MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE ! BALTIMORE, MARYLAND 21230-3432 ! PHONE (410) 354-3300 ! FAX (410) 354-3313
33439 WESTERN AVENUE ● UNION CITY, CALIFORNIA 94587 ● PHONE (510) 489-6300 ● FAX (510) 489-6372
3162 BELICK STREET ● SANTA CLARA, CALIFORNIA 95054 ● PHONE (408 748-3585 ● FAX (510) 489-6372

May 28, 2009

DTC Communications Inc.
486 Amherest Street
Nashua, NH 03063

Dear Steve Anderson,

Enclosed is the EMC Wireless test report for compliance testing of the DTC Communications Inc., MBOX4, tested to the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 90 for Private Land Mobile Radio Services, Part 15 Subpart B for a Class A Digital Device.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\DTC Communications Inc.\EMC26417-FCC90_Rev2)

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Electromagnetic Compatibility Criteria Test Report

For the

DTC Communications Inc.
Model MBOX4

Tested under

The FCC Verification Rules
Contained in Title 47 of the CFR, Part 90
for Private Land Mobile Radio Services,
Part 15, Subpart B for a Class A Digital Device

MET Report: EMC26417-FCC90_Rev2

May 28, 2009

Prepared For:
DTC Communications Inc.
486 Amherest Street
Nashua, NH 03063

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

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Test Report

For the

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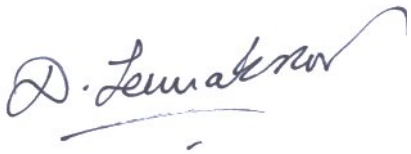

Dusmantha Tennakoon
Electromagnetic Compatibility Lab

Jennifer Warnell
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is / is not capable of operation in accordance with the requirements of Part 90, Part 15, Subpart B of the FCC Rules under normal use and maintenance.

Shawn McMillen, Wireless Manager
Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	April 6, 2009	Initial Issue.
1	May 18, 2009	Added Sierra Card test data.
2	May 28, 2009	Rev 2; Revise section 6.2

Table of Contents

All references to section numbers are taken directly from the standard/specification used. Only sections requiring testing or evaluation are included.

List of Tables

List of Figures

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent µ
E	**E**lectric Field
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

Executive Summary

1. Testing Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90. All tests were conducted using measurement procedure from ANSI TIA/EIA-603-A-2004 and ANSI C63.4-2003 as appropriate.

Title 47 of the CFR, Part 90	Conformance			Comments
	Yes	No	N/A	
	Yes - Equipment complies with the Requirement *No - Equipment does not comply with the Requirement* *N/A - Not applicable to the equipment under tests*			
2.1046; 90.205 Peak Power Output	✓			Measured emissions below applicable limits.
2.1047(a) Modulation Characteristics			✓	The EUT does not transmit voice. The device transmits video signals only.
2.1049; 90.210 Occupied Bandwidth (Emission Mask)	✓			The EUT met this requirement.
2.1051; 90.210 Spurious Emissions at Antenna Terminals	✓			The EUT met this requirement.
2.1053; 90.210 Radiated Spurious Emissions	✓			Measured emissions below applicable limits.
2.1055(a) (1); 90.213 Frequency Stability over Temperature Variations	✓			The EUT met this requirement.
2.1055(d) Frequency Stability over Voltage Variations	✓			The EUT met this requirement.
90.214 Transient Frequency Behavior			✓	E The device does not operate in the 150-174 MHz and 421-512 MHz band.
47 CFR Part 15.107 (a) Conducted Emission Limits for a Class A Digital Device	✓			Measured emissions below applicable limits.
47 CFR Part 15.109 (a) Radiated Emission Limits for a Class A Digital Device	✓			Measured emissions below applicable limits.

Equipment Configuration

2. Equipment Configuration

2.1. Overview

MET Laboratories, Inc. was contracted by DTC Communications Inc. to perform testing on the MBOX4 under purchase order number 502991.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the DTC Communications Inc., MBOX4.

