REPORT

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Date	Reference	Page
2008-06-13	F810802-F24	1 (2)

1002
ISO/IEC 17025

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Permissible change measurements on GSM Base station Transceiver unit with FCC ID: B5KFKRC1311004-2

(9 appendices)

Test object

Transceiver Unit dTRU 19 Edge, KRC 131 1004/2, R4F

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 port	Yes	5	-
2.1053 Field strength of spurious radiation	Yes	6	-
Industry Canada RSS-133			
Section 6.7 Receiver spurious emissions	Yes	7	

Note 1: The maximum output power that can be used on the channels adjacent to the frequency band edges (channel 512 and 810) are 37.8 dBm (GMSK) and (8-PSK) in order to comply with CDU-G and 37.4 dBm (GMSK) and (8-PSK) in order to comply with CDU-F.

SP Technical Research Institute of Sweden
Electronics – EMC

Christer Karlsson
Technical Manager

Jonas Bremholt
Technical Officer

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Description - Equipment Under Test (EUT)

Equipment: GSM Base station transceiver 1900 MHz

Tx Frequency range: 1930.2-1989.8 MHz

Modulations: GMSK and 8-PSK

Maximum output power (RMS):

CDU-G	GMSK	8-PSK
Uncombined:	44.8 dBm	41.5 dBm
Combined:	41.5 dBm	38.2 dBm
Combined+TCC:	47.5 dBm	44.2 dBm

CDU-F		
Uncombined:	41.0 dBm	38.7 dBm

Nominal power voltage: 24 V DC

Tested Channels

Conducted measurements:

ARFCN	Frequency	ARFCN	Frequency
512	1930.2	785	1984.8
513	1930.4	809	1989.6
537	1935.2	810	1989.8
661	1960.0		

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 7). The measurements were done at the output connector of CDU-G (BFL 119 153/1 rev. R3A) with serial number A40003DAHT. The dTRU with serial number AE58102972 was used for the measurements.
The CDU-F (BFL 119 156/1 rev. R1C) with serial number A400255680 were used for the measurements with CDU-F. The dTRUs with serial number AE58102972 and AE58120117 were used for the measurements with CDU-F. The measurements were performed with configurations that represents worst case scenario.

Radiated measurements:

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

dTRU	TRX	ARFCN	Modulation	RF config
1	0	512	GMSK	Combined
	1	537	GMSK	Combined
2	2	710	GMSK	Combined TCC
	3	-	-	-
3	4	652	8-PSK	Combined
	5	587	8-PSK	Combined
4	6	661	8-PSK	Combined TCC
	7	-	-	-
5	8	785	GMSK	Uncombined
	9	810	8-PSK	Uncombined

CDU-F
All six dTRUs were activated at maximum output power with the following settings:

dTRU	TRX	ARFCN	Modulation	RF config.
1	0	512	GMSK	Uncombined
	1	542	8-PSK	Uncombined
2	2	572	GMSK	Uncombined
	3	602	8-PSK	Uncombined
3	4	631	GMSK	Uncombined
	5	661	8-PSK	Uncombined
4	6	685	GMSK	Uncombined
	7	710	8-PSK	Uncombined
5	8	735	GMSK	Uncombined
	9	760	8-PSK	Uncombined
6	10	785	GMSK	Uncombined
	11	810	8-PSK	Uncombined

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

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.

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

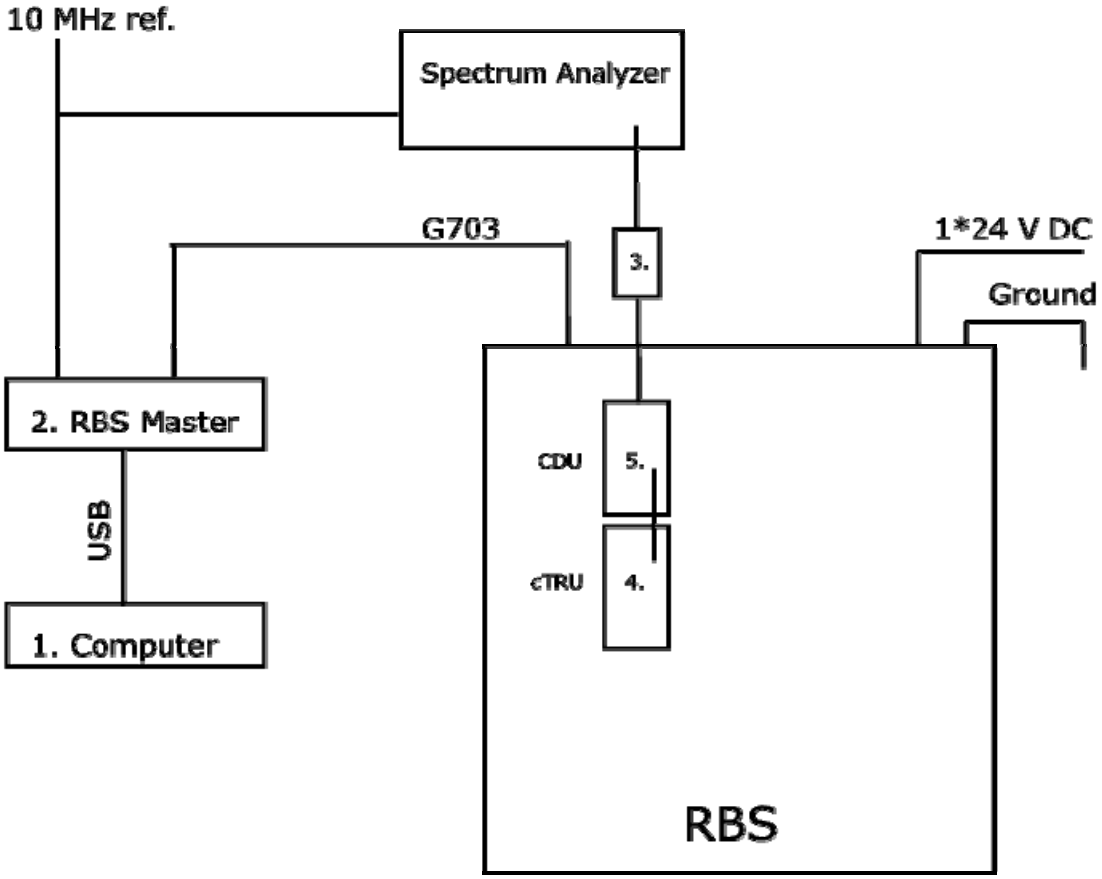
Test engineers

Stefan Larsson, Stig Norén, and Jonas Bremholt

Test witnesses

Lars Hagbjörk and Mats Iregren, Ericsson AB

Test set-up, conducted measurements

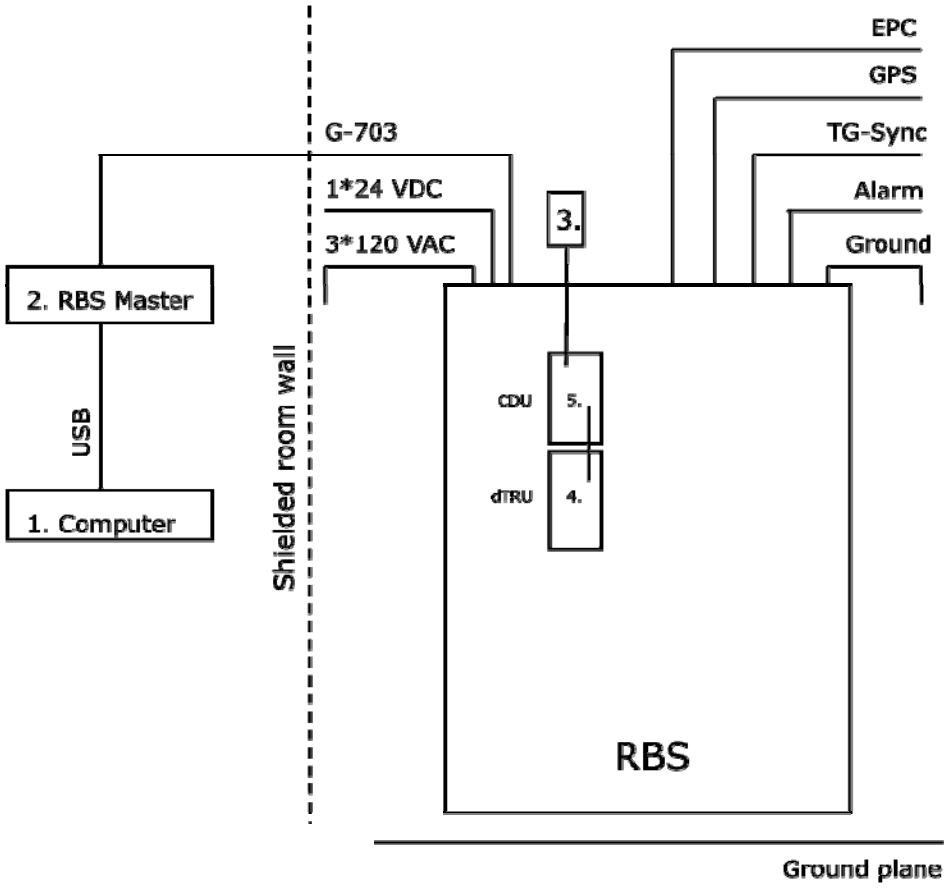


Note: The TG-Sync and Ext. trig were only used during the frequency stability measurements.

1. Computer with software RBSMMI ver. R10D03
2. Ericsson RBS Master 2 LPY 107 1007/1 R1D/A software ver. R6D03
3. Attenuator
4. Test object with FCC ID: B5KFKRC1311004-2
5. CDU-G/ CDU-F

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 emission



1. Computer, with software RBSMMI ver. R10D02
2. Ericsson RBS Master 2 LPY 107 1007/1 R1F/A
3. 6 Dummy loads (50 ohm)
4. Test object with FCC ID: B5KFKRC1311004-2
5. CDU-G/ CDU-F

Interfaces:	**Type of port:**
Power: 120 VAC, 60 Hz	AC mains
Power: 24 VDC	DC power
Antenna: Coaxial cable 50 ohm	Antenna
G703: T1, shielded multi-wire with 15-pin D-sub connector	Telecom
TG-sync: Shielded multi-wire, unterminted	Signal
Alarm: Unshielded multi-wire, terminated in distribution frame	Signal
GPS: Shielded multi-wire, 9-pin DSUB, unterminated	Signal
EPC: Shielded multi-wire, unterminated	Signal

RF Power output measurements according to CFR 47 2.1046

Date	Temperature	Humidity
2008-06-11	23 °C ± 3 °C	27 % ± 5 %
2008-06-12	23 °C ± 3 °C	31 % ± 5 %

Test set-up and procedure

Measurements were made at CDU-G and CDU-F output connectors. 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	2008-01	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.
Maximum rated output power level after CDU-G: 47.5 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	46.7/ 45.8	47.1/ 46.2	46.8/ 45.9

dTRU, output 1, without internal combiner:
Maximum rated output power level after CDU-G: 44.8 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	44.4/ 43.5	44.8/ 44.0	44.6/ 43.7

dTRU, output 2, without internal combiner:
Maximum rated output power level after CDU-G: 44.8 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	44.4/ 43.5	44.9/ 44.0	44.5/ 43.7

dTRU, output 1, with internal combiner:
Maximum rated output power level after CDU-G: 41.0 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	40.6/ 39.8	41.0/ 40.3	40.7/ 40.0

dTRU, output 2, with internal combiner:
Maximum rated output power level after CDU-G: 41.0 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	40.5/ 39.8	40.8/ 40.0	40.5/ 39.8

dTRU, output 1, without internal combiner:
Maximum rated output power level after CDU-F 3x4: 41.0 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	41.7/ 40.9	41.8/ 41.1	41.6/ 40.9

dTRU, output 2, without internal combiner:
Maximum rated output power level after CDU-F 3x4: 41.0 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	41.8/ 41.0	41.7/ 41.0	41.6/ 40.9

Modulation: **8-PSK**

dTRU, output 1+2, with internal combiner plus TCC:
Maximum rated output power level after CDU-G: 44.2 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	46.6/ 42.7	47.1/ 43.0	46.8/ 42.8

dTRU, output 1, without internal combiner:
Maximum rated output power level after CDU-G: 41.5 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	44.3/ 40.4	44.8/ 40.9	44.6/ 40.6

dTRU, output 2, without internal combiner:
Maximum rated output power level after CDU-G: 41.5 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	44.3/ 40.4	44.8/ 40.9	44.6/ 40.6

dTRU, output 1, with internal combiner:
Maximum rated output power level after CDU-G: 37.7 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	40.4/ 36.7	41.0/ 37.2	40.7/ 36.9

dTRU, output 2, with internal combiner:
Maximum rated output power level after CDU-G: 37.7 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	40.5/ 36.7	40.8/ 37.0	40.6/ 36.8

dTRU, output 1, without internal combiner:
Maximum rated output power level after CDU-F 3x4: 38.7 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	41.8/ 38.2	41.9/ 38.3	41.7/ 38.1

dTRU, output 2, without internal combiner:
Maximum rated output power level after CDU-F 3x4: 38.7 dBm

Test conditions		Transmitter power (dBm) Peak/ RMS		
		Channel 512	Channel 661	Channel 810
T_{nom} 22 °C	V_{nom} 24 V DC	41.9/ 38.3	41.9/ 38.3	41.7/ 38.1

Limit

According to CFR § 24 there are no conducted limits at the antenna connector.

§ 24.232: Base stations with an emission bandwidth of 1 MHz or less are limited to 1640 watts equivalent isotropically radiated power (EIRP).

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
2008-06-11	23 °C ± 3 °C	35 % ± 5 %
2008-06-12	23 °C ± 3 °C	31 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §24.238. Measurements were made at CDU-G and CDU-F output connectors. 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	2008-10	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results with CDU-G are shown in appendix 3.1

Modulation: **GMSK**				Modulation: **8-PSK**			
TRX 1		**ARFCN**	**OBW**	**TRX 1**		**ARFCN**	**OBW**
Diagram	1:	Ch 512	238 kHz	Diagram	7:	Ch 512	240 kHz
Diagram	2:	Ch 661	240 kHz	Diagram	8:	Ch 661	240 kHz
Diagram	3:	Ch 810	240 kHz	Diagram	9:	Ch 810	244 kHz
TRX 2		**ARFCN**	**OBW**	**TRX 2**		**ARFCN**	**OBW**
Diagram	4:	Ch 512	240 kHz	Diagram	10:	Ch 512	244 kHz
Diagram	5:	Ch 661	242 kHz	Diagram	11:	Ch 661	238 kHz
Diagram	6:	Ch 810	240 kHz	Diagram	12:	Ch 810	242 kHz

The results with CDU-F are shown in appendix 3.2

Modulation: **GMSK**				Modulation: **8-PSK**			
TRX 1		**ARFCN**	**OBW**	**TRX 1**		**ARFCN**	**OBW**
Diagram	1:	Ch 512	242 kHz	Diagram	7:	Ch 512	236 kHz
Diagram	2:	Ch 661	242 kHz	Diagram	8:	Ch 661	244 kHz
Diagram	3:	Ch 810	238 kHz	Diagram	9:	Ch 810	238 kHz
TRX 2		**ARFCN**	**OBW**	**TRX 2**		**ARFCN**	**OBW**
Diagram	4:	Ch 512	240 kHz	Diagram	10:	Ch 512	240 kHz
Diagram	5:	Ch 661	242 kHz	Diagram	11:	Ch 661	232 kHz
Diagram	6:	Ch 810	242 kHz	Diagram	12:	Ch 810	242 kHz

Complies?	Yes

FCC ID: B5KFKRC1311004-2 Appendix 3.1

Diagram 1

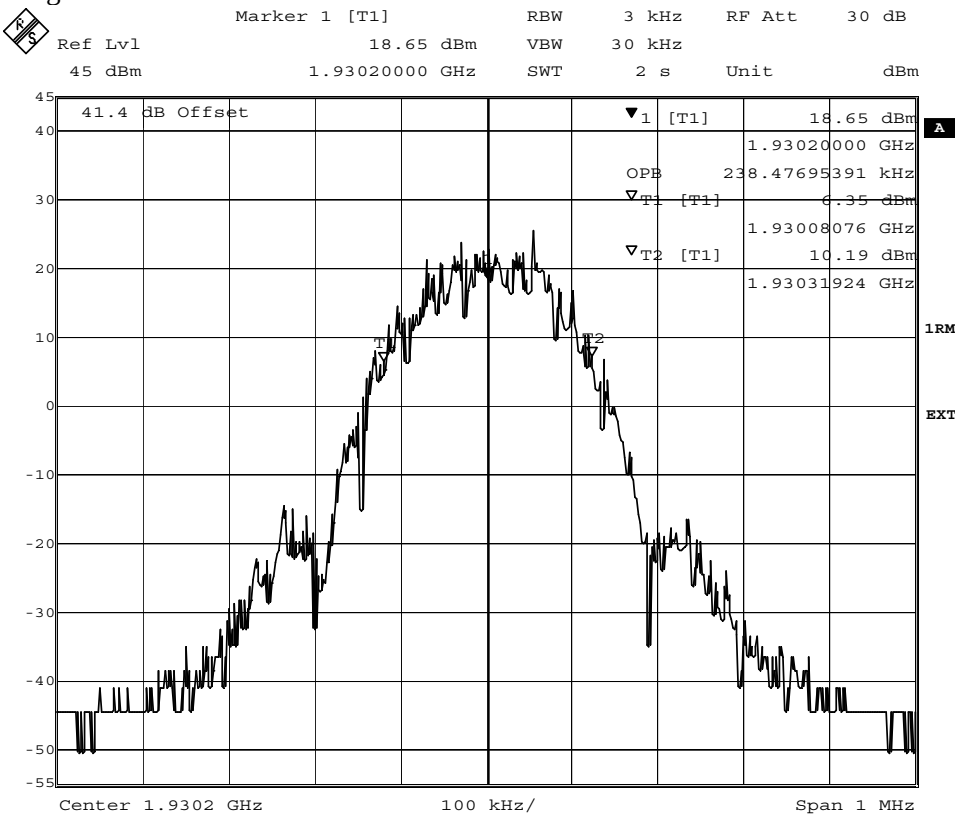


Diagram 2

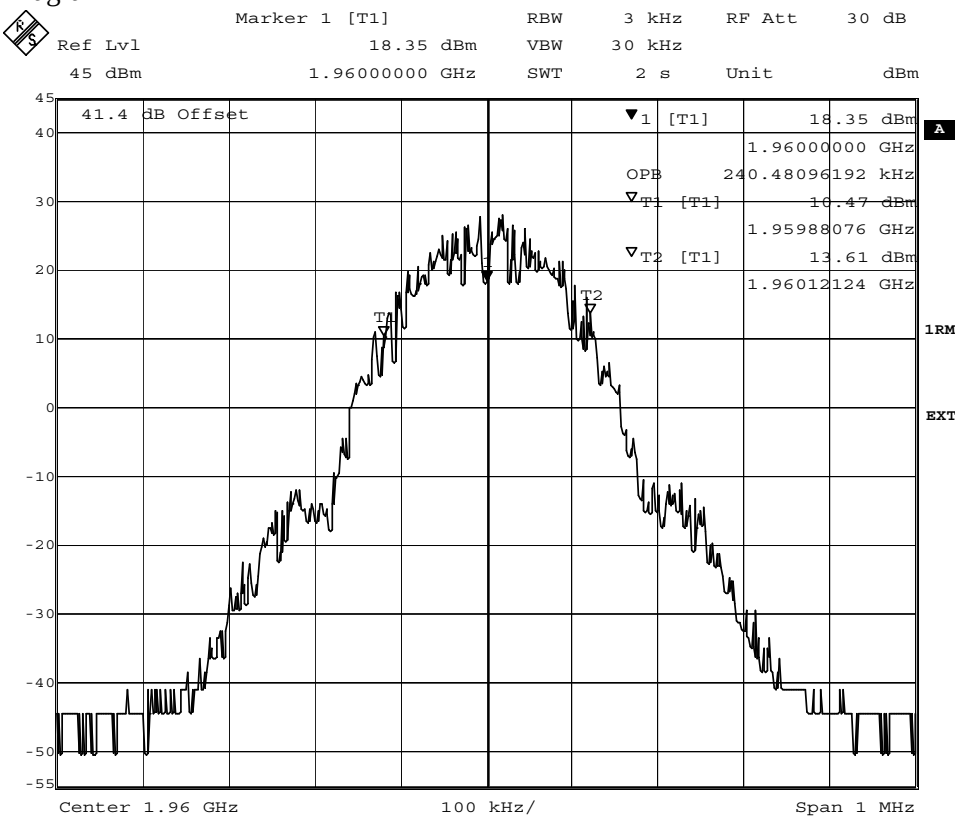


Diagram 3

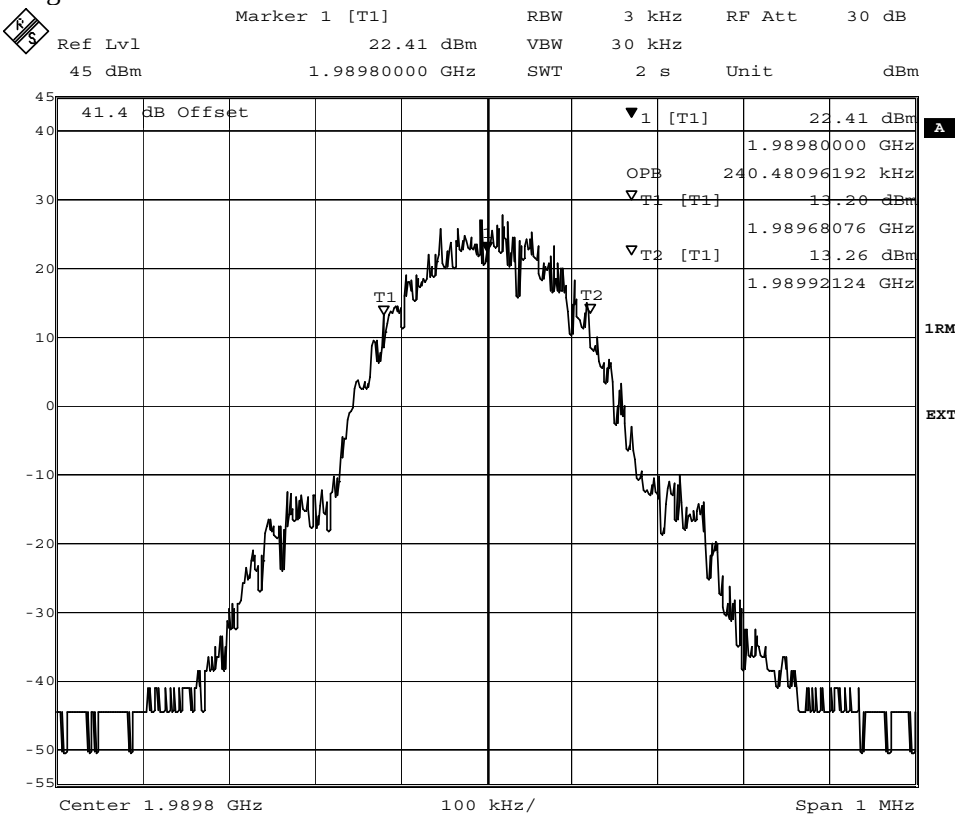


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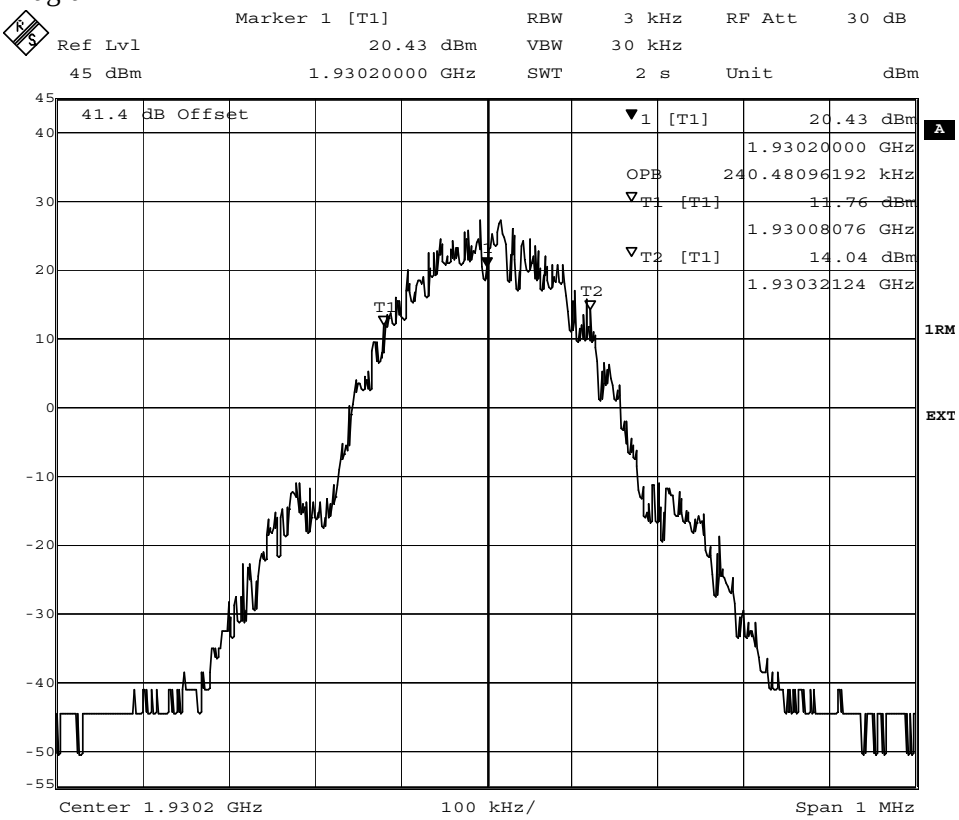
Diagram 4



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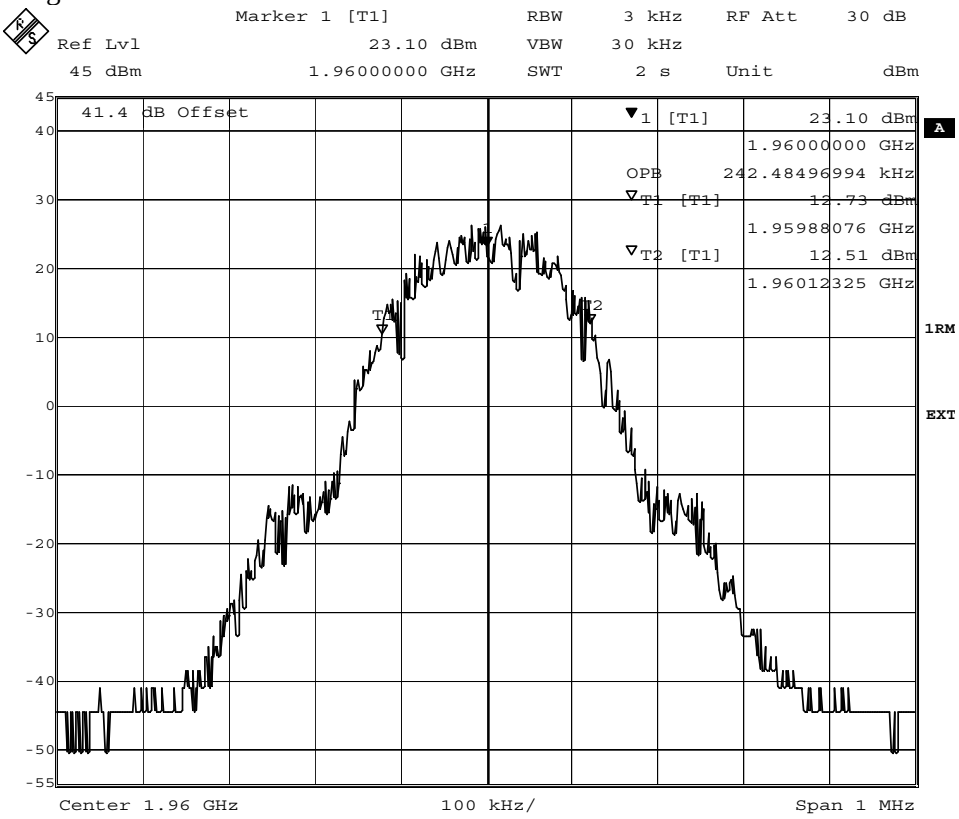

Diagram 6

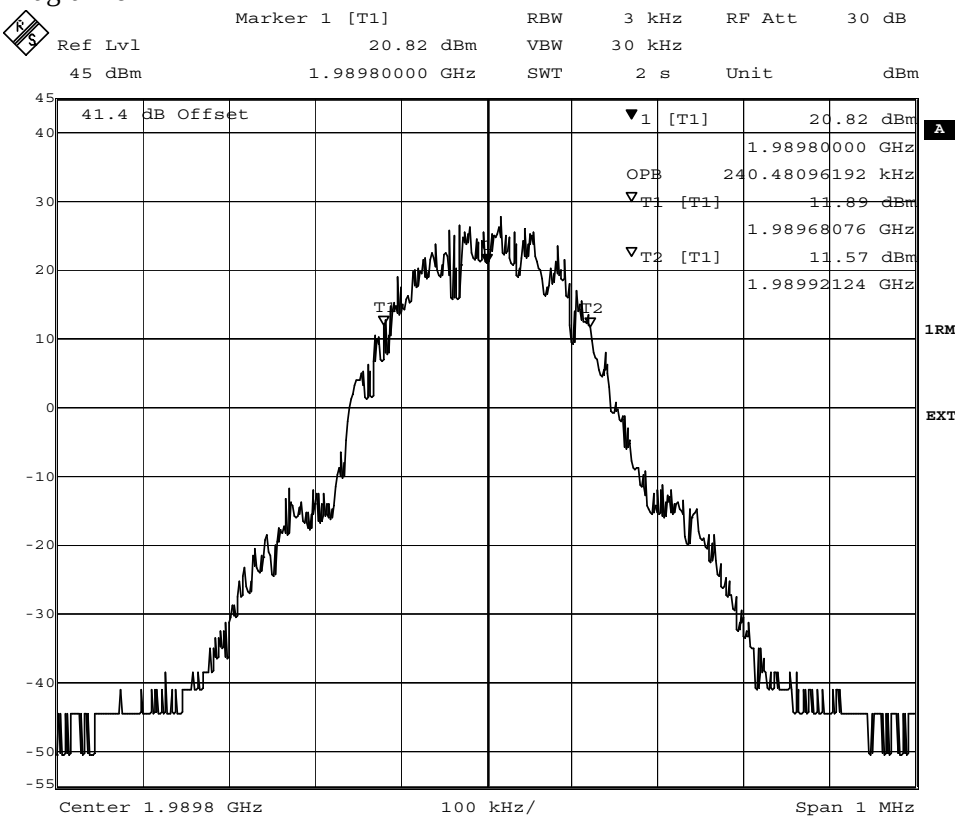

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Diagram 7

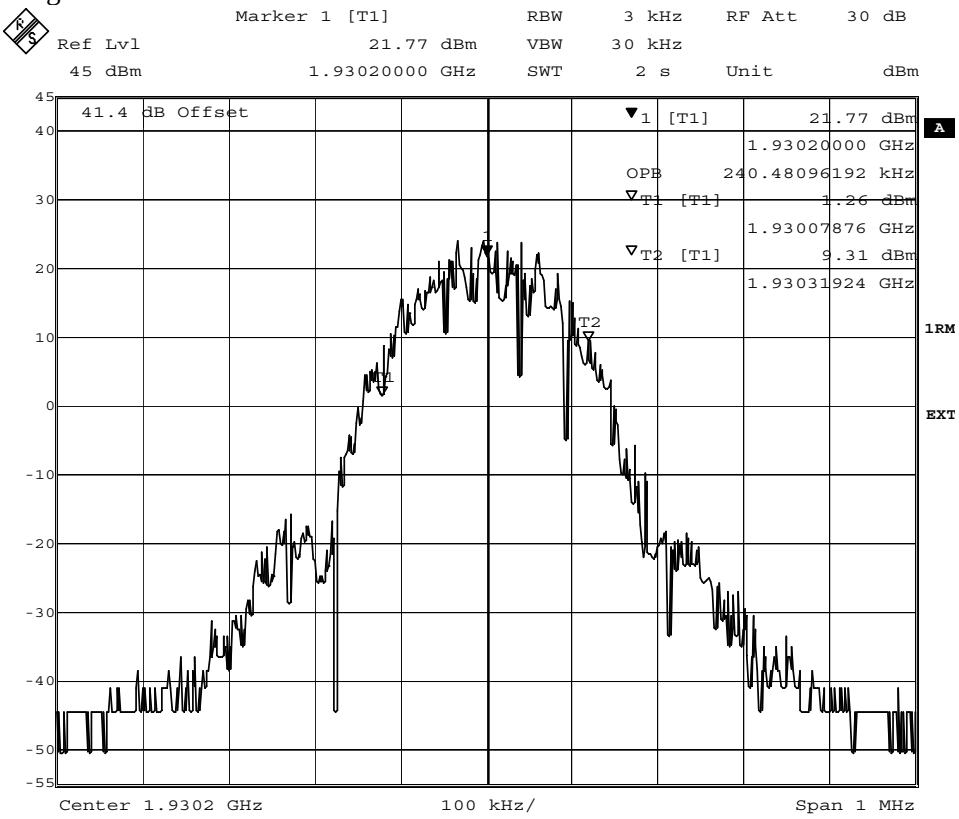


Diagram 8

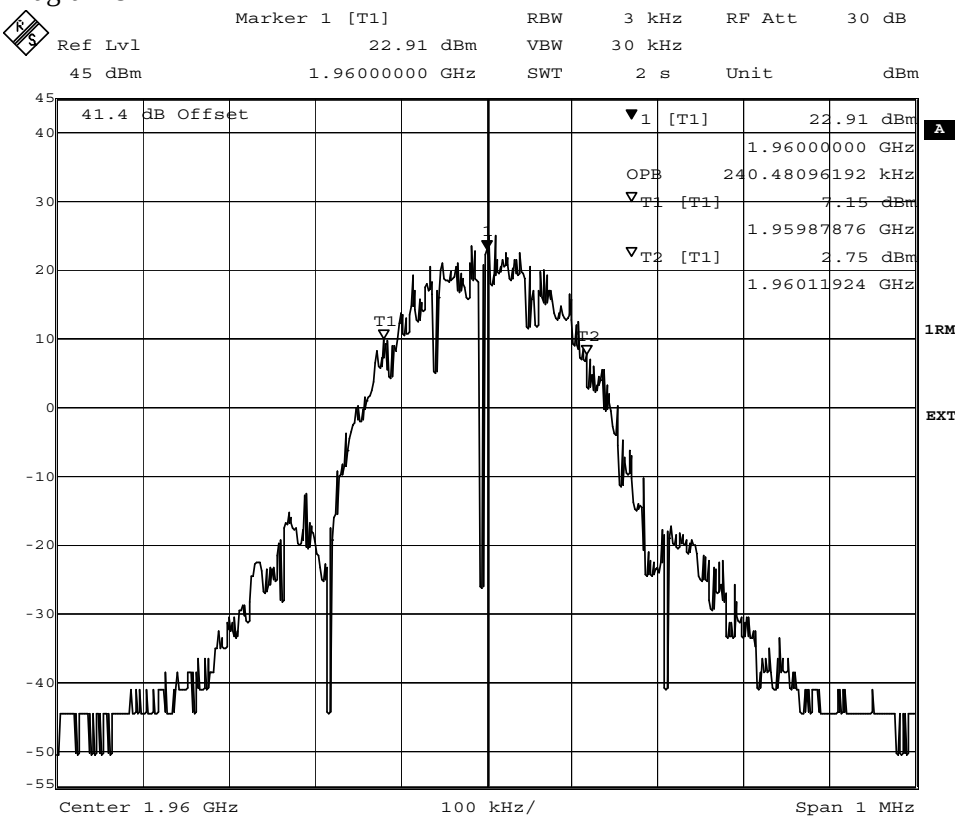


Diagram 9

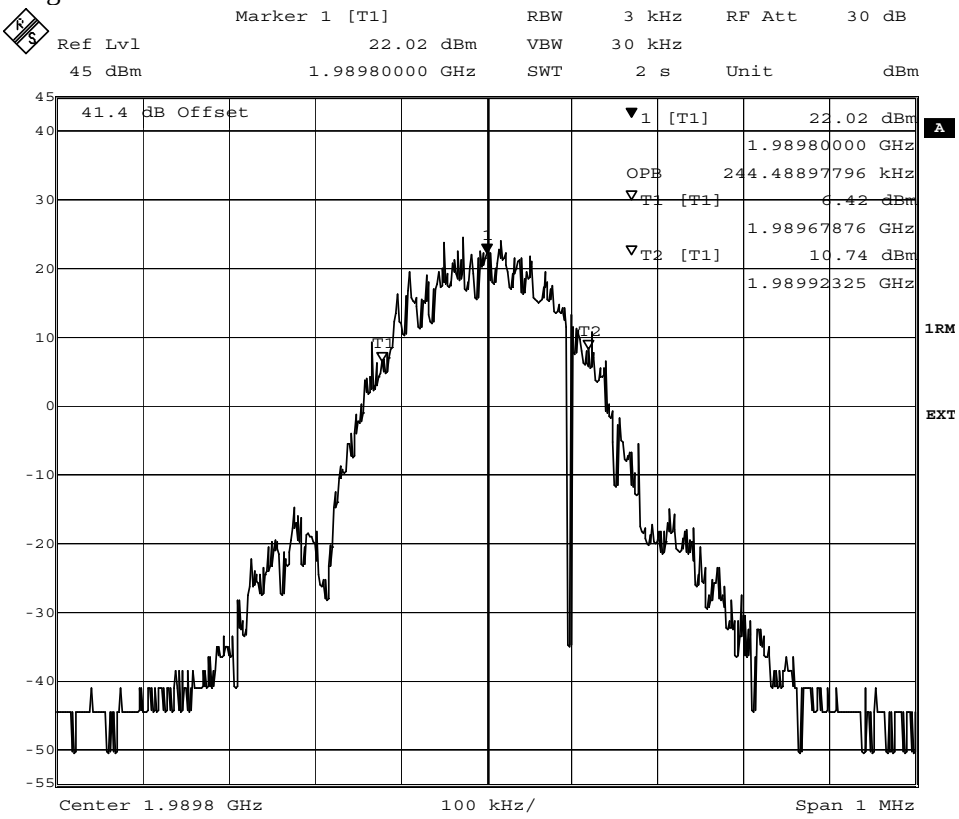
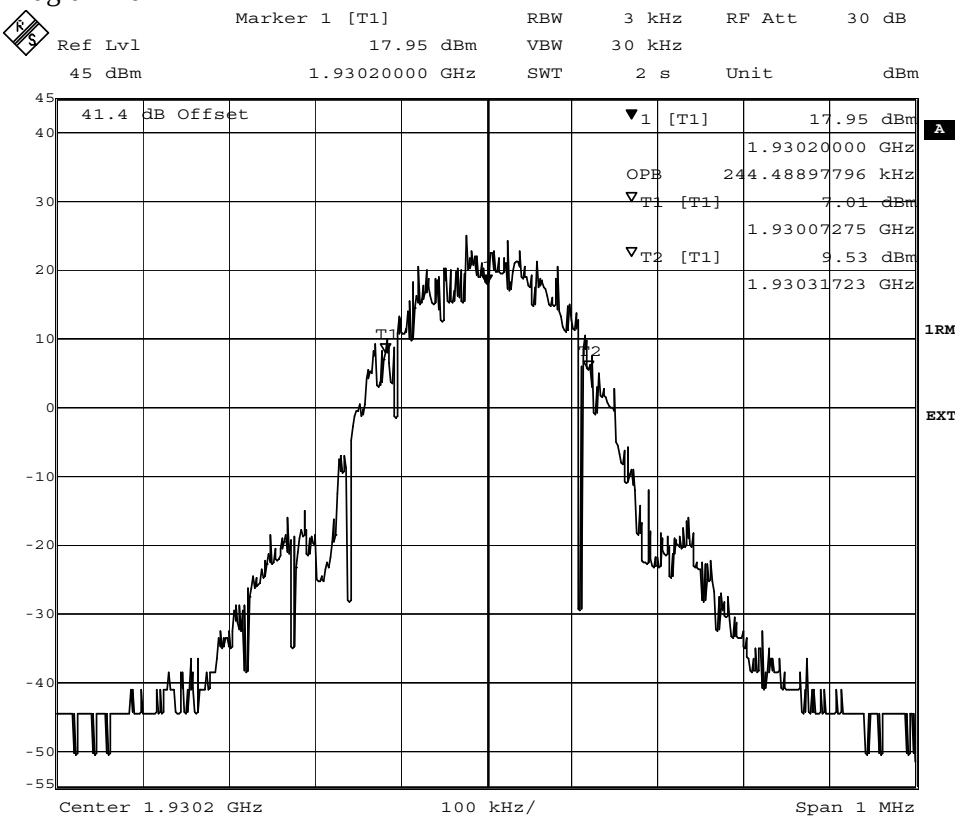


Diagram 10



FCC ID: B5KFKRC1311004-2 Appendix 3.1

Diagram 11

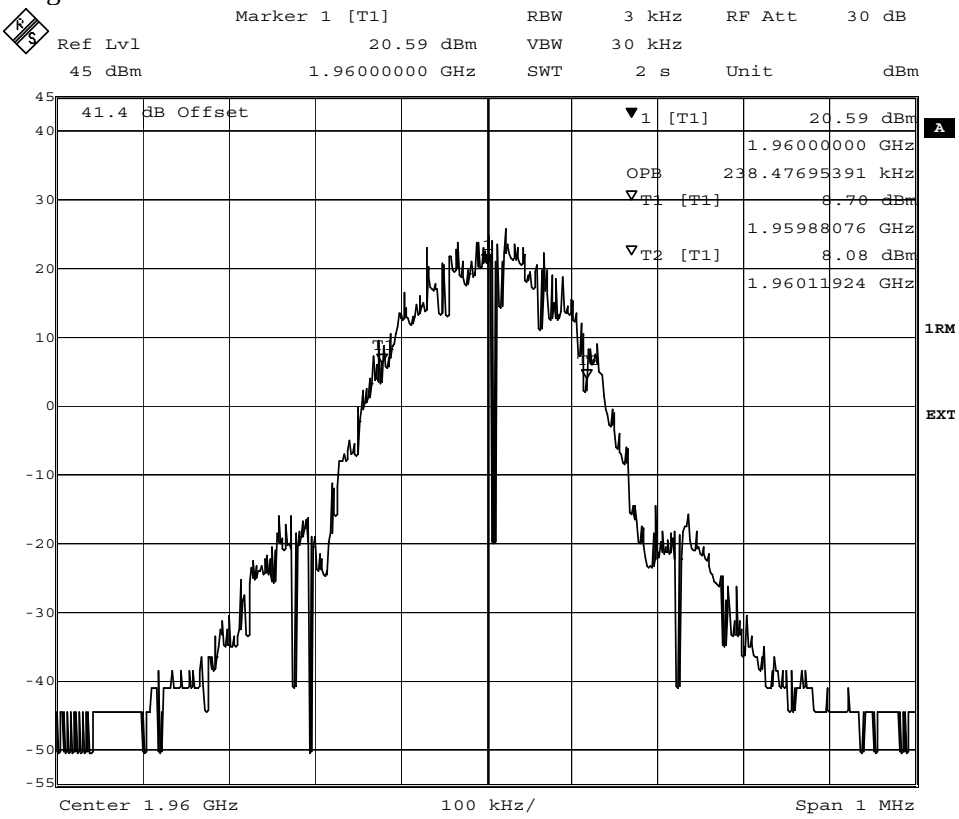


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Diagram 12

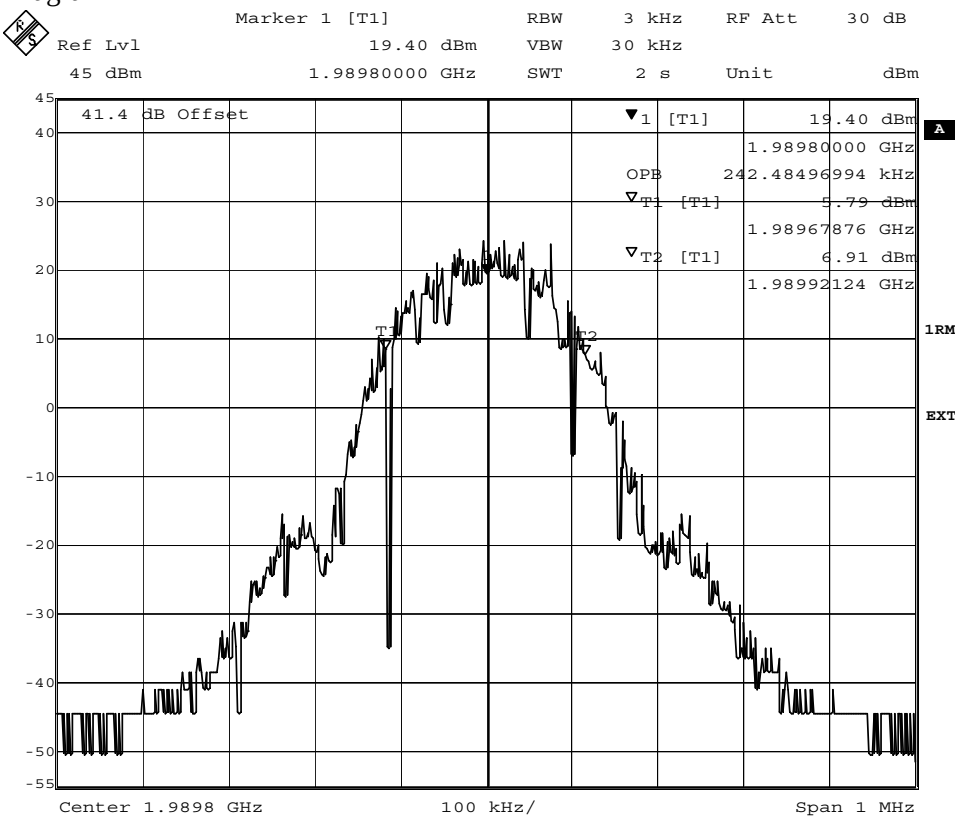

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Diagram 1

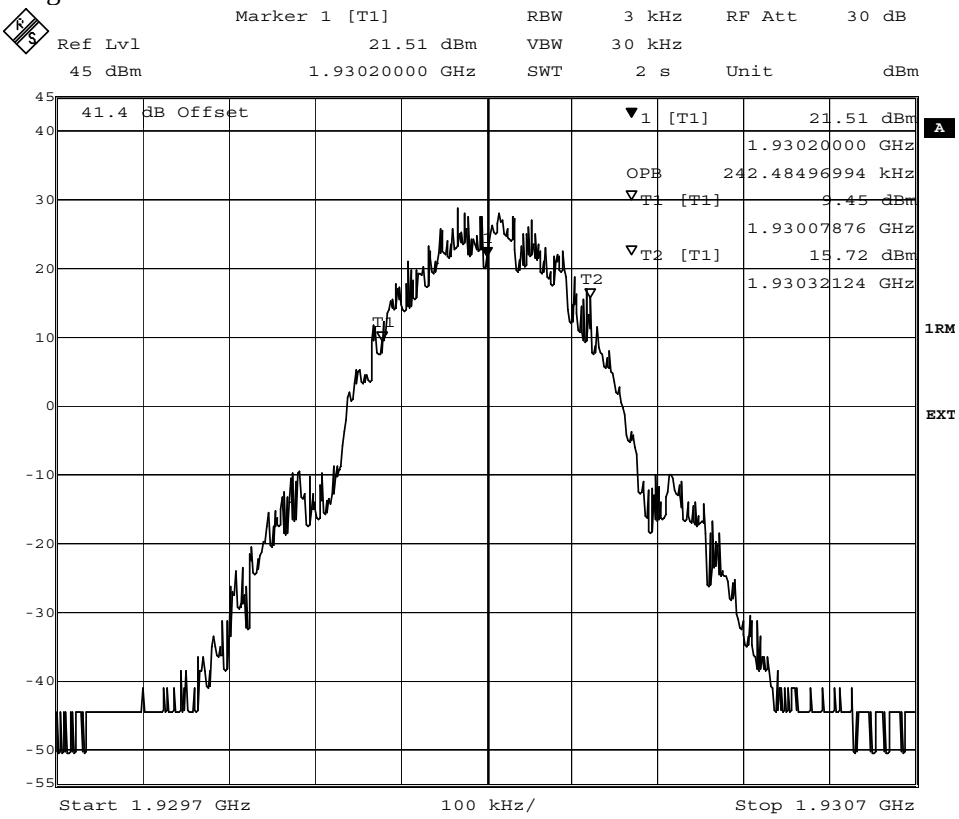

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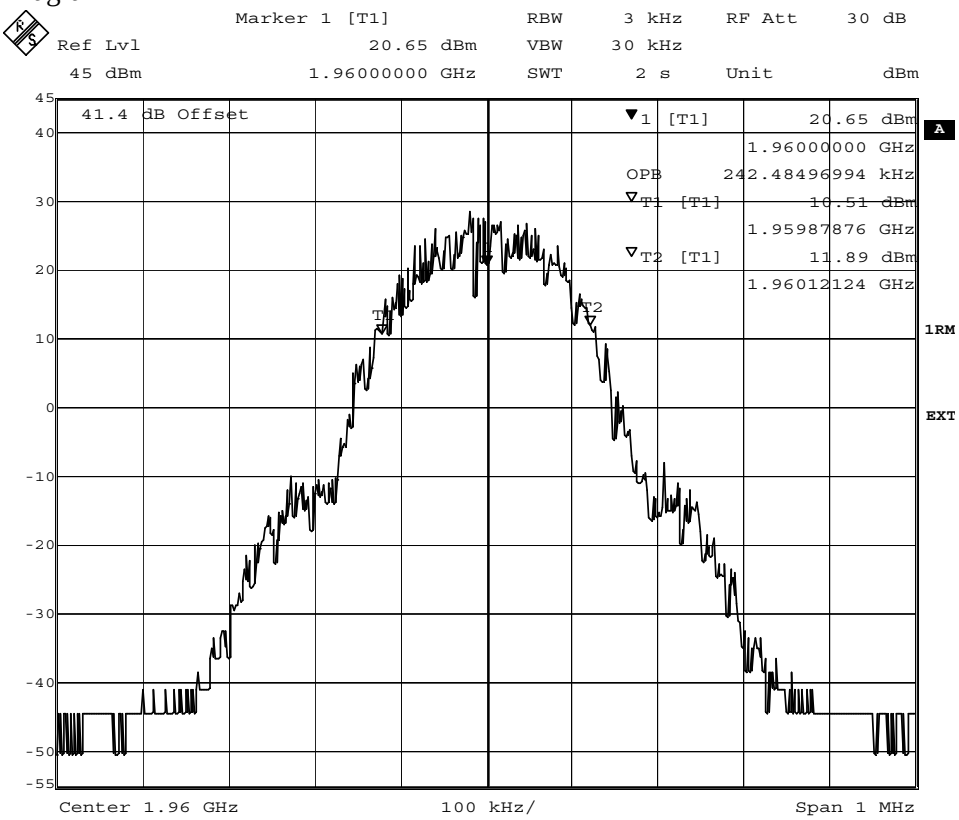
Diagram 2



