REPORT

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

Date	Reference	Page
2011-03-22	FX100776-F24G	1 (2)

1002
ISO/IEC 17025

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Radio measurements on RUS 01 B2 1900 MHz radio equipment withFCC ID: TA8BKRC11866-1 and IC: 287AB-BS118661

(9 appendices)

Test object

RUS 01 B2, KRC 118 66/1, revision R2F

Summary

Standard		Compliant	Appendix
FCC CFR 47 / IC RSS-133			
2.1046 / RSS-133 6.4	RF power output	Yes	2
2.1049 / RSS-Gen 4.6.1	Occupied bandwidth	Yes	3
2.1051 / RSS-133 6.5	Band edge	Yes	4
2.1051 / RSS-133 6.5	Spurious emission at antenna terminals	Yes	5
2.1053 / RSS-133 6.5	Field strength of spurious radiation	Yes	6
2.1055 / RSS-133 6.3	Frequency stability	Yes	7
Industry Canada RSS-133			
RSS-133 6.6	Receiver spurious emissions	Yes	8

Note 1: 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.

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.

SP Technical Research Institute of Sweden
Electronics - EMC

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Technical Officer

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Technical Manager

FCC ID: TA8BKRC11866-1
IC: 287AB-BS118661

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Description – Test object

Equipment:	Radio equipment RUS 01 B2 running in GSM mode supporting single and multi carrier
Antenna ports:	RF A: TX/RX port RF B: RX port
Frequency range:	TX: 1930 – 1990 MHz RX: 1850 – 1910 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 (MHz) Downlink	Uplink
B	512	1930.2	1850.2
B+5	517	1931.2	1851.2
B+6	518	1931.4	1851.4
B+10	522	1932.2	1852.2
B+15	527	1933.2	1853.2
M	661	1960.0	1880.0
T-15	795	1986.8	1906.8
T-10	800	1987.8	1907.8
T-6	804	1988.6	1908.6
T-5	805	1988.8	1908.8
T	810	1989.8	1909.8

Used RF configurations

Unless noted otherwise, following configurations were used:

Single Carrier (One carrier configuration):

Cell	1	1	1
Channel	B	M	T

Multi Carrier 1x2 (Two carrier configuration):

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

Multi Carrier 1x4 (Four carrier configuration):

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

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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 transmitter output power applicable 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 mounted into an RBS 6201 cabinet and powered by the cabinets internal -48 VDC. All RF conducted TX measurements were performed at antenna port RF A, with antenna port RF B terminated into 50 ohm. All RX measurements were performed at antenna port RF B, with the test object antenna port RF A transmitting at maximum output power into a 50 ohm termination.

Radiated measurements

The test object was tested stand-alone. It was powered with -48 VDC. All measurements were performed with the test object configured for maximum transmitter output power at port RF A. The port RF A was via a RF attenuator connected to a FSIQ spectrum analyzer outside the shielded chamber for signal monitoring. Antenna port RF B was left unterminated. The modulation 8-PSK was found to be representative for worst case setting for the radiated measurements. This configuration represented worst case for radiated spurious emission measurements.

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-133.

References

Measurements were done according to relevant parts of the following standards:
ANSI 63.4-2003
ANSI/TIA/EIA-603-C-2004
ANSI/TIA/EIA 136-280-D-2002
J-STD007A Vol 1
CFR 47 part 2, October 1st , 2010
CFR 47 part 24, October 1st, 2010
RSS-Gen Issue 3
RSS-133 Issue 5

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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
High pass filter	2011-07	503 739
High pass filter	2011-07	503 740
RF attenuator	2011-07	504 159
RF attenuator	2011-08	900 233
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	2014-01	502 175
Std.gain horn FLANN model 16240-25	-	503 939
Std.gain horn FLANN model 20240-20	-	503 674
µComp Nordic, Low Noise Amplifier	2011-07	504 160
MITEQ Low Noise Amplifier	2011-06	503 285
Temperature chamber 2	2013-11	501 031
Multimeter Fluke 87	2011-04	502 190
Testo 625, Temperature and humidity meter	2011-08	504 188
Testo 635 Temperature and humidity meter	2011-04	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 2011-02-25.

Manufacturer’s representative

Christer Gustavsson, Ericsson AB

Test engineers

Tomas Lennhager, Andreas Johnson, Jörgen Wassholm, Reinhold Reul and Jonas Bremholt

Test participant(-s)

Samir Catic, Ericsson AB (Partly present)

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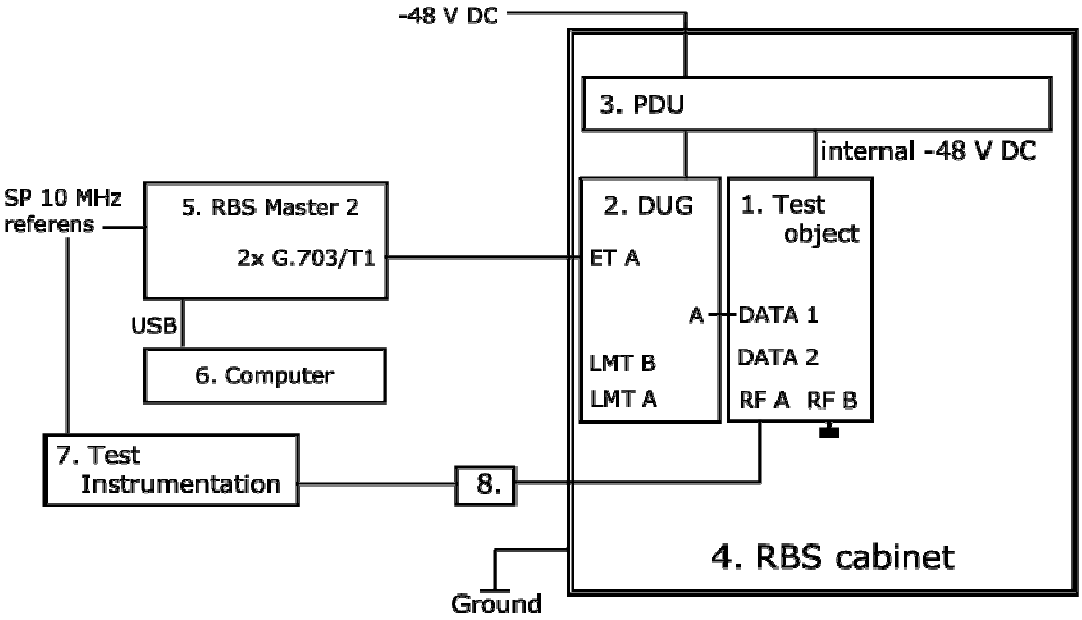
Test set-up conducted measurements TX



Test object

1. RUS 01 B2, KRC 118 66/1, revision R2F, S/N: CB4G545187
   (FCC ID: TA8BKRC11866-1 and IC: 287AB-BS118661)

Functional test equipment

2. DUG 20 01, KDU 137 569/1, revision R2A, C823667454
3. PDU 02 01, BMG 980 336/4, revision R2A, SN BJ31528316
4. RBS 6201 cabinet, BAMS 1000778792
5. RBS Master 2, LPY 107 1007/1, revision R1F/A, SN 0000000179
6. Computer, Compaq nc6000, BAMS – 1000092619
   running software RBS Master2, version R7D05
7. SP test instrument according measurement equipment list
8. Attenuator and filter according measurement equipment list

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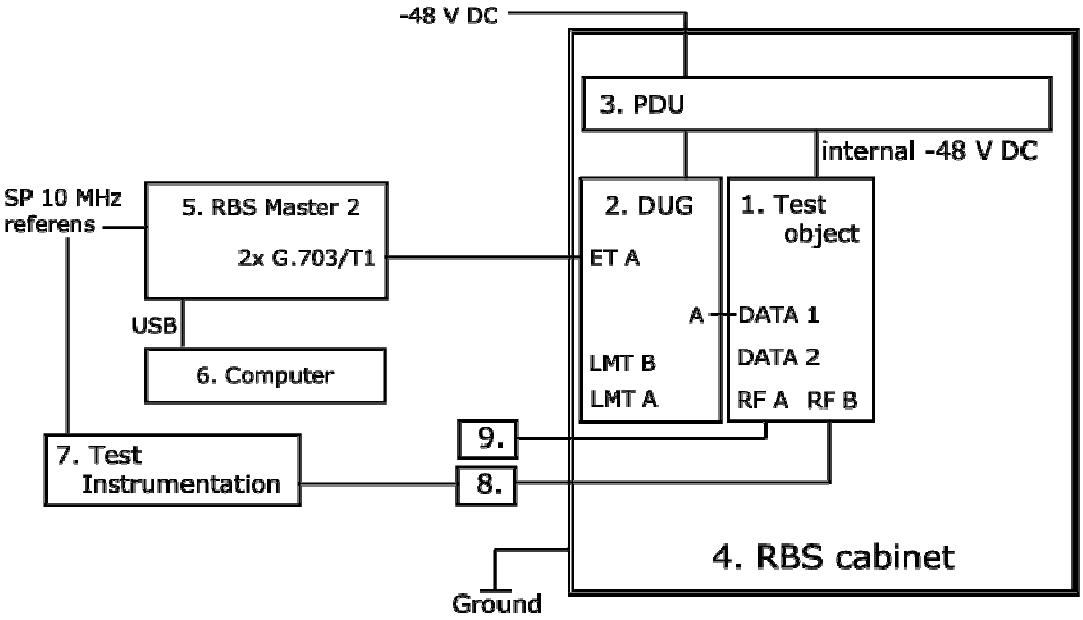
Test set-up conducted measurements RX



Test object

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   (FCC ID: TA8BKRC11866-1 and IC: 287AB-BS118661)

Functional test equipment

2. DUG 20 01, KDU 137 569/1, revision R2A, C823667454
3. PDU 02 01, BMG 980 336/4, revision R2A, SN BJ31528316
4. RBS 6201 cabinet, BAMS 1000778792
5. RBS Master 2, LPY 107 1007/1, revision R1F/A, SN 0000000179
6. Computer, Compaq nc6000, BAMS – 1000092619
   running software RBS Master2, version R7D05
7. SP test instrument according measurement equipment list
8. Attenuator and filter according measurement equipment list
9. Attenuator and 50 ohm termination

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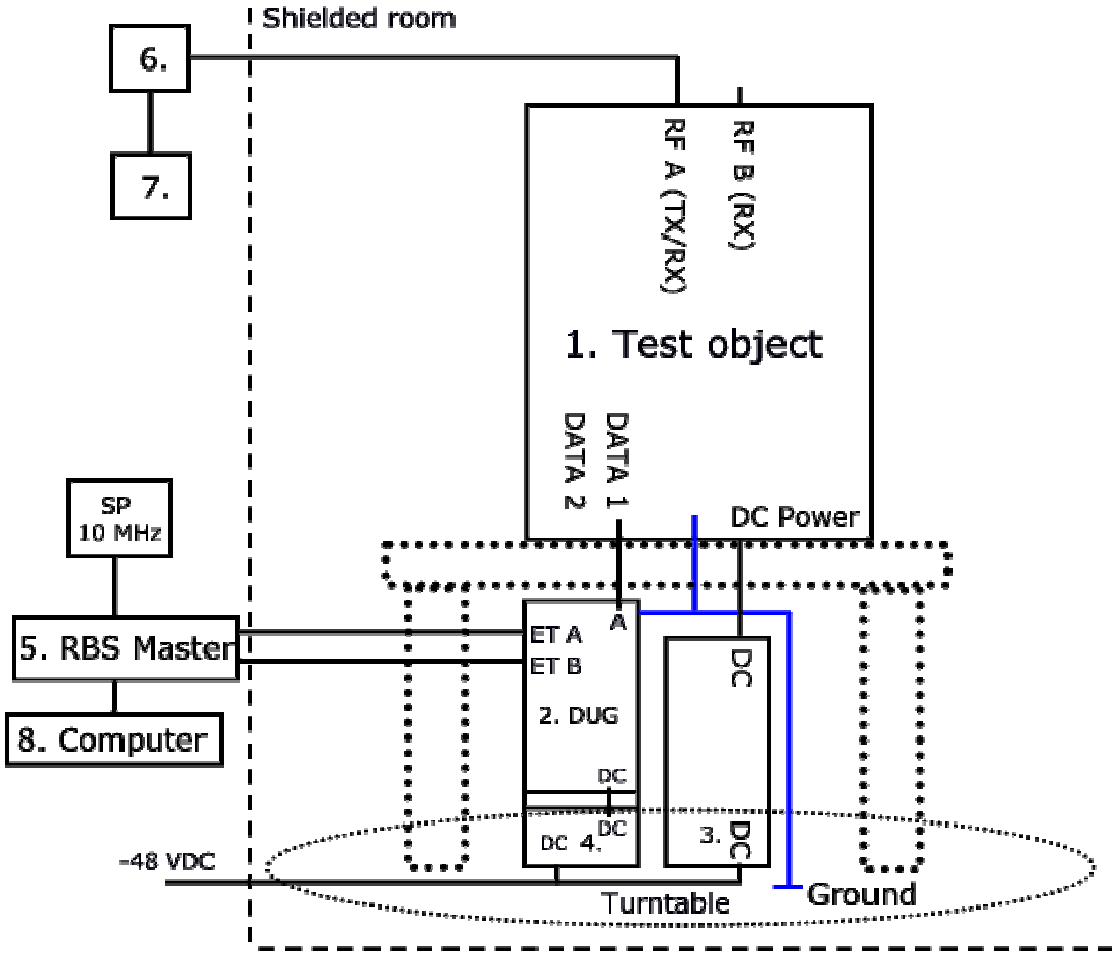
Test set-up radiated measurements



Test object

1. RUS 01 B2, KRC 118 66/1, revision R2F, S/N: CB4G545190
   (FCC ID: TA8BKRC11866-1 and IC: 287AB-BS118661)FCC ID: TA8BKRC11866-1

Functional test equipment

2. DUG 20 01, KDU 137 569/1, revision R2A, C823667454
3. Power subrack, see below for hardware details
4. SUP 6601 1/BFL 901 009/1 Rev R1B, S/N. BR80867188
5. RBS Master 2, LPY 107 1007/1, revision R1F/A, SN 0000000179
6. Attenuator, Weinschel model 57-40-34 s/n: ML394
7. Spectrum analyzer, Rohde & Schwarz FSIQ 40, SP 503 738, for supervision purposes
8. Computer, Compaq nc6000, BAMS – 1000092619
   running software RBS Master2, version R7D05

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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 DUG port A	Signal
Data 2, not supported	-

Hardware of power subrack used during stand-alone radiated tests

Position	Product name	Product number	R-state	Serial number
	Power subrack	SXK 109 8115/1	R2A	
1	PDU 01 01	BMG 980 336/2	R4F	BJ31532384
2	PDU 01 01	BMG 980 336/2	R4F	BJ31532382
3	SHU 01 01	BGK 901 18/1	R3C	BJ31446269
4	DUMMY	SXK 109 8257/1	R1D	-
5	DUMMY	SXK 109 8257/1	R1D	-
6	PFU 01 01	KFE 101 1162/1	R1B	BR80910495
7	DUMMY	SXK 109 8257/1	R1D	-
8	DUMMY	SXK 109 8257/1	R1D	-
9	PCF 02 01	KFE 101 1157/1	R1C	BW95301450

RBS software

Software	Revision
CXP 1040007/04	R29E

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Appendix 2

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

Date	Temperature	Humidity
2011-03-07	24 °C ± 3 °C	17 % ± 5 %
2011-03-08	24 °C ± 3 °C	12 % ± 5 %

Test set-up and procedure

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	503 145
RF attenuator	504 159
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 port RF A (maximum): 47.8 dBm

Transmitter power (dBm/ dB) RMS / PAR			
Channel	B	M	T
GMSK	47.7/ 0.7	47.6 / 0.7	47.5 / 0.7
8-PSK	47.3 / 3.9	47.2 / 3.9	47.1/ 3.8

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

Transmitter power (dBm/ dB) RMS / PAR			
Channel	B	M	T
GMSK	44.7 / 0.6	44.6 / 0.6	44.5 / 0.6
8-PSK	44.3 / 3.9	44.3 / 3.9	44.2 / 3.9

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

Transmitter power (dBm/ dB) RMS / PAR			
Channel	B	M	T
GMSK	41.7 / 0.5	41.7 / 0.5	41.7 / 0.5
8-PSK	39.6 / 3.7	39.5 / 3.7	39.6 / 3.6

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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

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

Date	Temperature	Humidity
2011-03-07	24 °C ± 3 °C	17 % ± 5 %

Test set-up and procedure

The measurements were made as defined in §2.1049. 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.

Measurement equipment	SP number
Rohde & Schwarz FSQ	504 143
RF attenuator	504 159
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	245 kHz

