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## Test Report for FCC Equipment Authorization

FCC ID AB6NT800RM-CBTS

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## Publication History

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## Decision Ratifier

The release of this document has been reviewed and approved for distribution and use by the following:

Ratifier's Name	Signature	Date
Tom Danshin	Tom Danshin	

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## Revision History

Stream/Issue	Revision Date	Reason for Change	Author
00/0.1	10/02/2004	Draft release of test Report	Tuan Tran
00/0.2	19/03/2004	Add RWB Column in Spectrum Analyzer Noise Floor Table	Tuan Tran
00/0.3	24/03/2004	Approved	

Change bars will not be used in this document.

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## Acronyms and Abbreviations

BPF	Bandpass Filter
BTS	Base Station Transceiver Subsystem
BW	Bandwidth
cBTS	Compact Base Station Transceiver Subsystem
CDMA	Code Division Multiple Access
CEM	Channel Enhancement Module
CM	Control Module
CR	Cost Reduced
DE	Digital Encloser
DPM	Duplexer Preselector Module
GPSTM	Global Position System Timing Module
LO	Local Oscillator
MFRM	Multi-Carrier Flexible Radio Module
PA	Power Amplifier
RBW	Resolution BandWidth
RM	Radio Module
RMS	Root Mean Square
RF	Radio Frequency
SA	Spectrum Analyzer
TBD	To Be Determined



# 1 Introduction

This test report supports FCC filing for the cBTS 800 MHz Radio Module. This test report will be used as a new filing for FCC part 22. This filing includes single, two and three carrier modes for the 800MHz cellular band. The following test results include; RF Power Output, Occupied Bandwidth, Spurious Emissions at Antenna Terminals, and Transmitter Test (CDMA Mode Transmitter). Frequency over voltage and temperature test results are included. Emissions testing was conducted at -48VDC at room temperature. The IS95 modulation schemes will be included in this report.

This test report is submitted in accordance with the FCC Rules and Regulations, Part 2, Subpart J, Sections 2.1046 through 2.1057 for equipment authorization of Nortel Networks' cBTS 800 MHz Radio Module (800 MHz RM).

The cBTS 800 MHz Radio Module is intended for use in the Domestic Public Cellular Radio Telecommunications Service and is designed in accordance with the following standards:

- *CFR 47, Part 22, Subpart H, Cellular Radiotelephone Service [1]*
- *CFR 47, Part 2, Subpart J, Equipment Authorization Procedures - Equipment Authorization[2]*
- *IC RSS-129, Issue 2, 800 MHz Dual-Mode CDMA Cellular Telephones [3]*
- *TIA/EIA-97-D, Recommended Minimum Performance Standards for Base Stations Supporting Dual Mode Spread Spectrum Systems [4]*

## 1.1 Required Tests

Table 1 summarizes the required tests for the cBTS 800 MHz Radio Module.

**Table 1 : Required Tests**

<b>FCC Measurement Specification</b>	<b>FCC Limit Specification</b>	<b>Description</b>	<b>Test to be Performed?</b>
2.1046	22.913	RF Power Output	Yes
2.1049	22.917	Occupied Bandwidth	Yes
2.1051, 2.1057	22.917	Spurious Emissions at Antenna Terminals	Yes
2.1053, 2.1057	22.917	Field Strength of Spurious Emissions	Yes <sup>a</sup>
2.1055		Frequency Stability	Yes

a. Field strength of spurious emissions testing will be performed by Sanmina-SCI Canada, Calgary.

## 2 Engineering Declaration

The CDMA 800MHz Compact Radio Module has been tested in accordance with the requirements contained in the Federal Communications Commission Rules and Regulations Part 2 and 22.

To the best of my knowledge, these tests were performed in accordance with good engineering practices using measurement procedures consistent with industry or commission standards or previous Commission correspondence or guidance and demonstrate that this equipment complies with the appropriate standards. All tests were conducted on a representative sample of the equipment for which equipment authorization is sought.

Tested by:

Tuan Tran

BTS Systems Test Prime

Nortel Networks

Calgary Canada



Signature

March 24/2004

Date

Reviewed by:

Thomas Wong

CDMA/TDMA Regulatory

Emissions Prime

Nortel Networks

Calgary Canada



Signature

March 24, 2004

Date

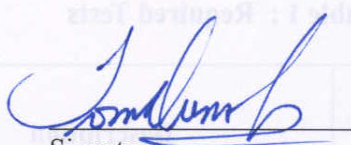
Approved by:

Tom Dannshin

BTS System Manager

Nortel Networks

Calgary Canada



Signature

March 24, 2004

Date



## 3 Equipment Authorization Application Requirements

### 3.1 Standard Test Conditions and Test Equipment

The cBTS 800 MHz Radio Module will be tested under the following standard test conditions unless otherwise noted:

- Ambient Temperature: 20 to 35 degrees C
- Ambient Humidity: 20 to 40%
- DC Supply Voltage: -48 Vdc and +24 Vdc (nominal)
- Input modulation IS-95

### 3.2 EUT Identification List

Table 2 shows the identification of the components required for testing.

**Table 2 : EUT Identification List**

<b>Equipment Description</b>	<b>Model / Part Number</b>	<b>Release Number</b>	<b>Serial Number</b>
800 MHz Compact Radio Module	NTRZ71AA	S5X	NNTM692FYJU4
800 DPM	NTRZ79AA	P4	ALLG74000G03

### 3.3 Test Equipment List

Table 3 shows the identification of the test equipment required.

**Table 3 : Test Equipment List**

<b>Description</b>	<b>Manufacturer</b>	<b>Model</b>	<b>Serial Number</b>	<b>Cal. Due Date</b>
9kHz to 40 GHz Spectrum Analyzer	Rohde&Schwarz	FSEK-30	DE25178	17 MAY 2004
RF Power Meter	Agilent	E4419B	US38260822	6 DEC 2005
RF Power Sensor Head	Agilent	E9300A	US39210633	09 DEC 2004
30dB Attenuator (>100W)	Weinschel	40-30-43	KL694	n/a
RF Cable 1 24"	Nortel	A0734233	n/a	n/a
RF Cable 2 8m Heliax	Nortel	A0803065	n/a	n/a

## 4 Transmitter Tests

### 4.1 RF Power Output

#### 4.1.1 RF Power Output Requirements

##### **FCC Part 2.1046 Measurements required: RF power output**

*§(a) For transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in §2.1033(c)(8). The electrical characteristics of the radio frequency load attached to the output terminals when this test is made shall be stated.*

*(c) For measurements conducted pursuant to paragraphs (a) and (b) of this section, all calculations and methods used by the applicant for determining carrier power or peak envelope power, as appropriate, on the basis of measured power in the radio frequency load attached to the transmitter output terminals shall be shown. Under the test conditions specified, no components of the emission spectrum shall exceed the limits specified in the applicable rule parts as necessary for meeting occupied bandwidth or emission limitations.*

#### 4.1.2 Test Method

Setup the DE via the BTS controller to enable the cBTS 800 MHz Radio Module to transmit at the rated power for each of the carrier configurations one, two and three carrier in the Baseband modulation formats IS-95. Measurements will be made on channels at the bottom and top of the operator bands with the Compact RM operating with -48Vdc. The RF output power will be measured using the power meter.

#### 4.1.3 Test Setup

The set-up required for the cBTS 800 MHz Radio Module RF output power test is illustrated in Figure 1. RF output power measurements will be referenced to the antenna port of the DPM

#### 4.1.4 IS-95

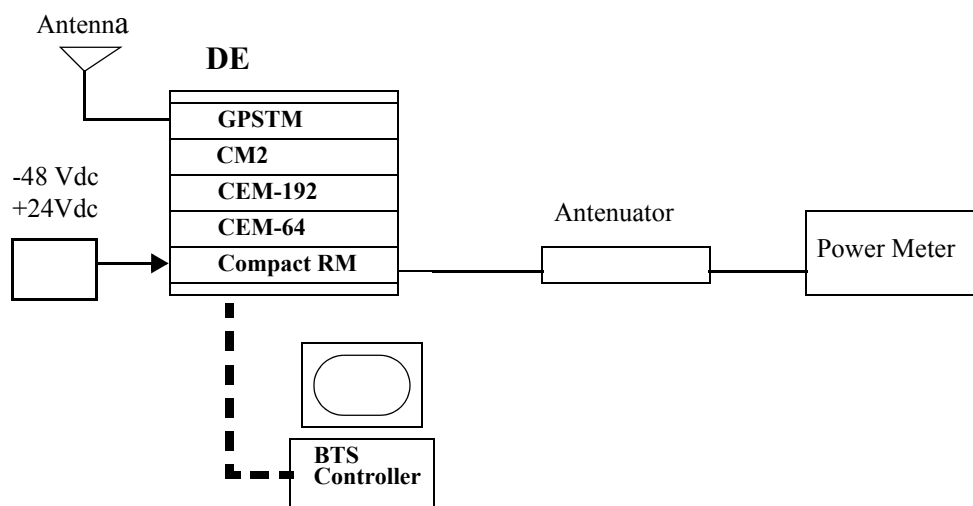
The conducted spurious emissions of the cBTS 800 MHz Radio Module, with IS-95 waveforms were tested at maximum power. Transmitters operating with IS95 are tested at +47.3 dBm.

### 4.1.5 Noise Floor

Table 4 lists the noise floor of the measurement system with no signal present.

**Table 4 : Spectrum Analyzer Noise Floor**

Start (MHz)	Stop (MHz)	Peak (dBm)	RBW kHz
0.01	400	-42.19	100
400	1000	-39.73	100
1000	2000	-37.82	100
2000	3000	-37.04	100
3000	4000	-36.06	100
4000	5000	-36.13	100
5000	6000	-33.52	100
6000	7000	-29.81	100
7000	8000	-31.88	100
8000	9000	-32.18	100
9000	10000	-32.77	100



**Figure 1 : Test Setup for RF Power Output Measurement**

#### 4.1.6 RF Output Power Test Results

**Table 5 : RF Output Power cBTS 800 MHz Radio Module 1-Carrier IS95**

Channel Number (Band)	Frequency (MHz)	Measured RF Output Power (dBm)	Typical Maximum Rated Power (dBm)
1015 (A'')	869.76	47.35	47.3
308 (A)	879.24	47.35	47.3
358 (B)	880.74	47.35	47.3
642 (B)	889.26	47.35	47.3
692 (A')	890.76	47.35	47.3
742 (B')	892.26	47.35	47.3
775 (B')	893.25	47.35	47.3

**Table 6 : RF Output Power cBTS 800 MHz Radio Module 2-Carrier IS95**

Channel Number (Band)	Frequency (MHz)	Measured RF Output Power (dBm)	Typical Maximum Rated Power (dBm)
1015, 33 (A'', A)	869.76, 870.99	47.35	47.3
267, 308 (A)	878.01, 879.24	47.35	47.3

**Table 7 : RF Output Power of cBTS 800 MHz Radio Module 3-Carrier IS95**

Channel Number (Band)	Frequencies (MHz)	Measured RF Output Power (dBm)	Typical Maximum Rated Power (dBm)
1015, 33, 74 (A'', A)	869.76, 870.99, 872.22	47.32	47.3
226, 267, 308 (A)	876.78, 878.01, 879.24	47.35	47.3

**Table 7 : RF Output Power of cBTS 800 MHz Radio Module 3-Carrier IS95**

Channel Number (Band)	Frequencies (MHz)	Measured RF Output Power (dBm)	Typical Maximum Rated Power (dBm)
358, 399, 440 (B)	880.74, 881.97, 883.20	47.35	47.3
560, 601, 642 (B)	886.8, 888.03, 889.26	47.35	47.3

## 4.2 Certification Requirements

### 4.2.1 Application for certification

#### FCC Part 2.1033 Application for certification.

*(c) Applications for equipment other than that operating under parts 15 and 18 of the rules shall be accompanied by a technical report containing the following information:*

*(8) The dc voltages applied to and dc currents into the several elements of the final radio frequency amplifying device for normal operation over the power range.*

### 4.2.2 Test Method

This information required for this section is available from [6]:

Title: Compact Metrocell Radio Module Beta Test Plan

Dataset Name: TPRZ71AA

Document Status: Approved

Stream: 00 Issue: 03.1

Issue Date: January 7, 2004

Author: Ken Minderhoud

### 4.2.3 Test Setup

See above document

### 4.2.4 Test Results

The final amplifying dc voltage is 27.0 Vdc. The final dc current is

**Table 8 : Average Current Values Pout = 48 dBm @ the output of PA**

Average Current Values @ Pout = 48 dBm				
	25°C			
	Q4	Q5	Q6	Q7
Mean	3.48	3.62	3.59	3.59

## 4.3 Occupied Bandwidth

### 4.3.1 Occupied Bandwidth Requirements

#### FCC Part 2.1049

*The OBW, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured under the following conditions as applicable:*

*(g) Transmitter in which the modulating baseband comprises not more than three independent channels - when modulated by the full complement of signals for which the transmitter is rated. The level of modulation for each channel should be set to that prescribed in rule parts applicable to the services for which the transmitter is intended. If specific modulation levels are not set forth in the rules, the tests should provide the manufacturer's maximum rated condition.*

*(h) Transmitters employing digital modulation techniques - when modulated by an input signal such that its amplitude and symbol rate represent the maximum rated conditions under which the equipment will be operated. The signal shall be applied through any filter networks, pseudo-random generators or other devices required in normal service. Additionally, the occupied bandwidth shall be shown for operation with any devices used for modifying the spectrum when such devices are optional at discretion of the user.*

### 4.3.2 Test Method

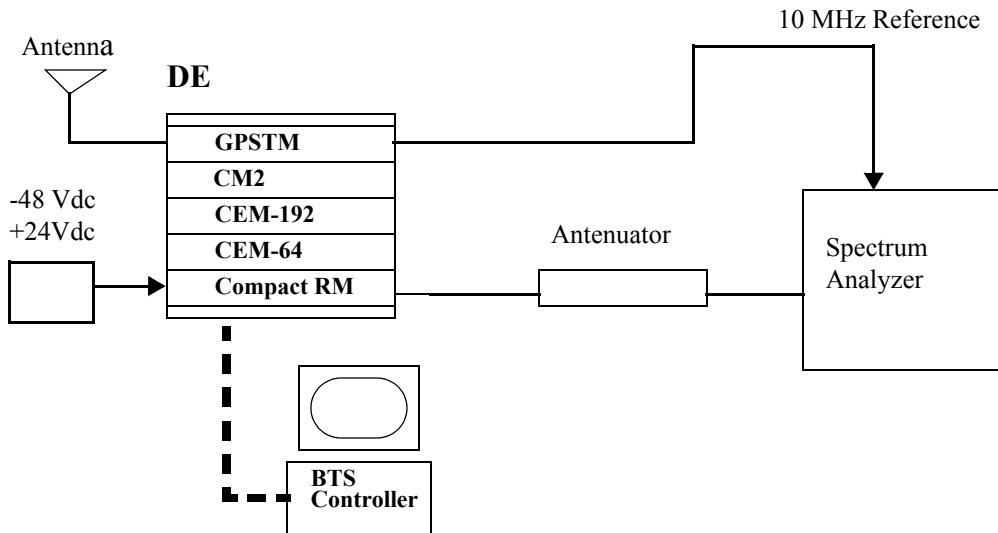
Setup the DE via the BTS controller to enable the cBTS 800 MHz Radio Module to transmit at maximum rated power for each of the carrier configurations one, two and three carrier in the Baseband modulation formats IS-95. Measurements will be made on channels at the bottom and top of each of the operator bands.

A reference level is established by first using a resolution bandwidth that exceeds the signal bandwidth. RBW is then set to 1% of the estimated emission bandwidth and the video bandwidth is set to 3 times the resolution bandwidth. The markers are now moved to the -20 dB points (from the previously established reference level) on either side of centre frequency.

### 4.3.3 Test Setup

The set-up required for the cBTS 800 MHz Radio Module Occupied bandwidth test is illustrated in Figure 2.





**Figure 2 : Test Setup for Occupied Bandwidth Measurement**

#### 4.3.4 Test Result

**Table 9 : Measured Occupied Bandwidth cBTS 800 MHz Radio Module 1-Carrier IS95**

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (MHz) (1-Carrier)
1015 (A'')	869.76	1.267
308 (A)	879.24	1.267
358 (B)	880.74	1.267
642 (B)	889.26	1.267
692 (A')	890.76	1.263
742 (B')	892.26	1.267
775 (B')	893.25	1.267

**Table 10 : Measured Occupied Bandwidth cBTS 800 MHz Radio Module 2-Carrier IS95**

Channel Number (Band)	Frequency (MHz)	Measured Occupied Bandwidth (MHz)
1015, 33 (A'', A)	869.76, 870.99	2.461
267, 308 (A)	878.01, 879.24	2.461

**Table 11 : Measured Occupied Bandwidth of cBTS 800 MHz Radio Module 3-Carrier IS95**

Channel Number (Band)	Frequencies (MHz)	Measured Occupied Bandwidth (MHz)
1015, 33, 74 (A'', A)	869.76, 870.99, 872.22	3.671
226, 267, 308 (A)	876.78, 878.01, 879.24	3.671
358, 399, 440 (B)	880.74, 881.97, 883.20	3.671
560, 601, 642 (B)	886.8, 888.03, 889.26	3.671

## 4.4 Spurious Emissions at Antenna Terminals

### 4.4.1 Spurious Emissions Requirements

#### FCC Part 2.1051

*The radio frequency voltage or powers generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminals when properly loaded with a suitable artificial antenna. Curves or equivalent data shall show the magnitude of each harmonic and other spurious emission that can be detected when the equipment is operated under the conditions specified in 2.1049 as appropriate. The magnitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be specified.*

#### FCC Part 2.1057 - Frequency Spectrum to be investigated

*The spectrum should be investigated from the lowest radio frequency generated in the equipment up to at least the 10th harmonic of the carrier frequency or to the highest frequency practicable in the present state of the art of measuring techniques, whichever is lower. Particular attention should be paid to harmonics and subharmonics of the carrier frequency. Radiation at the frequencies of multiplier stages should be checked. The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.*

#### FCC Part 22.917 Limit

*Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.*

*Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.*

*Alternative out of band emission limit. Licensees in this service may establish an alternative out of band emission limit to be used at specified band edge(s) in specified geographical areas, in lieu of that set forth in this section, pursuant to a private contractual arrangement of all affected licensees and applicants. In this event, each party to such contract shall maintain a copy of the contract in their station files and disclose it to prospective assignees or transferees and, upon request, to the FCC.*

*Interference caused by out of band emissions. If any emission from a transmitter operating in this service results in interference to users of another radio service, the FCC may require a greater attenuation of that emission than specified in this section*

#### 4.4.2 Test Method

Configure the BTS via the BTS controller to enable the cBTS 800 MHz Radio Module to transmit at maximum rated power for each of the carrier configurations one, two and three carrier in the Baseband modulation formats IS-95. Measurements will be made on channels at the bottom and top of the operator bands. The following spectrum analyzer settings are to be used for the measurement of the antenna port (DPM) spurious emissions:

##### 4.4.2.1 Adjacent 1MHz to indicated cellular band (Upper and Lower)

**Table 12: Adjacent 1MHz Spectrum Analyze Settings**

Setting	1 Carrier	2 Carrier	3 Carrier
Resolution Bandwidth <sup>a</sup> :	12.5 kHz	25 kHz	37.5 kHz
Video Bandwidth (3x RBW) <sup>b</sup>	(3x RBW)	(3x RBW)	(3x RBW)
Video Average	10 Averages	10 Averages	10 Averages
Span	Set accordingly	Set accordingly	Set accordingly
Detector	RMS	RMS	RMS
Attenuation <sup>c</sup>	30 dB	30 dB	30 dB
Ref. Level	35 dBm	35 dBm	35 dBm
Ref. Level Offset	31-34.5 dB	31-34.5 dB	31-34.5 dB

- If the spectrum analyze cannot be set to the specified RBW the next highest RBW should be used and all measurements corrected to the specified RBW
- If the spectrum analyze cannot be set to the specified Video Bandwidth the next highest Video Bandwidth should be used.
- The lowest value of attenuator should be used to improve measurement accuracy, without overdriving the Spectrum Analyzer.

All spectrum analyzer settings were coupled as per the manufacturers recommendations to improve measurement time, without compromising data.

#### 4.4.2.2 All other Spurious Emissions up to 10 GHz

**Table 13 : All other Emission Spectrum Analyze Settings**

Setting	1 Carrier	2 Carrier	3 Carrier
Resolution Bandwidth	100 kHz	100 kHz	100 kHz
Video Bandwidth (3x RBW)	300 kHz	300 kHz	300 kHz
Video Average	10 Averages	10 Averages	10 Averages
Span	Set accordingly	Set accordingly	Set accordingly
Detector	RMS	RMS	RMS
Attenuation <sup>a</sup>	30 dB	30 dB	30 dB
Ref. Level	35 dBm	35 dBm	35 dBm
Ref. Level Offset	31-34.5 dB	31-34.5 dB	31-34.5 dB

a. The lowest value of attenuator should be used to improve measurement accuracy, without overdriving the Spectrum Analyzer.

The emissions will be investigated up to 10 GHz (the 10<sup>th</sup> harmonic of the fundamental emission) for all carrier configurations (1, 2, 3) as per FCC Part 22.

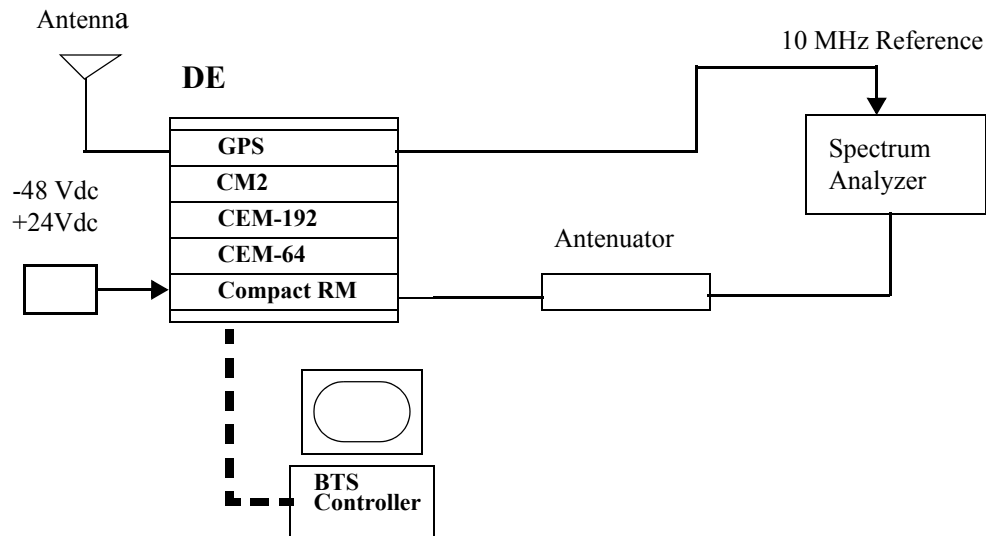
#### 4.4.3 Test Requirements

**Table 14 : Spurious Emissions Requirements**

Frequency Offset	1 Carrier	2 Carrier	3 Carrier
+/- 740 kHz	< -13 dBm/12.5KHz	< -13 dBm/25 KHz	< -13 dBm/37.5 KHz

#### 4.4.4 Test Setup

The set-up required for the cBTS 800 MHz Radio Module Antenna Port (DPM) Spurious Emission test is illustrated in Figure 3.



**Figure 3 : Test Setup for Spurious Emissions Measurement**

#### 4.4.5 Test Results IS95

**Table 15 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port one Carrier band A and A'' IS95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	1Carrier IS-95	1Carrier
869 MHz (Lower edge of band A'') Ch 1015 (RBW=12.5 kHz)	-27.38	14.38
880 MHz (Upper edge of band A) Ch 308 (RBW=12.5 kHz)	-28.55	15.55
0-1000 (RBW=100KHz)	-29.95	16.95
1000-2000 (RBW=100KHz)	-29.41	16.41
2000-3000 (RBW=100KHz)	-37.21	24.21
3000-4000 (RBW=100KHz)	-36.25	23.25
4000-5000 (RBW=100KHz)	-36.3	23.3
5000-6000 (RBW=100KHz)	-33.95	20.95
6000-7000 (RBW=100KHz)	-29.73	16.73
7000-8000 (RBW=100KHz)	-31.97	18.97
8000-9000 (RBW=100KHz)	-32.37	19.37
9000-10000 (RBW=100KHz)	-32.87	19.87

**Table 16 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port two Carrier band A and A'' IS95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	2Carrier IS-95	2Carrier
869.000 MHz (Lower edge of band A'') Ch 1015, 33 (RBW=25kHz)	-26.11	13.11
880 MHz (upper edge of band A) Ch 267, 308 (RBW=25kHz)	-28.18	15.18
0-1000 (RBW=100KHz)	-24.19	11.19
1000-2000 (RBW=100KHz)	-30.71	17.71
2000-3000 (RBW=100KHz)	-37.02	24.02
3000-4000 (RBW=100KHz)	-36.17	23.17
4000-5000 (RBW=100KHz)	-36.57	23.57
5000-6000 (RBW=100KHz)	-33.61	20.31
6000-7000 (RBW=100KHz)	-29.77	16.77
7000-8000 (RBW=100KHz)	-31.9	18.9
8000-9000 (RBW=100KHz)	-32.28	19.28
9000-10000 (RBW=100KHz)	-32.95	19.95



**Table 17 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port Three  
Carrier band A and A'' IS-95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	3Carrier IS-95	3Carrier
869 MHz (Lower edge of band A'') Ch 1015, 33, 74 (RBW=37.5 kHz)	-27.44	14.41
880 MHz (Upper edge of band A) Ch 226, 267, 308 (RBW=37.5 kHz)	-28.06	15.06
0-1000 (RBW=100KHz)	-21.34	8.34
1000-2000 (RBW=100KHz)	-32.94	19.94
2000-3000 (RBW=100KHz)	-37.05	24.05
3000-4000 (RBW=100KHz)	-36.03	23.03
4000-5000 (RBW=100KHz)	-36.4	23.4
5000-6000 (RBW=100KHz)	-33.79	20.79
6000-7000 (RBW=100KHz)	-30.06	17.06
7000-8000 (RBW=100KHz)	-32.32	19.32
8000-9000 (RBW=100KHz)	-32.27	19.27
9000-10000 (RBW=100KHz)	-33.1	20.1

**Table 18 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port One Carrier band B IS-95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	1Carrier IS-95	1Carrier
880 MHz (Lower edge of band B) Ch 358 (RBW=12.5kHz)	-24.27	11.27
890 MHz (Upper edge of band B) Ch 642 (RBW=12.5kHz)	-24.8	11.8
0-1000 (RBW=100KHz)	-29.54	16.54
1000-2000 (RBW=100KHz)	-30.02	17.02
2000-3000 (RBW=100KHz)	-36.89	23.89
3000-4000 (RBW=100KHz)	-36.21	23.21
4000-5000 (RBW=100KHz)	-36.63	23.63
5000-6000 (RBW=100KHz)	-33.9	20.9
6000-7000 (RBW=100KHz)	-29.75	16.75
7000-8000 (RBW=100KHz)	-31.92	18.92
8000-9000 (RBW=100KHz)	-32.34	19.34
9000-10000 (RBW=100KHz)	-32.62	19.62

**Table 19 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port Three  
Carrier band B IS-95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	3Carrier IS-95	3Carrier
880 MHz (Lower edge of band B) Ch 358, 399, 440 (RBW=37.5 kHz)	-25.29	12.29
890 MHz (Upper edge of band B) Ch 560, 601, 642 (RBW=37.5 kHz)	-26.27	13.27
0-1000 (RBW=100KHz)	-21.73	8.73
1000-2000 (RBW=100KHz)	-33.42	20.42
2000-3000 (RBW=100KHz)	-36.93	23.93
3000-4000 (RBW=100KHz)	-36.04	23.04
4000-5000 (RBW=100KHz)	-36.35	23.35
5000-6000 (RBW=100KHz)	-33.72	20.72
6000-7000 (RBW=100KHz)	-29.68	16.68
7000-8000 (RBW=100KHz)	-31.88	18.88
8000-9000 (RBW=100KHz)	-32.12	19.12
9000-10000 (RBW=100KHz)	-33	20

**Table 20 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port One Carrier band A' IS-95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	1 Carrier IS-95	1 Carrier
890 Mhz (Lower edge of band A') Ch 692(RBW=12.5 kHz)	-26.15	13.15
891.5 MHz (upper edge of band A') Ch 692 (RBW=12.5kHz)	-24.62	11.62
0-1000 (RBW=100KHz)	-29.88	16.88
1000-2000 (RBW=100KHz)	-31.23	18.23
2000-3000 (RBW=100KHz)	-37.12	24.12
3000-4000 (RBW=100KHz)	-36.44	23.44
4000-5000 (RBW=100KHz)	-36.28	23.28
5000-6000 (RBW=100KHz)	-33.62	20.62
6000-7000 (RBW=100KHz)	-29.98	16.98
7000-8000 (RBW=100KHz)	-32.22	19.22
8000-9000 (RBW=100KHz)	-32.31	19.31
9000-10000 (RBW=100KHz)	-33.12	20.12

**Table 21 : Spurious Emissions at the cBTS 800 MHz Radio Module Ant. Port One Carrier band B' IS95**

Frequency (MHz)	Spurious Emissions Level (dBm)	Margin to FCC Limit of -13 dBm (dB)
	1 Carrier IS-95	1 Carrier
891.5 MHz (lower edge of band B') Ch 742 (RBW=12.5kHz)	-27.27	14.27
894 MHz (upper edge of band B') Ch 775 (RBW=12.5kHz)	-26.86	13.86
0-1000 (RBW=100KHz)	-30.48	17.48
1000-2000 (RBW=100KHz)	-31.18	18.18
2000-3000 (RBW=100KHz)	-37.27	24.27
3000-4000 (RBW=100KHz)	-36.11	23.11
4000-5000 (RBW=100KHz)	-36.29	23.29
5000-6000 (RBW=100KHz)	-33.83	20.83
6000-7000 (RBW=100KHz)	-29.83	16.83
7000-8000 (RBW=100KHz)	-32.18	19.18
8000-9000 (RBW=100KHz)	-32.32	19.32
9000-10000 (RBW=100KHz)	-32.98	19.98

## 4.5 Transmitter Tests (CDMA Mode)

### Unwanted Emissions

Unwanted emissions are emissions on a frequency or frequencies outside the necessary bandwidth which result from the modulation process, from spurious emissions and harmonics.

#### IC RSS-129

*(1) Suppression inside cellular band: For all base station transmit frequencies allocated to the same operator system, the total spurious emissions in any 30 kHz band shall be attenuated below the mean output power level in accordance with the following schedule:*

*(a) for all offset frequencies greater than 750 kHz from the CDMA centre frequency, at least 45 dB. 800 MHz Dual-Mode CDMA Cellular Telephones RSS-129.*

*(b) for all offset frequencies greater than 1.98 MHz from the CDMA centre frequency, at least 60 dB.*

*(c) for all offset frequencies not allocated to the same operator system, at least 60 dB or -13 dBm, whichever is less stringent.*

*(2) In any 30 kHz outside the cellular band, the attenuation shall be at least  $43+10 \log_{10}$  (mean output power in watts) or 70, dB, whichever is the less stringent.*

### 4.5.1 Test Method

Configure the BTS via the BTS controller to enable the Compact RM to transmit at maximum rated power for each of the carrier configurations one, two and three carrier in the Baseband modulation formats IS-95. Measurements will be made on channels at the bottom and top of the duplexer band. The following spectrum analyzer settings are to be used for the measurement of the antenna port (DPM) spurious emissions:

#### 4.5.1.1 Adjacent 1MHz to indicated cellular band (Upper and Lower)

**Table 22: Adjacent 750 KHz and 1.98 MHz Spectrum Analyze Settings**

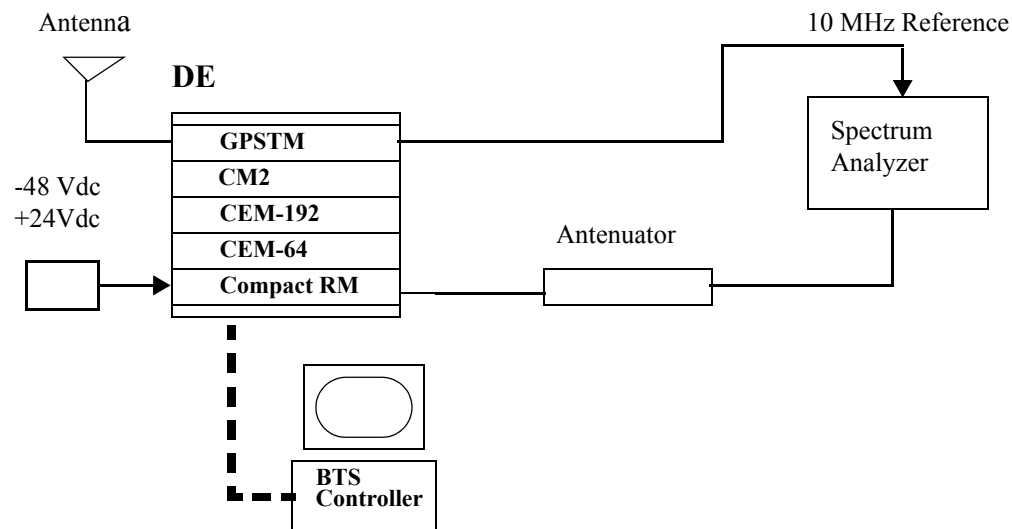
Setting	1 Carrier	2 Carrier	3 Carrier
Resolution Bandwidth <sup>a</sup> :	30 kHz	30 kHz	30 kHz
Video Bandwidth (3x RBW)	100 kHz	100 kHz	100 kHz
Video Average	10 Averages	10 Averages	10 Averages
Span	Set accordingly	Set accordingly	Set accordingly
Detector	RMS	RMS	RMS
Attenuation	30 dB	30 dB	30 dB
Ref. Level	35 dBm	35 dBm	35 dBm
Ref. Level Offset	31-34.5 dB	31-34.5 dB	31-34.5 dB

- a. If the spectrum analyzer can not be set to the specified RBW the next highest RBW should be used and all measurements corrected to the specified RBW

All spectrum analyzer settings were coupled as per the manufacturers recommendations to improve measurement time, without compromising data.

### 4.5.2 Test Setup

The set-up required for the Compact RM Antenna Port (DPM) Spurious Emission test is illustrated in Figure 4.



**Figure 4 : Test Setup for Spurious Emissions Measurement**



### 4.5.3 Test Results

**Table 23 : Industry Canada Suppression inside cellular band cBTS 800 MHz Radio Module Antenna Port IS95, 1 Carrier band A''**

Frequency (MHz)	Spurious Emissions Level (dBm)	Limit for 45 dBc/ 30KHz (dBm)	Margin to IC Limit of 45 dBc/ 30KHz (dB)
	1Carrier IS-95	1Carrier	1 Carrier
Ch1015 750KHz offset at lower side	-17.33	2.3	19.63
Ch1015 750KHz offset at upper side	-19.02	2.3	21.32
		Limit for 60 dBc/ 30KHz (dBm)	Margin to IC Limit of 60 dBc/ 30KHz (dB)
Ch1015 1.98MHz offset at lower side	-42.4	-12.7	29.7
Ch1015 1.89MHz offset at upper side	-41.53	-12.7	28.83

**Table 24 : Industry Canada Suppression inside cellular band cBTS 800 MHz Radio Module Antenna Port IS95, 3 Carrier band A'' and A**

Frequency (MHz)	Spurious Emissions Level (dBm)	Limit for 45 dBc/ 30KHz (dBm)	Margin to IC Limit of 45 dBc/ 30KHz (dB)
	3Carrier IS-95	3Carrier	3Carrier
Ch1015, 33, 74 750KHz offset at lower side	-22.13	2.3	24.43
Ch1015, 33, 74 750KHz offset at upper side	-23.51	2.3	25.81
		Limit for 60 dBc/ 30KHz (dBm)	Margin to IC Limit of 60 dBc/ 30KHz (dB)
Ch1015, 33, 74 1.98MHz offset at lower side	-34.01	-12.7	21.31
Ch1015, 33, 74 1.98MHz offset at upper side	-31.87	-12.7	19.17

**Table 25 : Industry Canada Suppression inside cellular band cBTS 800 MHz Radio Module Antenna Port IS95, 1 Carrier band B'**

Frequency (MHz)	Spurious Emissions Level (dBm)	Limit for 45 dBc/ 30KHz (dBm)	Margin to IC Limit of 45 dBc/ 30KHz (dB)
	1Carrier IS-95	1Carrier	1Carrier
Ch 742 750KHz offset at lower side	-17.33	2.3	19.63
Ch 742 750KHz offset at upper side	-19.44	2.3	21.74
		Limit for 60 dBc/ 30KHz (dBm)	Margin to IC Limit of 60 dBc/ 30KHz (dB)
Ch 742 1.98MHz offset at lower side	-42.18	-12.7	29.48
Ch 742 1.98MHz offset at upper side	-42.1	-12.7	29.4

## 4.6 Frequency Stability

### 4.6.1 Frequency Stability Requirements

#### FCC Part 2.1055

*(a) The frequency stability shall be measured with variation of ambient temperature as follows:*

*(1) From -30 to +50 centigrade for all equipment except that specified in subparagraphs (2) and (3) of this paragraph.*

*(b) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10 centigrade through the range. A period of time sufficient to stabilize all of the components of the oscillator circuit at each temperature level shall be allowed prior to frequency measurement. The short term transient effects on the frequency of the transmitter due to keying (except for broadcast transmitters) and any heating element cycling normally occurring at each ambient temperature level also shall be shown. Only the portion or portions of the transmitter containing the frequency determining and stabilizing circuitry need be subjected to the temperature variation test.*

*(d) The frequency stability shall be measured with variation of primary supply voltage as follows:*

*(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than hand carried battery equipment.*

*(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.*

*(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided. Effects on frequency of transmitter keying (except for broadcast transmitters) and any heating element cycling at the nominal supply voltage and at each extreme also shall be shown.*

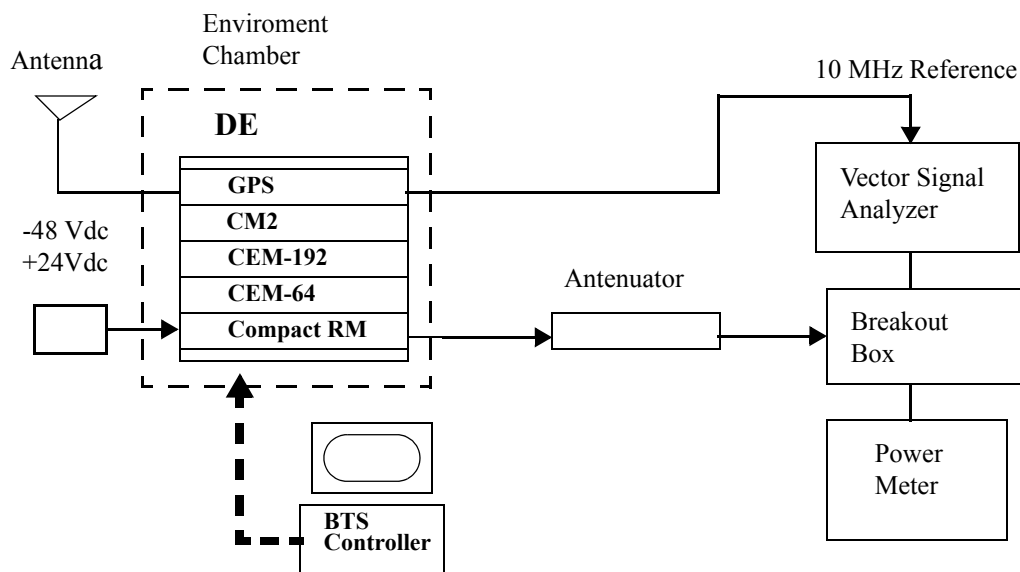
*(e) When deemed necessary, the Commission may require tests of frequency stability under conditions in addition to those specifically set out in paragraphs (a), (b), (c) and (d) of this section. (For example, measurements showing the effect of proximity to large metal objects, or of various types of antennas, may be required for portable equipment.)*

#### FCC Part 22.355 Frequency Tolerance

*The carrier frequency of each transmitter in the 821-896 MHz Frequency range, must be maintained within 1.5ppm tolerance, according to table C-1 of this section (22.355)*

## 4.6.2 Test Procedure

The test equipment was configured as shown in figure 5.



