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Date
2004-09-15

Reference
F413774-F22

Equipment Authorization measurements on GSM Transceiver Unit with FCC ID: B5KCKRC1311005-2 (10 appendices)

Test object

Transceiver Unit dTRU-8, KRC 131 1005/2, R3A

Summary

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

Note 1: The maximum peak output power that can be used on the channels adjacent to the frequency band edges (channels 128 and 251) are 41 dBm (GMSK) and 44 dBm (EDGE) in order to comply.

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Description - Equipment Under Test (EUT)

Equipment: GSM Base station transceiver 800 MHz

Tx Frequency range: 869.2-893.8 MHz

Nominal power voltage: 24 V DC

Output power with internal combiner plus TCC: 50 dBm

Output power without internal combiner: 47 dBm

Output power with internal combiner: 44 dBm

Output power with internal combiner plus TCC and HCU: 47 dBm

Output power with internal combiner and HCU: 41 dBm

Tested Channels

Radiated measurements:

ARFCN	Frequency	ARFCN	Frequency
128	869.2 MHz	195	882.6 MHz
140	871.6 MHz	200	883.6 MHz
152	874.0 MHz	201	883.8 MHz
153	874.2 MHz	203	884.2 MHz
155	874.6 MHz	209	885.4 MHz
165	876.6 MHz	210	885.6 MHz
169	877.4 MHz	215	886.6 MHz
176	878.8 MHz	224	888.4 MHz
178	879.2 MHz	226	888.8 MHz
180	879.6 MHz	228	889.2 MHz
181	879.8 MHz	235	890.6 MHz
190	881.6 MHz	251	893.8 MHz

The radiated spurious emission measurements were performed in 3 types of RBS cabinets, RBS 2106, RBS 2206, and RBS 2207. To cover worst case condition the following alternative configurations were tested. Without internal combiner, with internal combiner, with internal combiner plus TCC, with internal combiner and HCU, and with internal combiner plus TCC and HCU.

Conducted measurements:

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

All RF conducted measurements were performed in a RBS 2206 cabinet powered with DC power. The measurements were done at the output connector of CDU-G 8 (BFL 119 155/1 rev. R2G) with serial number A4000496WM. If not otherwise stated in the report the dTRU with serial number AE51160179 were used for the measurements. The measurement was performed with configurations that represents worst case scenario.

Manufacturer's representative

Per Helmersson, Ericsson AB

Purpose of test

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

References

Measurements were done according to relevant parts of the following standards:
ANSI/TIA/EIA-603-2000
J-STD007A Vol 1
ANSI/TIA/EIA 136-280-B-2000

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: 2004-08-13

Test engineers

Jonas Bremholt

Test witnesses

Lars Hagbjörk, Ericsson AB

RF Power output measurements according to 47CFR 2.1046

Date 2004-09-01	Temperature 22 °C ± 3 °C	Humidity 51 % ± 5 %
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Test set-up and Procedure

Measurements were made at CDU-G 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	2005-02	503 144
Boonton Power sensor 56518-S/4	2005-02	503 145
Multimeter Fluke 87	2004-10	502 190
Testo 610, Temperature and humidity meter	2004-12	502 658

Measurement uncertainty: 0.5 dB

Results

Mode: **GMSK**

dTRU, output 1+2, with internal combiner plus TCC.

Rated output power level after CDU-G (maximum): 50 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	49.8/ 49.0	50.0/ 49.2	49.3/ 48.5

dTRU, output 1, without internal combiner:

Rated output power level after CDU-G (maximum): 47 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	47.2/ 46.3	47.5/ 46.7	47.2/ 46.3

dTRU, output 2, without internal combiner:

Rated output power level after CDU-G (maximum): 47 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	47.1/ 46.3	47.3/ 46.4	46.9/ 46.0

dTRU, output 1, with internal combiner:

Rated output power level after CDU-G (maximum): 44 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	43.8/ 43.1	44.0/ 43.3	43.3/ 42.6

dTRU, output 2, with internal combiner:

Rated output power level after CDU-G (maximum): 44 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	43.9/ 43.1	44.1/ 43.3	43.2/42.5

dTRU, output 1+2, with internal combiner plus TCC and HCU.

Rated output power level after CDU-G (maximum): 47 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	46.8/ 46.0	46.7/ 45.9	46.4/ 45.6

dTRU, output 1, with internal combiner and HCU:

Rated output power level after CDU-G (maximum): 41 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	40.6/ 39.9	40.8/ 40.1	40.0/ 39.3

dTRU, output 2, with internal combiner and HCU:

Rated output power level after CDU-G (maximum): 41 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	40.8/ 40.0	40.9/ 40.2	39.9/ 39.2

Mode: **EDGE**

dTRU, output 1+2, with internal combiner plus TCC:
Rated output power level after CDU-G (maximum): 50 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	49.5/ 46.1	50.1/ 46.3	49.3/45.5

dTRU, output 1, without internal combiner:
Rated output power level after CDU-G (maximum): 47 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	47.0/ 43.1	47.0/ 43.2	46.4/ 42.6

dTRU, output 2, without internal combiner:
Rated output power level after CDU-G (maximum): 47 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	47.0/ 43.2	47.2/ 43.4	46.9/ 43.1

dTRU, output 1, with internal combiner:
Rated output power level after CDU-G 8 (maximum): 44 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	43.8/ 40.0	44.0/ 40.2	43.3/ 39.5

dTRU, output 2, with internal combiner:
Rated output power level after CDU-G 8 (maximum): 44 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	43.8/ 40.2	44.0/ 40.3	43.2/ 39.5

dTRU, output 1+2, with internal combiner plus TCC and HCU.

Rated output power level after CDU-G (maximum): 47 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	46.8/ 43.0	47.0/ 43.1	46.4/ 42.5

dTRU, output 1, with internal combiner and HCU:

Rated output power level after CDU-G (maximum): 41 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	40.6/ 37.0	40.9/ 36.5	39.9/ 36.2

dTRU, output 2, with internal combiner and HCU:

Rated output power level after CDU-G (maximum): 41 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	40.7/ 37.0	40.8/ 37.2	39.9/ 36.2

Limit

GMSK: The measured output power shall be within ± 2 dB of the rated output power (J-STD007A Vol 1)

EDGE: The measured output power shall be within +1 to -3 dB of the rated output power (ANSI/TIA/EIA 136-280-B)

Complies?	Yes
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Modulation characteristics measurements according to 47CFR 2.1047

Date 2004-08-24	Temperature 21 °C ± 3 °C	Humidity 42 % ± 5 %
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Test set-up and Procedure

Measurements were made at CDU-G output connector. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during measurement.

The transmitter was modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2005-04	503 738
Multimeter Fluke 87	2004-10	502 190
Testo 610, Temperature and humidity meter	2004-12	502 658

Results

With internal combiner 44 dBm output power at Channel 190 (881.6 MHz)

Mode: **GMSK**

Test conditions		Phase error (° _{RMS})	
Supply voltage DC (V)	T (°C)	Output 1	Output 2
24.0	+20	1.7	1.0
Maximum phase error (°)		1.7	

Mode: **EDGE**

Test conditions		EVM (% _{RMS})	
Supply voltage DC (V)	T (°C)	Output 1	Output 2
24.0	+20	3.0	1.6
Maximum EVM (% _{RMS})		3.0	

Test conditions		Origin offset (dBc)	
Supply voltage DC (V)	T (°C)	Output 1	Output 2
24.0	+20	-40.4	-45.2
Maximum origin offset (dBc)		-40.4	

**Limits**

GMSK: The tolerance of the maximum output phase error shall not be greater than 5 degrees (J-STD007A Vol 1).

EDGE: The Error Vector Magnitude (EVM) shall be less than 12.5 %_{RMS}
The origin offset in any burst shall be less than -30 dBc.
(ANSI/TIA/EIA 136-280-B)

Complies?	Yes
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Occupied bandwidth measurements according to 47CFR 2.1049

Date 2004-09-01	Temperature 22 °C ± 3 °C	Humidity 51 % ± 5 %
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Test set-up and Procedure

Measurements were made at CDU-G 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 modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2005-04	503 738
Testo 610, Temperature and humidity meter	2004-12	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 4.1

Mode: **GMSK**

dTRU Output 1, without internal combiner:

- Diagram 1 Ch 190 Reference level 47 dBm output power
Diagram 2 Ch 190 26 dB points 47 dBm output power

dTRU Output 2, without internal combiner:

- Diagram 3 Ch 190 Reference level 47 dBm output power
Diagram 4 Ch 190 26 dB points 47 dBm output power

Mode: **EDGE**

dTRU Output 1, without internal combiner:

- Diagram 5 Ch 190 Reference level 47 dBm output power
Diagram 6 Ch 190 26 dB points 47 dBm output power

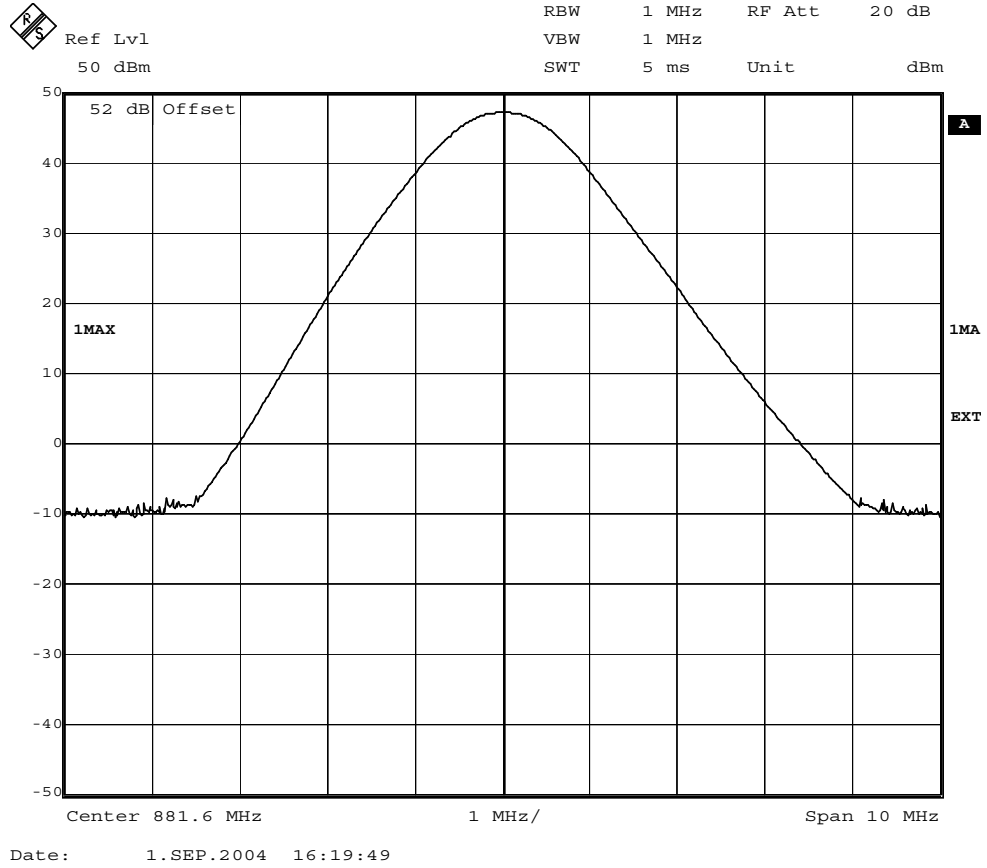
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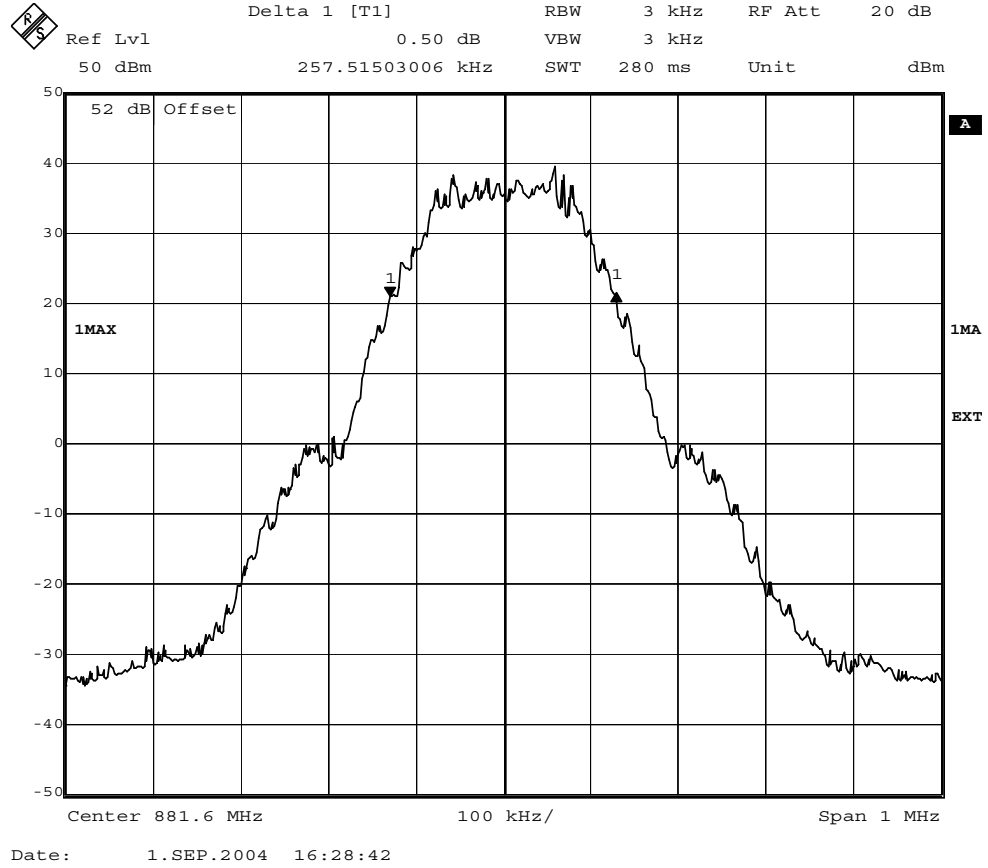
- Diagram 7 Ch 190 Reference level 47 dBm output power
Diagram 8 Ch 190 26 dB points 47 dBm output power

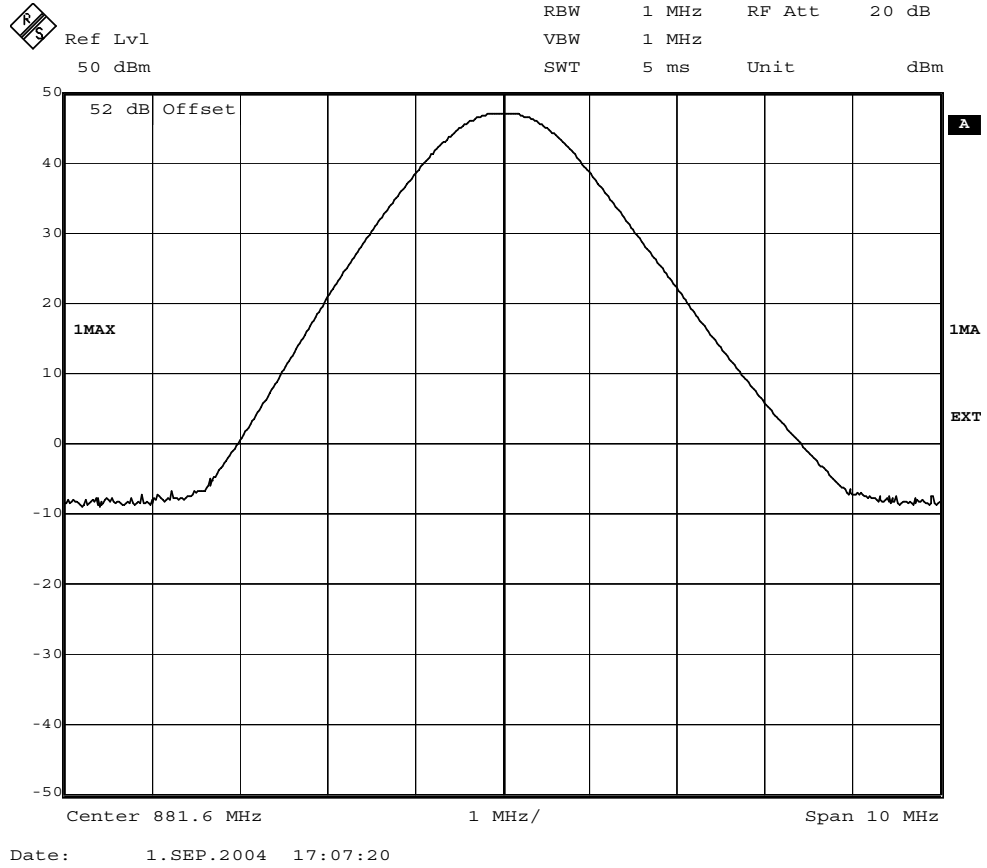
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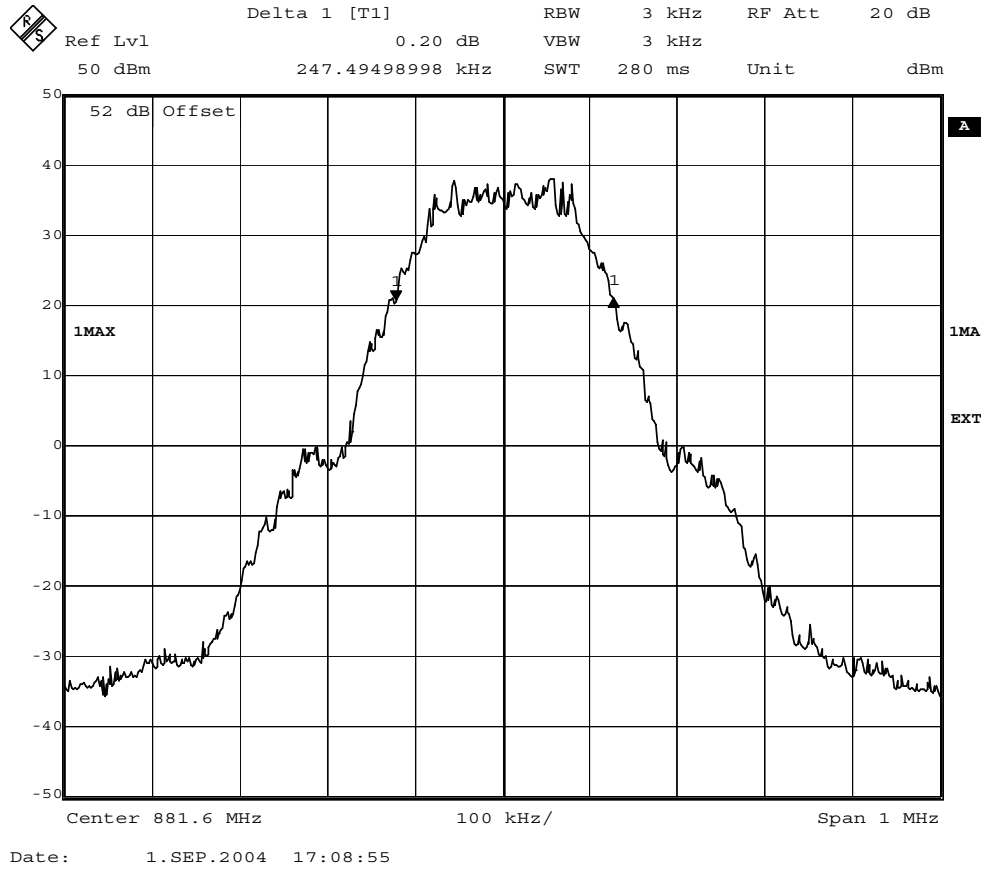
The power of any emission outside the frequency band shall be attenuated below the transmitter power (P) by at least $43 + 10 \log P$ dB.

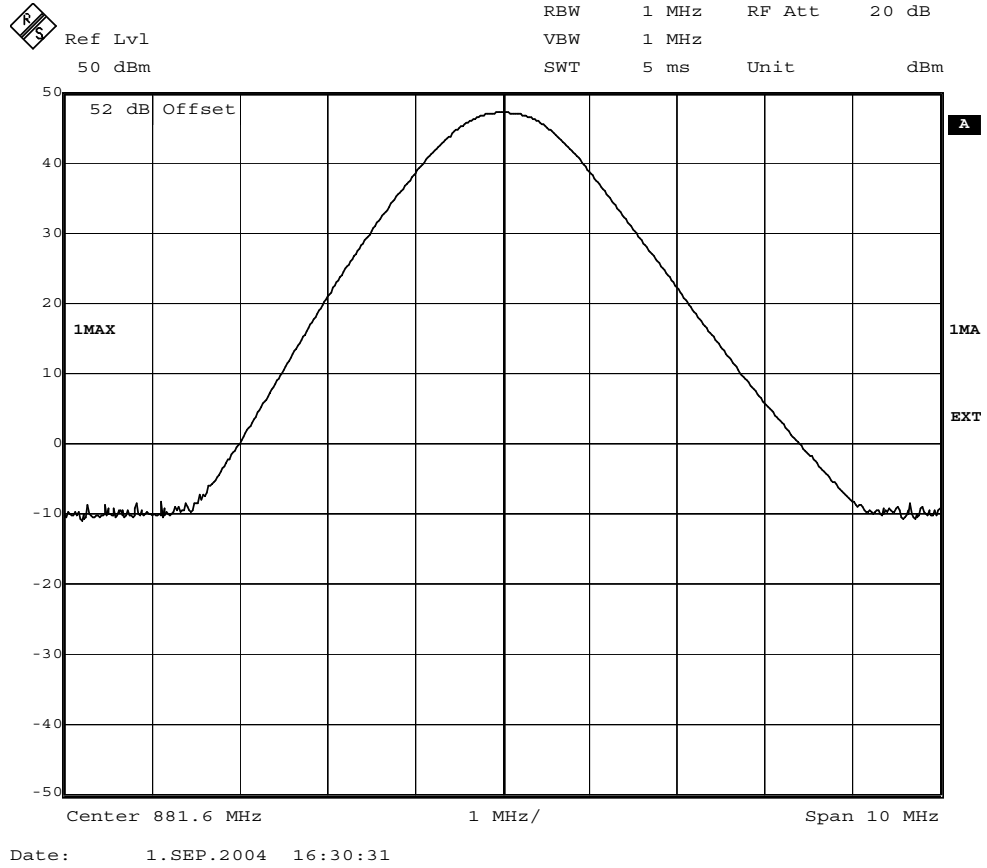
Complies?	Yes
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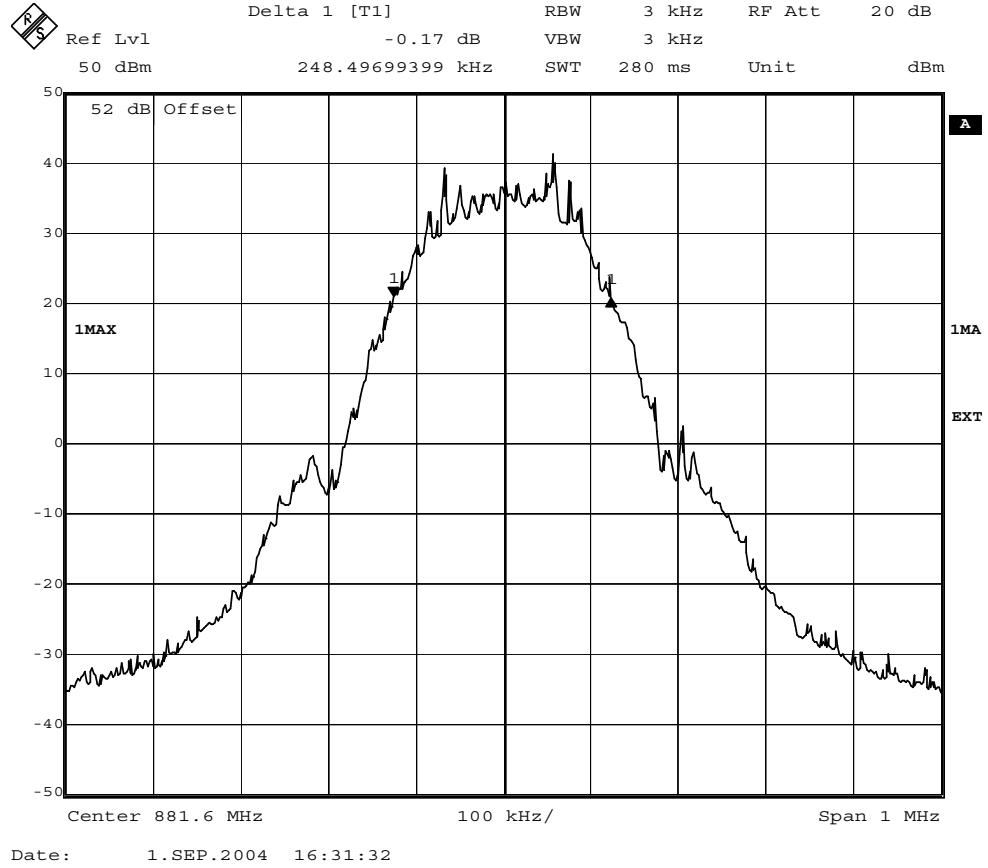