Modulation: 8-PSK

	Channel	OBW
Diagram 4	B	239 kHz
Diagram 5	M	241 kHz
Diagram 6	T	240 kHz

FCC ID: TA8BKRC11866-1 Appendix 3.1
IC: 287AB-BS118661

Diagram 1

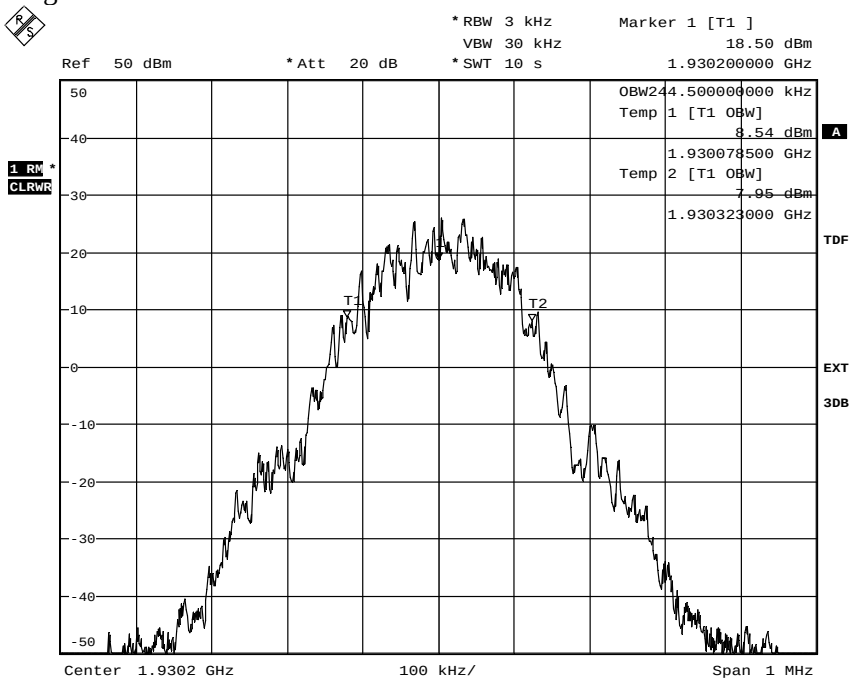

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Diagram 2

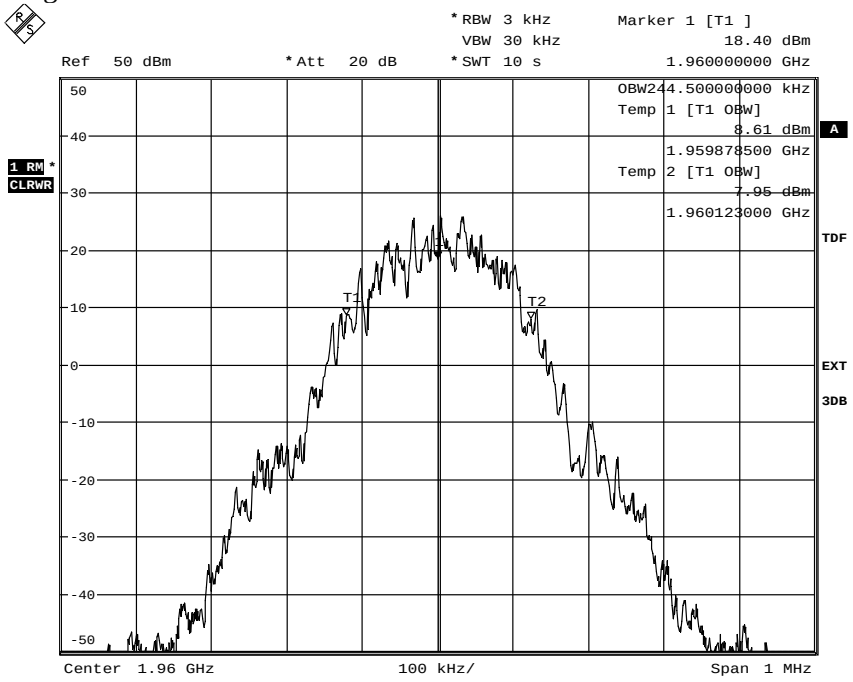

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Diagram 3

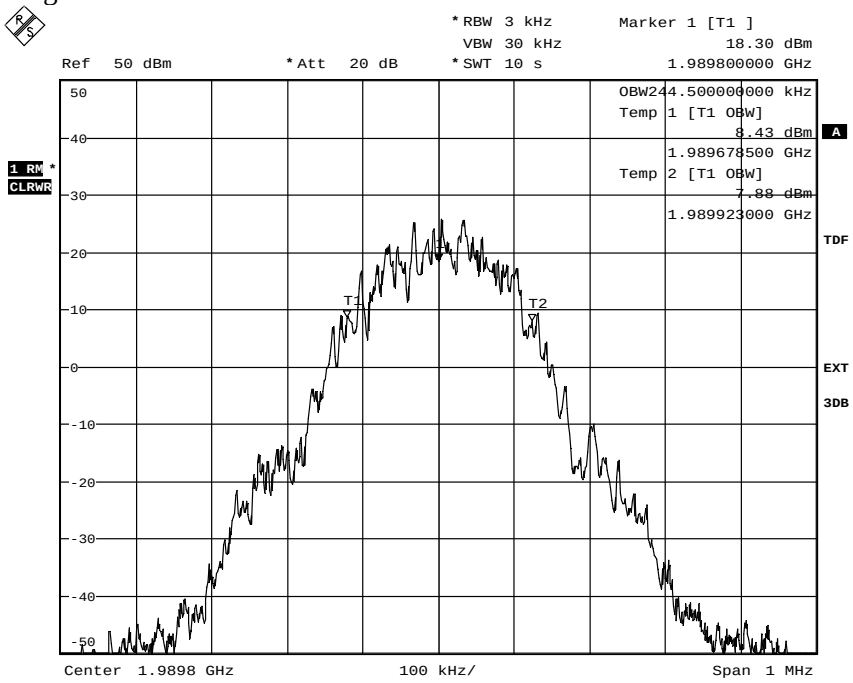

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Diagram 4

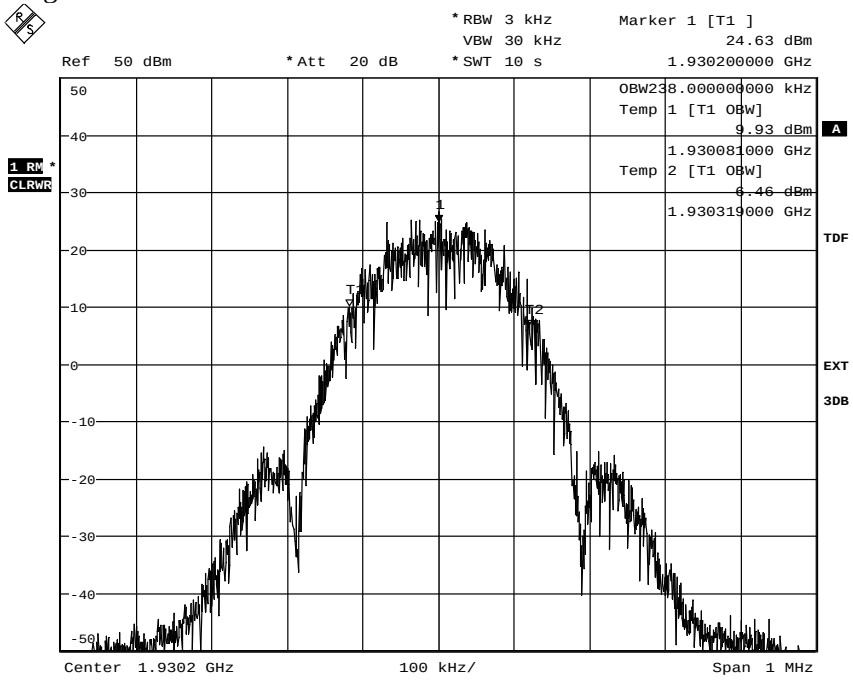

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Diagram 5

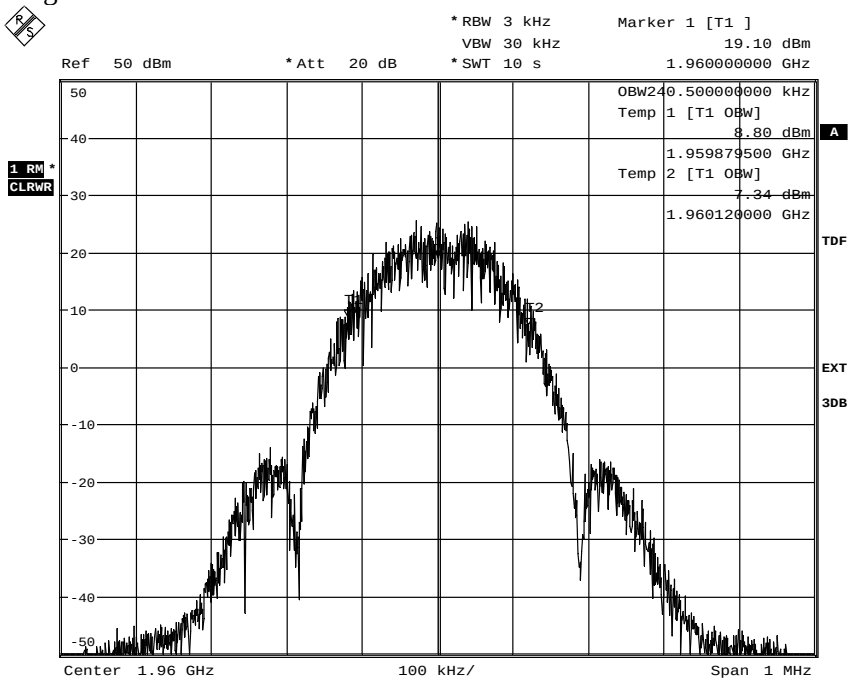

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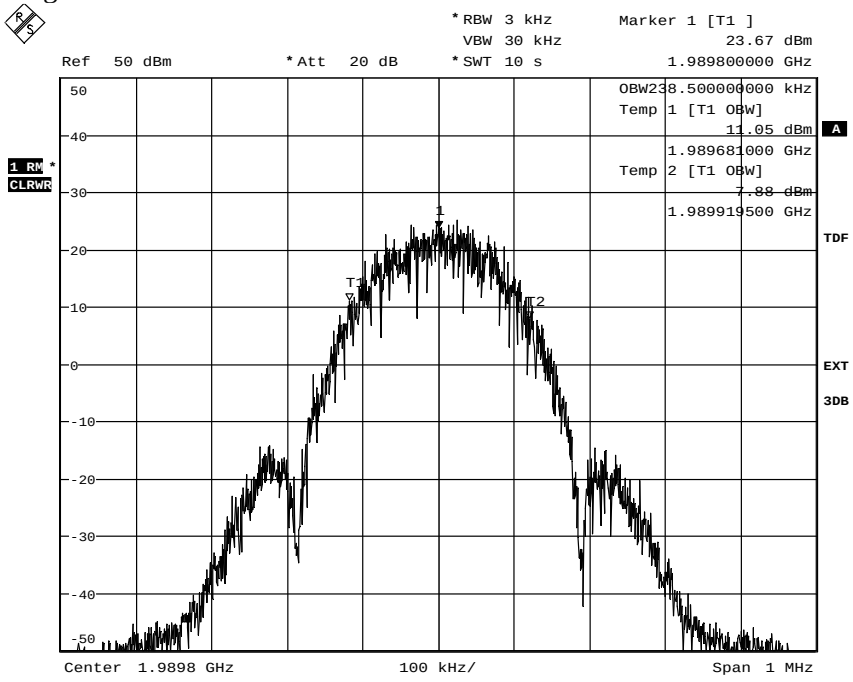
Diagram 6



Date: 7.MAR.2011 13:53:19

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Band edge measurements according to CFR 47 §24.238 / IC RSS-133 6.5

Date	Temperature	Humidity
2011-03-07	24 °C ± 3 °C	17 % ± 5 %
2011-03-08	24 °C ± 3 °C	12 % ± 5 %
2011-03-09	22 °C ± 3 °C	21 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §24.238. 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 RBW of 3 kHz (1% of EBW) was used up to 1 MHz away from the band edges, from 1 MHz to 6 MHz away from the band edges a RBW of 50 kHz was used. To compensate for the reduced RBW the limit was adjusted by 13 dB to -26 dBm in this frequency range. A RBW of 1 MHz was used from 6 to 15 MHz away from the band edges.

Measurement equipment	SP number
Rohde & Schwarz FSIQ	503 738
RF attenuator	504 159
Testo 635 temperature and humidity meter	504 203

Measurement uncertainty: 3.7 dB

Results

The results are shown in appendix 4.1

Modulation GMSK

		Power setting	Measured RMS power
Diagram 1:	B	P36	35.7 dBm
Diagram 2:	B+1	P48 (Maximum)	47.7 dBm
Diagram 3:	T-1	P48 (Maximum)	47.4 dBm
Diagram 4:	T	P34	33.5 dBm

Modulation 8-PSK

		Power setting	Measured RMS power
Diagram 5:	B	P36	35.4 dBm
Diagram 6:	B+1	P48 Maximum	47.5 dBm
Diagram 7	T-1	P48 Maximum	47.1 dBm
Diagram 8	T	P36	35.2 dBm

Remark

Above tables show the maximum reduced output power setting and corresponding measured RMS value for GMSK and 8-PSK modulation that meet band edge requirements for channels 512 and 810. Additional measurements were performed at maximum nominal TX output power with the carrier frequency moved one channel into the TX band.

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Limits

CFR 47 §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.

Complies?	Yes

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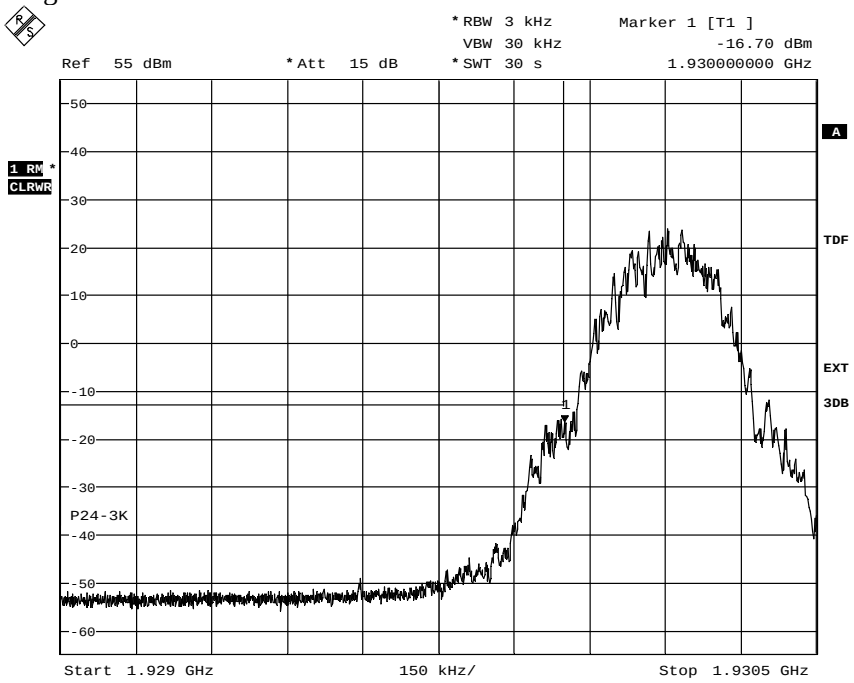
IC: 287AB-BS118661

Diagram 1-1



Date: 7.MAR.2011 12:45:52

Diagram 1-2

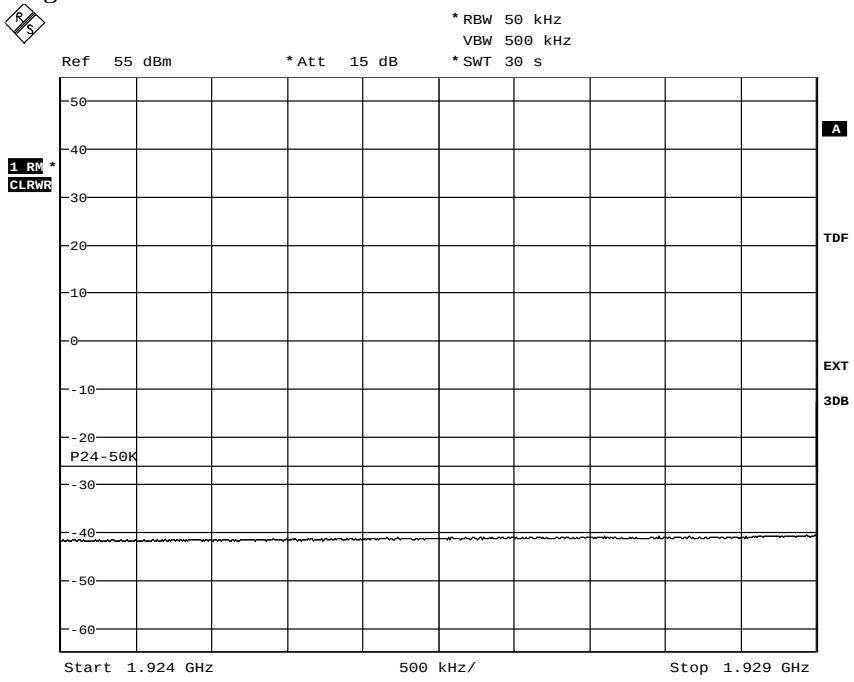


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Diagram 1-3

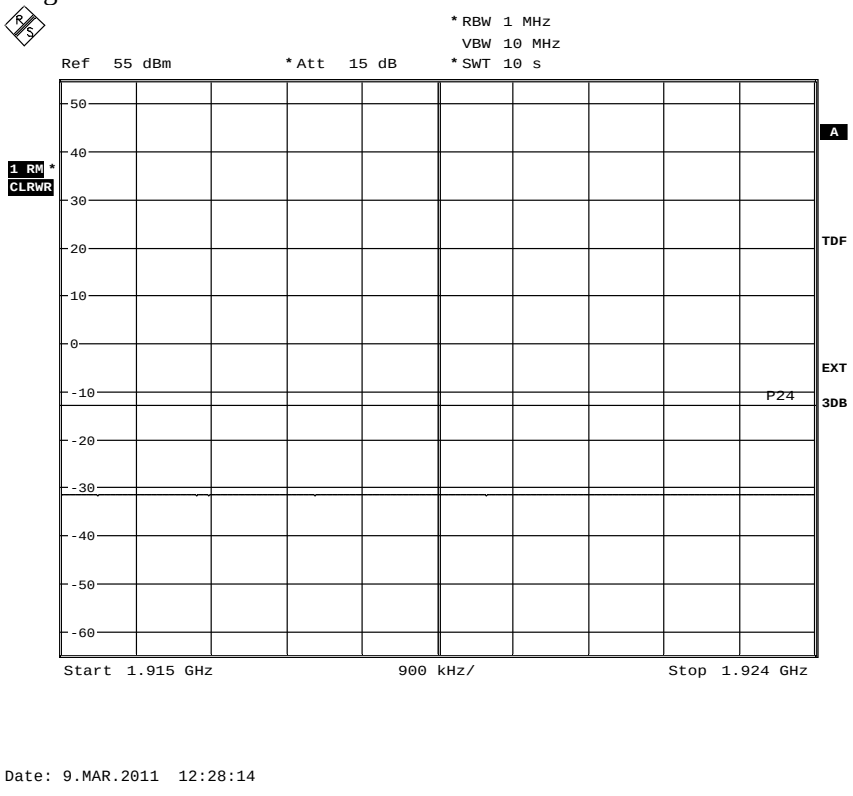

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Diagram 2-1

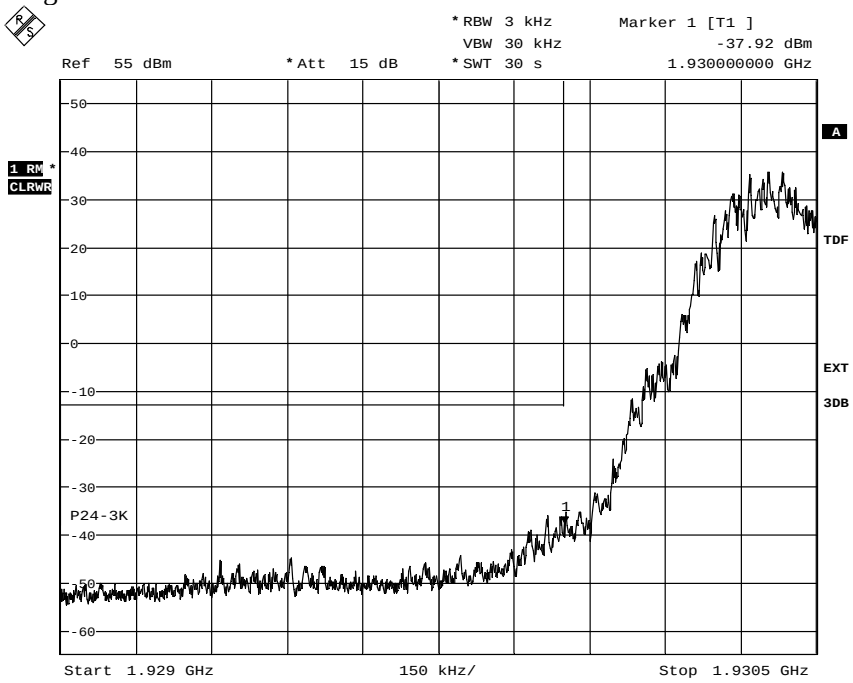

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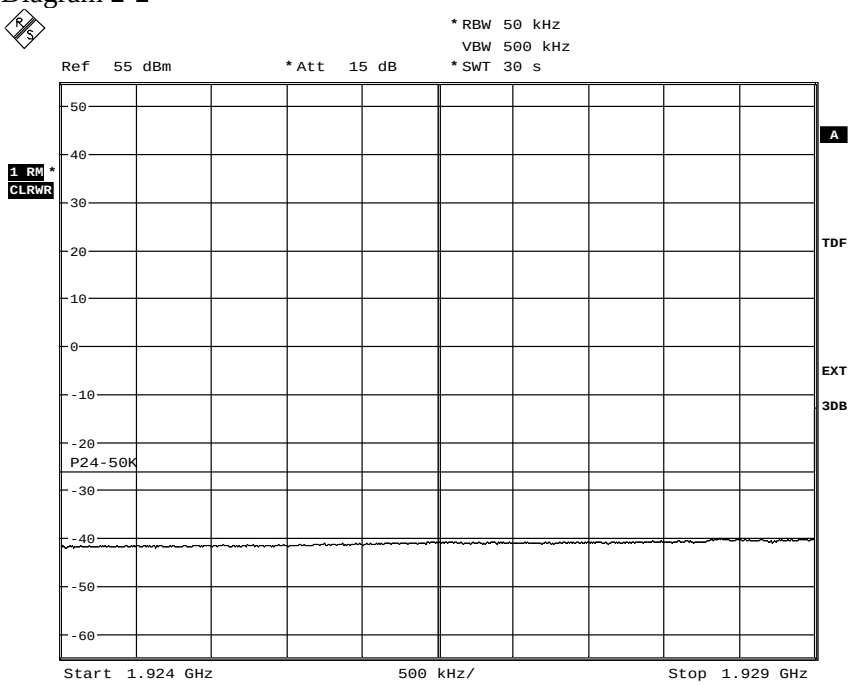
Diagram 2-2



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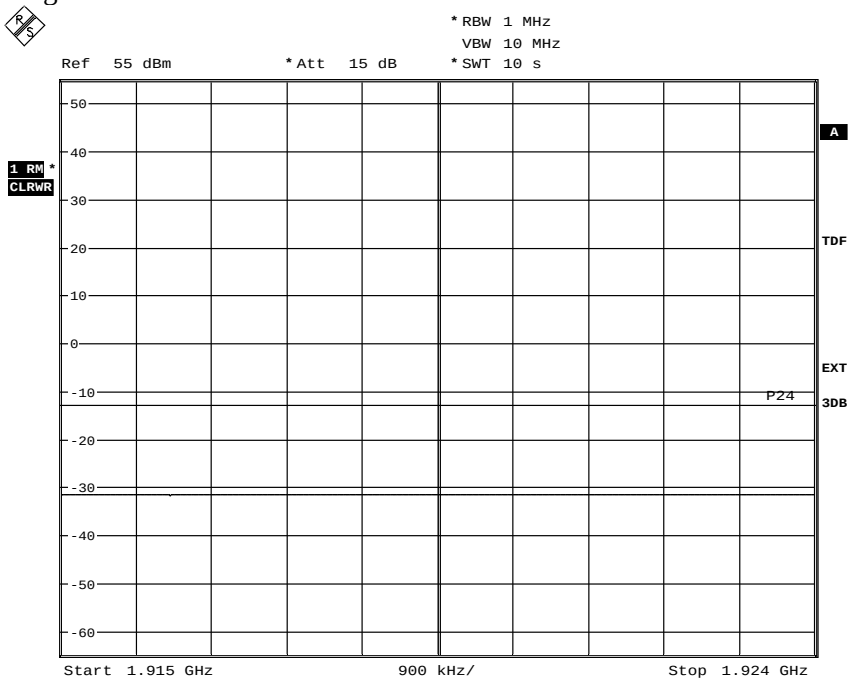
FCC ID: TA8BKRC11866-1 Appendix 4.1
IC: 287AB-BS118661

Diagram 2-3



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FCC ID: TA8BKRC11866-1 Appendix 4.1
IC: 287AB-BS118661

Diagram 3-1

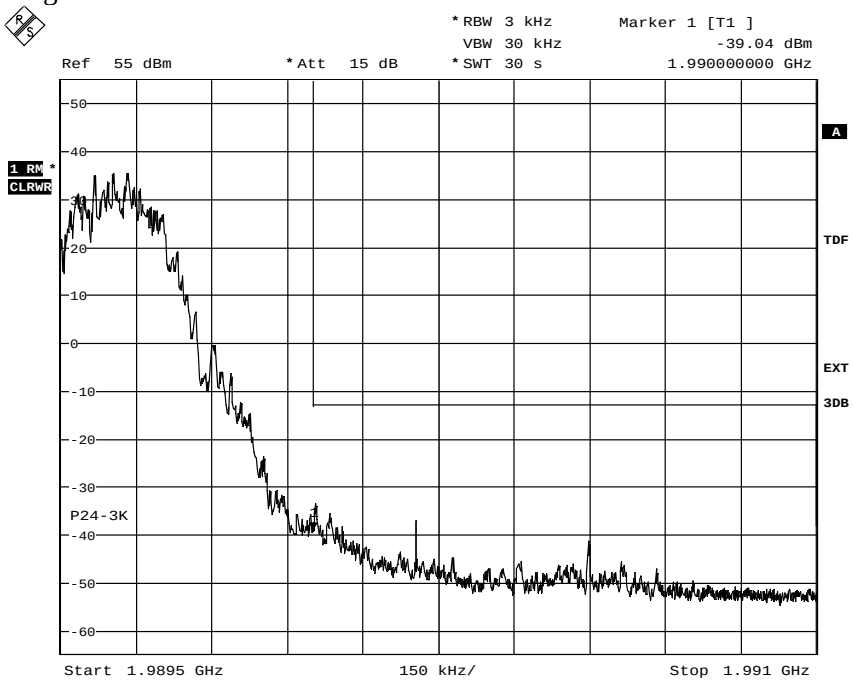

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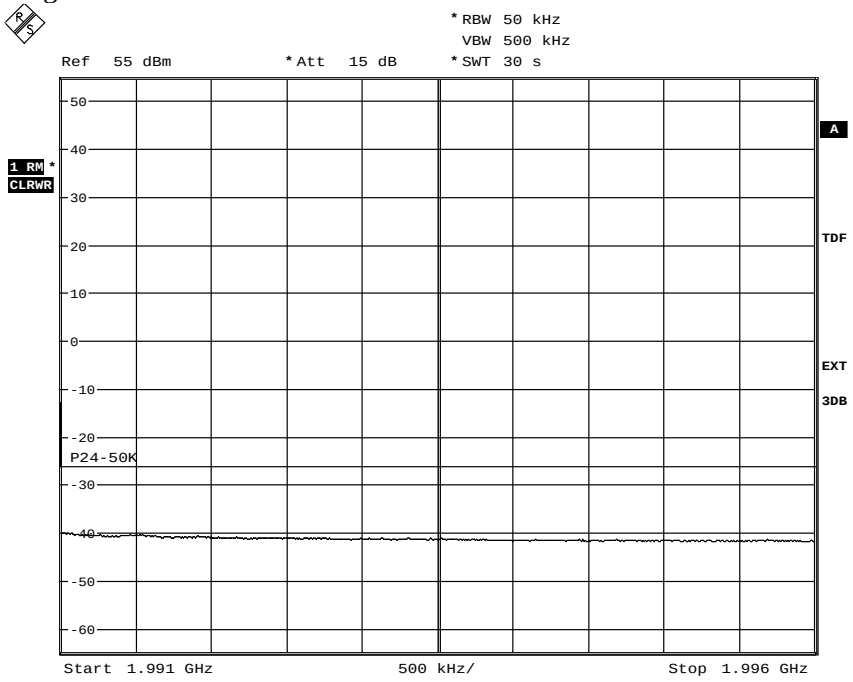
Diagram 3-2



