

Handled by, department

Jonas Bremholt

Electronics

+46 10 516 54 38. jonas.bremholt@sp.se

ERICSSON AB
Per Helmersson
Färögatan 2, Kista
164 80 Stockholm

Equipment Authorization measurements on GSM Base station Transceiver unit with FCC ID: B5KEKRC1311005-2 (10 appendices)

Test object

Transceiver Unit dTRU-8 Edge, KRC 131 1005/2, R5A

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	
2.1051 Spurious emission at antenna	Yes	5	Note 1
2.1053 Field strength of spurious radiation	Yes	6	
2.1055 Frequency stability	Yes	7	
15.111 Receiver spurious emission	Yes	8	

Note 1: The maximum output power with GMSK and 8-PSK modulation that can be used on the channels adjacent to the frequency band edges is 37.7 dBm in order to comply.

SP Swedish National Testing and Research Institute
Electronics - EMC



Jan Welinder
Technical Manager



Jonas Bremholt
Technical Officer

SP Swedish National Testing and Research Institute

Postal address

SP
Box 857
SE-501 15 Borås
SWEDEN

Office location

Västeråsen
Brinellgatan 4
Borås

Phone / Fax / E-mail

+46 33 16 50 00
+46 33 13 55 02
info@sp.se

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Appendix 1

Description - Equipment Under Test (EUT)

Equipment: GSM Base station transceiver 800 MHz

Tx Frequency range: 869.2-893.8 MHz

Modulations: GMSK and 8-PSK

Maximum output power(RMS):

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

Nominal power voltage: 24 V DC

Tested Channels

Radiated measurements:

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

dTRU	TRX	ARFCN	Modulation	RF config.
No 1	0	145	8-PSK	Combined
	1	163	GMSK	Combined
No 2	2	180	8-PSK	Combined
	3	198	GMSK	Combined
No 3	4	128	8-PSK	Combined +TCC
	5	-	-	-
No 4	6	251	GMSK	Combined +TCC
	7	-	-	-
No 5	8	215	8-PSK	Uncombined
	9	230	GMSK	Uncombined

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

The radiated measurements were performed with the EUT installed in a RBS 2206V2 powered with 120 VAC, 60 Hz which was used as a worst case configuration.

Conducted measurements:

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

All RF conducted measurements were performed with the EUT installed in a RBS 2206V2 powered with DC power (the list of the RBS hardware is shown in appendix 9). The measurements were done at the output connector of CDU-G 8 (BFL 119 155/1 rev. R3C) with serial number TR45516327. The dTRU with serial number AE55540327 was used for the measurements. The measurement was performed with configurations that represents worst case scenario.

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Appendix 1

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

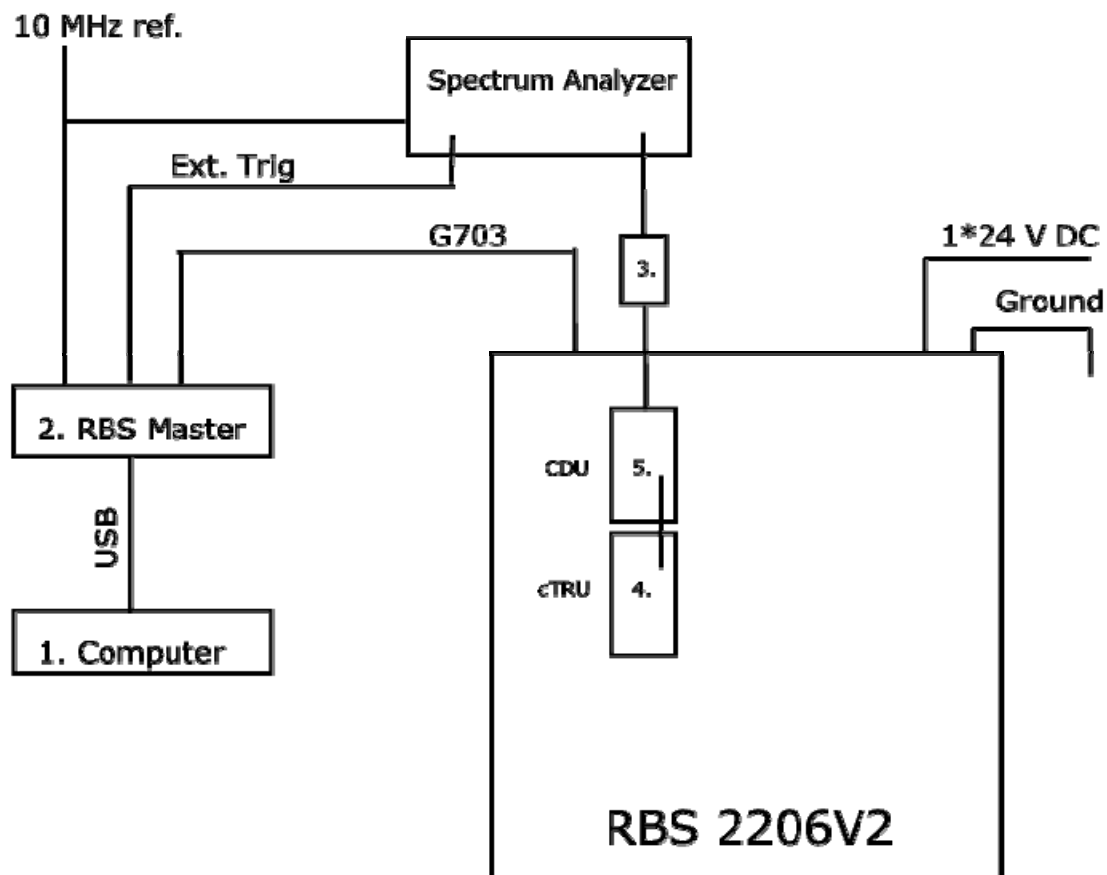
The test object was delivered: 2007-09-10

Test engineers

Jörgen Wassholm, Stefan Larsson and Jonas Bremholt

Test witnesses

Lars Hagbjörk, Bror Sjöblom, and Behzad Nourparvar, 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. R10B01
2. Ericsson RBS Master 2 LPY 107 1007/1 R1F/A
3. Attenuator
4. Test object with FCC ID: B5KEKRC1311005-2
5. CDU-G

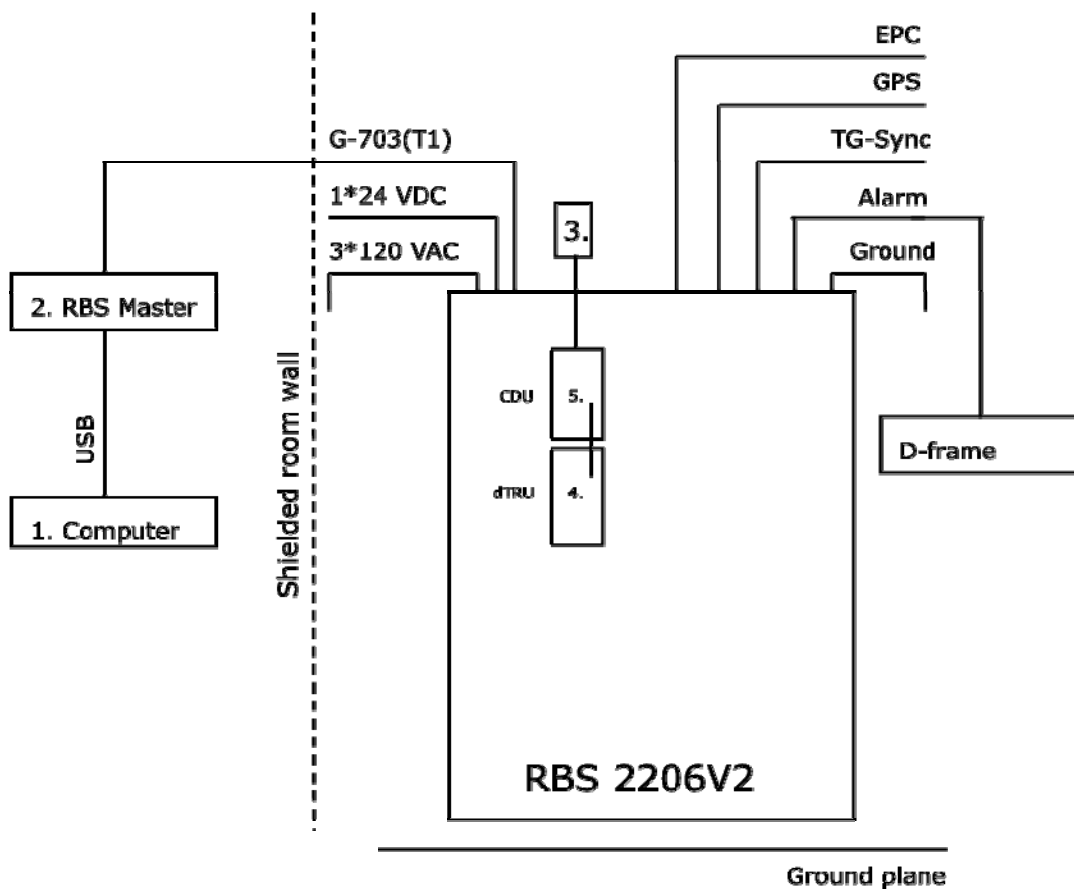
Interfaces:

24 VDC
Antenna: Coaxial cable (50 ohm)
G703: T1, shielded multi-wire (120 ohm)
TG-sync: Shielded multi-wire

Type of port:

DC power
Antenna
Telecom
Signal

Test set-up, radiated measurements



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

Interfaces:

120 VAC, 60 Hz

24 VDC

Antenna: Coaxial cable (50 ohm)

G703: T1, shielded multi-wire (120 ohm)

TG-sync: Shielded multi-wire, unterminated

Alarm: Unshielded 4 wire, unterminated in distribution frame

GPS: Shielded multi-wire, unterminated

EPC: Shielded multi-wire, unterminated

Type of port:

AC power

DC Power

Antenna

Telecom

Signal

Signal

Signal

Signal

RF Power output measurements according to 47CFR 2.1046

Date 2007-09-17	Temperature 22 °C ± 3 °C	Humidity 47 % ± 5 %
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Test set-up and procedure

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

Measurement equipment	Calibration Due	SP number
Boonton RF Peak power meter/analyzer	2008-12	503 144
Boonton Power sensor 56518-S/4	2009-06	503 146
Multimeter Fluke 87	2007-12	502 190
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 0.5 dB

Results

Modulation: **GMSK**

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

Rated output power level after CDU-G (maximum): 49.0 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	49.0/ 48.1	49.2/ 48.4	48.8/ 47.9

dTRU, output 1, without internal combiner:

Rated output power level after CDU-G (maximum): 46.3 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	46.4/ 45.5	46.6/ 45.8	46.3/ 45.4

dTRU, output 2, without internal combiner:

Rated output power level after CDU-G (maximum): 46.3 dBm

Test conditions		Transmitter power (dBm) Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	46.4/ 45.5	46.8/ 45.9	46.2/ 45.4

dTRU, output 1, with internal combiner:

Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	42.7/ 42.0	43.1/ 42.3	42.7/ 41.9

dTRU, output 2, with internal combiner:

Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	43.0/ 42.3	43.4/ 42.6	43.0/ 42.2

Modulation: **8-PSK**

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

Rated output power level after CDU-G (maximum): 45.7 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	48.9/ 45.0	49.2/ 45.3	48.8/ 44.8

dTRU, output 1, without internal combiner:

Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	46.4/ 42.4	46.7/ 42.7	46.3/ 42.3

dTRU, output 2, without internal combiner:

Rated output power level after CDU-G (maximum): 43.0 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T_{nom} 22 °C	V_{nom} 24 V DC	46.3/ 42.3	46.7/ 42.8	46.2/ 42.2



dTRU, output 1, with internal combiner:

Rated output power level after CDU-G (maximum): 39.7 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	42.7/ 38.9	43.1/ 39.2	42.6/ 38.8

dTRU, output 2, with internal combiner:

Rated output power level after CDU-G (maximum): 39.7 dBm

Test conditions		Transmitter power (dBm)		
		Peak/ Average		
		Channel 128	Channel 190	Channel 251
T _{nom} 22 °C	V _{nom} 24 V DC	43.1/ 39.2	43.3/ 39.5	42.9/ 39.1

Limit

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

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

GMSK: The measured output power shall be within ± 2 dB 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
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Occupied bandwidth measurements according to 47CFR 2.1049

Date 2006-09-17	Temperature 22 °C ± 3 °C	Humidity 47 % ± 5 %
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Test set-up and procedure

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

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2008-10	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 3.1

Modulation: **GMSK**

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

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

Modulation: **8-PSK**

Output 1	ARFCN	OBW
Diagram 7:	Ch 128	242 kHz
Diagram 8:	Ch 190	244 kHz
Diagram 9:	Ch 251	238 kHz

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

Limits

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

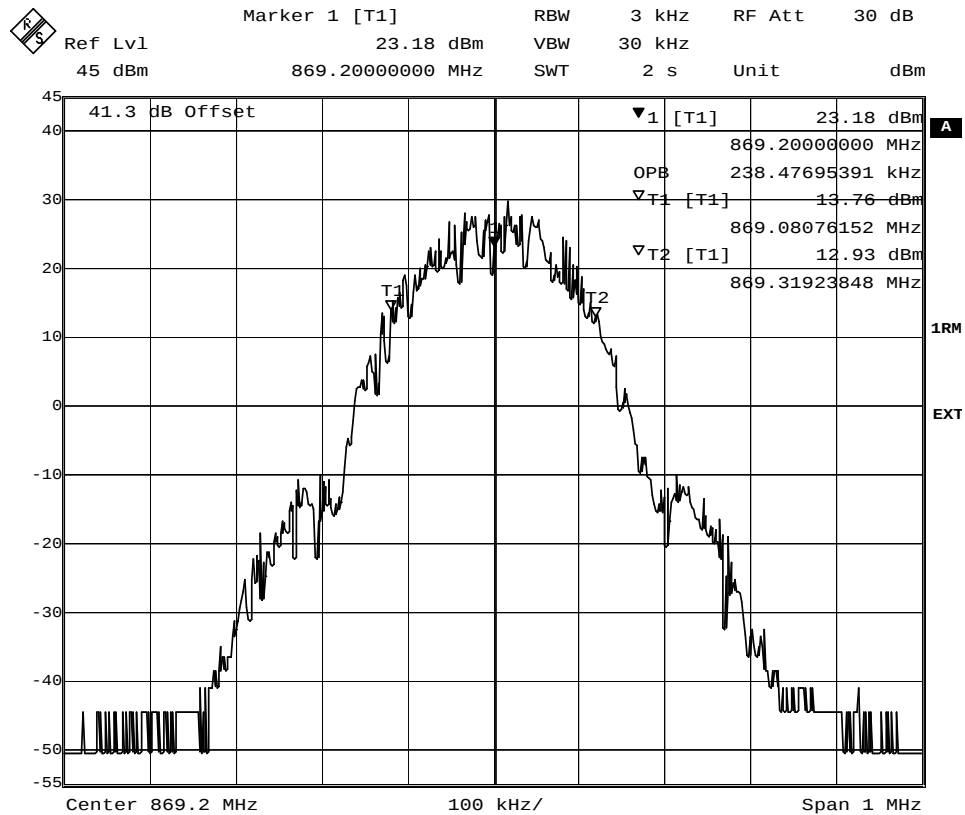
Complies?	Yes
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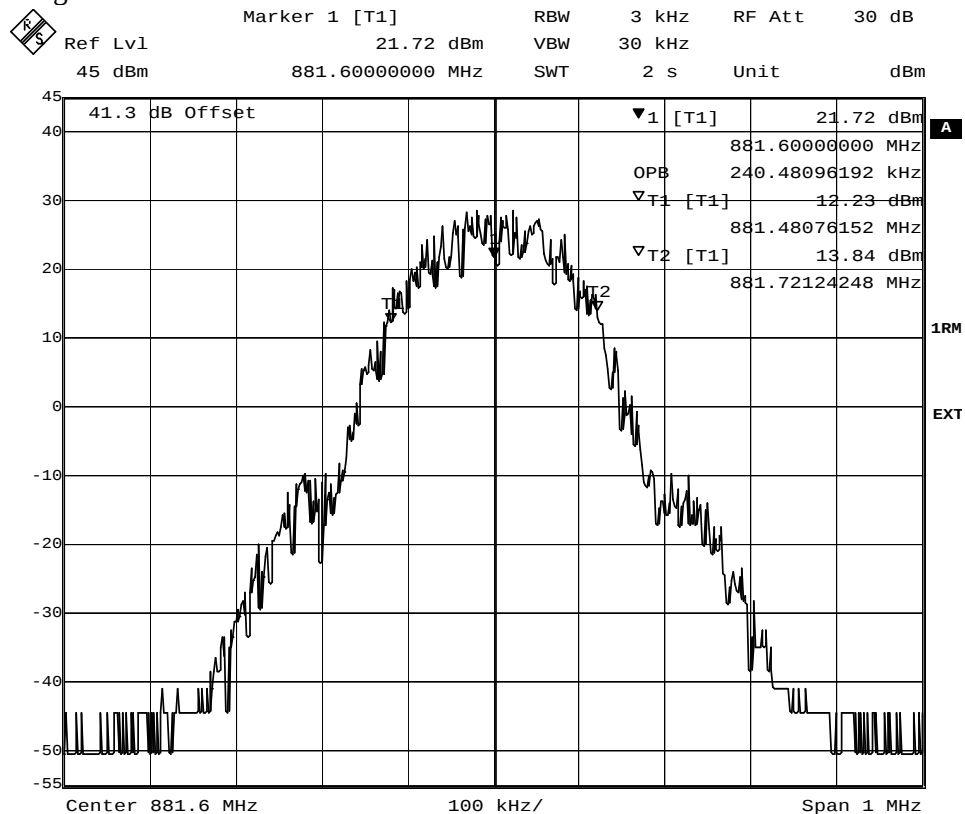
Appendix 3.1

Diagram 1



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Diagram 2



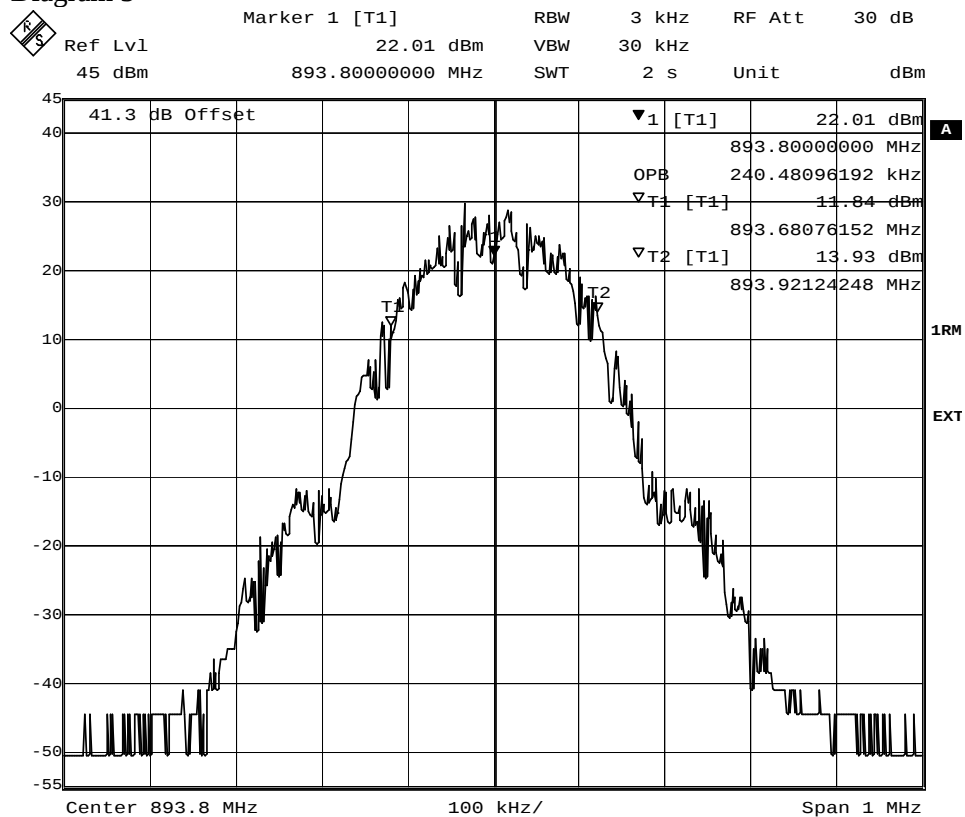
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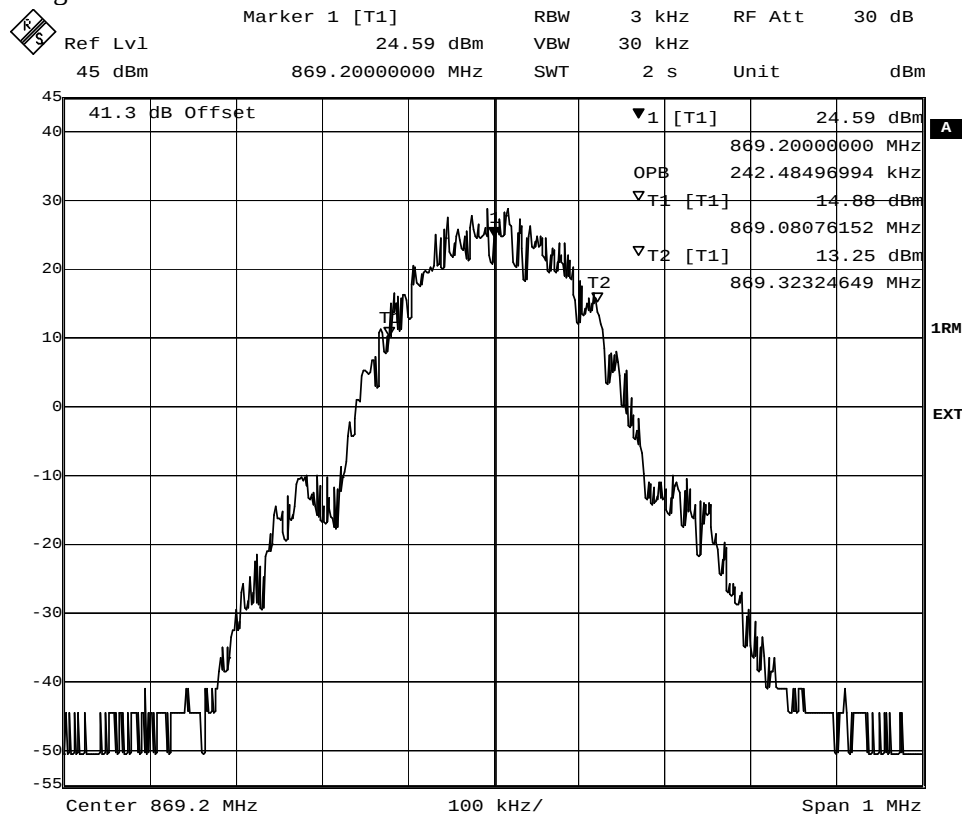
Appendix 3.1

Diagram 3



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Diagram 4



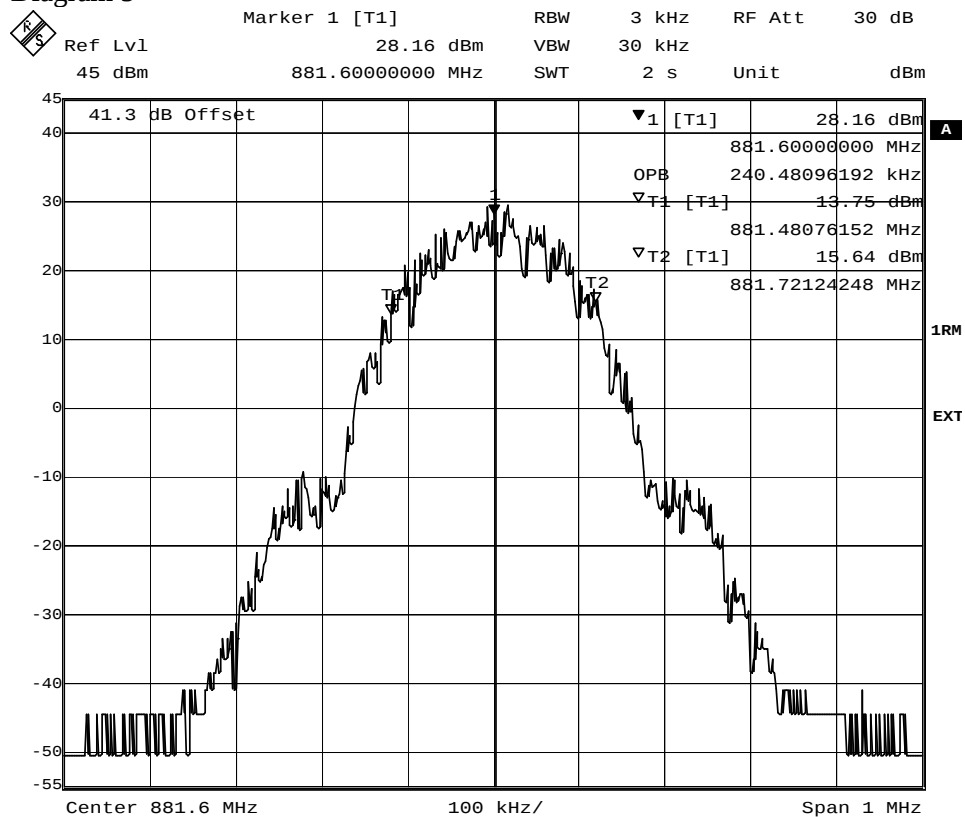
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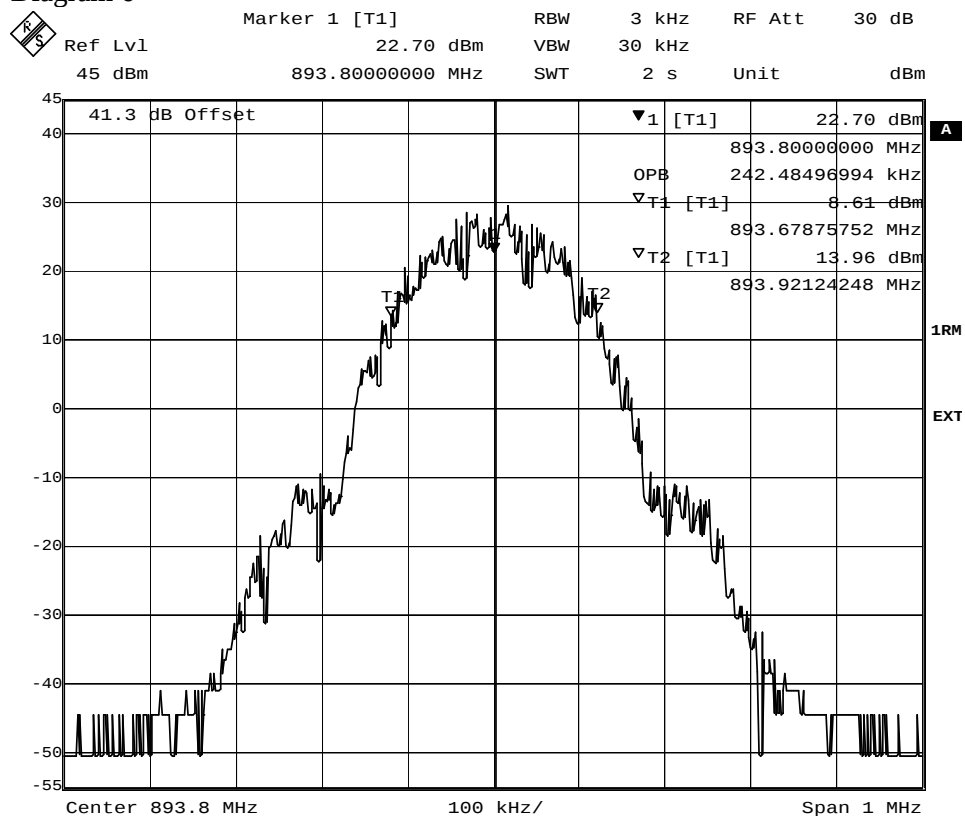
Appendix 3.1

Diagram 5



Date: 17.SEP.2007 11:21:03

Diagram 6



Date: 17.SEP.2007 11:30:42



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Appendix 3.1

Diagram 7

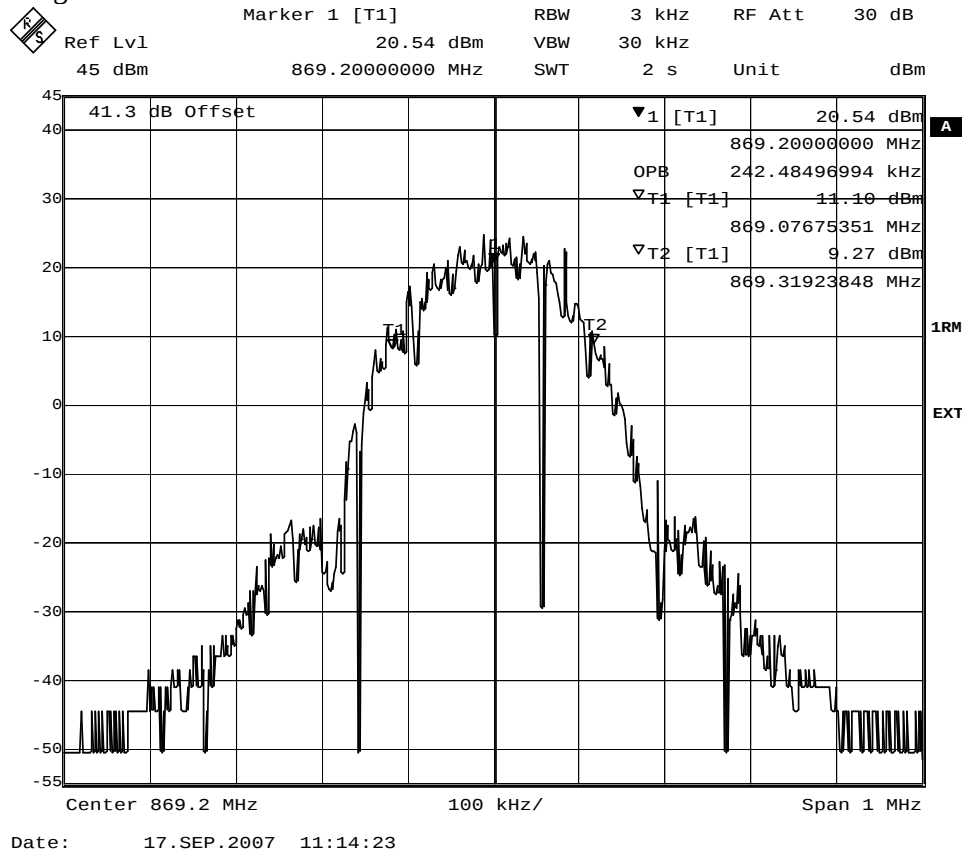
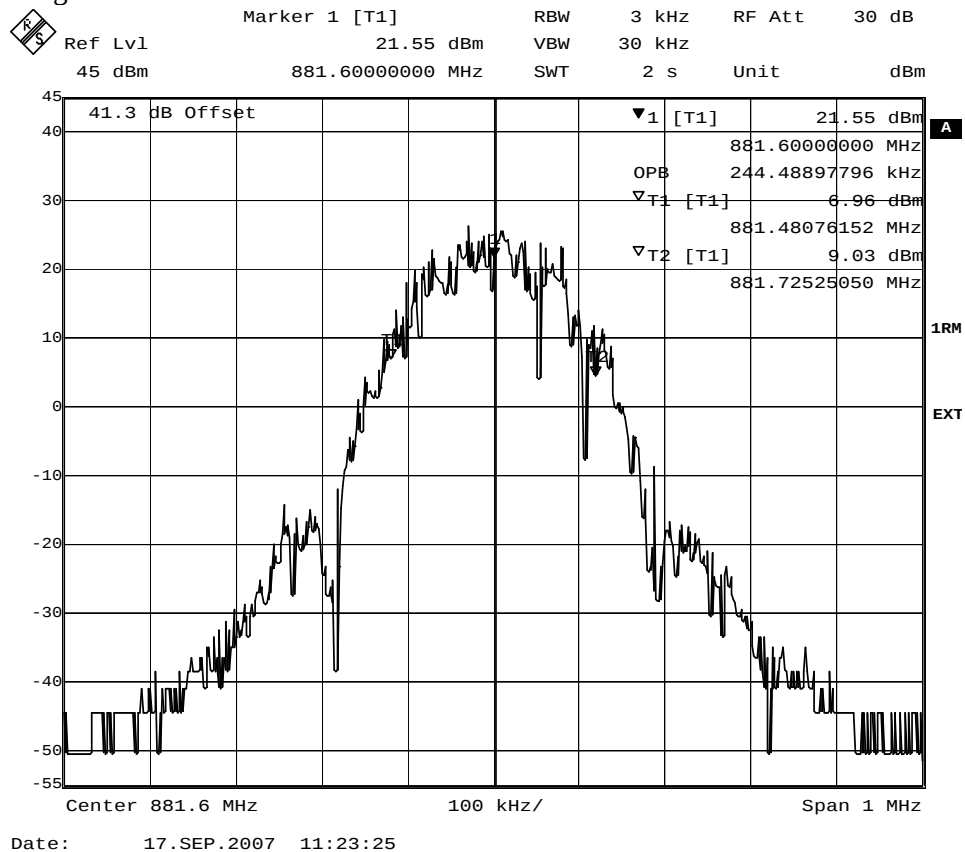


