1002
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REPORT

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2006-08-25	F612783-F22	1 (1)

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Equipment Authorization measurements on GSM Base station Transceiver unit with FCC ID: B5KDKRC1311005-2 in the RBS 2206 cabinet

(10 appendices)

Test object

Transceiver Unit dTRU-8 Edge, KRC 131 1005/2, R4A

Summary

Standard	Compliant	Appendix	Remarks
FCC CFR 47			
2.1046 RF Power output	Yes	2	
2.1047 Modulation characteristics	Yes	3	
2.1049 Occupied bandwidth	Yes	4	
2.1049 Band Edge	Yes	5	Note 1
2.1051 Spurious emission at antenna	Yes	6	
2.1053 Field strength of spurious radiation	Yes	7	
2.1055 Frequency stability	Yes	8	

Note 1: The maximum output power with GMSK and 8-PSK modulation that can be used on the channels adjacent to the frequency band edges is 38.3 dBm in order to comply.

SP Swedish National Testing and Research Institute
Electronics - EMC

Jan Welinder
Technical Manager

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FCC ID: B5KDKRC1311005-2 Appendix 1

Description - Equipment Under Test (EUT)

Equipment: GSM Base station transceiver 800 MHz

Tx Frequency range: 869.2-893.8 MHz

Modulations: GMSK and 8-PSK

Maximum output power(average):

	GMSK	8-PSK
Uncombined:	46.3 dBm	43.0 dBm
Combined:	43.0 dBm	39.7 dBm
Combined+TCC:	49.0 dBm	45.7 dBm

Nominal power voltage: 24 V DC

Tested Channels

Radiated measurements:

dTRU	ARFCN	Frequency	Modulation	Configuration
No 1	145	872.6 MHz	8-PSK	With internal combiner
	163	876.2 MHz	GMSK	With internal combiner
No 2	180	879.6 MHz	8-PSK	With internal combiner
	198	883.2. MHz	GMSK	With internal combiner
No 3	128	869.2 MHz	8-PSK	With internal combiner+TCC
No 4	251	893.8 MHz	GMSK	With internal combiner+TCC
No 5	215	886.6 MHz	8-PSK	Without internal combiner
	230	889.6 MHz	GMSK	Without internal combiner

The radiated spurious emission measurements were done with the three RF configurations listed above at the same time to simulate worst case.

The radiated measurements were performed with the EUT installed in a RBS 2206 powered with 24 VDC which was used as a worst case configuration.

Conducted measurements:

ARFCN	Frequency	ARFCN	Frequency
128	869.2 MHz	226	888.8 MHz
129	869.4 MHz	250	893.6 MHz
153	874.2 MHz	251	893.8 MHz
190	881.6 MHz		

All RF conducted measurements were performed with the EUT installed in a RBS 2206 powered with DC power (the list of the RBS hardware is shown in appendix 9). The measurements were done at the output connector of CDU-G 8 (BFL 119 155/1 rev. R3B) with serial number TR43144633. The dTRU with serial number AE53038585 was used for the measurements. The measurement was performed with configurations that represents worst case scenario.

Manufacturer's representative

Per Helmersson, Ericsson AB

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in FCC CFR47.

References

Measurements were done according to relevant parts of the following standards:
ANSI/TIA/EIA-603-C-2004
J-STD007A Vol 1
ANSI/TIA/EIA 136-280-D-2002

Reservation

The test results in this report apply only to the particular Equipment Under Test (EUT) as declared in the report.

Delivery of test object

The test object was delivered: 2006-08-04

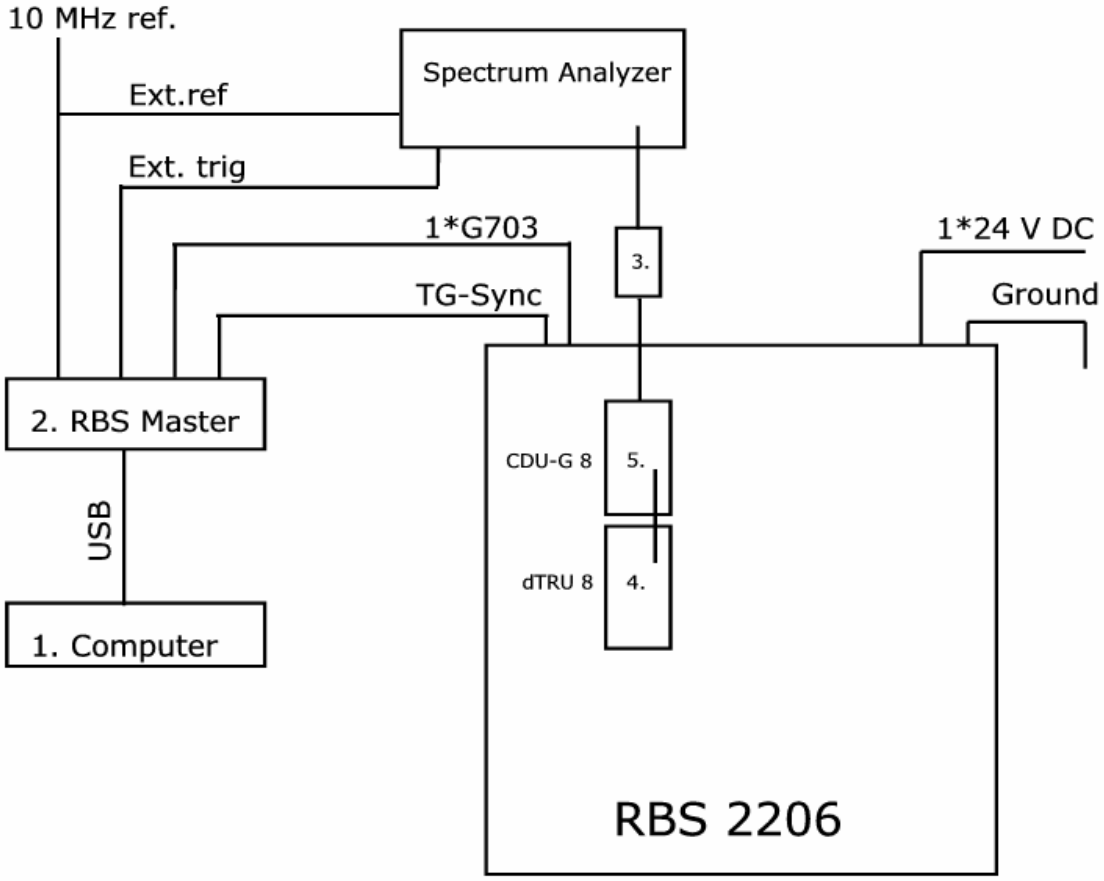
Test engineers

Jörgen Wassholm and Jonas Bremholt

Test witnesses

Lars Hagbjörk and Mikael Ohlsson, Ericsson AB

Test set-up, conducted measurements

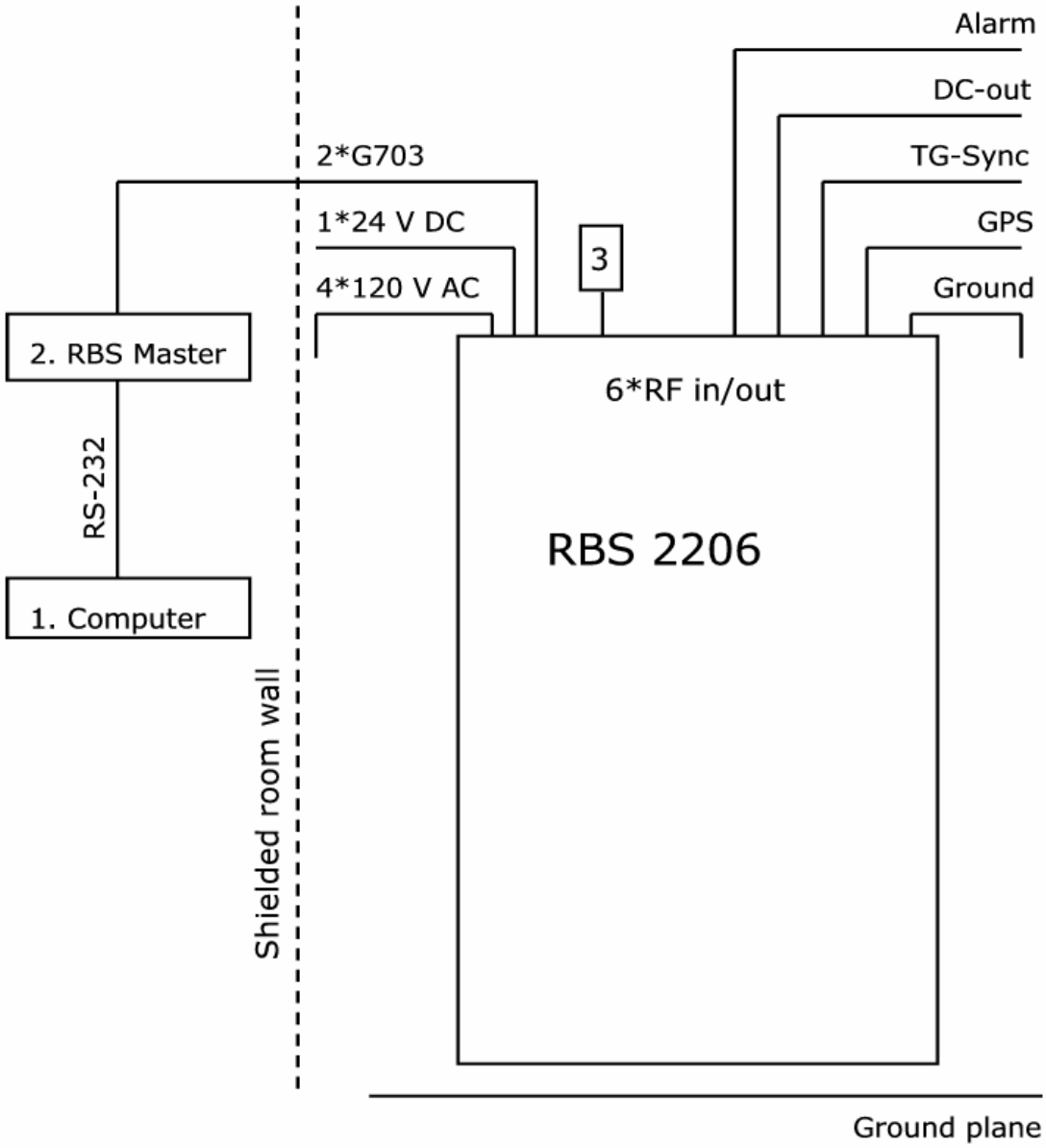


Note: The TG-Sync and Ext. trig were only used during the frequency stability measurements.

1. Computer with software RBSMMI ver. R9D08
2. Ericsson RBS Master 2 LPY 107 1007/1 R1F/A software ver. R5A08
3. Attenuator

Interfaces:	**Type of port:**
24 VDC	DC power
Antenna: Coaxial cable (50 ohm)	Antenna
G703: T1, shielded multi-wire (120 ohm)	Telecom
TG-sync: Shielded multi-wire	Signal

Test set-up, radiated measurements



1. Computers, with software RBSMMI ver. R9D08
2. Ericsson RBS Master 2 LPY 107 1007/1 R1F/A software ver. R5A08
3. Dummy loads (50 ohm)

Interfaces:	**Type of port:**
24 VDC	DC power
Antenna: Coaxial cable (50 ohm)	Antenna
G703: T1, shielded multi-wire (120 ohm)	Telecom
TG-sync: Shielded multi-wire, unterminated	Signal
Alarm: Unshielded 4 wire, unterminated	Signal
GPS: Shielded multi-wire, unterminated	Signal

FCC ID: B5KDKRC1311005-2 Appendix 2

RF Power output measurements according to 47CFR 2.1046

Date	Temperature	Humidity
2006-08-18	22 °C ± 3 °C	58 % ± 5 %

Test set-up and procedure

Measurements were made at CDU-G 8 output connector. The output was connected to a Peak power analyser via a 50 ohm attenuator. The transmitter was modulated with pseudorandom data and with maximum power in all the time slots during the measurements.

Measurement equipment	Calibration Due	SP number
Boonton RF Peak power meter/analyzer	2007-02	503 144
Boonton Power sensor 56518-S/4	2007-02	503 145
Multimeter Fluke 87	2006-11	502 190
Testo 610, Temperature and humidity meter	2006-12	502 658

Measurement uncertainty: 0.5 dB

Results

Modulation: **GMSK**

dTRU, output 1+2, with internal combiner plus TCC.
Rated output power level after CDU-G (maximum): 49.0 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	49.4/ 48.8	49.9/ 49.2	49.6/ 48.9

dTRU, output 1, without internal combiner:
Rated output power level after CDU-G (maximum): 46.3 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	46.8/ 46.2	47.3/ 46.6	47.0/ 46.3

dTRU, output 2, without internal combiner:
Rated output power level after CDU-G (maximum): 46.3 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	46.8/ 46.1	47.2/ 46.5	46.7/ 46.0

dTRU, output 1, with internal combiner:
Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	43.5/ 42.7	43.8/ 43.1	43.7/ 42.9

dTRU, output 2, with internal combiner:
Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	43.5/ 42.8	43.9/ 43.2	43.6/ 42.9

Modulation: **8-PSK**

dTRU, output 1+2, with internal combiner plus TCC:
Rated output power level after CDU-G (maximum): 45.7 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	49.4/ 45.6	49.9/ 46.1	49.6/ 45.8

dTRU, output 1, without internal combiner:
Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	46.8/ 43.0	47.2/ 43.4	46.9/ 43.1

dTRU, output 2, without internal combiner:
Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	46.7/ 42.9	47.1/ 43.3	46.7/ 42.9

dTRU, output 1, with internal combiner:
Rated output power level after CDU-G (maximum): 39.7 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	43.4/ 39.5	43.8/ 40.0	43.6/ 39.8

dTRU, output 2, with internal combiner:
Rated output power level after CDU-G (maximum): 39.7 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	43.5/ 39.7	43.9/ 40.1	43.7/ 39.9

Limit

According to CFR § 22 there are no conducted limits at the antenna connector.

CFR § 22.913: The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts (57 dBm).

GMSK: The measured output power shall be within ± 2dB of the rated output power (J-STD007A Vol 1)
8-PSK: The measured output power shall be within +1 to -3 dB of the rated output power (ANSI/TIA/EIA 136-280-B)

Complies?	Yes

Occupied bandwidth measurements according to 47CFR 2.1049

Date	Temperature	Humidity
2006-08-18	22 °C ± 3 °C	58 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §2.1049. The measurements were made at CDU-G8 output connector. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during the measurements. The transmitter was activated at maximum output power and modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2007-08	503 738
Testo 610, Temperature and humidity meter	2006-12	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 4.1

Modulation: **GMSK**

Output 1		**ARFCN**	**OBW**
Diagram	1:	Ch 128	240 kHz
Diagram	2:	Ch 190	240 kHz
Diagram	3:	Ch 251	240 kHz

Output 2		**ARFCN**	**OBW**
Diagram	4:	Ch 128	244 kHz
Diagram	5:	Ch 190	242 kHz
Diagram	6:	Ch 251	240 kHz

Modulation: **8-PSK**

Output 1		**ARFCN**	**OBW**
Diagram	7:	Ch 128	238 kHz
Diagram	8:	Ch 190	242 kHz
Diagram	9:	Ch 251	240 kHz

Output 2		**ARFCN**	**OBW**
Diagram	10:	Ch 128	242 kHz
Diagram	11:	Ch 190	242 kHz
Diagram	12:	Ch 251	240 kHz

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least 43 + 10 log P dB.