**Figure 5 : Test configuration for Frequency Stability**

## 4.6.3 Frequency Results

The frequency measured in this section is 882.75 MHz. Operating temperature for the cBTS 800 MHz Radio Module is from -5°C to +50°C. See Reference [7]

**Table 26 : Test results for Frequency Stability versus Power supply Voltage**

Voltage (Vdc)	Maximum Carrier Frequency Deviation (PPM)	Maximum Carrier Frequency Deviation (Hz)
40	0.0053	0.26

**Table 26 : Test results for Frequency Stability versus Power supply Voltage**

Voltage (Vdc)	Maximum Carrier Frequency Deviation (PPM)	Maximum Carrier Frequency Deviation (Hz)
48 nominal	0.0005	-0.43
56	0.0096	-8.74
20	0.0027	-2.36
24 nominal	0.0019	-1.65
28	0.0055	4.85

**Table 27 : Test results for Frequency Stability versus Temperature at -48V operation**

Temperature (°C)	Maximum Carrier Frequency Deviation (PPM)	Maximum Carrier Frequency Deviation (Hz)
-5	0.0044	-3.85
0	0.0030	-2.64
10	0.0005	0.48
20	0.0029	2.54
25	0.005	-0.43
30	0.0015	-1.29
40	0.0027	2.42
50	0.0007	-0.66

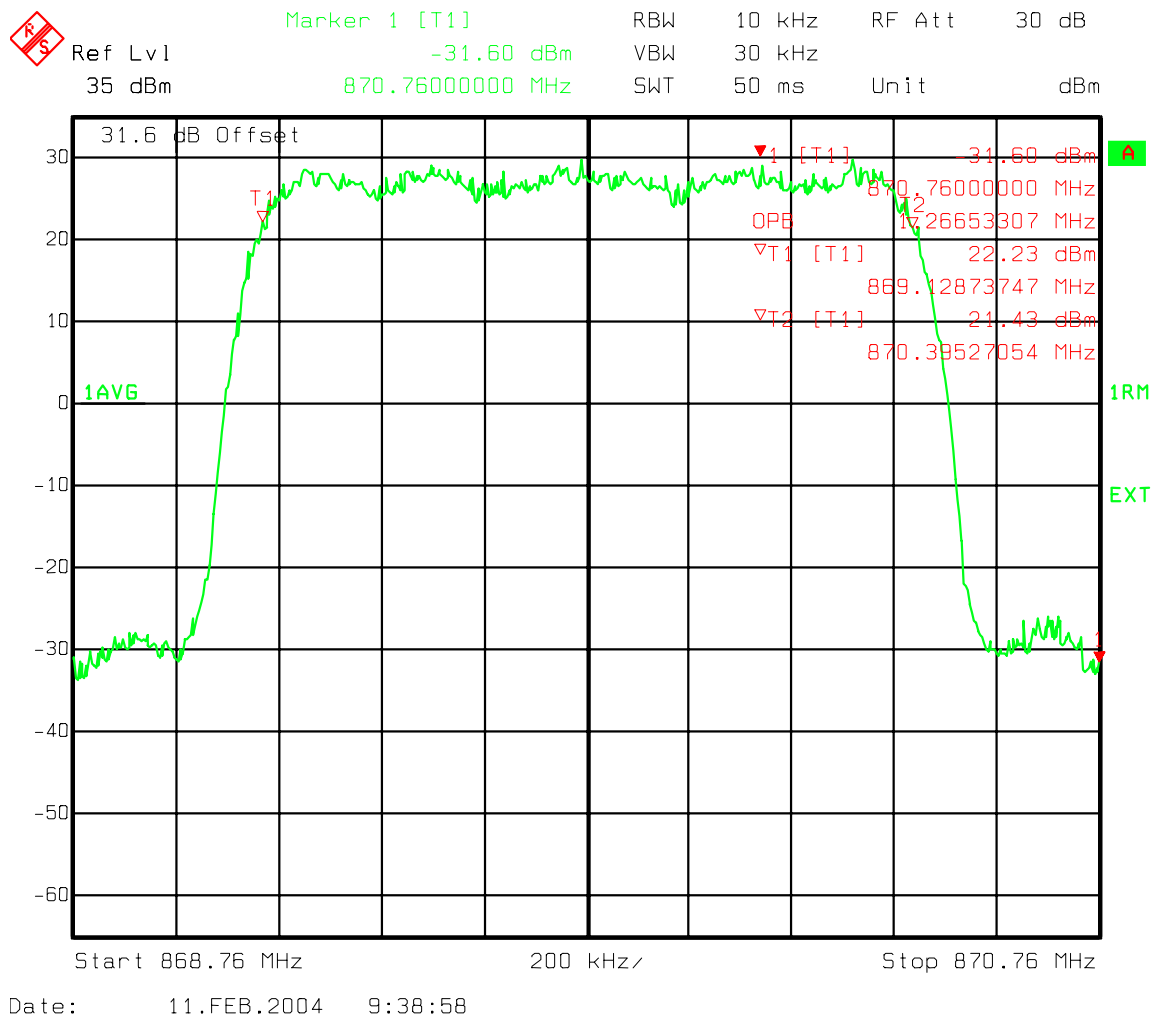
**Table 28 : Test results for Frequency Stability versus Temperature at 24V operation**

Temperature (°C)	Maximum Carrier Frequency Deviation (PPM)	Maximum Carrier Frequency Deviation (Hz)
-5	0.0046	4.05
0	0.0034	2.99
10	0.0077	6.77
20	0.0019	1.69
25	0.0019	-1.65
30	0.0007	0.66
40	0.0004	-0.32
50	0.0055	-4.86

## 5 Appendix A - Single Carrier IS-95 Spurious Emission

### Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A" IS95

#### Occupied Bandwidth Ch 1015 A''

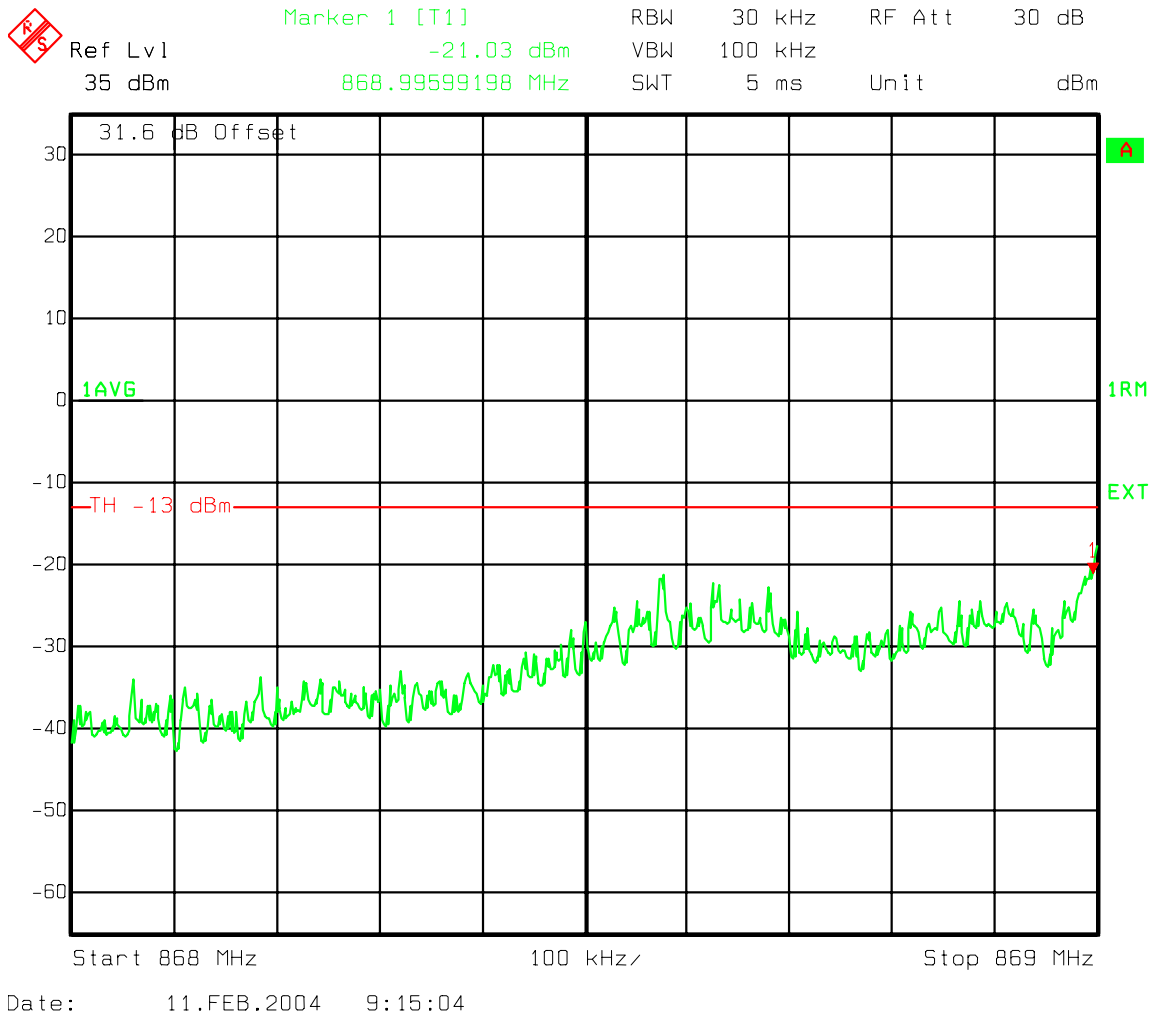


**Figure 6 : 1 Carrier - Occupied Bandwidth Channel 1015**

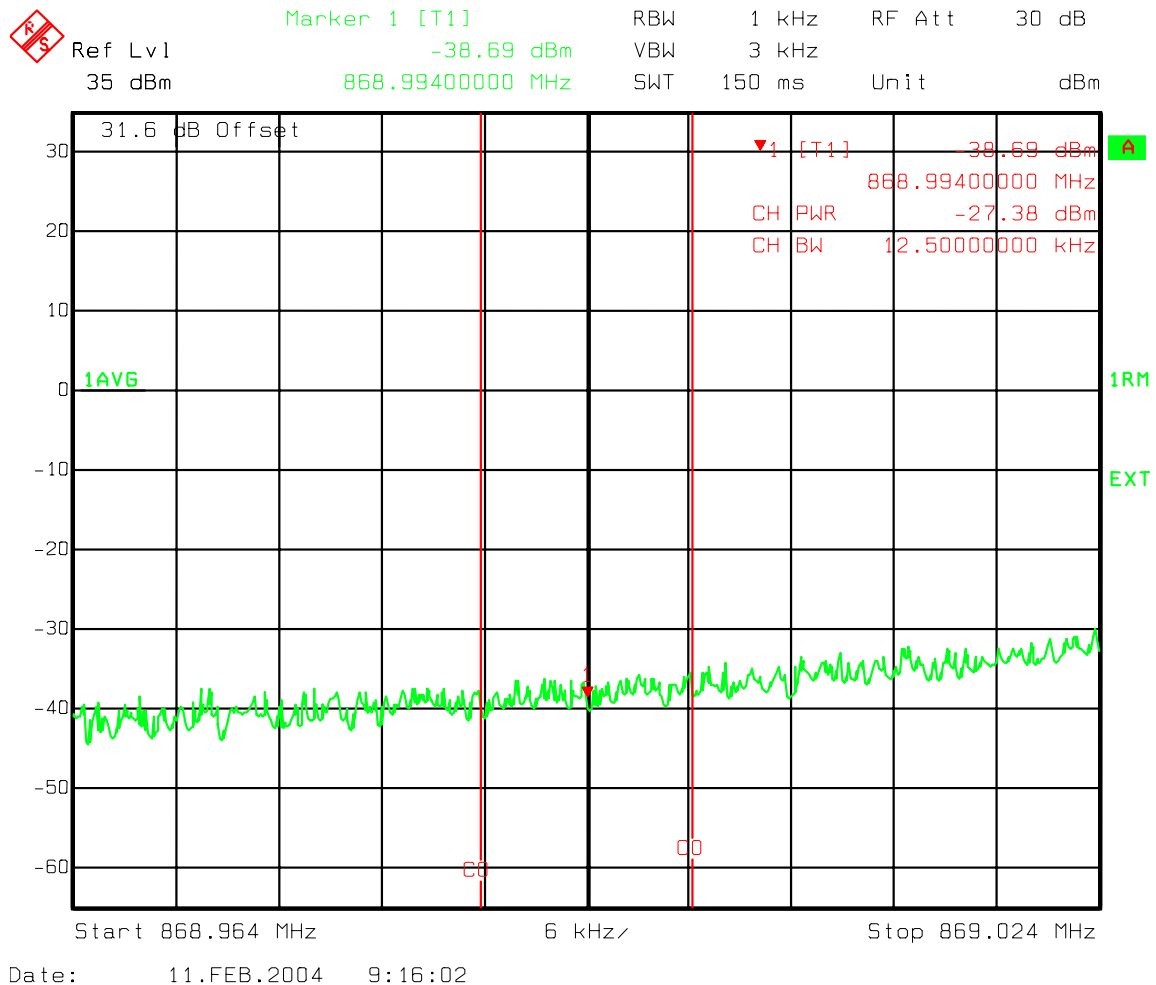


**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

**A '' Band Ch 1015 IS95 Adjacent 1 MHz Lower emissions 868-869 MHz**

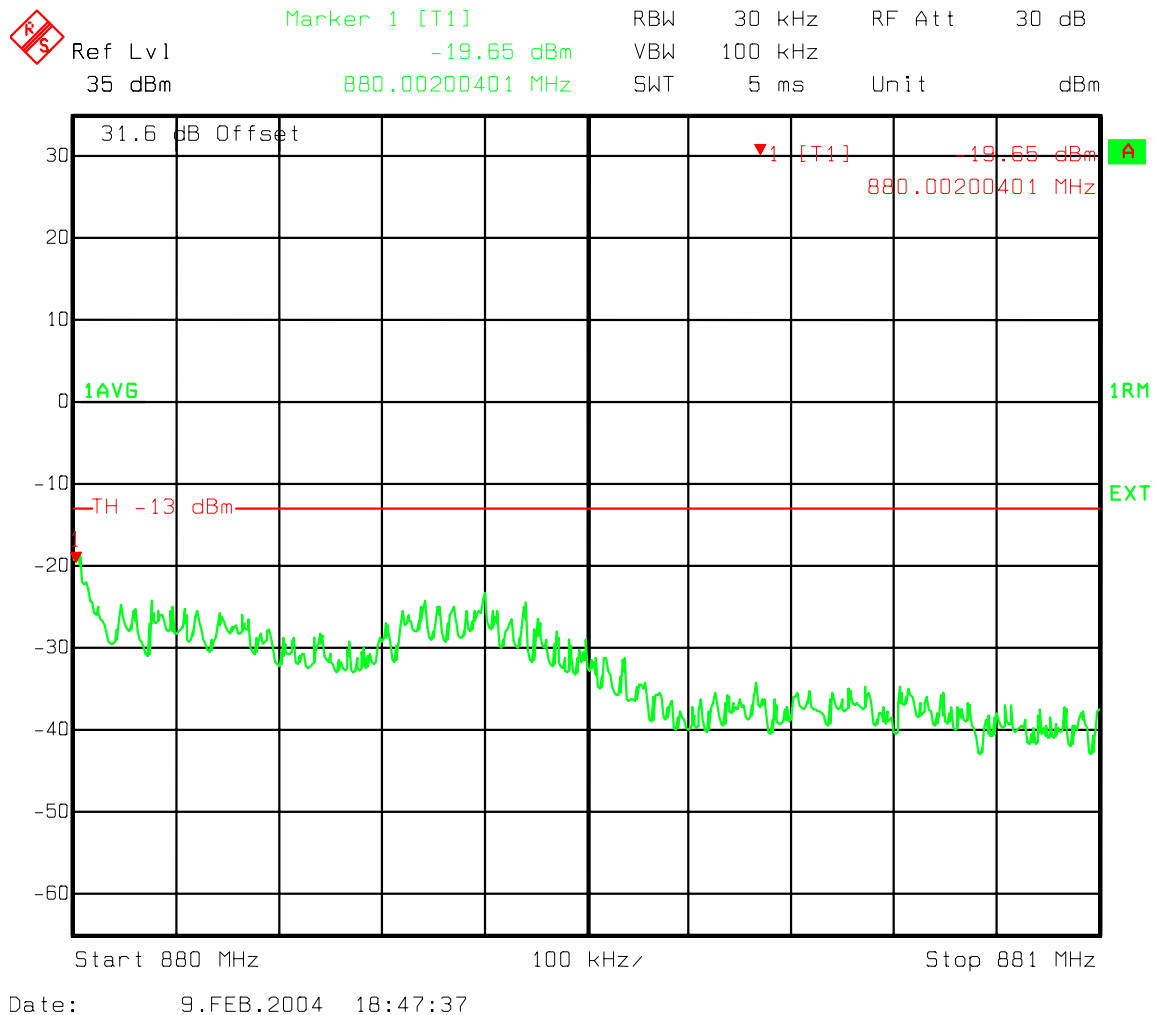


**Figure 7 : One Carrier - A '' Band Ch 1015 IS95 Adjacent 1 MHz Lower emissions 868-869 MHz**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
Ant. Port one Carrier band A and A'' IS95****Ch1015 IS95 Lower A'' Band Adjacent to outside edge 12.5kHz band Channel  
Power****Figure 8 : One Carrier - Ch1015 IS95 Lower A'' Band Adjacent to outside edge 12.5kHz  
band Channel Power**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

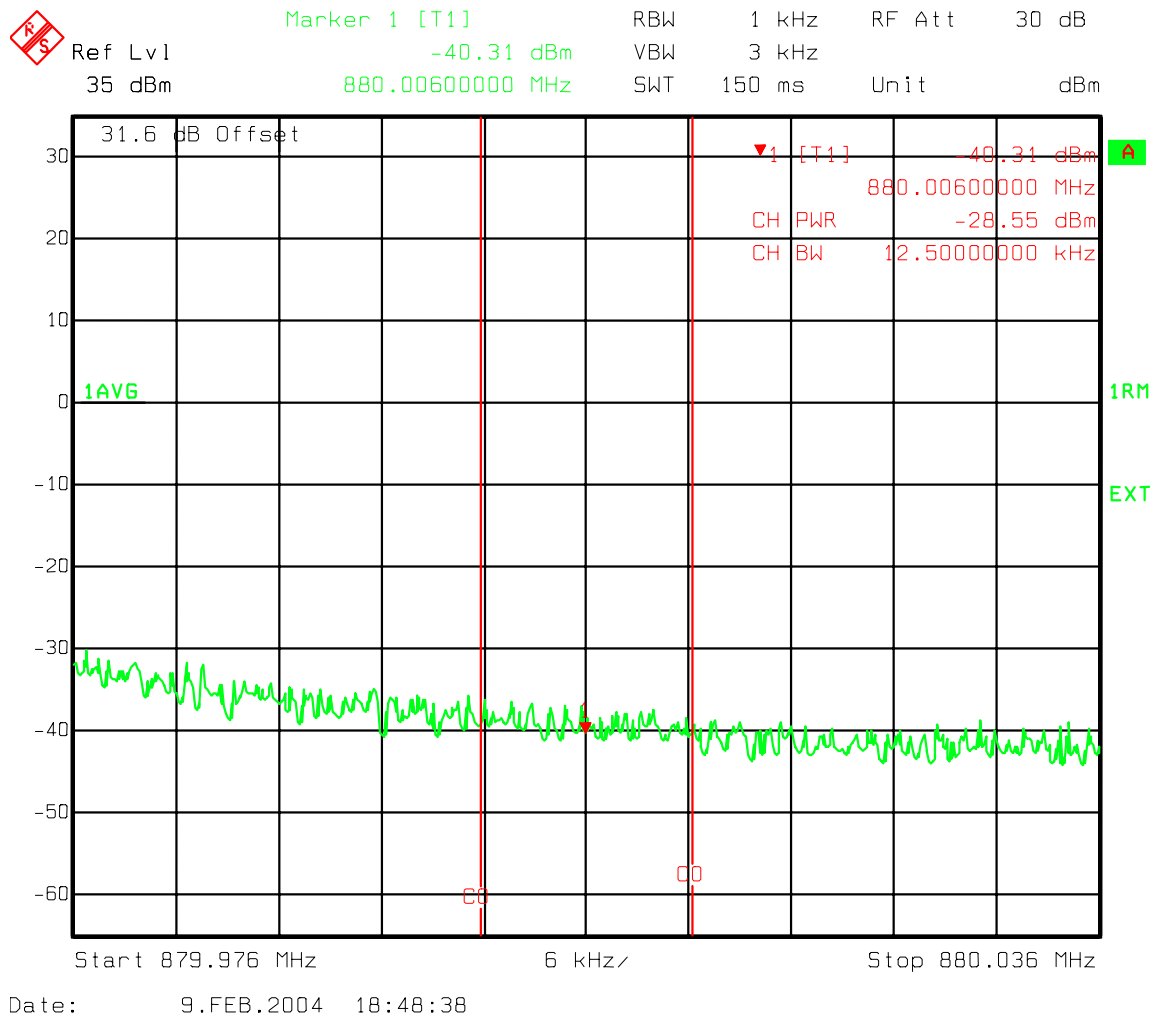
**Ch 308 Upper A Band adjacent 1MHz band emissions**



**Figure 9 : One Carrier - Ch 308 Upper A Band adjacent 1MHz band emissions**

# Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

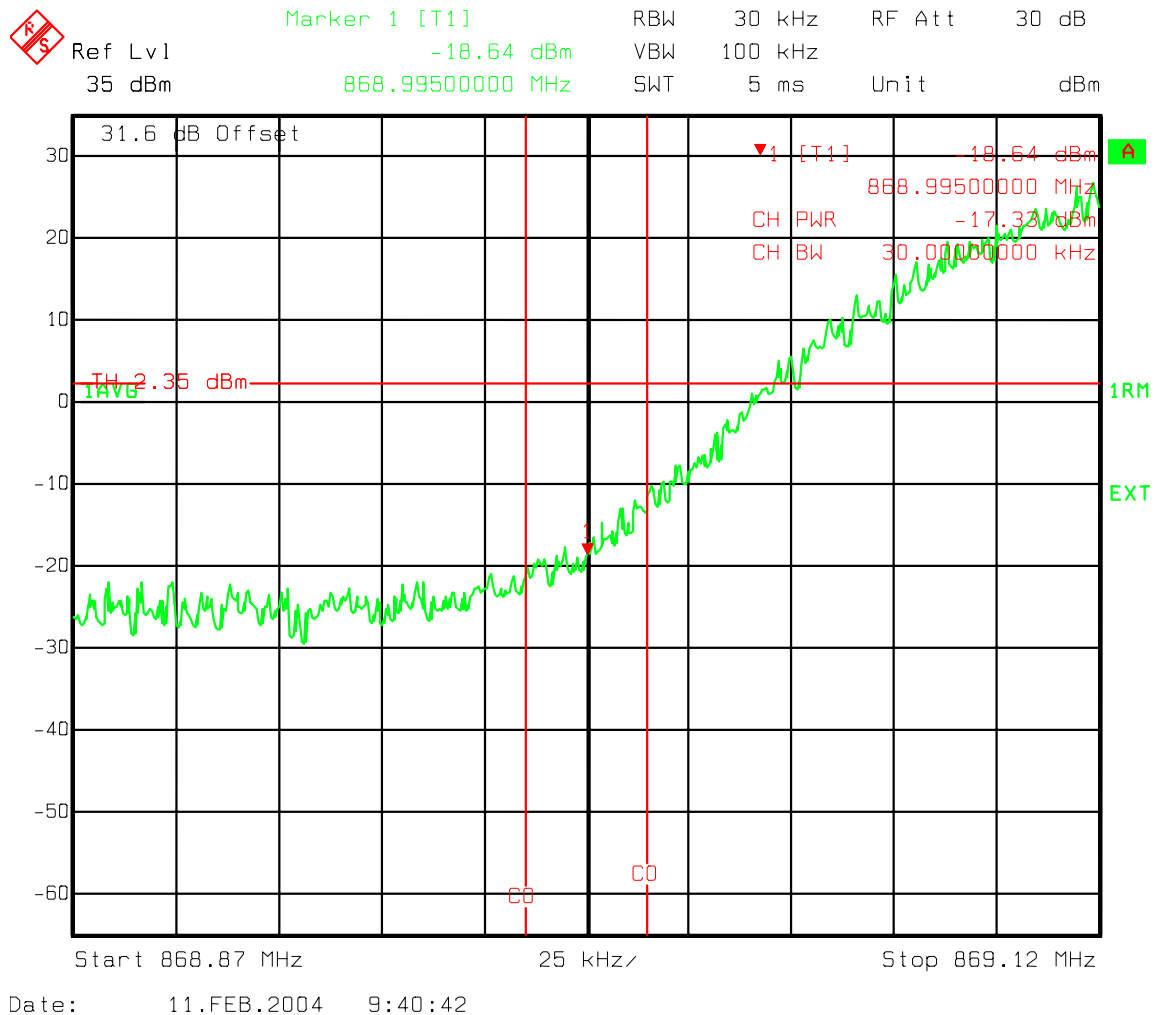
## Ch 308 Upper A Band adjacent to outside edge 12.5 kHz band Channel power



**Figure 10 : One Carrier - Ch 308 Upper A Band adjacent to outside edge 12.5 kHz band  
 Channel power**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

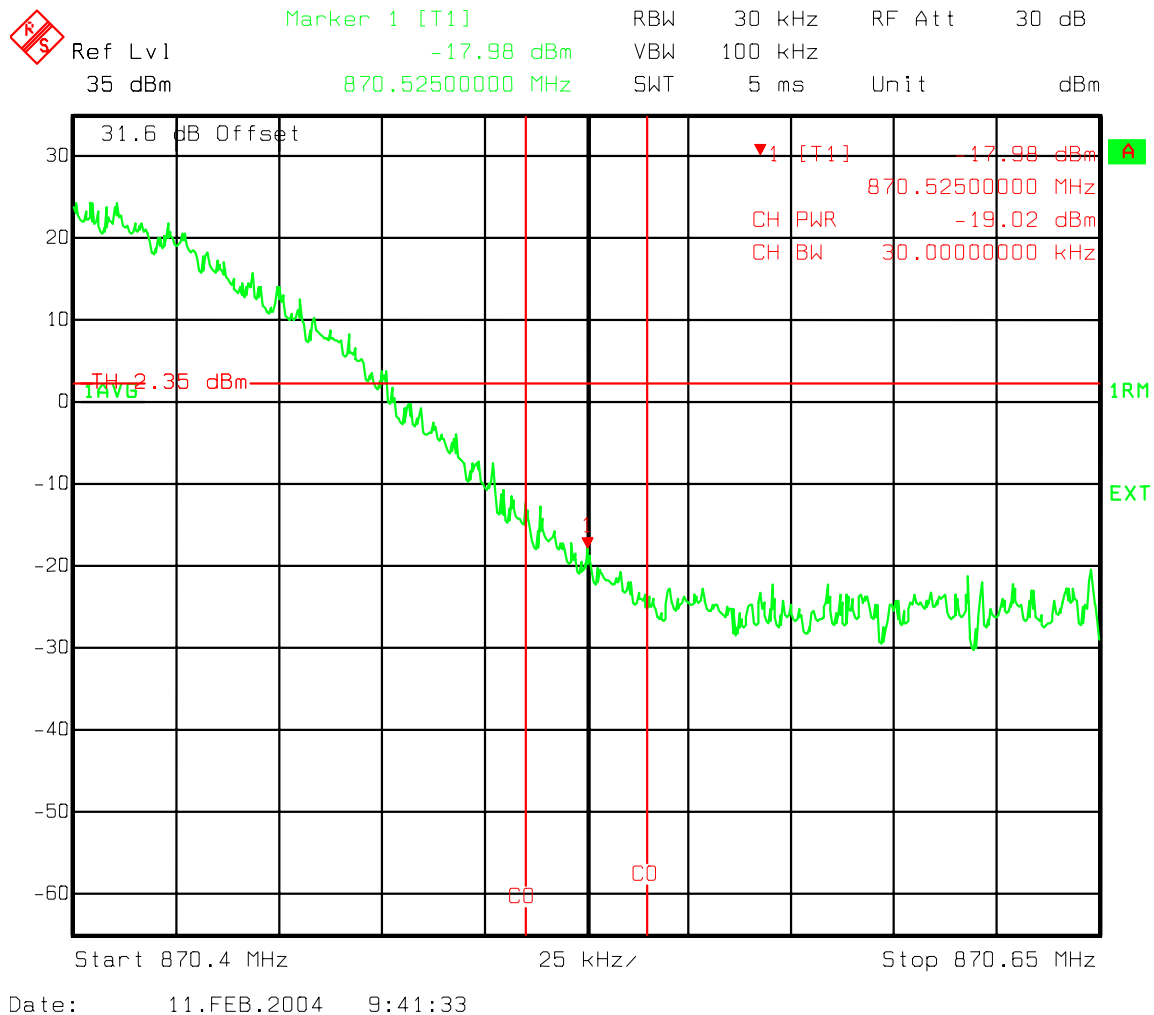
**Industry Canada Lower 750 kHz offset 30 kHz Chan Power Ch 1015**



**Figure 11 : One Carrier - Industry Canada Lower 750 kHz offset 30 kHz Chan Power Ch 1015**

## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

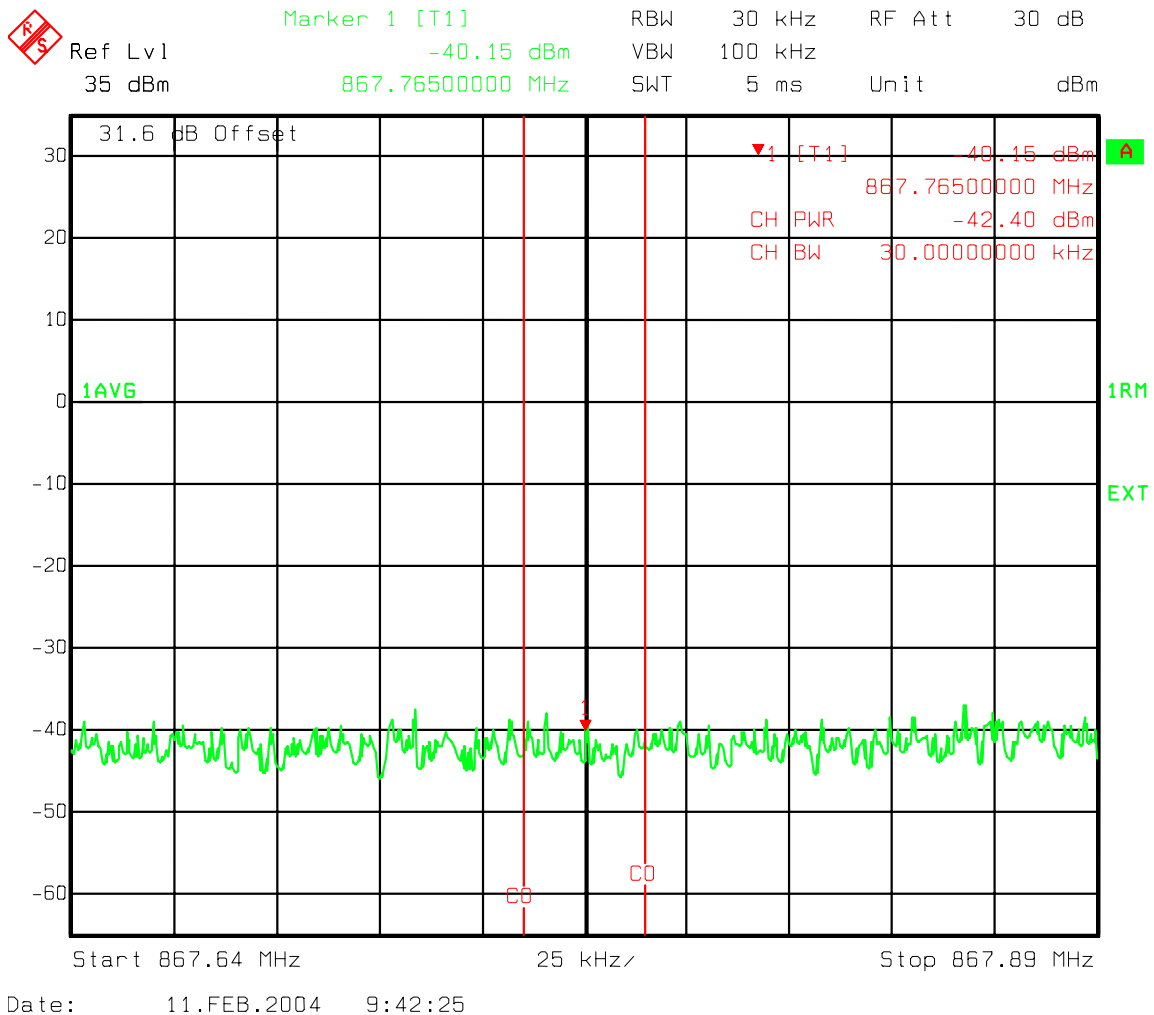
### Industry Canada Upper 750 kHz offset 30 kHz Chan Power Ch 1015



**Figure 12 : One Carrier - Industry Canada Upper 750 kHz offset 30 kHz Chan Power Ch 1015**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

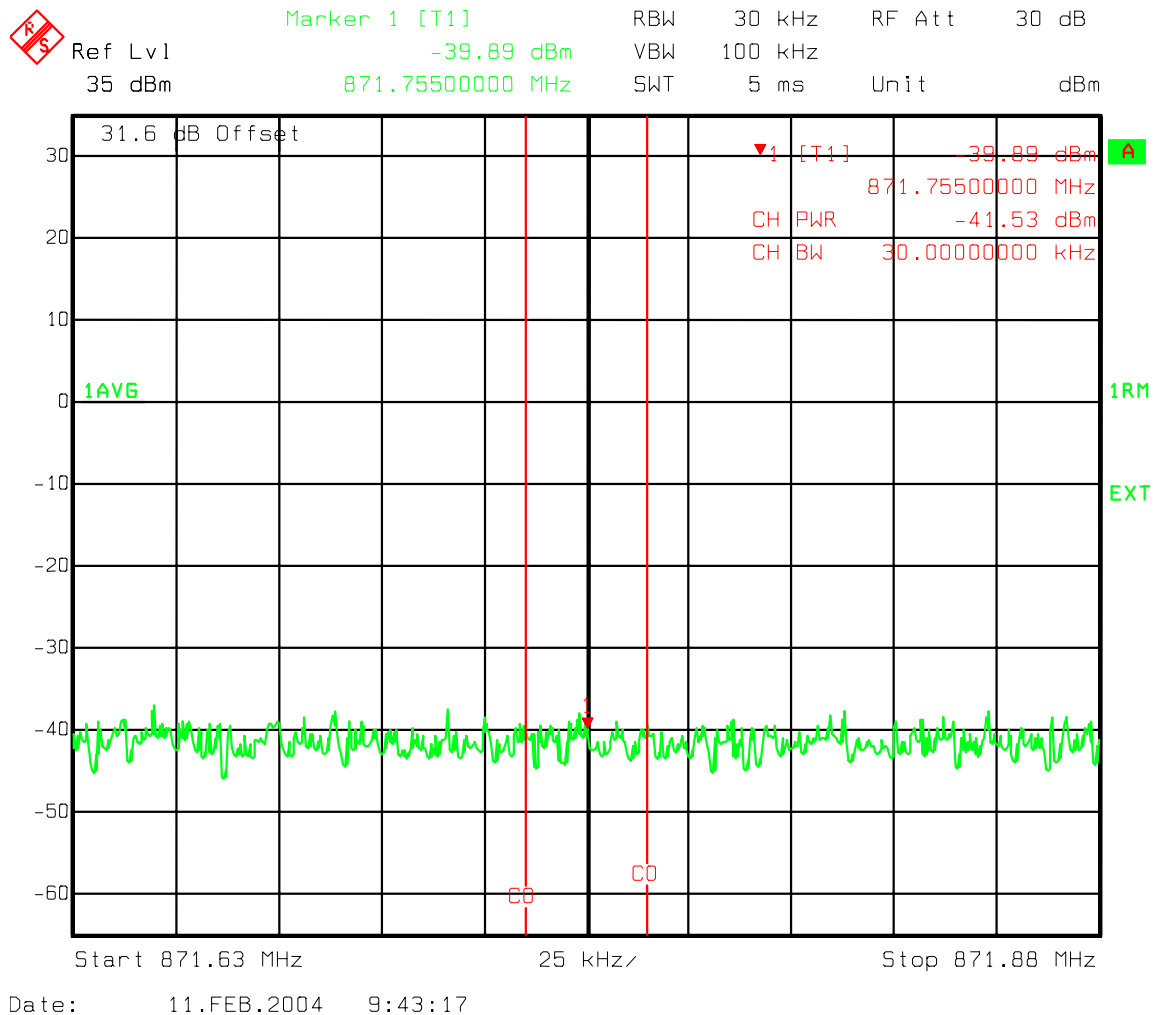
**Industry Canada 1.98 MHz offset Lower 30 kHz Chan Power Ch 1015**



