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Radio measurements on RUS 01 B4 1700/ 2100 MHz radio equipment with FCC ID:TA8AKRC11859-2 and IC:287AB-AS118592

(9 appendices)

Test object

RUS 01 B4, KRC 118 59/2 Rev. R1D

Summary

Standard		Compliant	Appendix
FCC CFR 47 / IC RSS-139			
2.1046 / RSS-139 6.4	RF power output	Yes	2
2.1049 / RSS-Gen 4.6.1	Occupied bandwidth	Yes	3
2.1051 / RSS-139 6.5	Band edge	Yes	4
2.1051 / RSS-139 6.5	Spurious emission at antenna terminals	Yes	5
2.1053 / RSS-139 6.5	Field strength of spurious radiation	Yes	6
2.1055 / RSS-139 6.3	Frequency stability	Yes	7
Industry Canada RSS-139			
RSS-139 6.6	Receiver spurious emissions	Yes	8

Note: Above RSS-139 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

Bengt Andersson

Table of contents

Description – Test object

Equipment:	Radio equipment RUS 01 B4 running in WCDMA mode supporting single and multi carrier.
Antenna ports:	1 TX/RX port and 1 RX port
Frequency bands:	TX: 2110 – 2155 MHz RX: 1710 – 1755 MHz
Modulations:	QPSK, 16QAM and 64QAM
Nominal output power: (Maximum)	Single carrier: 1x 49.0 dBm (1x 80W) Multi carrier: 2x 46.0 dBm (2x 40W) 4x 43.0 dBm (4x 20W)
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

Tested channels

	Downlink		Uplink	
Channel	Frequency*	UARFCN	Frequency*	UARFCN
B	2112.4	1537	1712.4	1312
B+5	2117.4	1562	1717.4	1337
B+10	2122.4	1587	1722.4	1362
B+15	2127.4	1612	1727.4	1387
M	2132.6	1638	1732.6	1413
T-15	2137.6	1663	1737.6	1438
T-10	2142.6	1688	1742.6	1463
T-5	2147.6	1713	1747.6	1488
T	2152.6	1738	1752.6	1513

* Frequency in MHz

Operation mode during measurements

Measurements were performed with the test object transmitting the Test models which are defined in 3GPP TS 25.141. Test model 1 (TM1) uses the QPSK modulation only, Test model 5 (TM5) includes the 16QAM modulation and Test model 6 (TM6) includes the 64QAM modulation.

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

Single carrier
TM1: 64 DPCH:s at 30 ksps (SF=128)
Multi carrier
TM1: 32 DPCH:s at 30 ksps (SF=128) in each carrier (Two carriers activated)

Channel bandwidth 5 MHz

Appendix 1

Conducted measurements

The EUT was mounted into a RBS 6201 cabinet and supplied by the cabinet's internal -48 V DC. 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 and the RX measurements were done on the RF B 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 configuration 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.

The RUS unit was allocated to the following UARFCN:

Single Carrier: (One carrier configuration)

Cell	1	1	1
Channel	B	M	T

Multi Carrier: (Two carrier configuration)

Cell	1	2
Channel	B	B+10
Channel	T-10	T

Multi Carrier: (Four carrier configuration)

Cell	1	2	3	4
Channel	B	B+5	B+10	B+15
Channel	T	T-5	T-10	T-15

Purpose of test

The purpose of the tests is to verify compliance to the performance characteristics specified in applicable items of FCC CFR 47 and Industry Canada RSS-139 and RSS-Gen.

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 , 2010
CFR 47 part 27 Subpart H, October 1st, 2010
3GPP TS 25.141, version 8.9.0
RSS-Gen Issue 2
RSS-139 Issue 2

Appendix 1

Measurement equipment

Measurement equipment	Calibration Due	SP number
Test site Tesla	2012-10	503 881
R&S FSIQ 40	2012-07	503 738
R&S FSQ 40	2012-07	504 143
R&S ESI 26	2012-07	503 292
Control computer with R&S software EMC32 version 8.20.1	-	503 479
High pass filter	2012-07	504 200
High pass filter	2012-07	503 739
High pass filter	2012-07	503 740
RF attenuator	2012-07	503 248
RF attenuator	2012-07	504 159
RF attenuator	2012-07	900 229
RF attenuator	2012-07	900 260
RF attenuator	2012-07	900 261
Boonton RF Peak power meter/analyzer	2012-11	503 144
Boonton Power sensor 56518-S/4	2012-11	503 146
Chase Bilog Antenna CBL 6111A	2011-10	503 182
EMCO Horn Antenna 3115	2014-01	502 175
Std.gain horn FLANN model 20240-20	-	503 674
µComp Nordic, Low Noise Amplifier	2012-07	504 160
MITEQ Low Noise Amplifier	2012-07	503 285
Temperature cabinet	-	503 360
Multimeter Fluke 87	2012-05	502 190
Testo 625, Temperature and humidity meter	2012-06	504 188
Testo 635 Temperature and humidity meter	2012-05	504 203

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.

Modification of test object

To fulfil the requirements of RX spurious emission the test object PIS software was upgraded from R39SF (Rev state R1A) to R39UL (Rev state R1D) to improve performance. Based on an analysis and justification measurements, it is deemed that this software upgrade do not affect previous measured RF parameters.

Delivery of test object

The test object was delivered : 2011-08-10.

Manufacturer’s representative

Christer Gustavsson, Ericsson AB

Test engineers

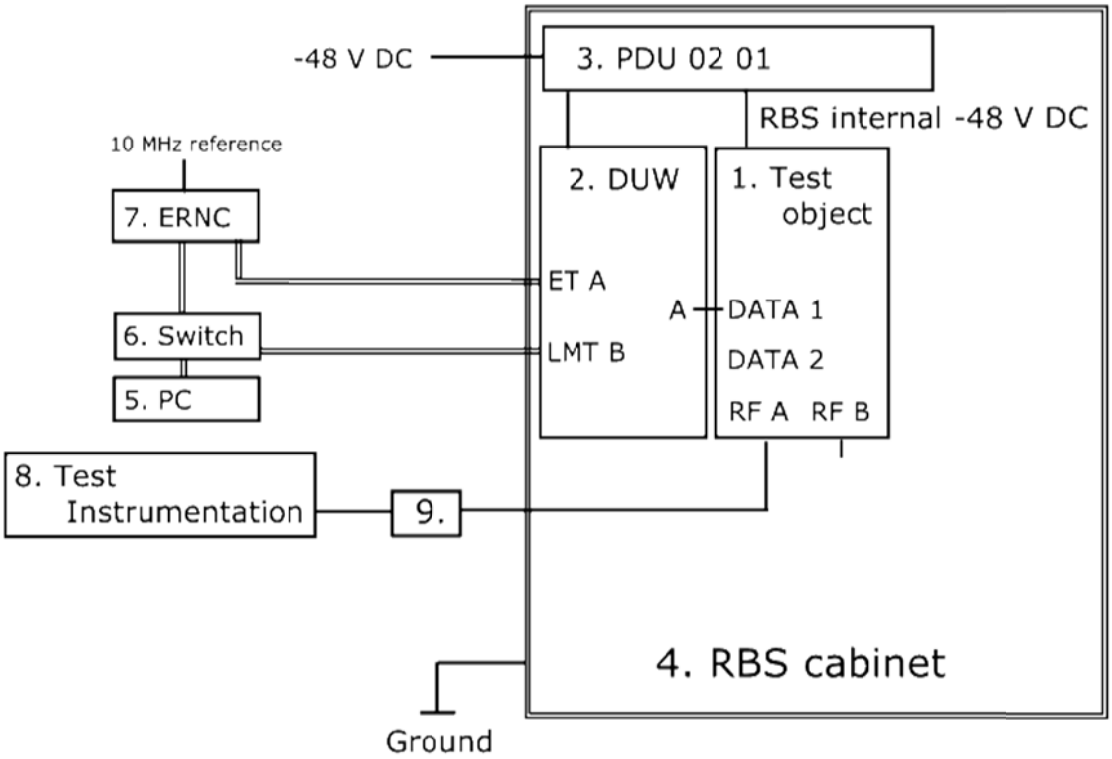
Andreas Johnson, Tomas Lennhager and Jörgen Wassholm

Test participant

Xiang Yue, Ericsson CBC (Partly present)

Appendix 1

Test set-up conducted measurements TX



Test object

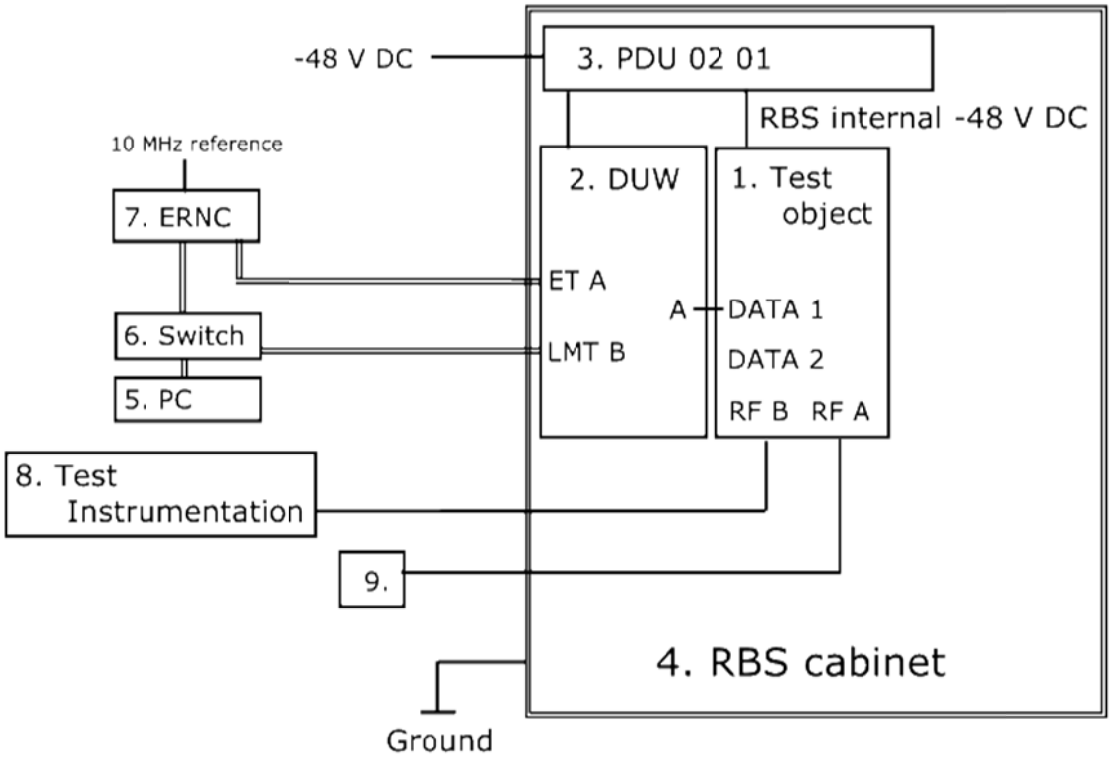
1. RUS 01 B4, KRC 118 59/2, revision R1A, S/N: C824815960
   FCC ID:TA8AKRC11859-2 and IC:287AB-AS118592

Functional test equipment

2. DU units:
   DU 1: DUW 30 01 KDU 127 161/3 Rev R4C, S/N: C824599840 and
   DU 2: DUW 30 01 KDU 127 161/3 Rev R3C, S/N: C824357268
3. PDU 02 01, BMG 980336/4, R2A, (S)BJ31528316
4. RBS 6201 cabinet, BAMS 1000778792
5. Computer, Sunblade 1500
6. Ethernet switch, Mercury H108M
7. ERNC, BAMS – 1000759880
8. SP test instrument according measurement equipment list
9. RF attenuator

Appendix 1

Test set-up conducted measurements RX



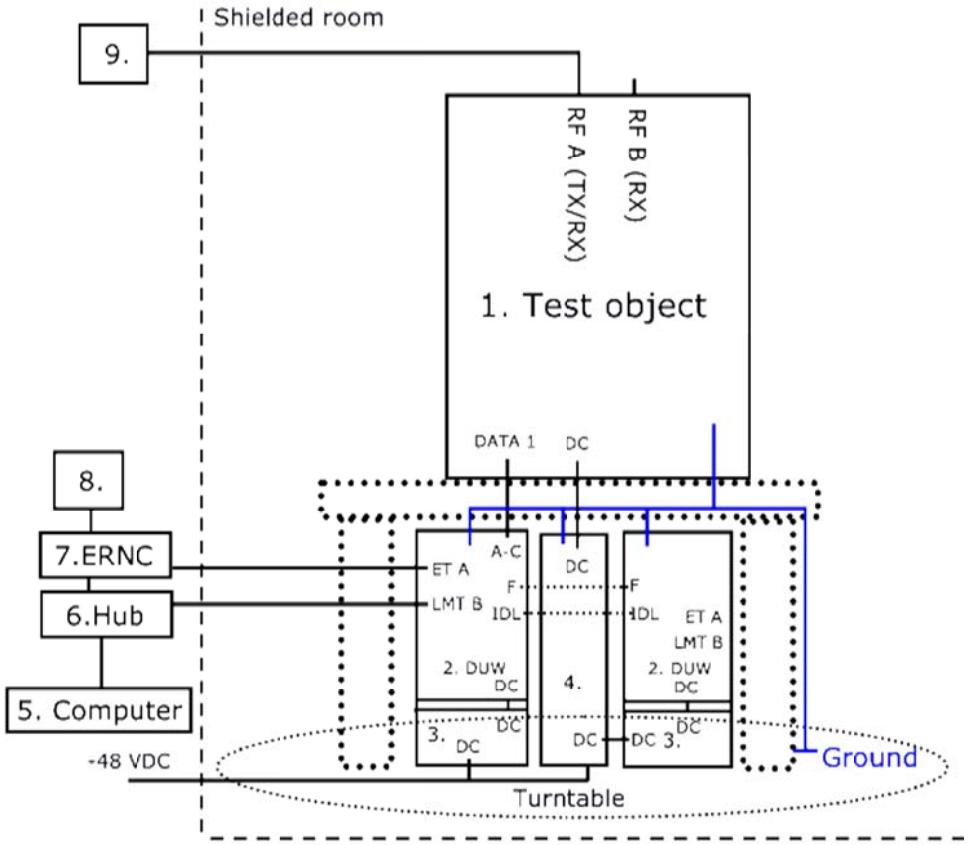
Test object

1. RUS 01 B4, KRC 118 59/2, revision R1D, S/N: C824815960
   (FCC ID: TA8AKRC11859-2 / IC:287AB-AS118592

Functional test equipment

2. DU units:
   DU 1: DUW 30 01 KDU 127 161/3 Rev R4C, S/N: C824599840 and
   DU 2: DUW 30 01 KDU 127 161/3 Rev R3C, S/N: C824357268
3. PDU 02 01, BMG 980336/4, R2A, (S)BJ31528316
4. RBS 6201 cabinet, BAMS 1000778792
5. Computer, Sunblade 1500
6. Ethernet switch, Mercury H108M
7. ERNC, BAMS – 1000759880
8. SP test instrument according measurement equipment list
9. RF terminator

