REPORT

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The test site complies with RSS-Gen, IC file no: 3482A

Date	Reference	Page
2012-09-25	FX200291-F24	1 (2)

Contact person
Jörgen Wassholm
Electronics
+46 10 516 57 06
jorgen.wassholm@sp.se

Ericsson AB
Klaes Holm
PDU Radio Base Station
164 80 Stockholm

Class II permissive change measurements on RRUS 01 B2 1900 MHz radio equipment with FCC ID:TA8AKRC11874-2 and IC:287AB-AS118742

(7 appendices)

Test object

RRUS 01 B2, KRC 118 74/2 Rev R1C, serial no: CB4K978514

Summary

Standard		Compliant	Appendix
FCC CFR 47 / IC RSS-133			
2.1046 / RSS-133 6.4	RF power output	Yes	2
2.1051 / RSS-133 6.5	Spurious emission at antenna terminals	Yes	3
2.1053 / RSS-133 6.5	Field strength of spurious radiation	Yes	4
2.1055 / RSS-133 6.3	Frequency stability	Yes	5
Industry Canada RSS-133			
RSS-133 6.6	Receiver spurious emissions	Yes	6

Note: Above RSS-133 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

Performed by

Jörgen Wassholm

Examined by

Christer Karlsson

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Description – Test object

Equipment:	Multi standard radio equipment RRUS 01 B2 running in WCDMA and GSM mode in multi standard configuration.
Antenna ports:	1 TX/RX port and 1 RX port
Frequency bands:	TX: 1930 – 1990 MHz RX: 1850 – 1910 MHz
Modulations:	QPSK, 16QAM and 64QAM (WCDMA) GMSK, 16QAM, 32QAM, AQPSK and 8PSK (GSM)
Number of carriers:	Maximum 4 carrier (1-2 WCDMA carriers and 1-3 GSM carriers)
Nominal output power: (Maximum)	49 dBm total power (80W)
Channel distribution:	Contiguous and Non-contiguous spectrum
IF band width	20 MHz
Channel bandwidth:	4.2 to 5 MHz (configurable in steps of 100/200 kHz)
Channel spacing:	4.4 to 5 MHz (configurable in steps of 100/200 kHz)
Nominal power voltage:	-48 VDC

WCDMA operation mode during measurements

Measurements were performed with the test object transmitting the Test model TM1 which are defined in 3GPP TS 25.141.

The settings below were found to be representative for all traffic scenarios when several settings with the different number of carriers were tested to find the worst case setting. These settings were used for all measurements if not otherwise noted.

One WCDMA carrier
TM1: 64 DPCH:s at 30 ksps (SF=128)
Channel bandwidth 5 MHz
Modulation: QPSK

GSM operation mode during measurements

The scope of this report addresses GSM in Multi-RAT/Multi-carrier usage, using 2 activated GSM carriers, with BCCH filling and all GSM timeslots activated, using GMSK modulation and individual encryption sets A5/1 and A5/2 for the 2 GSM carriers. GSM intelligent power management (IPM) and MCPA overbooking were excluded from the scope of this test.
The settings were defined by the client.

Appendix 1

Tested configurations:

Configuration 1:

GSM			**WCDMA**
TRX	1 (30 W)	2 (30 W)	1 (20 W)
Downlink	513 (1930.4 MHz)	521 (1932 MHz)	9725 (1945 MHz)
Uplink	513 (1850.4 MHz)	521 (1852 MHz)	9325 (1865 MHz)

Configuration 2:

GSM			**WCDMA**
TRX	1 (30 W)	2 (30 W)	1 (20 W)
Downlink	513 (1930.4 MHz)	521 (1932 MHz)	9674 (1934.8 MHz)
Uplink	513 (1850.4 MHz)	521 (1852 MHz)	9274 (1854.8 MHz)

Configuration 3:

GSM			**WCDMA**
TRX	1 (30 W)	2(30 W)	1 (20 W)
Downlink	801 (1988 MHz)	809 (1989.6 MHz)	9883 (1976.6 MHz)
Uplink	801 (1908 MHz)	809 (1909.6 MHz)	9483 (1896.6 MHz)

Configuration 4:

GSM			**WCDMA**
TRX	1 (30 W)	2 (30 W)	1 (20 W)
Downlink	564 (1940.6 MHz)	623 (1952.4 MHz)	9732 (1946.4 MHz)
Uplink	564 (1860.6MHz)	623 (1872.4 MHz)	9332 (1866.4 MHz)

Configuration 5:

GSM			**WCDMA**
TRX	1 (30 W)	2 (30 W)	1 (20 W)
Downlink	758 (1979.4 MHz)	699 (1967.6 MHz)	9868 (1973.6 MHz)
Uplink	758 (1899.4MHz)	699 (1887.6 MHz)	9468 (1893.6 MHz)

Appendix 1

Configuration 6:

WCDMA	
TRX	1 (80 W)
Downlink	9662 (1932.4 MHz)
Uplink	9262 (1852.4 MHz)

Configuration 7:

WCDMA	
TRX	1 (80 W)
Downlink	9800 (1960.0 MHz)
Uplink	9400 (1880.0 MHz)

Configuration 8:

WCDMA	
TRX	1 (80 W)
Downlink	9938 (1987.6 MHz)
Uplink	9538 (1907.6 MHz)

Configuration 9:

GSM			**WCDMA**
TRX	1 (30 W)	2 (30 W)	1 (20 W)
Downlink	634 (1954.6 MHz)	688 (1965.4 MHz)	9800 (1960 MHz)
Uplink	634 (1874.6 MHz)	688 (1885.4 MHz)	9400 (1880 MHz)

Configuration 10:

GSM	
TRX	1 (80 W)
Downlink	661 (1960.0 MHz)
Uplink	661 (1880.0 MHz)

Conducted measurements

All RF conducted measurements were performed with the test object configured for maximum transmit power. All TX measurements were done at the RF A connector.

Radiated measurements

The test object was powered with -48 VDC. All measurements were performed with the test object configured for maximum transmit power. The configurations represents worst case for radiated spurious emission measurements.

The RF output power port was via a RF attenuator connected to functional test equipment for supervision.

Purpose of test

The purpose of this test is to justify a Class II Permissive Change of the test object to include the use of multi- standard radio (MSR) for access technologies GSM and WCDMA running in Contiguous and Non- contiguous mode and to verify the frequency stability performance to be within tolerance due to new frequency stabilizing components. In WCDMA mode the RF output power shall be verified to be within tolerance after a software upgrade ensuring correct setting of WCDMA output power.

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 , 2011
CFR 47 part 24, October 1st, 2011
3GPP TS 25.141, version 8.9.0
RSS-Gen Issue 3
RSS-133 Issue 5

Appendix 1

Measurement equipment

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	2013-07	504 143
R&S ESU 26	2013-03	901 553
Control computer with R&S software EMC32 version 8.52.0	-	503 479
High pass filter	2013-07	504 199
High pass filter	2013-07	901 502
High pass filter	2013-01	901 373
High pass filter	2013-08	503 739
High pass filter	2013-07	503 740
High pass filter	2013-08	504 200
RF attenuator	2013-07	504 159
RF attenuator	2012-10	900 233
RF attenuator	2013-01	901 374
Boonton RF Peak power meter/analyzer	2012-11	503 144
Boonton Power sensor 56518-S/4	2012-11	503 145
Chase Bilog Antenna CBL 6111A	2013-10	503 182
EMCO Horn Antenna 3115	2014-01	502 175
Std.gain horn FLANN model 20240-20	-	503 674
µComp Nordic, Low Noise Amplifier	2013-03	901 545
MITEQ Low Noise Amplifier	2013-08	503 285
Temperature cabinet	-	503 360
Testo 635 Temperature and humidity meter	2013-05	504 203
Testo 625 Temperature and humidity meter	2013-05	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).

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 2012-01-05.

Manufacturer's representative

Christer Gustavsson, Ericsson AB

Test engineers

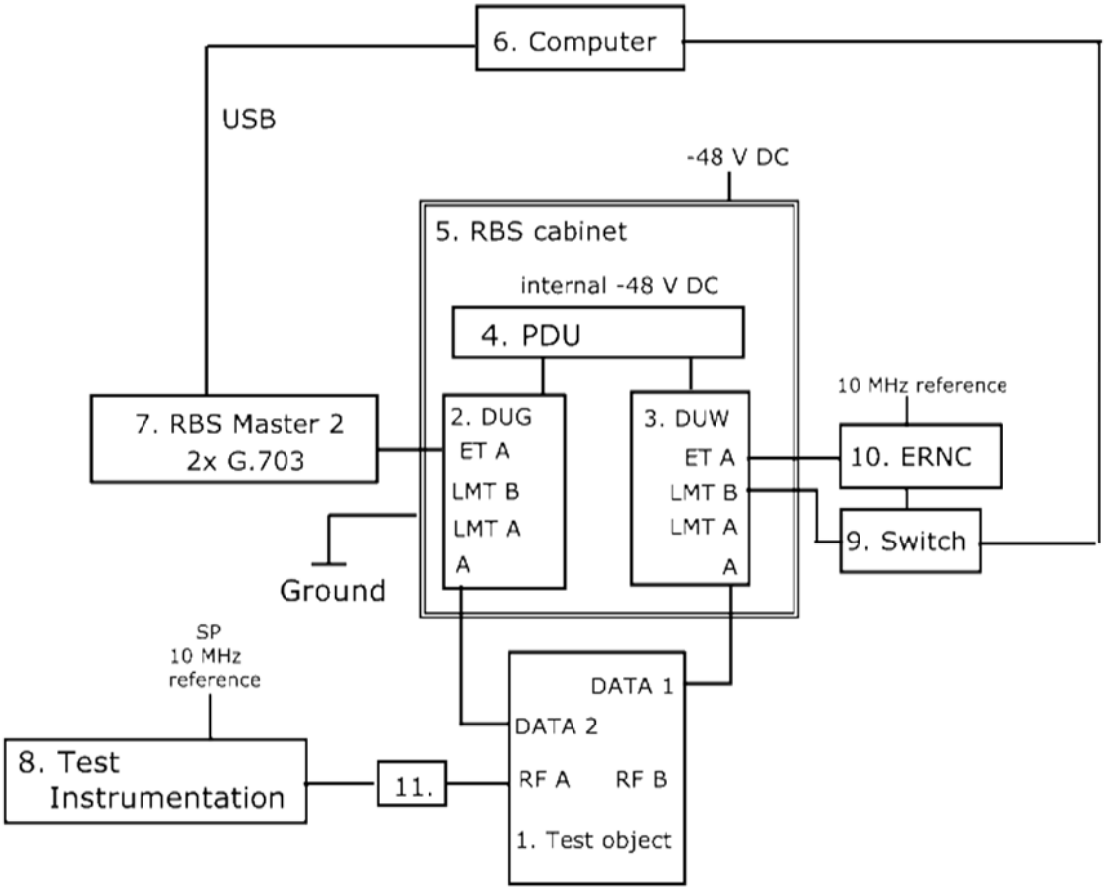
Tomas Lennhager, Andreas Johnson, Tomas Isbring, Jörgen Wassholm and Martin Theorin

Test participant

Samir Catic and Martin Ivanovic, Ericsson AB (Partly present)

Appendix 1

Test set-up conducted measurements TX



Test object

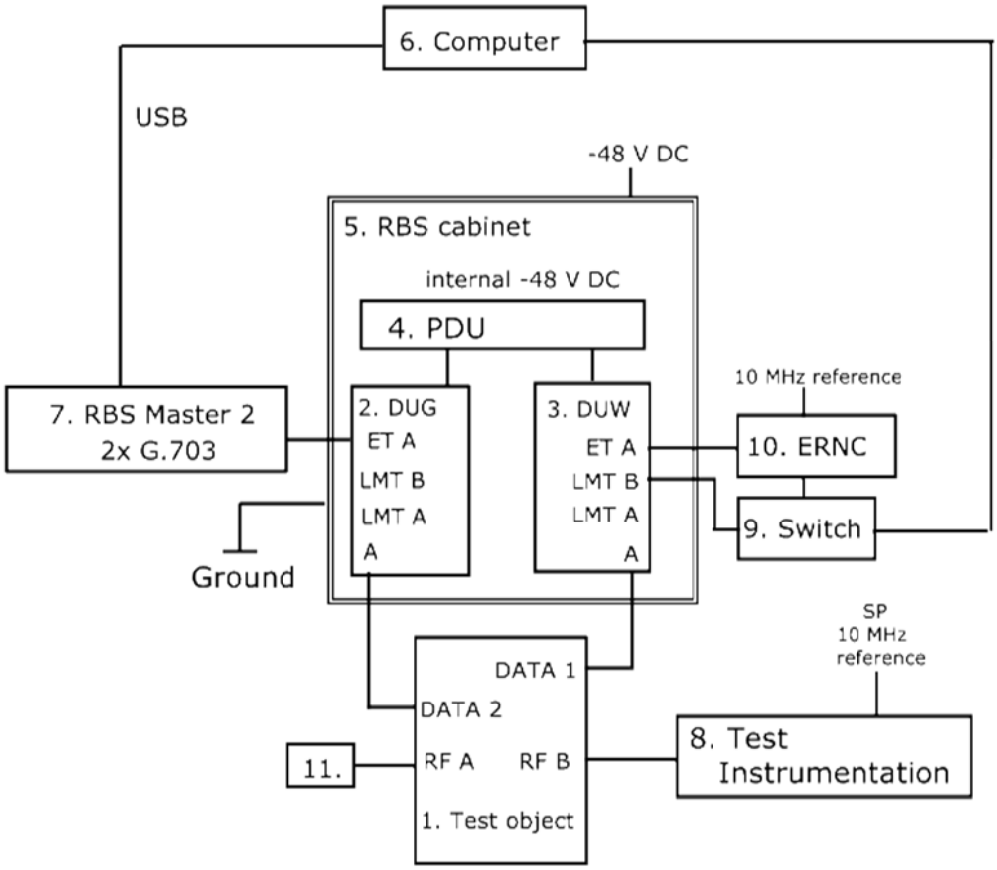
1. RRUS 01 B2, KRC 118 74/2, rev. R1C, s/n: CB4K978514
   (FCC ID:TA8AKRC11874-2 / IC:287AB-AS118742) with preinstalled software (PIS) CXP9017316/1_R39UD and unlocked working software CXP 901 3268/6 rev. R44FZ