**Figure 13 : One Carrier - Industry Canada 1.98 MHz offset Lower 30 kHz Chan Power Ch 1015**

### Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

#### Industry Canada 1.98 MHz offset Upper 30 kHz Chan Power Ch 1015

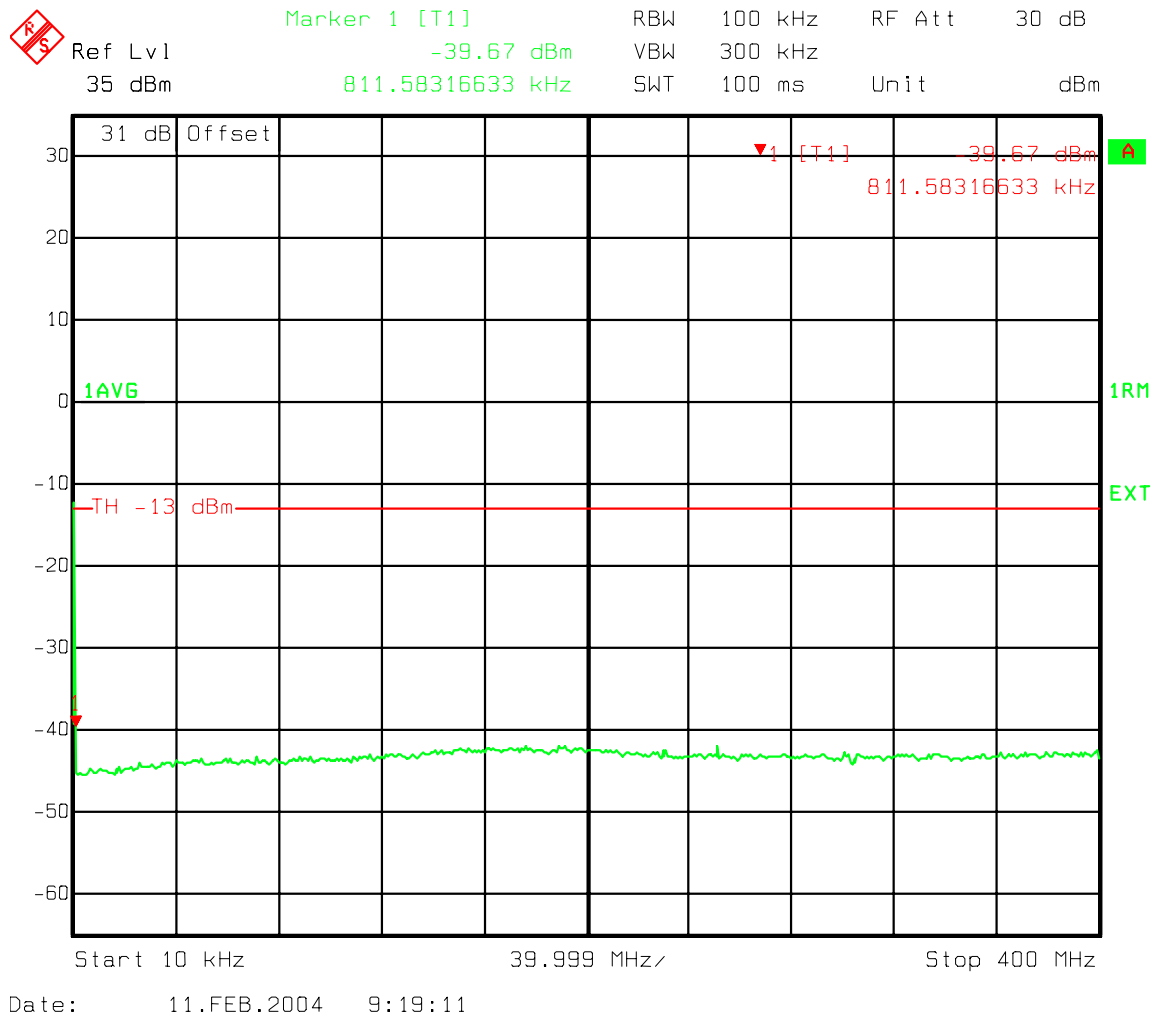


**Figure 14 : One Carrier - Industry Canada 1.98 MHz offset Upper 30 kHz Chan Power Ch 1015**

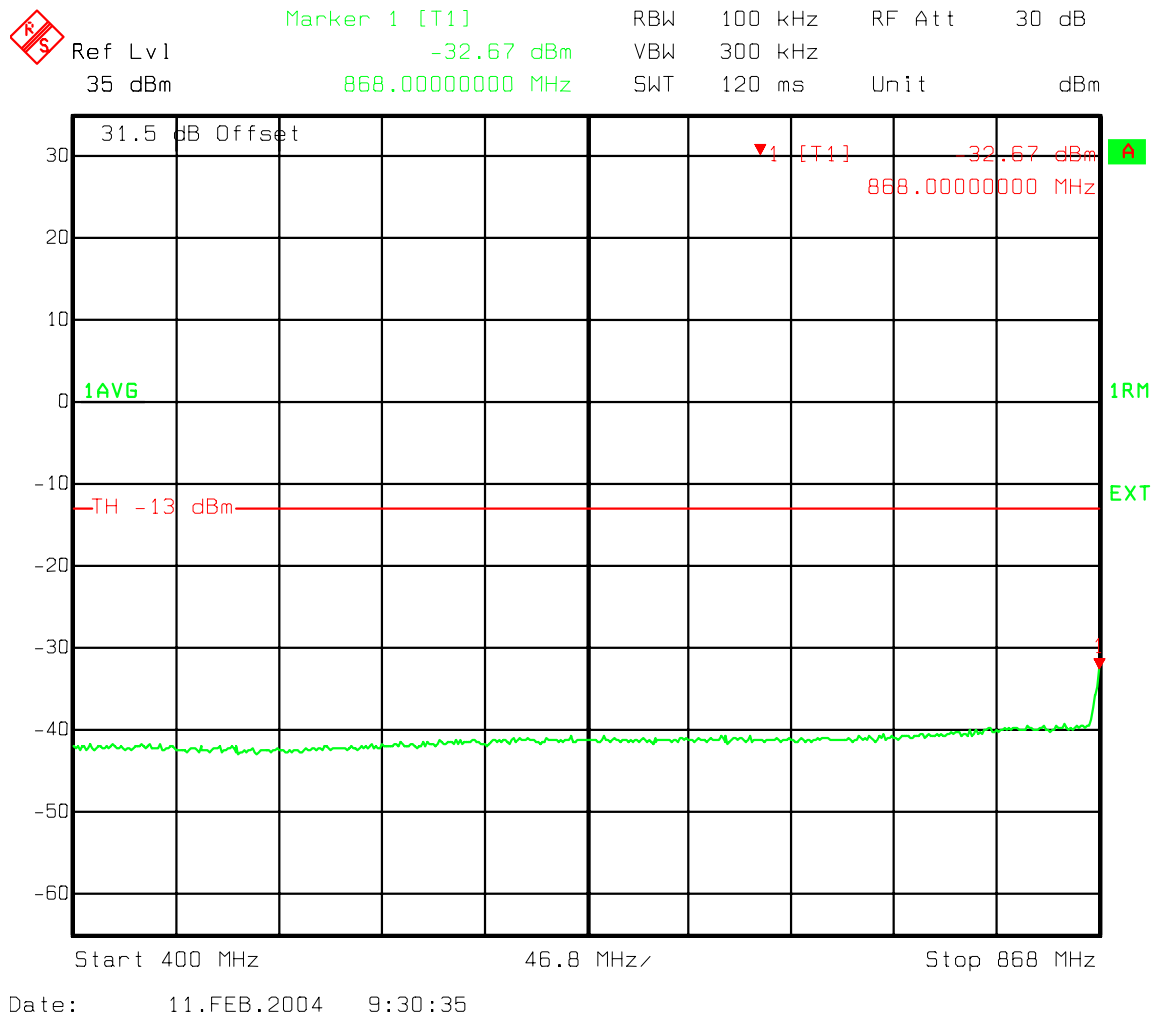


## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

### A'' and A Band IS95 Spurious emissions 10kHz-400 MHz

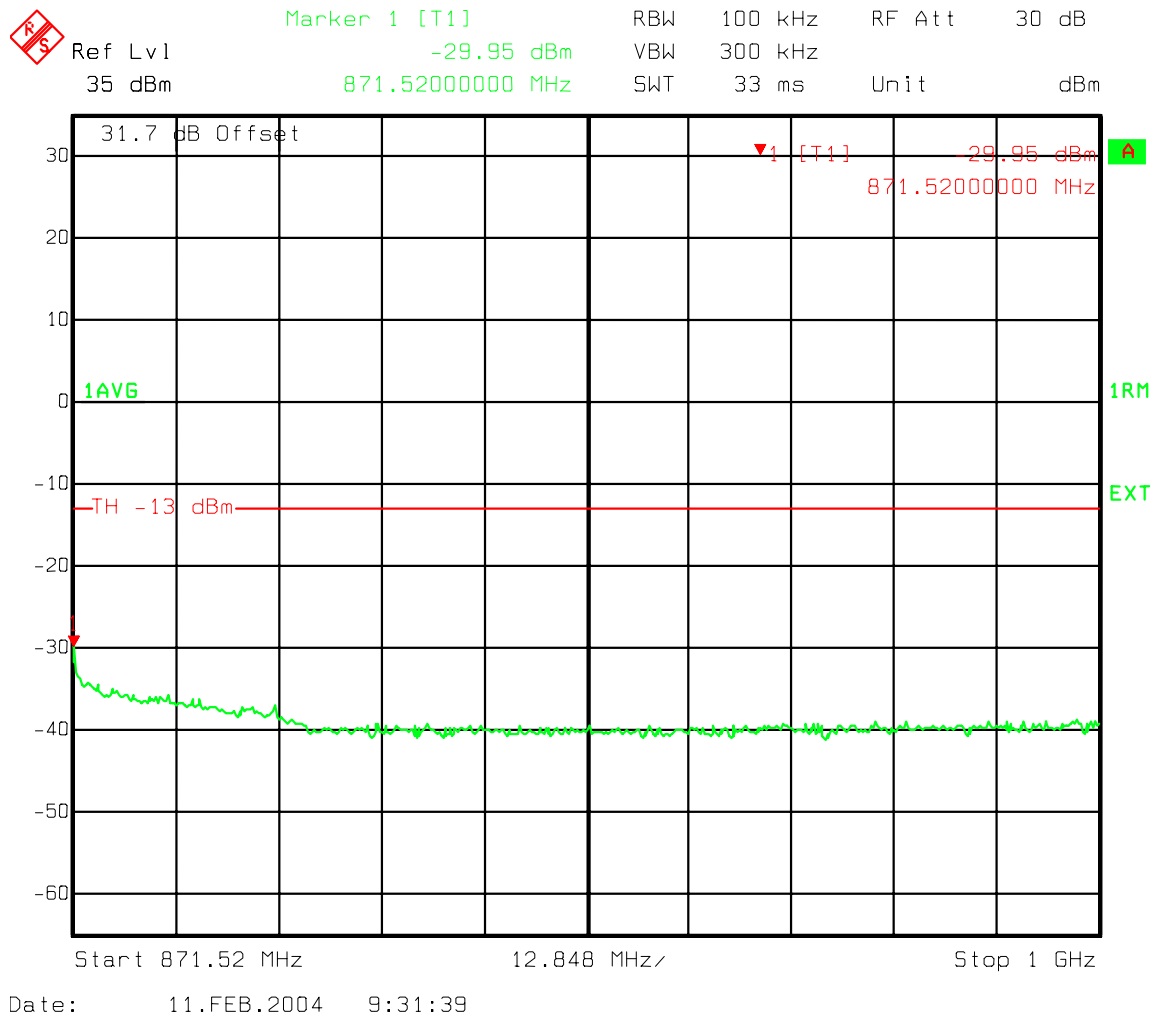


**Figure 15 : One Carrier - A'' and A Band IS95 Spurious emissions 10kHz-400 MHz**

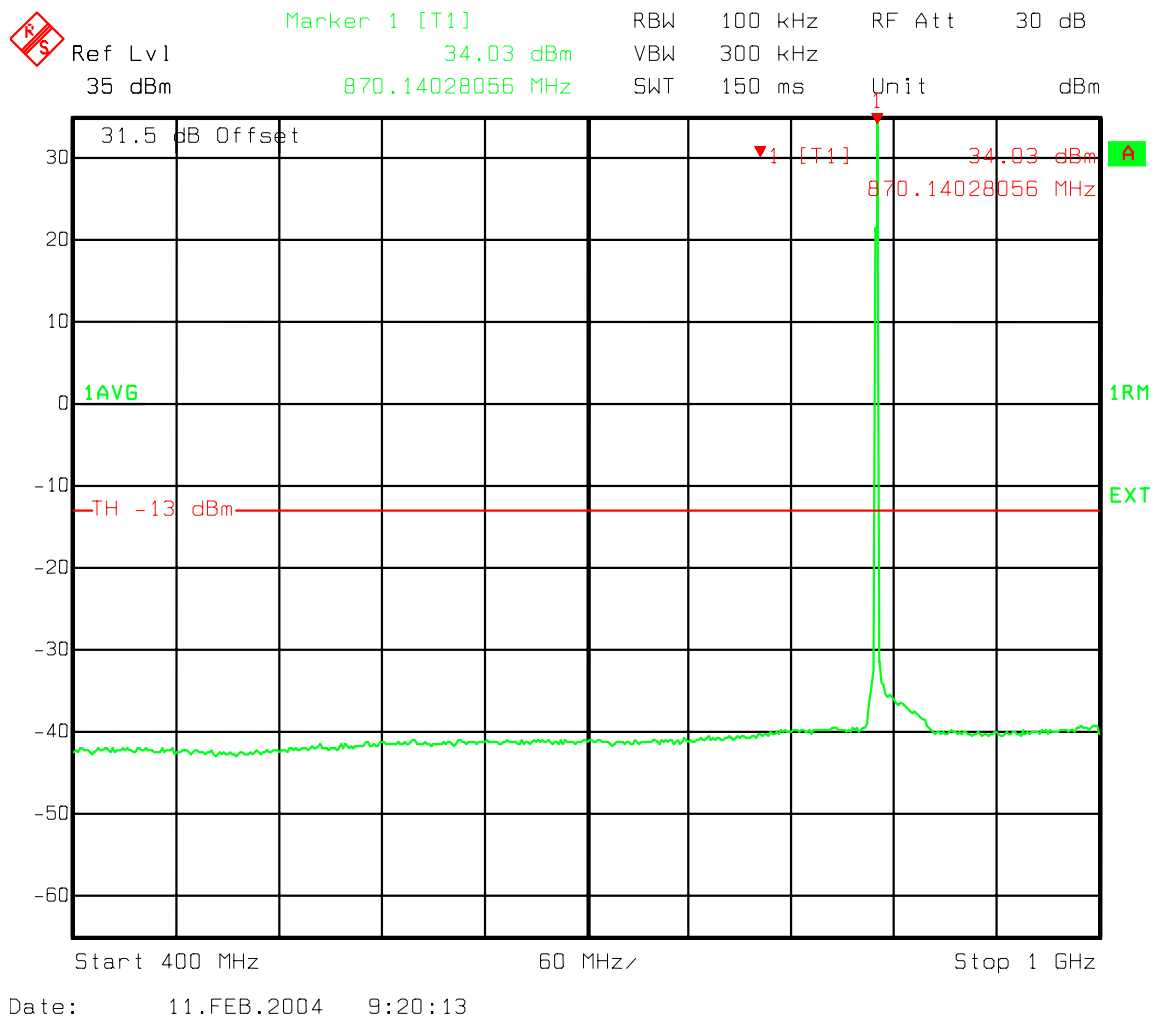
**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
Ant. Port one Carrier band A and A'' IS95****A '' and a Band IS95 Spurious emissions 400 MHz to Lower 1 MHz Band Edge****Figure 16 : One Carrier - A '' and a Band IS95 Spurious emissions 400 MHz to Lower 1 MHz Band Edge**

# **Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95**

## **A '' and a Band IS95 Spurious emissions Upper 1 MHz Band Edge to 1 GHz**

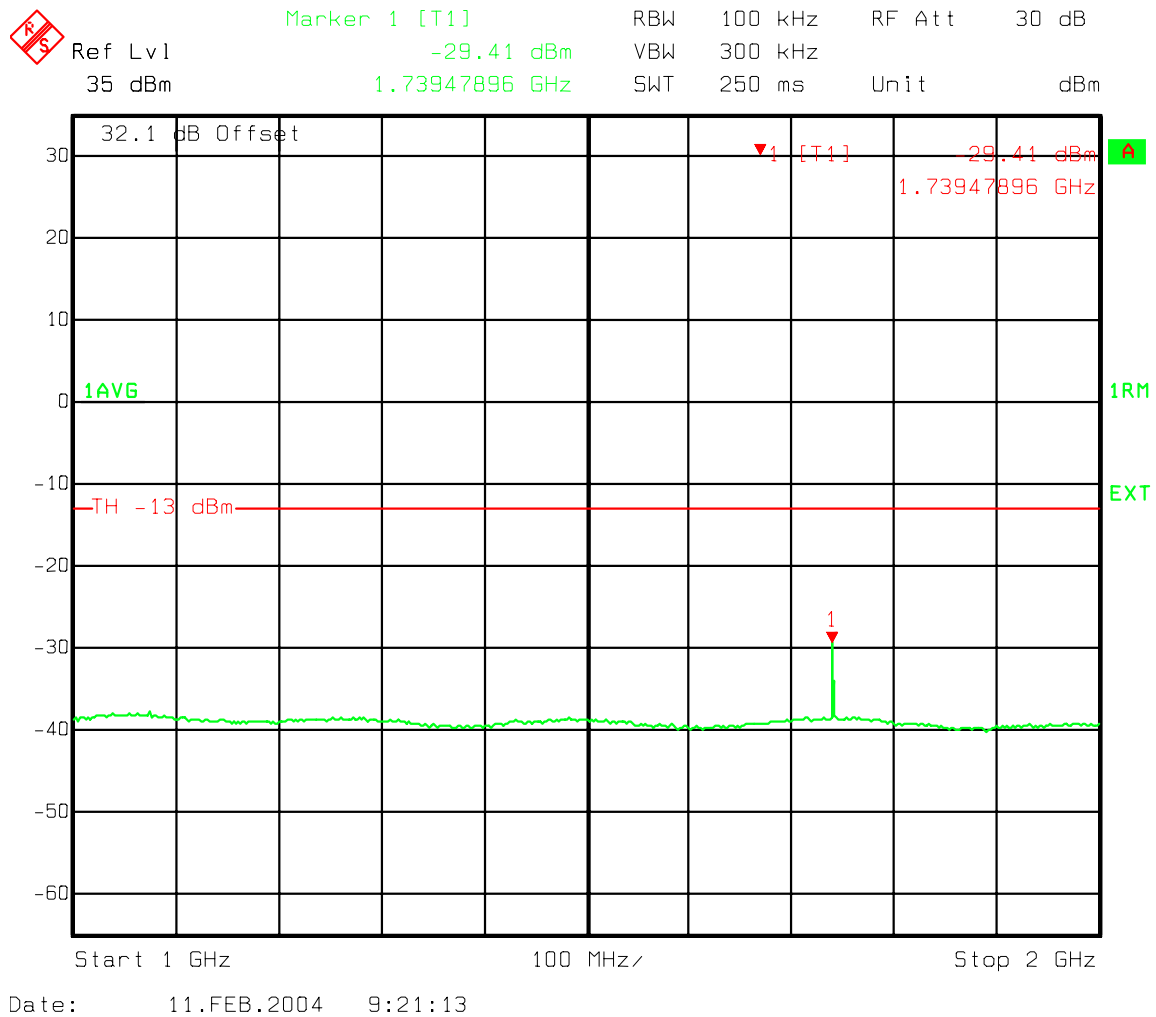


**Figure 17 : One Carrier - A '' and a Band IS95 Spurious emissions Upper 1 MHz Band Edge to 1 GHz**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
Ant. Port one Carrier band A and A'' IS95****A'' and A Band IS95 Spurious emissions 400-1000 MHz****Figure 18 : One Carrier - A'' and A Band IS95 Spurious emissions 400-1000 MHz**

## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

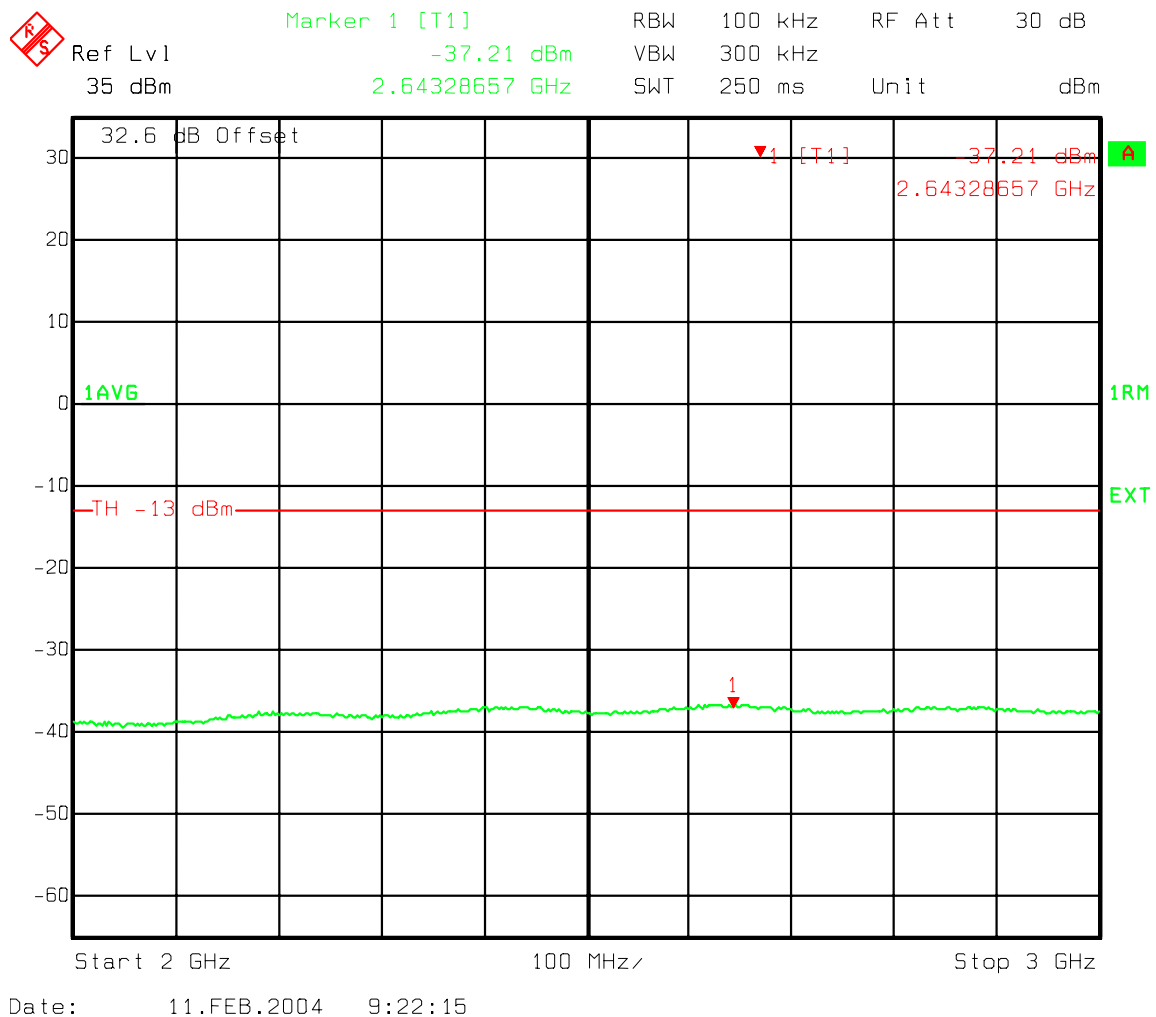
### A'' and A Band IS95 Spurious emissions 1000-2000 MHz



**Figure 19 : One Carrier - A'' and A Band IS95 Spurious emissions 1000-2000 MHz**

## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

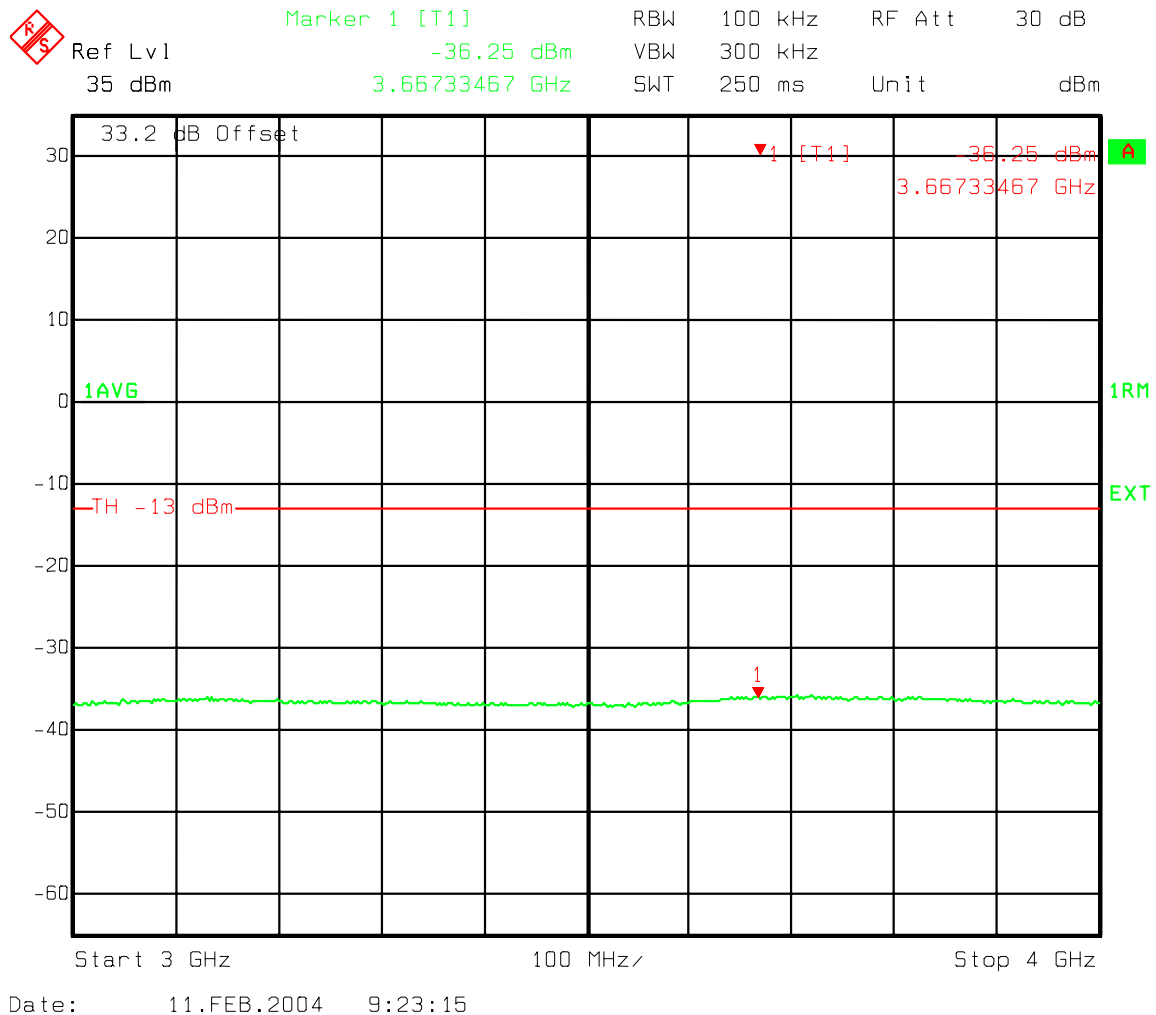
### A'' and A Band IS95 Spurious emissions 2000-3000 MHz



**Figure 20 : One Carrier - A'' and A Band IS95 Spurious emissions 2000-3000 MHz**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

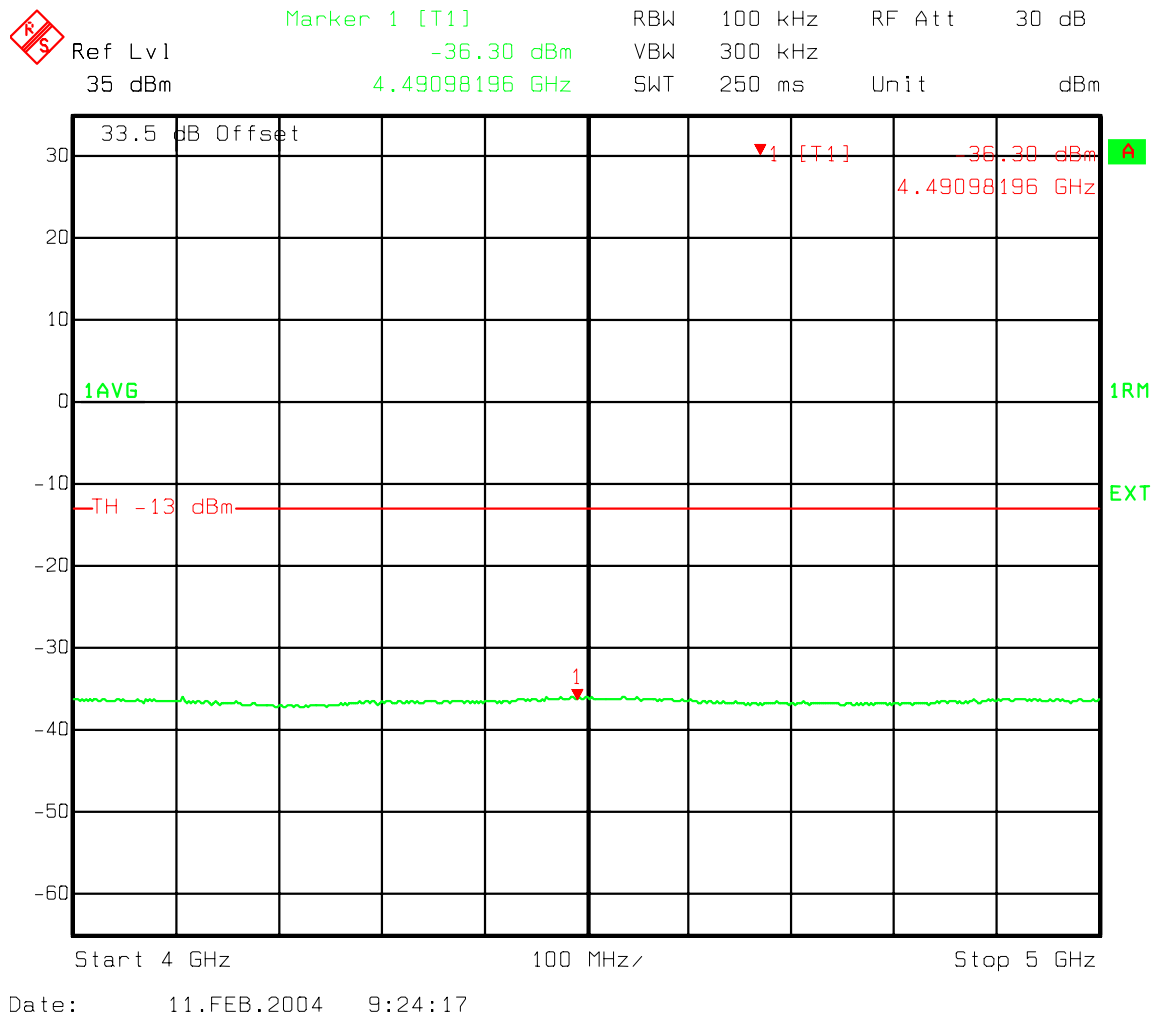
**A'' and A Band IS95 Spurious emissions 3000-4000 MHz**



**Figure 21 : One Carrier - A'' and A Band IS95 Spurious emissions 3000-4000 MHz**

## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

### A'' and A Band IS95 Spurious emissions 4000-5000 MHz

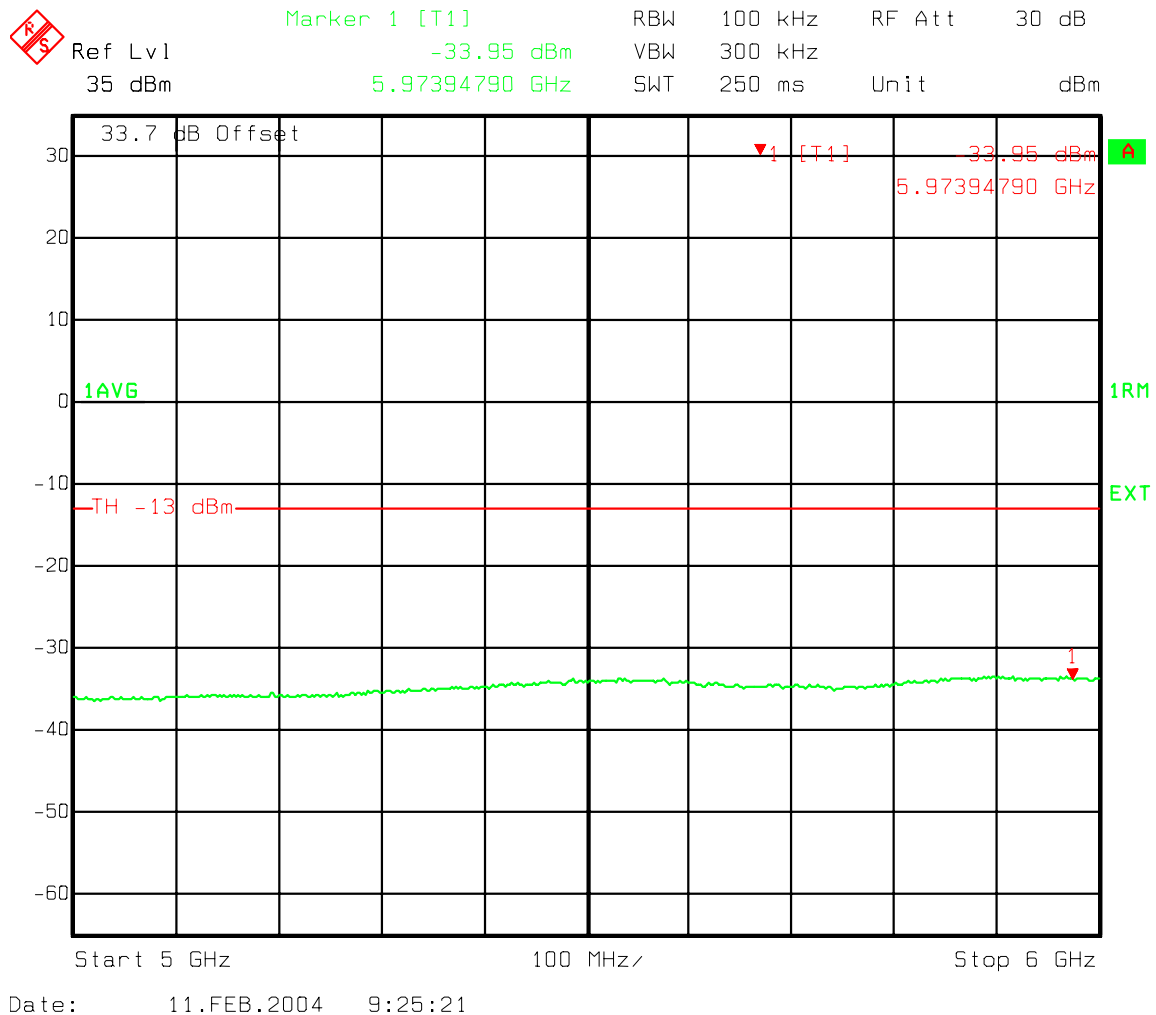


**Figure 22 : One Carrier - A'' and A Band IS95 Spurious emissions 4000-5000 MHz**



## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

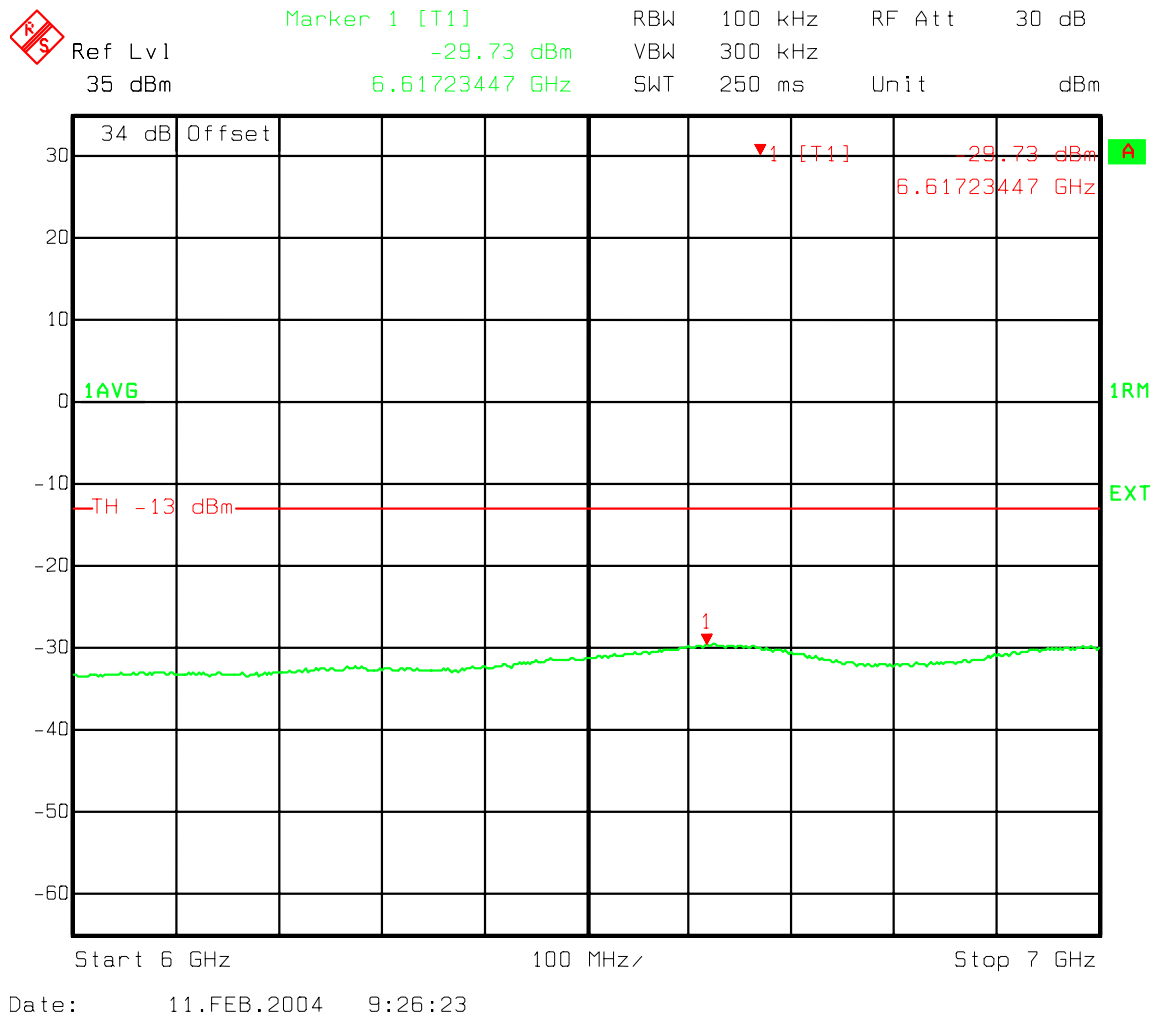
### A'' and A Band IS95 Spurious emissions 5000-6000 MHz



