REPORT

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

Date	Reference	Page
2010-11-23	FX018746-F22G	1 (2)

1002
ISO/IEC 17025

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Radio measurements on RRUS 01 B5 with FCC ID: TA8AKRC11870-2 and IC: 287AB-AS118702 operating in the 850 MHz cellular band

(9 appendices)

Test object

RRUS 01 B5, KRC 118 70/2 Rev. R1A

Summary

Standard		Compliant	Appendix
FCC CFR 47 / IC RSS-132 Issue 2			
2.1046 / RSS-132 4.4	RF power output	Yes	2
2.1049 / RSS-Gen 4.6.1	Occupied bandwidth	Yes	3
2.1051 / RSS-132 4.5	Band edge	Yes	4
2.1051 / RSS-132 4.5	Spurious emission at antenna terminals	Yes	5
2.1053 / RSS-132 4.5	Field strength of spurious radiation	Yes	6
2.1055 / RSS-132 4.3	Frequency stability	Yes	7
FCC CRF 47 / Industry Canada RSS-132 Issue 2			
15.111 / RSS-132 4.6	Receiver spurious emissions	Yes	8

Note 1: 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.
Note 2: Reduced output power must be used on the channels adjacent to the frequency band edges in order to comply with band edge requirements, see appendix 4 for details.

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Electronics - EMC

Christer Karlsson
Technical Manager

Jonas Bremholt
Technical Officer

FCC ID: TA8AKRC11870-2
IC: 287AB-AS118702

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IC: 287AB-AS118702

Description – Test object

Equipment:	Radio equipment (RRUS) 850 MHz operating in GSM mode supporting single and multi carrier.
Antenna ports:	1 TX/RX port and 1 RX port
Frequency range:	TX: 869.2 – 893.8 MHz RX: 824.2 – 848.8 MHz
Modulations:	GMSK and 8-PSK
Nominal output power: (Maximum)	Single carrier: 1x 47.8 dBm (1x 60W) Multi carrier: 2x 44.8 dBm (2x 30W)/ Carrier 4x 41.8 dBm (4x 15W)/ Carrier
Nominal power voltage:	-48 VDC

Tested channels

Channel	ARFCN	Frequency* Downlink	Uplink
B	128	869.2	824.2
B+1	129	869.4	824.4
B+5	133	870.2	825.2
B+10	138	871.2	826.2
B+15	143	872.2	827.2
M	190	881.6	836.6
T-15	236	890.8	845.8
T-10	241	891.8	846.8
T-5	246	892.8	847.8
T-1	250	893.6	848.6
T	251	893.8	848.8

* Frequency in MHz

Operation mode during measurements

Unless otherwise stated, all measurements were performed with the test object transmitting pseudorandom data in all timeslots and settings for maximum output power for each configuration. Both modulations GMSK and 8-PSK were tested. Occupied bandwidth and frequency error were only measured with single carrier configuration.

Conducted measurements

The test object was powered with -48 VDC. All RF conducted TX measurements were performed on the RF A connector and the RX measurements were performed 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 modulation 8-PSK was found to be representative for worst case setting for the measurements.

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

The RRUS unit was allocated to the following channels:

Single Carrier: (One carrier configuration)

Cell	1	1	1
Channel	B	M	T

Multi Carrier: (Two carrier configuration)

Cell	1	2	1	2
Channel	B	B+10	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-132.

References

Measurements were done according to relevant parts of the following standards:
ANSI 63.4-2003
ANSI/TIA/EIA-603-C-2004
J-STD007A Vol 1
ANSI/TIA/EIA 136-280-D-2002
CFR 47 part 2, October 1st , 2009
CFR 47 part 22, October 1st, 2009
RSS-Gen Issue 2
RSS-132 Issue 2

Measurement equipment

Measurement equipment	Calibration Due	SP number
Test site Tesla	2012-10	503 881
R&S FSIQ 40	2011-07	503 738
R&S FSQ 40	2011-07	504 143
R&S ESI 26	2011-08	503 292
High pass filter	2011-07	504 199
RF attenuator	2011-07	504 159
RF step attenuator	2012-07	503 096
Boonton RF Peak power meter/analyzer	2011-10	503 144
Boonton Power sensor 56518-S/4	2012-10	503 145
Chase Bilog Antenna CBL 6111A	2011-10	503 182
EMCO Horn Antenna 3115	2011-01	502 175
µComp Nordic, Low Noise Amplifier	2011-07	504 160
Climate chamber 3	2012-05	503 546
Multimeter Fluke 87	2011-03	502 190
Testo 625, Temperature and humidity meter	2011-08	504 188
Testo 635 Temperature and humidity meter	2011-03	504 203

Uncertainties

Measurement and test instrument uncertainties are described in the quality assurance documentation ”SP-QD 10885”. The measurement uncertainties can be found in the table below. 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 2010-10-26.

Test engineers

Tomas Lennhager, Jörgen Wassholm and Jonas Bremholt

Test participants

Christer Hjorth and Ove Nilsson, Ericsson AB

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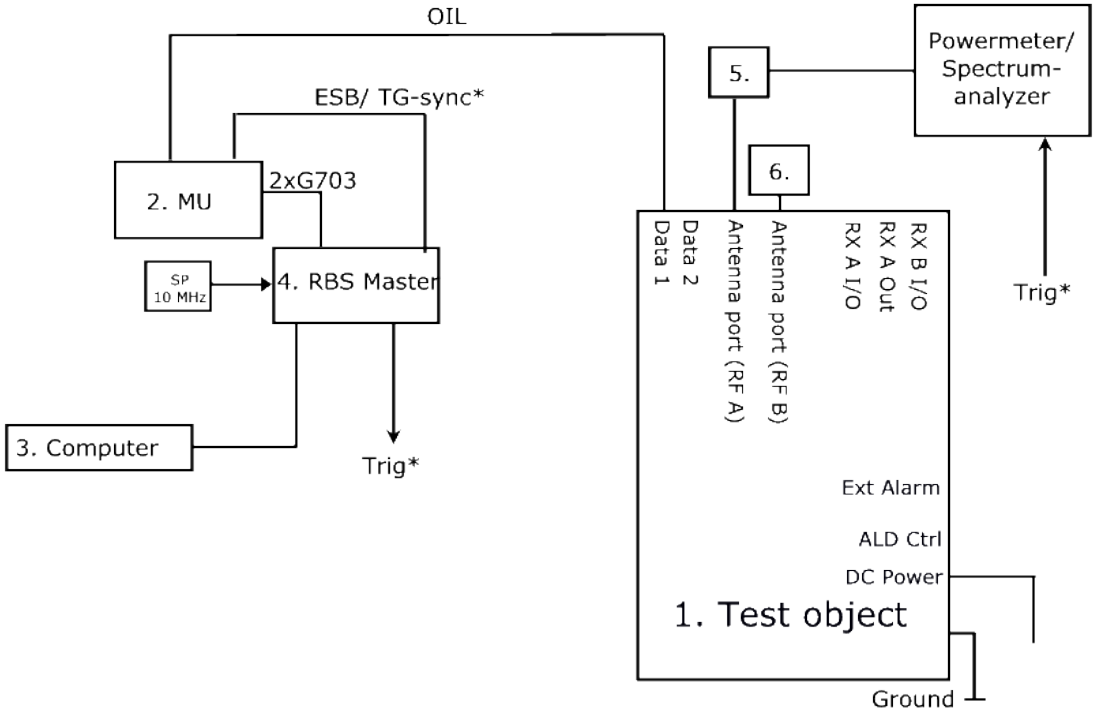
Test set-up conducted measurements TX



Note: The ESB/TG-sync and the trig cable between the RBS Master and Spectrum analyzer were only used for the frequency error measurements.

Test object

1. RRUS 01 B5, KRC 118 70/2 Rev R1A S/N C823756689 with software CXP1040007/04 Rev GR05
(FCC ID: TA8AKRC11870-2 / IC: 287AB-AS118702)

Functional test equipment

2. Main Unit, RBS 6601 BFL 901 009/1 Rev R3B with
DUG 20 01 KDU 137 569/1 Rev R2A S/N (S)C823721026, with software
CXP 104 0007/04 Rev GR05
3. Computer, HP Elitbook 6930p with RBS master software version R7D03
4. RBS Master, BAMS – 1000778897
5. Attenuator
6. Terminator

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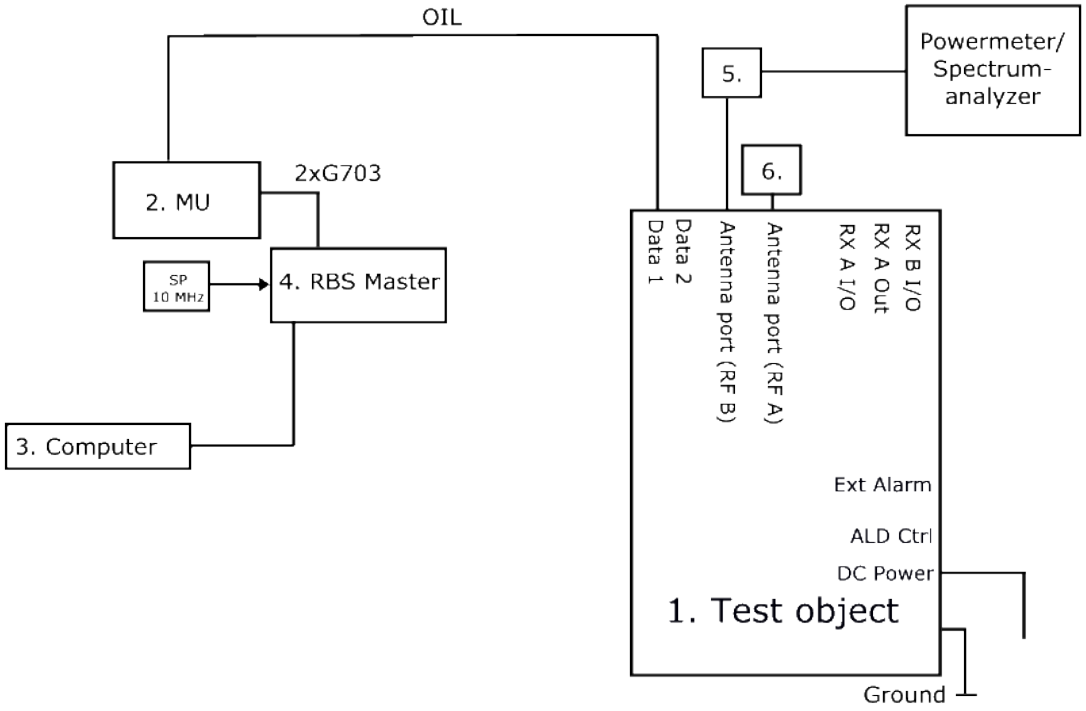
Test set-up conducted measurements RX



Test object

1. RRUS 01 B5, KRC 118 70/2 Rev R1A S/N C823756689 with software CXP1040007/04 Rev GR05
   (FCC ID: TA8AKRC11870-2 / IC: 287AB-AS118702)

Functional test equipment

2. Main Unit, RBS 6601 BFL 901 009/1 Rev R3B with DUG 20 01 KDU 137 569/1 Rev R2A S/N (S)C823721026, with software CXP 104 0007/04 Rev GR05
3. Computer, HP Elitbook 6930p with RBS master software version R7D03
4. RBS Master, BAMS – 1000778897
5. Attenuator
6. Terminator

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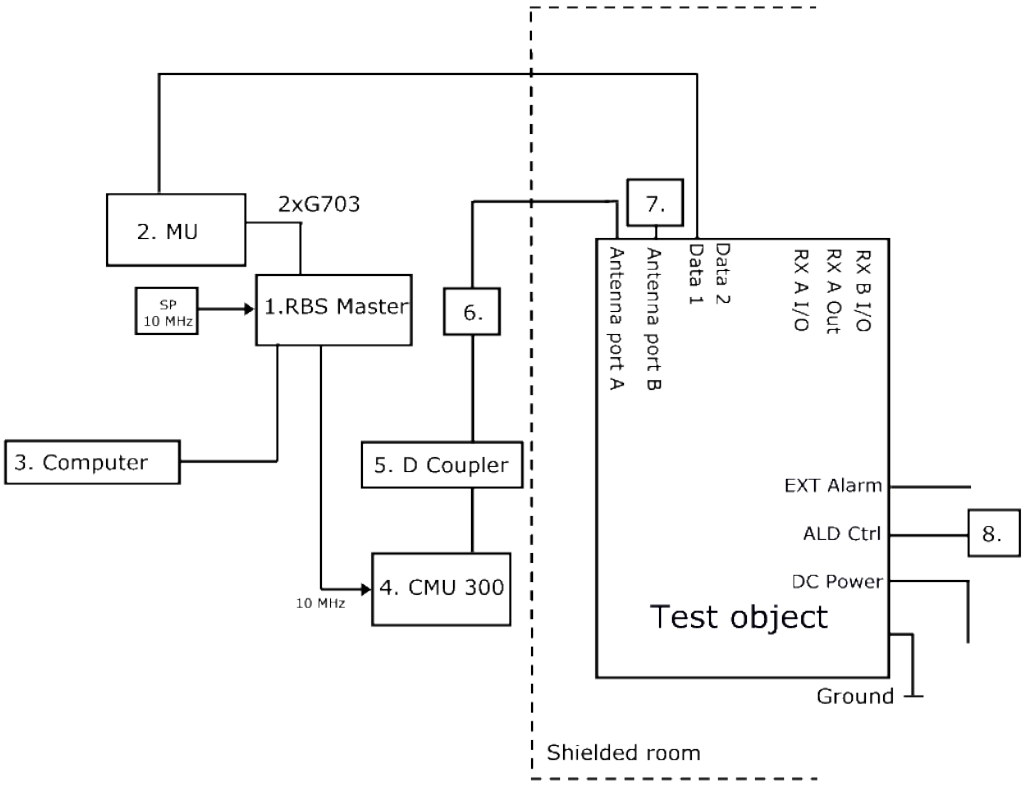
Test set-up radiated measurements



Test object

RRUS 01 B5, KRC 118 70/2 Rev R1A S/N C823764907 with software CXP1040007/04 Rev GR05
(FCC ID: TA8AKRC11870-2 / IC: 287AB-AS118702)

Functional test equipment

1. RBS Master, BAMS – 1000778893
2. Main Unit, RBS 6601 BFL 901 009/1 Rev R3B with DUG 20 01 KDU 137 569/1 Rev R1D S/N (S)C823492620, with software CXP1040007/04 Rev GR05
3. Computer, HP Elitbook 6930p with RBS master software version R7D03
4. Communication analyzer, R&S CMU 300, BAMS – 1000458040
5. Directional coupler
6. Attenuator
7. Terminator
8. RET – Remote Electrical Tilt unit

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Interfaces:	**Type of port:**
Power configuration: -48 VDC	DC Power
Antenna port RF A, 7/16 connector, female	Antenna
Antenna port RF B, terminated	Antenna
Test, No cable attached	Test purposes
Xalm, Not supported	Signal
Cross connect RX A, Not supported	Signal
Cross connect RX B, Not supported	Signal
RXA CO-site, Not supported	Signal
ALD Ctrl, Shielded multi-wire connected to RET unit	Signal
Data 1: Optical Interface Link, Single mode opto fibre	Signal
Data 2: Not supported	Signal

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RF power output measurements according to 47 CFR 2.1046/ RSS-132 4.4

Date	Temperature	Humidity
2010-10-27 to 2010-11-17	22-23 °C ± 3 °C	32-37 % ± 5 %

Test set-up and procedure

The output was connected to a peak power analyzer with the CDF mode activated.

Measurement equipment	SP number
Boonton RF Peak power meter/analyzer	503 144
Boonton Power sensor 56518-S/4	503 145
Multimeter Fluke 87	502 190
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): 47.8 dBm

Transmitter power (dBm/ dB) RMS/ PAR			
Channel	B	M	T
GMSK	47.4/ 0.7	47.4/ 0.7	47.0/ 0.7
8-PSK	47.0/ 3.9	47.1/ 3.9	46.8/ 3.9

Multi carrier (1x2): Rated output power level at RF A connector (maximum): 44.8 dBm/ carrier

Transmitter power (dBm/ dB) RMS/ PAR			
Channel	B	M	T
GMSK	44.4/ 0.7	44.5/ 0.7	44.1/ 0.7
8-PSK	44.1/ 3.9	44.4/ 3.7	44.0/ 3.8

Multi carrier (1x4): Rated output power level at RF A connector (maximum): 41.8 dBm/ Carrier

Transmitter power (dBm/ dB) RMS/ PAR			
Channel	B	M	T
GMSK	41.4/ 0.5	41.5/ 0.5	41.2/ 0.5
8-PSK	39.3/ 3.6	39.4/ 3.7	39.1/ 3.7

Limit

According to CFR 47/ RSS there are no conducted limits at the antenna connector.

CFR § 22.913/ SRSP-503 5.1: The effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 Watts (57 dBm).