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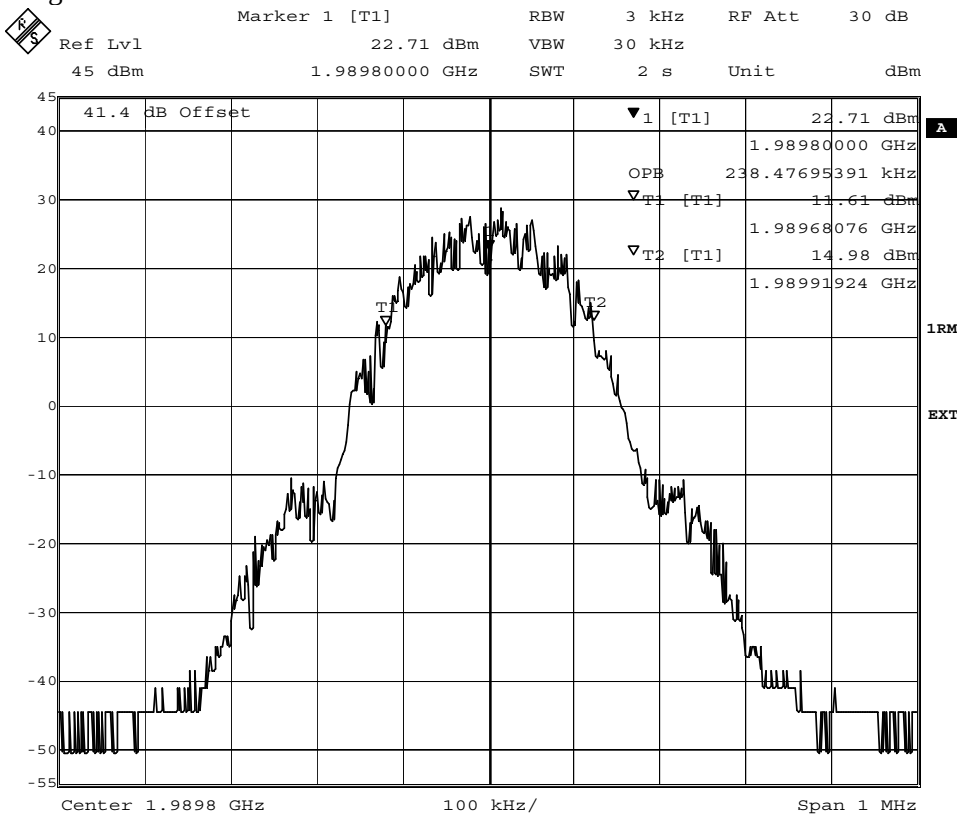

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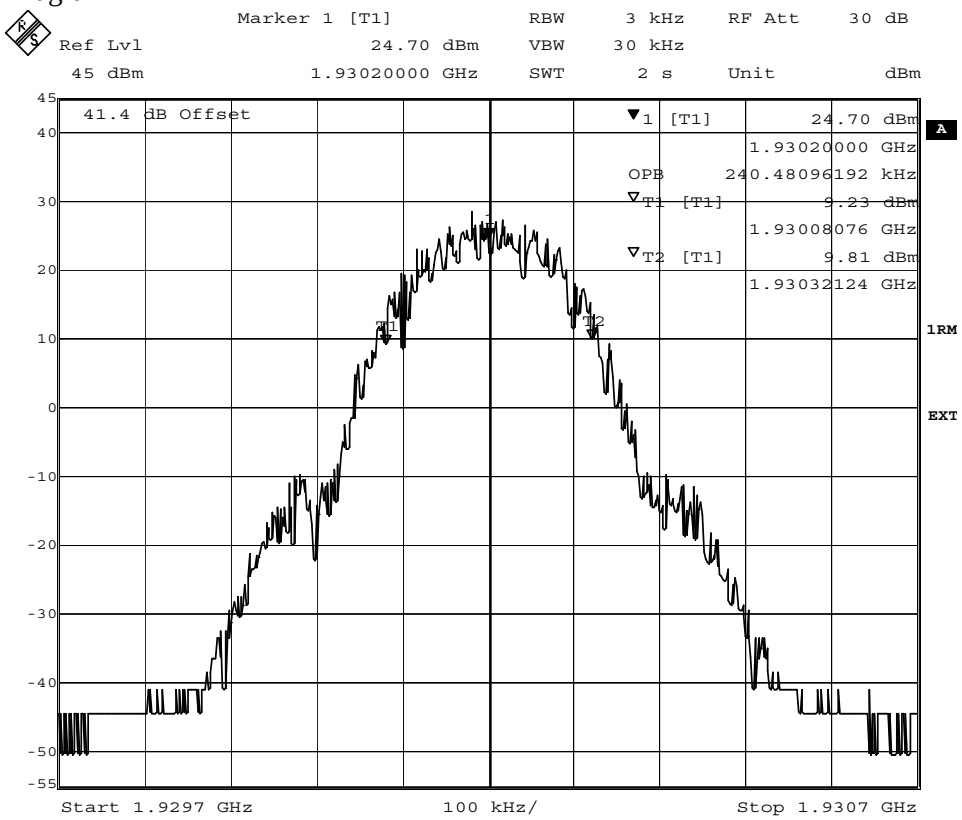

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Diagram 5

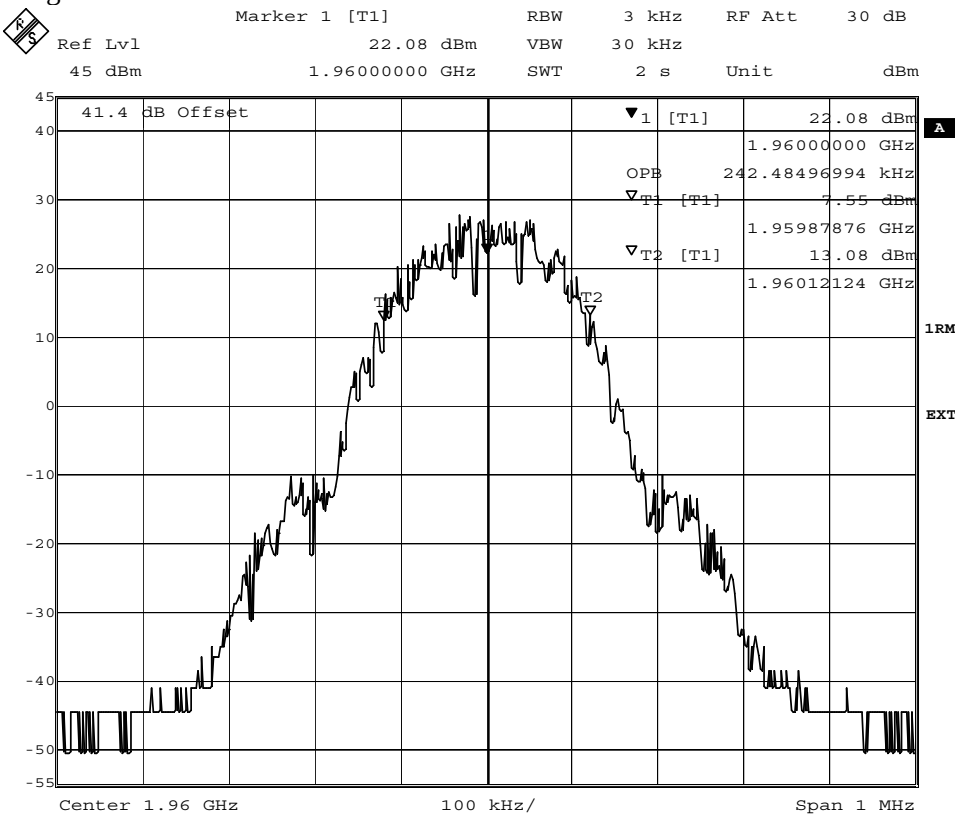
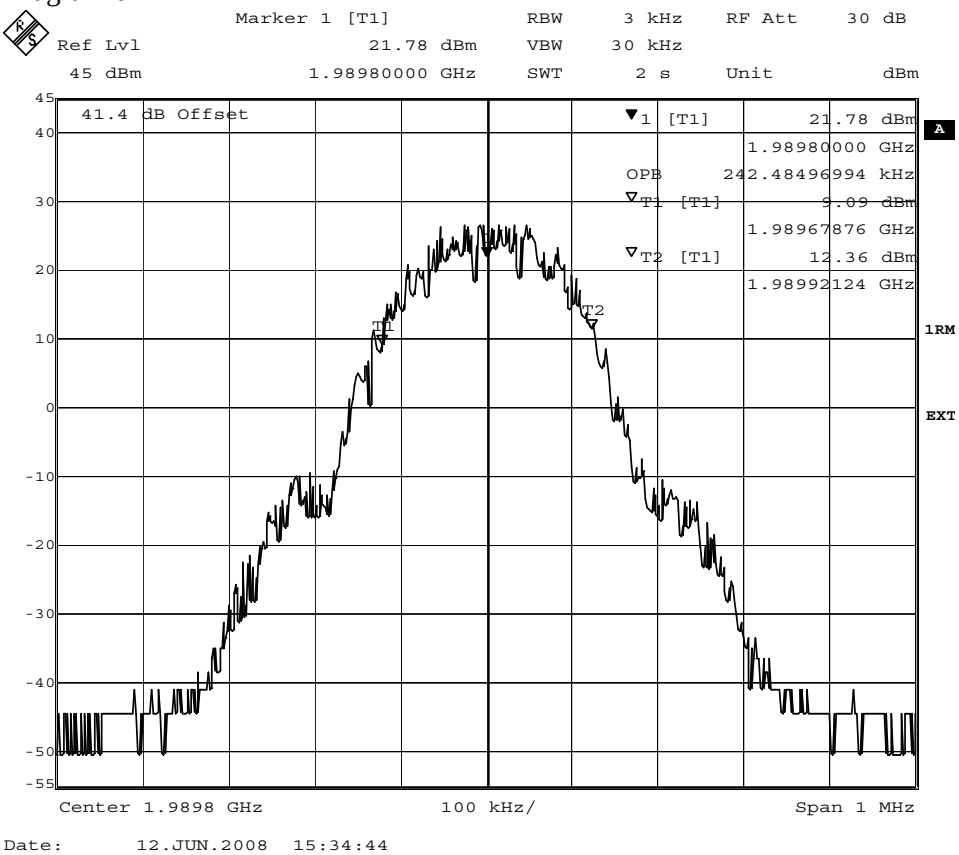


Diagram 6



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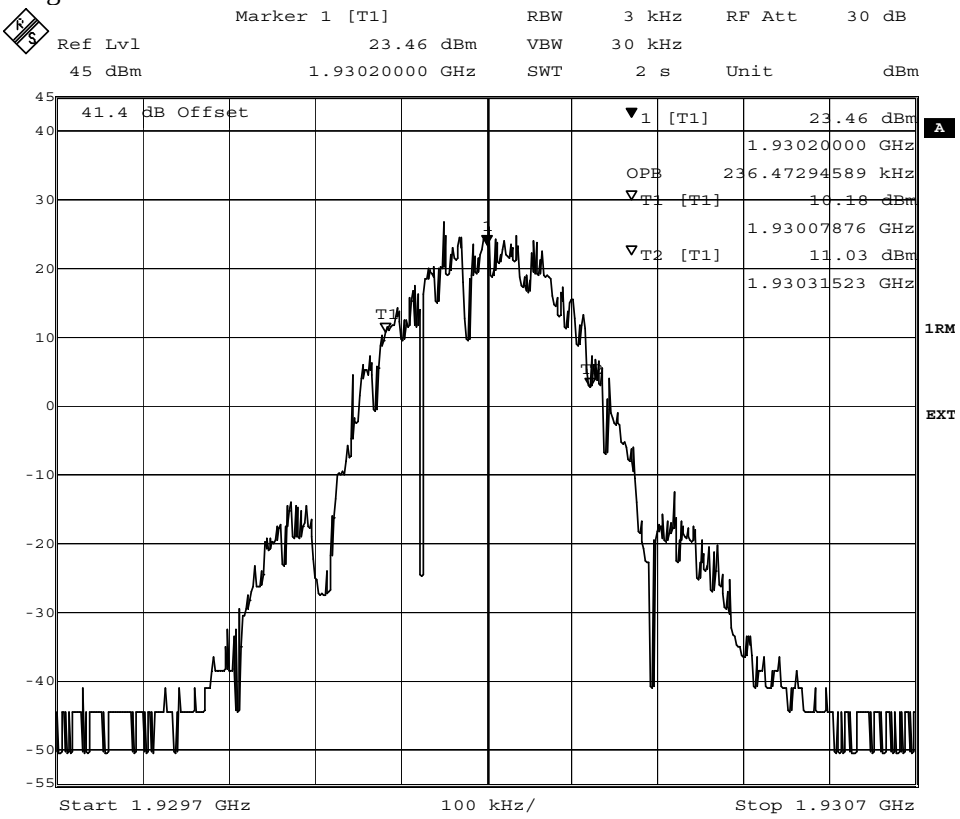

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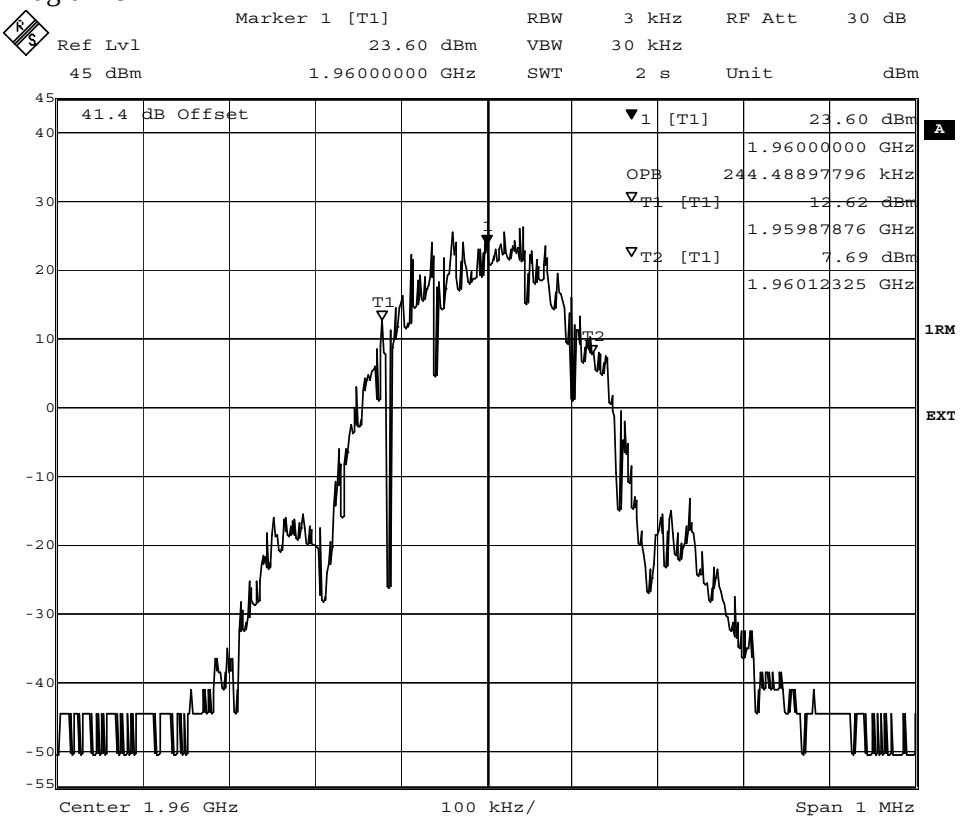
Diagram 8



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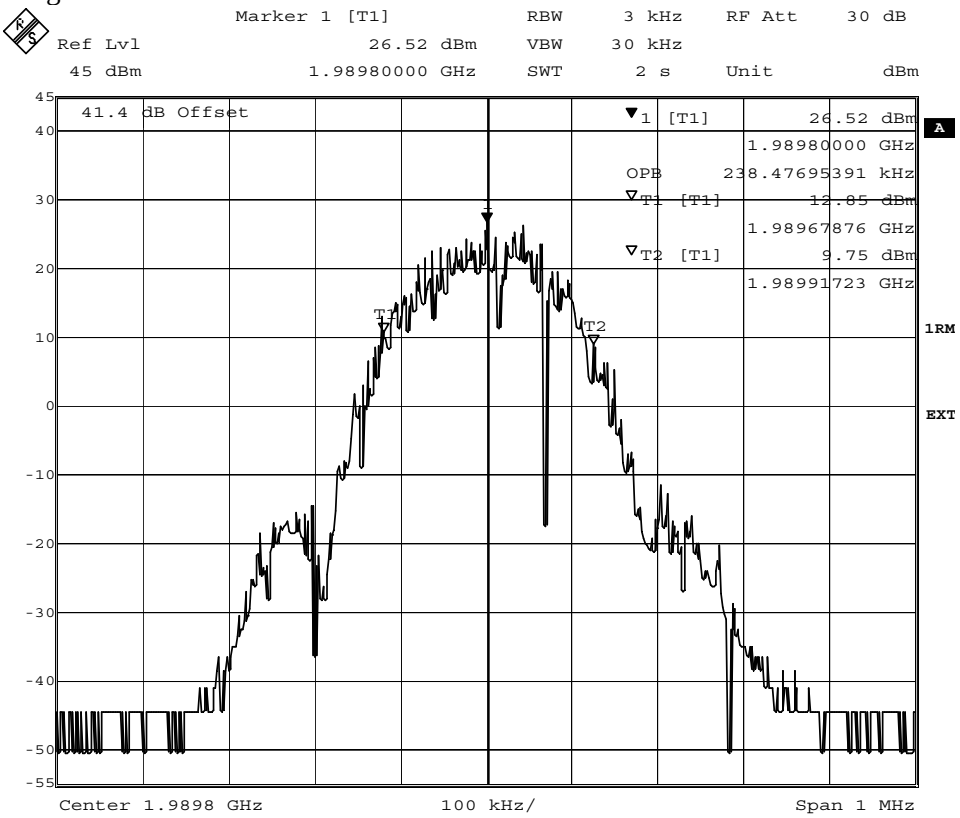

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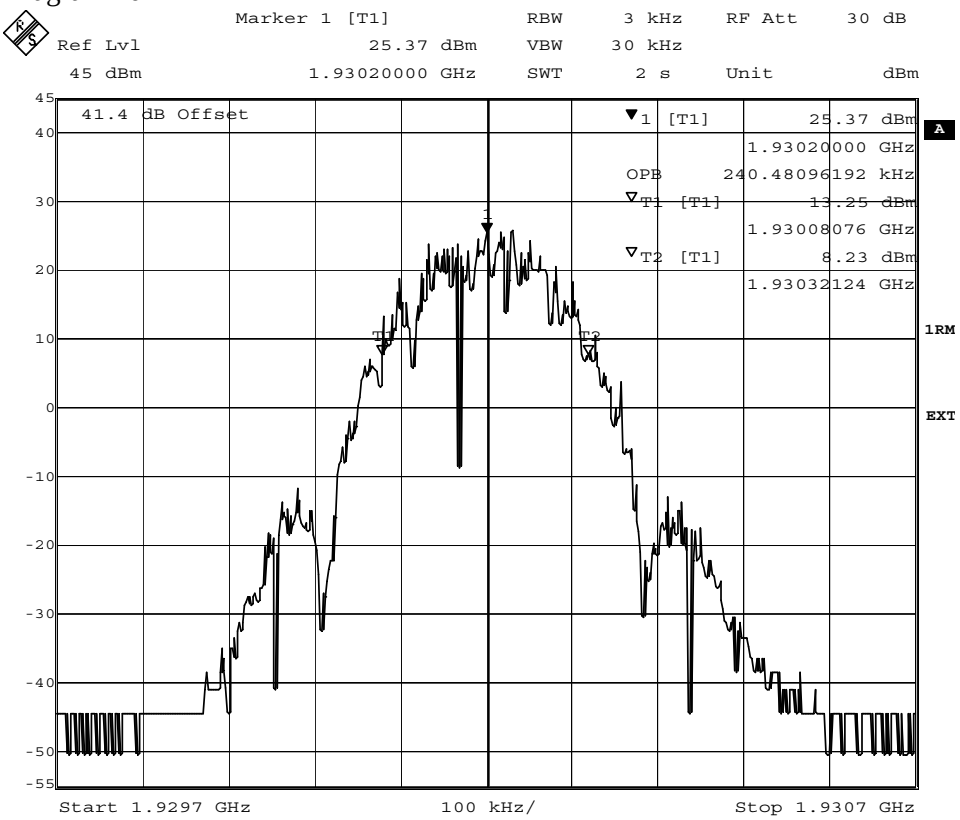

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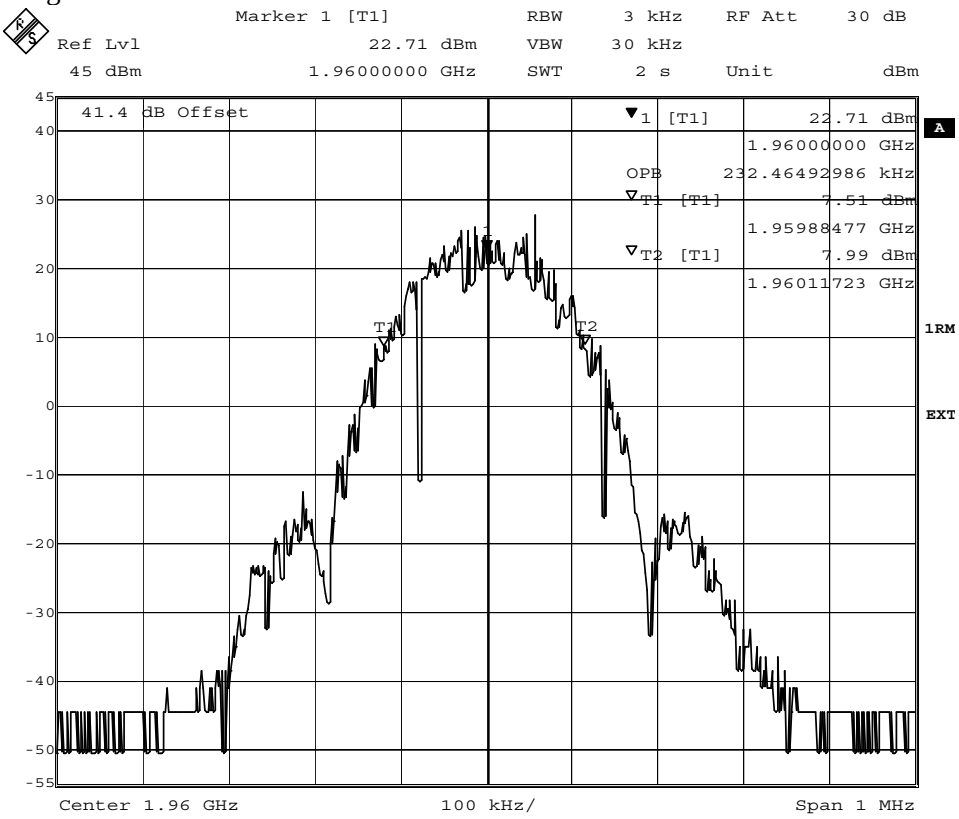
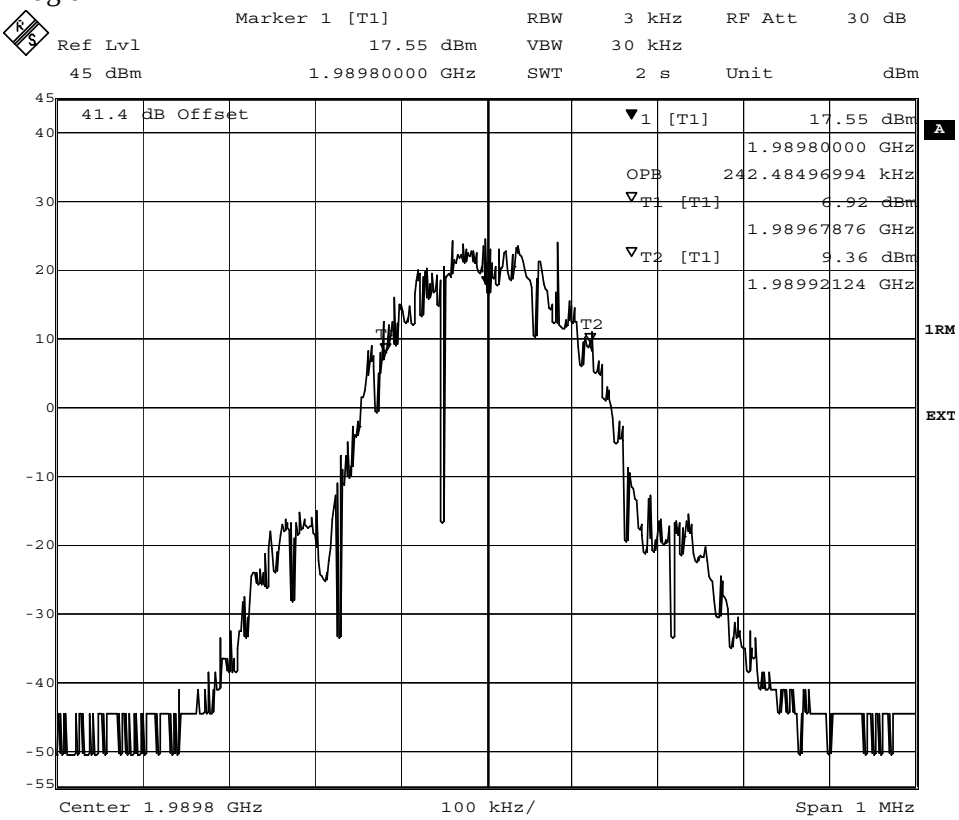


Date: 12.JUN.2008 15:20:44

Diagram 12



Date: 12.JUN.2008 15:37:41

Band edge measurements according to 47CFR 2.1049

Date	Temperature	Humidity
2008-06-11	23 °C ± 3 °C	37 % ± 5 %
2008-06-12	23 °C ± 3 °C	31 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §24.238. The measurements were made at CDU-G and CDU-F output connectors. The output was connected to a spectrum analyzer with the RMS detector activated. A resolution bandwidth of 50 kHz was used up to 5 MHz away from the band edges. As the FCC rules specify a RBW of 1 MHz for measurements of emissions >1 MHz away from the band edges, the limit was adjusted with 13 dB to –26 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	2008-10	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

Modulation: **GMSK**

dTRU Output 1, without internal combiner (CDU-G):
Diagram 1 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 2 Ch 810 (1989.8 MHz) Band edge, reduced output power

dTRU Output 2, without internal combiner (CDU-G):
Diagram 3 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 4 Ch 810 (1989.8 MHz) Band edge, reduced output power

(TCC), dTRU Output 1+2 (TX1+TX2) (CDU-G):
Diagram 5 Ch 513 (1930.4 MHz) Band edge, maximum output power
Diagram 6 Ch 809 (1989.6 MHz) Band edge, maximum output power

dTRU Output 1, without internal combiner (CDU-F):
Diagram 7 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 8 Ch 513 (1930.4 MHz) Band edge, maximum output power
Diagram 9 Ch 809 (1989.6 MHz) Band edge, maximum output power
Diagram 10 Ch 810 (1989.8 MHz) Band edge, reduced output power

dTRU Output 2, without internal combiner (CDU-F):
Diagram 11 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 12 Ch 513 (1930.4 MHz) Band edge, maximum output power
Diagram 13 Ch 809 (1989.6 MHz) Band edge, maximum output power
Diagram 14 Ch 810 (1989.8 MHz) Band edge, reduced output power

Modulation: **8-PSK**

dTRU Output 1, without internal combiner (CDU-G):

Diagram 15 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 16 Ch 810 (1989.8 MHz) Band edge, reduced output power

dTRU Output 2, without internal combiner (CDU-G):

Diagram 17 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 18 Ch 810 (1989.8 MHz) Band edge, reduced output power

(TCC), dTRU Output 1+2 (TX1+TX2) (CDU-G):

Diagram 19 Ch 513 (1930.4 MHz) Band edge, maximum output power
Diagram 20 Ch 809 (1989.6 MHz) Band edge, maximum output power

dTRU Output 1, without internal combiner (CDU-F):

Diagram 21 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 22 Ch 513 (1930.4 MHz) Band edge, maximum output power
Diagram 23 Ch 809 (1989.6 MHz) Band edge, maximum output power
Diagram 24 Ch 810 (1989.8 MHz) Band edge, reduced output power

dTRU Output 2, without internal combiner (CDU-F):

Diagram 25 Ch 512 (1930.2 MHz) Band edge, reduced output power
Diagram 26 Ch 513 (1930.4 MHz) Band edge, maximum output power
Diagram 27 Ch 809 (1989.6 MHz) Band edge, maximum output power
Diagram 28 Ch 810 (1989.8 MHz) Band edge, reduced output power

Remarks

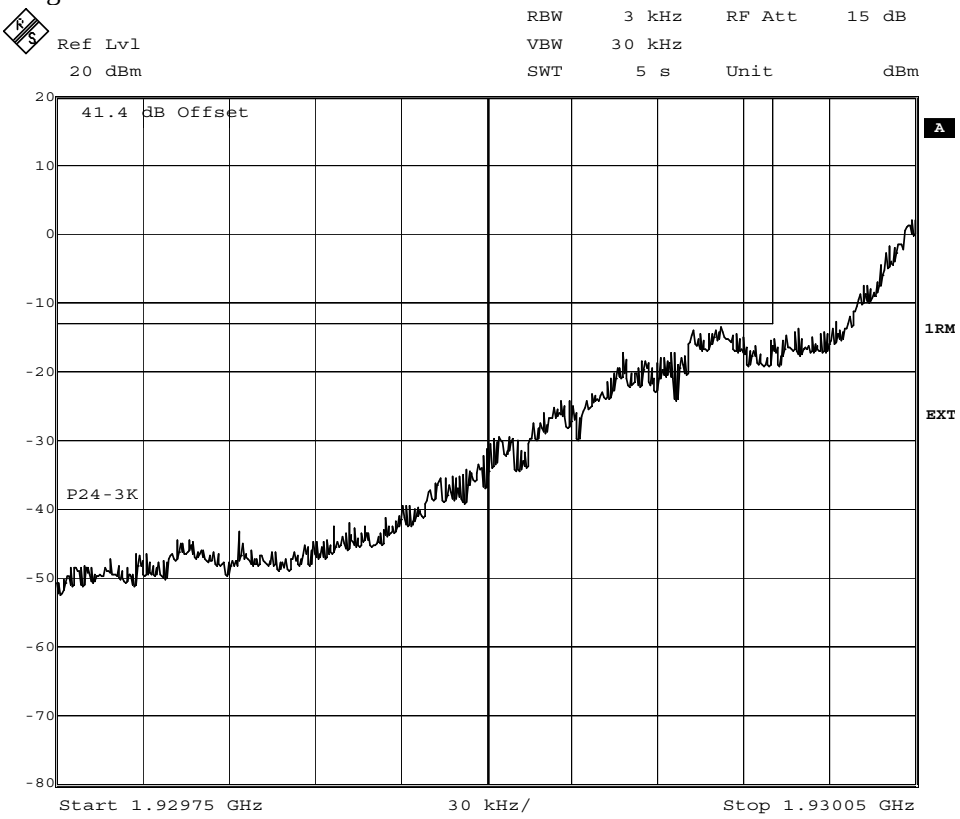
The maximum output power that can be used on the channels adjacent to the frequency band edges (channel 512 and 810) are 37.8 dBm in order to comply with CDU-G and 37.4 dBm (GMSK) and (8-PSK) in to comply with CDU-F.

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


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 11.JUN.2008 16:49:23

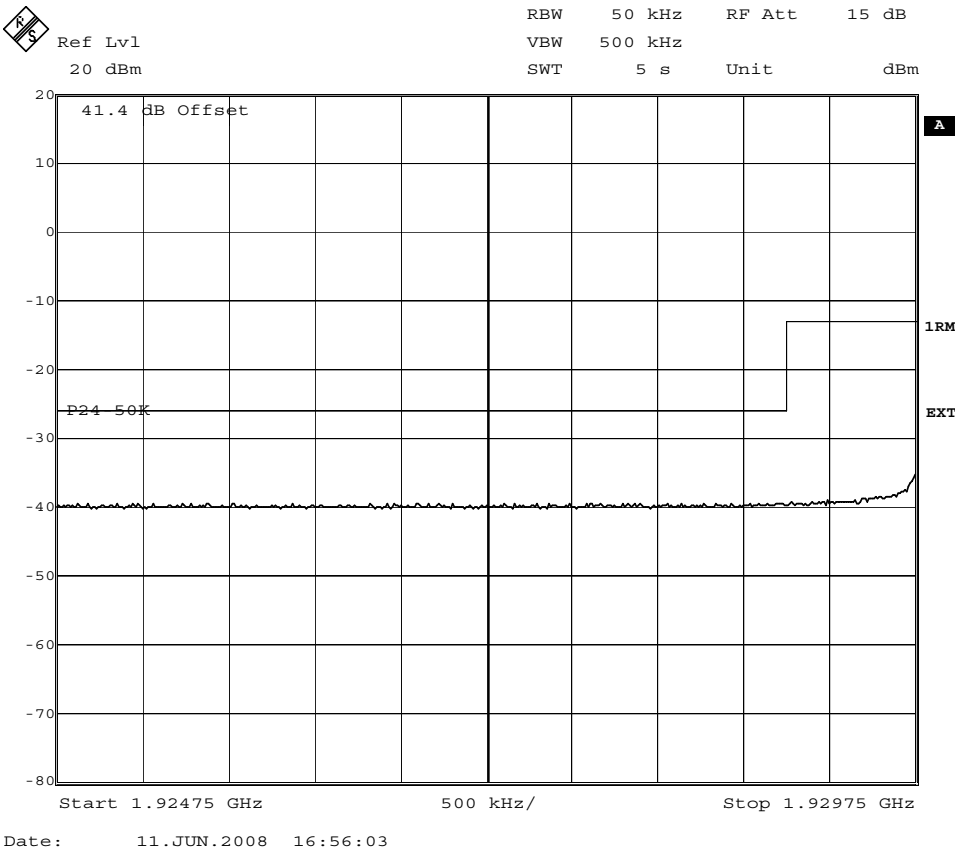
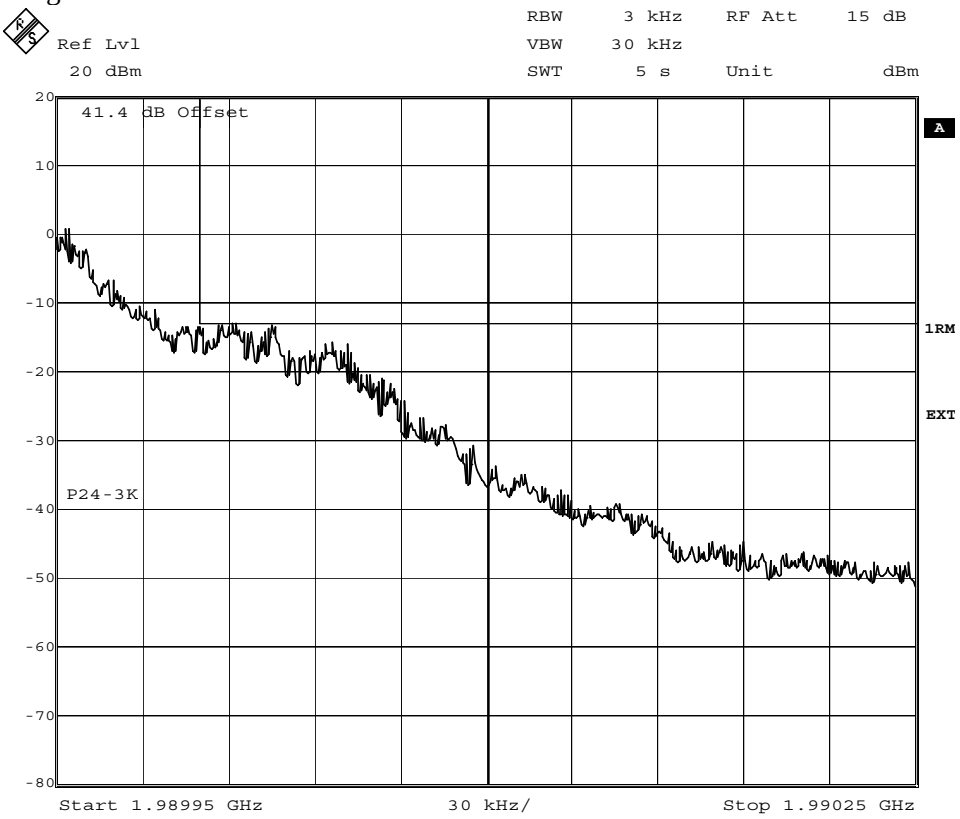

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 11.JUN.2008 16:56:03

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
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 09:50:36

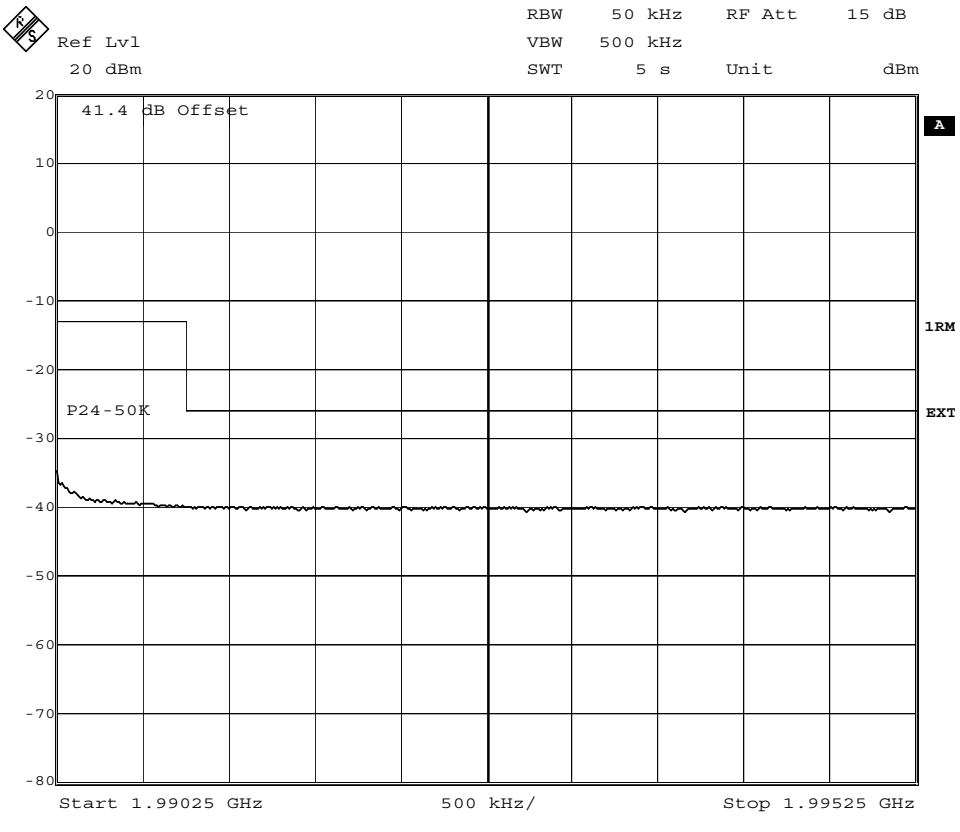
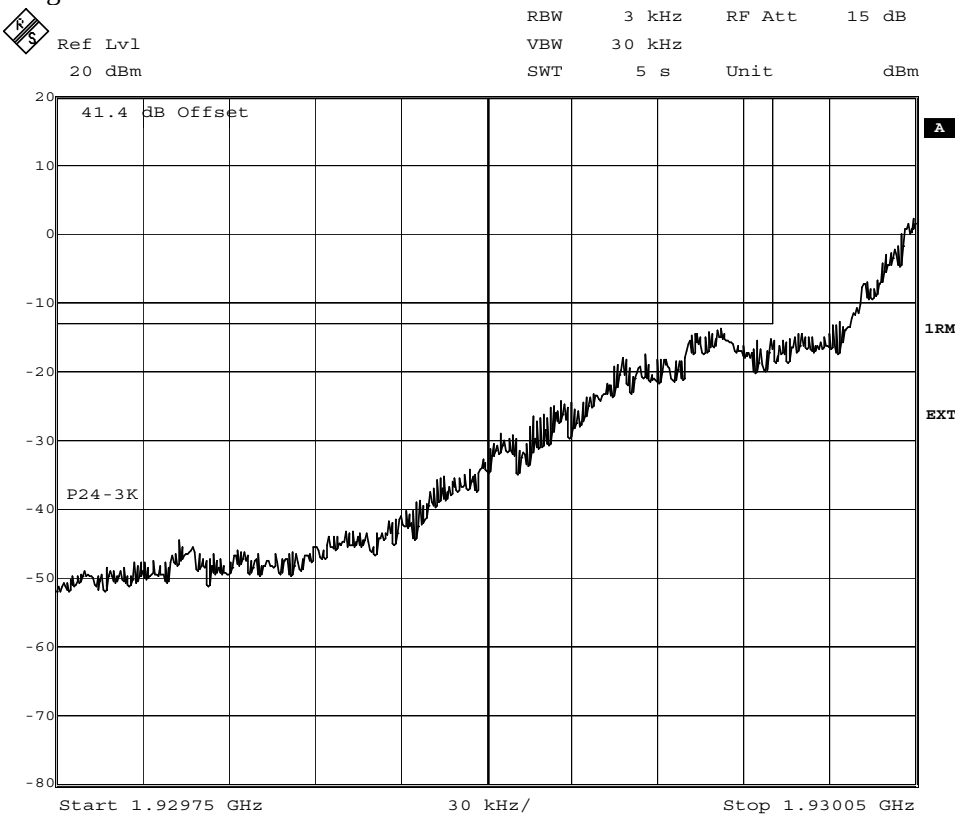

RBW 50 kHz
RF Att 15 dB
VBW 500 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 09:51:16

Diagram 3


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 10:51:15

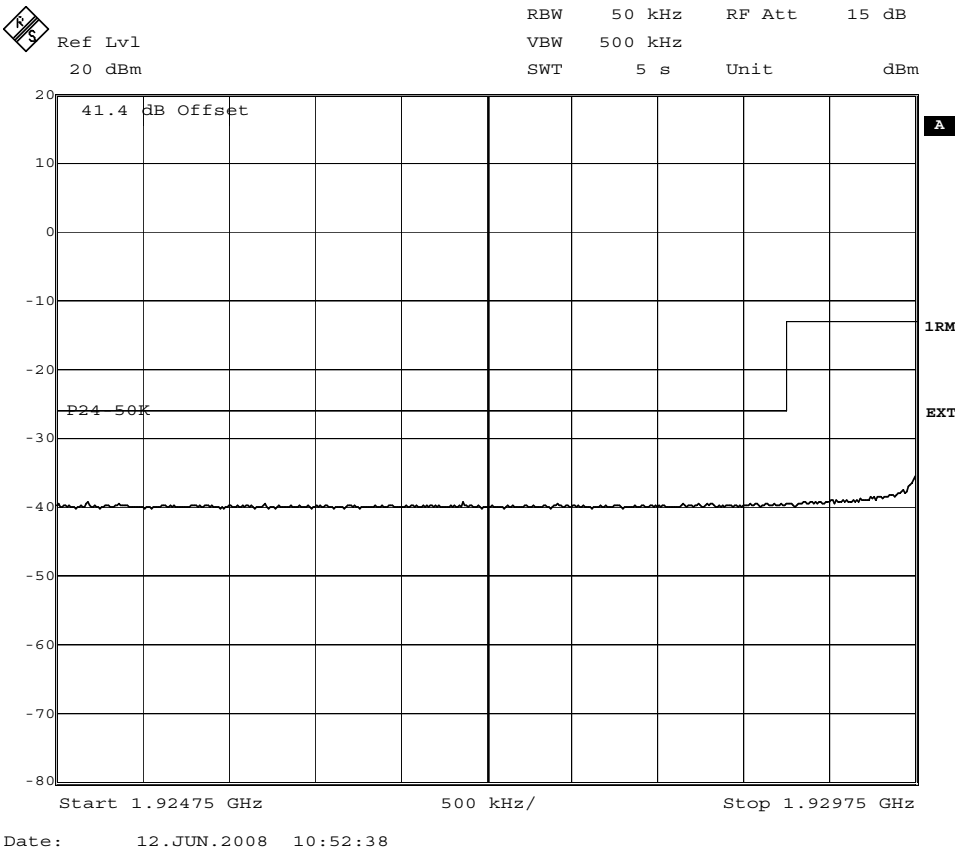
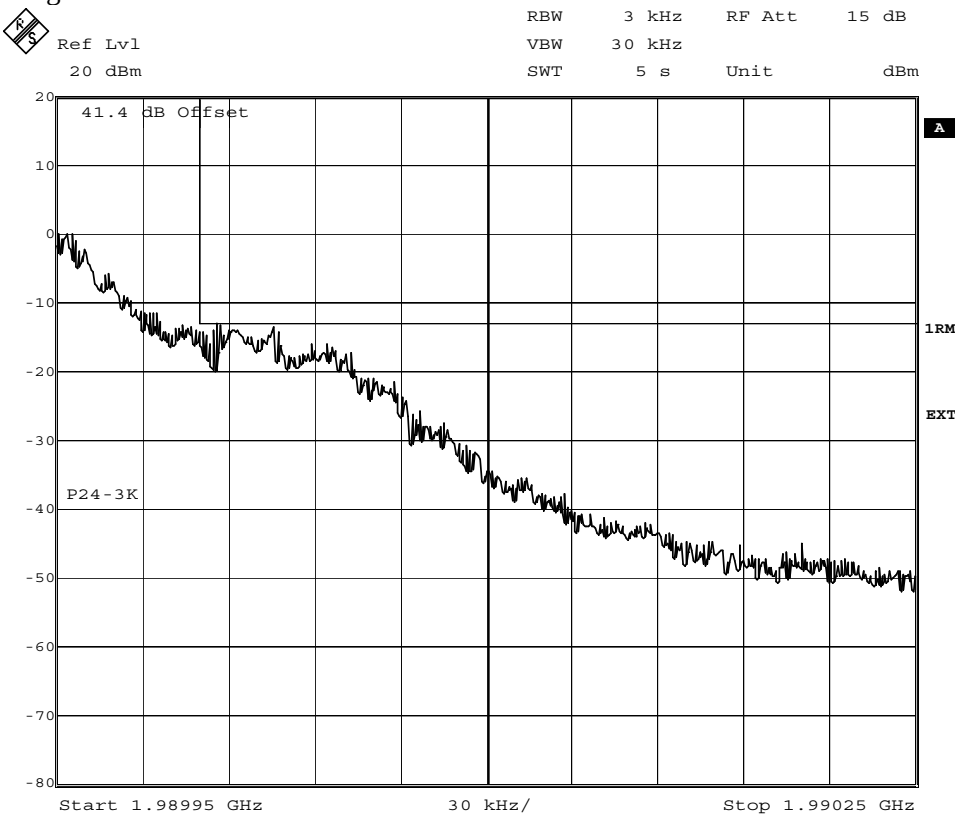