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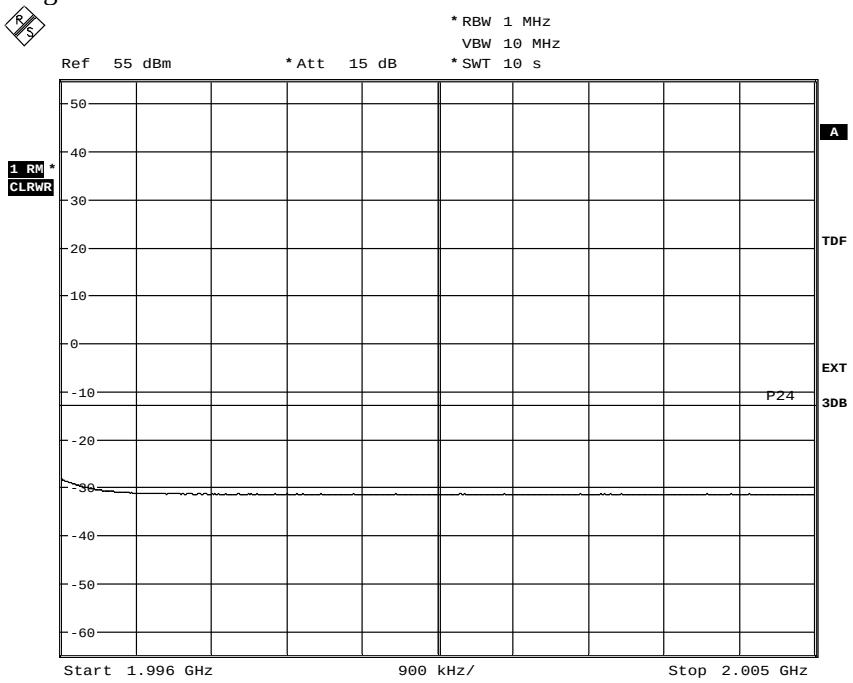
IC: 287AB-BS118661

Diagram 3-3



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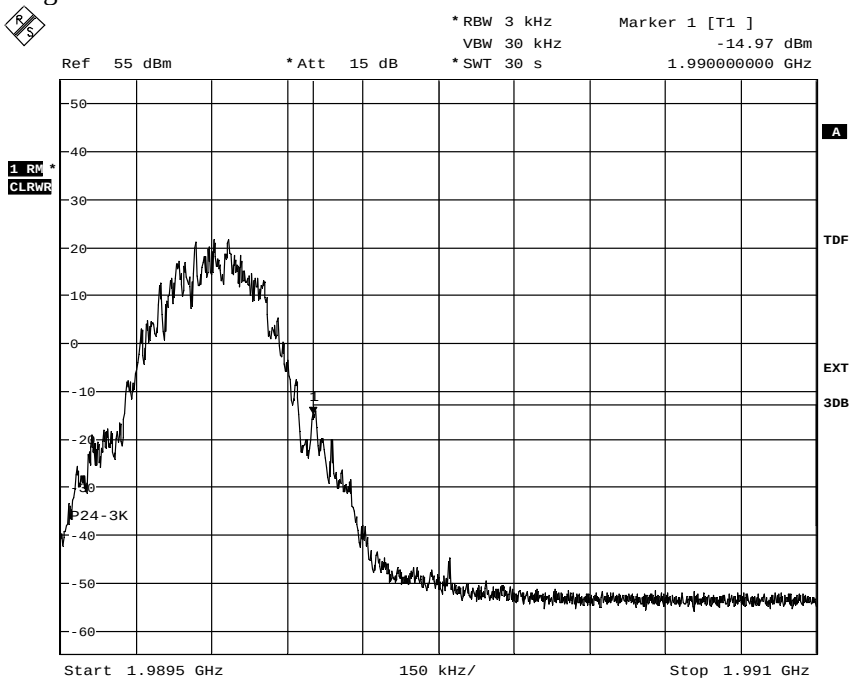
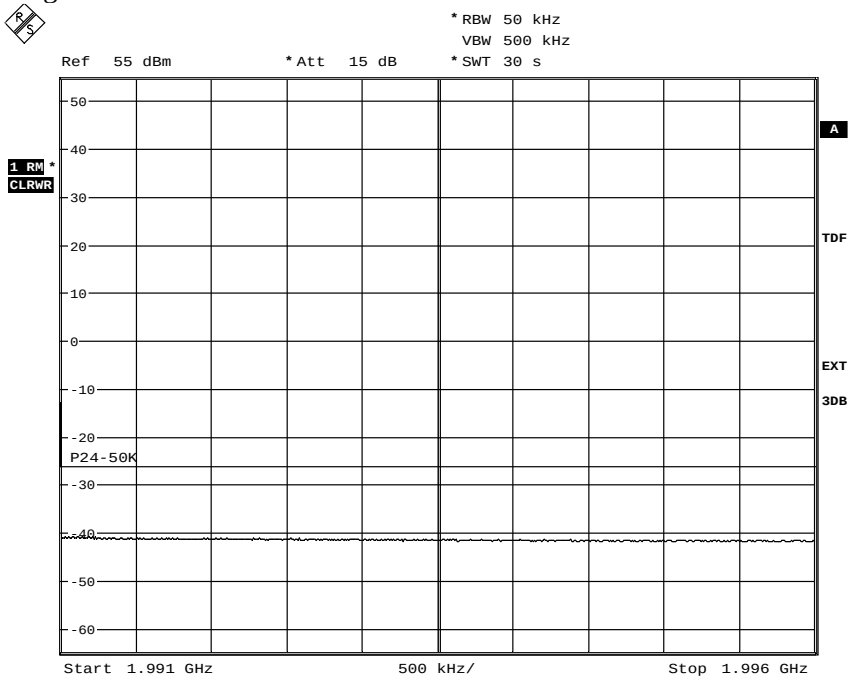
FCC ID: TA8BKRC11866-1 Appendix 4.1
IC: 287AB-BS118661

Diagram 4-1



Date: 8.MAR.2011 08:55:44

Diagram 4-2



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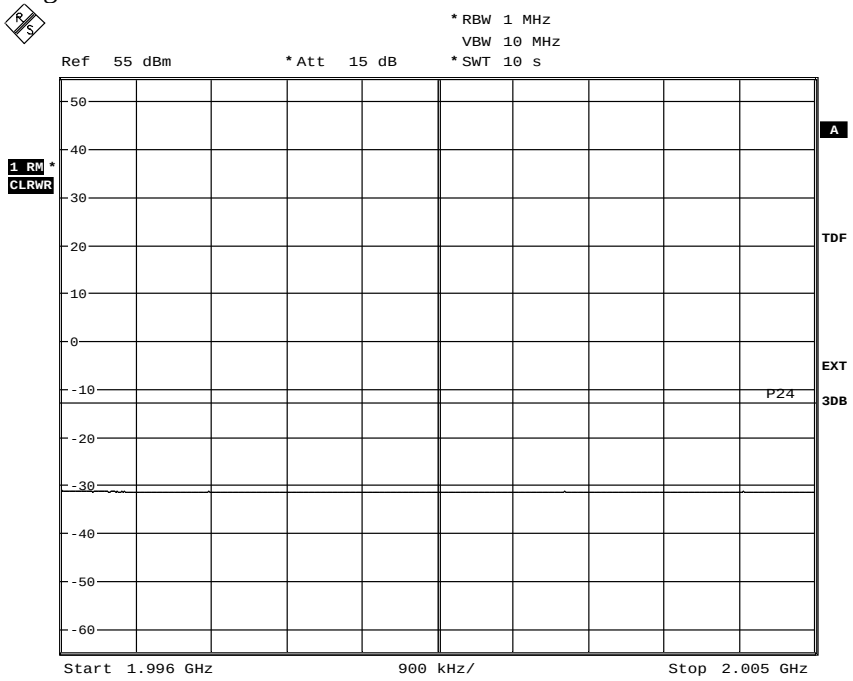
IC: 287AB-BS118661

Diagram 4-3



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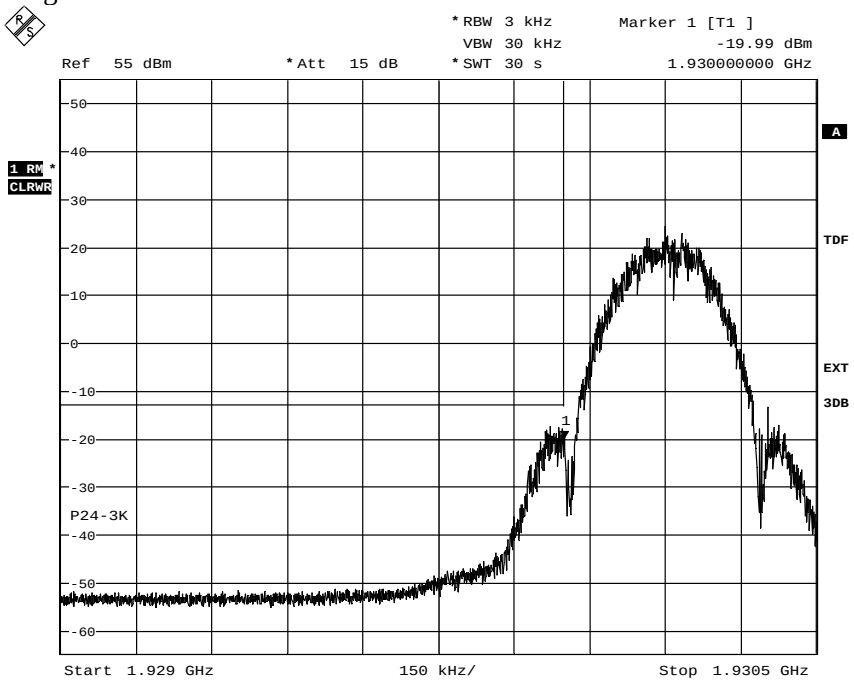
IC: 287AB-BS118661

Diagram 5-1



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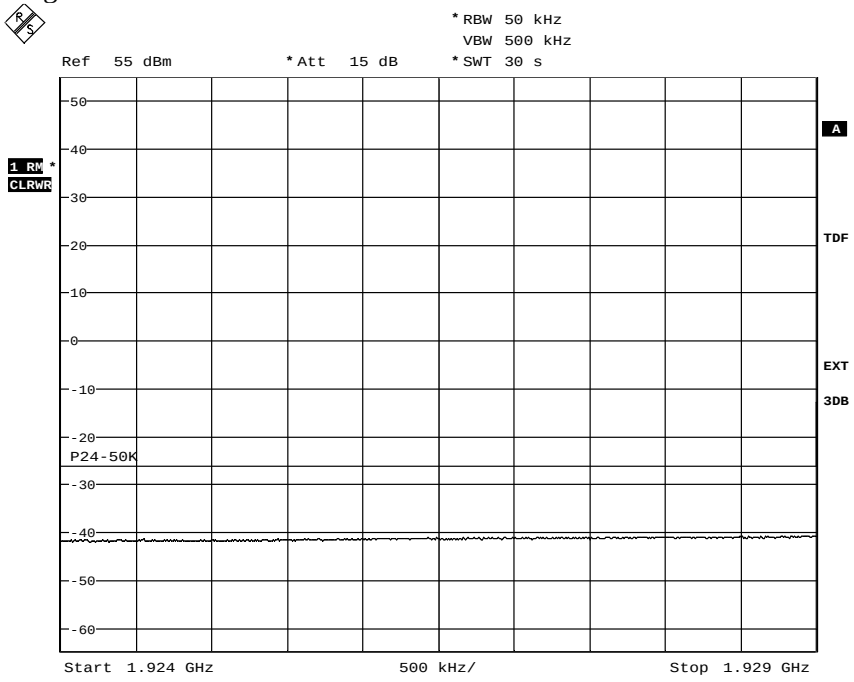

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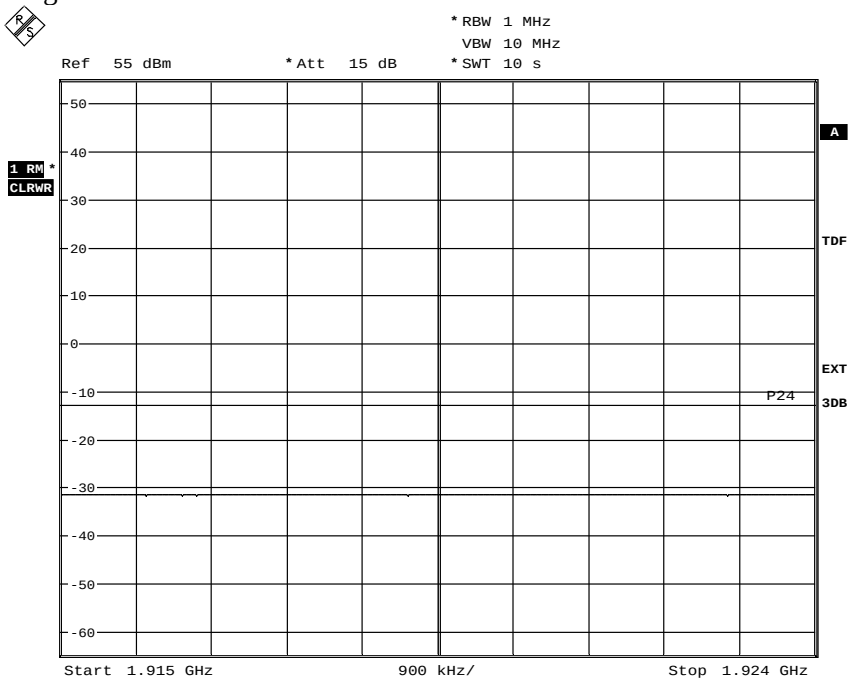
IC: 287AB-BS118661

Diagram 5-3



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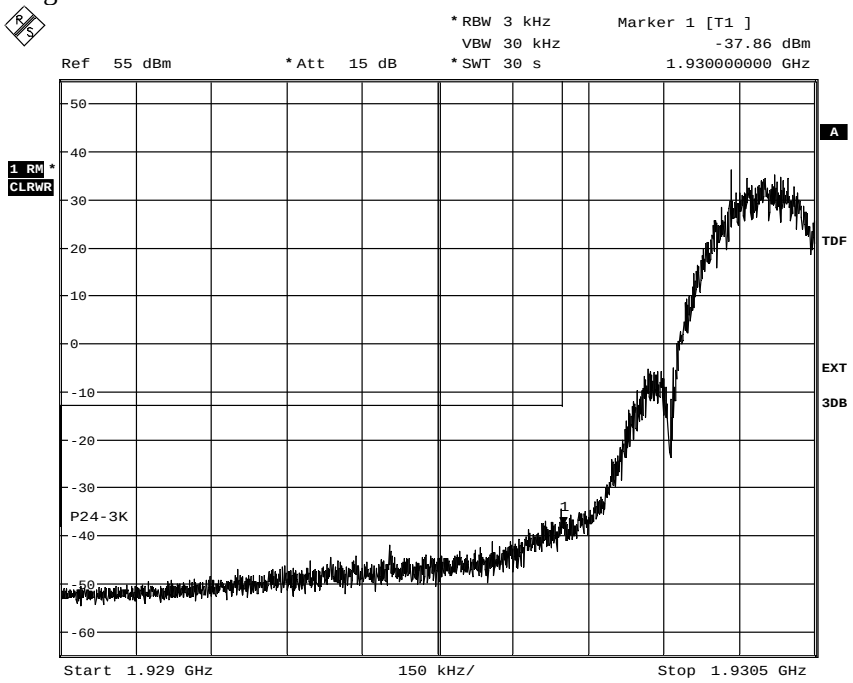
IC: 287AB-BS118661

Diagram 6-1



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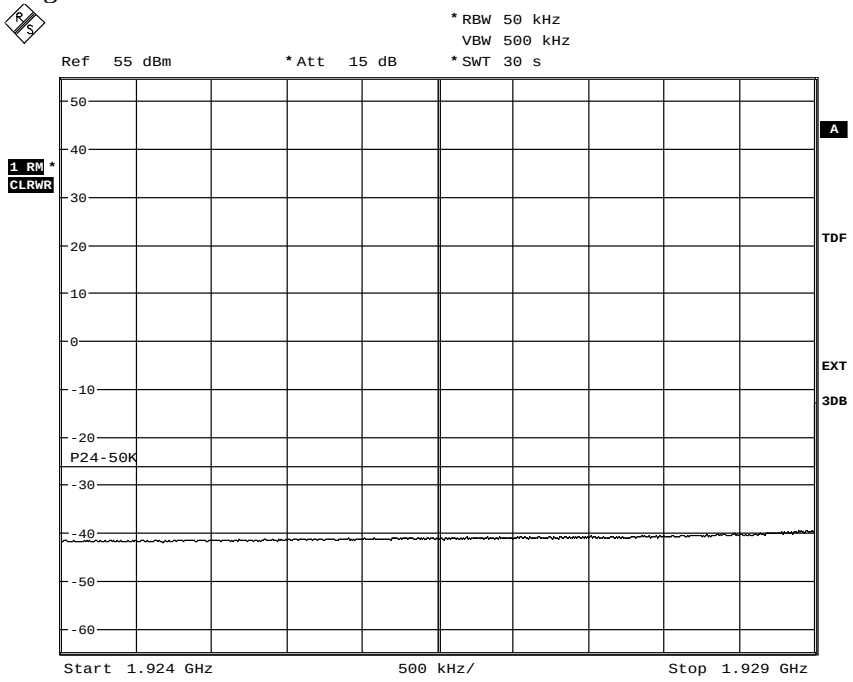

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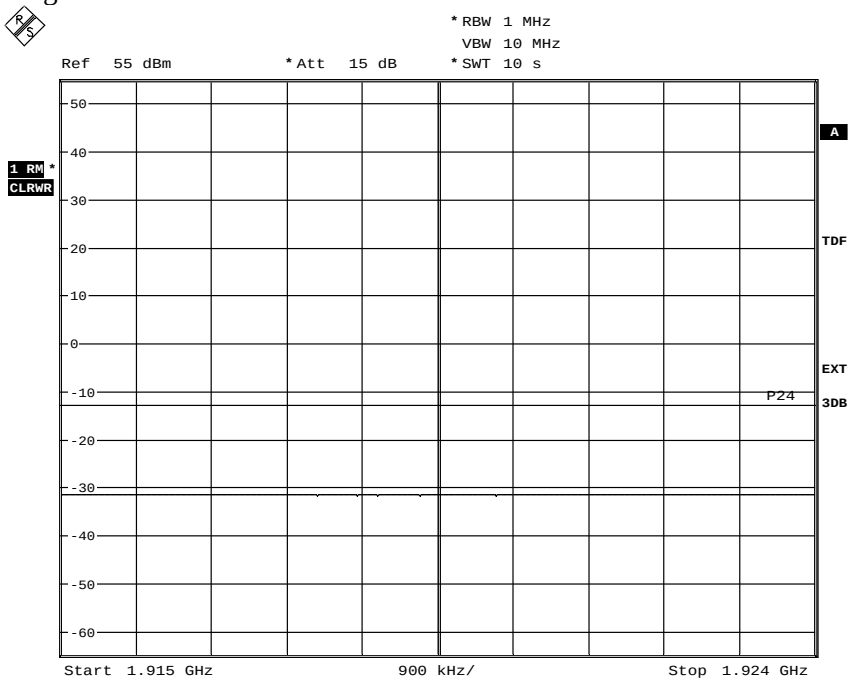
IC: 287AB-BS118661

Diagram 6-3



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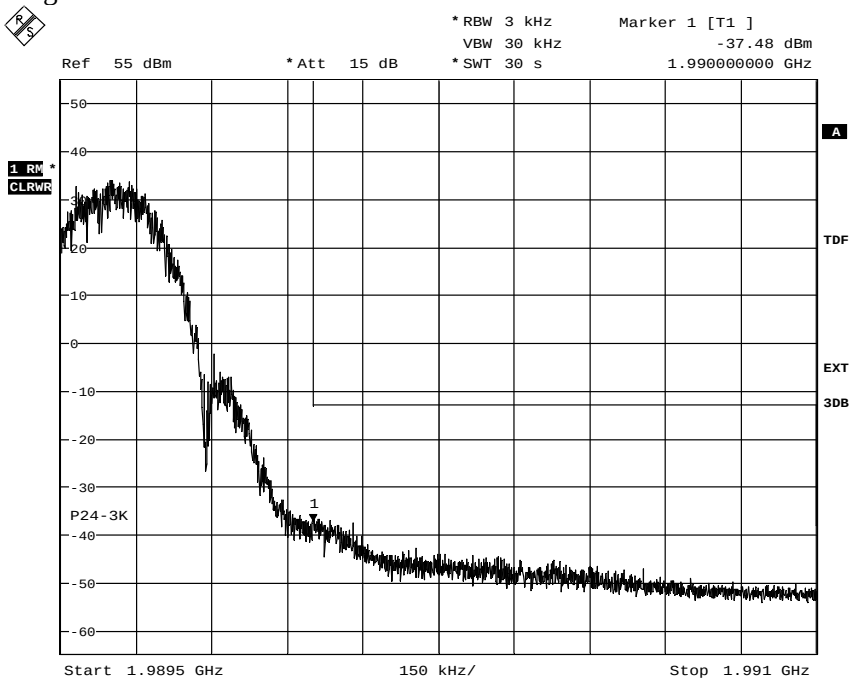
IC: 287AB-BS118661

Diagram 7-1



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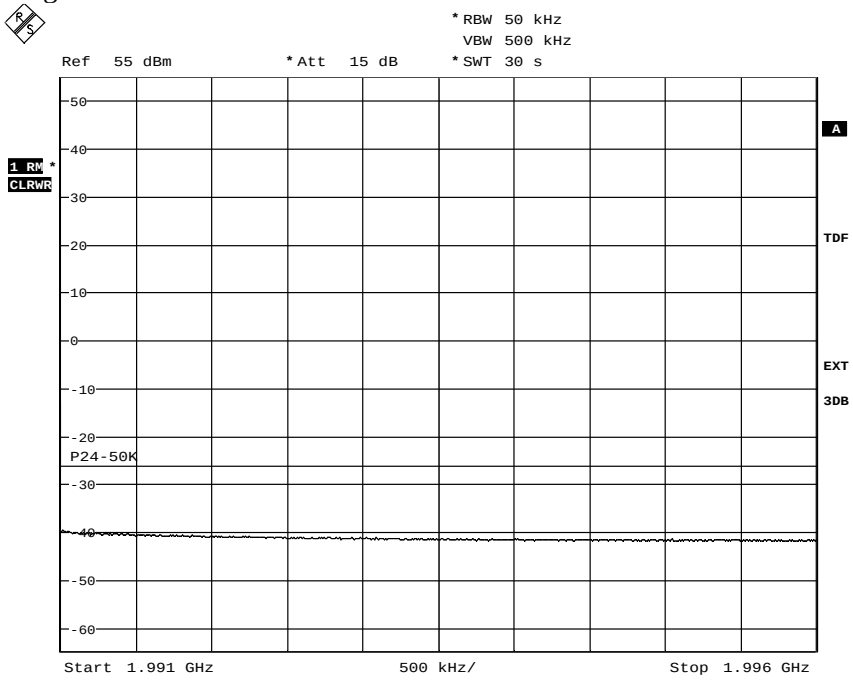