Functional test equipment

2. DUG 20 01 KDU 137 569/1 Rev R2B, S/N: C823833522
3. DUW 30 01 KDU 127 161/3 Rev R4C, S/N: C824609611
4. PDU 02 01, BMG 980336/4, R2A, (S)BJ31528316
5. RBS 6201 cabinet, BAMS 1000778792
6. Computer, BAMS 1001052042
7. RBS Master, 2E LPY 107 1007/3, BAMS 1000878432
8. SP test instrument according measurement equipment list
9. Switch Netgear FS726T
10. ERNC, BAMS – 1000759880
11. RF attenuator

Appendix 1

Test set-up conducted measurements RX



Test object

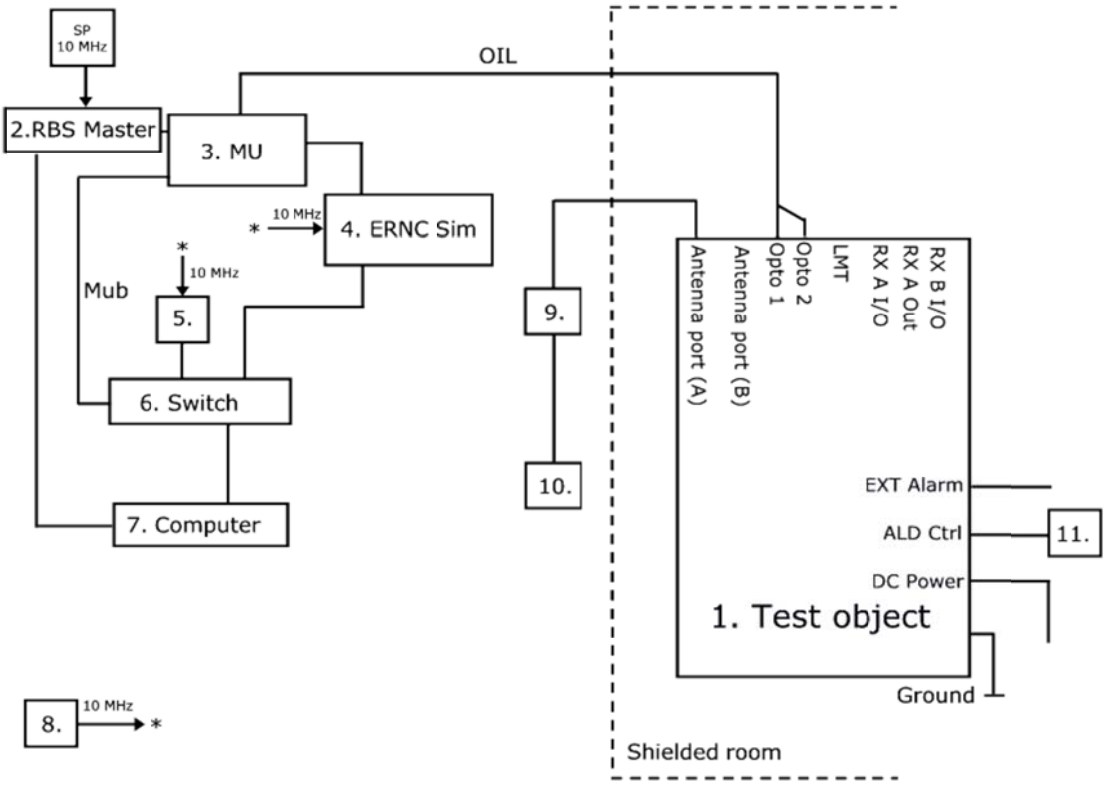
1. RRUS 01 B2, KRC 118 74/2, rev. R1C, s/n: CB4K978514 (FCC ID:TA8AKRC11874-2 / IC:287AB-AS118742) with preinstalled software (PIS) CXP9017316/1_R39UD and unlocked working software CXP 901 3268/6 rev. R44FZ

Functional test equipment

2. DUG 20 01 KDU 137 569/1 Rev R2B, S/N: C823833522
3. DUW 30 01 KDU 127 161/3 Rev R4C, S/N: C824609611
4. PDU 02 01, BMG 980336/4, R2A, (S)BJ31528316
5. RBS 6201 cabinet, BAMS 1000778792
6. Computer, BAMS 1001052042
7. RBS Master, 2E LPY 107 1007/3, BAMS 1000878432
8. SP test instrument according measurement equipment list
9. Switch Netgear FS726T
10. ERNC, BAMS – 1000759880
11. RF terminator

Appendix 1

Test set-up radiated measurements



Test object

1. RRUS 01 B2, KRC 118 74/2, rev. R1C, s/n: CB4K978514
(FCC ID:TA8AKRC11874-2 / IC:287AB-AS118742 with preinstalled software (PIS)
CXP9017316/ 1_R39UD

Functional test equipment

2. RBS Master 2E, LPY 107 1007/3, rev R1C/A BAMS – 1000878432
3. Main Unit: RBS 6601, see details in the table below
4. ERNC SIM 127
5. NTP server, Symmetricom, BAMS – 1000714181
6. Fast Ethernet switch, Netgear FS726 & Netgear GSM7212
7 Computer HP Elitbook, BAMS – 1001052042
8. 10 MHz reference, Symmetricom model 8040, BAMS – 1000714186
9. Attenuator
10. Signal analyzer, Rohde & Schwarz FSIQ 40, SP 503 738
11. RET – Remote Electrical Tilt unit

RBS 6601 Main Unit

Product name	Product number	R-state	Serial number
PDU 02 01	BMG 980 336/4	R2A	BJ31534775
SUP 6601	1/BFL 901 009/1	R3B	BR81262561
DUG 20 01	KDU 137 569/1	R2B	C823833522
DUMMY	SXK 109 8971/1	R1A	-
SUP 6601	1/BFL 901 009/1	R2A	BR80879339
DUW 30 01	KDU 127 161/3	R4C	C824609611

Appendix 1

Test object interfaces	**Type of port:**
Power configuration: -48 VDC	DC Power
Ground wire	Ground
Antenna port RF A, combined TX/RX, female 7/16 connector	Antenna
Antenna port RF B, RX only, female 7/16 connector	Antenna
LMT, for maintenance only	Telecom
Cross connect RX A, not supported, omitted in set-up drawings above	Antenna
Cross connect RX B, not supported, omitted in set-up drawings above	Antenna
RXA CO-site, not supported, omitted in set-up drawings above	Antenna
Data 1, connected to DUW port RIA	Telecom
Data 2, connected to DUG port RIA	Telecom
EXT Alarm, shielded multi-wire	Signal
ALD Ctrl, shielded multi-wire	Signal

RBS software

WCDMA

Software	**Revision**
CXP 901 8350/1	R4A02

GSM

Software	**Revision**
CXP104 0013_07 (g12a1g7_r65G)	R65G

Appendix 2

RF power output measurements according to CFR 47 §24.232 / IC RSS-133 6.4

Date	Temperature	Humidity
2012-09-17	20 °C ± 3 °C	53 % ± 5 %

Test set-up and procedure

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

Measurement equipment	SP number
R&S FSQ 40	504 143
RF attenuator	504 159
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 1.1 dB

Results

Diagram 1: Configuration 1:
Diagram 2: Configuration 2:
Diagram 3: Configuration 3:
Diagram 4: Configuration 4:
Diagram 5: Configuration 5:
Diagram 6: Configuration 6:
Diagram 7: Configuration 7:
Diagram 8: Configuration 8:

Limits

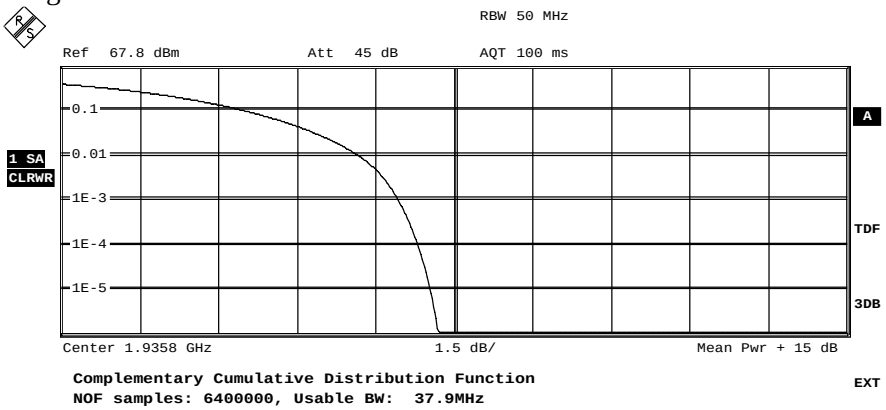
§24.232 Federal Register / Vol. 73, No. 86
The maximum output power may not exceed 1640 W (EIRP).
The Peak to Average Ratio (PAR) may not exceed 13 dB.

RSS-133: The average equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.
In addition, when the transmitter power is measured in terms of average value, the peak-to-average ratio of the power shall not exceed 13 dB.

Complies?	Yes

Appendix 2

Diagram 1:

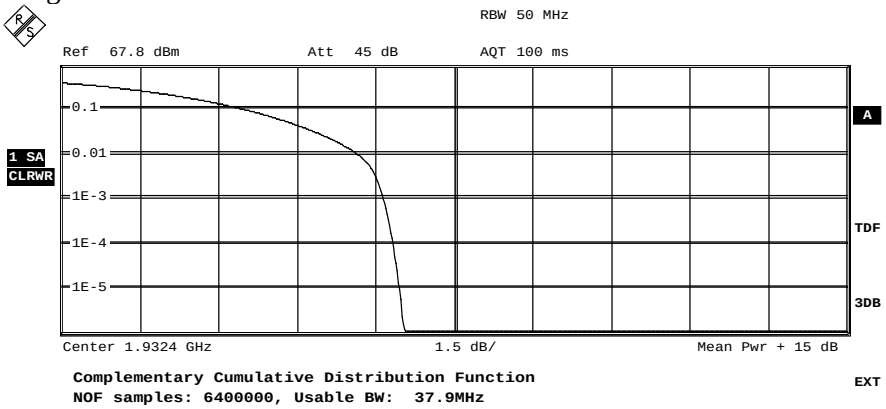


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.37 dBm
Peak	55.61 dBm
Crest	7.25 dB
10 %	3.53 dB
1 %	5.67 dB
.1 %	6.44 dB
.01 %	6.80 dB

Date: 17.SEP.2012 12:07:23

Diagram 2:



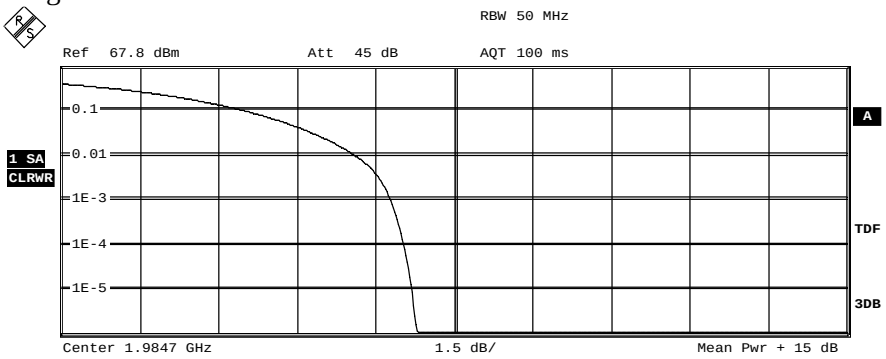
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.54 dBm
Peak	55.18 dBm
Crest	6.64 dB
10 %	3.53 dB
1 %	5.65 dB
.1 %	6.15 dB
.01 %	6.35 dB

Date: 17.SEP.2012 12:28:31

Appendix 2

Diagram 3:

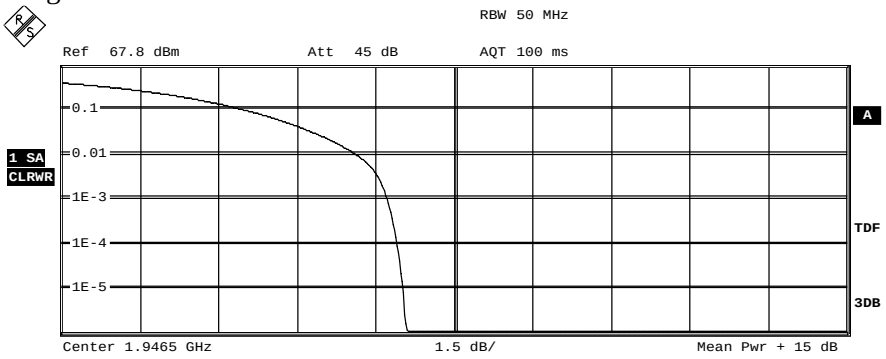


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.40 dBm
Peak	55.40 dBm
Crest	7.01 dB
10 %	3.51 dB
1 %	5.60 dB
.1 %	6.27 dB
.01 %	6.54 dB

