REPORT

Issued by an FCC listed Laboratory Reg. no. 93866.
The test site complies with RSS-Gen, IC file no: 3482A

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Date 2013-02-01 | Reference FX223720-F22 | Page 1 (2)

1002
ISO/IEC 17025

Ericsson AB
Klaes Holm
PDU HW
164 80 Stockholm

Class II permissive change on RRUS 11 B5 850 MHz radio equipment with FCC ID: TA8AKRC161285-1 and IC: 287AB-AS1612851

(8 appendices)

Test object

RRUS 11 B5, product KRC 161 285/1, revision R1E

Summary

See appendix 1 for general information and appendix 8 for external photos.

Standard		Compliant	Appendix
FCC CFR 47 / IC RSS-132			
2.1046 / RSS-132 5.4	RF power output	Yes	2
2.1049 / RSS-Gen 4.6.1	Occupied bandwidth	Yes	3
2.1051 / RSS-132 5.5	Band edge	Yes	4
2.1051 / RSS-132 5.5	Spurious emission at antenna terminals	Yes	5
2.1053 / RSS-132 5.5	Field strength of spurious radiation	Yes	6
2.1055 / RSS-132 5.3	Frequency stability	Yes	7

Note: Above RSS-132 items are given as cross-reference only. Measurements were performed according to ANSI procedures referenced by FCC and covered by SP's accreditation.

SP Technical Research Institute of Sweden

Electronics – EMC

Prepared by

Reinhold Reul

Examined by

Christer Karlsson

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Appendix 1

Description of the test object

Equipment:	Radio equipment RRUS 11 B5
Operating bands:	TX: 869 - 894 MHz RX: 824 - 849 MHz
Antenna ports:	2 TX/RX ports
Nominal RF output power:	1x 44.8 dBm (1x 30 W) per antenna port 2x 41.8 dBm (2x 15 W) per antenna port 4x 38.8 dBm (4x 7.5 W) per antenna port
LTE supports	
Modulations (payload):	QPSK, 16QAM and 64QAM
Channel bandwidths:	1.4 MHz, 3 MHz, 5 MHz, 10 MHz and 15 MHz, 20 MHz
Carrier constellations	Single carrier in conventional and MIMO mode
WCDMA supports	
Modulations:	QPSK, 16QAM and 64QAM
Channel bandwidths:	4.2 to 5 MHz (configurable in steps of 100/200 kHz)
Channel spacings:	4.4 to 5 MHz (configurable in steps of 100/200 kHz)
Carrier constellations	Single & multi carrier in conventional and in MIMO mode
Nominal supply voltage:	-48VDC

Purpose of test

The purpose of this test is to justify a Class II Permissive Change of the test object to add single RAT WCDMA in both conventional and MIMO mode, LTE single RAT in MIMO mode and MSR for LTE and WCDMA access technologies. Maintained compliance is verified for performance characteristics specified in applicable items of FCC CFR 47 and Industry Canada RSS-132 and RSS-Gen.

Operation modes during measurements

LTE single RAT

Measurements in MIMO mode single carrier configuration were performed with the test object transmitting test model E-TM1.1 defined in 3GPP TS 36.141.

WCDMA single RAT

Measurements in conventional mode were performed with the test object transmitting test model TM1 with 32 DPCH:s at 30 ksps according 3GPP TS 25.141.

Measurements in MIMO mode were performed with the test object transmitting test model TM5 with 30 DPCH:s at 30 ksps and 8 HS-PDSCH (SF=128) according 3GPP TS 25.141.

LTE & WCDMA MSR

The EUT supports MSR with LTE & WCDMA access techniques in conventional mode. Measurements were performed with one WCDMA carrier transmitting TM1 with 32 DPCH:s at 30 ksps (SF=128) and one LTE carrier transmitting E-TM1.1, as proposed in 3GPP TS 37.141.

Complete measurements were made on port RF A and additional measurements on port RF B to verify that the ports were electrical identical, as declared by the client.

The EUT was supplied with -48 VDC by an external power supply. Additional connections are documented in the set-up drawings below. Measurements were performed with the test object configured for the maximum transmit power applicable for the tested configuration.

For the purpose of this report the selected test configurations were deemed representative for a worst case based on the guidelines applied in above mentioned 3GPP standards and prior experience from comparative tests with different modulations on similar products.

Test frequencies and configurations used for radiated measurements

WCDMA single RAT in conventional (none-MIMO) mode

Port A and B	Bottom channel (B)
UARFCN Downlink	4357 (871.4 MHz)
UARFCN Uplink	4132 (826.4 MHz)
Channel Bandwidth	5 MHz
Test model	TM1

WCDMA single RAT in MIMO mode

Single carrier:

Port A and B	Bottom channel (B)	Mid channel (M)	Top channel (T)
UARFCN Downlink	4357 (871.4 MHz)	4407 (881.4 MHz)	4458 (891.6 MHz)
UARFCN Uplink	4132 (826.4 MHz)	4182 (836.4 MHz)	4233 (846.6 MHz)
Channel Bandwidth	5 MHz	5 MHz	5 MHz
Test model	TM5	TM5	TM5

Multi-carrier:

Port A and B	Bottom configuration (B)	
UARFCN Downlink	4357 (871.4 MHz)	4407 (881.4 MHz)
UARFCN Uplink	4132 (826.4 MHz)	4182 (836.4 MHz)
Channel Bandwidth	5 MHz	5 MHz
Test model	TM5	TM5

LTE single RAT in MIMO mode

Port A and B	Bottom channel (B)
EARFCN Downlink	2407 (869.7 MHz)
EARFCN Uplink	20407 (824.7 MHz)
Channel Bandwidth	1.4 MHz
Test model	E-TM1.1

WCDMA + LTE MSR in conventional mode

Port A and B	WCDMA	LTE
UARFCN, EARFCN Downlink	4357 (871.4 MHz)	2593 (888.3 MHz)
UARFCN, EARFCN Uplink	4132 (826.4 MHz)	20593 (843.3 MHz)
Channel Bandwidth	5 MHz	1.4 MHz
Test model	TM1	E-TM1.1

Appendix 1

Test frequencies used for conducted measurements

LTE single RAT TX test frequencies

EARFCN Downlink	Frequency [MHz]	Symbolic name	Comment
2407	869.7	B	TX bottom frequency in 1.4 MHz BW configuration
2415	870.5	B	TX bottom frequency in 3 MHz BW configuration
2425	871.5	B	TX bottom frequency in 5 MHz BW configuration
2525	881.5	M	TX band mid frequency all BW configurations
2625	891.5	T	TX top frequency in 5 MHz BW configuration
2635	892.5	T	TX top frequency in 3 MHz BW configuration
2643	893.3	T	TX top frequency in 1.4 MHz BW configuration

WCDMA single RAT TX test frequencies

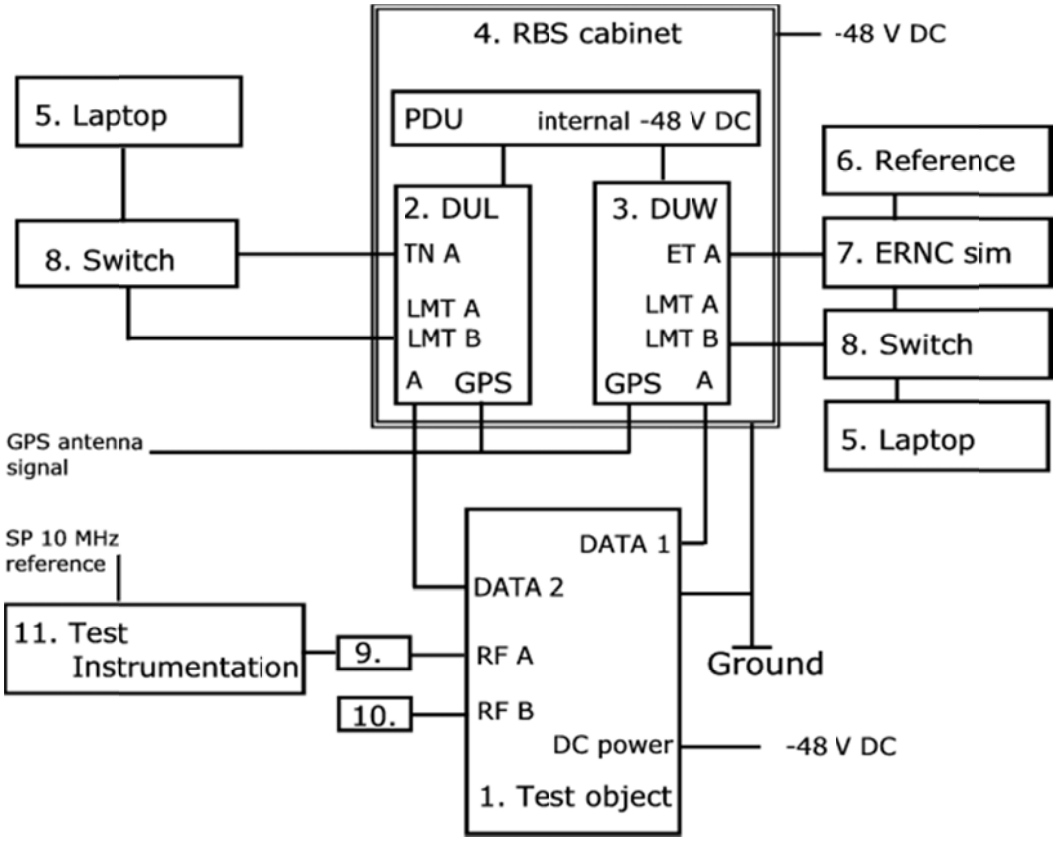
UARFCN Downlink	Frequency [MHz]	Symbolic name	Comment
4357	871.4	B	Single carrier TX bottom frequency
4357 4382	871.4 876.4	B2	2 carrier TX band bottom constellation
4408	881.6	M	Single carrier TX band mid frequency
4385 4431	877.0 886.2	M2	2 carrier TX band mid constellation
4458	891.6	T	Single carrier TX top frequency
4433 4458	886.6 891.6	T2	2 carrier TX band top constellation

WCDMA & LTE MSR TX test frequencies

WCDMA			LTE			Symbolic name	Comment
UARFCN Downlink	Frequency [MHz]	BW [MHz]	EARFCN Downlink	Frequency [MHz]	BW [MHz]		
4385	877.0	5	2572	886.2	1.4	M3	TX constellation per LTE BW
4385	877.0	5	2572	886.2	3	M3	
4385	877.0	5	2572	886.2	5	M3	

All RX frequencies were configured 45 MHz below the corresponding TX frequency according the applicable duplex offset for the operating band.

Test set-up conducted measurements



Note: Above set-up shows connections for MSR mode. For single RAT, the data connection from DUW/DUL port A was connected to port DATA 1 only. Unconnected EUT interfaces were omitted in the picture for simplicity, but are listed in the interface table below.

Test object:

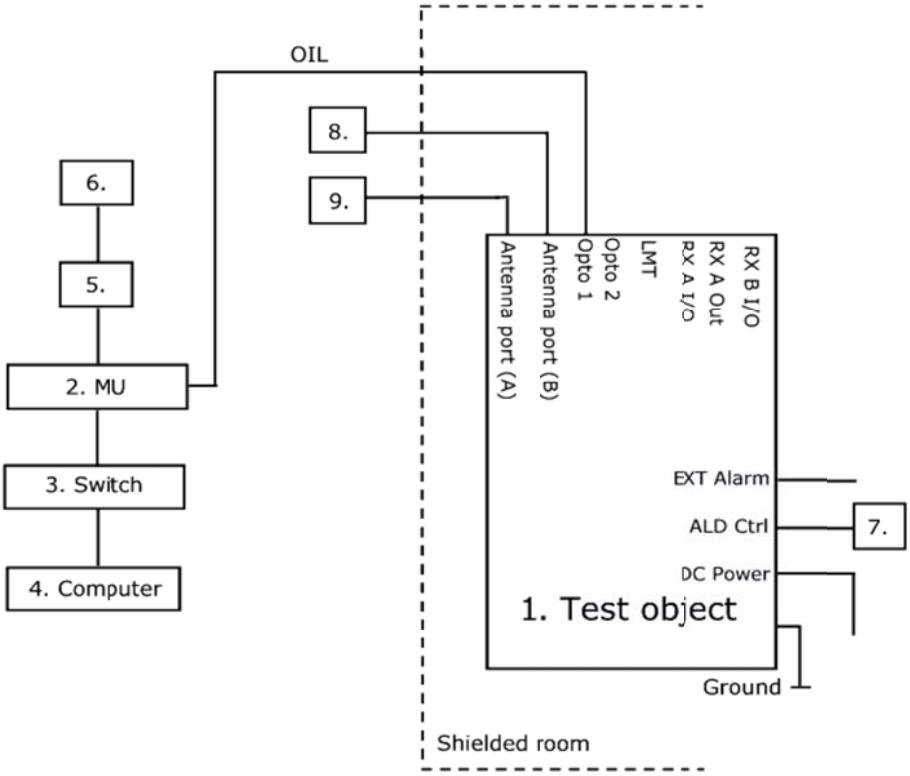
1. RRUS 11 B5, KRC 161 285/1, revision R1E, s/n: CB4H986215
   Pre-installed and used software details are specified below.
   FCC ID: TA8AKRC161285-1 and IC: 287AB-AS1612851

Functional test equipment:

2. DUL 20 01, product KDU 137 533/4, revision R1F, s/n C825589657
3. DUW 30 01, product KDU 127 161/3, revision R4E, s/n: C825433814
4. RBS 6201 cabinet, BAMS 1000778792.
   PDU 02 01, BMG 980 336/4, rev: R2A, s/n: BJ31528316
5. Controlling laptop HP Elitebook 8740w, BAMS 1001052043
   running software MOSHELL V9.0c for LTE and channel builder SW for WCDMA
6. Symmetricon 8040, BAMS 1000714186 reference
7. ERNC Sim 127
8. Fast Ethernet switch, Netgear FS726G
9. Attenuator, filter, directional coupler according respective appendix
10. Termination 50 ohm
11. SP test instrument according measurement equipment list

Appendix 1

Test setup radiated measurements single RAT LTE



Test object:

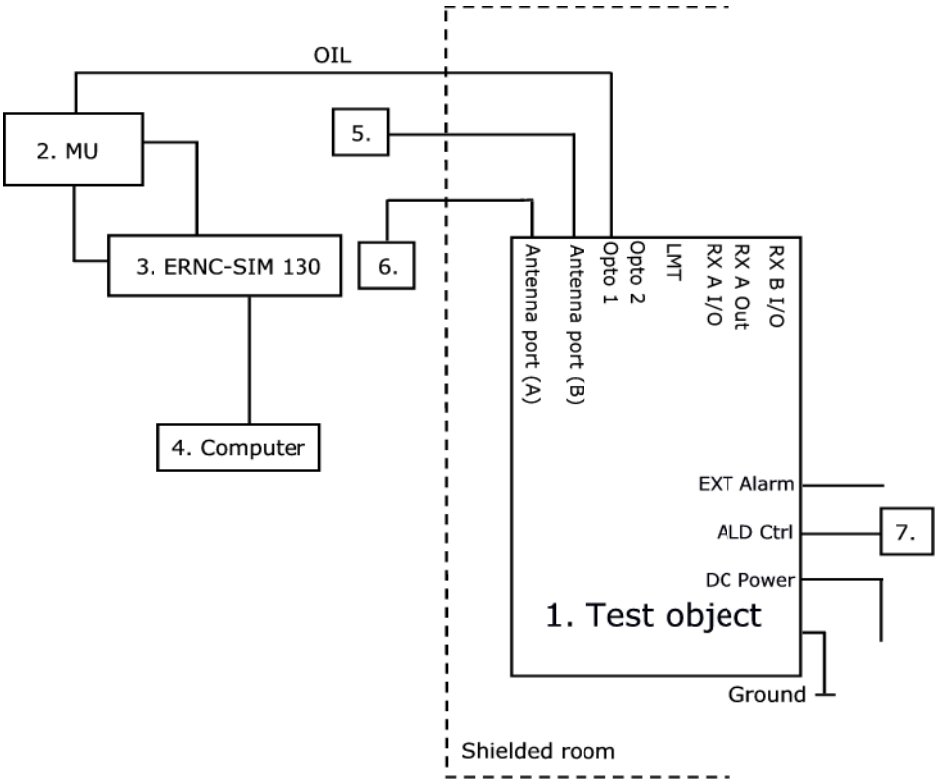
1. RRUS 11 B5, KRC 161 285/1, revision R1E, s/n: CB4H986215
   Pre-installed and used software details are specified below.
   FCC ID: TA8AKRC161285-1 and IC: 287AB-AS1612851

Functional test equipment:

2. DUL 20 01, KDU 137 533/4, rev. R1F, s/n: C825589657,
   hosted in RBS 6202, BAMS – 1000961945
3. Fast Ethernet switch, Netgear FS108
4. Computer HP Elitebook 8540w, BAMS – 1001052032
5. GPS 02 01, NCD 901 41/1, rev. R1D, s/n: TU8K356490
6. GPS Antenna
7. RET – Remote Electrical Tilt unit, KRY 121 67/2, rev. R1N
8. Termination 50 ohm
9. Termination 50 ohm

Appendix 1

Test setup radiated measurements single RAT WCDMA



Test object:

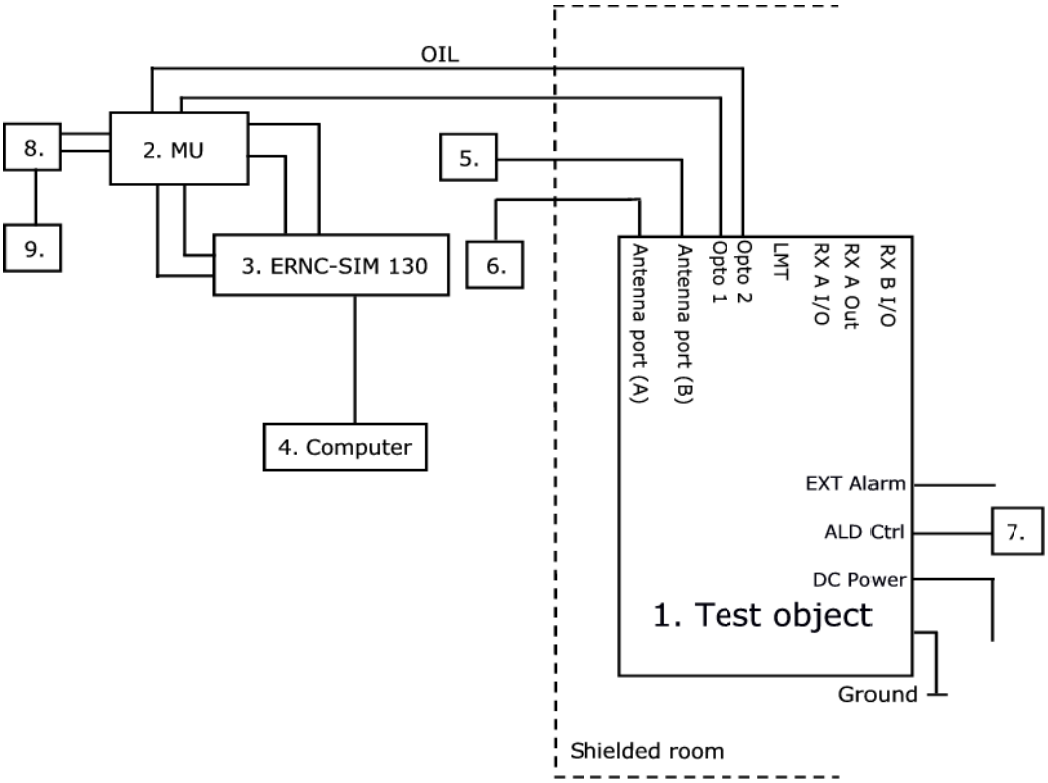
1. RRUS 11 B5, KRC 161 285/1, revision R1E, s/n: CB4H986215
   Pre-installed and used software details are specified below.
   FCC ID: TA8AKRC161285-1 and IC: 287AB-AS1612851

Functional test equipment:

2. DUW 30 01, product KDU 127 161/3, revision R4E, s/n: C826303721, hosted in RBS 6202, BAMS – 1000961945
3. ERNC-SIM 130, BAMS – 1000660991
4. Computer HP Elitebook 8540w, BAMS – 1001052032
5. Termination 50 ohm
6. Termination 50 ohm
7. RET – Remote Electrical Tilt unit, KRY 121 67/2, rev. R1N

Appendix 1

Test setup radiated measurements MSR WCDMA + LTE



Test object:

1. RRUS 11 B5, KRC 161 285/1, revision R1E, s/n: CB4H986215
   Pre-installed and used software details are specified below.
   FCC ID: TA8AKRC161285-1 and IC: 287AB-AS1612851

Functional test equipment:

2. DUW 30 01, product KDU 127 161/3, revision R4E, s/n: C826303721,
   DUL 20 01, product KDU 137 533/4, revision R1F, s/n: C825589657
   hosted in a RBS 6202 cabinet, BAMS – 1000961945
3. ERNC-SIM 130, BAMS – 1000660991
4. Computer HP Elitebook 8540w, BAMS – 1001052032
5. Termination 50 ohm
6. Termination 50 ohm
7. RET – Remote Electrical Tilt unit, KRY 121 67/2, rev. R1N
8. GPS 02 01, NCD 901 41/1, rev. R1D, s/n: TU8K356490
9. GPS Antenna

Appendix 1

Interfaces:	**Type of port:**
Supply power -48 VDC	DC Power
Antenna port (A), 7/16 male connector	Antenna
Antenna port (B), 7/16 male connector	Antenna
Opto 1, Optical Interface Link, single mode opto fibre 1	Signal
Opto 2, for MSR Optical Interface Link, single mode opto fibre 2 for single RAT not connected	Signal
LMT, for maintenance use only	Signal
RX A Out, no cable attached	Antenna
RX A I/O, no cable attached	Antenna
RX B I/O, no cable attached	Antenna
EXT Alarm, shielded multi-wire	Signal
ALD Ctrl, shielded multi-wire	Signal
Ground wire	Ground

RBS softwares

For WCDMA

Software	**Revision**
CXP 901 8350/1	R11D02

For LTE

Software	**Revision**
CXP 102 051/16	R26AD

RRUS

Software	**Revision**
PIS CXP 901 7316/1 (pre-installed) CXP 901 3268/6 (running)	R32LY R49AY

References

Measurements were done according to relevant parts of the following standards:
ANSI 63.4-2009
ANSI/TIA/EIA-603-C-2004
CFR 47 part 2, October 1st , 2012
CFR 47 part 22, October 1st, 2012
3GPP TS 25.141, version 8.9.0
3GPP TS 36.141, version 8.4.0
3GPP TS 37.141, version 10.8.0
RSS-Gen Issue 3
RSS-132 Issue 3

Measurement equipment

	Calibration Due	SP number
Test site Tesla	2014-01	503 881
R&S FSIQ 40	2013-07	503 738
R&S FSQ 40	2013-05	504 143
R&S ESU 26	2013-09	901 553
Control computer with R&S software EMC32 version 8.52.0	-	503 479
High pass filter	2013-07	901 501
High pass filter	2013-08	901 373
RF attenuator	2013-07	504 159
RF attenuator	2013-09	900 233
RF attenuator	2013-06	901 384
Directional coupler	2013-07	901 496
Chase Bilog Antenna CBL 6111A	2014-10	503 182
EMCO Horn Antenna 3115	2014-01	502 175
µComp Nordic, Low Noise Amplifier	2013-03	901 545
MITEQ Low Noise Amplifier	2013-08	503 285
Testo 635 Temperature and humidity meter	2013-06	504 203
Testo 625 Temperature and humidity meter	2013-06	504 188

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation ”SP-QD 10885”. The uncertainties are calculated with a coverage factor k=2 (95% level of confidence). Compliance evaluation is based on a shared risk principle with respect to the measurement uncertainty.

Reservation

The test results in this report apply only to the particular test object as declared in the report.

Delivery of test object

The test object was delivered 2012-12-04.

Appendix 1

Manufacturer's representative

Christer Gustavsson, Ericsson AB

Test engineers

Andreas Johnson, Tomas Lennhager, Jörgen Wassholm and Martin Theorin, SP

Test participants

Adam Skoglund, Ericsson AB (partially during radiated tests)

RF power output measurements according to CFR 47 2.1046 / IC RSS-132 5.4

Date	Temperature	Humidity
2012-12-17	23 °C ± 3 °C	22 % ± 5 %
2012-12-18	22 °C ± 3 °C	22 % ± 5 %
2012-12-19	23 °C ± 3 °C	22 % ± 5 %

The test object was connected to a signal analyzer measuring peak and RMS output power in CDF mode. A RBW of 50 MHz was used.

Measurement equipment	SP number
Rohde & Schwarz signal analyzer FSQ40	504 143
RF attenuator	900 233
RF attenuator	901 384
Directional coupler	901 496
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 1.1 dB

Results

LTE single RAT, single carrier, MIMO mode. Rated output power 1x 44.8 dBm per RF port

Tested configuration BW and frequency	Transmitter power RMS (dBm)		
	Port RFA	Port RFB	RFA+RFB [1)]
1.4 MHz, M	44.28 (Diagram 1)	44.13 (Diagram 2)	47.22
3 MHz, M	44.35 (Diagram 3)	44.20 (Diagram 4)	47.29
5 MHz, M	44.32 (Diagram 5)	44.23 (Diagram 6)	47.29
10 MHz, M	44.33 (Diagram 7)	44.25 (Diagram 8)	47.30
15 MHz, M	44.30 (Diagram 9)	44.23 (Diagram 10)	47.28
20 MHz , M	44.26 (Diagram 11)	44.19 (Diagram 12)	47.24

[1)]: summed output power according to FCC KDB662911 Multiple transmitter output v01r02

WCDMA single RAT, single carrier, MIMO mode

Rated output power 1x 44.8 dBm per RF port. Total nominal RF power 47.8 dBm.

Tested configuration BW and frequency	Transmitter power RMS (dBm)		
	Port RF A	Port RF B	RF A+ RF B[1)]
5 MHz, B	44.39 (Diagram 13)	44.36 (Diagram 14)	47.39
5 MHz, M	44.43 (Diagram 15)	44.26 (Diagram 16)	47.36
5 MHz, T	44.35 (Diagram 17)	44.33 (Diagram 18)	47.35

[1)]: summed output power according to FCC KDB662911 Multiple transmitter output v01r02

WCDMA single RAT, multi carrier, MIMO mode

Rated output power 2 x 41.8 dBm per RF port.Total nominal RF power 47.8 dBm.

Tested configuration Bandwidth and frequency	Transmitter power RMS (dBm)		
	Port RF A	Port RF B	RF A+ RF B[1)]
5 MHz, B2	44.49 (Diagram 19)	44.42 (Diagram 20)	47.47
5 MHz, M2	44.43 (Diagram 21)	44.31 (Diagram 22)	47.38
5 MHz, T2	44.47 (Diagram 23)	44.42 (Diagram 24)	47.46

[1)]: summed output power according to FCC KDB662911 Multiple transmitter output v01r02

WCDMA single RAT, single carrier, conventional mode

Rated output power 1x 44.8 dBm per RF port.

Tested configuration Bandwidth and frequency	Transmitter power RMS (dBm)
	Port RF A
M, BW 5 MHz	44.26 (Diagram 25)

WCDMA single RAT, multi carrier, conventional mode

Rated output power level 2x 41.8 dBm per RF port.

Tested configuration Bandwidth and frequency	Transmitter power RMS (dBm)
	Port RF A
M2, BW 5 MHz	44.47 (Diagram 26)

WCDMA & LTE MSR, conventional mode

Rated output power level at RF connector 1x 44.8 dBm/ RF port

Tested frequency	BW configuration WCDMA / LTE	Transmitter power RMS (dBm)	
		Port RF A	Port RF B
M3	5 MHz / 1.4 MHz	44.24 (Diagram 27)	N.T.
M3	5 MHz / 3 MHz	44.34 (Diagram 28)	N.T.
M3	5 MHz / 5 MHz	44.35 (Diagram 29)	44.21 (Diagram 30)

Note: For conventional mode RF power was measured per single port. The client declared ports RF A and RF B electrical identically.

The diagrams are shown on the following pages.

Limits

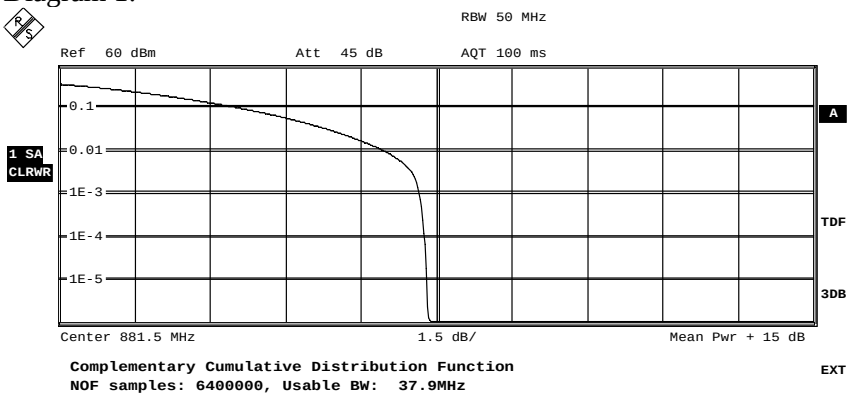
CFR47 § 22.913: The effective radiated power ERP shall not exceed 1000 W.

RSS-132 5.4: The average equivalent isotropically radiated power (e.i.r.p.) limits in SRSP-503 apply, resulting in a maximum EIRP of 1640 W.
The PAPR shall not exceed 13 dB.

Complies?	Yes

Appendix 2

Diagram 1:

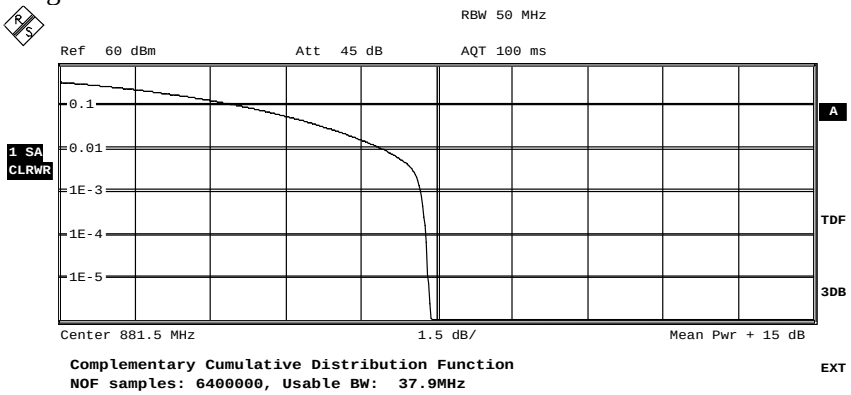


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.28 dBm
Peak	51.65 dBm
Crest	7.37 dB
10 %	3.65 dB
1 %	6.47 dB
.1 %	7.16 dB
.01 %	7.26 dB

Date: 19.DEC.2012 08:00:27

Diagram 2:



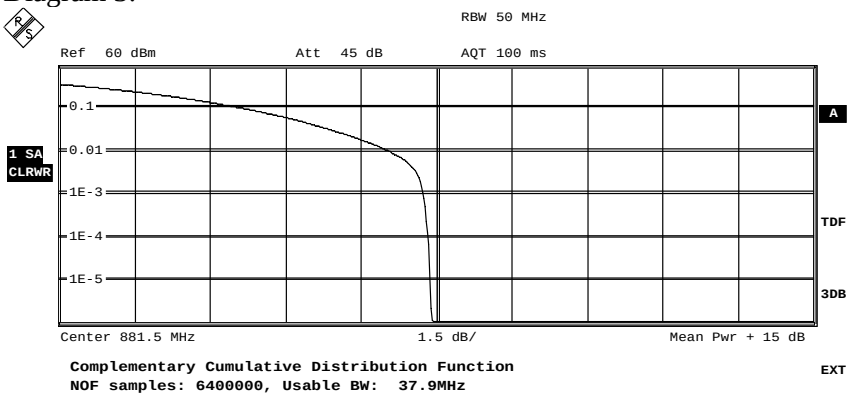
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.13 dBm
Peak	51.51 dBm
Crest	7.38 dB
10 %	3.68 dB
1 %	6.44 dB
.1 %	7.19 dB
.01 %	7.31 dB

Date: 19.DEC.2012 09:12:52

Appendix 2

Diagram 3:

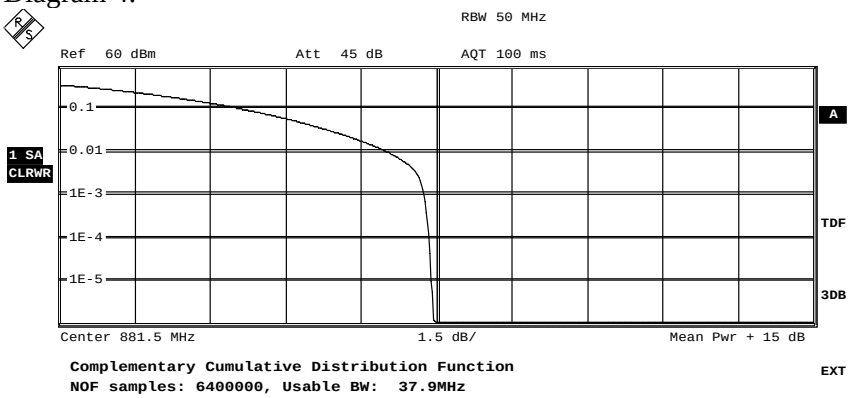


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.35 dBm
Peak	51.79 dBm
Crest	7.44 dB
10 %	3.70 dB
1 %	6.56 dB
.1 %	7.24 dB
.01 %	7.33 dB

Date: 19.DEC.2012 08:30:14

Diagram 4:



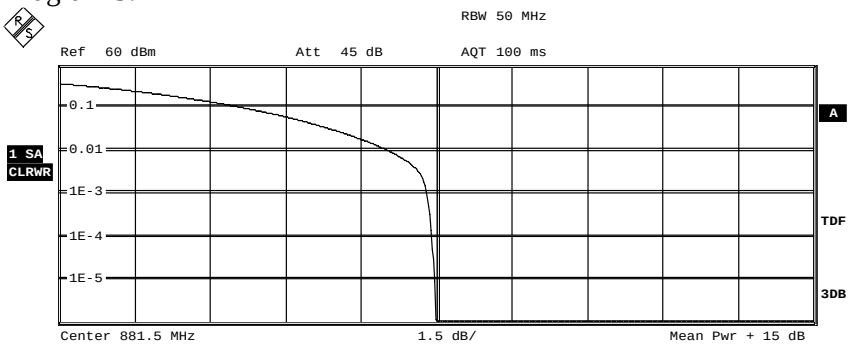
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.20 dBm
Peak	51.65 dBm
Crest	7.45 dB
10 %	3.68 dB
1 %	6.54 dB
.1 %	7.26 dB
.01 %	7.36 dB

Date: 19.DEC.2012 09:13:51

Appendix 2

Diagram 5:



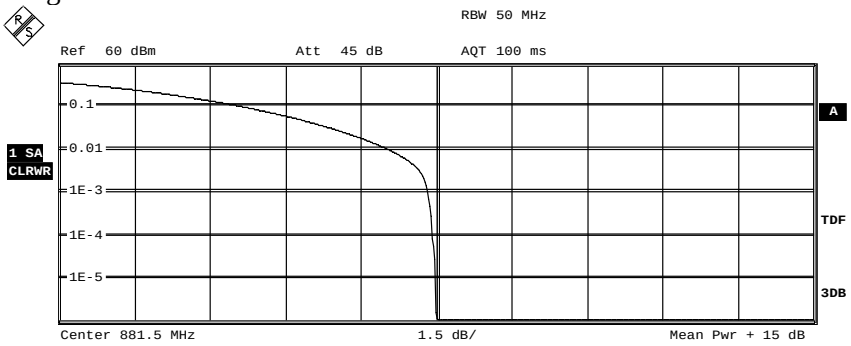
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

EXT

	Trace 1
Mean	44.32 dBm
Peak	51.86 dBm
Crest	7.54 dB
10 %	3.70 dB
1 %	6.54 dB
.1 %	7.31 dB
.01 %	7.40 dB