RSS-132: The transmitter output power shall not exceed the limits given in SRSP-503

Complies?	Yes

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Appendix 3

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

Date	Temperature	Humidity
2010-10-27	23 °C ± 3 °C	37 % ± 5 %

Test set-up and procedure

The measurements were made as defined in §2.1049. 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
R&S FSQ	504 143
Testo 635, Temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 3.1

Modulation: GMSK

	Channel	OBW
Diagram 1	B	245 kHz
Diagram 2	M	245 kHz
Diagram 3	T	244 kHz

Modulation: 8-PSK

	Channel	OBW
Diagram 4	B	239 kHz
Diagram 5	M	239 kHz
Diagram 6	T	239 kHz

FCC ID: TA8AKRC11870-2 Appendix 3.1
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Diagram 1

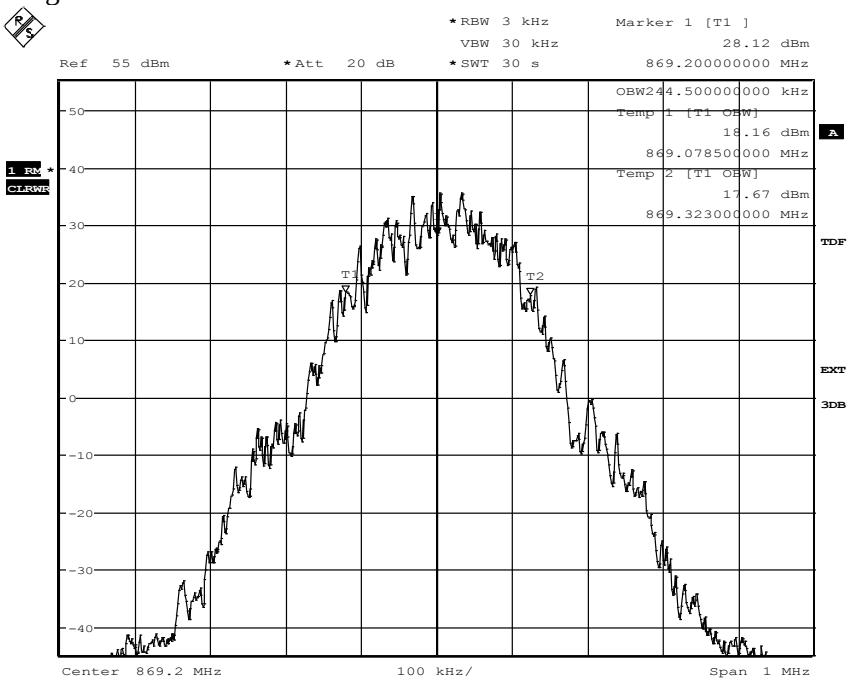

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Diagram 2

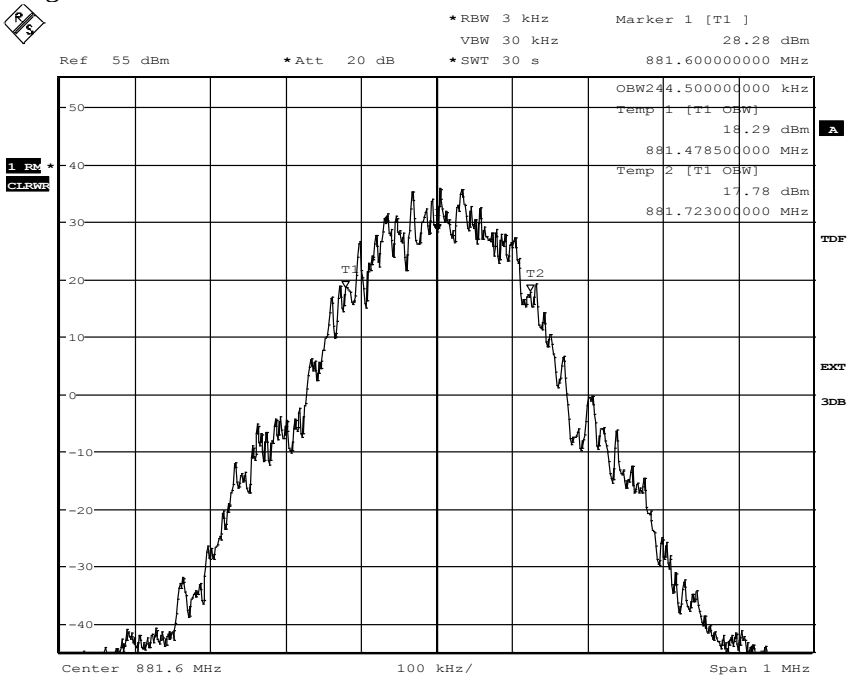

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Diagram 3

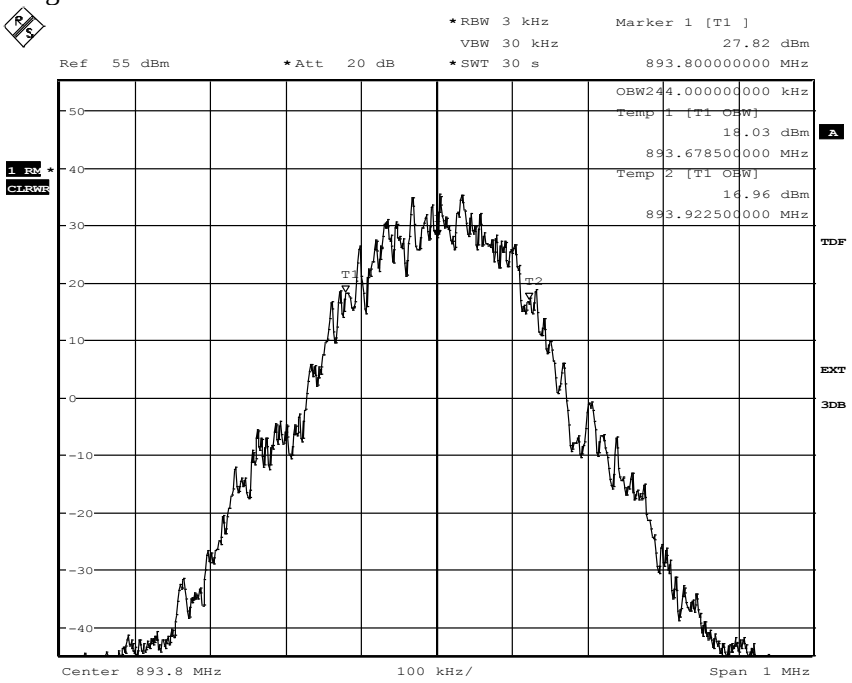

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Diagram 4

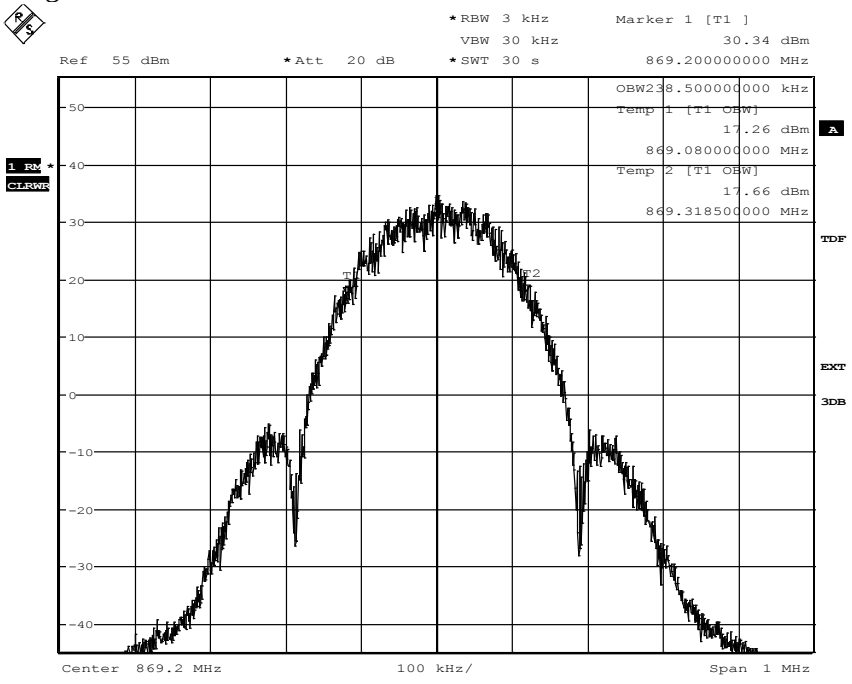

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Diagram 5

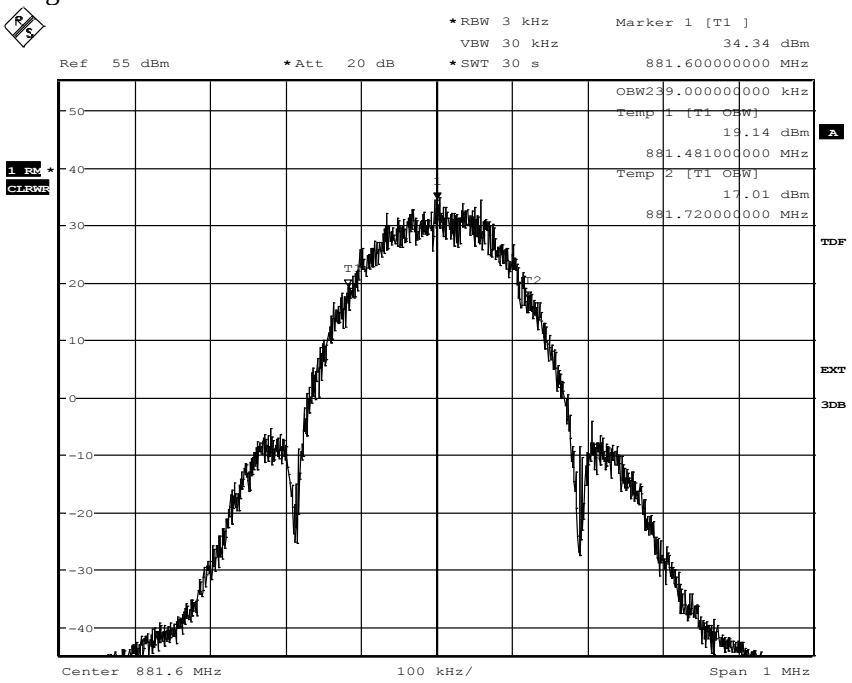

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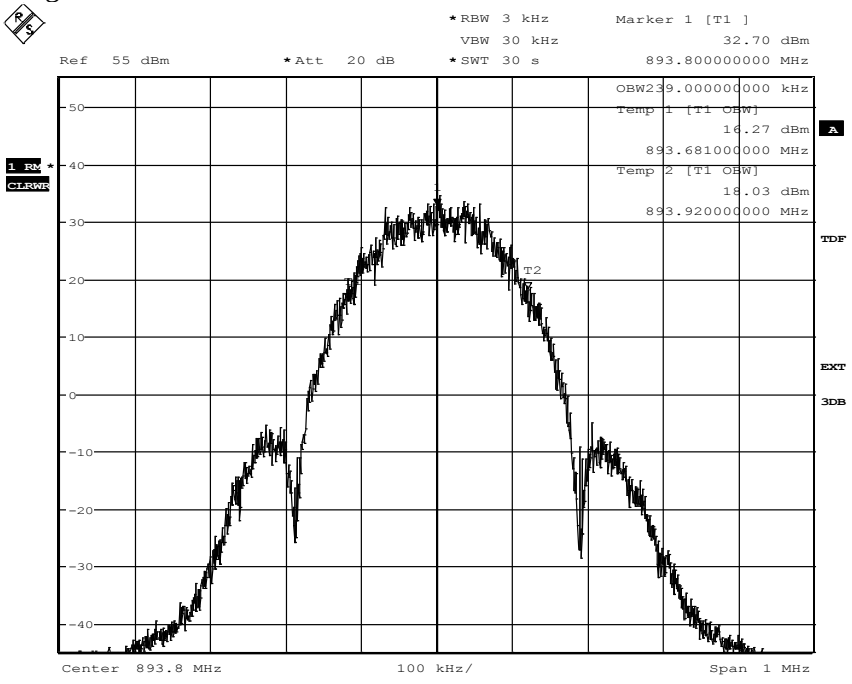
Diagram 6



Date: 27.OCT.2010 09:59:14

FCC ID: TA8AKRC11870-2
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Appendix 4

Band edge measurements according to 47 CFR 2.1051/ RSS-132 4.5

Date	Temperature	Humidity
2010-10-26 to 2010-11-17	22-23 °C ± 3 °C	33-37 % ± 5 %

Test set-up and procedure

The measurements were made as defined in §22.917. 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 3 kHz (1% of OBW) was used up to 1 MHz away from the band edges and 100 kHz was used from 1 MHz to 11 MHz away from the band edges.

Measurement equipment	SP number
R&S FSQ	504 143
Testo 635, Temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 4.1

GMSK

		Power setting	Measured power
Diagram 1:	B	38	37.3 dBm
Diagram 2:	B+1	48 (Maximum)	47.4 dBm
Diagram 3:	T-1	48 (Maximum)	47.0 dBm
Diagram 4:	T	34	33.2 dBm

8-PSK:

		Power setting	Measured power
Diagram 5:	B	38	37.0 dBm
Diagram 6:	B+1	48 (Maximum)	47.0 dBm
Diagram 7	T-1	48 (Maximum)	46.8 dBm
Diagram 8	T	38	36.8 dBm

The table above shows the reduced maximum output power that can be used on channels 128 and 251 for the modulation GMSK and 8-PSK.

Limits

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

Complies?	Yes

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Diagram 1-1

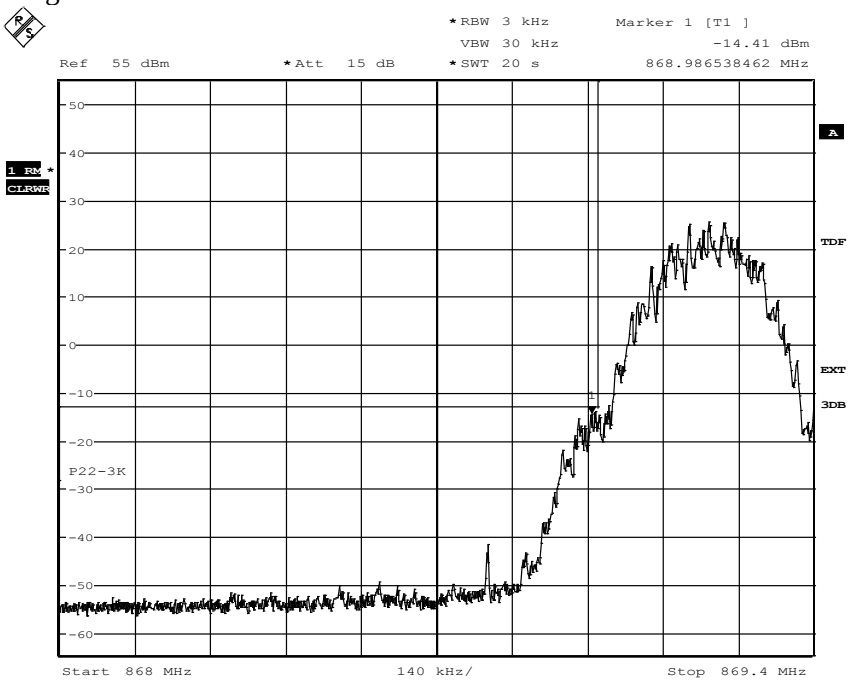

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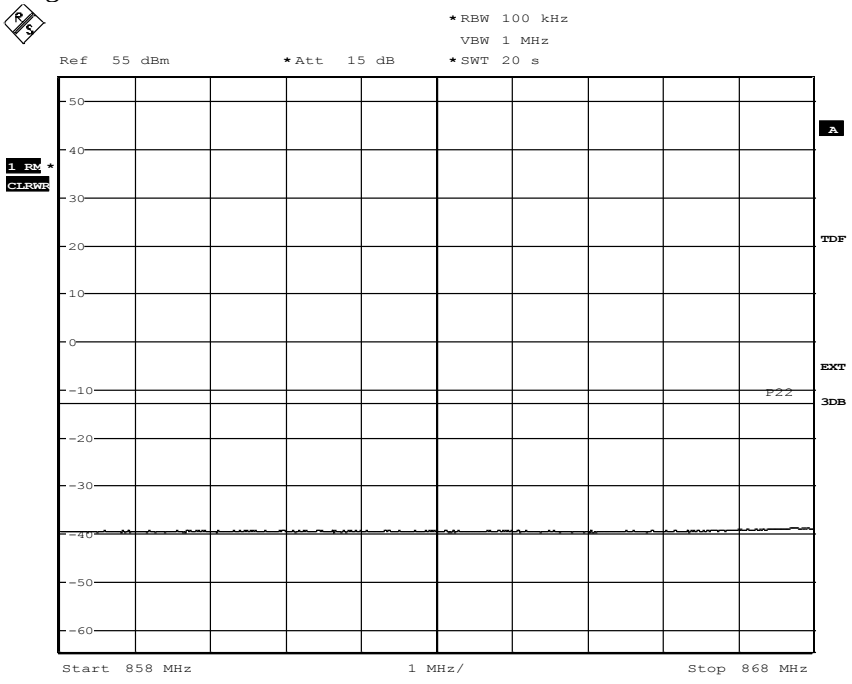
Diagram 1-2



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FCC ID: TA8AKRC11870-2 Appendix 4.1
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Diagram 2-1

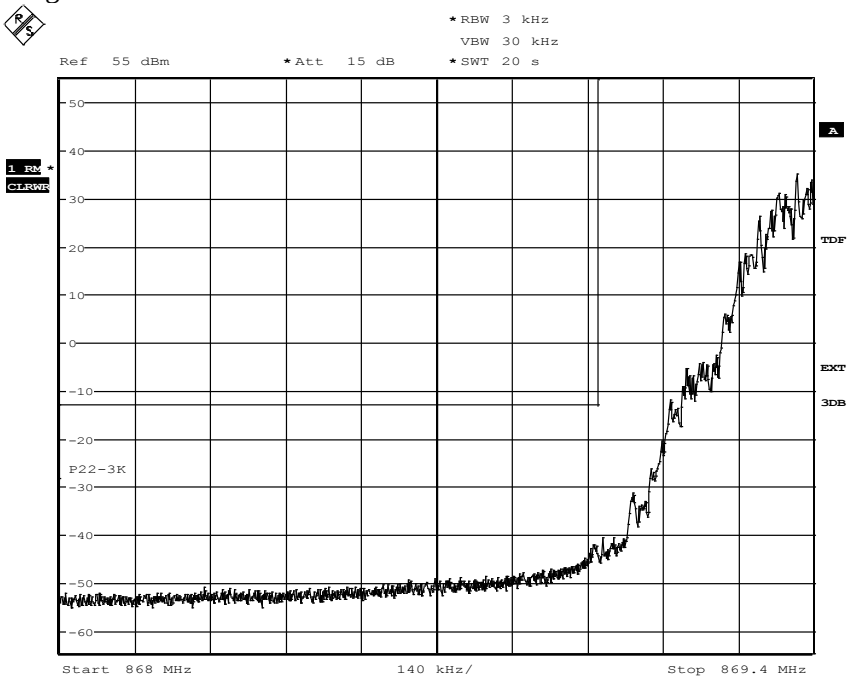

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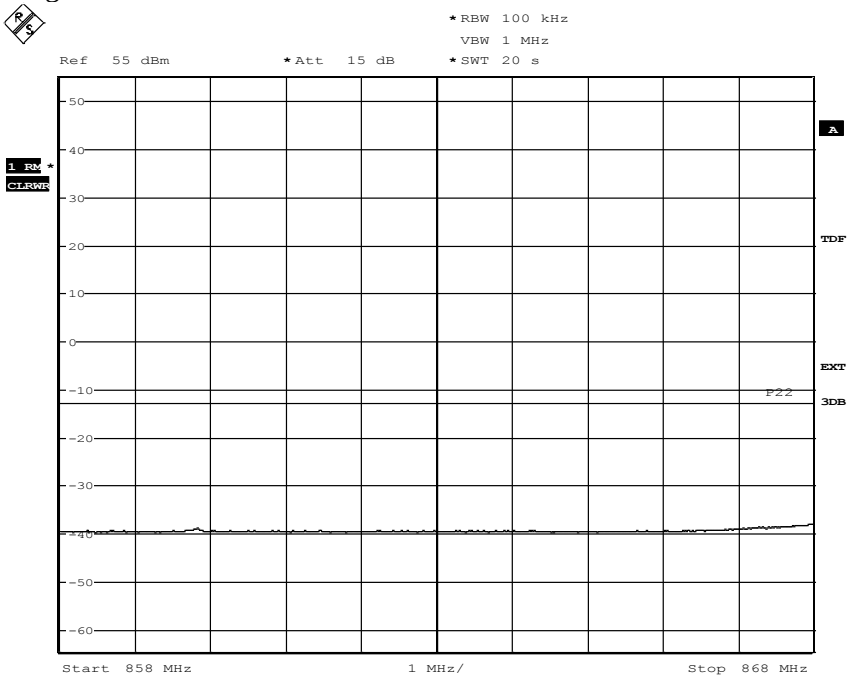
Diagram 2-2