**Figure 23 : One Carrier - A'' and A Band IS95 Spurious emissions 5000-6000 MHz**

## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

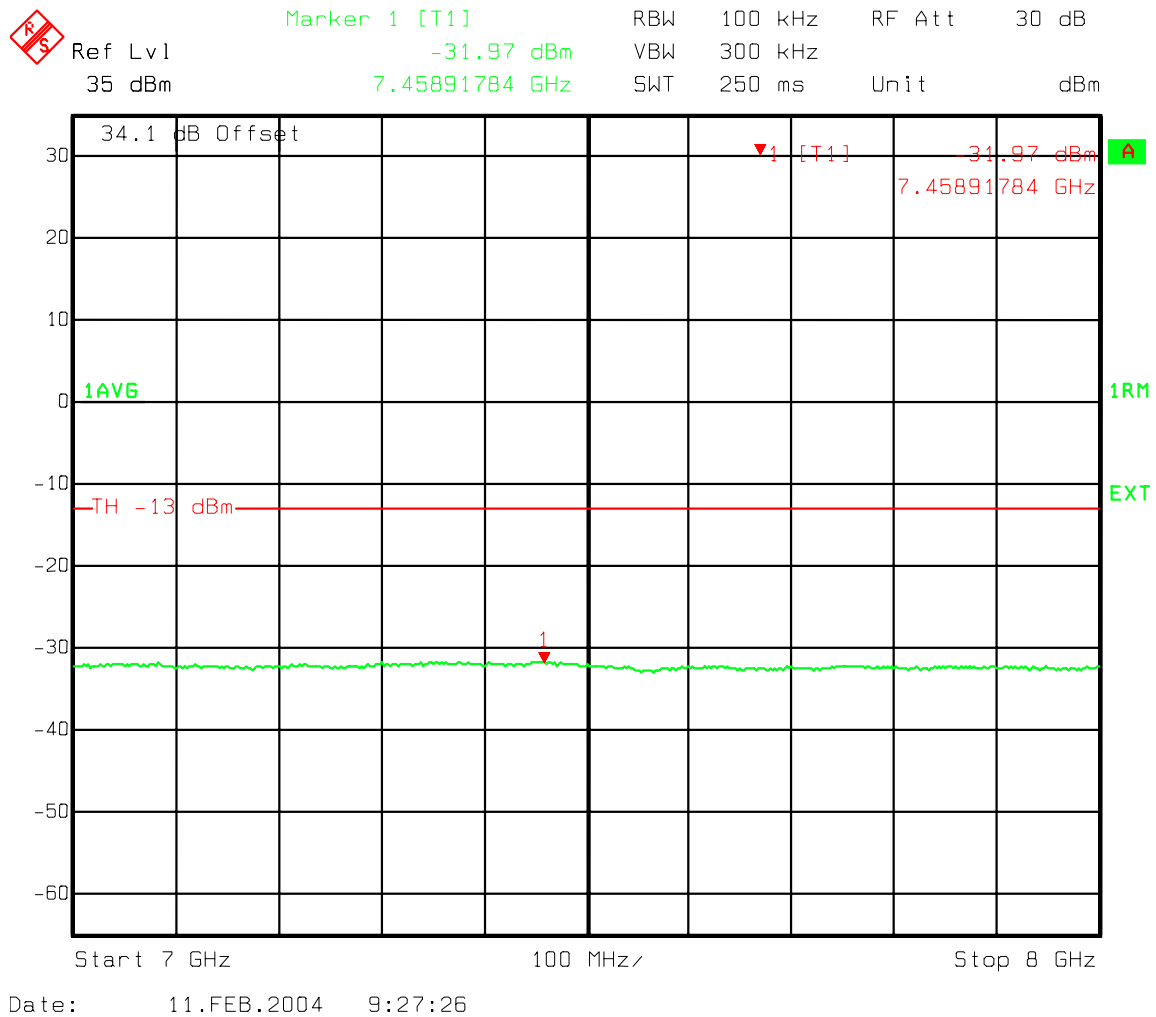
### A'' and A Band IS95 Spurious emissions 6000-7000 MHz



**Figure 24 : One Carrier - A'' and A Band IS95 Spurious emissions 6000-7000 MHz**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

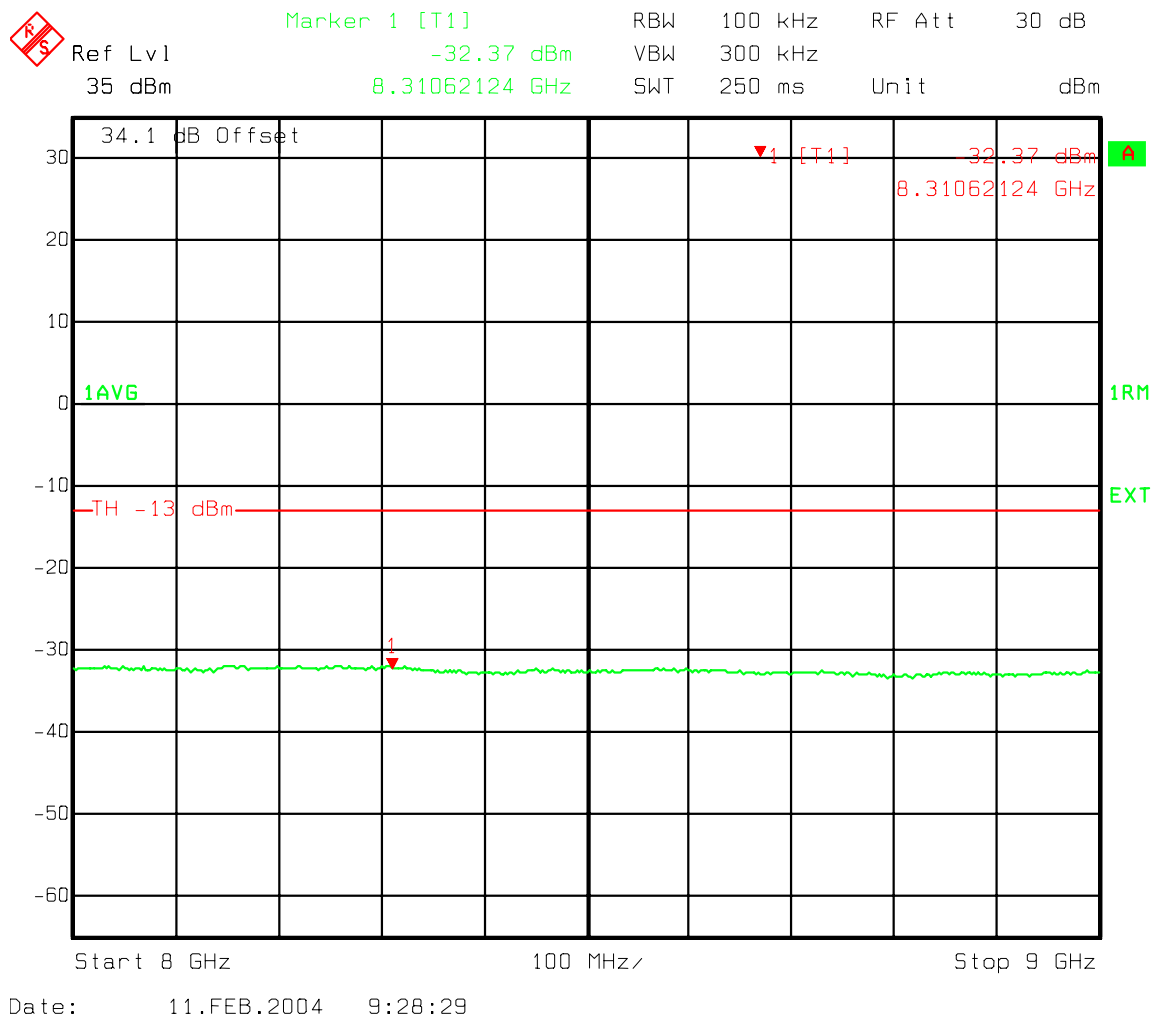
**A'' and A Band IS95 Spurious emissions 7000-8000 MHz**



**Figure 25 : One Carrier - A'' and A Band IS95 Spurious emissions 7000-8000 MHz**

## Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port one Carrier band A and A'' IS95

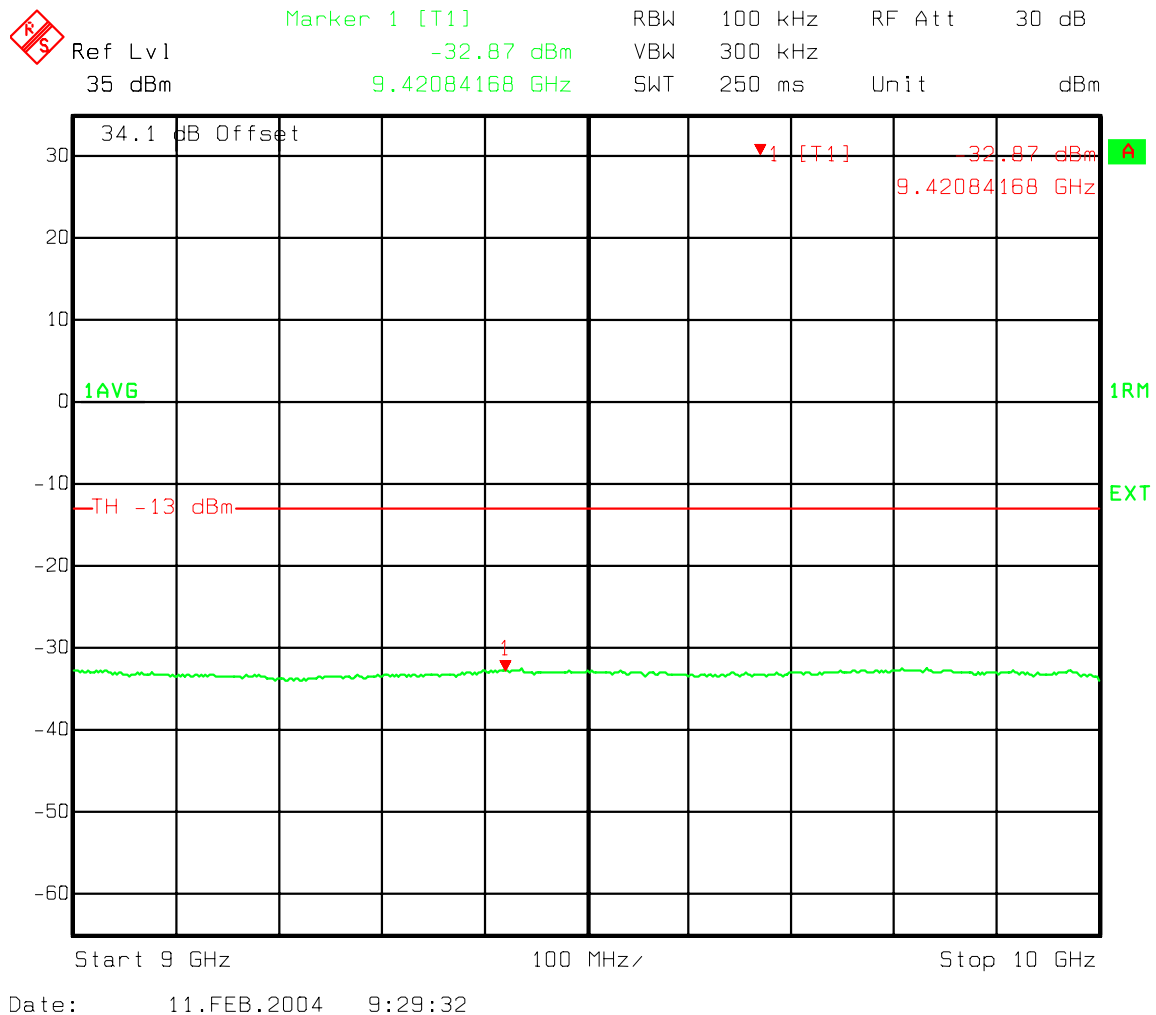
### A'' and A Band IS95 Spurious emissions 8000-9000 MHz



**Figure 26 : One Carrier - A'' and A Band IS95 Spurious emissions 8000-9000 MHz**

**Single Chan 1015 IS95 Spurious Emissions at the 800 MHz Compact Radio Module  
 Ant. Port one Carrier band A and A'' IS95**

**A'' and A Band IS95 Spurious emissions 9000-10000 MHz**



**Figure 27 : One Carrier - A'' and A Band IS95 Spurious emissions 9000-10000 MHz**

## 6 Appendix B - Two Carriers IS-95 Spurious Emission

### Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

#### Occupied Bandwidth Ch 1015, 33 A''

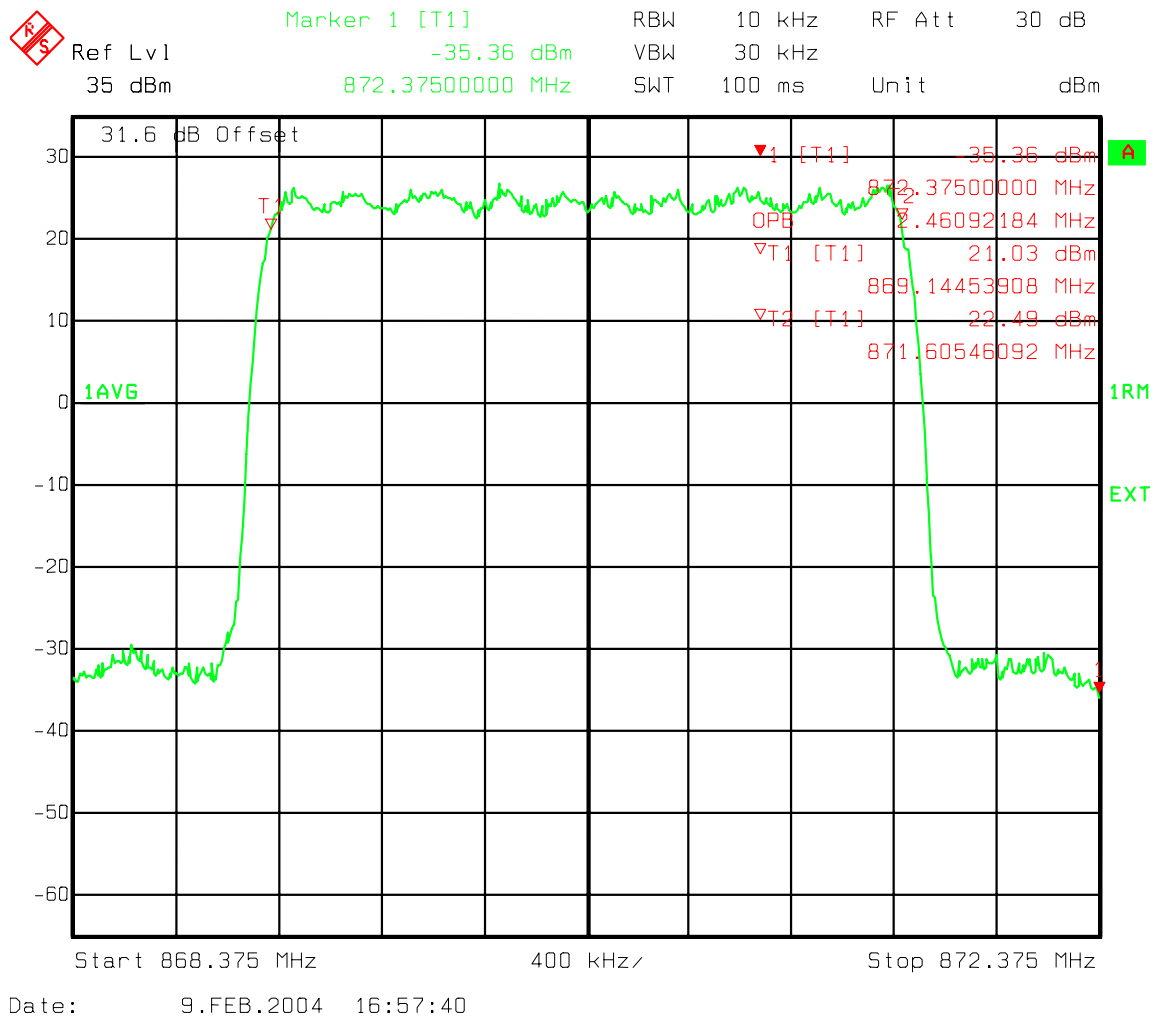
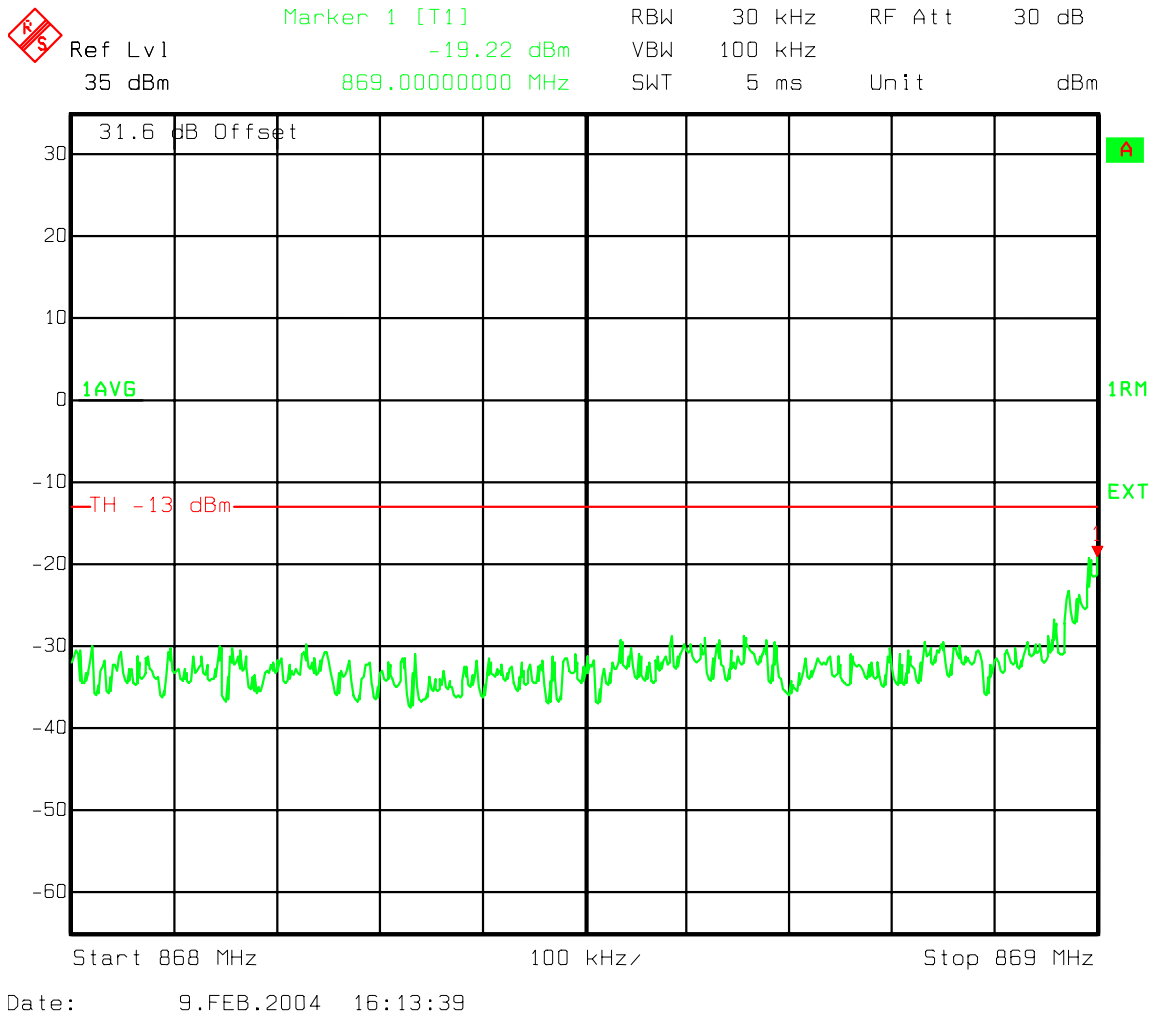


Figure 28 : Two Carriers - Occupied Bandwidth Ch 1015, 33 A''

**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact  
 Radio Module Ant. Port band A and A'' IS95**

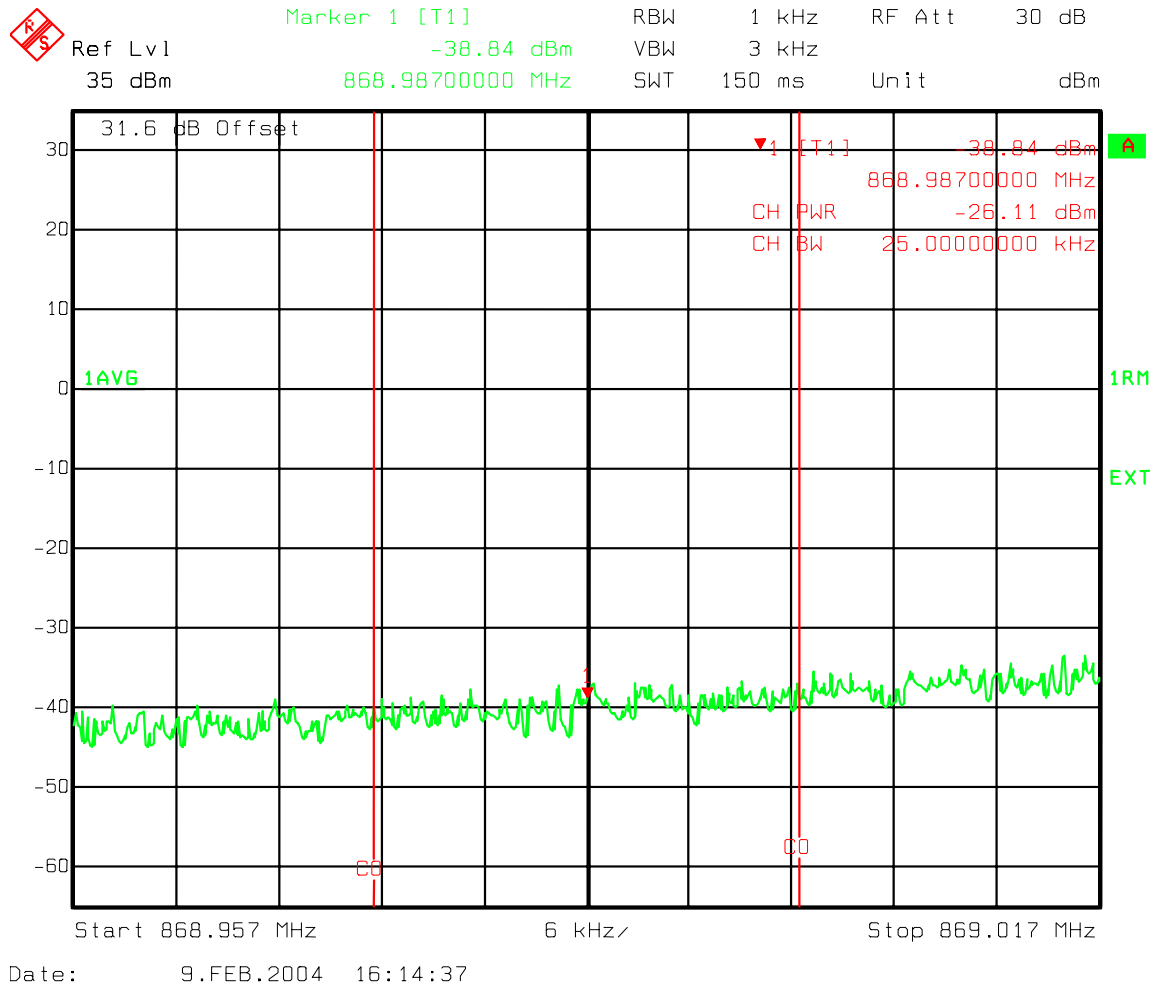
**A '' Band Ch 1015, 33 IS95 Adjacent 1 MHz Lower emissions 868-869 MHz**



**Figure 29 : Two Carriers - A '' Band Ch1015, 33 IS95 Adjacent 1 MHz Lower emissions  
 868-869 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

### Ch1015, 33 IS95 Lower A'' Band Adjacent to outside edge 25kHz band Channel Power

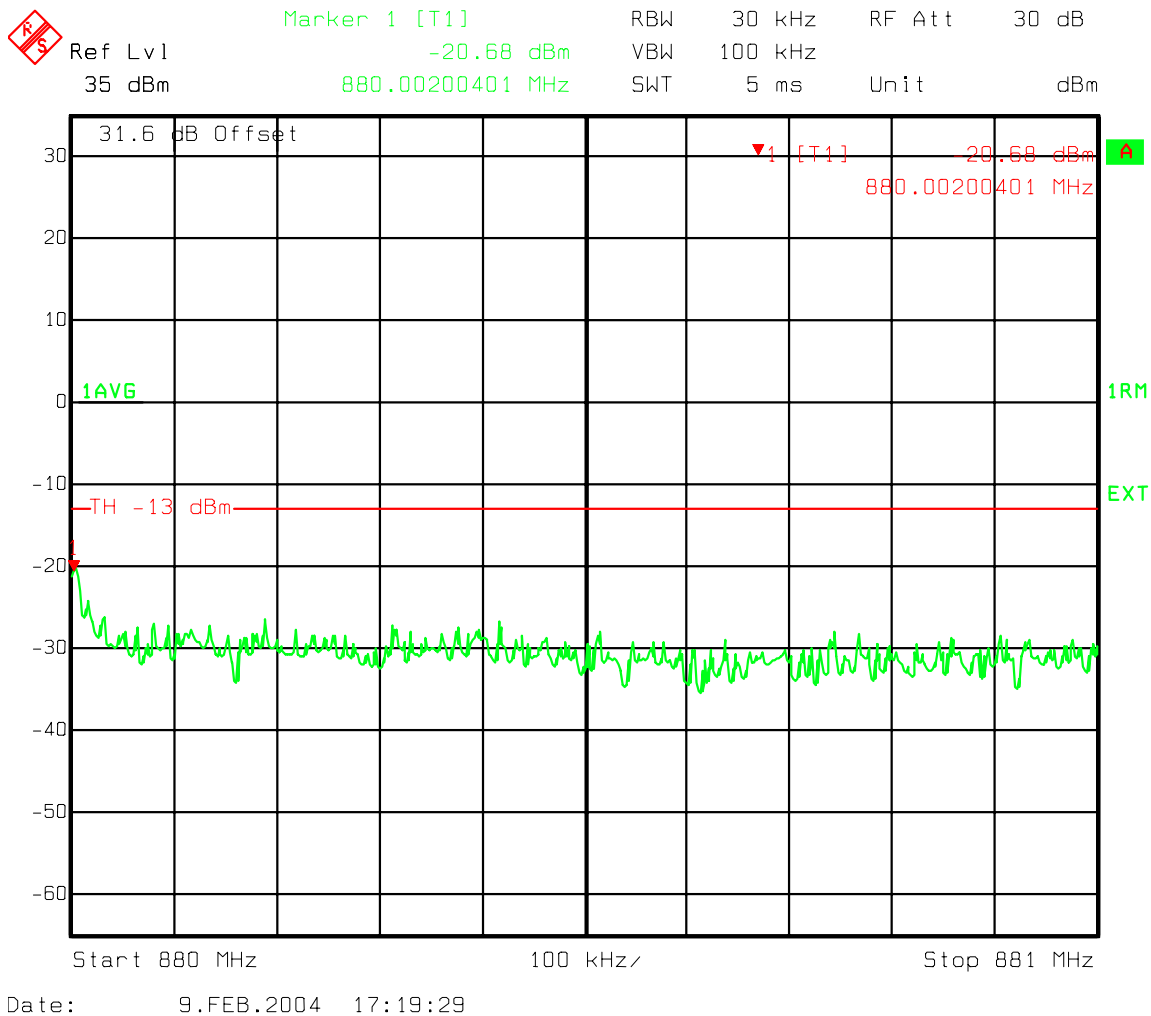


**Figure 30 : Two Carriers - Ch1015, 33 IS95 Lower A'' Band Adjacent to outside edge 25kHz band Channel Power**

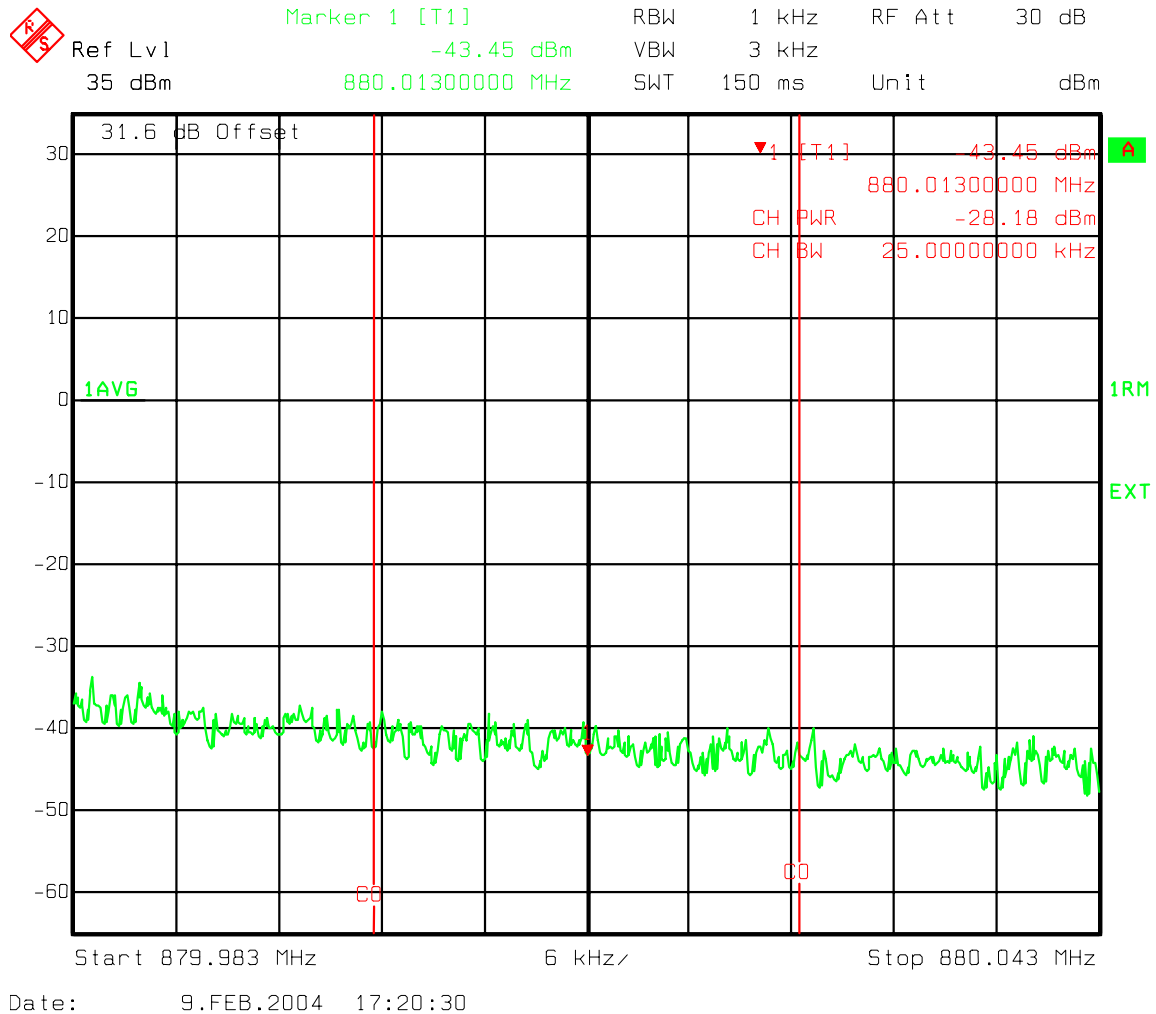


**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact  
 Radio Module Ant. Port band A and A'' IS95**

**Ch 267, 308 Upper a Band adjacent 1 MHz band emissions 880-881 MHz**

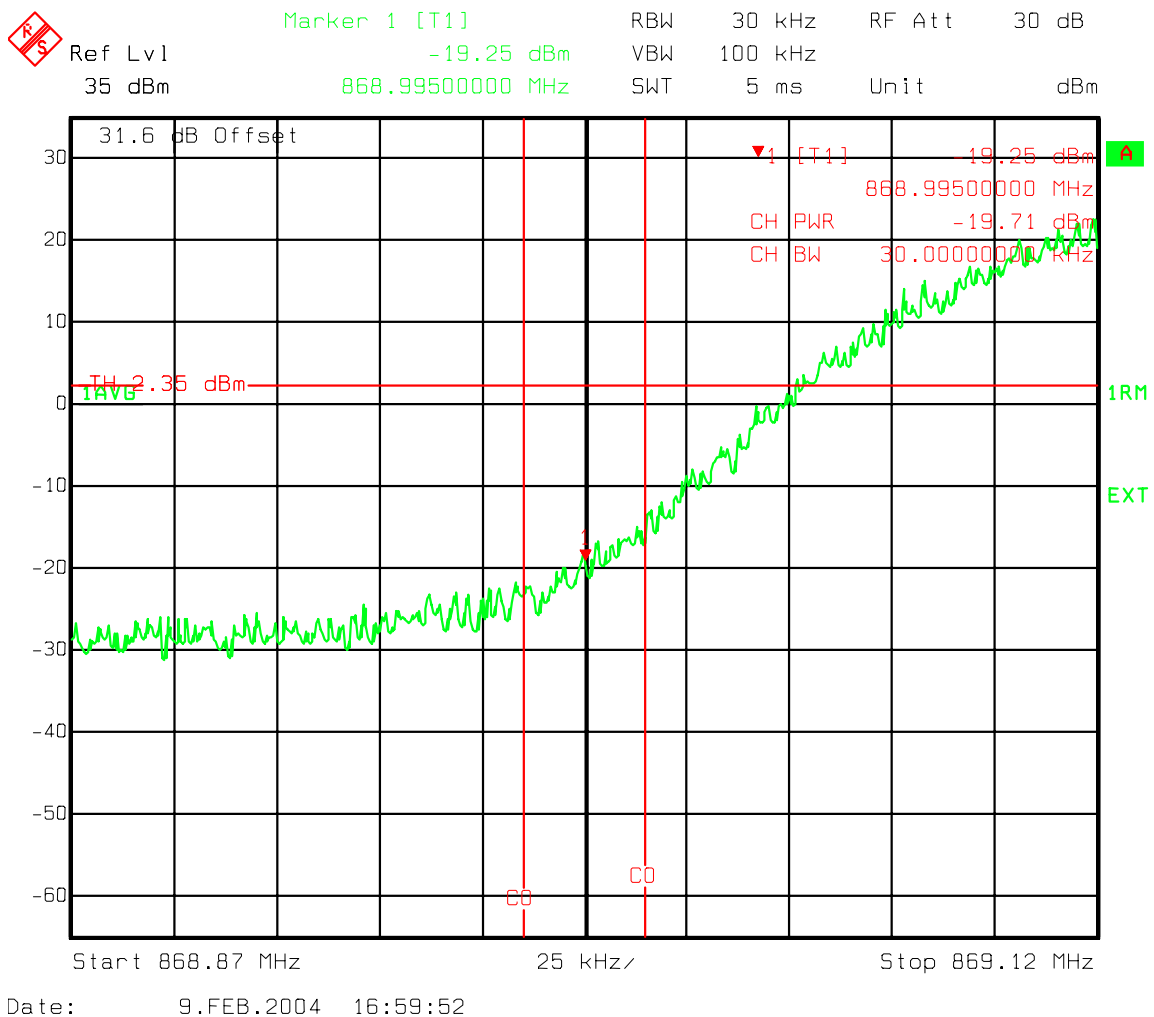


**Figure 31 : Two Carriers - Ch 267, 308 Upper a Band adjacent 1 MHz band emissions 880-881 MHz**

**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95****Ch 267, 308 Upper A Band adjacent to outside edge 25.0 kHz band Channel power****Figure 32 : Two Carriers - Ch 267, 308 Upper A Band adjacent to outside edge 25.0 kHz band Channel power**