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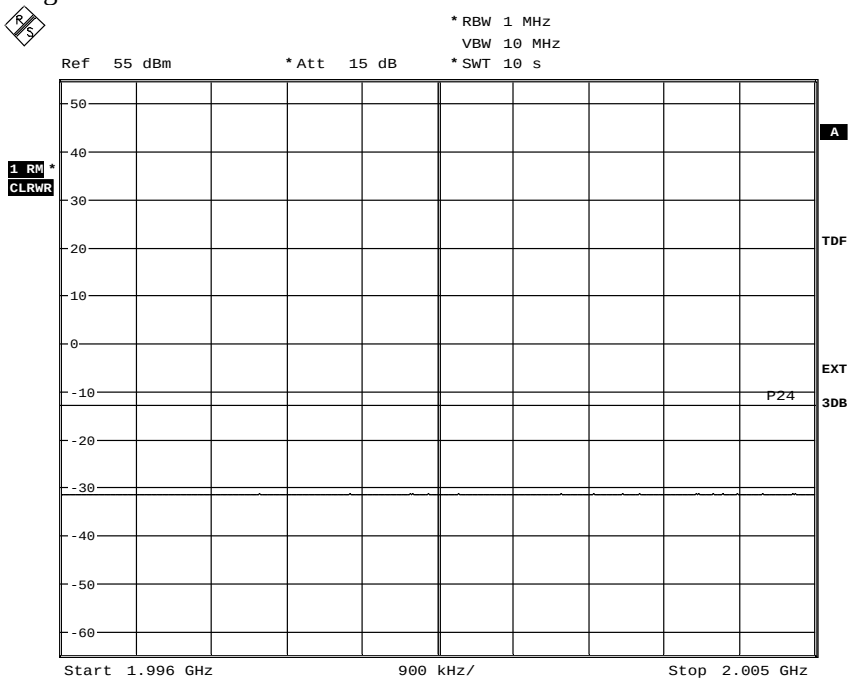
IC: 287AB-BS118661

Diagram 7-3



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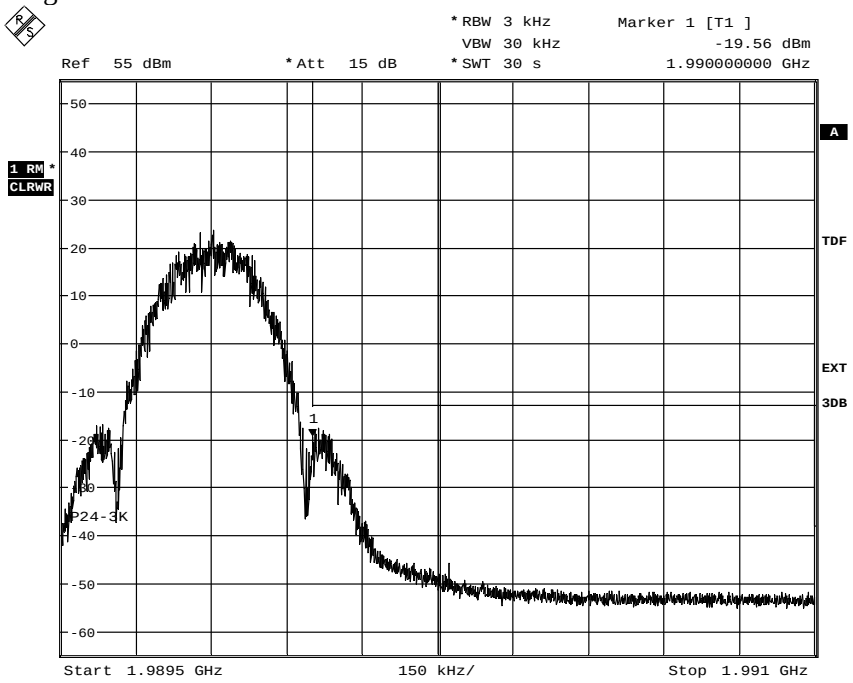
IC: 287AB-BS118661

Diagram 8-1



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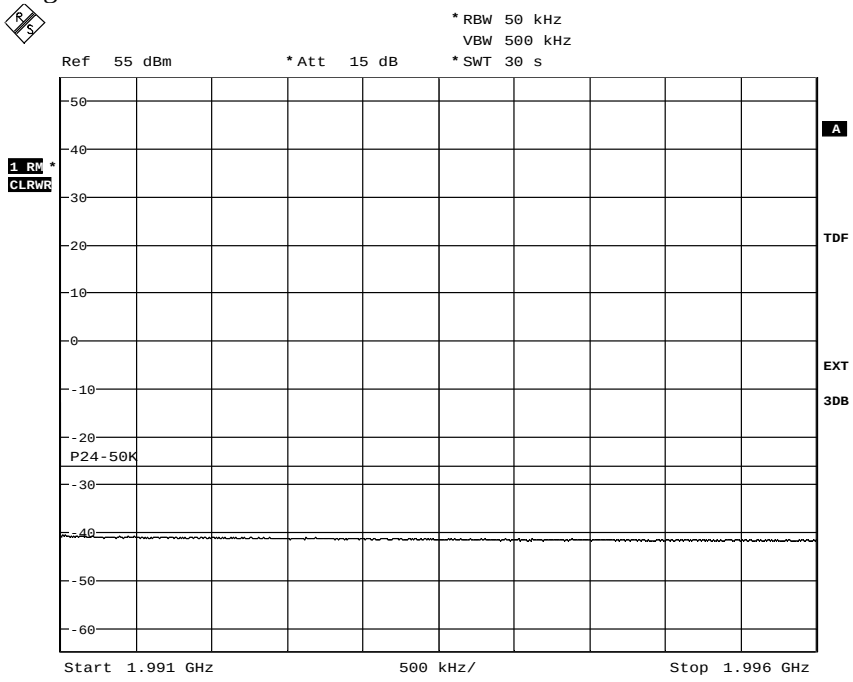

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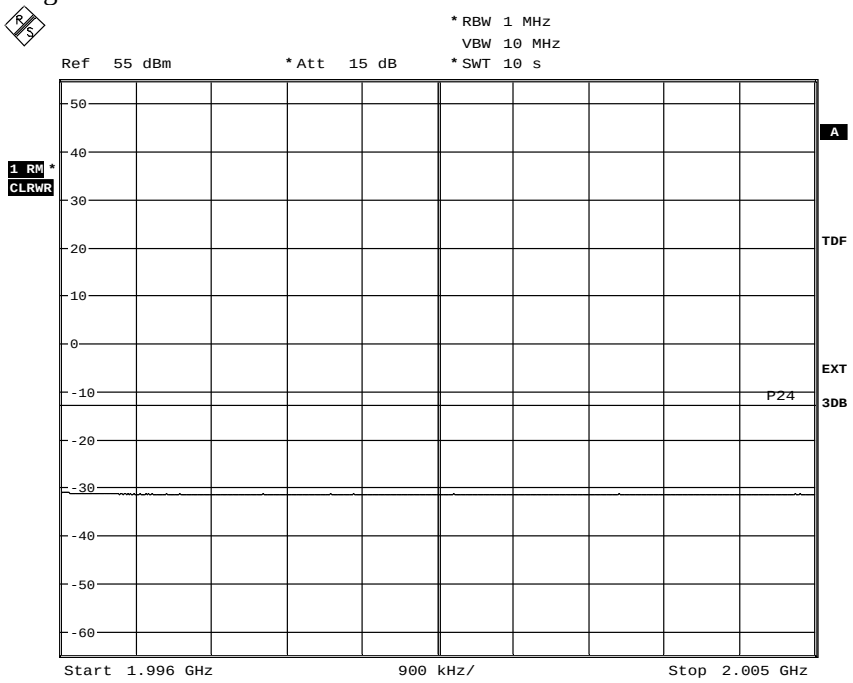
IC: 287AB-BS118661

Diagram 8-3



Date: 9.MAR.2011 12:51:36

FCC ID: TA8BKRC11866-1 Appendix 5
IC: 287AB-BS118661

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

Date	Temperature	Humidity
2011-03-07	24 °C ± 3 °C	17 % ± 5 %
2011-03-08	24 °C ± 3 °C	12 % ± 5 %

Test set-up and procedure

The measurements were made per definition in §24.238. The output was connected to a spectrum analyzer. The spectrum analyzer was connected to an external 10 MHz reference standard during the measurements. A pre-measurement was performed with the PEAK detector activated. Emission close to or above the limit with the PEAK detector is measured with the RMS detector activated and the level of the emission is determined with the substitution method.

Measurement equipment	SP number
R&S FSQ	504 143
RF attenuator	504 159
High pass filter	504 200
RF attenuator	900 229
High pass filter	503 740
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 1x2 (2 carriers):

Channels	GMSK	8-PSK
B+(B+5):	Diagram 7	Diagram 9
T+(T-5):	Diagram 8	Diagram 10

Multi carrier 1x4 (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 some 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 1920 to 1935 MHz and 1985 to 2000 MHz were not intended to show compliance at the band edges. The purpose was to verify compliance for intermodulation products in multicarrier configurations. The configuration 1x2 was found to be representative for worst case setting. Band edge compliance was addressed in appendix 4.

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.

The 2.4576 GHz frequency was identified as not used in the RF chain and is not affected by the power setting of the carrier frequency, the transmitter was activated for 40 W output power during the measurements in the frequency range 18 to 25 GHz. In the frequency range 9 kHz to 18 GHz the transmitter was activated for maximum output power.

Limits

CFR 47 §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

FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 1-1

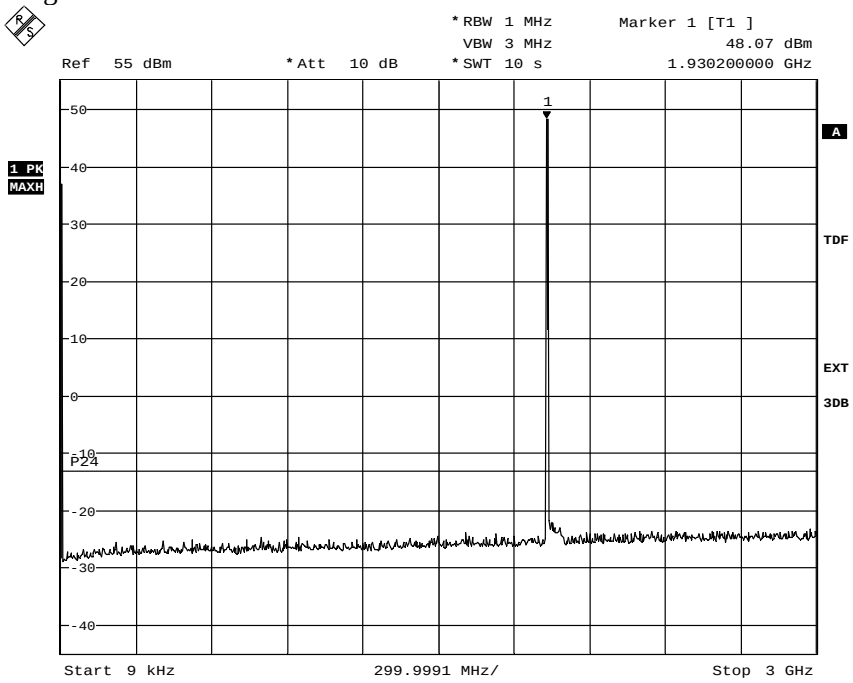


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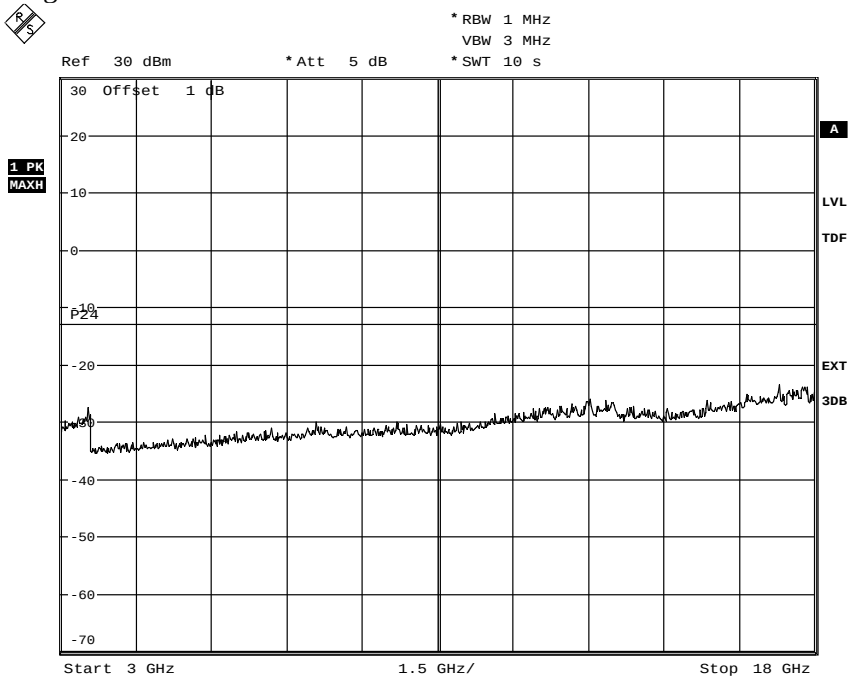
Diagram 1-2



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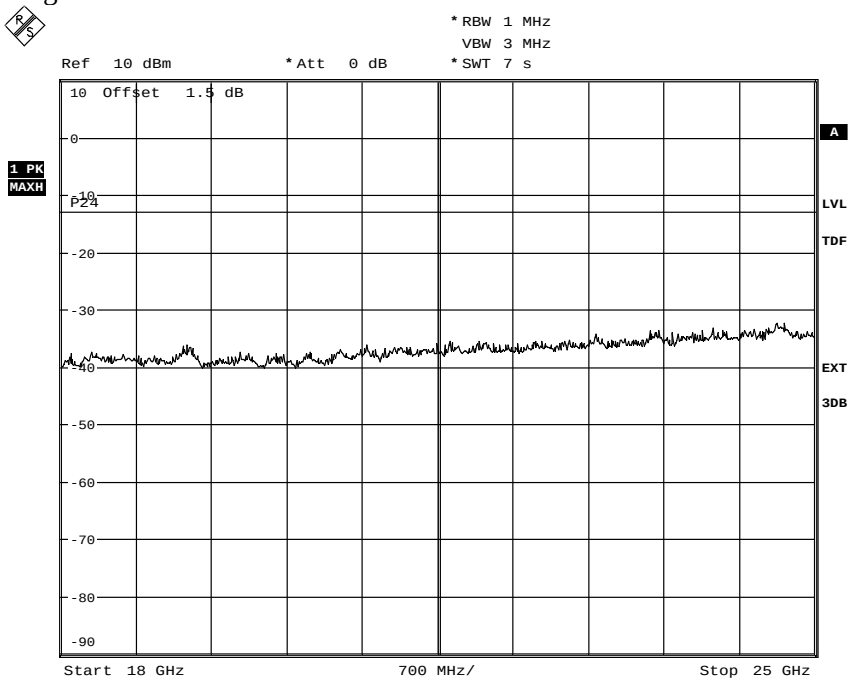
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 1-3



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IC: 287AB-BS118661

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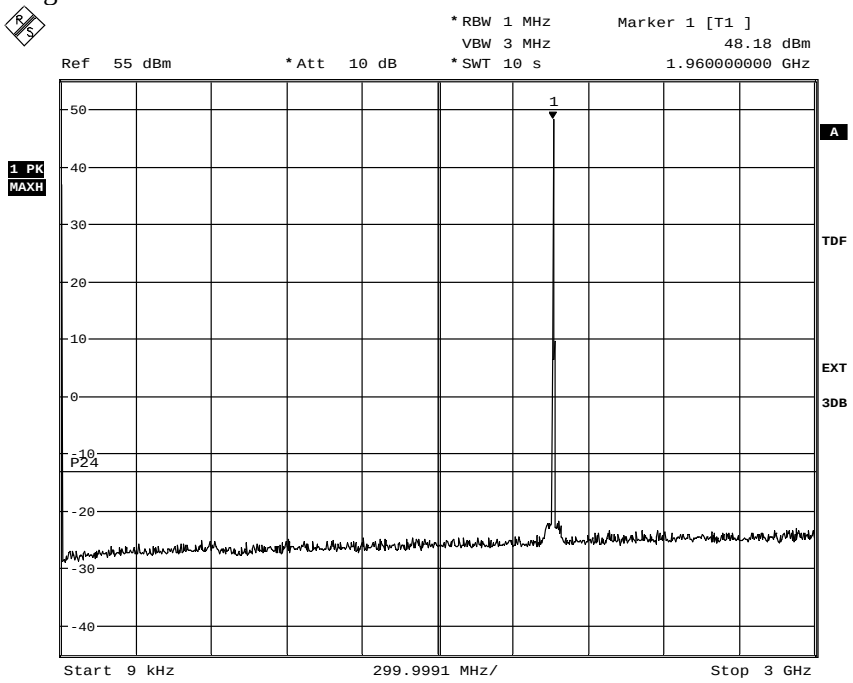

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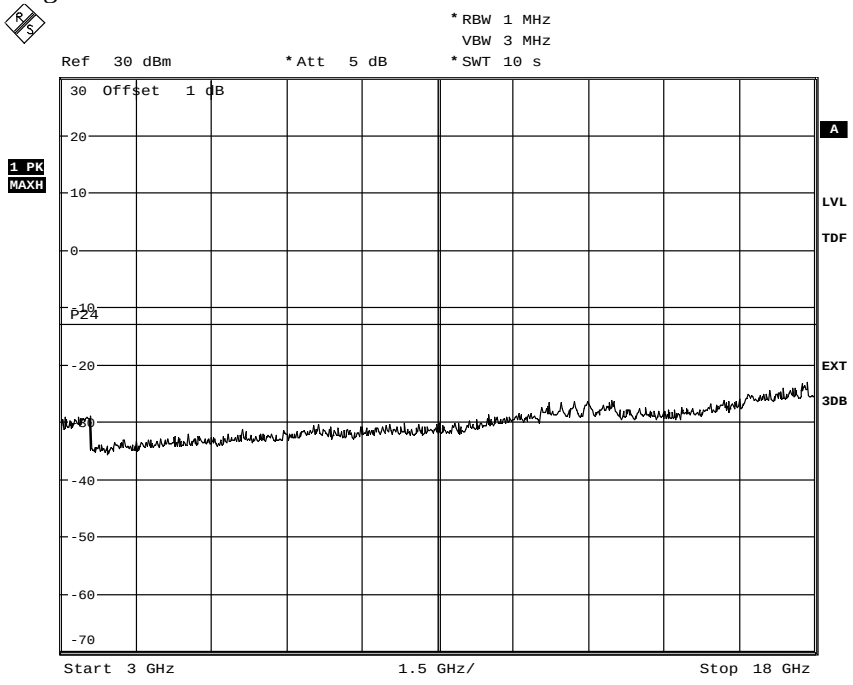

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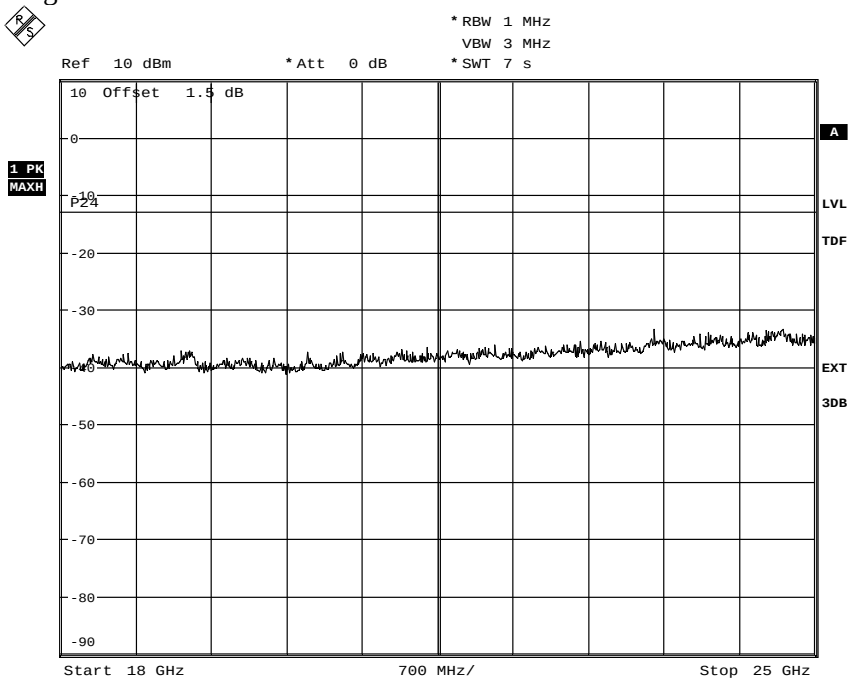
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 2-3



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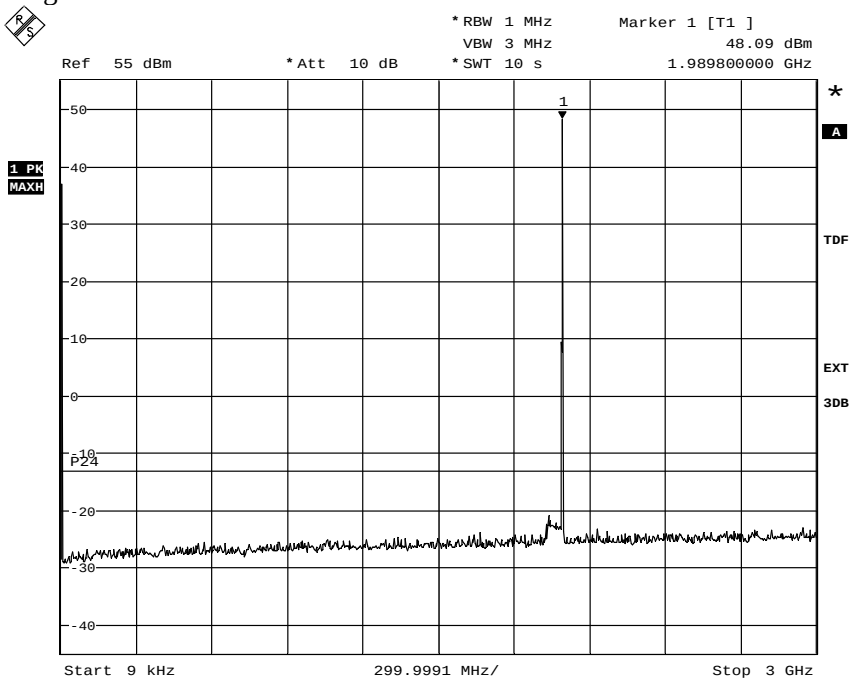
IC: 287AB-BS118661