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FCC ID: TA8AKRC11870-2 Appendix 4.1
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Diagram 3-1

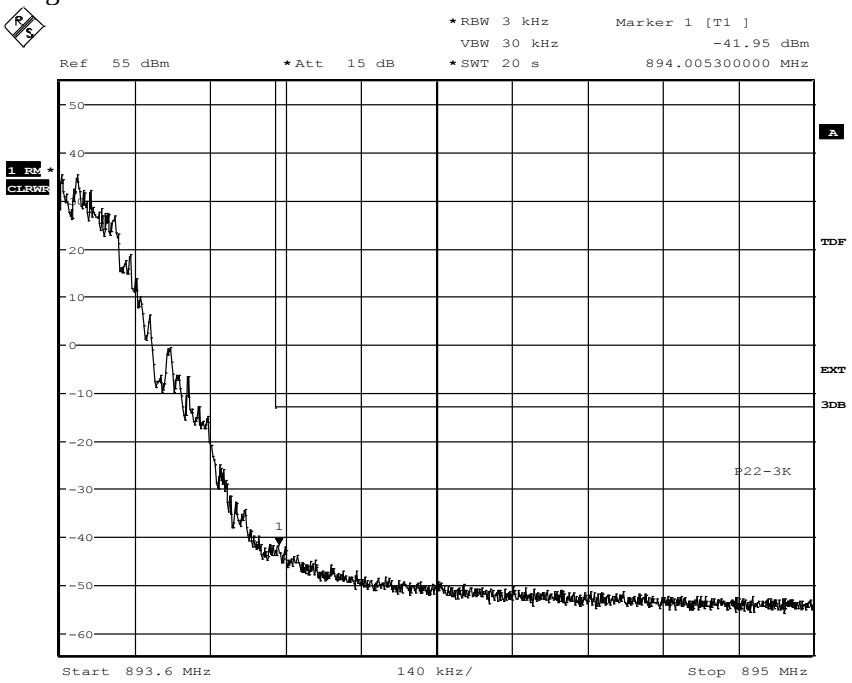

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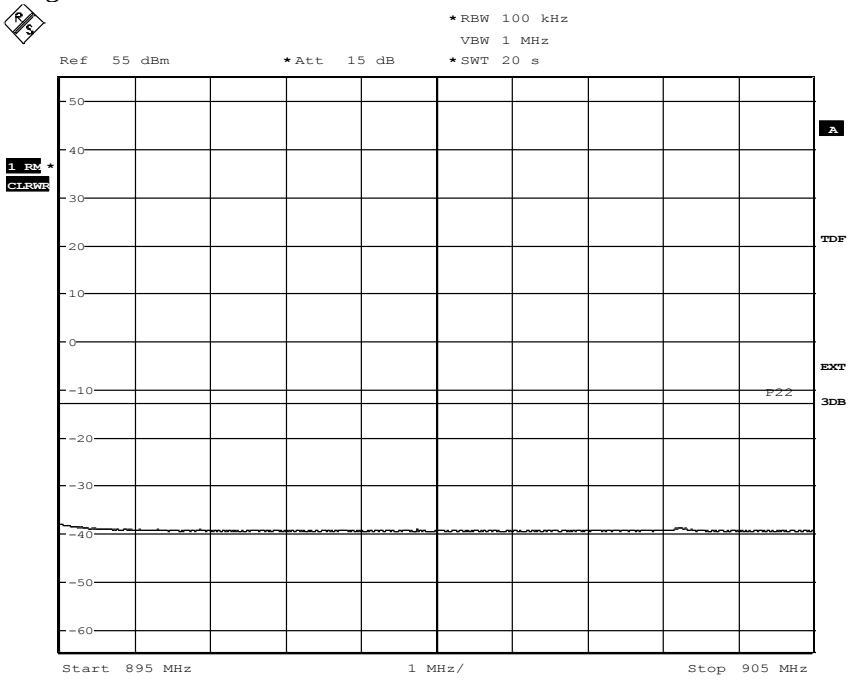
Diagram 3-2



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FCC ID: TA8AKRC11870-2 Appendix 4.1
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Diagram 4-1

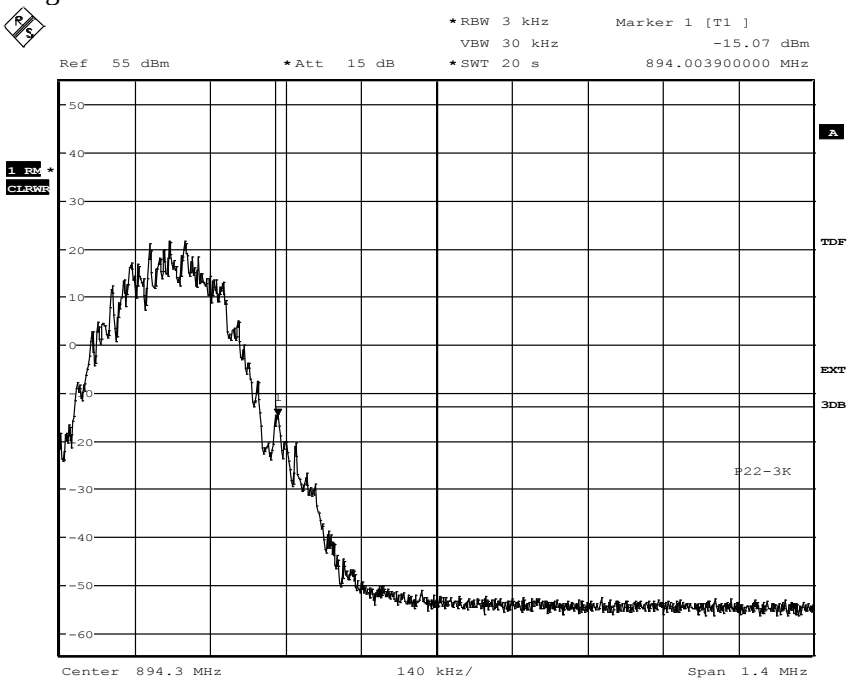

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Diagram 4-2

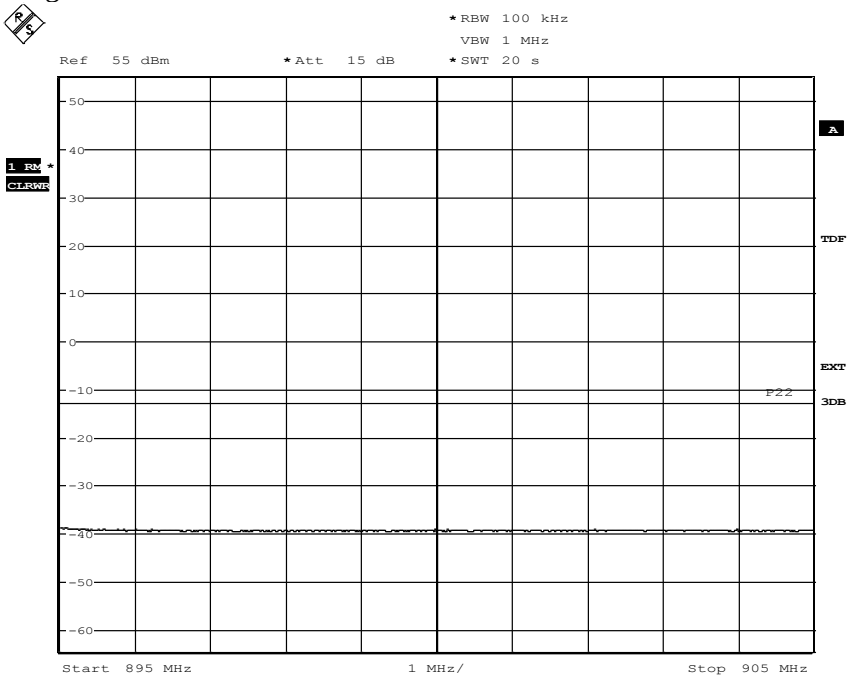

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Diagram 5-1

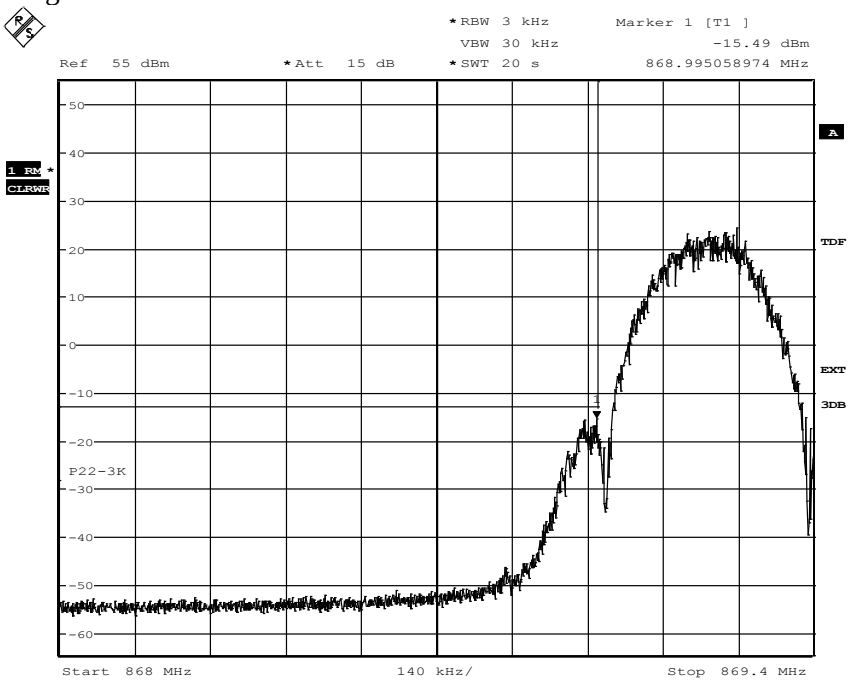

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Diagram 5-2

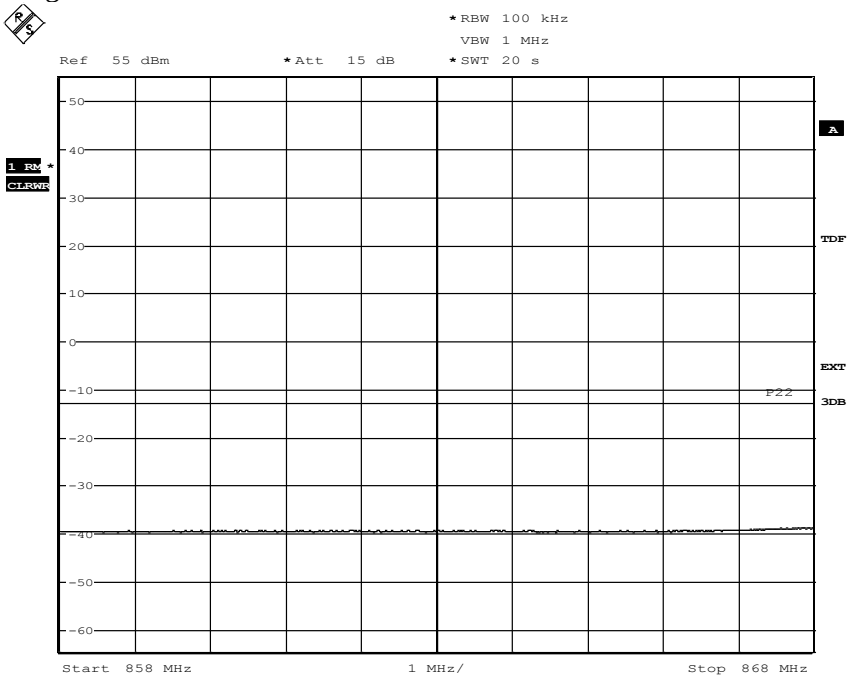

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Diagram 6-1

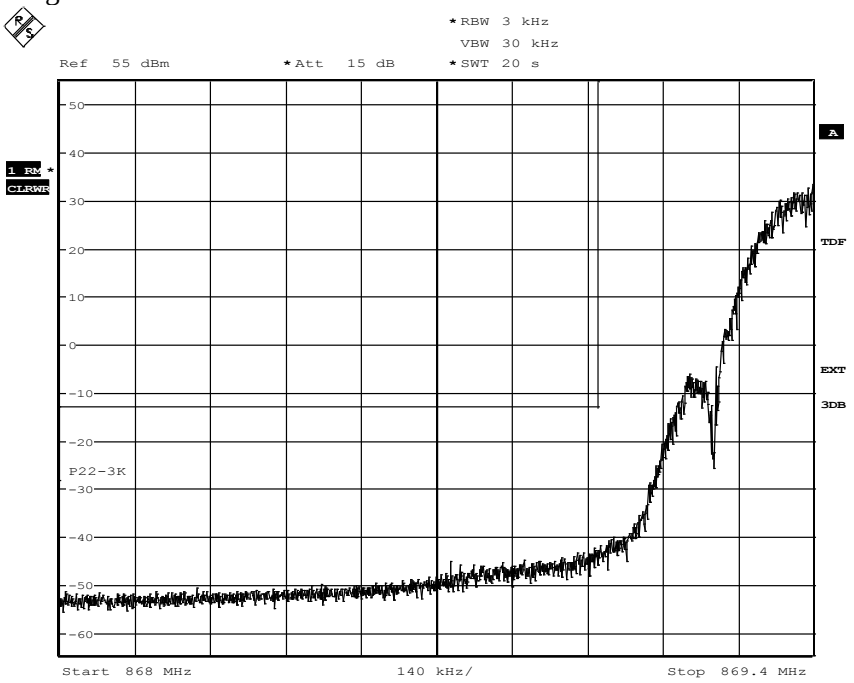

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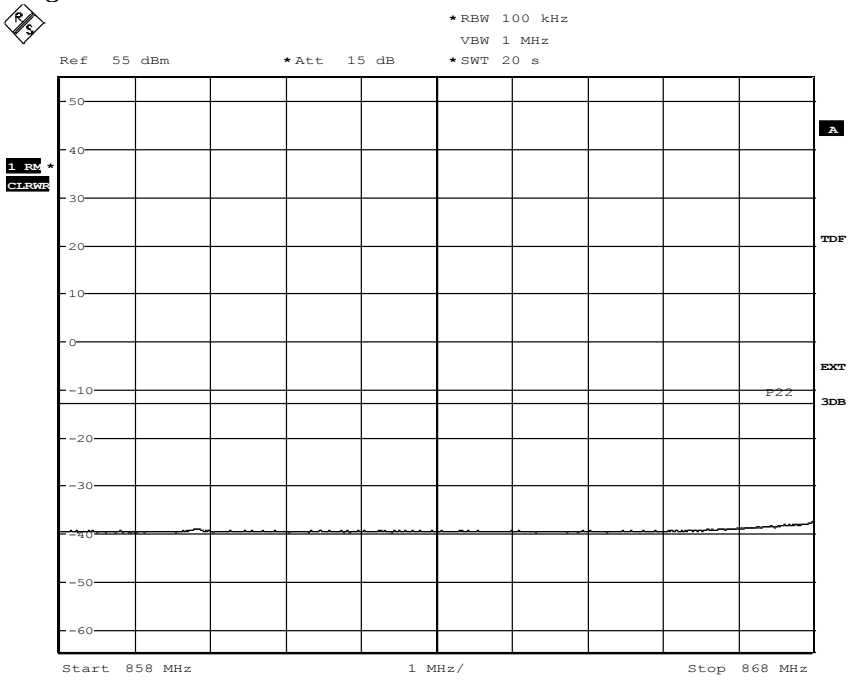
Diagram 6-2



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FCC ID: TA8AKRC11870-2 Appendix 4.1
IC: 287AB-AS118702

Diagram 7-1

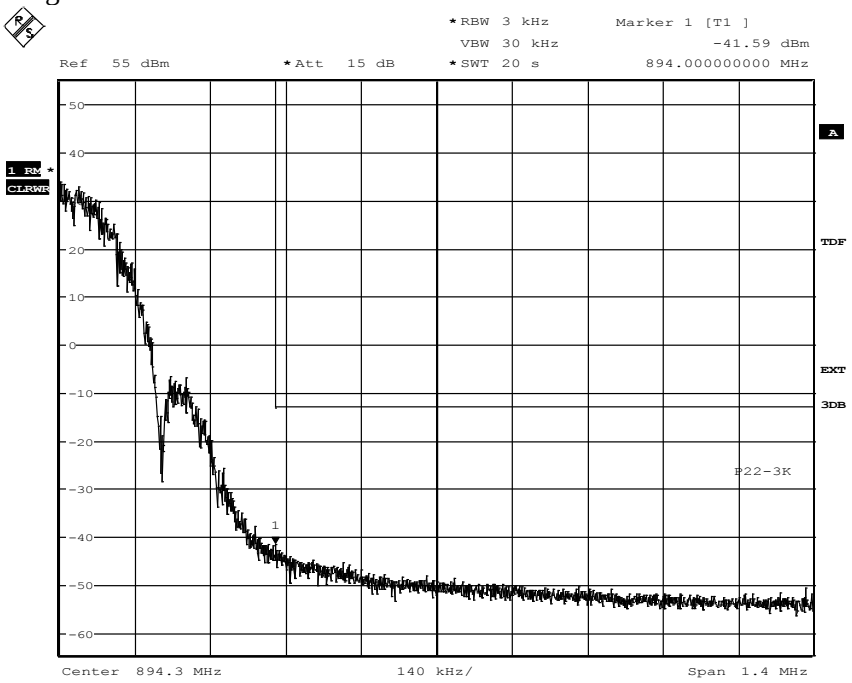

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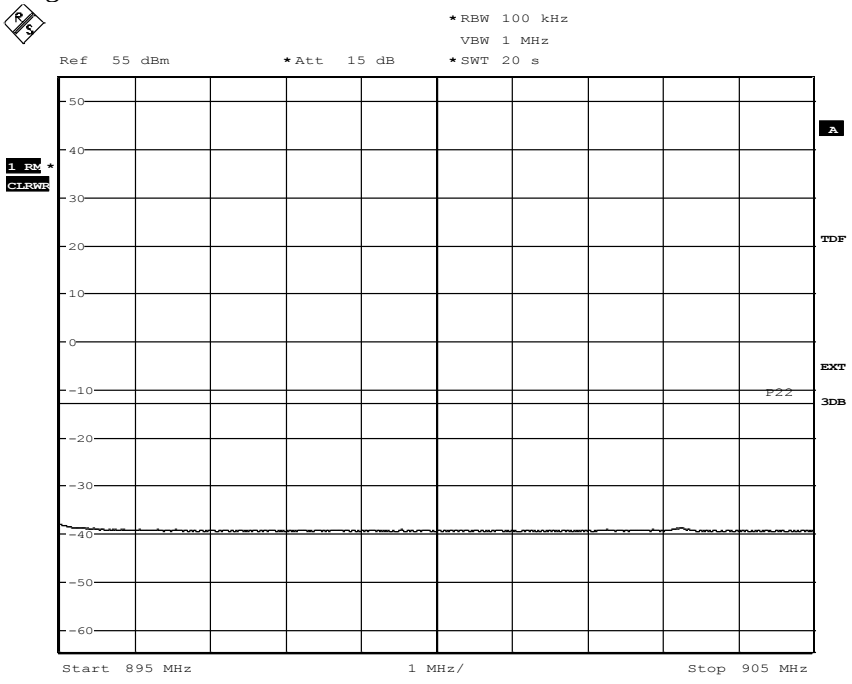
Diagram 7-2