Diagram 8

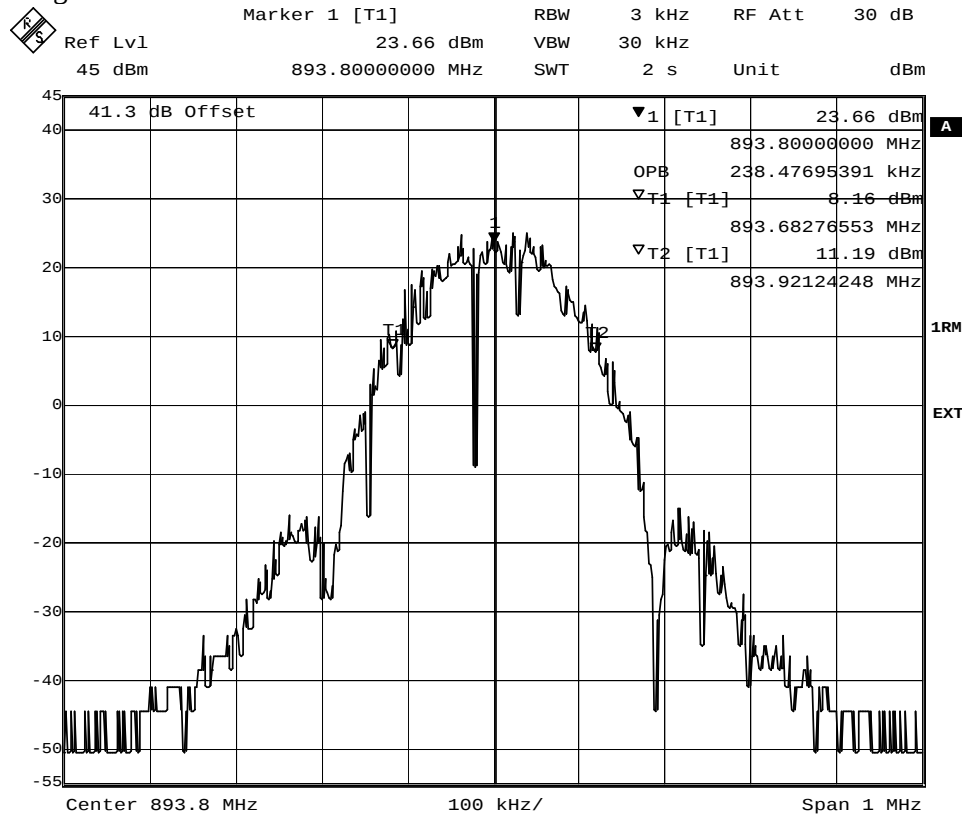




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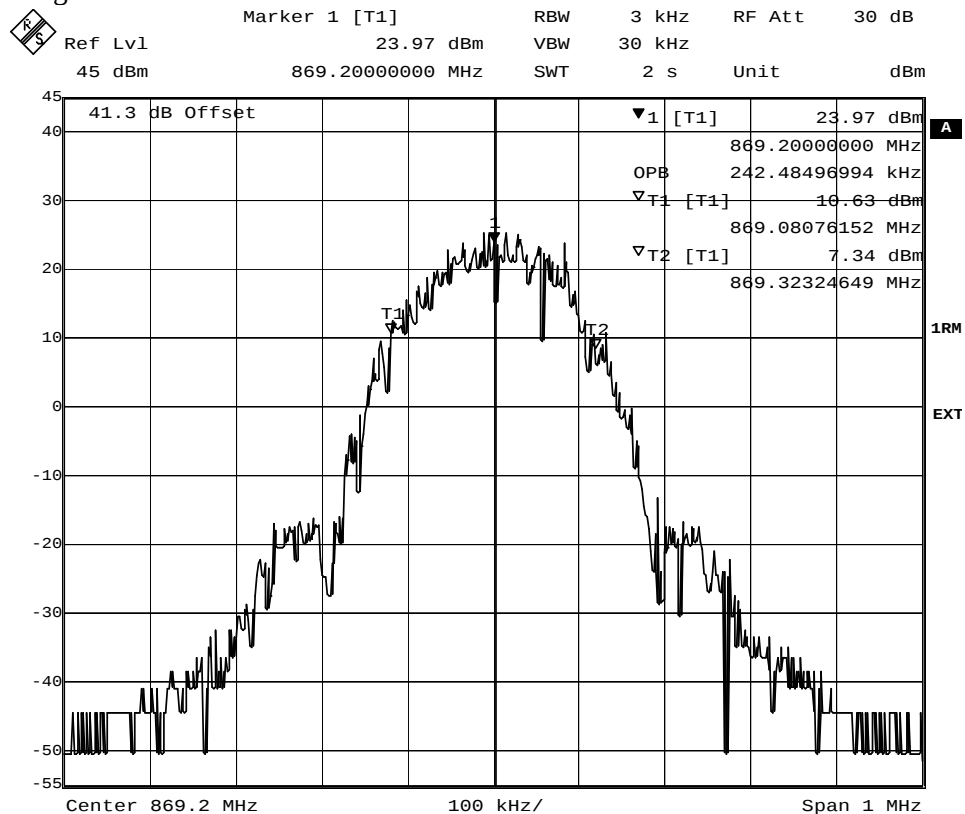
Appendix 3.1

Diagram 9



Date: 17.SEP.2007 11:27:56

Diagram 10



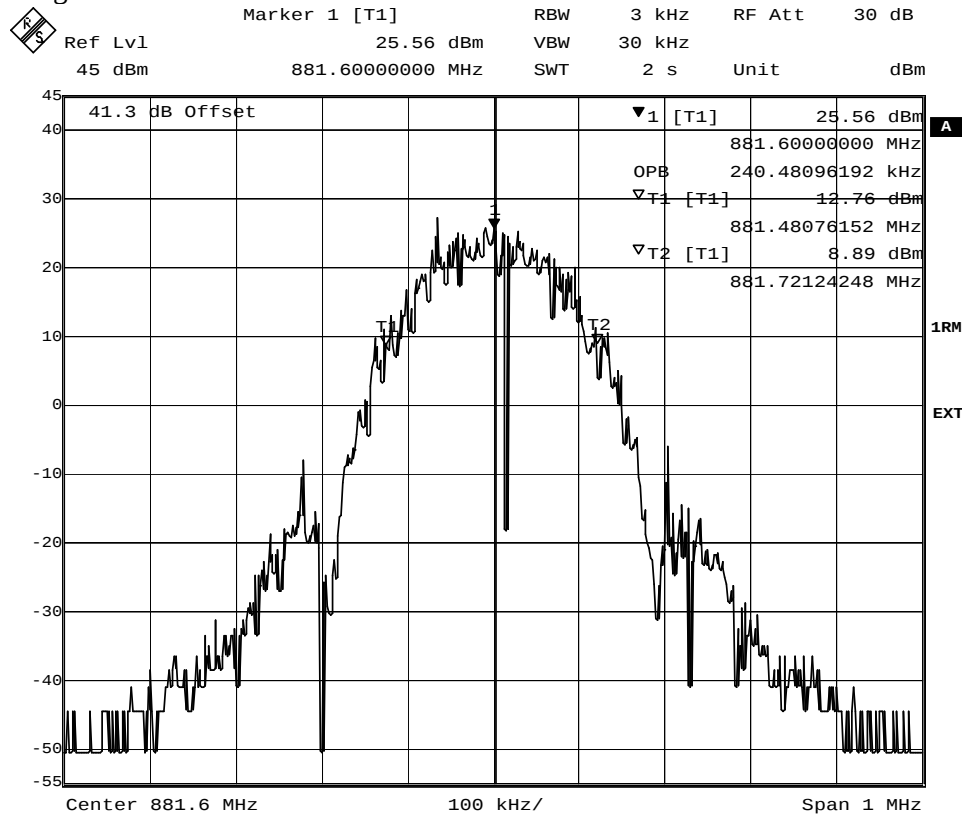
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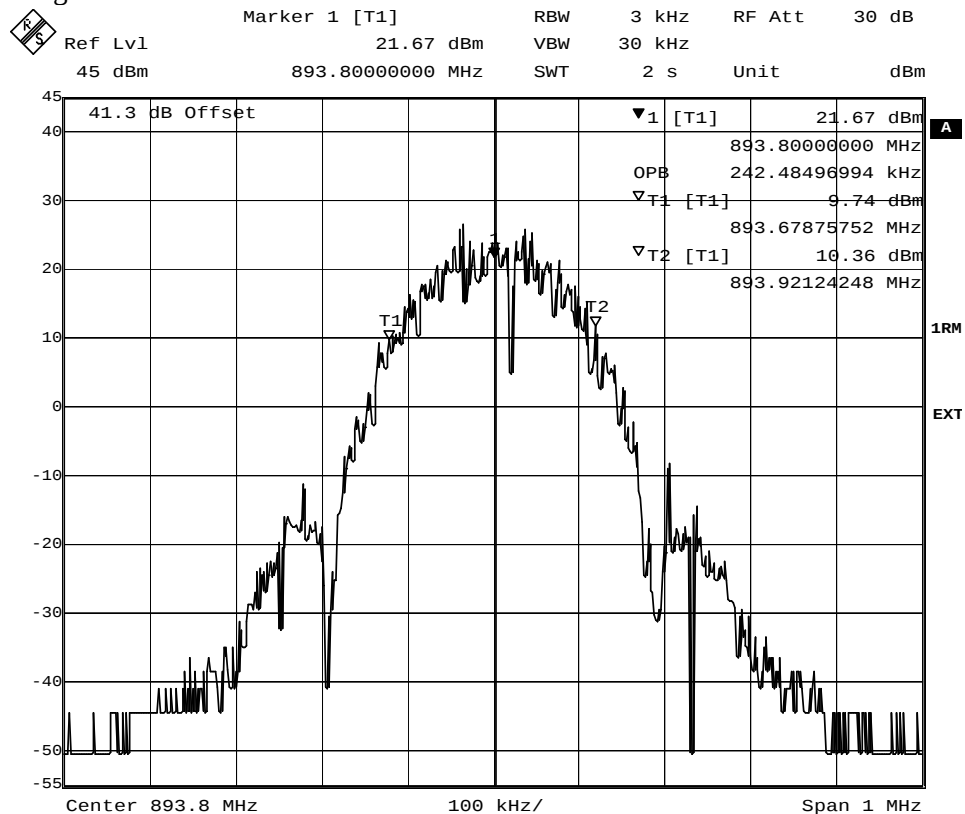
Appendix 3.1

Diagram 11



Date: 17.SEP.2007 11:22:12

Diagram 12



Date: 17.SEP.2007 11:29:31

Band edge measurements according to 47CFR 2.1049

Date 2007-09-17	Temperature 22 °C ± 3 °C	Humidity 47 % ± 5 %
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Test set-up and procedure

The measurements were made per definition in 22.917. The measurements were made at CDU-G8 output connector. The output was connected to a spectrum analyser with the RMS detector activated. A resolution bandwidth of 3 kHz (1% of OBW) was used up to 250 kHz away from the band edges. A resolution bandwidth of 50 kHz was used up to 5 MHz from the band edges. As the FCC rules specify a RBW of 100 kHz for measurements of emissions >1 MHz away from the band edges, the limit was adjusted with 3 dB to –16 dBm to compensate for the reduced measurement bandwidth.

The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements. The transmitter was modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2008-10	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

GMSK

dTRU Output 1, without internal combiner

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

dTRU Output 2, without internal combiner

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

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

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

8-PSK

dTRU Output 1, without internal combiner

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

dTRU Output 2, without internal combiner

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

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

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



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Appendix 4

Remarks

The maximum output power with GMSK and 8-PSK modulation that can be used on the channels adjacent to the frequency band edges are 37.7 dBm in order to comply.

Limits

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

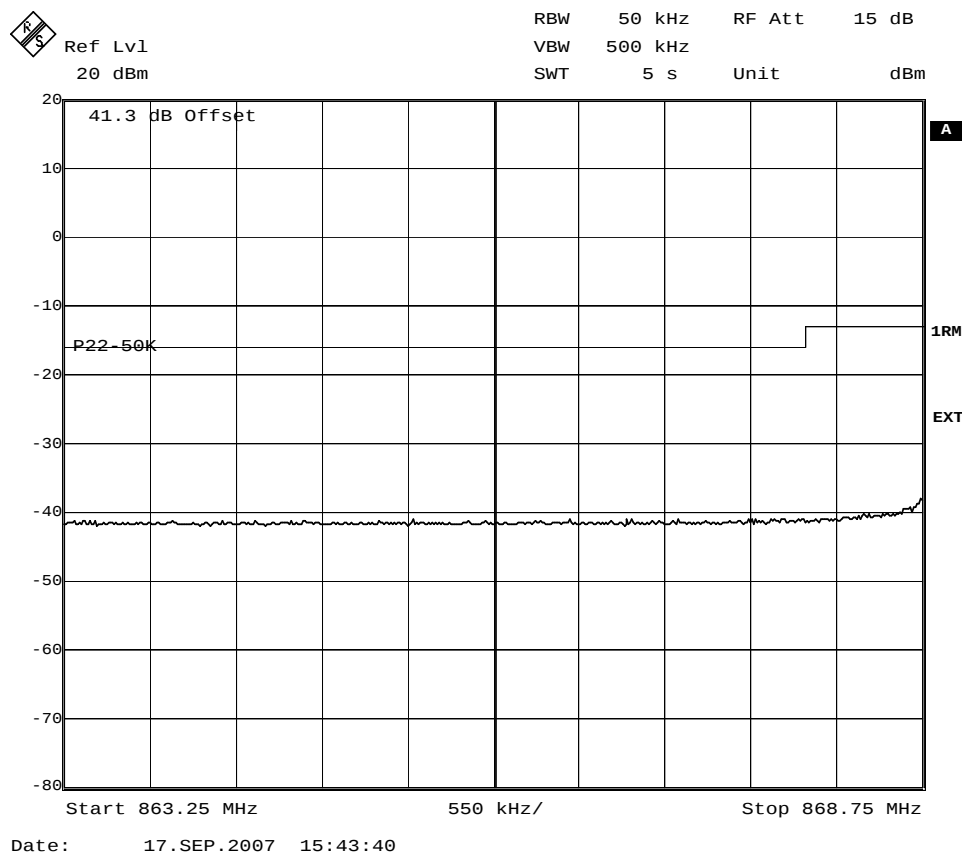
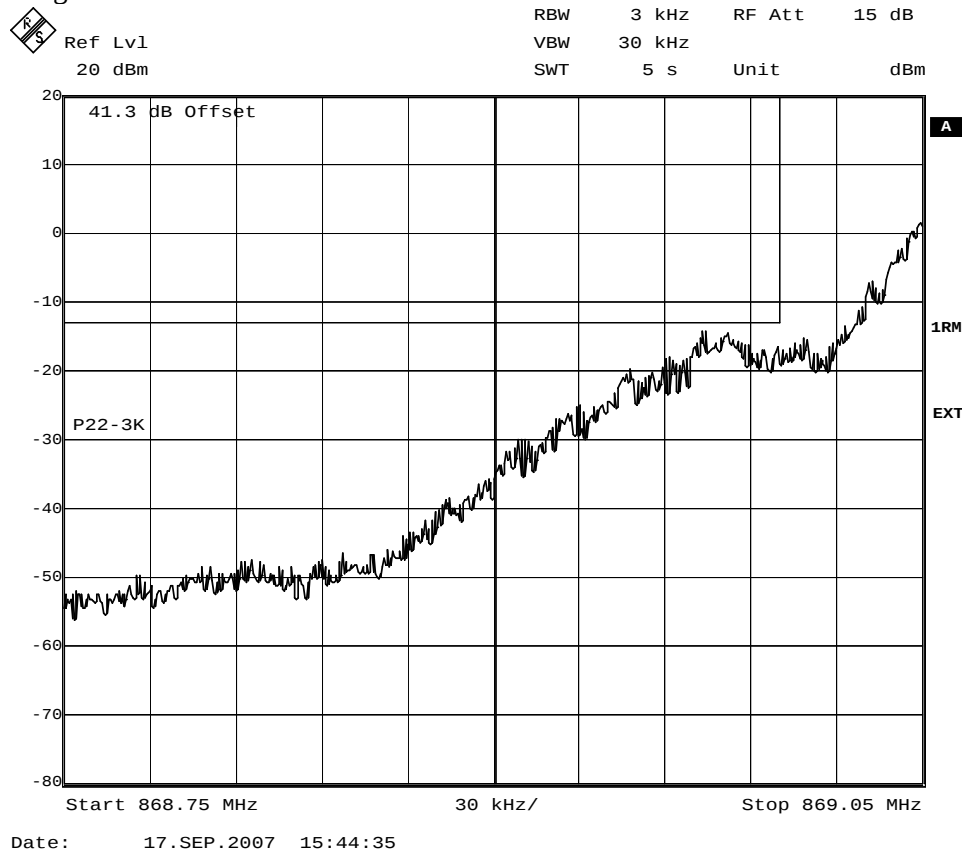
Complies?	Yes
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Appendix 4.1

Diagram 1

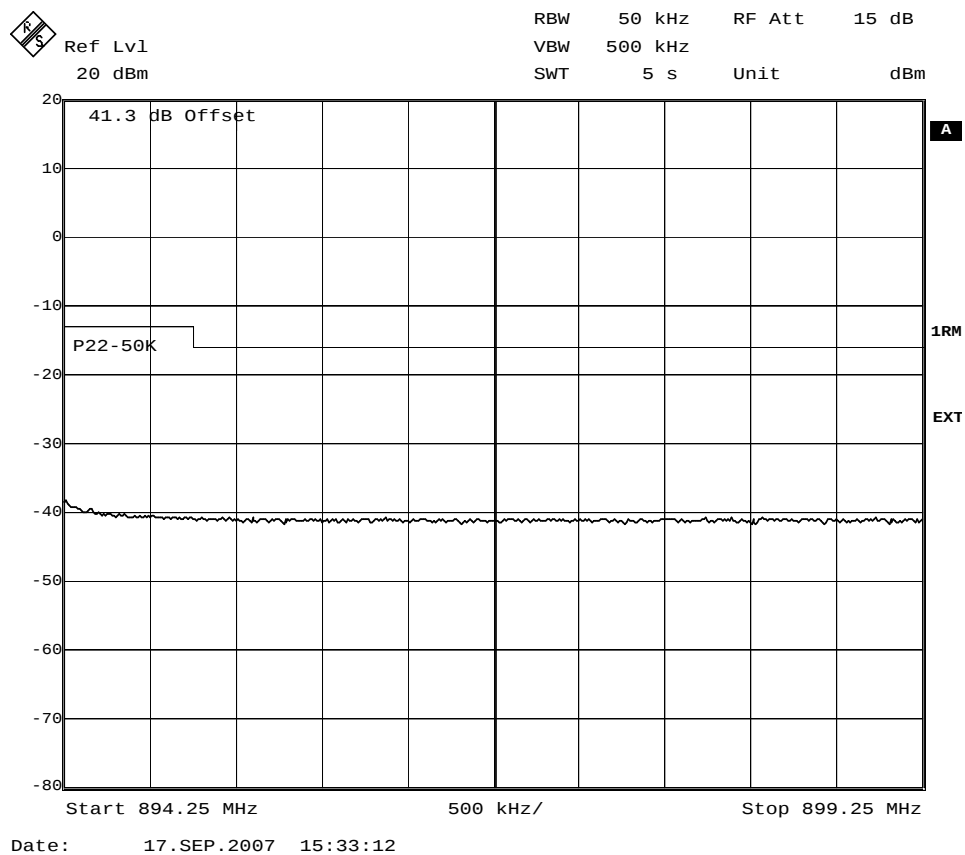
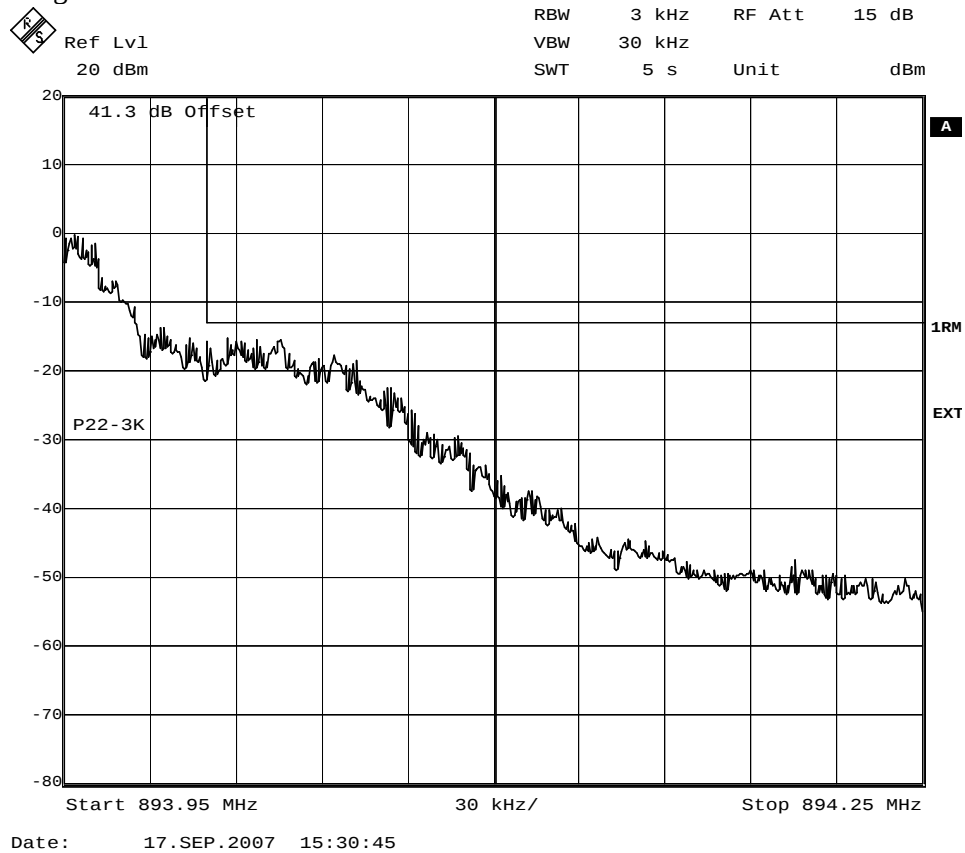




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Appendix 4.1

Diagram 2

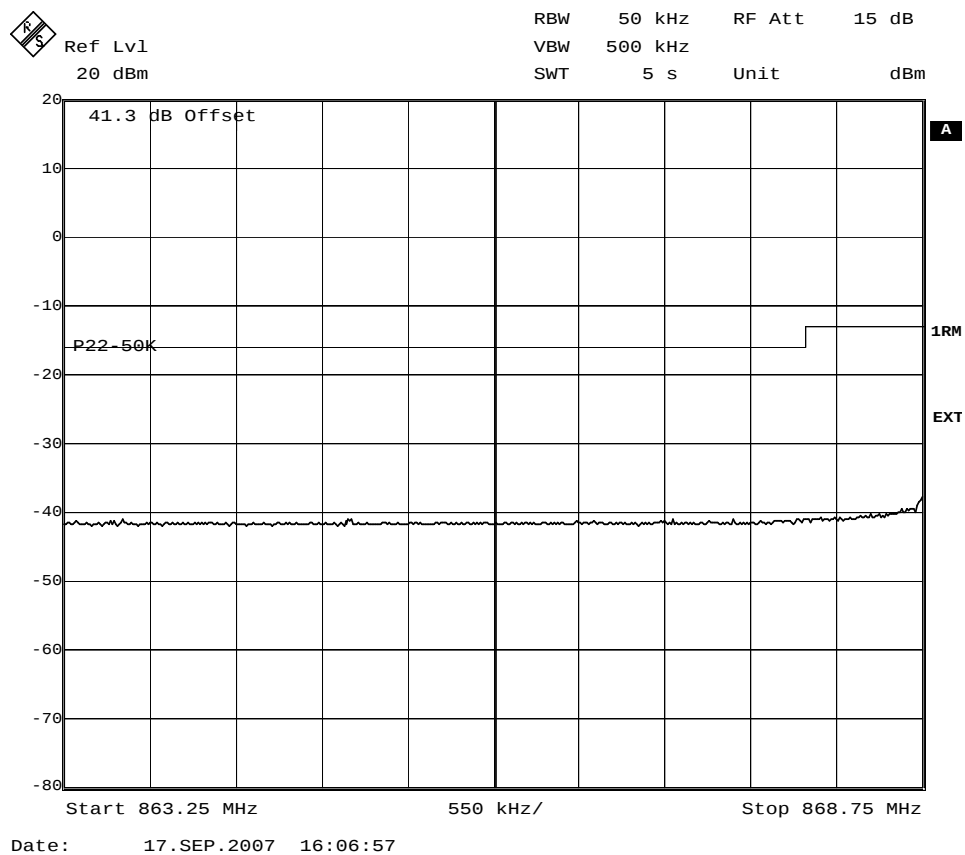
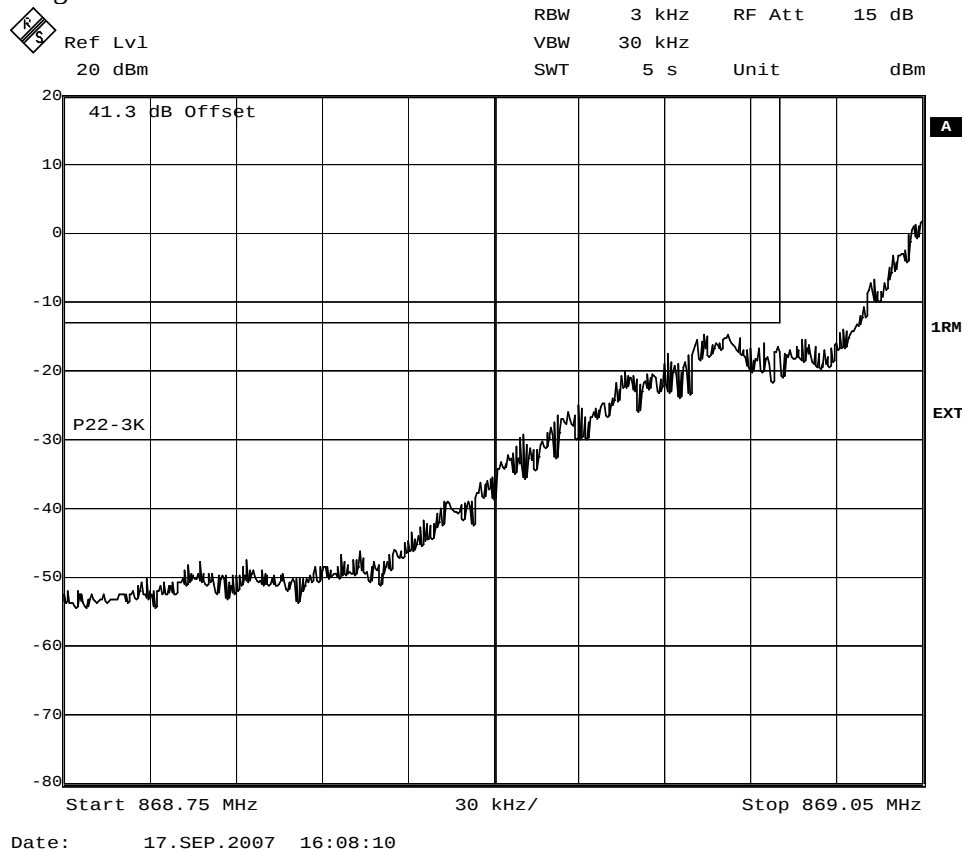