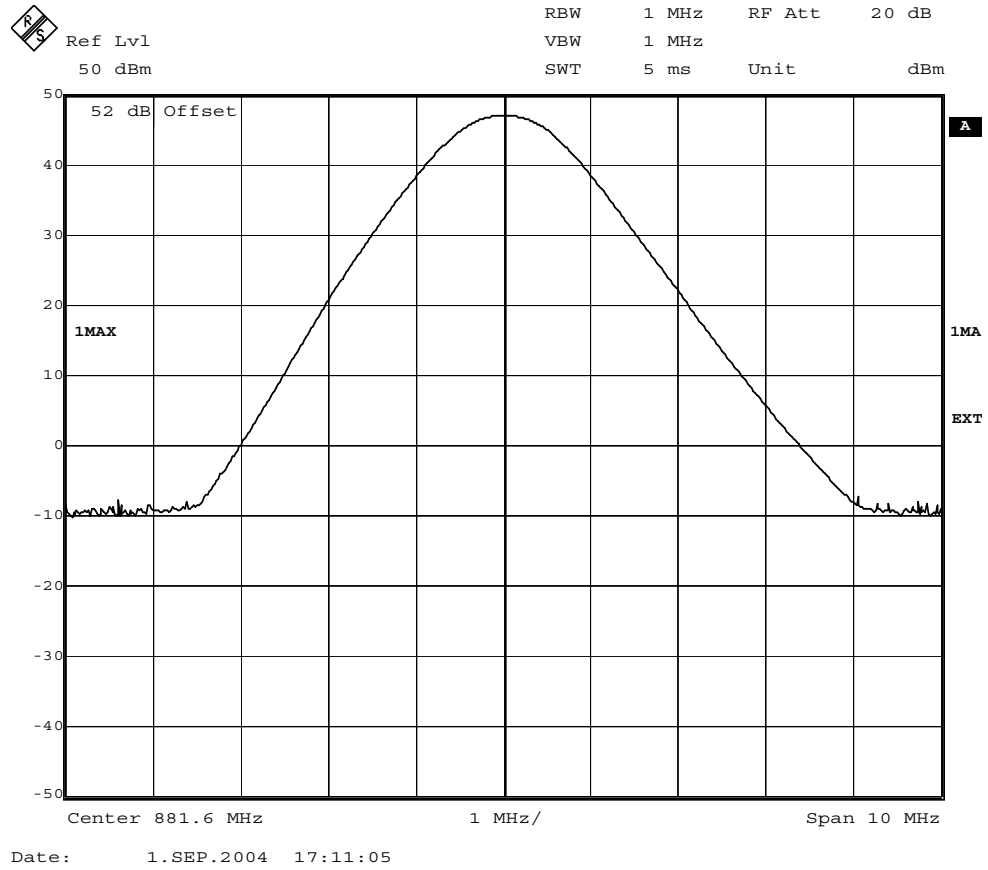


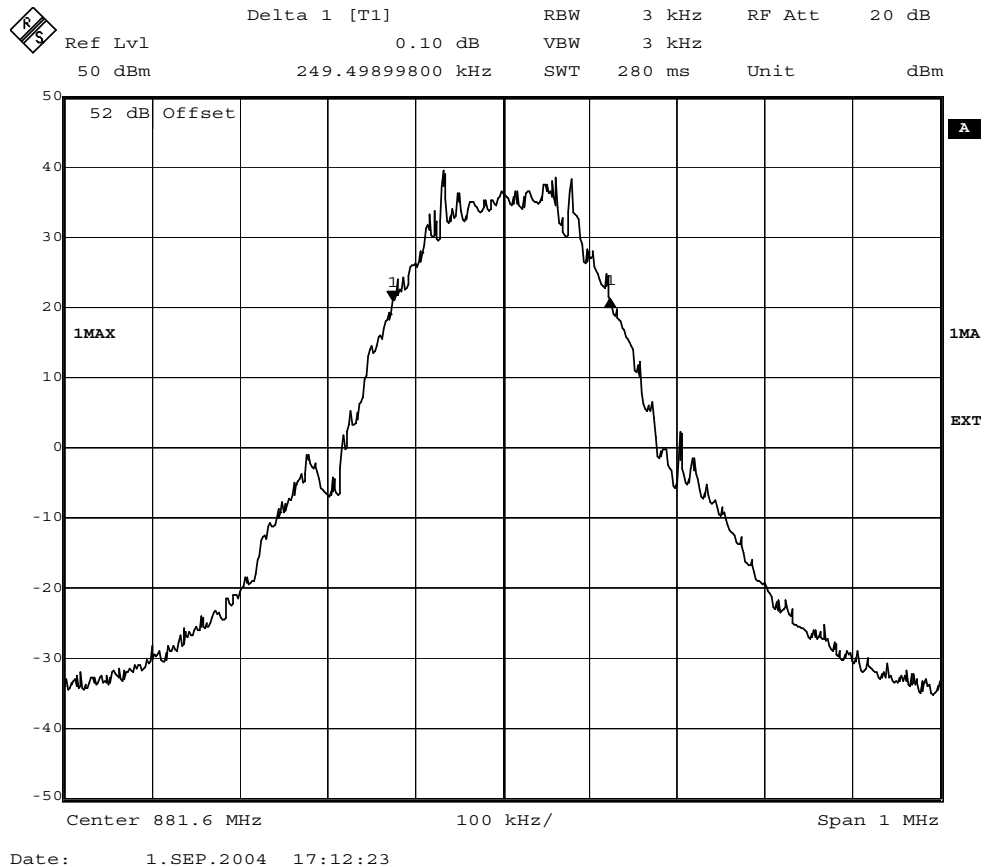












Band edge measurements according to 47CFR 2.1049

Date	Temperature	Humidity
2004-09-02	22 °C ± 3 °C	53 % ± 5 %
2004-09-03	22 °C ± 3 °C	51 % ± 5 %

Test set-up and Procedure

The measurements were made per definition in 22.917. The measurements were made at CDU-G output connector. The output was connected to a spectrum analyzer with the average detector activated. A resolution bandwidth of 3 kHz (1% of OBW) was used up to 5 MHz away 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 15.2 dB to -28.2 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	2005-04	503 738
Testo 610, Temperature and humidity meter	2004-12	502 658

Measurement uncertainty: 3.7 dB**Results**

The results are shown in appendix 5.1

Mode: GMSK**dTRU Output 1, without internal combiner:**

- Diagram 1 Ch 128 (869.2 MHz) Band edge 41 dBm output power
Diagram 2 Ch 251 (893.8 MHz) Band edge 41 dBm output power

dTRU Output 2, without internal combiner:

- Diagram 3 Ch 128 (869.2 MHz) Band edge 41 dBm output power
Diagram 4 Ch 251 (893.8 MHz) Band edge 41 dBm output power

dTRU Output 1+2, with internal combiner plus TCC:

- Diagram 5 Ch 129 (869.4 MHz) Band edge 50 dBm output power
Diagram 6 Ch 250 (893.6 MHz) Band edge 50 dBm output power

Mode: **EDGE**

dTRU Output 1, without internal combiner:

- Diagram 7 Ch 128 (869.2 MHz) Band edge 44 dBm output power
Diagram 8 Ch 251 (893.8 MHz) Band edge 44 dBm output power

dTRU Output 2, without internal combiner:

- Diagram 9 Ch 128 (869.2 MHz) Band edge 44 dBm output power
Diagram 10 Ch 251 (893.8 MHz) Band edge 44 dBm output power

dTRU Output 1+2, with internal combiner plus TCC:

- Diagram 11 Ch 129 (869.4 MHz) Band edge 50 dBm output power
Diagram 12 Ch 250 (893.6 MHz) Band edge 50 dBm output power

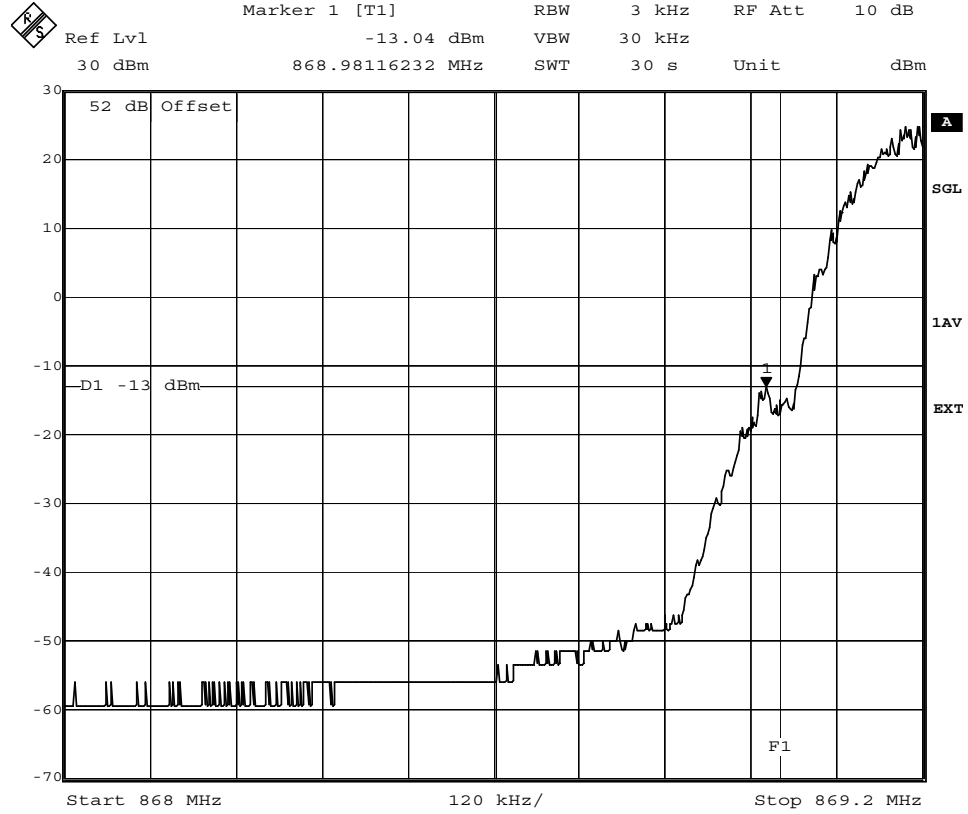
Remarks

The maximum peak output powers that can be used on the channels adjacent to the frequency band edges (channel 128 and 251) are 41 dBm (GMSK) and 44 dBm (Edge) 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
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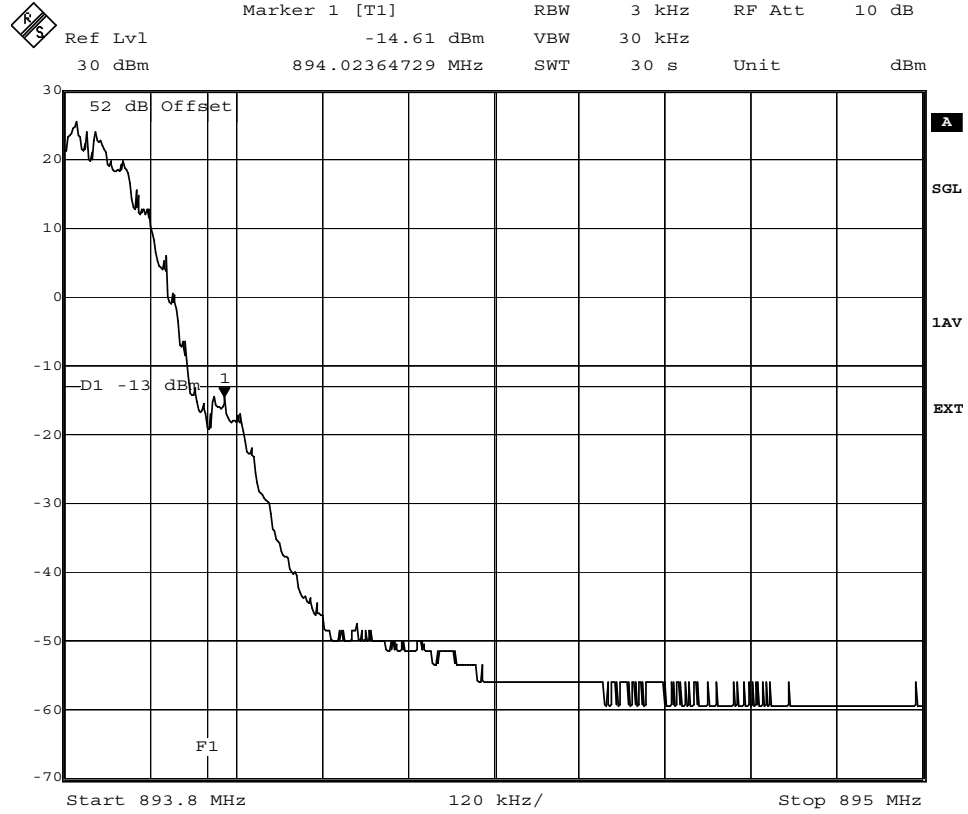
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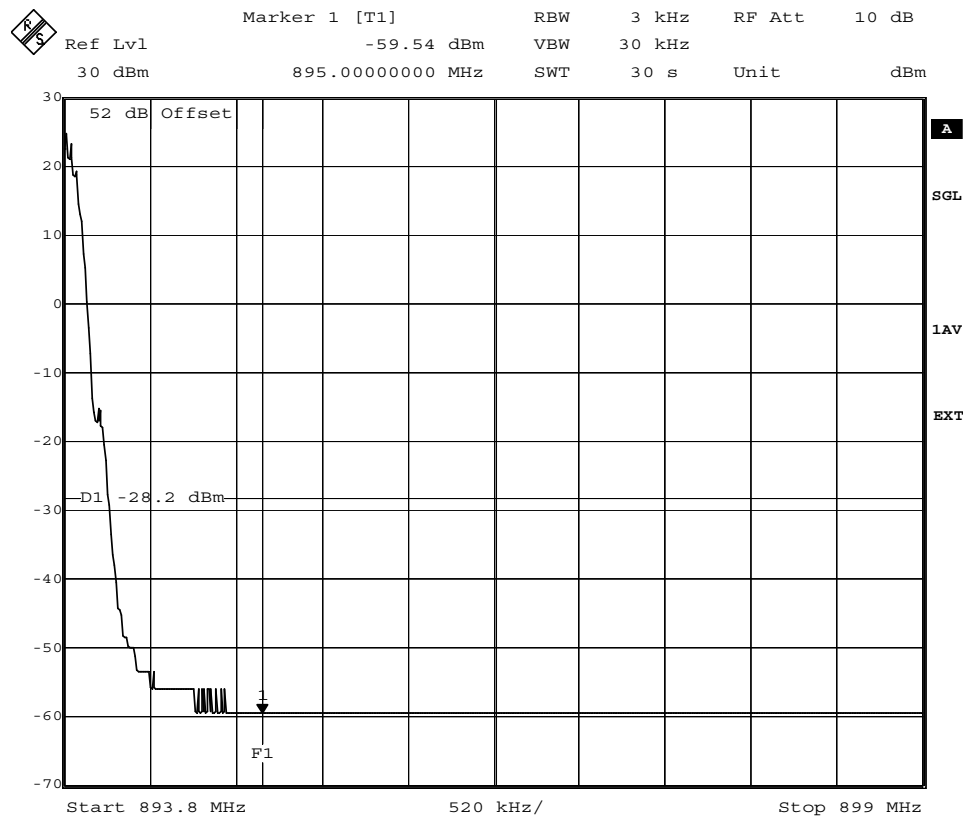
B5KCKRC1311005-2

