REPORT

issued by an FCC listed Laboratory Reg. no. 93866.
The test site complies with RSS Gen Issue 2, file no: IC 3482

Date	Reference	Page
2008-06-13	F810801-F22	1 (2)

1002
ISO/IEC 17025

Handled by, department
Jonas Bremholt
Electronics
+46 10 516 54 38, jonas.bremholt@sp.se

ERICSSON AB
Per Helmersson
Färögatan 2, Kista
164 80 Stockholm

Permissible change measurements on GSM Base station Transceiver unit with FCC ID: B5KEKRC1311005-2

(9 appendices)

Test object

Transceiver Unit dTRU-8 Edge, KRC 131 1005/2, R5B

Summary

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

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 (channel 128 and 251) is 37.9 dBm in order to comply.

SP Technical Research Institute of Sweden
Electronics - EMC

Christer Karlsson
Technical Manager

Jonas Bremholt
Technical Officer

Table of contents

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(RMS):

	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:

Five dTRUs were activated at maximum output power with the following settings:

dTRU	TRX	ARFCN	Modulation	Configuration
No 1	0	145	GMSK	With internal combiner
	1	163	GMSK	With internal combiner
No 2	2	180	GMSK	With internal combiner+TCC
	3	-	-	-
No 3	4	198	8-PSK	With internal combiner
	5	128	8-PSK	With internal combiner
No 4	6	251	8-PSK	With internal combiner+TCC
	7	-	-	-
No 5	8	215	GMSK	Without internal combiner
	9	230	8-PSK	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 2206V2 powered with 120 VAC, 60 Hz 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 2206V2 powered with 24 VDC (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 TR45399997. The dTRU with serial number AE57593585 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 63.4 2003
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: 2008-06-09

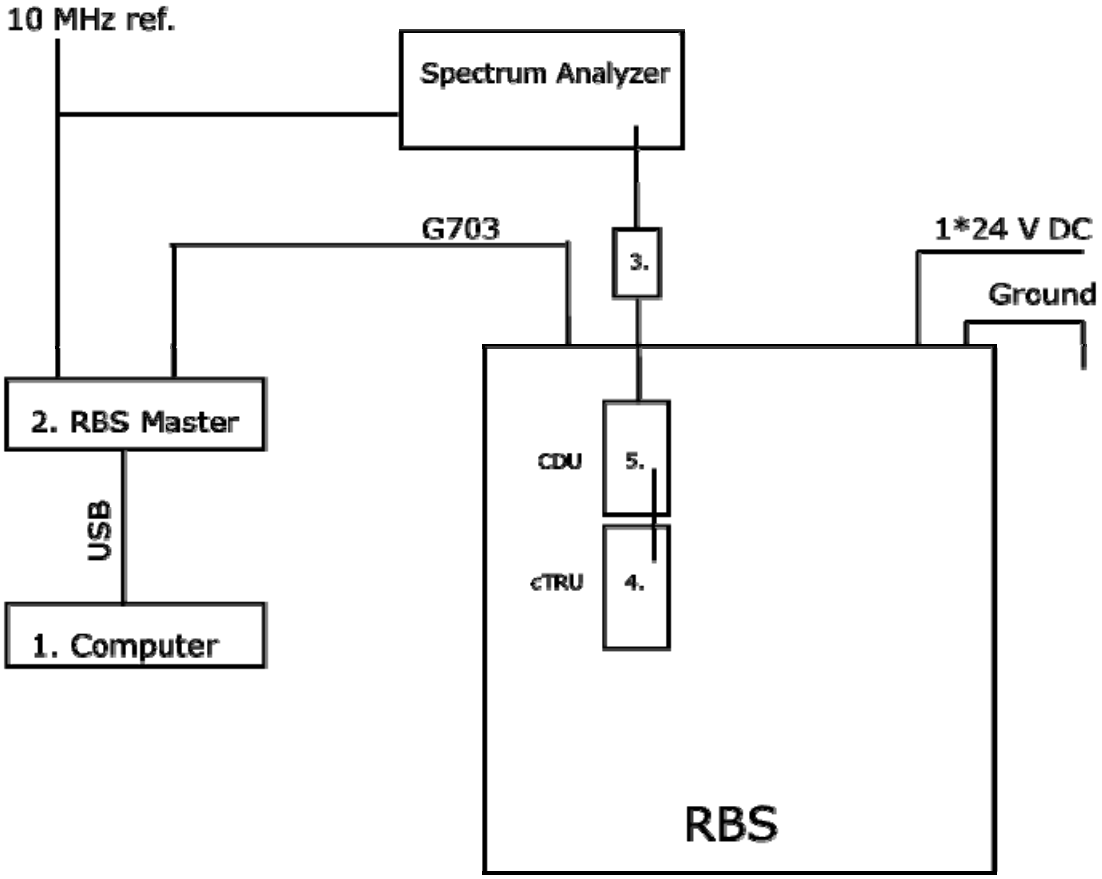
Test engineers

Stefan Larsson and Jonas Bremholt

Test witnesses

Lars Hagbjörk and Mats Iregren, Ericsson AB

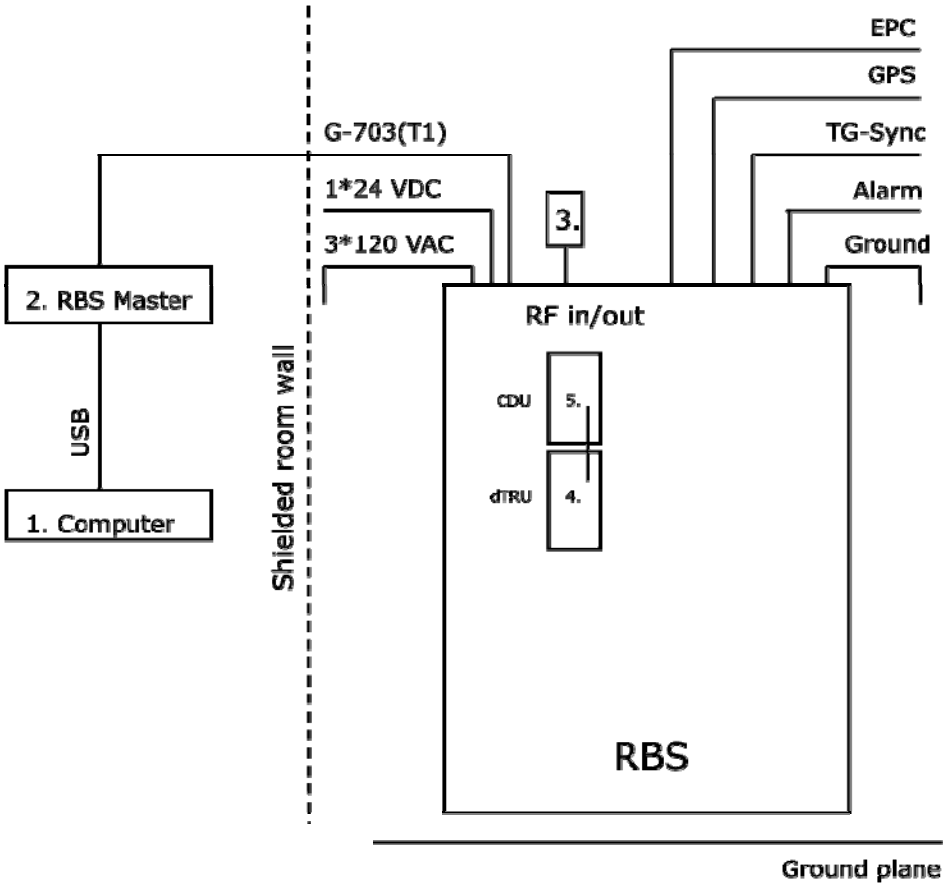
Test set-up, conducted measurements



1. Computer with software RBSMMI ver. R10D03
2. Ericsson RBS Master 2 LPY 107 1007/1 R1D/A software ver. R6D03
3. Attenuator
4. Test object with FCC ID: B5KEKRC1311005-2
5. CDU-G

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. R10B01
2. Ericsson RBS Master 2 LPY 107 1007/1 R1F/A
3. Dummy loads (50 ohm)
4. Test object with FCC ID: B5KEKRC1311005-2
5. CDU-G

Interfaces:	**Type of port:**
120 VAC, 60 Hz	AC power
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
EPC: Shielded multi-wire, unterminated	Signal

RF Power output measurements according to 47CFR 2.1046

Date	Temperature	Humidity
2008-06-10	23 °C ± 3 °C	45 % ± 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	2008-12	503 144
Boonton Power sensor 56518-S/4	2009-06	503 146
Multimeter Fluke 87	2009-01	502 190
Testo 610, Temperature and humidity meter	2009-04	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	49.3/ 48.4	49.5/ 48.7	49.2/ 48.3

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	46.7/ 45.8	46.8/ 45.9	46.8/45.8

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	46.6/ 45.7	47.1/ 46.1	46.6/ 45.7

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	43.2/ 42.3	43.5/ 42.6	43.1/ 42.2

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	43.4/ 42.5	43.6/ 42.8	43.4/ 42.5

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	49.2/ 45.3	49.5/ 45.5	49.2/ 45.3

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	46.7/ 42.6	46.8/ 42.8	46.7/ 42.6

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	46.6/ 42.6	47.0/ 43.0	46.6/ 42.7

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	43.2/ 39.2	43.4/ 39.5	43.2/ 39.2

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	43.4/ 39.5	43.7/ 39.8	43.4/ 39.5

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
2008-06-09	24 °C ± 3 °C	25 % ± 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	2008-07	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 3.1

Modulation: **GMSK**

Output 1		**ARFCN**	**OBW**
Diagram	1:	Ch 128	240 kHz
Diagram	2:	Ch 190	242 kHz
Diagram	3:	Ch 251	238 kHz

Output 2		**ARFCN**	**OBW**
Diagram	4:	Ch 128	240 kHz
Diagram	5:	Ch 190	238 kHz
Diagram	6:	Ch 251	240 kHz

Modulation: **8-PSK**

Output 1		**ARFCN**	**OBW**
Diagram	7:	Ch 128	240 kHz
Diagram	8:	Ch 190	238 kHz
Diagram	9:	Ch 251	236 kHz

Output 2		**ARFCN**	**OBW**
Diagram	10:	Ch 128	240 kHz
Diagram	11:	Ch 190	238 kHz
Diagram	12:	Ch 251	244 kHz

