Engineering and Testing for EMC and Safety Compliance

CLASS II PERMISSIVE CHANGE TEST REPORT

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MODEL: OpenSky M-803 Mobile Radio

FCC ID: BV8M803M

October 24, 2005

Standards Referenced for this Report	
FCC Part 2: 2004	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
FCC Part 15: 2004	§15.109: Radiated Emissions Limits
FCC Part 90: 2004	Private Land Mobile Radio Services
ANSI/TIA/EIA 603-2002	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA/EIA –102.CAAA; 2002	Digital C4FM/CQPSK Transceiver Measurement Methods

Frequency Range (MHz)	Maximum Conducted Power Output (W)*	Frequency Tolerance Limit (ppm)	Emission Designator
806-824	25.0	1.5	11K8F1E
806-824	25.0	1.5	11K8F1D
821-824	25.0	1.5	14K0F3E
866-869	25.0	1.5	14K0F3E
806-821	25.0	1.5	16K0F3E
851-866	25.0	1.5	16K0F3E
806-824	25.0	1.5	8K4F1D
806-824	25.0	1.5	8K4F1E
851-869	25.0	1.5	8K4F1D
851-869	25.0	1.5	8K4F1E

*as stated on original grant

REPORT PREPARED BY TEST ENGINEER: DANIEL BIGGS

Document Number: 2005111/QRTL05-182

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1 General Information

The following Class II permissive change report is prepared on behalf of **M/A-COM, Inc**. in accordance with the Federal Communications Commission Rules and Regulations. The Equipment Under Test (EUT) was the **OpenSky M-803M Mobile Radio; FCC ID: BV8M803M**. The test results reported in this document relate only to the item that was tested.

All measurements contained in this application were conducted in accordance with FCC Rules and Regulations CFR 47, Part 90, and ANSI/TIA/EIA 603-2002, Land Mobile FM or PM Communications Equipment Measurement and Performance Standards. Calibration checks are performed regularly on the instruments, and all accessories including high pass filter, coaxial attenuator, preamplifier and cables.

1.1 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the parking lot of Rhein Tech Laboratories, Inc. 360 Herndon Parkway, Suite 1400, Herndon, Virginia 20170. This site has been fully described in a report dated March 3, 1994, submitted to and approved by the Federal Communications Commission to perform AC line conducted and radiated emissions testing.

1.2 Related Submittal(s)/Grant(s)

This is a Class II permissive change report for FCC ID: BV8M803M, originally certified October 15, 2001.

1.3 Description of Change in Device

An HPA change was made to the last stage of RF amplification of the M803 radio. The original power amplifier became obsolete and was changed to a newer version of the same amplifier. The part is from the same manufacturer, and has the same specs as the original. The only difference between the old and the new power amplifier is that the bias voltage changed, which required changing three additional components which affect the bias voltage. .This change is critical to all transmit parameters on the radio, e.g. RF power, current, spectral purity, etc.

Due to the fact that this amplifier needs to be biased differently, the following components were also changed:

- R127 from 2.43kΩ to 619Ω
- R124 from 1kΩ to 71.5Ω
- C89 from 100pF to 1.5pF

1.4 Product Description

The EUT is a mobile radio that operates in the 800 MHz SMR and NPSPAC frequency bands. The rated RF output power is programmable to 25.0 watts.

Trade Name	OpenSky M-803 Mobile Radio
Use of Product	Voice and data communications
Type Modulation	GFSK, FM
Bit Rate	19200 bps
Max. Deviation	5 kHz
RF Output	25 W programmable
Frequency Range	806-824 MHz and 851-869 MHz
Max. Number of Channels	830 normal, 830 Talk Around
Antenna(e) Gain	0 dBi and 3 dBi (detachable)
External Input	Audio and Digital

2 Conformance Statement

Standards Referenced for This Report	
FCC Part 2: 2004	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
FCC Part 15: 2004	§15.109: Radiated Emissions Limits
FCC Part 90: 2004	Private Land Mobile Radio Services
ANSI/TIA/EIA 603 - 2002	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ANSI/TIA/EIA – 102.CAAA; 2002	Digital C4FM/CQPSK Transceiver Measurement Methods

Frequency Range (MHz)	Maximum Conducted Power Output (W)	Frequency Tolerance Limit (ppm)	Emission Designator
806-824*	25.0*	1.5*	11K8F1E*
806-824*	25.0*	1.5*	11K8F1D*
821-824	25.0	1.5	14K0F3E
866-869	25.0	1.5	14K0F3E
806-821	25.0	1.5	16K0F3E
851-866	25.0	1.5	16K0F3E
806-824	25.0	1.5	8K4F1D
806-824	25.0	1.5	8K4F1E
851-869	25.0	1.5	8K4F1D
851-869	25.0	1.5	8K4F1E

*as stated on original grant

We, the undersigned, hereby declare that the equipment tested and referenced in this report conforms to the identified standard(s) as described in this attached test record. No modifications were made to the equipment during testing in order to achieve compliance with these standards.

Furthermore, there was no deviation from, additions to or exclusions from the above standards for Certification methodology.

Signature: _____ Date: October 24, 2005

Typed/Printed Name: Desmond A. Fraser Position: President

Signature: _____ Date: October 24, 2005

Typed/Printed Name: Daniel W. Biggs Position: Test Engineer

3 Tested System Details

The EUT was received for testing on August 5, 2005. Listed below are the identifiers and descriptions of all equipment, cables, and internal devices used with the EUT for this test, as applicable. There are multiple configurations of the M-803 Mobile Radio series. Model number MAMROS0004 – Dash Mount Mobile Radio Unit Half Duplex with GPS system was provided for testing.

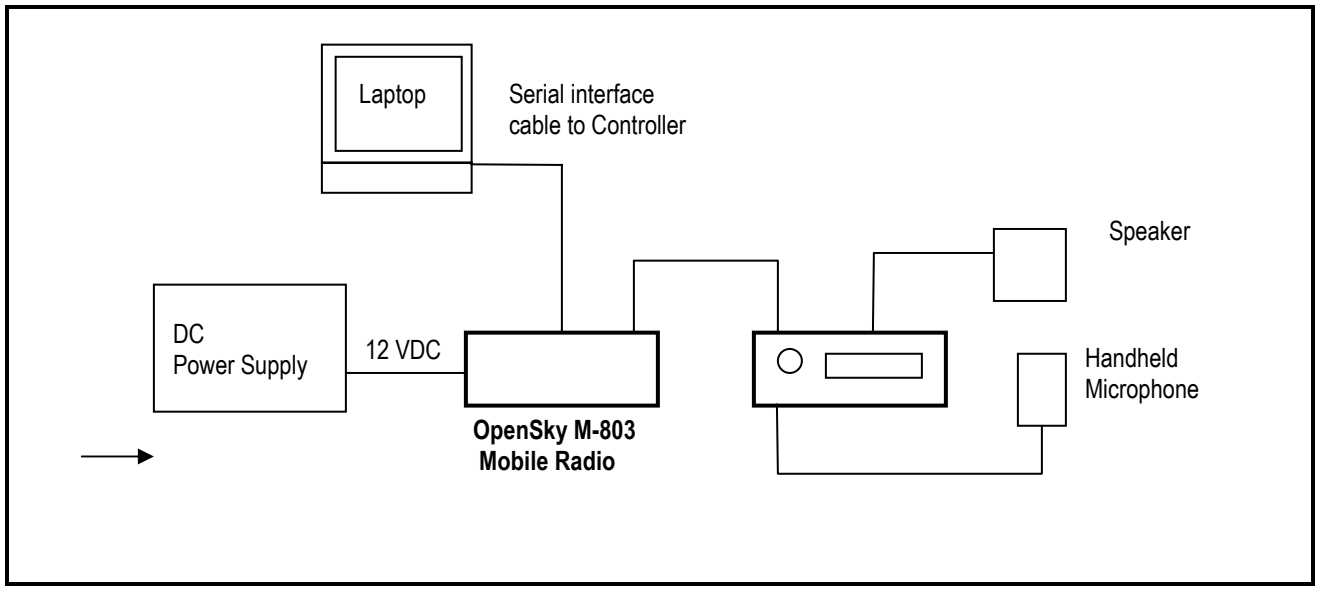
Table 3-1: Equipment Under Test (EUT)