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Appendix 4.1

Diagram 3

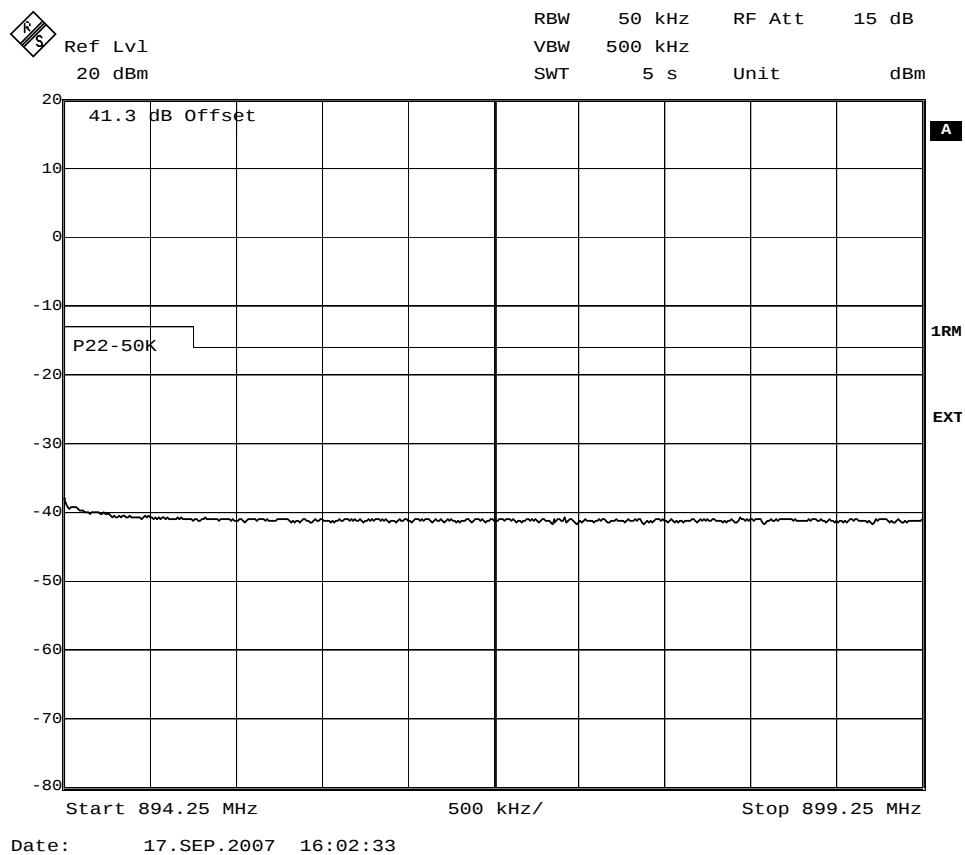
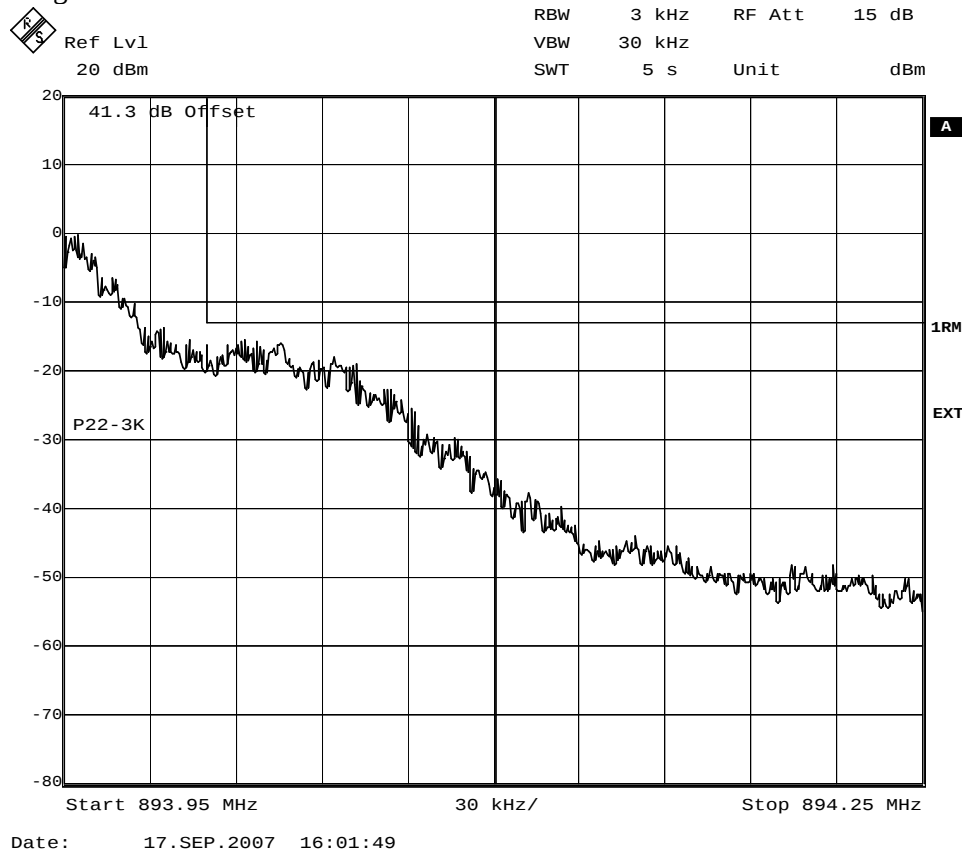




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Appendix 4.1

Diagram 4

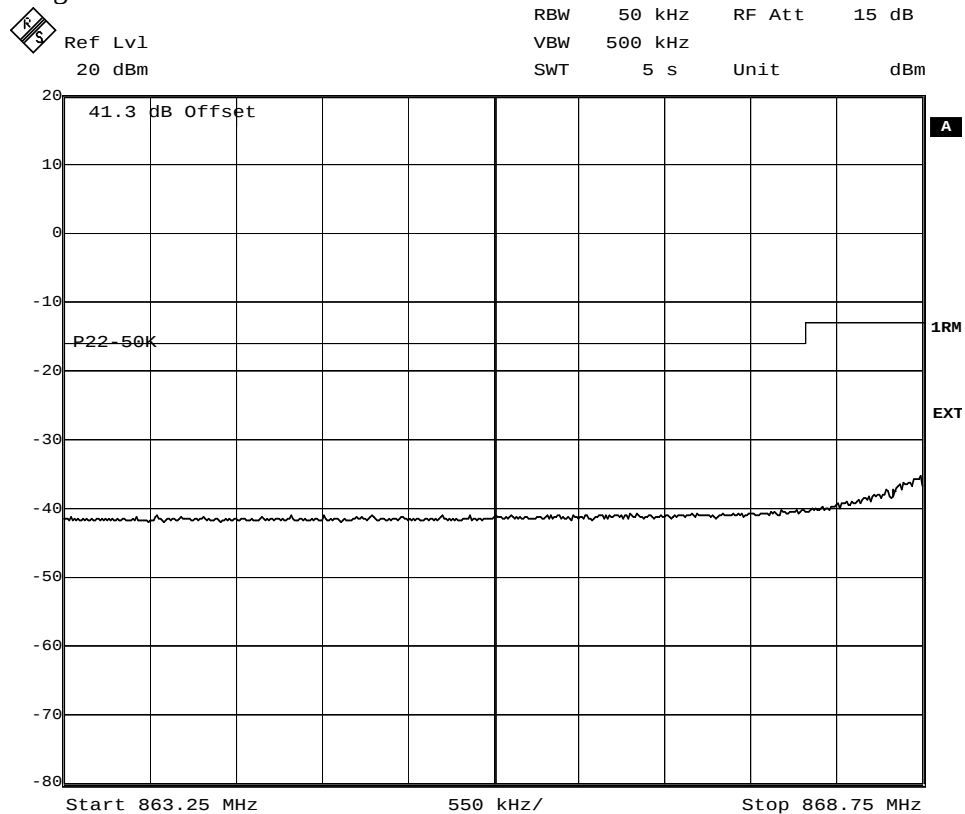




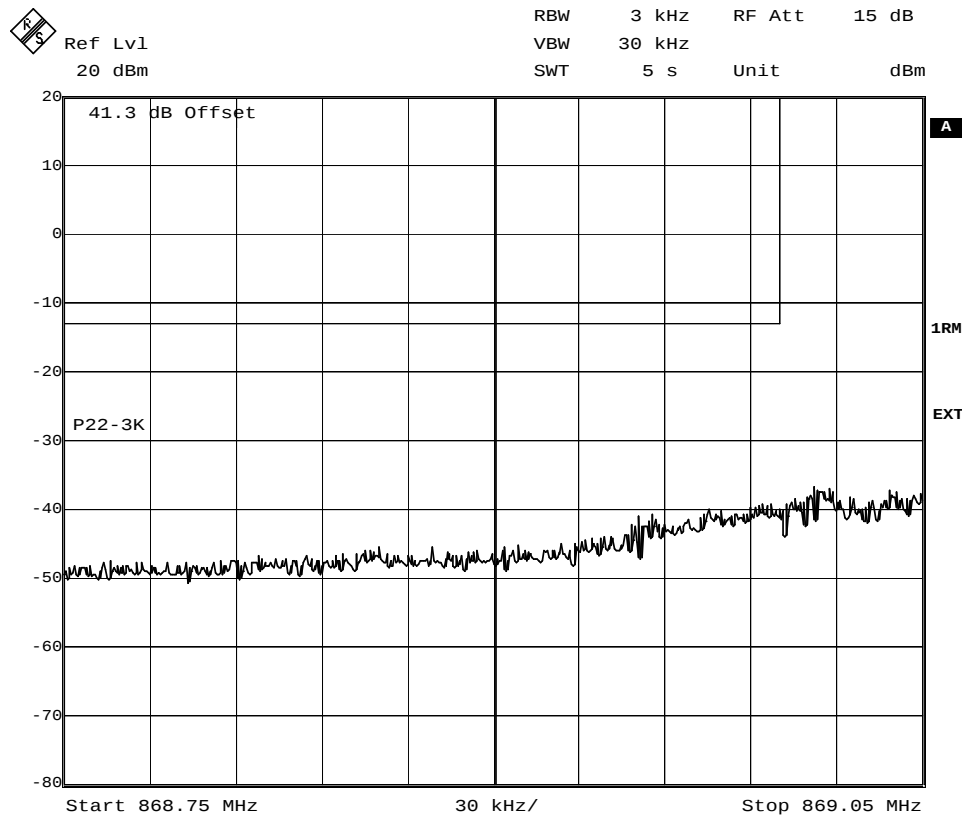
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Appendix 4.1

Diagram 5



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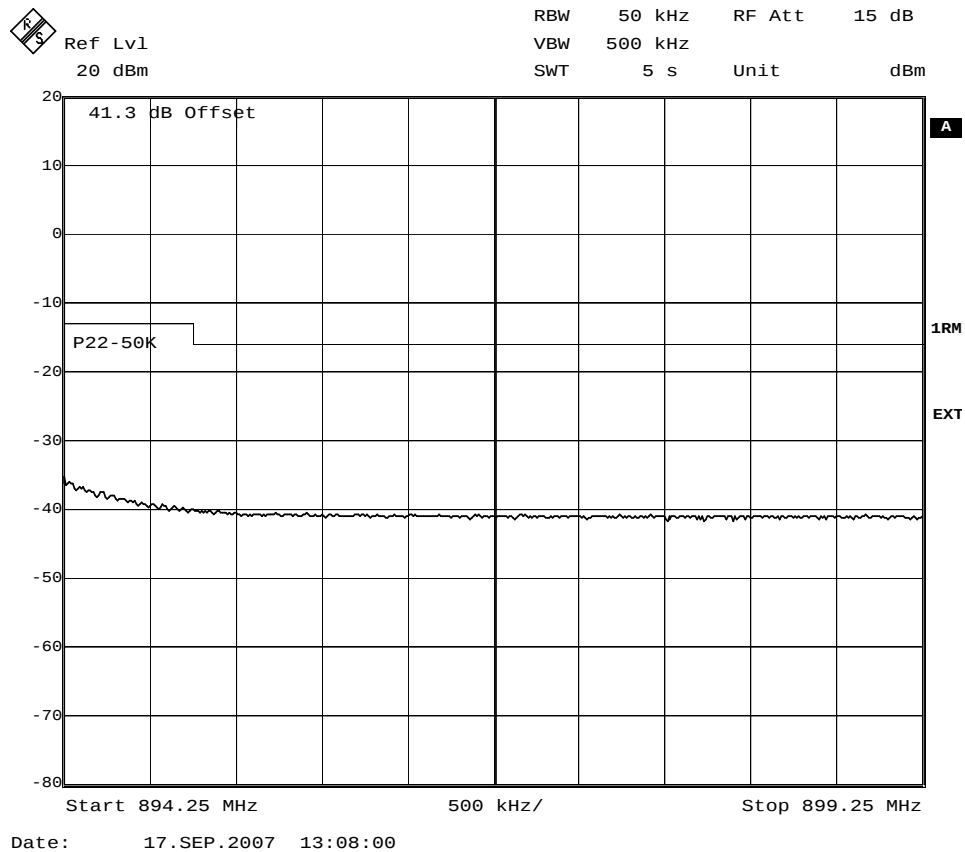
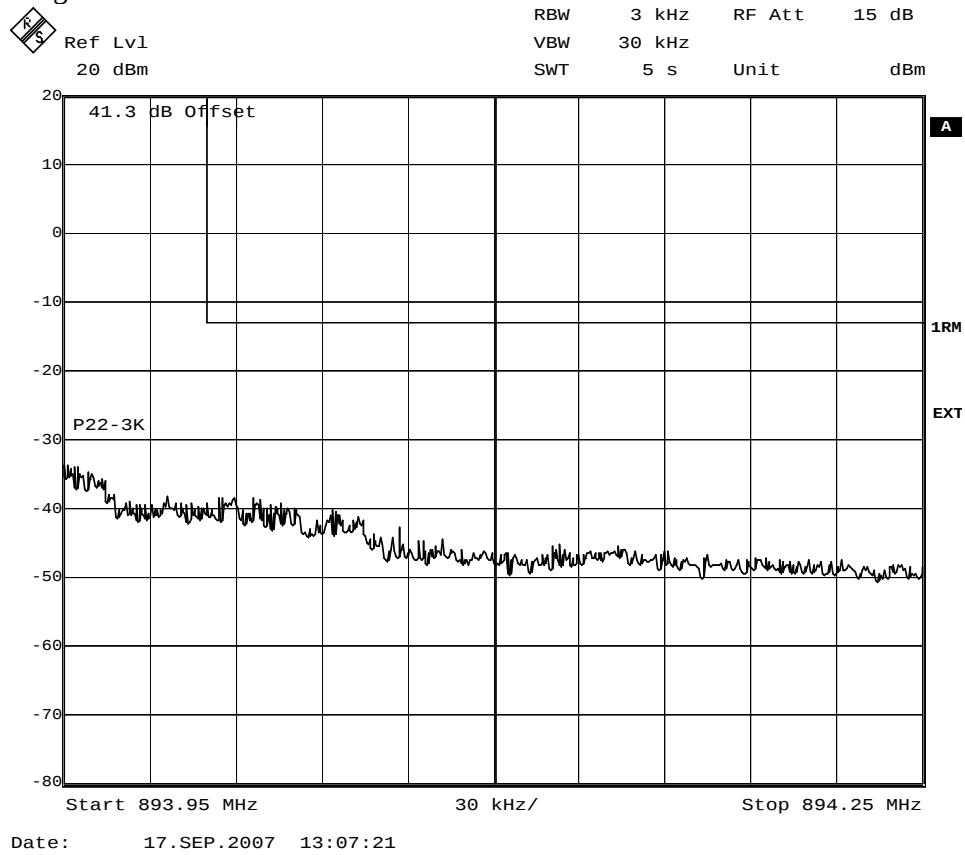
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Appendix 4.1

Diagram 6





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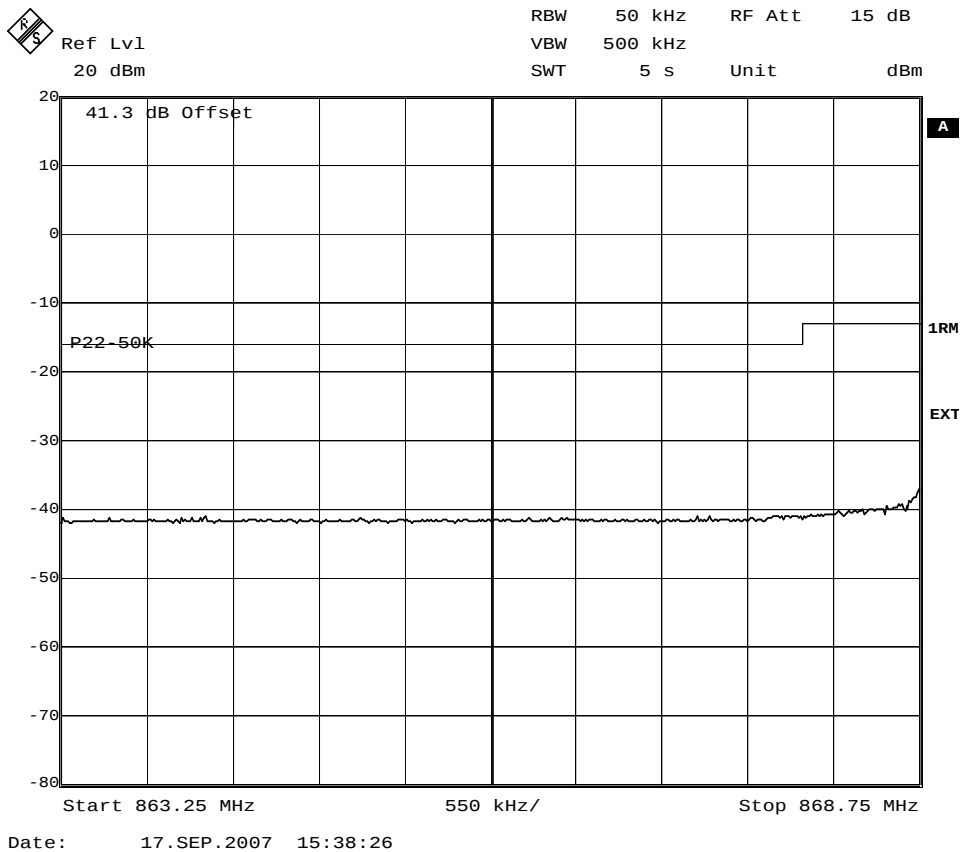
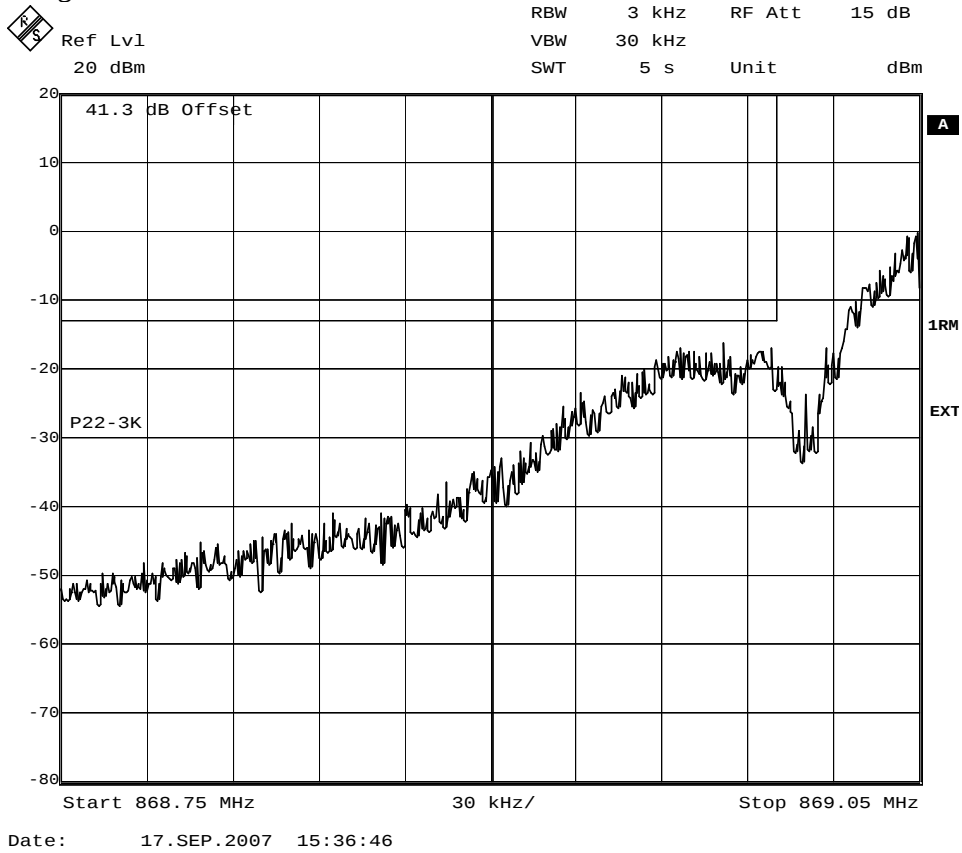
Reference
F713507-F22

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Appendix 4.1

Diagram 7

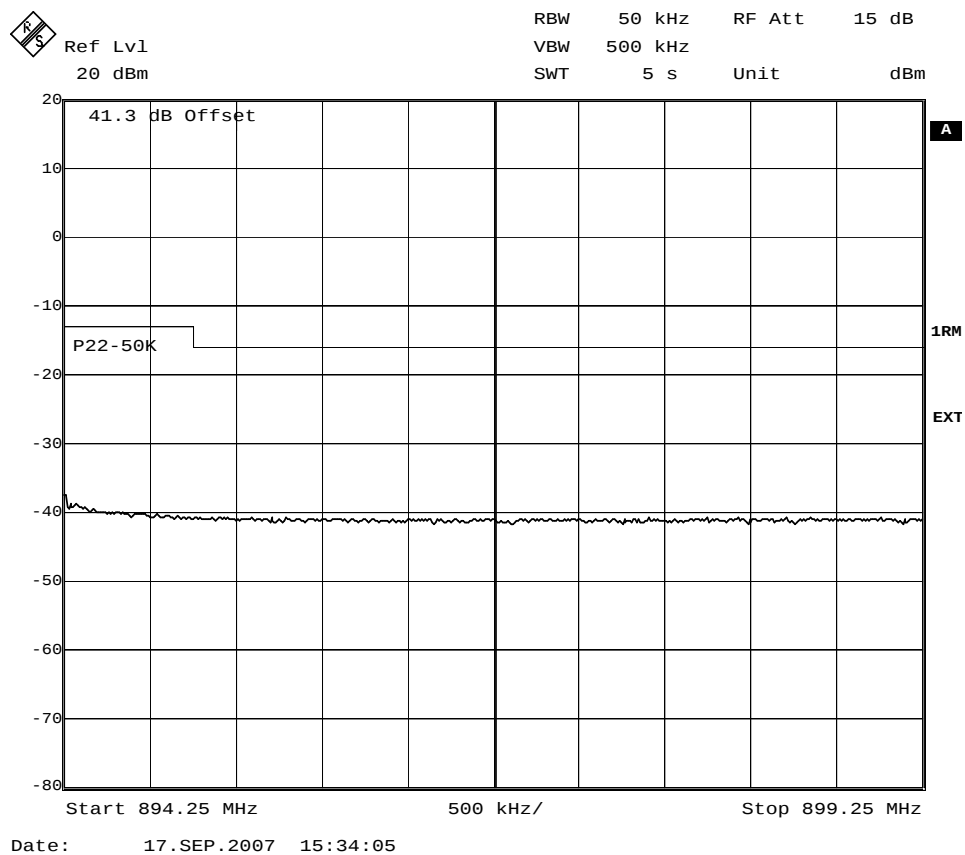
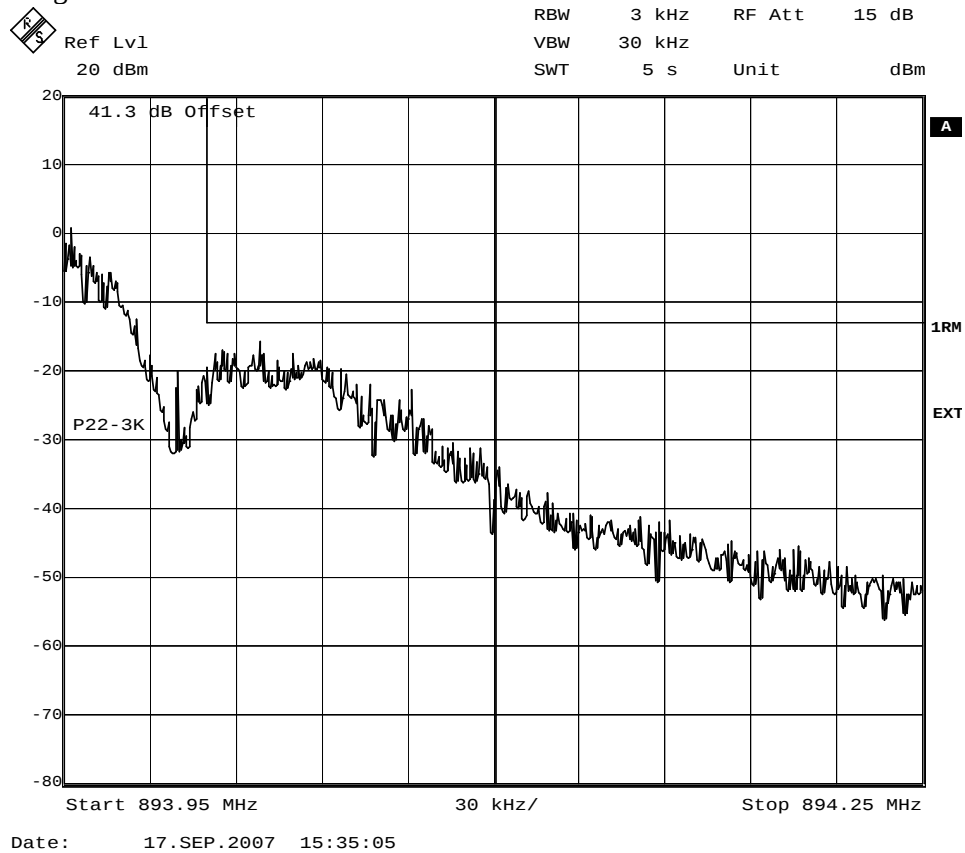




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Appendix 4.1

Diagram 8

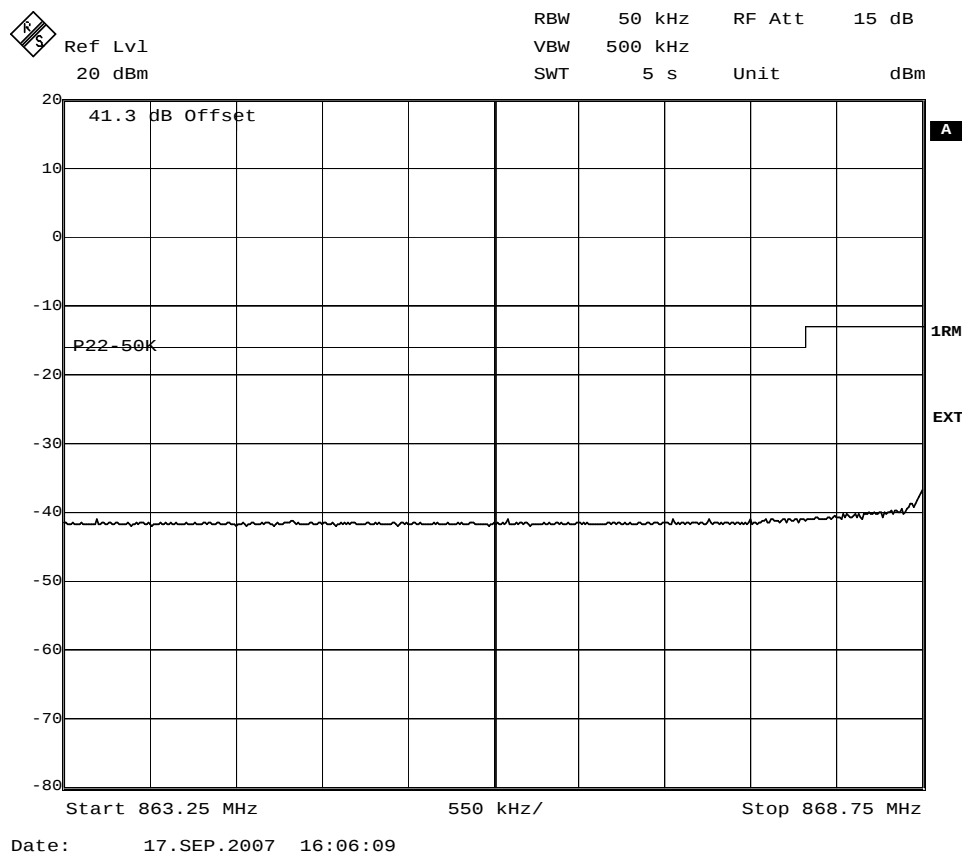
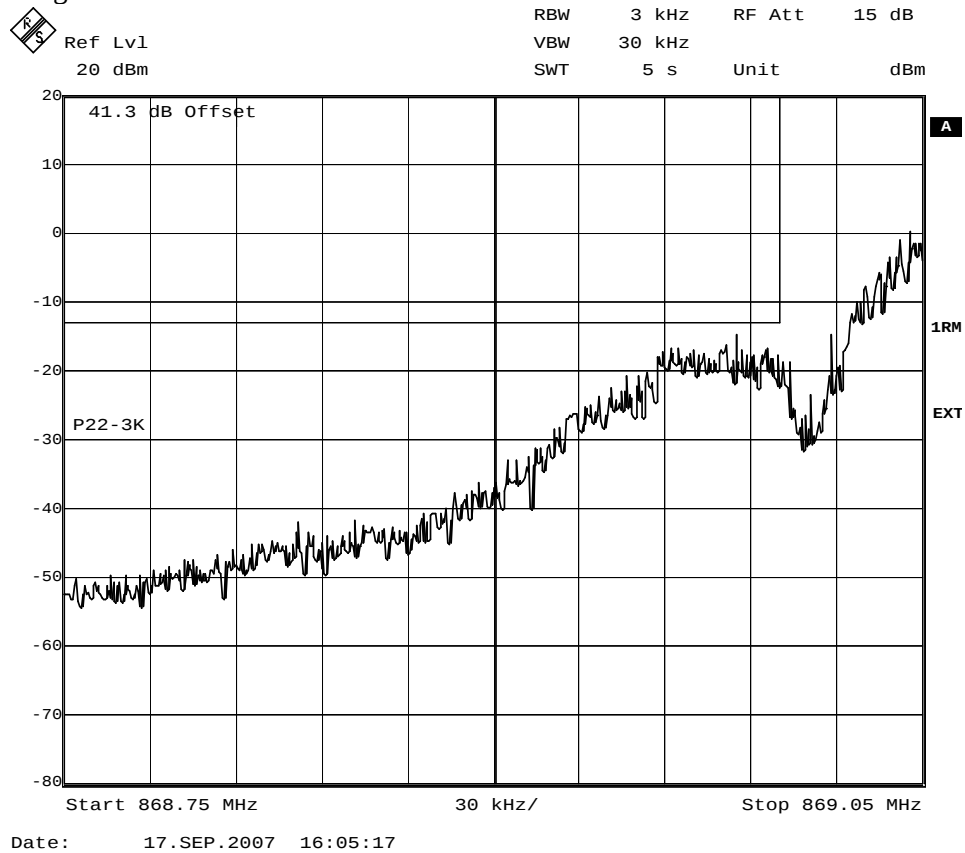




