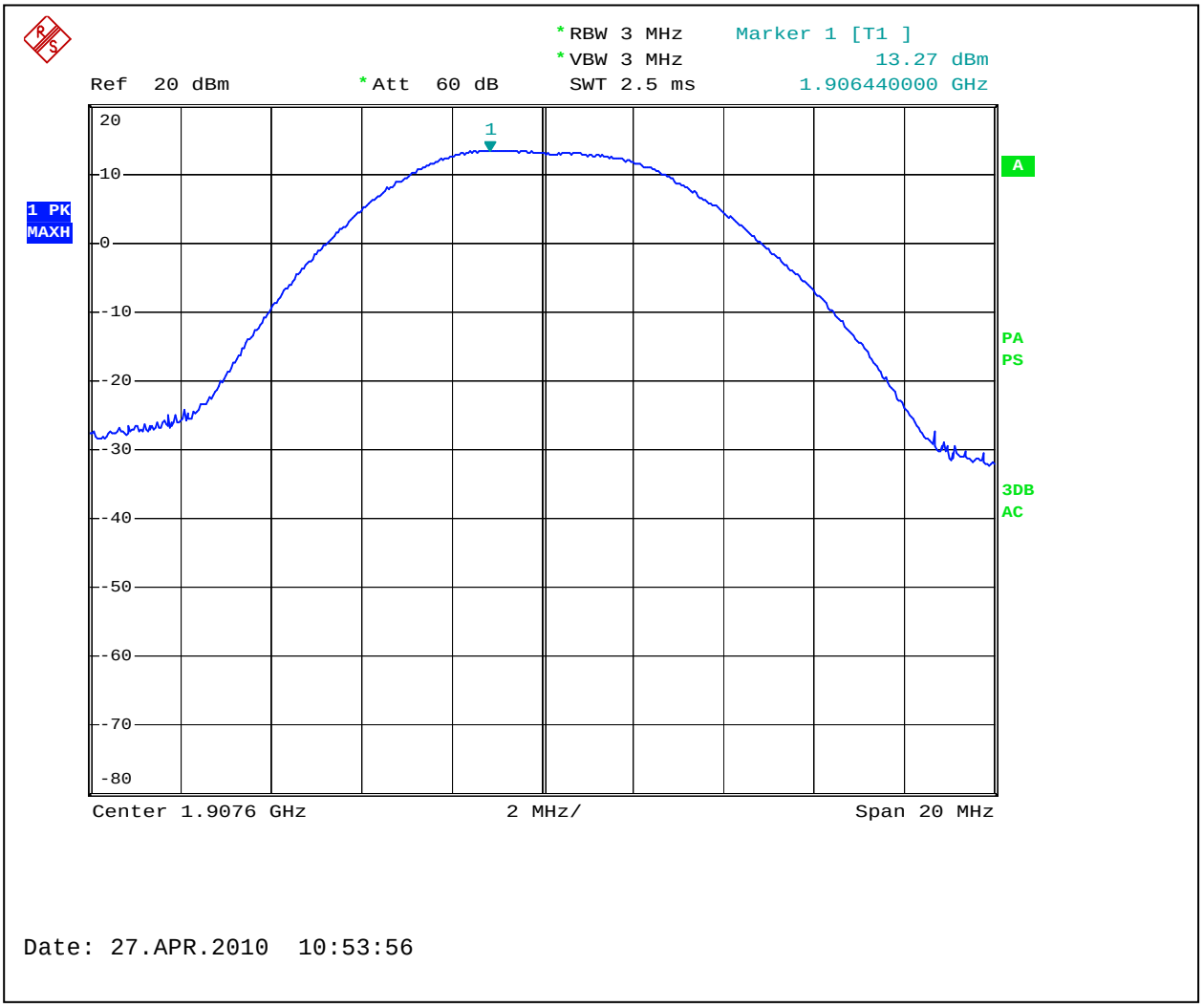
Graph 3.1.22


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
13.40 dBm
1.851840000 GHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.8524 GHz
2 MHz/
Span 20 MHz
Date: 27.APR.2010 10:39:24

Graph 3.1.23


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
13.86 dBm
1.880960000 GHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.88 GHz
2 MHz/
Span 20 MHz
Date: 27.APR.2010 11:01:17

Graph 3.1.24


*RBW 3 MHz
*VBW 3 MHz
Marker 1 [T1]
13.27 dBm
1.906440000 GHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.9076 GHz
2 MHz/
Span 20 MHz
Date: 27.APR.2010 10:53:56

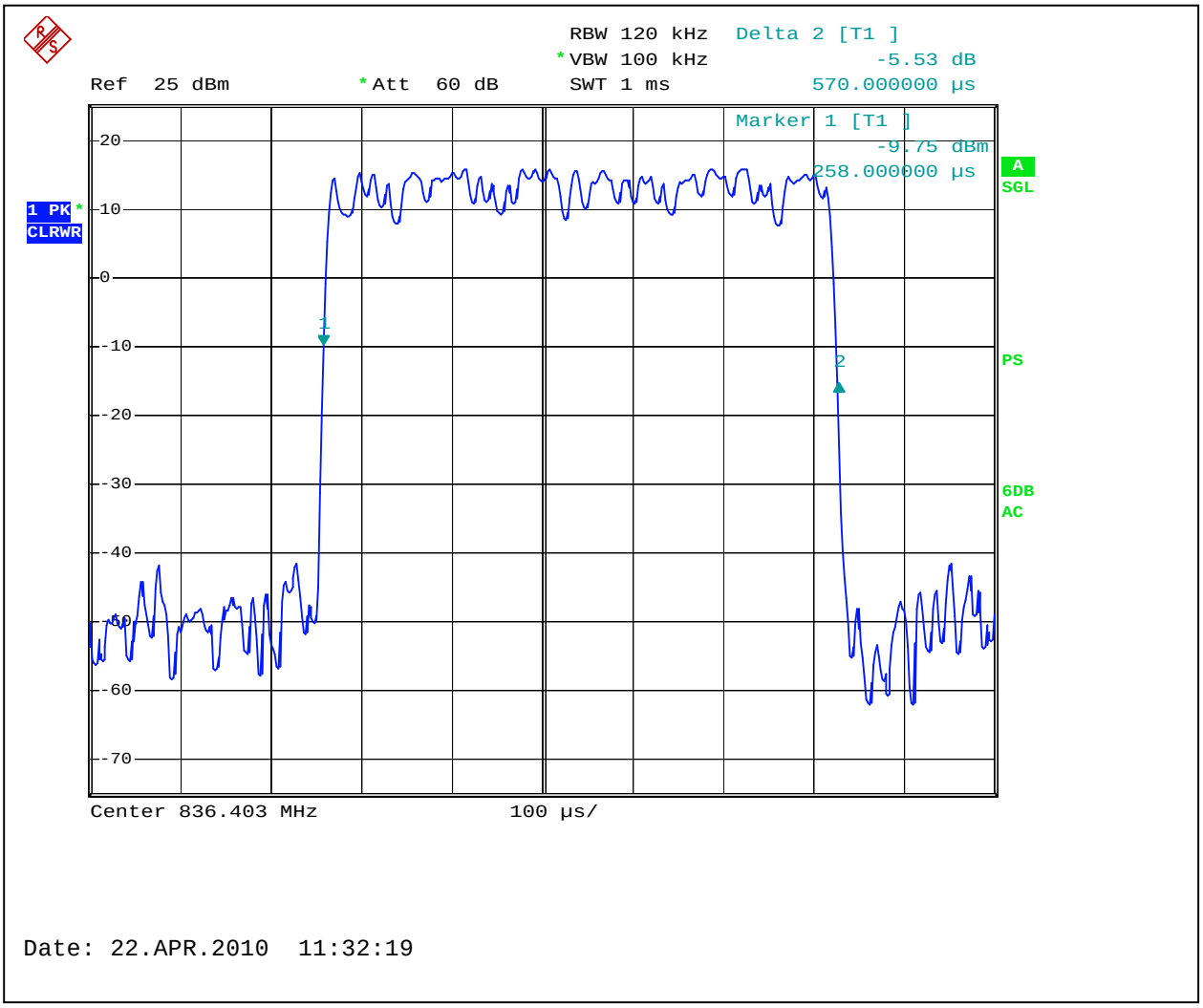
3.2 Modulation Characteristics

The EUT uses GMSK modulation in which information is digitized and coded into a bit system.

Modulation characteristics were measured of 568-570µs

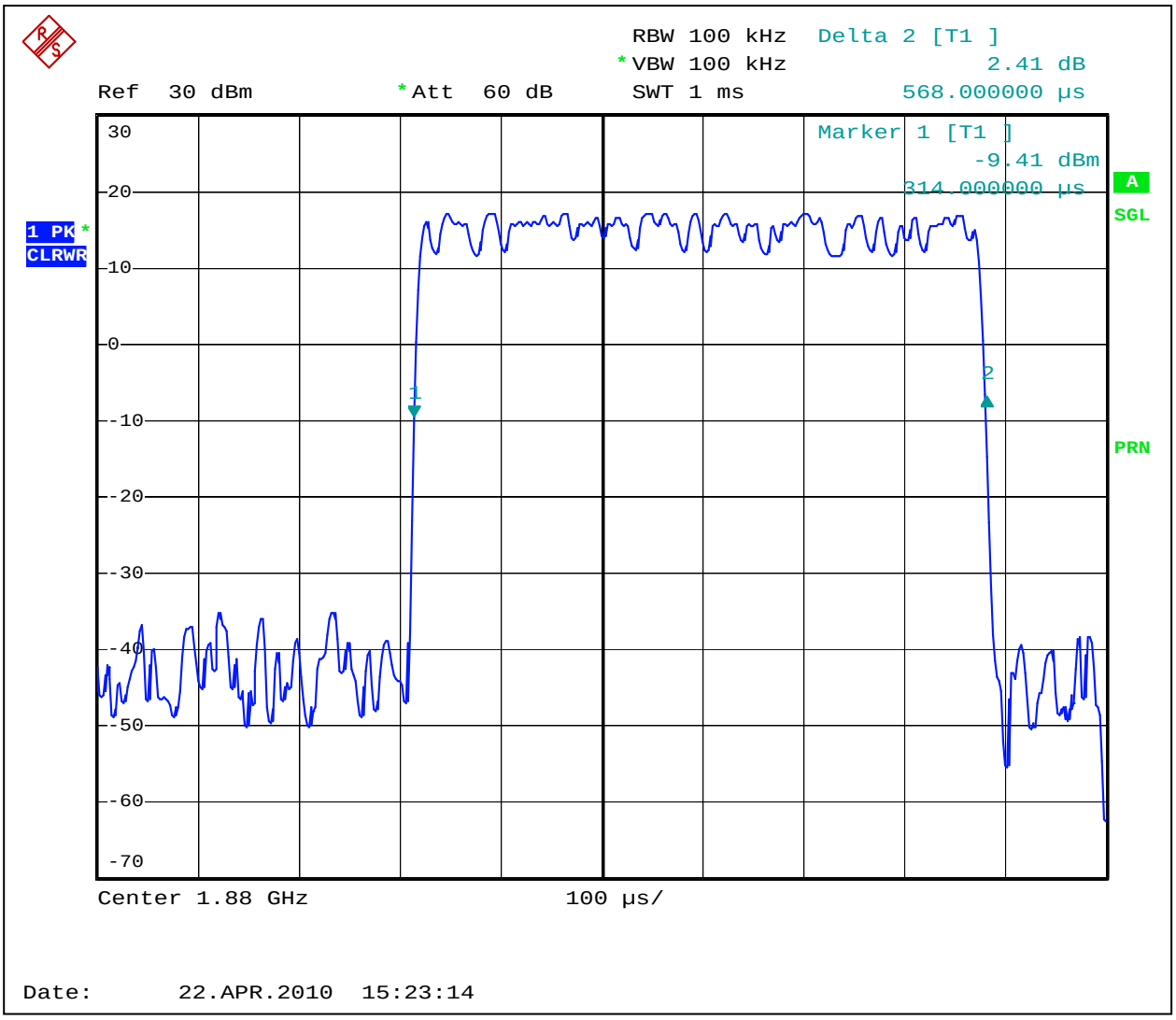
The following graphs show the modulation scheme in the EUT.

Graph 3.2.1



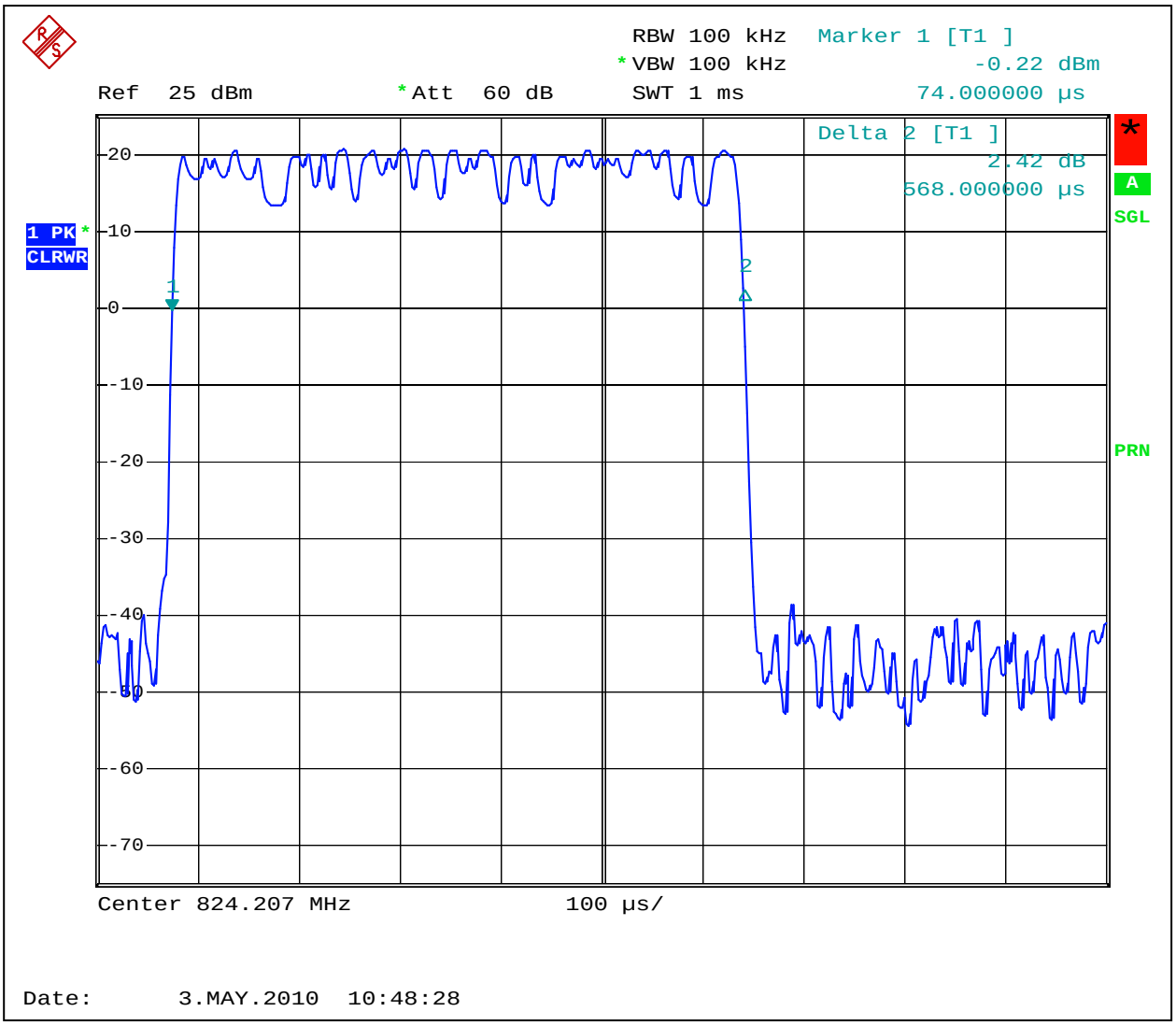
GSM

Graph 3.2.2



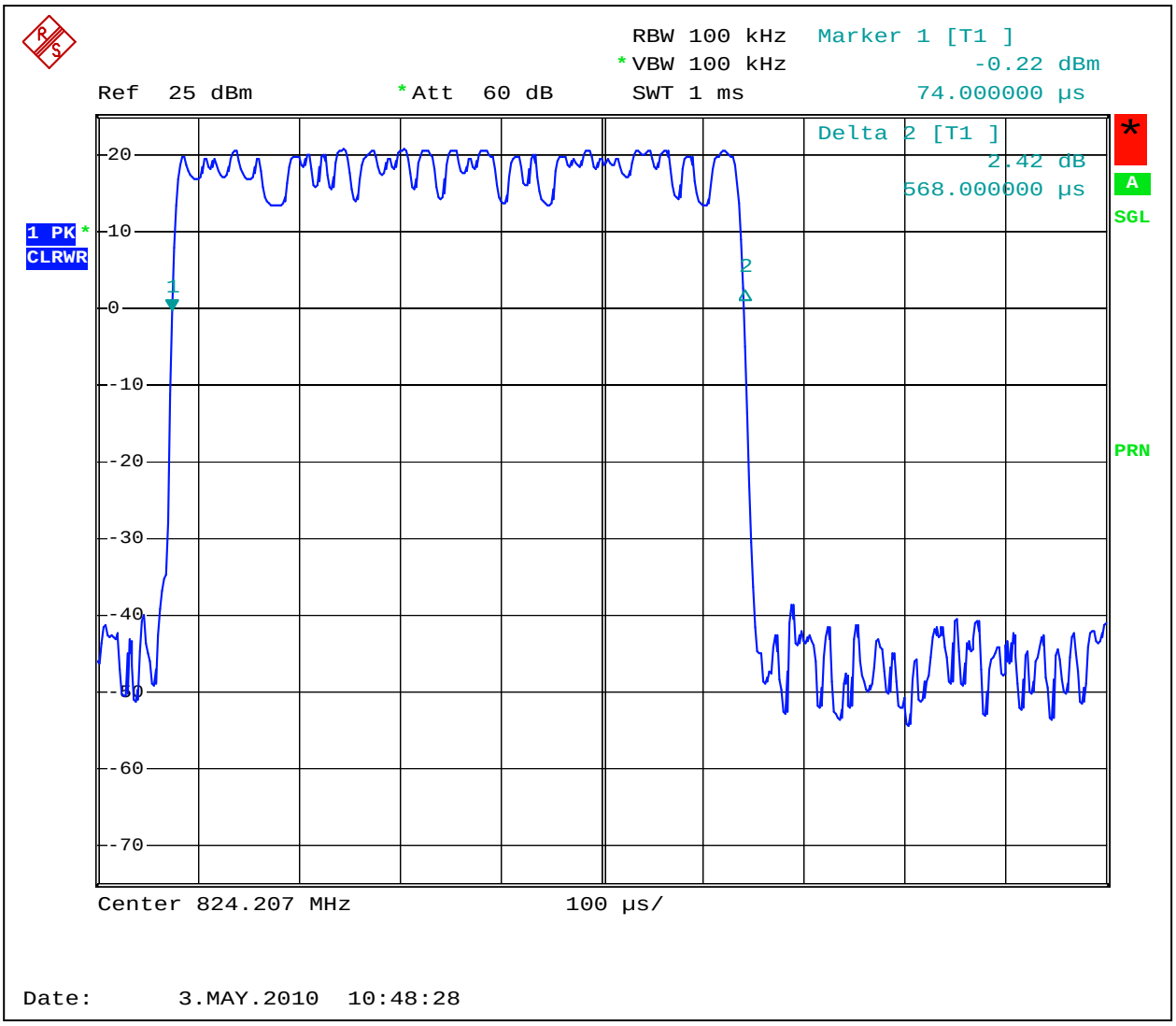
PCS

Graph 3.2.3



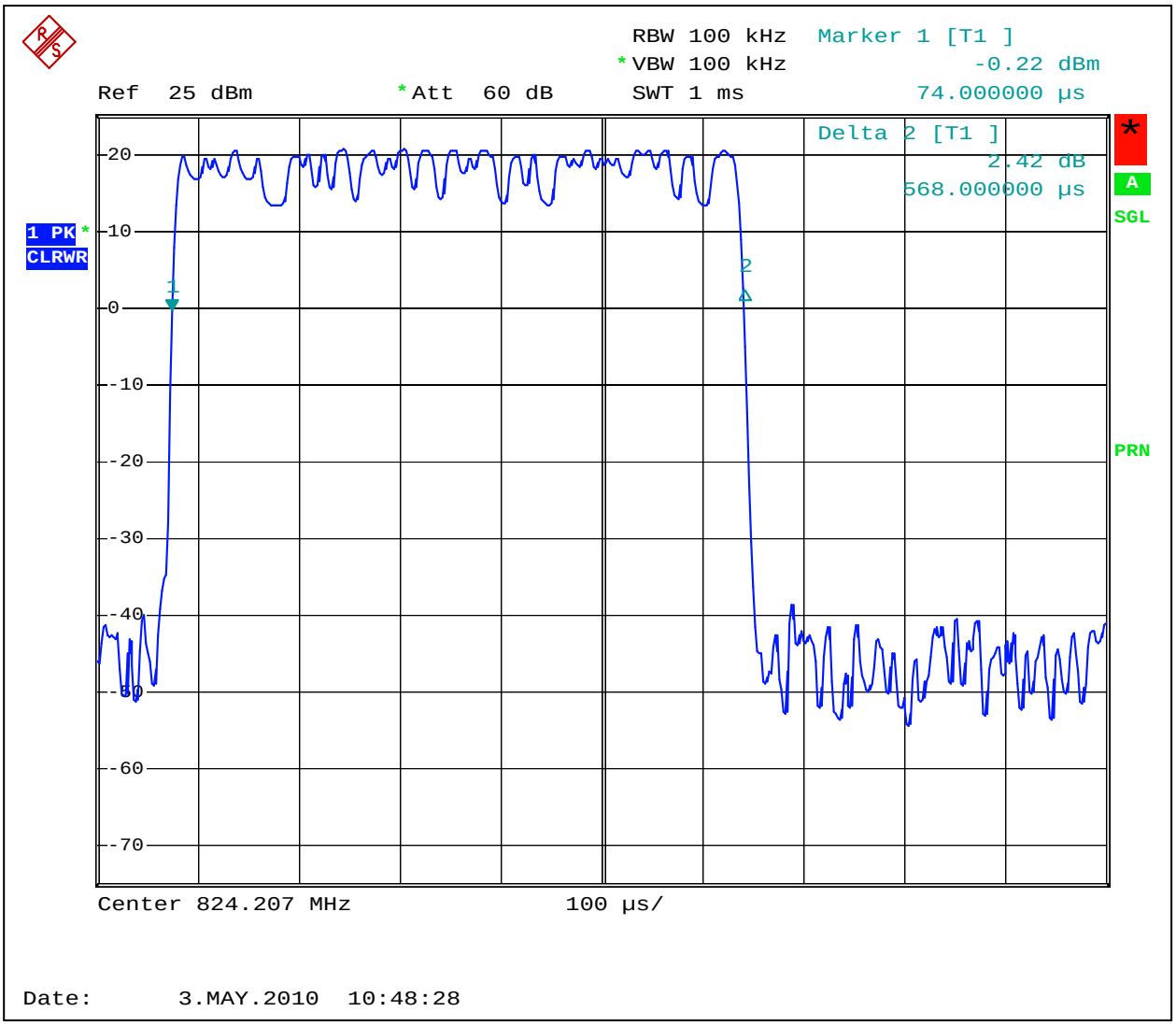
EDGE

Graph 3.2.4



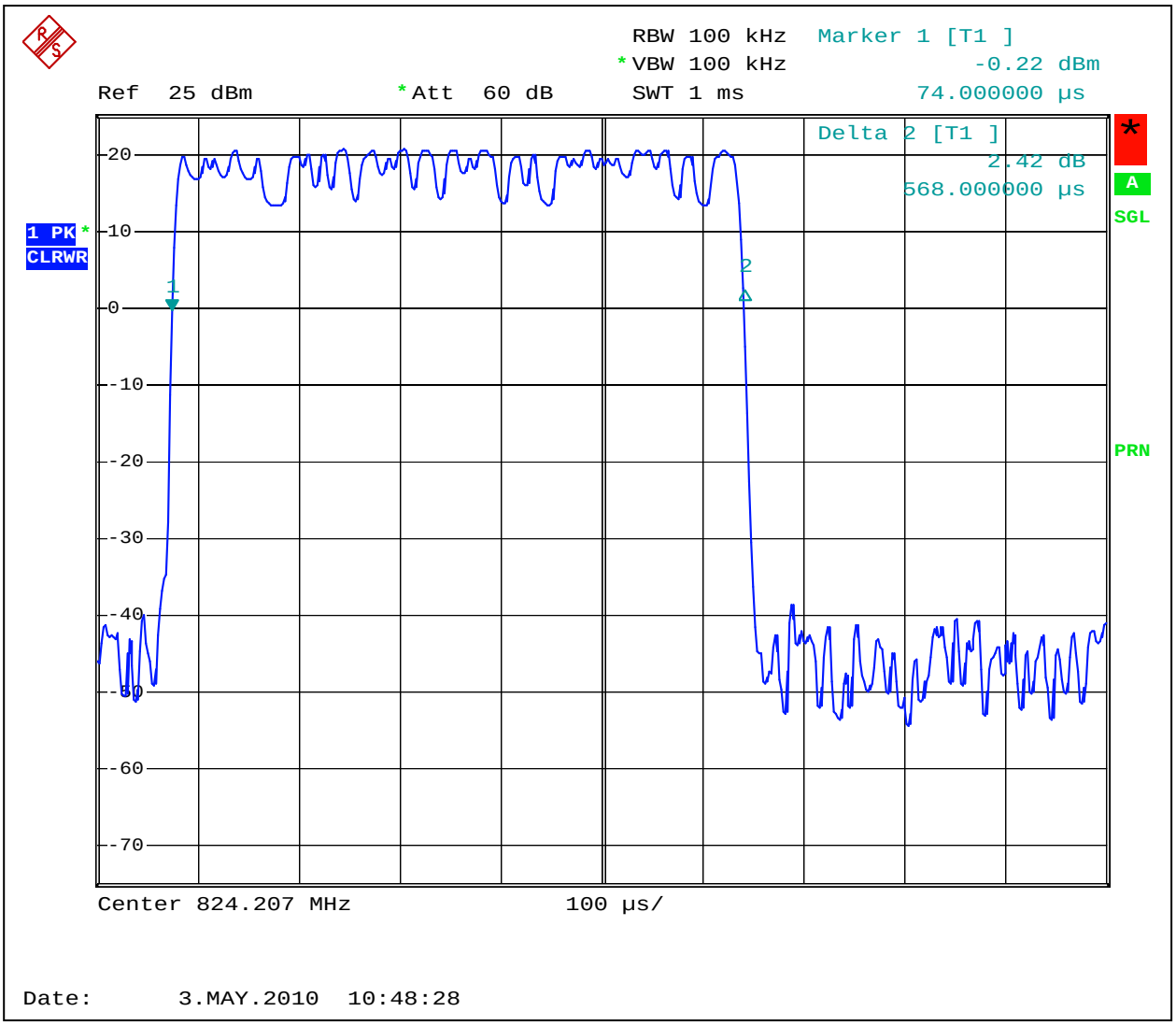
EDGE

Graph 3.2.5



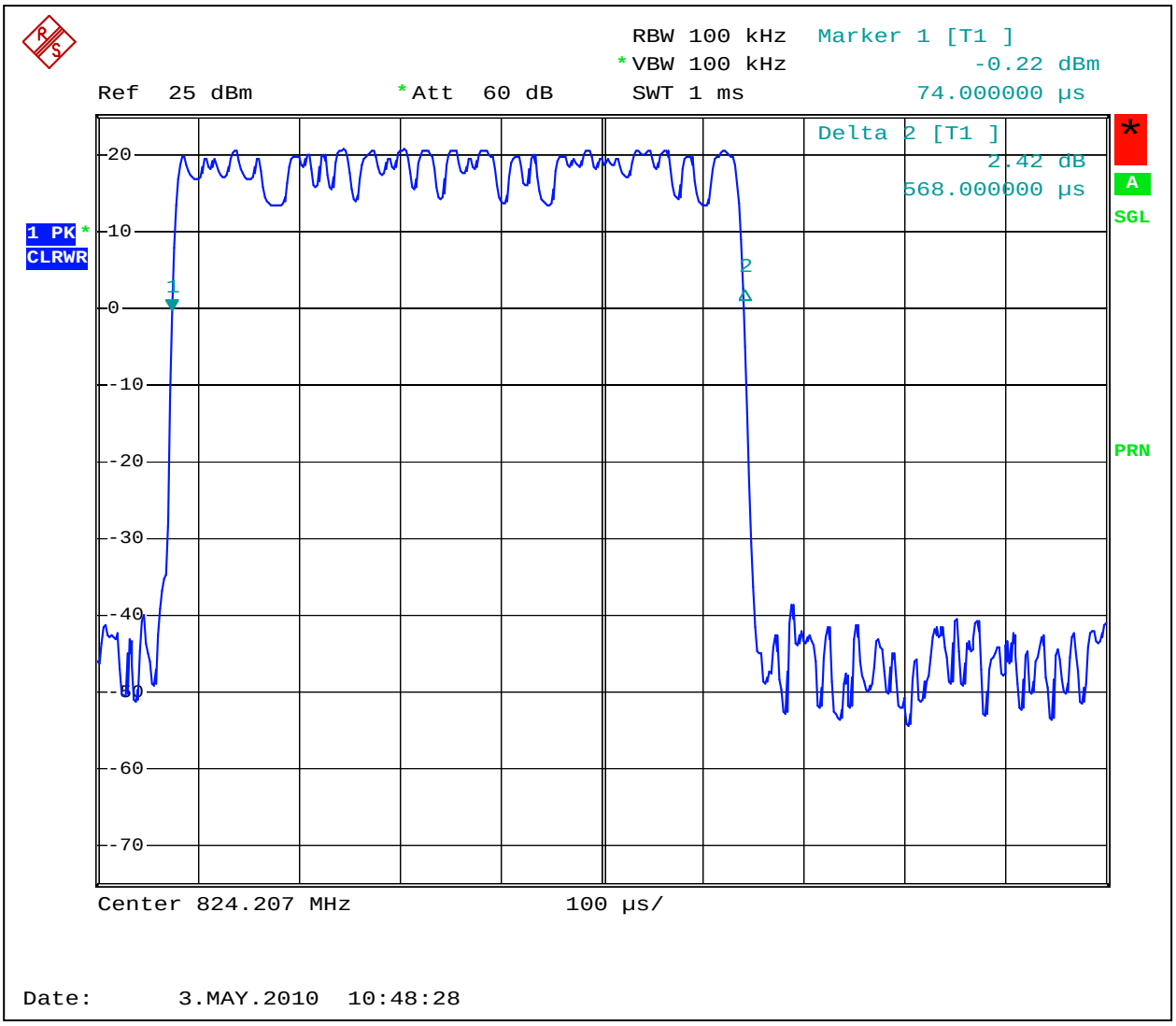
EDGE

Graph 3.2.6



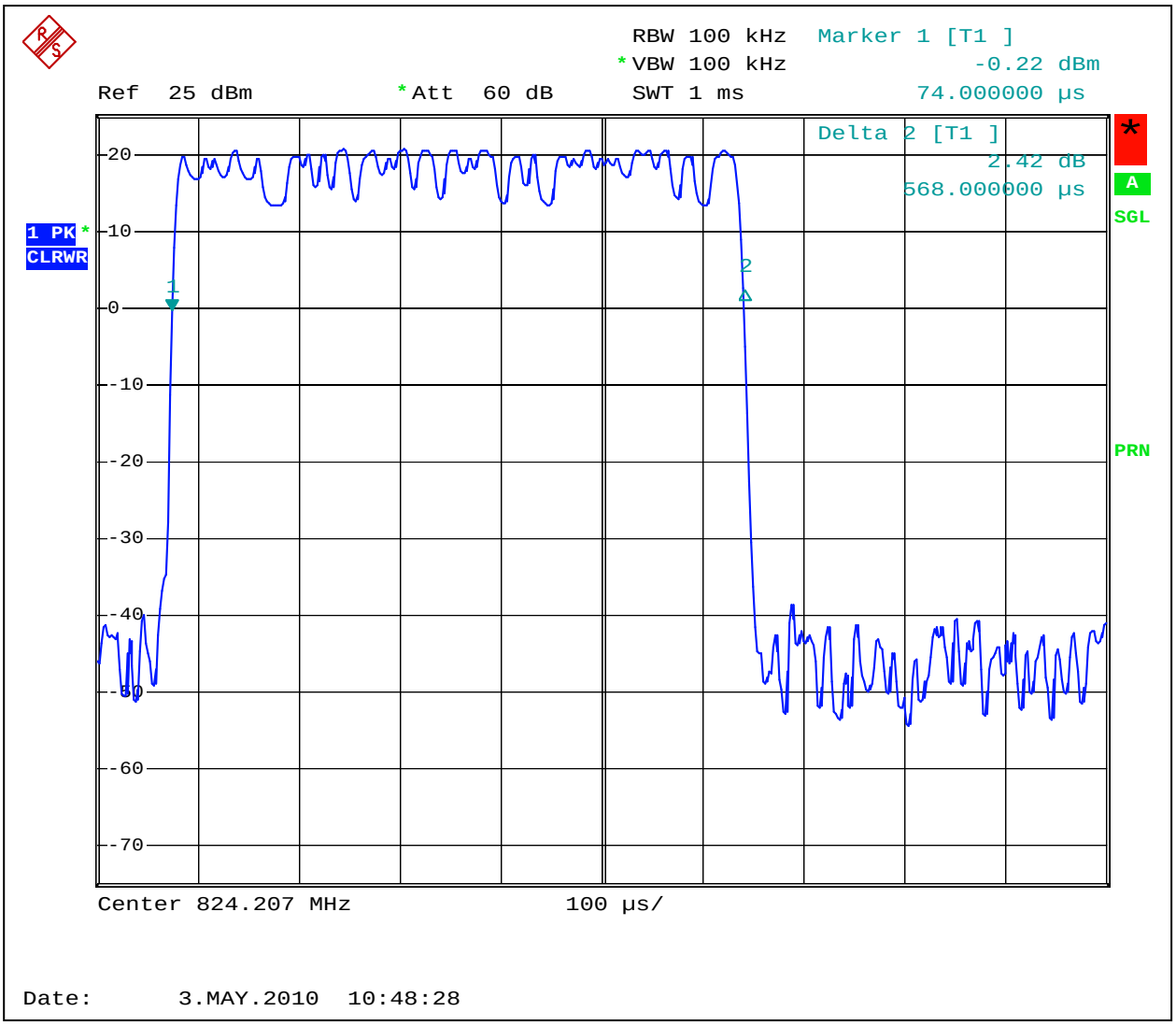
EDGE

Graph 3.2.7



EDGE

Graph 3.2.8



EDGE

3.3 Occupied Bandwidth

The HNAD 99% Occupied Bandwidth shown in the Tables below.
Graphs 3.3.1 to 3.3.6 show GSM/PCS 99% Occupied Bandwidth.
Graphs 3.3.7 to 3.3.12 show EDGE 99% Occupied Bandwidth.
Graphs 3.3.13 to 3.3.18 show WCDMA/HSDPA 99% Occupied Bandwidth.

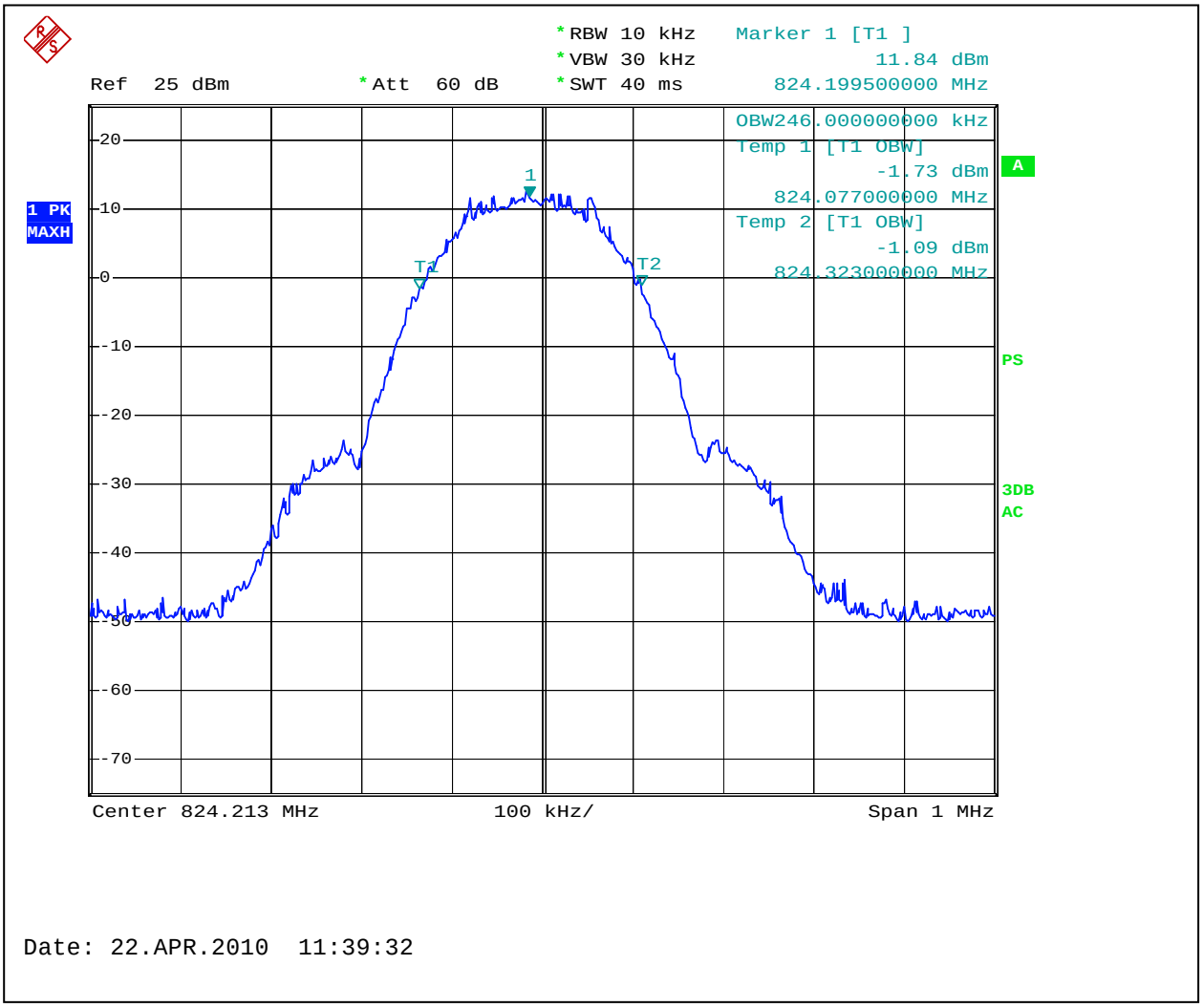
99% Occupied Bandwidth (kHz) GSM/PCS/GPRS/EDGE		
Channel 128	**Channel 189**	**Channel 251**
240-246	240-242	234-242
RBW: ☒ 10kHz ☐ 100kHz ☐ other ____ kHz **VBW:** ☒ 30kHz ☐ 300kHz ☐ other ____ kHz		

99% Occupied Bandwidth (kHz) GSM/PCS/GPRS/EDGE		
Channel 512	**Channel 661**	**Channel 810**
340-344	342-344	342-344
RBW: ☐ 10kHz ☒ 100kHz ☐ other ____ kHz **VBW:** ☐ 30kHz ☒ 100kHz ☒ 300kHz (for EDGE mode)		

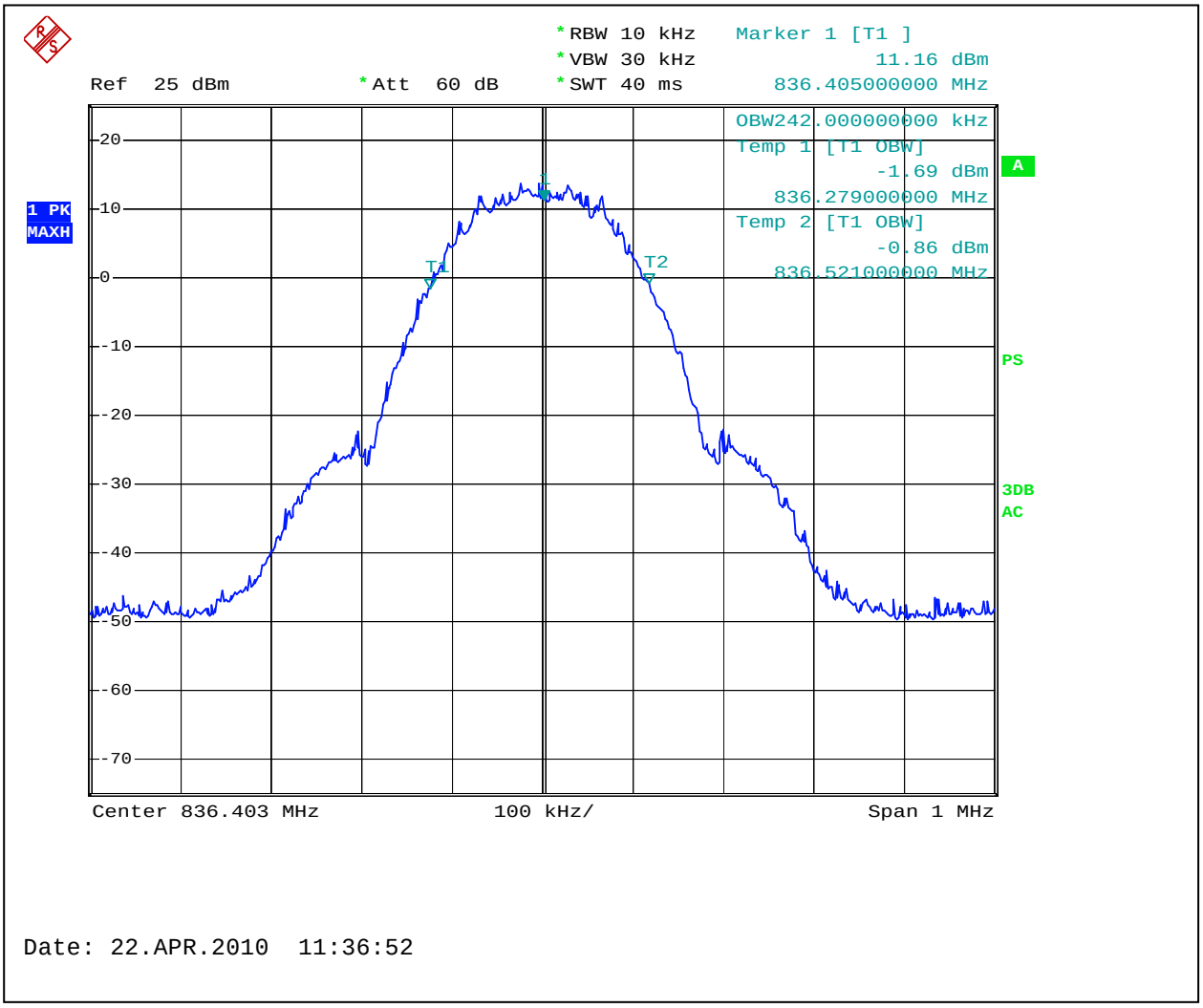
99% Occupied Bandwidth (kHz) WCDMA/HSDPA		
Channel 4132	**Channel 4183**	**Channel 4233**
4060	4080	4060
RBW: ☒ 10kHz ☐ 100kHz ☐ other ____ kHz **VBW:** ☒ 30kHz ☐ 300kHz ☐ other ____ kHz		

99% Occupied Bandwidth (kHz) WCDMA/HSDPA		
Channel 9262	**Channel 9400**	**Channel 9538**
4080	**4100**	**4060**
RBW: ☐ 10kHz ☒ 100kHz ☐ other ____ kHz **VBW:** ☐ 30kHz ☒ 100kHz ☐ other ____ kHz		

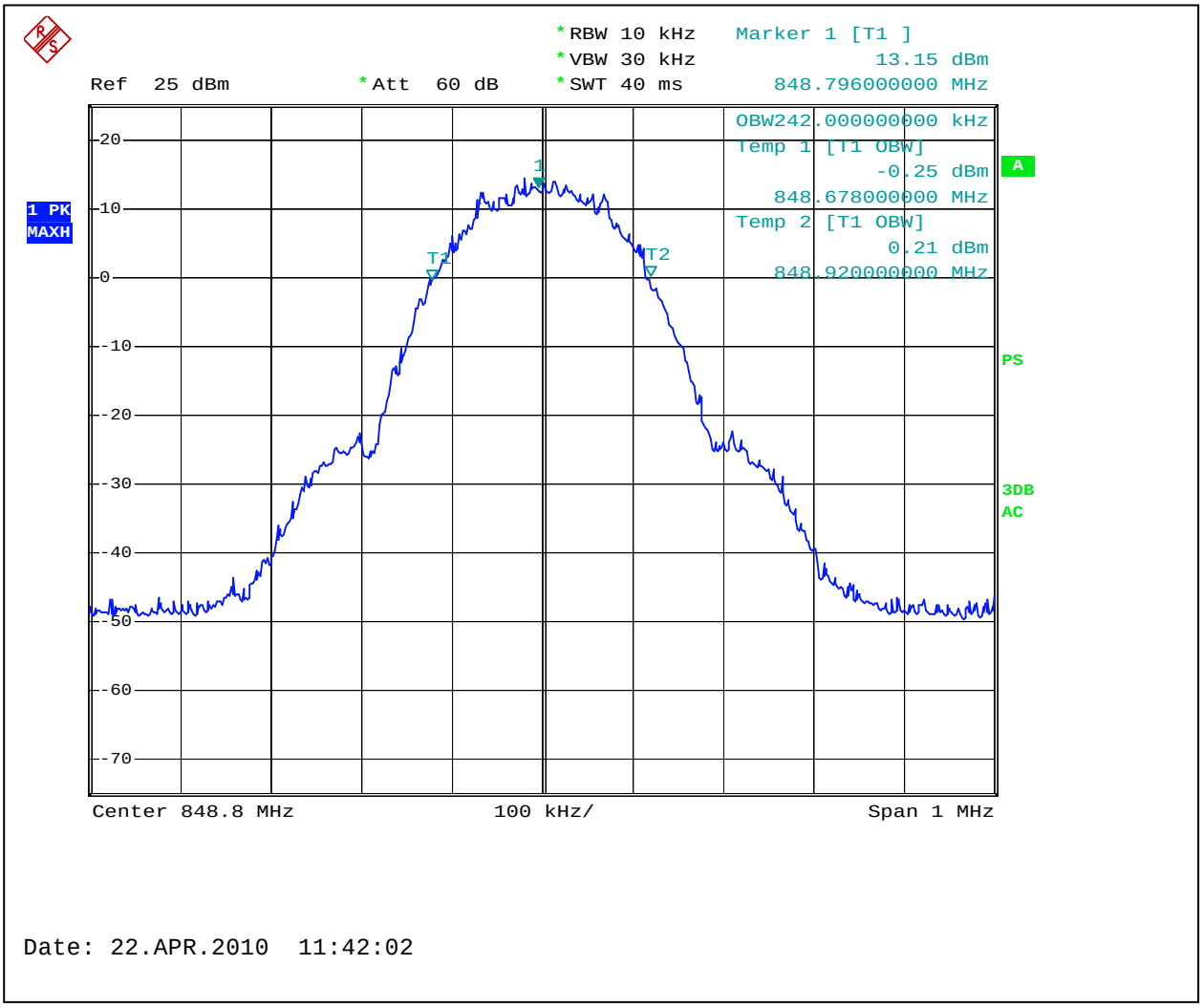
Graph 3.3.1


*RBW 10 kHz
*VBW 30 kHz
*SWT 40 ms
Marker 1 [T1]
11.84 dBm
824.199500000 MHz
OBW246.000000000 kHz
Temp 1 [T1 OBW]
-1.73 dBm
824.077000000 MHz
Temp 2 [T1 OBW]
-1.09 dBm
824.323000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
Center 824.213 MHz
100 kHz/
Span 1 MHz
Date: 22.APR.2010 11:39:32

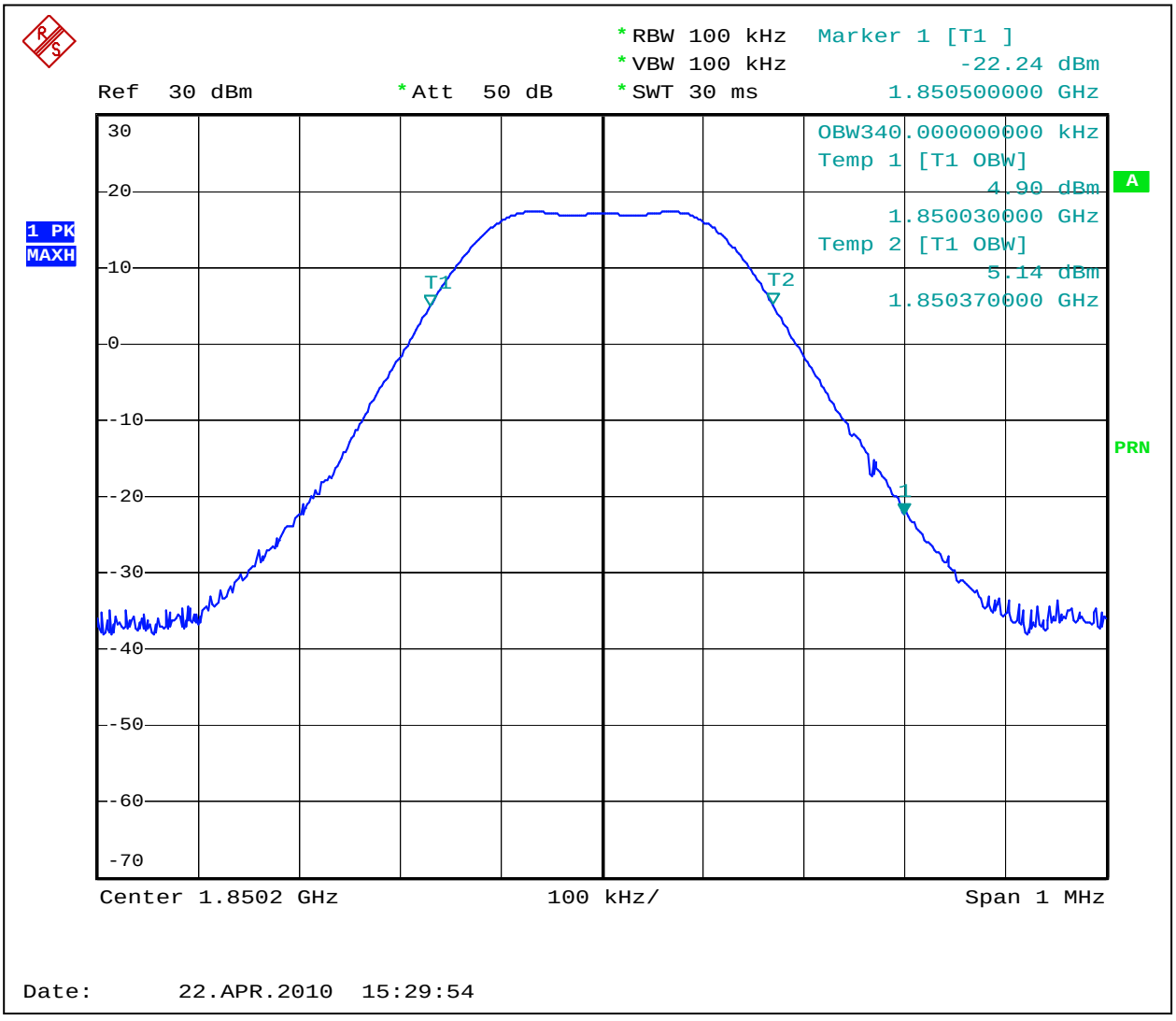
Graph 3.3.2


*RBW 10 kHz
*VBW 30 kHz
*SWT 40 ms
Marker 1 [T1]
11.16 dBm
836.405000000 MHz
Ref 25 dBm
*Att 60 dB
OBW242.000000000 kHz
Temp 1 [T1 OBW]
-1.69 dBm
836.279000000 MHz
Temp 2 [T1 OBW]
-0.86 dBm
836.521000000 MHz
1 PK
MAXH
A
PS
3DB
AC
T1
T2
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 836.403 MHz
100 kHz/
Span 1 MHz
Date: 22.APR.2010 11:36:52

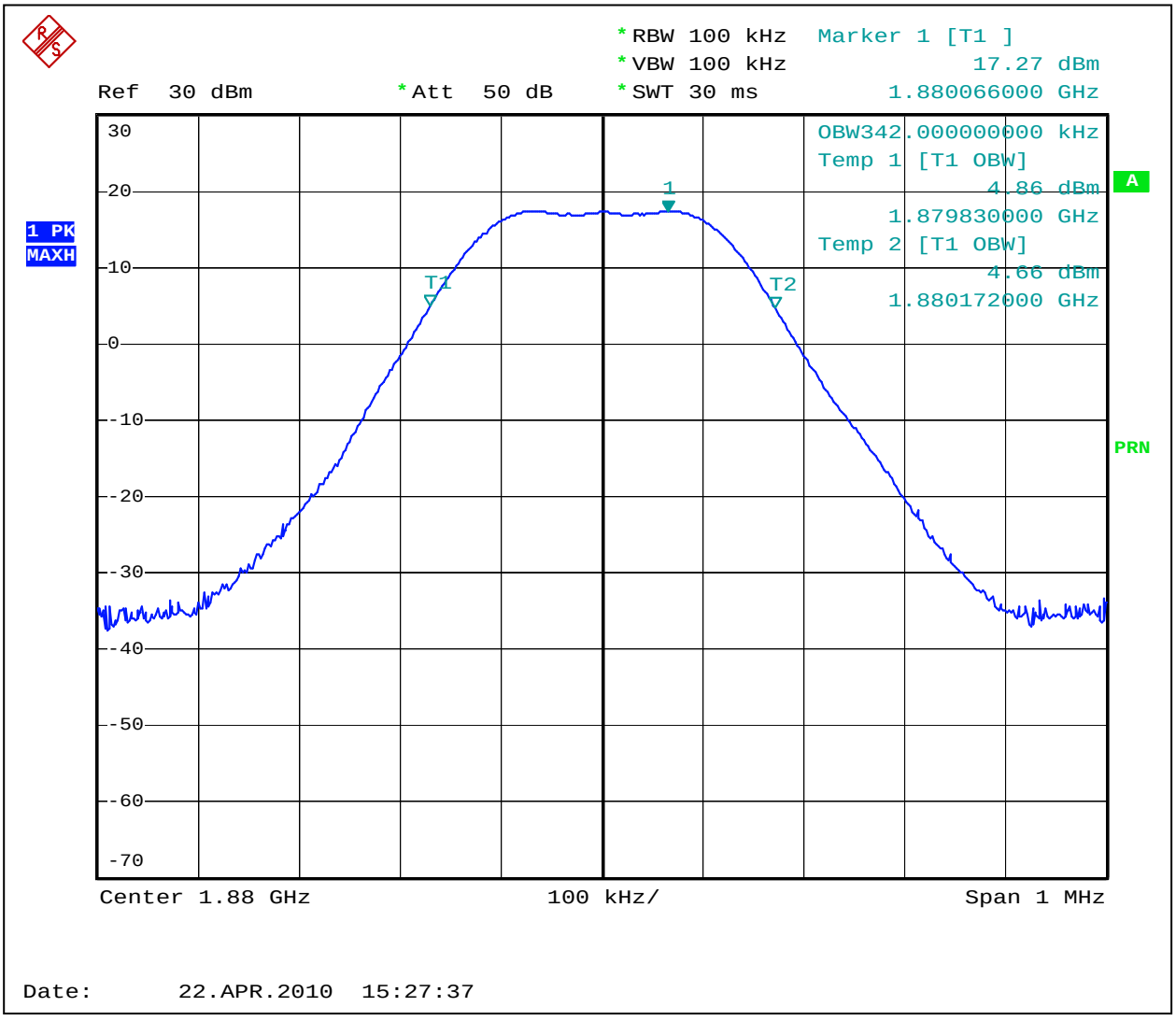
Graph 3.3.3


*RBW 10 kHz
*VBW 30 kHz
*SWT 40 ms
Marker 1 [T1]
13.15 dBm
848.796000000 MHz
OBW242.000000000 kHz
Temp 1 [T1 OBW]
-0.25 dBm
848.678000000 MHz
Temp 2 [T1 OBW]
0.21 dBm
848.920000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
T2
Center 848.8 MHz
100 kHz/
Span 1 MHz
Date: 22.APR.2010 11:42:02