**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact  
 Radio Module Ant. Port band A and A'' IS95**

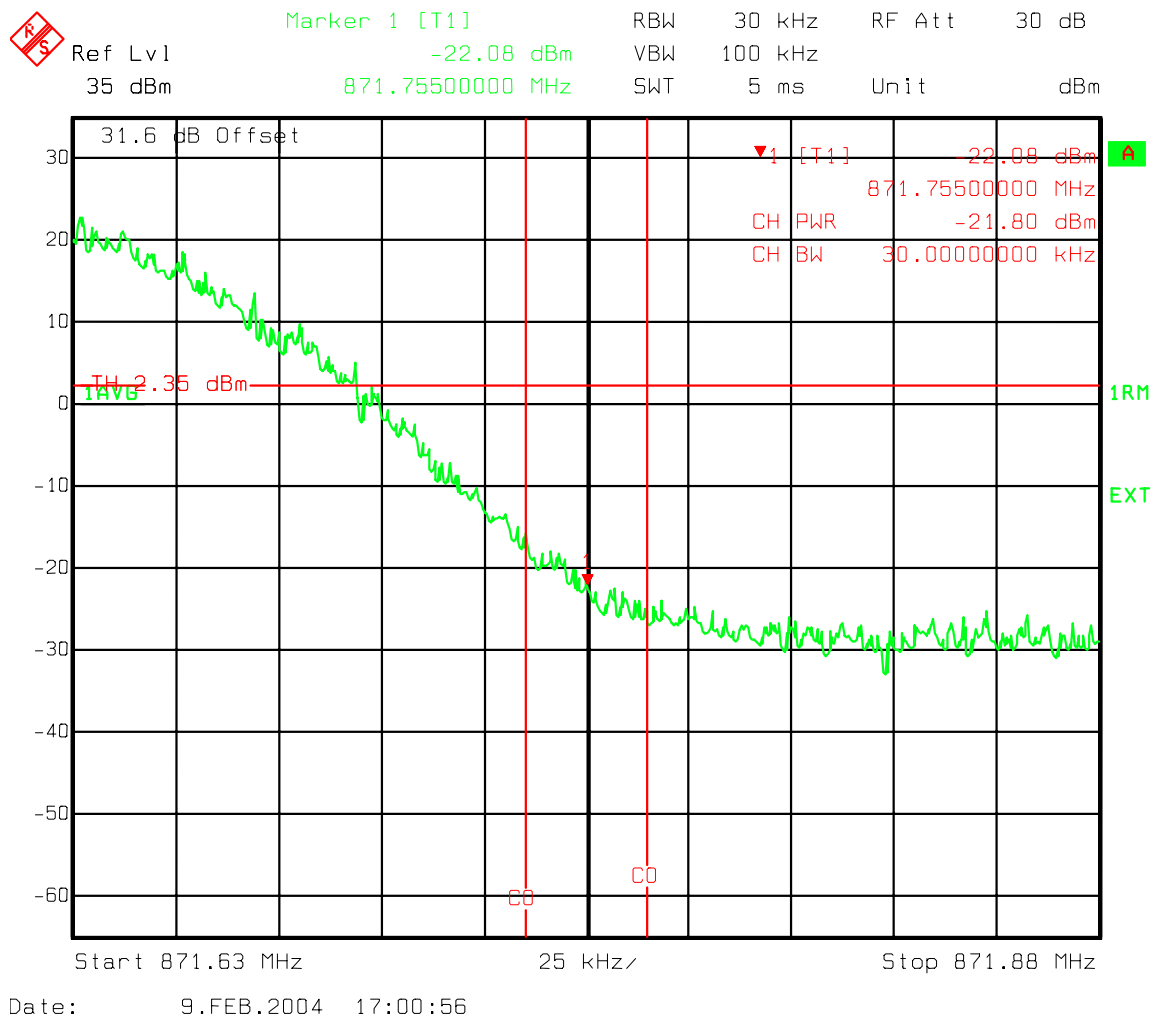
**Industry Canada Lower 750 kHz offset 30 kHz Chan Power Ch 1015, 33**



**Figure 33 : Two Carriers - Industry Canada Lower 750 kHz offset 30 kHz Chan Power Ch 1015, 33**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

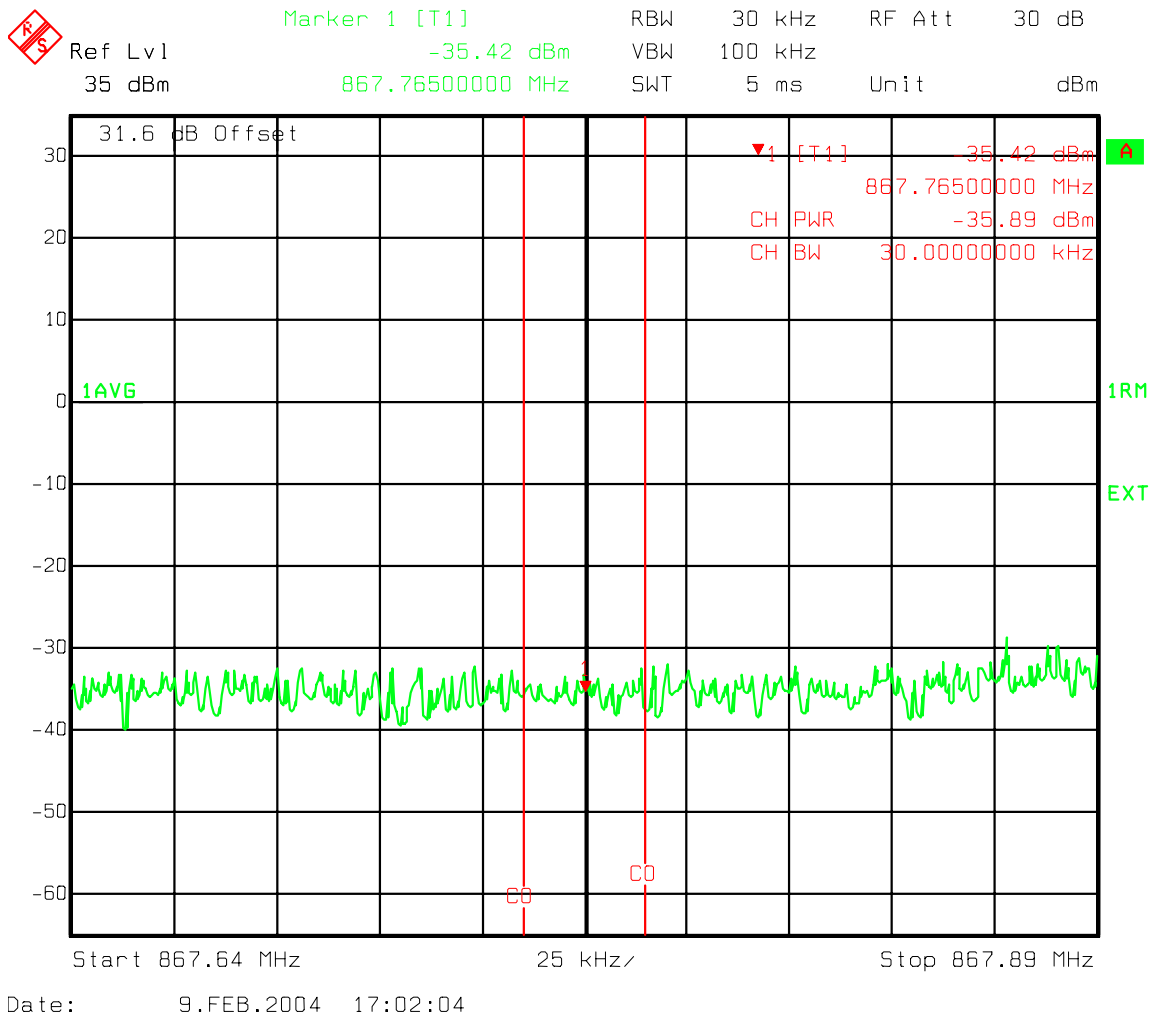
### Industry Canada Upper 750 kHz offset 30 kHz Chan Power Ch 1015, 33



**Figure 34 : Two Carriers - Industry Canada Upper 750 kHz offset 30 kHz Chan Power Ch 1015, 33**

**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact  
 Radio Module Ant. Port band A and A'' IS95**

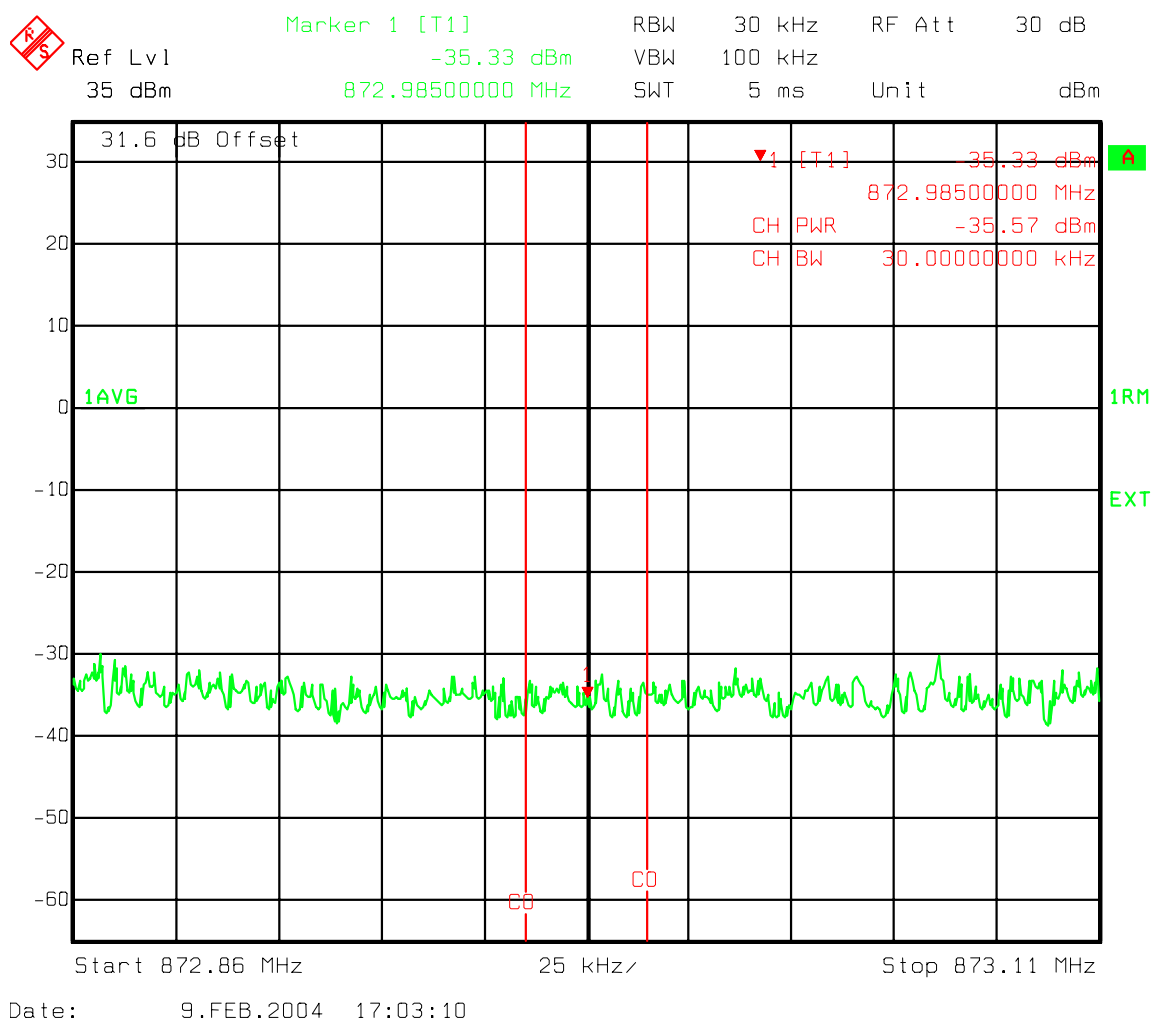
**Industry Canada 1.98 MHz offset Lower 30 kHz Chan Power Ch 1015, 33**



**Figure 35 : Two Carriers - Industry Canada 1.98 MHz offset Lower 30 kHz Chan Power  
 Ch 1015, 33**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

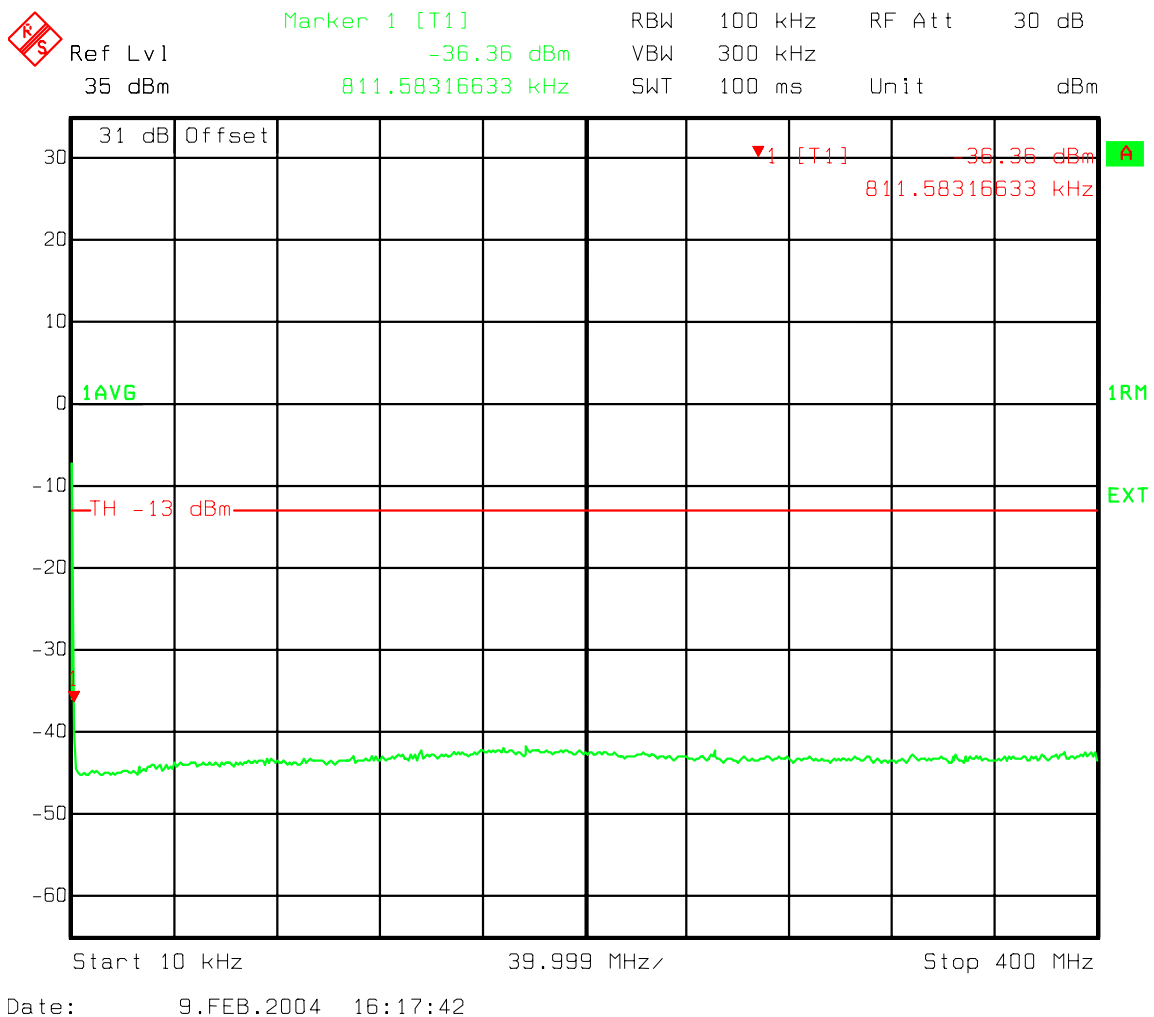
### Industry Canada 1.98 MHz offset Upper 30 kHz Chan Power Ch 1015, 33



**Figure 36 : Two Carriers - Industry Canada 1.98 MHz offset Upper 30 kHz Chan Power Ch 1015, 33**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

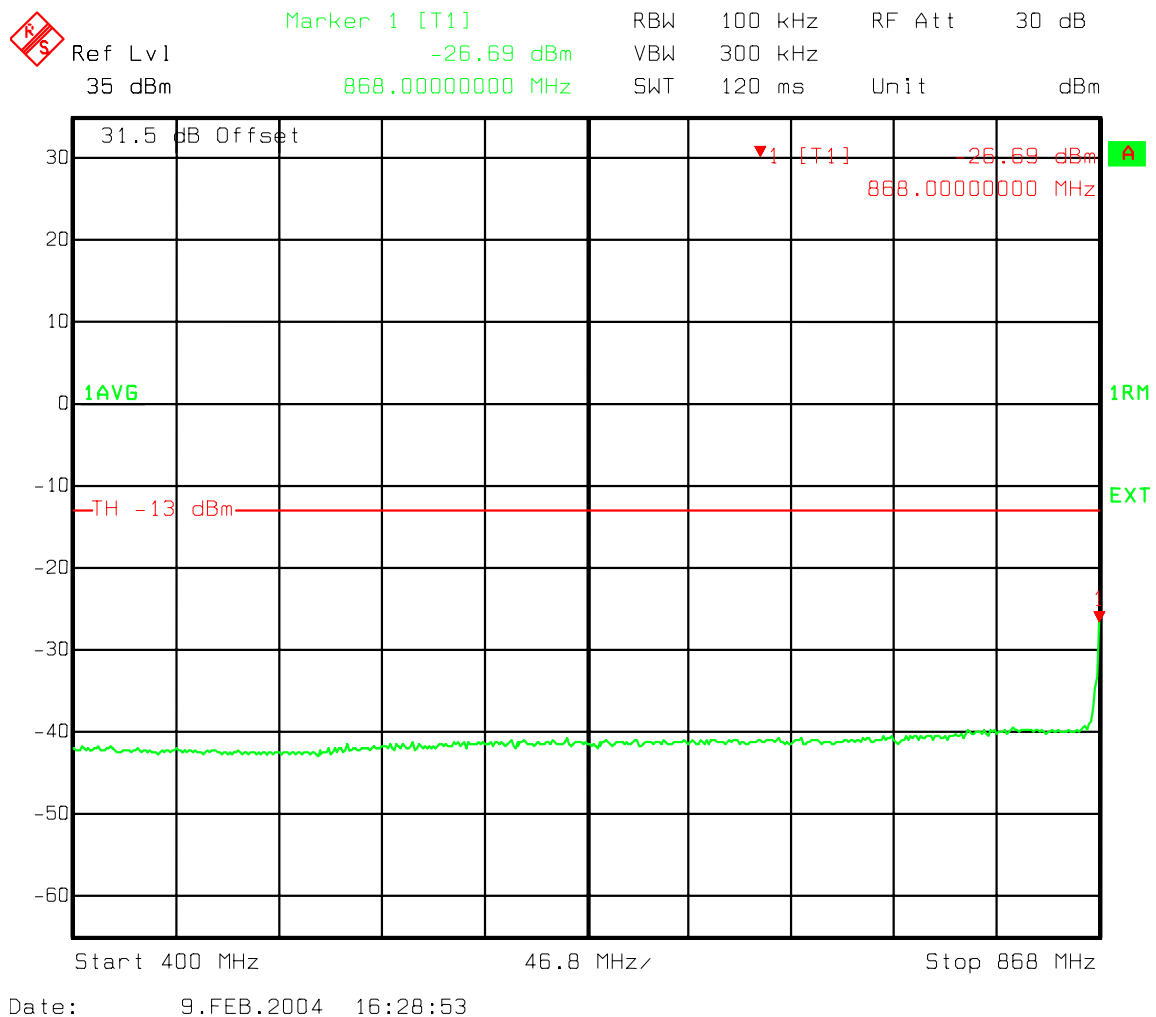
### A'' and A Band IS95 Spurious emissions 10kHz-400 MHz



**Figure 37 : Two Carriers - A'' and A Band IS95 Spurious emissions 10kHz-400 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

### A'' and a Band IS95 Spurious emissions 400 MHz to Lower 1 MHz Band Edge

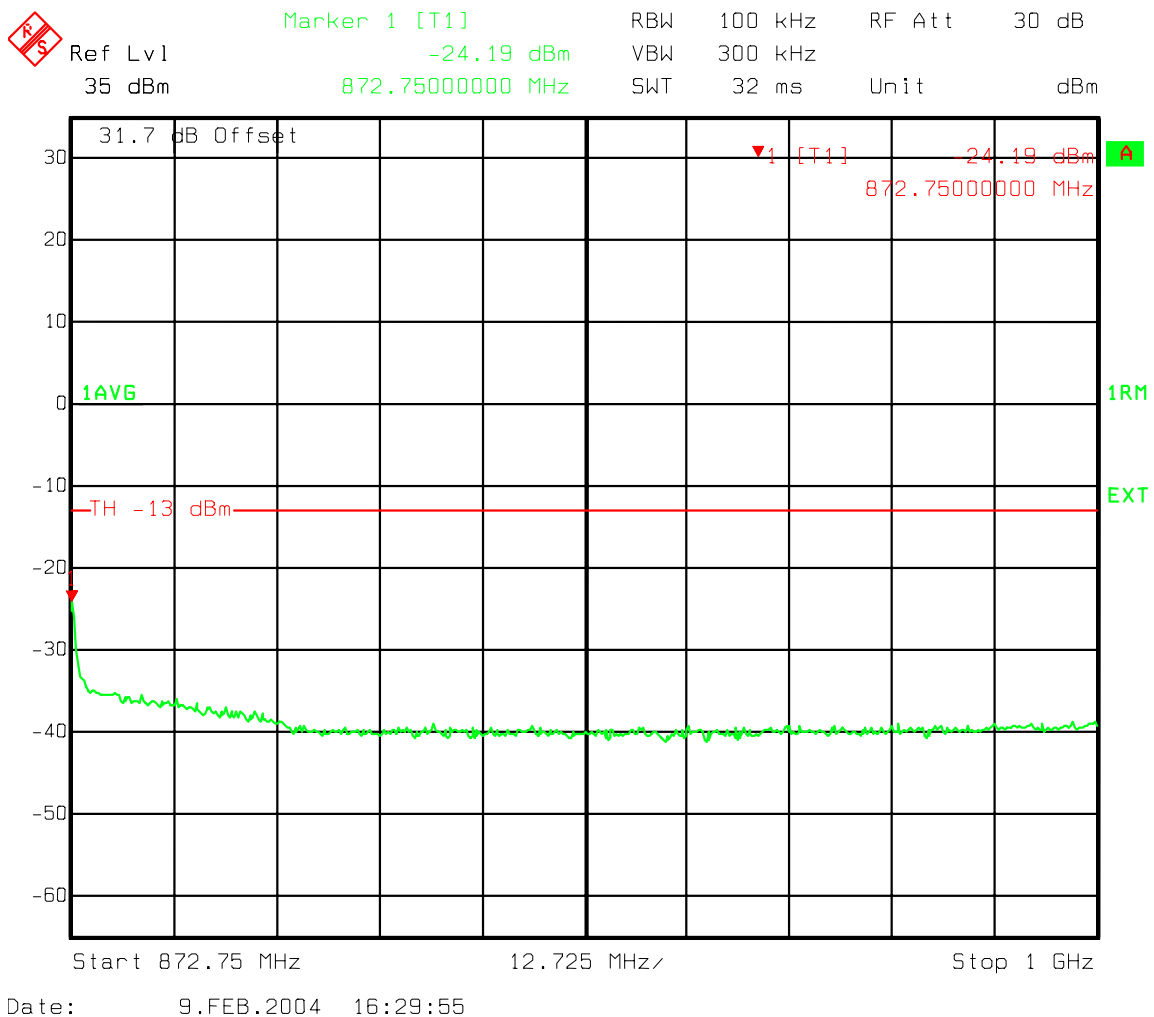


**Figure 38 : Two Carriers - A'' and a Band IS95 Spurious emissions 400 MHz to Lower 1 MHz Band Edge**



## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

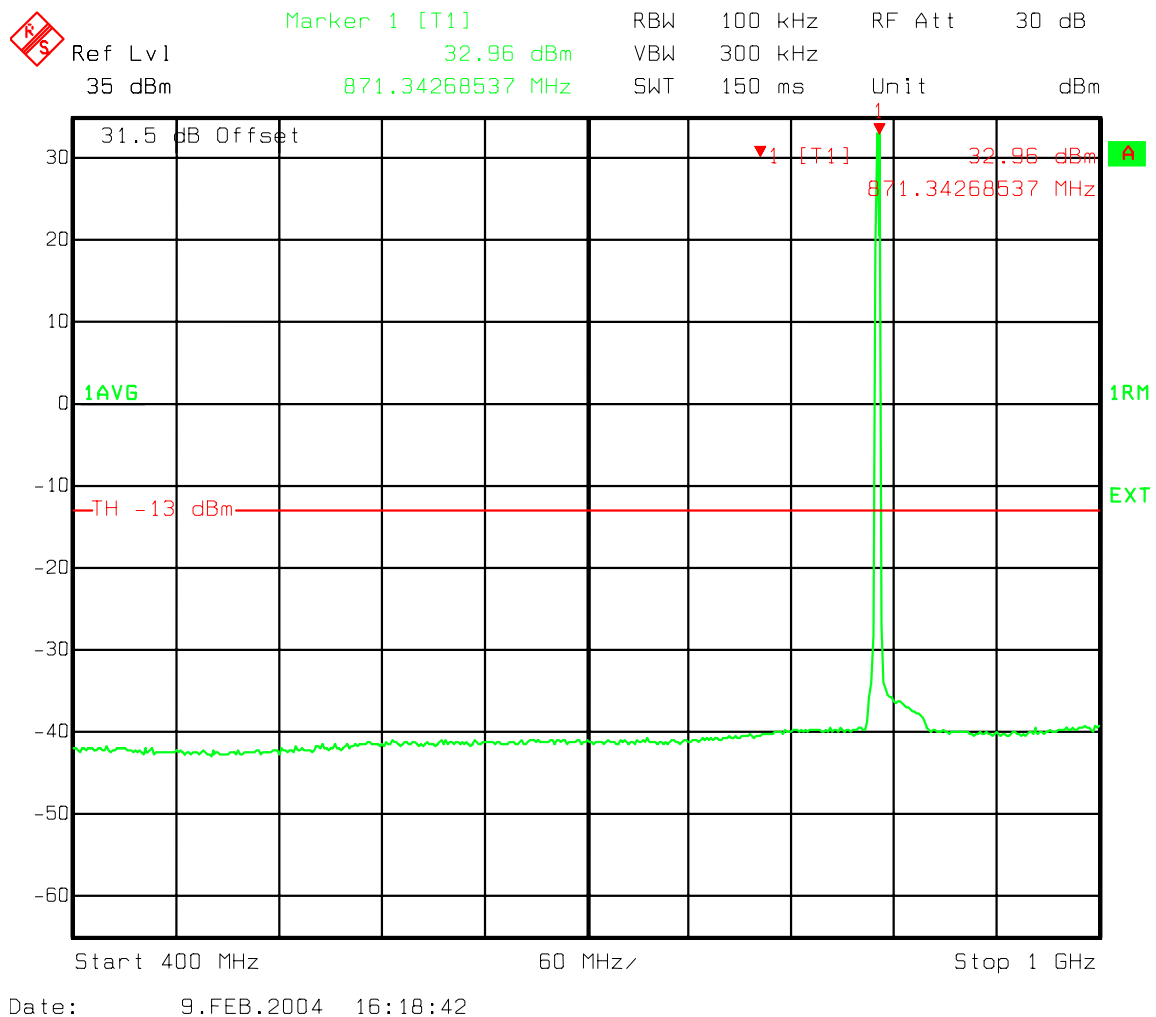
### A '' and a Band IS95 Spurious emissions Upper 1 MHz Band Edge to 1 GHz



**Figure 39 : Two Carriers - A '' and a Band IS95 Spurious emissions Upper 1 MHz Band Edge to 1 GHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

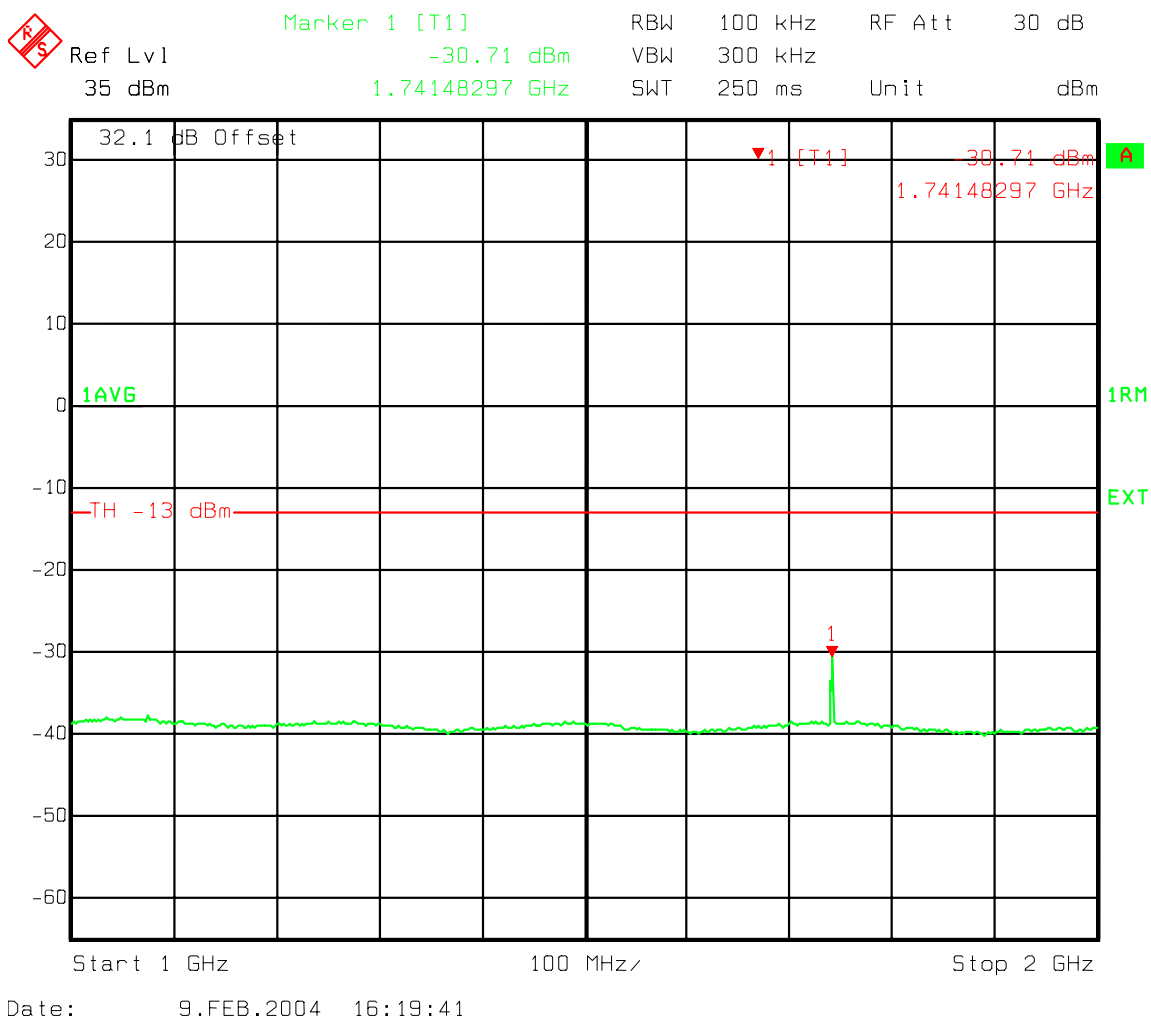
### A'' and A Band IS95 Spurious emissions 400-1000 MHz



**Figure 40 : Two Carriers - A'' and A Band IS95 Spurious emissions 400-1000 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

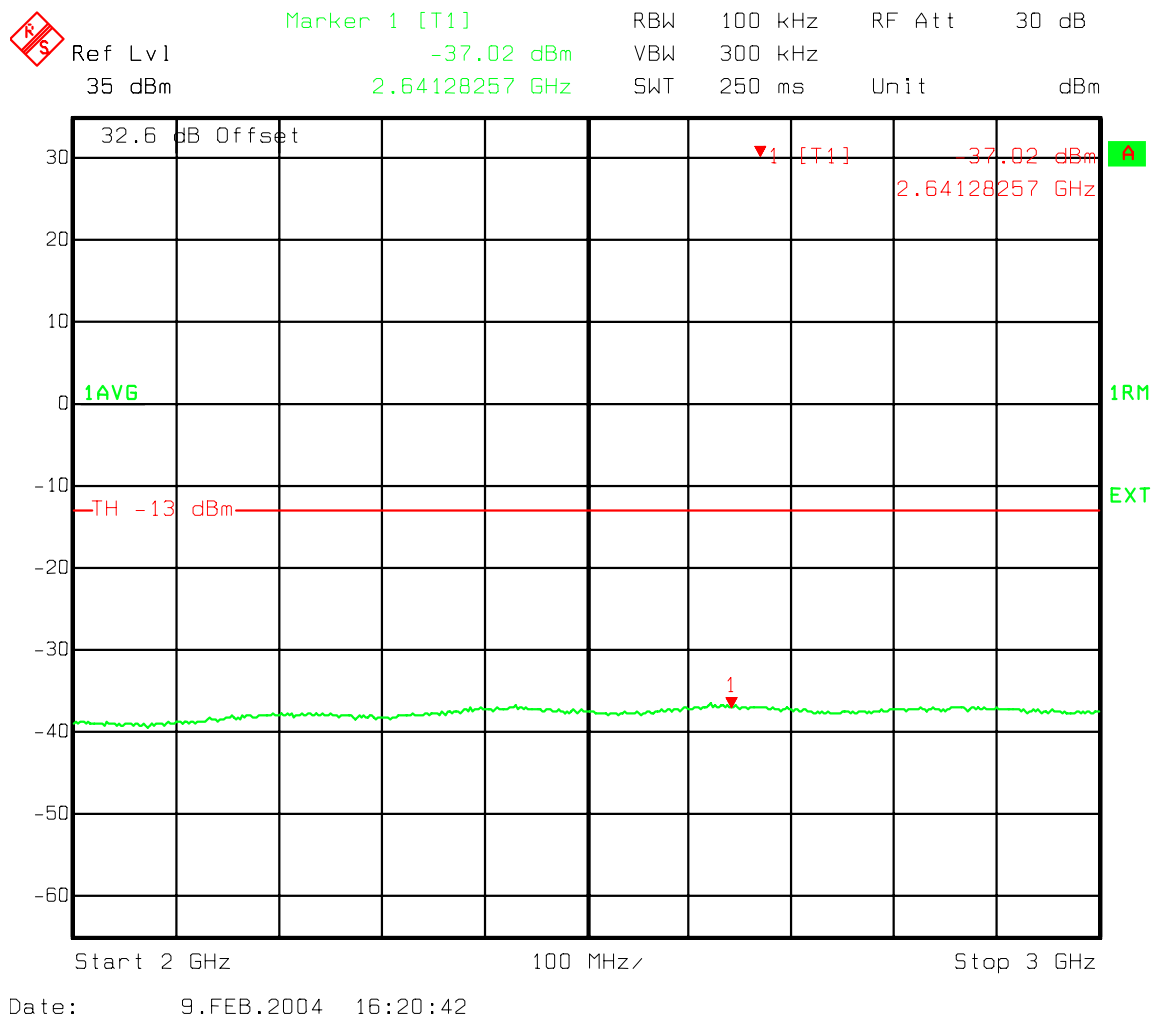
### A'' and A Band IS95 Spurious emissions 1000-2000 MHz



**Figure 41 : Two Carriers - A'' and A Band IS95 Spurious emissions 1000-2000 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