Complies?	Yes

Diagram 1

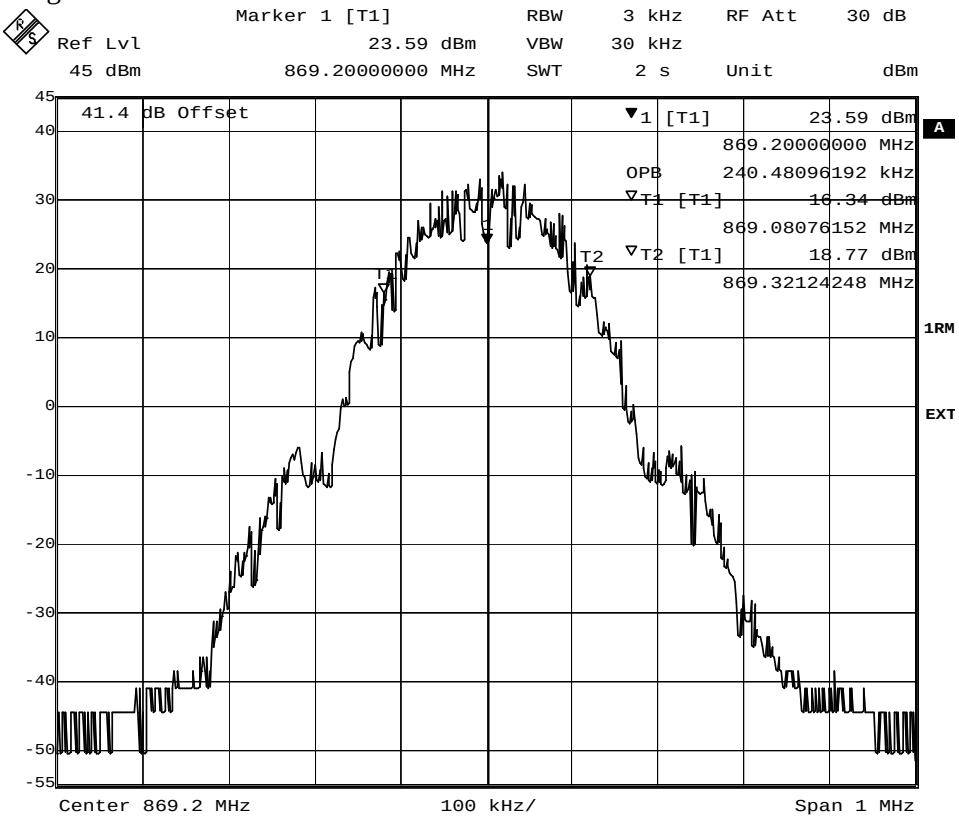


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Diagram 2

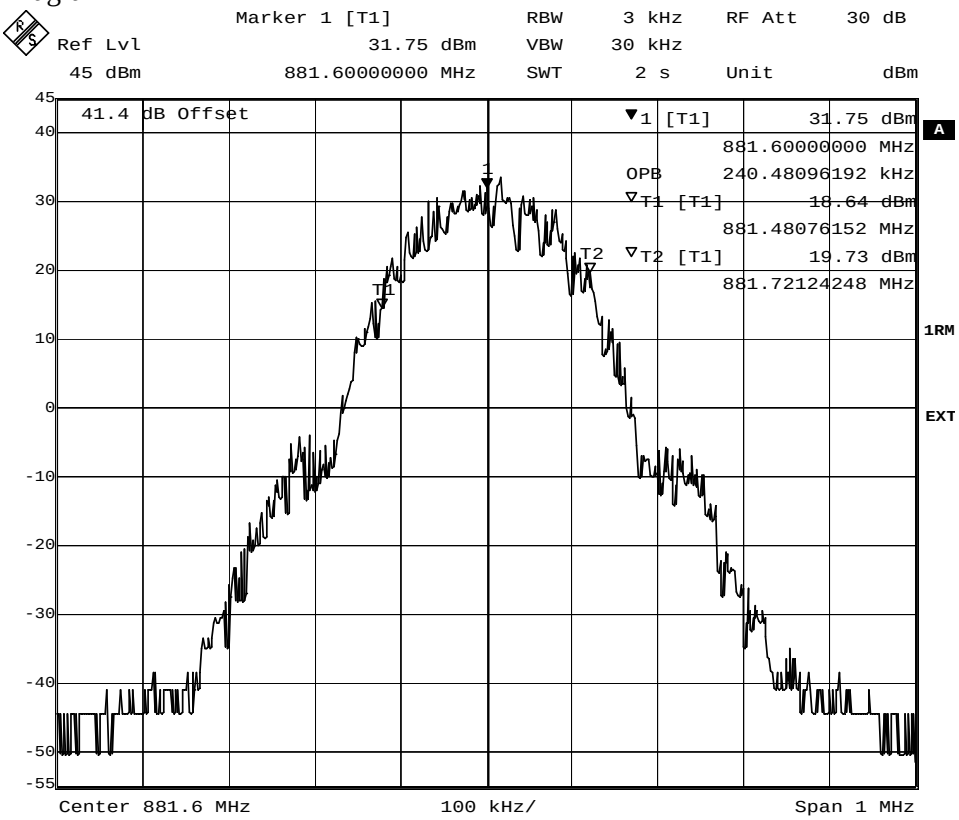

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Diagram 3

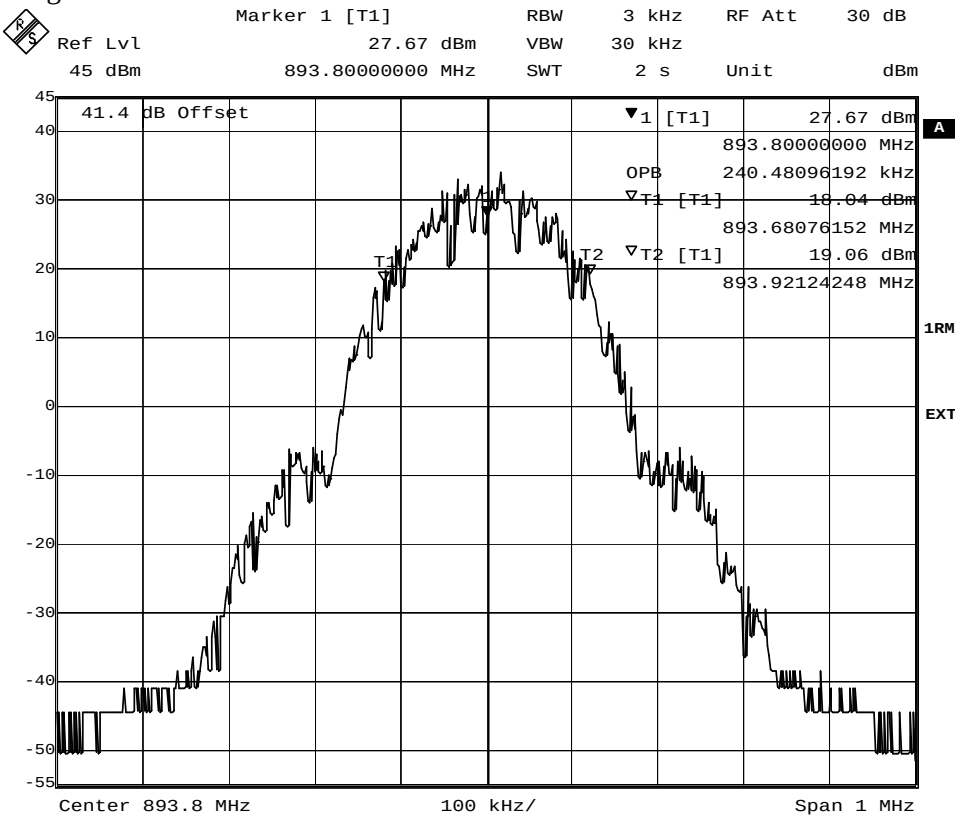

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Diagram 4

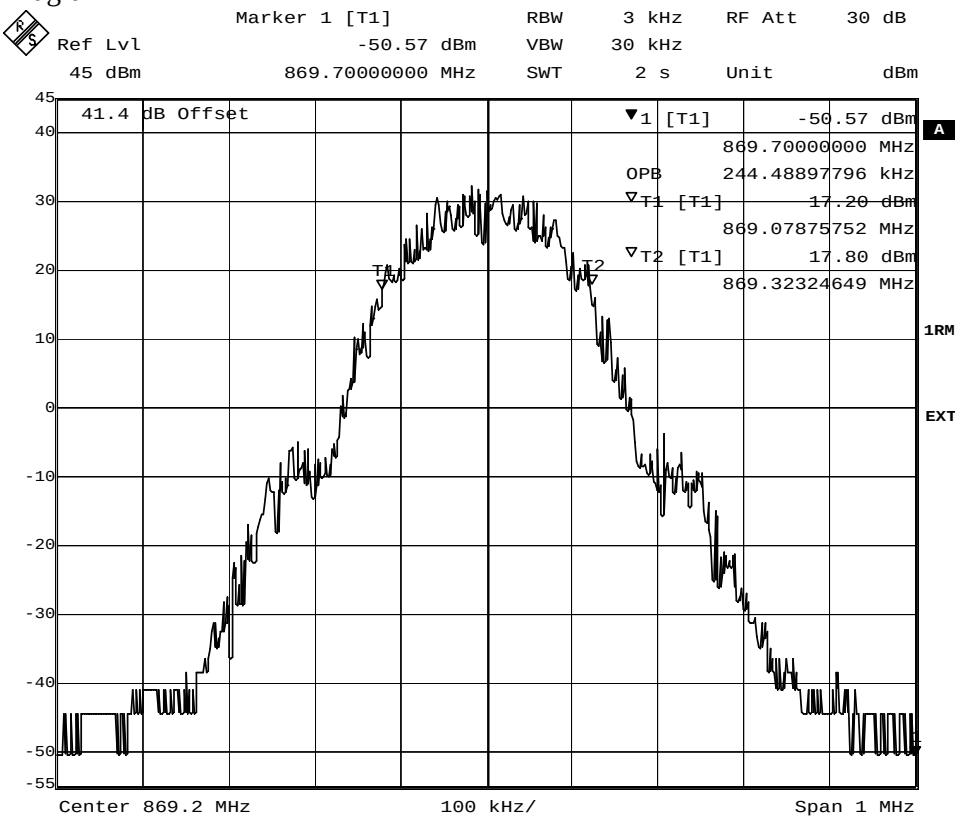

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Diagram 5

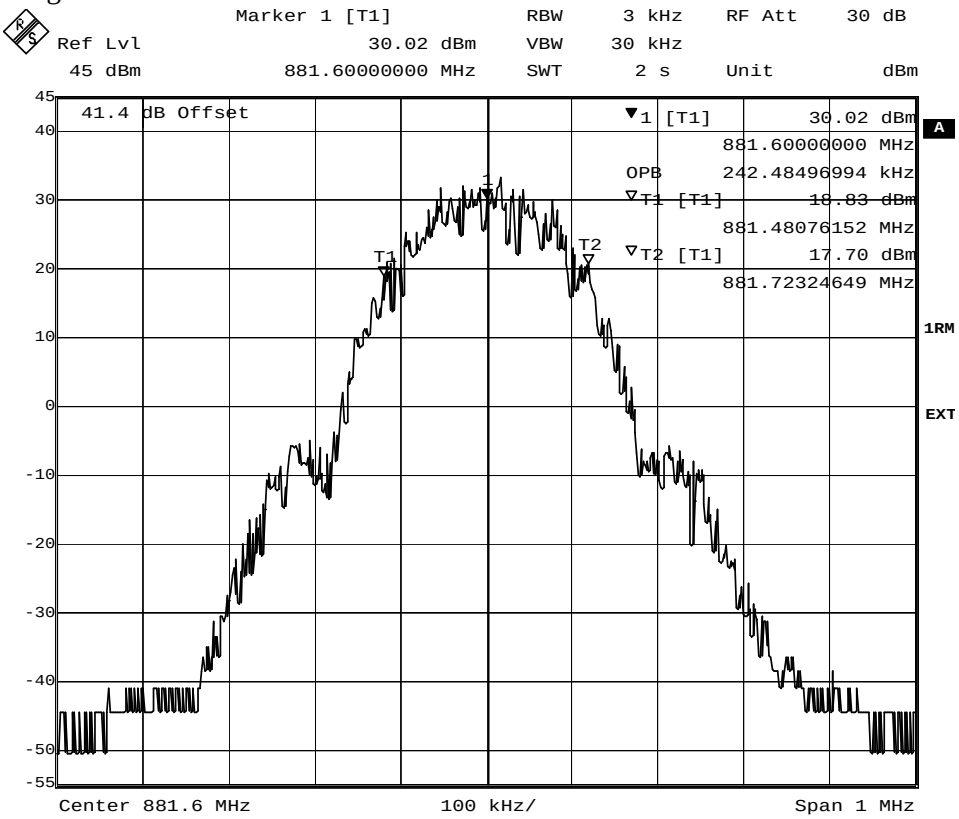

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Diagram 6

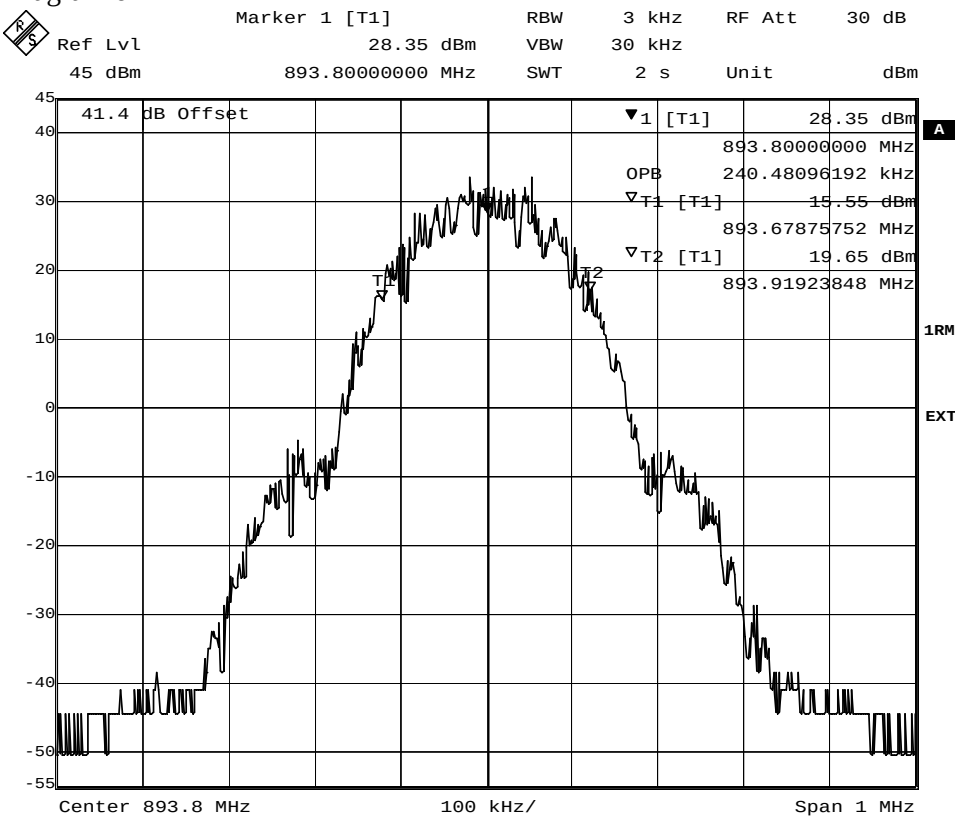

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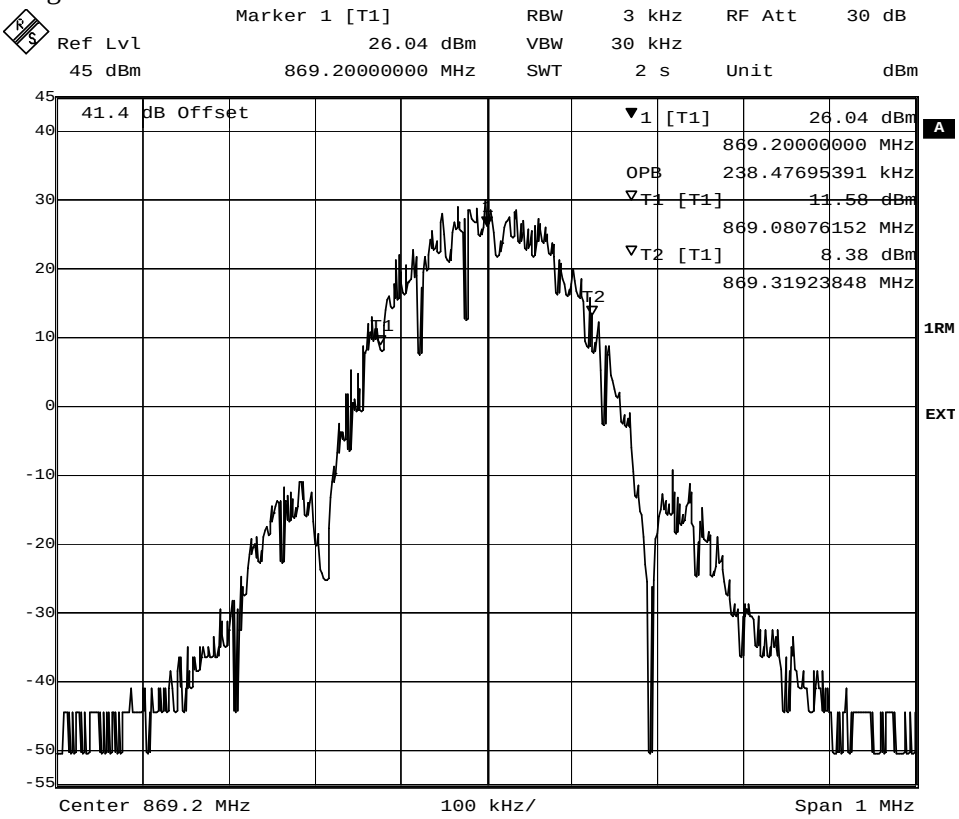
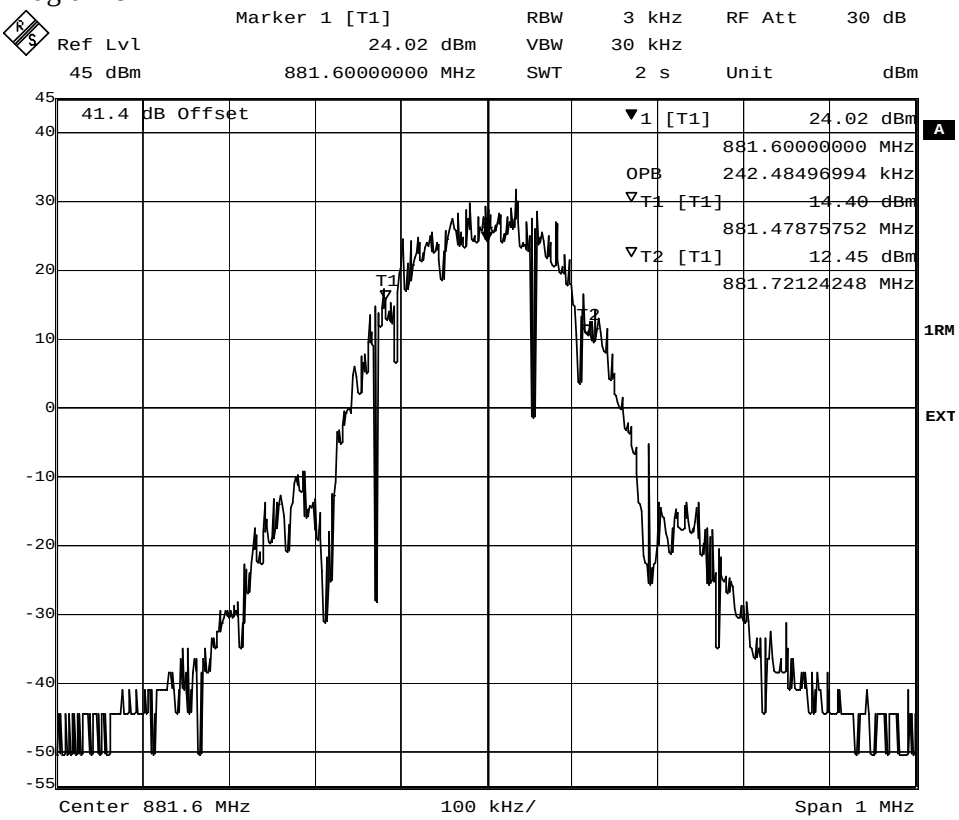
Diagram 7



Date: 18.AUG.2006 18:05:12

Diagram 8



Date: 18.AUG.2006 18:03:05

Diagram 9

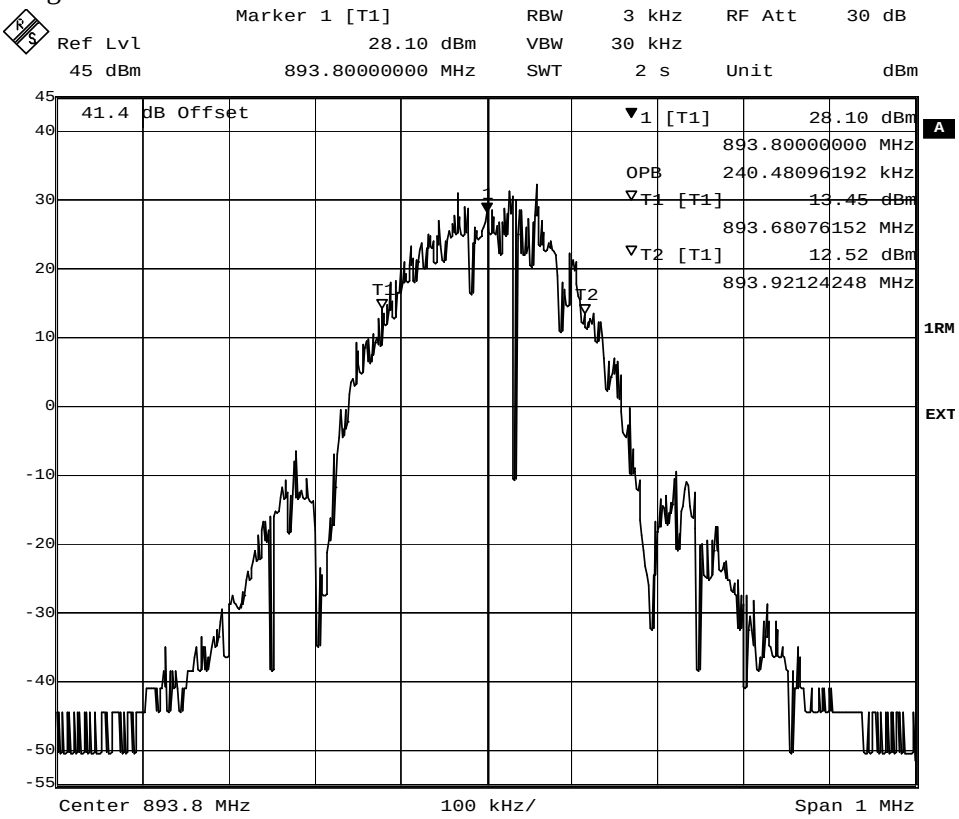


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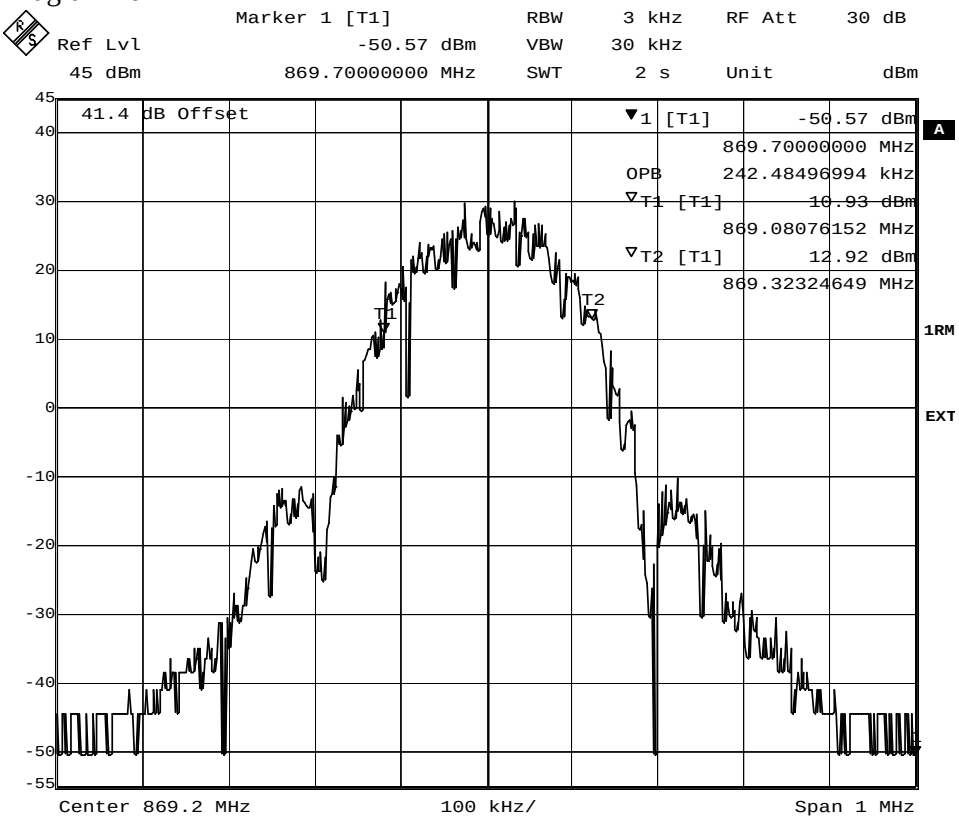
Diagram 10



Date: 18.AUG.2006 17:39:40

Diagram 11

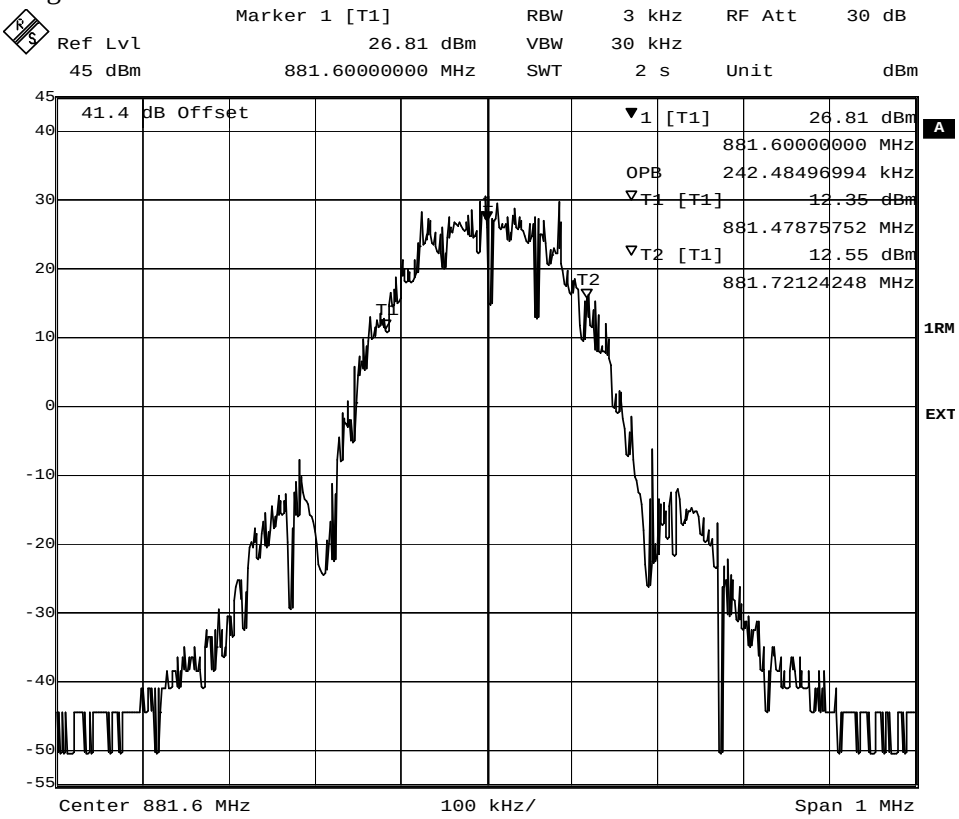


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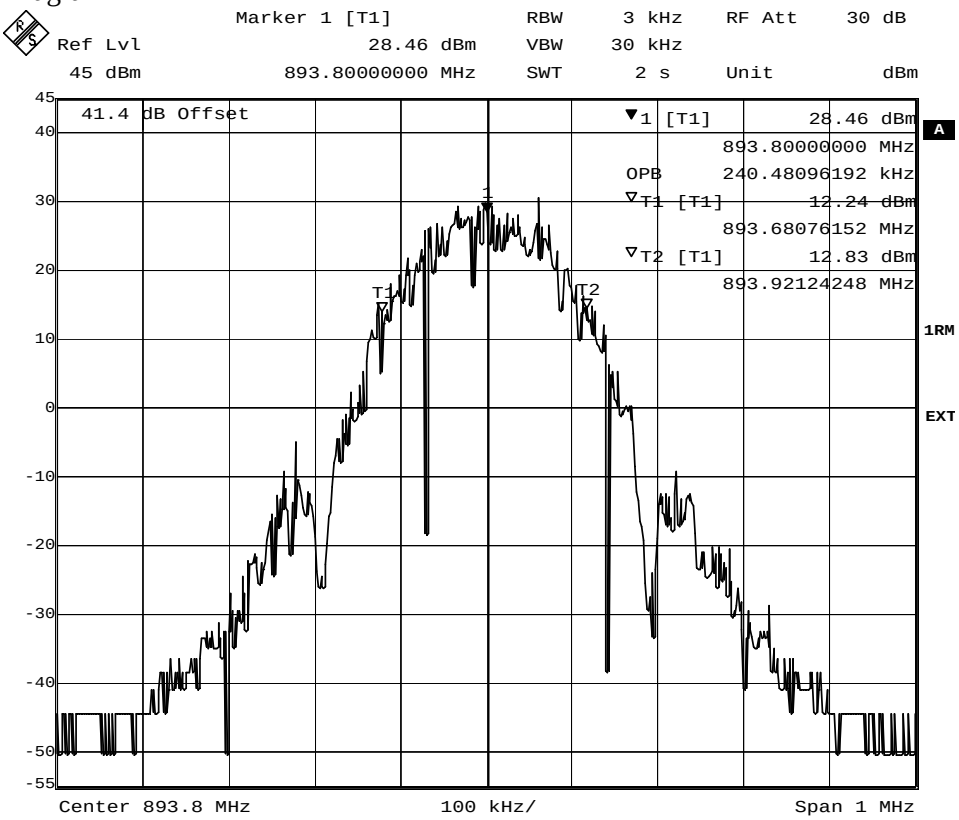
Diagram 12



Date: 18.AUG.2006 17:52:18

Band edge measurements according to 47CFR 2.1049

Date	Temperature	Humidity
2006-08-22	23 °C ± 3 °C	60 % ± 5 %

Test set-up and procedure

The measurements were made per definition in 22.917. The measurements were made at CDU-G8 output connector. The output was connected to a spectrum analyser with the RMS detector activated. A resolution bandwidth of 3 kHz (1% of OBW) was used up to 300 kHz away from the band edges. A resolution bandwidth of 50 kHz was used up to 5 MHz from the band edges. As the FCC rules specify a RBW of 100 kHz for measurements of emissions >1 MHz away from the band edges, the limit was adjusted with 3 dB to –16 dBm to compensate for the reduced measurement bandwidth.
The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements. The transmitter was modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2007-08	503 738
Testo 610, Temperature and humidity meter	2006-12	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 5.1

GMSK

dTRU Output 1, without internal combiner

Diagram 1 Ch 128 (869.2 MHz) Band edge 38.3 dBm output power
Diagram 2 Ch 251 (893.8 MHz) Band edge 38.3 dBm output power

dTRU Output 2, without internal combiner

Diagram 3 Ch 128 (869.2 MHz) Band edge 38.3 dBm output power
Diagram 4 Ch 251 (893.8 MHz) Band edge 38.3 dBm output power

TCC), dTRU Output 1+2 (TX1+TX2)

Diagram 5 Ch 129 (869.4 MHz) Band edge 49.0 dBm output power
Diagram 6 Ch 250 (893.6 MHz) Band edge 49.0 dBm output power

8-PSK

dTRU Output 1, without internal combiner

Diagram 7 Ch 128 (869.2 MHz) Band edge 38.3 dBm output power
Diagram 8 Ch 251 (893.8 MHz) Band edge 38.3 dBm output power

dTRU Output 2, without internal combiner

Diagram 9 Ch 128 (869.2 MHz) Band edge 38.3 dBm output power
Diagram 10 Ch 251 (893.8 MHz) Band edge 38.3 dBm output power

TCC), dTRU Output 1+2 (TX1+TX2)

Diagram 11 Ch 129 (869.4 MHz) Band edge 45.7 dBm output power
Diagram 12 Ch 250 (893.6 MHz) Band edge 45.7 dBm output power

Remarks

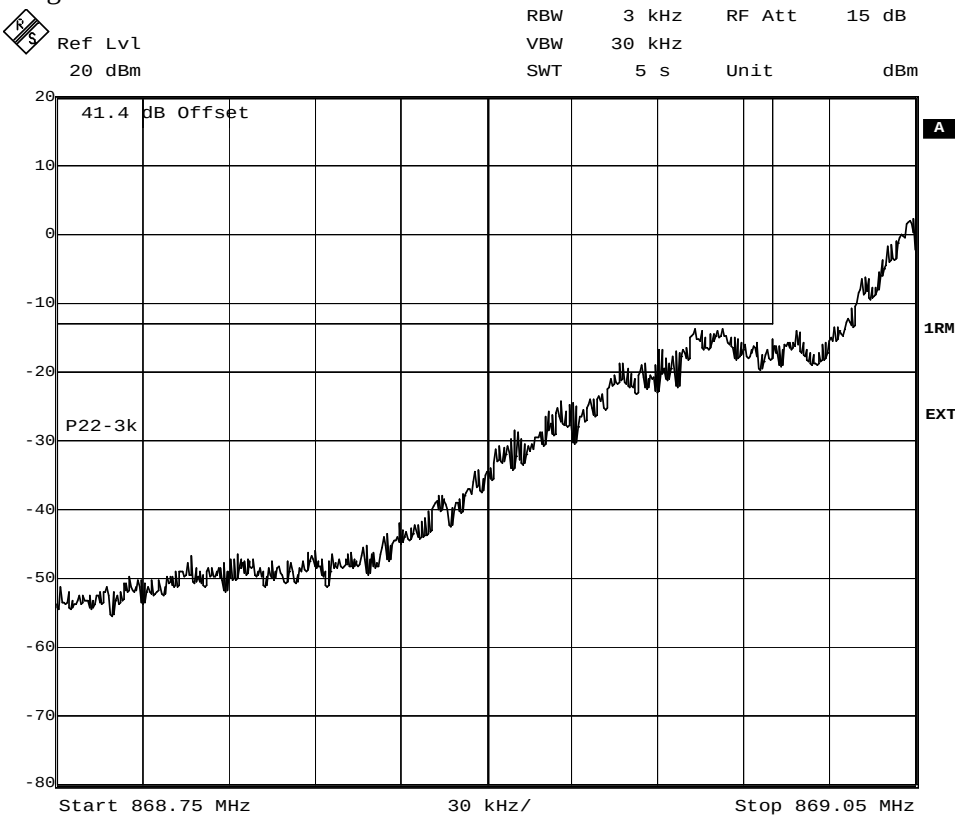
The maximum output power with GMSK and 8-PSK modulation that can be used on the channels adjacent to the frequency band edges are 38.3 dBm in order to comply.

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least 43 + 10 log P dB.

Complies?	Yes

Diagram 1



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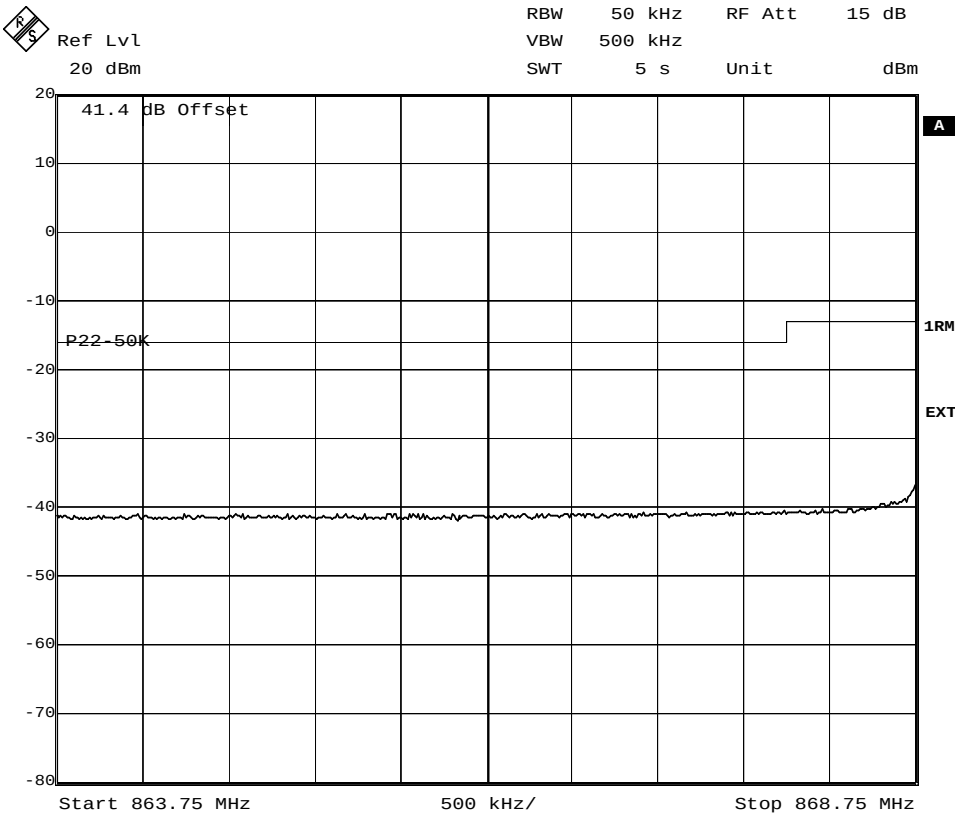

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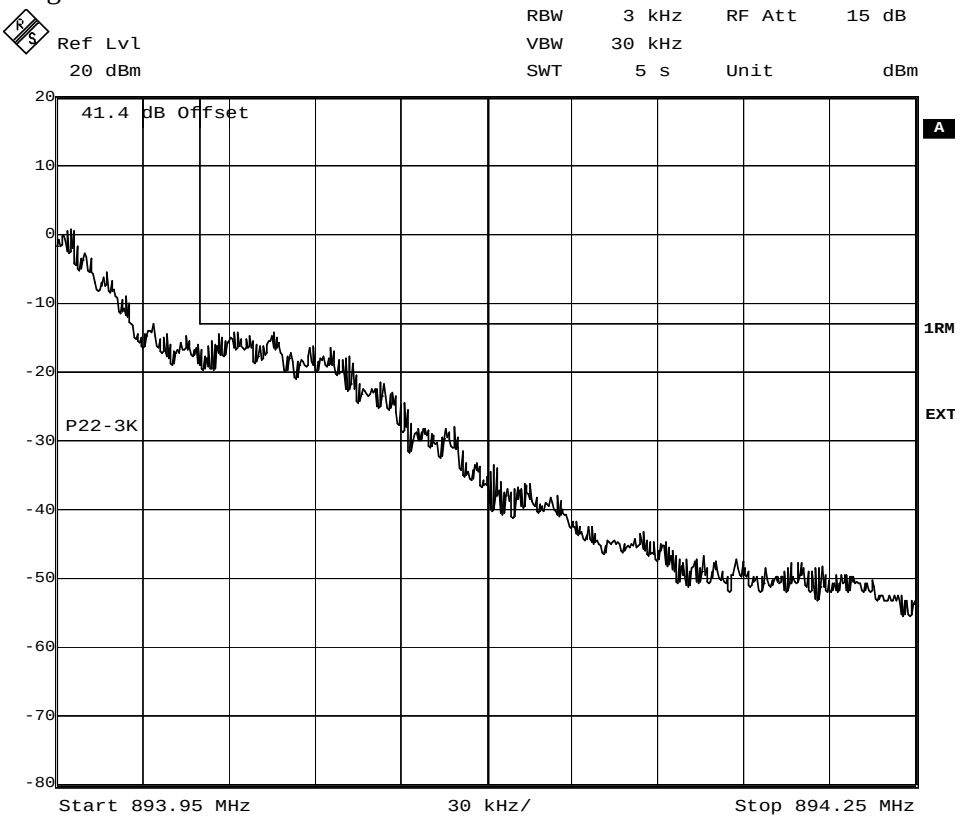
Diagram 2


RBW 3 kHz
RF Att 15 dB
VBW 30 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 893.95 MHz
30 kHz/
Stop 894.25 MHz
Date: 22.AUG.2006 10:32:33

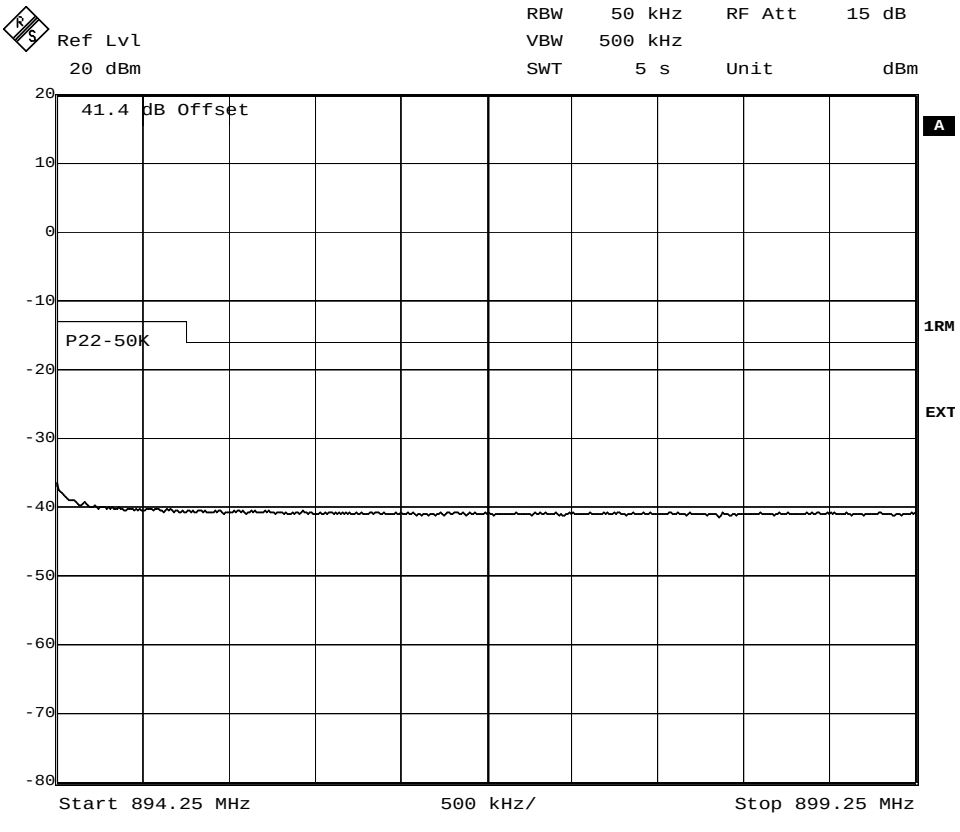
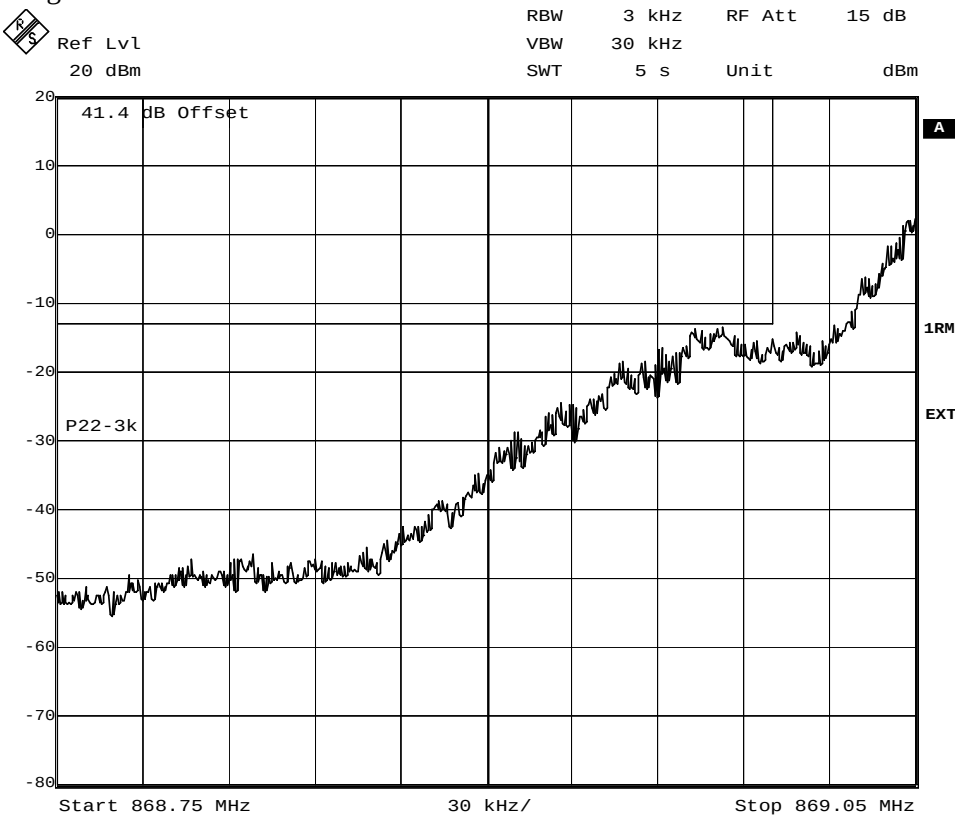