Date: 19.DEC.2012 08:34:19

Diagram 6:



Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

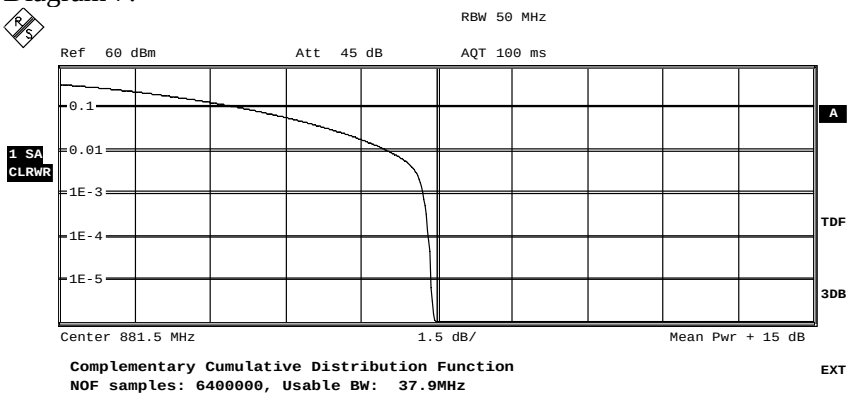
EXT

	Trace 1
Mean	44.23 dBm
Peak	51.79 dBm
Crest	7.56 dB
10 %	3.68 dB
1 %	6.54 dB
.1 %	7.33 dB
.01 %	7.43 dB

Date: 19.DEC.2012 09:14:36

Appendix 2

Diagram 7:

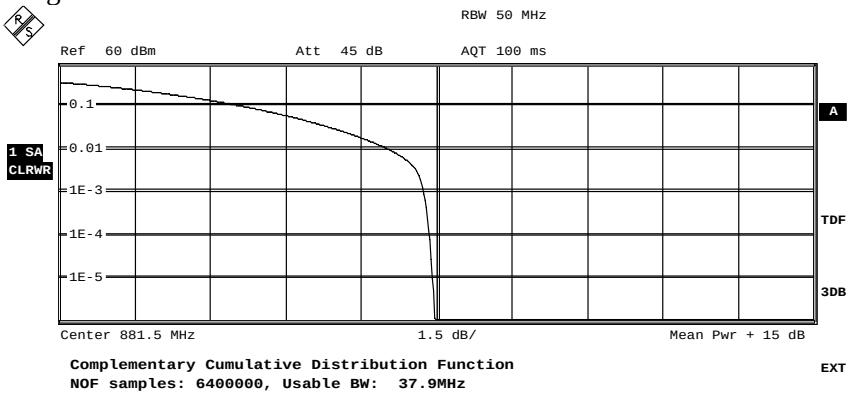


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.33 dBm
Peak	51.79 dBm
Crest	7.46 dB
10 %	3.70 dB
1 %	6.56 dB
.1 %	7.24 dB
.01 %	7.36 dB

Date: 19.DEC.2012 08:37:27

Diagram 8:



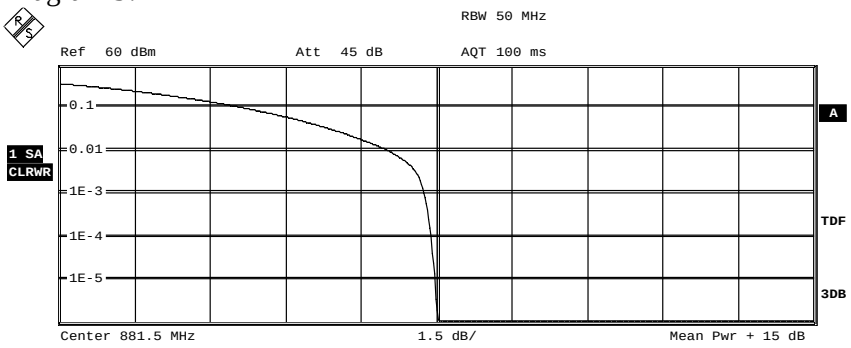
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.25 dBm
Peak	51.72 dBm
Crest	7.47 dB
10 %	3.70 dB
1 %	6.56 dB
.1 %	7.26 dB
.01 %	7.38 dB

Date: 19.DEC.2012 09:18:21

Appendix 2

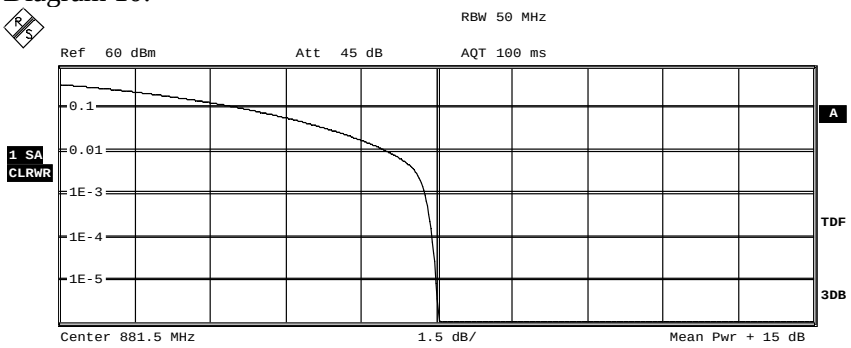
Diagram 9:



	Trace 1
Mean	44.30 dBm
Peak	51.86 dBm
Crest	7.56 dB
10 %	3.70 dB
1 %	6.54 dB
.1 %	7.26 dB
.01 %	7.40 dB

Date: 19.DEC.2012 08:40:47

Diagram 10:

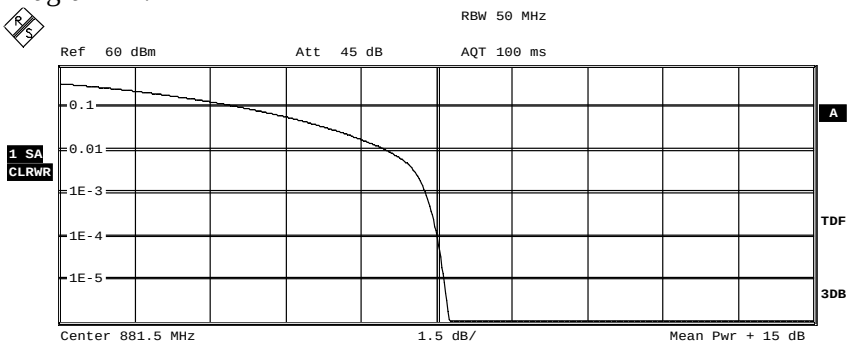


	Trace 1
Mean	44.23 dBm
Peak	51.79 dBm
Crest	7.56 dB
10 %	3.70 dB
1 %	6.54 dB
.1 %	7.28 dB
.01 %	7.43 dB

Date: 19.DEC.2012 09:19:20

Appendix 2

Diagram 11:

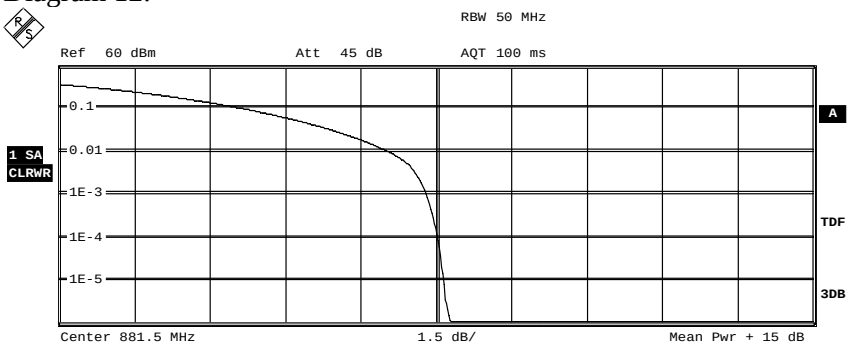


Complementary Cumulative Distribution Function EXT
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.26 dBm
Peak	52.07 dBm
Crest	7.81 dB
10 %	3.70 dB
1 %	6.54 dB
.1 %	7.28 dB
.01 %	7.52 dB

Date: 19.DEC.2012 08:43:38

Diagram 12:



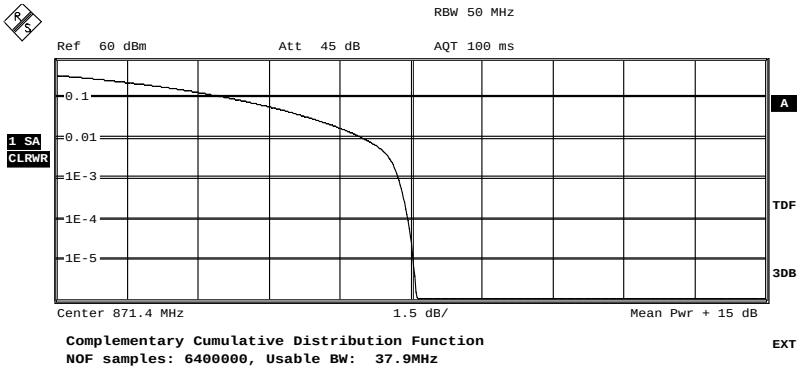
Complementary Cumulative Distribution Function EXT
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.19 dBm
Peak	52.07 dBm
Crest	7.89 dB
10 %	3.70 dB
1 %	6.54 dB
.1 %	7.31 dB
.01 %	7.52 dB

Date: 19.DEC.2012 09:20:33

Appendix 2

Diagram 13:

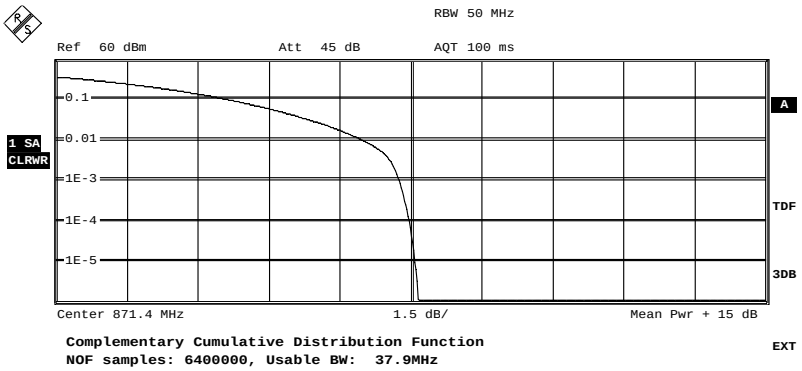


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.39 dBm
Peak	52.08 dBm
Crest	7.69 dB
10 %	3.70 dB
1 %	6.51 dB
.1 %	7.24 dB
.01 %	7.45 dB

Date: 18.DEC.2012 10:35:37

Diagram 14:



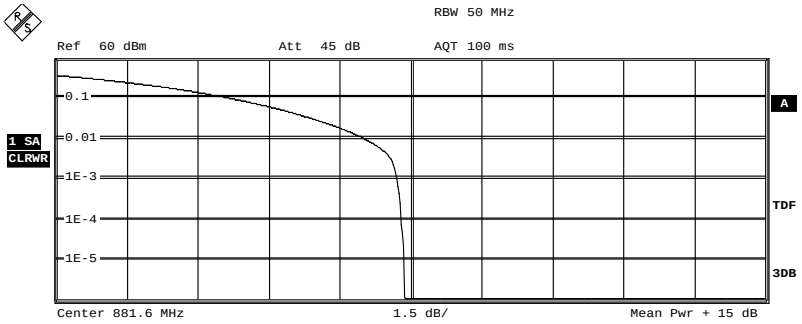
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.36 dBm
Peak	52.15 dBm
Crest	7.79 dB
10 %	3.68 dB
1 %	6.49 dB
.1 %	7.26 dB
.01 %	7.48 dB

Date: 18.DEC.2012 11:40:39

Appendix 2

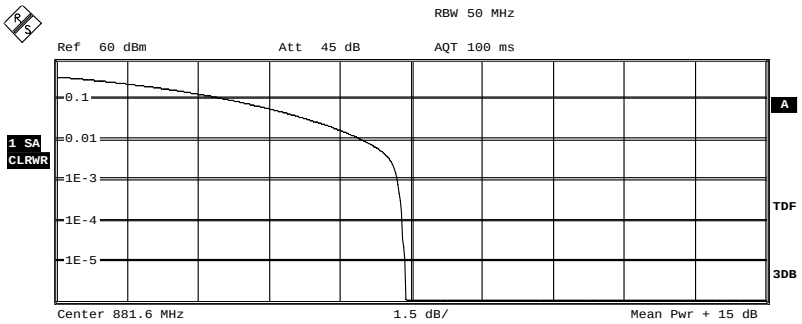
Diagram 15:



	Trace 1
Mean	44.43 dBm
Peak	51.86 dBm
Crest	7.43 dB
10 %	3.70 dB
1 %	6.51 dB
.1 %	7.21 dB
.01 %	7.31 dB

Date: 18.DEC.2012 10:24:28

Diagram 16:

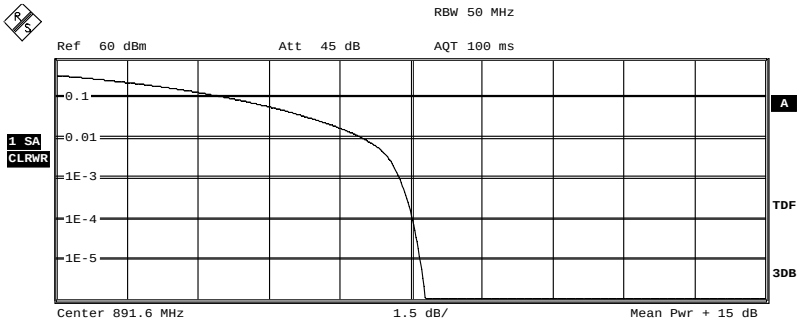


	Trace 1
Mean	44.26 dBm
Peak	51.65 dBm
Crest	7.39 dB
10 %	3.68 dB
1 %	6.49 dB
.1 %	7.21 dB
.01 %	7.33 dB

Date: 18.DEC.2012 11:29:23

Appendix 2

Diagram 17:

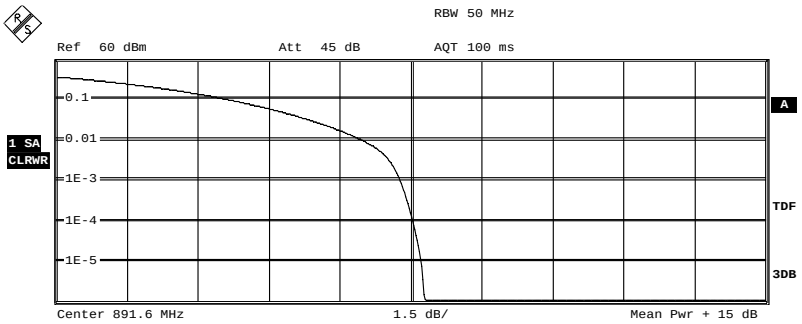


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.35 dBm
Peak	52.23 dBm
Crest	7.88 dB
10 %	3.70 dB
1 %	6.49 dB
.1 %	7.26 dB
.01 %	7.55 dB

Date: 18.DEC.2012 10:53:25

Diagram 18:



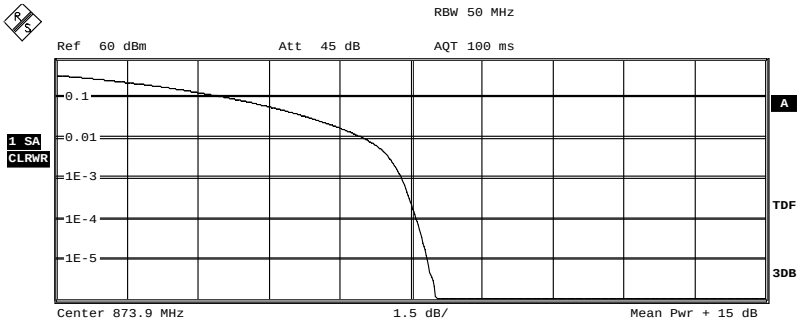
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.33 dBm
Peak	52.16 dBm
Crest	7.83 dB
10 %	3.68 dB
1 %	6.47 dB
.1 %	7.28 dB
.01 %	7.55 dB

Date: 18.DEC.2012 11:11:03

Appendix 2

Diagram 19:

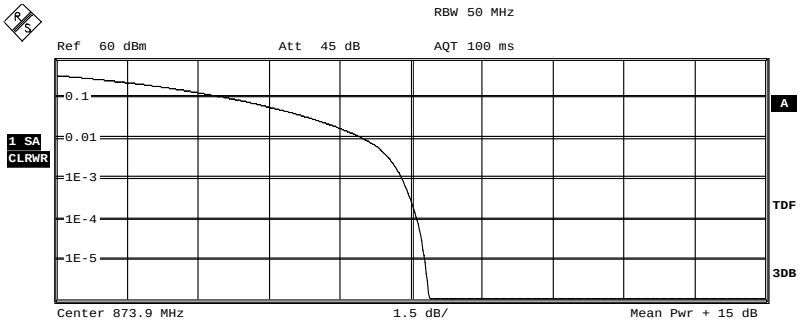


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.49 dBm
Peak	52.59 dBm
Crest	8.10 dB
10 %	3.70 dB
1 %	6.51 dB
.1 %	7.31 dB
.01 %	7.62 dB

Date: 18.DEC.2012 12:35:49

Diagram 20:



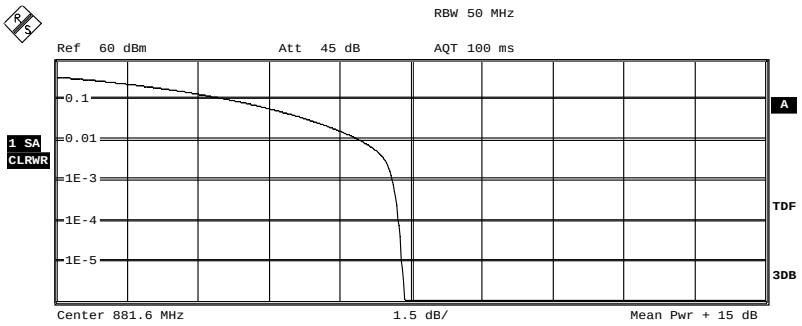
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.42 dBm
Peak	52.38 dBm
Crest	7.96 dB
10 %	3.70 dB
1 %	6.49 dB
.1 %	7.31 dB
.01 %	7.64 dB

Date: 18.DEC.2012 12:57:02

Appendix 2

Diagram 21:

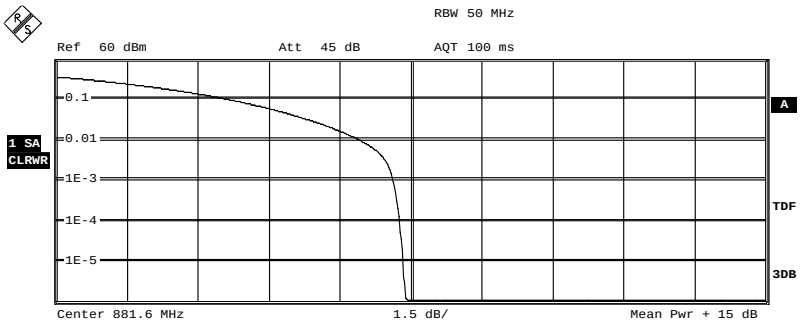


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.43 dBm
Peak	51.86 dBm
Crest	7.44 dB
10 %	3.70 dB
1 %	6.42 dB
.1 %	7.12 dB
.01 %	7.24 dB

Date: 18.DEC.2012 12:29:33

Diagram 22:



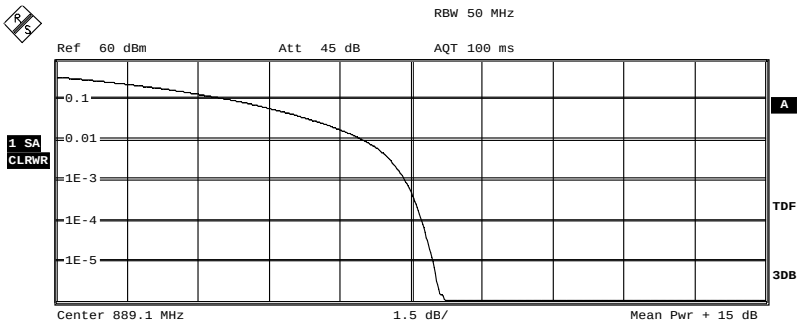
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.31 dBm
Peak	51.72 dBm
Crest	7.41 dB
10 %	3.70 dB
1 %	6.42 dB
.1 %	7.14 dB
.01 %	7.26 dB

Date: 18.DEC.2012 12:04:54

Appendix 2

Diagram 23

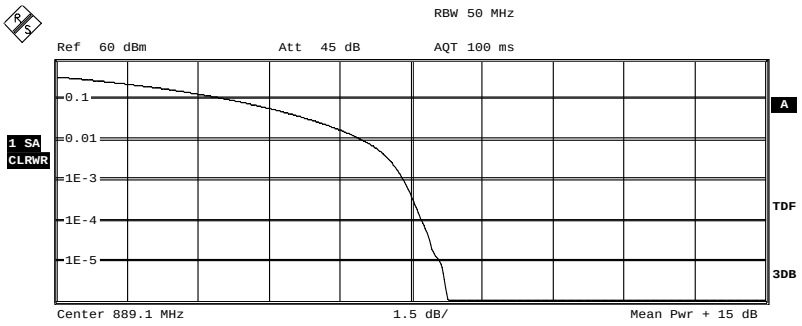


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.47 dBm
Peak	52.78 dBm
Crest	8.31 dB
10 %	3.73 dB
1 %	6.51 dB
.1 %	7.38 dB
.01 %	7.74 dB

Date: 18.DEC.2012 13:10:59

Diagram 24



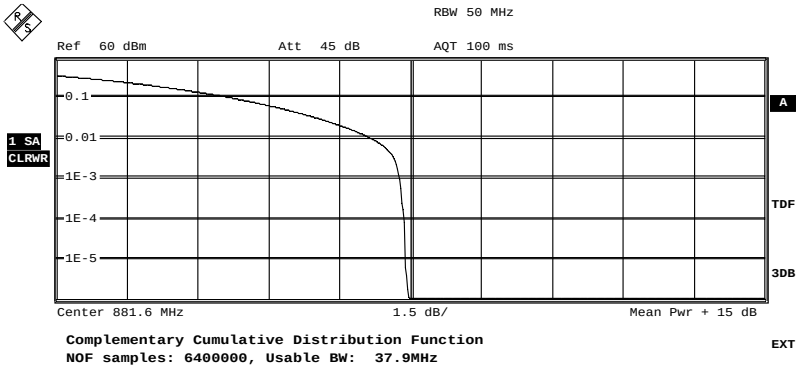
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.42 dBm
Peak	52.85 dBm
Crest	8.43 dB
10 %	3.70 dB
1 %	6.49 dB
.1 %	7.36 dB
.01 %	7.74 dB

Date: 18.DEC.2012 13:08:14

Appendix 2

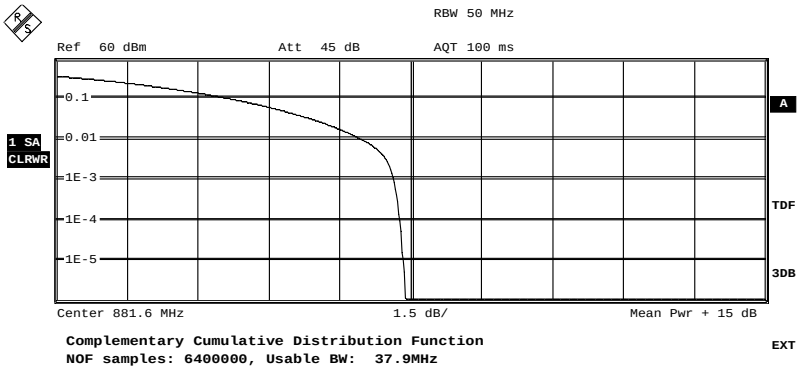
Diagram 25:



	Trace 1
Mean	44.26 dBm
Peak	51.72 dBm
Crest	7.46 dB
10 %	3.77 dB
1 %	6.68 dB
.1 %	7.28 dB
.01 %	7.38 dB

Date: 17.DEC.2012 09:44:56

Diagram 26:

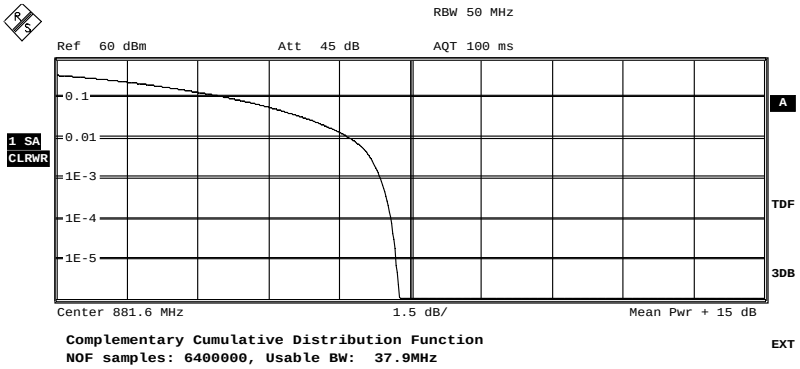


	Trace 1
Mean	44.47 dBm
Peak	51.93 dBm
Crest	7.46 dB
10 %	3.73 dB
1 %	6.47 dB
.1 %	7.14 dB
.01 %	7.28 dB

Date: 17.DEC.2012 13:24:29

Appendix 2

Diagram 27:

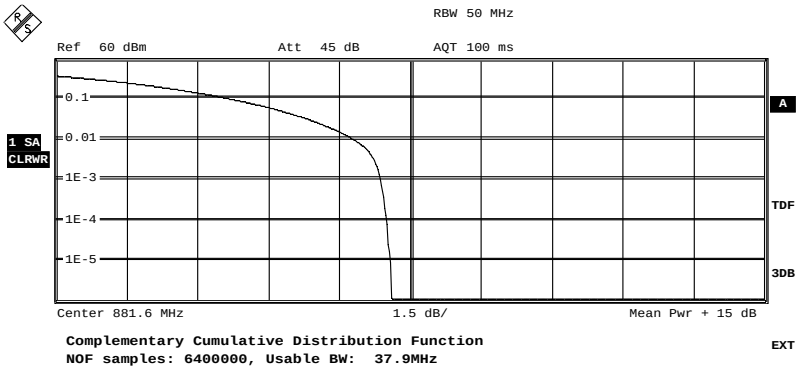


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.24 dBm
Peak	51.58 dBm
Crest	7.34 dB
10 %	3.70 dB
1 %	6.23 dB
.1 %	6.88 dB
.01 %	7.09 dB

Date: 18.DEC.2012 16:05:32

Diagram 28:



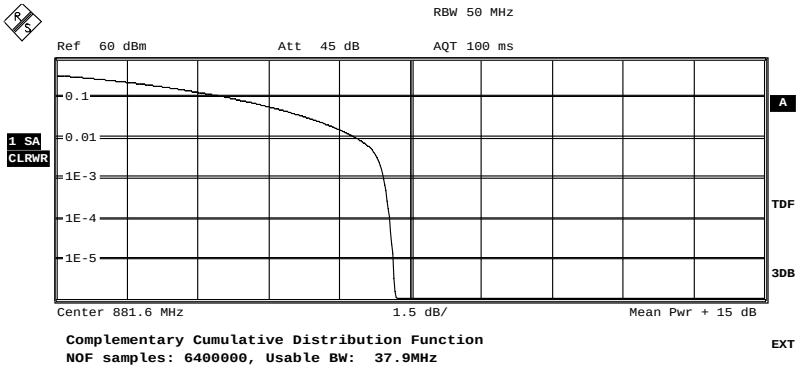
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.34 dBm
Peak	51.51 dBm
Crest	7.17 dB
10 %	3.70 dB
1 %	6.30 dB
.1 %	6.88 dB
.01 %	7.02 dB

Date: 18.DEC.2012 16:17:17

Appendix 2

Diagram 29:

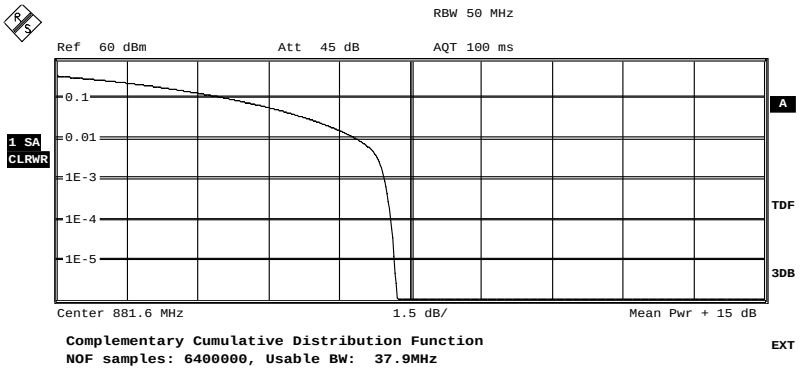


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.35 dBm
Peak	51.65 dBm
Crest	7.30 dB
10 %	3.73 dB
1 %	6.37 dB
.1 %	6.95 dB
.01 %	7.07 dB

Date: 18.DEC.2012 16:23:40

Diagram 30:



Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	44.21 dBm
Peak	51.44 dBm
Crest	7.23 dB
10 %	3.70 dB
1 %	6.37 dB
.1 %	6.97 dB
.01 %	7.09 dB

Date: 19.DEC.2012 07:45:11

Occupied bandwidth measurements according to CFR47 2.1049 / RSS-Gen 4.6.1

Date	Temperature	Humidity
2012-12-17	23 °C ± 3 °C	22 % ± 5 %
2012-12-18	22 °C ± 3 °C	22 % ± 5 %
2012-12-19	23 °C ± 3 °C	22 % ± 5 %

Test set-up and procedure

The measurements were made per definition in § 2.1049. The output was connected to a signal analyzer with the RMS detector activated. The signal analyzer was connected to an external 10 MHz reference standard during the measurements.

Measurement equipment	SP number
Rohde & Schwarz signal analyzer FSQ40	504 143
RF attenuator	900 233
RF attenuator	901 384
Directional coupler	901 496
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

LTE single RAT, MIMO mode

Diagram	BW configuration	Tested frequency	Tested Port	Occupied BW (99%) [MHz]
1	1.4 MHz	M	RF A	1.09
2	1.4 MHz	M	RF B	1.09
3	3 MHz	M	RF A	2.69
4	5 MHz	M	RF A	4.48
5	10 MHz	M	RF A	8.94
6	15 MHz	M	RF A	13.42
7	20 MHz	M	RF A	17.86
8	20 MHz	M	RF B	17.86

WCDMA single RAT, MIMO mode

Diagram	BW configuration	Tested frequency	Tested Port	Occupied BW (99%) [MHz]
9	5 MHz	B	RF A	4.17
10	5 MHz	M	RF A	4.17
11	5 MHz	M	RF B	4.17
12	5 MHz	T	RF A	4.17

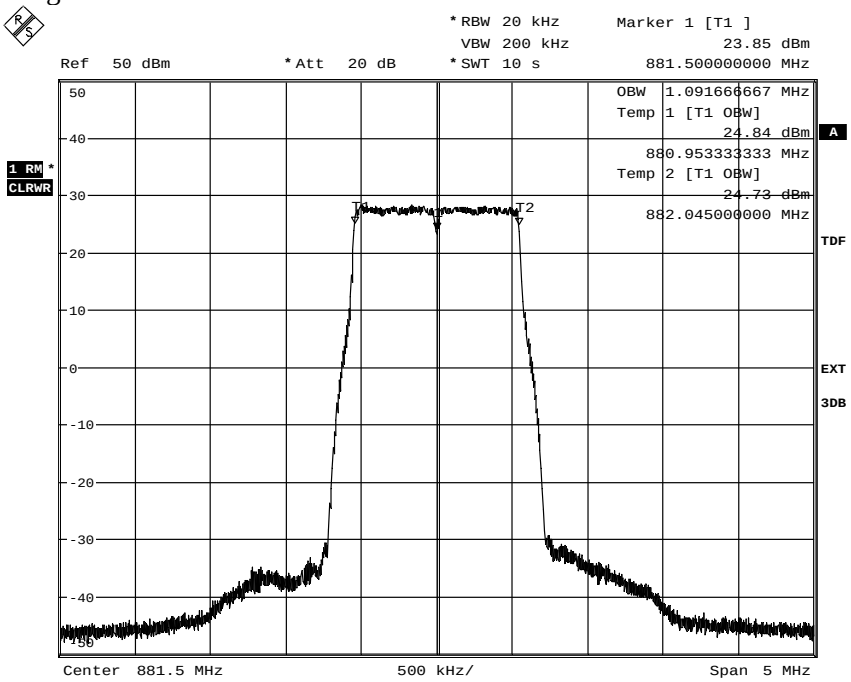
WCDMA, single RAT, conventional mode

Diagram	BW configuration	Tested frequency	Tested Port	Occupied BW (99%) [MHz]
13	5 MHz	M	RF A	4.17

The diagrams are shown on the following pages.