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Appendix 4.1

Diagram 9

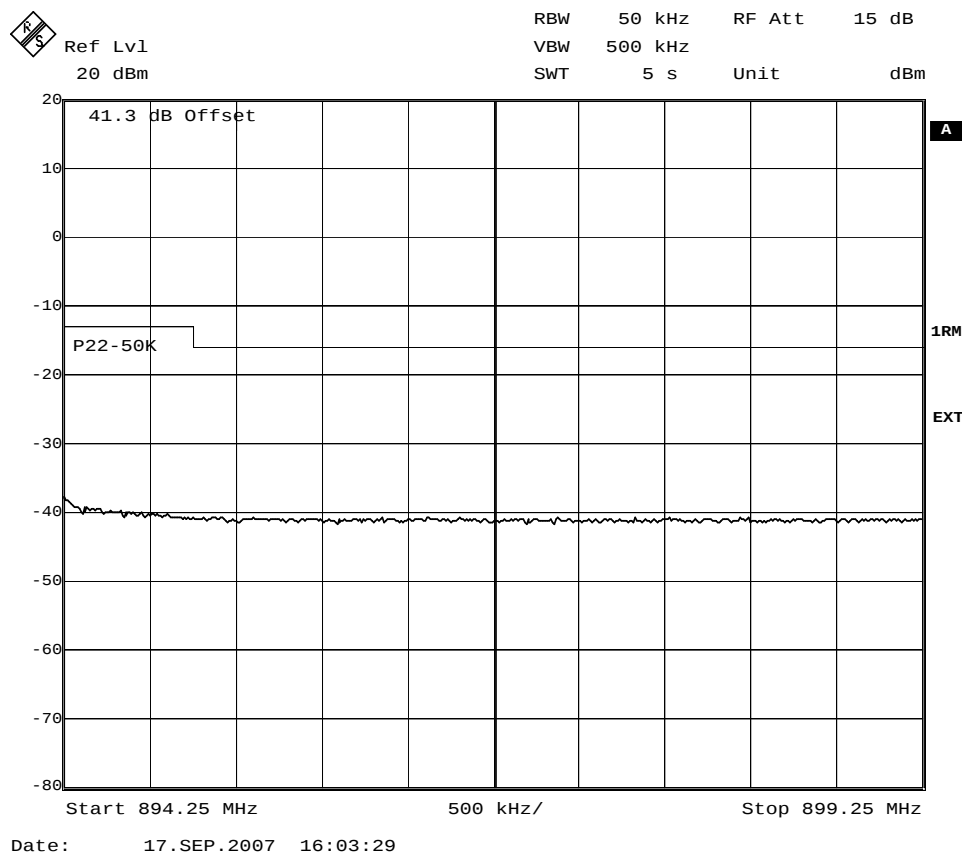
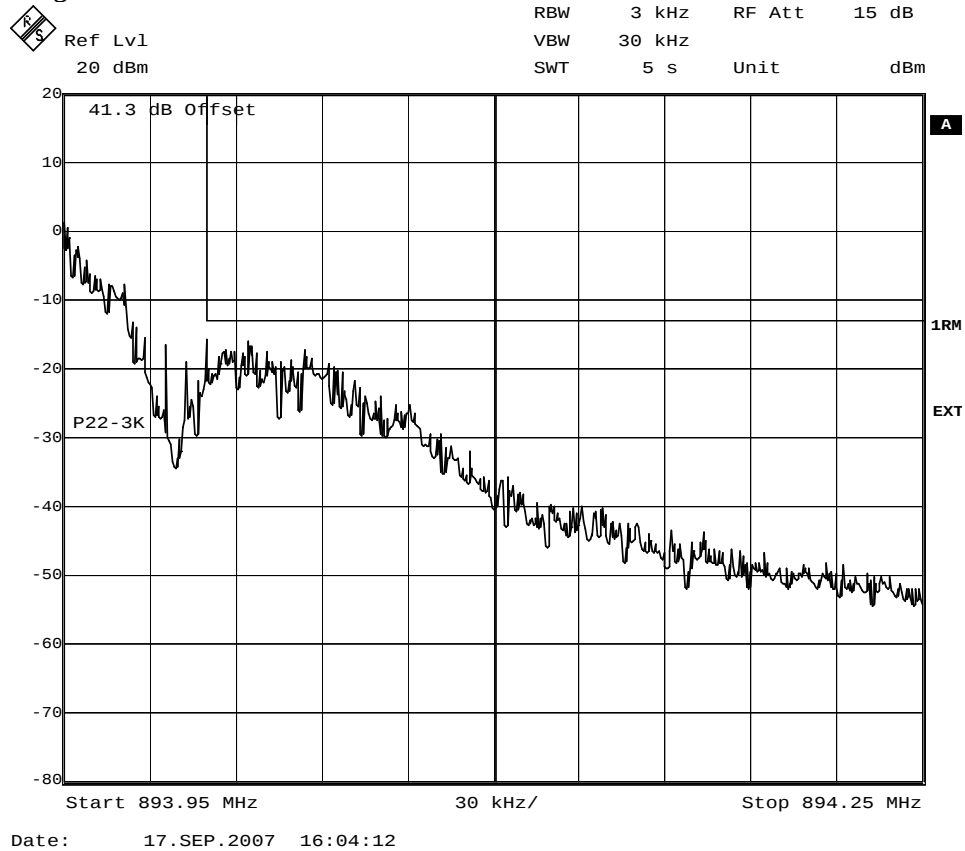




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Appendix 4.1

Diagram 10

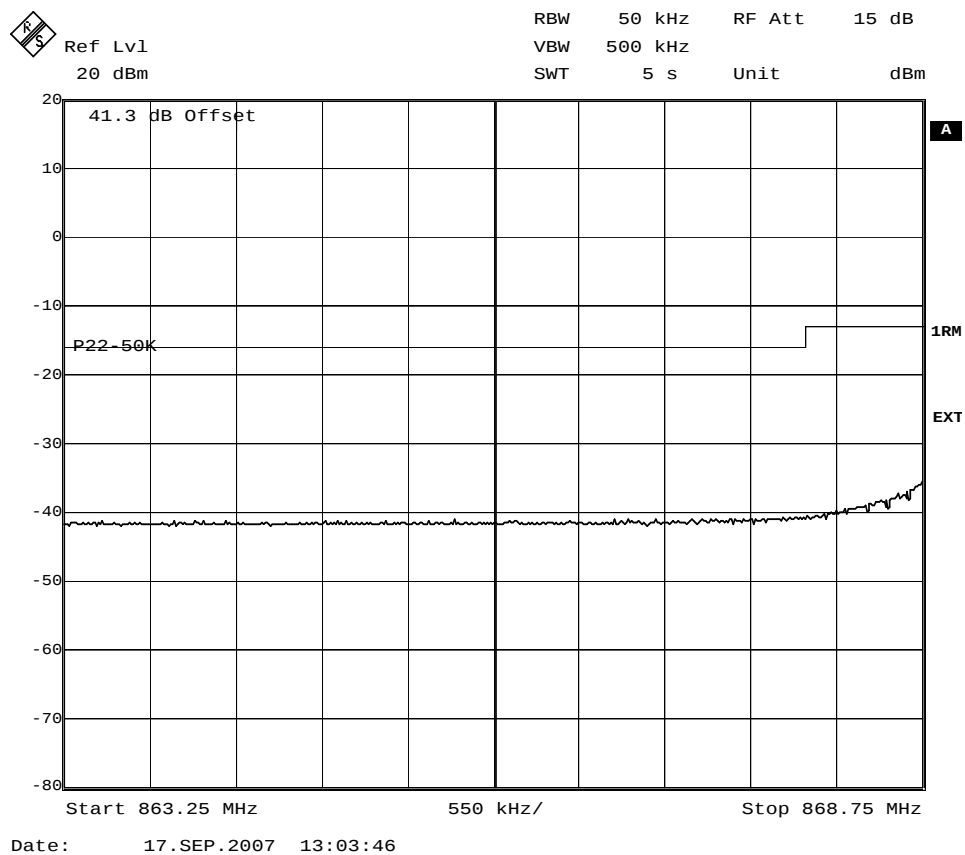
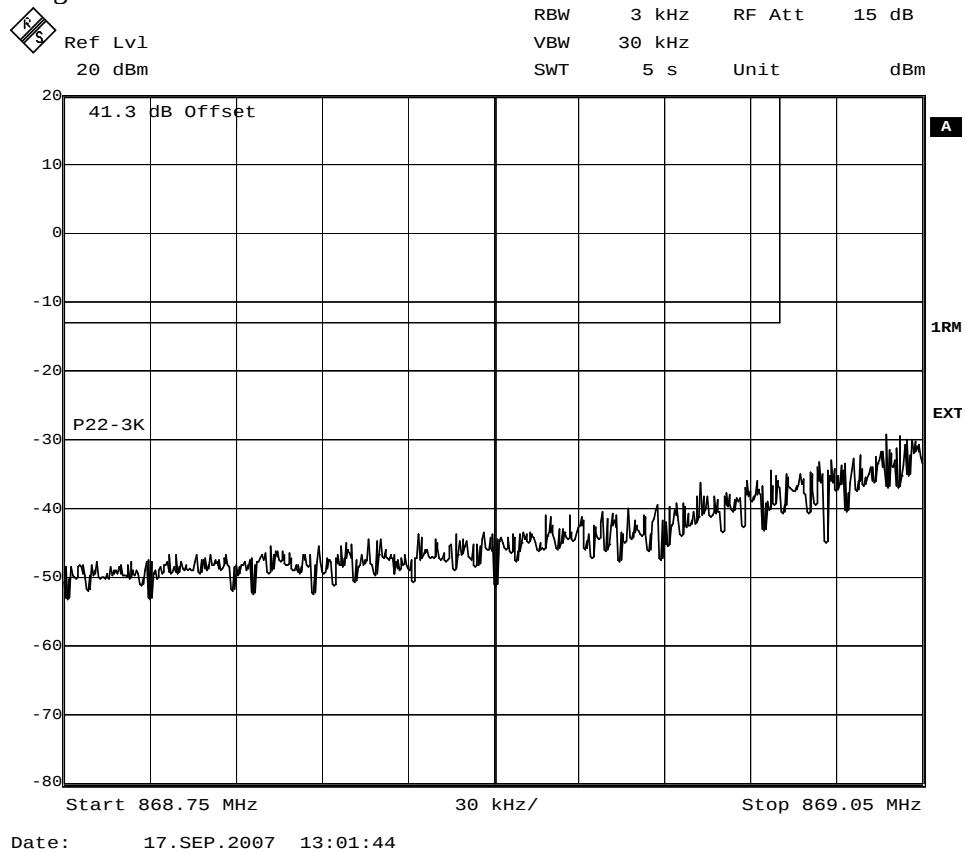




FCC ID: B5KEKRC1311005-2

Appendix 4.1

Diagram 11

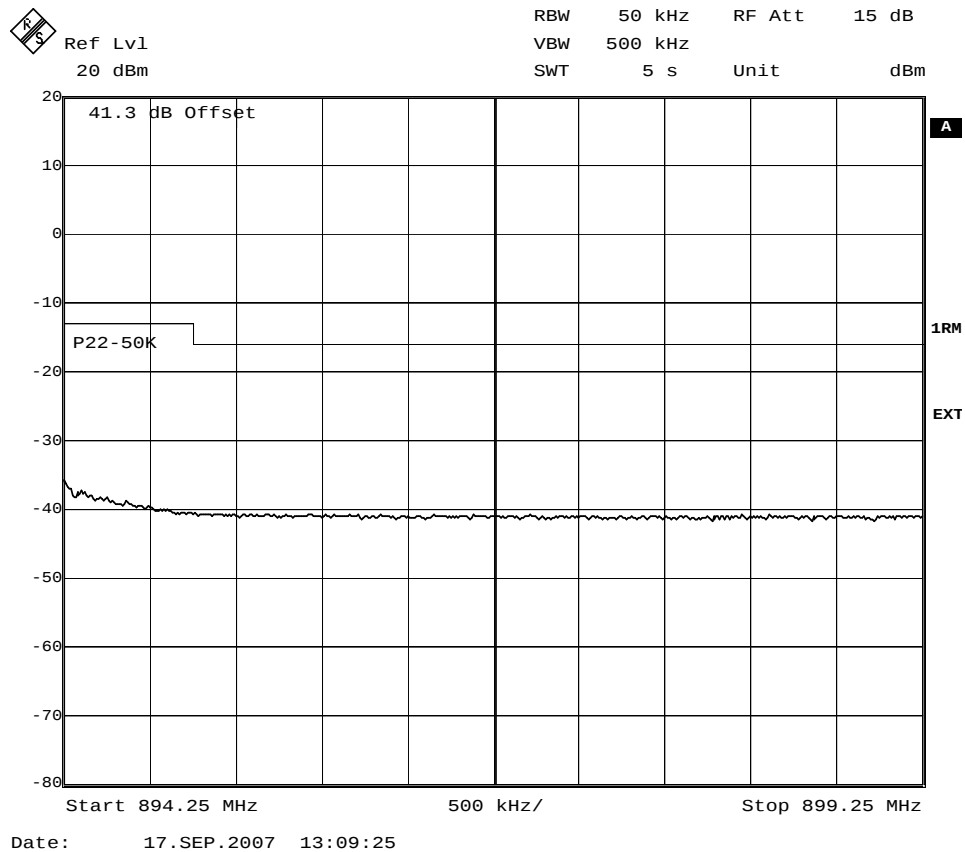
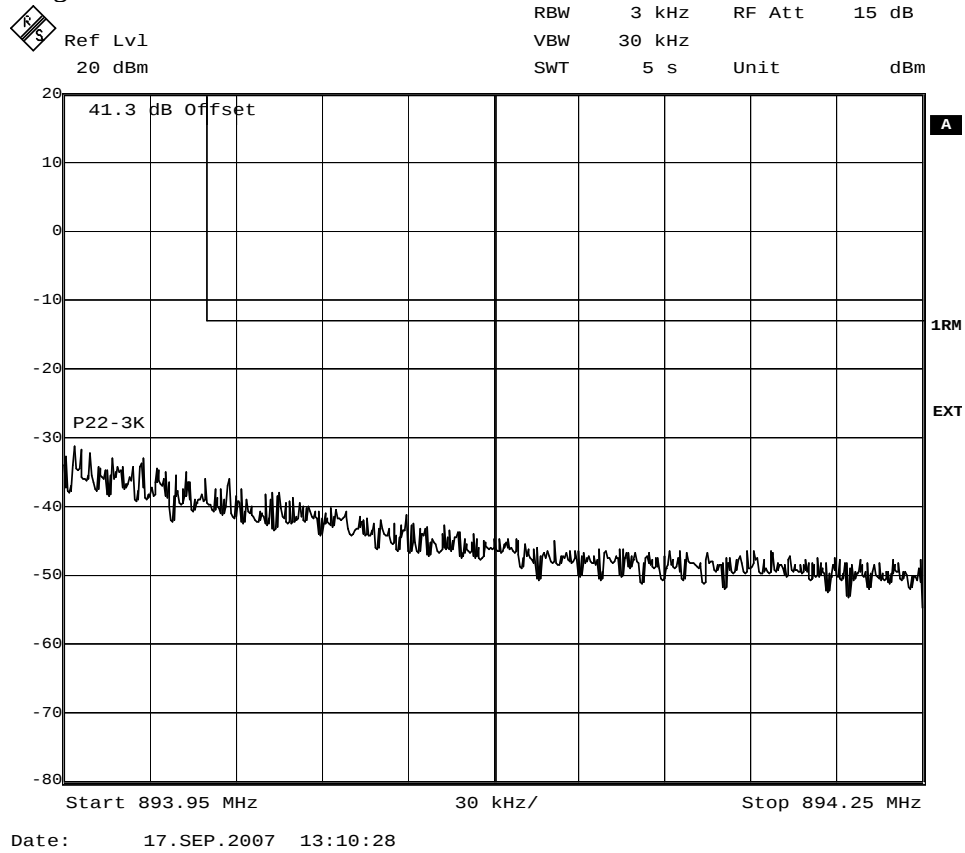




FCC ID: B5KEKRC1311005-2

Appendix 4.1

Diagram 12



Conducted spurious emission measurements according to 47CFR 2.1051

Date	Temperature	Humidity
2007-09-17	22 °C ± 3 °C	47 % ± 5 %
2007-09-18	23 °C ± 3 °C	41 % ± 5 %

Test set-up and procedure

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

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2008-10	503 738
HP filter	2008-07	502 758
Testo 610, Temperature and humidity meter	2009-04	502 658

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 5.1

GMSK

dTRU, with internal combiner plus TCC:

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

dTRU, without internal combiner:

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

dTRU, with internal combiner:

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

8-PSK**dTRU, with internal combiner plus TCC:**

Diagram 12: Ch 128

Diagram 13: Ch 190

Diagram 14: Ch 251

dTRU, without internal combiner:

Diagram 15: TRX output 1, Ch 128

Diagram 16: TRX output 1, Ch 190

Diagram 17: TRX output 1, Ch 251

Diagram 18: TRX output 2, Ch 128

Diagram 19: TRX output 2, Ch 190

Diagram 20: TRX output 2, Ch 251

dTRU, with internal combiner:

Diagram 21: Ch 128, and ch 153

Diagram 22: Ch 226, and ch 251

Remark

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

Limits

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

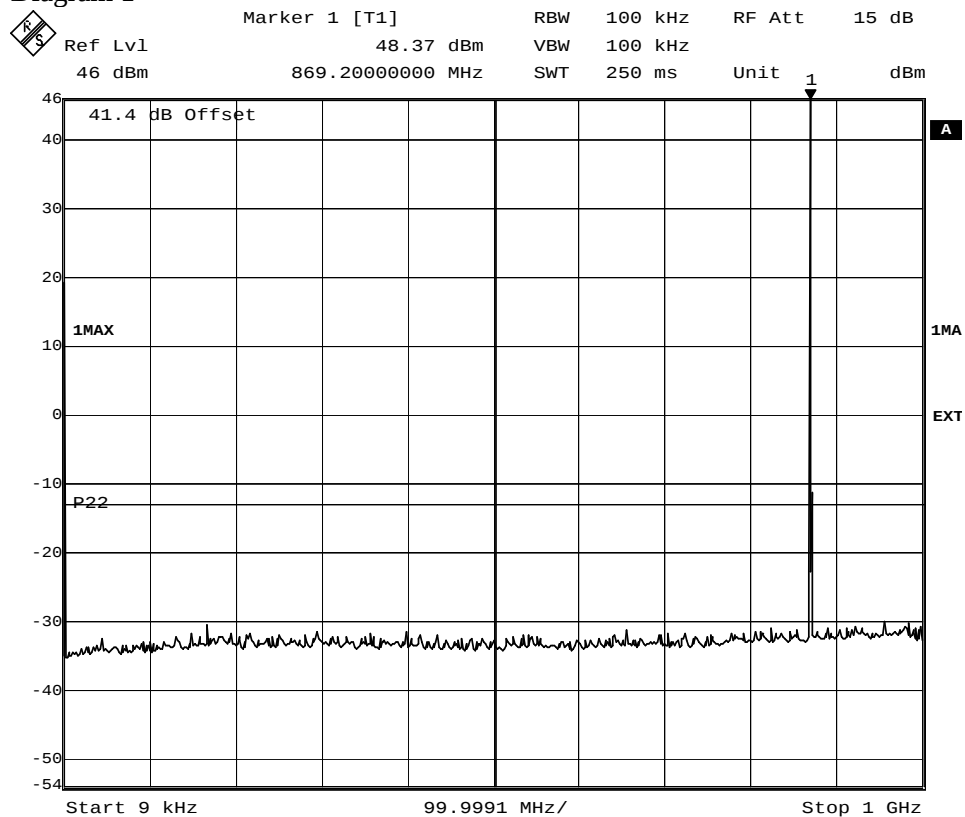
Complies?	Yes
-----------	-----



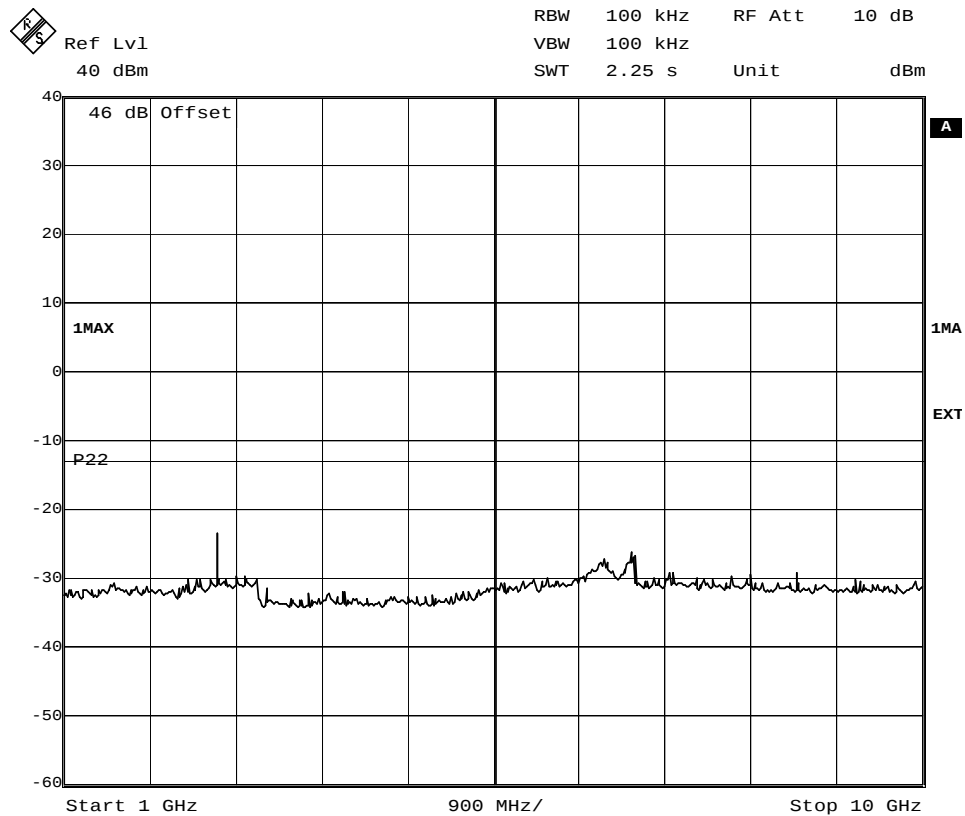
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 1



Date: 17.SEP.2007 13:50:15



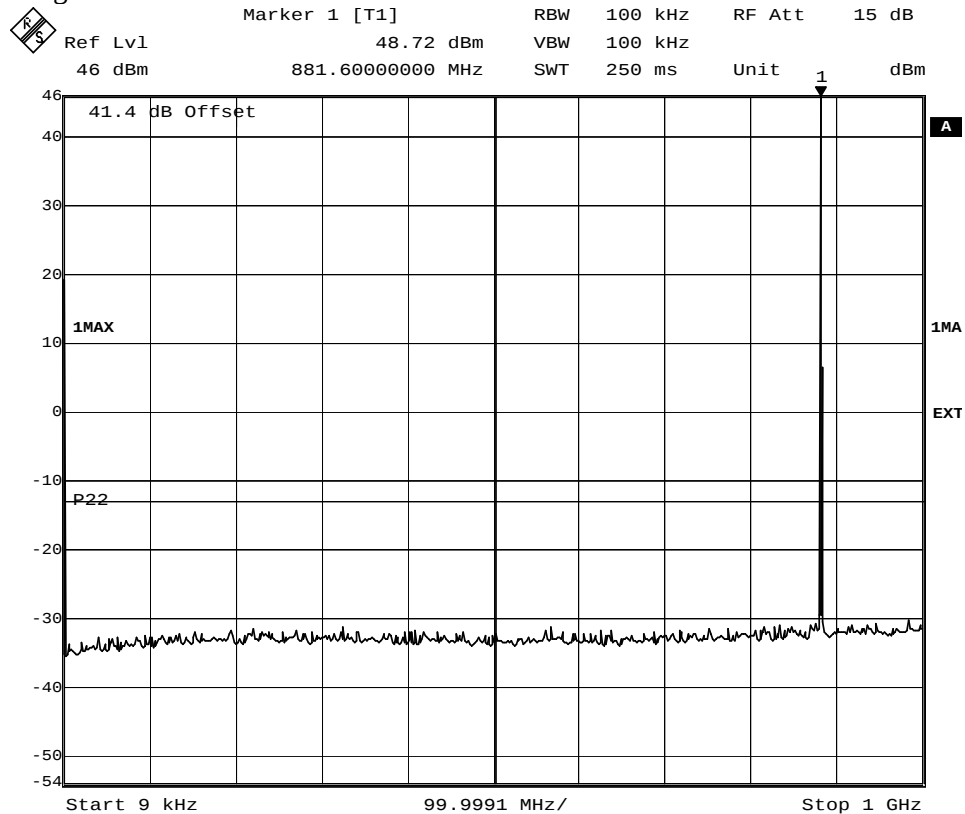
Date: 17.SEP.2007 13:31:24



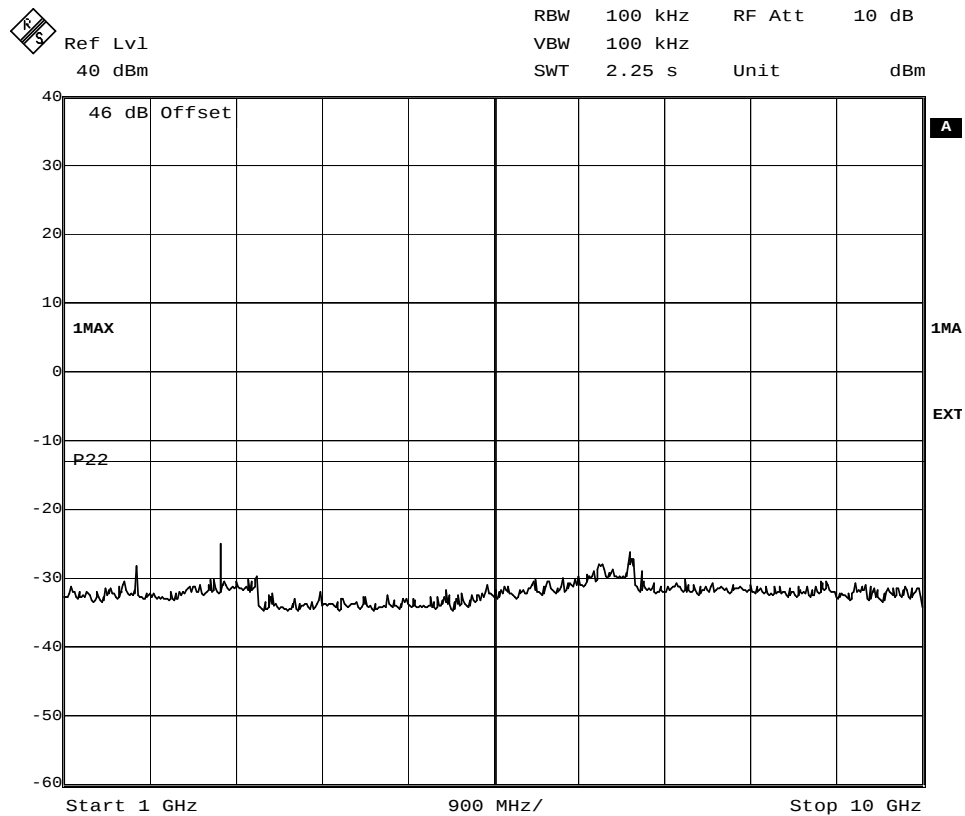
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 2



Date: 17.SEP.2007 13:49:12



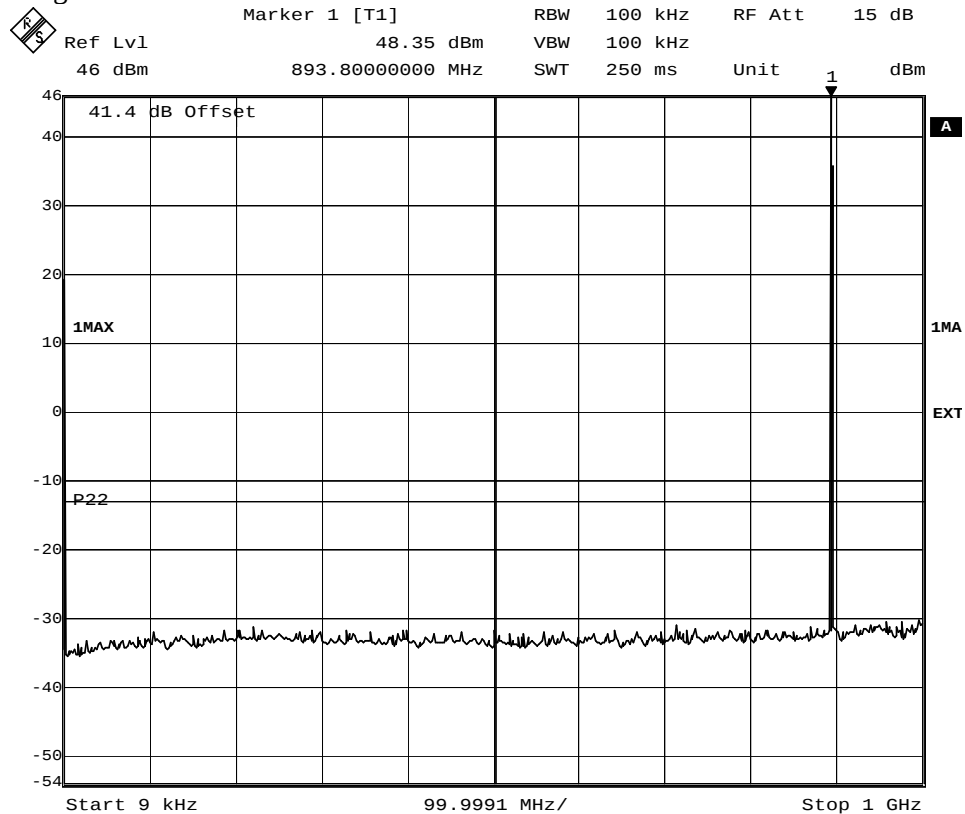
Date: 17.SEP.2007 13:34:21



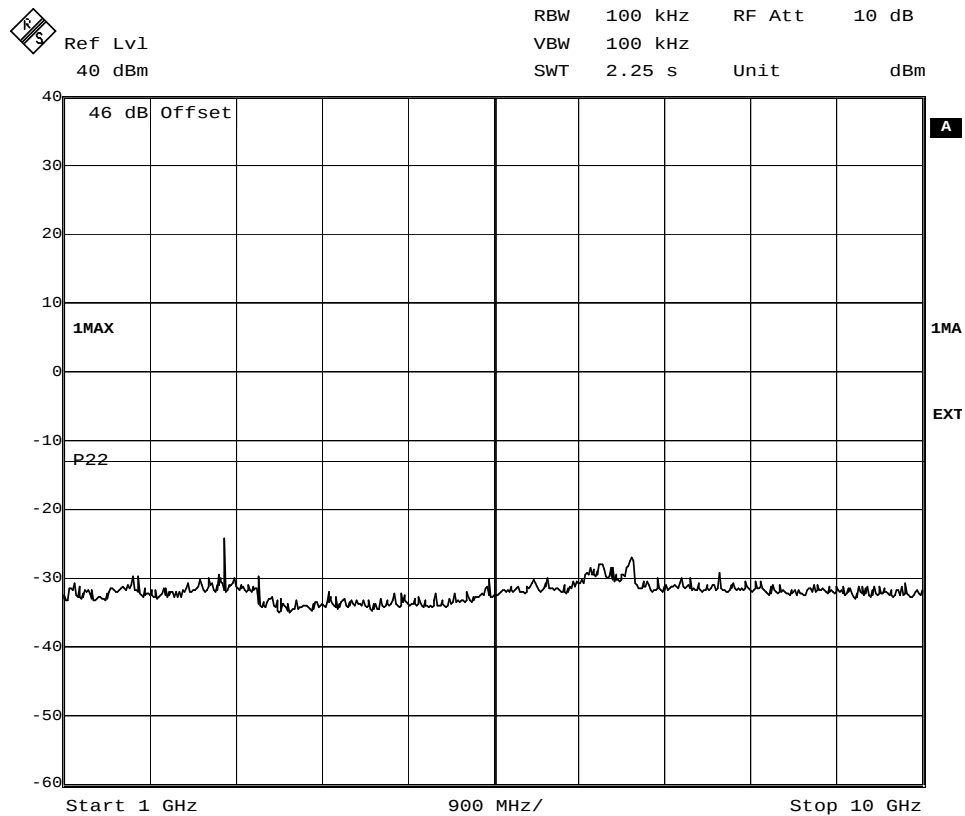
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 3