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Mobile Radio	M/A-Com, Inc.	M-803	MAMROS0004	BV8M803M	16915
Control head	M/A-Com, Inc.	CH-103	MACDOS0003	N/A	16485
Microphone	OTTO	N/A	LS102824V10	N/A	16810
Antenna	M/A-Com, Inc.	ASPA	1860	N/A	16489
Speaker	M/A-Com, Inc.	N/A	MC103334V1	N/A	16811

Table 3-2: Support Equipment

Part	Manufacturer	Model	PN/SN	FCC ID	RTL Bar Code
Notebook computer	N/A	N/A	N/A	N/A	N/A
RS-232 interface cable	N/A	DB-9	N/A	N/A	16500
Power Supply	M/A-Com, Inc.	N/A	N/A	N/A	16805

Figure 3-1: Configuration of Tested System



4 FCC Rules and Regulations Part 2 §2.1033(C)(8) Voltages and Currents Through the Final Amplifying Stage

Nominal DC Voltage: 13.8 VDC
Current: 9 AMPS

5 FCC Rules and Regulations Part 90 §90.541 and Part 2 §2.1046(a): RF Power Output: Conducted

5.1 Test Procedure

ANSI/TIA/EIA-603-2002, Section 2.2.1.

The EUT was connected to a coaxial attenuator having a 50Ω load impedance.

5.2 Test Data

Table 5-1: RF Power Output (High Power): Carrier Output Power (Unmodulated)

Channel	Frequency (MHz)	RF Power Measured (Watt)*
A001N	806.0125	24.2
A300N	813.4875	23.9
A415N	816.3635	23.7
A600N	820.9875	23.5
A601N	821.0125	23.5
A715N	822.5125	22.4
A830N	823.9875	22.4
A001T	851.0125	22.9
A300T	858.4875	22.4
A415T	861.3635	22.4
A600T	865.9875	22.4
A601T	866.0125	22.4
A715T	867.5125	22.4
A830T	868.9875	22.4

* Measurement accuracy: +/- .02 dB (logarithmic mode)

Table 5-2: RF Power Output (Rated Power)

Rated Power (W)
25

Table 5-3: Test Equipment for Testing RF Power Output - Conducted

RTL Asset #	Manufacturer	Model	Part Type	Serial Number	Calibration Due
901184/901186	Agilent	E4416A/E9323A	Power Meter/ Sensor	GB41050573/US420.52510380	09/21/05

TEST PERSONNEL:

Daniel Biggs		Sept. 27, 2005
Test Technician/Engineer	Signature	Date Of Test

6 FCC Rules and Regulations Part 90 §90.543(C) and Part 2 §2.1051: Spurious Emissions at Antenna Terminals

6.1 Test Procedure

ANSI/TIA/EIA-603-2002, Section 2.2.13.

The transmitter is terminated with a 50Ω load and interfaced with a spectrum analyzer.

Device with digital modulation: Modulated to its maximum extent using a pseudo random data sequence – 9600 bps for P25 mode.

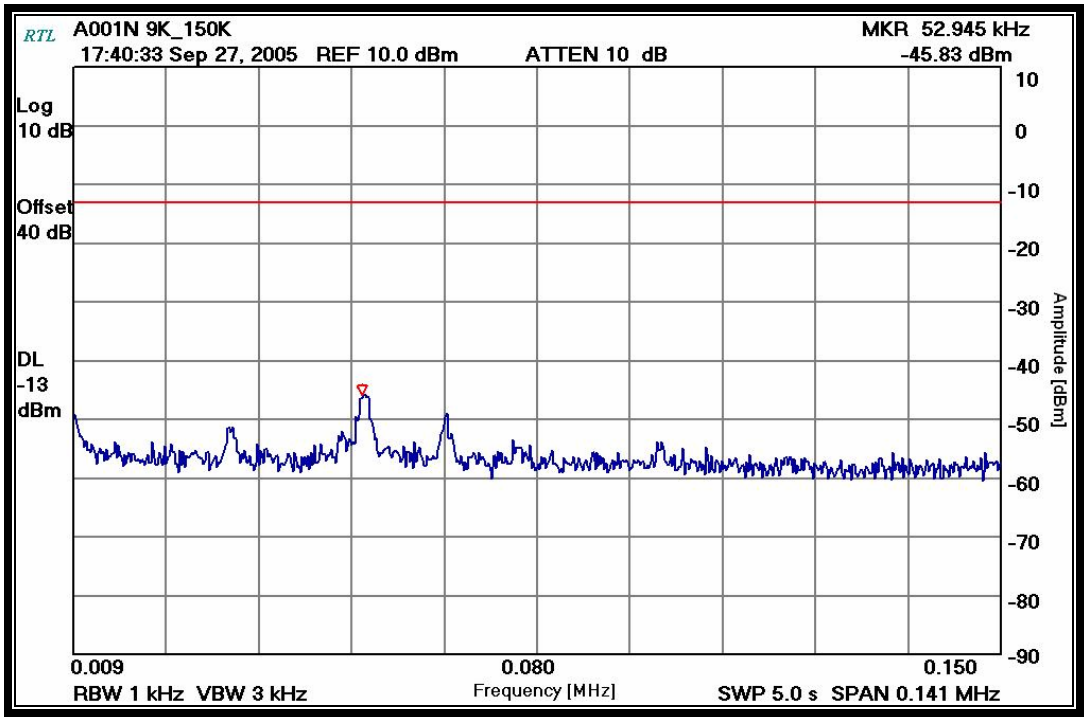
6.2 Test Data

Frequency range of measurement per Part 2.1057: 9 kHz to 10xFc.

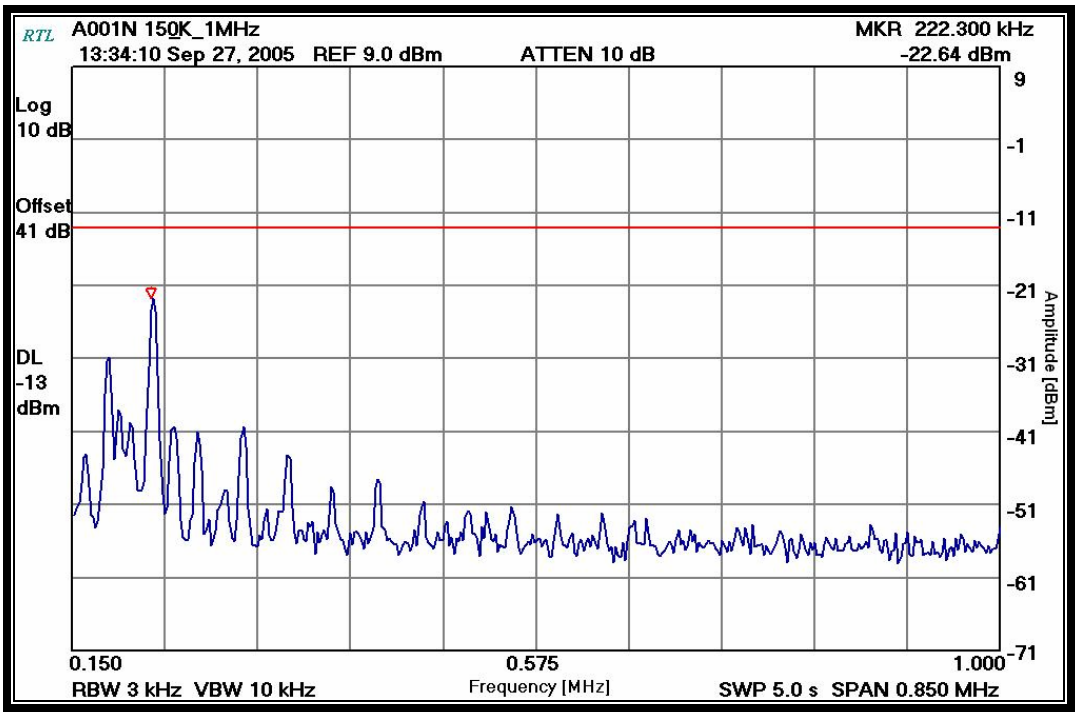
Limits: P(dBm) – (43 + 10xLOG P(W))