An EMC evaluation to determine compliance of the TB 4.9 with the requirements of Part 90 was conducted. (All references are to the most current version of Title 47 of the Code of Federal Regulations in effect). In accordance with §2.1033, the following data is presented in support of the Certification of the TB4.9. DTC Communications Inc. should retain a copy of this document and it should be kept on file for at least five years after the manufacturing of the EUT has been **permanently** discontinued. The results obtained relate only to the item(s) tested.

Product Name:	MBOX4		
Model(s) Tested:	MBOX4-PD2-S-XX-XX-XXX-XXX-XX		
EUT Specifications:	Primary Power Source: 120 VAC, 60 Hz		
	FCC ID: H25MBOX4DS		
	Type of Modulations:	QPSK, 64QAM, 16QAM	
	Peak Output Power:	30.58 dBm	
	Equipment Code:	TNB	
	EUT Frequency Ranges:	1.25 MHz	2451 – 2482.5 MHz
		2.5 MHz	2451.25 – 2482.25 MHz
		6 MHz	2453 – 2480.5 MHz
		7 MHz	2453.5 – 2480 MHz
		8 MHz	2454 – 2479.5 MHz
Analysis:	The results obtained relate only to the item(s) tested.		
Environmental Test Conditions:	Temperature (15-35° C):		
	Relative Humidity (30-60%):		
	Barometric Pressure (860-1060 mbar):		
Evaluated by:	Dusmantha Tennakoon		
Test Date(s):	03/09/2009 – 03/16/2009		

Note: All testing was performed using QPSK modulation. A preliminary investigation showed that 16QAM and 64QAM showed similar results.

2.2. Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

2.3. Description of Test Sample

The DTC Communications Inc. MBOX4, is a covert video surveillance system. The components are contained in an environmentally conditioned utility box. It can be mounted on a utility pole or wall. It runs off 120 VAC via a 12.5 foot, 3 wire line cord. This model transmits video in a digital format in the 2200 to 2500 MHz range. The units PTZ camera is controlled by DTMF from a handheld transceiver operating in the 150 to 174 MHz range.

2.4. Equipment Configuration

All cards, racks, etc., incorporated as part of the EUT, are included in the following section.

Ref. ID	Name / Description	P/N Number	Serial Number
#1	SONY CAMERA SNC-RX550N	8720633-NTSC	103261
#2	STEALTH RF AMPLIFIER SM1727-37H/8720374-3	8720374-3	24199
#3	ASTRODYNE POWER SUPPLY MK150S-12	8340104	NONE
#4	PDII TX, S BAND, 100 MW, NO PACK	PD2-TX-100-S-NP	SB029071
#5	MINICIRCUITS POWER SPLITTER, 1-9 GHZ ZN2PD-9G-S+	8230007	F342500820
#6	ANTENEX VHF ANTENNA, 148-174 MHZ DEXW-148-BNX	8010127-2	NONE
#7	MICROSTRIP STACKED PATCH ANTENNA, 2.2-2.5GHZ	VA-5-LITE-S2/3S-LIN	A0903195
#8	MICROSTRIP STACKED PATCH ANTENNA, 2.2-2.5GHZ	VA-5-LITE-S2/3S-LIN	A0907017
#9	DTMF RECEIVER CCA, R-99WS, 150-174 MHZ	4045011	C0715-1134
#10	TEMPERATURE CONTROL CCA	4140234-T	11343-03
#11	VICSA CONTROL CCA	4140243-T	11377-02
#12	SIERRA WIRELESS MODEM	RAVEN X V42221-V OR RAVEN X H4223-C	0821336036 OR 0903394171
#13	SONY WIRELESS CARD	SNCA-CFW5	0101945

Table 1. Equipment Configuration

2.5. Support Equipment

DTC Communications Inc. supplied support equipment necessary for the operation and testing of the MBOX4. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	P/N Number	Serial Number
#13	S-BAND RCVR W/ANTENNA	DTC	PD2-RX-S-NP	SB003028
#14	POWER SUPPLY	ASTRODYNE	SPU50-3	006889131
#15	LCD MONITOR	WELDEX	WDL-1040	WDGI1200063
#16	POWER SUPPLY	LI SHIN	LSE9901B1250	A30716117271

Table 2. Support Equipment

2.6. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded? (Y/N)	Termination Box ID & Port ID
#12	NONE	AC POWER CORD	1	3.8	N	120 VAC SOURCE

Table 3. Ports and Cabling Information

2.7. Method of Monitoring EUT Operation

A test receiver will be used to monitor video transmission from the EUT. The PTZ camera inside the EUT will be controlled by a handheld VHF transceiver.