RBW 50 kHz
RF Att 15 dB
VBW 500 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 22.AUG.2006 10:35:45

Diagram 3


RBW 3 kHz
RF Att 15 dB
VBW 30 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-3k
Start 868.75 MHz
30 kHz/
Stop 869.05 MHz
Date: 22.AUG.2006 11:10:57

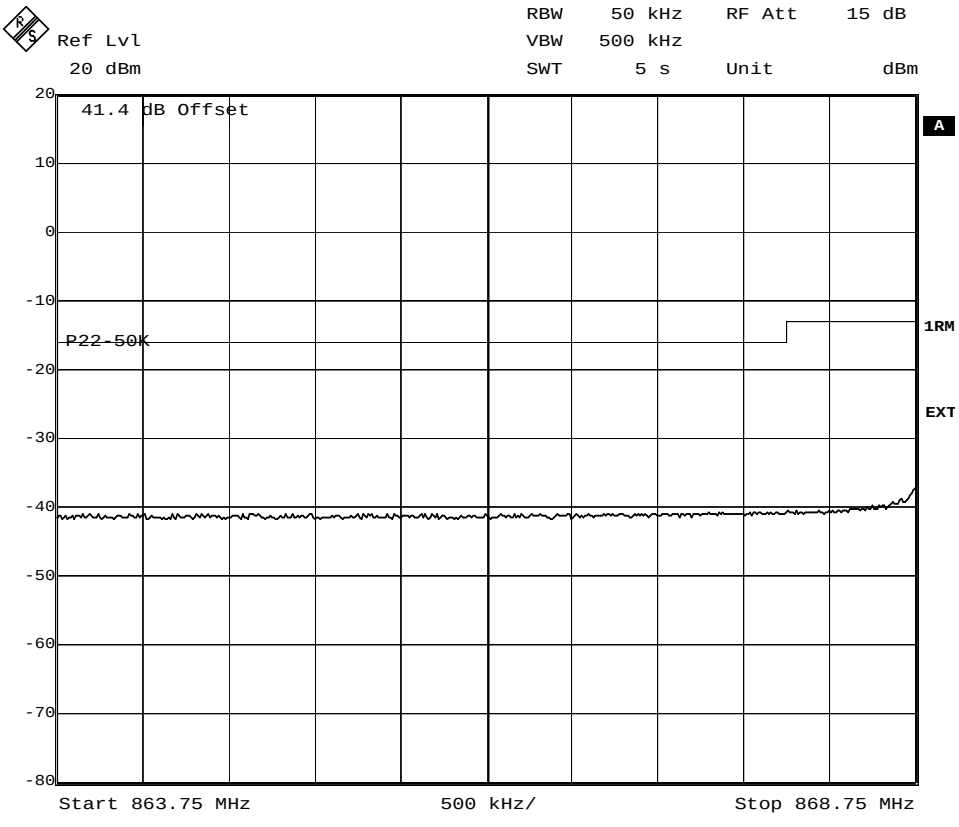
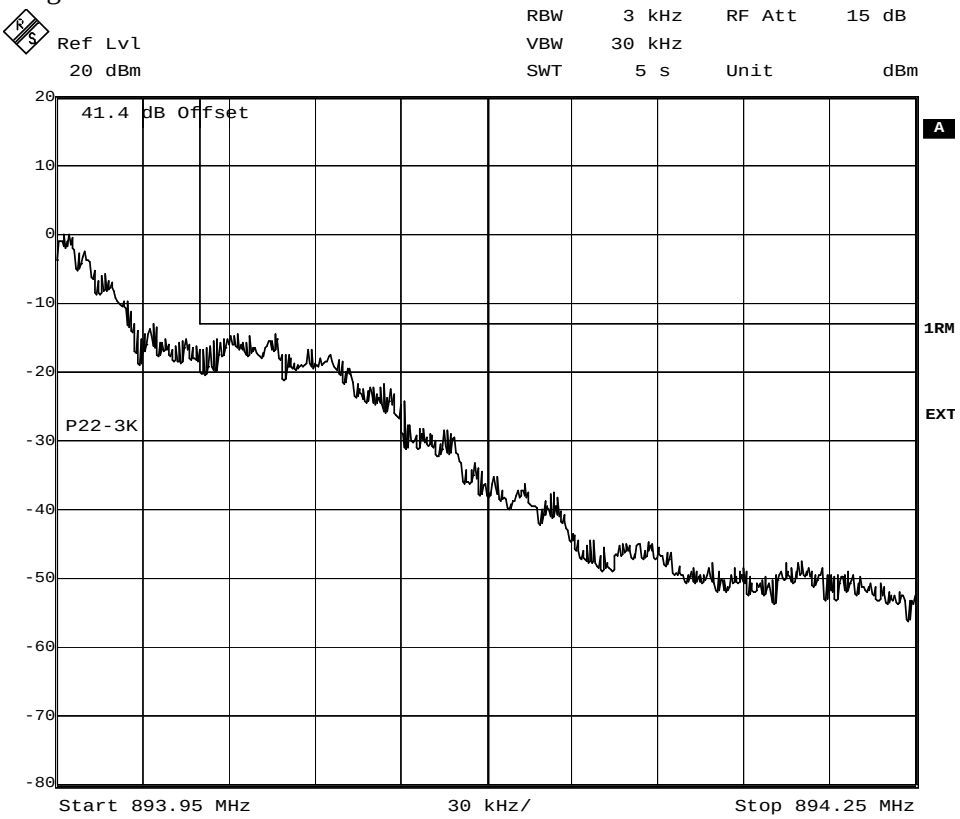

RBW 50 kHz
RF Att 15 dB
VBW 500 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-50K
Start 863.75 MHz
500 kHz/
Stop 868.75 MHz
Date: 22.AUG.2006 11:09:22

Diagram 4


RBW 3 kHz
RF Att 15 dB
VBW 30 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 893.95 MHz
30 kHz/
Stop 894.25 MHz
Date: 22.AUG.2006 11:19:43

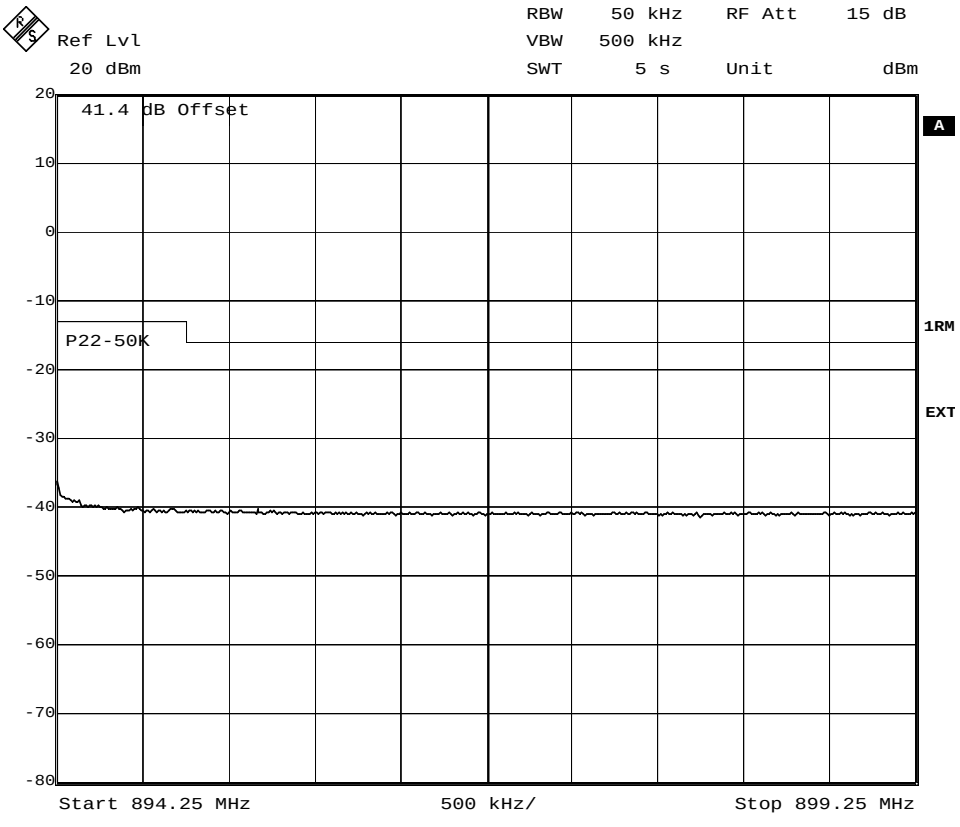
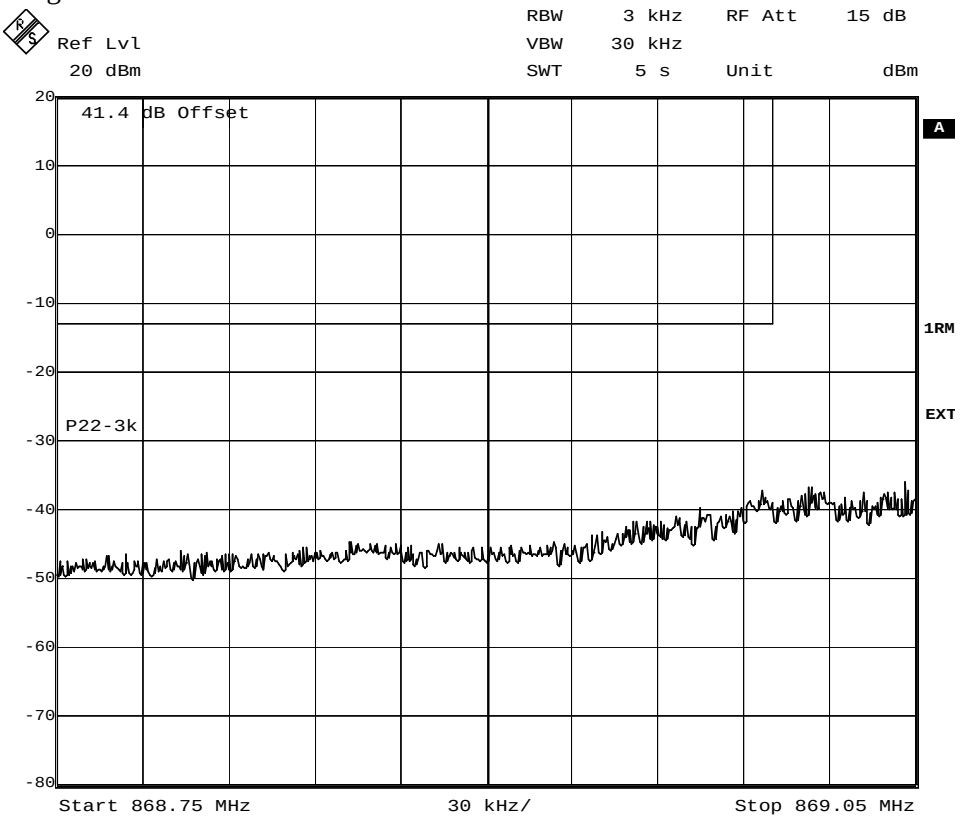
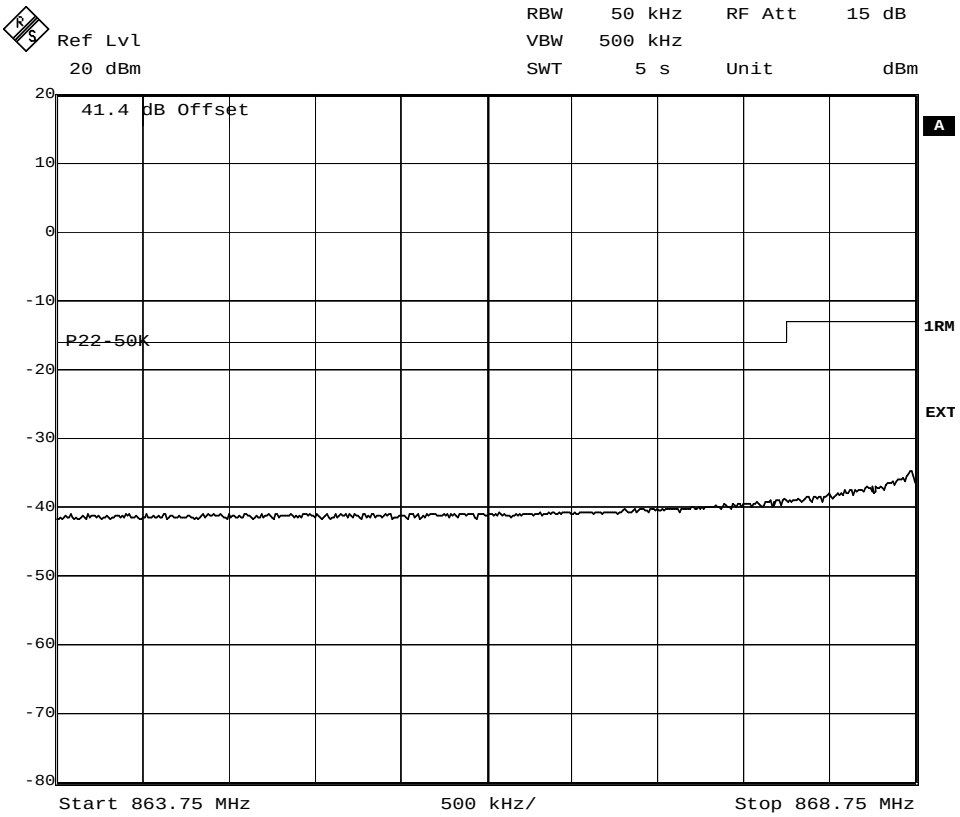

RBW 50 kHz
RF Att 15 dB
VBW 500 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 22.AUG.2006 11:19:14

Diagram 5

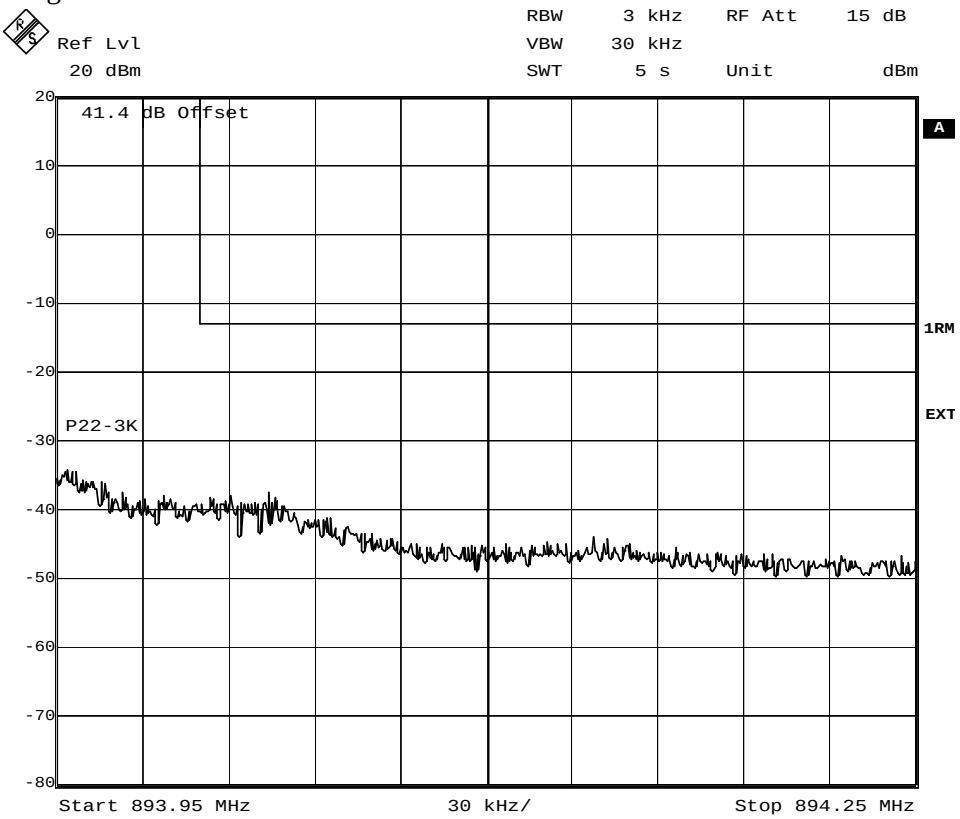


Date: 22.AUG.2006 13:46:10

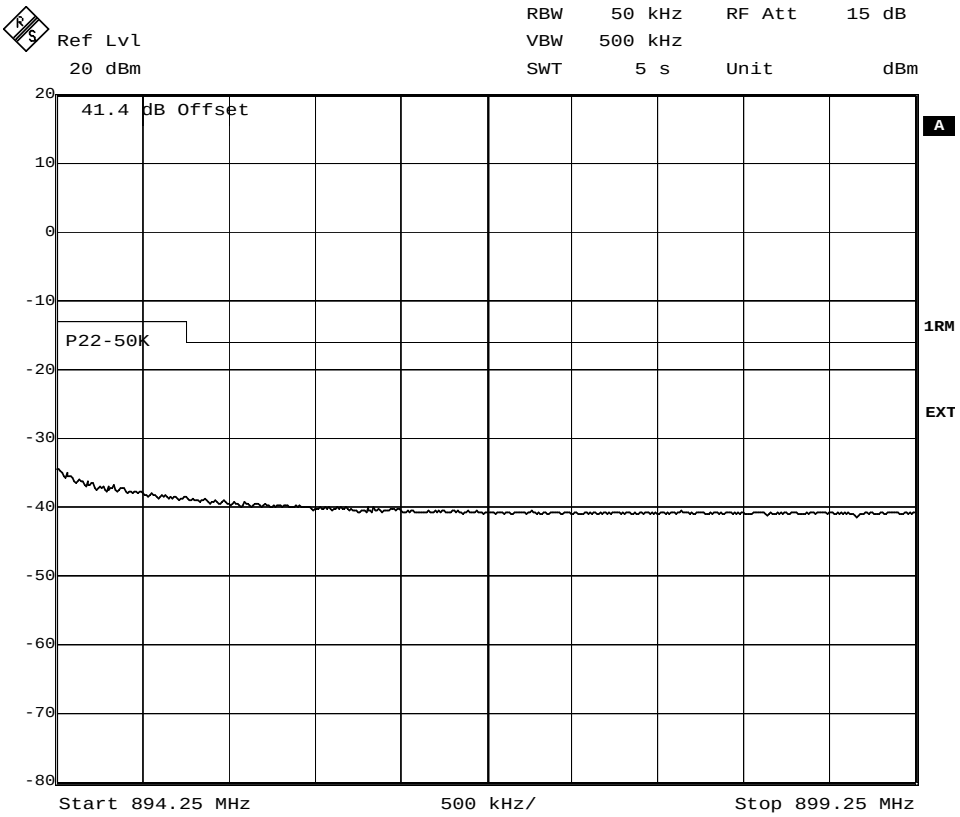


Date: 22.AUG.2006 13:46:57

Diagram 6

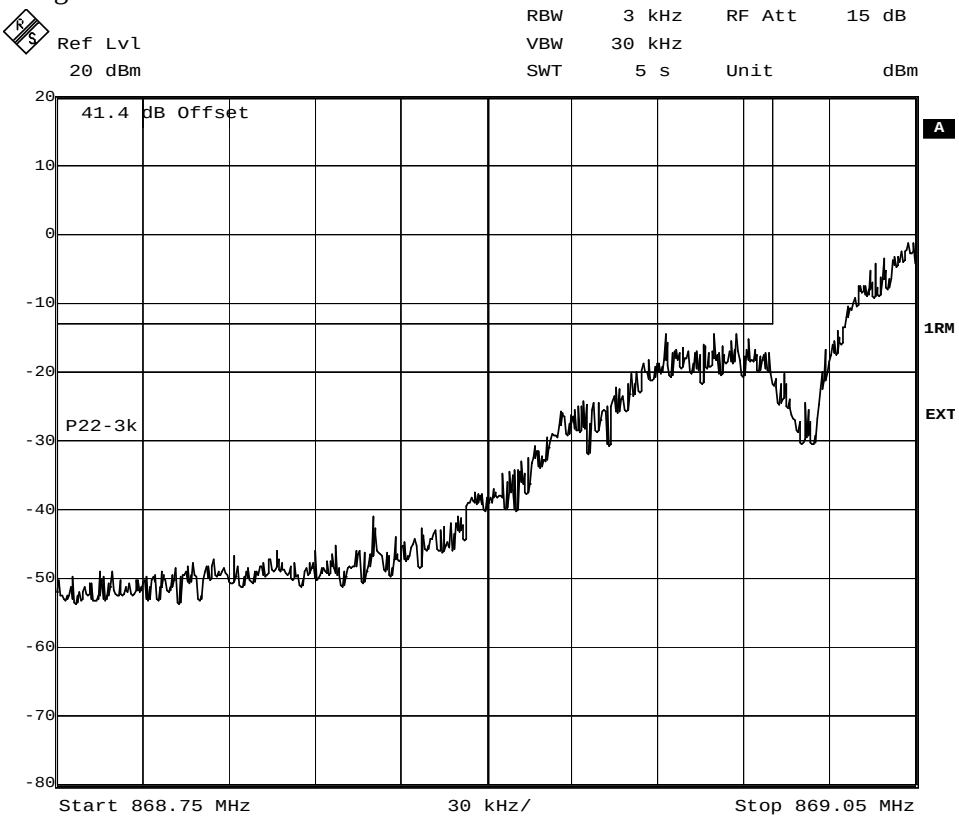


Date: 22.AUG.2006 13:57:30



Date: 22.AUG.2006 13:56:03

Diagram 7


RBW 3 kHz
RF Att 15 dB
VBW 30 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-3k
Start 868.75 MHz
30 kHz/
Stop 869.05 MHz
Date: 22.AUG.2006 11:05:23

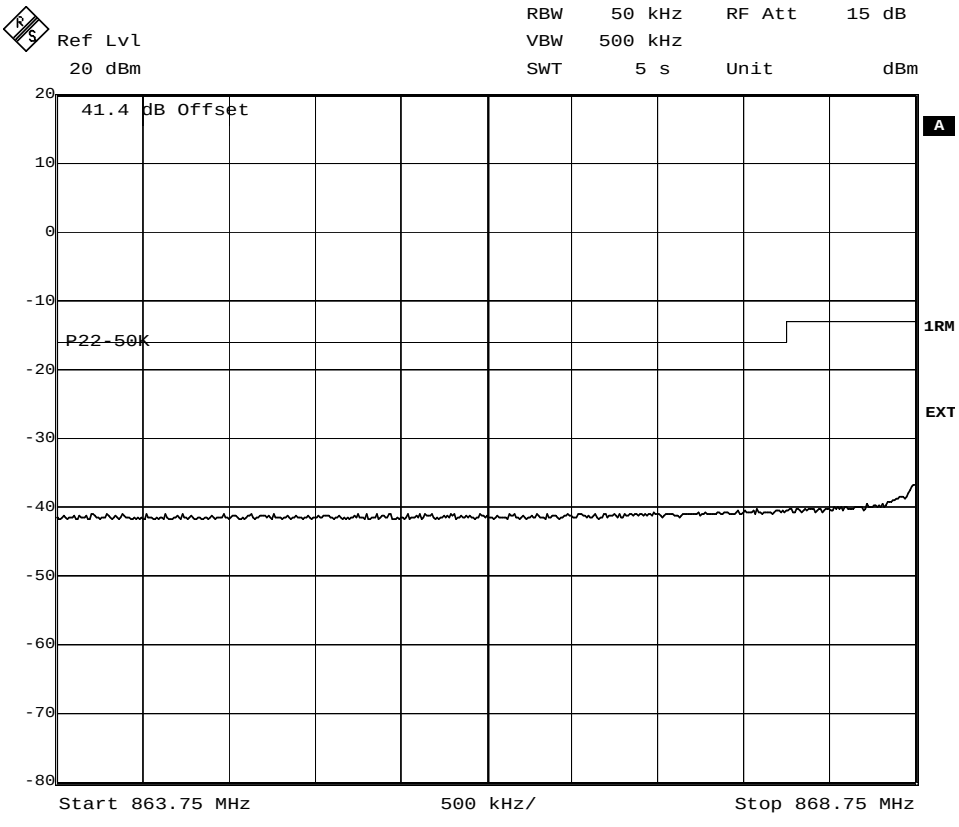
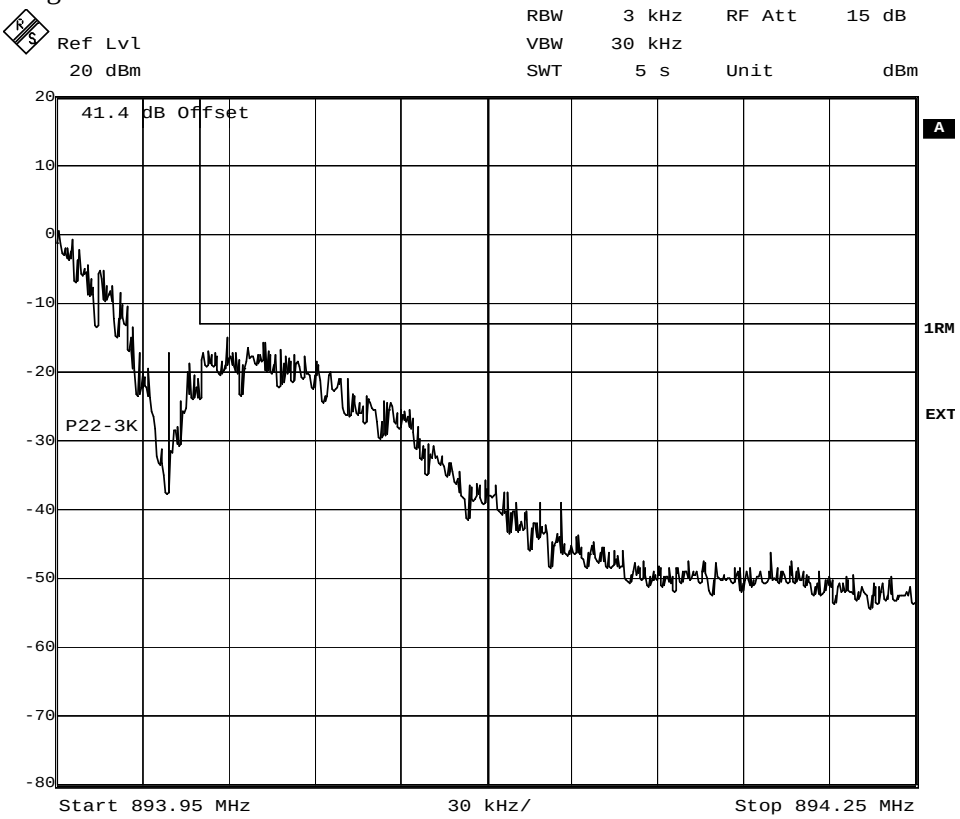
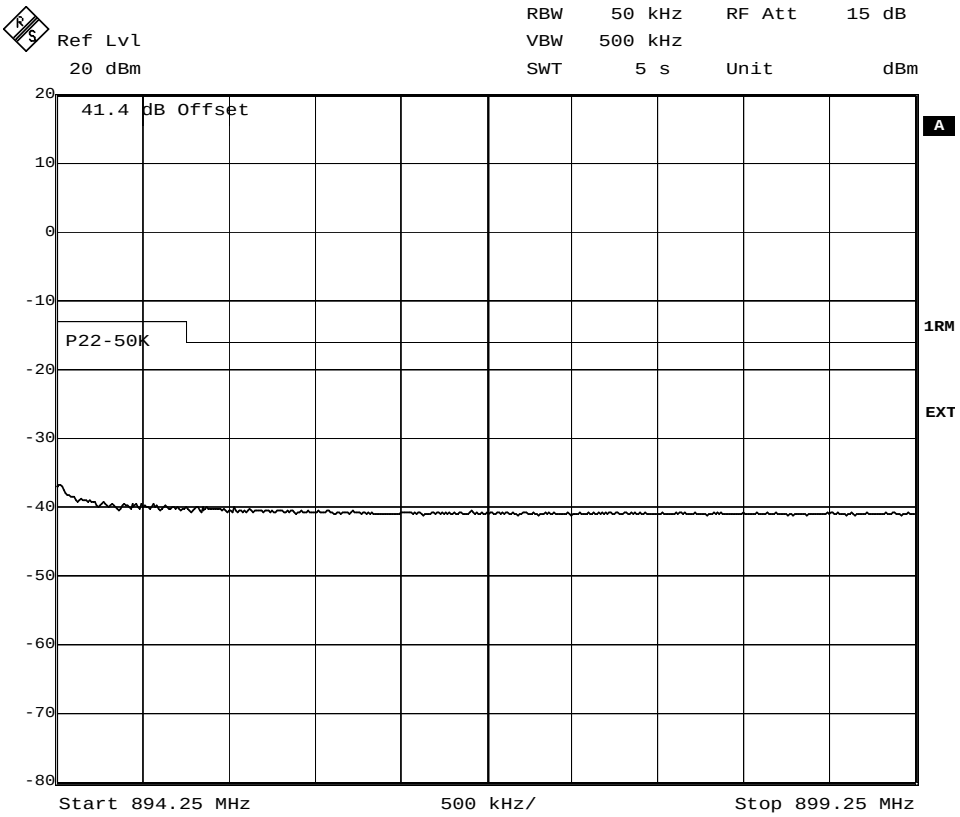