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FCC ID: TA8AKRC11870-2 Appendix 4.1
IC: 287AB-AS118702

Diagram 8-1

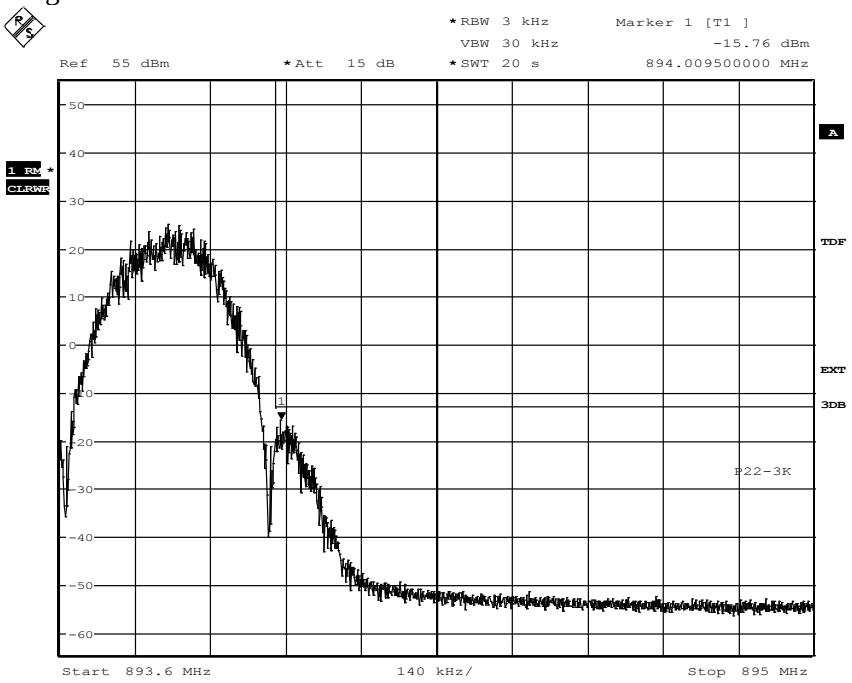

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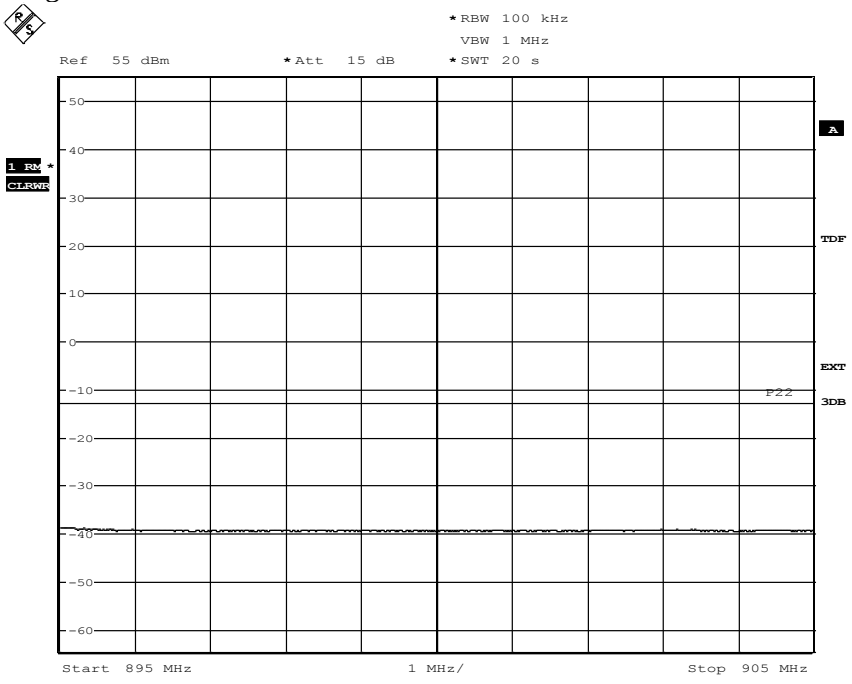
Diagram 8-2



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FCC ID: TA8AKRC11870-2
IC: 287AB-AS118702

Appendix 5

Conducted spurious emission measurements according to 47 CFR 2.1051/ RSS-132 4.5

Date	Temperature	Humidity
2010-10-27 to 2010-11-22	22-23 °C ± 3 °C	32-37 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §22.917. The output was connected to a spectrum analyzer. First a pre-measurement with activated peak detector was performed. An emission close to or above the limit is measured with activated RMS detector and the RMS measurement result is noted. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements.

Measurement equipment	SP number
R&S FSQ	504 143
High pass filter	503 739
Testo 635, Temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 5.1

Single carrier

Channel	GMSK	8-PSK
B:	Diagram 1	Diagram 4
M:	Diagram 2	Diagram 5
T:	Diagram 3	Diagram 6

Multi carrier (2 carriers):

Channels	GMSK	8-PSK
B+(B+10):	Diagram 7	Diagram 9
T+(T-10):	Diagram 8	Diagram 10

Multi carrier (4 carriers):

Channels	GMSK	8-PSK
B+(B+5)+(B+10)+(B+15):	Diagram 11	Diagram 13
T+(T-5)+(T-10)+(T-15):	Diagram 12	Diagram 14

Remarks

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 measurements in the frequency range 859 to 904 MHz are not intended to show compliance at band edges, the purpose of these measurements is to check that no intermodulation products are above the spurious emission limits. Band edge measurements are reported in appendix 4.

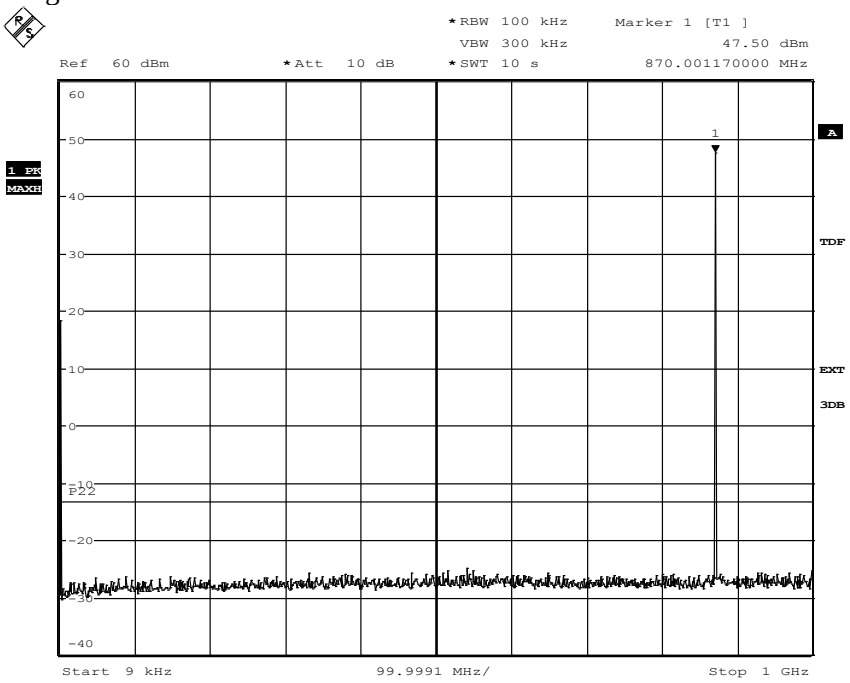
Limits

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

Complies?	Yes

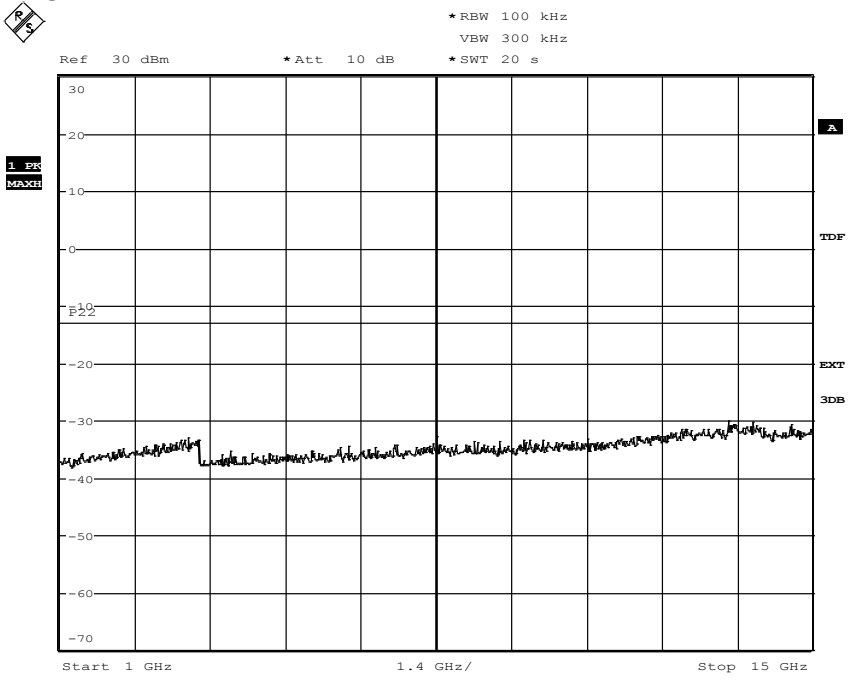
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 1-1



Date: 27.OCT.2010 10:58:45

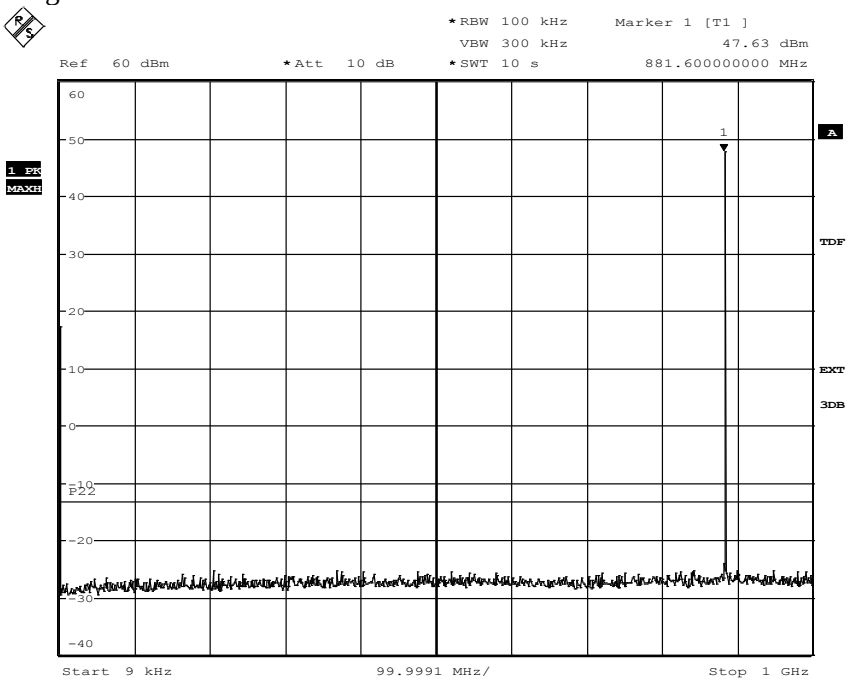
Diagram 1-2



Date: 27.OCT.2010 12:51:55

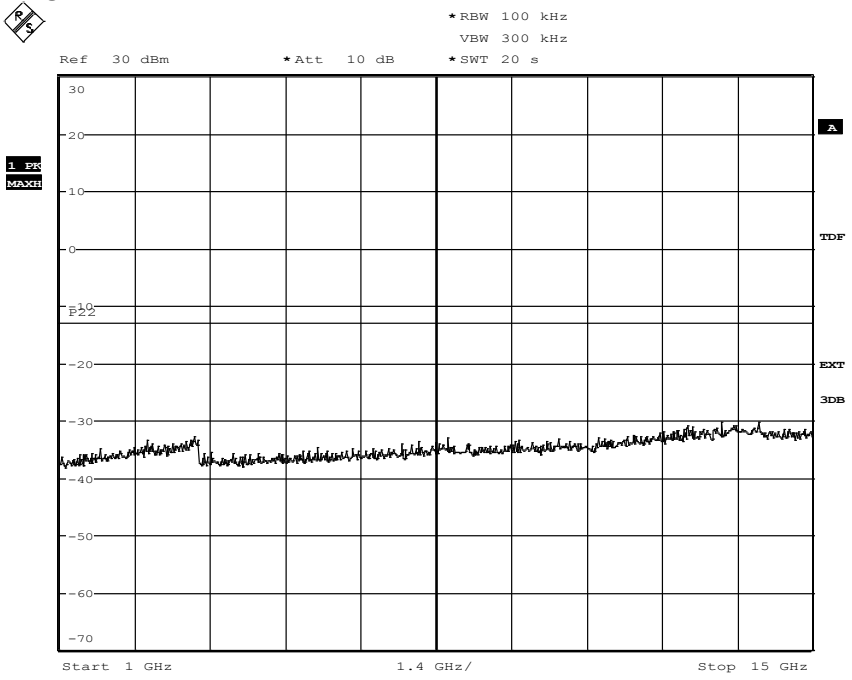
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 2-1



Date: 27.OCT.2010 12:25:16

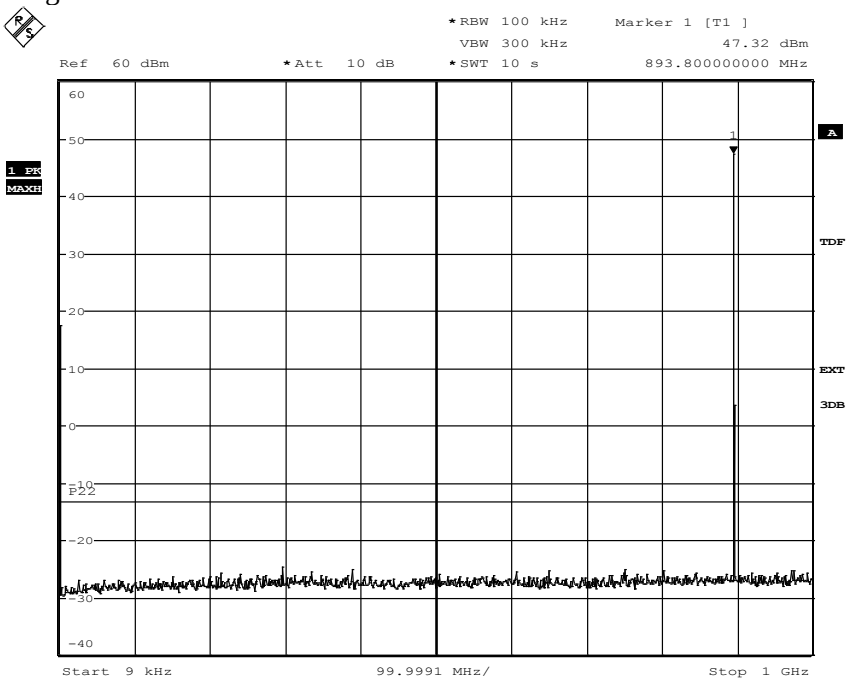
Diagram 2-2



Date: 27.OCT.2010 12:48:54

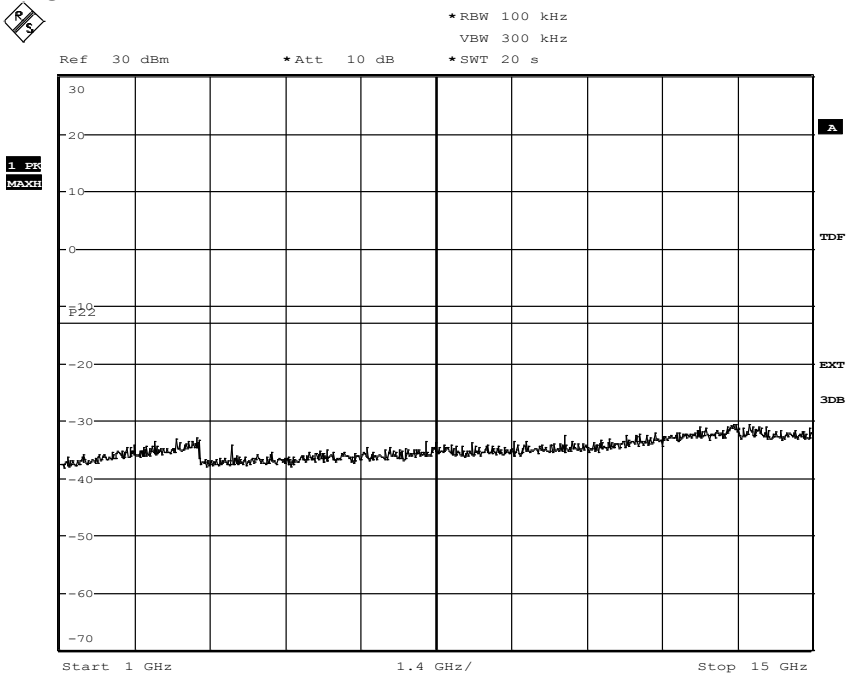
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 3-1