Date: 17.SEP.2012 10:09:33

Diagram 4:



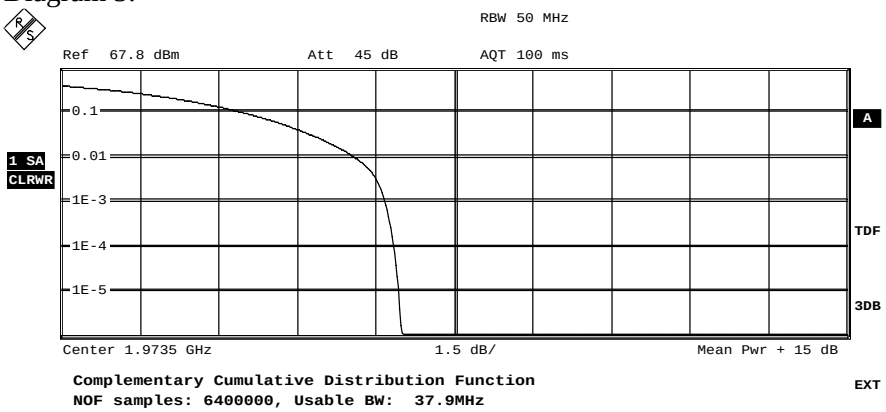
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.58 dBm
Peak	55.19 dBm
Crest	6.62 dB
10 %	3.51 dB
1 %	5.63 dB
.1 %	6.23 dB
.01 %	6.42 dB

Date: 17.SEP.2012 12:51:19

Appendix 2

Diagram 5:

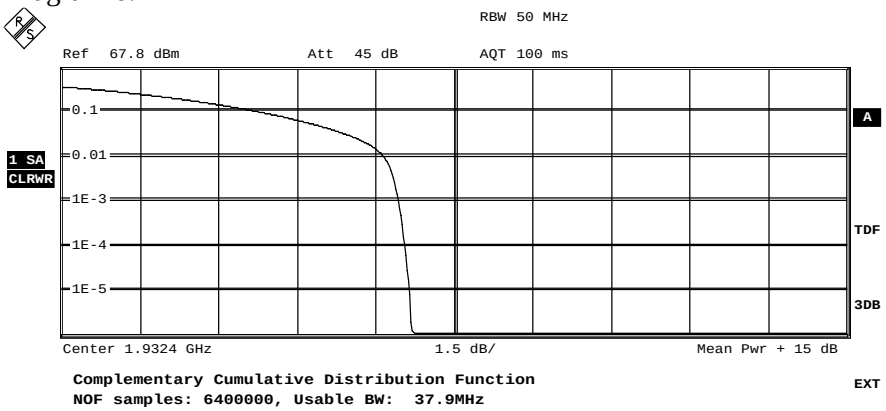


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.65 dBm
Peak	55.25 dBm
Crest	6.60 dB
10 %	3.51 dB
1 %	5.60 dB
.1 %	6.18 dB
.01 %	6.35 dB

Date: 17.SEP.2012 13:14:10

Diagram 6:



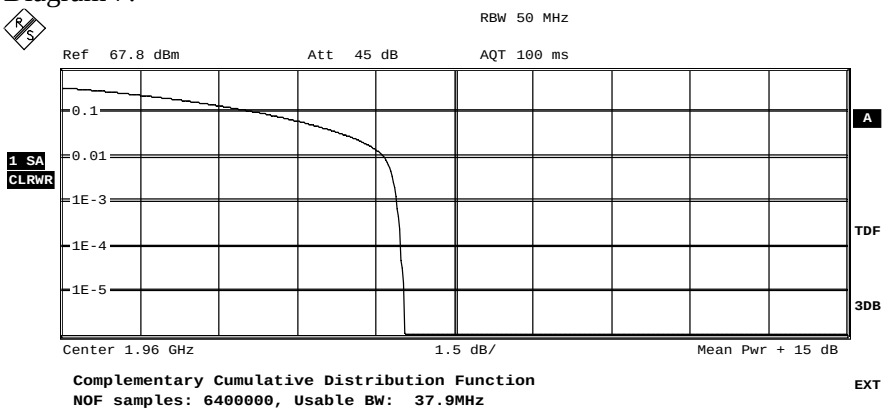
Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.45 dBm
Peak	55.25 dBm
Crest	6.80 dB
10 %	3.80 dB
1 %	6.15 dB
.1 %	6.44 dB
.01 %	6.56 dB

Date: 17.SEP.2012 15:52:56

Appendix 2

Diagram 7:

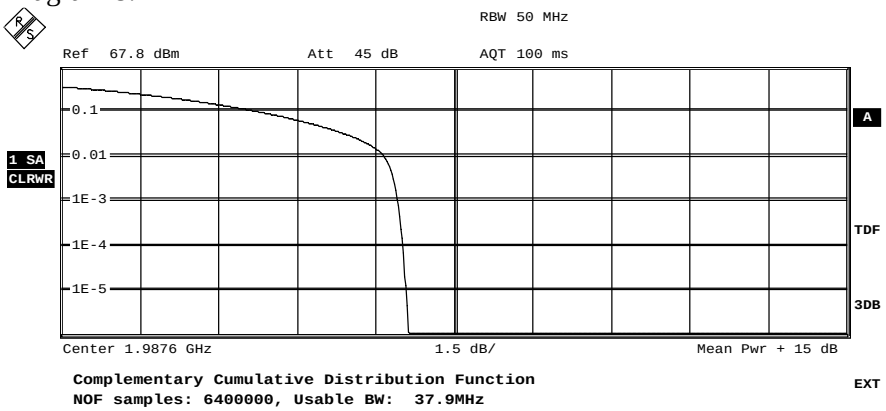


Complementary Cumulative Distribution Function
NOF samples: 6400000, Usable BW: 37.9MHz

	Trace 1
Mean	48.99 dBm
Peak	55.61 dBm
Crest	6.62 dB
10 %	3.82 dB
1 %	6.15 dB
.1 %	6.42 dB
.01 %	6.49 dB

Date: 17.SEP.2012 15:48:10

Diagram 8:



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

	Trace 1
Mean	48.37 dBm
Peak	55.05 dBm
Crest	6.68 dB
10 %	3.80 dB
1 %	6.15 dB
.1 %	6.42 dB
.01 %	6.54 dB

Date: 17.SEP.2012 15:57:59

Appendix 3

Conducted spurious emission measurements according to CFR 47 §24.238 / IC RSS-133 6.5

Date	Temperature	Humidity
2012-09-17	20 °C ± 3 °C	53 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §24.238. The output was connected to a spectrum analyzer with a RBW setting of 1 MHz and RMS detector activated.

Measurement equipment	SP number
R&S FSQ	504 143
RF attenuator	504 159
High pass filter	504 200
RF attenuator	900 691
High pass filter	503 740
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

Diagram 1:a-e Configuration 1
Diagram 2:a-e Configuration 2
Diagram 3:a-e Configuration 3
Diagram 4:a-e Configuration 4
Diagram 5:a-e Configuration 5

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 feed-through.

The highest internal frequency as declared by the client was 2.4576 GHz, thus the choice of the upper frequency boundary was set to 10x2.5 GHz = 25 GHz for emission measurements.

Limits

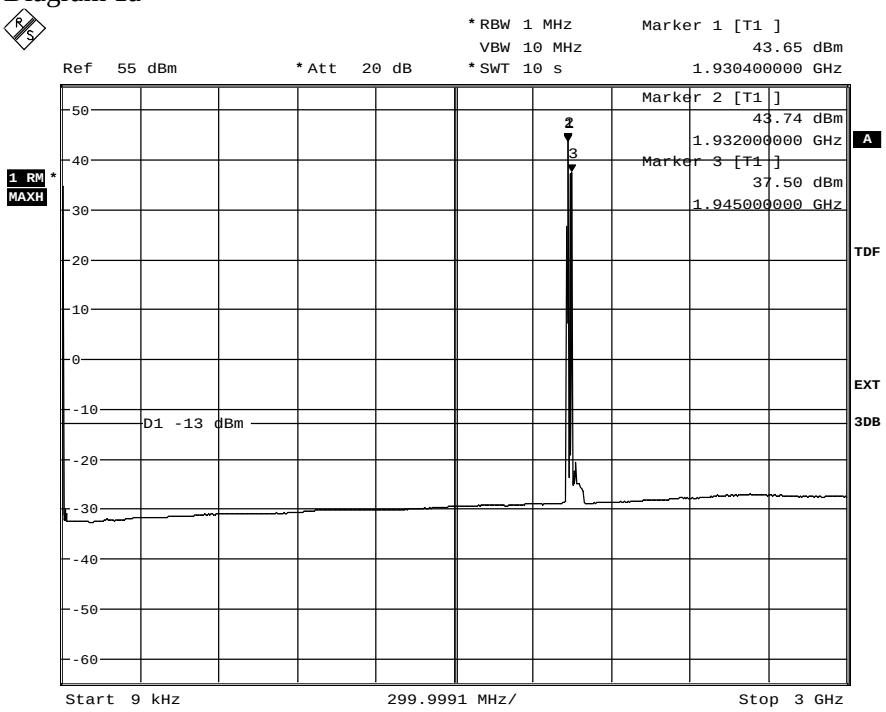
§24.238 and RSS-133 6.5

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 per 1 MHz RBW.