RBW 50 kHz
RF Att 15 dB
VBW 500 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P22-50K
Start 863.75 MHz
500 kHz/
Stop 868.75 MHz
Date: 22.AUG.2006 11:05:55

Diagram 8

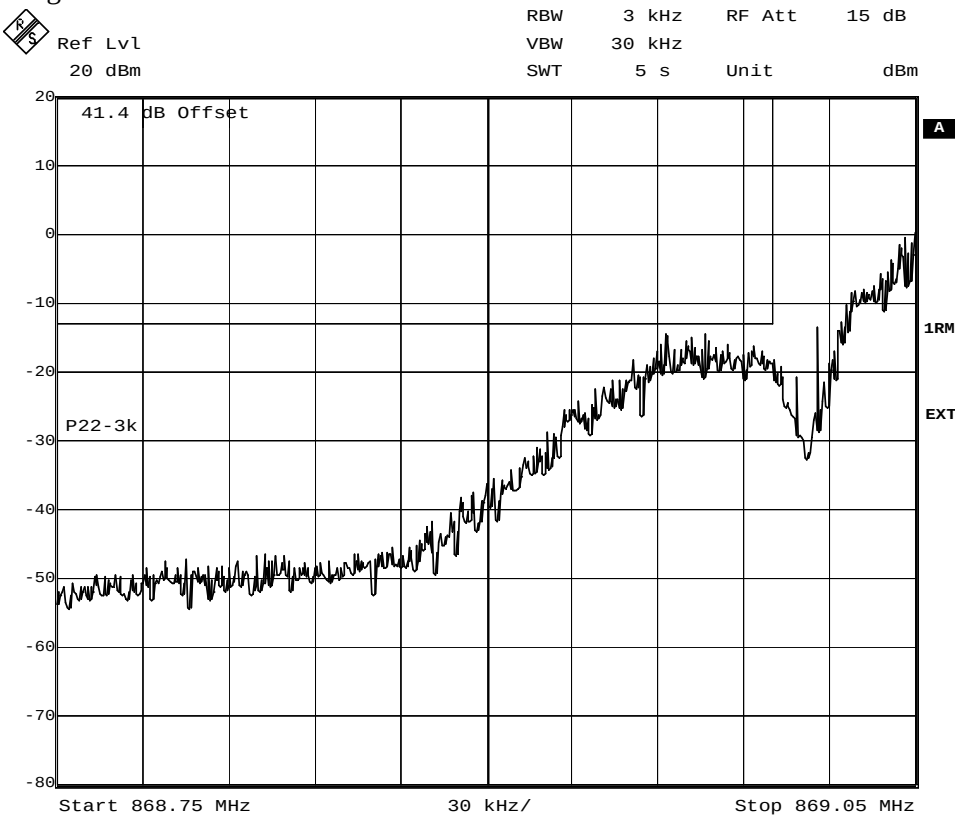


Date: 22.AUG.2006 10:58:53

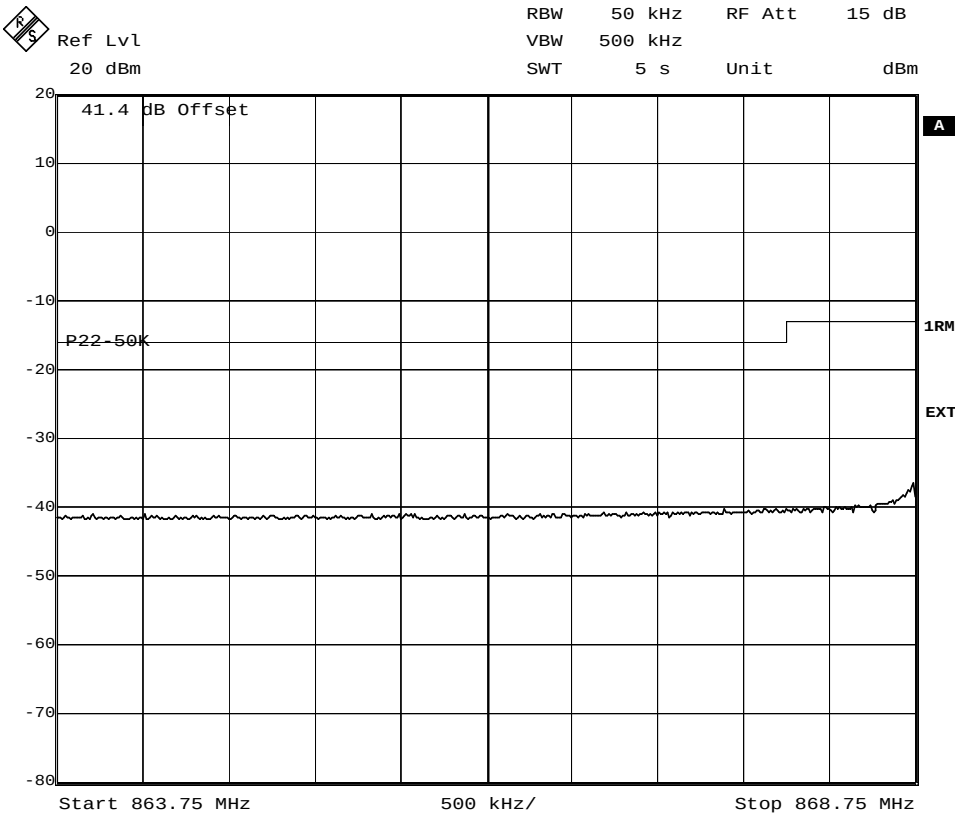


Date: 22.AUG.2006 10:58:19

Diagram 9

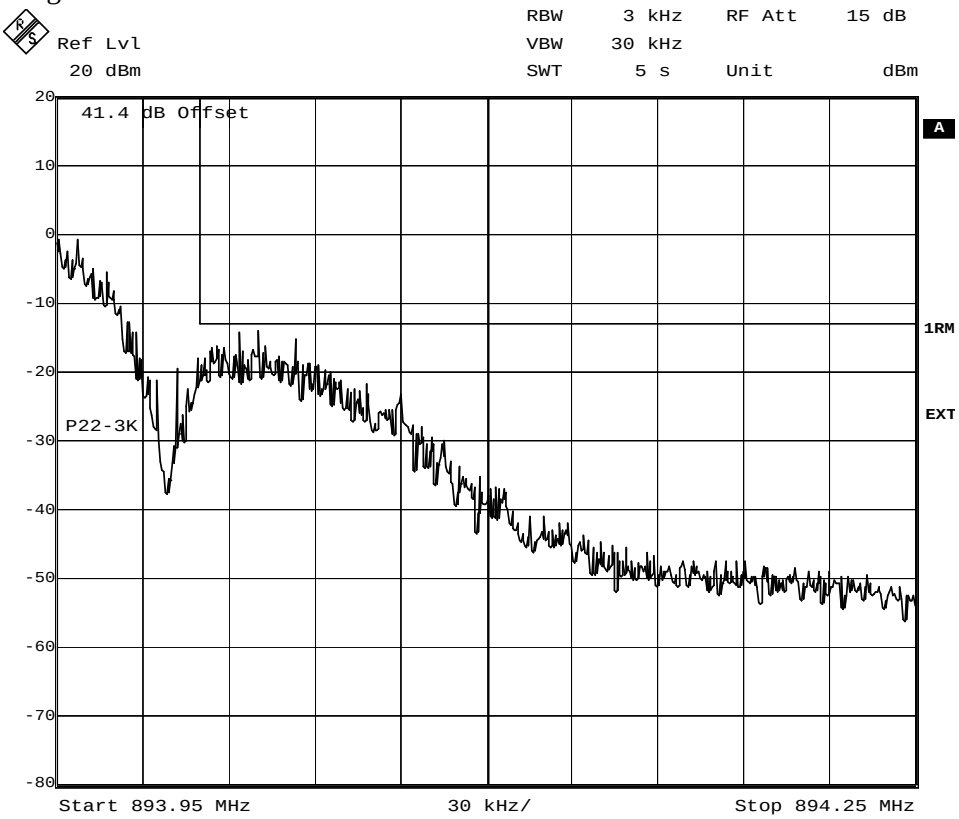


Date: 22.AUG.2006 11:13:00

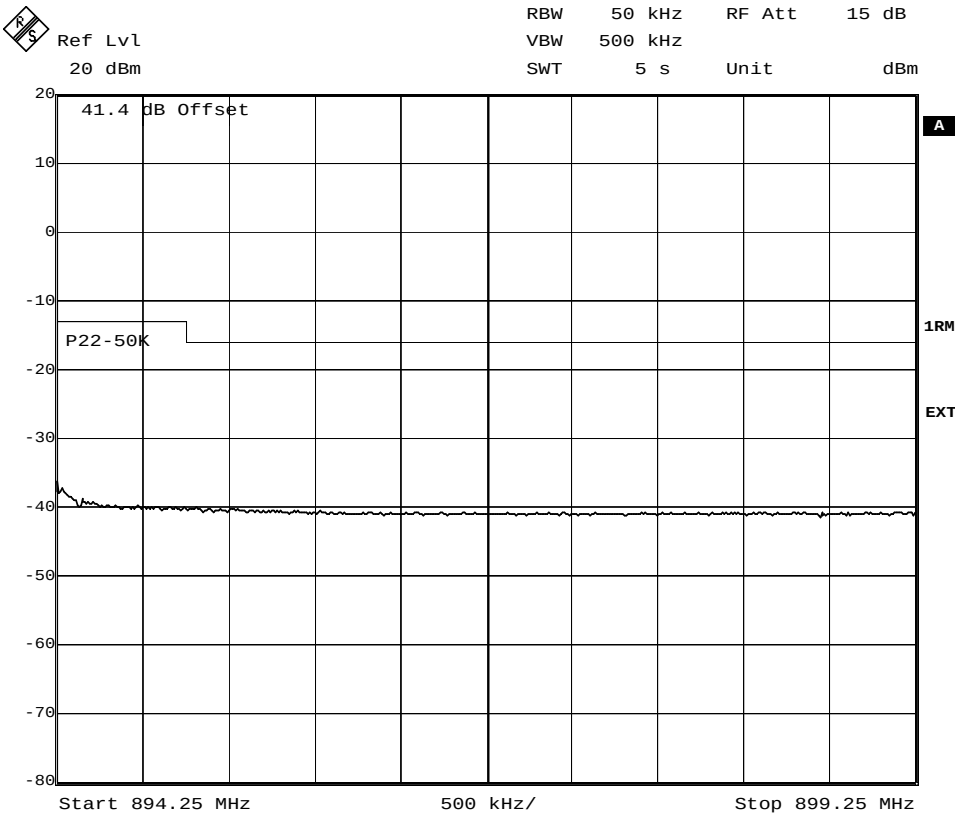


Date: 22.AUG.2006 11:14:01

Diagram 10

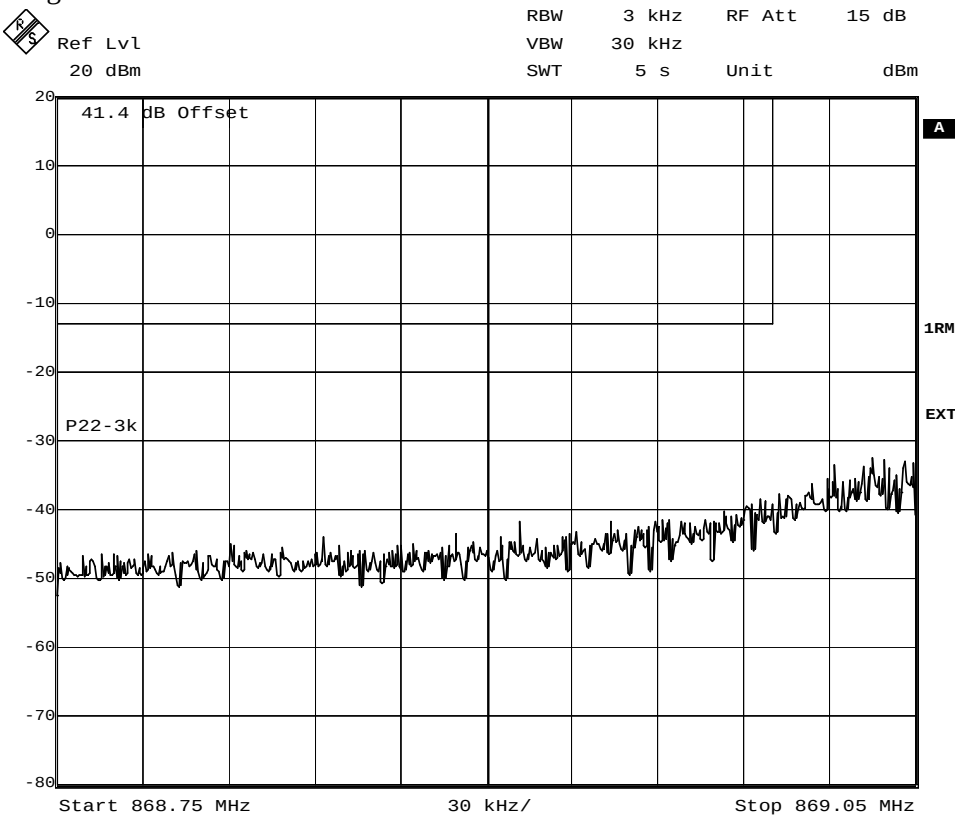


Date: 22.AUG.2006 11:16:24

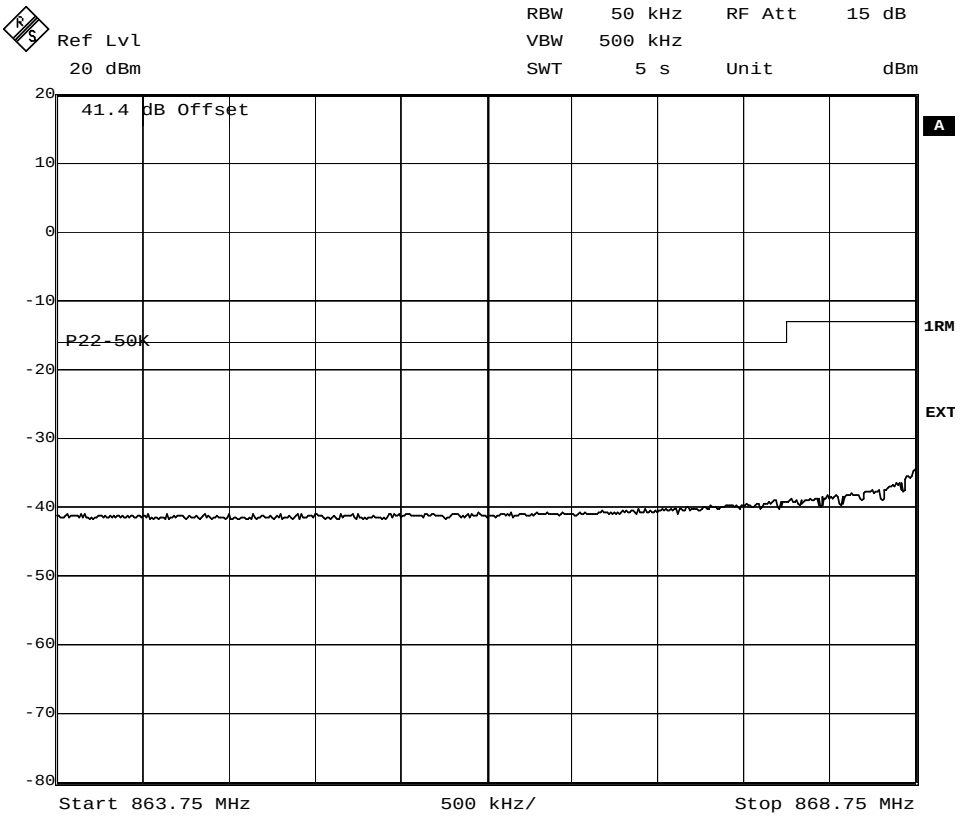


Date: 22.AUG.2006 11:17:28

Diagram 11

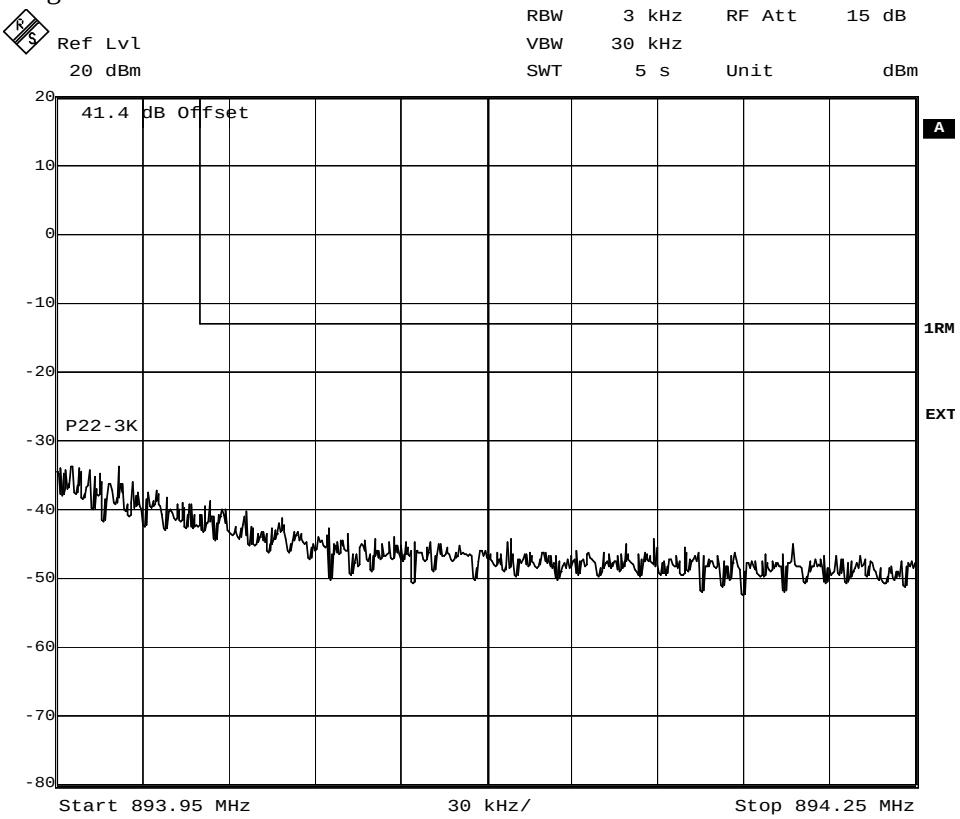


Date: 22.AUG.2006 13:50:23

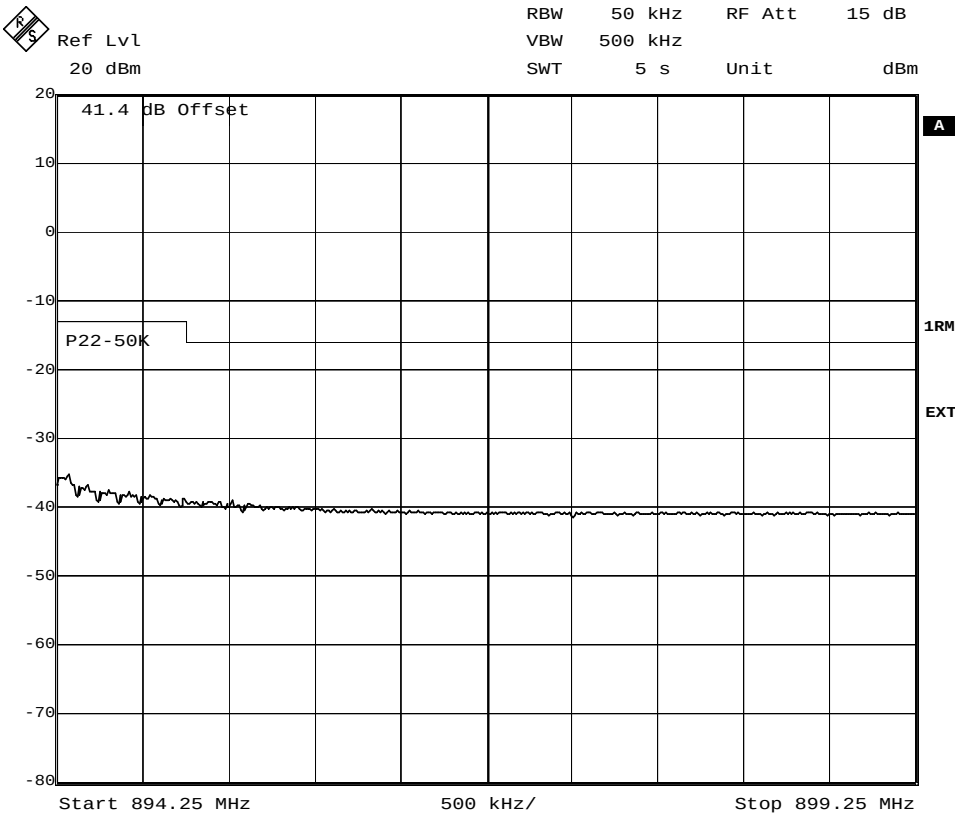


Date: 22.AUG.2006 13:49:25

Diagram 12



Date: 22.AUG.2006 13:52:34



Date: 22.AUG.2006 13:52:57

Conducted spurious emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2006-08-21	22 °C ± 3 °C	68 % ± 5 %
2006-08-22	23 °C ± 3 °C	60 % ± 5 %

Test set-up and procedure

The measurements were made per definition in 22.917. Measurements were made at CDU-G8 output connector. The output was connected to a spectrum analyser. A pre-measurement was performed with the peak detector, spurious emissions close to or above the limit was measured with the RMS detector. The spectrum analyser was connected to an external 10 MHz reference standard during the measurements. The transmitter was activated at maximum output power and modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2007-08	503 738
HP filter	2007-07	502 758
Testo 610, Temperature and humidity meter	2006-12	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 6.1

GMSK

dTRU, with internal combiner plus TCC:

Diagram 1: Ch 128, 49.0 dBm
Diagram 2: Ch 190, 49.0 dBm
Diagram 3: Ch 251, 49.0 dBm

dTRU, without internal combiner:

Diagram 4: TRX output 1, Ch 128, 46.3 dBm
Diagram 5: TRX output 1, Ch 190, 46.3 dBm
Diagram 6: TRX output 1, Ch 251, 46.3 dBm
Diagram 7: TRX output 2, Ch 128, 46.3 dBm
Diagram 8: TRX output 2, Ch 190, 46.3 dBm
Diagram 9: TRX output 2, Ch 251, 46.3 dBm

dTRU, with internal combiner:

Diagram 10: Ch 128, 43.0 dBm and ch 153, 43.0 dBm
Diagram 11: Ch 226, 43.0 dBm and ch 251, 43.0 dBm

8-PSK

dTRU, with internal combiner plus TCC:

Diagram 12: Ch 128, 45.7 dBm
Diagram 13: Ch 190, 45.7 dBm
Diagram 14: Ch 251, 45.7 dBm

dTRU, without internal combiner:

Diagram 15: TRX output 1, Ch 128, 43.0 dBm
Diagram 16: TRX output 1, Ch 190, 43.0 dBm
Diagram 17: TRX output 1, Ch 251, 43.0 dBm
Diagram 18: TRX output 2, Ch 128, 43.0 dBm
Diagram 19: TRX output 2, Ch 190, 43.0 dBm
Diagram 20: TRX output 2, Ch 251, 43.0 dBm

dTRU, with internal combiner:

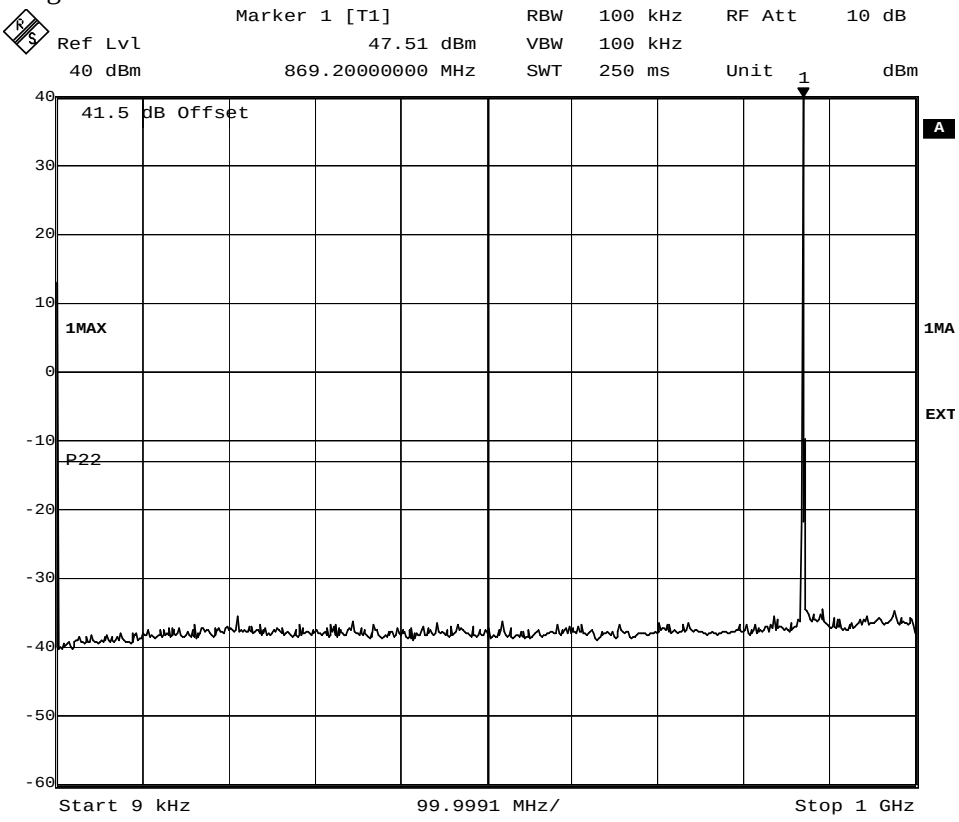
Diagram 21: Ch 128, 39.7 dBm and ch 153, 39.7 dBm
Diagram 22: Ch 226, 39.7 dBm and ch 251, 39.7 dBm

Limits

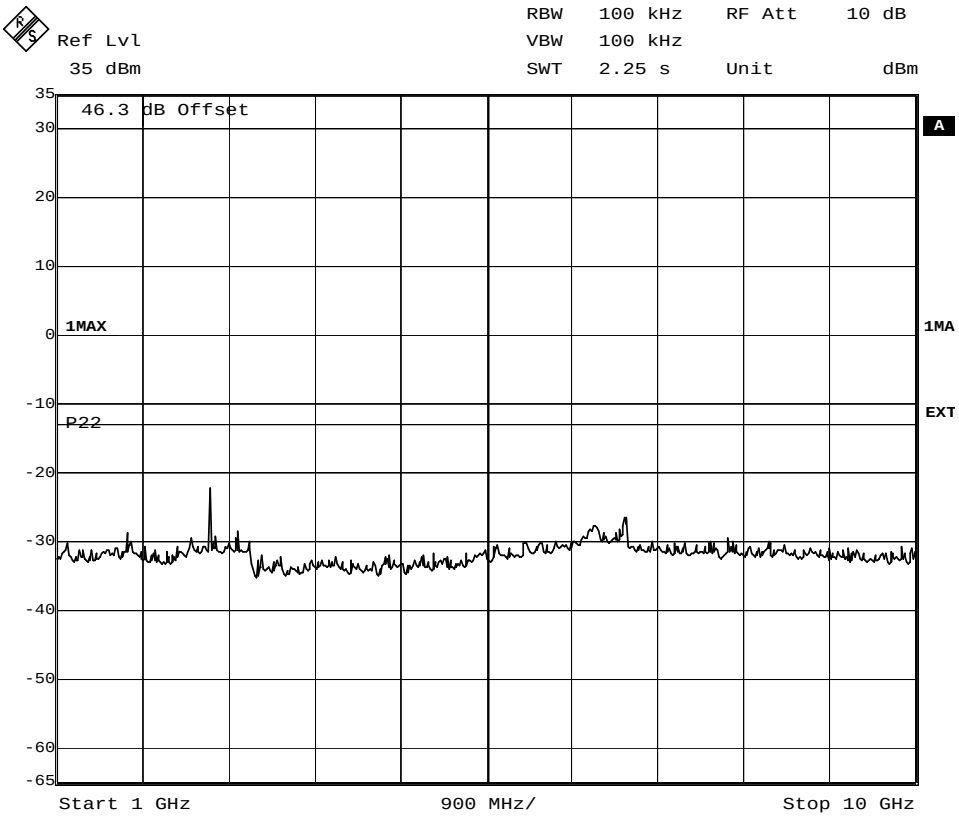
The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least 43 + 10 log P dB.