Test set-up radiated measurements



Test object

1. RUS 01 B4, KRC 118 59/2, revision R1A, S/N: C824815980 with SW (FCC ID: TA8AKRC11859-2 / IC: 287AB-AS118592)

Functional test equipment

2. DU units
   DU 1: DUW 30 01, KDU 127 161/3, Rev R4C, S/N: C824599840 and
   DU 2: DUW 30 01, KDU 127 161/3, Rev R3C, S/N: C824357268
3. SUP 1: SUP 6601, 1/BFL 901 009/1, Rev R3B, S/N: BR81262576
   SUP 2: SUP 6601, 1/BFL 901 009/1, Rev R3B, S/N: BR81262561
4. PDU 02 01, BMG 980 336/4, Rev R2A, S/N: BJ31534775
5. Computer Sunblade 1500
6. Mercury mini hub H108M
7. ERNC, BAMS – 1000759880
8. 10 MHz reference
9. Terminator

Appendix 1

Test object interfaces	Type of port:
Power configuration: -48 VDC	DC Power
Ground via RBS frame during conducted measurements, Ground via ground strap during radiated stand-alone measurements	Ground
Antenna port RF A, combined TX/RX, female 7/16 connector	Antenna
Antenna port RF B, RX only, female 7/16 connector	Antenna
Cross connect RX A, not supported, omitted in set-up drawings above	-
Cross connect RX B, not supported, omitted in set-up drawings above	-
RXA CO-site, not supported, omitted in set-up drawings above	-
Data 1, connected to DUW port RI A	Signal
Data 2, not supported	-

RBS software

Software	Revision
CXP 901 7021/1	R6AH02

RF power output measurements according to CFR 47 §27.50 / IC RSS-139 6.4

Date	Temperature	Humidity
2011-09-27	23 °C ± 3 °C	42 % ± 5 %
2011-09-28	23 °C ± 3 °C	41 % ± 5 %
2011-09-29	23 °C ± 3 °C	41 % ± 5 %

Test set-up and procedure

Tested revision state R1A.

The test object was connected to a power analyzer measuring peak and RMS output power in CDF mode.

Measurement equipment	SP number
Boonton RF Peak power meter/analyzer	503 144
Boonton Power sensor 56518-S/4	503 146
RF attenuator	900 229
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 0.7 dB

Results

Single carrier: Rated output power level at RF A connector (maximum): 1x 49 dBm

Transmitter power (dBm / dB) RMS / PAR		
B	M	T
48.7/ 6.6	48.7/ 6.6	48.7/ 6.6

Multi carrier: Rated output power level at RF A connector (maximum): 2x 46 dBm/ carrier

Combined Transmitter power (dBm / dB) RMS / PAR		
B+(B+5)	M+(M+5)	(T-5) +T
48.5/ 6.4	48.6/ 6.4	48.6/ 6.4

Multi carrier: Rated output power level at RF A connector (maximum): 4x 43 dBm/ carrier

Combined Transmitter power (dBm / dB) RMS / PAR		
B+(B+5)+(B+10)+(B+15)	(M-5) + M+ (M+5) +(M+10)	(T-15) +(T-10) +(T-5) +T
48.7/ 6.1	48.6/ 6.1	48.5/ 6.2

Limits

§27.50: The maximum output power may not exceed 1640 W (EIRP) / MHz. The Peak to Average Ratio (PAR) may not exceed 13 dB.

RSS-139 6.4: The average equivalent isotropically radiated power (e.i.r.p.) limits in SRSP-513 apply, resulting in a maximum EIRP of 1640 W / MHz for the scope of this report. The peak-to-average ratio of the power shall not exceed 13 dB.

Complies?	Yes

Occupied bandwidth measurements according to 47 CFR 2.1049 / RSS-Gen 4.6.1

Date	Temperature	Humidity
2011-09-27	23 °C ± 3 °C	42 % ± 5 %
2011-09-28	23 °C ± 3 °C	41 % ± 5 %

Test set-up and procedure

Tested revision state R1A.

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	900 229
Testo 615 temperature and humidity meter	503 498

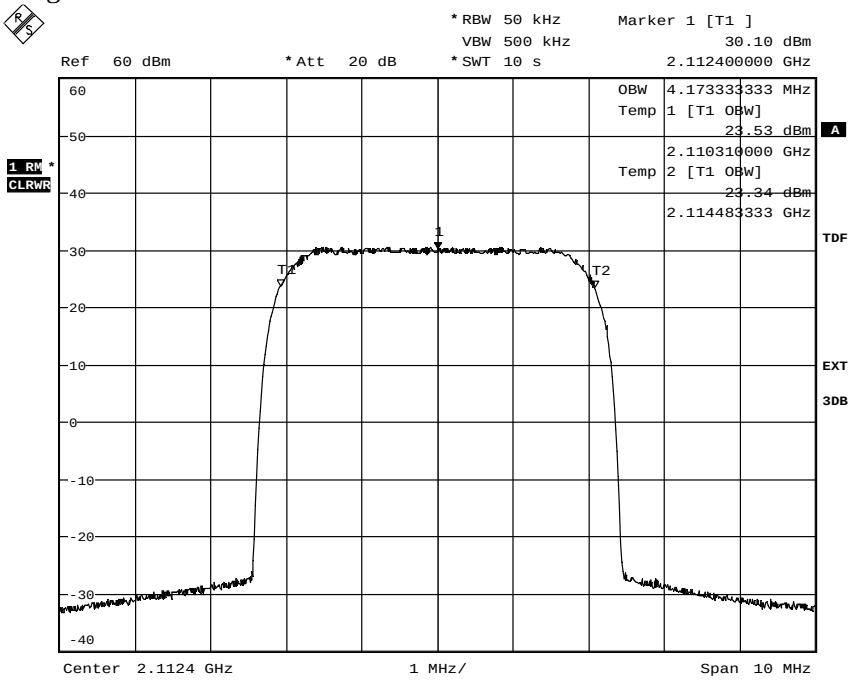
Measurement uncertainty: 3.7 dB

Results

Diagram	BW configuration	Tested frequency	Occupied BW (99%) [MHz]
1	5.0 MHz	B	4.17
2	5.0 MHz	M	4.17
3	5.0 MHz	T	4.17
4	4.2 MHz	B	3.85
5	4.2 MHz	M	3.85
6	4.2 MHz	T	3.85