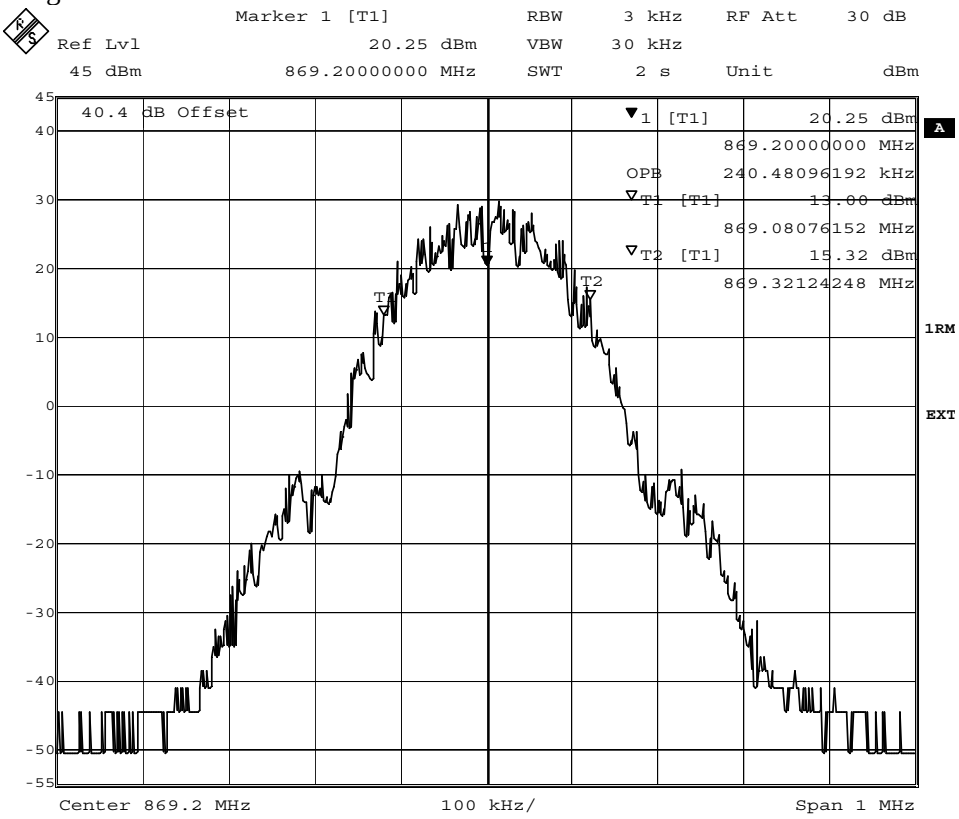
Limits

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

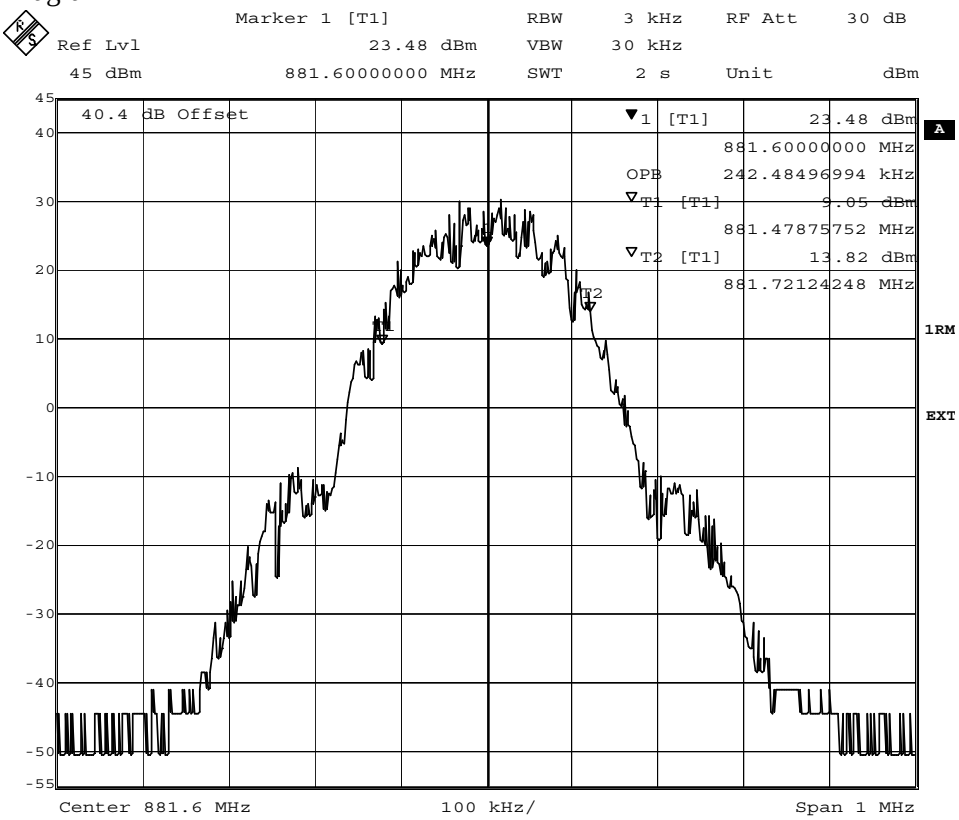
FCC ID: B5KEKRC1311005-2 Appendix 3.1

Diagram 1



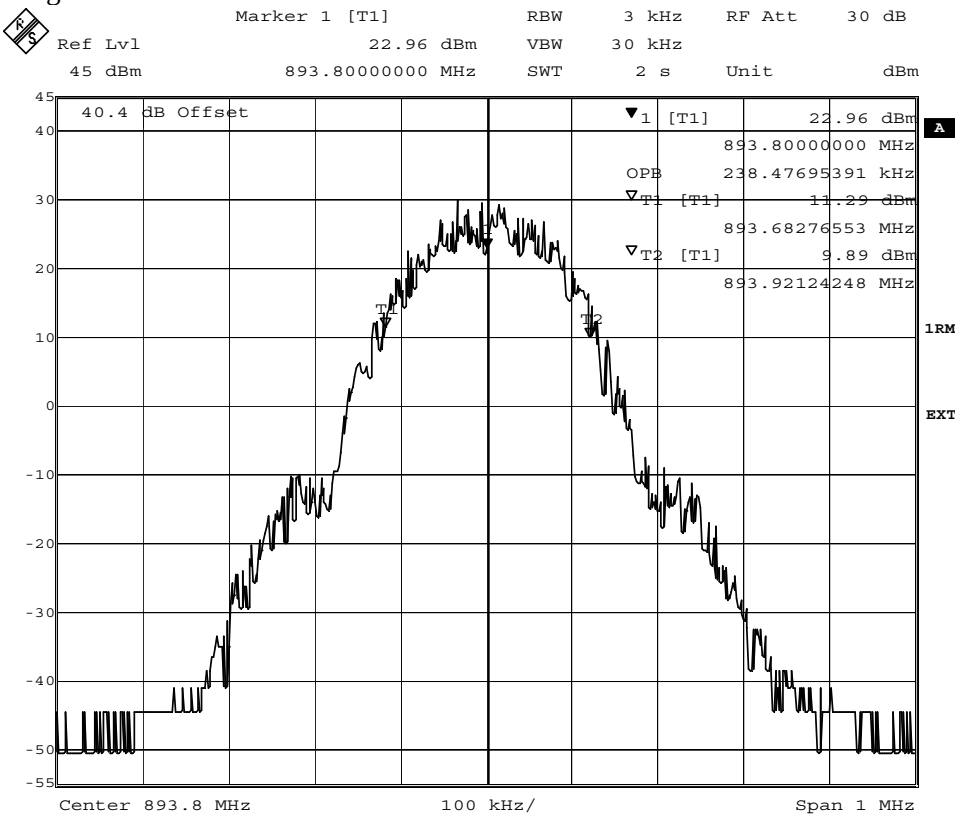
Date: 9.JUN.2008 16:23:07

Diagram 2



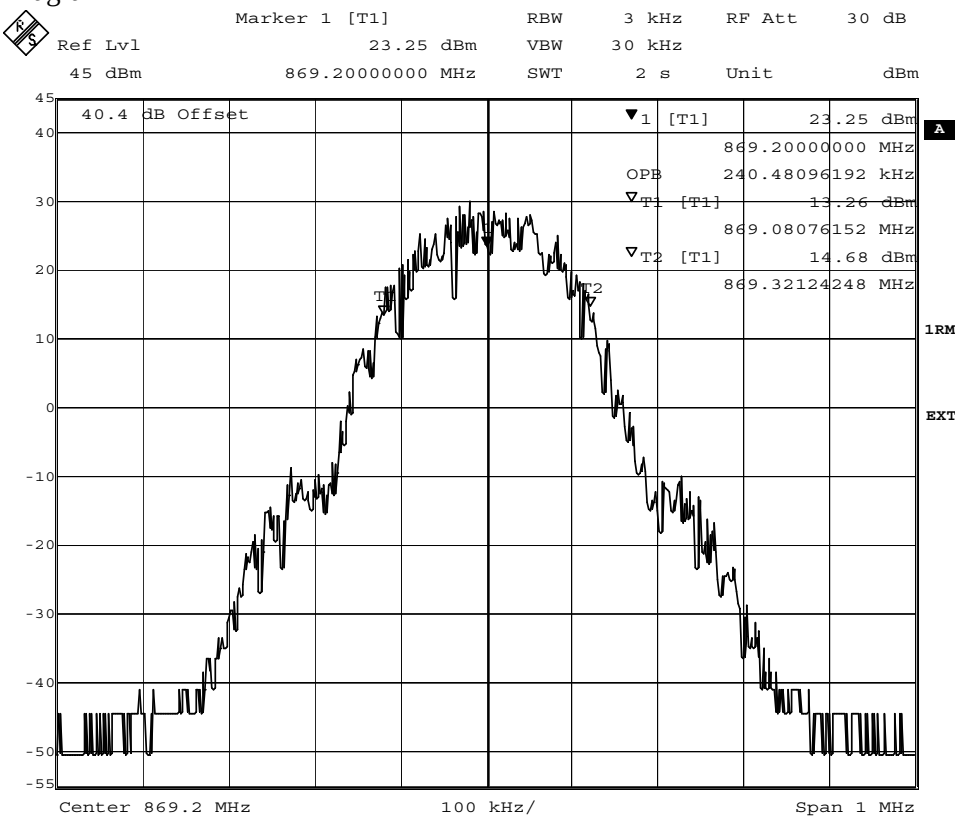
Date: 9.JUN.2008 16:34:56

Diagram 3



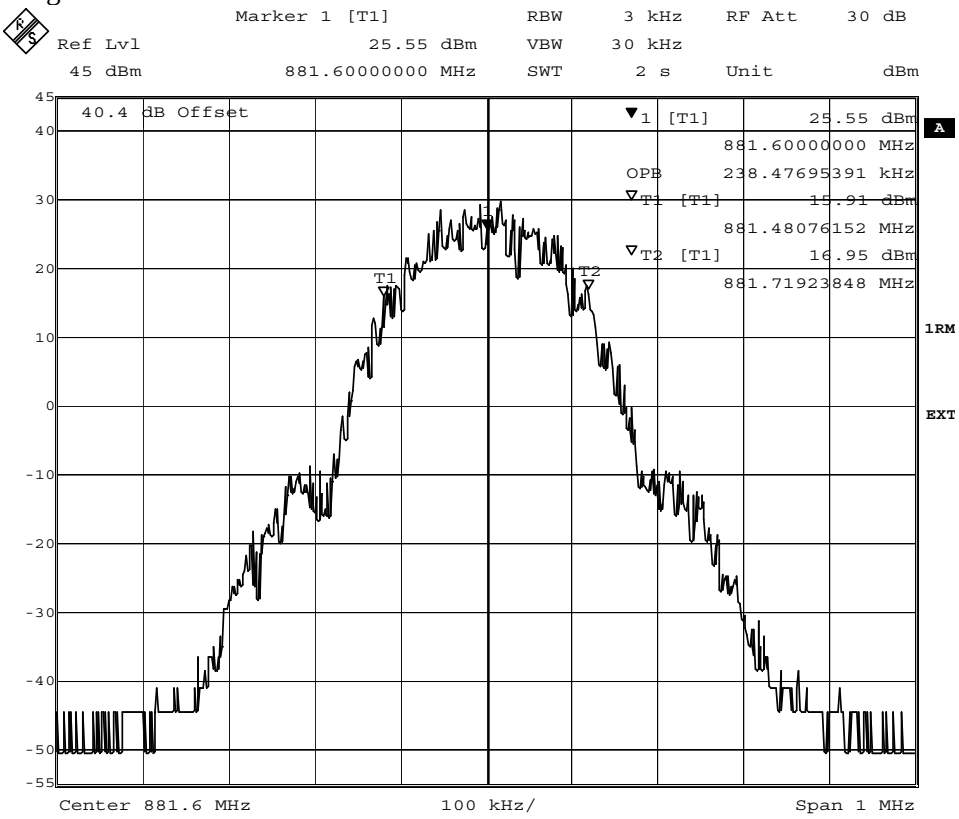
Date: 9.JUN.2008 16:44:23

Diagram 4



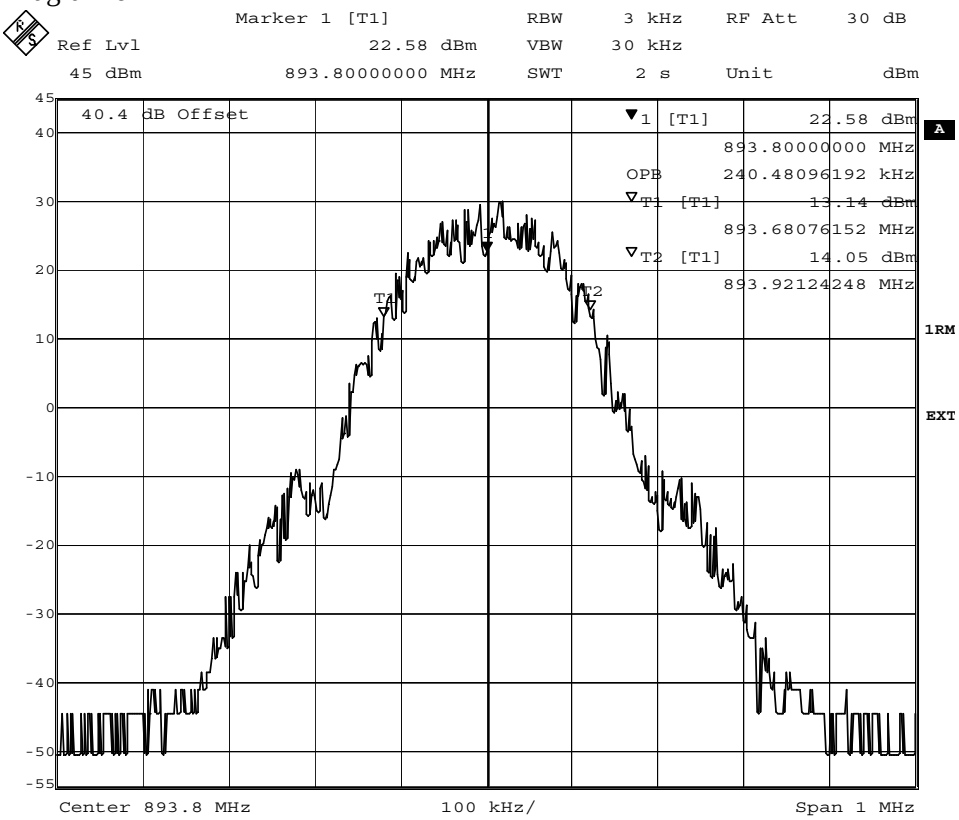
Date: 9.JUN.2008 16:27:21

Diagram 5



Date: 9.JUN.2008 16:36:26

Diagram 6



Date: 9.JUN.2008 16:45:41

Diagram 7

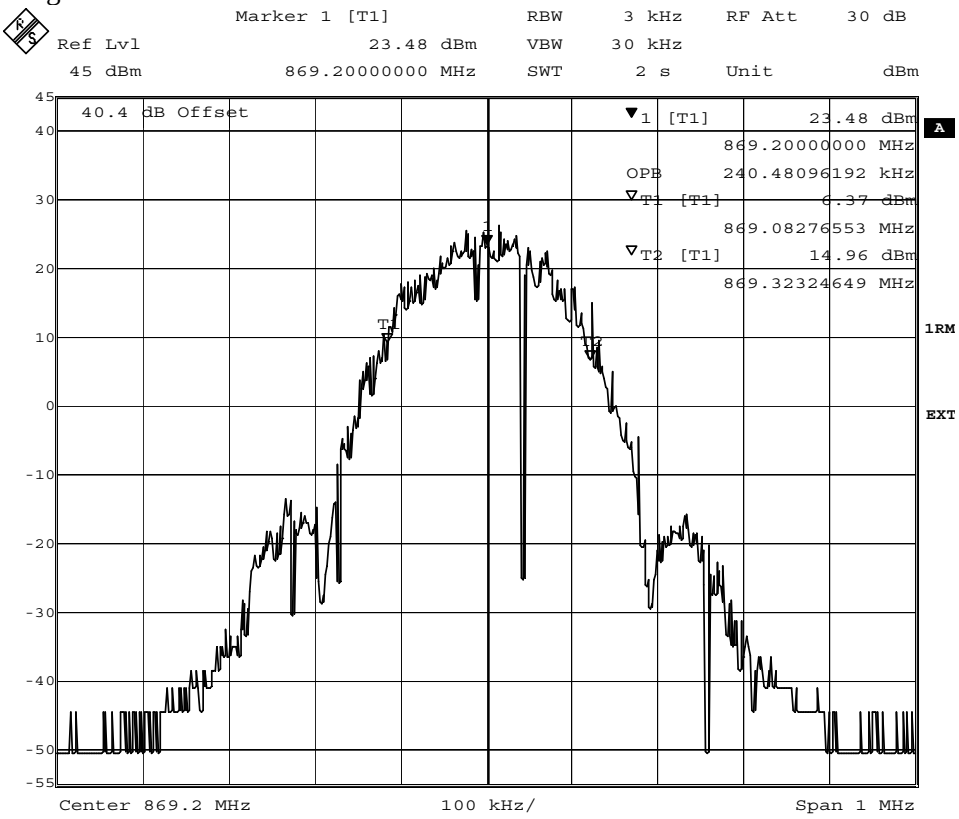


Diagram 8

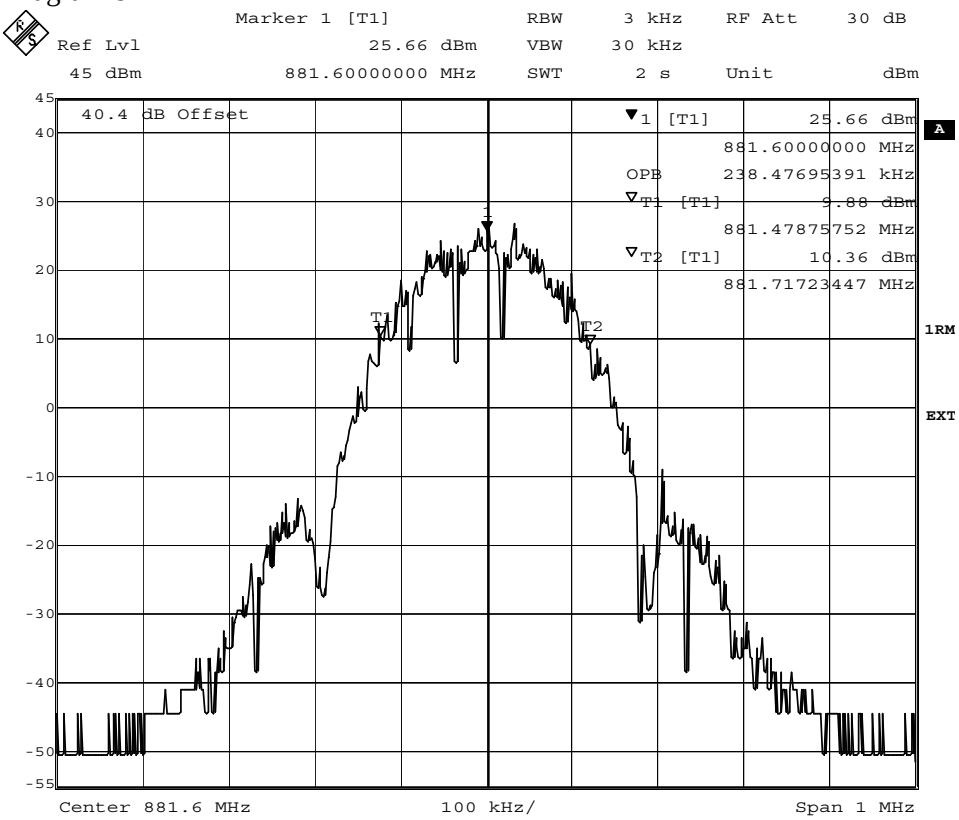
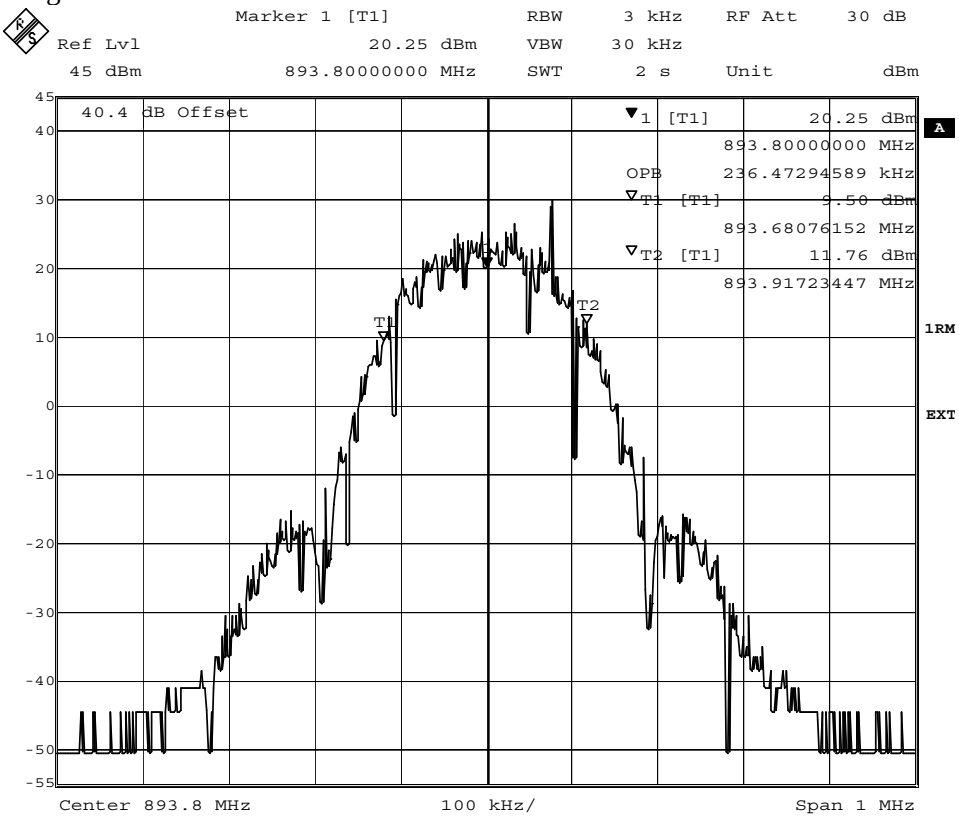
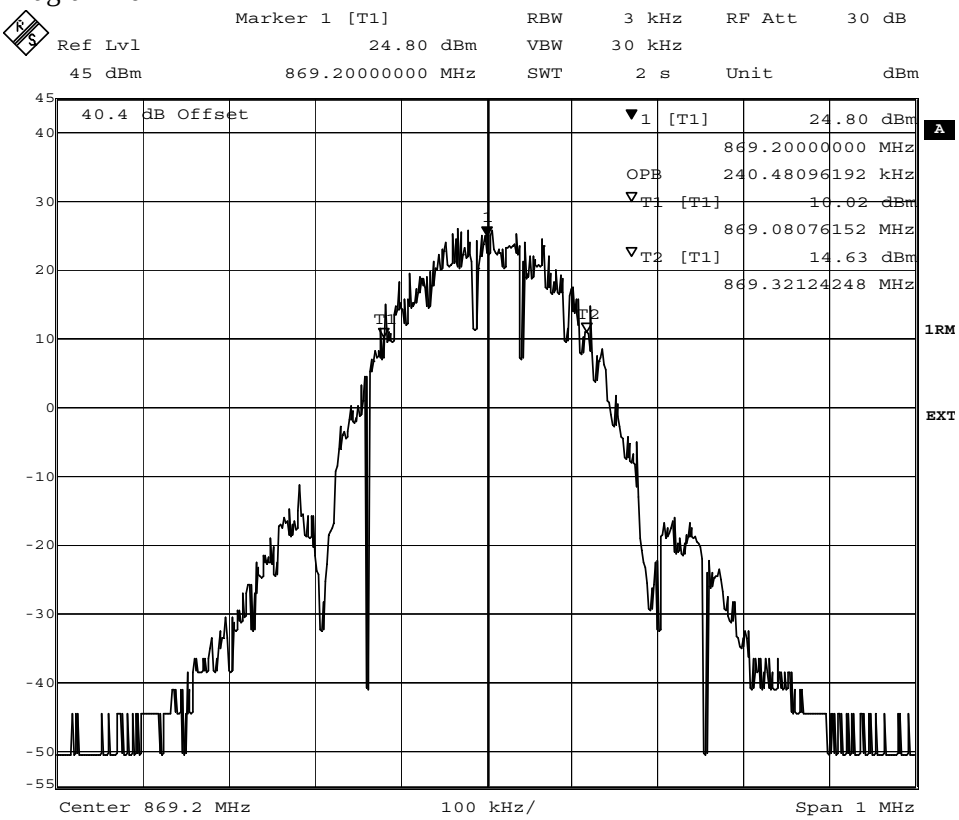


Diagram 9



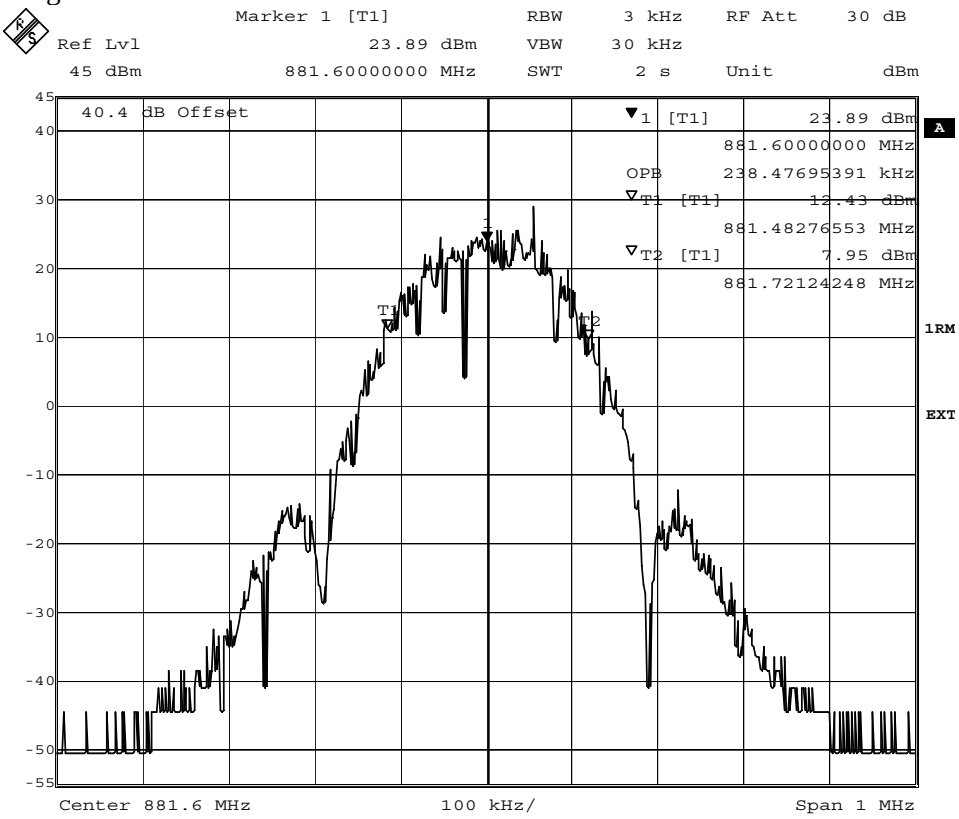
Date: 9.JUN.2008 16:47:09

Diagram 10



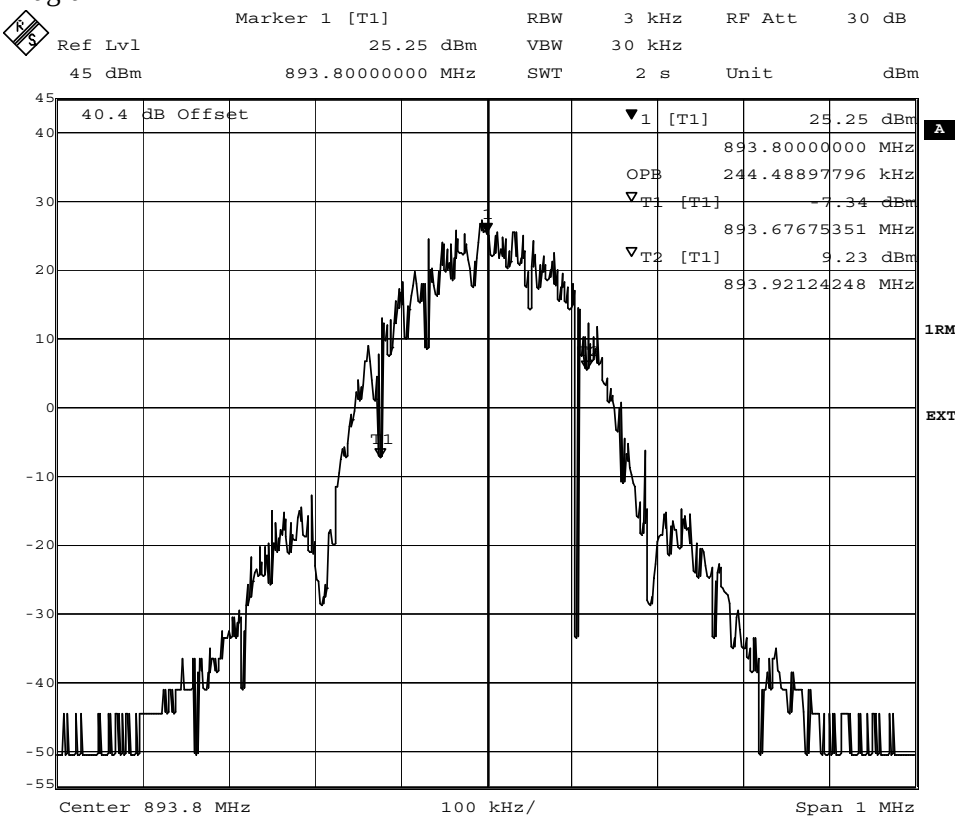
Date: 9.JUN.2008 16:30:18

Diagram 11



Date: 9.JUN.2008 16:42:12

Diagram 12



Date: 9.JUN.2008 16:48:27

Band edge measurements according to 47CFR 2.1049

Date	Temperature	Humidity
2008-06-10	23 °C ± 3 °C	45 % ± 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 250 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	2008-07	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 4.1

GMSK

dTRU Output 1, without internal combiner

Diagram 1 Ch 128 (869.2 MHz) Band edge, reduced output power
Diagram 2 Ch 251 (893.8 MHz) Band edge, reduced output power

dTRU Output 2, without internal combiner

Diagram 3 Ch 128 (869.2 MHz) Band edge, reduced output power
Diagram 4 Ch 251 (893.8 MHz) Band edge, reduced output power

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

Diagram 5 Ch 129 (869.4 MHz) Band edge, maximum output power
Diagram 6 Ch 250 (893.6 MHz) Band edge, maximum output power

8-PSK

dTRU Output 1, without internal combiner

Diagram 7 Ch 128 (869.2 MHz) Band edge, reduced output power
Diagram 8 Ch 251 (893.8 MHz) Band edge, reduced output power

dTRU Output 2, without internal combiner

Diagram 9 Ch 128 (869.2 MHz) Band edge, reduced output power
Diagram 10 Ch 251 (893.8 MHz) Band edge, reduced output power

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

Diagram 11 Ch 129 (869.4 MHz) Band edge, maximum output power
Diagram 12 Ch 250 (893.6 MHz) Band edge, maximum 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 37.9 dBm in order to comply.

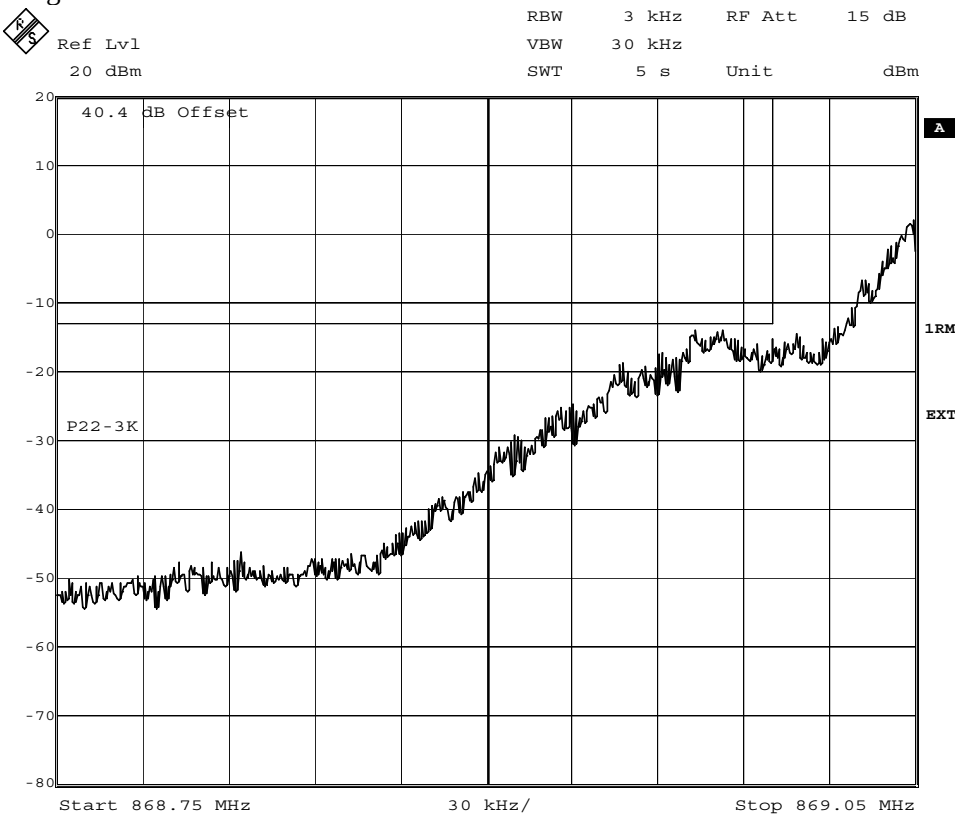
Limits

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.

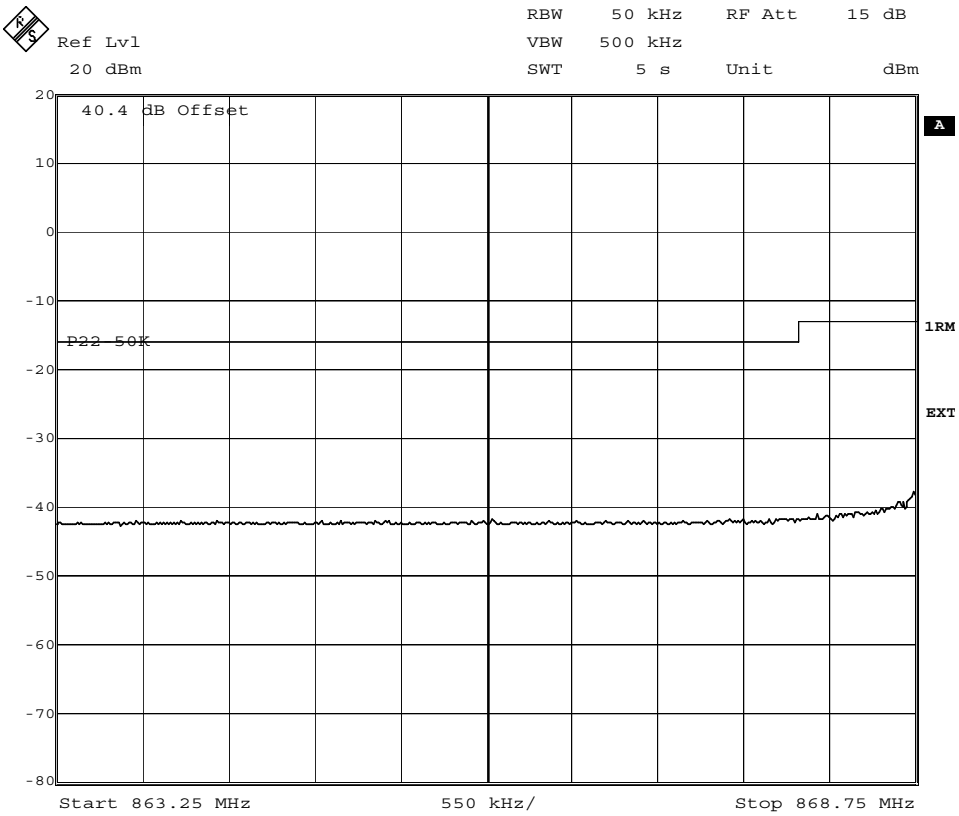
Complies?	Yes

FCC ID: B5KEKRC1311005-2 Appendix 4.1

Diagram 1

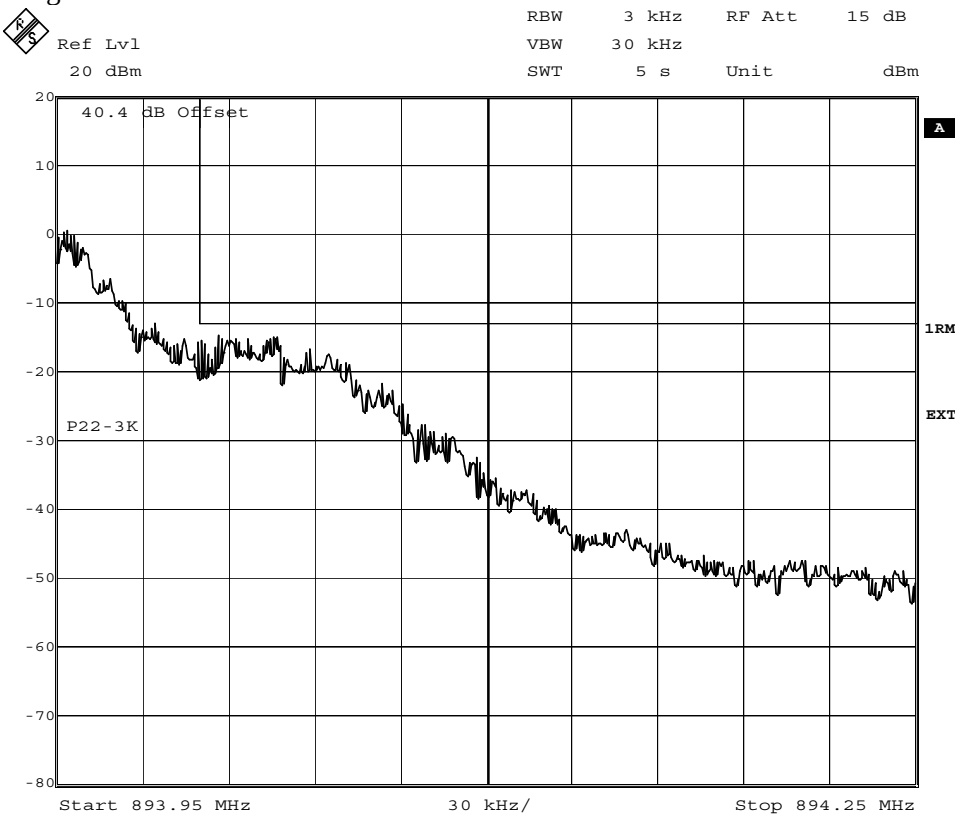


Date: 10.JUN.2008 13:38:03



Date: 10.JUN.2008 13:39:29

Diagram 2


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 13:41:26

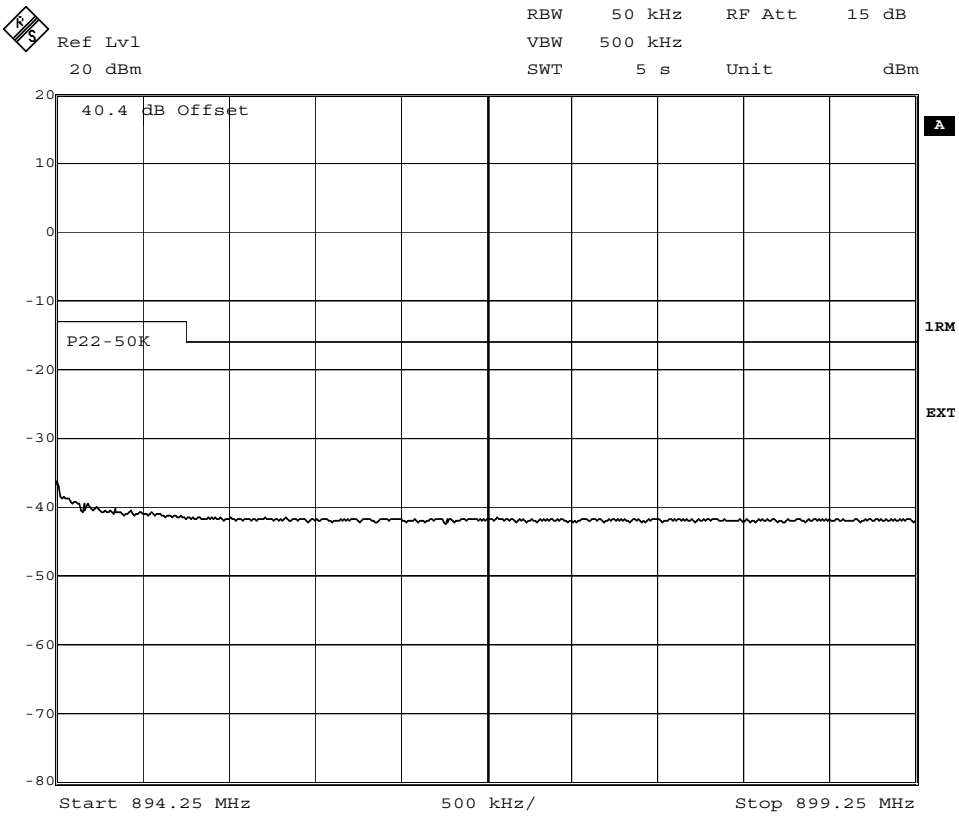
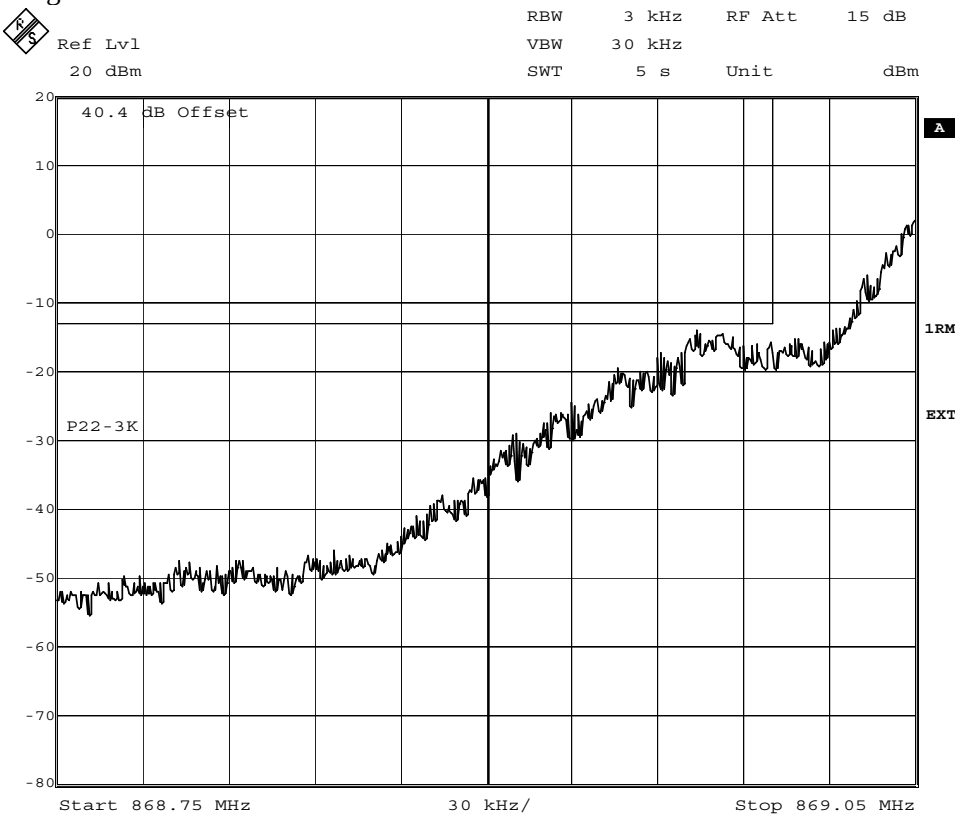
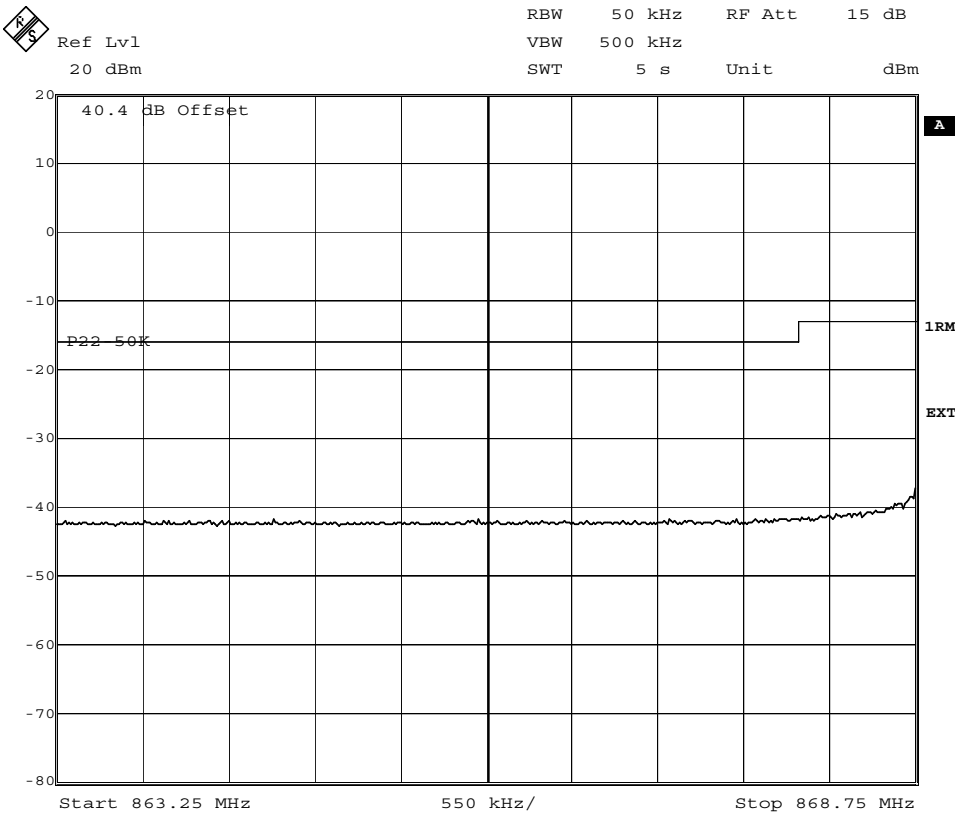

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 10.JUN.2008 13:43:00

Diagram 3

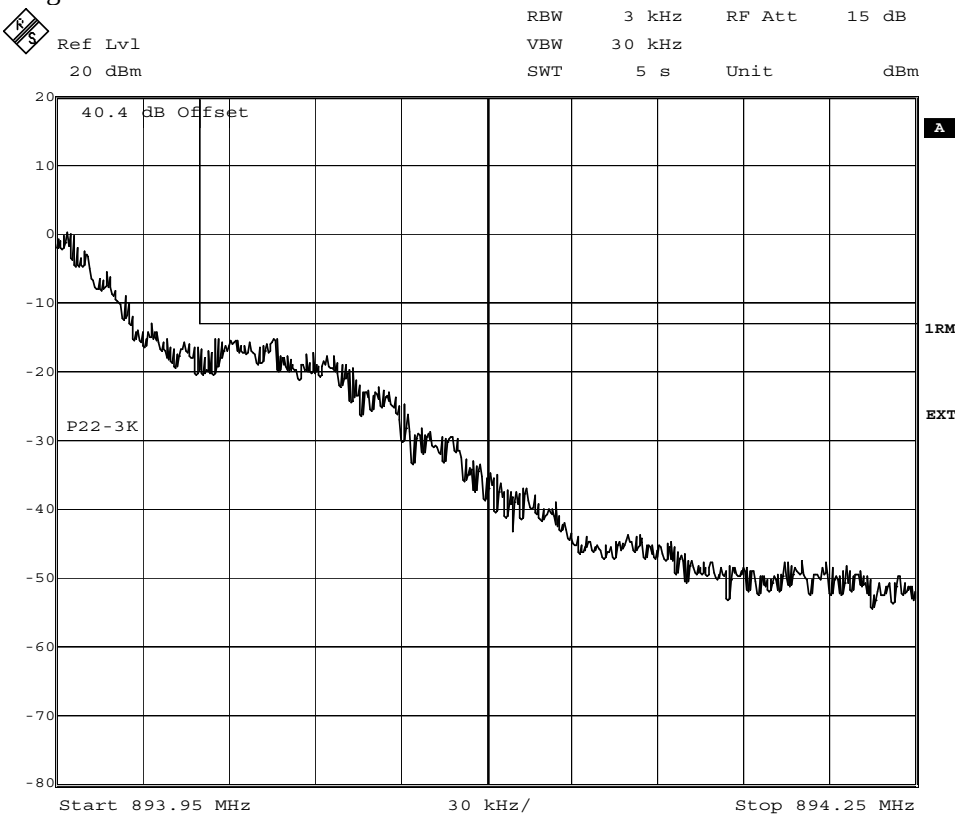


Date: 10.JUN.2008 16:44:30



Date: 10.JUN.2008 16:46:38

Diagram 4


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 16:54:21

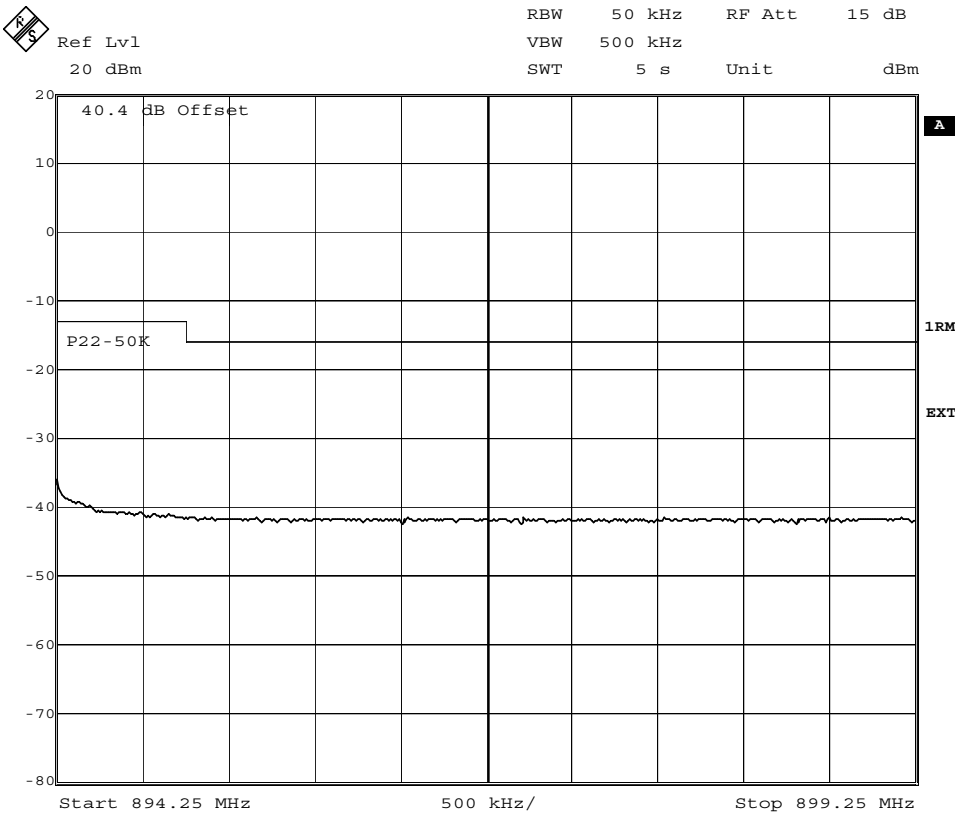
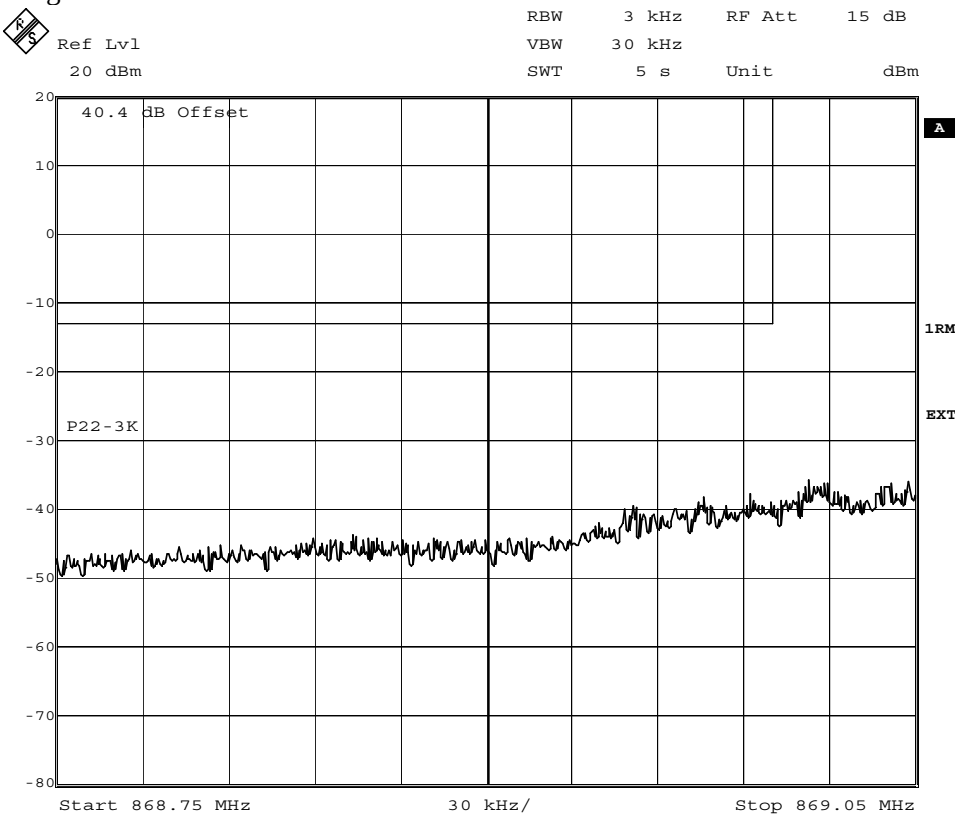