Date: 27.OCT.2010 12:27:13

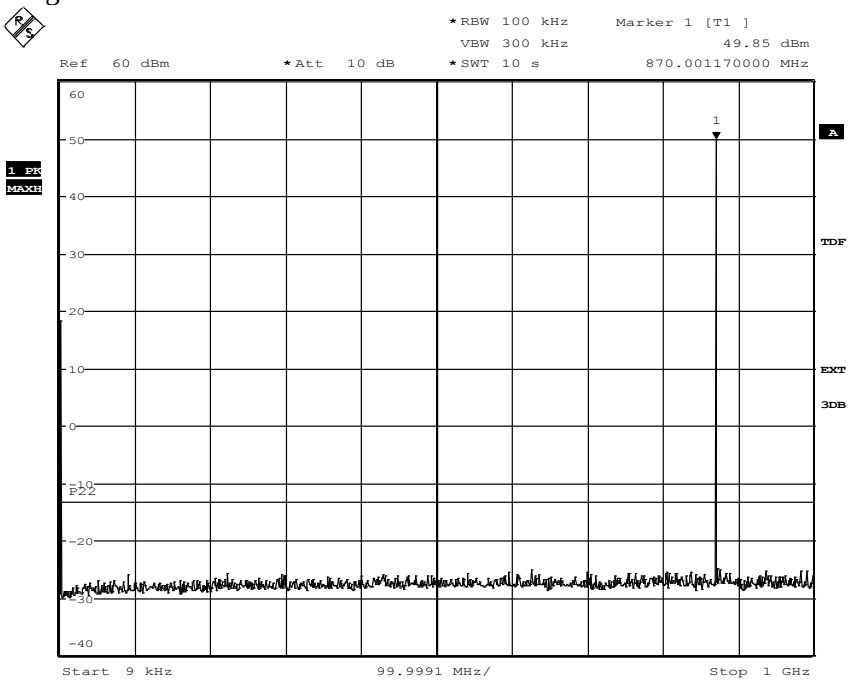
Diagram 3-2



Date: 27.OCT.2010 12:42:31

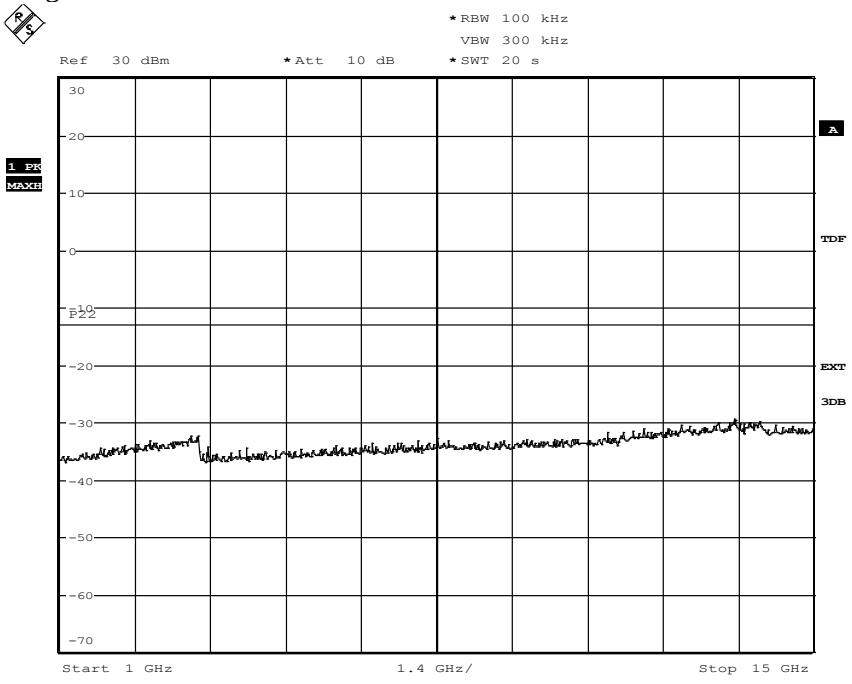
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 4-1



Date: 27.OCT.2010 10:59:57

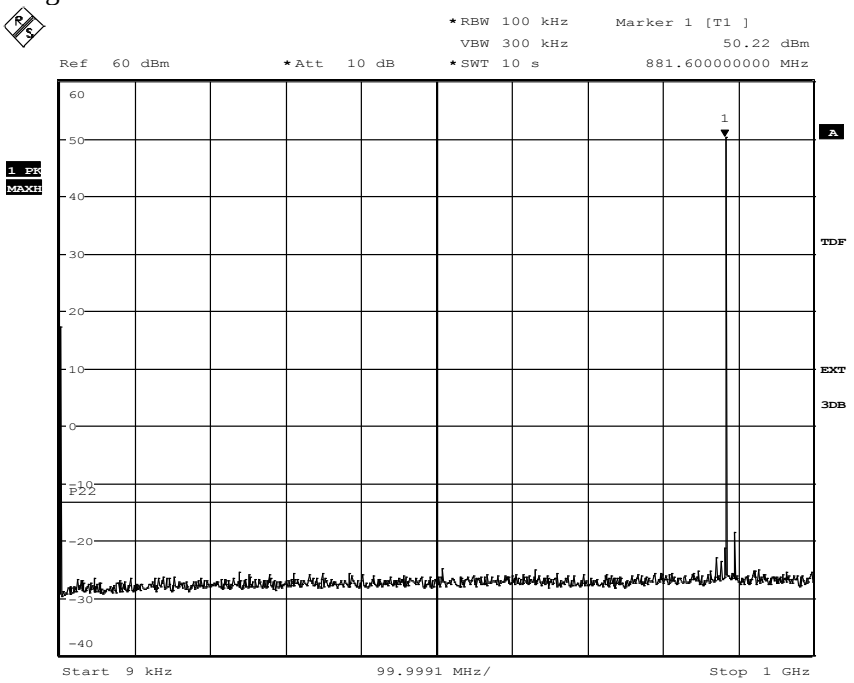
Diagram 4-2



Date: 27.OCT.2010 13:15:29

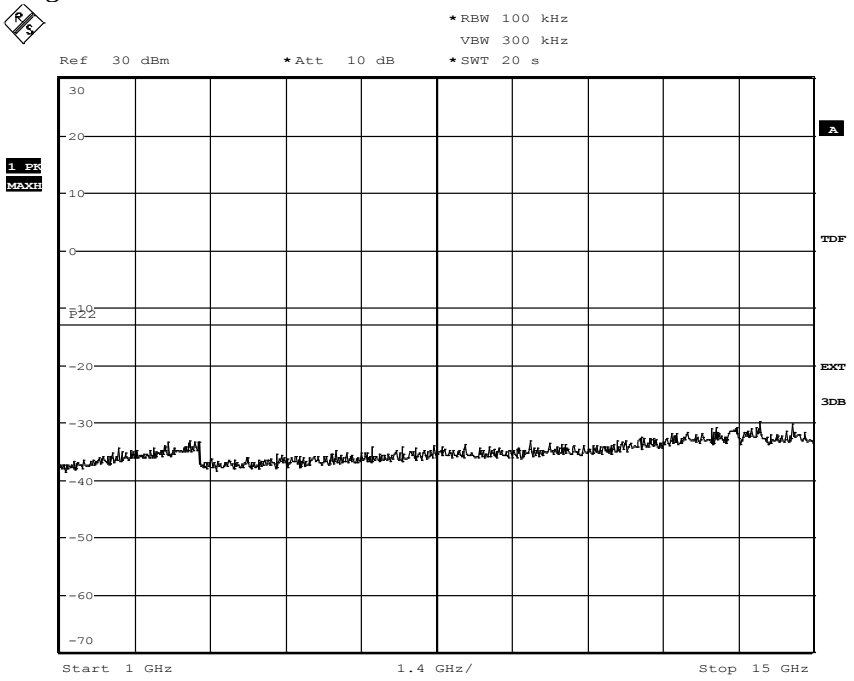
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 5-1



Date: 27.OCT.2010 12:18:59

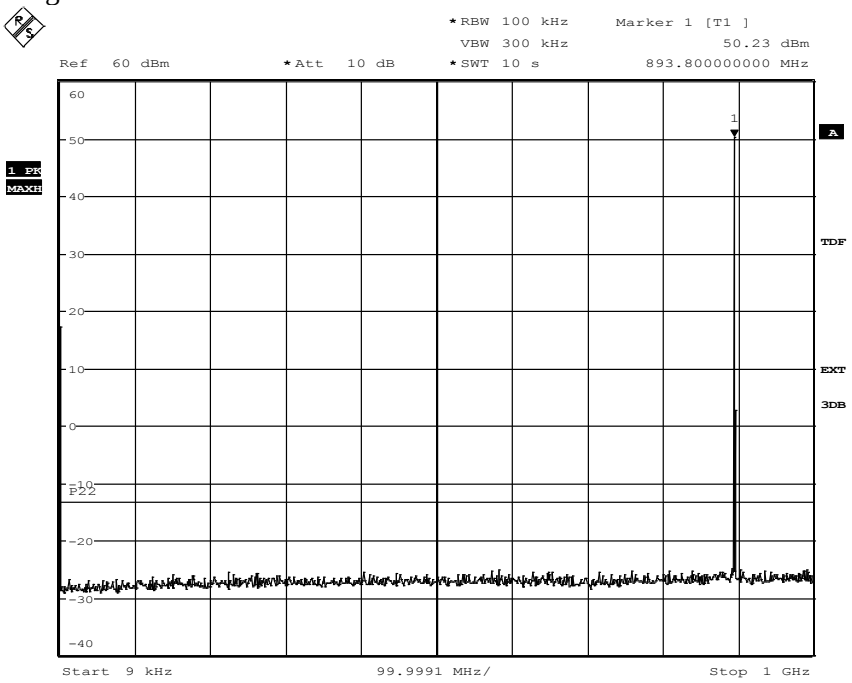
Diagram 5-2



Date: 27.OCT.2010 12:46:43

FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

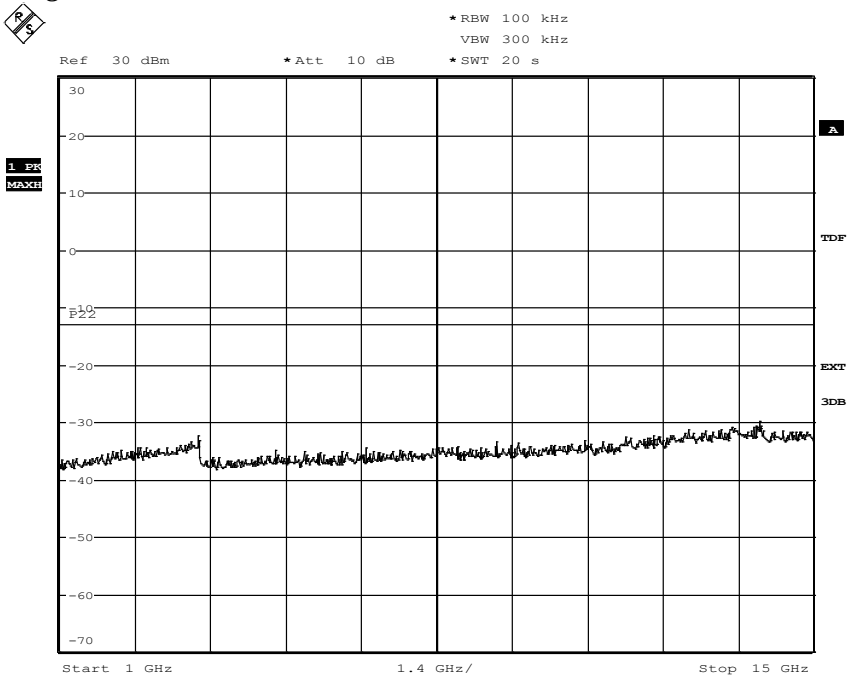
Diagram 6-1



Date: 27.OCT.2010 12:32:52

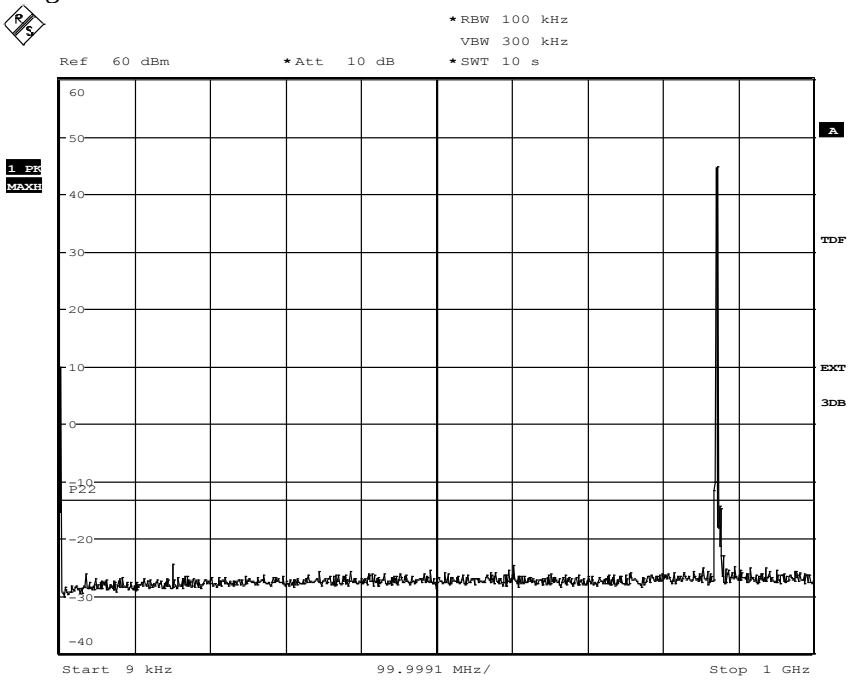
The emissions around the carriers are within the operating frequency band

Diagram 6-2



Date: 27.OCT.2010 12:44:42

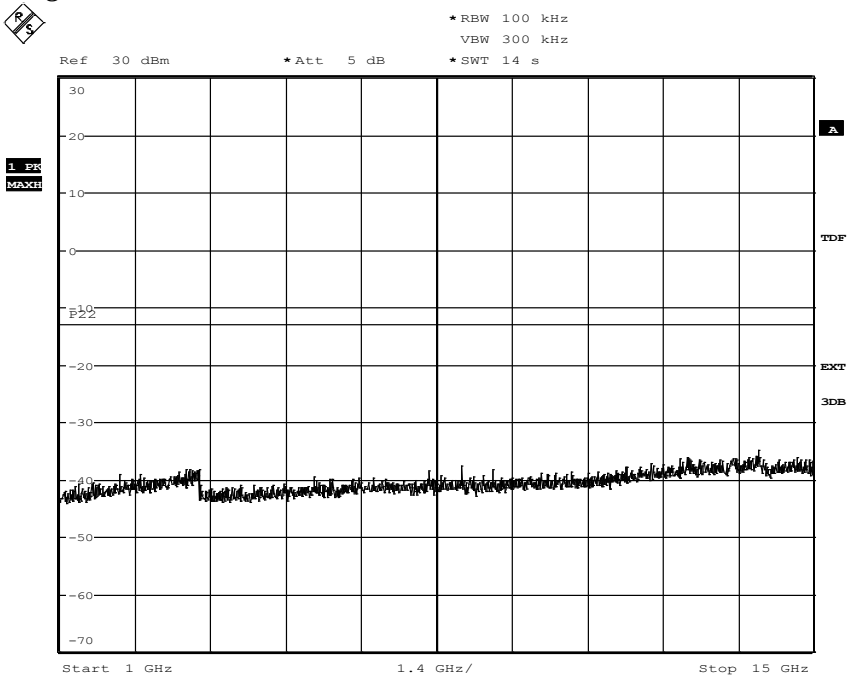
Diagram 7-1



Date: 15.NOV.2010 18:25:17

The emissions around the carriers are within the operating frequency band

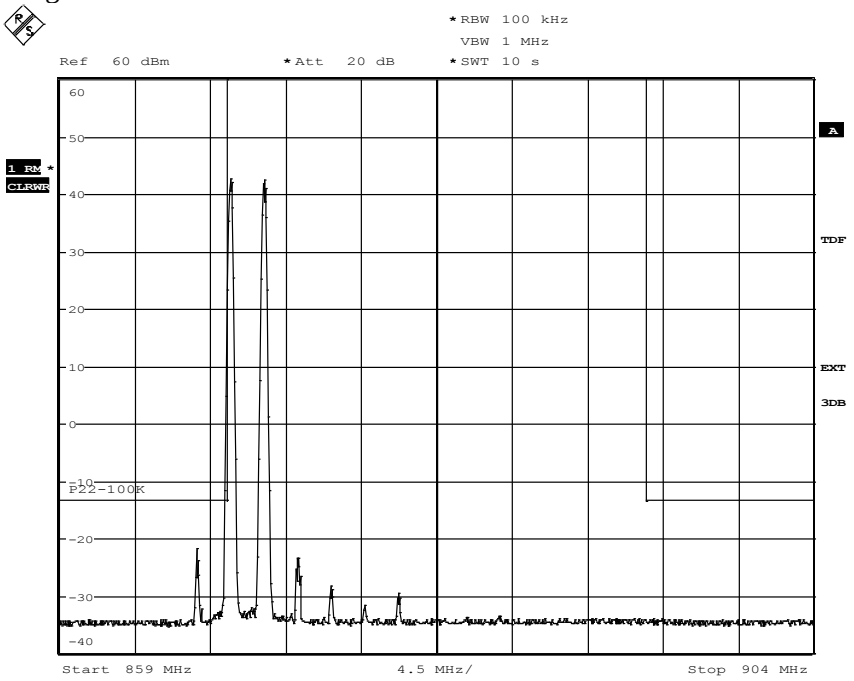
Diagram 7-2



Date: 16.NOV.2010 15:13:26

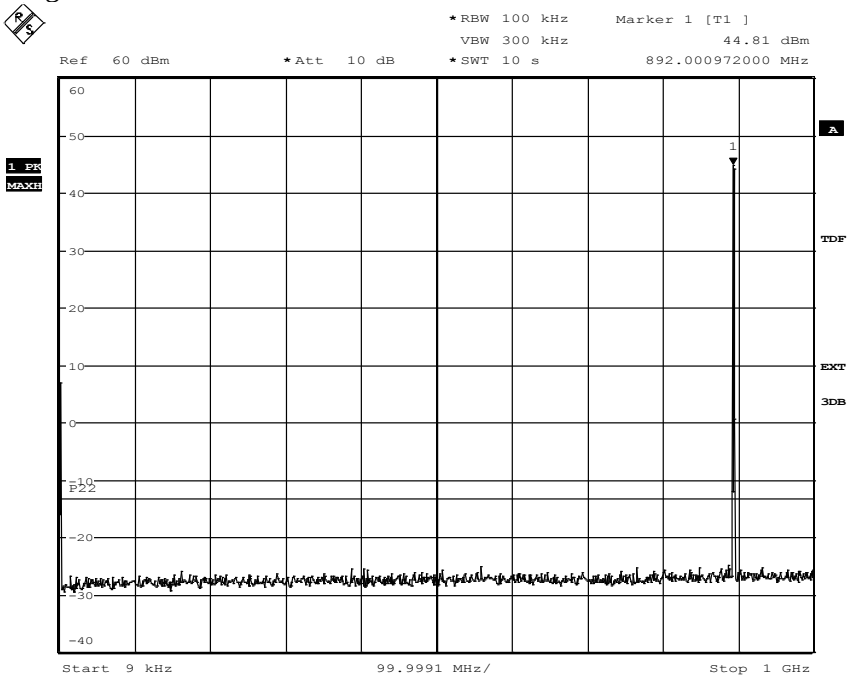
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 7-3