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 10:52:38

Diagram 4


Ref Lvl
20 dBm
RBW 3 kHz
VBW 30 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 10:57:09

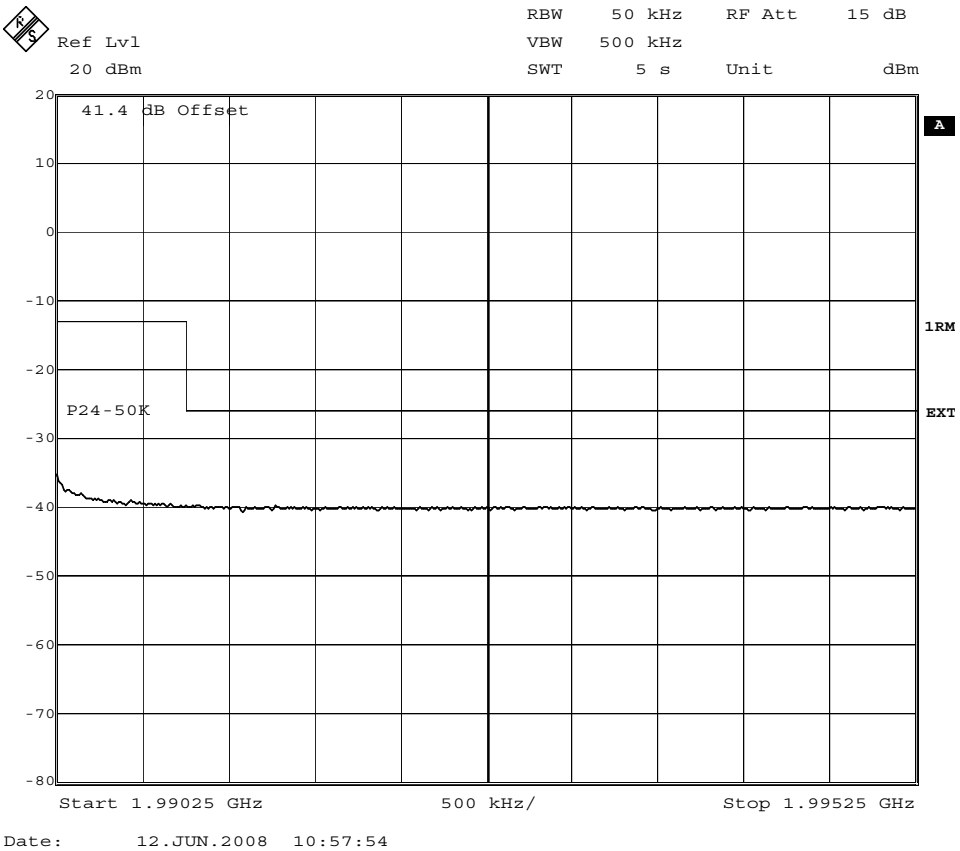
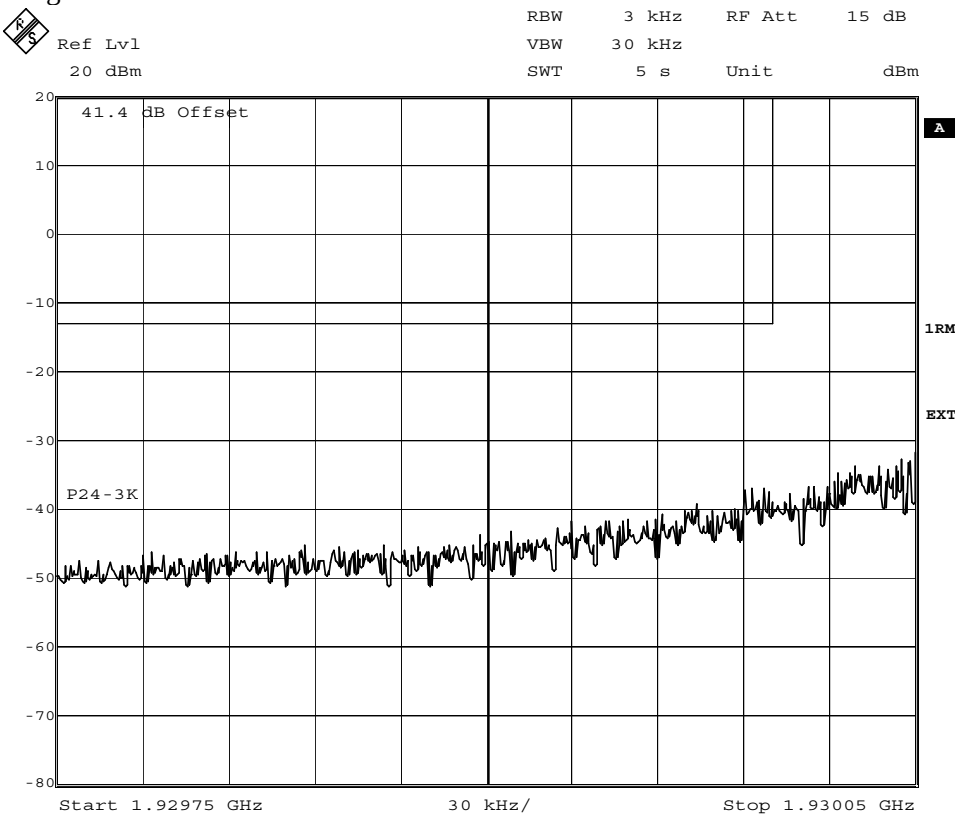
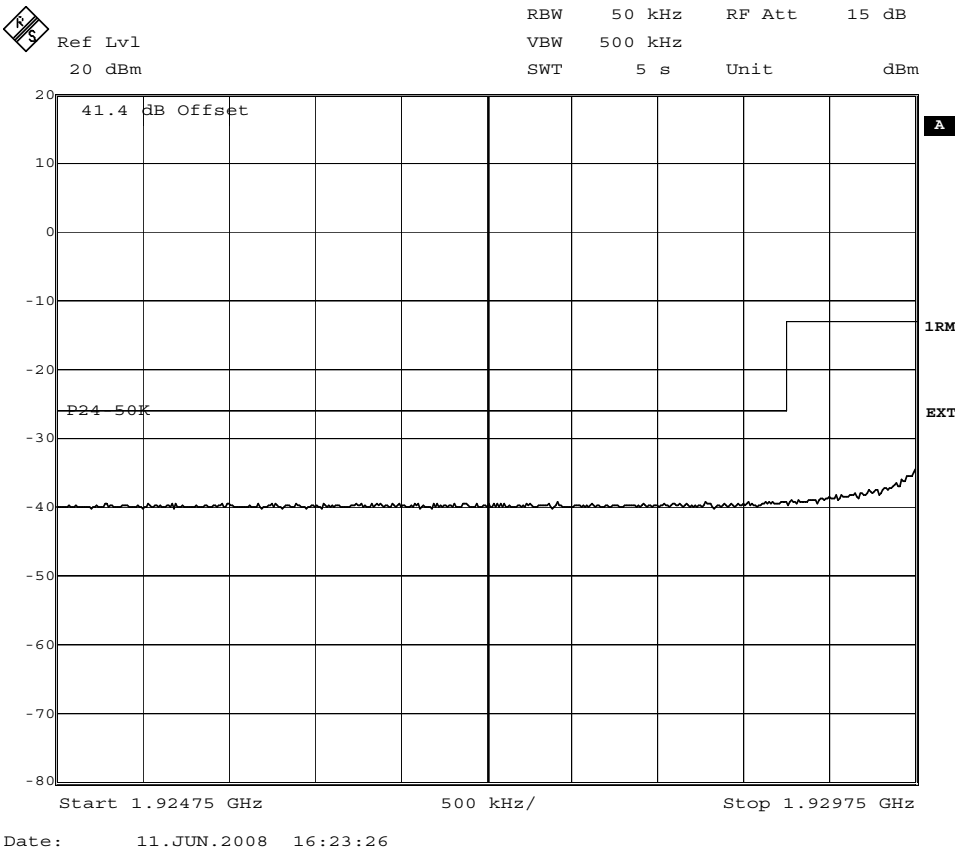

Ref Lvl
20 dBm
RBW 50 kHz
VBW 500 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 10:57:54

Diagram 5


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 11.JUN.2008 16:22:24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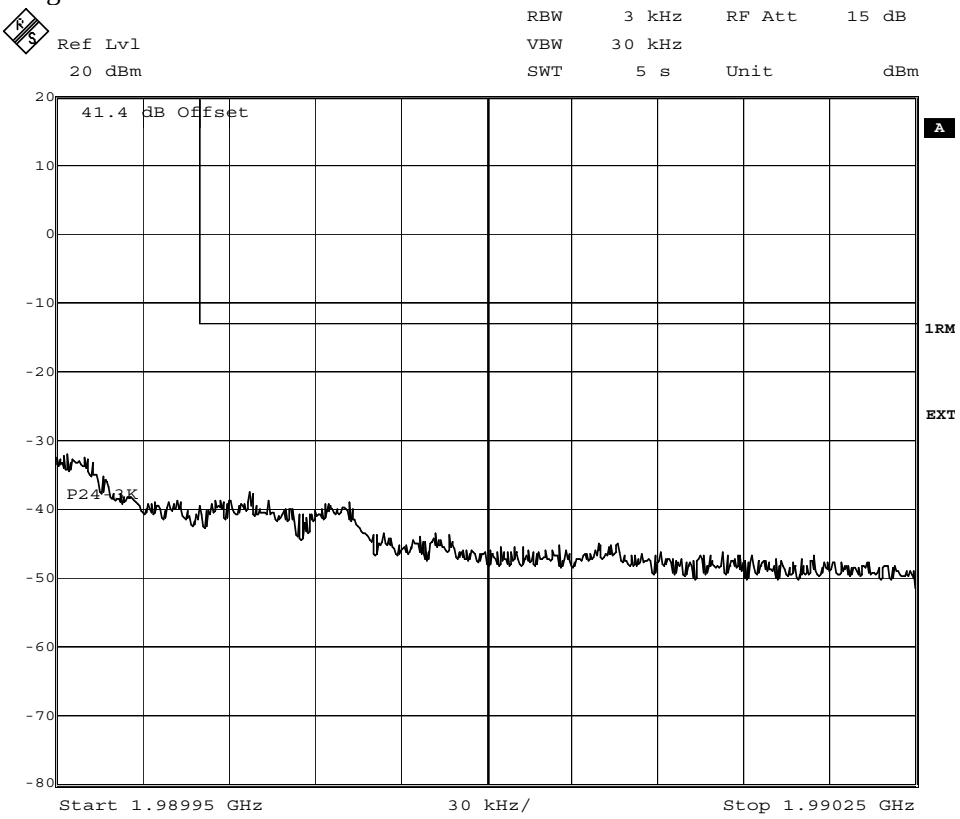
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 11.JUN.2008 16:23:26

Diagram 6


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 11.JUN.2008 16:29:09

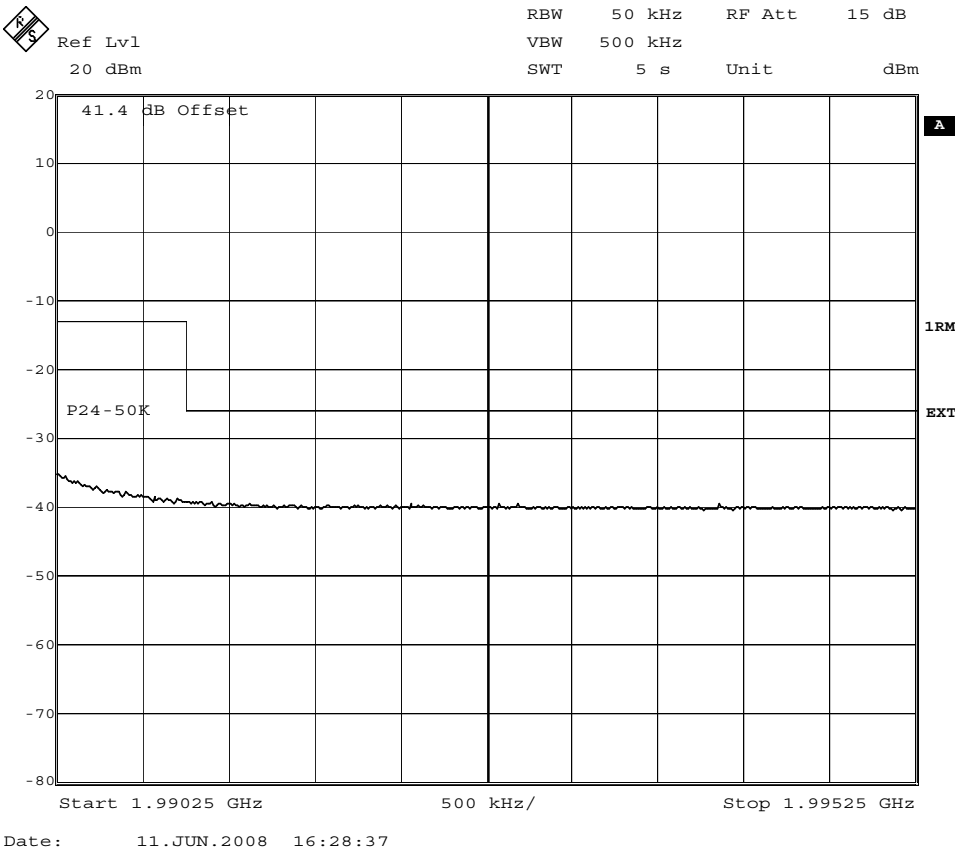
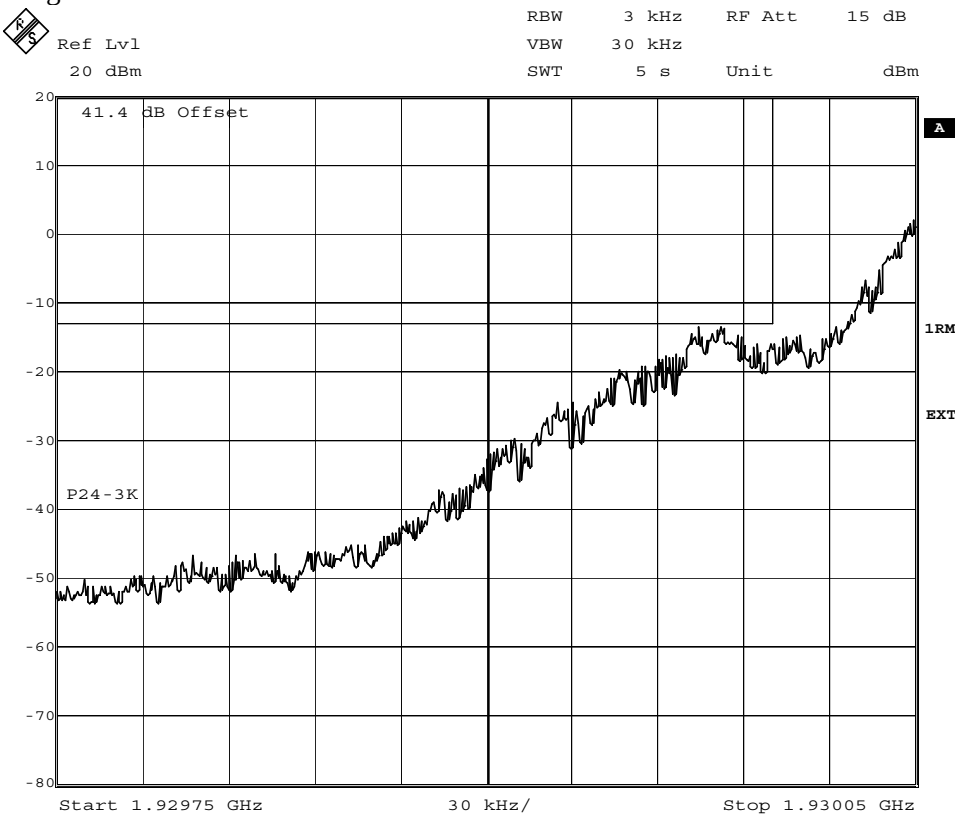

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 11.JUN.2008 16:28:37

Diagram 7


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 13:27:59

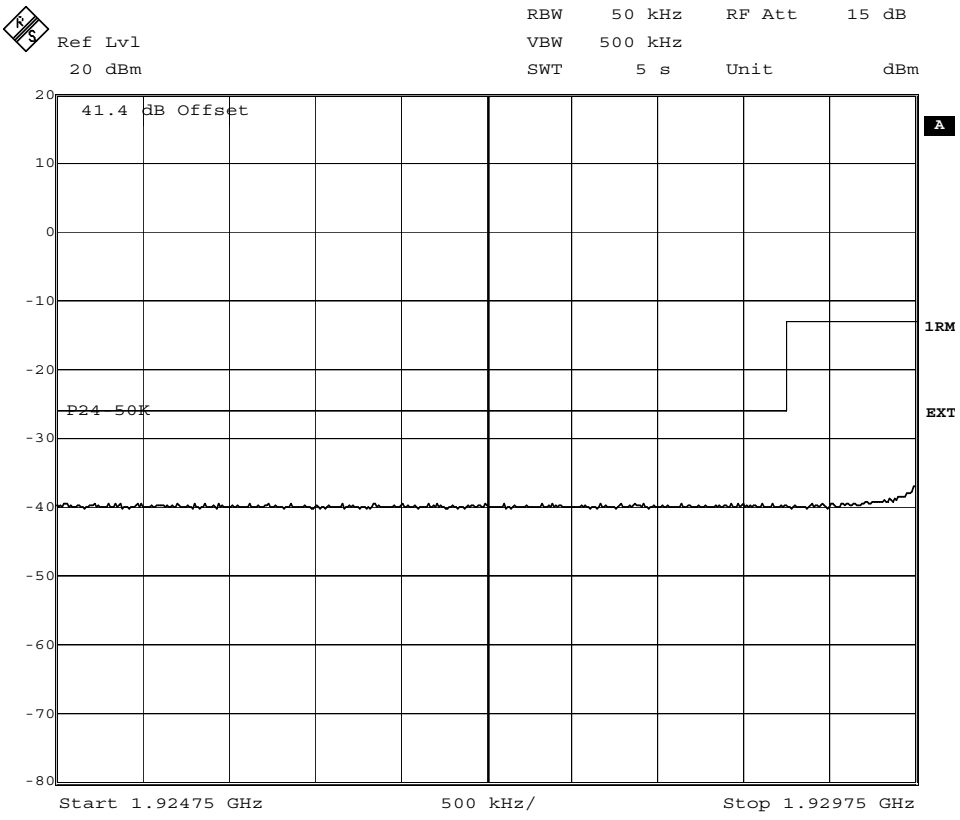
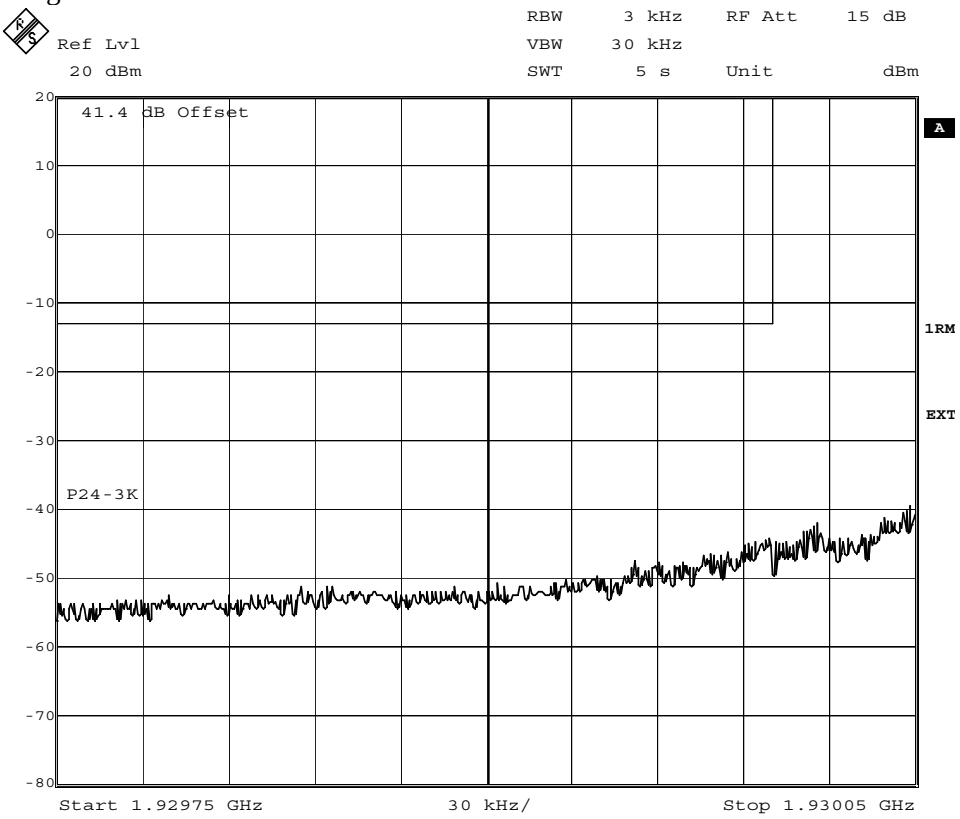

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 13:28:41

Diagram 8


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 14:04:32

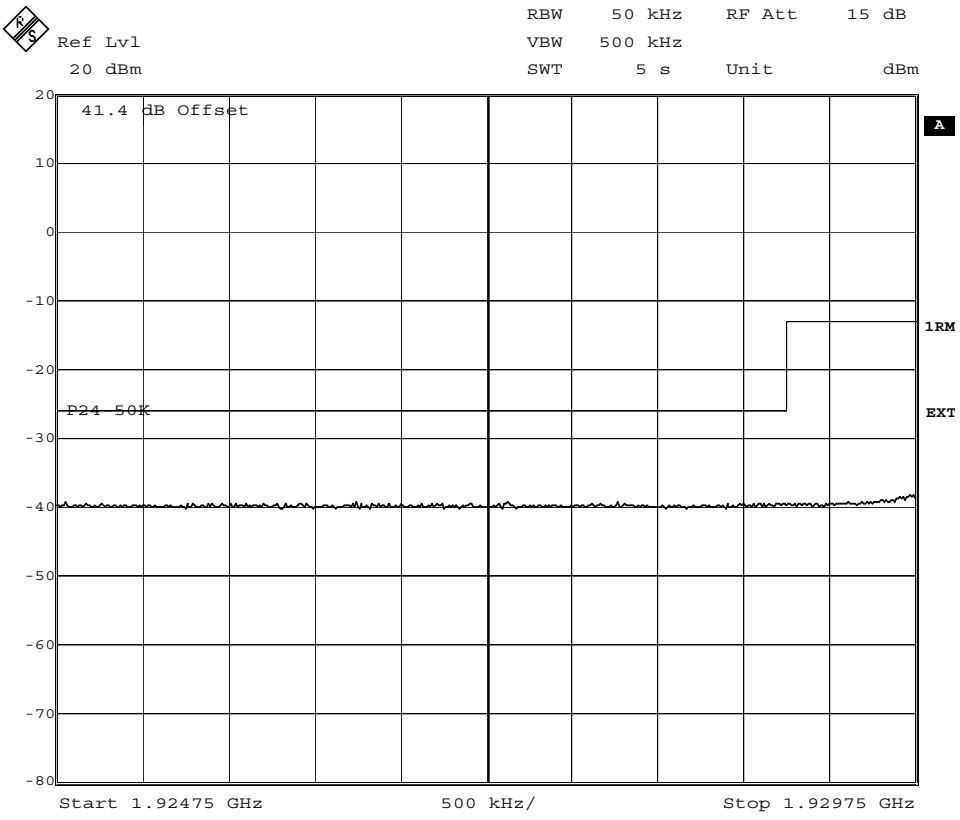
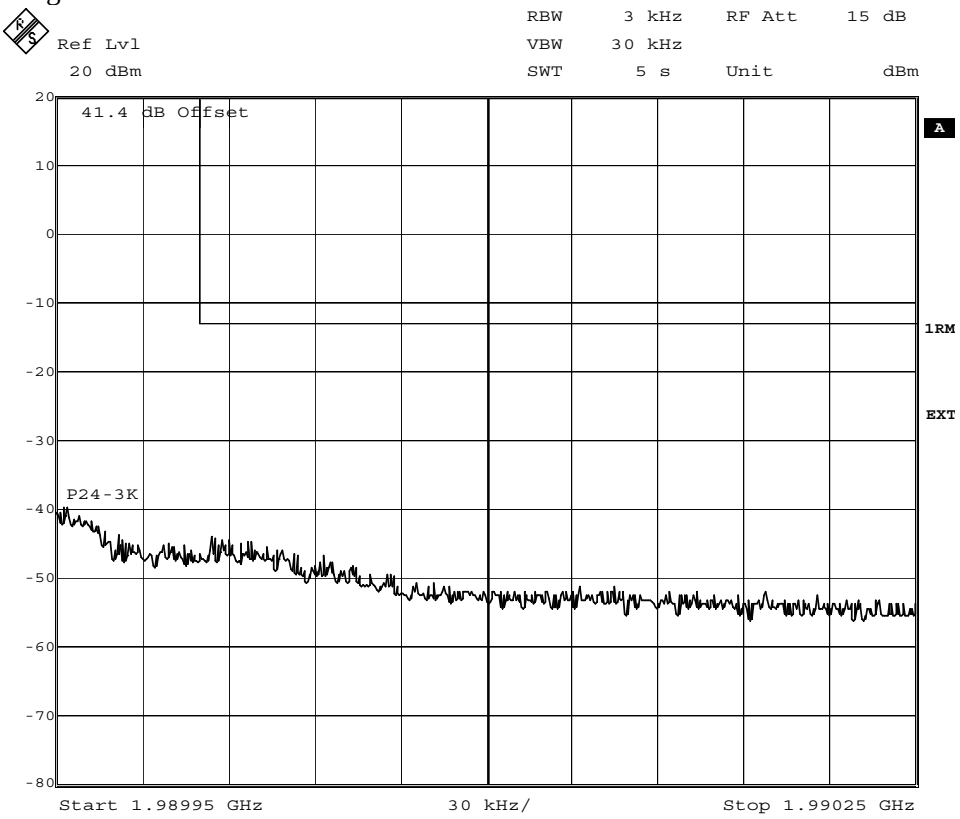

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 14:05:01

Diagram 9


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:48:11

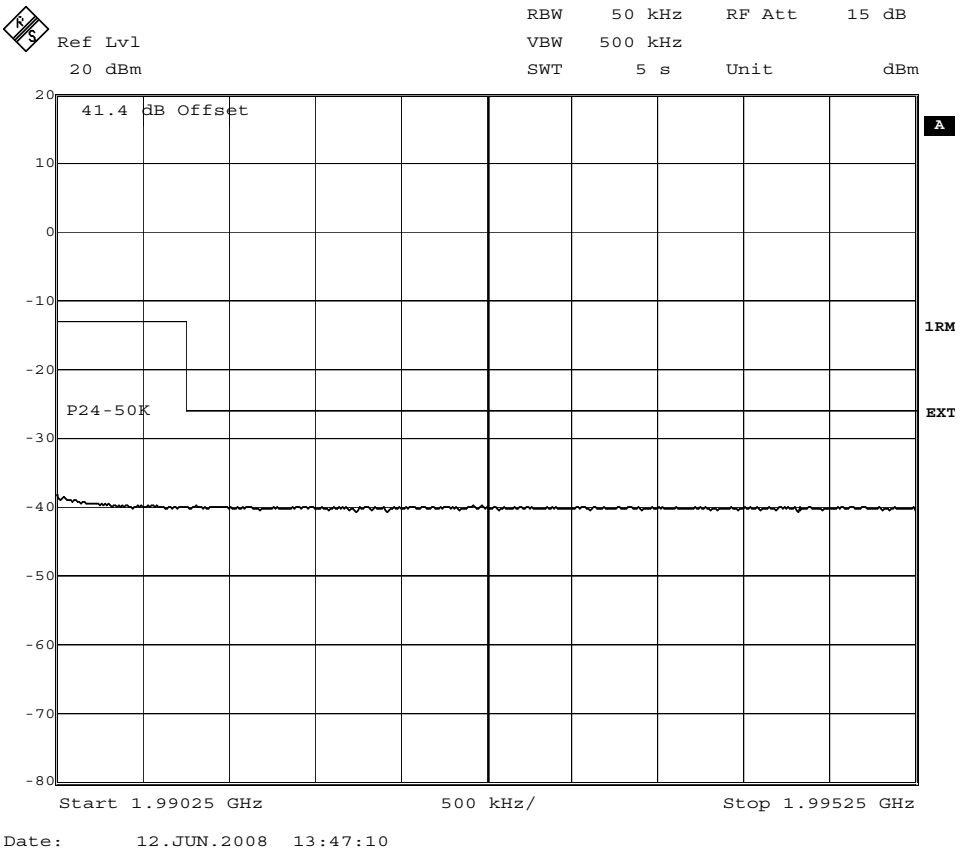
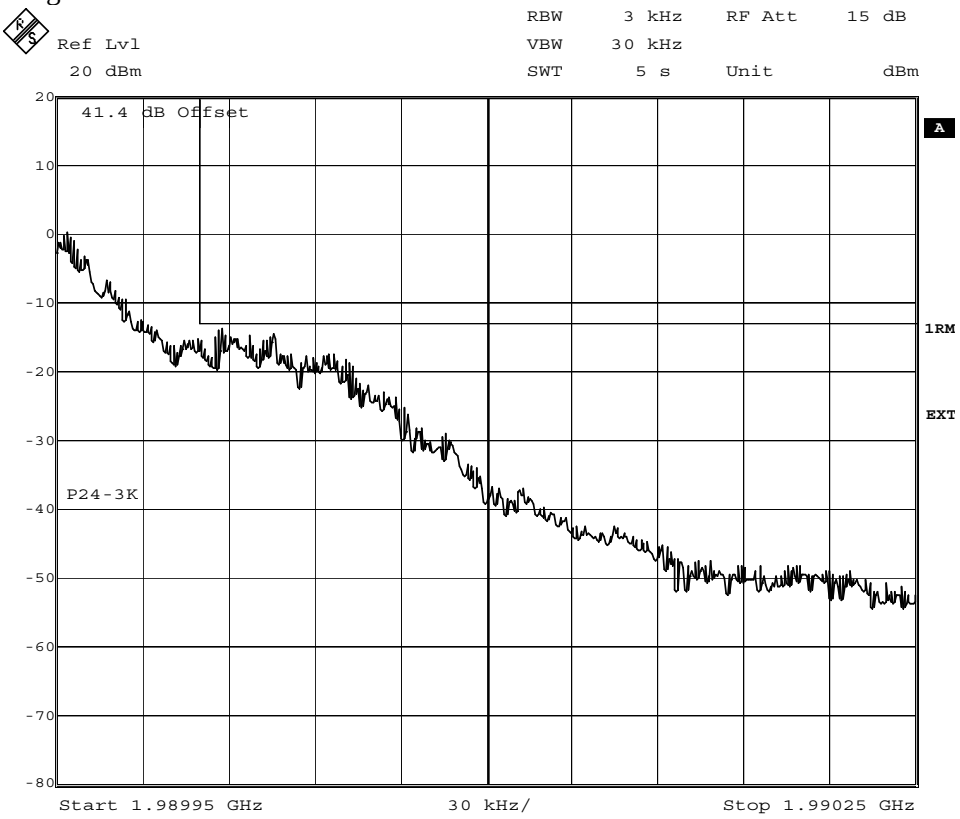
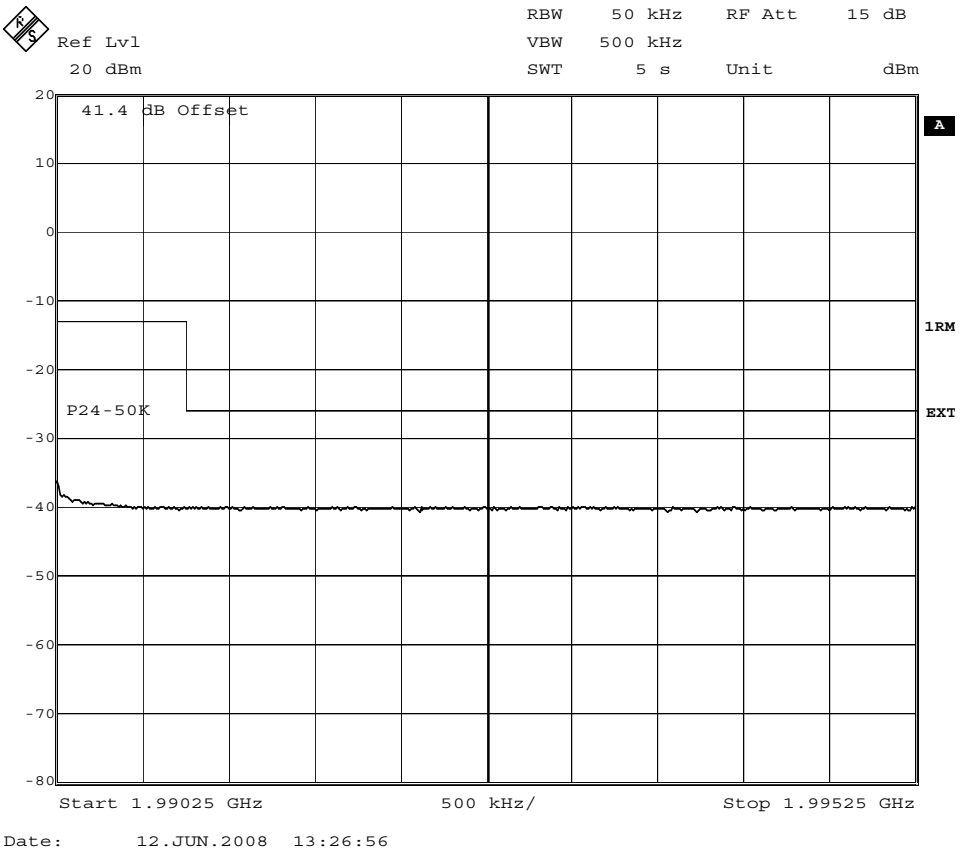

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:47:10

Diagram 10


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:25:42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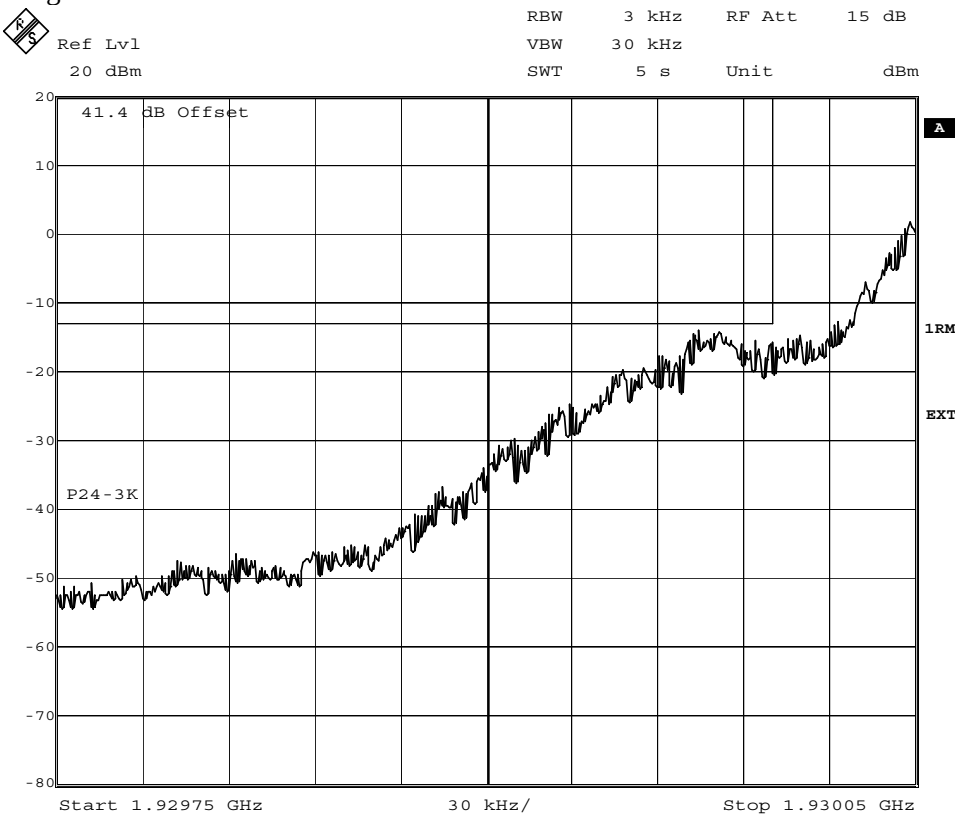
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:26:56

Diagram 11


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 13:30:34

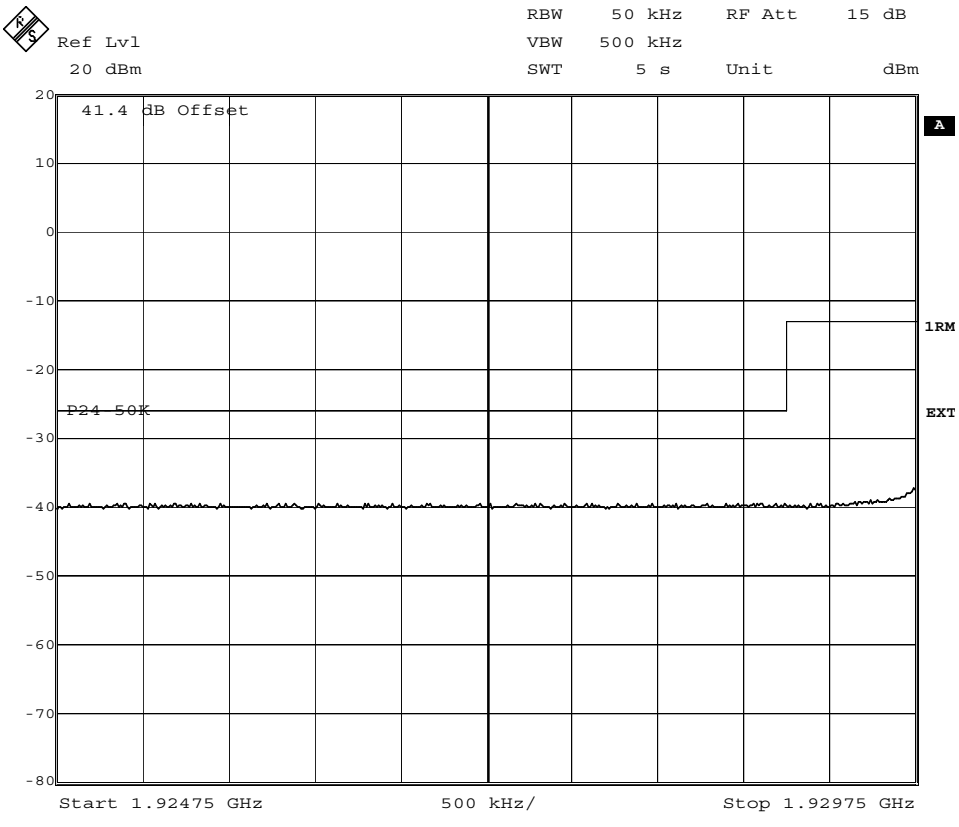
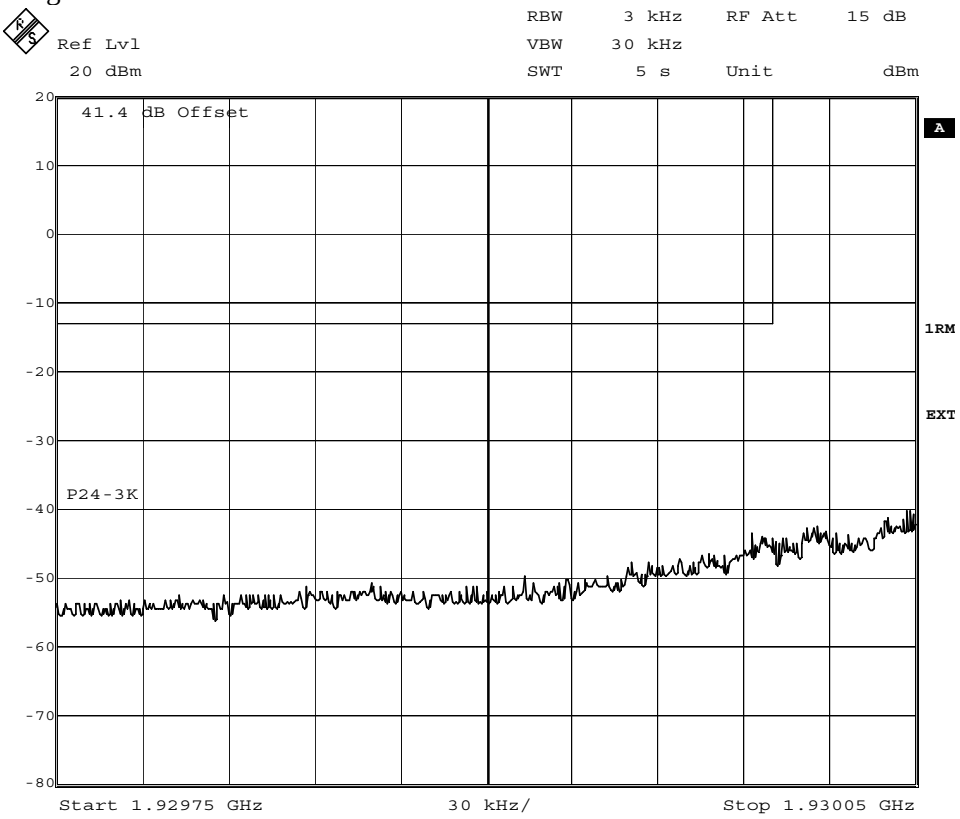
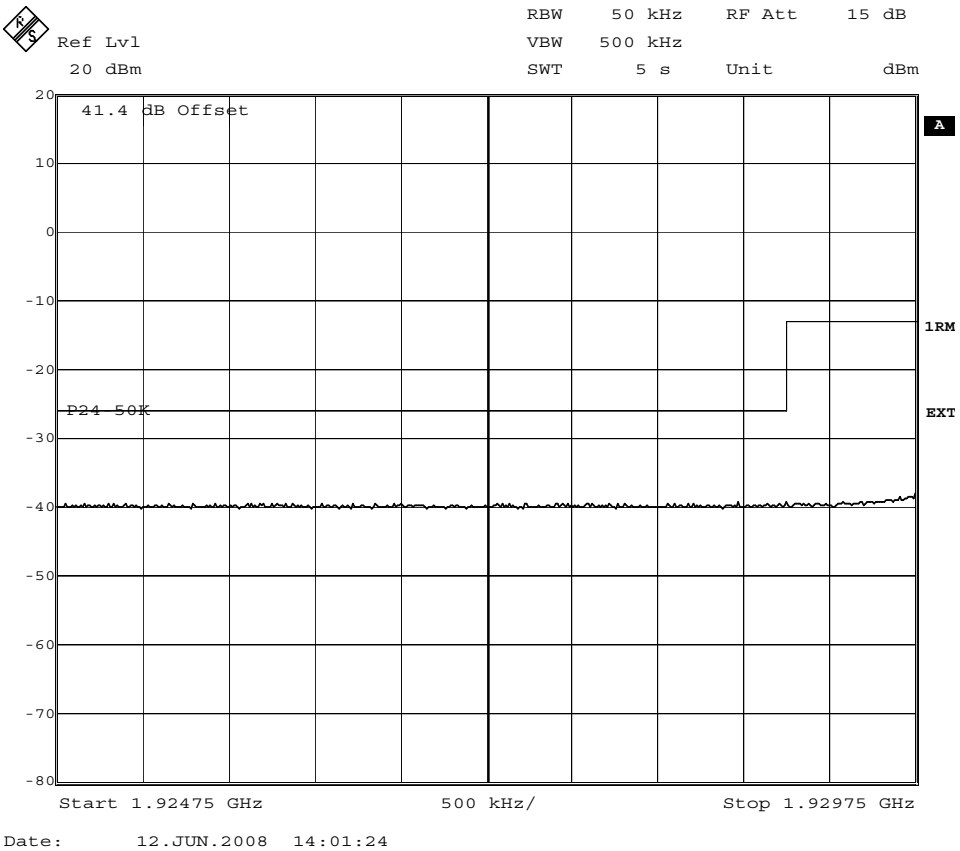

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 13:29:46

Diagram 12


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 14:00:33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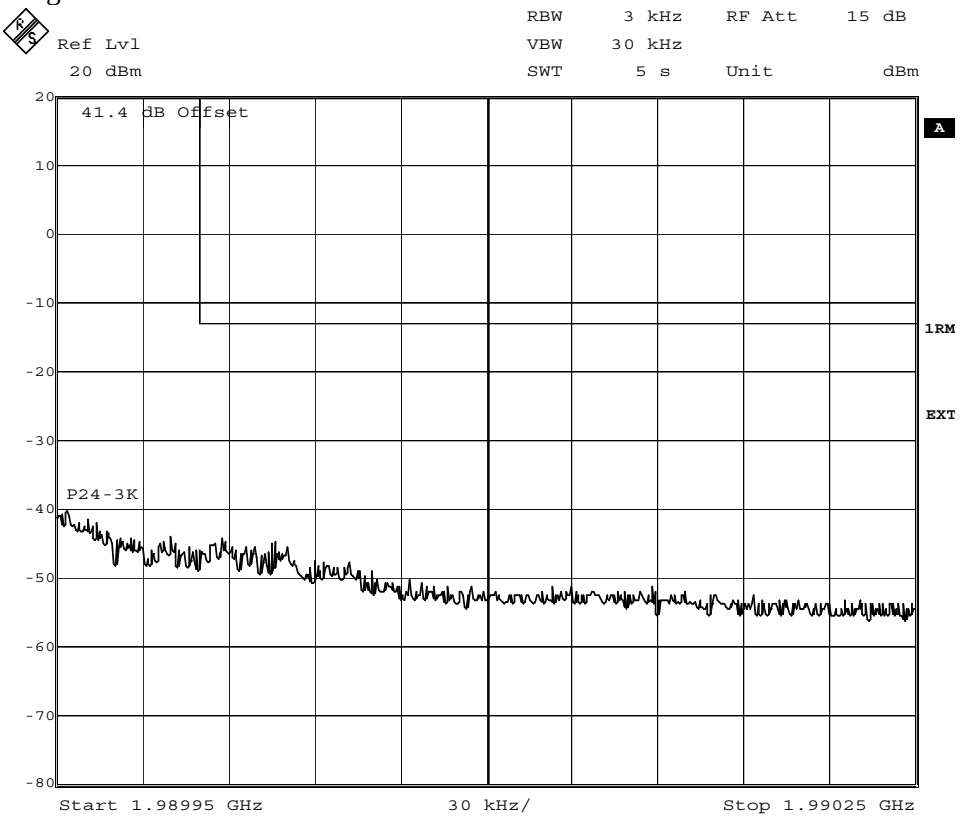
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 14:01:24