Appendix 5.1

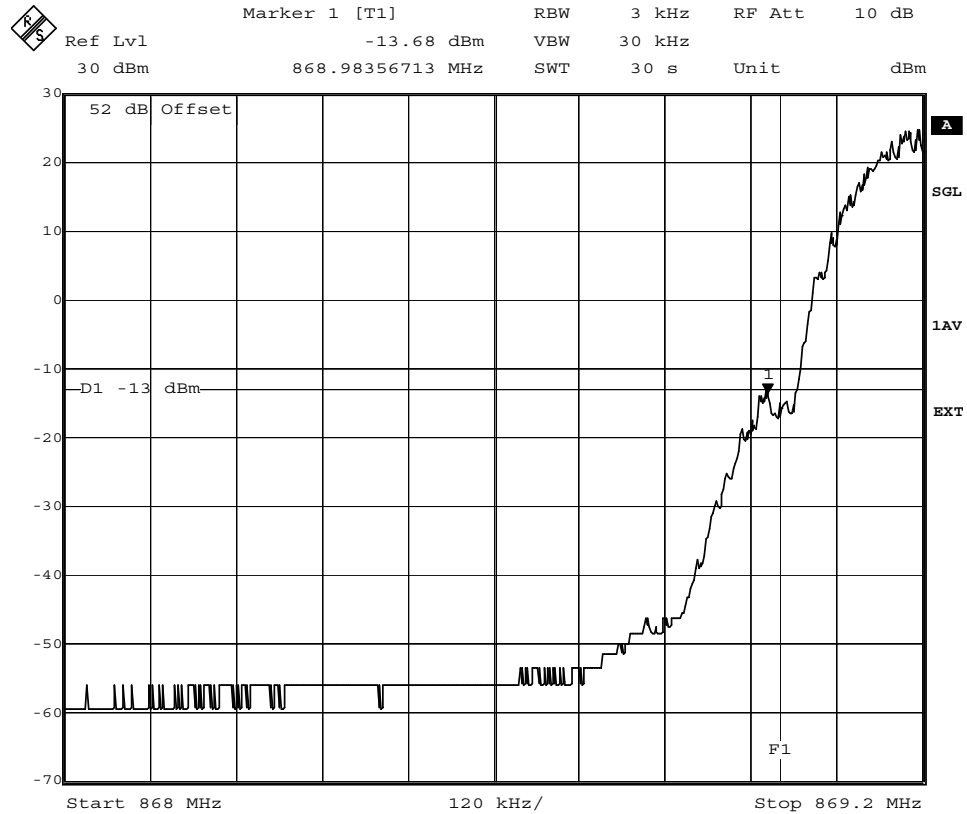
Diagram
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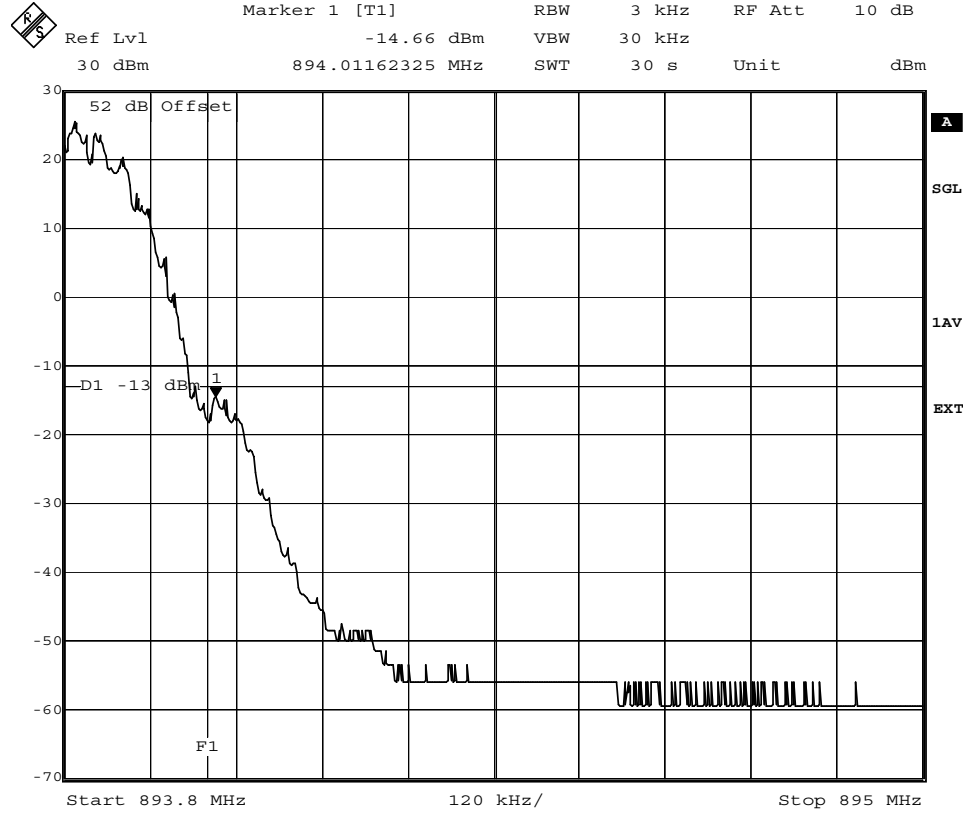
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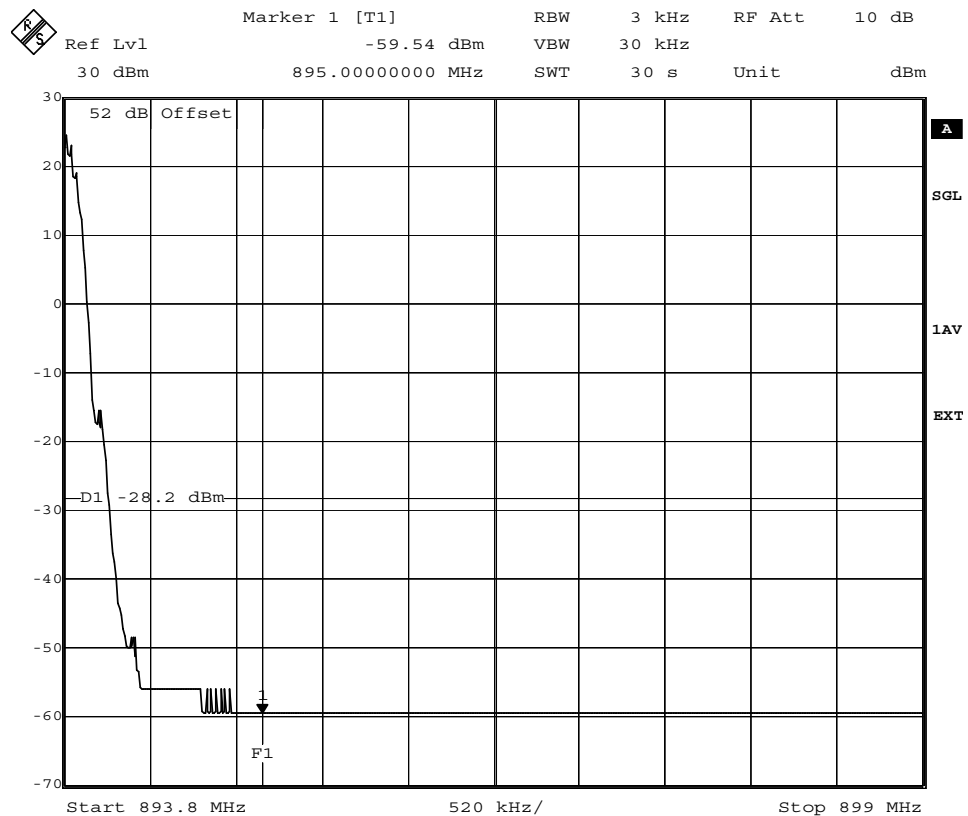
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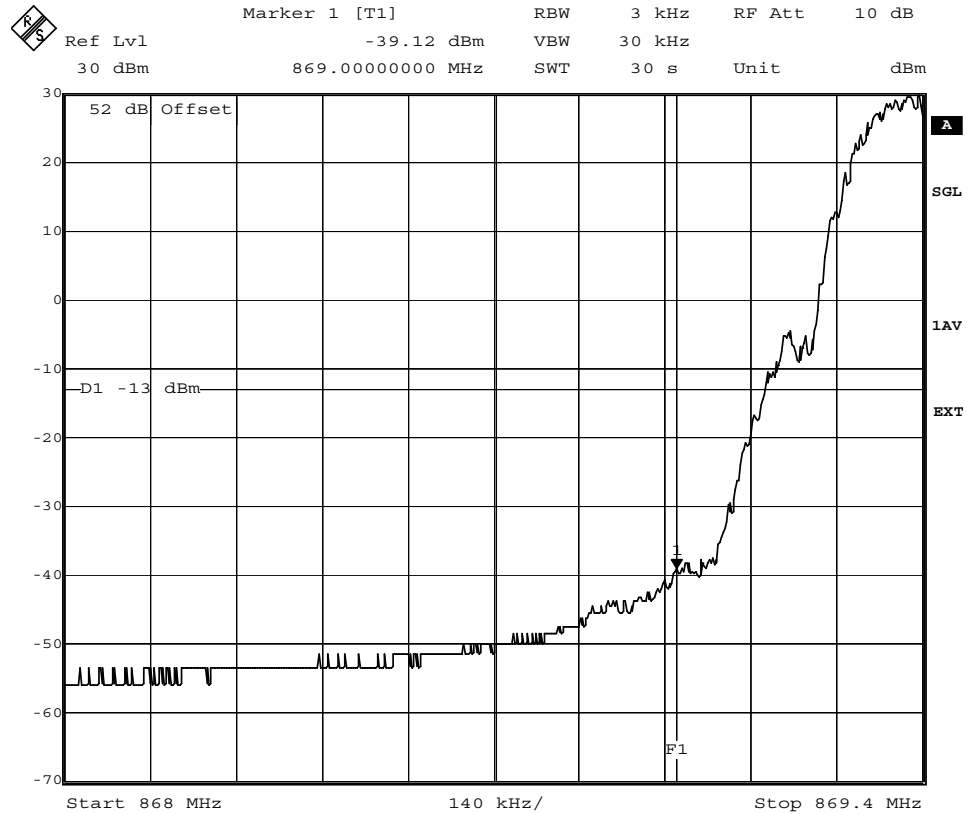
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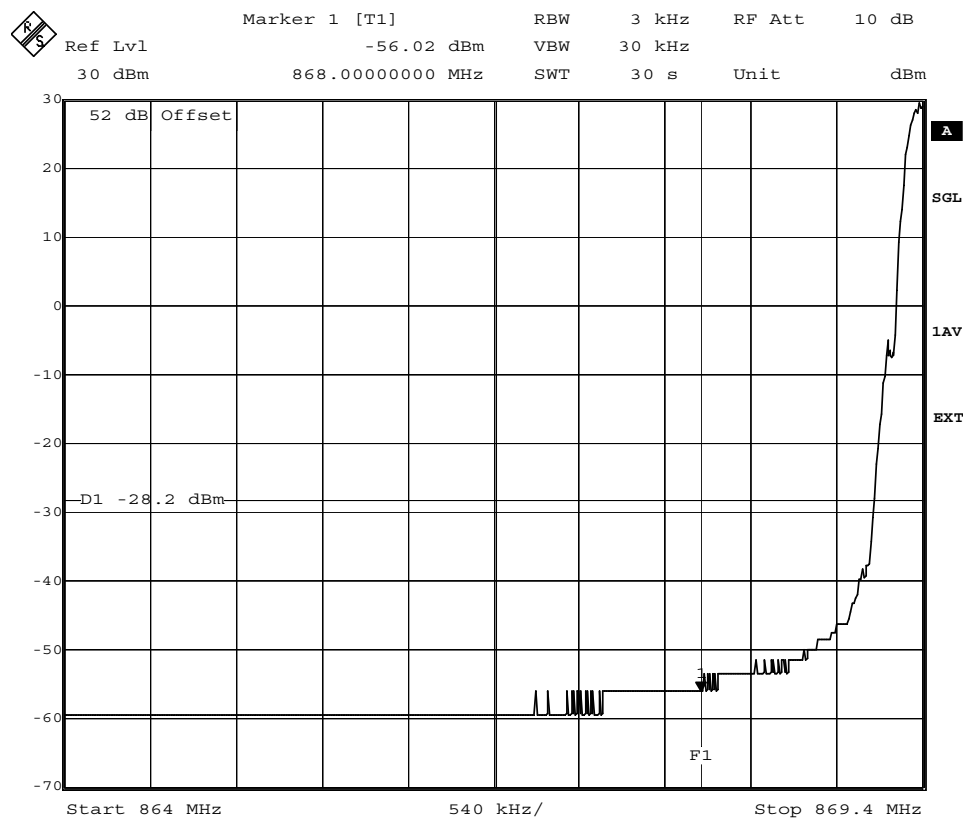
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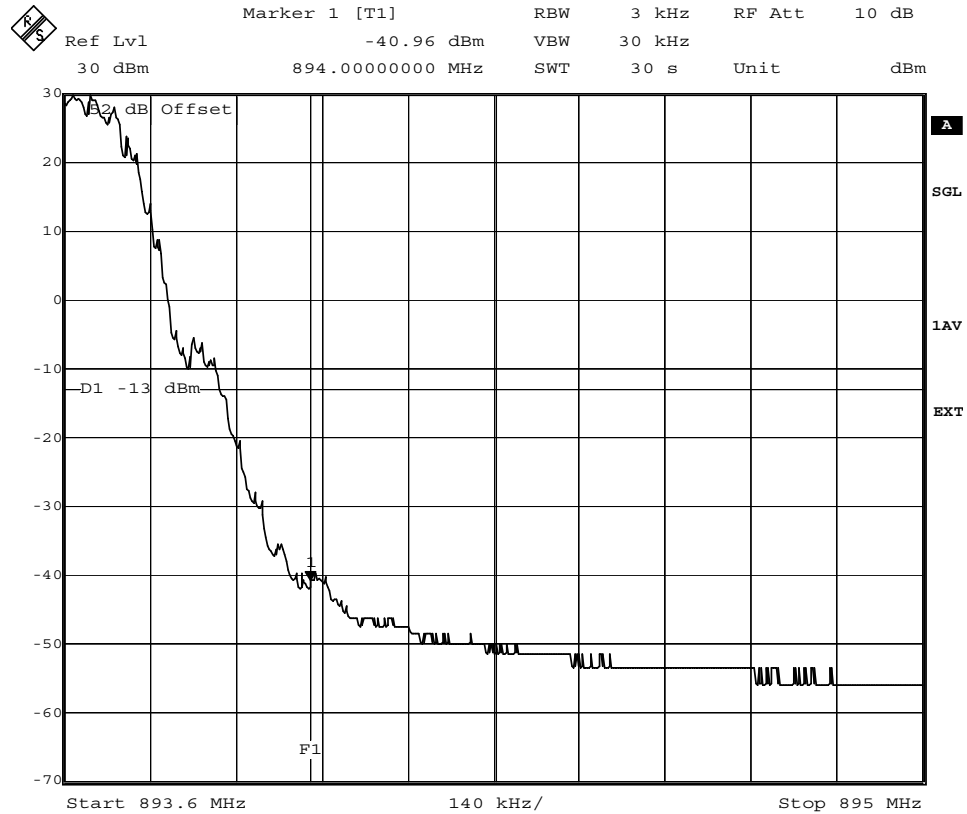
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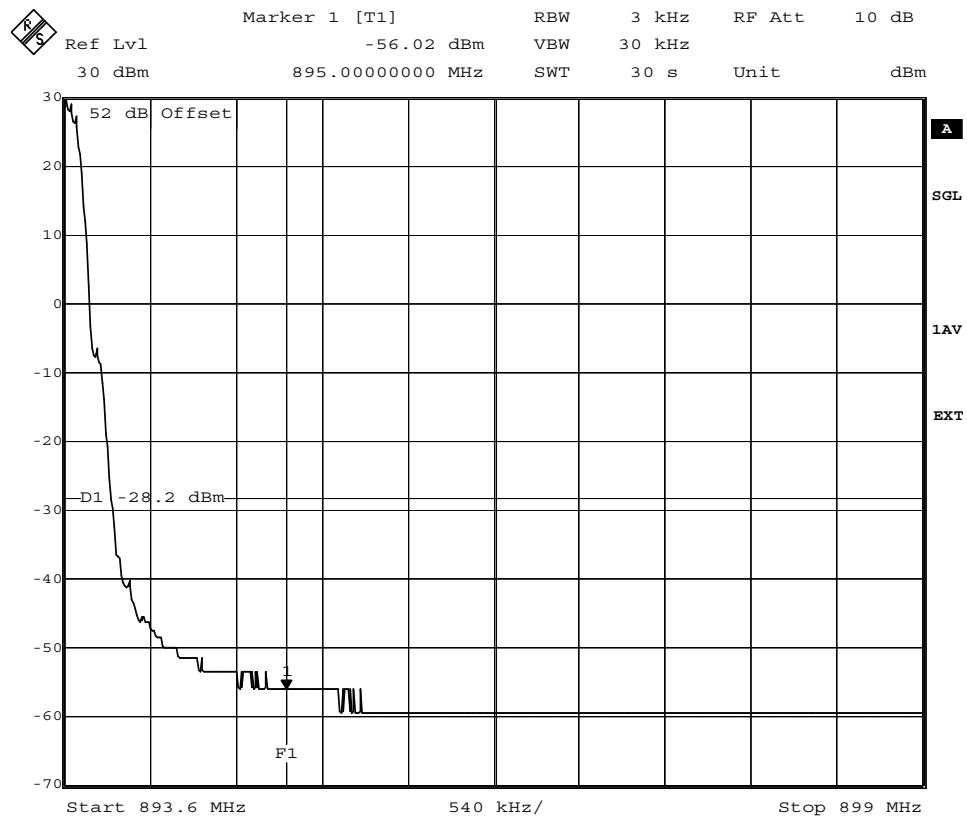
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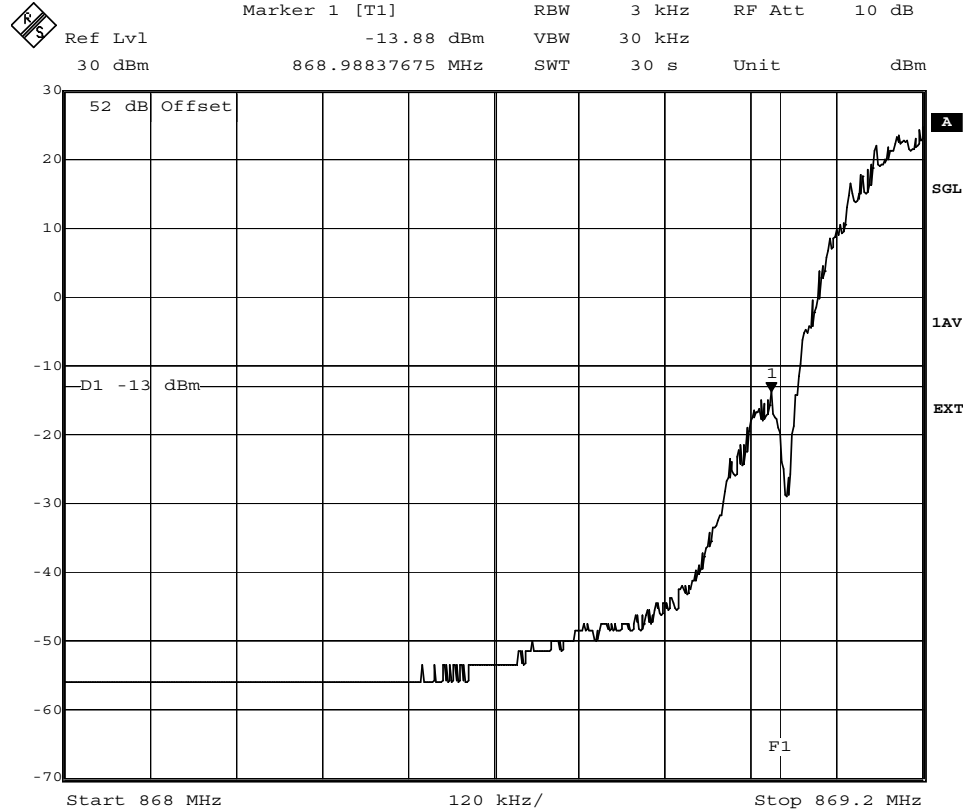
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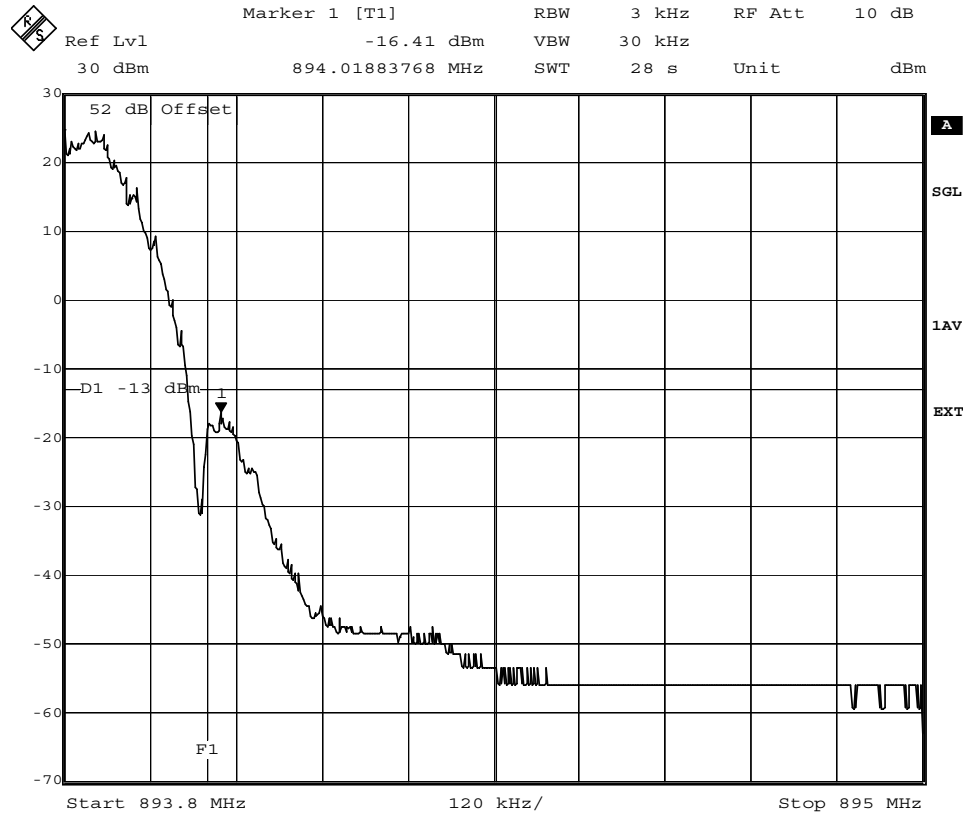
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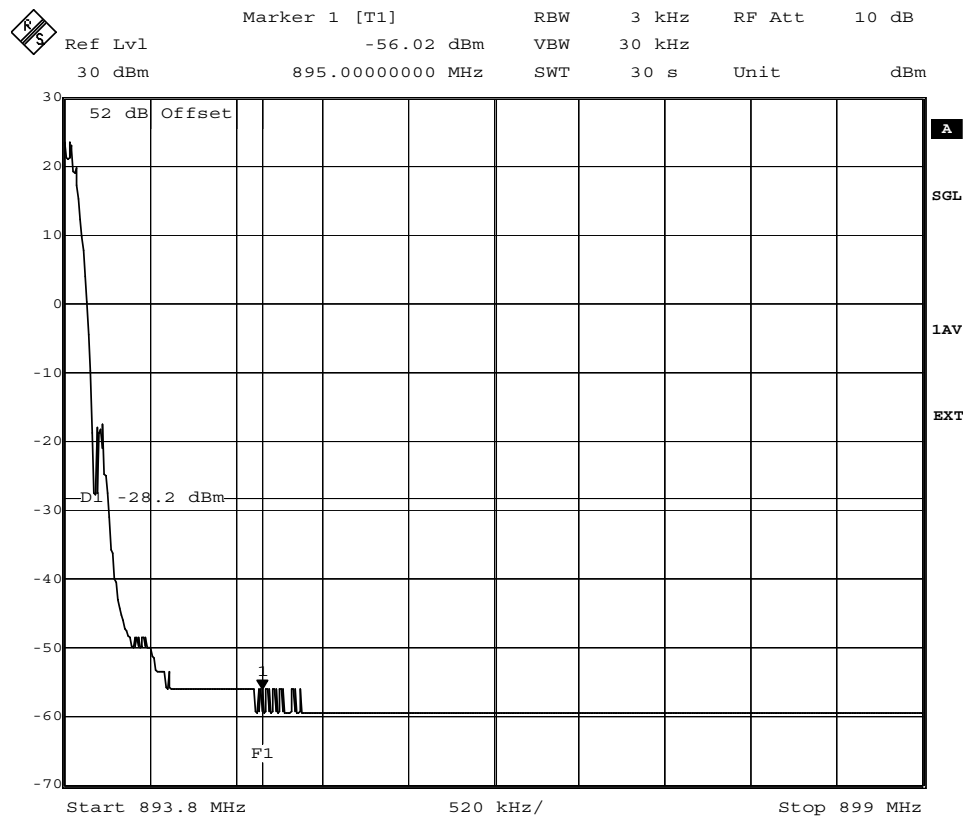
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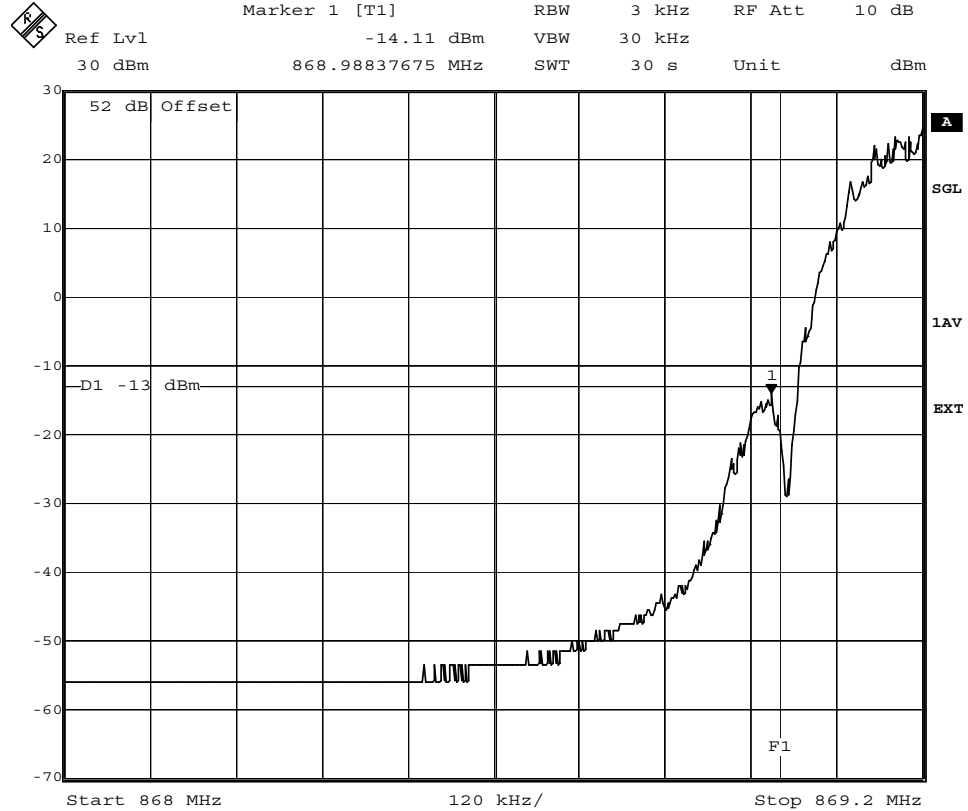
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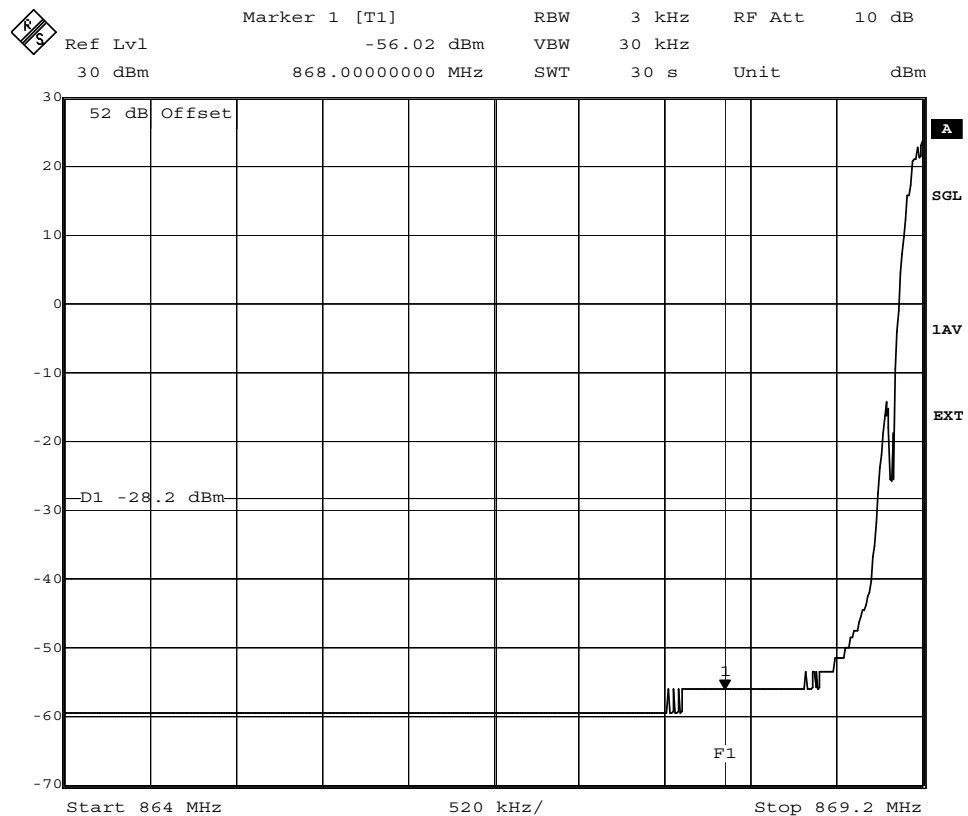
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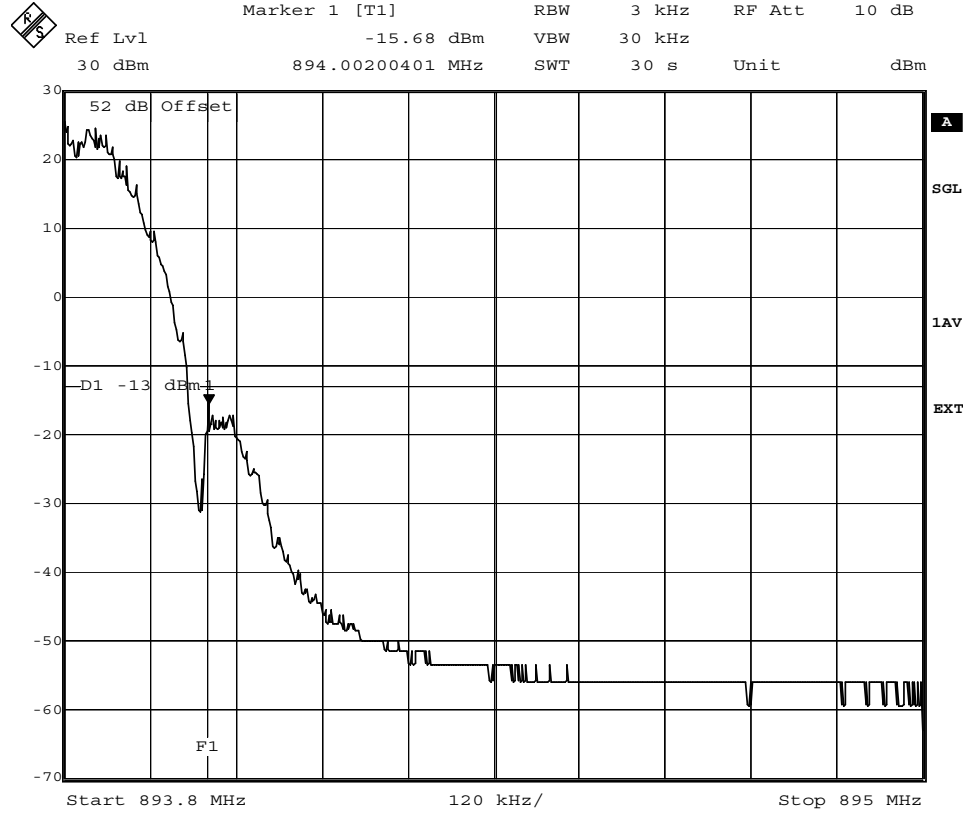
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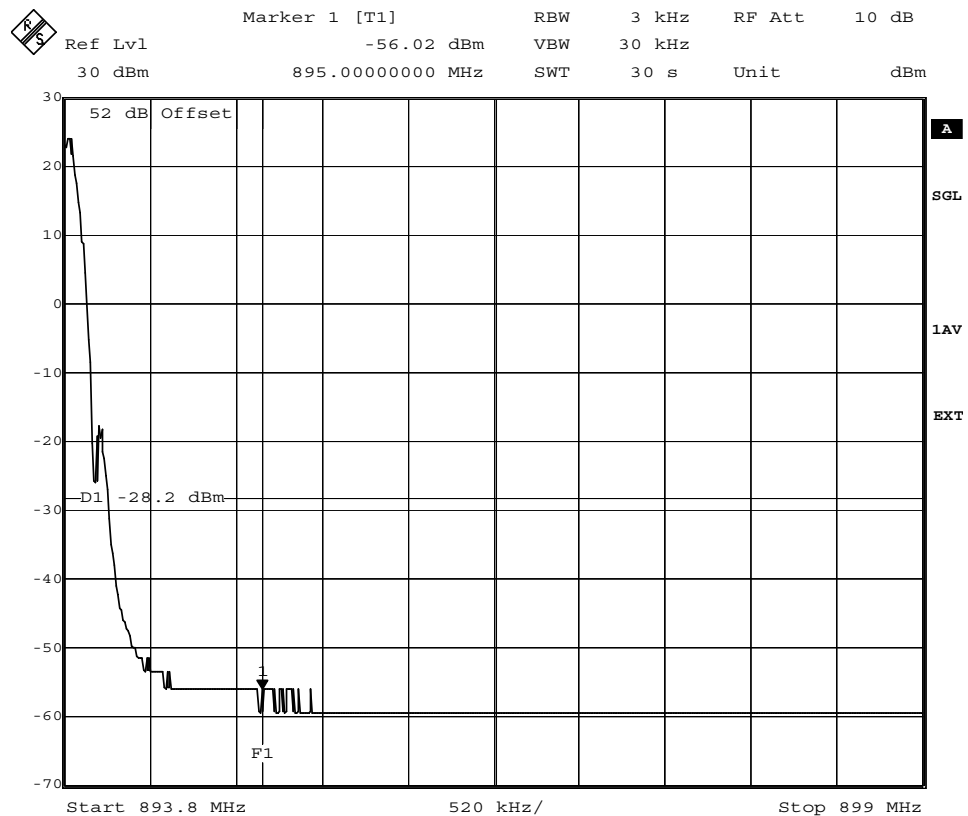
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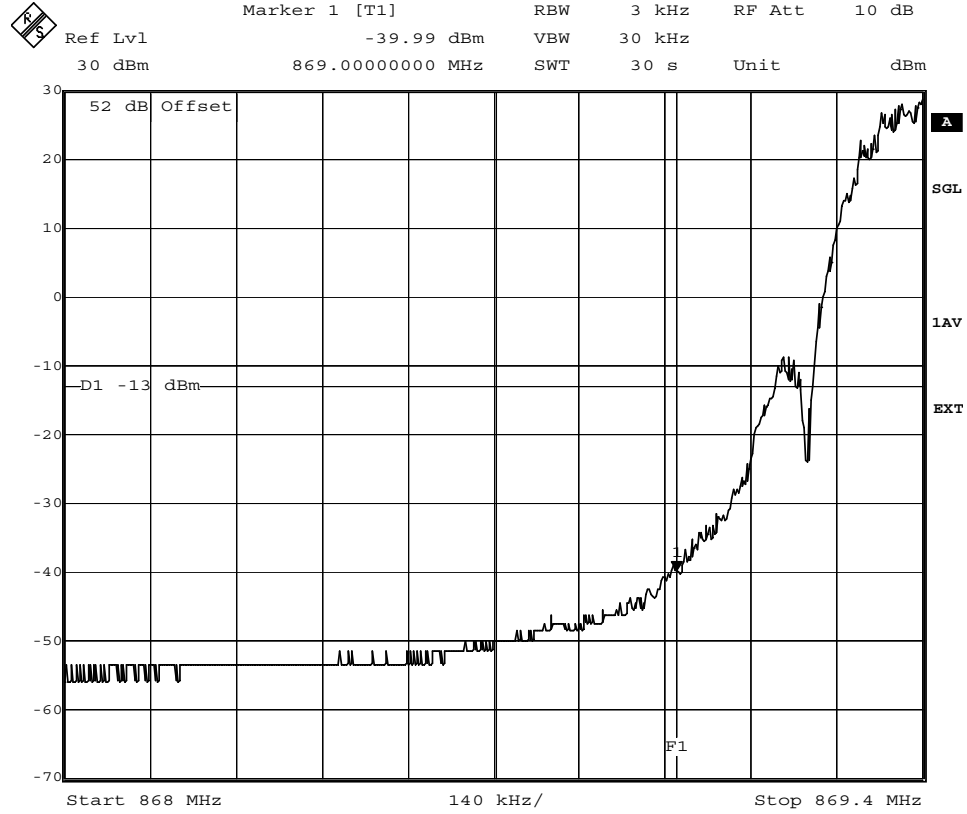
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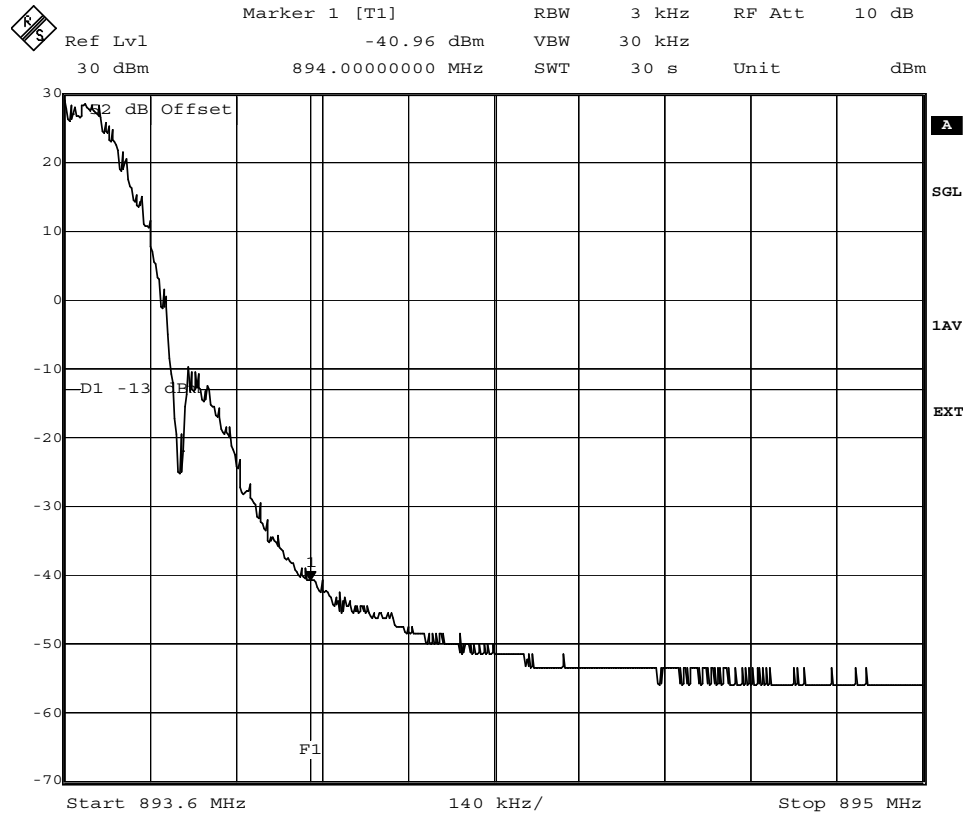
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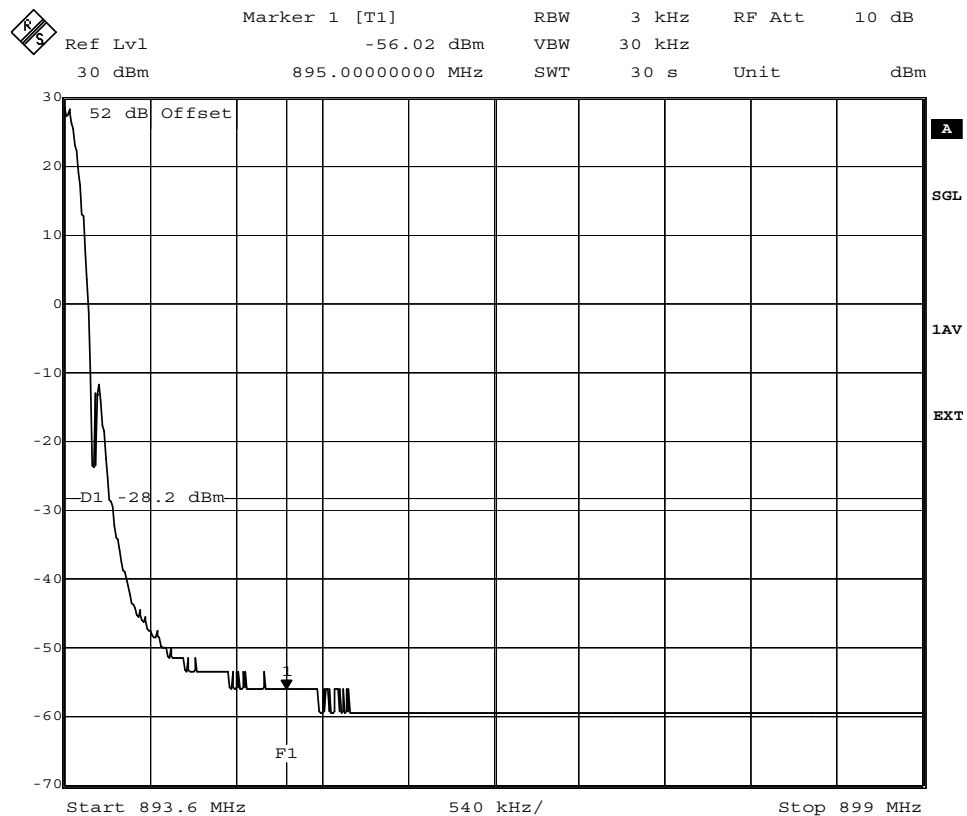
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Date: 3.SEP.2004 12:09:42