Diagram 3-1



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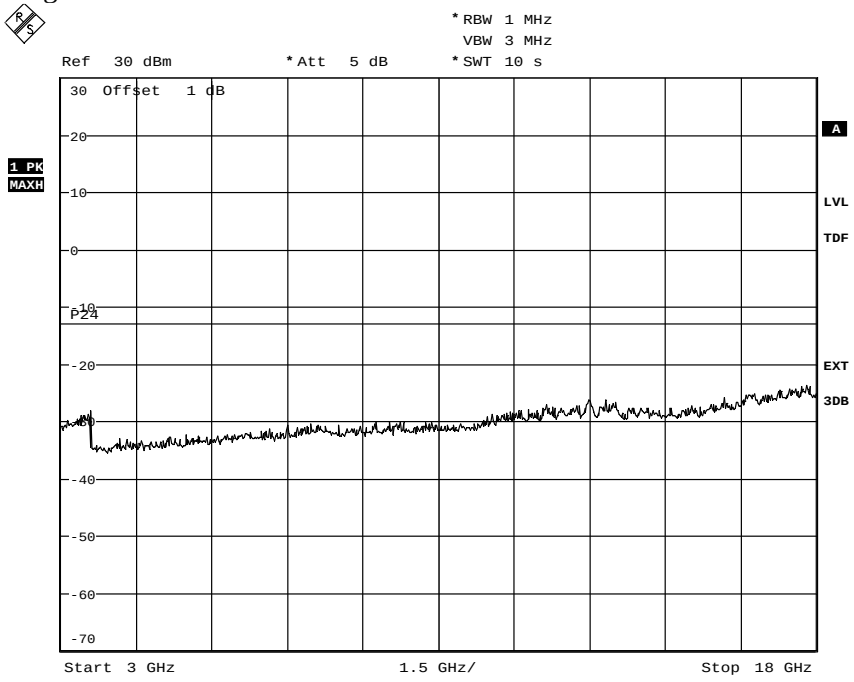

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IC: 287AB-BS118661

Diagram 3-3

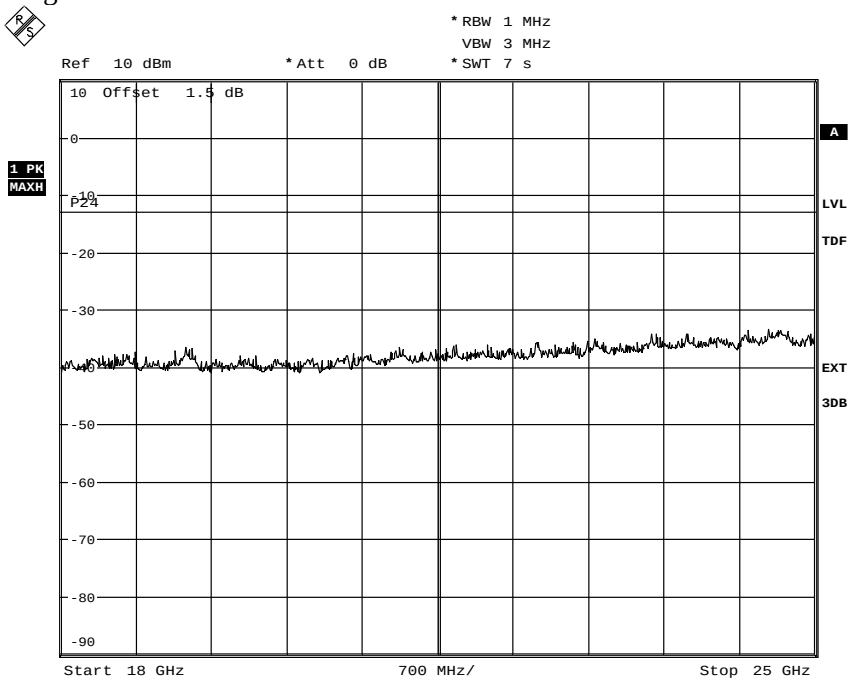

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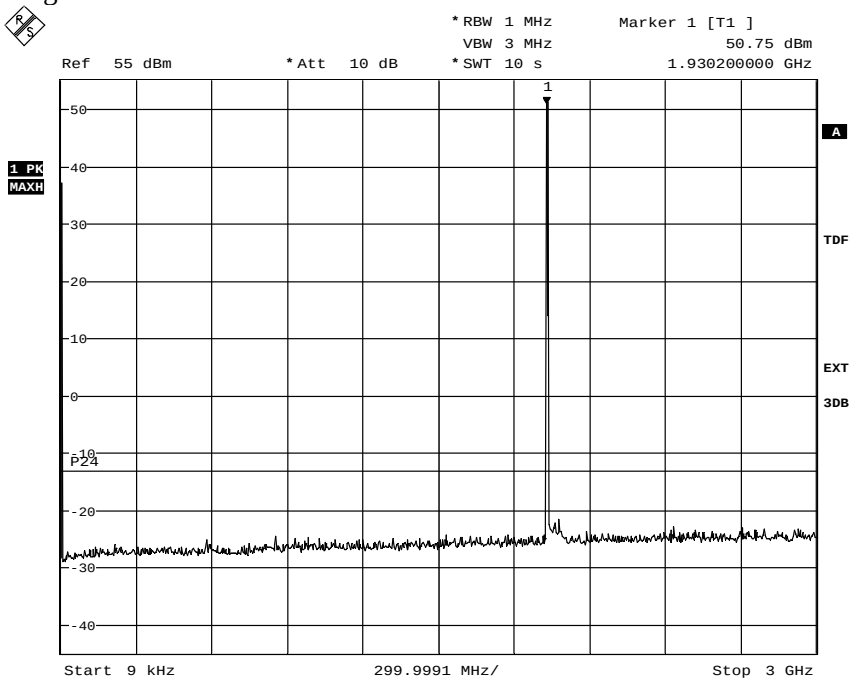
Diagram 4-1



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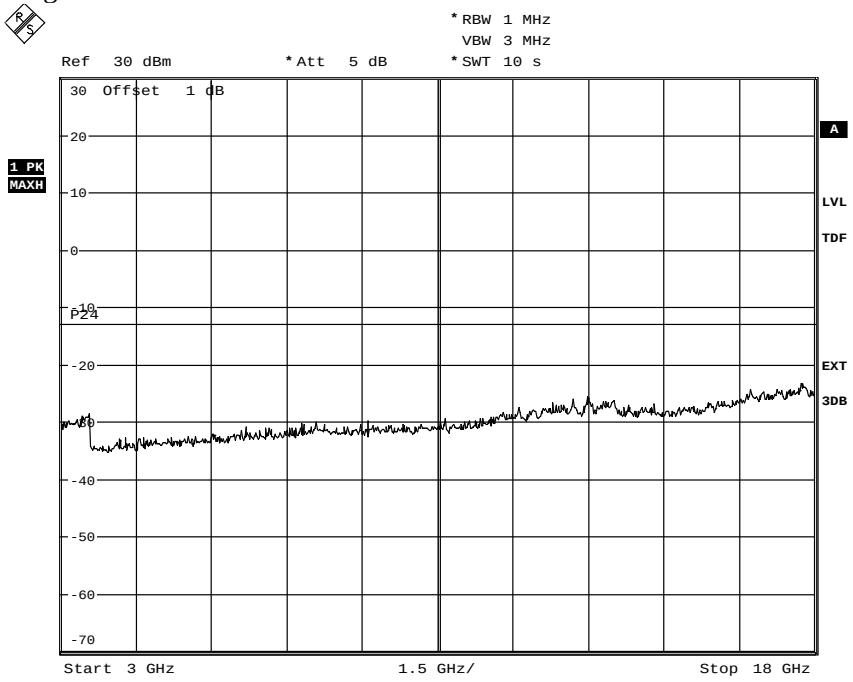

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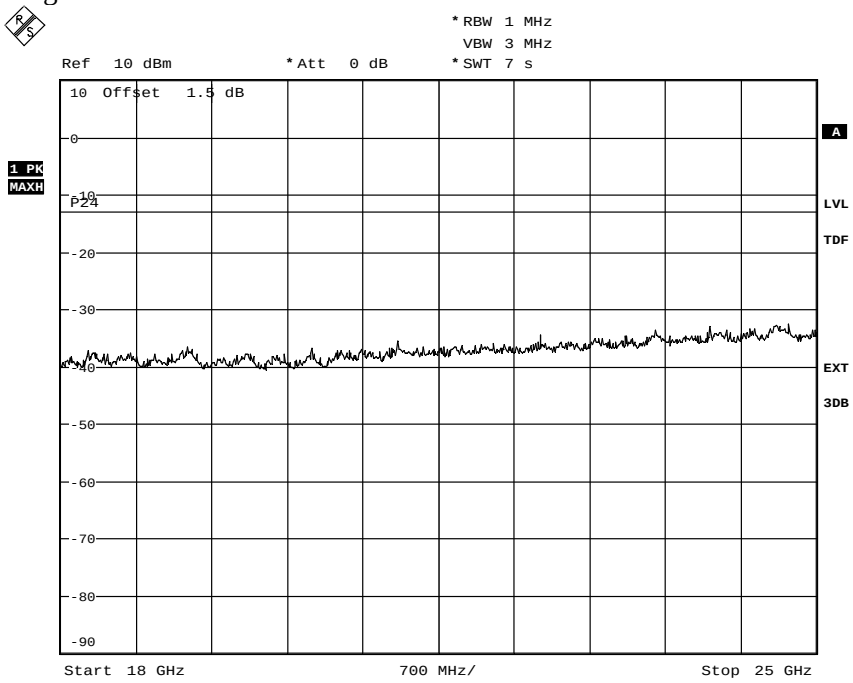
Diagram 4-3



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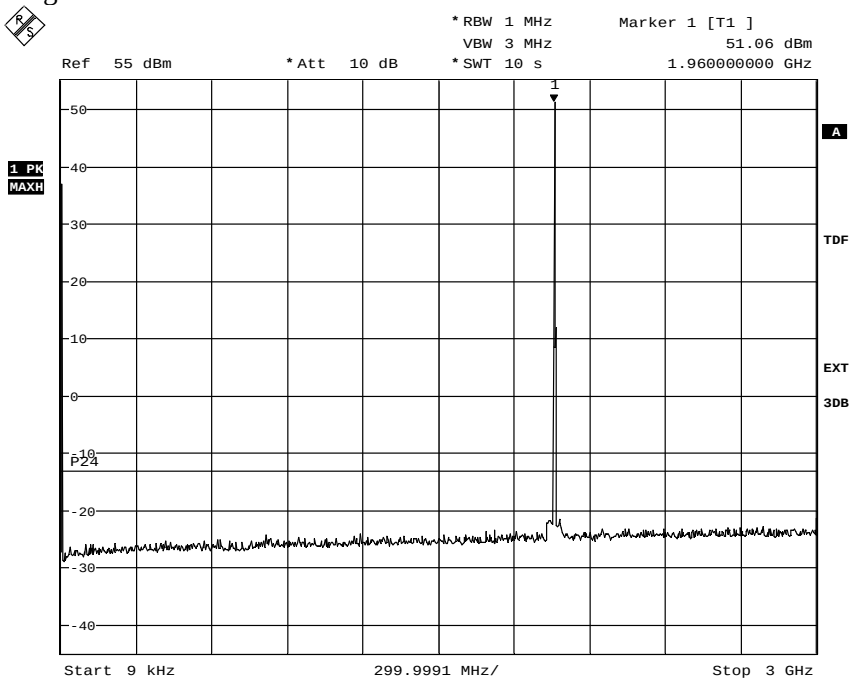

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Diagram 5-2

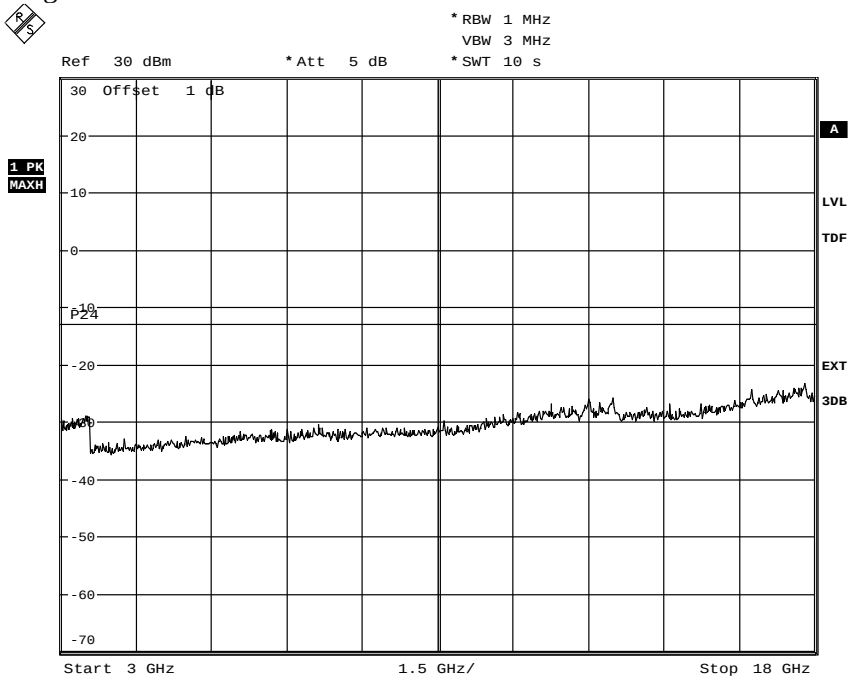

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Diagram 5-3

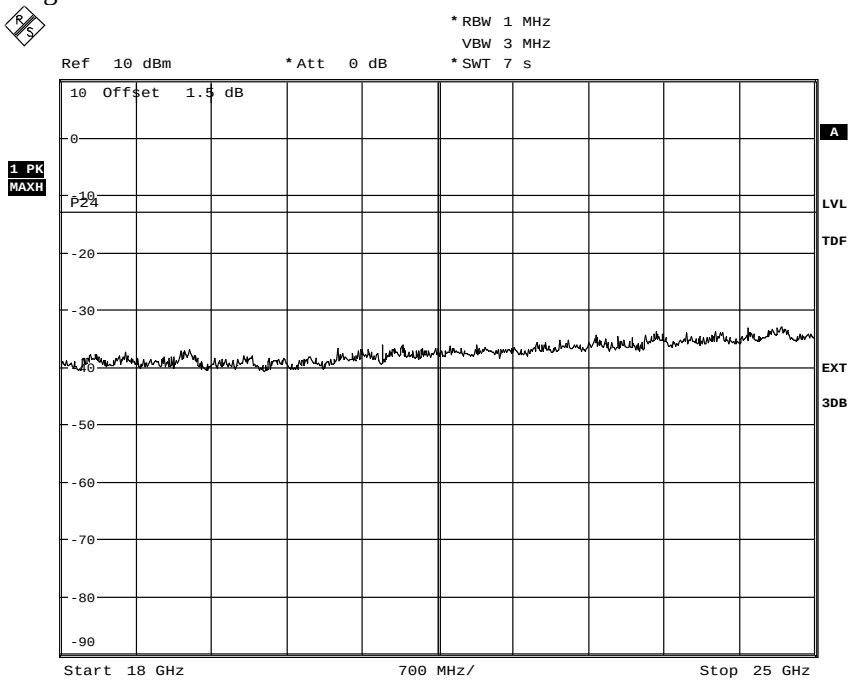

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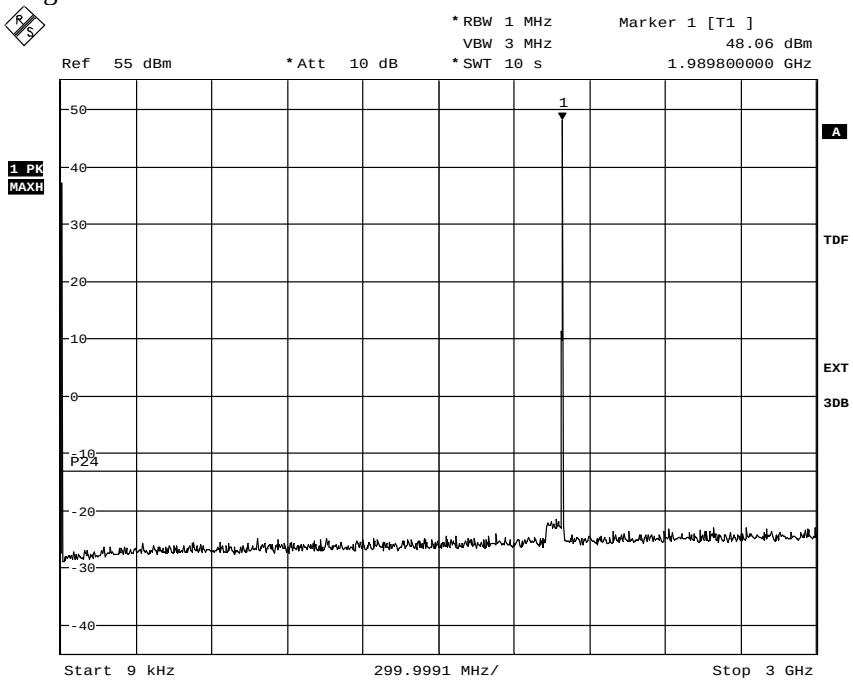
Diagram 6-1



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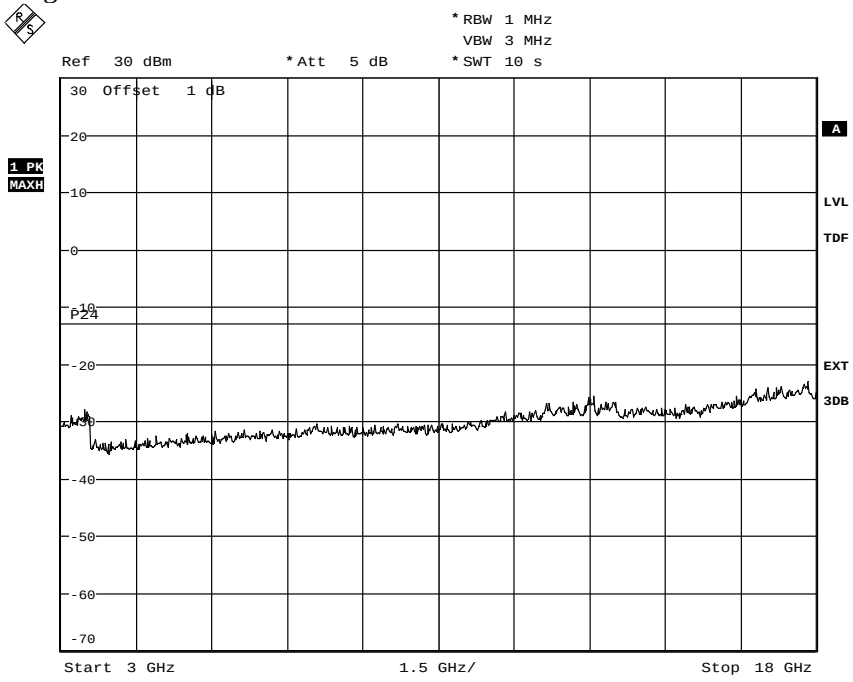

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Diagram 6-3

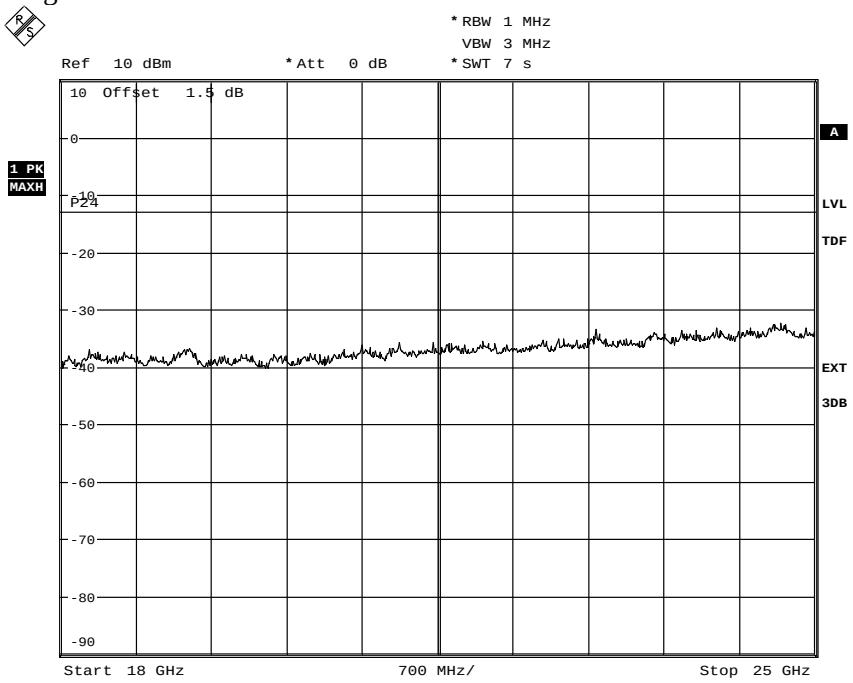

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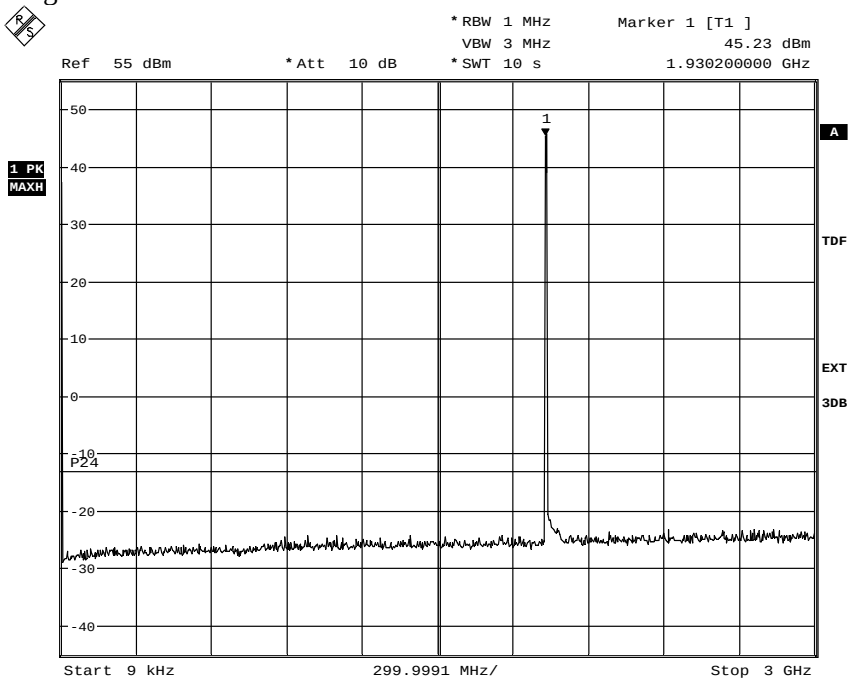
Diagram 7-1