Date: 17.SEP.2007 13:48:12



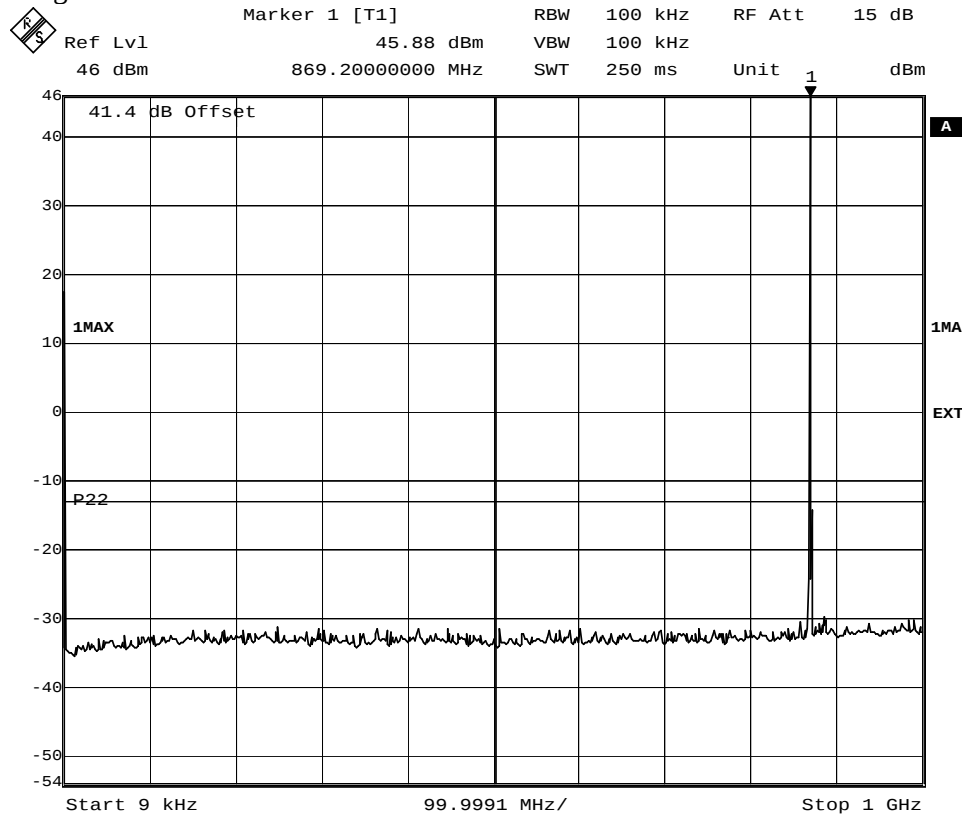
Date: 17.SEP.2007 13:35:32



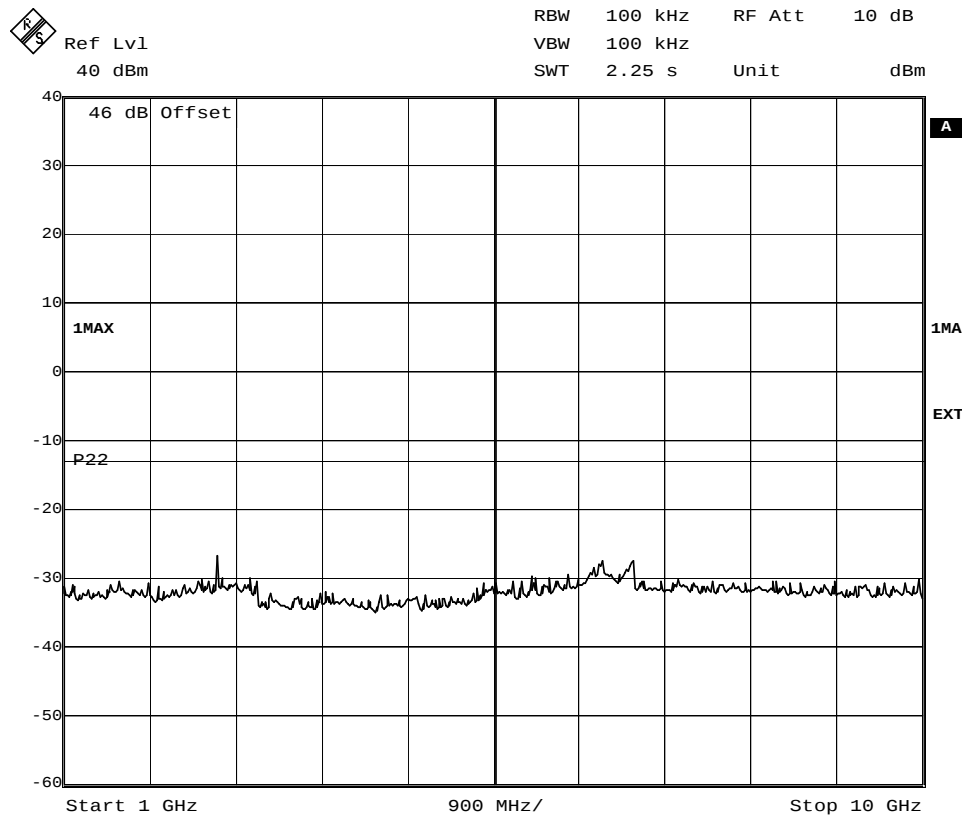
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 4



Date: 18.SEP.2007 09:17:04



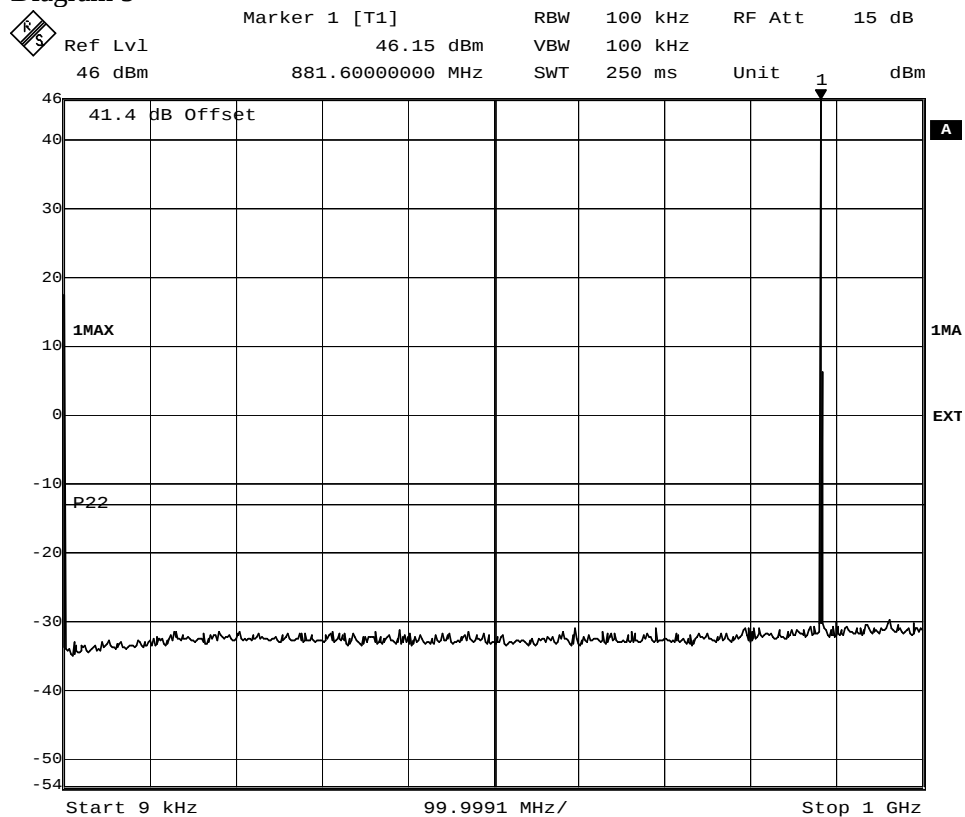
Date: 18.SEP.2007 09:02:41



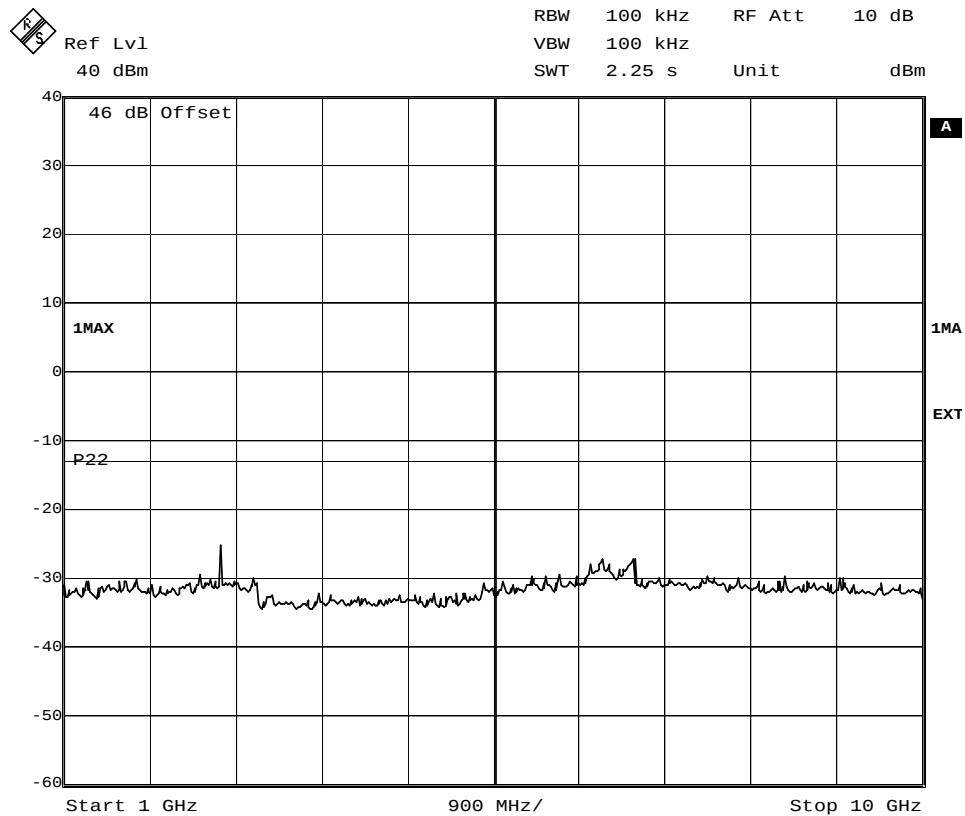
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 5



Date: 18.SEP.2007 09:16:08



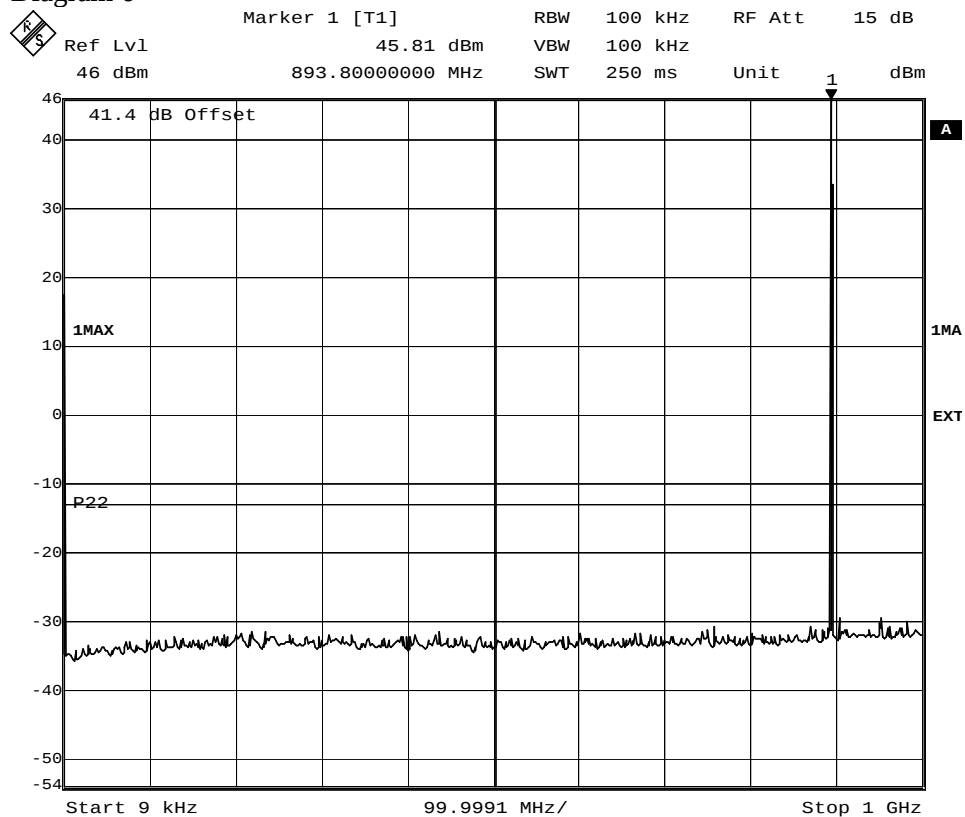
Date: 18.SEP.2007 09:04:07



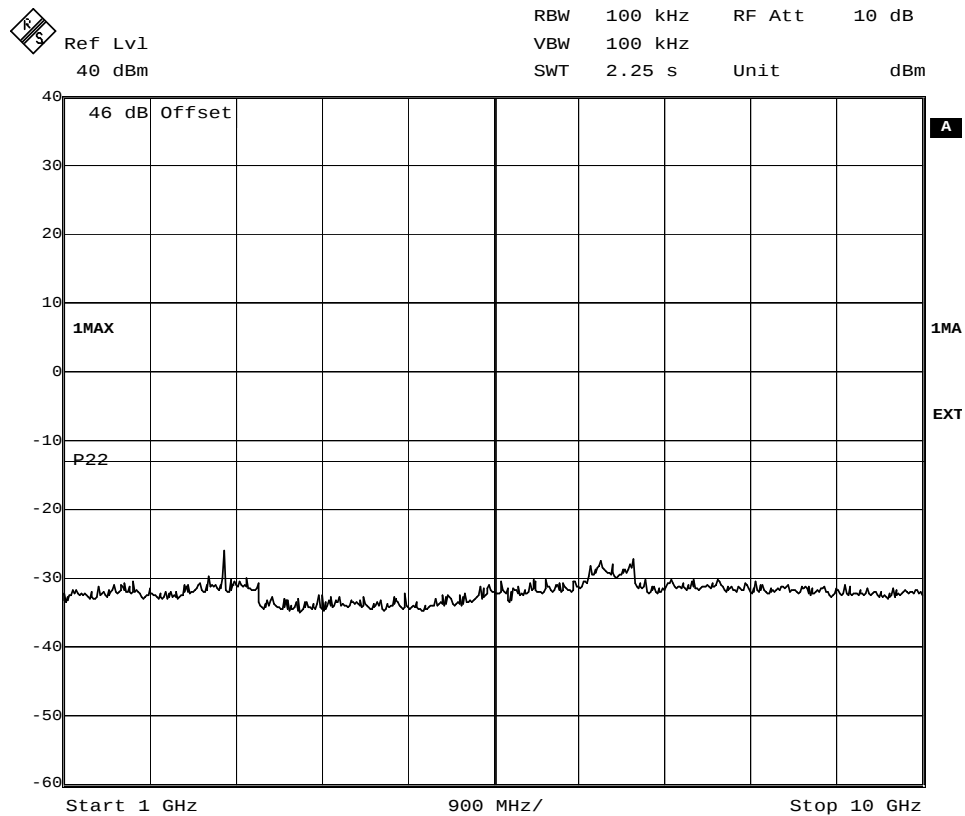
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 6



Date: 18.SEP.2007 09:14:36



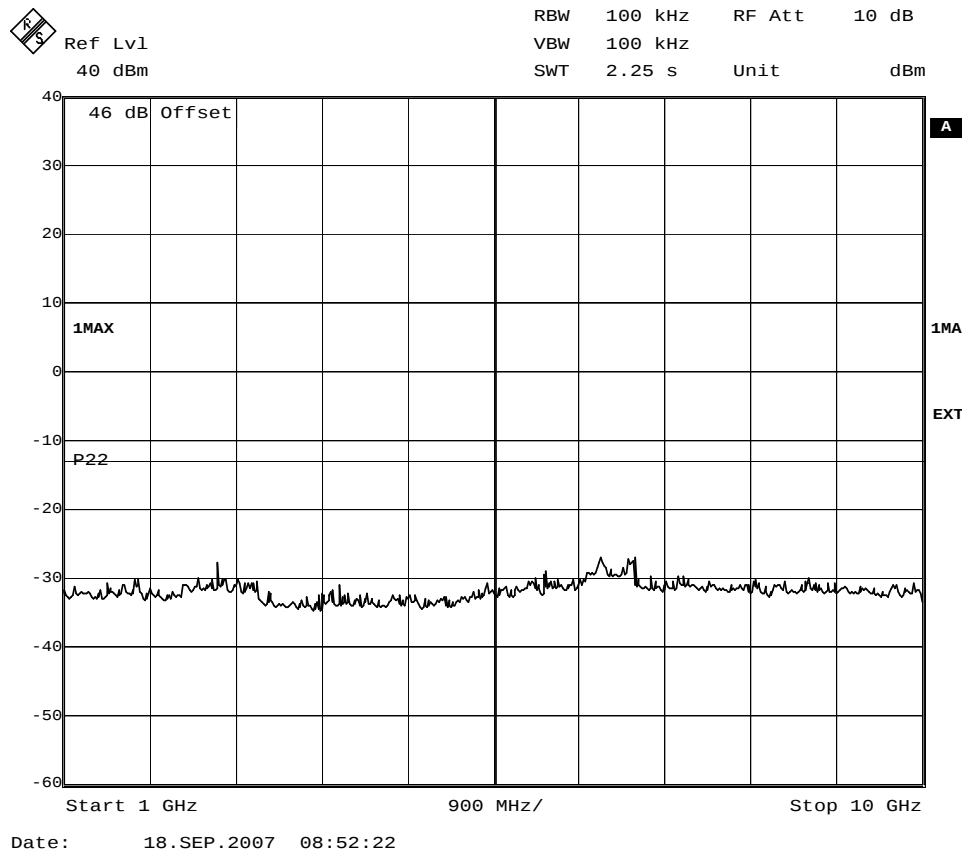
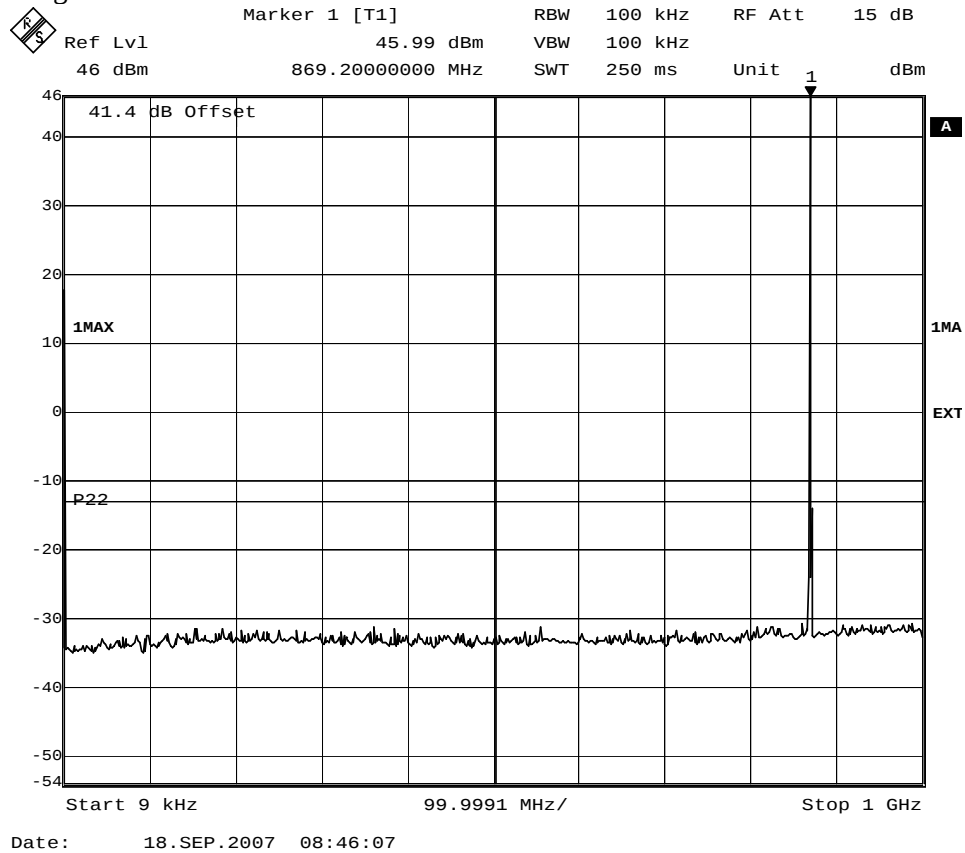
Date: 18.SEP.2007 09:04:53



FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 7

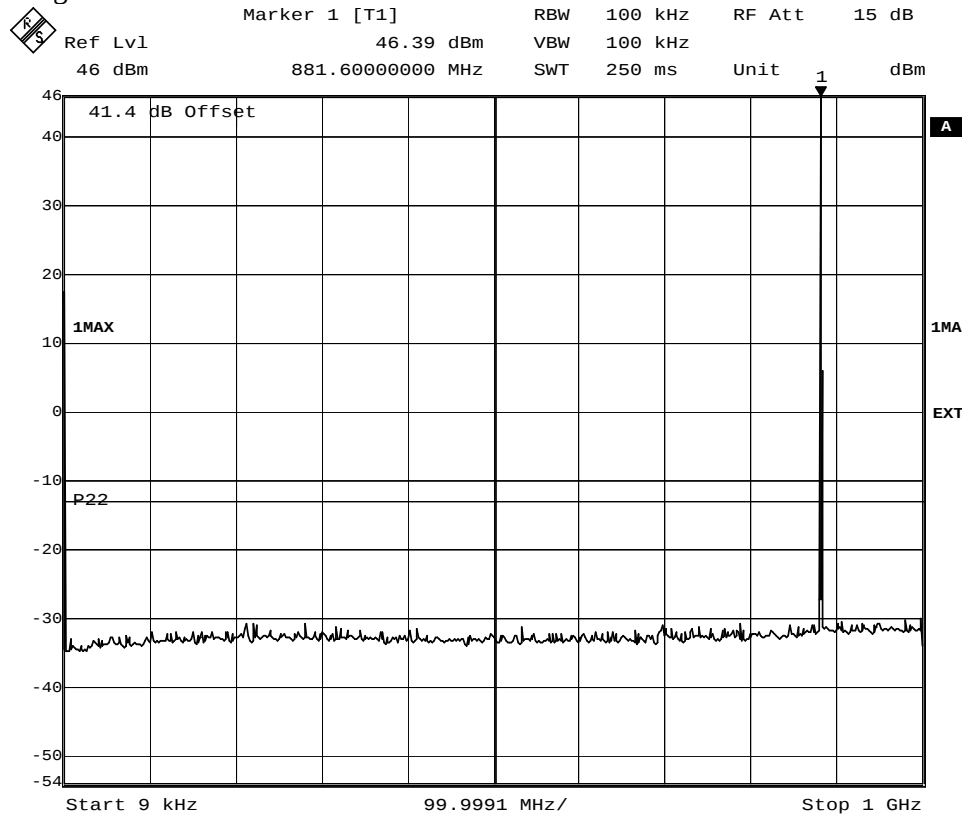




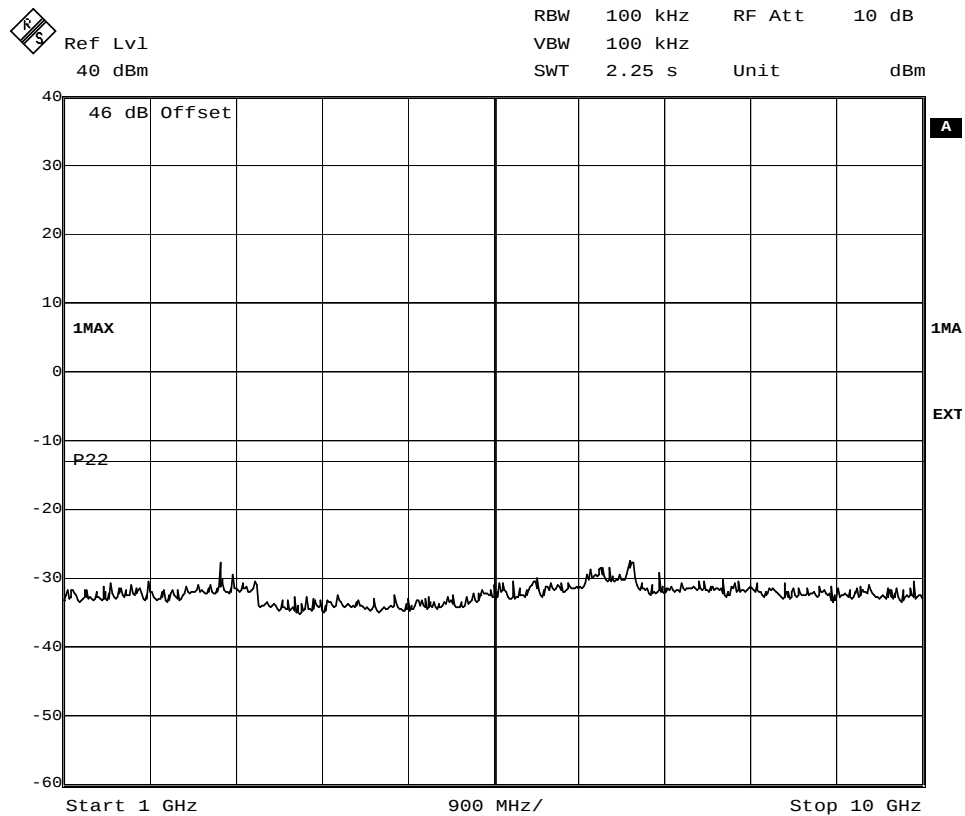
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 8



Date: 18.SEP.2007 08:47:11



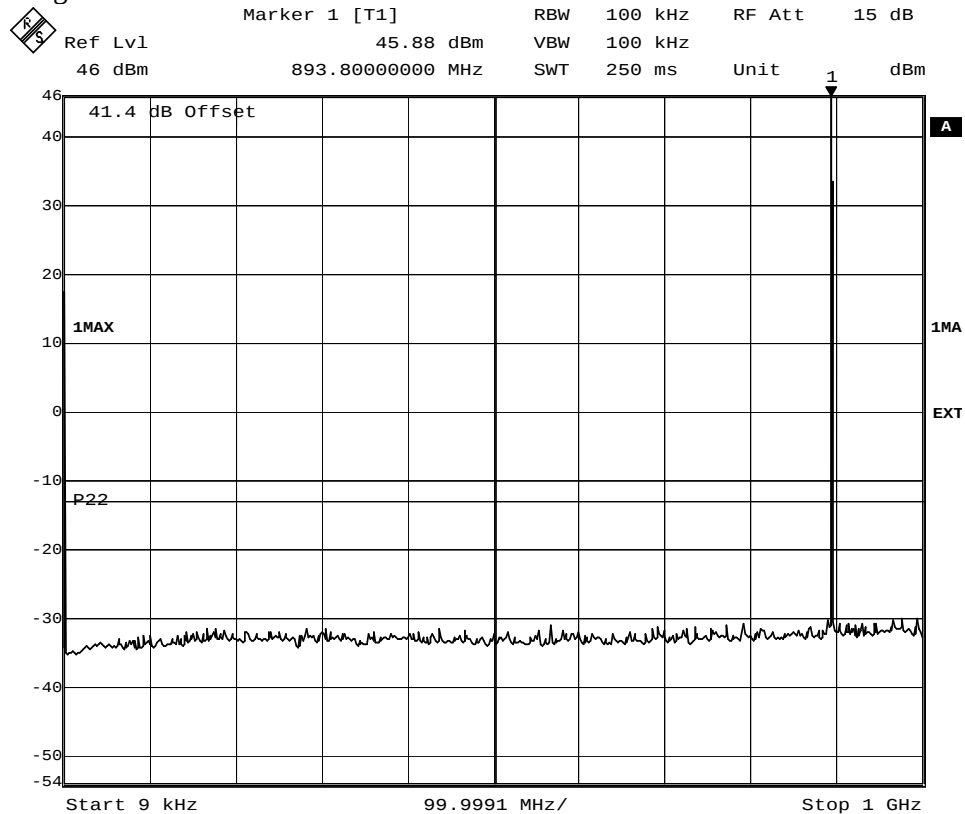
Date: 18.SEP.2007 08:55:10



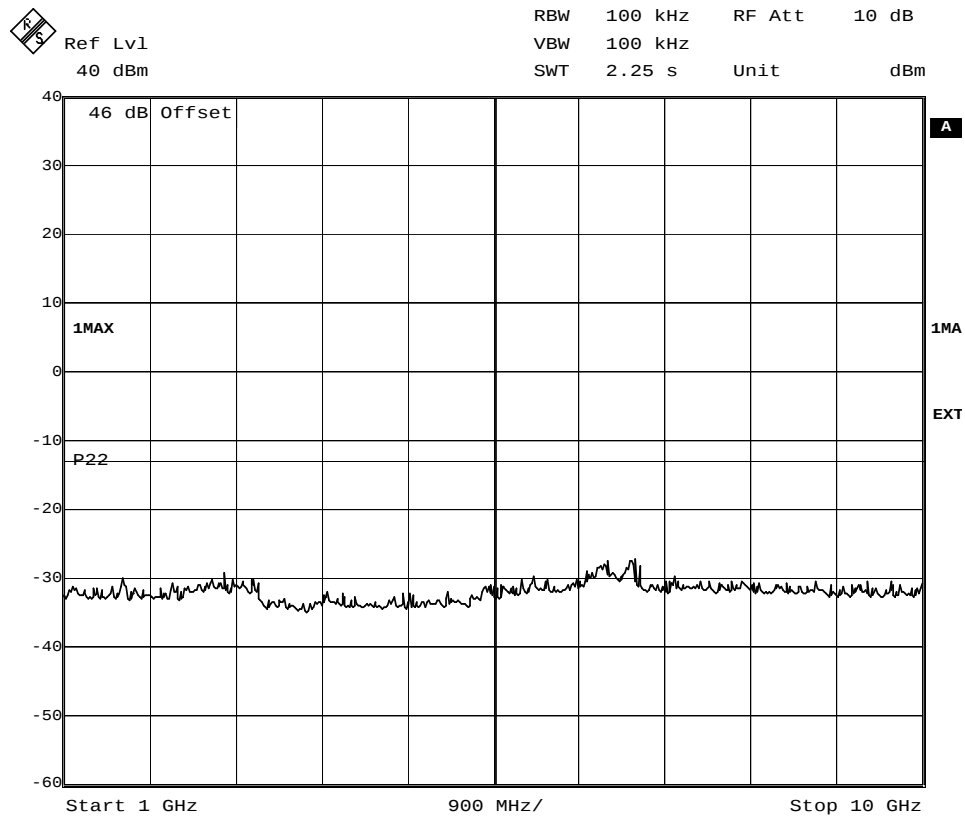
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 9