The worst case (unwanted emissions) channels are shown. The magnitude of emissions attenuated more than 20 dB below the FCC limit need not be recorded.

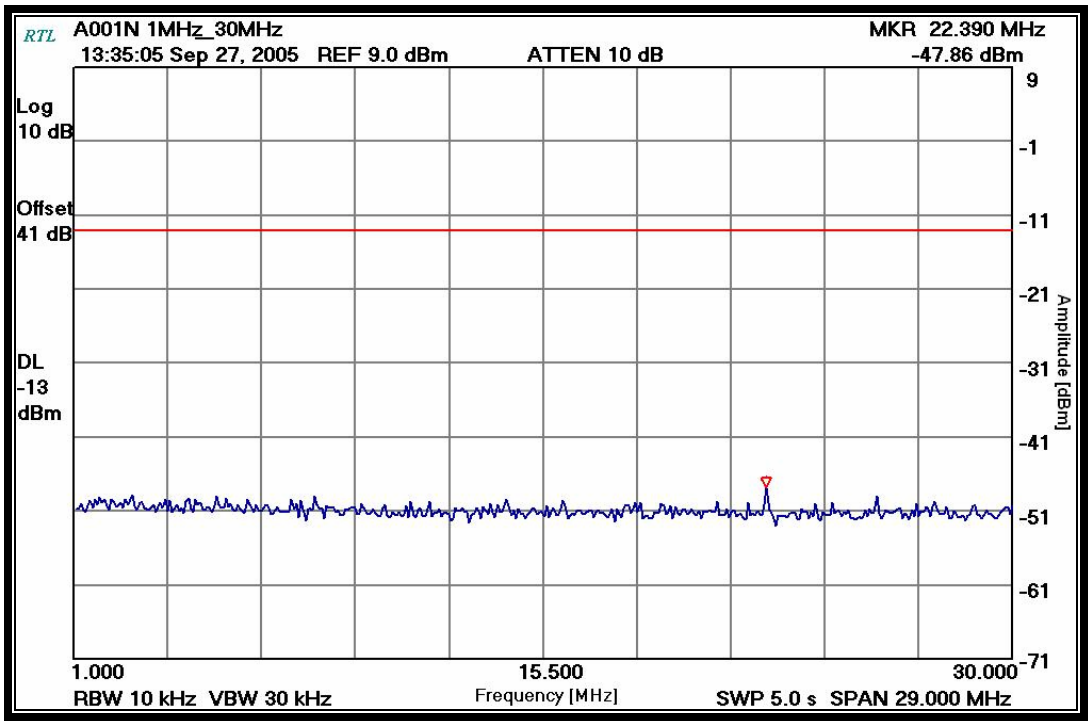
Plot 6-1: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (9 kHz – 150 KHz)



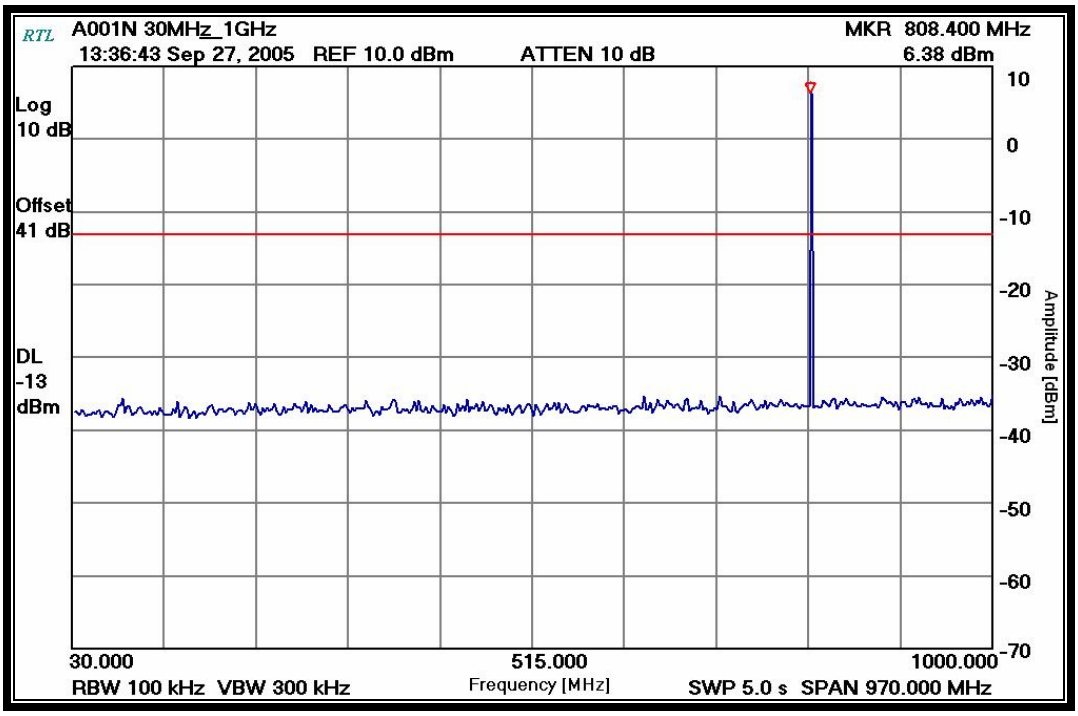
Plot 6-2: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (150 kHz – 1 MHz)