Diagram 13


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:49:19

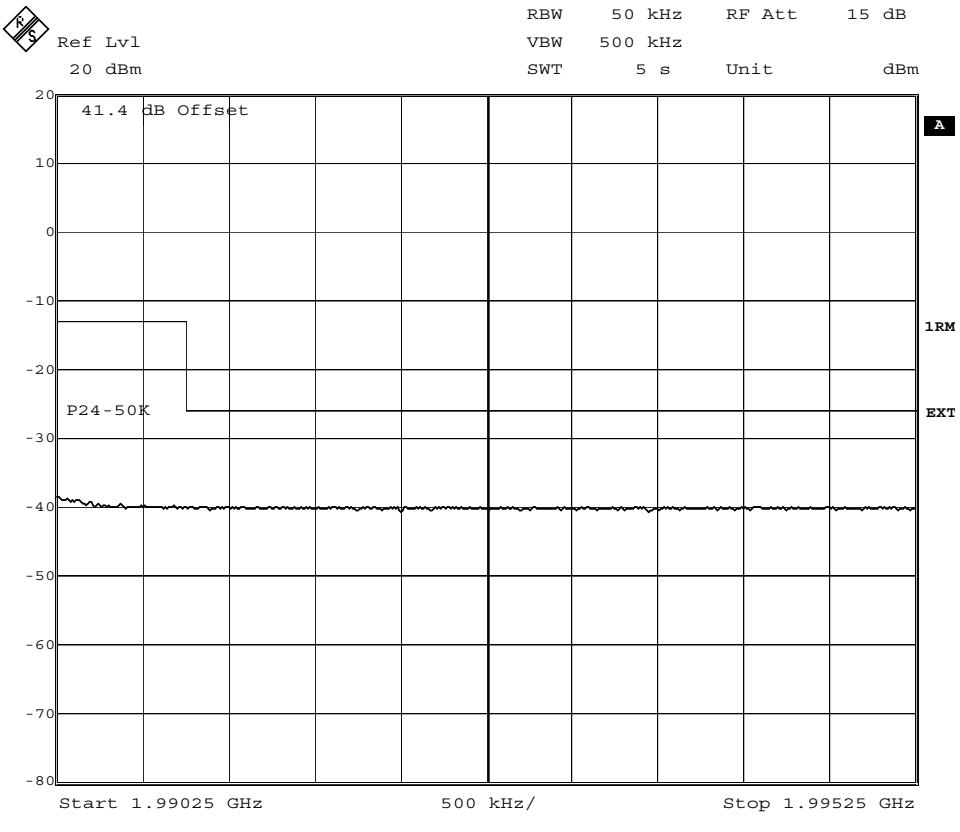
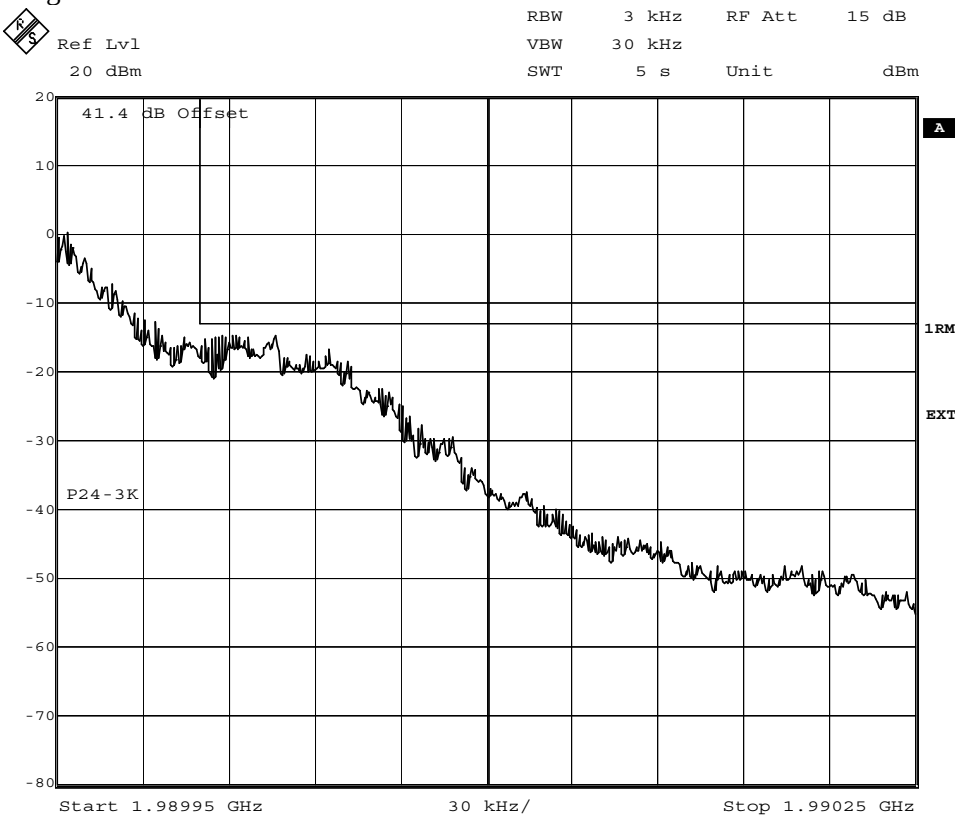

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:49:57

Diagram 14


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:16:16

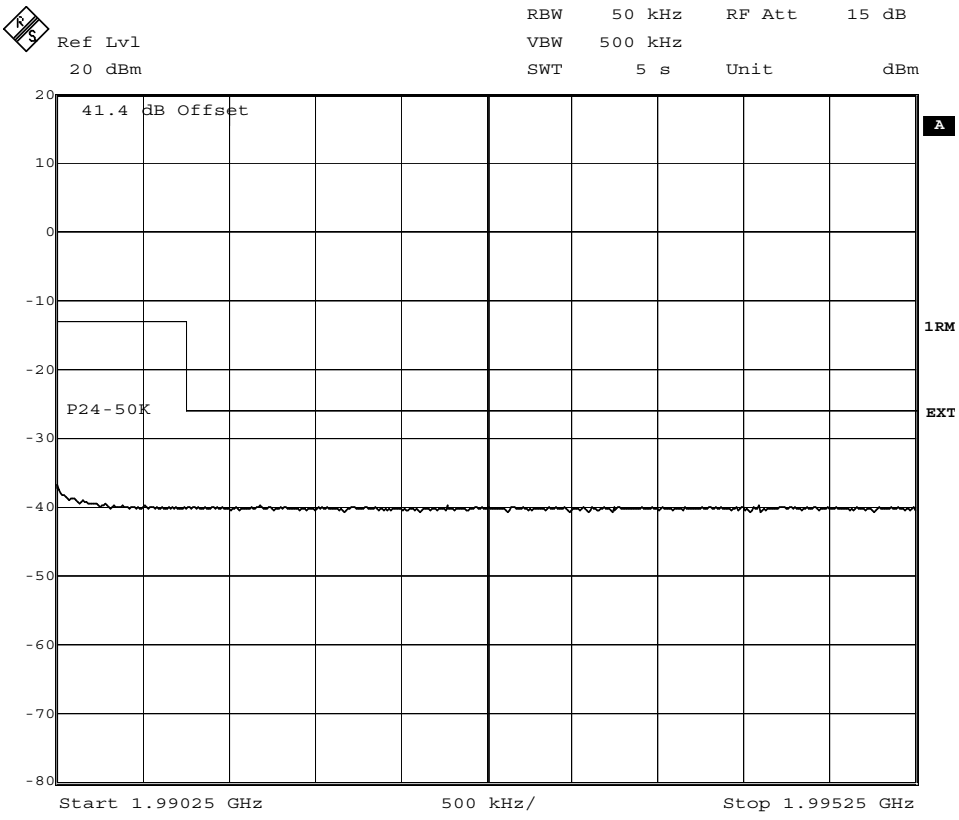
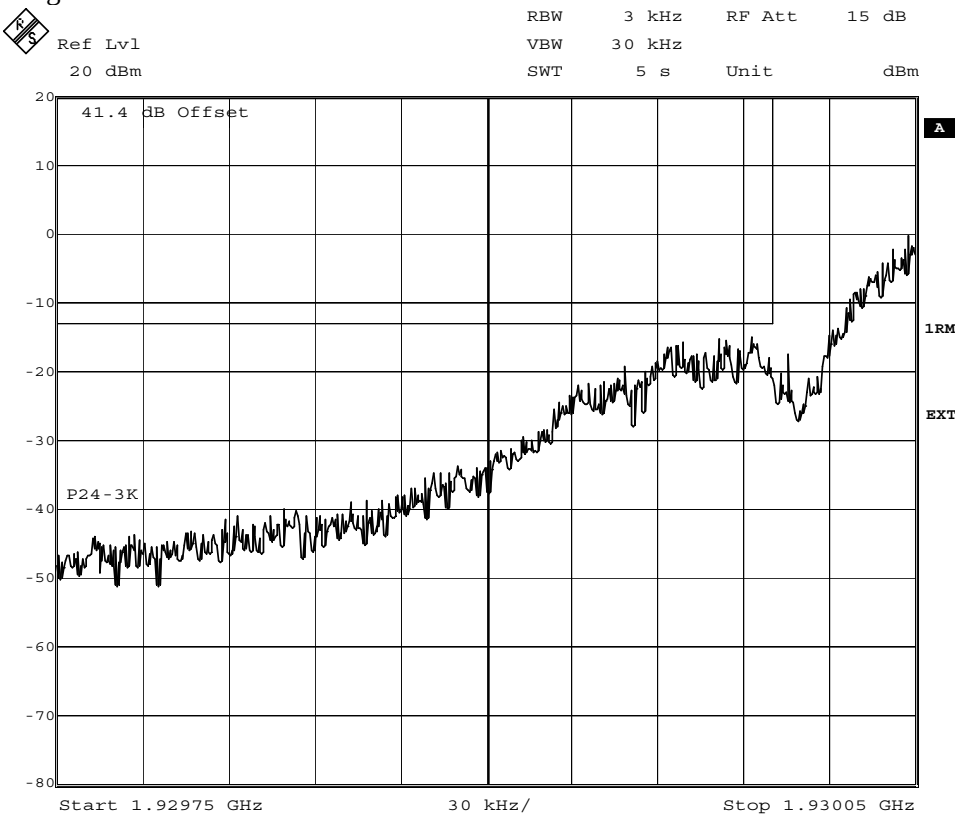

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:17:16

Diagram 15


Ref Lvl
20 dBm
RBW 3 kHz
VBW 30 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 11.JUN.2008 16:53:23

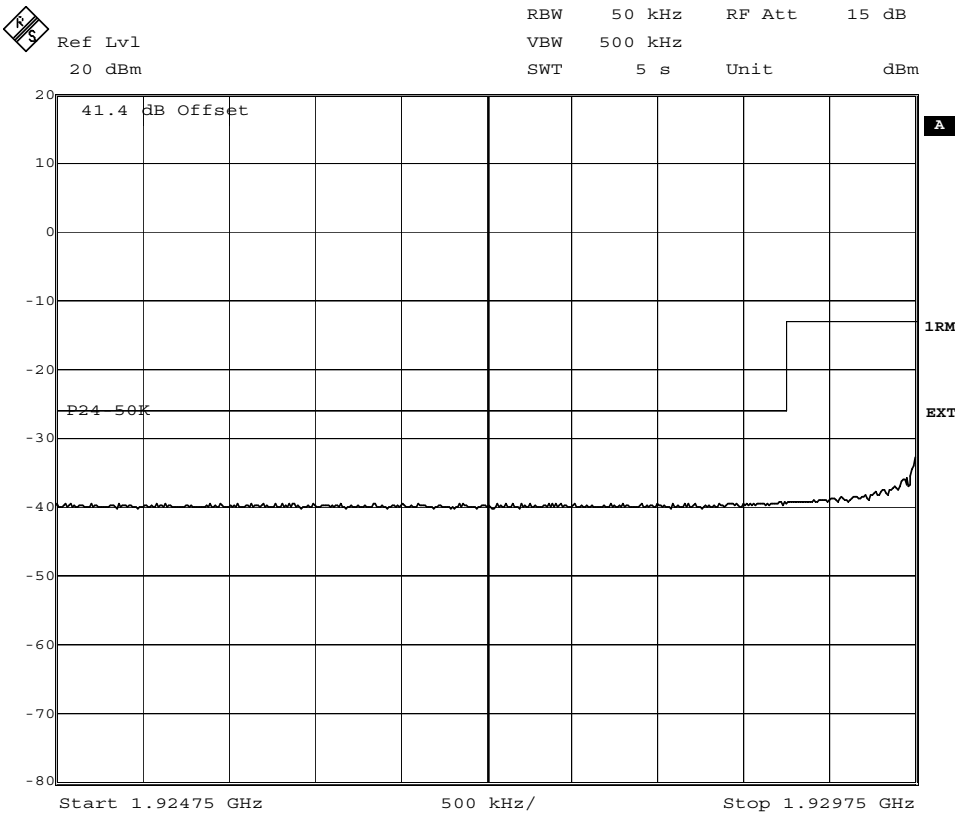
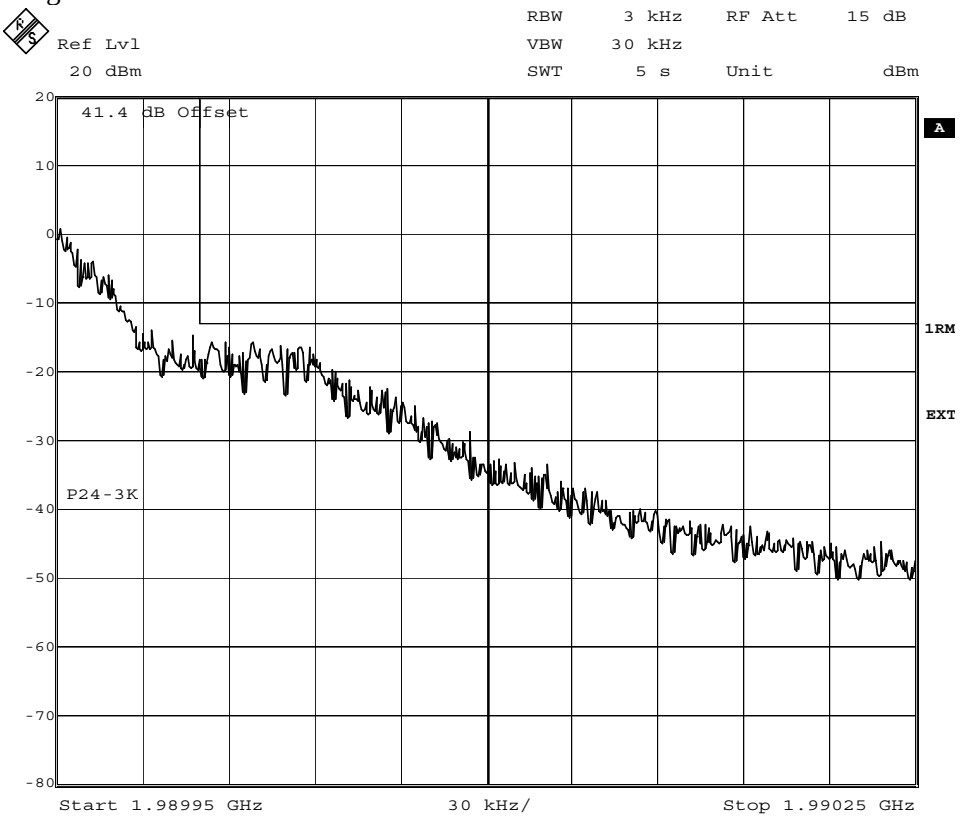

Ref Lvl
20 dBm
RBW 50 kHz
VBW 500 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24 50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 11.JUN.2008 16:52:27

Diagram 16


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 09:52:45

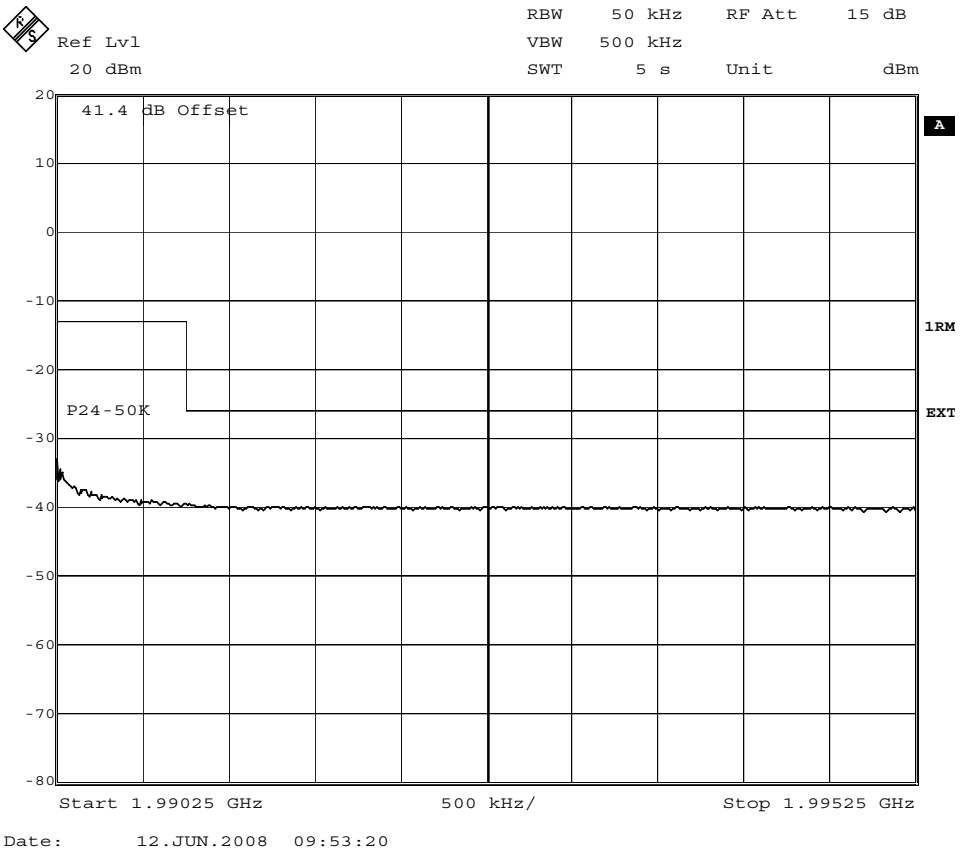
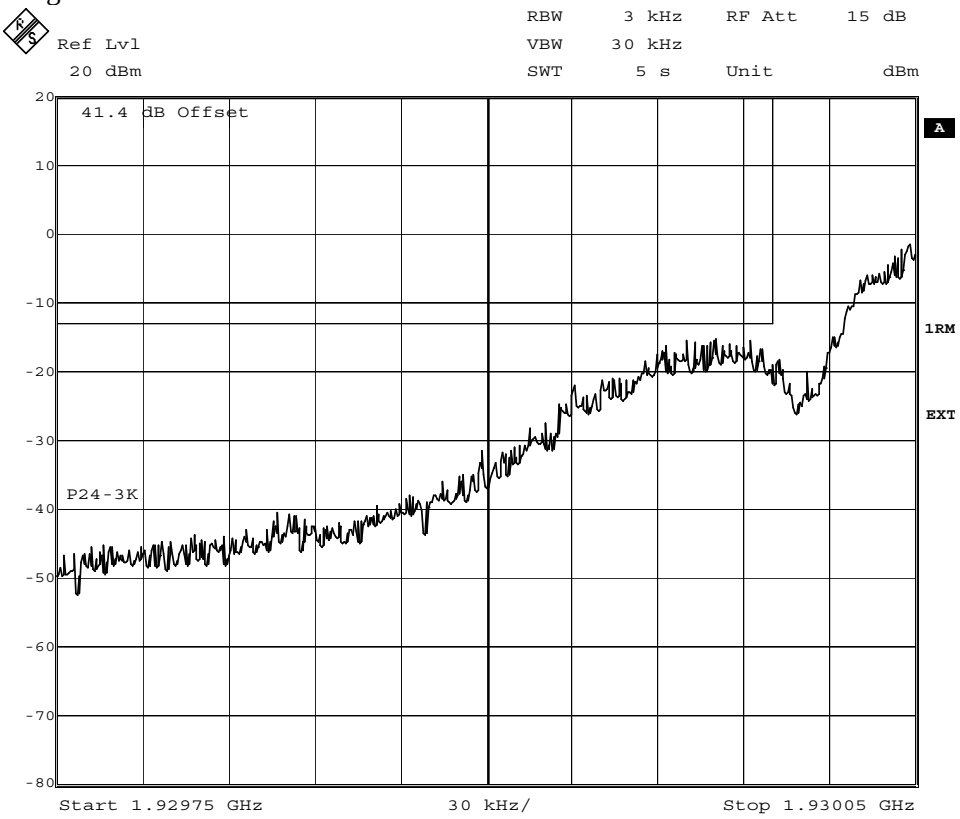

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 09:53:20

Diagram 17


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
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 11:01:15

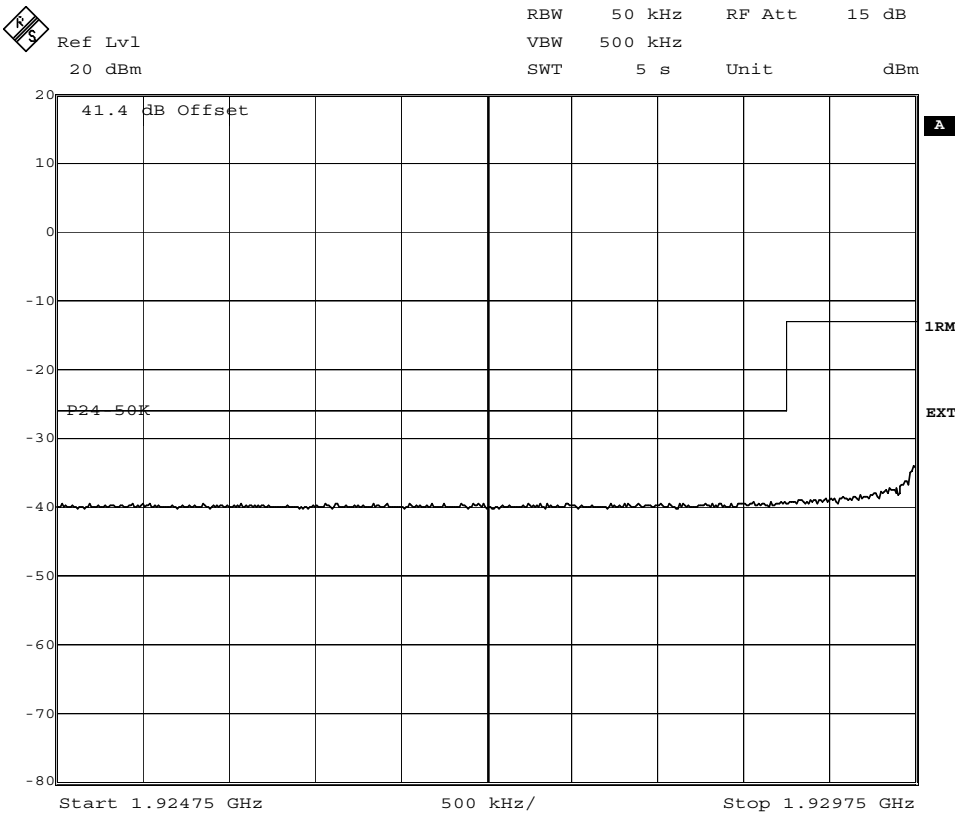
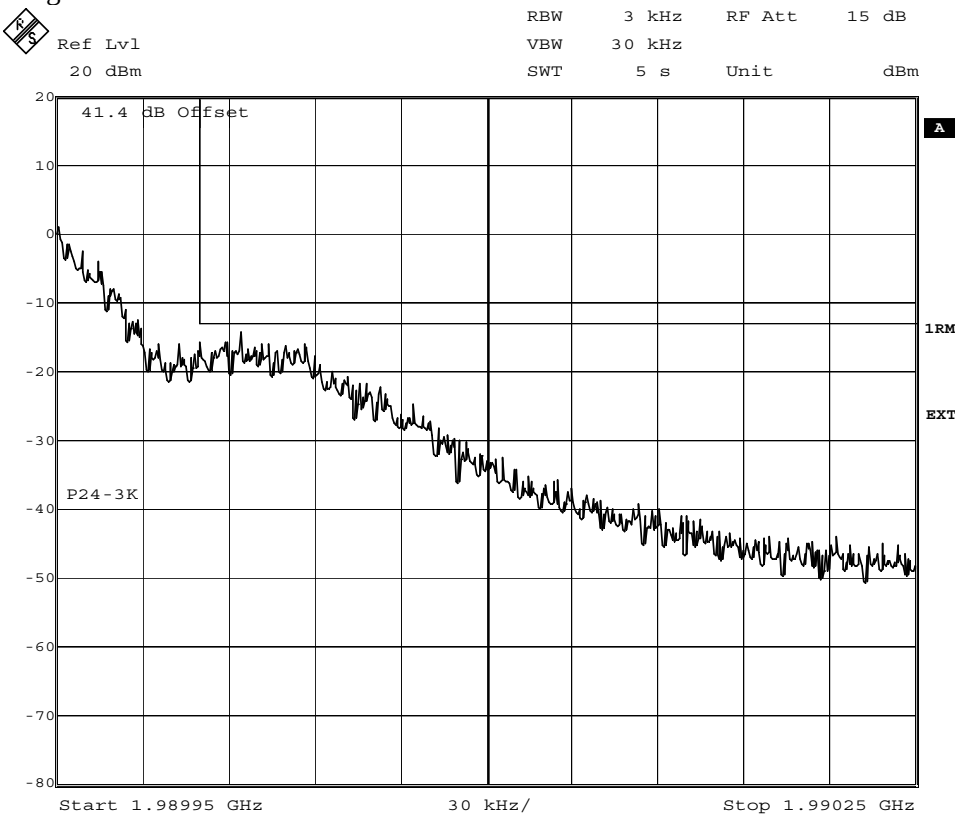

RBW 50 kHz
RF Att 15 dB
VBW 500 kHz
Ref Lvl
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 11:02:03

Diagram 18


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 11:00:11

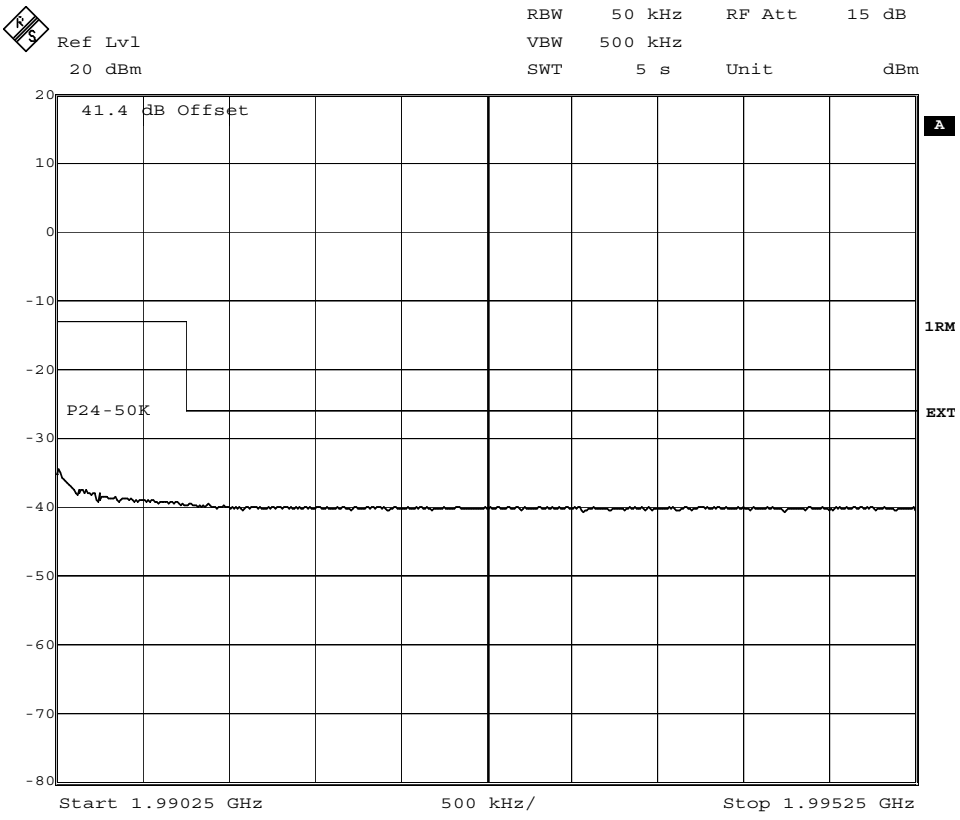
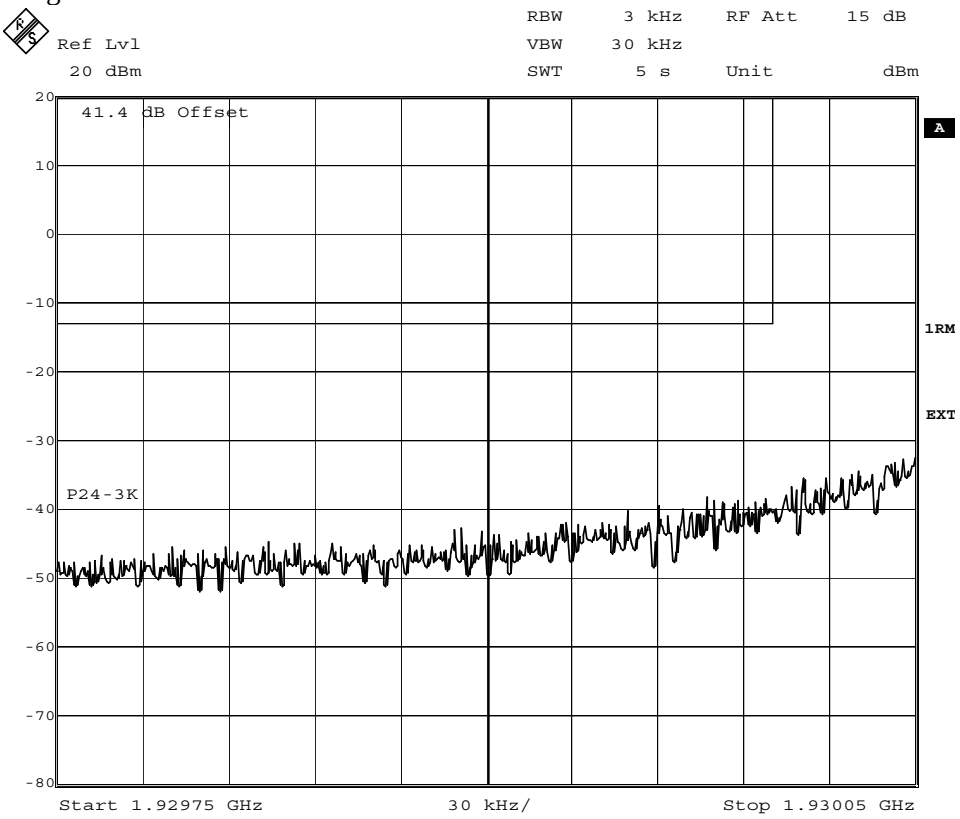

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 10:59:09

Diagram 19


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 11.JUN.2008 16:26:09

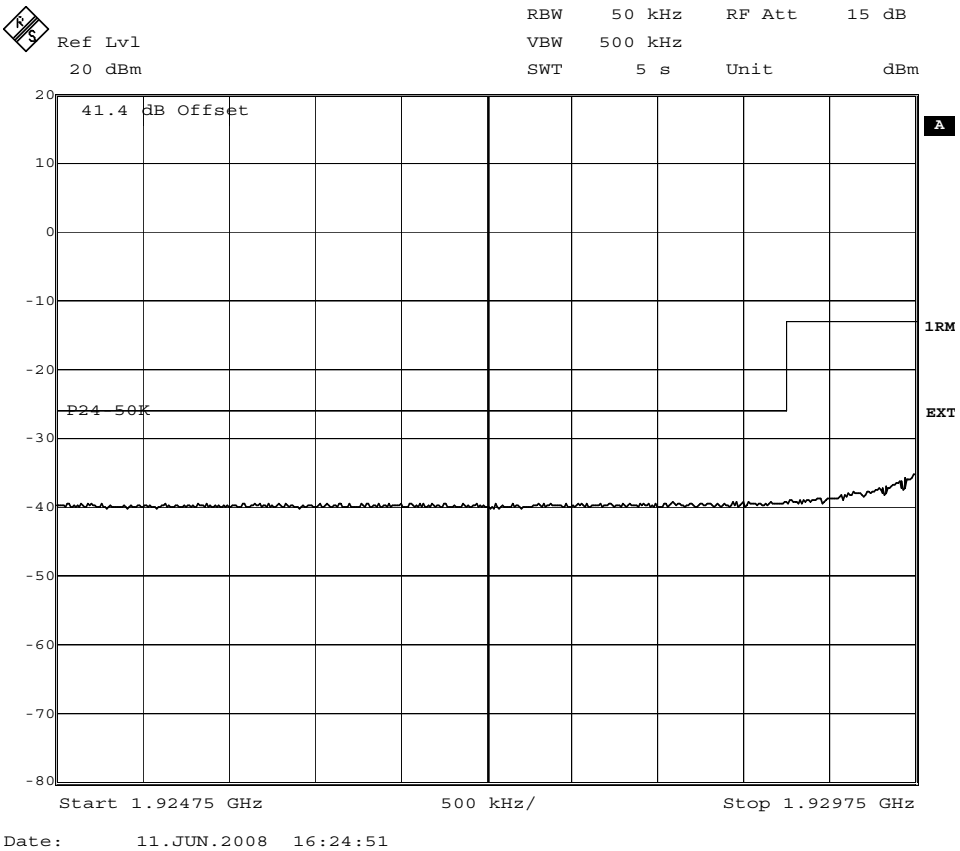
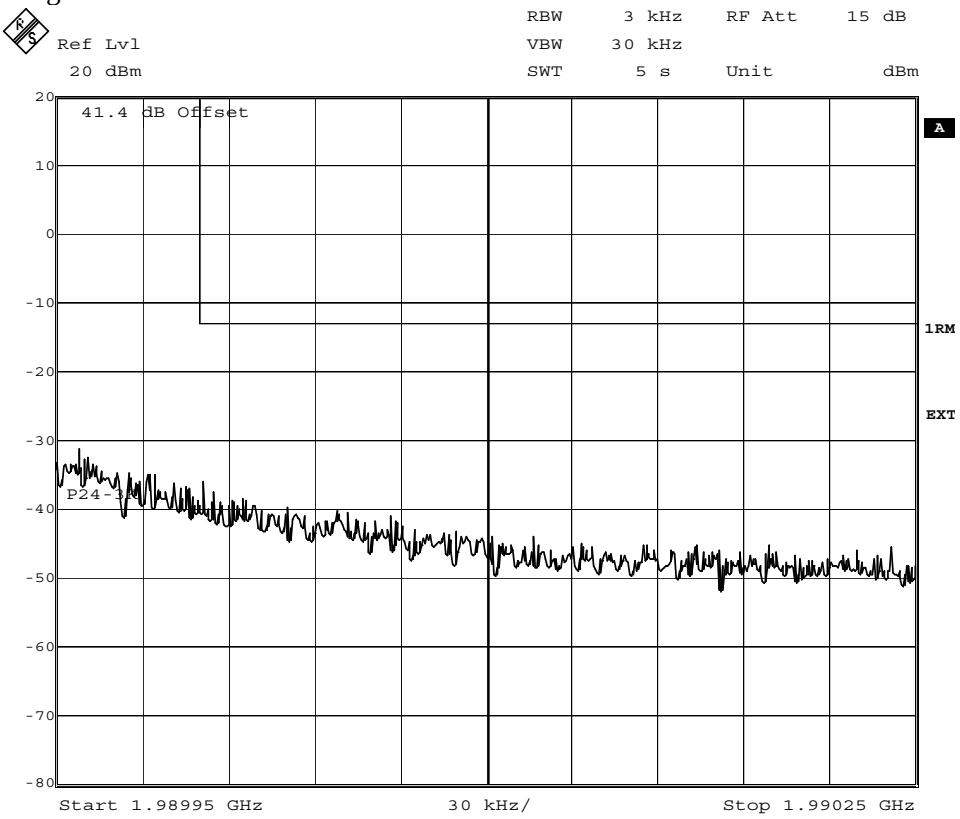

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 11.JUN.2008 16:24:51

Diagram 20


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-1M
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 11.JUN.2008 16:27:01

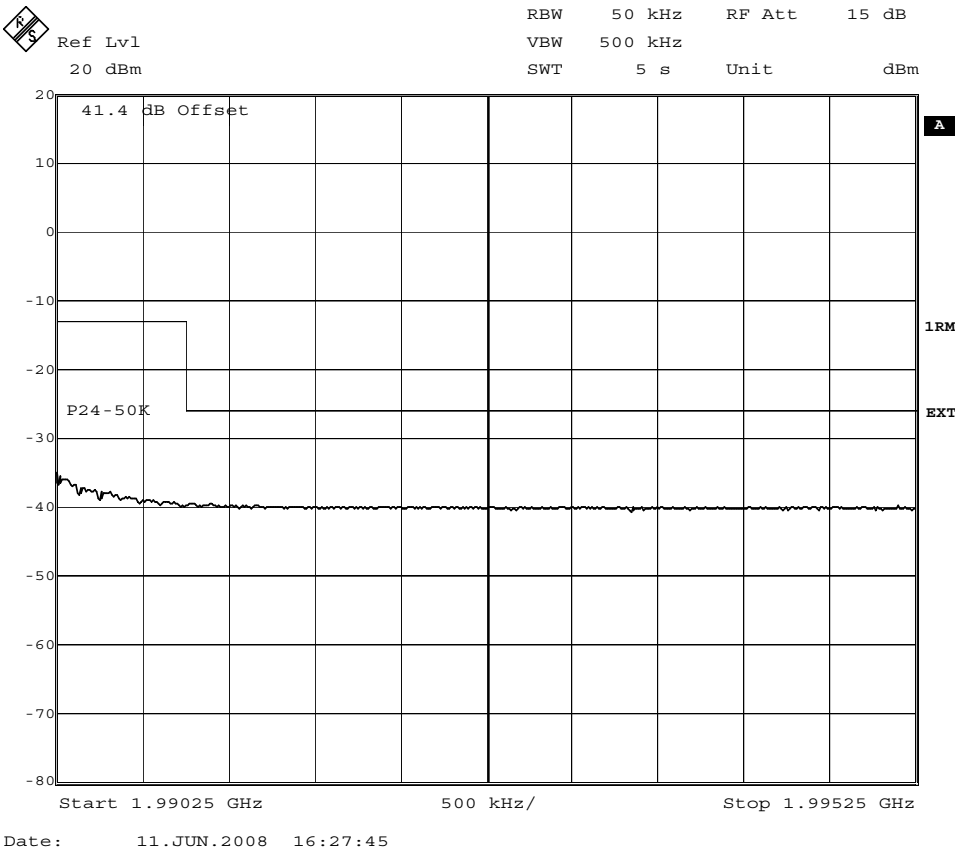
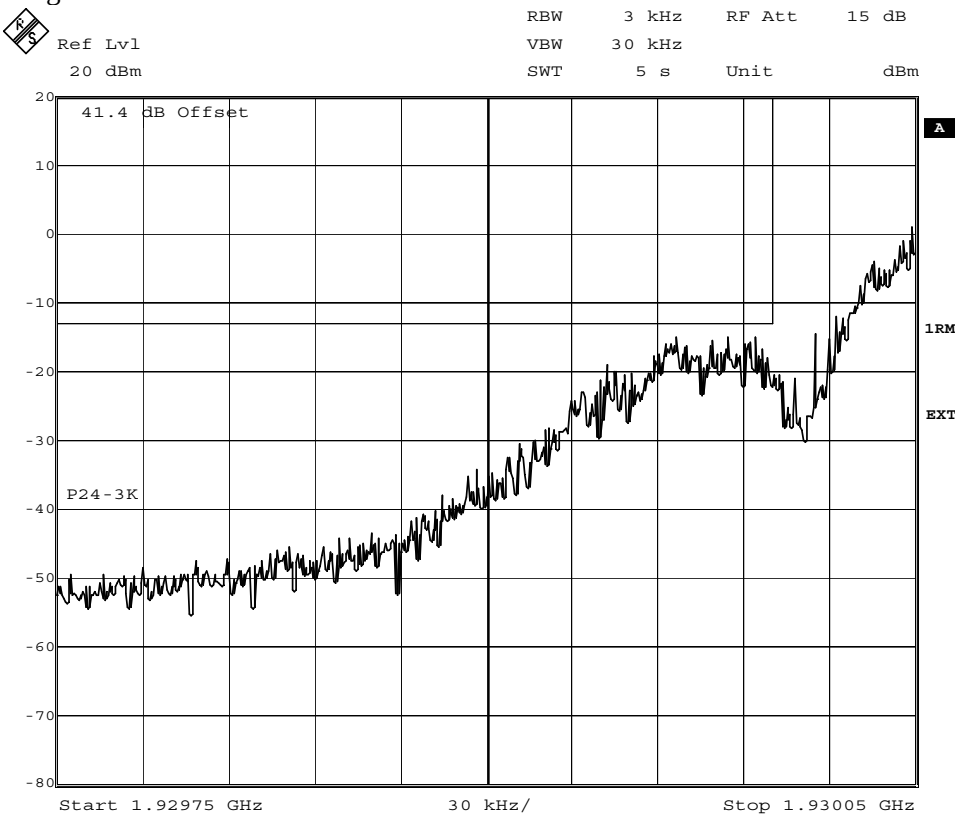

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 11.JUN.2008 16:27:45

Diagram 21


Ref Lvl
20 dBm
RBW 3 kHz
VBW 30 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 13:36:20

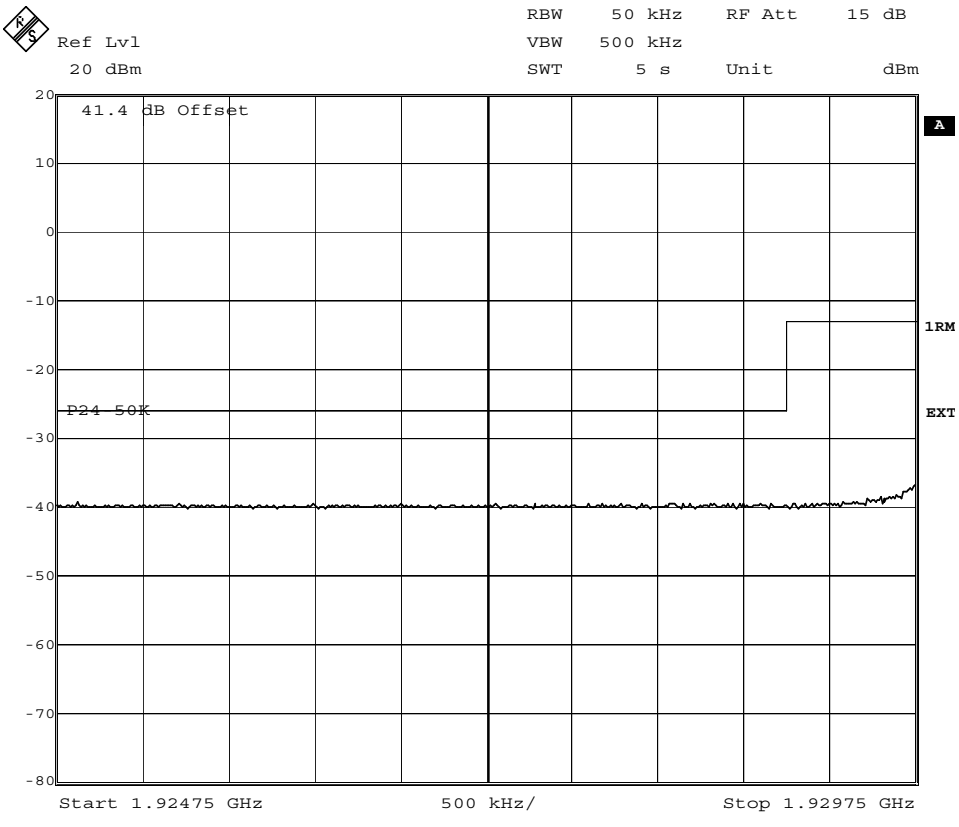
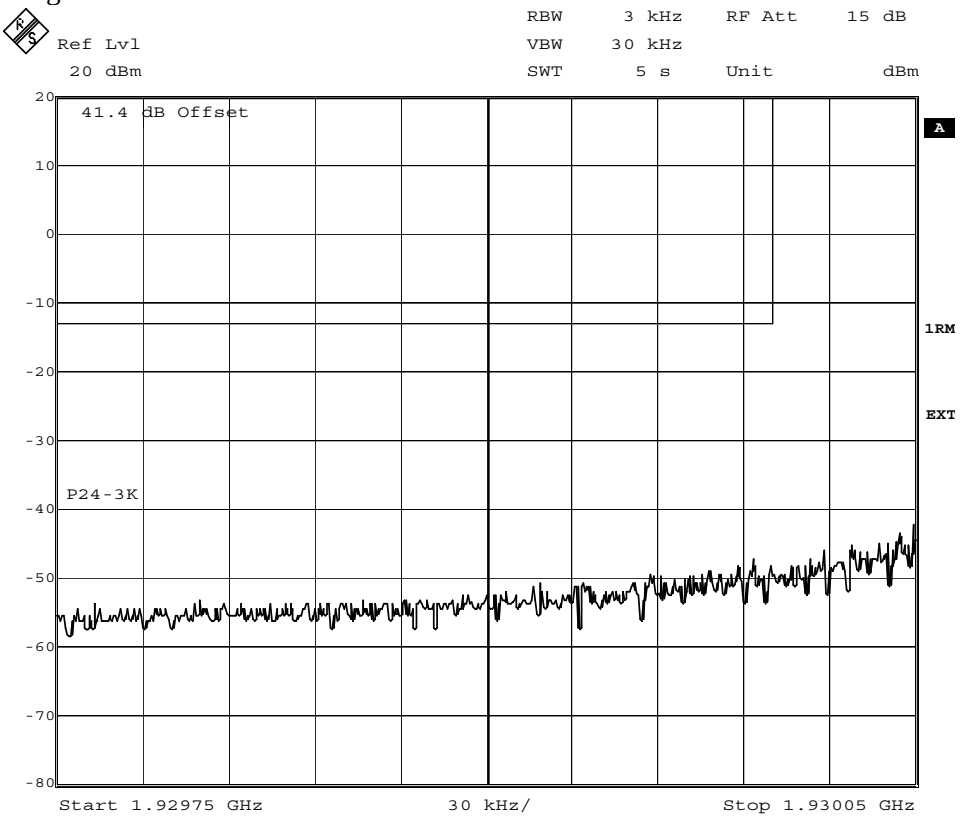
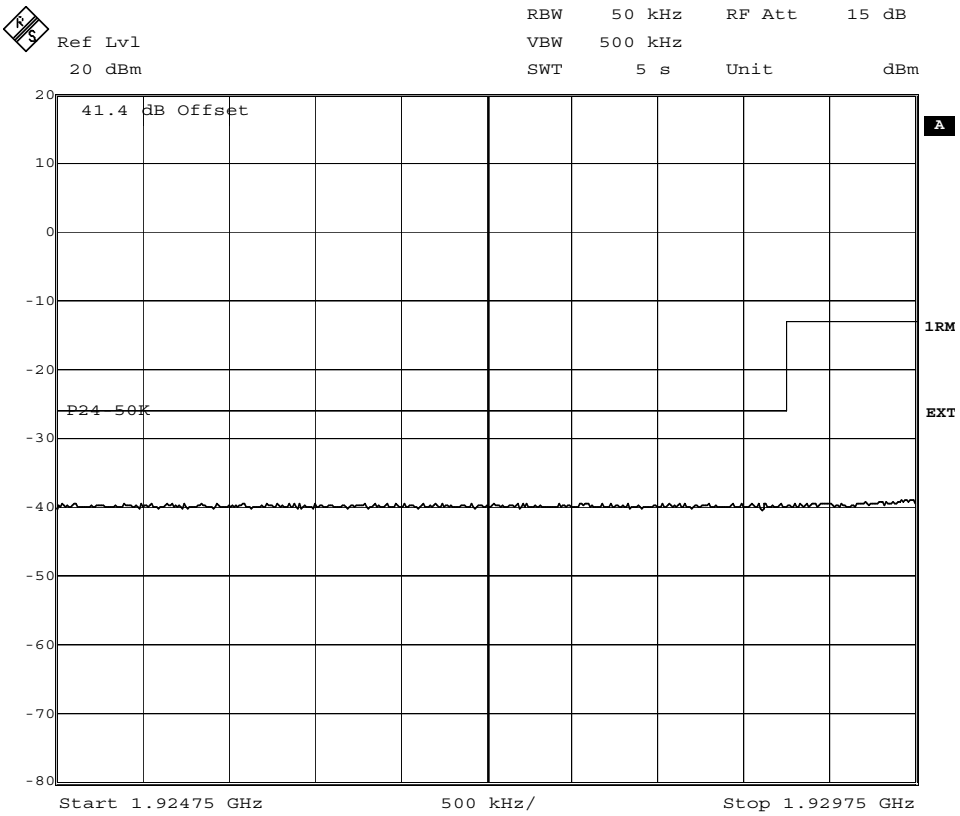

Ref Lvl
20 dBm
RBW 50 kHz
VBW 500 kHz
SWT 5 s
RF Att 15 dB
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24 50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 13:35:36