Date: 18.SEP.2007 08:50:43



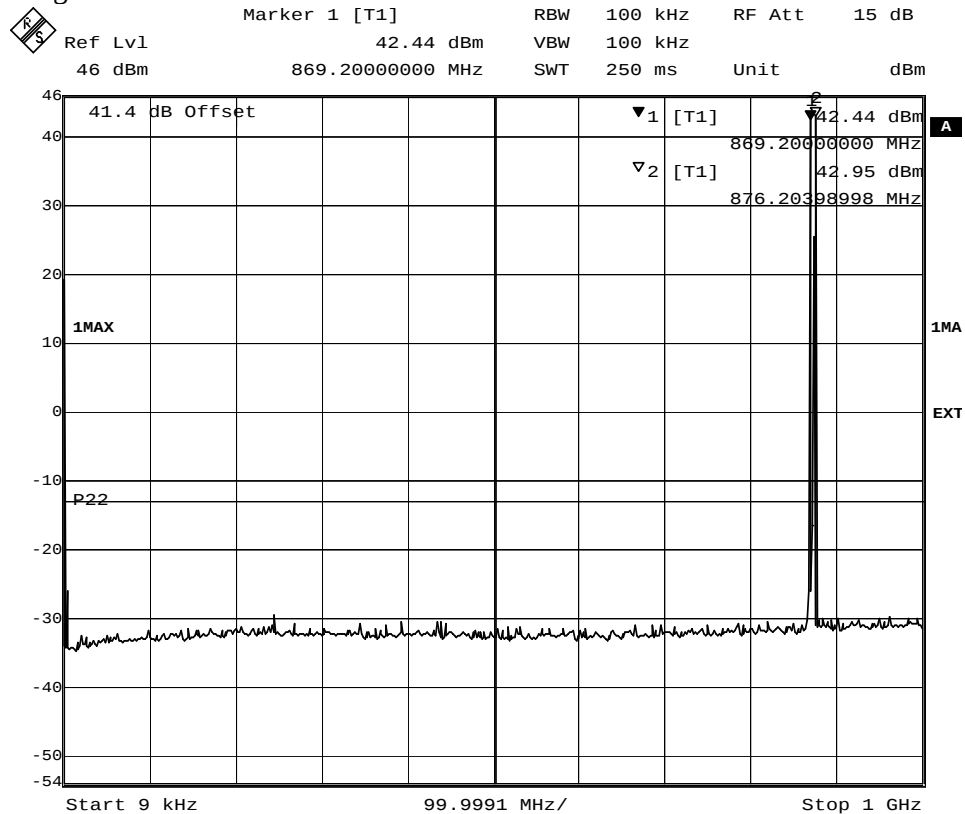
Date: 18.SEP.2007 08:56:37



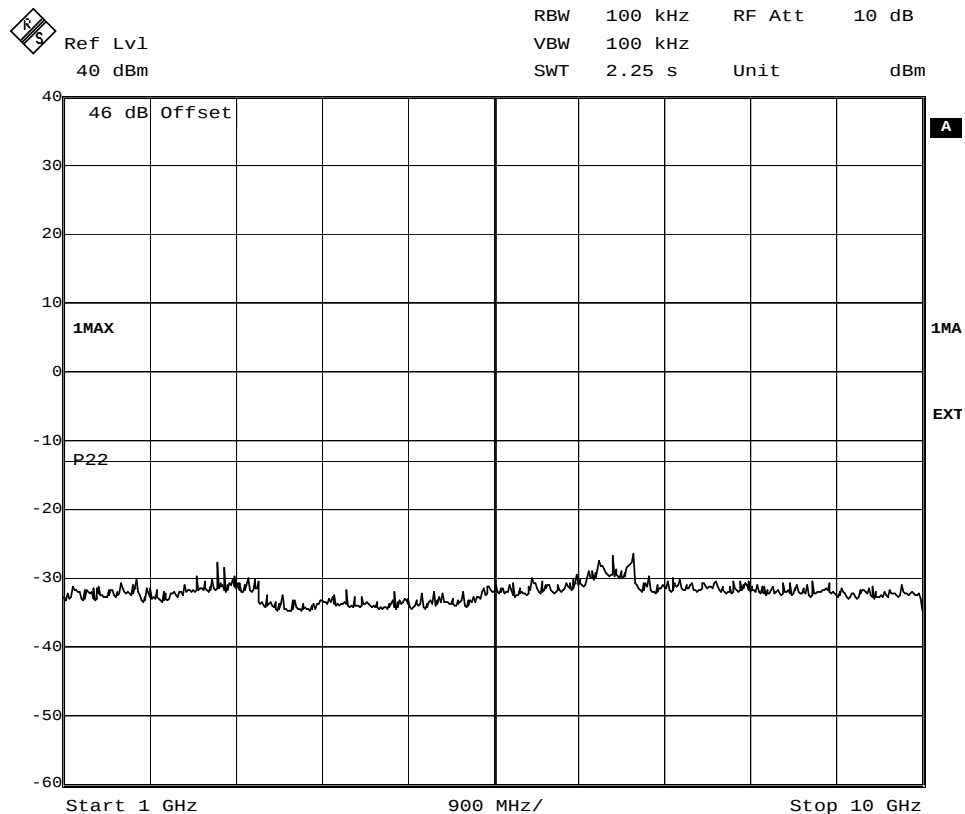
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 10



Date: 17.SEP.2007 13:57:43



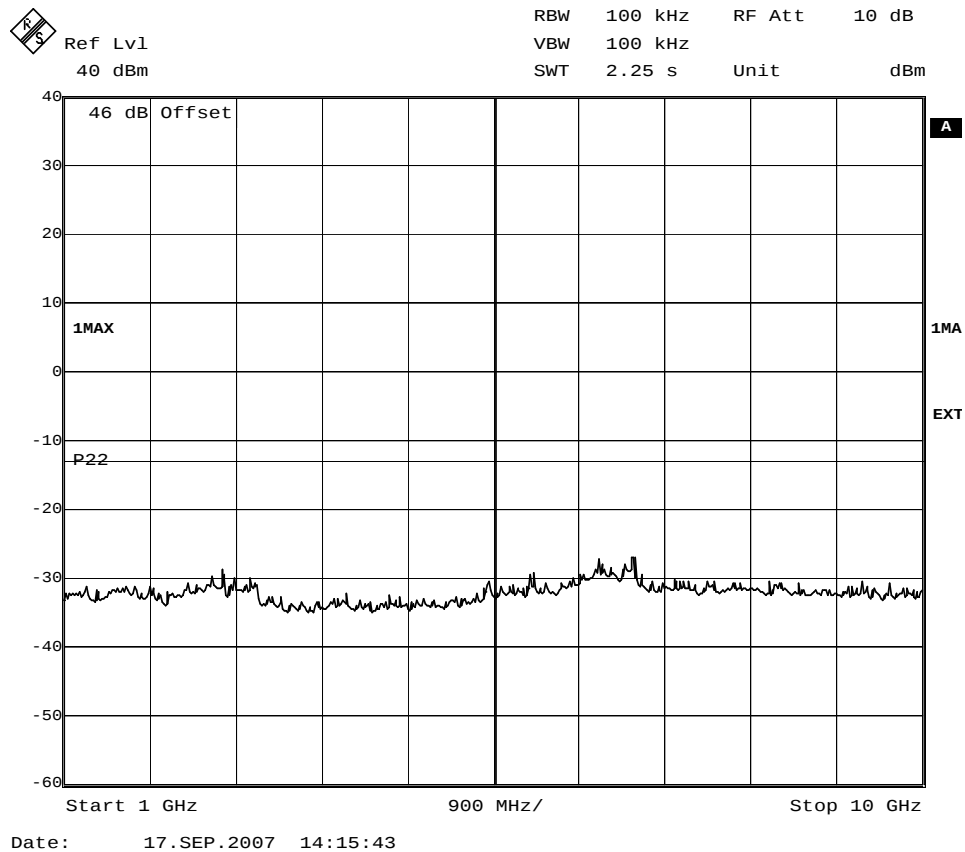
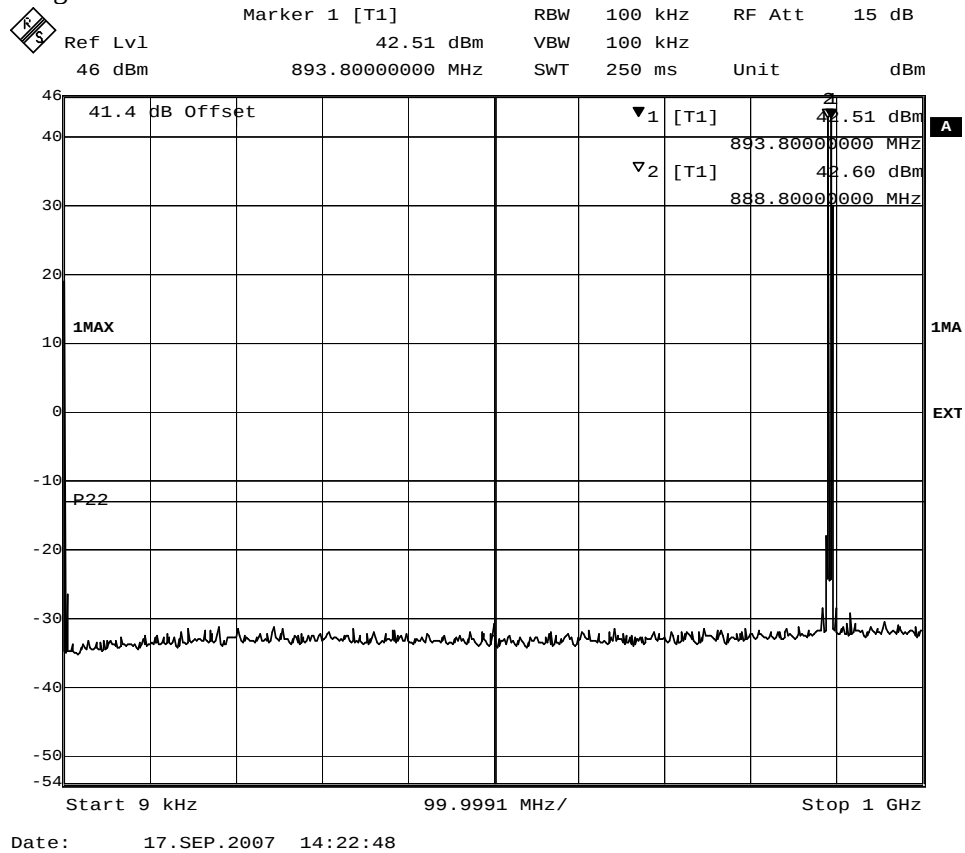
Date: 17.SEP.2007 14:13:42



FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 11

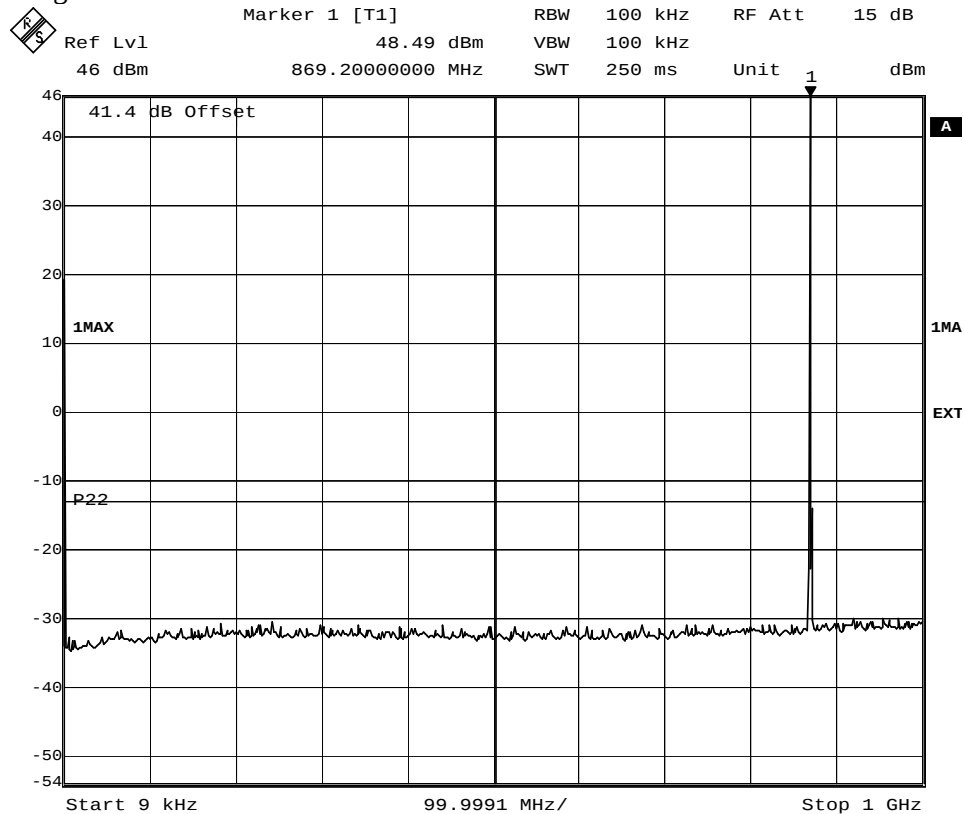




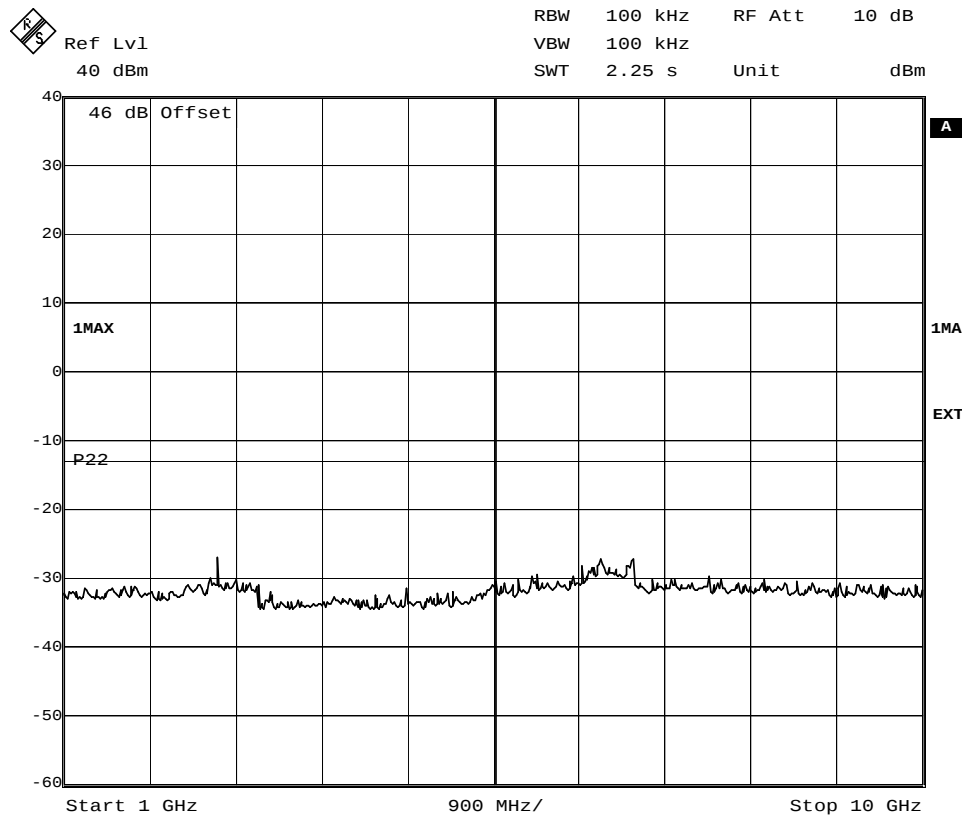
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 12



Date: 17.SEP.2007 13:43:58



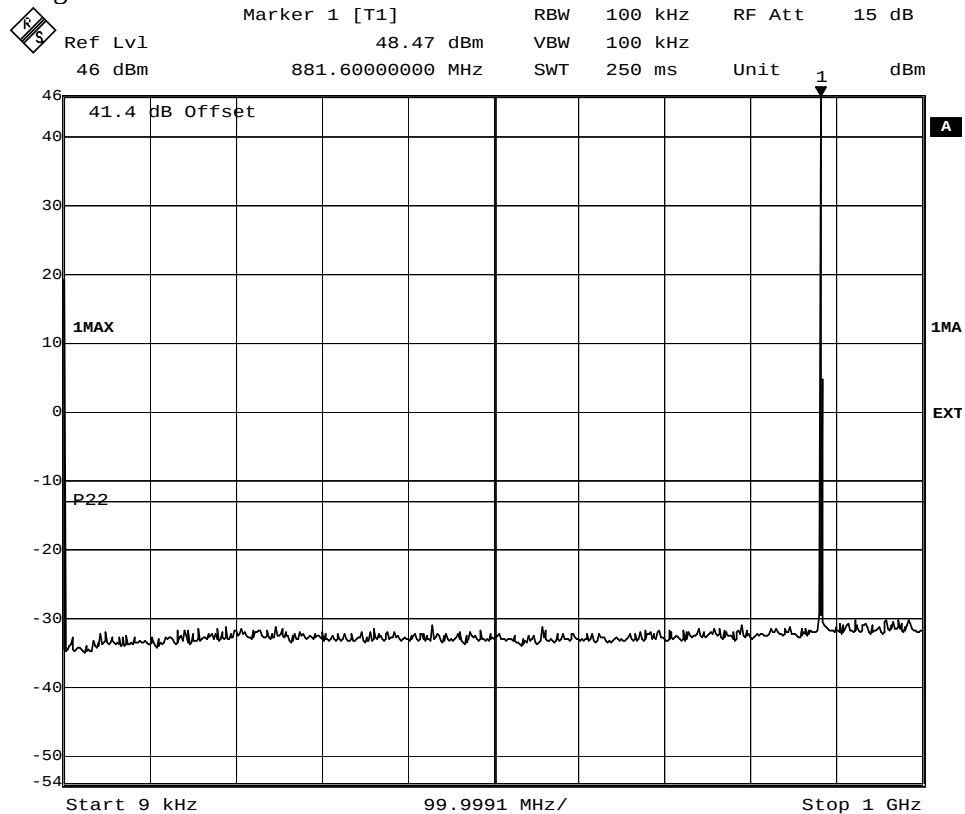
Date: 17.SEP.2007 13:39:19



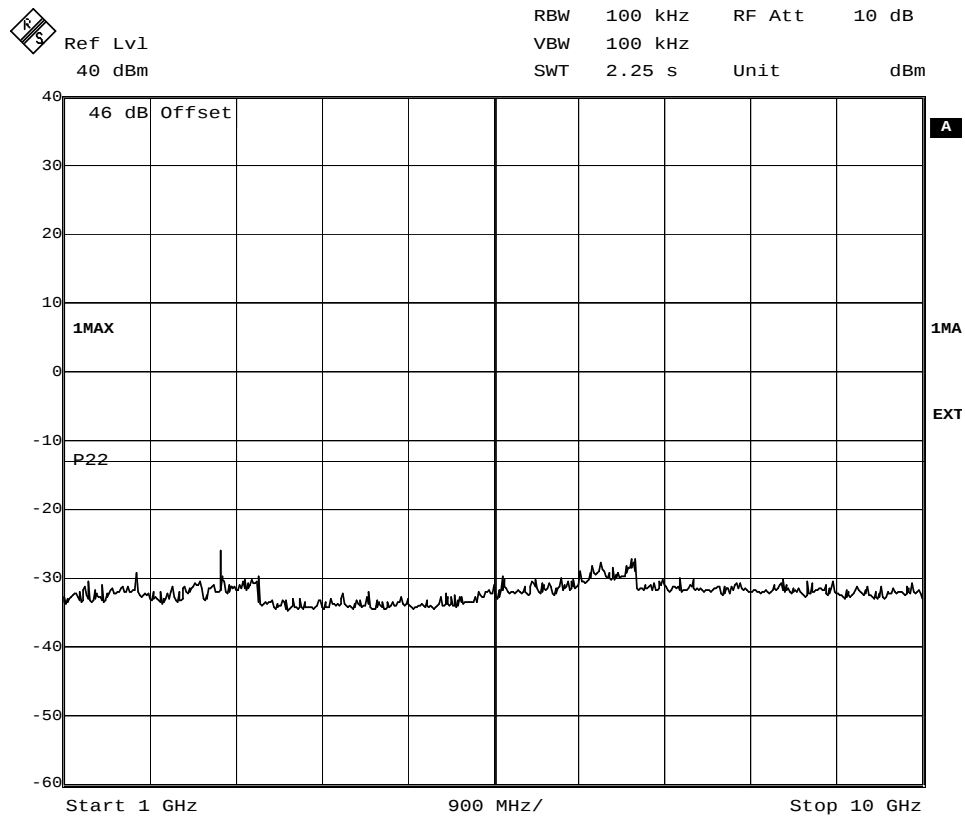
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 13



Date: 17.SEP.2007 13:45:14



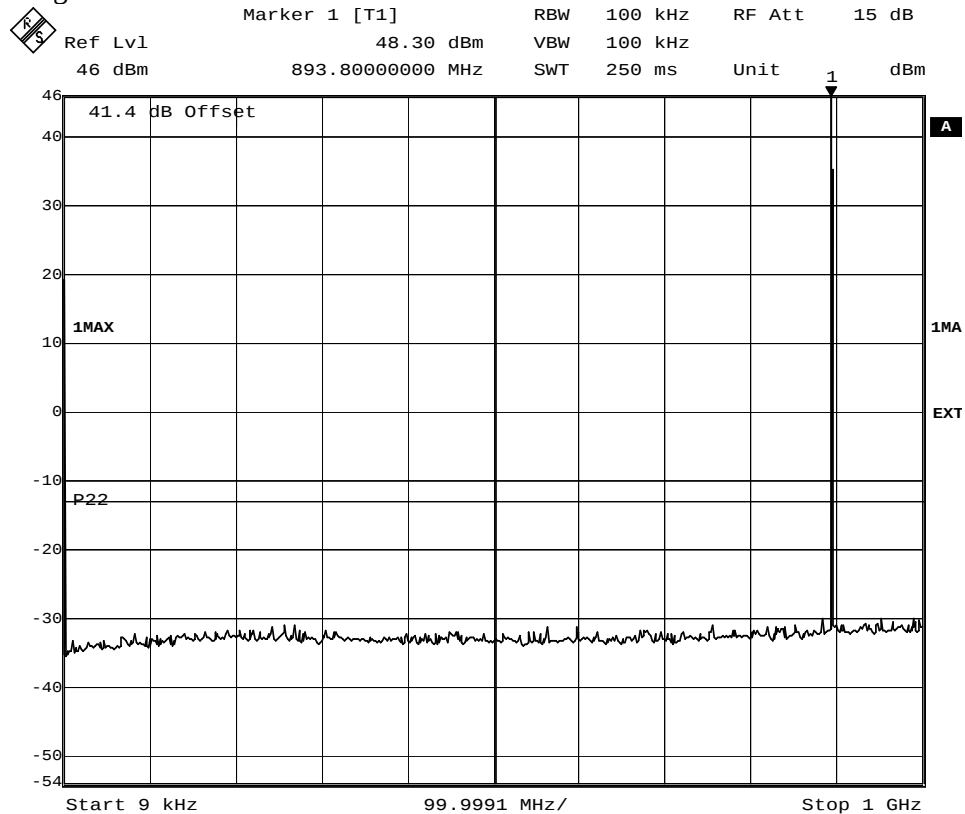
Date: 17.SEP.2007 13:38:06



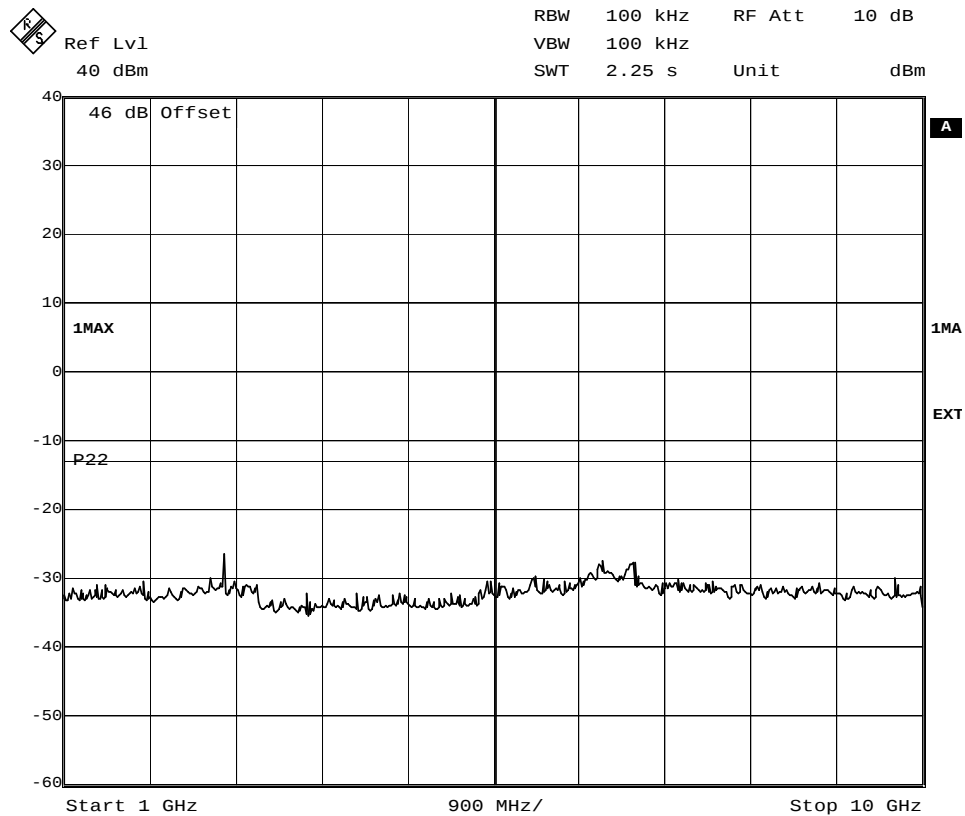
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 14



Date: 17.SEP.2007 13:46:28



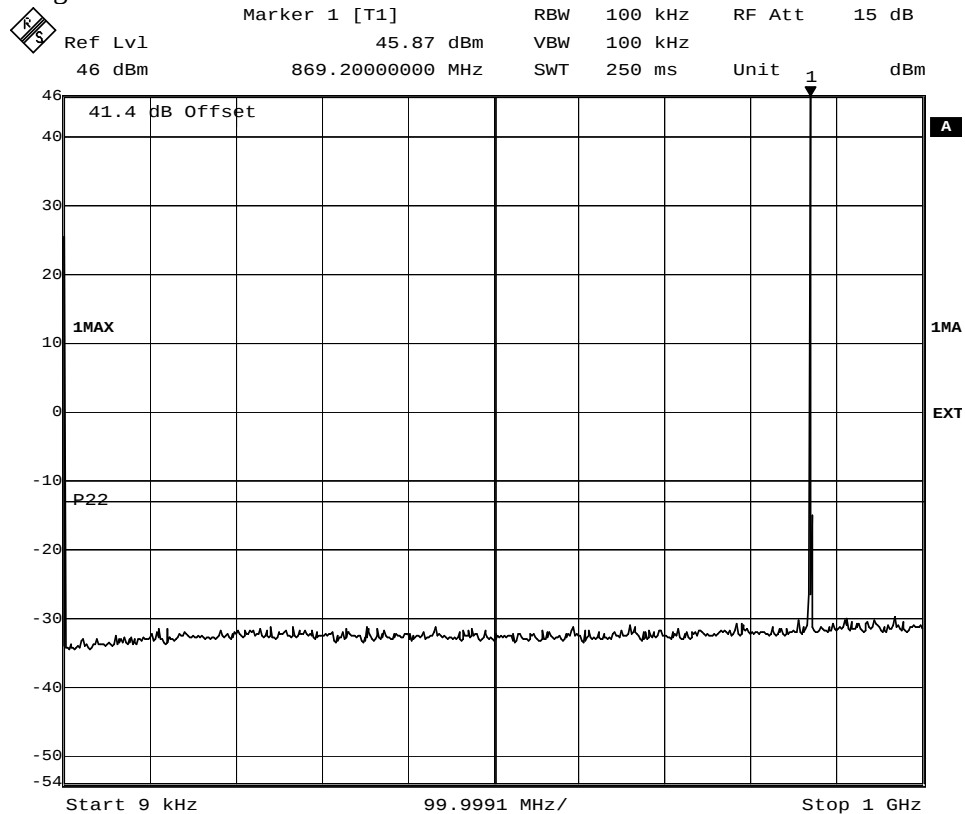
Date: 17.SEP.2007 13:36:50



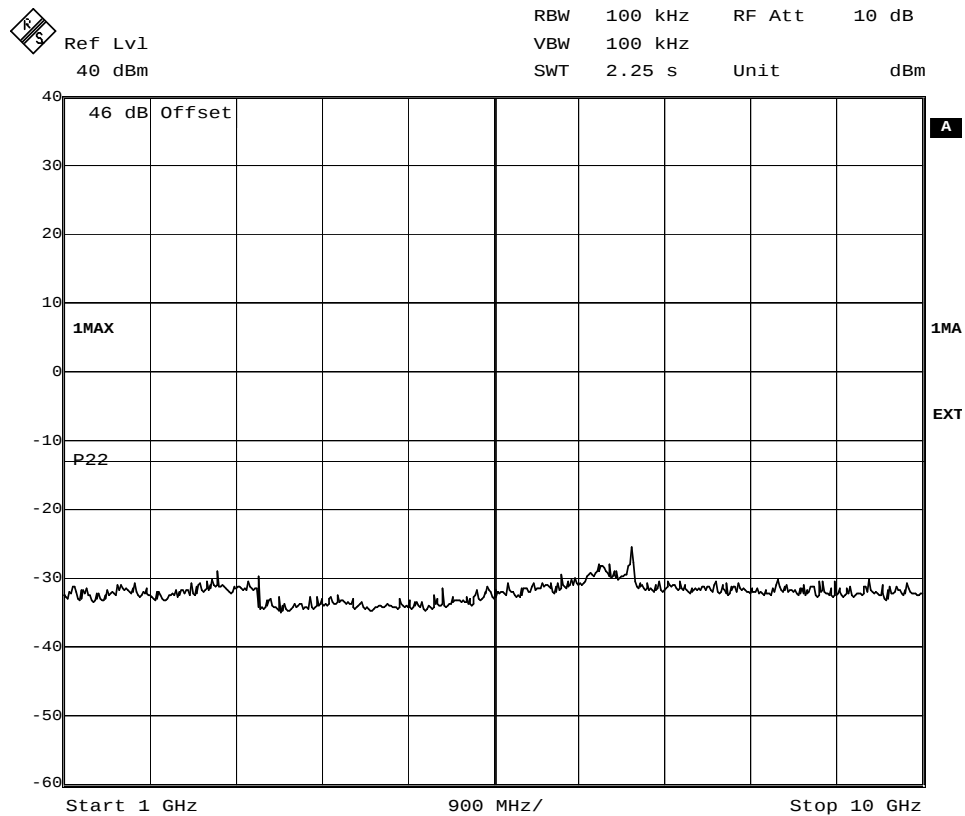
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 15



Date: 18.SEP.2007 09:11:10



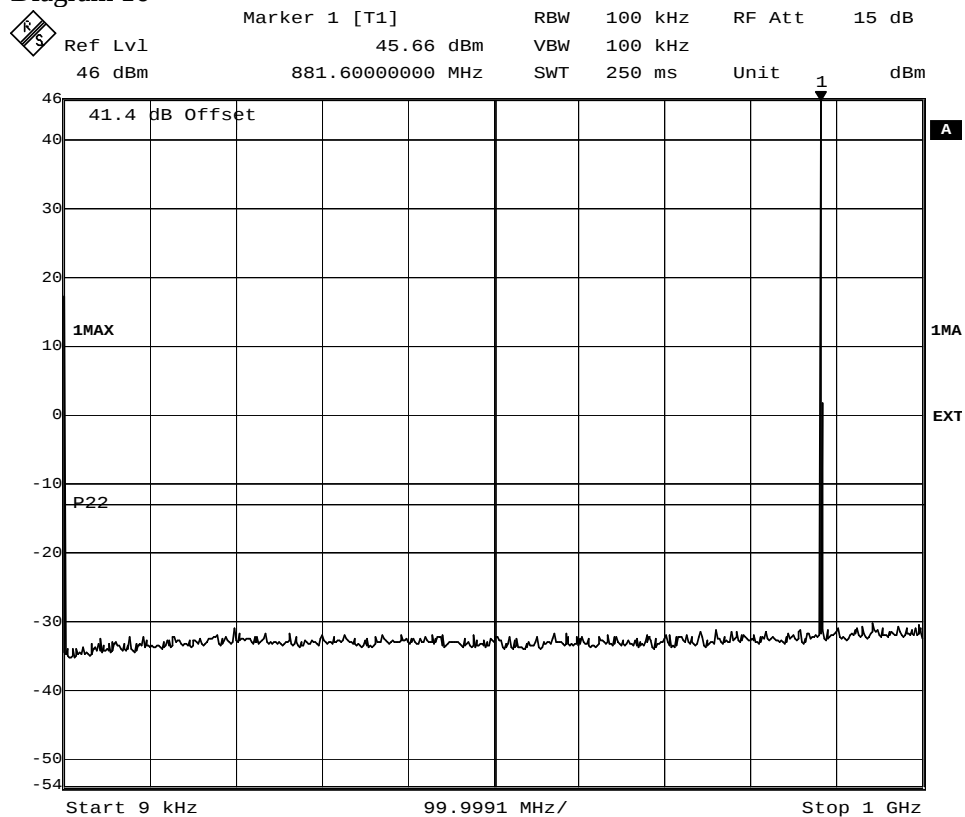
Date: 18.SEP.2007 09:07:33



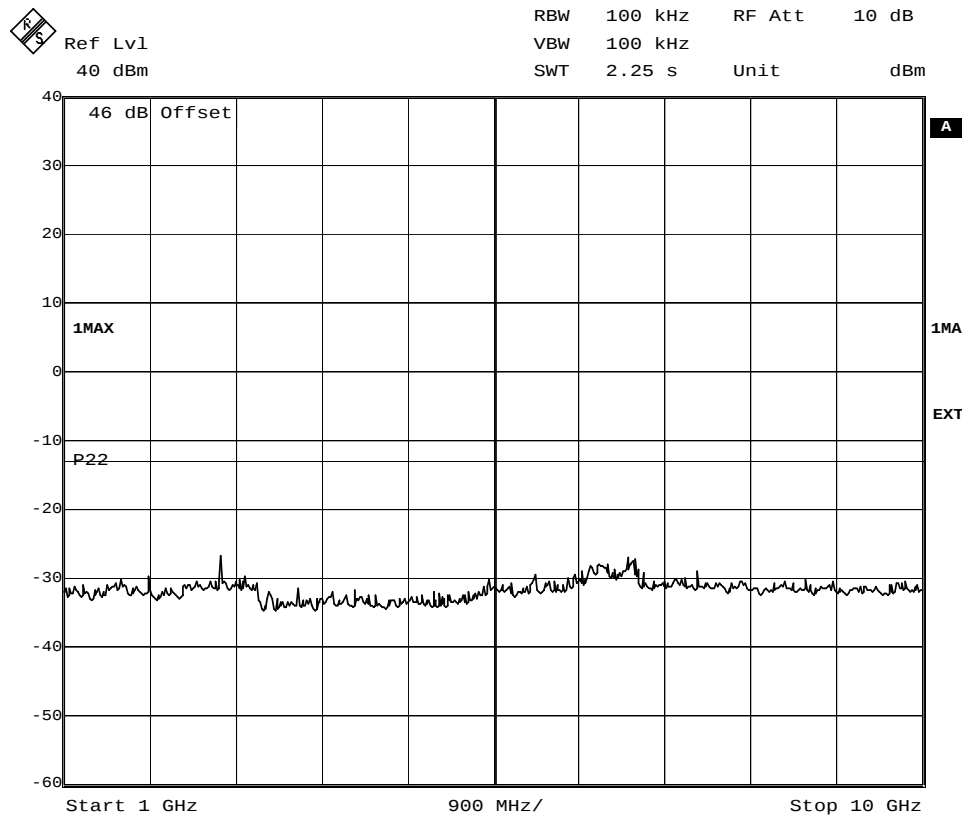
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 16