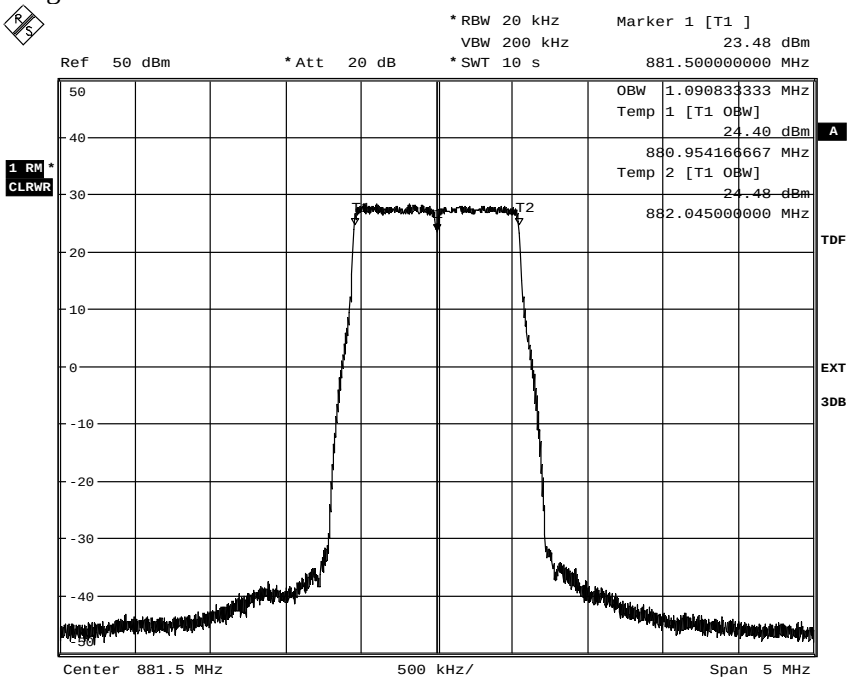
Appendix 3

Diagram 1:



Date: 19.DEC.2012 08:06:54

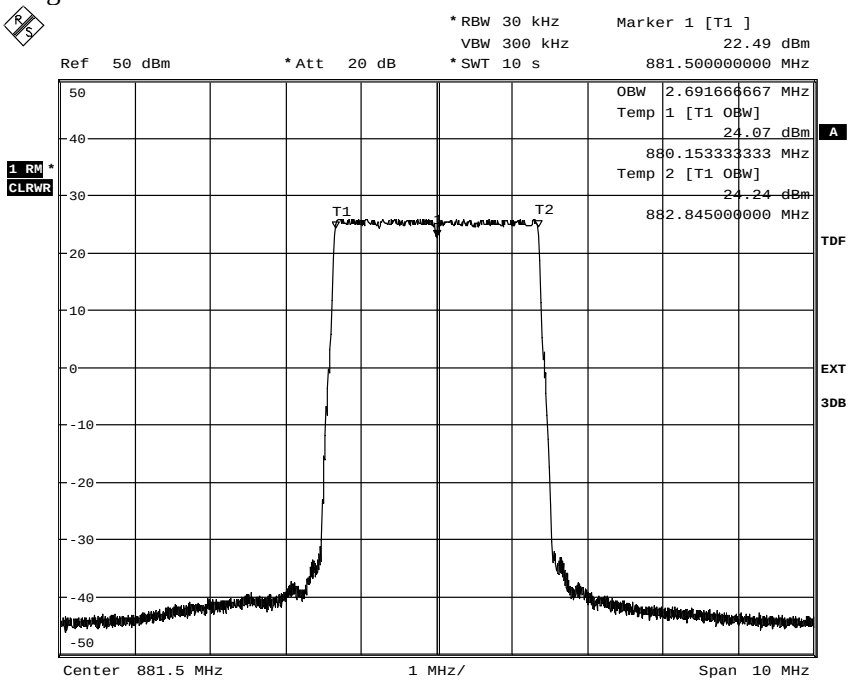
Diagram 2:



Date: 19.DEC.2012 08:13:23

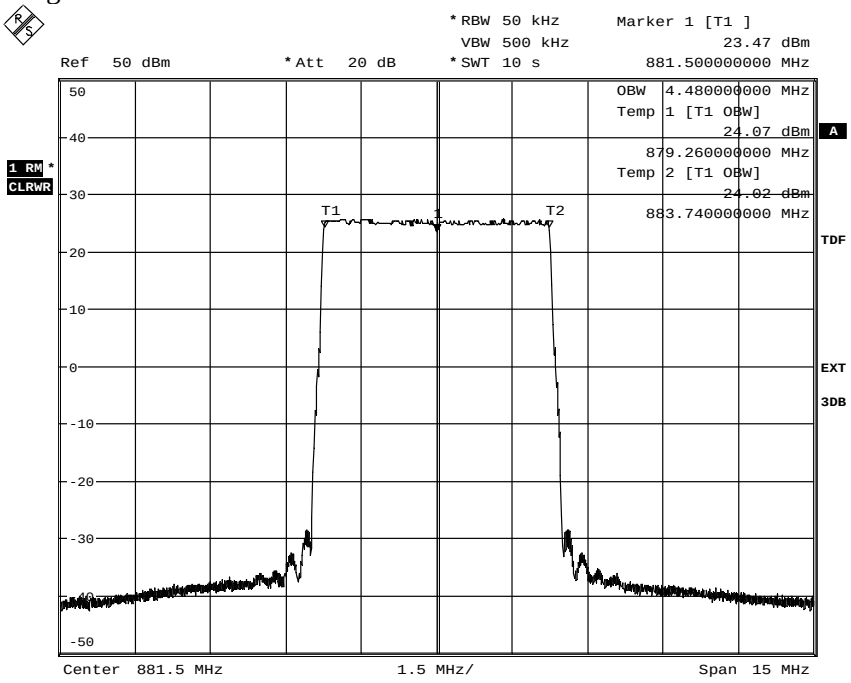
Appendix 3

Diagram 3:



Date: 19.DEC.2012 08:31:42

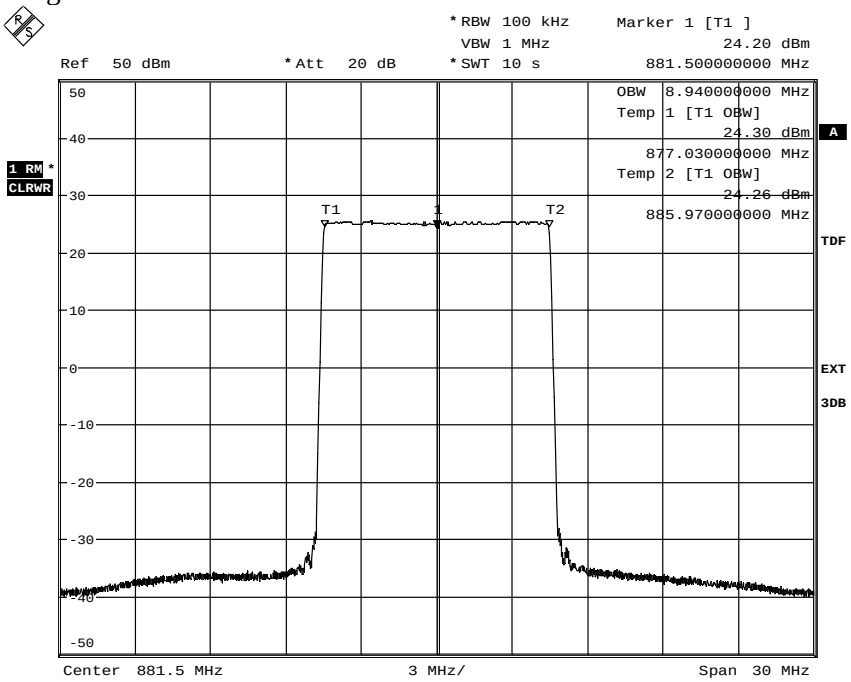
Diagram 4:



Date: 19.DEC.2012 08:33:51

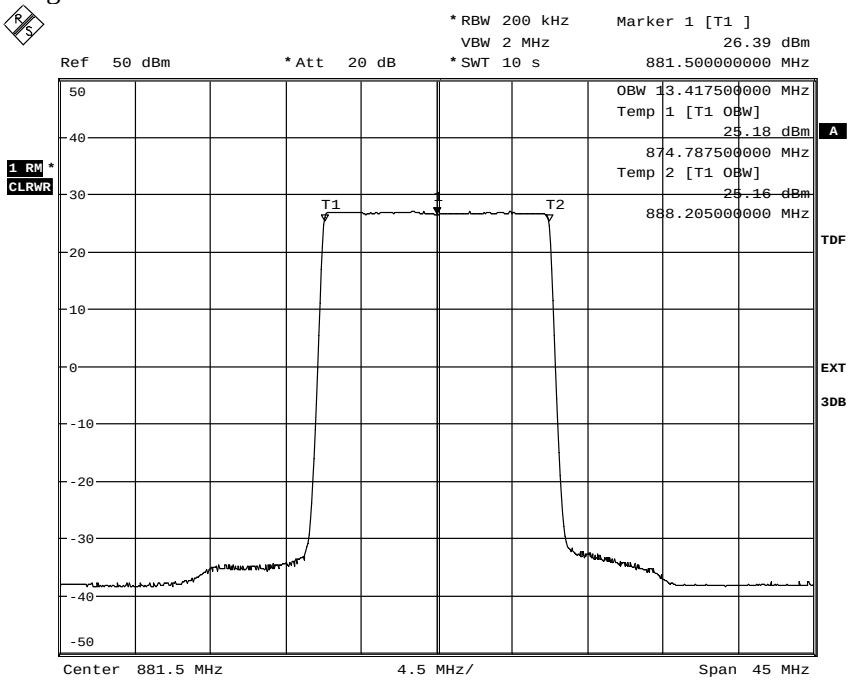
Appendix 3

Diagram 5:



Date: 19.DEC.2012 08:38:30

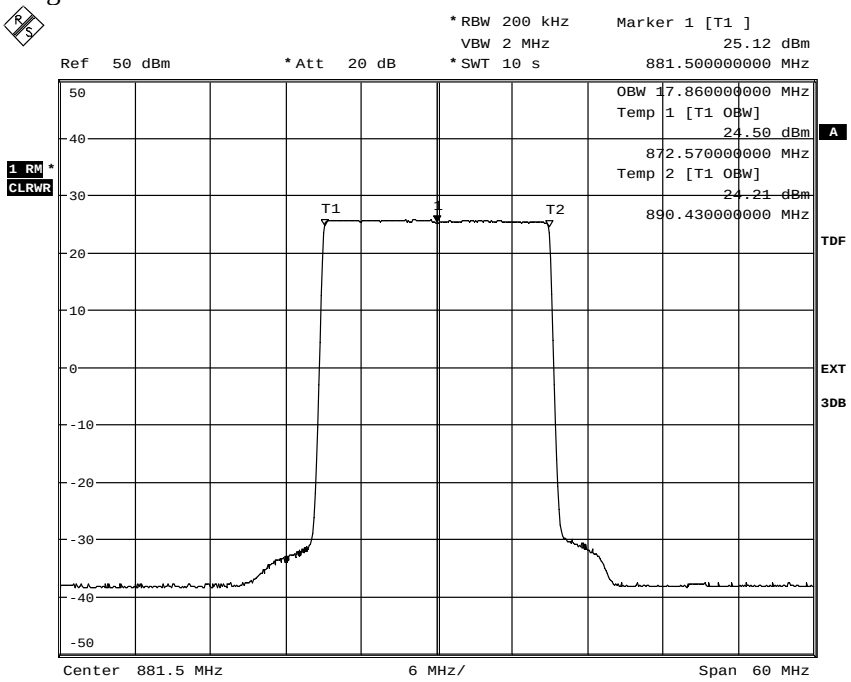
Diagram 6:



Date: 19.DEC.2012 08:41:37

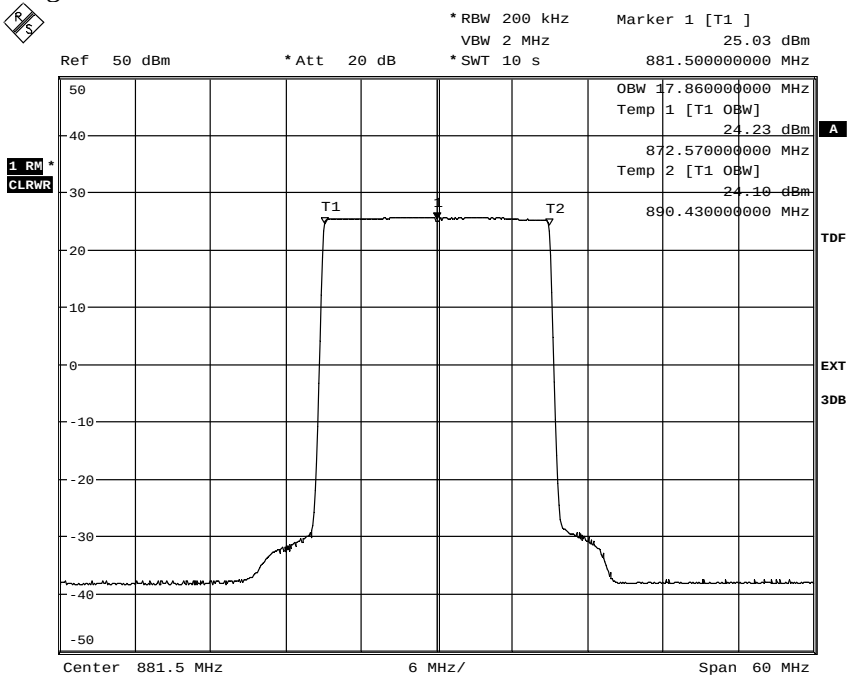
Appendix 3

Diagram 7:



Date: 19.DEC.2012 08:43:03

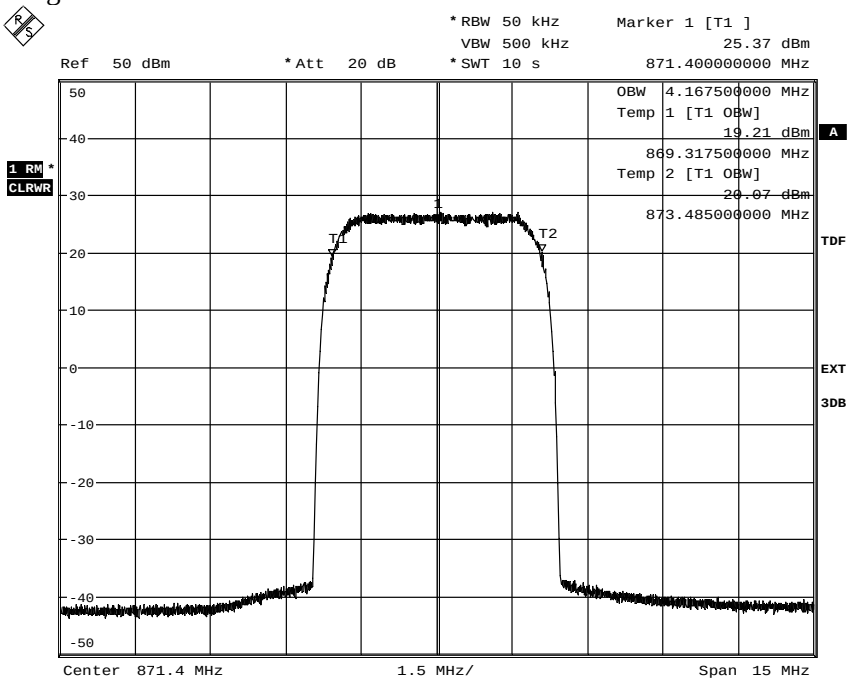
Diagram 8:



Date: 19.DEC.2012 09:21:24

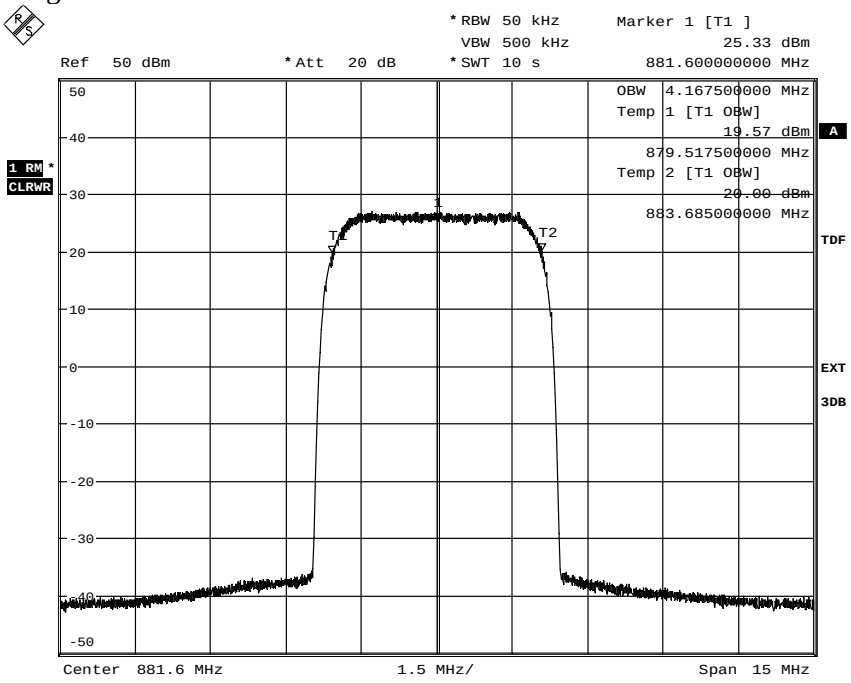
Appendix 3

Diagram 9:



Date: 18.DEC.2012 10:33:29

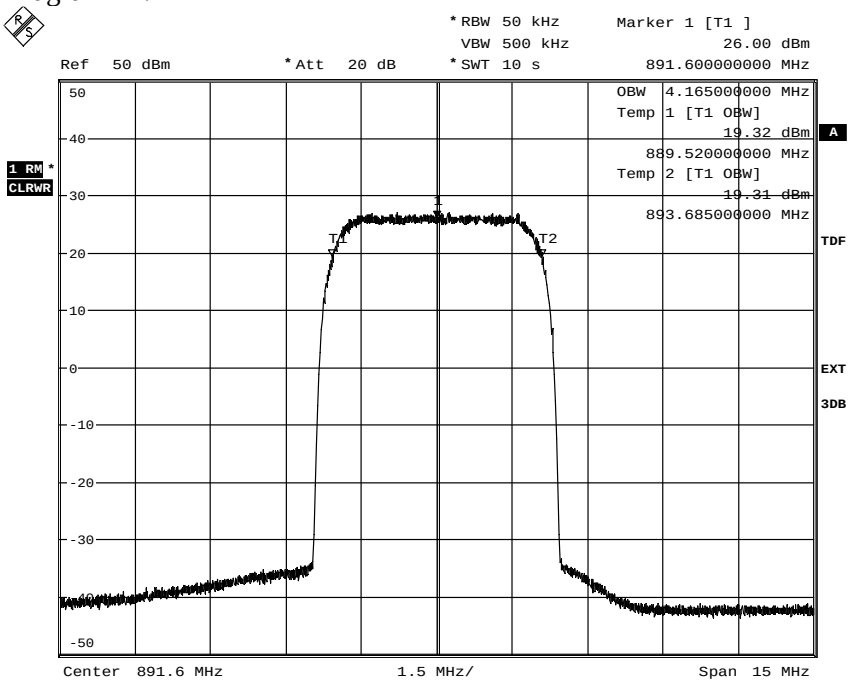
Diagram 10:



Date: 18.DEC.2012 10:25:53

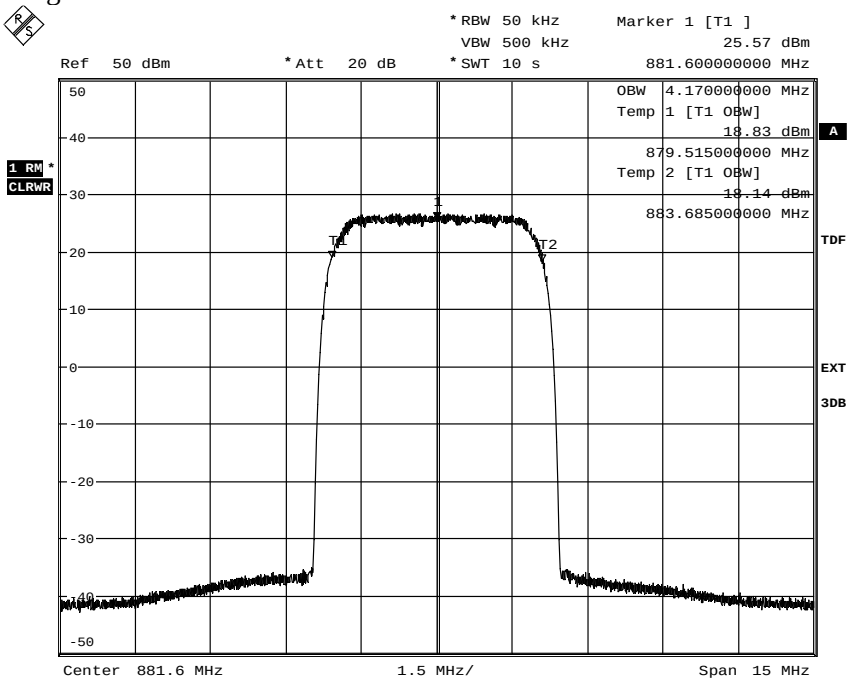
Appendix 3

Diagram 11:



Date: 18.DEC.2012 10:54:37

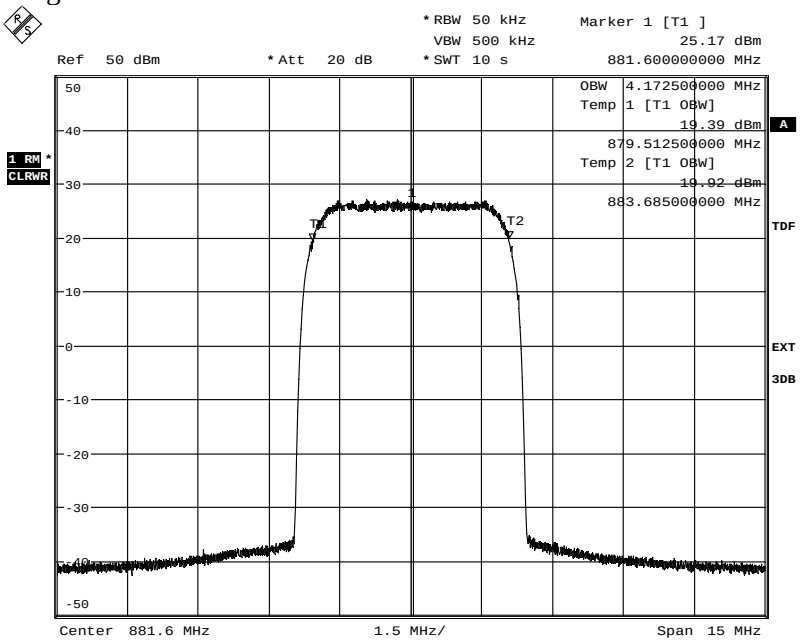
Diagram 12:



Date: 18.DEC.2012 11:30:39

Appendix 3

Diagram 13:



Date: 17.DEC.2012 09:50:07

Band edge measurements according to CFR 47 §2.1051 / IC RSS-132 5.5

Date	Temperature	Humidity
2012-12-17	23 °C ± 3 °C	22 % ± 5 %
2012-12-18	22 °C ± 3 °C	22 % ± 5 %
2012-12-19	23 °C ± 3 °C	22 % ± 5 %

Test set-up and procedure

The measurements were made per definition in § 22.917. The test object was connected to a spectrum analyzer with the RMS detector activated. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements.

FCC rules specify a RBW of at least 1% of the fundamental emission bandwidth (EBW) for offsets up to 1 MHz from the band edge and a RBW of 100 kHz for larger frequency offsets.

Before comparing results to the limit, two mathematical adjustments need to be applied: Where a smaller RBW was used as compared to the rules the limit in the plot is adjusted by 10*log(RBWused/RBW1%EBW) [dB].

In diagrams 'b:' the shown limit line -23 dBm is to be relieved to -13 dBm. Measurements were taken while RSS-132 issue 2 required signals wider than 4 MHz to use 1 MHz RBW, while present RSS-132 issue 3 allows 100 kHz RBW consistent with FCC rules.

To address the MIMO aspect of the EUT with 2 RF ports, additional 3 dB [10 log (2)] margin shall be added to the trace values shown prior to comparing to the limit, according to method 2 "measure and add 10 log(N_{ANT})" of FCC KDB662911 D01 Multiple Transmitter Output v01r02.

LTE:

BW configuration	Emission BW [MHz]	"1%" RBW used	Adjusted limit [dBm]
1.4 MHz	1.12	20 kHz	-13.00
3 MHz	2.73	30 kHz	-13.00
5 MHz	4.54	50 kHz	-13.00

WCDMA:

BW configuration	Emission BW [MHz]	"1%" RBW used	Adjusted limit [dBm]
5 MHz	4.37	30 kHz	-14.63

Measurement equipment	SP number
Rohde & Schwarz signal analyzer FSQ40	504 143
RF attenuator	900 233
RF attenuator	901 384
Directional coupler	901 496
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

LTE single RAT, MIMO mode

Diagram	BW configuration	Tested frequency	Tested Port
1 a-c	1.4 MHz	B	RF A
2 a-c	3 MHz	B	RF A
3 a-c	3 MHz	B	RF B
4 a-c	5 MHz	B	RF A
5 a-c	5 MHz	B	RF B
6 a-c	1.4 MHz	T	RF A
7 a-c	3 MHz	T	RF A
8 a-c	3 MHz	T	RF B
9 a-c	5 MHz	T	RF A
10 a-c	5 MHz	T	RF B

WCDMA single RAT, MIMO mode

Diagram	BW configuration	Tested frequency	Tested Port
11 a-c	5 MHz	B	RF A
12 a-c	5 MHz	B	RF B
13 a-c	5 MHz	T	RF A
14 a-c	5 MHz	T	RF B

WCDMA single RAT, conventional mode

Diagram	BW configuration	Tested frequency	Tested Port
15 a-c	5 MHz	B	RF A
16 a-c	5 MHz	T	RF A

The diagrams are shown on the following pages.

Remark

Where multiple requirements apply, the most stringent requirement is considered for compliance assessment.

Limits

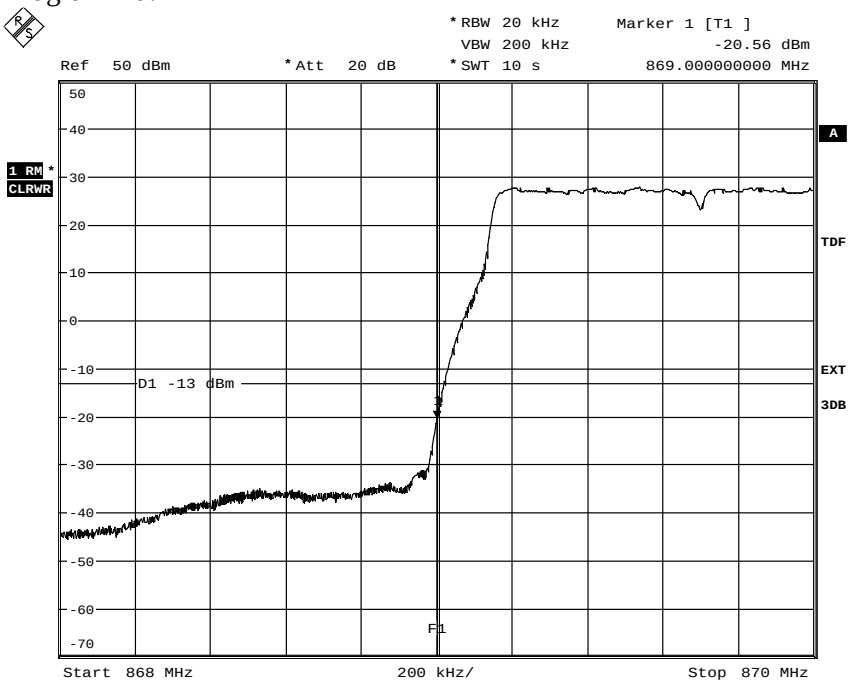
CFR 47 § 22.917, IC RSS-132 5.5:

Outside a licensee's frequency band(s) of operation the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, resulting in a limit of -13 dBm.

Complies?	Yes

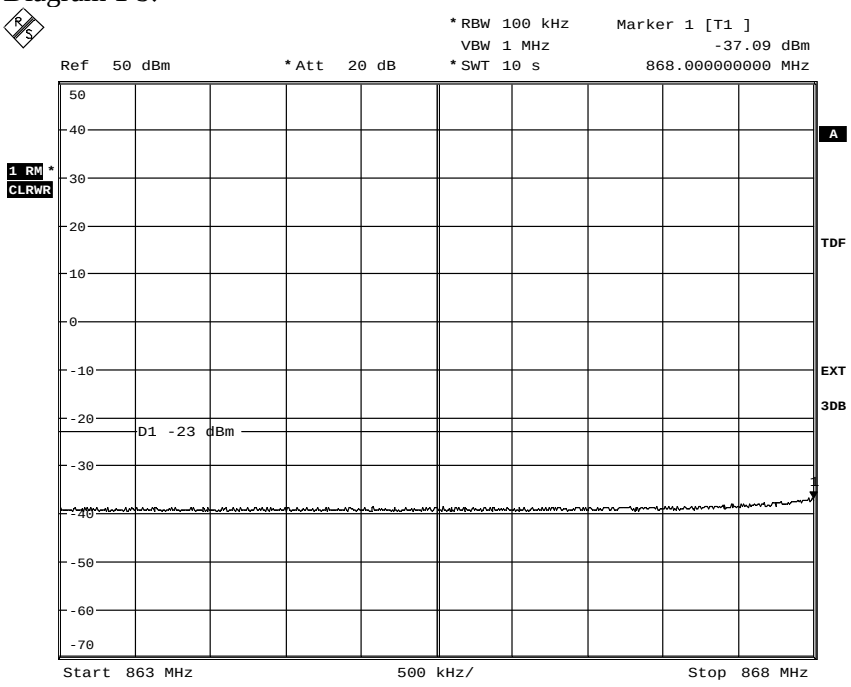
Appendix 4

Diagram 1 a:



Date: 19.DEC.2012 08:50:57

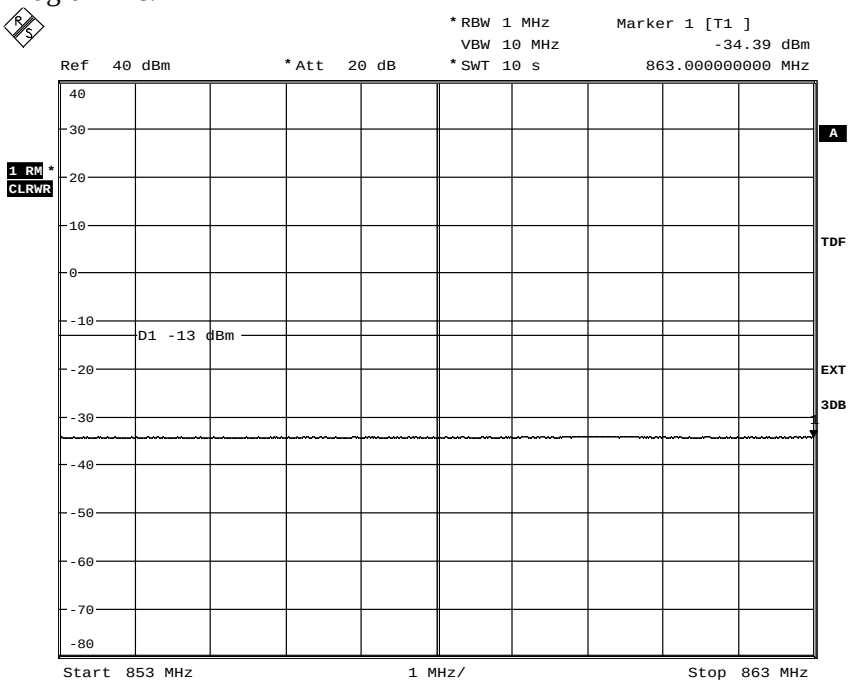
Diagram 1 b:



Date: 19.DEC.2012 08:52:01

Appendix 4

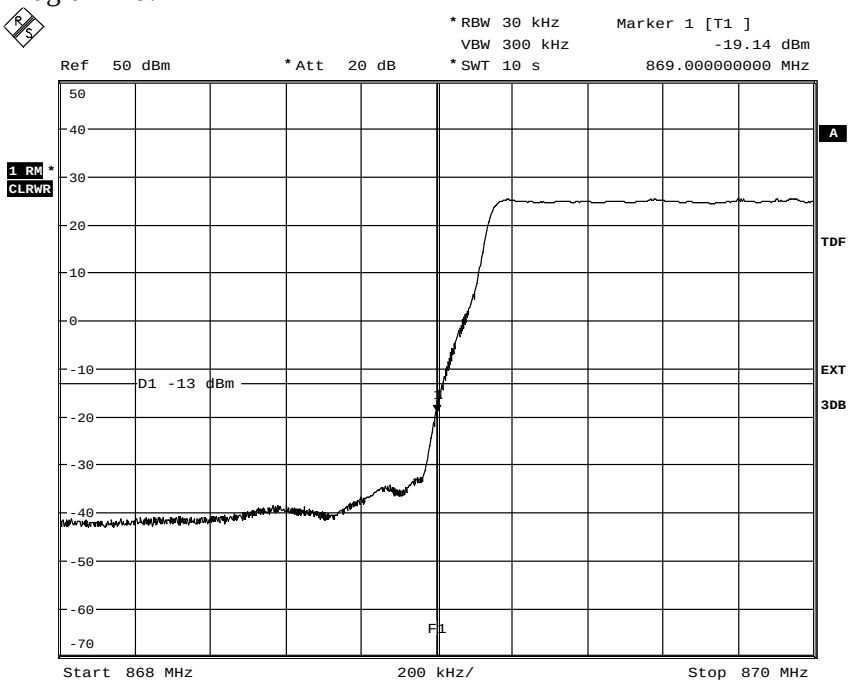
Diagram 1 c:



Date: 19.DEC.2012 08:52:37

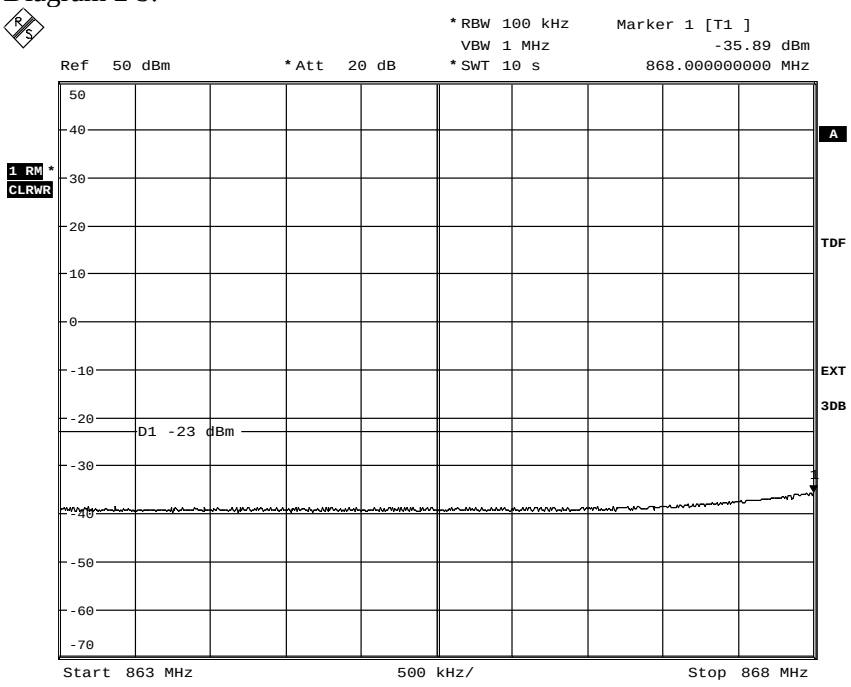
Appendix 4

Diagram 2 a:



Date: 19.DEC.2012 08:54:20

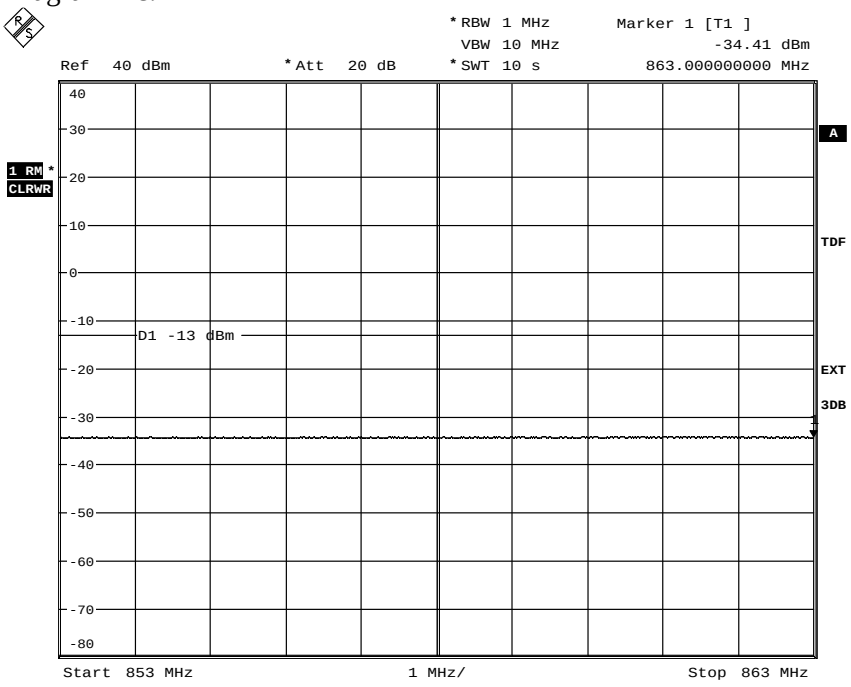
Diagram 2 b:



Date: 19.DEC.2012 08:55:09

Appendix 4

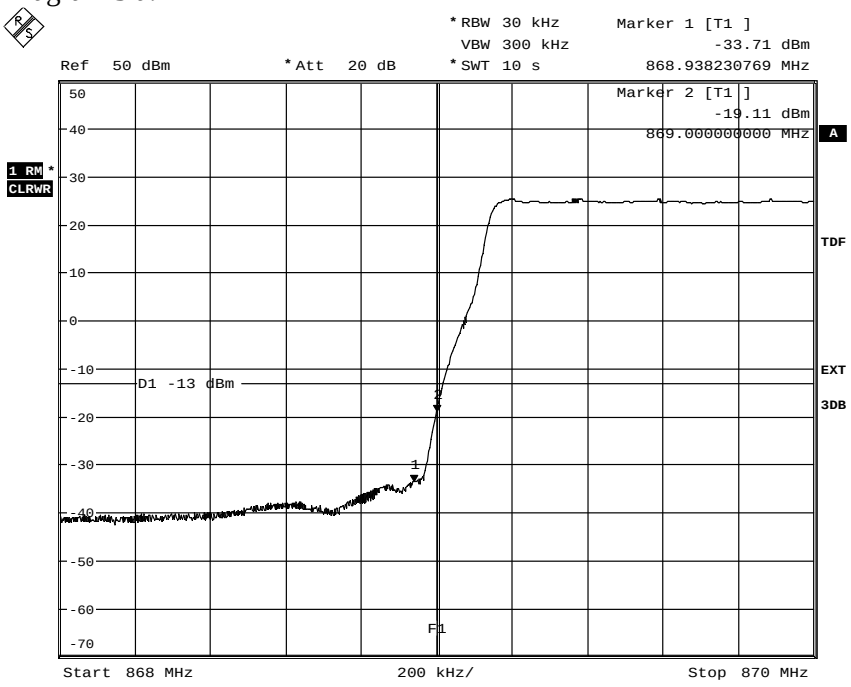
Diagram 2 c:



Date: 19.DEC.2012 08:55:49

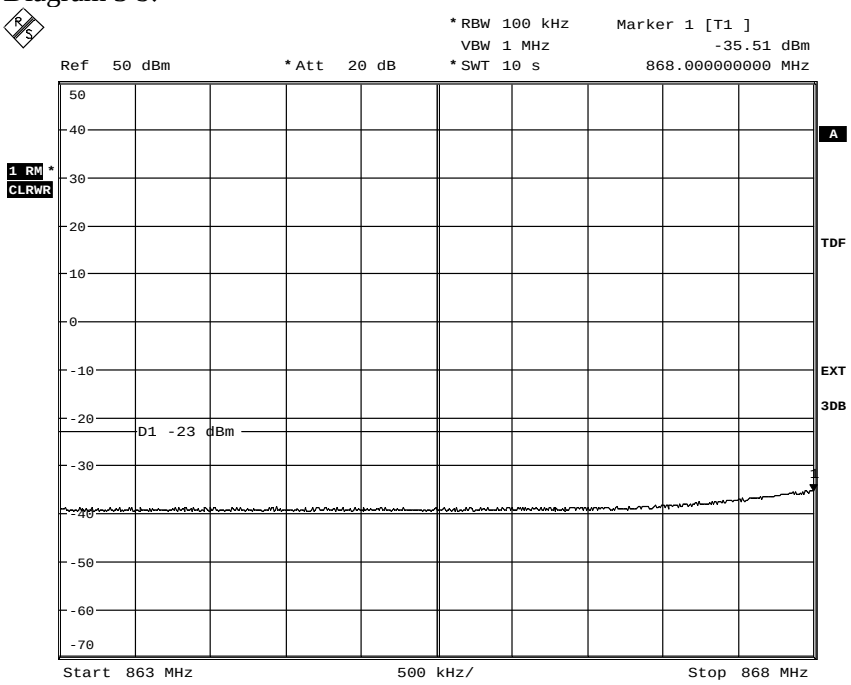
Appendix 4

Diagram 3 a:



Date: 19.DEC.2012 09:46:24

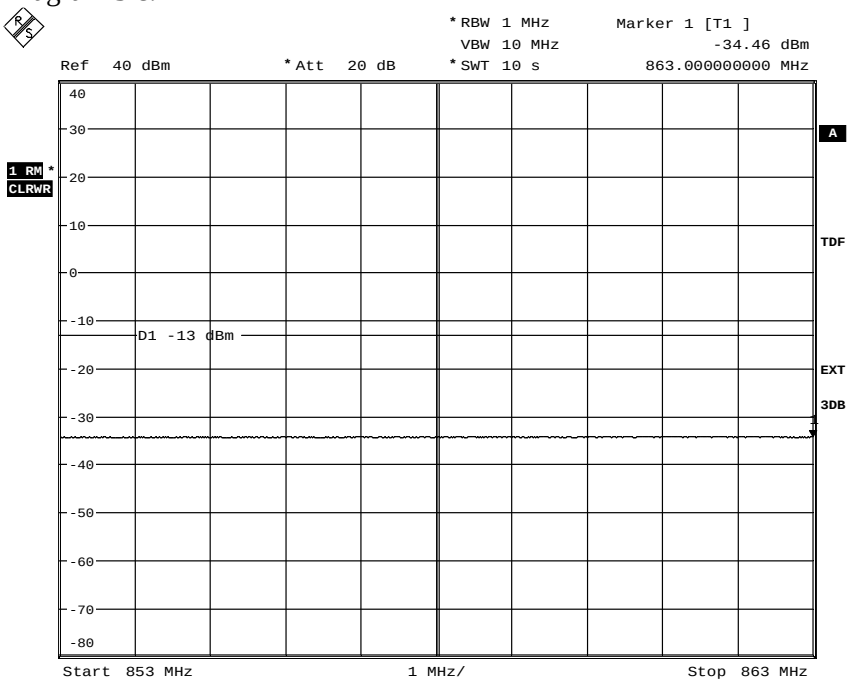
Diagram 3 b:



Date: 19.DEC.2012 09:40:17

Appendix 4

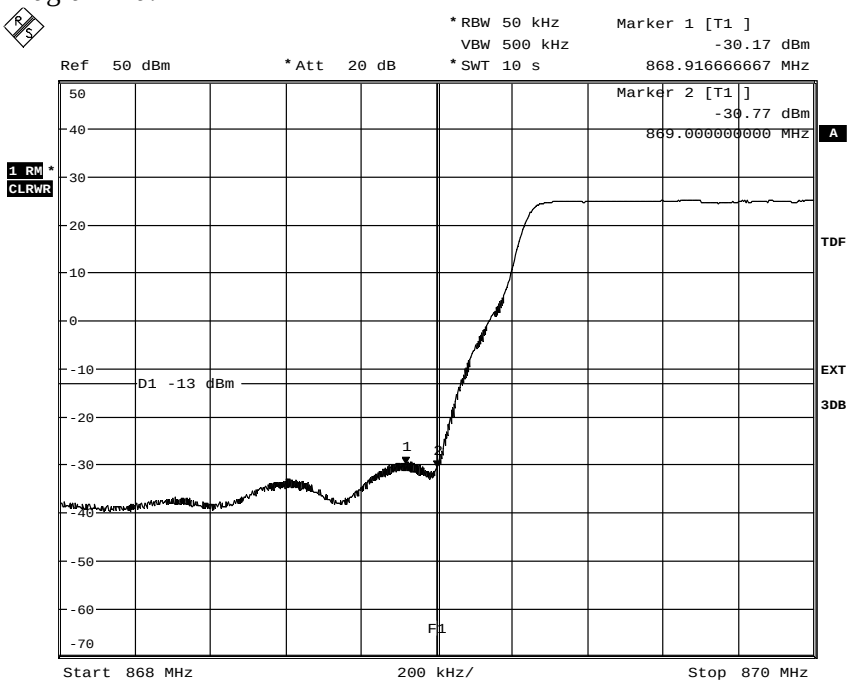
Diagram 3 c:



Date: 19.DEC.2012 09:40:55

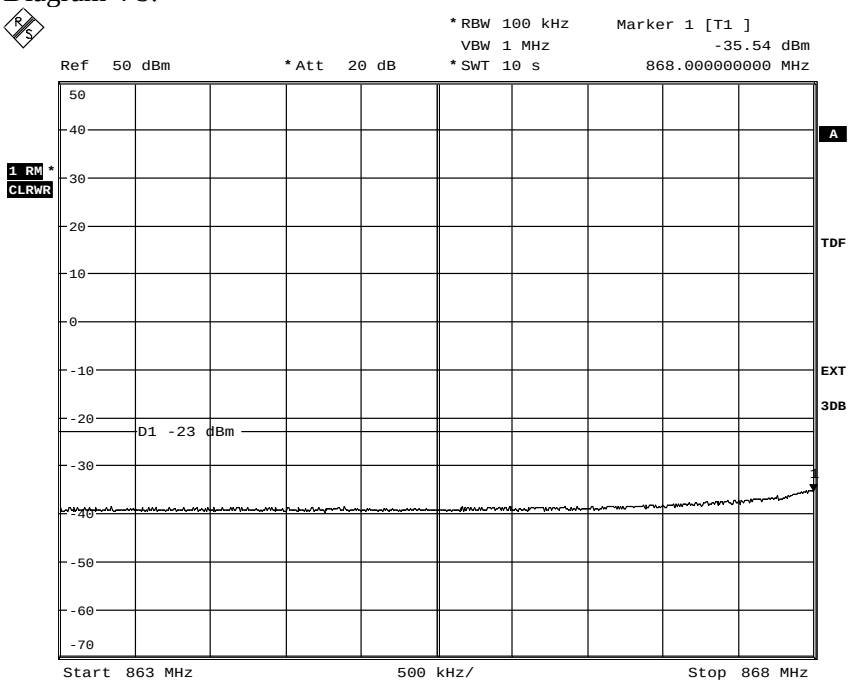
Appendix 4

Diagram 4 a:



Date: 19.DEC.2012 08:59:30

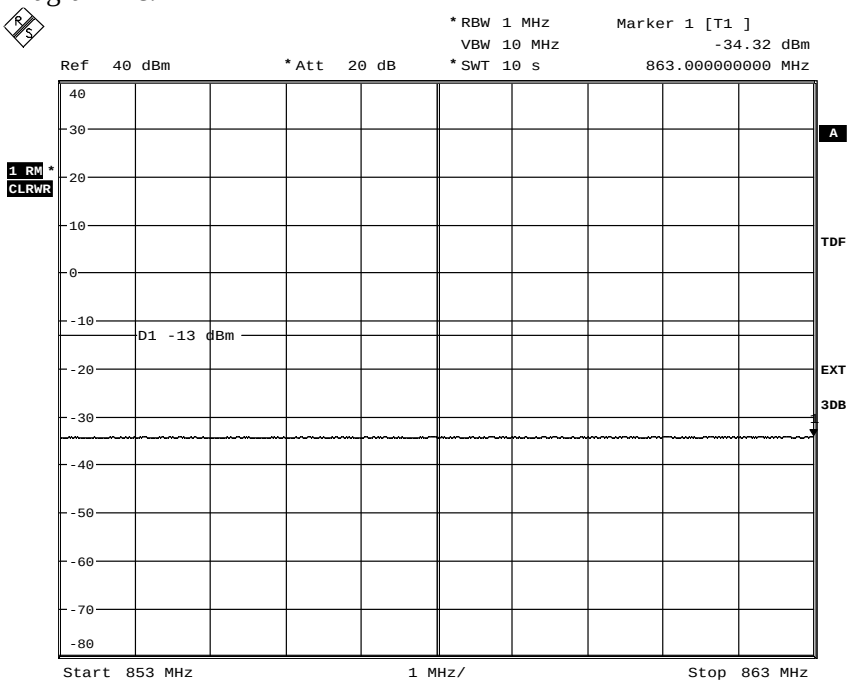
Diagram 4 b:



Date: 19.DEC.2012 09:00:16

Appendix 4

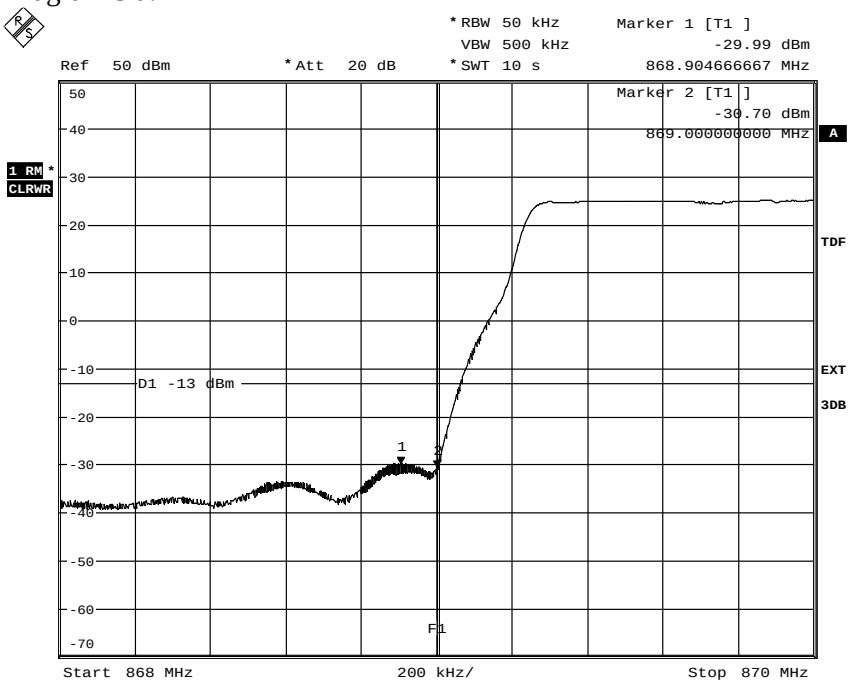
Diagram 4 c:



Date: 19.DEC.2012 09:00:45

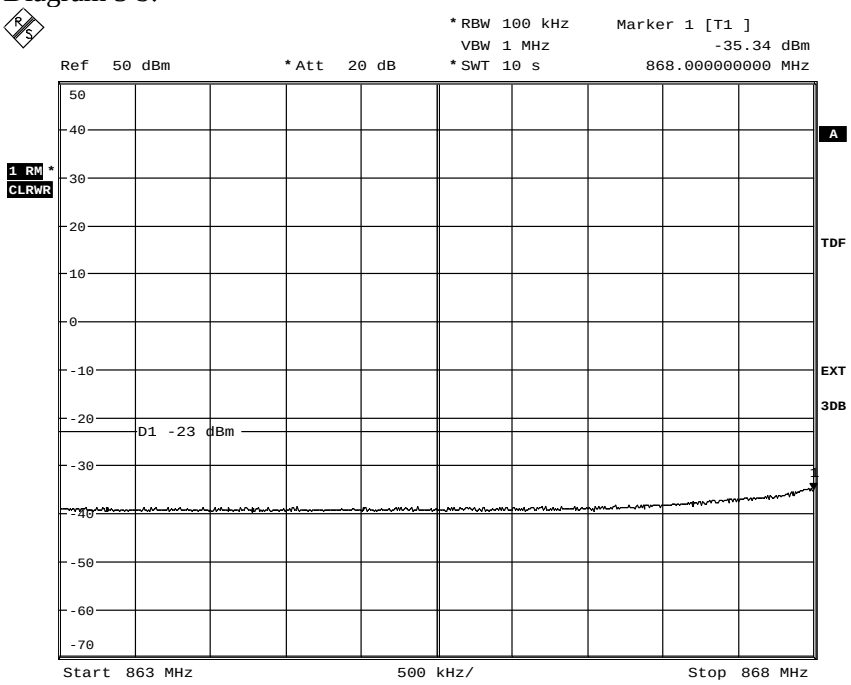
Appendix 4

Diagram 5 a:



Date: 19.DEC.2012 09:43:45

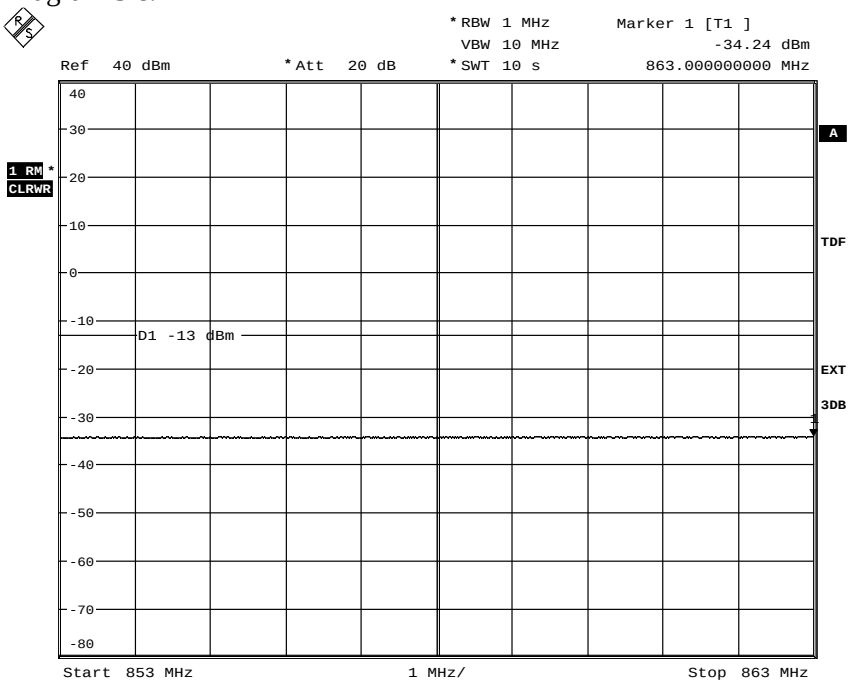
Diagram 5 b:



Date: 19.DEC.2012 09:44:19

Appendix 4

Diagram 5 c:



Date: 19.DEC.2012 09:44:52

Appendix 4

Diagram 6 a:

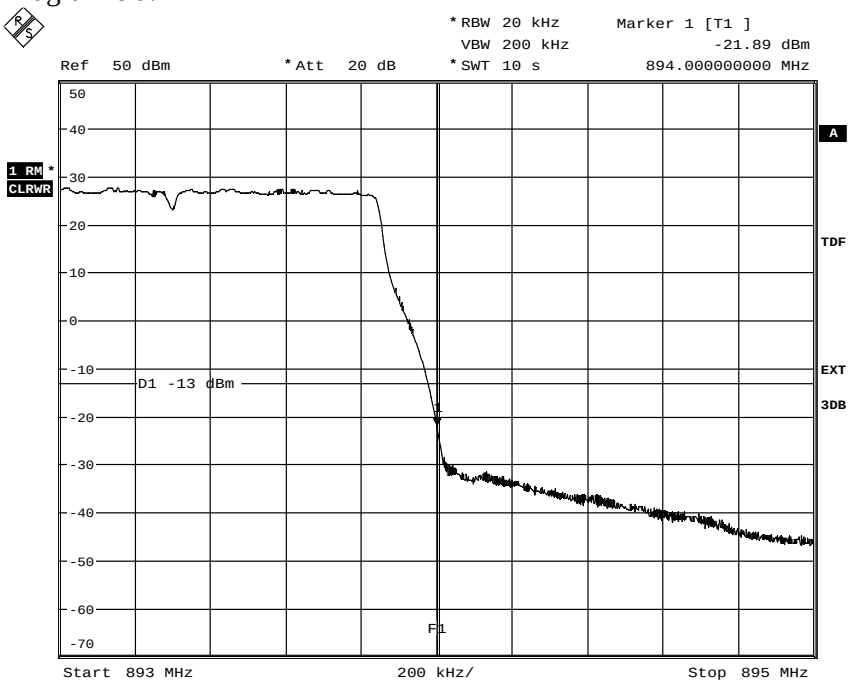


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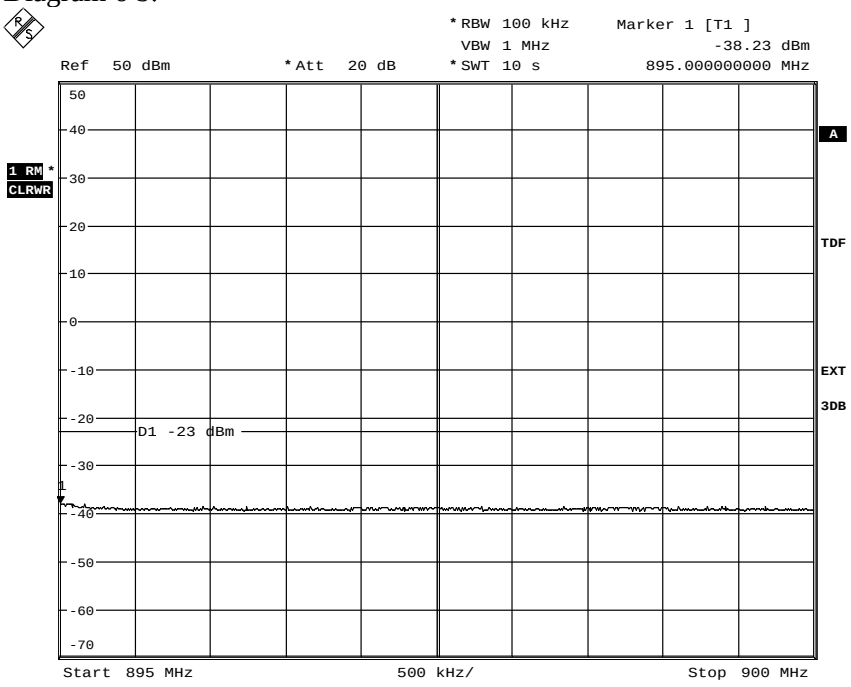
Diagram 6 b:



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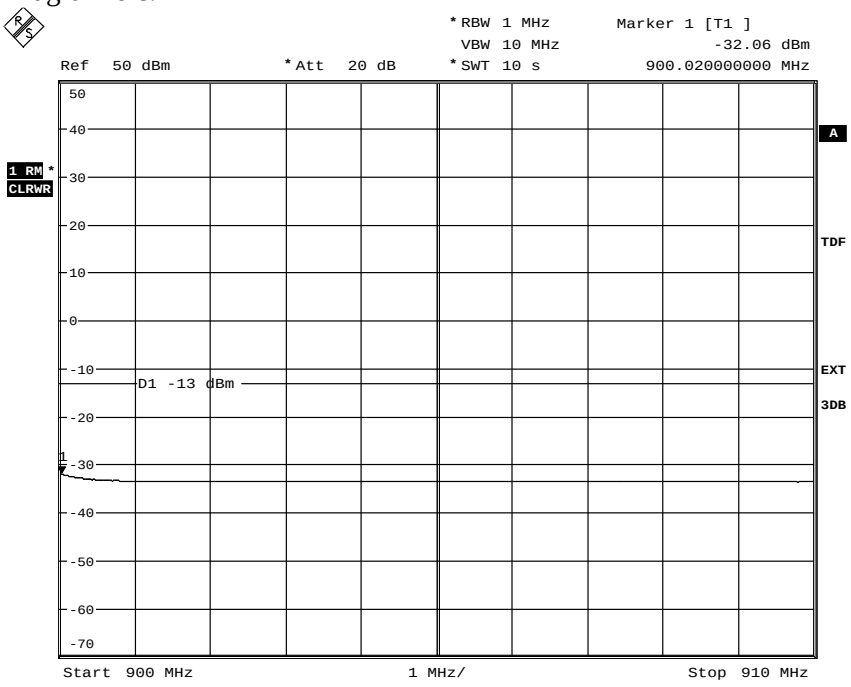
Appendix 4

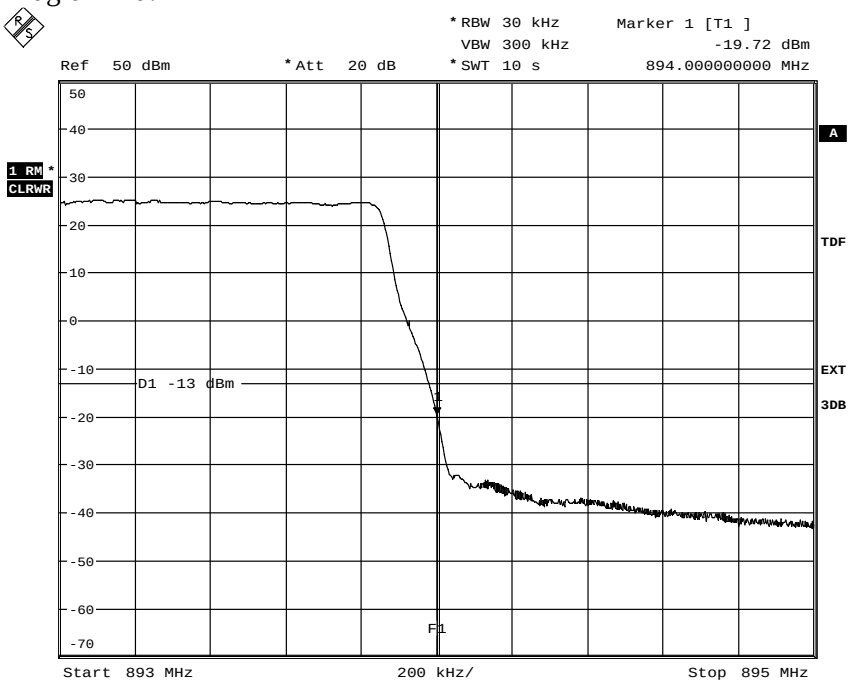
Diagram 6 c:



Date: 19.DEC.2012 09:09:22

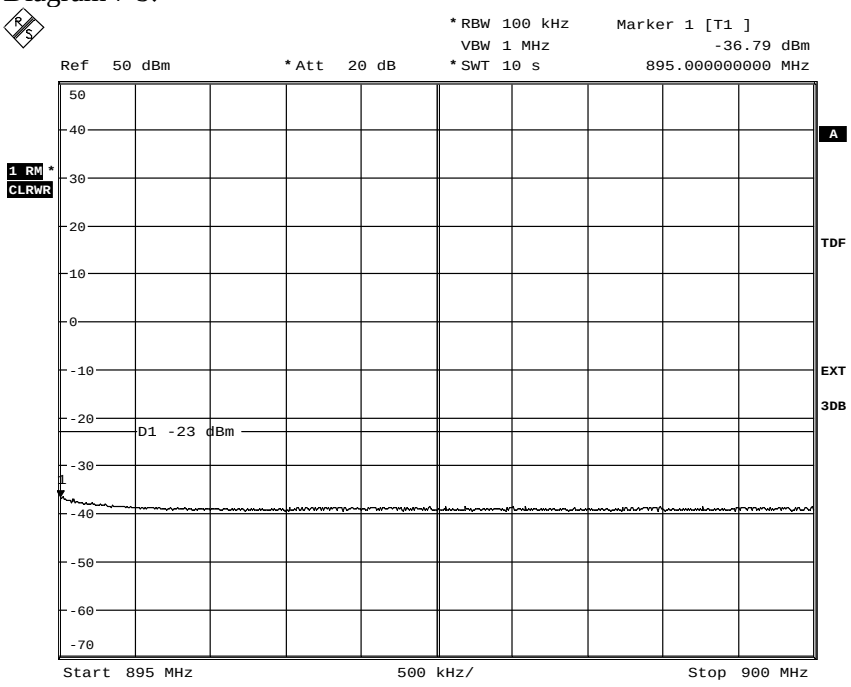
Appendix 4

Diagram 7 a:



Date: 19.DEC.2012 09:07:16

Diagram 7 b:



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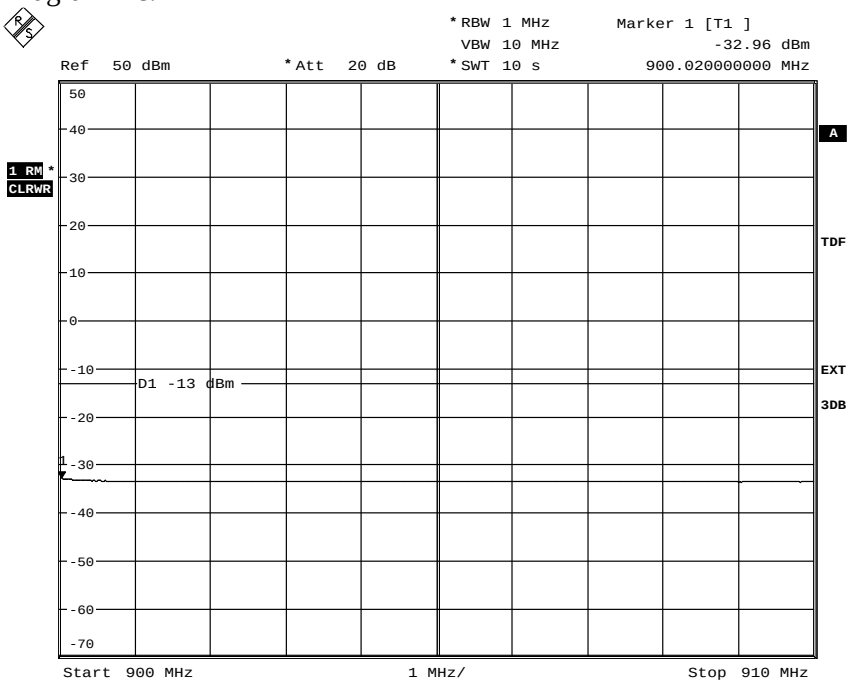
Appendix 4

Diagram 7 c:



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Appendix 4

Diagram 8 a:

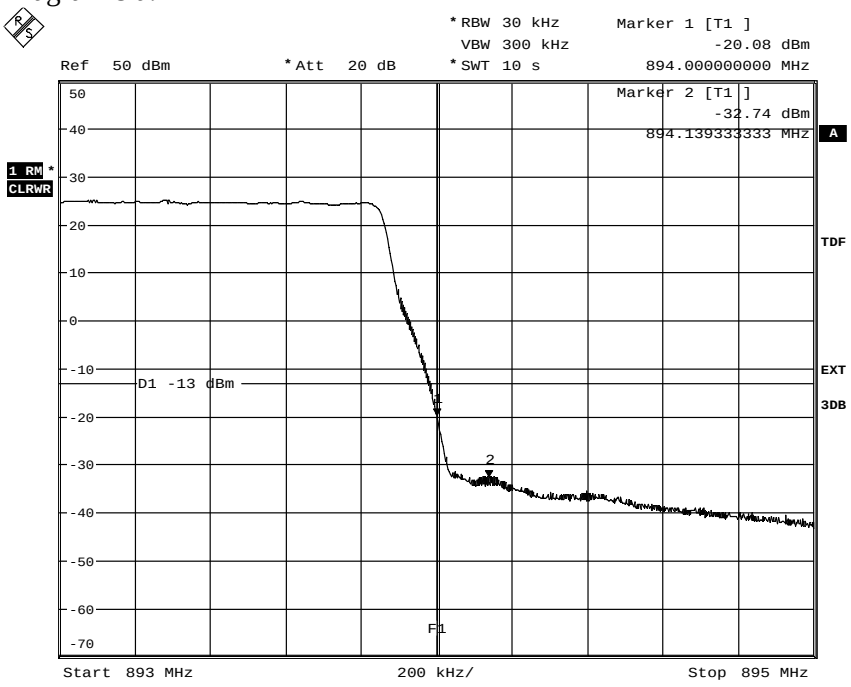

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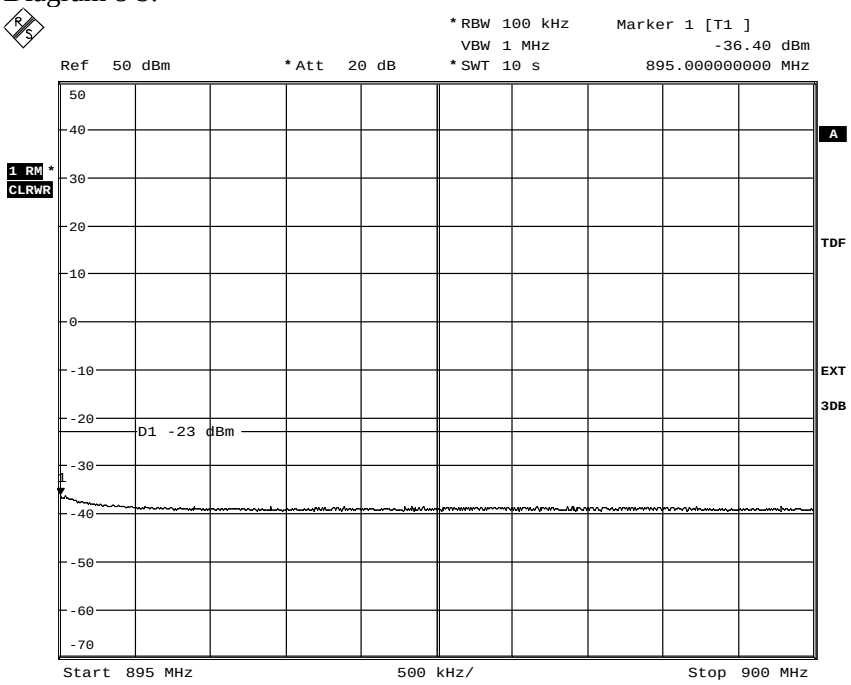
Diagram 8 b:



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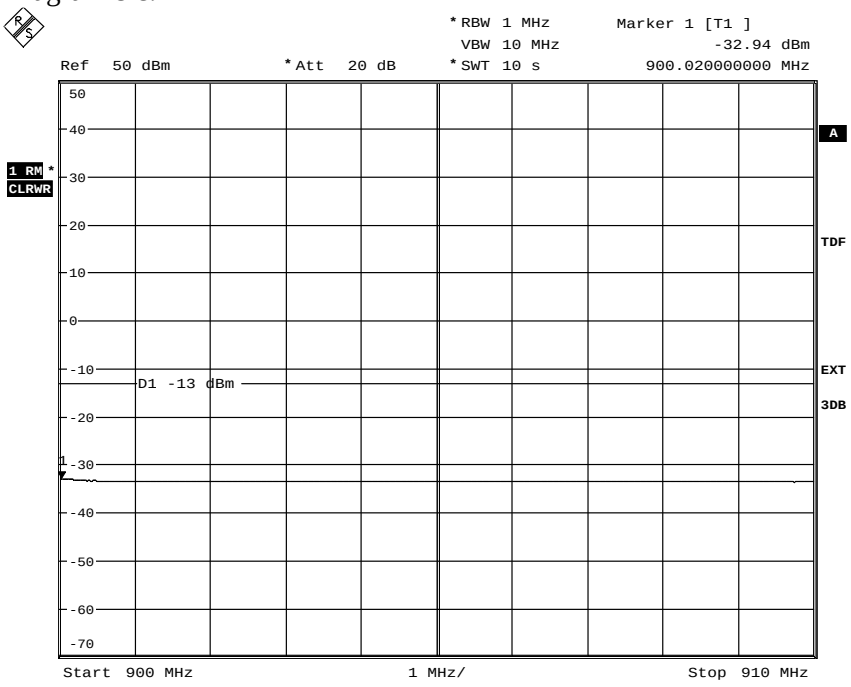
Appendix 4

Diagram 8 c:



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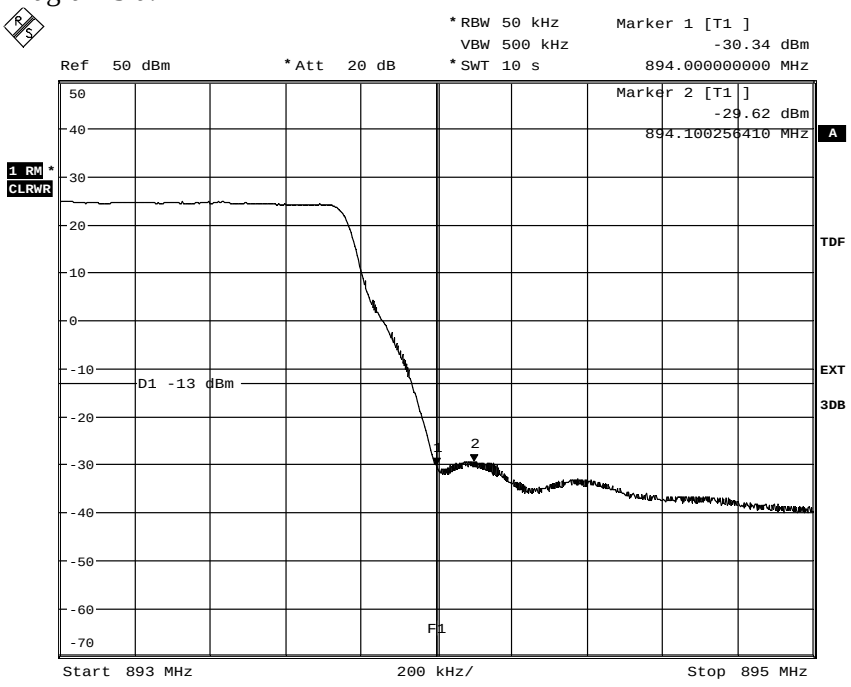
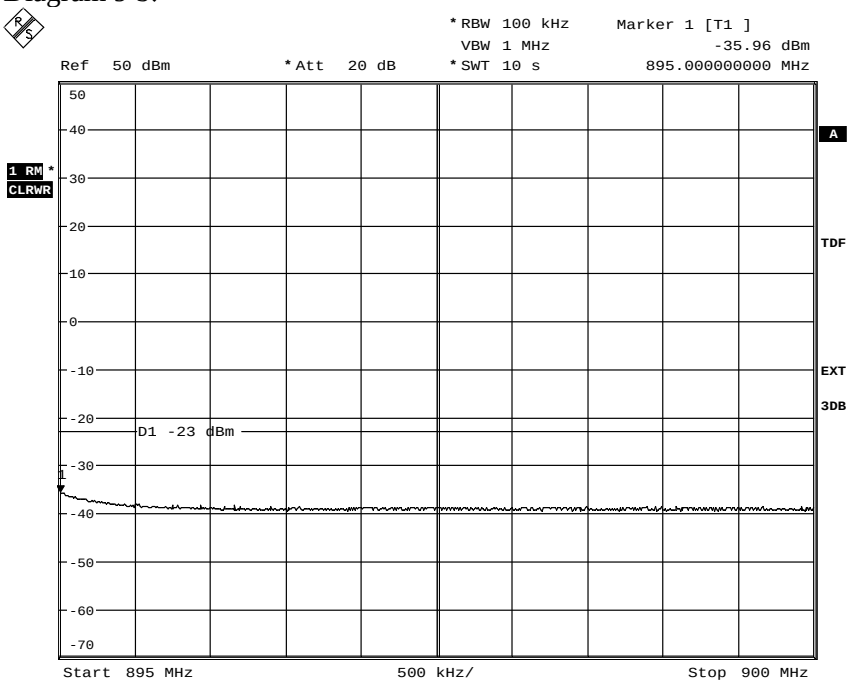
Appendix 4