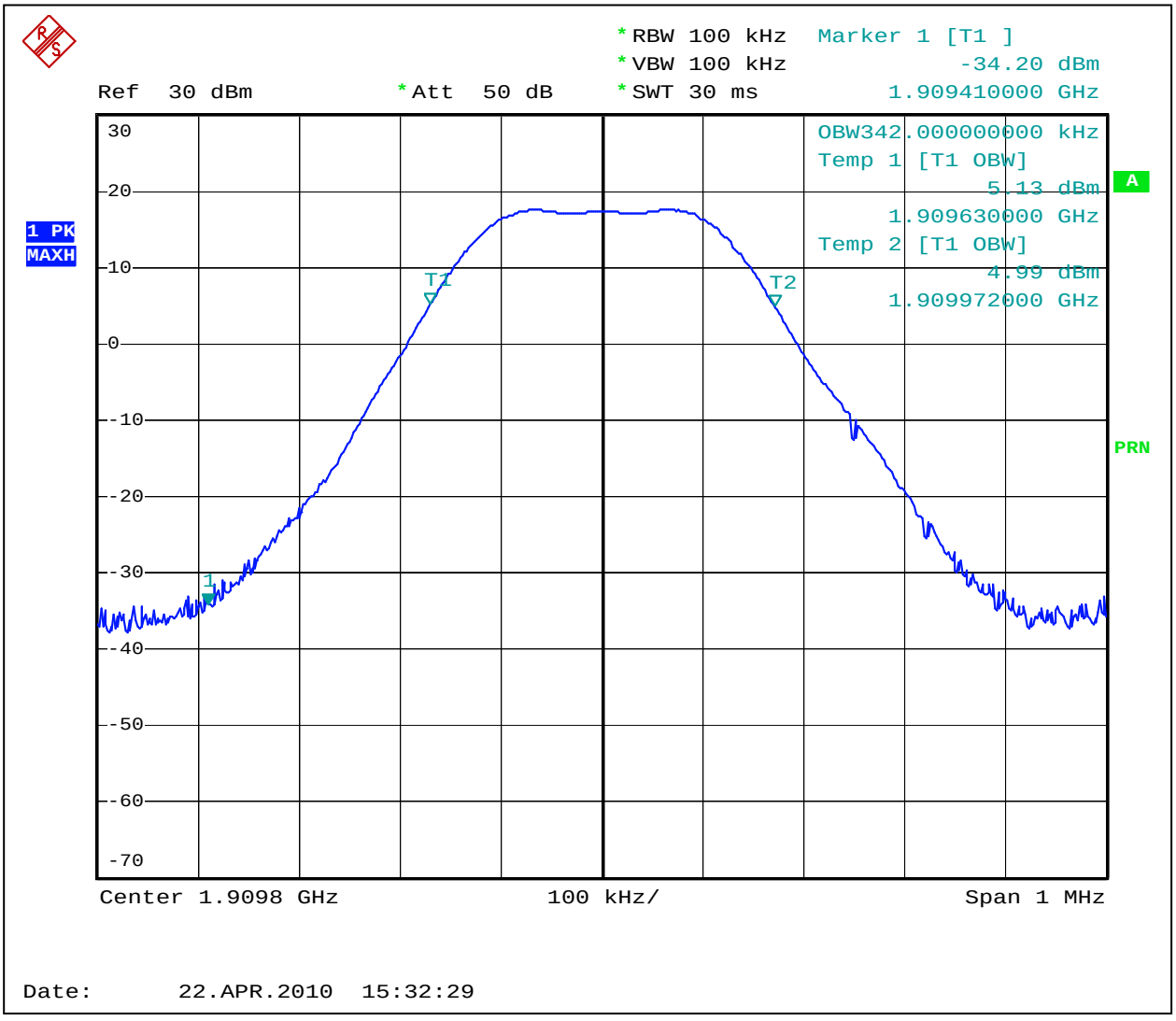
Graph 3.3.4


*RBW 100 kHz
*VBW 100 kHz
Ref 30 dBm
*Att 50 dB
*SWT 30 ms
Marker 1 [T1]
-22.24 dBm
1.850500000 GHz
OBW340.000000000 kHz
Temp 1 [T1 OBW]
4.90 dBm
1.850030000 GHz
Temp 2 [T1 OBW]
5.14 dBm
1.850370000 GHz
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
1
Center 1.8502 GHz
100 kHz/
Span 1 MHz
Date: 22.APR.2010 15:29:54

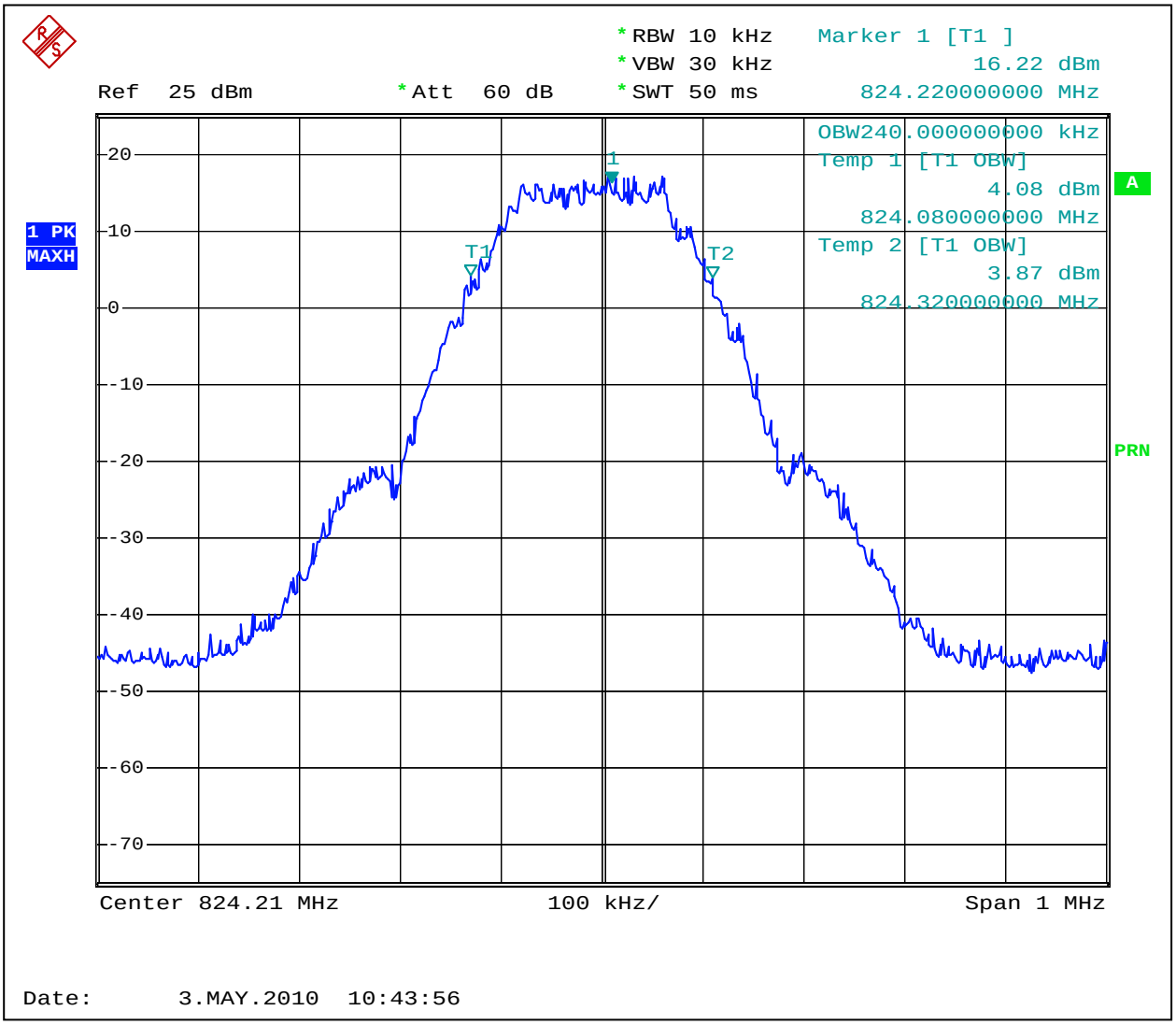
Graph 3.3.5


*RBW 100 kHz
*VBW 100 kHz
*SWT 30 ms
Marker 1 [T1]
17.27 dBm
1.880066000 GHz
Ref 30 dBm
*Att 50 dB
OBW342.000000000 kHz
Temp 1 [T1 OBW]
4.86 dBm
1.879830000 GHz
Temp 2 [T1 OBW]
4.66 dBm
1.880172000 GHz
1 PK
MAXH
A
PRN
T1
T2
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.88 GHz
100 kHz/
Span 1 MHz
Date: 22.APR.2010 15:27:37

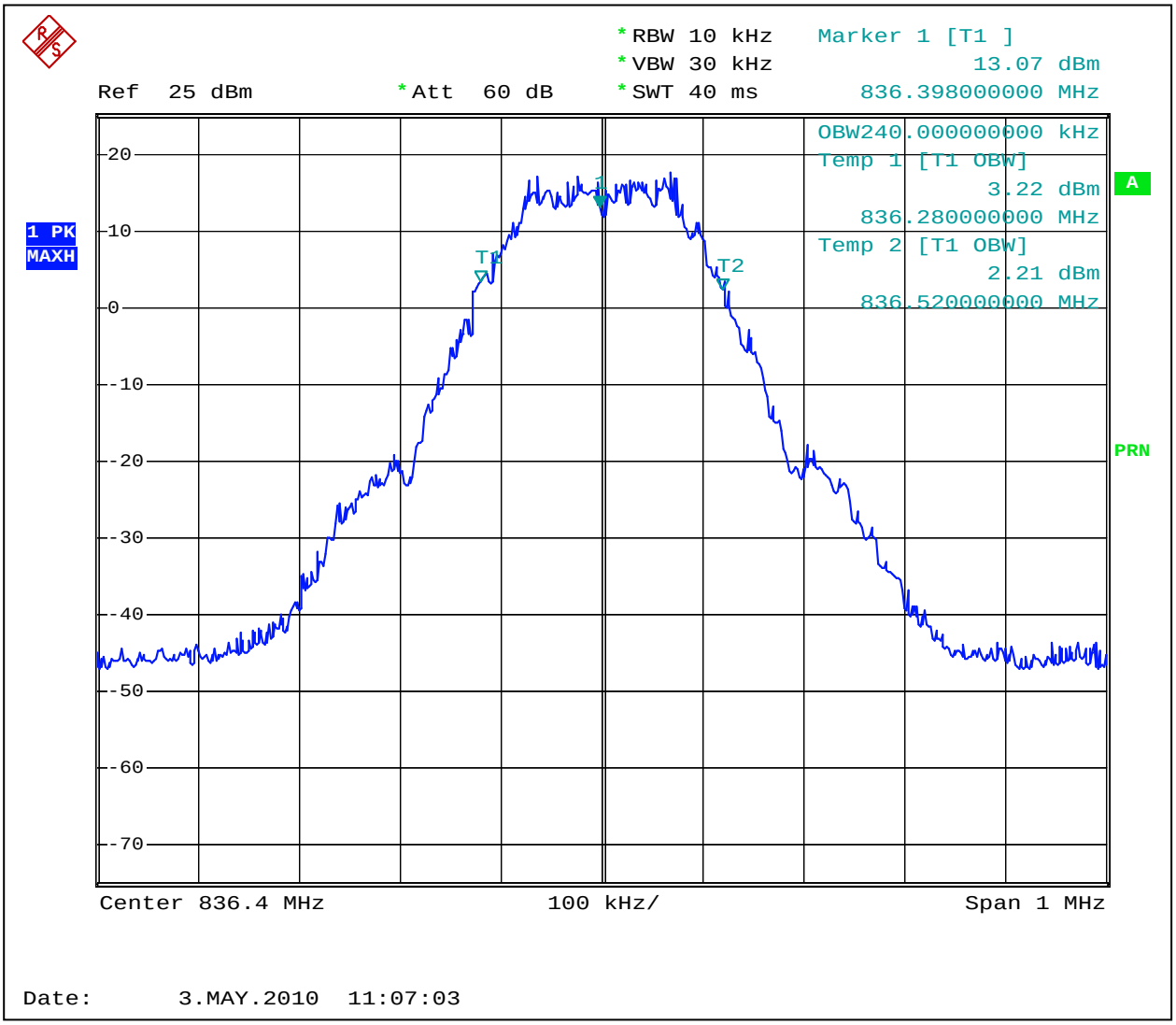
Graph 3.3.6


*RBW 100 kHz
*VBW 100 kHz
Ref 30 dBm
*Att 50 dB
*SWT 30 ms
Marker 1 [T1]
-34.20 dBm
1.909410000 GHz
OBW342.000000000 kHz
Temp 1 [T1 OBW]
5.13 dBm
1.909630000 GHz
Temp 2 [T1 OBW]
4.99 dBm
1.909972000 GHz
1 PK
MAXH
A
PRN
T1
T2
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Center 1.9098 GHz
100 kHz/
Span 1 MHz
Date: 22.APR.2010 15:32:29

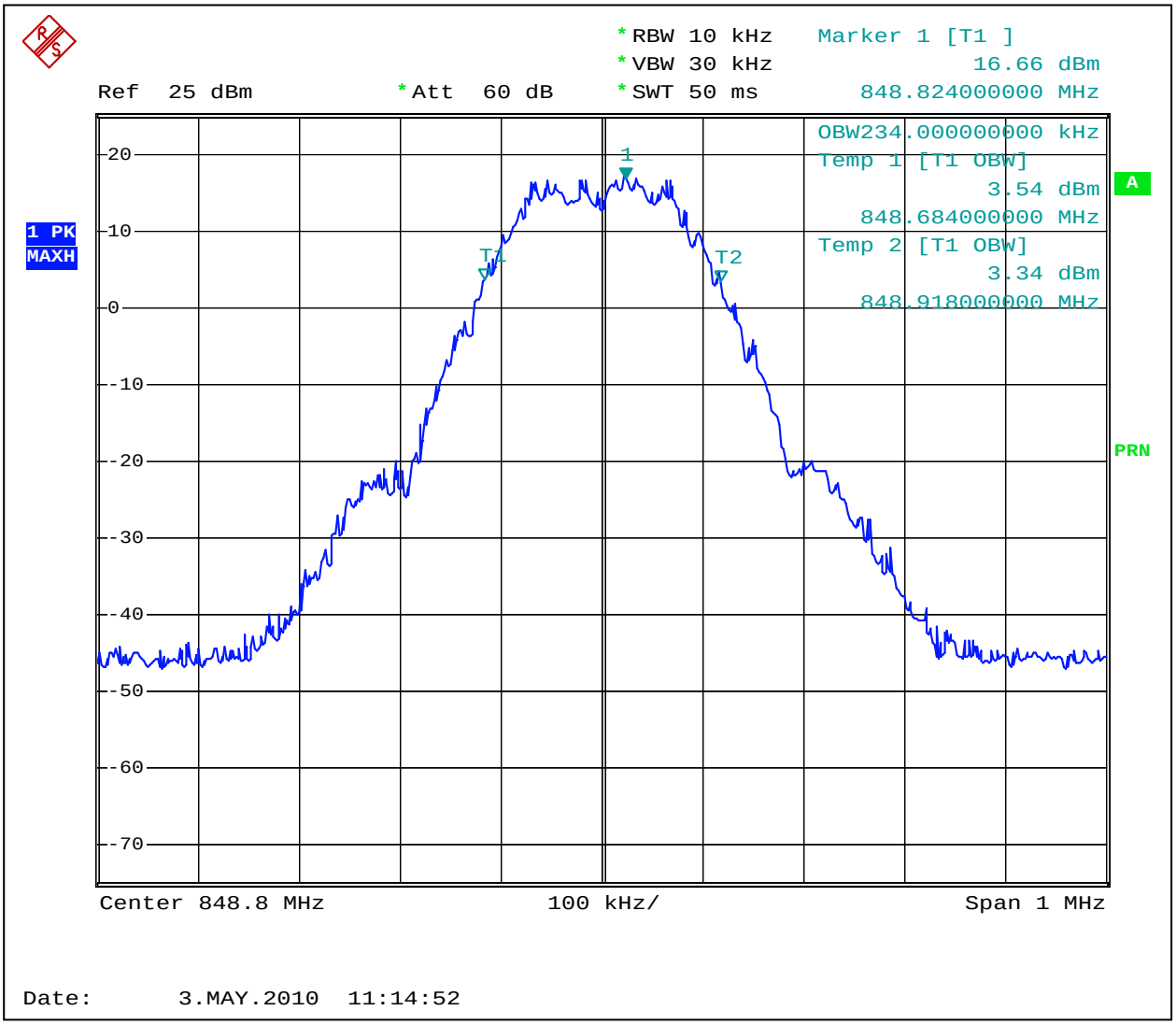
Graph 3.3.7


*RBW 10 kHz
*VBW 30 kHz
*SWT 50 ms
Marker 1 [T1]
16.22 dBm
824.220000000 MHz
OBW240.000000000 kHz
Temp 1 [T1 OBW]
4.08 dBm
824.080000000 MHz
Temp 2 [T1 OBW]
3.87 dBm
824.320000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
Center 824.21 MHz
100 kHz/
Span 1 MHz
Date: 3.MAY.2010 10:43:56

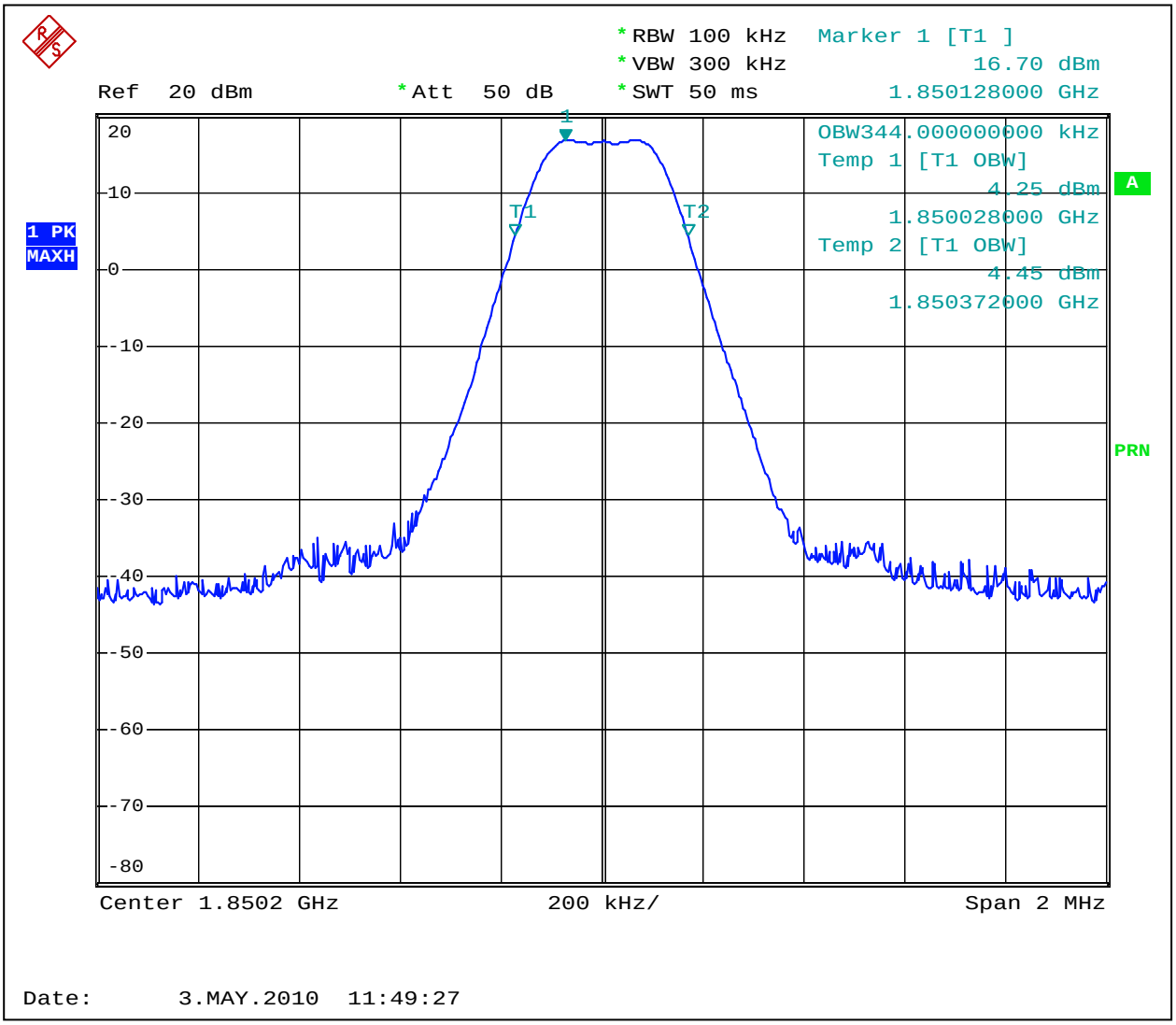
Graph 3.3.8


*RBW 10 kHz
*VBW 30 kHz
*SWT 40 ms
Marker 1 [T1]
13.07 dBm
836.398000000 MHz
OBW240.000000000 kHz
Temp 1 [T1 OBW]
3.22 dBm
836.280000000 MHz
Temp 2 [T1 OBW]
2.21 dBm
836.520000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
Center 836.4 MHz
100 kHz/
Span 1 MHz
Date: 3.MAY.2010 11:07:03

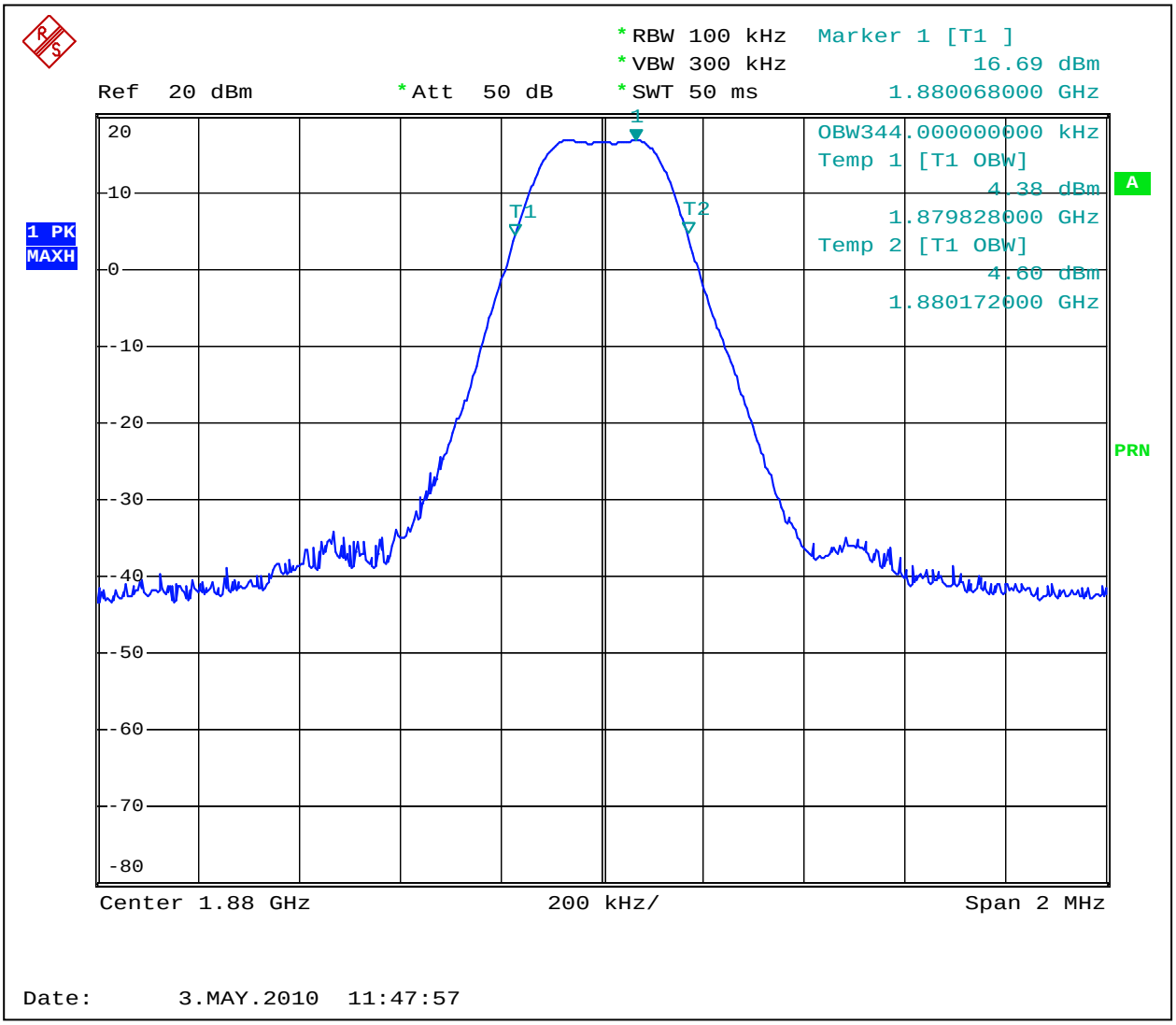
Graph 3.3.9


*RBW 10 kHz
*VBW 30 kHz
*SWT 50 ms
Marker 1 [T1]
16.66 dBm
848.824000000 MHz
OBW234.000000000 kHz
Temp 1 [T1 OBW]
3.54 dBm
848.684000000 MHz
Temp 2 [T1 OBW]
3.34 dBm
848.918000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
T1
T2
Center 848.8 MHz
100 kHz/
Span 1 MHz
Date: 3.MAY.2010 11:14:52

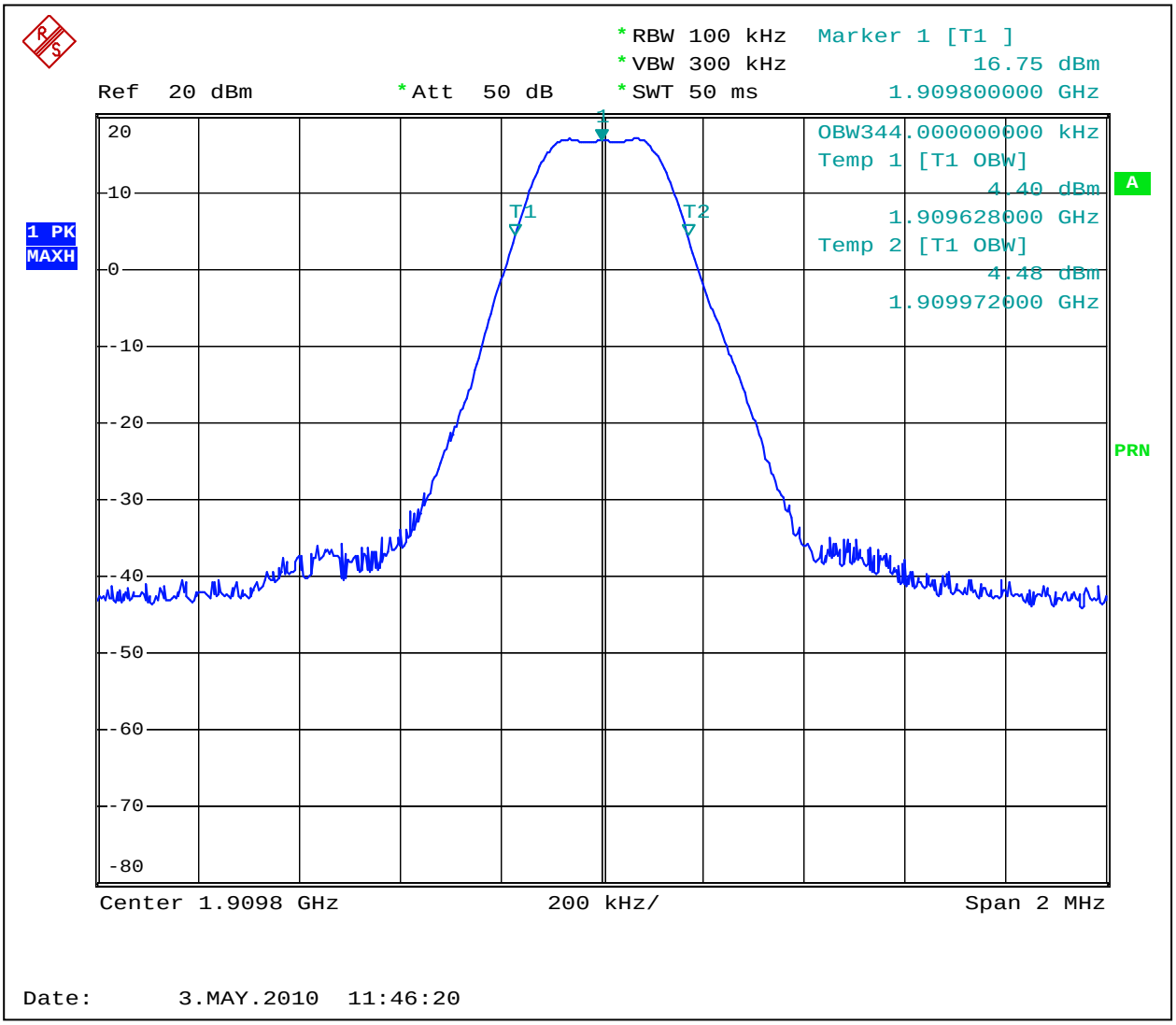
Graph 3.3.10


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 50 dB
*SWT 50 ms
Marker 1 [T1]
16.70 dBm
1.850128000 GHz
OBW344.000000000 kHz
Temp 1 [T1 OBW]
4.25 dBm
1.850028000 GHz
Temp 2 [T1 OBW]
4.45 dBm
1.850372000 GHz
1 PK
MAXH
A
PRN
T1
T2
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.8502 GHz
200 kHz/
Span 2 MHz
Date: 3.MAY.2010 11:49:27

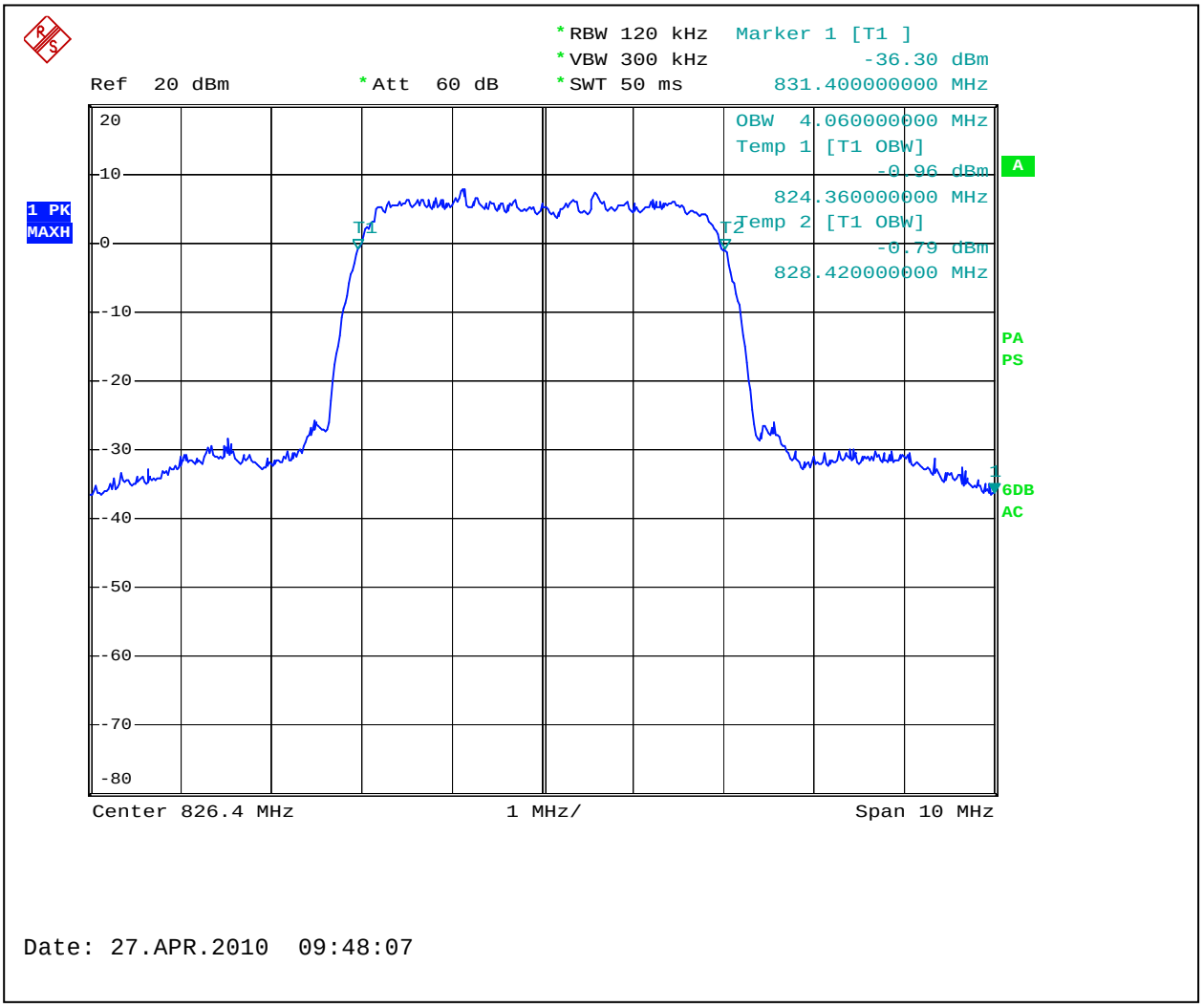
Graph 3.3.11


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
*Att 50 dB
*SWT 50 ms
Marker 1 [T1]
16.69 dBm
1.880068000 GHz
OBW344.000000000 kHz
Temp 1 [T1 OBW]
4.38 dBm
1.879828000 GHz
Temp 2 [T1 OBW]
4.60 dBm
1.880172000 GHz
1 PK
MAXH
A
PRN
T1
T2
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.88 GHz
200 kHz/
Span 2 MHz
Date: 3.MAY.2010 11:47:57

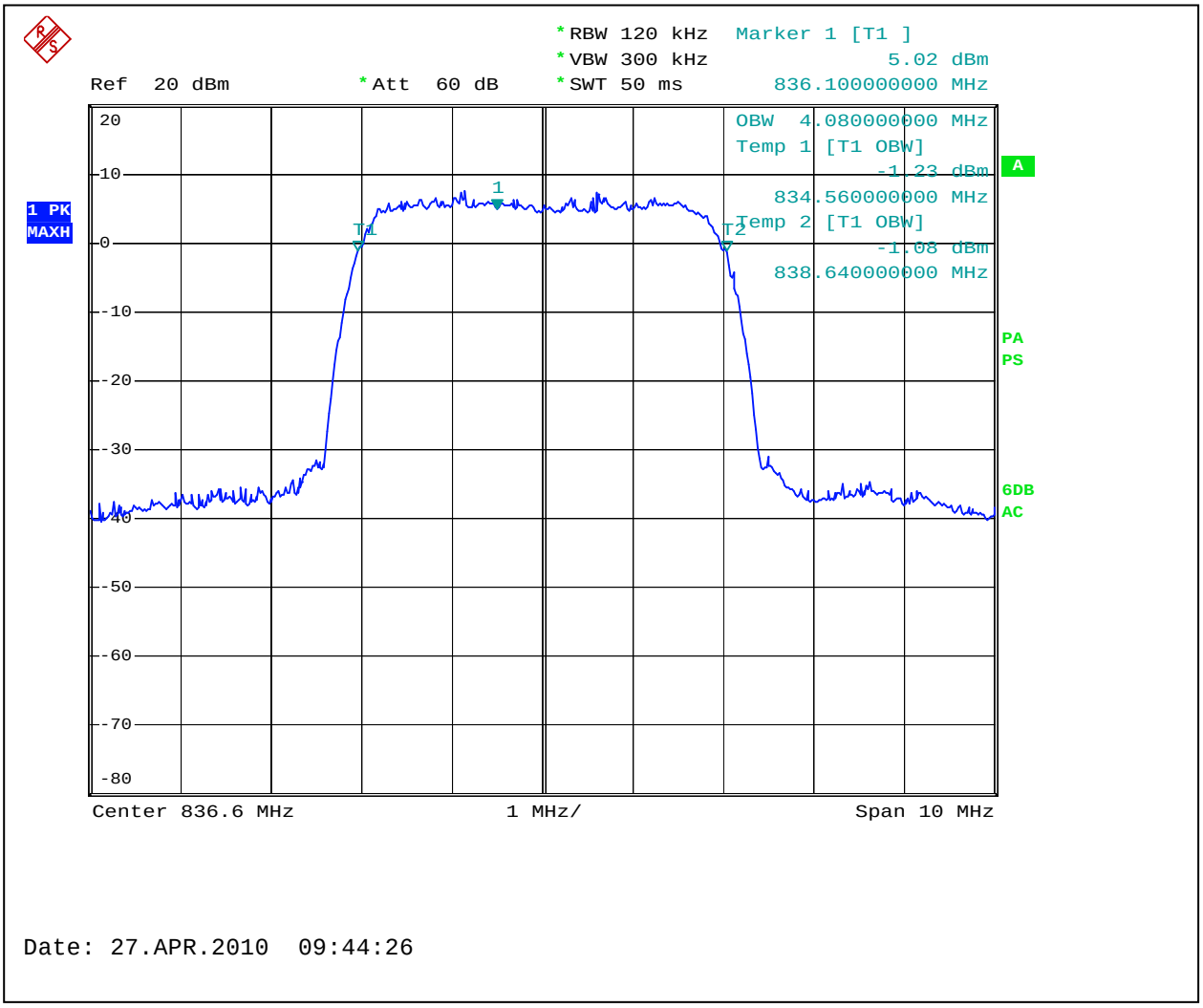
Graph 3.3.12


*RBW 100 kHz
*VBW 300 kHz
*SWT 50 ms
Marker 1 [T1]
16.75 dBm
1.909800000 GHz
OBW344.000000000 kHz
Temp 1 [T1 OBW]
4.40 dBm
1.909628000 GHz
Temp 2 [T1 OBW]
4.48 dBm
1.909972000 GHz
Ref 20 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
T1
T2
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.9098 GHz
200 kHz/
Span 2 MHz
Date: 3.MAY.2010 11:46:20

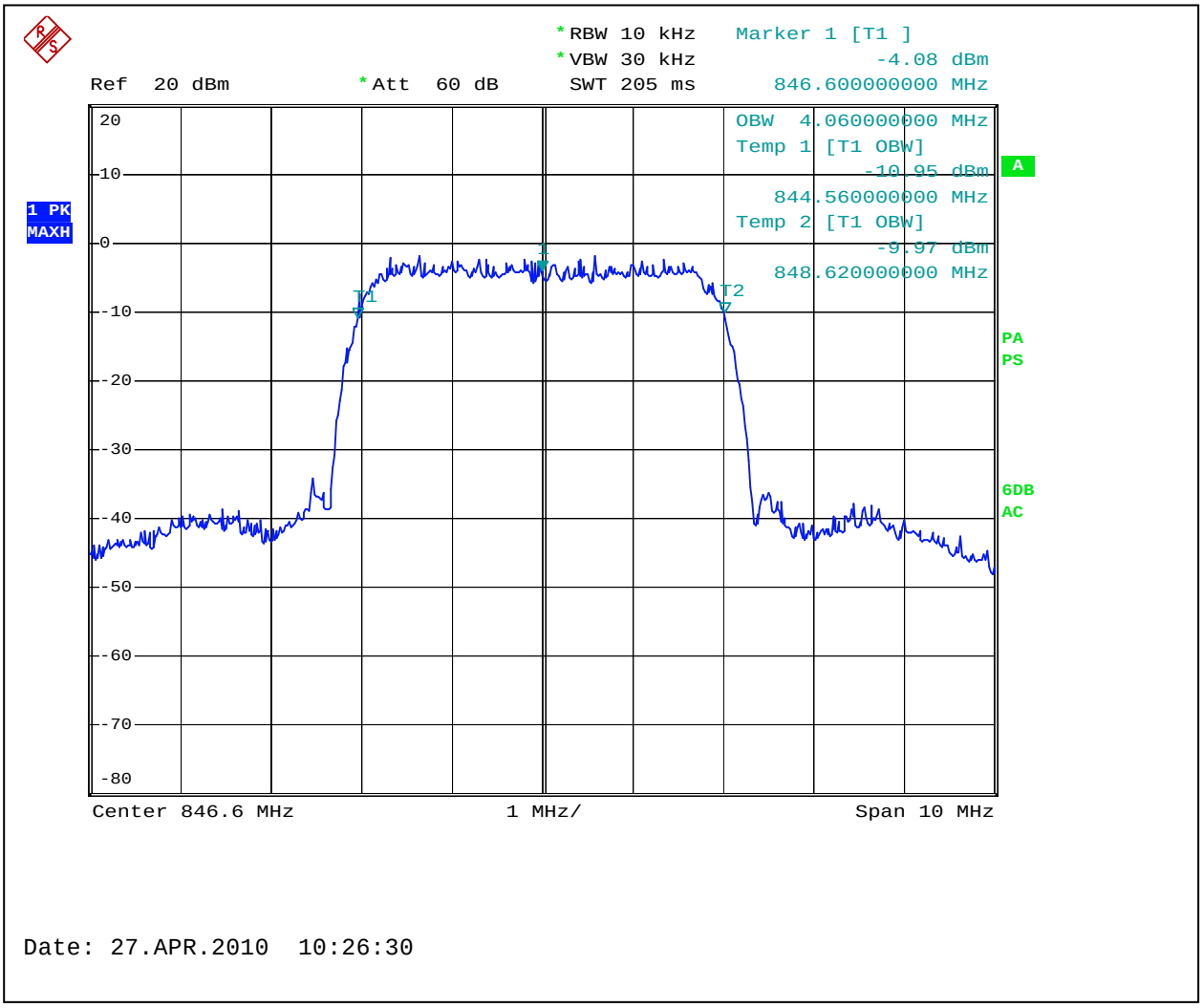
Graph 3.3.13


*RBW 120 kHz
*VBW 300 kHz
*SWT 50 ms
Marker 1 [T1]
-36.30 dBm
831.400000000 MHz
Ref 20 dBm
*Att 60 dB
OBW 4.060000000 MHz
Temp 1 [T1 OBW]
-0.96 dBm
824.360000000 MHz
Temp 2 [T1 OBW]
-0.79 dBm
828.420000000 MHz
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 826.4 MHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 09:48:07

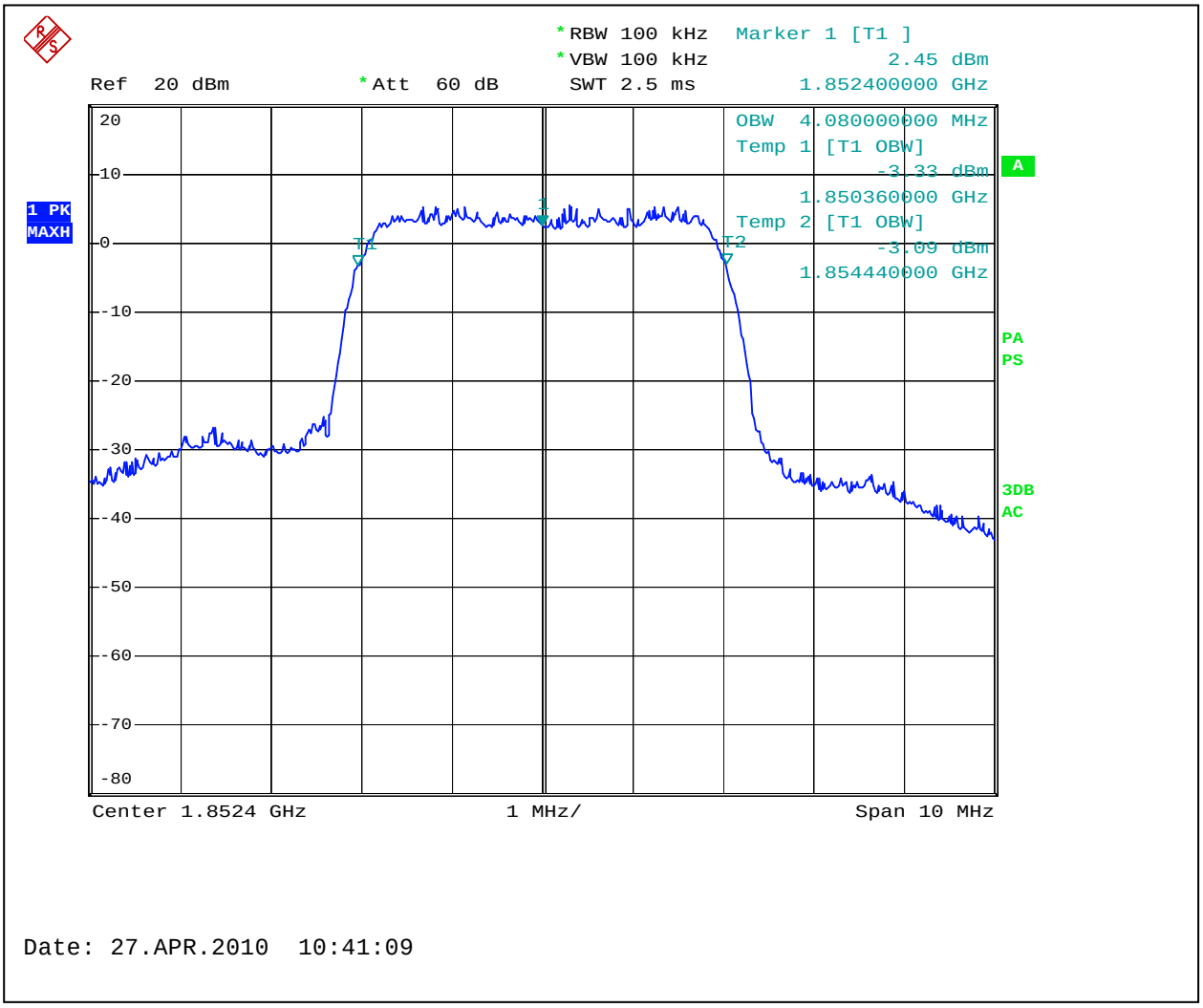
Graph 3.3.14


*RBW 120 kHz
*VBW 300 kHz
*SWT 50 ms
Marker 1 [T1]
5.02 dBm
836.100000000 MHz
Ref 20 dBm
*Att 60 dB
OBW 4.080000000 MHz
Temp 1 [T1 OBW]
-1.23 dBm
834.560000000 MHz
Temp 2 [T1 OBW]
-1.08 dBm
838.640000000 MHz
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 836.6 MHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 09:44:26

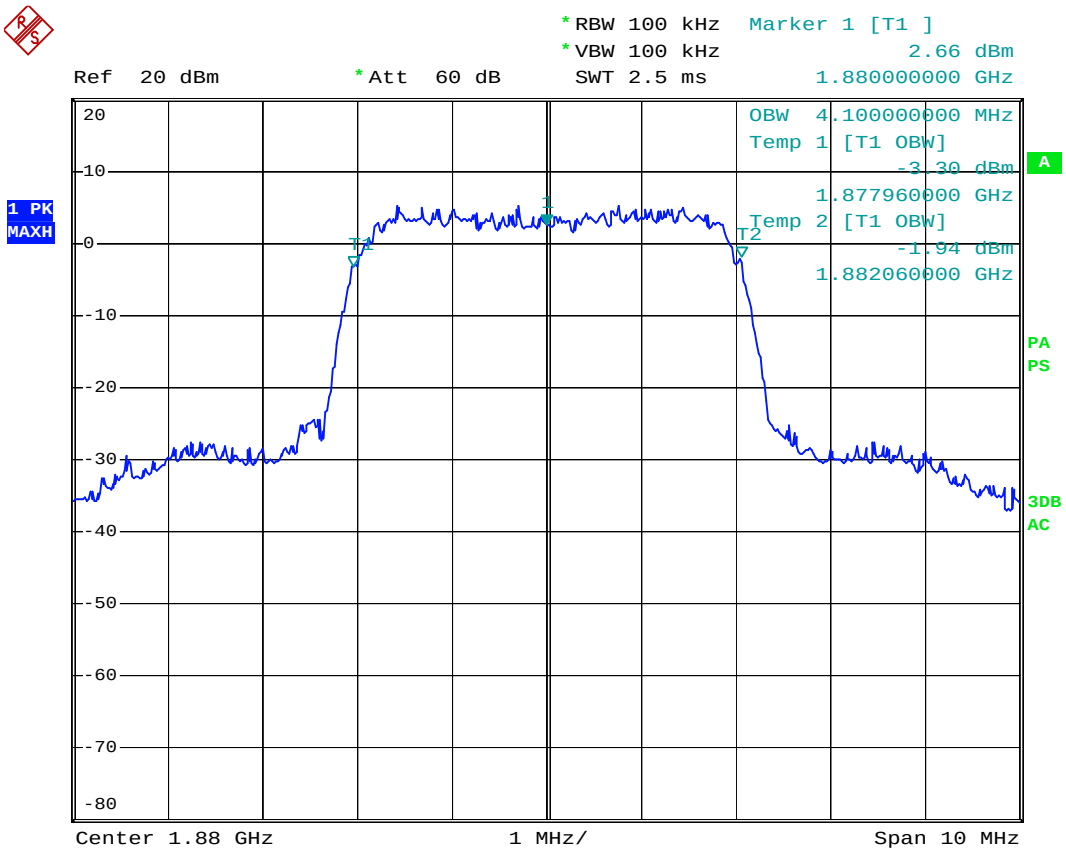
Graph 3.3.15


*RBW 10 kHz
*VBW 30 kHz
Ref 20 dBm
*Att 60 dB
SWT 205 ms
Marker 1 [T1]
-4.08 dBm
846.600000000 MHz
OBW 4.060000000 MHz
Temp 1 [T1 OBW]
-10.95 dBm
844.560000000 MHz
Temp 2 [T1 OBW]
-9.97 dBm
848.620000000 MHz
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
T1
T2
Center 846.6 MHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 10:26:30

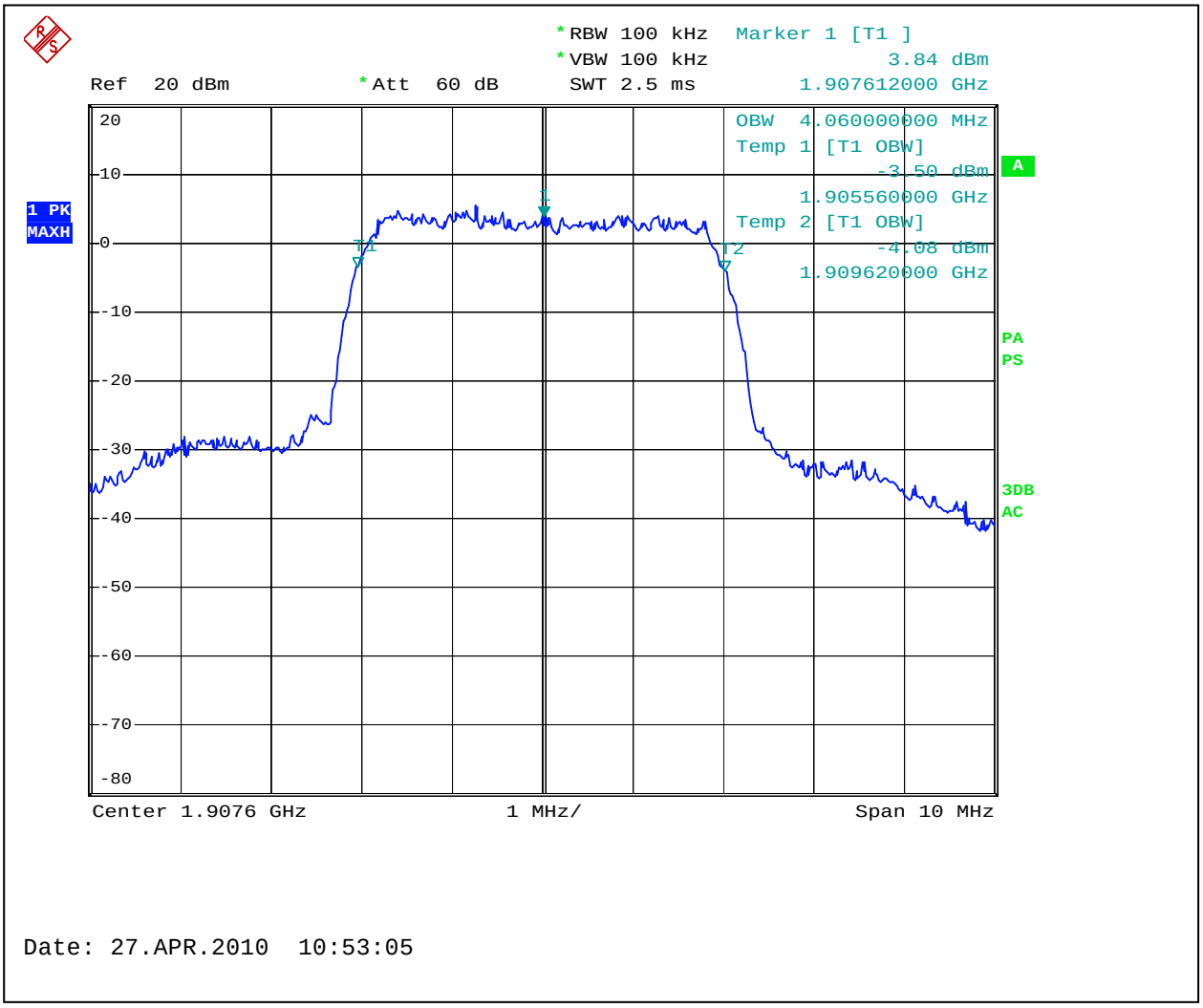
Graph 3.3.16


*RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
Marker 1 [T1]
2.45 dBm
1.852400000 GHz
OBW 4.080000000 MHz
Temp 1 [T1 OBW]
-3.33 dBm
1.850360000 GHz
Temp 2 [T1 OBW]
-3.09 dBm
1.854440000 GHz
1 PK
MAXH
A
PA
PS
3DB
AC
T1
T2
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.8524 GHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 10:41:09