2.8 Mode of Operation

The EUT will be configured to transmit a live video image from a PTZ camera, on one of three front panel selectable frequencies. These will be set for the lower and upper band limits and band center. The transmit power is fixed at 1 watt into the antenna network.

2.9 Modifications

2.9.1 Modifications to EUT

No modifications were made to the EUT.

2.9.2 Modifications to Test Standard

No modifications were made to the test standard.

2.10 Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to DTC Communications Inc. upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

3. Electromagnetic Compatibility Criteria for Unintentional Radiators

3.1. Conducted Emissions Limits

Test Requirement(s):

15.107 (a) "Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 4. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals."

15.107 (b) "For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 4. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges."

Frequency range (MHz)	15.107(b), Class A Limits (dBμV)		15.107(a), Class B Limits (dBμV)	
	Quasi-Peak	Average	Quasi-Peak	Average
0.15- 0.5	79	66	66 - 56	56 - 46
0.5 – 5.0	73	60	56	46
5.0 - 30	73	60	60	50
Note — The lower limit shall apply at the transition frequencies.				

Table 4. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Section 15.107(a) (b)

Test Procedures:

The EUT was placed on a 0.8m-high wooden table inside a shielded chamber. The method of testing, test conditions, and test procedures of ANSI C63.4 were used. The EUT was powered through a 50Ω/50μH LISN. An EMI receiver, connected to the measurement port of the LISN, scanned the frequency range from 150 kHz to 30 MHz in order to find the peak conducted emissions. Multiple scans were performed with various loading. All peak emissions within 6 dB of the limit were re-measured using a quasi-peak and/or average detector as appropriate.

Test Results:

The EUT was compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits. The EUT was tested with out any third party wireless accessories and also with them installed. The EUT may use these third party wireless accessories in two different configurations:

1. Sony WIFI card (FCC ID: AK8SNCACFW5) and Sierra wireless modem (FCC ID: N7N-MC8781) or;
2. Sony WIFI card (FCC ID: AK8SNCACFW5) and Sierra wireless Modem (FCC ID: N7N-MC5725)

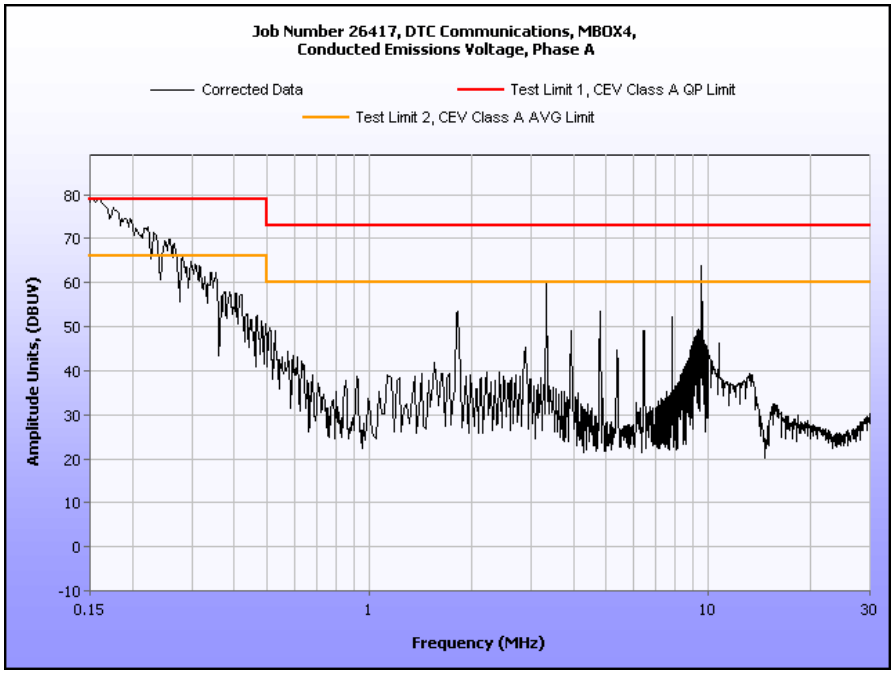
Pre-scans revealed that the emissions profiles for both configurations were similar. The amplitudes were slightly higher for the second configuration. Therefore, final measurements were only taken for configuration 2. Pre-scans for the first configuration are also shown in plots 5 and 6.