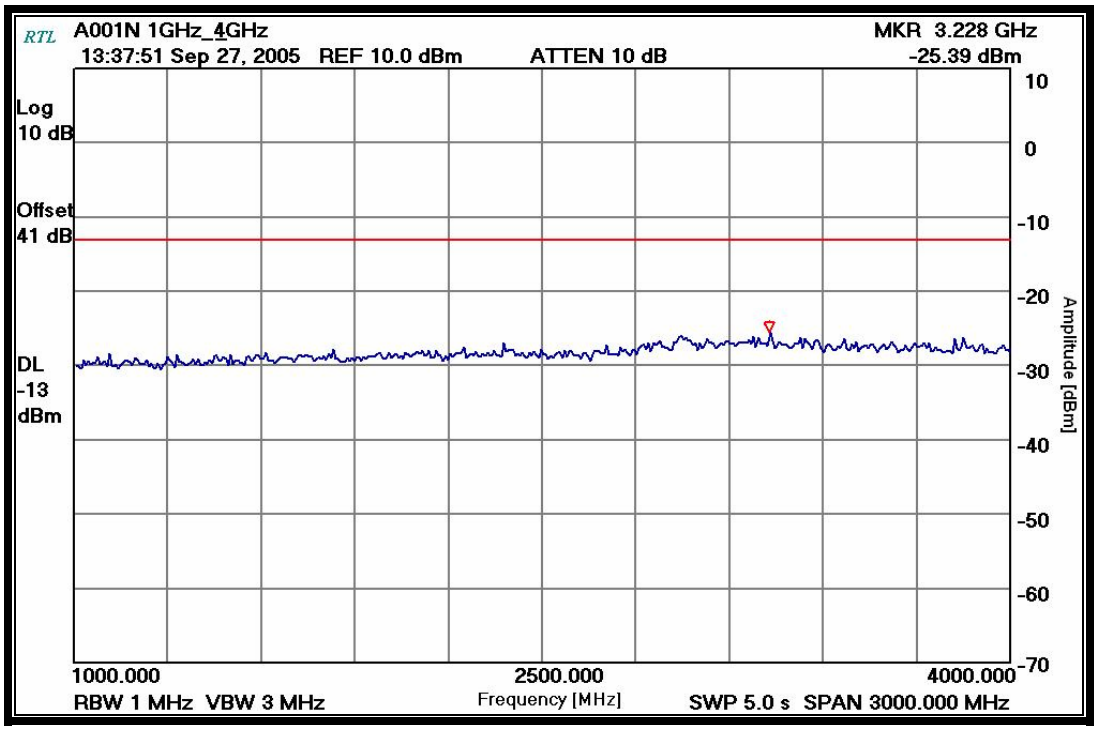
Plot 6-3: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (1 MHz – 30 MHz)



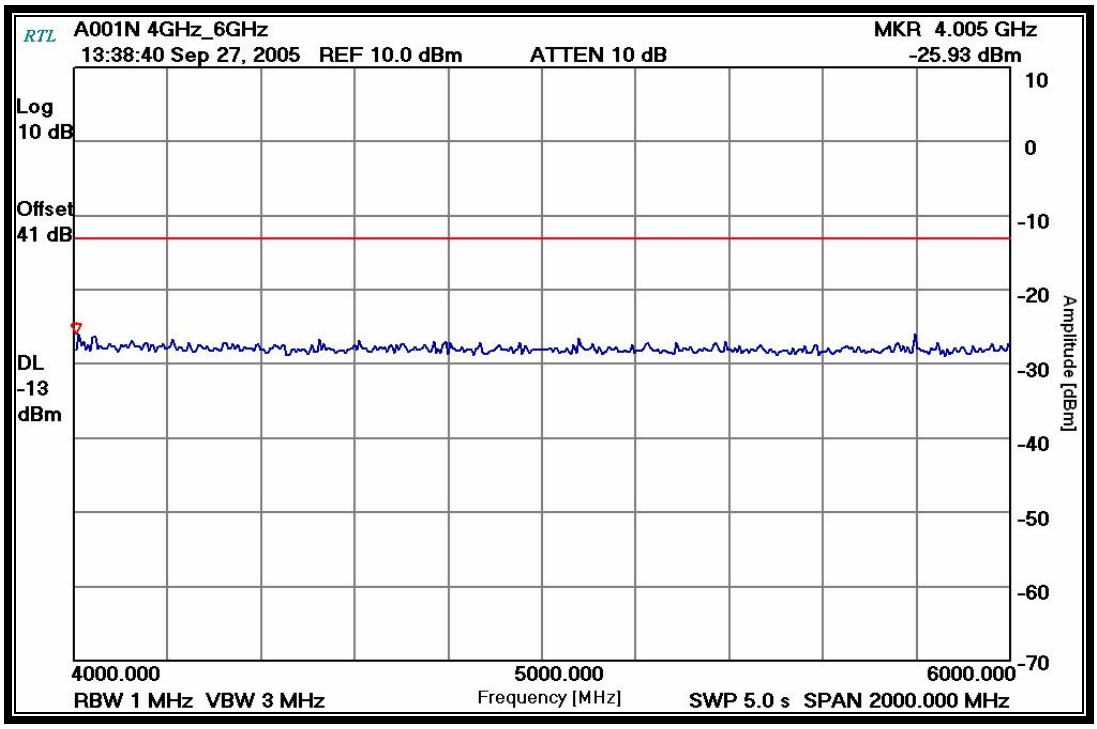
Plot 6-4: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (30 MHz – 1 GHz)



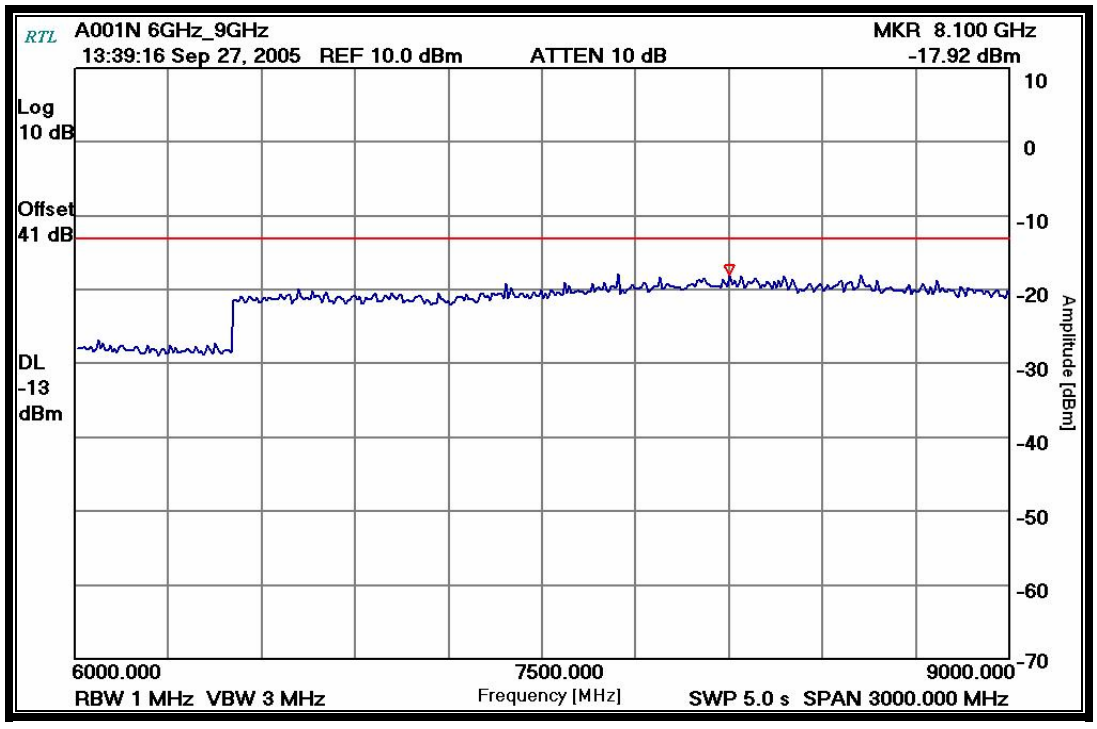
Plot 6-5: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (1 GHz – 4 GHz)