Complies?	Yes

Diagram 1

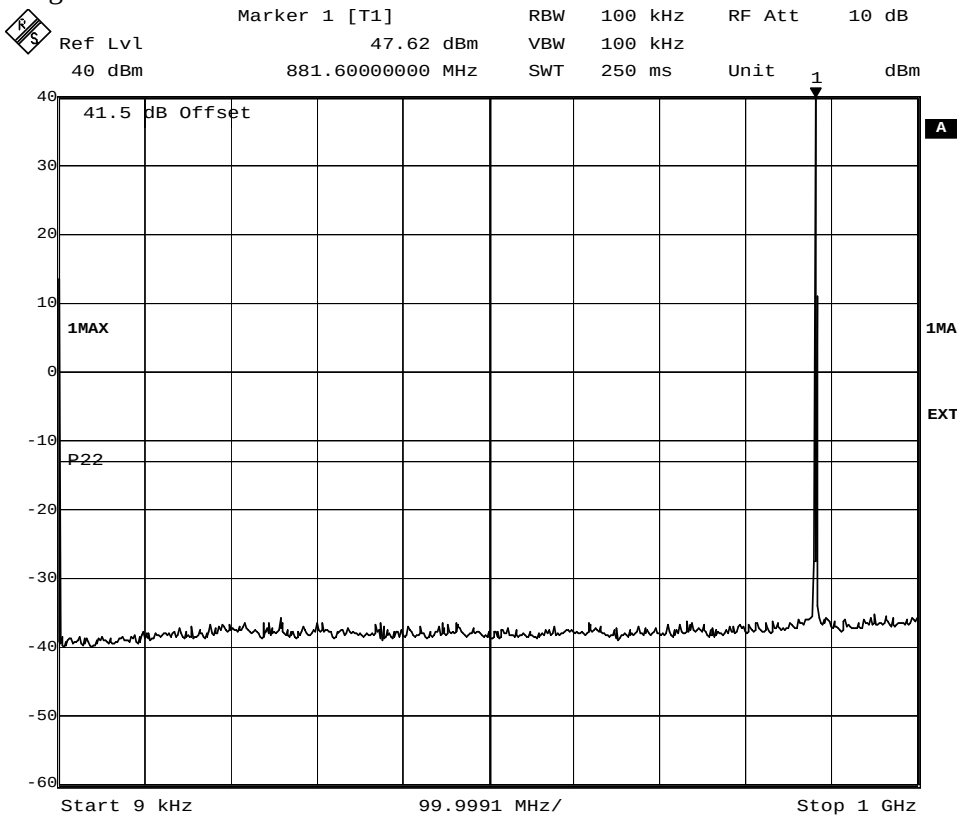


Date: 21.AUG.2006 15:33:16



Date: 21.AUG.2006 15:28:59

Diagram 2


Marker 1 [T1]
Ref Lvl
47.62 dBm
40 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 14:04:29

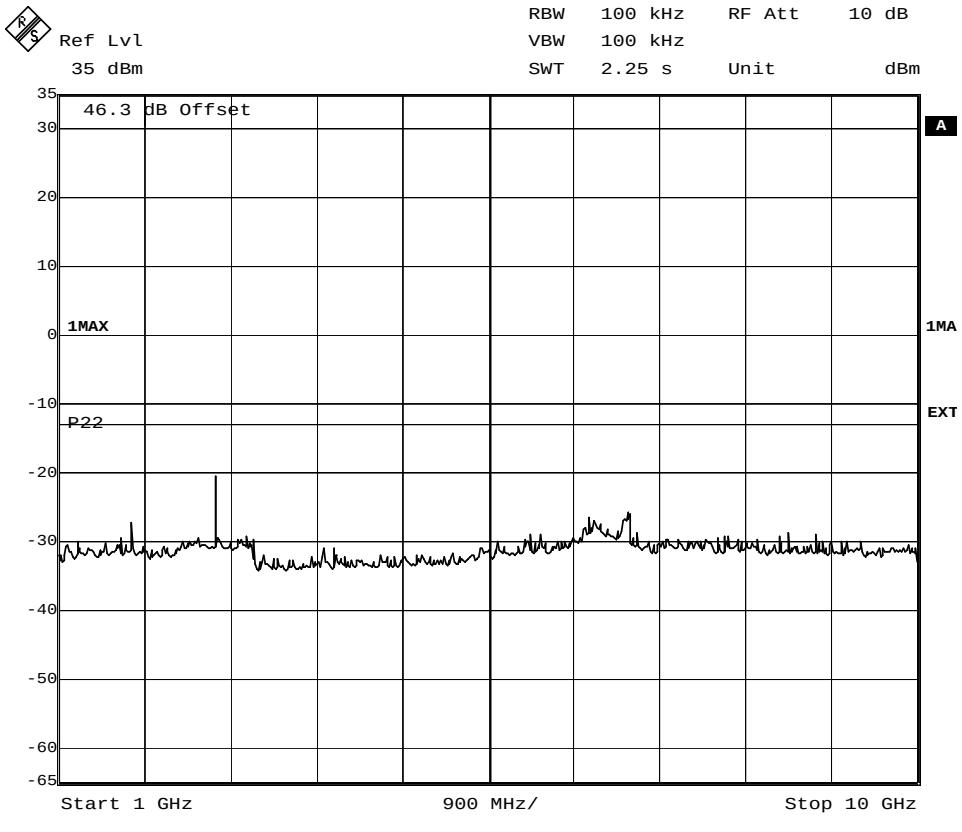
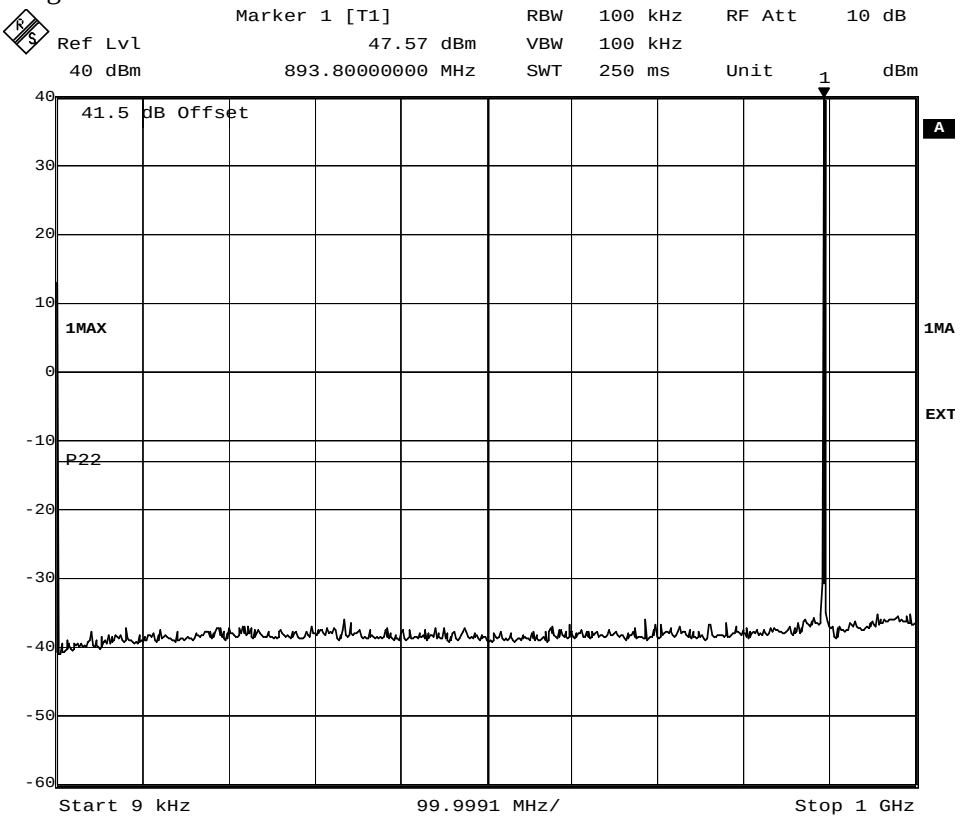

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 15:32:27

Diagram 3


Marker 1 [T1]
Ref Lvl
47.57 dBm
40 dBm
893.80000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 21.AUG.2006 15:34:48

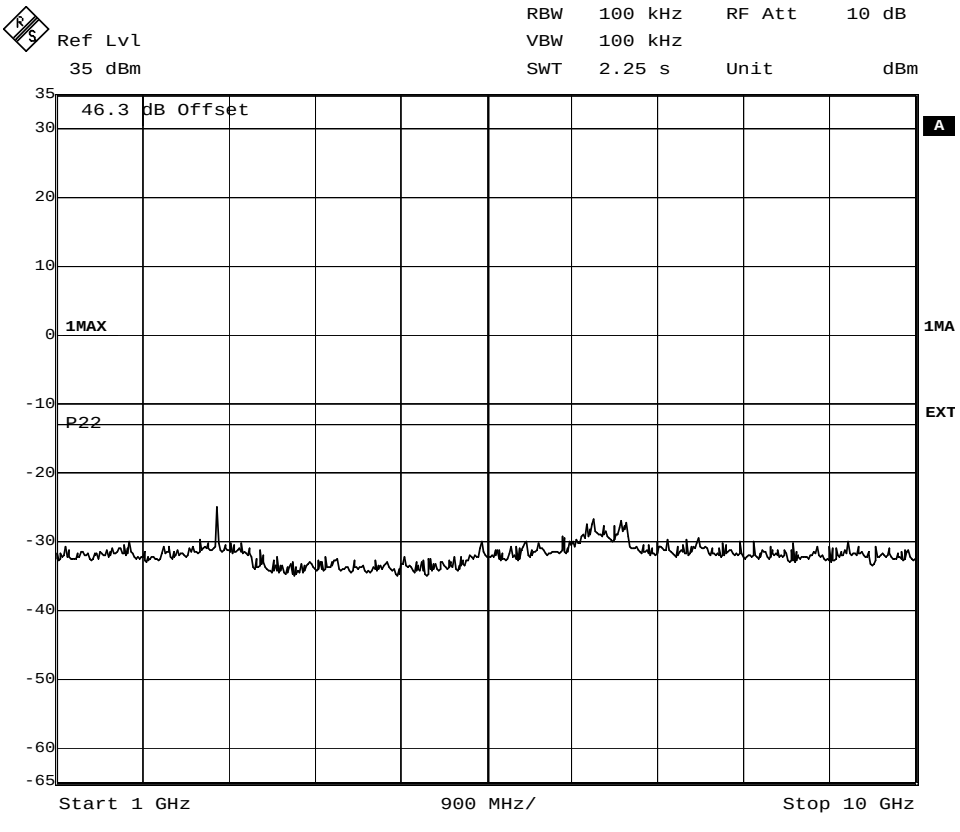
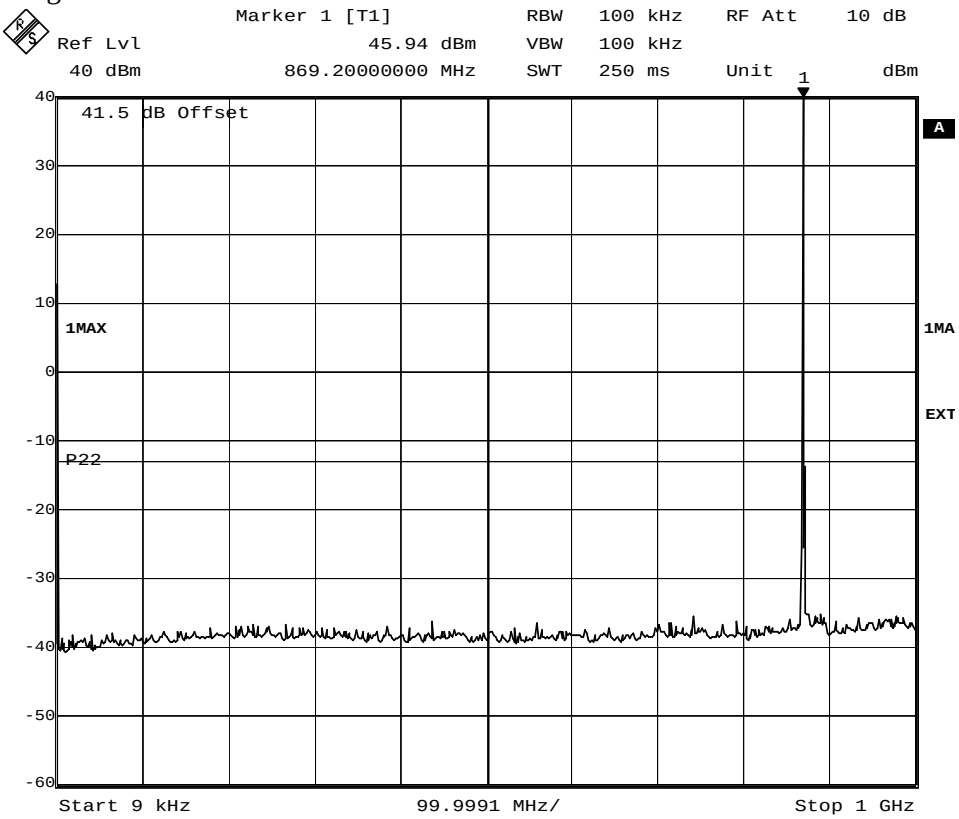

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 21.AUG.2006 15:27:28

Diagram 4


Marker 1 [T1]
Ref Lvl
45.94 dBm
40 dBm
869.20000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 15:51:24

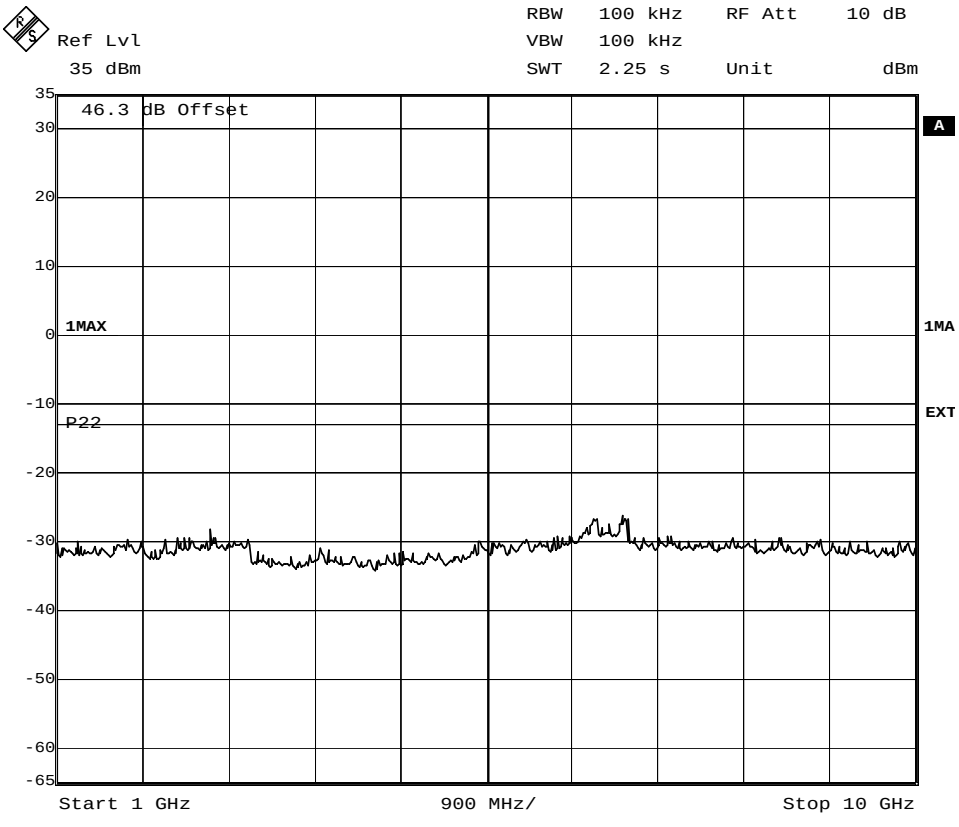
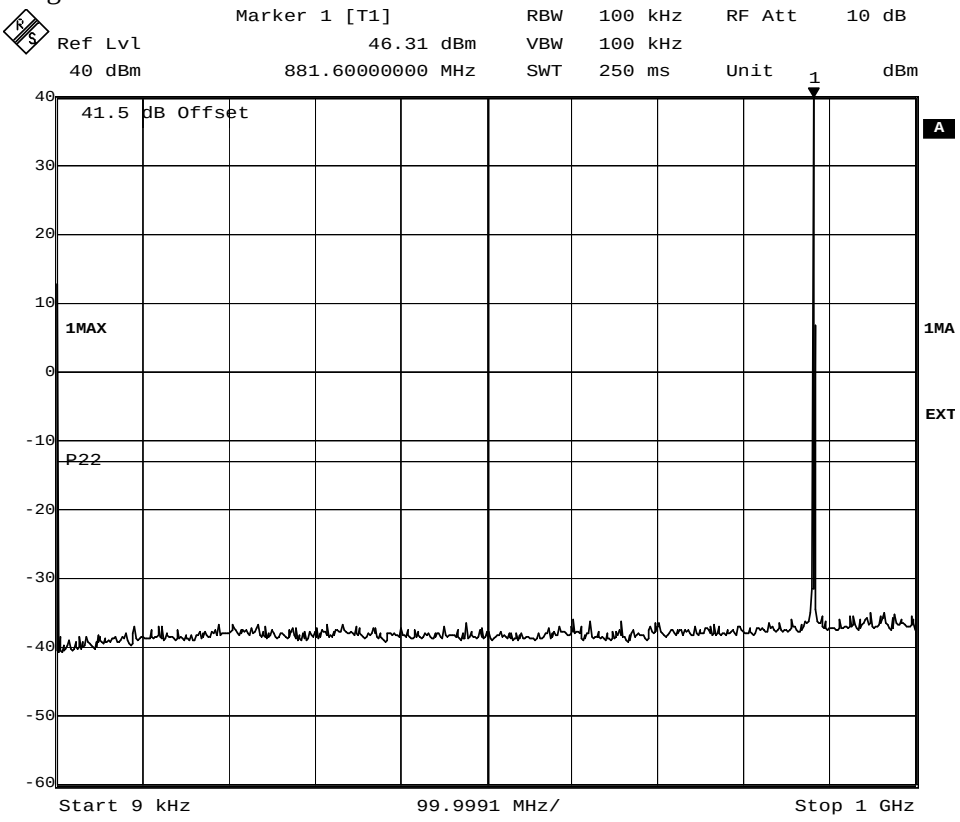

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 15:43:49

Diagram 5


Marker 1 [T1]
Ref Lvl
40 dBm
46.31 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 15:52:16

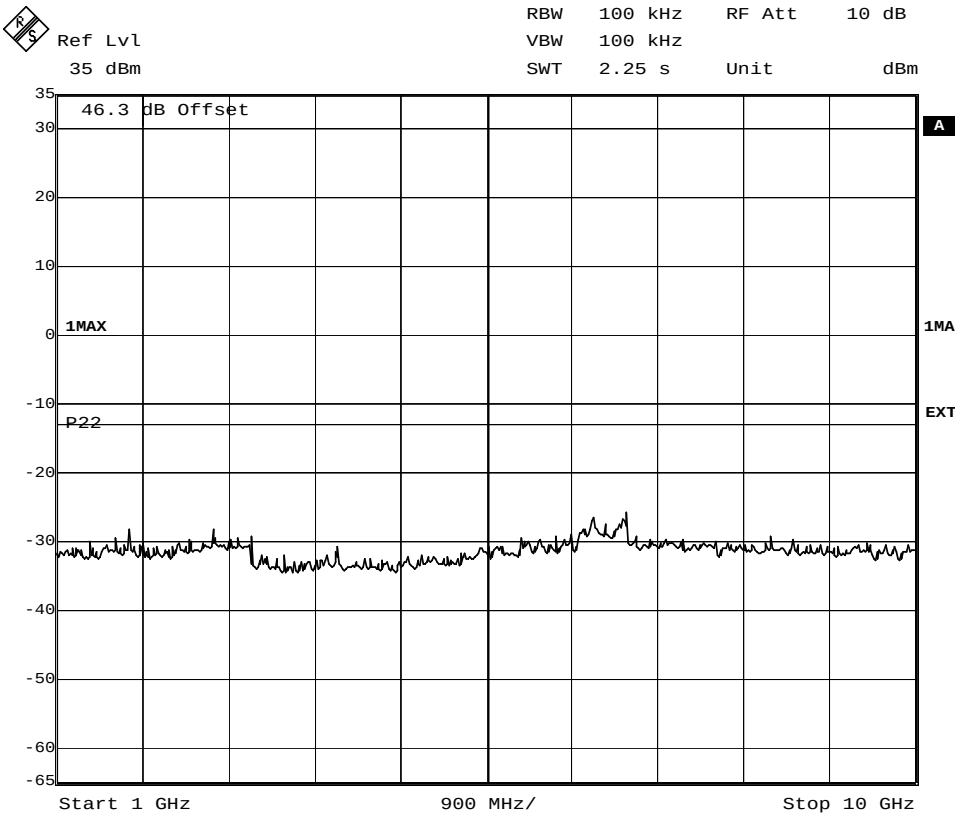
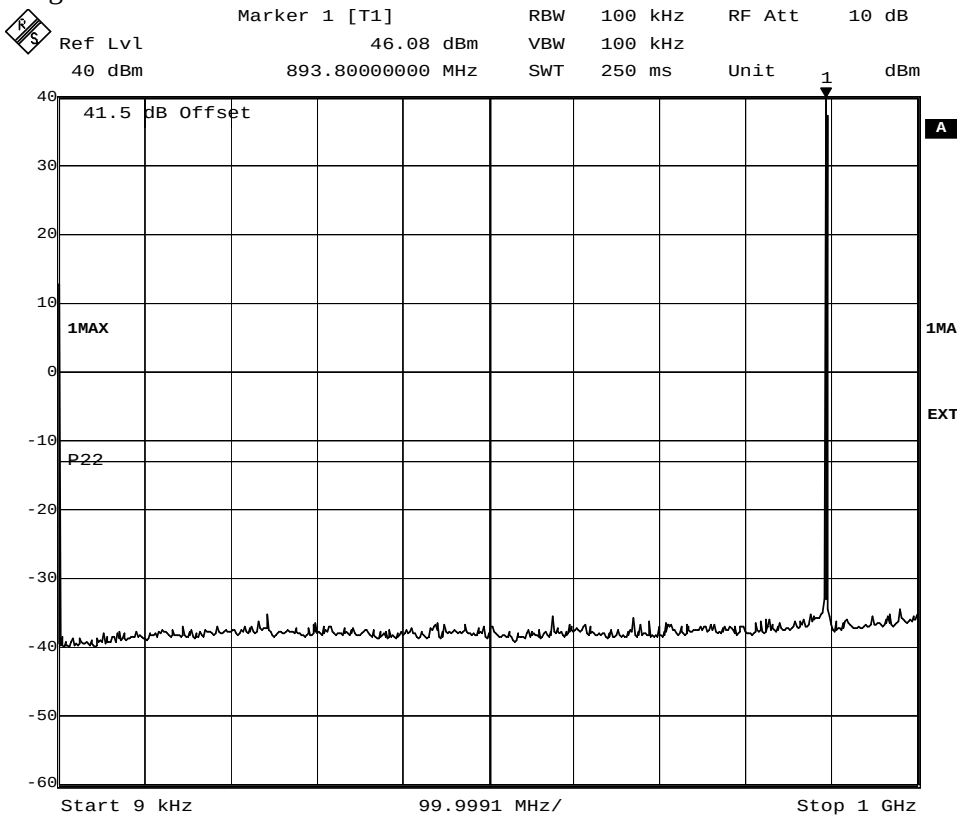

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 15:44:37

Diagram 6


Marker 1 [T1]
Ref Lvl
40 dBm
46.08 dBm
893.80000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 15:55:25

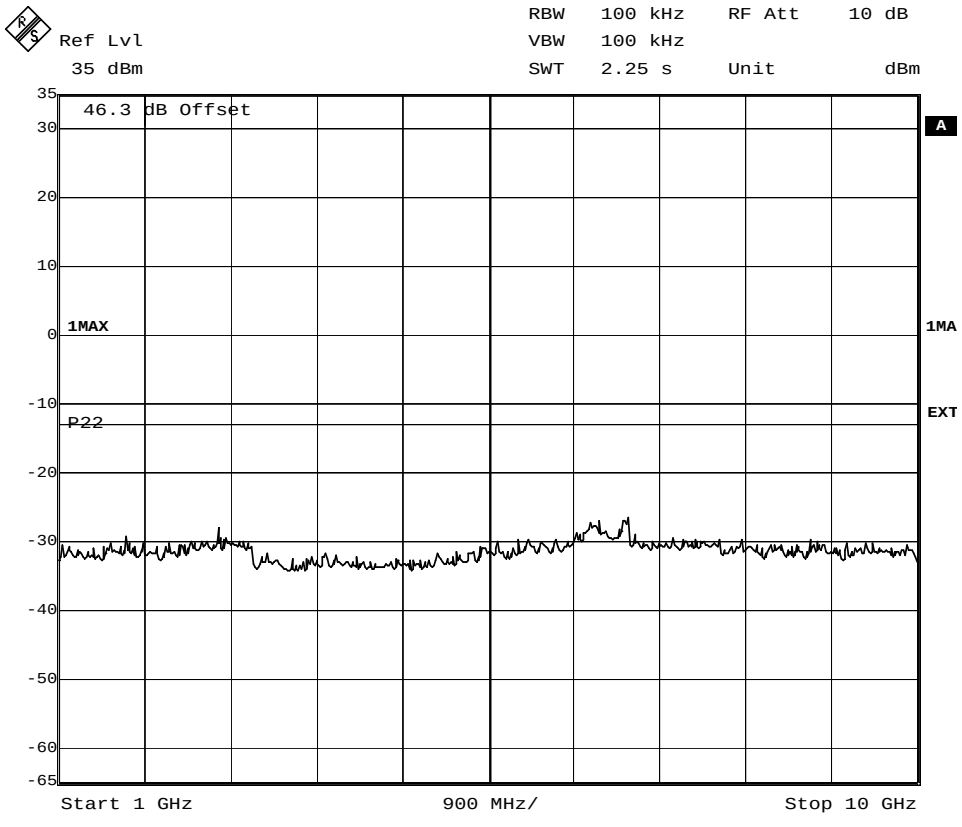
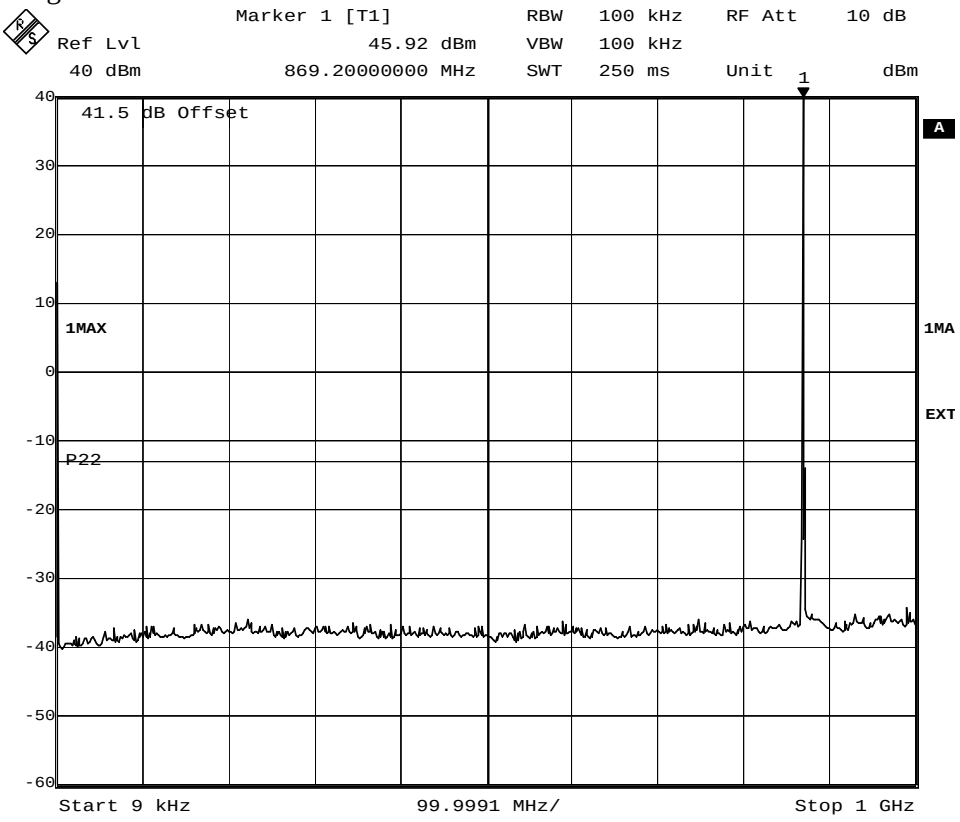

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 15:45:14

Diagram 7


Marker 1 [T1]
Ref Lvl 45.92 dBm
40 dBm 869.20000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 16:05:55