Complies?	Yes

Appendix 3

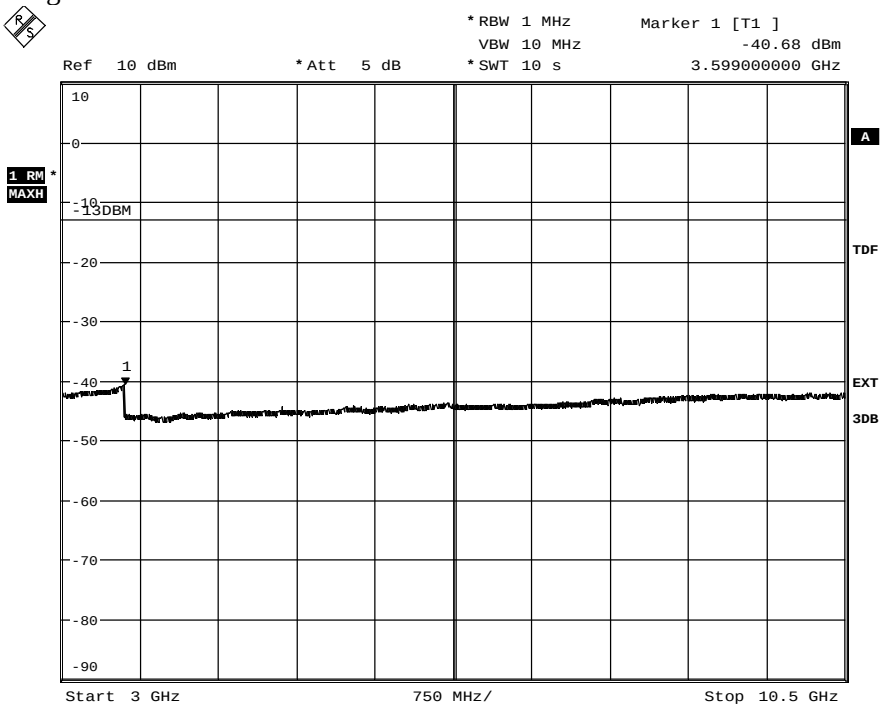
Diagram 1a



Date: 17.SEP.2012 12:08:41

The emissions around the carrier are within the operating frequency band

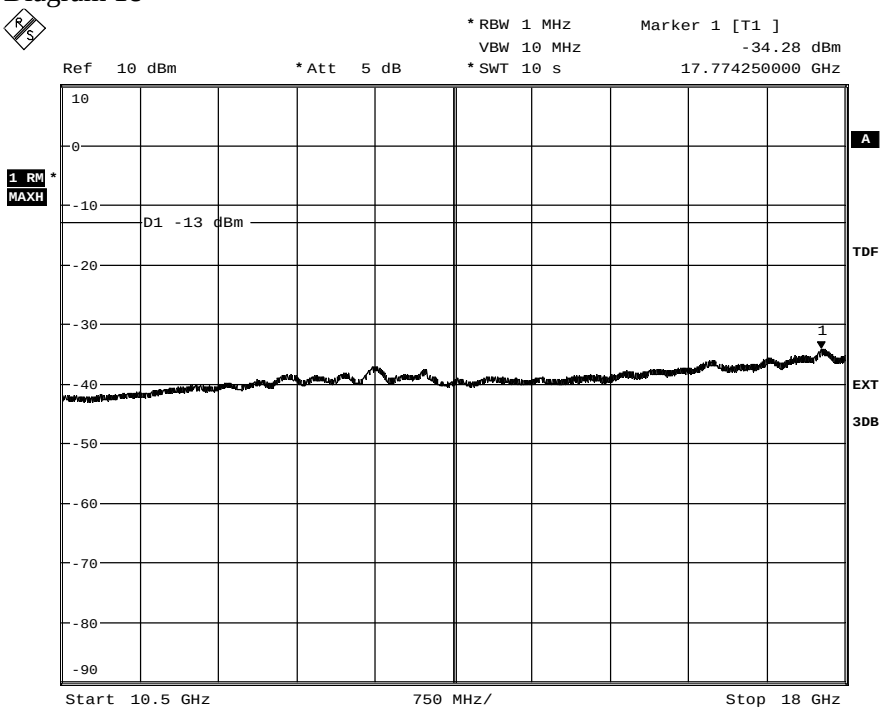
Diagram 1b



Date: 17.SEP.2012 12:10:02

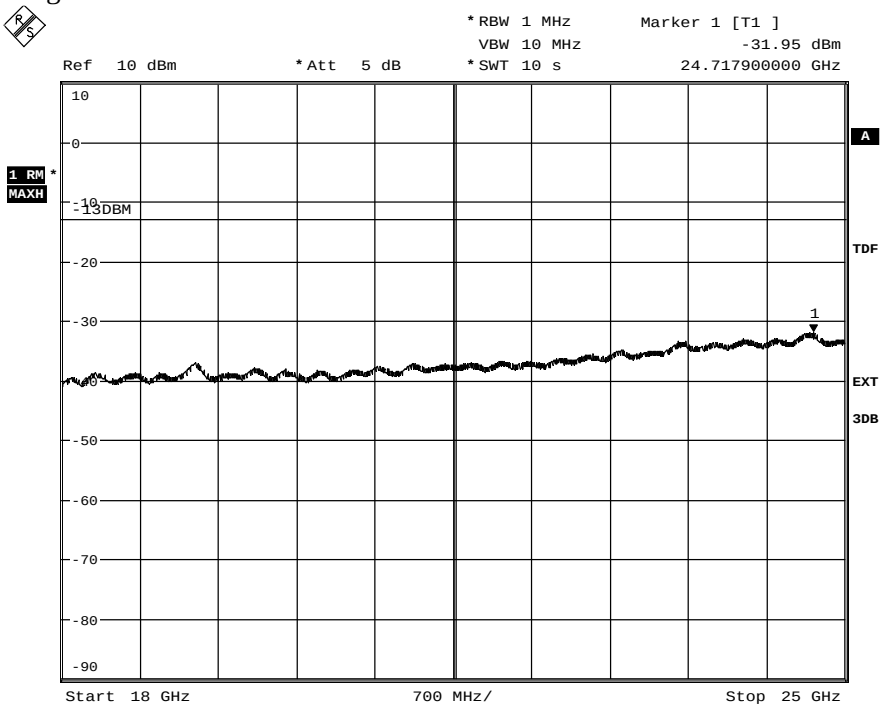
Appendix 3

Diagram 1c



Date: 17.SEP.2012 12:12:02

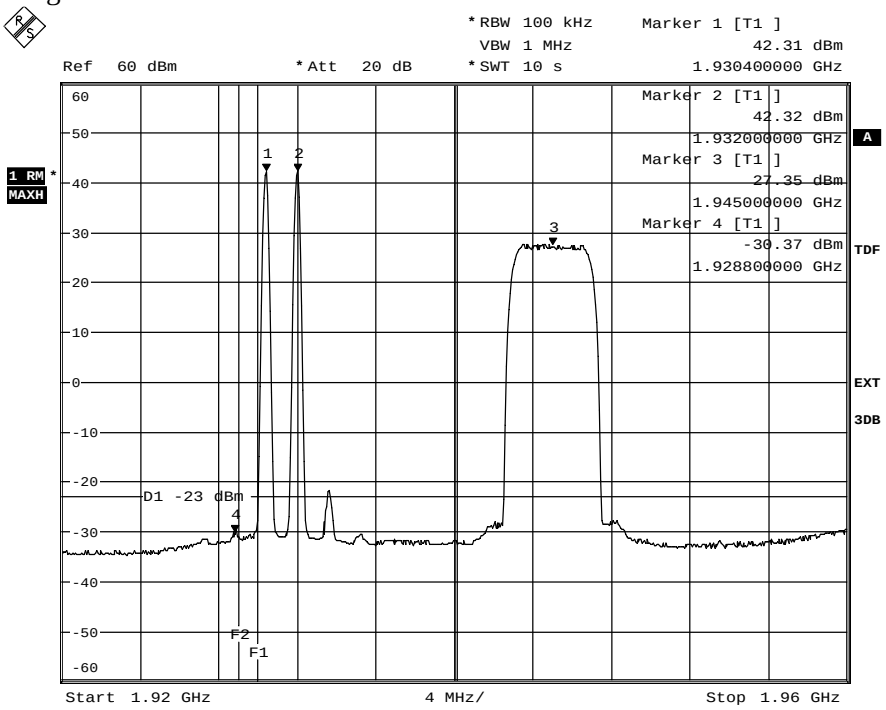
Diagram 1d



Date: 17.SEP.2012 12:13:37

Appendix 3

Diagram 1e

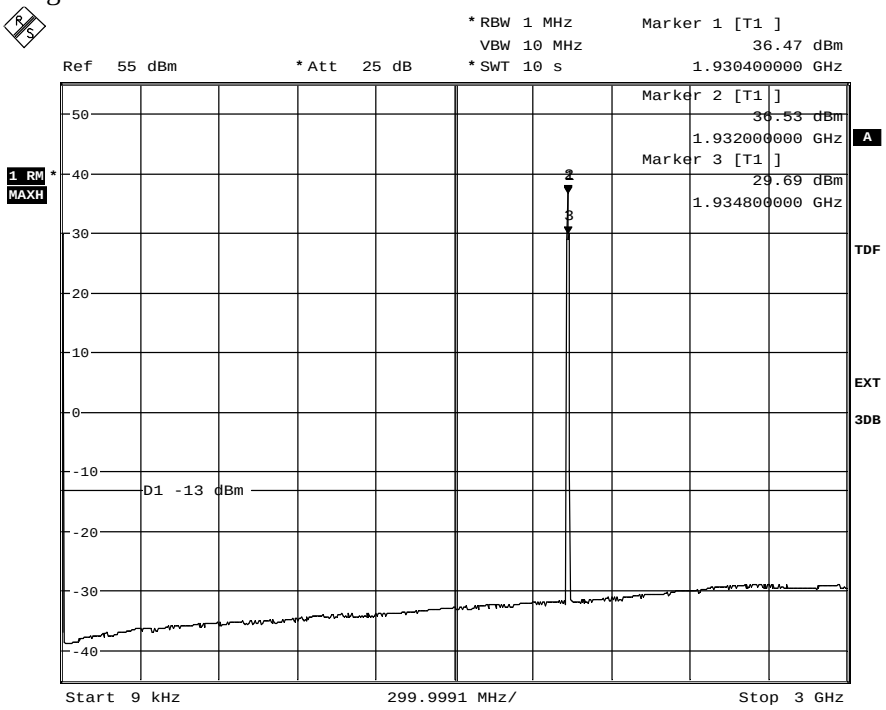


Date: 17.SEP.2012 12:06:18

The emission at 1928.8 MHz was -22.12 dBm measured with the channel power method with 1 MHz channel bandwidth