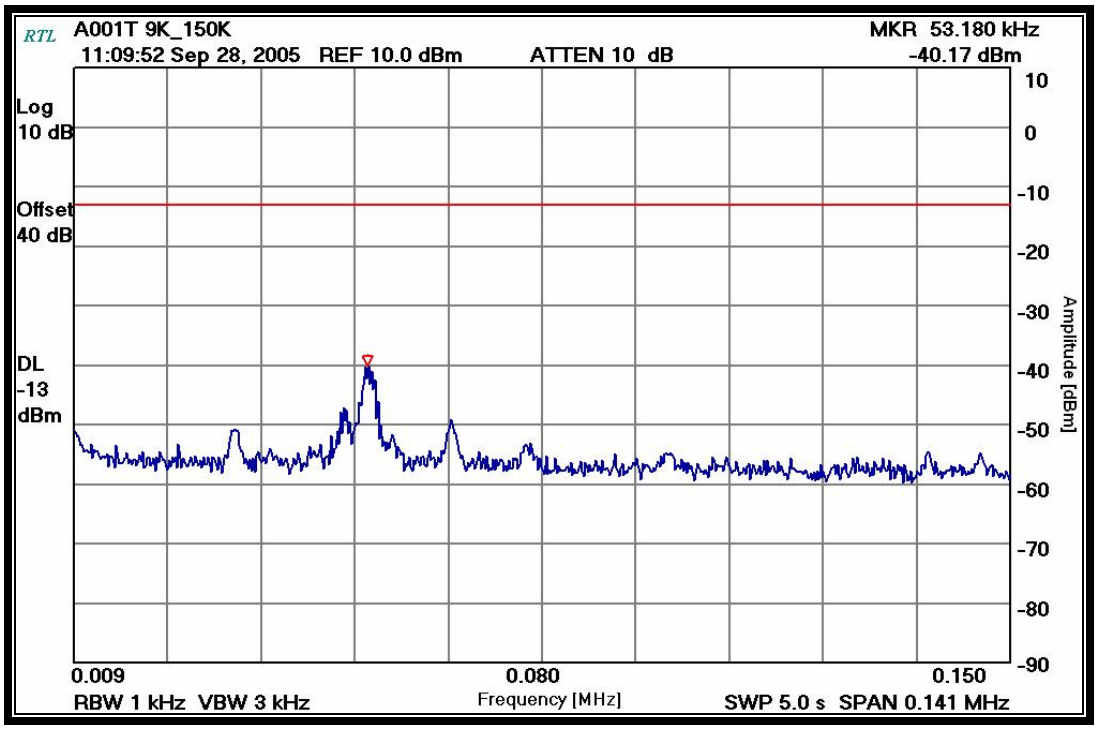
Plot 6-6: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (4 GHz – 6 GHz)



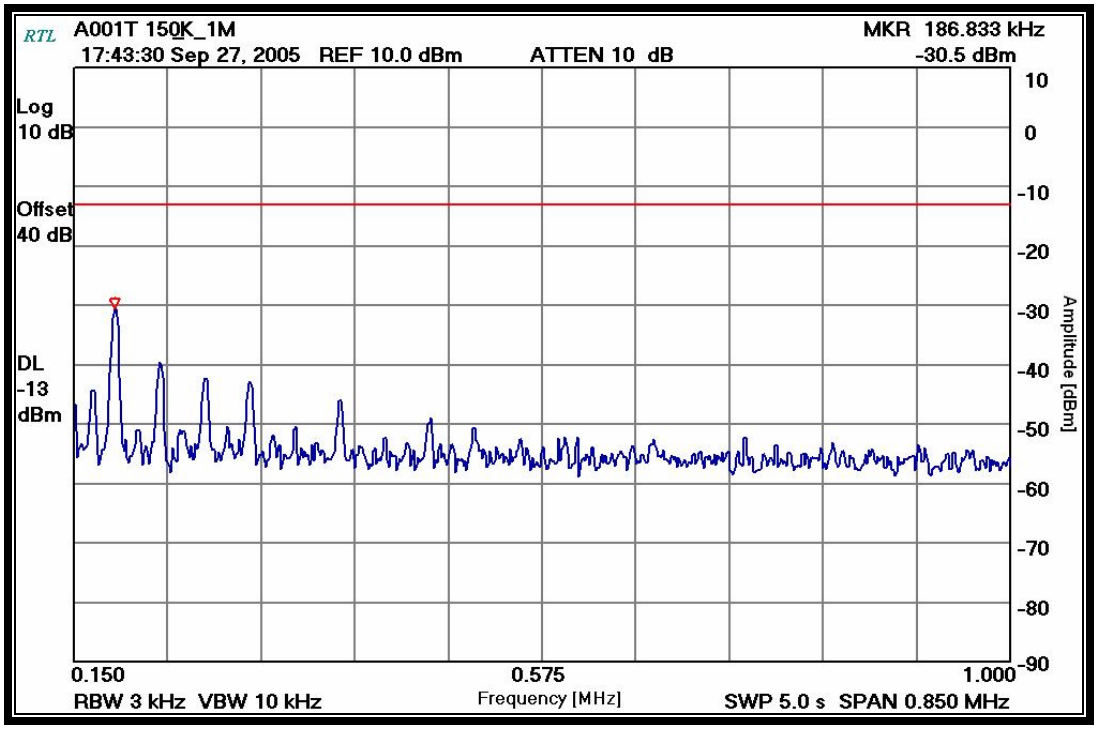
Plot 6-7: Conducted Spurious Emissions Channel A001N – 806.0125 MHz (6 GHz – 9 GHz)



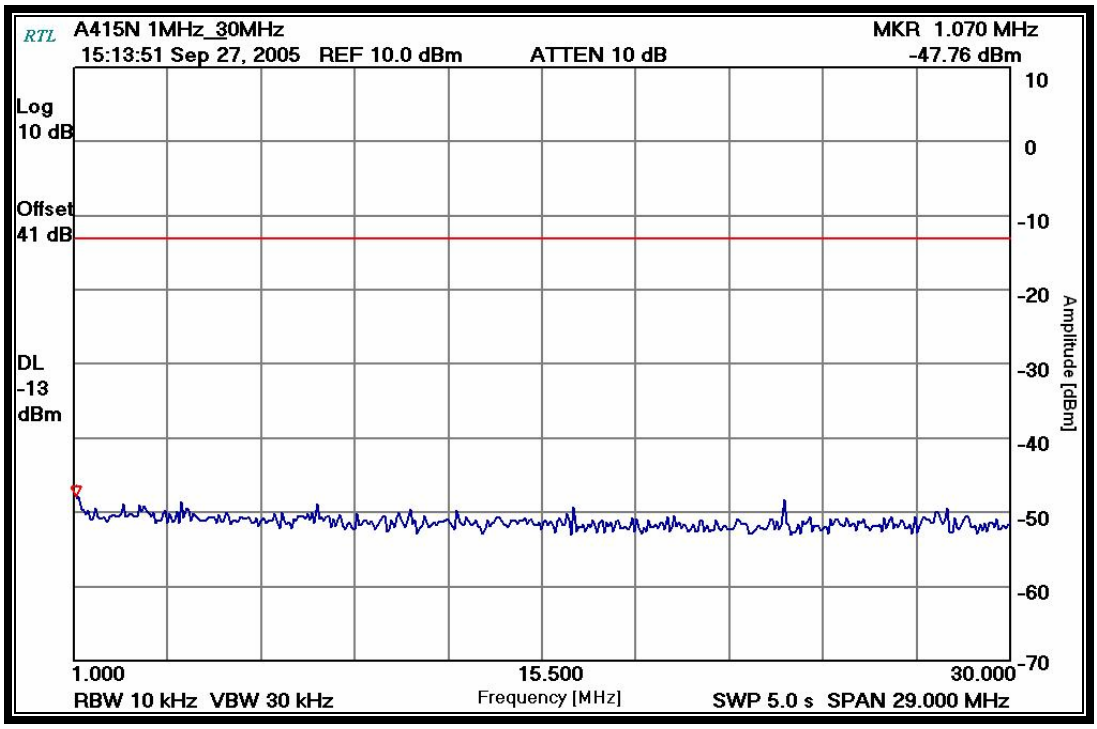
Plot 6-8: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (9 kHz – 150 kHz)