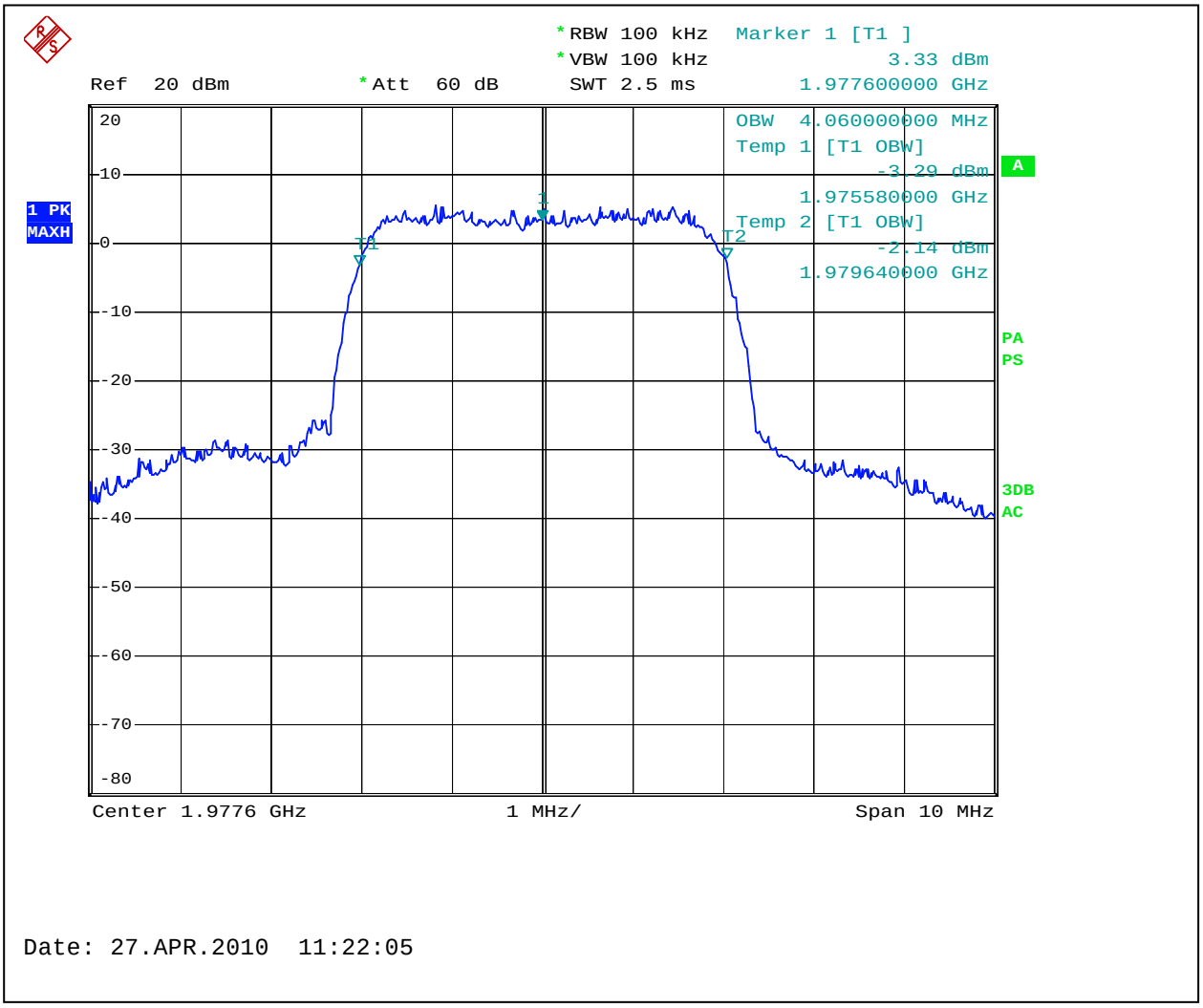
Graph 3.3.17


*RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
Marker 1 [T1]
2.66 dBm
1.880000000 GHz
OBW 4.100000000 MHz
Temp 1 [T1 OBW]
-3.30 dBm
1.877960000 GHz
Temp 2 [T1 OBW]
-1.94 dBm
1.882060000 GHz
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.88 GHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 11:02:07

Graph 3.3.18


*RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
Marker 1 [T1]
3.84 dBm
1.907612000 GHz
OBW 4.060000000 MHz
Temp 1 [T1 OBW]
-3.50 dBm
1.905560000 GHz
Temp 2 [T1 OBW]
-4.08 dBm
1.909620000 GHz
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.9076 GHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 10:53:05

Graph 3.3.21


*RBW 100 kHz
*VBW 100 kHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
Marker 1 [T1]
3.33 dBm
1.977600000 GHz
OBW 4.060000000 MHz
Temp 1 [T1 OBW]
-3.29 dBm
1.975580000 GHz
Temp 2 [T1 OBW]
-2.14 dBm
1.979640000 GHz
1 PK
MAXH
A
PA
PS
3DB
AC
T1
T2
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 1.9776 GHz
1 MHz/
Span 10 MHz
Date: 27.APR.2010 11:22:05

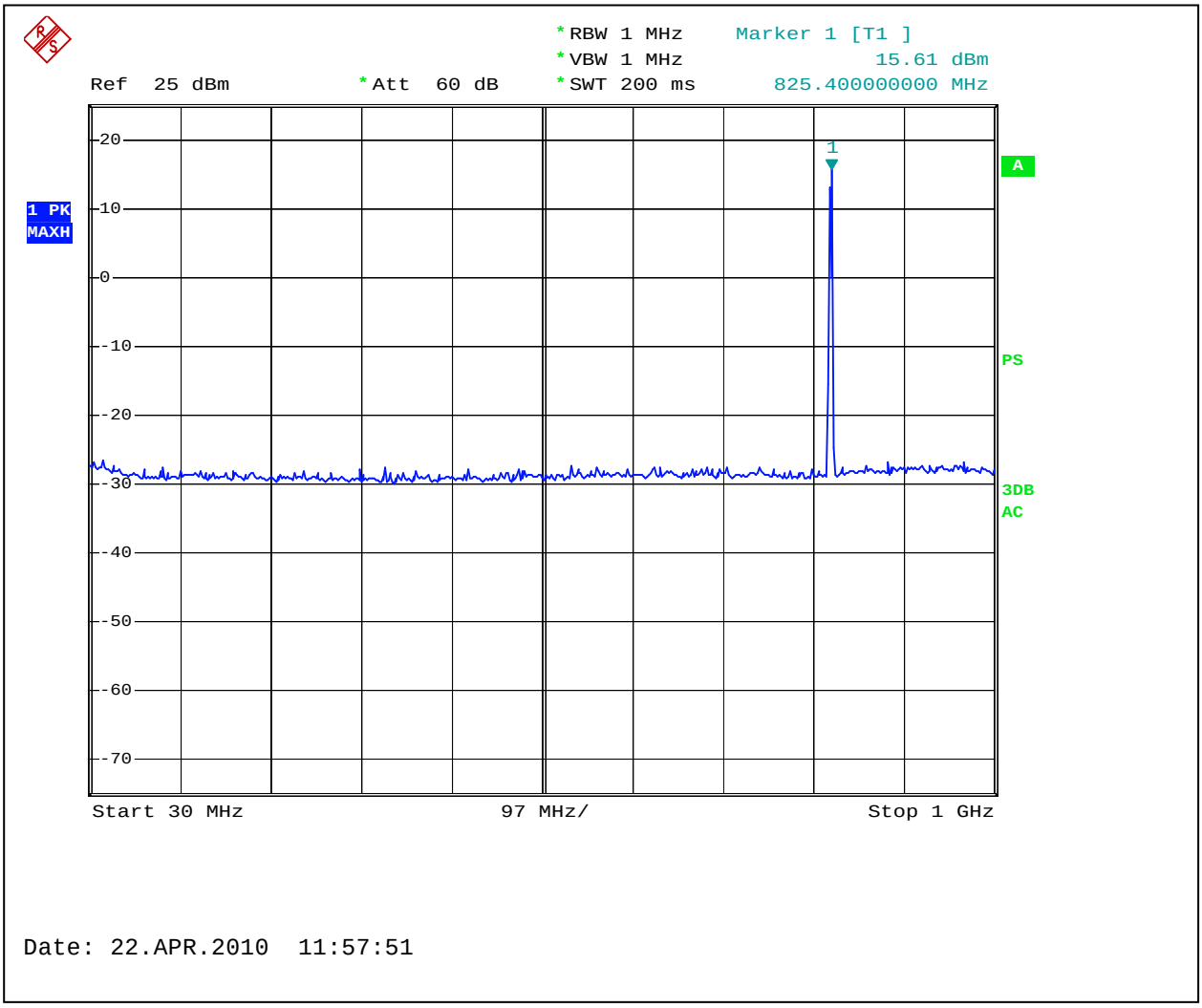
3.4 Antenna Conducted Spurious Emissions

Test location: ☐ OATS ☐ Anechoic Chamber ☐ Other

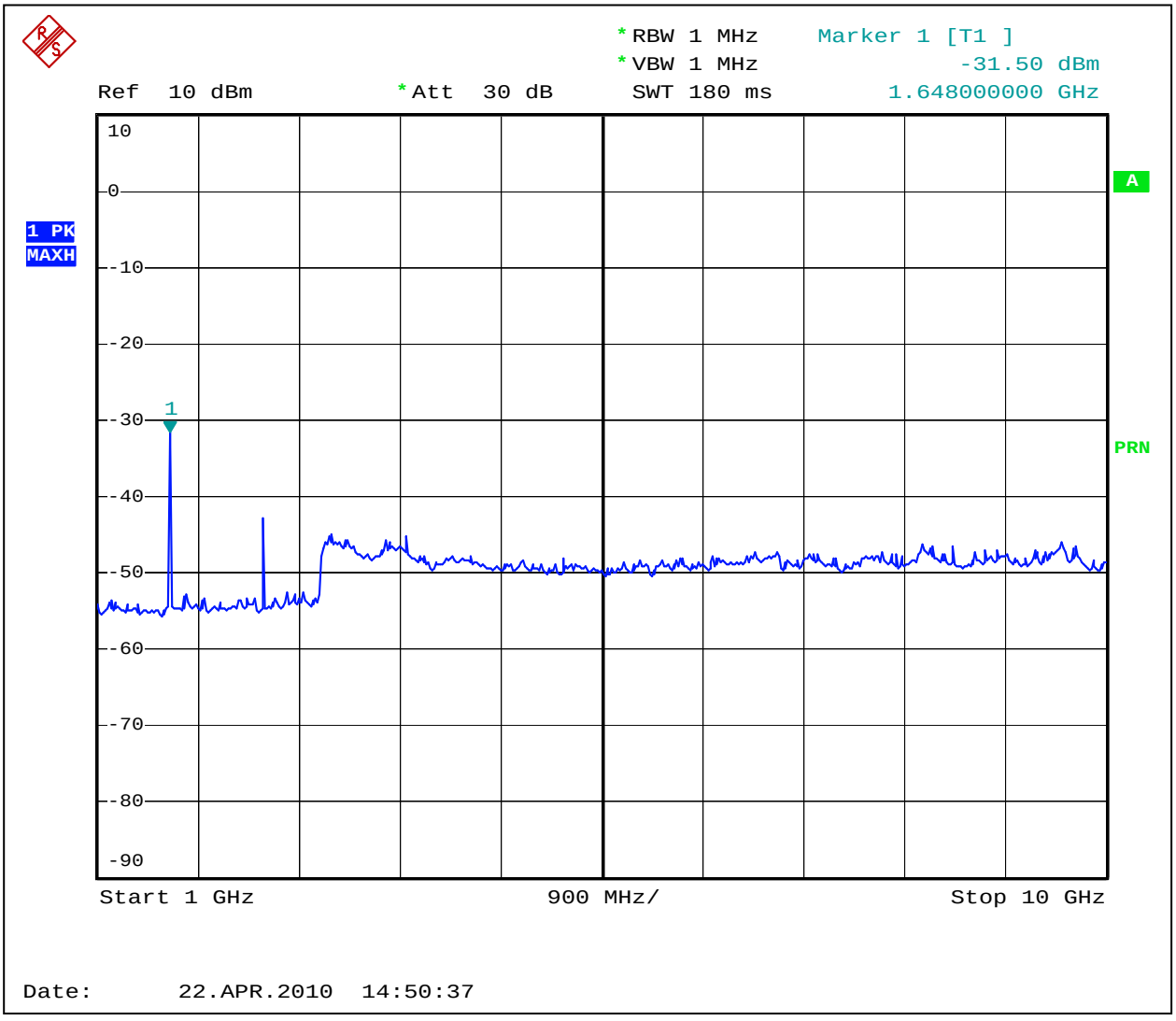
Test result: **Pass**

Notes: The power of spurious emissions should be attenuated at least 43+10log(P) dB, P in watts, so that the level in dBm is -13dBm.
The maximum detected spurious emission is -20.4dBm (-31.5dBm measured emissions + 11.1dB Correction Factor).
The margin of the maximum emissions is -20.4dB-(-13dB) = -7.4dB.
see Graphs 3.4.1 to 3.4.15 for GPS/PCS
see Graphs 3.4.16 to 3.4.27 for EDGE
see Graphs 3.4.28 to 3.4.33 for WCDMA/HSDPA

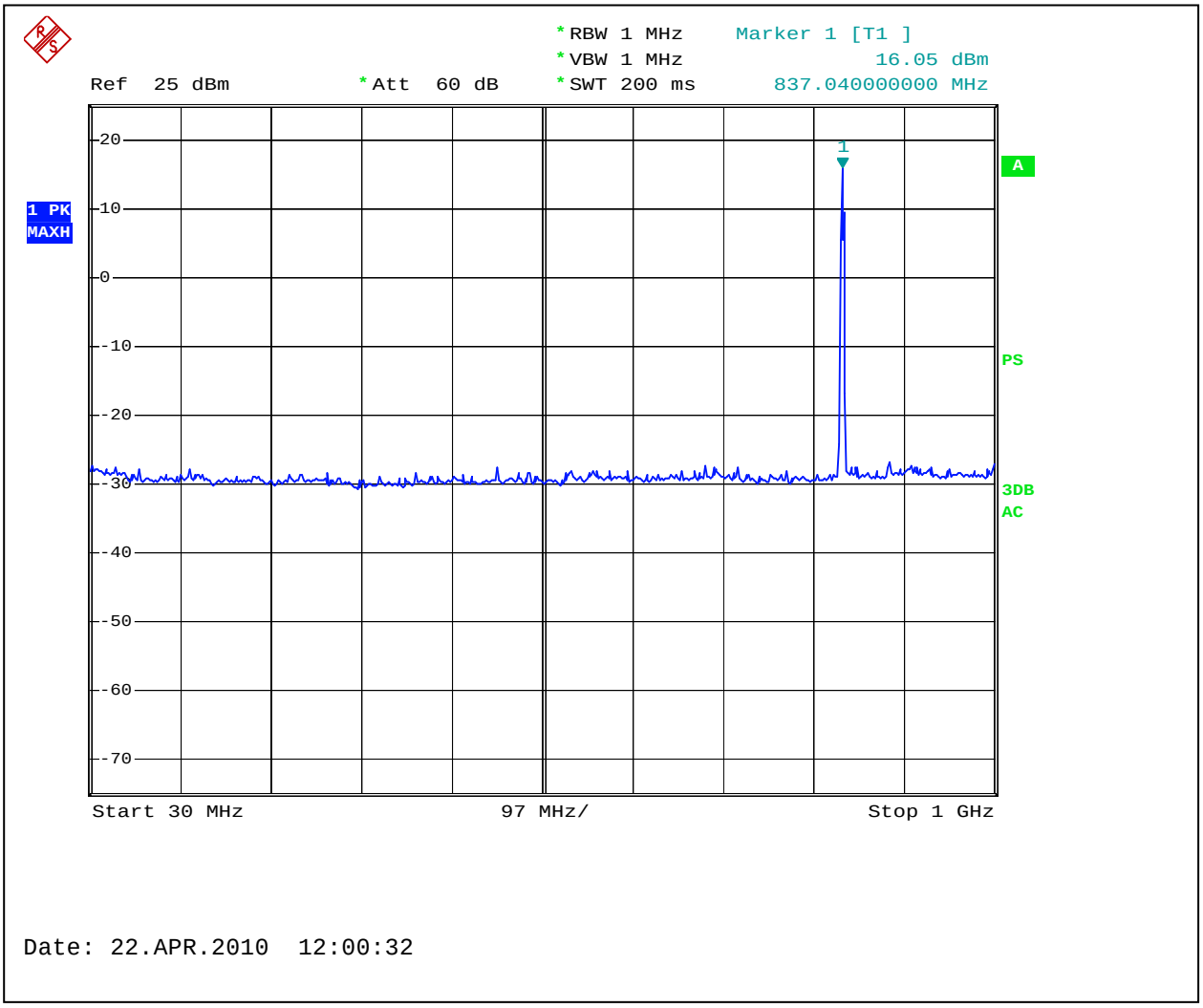
Graph 3.4.1


*RBW 1 MHz
*VBW 1 MHz
*SWT 200 ms
Marker 1 [T1]
15.61 dBm
825.400000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 22.APR.2010 11:57:51

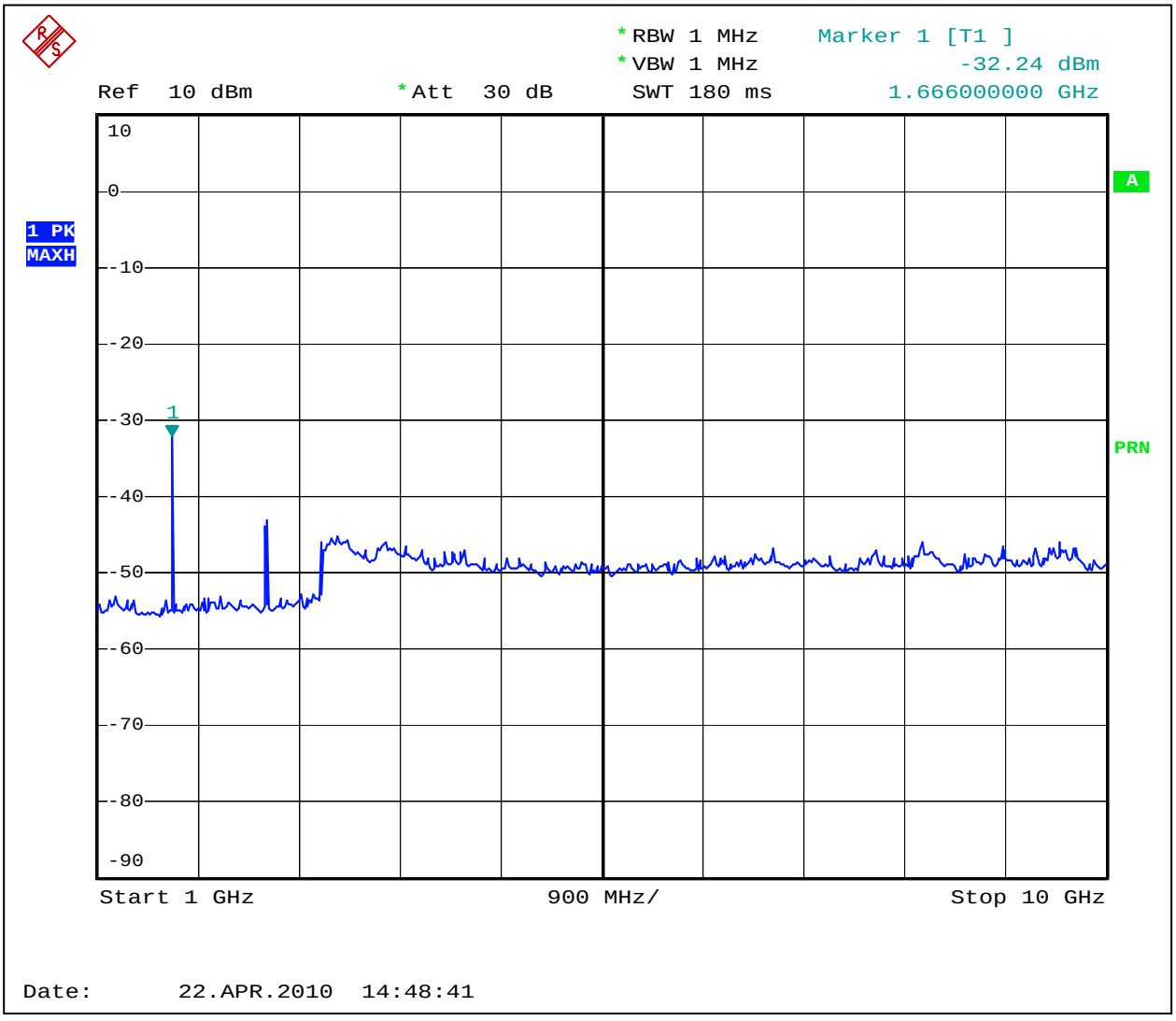
Graph 3.4.2


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-31.50 dBm
Ref 10 dBm
*Att 30 dB
SWT 180 ms
1.648000000 GHz
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.APR.2010 14:50:37

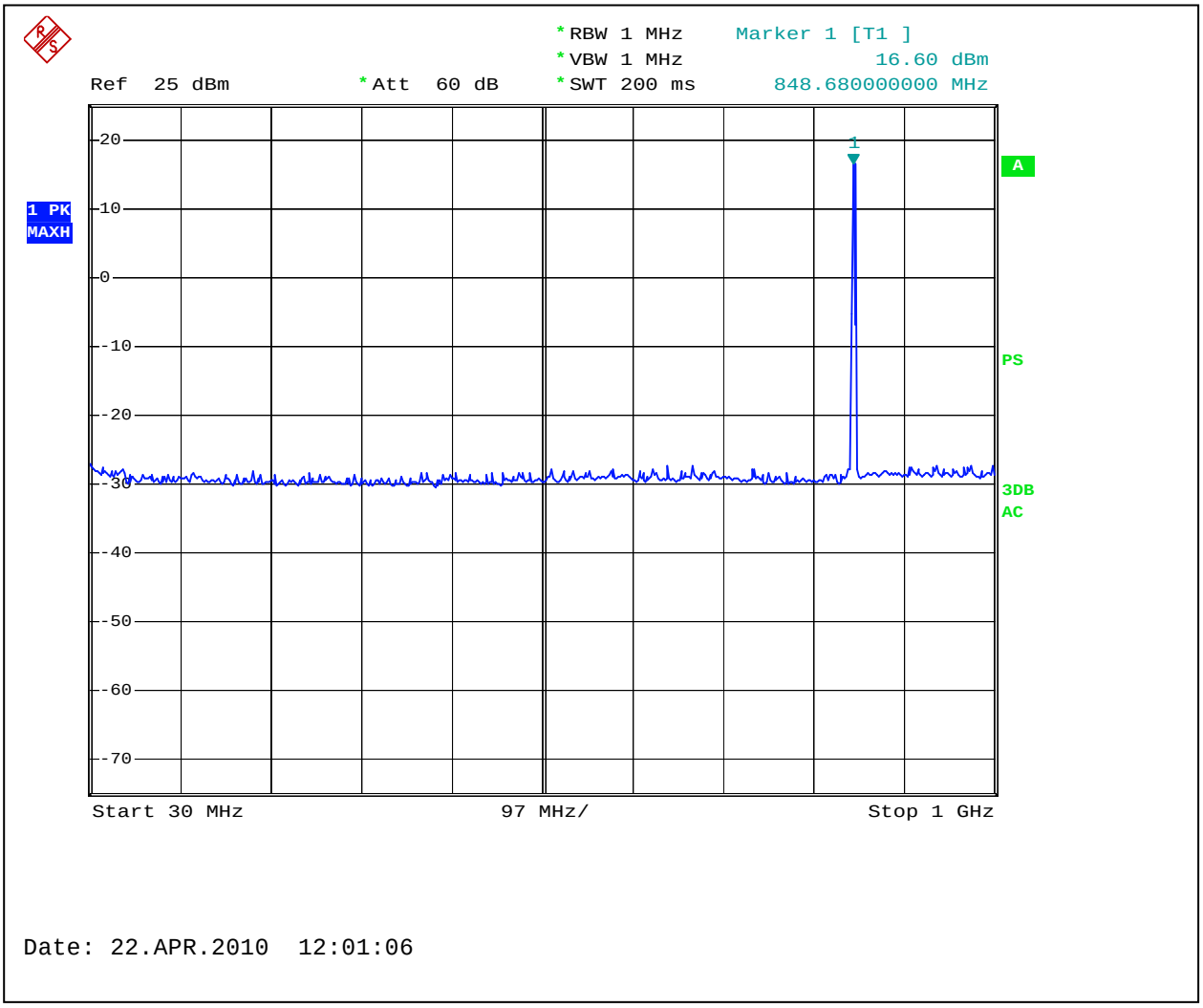
Graph 3.4.3


*RBW 1 MHz
*VBW 1 MHz
*SWT 200 ms
Marker 1 [T1]
16.05 dBm
837.040000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 22.APR.2010 12:00:32

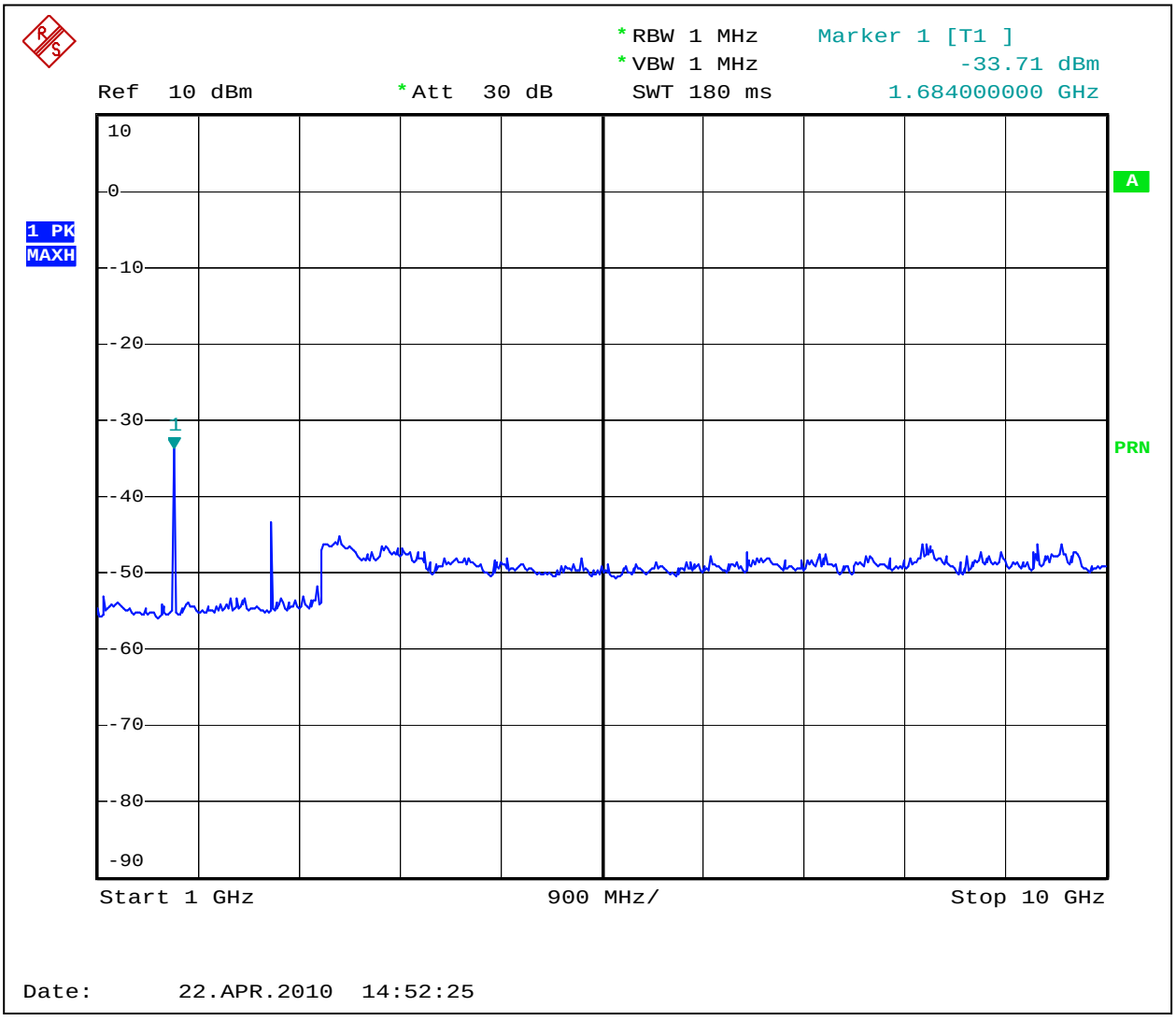
Graph 3.4.4


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-32.24 dBm
1.666000000 GHz
Ref 10 dBm
*Att 30 dB
SWT 180 ms
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.APR.2010 14:48:41

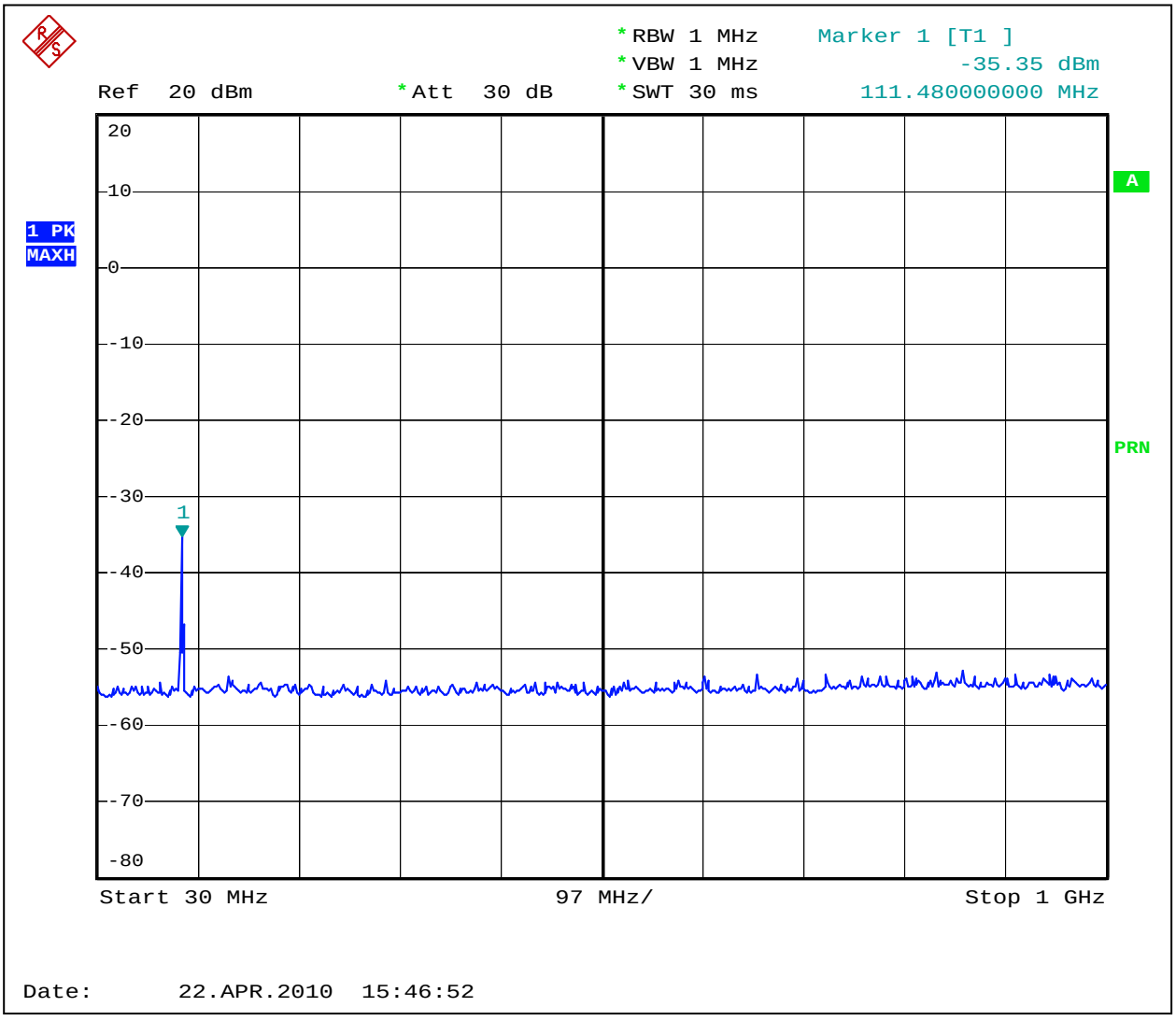
Graph 3.4.5


*RBW 1 MHz
*VBW 1 MHz
*SWT 200 ms
Marker 1 [T1]
16.60 dBm
848.680000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 22.APR.2010 12:01:06

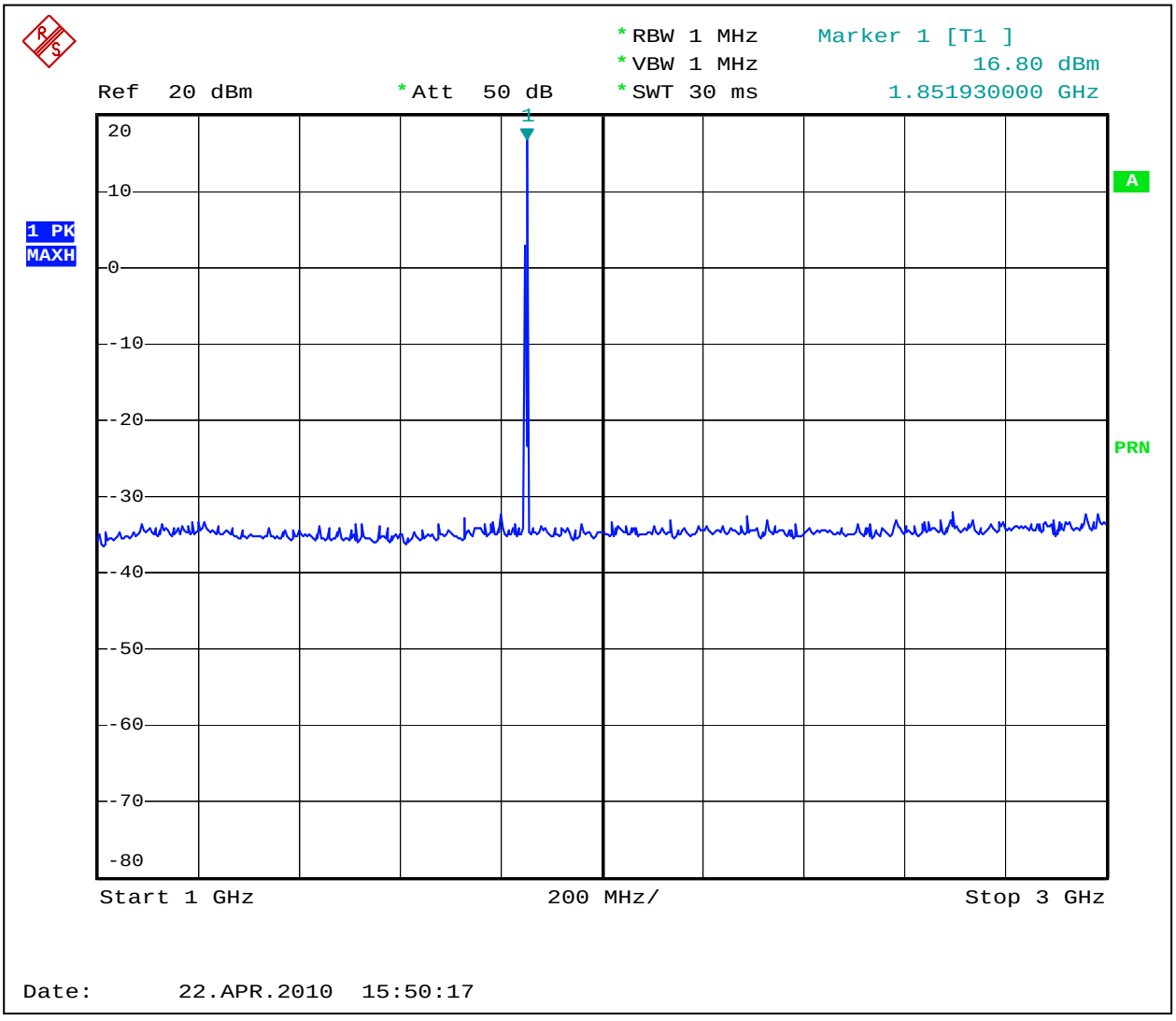
Graph 3.4.6


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-33.71 dBm
1.684000000 GHz
Ref 10 dBm
*Att 30 dB
SWT 180 ms
1 PK
MAXH
A
PRN
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.APR.2010 14:52:25

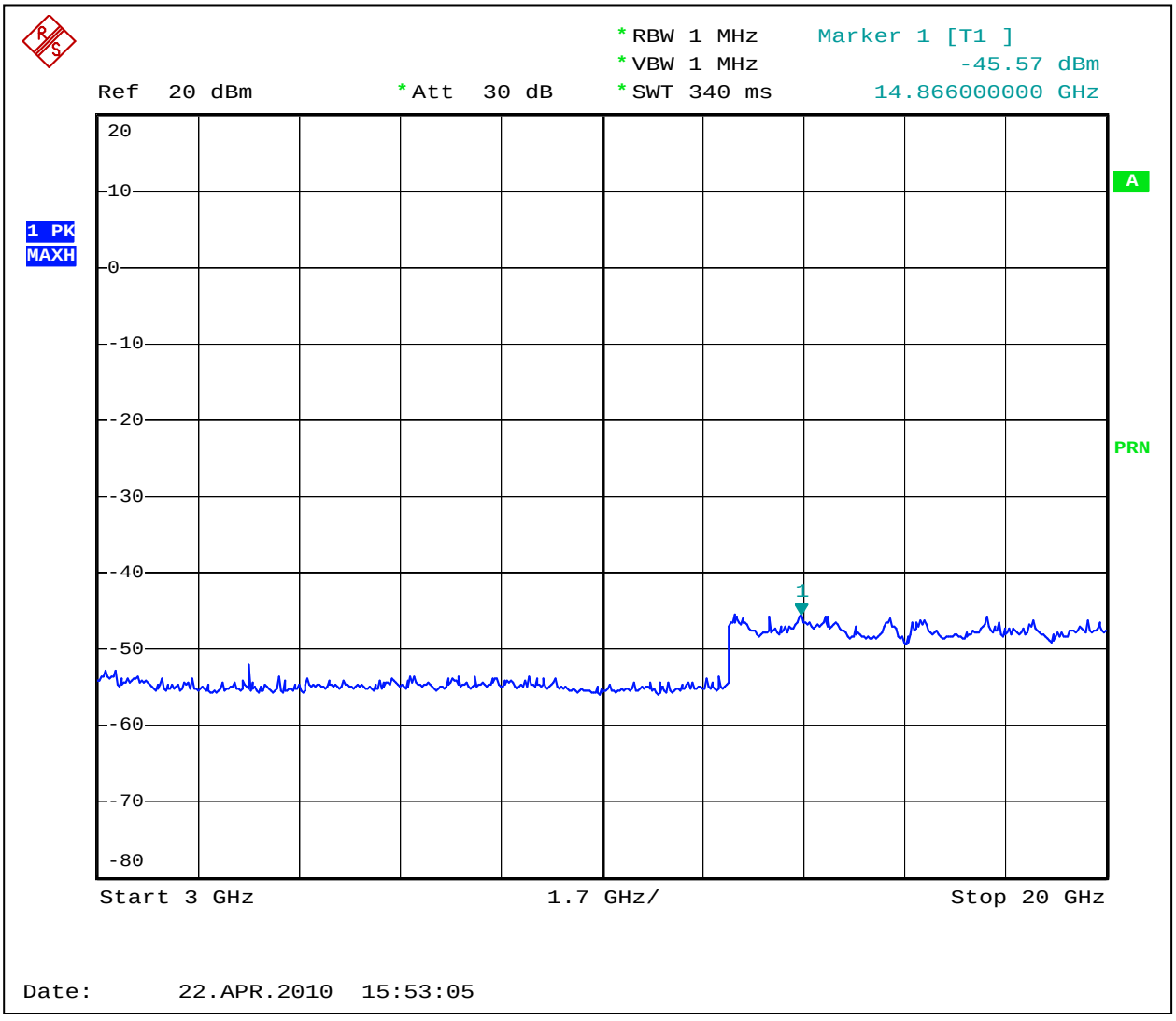
Graph 3.4.7


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1]
-35.35 dBm
111.480000000 MHz
Ref 20 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 22.APR.2010 15:46:52

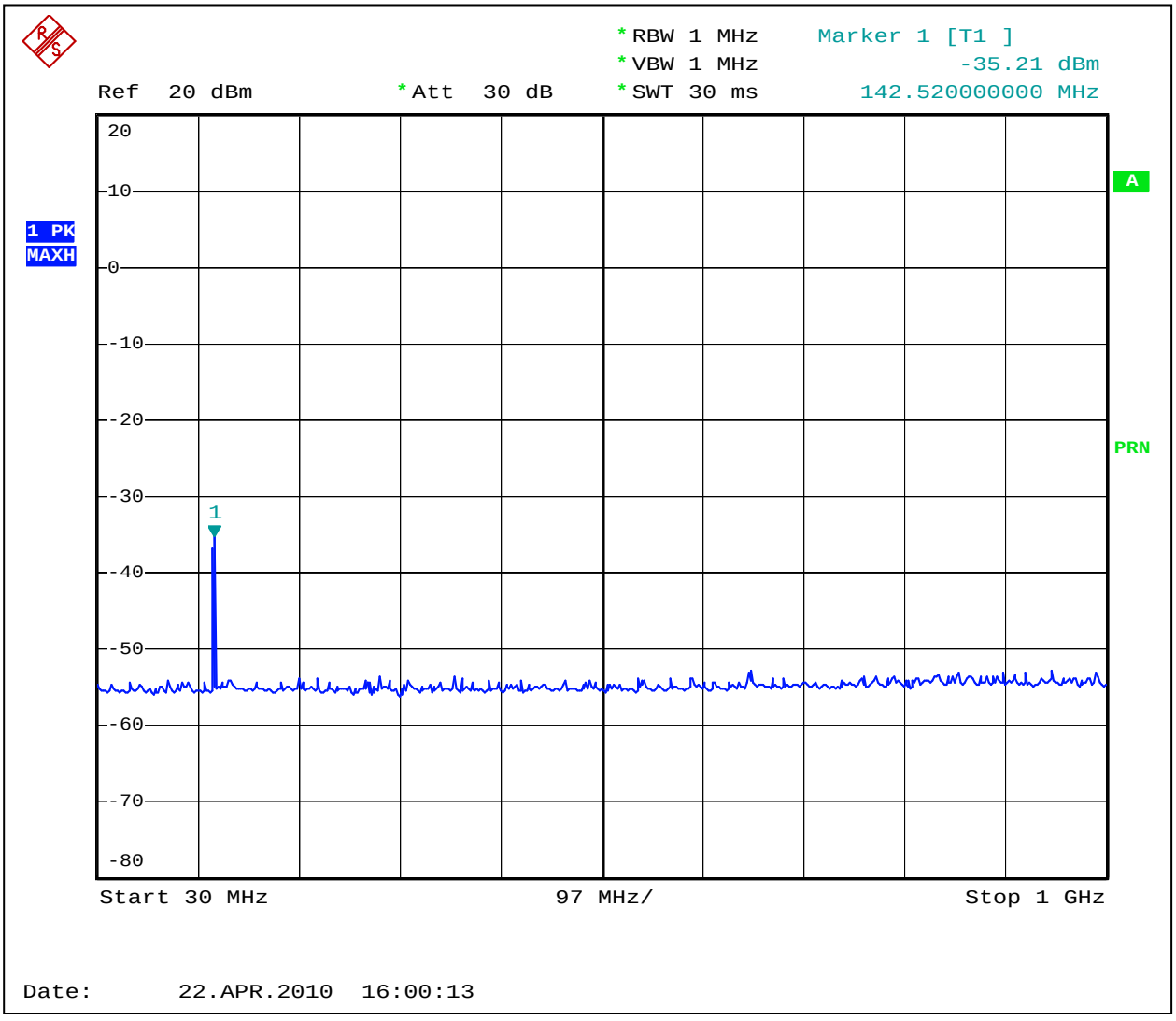
Graph 3.4.8


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1]
16.80 dBm
1.851930000 GHz
Ref 20 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 22.APR.2010 15:50:17

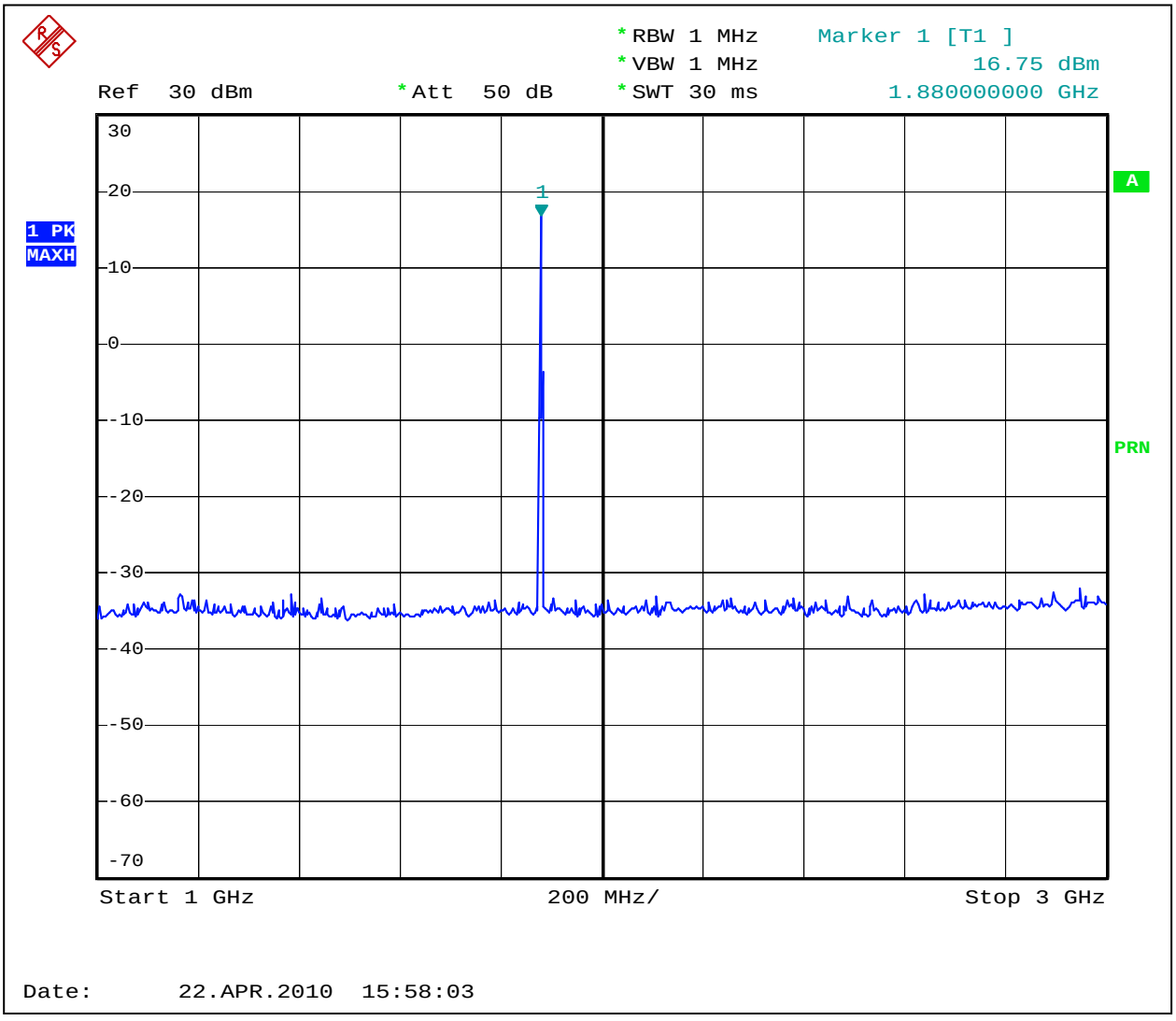
Graph 3.4.9


*RBW 1 MHz
*VBW 1 MHz
*SWT 340 ms
Marker 1 [T1]
-45.57 dBm
14.866000000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 22.APR.2010 15:53:05

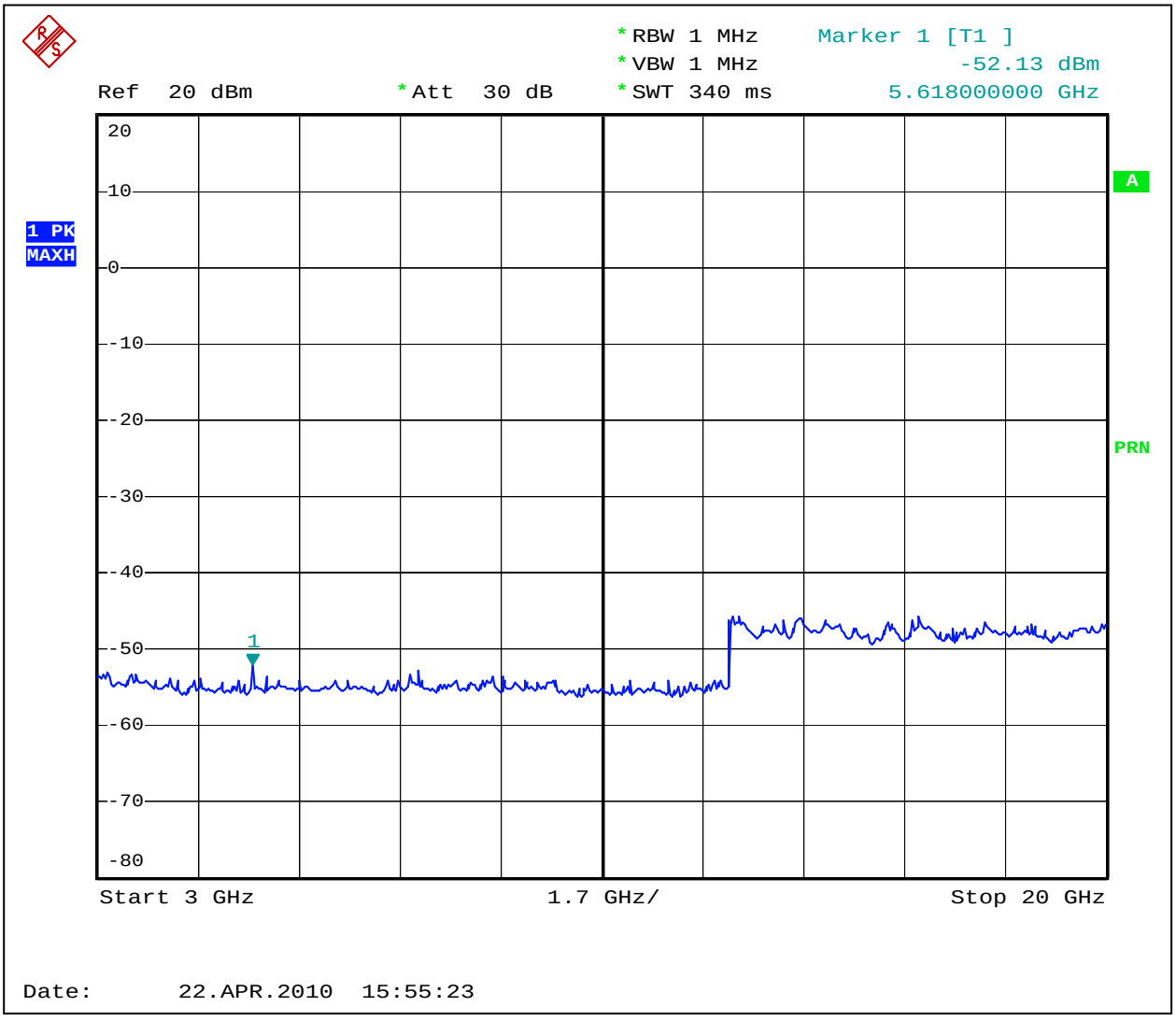
Graph 3.4.10


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1]
-35.21 dBm
142.520000000 MHz
Ref 20 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 22.APR.2010 16:00:13

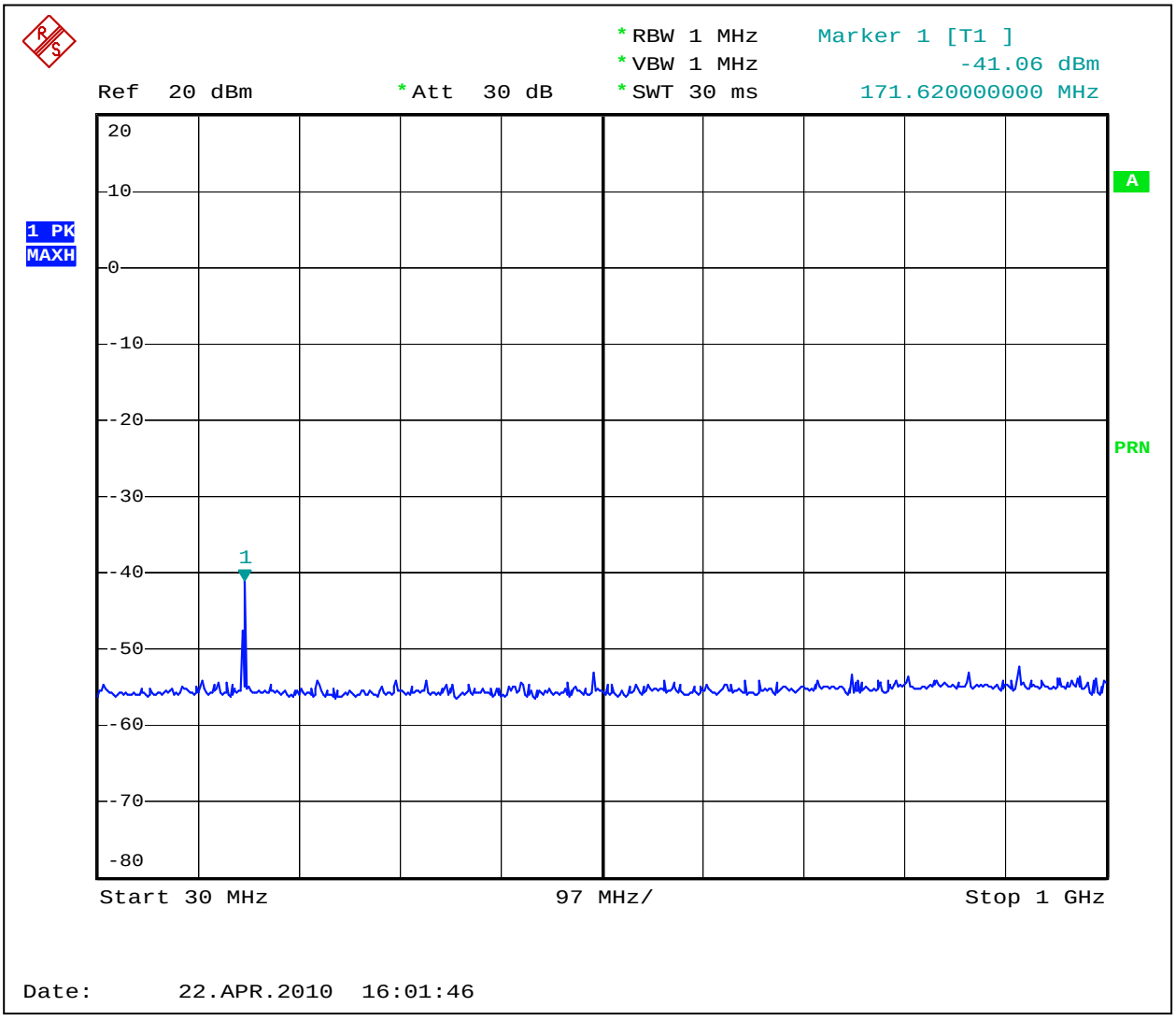
Graph 3.4.11


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1]
16.75 dBm
1.880000000 GHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 22.APR.2010 15:58:03