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 10.JUN.2008 16:53:26

Diagram 5


Ref Lvl
20 dBm
RBW 3 kHz
VBW 30 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 868.75 MHz
30 kHz/
Stop 869.05 MHz
Date: 10.JUN.2008 09:31:49

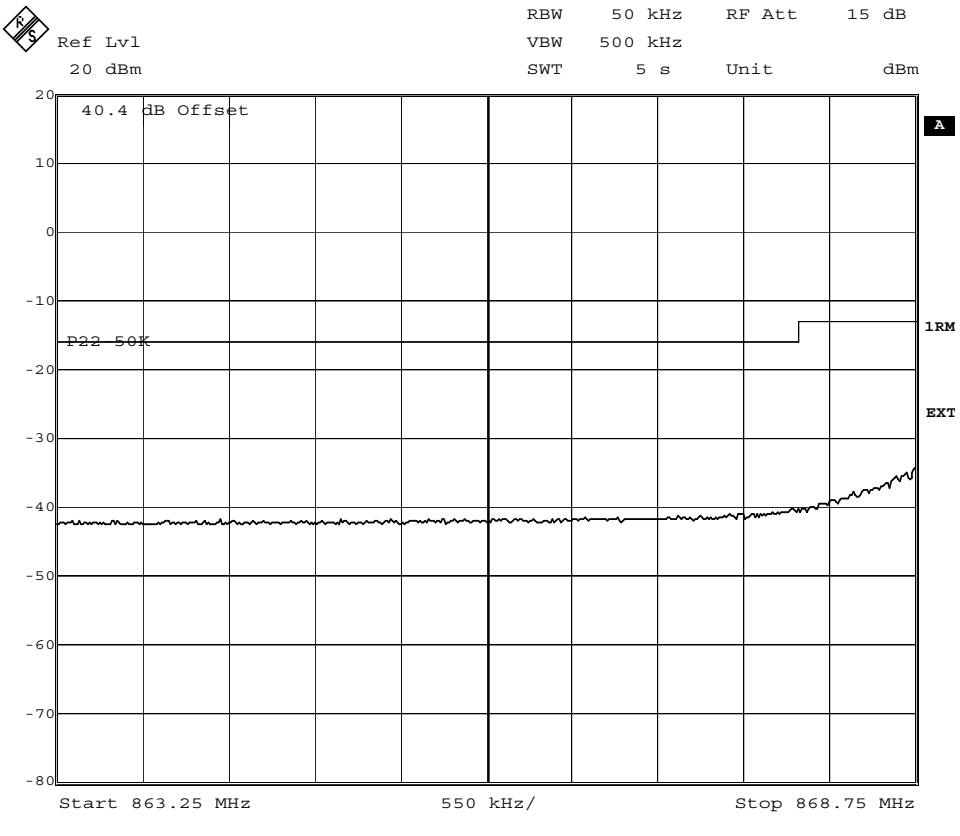
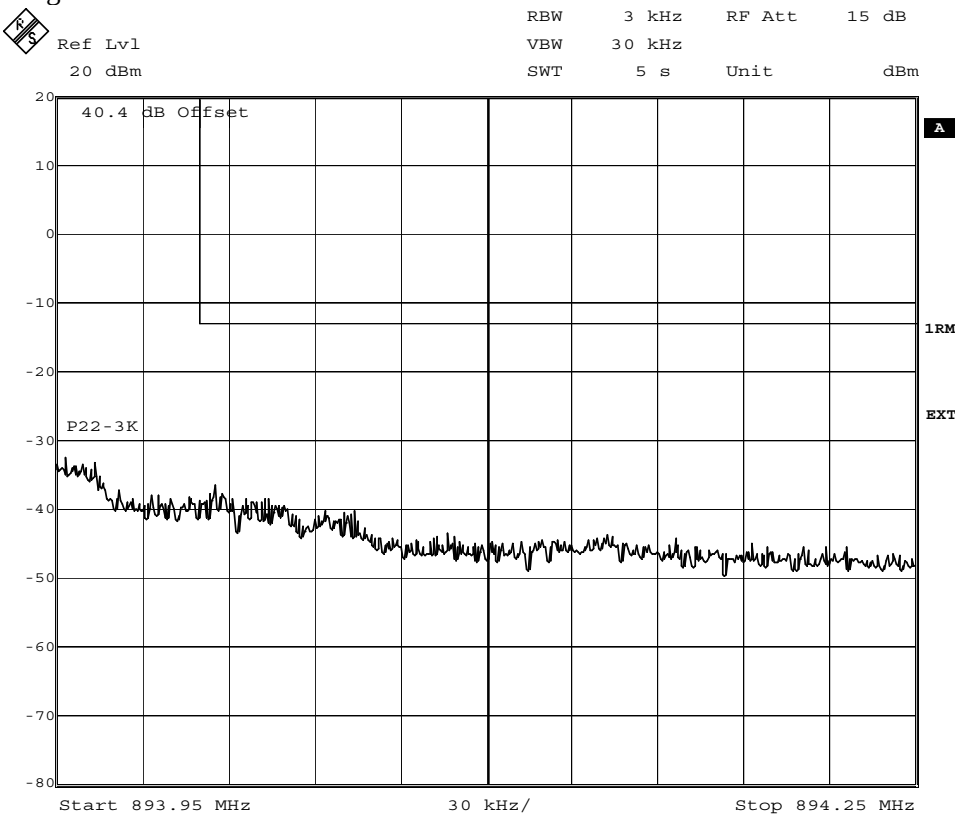

Ref Lvl
20 dBm
RBW 50 kHz
VBW 500 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22 50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 863.25 MHz
550 kHz/
Stop 868.75 MHz
Date: 10.JUN.2008 09:32:29

Diagram 6


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 09:28:19

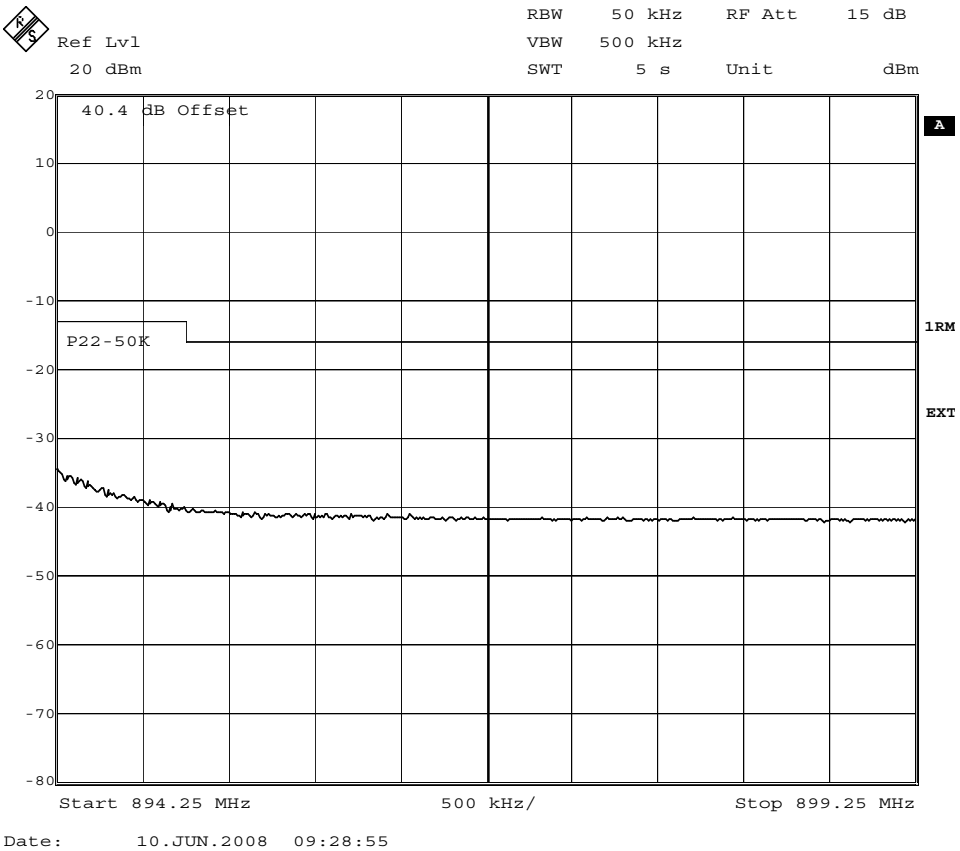
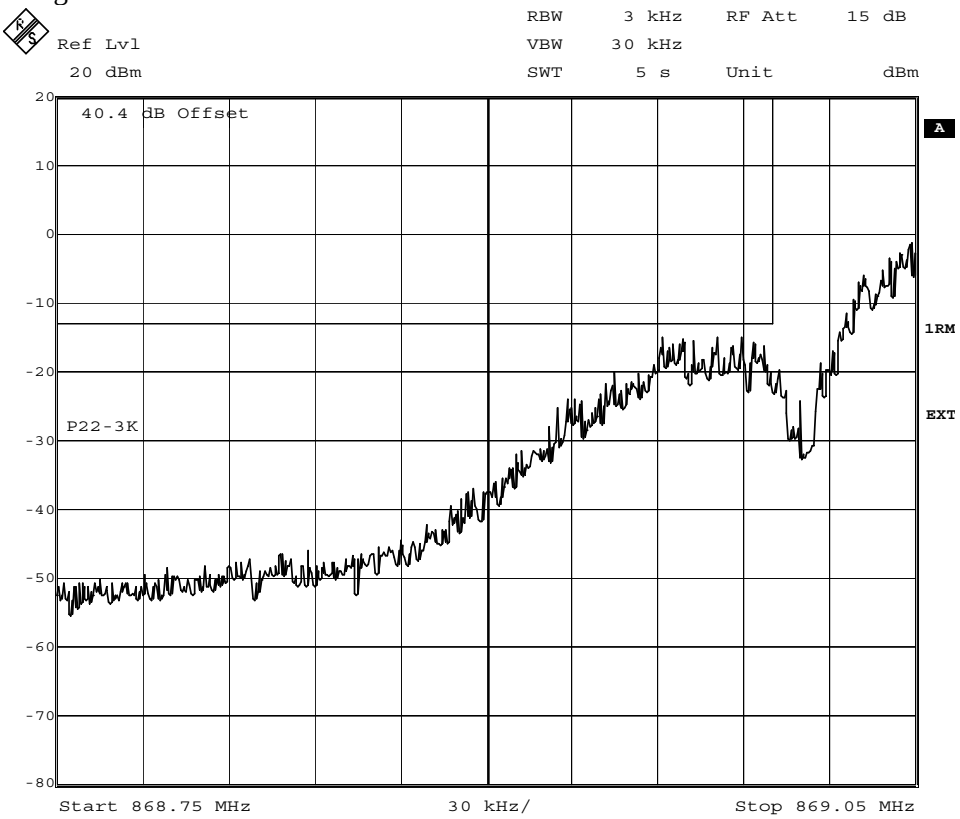

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 10.JUN.2008 09:28:55

Diagram 7


Ref Lvl
20 dBm
RBW 3 kHz
VBW 30 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 868.75 MHz
30 kHz/
Stop 869.05 MHz
Date: 10.JUN.2008 13:47:19

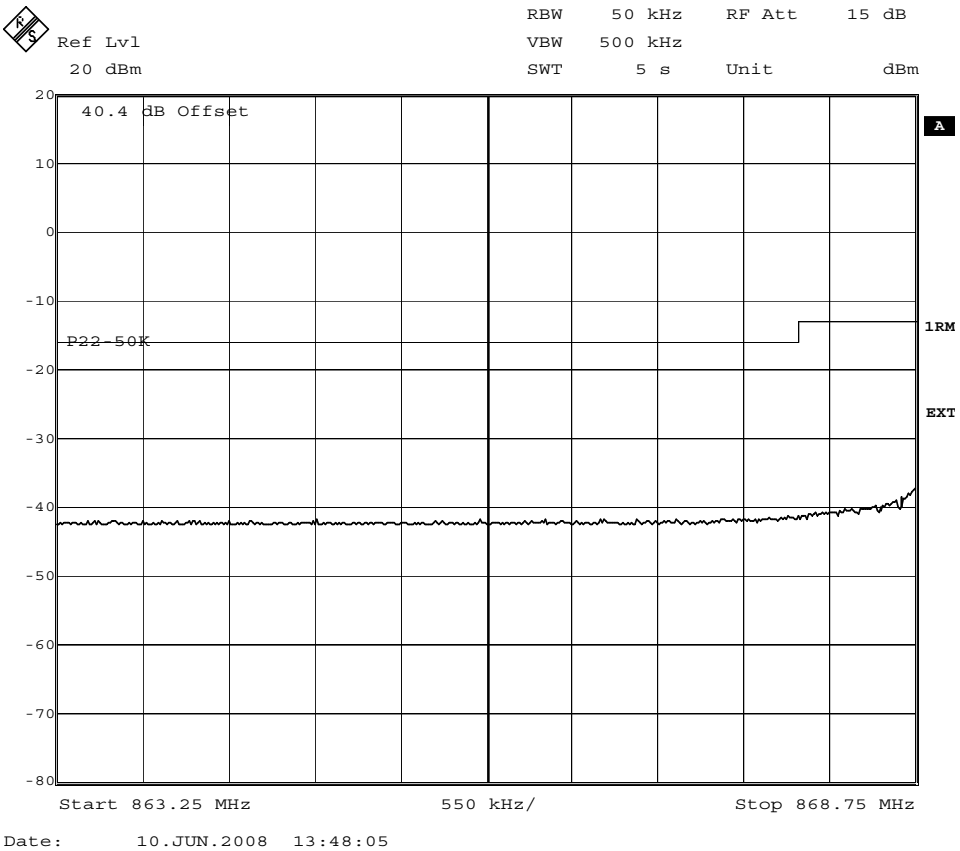
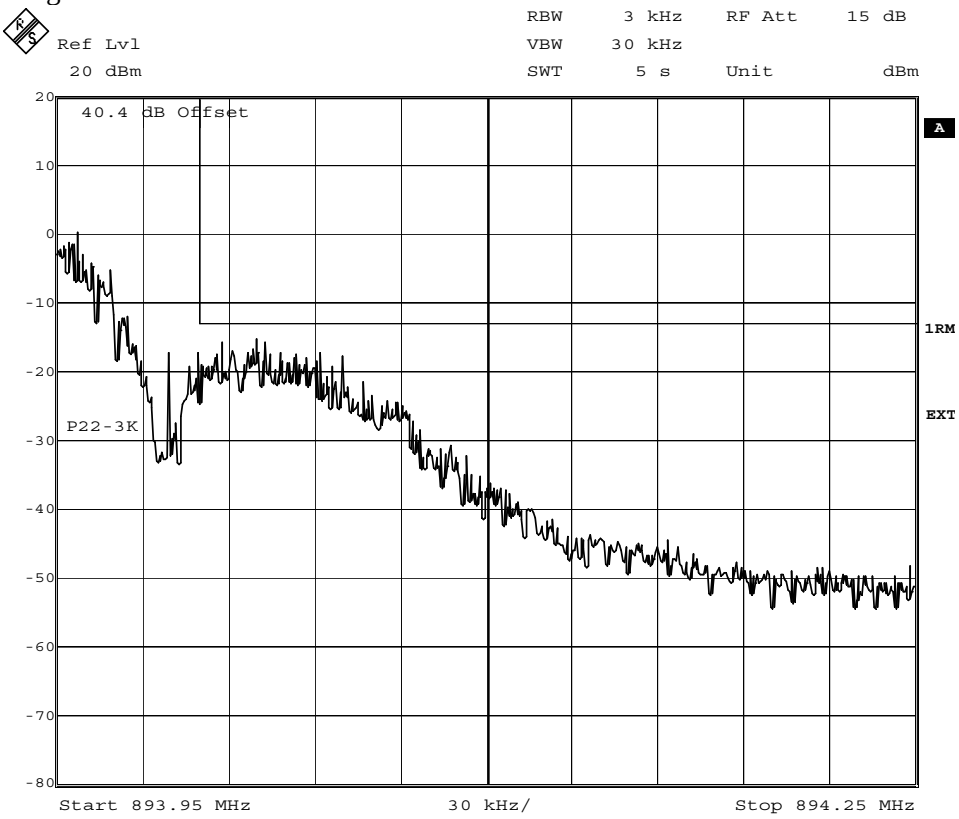

Ref Lvl
20 dBm
RBW 50 kHz
VBW 500 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 863.25 MHz
550 kHz/
Stop 868.75 MHz
Date: 10.JUN.2008 13:48:05

Diagram 8


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 13:44:40

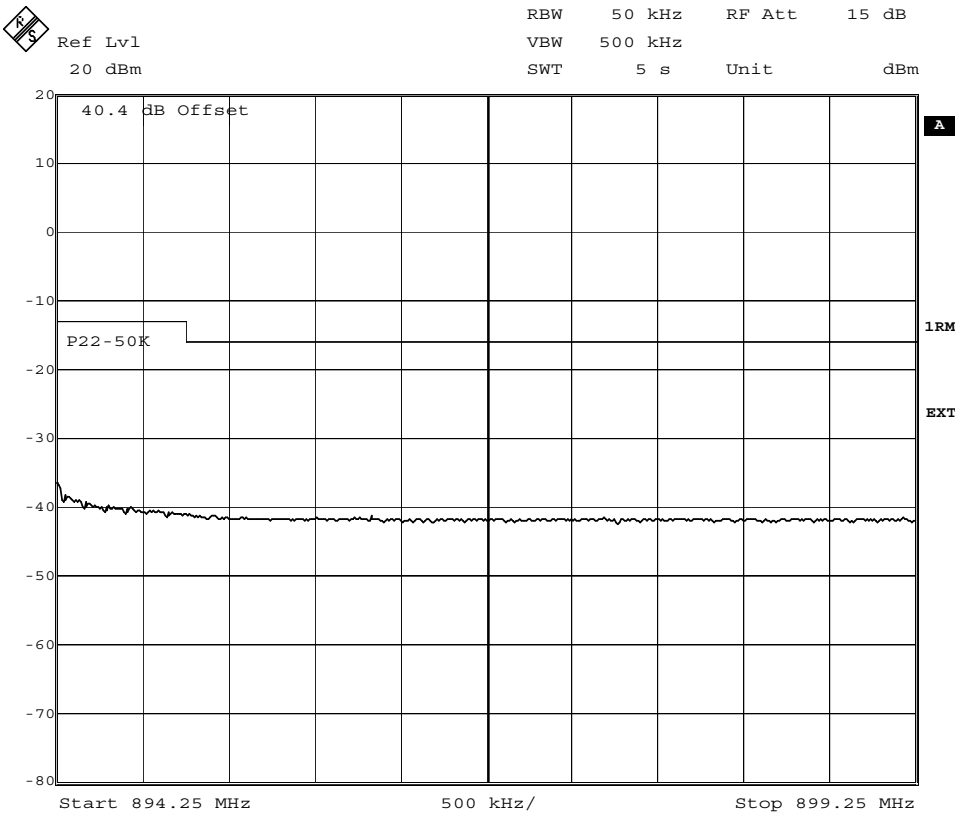
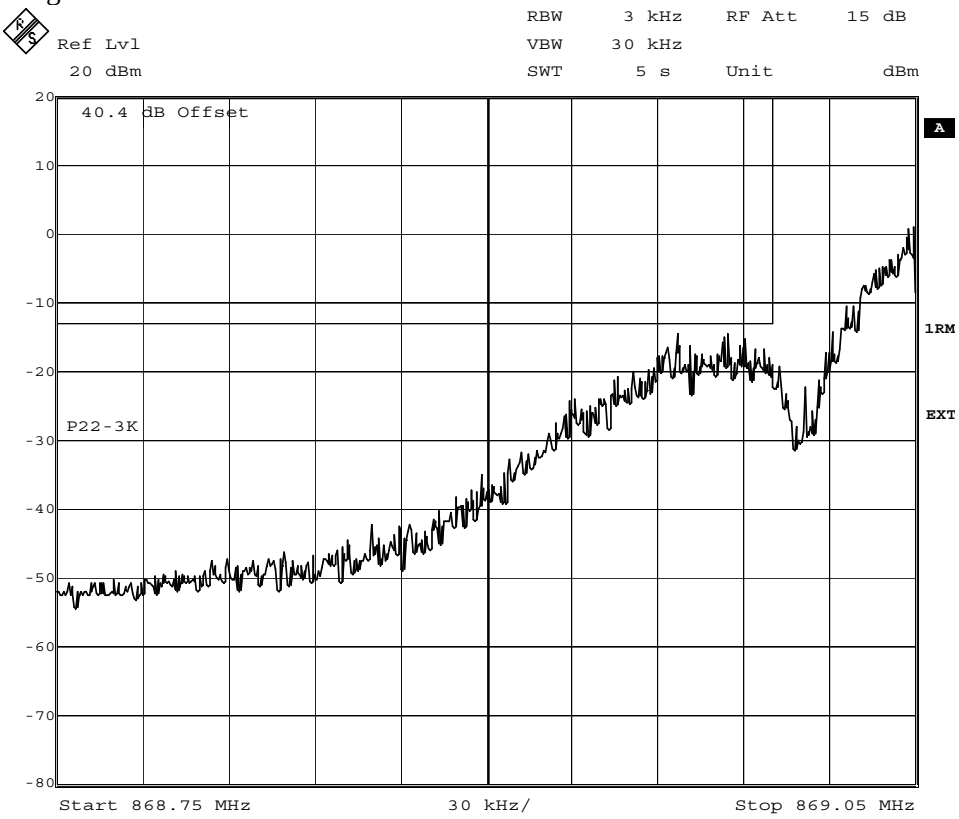

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 10.JUN.2008 13:45:38

Diagram 9


Ref Lvl
20 dBm
RBW 3 kHz
VBW 30 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 868.75 MHz
30 kHz/
Stop 869.05 MHz
Date: 10.JUN.2008 16:49:42

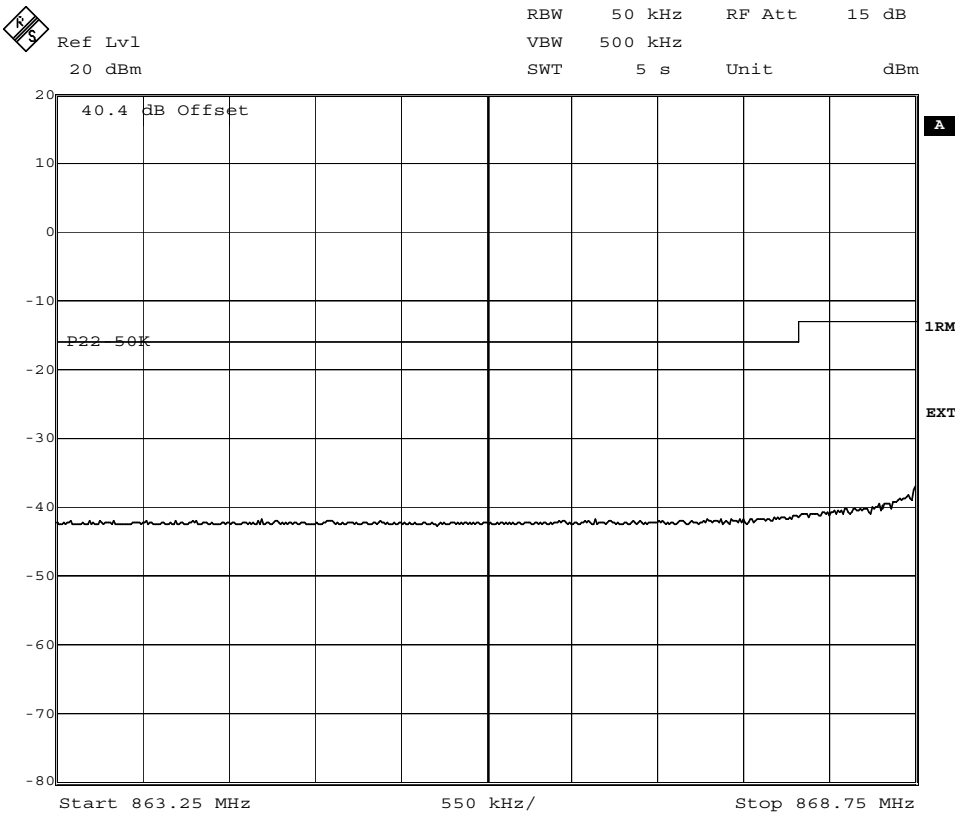
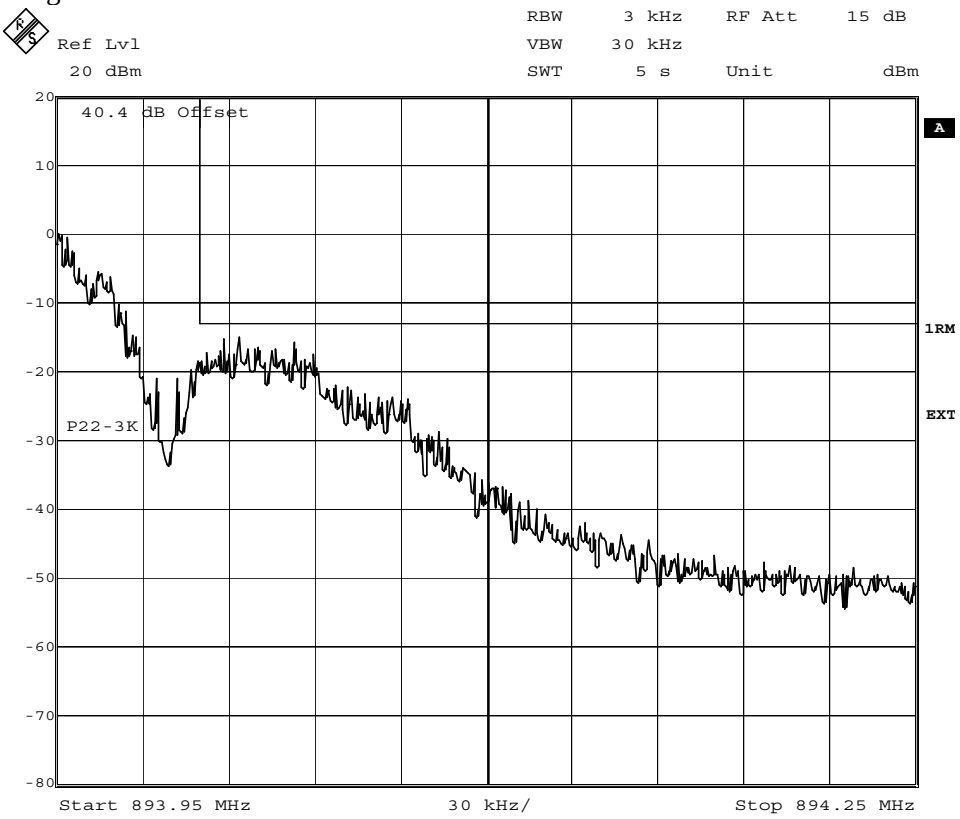

Ref Lvl
20 dBm
RBW 50 kHz
VBW 500 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22 50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 863.25 MHz
550 kHz/
Stop 868.75 MHz
Date: 10.JUN.2008 16:47:52