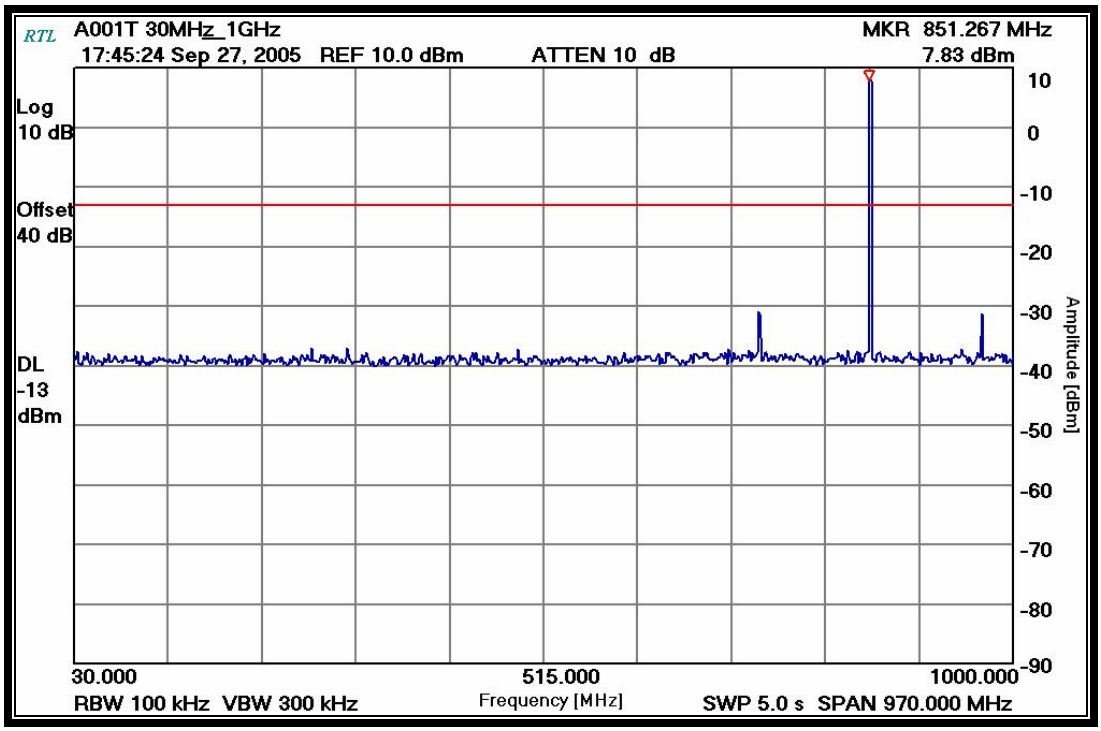
Plot 6-9: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (150 kHz – 1 MHz)



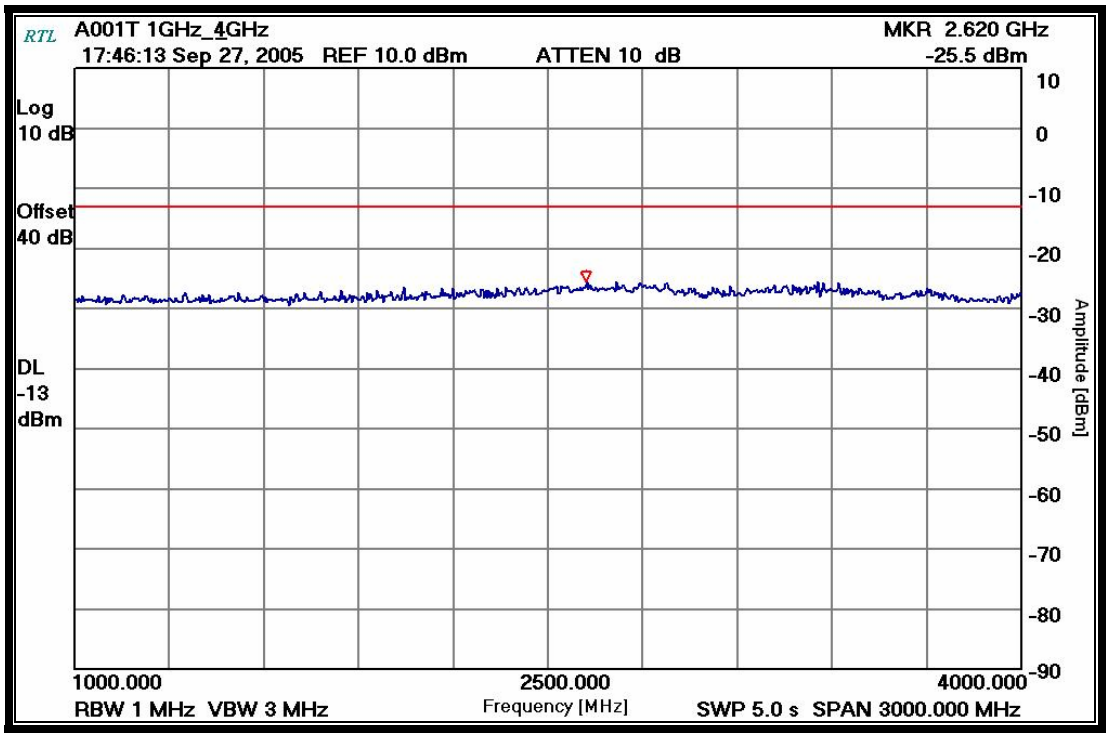
Plot 6-10: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (1 MHz – 30 MHz)



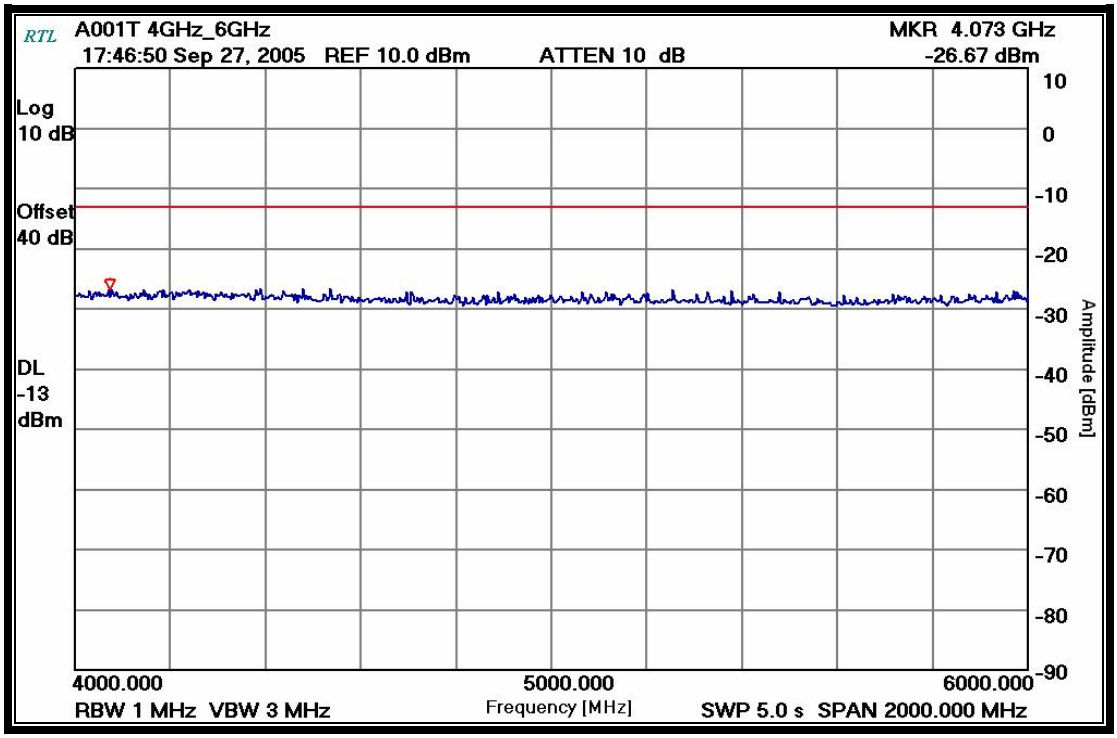
Plot 6-11: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (30 MHz – 1 GHz)