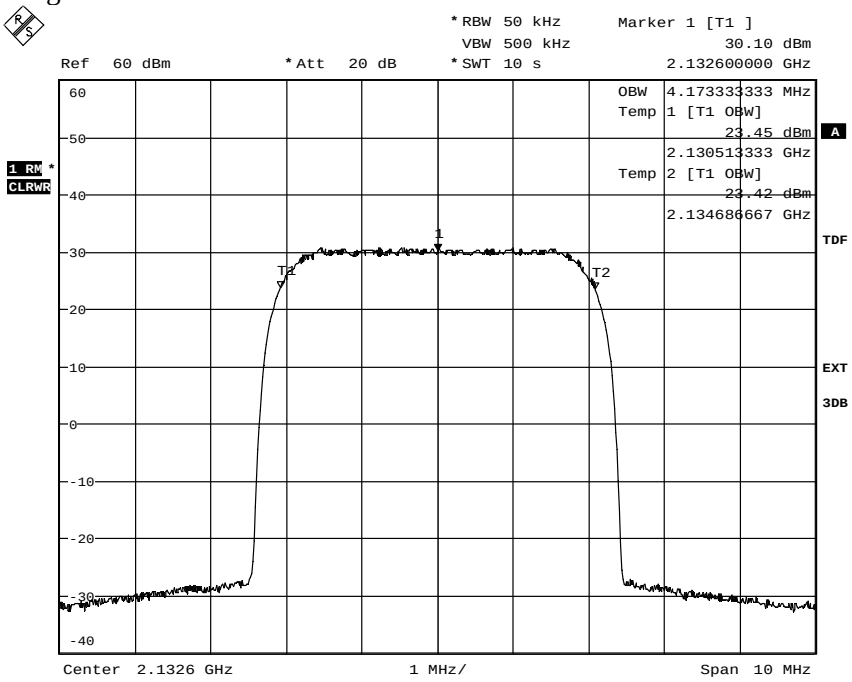
Appendix 3

Diagram 1



Date: 28.SEP.2011 07:19:12

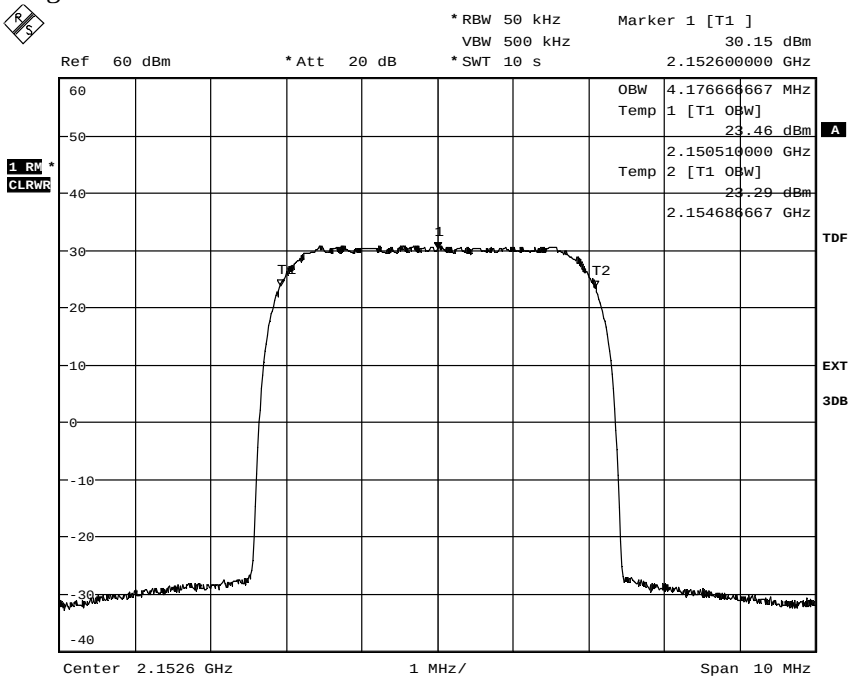
Diagram 2



Date: 27.SEP.2011 12:08:19

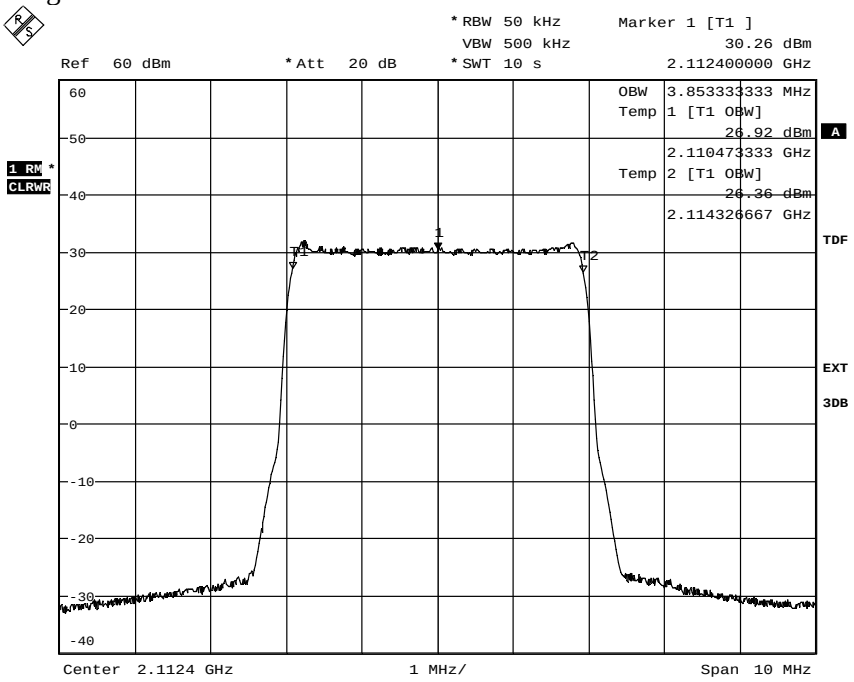
Appendix 3

Diagram 3



Date: 28.SEP.2011 07:47:04

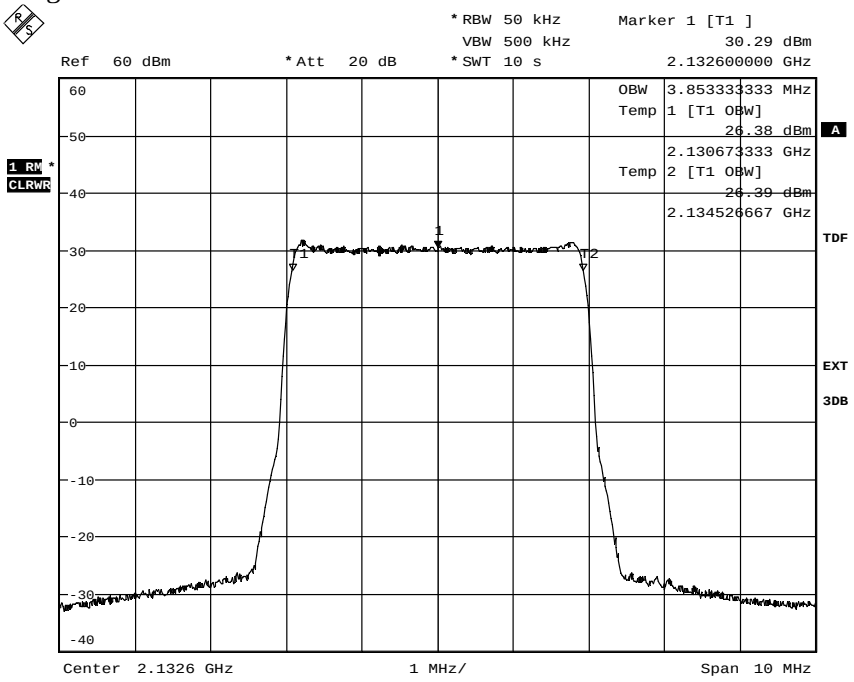
Diagram 4



Date: 28.SEP.2011 08:48:42

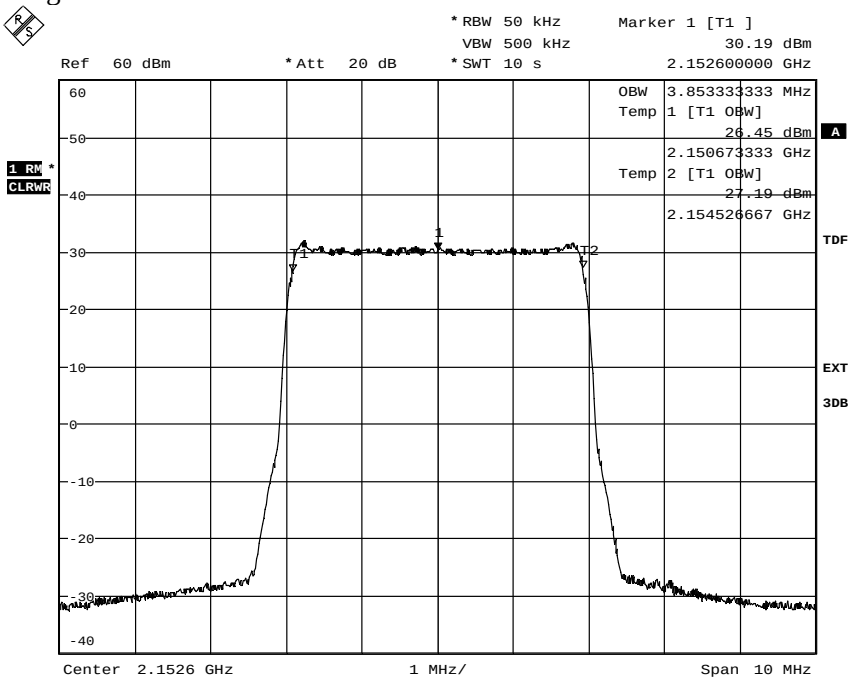
Appendix 3

Diagram 5



Date: 27.SEP.2011 15:53:21

Diagram 6



Date: 28.SEP.2011 08:41:13

Band edge measurements according to CFR 47 §27.53(h) / IC RSS-139 6.5

Date	Temperature	Humidity
2011-09-27	23 °C ± 3 °C	42 % ± 5 %
2011-09-28	23 °C ± 3 °C	41 % ± 5 %
2011-09-29	23 °C ± 3 °C	41 % ± 5 %

Test set-up and procedure

Tested revision state R1A.

The measurements were made per definition in in §27.53(h). 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. A resolution bandwidth of 10 kHz was used up to 1 MHz away from the band edges. 10 kHz is <1% of the Emission BW (4.37 MHz between the 26 dB points for 5 MHz nominal BW setting). To compensate for the reduced resolution bandwidth, the limit was adjusted with 6.40 dB to -19.40 dBm. A resolution bandwidth of 200 kHz was used 1 MHz to 6 MHz away from the bandedges, to compensate for the reduced resolution bandwidth the limit was adjusted by 7 dB to -20 dBm.

Measurement equipment	SP number
R&S FSQ	504 143
RF attenuator	900 229
Testo 635, temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

Single carrier:

Diagram 1 a-c: B
Diagram 2 a-c: T

Multi carrier:

Diagram 3 a-c: B+(B+5)
Diagram 4 a-c: T+(T-5)

Limits

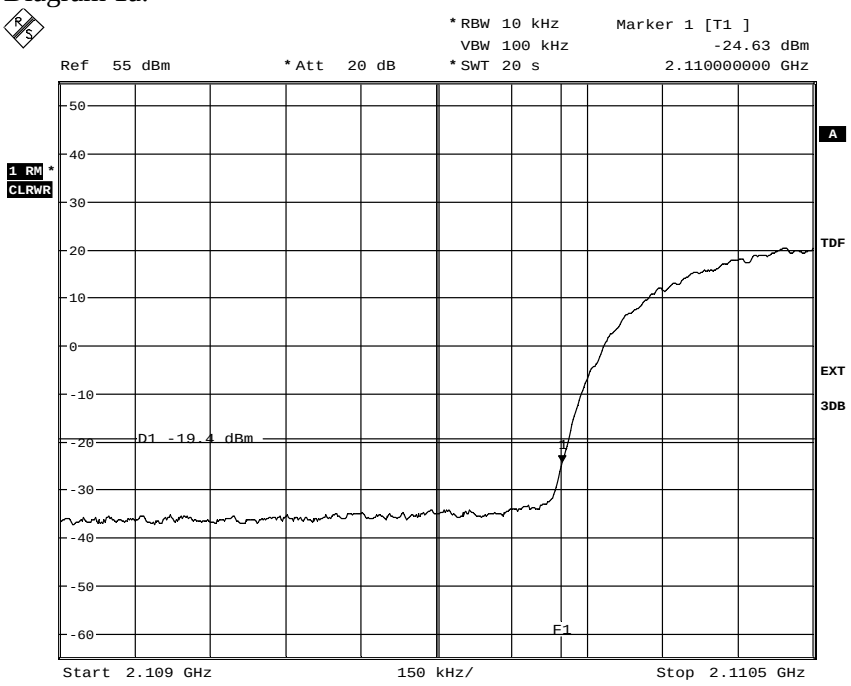
CFR 47 §27.53(h) and RSS-139 6.5

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.

Complies?	Yes

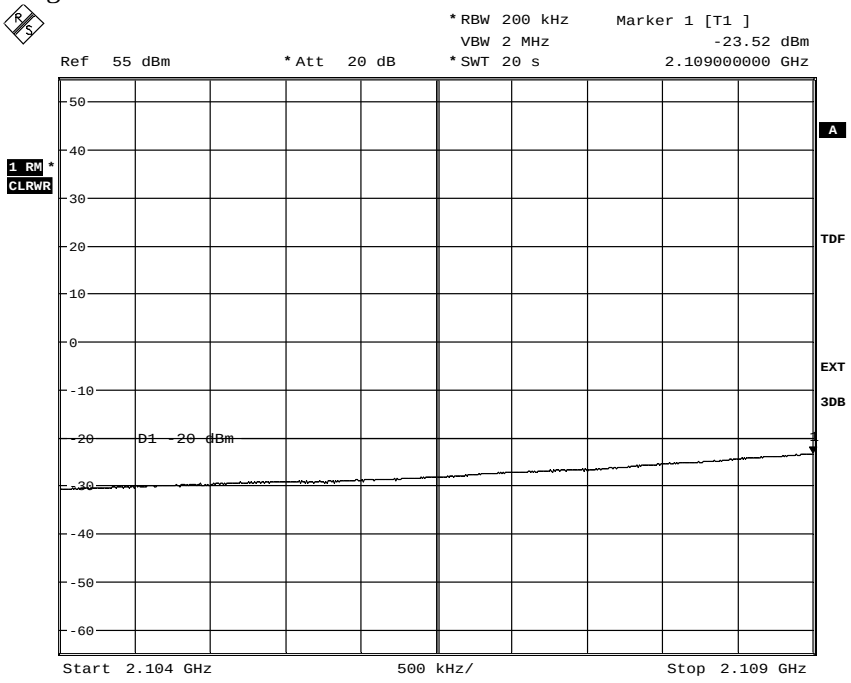
Appendix 4

Diagram 1a:



Date: 27.SEP.2011 20:33:59

Diagram 1b:

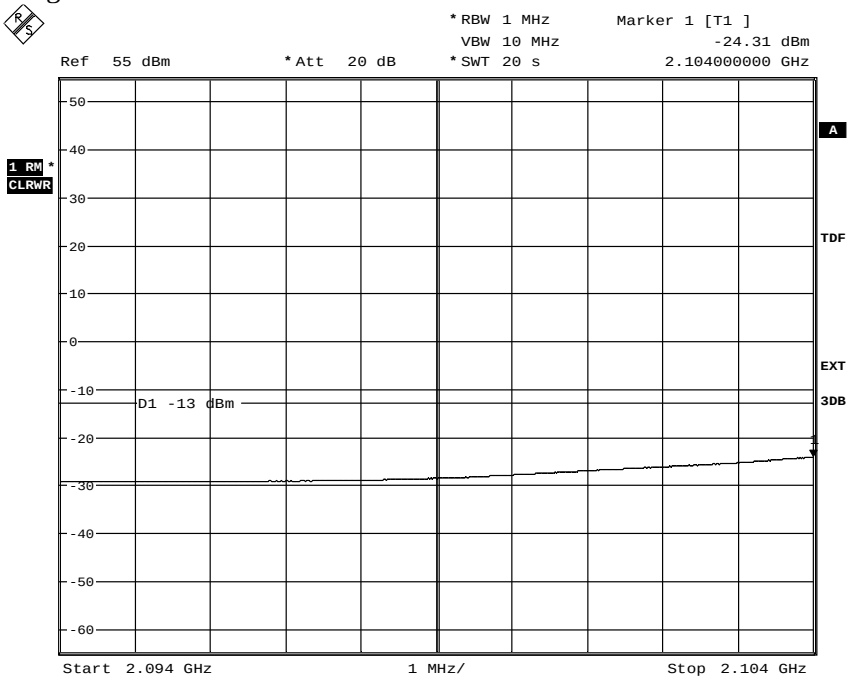


Date: 27.SEP.2011 20:42:11

The emission at 2109 MHz was -17.02 dBm measured with the channel power method with 1 MHz channel bandwidth.

Appendix 4

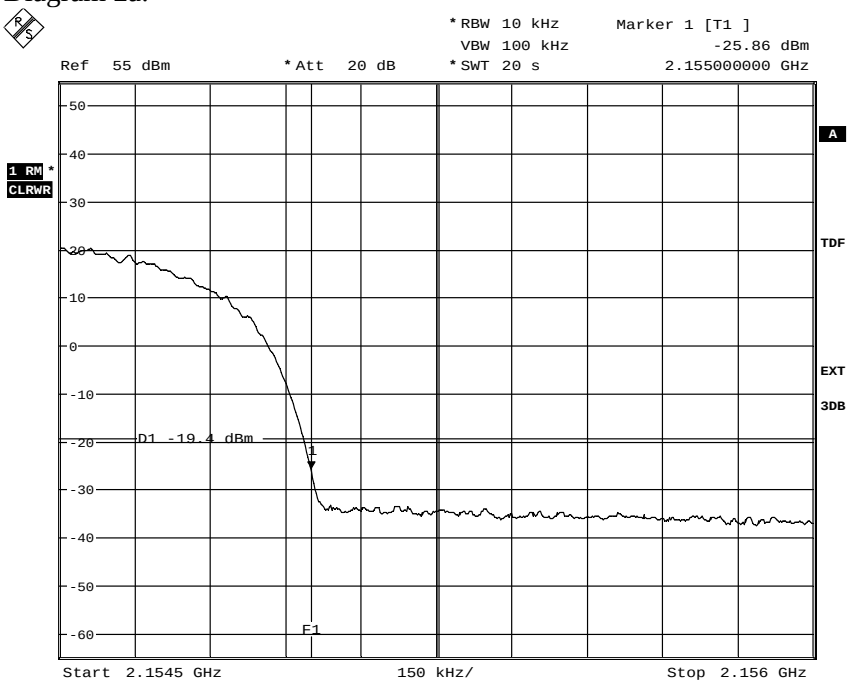
Diagram 1c



Date: 27.SEP.2011 20:44:42

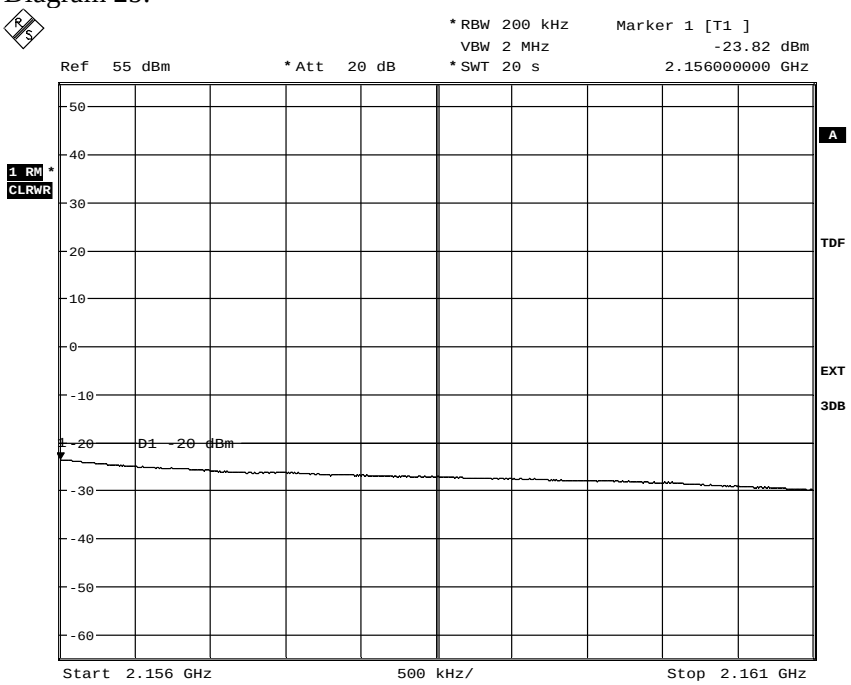
Appendix 4

Diagram 2a:



Date: 28.SEP.2011 08:12:55

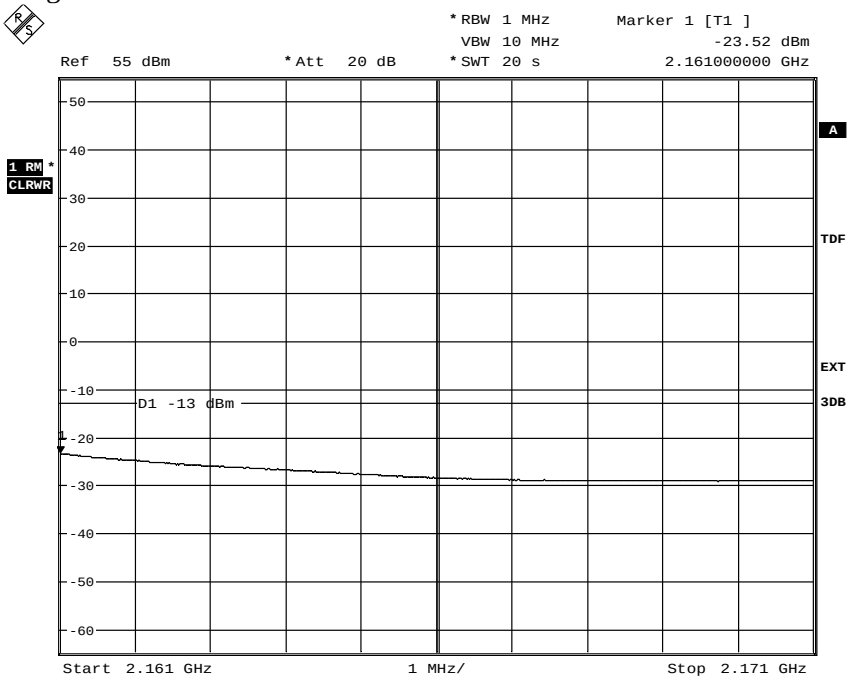
Diagram 2b:



Date: 28.SEP.2011 08:15:11

Appendix 4

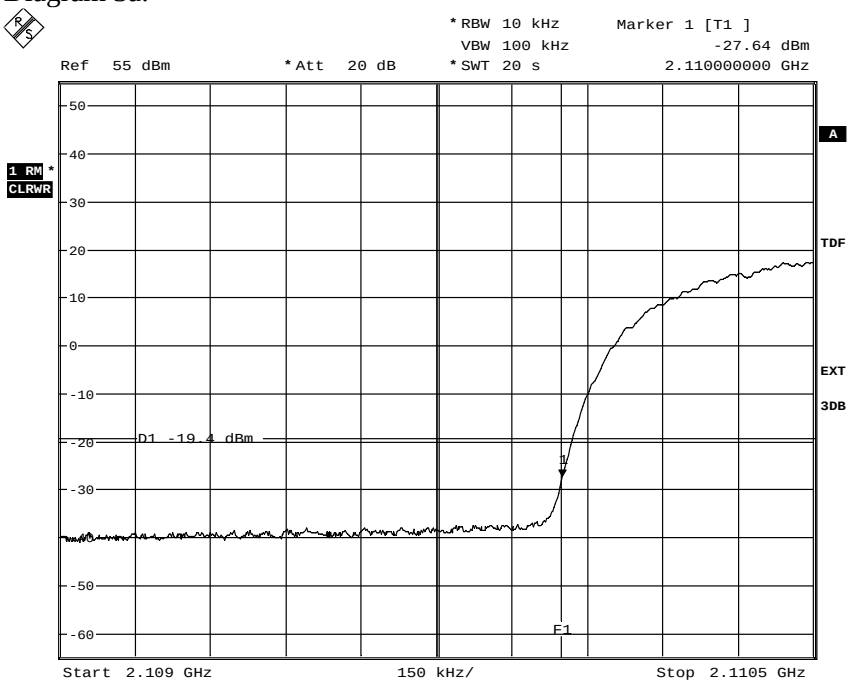
Diagram 2c:



Date: 28.SEP.2011 08:16:45

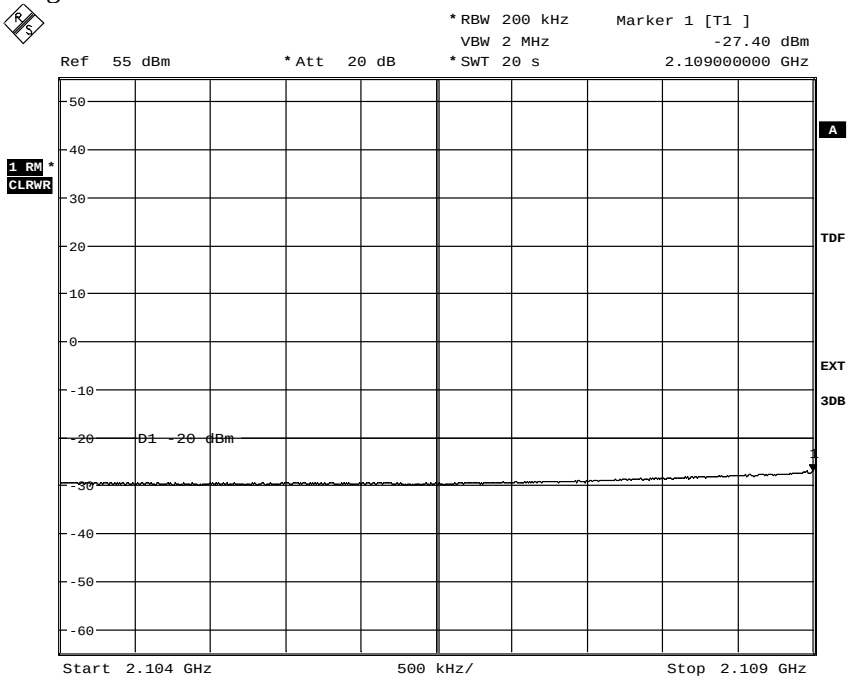
Appendix 4

Diagram 3a:



Date: 28.SEP.2011 12:57:04

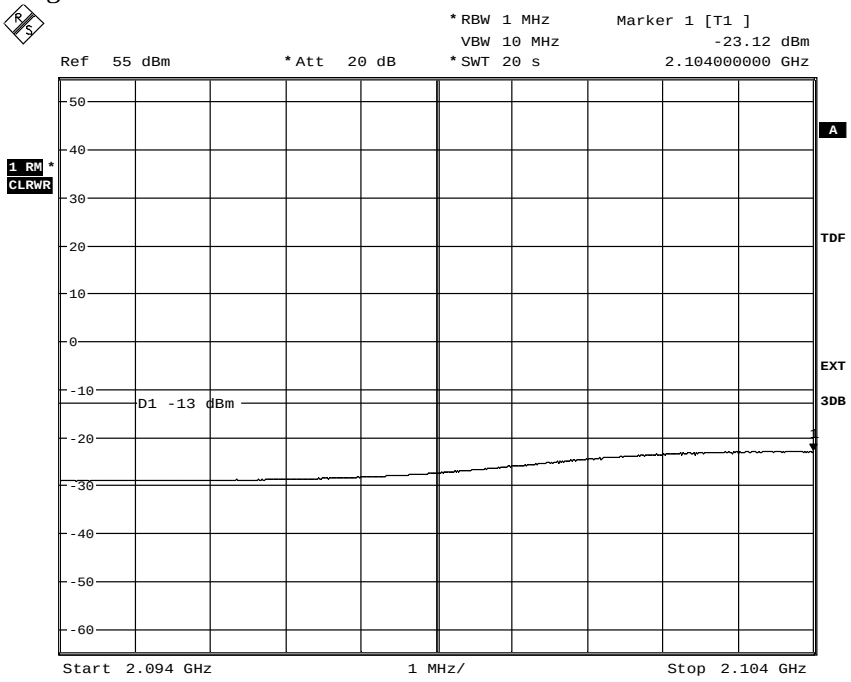
Diagram 3b:



Date: 28.SEP.2011 12:58:36

Appendix 4

Diagram 3c:



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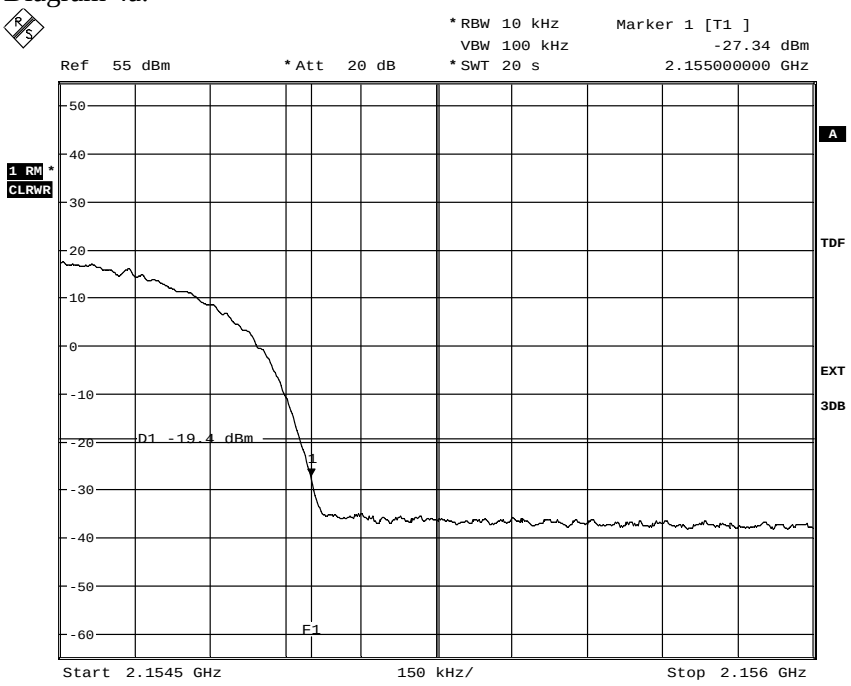
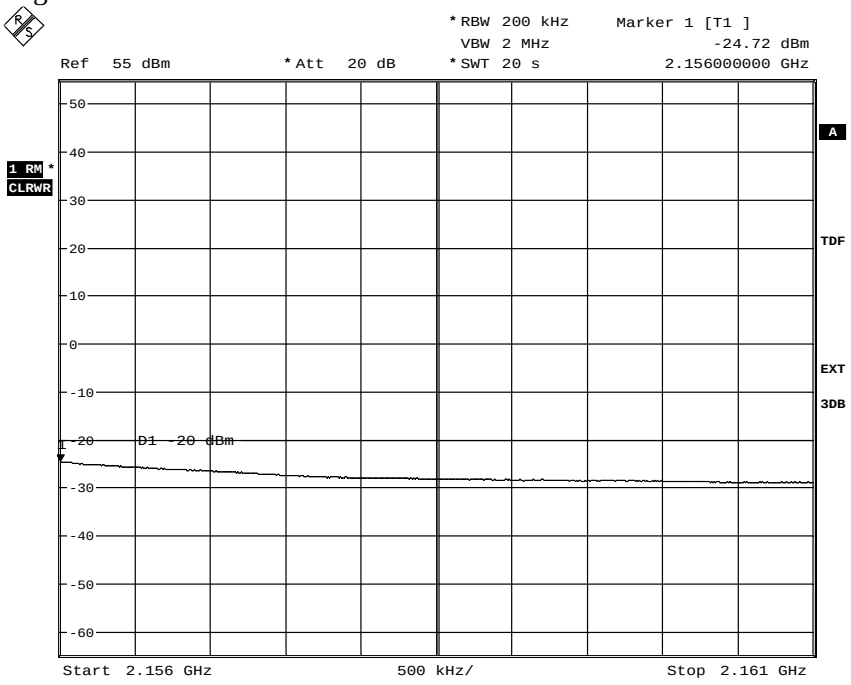
Appendix 4

Diagram 4a:



Date: 28.SEP.2011 14:05:30

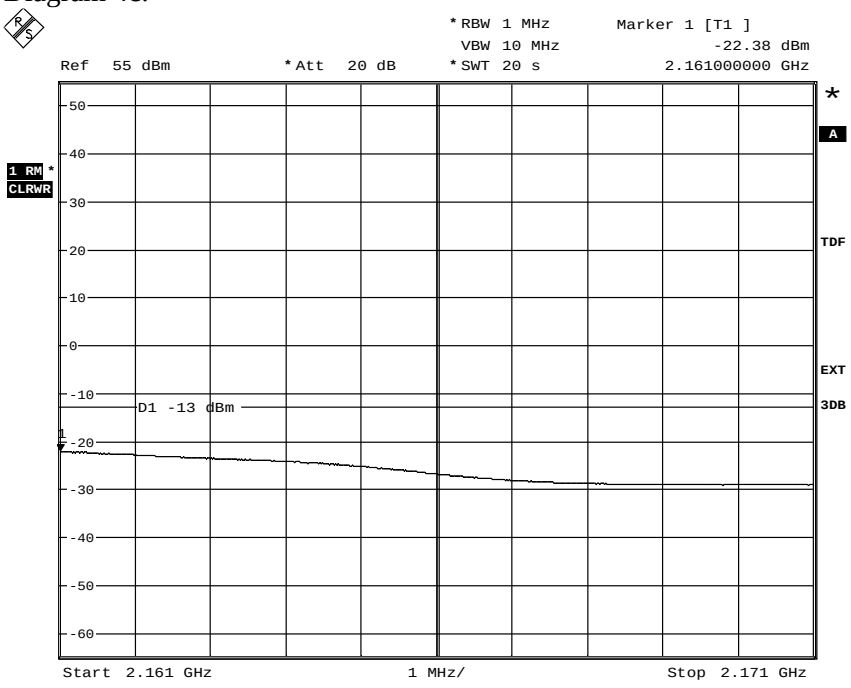
Digram 4b:



Date: 28.SEP.2011 14:07:29

Appendix 4

Diagram 4c:



Date: 28.SEP.2011 14:09:14

Conducted spurious emission measurements according to CFR 47 §27.53(h) / IC RSS-139 6.5

Date	Temperature	Humidity
2011-09-27	23 °C ± 3 °C	42 % ± 5 %
2011-09-28	23 °C ± 3 °C	41 % ± 5 %
2011-09-29	23 °C ± 3 °C	41 % ± 5 %

Test set-up and procedure

Tested revision state R1A.