Date: 16.NOV.2010 09:45:28

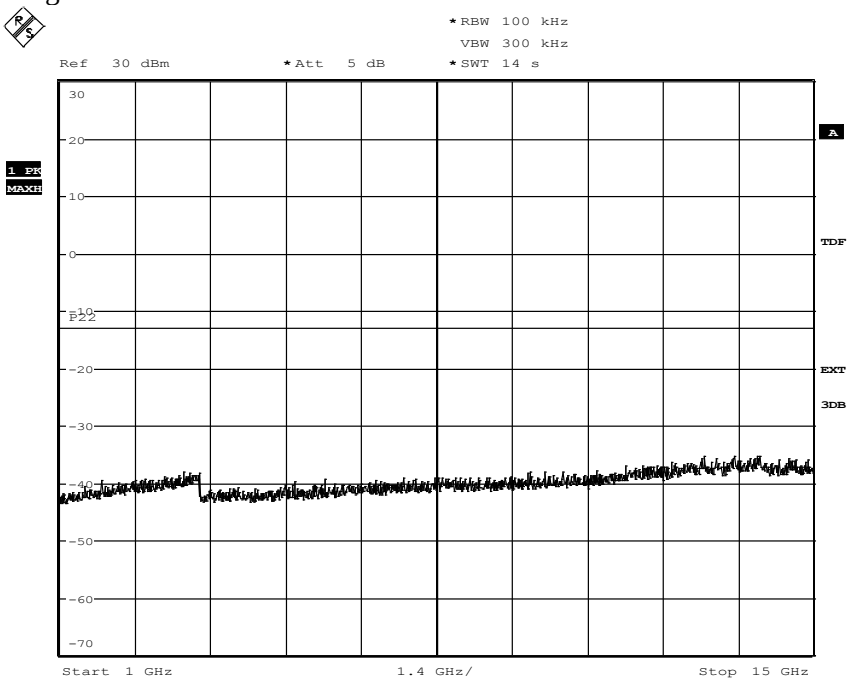
Diagram 8-1



Date: 16.NOV.2010 14:38:43

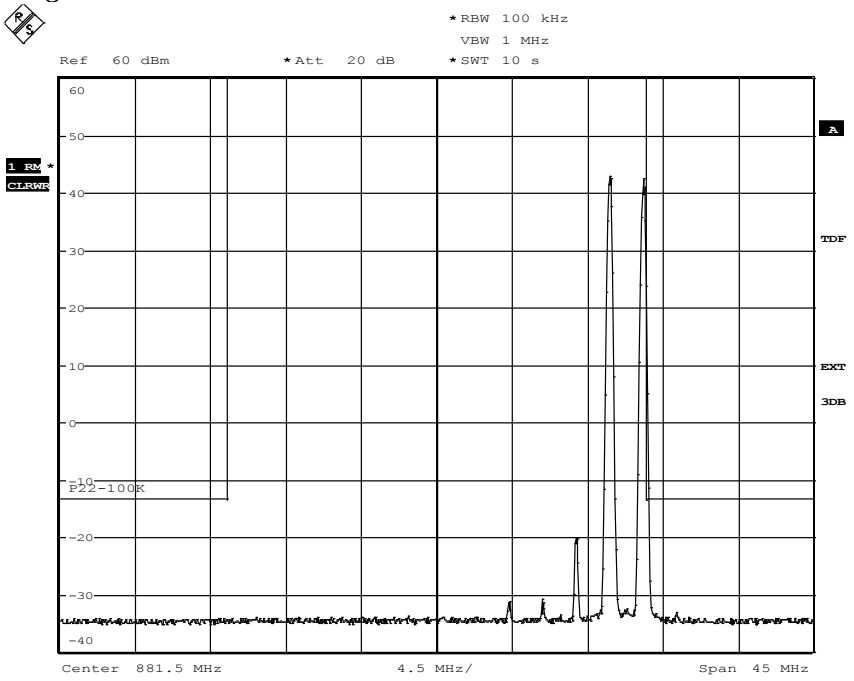
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 8-2



Date: 16.NOV.2010 14:55:17

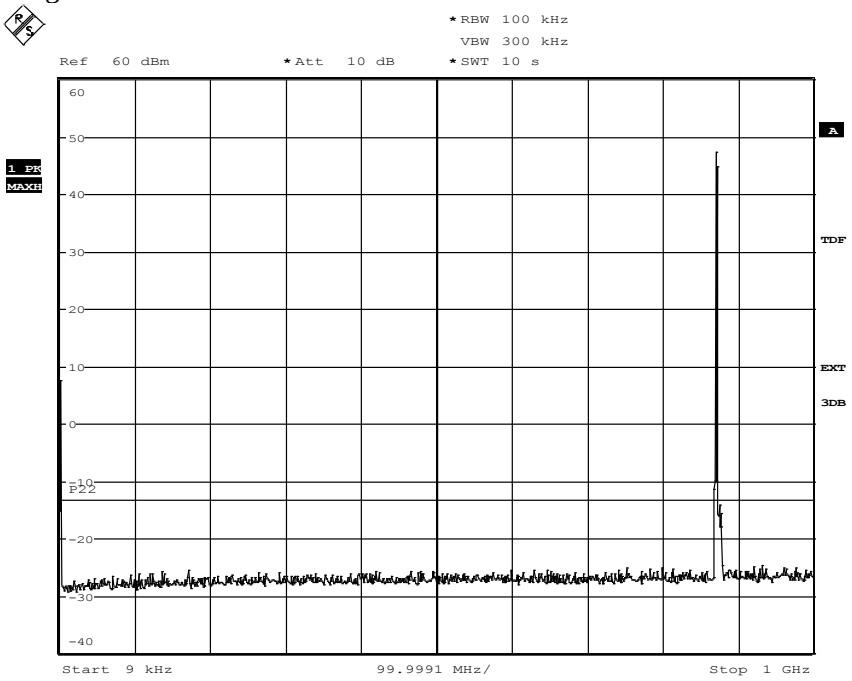
Diagram 8-3



Date: 16.NOV.2010 14:36:50

FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

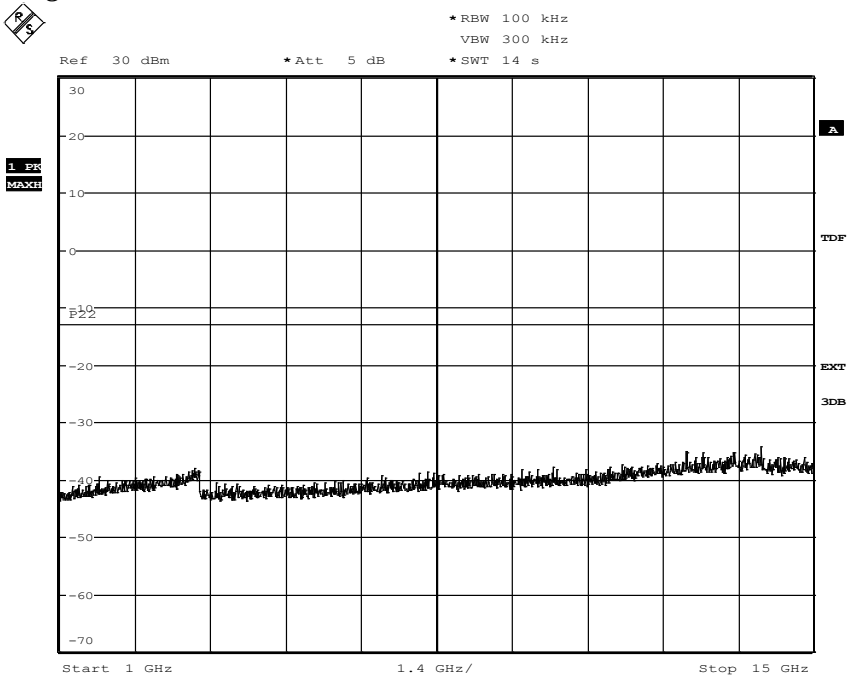
Diagram 9-1



Date: 15.NOV.2010 18:34:47

The emissions around the carriers are within the operating frequency band

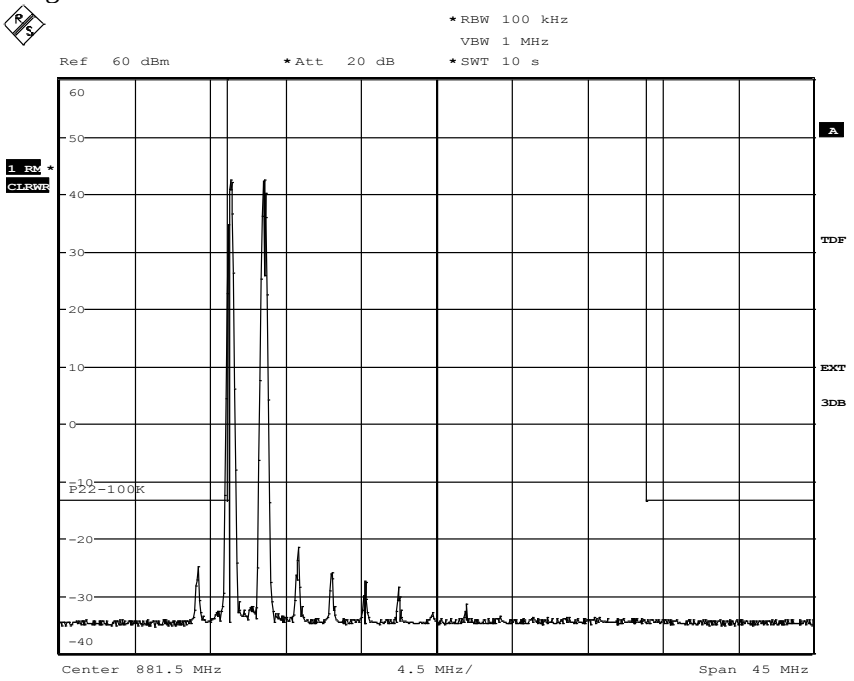
Diagram 9-2



Date: 16.NOV.2010 15:15:38

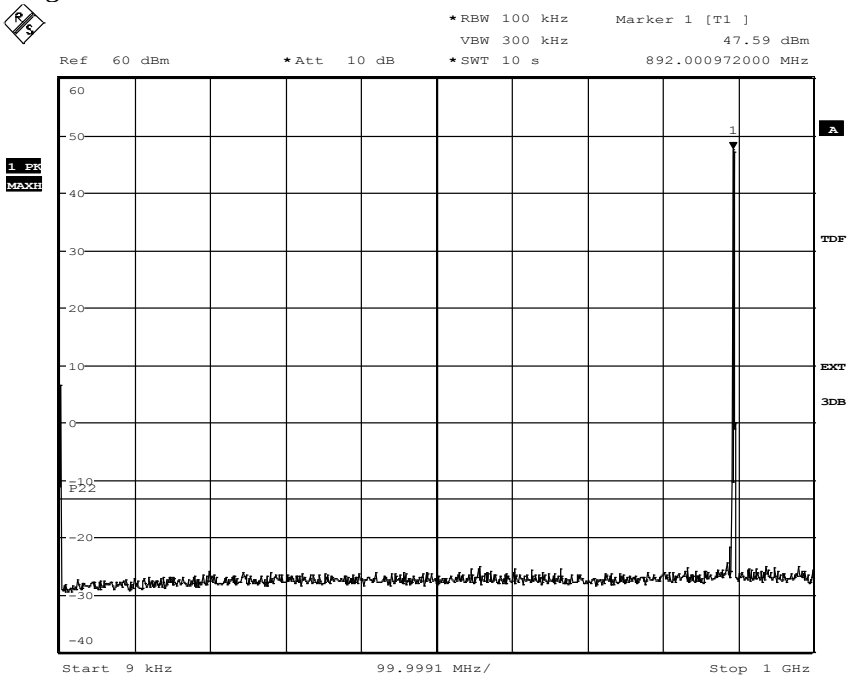
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 9-3



Date: 16.NOV.2010 11:00:34

Diagram 10-1

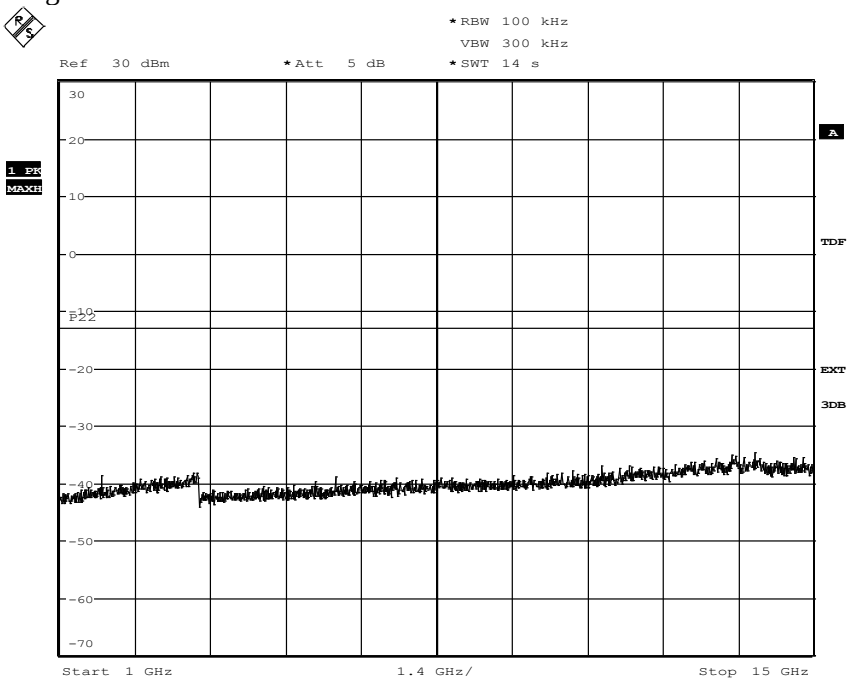


Date: 16.NOV.2010 14:49:31

The emissions around the carriers are within the operating frequency band

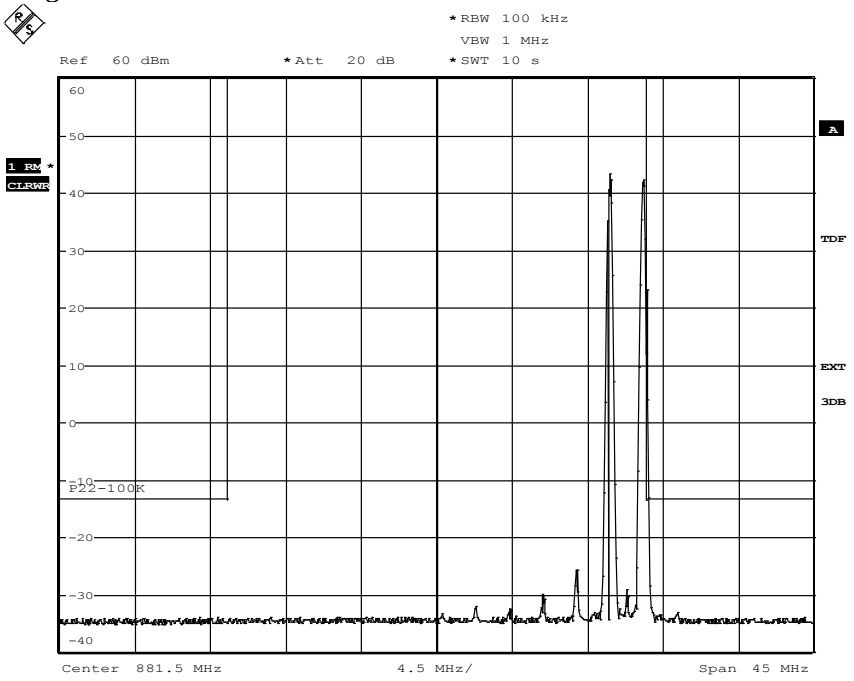
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 10-2