Conducted spurious emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2004-09-01	22 °C ± 3 °C	51 % ± 5 %
2004-09-02	22 °C ± 3 °C	53 % ± 5 %
2004-09-03	22 °C ± 3 °C	51 % ± 5 %

Test set-up and Procedure

The measurements were made per definition in 22.917. Measurements were made at CDU-G 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 modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2005-04	503 738
HP filter	2005-04	502 758
Testo 610, Temperature and humidity meter	2004-12	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 6.1

Mode: **GMSK**

dTRU, with internal combiner plus TCC:

Diagram 1: Ch 128, 50 dBm

Diagram 2: Ch 251, 50 dBm

dTRU, without internal combiner:

Diagram 3: TRX output 1, Ch 128, 47 dBm

Diagram 4: TRX output 1, Ch 251, 47 dBm

Diagram 5: TRX output 2, Ch 128, 47 dBm

Diagram 6: TRX output 2, Ch 251, 47 dBm

dTRU, with internal combiner:

Diagram 7: Ch 128, 44 dBm and ch 153, 44 dBm

Diagram 8: Ch 226, 44 dBm and ch 251, 44 dBm

2 dTRU, with internal combiner plus TCC and HCU:

Diagram 9: dTRU 1 Ch 128, 47 dBm and dTRU 2 ch 153, 47 dBm

Diagram 10: dTRU 1 Ch 251, 47 dBm and dTRU 2 ch 226, 47 dBm

The dTRU with serial no: AE51160172 was used as dTRU 2 for the measurements with 2 dTRUs.

Mode: **EDGE**

dTRU, with internal combiner plus TCC:

Diagram 11: Ch 128, 50 dBm

Diagram 12: Ch 251, 50 dBm

dTRU, without internal combiner:

Diagram 13: TRX output 1, Ch 128, 47 dBm

Diagram 14: TRX output 1, Ch 251, 47 dBm

Diagram 15: TRX output 2, Ch 128, 47 dBm

Diagram 16: TRX output 2, Ch 251, 47 dBm

dTRU, with internal combiner:

Diagram 17: Ch 128, 44 dBm and ch 153, 44 dBm

Diagram 18: Ch 226, 44 dBm and ch 251, 44 dBm

2 dTRU, with internal combiner plus TCC and HCU:

Diagram 19: dTRU 1 Ch 128, 47 dBm and dTRU 2 ch 153, 47 dBm

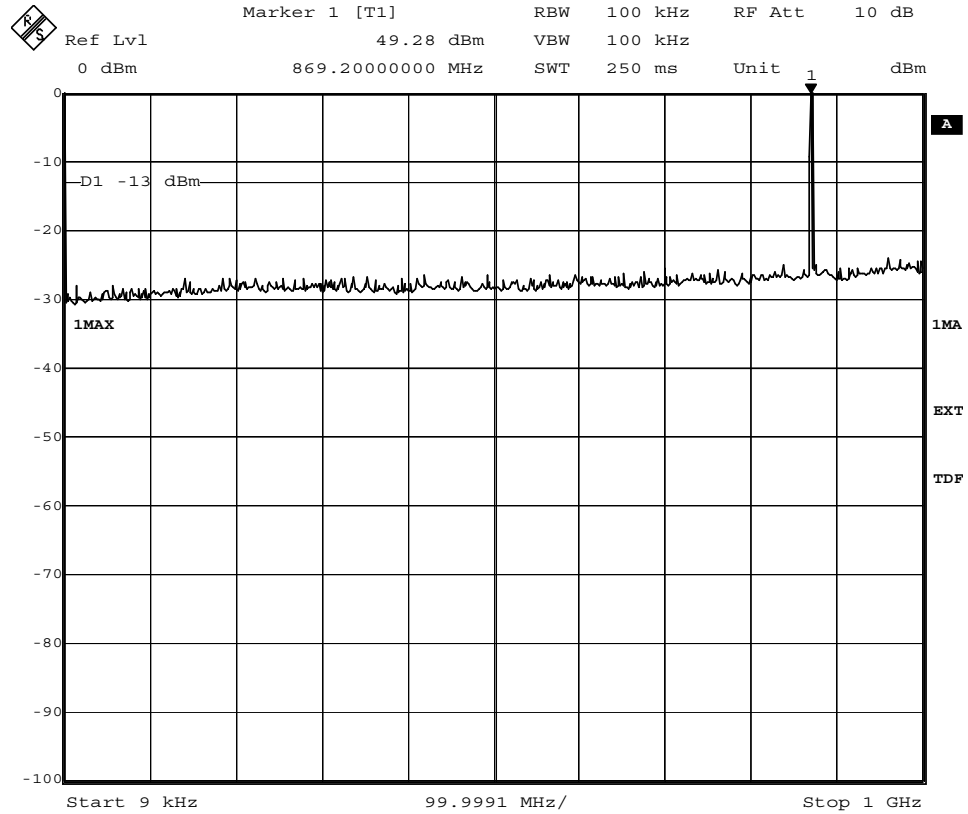
Diagram 20: dTRU 1 Ch 251, 47 dBm and dTRU 2 ch 226, 47 dBm

The dTRU with serial no: AE51160172 was used as dTRU 2 for the measurements with 2 dTRUs.

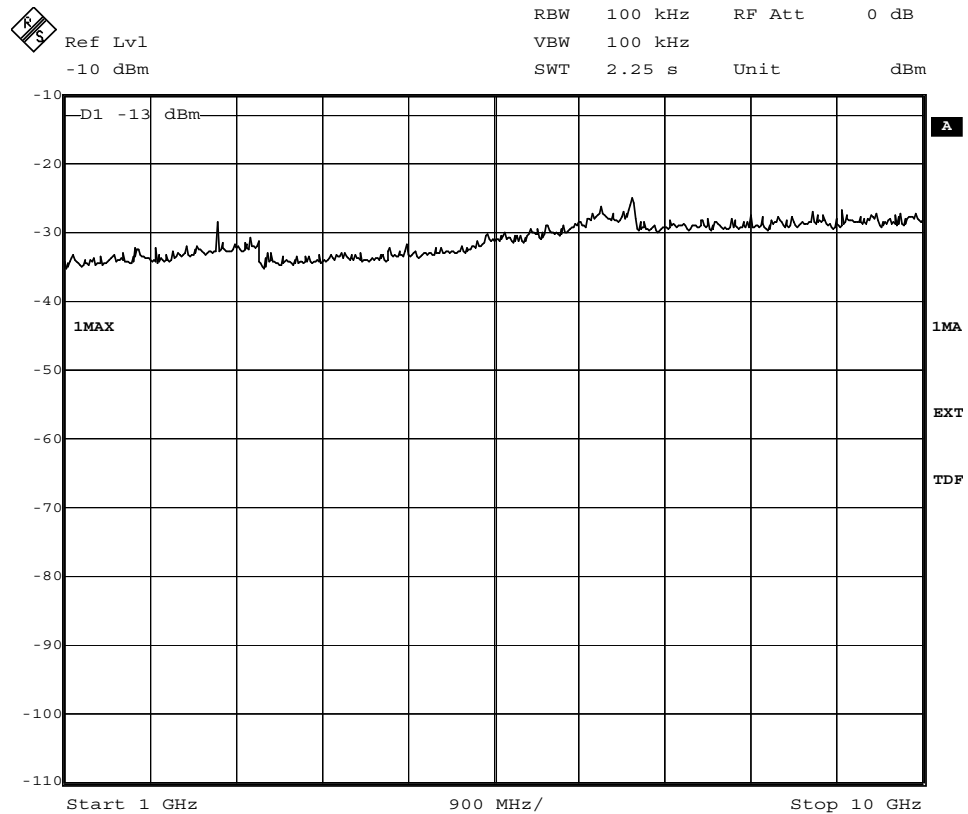
Limits

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.

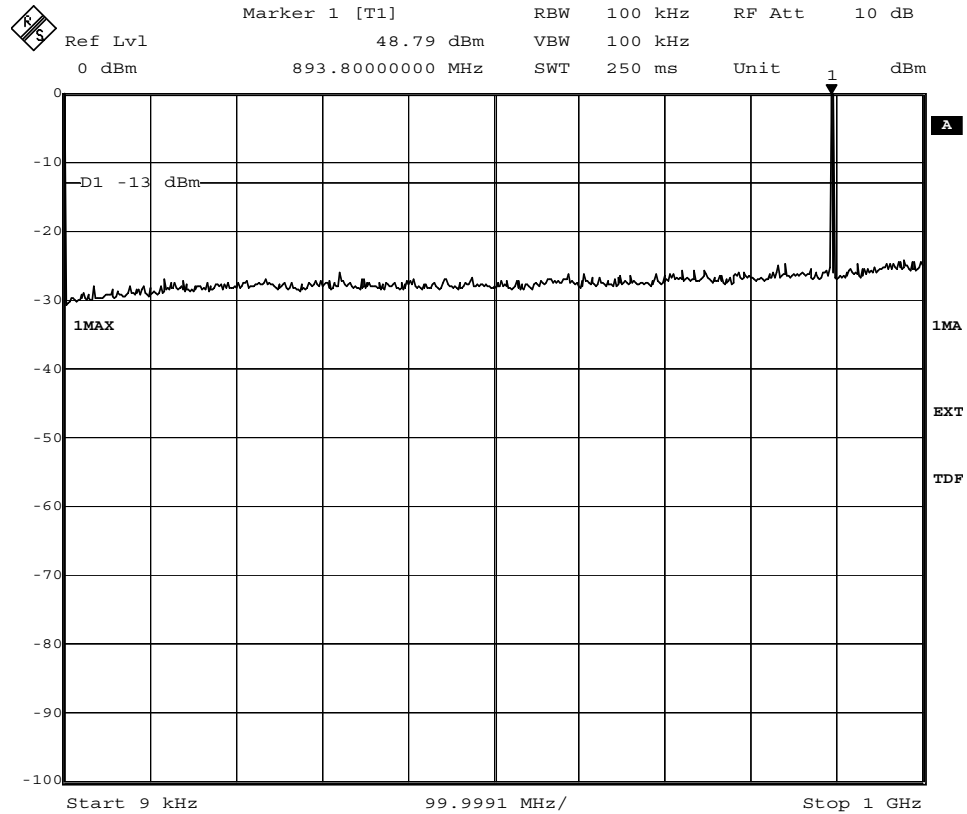
Complies?	Yes
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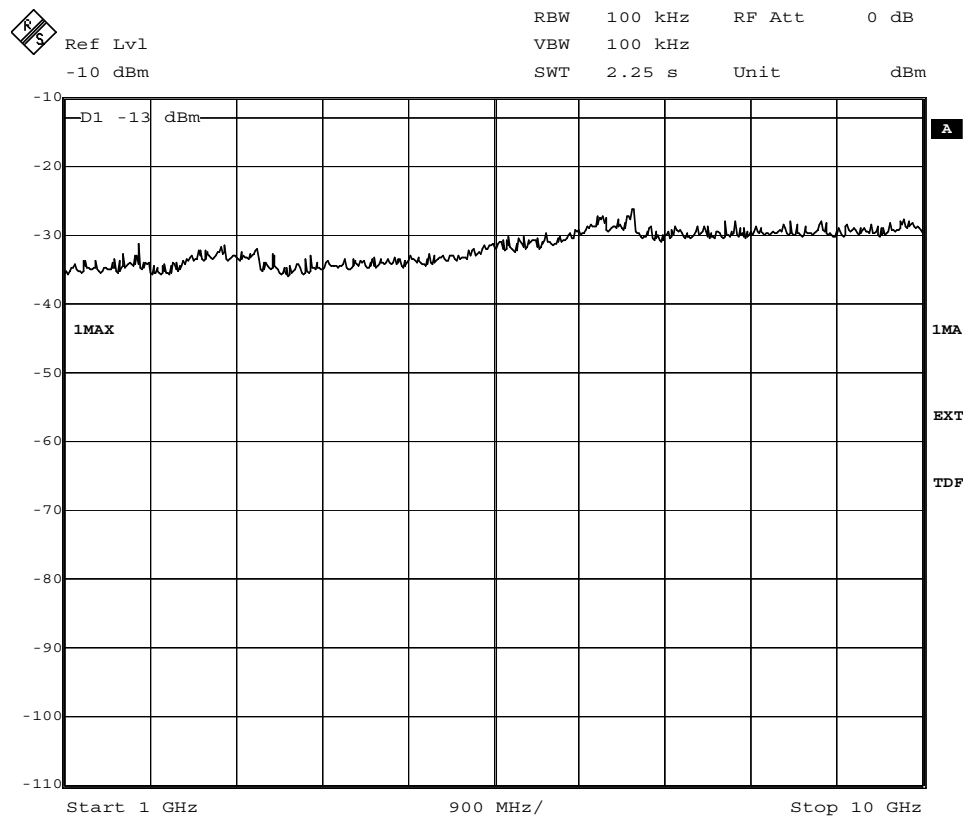
Date: 1.SEP.2004 12:42:48



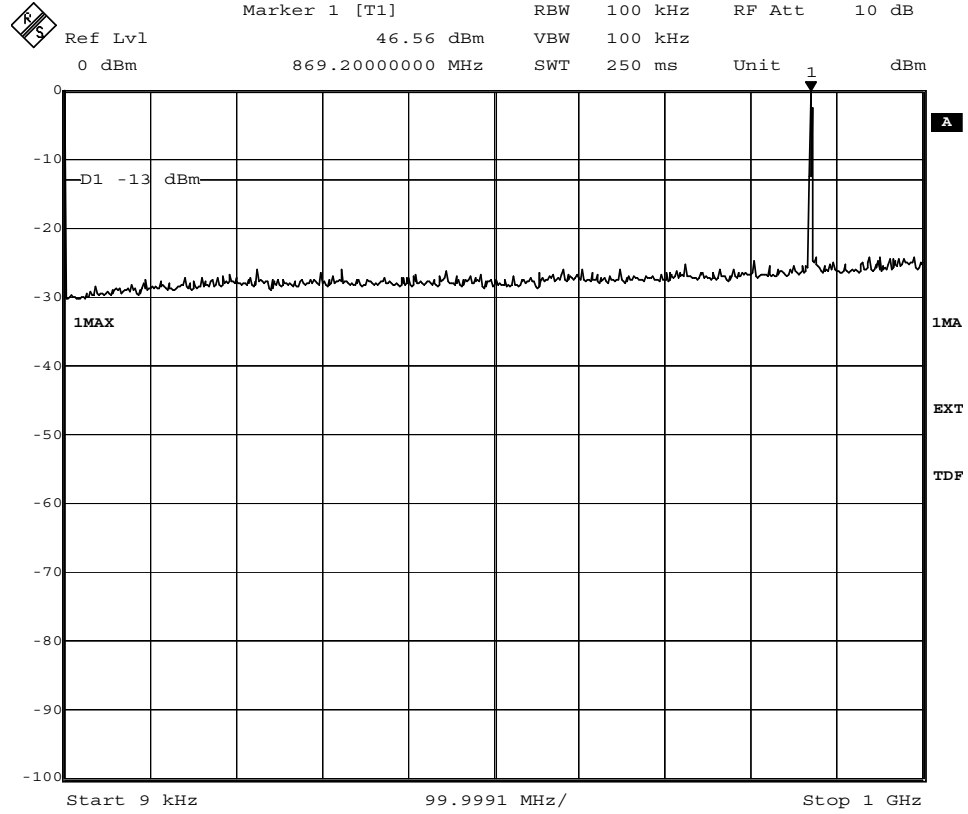
Date: 1.SEP.2004 12:24:00



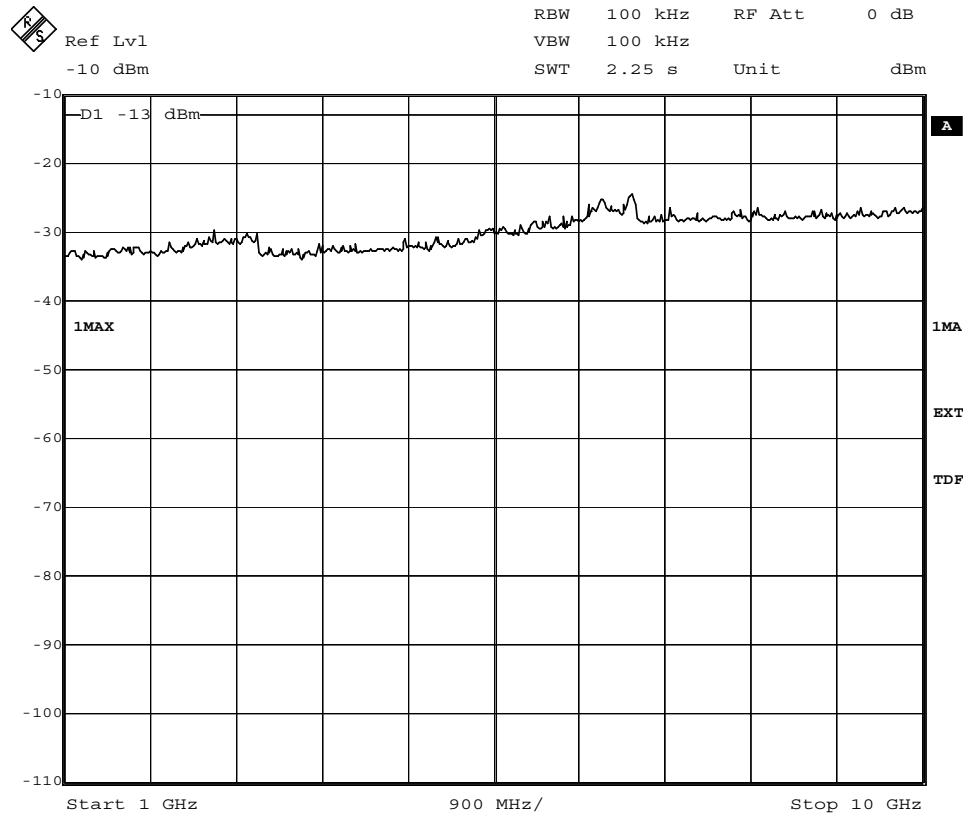
Date: 1.SEP.2004 12:40:40



Date: 1.SEP.2004 12:25:13



Date: 2.SEP.2004 12:34:35



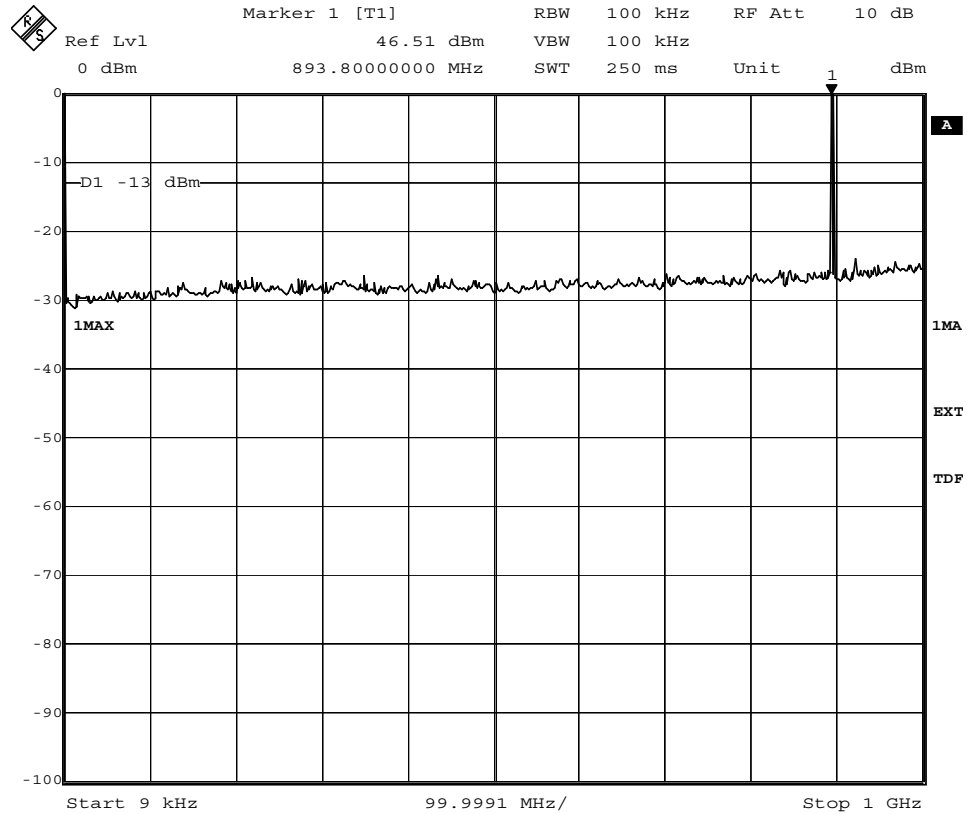
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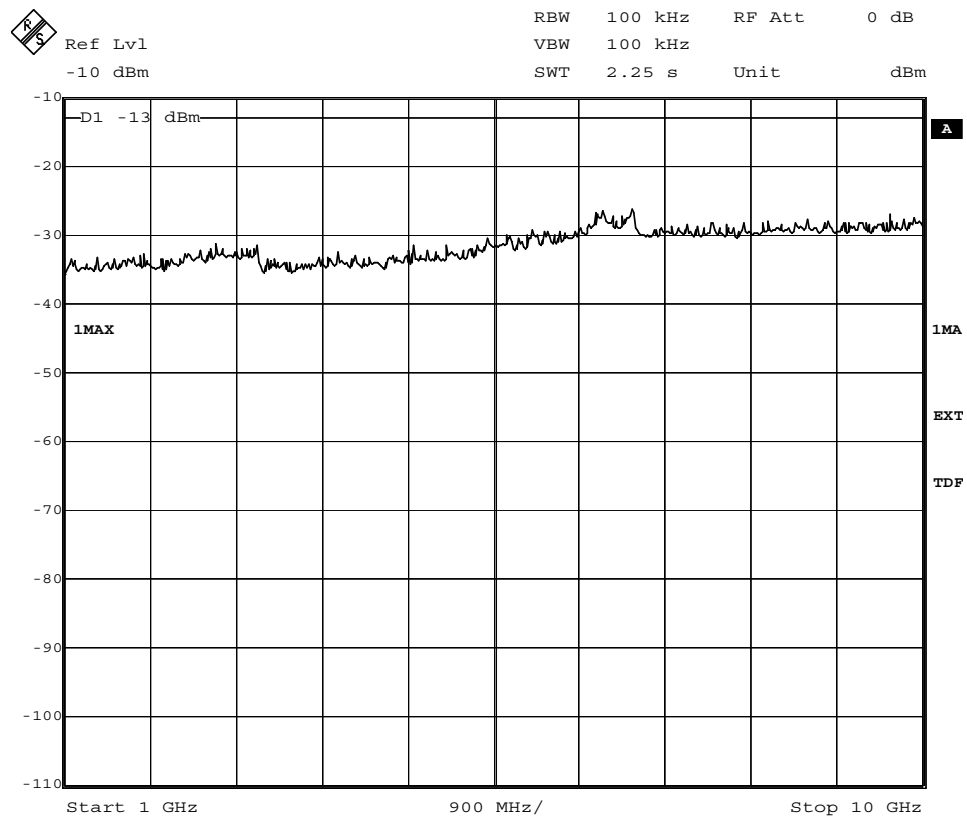
B5KCKRC1311005-2