Appendix 3

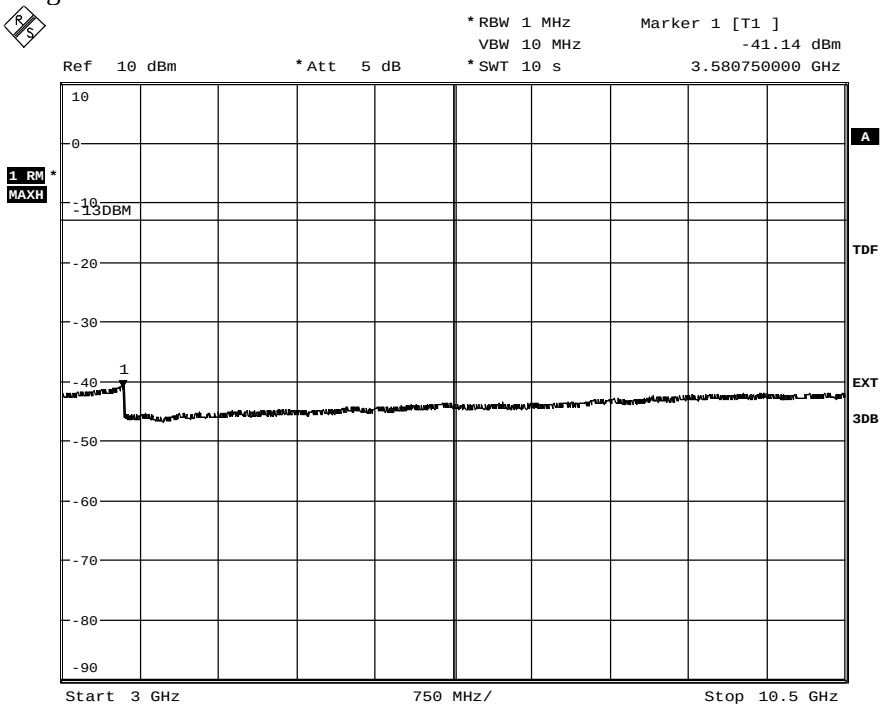
Diagram 2a



Date: 17.SEP.2012 12:30:01

The emissions around the carrier are within the operating frequency band

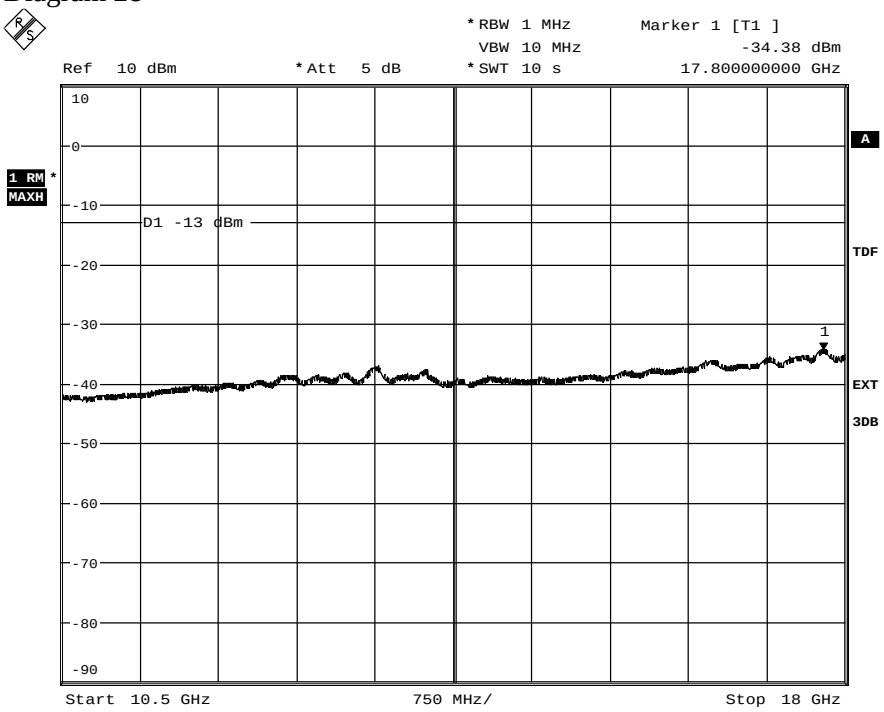
Diagram 2b



Date: 17.SEP.2012 12:31:56

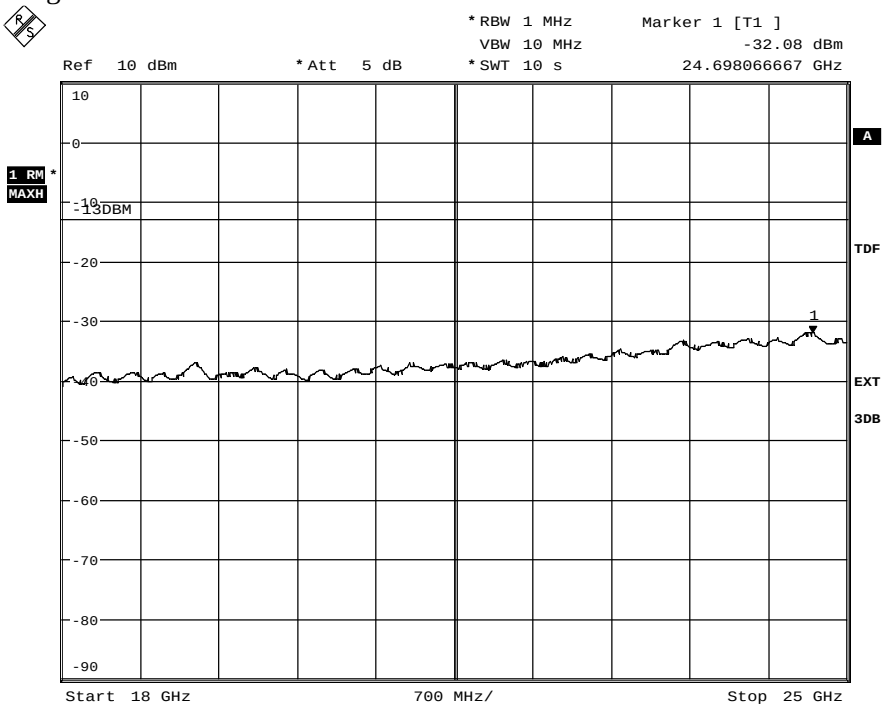
Appendix 3

Diagram 2c



Date: 17.SEP.2012 12:32:38

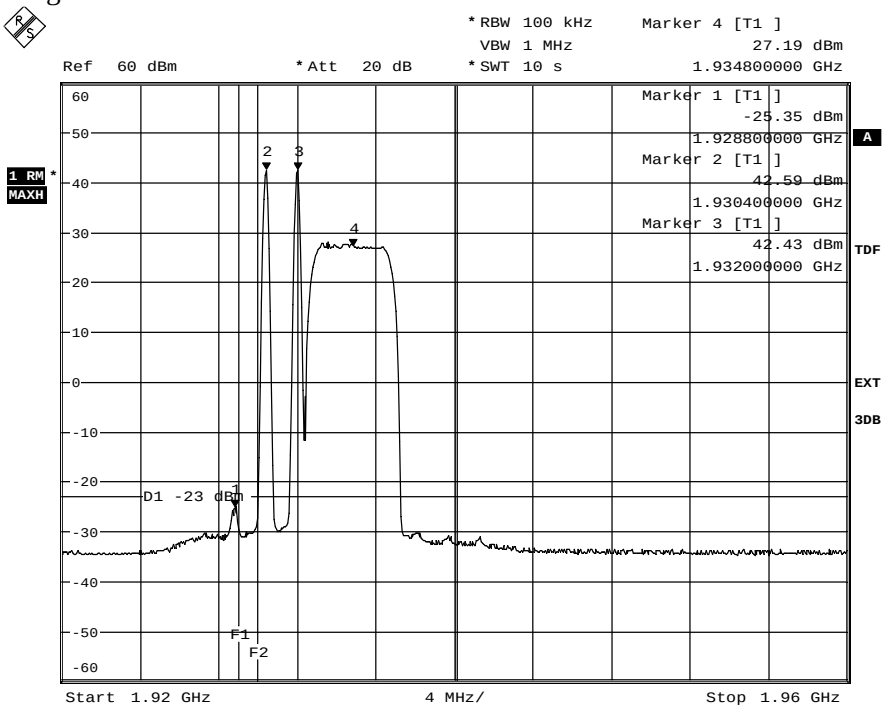
Diagram 2d



Date: 17.SEP.2012 12:35:49

Appendix 3

Diagram 2e

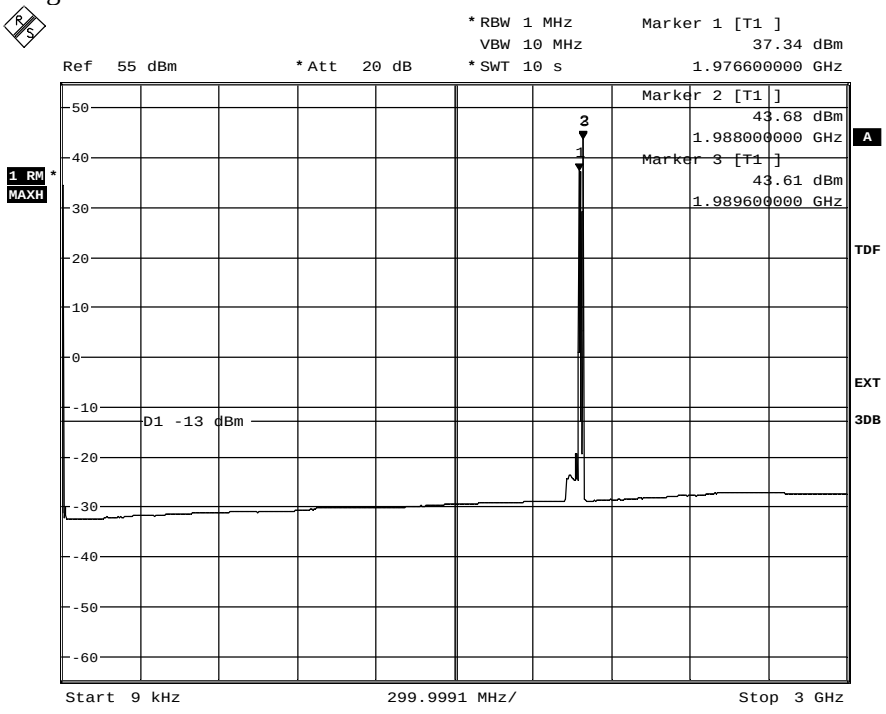


Date: 17.SEP.2012 12:27:43

The emission at 1928.8 MHz was -19.14 dBm measured with the channel power method with 1 MHz channel bandwidth

Appendix 3

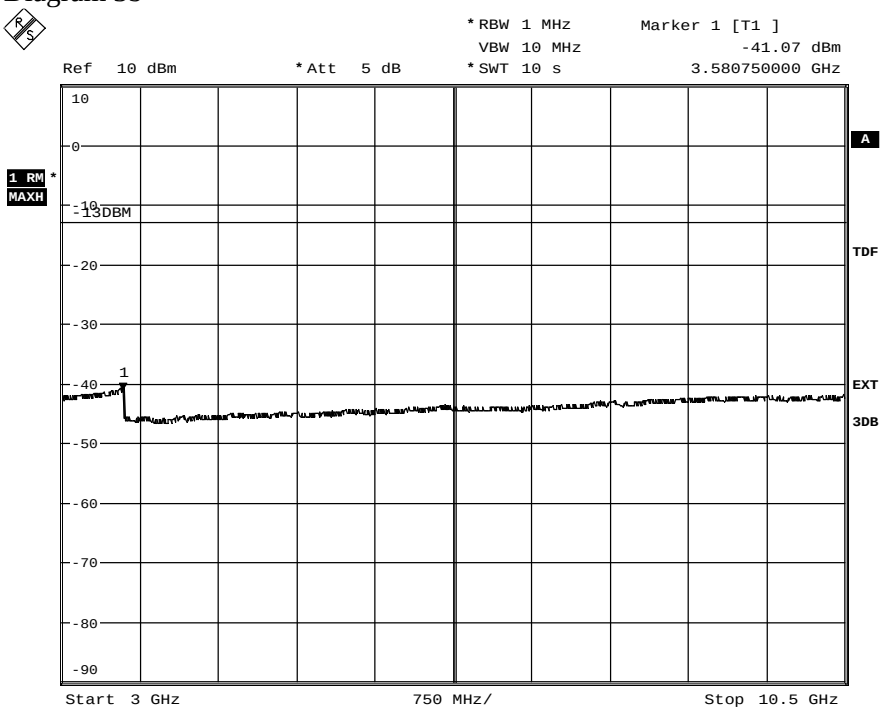
Diagram 3a



Date: 17.SEP.2012 10:29:13

The emissions around the carrier are within the operating frequency band

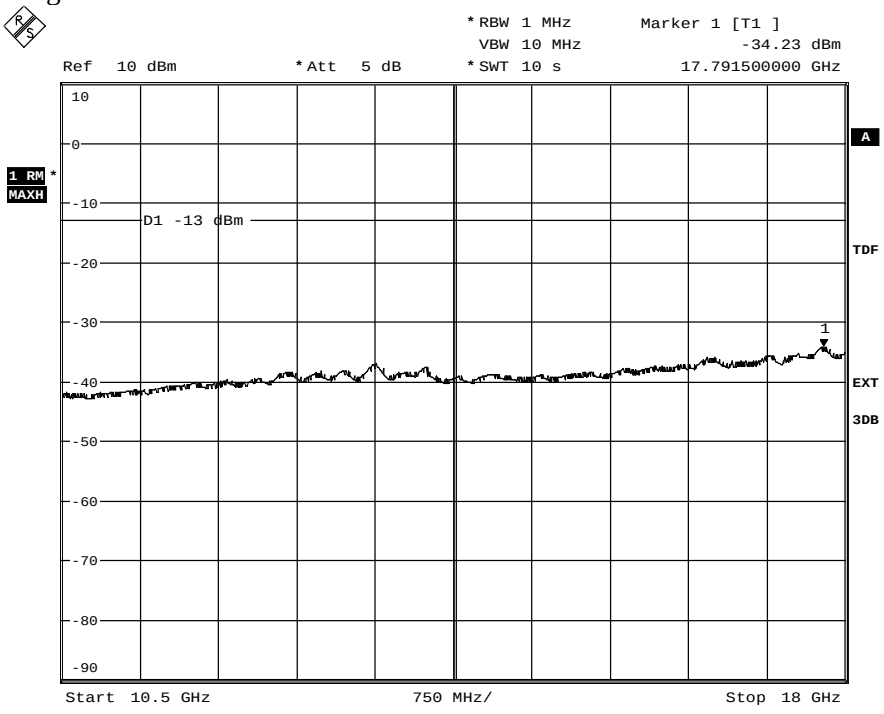
Diagram 3b



Date: 17.SEP.2012 10:40:16

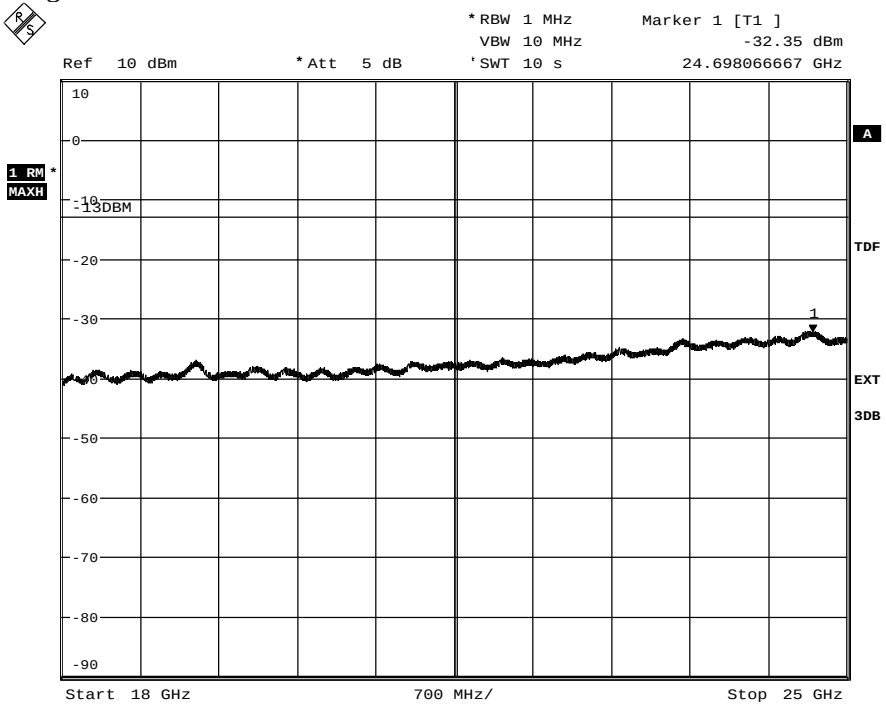
Appendix 3

Diagram 3c



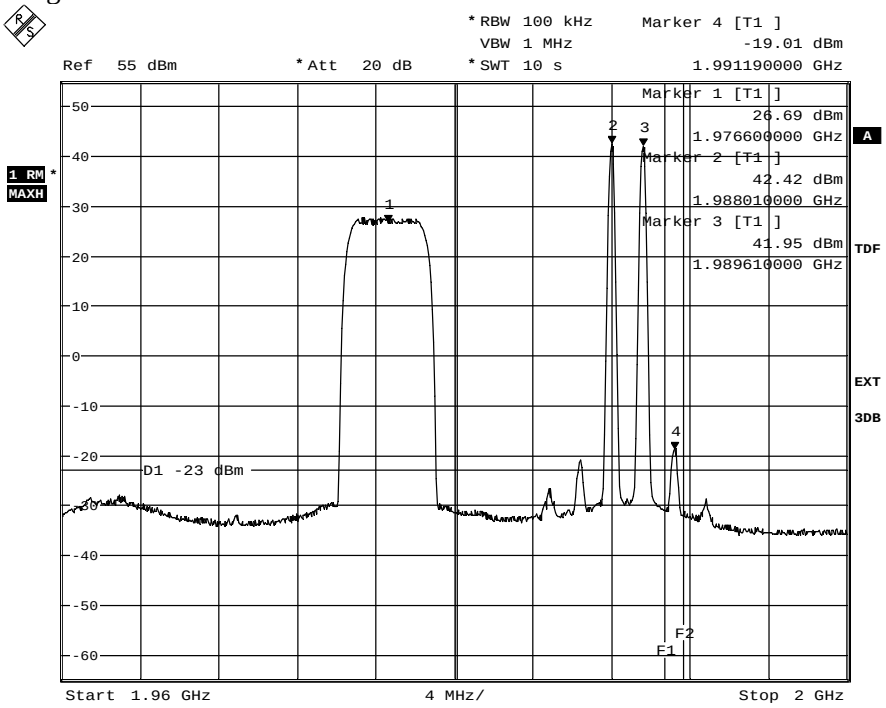
Date: 17.SEP.2012 10:41:38

Diagram 3d



Date: 17.SEP.2012 10:54:41

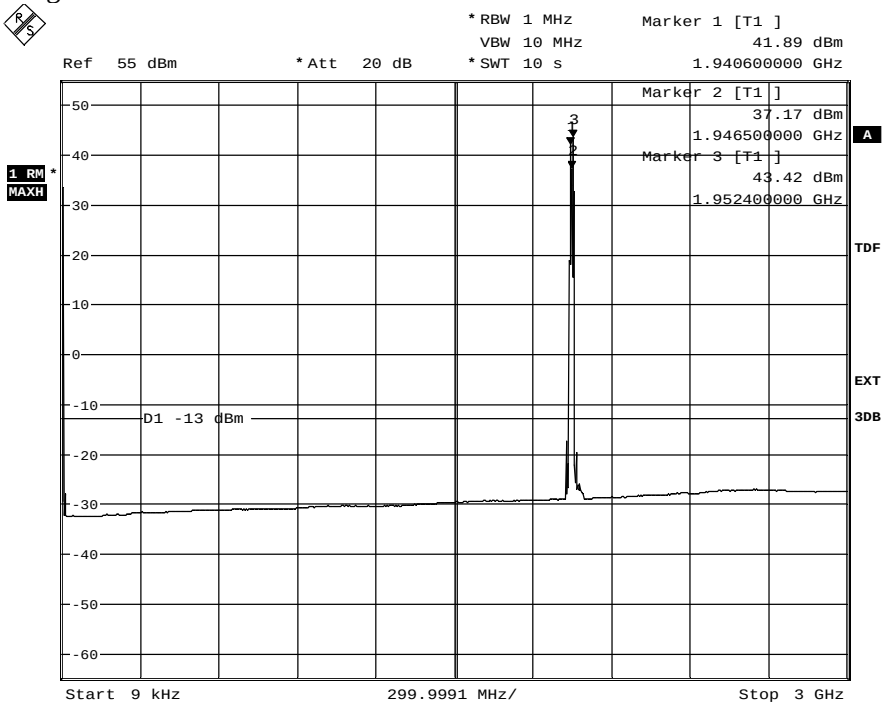
Diagram 3e



Date: 17.SEP.2012 10:13:33

The emission at 1991.2 MHz was -14.35 dBm measured with the channel power method with 1 MHz channel bandwidth