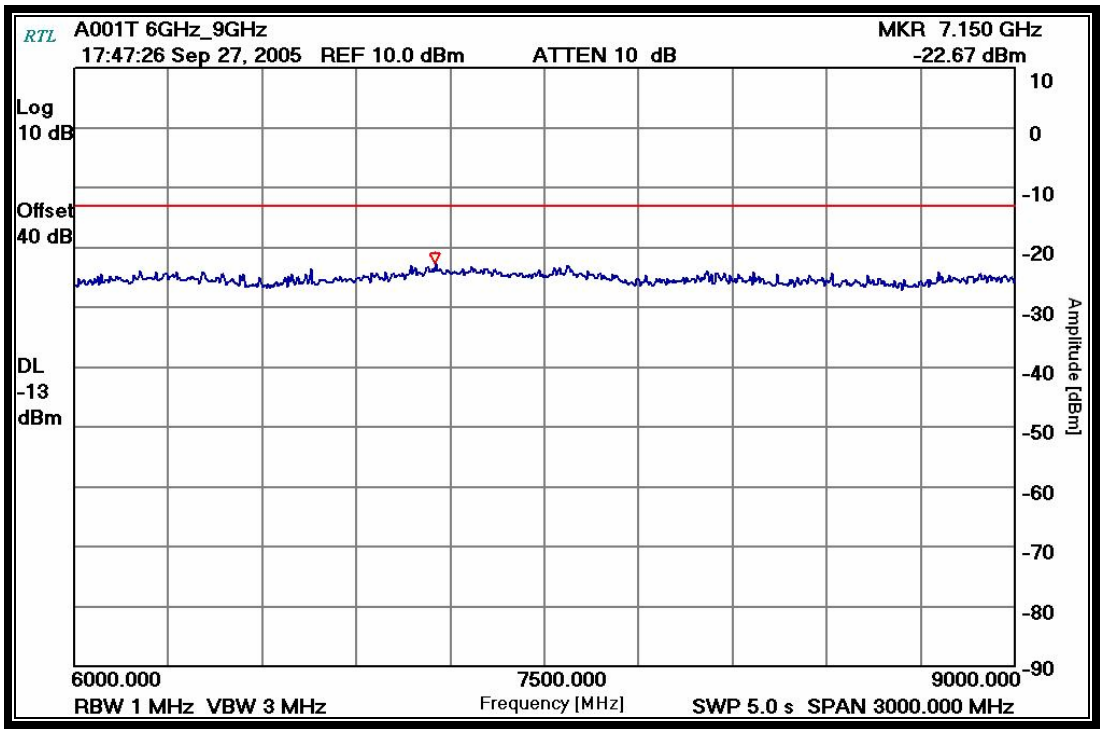
Plot 6-12: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (1 GHz – 4 GHz)



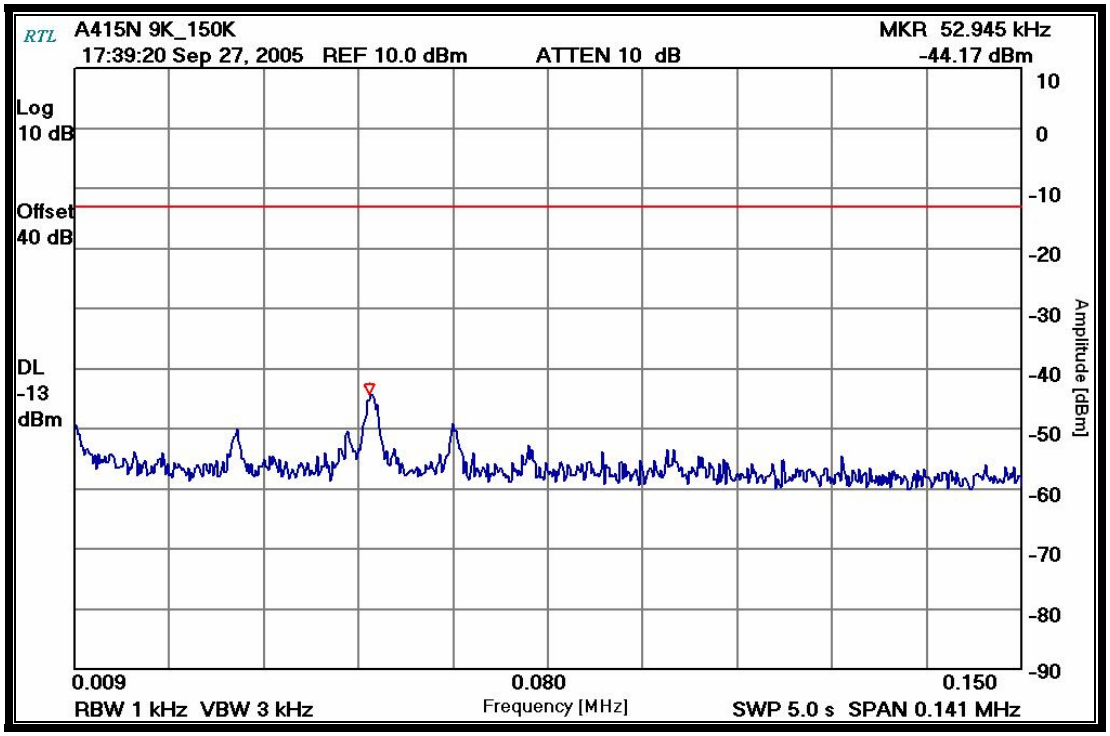
Plot 6-13: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (4 GHz – 6 GHz)