Diagram 22

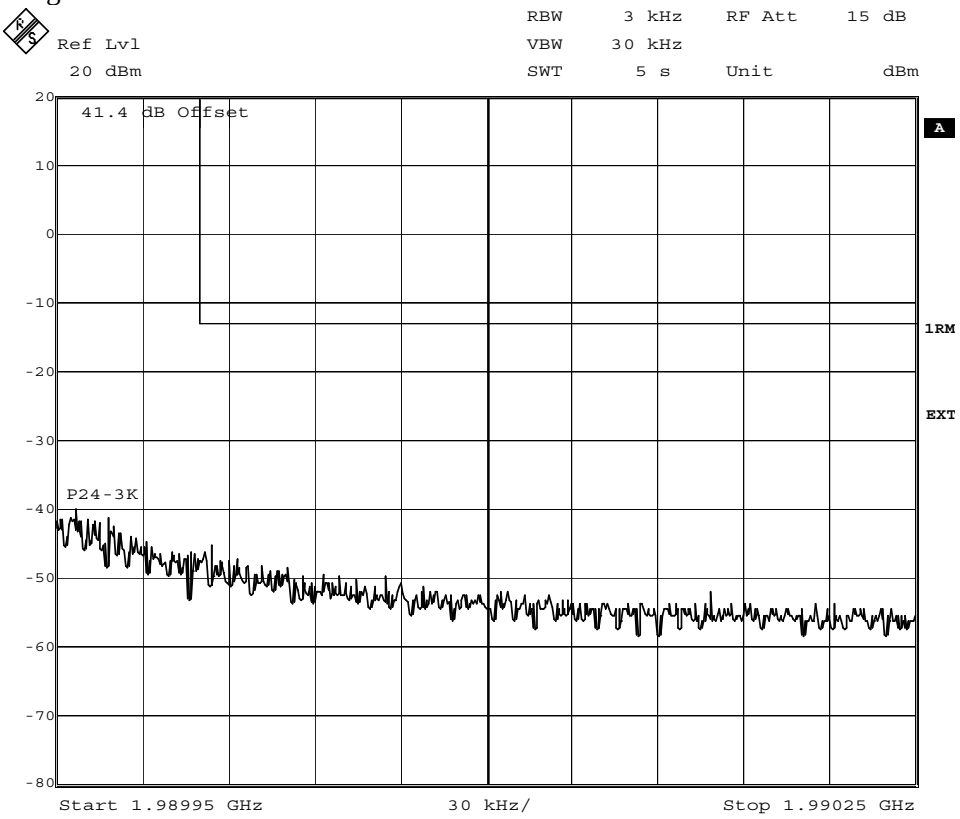


Date: 12.JUN.2008 14:08:17



Date: 12.JUN.2008 14:07:24

Diagram 23


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:42:47

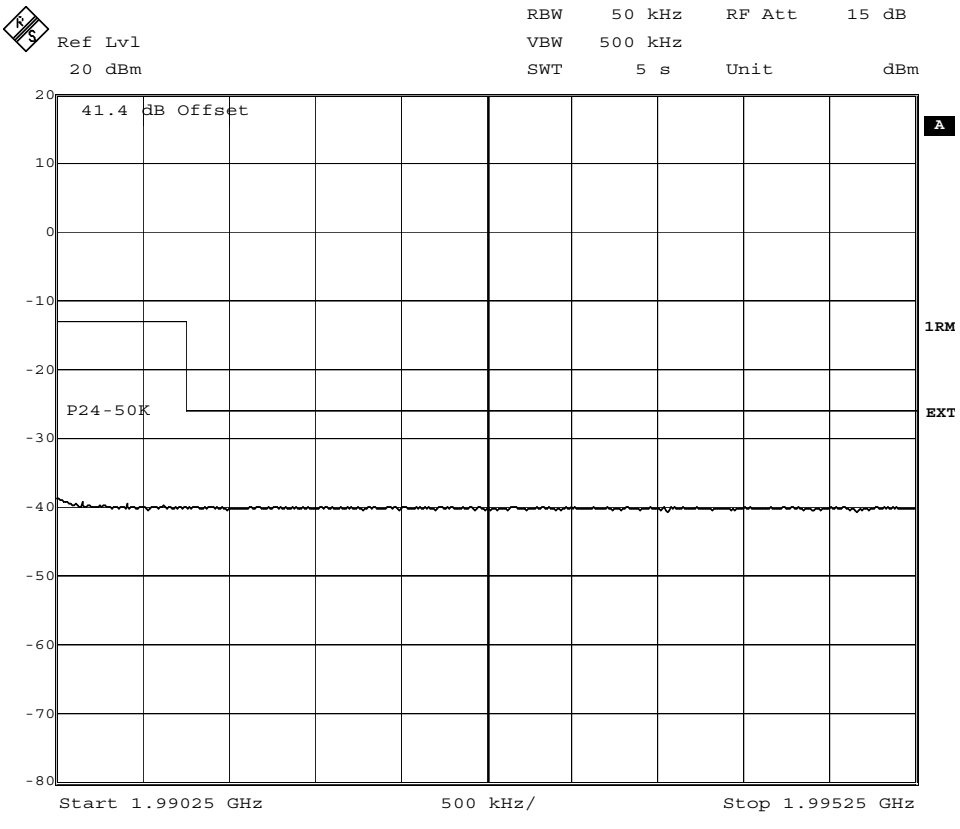
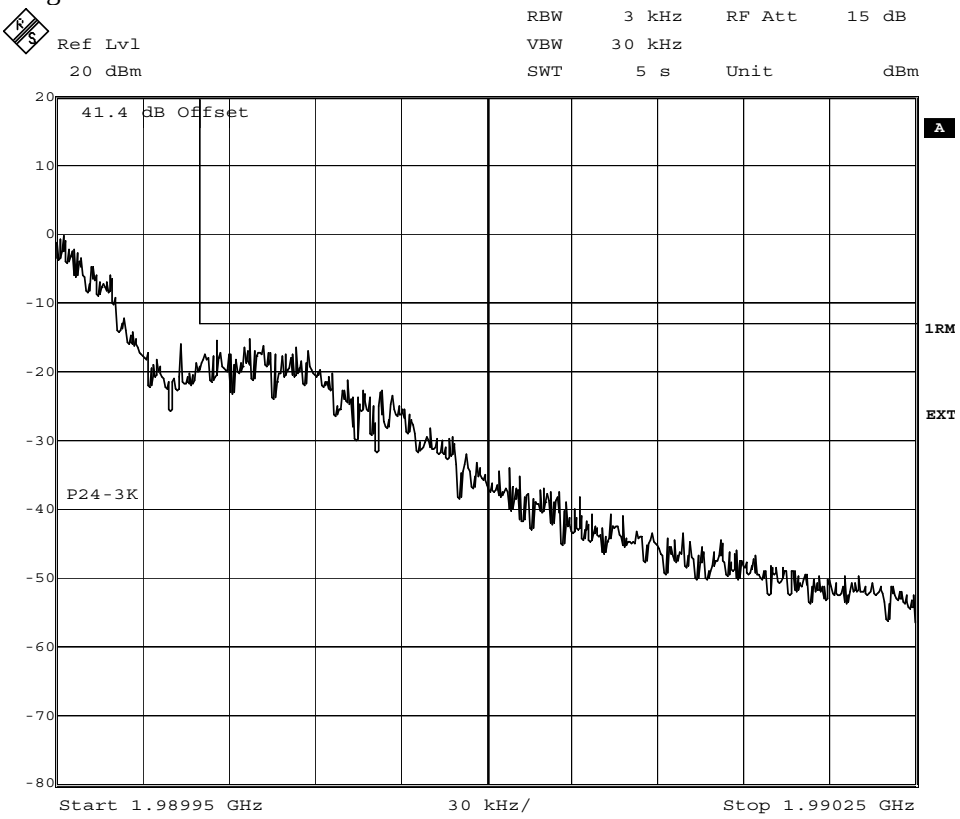

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:41:16

Diagram 24


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:37:52

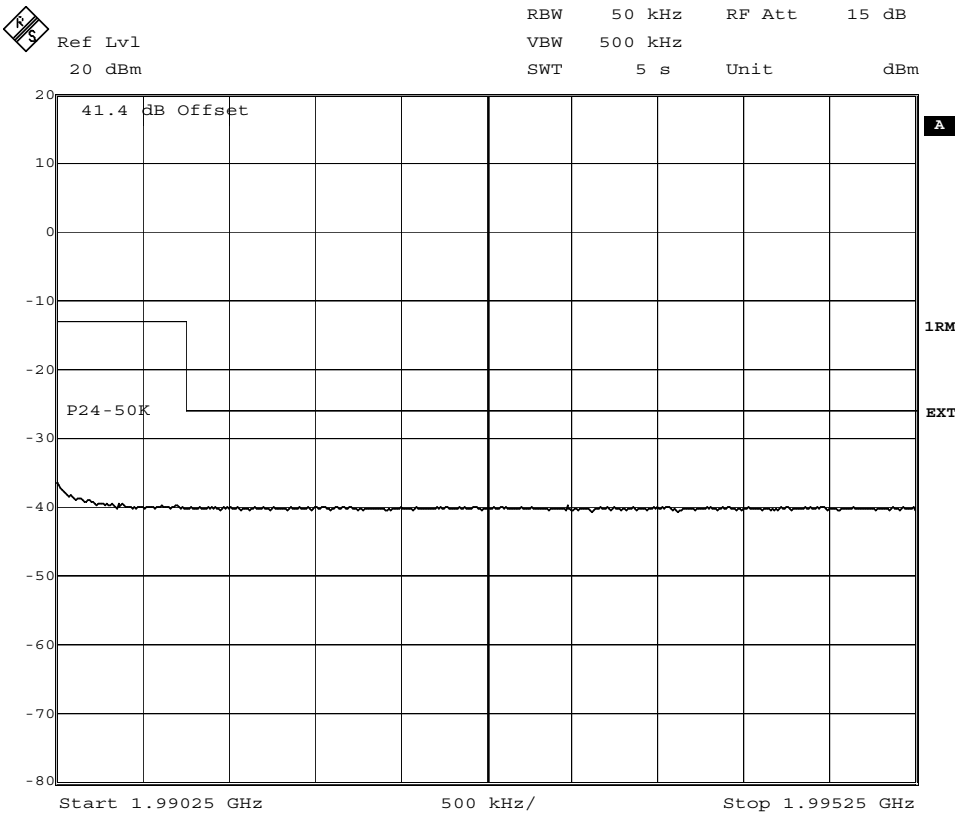
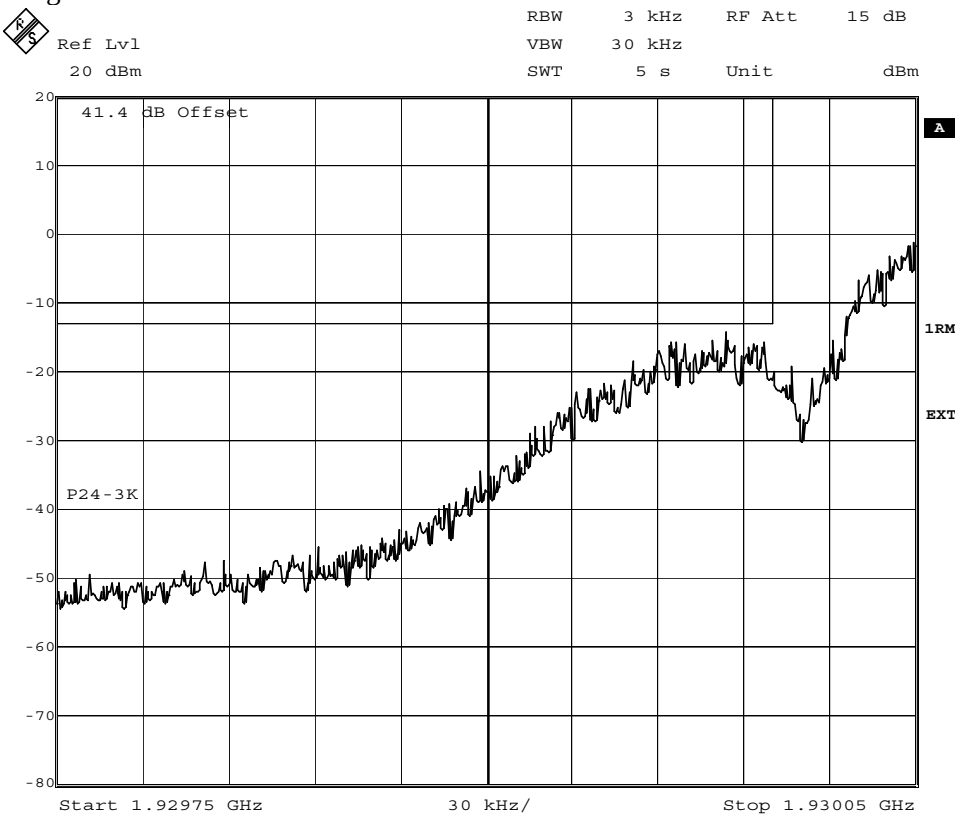

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:38:39

Diagram 25


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 13:32:45

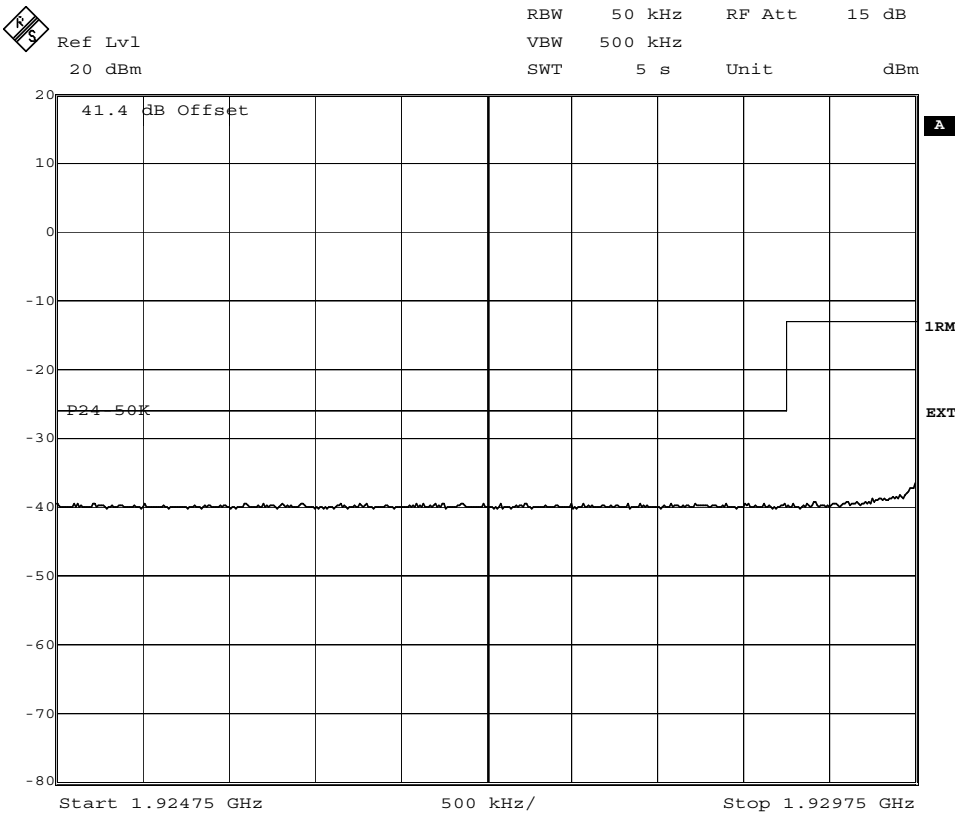
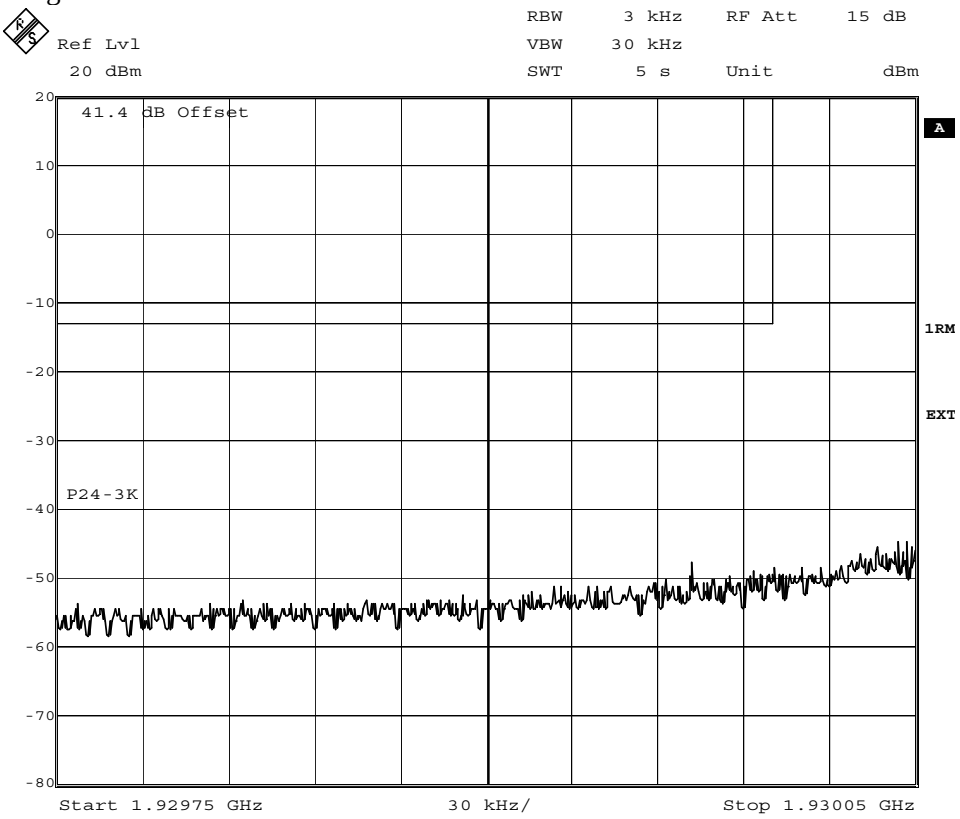

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 13:34:21

Diagram 26


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.92975 GHz
30 kHz/
Stop 1.93005 GHz
Date: 12.JUN.2008 14:09:30

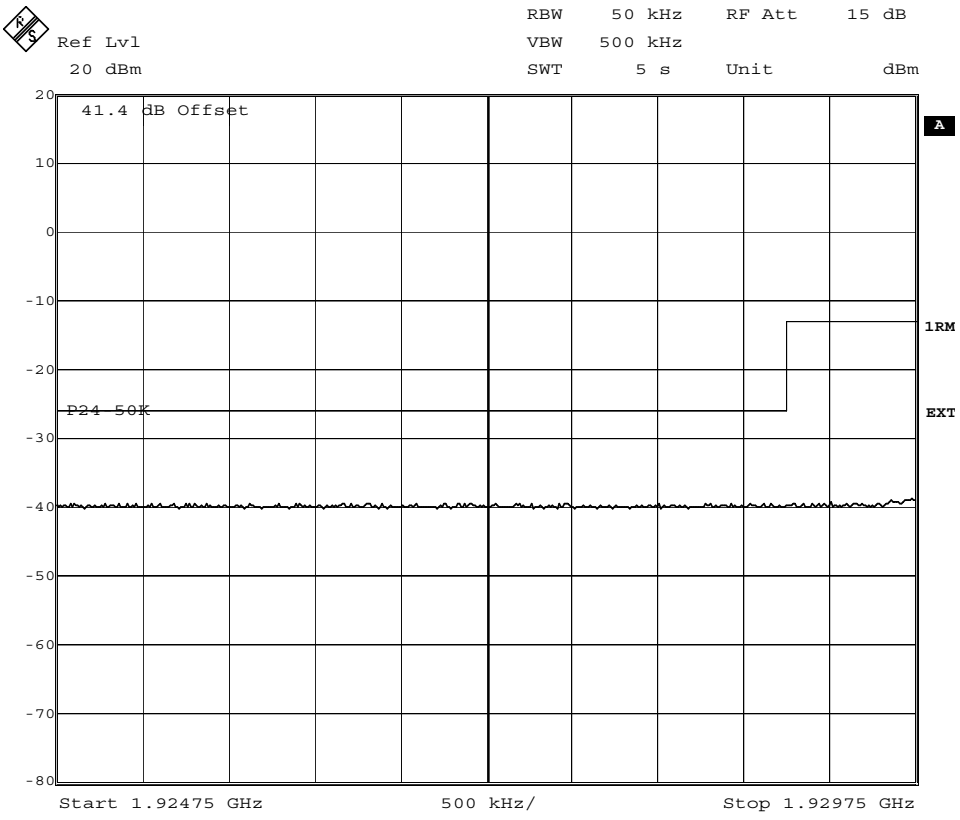
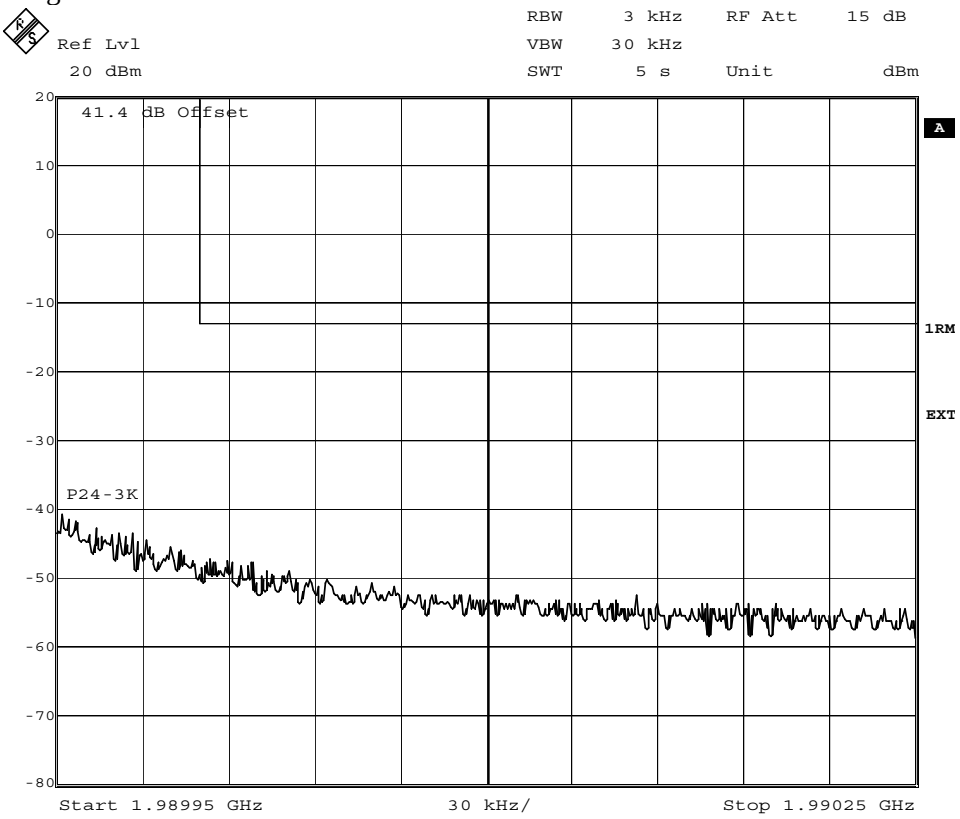

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24 50K
Start 1.92475 GHz
500 kHz/
Stop 1.92975 GHz
Date: 12.JUN.2008 14:10:09

Diagram 27


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:44:10

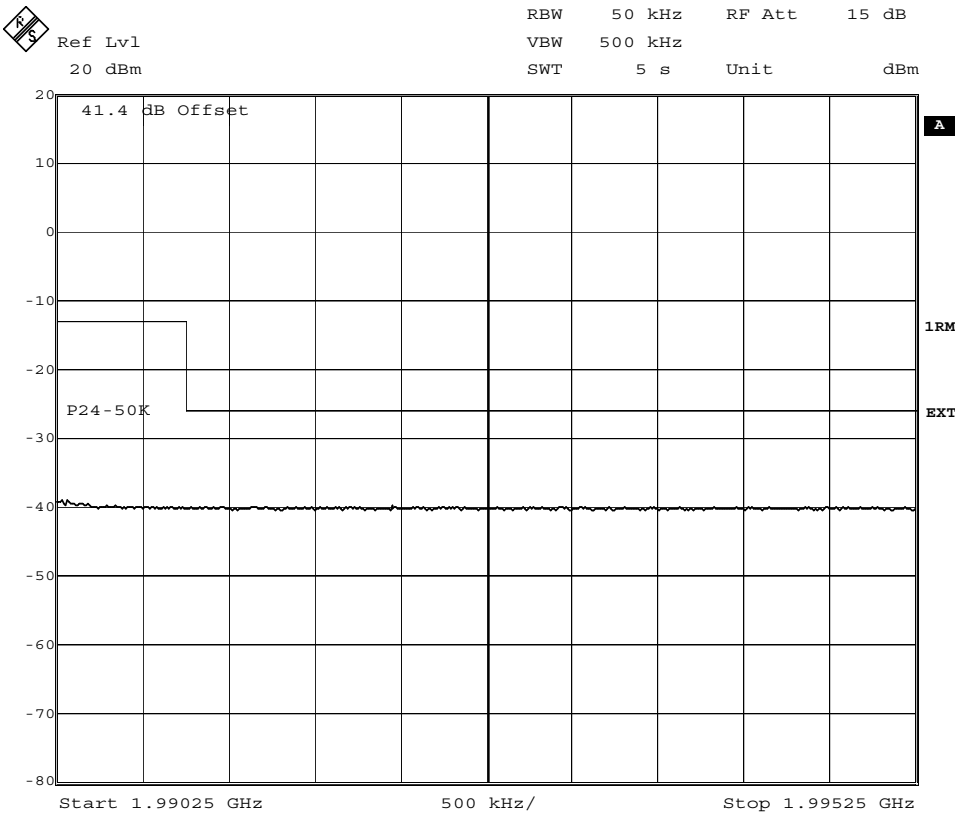
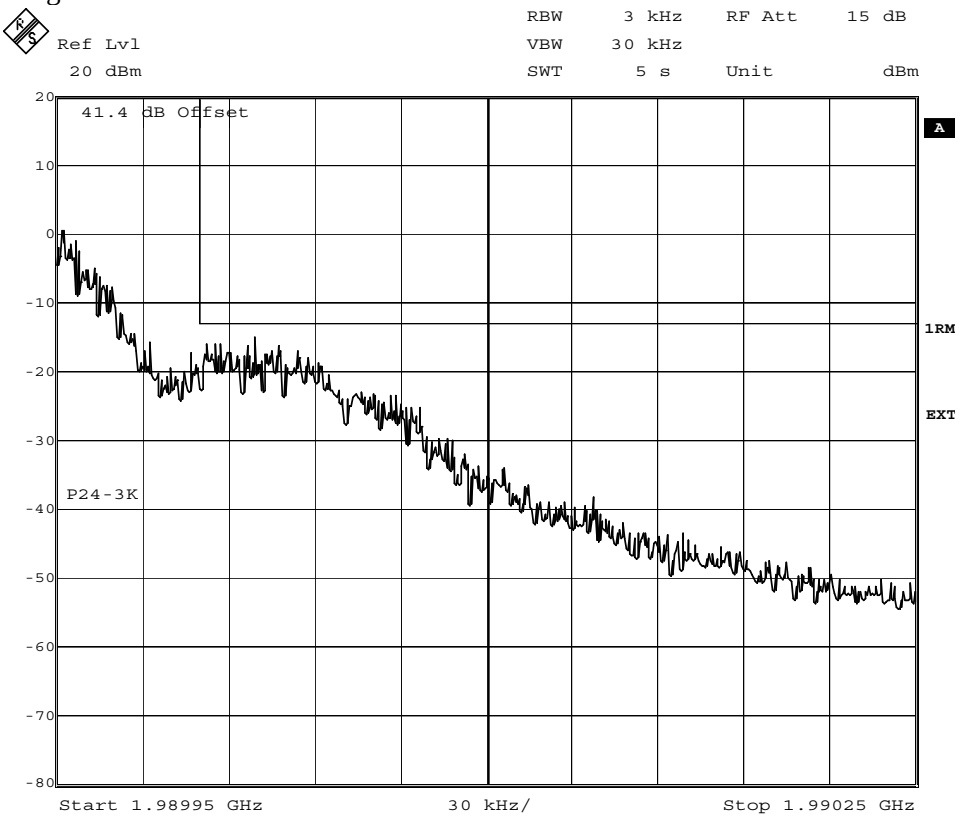
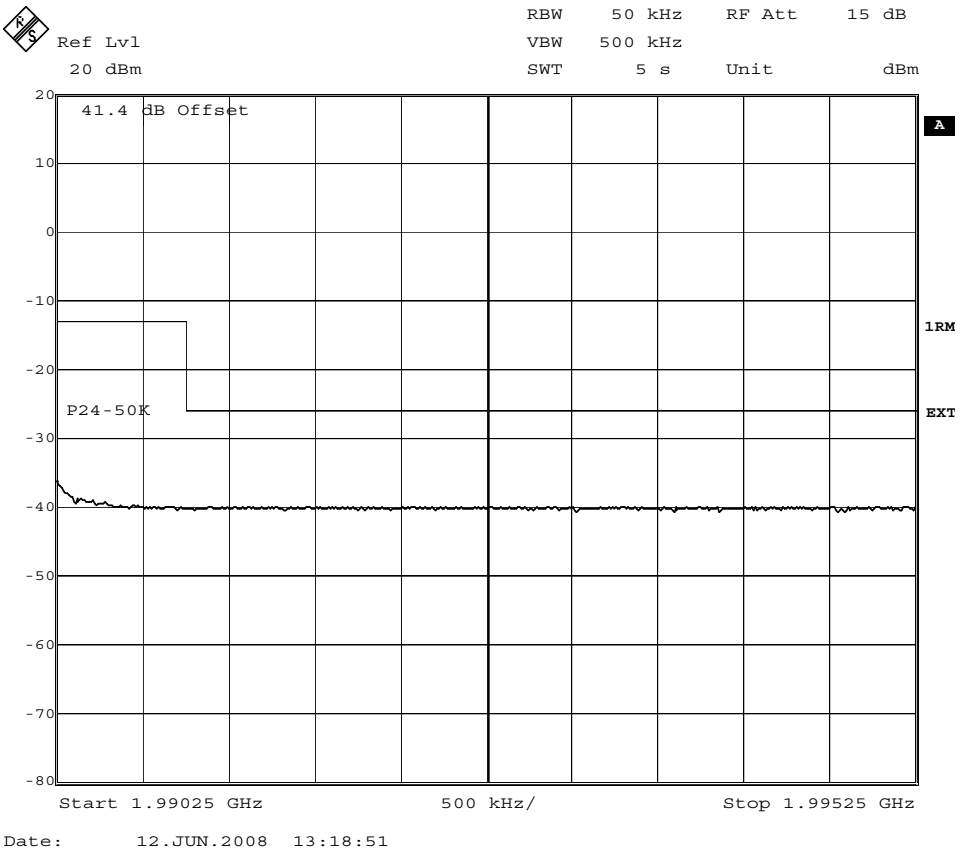

RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:45:17

Diagram 28


RBW 3 kHz
RF Att 15 dB
Ref Lvl
VBW 30 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-3K
Start 1.98995 GHz
30 kHz/
Stop 1.99025 GHz
Date: 12.JUN.2008 13:19:38


RBW 50 kHz
RF Att 15 dB
Ref Lvl
VBW 500 kHz
20 dBm
SWT 5 s
Unit dBm
41.4 dB Offset
A
1RM
EXT
P24-50K
Start 1.99025 GHz
500 kHz/
Stop 1.99525 GHz
Date: 12.JUN.2008 13:18:51

Conducted spurious emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2008-06-11	23 °C ± 3 °C	35 % ± 5 %
2008-06-12	23 °C ± 3 °C	31 % ± 5 %
2008-06-13	22 °C ± 3 °C	41 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §24.238. Measurements were made at CDU-G and CDU-F output connector. The output was connected to a spectrum analyser. A pre-measurement was performed with the PEAK detector activated. Emission above the limit with the PEAK detector is measured with the RMS detector activated. 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	2008-10	503 738
HP filter	2008-07	503 739
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 5.1

CDU-G

Modulation: **GMSK**

dTRU, with internal combiner plus TCC:

Diagram 1: Ch 512
Diagram 2: Ch 661
Diagram 3: Ch 810

dTRU, without internal combiner:

Diagram 4: TRX output 1, Ch 512
Diagram 5: TRX output 1, Ch 661
Diagram 6: TRX output 1, Ch 810
Diagram 7: TRX output 2, Ch 512
Diagram 8: TRX output 2, Ch 661
Diagram 9: TRX output 2, Ch 810

dTRU, with internal combiner:

Diagram 10: TRX output 1 Ch 512, TRX output 2 Ch 537
Diagram 11: TRX output 1 Ch 785, TRX output 2 Ch 810

Modulation: **8-PSK**

dTRU, with internal combiner plus TCC:

Diagram 12: Ch 512
Diagram 13: Ch 661
Diagram 14: Ch 810

dTRU, without internal combiner:

Diagram 15: TRX output 1, Ch 512
Diagram 16: TRX output 1, Ch 661
Diagram 17: TRX output 1, Ch 810
Diagram 18: TRX output 2, Ch 512
Diagram 19: TRX output 2, Ch 661
Diagram 20: TRX output 2, Ch 810

dTRU, with internal combiner:

Diagram 21: TRX output 1 Ch 512, TRX output 2 Ch 537
Diagram 22: TRX output 1 Ch 785, TRX output 2 Ch 810

CDU-F

Modulation: **GMSK**

dTRU, without internal combiner (3x4):

Diagram 23: dTRU 1, TRX output 1 Ch 512, TRX output 2 Ch 537
dTRU 2, TRX output 1 Ch 785, TRX output 2 Ch 810

Modulation: **8-PSK**

dTRU, without internal combiner (3x4):

Diagram 24: dTRU 1, TRX output 1 Ch 512, TRX output 2 Ch 537
dTRU 2, TRX output 1 Ch 785, TRX output 2 Ch 810

Remark

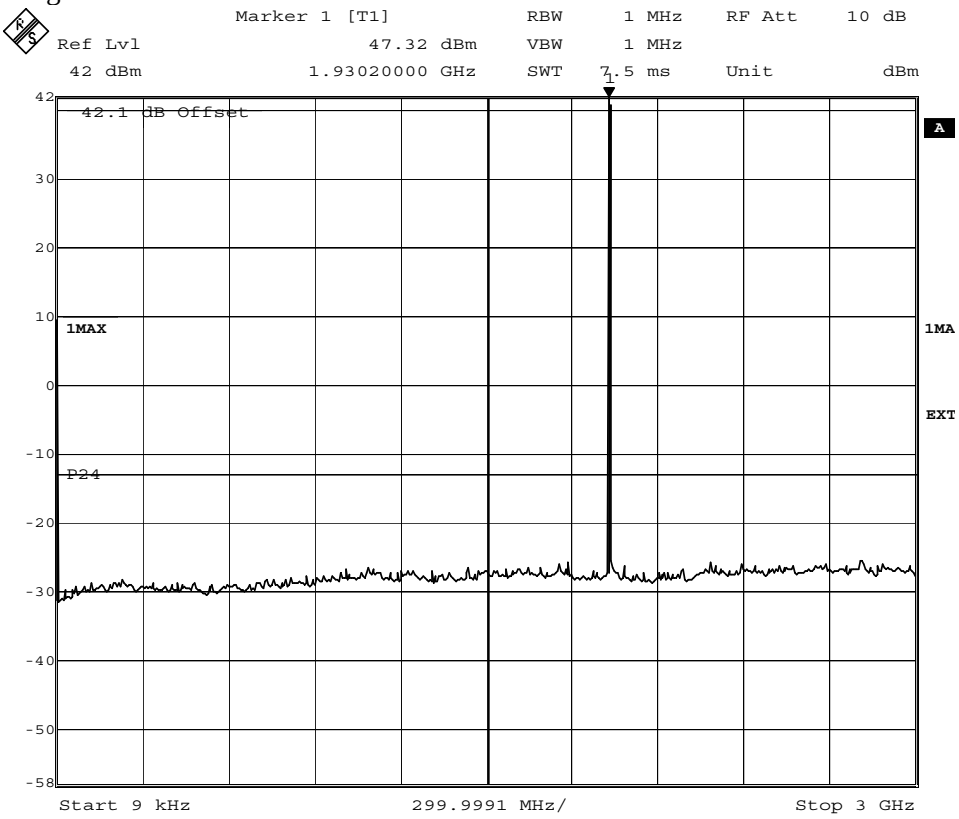
The emission at 9 kHz on the plots was not generated by the test object. A complementary measurement with a smaller RBW showed that it was related to the LO feedthrough.

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]
47.32 dBm
1.93020000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 14:37:13

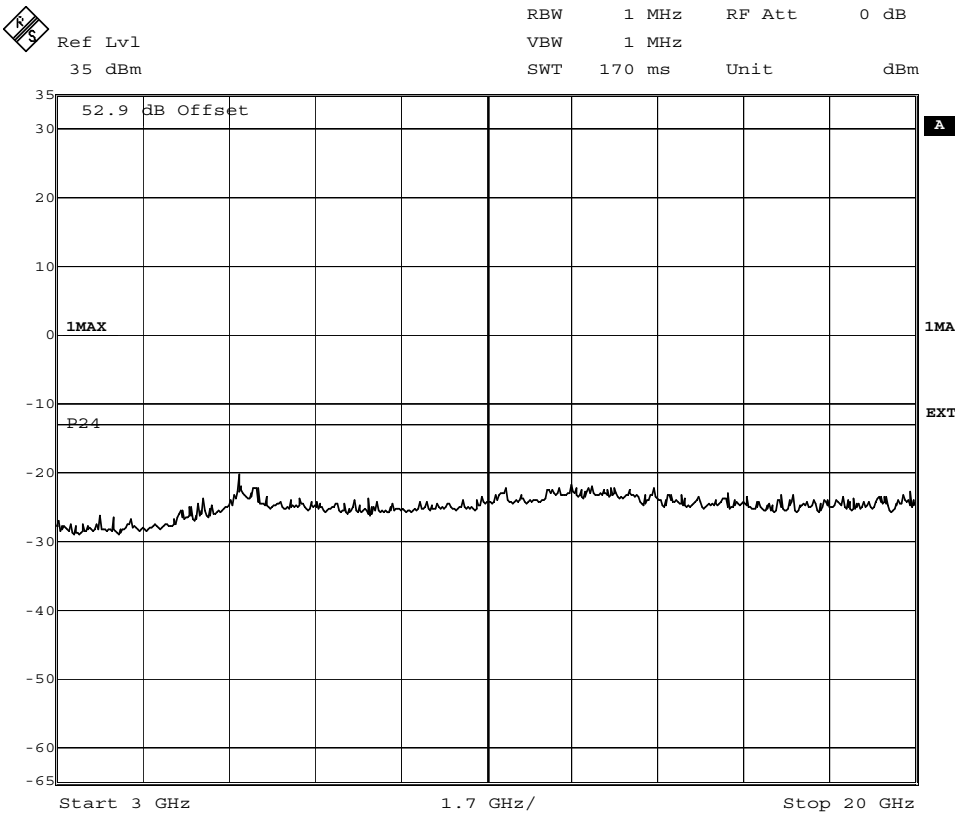
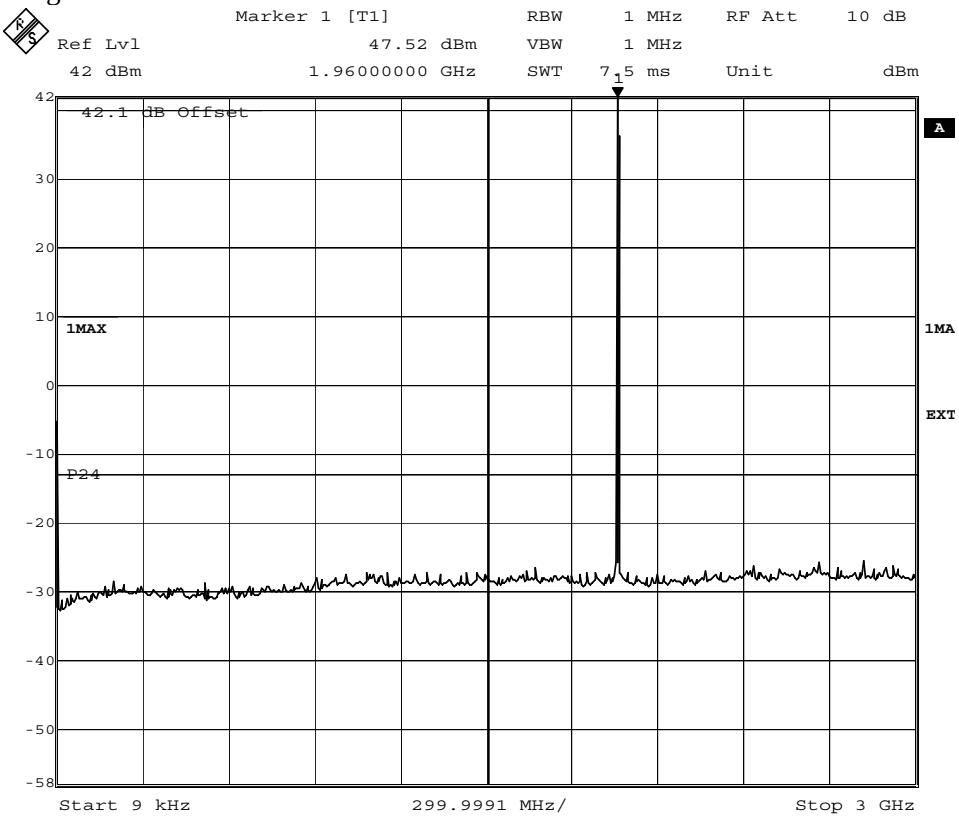
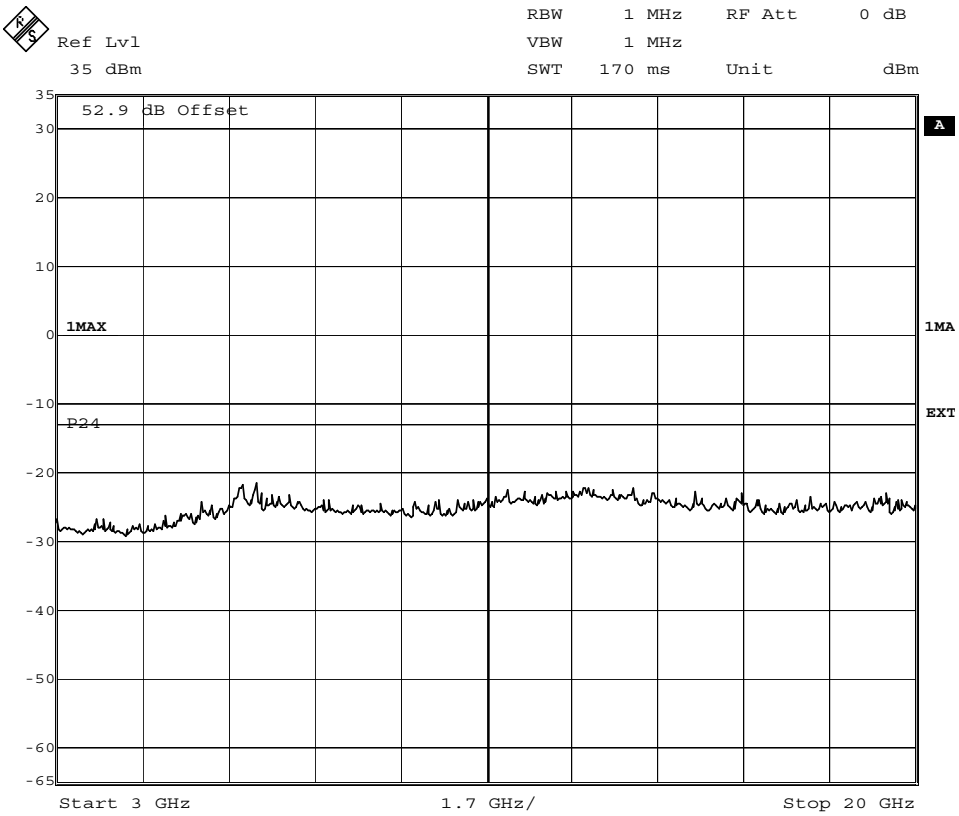

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:27:46

Diagram 2

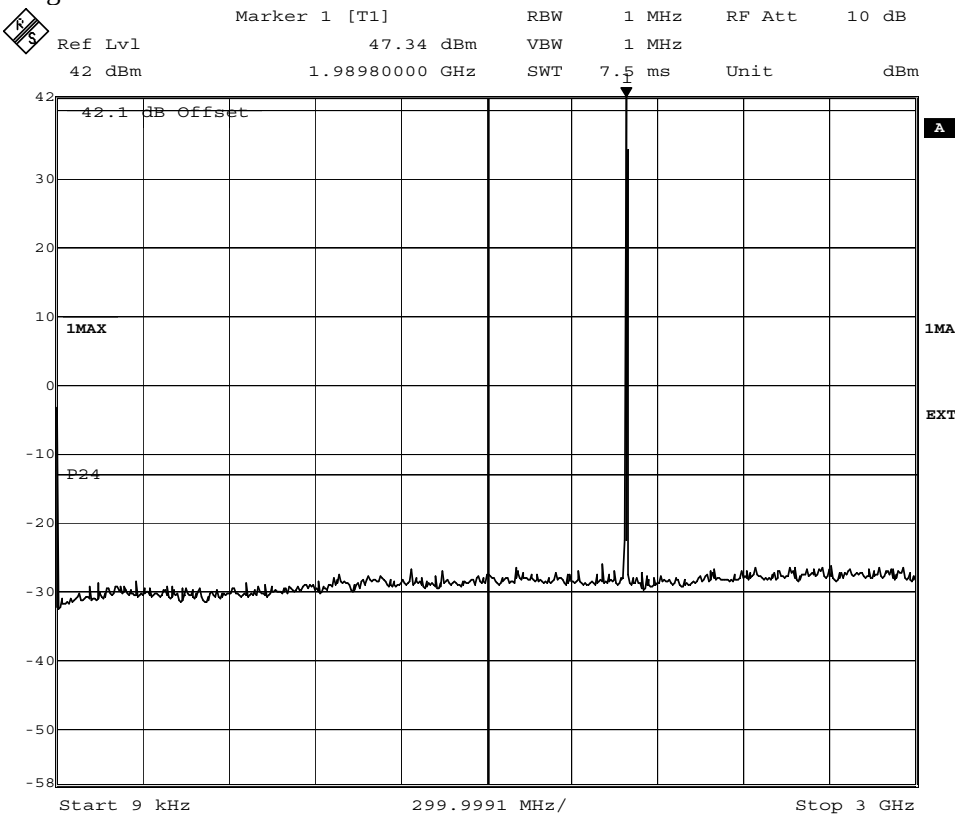


Date: 11.JUN.2008 14:38:43



Date: 11.JUN.2008 14:29:27

Diagram 3


Marker 1 [T1]
47.34 dBm
1.98980000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 14:46:22