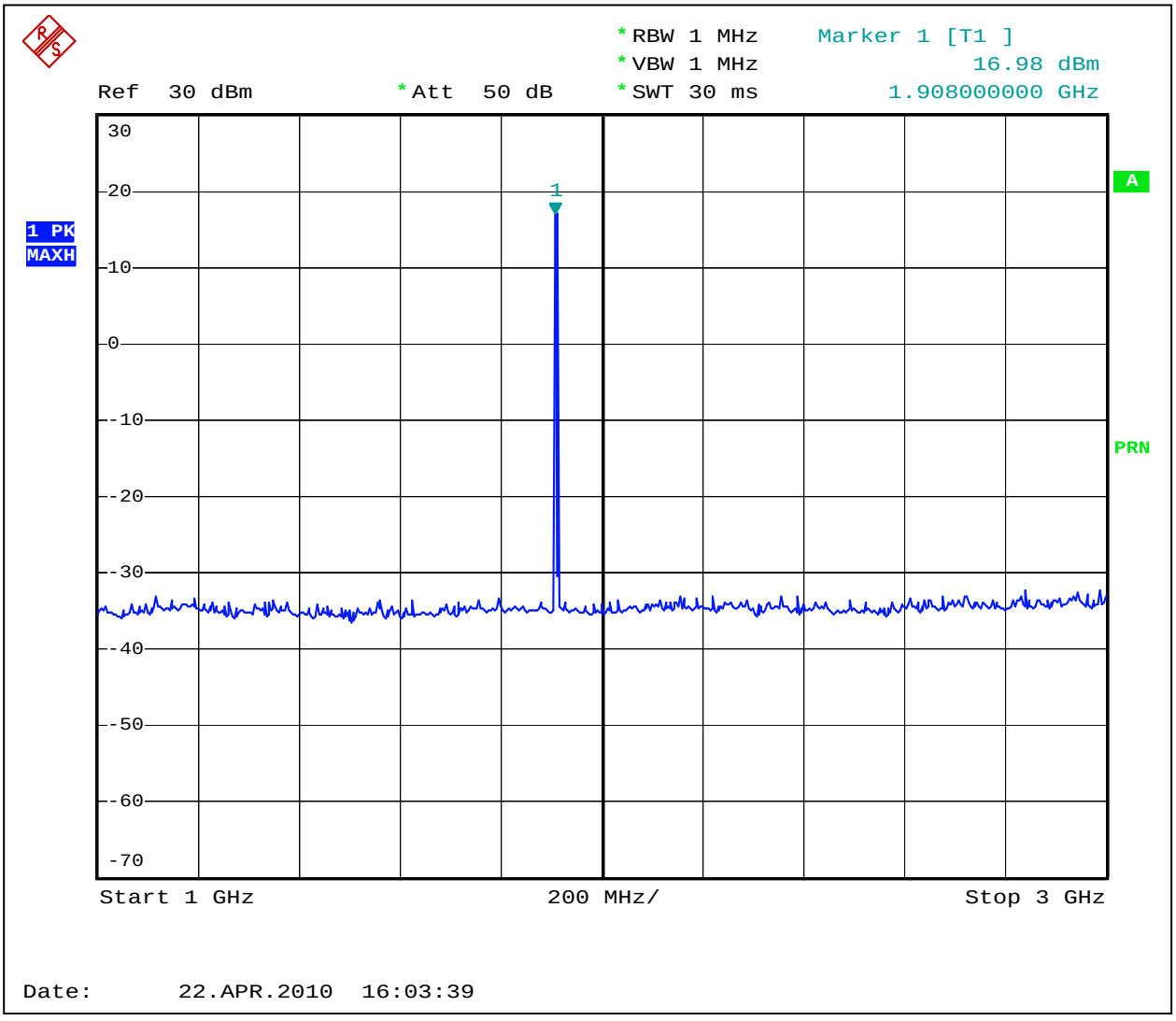
Graph 3.4.12


*RBW 1 MHz
*VBW 1 MHz
*SWT 340 ms
Marker 1 [T1]
-52.13 dBm
5.618000000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 22.APR.2010 15:55:23

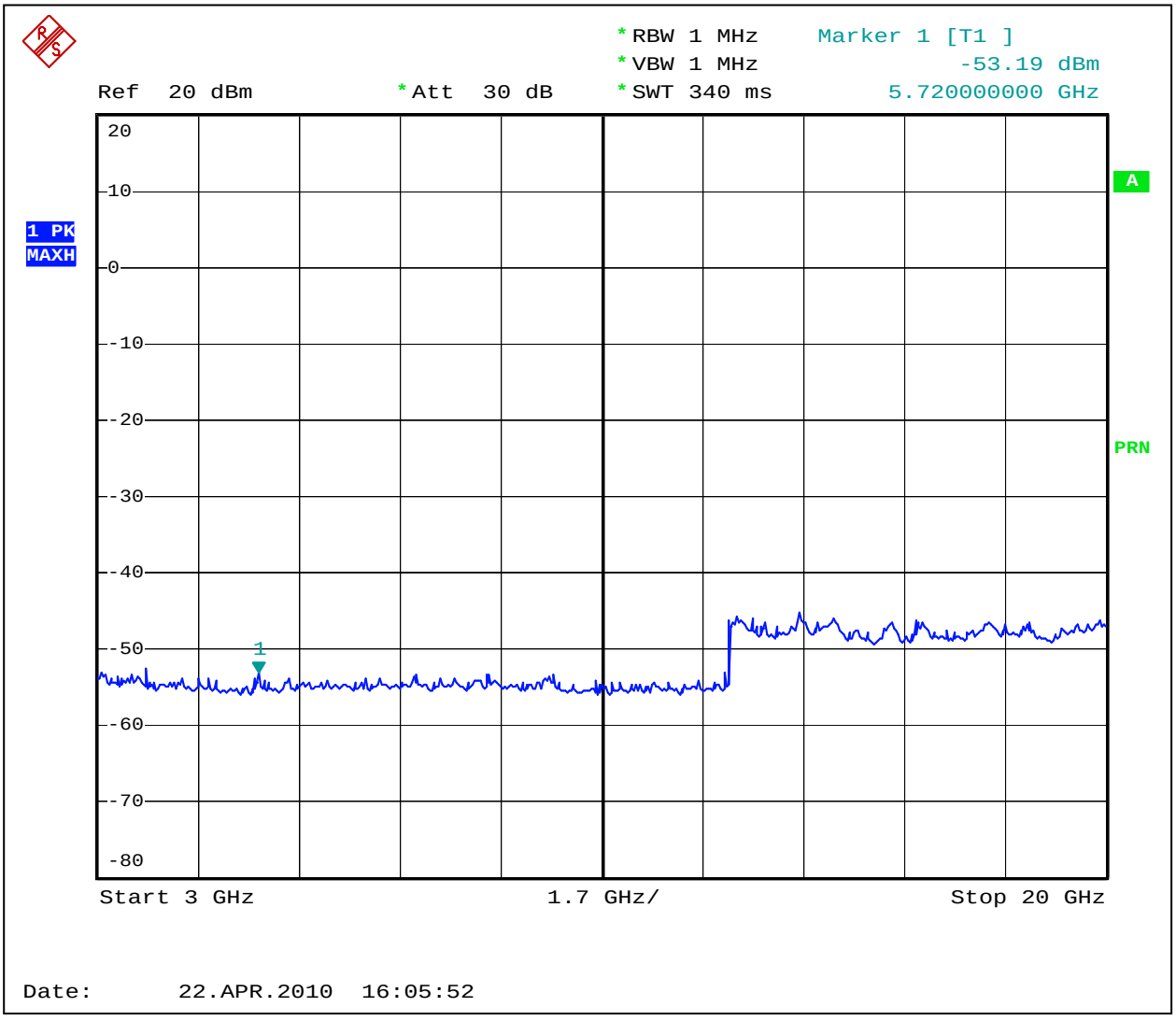
Graph 3.4.13


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1]
-41.06 dBm
171.620000000 MHz
Ref 20 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 22.APR.2010 16:01:46

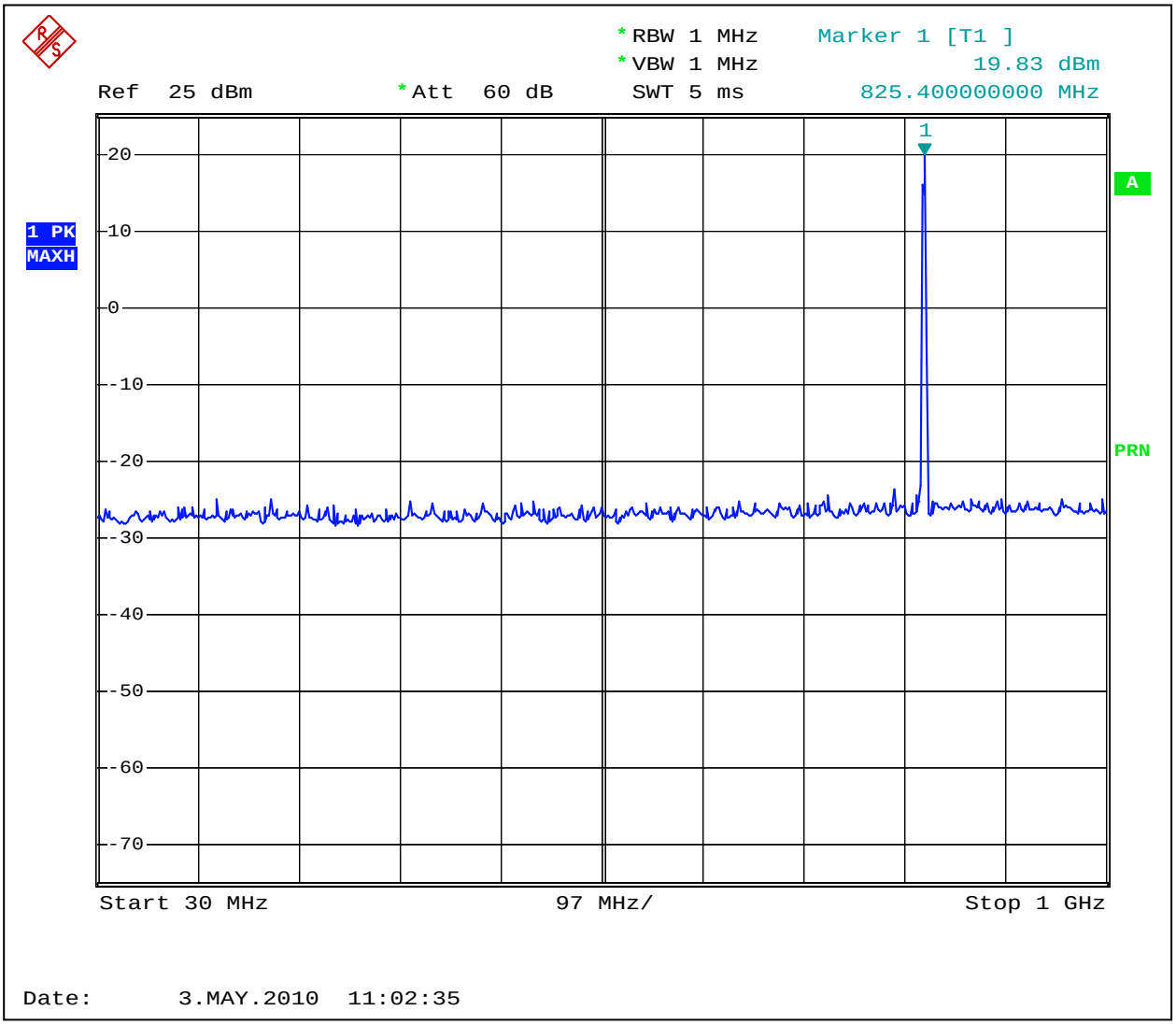
Graph 3.4.14


*RBW 1 MHz
*VBW 1 MHz
*SWT 30 ms
Marker 1 [T1]
16.98 dBm
1.908000000 GHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 1 GHz
200 MHz/
Stop 3 GHz
Date: 22.APR.2010 16:03:39

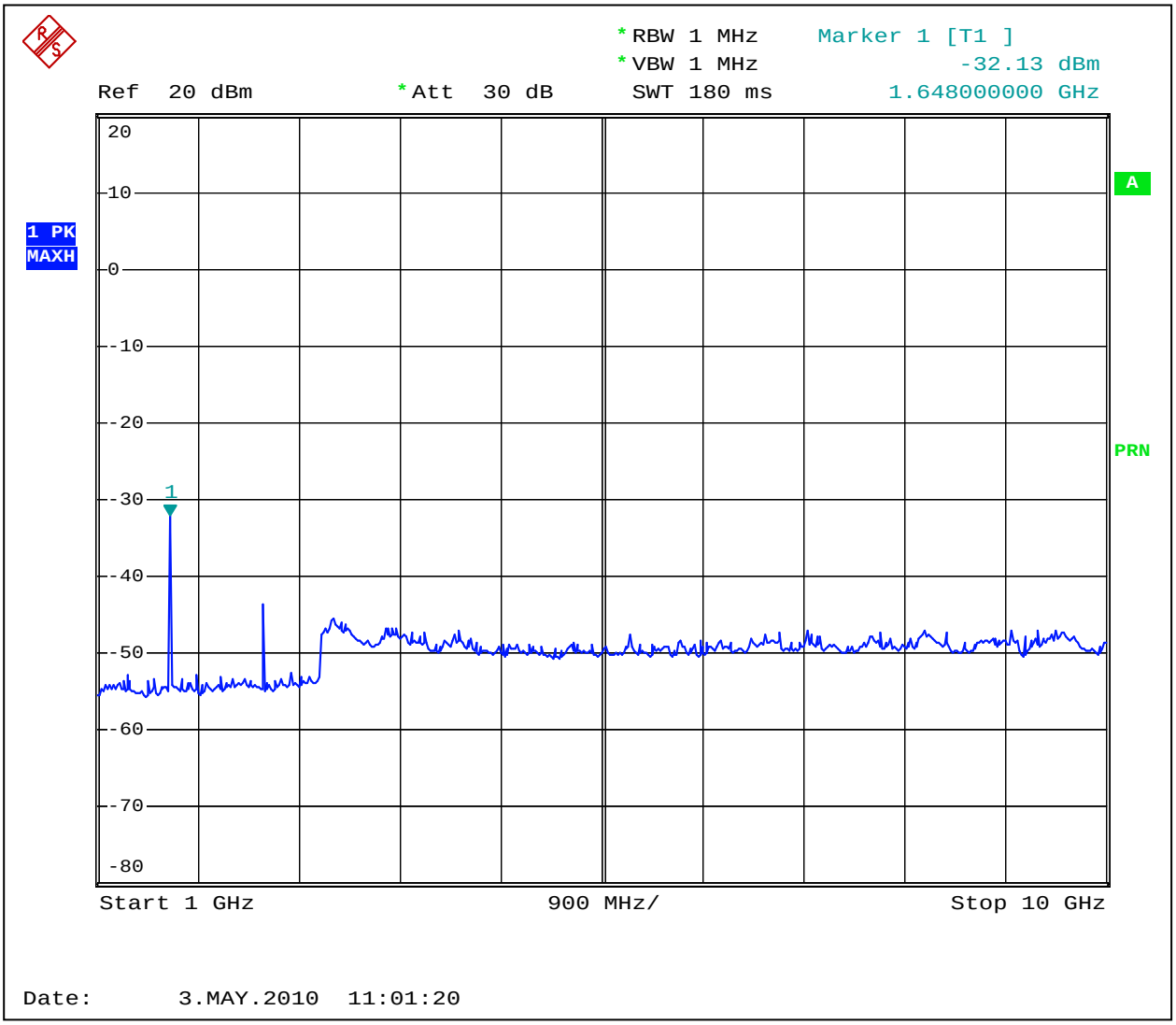
Graph 3.4.15


*RBW 1 MHz
*VBW 1 MHz
*SWT 340 ms
Marker 1 [T1]
-53.19 dBm
5.720000000 GHz
Ref 20 dBm
*Att 30 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 22.APR.2010 16:05:52

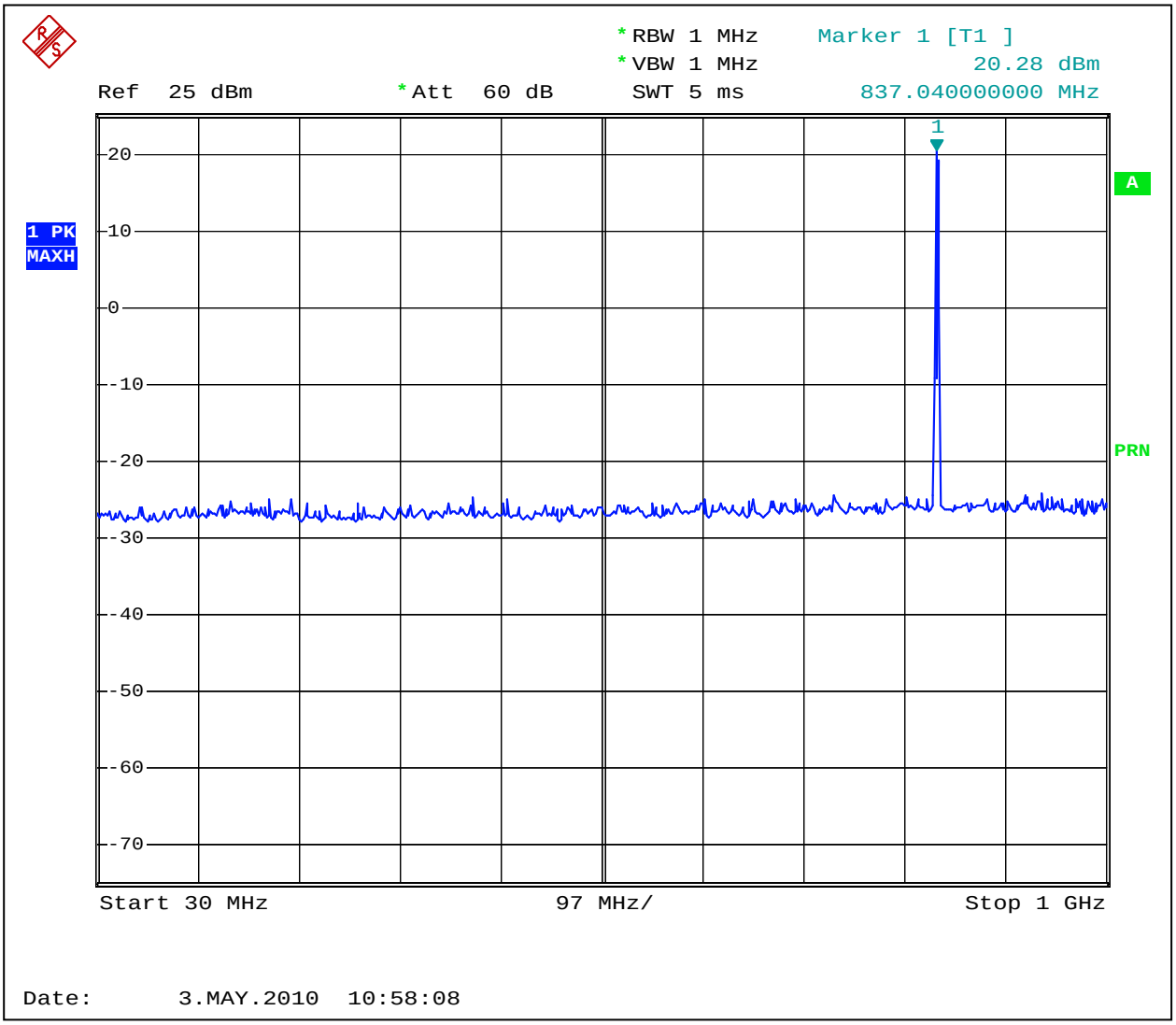
Graph 3.4.16


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
19.83 dBm
825.400000000 MHz
Ref 25 dBm
*Att 60 dB
SWT 5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 3.MAY.2010 11:02:35

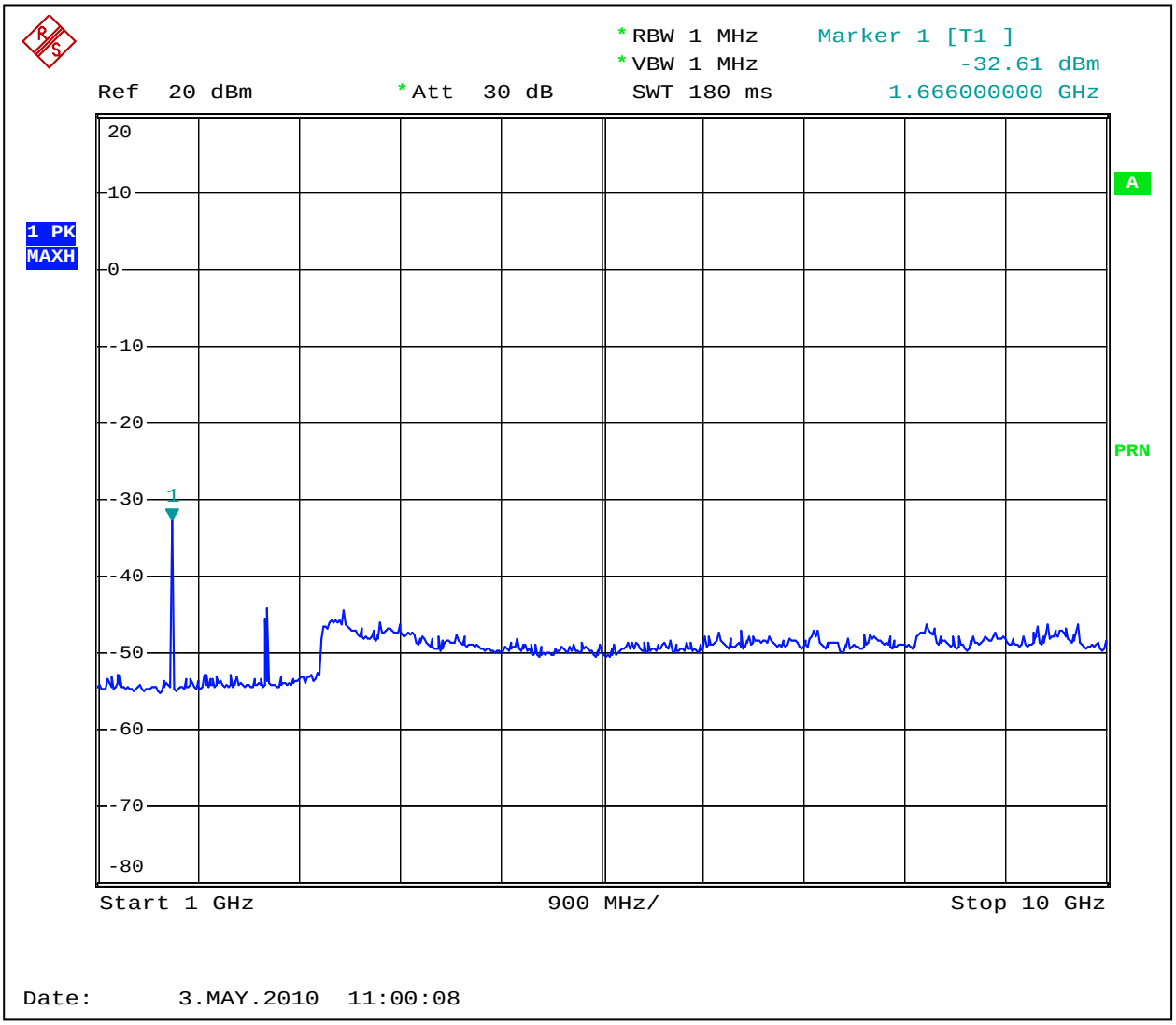
Graph 3.4.17


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-32.13 dBm
Ref 20 dBm
*Att 30 dB
SWT 180 ms
1.648000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 3.MAY.2010 11:01:20

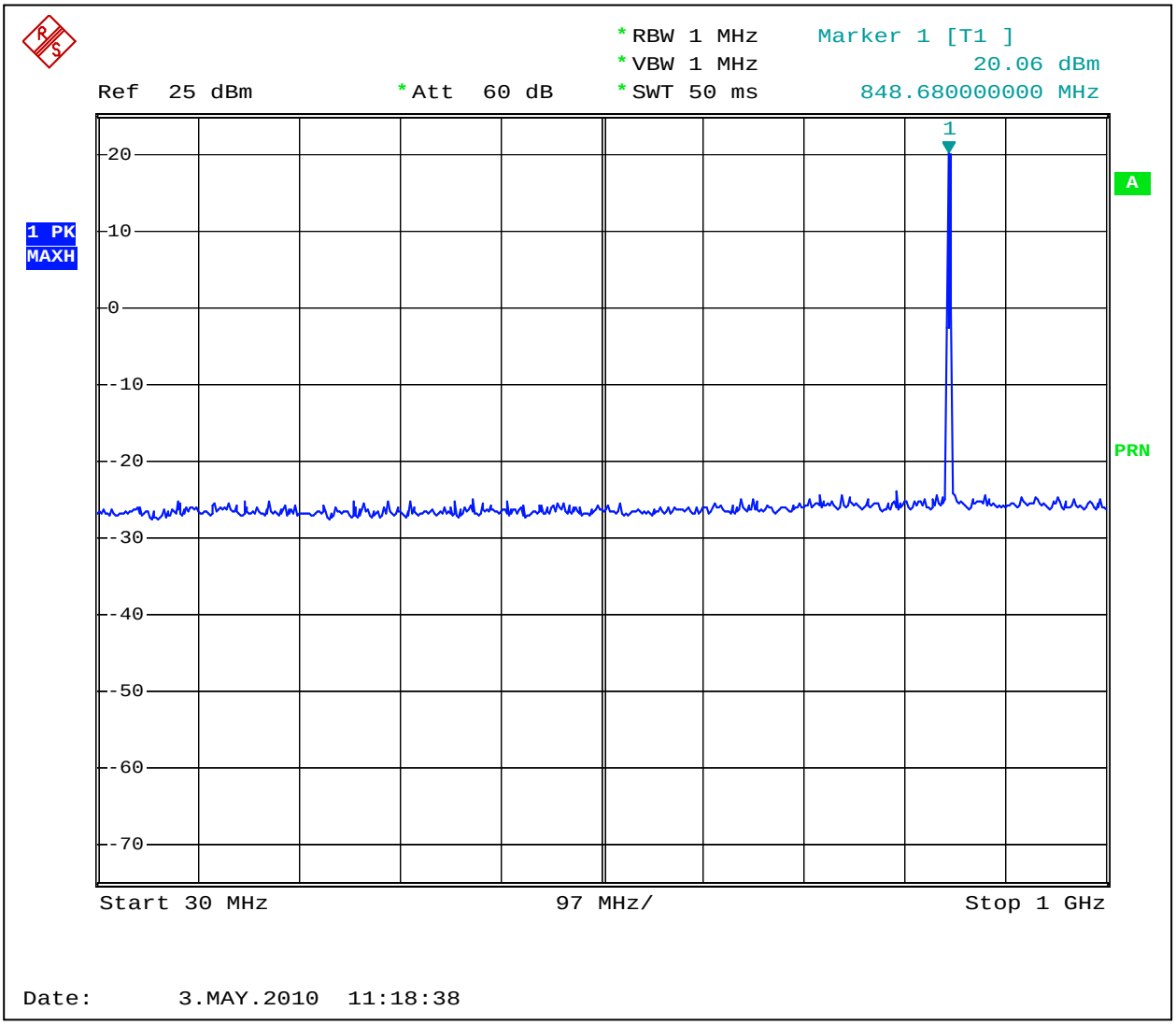
Graph 3.4.18


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
20.28 dBm
837.040000000 MHz
Ref 25 dBm
*Att 60 dB
SWT 5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 3.MAY.2010 10:58:08

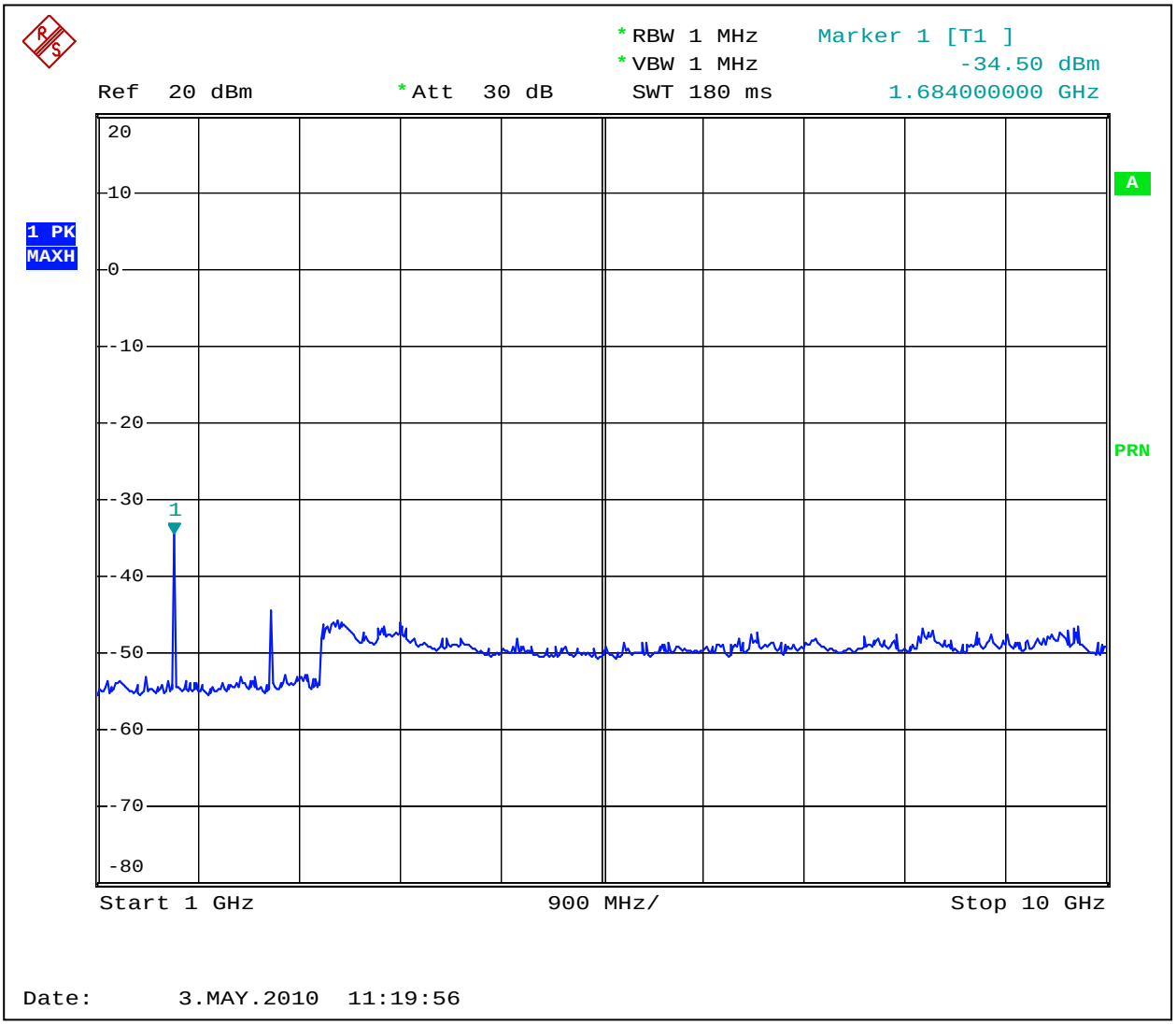
Graph 3.4.19


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-32.61 dBm
1.666000000 GHz
Ref 20 dBm
*Att 30 dB
SWT 180 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 3.MAY.2010 11:00:08

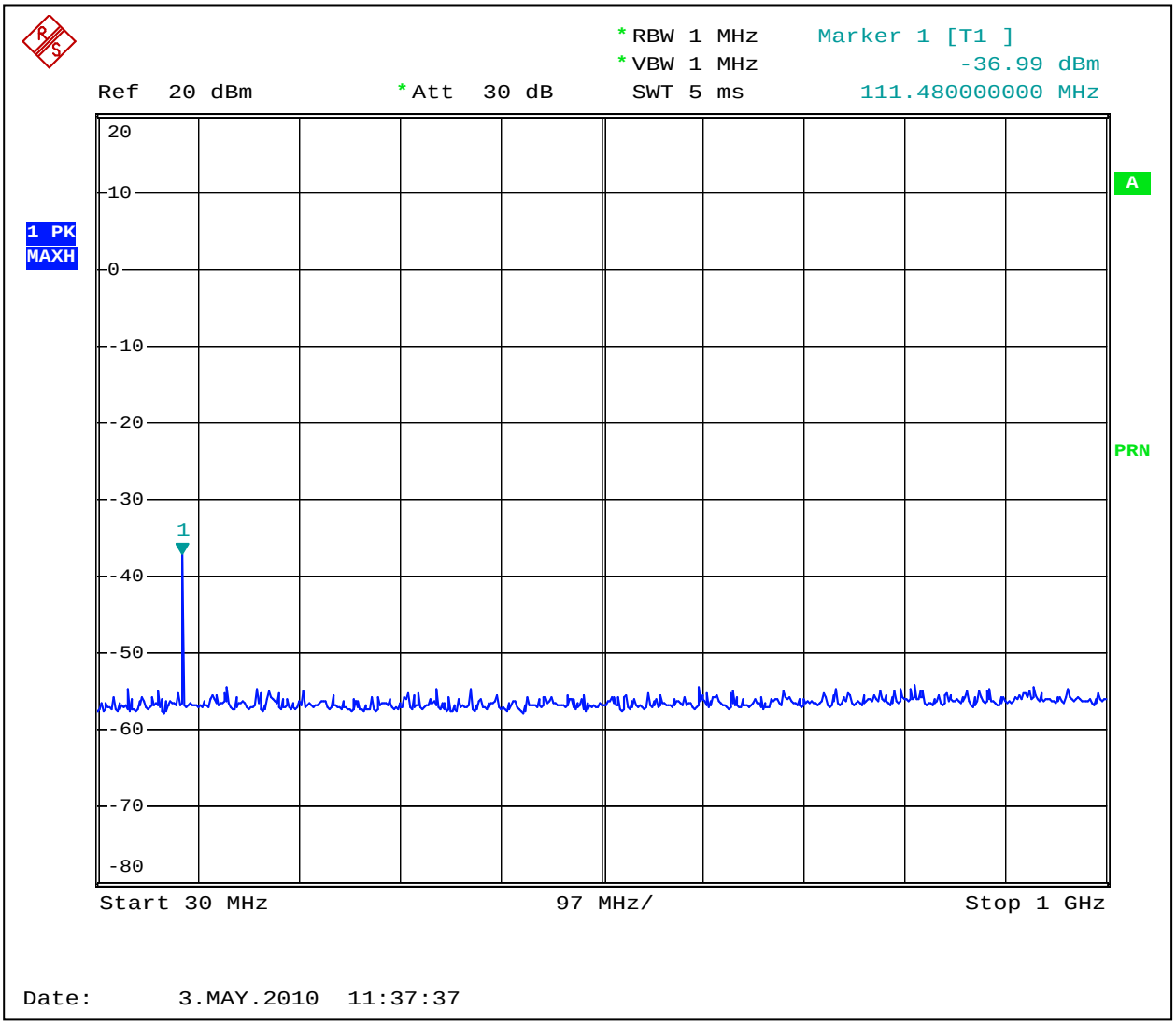
Graph 3.4.20


*RBW 1 MHz
*VBW 1 MHz
*SWT 50 ms
Marker 1 [T1]
20.06 dBm
848.680000000 MHz
Ref 25 dBm
*Att 60 dB
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 3.MAY.2010 11:18:38

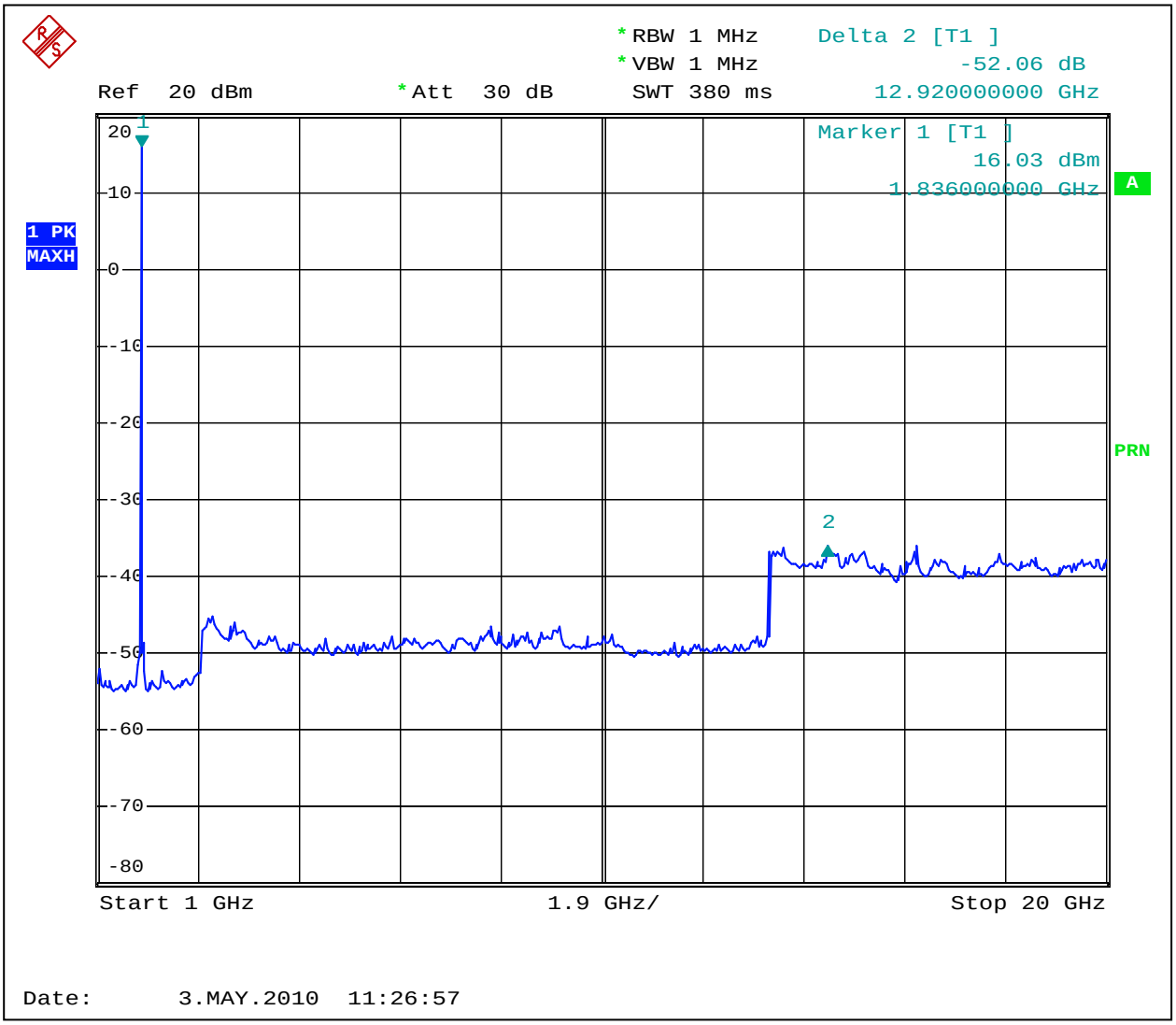
Graph 3.4.21


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-34.50 dBm
Ref 20 dBm
*Att 30 dB
SWT 180 ms
1.684000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 3.MAY.2010 11:19:56

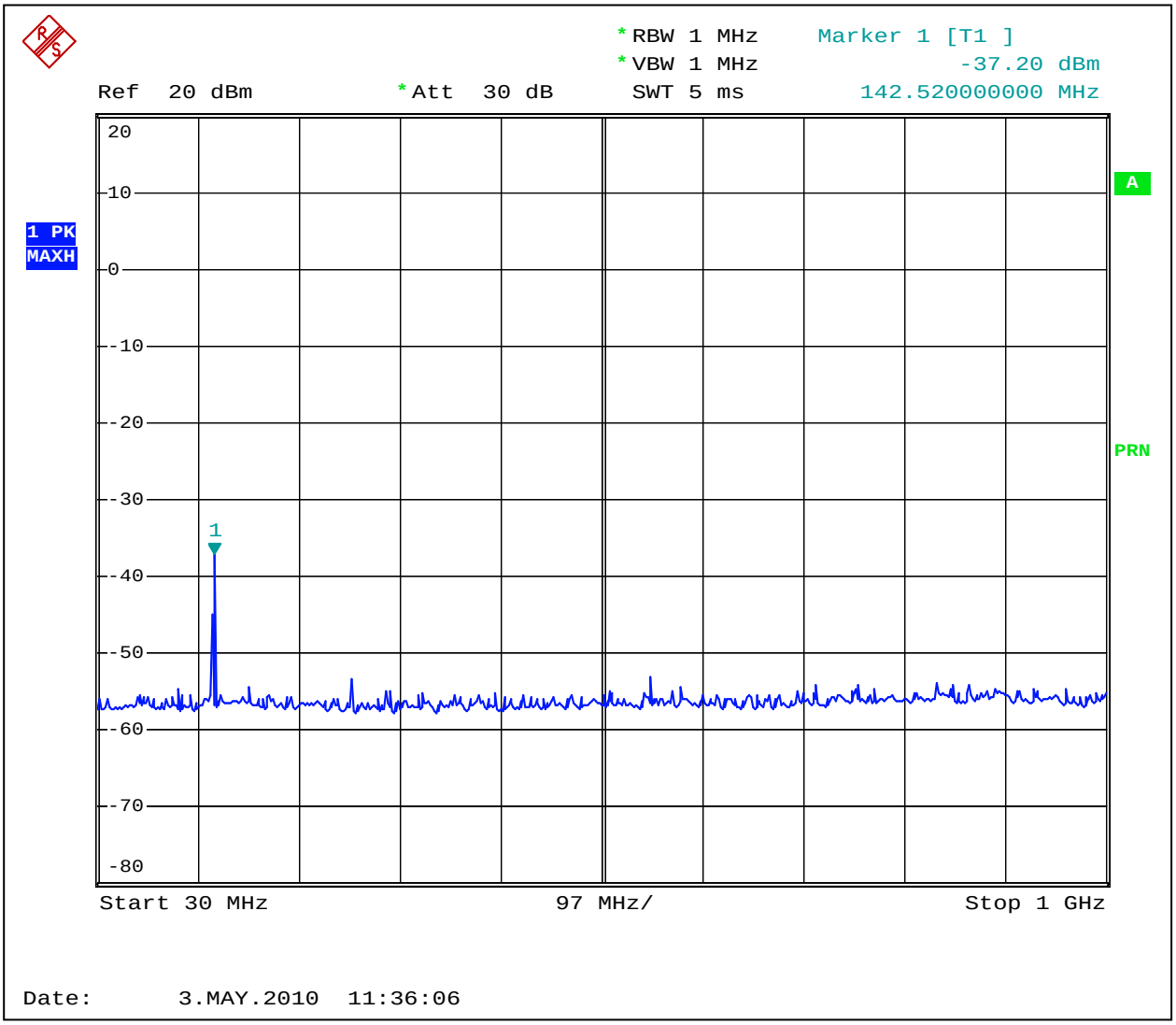
Graph 3.4.22


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-36.99 dBm
111.480000000 MHz
Ref 20 dBm
*Att 30 dB
SWT 5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 3.MAY.2010 11:37:37

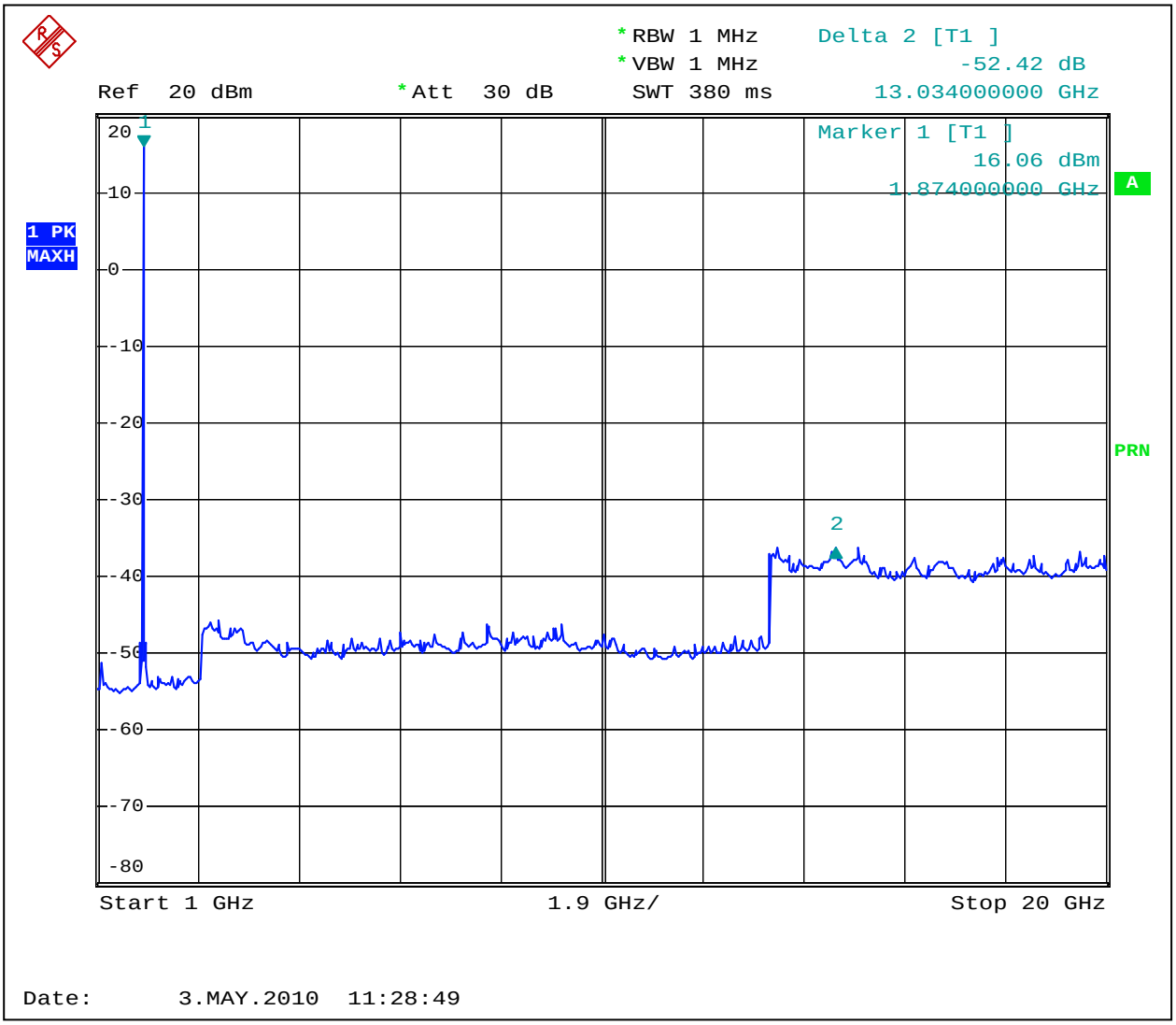
Graph 3.4.23


*RBW 1 MHz
*VBW 1 MHz
Delta 2 [T1]
-52.06 dB
12.920000000 GHz
Ref 20 dBm
*Att 30 dB
SWT 380 ms
Marker 1 [T1]
16.03 dBm
1.836000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
1.9 GHz/
Stop 20 GHz
Date: 3.MAY.2010 11:26:57

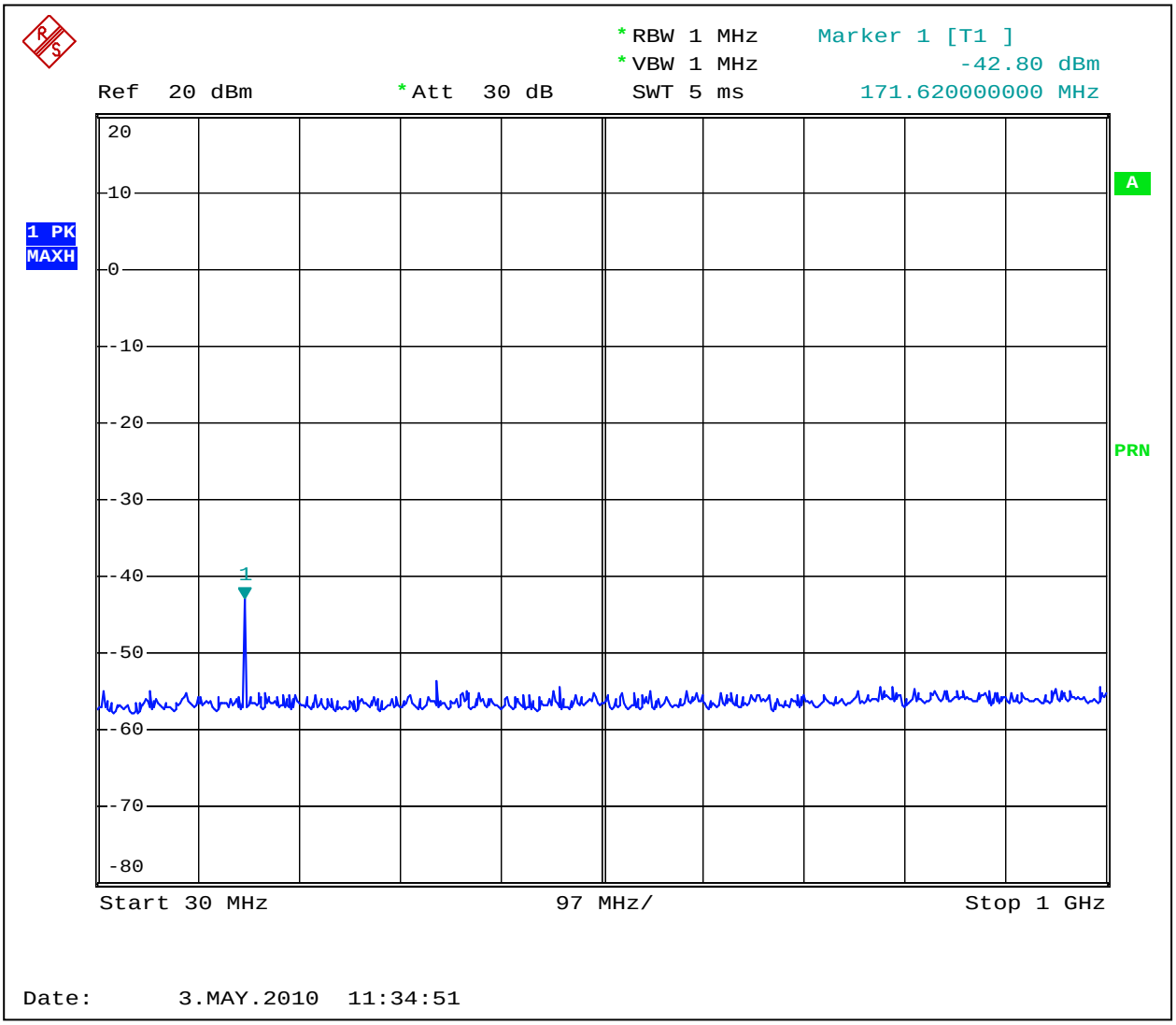
Graph 3.4.24


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-37.20 dBm
142.520000000 MHz
Ref 20 dBm
*Att 30 dB
SWT 5 ms
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 3.MAY.2010 11:36:06

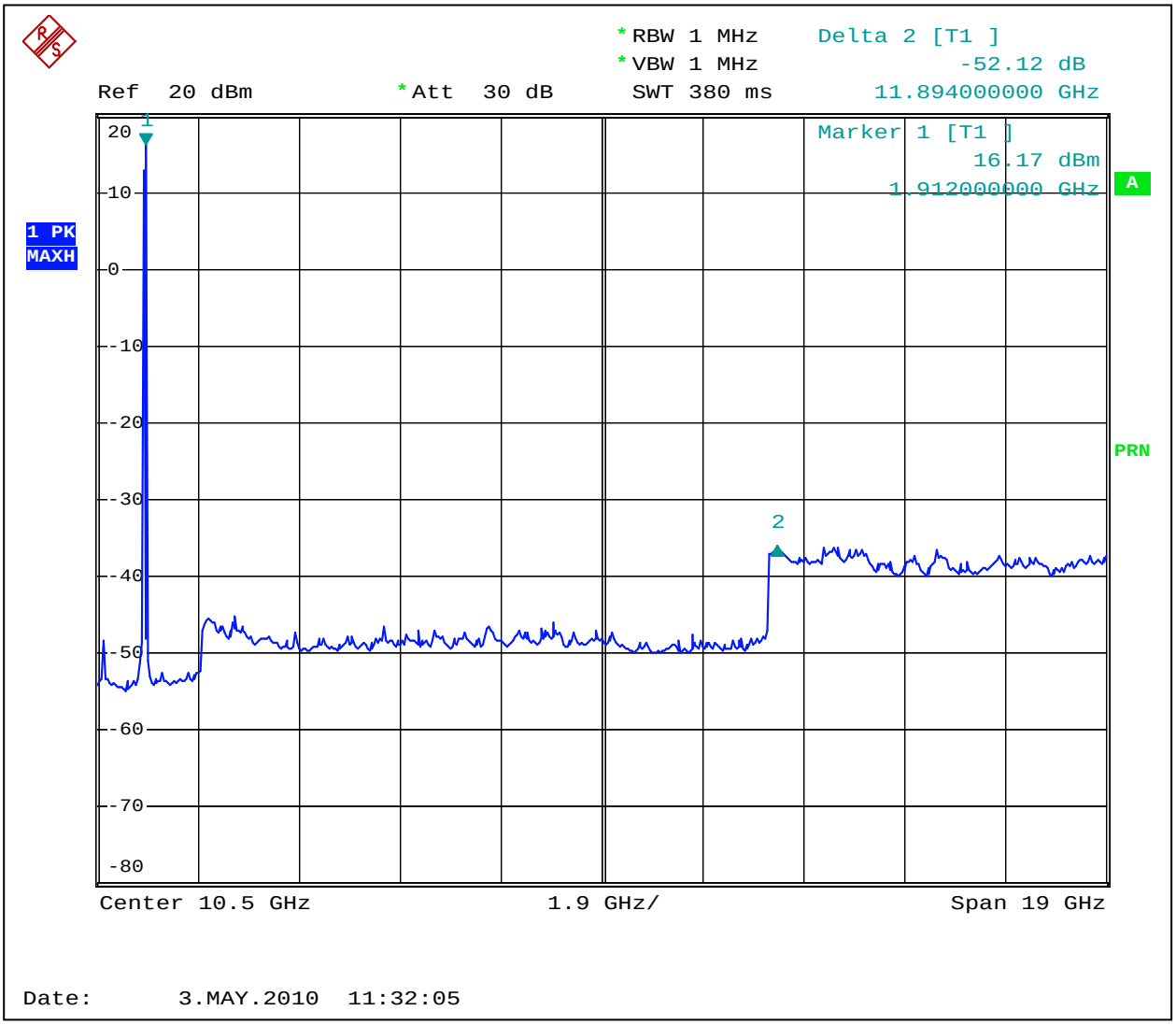
Graph 3.4.25


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 380 ms
Delta 2 [T1]
-52.42 dB
13.034000000 GHz
Marker 1 [T1]
16.06 dBm
1.874000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1 GHz
1.9 GHz/
Stop 20 GHz
Date: 3.MAY.2010 11:28:49