Appendix 6.1

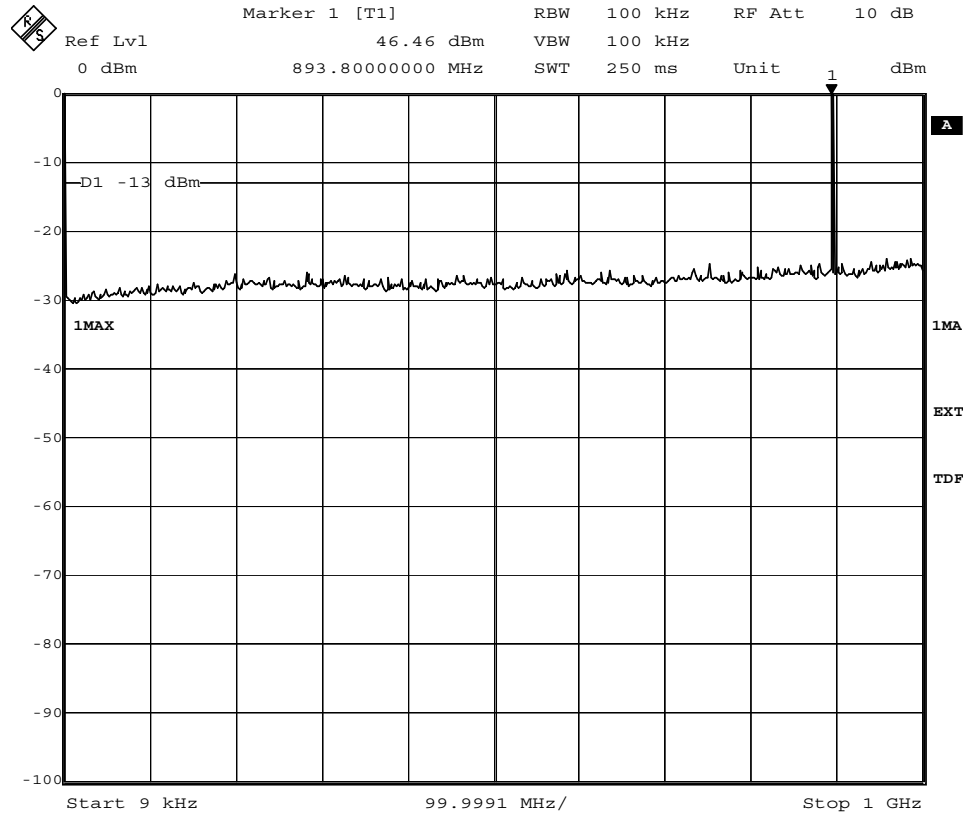
Diagram
4 (20)



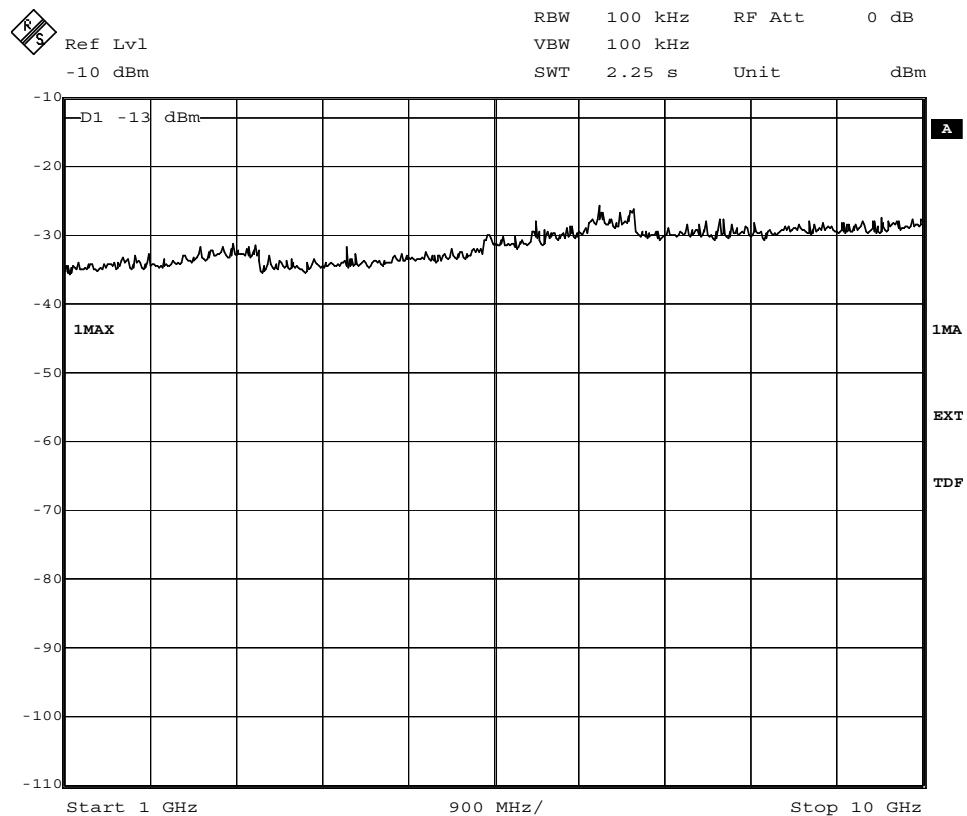
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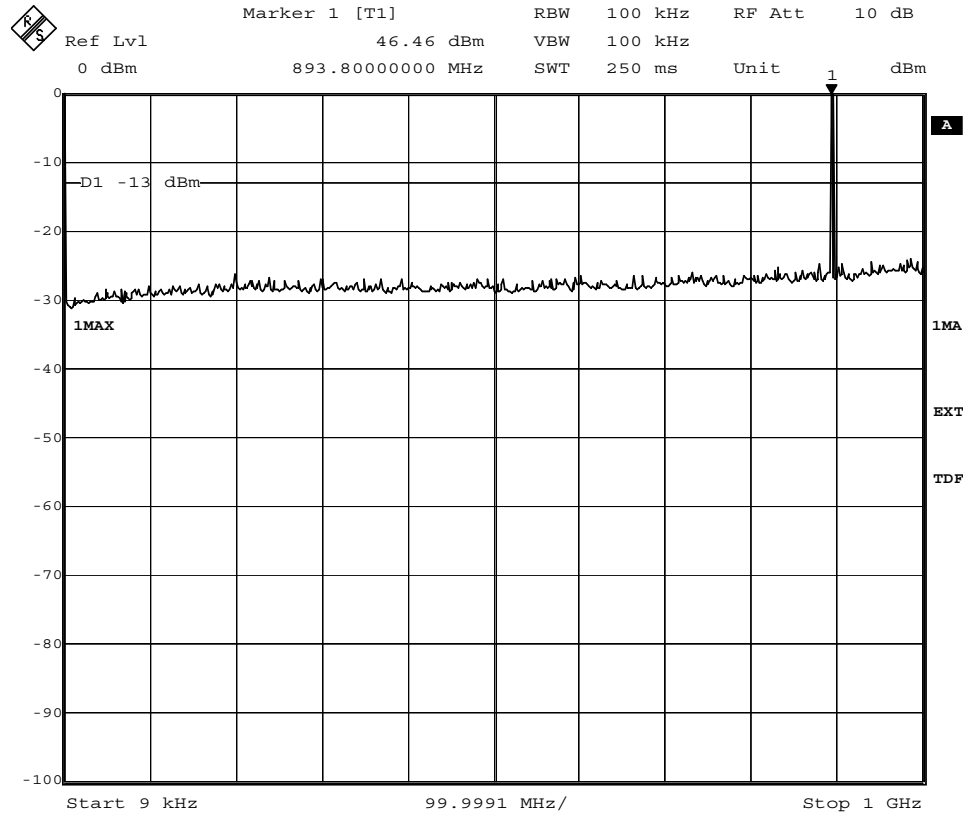
Date: 2.SEP.2004 12:52:31



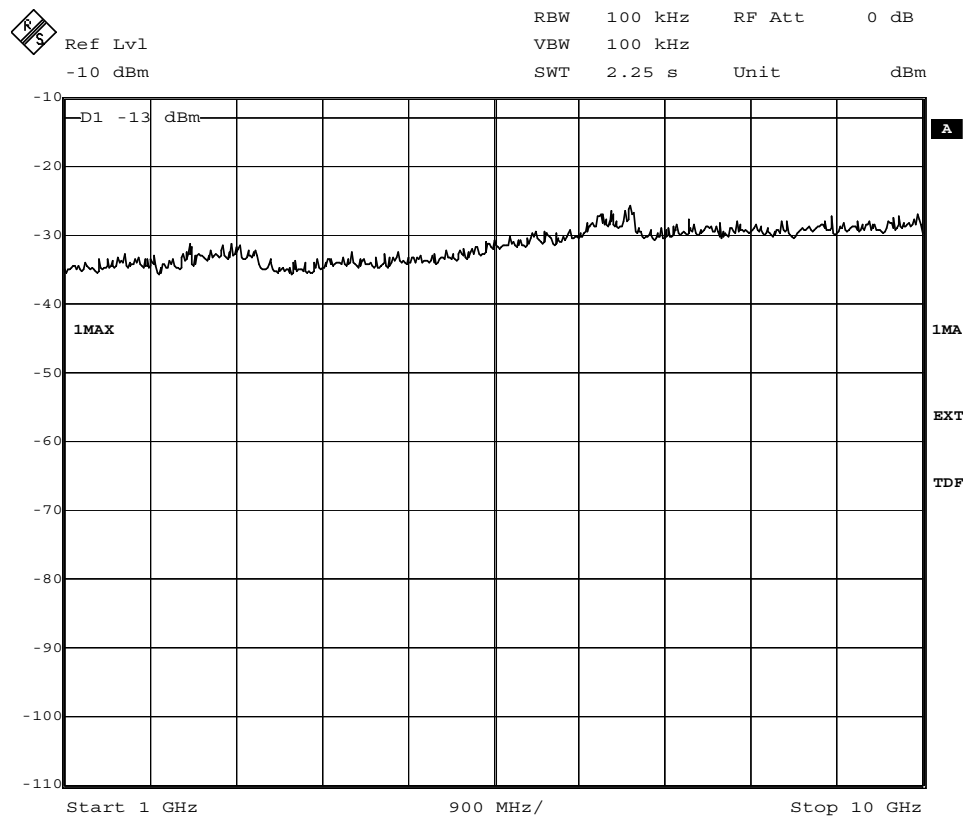
Date: 2.SEP.2004 12:27:50



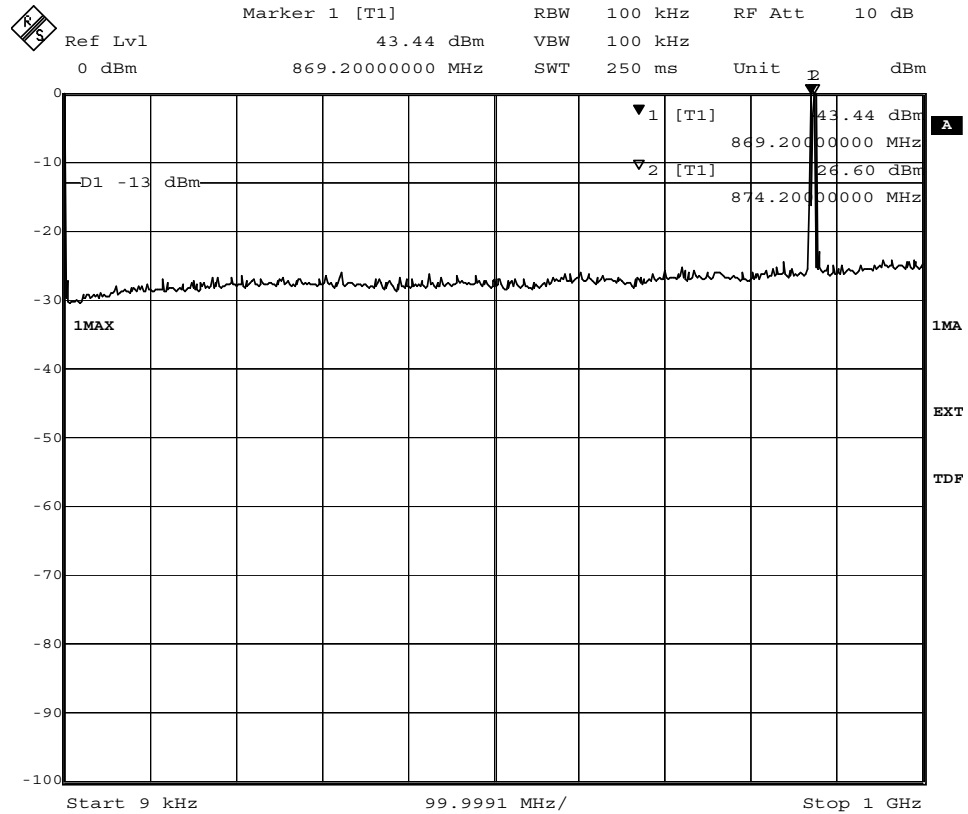
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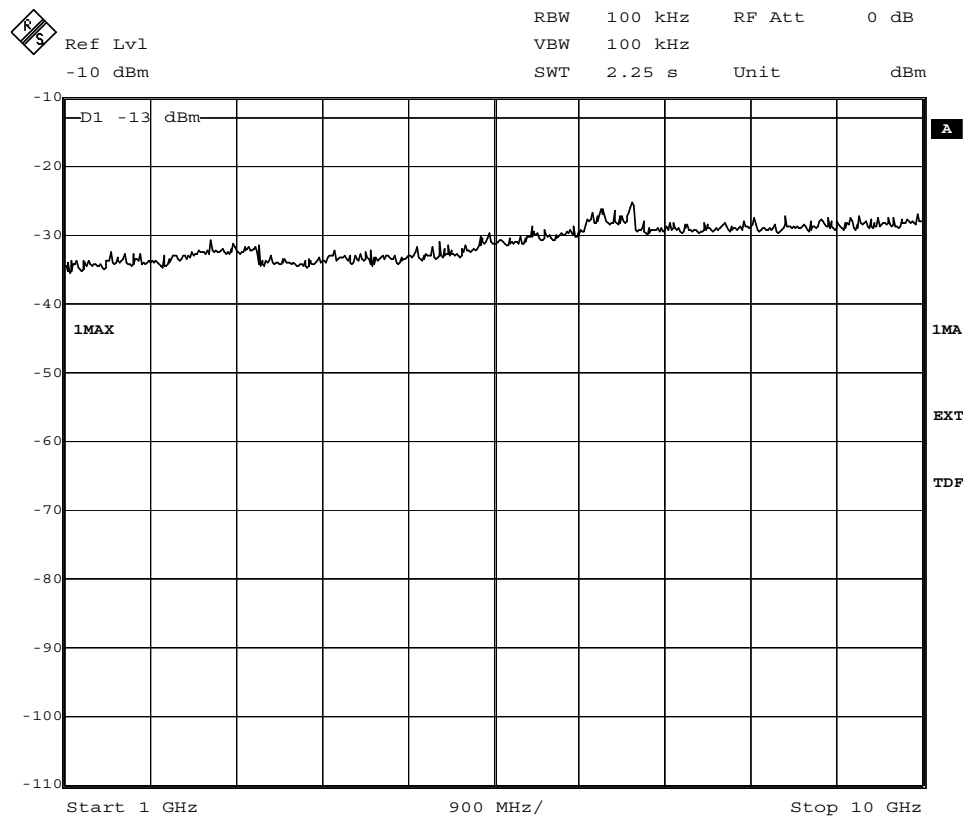
Date: 2.SEP.2004 12:27:07