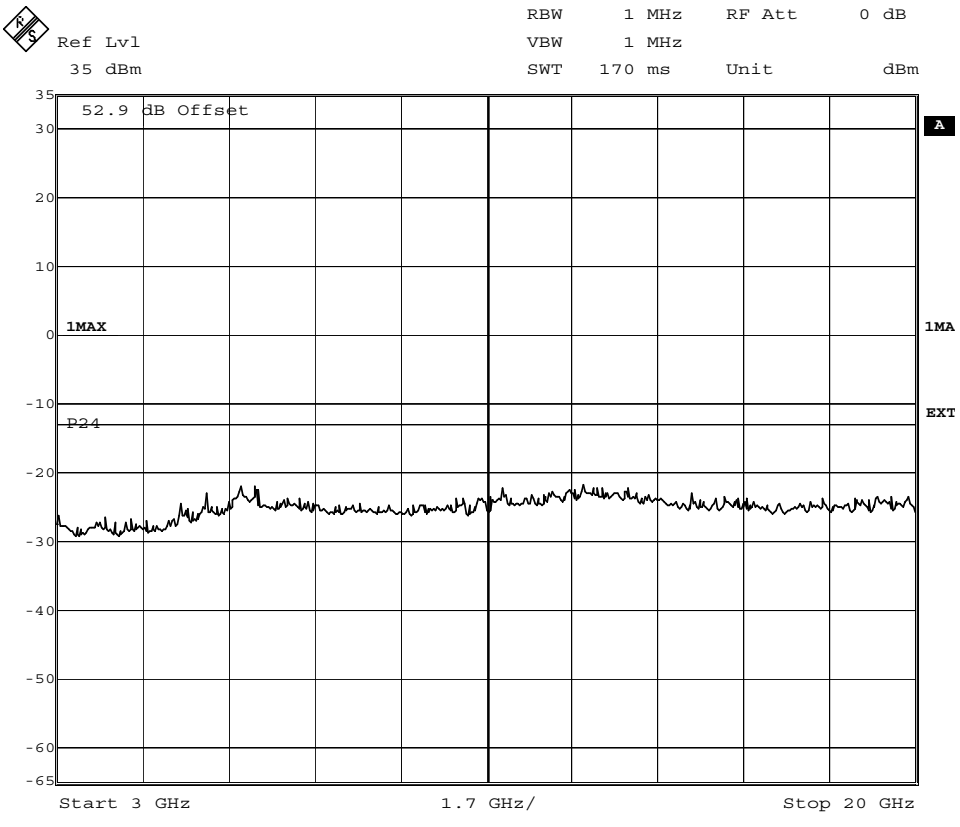
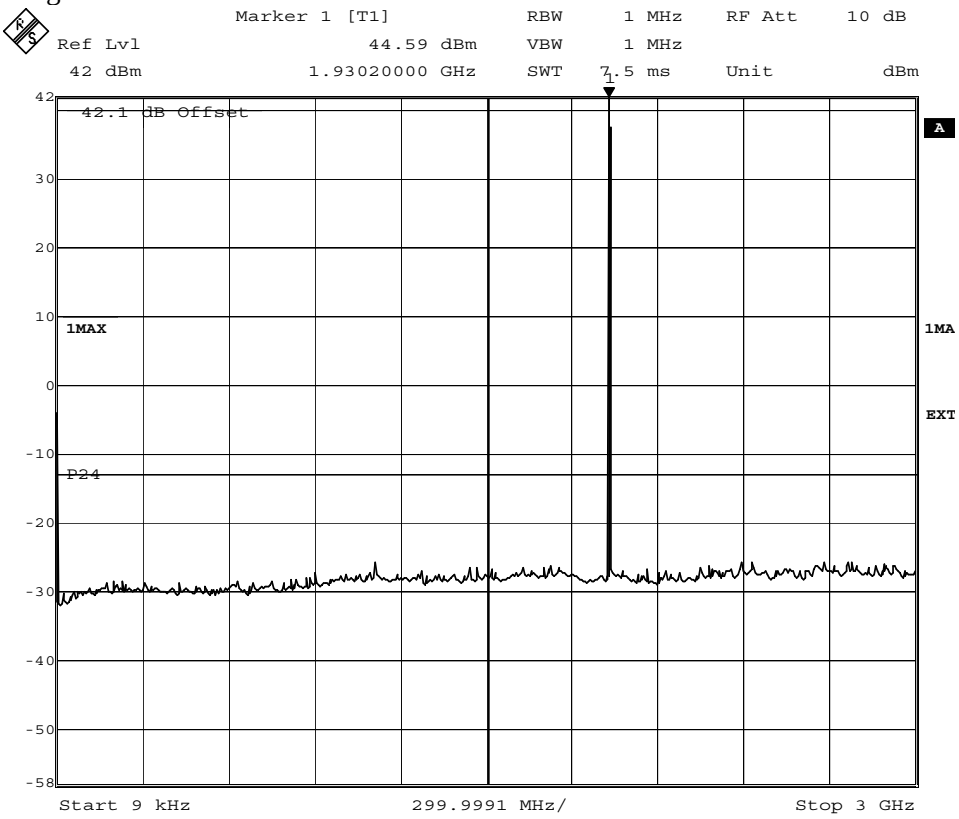

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:30:12

Diagram 4


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
44.59 dBm
VBW 1 MHz
42 dBm
1.93020000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:05:23

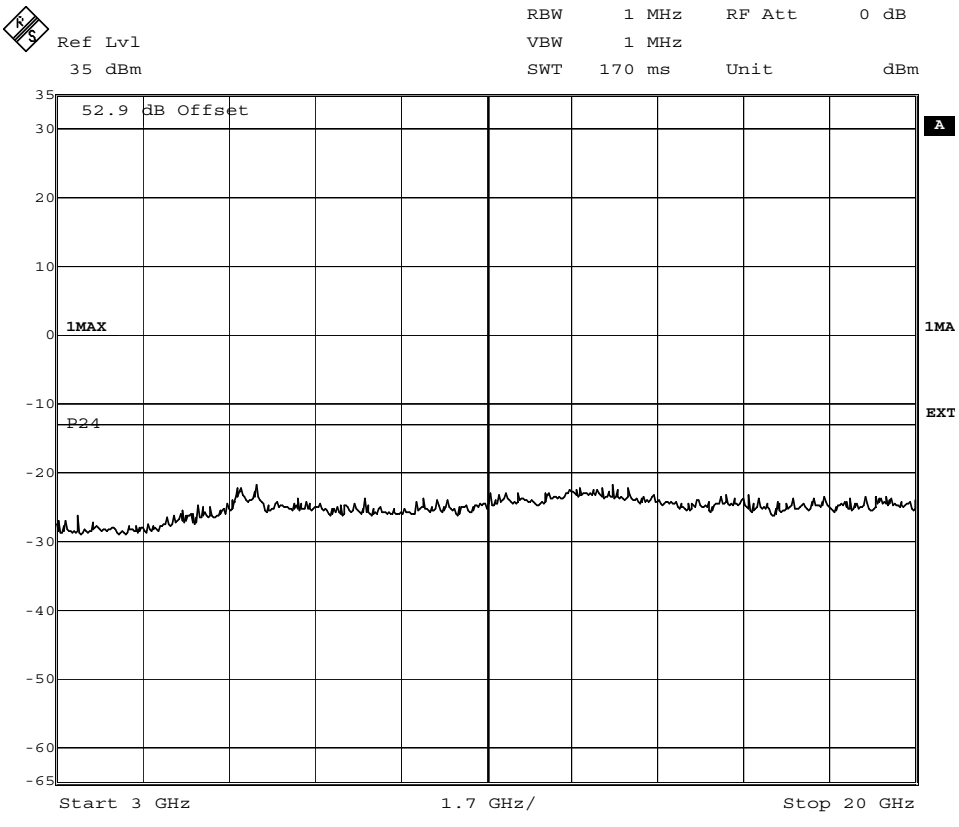
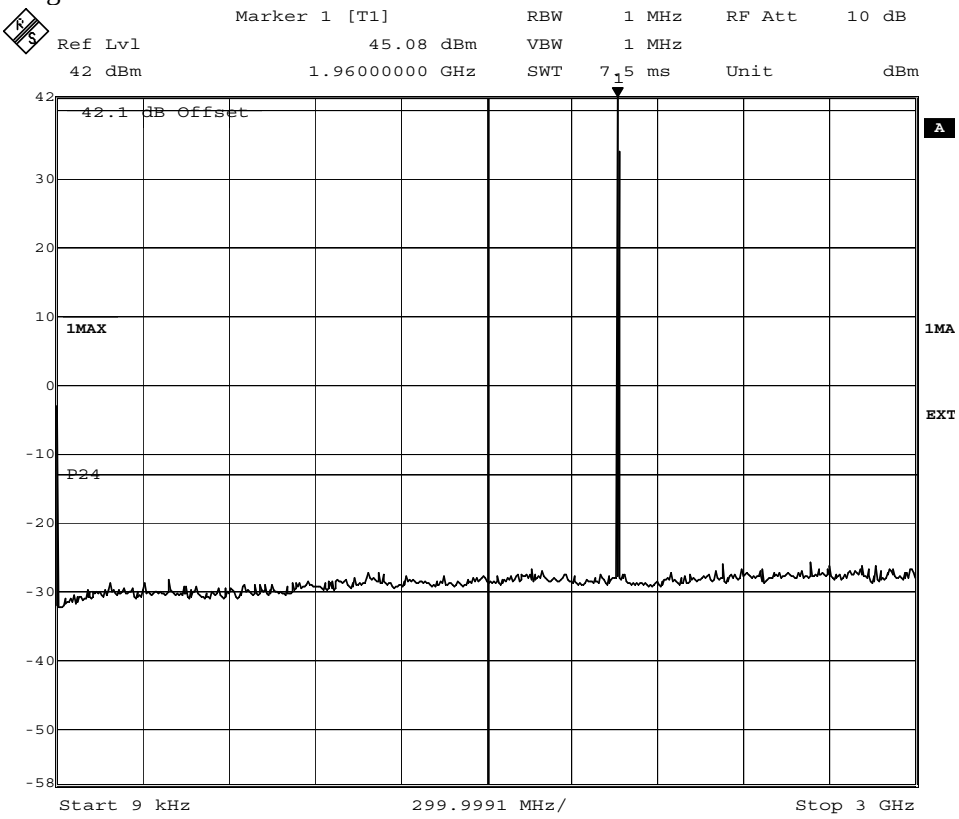

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:14:19

Diagram 5


Marker 1 [T1]
45.08 dBm
1.96000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:06:40

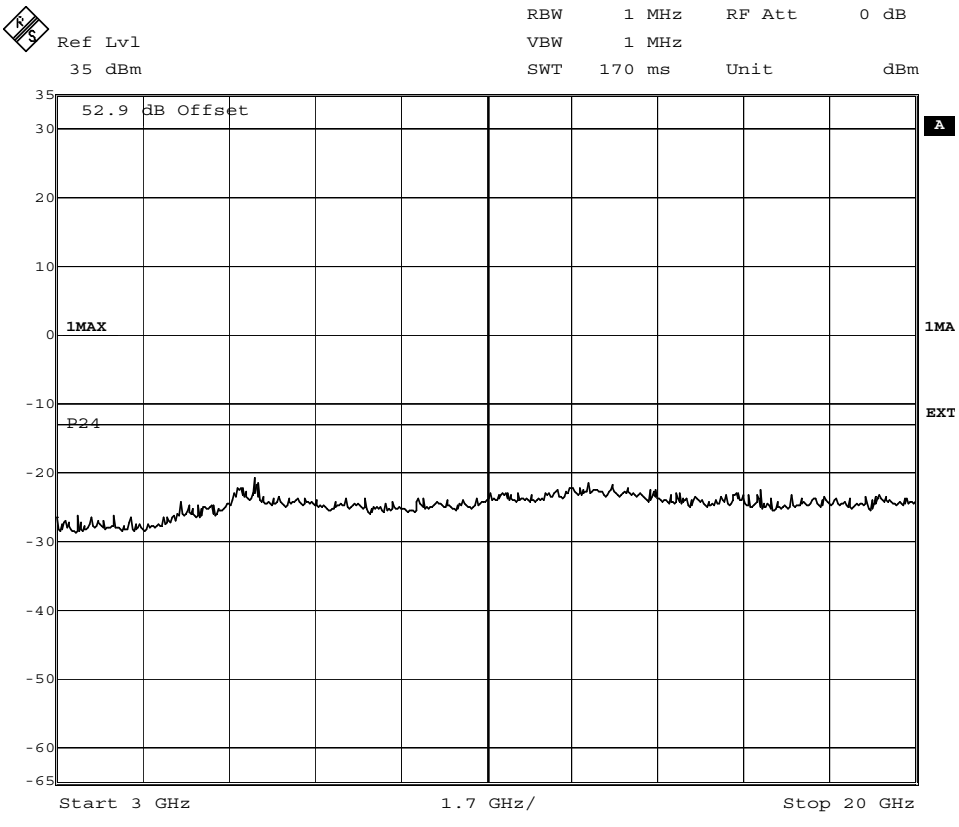
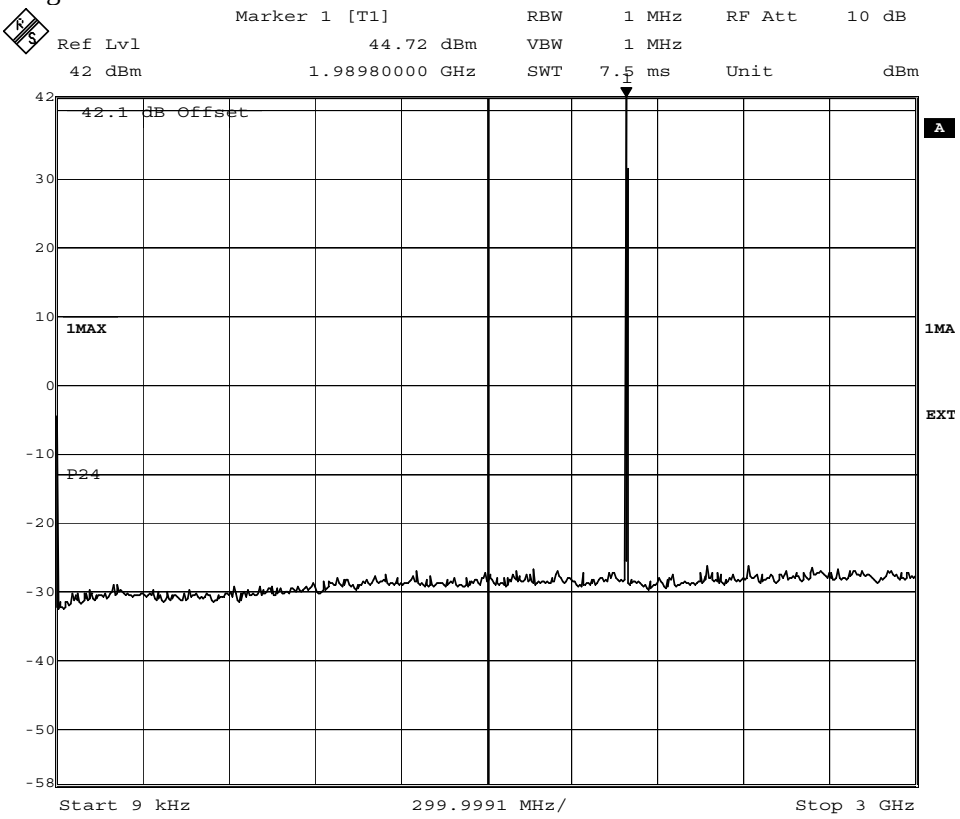

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:14:56

Diagram 6


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
44.72 dBm
VBW 1 MHz
42 dBm
1.98980000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:07:28

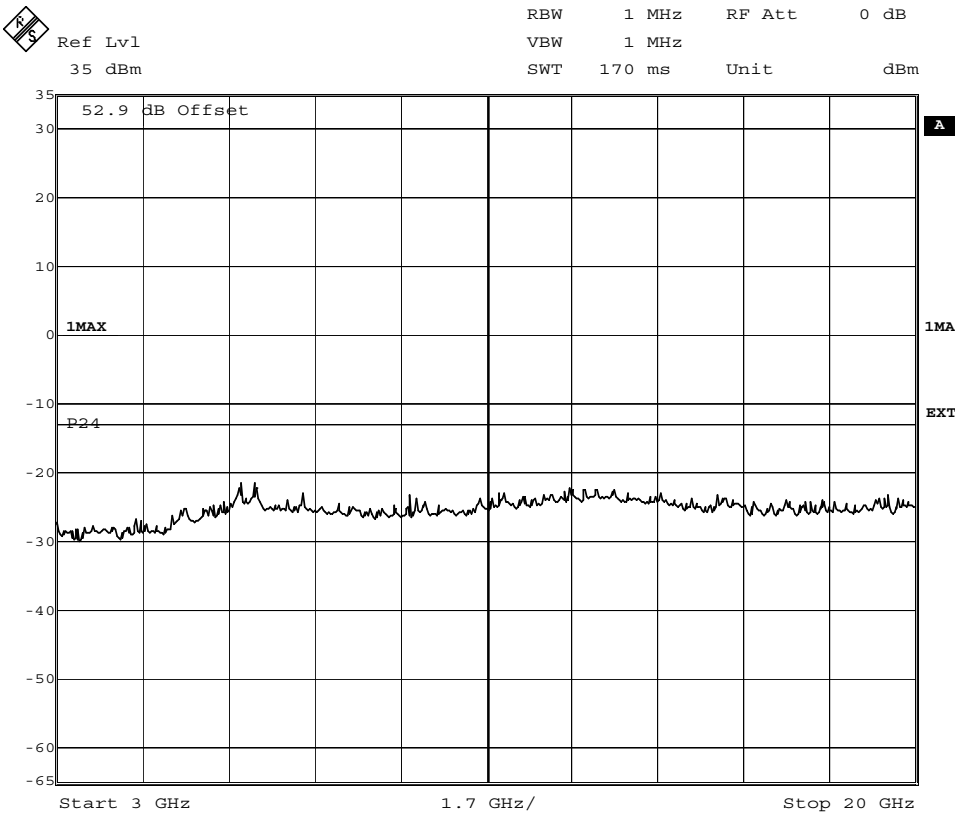
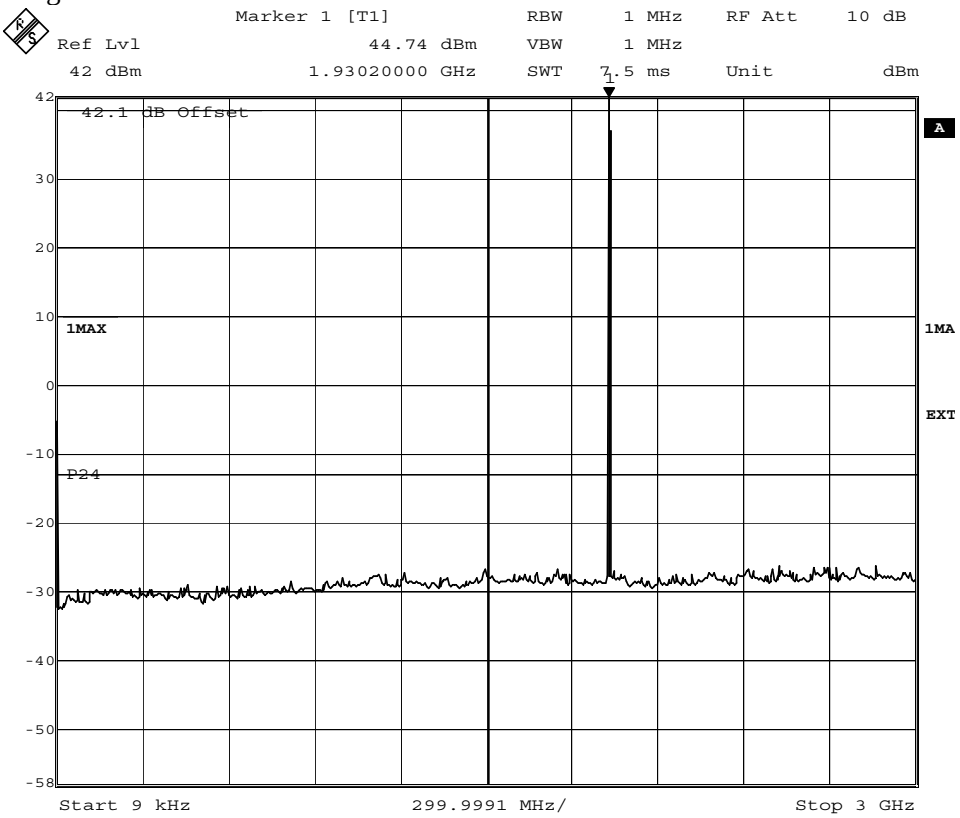

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:15:37

Diagram 7


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
44.74 dBm
VBW 1 MHz
42 dBm
1.93020000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:48:57

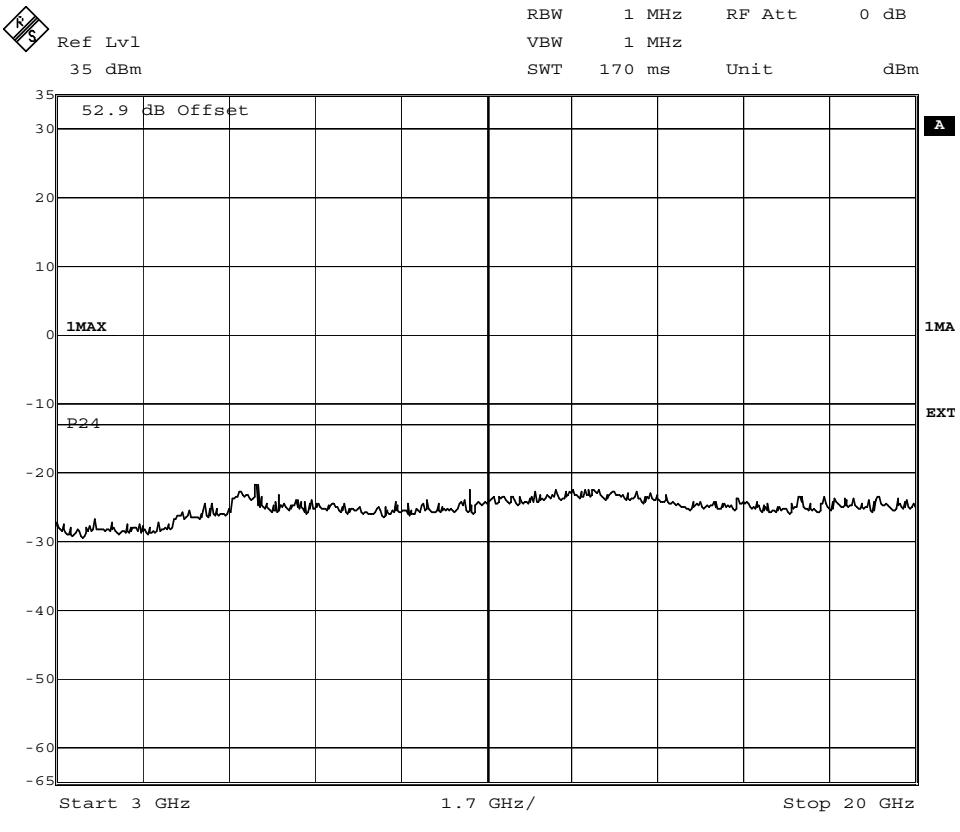
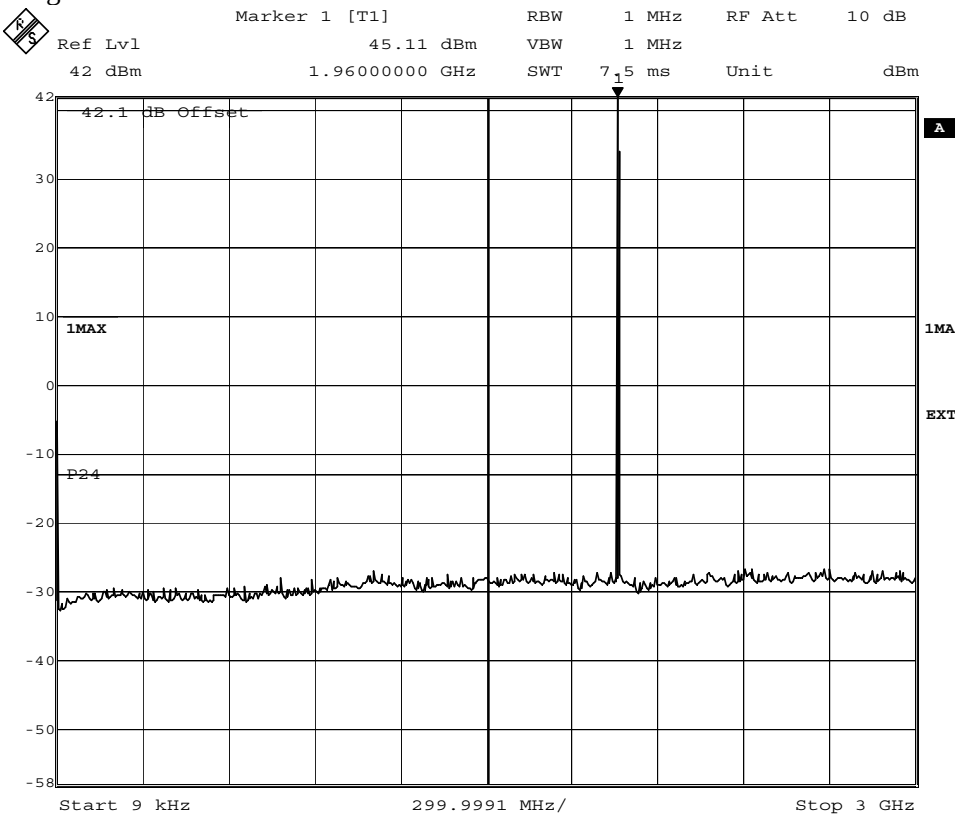

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:37:34

Diagram 8


Marker 1 [T1]
45.11 dBm
1.96000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:48:04

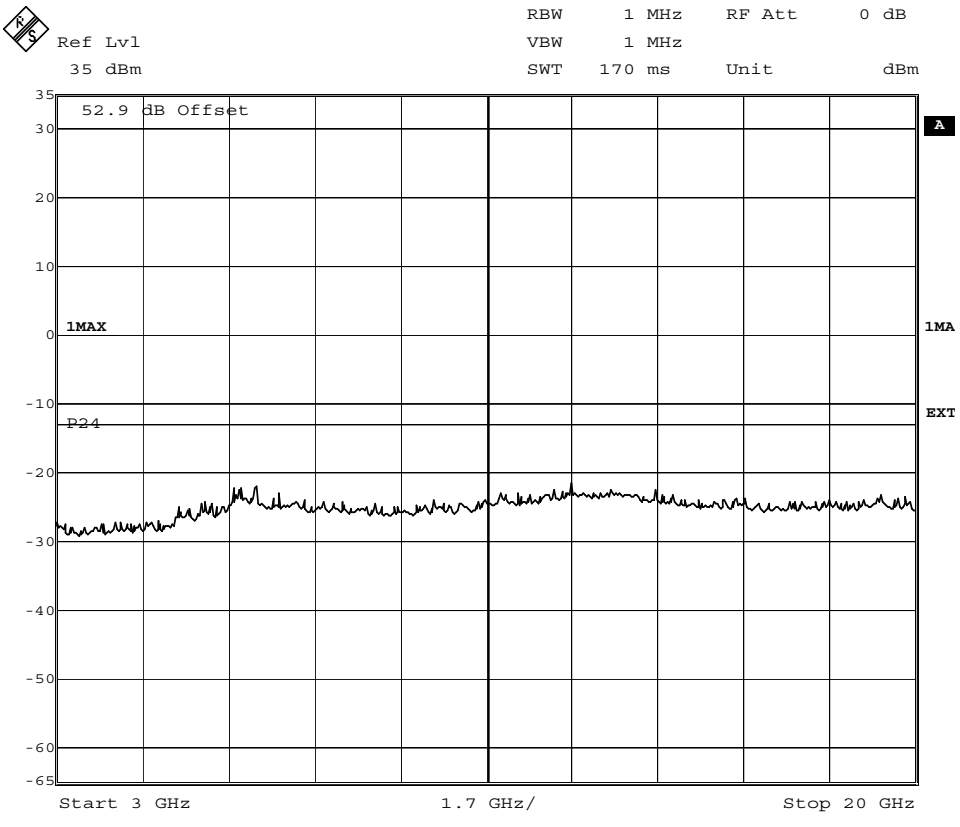
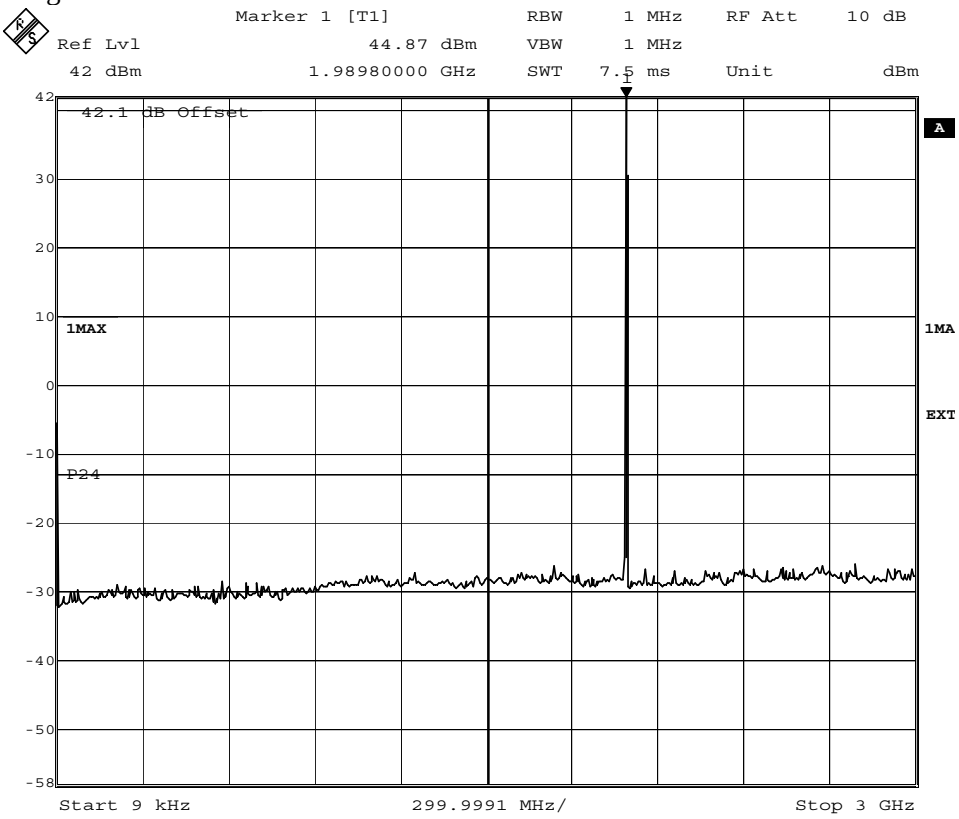

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:38:40

Diagram 9


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
44.87 dBm
VBW 1 MHz
42 dBm
1.98980000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:47:15

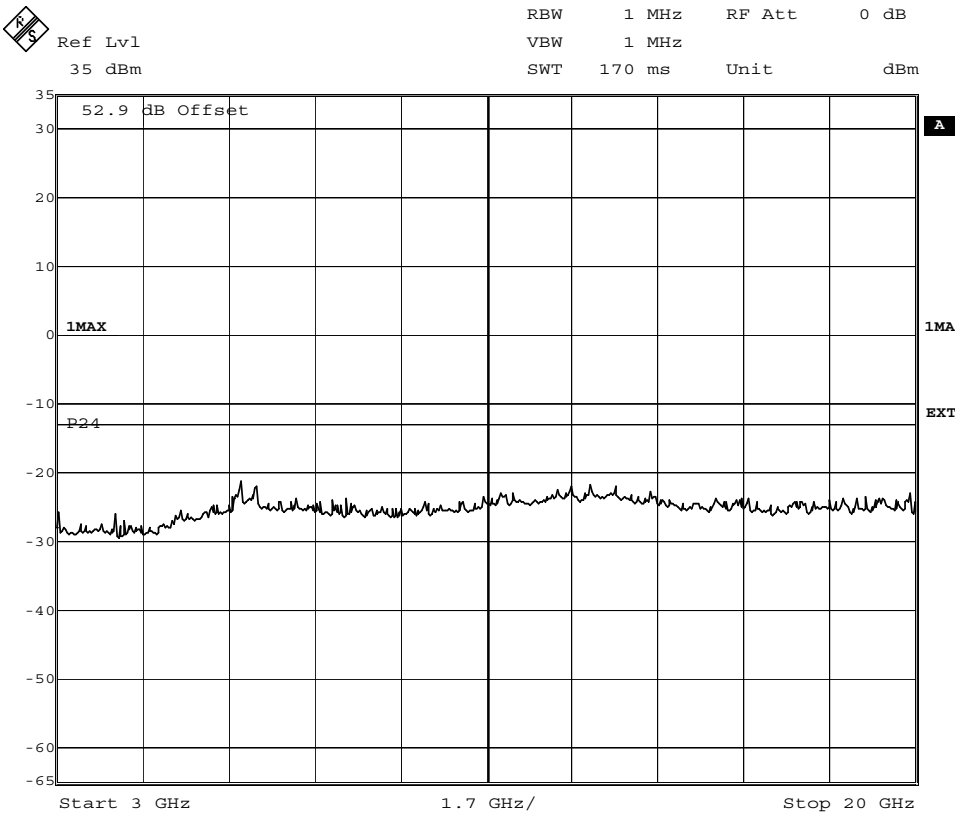
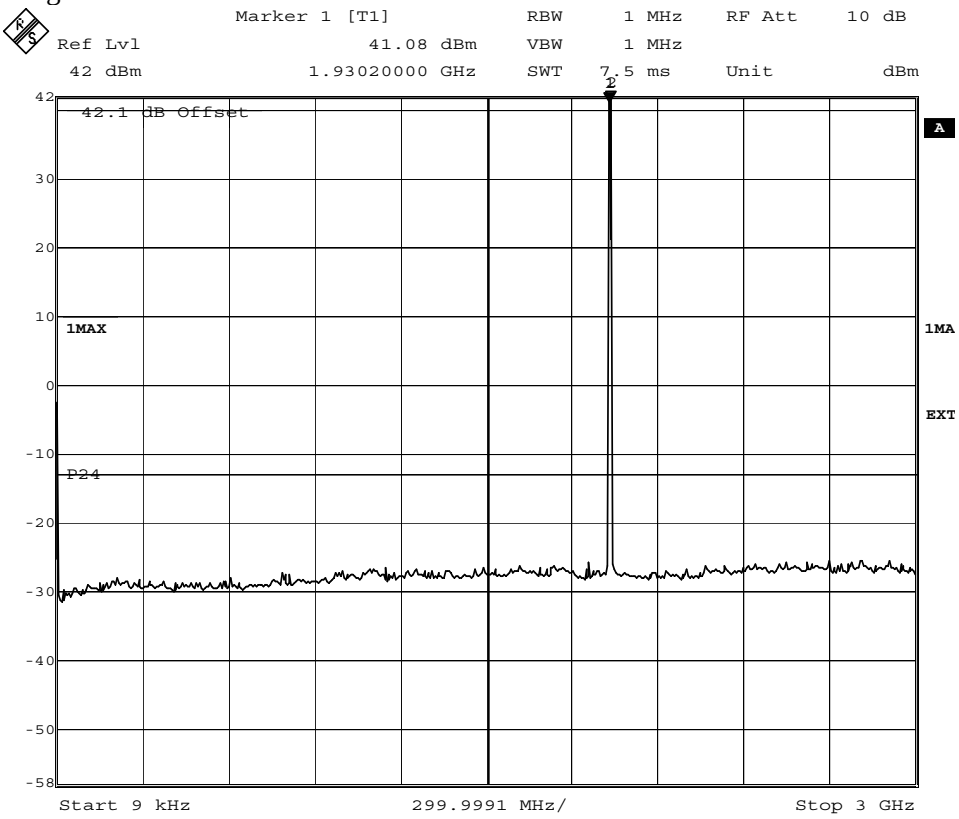

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:39:23

Diagram 10


Marker 1 [T1]
41.08 dBm
1.93020000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 13:19:13

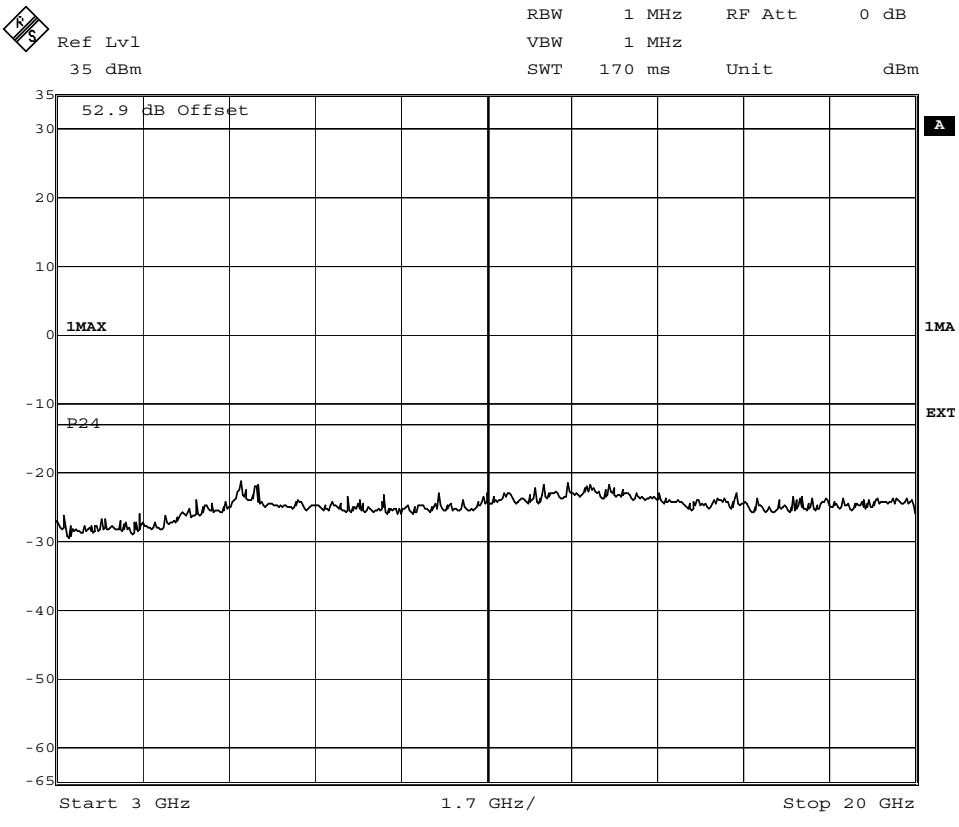
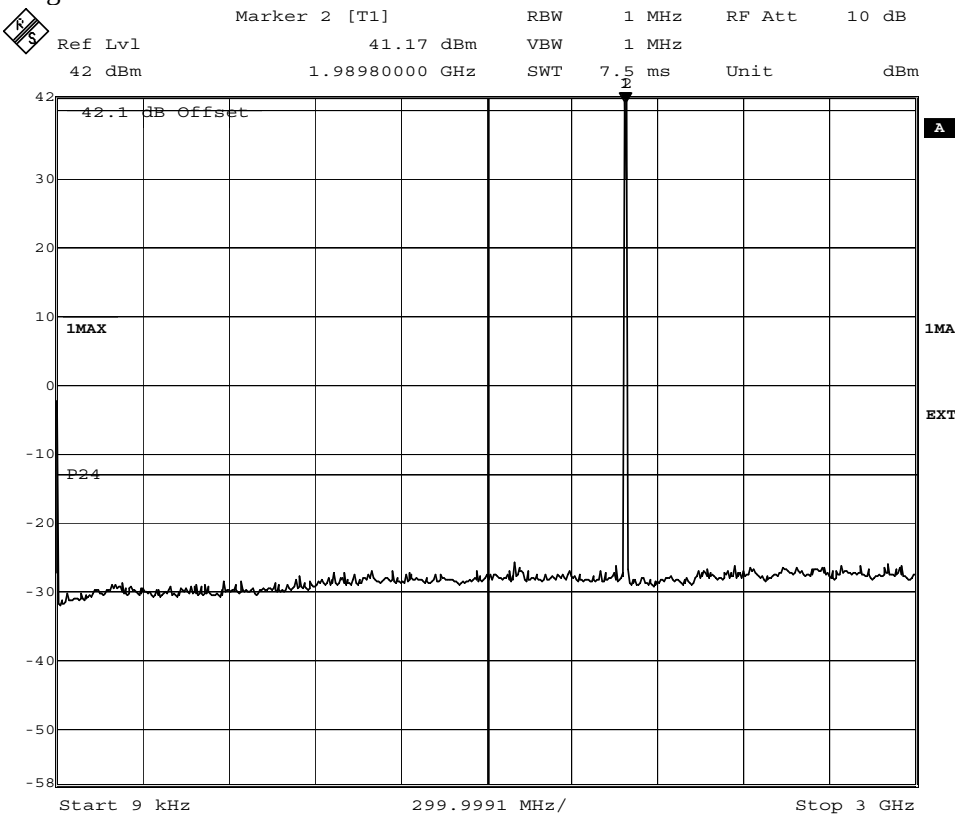
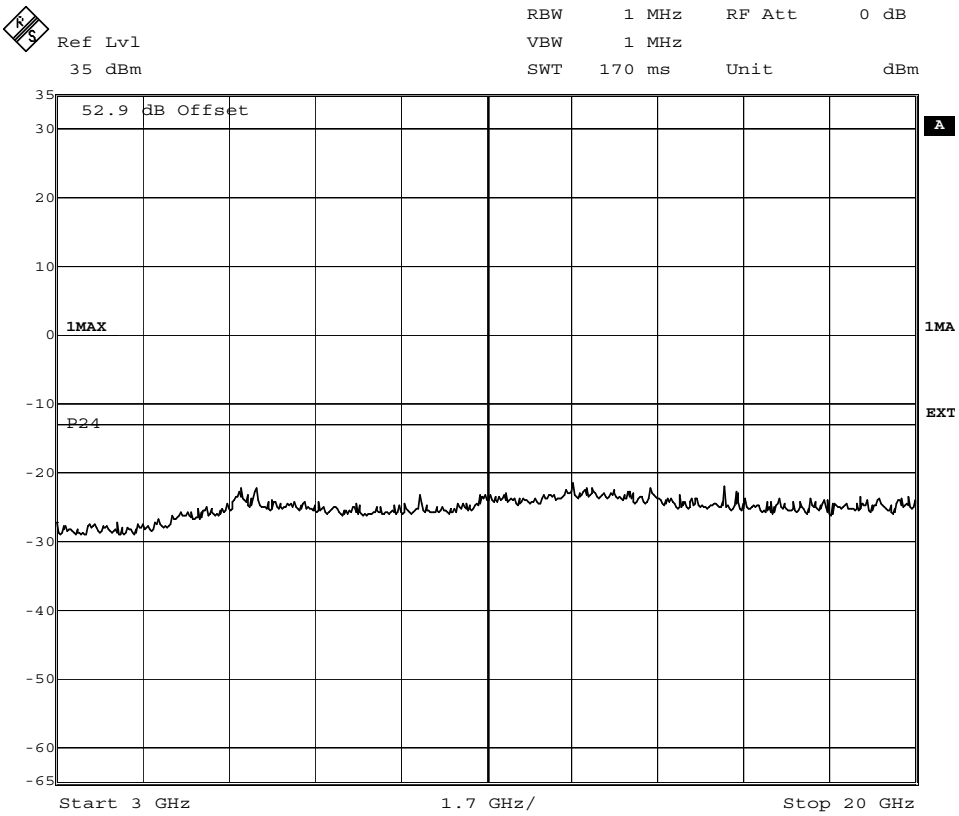

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:19:29

Diagram 11

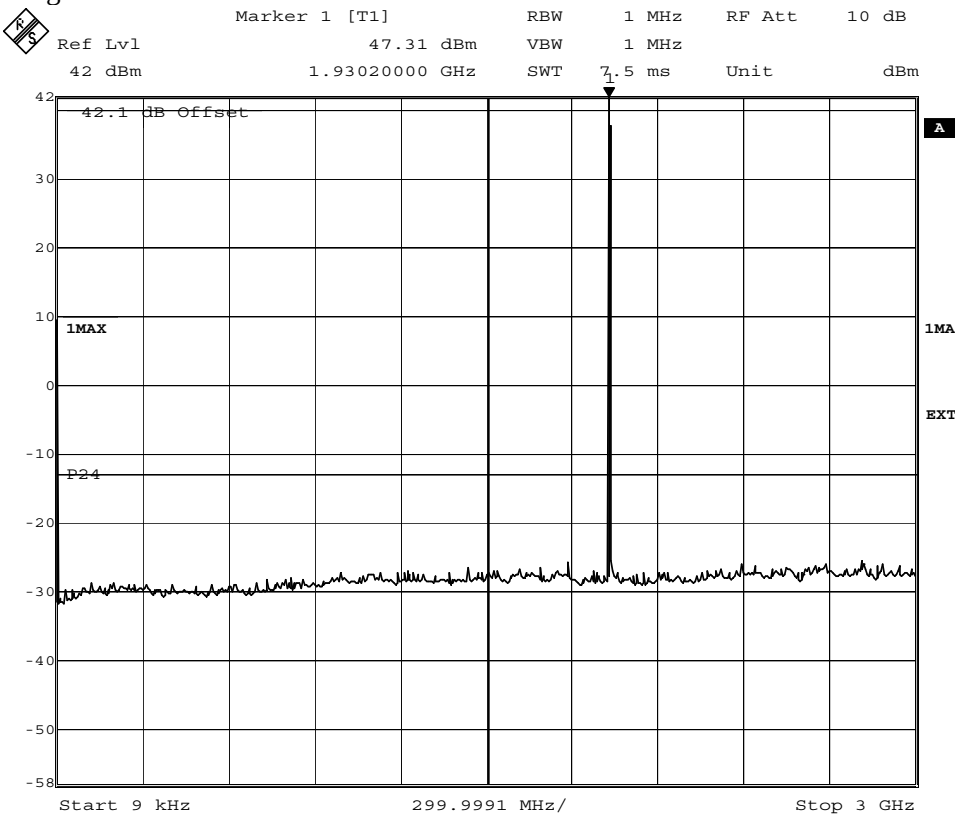


Date: 11.JUN.2008 14:09:12

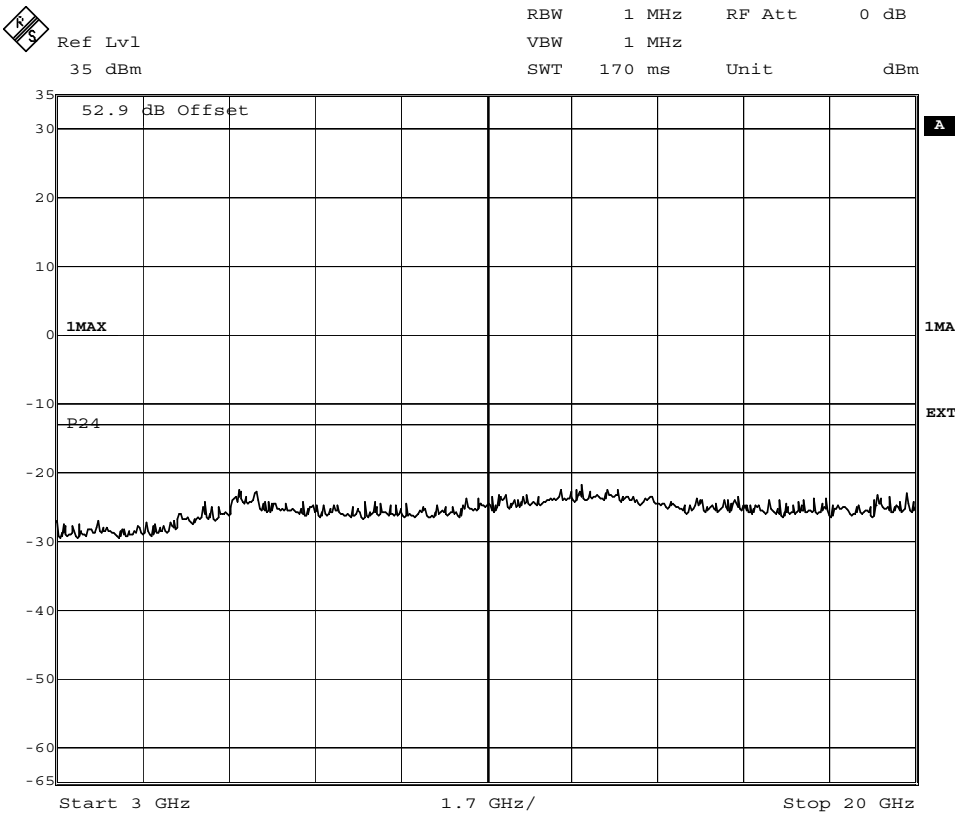


Date: 11.JUN.2008 14:24:12

Diagram 12

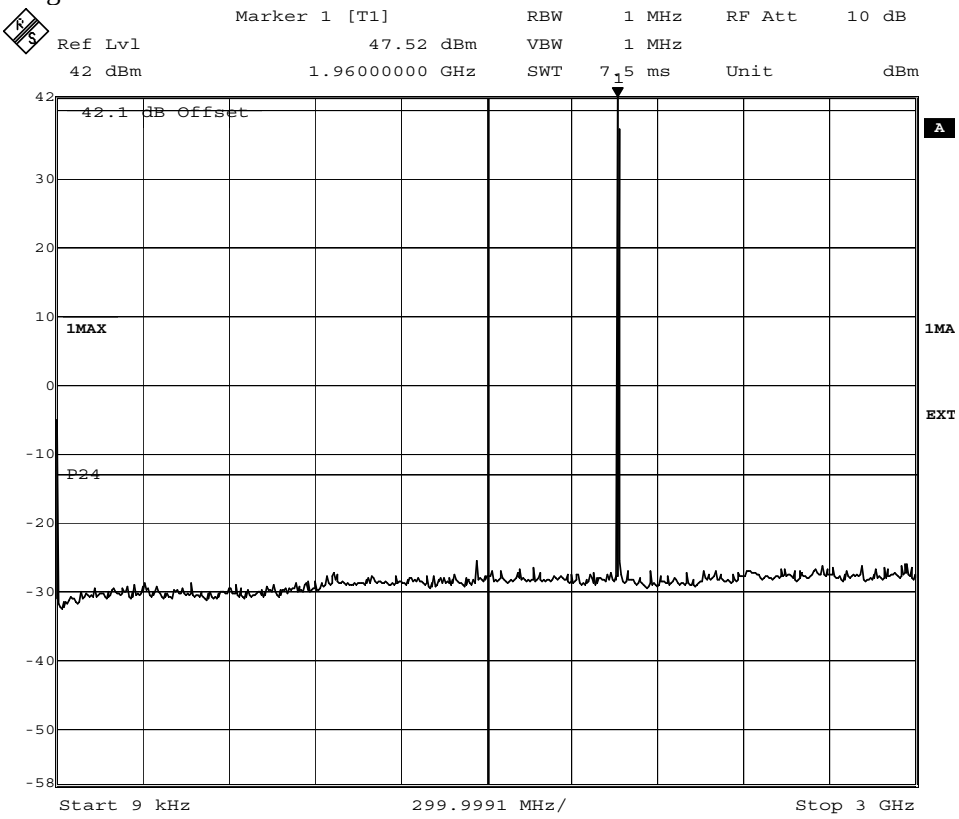


Date: 11.JUN.2008 14:35:52



Date: 11.JUN.2008 14:34:14

Diagram 13


Marker 1 [T1]
47.52 dBm
1.96000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 14:39:48