Diagram 10


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 16:51:24

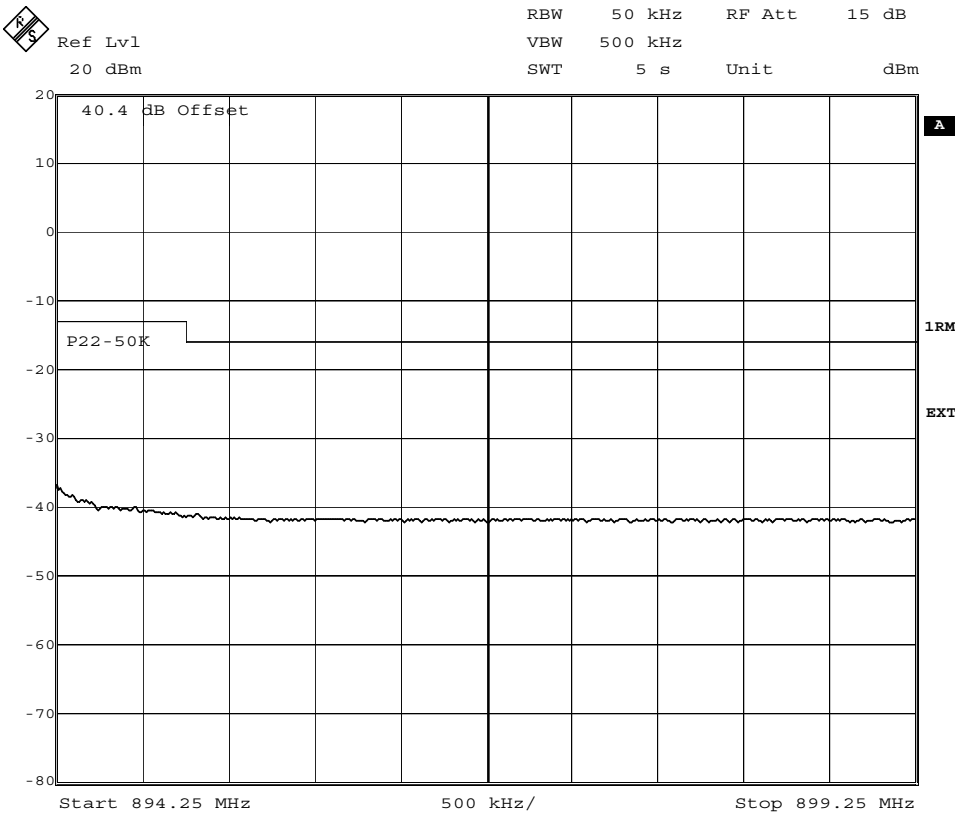
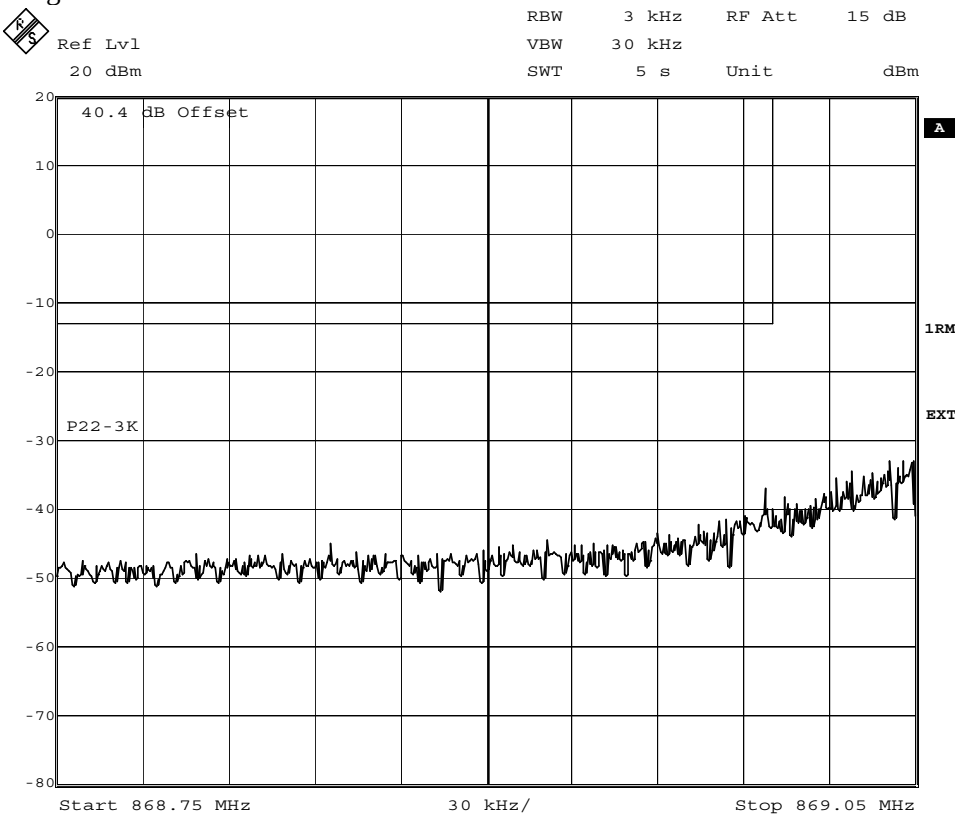
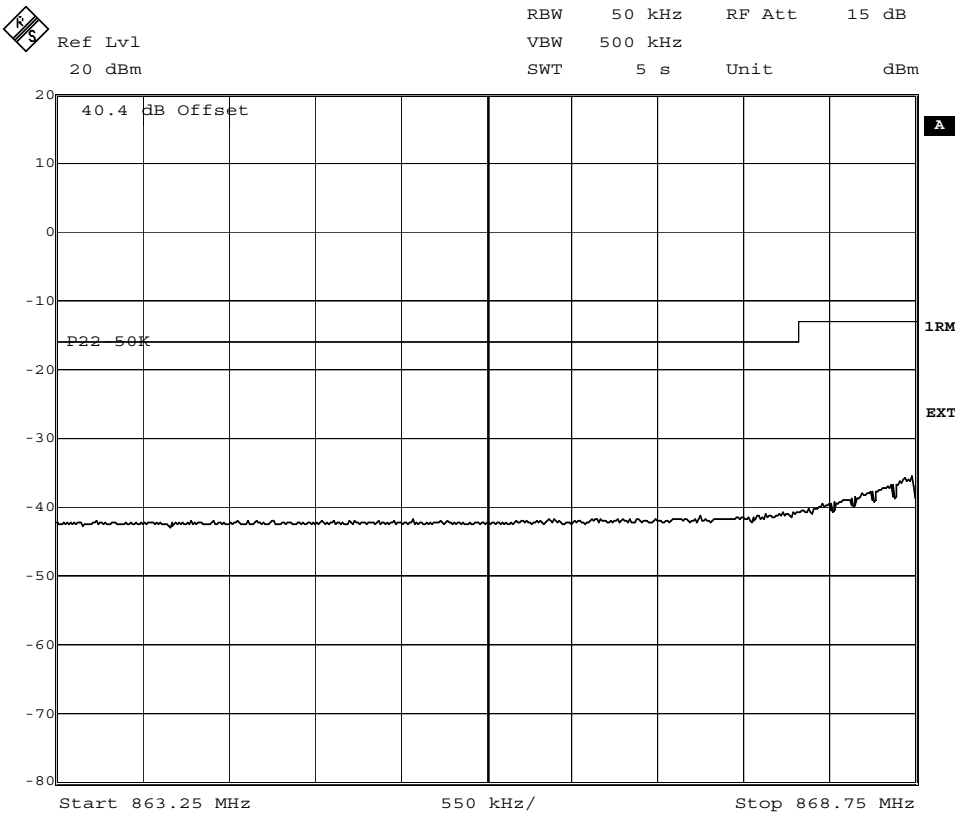

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 dB Offset
A
1RM
EXT
P22-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 894.25 MHz
500 kHz/
Stop 899.25 MHz
Date: 10.JUN.2008 16:52:27

Diagram 11

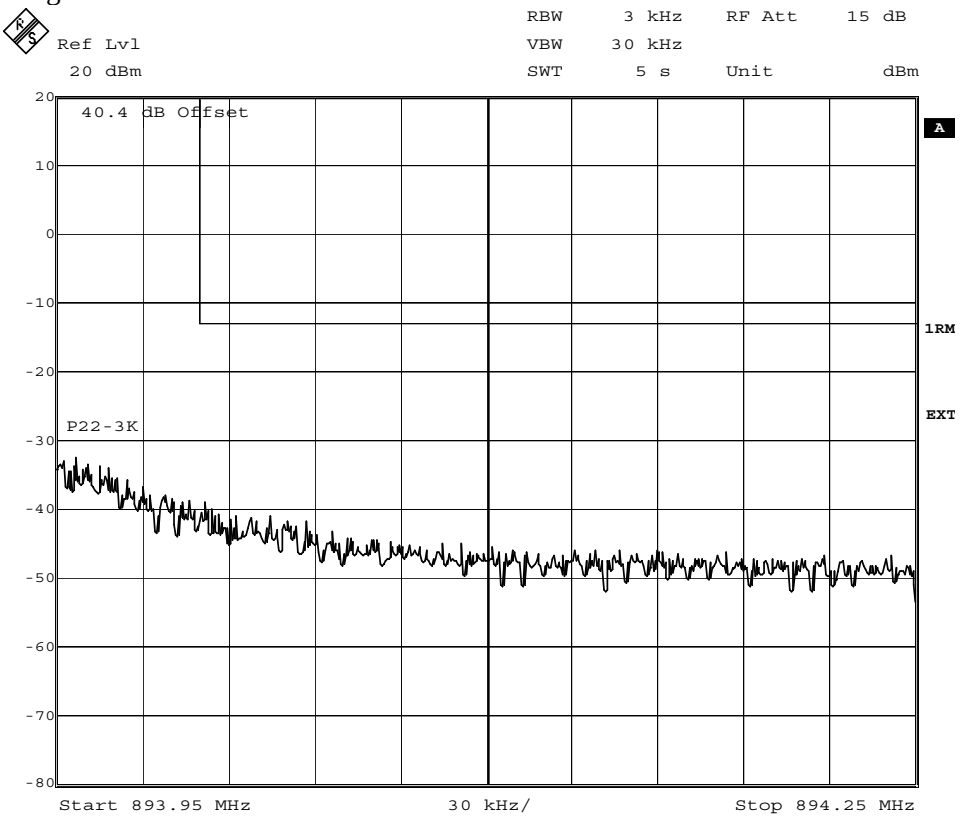


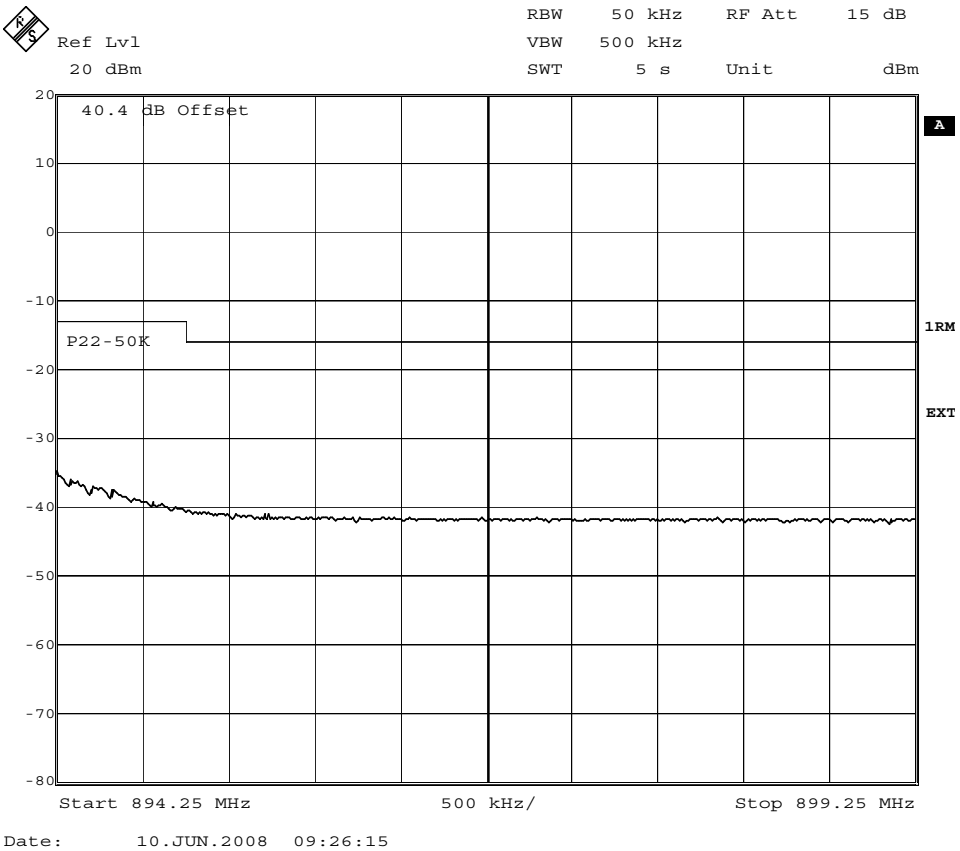
Date: 10.JUN.2008 09:33:44



Date: 10.JUN.2008 09:34:46

Diagram 12


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 09:26:54


RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
40.4 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: 10.JUN.2008 09:26:15

Conducted spurious emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2008-06-10	23 °C ± 3 °C	46 % ± 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	2008-07	503 738
HP filter	2008-07	502 758
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 5.1

GMSK

dTRU, with internal combiner plus TCC:

Diagram 1: Ch 128
Diagram 2: Ch 190
Diagram 3: Ch 251

dTRU, without internal combiner:

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

dTRU, with internal combiner:

Diagram 10: Ch 128 and ch 153
Diagram 11: Ch 226 and ch 251

8-PSK

dTRU, with internal combiner plus TCC:

Diagram 12: Ch 128
Diagram 13: Ch 190
Diagram 14: Ch 251

dTRU, without internal combiner:

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

dTRU, with internal combiner:

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

Remark

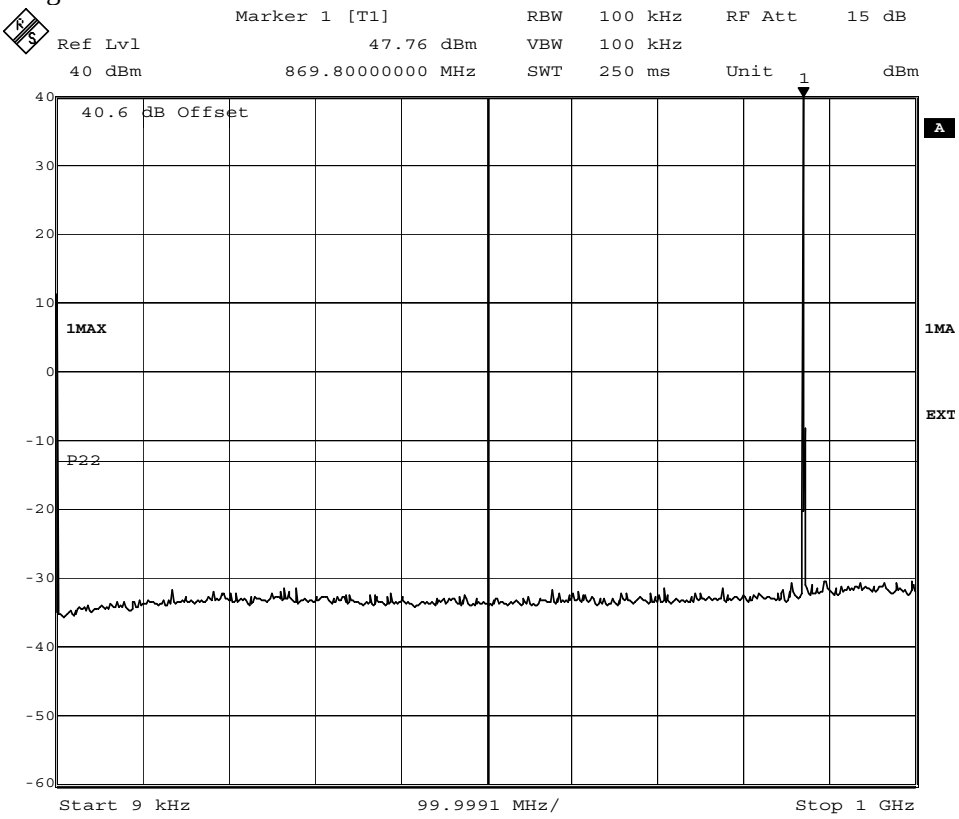
The emission at 9 kHz on the plots was not generated by the test object. A complementary measurement with a smaller RBW showed that it was related to the LO feedthrough.

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


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
47.76 dBm
VBW 100 kHz
40 dBm
869.80000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 09:41:50

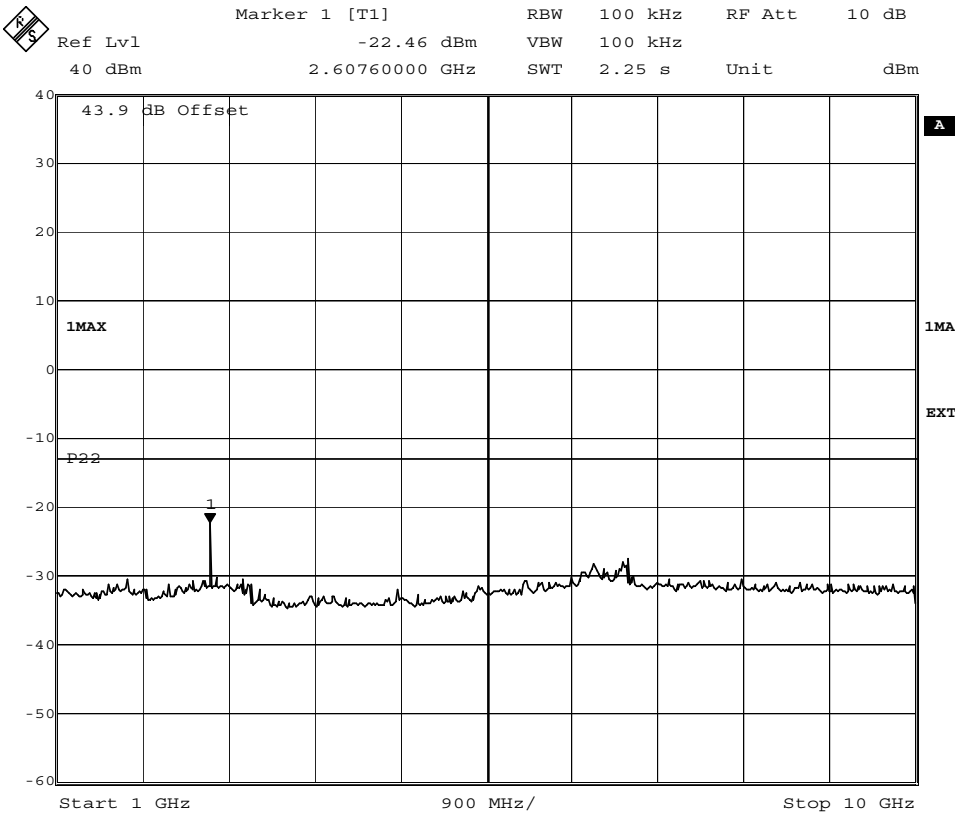
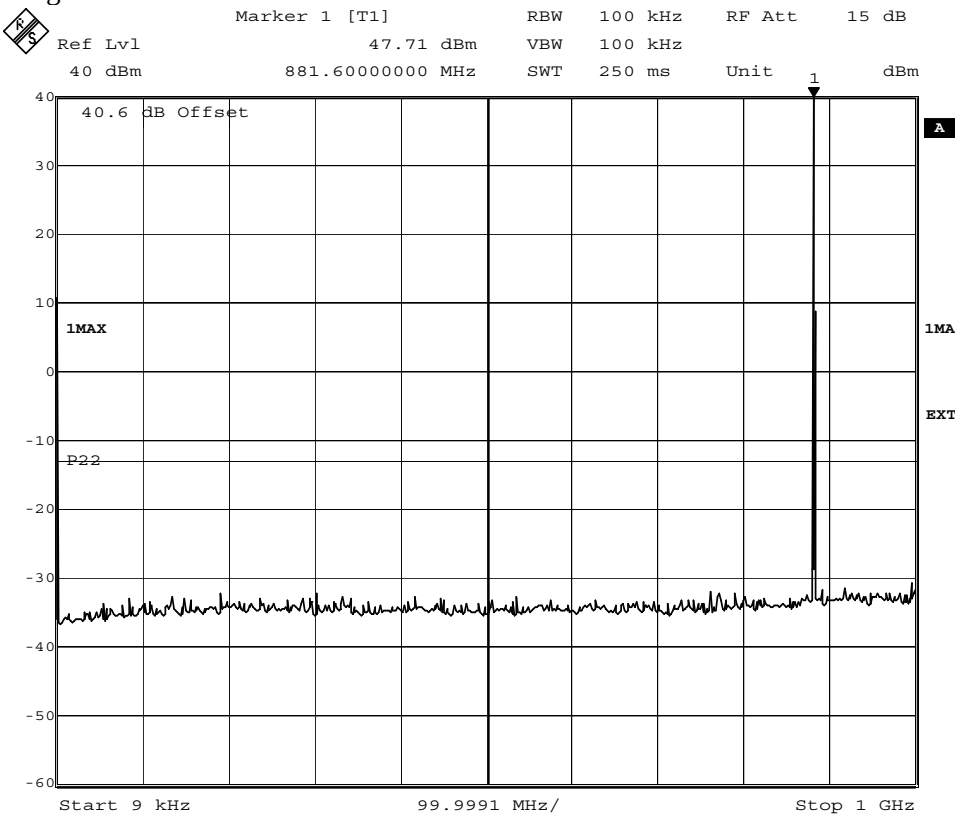
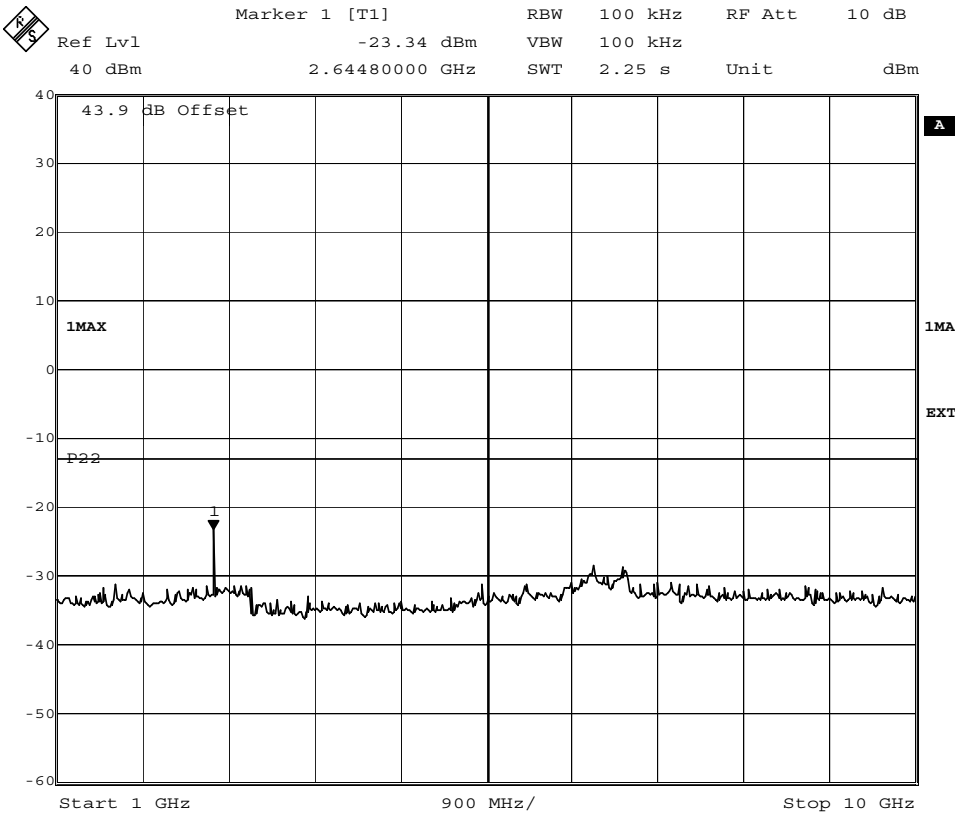

Marker 1 [T1]
RBW 100 kHz
RF Att 10 dB
Ref Lvl
-22.46 dBm
VBW 100 kHz
40 dBm
2.60760000 GHz
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 10:04:52

Diagram 2

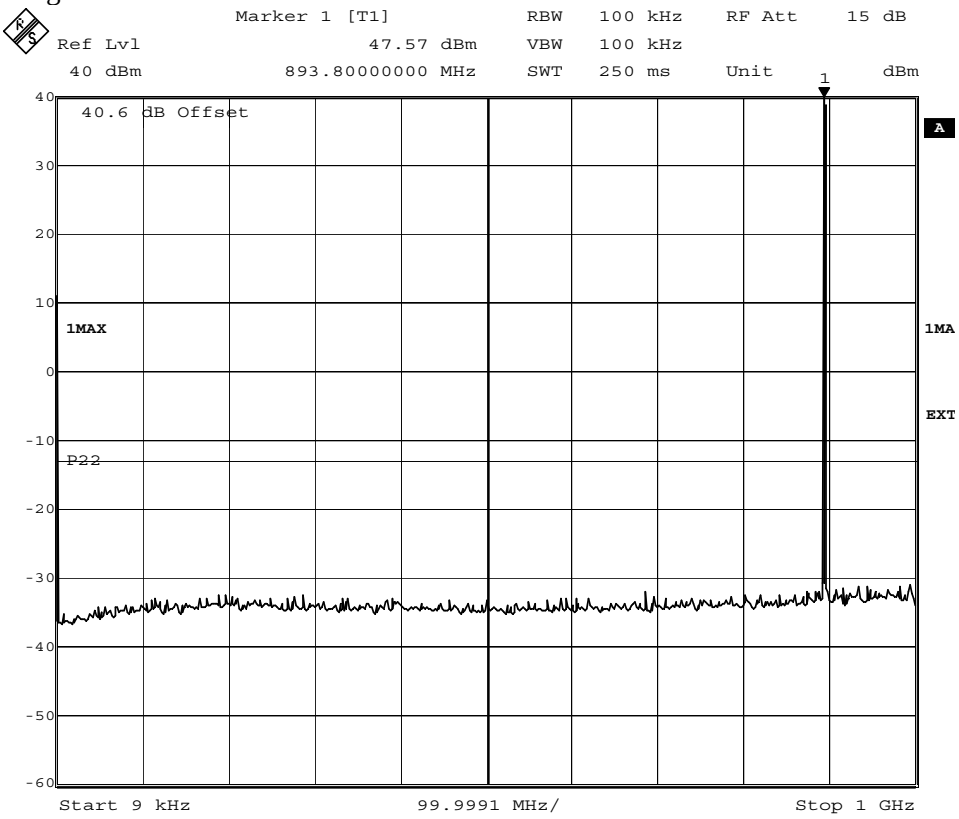


Date: 10.JUN.2008 09:44:18



Date: 10.JUN.2008 10:06:57

Diagram 3


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
47.57 dBm
VBW 100 kHz
40 dBm
893.80000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 09:45:16

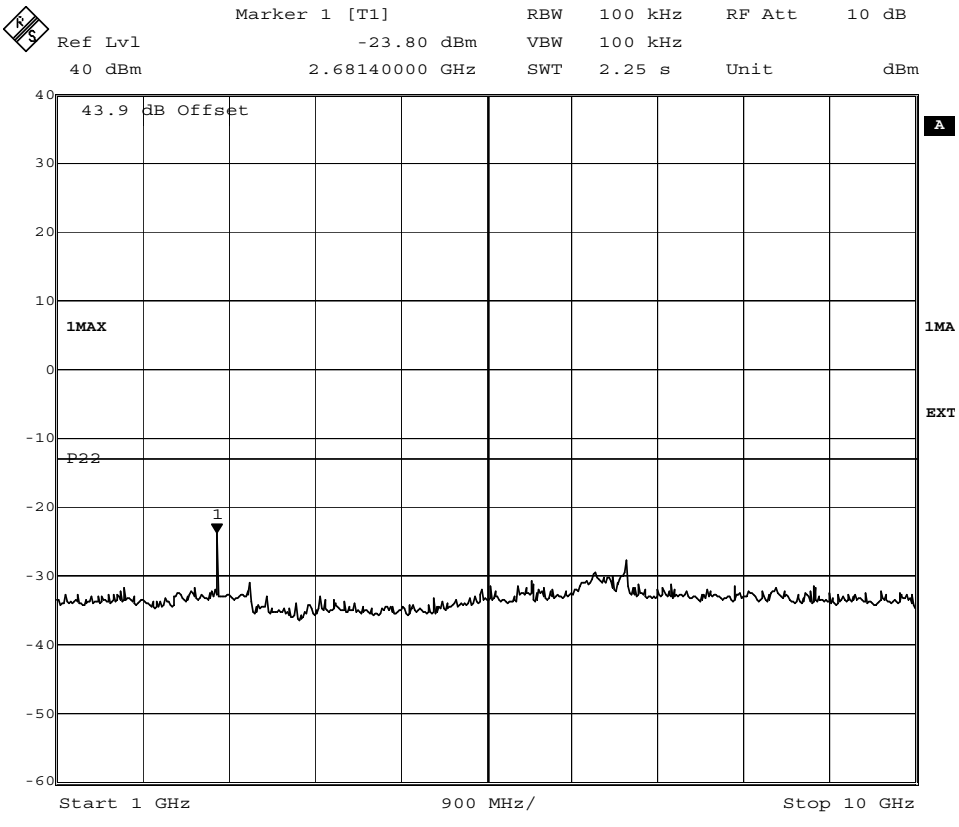
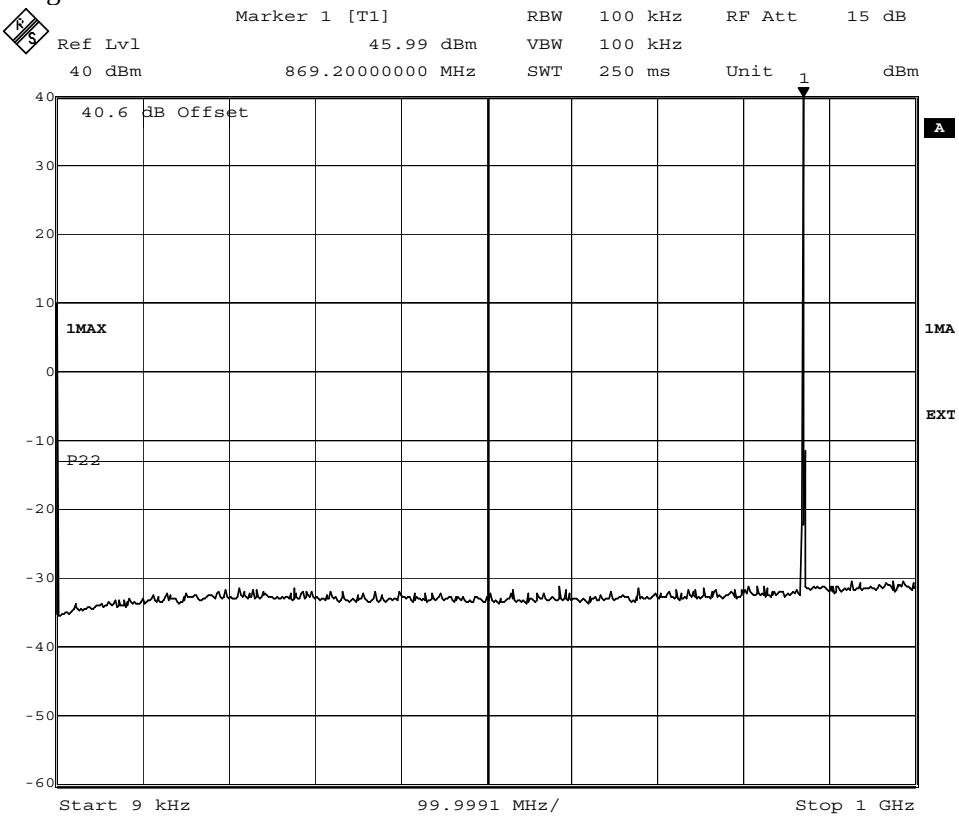