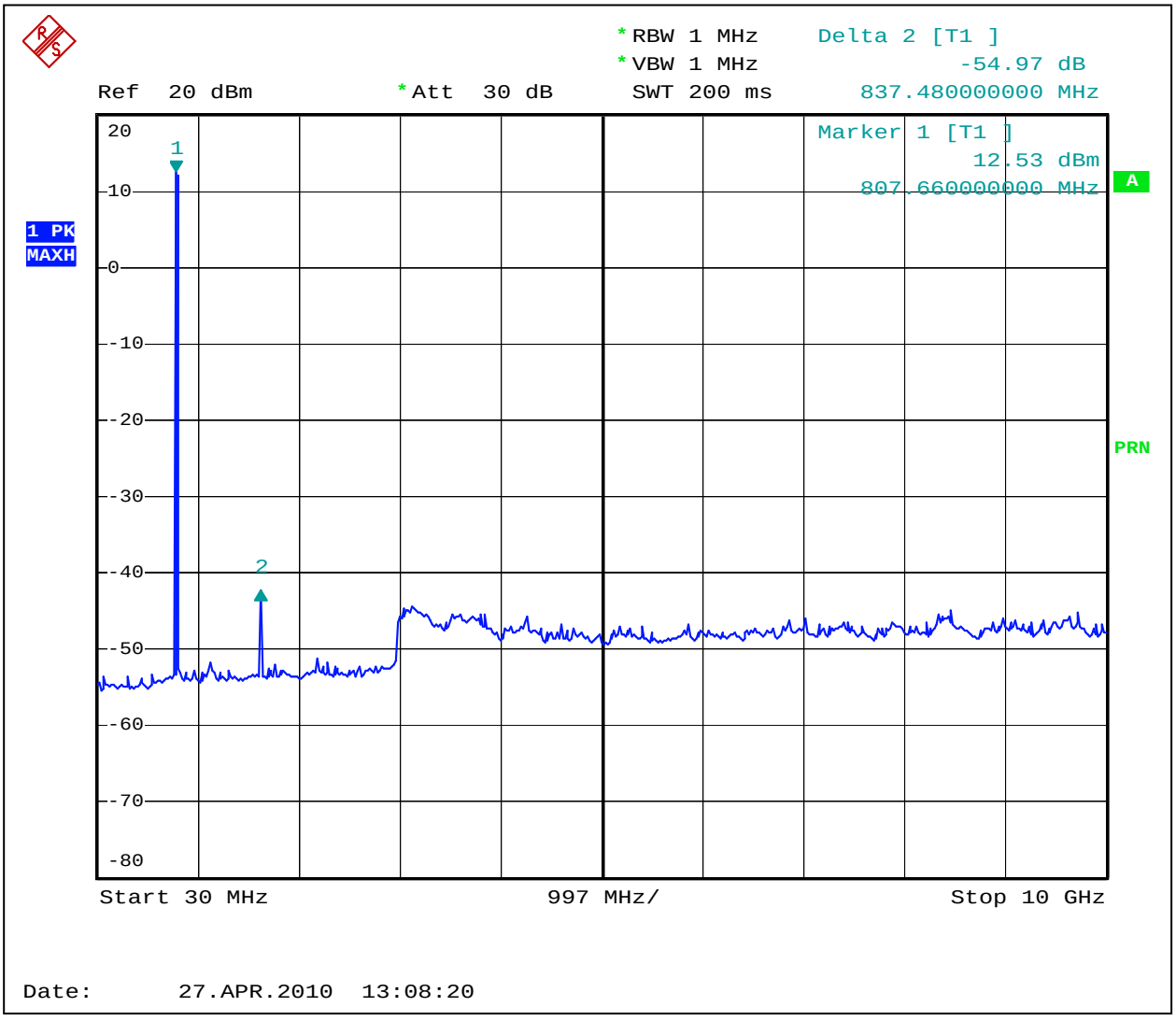
Graph 3.4.26


*RBW 1 MHz
*VBW 1 MHz
Marker 1 [T1]
-42.80 dBm
Ref 20 dBm
*Att 30 dB
SWT 5 ms
171.620000000 MHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 3.MAY.2010 11:34:51

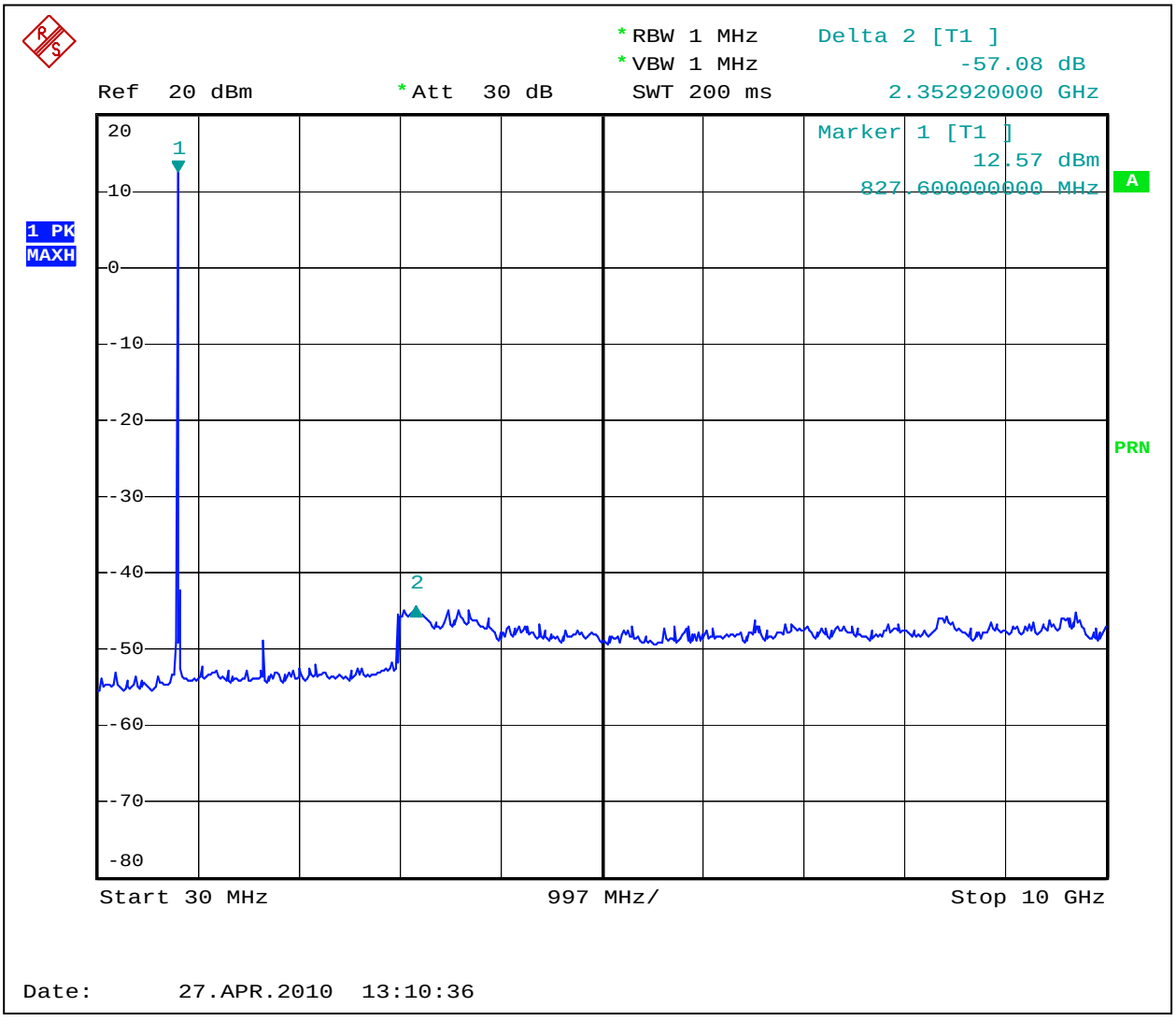
Graph 3.4.27


*RBW 1 MHz
*VBW 1 MHz
Delta 2 [T1]
-52.12 dB
11.894000000 GHz
Ref 20 dBm
*Att 30 dB
SWT 380 ms
Marker 1 [T1]
16.17 dBm
1.912000000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 10.5 GHz
1.9 GHz/
Span 19 GHz
Date: 3.MAY.2010 11:32:05

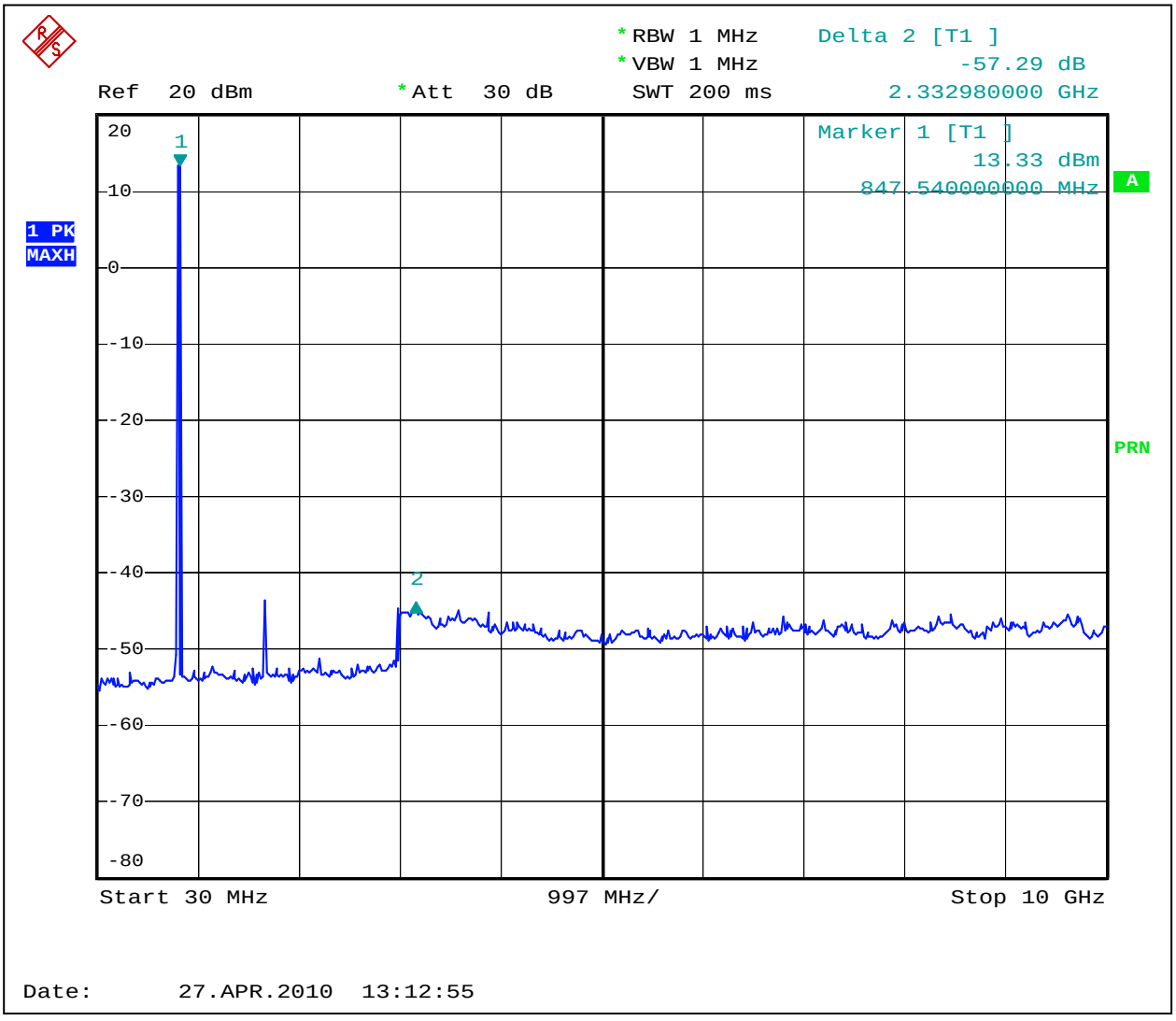
Graph 3.4.28


*RBW 1 MHz
*VBW 1 MHz
Delta 2 [T1]
-54.97 dB
837.480000000 MHz
Ref 20 dBm
*Att 30 dB
SWT 200 ms
Marker 1 [T1]
12.53 dBm
807.660000000 MHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
997 MHz/
Stop 10 GHz
Date: 27.APR.2010 13:08:20

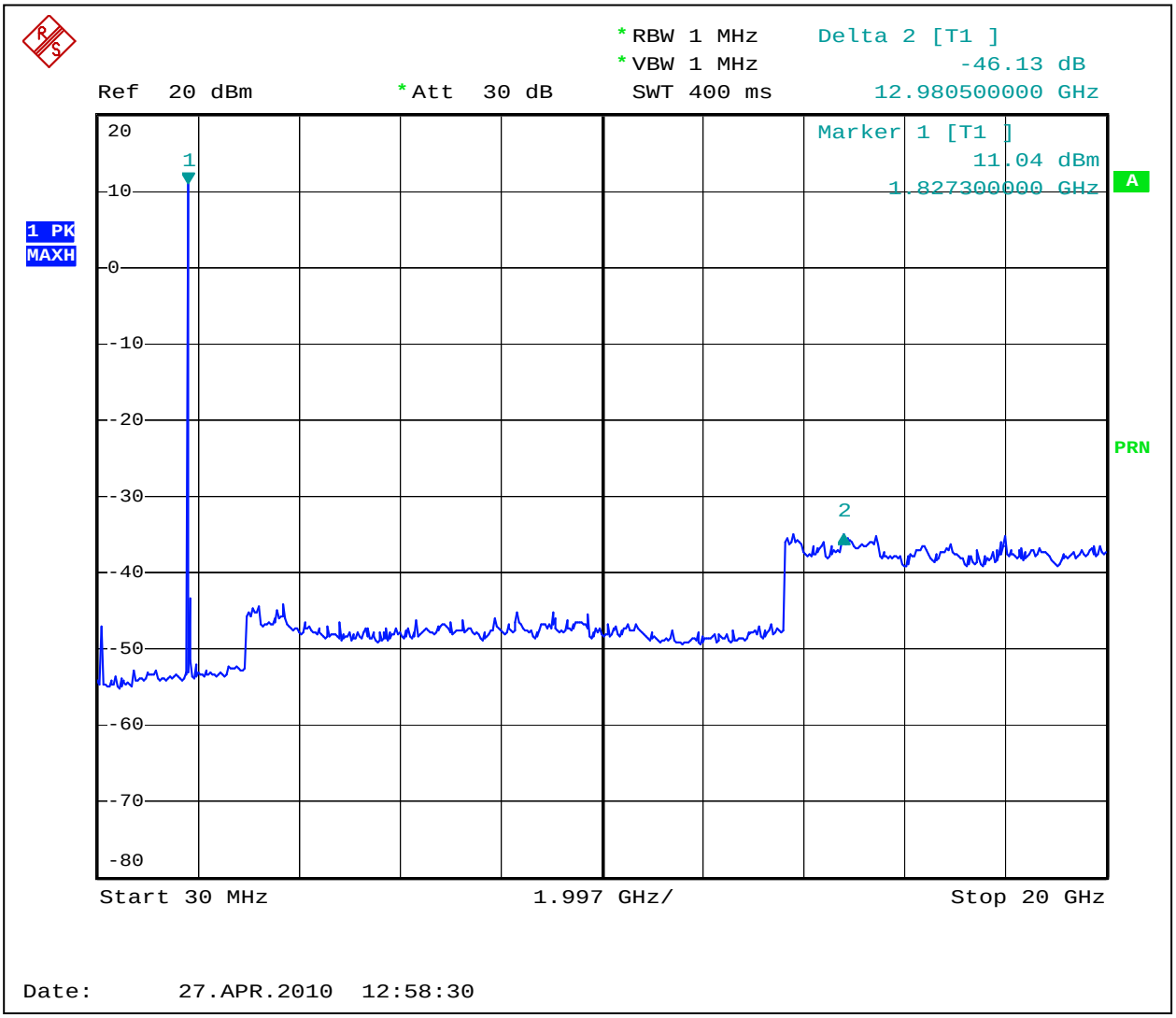
Graph 3.4.29


*RBW 1 MHz
*VBW 1 MHz
Delta 2 [T1]
-57.08 dB
2.352920000 GHz
Ref 20 dBm
*Att 30 dB
SWT 200 ms
Marker 1 [T1]
12.57 dBm
827.600000000 MHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
997 MHz/
Stop 10 GHz
Date: 27.APR.2010 13:10:36

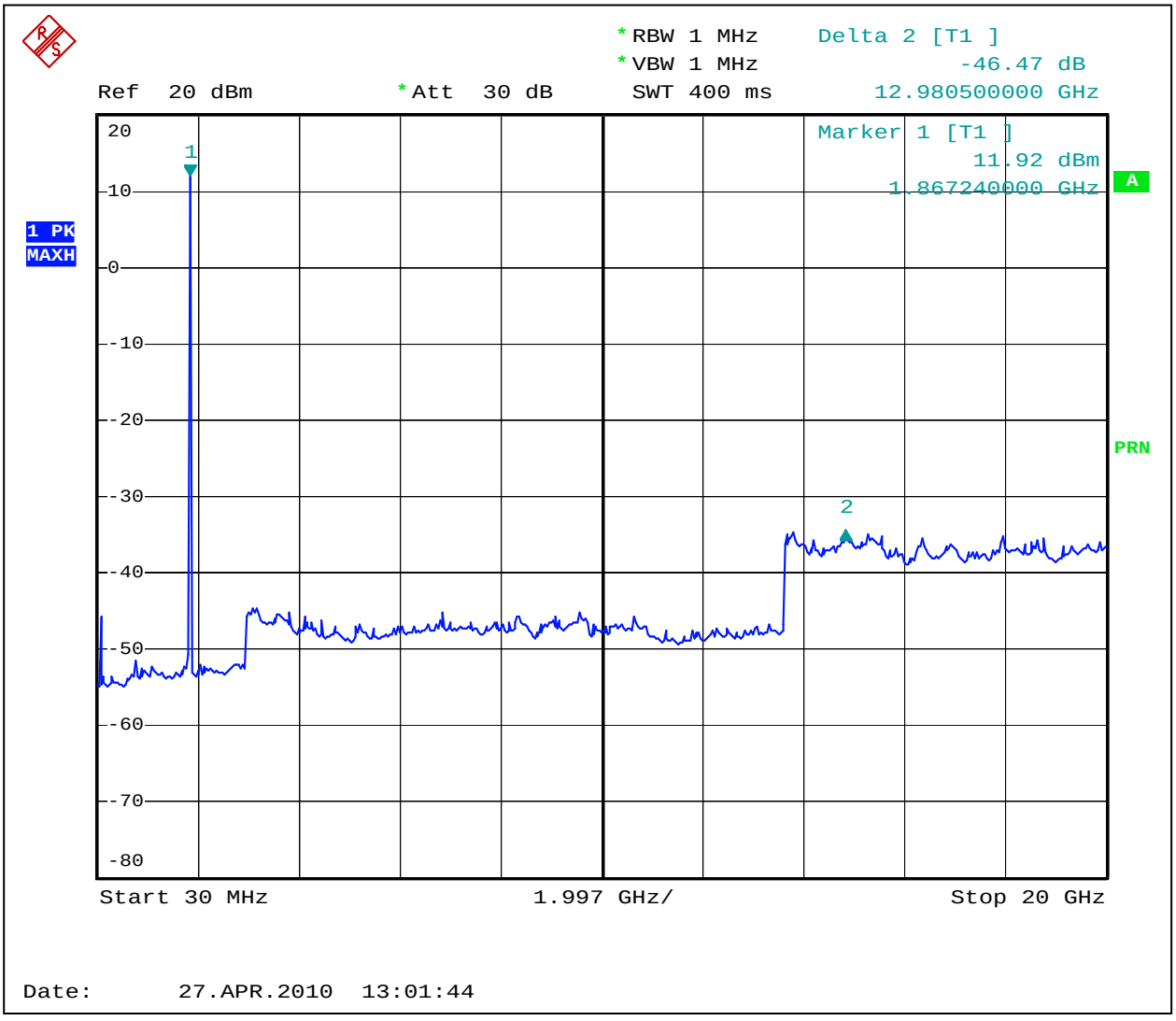
Graph 3.4.30


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 200 ms
Delta 2 [T1]
-57.29 dB
2.332980000 GHz
Marker 1 [T1]
13.33 dBm
847.540000000 MHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
997 MHz/
Stop 10 GHz
Date: 27.APR.2010 13:12:55

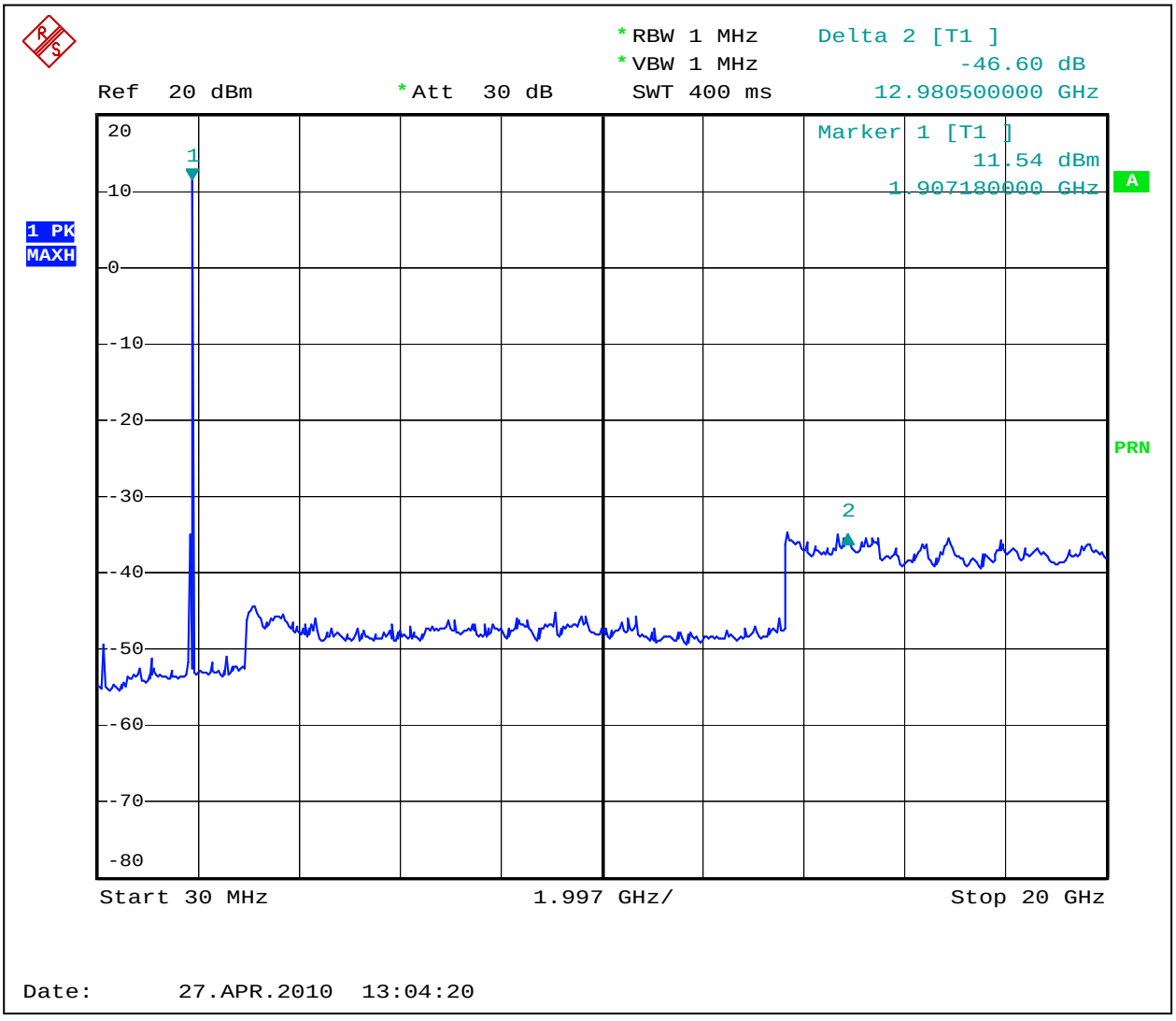
Graph 3.4.31


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 400 ms
Delta 2 [T1]
-46.13 dB
12.980500000 GHz
Marker 1 [T1]
11.04 dBm
1.827300000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
1.997 GHz/
Stop 20 GHz
Date: 27.APR.2010 12:58:30

Graph 3.4.32


*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 400 ms
Delta 2 [T1]
-46.47 dB
12.980500000 GHz
Marker 1 [T1]
11.92 dBm
1.867240000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
1.997 GHz/
Stop 20 GHz
Date: 27.APR.2010 13:01:44

Graph 3.4.33

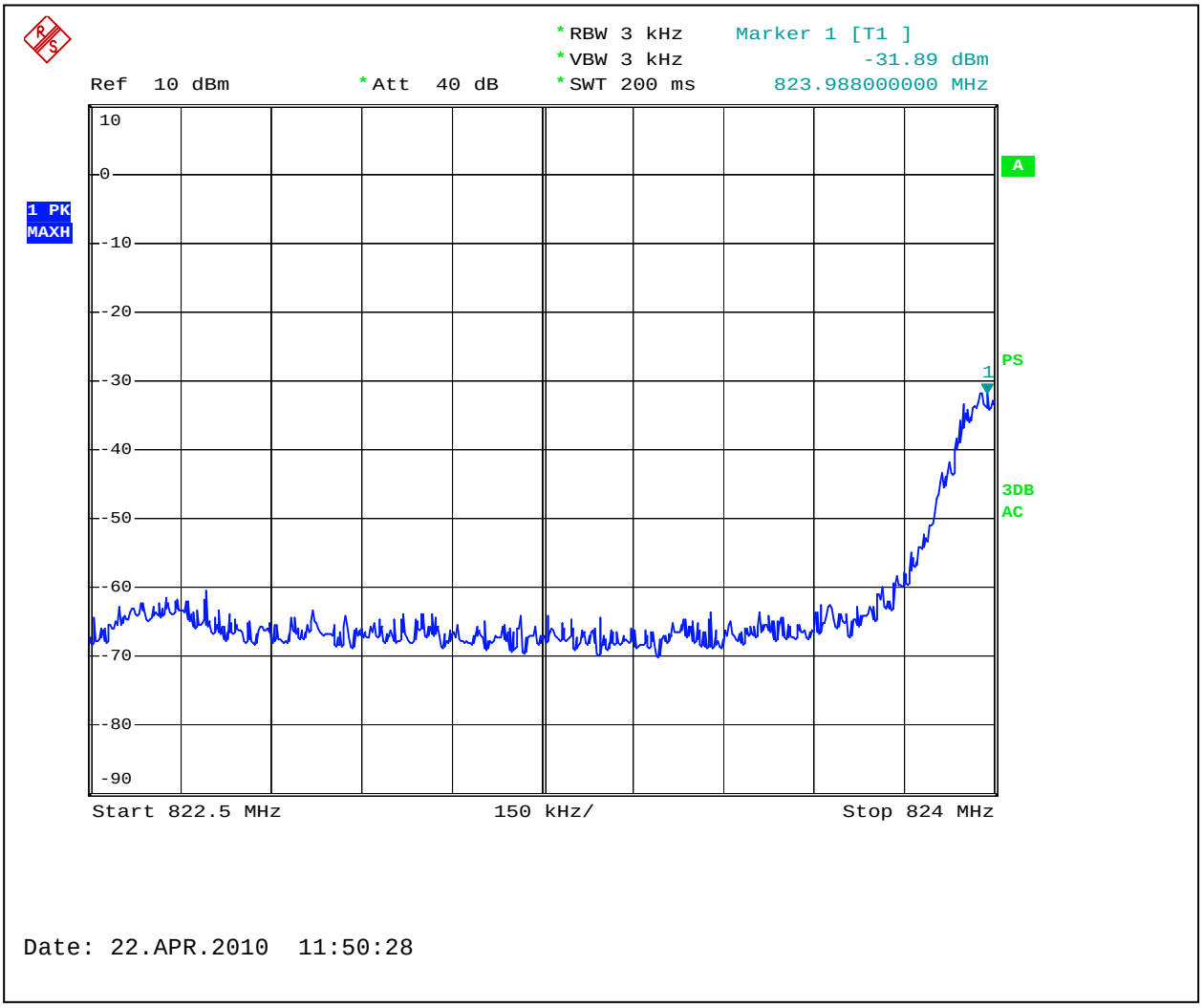

*RBW 1 MHz
*VBW 1 MHz
Ref 20 dBm
*Att 30 dB
SWT 400 ms
Delta 2 [T1]
-46.60 dB
12.980500000 GHz
Marker 1 [T1]
11.54 dBm
1.907180000 GHz
1 PK
MAXH
A
PRN
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 30 MHz
1.997 GHz/
Stop 20 GHz
Date: 27.APR.2010 13:04:20

3.5 Antenna Block Edge Emissions

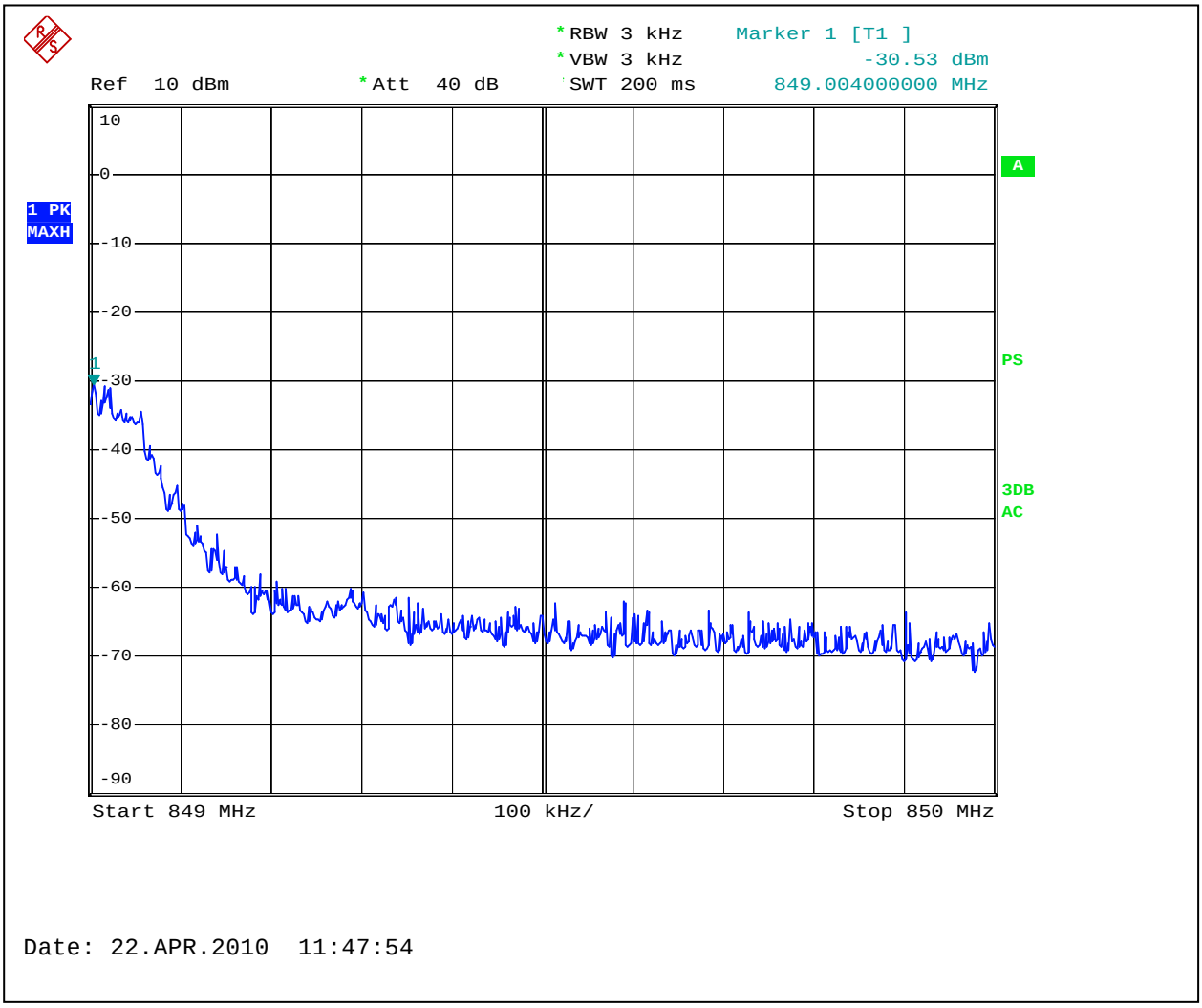
Test result: **Pass**

Power Output:	**Conducted**				
Channel / Edge Fequency	**Measured Emissions dBm**	**Total CF dB**	**Total dBm**	**Limit dBm**	**Margin dB**
Channel 128 824.0MHz	-31.89	15.9	-16.0	-13.0	-3.0
Channel 251 849.0MHz	-30.53	15.9	-14.6	-13.0	-1.6
Channel 512 1850.0MHz	-29.84	11.1	-18.7	-13.0	-5.7
Channel 810 1910.0MHz	-28.41	11.1	-17.3	-13.0	-4.3
Channel 4132 824.0MHz	-26.14	10.9	-15.2	-13.0	-2.2
Channel 4233 849.0MHz	-26.77	10.9	-15.9	-13.0	-2.9
Channel 9262 1850.0MHz	-27.23	11.8	-15.4	-13.0	-2.4
Channel 9538 1910.0MHz	-28.18	11.8	-16.4	-13.0	-3.4
Total CF:	**RF Cable Insertion Loss + Coupler Insertion Loss**				

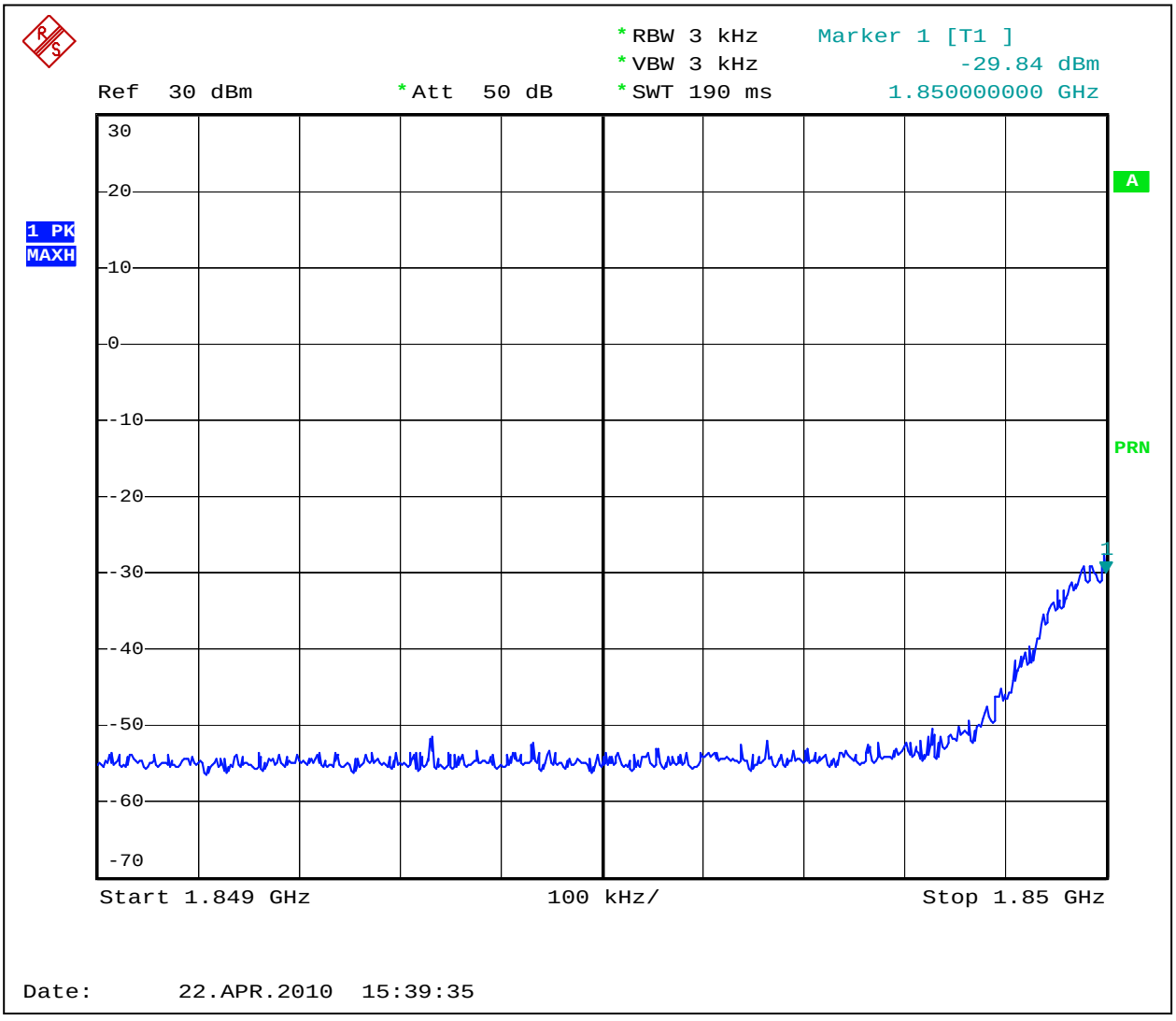
Graph 3.5.1


*RBW 3 kHz
*VBW 3 kHz
*SWT 200 ms
Marker 1 [T1]
-31.89 dBm
823.988000000 MHz
Ref 10 dBm
*Att 40 dB
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 822.5 MHz
150 kHz/
Stop 824 MHz
Date: 22.APR.2010 11:50:28

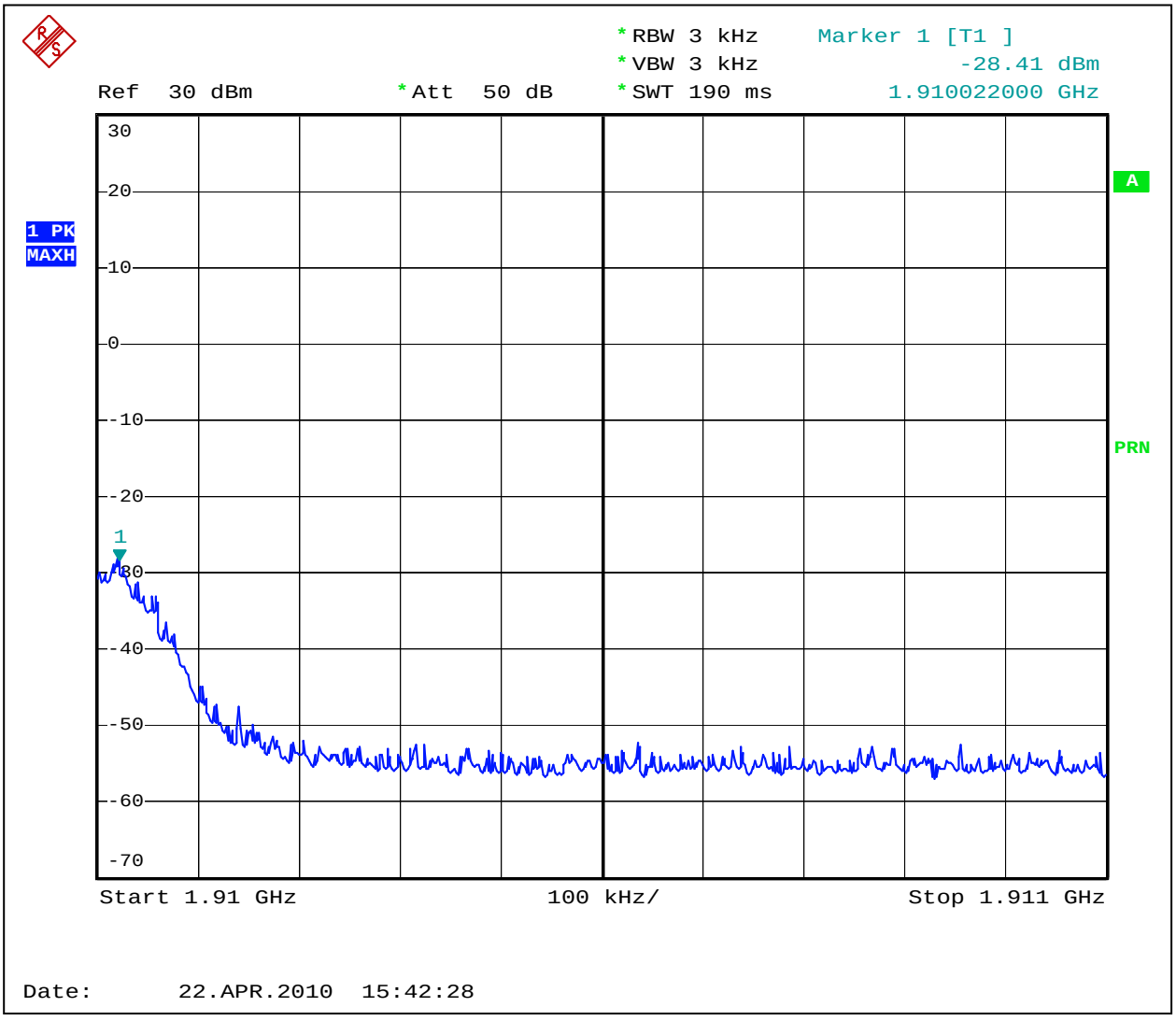
Graph 3.5.2


*RBW 3 kHz
*VBW 3 kHz
Marker 1 [T1]
-30.53 dBm
849.004000000 MHz
Ref 10 dBm
*Att 40 dB
SWT 200 ms
1 PK
MAXH
A
PS
3DB
AC
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Start 849 MHz
100 kHz/
Stop 850 MHz
Date: 22.APR.2010 11:47:54

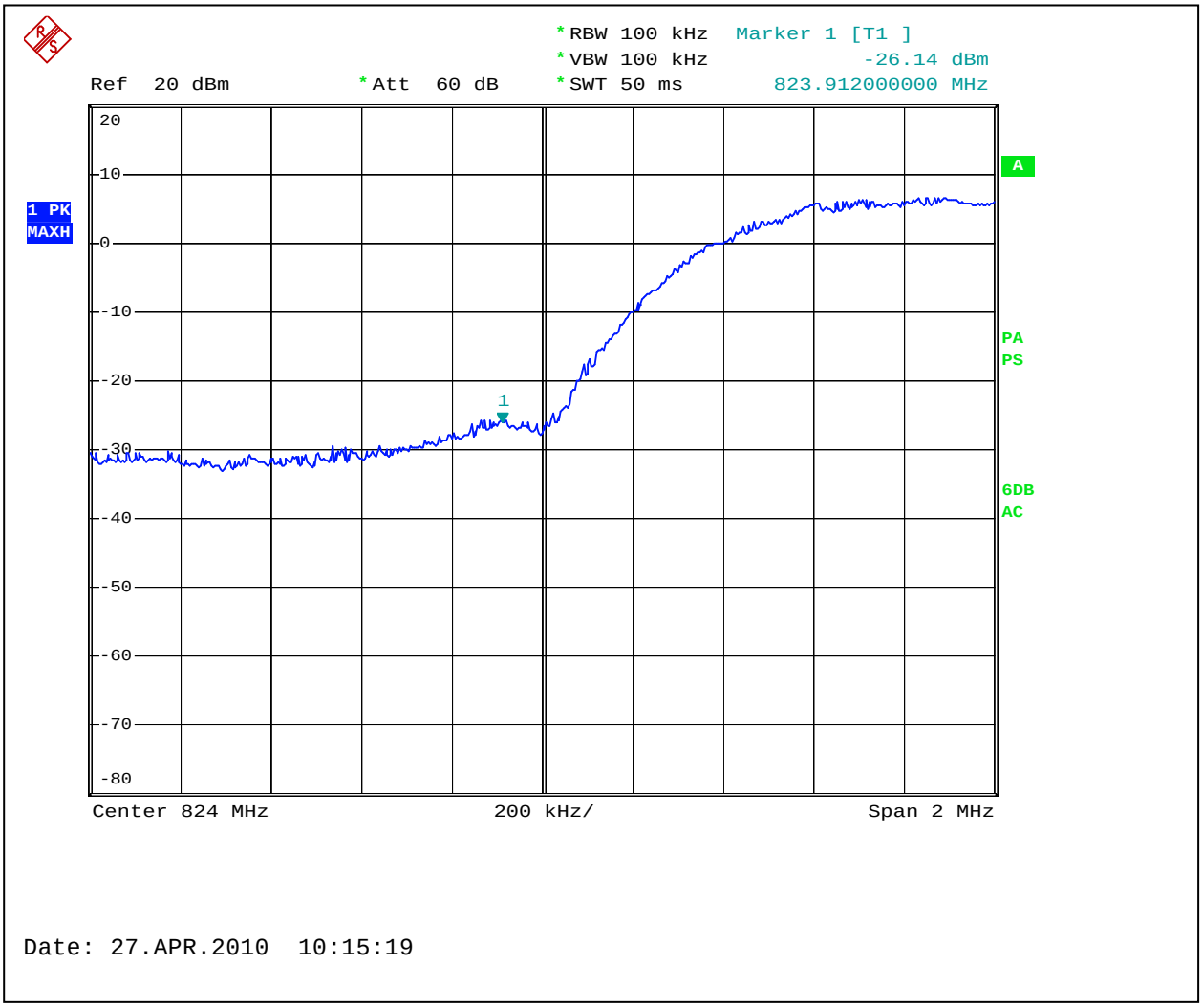
Graph 3.5.3


*RBW 3 kHz
*VBW 3 kHz
*SWT 190 ms
Marker 1 [T1]
-29.84 dBm
1.850000000 GHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
Start 1.849 GHz
100 kHz/
Stop 1.85 GHz
Date: 22.APR.2010 15:39:35

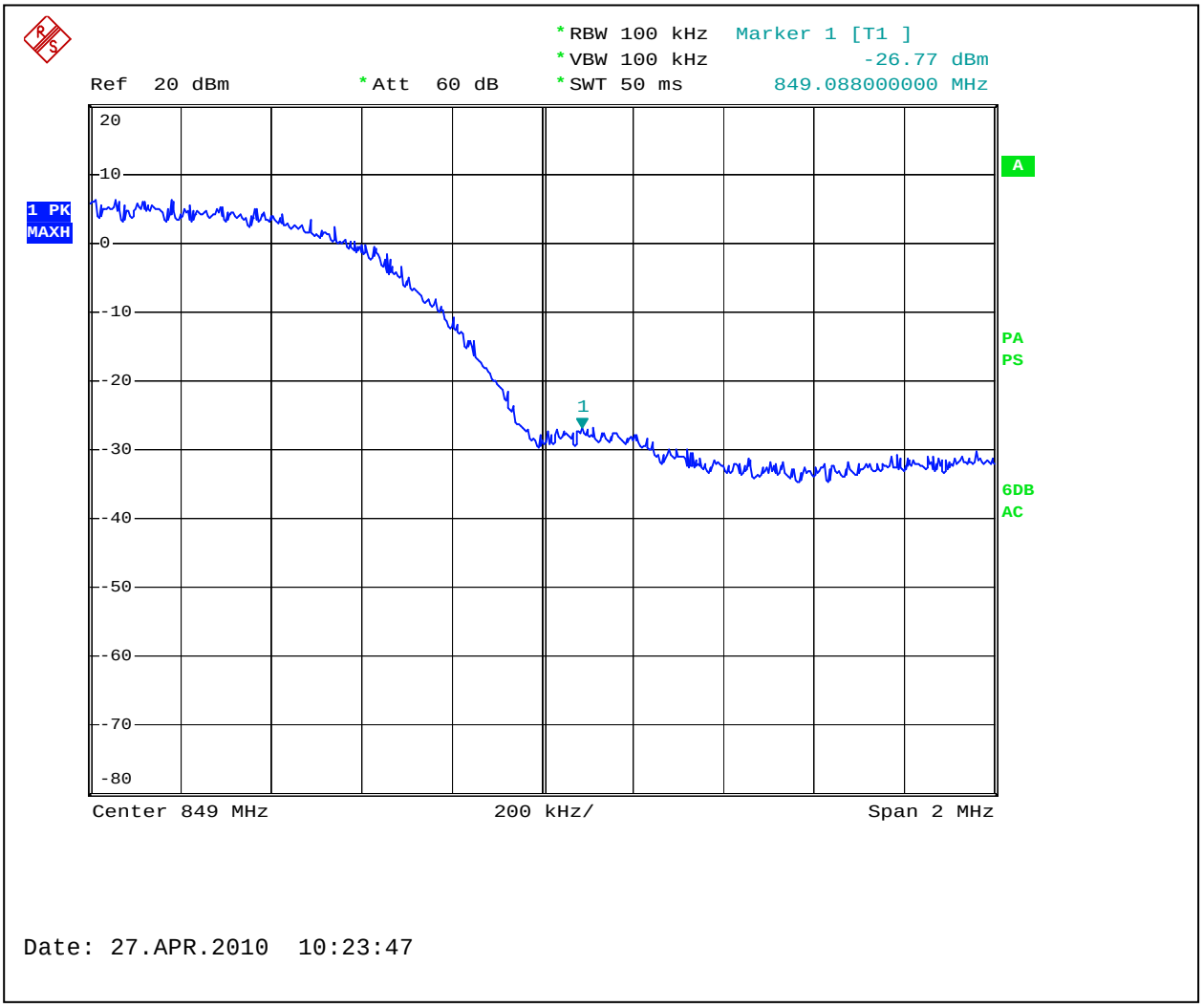
Graph 3.5.4


*RBW 3 kHz
*VBW 3 kHz
*SWT 190 ms
Marker 1 [T1]
-28.41 dBm
1.910022000 GHz
Ref 30 dBm
*Att 50 dB
1 PK
MAXH
A
PRN
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
1
Start 1.91 GHz
100 kHz/
Stop 1.911 GHz
Date: 22.APR.2010 15:42:28

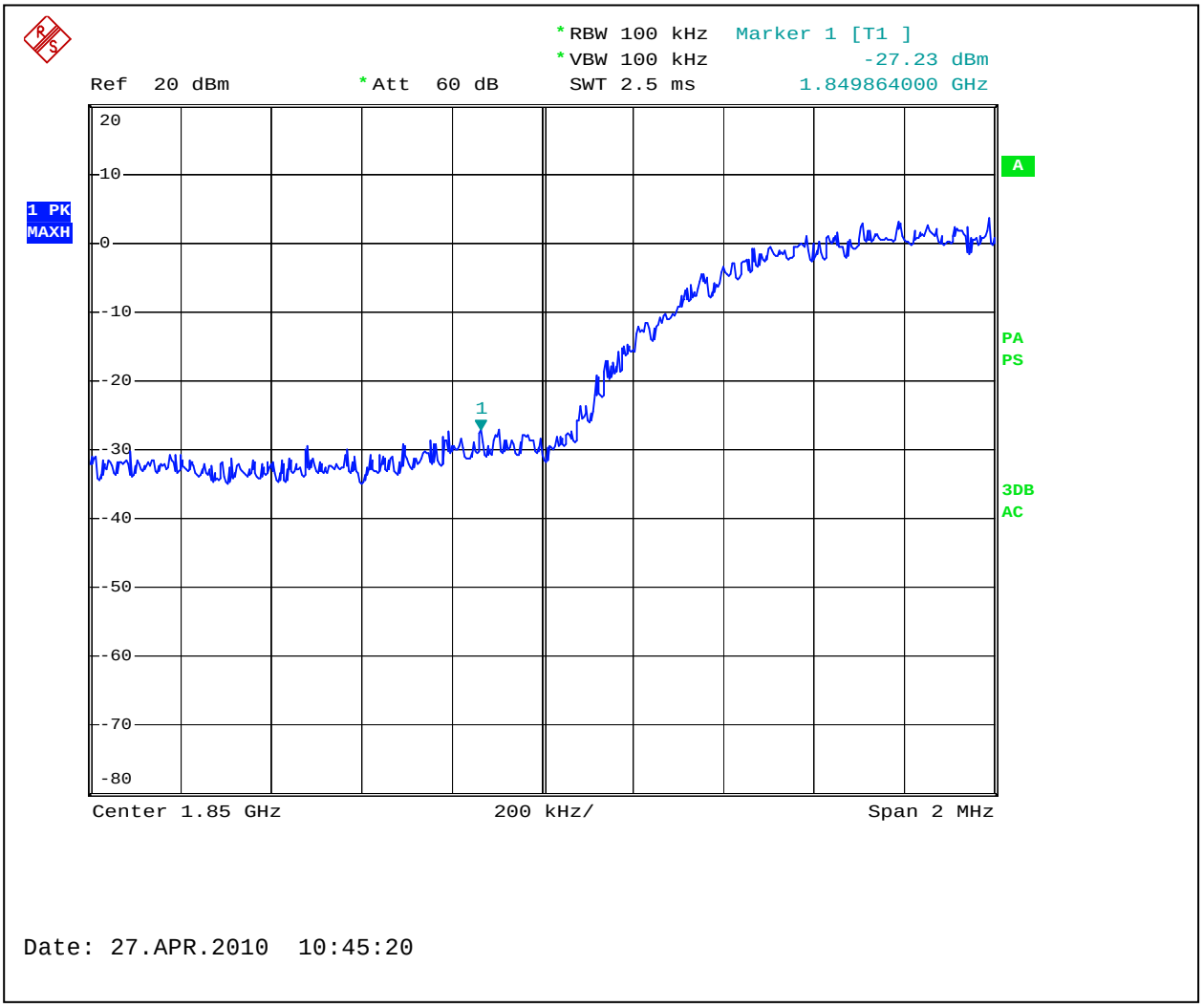
Graph 3.5.5


*RBW 100 kHz
*VBW 100 kHz
*SWT 50 ms
Marker 1 [T1]
-26.14 dBm
823.912000000 MHz
Ref 20 dBm
*Att 60 dB
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 824 MHz
200 kHz/
Span 2 MHz
Date: 27.APR.2010 10:15:19

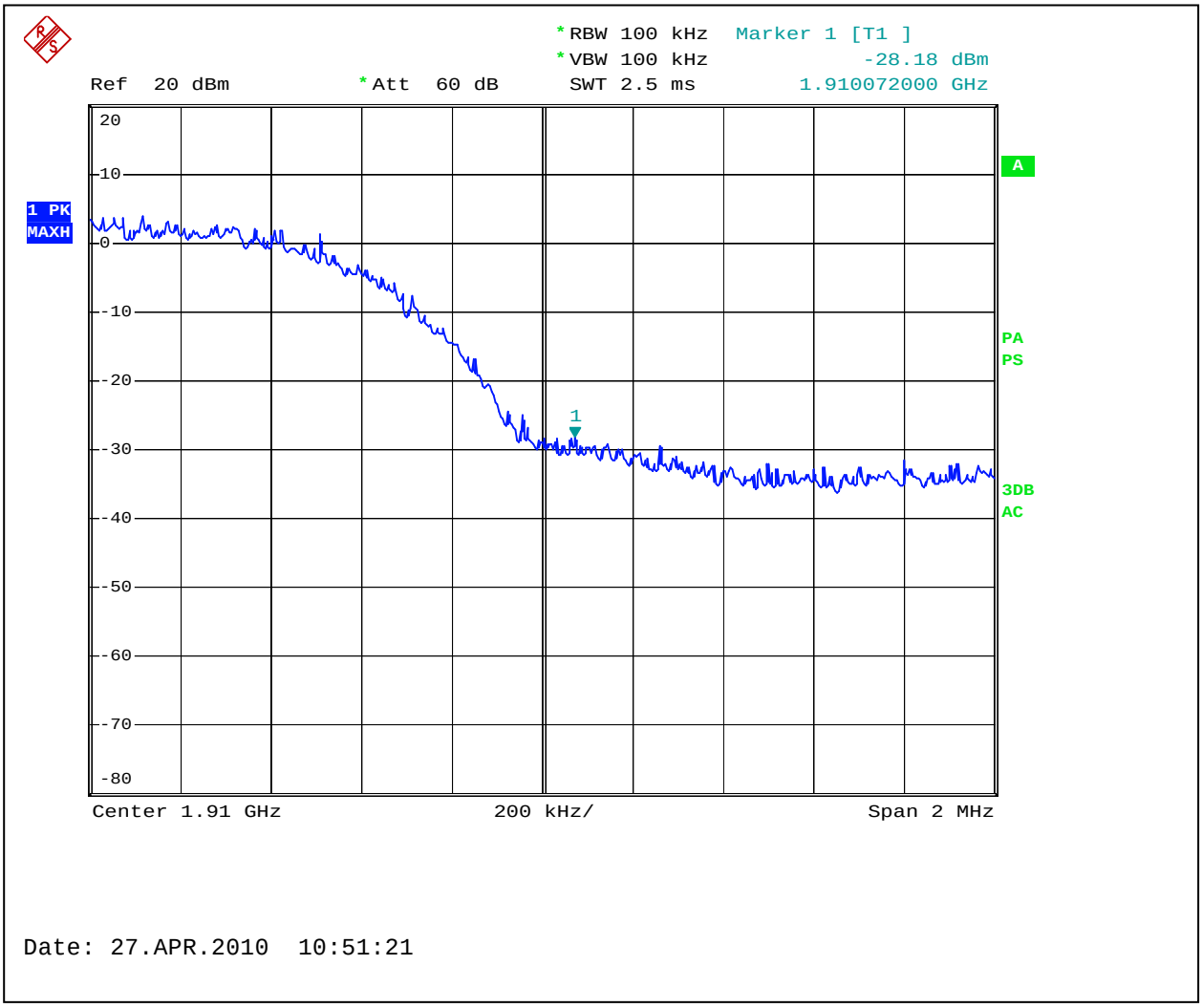
Graph 3.5.6


*RBW 100 kHz
*VBW 100 kHz
*SWT 50 ms
Marker 1 [T1]
-26.77 dBm
849.088000000 MHz
Ref 20 dBm
*Att 60 dB
1 PK
MAXH
A
PA
PS
6DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Center 849 MHz
200 kHz/
Span 2 MHz
Date: 27.APR.2010 10:23:47

Graph 3.5.7


*RBW 100 kHz
*VBW 100 kHz
Marker 1 [T1]
-27.23 dBm
1.849864000 GHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Center 1.85 GHz
200 kHz/
Span 2 MHz
Date: 27.APR.2010 10:45:20

Graph 3.5.8


*RBW 100 kHz
*VBW 100 kHz
Marker 1 [T1]
-28.18 dBm
1.910072000 GHz
Ref 20 dBm
*Att 60 dB
SWT 2.5 ms
1 PK
MAXH
A
PA
PS
3DB
AC
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
1
Center 1.91 GHz
200 kHz/
Span 2 MHz
Date: 27.APR.2010 10:51:21

3.6 Enclosure Radiated Spurious Emissions

Test location: ☐ OATS ☒ Anechoic Chamber ☐ Other

Test result: **Pass**

Table 3.6.1 shows the maximum Spurious Radiated Emissions for Channels 128, 198, and 251from 30MHz to 10GHz.
Table 3.6.2 shows the maximum Spurious Radiated Emissions for Channels 512, 661, and 810 from 30MHz to 20GHz.
Table 3.6.3 shows the maximum Spurious Radiated Emissions for Channels 4132, 4183, and 4233 from 30MHz to 10GHz.
Table 3.6.4 shows the maximum Spurious Radiated Emissions for Channels 9262, 9400, and 9538 from 30MHz to 20GHz.