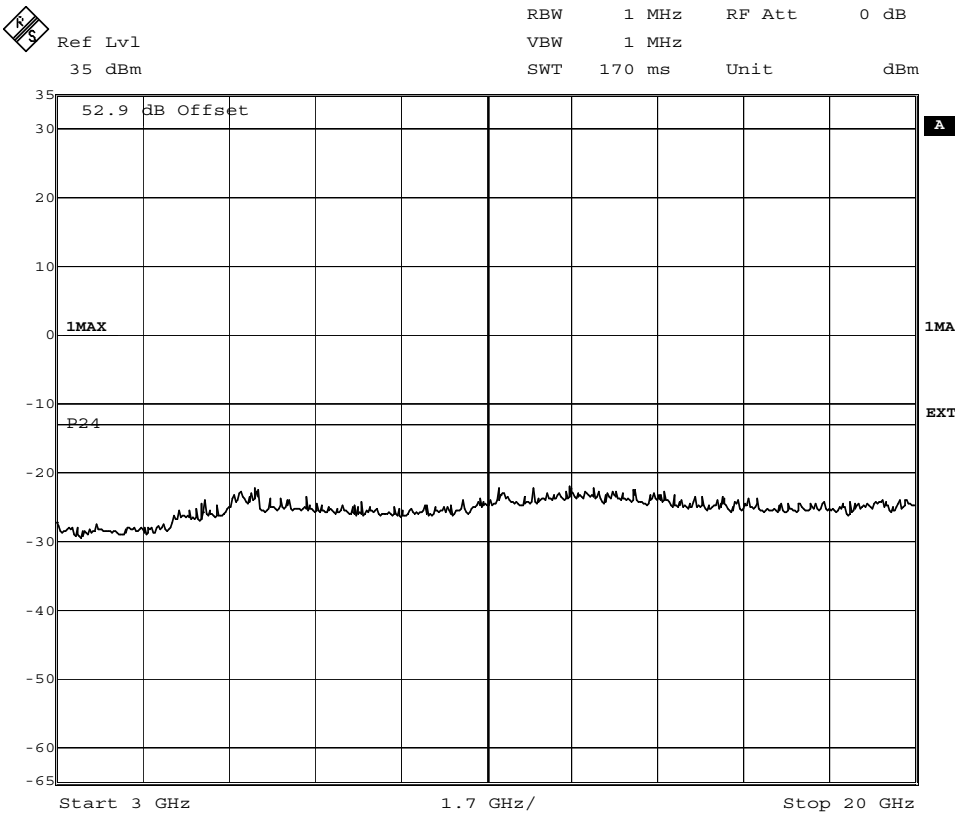
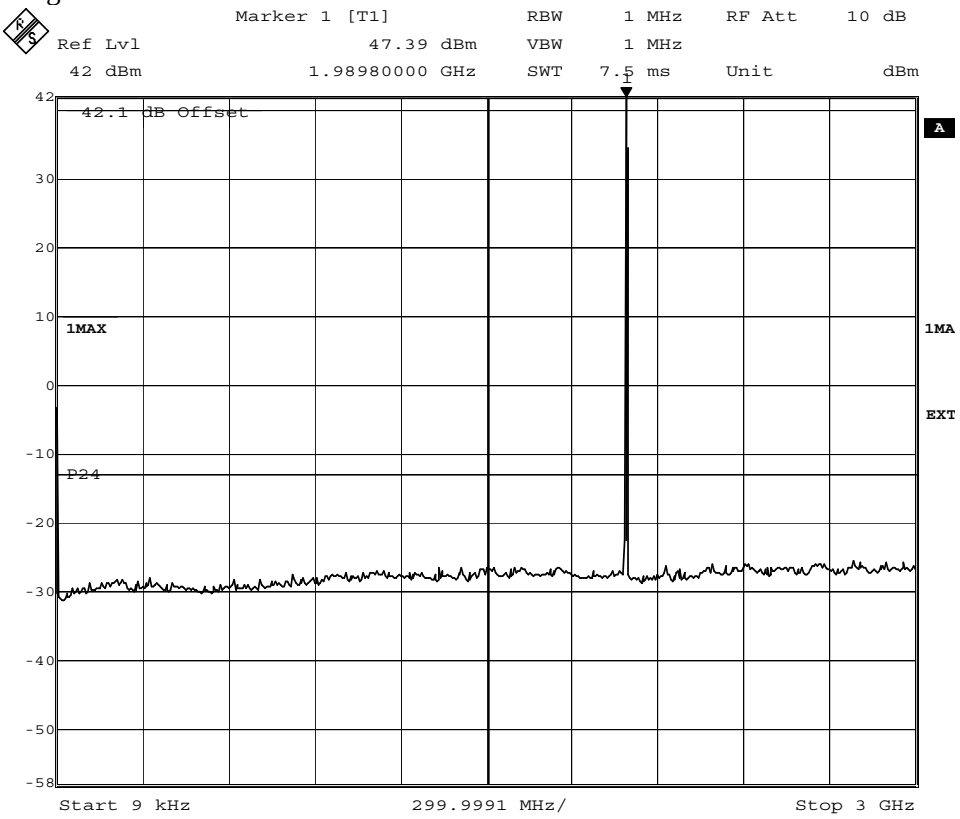

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:33:33

Diagram 14


Marker 1 [T1]
47.39 dBm
1.98980000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 14:45:17

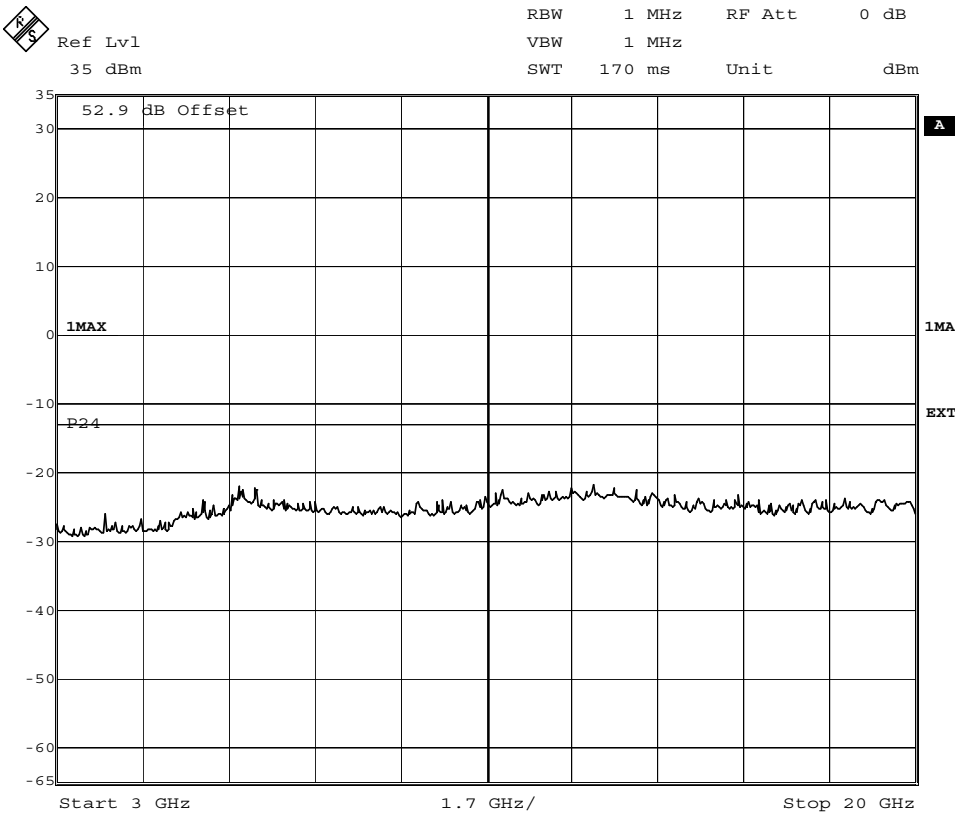
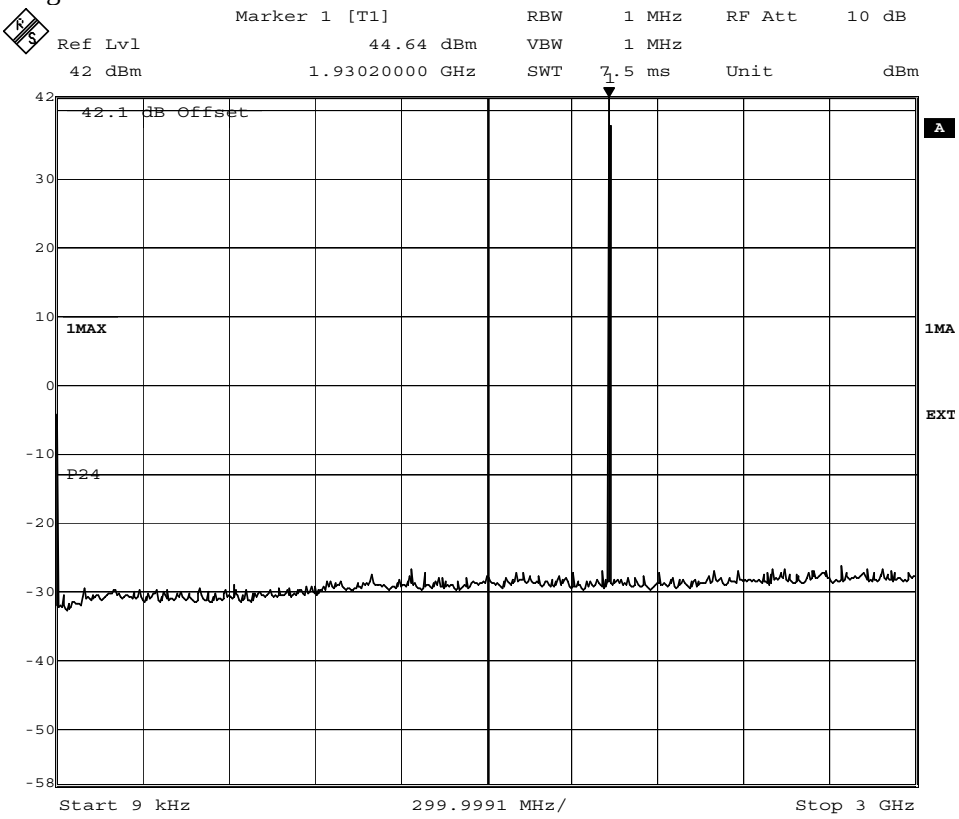

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:32:29

Diagram 15


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
44.64 dBm
VBW 1 MHz
42 dBm
1.93020000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
A
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:08:54

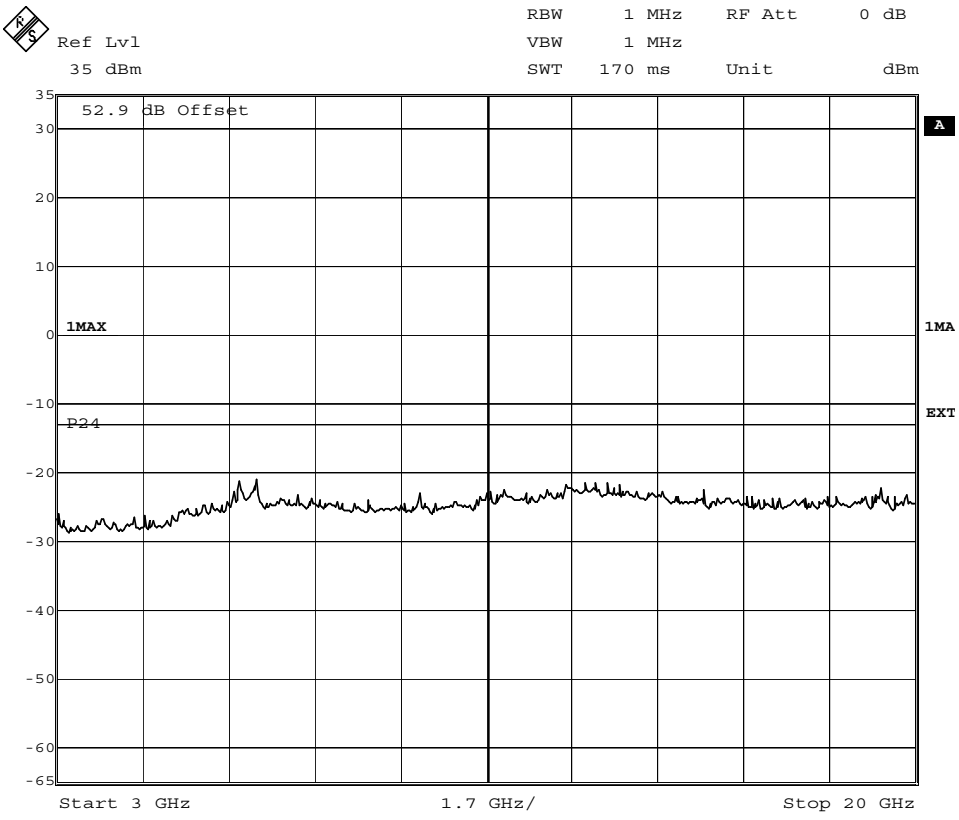
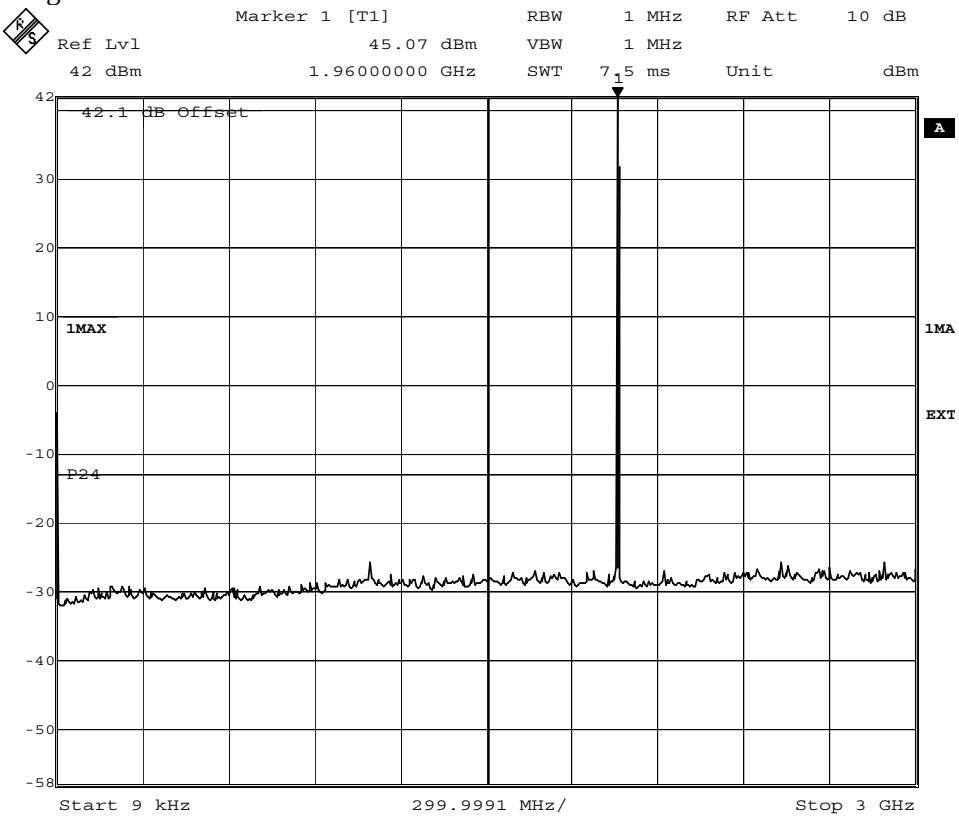

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
A
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:12:58

Diagram 16


Marker 1 [T1]
45.07 dBm
1.96000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:09:42

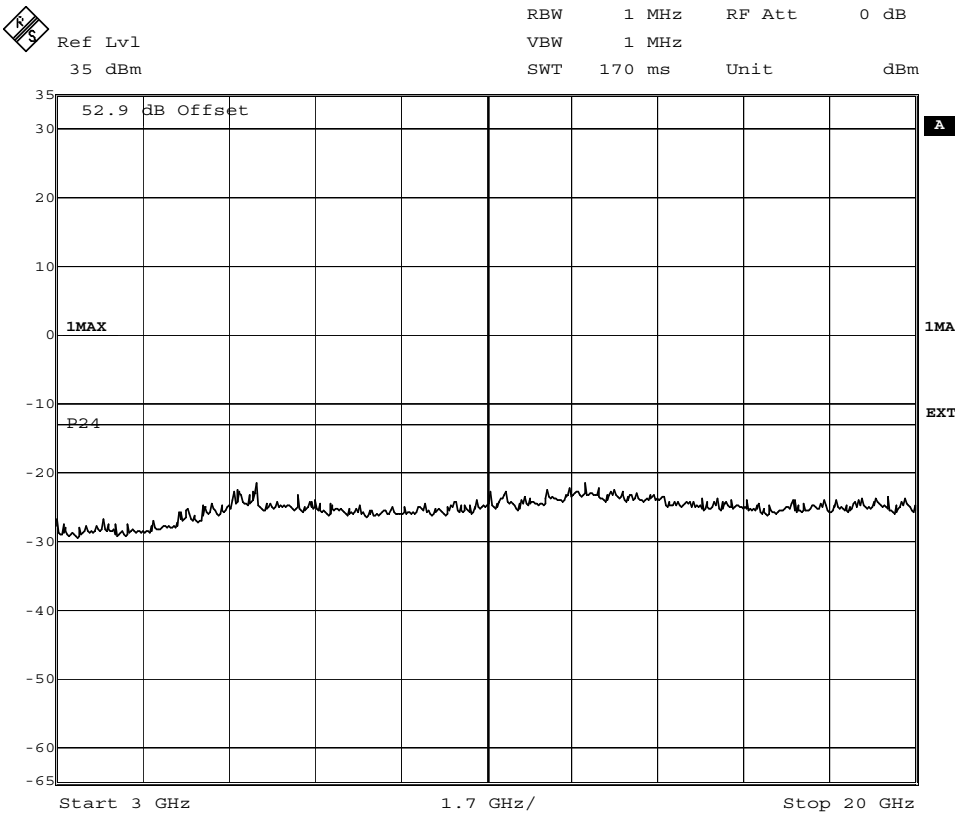
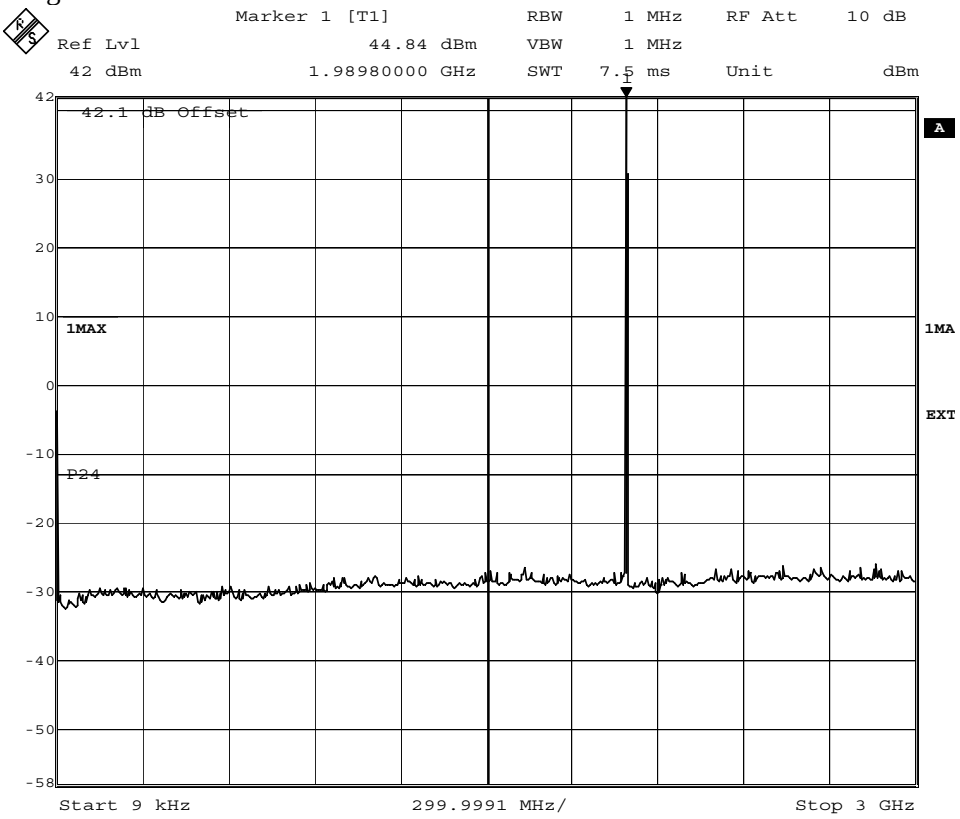

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:12:27

Diagram 17


Marker 1 [T1]
44.84 dBm
1.98980000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
42
30
20
10
0
-10
-20
-30
-40
-50
-58
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:10:34

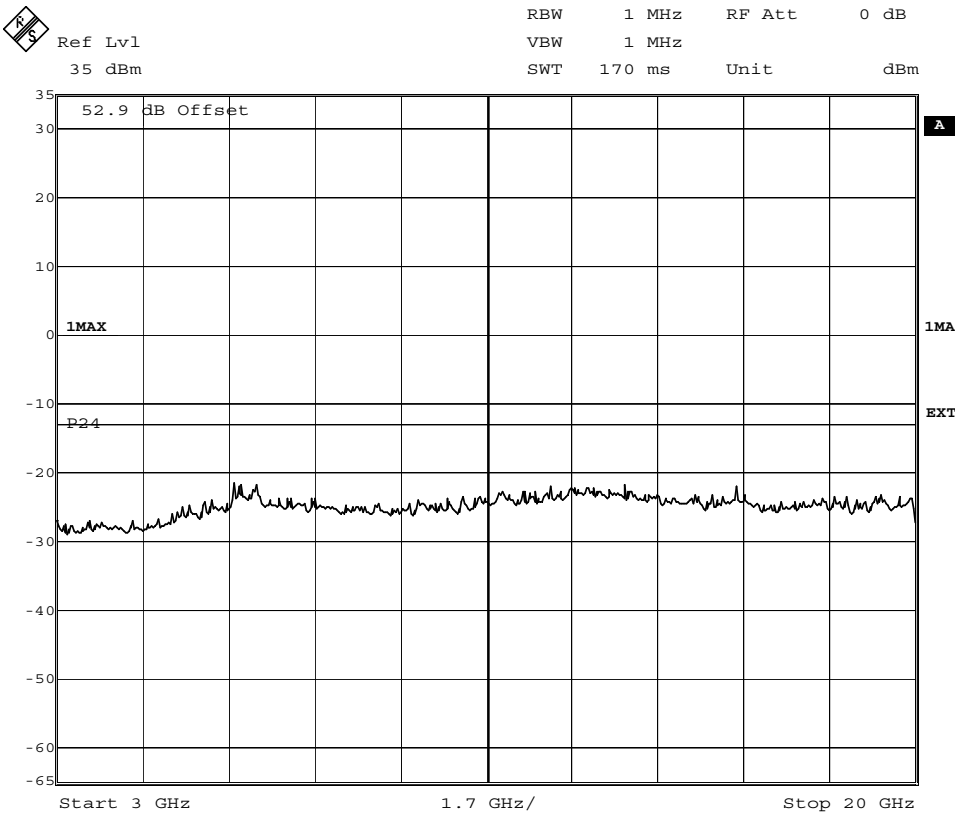
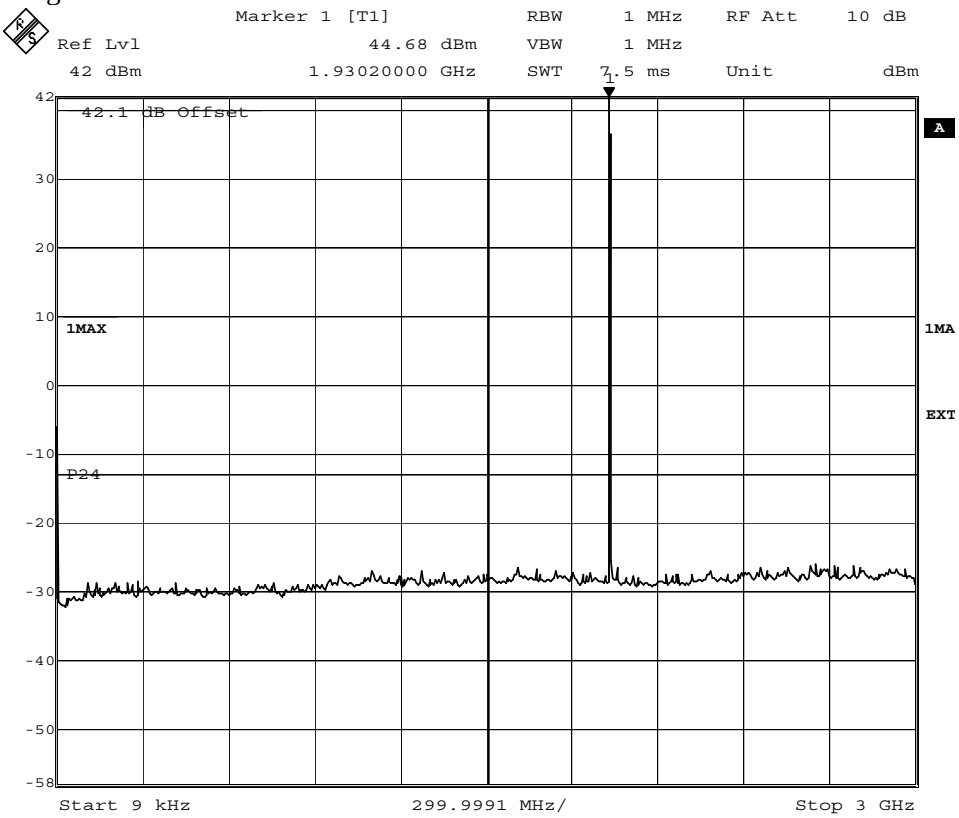

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
35
30
20
10
0
-10
-20
-30
-40
-50
-60
-65
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:11:52

Diagram 18


Marker 1 [T1]
RBW 1 MHz
RF Att 10 dB
Ref Lvl
44.68 dBm
VBW 1 MHz
42 dBm
1.93020000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:43:47

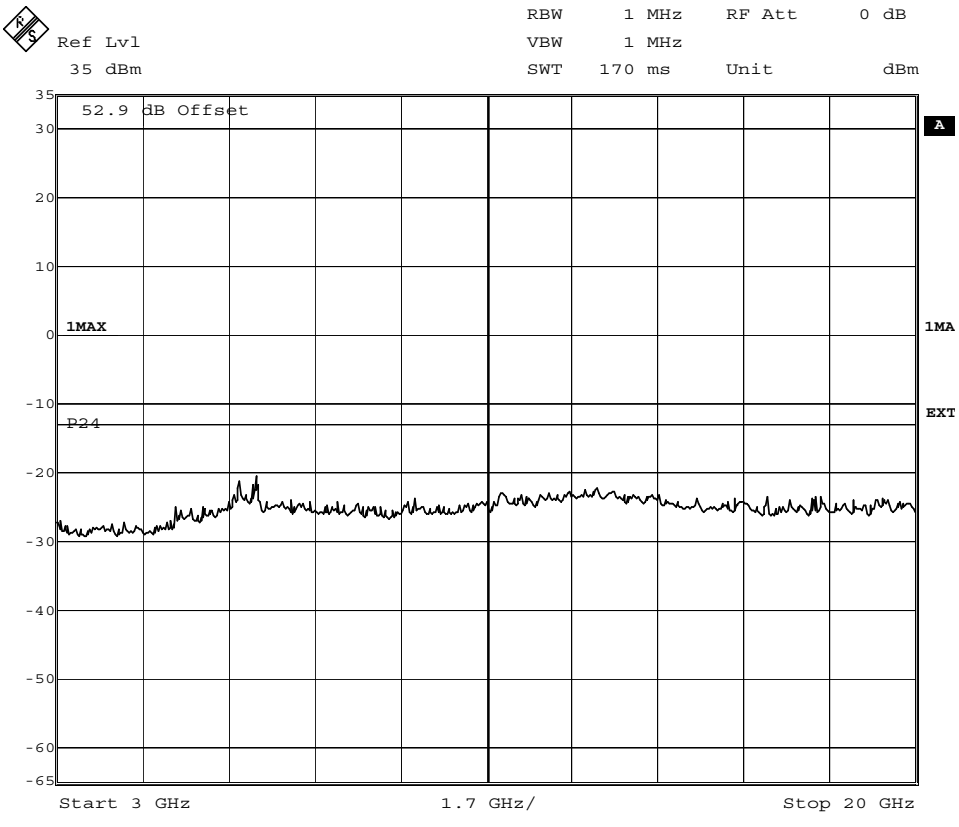
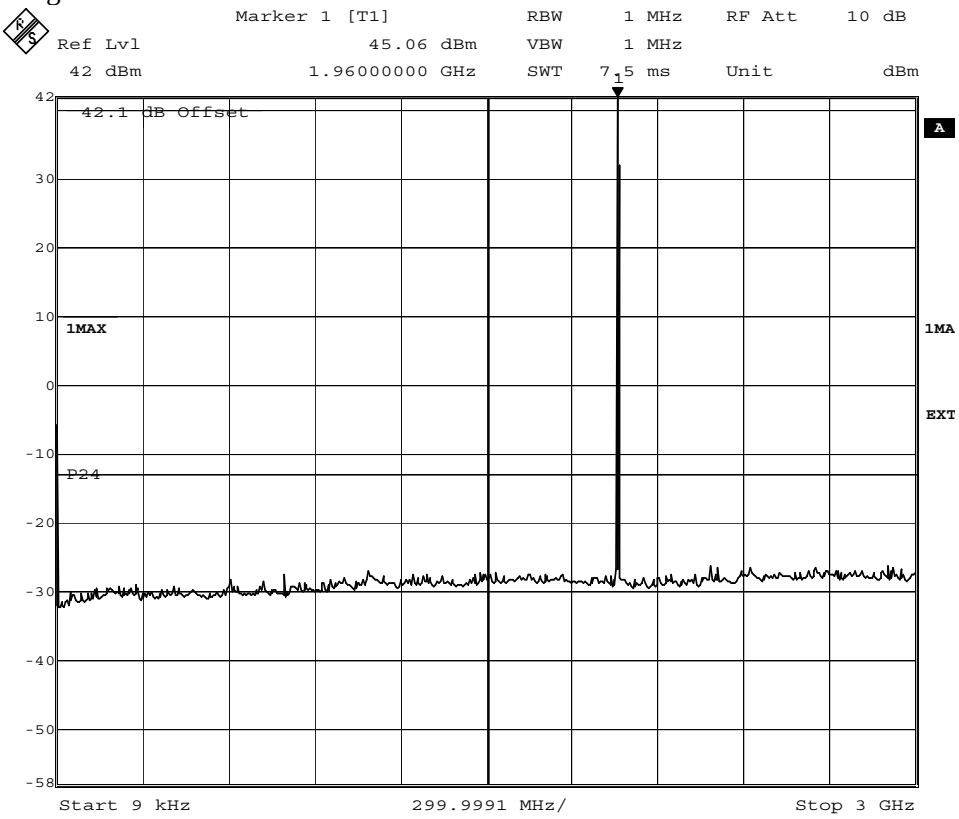

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:42:06

Diagram 19


Marker 1 [T1]
45.06 dBm
1.96000000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 12.JUN.2008 10:44:51

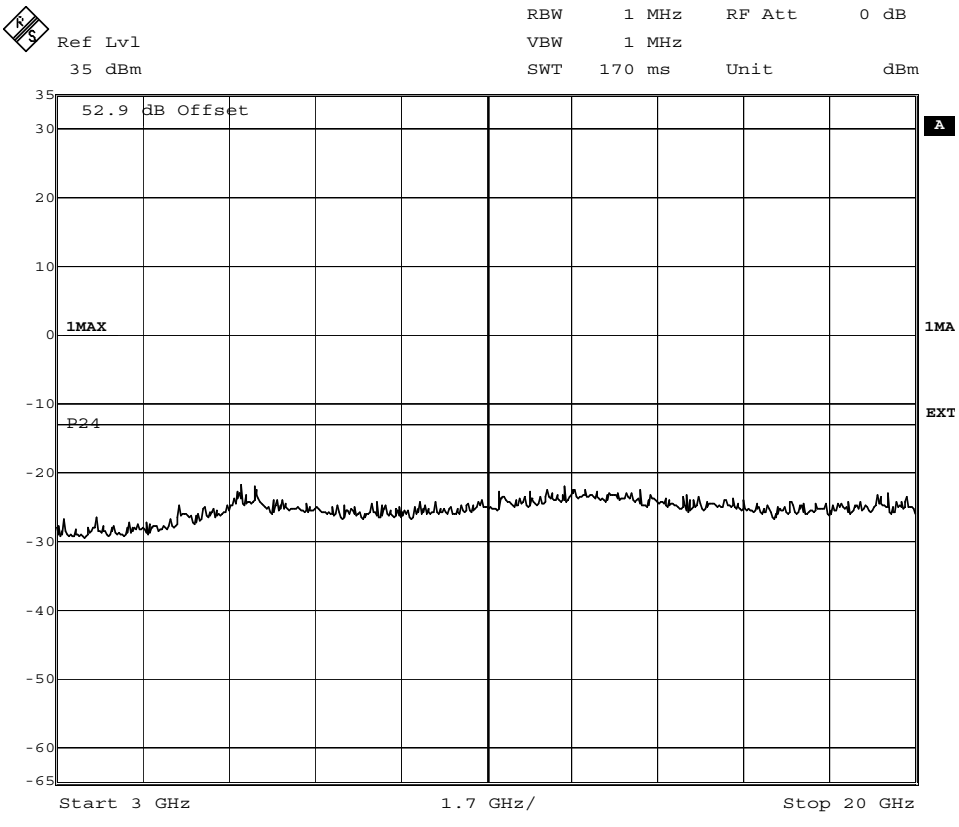
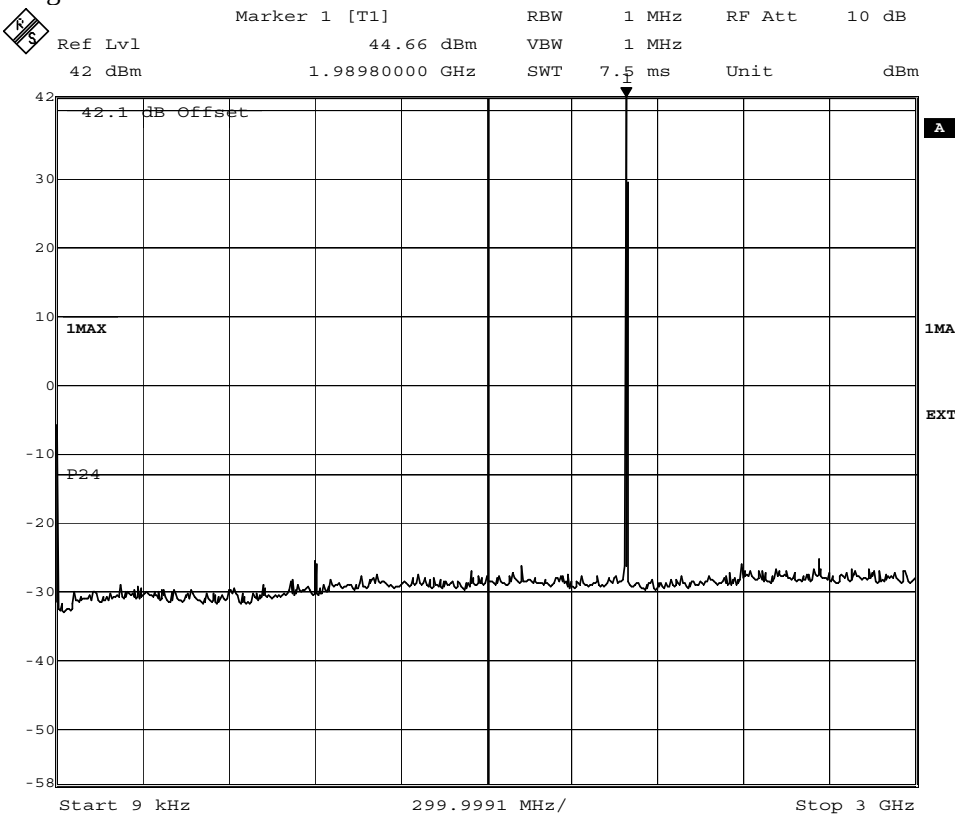
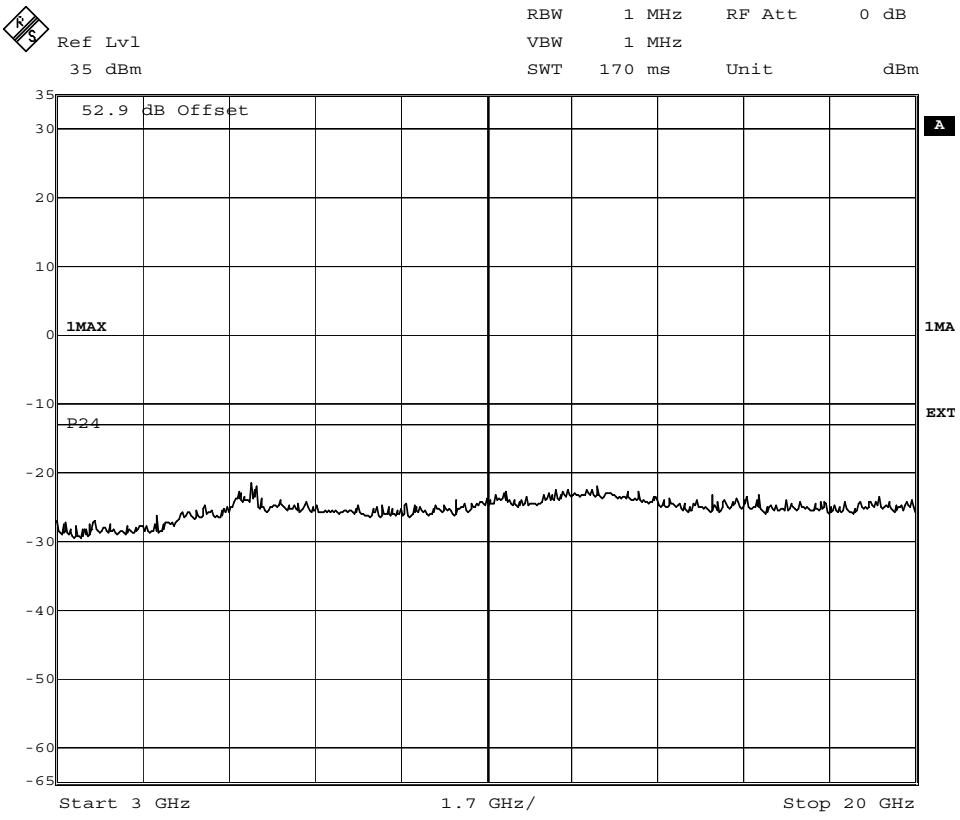

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:41:26

Diagram 20

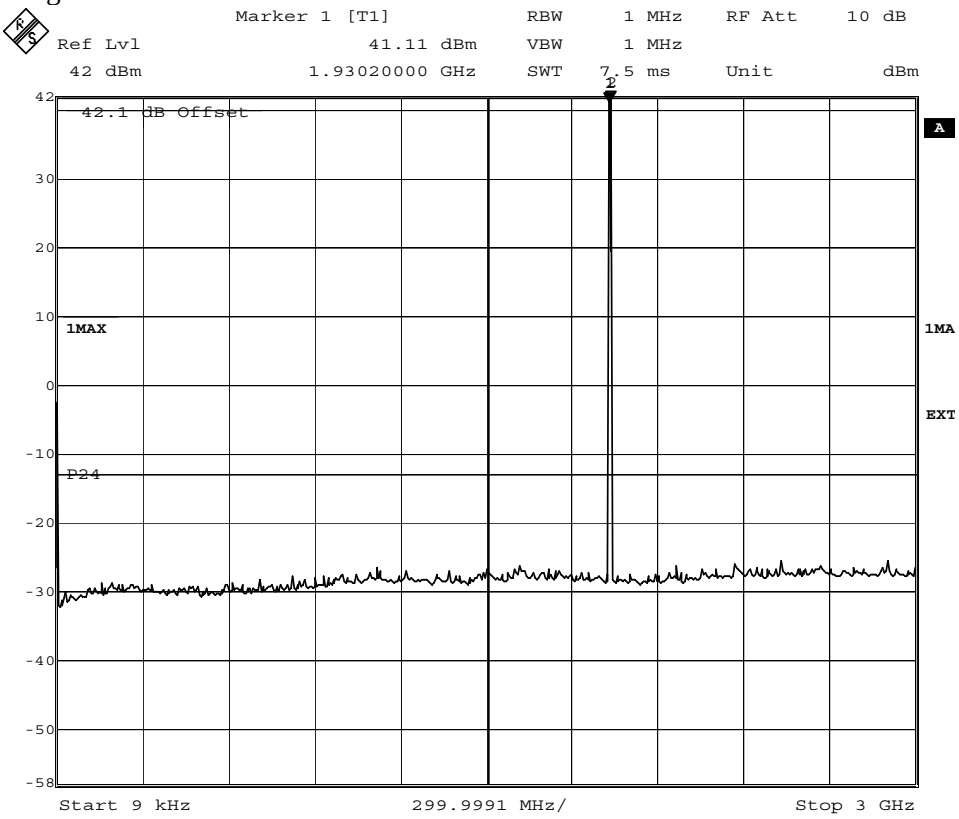


Date: 12.JUN.2008 10:45:45



Date: 12.JUN.2008 10:40:39

Diagram 21


Marker 1 [T1]
41.11 dBm
1.93020000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 13:57:17

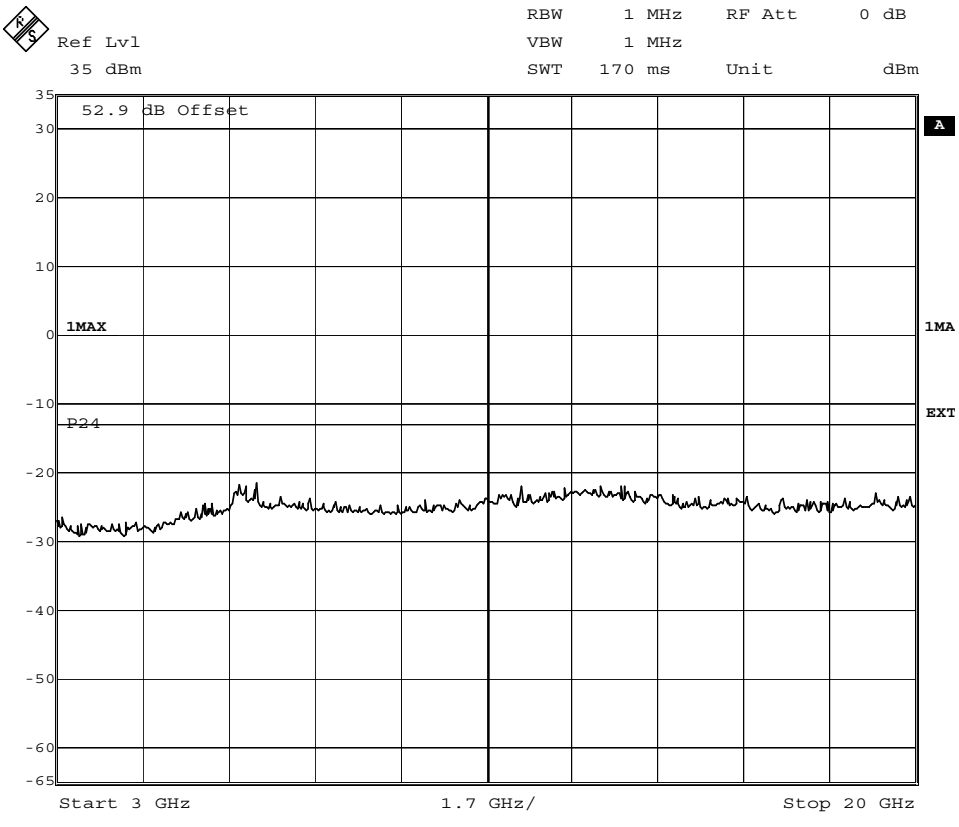
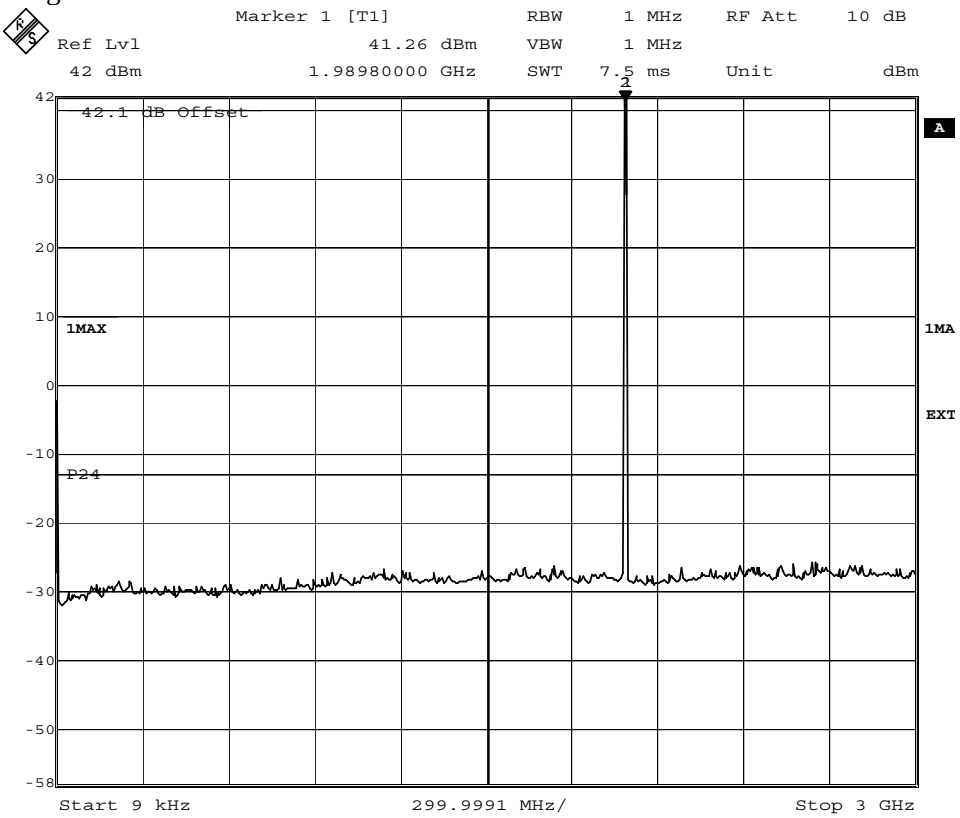

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:21:19

Diagram 22


Marker 1 [T1]
41.26 dBm
1.98980000 GHz
RBW 1 MHz
VBW 1 MHz
SWT 7.5 ms
RF Att 10 dB
Unit dBm
Ref Lvl
42 dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
42
30
20
10
0
-10
-20
-30
-40
-50
-58
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 11.JUN.2008 14:00:22