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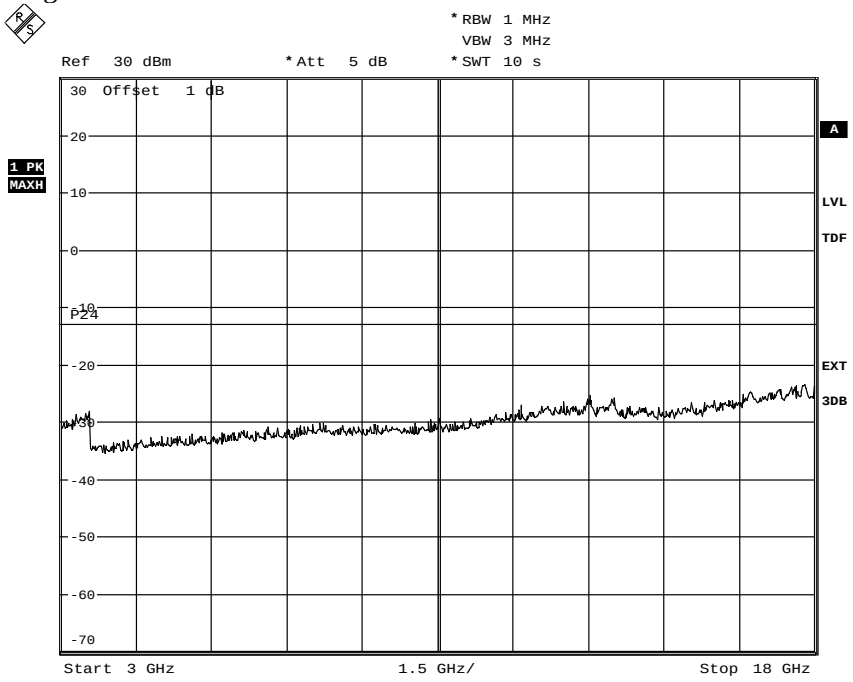

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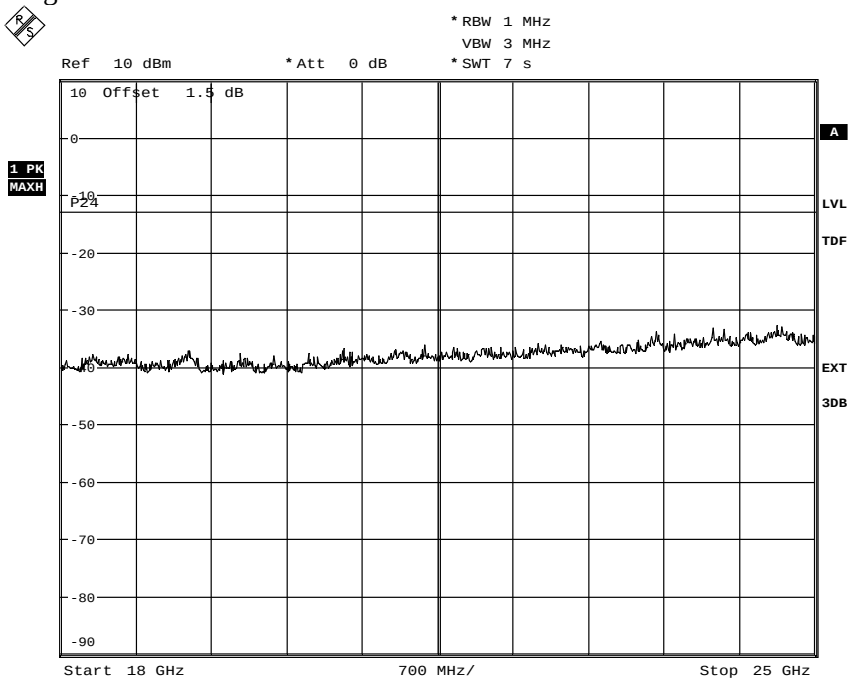
Diagram 7-3



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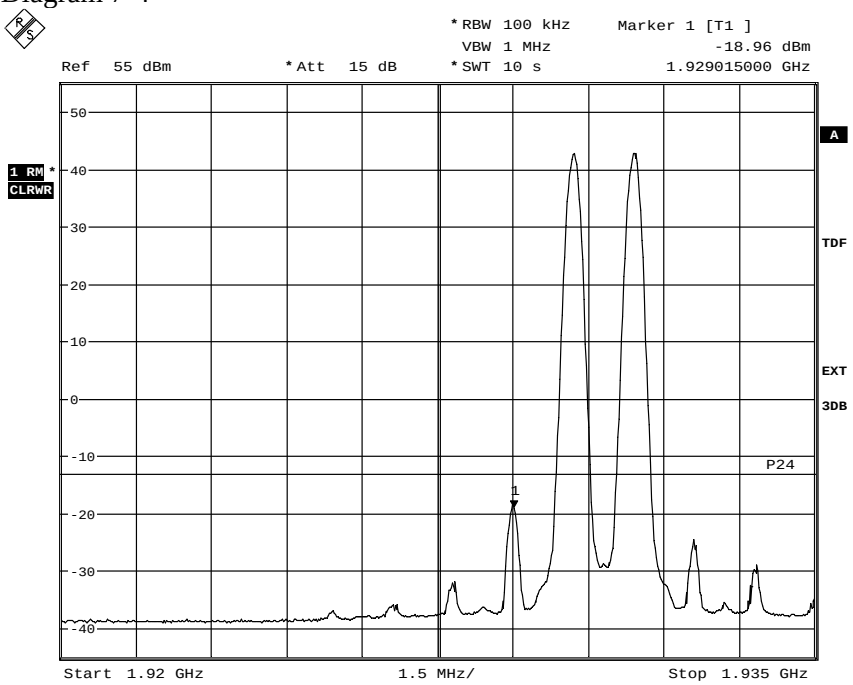
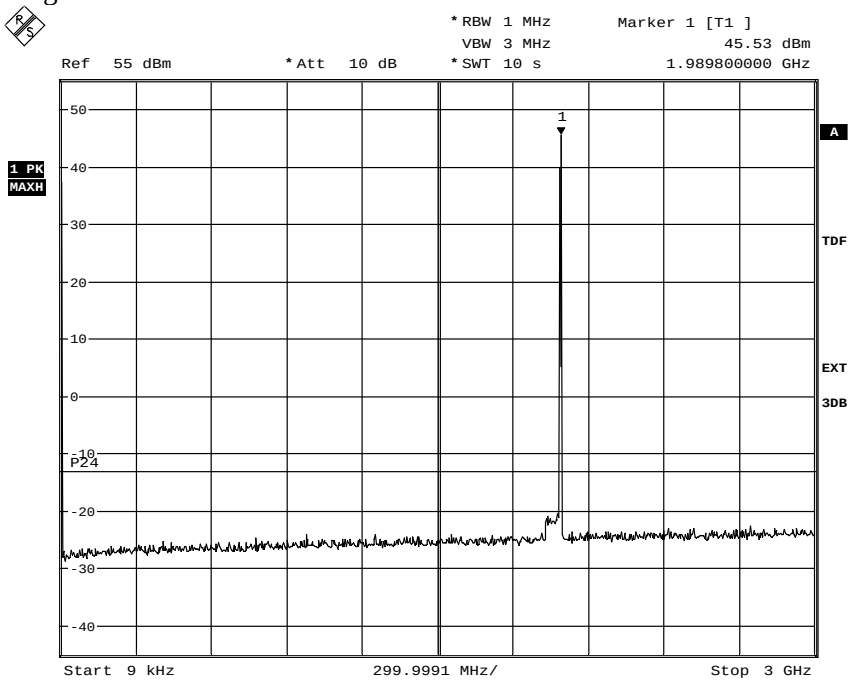


Date: 9.MAR.2011 13:43:36

Activated channels for this test B+(B+6). The level of the emission at 1929 MHz integrated over 1 MHz was -16.2 dBm.

FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 8-1



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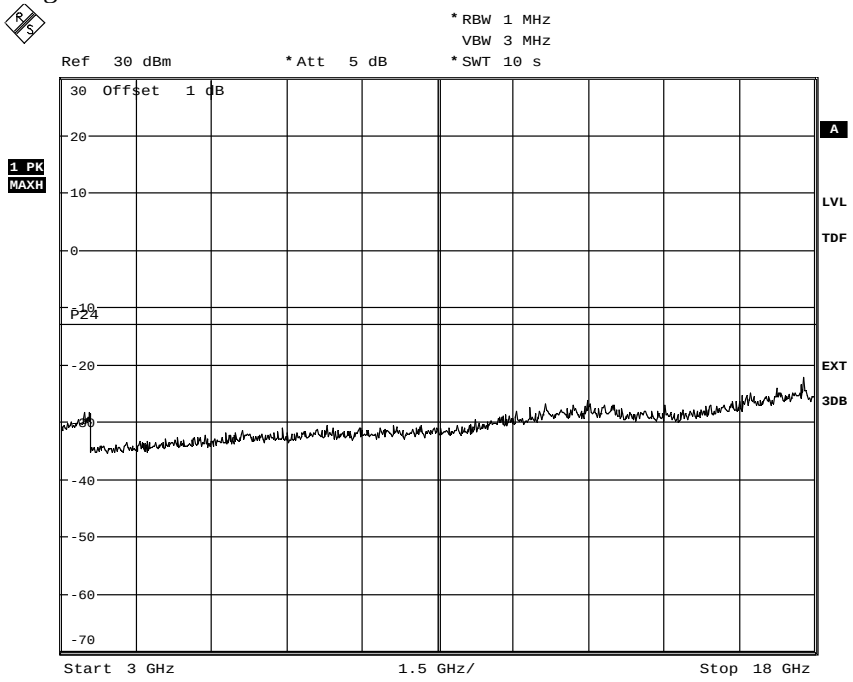

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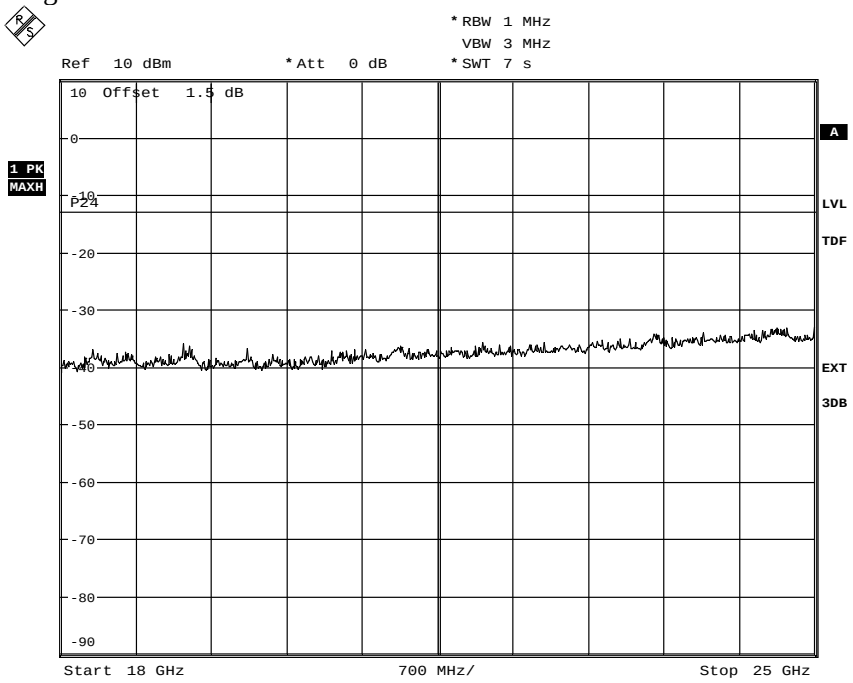
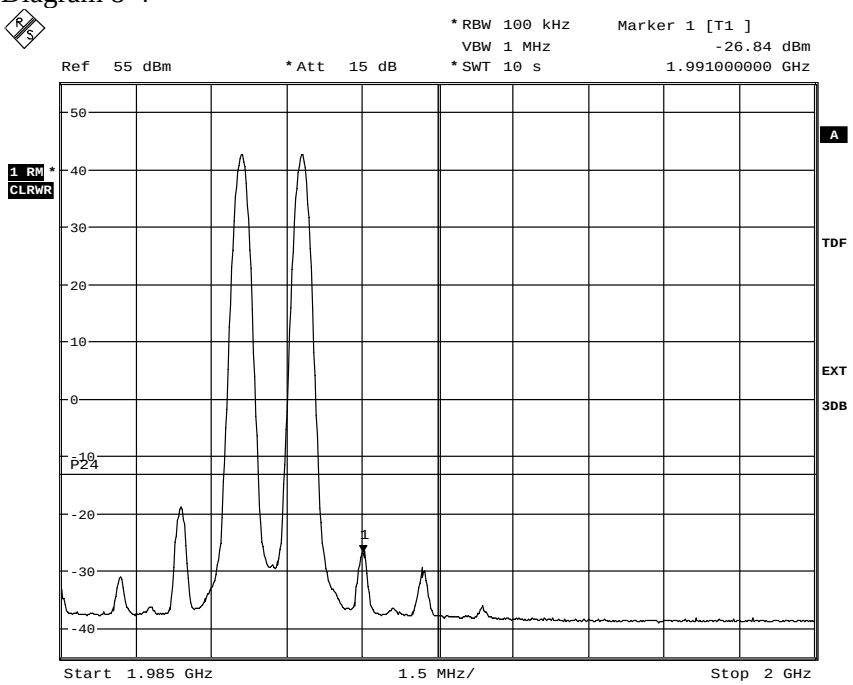
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 8-3



Date: 8.MAR.2011 07:15:36

Diagram 8-4

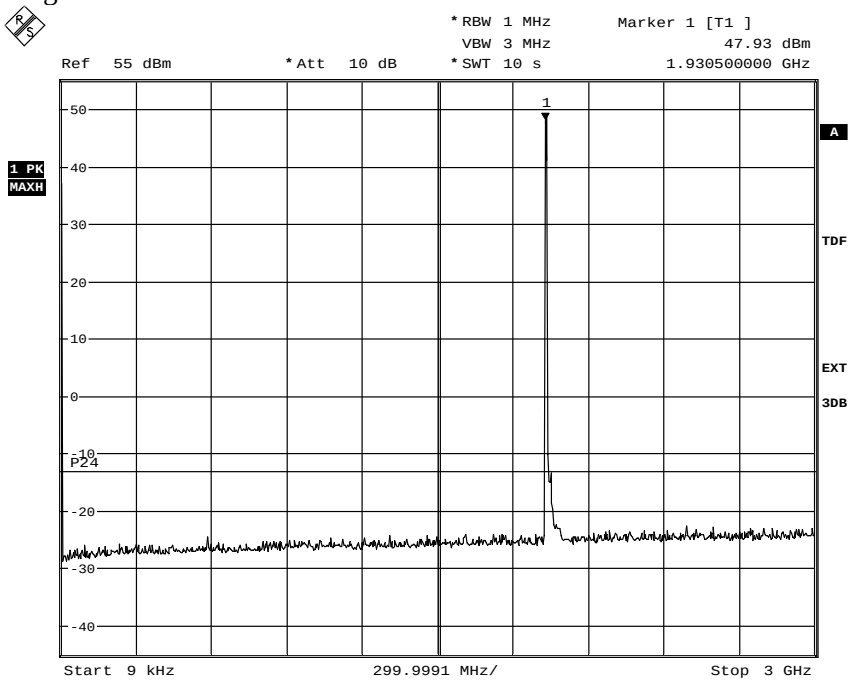


Date: 9.MAR.2011 15:28:48

Activated channels for this test T+(T-6). The level of the emission at 1991 MHz integrated over 1 MHz was -22.1 dBm.

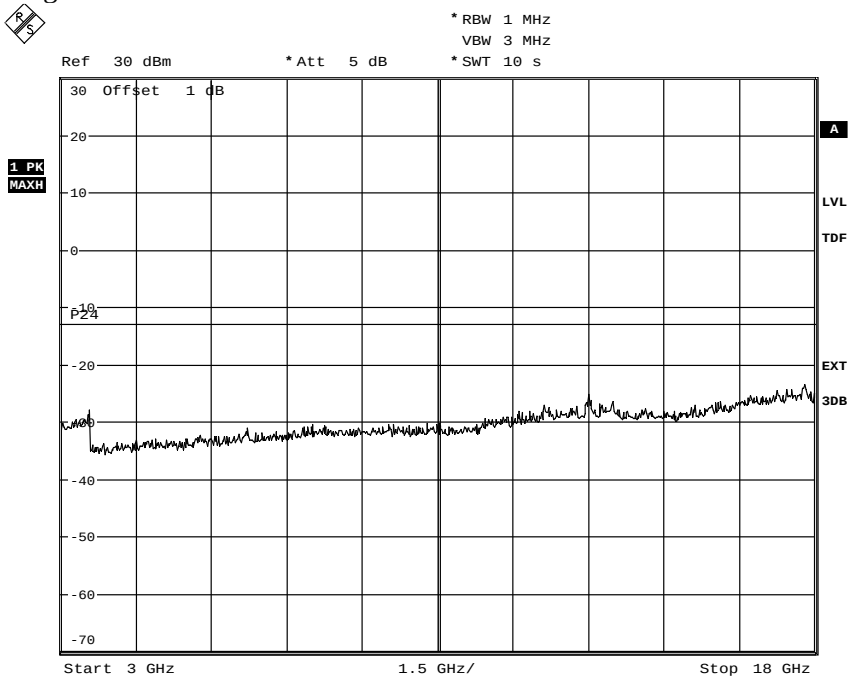
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 9-1



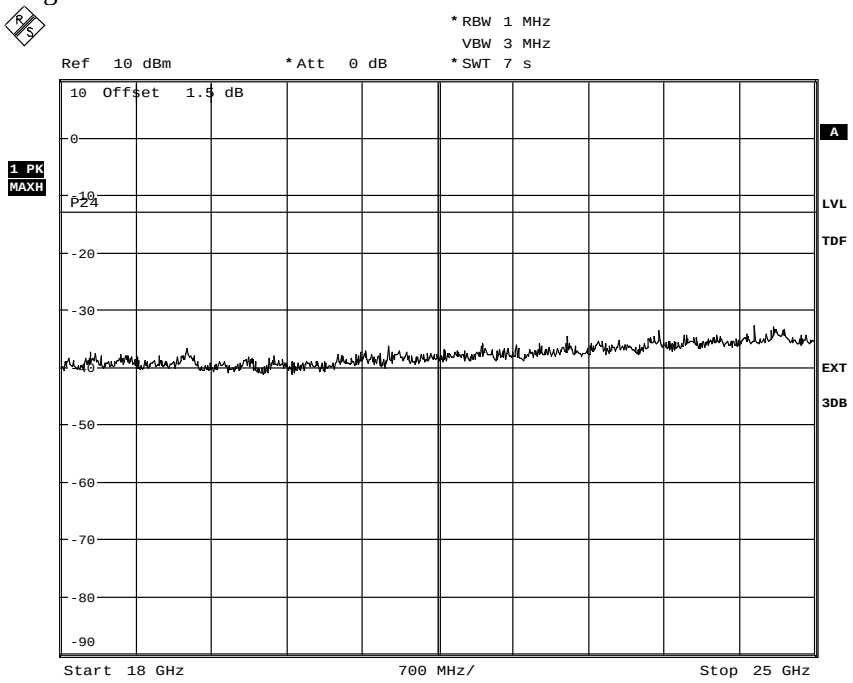
Date: 8.MAR.2011 07:32:53

Diagram 9-2



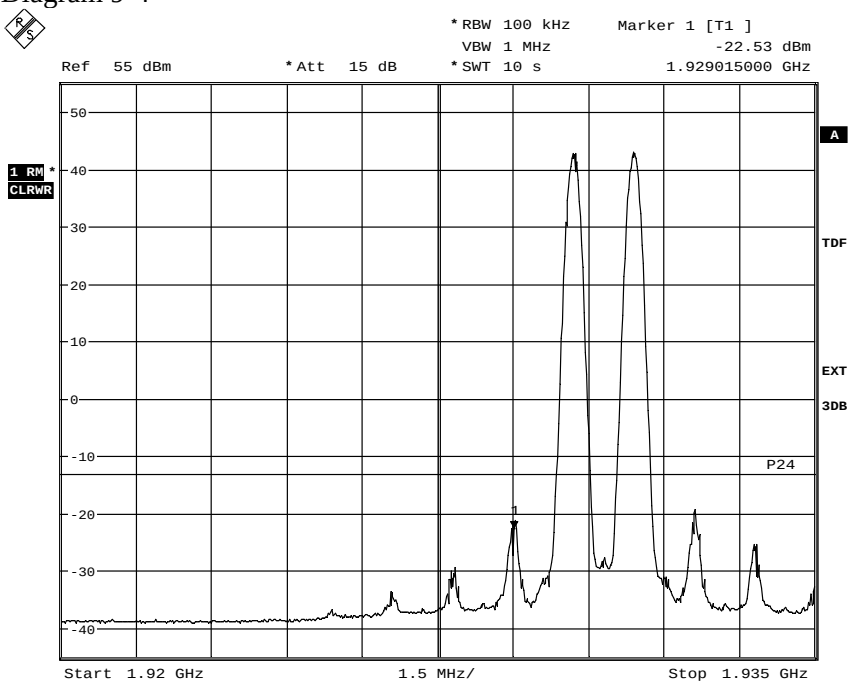
Date: 8.MAR.2011 07:45:18

Diagram 9-3



Date: 8.MAR.2011 07:22:16

Diagram 9-4

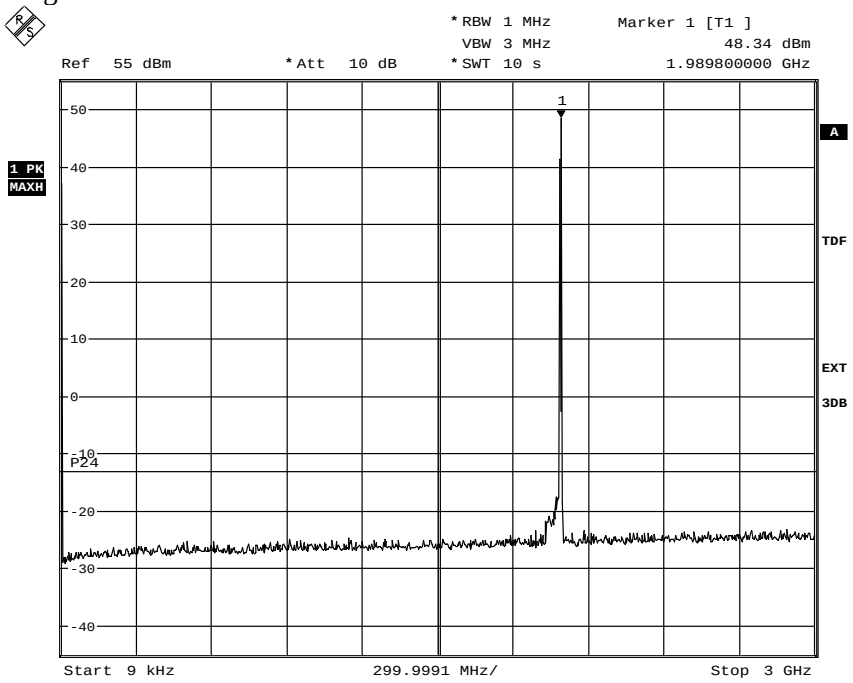


Date: 9.MAR.2011 15:07:30

Activated channels for this test B+(B+6). The level of the emission at 1929 MHz integrated over 1 MHz was -18.9 dBm.