Marker 1 [T1]
RBW 100 kHz
RF Att 10 dB
Ref Lvl
-23.80 dBm
VBW 100 kHz
40 dBm
2.68140000 GHz
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 10:08:16

Diagram 4


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
45.99 dBm
VBW 100 kHz
40 dBm
869.20000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:05:23

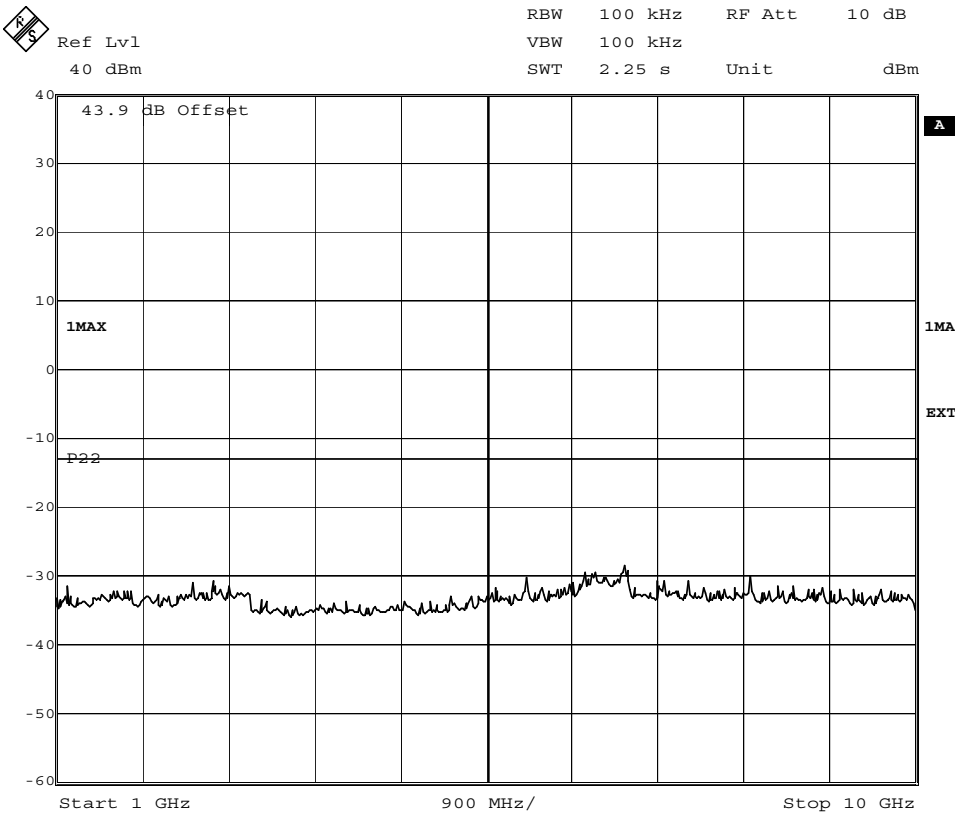
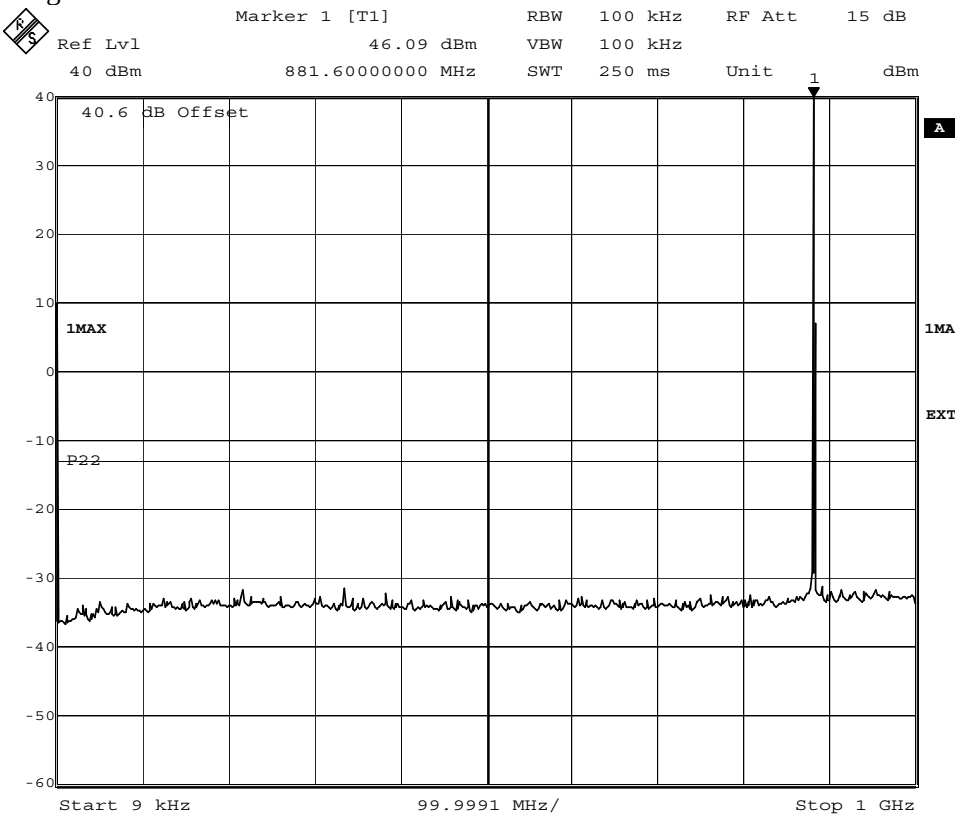

RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:15:13

Diagram 5


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
46.09 dBm
VBW 100 kHz
40 dBm
881.60000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:10:55

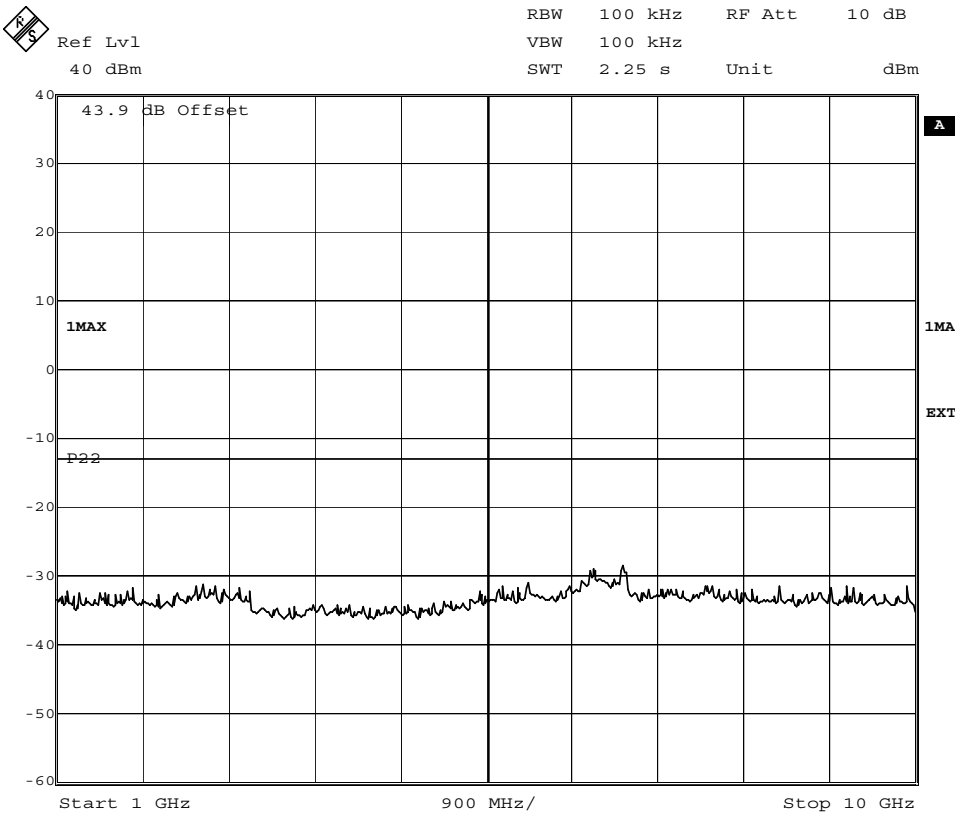
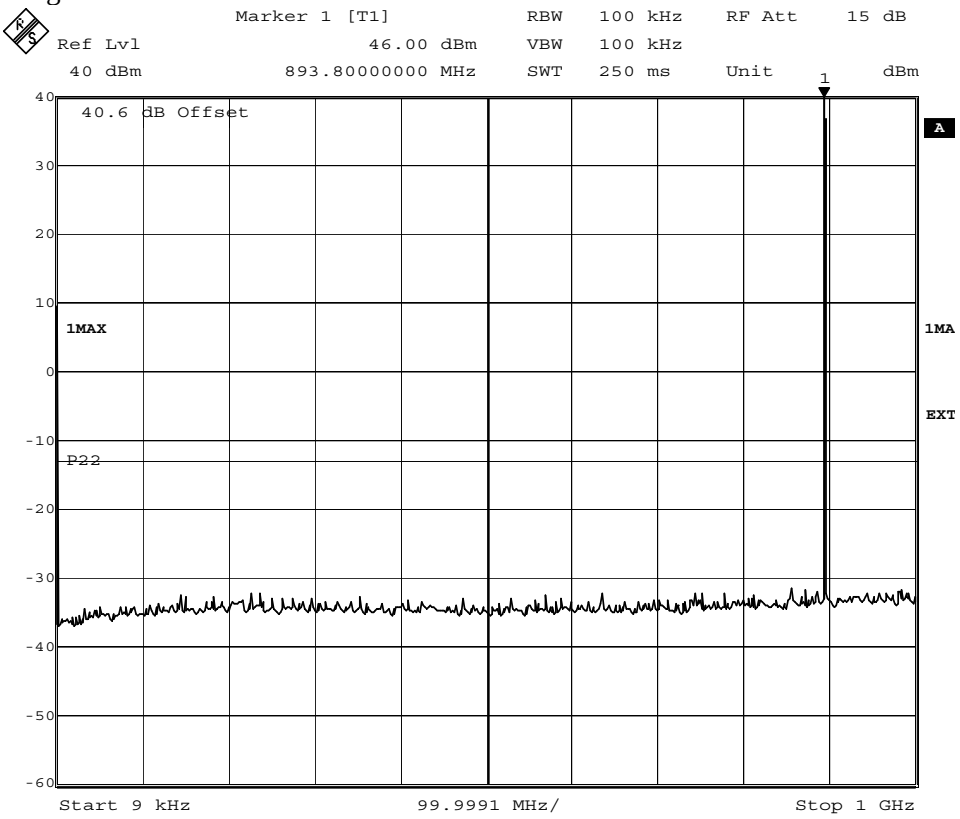

RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:14:16

Diagram 6


Marker 1 [T1]
Ref Lvl
40 dBm
46.00 dBm
893.80000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
40.6 dB Offset
1MAX
A
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:11:43

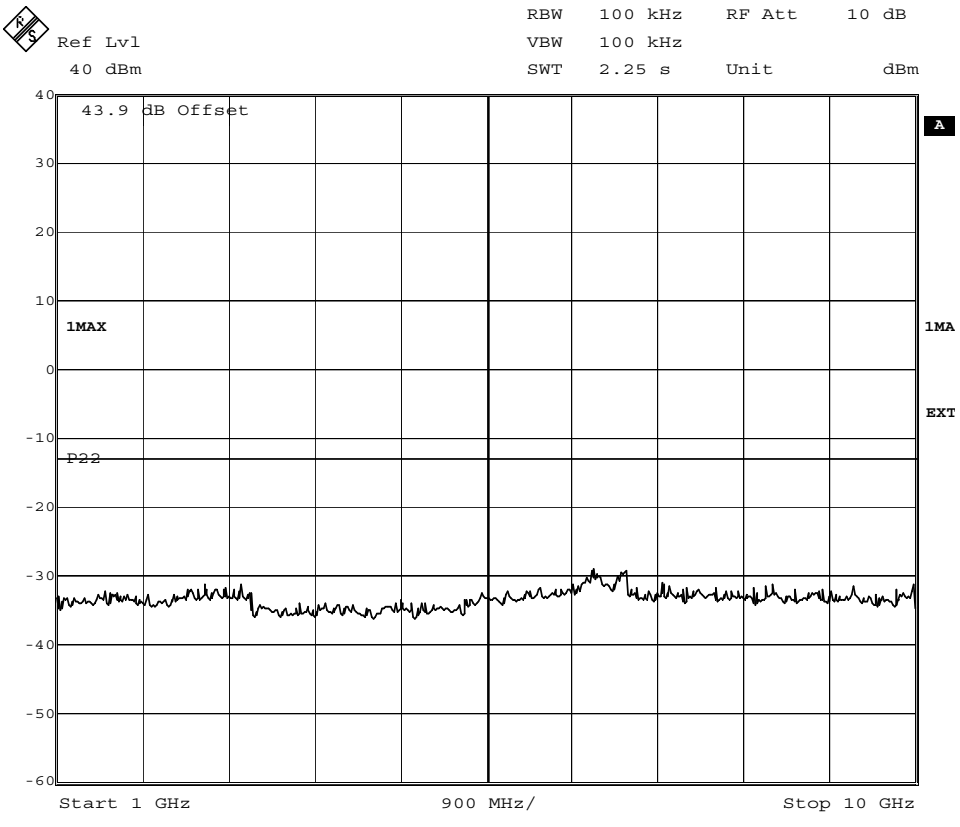
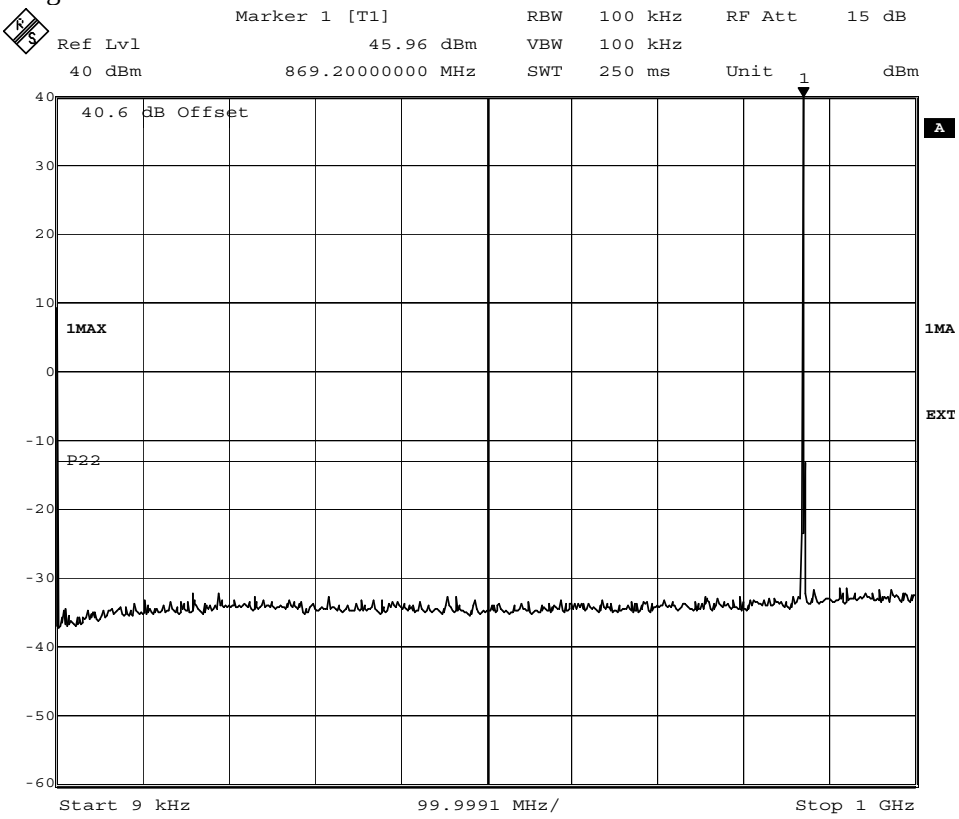

Ref Lvl
40 dBm
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
43.9 dB Offset
1MAX
A
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:13:26

Diagram 7


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
45.96 dBm
VBW 100 kHz
40 dBm
869.20000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:38:28

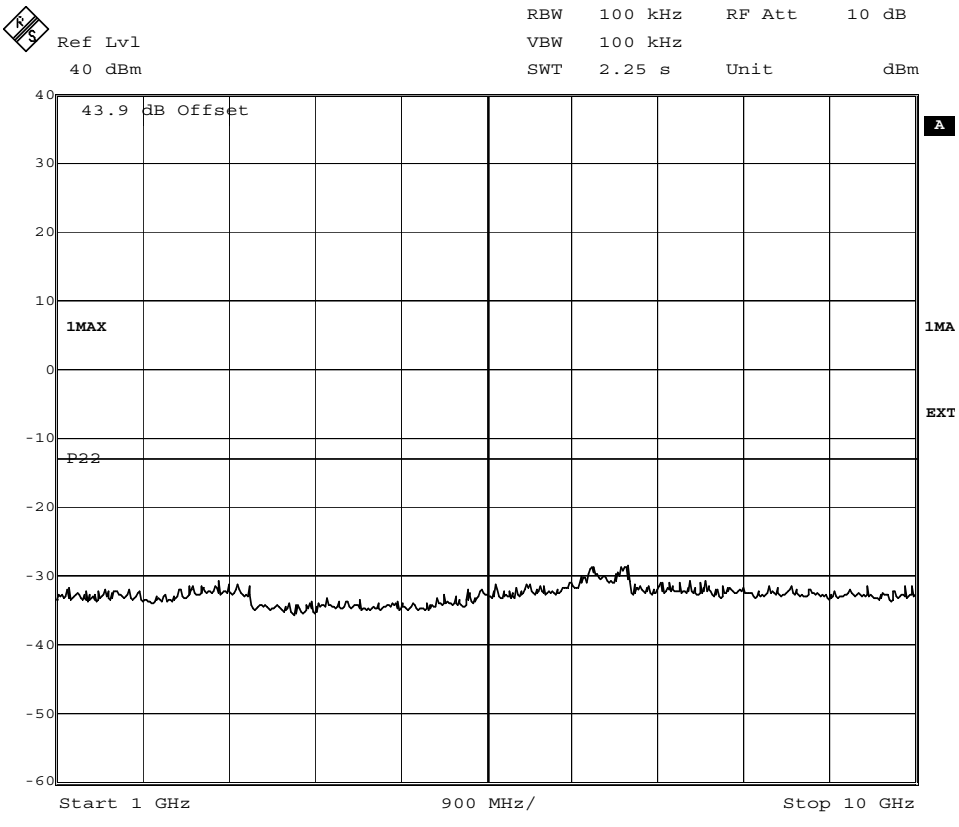
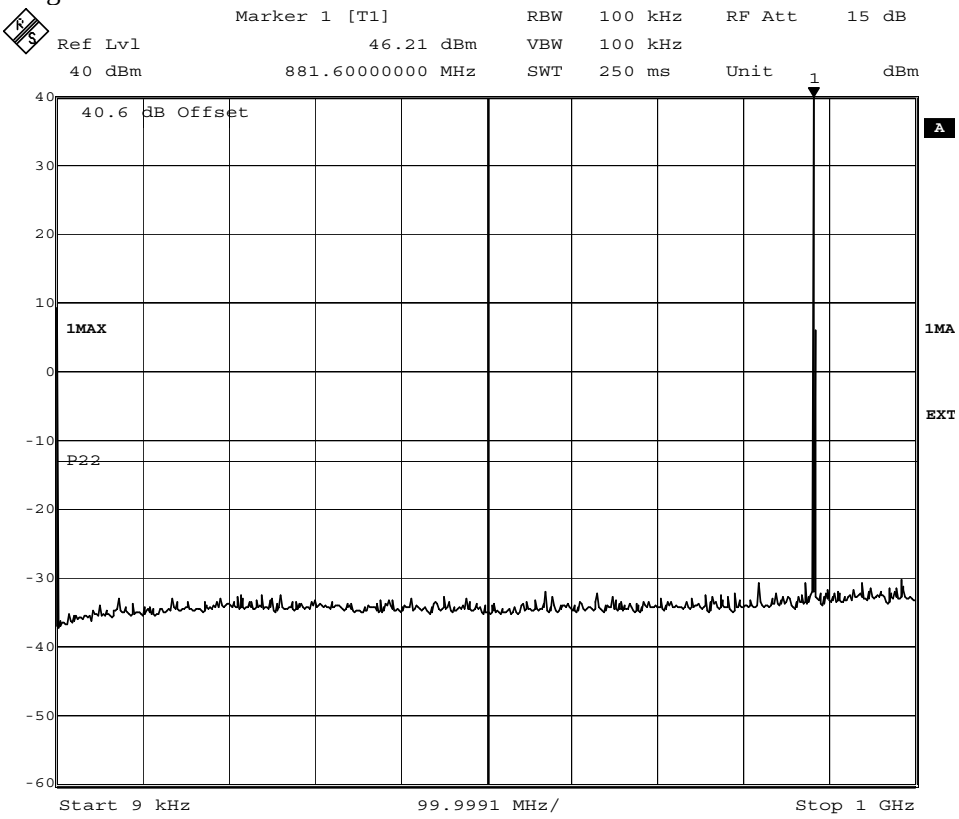

RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:22:15

Diagram 8


Marker 1 [T1]
46.21 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:39:28

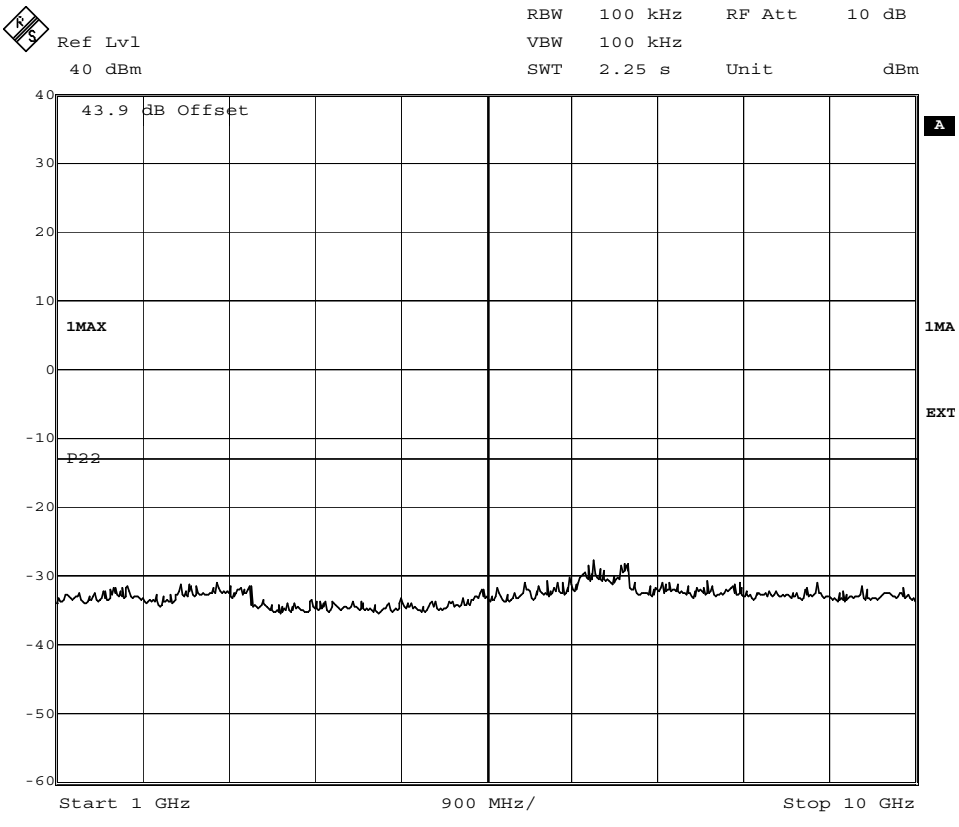
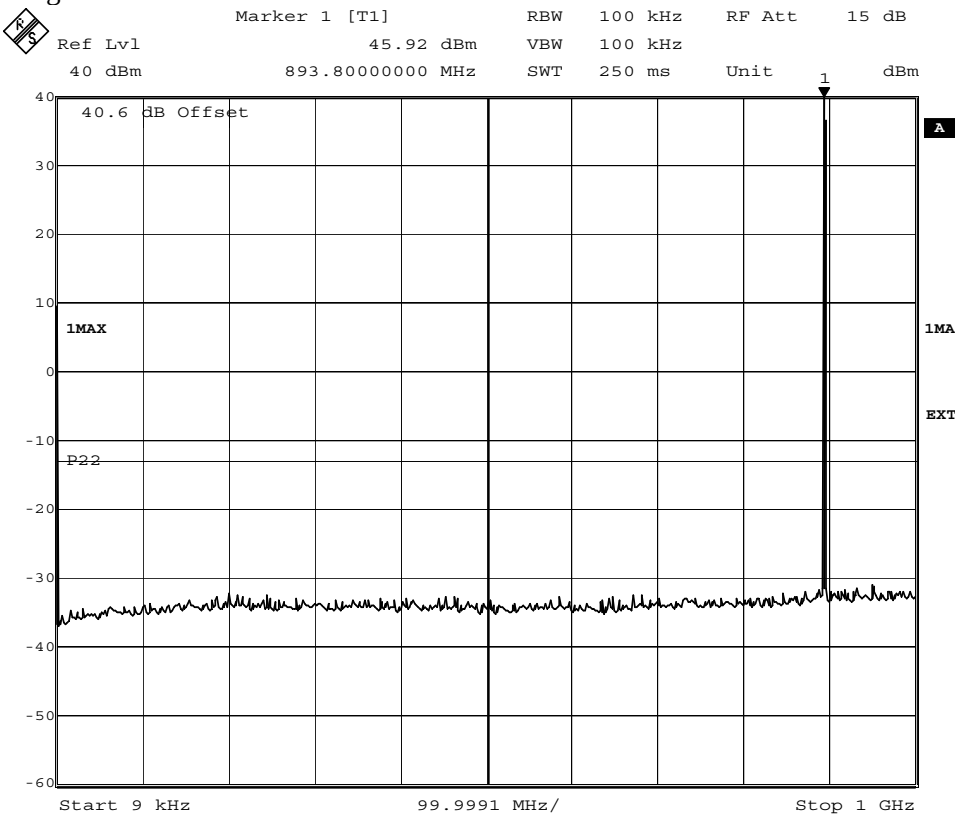

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:27:14

Diagram 9


Marker 1 [T1]
45.92 dBm
893.80000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
A
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:40:23

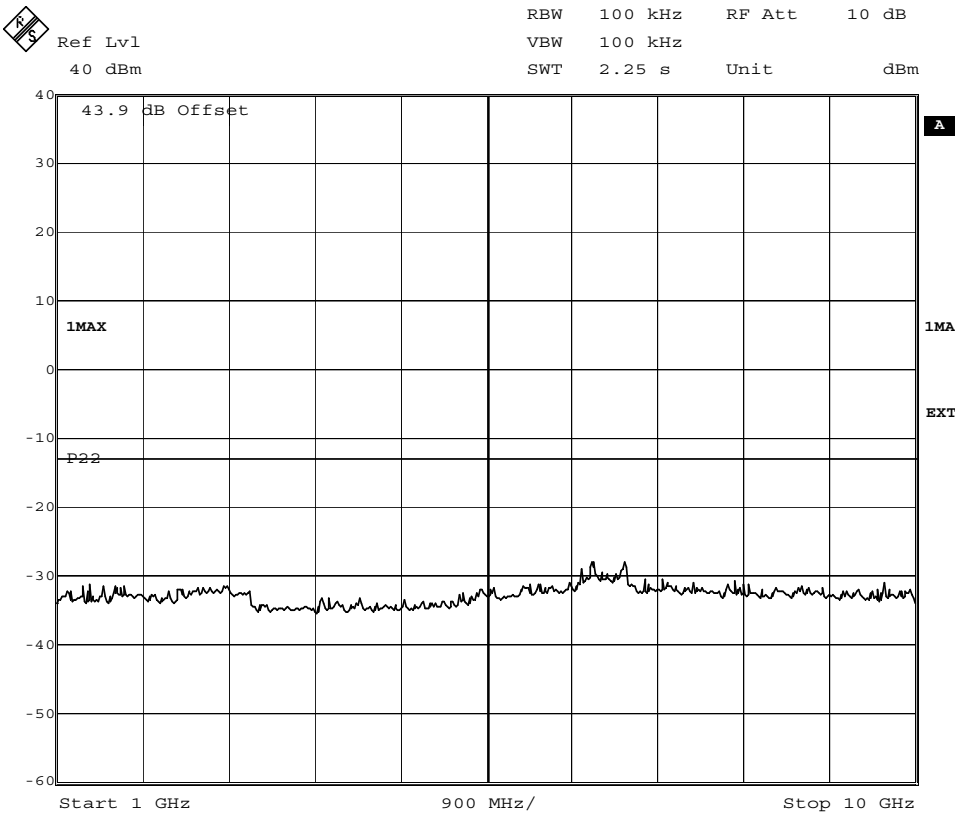
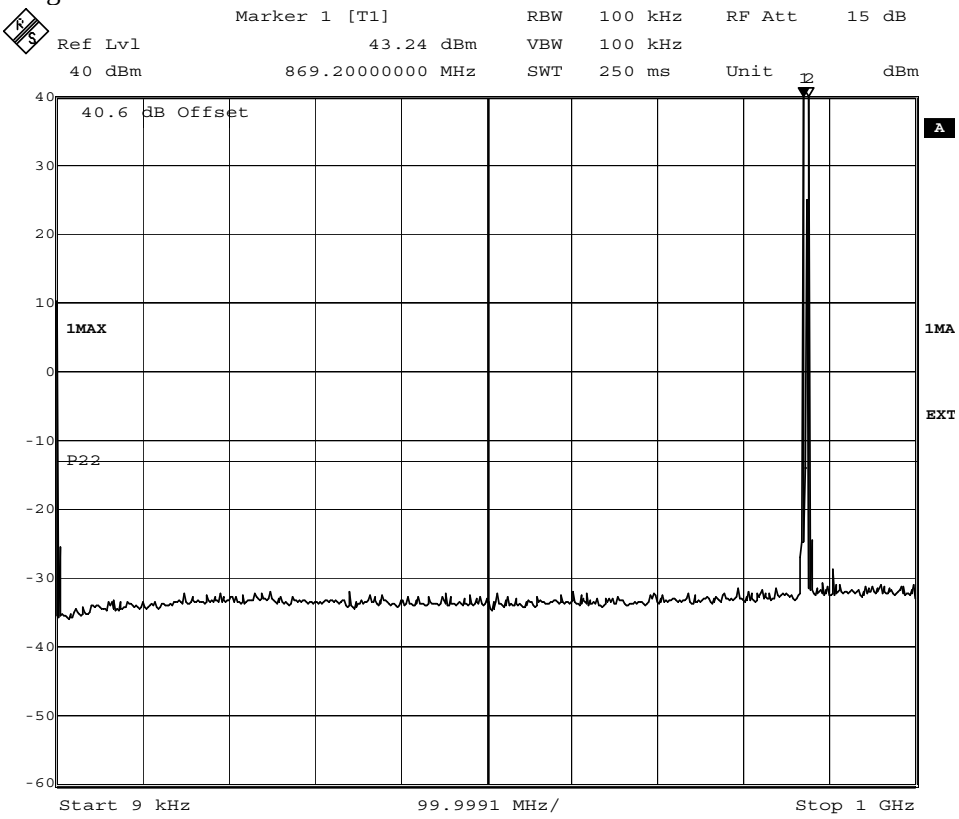