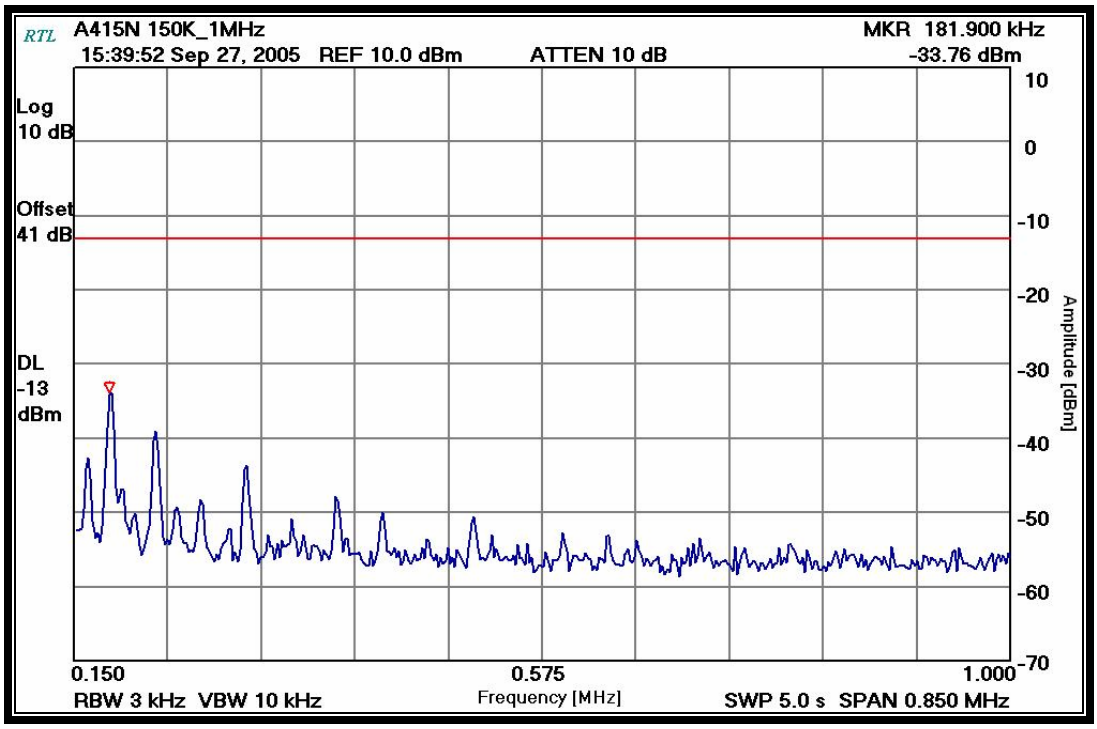
Plot 6-14: Conducted Spurious Emissions Channel A001T – 851.0125 MHz (6 GHz – 9 GHz)



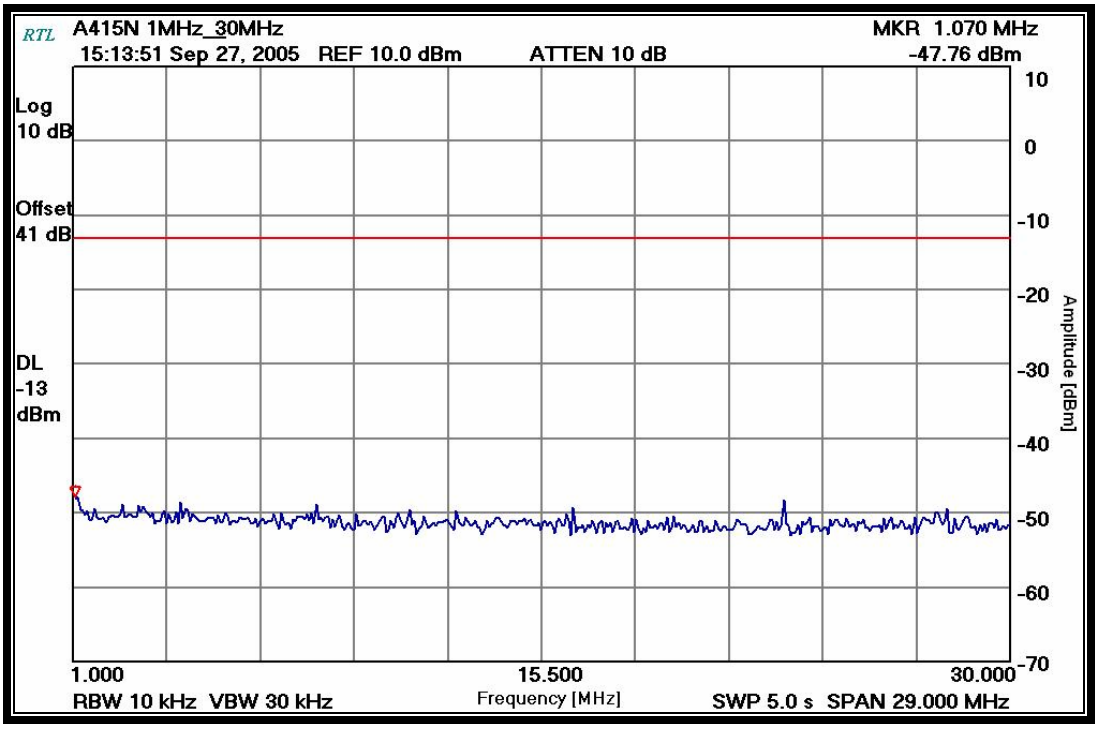
Plot 6-15: Conducted Spurious Emissions Channel A415N – 816.3635 MHz (9 kHz – 150 kHz)



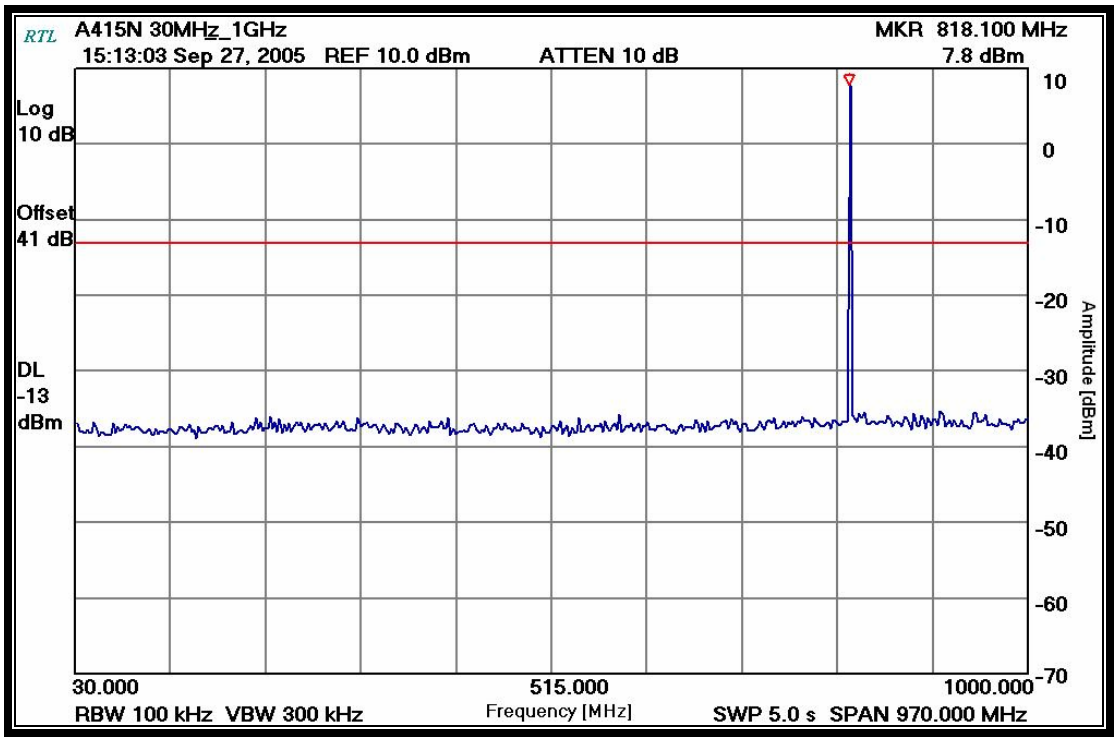
Plot 6-16: Conducted Spurious Emissions Channel A415N – 816.3635 MHz (150 kHz – 1 MHz)



Plot 6-17: Conducted Spurious Emissions Channel A415N – 816.3635 MHz (1 MHz – 30 MHz)



Plot 6-18: Conducted Spurious Emissions Channel A415N – 816.3635 MHz (30 MHz – 1 GHz)



Plot 6-19: Conducted Spurious Emissions Channel A415N – 816.3635 MHz (1 GHz – 4 GHz)