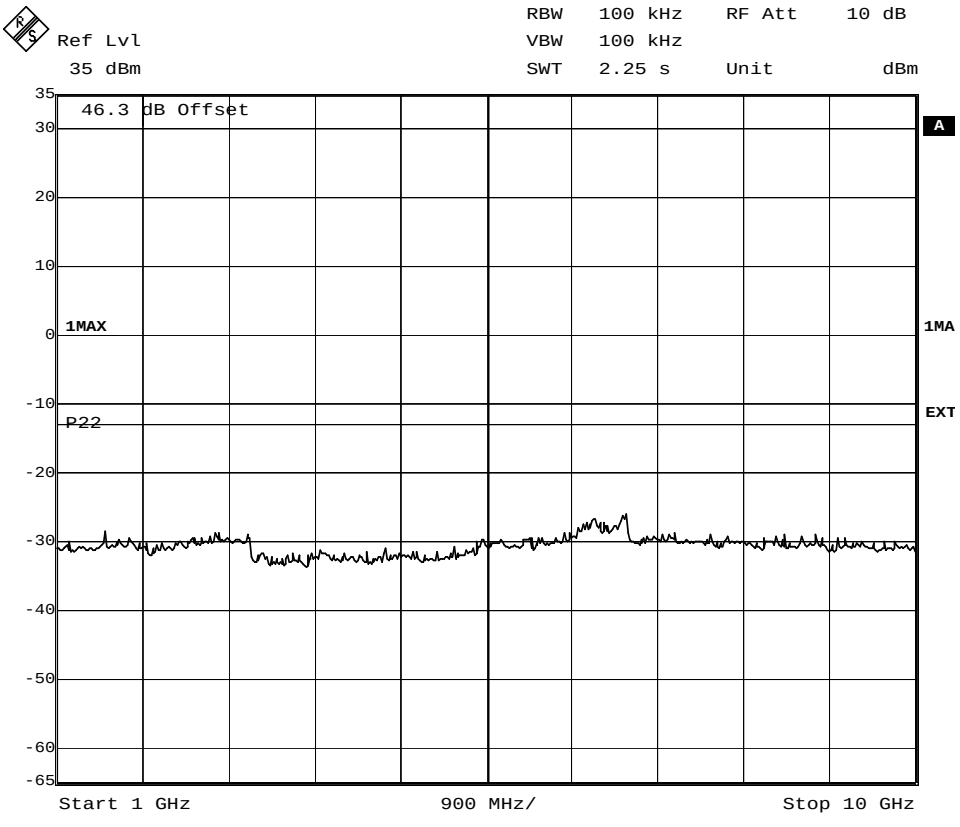
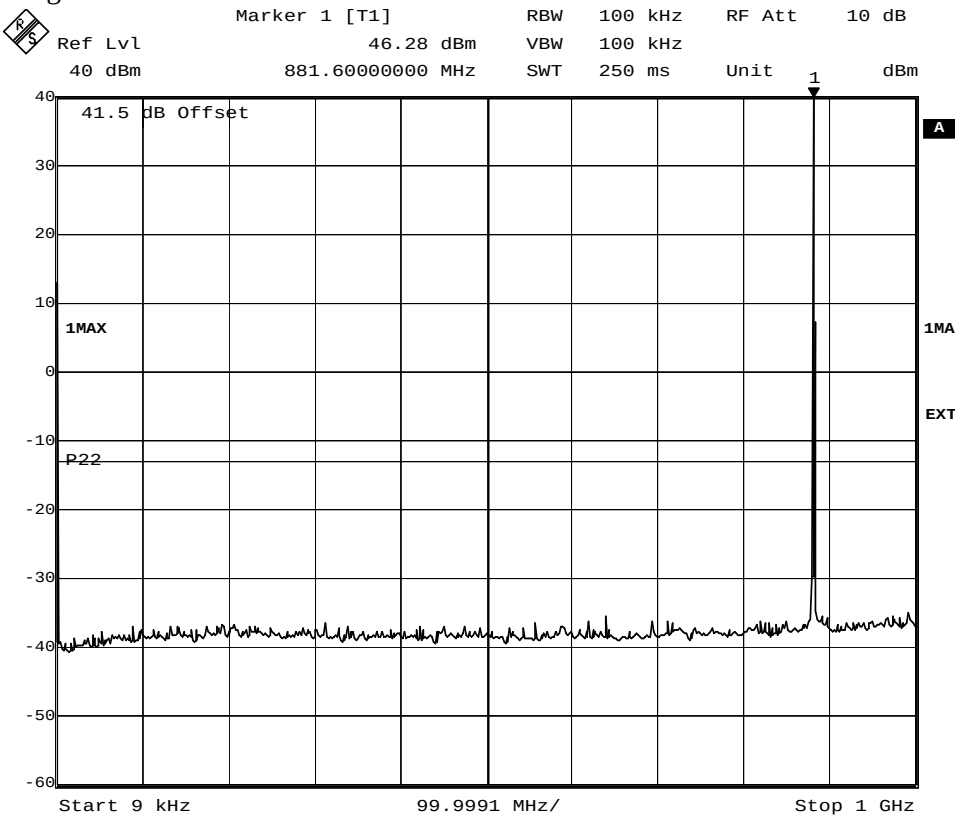

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 16:54:53

Diagram 8


Marker 1 [T1]
Ref Lvl
40 dBm
46.28 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 16:06:39

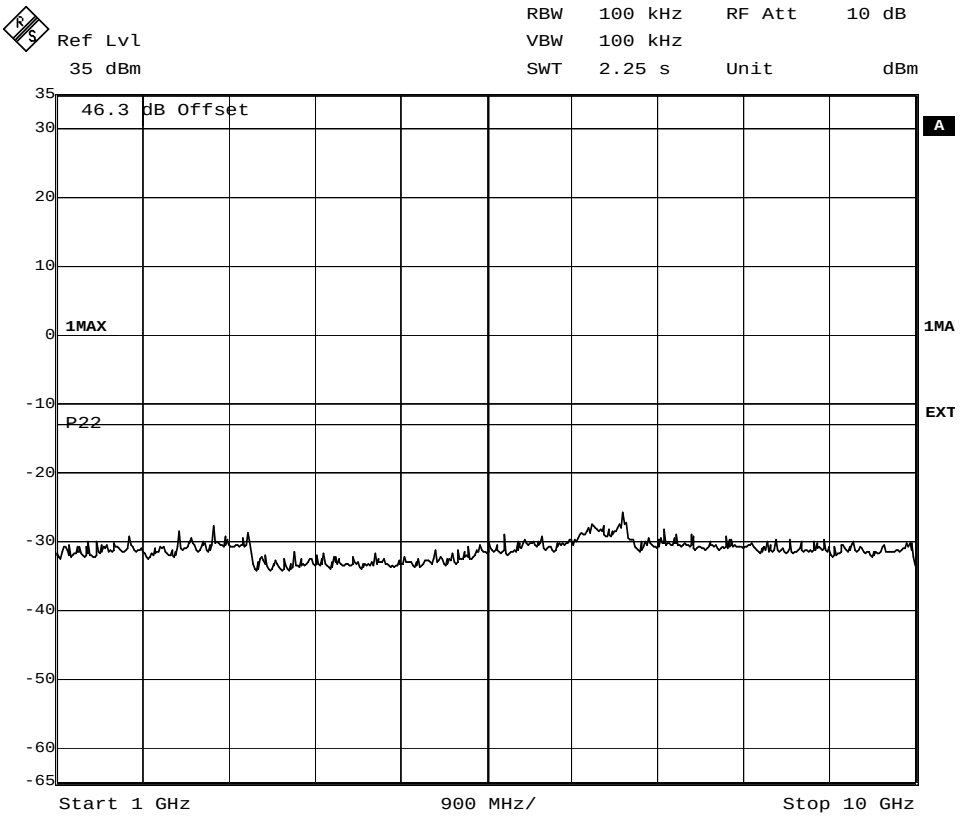
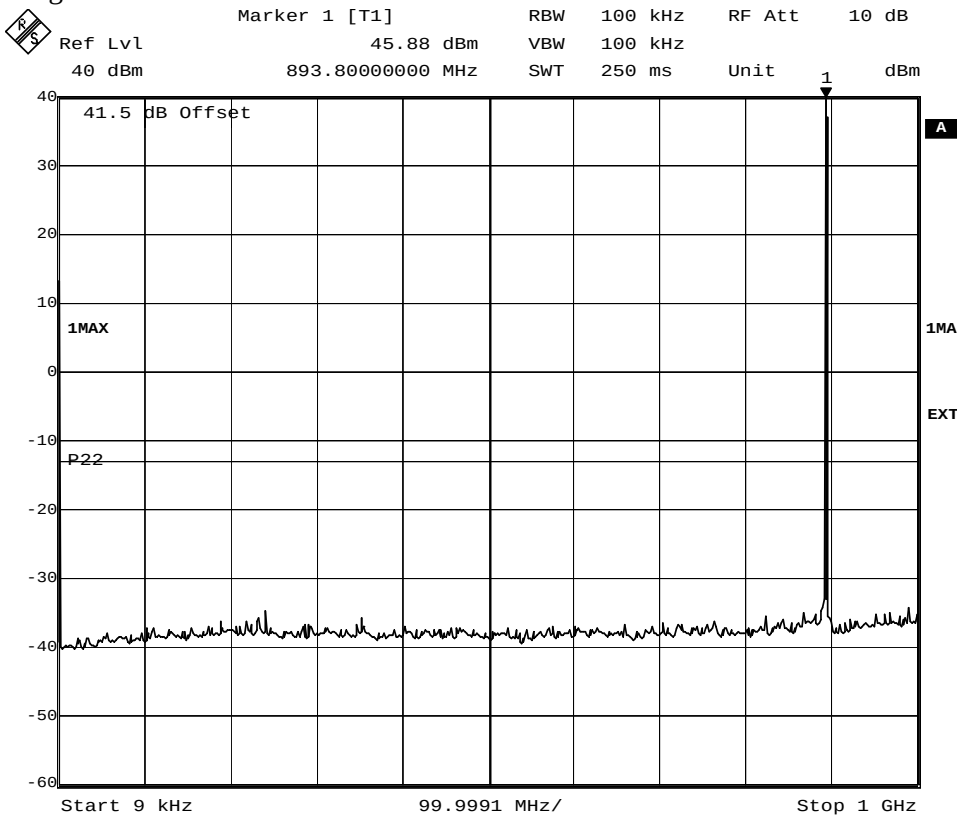
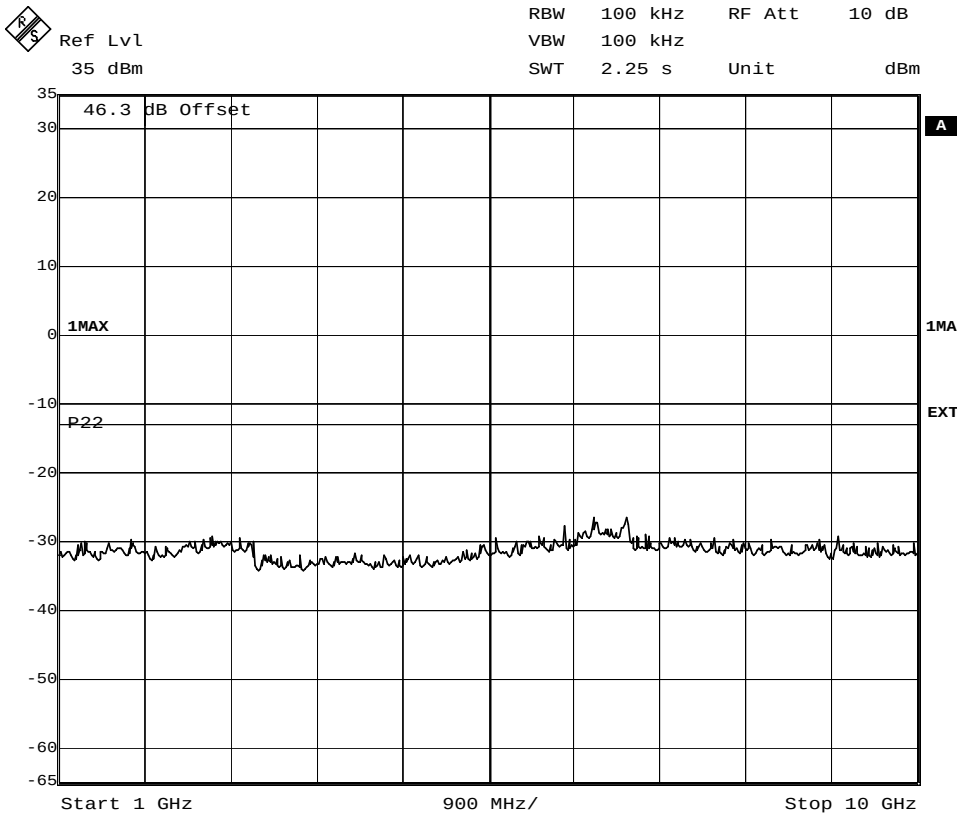

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 16:55:37

Diagram 9

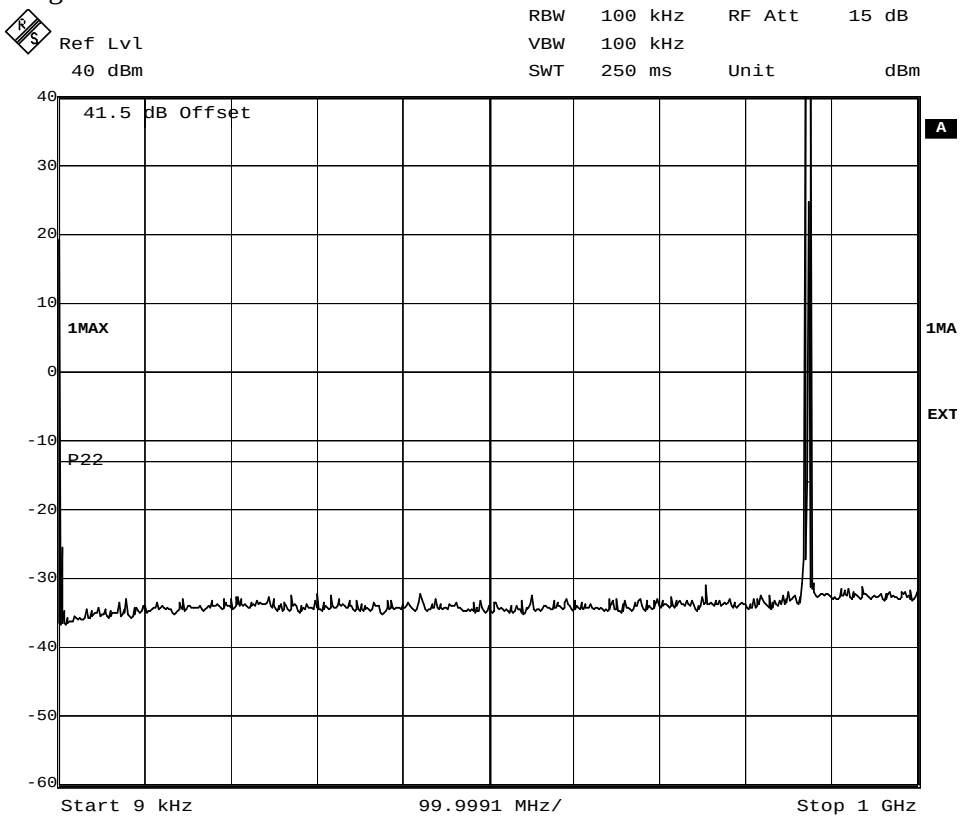


Date: 22.AUG.2006 16:07:23

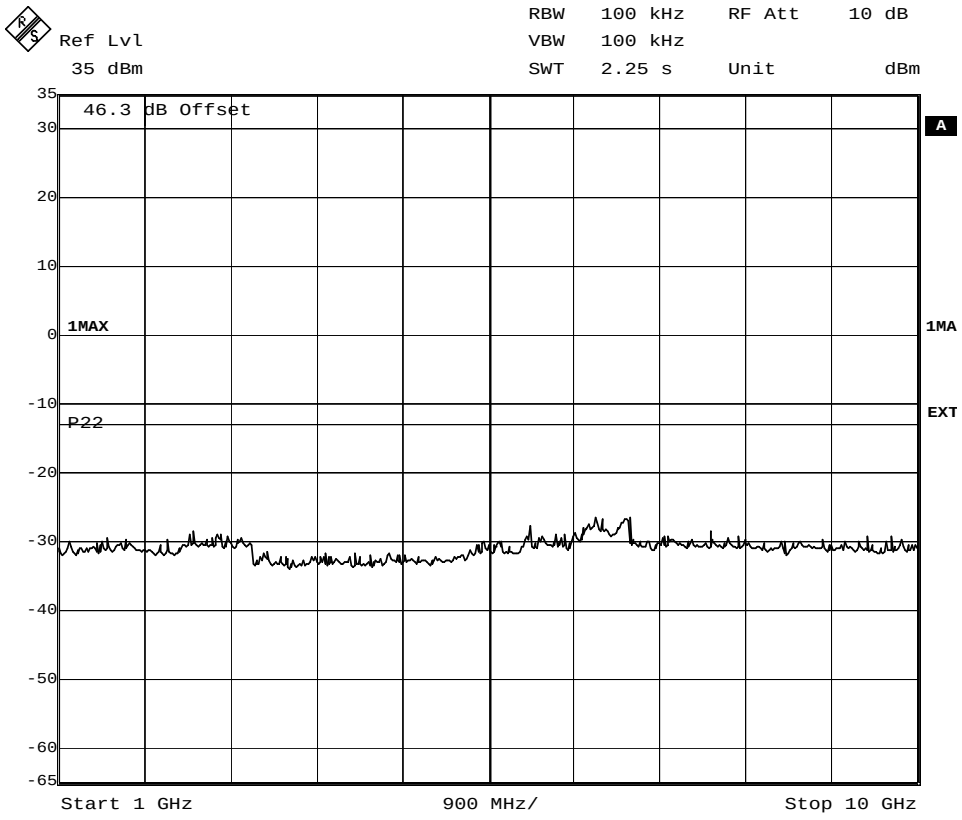


Date: 22.AUG.2006 16:56:11

Diagram 10

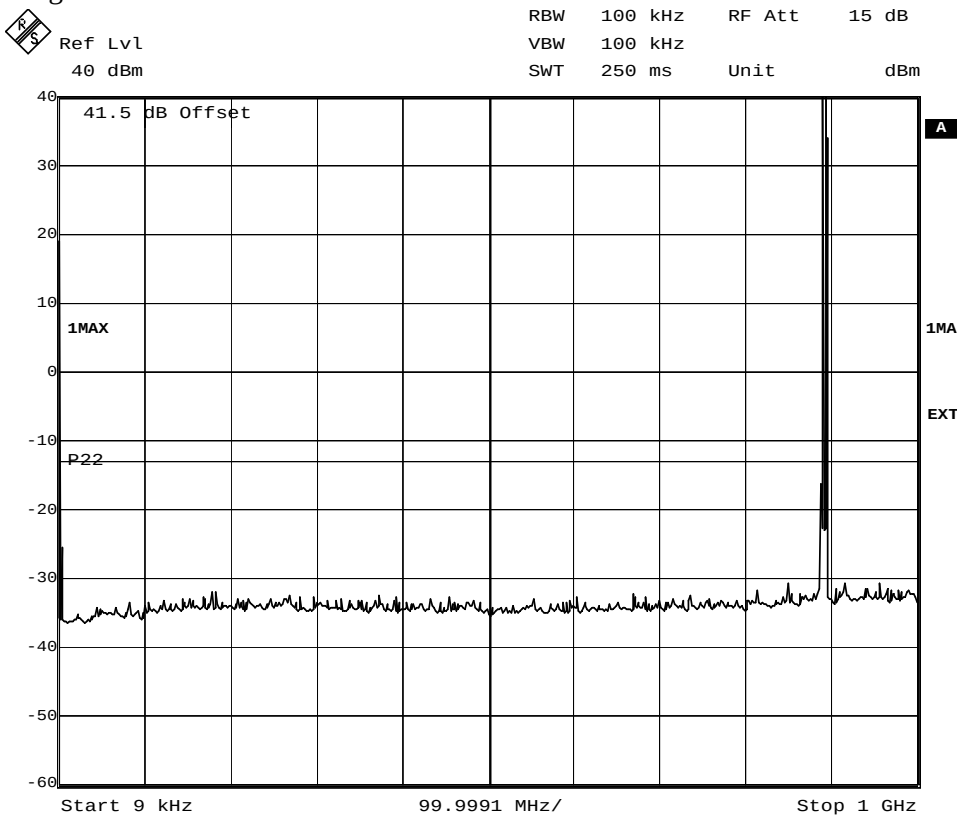


Date: 21.AUG.2006 15:50:49

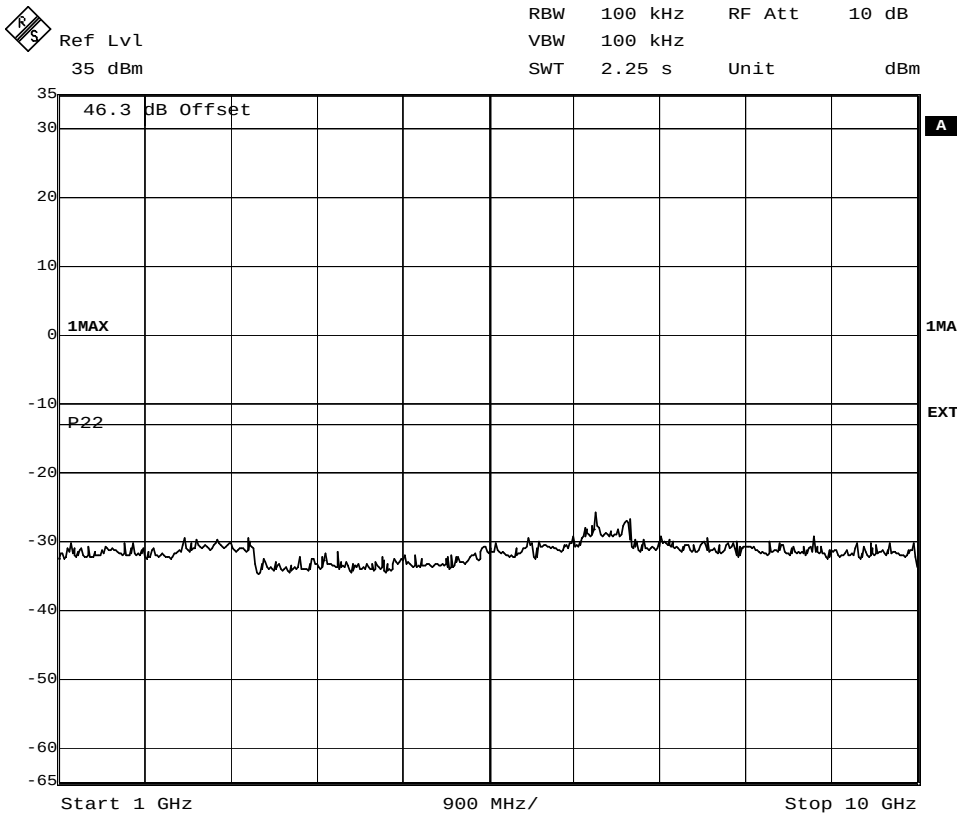


Date: 21.AUG.2006 15:17:01

Diagram 11

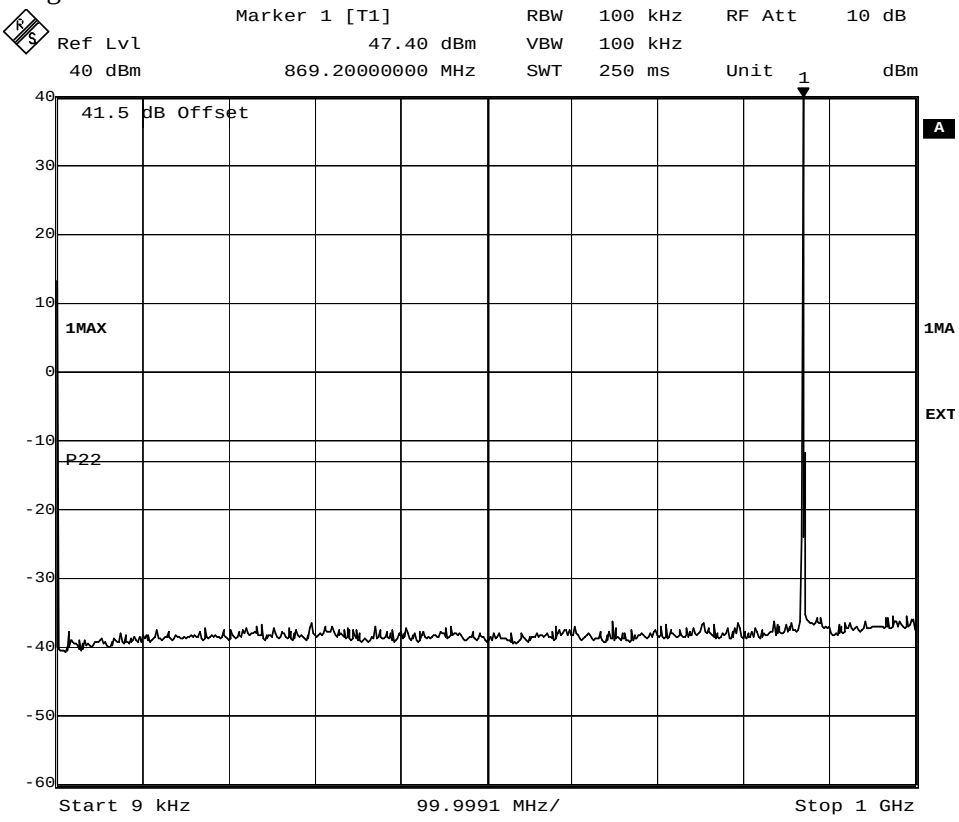


Date: 21.AUG.2006 15:52:59



Date: 21.AUG.2006 15:10:40

Diagram 12


Marker 1 [T1]
47.40 dBm
869.20000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 21.AUG.2006 15:39:56

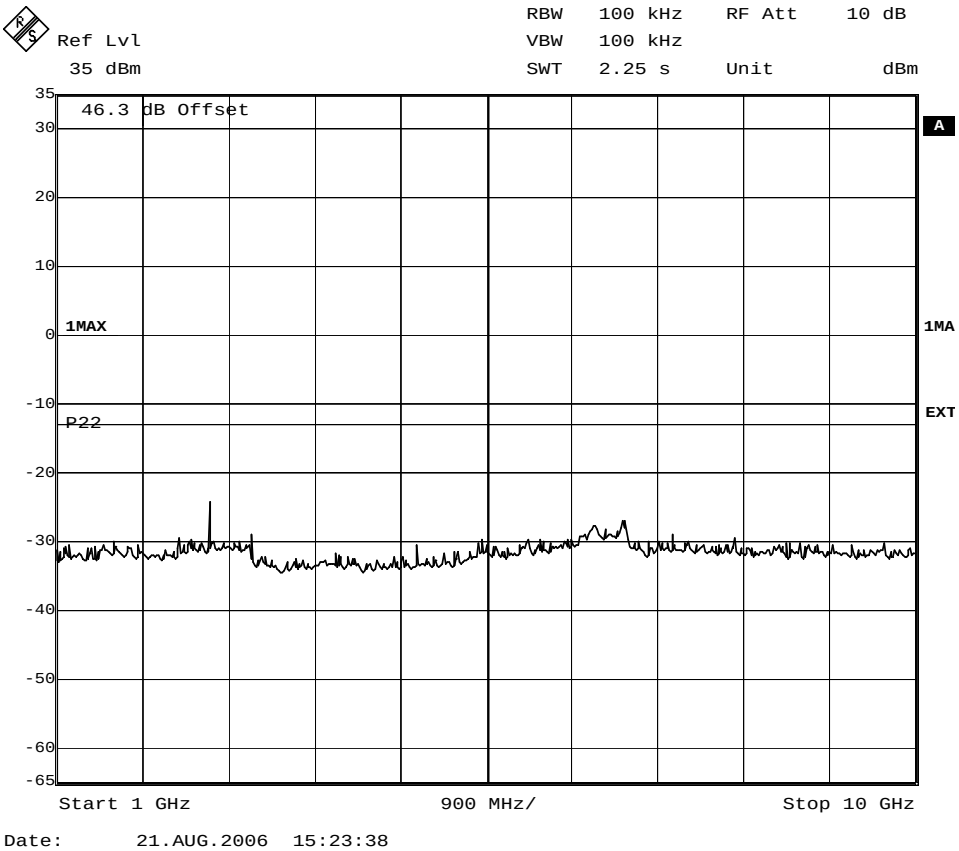
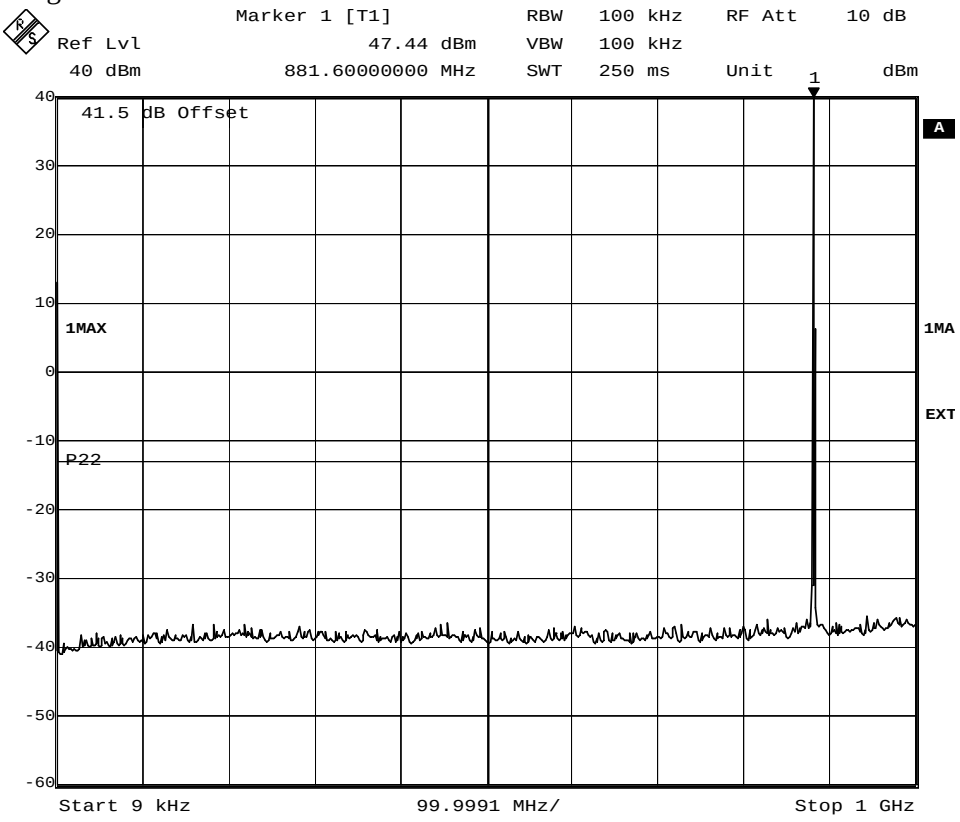

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
35 dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 21.AUG.2006 15:23:38

Diagram 13


Marker 1 [T1]
Ref Lvl
40 dBm
47.44 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 14:05:16