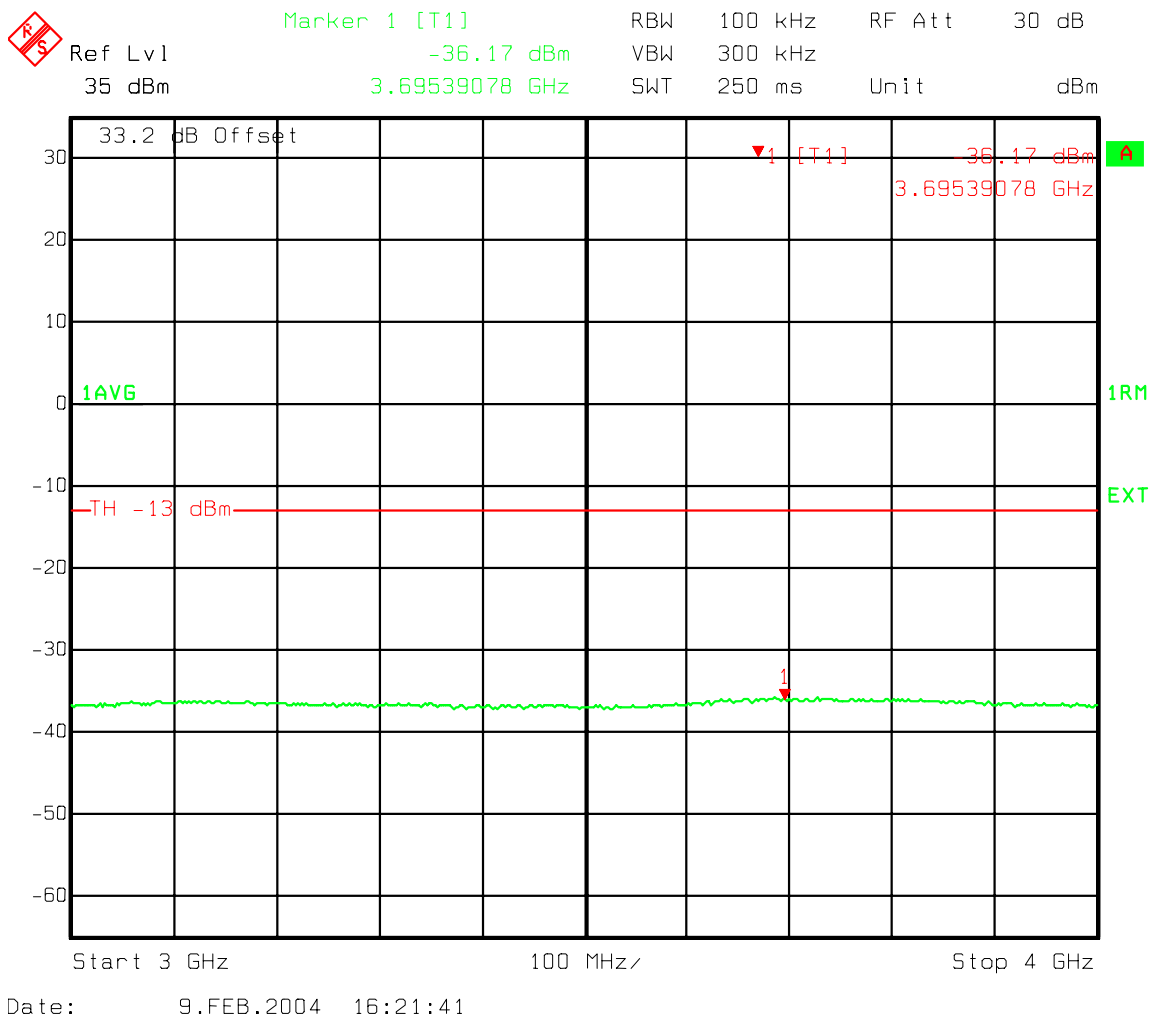
### A'' and A Band IS95 Spurious emissions 2000-3000 MHz



**Figure 42 : Two Carriers - A'' and A Band IS95 Spurious emissions 2000-3000 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

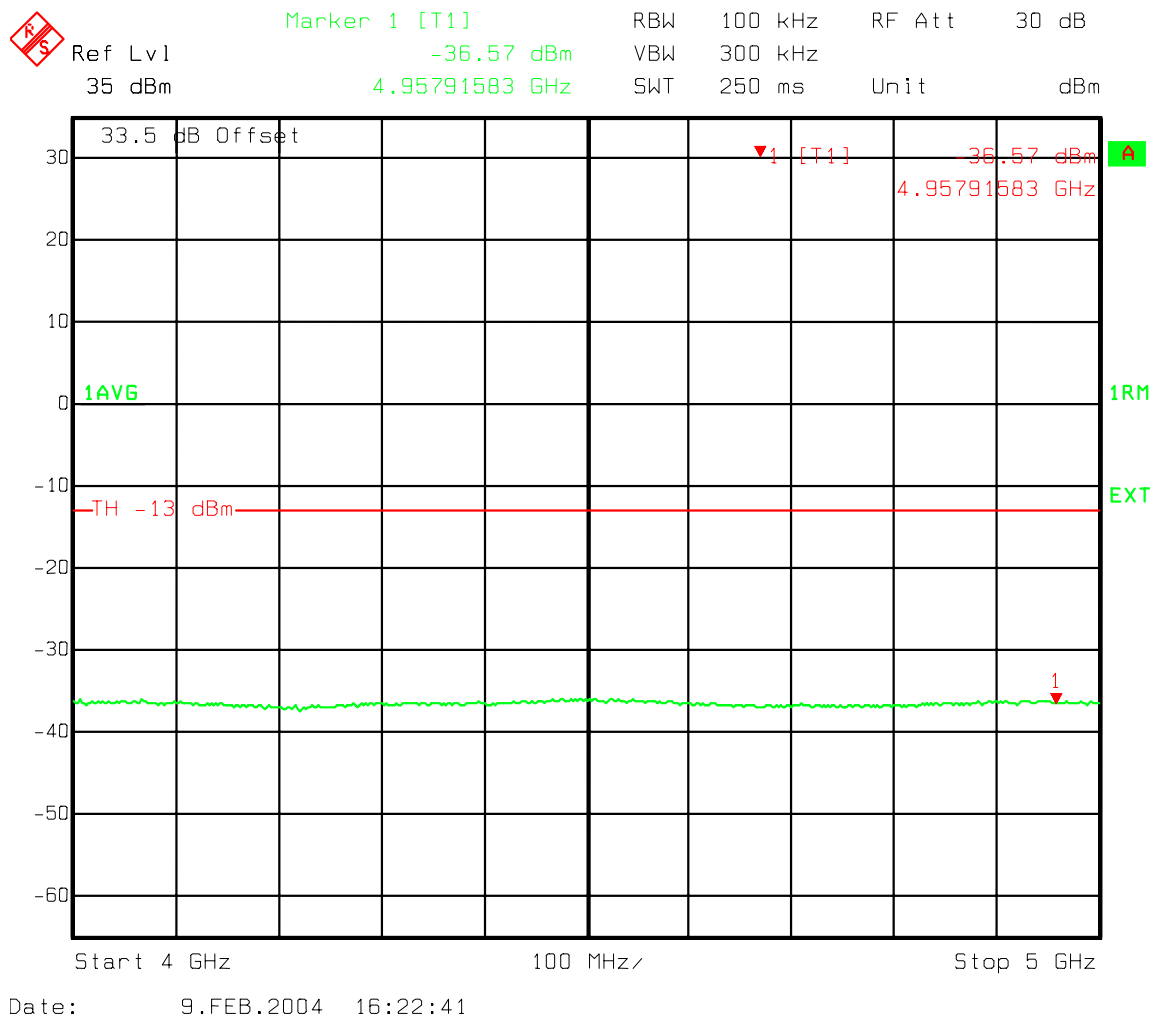
### A'' and A Band IS95 Spurious emissions 3000-4000 MHz



**Figure 43 : Two Carriers - A'' and A Band IS95 Spurious emissions 3000-4000 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

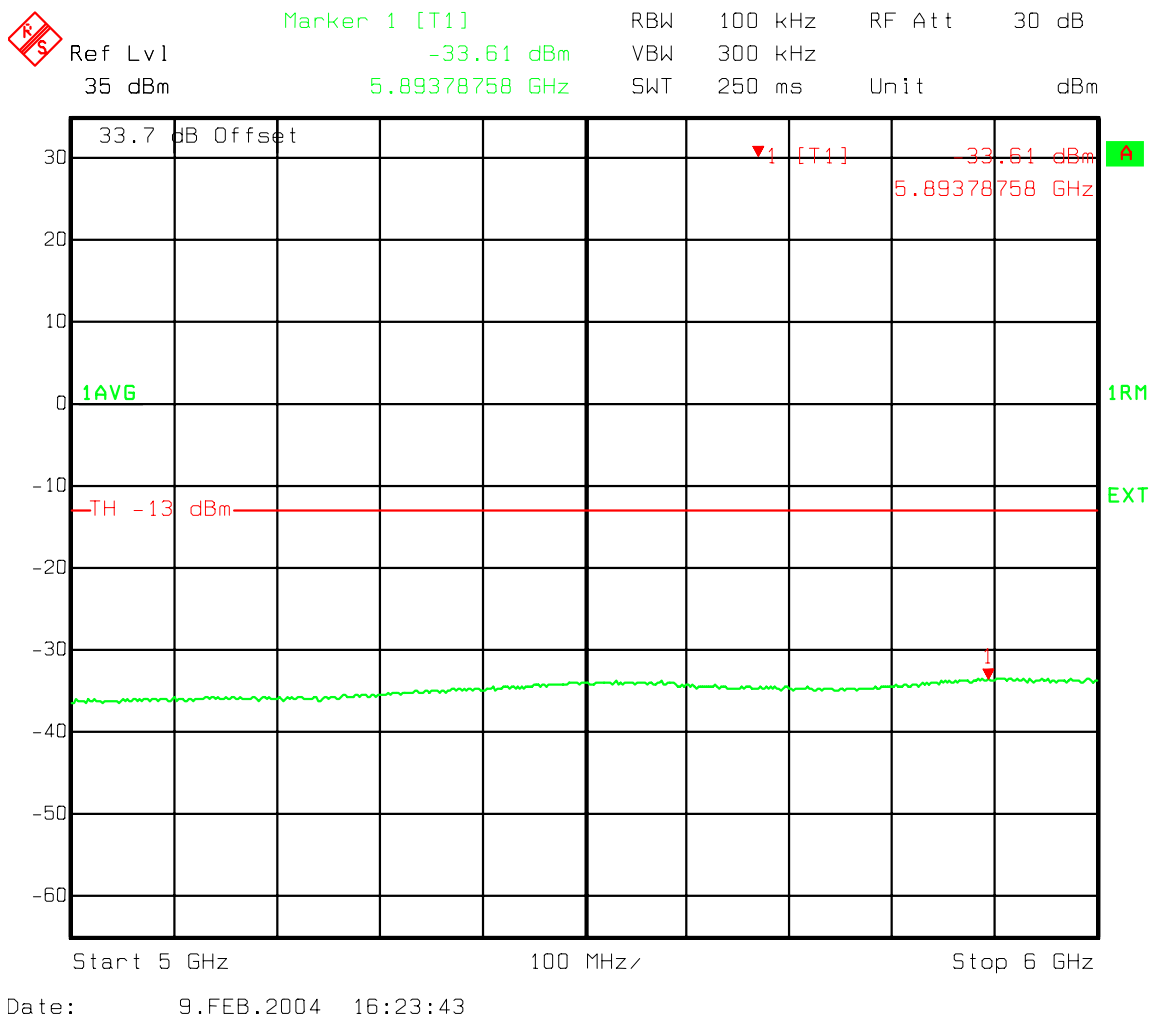
### A'' and A Band IS95 Spurious emissions 4000-5000 MHz



**Figure 44 : Two Carriers - A'' and A Band IS95 Spurious emissions 4000-5000 MHz**

**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact  
 Radio Module Ant. Port band A and A'' IS95**

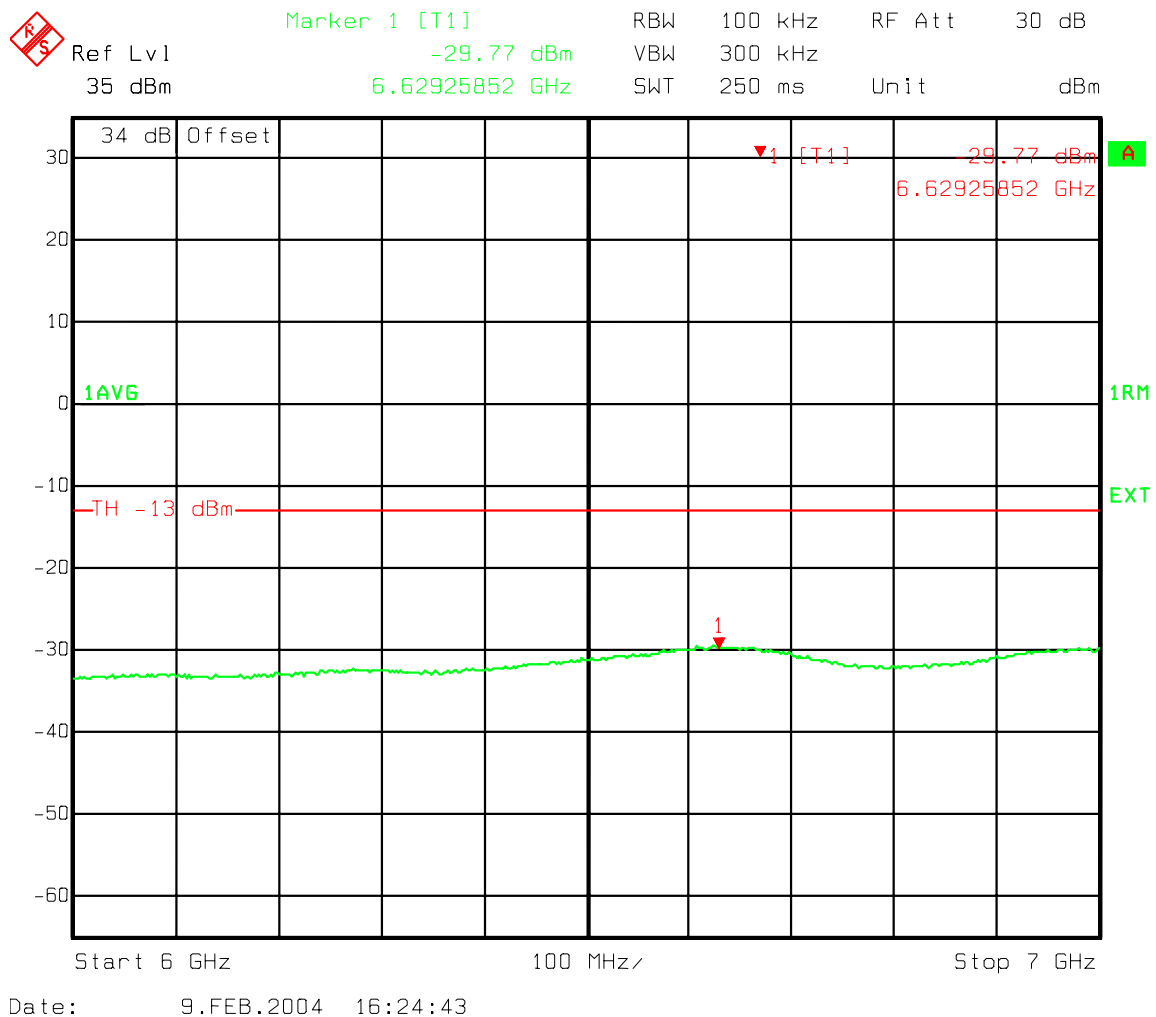
**A'' and A Band IS95 Spurious emissions 5000-6000 MHz**



**Figure 45 : Two Carriers - A'' and A Band IS95 Spurious emissions 5000-6000 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

### A'' and A Band IS95 Spurious emissions 6000-7000 MHz

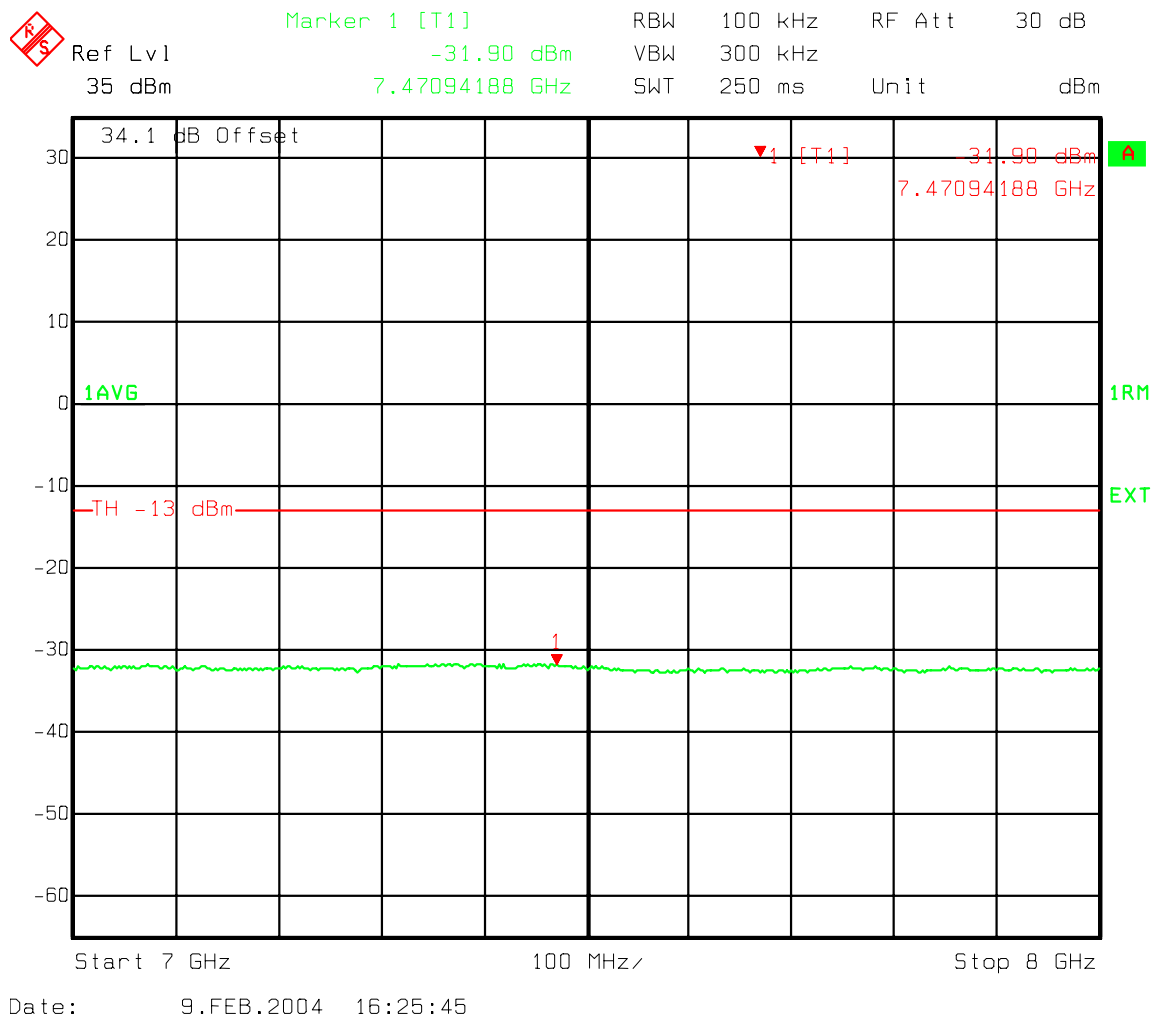


**Figure 46 : Two Carriers - A'' and A Band IS95 Spurious emissions 6000-7000 MHz**

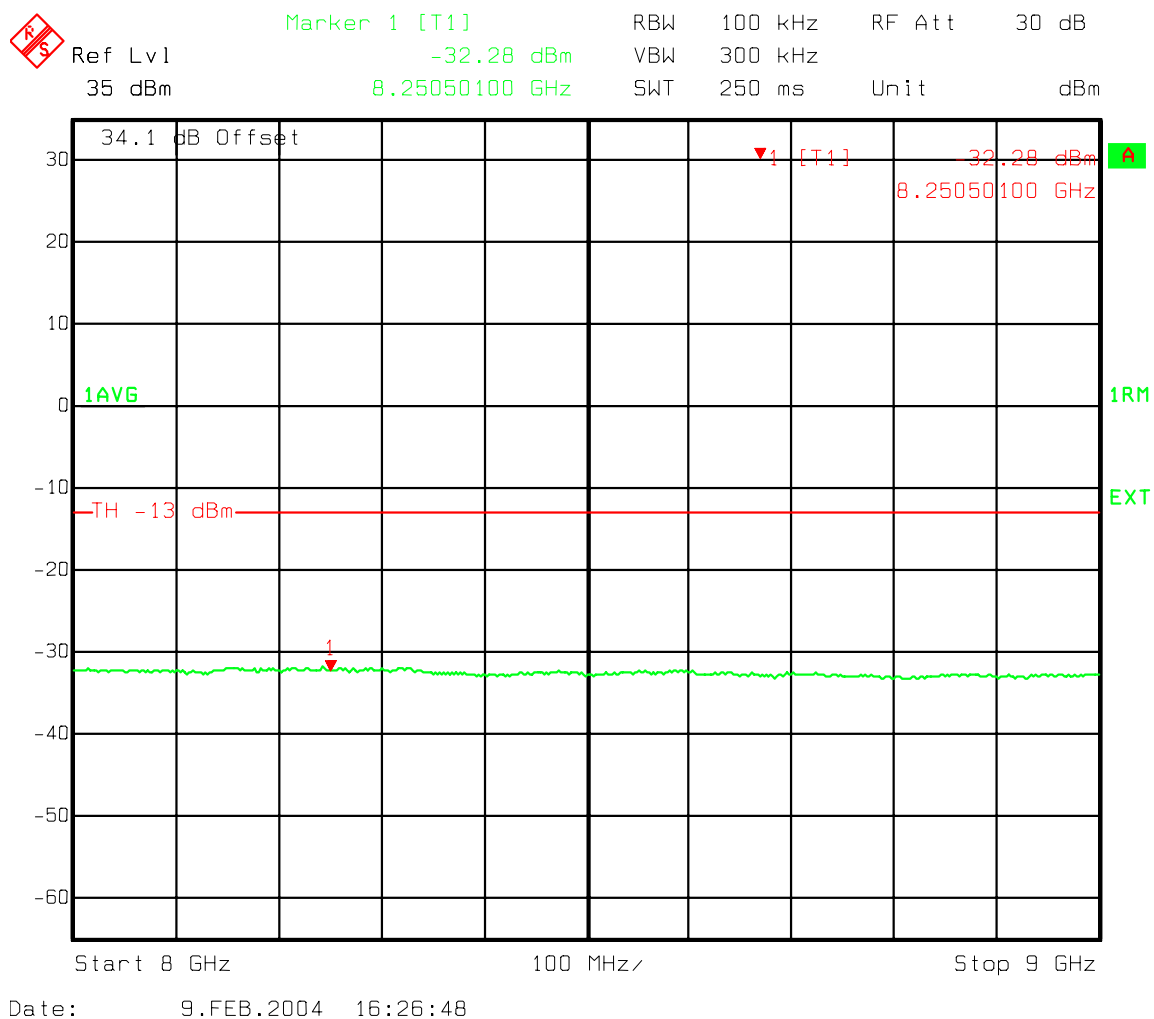


## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

### A'' and A Band IS95 Spurious emissions 7000-8000 MHz

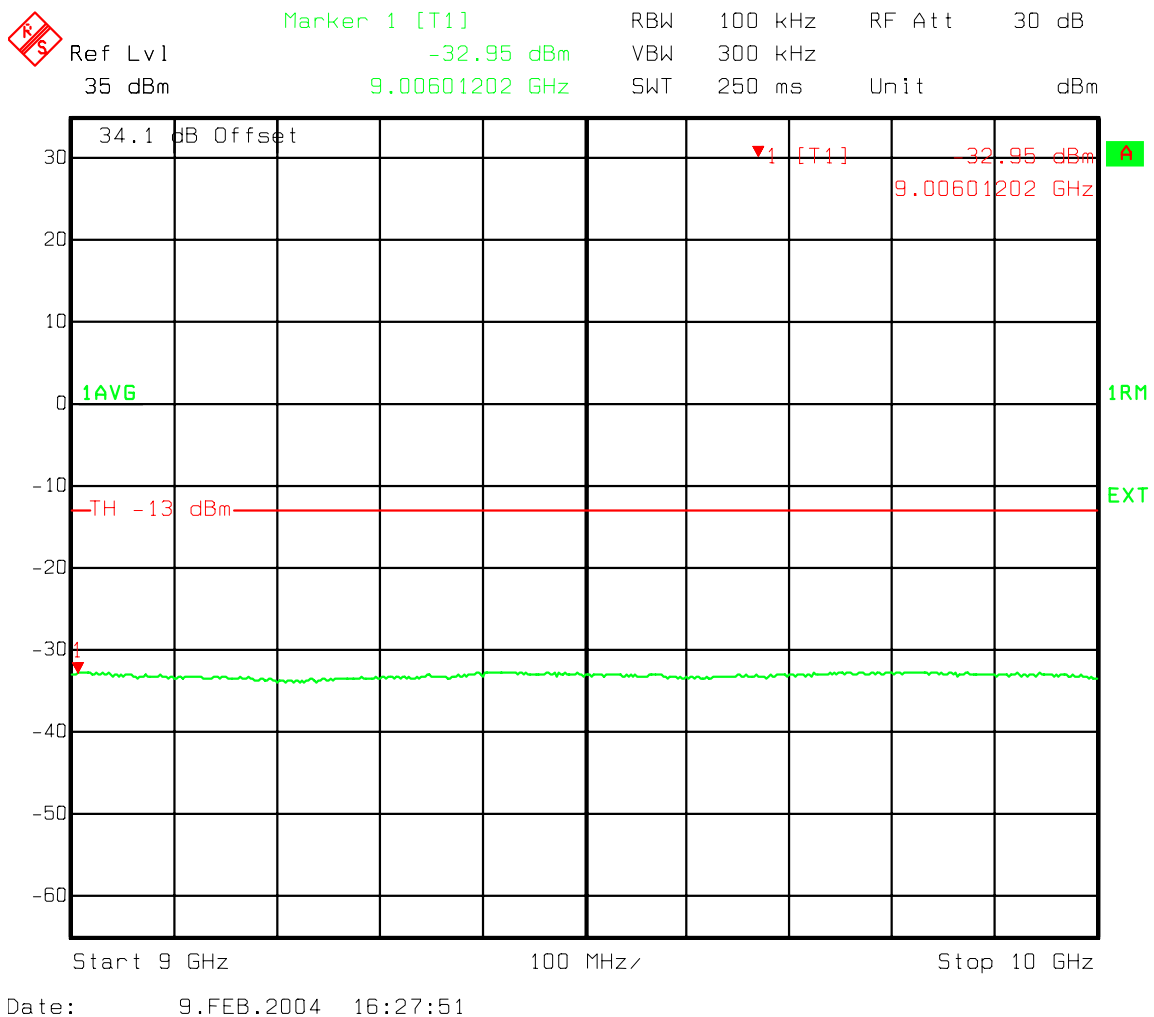


**Figure 47 : Two Carriers - A'' and A Band IS95 Spurious emissions 7000-8000 MHz**

**Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95****A'' and A Band IS95 Spurious emissions 8000-9000 MHz****Figure 48 : Two Carriers - A'' and A Band IS95 Spurious emissions 8000-9000 MHz**

## Two Carrier 1015, 33 and 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port band A and A'' IS95

### A'' and A Band IS95 Spurious emissions 9000-10000 MHz

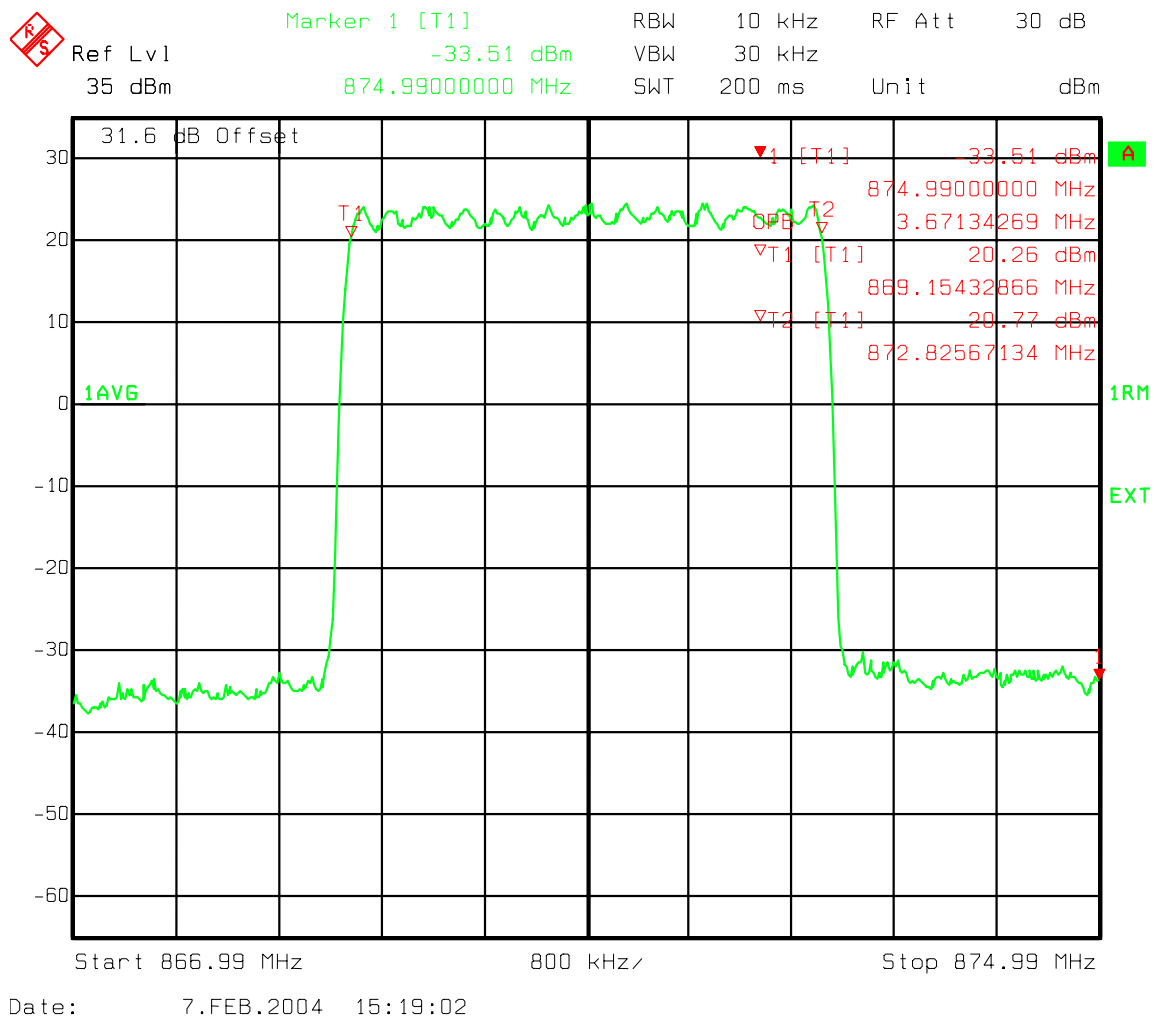


**Figure 49 : Two Carriers - A'' and A Band IS95 Spurious emissions 9000-10000 MHz**

## 7 Appendix C - Three Carrier IS-95 Spurious Emission

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95

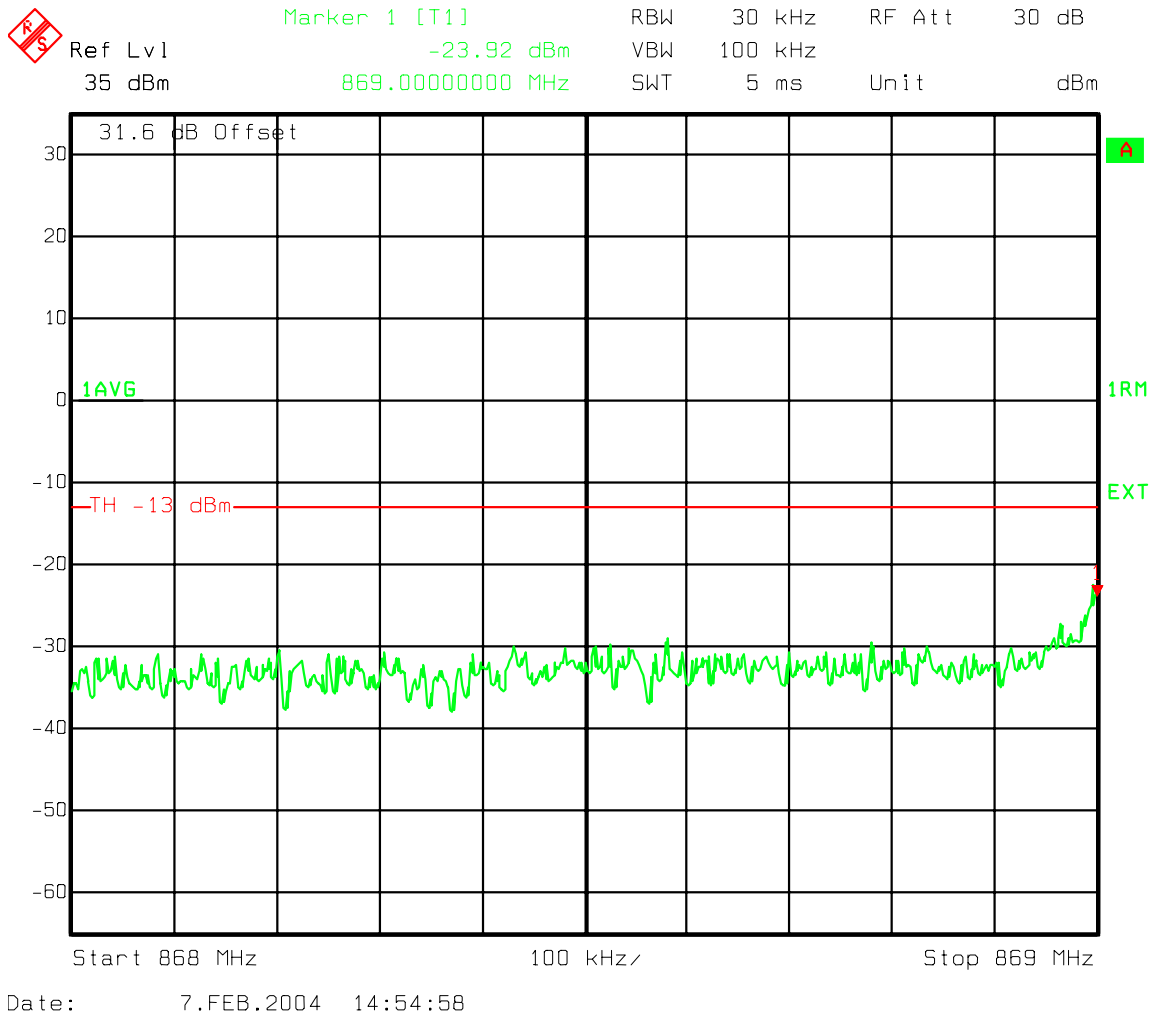
#### Occupied Bandwidth Ch 1015, 33, 74 A"



**Figure 50 : Three Carriers - Occupied Bandwidth Ch 1015, 33, 74 A"**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

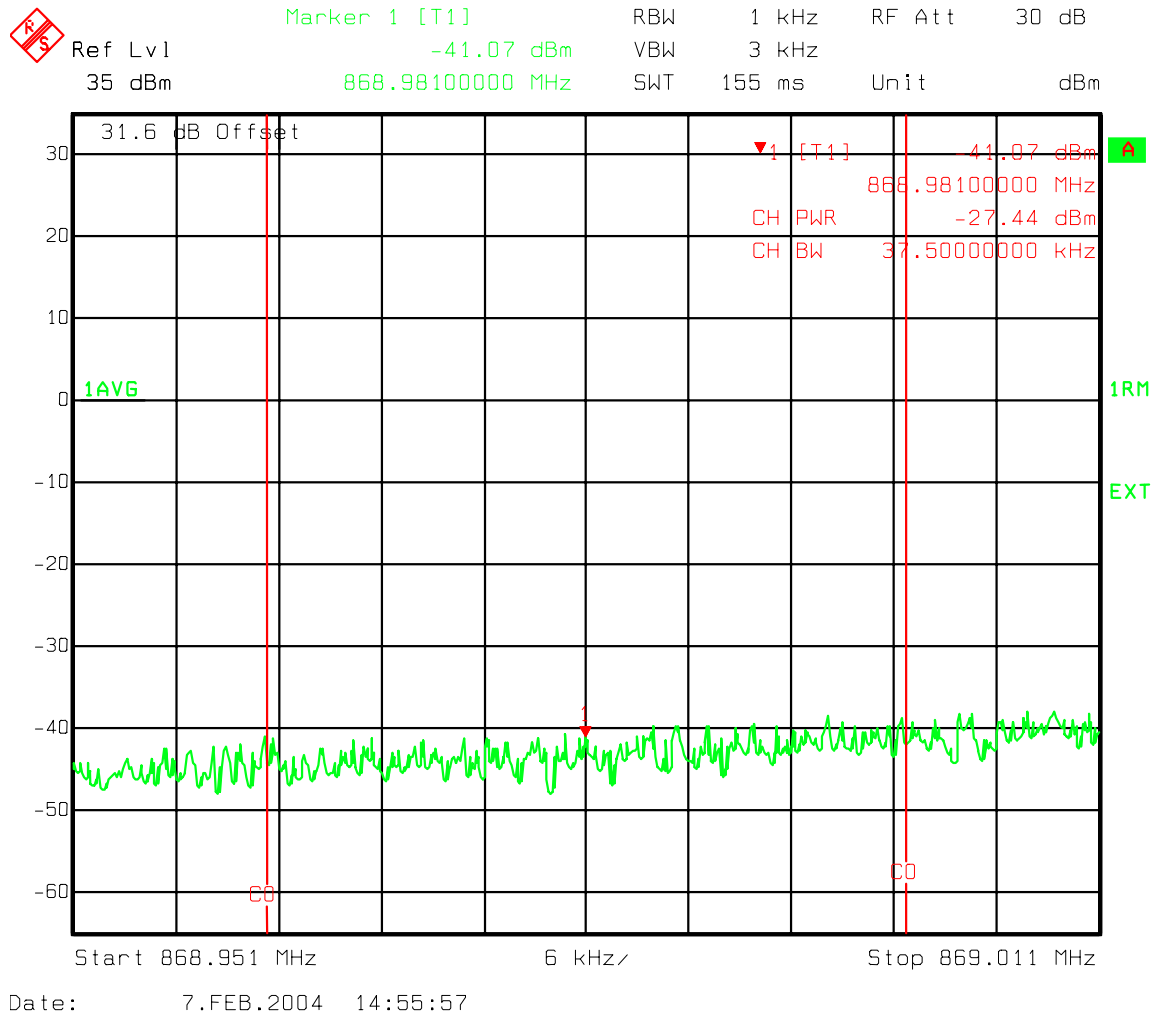
**A" Band Ch 1015, 33, 74 IS95 Adjacent 1MHz Lower emissions 868-869MHz**