The measurements were made per definition in §27.53(h). 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	900 229
RF attenuator	900 260
RF attenuator	900 261
High pass filter	503 740
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

Single carrier:
Diagram 1: B
Diagram 2: M
Diagram 3: T

Multi carrier:
Diagram 4: B+(B+10)
Diagram 5: T+(T-10)

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.

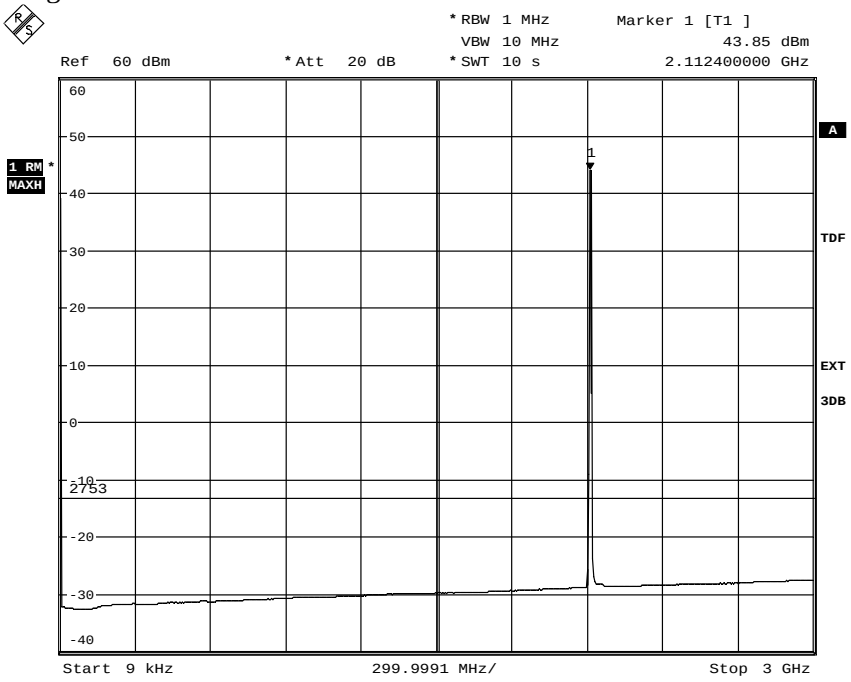
Limits

§27.53(h) and RSS-139 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 5

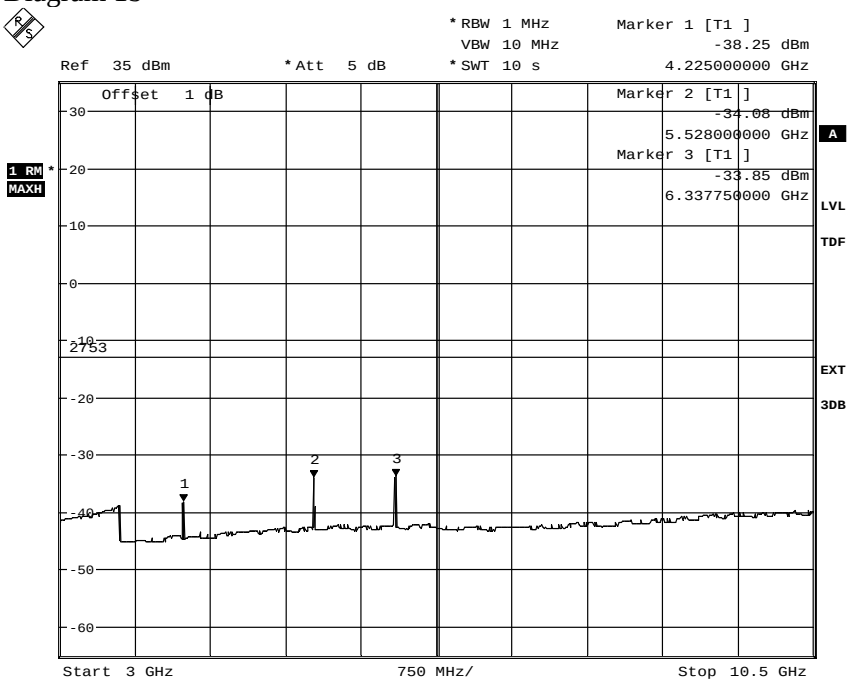
Diagram 1a



Date: 27.SEP.2011 21:16:53

The emissions around the carrier are within the operating frequency band

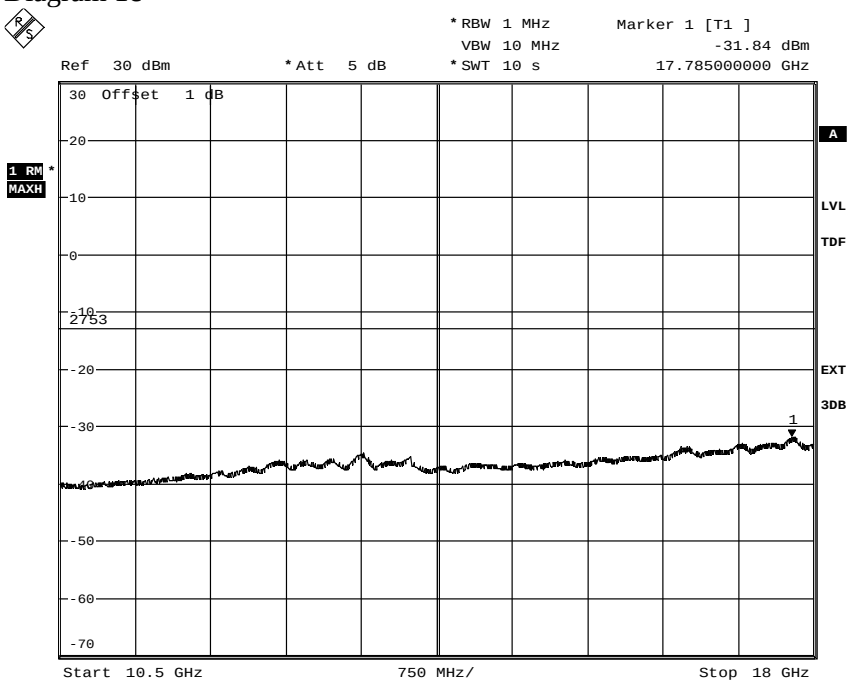
Diagram 1b



Date: 27.SEP.2011 21:21:45

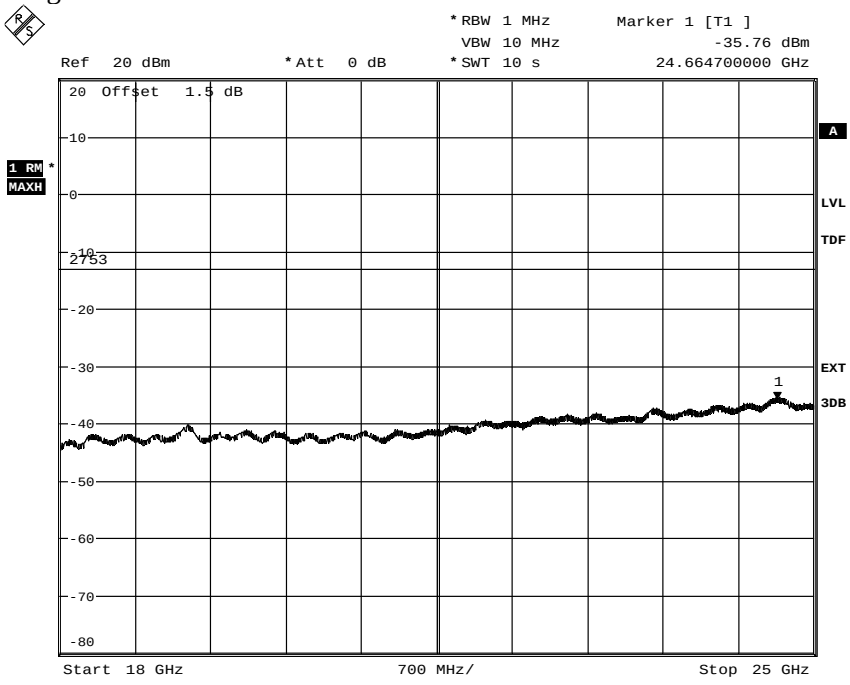
Appendix 5

Diagram 1c



Date: 27.SEP.2011 21:22:56

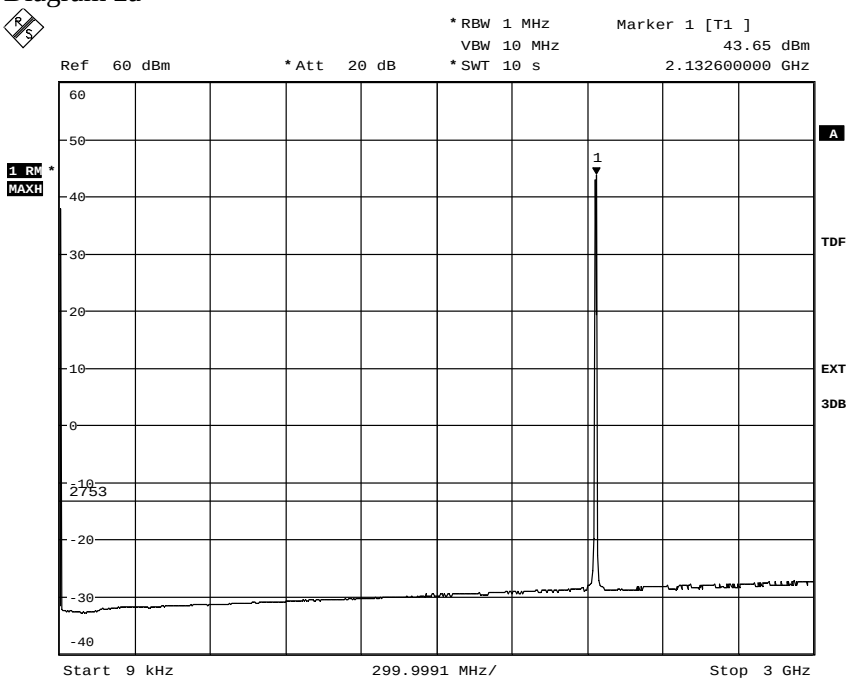
Diagram 1d



Date: 28.SEP.2011 10:42:16

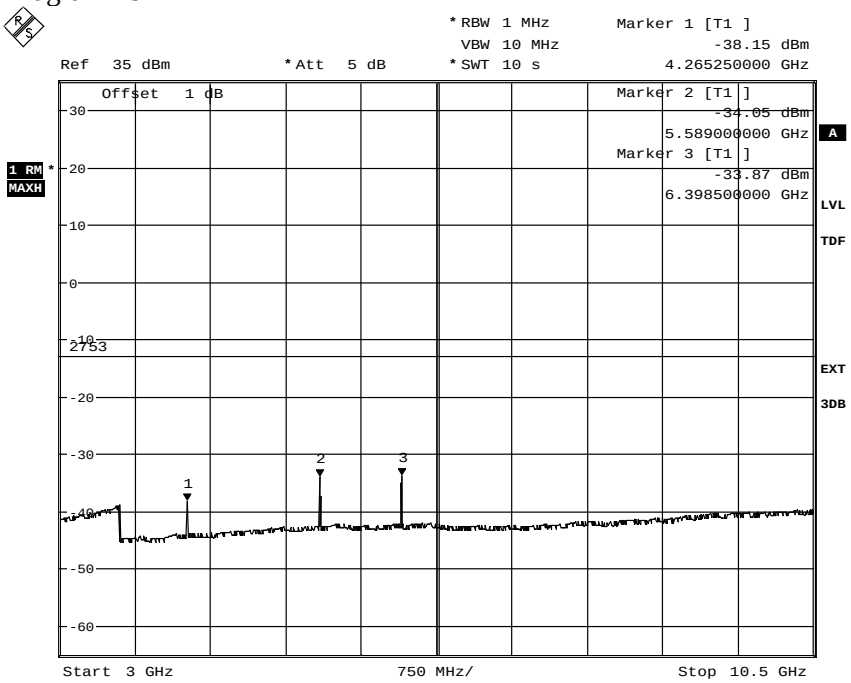
Appendix 5