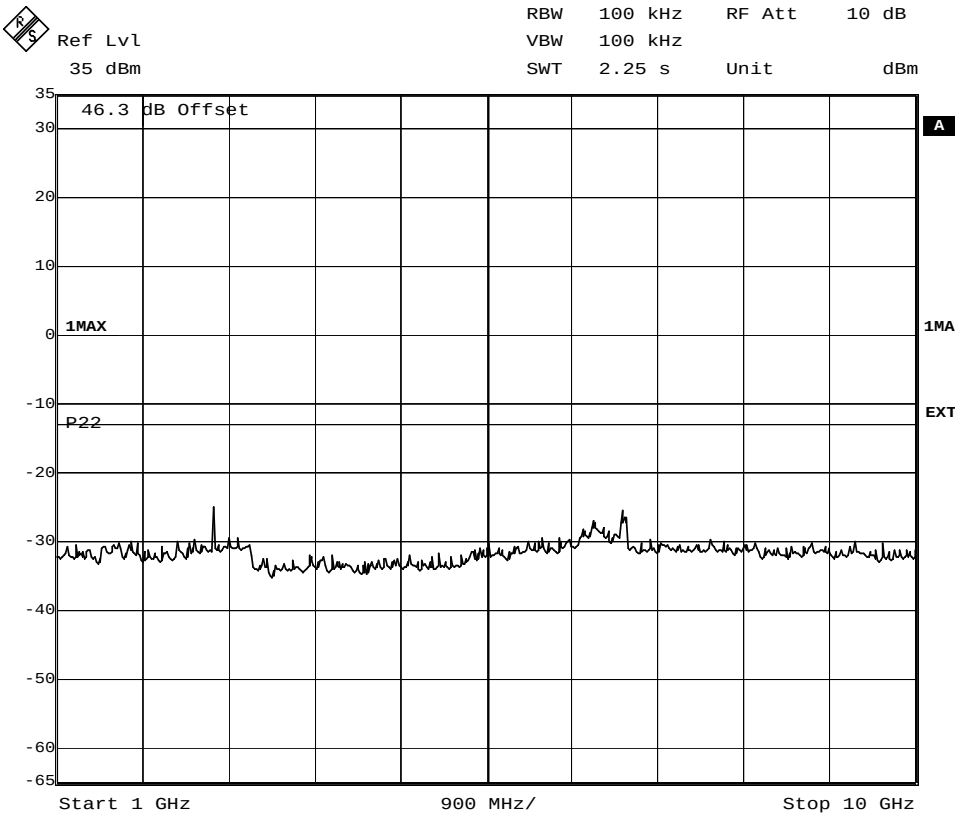
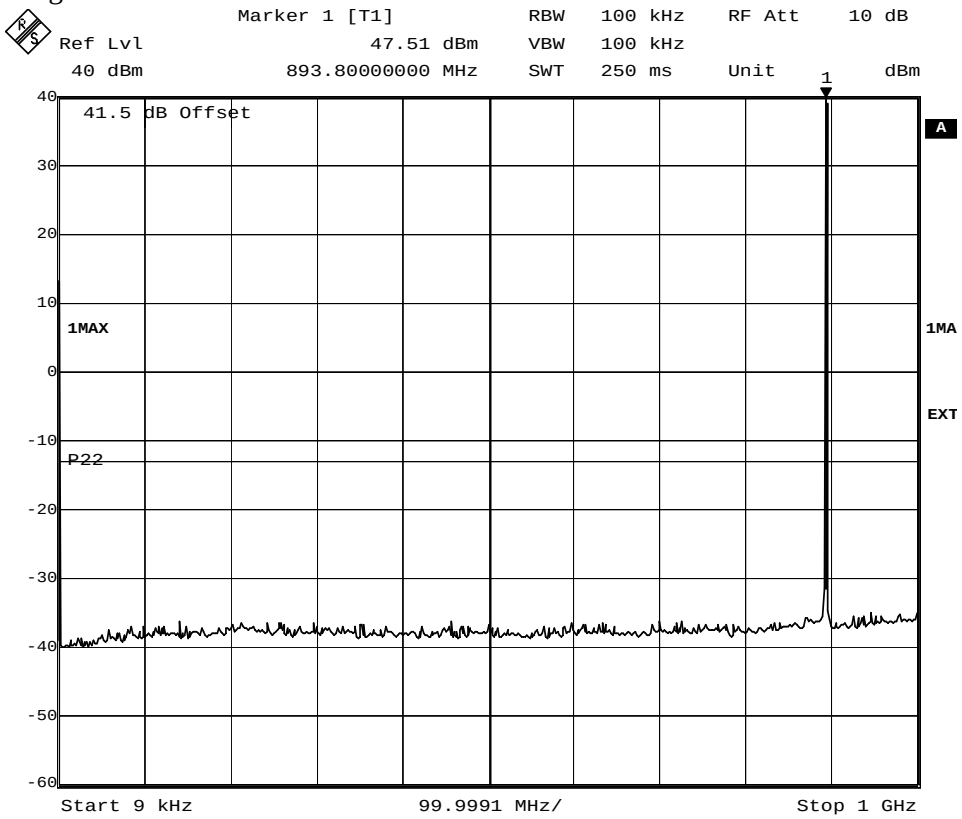

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 15:30:45

Diagram 14


Marker 1 [T1]
Ref Lvl
47.51 dBm
40 dBm
893.80000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 21.AUG.2006 15:38:18

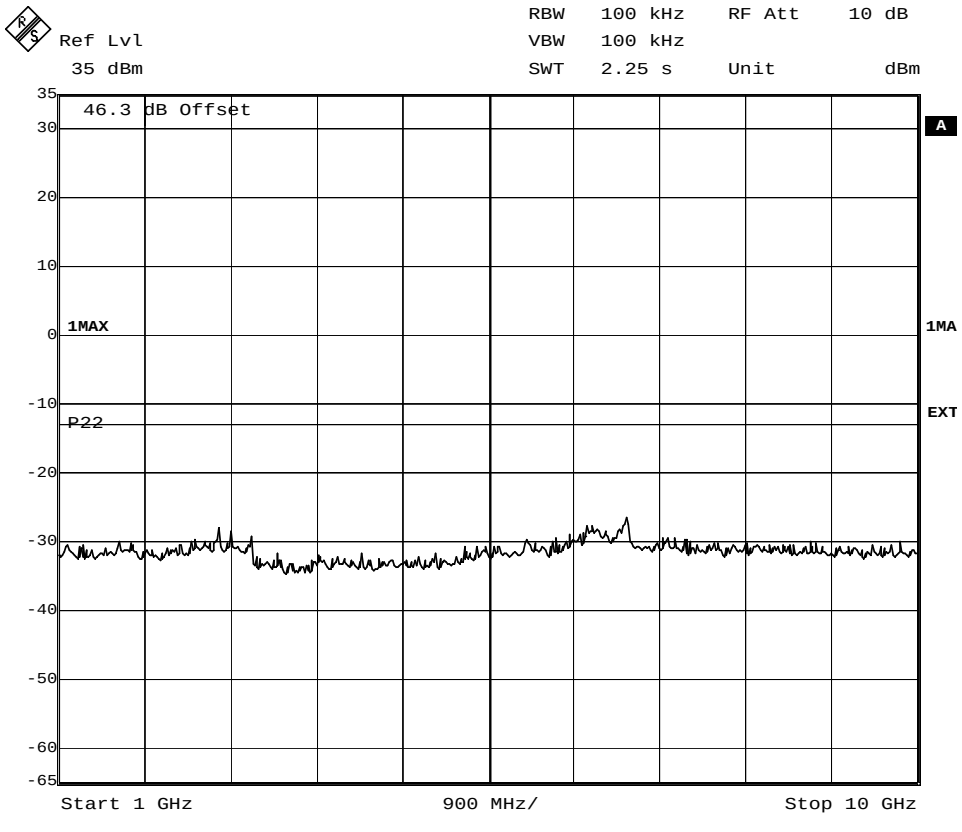
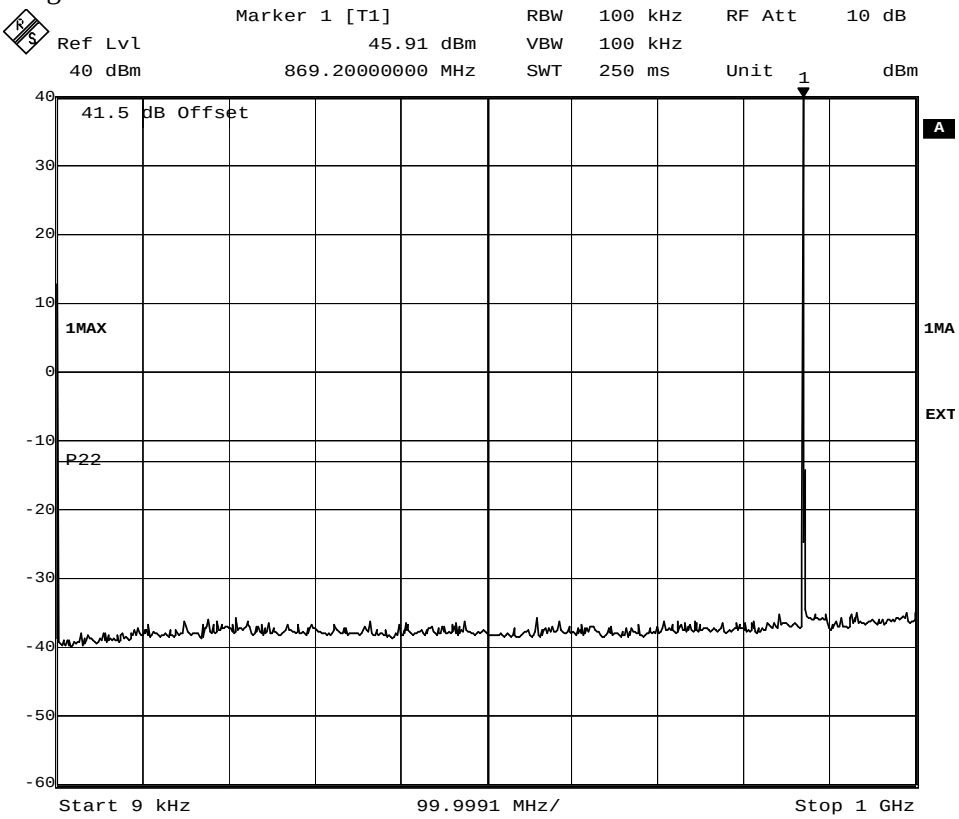
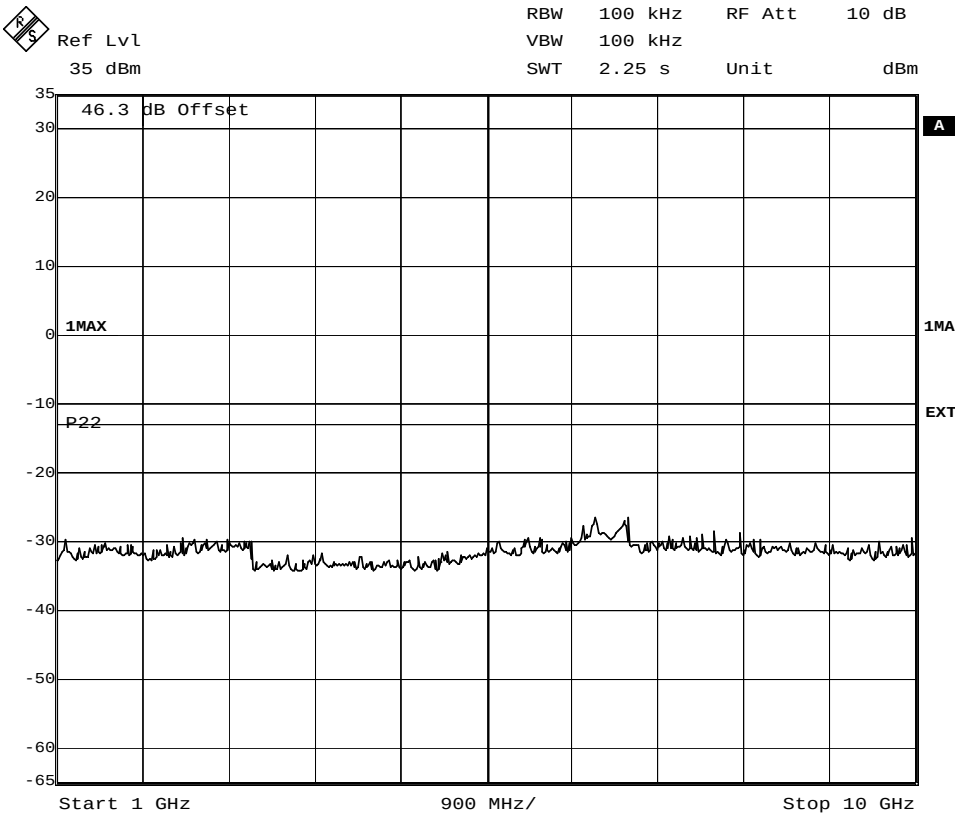

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 21.AUG.2006 15:26:01

Diagram 15

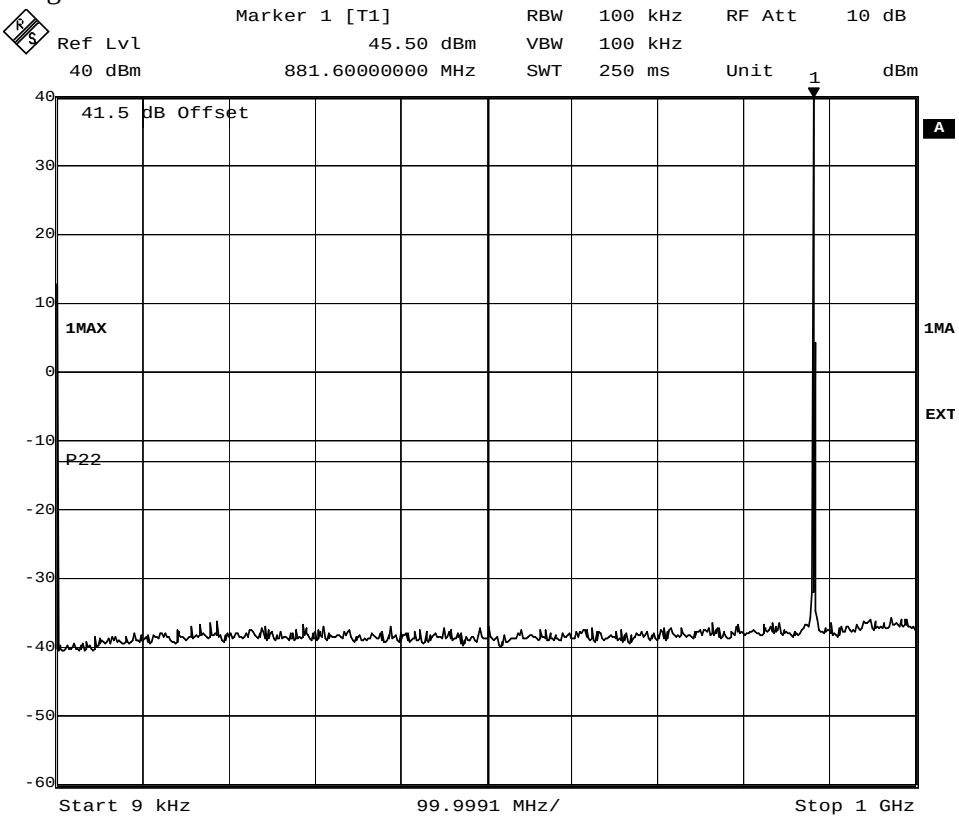


Date: 22.AUG.2006 15:50:27



Date: 22.AUG.2006 15:47:22

Diagram 16


Marker 1 [T1]
Ref Lvl
40 dBm
45.50 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 15:53:15

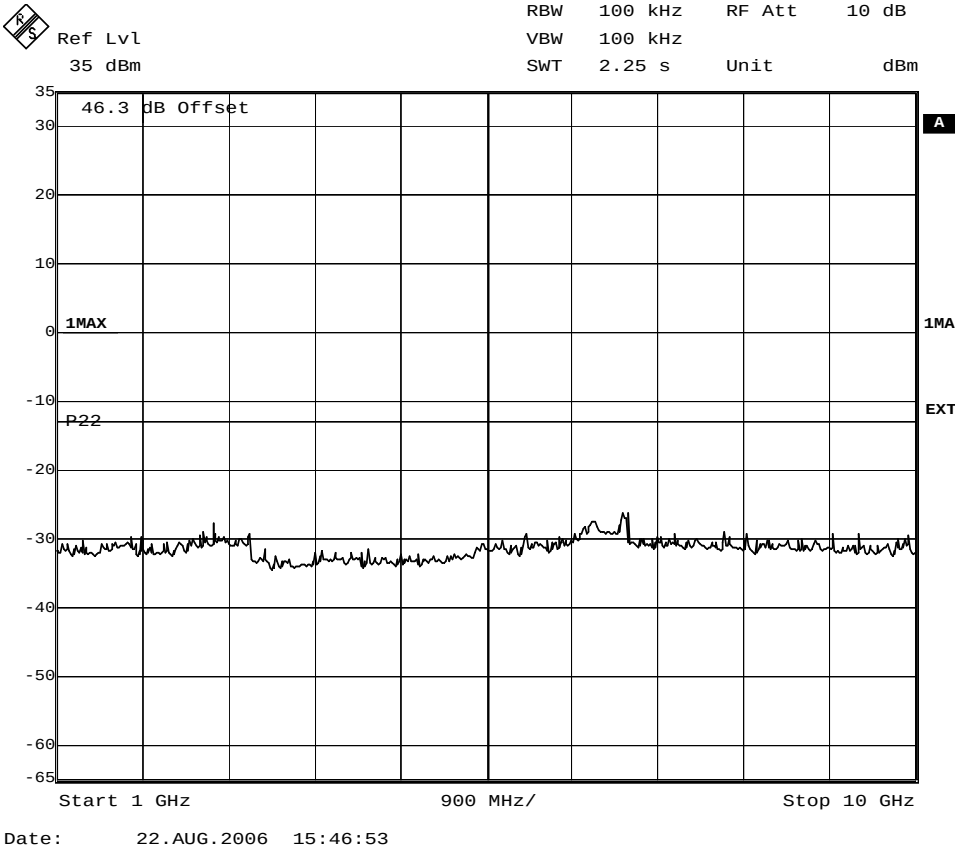
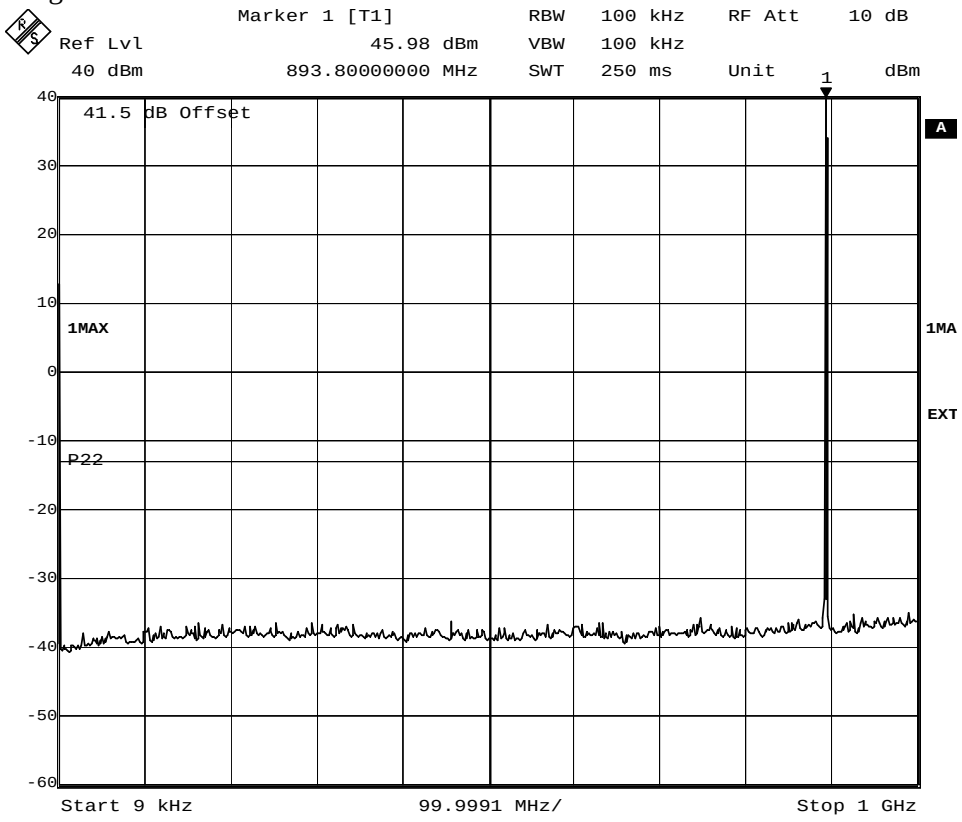
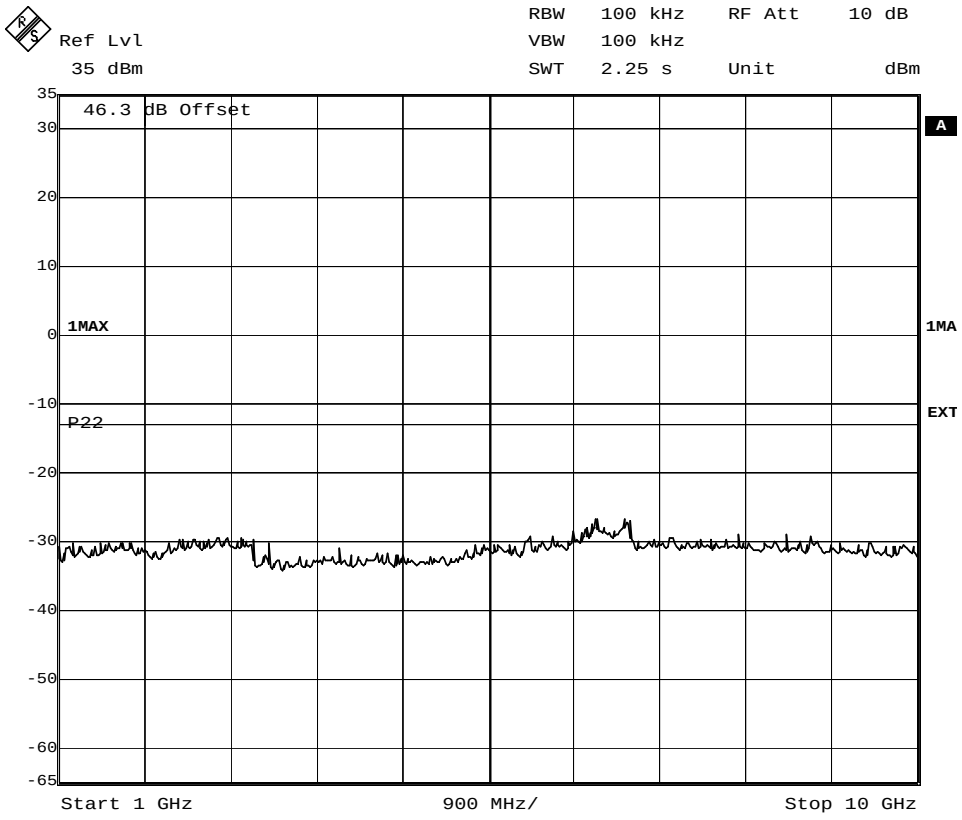

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 15:46:53

Diagram 17

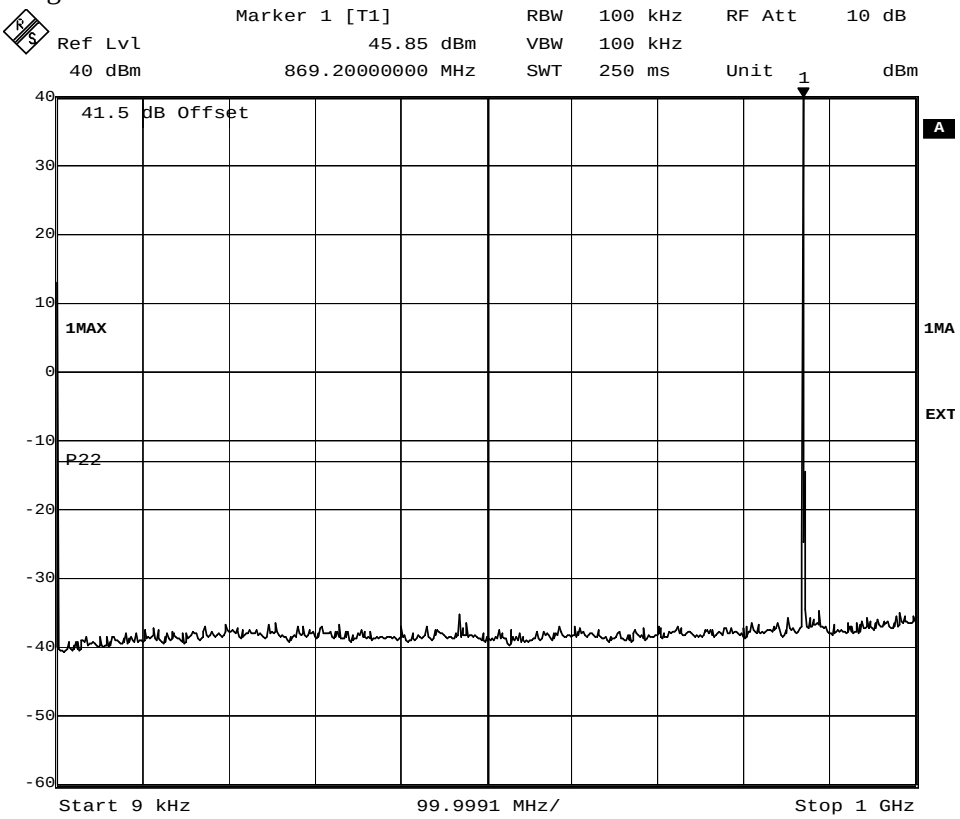


Date: 22.AUG.2006 15:54:16



Date: 22.AUG.2006 15:46:13

Diagram 18


Marker 1 [T1]
Ref Lvl
45.85 dBm
40 dBm
869.20000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 16:08:53

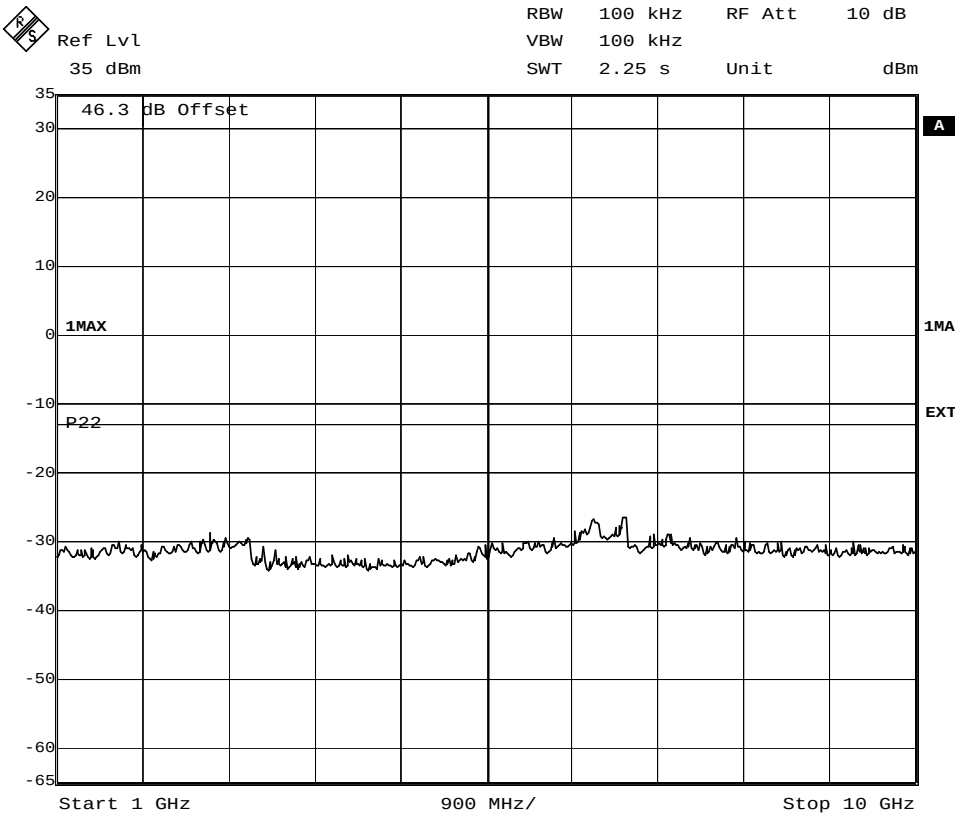
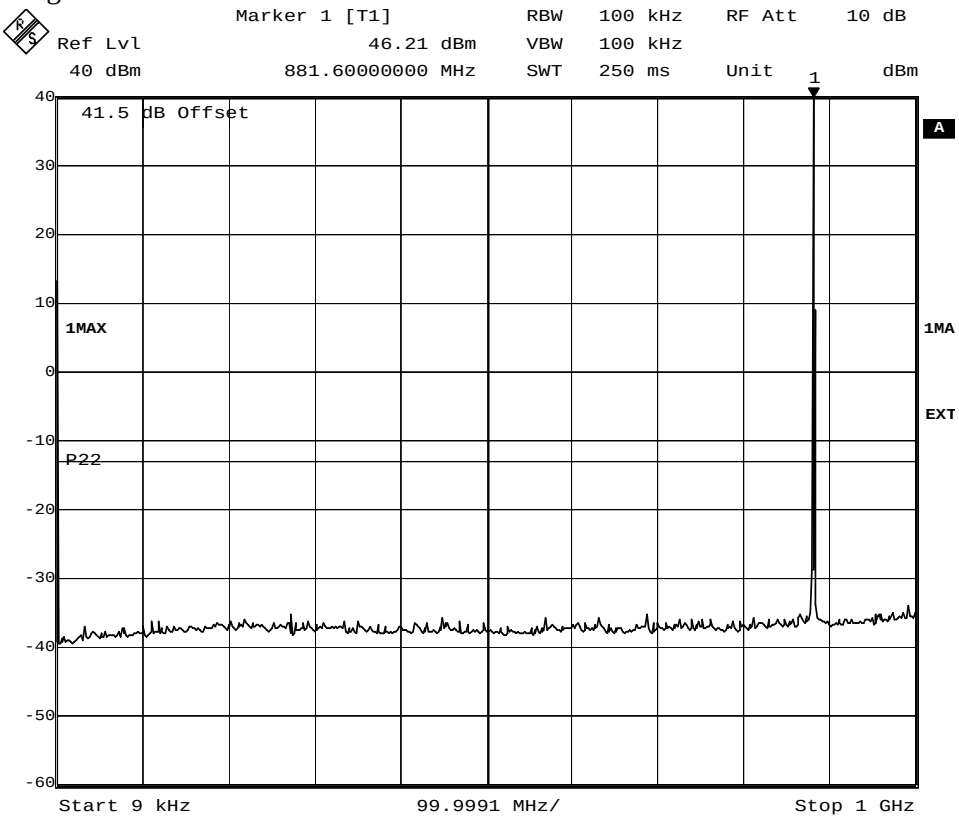

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 16:38:57

Diagram 19


Marker 1 [T1]
Ref Lvl
40 dBm
46.21 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
41.5 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 22.AUG.2006 16:14:31