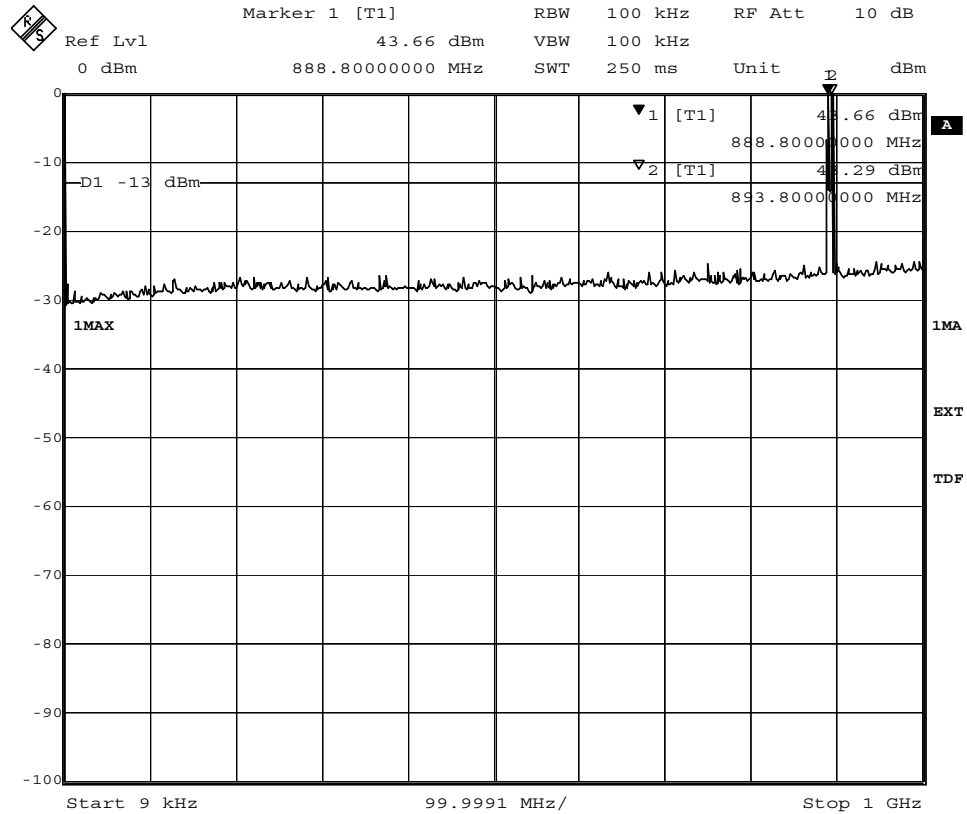
Date: 2.SEP.2004 12:57:31



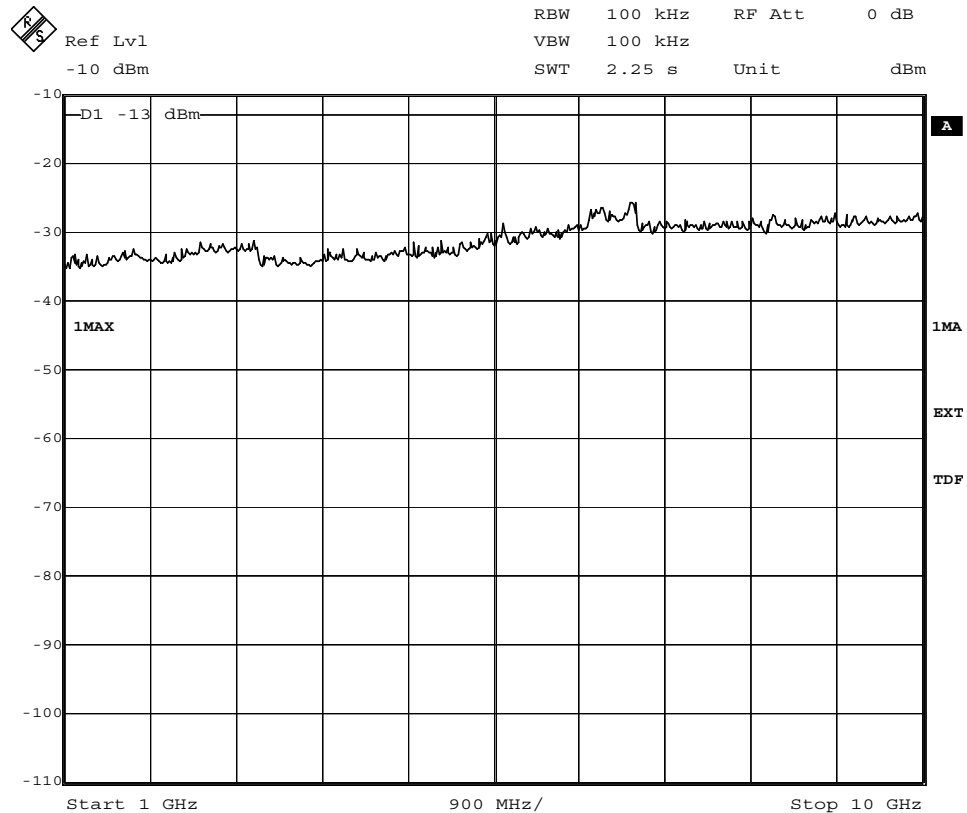
Date: 3.SEP.2004 12:31:02



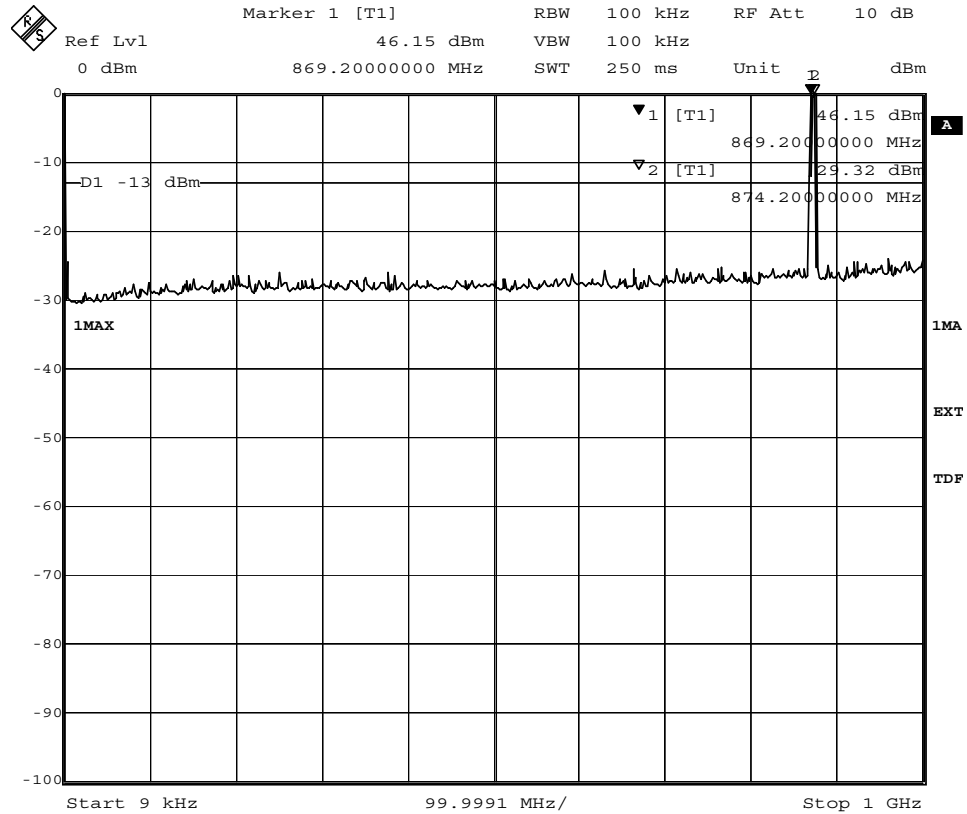
Date: 3.SEP.2004 12:48:00



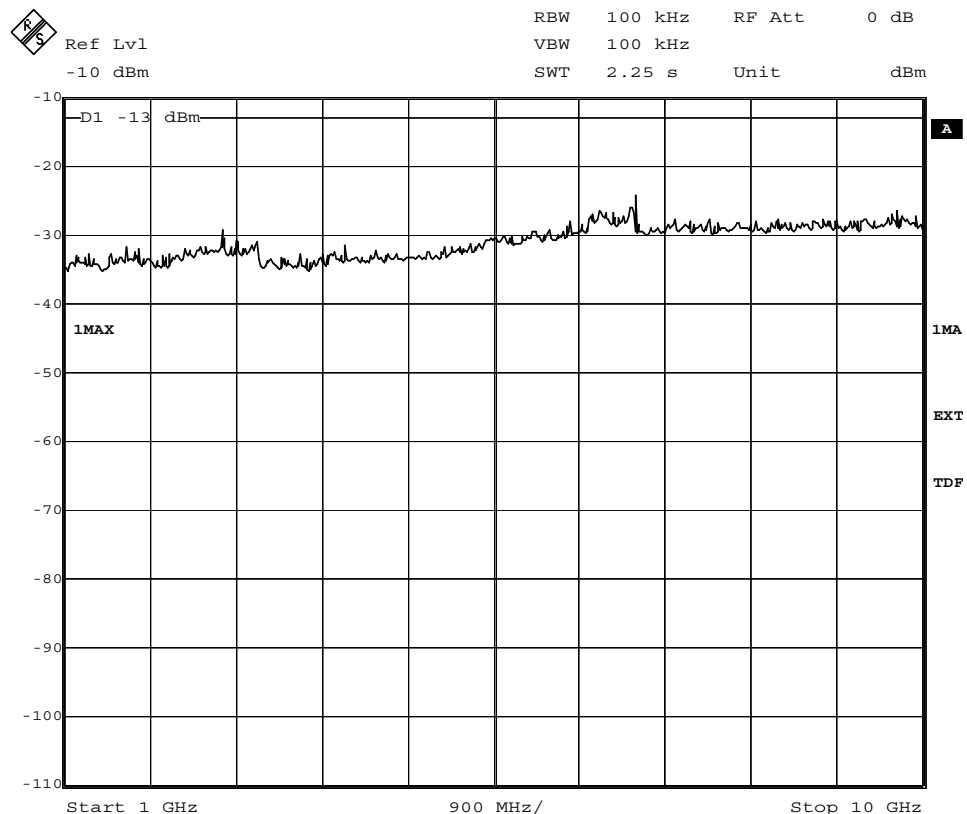
Date: 3.SEP.2004 12:38:19



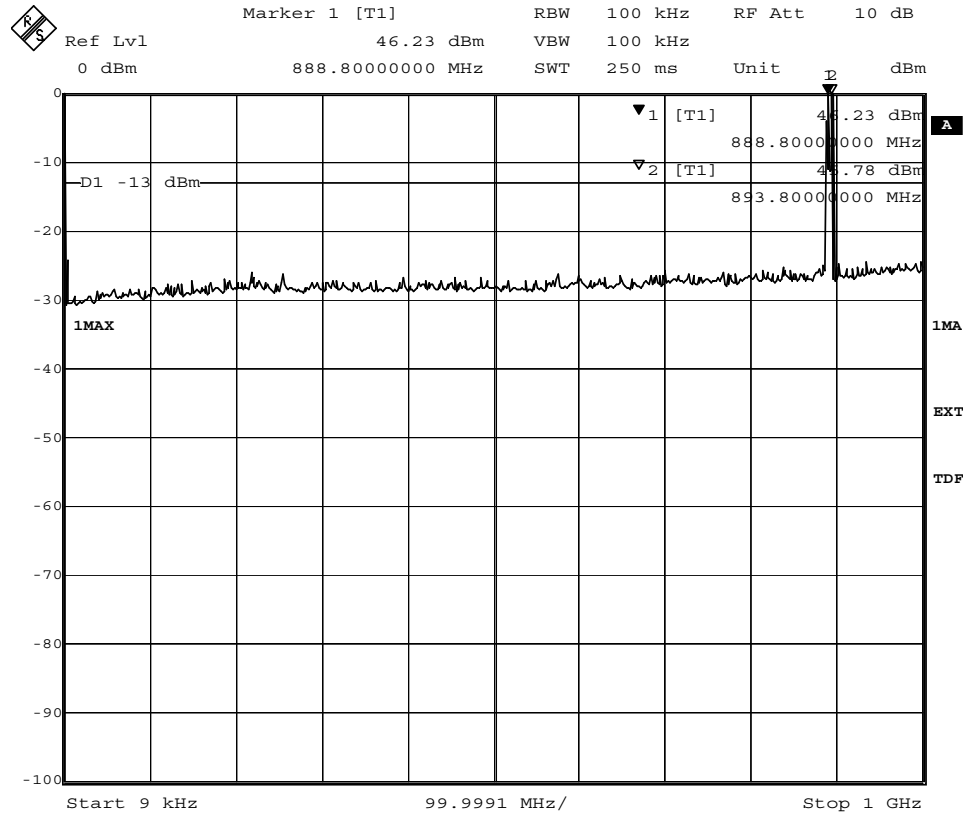
Date: 3.SEP.2004 12:42:30



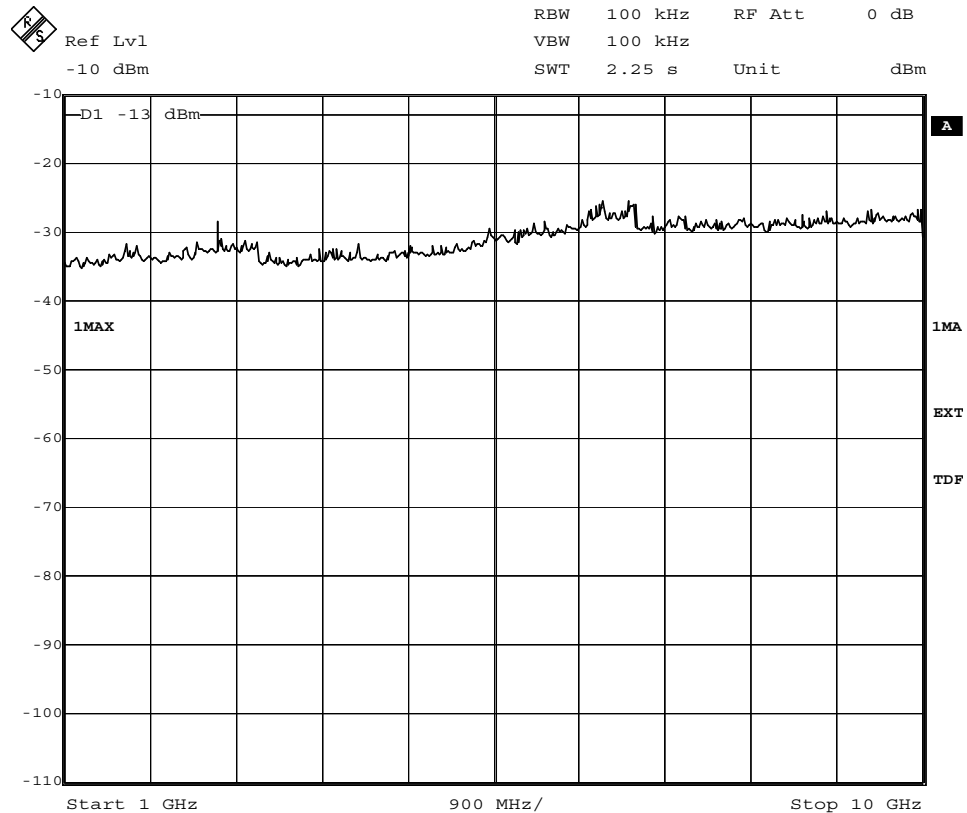
Date: 1.SEP.2004 11:00:40



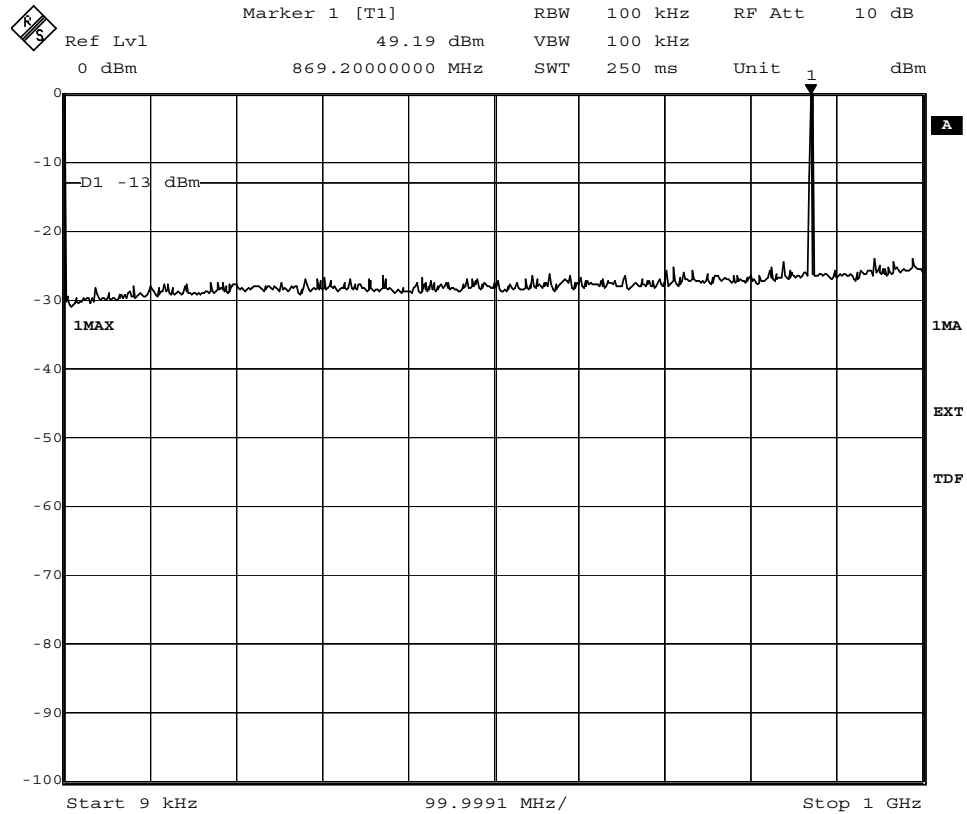
Date: 1.SEP.2004 11:07:09



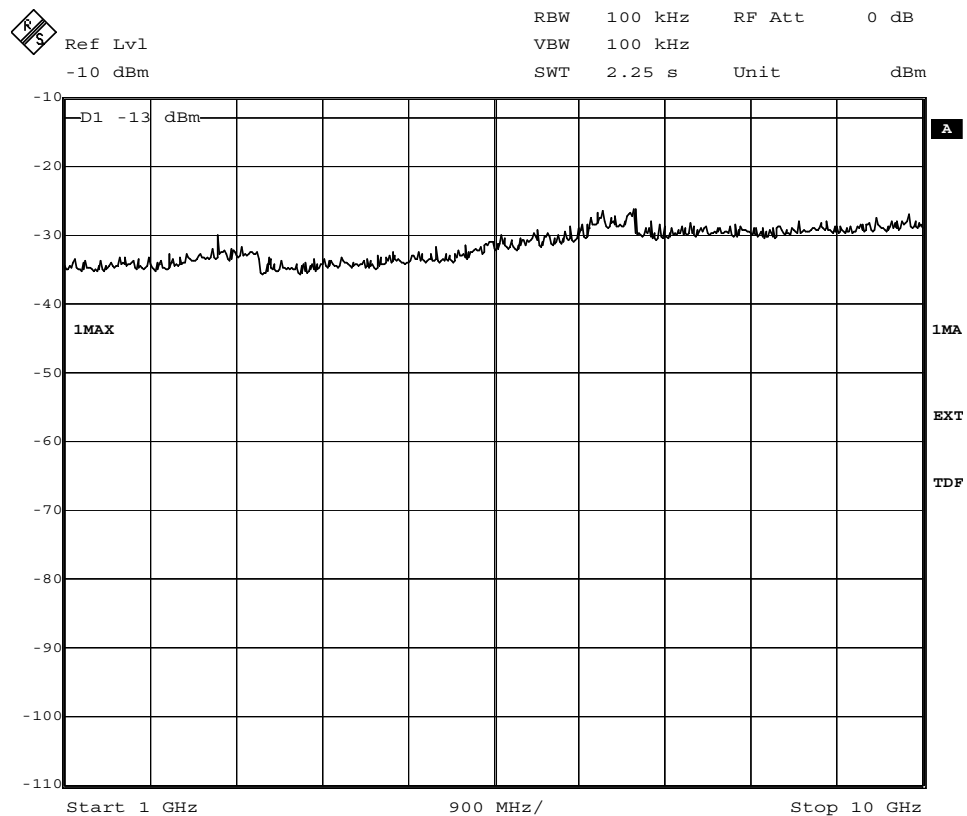
Date: 1.SEP.2004 10:52:42



Date: 1.SEP.2004 11:03:45



Date: 1.SEP.2004 12:47:45



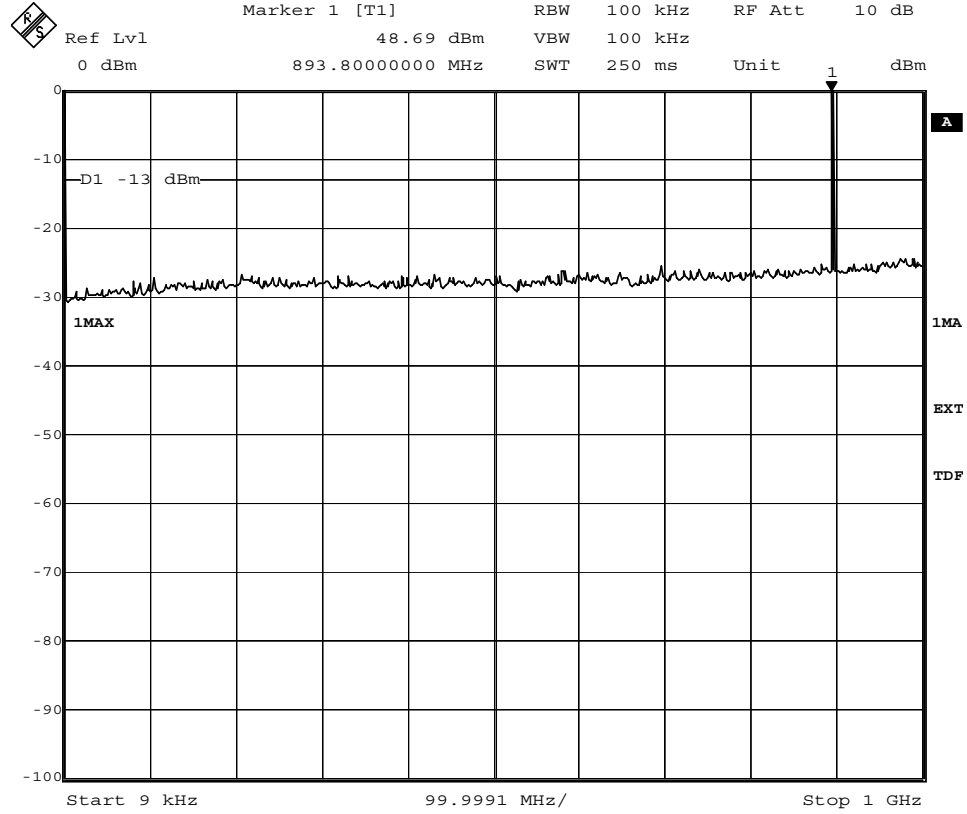
Date: 1.SEP.2004 12:20:37



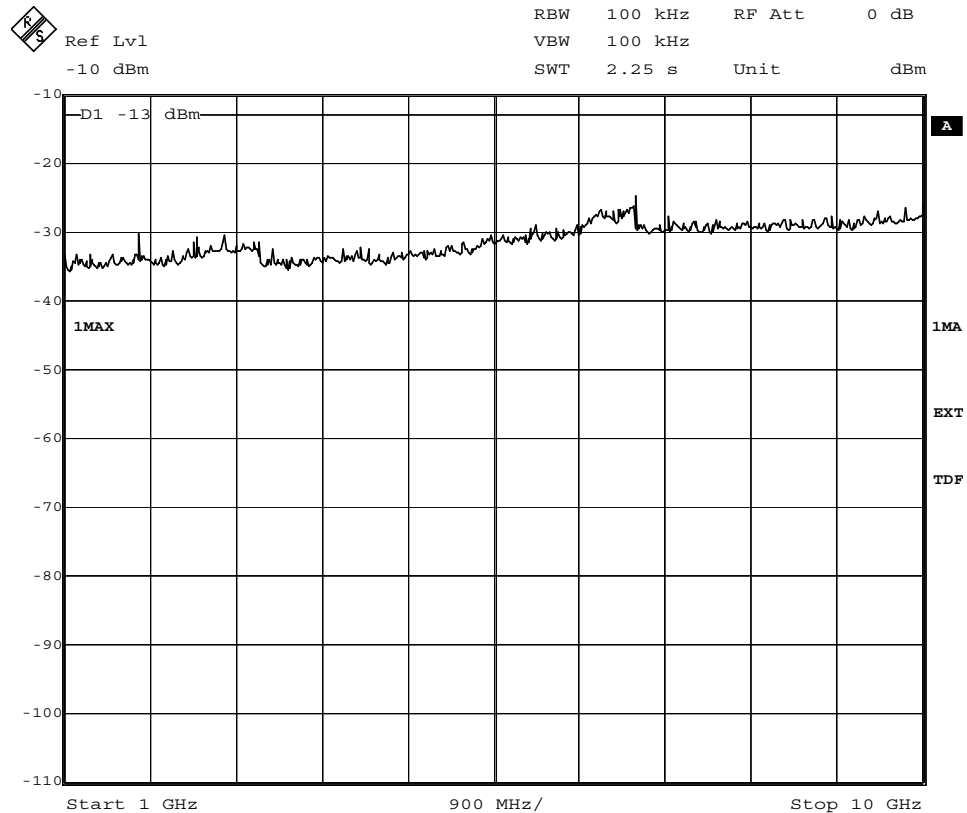
B5KCKRC1311005-2

Appendix 6.1

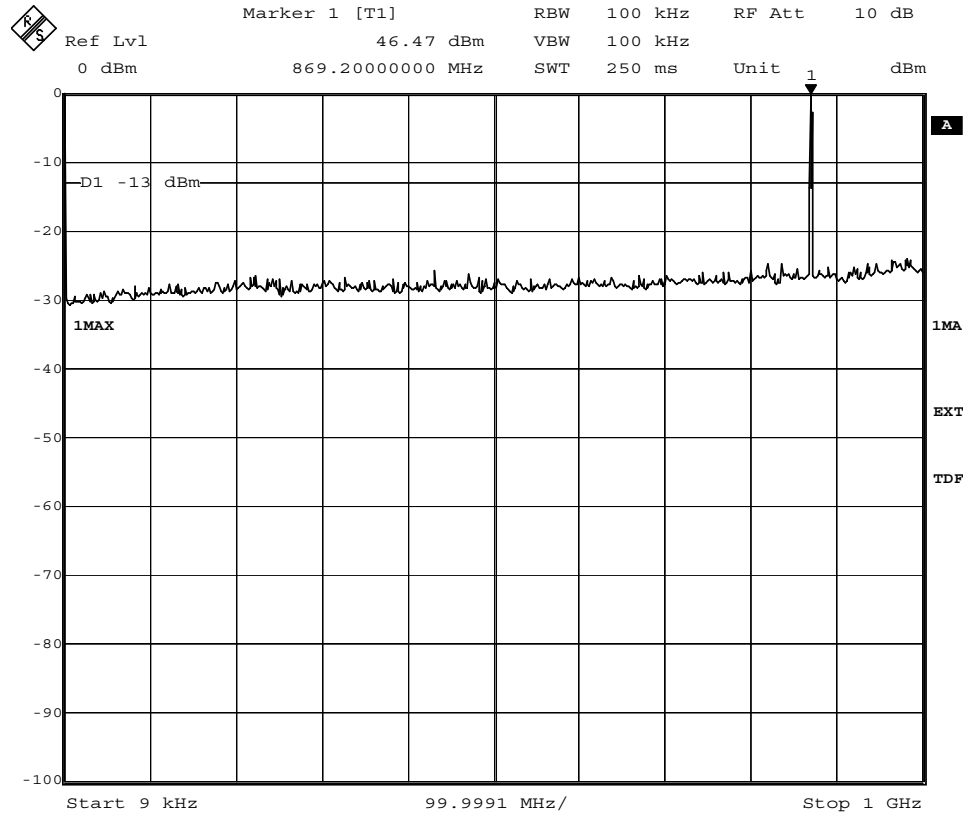
Diagram
12 (20)



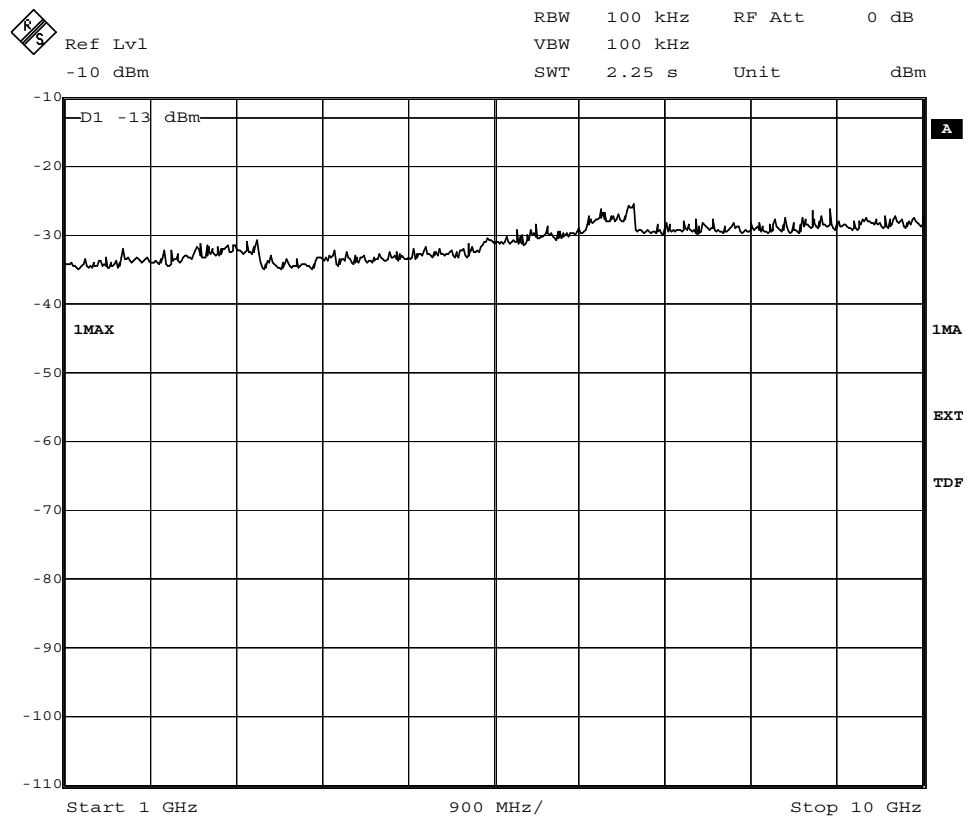
Date: 1.SEP.2004 12:38:04



Date: 1.SEP.2004 12:29:06



Date: 2.SEP.2004 12:33:27



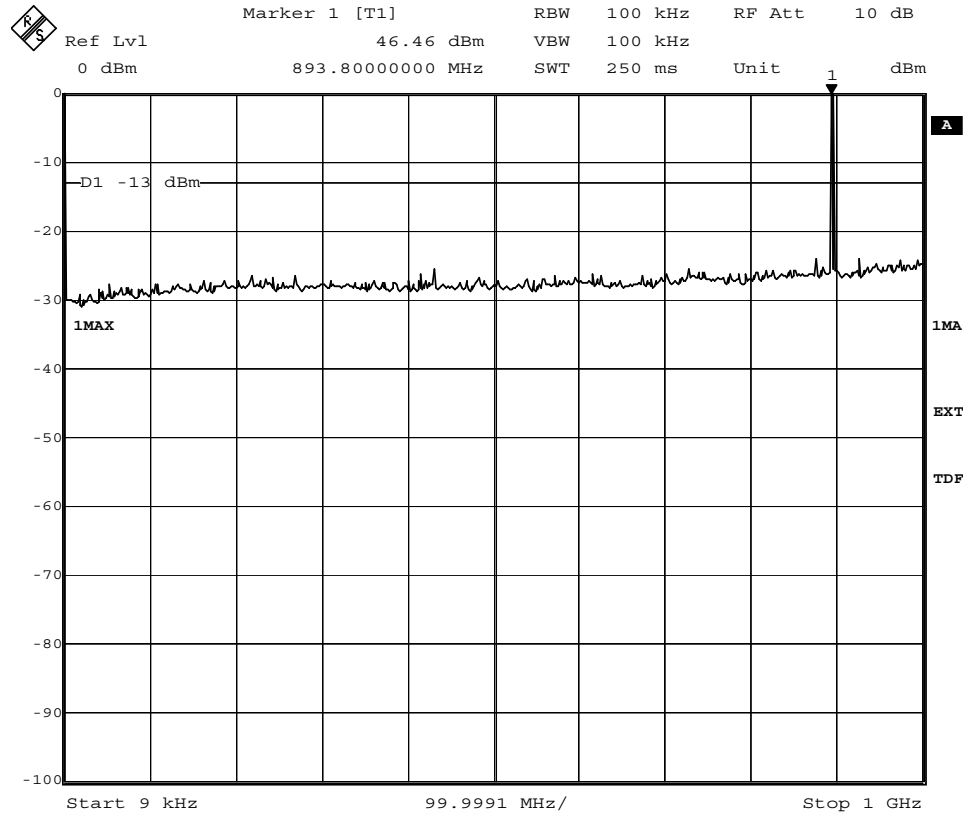
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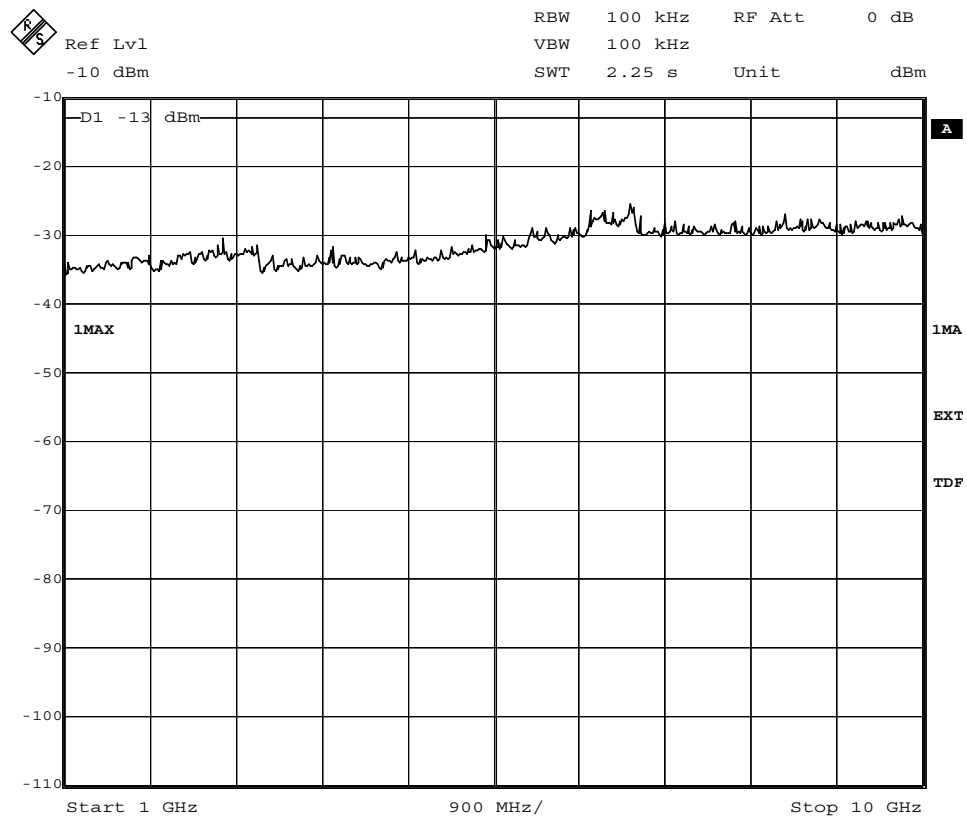
B5KCKRC1311005-2

Appendix 6.1

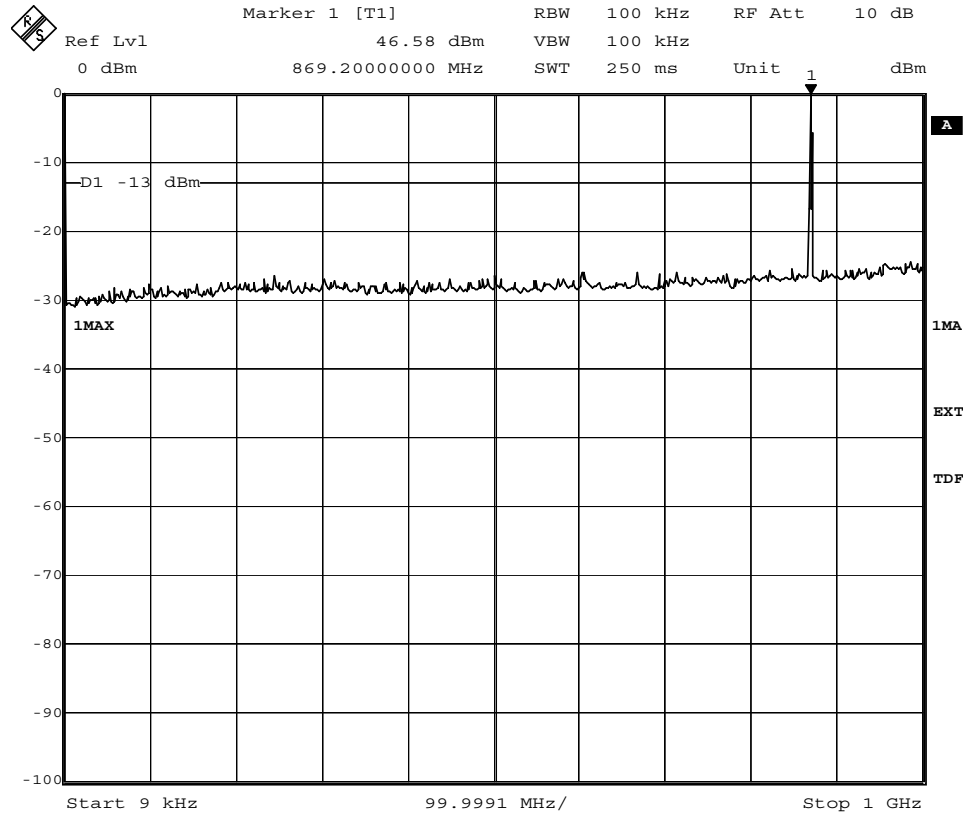
Diagram
14 (20)