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
A
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:28:37

Diagram 10


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
43.24 dBm
VBW 100 kHz
40 dBm
869.20000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 12:26:53

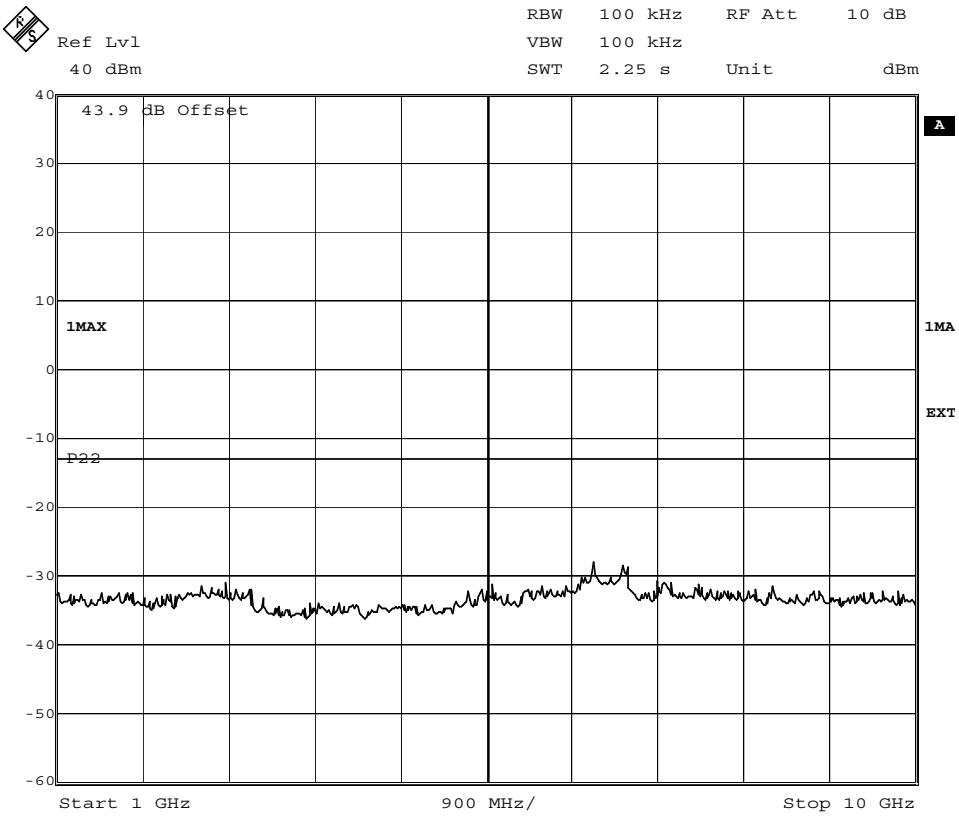
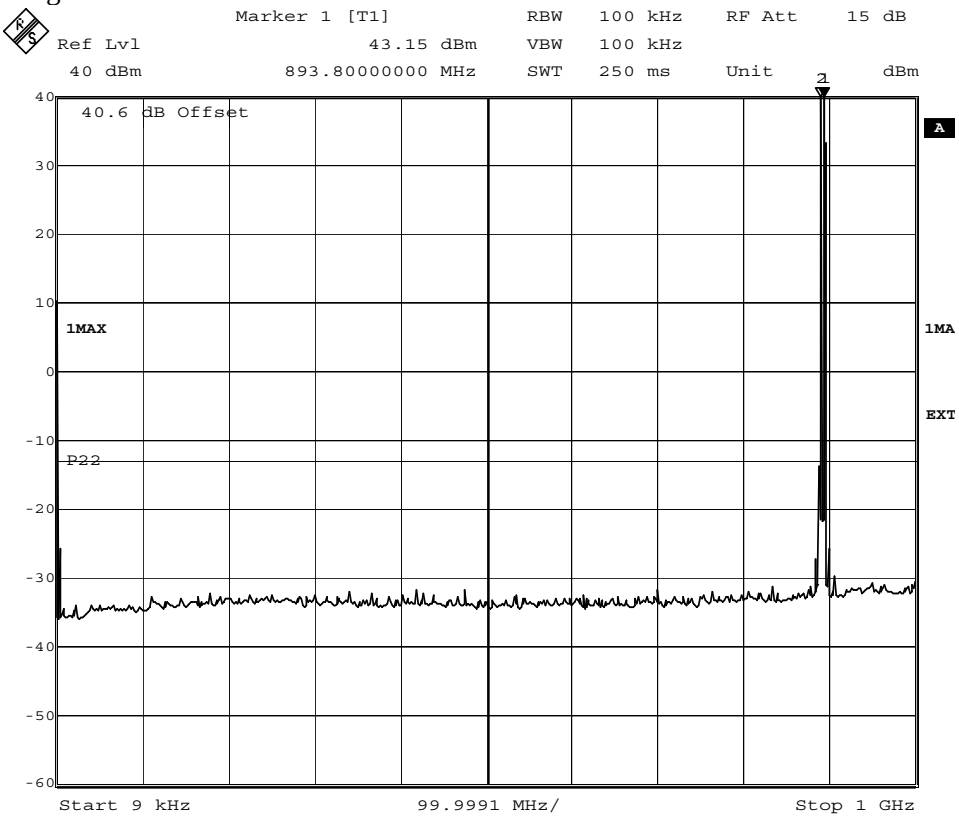

RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 12:24:11

Diagram 11


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
43.15 dBm
VBW 100 kHz
40 dBm
893.80000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
A
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 12:29:22

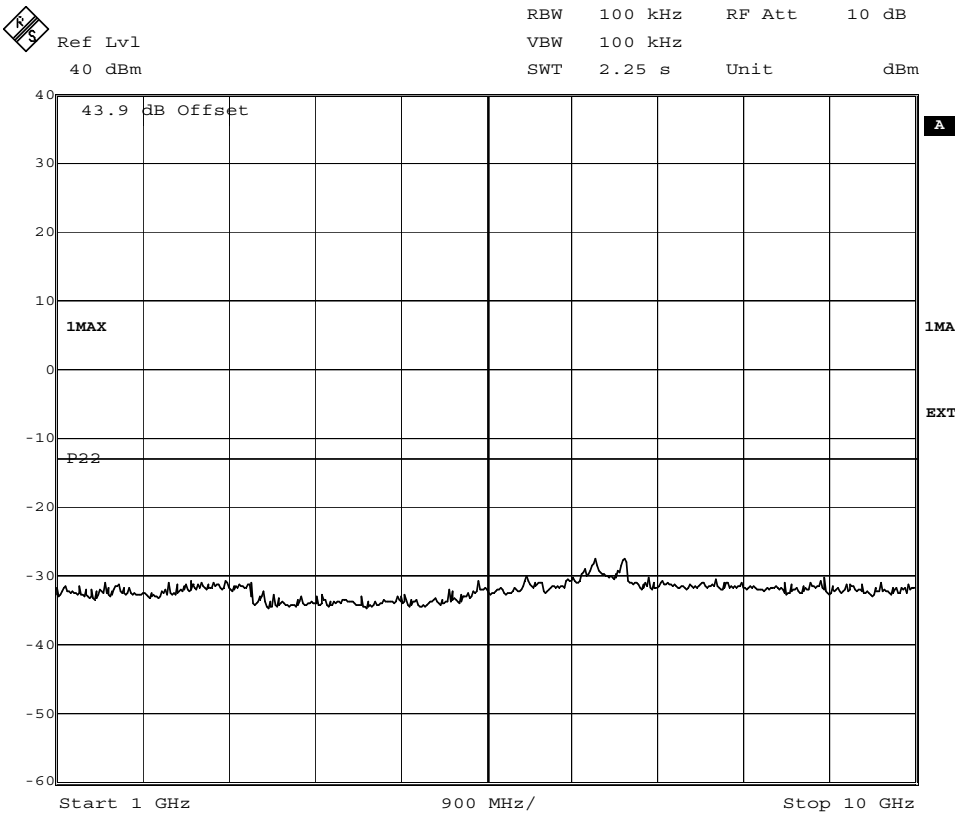
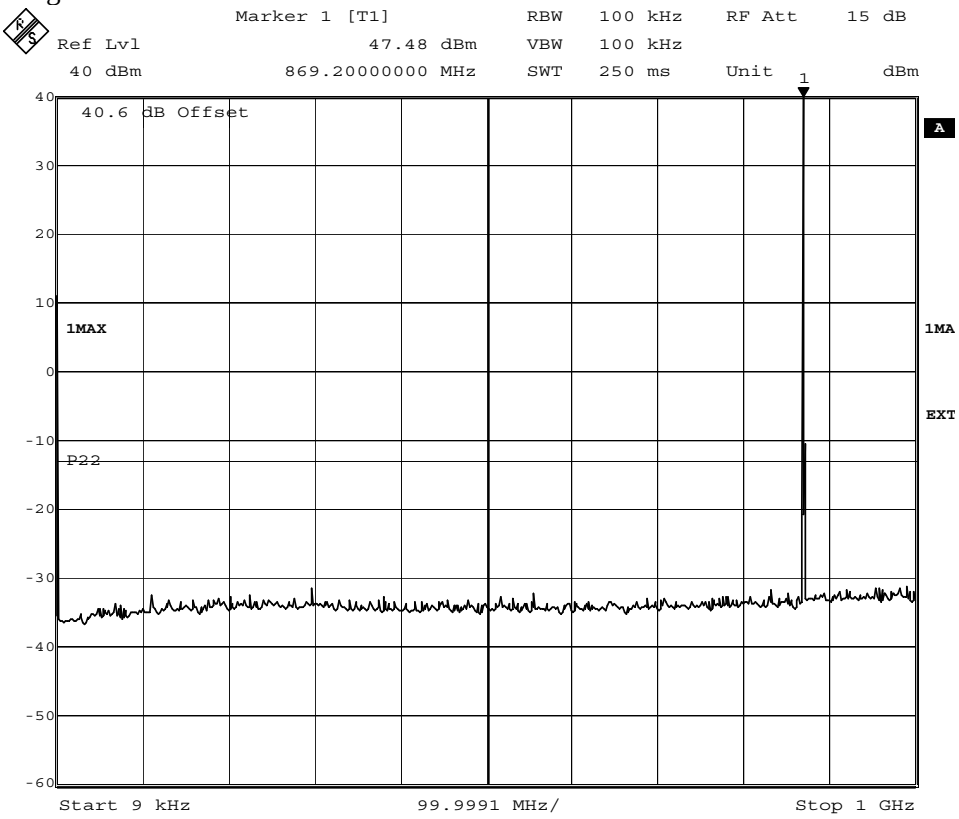
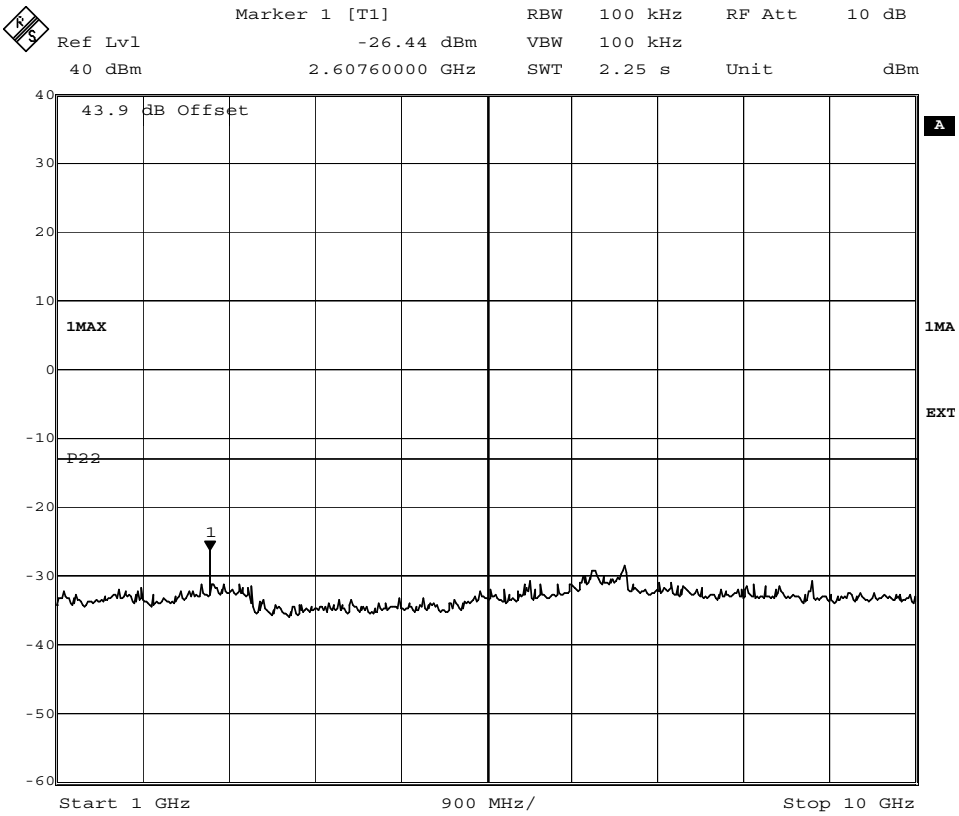

RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
A
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 12:23:17

Diagram 12

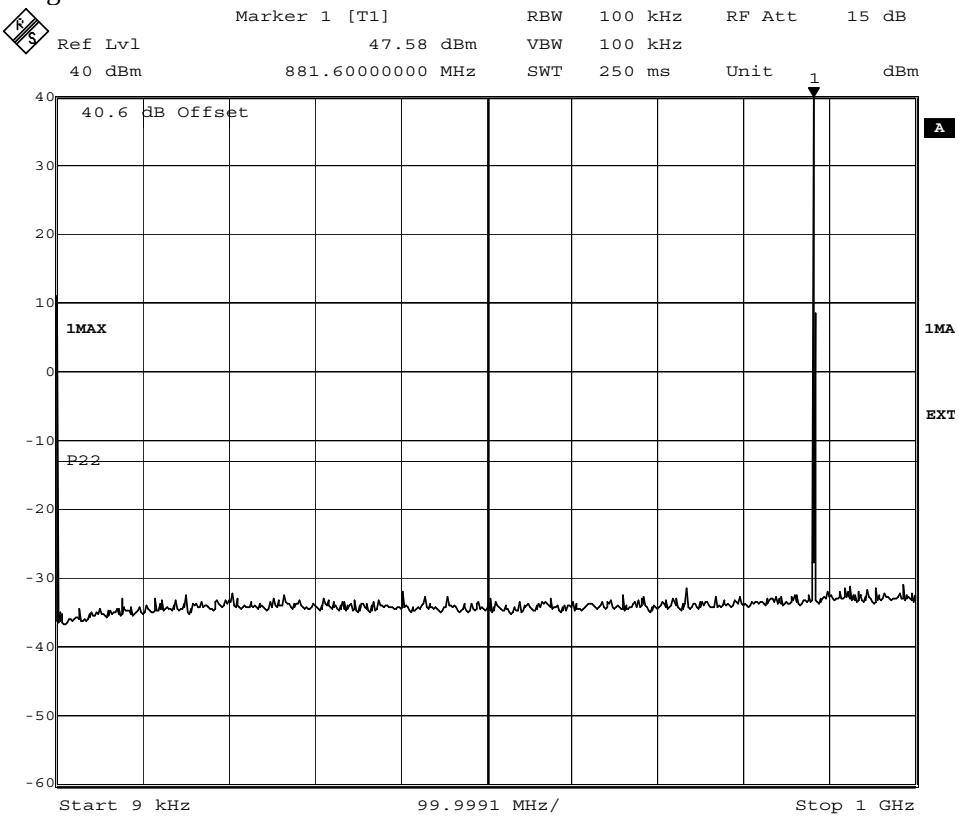


Date: 10.JUN.2008 09:47:02



Date: 10.JUN.2008 09:59:41

Diagram 13


Marker 1 [T1]
47.58 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
40.6 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 09:47:53

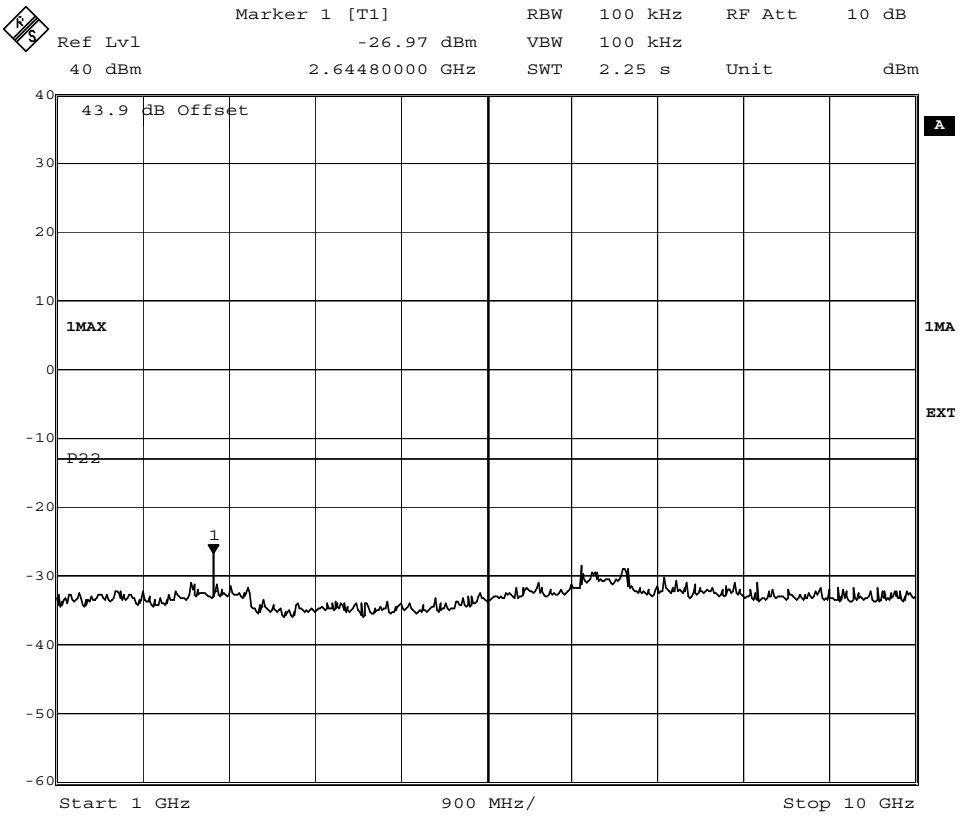
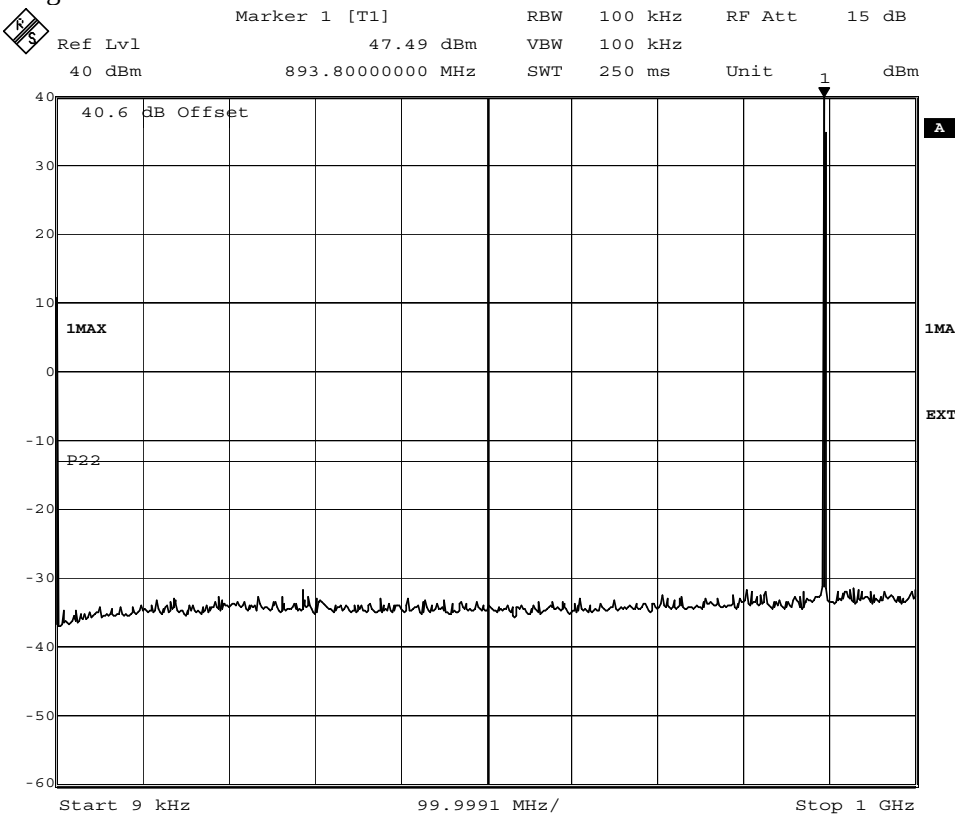

Marker 1 [T1]
-26.97 dBm
2.64480000 GHz
RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
43.9 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 09:58:16

Diagram 14


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
47.49 dBm
VBW 100 kHz
40 dBm
893.80000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 09:48:42

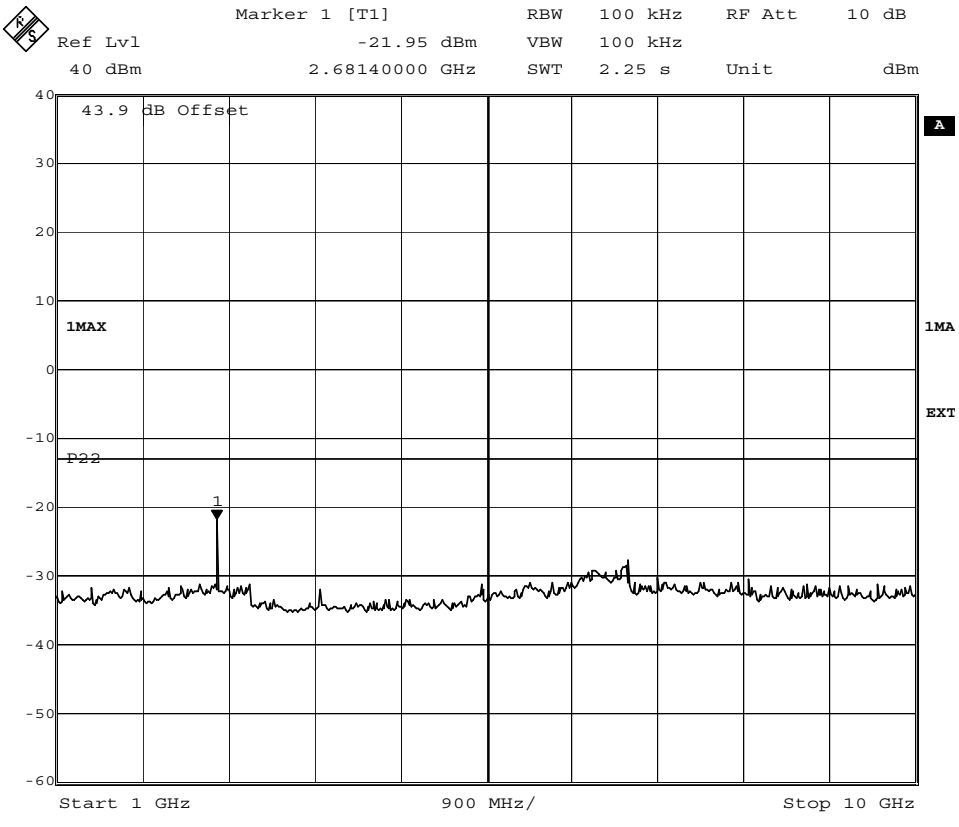
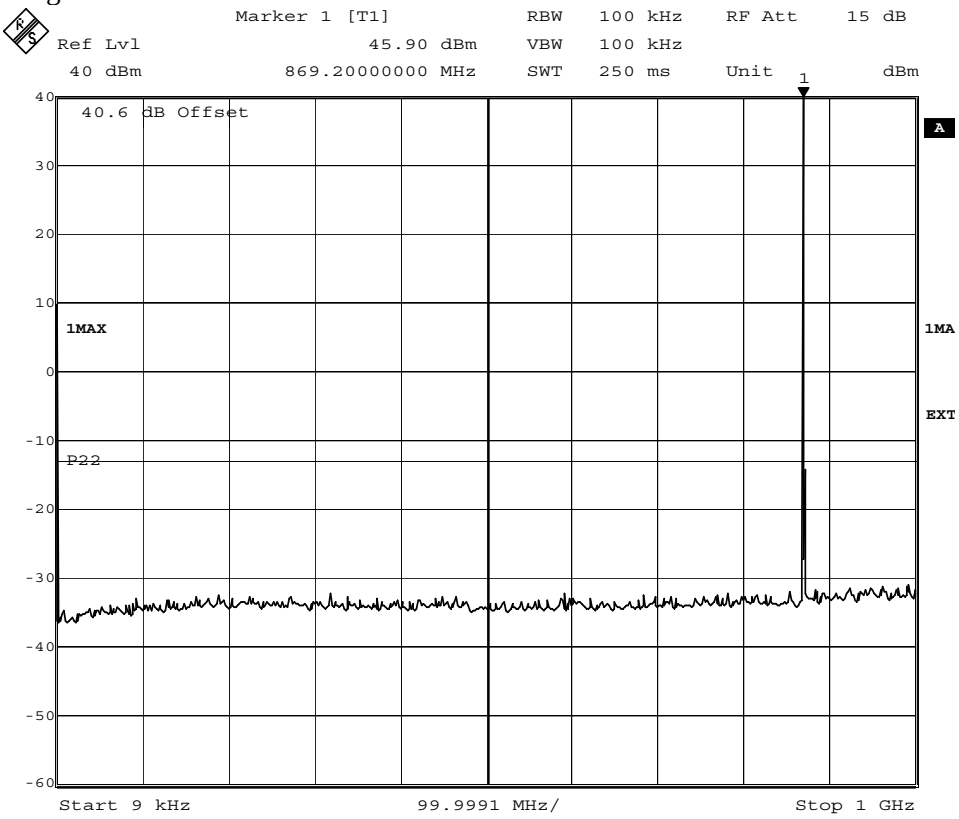

Marker 1 [T1]
RBW 100 kHz
RF Att 10 dB
Ref Lvl
-21.95 dBm
VBW 100 kHz
40 dBm
2.68140000 GHz
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 09:57:19

Diagram 15


Marker 1 [T1]
45.90 dBm
869.20000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
A
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:06:48

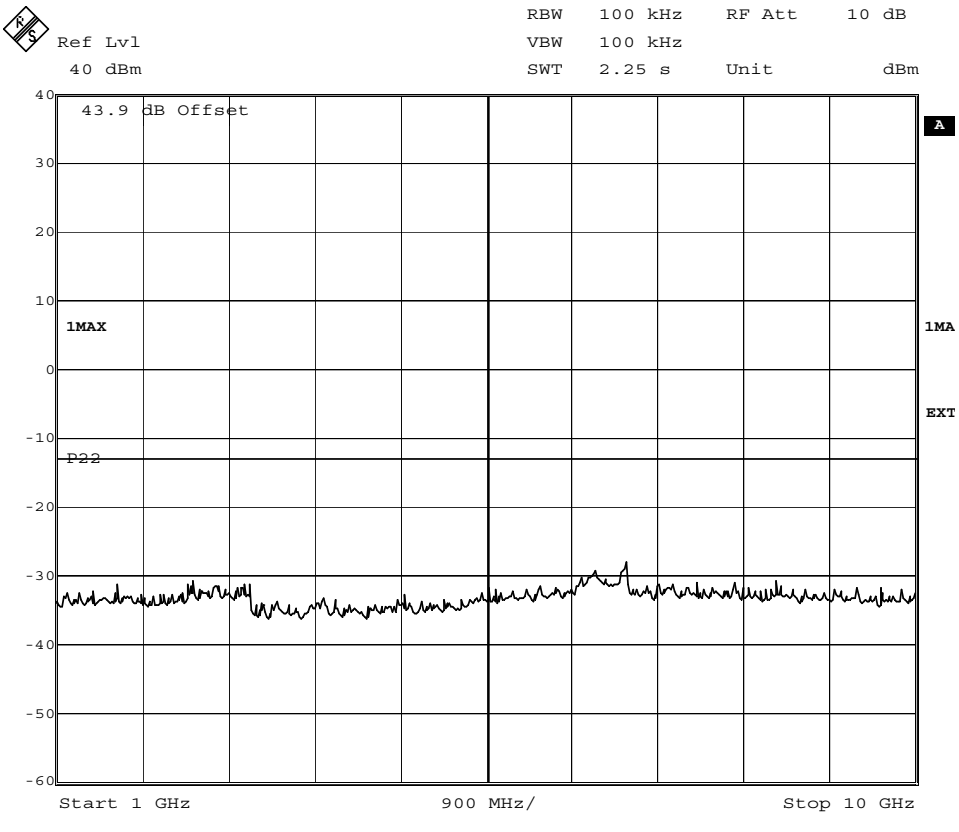
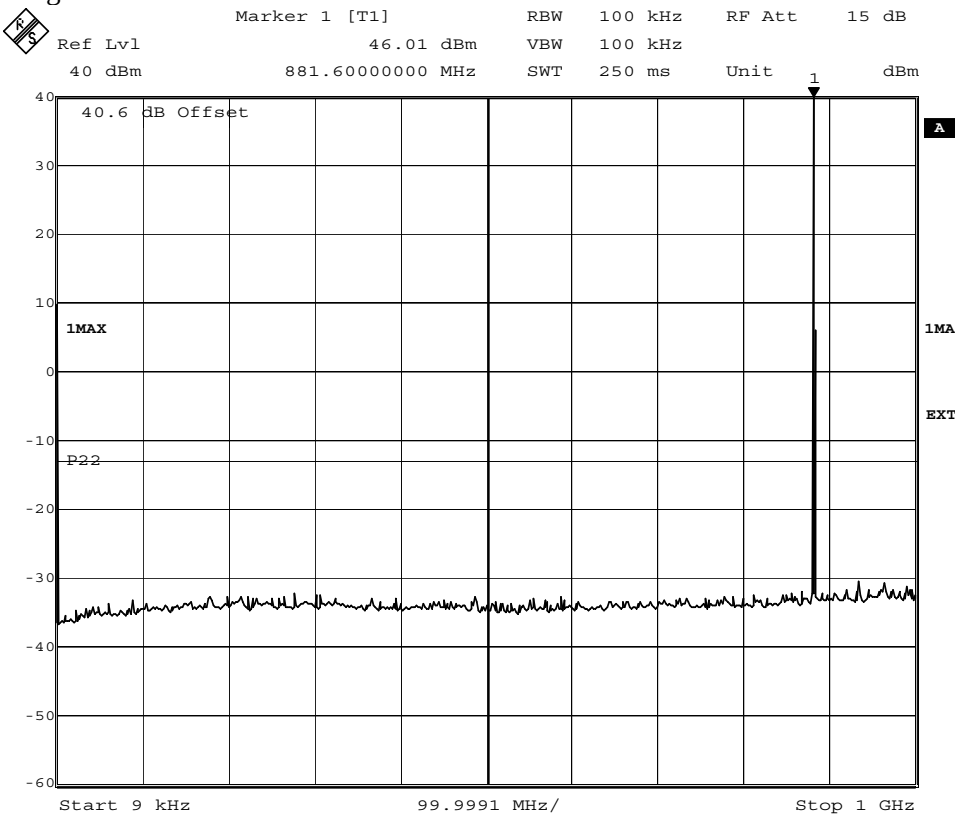