Graphs 3.6.1- to 3.6.24 show the EUT peak Radiated Emissions.

The Spurious Radiated Power limits of -13dBm was correlated with field strength reference level of 82.2dBµV/m during field strength measurements at 3m measurement distance.

No emissions were chosen for substitution measurements as the maximum emission is more than 20dB below the reference limit. The transmitting fundamental frequencies were excluded form the measurements.

Table 3.6.1

Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Ref. Limit dBµV/m	Margin dB
			Channel 128				
32.217 MHz	V	23.7	19.6	0.0	43.2	82.2	-39.0
63.663 MHz	V	41.6	7.0	0.0	48.6	82.2	-33.6
101.04 MHz	V	29.3	12.0	0.0	41.3	82.2	-40.9
106.72 MHz	H	26.6	12.8	0.0	39.5	82.2	-42.8
139.25 MHz	H	26.5	13.1	0.0	39.6	82.2	-42.6
204.83 MHz	H	29.6	11.9	0.0	41.5	82.2	-40.7
2.125 GHz	V	59.5	30.3	43.2	46.5	82.2	-35.7
2.398 GHz	V	57.2	31.2	43.1	45.3	82.2	-36.9
2.476 GHz	V	64.1	31.5	43.1	52.5	82.2	-29.7
2.134 GHz	H	55.1	30.3	43.2	42.2	82.2	-40.0
2.476 GHz	H	59.8	31.5	43.1	48.2	82.2	-34.0
9.907 GHz	H	37.9	44.5	40.9	41.5	82.2	-40.7
			Channel 189				
30.9 MHz	V	24.1	20.3	0.0	44.3	82.2	-37.9
64.633 MHz	V	41.8	7.0	0.0	48.8	82.2	-33.4
101.04 MHz	V	30.8	12.0	0.0	42.9	82.2	-39.3
106.42 MHz	H	28.3	12.8	0.0	41.1	82.2	-41.1
138.65 MHz	H	27.7	13.2	0.0	40.8	82.2	-41.4
203.87 MHz	H	27.6	11.9	0.0	39.5	82.2	-42.7
1.2232 GHz	V	60.0	26.8	42.6	44.2	82.2	-38.0
2.134 GHz	V	59.8	30.3	43.2	46.9	82.2	-35.3
4.1824 GHz	V	51.2	36.5	42.7	45.1	82.2	-37.1
2.1268 GHz	H	54.9	30.3	43.2	42.0	82.2	-40.2
2.512 GHz	H	63.6	31.6	43.1	52.1	82.2	-30.1
3.3436 GHz	H	49.8	34.8	43.4	41.3	82.2	-40.9
			Channel 251				
31.108 MHz	V	24.8	20.2	0.0	44.9	82.2	-37.3
64.356 MHz	V	41.1	7.0	0.0	48.1	82.2	-34.1
101.79 MHz	V	31.4	12.2	0.0	43.6	82.2	-38.6
107.16 MHz	H	28.4	12.9	0.0	41.2	82.2	-41.0
139.57 MHz	H	25.2	13.1	0.0	38.3	82.2	-43.9
205.48 MHz	H	28.0	11.9	0.0	39.9	82.2	-42.3
1.219 GHz	V	59.6	26.8	42.6	43.8	82.2	-38.4
2.131 GHz	V	59.4	30.3	43.2	46.4	82.2	-35.8
2.545 GHz	V	63.0	31.7	43.1	51.6	82.2	-30.6
2.545 GHz	H	62.5	31.7	43.1	51.1	82.2	-31.2
4.243 GHz	H	46.7	36.5	42.6	40.6	82.2	-41.6
9.856 GHz	H	38.4	44.5	40.9	41.9	82.2	-40.3

Table 3.6.2

Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Ref. Limit dBµV/m	Margin dB
			Channel 512				
54.312 MHz	V	40.4	8.6	0.0	49.0	82.2	-33.3
73.736 MHz	V	36.4	7.7	0.0	44.1	82.2	-38.1
966.76 MHz	V	15.8	25.7	0.0	41.5	82.2	-40.7
74.034 MHz	H	33.3	7.7	0.0	41.0	82.2	-41.2
240.2 MHz	H	27.3	13.6	0.0	40.9	82.2	-41.3
960.39 MHz	H	16.4	25.4	0.0	41.8	82.2	-40.4
5.5526 GHz	V	59.3	39.4	41.6	57.2	82.2	-25.0
9.2518 GHz	V	53.0	44.6	40.4	57.2	82.2	-25.0
17.973 GHz	V	42.3	53.4	41.3	54.4	82.2	-27.8
5.5526 GHz	H	56.8	39.5	41.6	54.7	82.2	-27.5
13.893 GHz	H	43.5	49.0	41.1	51.4	82.2	-30.8
17.956 GHz	H	42.7	53.1	41.3	54.5	82.2	-27.7
			Channel 661				
54.52 MHz	V	40.5	8.5	0.0	49.0	82.2	-33.2
74.184 MHz	V	35.0	7.8	0.0	42.7	82.2	-39.5
998.59 MHz	V	15.1	26.3	0.0	41.4	82.2	-40.8
74.184 MHz	H	32.7	7.8	0.0	40.4	82.2	-41.8
336.02 MHz	H	24.9	16.7	0.0	41.6	82.2	-40.6
826.7 MHz	H	18.2	24.7	0.0	42.9	82.2	-39.3
5.641 GHz	V	61.4	39.5	41.6	59.3	82.2	-22.9
7.5212 GHz	V	54.0	42.6	40.9	55.7	82.2	-26.5
13.158 GHz	V	48.4	47.8	41.6	54.6	82.2	-27.6
5.641 GHz	H	52.0	39.6	41.6	50.0	82.2	-32.2
14.624 GHz	H	42.6	49.6	40.8	51.4	82.2	-30.8
17.983 GHz	H	42.9	53.3	41.3	54.8	82.2	-27.4
			Channel 810				
36.719 MHz	V	25.7	17.2	0.0	43.0	82.2	-39.3
54.52 MHz	V	40.1	8.5	0.0	48.6	82.2	-33.6
74.333 MHz	V	36.7	7.8	0.0	44.4	82.2	-37.8
74.184 MHz	H	33.9	7.8	0.0	41.6	82.2	-40.6
240.2 MHz	H	27.2	13.6	0.0	40.8	82.2	-41.4
972.41 MHz	H	15.8	26.0	0.0	41.8	82.2	-40.4
3.822 GHz	V	59.7	36.5	43.0	53.1	82.2	-29.1
9.5476 GHz	V	55.6	44.7	40.6	59.7	82.2	-22.5
17.956 GHz	V	42.8	53.3	41.3	54.8	82.2	-27.4
2.1288 GHz	H	59.6	31.3	43.2	47.6	82.2	-34.6
14.484 GHz	H	42.6	50.0	40.8	51.8	82.2	-30.4
17.983 GHz	H	42.8	53.3	41.3	54.8	82.2	-27.4

Table 3.6.3

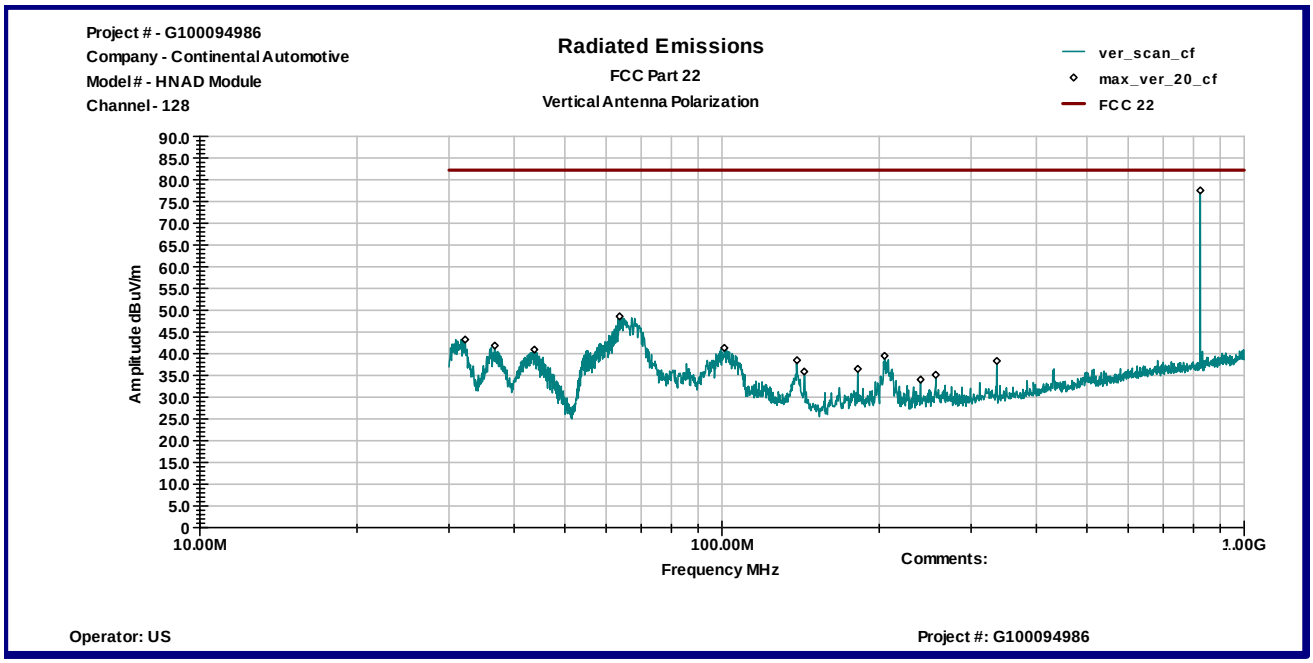
Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Ref. Limit dBµV/m	Margin dB
		Channel 4132					
62.209 MHz	V	37.9	7.0	0.0	44.9	82.2	-37.3
75.378 MHz	V	30.8	7.9	0.0	38.7	82.2	-43.5
202.91 MHz	V	26.1	11.8	0.0	37.9	82.2	-44.3
62.555 MHz	H	29.5	6.9	0.0	36.5	82.2	-45.8
209.98 MHz	H	24.9	12.2	0.0	37.1	82.2	-45.1
266.24 MHz	H	20.3	15.7	0.0	35.9	82.2	-46.3
1.6502 GHz	V	53.4	28.8	42.9	39.3	82.2	-42.9
2.4738 GHz	V	49.8	32.0	43.1	38.7	82.2	-43.5
8.6207 GHz	V	40.0	44.2	40.2	44.0	82.2	-38.2
1.6502 GHz	H	55.9	28.9	42.9	41.9	82.2	-40.3
3.6235 GHz	H	51.8	31.5	43.2	40.1	82.2	-42.1
9.3993 GHz	H	40.8	44.7	40.5	45.0	82.2	-37.2
		Channel 4183					
30.0 MHz	V	14.8	20.8	0.0	35.6	82.2	-46.7
62.486 MHz	V	37.8	6.9	0.0	44.7	82.2	-37.5
208.69 MHz	V	25.6	12.1	0.0	37.7	82.2	-44.5
30.069 MHz	H	13.9	20.7	0.0	34.6	82.2	-47.6
62.971 MHz	H	29.7	6.9	0.0	36.6	82.2	-45.6
209.66 MHz	H	25.6	12.2	0.0	37.8	82.2	-44.4
4.312 GHz	V	45.4	37.2	42.5	40.1	82.2	-42.1
6.5508 GHz	V	43.6	40.0	41.9	41.7	82.2	-40.5
9.9347 GHz	V	39.3	45.5	41.0	43.8	82.2	-38.4
4.258 GHz	H	45.6	37.3	42.6	40.3	82.2	-41.9
5.0433 GHz	H	43.4	38.3	41.6	40.1	82.2	-42.1
9.7412 GHz	H	39.6	45.2	40.8	44.0	82.2	-38.2
		Channel 4233					
36.026 MHz	V	18.0	17.6	0.0	35.6	82.2	-46.6
62.139 MHz	V	37.6	7.0	0.0	44.6	82.2	-37.6
202.58 MHz	V	25.2	11.8	0.0	37.0	82.2	-45.2
31.732 MHz	H	15.3	19.8	0.0	35.1	82.2	-47.1
62.417 MHz	H	30.0	7.0	0.0	37.0	82.2	-45.3
209.34 MHz	H	24.0	12.2	0.0	36.2	82.2	-46.0
1.6953 GHz	V	52.5	29.0	42.9	38.6	82.2	-43.6
3.781 GHz	V	46.5	36.4	43.1	39.8	82.2	-42.4
9.8965 GHz	V	40.0	45.4	40.9	44.4	82.2	-37.8
1.6953 GHz	H	53.1	29.2	42.9	39.4	82.2	-42.8
2.467 GHz	H	55.9	32.2	43.1	45.0	82.2	-37.2
8.8952 GHz	H	39.6	44.5	40.1	43.9	82.2	-38.3

Table 3.6.4

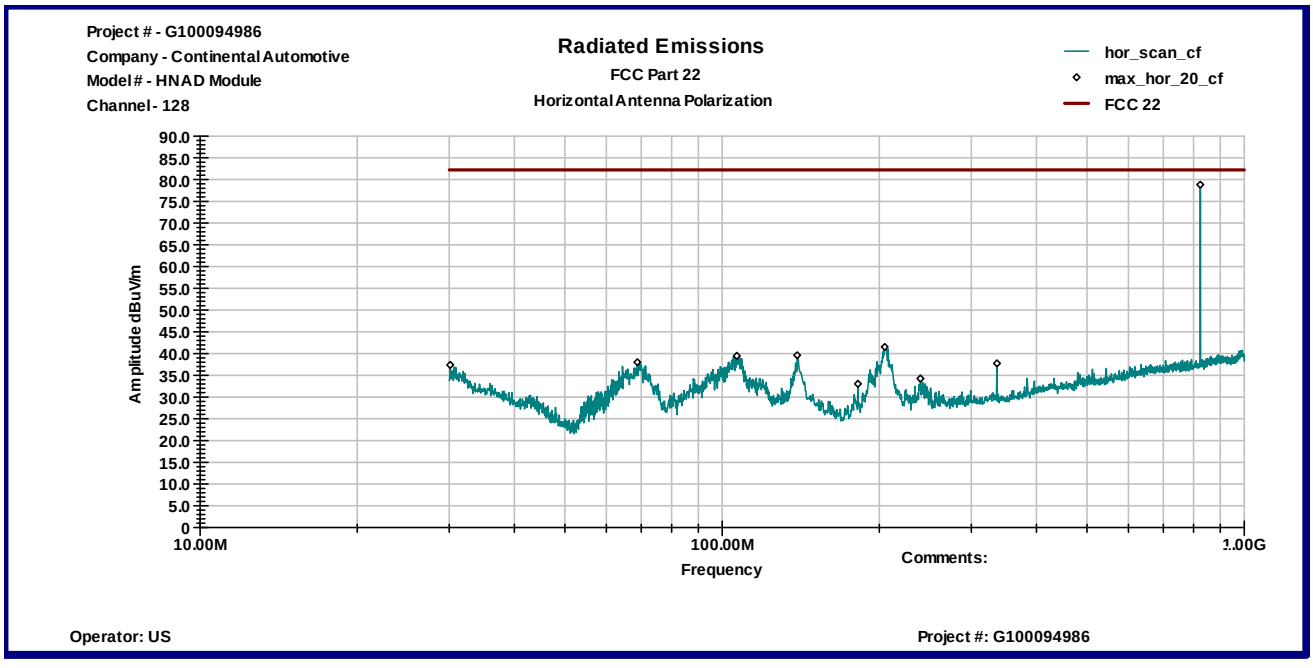
Frequency MHz	Antenna Polarity	Reading dBµV	Total C.F. dB1/m	Pre-Amp. Gain (dB)	Total at 3m dBµV/m	Ref. Limit dBµV/m	Margin dB
		Channel 9262					
30.623 MHz	V	15.5	20.4	0.0	35.9	82.2	-46.3
62.347 MHz	V	37.6	7.0	0.0	44.5	82.2	-37.7
987.98 MHz	V	14.8	26.7	0.0	41.5	82.2	-40.8
62.347 MHz	H	29.4	7.0	0.0	36.4	82.2	-45.8
266.56 MHz	H	22.9	15.7	0.0	38.5	82.2	-43.7
995.76 MHz	H	14.6	26.4	0.0	41.1	82.2	-41.1
3.7098 GHz	V	62.6	36.2	43.1	55.6	82.2	-26.6
7.4158 GHz	V	53.8	42.4	41.1	55.2	82.2	-27.0
17.925 GHz	V	42.0	53.2	41.3	53.8	82.2	-28.4
3.703 GHz	H	59.1	36.3	43.2	52.2	82.2	-30.0
14.845 GHz	H	44.0	48.7	40.8	52.0	82.2	-30.3
17.99 GHz	H	41.8	53.3	41.3	53.8	82.2	-28.4
		Channel 9400					
38.173 MHz	V	27.7	16.5	0.0	44.2	82.2	-38.0
62.555 MHz	V	38.4	6.9	0.0	45.3	82.2	-36.9
963.22 MHz	V	15.1	25.5	0.0	40.6	82.2	-41.6
62.694 MHz	H	30.6	6.9	0.0	37.5	82.2	-44.7
209.34 MHz	H	25.0	12.2	0.0	37.2	82.2	-45.0
941.29 MHz	H	15.9	25.3	0.0	41.2	82.2	-41.0
3.7574 GHz	V	66.2	36.3	43.1	59.4	82.2	-22.8
14.246 GHz	V	43.0	49.5	40.9	51.7	82.2	-30.5
17.976 GHz	V	42.4	53.4	41.3	54.5	82.2	-27.7
3.7608 GHz	H	61.3	36.5	43.1	54.7	82.2	-27.6
14.386 GHz	H	43.1	49.8	40.8	52.1	82.2	-30.1
17.935 GHz	H	42.4	53.0	41.3	54.1	82.2	-28.1
		Channel 9538					
62.209 MHz	V	38.8	7.0	0.0	45.7	82.2	-36.5
204.19 MHz	V	27.0	11.9	0.0	38.9	82.2	-43.3
975.95 MHz	V	15.0	26.2	0.0	41.2	82.2	-41.0
211.26 MHz	H	26.1	12.2	0.0	38.2	82.2	-44.0
265.92 MHz	H	23.0	15.7	0.0	38.7	82.2	-43.5
983.73 MHz	H	14.0	26.5	0.0	40.6	82.2	-41.6
3.8118 GHz	V	62.2	36.5	43.1	55.6	82.2	-26.6
7.63 GHz	V	52.8	42.7	40.8	54.7	82.2	-27.5
17.983 GHz	V	41.8	53.5	41.3	53.9	82.2	-28.3
3.8152 GHz	H	64.7	36.6	43.1	58.3	82.2	-24.0
14.546 GHz	H	43.1	49.8	40.7	52.2	82.2	-30.0
17.969 GHz	H	41.9	53.2	41.3	53.8	82.2	-28.5