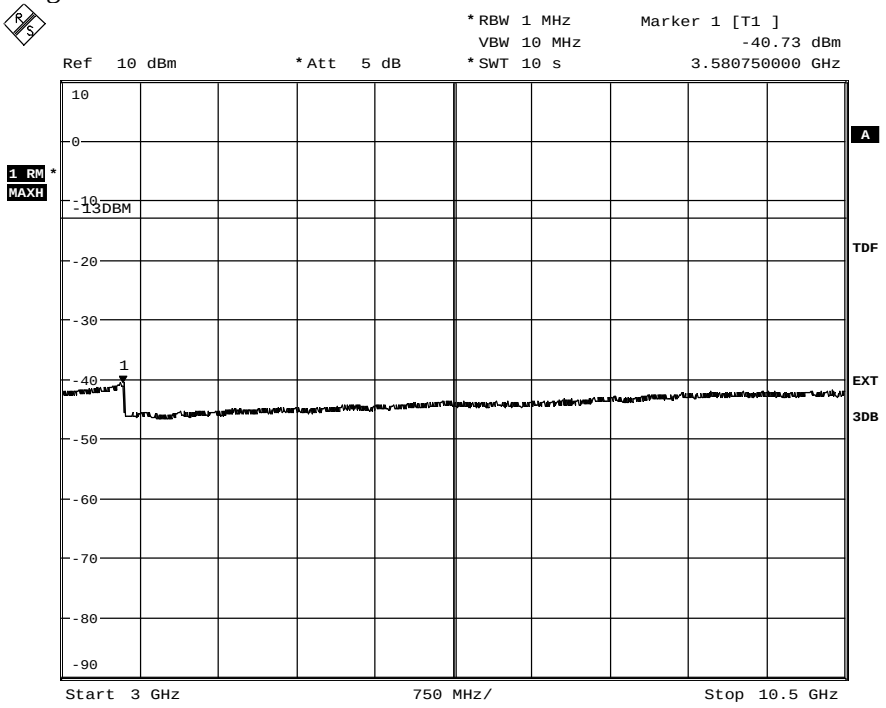
Diagram 4a



Date: 17.SEP.2012 12:54:11

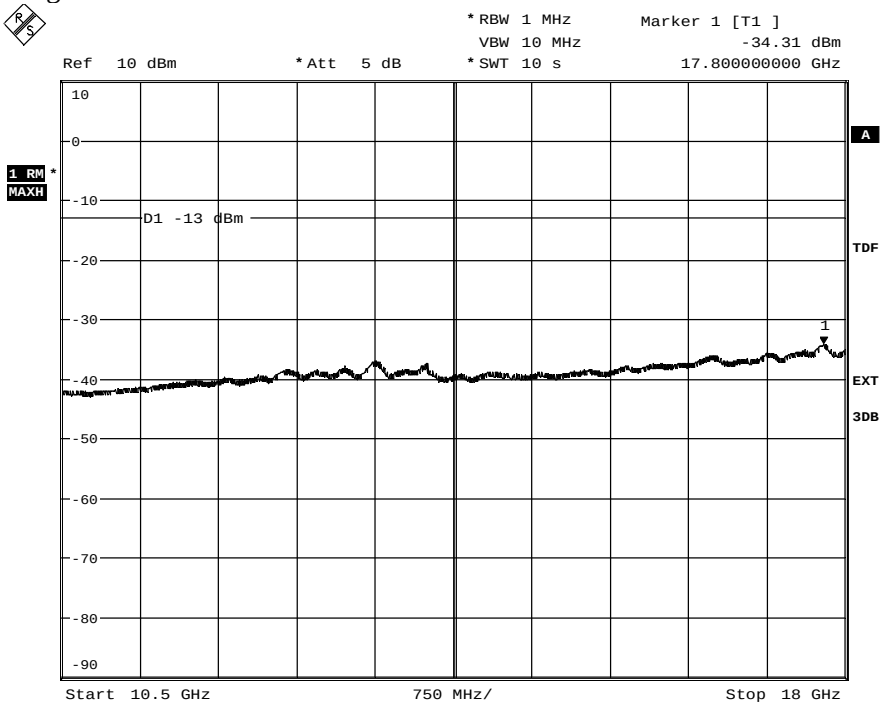
The emissions around the carrier are within the operating frequency band

Diagram 4b



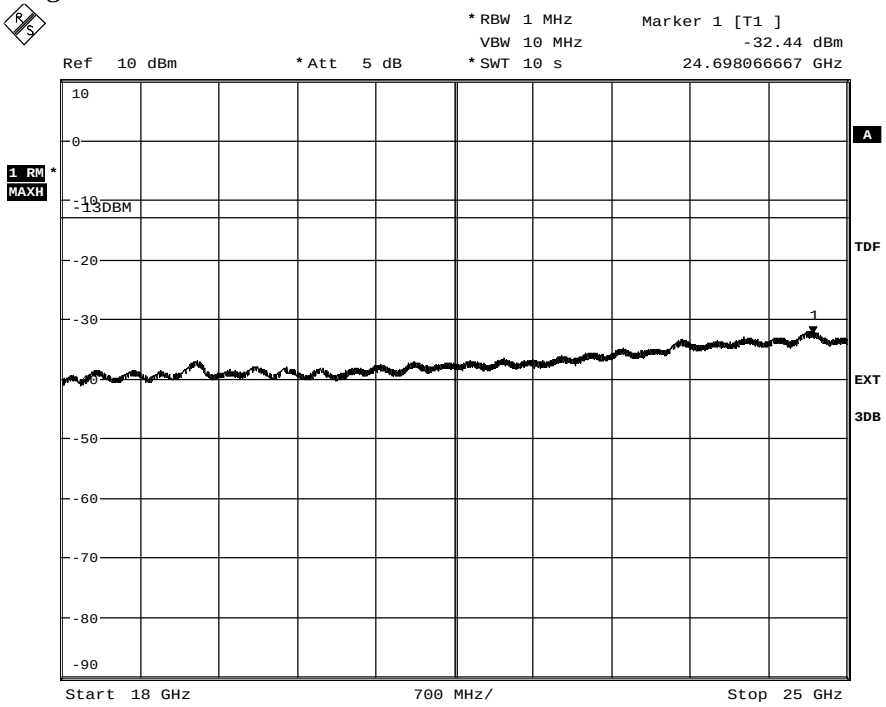
Date: 17.SEP.2012 12:55:32

Diagram 4c



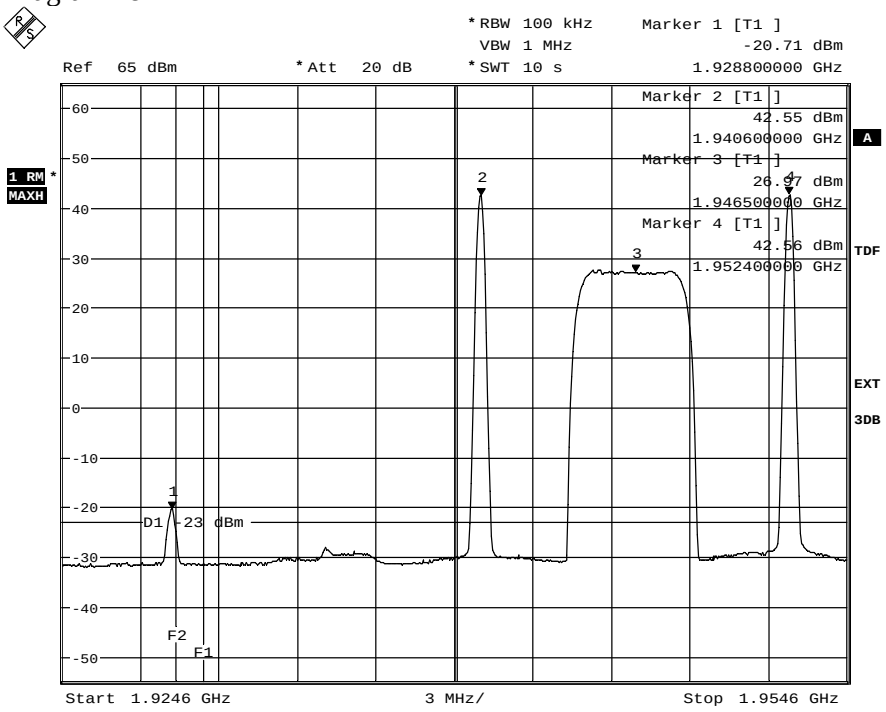
Date: 17.SEP.2012 12:56:12

Diagram 4d



Date: 17.SEP.2012 12:57:28

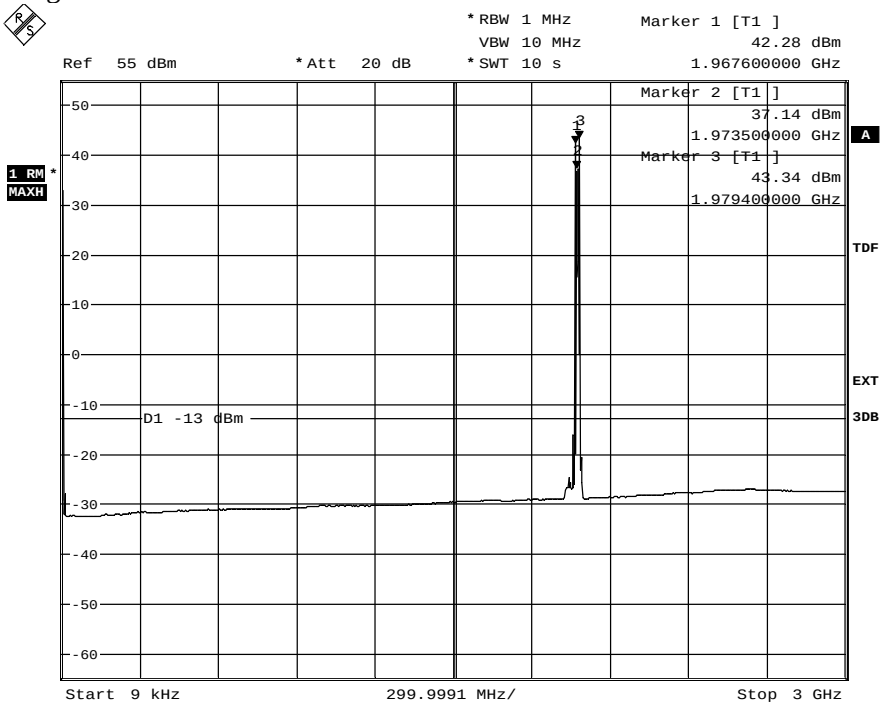
Diagram 4e



Date: 17.SEP.2012 12:50:34

The emission at 1928.8 MHz was -16.92 dBm measured with the channel power method with 1 MHz channel bandwidth