Date: 18.SEP.2007 09:12:14



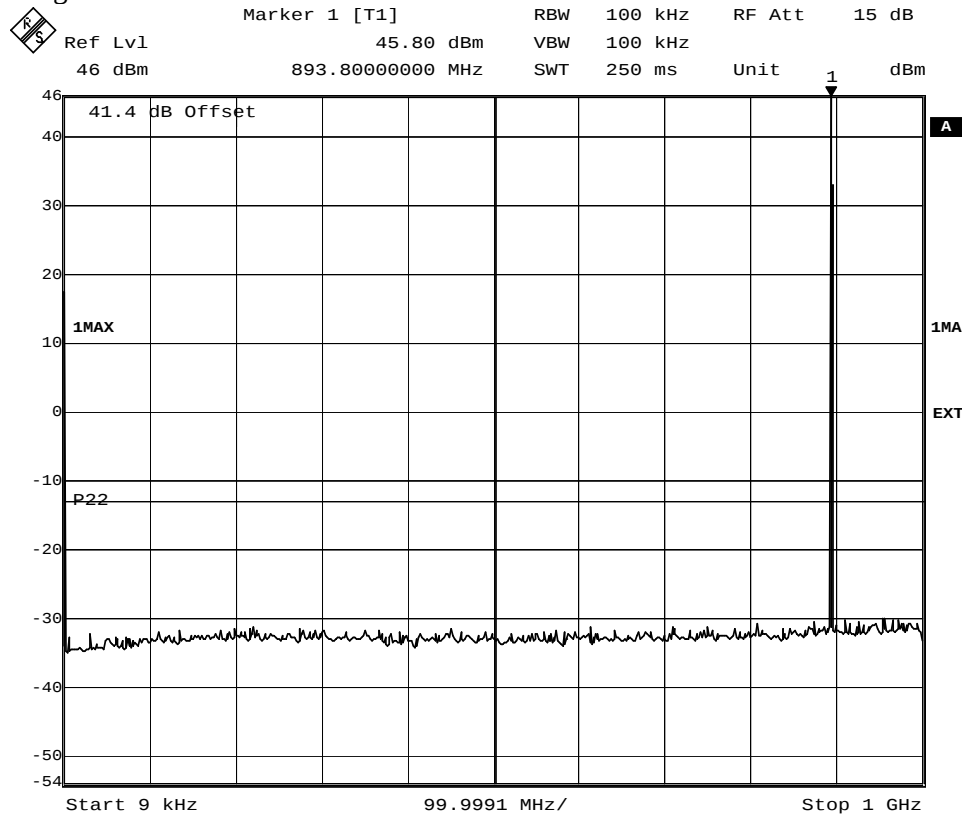
Date: 18.SEP.2007 09:08:48



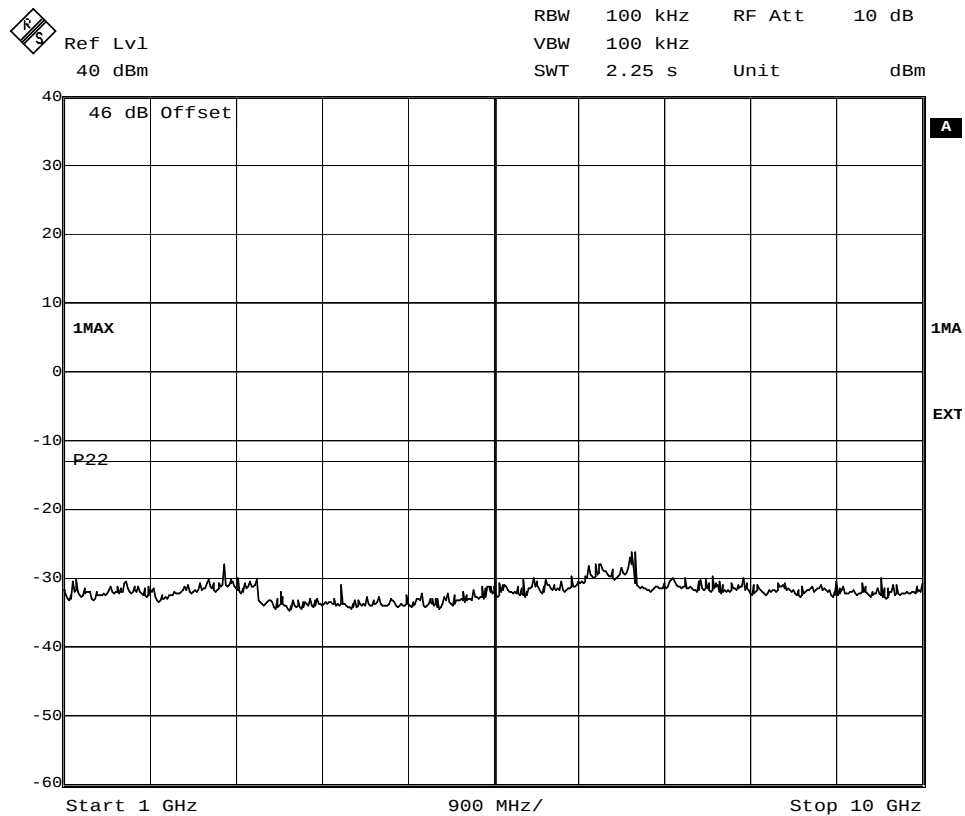
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 17



Date: 18.SEP.2007 09:13:14



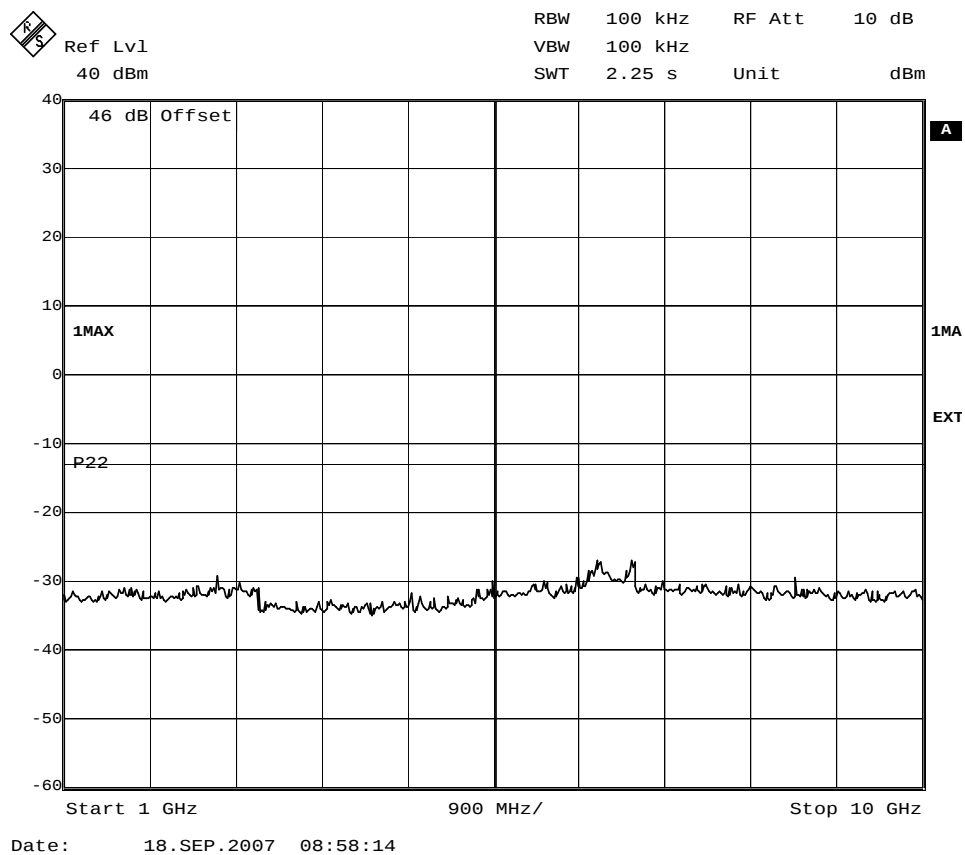
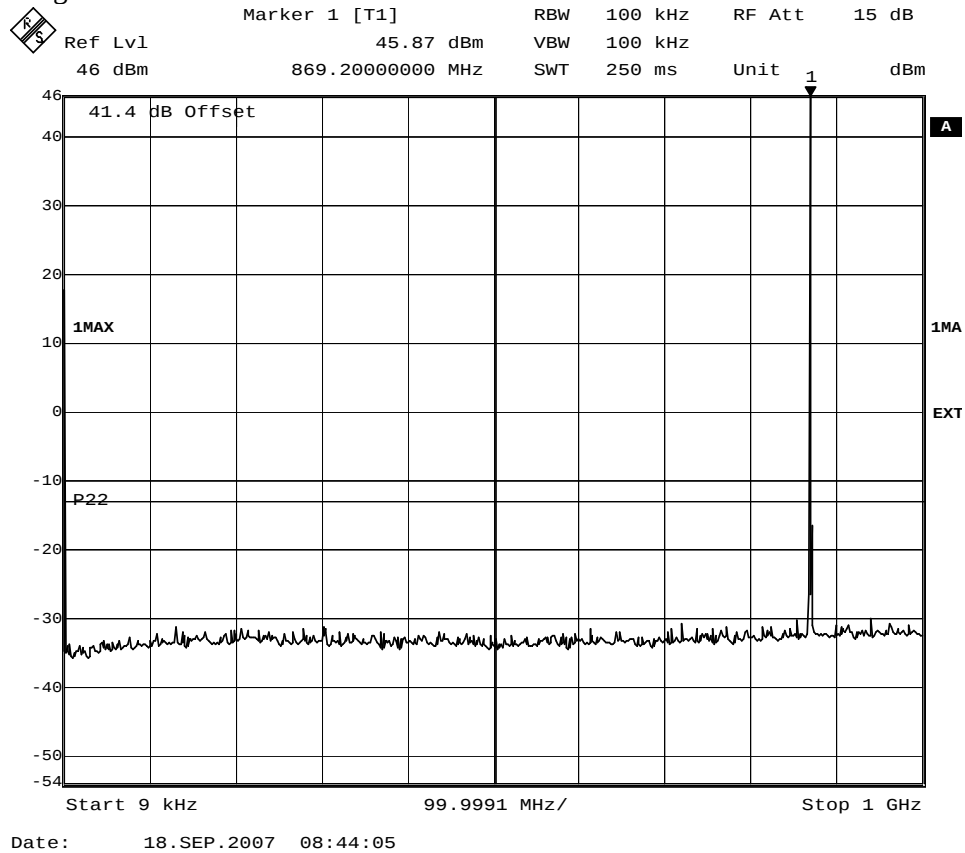
Date: 18.SEP.2007 09:09:42



FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 18

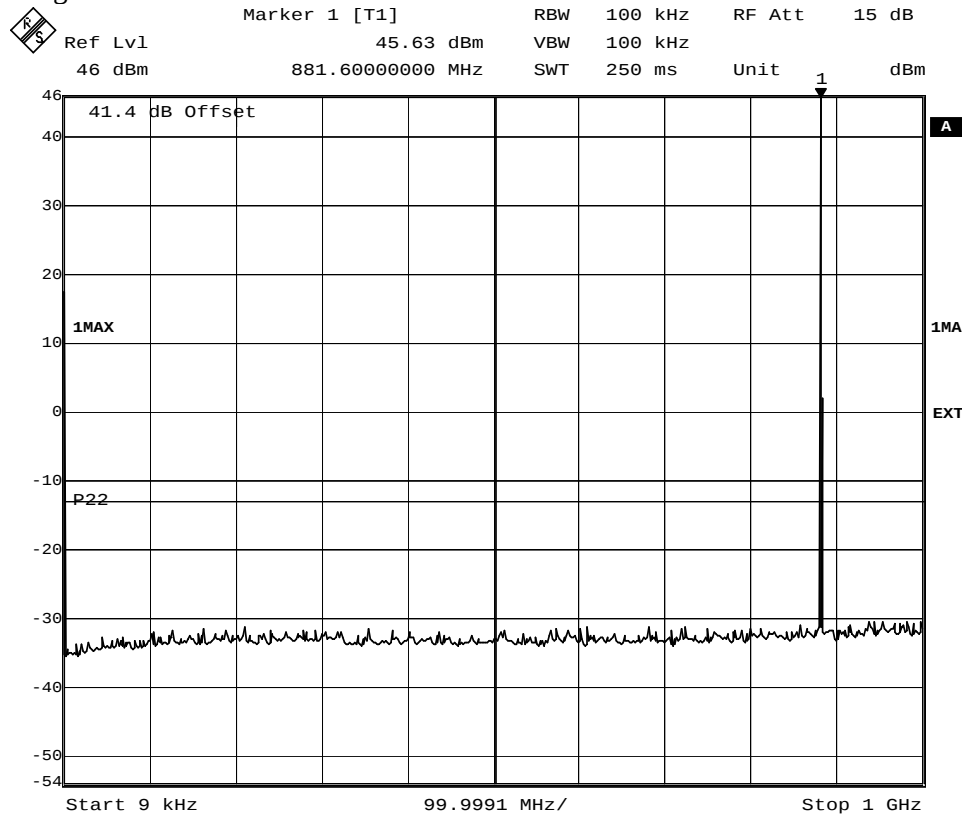




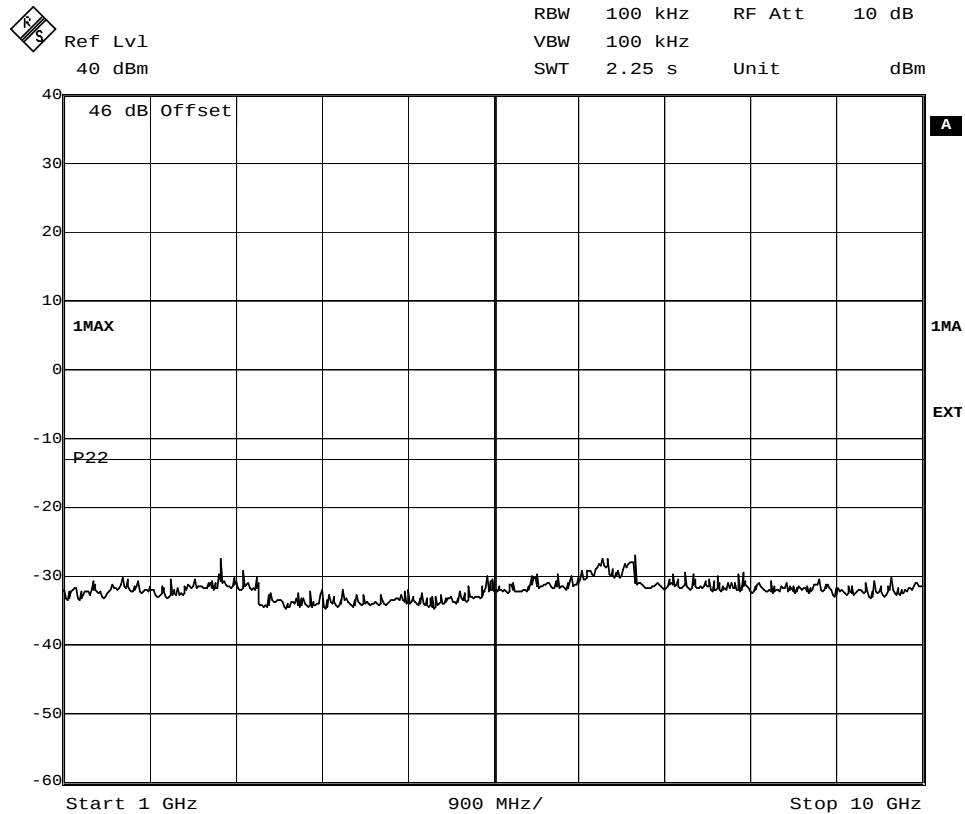
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 19



Date: 18.SEP.2007 08:48:15



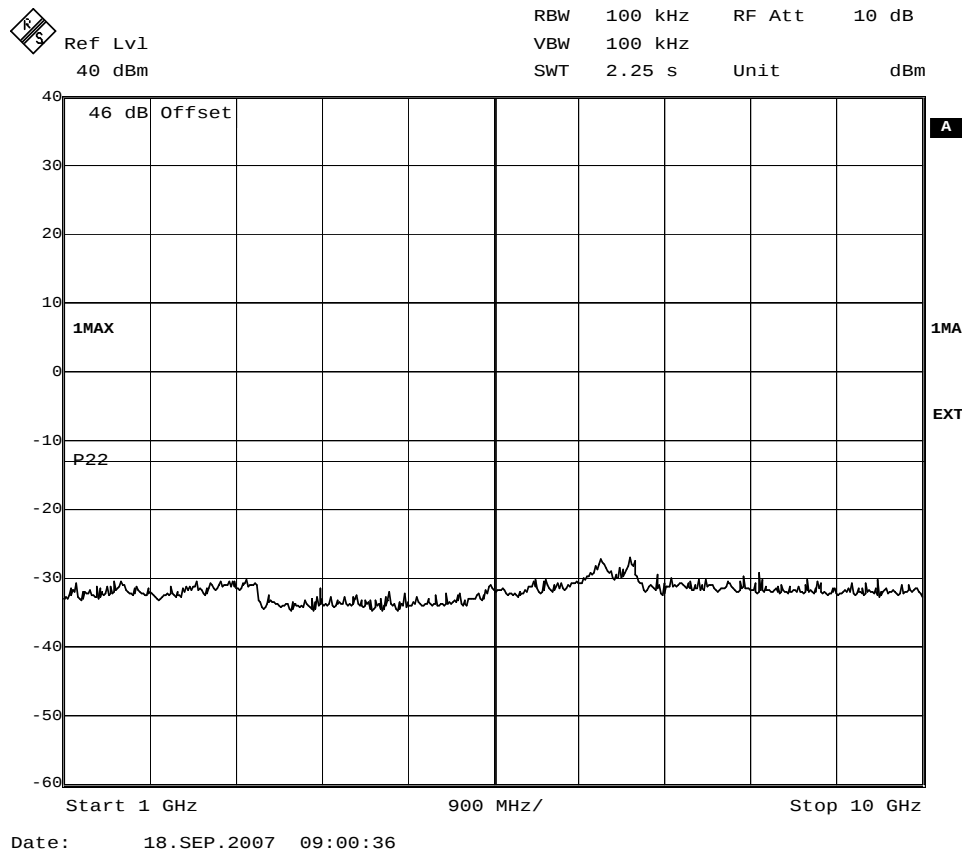
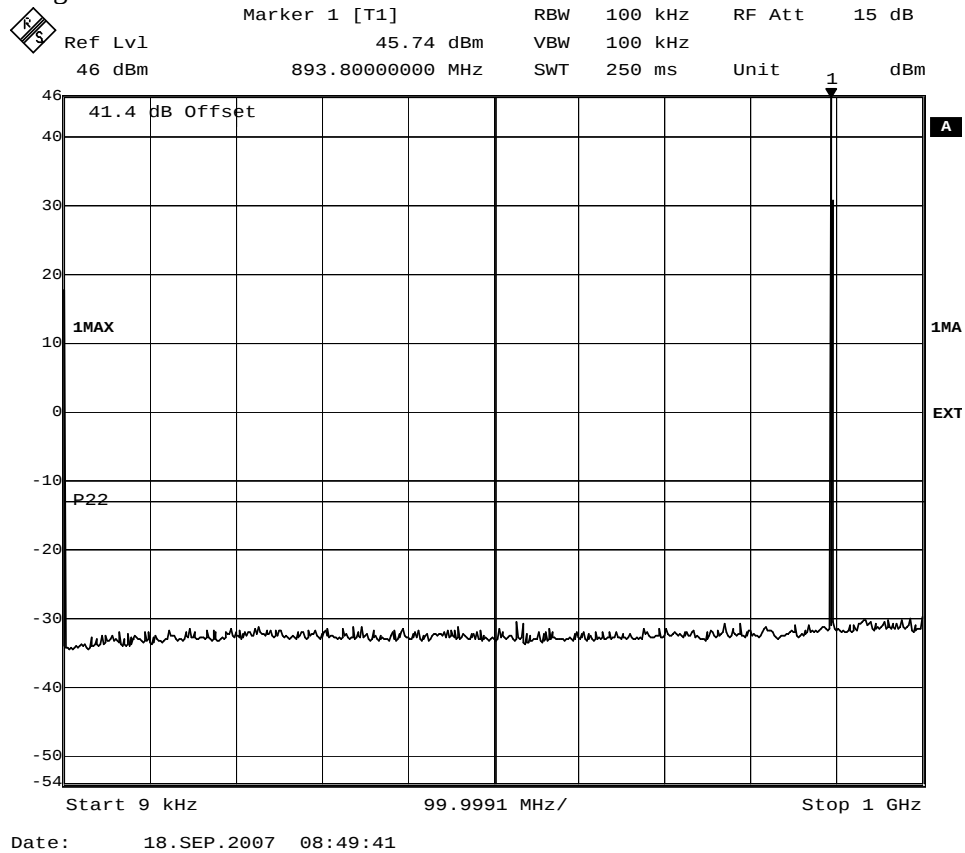
Date: 18.SEP.2007 08:59:42



FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 20

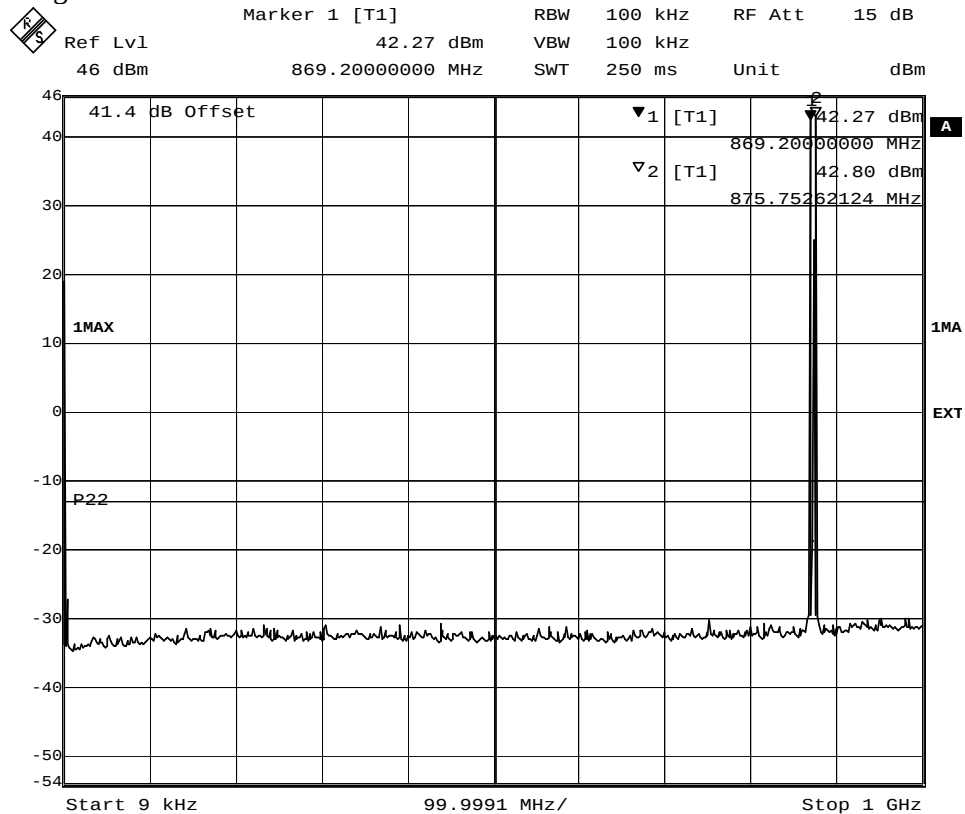




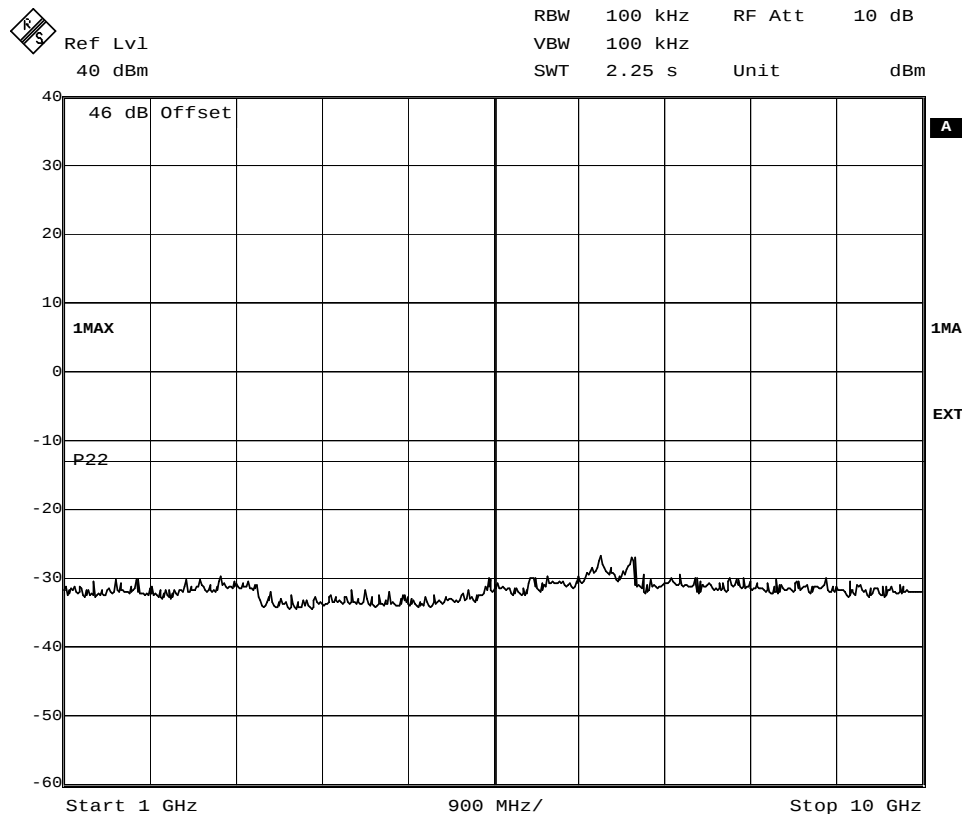
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 21



Date: 17.SEP.2007 14:06:06



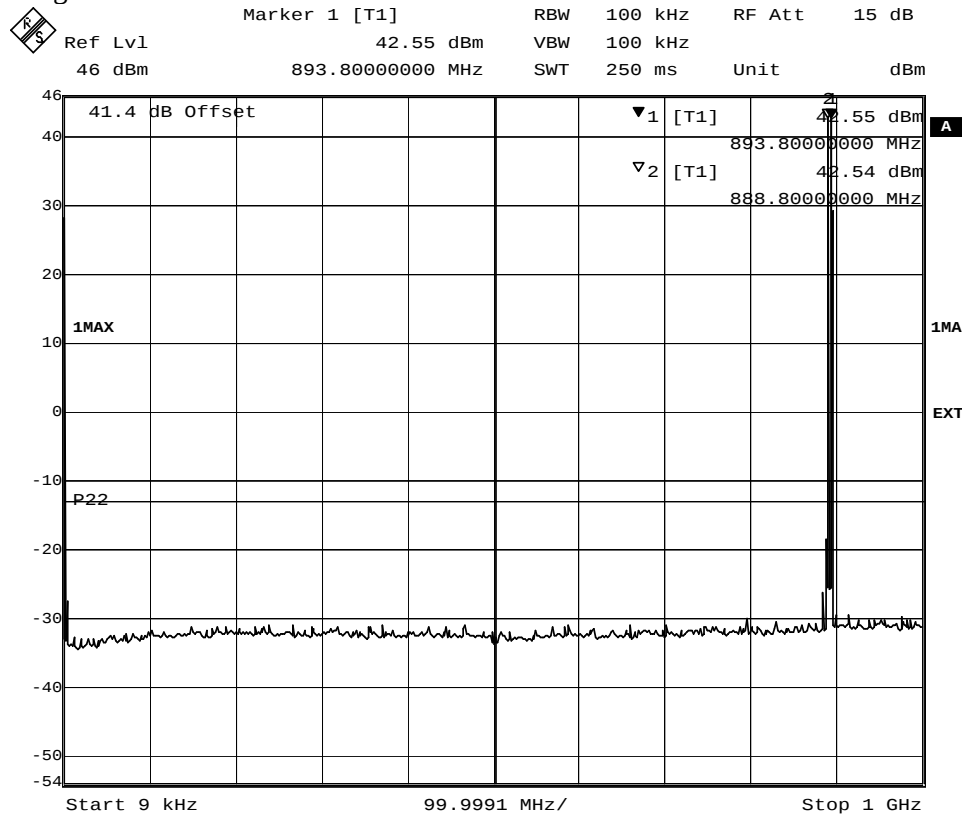
Date: 17.SEP.2007 14:10:53



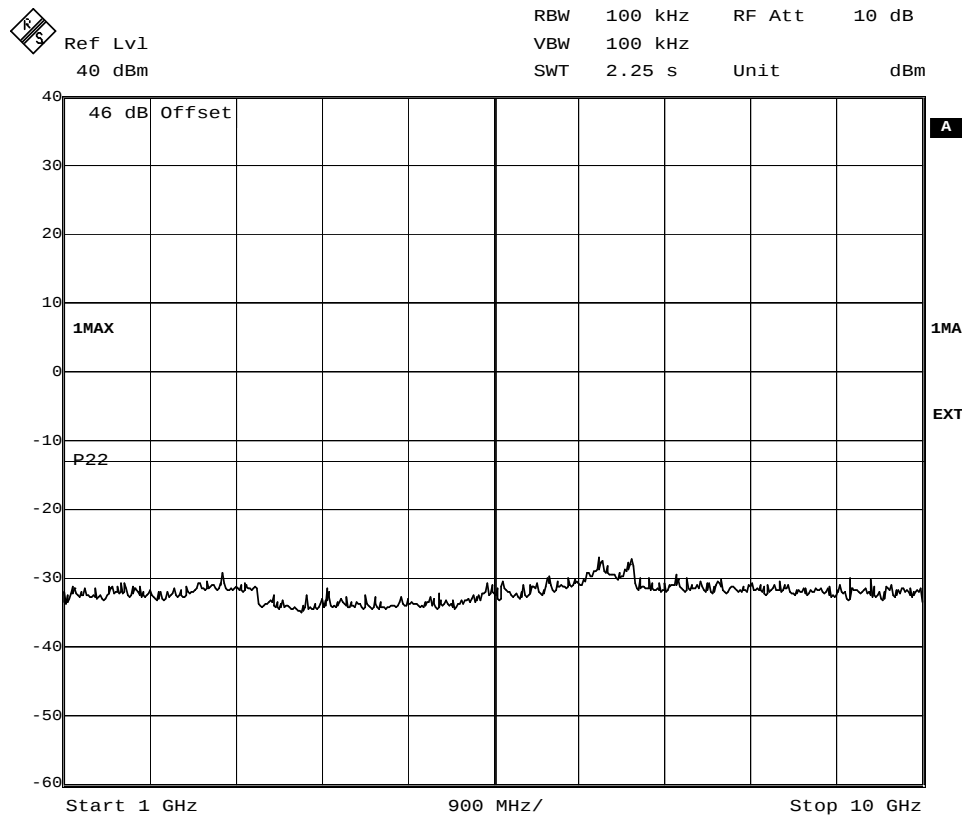
FCC ID: B5KEKRC1311005-2

Appendix 5.1

Diagram 22



Date: 17.SEP.2007 14:19:50



Date: 17.SEP.2007 14:17:35

Field strength of spurious radiation measurements according to 47CFR 2.1053

Date 2007-09-13	Temperature § °C ± 3 °C	Humidity § % ± 5 %
--------------------	----------------------------	-----------------------

Test set-up and procedure

The test site is listed at FCC, Columbia with registration number: 93866. The test site also complies with RSS 212, Issue 1, Industry Canada file no.:IC 3482.