Graph 3.6.1

Vertical antenna polarization

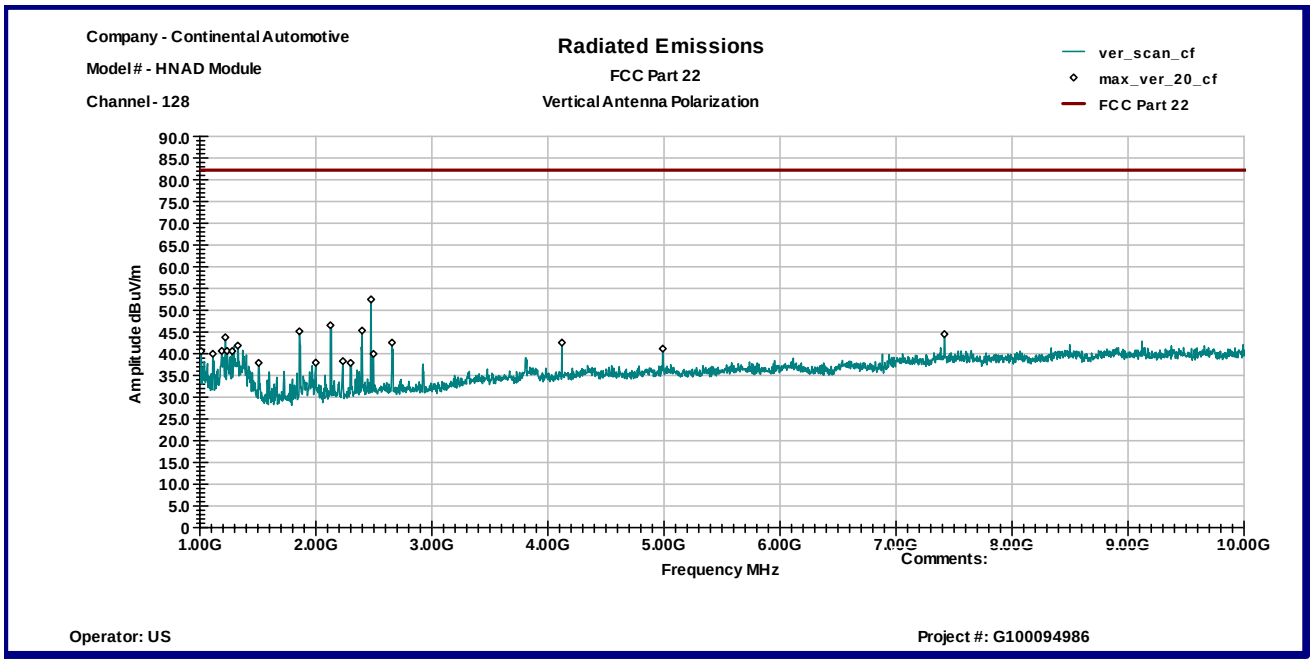


Horizontal antenna polarization

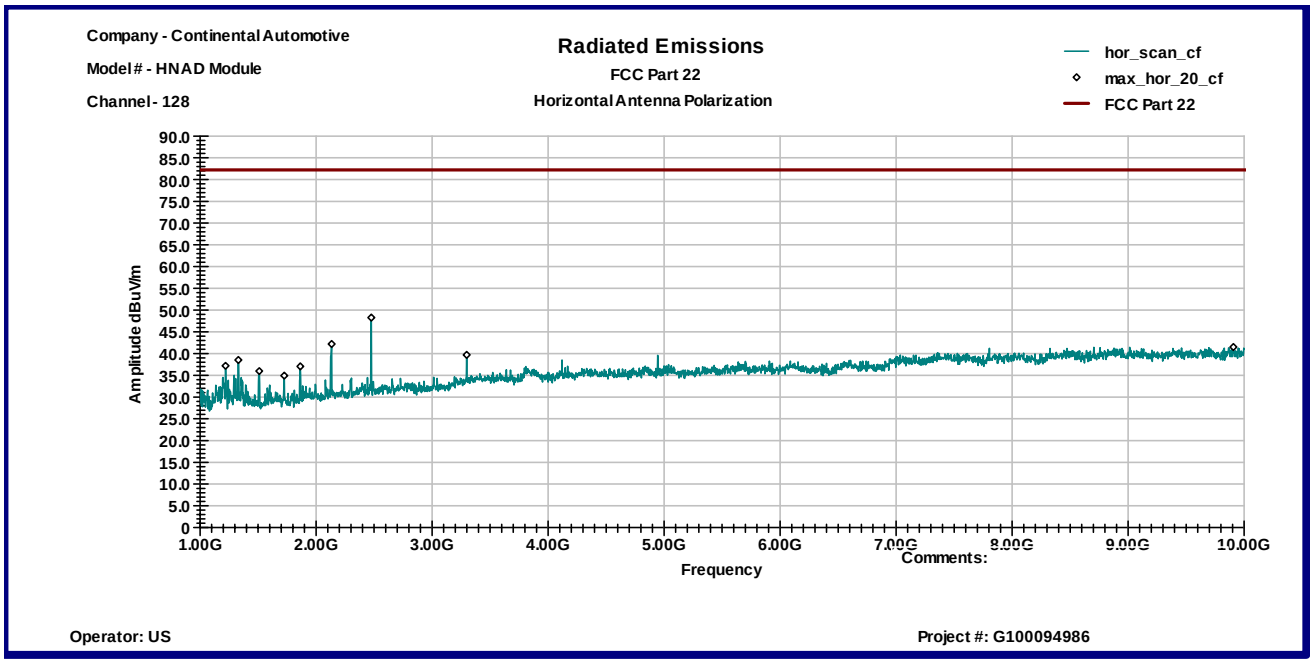


Graph 3.6.2

Vertical antenna polarization

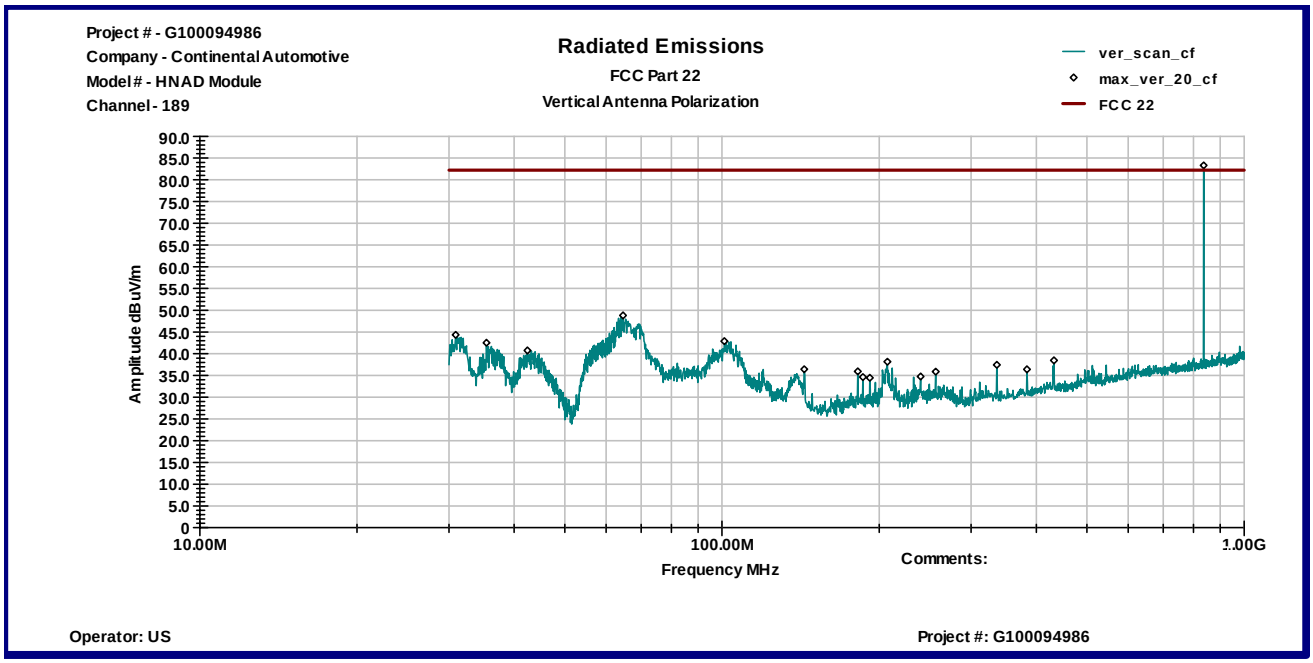


Horizontal antenna polarization

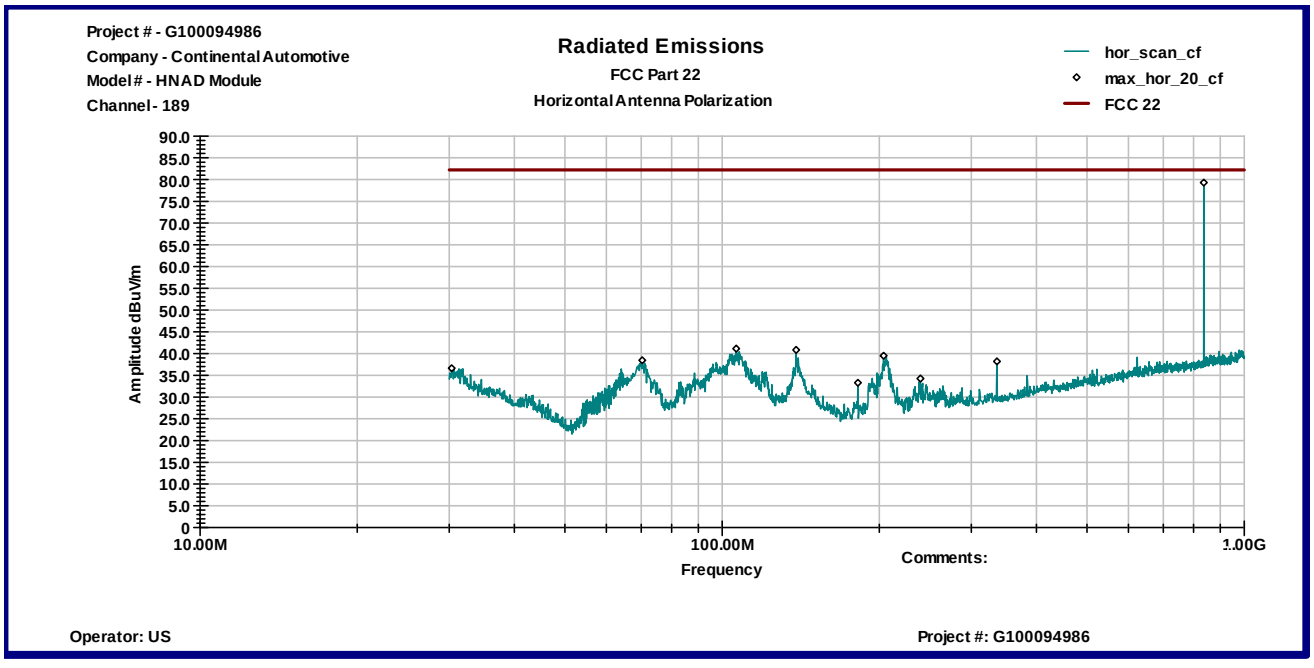


Graph 3.6.3

Vertical antenna polarization

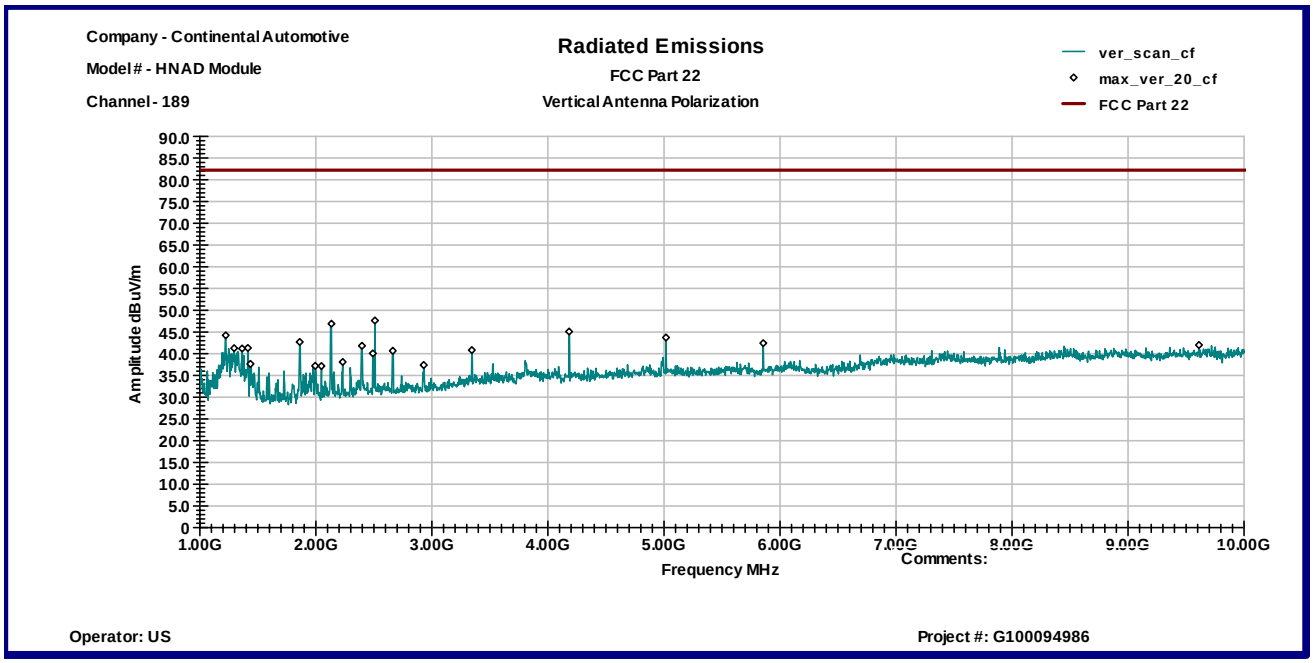


Horizontal antenna polarization

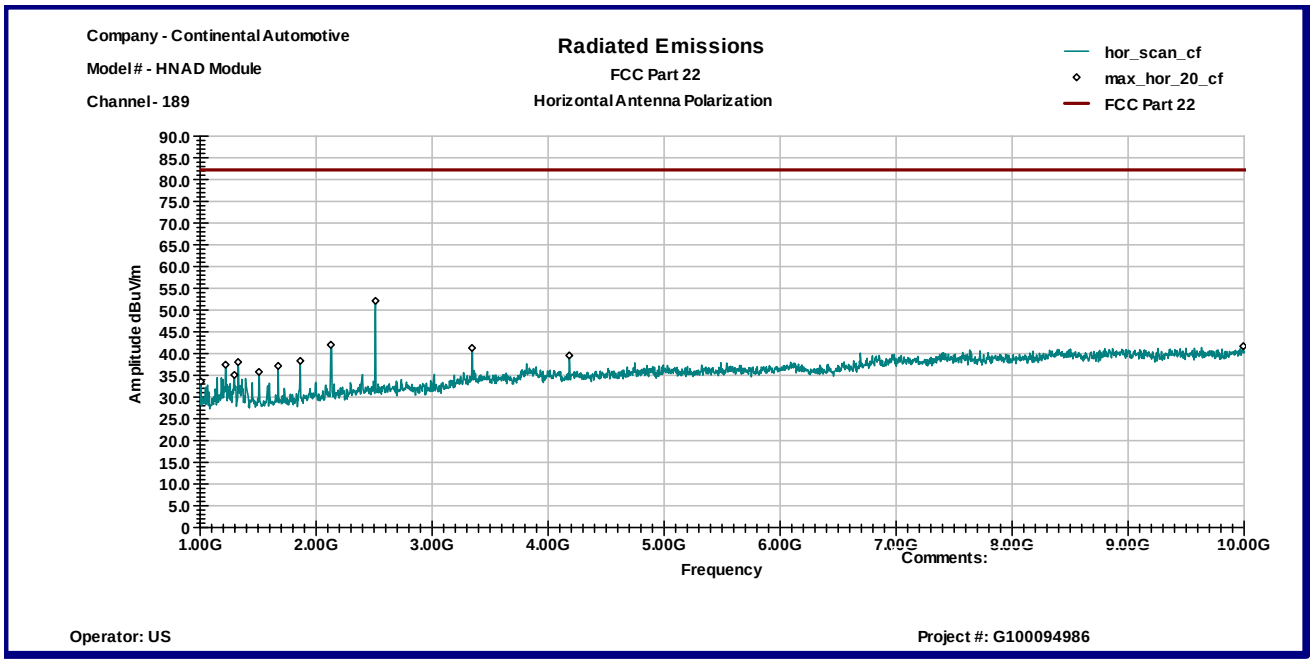


Graph 3.6.4

Vertical antenna polarization

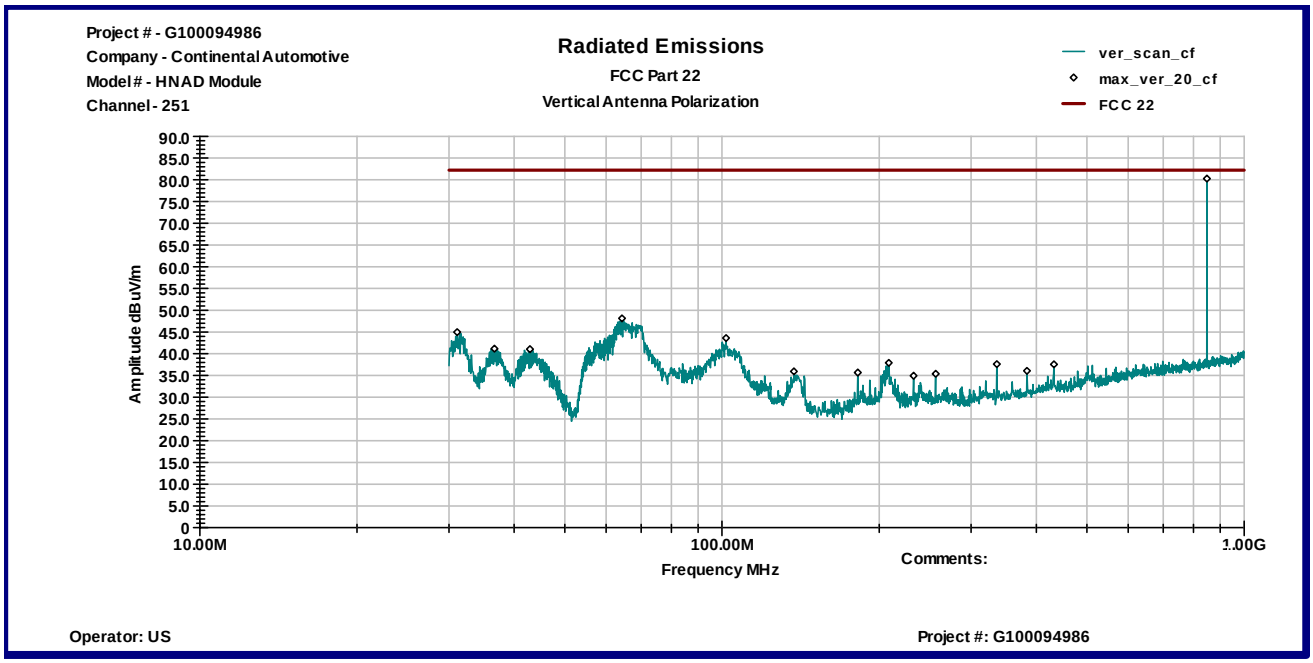


Horizontal antenna polarization

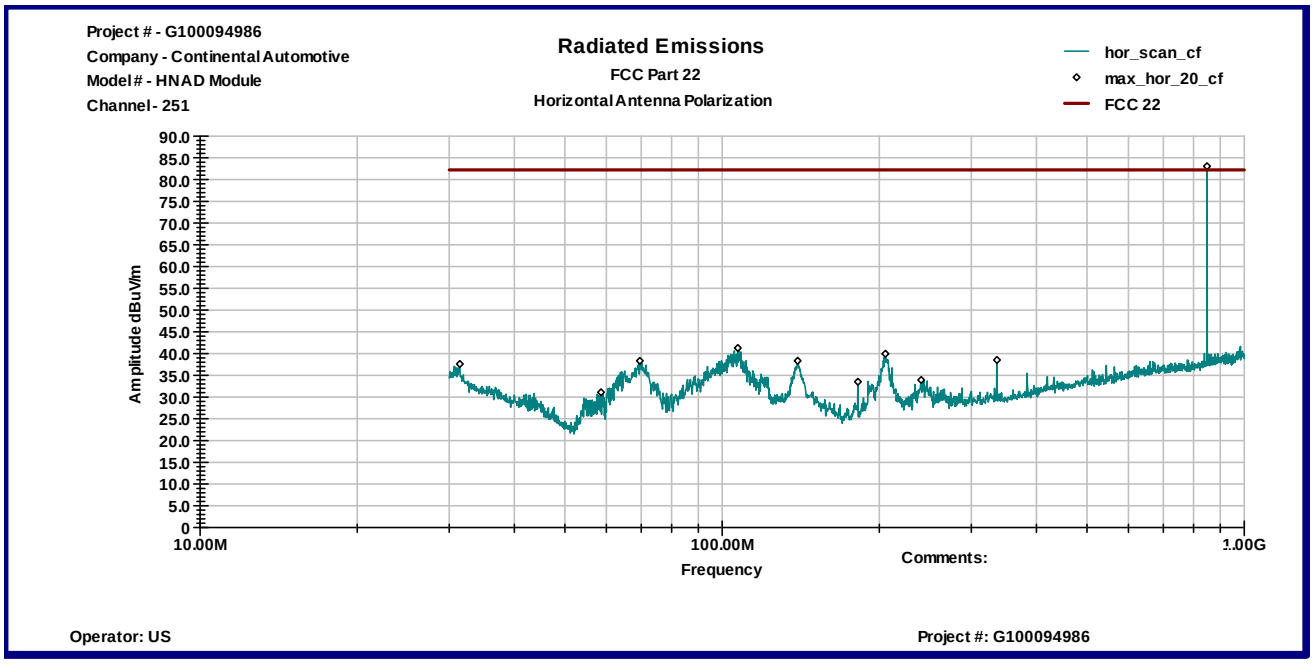


Graph 3.6.5

Vertical antenna polarization

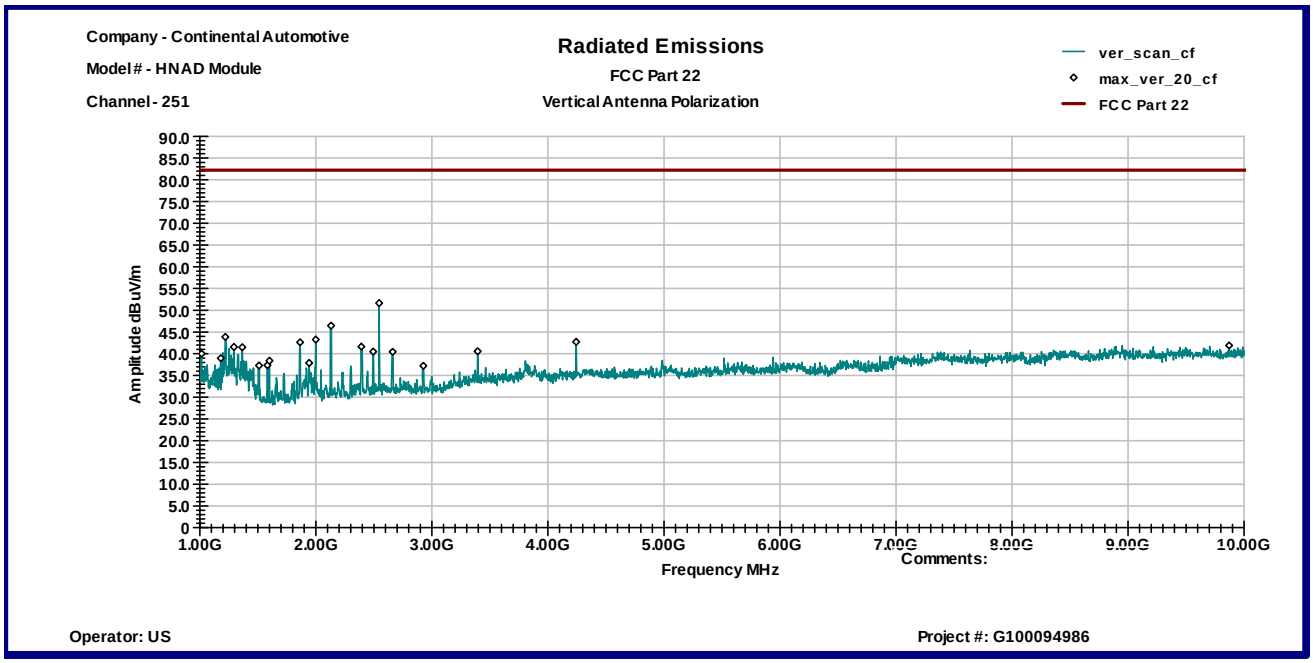


Horizontal antenna polarization

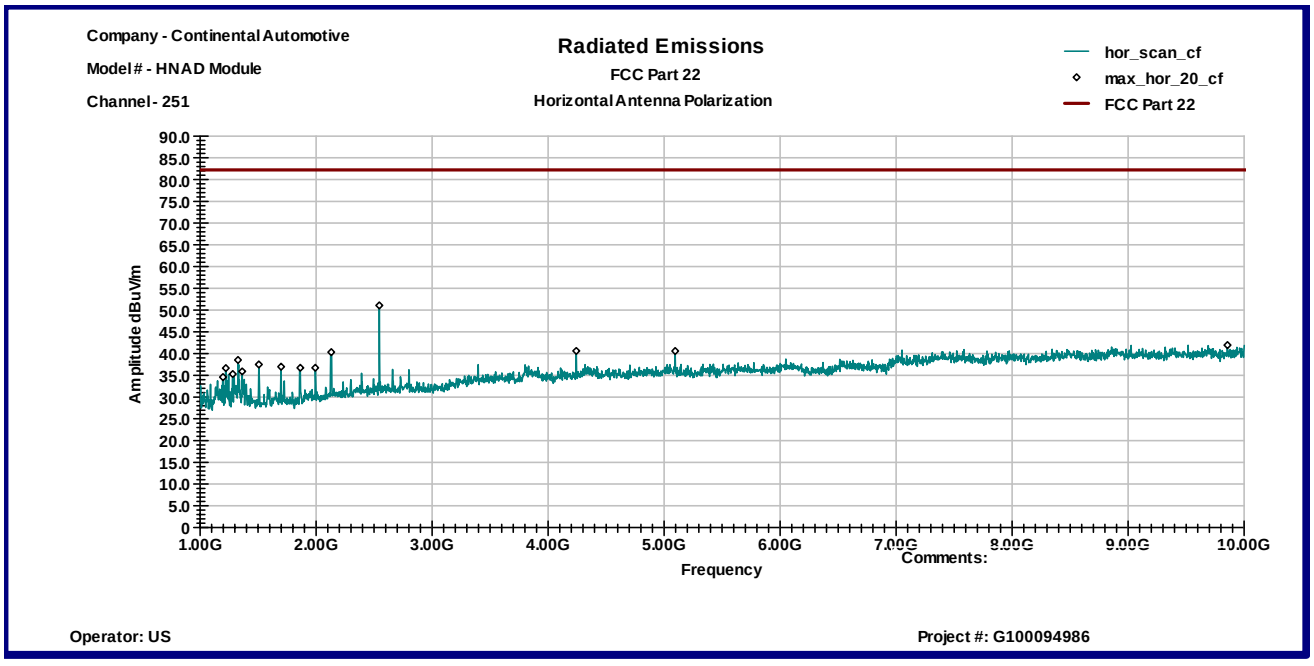


Graph 3.6.6

Vertical antenna polarization

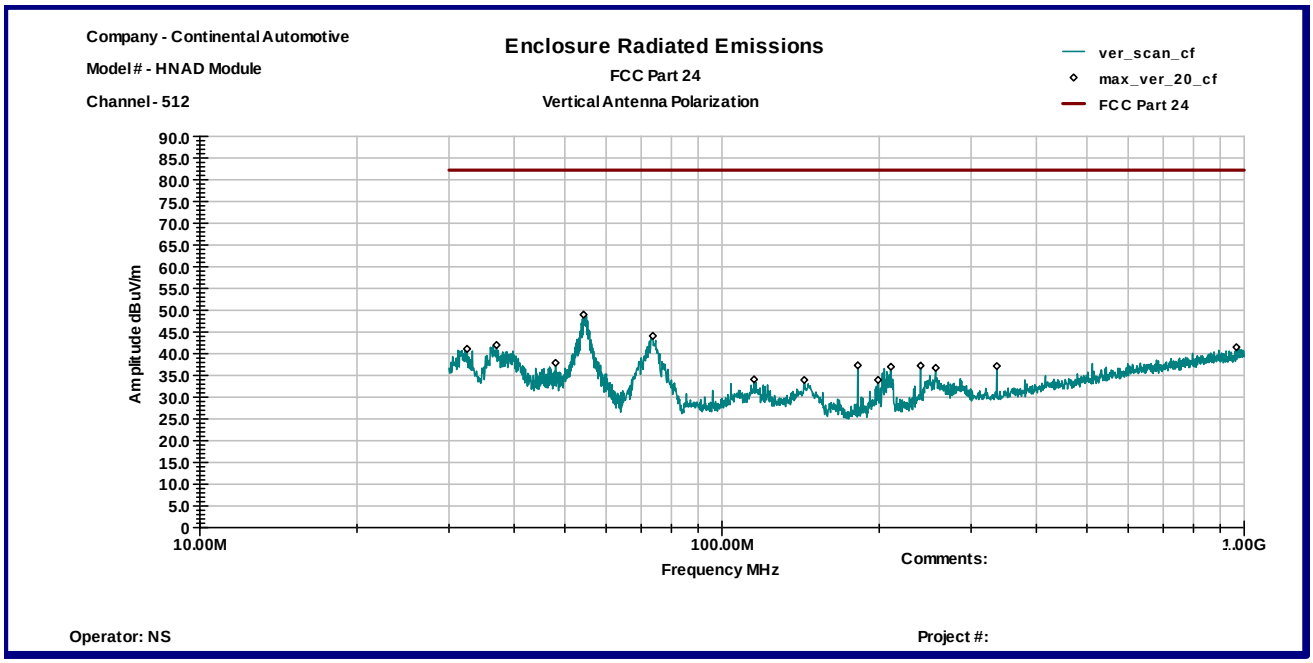


Horizontal antenna polarization

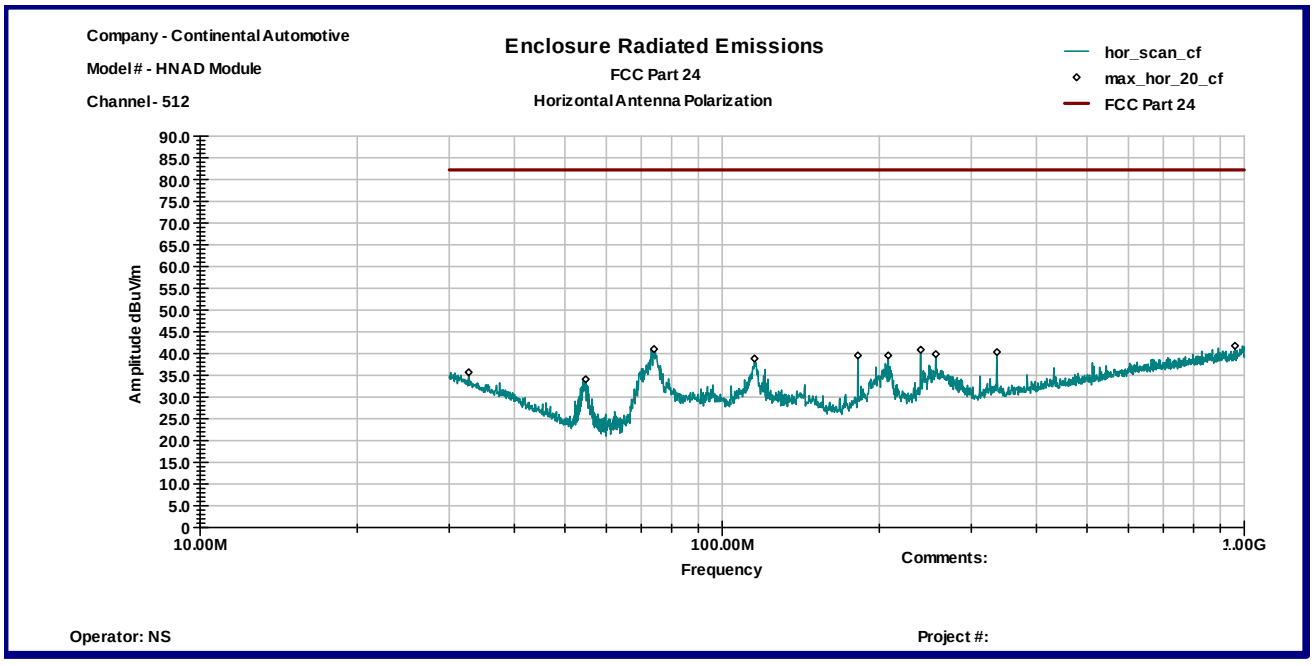


Graph 3.6.7

Vertical antenna polarization

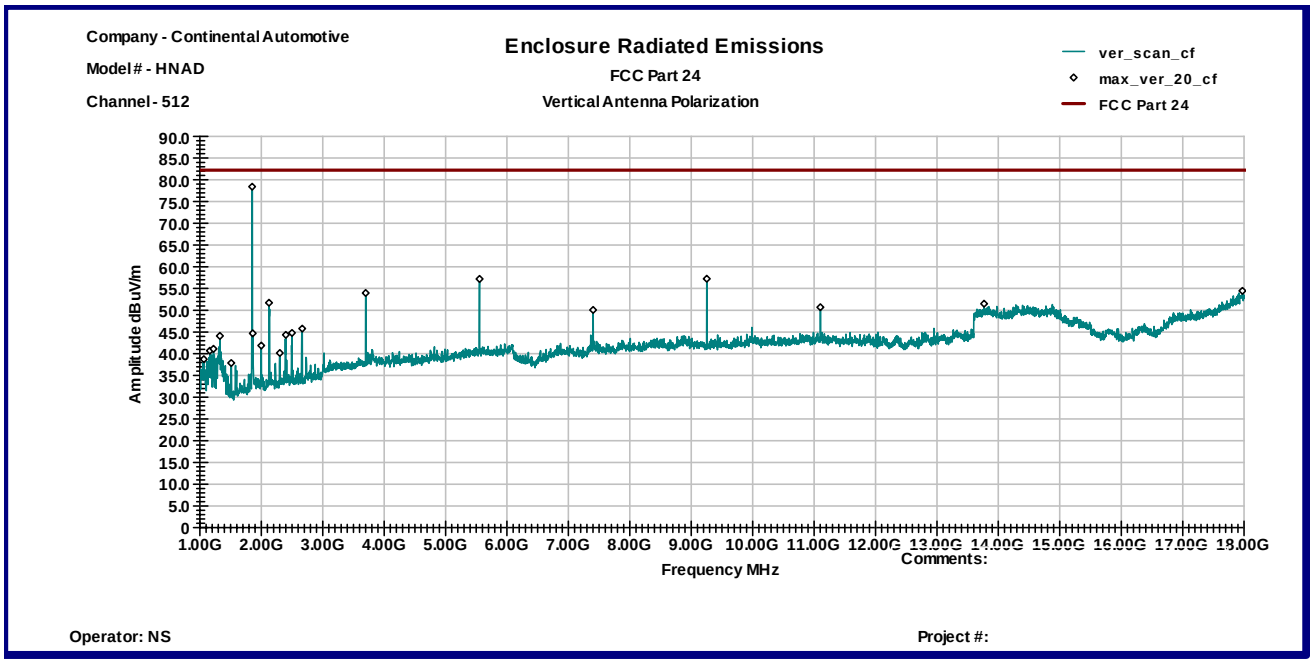


Horizontal antenna polarization

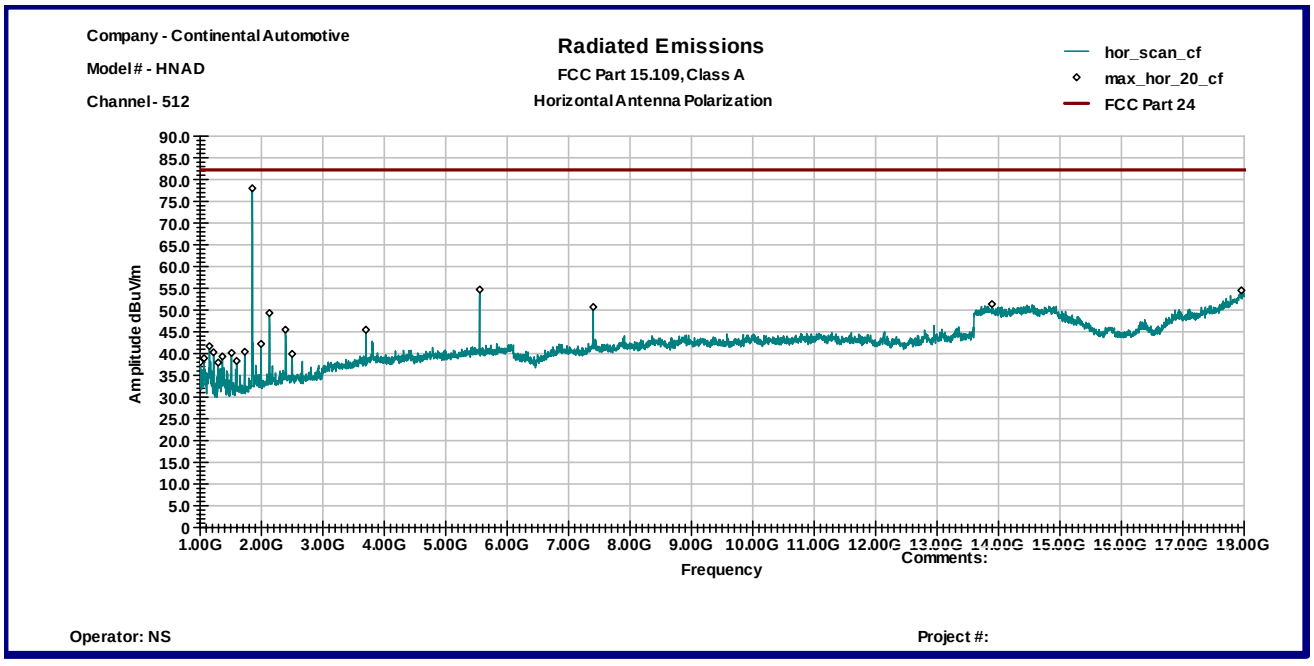


Graph 3.6.8

Vertical antenna polarization

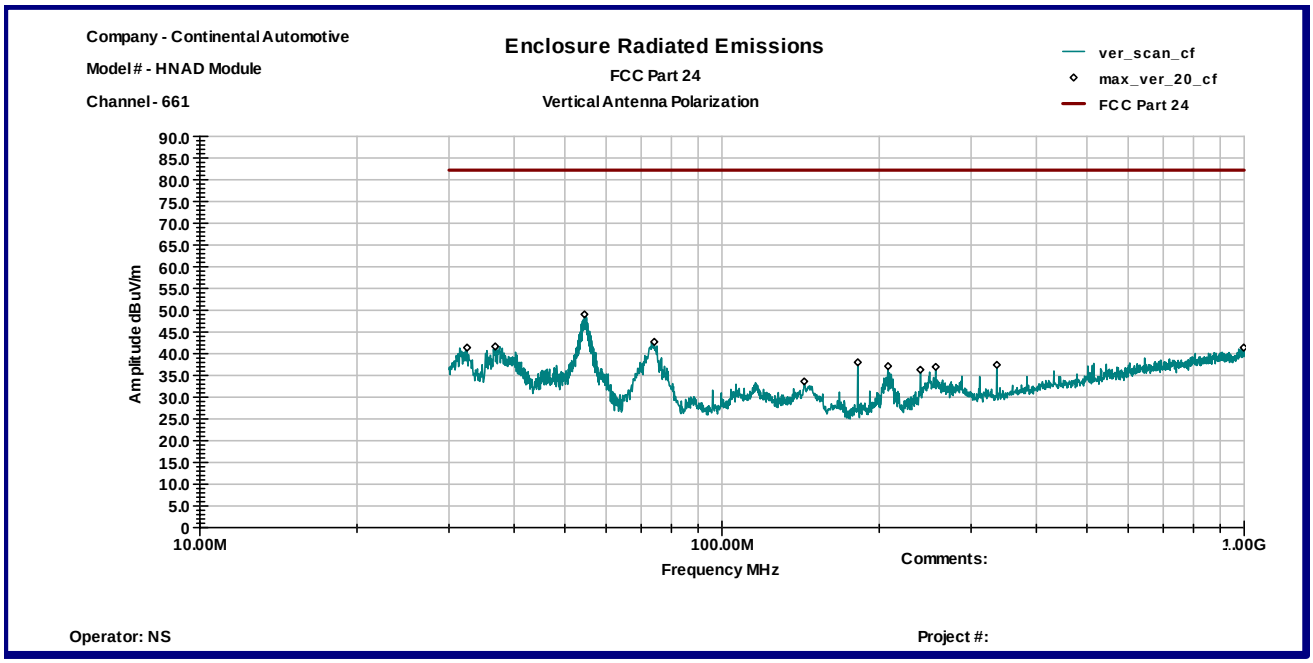


Horizontal antenna polarization

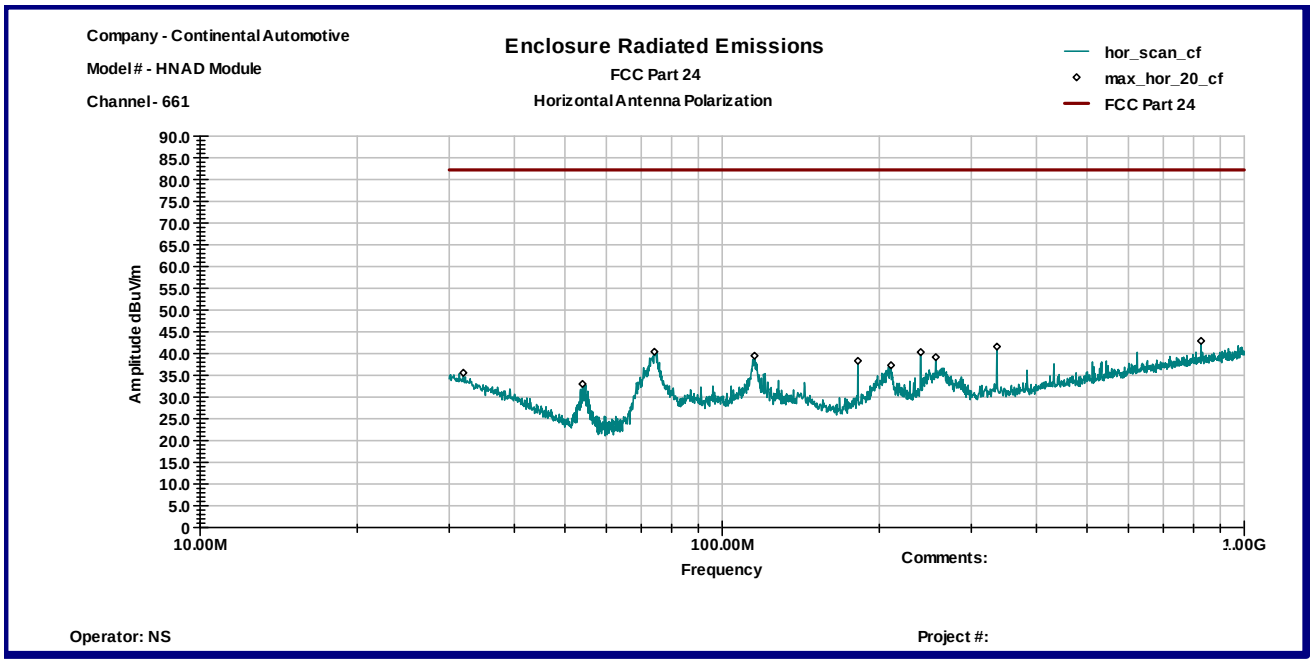


Graph 3.6.9

Vertical antenna polarization

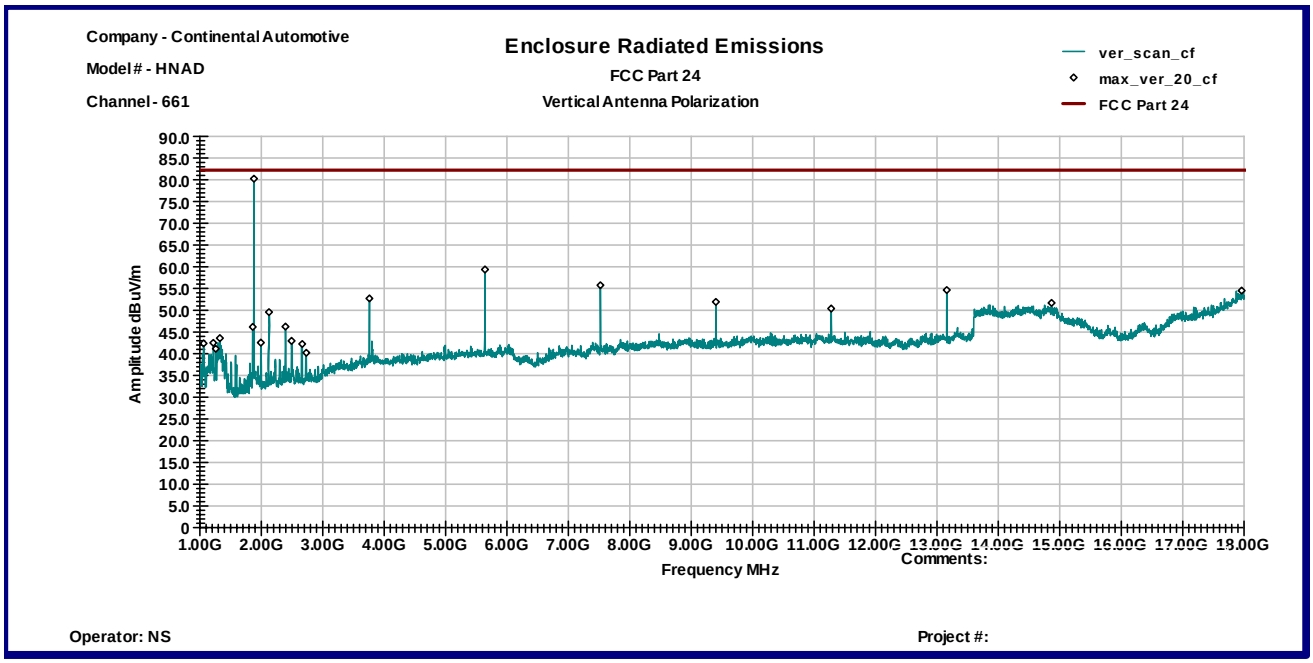


Horizontal antenna polarization

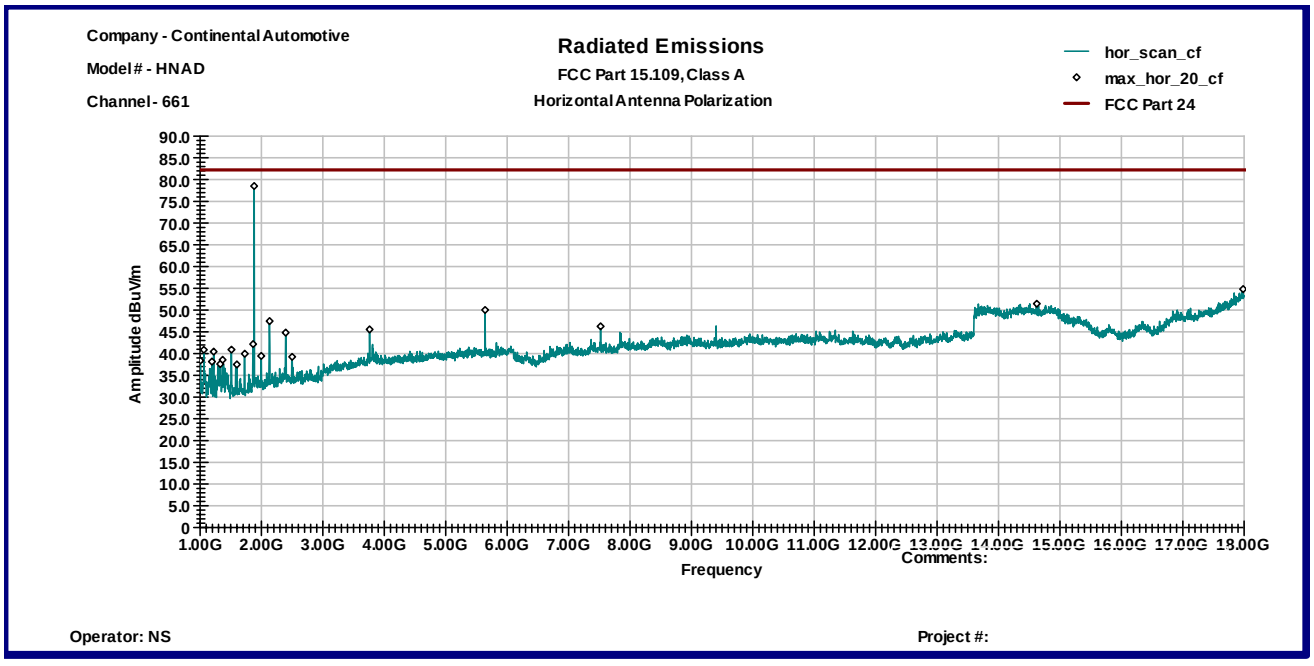


Graph 3.6.10

Vertical antenna polarization

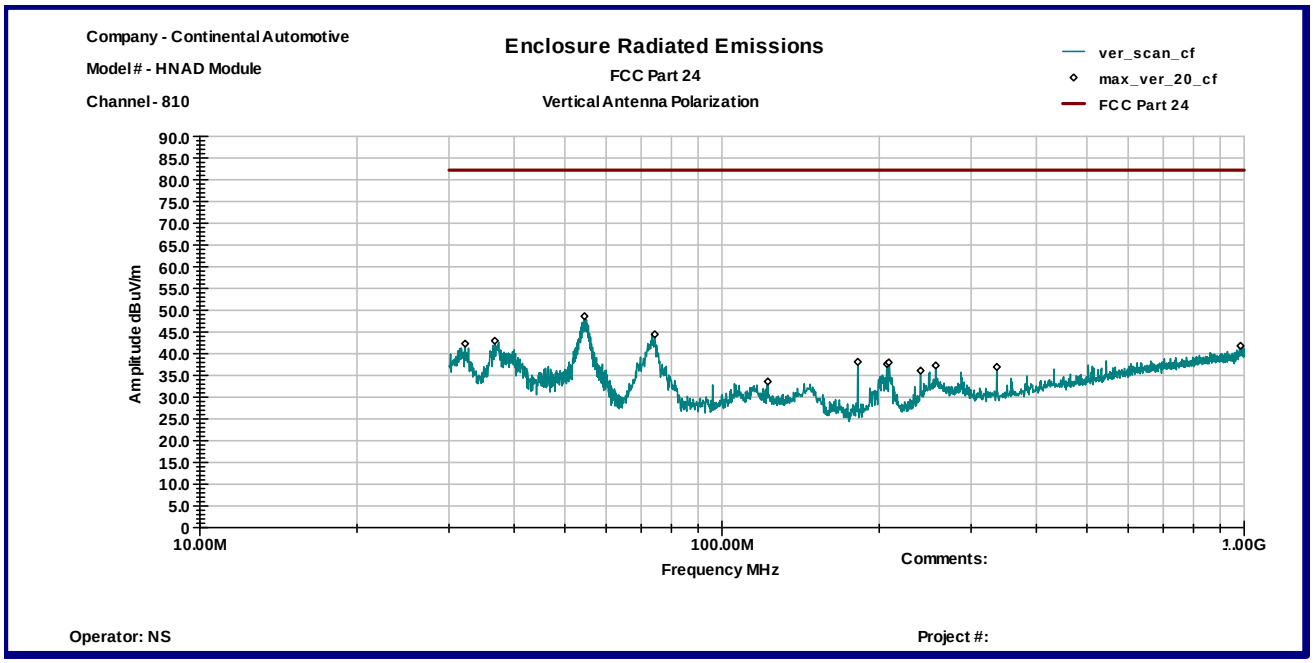


Horizontal antenna polarization

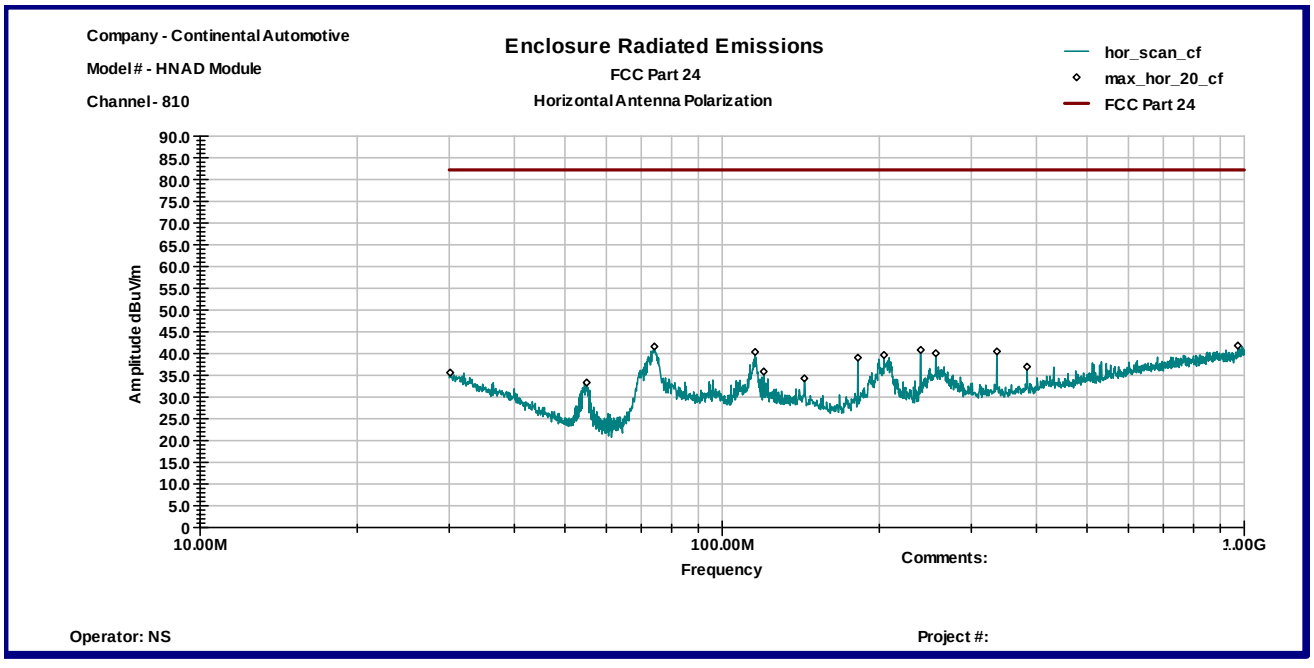


Graph 3.6.11

Vertical antenna polarization

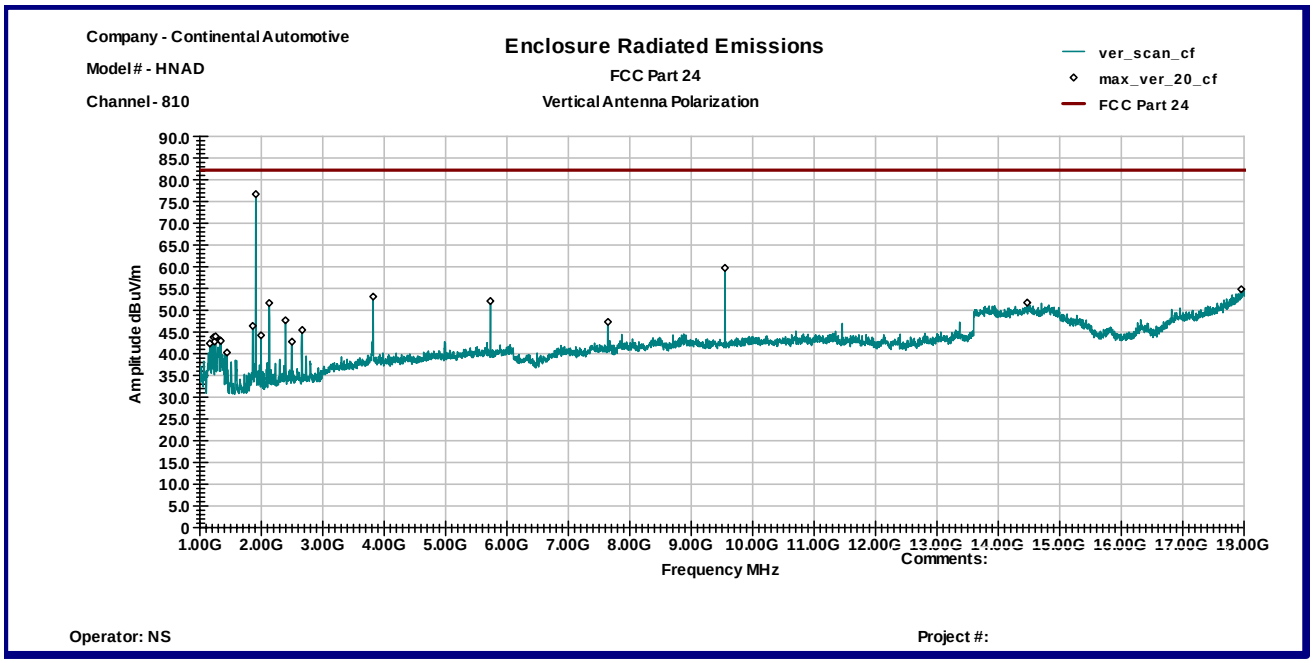


Horizontal antenna polarization

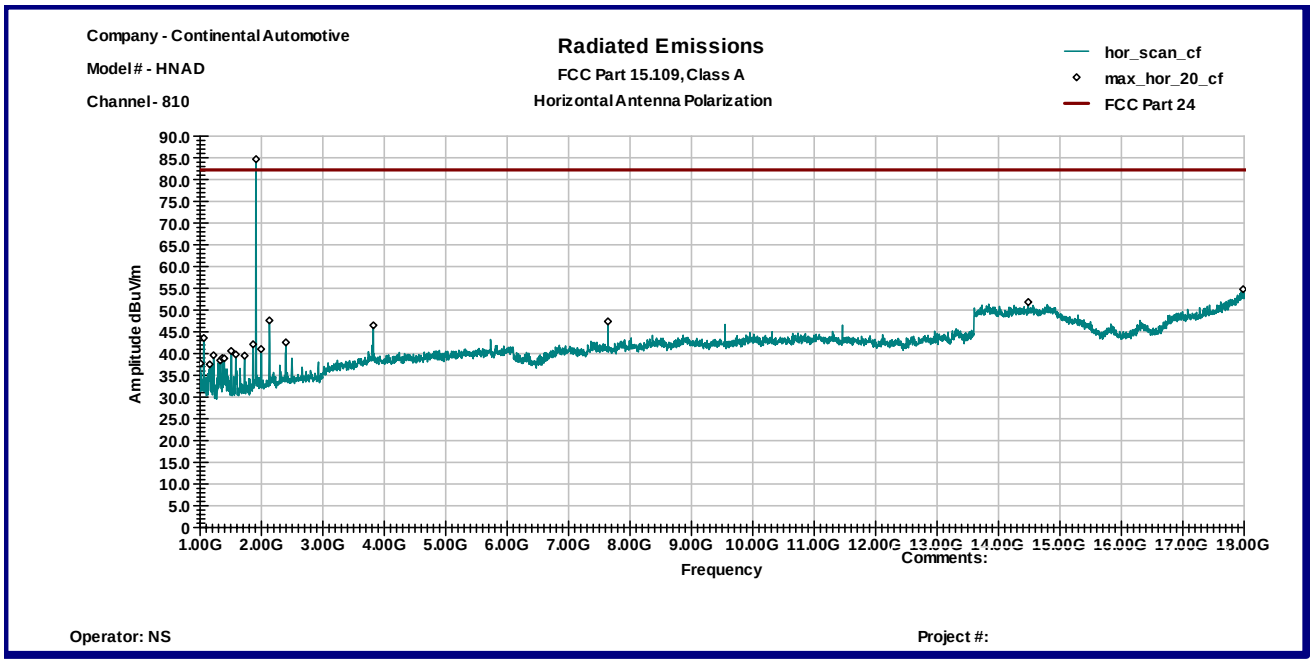


Graph 3.6.12

Vertical antenna polarization

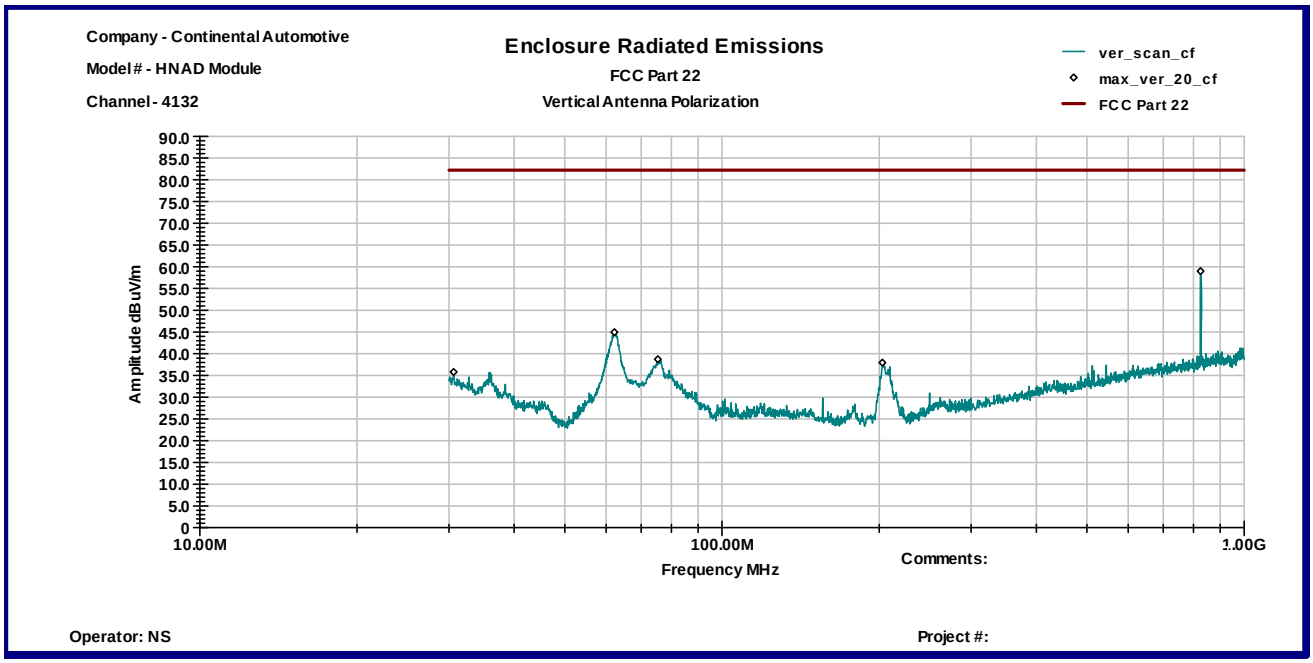


Horizontal antenna polarization

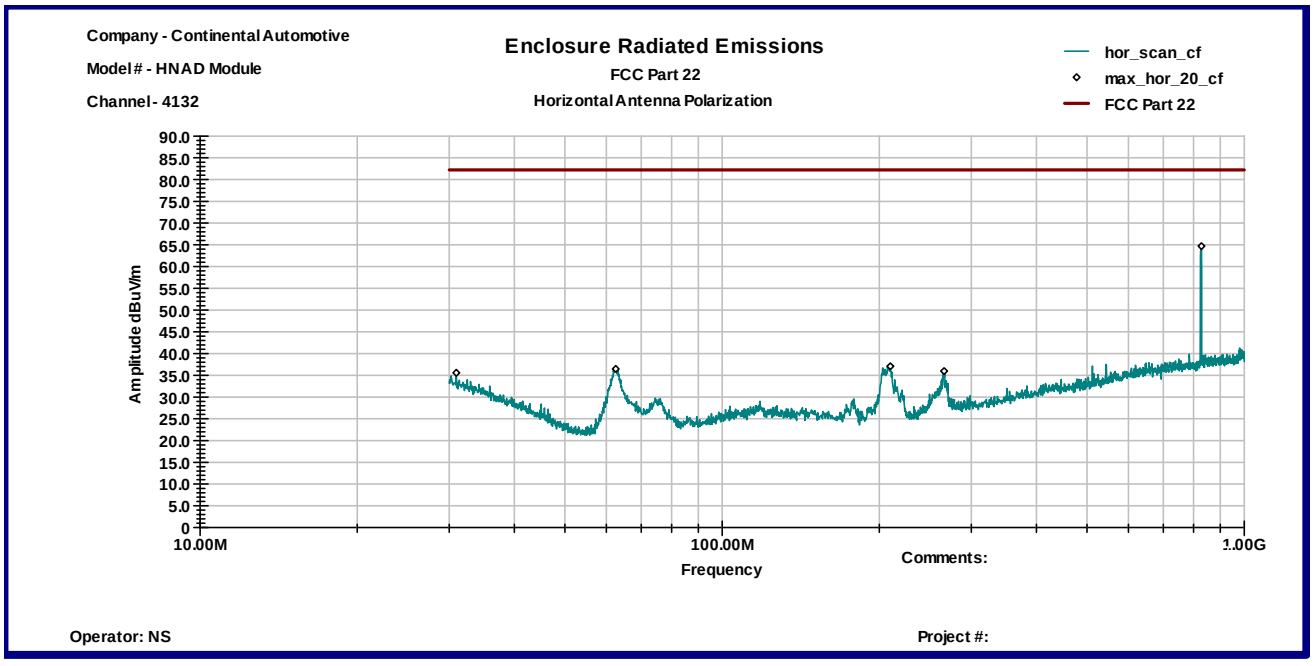


Graph 3.6.13

Vertical antenna polarization

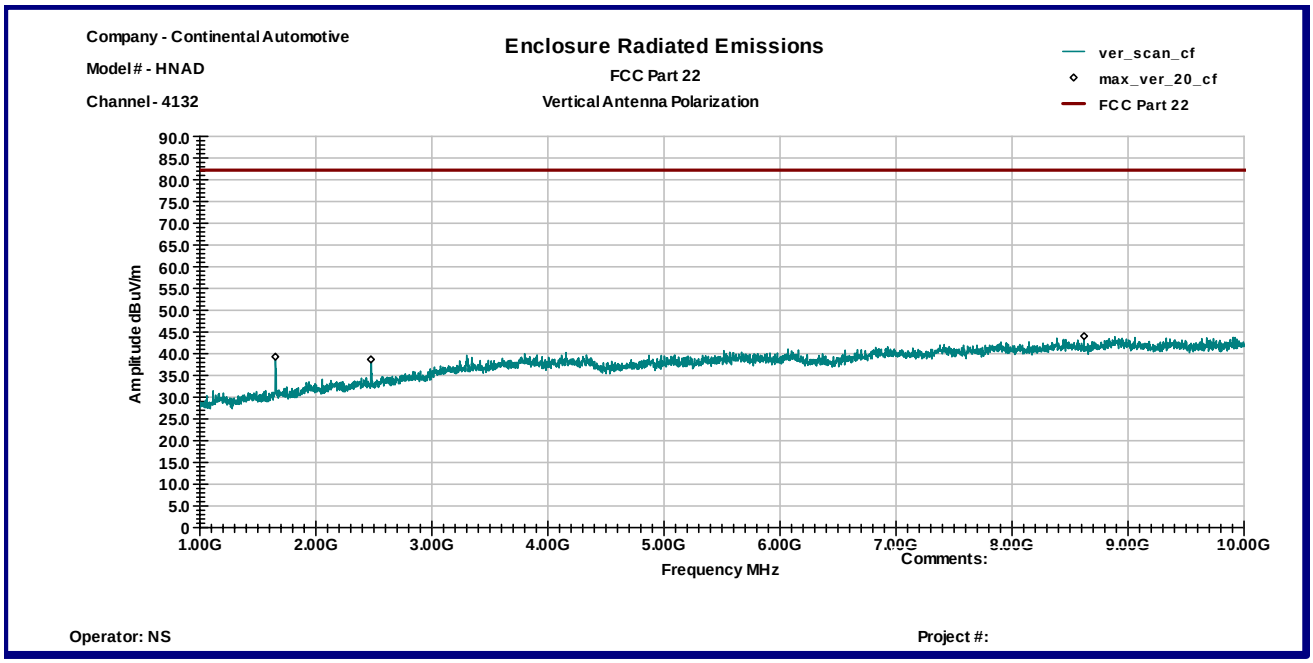


Horizontal antenna polarization

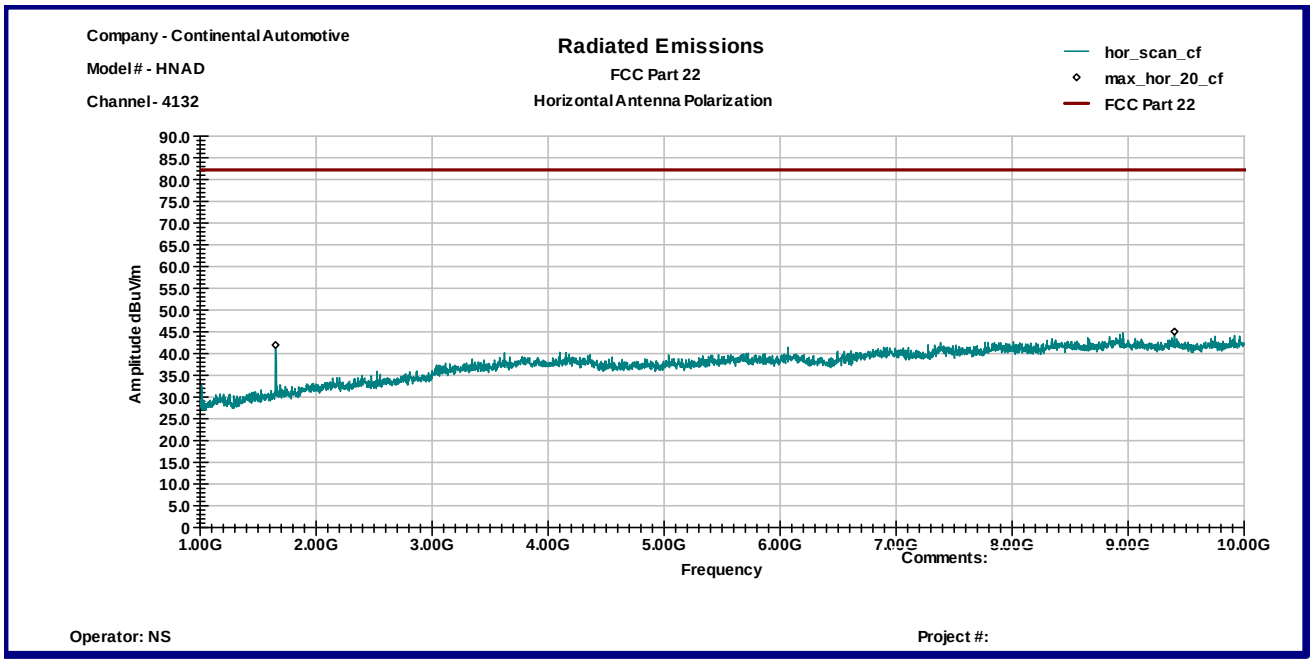


Graph 3.6.14

Vertical antenna polarization

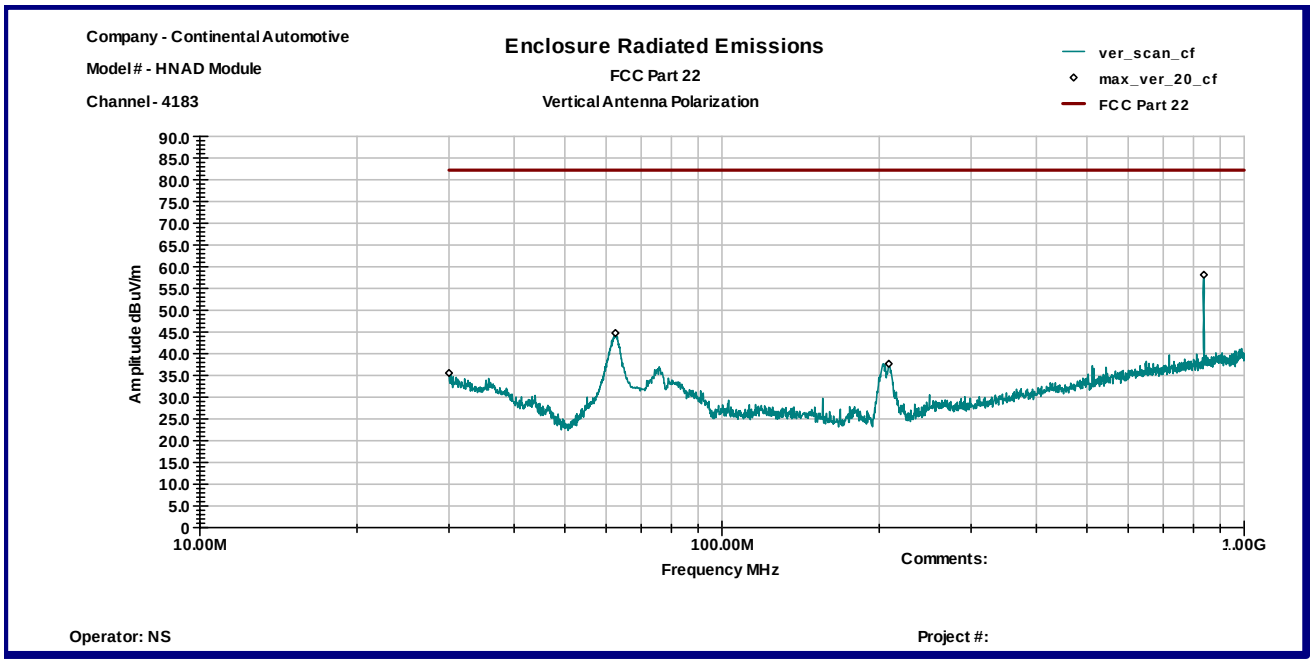


Horizontal antenna polarization

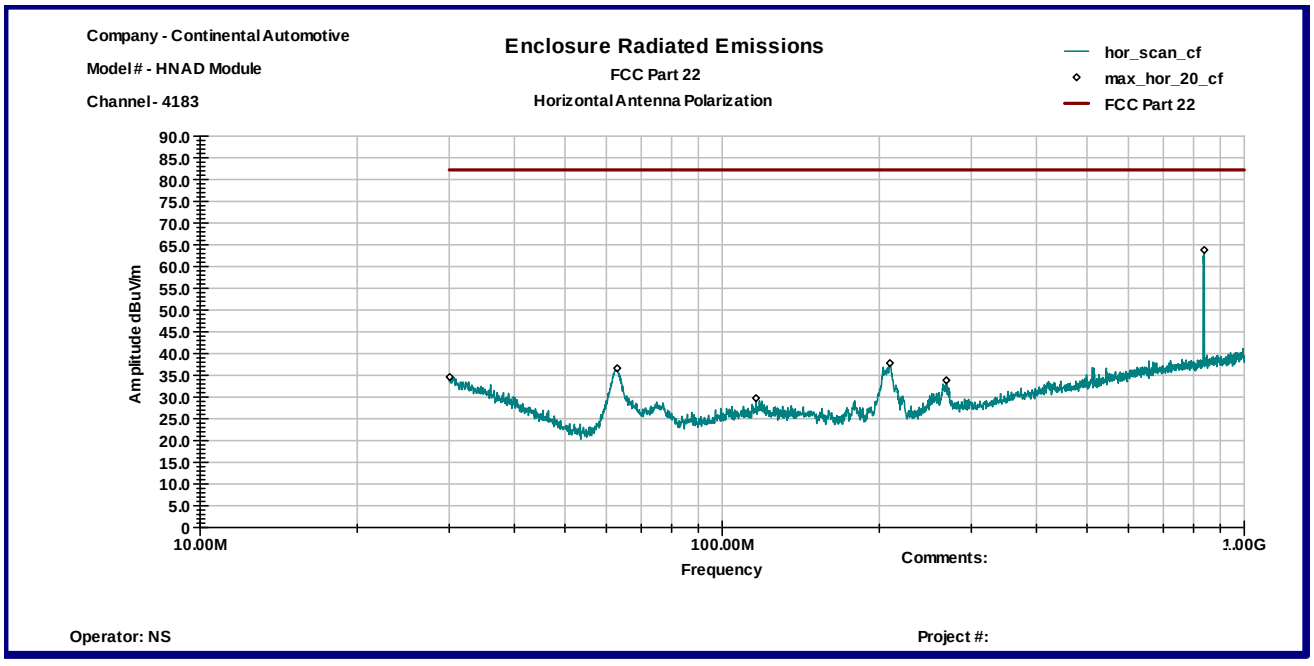


Graph 3.6.15

Vertical antenna polarization

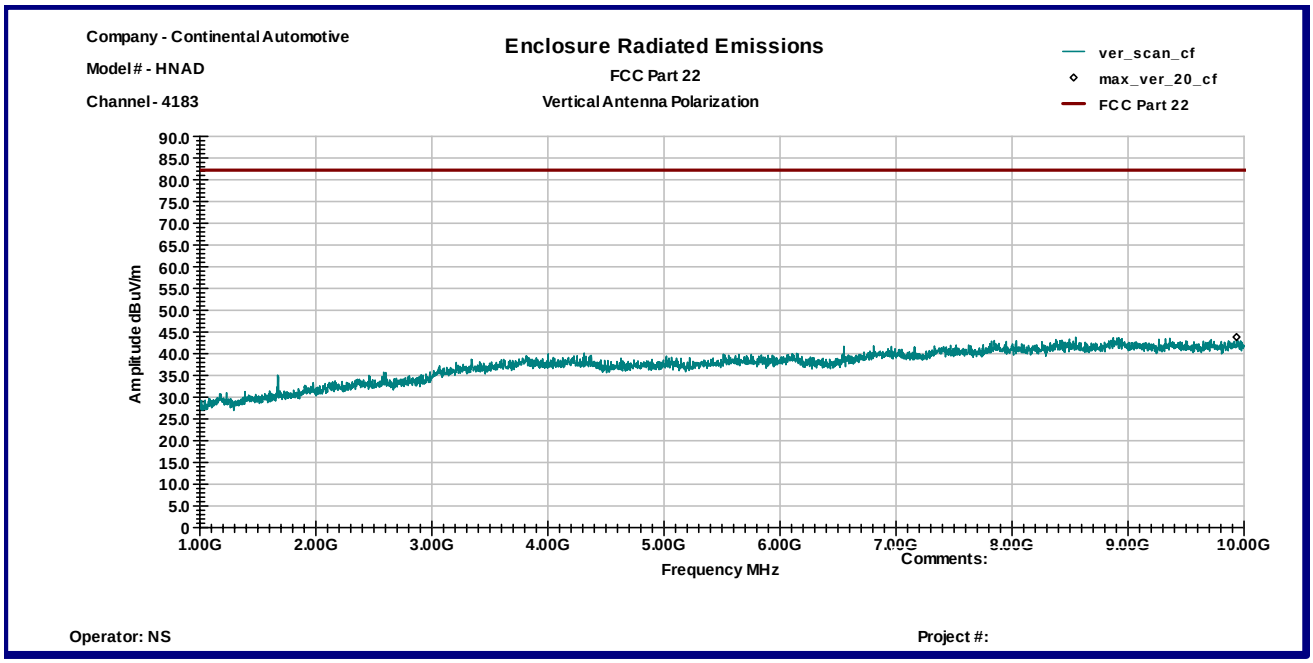


Horizontal antenna polarization

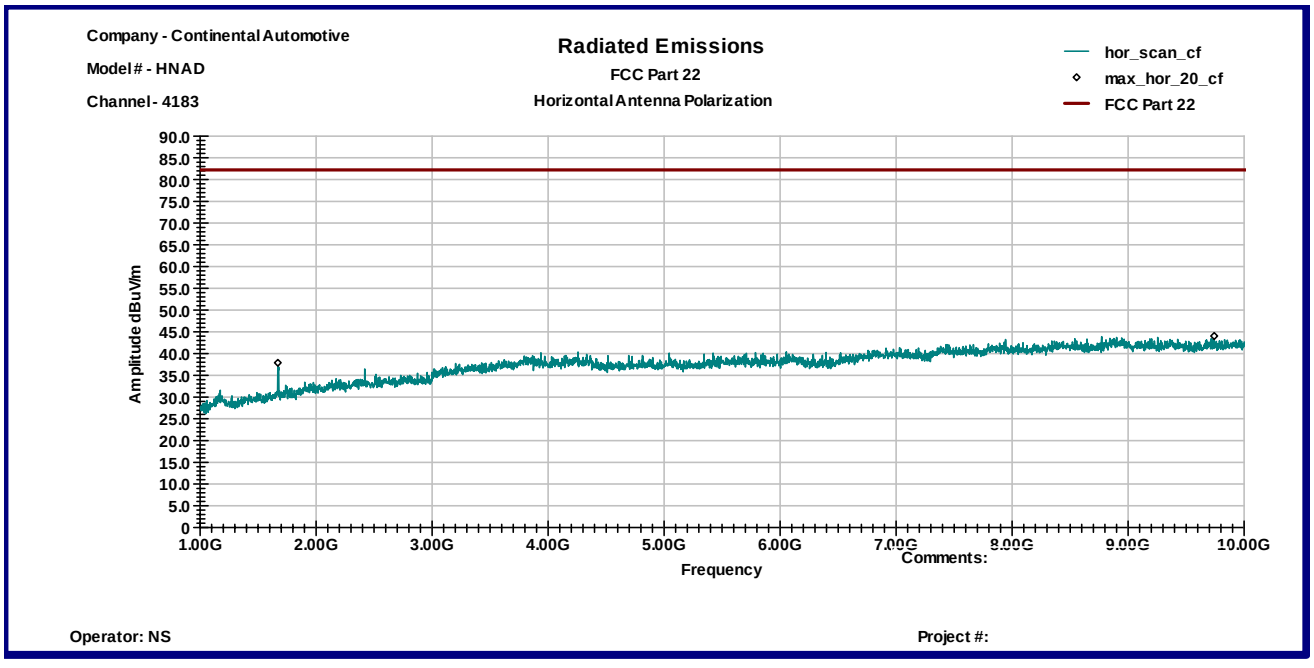


Graph 3.6.16

Vertical antenna polarization

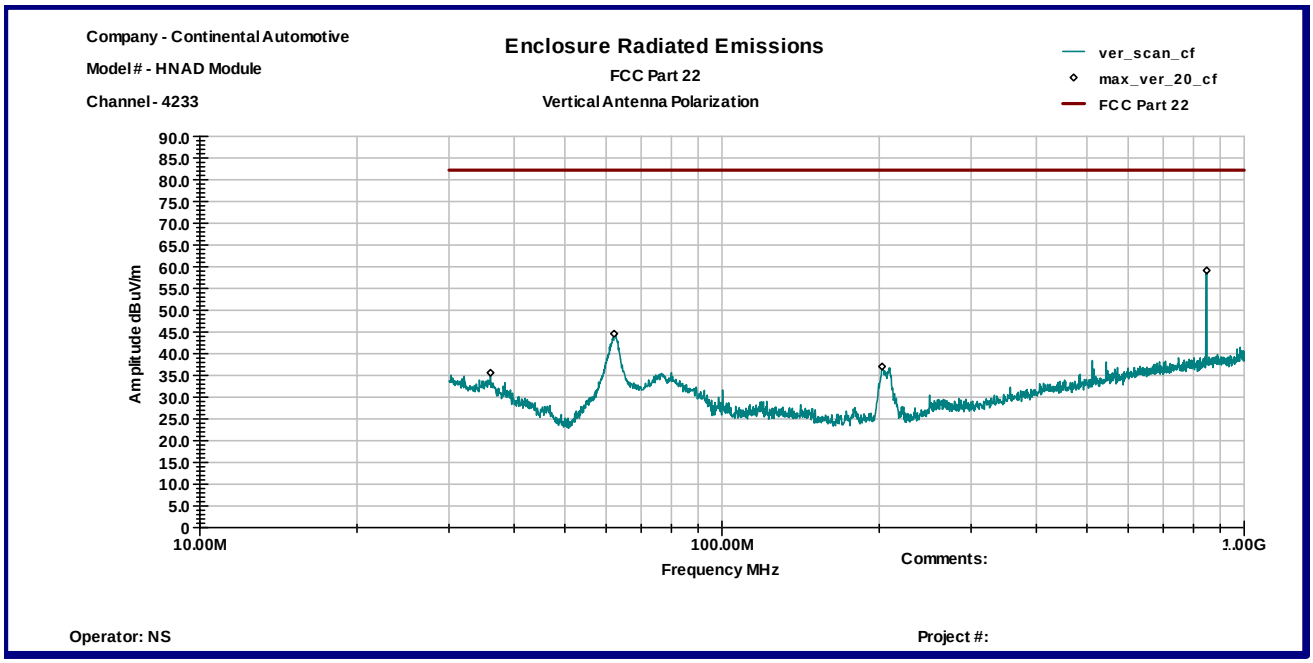


Horizontal antenna polarization

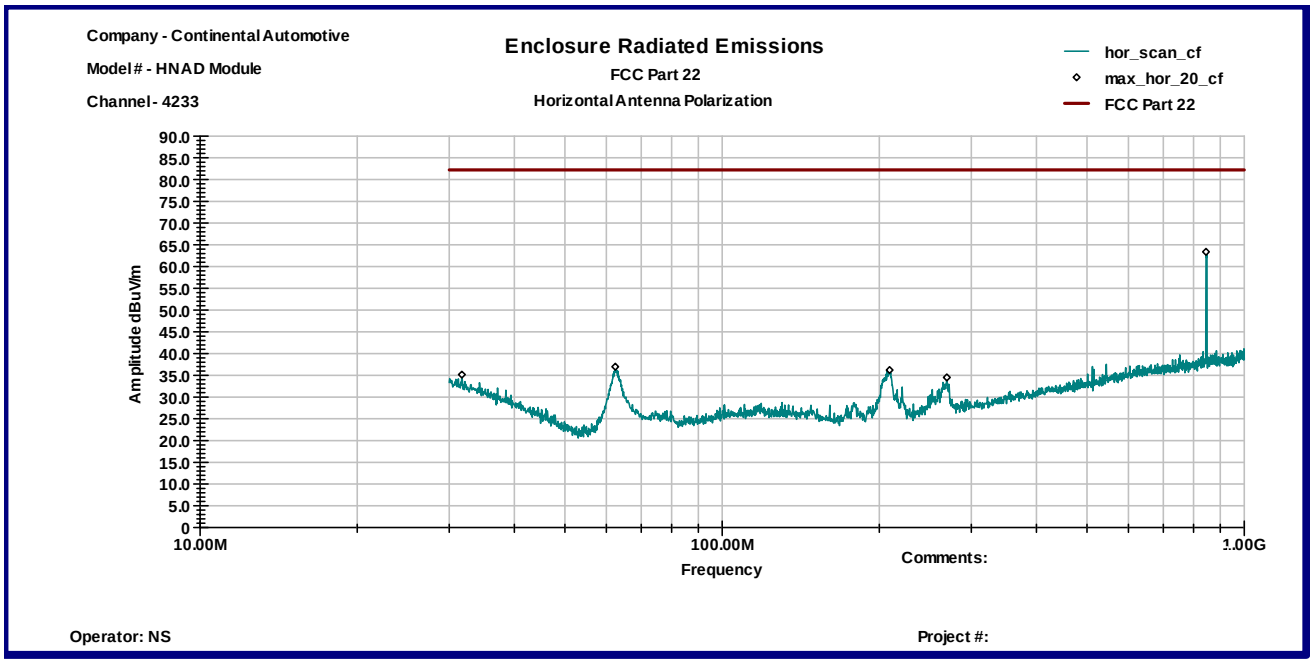


Graph 3.6.17

Vertical antenna polarization

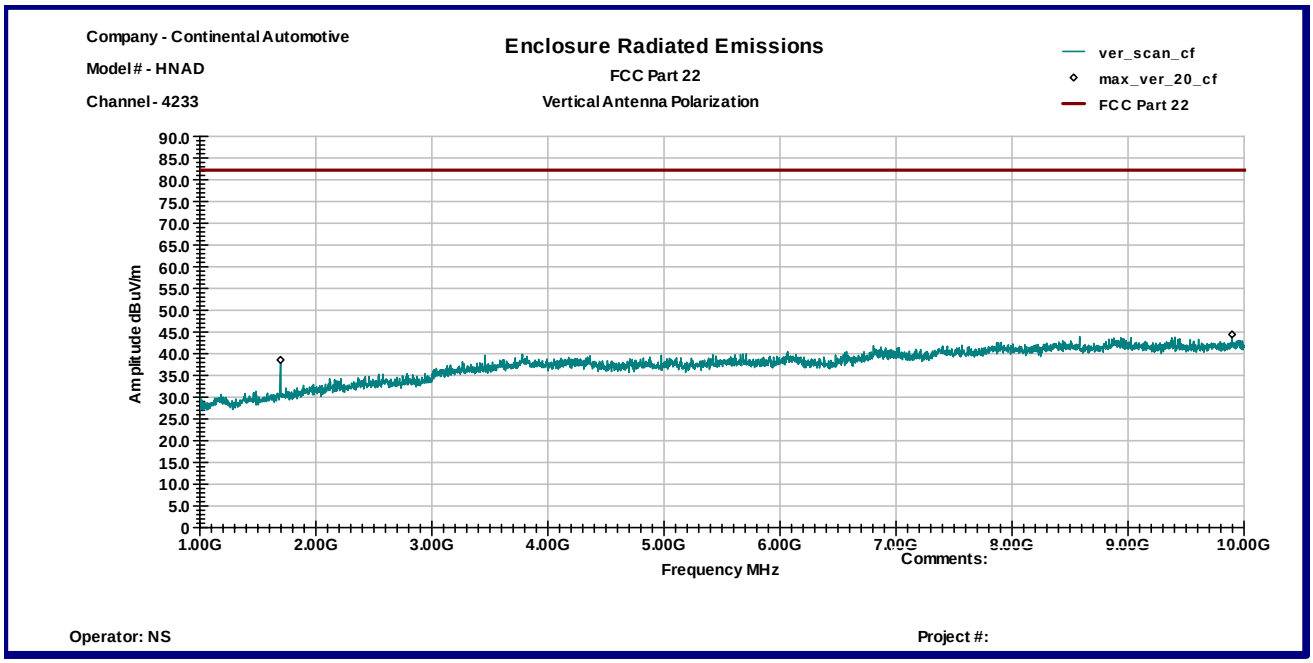


Horizontal antenna polarization

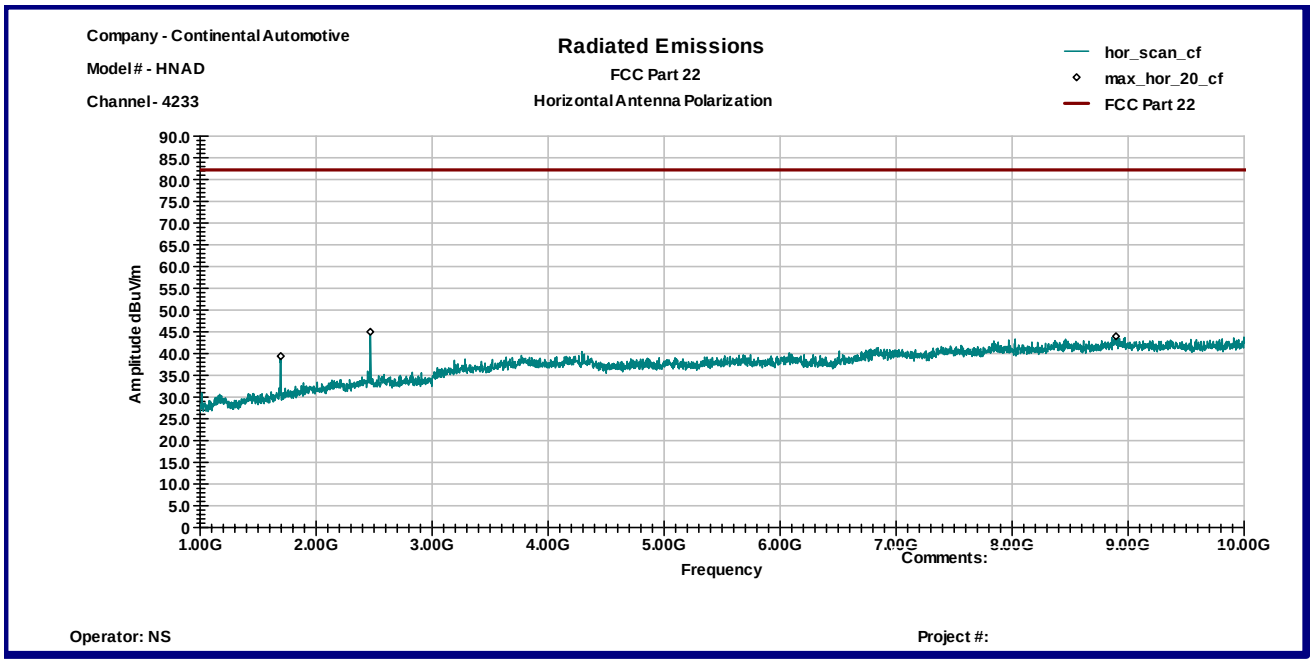


Graph 3.6.18

Vertical antenna polarization

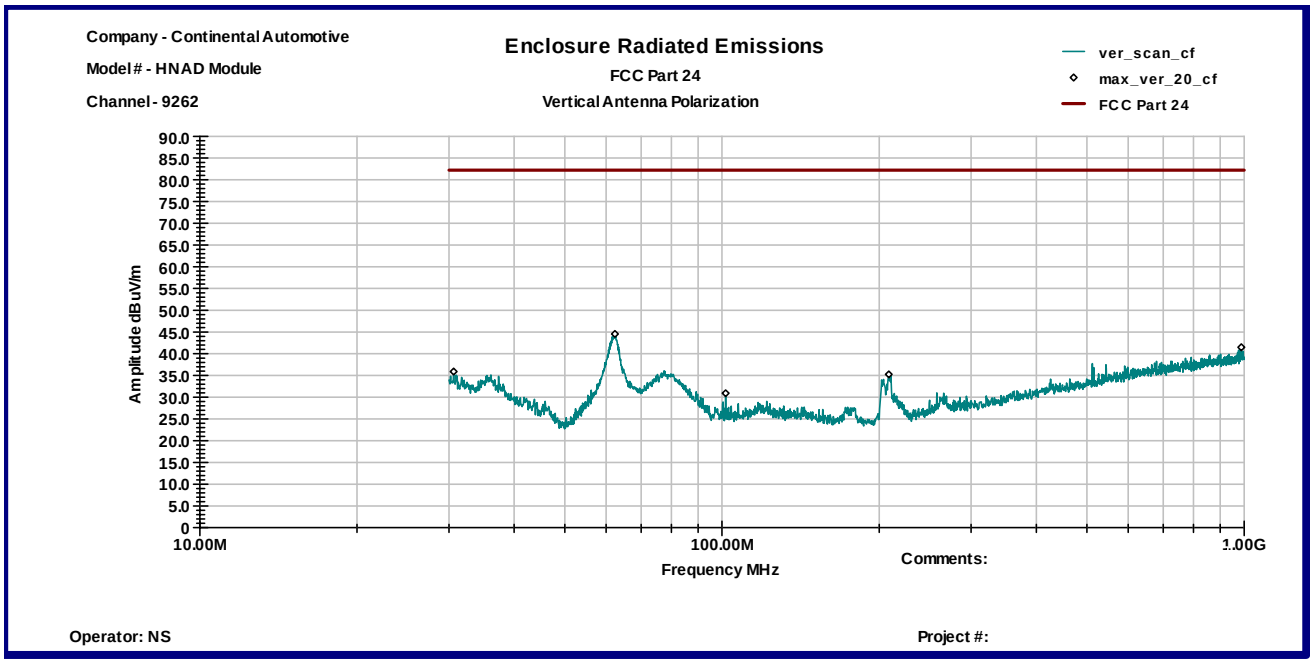


Horizontal antenna polarization

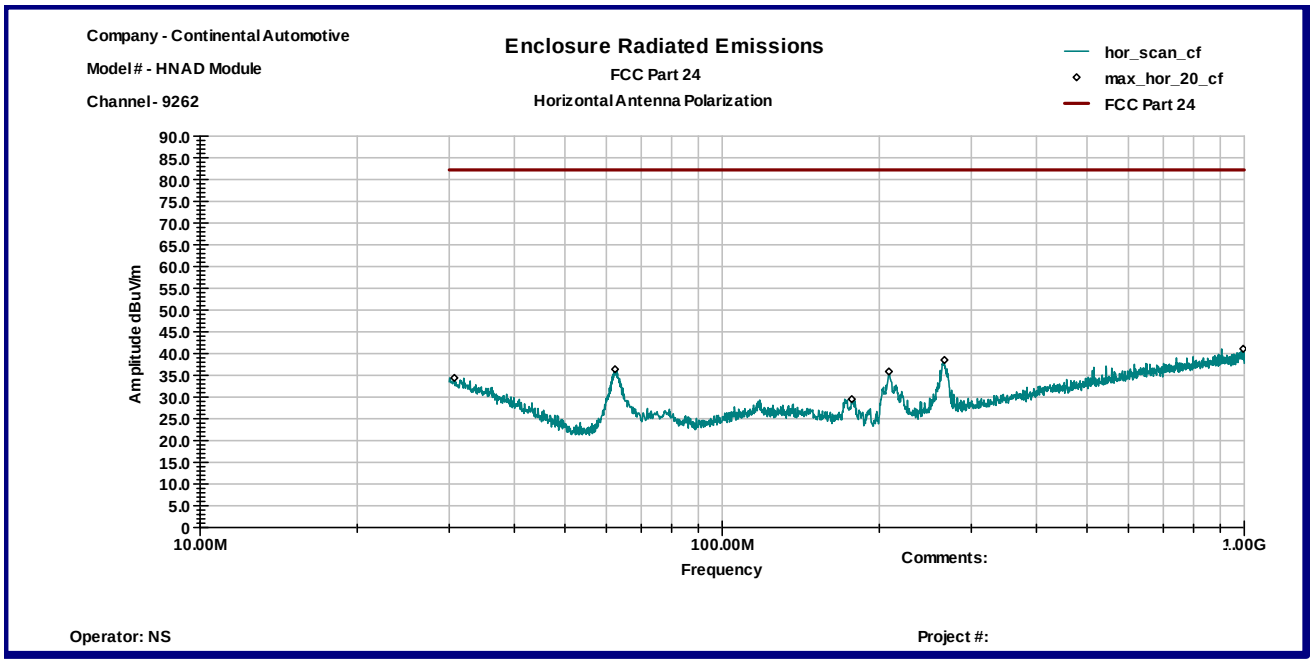


Graph 3.6.19

Vertical antenna polarization

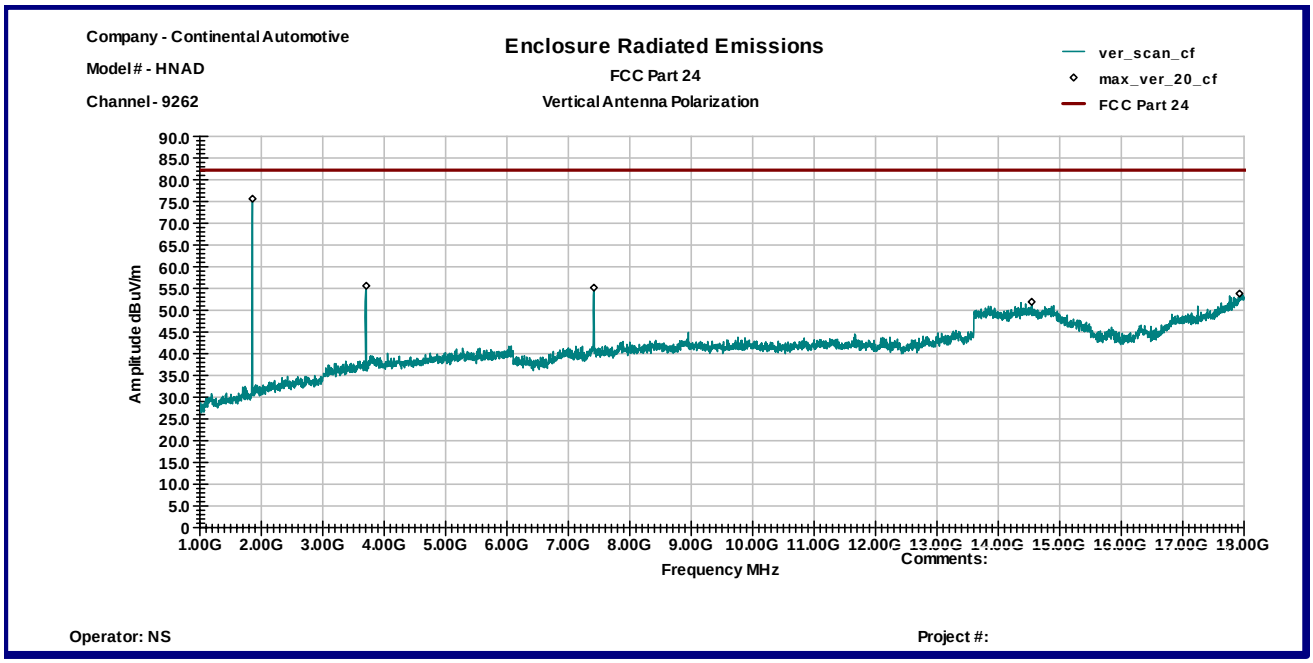


Horizontal antenna polarization

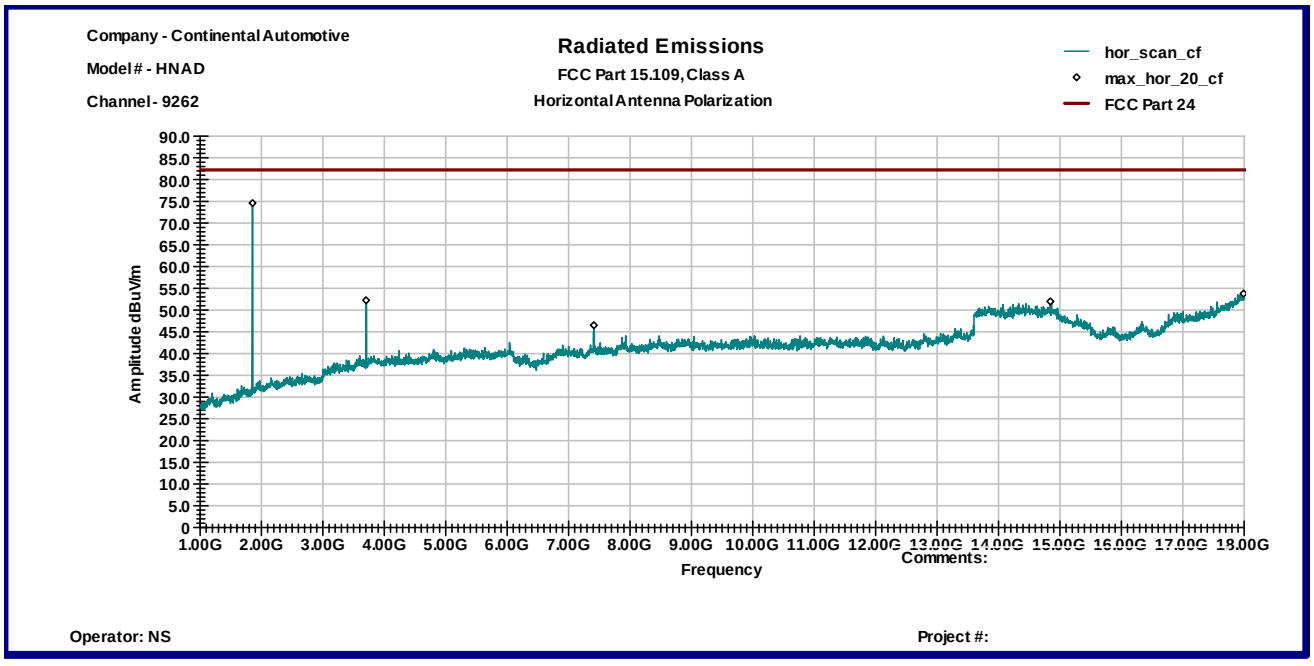


Graph 3.6.20

Vertical antenna polarization

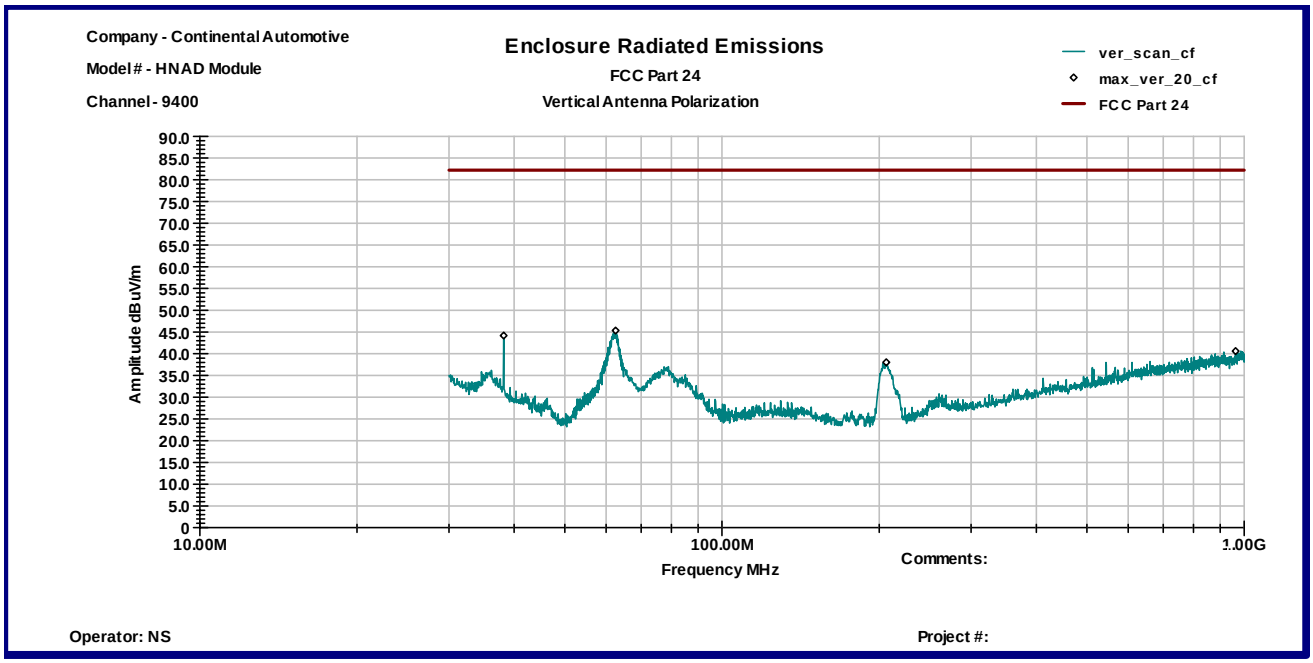


Horizontal antenna polarization

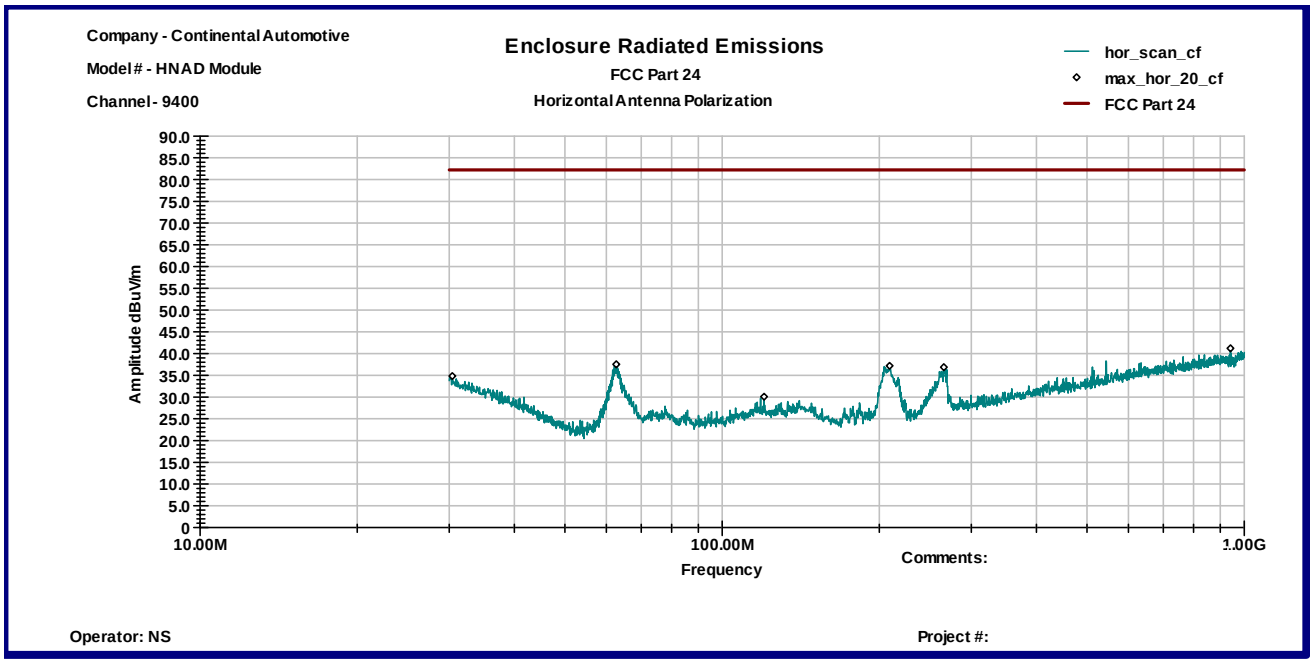


Graph 3.6.21

Vertical antenna polarization

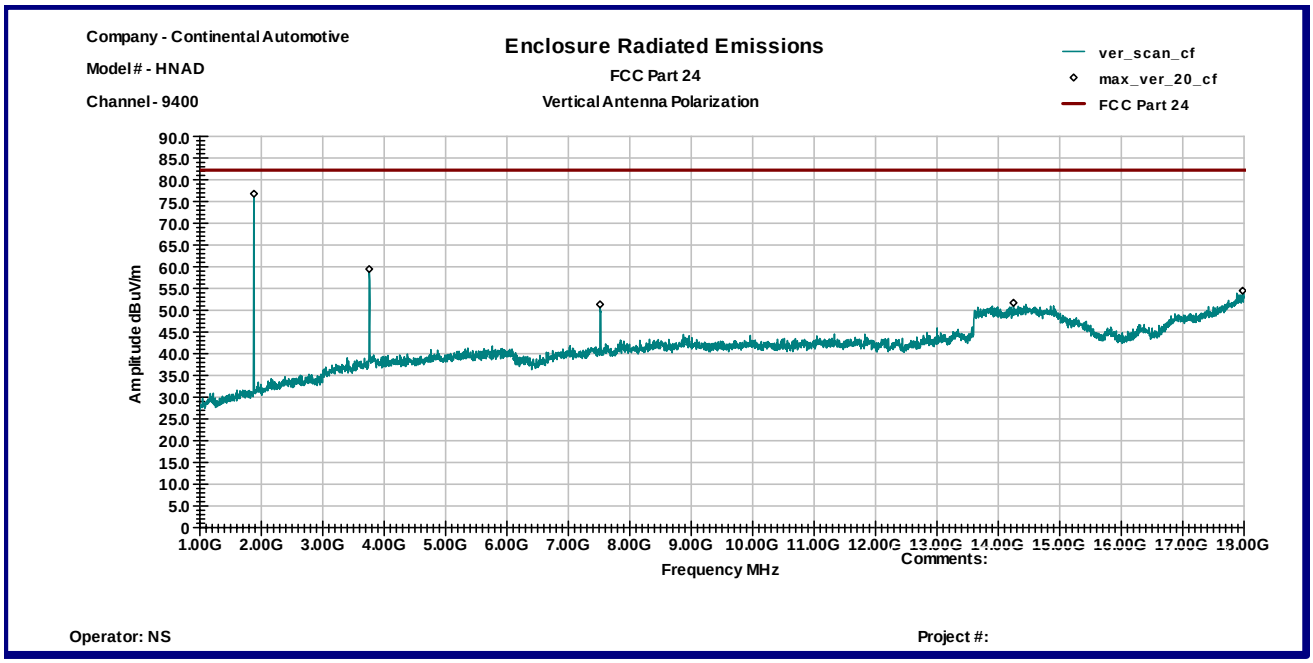


Horizontal antenna polarization

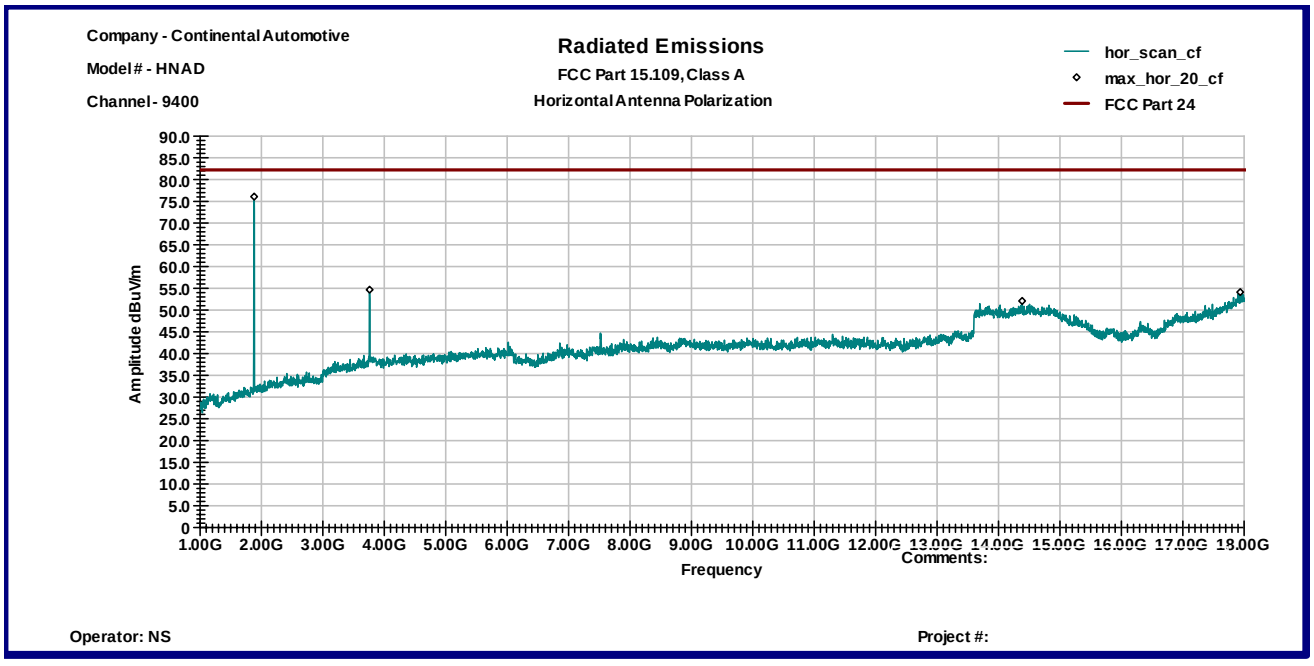


Graph 3.6.22

Vertical antenna polarization

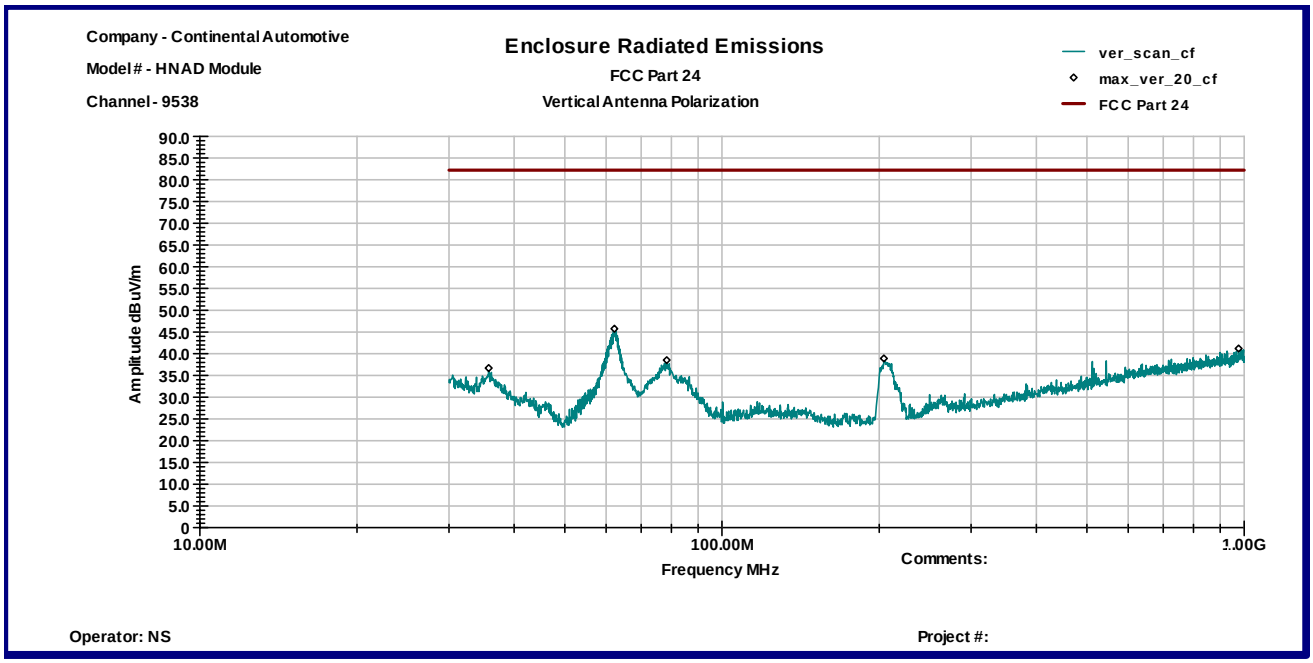


Horizontal antenna polarization

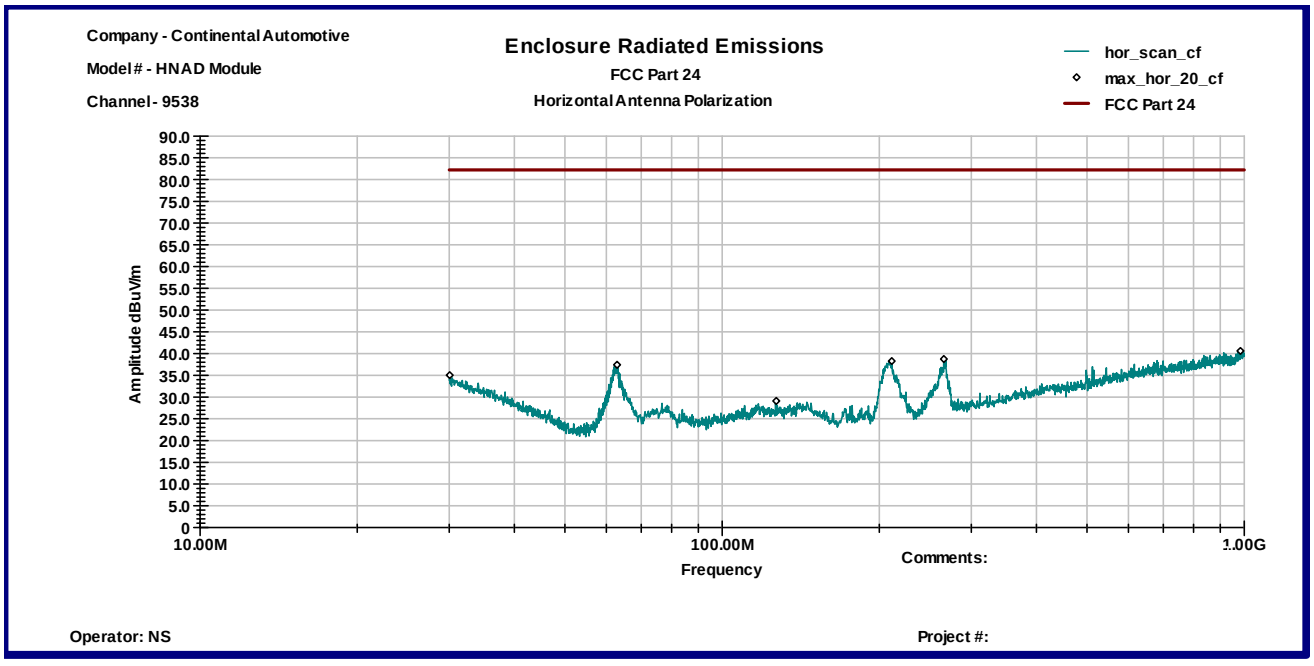


Graph 3.6.23

Vertical antenna polarization

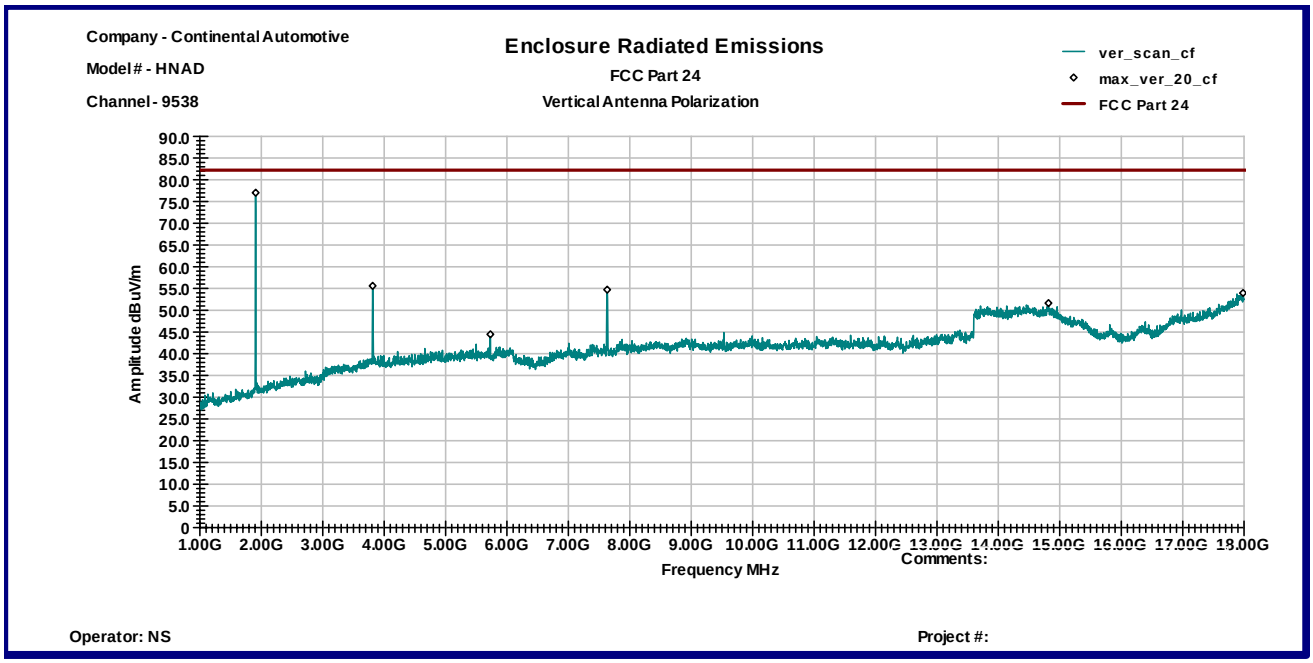


Horizontal antenna polarization

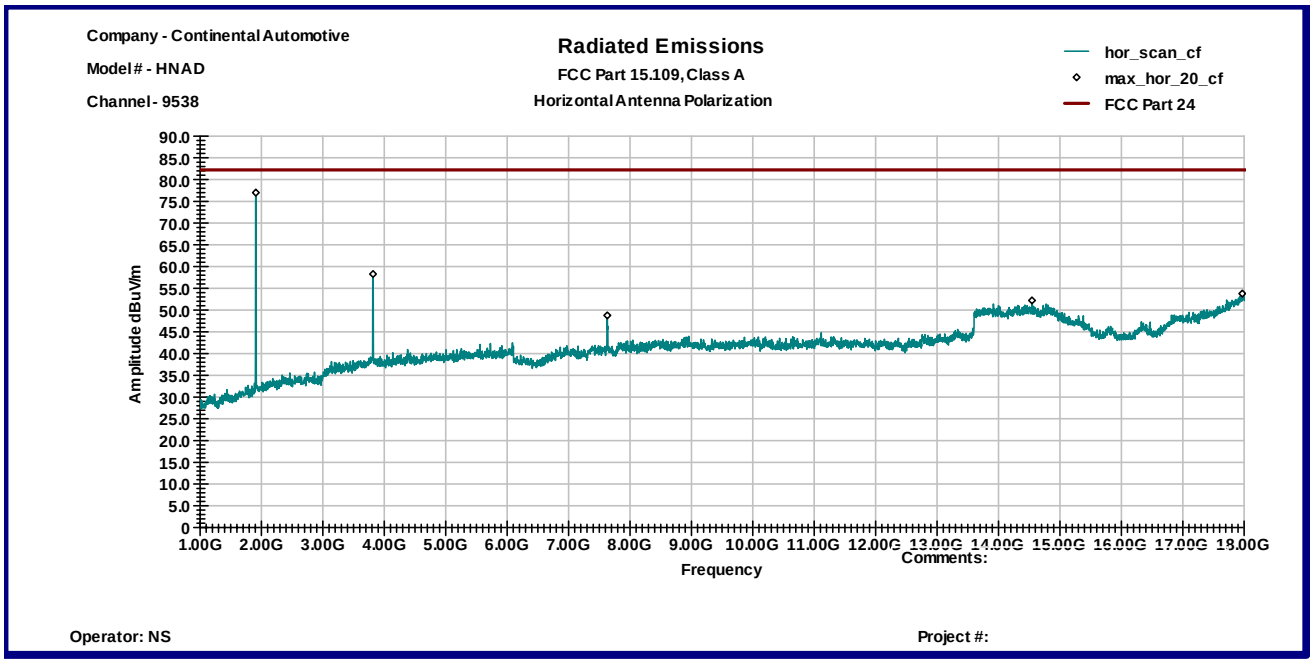


Graph 3.6.24

Vertical antenna polarization



Horizontal antenna polarization



3.7 Frequency Stability

The HNAD met the Frequency Stability requirements of FCC Part 22.355 and Part 24.235 (see Tables below)

Table 3.7.1
GSM850 Band

Temperature Degree C	Frequency Deviation Hz	Frequency Stability ppm	Frequency error limit ppm	Test Result
-30	16.0	0.019	±2.5	Pass
-20	7.0	0.008	±2.5	Pass
-10	5.0	0.006	±2.5	Pass
0	4.0	0.005	±2.5	Pass
10	5.0	0.006	±2.5	Pass
20	7.0	0.008	±2.5	Pass
25	0.0	0.000	±2.5	Pass
30	10.0	0.012	±2.5	Pass