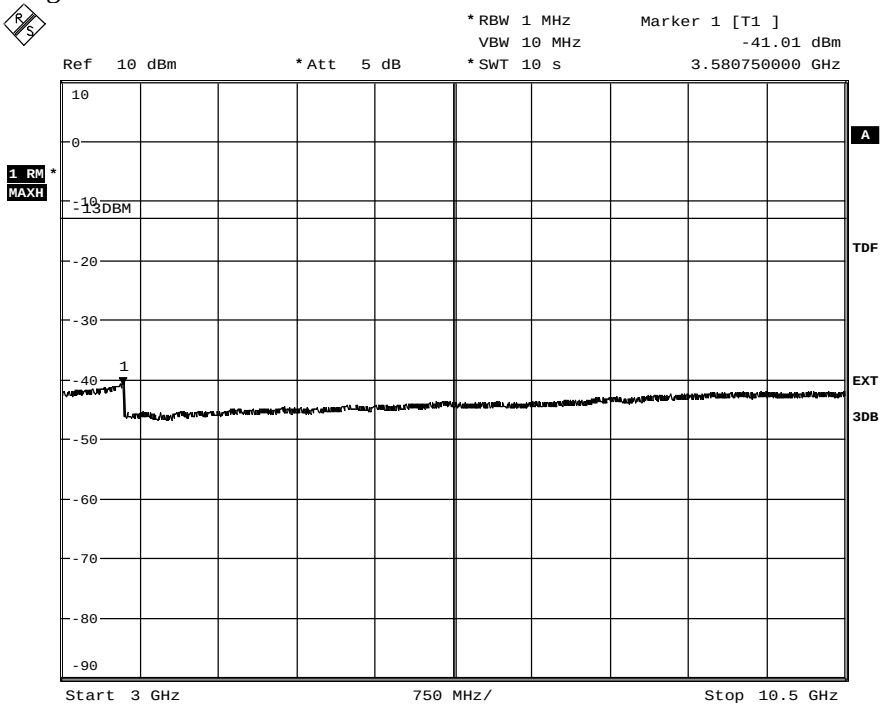
Diagram 5a



Date: 17.SEP.2012 13:17:02

The emissions around the carriers are within the operating frequency band

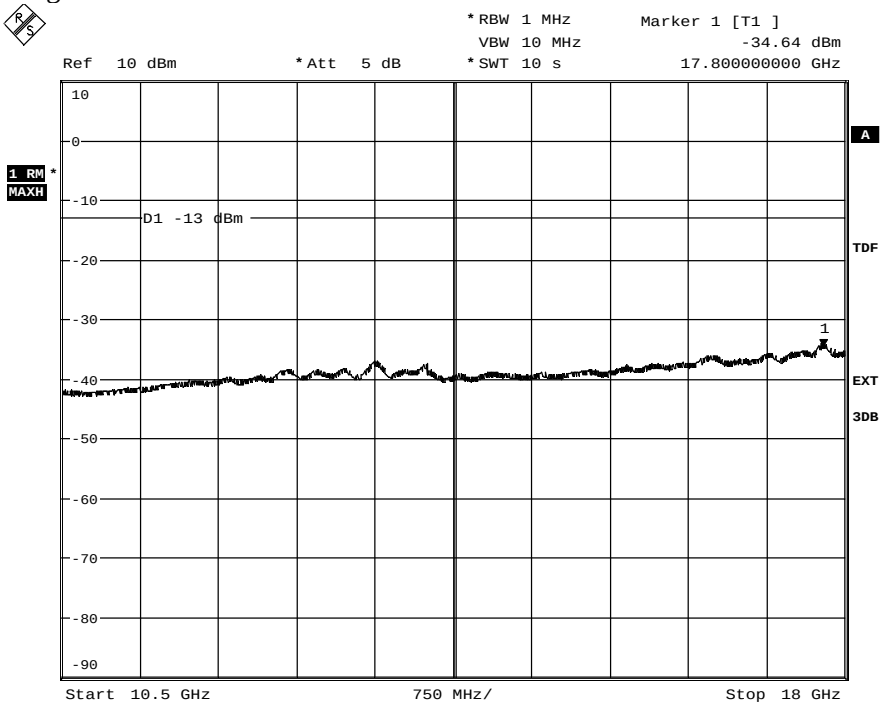
Diagram 5b



Date: 17.SEP.2012 13:20:34

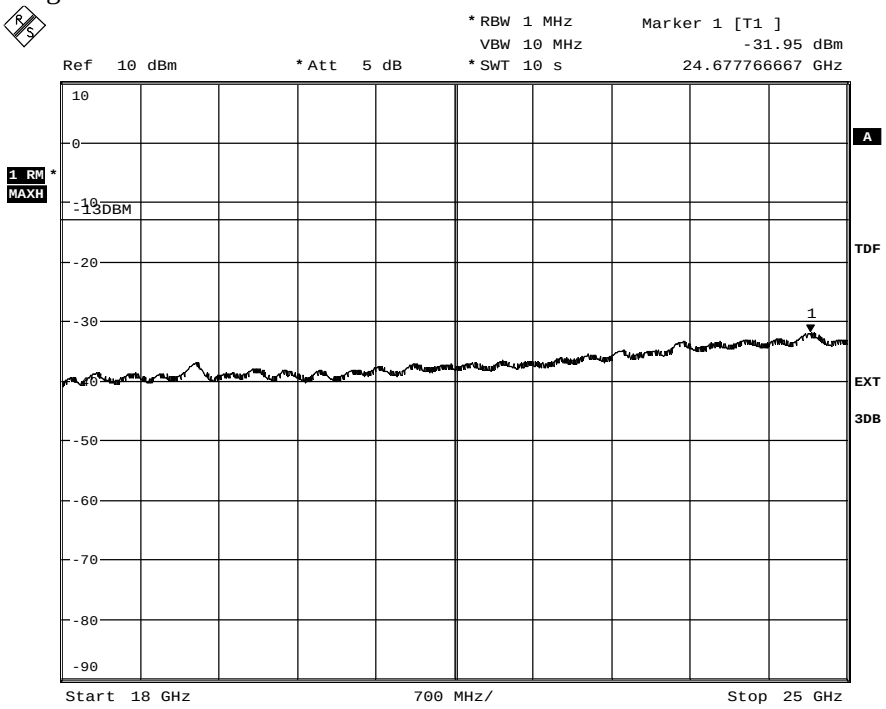
Appendix 3

Diagram 5c



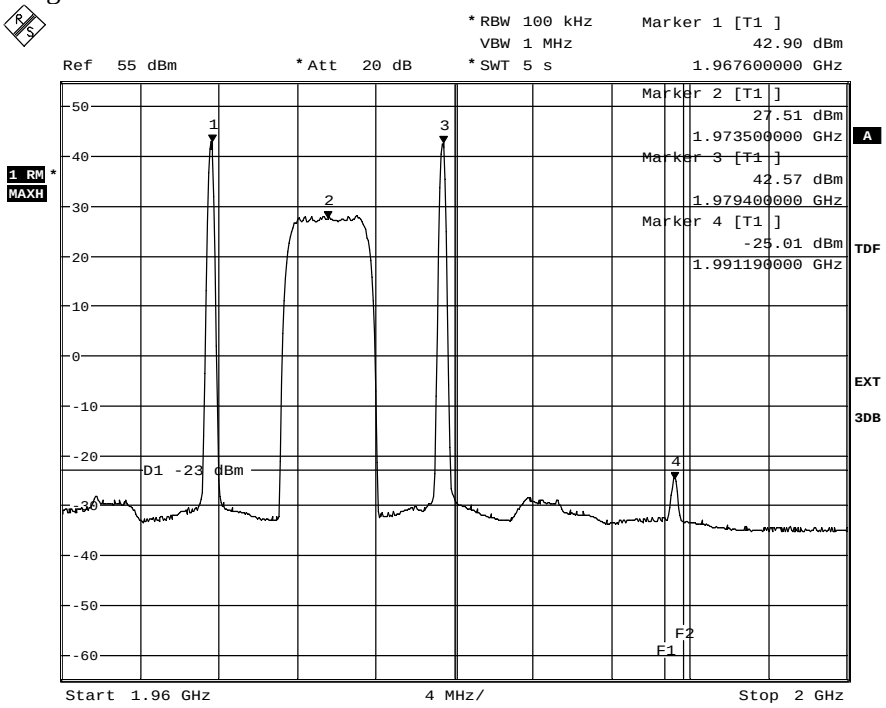
Date: 17.SEP.2012 13:21:19

Diagram 5d



Date: 17.SEP.2012 13:22:44

Diagram 5e



Date: 17.SEP.2012 13:13:12

The emission at 1991.2 MHz was -20.16 dBm measured with the channel power method with 1 MHz channel bandwidth

Field strength of spurious radiation measurements according to CFR 47 §24.238 / IC RSS-133 6.5

Date	Temperature	Humidity
2012-01-27	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.

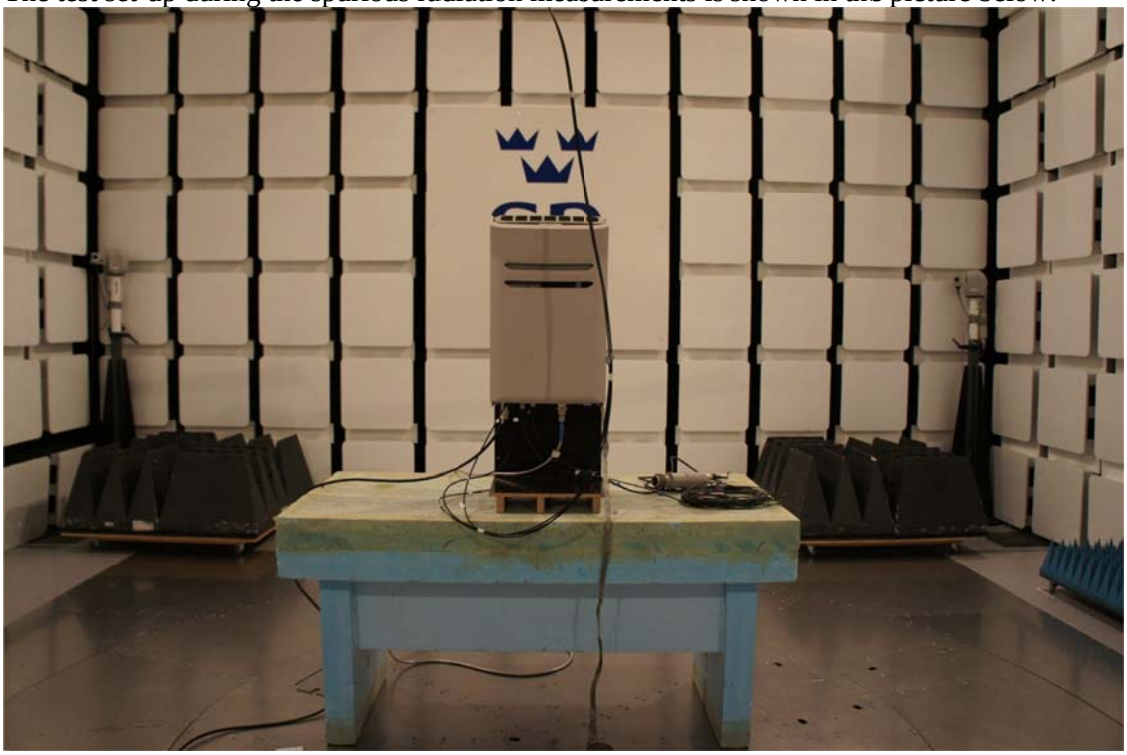
The measurements were performed with both horizontal and vertical polarization of the antenna. The antenna distance was 3 m in the frequency range 30 MHz – 18 GHz and 1m in the frequency range 18 - 25 GHz.

In the frequency range 30 MHz - 25 GHz the measurement was performed in power with a RBW of 1 MHz. A propagation loss in free space was calculated. The used formula was $\gamma = 20\log\left(\frac{4\pi D}{\lambda}\right)$, γ is the propagation loss and D is the antenna distance.

The measurement procedure was as the following:

1. The pre-measurement was first performed with peak detector. The EUT was measured in eight directions and with the antenna at three heights, 1.0 m, 1.5 m and 2.0 m.
2. Spurious radiation on frequencies closer than 20 dB to the limit 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:



Appendix 4

Measurement equipment

Measurement equipment	SP number
Test site Tesla	503 881
R&S ESI 26	503 292
Control computer	-
R&S FSIQ 40	503 738
Software: R&S EMC32, ver. 8.20.1	503 745
Chase Bilog antenna CBL 6111A	503 182
µCorp Nordic, Low Noise Amplifier	504 160
Miteq, Low Noise Amplifier	503 285
EMCO Horn Antenna 3115	502 175
Standard gain antenna 20240-20	503 674
High pass filter, Wainright	504 200
Testo 625, temperature and humidity meter	504 188

Tested configurations:

Configuration 1
Configuration 2
Configuration 3

Results, representing worst case

Diagram 1:a-d Configuration 1

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30-25 000	All emission > 20 dB below limit	All emission > 20 dB below limit

Measurement uncertainty:

3.2 dB up to 18 GHz, 3.6 dB above 18 GHz

Limits

§24.238 and RSS-133 6.5

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 per 1 MHz RBW.