The transmitter was activated at maximum output power and modulated with pseudorandom data during the measurements. The antenna ports were terminated with 50 ohm loads.

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

A pre-measurement was first performed:

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

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

The measurement procedure was as the following:

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

Measurement equipment	Calibration Due	SP number
Test site, Tesla	2008-11	503 881
R&S ESI 26	2008-07	503 885
Control computer	-	503 479
Software: R&S ES-K1, ver. 1.60	-	-
Chase Bilog antenna CBL 6111A	2008-11	503 182
EMCO Horn Antenna 3115	2007-11	502 548
Std. gain :16240-25	-	503 939
MITEQ Low Noise Amplifier	2008-08	503 285
Testo 615, Temperature and humidity meter	2007-09	503 505

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



Results

GMSK and 8-PSK

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

Limits

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

Complies?	Yes
-----------	-----

Frequency stability measurements according to 47CFR 2.1055

Date 2007-09-10 to 2007-09-13	Temperature 22-23 °C ± 3 °C	Humidity 42-52 % ± 5 %
----------------------------------	--------------------------------	---------------------------

Test set-up and procedure

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

The test was made with the dTRU mounted in the RBS 2206V2 cabinet.

Measurements were made at CDU-G8 output connector. The output was connected to a spectrum analyser. The spectrum analyser was connected to an external 10 MHz reference standard during measurement.

The transmitter was activated at maximum output power and modulated with pseudorandom data during the measurements.

Measurement equipment	Calibration Due	SP number
Climate chamber	2009-05	503 546
R&S FSIQ	2008-10	503 738
Multimeter Fluke 87	2007-12	502 190
Testo 610, Temperature and humidity meter	2009-04	502 658

Results

Nominal Voltage 24 V DC

Channel 190 (881.6 MHz)

Test conditions		Frequency error (Hz)			
Supply voltage DC (V)	Temperature (°C)	GMSK		8-PSK	
		TRX 1	TRX 2	TRX 1	TRX 2
24.0	+20	-4	-4	+4	-4
27.6	+20	-5	-5	-4	-5
20.4	+20	-5	-4	-5	-4
24.0	+30	+3	+3	-4	-4
24.0	+40	-5	-4	-5	+5
24.0	+50	-3	-3	-5	-5
24.0	+10	-3	-3	-4	-4
24.0	0	2	-2	+4	+3
24.0	-10	-4	-5	-5	-8
24.0	-20	-2	+2	-5	-4
24.0	-30	-2	-3	-4	-5
Maximum freq. error (Hz)		5		8	
Measurement uncertainty		$< \pm 1 \times 10^{-7}$			



REPORT

Date
2007-09-25

Reference
F713507-F22

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2 (2)

FCC ID: B5KEKRC1311005-2

Appendix 7

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

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

Limits

§ 22.335 The maximum frequency error shall not be greater than 1.5 ppm (1322.4 Hz).

Complies?	Yes
-----------	-----

**Receiver spurious emission according to FCC CFR 47 part 15.111**

Date 2007-09-17	Temperature 22 °C ± 3 °C	Humidity 47 % ± 5 %
--------------------	-----------------------------	------------------------

Test set-up and procedure

The measurements were performed according to ANSI C63.4.

The EUT was powered with 24 VDC during the measurement.

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

Measurement equipment	Calibration Due	SP number
R&S FSIQ	2007-10	503 738
Testo 610, Temperature and humidity meter	2009-04	502 658

Result

The emission spectra are shown in appendix 4.1:

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

Limit

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

RSS-132 Section 6 b

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



REPORT

Date
2007-09-25

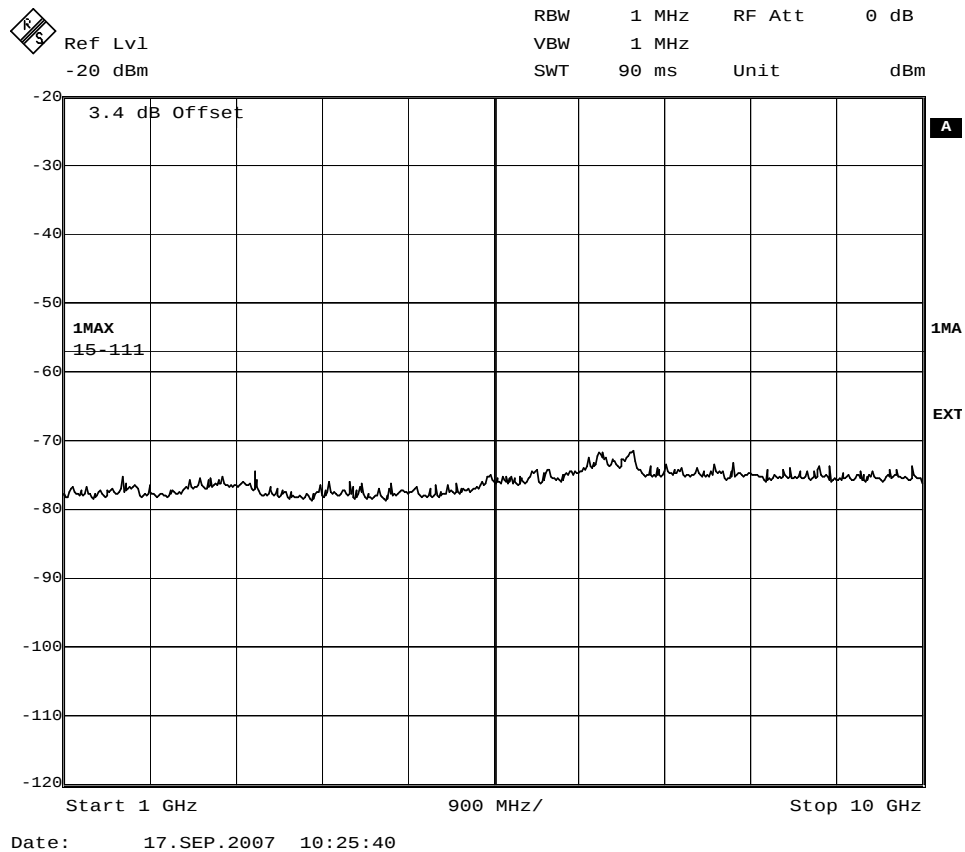
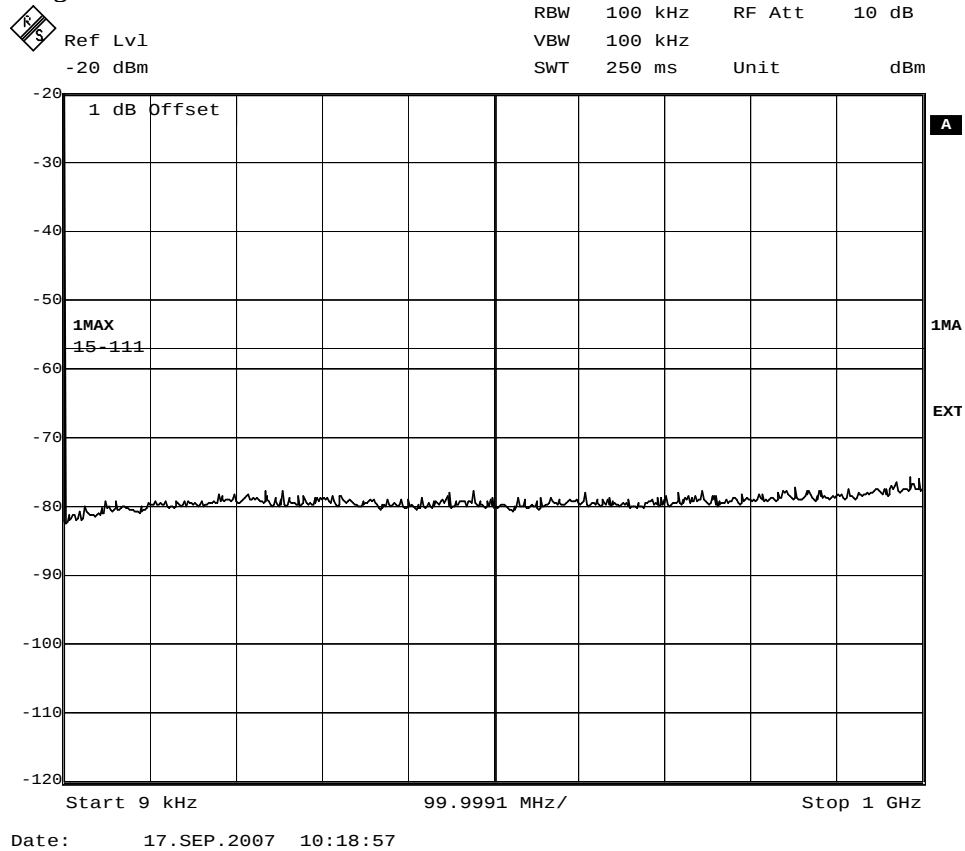
Reference
F713507-F22

Page
1 (4)

FCC ID: B5KEKRC1311005-2

Appendix 7

Diagram 1





REPORT

Date
2007-09-25

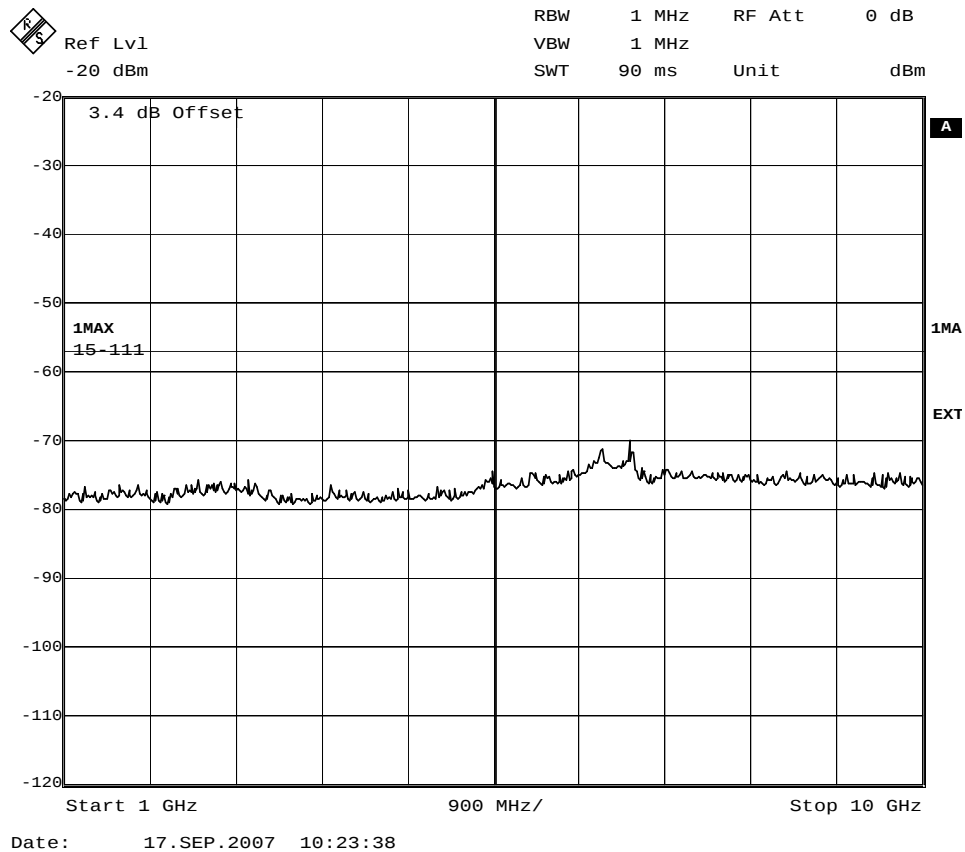
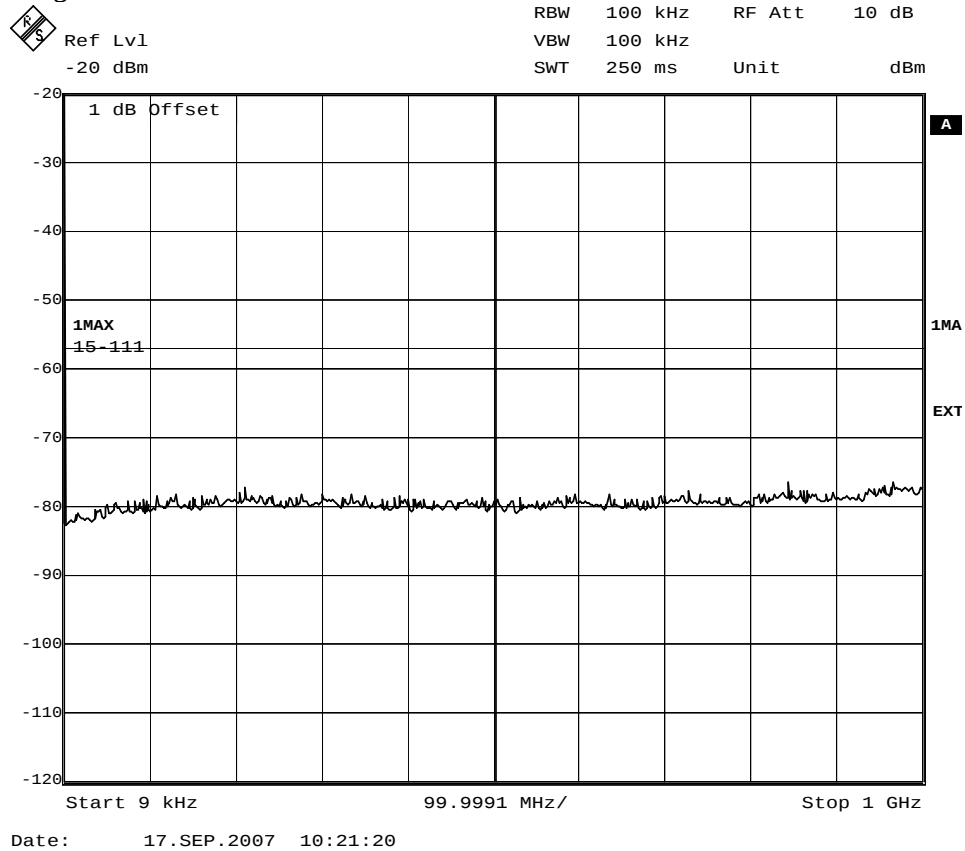
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2 (4)

FCC ID: B5KEKRC1311005-2

Appendix 7

Diagram 2

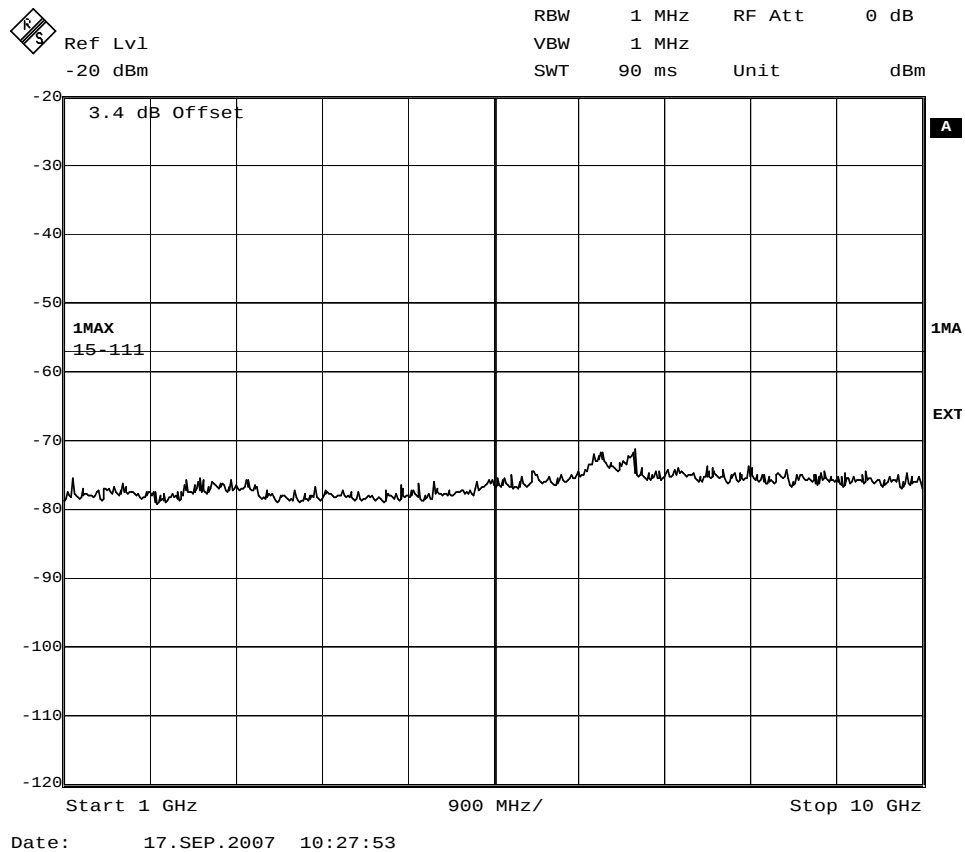
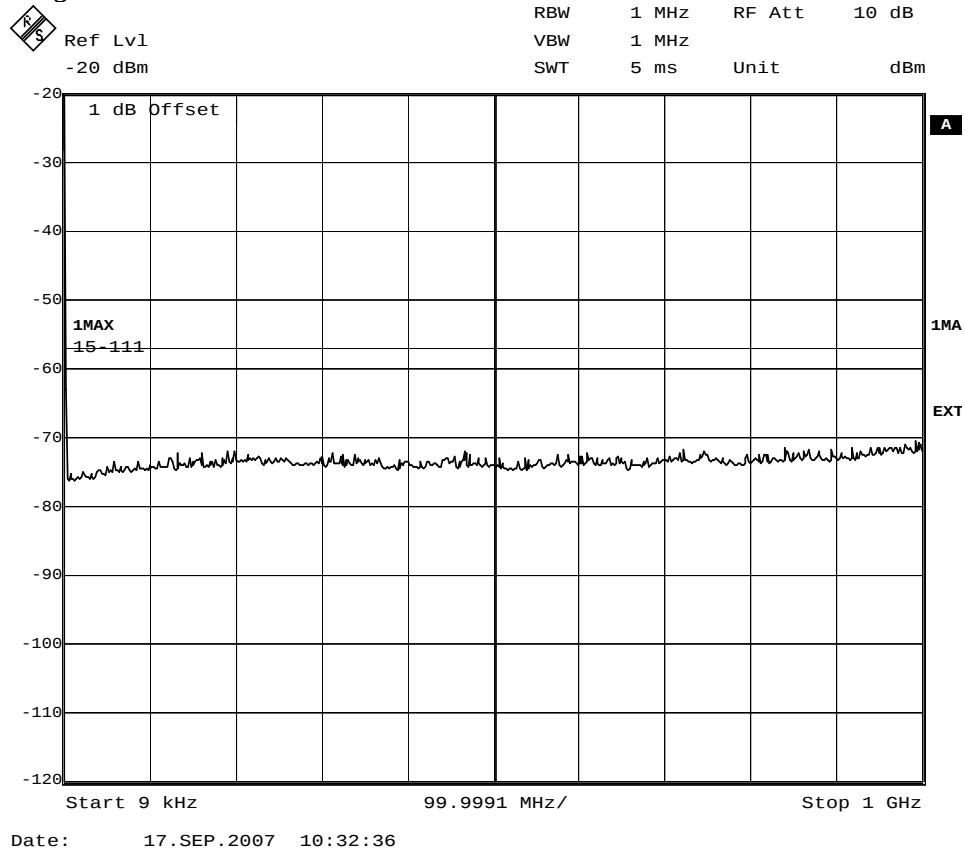




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Appendix 7

Diagram 3





REPORT

Date
2007-09-25

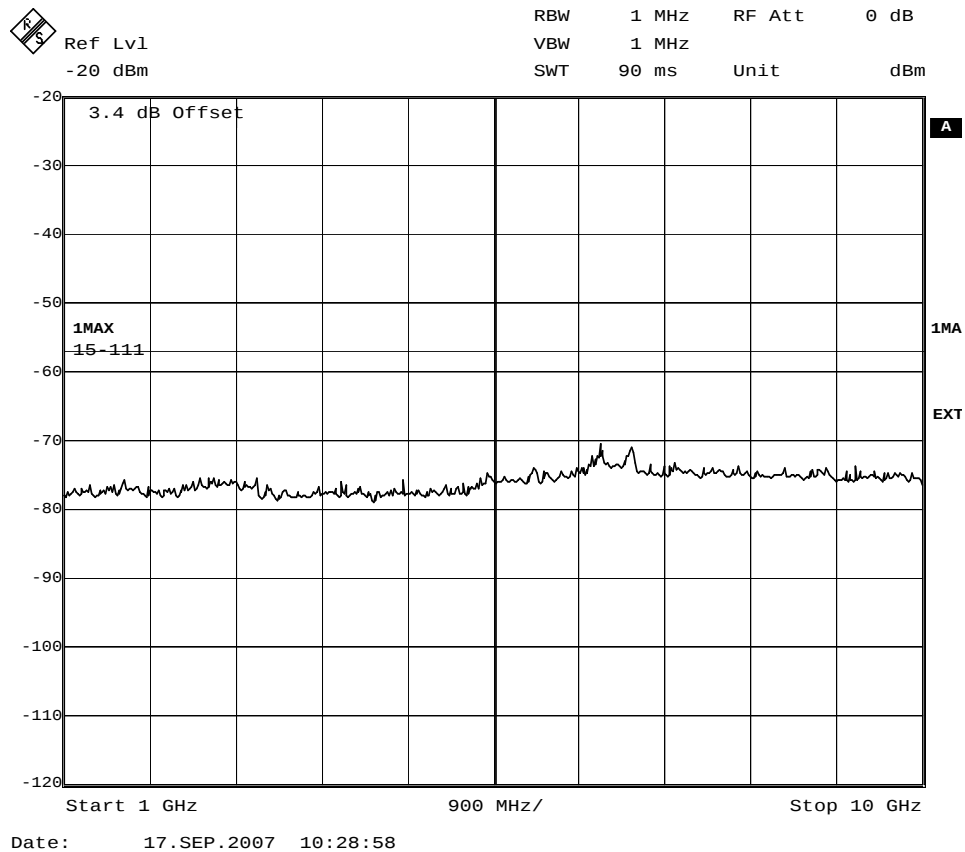
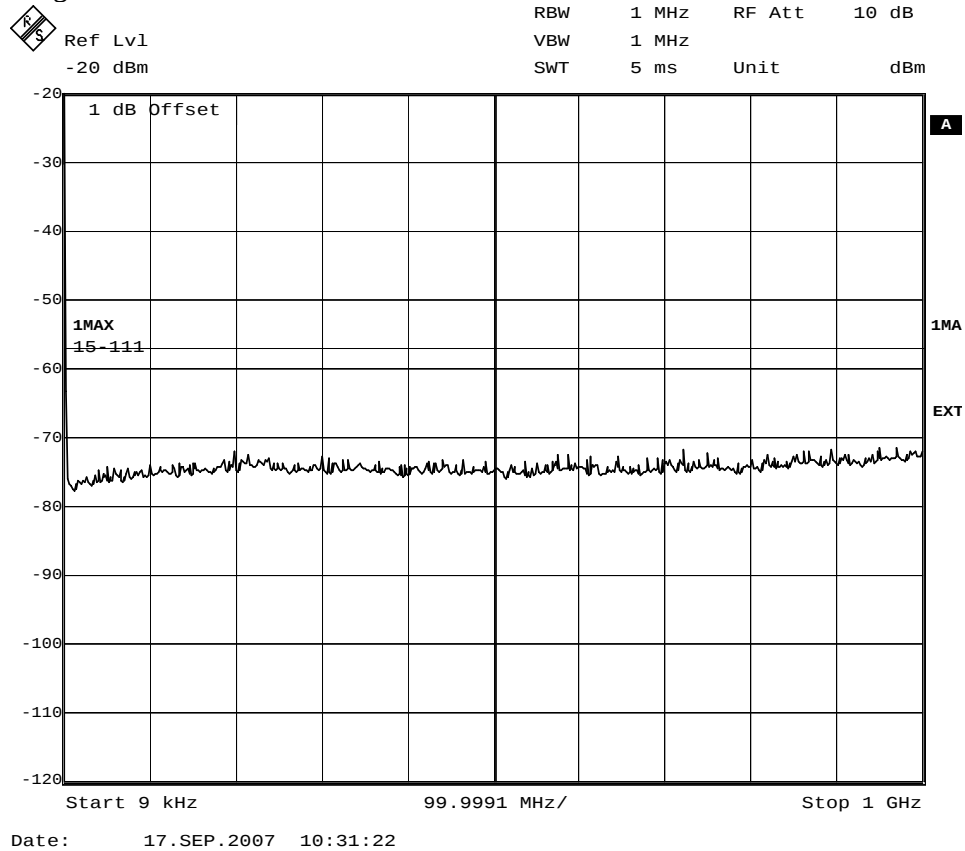
Reference
F713507-F22

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Appendix 7

Diagram 4





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Appendix 8

Hardware list RBS 2206V2

Unit	Product Number	Revision	Serial Number
Cabinet	SEB 112 1154/1	R3A	AB20243836
Door	SXK 109 7157/1	R1A	-
DCCU-13	BMG 980 07/11	R1D	BH41065710
ACCU-11	BMG 980 07/9	R1C	BH41057562
Subrack	BFL 119 424/1	R2C	-
CDU-G8	BFL 119 115/1	R3B	TR45399997
CDU-G8	BFL 119 115/1	R3B	TR43144644
CDU-G8	BFL 119 115/1	R3B	TR43144629
Dummy	SXK 107 5031/2	R1B	-
CXU-10	KRY 101 1856/1	R3D	TR44853077
Dummy	SXK 107 5031/1	R1B	-
TRU shelf	BFL 119 425/1	R1C	-
Backplane	BFX 101 107/3	R1B	-
dTRU-8	KRC 131 1005/2	R5A	AE55540317
dTRU-8	KRC 131 1005/2	R5A	AE55540316
dTRU-8	KRC 131 1005/2	R5A	AE55540325
dTRU-8	KRC 131 1005/2	R5A	AE55540319
dTRU-8	KRC 131 1005/2	R5A	AE55540328
dTRU-8	KRC 131 1005/2	R5A	AE55540322
IDM-11	BMG 980 327/2	R1C	X181224683
PSU/DXU subrack	BFL 119 453/1	R1A	-
Backplane	BFX 101 109/1	R1A	-
PSU-AC-32	BML 353 206/2	R1C	BR80397704
PSU-AC-32	BML 353 206/2	R1C	BR80348848
PSU-AC-32	BML 353 206/2	R1C	BR80397727
Dummy	SXK 107 9314/1	R1D	-
Dummy	-	-	-
TMA-CM-02	SDK 107 881/1	R4A	BR60000W2E
Dummy	SXK 107 5029/1	R1C	-
DXU-23	BOE 602 21/1	R1C	AE53362969
Units outside cabinet			
DF-OVP	NBA 101 22/1	R1A	-
OVP-ALM8	NFD 302 34/08	R1A	-
OVP-ALM8	NFD 302 34/08	R1A	-
OVP-TRM1	NCD 901 26/1	R2D	-

Software	Revision
07A	R14H

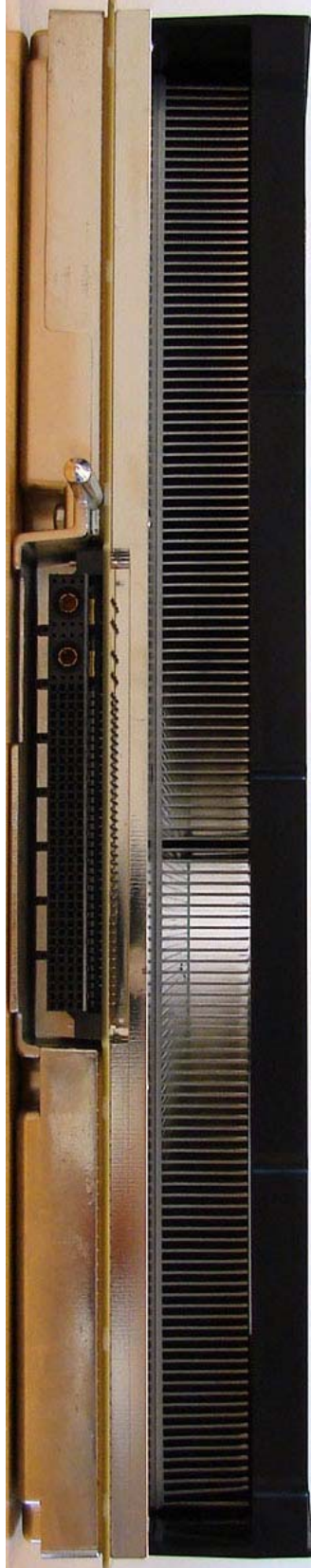
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Transceiver Unit KRC 131 1005/2, R5A

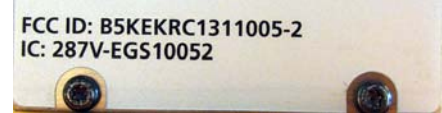
Front side



Rear side



FCC ID label



FCC ID: B5KEKRC1311005-2

Appendix 9

Left side



Right side