40	19.0	0.023	±2.5	Pass
50	24.0	0.029	±2.5	Pass

Input Voltage VDC	Frequency Deviation Hz	Frequency Stability ppm	Frequency error limit ppm	Test Result
13.8	5.0	0.006	±2.5	Pass
10.2	7.0	0.008	±2.5	Pass

Table 3.7.2
PCS1900 Band

Temperature Degree C	Frequency Deviation Hz	Frequency Stability ppm	Frequency error limit ppm	Test Result
-30	24.0	0.013	±2.5	Pass
-20	17.0	0.009	±2.5	Pass
-10	11.0	0.006	±2.5	Pass
0	9.0	0.005	±2.5	Pass
10	10.0	0.005	±2.5	Pass
20	9.0	0.005	±2.5	Pass
25	0.0	0.000	±2.5	Pass
30	14.0	0.008	±2.5	Pass
40	20.0	0.011	±2.5	Pass
50	25.0	0.014	±2.5	Pass

Input Voltage VDC	Frequency Deviation Hz	Frequency Stability ppm	Frequency error limit ppm	Test Result
13.8	16.0	0.009	±2.5	Pass
10.2	20.0	0.011	±2.5	Pass

Notes: None

3.8 RF Exposure Compliance

3.8.1 GSM Band

MPE Requirement:

S=f/1500 mW/cm^2
f= operating frequency in MHz
S=824/1500=0.55 mW/cm^2

Exposure Calculation:

S(mW/cm^2) = ERP(mW) / 4πD^2, where

ERP is the maximum measured RF output power with Antenna Gain
Antenna Gain = 2.0dBi (per client request ADBM800/1900 MAXRAD antenna was used as a reference antenna)
The maximum ERP power is 32.3dBm + 2.0dBi = 34.3dBm = 2690mW

D = distance of 20cm

S = 2690 / 4π(20)^2 = 0.535 mW/cm^2

3.8.2 PCS Band

MPE Requirement:

S=1.0mW/cm^2

Exposure Calculation:

S(mW/cm^2) = EIRP(mW) / 4πD^2, where

EIRP is the maximum measured RF output power with Antenna Gain
Antenna Gain = 2.0dBi (per client request ADBM800/1900 MAXRAD antenna was used as a reference antenna)
The maximum EIRP power is 28.4dBm + 2.0dBi = 30.4dBm = 1100mW

D = distance of 20cm

S = 1100 / 4π(20)^2 = 0.219 mW/cm^2

3.9 Receiver/digital device radiated emissions, FCC Part 15.109

Test location: ☐ OATS ☒ Anechoic Chamber

Test distance: ☐ 10 meters ☒ 3 meters

Test result: **Pass**

Frequency range: 30MHz-1000MHz

Max. Emissions margin: 3.8dB below the limits

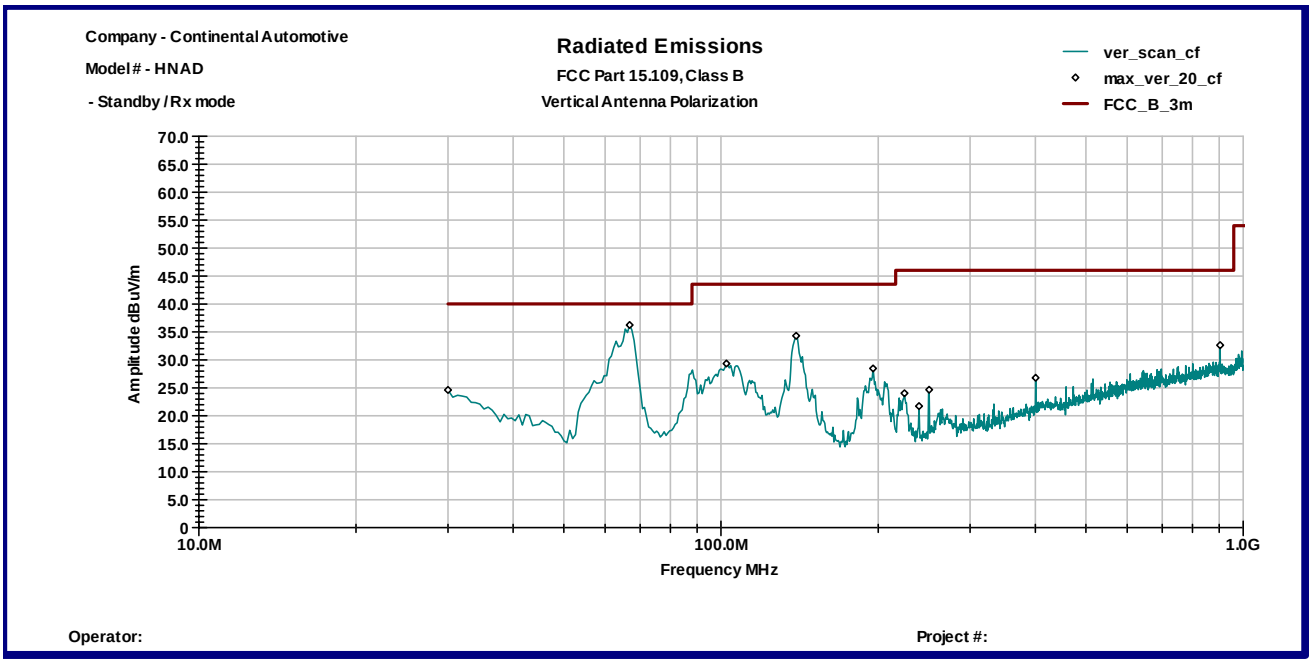
Notes: 1. The Radiated Emissions test was performed in the Anechoic chamber at 3m measurement distance (see Table 3.9.1 and Graphs 3.9.1 and 3.9.2 with Radiated Emissions Peak readings)
2. MAXRAD MDBM800/1900 Antenna was used during testing

Table 3.9.1

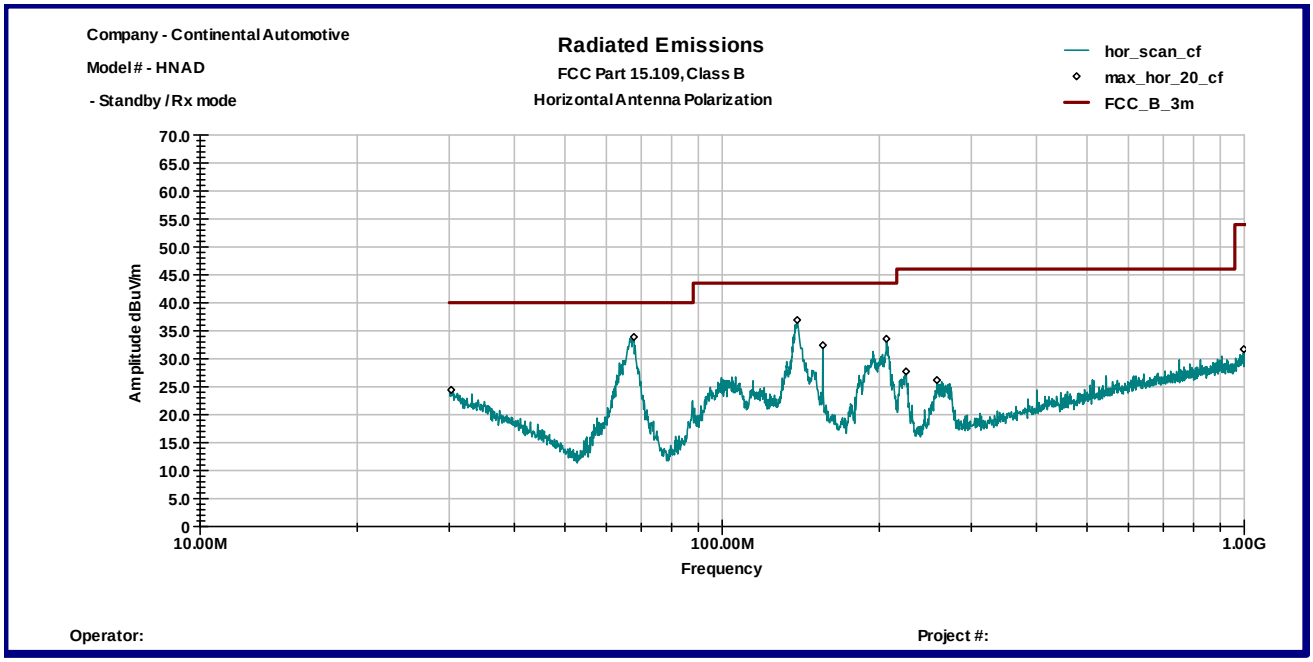
Frequency	Ant. Polarity	Peak Reading dBµV	Ant.Factor dB1/m	Total at 3m dBµV/m	QP Limit dBµV/m	Margin dB
30.0 MHz	V	3.9	20.8	24.6	40.0	-15.4
66.86 MHz	V	29.2	7.1	36.2	40.0	-3.8
102.43 MHz	V	17.1	12.2	29.3	43.5	-14.2
139.29 MHz	V	21.2	13.1	34.3	43.5	-9.2
195.55 MHz	V	17.0	11.4	28.5	43.5	-15.1
224.65 MHz	V	11.7	12.4	24.0	46.0	-22.0
239.52 MHz	V	8.2	13.5	21.7	46.0	-24.3
250.51 MHz	V	10.2	14.4	24.7	46.0	-21.4
400.54 MHz	V	8.1	18.7	26.8	46.0	-19.2
903.65 MHz	V	7.1	25.5	32.6	46.0	-13.4
30.277 MHz	H	3.8	20.6	24.4	40.0	-15.6
67.767 MHz	H	26.8	7.1	33.9	40.0	-6.1
139.25 MHz	H	23.8	13.1	36.9	43.5	-6.6
155.97 MHz	H	20.2	12.2	32.4	43.5	-11.1
206.44 MHz	H	21.6	12.0	33.6	43.5	-10.0
225.09 MHz	H	15.3	12.4	27.7	46.0	-18.3
257.88 MHz	H	11.0	15.2	26.2	46.0	-19.8
998.59 MHz	H	5.4	26.3	31.7	54.0	-22.3

Graph 3.9.1

Vertical antenna polarization

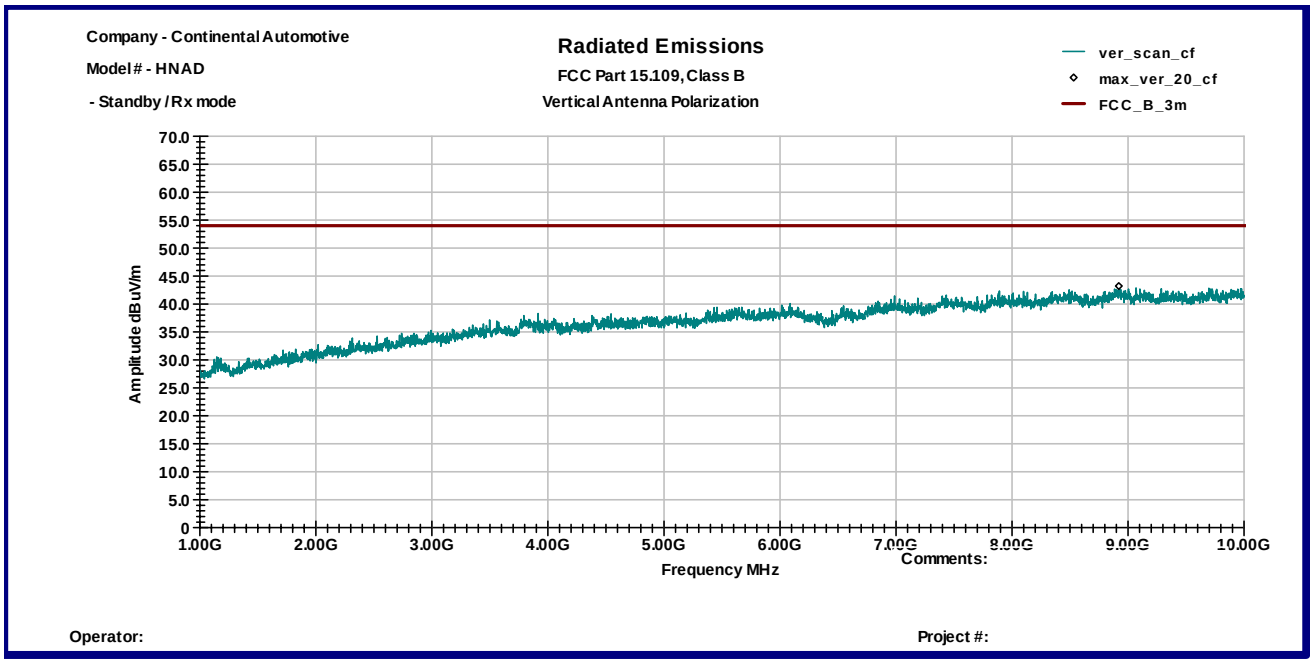


Horizontal antenna polarization

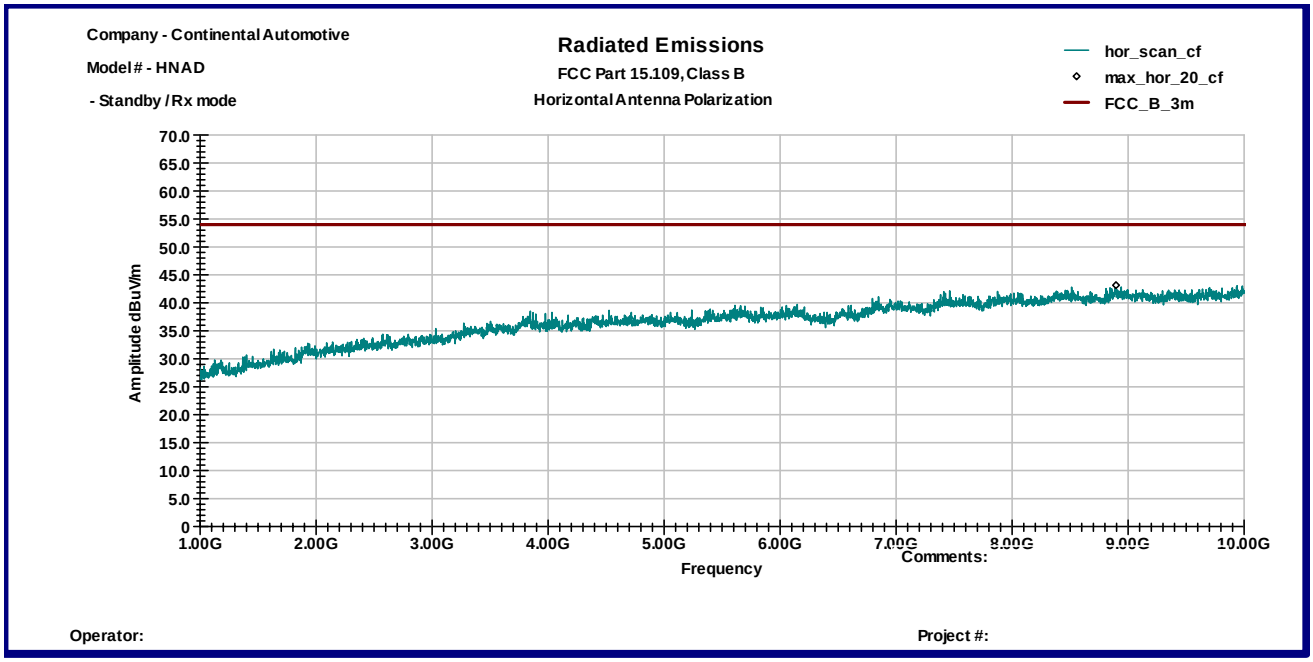


Graph 3.9.2

Vertical antenna polarization



Horizontal antenna polarization



4.0 TEST EQUIPMENT

DESCRIPTION	MANUFACTURER	MODEL	SERIAL NO.	INTERTEK ID	CAL DUE	USED
Spectrum Analyzer	R & S	FSP 40	100024	12559	09/10/2010	☒
Spectrum Analyzer	R & S	ESCI	100358	12909	05/18/2010	☒
Bicono-Log Antenna	Schaffner-Chase	CBL 6112 B	2468	14459	09/22/2010	☒
Horn Antenna	EMCO	3115	9507-4513	9936	04/13/2011	☒
Horn Antenna	EMCO	3115	6579	15580	04/29/2011	☐
Waveguide Horn Antenna	EMCO	3116	9904-2423	9705	08/06/2010	☒
Signal Generator	R & S	SMR20	101469	25233	07/31/2010	☒
LISN	Fischer Custom Communications	FCC-LISN-2 MOD.SD	316	9945	11/06/2010	☐
Wireless Communications Test Set	Agilent	8960 Series 10 E5515C	GB47200520	N/A	11/16/2010	☒
Wireless Communications Test Set	Agilent	8960 Series 10 E5515C	GB44052759	N/A	02/27/2011	☒
Pre-Amplifier	MITEQ	AMF-5D-00501800-28-13P	1402232	172081	08/07/2010	☒
Pre-Amplifier	MITEQ	AMF-6F-16002600-25-10P	1222383	MIN-0065	08/07/2010	☒
Power Splitter	Mini-Circuits	ZFRSC-123-S+	SF764901013	N/A	VBU	☒
Power Splitter	Mini-Circuits	ZSC-2-4	BF221200749	N/A	VBU	☒
System	TILE! Instrument Control		Ver. 3.4.K.29	15259	VBU	☒