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
A
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:16:57

Diagram 16


Marker 1 [T1]
46.01 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:07:44

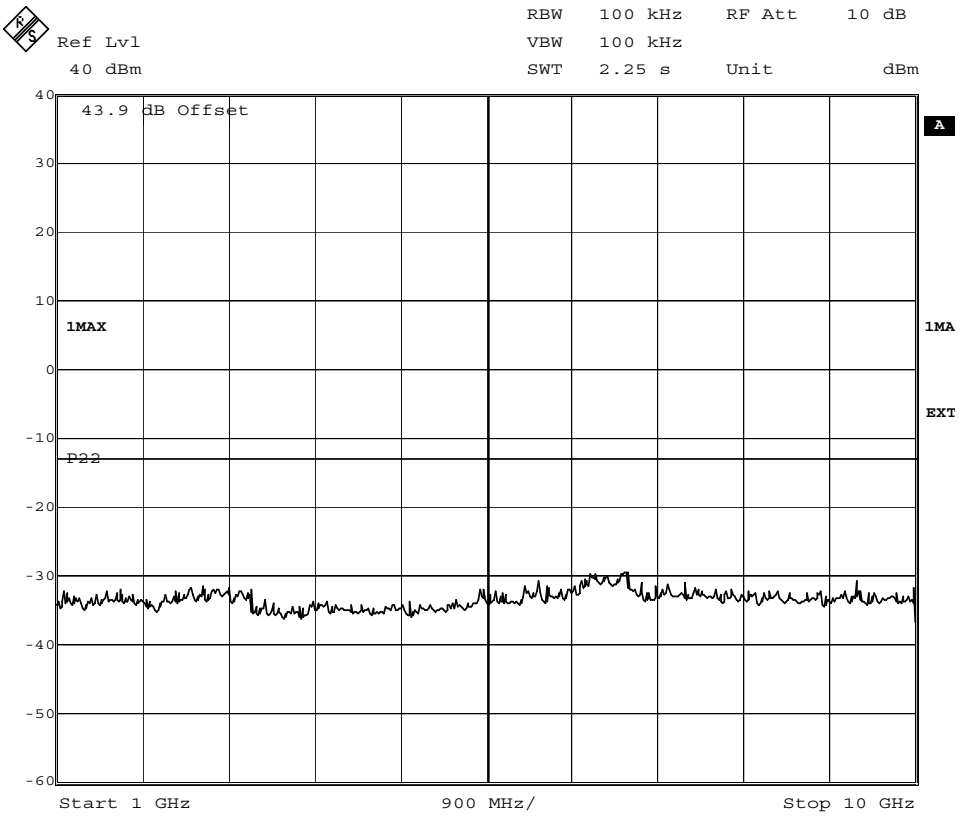
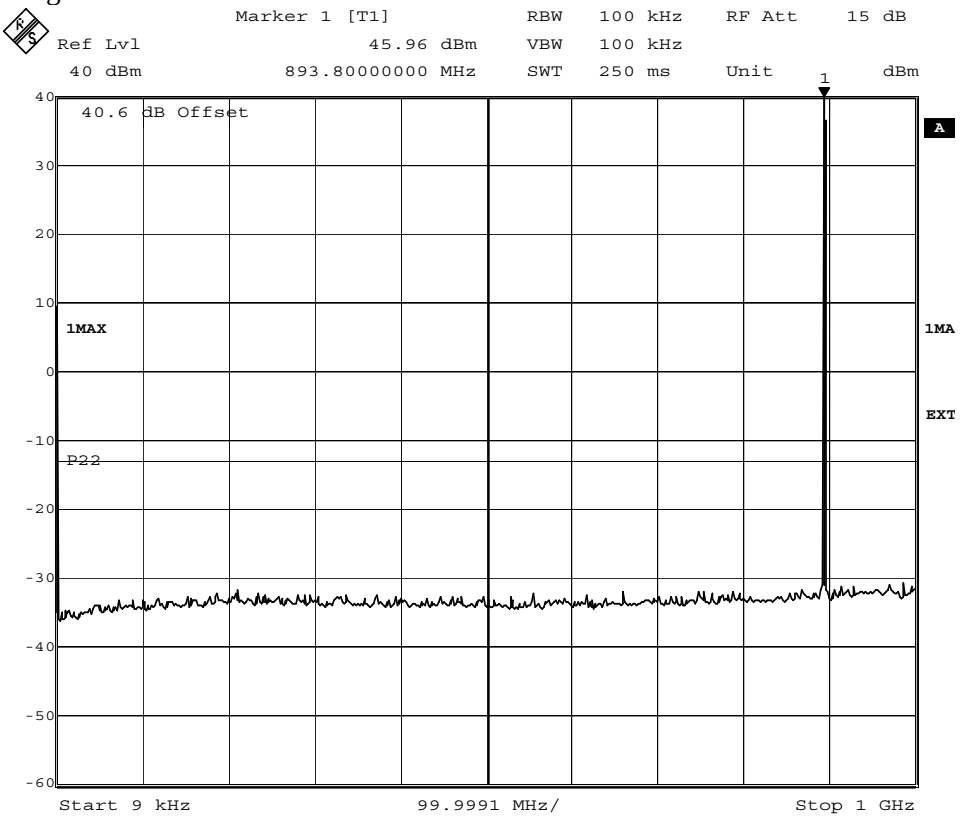
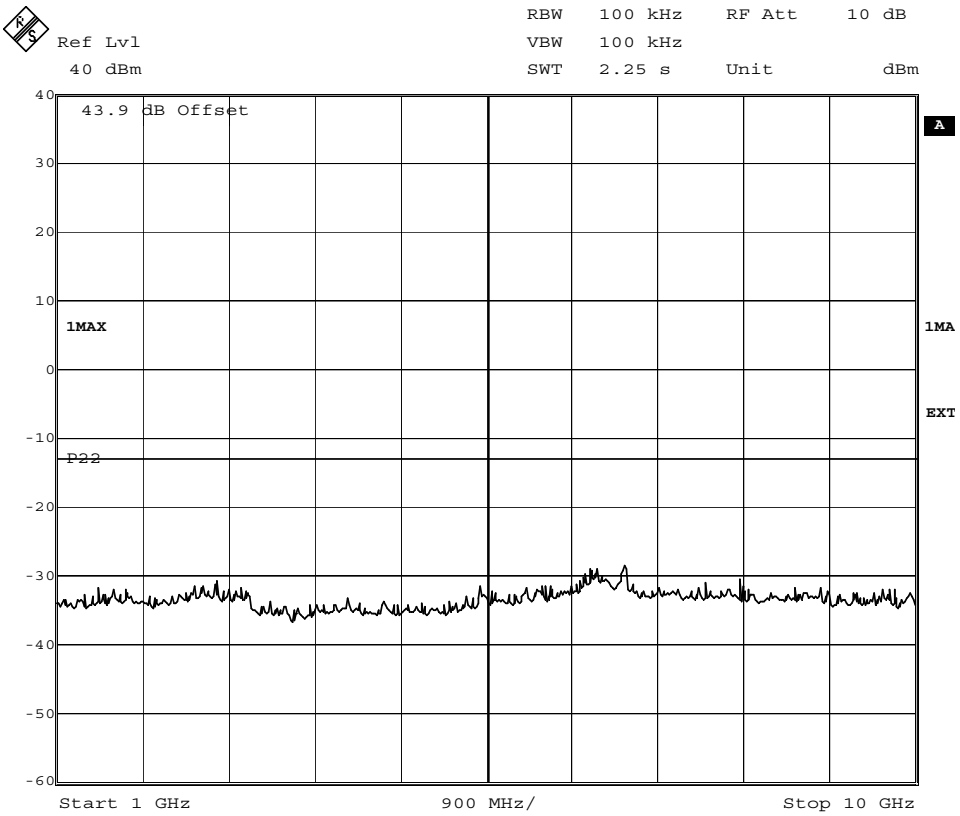

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:17:50

Diagram 17

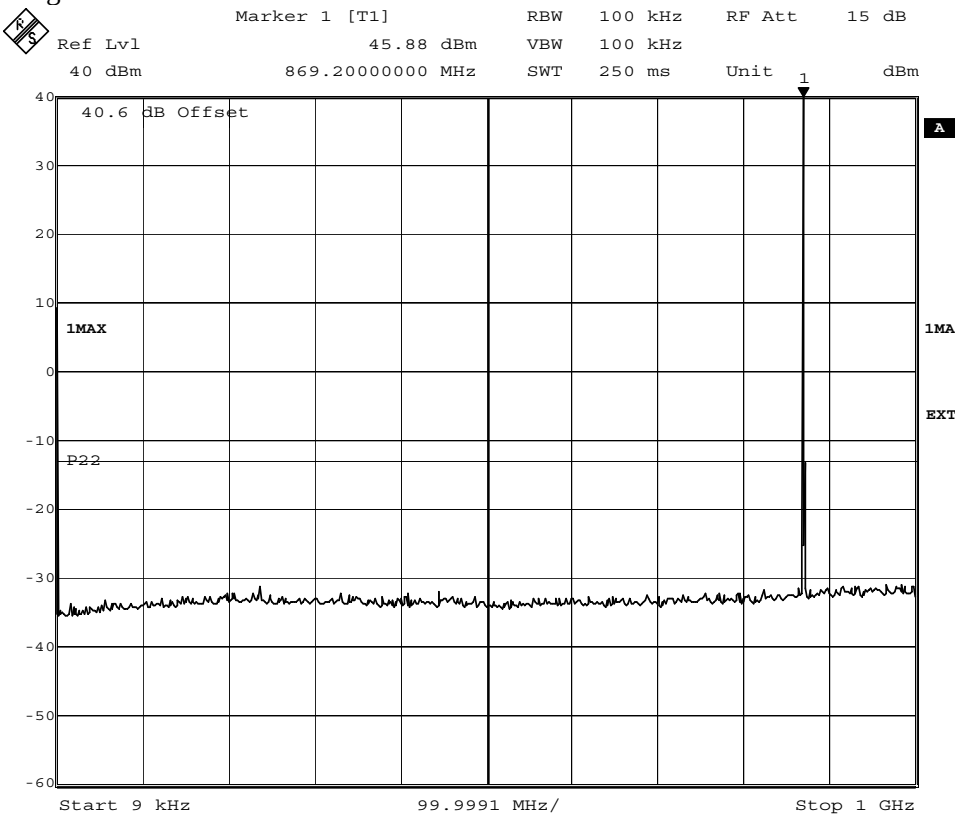


Date: 10.JUN.2008 16:09:19



Date: 10.JUN.2008 16:18:40

Diagram 18


Marker 1 [T1]
45.88 dBm
869.20000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
1MA
EXT
P22
A
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:35:02

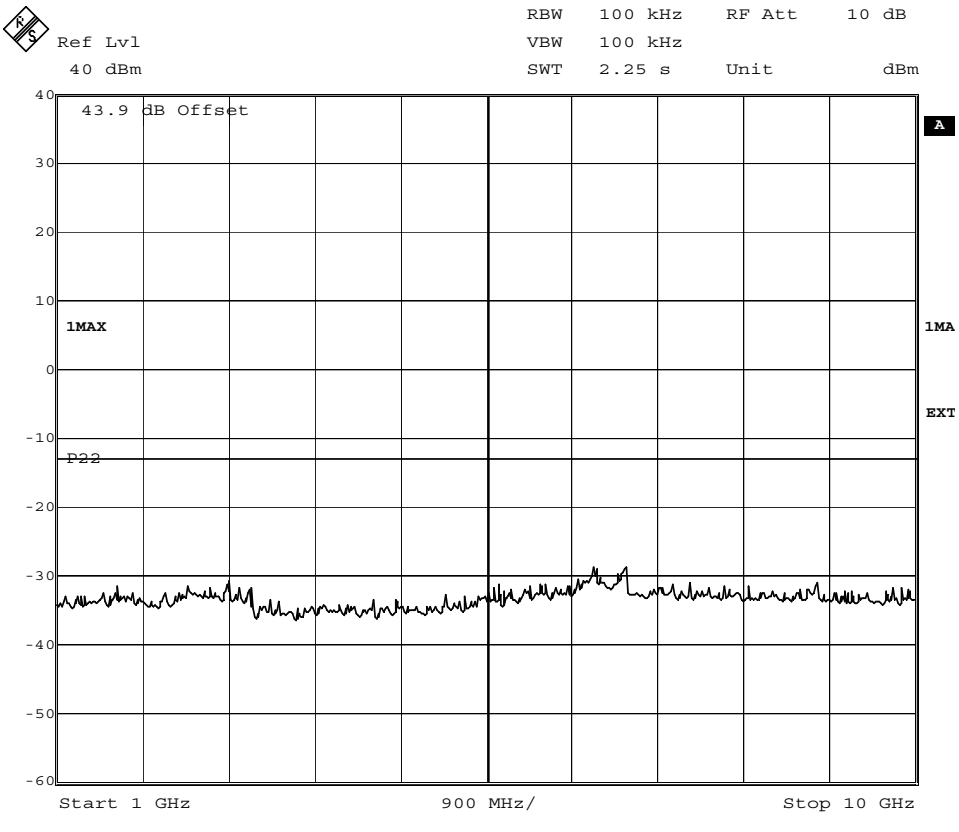
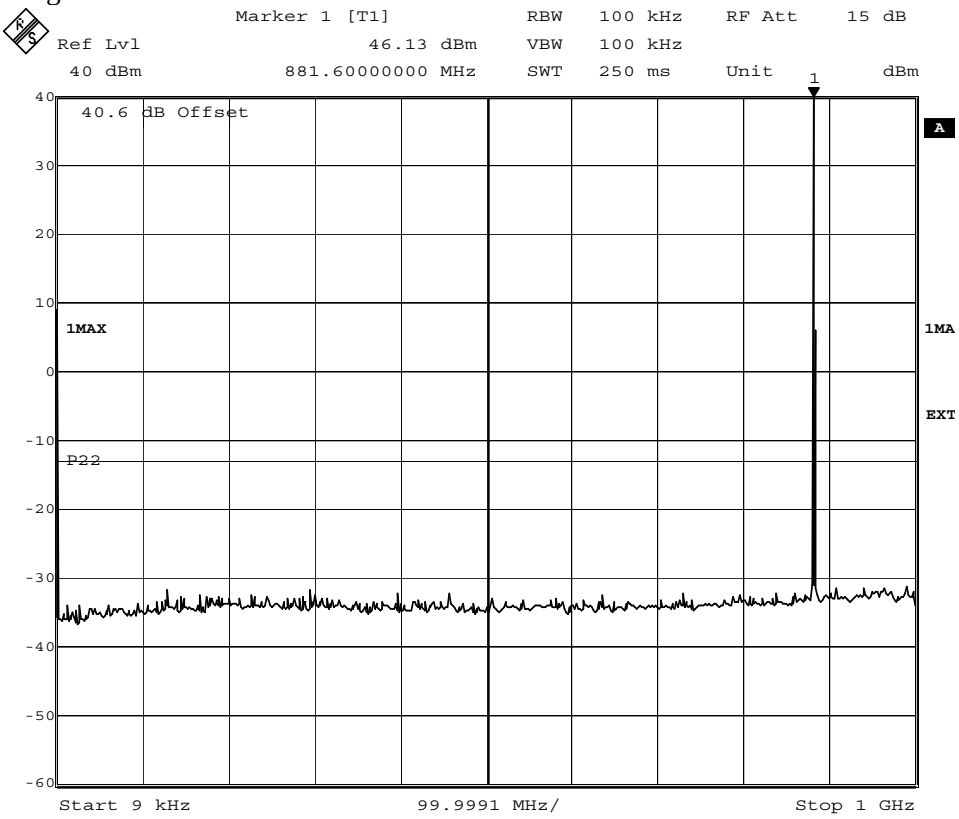

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
1MA
EXT
P22
A
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:32:45

Diagram 19


Marker 1 [T1]
46.13 dBm
881.60000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:36:14

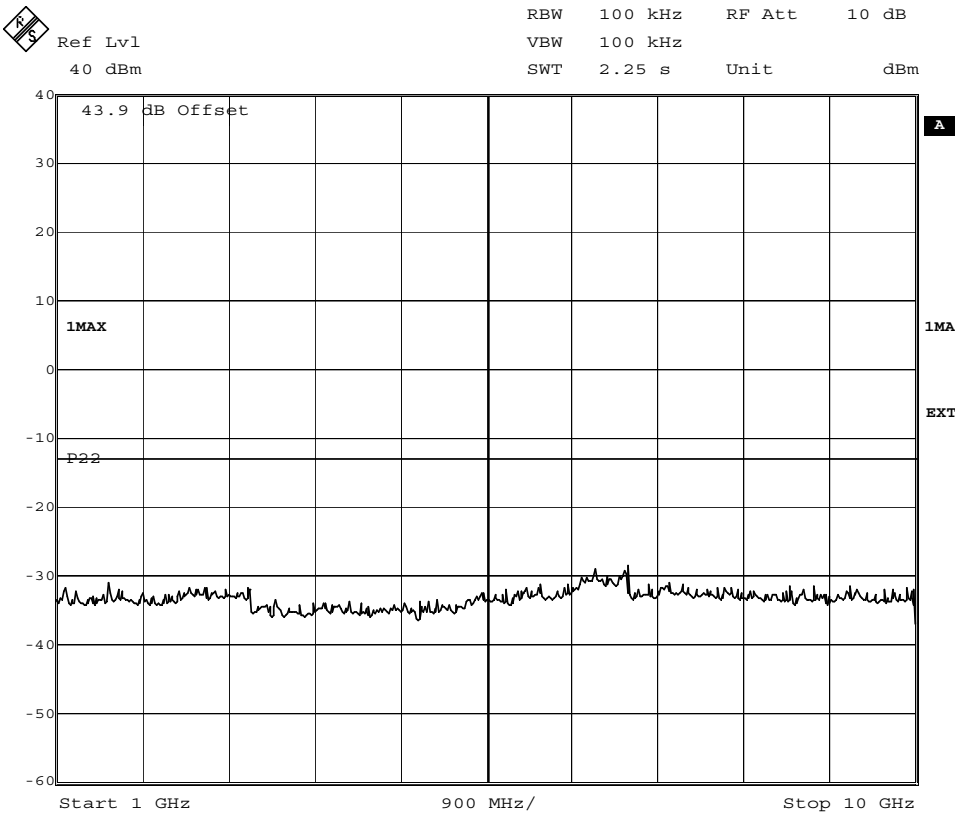
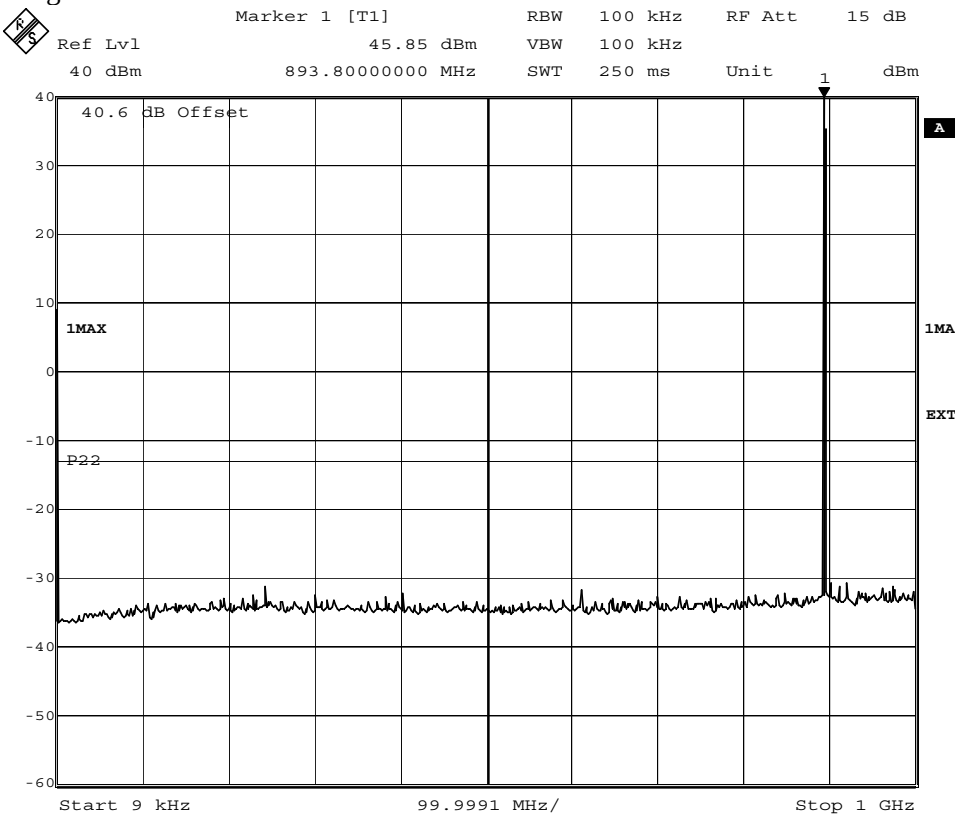

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:31:58

Diagram 20


Marker 1 [T1]
45.85 dBm
893.80000000 MHz
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 15 dB
Unit dBm
Ref Lvl
40 dBm
40.6 dB Offset
1MAX
P22
A
1MA
EXT
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 16:37:07

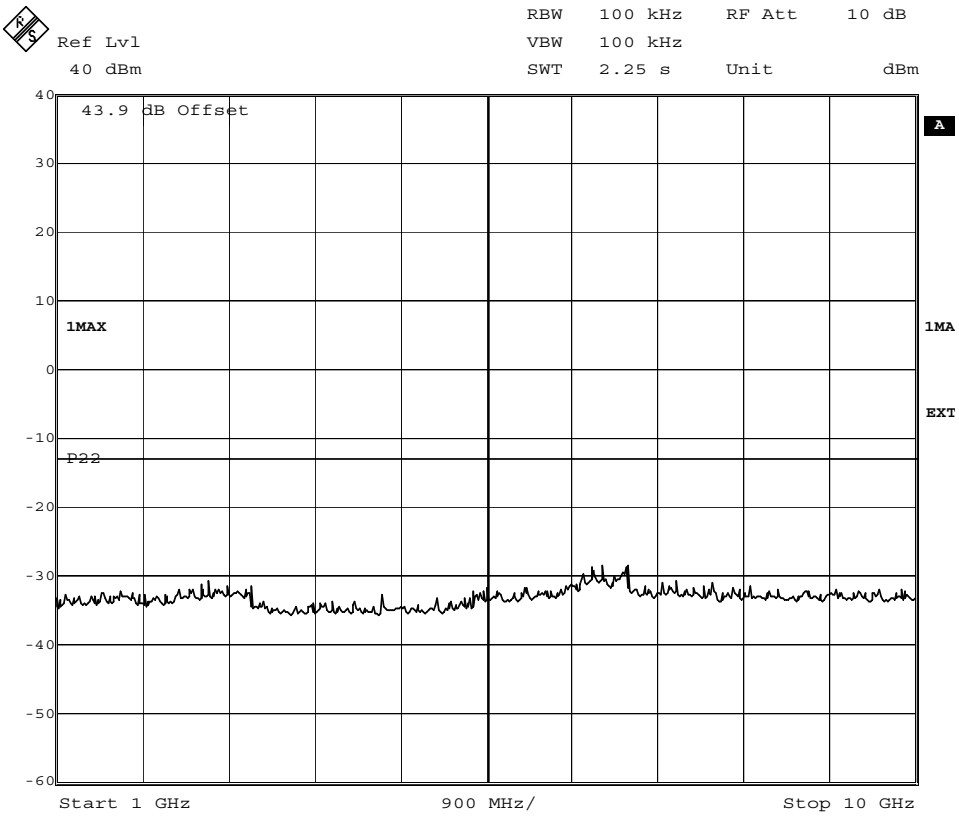
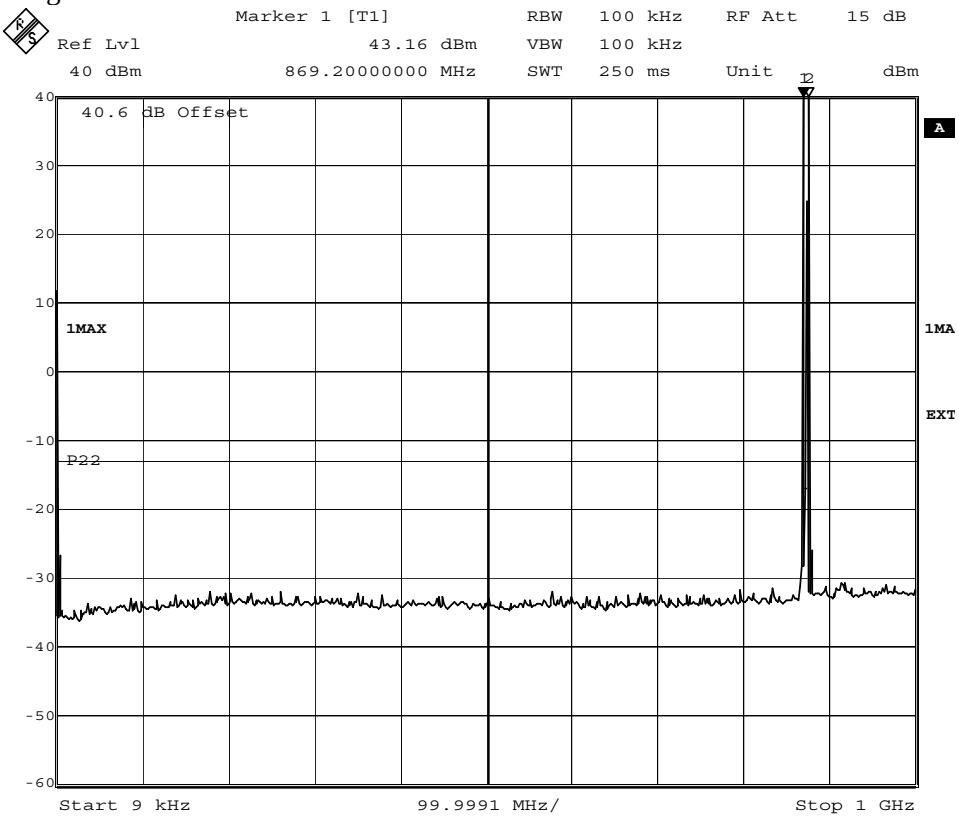

RBW 100 kHz
VBW 100 kHz
SWT 2.25 s
RF Att 10 dB
Unit dBm
Ref Lvl
40 dBm
43.9 dB Offset
1MAX
P22
A
1MA
EXT
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 16:30:50

Diagram 21


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
43.16 dBm
VBW 100 kHz
40 dBm
869.20000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
A
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 12:40:54

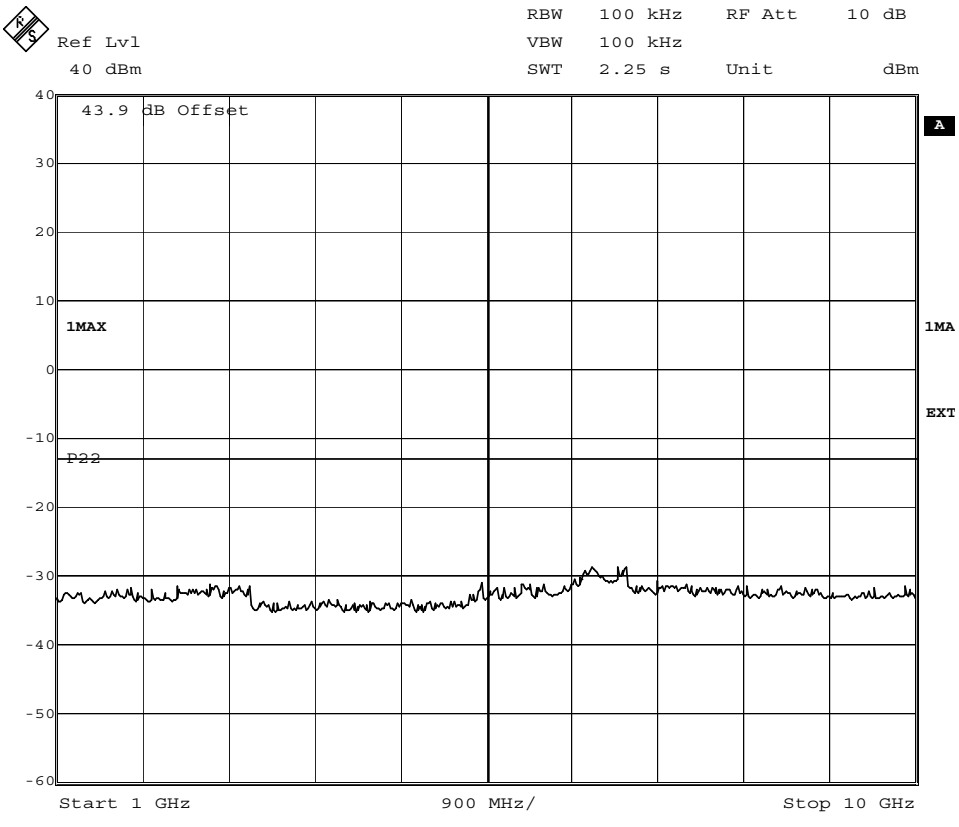
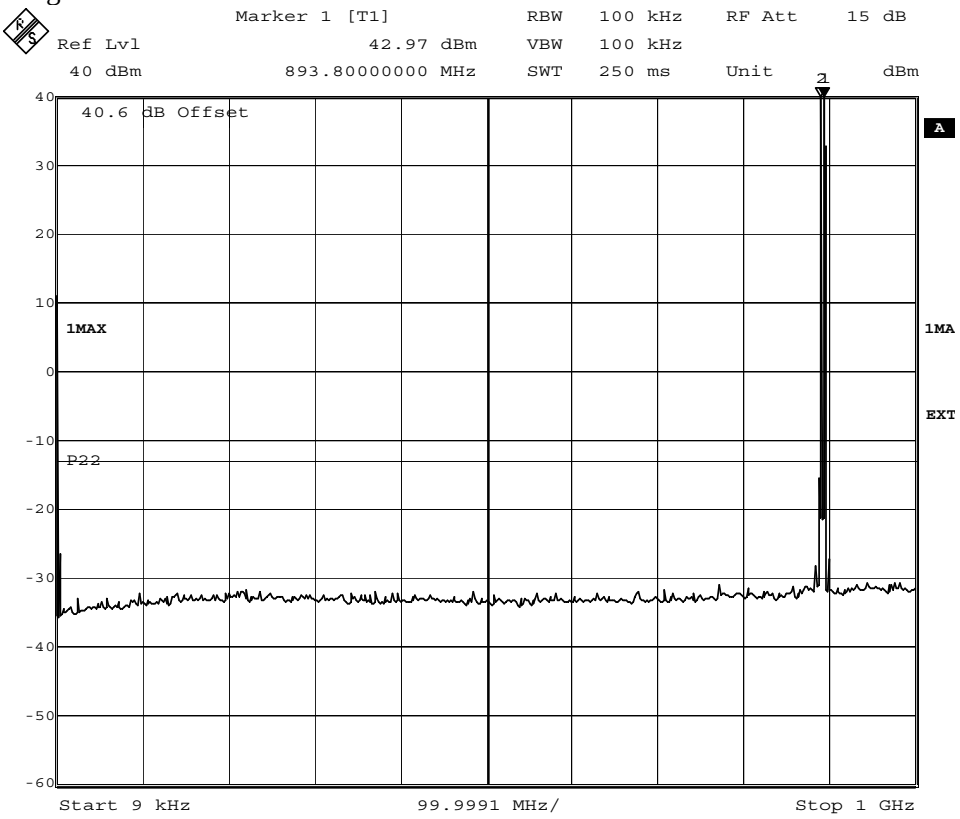
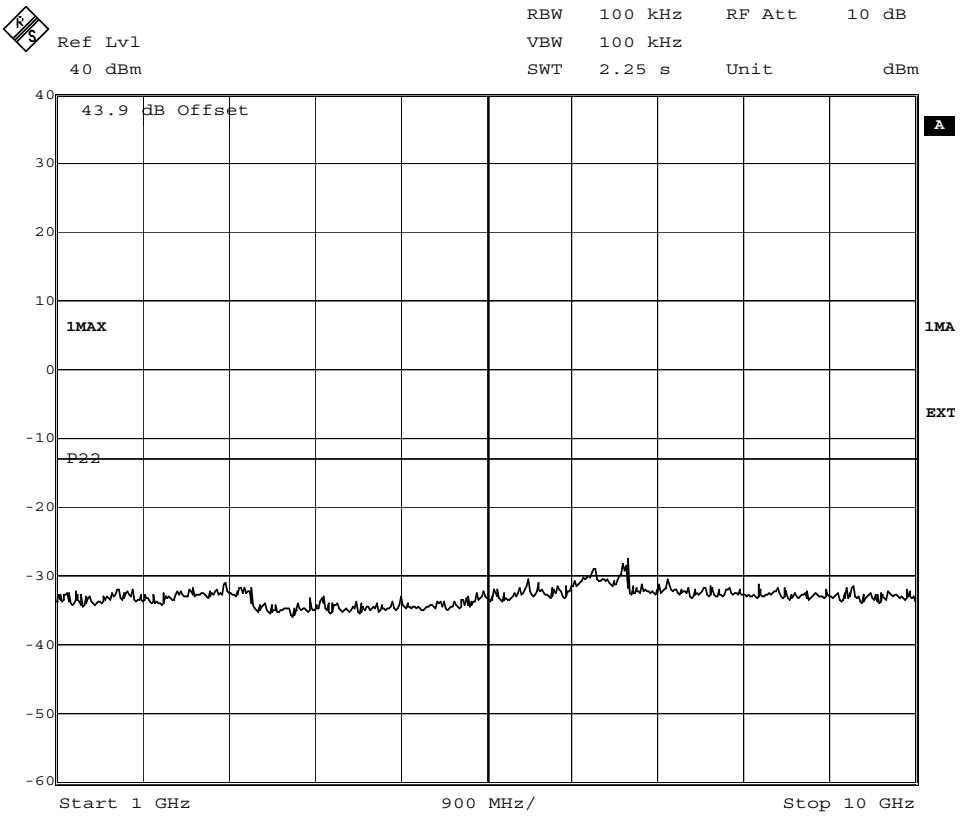

RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
A
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 12:13:04

Diagram 22


Marker 1 [T1]
RBW 100 kHz
RF Att 15 dB
Ref Lvl
42.97 dBm
VBW 100 kHz
40 dBm
893.80000000 MHz
SWT 250 ms
Unit dBm
40.6 dB Offset
1MAX
A
1MA
EXT
P22
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 10.JUN.2008 12:36:18


RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
40 dBm
SWT 2.25 s
Unit dBm
43.9 dB Offset
1MAX
A
1MA
EXT
P22
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 10.JUN.2008 12:16:44

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date	Temperature	Humidity
2008-06-09	21 °C ± 3 °C	40 % ± 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 Gen, Issue 2, 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	2008-07	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	2011-01	502 548
HP-filter, RLC electronics F-16149	2008-07	503 739
HP-filter; Wainwright WHK1000C11/40SS	2009-01	504 096
MITEQ Low Noise Amplifier	2008-08	503 285
Testo 615, Temperature and humidity meter	2009-11	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 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

Receiver spurious emission according to FCC CFR 47 part 15.111

Date	Temperature	Humidity
2008-06-10	23 °C ± 3 °C	45 % ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.4.