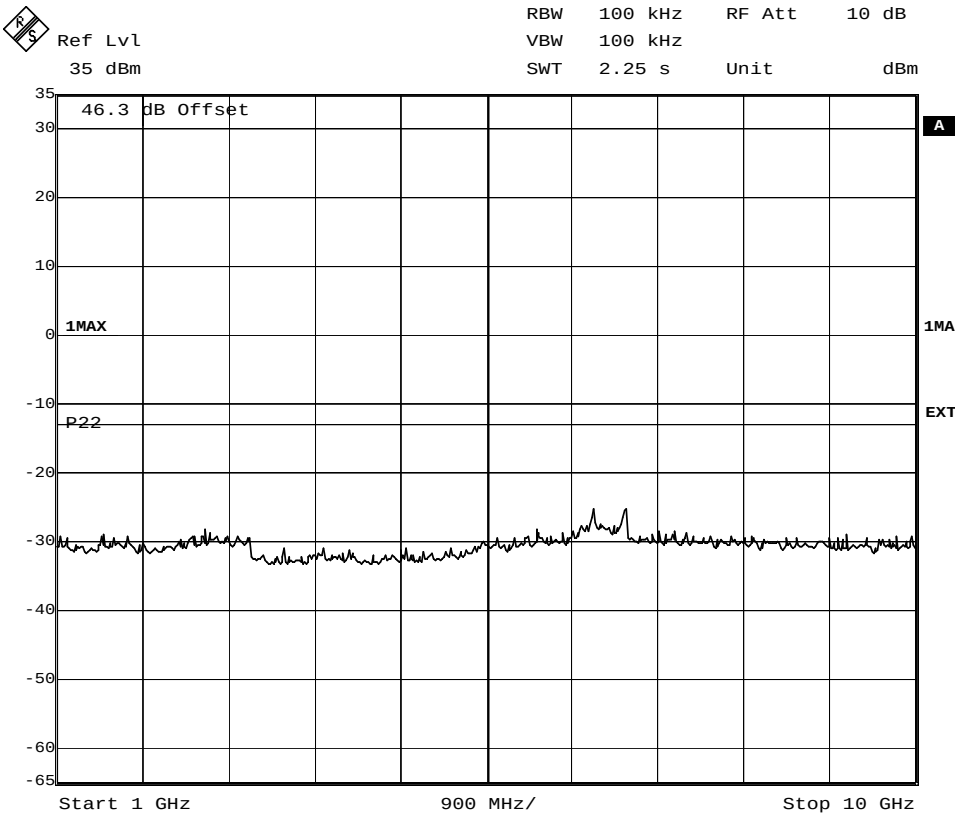
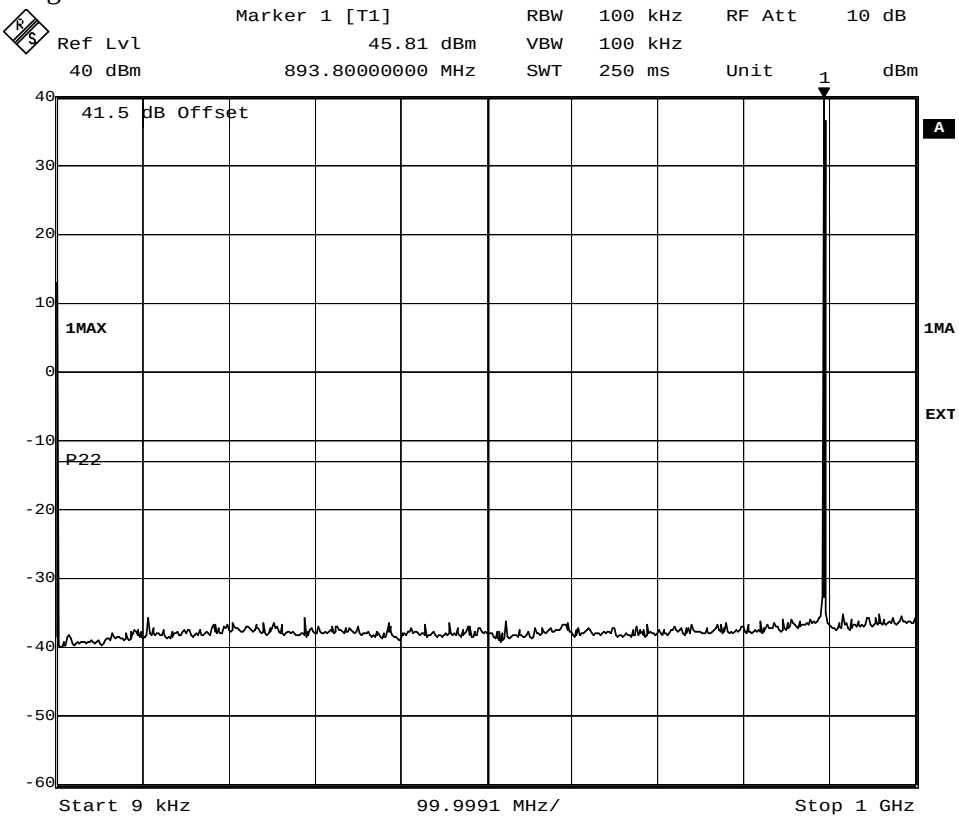
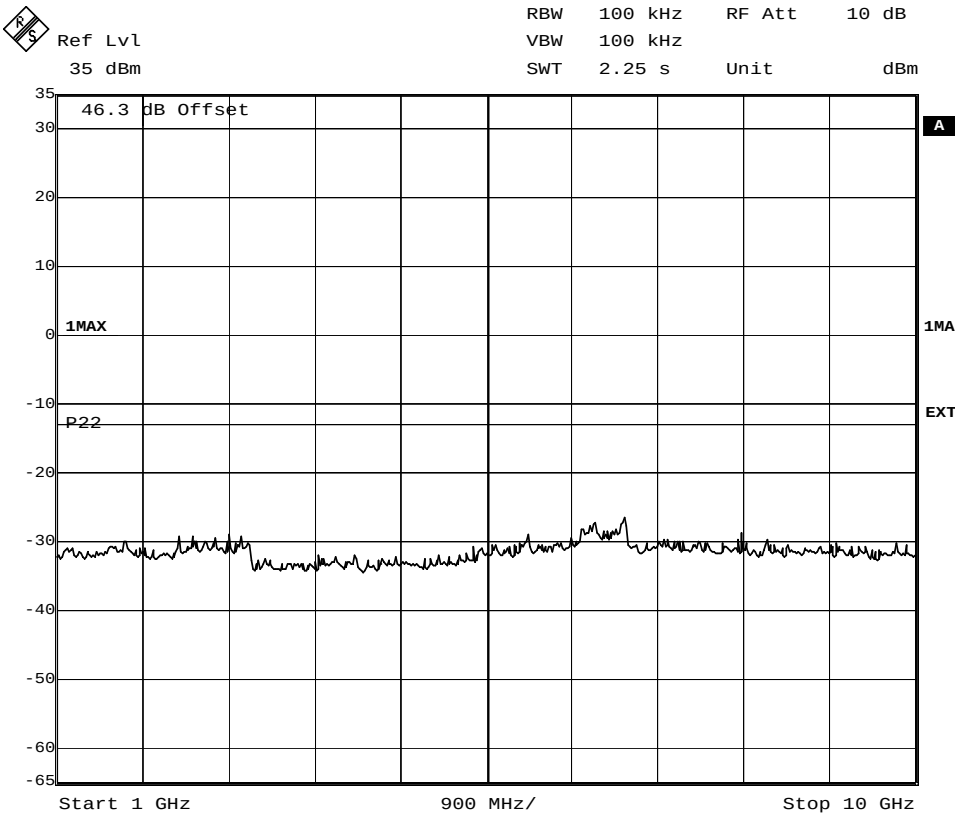

Ref Lvl
35 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
46.3 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 22.AUG.2006 16:50:40

Diagram 20

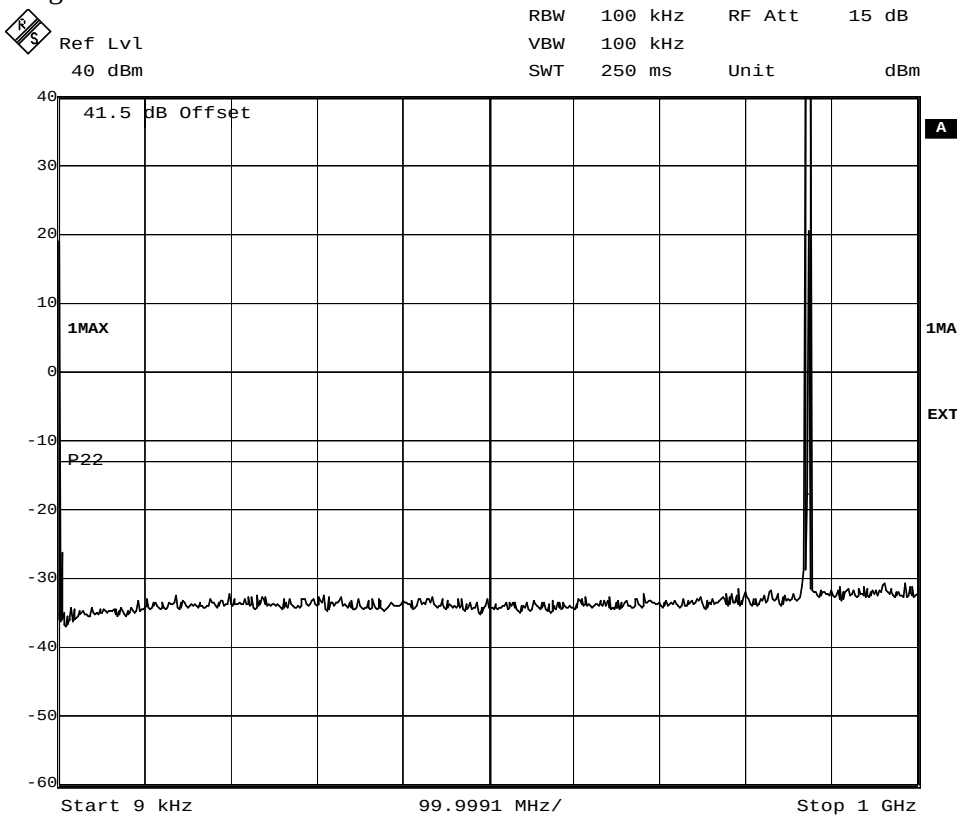


Date: 22.AUG.2006 16:16:44

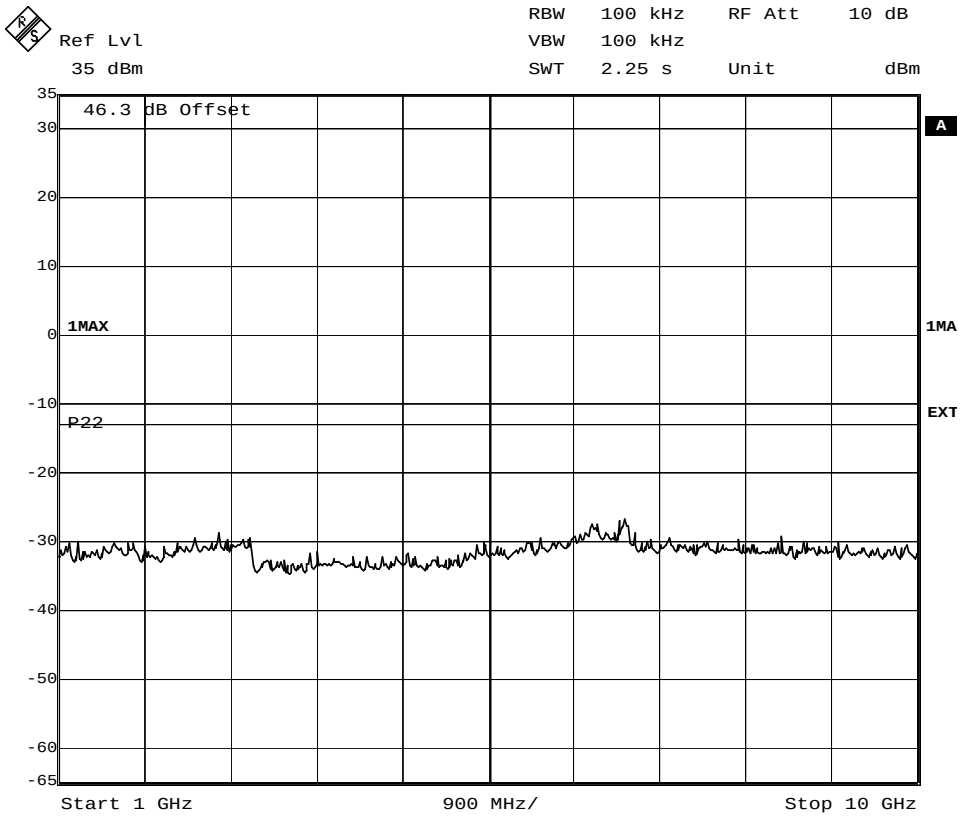


Date: 22.AUG.2006 16:51:10

Diagram 21

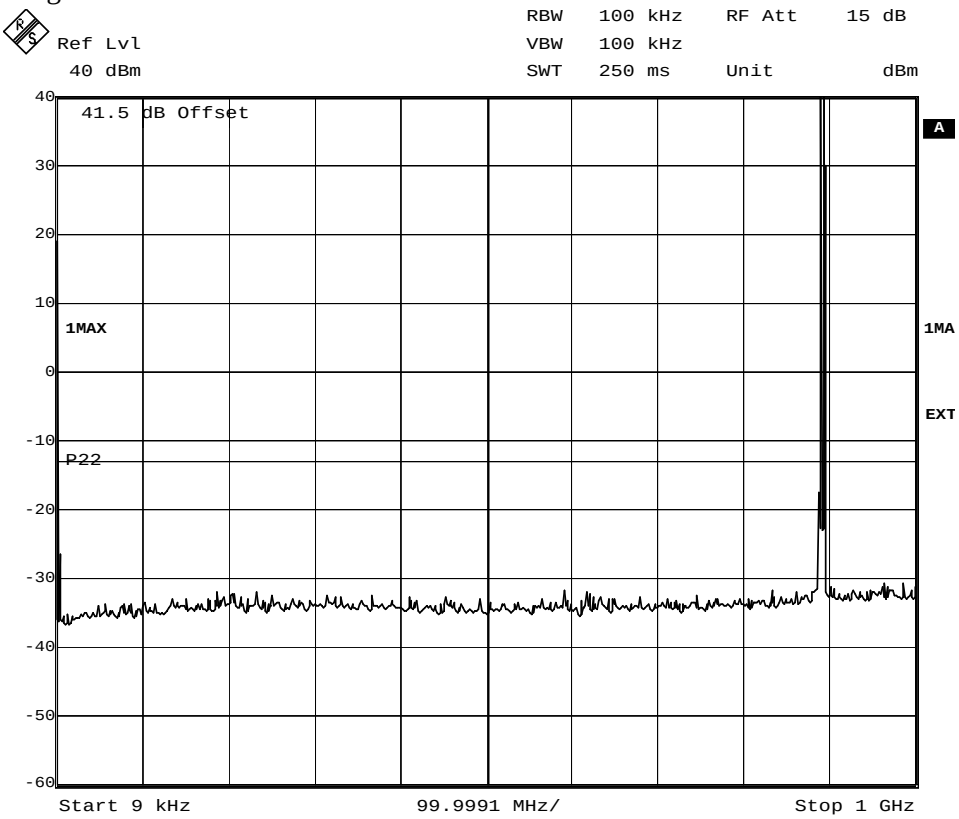


Date: 21.AUG.2006 15:49:29

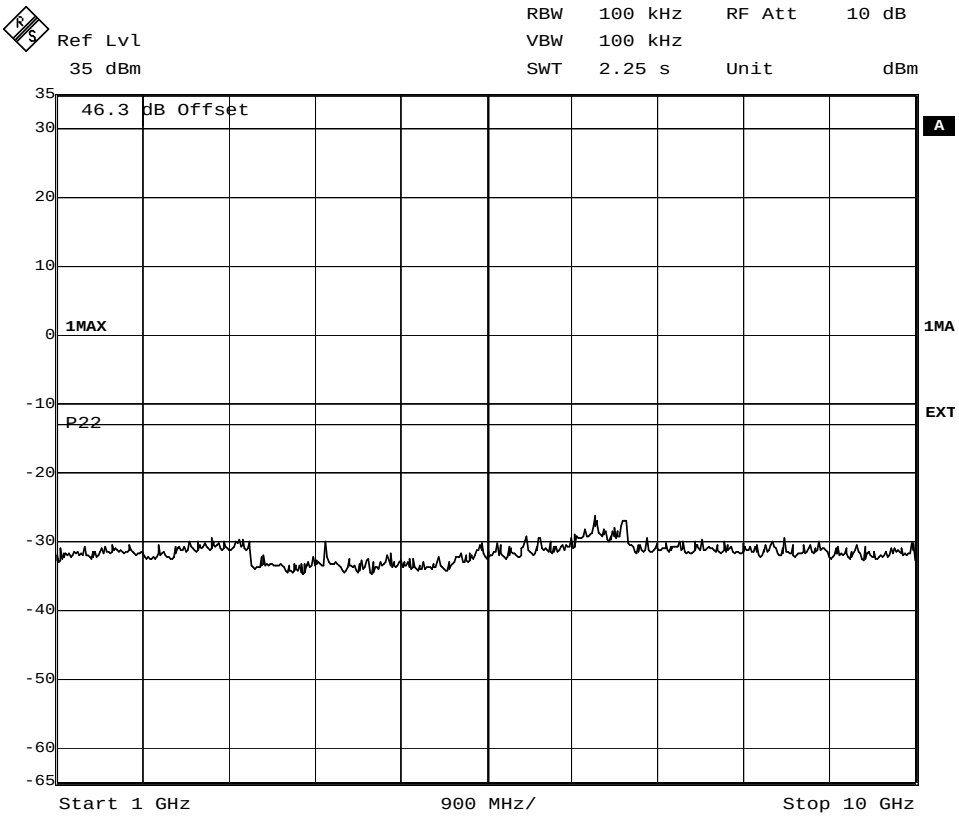


Date: 21.AUG.2006 15:18:45

Diagram 22



Date: 21.AUG.2006 16:01:45



Date: 21.AUG.2006 15:12:18

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date	Temperature	Humidity
2006-08-08	20 °C ± 3 °C	69 % ± 5 %
2006-08-09	21 °C ± 3 °C	56 % ± 5 %

Test set-up and procedure

The test site is listed at FCC, Columbia with registration number: 93866. The test site also complies with RSS 212, Issue 1, Industry Canada file no.:IC 3482.
The transmitter was activated at maximum output power and modulated with pseudorandom data during the measurements. The antenna ports were terminated with 50 ohm loads.

The measurements were performed with both horizontal and vertical polarisation of the antenna. The antenna distance was 3 m.

A pre-measurement was first performed:
In the frequency range 30 MHz-10 GHz the measurement was performed in power with a RBW of 1 MHz. A propagation loss in free space was calculated. The used formula was,

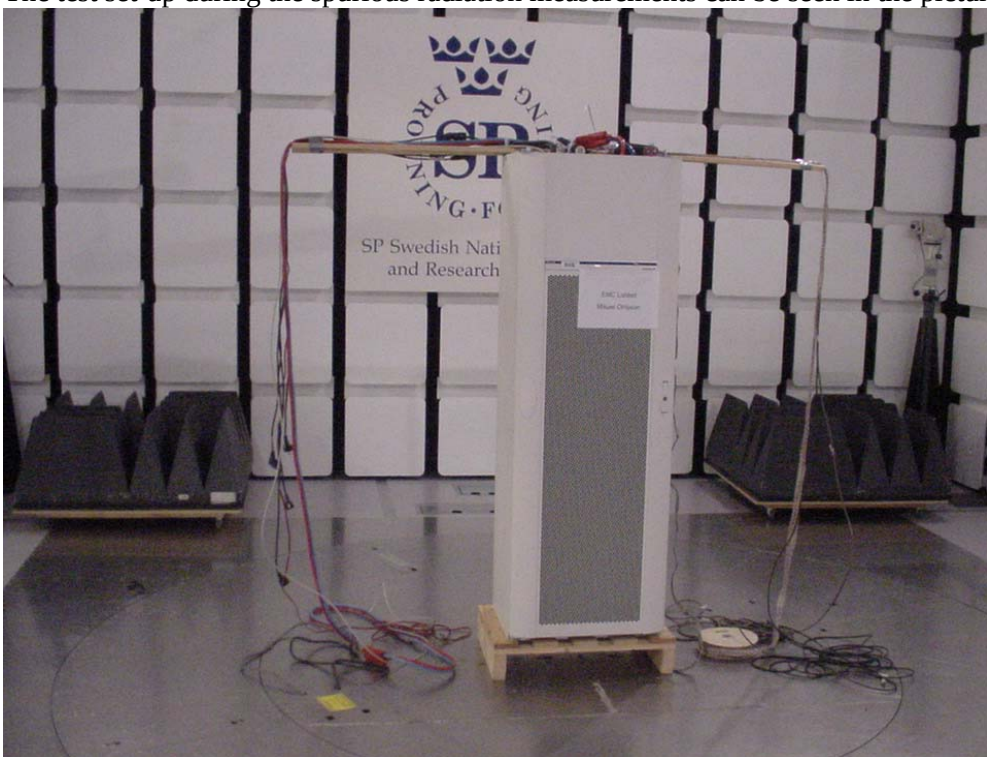
$\gamma = 20\log\left(\frac{4\pi D}{\lambda}\right)$, γ is the propagation loss and D is the antenna distance.

The measurement procedure was as the following:

1. The pre-measurement was first performed with peak detector. The EUT was measured in eight directions and with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.
2. Spurious radiation on frequencies closer than 20 dB to the limit is scanned 0-360 degrees and the antenna is scanned 1-4 m for maximum response. The emission is then measured with the RMS detector and the RMS value is reported, frequencies closer than 10 dB to the limit measured with the RMS detector was measured with the substitution method according to the standard.

Measurement equipment	Calibration Due	SP number
Test site, Tesla	2008-11	503 881
R&S ESI 26	2007-07	503 885
Control computer	-	503 479
Software: R&S ES-K1, ver. 1.60	-	-
Chase Bilog antenna CBL 6111A	2008-11	503 182
EMCO Horn Antenna 3115	2007-11	502 548
Std. gain :16240-25	-	503 939
MITEQ Low Noise Amplifier	2007-07	503 285
Testo 615, Temperature and humidity meter	2007-09	503 505

The test set-up during the spurious radiation measurements can be seen in the picture below



Results

GMSK and 8-PSK

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30-10 000	All other emission > 20 dB below limit	All emission > 20 dB below limit
Measurement uncertainty		4.7 dB

Limits

The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least 43 + 10 log P dB.

Complies?	Yes

Frequency stability measurements according to 47CFR 2.1055

Date	Temperature	Humidity
2006-08-14 to 2006-08-17	22 °C ± 3 °C	54 % ± 5 %

Test set-up and procedure

The measurements were made per J-STD-007A Vol 1 (GMSK) and TIA/EIA-136-280-B (8-PSK).

The test was made with the dTRU mounted in the RBS 2206 cabinet.
Measurements were made at CDU-G8 output connector. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during measurement.
The transmitter was activated at maximum output power and modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
Climate chamber	2007-03	503 546
R&S FSIQ	2007-08	503 738
Multimeter Fluke 87	2006-09	502 190
Testo 610, Temperature and humidity meter	2006-12	502 658

Results

Nominal Voltage 24 V DC
Channel 190 (881.6 MHz)

Test conditions		Frequency error (Hz)			
Supply voltage DC (V)	Temperature (°C)	**GMSK**		**8-PSK**	
		TRX 1	TRX 2	TRX 1	TRX 2
24.0	+20	+10	-10	-15	-12
27.6	+20	-14	-15	-13	-17
20.4	+20	-11	-13	-16	-14
24.0	+30	-22	-17	-20	-20
24.0	+40	-20	-18	-21	-23
24.0	+50	-18	-13	-19	-18
24.0	+10	-14	-17	-29	-24
24.0	0	-39	-29	-18	-25
24.0	-10	-12	-18	-30	-26
24.0	-20	-44	-36	-23	-26
24.0	-30	-20	-32	-56	-46
Maximum freq. error (Hz)		44		56	
Measurement uncertainty		$< \pm 1 \times 10^{-7}$			

Note1: At 0 and -10 °C the following was reported in the RBS Fault log:
"CF Fault 2A No. 16: Indoor Temp Out Of Normal Conditional Range".

Note2: At -20 and -30 °C the following was reported in the RBS Fault log:
"CF Fault 1A No. 10: Indoor Temp Out of Safe Range".

Note 3: The maximum frequency error within the dTRU specified temperature range is 39 Hz.

Limits

§ 22.335 The maximum frequency error shall not be greater than 1.5 ppm (1322 Hz).

Complies?	Yes

Hardware list RBS 2206

Unit	Product Number	Revision	Serial Number
Cabinet	SEB 112 1095/1	R6K	AB20072419
Door	BXK 109 6000/2	R1D	TU89102931
ACCU-01	BMG 980 07/1	R2A	S792034257
FCU-01	BGM 136 1001/3	R2A	B992911691
DC-filter	KFE 101 1145/1	R1B	X181032563
CDU shelf	BFL 119 424/1	R1C	- -
CDU-G 8	BFL 119 155/1	R3B	TR43144633
CDU-G 8	BFL 119 155/1	R3B	TR43144625
CDU-G 8	BFL 119 155/1	R3B	TR43144626
Dummy	SXK 107 5031/2	R1B	- -
CXU-10	KRY 101 1856/1	R3C	TR41232619
Dummy	SXK 107 5031/1	R1B	- -
TRU shelf	BFL 119 425/1	R1C	- -
Backplane	BFX 101 107/1	R1B	- -
dTRU-8	KRC 131 1005/2	R4A	AE53038585
dTRU-8	KRC 131 1005/2	R4A	AE53038583
dTRU-8	KRC 131 1005/2	R4A	AE53038589
dTRU-8	KRC 131 1005/2	R4A	AE53038582
dTRU-8	KRC 131 1005/2	R4A	AE53038579
dTRU-8	KRC 131 1005/2	R4A	AE53038709
Dummy	SXK 107 5031/2	R1B	- -
IDM 01	BMG 980 06/1	R3D	T671395602
PSU-shelf	BFL 119 426/1	R1C	- -
Backplane	BFX 101 108/1	R1B	- -
PSU-AC	BML 231 202/1	R3C	BH51330881
PSU-AC	BML 231 202/1	R3C	TL93765256
PSU-AC	BML 231 202/1	R3C	TL93361387
PSU-AC	BML 231 202/1	R3C	TL93765257
DXU-21A	BOE 602 14/1	R15B	TU87799308
Dummy	SXK 107 5029/1	R1E	- -
Dummy	SXK 107 5029/1	R1E	- -
Dummy	SXK 107 5030/1	R1D	- -
Dummy	SXK 107 5030/1	R1D	- -

Software	Revision
R11	R07F

Description of EUT

The EUT is a dTRU that can be installed in a GSM Base station that are designed to provide mobile telephone users with a connection to a mobile network or the PSTN.

Photos
Transceiver Unit KRC 131 1005/2, R4A

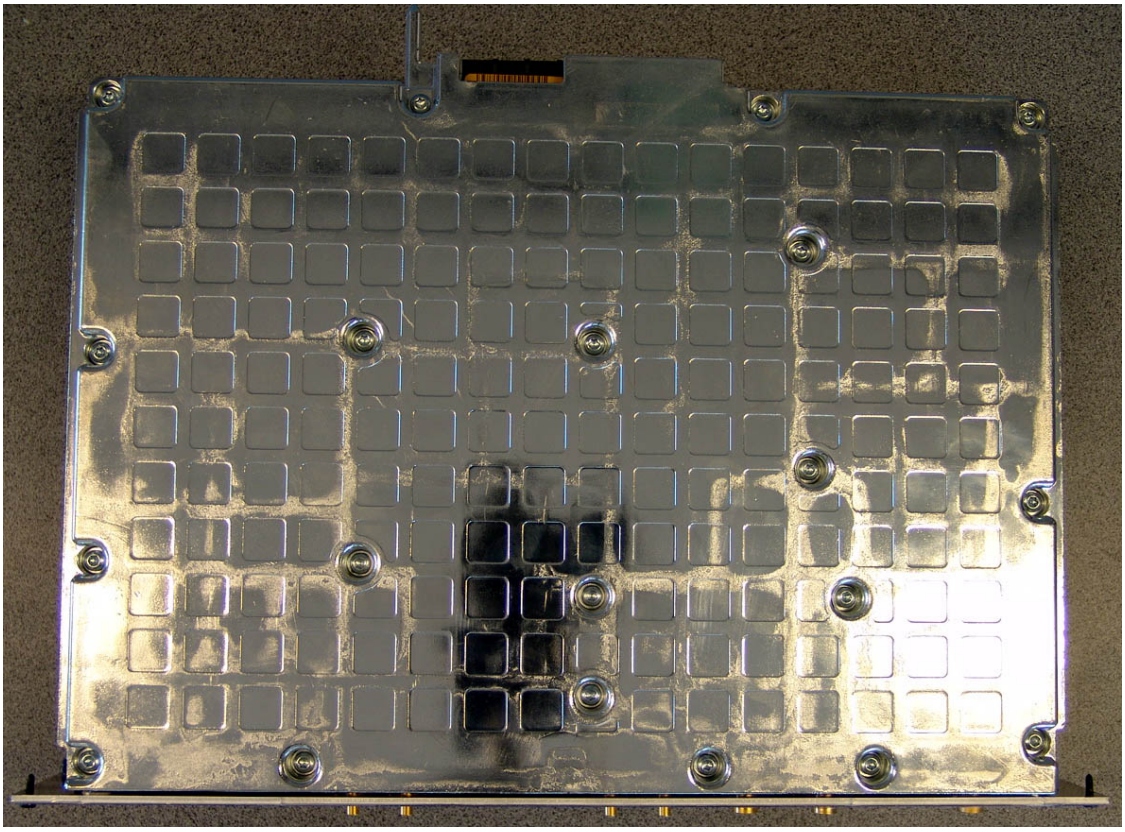
Front side

Rear side

FCC ID label

FCC ID: B5KDKRC1311005-2 Appendix 10

Left side



Right side