**Figure 51 : Three Carriers - A" Band Ch 1015, 33, 74 IS95 Adjacent 1MHz Lower emissions 868-869MHz**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95

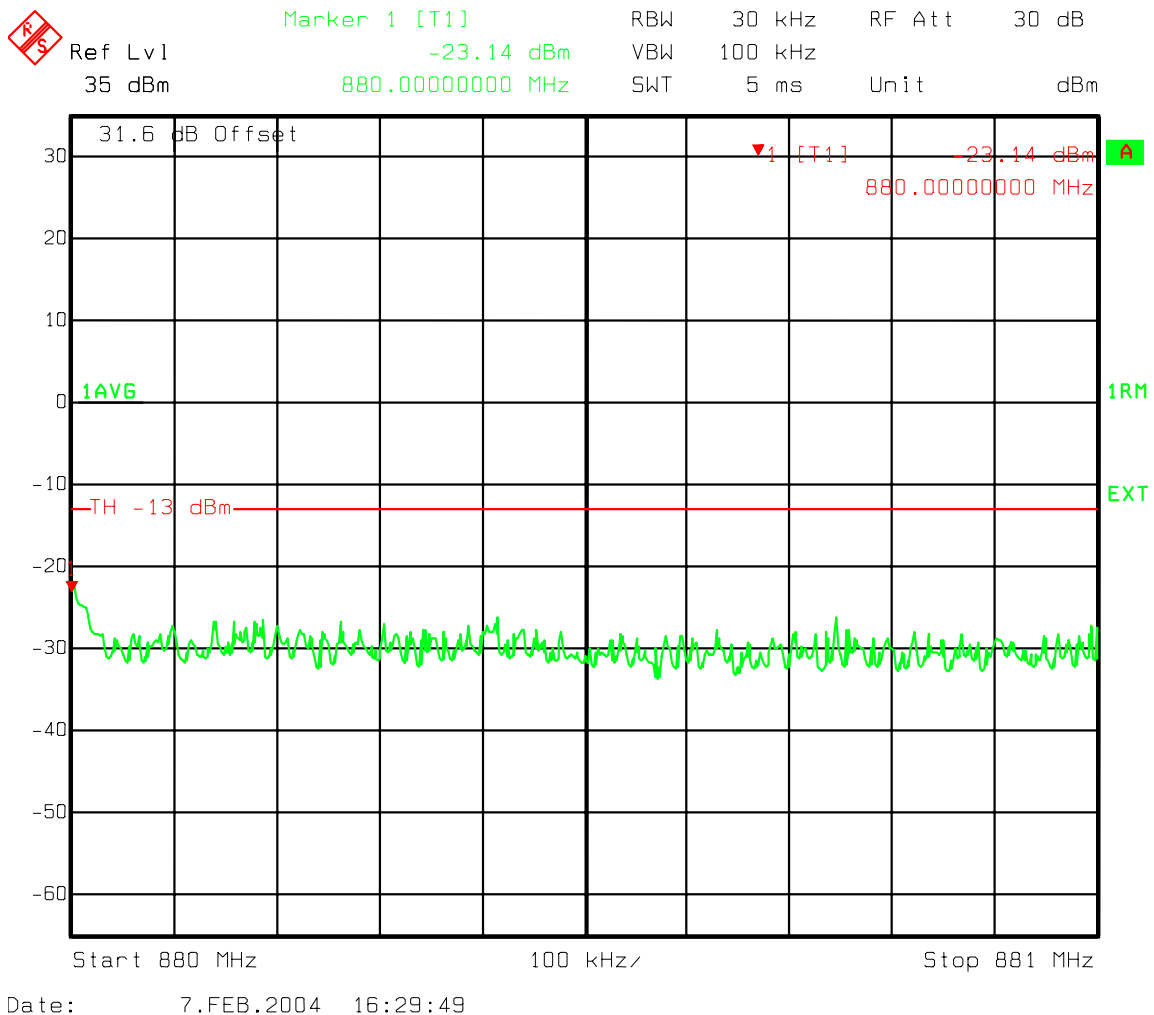
#### Ch 1015, 33, 74 IS95 Lower A" Band Adjacent to outside edge 37.5kHz band Channel Power



**Figure 52 : Three Carriers - Ch 1015, 33, 74 IS95 Lower A" Band Adjacent to outside edge 37.5kHz band Channel Power**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

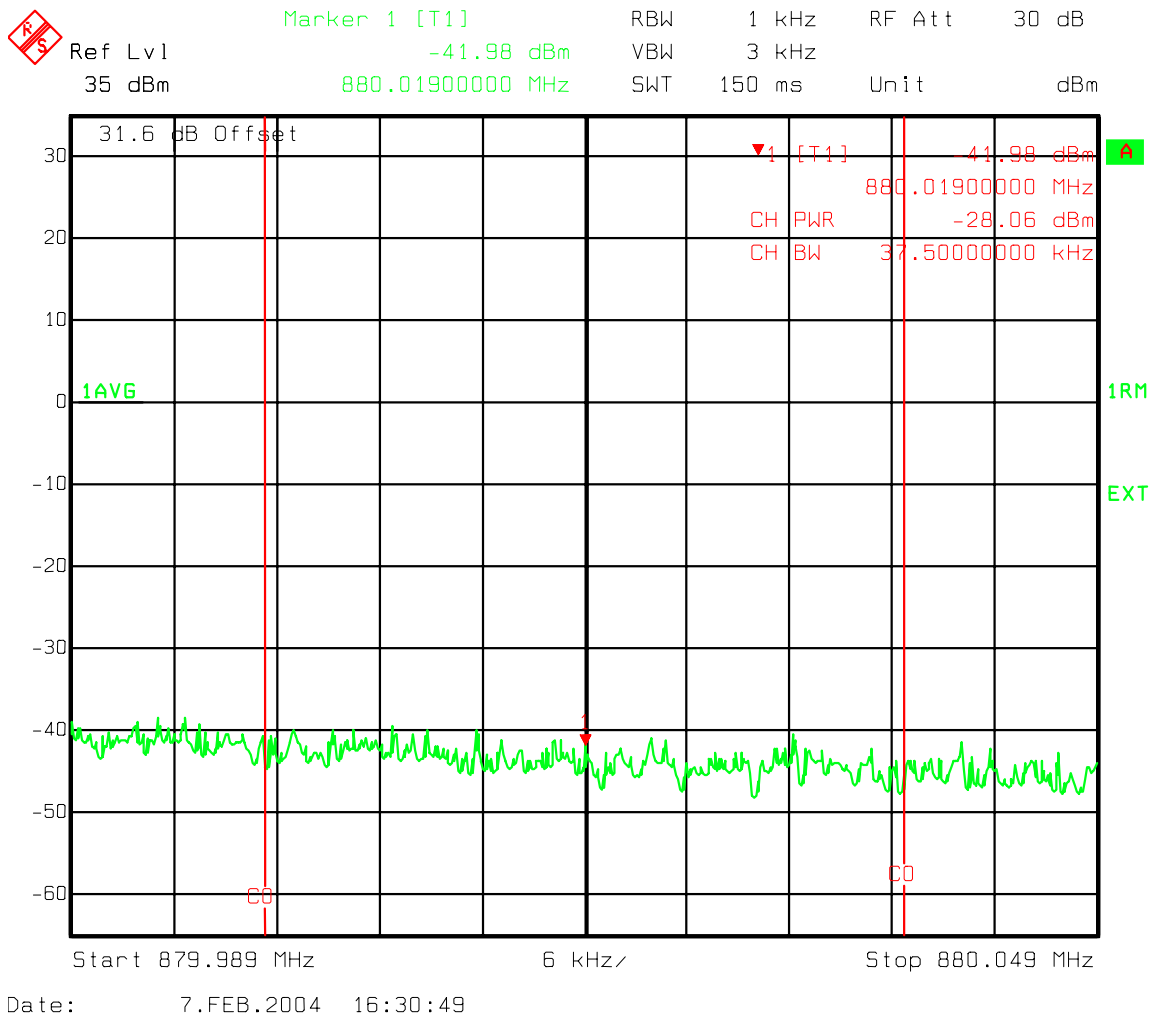
**Ch 226, 267, 308 Upper a Band adjacent 1 MHz band emissions 880-881 MHz**



**Figure 53 : Three Carriers - Ch 226, 267, 308 Upper a Band adjacent 1 MHz band emissions 880-881 MHz**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95

#### Ch 226, 267, 308 Upper A Band adjacent to outside edge 37.5 kHz band Channel power

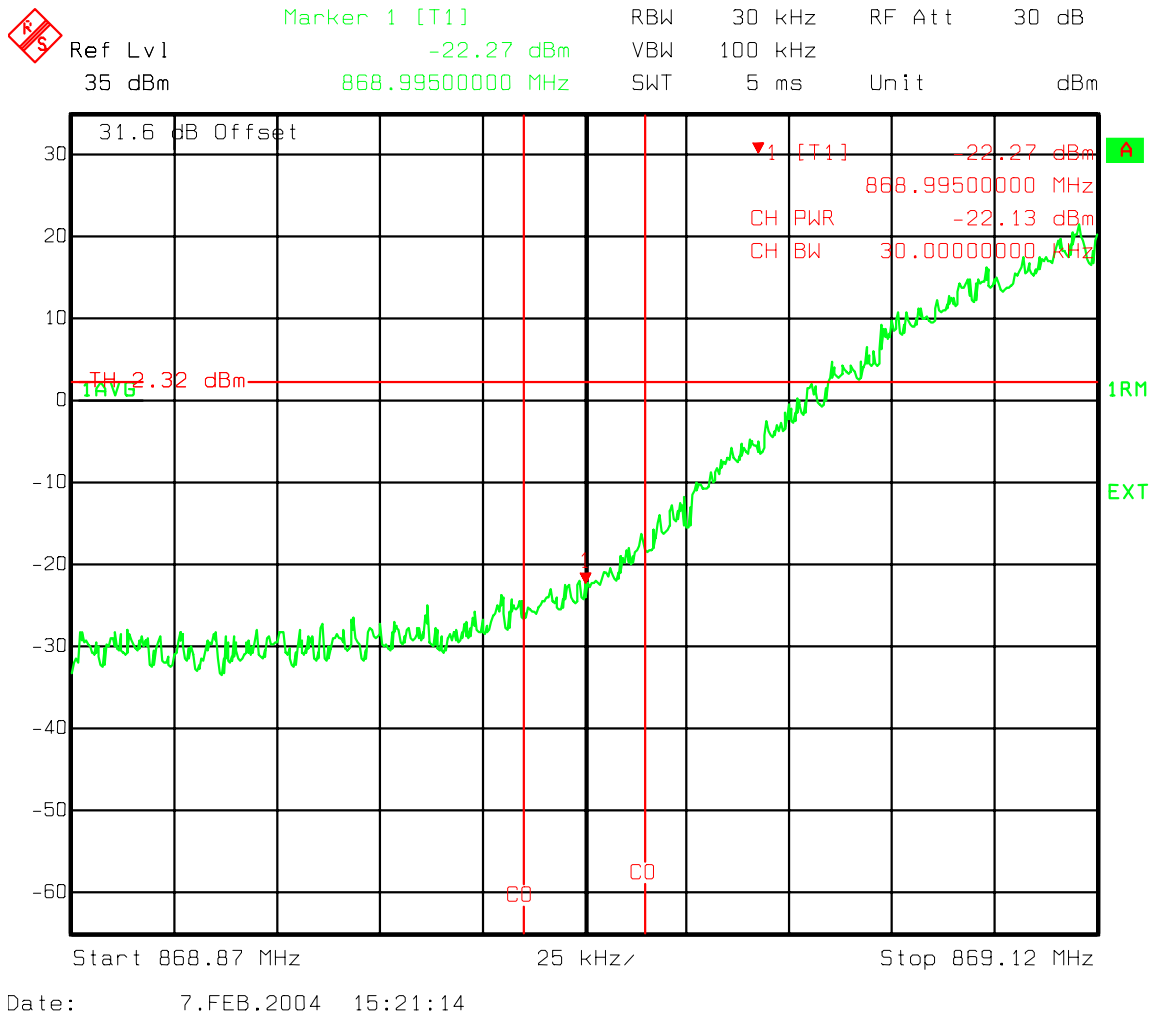


**Figure 54 : Three Carriers - Ch 226, 267, 308 Upper A Band adjacent to outside edge 37.5 kHz band Channel power**



**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

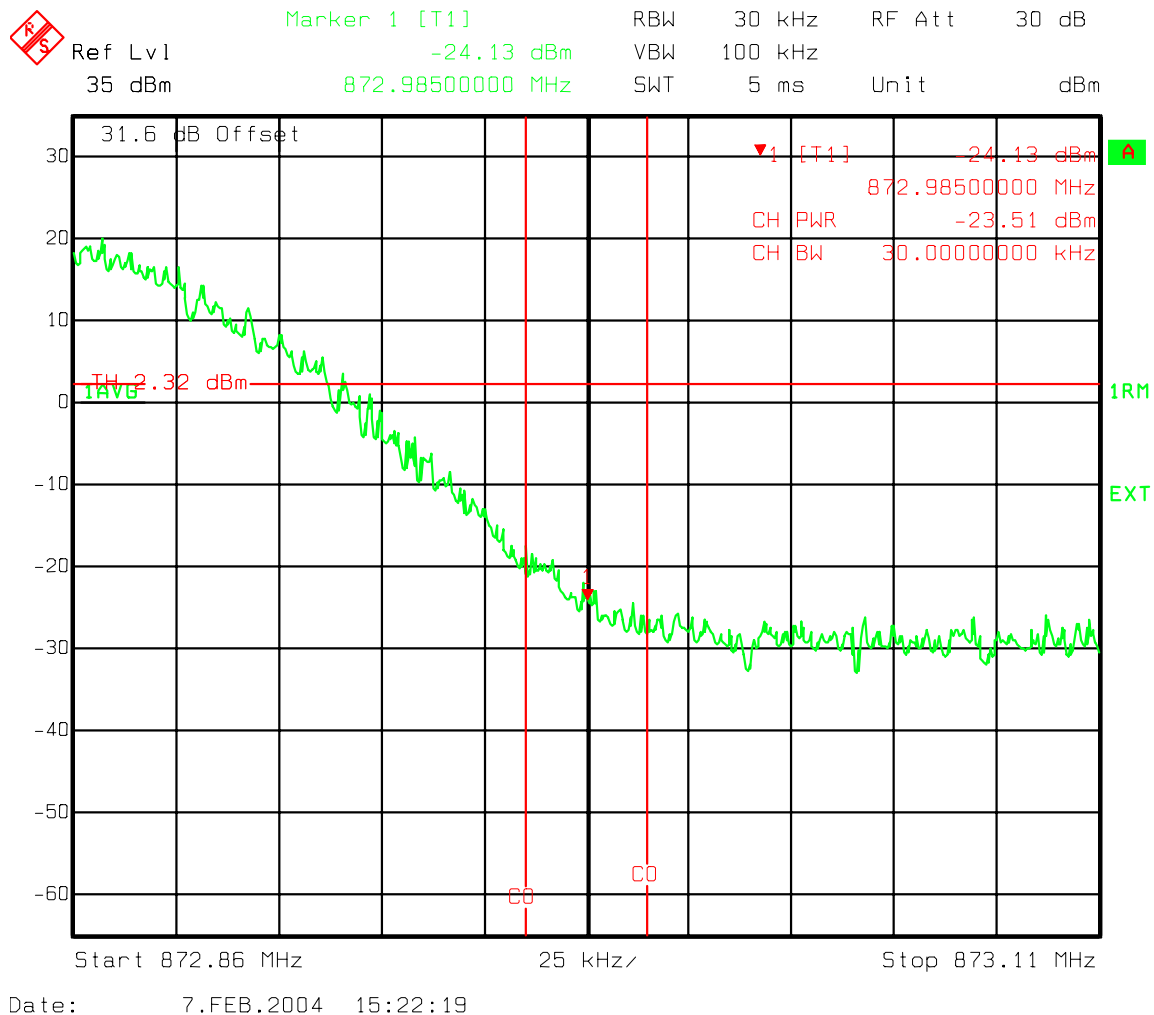
**Industry Canada Lower 750 kHz offset 30 kHz Chan Power Ch 1015, 33, 74**



**Figure 55 : Three Carriers - Industry Canada Lower 750 kHz offset 30 kHz Chan Power Ch 1015, 33, 74**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95

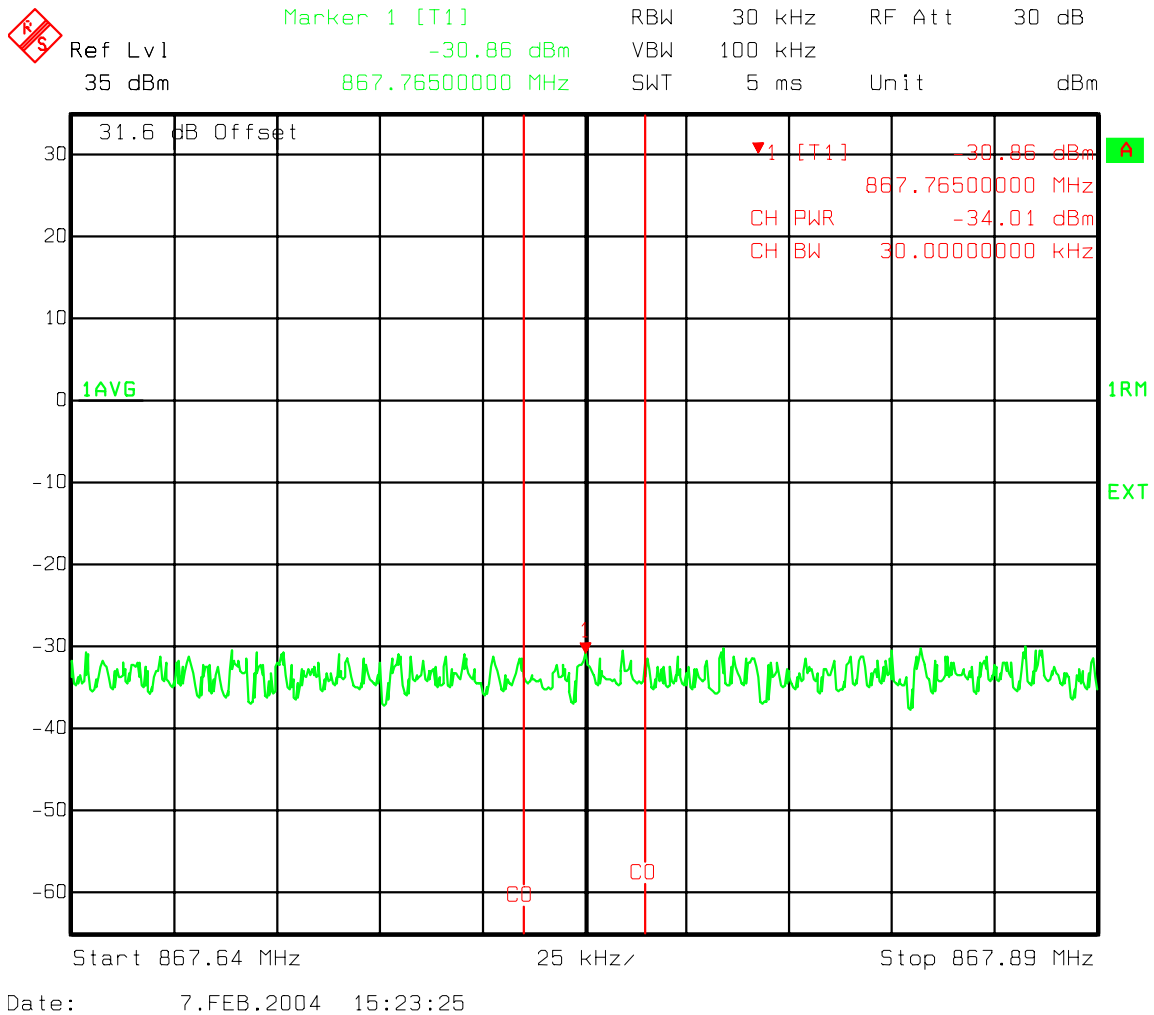
#### Industry Canada Upper 750 kHz offset 30 kHz Chan Power Ch 1015, 33, 74



**Figure 56 : Three Carriers - Industry Canada Upper 750 kHz offset 30 kHz Chan Power Ch 1015, 33, 74**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

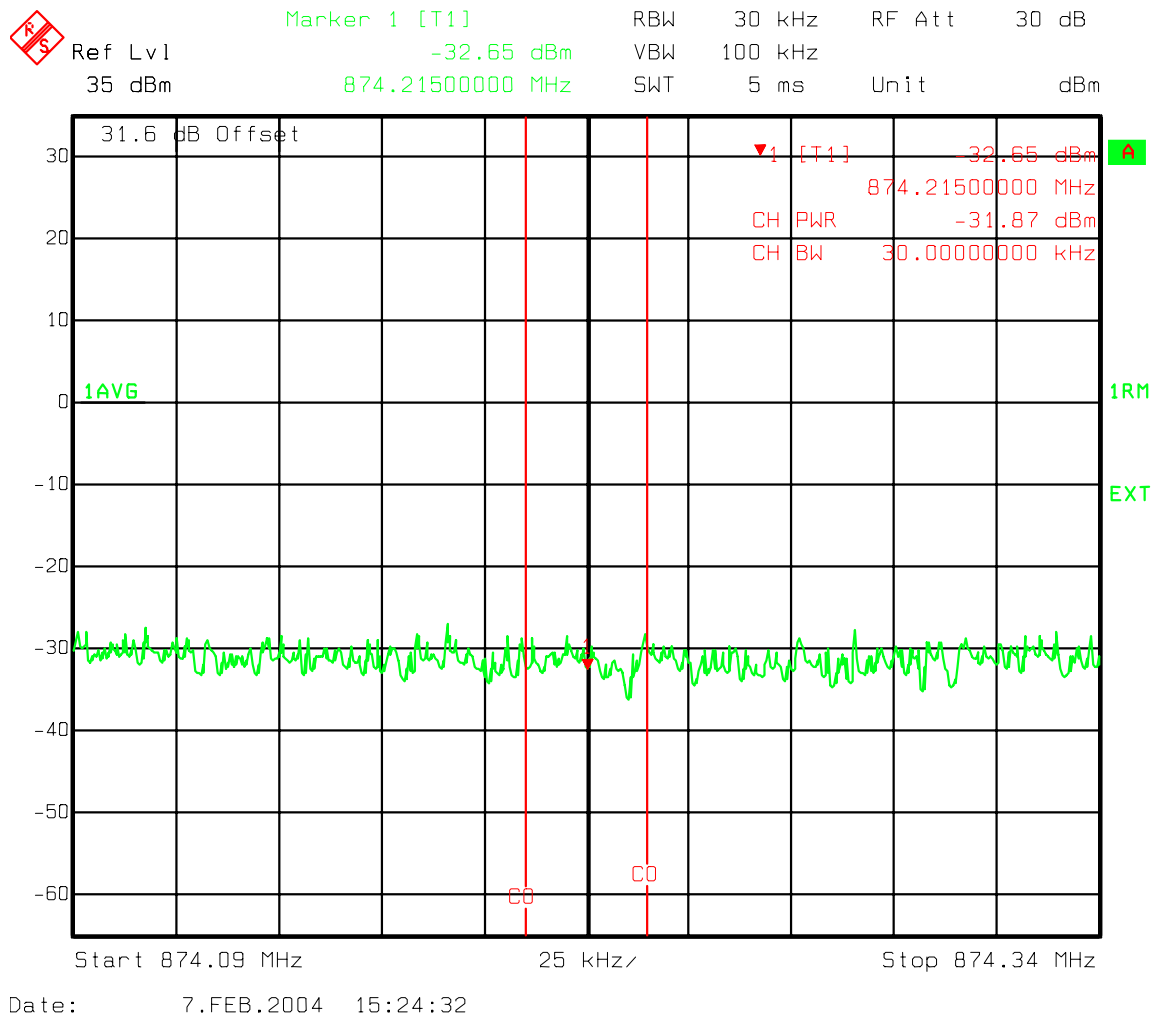
**Industry Canada 1.98 MHz offset Lower 30 kHz Chan Power Ch 1015, 33, 74**



**Figure 57 : Three Carriers - Industry Canada 1.98 MHz offset Lower 30 kHz Chan Power Ch 1015, 33, 74**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95

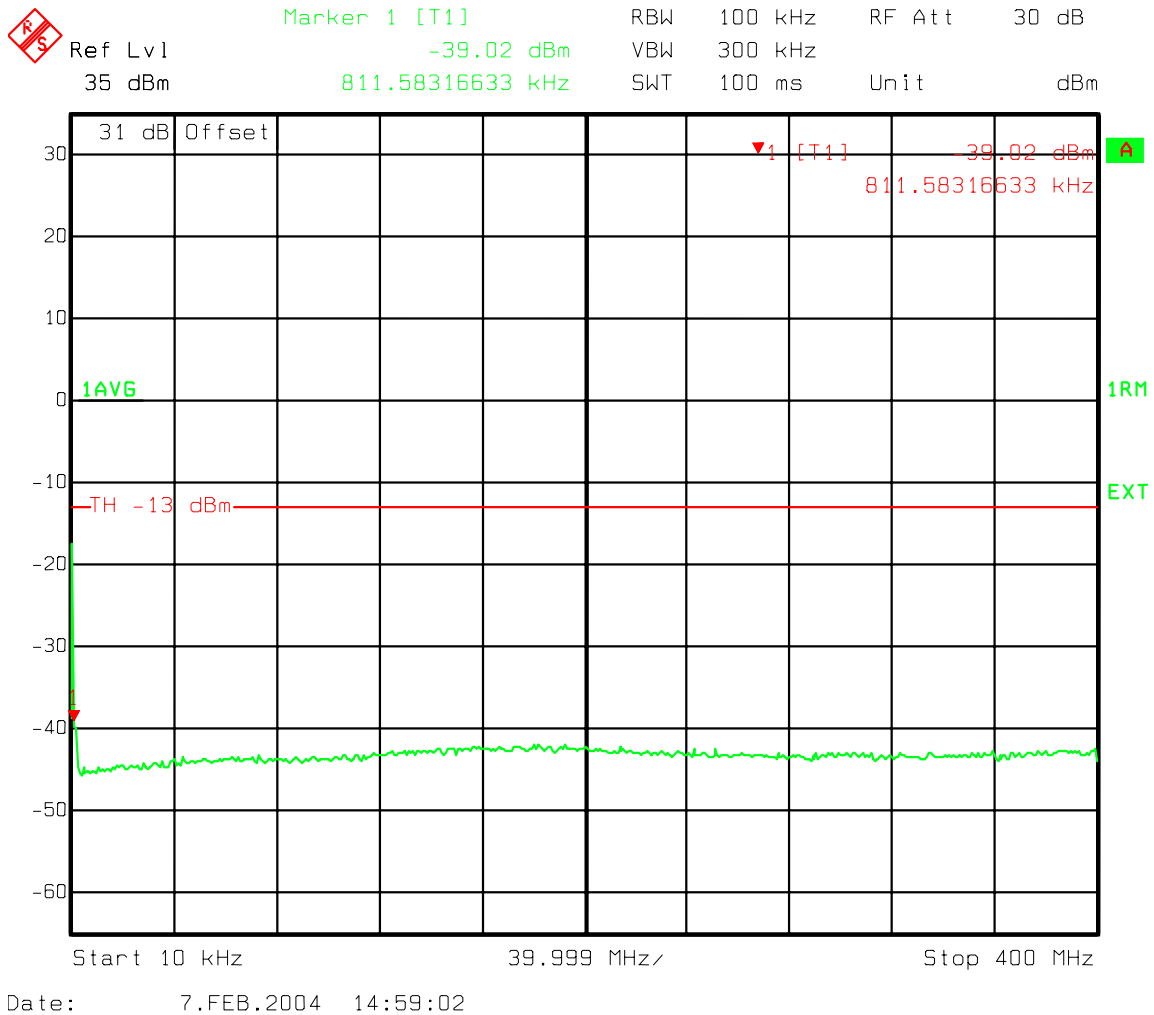
#### Industry Canada 1.98 MHz offset Upper 30 kHz Chan Power Ch 1015, 33, 74



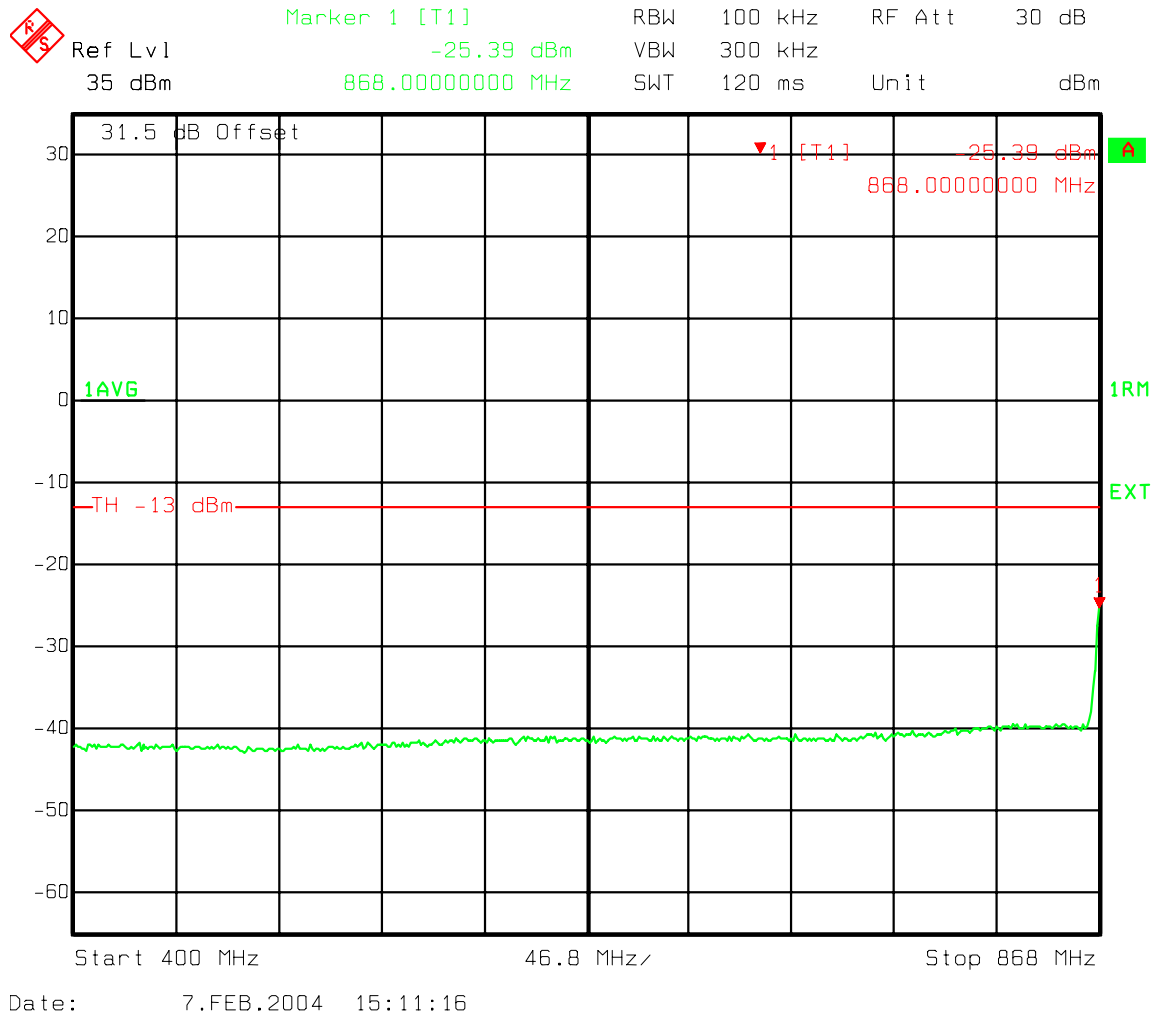
**Figure 58 : Three Carriers - Industry Canada 1.98 MHz offset Upper 30 kHz Chan Power Ch 1015, 33, 74**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

**A" and A Band IS95 Spurious emissions 10kHz-400 MHz**

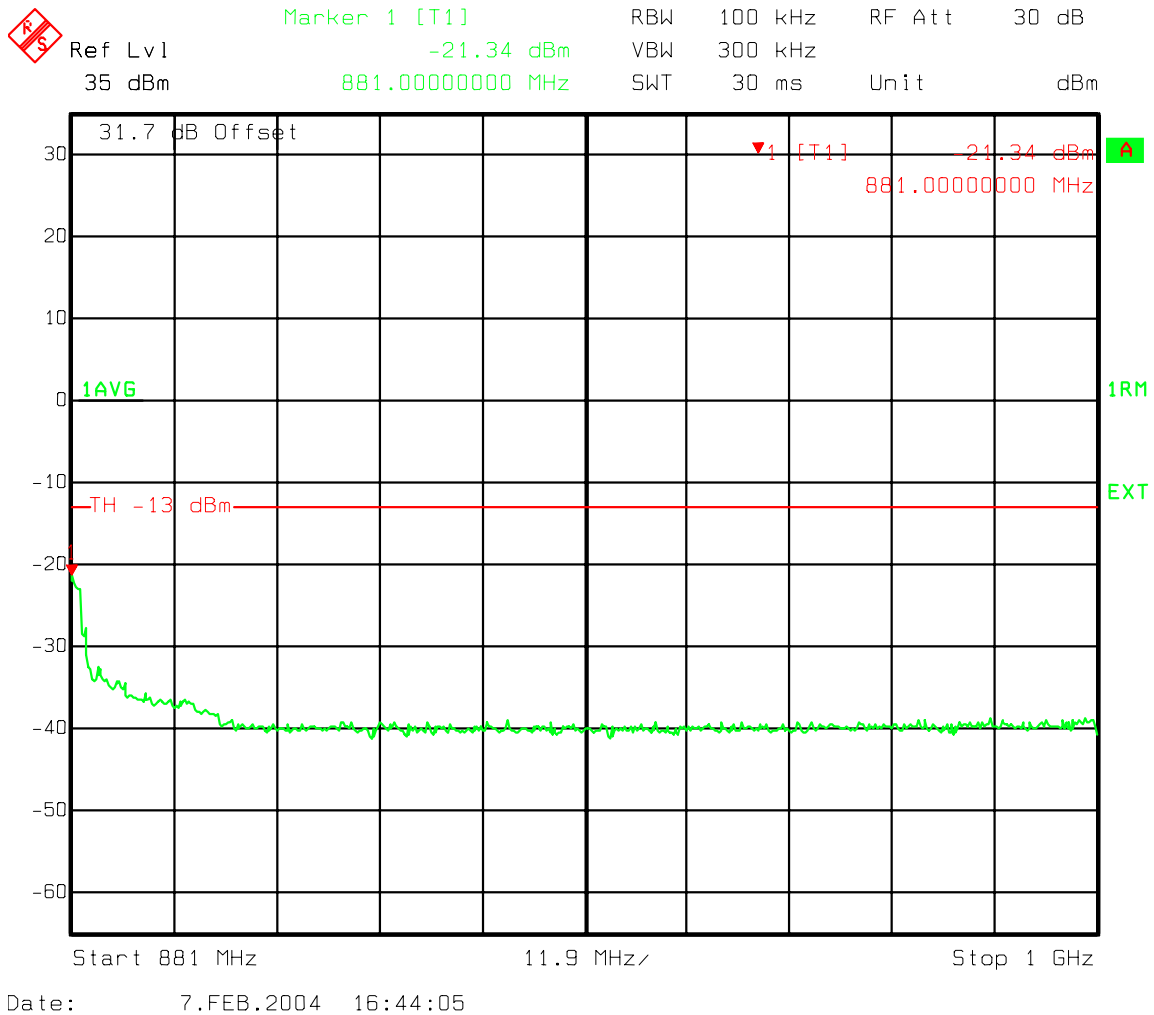


**Figure 59 : Three Carriers - A" and A Band IS95 Spurious emissions 10kHz-400 MHz**

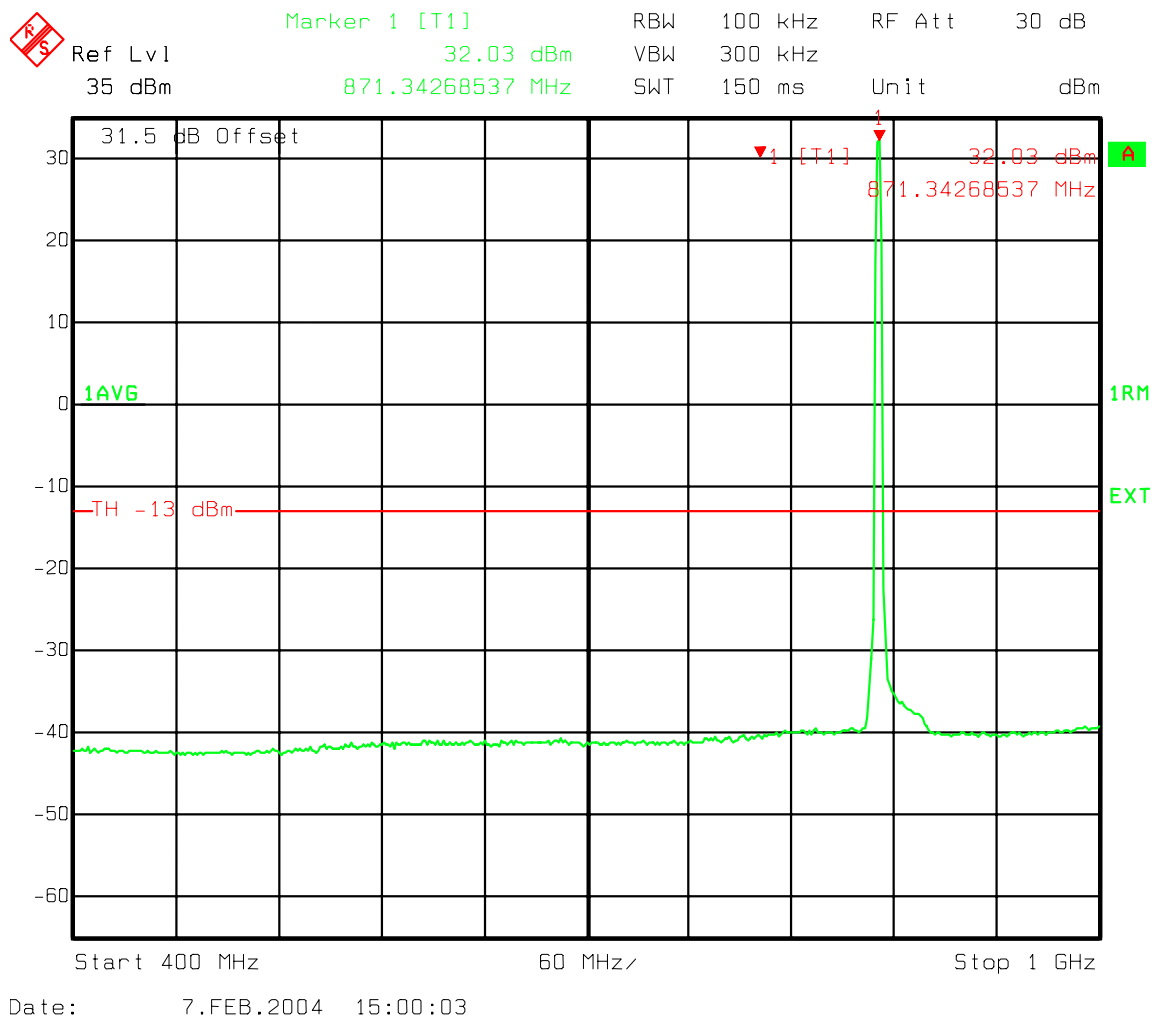
**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95****A " and a Band IS95 Spurious emissions 400 MHz to Lower 1 MHz Band Edge****Figure 60 : Three Carriers - A " and A Band IS95 Spurious emissions 400 MHz to Lower 1 MHz Band Edge**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