Test Engineer(s): Len Knight and Dusmantha Tennakoon

Test Date(s): 03/16/09 and 5/15/09

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) Avg.	Limit (dBuV) Avg.	Margin (dB) Avg.
0.15	69.35	0.085	69.435	79	-9.565	45.4	0.085	45.485	66	-20.515
0.155	68.37	0.0935	68.4635	79	-10.5365	40.2	0.0935	40.2935	66	-25.7065
0.16	67.81	0.102	67.912	79	-11.088	30.22	0.102	30.322	66	-35.678
0.2	63.19	0.17	63.36	79	-15.64	20.55	0.17	20.72	66	-45.28
0.25	59.88	0.17	60.05	79	-18.95	20.17	0.17	20.34	66	-45.66
0.3	56.7	0.17	56.87	79	-22.13	18.02	0.17	18.19	66	-47.81
1.817	47.4	0.17	47.57	73	-25.43	20.86	0.17	21.03	60	-38.97
3.317	31.2	0.17	31.37	73	-41.63	12.07	0.17	12.24	60	-47.76
9.5	27.04	0.30333333	27.34333333	73	-45.6567	19.26	0.30333333	19.56333333	60	-40.4367

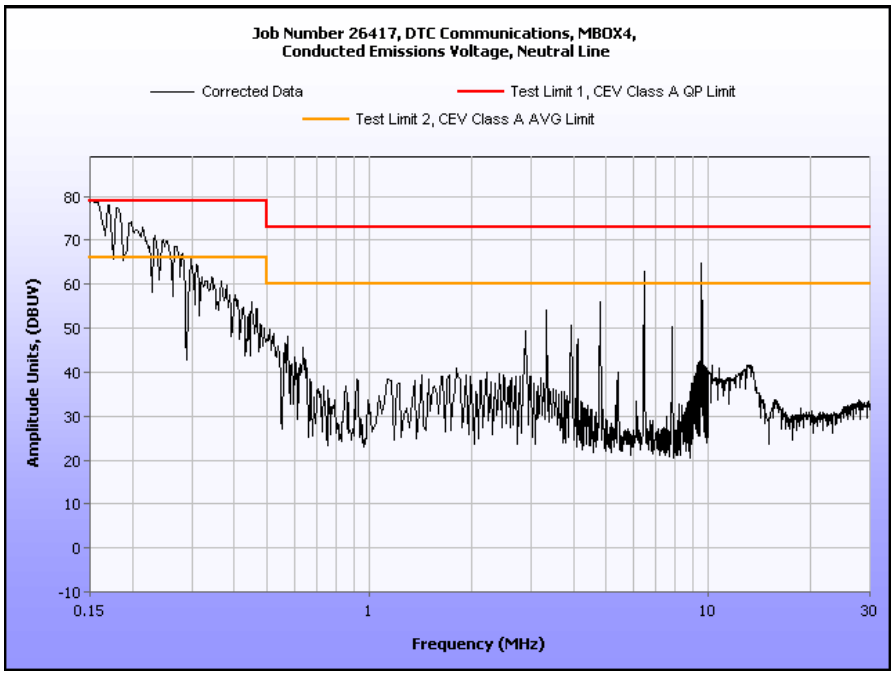
Table 5. Conducted Emissions - Voltage, AC Power, Phase Line, 120 VAC, 60 Hz (without any third party wireless accessories)