Diagram 2a



Date: 27.SEP.2011 12:22:43

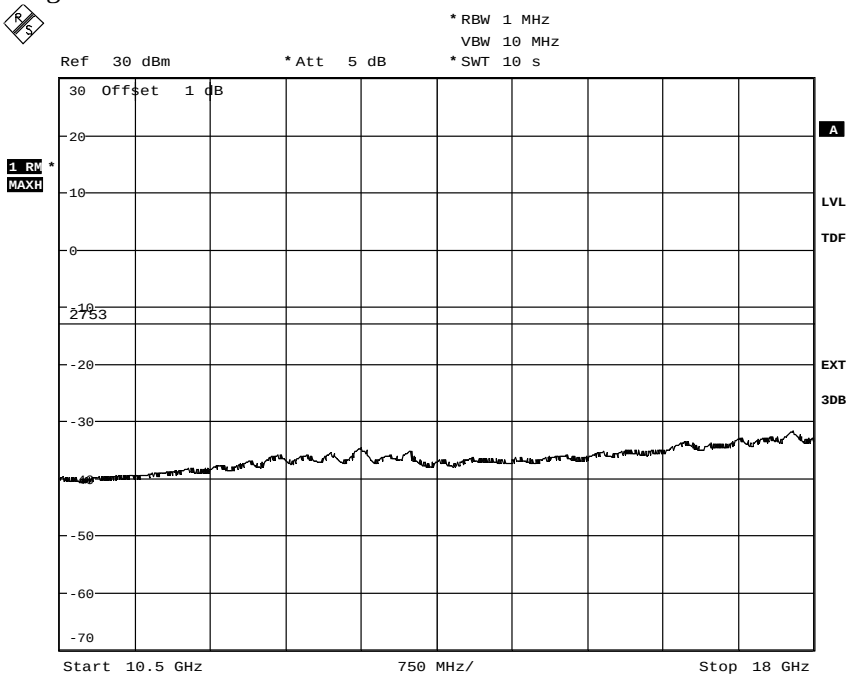
Diagram 2b



Date: 27.SEP.2011 12:28:27

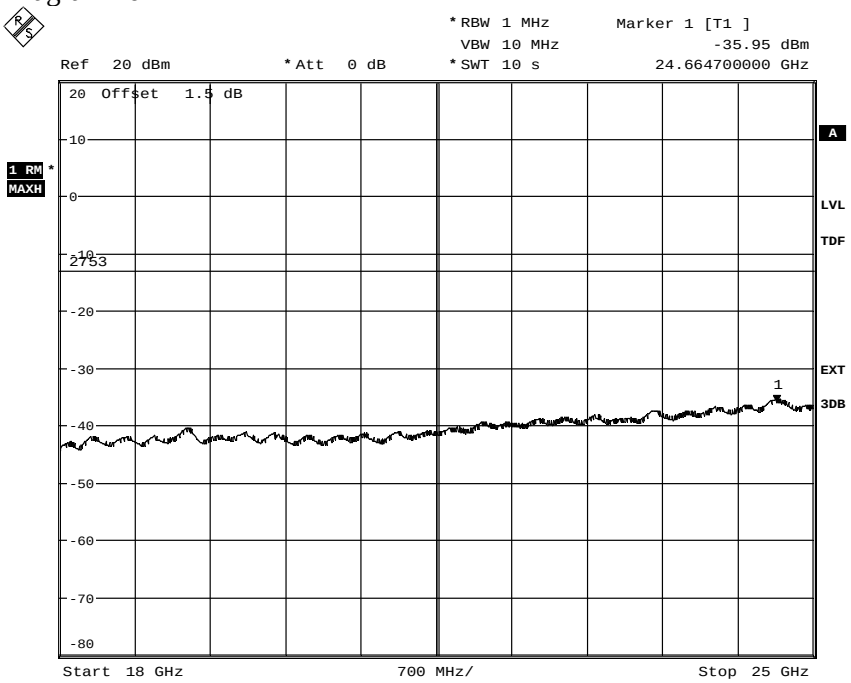
Appendix 5

Diagram 2c



Date: 27.SEP.2011 12:33:13

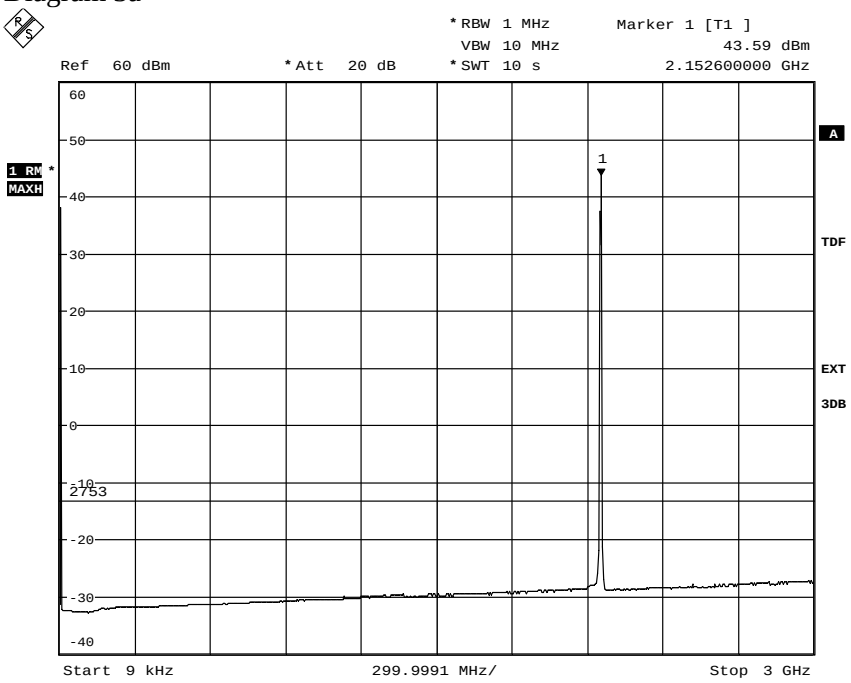
Diagram 2d



Date: 28.SEP.2011 10:21:26

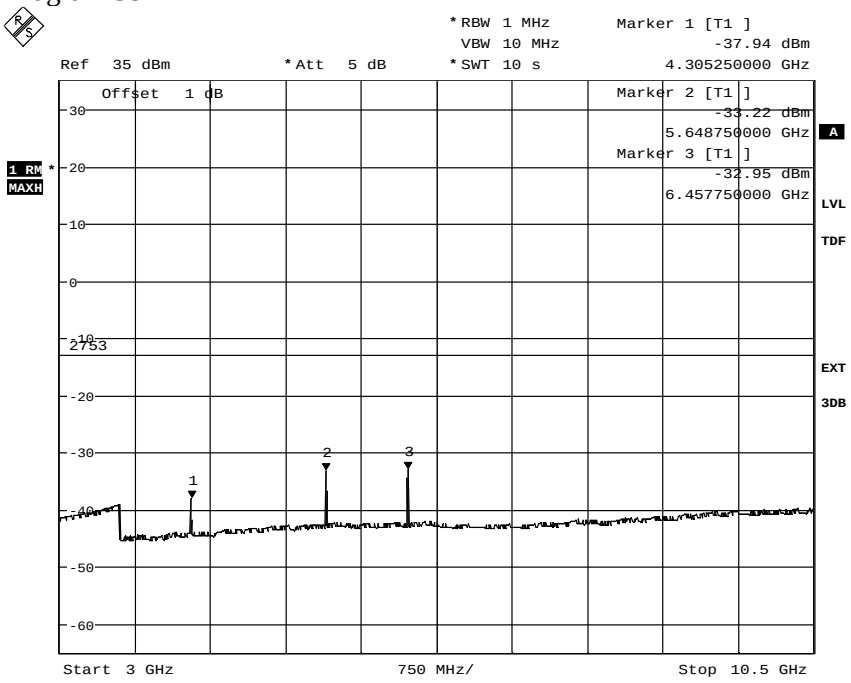
Appendix 5

Diagram 3a



Date: 28.SEP.2011 07:50:17

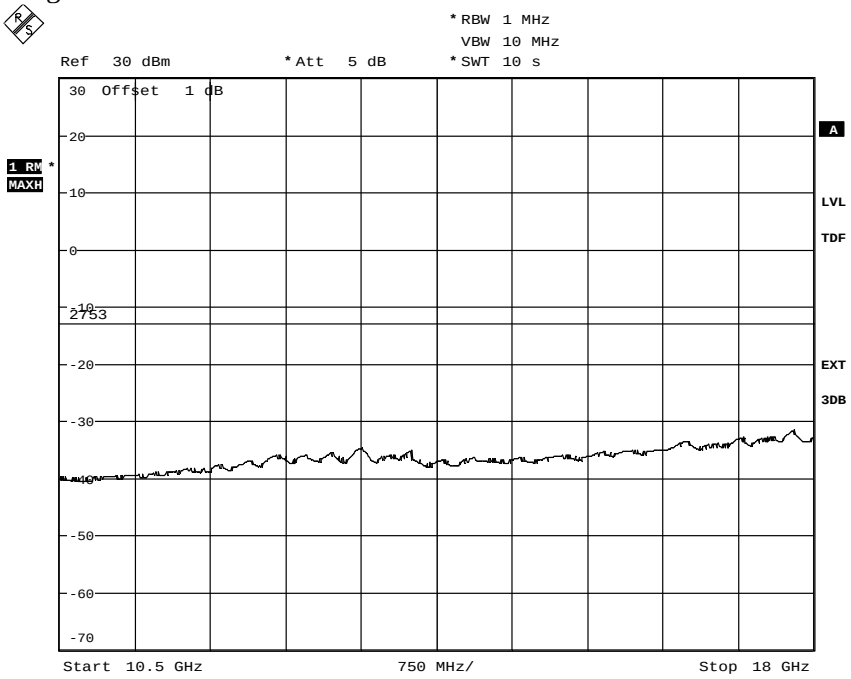
Diagram 3b



Date: 28.SEP.2011 08:25:51

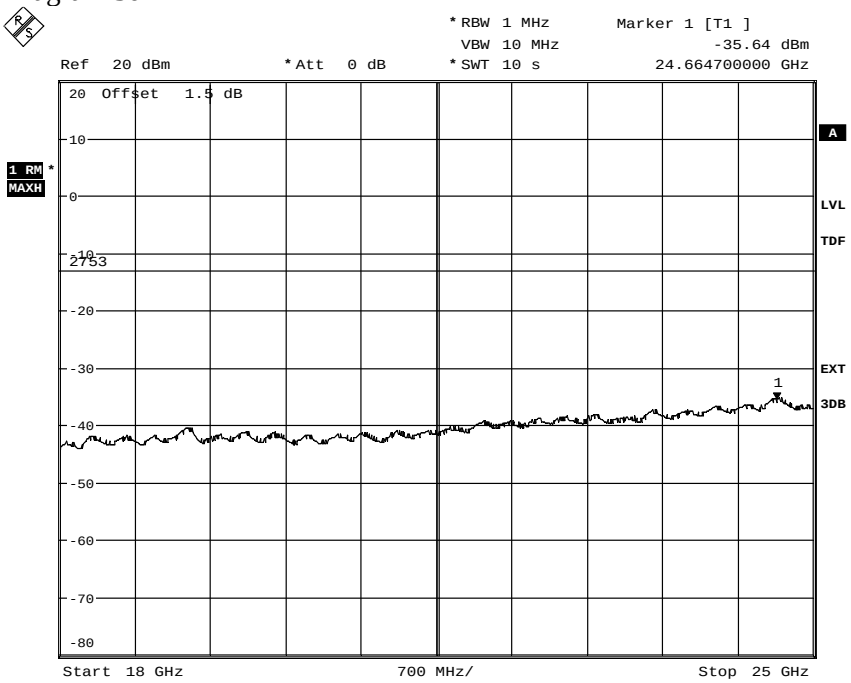
Appendix 5

Diagram 3c



Date: 28.SEP.2011 08:22:53

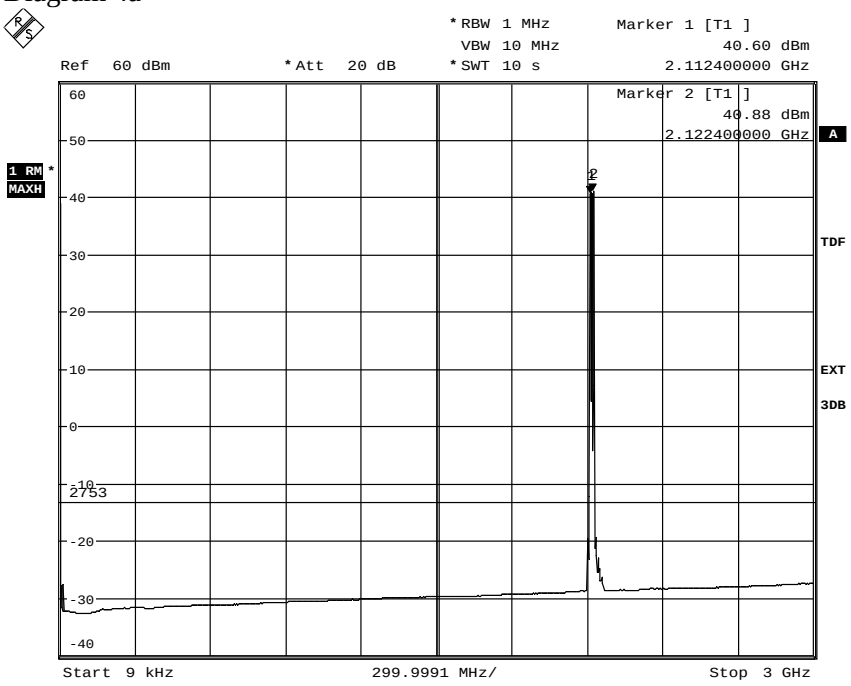
Diagram 3d



Date: 28.SEP.2011 10:51:44

Appendix 5

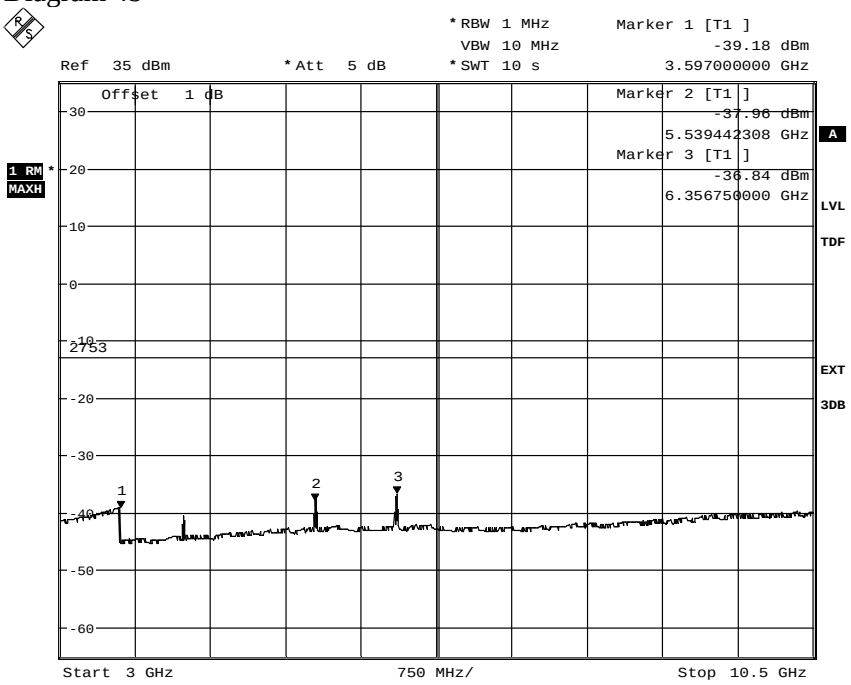
Diagram 4a



Date: 28.SEP.2011 12:40:29

The emissions around the carriers are within the operating frequency band

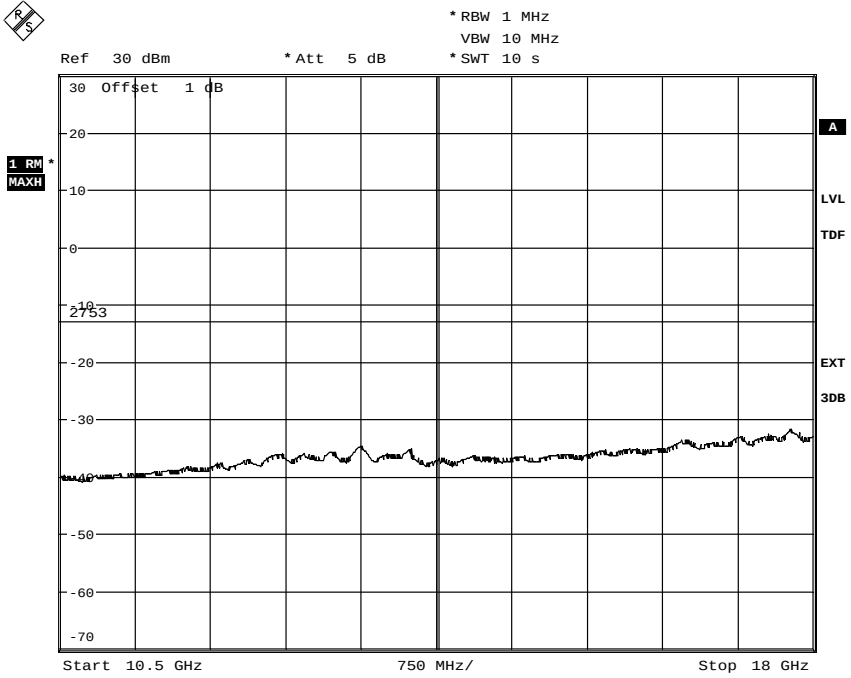
Diagram 4b



Date: 28.SEP.2011 12:43:31

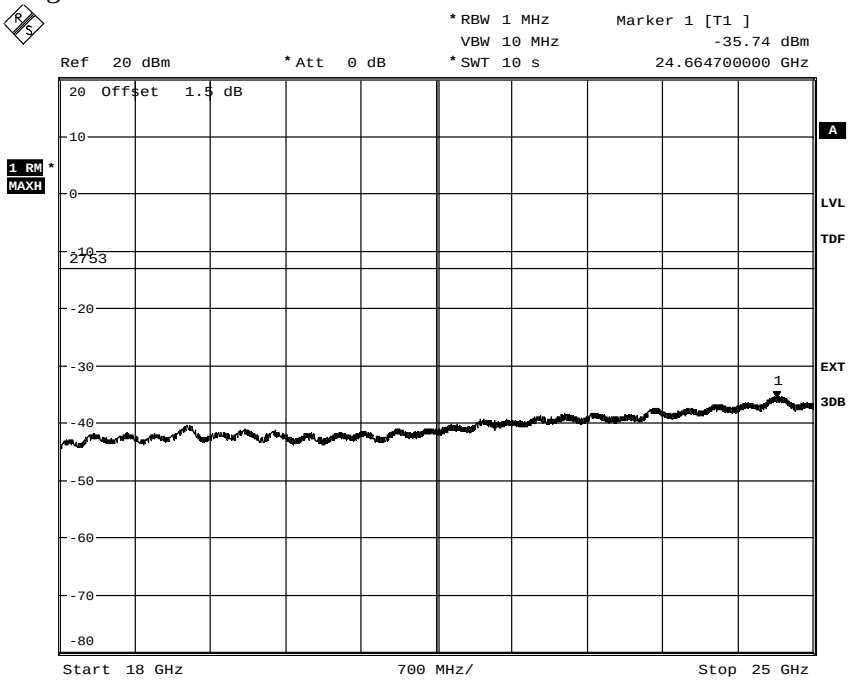
Appendix 5

Diagram 4c



Date: 28.SEP.2011 12:44:56