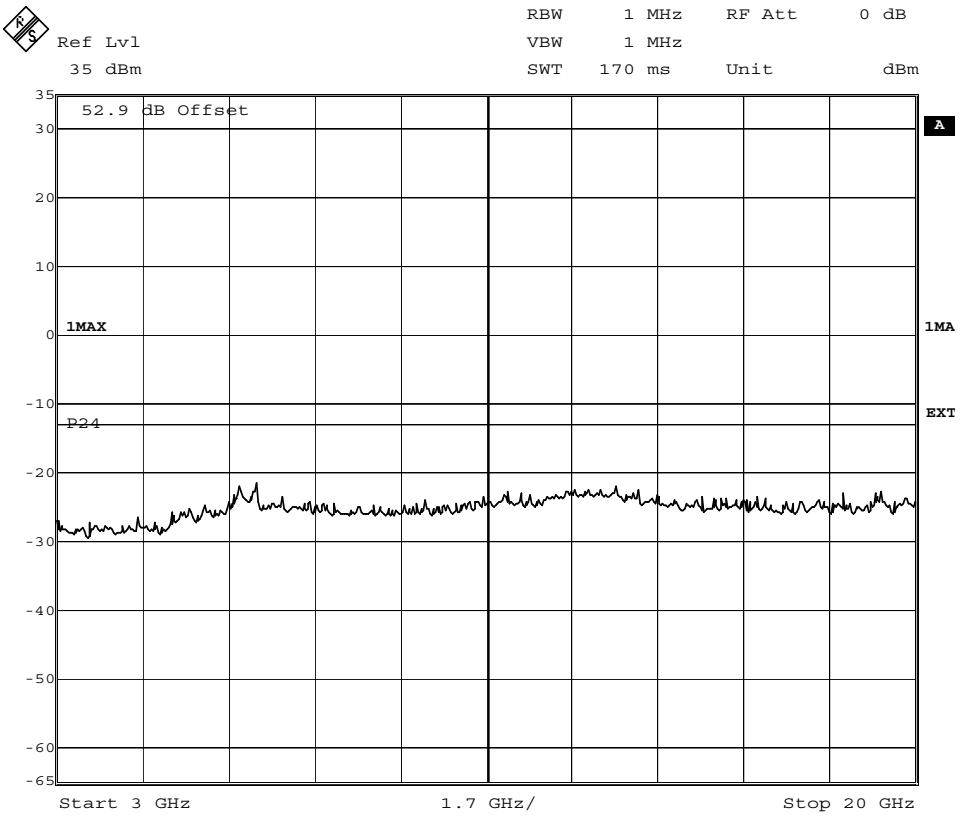
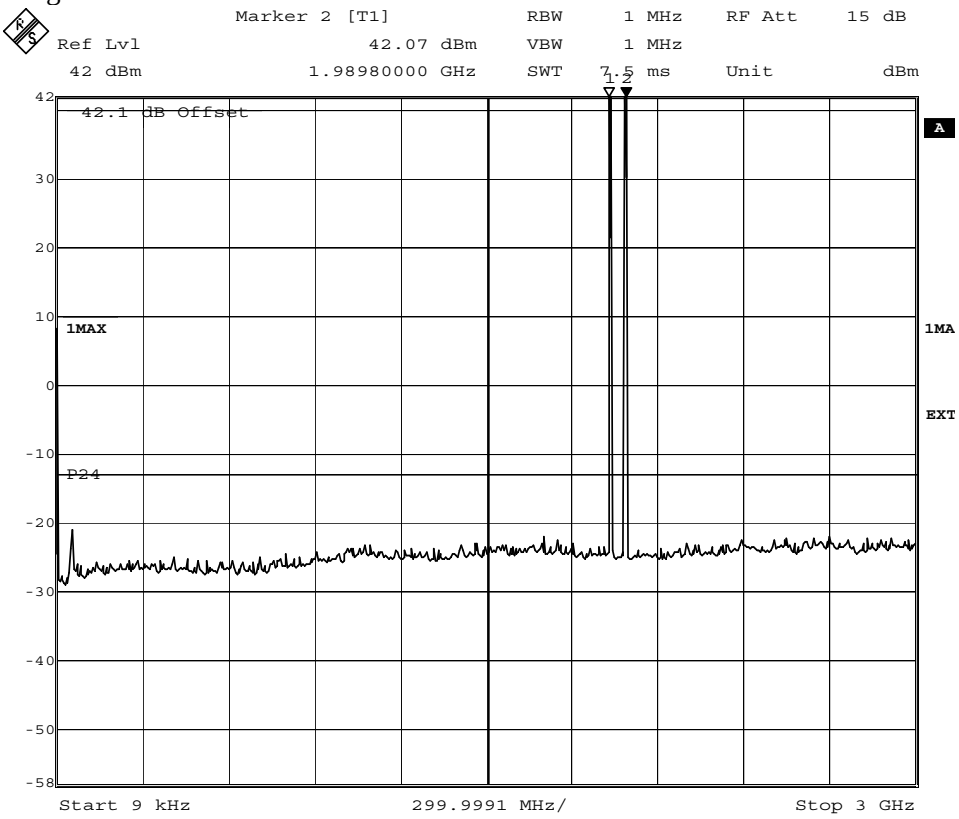

RBW 1 MHz
VBW 1 MHz
SWT 170 ms
RF Att 0 dB
Unit dBm
Ref Lvl
35 dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
35
30
20
10
0
-10
-20
-30
-40
-50
-60
-65
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 11.JUN.2008 14:22:33

Diagram 23


Marker 2 [T1]
RBW 1 MHz
RF Att 15 dB
Ref Lvl
42.07 dBm
VBW 1 MHz
42 dBm
1.98980000 GHz
SWT 7.5 ms
Unit dBm
1Δ2
42.1 dB Offset
A
1MAX
1MA
EXT
P24
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 13.JUN.2008 09:11:43

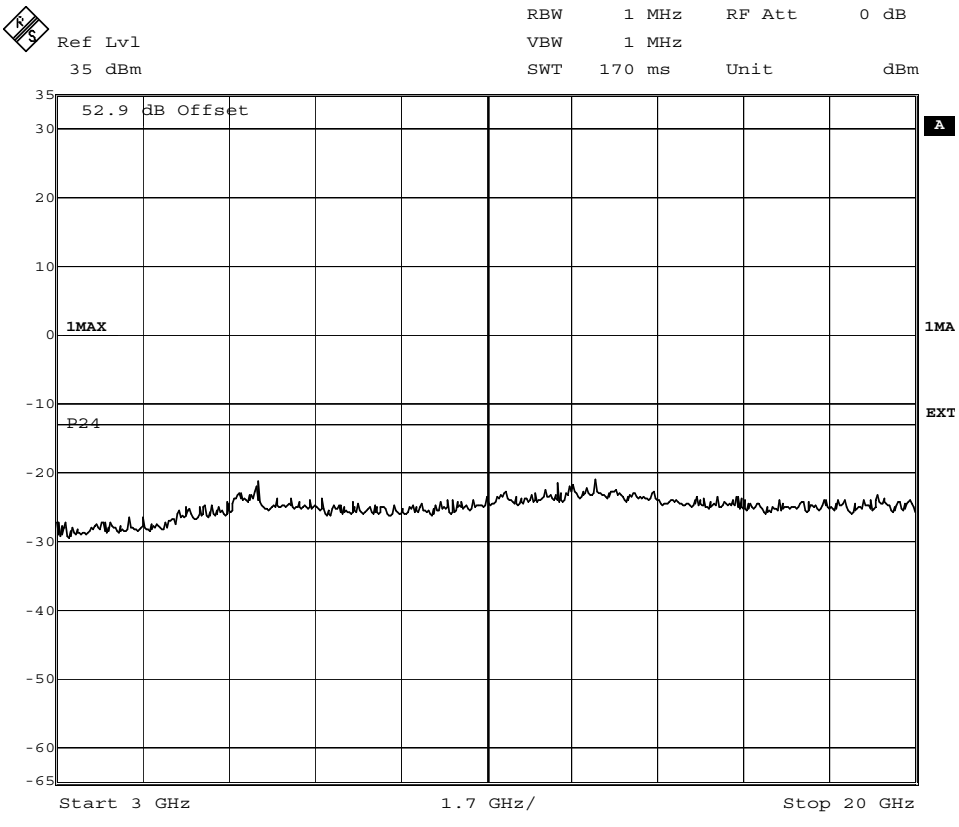
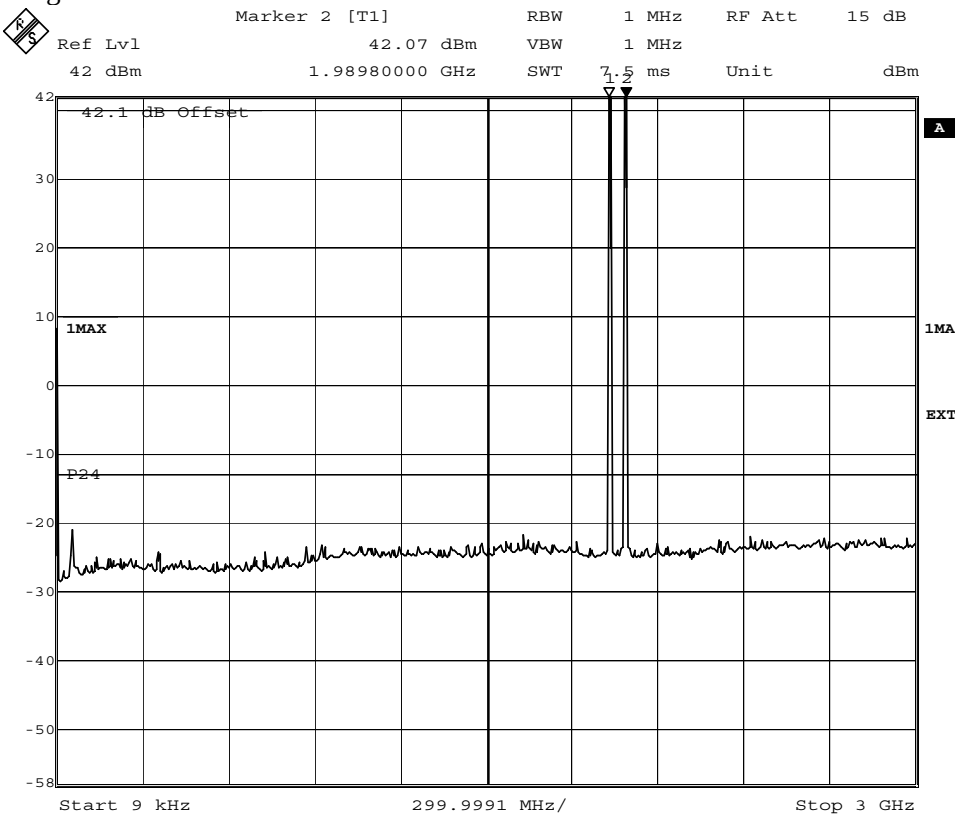
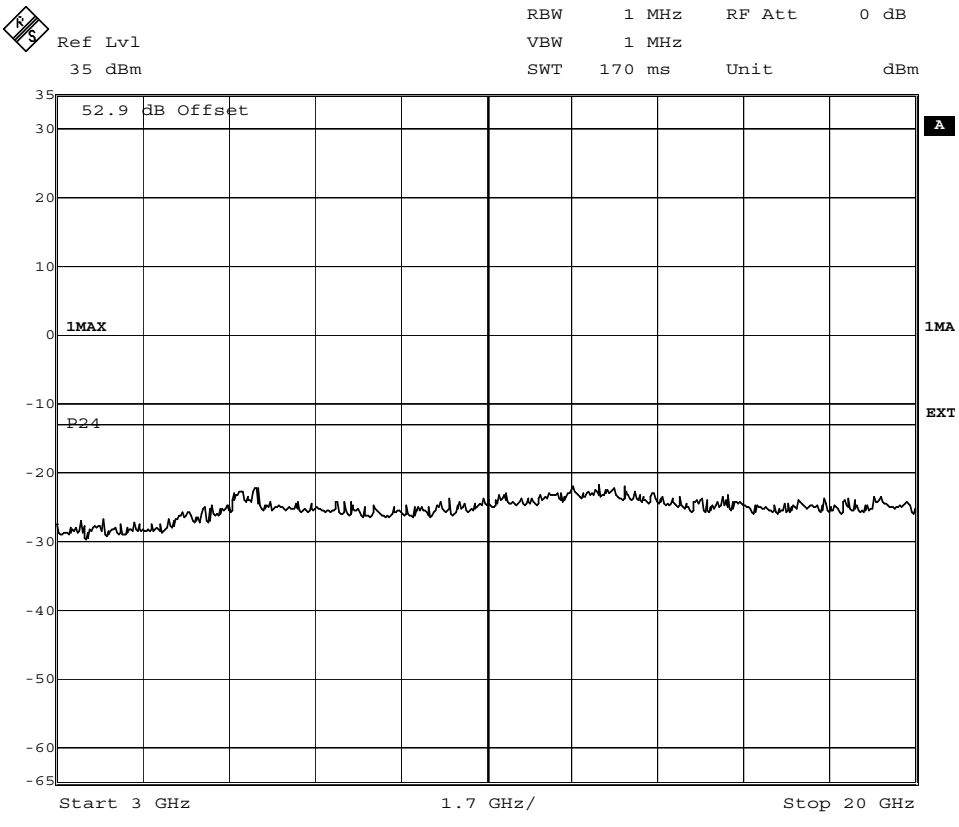

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
A
1MAX
1MA
EXT
P24
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 13.JUN.2008 09:20:00

Diagram 24


Marker 2 [T1]
RBW 1 MHz
RF Att 15 dB
Ref Lvl
42.07 dBm
VBW 1 MHz
42 dBm
1.98980000 GHz
SWT 7.5 ms
Unit dBm
42.1 dB Offset
1MAX
P24
A
1MA
EXT
Start 9 kHz
299.9991 MHz/
Stop 3 GHz
Date: 13.JUN.2008 09:14:41


RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
35 dBm
SWT 170 ms
Unit dBm
52.9 dB Offset
1MAX
P24
A
1MA
EXT
Start 3 GHz
1.7 GHz/
Stop 20 GHz
Date: 13.JUN.2008 09:15:53

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date	Temperature	Humidity
2008-06-10	22 °C ± 3 °C	55 % ± 5 %
2008-06-11	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 212, Issue 1, Industry Canada file no.:IC 3482.
The transmitter was 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 in the frequency range 30 MHz – 18 GHz and 1m in the frequency range 18-20 GHz.

A pre-measurement was first performed:
In the frequency range 30 MHz-20 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:

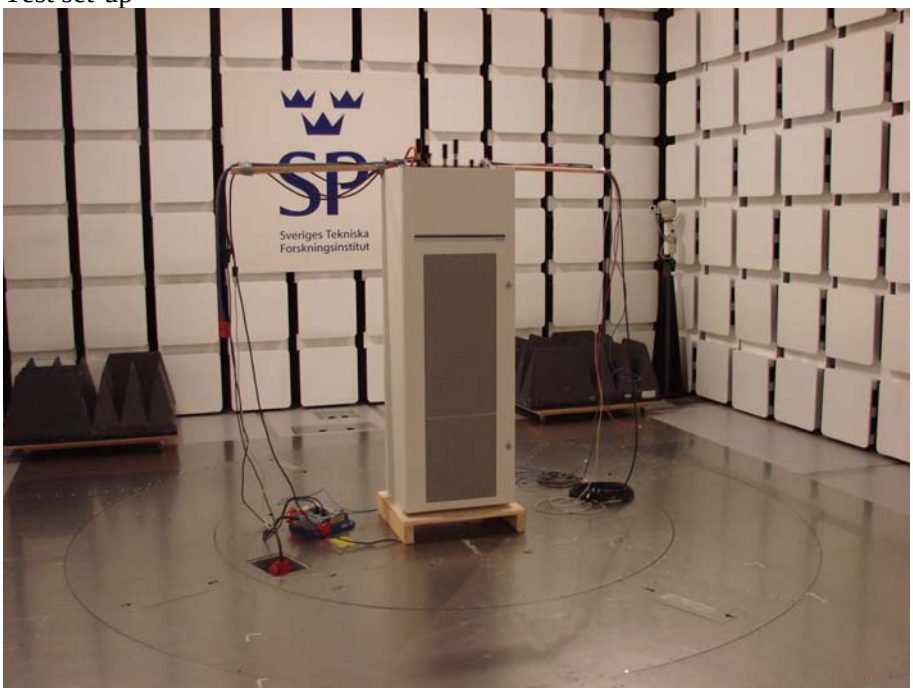
1. The pre-measurement was first performed with peak detector. The EUT was measured in eight directions and with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.
2. Spurious radiation on frequencies closer than 20 dB to the limit is scanned 0-360 degrees and the antenna is scanned 1-4 m for maximum 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	503 292
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	2011-02	502 548
HP-filter, RLC electronics F-16149	2008-07	503 739
Std. gain: 16240-25	-	503 939
Std. gain: 18240-25	-	503 900
Std. gain: 20240	-	-
MITEQ Low Noise Amplifier	2009-04	503 285
Testo 615, Temperature and humidity meter	2009-04	503 505

Results

CDU-G

Test set-up

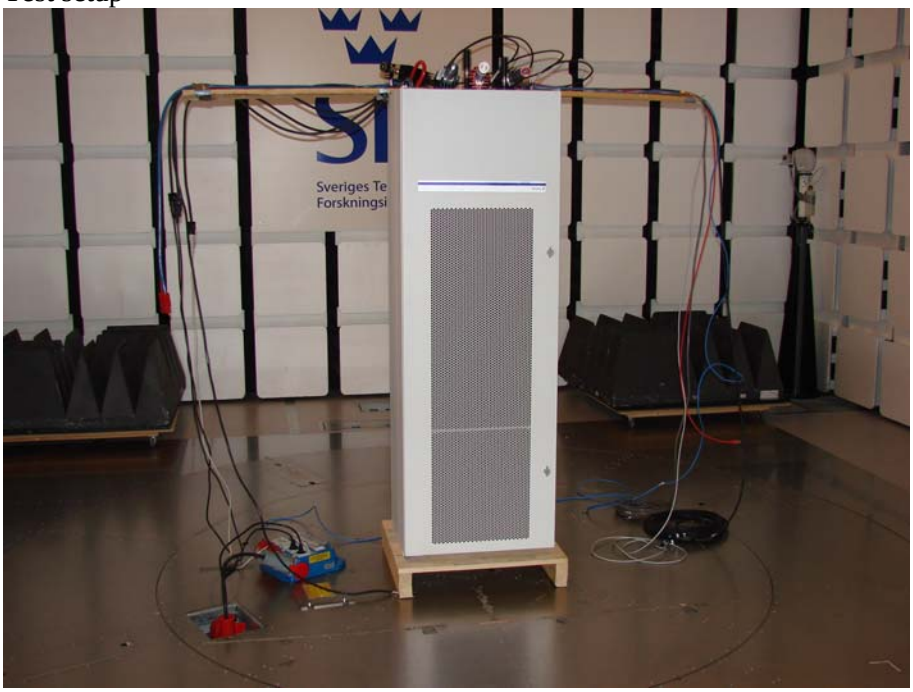


GMSK and 8-PSK

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

CDU-F

Test setup



GMSK and 8-PSK

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30-20 000	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

Industry Canada RSS-133 section 6.7, Receiver spurious emissions

Date	Temperature	Humidity
2008-06-12	23 °C ± 3 °C	31 % ± 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 ports. 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	2008-07	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Result

The emission spectra are shown in appendix 7.1:

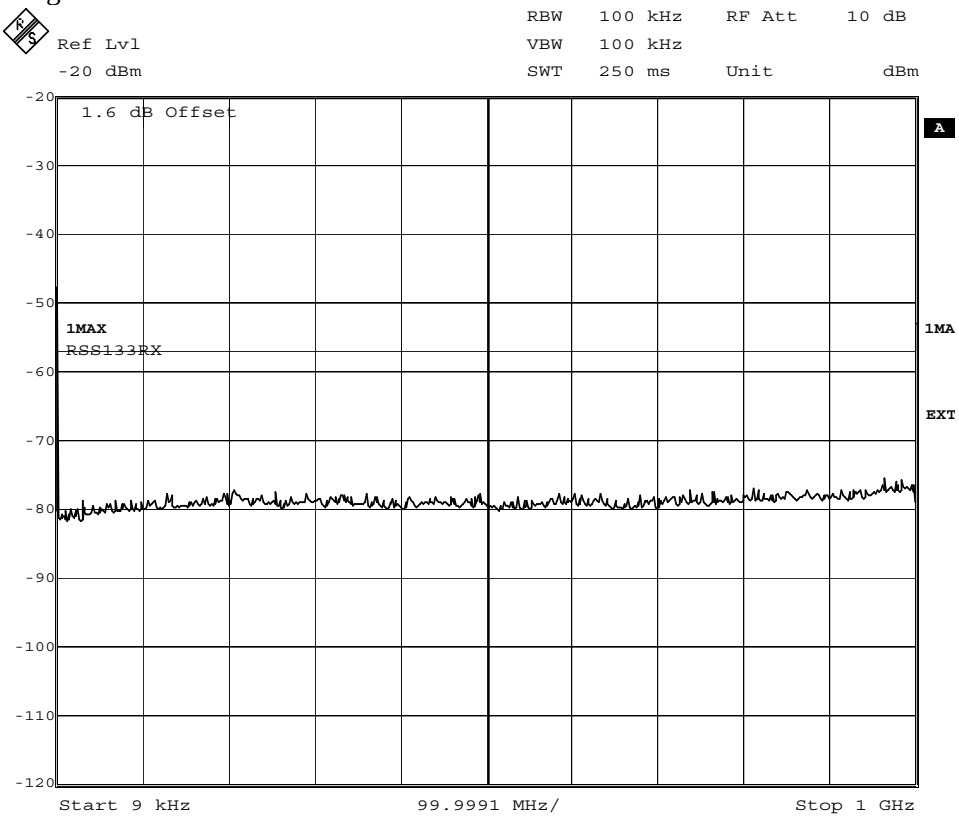
Diagram 1:	9 kHz-20 GHz, Rx-mode	RX 1 Ch. 512
Diagram 2:	9 kHz-20 GHz, Rx-mode	RX 1 Ch. 810
Diagram 3:	9 kHz-20 GHz, Rx-mode	RX 2 Ch. 512
Diagram 4:	9 kHz-20 GHz, Rx-mode	RX 2 Ch. 810

Limit

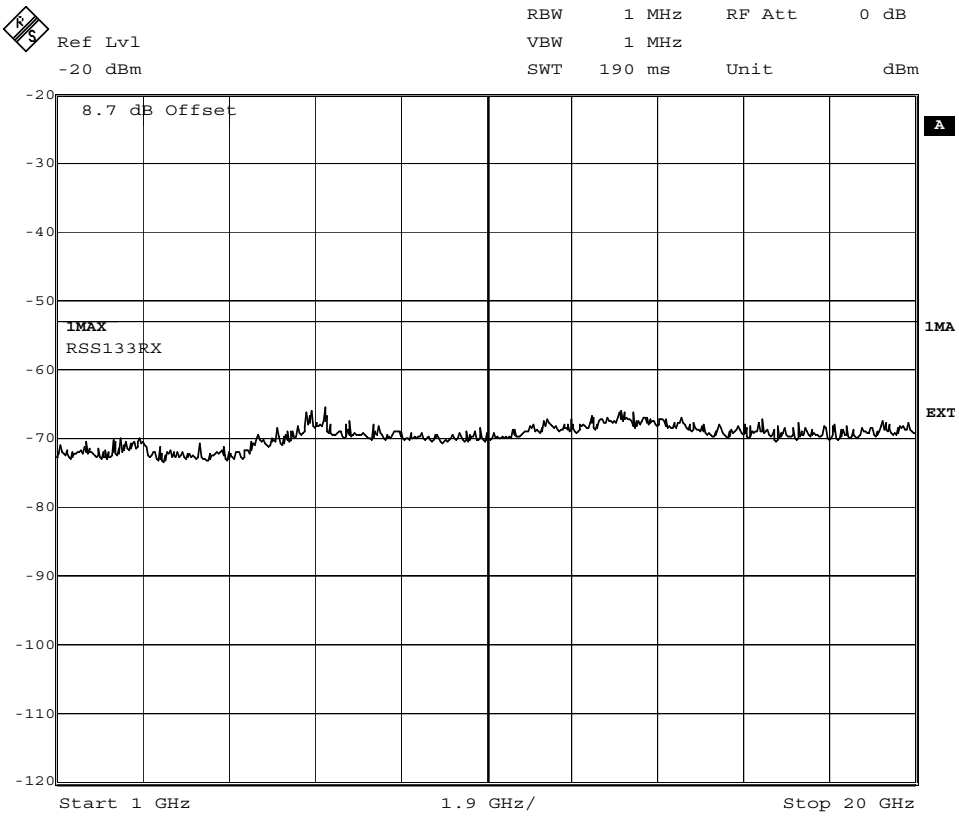
The power at the antenna terminal shall not exceed 2.0 nanowatts (-57 dBm) in the frequency range 30-1000 MHz and shall not exceed 5.0 nanowatts (-53 dBm) above 1 GHz.

Compliant ?	Yes

Diagram 1

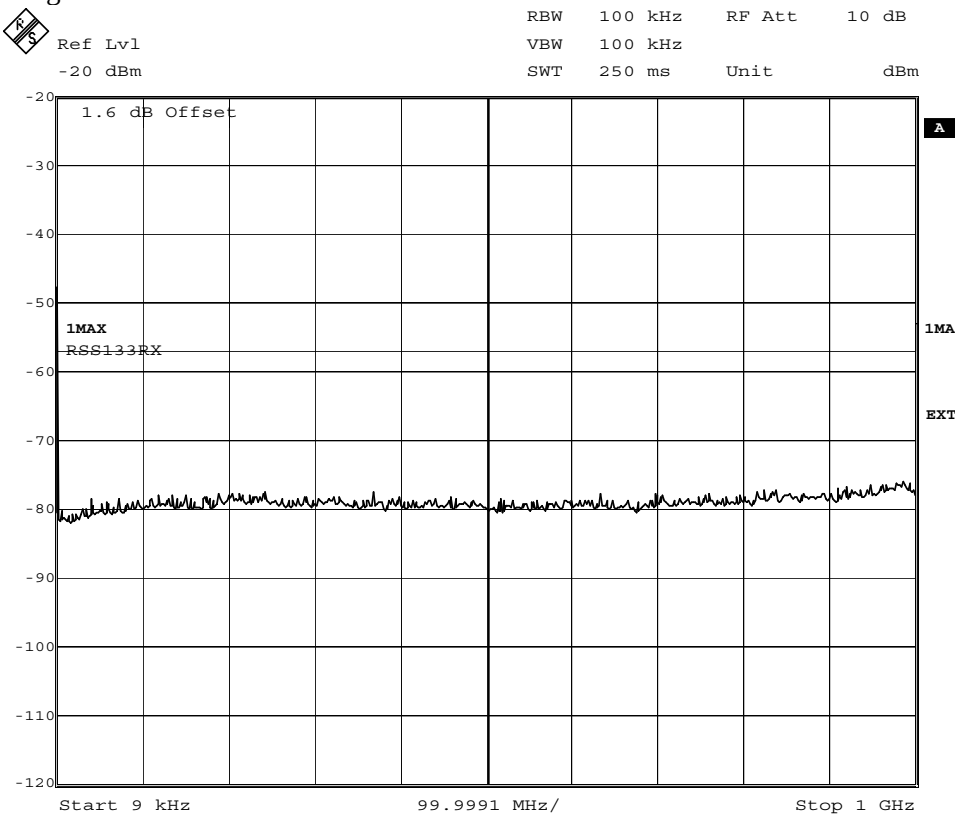


Date: 12.JUN.2008 10:25:53



Date: 12.JUN.2008 10:28:56

Diagram 2


RBW 100 kHz
RF Att 10 dB
Ref Lvl
VBW 100 kHz
-20 dBm
SWT 250 ms
Unit dBm
1.6 dB Offset
A
1MAX
RSS133RX
1MA
EXT
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 12.JUN.2008 10:27:00

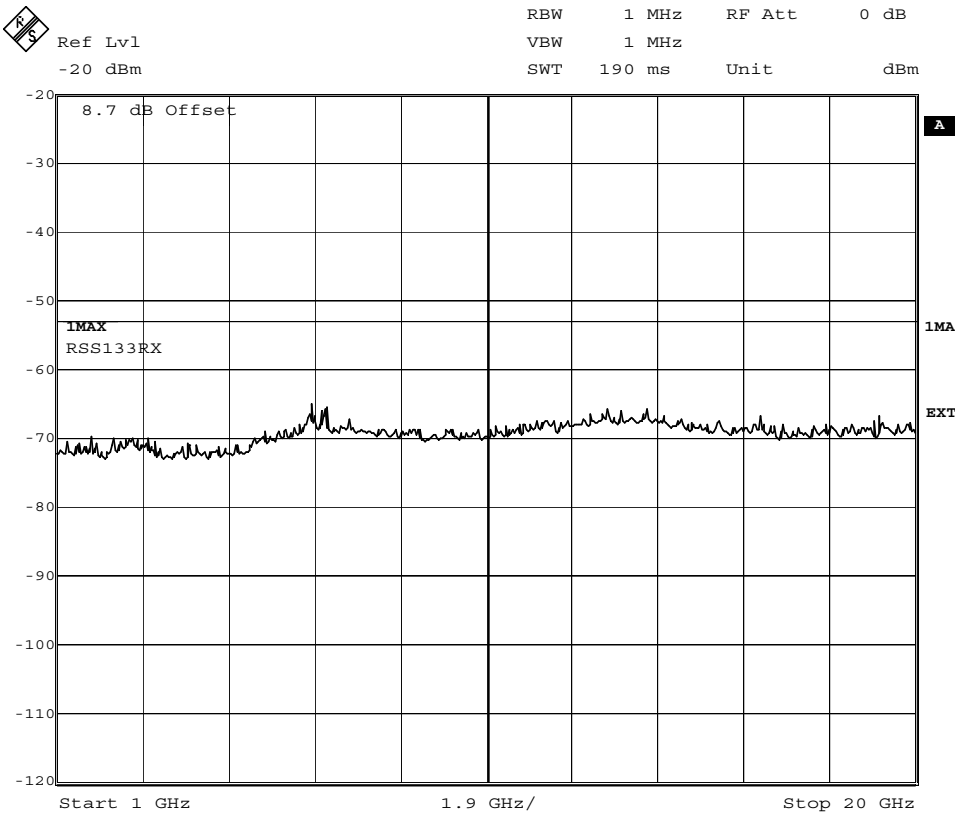
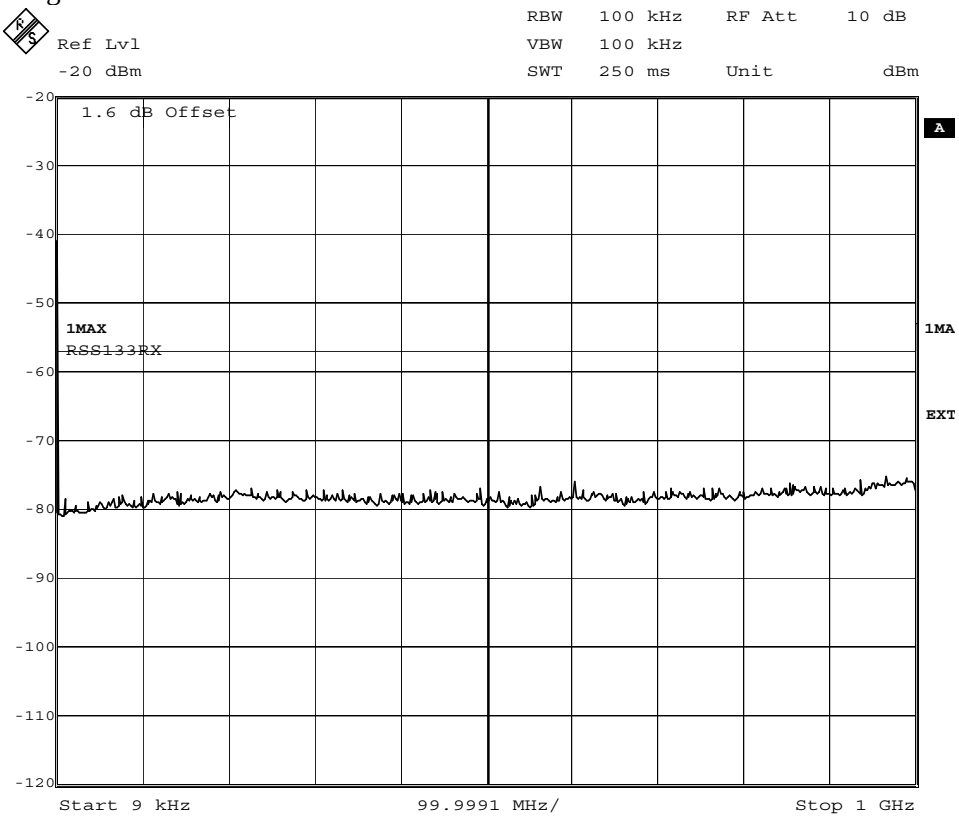
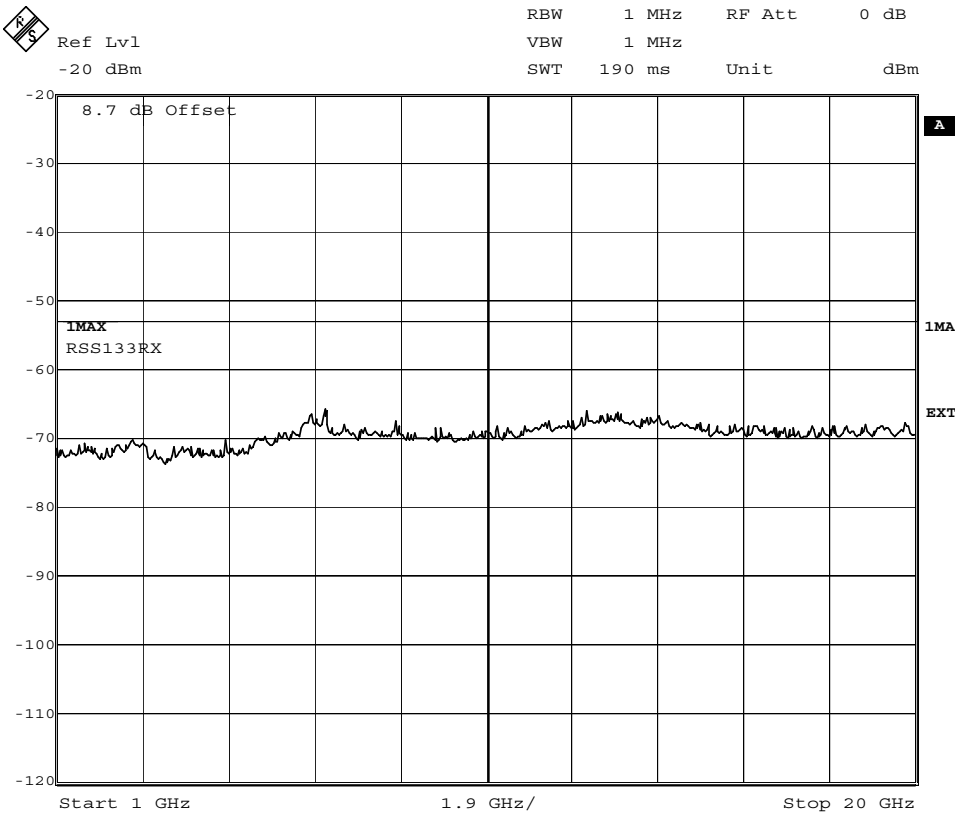

RBW 1 MHz
RF Att 0 dB
Ref Lvl
VBW 1 MHz
-20 dBm
SWT 190 ms
Unit dBm
8.7 dB Offset
A
1MAX
RSS133RX
1MA
EXT
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Start 1 GHz
1.9 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:28:03

Diagram 3

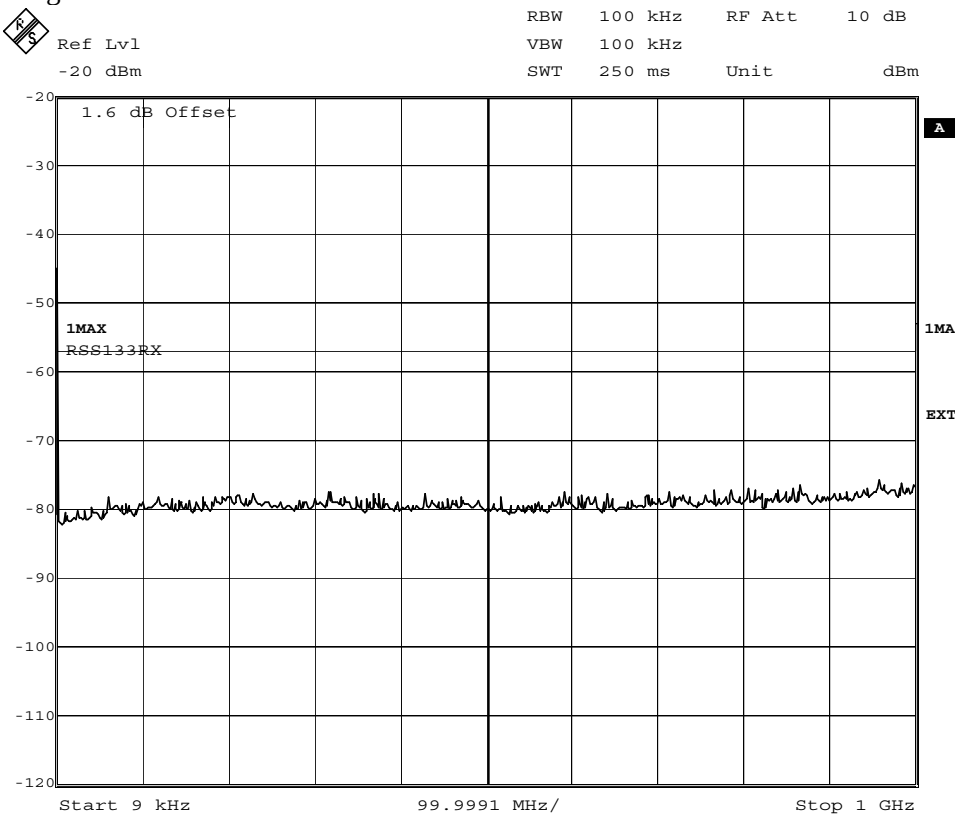


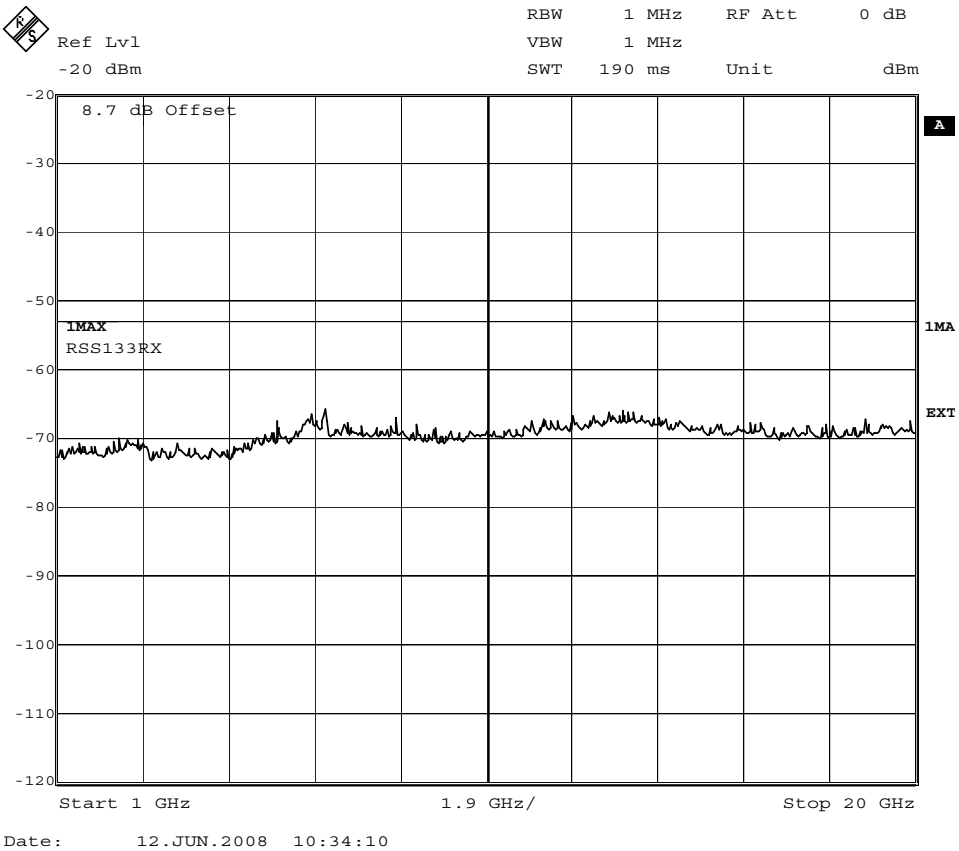
Date: 12.JUN.2008 10:32:45



Date: 12.JUN.2008 10:31:05

Diagram 4


Ref Lvl
-20 dBm
RBW 100 kHz
VBW 100 kHz
SWT 250 ms
RF Att 10 dB
Unit dBm
1.6 dB Offset
1MAX
RSS133RX
A
1MA
EXT
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Start 9 kHz
99.9991 MHz/
Stop 1 GHz
Date: 12.JUN.2008 10:33:33


Ref Lvl
-20 dBm
RBW 1 MHz
VBW 1 MHz
SWT 190 ms
RF Att 0 dB
Unit dBm
8.7 dB Offset
1MAX
RSS133RX
A
1MA
EXT
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
-120
Start 1 GHz
1.9 GHz/
Stop 20 GHz
Date: 12.JUN.2008 10:34:10

Hardware list RBS 2206V2 with CDU-G

Unit	Product Number	Revision	Serial Number
Cabinet	SEB 112 1154/1	R3A	AB20270104
Door	SXK 109 7157/1	R1A	-
ACCU-11	BMG 980 07/9	R1E	S792326170
DCCU-13	BMG 980 07/11	R1D	BH41172516
Subrack	BFL 119 424/1	R2C	-
CDU-G19	BFL 119 153/1	R3A	A40003DAHT
CDU-G19	BFL 119 153/1	R3A	A40003DAHQ
CDU-G19	BFL 119 153/1	R3A	A40003DTQT
Dummy	SXK 107 5031/2	R1B	-
CXU-10	KRY 101 1856/1	R3C	S690013KKP
Dummy	SXK 107 5031/1	R1B	-
TRU shelf	BFL 119 425/1	R1C	-
Backplane	BFX 101 107/3	R1B	-
dTRU-19	KRC 131 1004/2	R4F	AE58102972
dTRU-19	KRC 131 1004/2	R4F	AE58120117
dTRU-19	KRC 131 1004/2	R4F	AE58102976
dTRU-19	KRC 131 1004/2	R4F	AE58102977
dTRU-19	KRC 131 1004/2	R4F	AE58102973
dTRU-19	KRC 131 1004/2	R4F	AE58102974
IDM-11	BMG 980 327/2	R1C	X181233322
PSU-shelf	BFL 119 453/1	R1A	-
Backplane	BFX 101 109/1	R1A	-
PSU-AC-32	BML 353 206/2	R1A	BR80224705
PSU-AC-32	BML 353 206/2	R1A	BR80224715
PSU-AC-32	BML 353 206/2	R1A	BR80224716
Dummy	SXK 107 9314/1	R1D	-
Dummy	-	-	-
Dummy	SXK 107 5029/1	R1C	-
TMA-CM-01	SDX 107 881/1	R1A	SA22124420
DXU-23	BOE 602 21/1	R1C/B	TU80270701

Software	Revision
R07A	R14H

Hardware list RBS 2206V2 with CDU-F

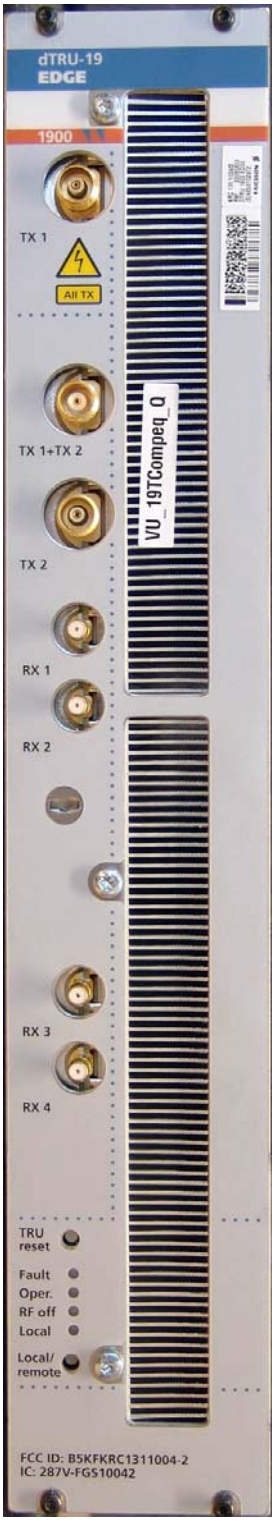
Unit	Product Number	Revision	Serial Number
Cabinet	SEB 112 1154/1	R3A	AB20270104
Door	SXK 109 7157/1	R1A	-
ACCU-11	BMG 980 07/9	R1E	S792326170
DCCU-13	BMG 980 07/11	R1D	BH41172516
Subrack	BFL 119 424/1	R2C	-
CDU-F19	BFL 119 156/1	R1C	A400255682
CNU	KRY 101 1909/1	P1A	-
CDU-F19	BFL 119 156/1	R1C	A400183754
CNU	KRY 101 1909/1	P1A	-
CDU-F19	BFL 119 156/1	R1C	A400255680
CNU	KRY 101 1909/1	P1A	-
Dummy	SXK 107 5031/2	R1B	-
CXU-10	KRY 101 1856/1	R3C	S690013KKP
Dummy	SXK 107 5031/1	R1B	-
TRU shelf	BFL 119 425/1	R1C	-
Backplane	BFX 101 107/3	R1B	-
dTRU-19	KRC 131 1004/2	R4F	AE58102972
dTRU-19	KRC 131 1004/2	R4F	AE58120117
dTRU-19	KRC 131 1004/2	R4F	AE58102976
dTRU-19	KRC 131 1004/2	R4F	AE58102977
dTRU-19	KRC 131 1004/2	R4F	AE58102973
dTRU-19	KRC 131 1004/2	R4F	AE58102974
IDM-11	BMG 980 327/2	R1C	X181233322
PSU-shelf	BFL 119 453/1	R1A	-
Backplane	BFX 101 109/1	R1A	-
PSU-AC-32	BML 353 206/2	R1A	BR80224705
PSU-AC-32	BML 353 206/2	R1A	BR80224715
PSU-AC-32	BML 353 206/2	R1A	BR80224716
Dummy	SXK 107 9314/1	R1D	-
Dummy	-	-	-
Dummy	SXK 107 5029/1	R1C	-
TMA-CM-01	SDX 107 881/1	R1A	SA22124420
DXU-23	BOE 602 21/1	R1C/B	TU80270701

Software	Revision
R12A	R09V

FCC ID: B5KFKRC1311004-2 Appendix 9

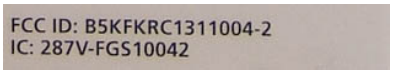
Photos
Transceiver Unit KRC 131 1004/2, R4F

Front side

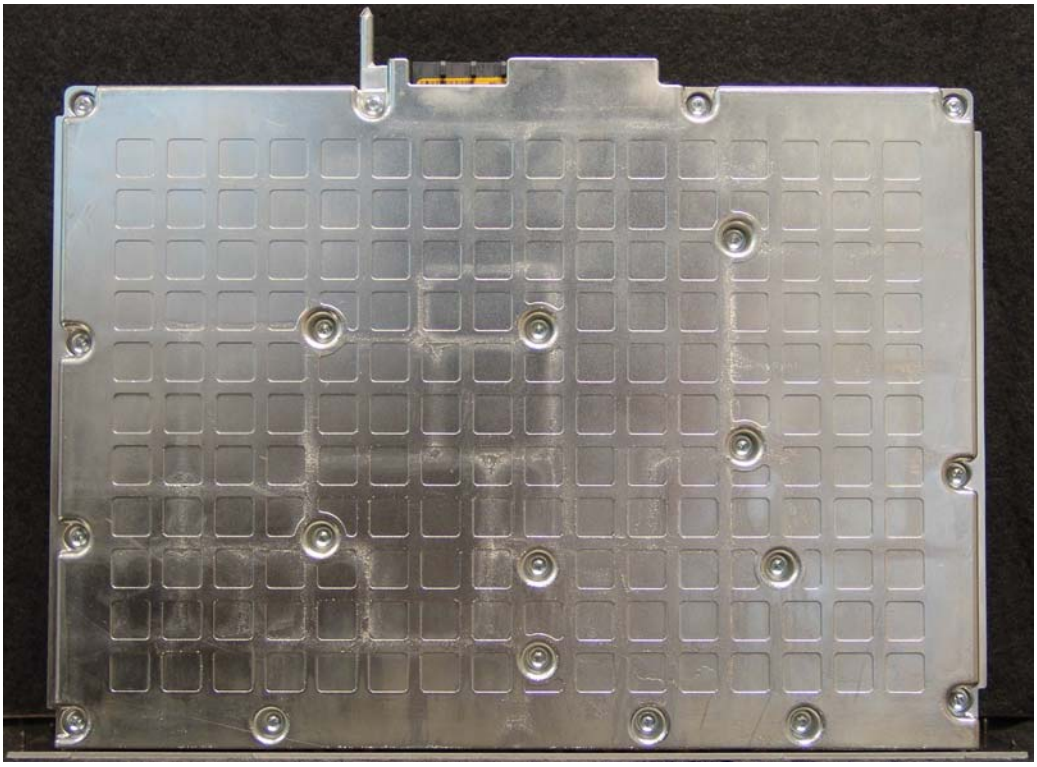


Rear side

FCC ID label



Left side



Right side