Date: 16.NOV.2010 14:53:28

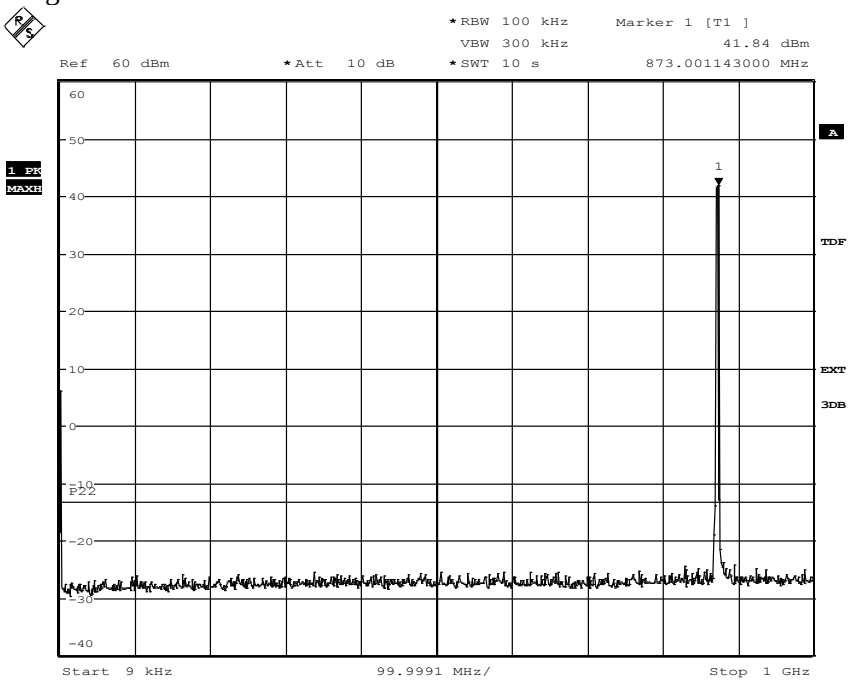
Diagram 10-3



Date: 16.NOV.2010 13:04:16

FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

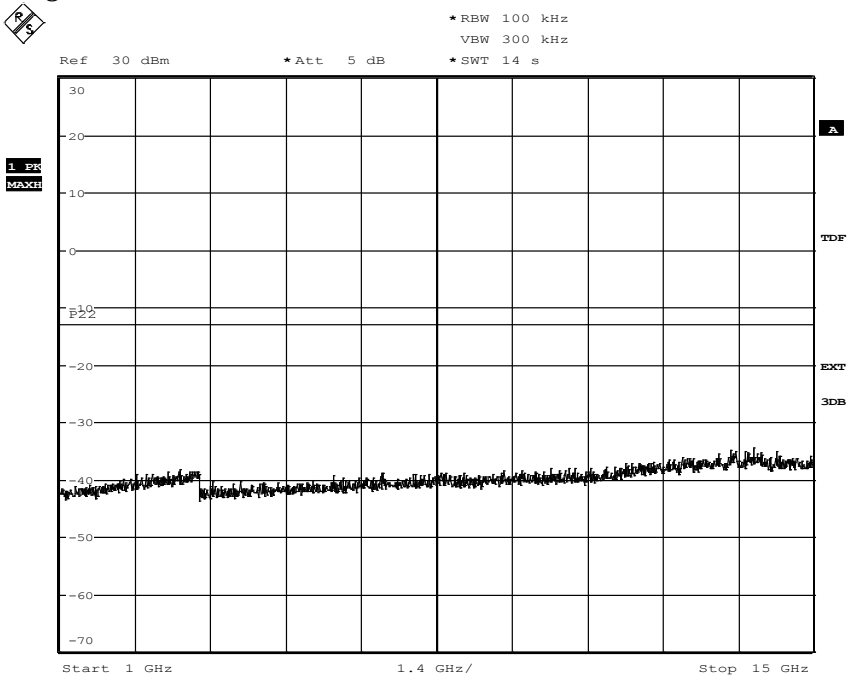
Diagram 11-1



Date: 17.NOV.2010 14:46:48

The emissions around the carriers are within the operating frequency band

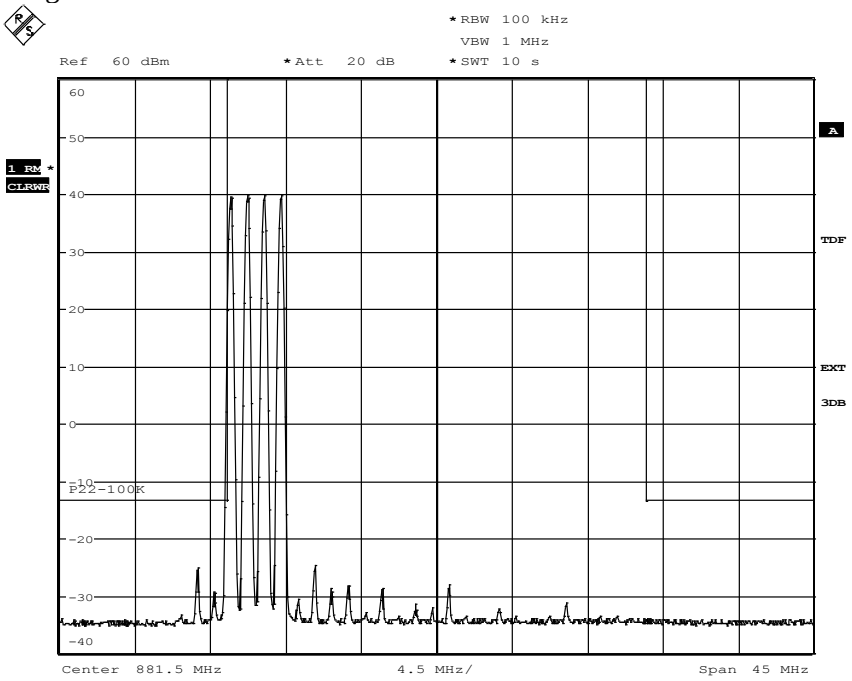
Diagram 11-2



Date: 17.NOV.2010 14:52:53

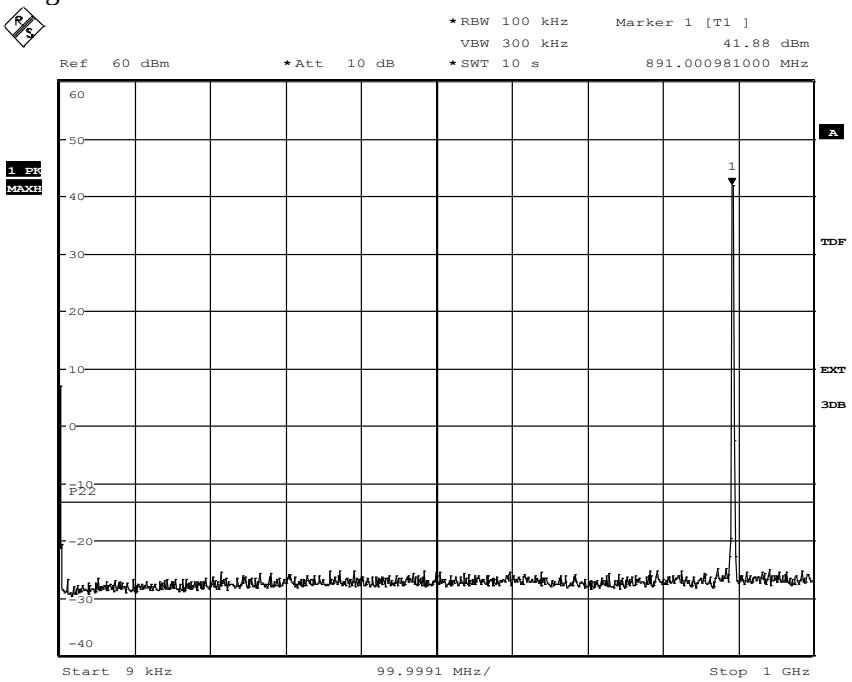
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 11-3



Date: 17.NOV.2010 13:38:22

Diagram 12-1

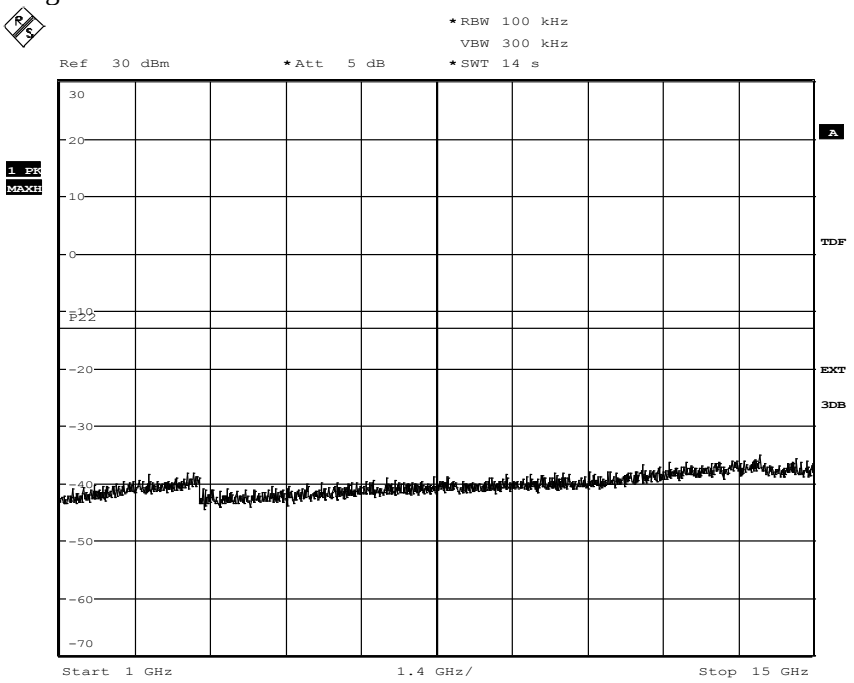


Date: 17.NOV.2010 10:23:38

The emissions around the carriers are within the operating frequency band

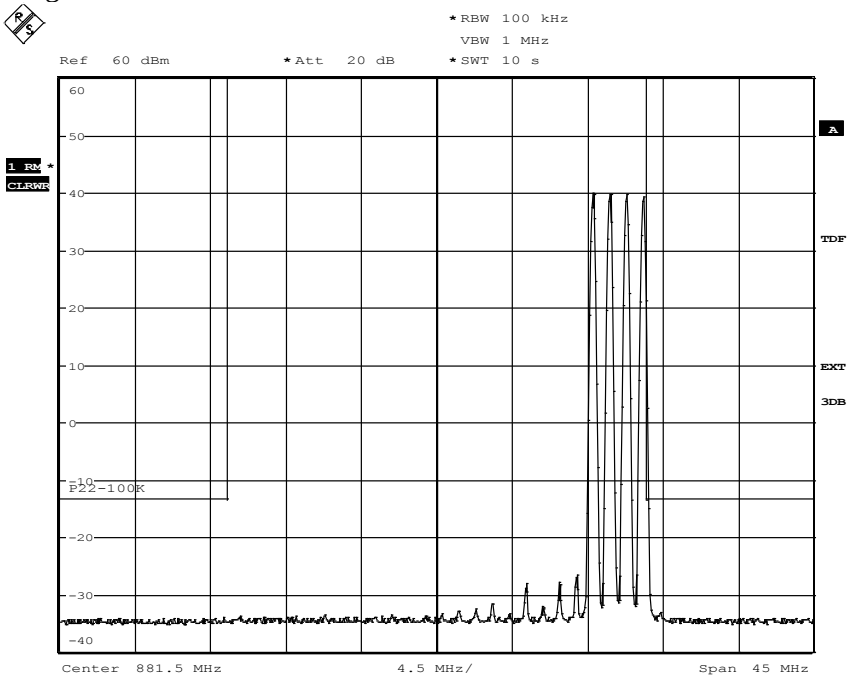
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 12-2



Date: 17.NOV.2010 11:20:03

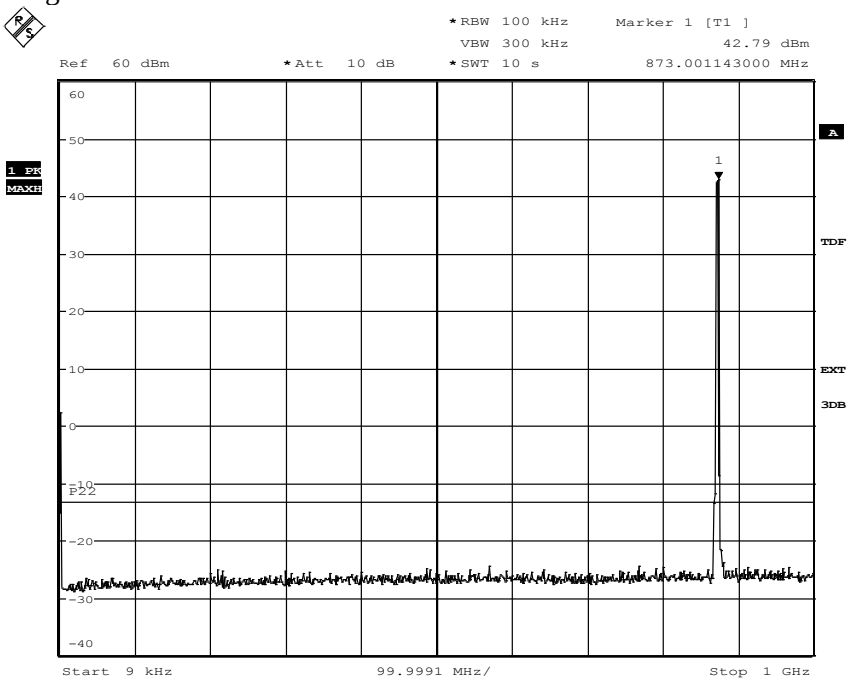
Diagram 12-3



Date: 17.NOV.2010 10:18:16

FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

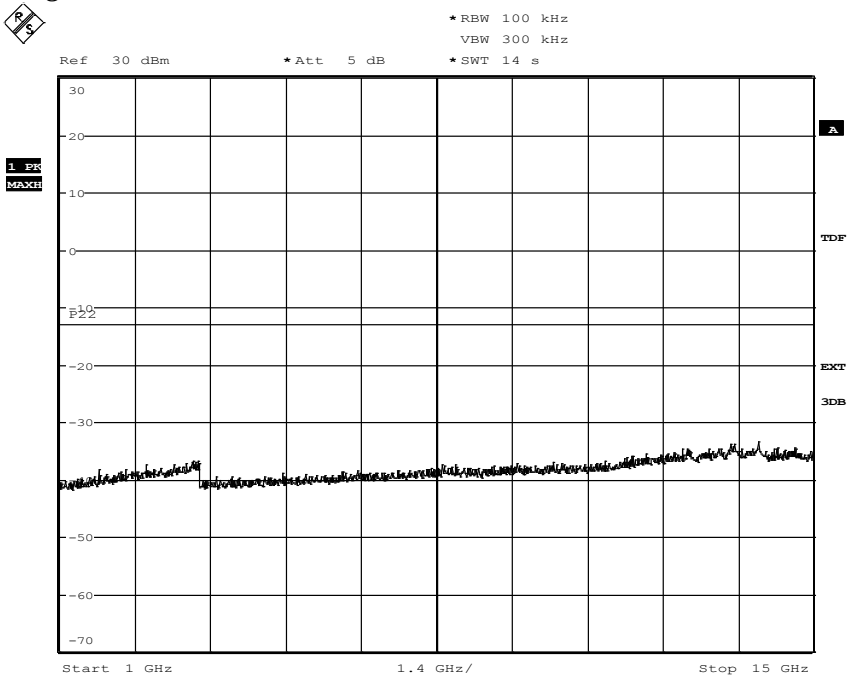
Diagram 13-1



Date: 17.NOV.2010 16:50:05

The emissions around the carriers are within the operating frequency band

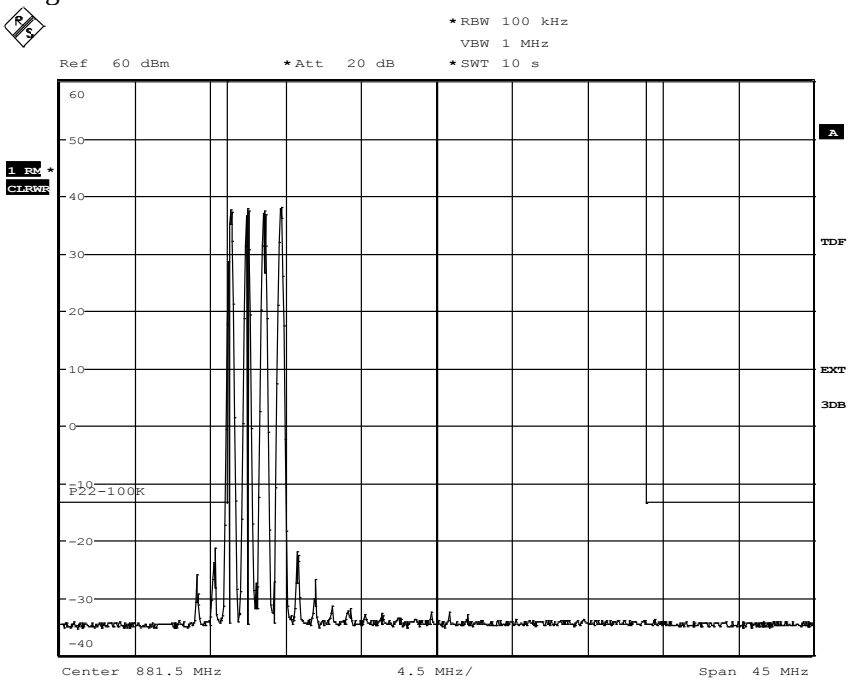
Diagram 13-2



Date: 17.NOV.2010 16:45:27

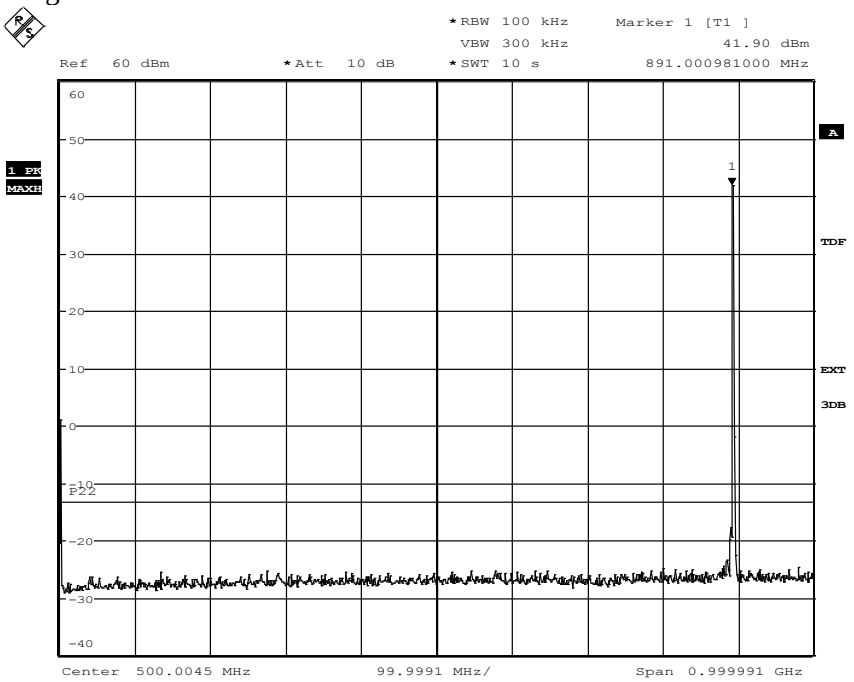
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 13-3