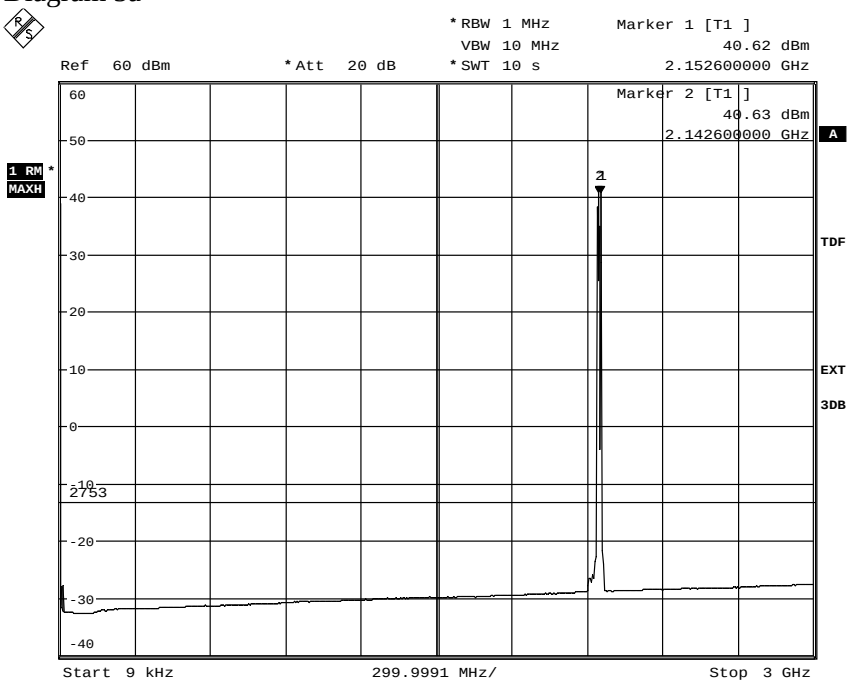
Diagram 4d



Date: 28.SEP.2011 11:20:32

Appendix 5

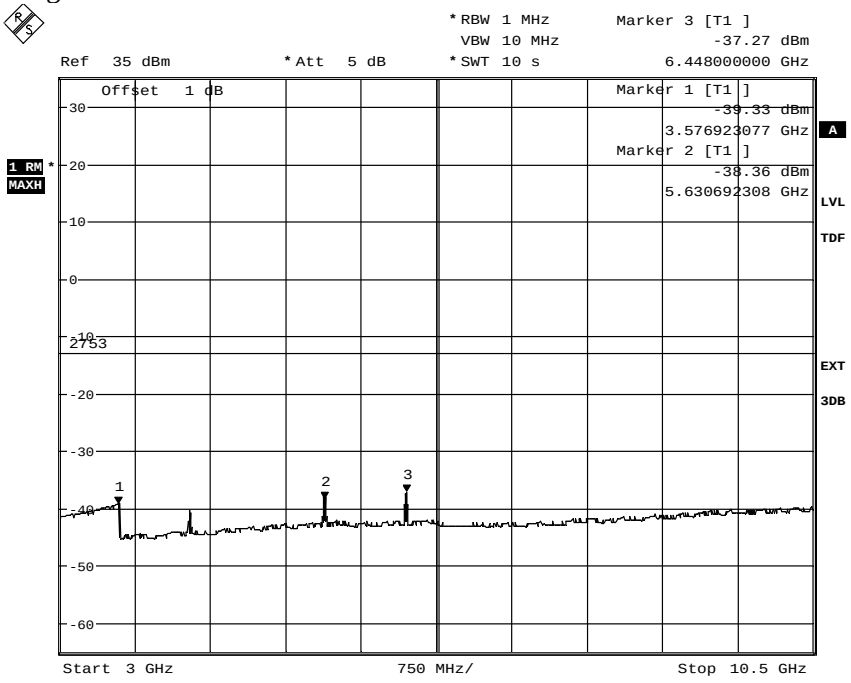
Diagram 5a



Date: 28.SEP.2011 12:27:39

The emissions around the carriers are within the operating frequency band

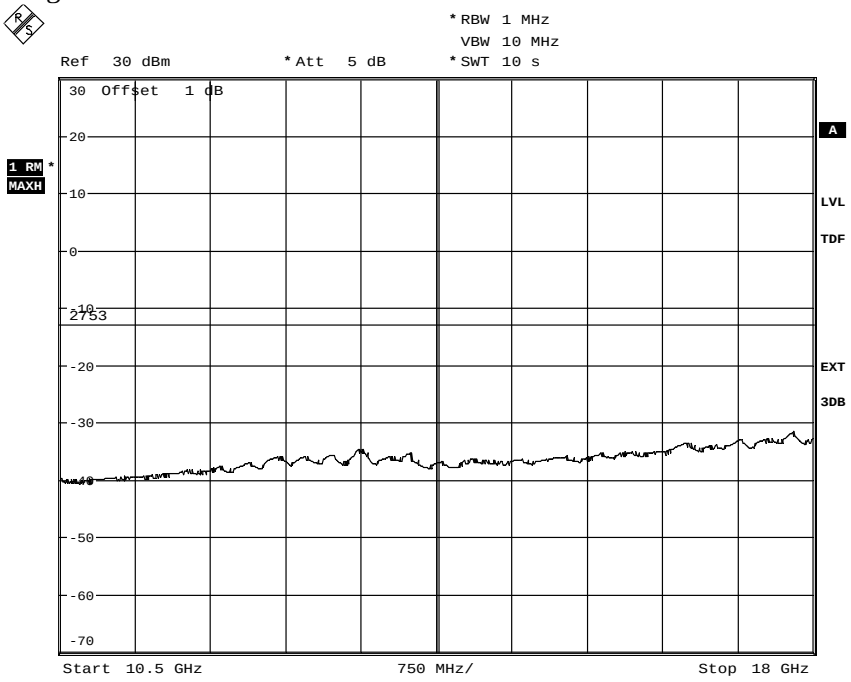
Diagram 5b



Date: 28.SEP.2011 12:25:21

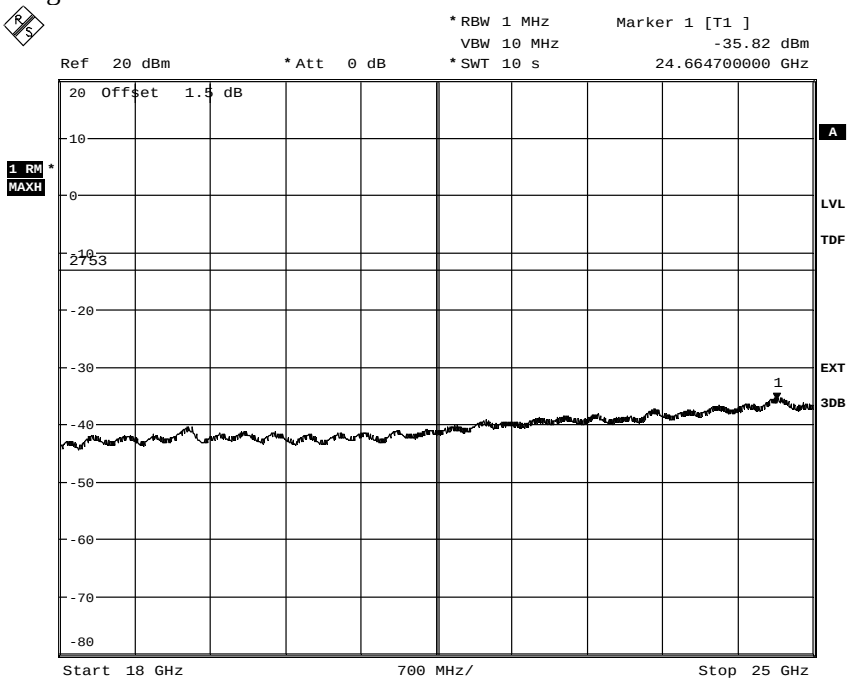
Appendix 5

Diagram 5c



Date: 28.SEP.2011 12:22:48

Diagram 5d



Date: 28.SEP.2011 12:04:03

Field strength of spurious radiation measurements according to 47 CFR 27.53 (h) / IC RSS-139 6.5

Date	Temperature	Humidity
2011-09-19 to 2011-09-21	21-22 °C ± 3 °C	52% to 61 % ± 5 %

Test set-up and procedure

Tested revision state R1A.

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.

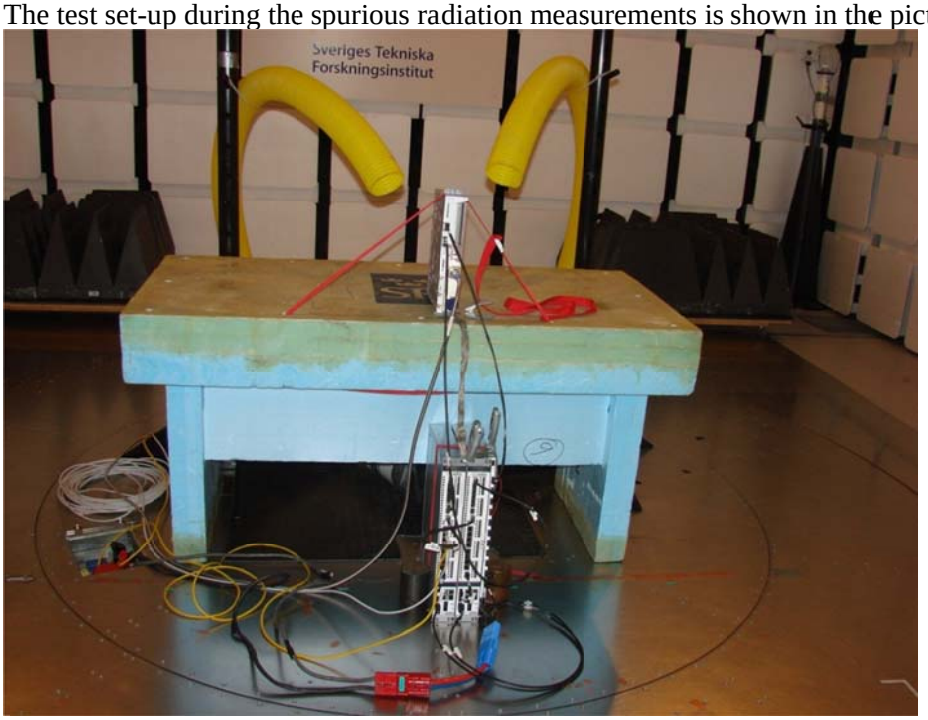
The measurements were performed with both horizontal and vertical polarization of the antenna. The antenna distance was 3 m in the frequency range 30 MHz – 18 GHz and 1m in the frequency range 18 - 25 GHz.