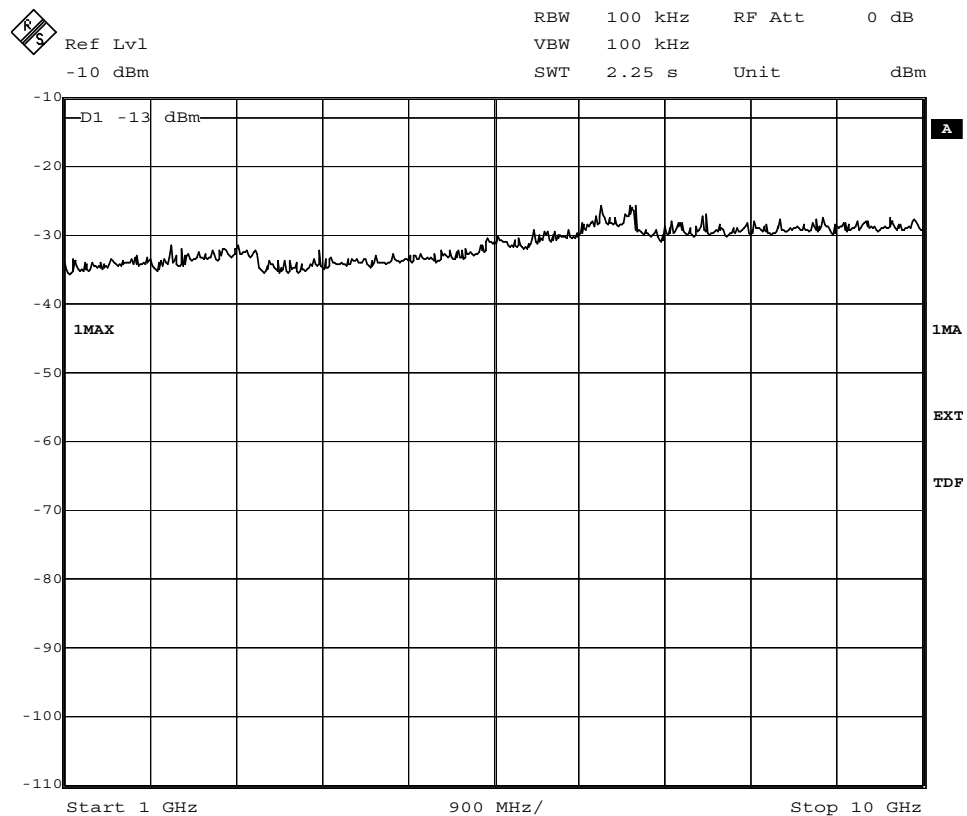
Date: 2.SEP.2004 12:31:52



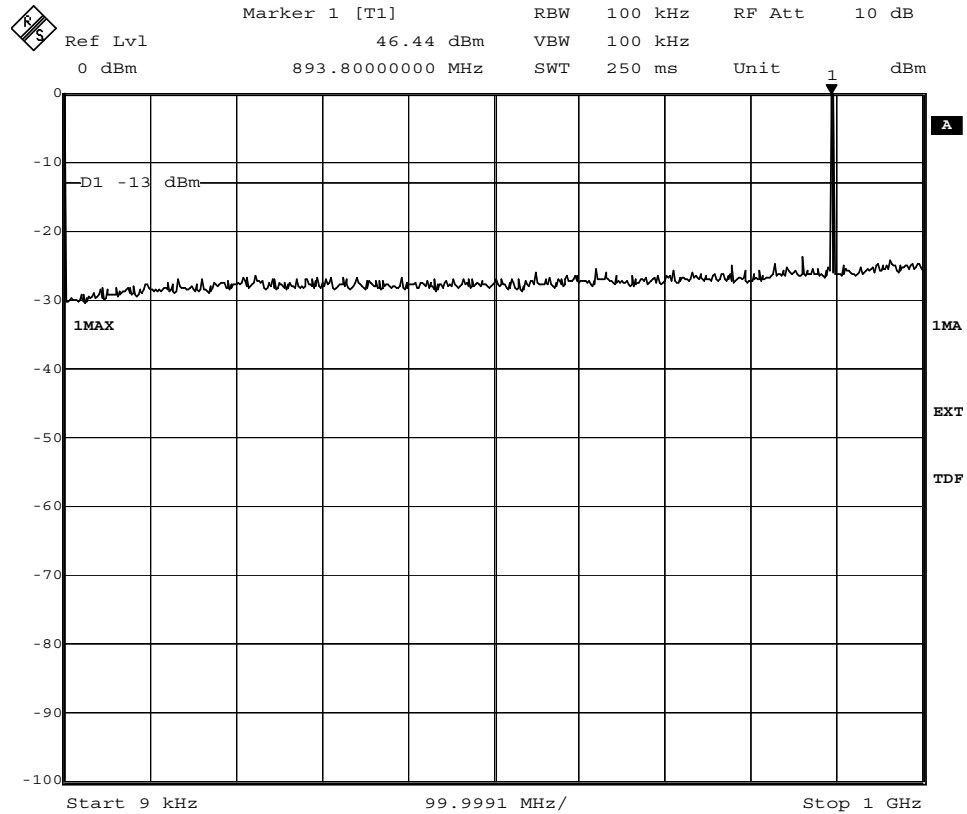
Date: 2.SEP.2004 12:51:49



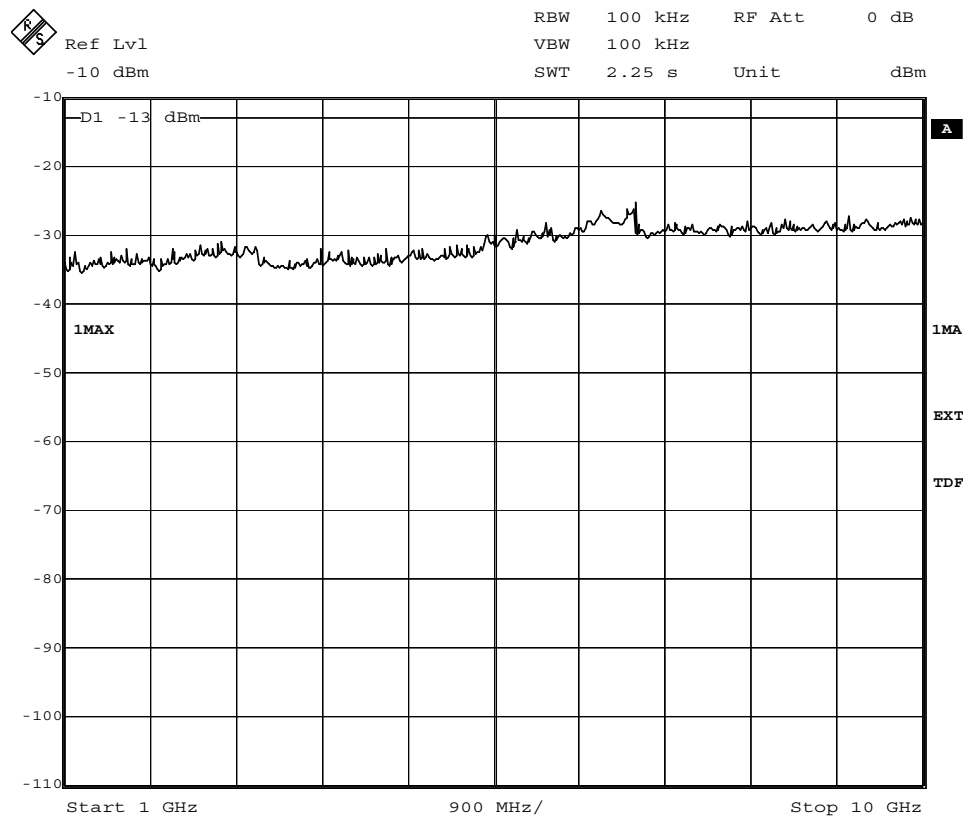
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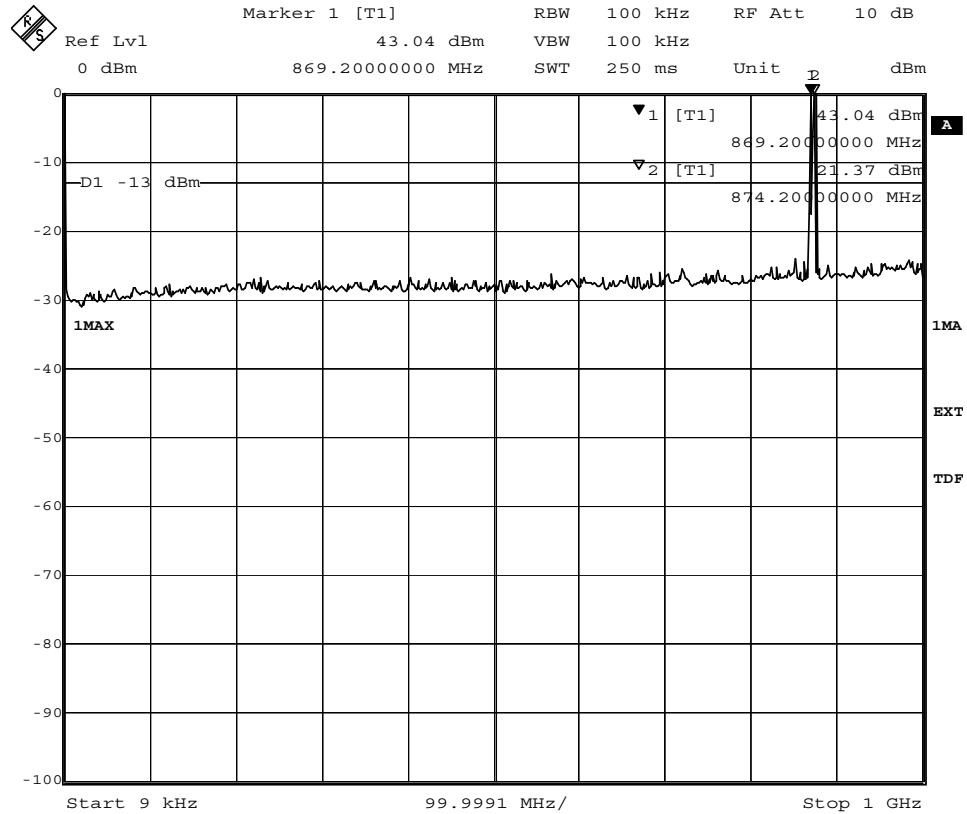
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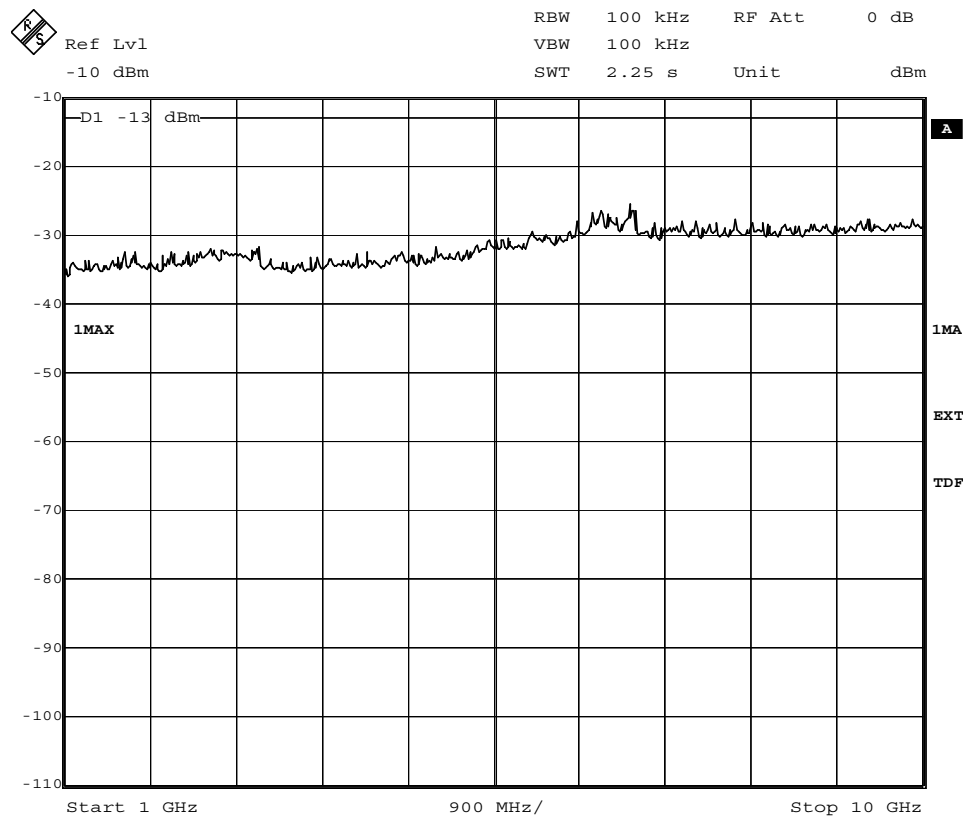
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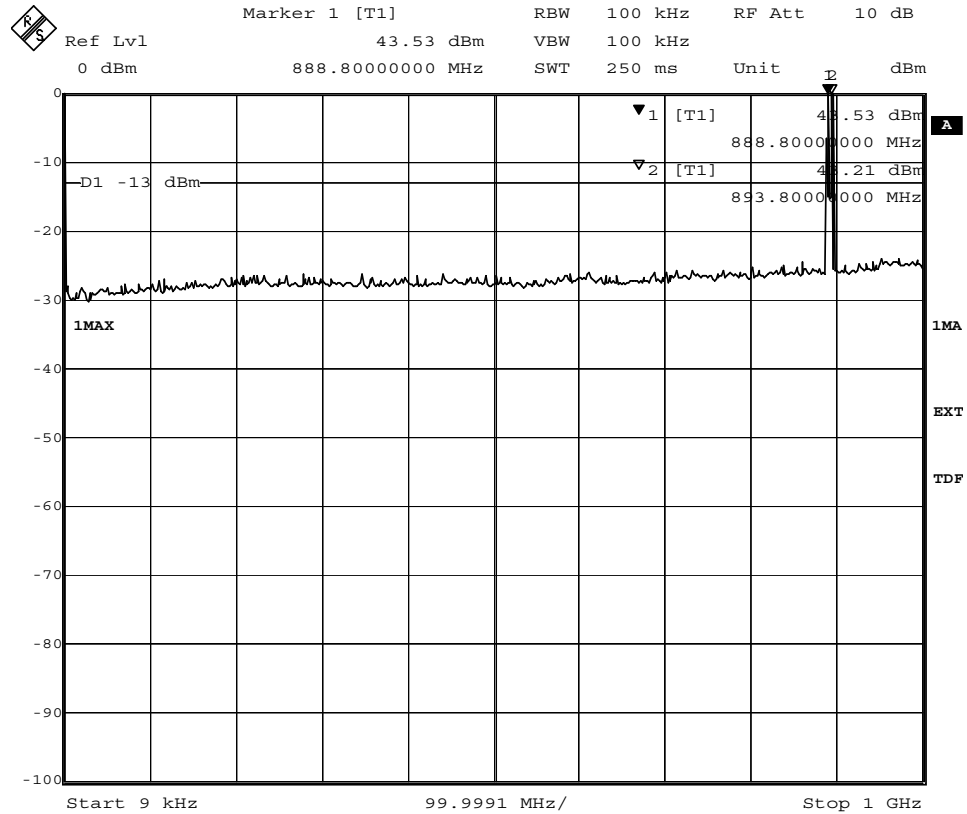
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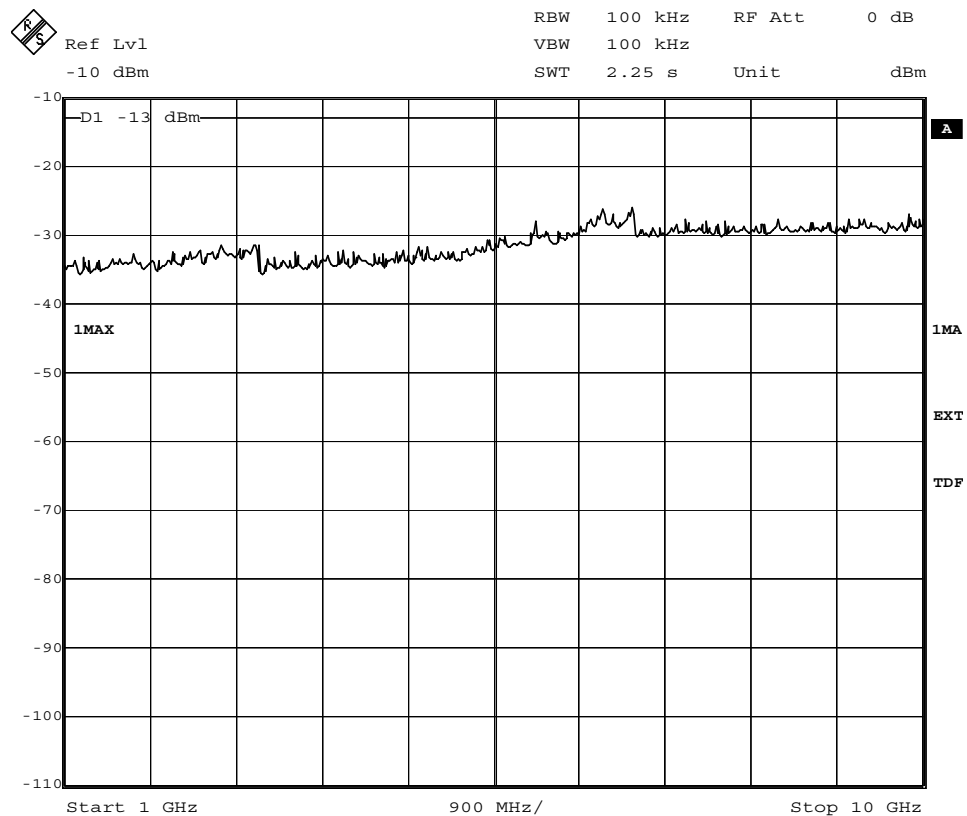
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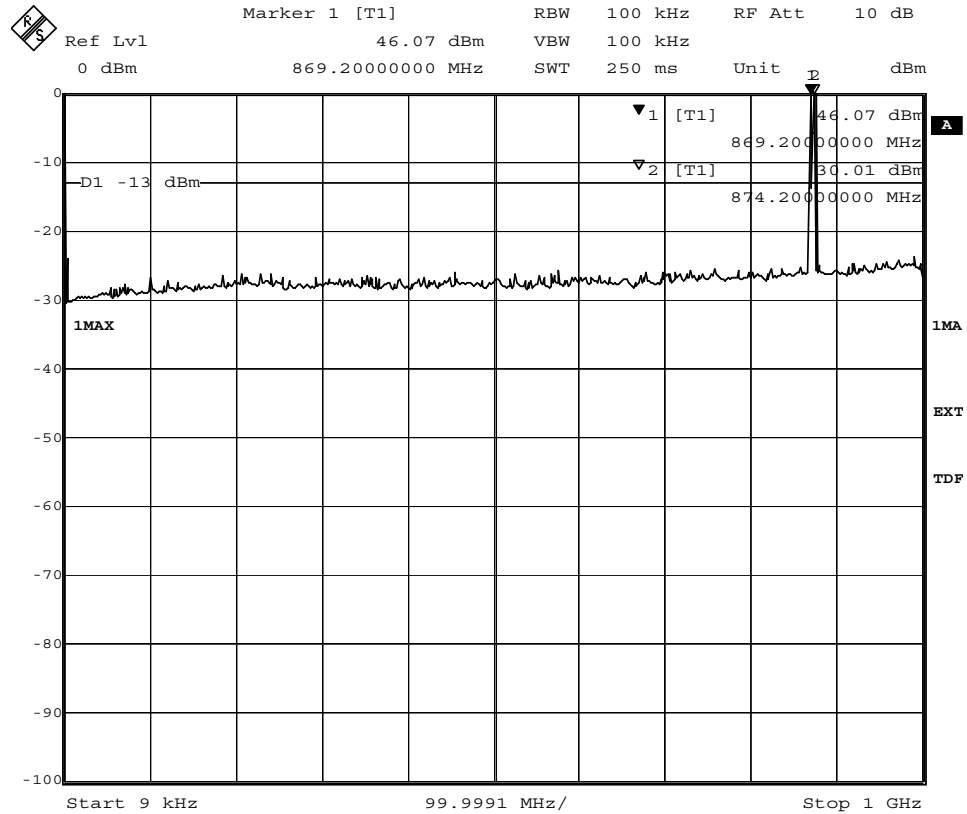
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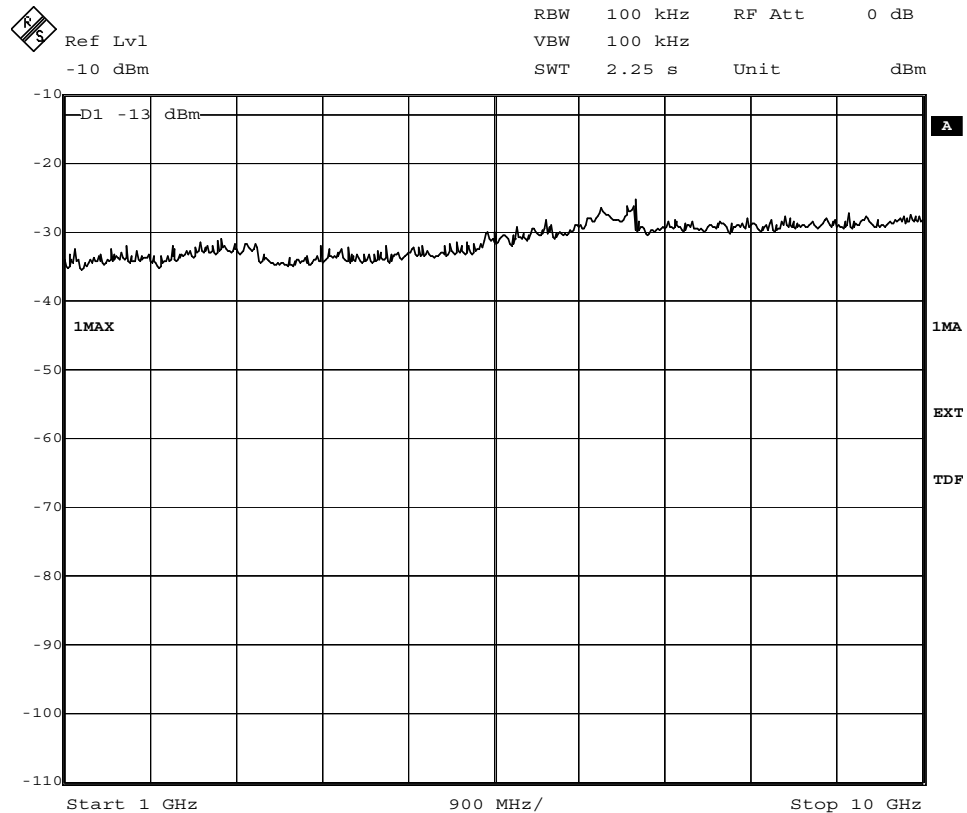
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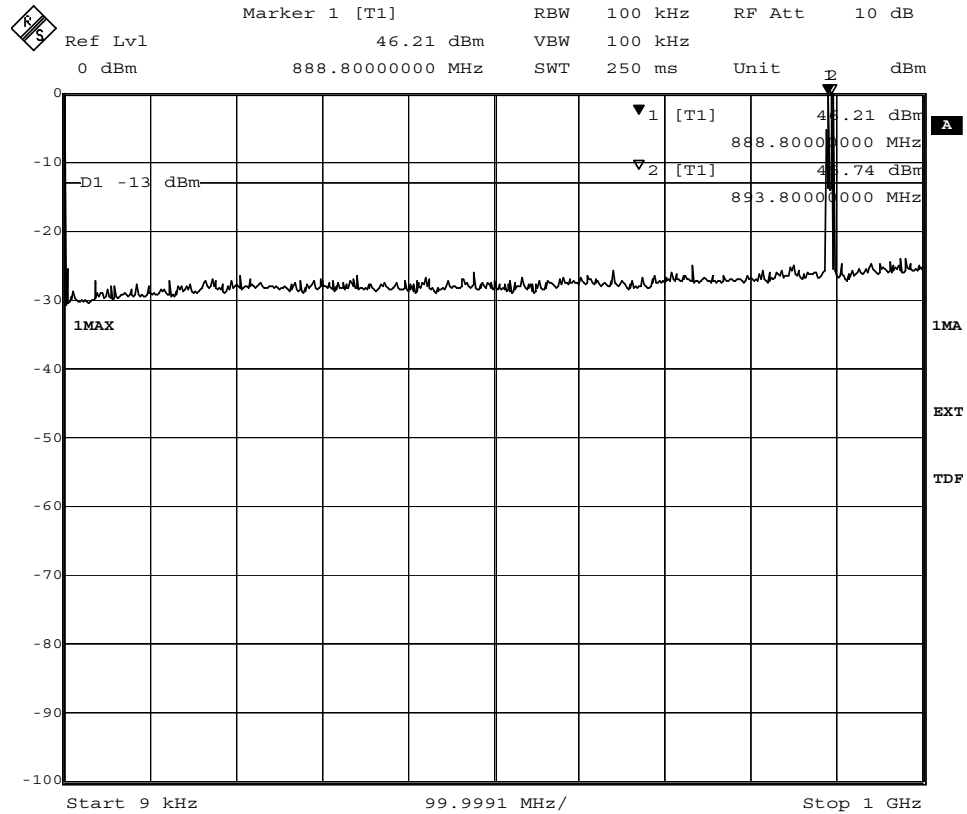
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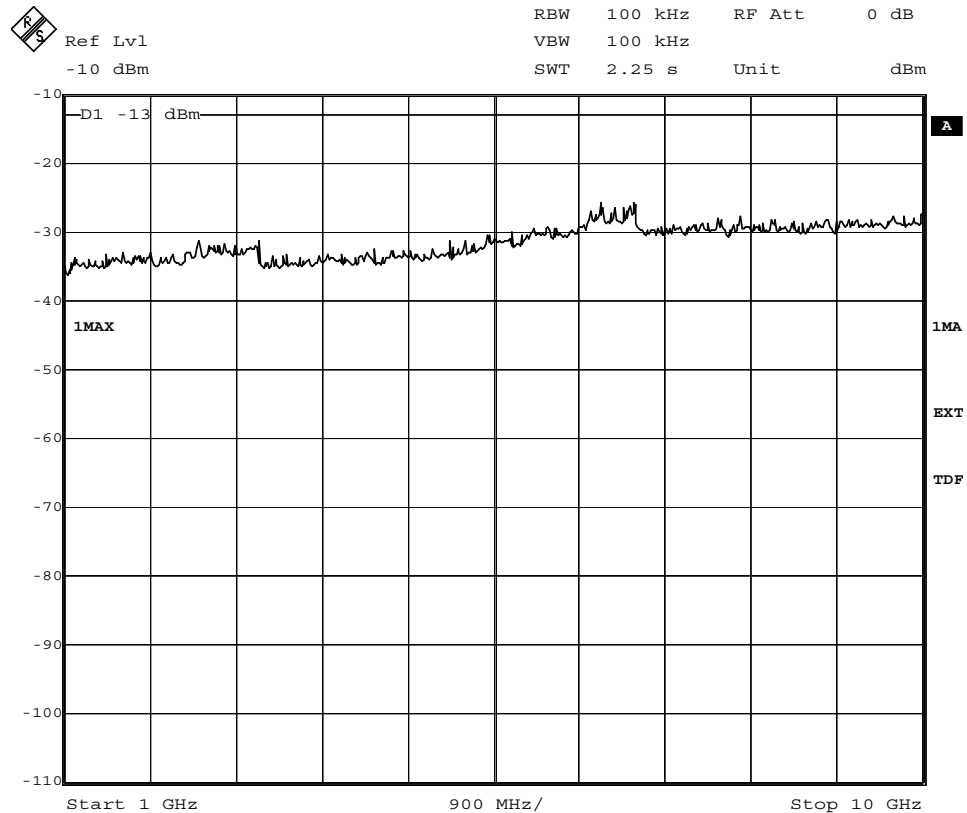
Date: 1.SEP.2004 10:58:58



Date: 1.SEP.2004 11:12:18



Date: 1.SEP.2004 10:56:29



Date: 1.SEP.2004 11:09:39

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date	Temperature	Humidity
2004-08-16	22 °C ± 3 °C	64 % ± 5 %
2004-08-17	22 °C ± 3 °C	60 % ± 5 %
2004-08-18	22 °C ± 3 °C	58 % ± 5 %
2004-08-19	22 °C ± 3 °C	68 % ± 5 %
2004-08-24	21 °C ± 3 °C	42 % ± 5 %

Test set-up and Procedure

The chamber 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.