Complies?	Yes

Appendix 4

Diagram 1a

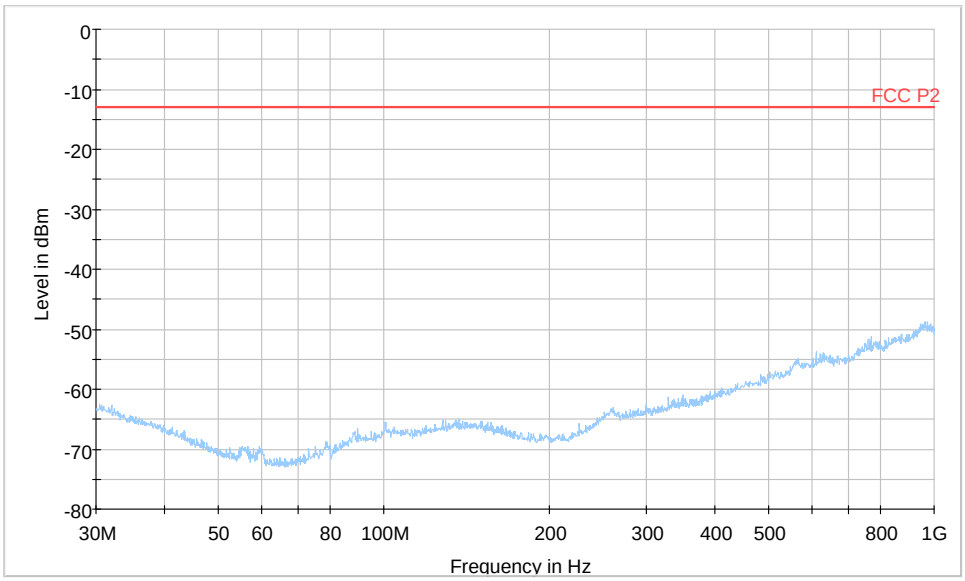
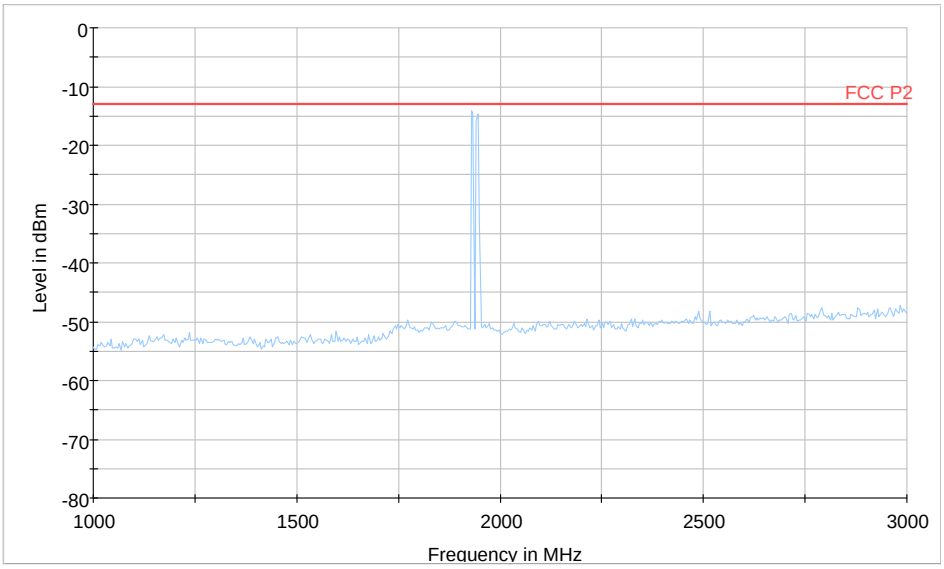


Diagram 1b



Note: The emission between 1930.4 MHz and 1945 MHz are the carrier frequencies and shall be ignored in the context.

Appendix 4

Diagram 1c

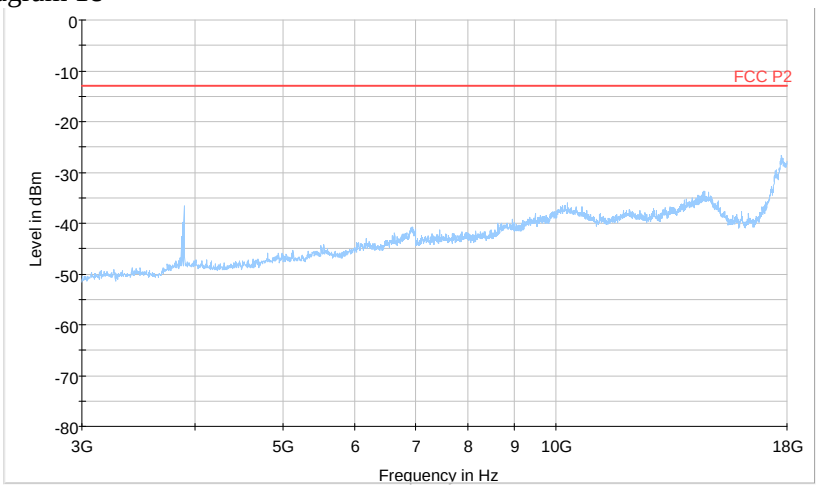
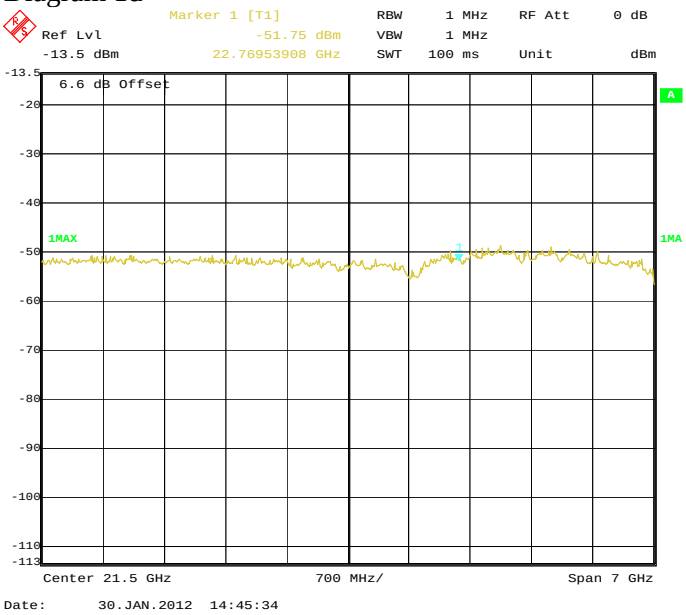


Diagram 1d



Note: The reference level offset value in diagram 1d should be corrected with 6.95 dBm to 13.55 dBm.

Frequency stability measurements according to CFR 47 §24.235 / IC RSS 133 6.3

Date	Temperature (test equipment)	Humidity (test equipment)
2012-01-03 to 2011-01-05	22-23 °C ± 3 °C	31-45 % ± 5 %

Test set-up and procedure

The measurement was made per J-STD-007A Vol 1 (GMSK). The output was connected to a spectrum analyzer. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements.

Measurement equipment	SP number
Rohde & Schwarz FSQ 40	504 143
Climate chamber 2	501 031
Testo 635 temperature and humidity meter	504 203

Results

Nominal Voltage -48 V DC

Tested configuration:

Configuration 10

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	T (°C)	
-48.0	+20	+10
-55.2	+20	+11
-40.8	+20	+10
-48.0	+30	-8
-48.0	+40	-14
-48.0	+50	+10
-48.0	+10	-6
-48.0	0	+10
-48.0	-10	-9
-48.0	-20	-8
-48.0	-30	-7
Maximum freq. error (Hz)		14
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Limit

§24.235 The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

RSS-133 The carrier frequency shall not depart from the reference frequency, in excess of ±1.0 ppm for base stations.

Complies?	Yes

Appendix 6

Receiver spurious emissions measurements according to IC RSS-133 6.6

Date	Temperature	Humidity
2012-09-17	20 °C ± 3 °C	53 % ± 5 %

Test set-up and procedure

The measurements were performed according to ANSI C63.4.

Measurements were performed on the receiver antenna terminal (RF B). 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	SP number
R&S FSQ40	504 143
RF attenuator (RF A)	-
Testo 635, Temperature and humidity meter	504 203

Result

Diagram 1:a-c Configuration 9

Note: During the measurement on the RX port RF B the combined TX/RX port RF A was terminated into 50 ohm.

Remark

The highest internal frequency as declared by the client was 2.4576 GHz, thus the choice of the upper frequency boundary was set to 5x2.5 GHz = 12.5 GHz for emission measurements.

Limit

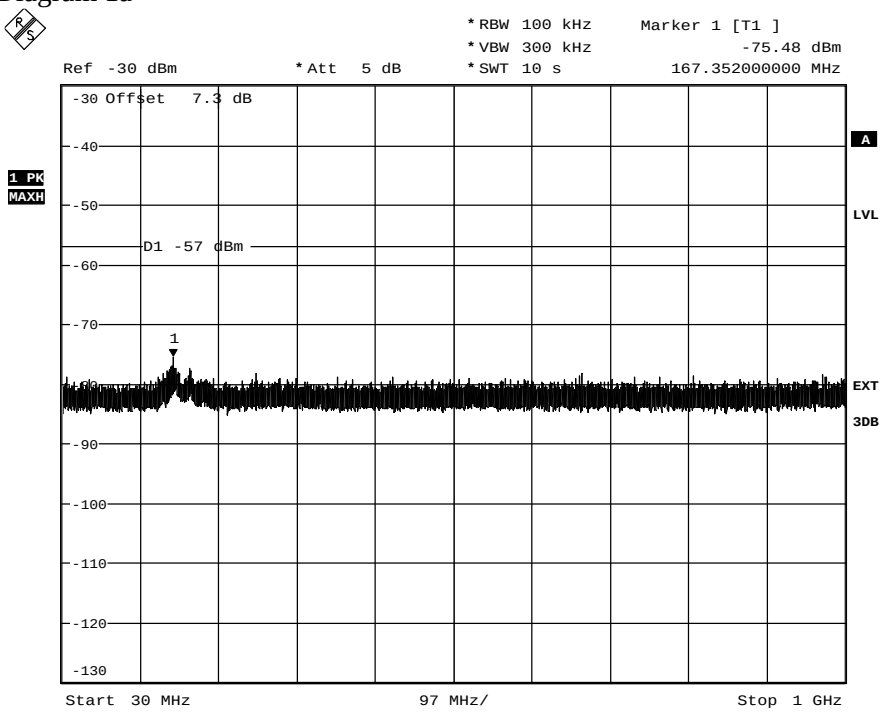
RSS-Gen 6.2 Antenna Conducted limits

Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, and 5 nanowatts (-53 dBm) above 1000 MHz.

Emission below limit?	Yes

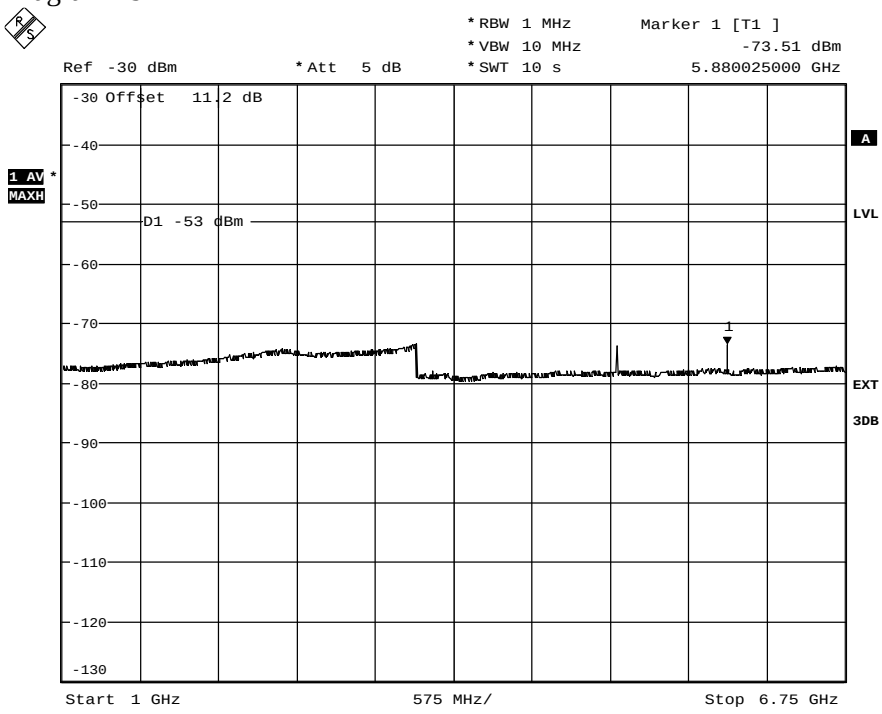
Appendix 6

Diagram 1a



Date: 17.SEP.2012 14:31:56

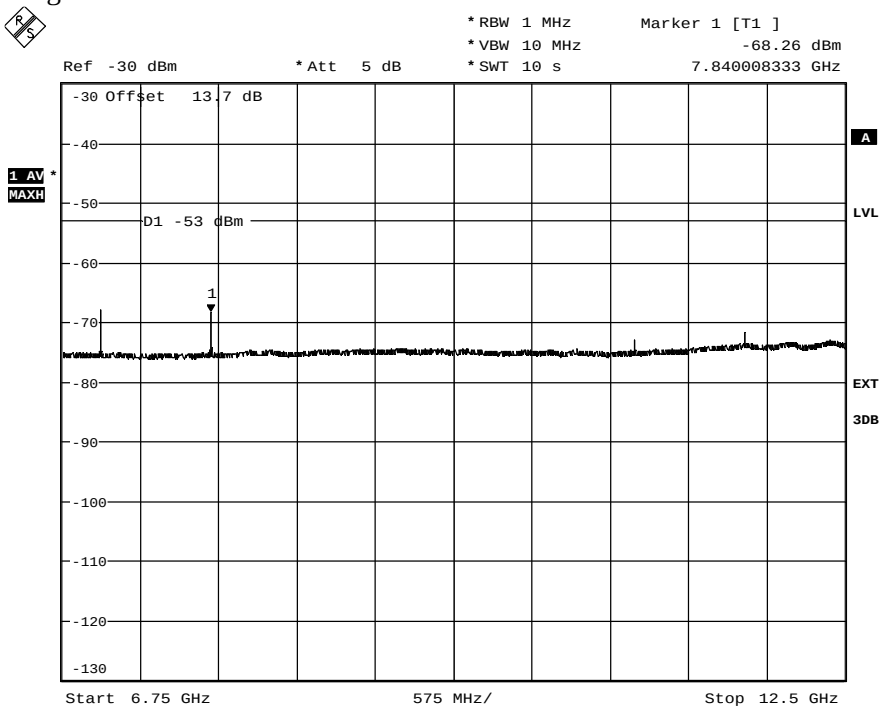
Diagram 1b



Date: 17.SEP.2012 14:34:34

Appendix 6

Diagram 1c



Date: 17.SEP.2012 14:36:25

Appendix 7

External photos

Front Side

Appendix 7

Rear Side

Appendix 7

Left side

Appendix 7

Right side

Appendix 7

Bottom Side

Top Side