Diagram 9 a:



Date: 19.DEC.2012 15:32:08

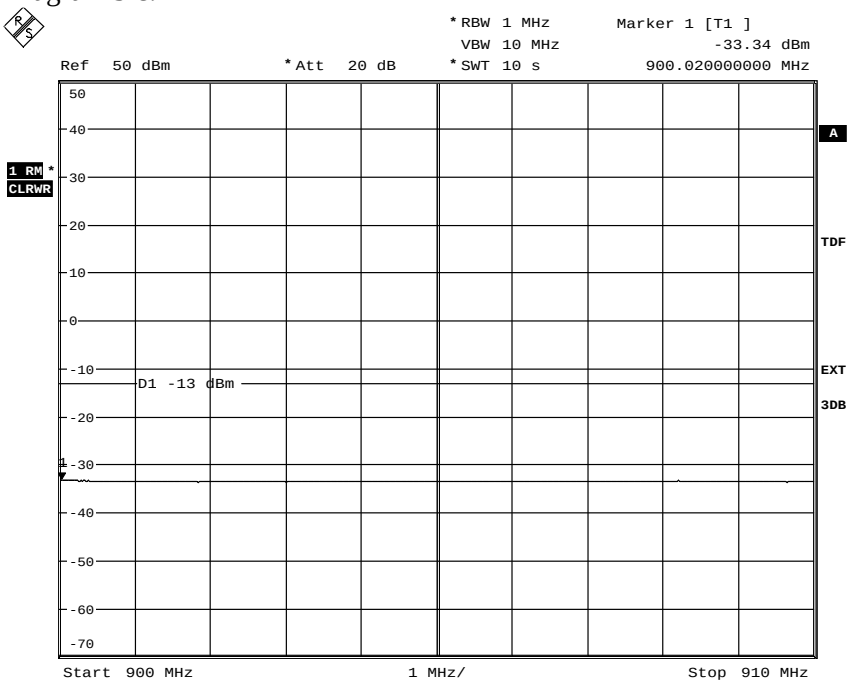
Diagram 9 b:



Date: 19.DEC.2012 09:03:50

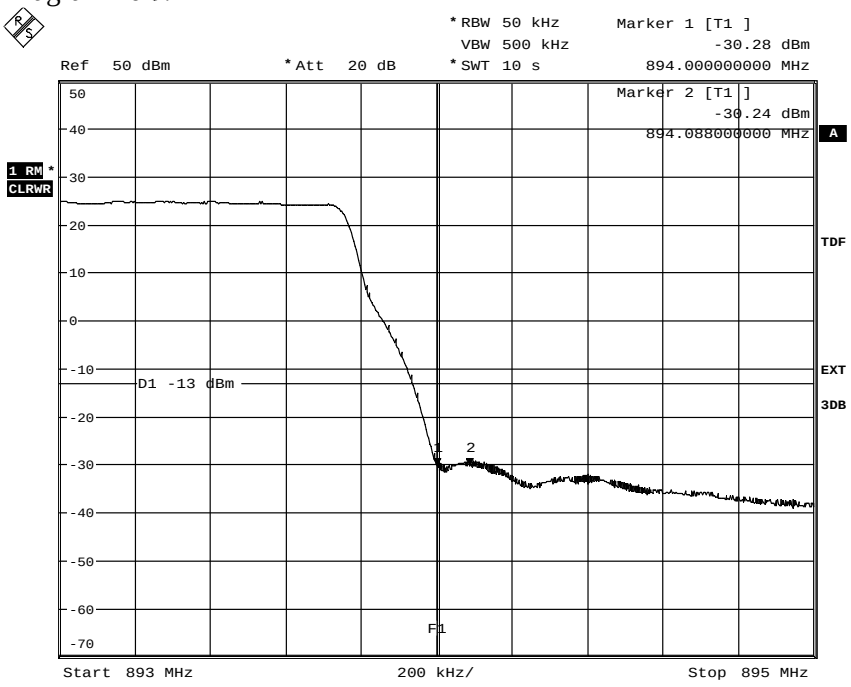
Appendix 4

Diagram 9 c:



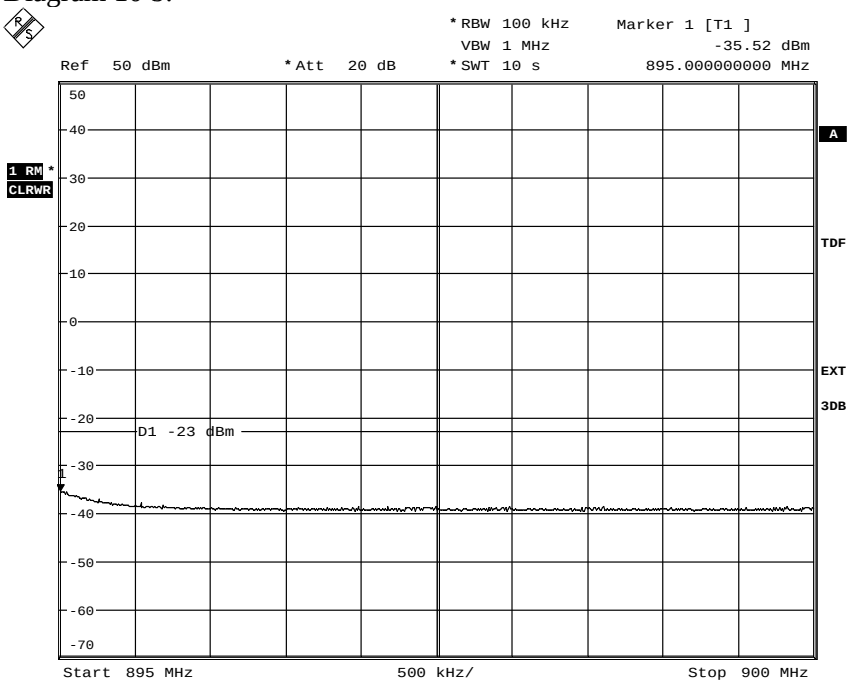
Appendix 4

Diagram 10 a:



Date: 19.DEC.2012 09:51:07

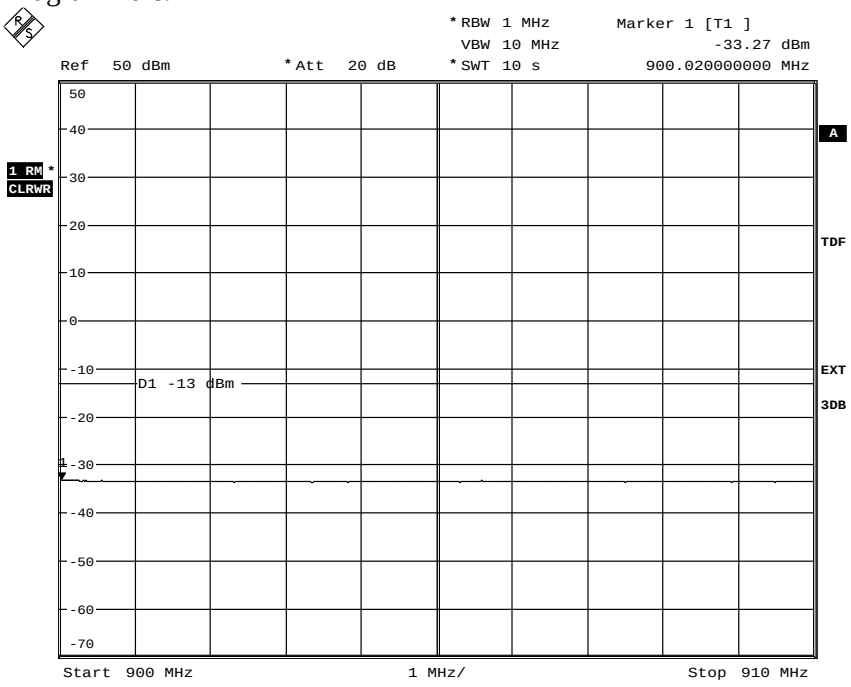
Diagram 10 b:



Date: 19.DEC.2012 09:51:48

Appendix 4

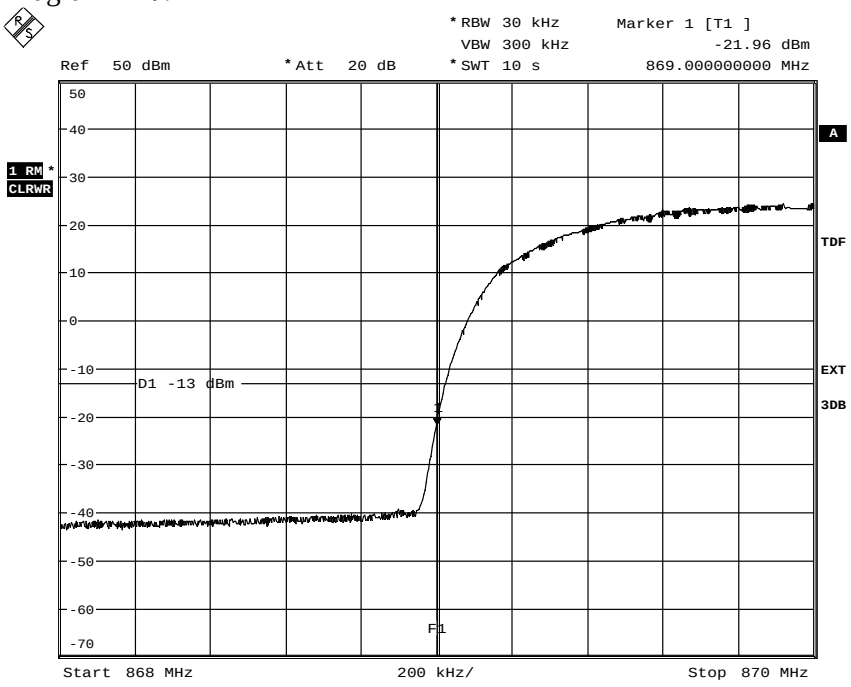
Diagram 10 c:



Date: 19.DEC.2012 09:52:18

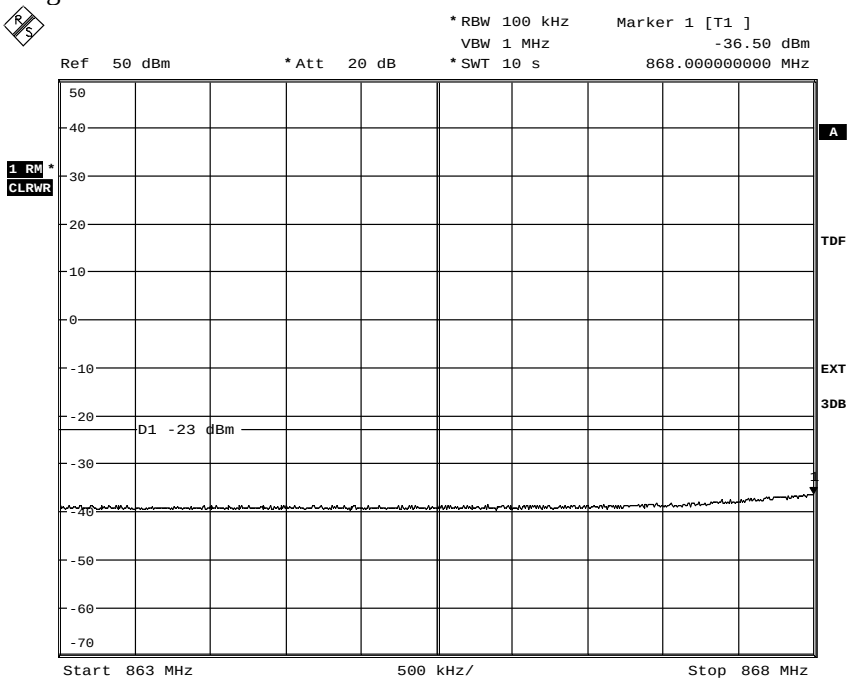
Appendix 4

Diagram 11 a:



Date: 18.DEC.2012 10:39:31

Diagram 11 b:



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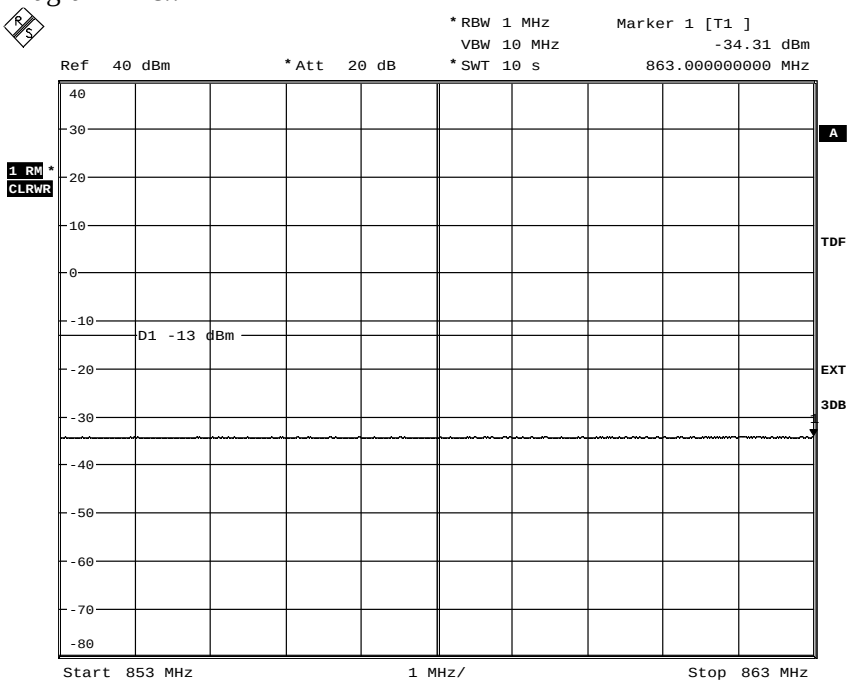
Appendix 4

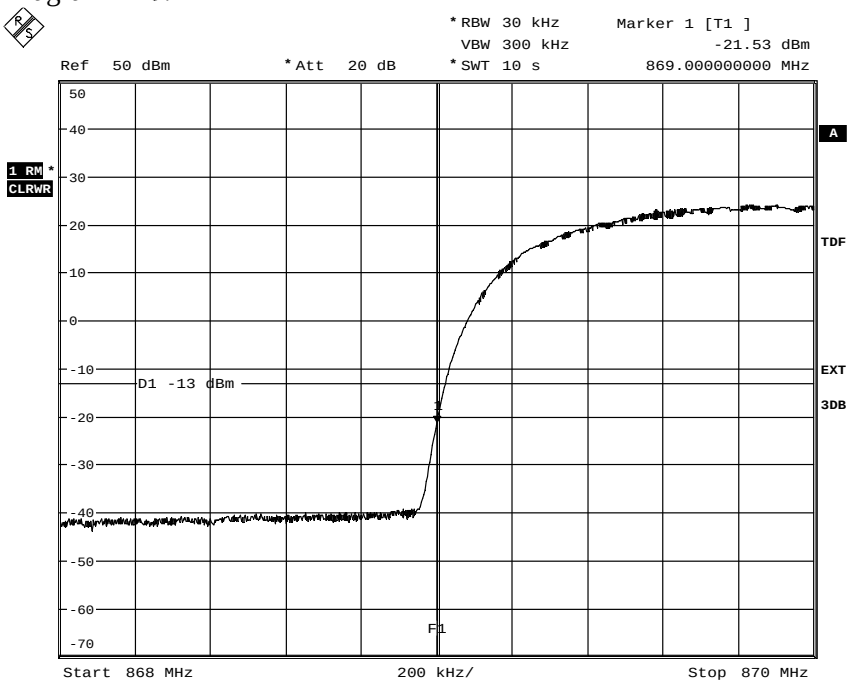
Diagram 11 c::



Date: 18.DEC.2012 10:40:21

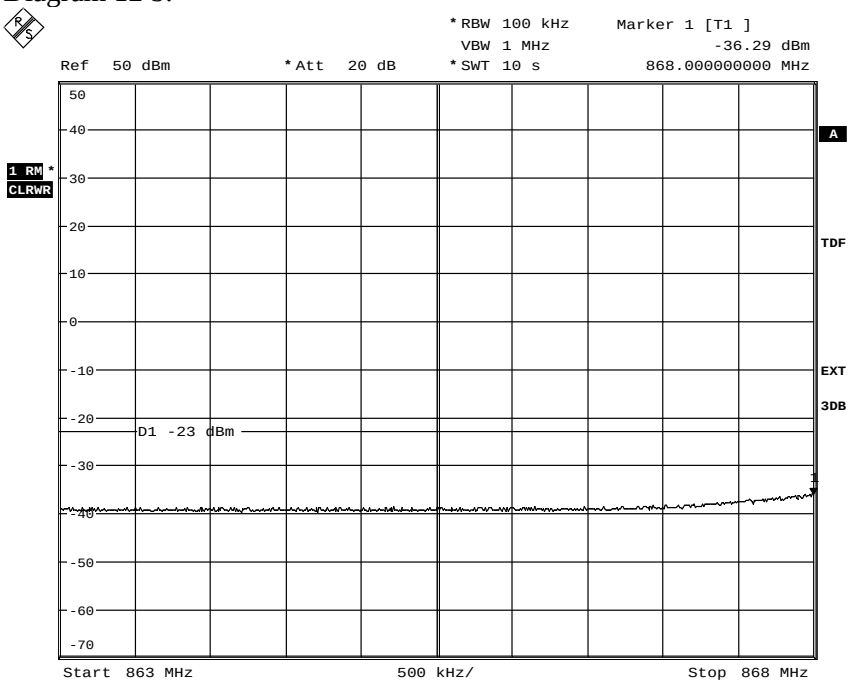
Appendix 4

Diagram 12 a:



Date: 18.DEC.2012 11:41:43

Diagram 12 b:



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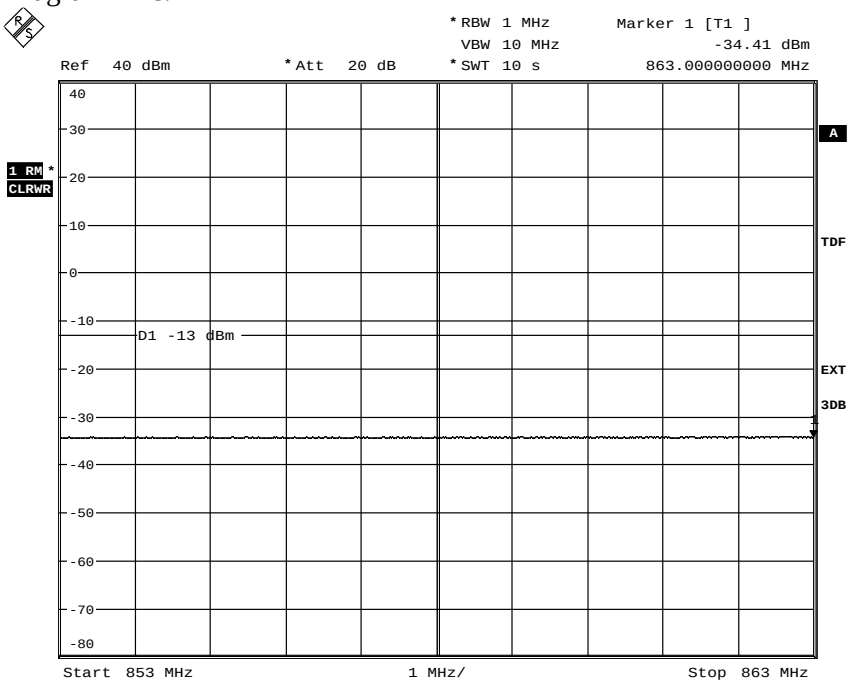
Appendix 4

Diagram 12 c:



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Appendix 4

Diagram 13 a:

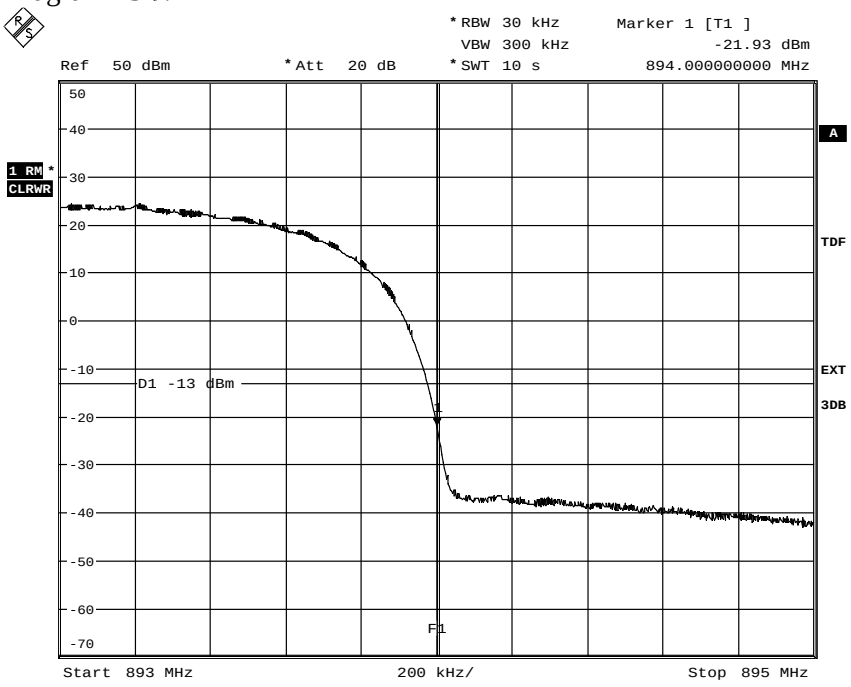

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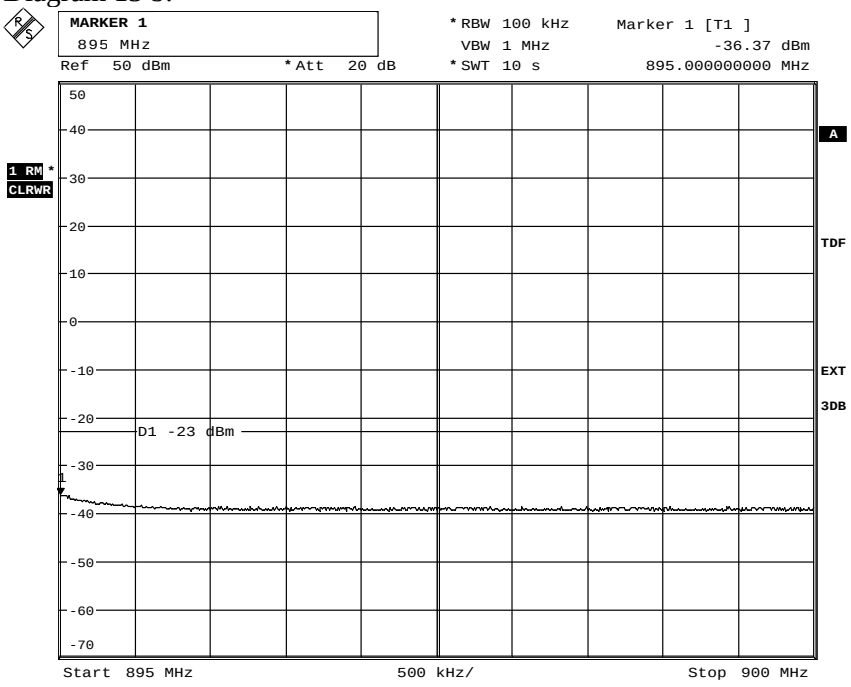
Diagram 13 b:



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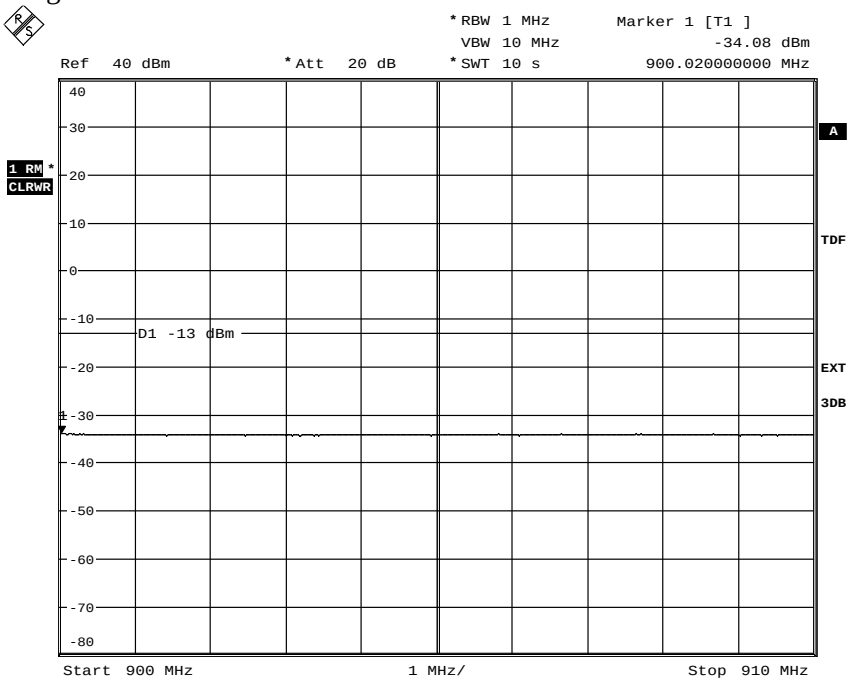
Appendix 4

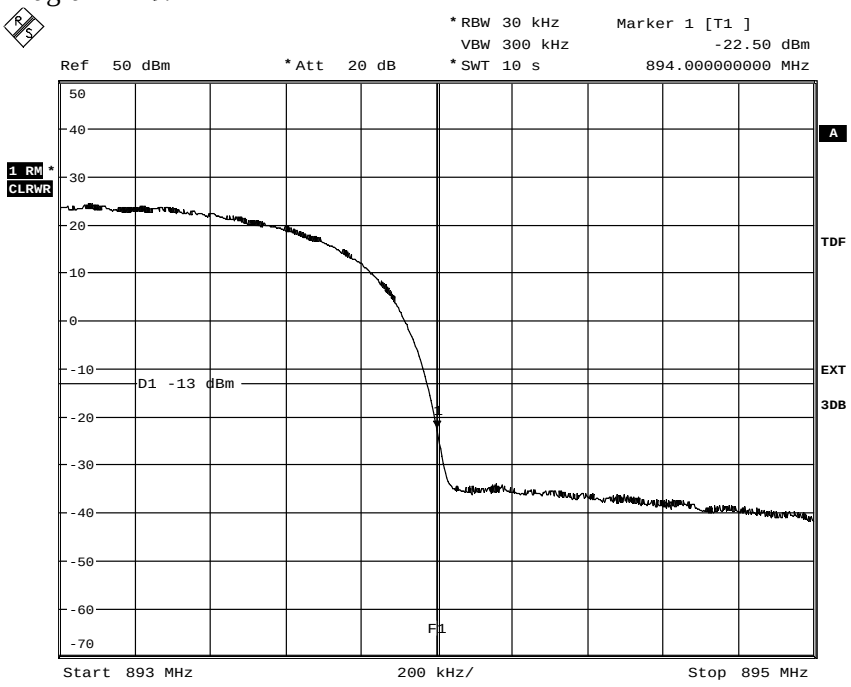
Diagram 13 c:



Date: 18.DEC.2012 10:52:29

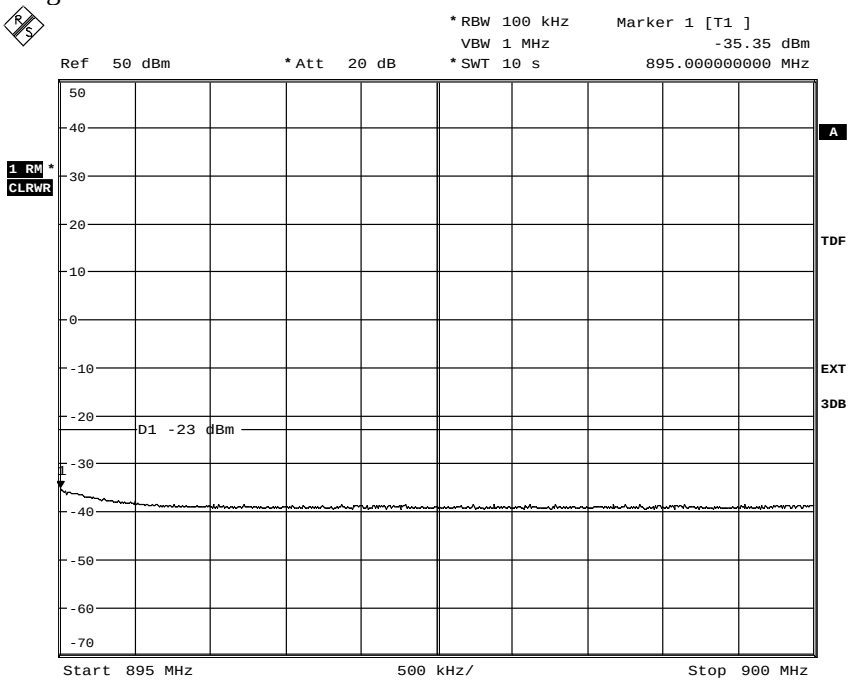
Appendix 4

Diagram 14 a:



Date: 18.DEC.2012 11:16:31

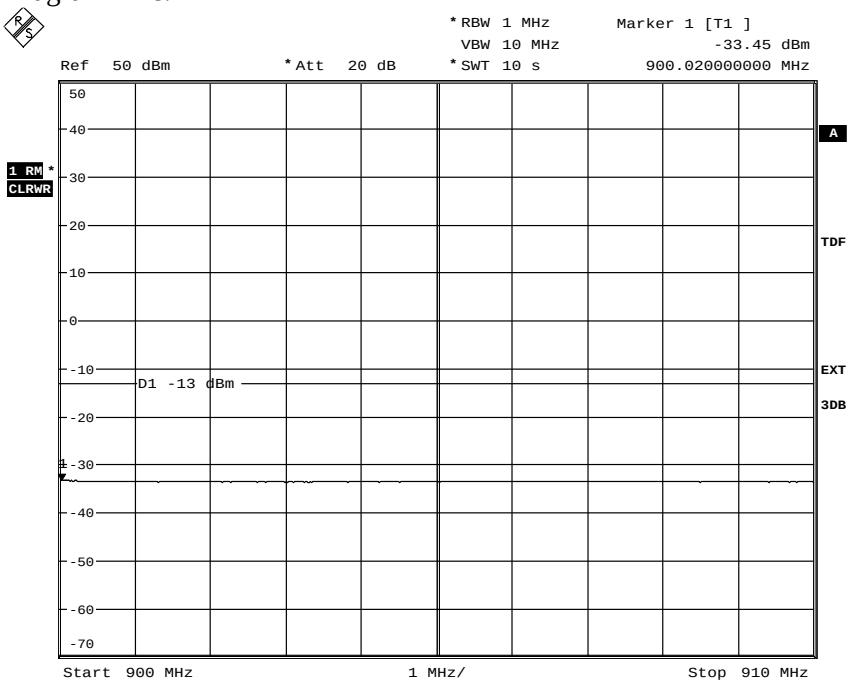
Diagram 14 b:



Date: 18.DEC.2012 11:17:57

Appendix 4

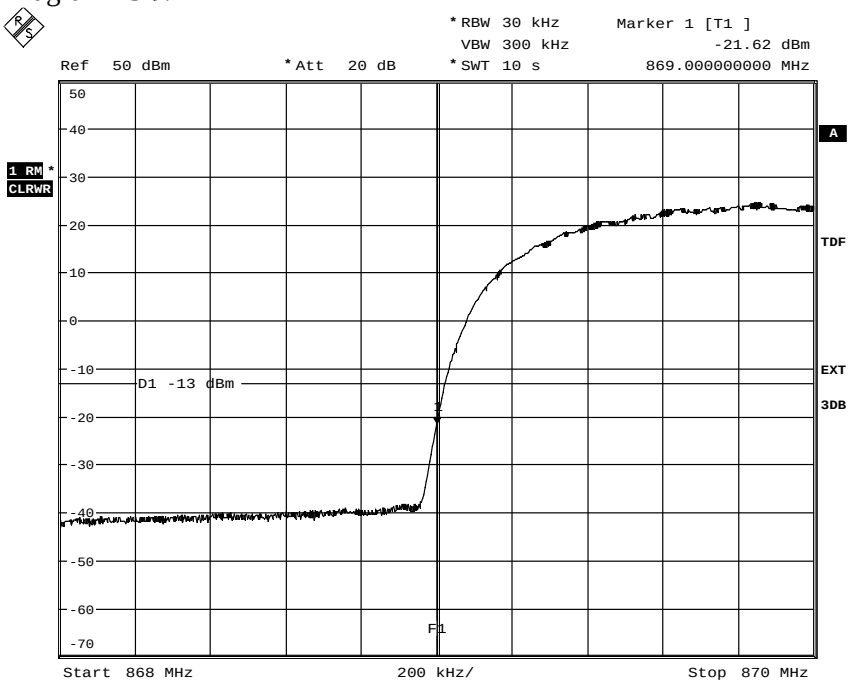
Diagram 14 c:



Date: 18.DEC.2012 11:18:44

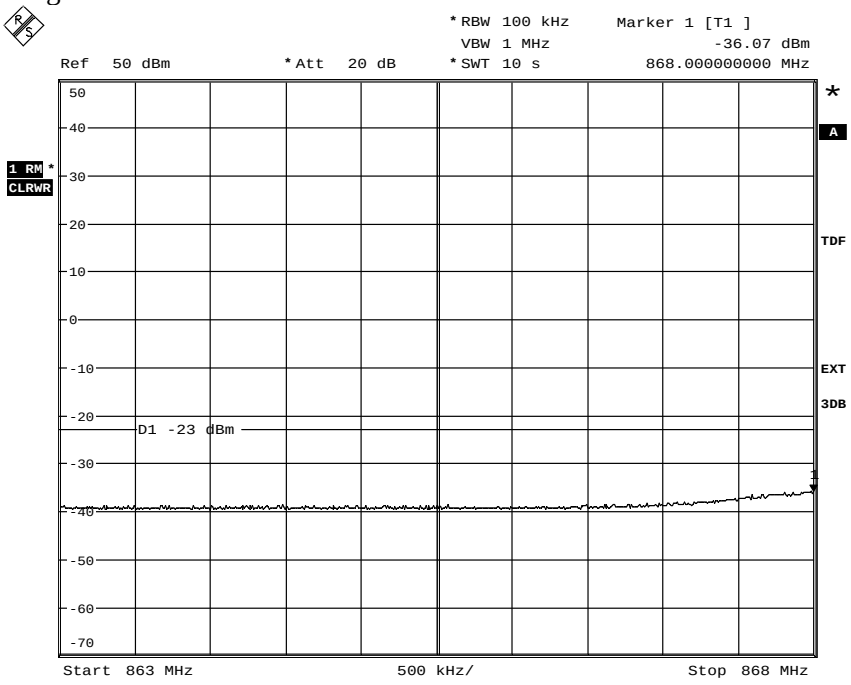
Appendix 4

Diagram 15 a:



Date: 17.DEC.2012 13:04:27

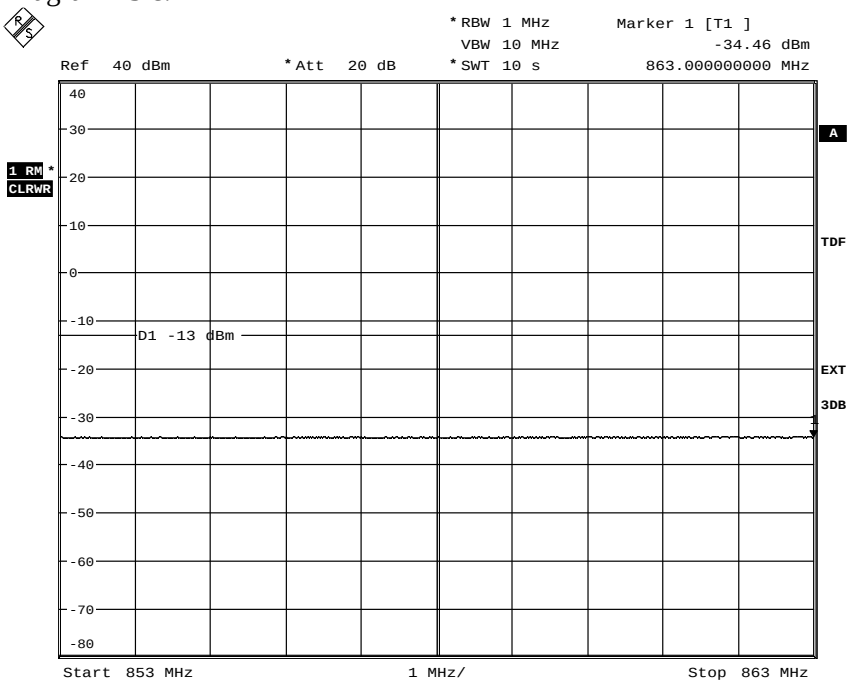
Diagram 15 b:



Date: 17.DEC.2012 13:05:22

Appendix 4

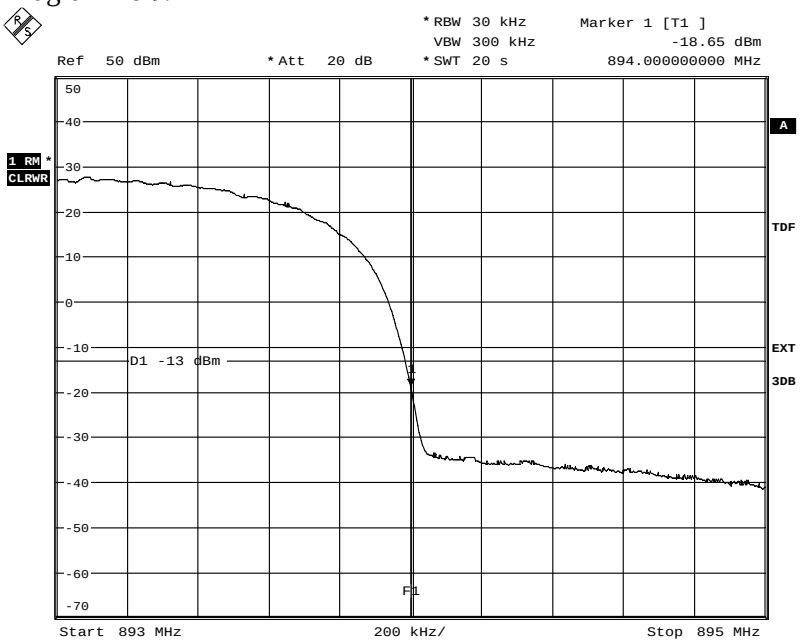
Diagram 15 c:



Date: 17.DEC.2012 13:07:27

Appendix 4

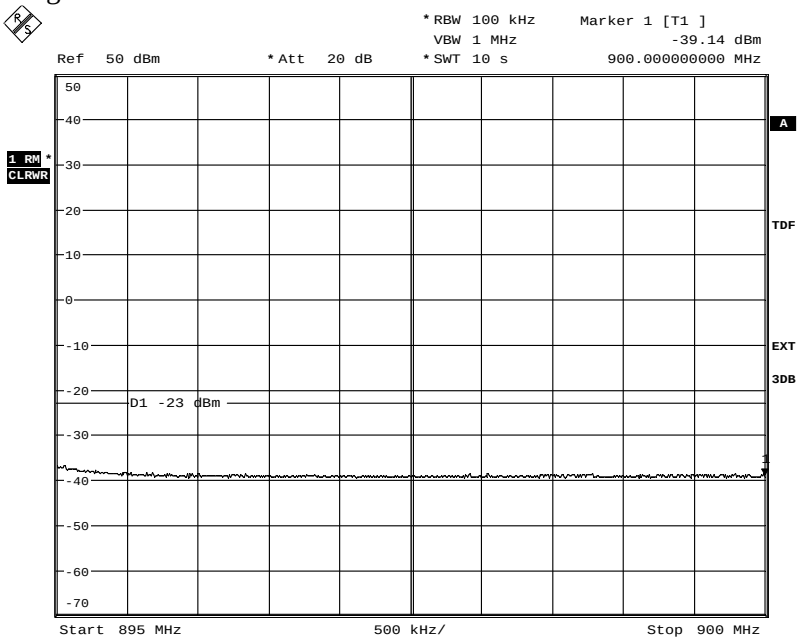
Diagram 16 a:



Date: 17.DEC.2012 12:50:33

Note: Values in above trace need to be reduced by 3.26 dB due to an erroneous transducer being used during the measurement. The correct marker value at the upper band-edge is -21.91 dBm.

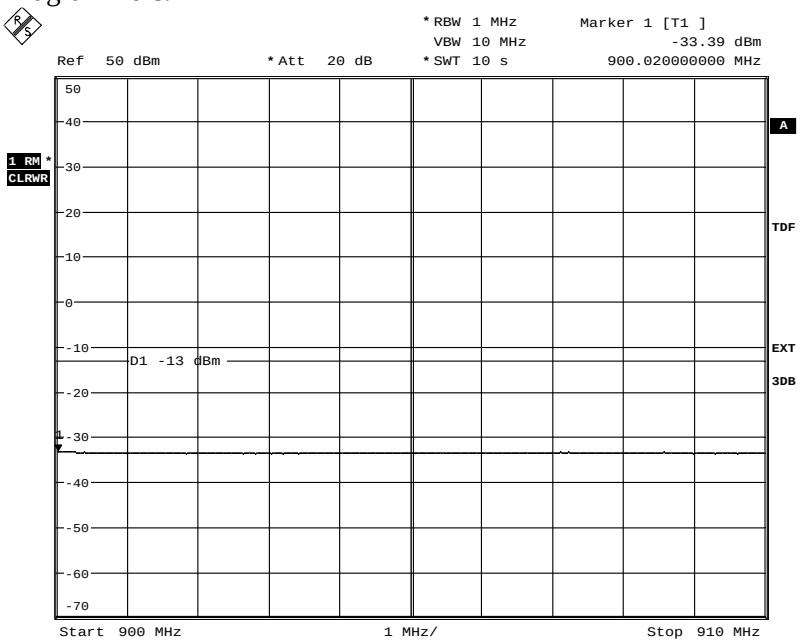
Diagram 16 b:



Date: 17.DEC.2012 12:52:49

Appendix 4

Diagram 16 c:



Date: 17.DEC.2012 12:54:01

Conducted spurious emission measurements according to CFR 47 2.1051 / IC RSS-132 5.5

Date	Temperature	Humidity
2012-12-17	23 °C ± 3 °C	22 % ± 5 %
2012-12-18	22 °C ± 3 °C	22 % ± 5 %
2012-12-19	23 °C ± 3 °C	22 % ± 5 %

Test set-up and procedure

The measurements were made per definition in § 22.917, but with a wider RBW of 1 MHz. The output was connected to a spectrum analyzer with the RMS detector activated. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements.

To address the MIMO aspect of the present EUT with 2 antenna ports, additional 3 dB [10 log (2)] margin shall be added to trace values shown according to method 2 “measure and add 10 log(N_{ANT})” of FCC KDB662911 D01 Multiple Transmitter Output v01r02 before comparing the results to the limit.

Measurement equipment	SP number
Rohde & Schwarz signal analyzer FSQ40	504 143
RF attenuator	900 233
RF attenuator	901 384
Directional coupler	901 496
High pass filter	901 501
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

Diagram	BW configuration / [MHz]	Tested frequency	Tested Port
LTE single RAT, MIMO mode, single carrier			
1 a+b	1.4 MHz	M	RF A
2 a+b	1.4 MHz	M	RF B
3 a+b	20 MHz	M	RF A
4 a+b	20 MHz	M	RF B
WCDMA single RAT, MIMO mode, single carrier			
5 a+b	5 MHz	B	RF A
6 a+b	5 MHz	M	RF A
7 a+b	5 MHz	M	RF B
8 a+b	5 MHz	T	RF A
WCDMA single RAT, MIMO mode, 2 carrier			
9 a+b	5 MHz	B2	RF A
10 a+b+c	5 MHz	M2	RF A
11 a+b+c	5 MHz	M2	RF B
12 a+b	5 MHz	T2	RF A
WCDMA single RAT, conventional mode, single carrier			
13 a+b	5 MHz	M	RF A
WCDMA single RAT, conventional mode, 2 carrier			
14 a+b+c	5 MHz	M2	RF A

Note: Test of 2 carriers was deemed sufficient to represent worst-case multi-carrier scenarios.

WCDMA+LTE MSR, conventional mode			
	WCDMA / LTE		
15 a+b+c	5 / 1.4 MHz	M3	RF A
16 a+b+c	5 / 3 MHz	M3	RF A
17 a+b+c	5 / 5 MHz	M3	RF A
18 a+b+c	5 / 5 MHz	M3	RF B

Note: Test of only the mid-constellation for MSR was deemed sufficient. The operating bandwidth and the supported instantaneous radio bandwidth are similar (25 MHz respectively 20 MHz) and the used constellation's resulting IM products are generated just outside the operating band.

Remarks

The emission at 9 kHz on some of the plots was not generated by the test object. A complementary measurement with a smaller RBW showed that it was related to the LO feed-through. The upper frequency boundary covers 10x the highest TX fundamental frequency.

Where multiple requirements apply, the most stringent requirement is considered for compliance assessment.

Limits

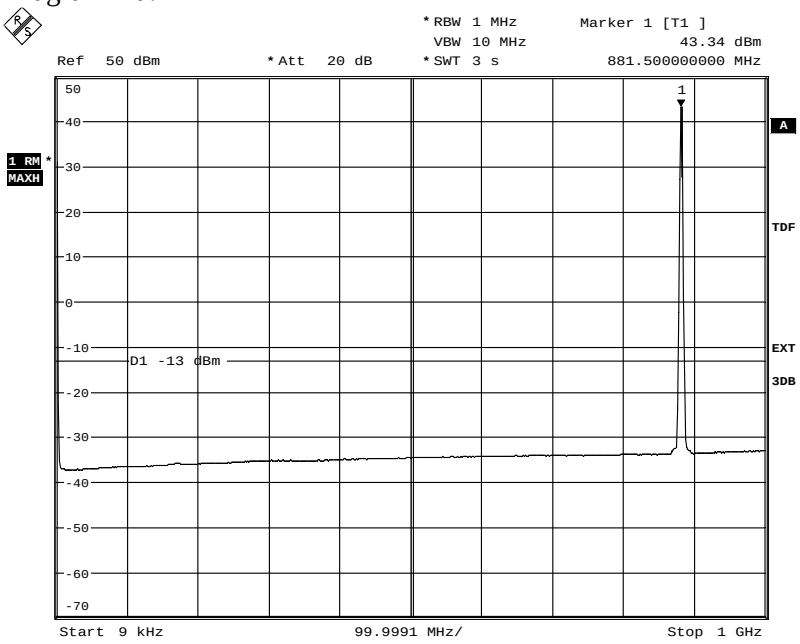
CFR 47 § 22.917, IC RSS-132 5.5:

Outside a licensee's frequency band(s) of operation the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, resulting in a limit of -13 dBm.

Complies?	Yes

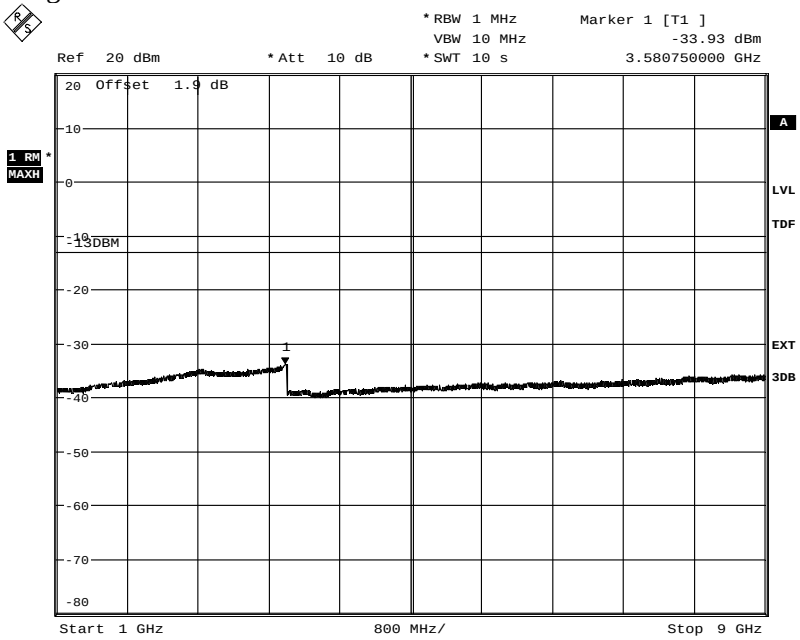
Appendix 5

Diagram 1 a:



Date: 19.DEC.2012 08:08:52

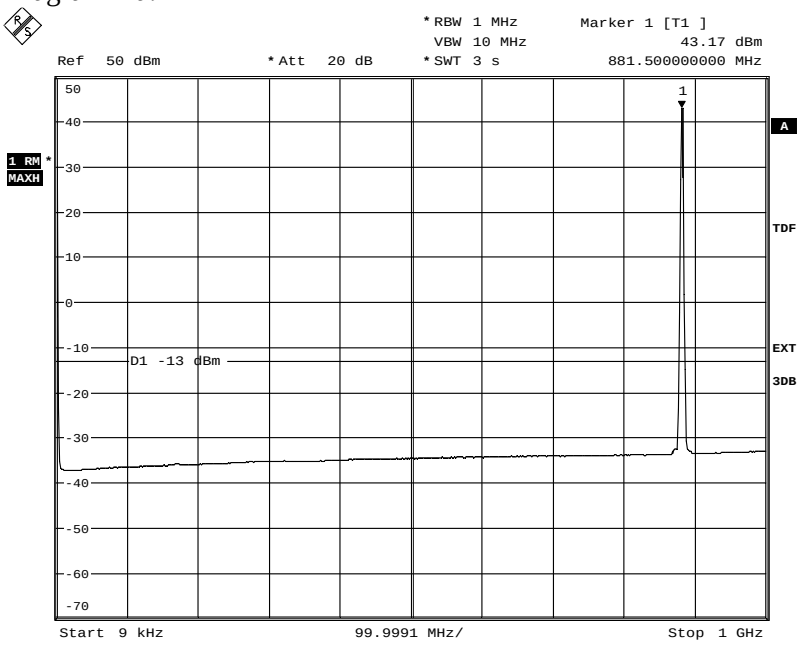
Diagram 1 b:



Date: 19.DEC.2012 08:25:03

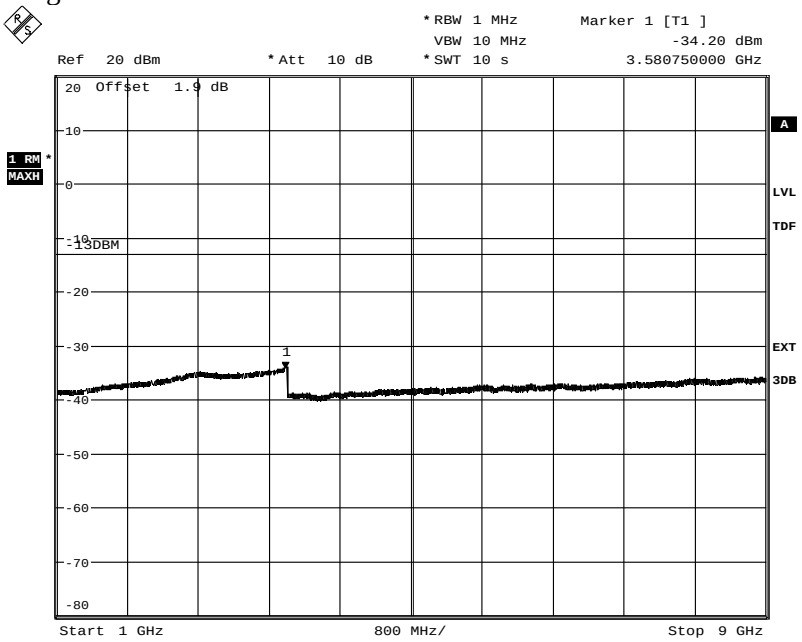
Appendix 5

Diagram 2 a:



Date: 19.DEC.2012 08:10:53

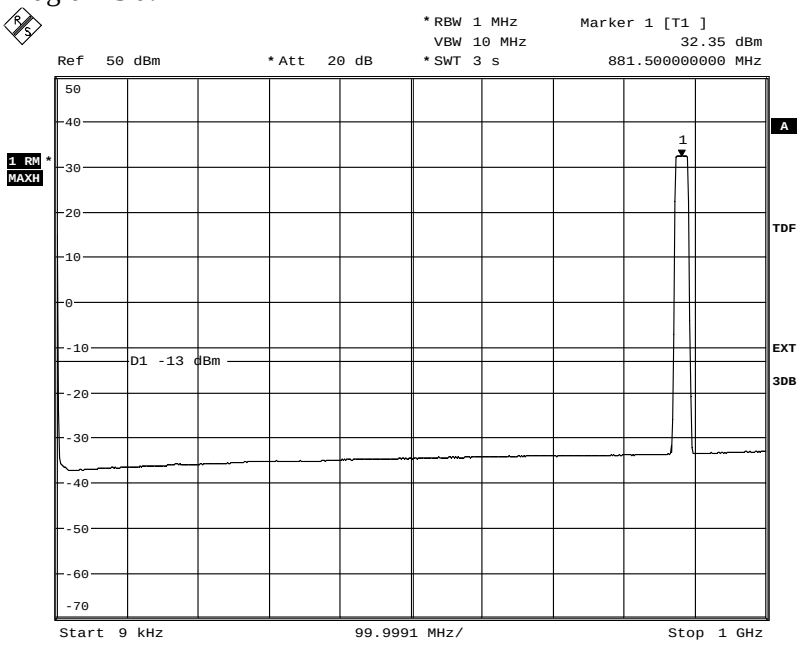
Diagram 2 b:



Date: 19.DEC.2012 08:23:24

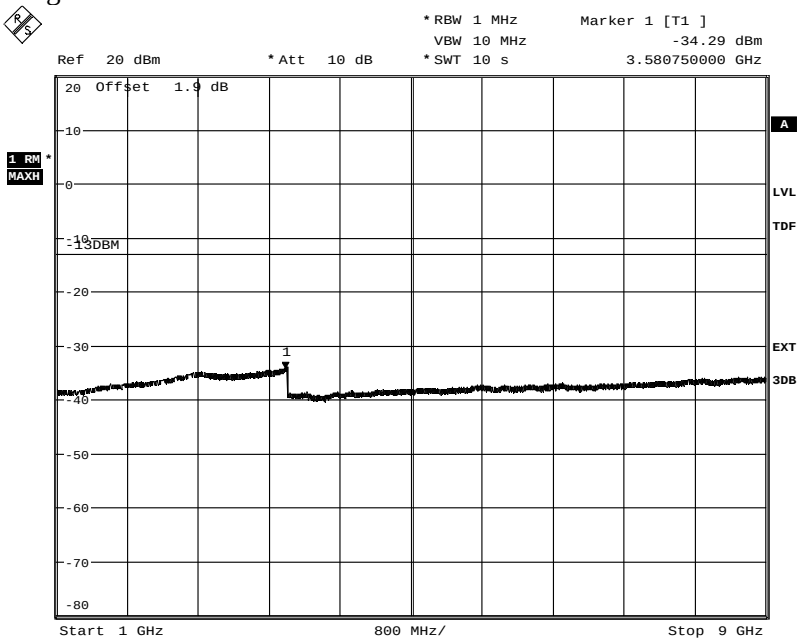
Appendix 5

Diagram 3 a:



Date: 19.DEC.2012 08:44:04

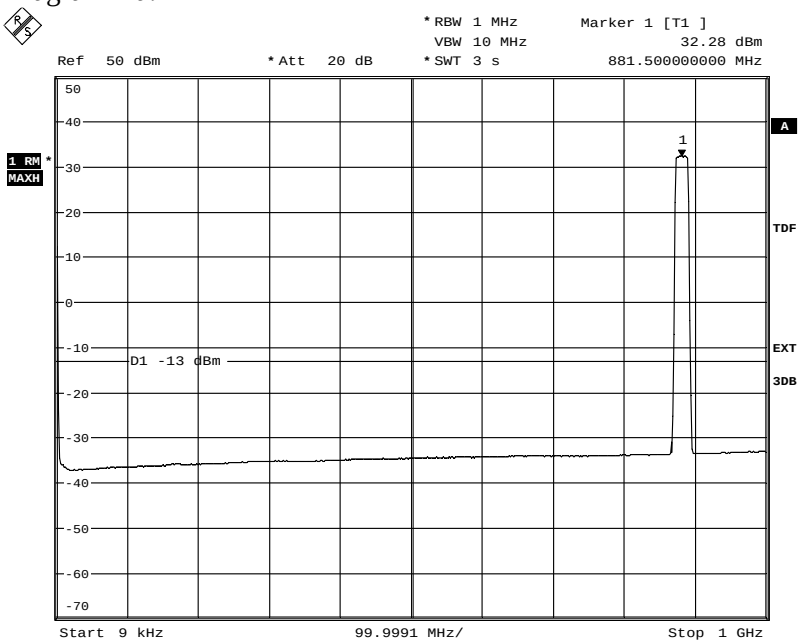
Diagram 3 b:



Date: 19.DEC.2012 08:47:22

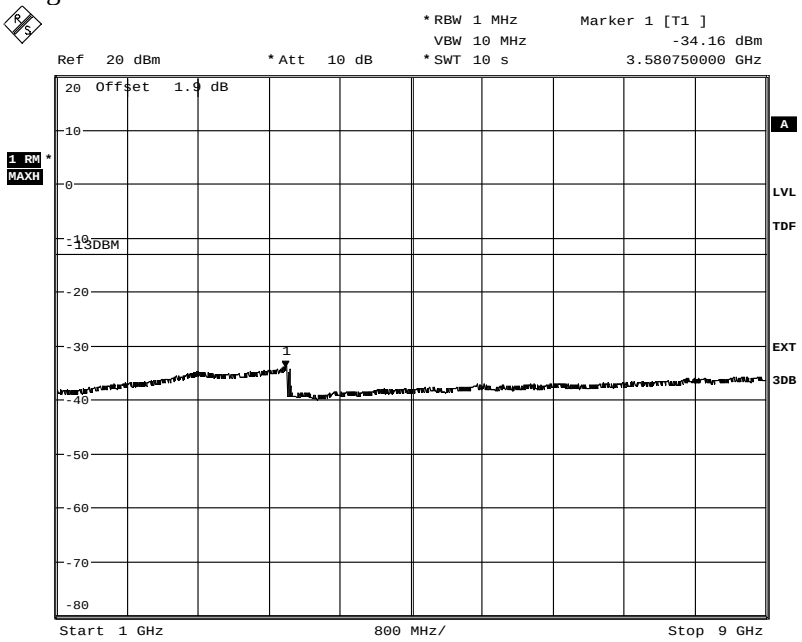
Appendix 5

Diagram 4 a:



Date: 19.DEC.2012 09:22:32

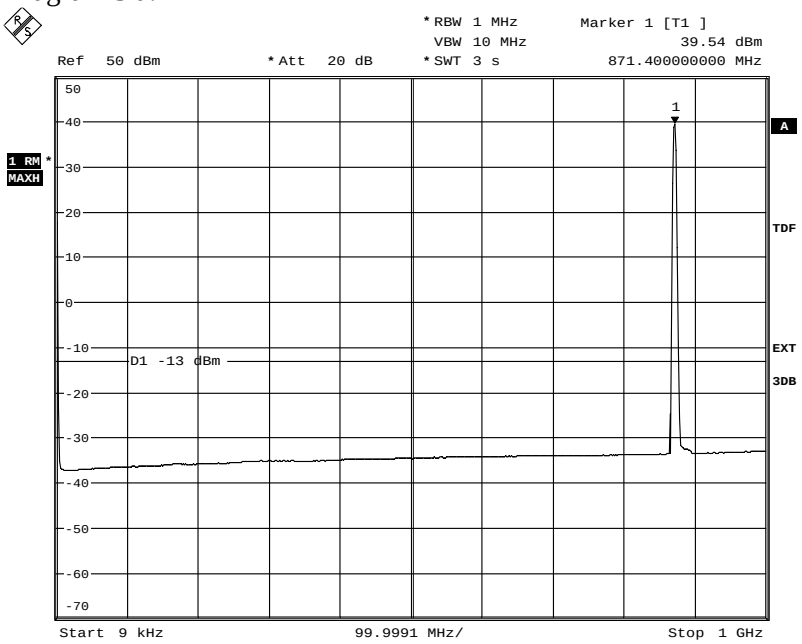
Diagram 4 b:



Date: 19.DEC.2012 09:23:27

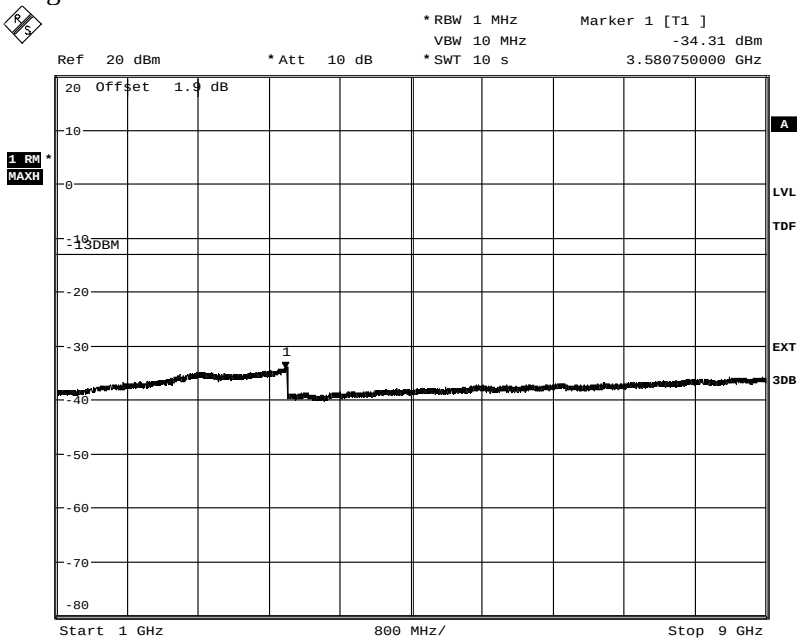
Appendix 5

Diagram 5 a:



Date: 18.DEC.2012 10:35:02

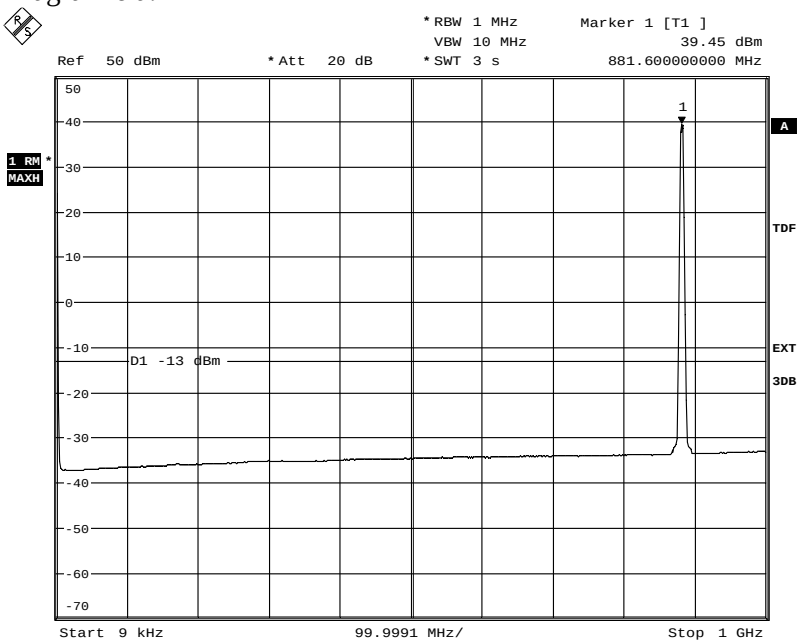
Diagram 5 b:



Date: 18.DEC.2012 10:30:58

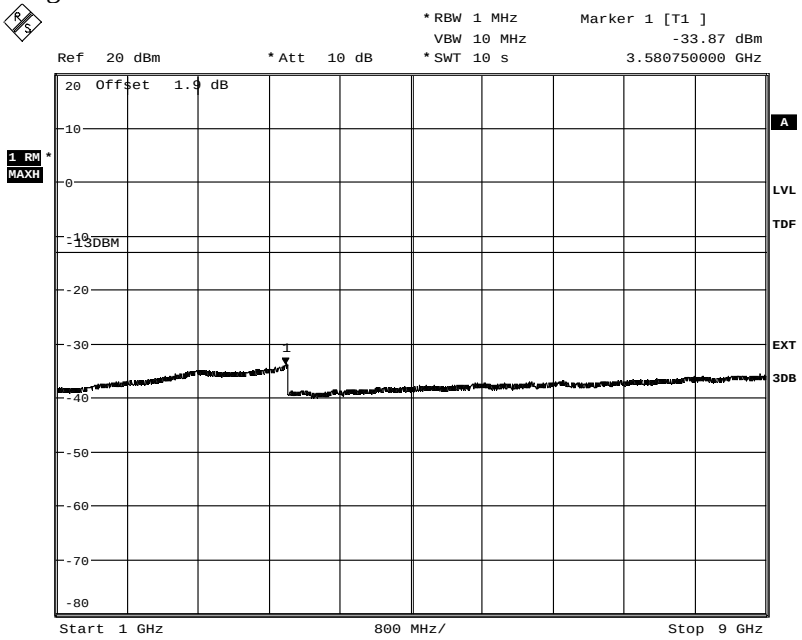
Appendix 5

Diagram 6 a:



Date: 18.DEC.2012 10:22:46

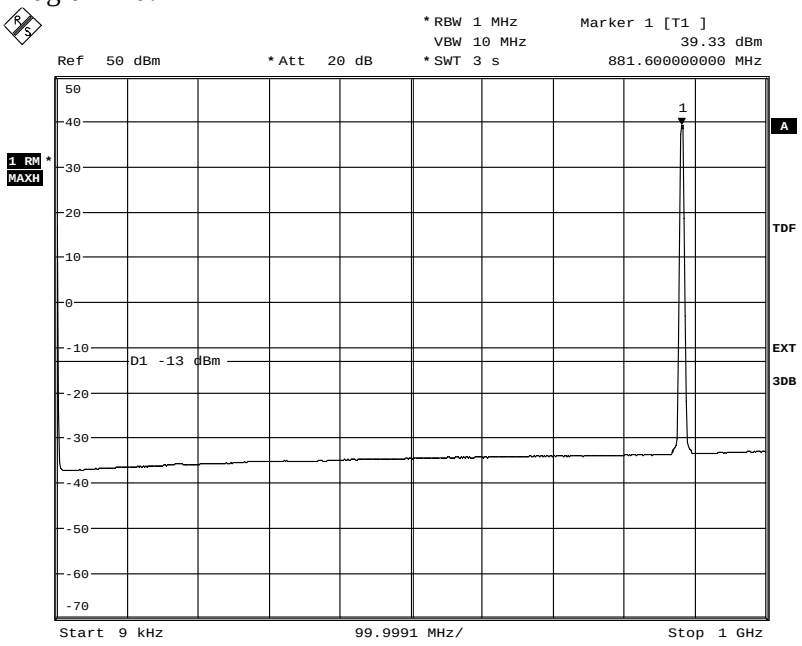
Diagram 6 b:



Date: 18.DEC.2012 10:27:24

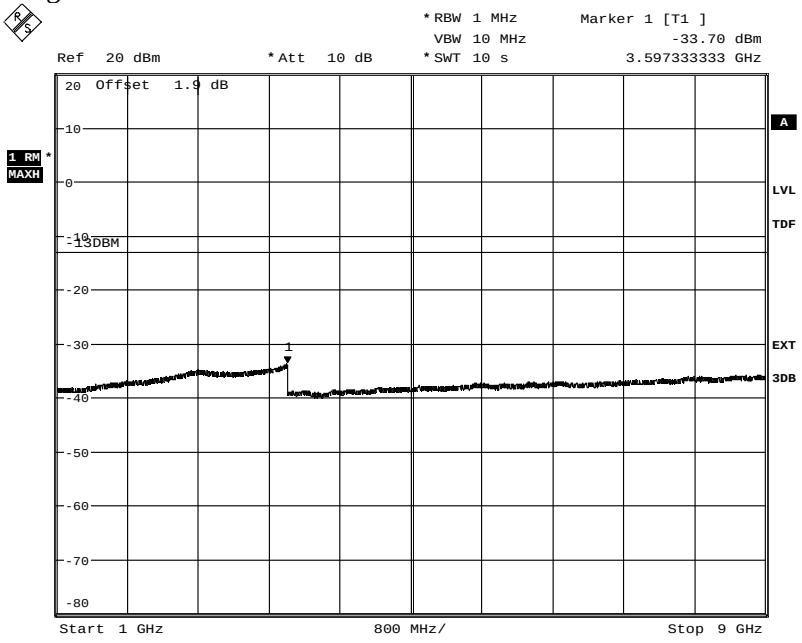
Appendix 5

Diagram 7 a:



Date: 18.DEC.2012 11:28:06

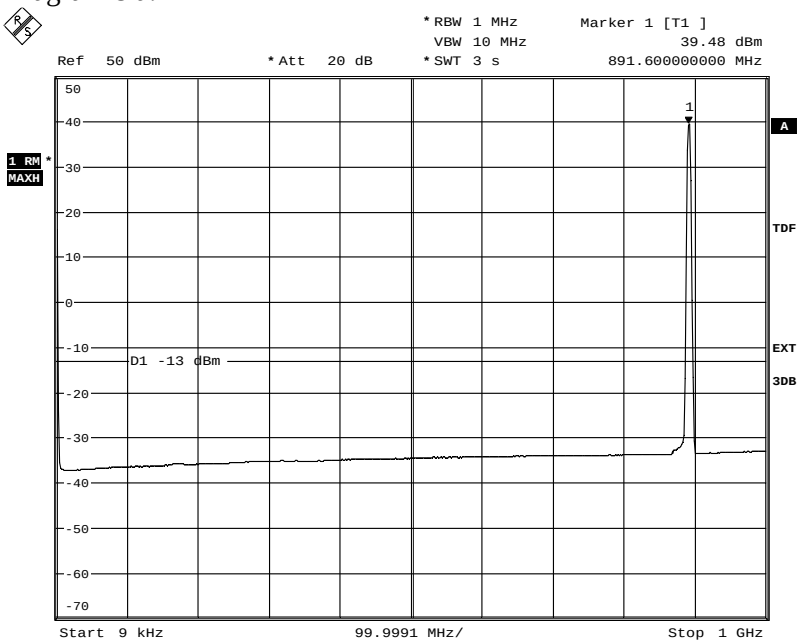
Diagram 7 b:



Date: 20.DEC.2012 13:30:56

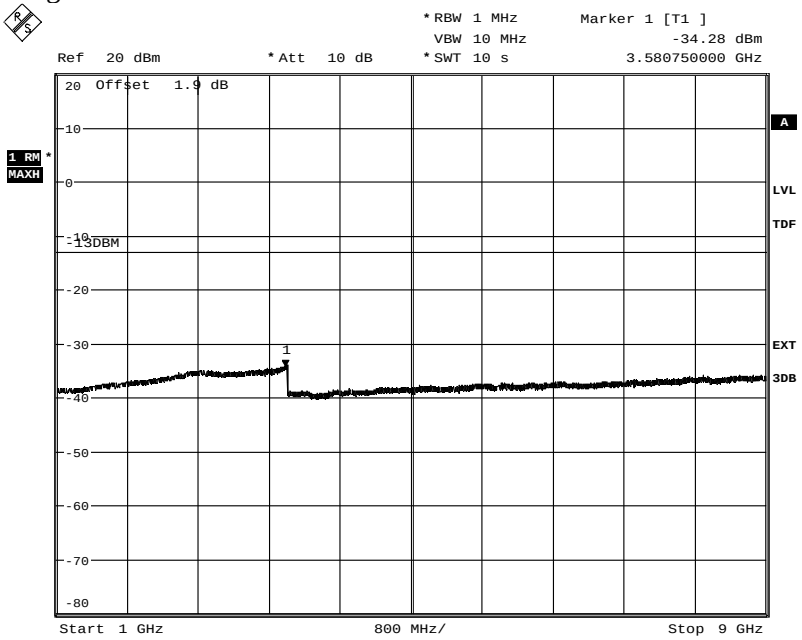
Appendix 5

Diagram 8 a:



Date: 18.DEC.2012 10:55:25

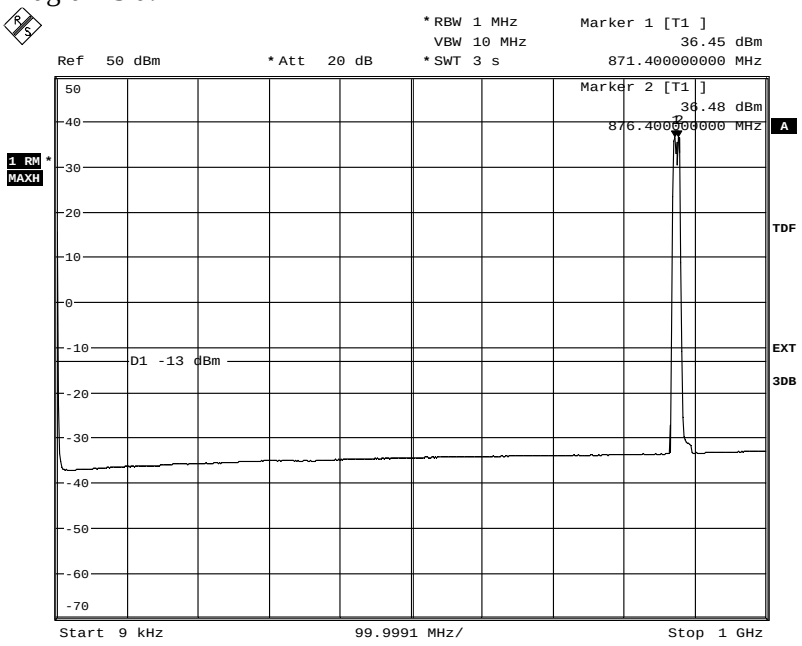
Diagram 8 b:



Date: 18.DEC.2012 10:56:36

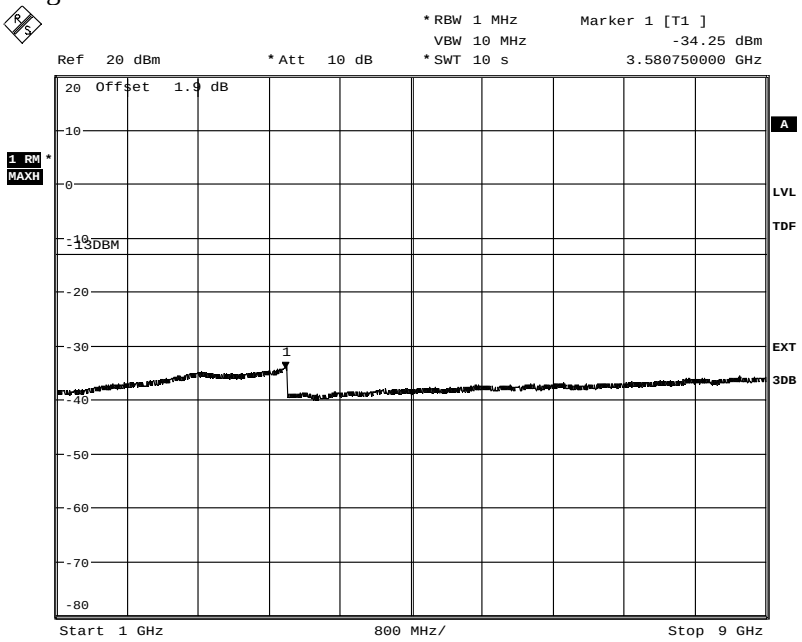
Appendix 5

Diagram 9 a:



Date: 18.DEC.2012 12:37:16

Diagram 9 b:



Date: 18.DEC.2012 12:40:31

Appendix 5

Diagram 10 a:

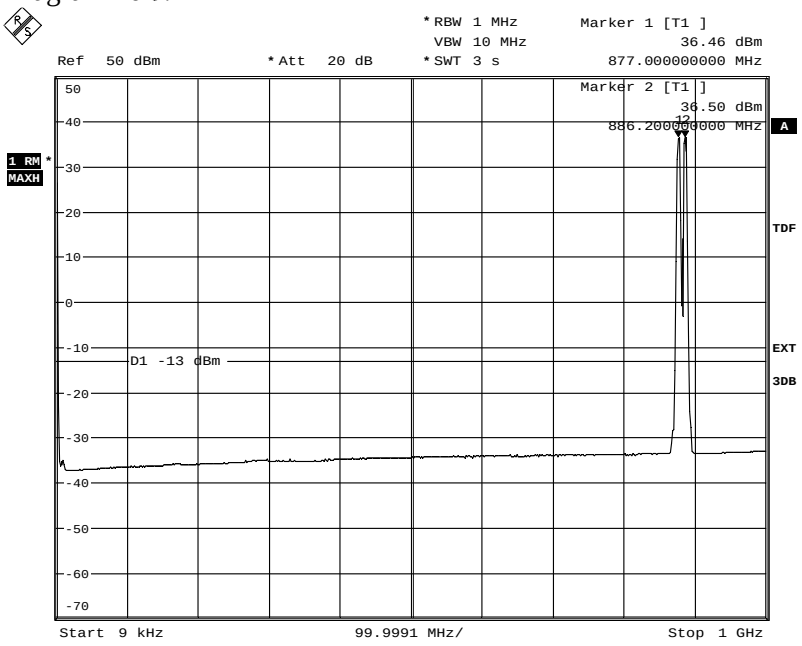


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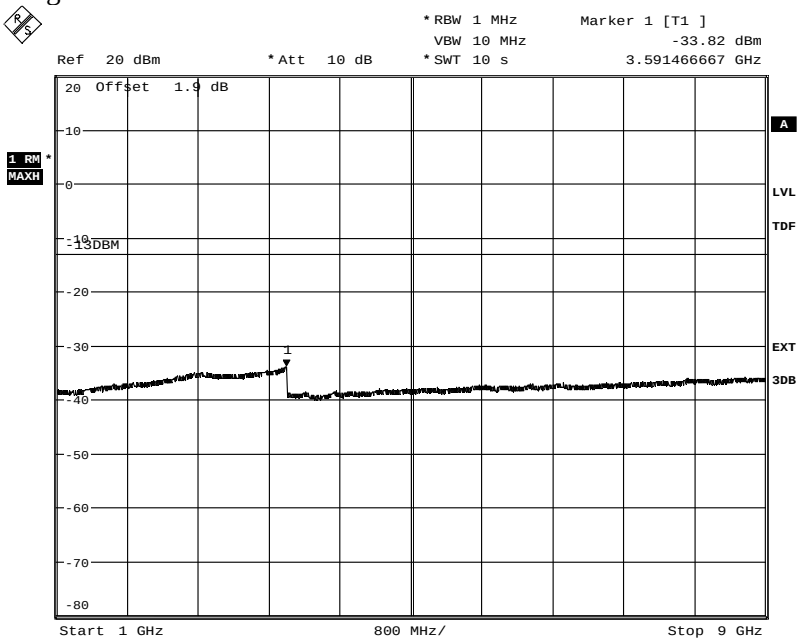
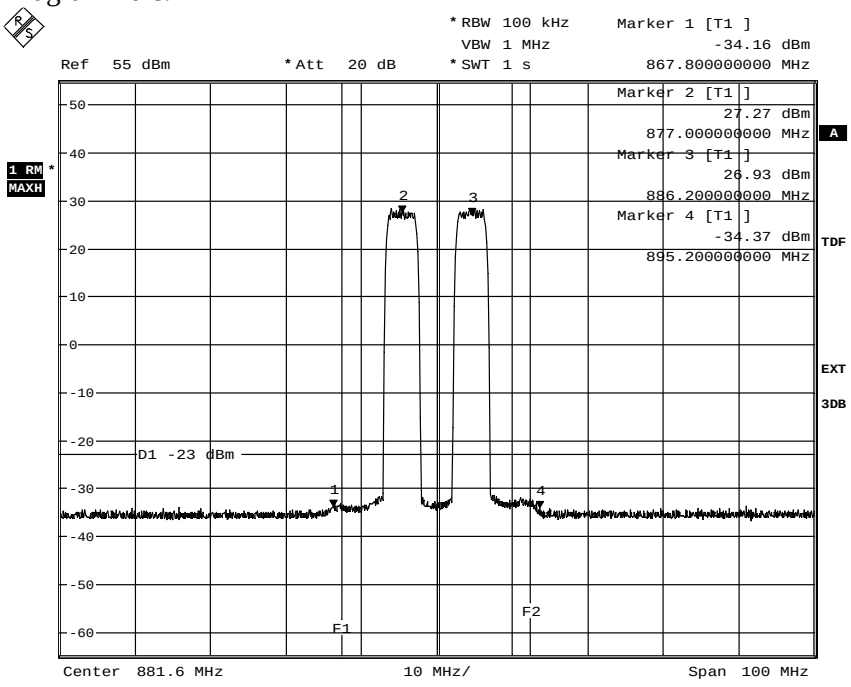
Diagram 10 b:



Date: 20.DEC.2012 13:51:56

Appendix 5

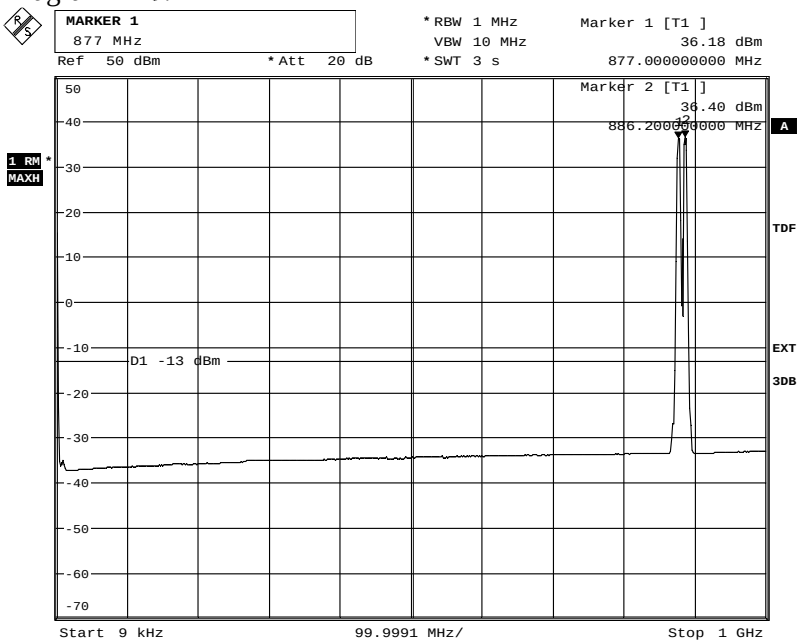
Diagram 10 c:



Date: 18.DEC.2012 12:28:46

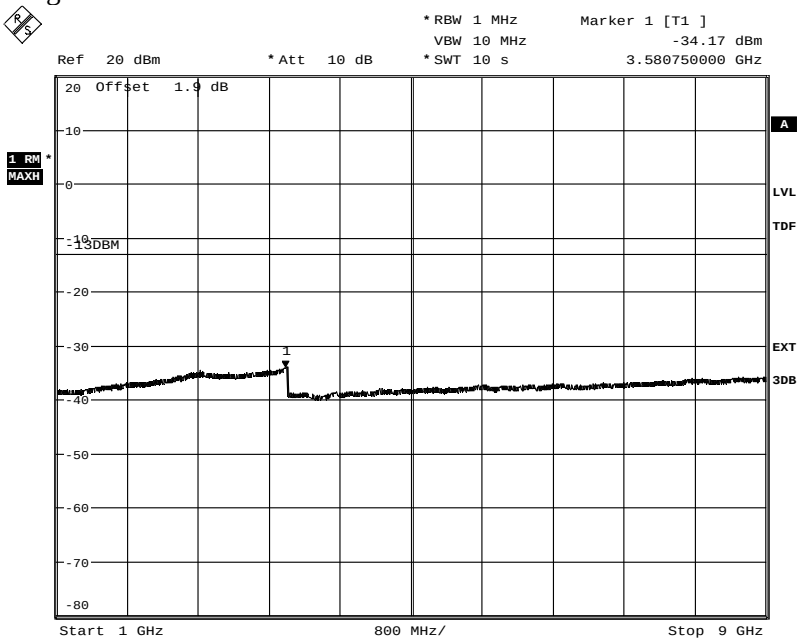
Appendix 5

Diagram 11 a:



Date: 18.DEC.2012 12:07:35

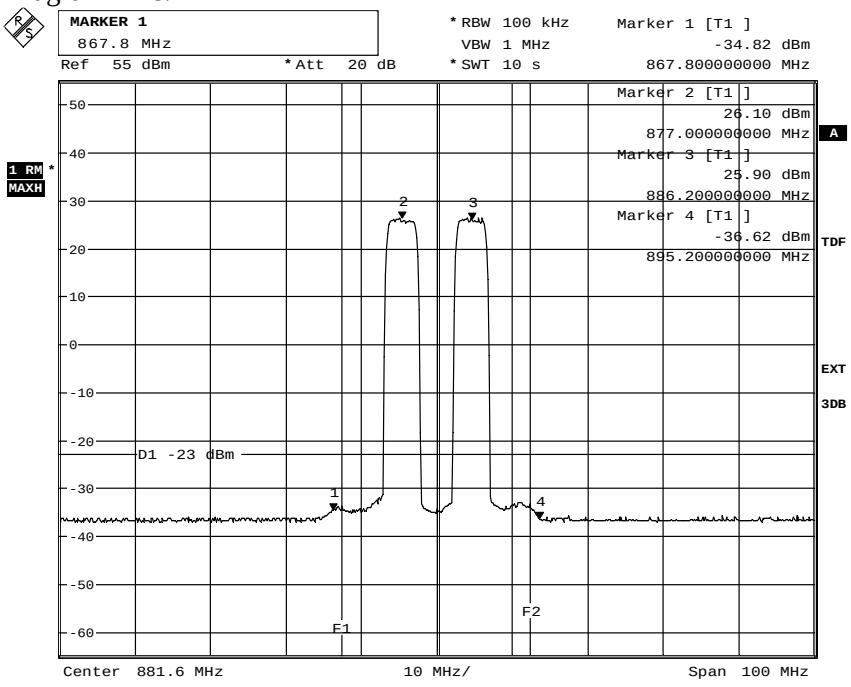
Diagram 11 b:



Date: 18.DEC.2012 12:18:08

Appendix 5

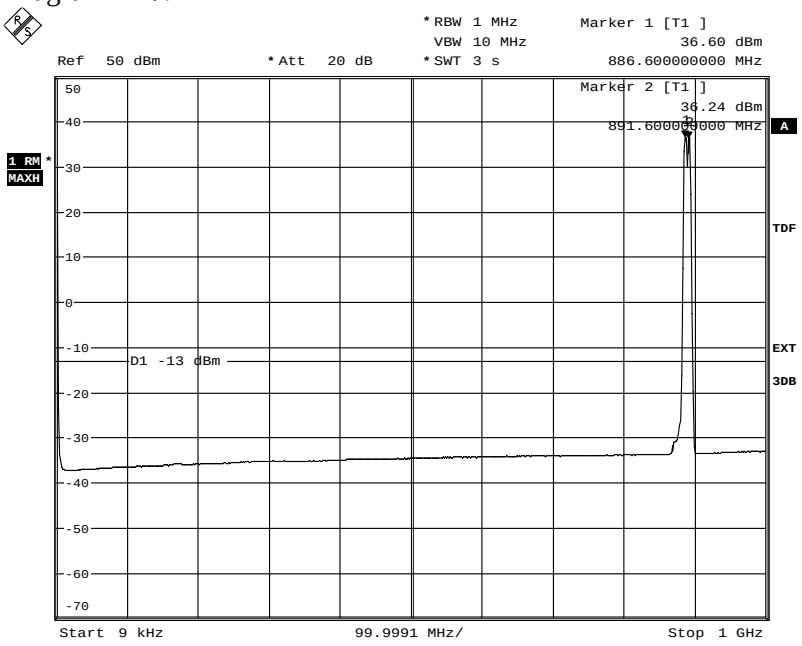
Diagram 11 c:



Date: 18.DEC.2012 12:09:10

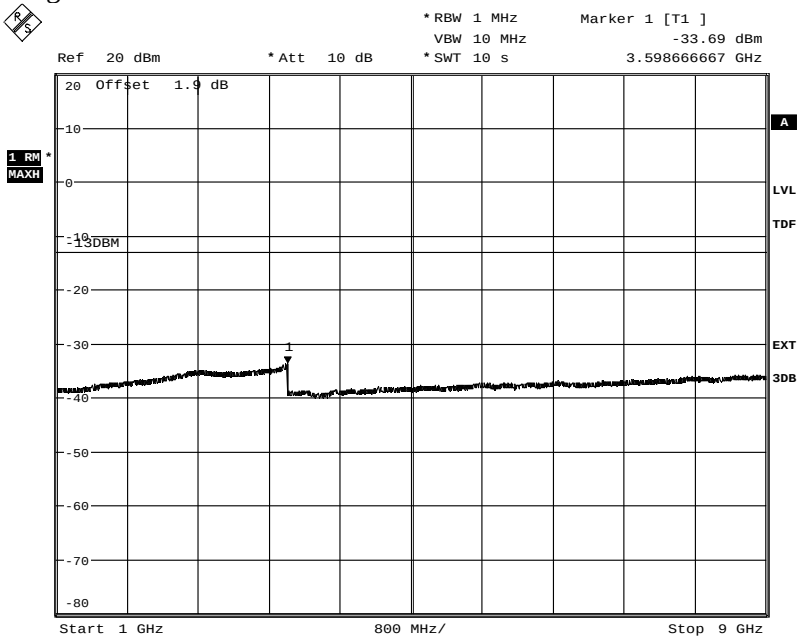
Appendix 5

Diagram 12 a:



Date: 18.DEC.2012 13:13:15

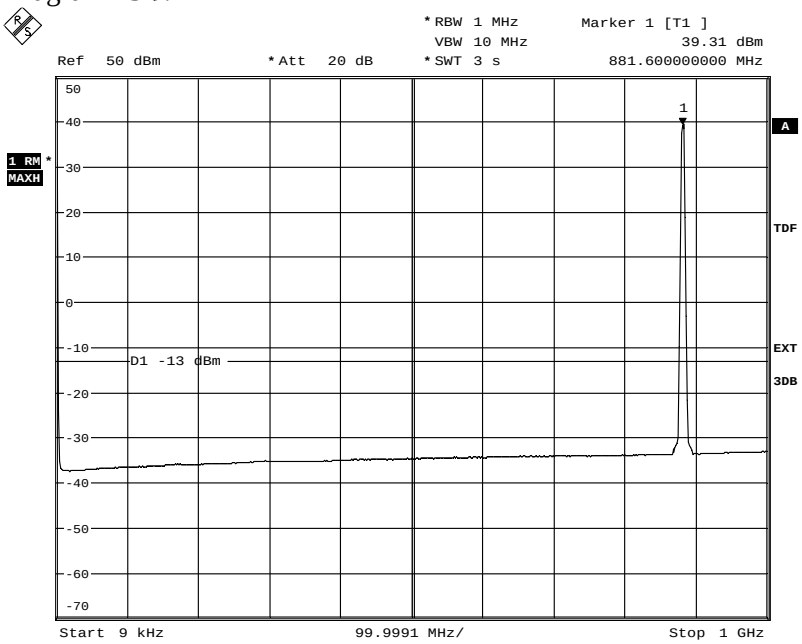
Diagram 12 b:



Date: 18.DEC.2012 13:15:26

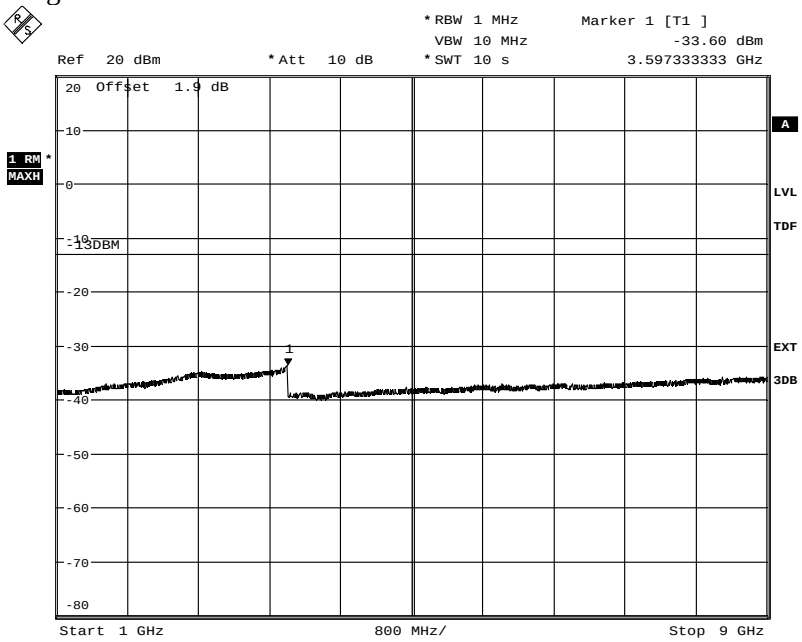
Appendix 5

Diagram 13 a:



Date: 18.DEC.2012 09:13:16

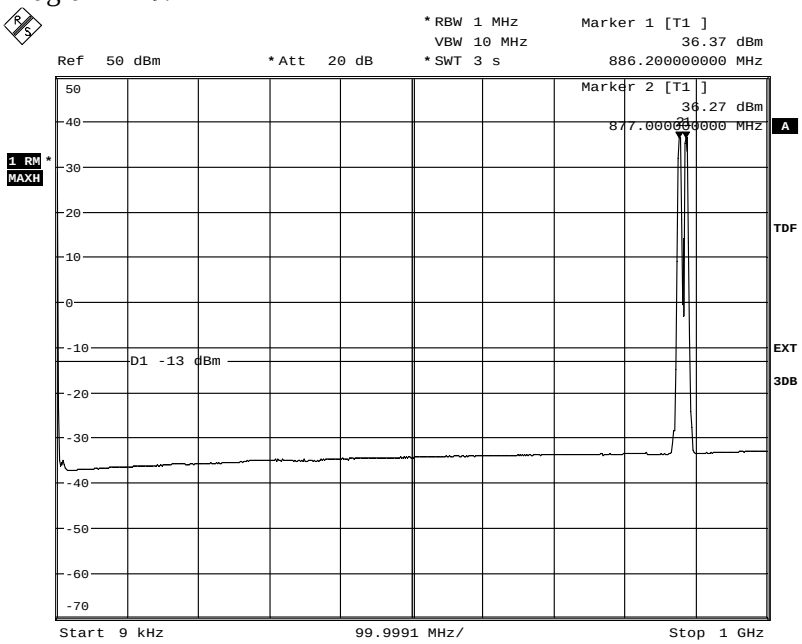
Diagram 13 b:



Date: 18.DEC.2012 09:15:57

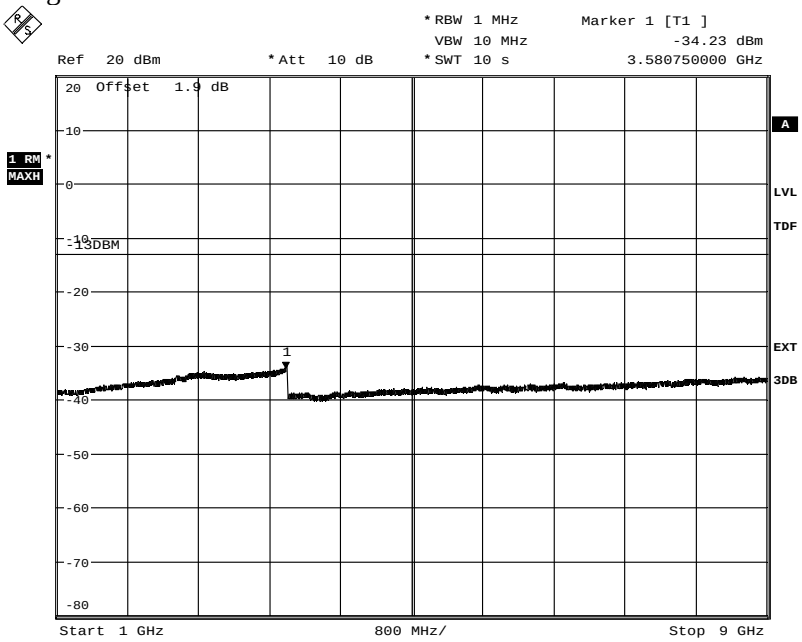
Appendix 5

Diagram 14 a:



Date: 17.DEC.2012 13:31:21

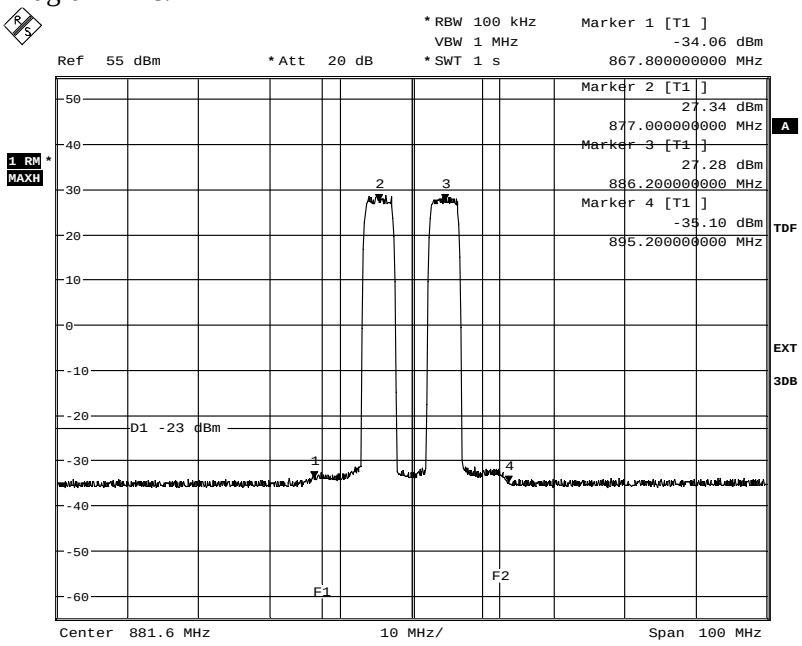
Diagram 14 b:



Date: 18.DEC.2012 08:33:20

Appendix 5

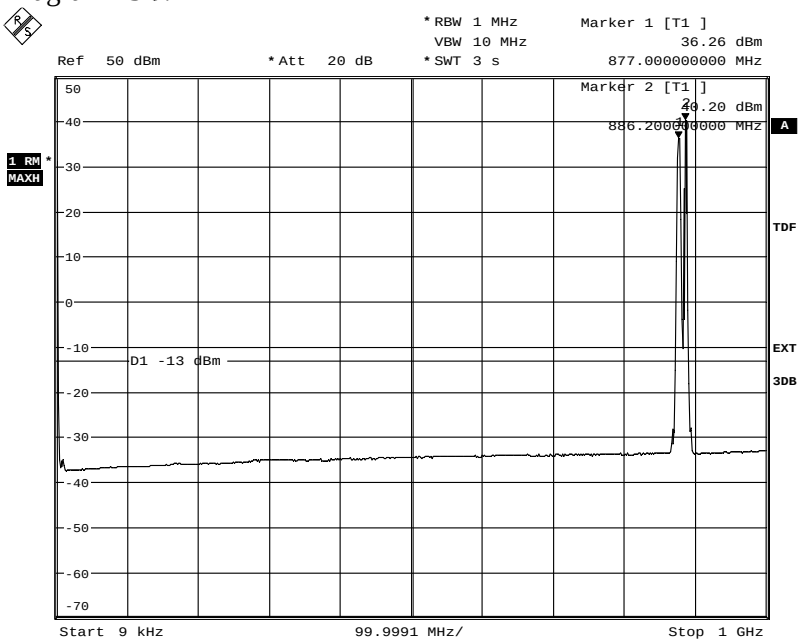
Diagram 14 c:



Date: 18.DEC.2012 08:43:45

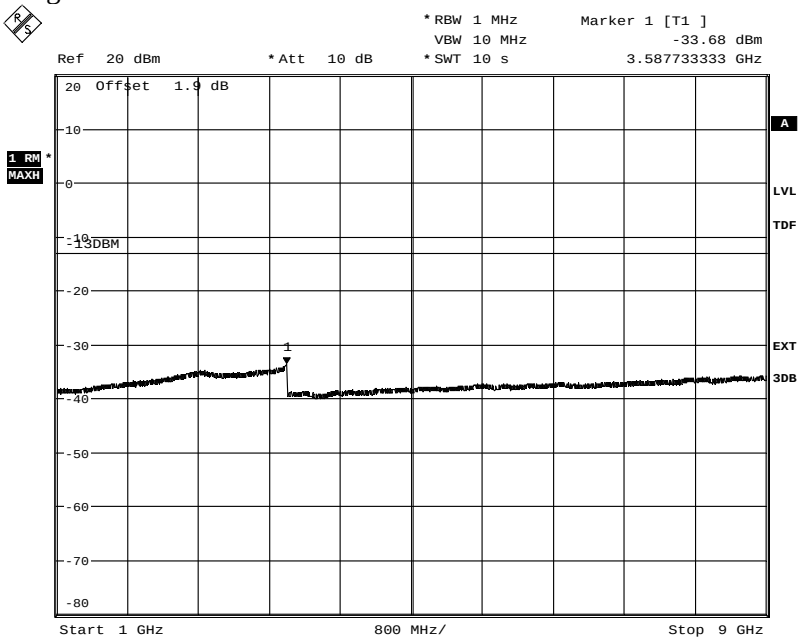
Appendix 5

Diagram 15 a:



Date: 18.DEC.2012 16:06:58

Diagram 15 b:



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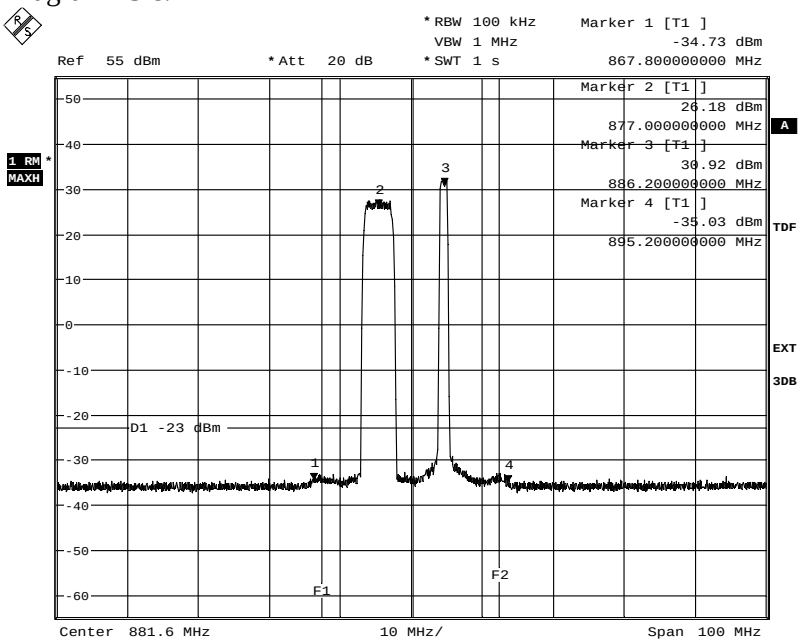
Appendix 5

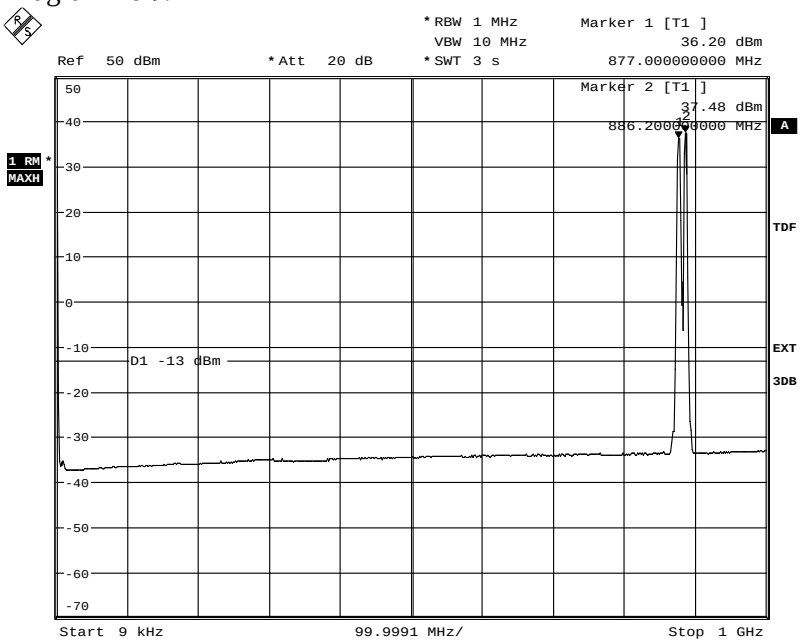
Diagram 15 c:



Date: 18.DEC.2012 16:12:29

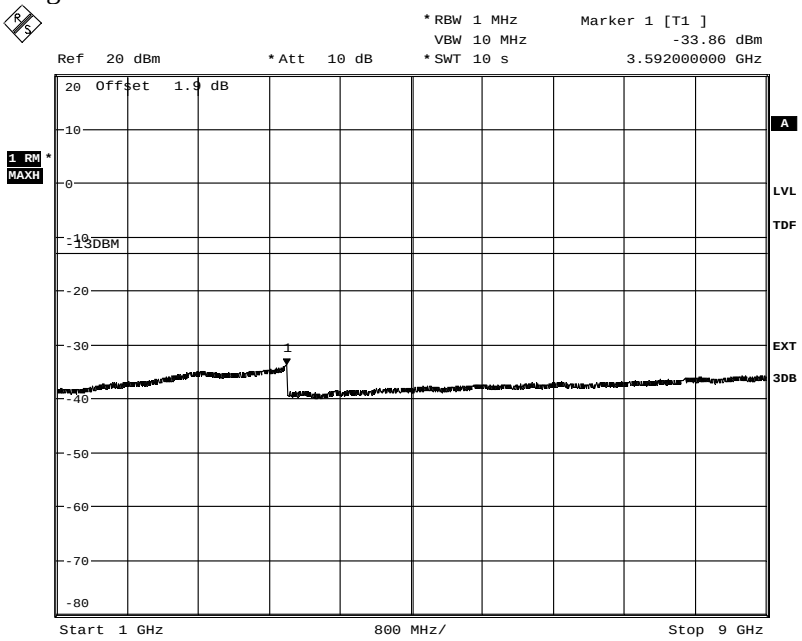
Appendix 5

Diagram 16 a:



Date: 18.DEC.2012 16:21:28

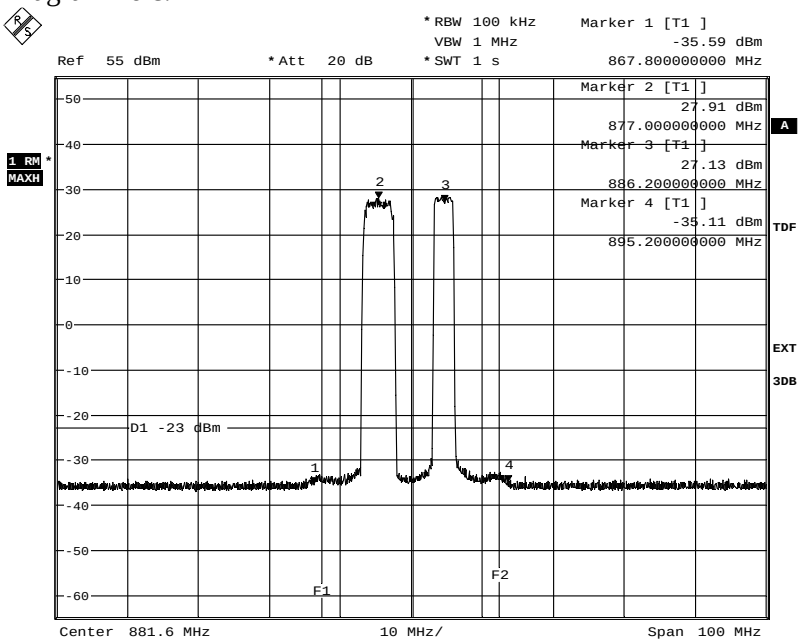
Diagram 16 b:



Date: 18.DEC.2012 16:18:58

Appendix 5

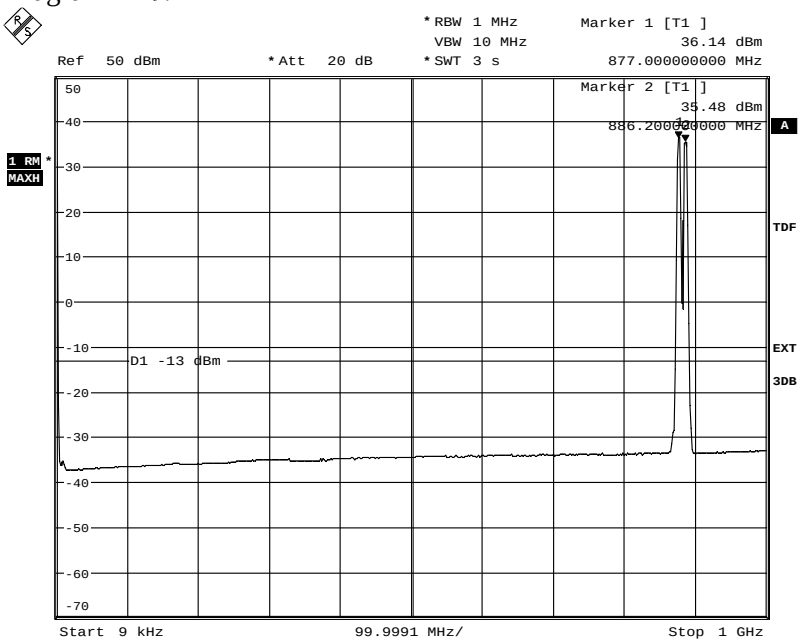
Diagram 16 c:



Date: 18.DEC.2012 16:15:29

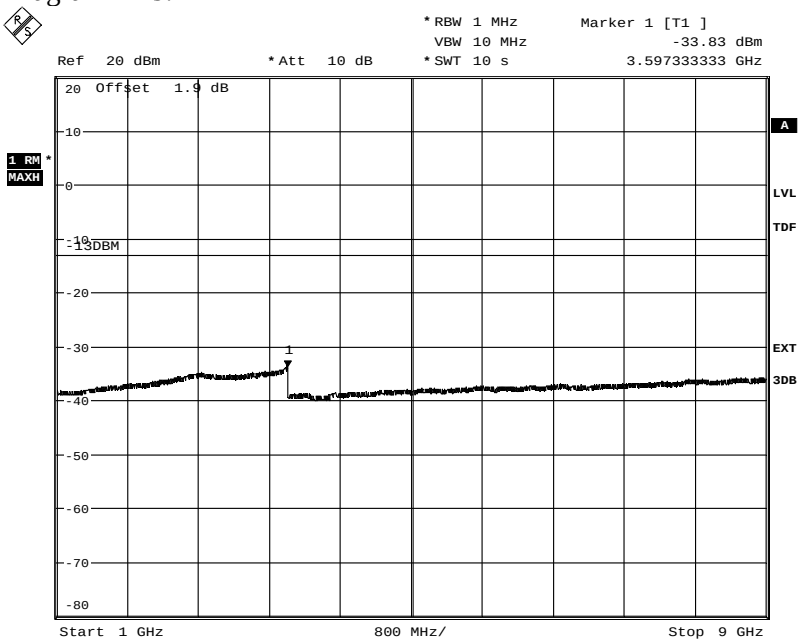
Appendix 5

Diagram 17 a:



Date: 18.DEC.2012 16:22:53

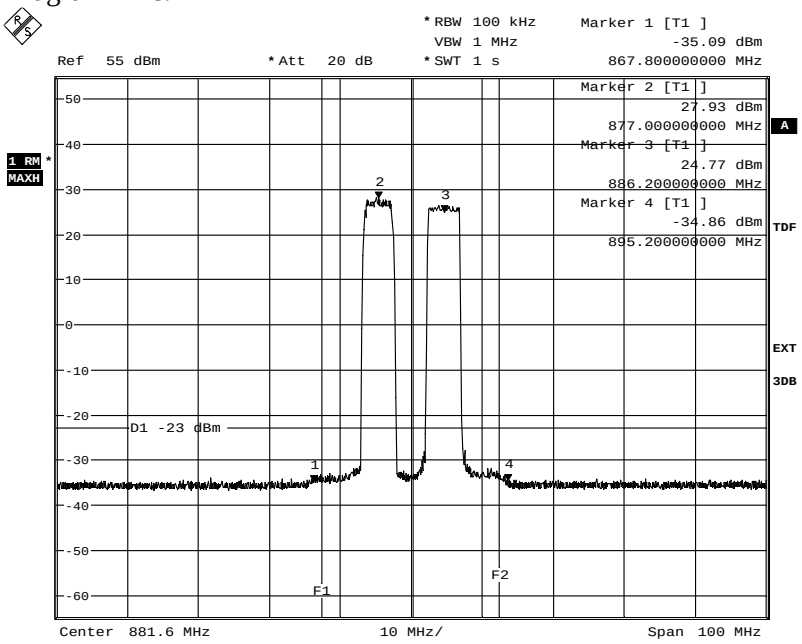
Diagram 17 b:



Date: 18.DEC.2012 16:25:22

Appendix 5

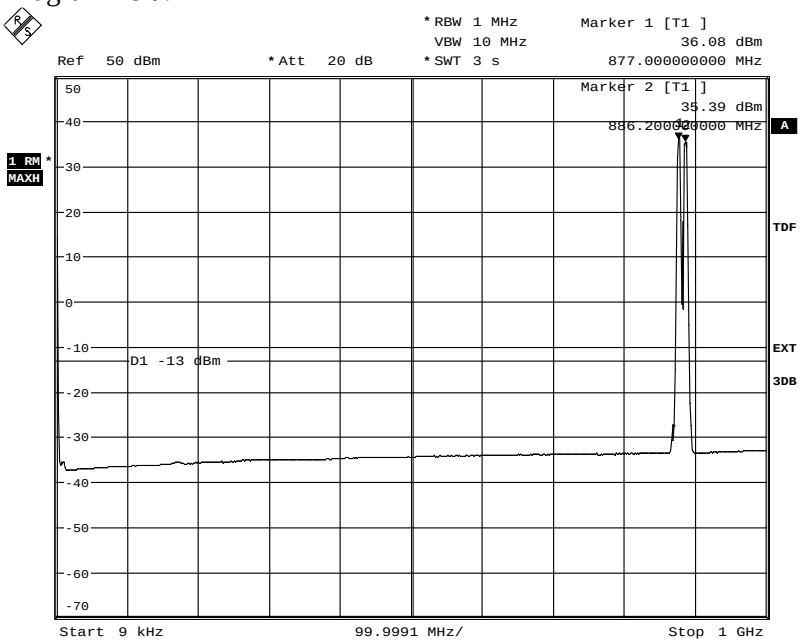
Diagram 17 c:



Date: 18.DEC.2012 16:28:21

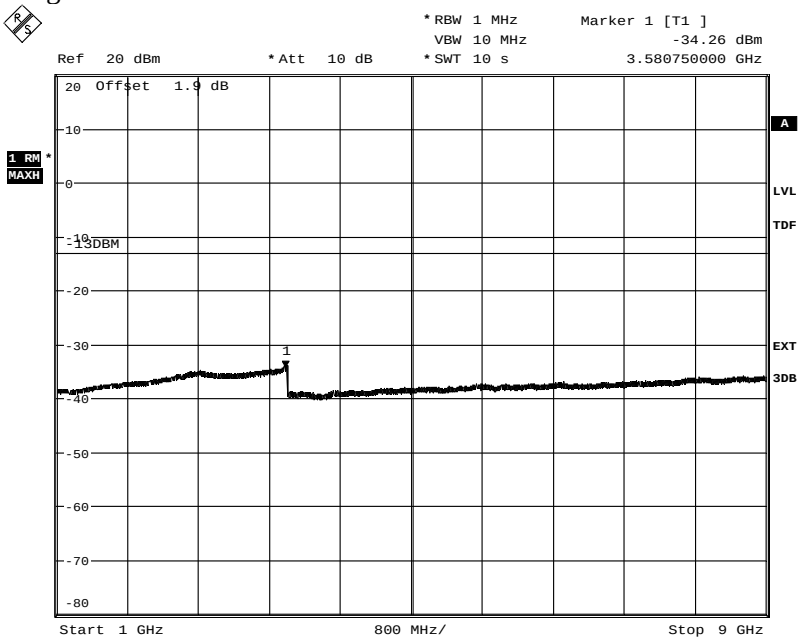
Appendix 5

Diagram 18 a:



Date: 19.DEC.2012 07:46:09

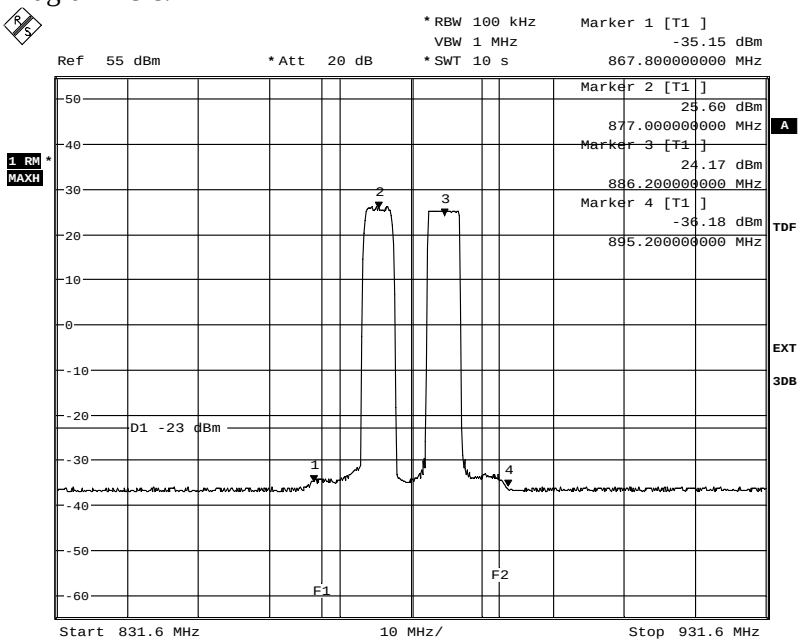
Diagram 18 b:



Date: 19.DEC.2012 07:48:34

Appendix 5

Diagram 18 c:



Date: 19.DEC.2012 07:43:44

Appendix 6

Field strength of spurious radiation measurements according to 47 CFR 2.1053 / IC RSS-132 5.5

Date	Temperature	Humidity
2012-12-07	23°C ± 3°C	15 % ± 5 %
2012-12-10	23°C ± 3°C	18 % ± 5 %

Test set-up and procedure

The test sites are listed at FCC, Columbia with registration number: 93866. The test site complies with RSS-Gen, Industry Canada file no. 3482A-1.

The measurements were performed with both horizontal and vertical polarization of the antenna. The antenna distance was 3 m in the frequency range 30 MHz – 9 GHz. The upper frequency boundary was chosen to comprise 10x the highest fundamental TX frequency.

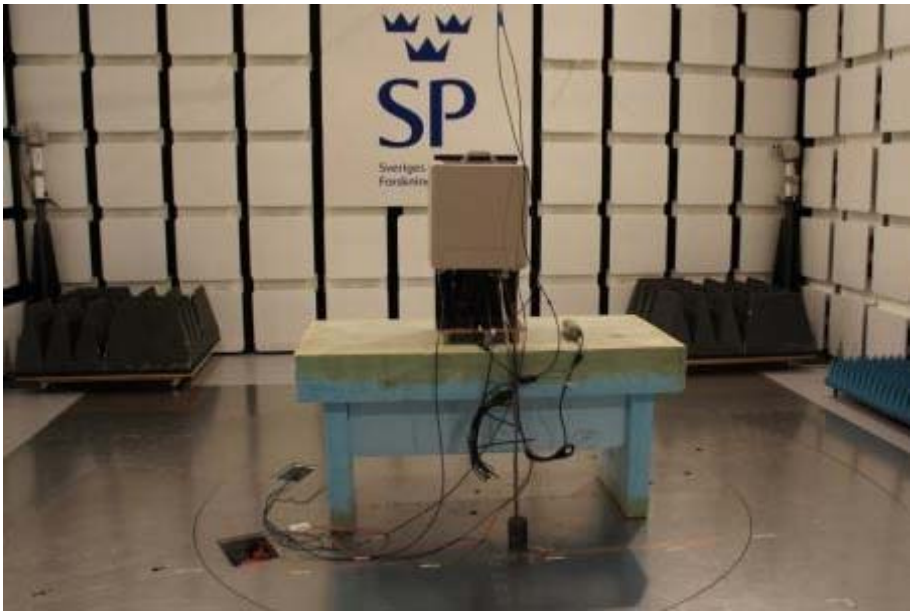
In the frequency range 30 MHz - 9 GHz the measurement was performed in power with a RBW of 1 MHz. A propagation loss in free space was calculated. The used formula was $\gamma = 20\log\left(\frac{4\pi D}{\lambda}\right)$, γ is the propagation loss and D is the antenna distance.

The measurement procedure was as the following:

1. A 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 in the pre-measurement 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 when measured with the RMS detector were measured with the substitution method according to the standard.

The test set-up during the spurious radiation measurements is shown in the picture below:



Measurement equipment

Measurement equipment	SP number
Semi anechoic chamber	503 881
R&S ESU 26	901 553
EMC 32 ver. 8.52.0	503 745
Chase Bilog Antenna CBL 6111A	503 182
EMCO Horn Antenna 3115	502 175
High pass filter, RLC Electronics	901 373
Miteq, Low Noise Amplifier	503 285
Testo 625 temperature and humidity meter	504 188

Results

Measured worst case emission results are presented on the following pages.

Diagram 1 a-b : LTE single RAT, MIMO mode, frequency B, single carrier, BW 1.4 MHz
Diagram 2 a-b : WCDMA single RAT, MIMO mode, frequency B, BW 5 MHz
Diagram 3 a-b: WCDMA in BW 5 MHz and LTE in BW 1.4 MHz, MSR, frequency B

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30 - 9 000	All emissions > 20 dB below limit	All emissions > 20 dB below limit

Measurement uncertainty: 3.2 dB

Remarks

The upper frequency bound for verification was chosen as 9 GHz in order to cover 10 x the maximum fundamental EUT TX frequency.

A RBW of 1 MHz was chosen to embrace both FCC and IC requirements. Where different limits apply the most restrictive limit was applied for compliance assessment.

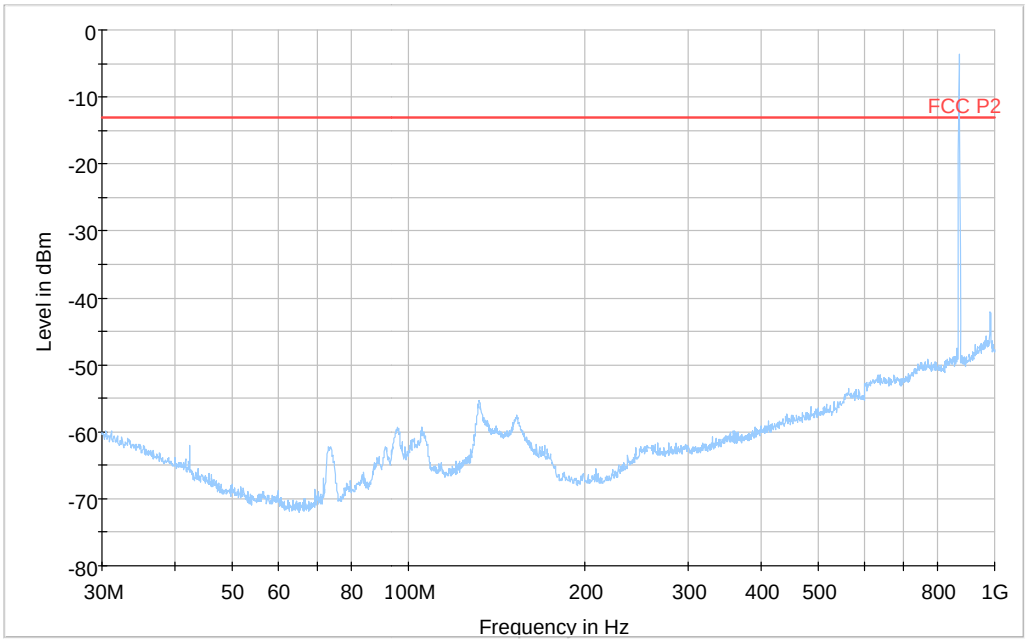
Limits

CFR 47 § 22.917 and IC RSS-132 5.5

Outside a licensee's frequency band(s) of operation the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB, resulting in a limit of -13 dBm.

Complies?	Yes

Diagram 1 a:



Note: The emission at 869.7 MHz is the carrier frequency and shall be ignored in this context.

Diagram 1 b:

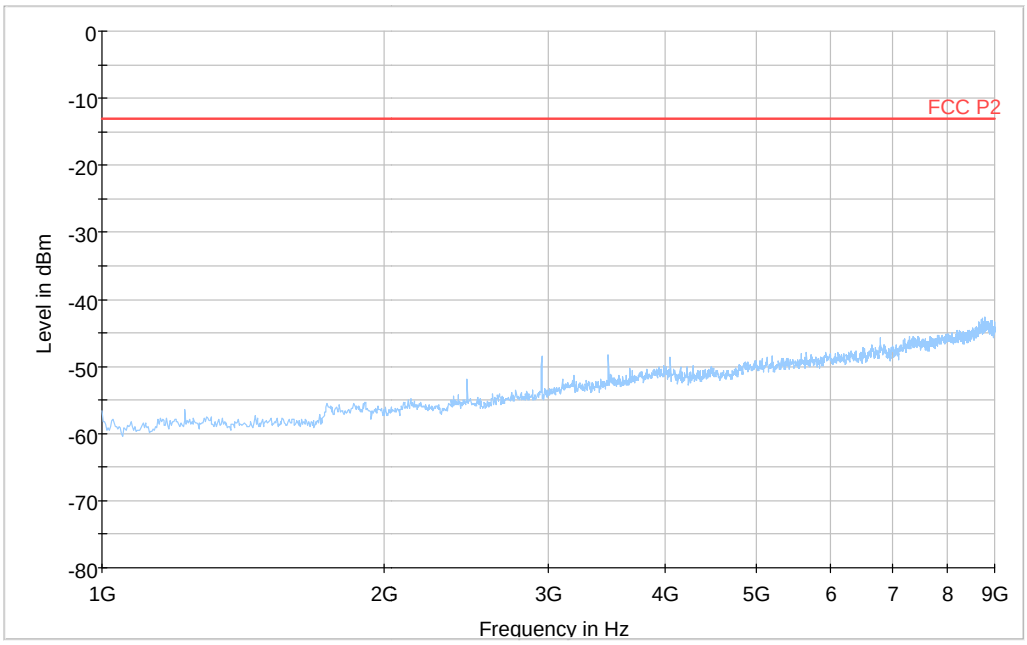
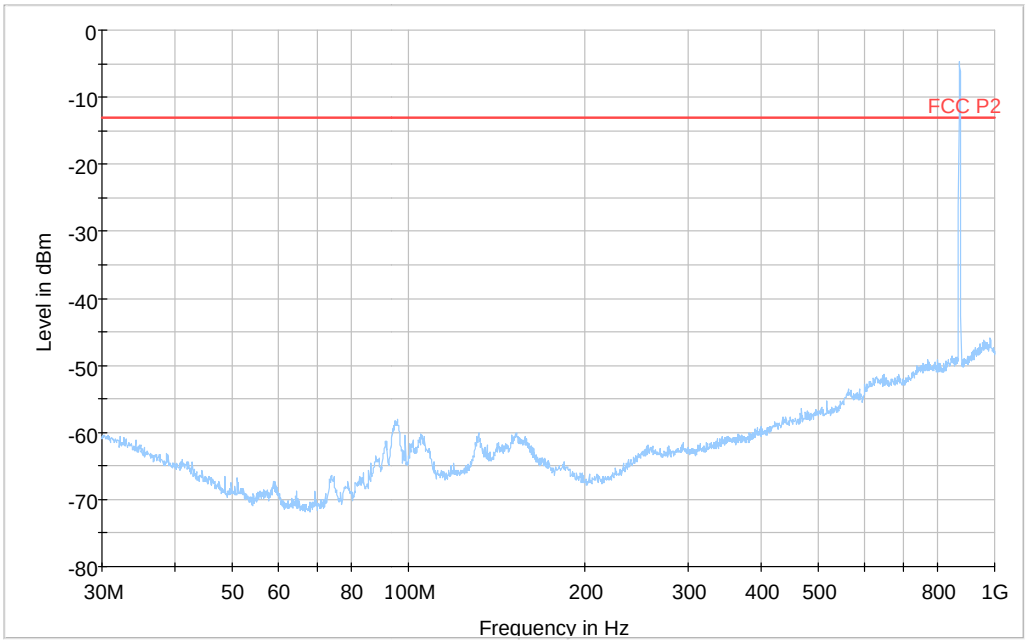


Diagram 2 a:



Note: The emission at 869.7 MHz is the carrier frequency and shall be ignored in the context.

Diagram 2 b:

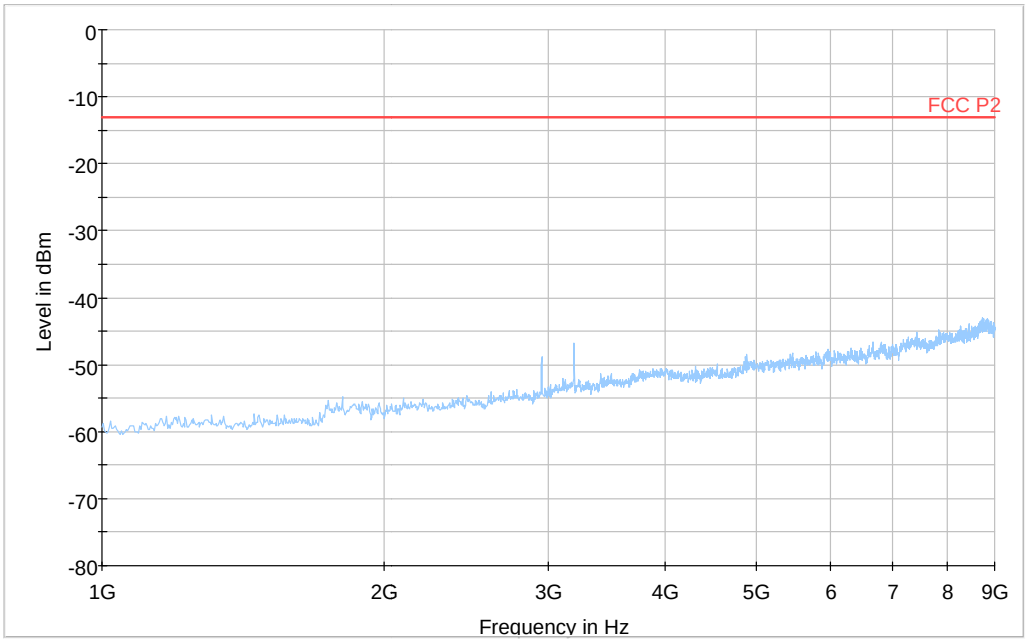
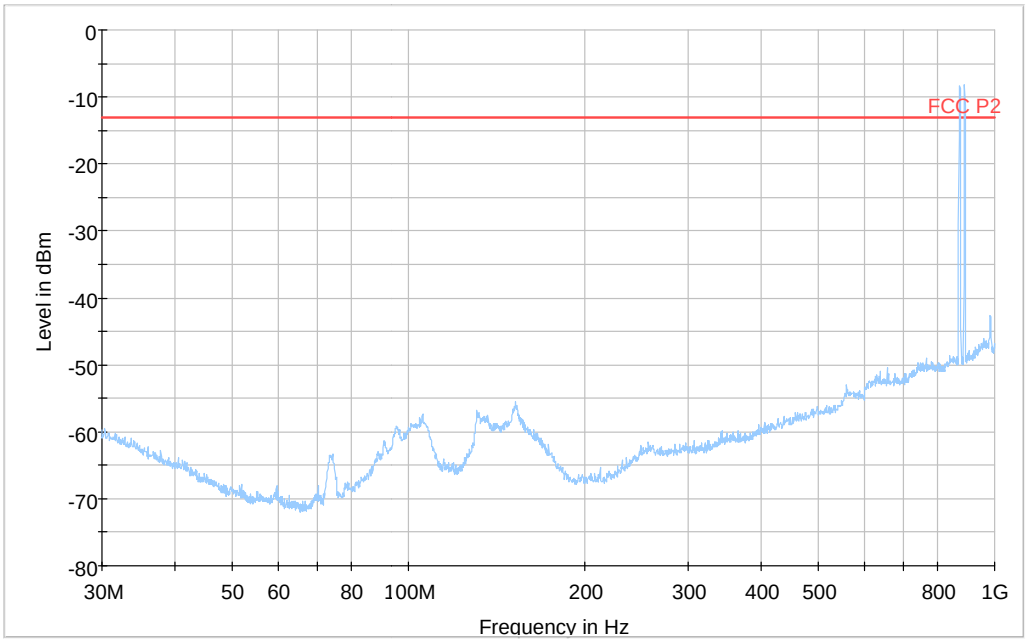
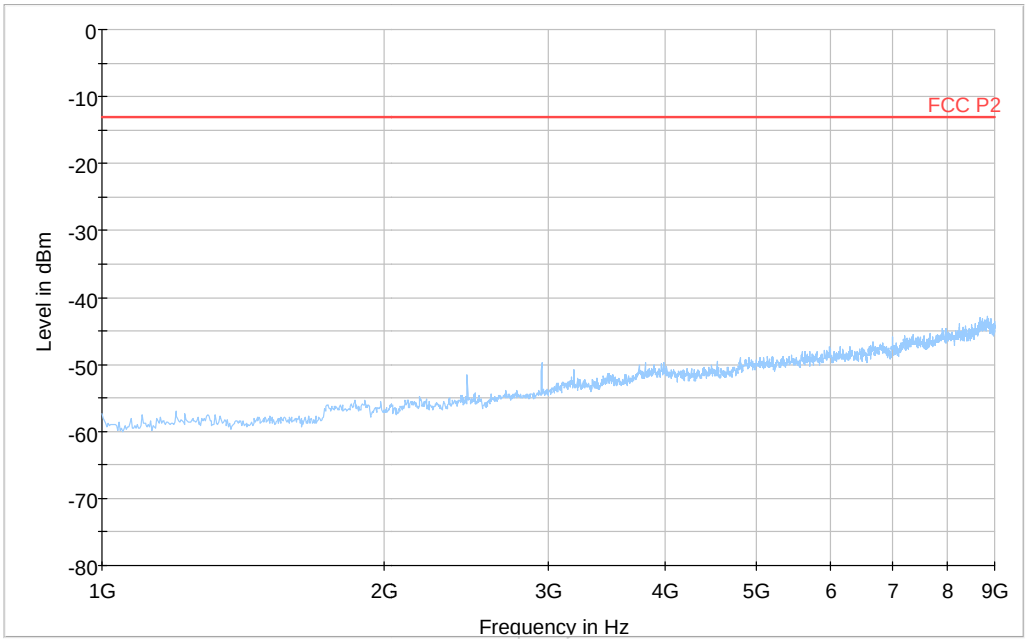


Diagram 3 a:



Note: The emissions at 871.4 MHz and 888.3 MHz are the carrier frequencies and shall be ignored in this context.

Diagram 3 b:



Appendix 7

Frequency stability measurements according to CFR 47 §2.1055, 22.355 / and IC RSS-132 5.3

Date	Temperature (test equipment)	Humidity (test equipment)
2012-12-12 to 2012-12-14	22-23 °C ± 3 °C	14-19 % ± 5 %

Test set-up and procedure

The measurement was made per 3GPP TS 25.141. Port RFA was via an RF attenuator connected to a spectrum analyzer. The spectrum analyzer had an external 10 MHz reference standard connected.

Measurement equipment	SP number
R&S FSIQ 40	503 738
RF attenuator	504 159
Testo 635 temperature and humidity meter	504 203
Climate chamber 2	501 031

Results

Nominal Voltage -48 V DC.
Nominal TX frequency 881.6 MHz, WCDMA with 5 MHz BW and test model TM1.

Test conditions		Frequency error (Hz)
Supply voltage (V DC)	T (°C)	
-48.0	+20	-1
-55.2	+20	+1
-40.8	+20	-2
-48.0	+30	+2
-48.0	+40	-3
-48.0	+50	-2
-48.0	+10	+2
-48.0	0	-1
-48.0	-10	+1
-48.0	-20	-3
-48.0	-30	+12
Maximum frequency error (Hz)		12
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Remark

It was deemed sufficient to test one combination of TX frequency, bandwidth configuration and test model (modulation), as all combinations share a common internal reference to derive the TX frequency from.

Limits

According 3GPP TS 25.141 the error shall be within ±(0.05 PPM+12 Hz) (±56.1 Hz).

CFR 47 § 22.355: The carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances of ±1.5 ppm for base stations.

RSS-132, 5.3: The carrier frequency shall not depart from the reference frequency in excess of ±1.5 ppm for base stations.

Complies?	Yes

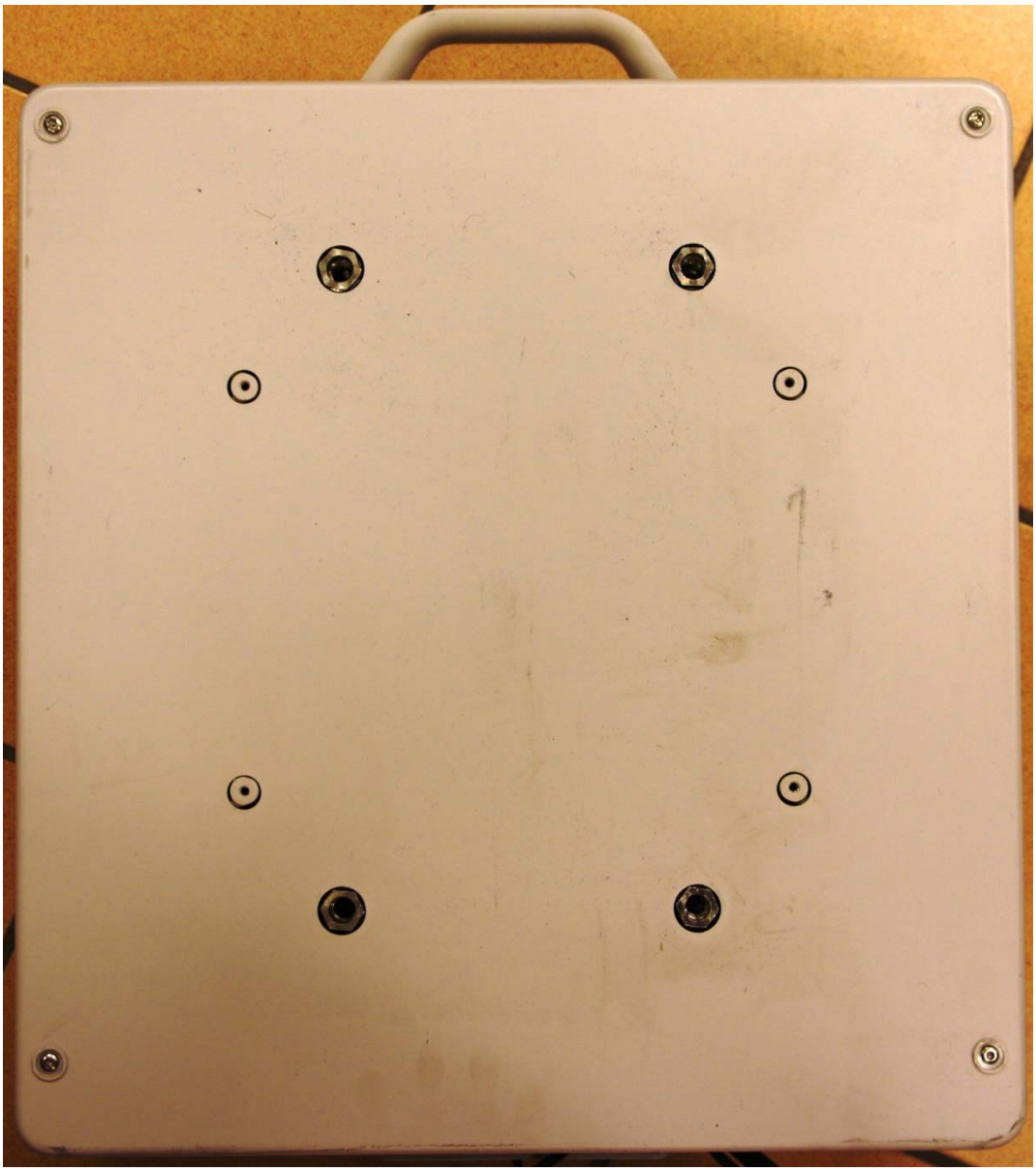
External photos

Front side:

FCC & IC ID and productlabel mounted under plastic cover.

Appendix 8

Rear side



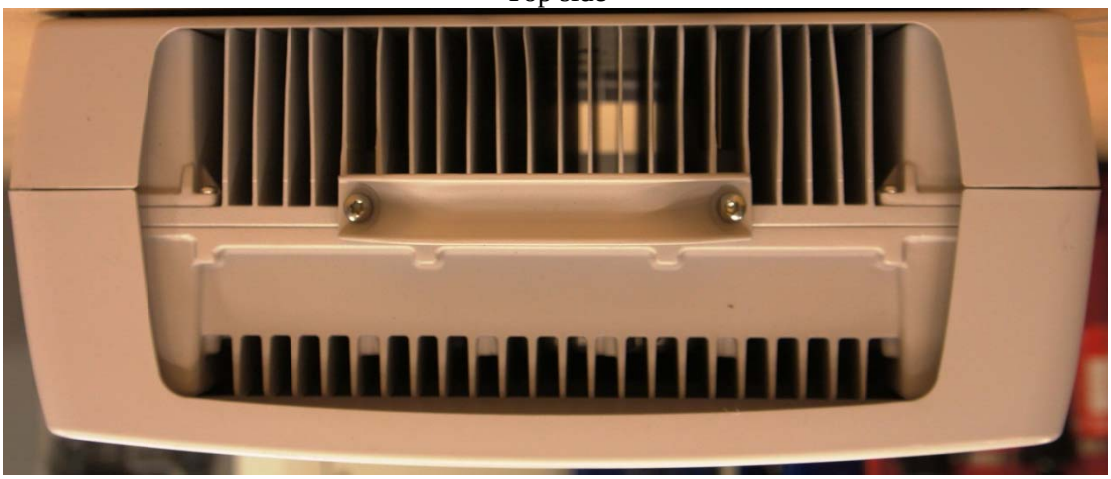
Appendix 8

Left side

Right side

Appendix 8

Top side



Bottom side with connections