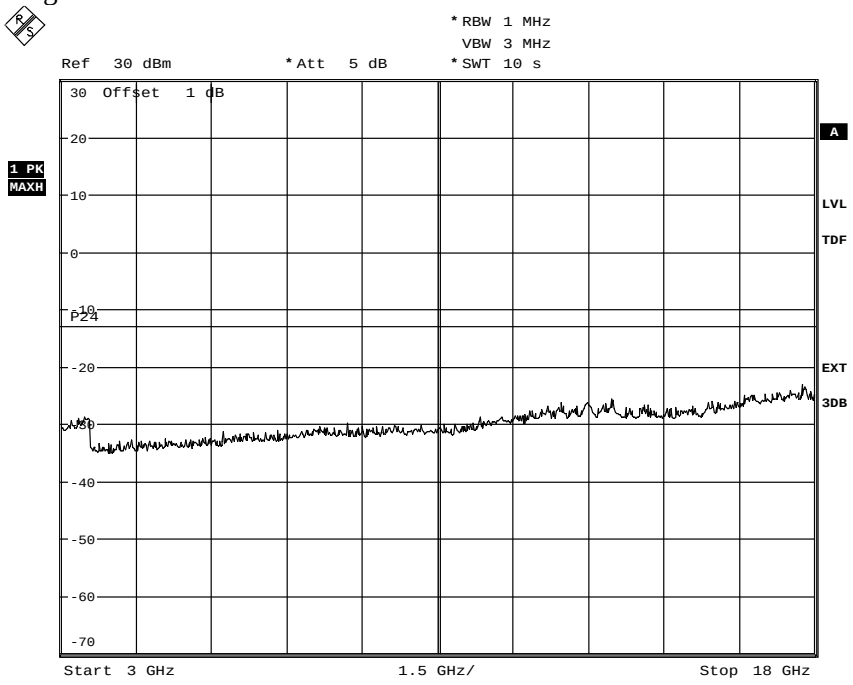
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 10-1



Date: 8.MAR.2011 07:38:39

Diagram 10-2



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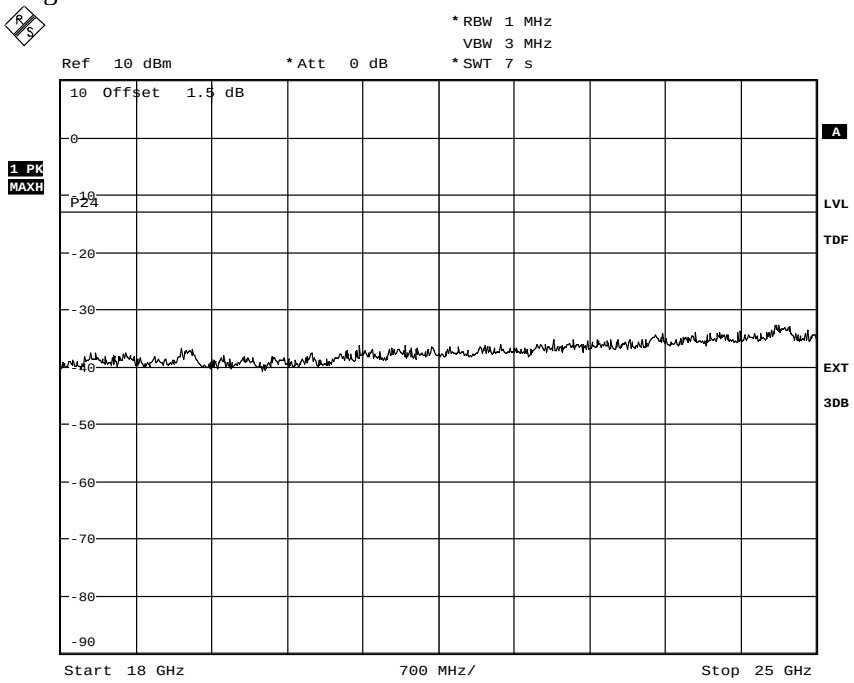
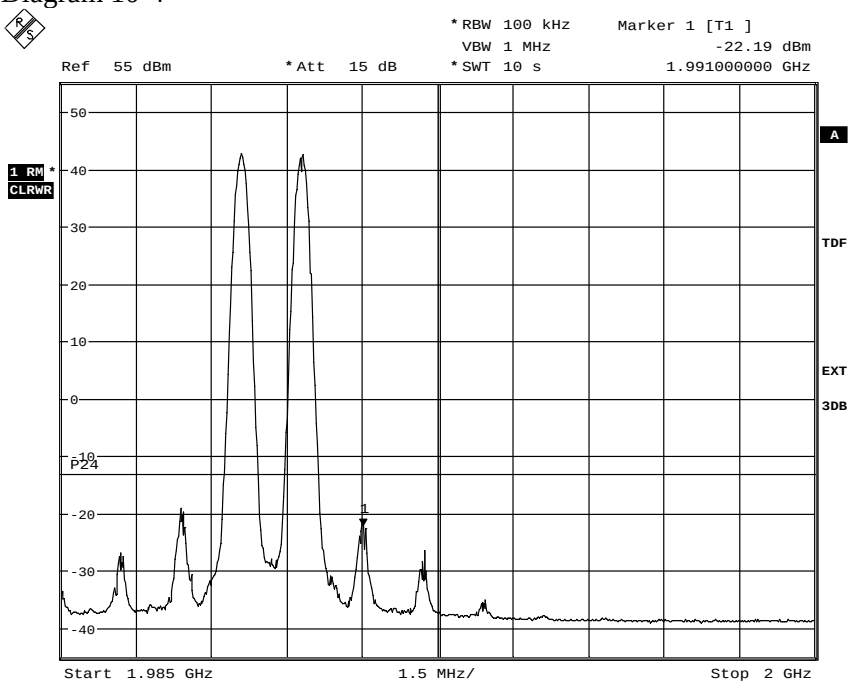
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 10-3



Date: 8.MAR.2011 07:19:07

Diagram 10-4

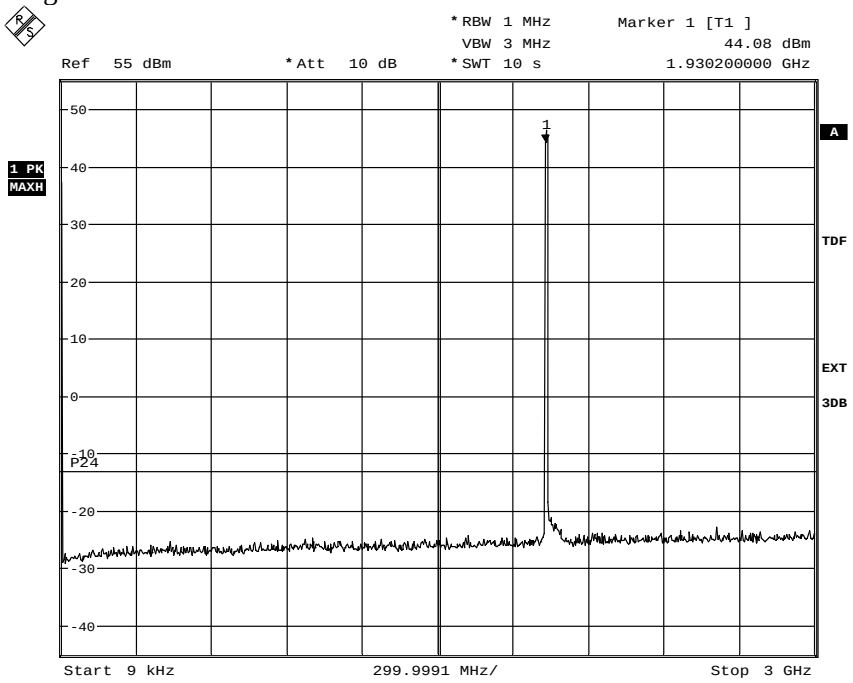


Date: 9.MAR.2011 15:22:16

Activated channels for this test T+(T-6). The level of the emission at 1991 MHz integrated over 1 MHz was -18.3 dBm.

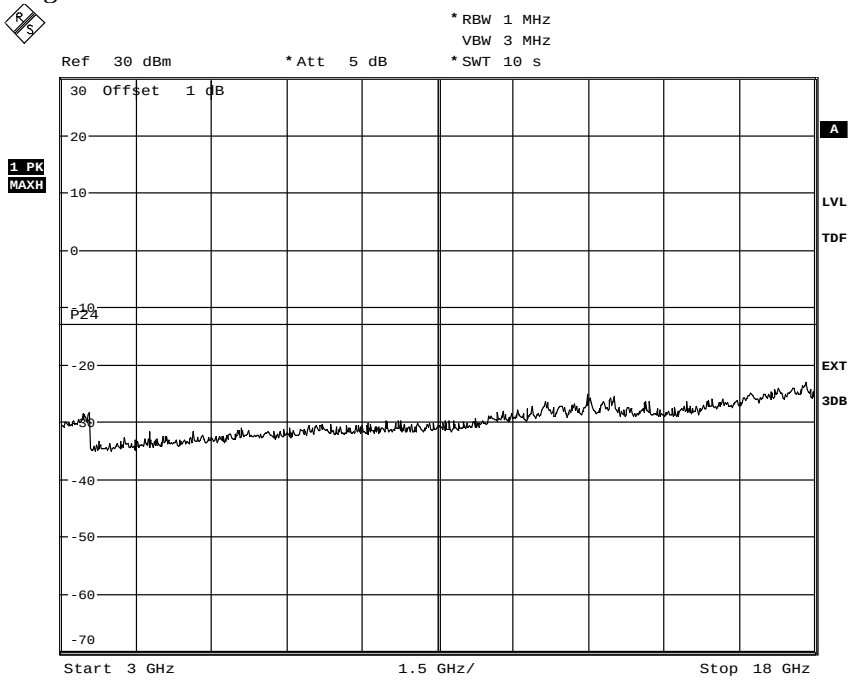
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 11-1



Date: 8.MAR.2011 09:51:34

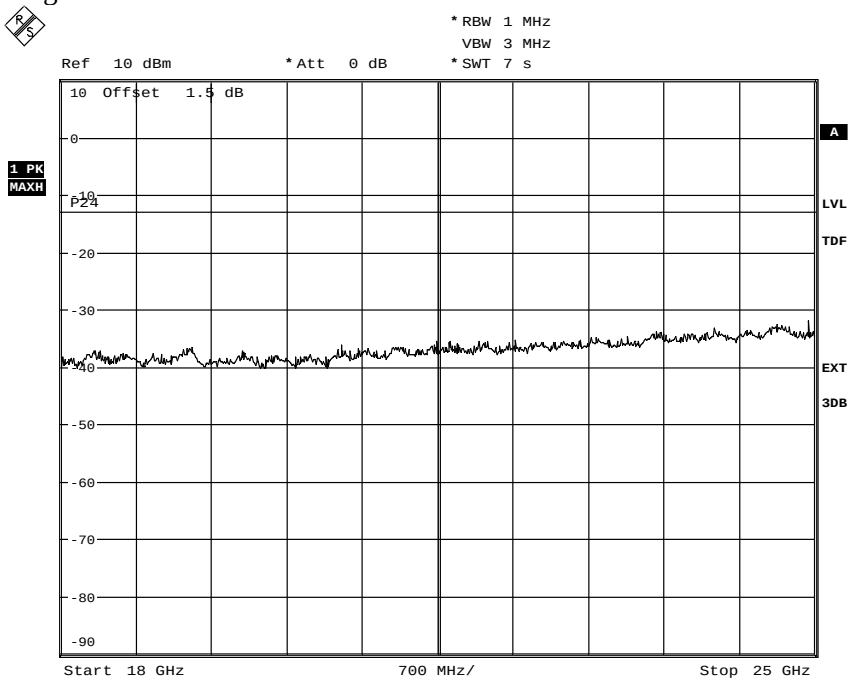
Diagram 11-2



Date: 8.MAR.2011 09:59:49

FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

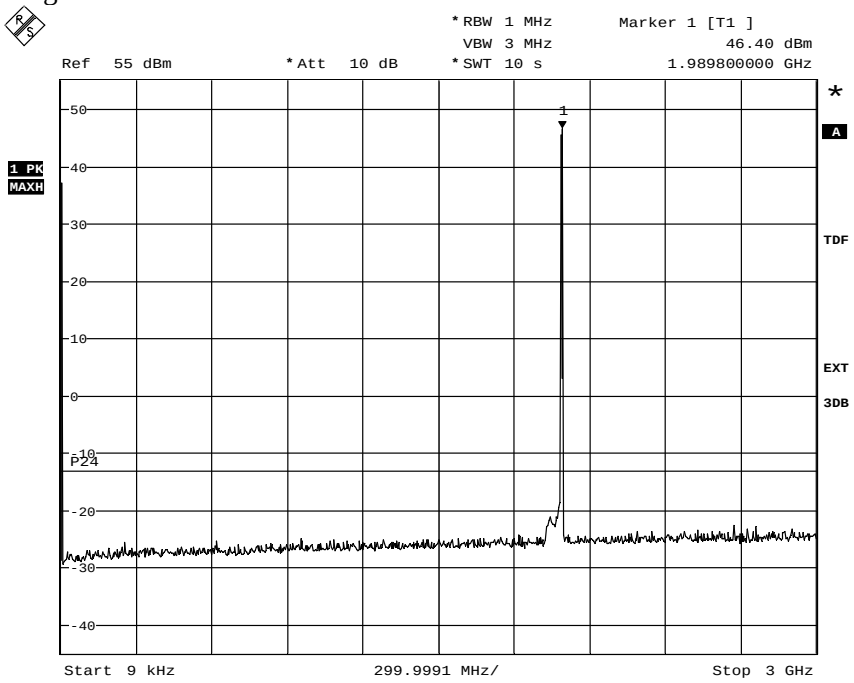
Diagram 11-3



Date: 8.MAR.2011 10:54:13

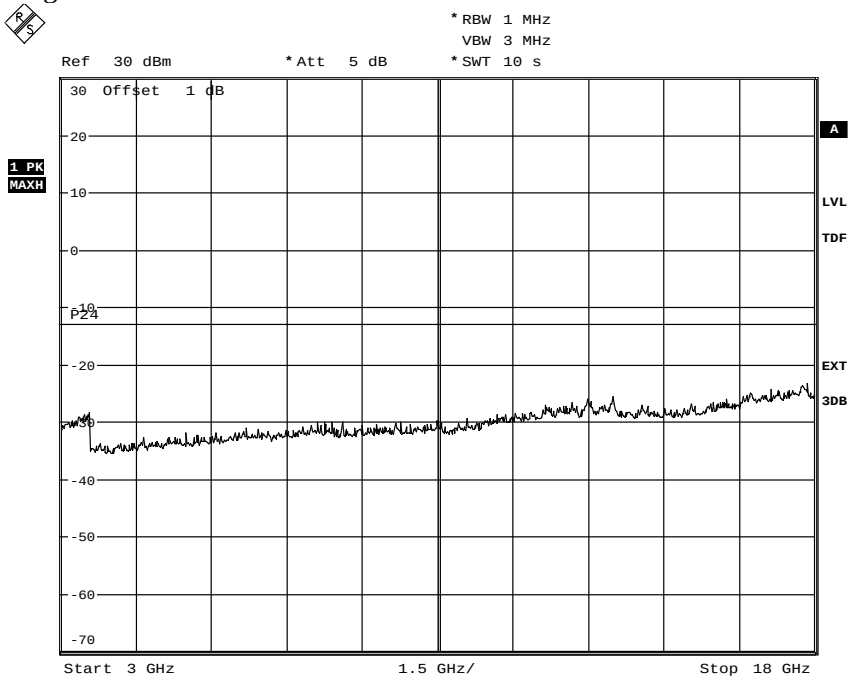
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 12-1



Date: 8.MAR.2011 10:19:55

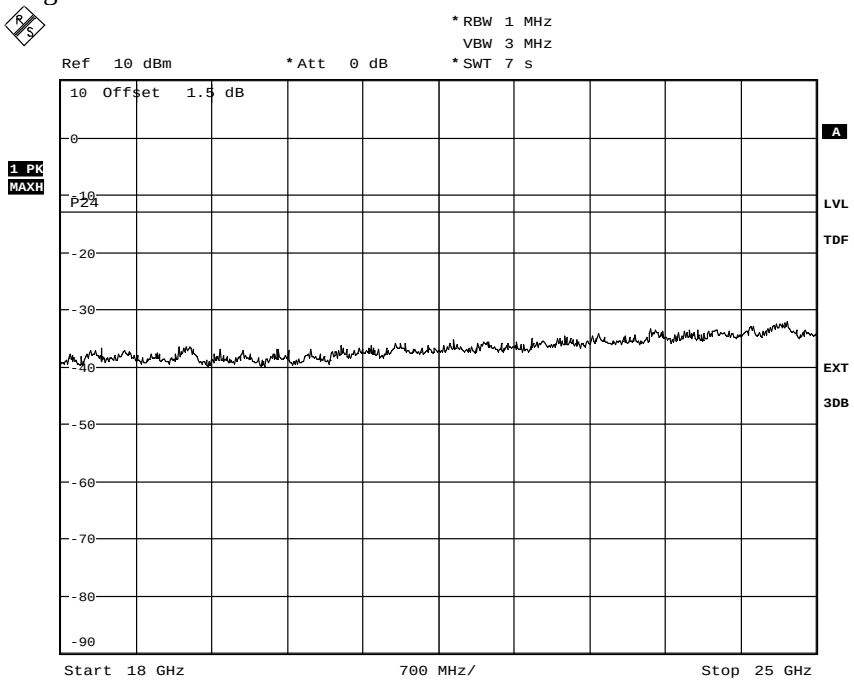
Diagram 12-2



Date: 8.MAR.2011 10:21:28

FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

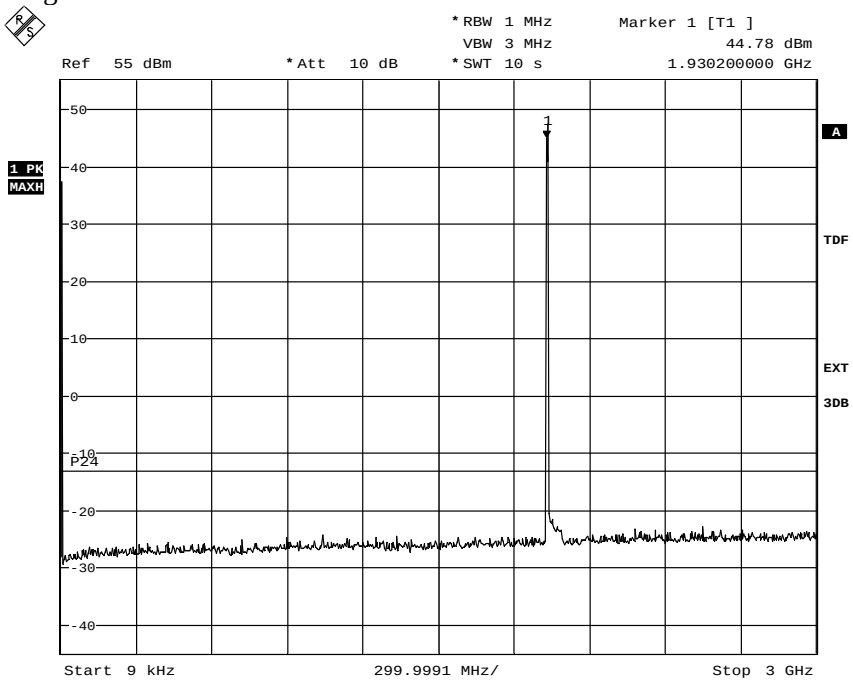
Diagram 12-3



Date: 8.MAR.2011 10:30:00

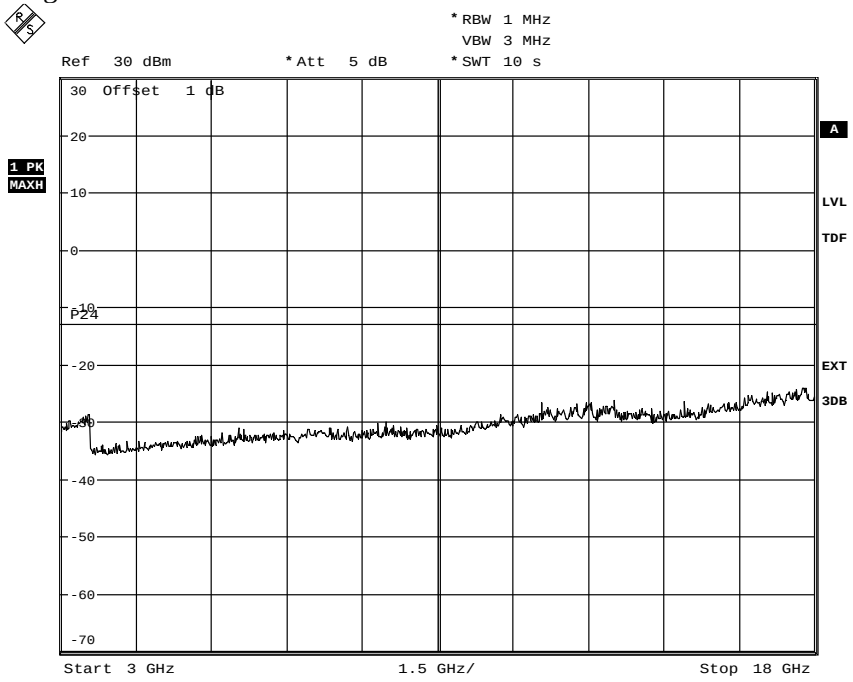
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 13-1