**A " and a Band IS95 Spurious emissions Upper 1 MHz Band Edge to 1 GHz**



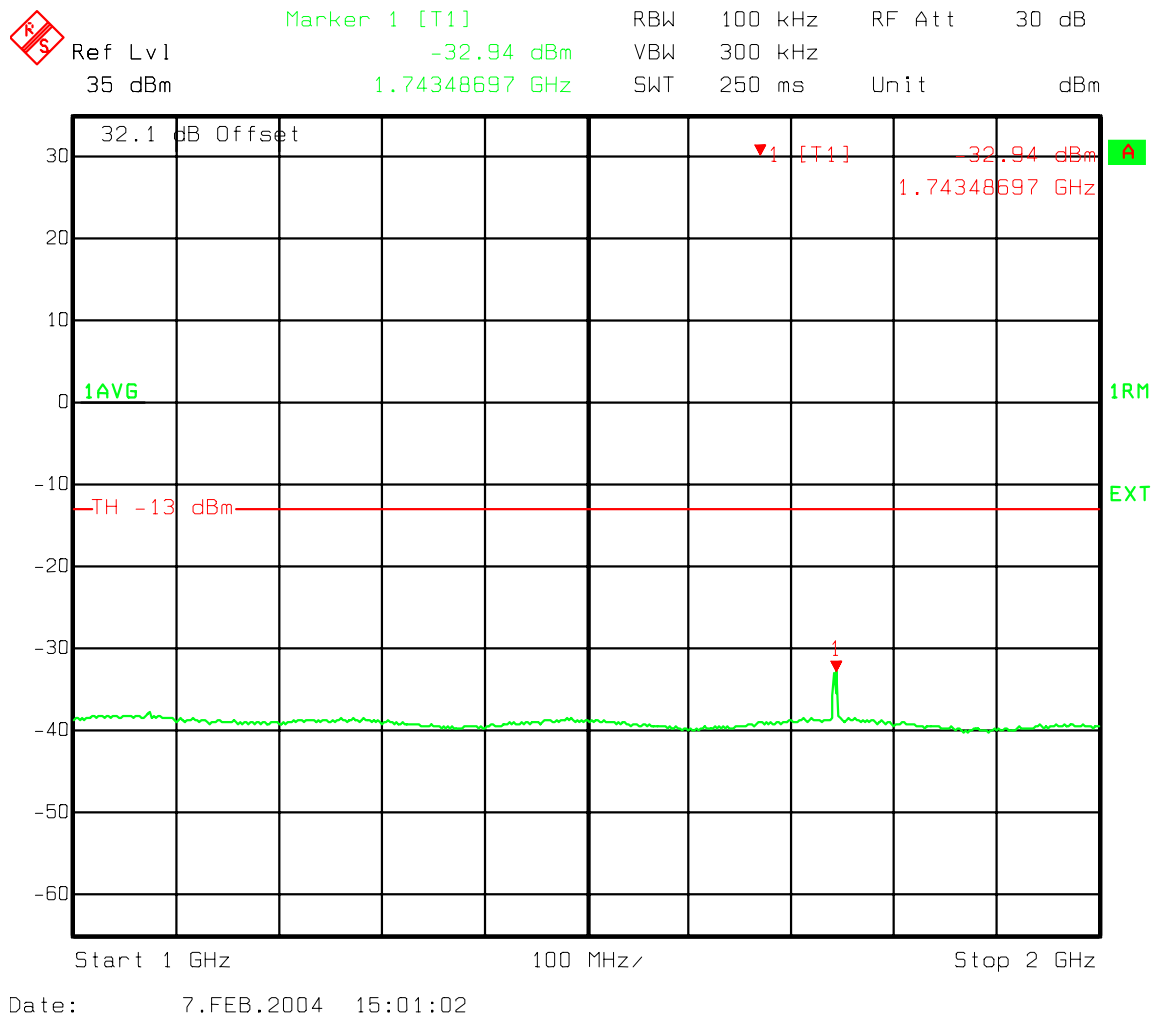
**Figure 61 : Three Carriers - A " and a Band IS95 Spurious emissions Upper 1 MHz Band Edge to 1 GHz**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A'' IS95****A'' and A Band IS95 Spurious emissions 400-1000 MHz****Figure 62 : Three Carriers - A'' and A Band IS95 Spurious emissions 400-1000 MHz**



**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

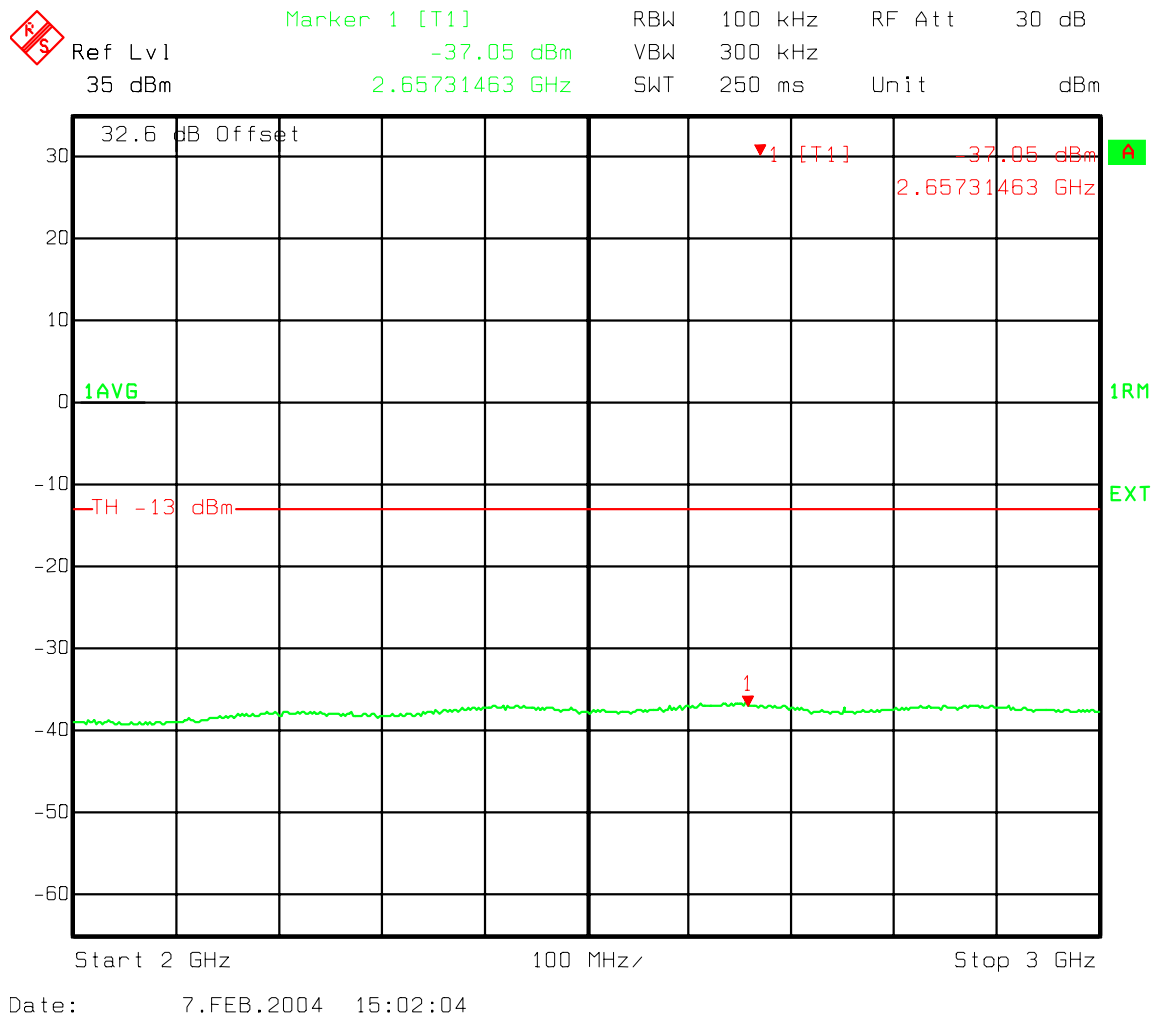
**A" and A Band IS95 Spurious emissions 1000-2000 MHz**



**Figure 63 : Three Carriers - A" and A Band IS95 Spurious emissions 1000-2000 MHz**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A'' IS95

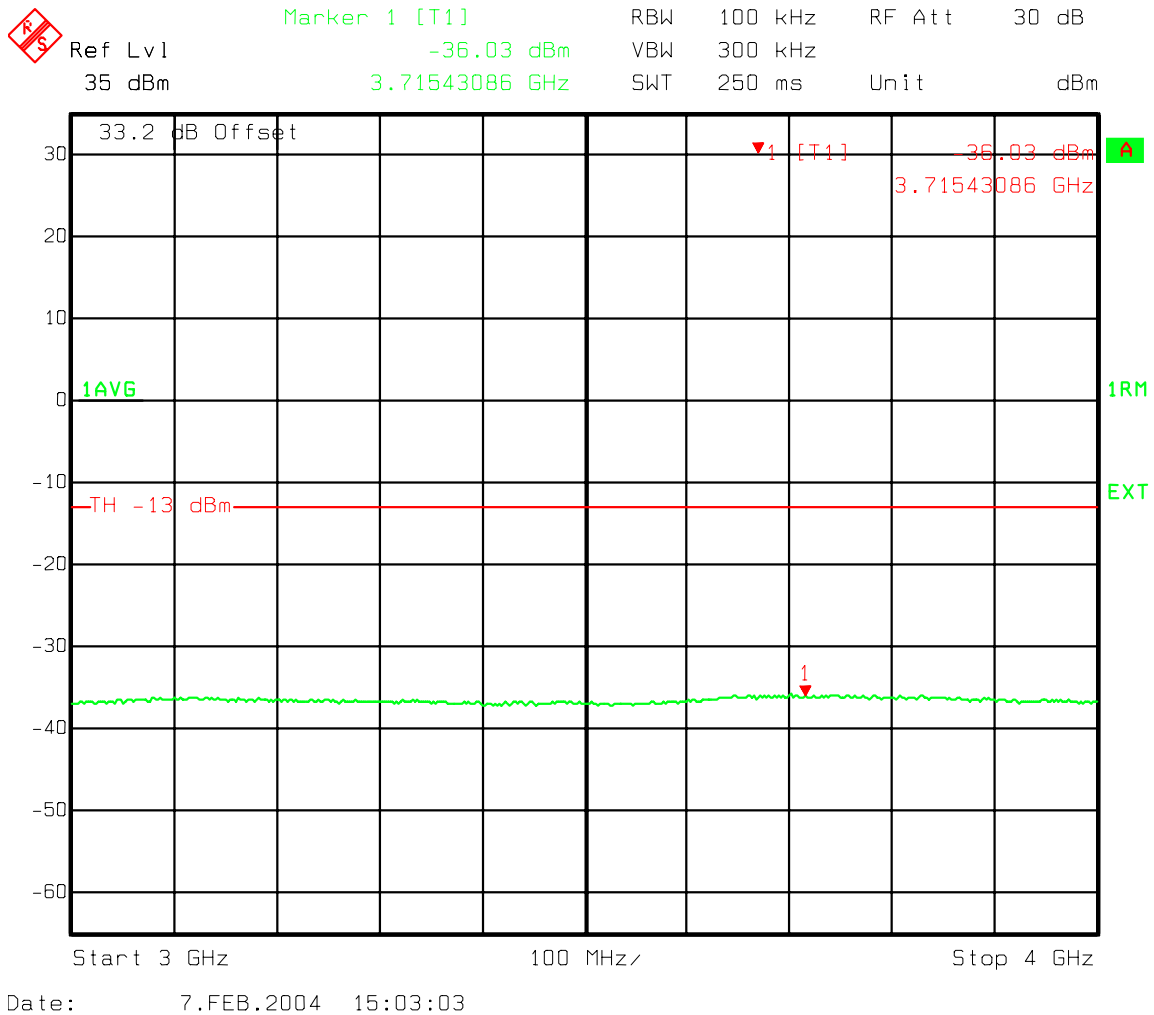
#### A'' and A Band IS95 Spurious emissions 2000-3000 MHz



**Figure 64 : Three Carriers - A'' and A Band IS95 Spurious emissions 2000-3000 MHz**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

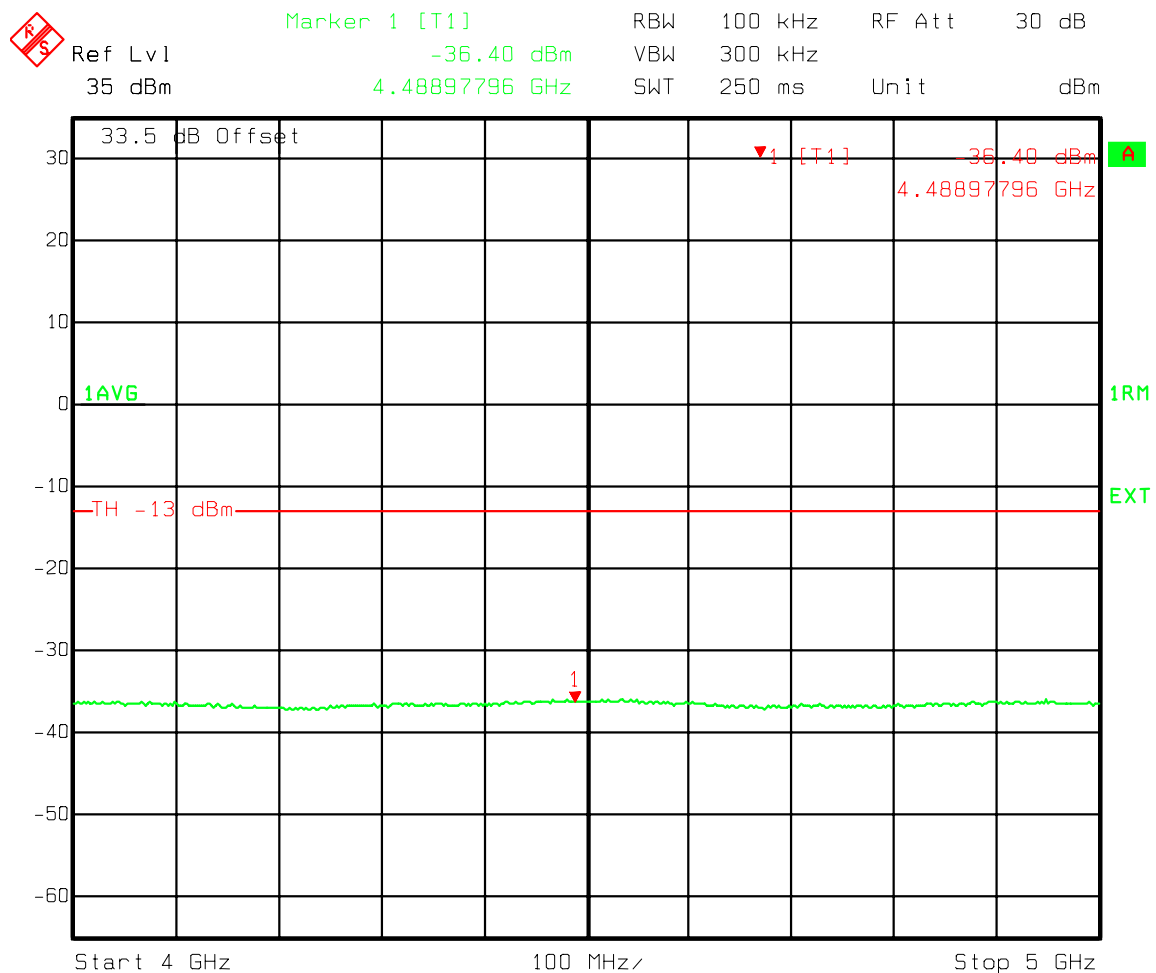
**A" and A Band IS95 Spurious emissions 3000-4000 MHz**



**Figure 65 : Three Carriers - A" and A Band IS95 Spurious emissions 3000-4000 MHz**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A'' IS95

#### A'' and A Band IS95 Spurious emissions 4000-5000 MHz

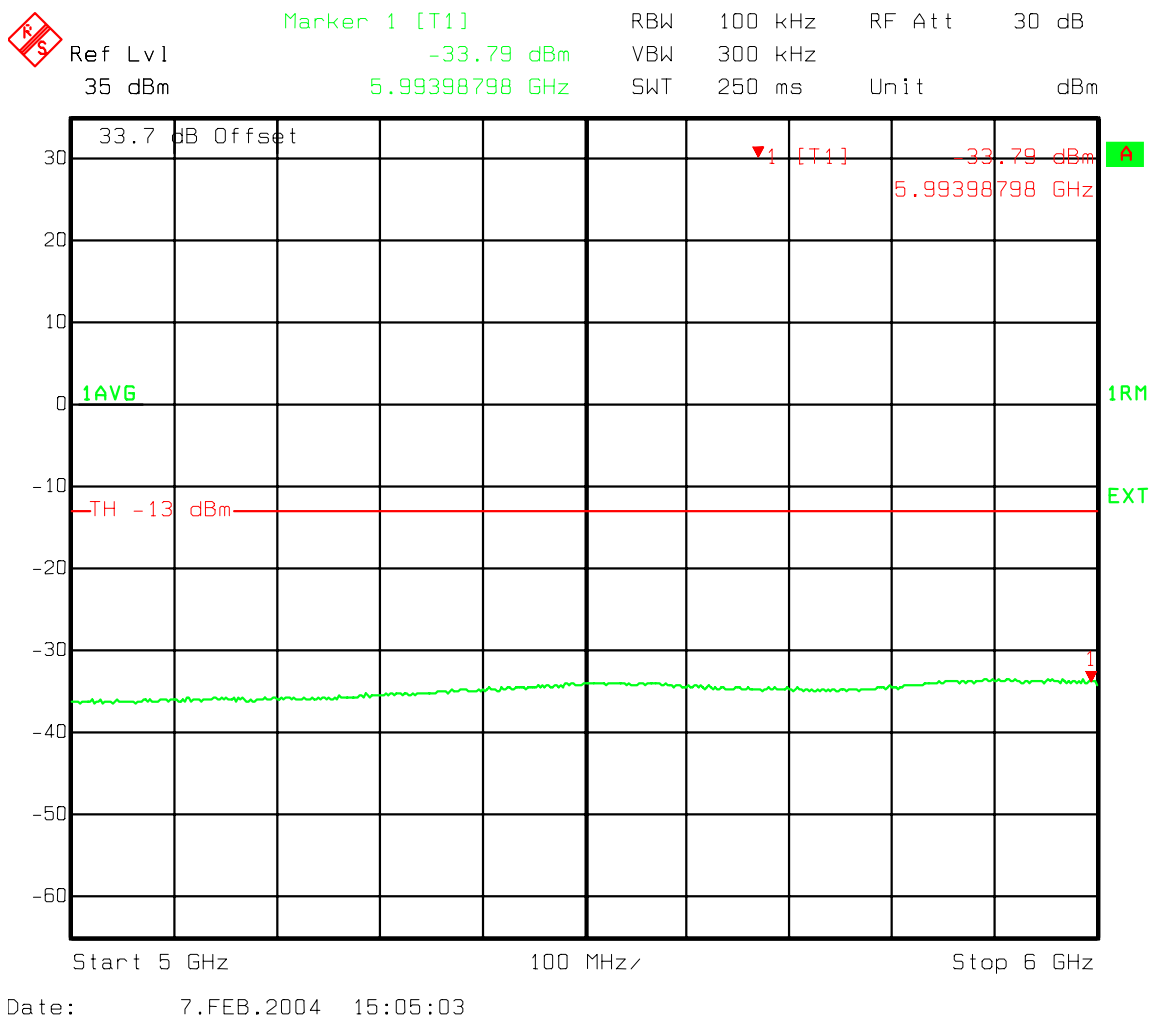


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**Figure 66 : Three Carriers - A'' and A Band IS95 Spurious emissions 4000-5000 MHz**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

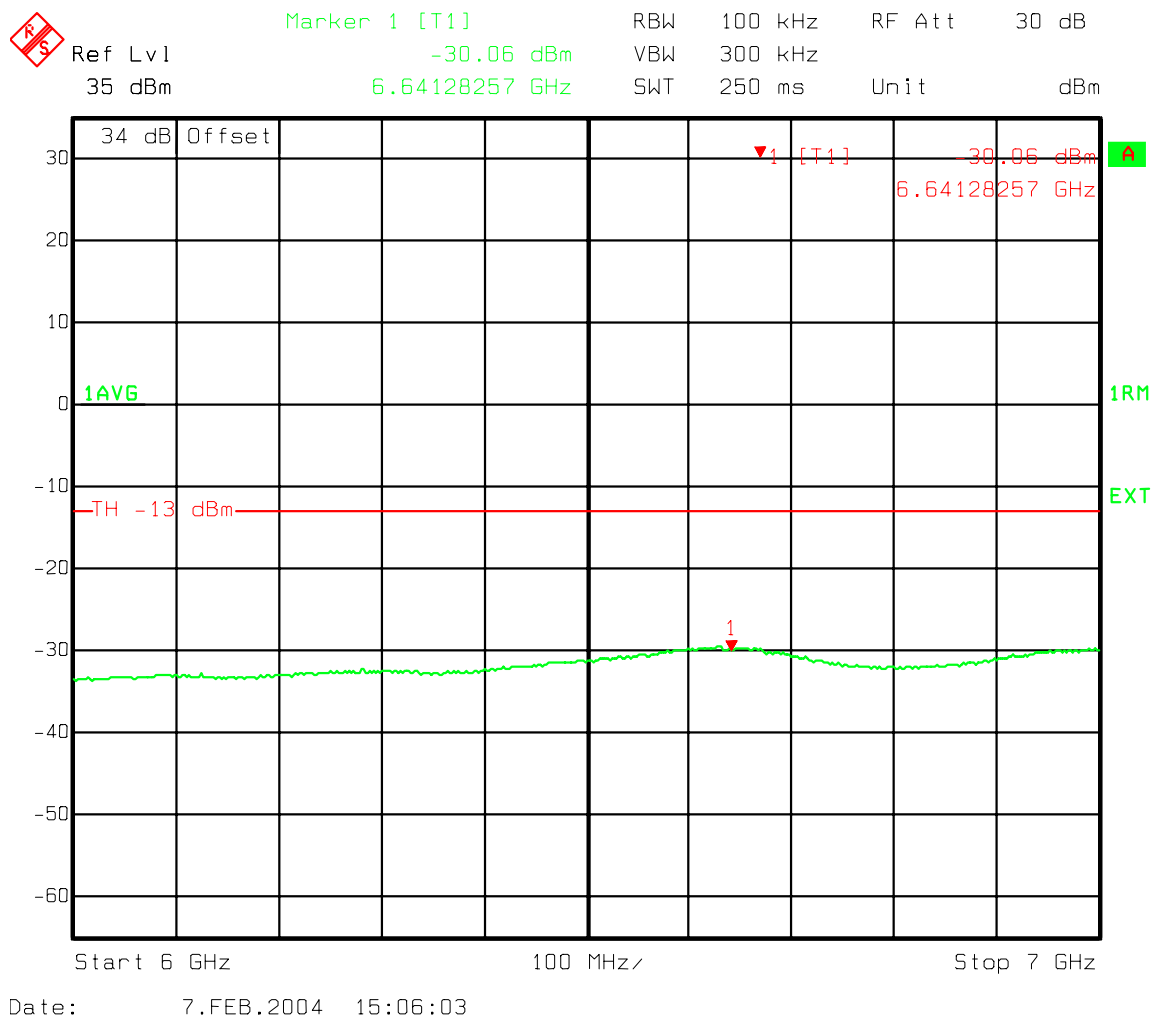
**A" and A Band IS95 Spurious emissions 5000-6000 MHz**



**Figure 67 : Three Carriers - A" and A Band IS95 Spurious emissions 5000-6000 MHz**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A'' IS95

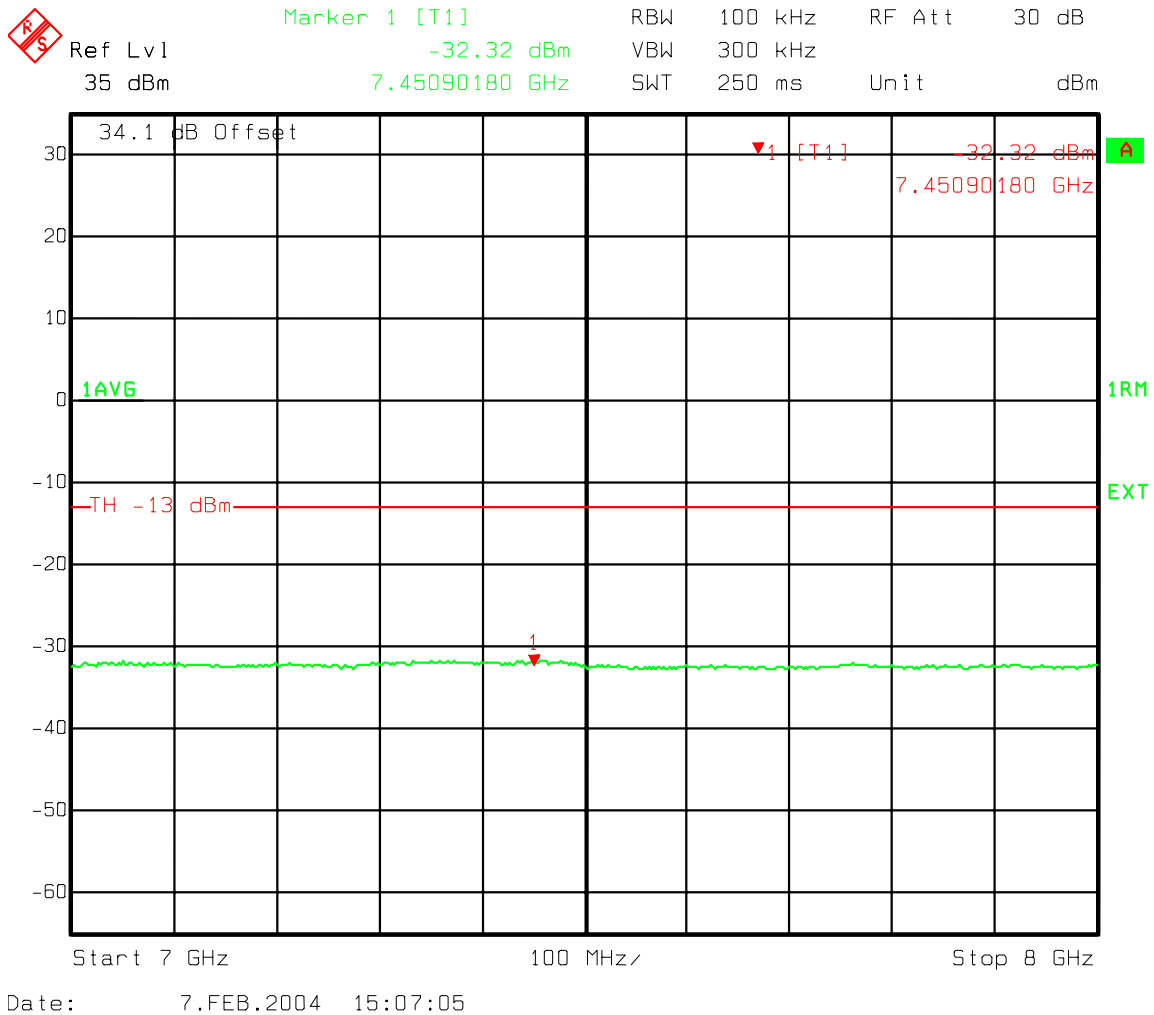
#### A'' and A Band IS95 Spurious emissions 6000-7000 MHz



**Figure 68 : Three Carriers - A'' and A Band IS95 Spurious emissions 6000-7000 MHz**

**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

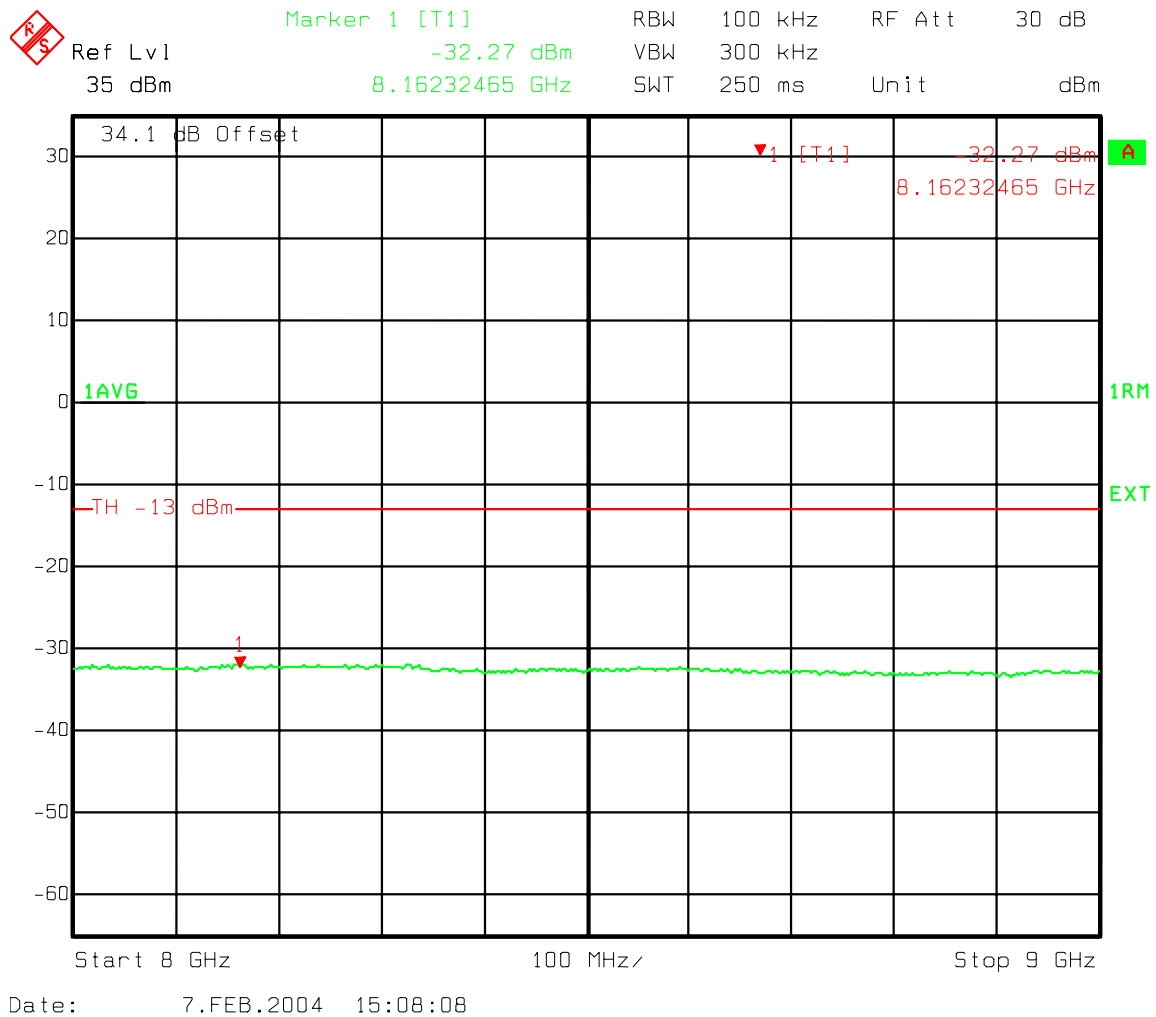
**A" and A Band IS95 Spurious emissions 7000-8000 MHz**



**Figure 69 : Three Carriers - A" and A Band IS95 Spurious emissions 7000-8000 MHz**

### Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95

#### A" and A Band IS95 Spurious emissions 8000-9000 MHz

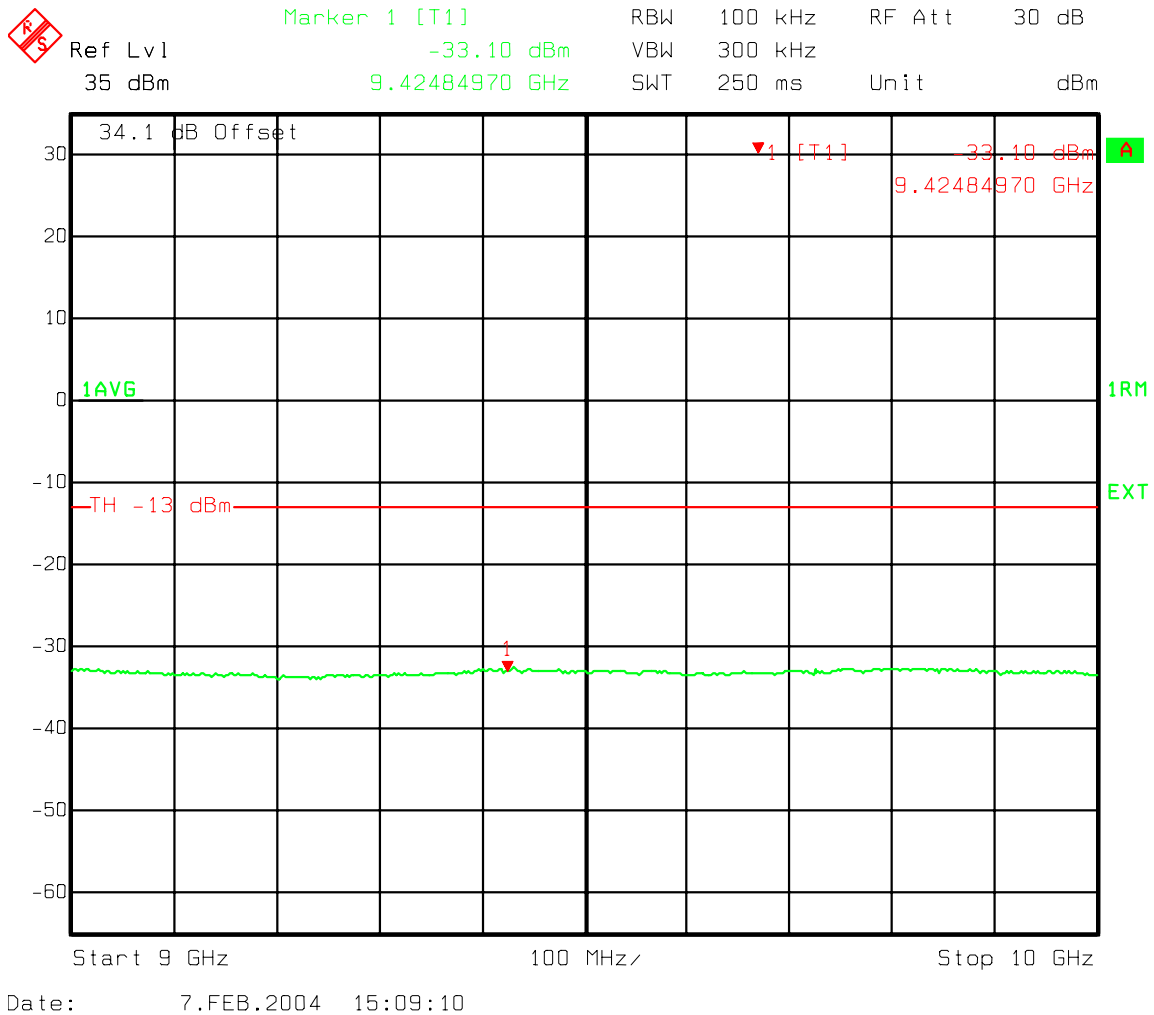


**Figure 70 : Three Carriers - A" and A Band IS95 Spurious emissions 8000-9000 MHz**



**Three Carrier Channel 1015, 33, 74 and 226, 267, 308 Spurious Emissions at the 800 MHz Compact Radio Module Ant. Port Band A and A" IS95**

**A" and A Band IS95 Spurious emissions 9000-10000 MHz**



**Figure 71 : Three Carriers - A" and A Band IS95 Spurious emissions 9000-10000 MHz**



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