Date: 17.NOV.2010 16:46:47

Diagram 14-1

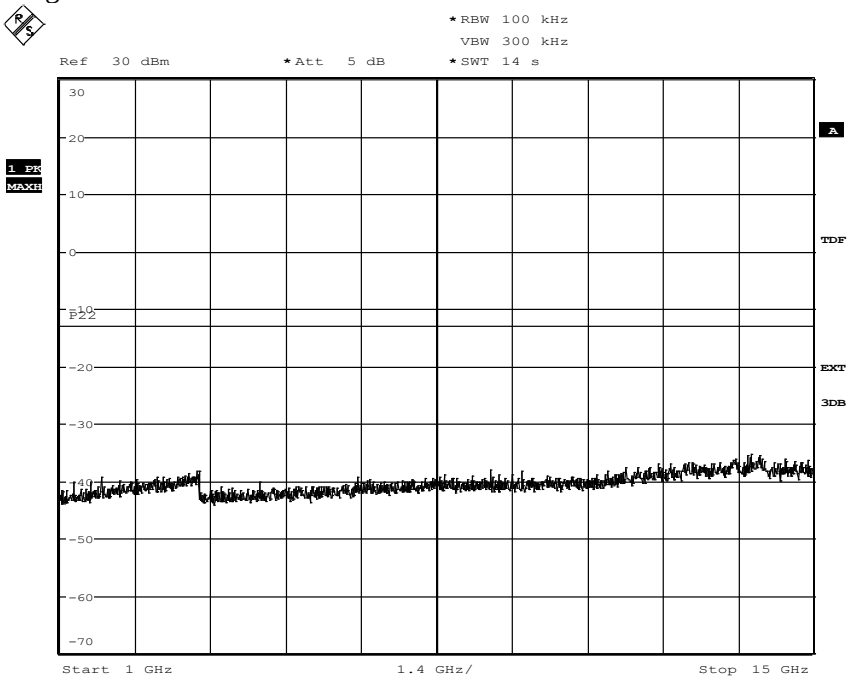


Date: 22.NOV.2010 14:04:02

The emissions around the carriers are within the operating frequency band

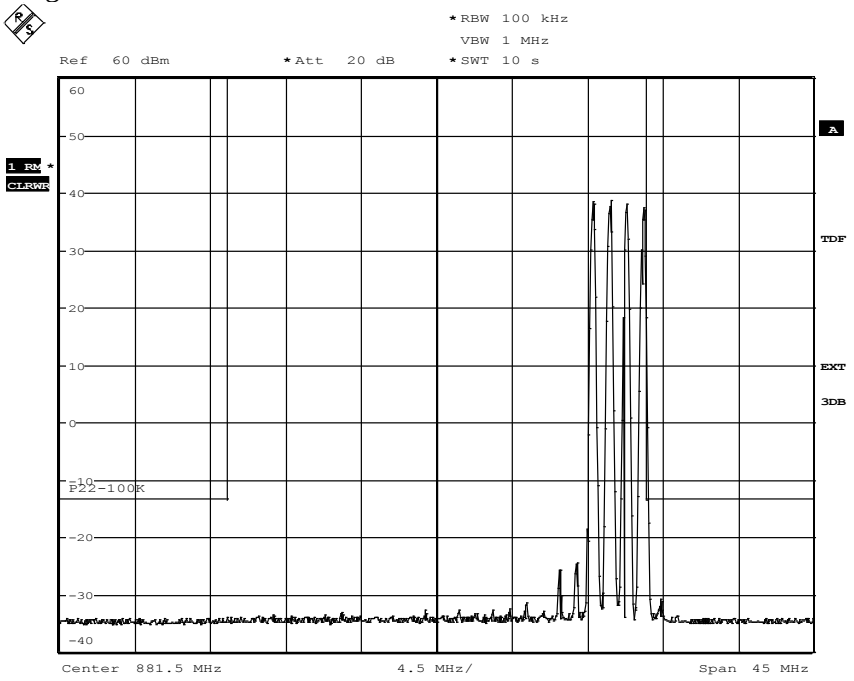
FCC ID: TA8AKRC11870-2 Appendix 5.1
IC: 287AB-AS118702

Diagram 14-2



Date: 17.NOV.2010 12:48:26

Diagram 14-3



Date: 17.NOV.2010 12:50:52

FCC ID: TA8AKRC11870-2
IC: 287AB-AS118702

Appendix 6

Field strength of spurious radiation measurements according to 47 CFR 2.1053/ RSS-132 4.5

Date	Temperature	Humidity
2010-10-29 to 2010-11-01	22-23 °C ± 3 °C	48 % ± 5 % to 54 % ± 5 %

Test set-up and procedure

The test site is listed at FCC, Columbia with registration number: 93866. The test site also complies with RSS-Gen, Industry Canada file no.:IC 3482A-1.
The antenna port "RF A" was connected to functional test equipment outside the test chamber for signal monitoring. Antenna port "RF B" was terminated with a 50 ohm load.

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

1. A pre-measurement was first performed:
2. In the frequency range 30 MHz-15 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.
3. The measurement procedure was as the following:
4. 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.
5. Spurious radiation on frequencies closer than 20 dB to the limit is scanned 0-360 degrees and the antenna is scanned 1-4 m for maximum response. The emission is then measured with the RMS detector and the RMS value is reported, frequencies closer than 10 dB to the limit measured with the RMS detector were measured with the substitution method according to the standard.

Measurement equipment	SP number
Semi anechoic chamber	503 881
R&S ESI 26	503 292
Software: R&S EMC 32, ver.8.20.1	503 745
Chase Bilog Antenna CBL 6111A	503 182
EMCO Horn Antenna 3115	502 175
MITEQ Low Noise Amplifier	504 160
HP 1-15 GHz	504 199
Testo 625, Temperature and humidity meter	504 188

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

Results

Frequency (MHz)	Spurious emission level (dBm)	
	Vertical	Horizontal
30-15 000	All emission > 20 dB below limit	All emission > 20 dB below limit
Measurement uncertainty 4.7 dB		

Limits

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

Complies?	Yes

FCC ID: TA8AKRC11870-2
IC: 287AB-AS118702

Appendix 7

Frequency stability according to 47 CFR 2.1055/ RSS-132 4.3

Date	Temperature (test equipment)	Humidity (test equipment)
2010-10-28 to 2010-11-02	22-23°C ± 3 °C	30-43 % ± 5 %

Test set-up and procedure

The measurements were made per J-STD-007A Vol 1 (GMSK) and TIA/EIA-136-280-B (8-PSK).
The 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
R&S FSIQ 40	503 758
Testo 635, Temperature and humidity meter	504 203
Climate chamber 3	503 546

Results

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

Test conditions		Frequency error (Hz)	
Supply voltage DC (V)	T (°C)	GMSK	8-PSK
-48.0	+20	+5	-8
-55.2	+20	-5	-6
-40.8	+20	-4	+7
-48.0	+30	+4	+5
-48.0	+40	-4	-7
-48.0	+50	-4	-5
-48.0	+10	-4	+6
-48.0	0	-4	+6
-48.0	-10	+4	-7
-48.0	-20	+4	-6
-48.0	-30	+4	-6
Maximum freq. error (Hz)		5	8
Measurement uncertainty		$< \pm 1 \times 10^{-7}$	

Limits

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

Complies?	Yes

FCC ID: TA8AKRC11870-2
IC: 287AB-AS118702

Appendix 8

Receiver spurious emissions measurements according to 47 CFR 15.111/ IC RSS-132, section 4.6.

Date	Temperature	Humidity
2010-11-17	23°C ± 3 °C	32 % ± 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 FSQ 40	504 143
Testo 635, Temperature and humidity meter	504 203

Result

The results are shown in appendix 8.1:

	Channel
Diagram 1	B
Diagram 2	M
Diagram 3	T

Note: During the measurement on the RX port RF B the combined TX/RX port RF A was terminated into 50 ohm, the TX was active in single carrier mode transmitting GMSK modulation at maximum output power setting.

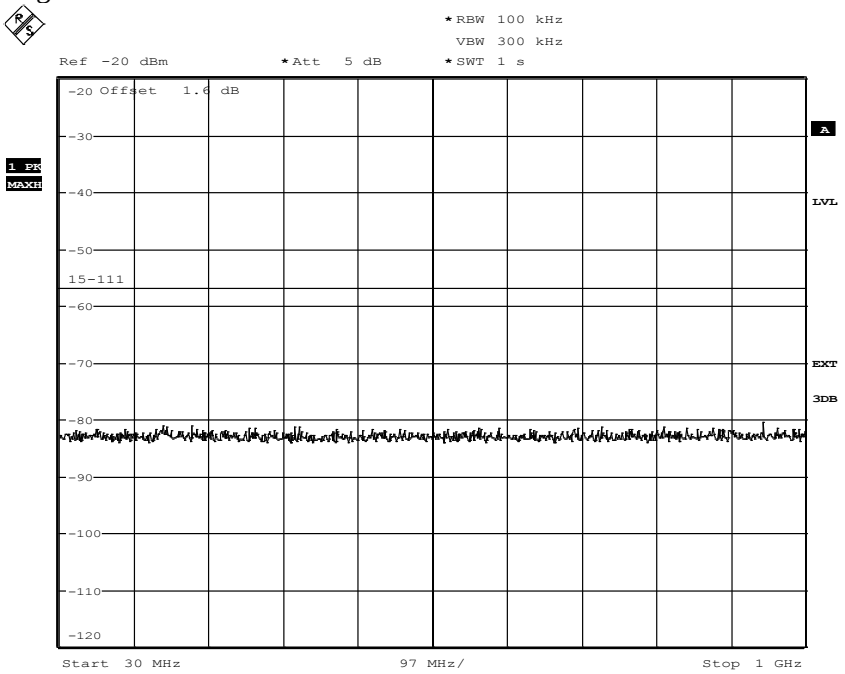
Limit

The power of any spurious output signals appearing at the antenna terminals must not exceed -57 dBm (2 nanowatt).

Emission below limit?	Yes

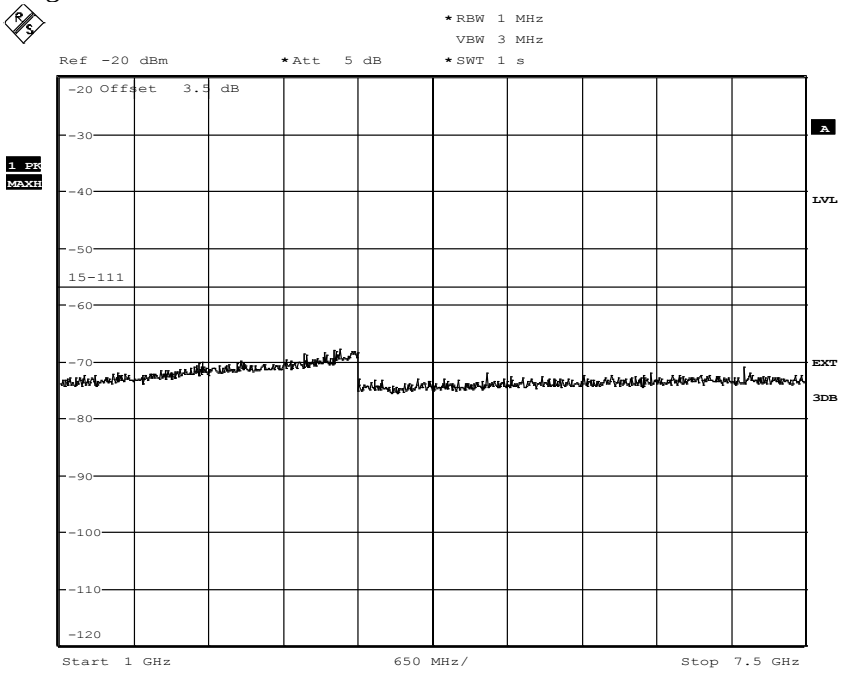
FCC ID: TA8AKRC11870-2 Appendix 8.1
IC: 287AB-AS118702

Diagram 1-1



Date: 17.NOV.2010 17:26:29

Diagram 1-2



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FCC ID: TA8AKRC11870-2 Appendix 8.1
IC: 287AB-AS118702

Diagram 2-1

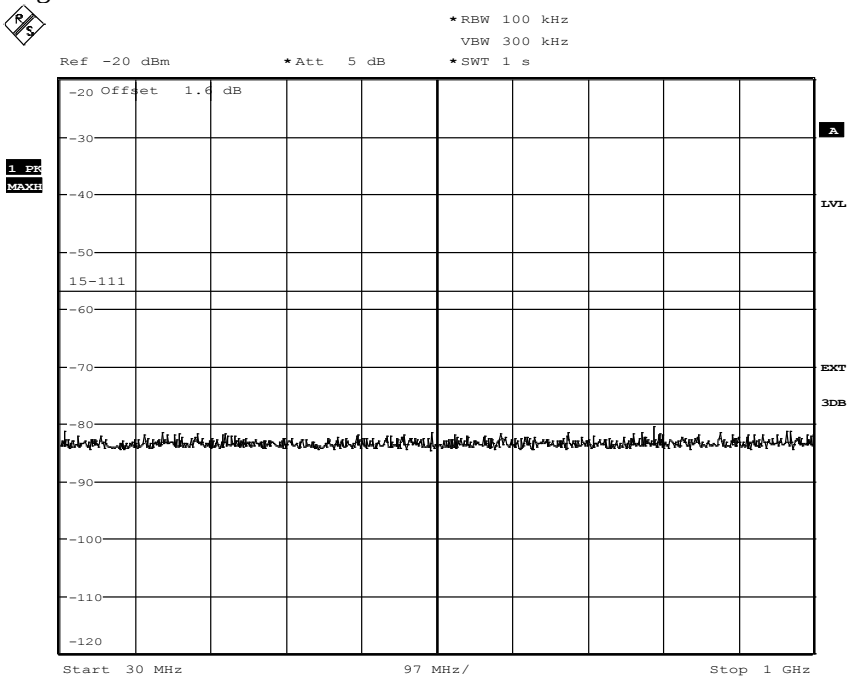

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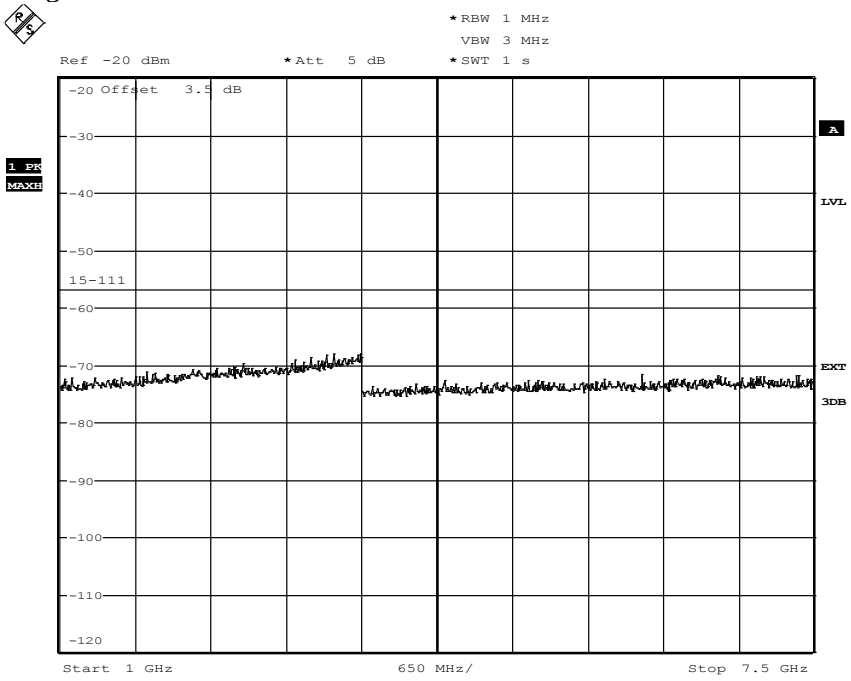
Diagram 2-2



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Appendix 8.1

Diagram 3-1

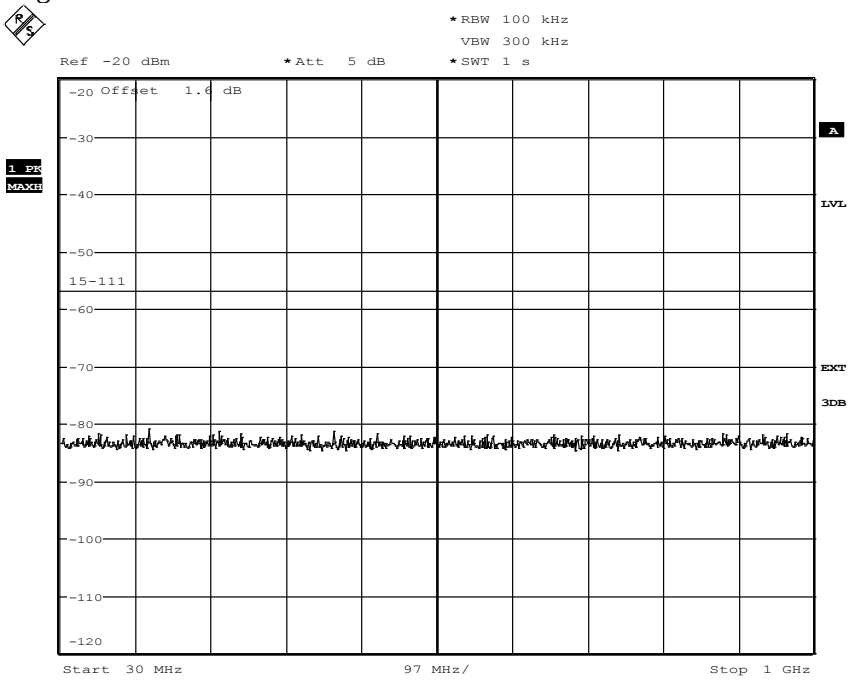

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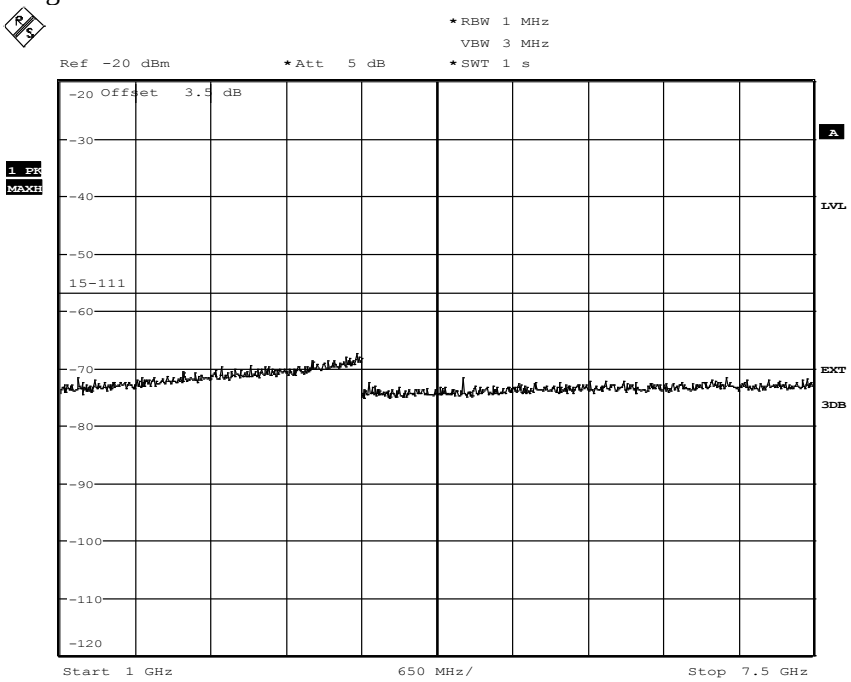
Diagram 3-2



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IC: 287AB-AS118702

Appendix 9

External photos of EUT

Front side

Rear side

Right side

Left side

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Appendix 9

Bottom side

Top side