Date: 8.MAR.2011 09:47:33

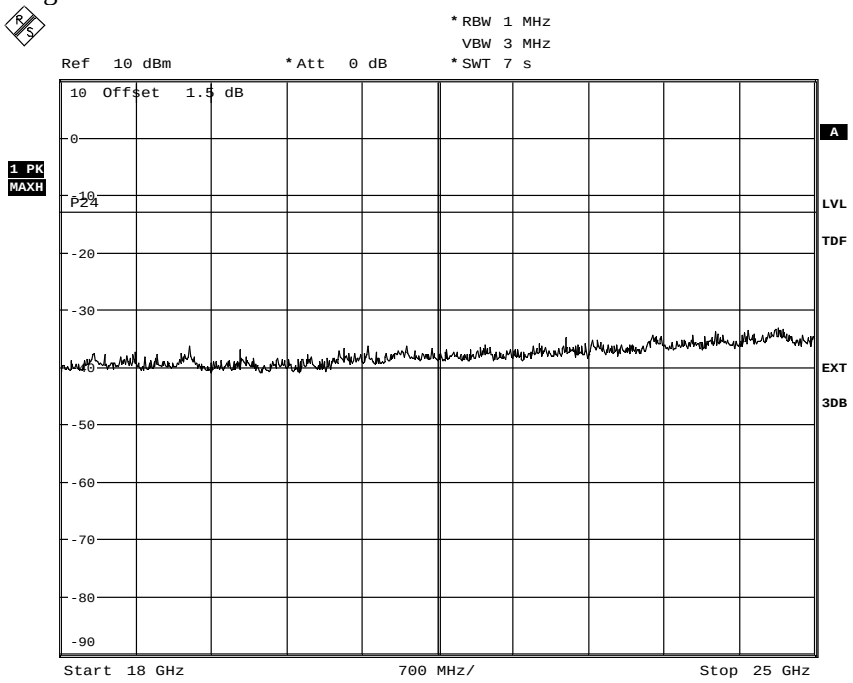
Diagram 13-2



Date: 8.MAR.2011 10:04:00

FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

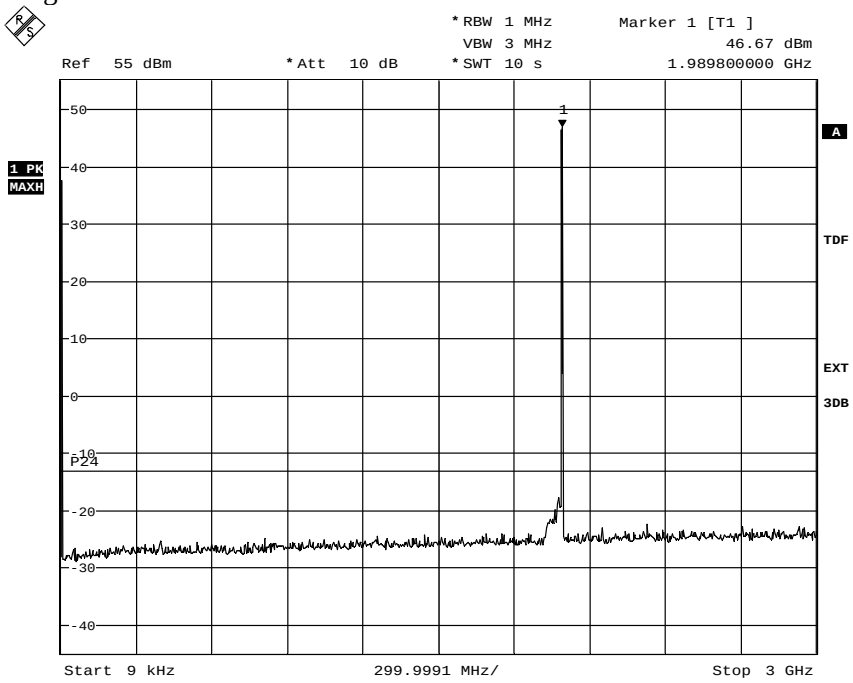
Diagram 13-3



Date: 8.MAR.2011 12:01:18

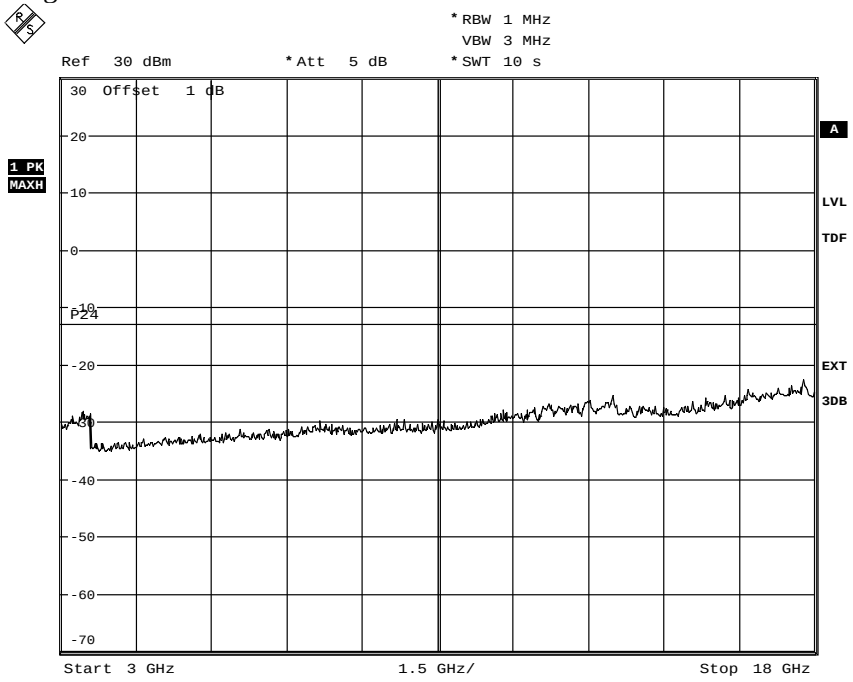
FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 14-1



Date: 8.MAR.2011 10:15:08

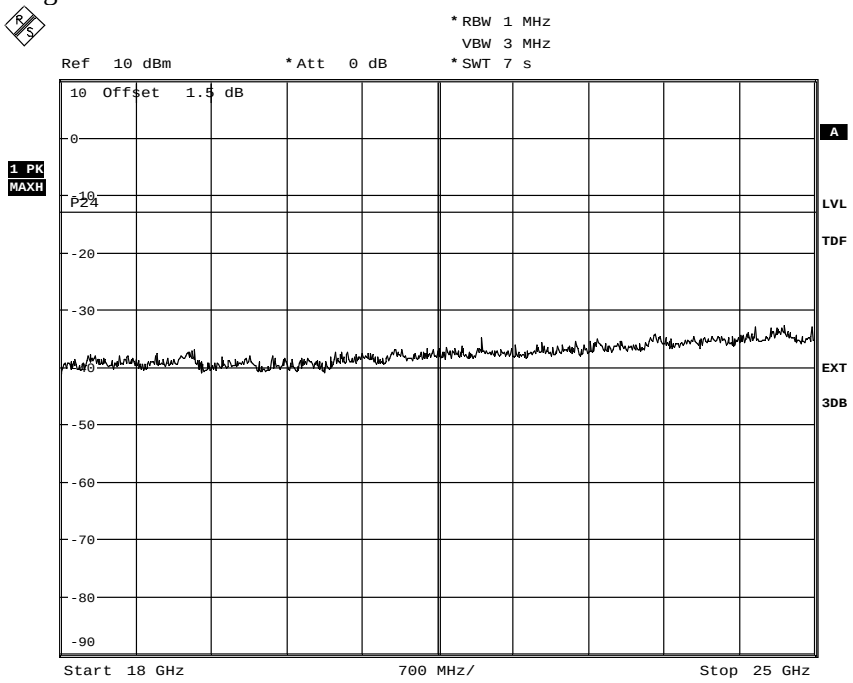
Diagram 14-2



Date: 8.MAR.2011 10:12:32

FCC ID: TA8BKRC11866-1 Appendix 5.1
IC: 287AB-BS118661

Diagram 14-3



Date: 8.MAR.2011 10:33:17

FCC ID: TA8BKRC11866-1
IC: 287AB-BS118661

Appendix 6

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

Date	Temperature	Humidity
2011-02-28 to 2011-03-03	23°C to 24°C ± 3°C	18 % to 20 % ± 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.

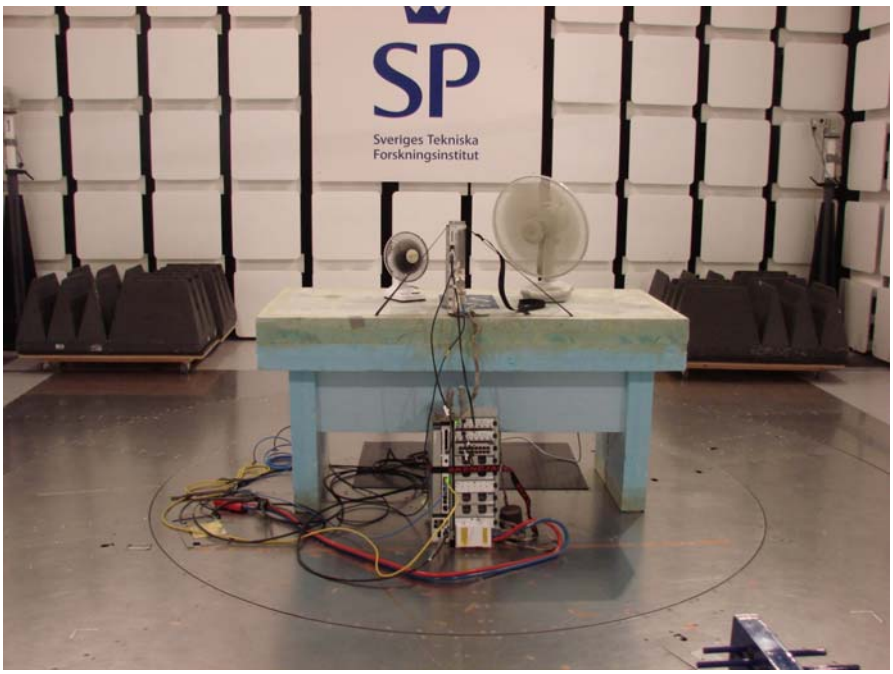
The measurements were performed with both horizontal and vertical polarisation of the antenna. The antenna distance was 3 m in the frequency range 30 MHz – 18 GHz and 1m in the frequency range 18 - 25 GHz.

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 measurement is shown in the picture below:



Note: The fans were required for thermal relief. The equipment lacks sufficient passive cooling capacity when tested stand-alone outside a RBS cabinet.

FCC ID: TA8BKRC11866-1 Appendix 6
IC: 287AB-BS118661

Measurement equipment

Measurement equipment	SP number
Test site Tesla	503 881
R&S ESI 26	503 292
Control computer	503 479
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

Tested configurations

Single Carrier (One carrier configuration):

Cell	1	1	1
Channel	B	M	T

Multi Carrier 1x2 (Two carrier configuration):

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

Multi Carrier 1x4 (Four carrier configuration):

Cell	1	2	3	4
Channels	B	B+5	B+10	B+15
Channels	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

§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

FCC ID: TA8BKRC11866-1
IC: 287AB-BS118661

Appendix 7

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

Date	Temperature (test equipment)	Humidity (test equipment)
2011-03-10 to 2011-03-14	22-24°C ± 3 °C	19-29% ± 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
Rohde & Schwarz FSIQ 40	503 758
RF attenuator	504 159
Testo 635 temperature and humidity meter	504 203
Climate chamber 2	501 031

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	-25	-29
-55.2	+20	-28	-33
-40.8	+20	-24	-31
-48.0	+30	-19	-32
-48.0	+40	-15	-19
-48.0	+50	-13	-17
-48.0	+10	-19	-23
-48.0	0	-21	-27
-48.0	-10	-19	-26
-48.0	-20	-21	-28
-48.0	-30	-20	-23
Maximum freq. error (Hz)		28	33
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

FCC ID: TA8BKRC11866-1 Appendix 8
IC: 287AB-BS118661

Receiver spurious emissions measurements according to IC RSS-133 6.6

Date	Temperature	Humidity
2011-03-08	24 °C ± 3 °C	12 % ± 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
Rohde & Schwarz FSQ 40	504 143
Testo 635 temperature and humidity meter	504 203

Result

The results are shown in appendix 8.1:

Channel M:	GMSK	8-PSK
	Diagram 1	Diagram 2

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.

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

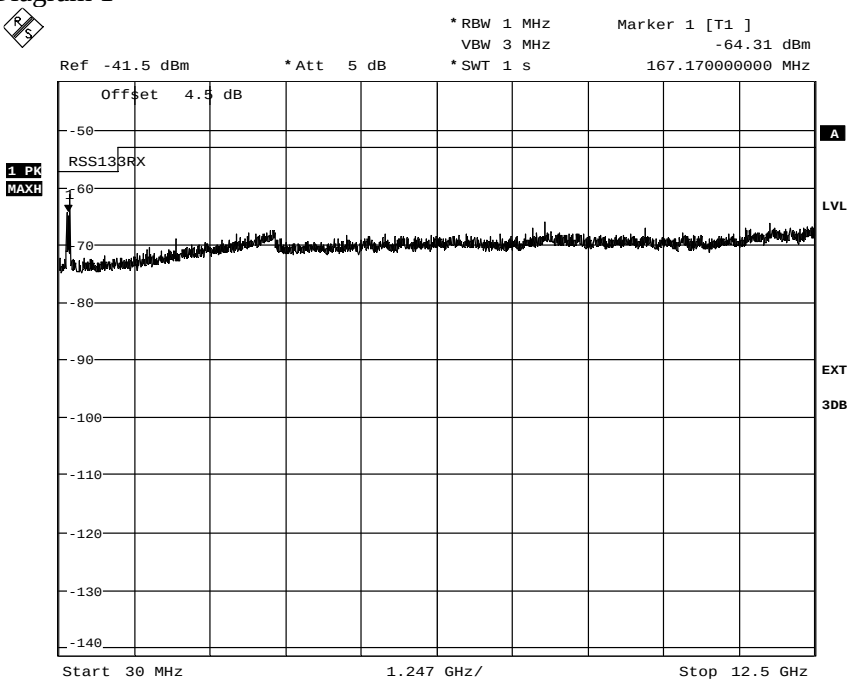
RSS-Gen 6.2 Antenna Conducted limits

Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts (-57 dBm) in the band 30-1000 MHz, and 5 nanowatts (-54 dBm) above 1000 MHz.

Emission below limit?	Yes

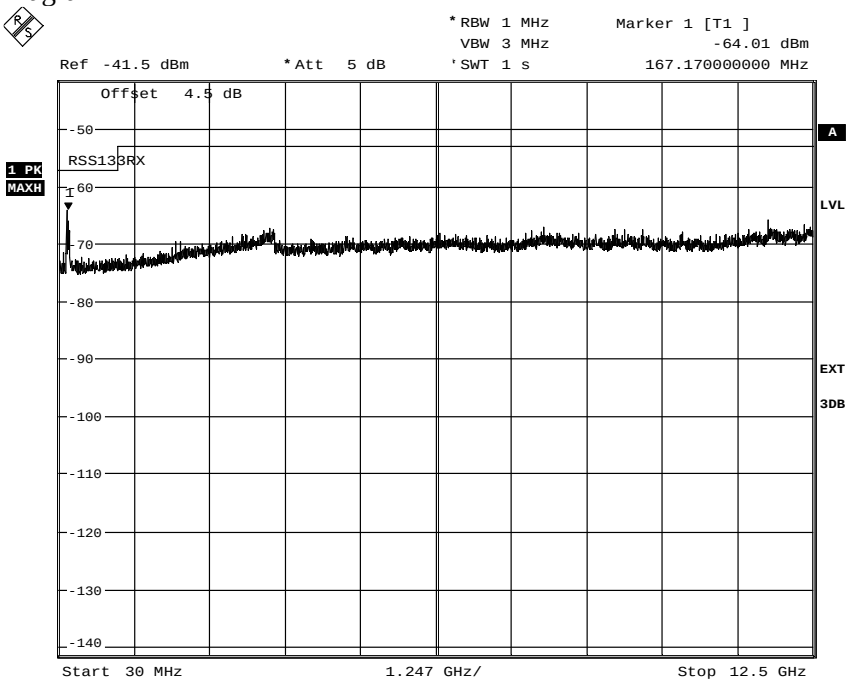
FCC ID: TA8BKRC11866-1 Appendix 8.1
IC: 287AB-BS118661

Diagram 1



Date: 8.MAR.2011 12:47:45

Diagram 2



Date: 8.MAR.2011 12:50:48

FCC ID: TA8BKRC11866-1
IC: 287AB-BS118661

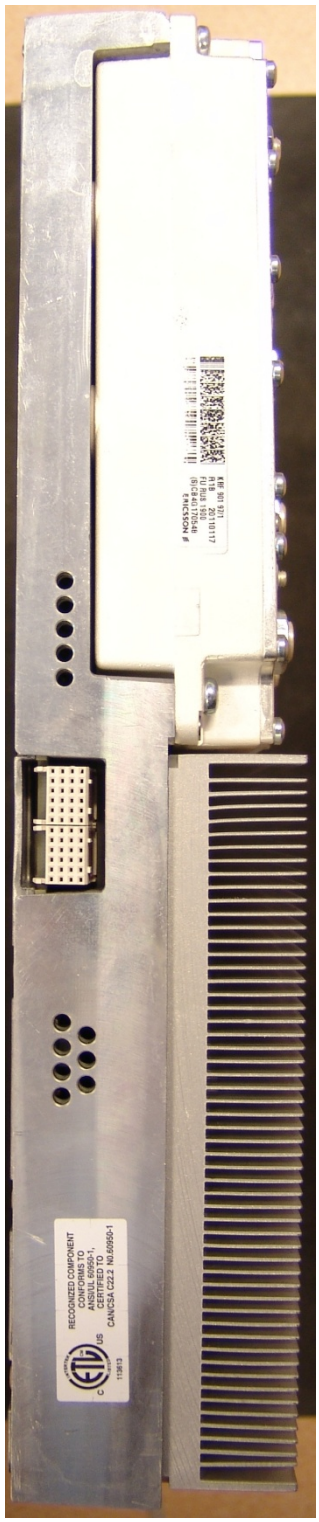
Appendix 9

External photos

Photos show the sample used for conducted measurements

Front side

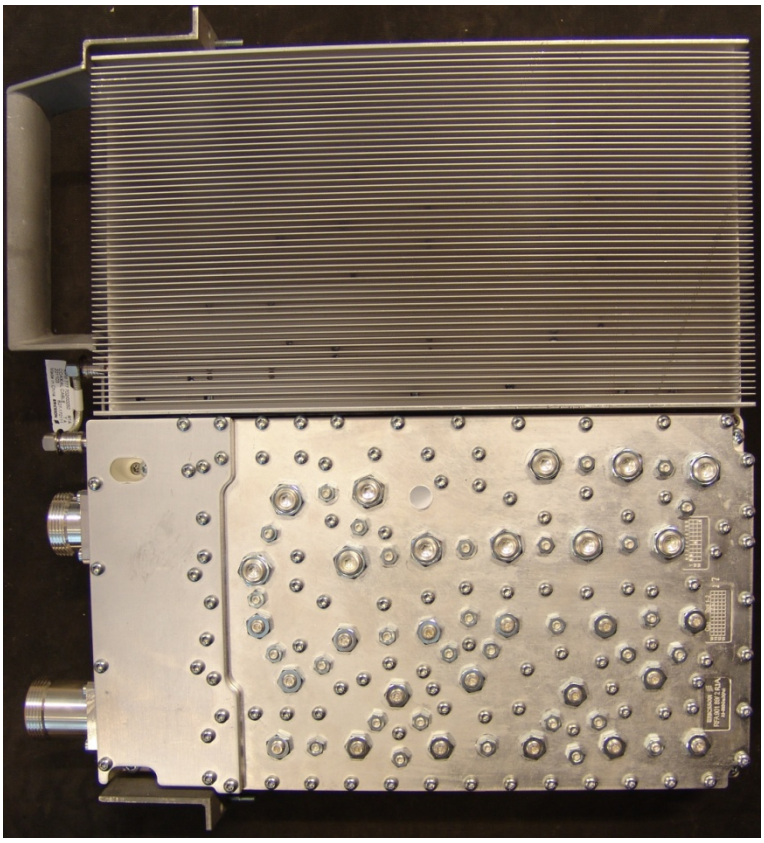
Rear side



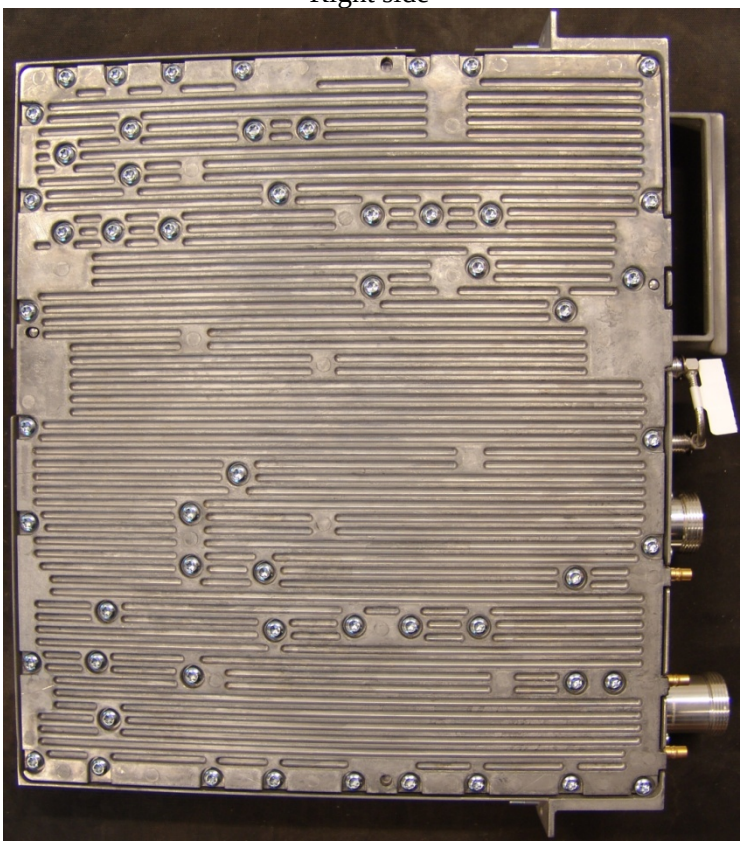
FCC ID: TA8BKRC11866-1
IC: 287AB-BS118661

Appendix 9

Left side



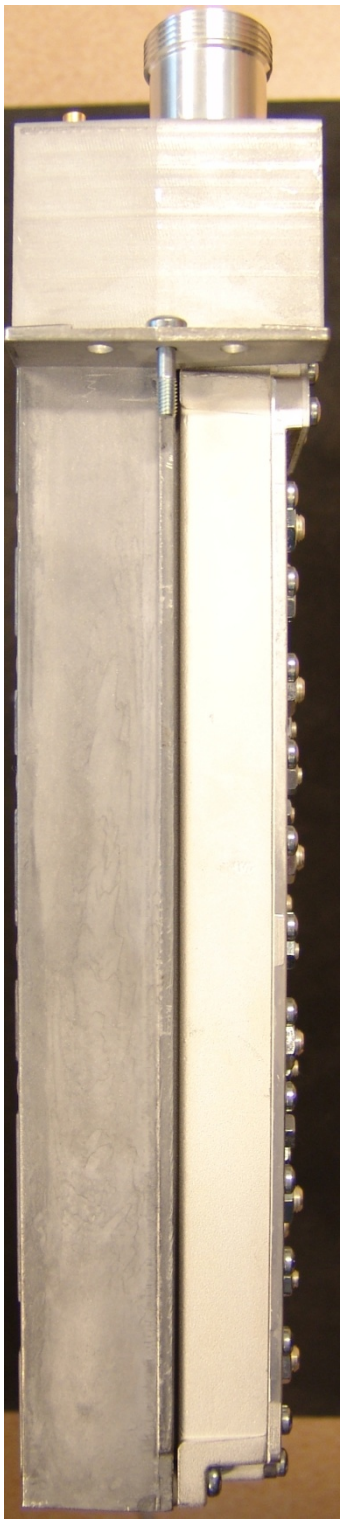
Right side



FCC ID: TA8BKRC11866-1
IC: 287AB-BS118661

Appendix 9

Bottom side



Top side