The EUT was powered with 24 VDC during the measurement.

The measurements were performed on the CDU-G antenna port. The measurement is first performed with peak detector. Emission on frequencies close to or above the limit is re-measured with quasi-peak detector (average detector above 1000 MHz).

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2007-07	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Result

The emission spectra are shown in appendix 7.1:

Diagram 1:	9 kHz-10 GHz, Rx-mode	RX 1 Ch. 128
Diagram 2:	9 kHz-10 GHz, Rx-mode	RX 1 Ch. 251
Diagram 3:	9 kHz-10 GHz, Rx-mode	RX 2 Ch. 128
Diagram 4:	9 kHz-10 GHz, Rx-mode	RX 2 Ch. 251

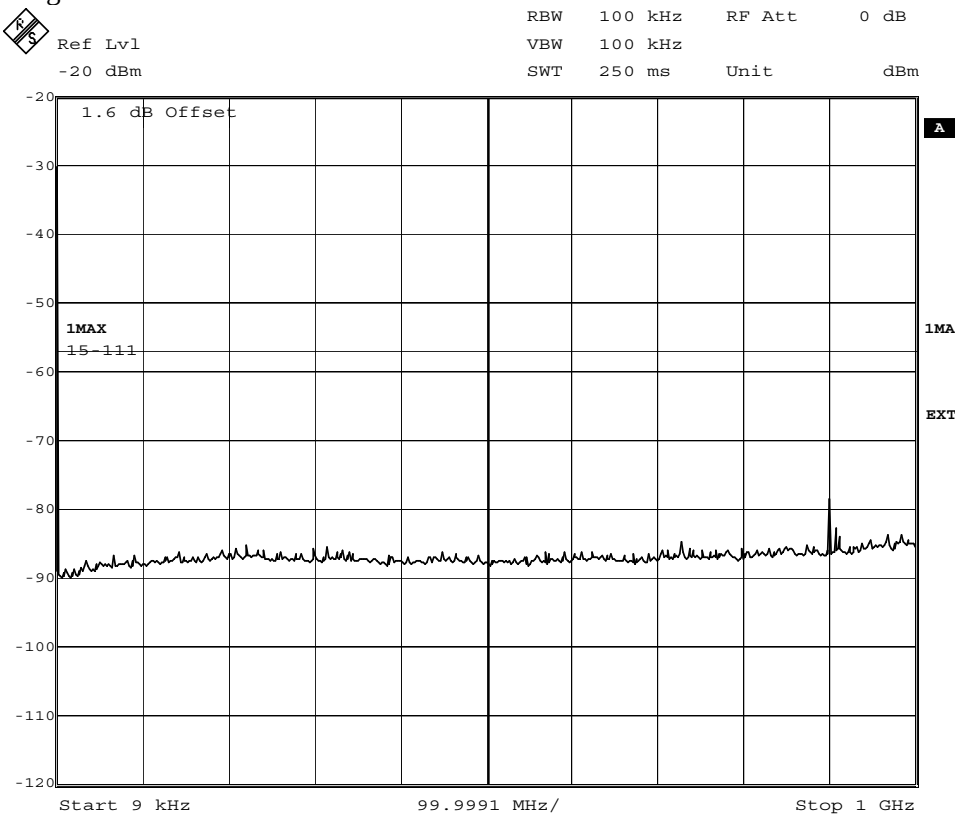
Limit

The power at the antenna terminal at any frequency within the range of measurements specified in Section 15.33 shall not exceed 2.0 nanowatts (-57 dBm).

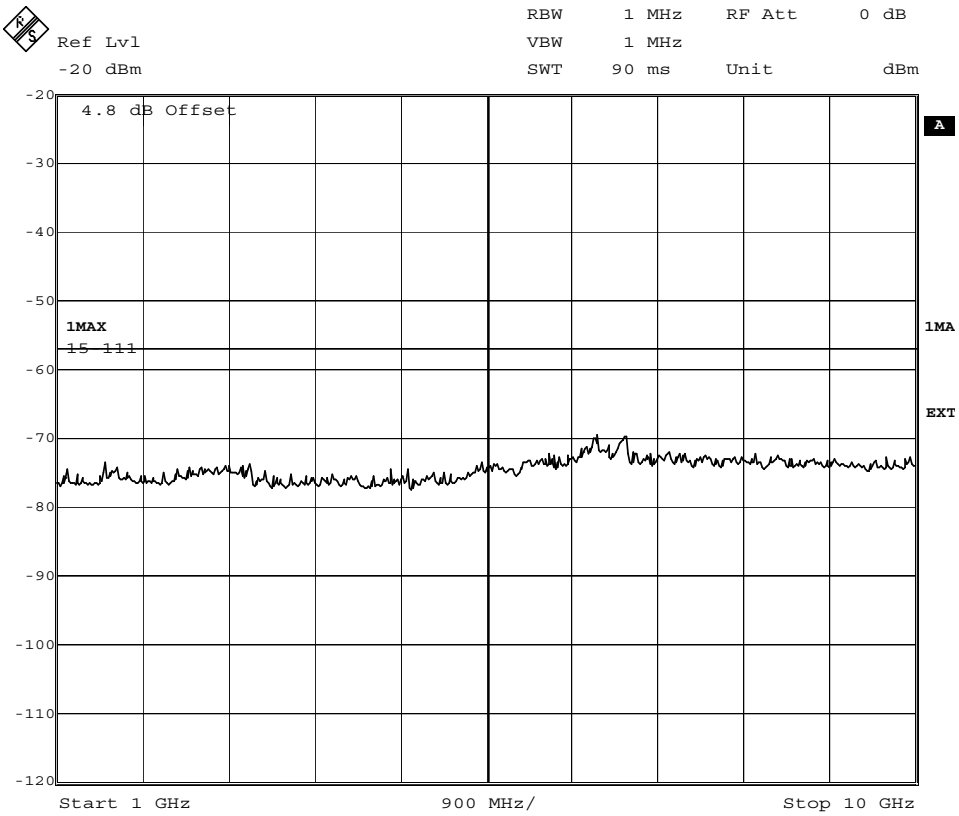
RSS-132 Section 6 b
The power at the antenna terminal shall not exceed 2.0 nanowatts (-57 dBm) in the frequency range 30-1000 MHz and shall not exceed 5.0 nanowatts (-53 dBm) above 1 GHz.

FCC ID: B5KEKRC1311005-2 Appendix 7.1

Diagram 1

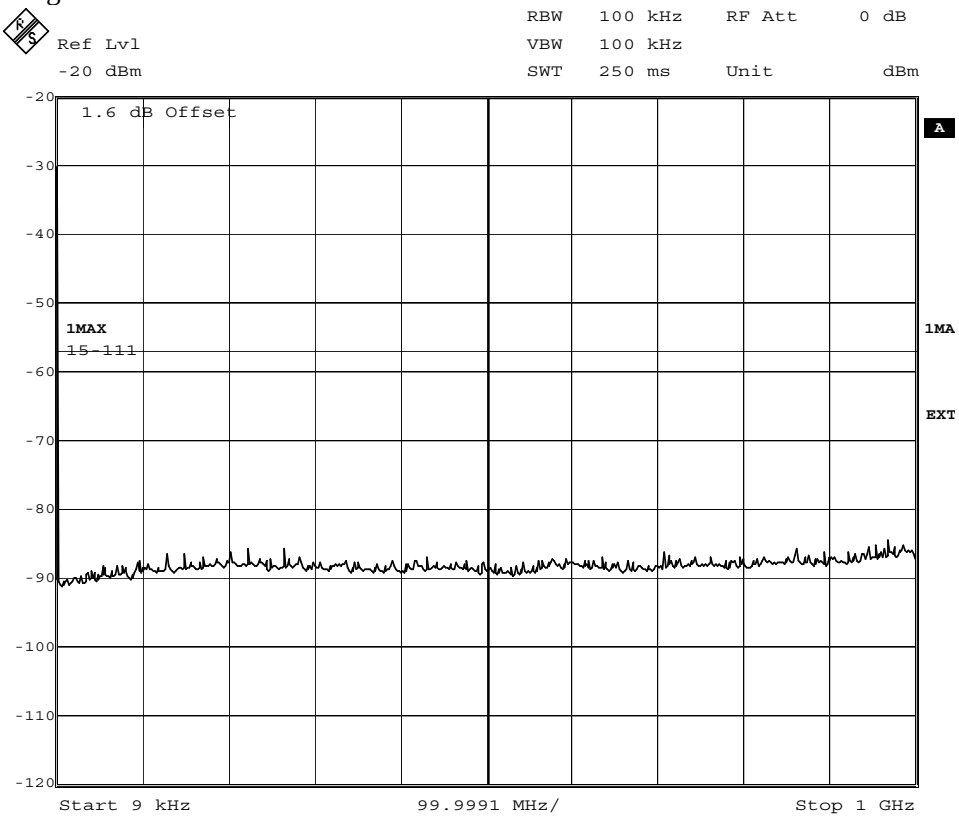


Date: 10.JUN.2008 15:21:53

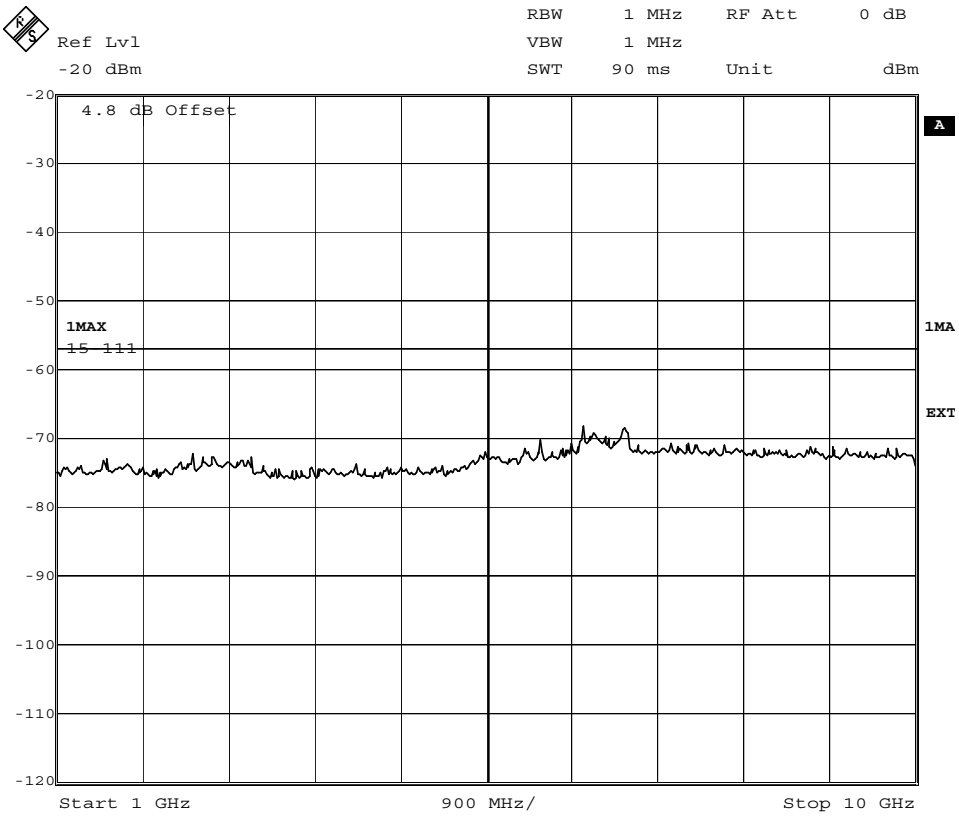


Date: 10.JUN.2008 15:31:33

Diagram 2

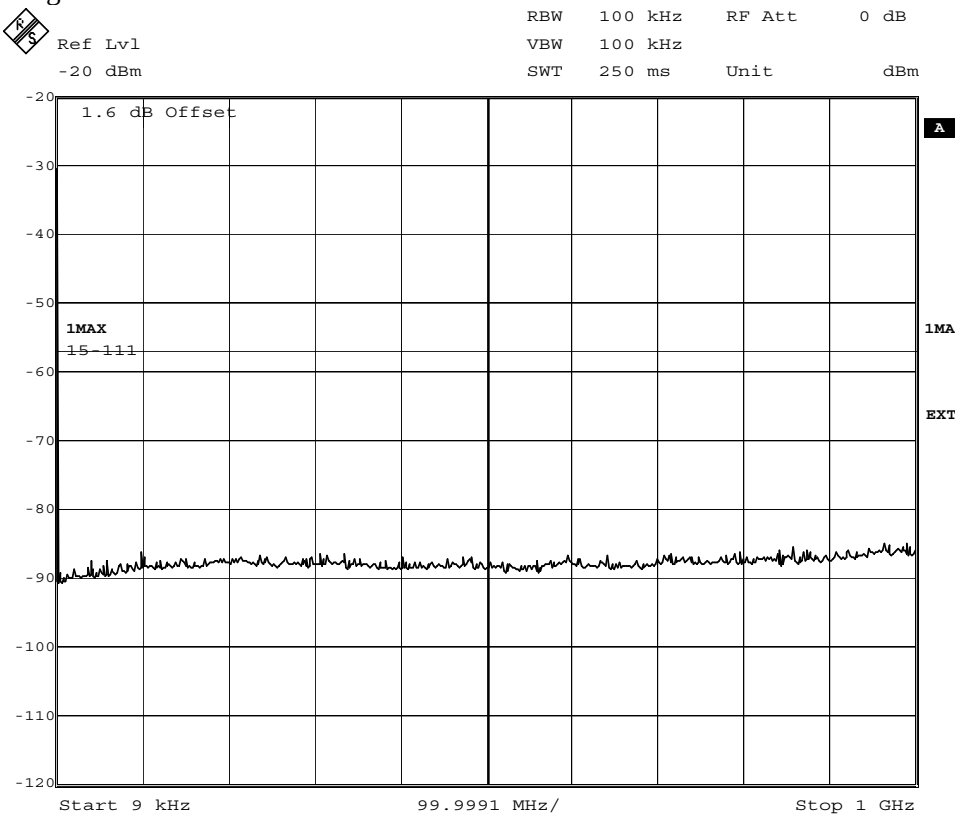


Date: 10.JUN.2008 15:24:11

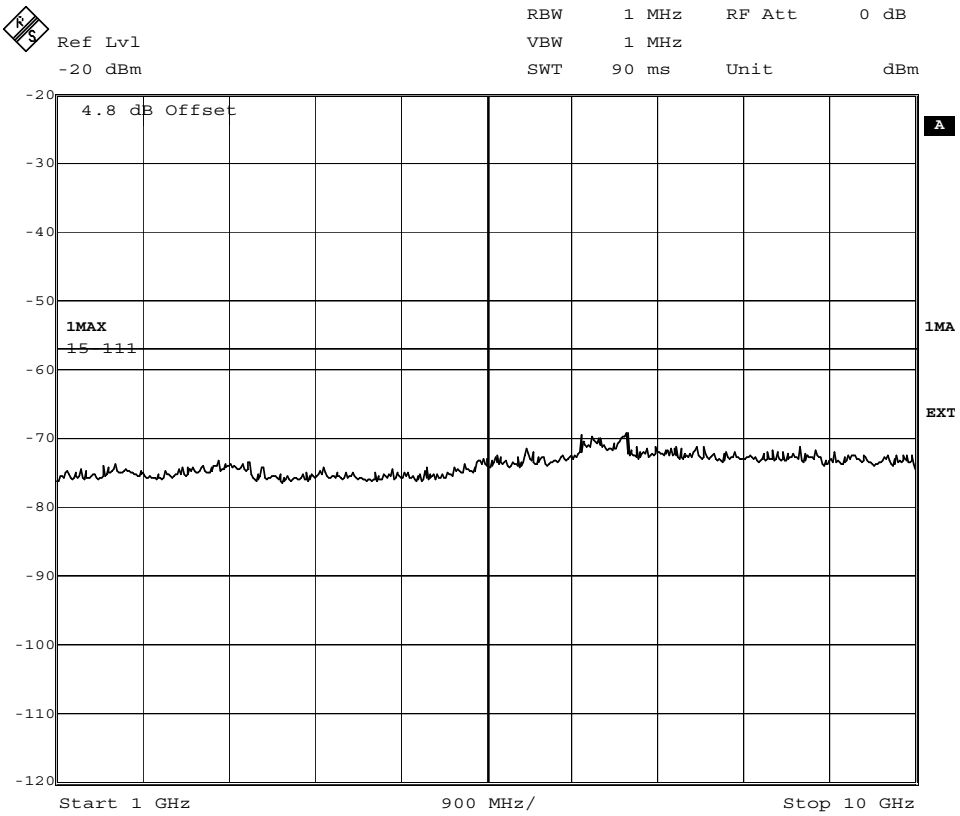


Date: 10.JUN.2008 15:30:54

Diagram 3

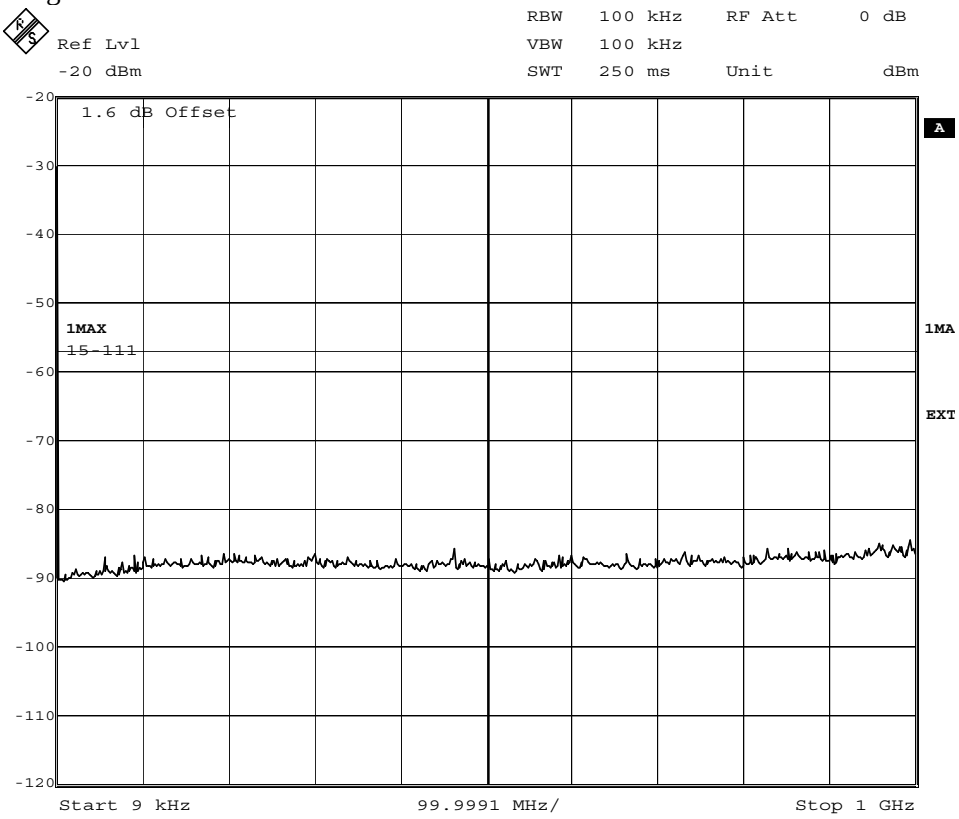


Date: 10.JUN.2008 16:58:36

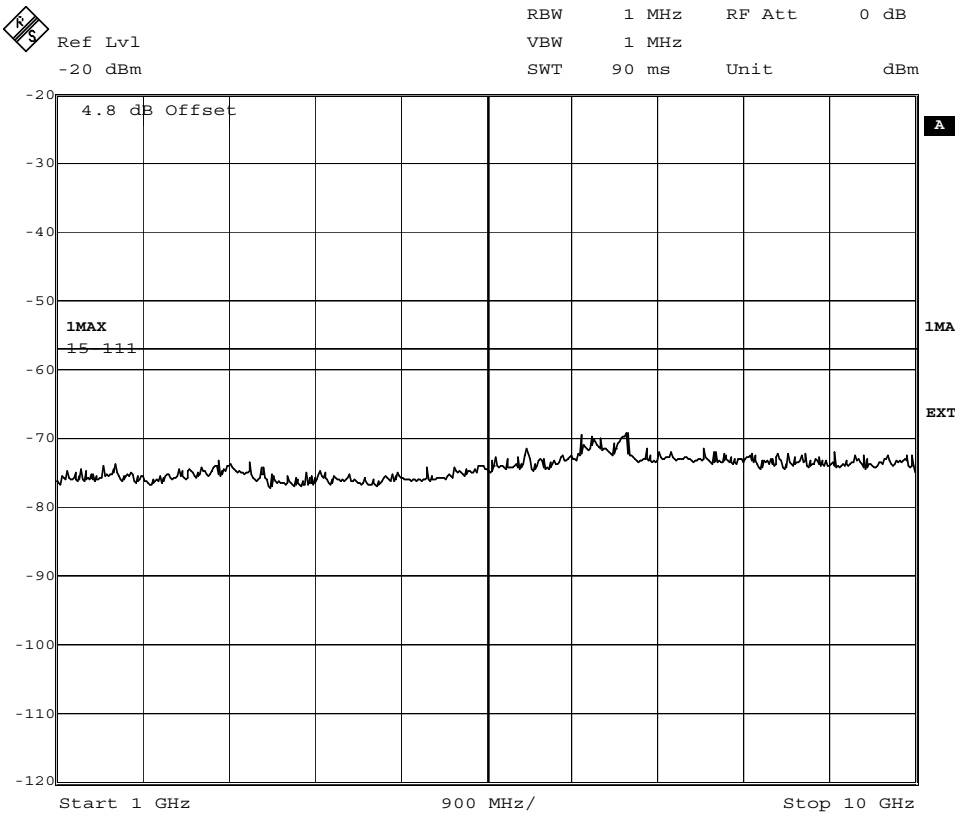


Date: 10.JUN.2008 17:02:15

Diagram 4



Date: 10.JUN.2008 16:59:52



Date: 10.JUN.2008 17:01:40

Hardware list RBS 2206V2

Unit	Product Number	Revision	Serial Number
Cabinet	SEB 112 1154/1	R3A	AB20243836
Door	SXK 109 7154/1	R1A	-
DCCU-13	BMG 980 07/11	R1D	BH41065710
ACCU-11	BMG 980 07/9	R1C	BH41057562
Subrack	BFL 119 424/1	R2C	-
CDU-G8	BFL 119 155/1	R3B	TR45399997
CDU-G8	BFL 119 155/1	R3B	TR43144644
CDU-G8	BFL 119 155/1	R3B	TR43144629
Dummy	SXK 107 5031/2	R1B	-
CXU-10	KRY 101 1856/1	R3D	TR44853077
Dummy	SXK 107 5031/1	R1B	-
TRU shelf	BFL 119 425/1	R1C	-
Backplane	BFX 101 107/3	R1B	-
dTRU-8	KRC 131 1005/2	R5B	AE57593585
dTRU-8	KRC 131 1005/2	R5B	AE57593603
dTRU-8	KRC 131 1005/2	R5B	AE57593607
dTRU-8	KRC 131 1005/2	R5B	AE57593602
dTRU-8	KRC 131 1005/2	R5B	AE57593616
dTRU-8	KRC 131 1005/2	R5B	AE57593610
IDM-11	BMG 980 327/2	R1C	X181224683
PSU/DXU subrack	BFL 119 453/1	R1A	-
Backplane	BFX 101 109/1	R1A	-
PSU-AC-32	BML 353 206/2	R1C	BR80397704
PSU-AC-32	BML 353 206/2	R1C	BR80348848
PSU-AC-32	BML 353 206/2	R1C	BR80397727
Dummy	SXK 107 9314/1	R1D	-
Dummy	-	-	-
TMA-CM-02	SDK 107 881/1	R4A	BR60000W2E
Dummy	SXK 107 5029/1	R1C	-
DXU-23	BOE 602 21/1	R1C/B	TU8D270698

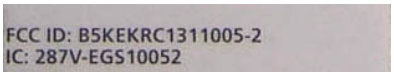
Software	Revision
R12A	R09V

Photos
Transceiver Unit KRC 131 1005/2, R5B

Front side

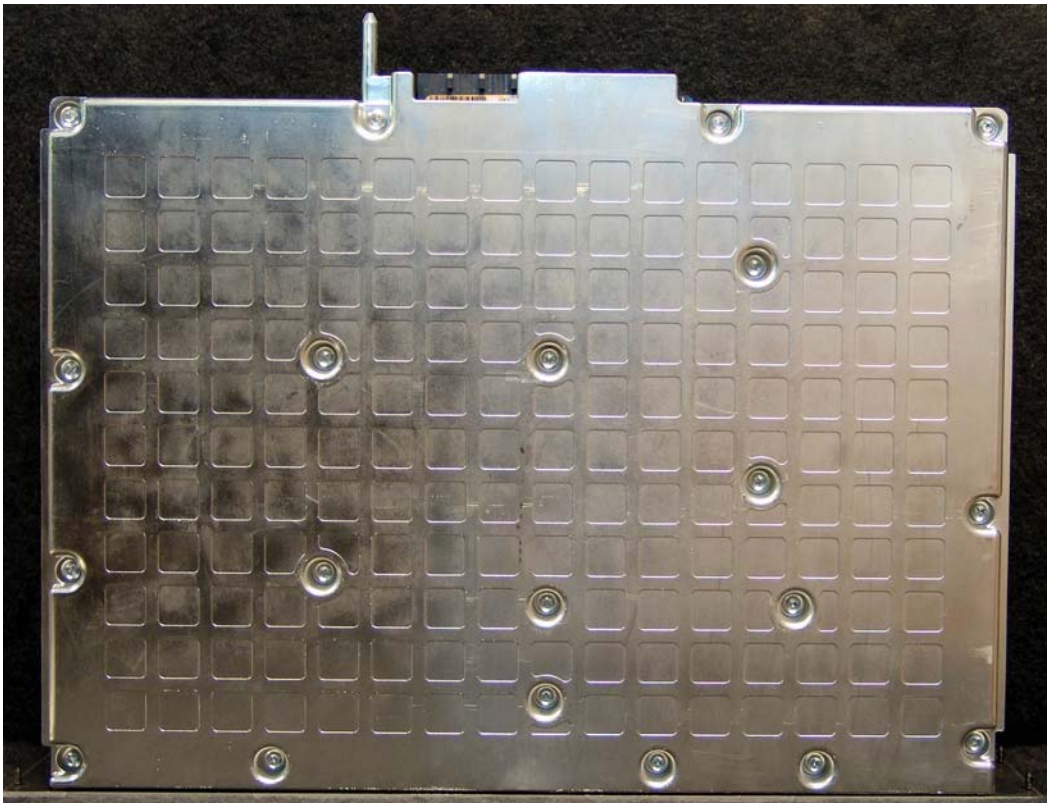
Rear side

FCC ID label



FCC ID: B5KEKRC1311005-2 Appendix 9

Left side



Right side