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 6

Measurement equipment

Measurement equipment	SP number
Test site Tesla	503 881
R&S ESI 26	503 292
Control computer	503 479
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
High pass filter, RLC Electronics	503 739
Testo 625, temperature and humidity meter	504 188

The RUS unit was allocated to the following UARFCN:

Single Carrier: (One carrier configuration)

Cell	1	1	1
Channel	B	M	T

Multi Carrier: (Two carrier configuration)

Cell	1	2
Channel	B	B+10
Channel	T-10	T

Multi Carrier: (Four carrier configuration)

Cell	1	2	3	4
Channel	B	B+5	B+10	B+15
Channel	T	T-5	T-10	T-15

Results

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

§27.53(h) and RSS-139 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

Frequency stability measurements according to CFR 47 §27.54 / IC RSS 139 6.3

Date	Temperature (test equipment)	Humidity (test equipment)
2011-10-04 to 2011-10-05	22-24°C ± 3 °C	43-58% ± 5 %

Test set-up and procedure

Tested revision state R1A.

The measurement was made per 3GPP TS 25.141. 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 signal analyzer FSQ40	504 143
RF attenuator	504 159
Testo 635, Temperature and humidity meter	504 203
Temperature cabinet	503 360
Multimeter Fluke 87	502 190

Results

Nominal Voltage -48 V DC
Maximum output power at mid channel (M)

Test conditions		Frequency error (Hz)
Supply voltage DC (V)	T (°C)	
-48.0	+20	-10
-55.2	+20	-11
-40.8	+20	-11
-48.0	+30	-10
-48.0	+40	-9
-48.0	+50	-10
-48.0	+10	-8
-48.0	0	-8
-48.0	-10	-8
-48.0	-20	-9
-48.0	-30	-13
Maximum freq. error (Hz)		13
Measurement uncertainty		$< \pm 1 \times 10^{-7}$

Limits

Limit according to 3GPP TS 25.141:
The frequency error shall be within ± 0.05 PPM ± 12 Hz (±118.63).

§27.54
The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-139 6.3 Frequency:
The frequency stability shall be sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Complies?	Yes

Receiver spurious emissions measurements according to IC RSS-133 6.6

Date	Temperature	Humidity
2011-12-10	23 °C ± 3 °C	25 % ± 5 %

Test set-up and procedure

Tested revision state R1D.

The measurements were performed according to ANSI C63.4.

Measurements were performed on the receiver antenna terminal (RF B). In the frequency range 30MHz -1000 MHz the measurement is first performed with peak detector. Emission on frequencies close to or above the limit is re-measured with quasi-peak detector. The average detector was used in the frequency range 1-12.5 GHz.

During the measurement at the receiver port “RF B” the combined TX/RX port “RF A” was terminated into 50 ohm. The TX was active at maximum power at the TX band center frequency(M) with test model TM1.

Measurement equipment	SP number
R&S FSQ40	504 143
RF attenuator (RF A)	504 159
RF attenuator (RF B)	503 248
Testo 635, Temperature and humidity meter	504 203

Result

The nominal RX frequency was 1732.6 MHz.

	Tested port, frequency range
Diagram 1a+b+c	RX B, 30 MHz – 12.5 GHz

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

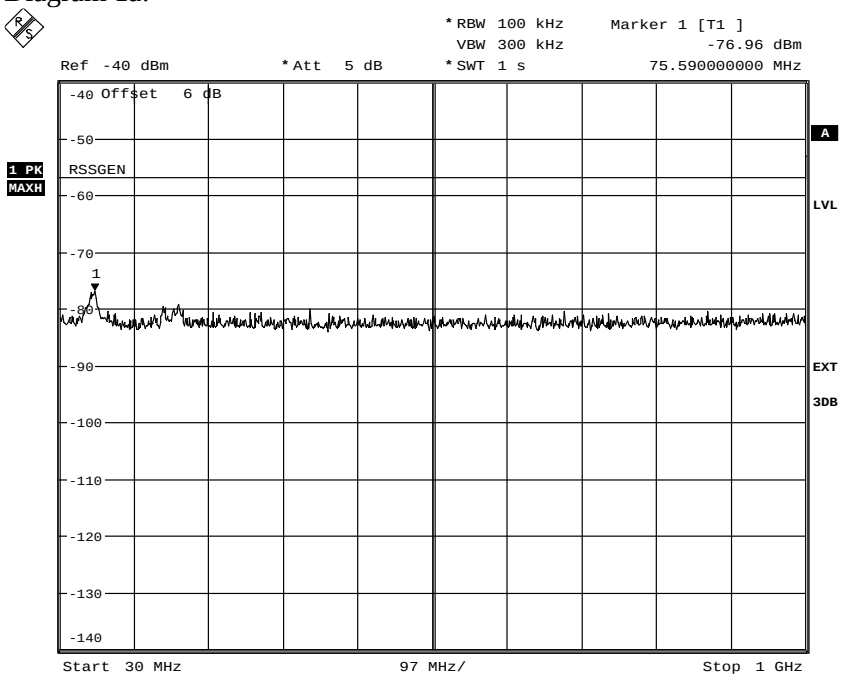
RSS-Gen 6.2 Antenna Conducted limits

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

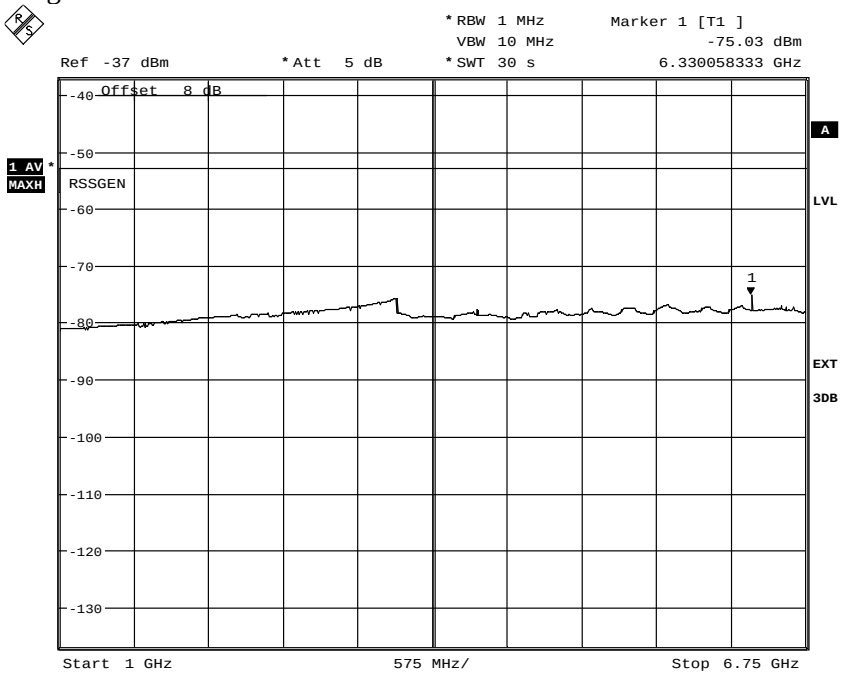
Appendix 8

Diagram 1a:



Date: 10.DEC.2011 15:00:38

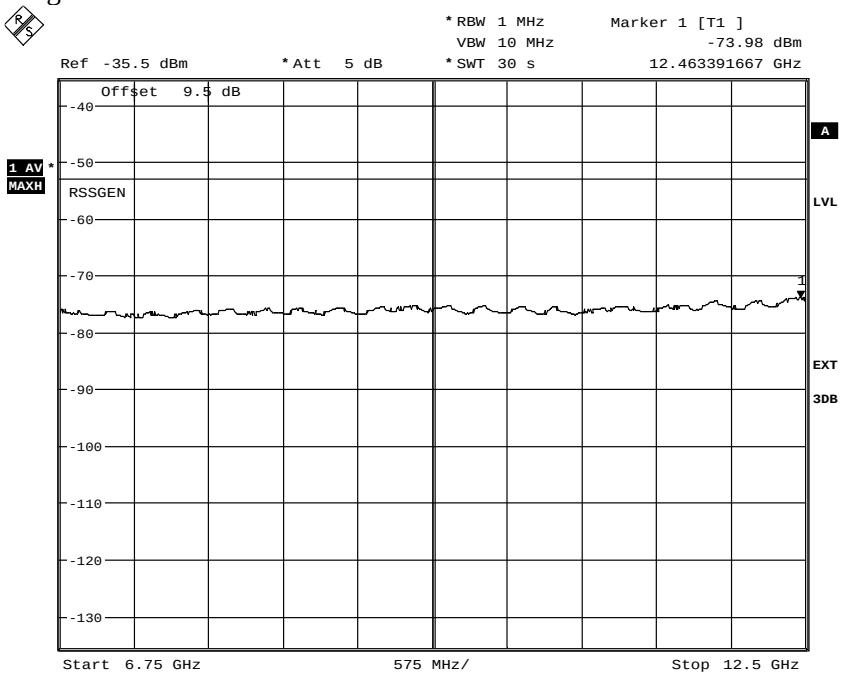
Diagram 1b:



Date: 10.DEC.2011 15:03:30

Appendix 8

Diagram 1c:

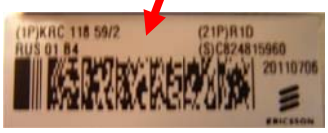


Date: 10.DEC.2011 14:51:36

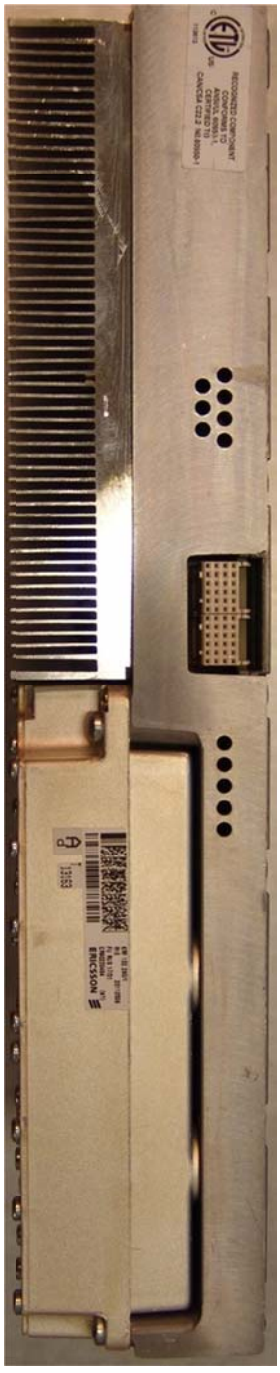
Appendix 9

External photos

Front side

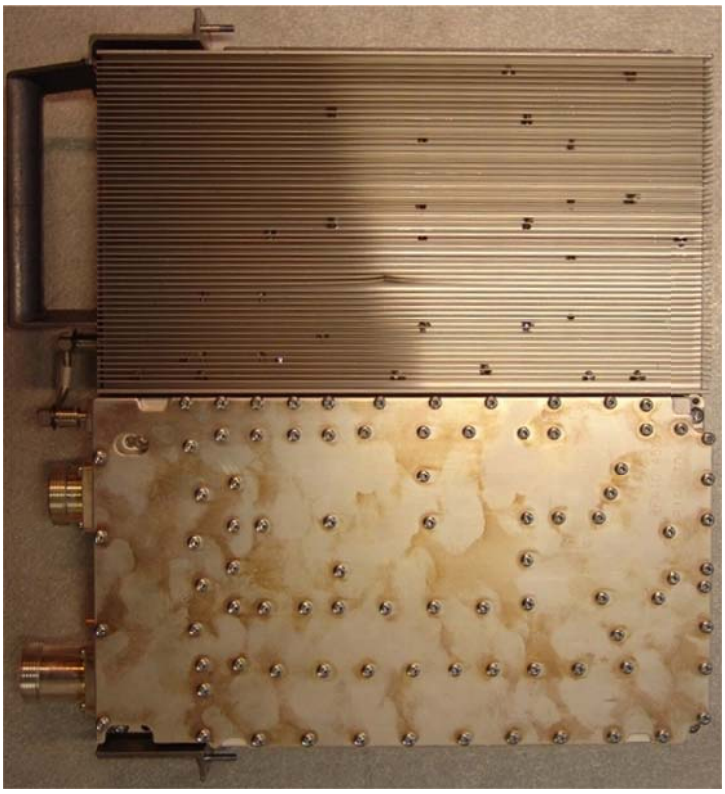


Rear side

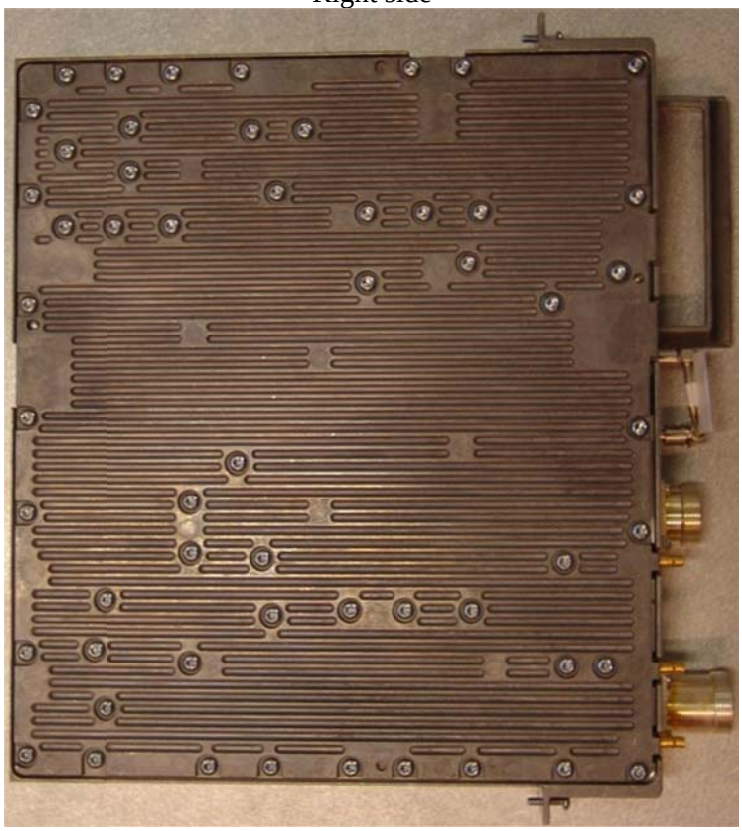


Appendix 9

Left side



Right side



Appendix 9

Bottom side

Top side