A pre-measurement was first performed:

In the frequency range 30 MHz-10 GHz the measurement was performed in power. A propagation loss in free space was calculated and used as a transducer. 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 was measured with the substitution method according to the standard.

Measurement equipment	Calibration Due	SP number
Anechoic chamber	-	15:115
R&S ESI 40	2005-08	503 125
Control computer	-	503 479
Software: R&S ES-K1, ver. 1.60	-	-
Chase Bilog antenna CBL 6111A	2006-08	503 182
EMCO Horn Antenna 3115	2006-10	502 175
High pass filter	2005-04	503 637
MITEQ Low Noise Amplifier	2005-04	503 285
Testo 615, Temperature and humidity meter	2005-09	503 505

Measurement uncertainty: 4.7 dB

The measurement was performed with the following configurations that represents worst case scenario:

Without internal combiner, with internal combiner, with internal combiner plus TCC, with internal combiner and HCU, and with internal combiner plus TCC and HCU (the configurations with the HCU unit were not tested in the RBS 2207, as this unit is not supported in the RBS 2207 cabinet).

During the measurements the test object was transmitting the pseudorandom data with GMSK and EDGE modulation (one modulation tested at a time).

Results

Cabinet 2206, 24 V DC



Mode: **GMSK**

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

Mode: **EDGE**

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

Cabinet 2207, 24 V DC:



Mode: **GMSK**

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

Mode: **EDGE**

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

Cabinet 2106, three phase 208 V AC (phase-to-phase voltage):



Mode: **GMSK**

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

Mode: **EDGE**

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

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
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Frequency stability measurements according to 47CFR 2.1055

Date	Temperature	Humidity
2004-08-24	21 °C ± 3 °C	42 % ± 5 %
2004-08-25	22 °C ± 3 °C	57 % ± 5 %
2004-08-26	22 °C ± 3 °C	50 % ± 5 %
2004-08-27	22 °C ± 3 °C	53 % ± 5 %

Test set-up and Procedure

The measurements were made at CDU-G output connector. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during measurement.

The transmitter was modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
Climate chamber	2006-02	503 546
R&S FSIQ	2005-04	503 738
Multimeter Fluke 87	2004-10	502 190
Testo 610, Temperature and humidity meter	2005-09	503 505

Measurement uncertainty: $< \pm 1 \times 10^{-9}$

Results

With internal combiner 44 dBm output power at Channel 190 (881.6 MHz)

Mode: **GMSK**

Test conditions		Frequency error (Hz)	
Supply voltage DC (V)	T (°C)	TRU Output 1	TRU Output 2
24.0	+20	-27	-16
27.6	+20	-27	-16
20.4	+20	-25	-15
24.0	+30	-22	-17
24.0	+40	-30	-17
24.0	+50	-27	-24
24.0	+10	-19	-11
24.0	0	-19	-11
24.0	-10	-18	+12
24.0	-20	+16	+15
24.0	-30	+18	+16
Maximum freq. error (Hz)		-30	

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

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

Mode: **EDGE**

Test conditions		Frequency error (Hz)	
Supply voltage DC (V)	T (°C)	TRU Output 1	TRU Output 2
24.0	+20	-24	-18
27.6	+20	-28	-15
20.4	+20	-21	-20
24.0	+30	-31	-21
24.0	+40	-24	+15
24.0	+50	-26	+16
24.0	+10	+25	-17
24.0	0	+30	+16
24.0	-10	-29	+16
24.0	-20	-24	+17
24.0	-30	+26	+17
Maximum freq. error (Hz)		-31	

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

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

Limits

The maximum frequency error shall not be greater than 0.05 ppm (44 Hz).

Complies?	Yes
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Hardware configuration list RBS 2206

Unit	Product Number	Serial Number	Revision
Cabinet	SEB 112 1095/1	S763397318	R3A
ACCU-01	BMG 980 07/1	S792034264	R1A
FCU-01	BGM 136 1001/2	A082667266	R2D
DC-filter	KFE 101 1145/3	- -	P1E
CDU shelf	BFL 119 406/1	- -	R3A
CDU-G 8	BFL 119 155/1	A4000474X8	R2F/B
CDU-G 8	BFL 119 155/1	A40003WNBV	R2F/B
CDU-G 8	BFL 119 155/1	A40003TMG6	R2F/B
HCU 8/9	KRF 10139/1	- -	R1B
Dummy	SXK 107 5031/1	- -	R1B
CXU-10	KRY 101 1856/1	A40003F40N	R3B
Dummy	SXK 107 5031/1	- -	R1B
TRU shelf	BFL 119 407/1	- -	R3B
dTRU-8 EDGE ²⁾	KRC 131 1005/2	AE51160155	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160172	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160179	R3A
dTRU-8 EDGE ²⁾	KRC 131 1005/2	AE51160146	R3A
dTRU-8 EDGE ^{1), 2)}	KRC 131 1005/2	AE51160168	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160165	R3A
dTRU-8 ³⁾	KRC 131 1005/1	AE51162047	R2A
dTRU-8 ³⁾	KRC 131 1005/1	AE51162048	R2A
dTRU-8 ^{1), 3)}	KRC 131 1005/1	AE51162046	R2A
IDM-01	BMG 980 06/1	T671032446	- -
PSU-shelf	BFL 119 408/1	- -	R2A
PSU-AC	BML 231 202/1	A082428501	R2F
PSU-AC	BML 231 202/1	A082521523	R2F
PSU-AC	BML 231 202/1	A082565210	R2F
PSU-AC	BML 231 202/1	A081790364	R2D
DXU-21A	BOE 602 14/1	TU82633957	R13B
TMA-CM-01	SDK 107 881/1	SA22338001	R1B
Dummy	SXK 107 5029/1	- -	R1B
Dummy	SXK 107 5030/1	- -	R1B
Dummy	SXK 107 5030/1	- -	R1B

- ¹⁾ This dTRU was switched off during the radiated spurious emission measurements when the uncombined configuration was tested.
- ²⁾ This dTRU was only used during the radiated spurious emission measurement in EDGE mode.
- ³⁾ This dTRU was only used during the radiated spurious emission measurements in GMSK mode

Software

R10_1D revision R02U

Hardware configuration list RBS 2207

Unit	Product Number	Serial Number	Revision
Cabinet	SEB 112 1141/1	TU81905610	R2A
ACCU-03	BMG 980 07/7	S792092823	R1A
FCU-01	BGM 136 1001/2	B991218699	R3A
DC FILTER-01	KFE 101 1145/5	TR21004038	P1B
CDU shelf	BFL 119 406/1	- -	R3A
CDU-G 8	BFL 119 155/1	A40004MT7S	R2H
CDU-G 8	BFL 119 155/1	A40004MT7R	R2H
CDU-G 8	BFL 119 155/1	A40004MT7Y	R2H
PSU/DXU/TRU shelf	BFX 901 27/1	- -	R2H
IDM 02	BMG 980 28/1	TU81905599	R13B
PSU-AC	BML 231202/1	TL92382753	R3B
PSU-AC	BML 231202/1	TL92382739	R3B
DXU-21A	BOE 602 14/1	TU82840612	R13B
Dummy	SXK 107 5029/1	- -	R1C
dTRU-8 EDGE	KRC 131 1005/2	AE51160137	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160144	R3A
dTRU-8 EDGE ¹⁾	KRC 131 1005/2	AE51160173	R3A
dTRU-8 ²⁾	KRC 131 1005/1	AE51162049	R2A

¹⁾ This dTRU was only used during the radiated spurious emission measurement in EDGE mode.

²⁾ This dTRU was only used during the radiated spurious emission measurements in GMSK mode

Software

R10_1D revision R02U

Hardware configuration list RBS 2106

Unit	Product Number	Serial Number	Revision
Cabinet	SEB 112 1035/04	X891009525	R5A
Climate	BPD 104 36/2	S781243372	R1D
IDM-01	BMG 980 06/1	T671103273	R3A
PSU shelf	BFL 119 408/1	--	R2A
PSU-AC	BML 231 202/1	TL92363469	R3B
PSU-AC	BML 231 202/1	TL92363457	R3B
PSU-AC	BML 231 202/1	TL92341499	R3B
PSU-AC	BML 231 202/1	TL92363475	R3B
DXU-21A	BOE 602 14/1	TU83409188	R14A
Dummy	SXK 107 5030/1	--	R1C
Dummy	SXK 107 5029/1	--	R1C
Dummy	SXK 107 5030/1	--	R1C
Dummy	SXK 107 5030/1	--	R1C
ACCU-02-DU	BMG 980 11/1	A441723536	R3D
Battery shelf	SXK 109 4774/2	--	R3A
Dummy	SXK 107 5031/2	--	R1B
Dummy	SXK 107 5031/2	--	R1B
Dummy	SXK 107 5031/2	--	R1B
Dummy	SXK 107 5031/2	--	R1B
Dummy	SXK 107 5031/2	--	R1B
FCU-01	BGM 136 1001/2	A083759477	R3A
DC/DC-200W	BMR 91120/1	B991242137	R4A
DC/DC-200W	BMR 91120/1	B991238941	R4A
ADM-01	BMG 980 12/1	T671094359	R2C
BFU-21	BMG 980 13/1	A082646002	R1A
CDU shelf	BFL 119 406/1	--	R3A
CDU-G 8	BFL 119 155/1	A40004MT7T	R2H
CDU-G 8	BFL 119 155/1	A40004MT7W	R2H
CDU-G 8	BFL 119 155/1	A40004MT7V	R2H
HCU 8-900	KRF 10139/1	--	P1B
Dummy	SXK 107 5031/1	--	R1B
CXU-10	KRY 101 1856/1	A40004C0X9	R3C
Dummy	SXK 107 5031/1	--	R1B
TRU shelf	BFL 119 407/1	--	R3B
dTRU-8 EDGE ²⁾	KRC 131 1005/2	AE51160137	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160144	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160146	R3A
dTRU-8 EDGE ²⁾	KRC 131 1005/2	AE51160155	R3A
dTRU-8 EDGE ^{1), 2)}	KRC 131 1005/2	AE51160167	R3A
dTRU-8 EDGE	KRC 131 1005/2	AE51160168	R3A
dTRU-8 ³⁾	KRC 131 1005/1	AE51162046	R2A
dTRU-8 ³⁾	KRC 131 1005/1	AE51162049	R2A
dTRU-8 ^{1), 3)}	KRC 131 1005/1	AE51162050	R2A
ACCU-02-CU	--	--	--



- 1) This dTRU was switched off during the radiated spurious emission measurements when the uncombined configuration was tested.
- 2) This dTRU was only used during the radiated spurious emission measurement in EDGE mode.
- 3) This dTRU was only used during the radiated spurious emission measurements in GMSK mode

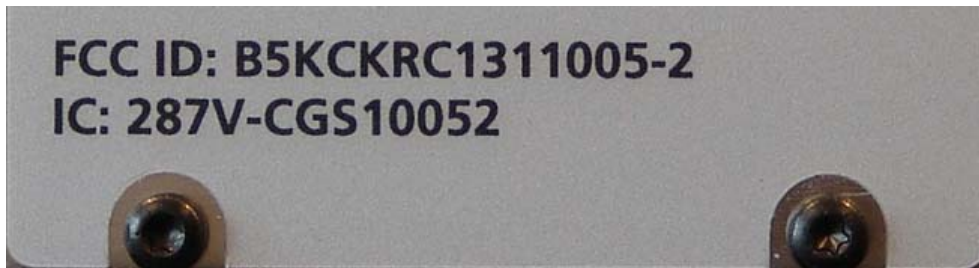
Software

R10_1D revision R02U

Photos

Transceiver Unit KRC 131 1005/2, R3A

FCC ID label:



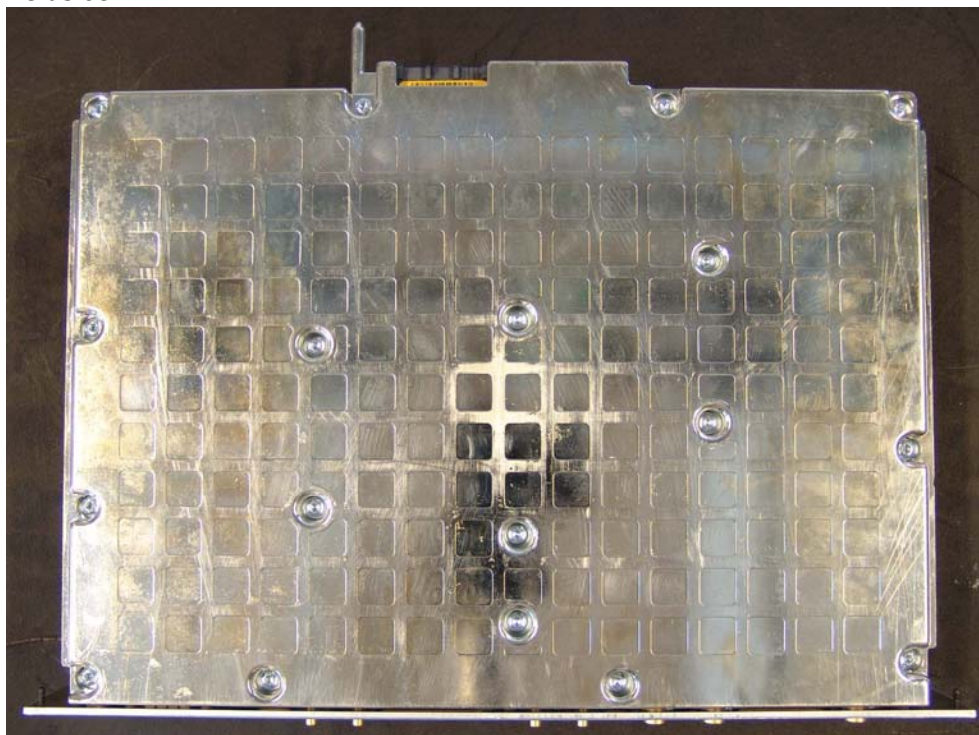
Front side



Rear side



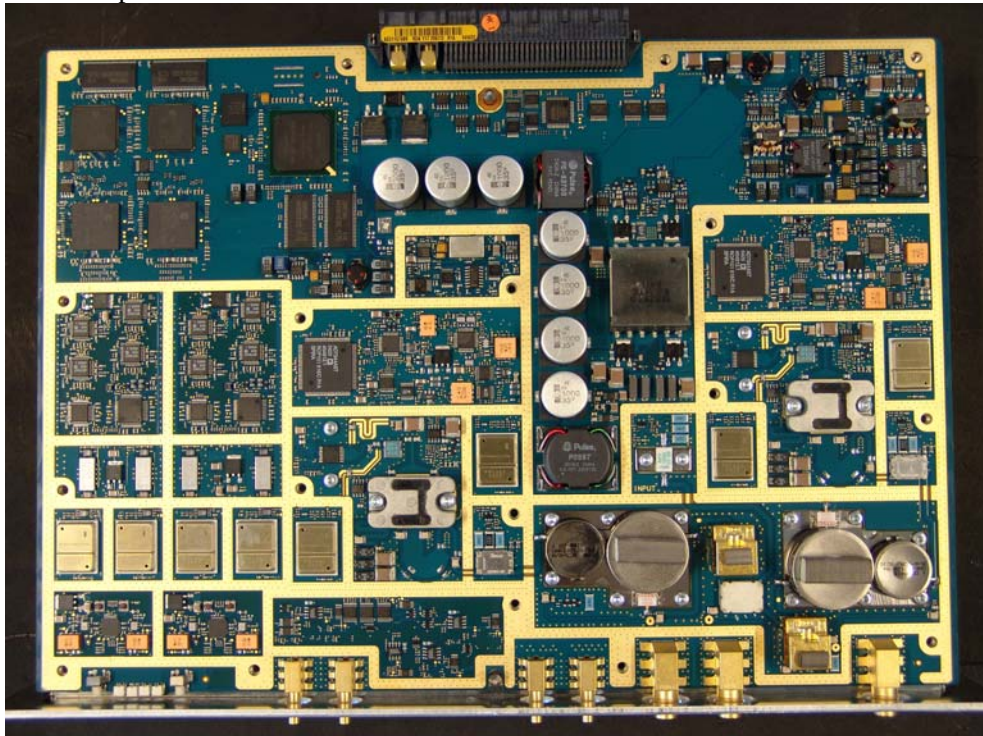
Left side



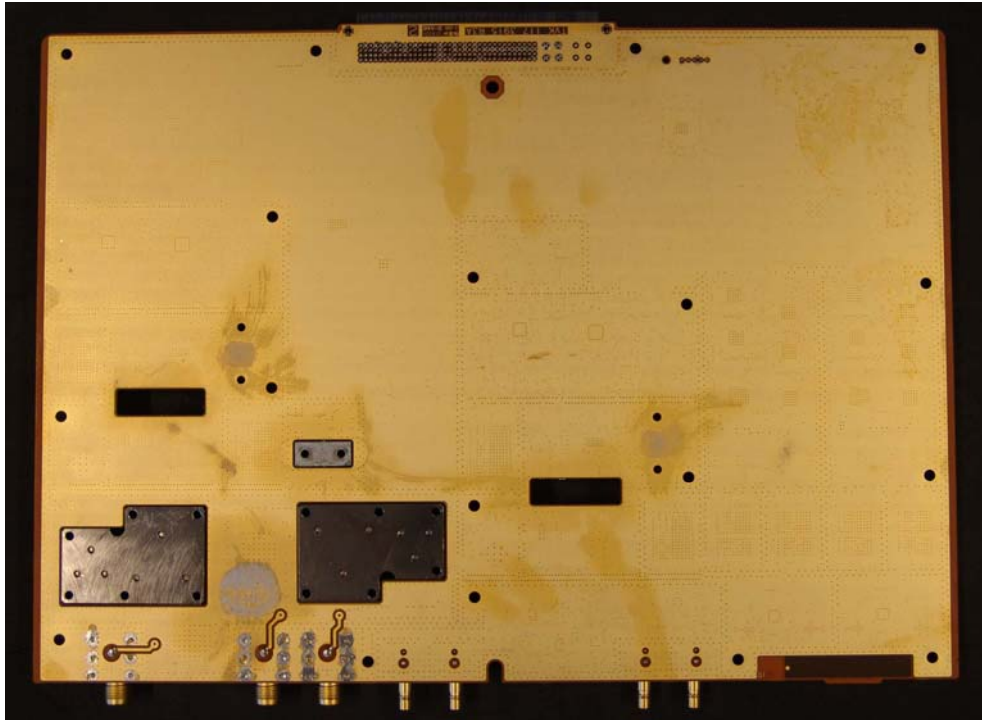
Right side



PCB component side



PCB, back side



RBS 2206 Cabinet, 24 Volt DC/ 120 VAC system

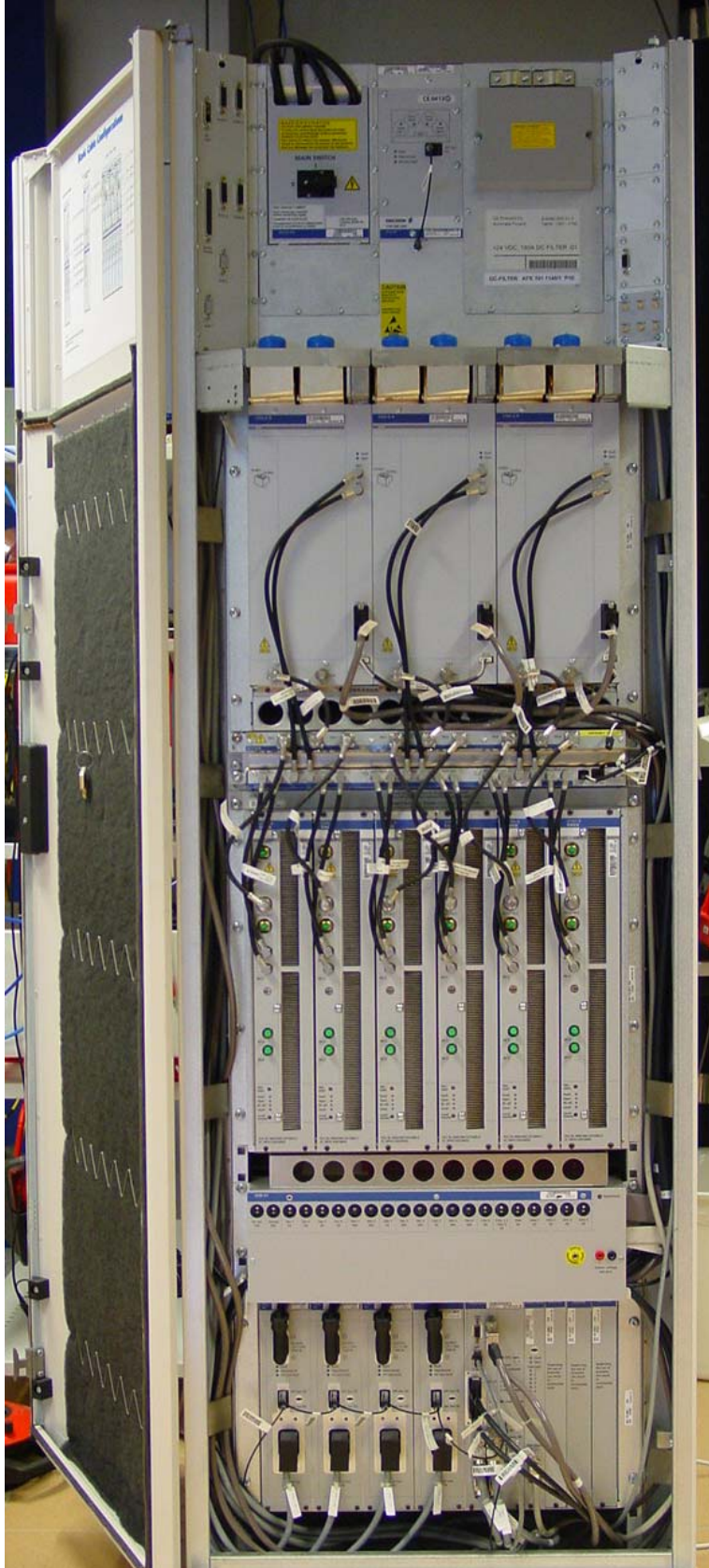
Front view



Rear view



RBS 2206, Open door view



RBS 2106 Cabinet, 208 VAC (phase-to-phase voltage) system

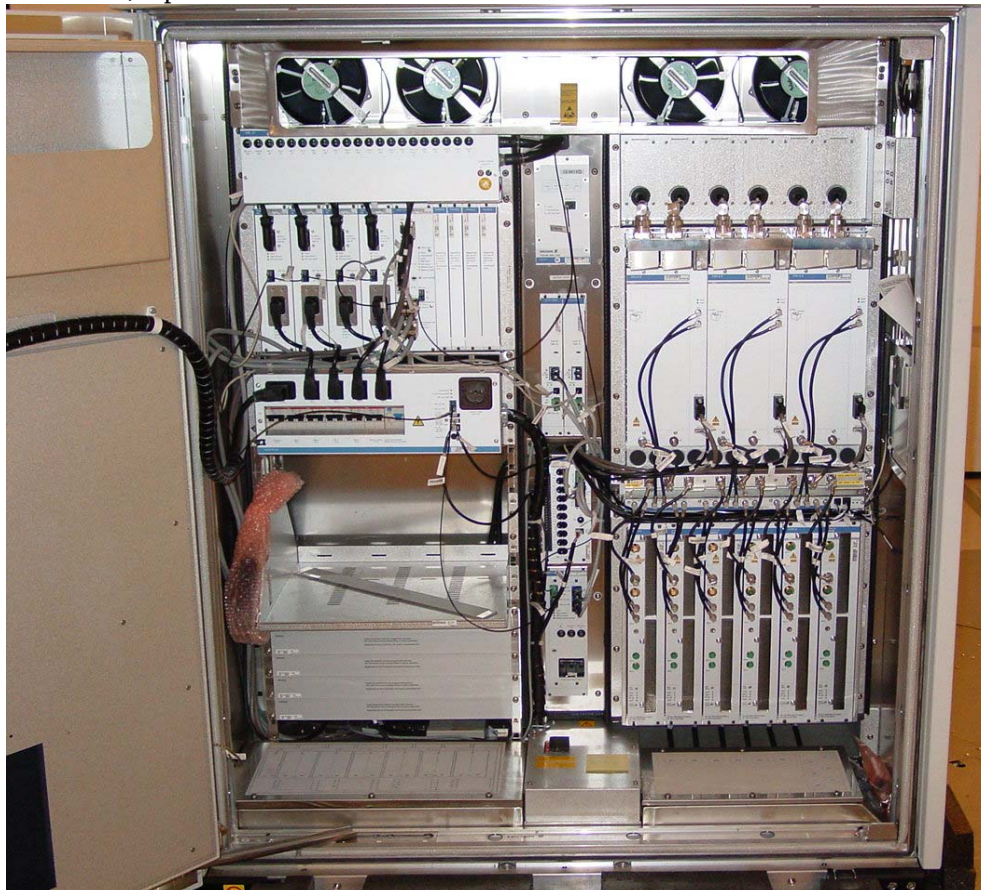
Front view



Rear view



RBS 2106, Open door



RBS 2207 Cabinet, 24 Volt DC/ 120 VAC system

Front view



Rear view



RBS 2207, Open door view