Plot 1. Conducted Emissions, Phase Line Plot

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) Avg.	Limit (dBuV) Avg.	Margin (dB) Avg.
0.15	69.64	0.085	69.725	79	-9.275	48.96	0.085	49.045	66	-16.955
0.155	68.35	0.0935	68.4435	79	-10.5565	42.8	0.0935	42.8935	66	-23.1065
0.16	67.75	0.102	67.852	79	-11.148	36.63	0.102	36.732	66	-29.268
0.2	63.02	0.17	63.19	79	-15.81	26.84	0.17	27.01	66	-38.99
0.25	59.59	0.17	59.76	79	-19.24	15.47	0.17	15.64	66	-50.36
0.3	56.58	0.17	56.75	79	-22.25	19.88	0.17	20.05	66	-45.95
1.5	30.11	0.17	30.28	73	-42.72	26.03	0.17	26.2	60	-33.8
3.317	31.92	0.17	32.09	73	-40.91	12.55	0.17	12.72	60	-47.28
9.555	59.75	0.30626667	60.05626667	73	-12.9437	29.67	0.30626667	29.97626667	60	-30.0237

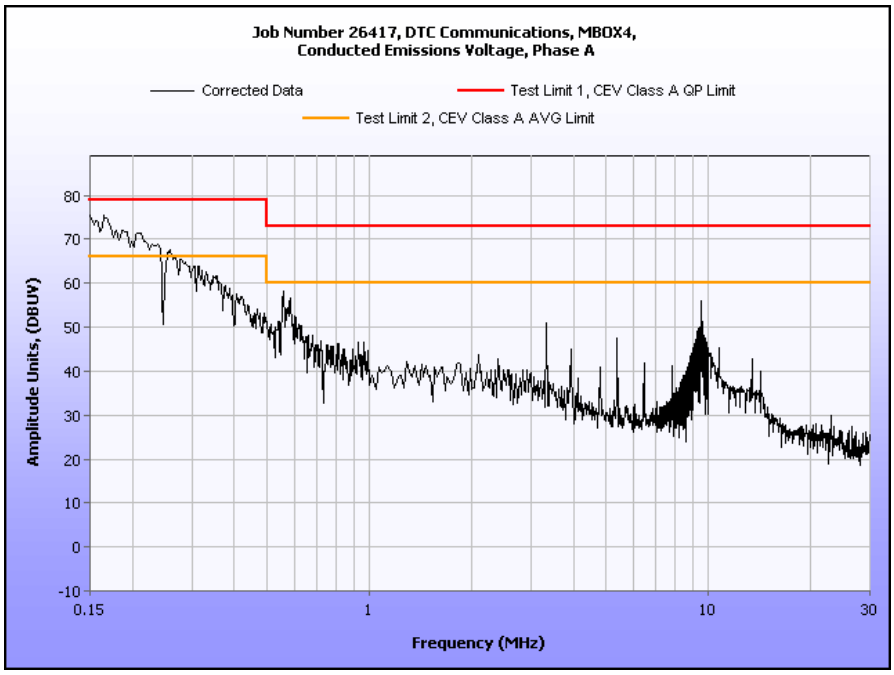
Table 6. Conducted Emissions - Voltage, AC Power, Neutral Line, 120 VAC, 60 Hz (without any third party accessories)



Plot 2 Conducted Emissions, Neutral Line Plot

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) Avg.	Limit (dBuV) Avg.	Margin (dB) Avg.
0.1504	65.08	0.08568	65.16568	79	-13.8343	50.65	0.08568	50.73568	66	-15.2643
0.2002	51.96	0.17	52.13	79	-26.87	39.56	0.17	39.73	66	-26.27
0.3018	29.55	0.17	29.72	79	-49.28	16.9	0.17	17.07	66	-48.93
9.554	37.99	0.306	38.29	73	-34.70	21.36	0.306	21.66	60	-38.3338
0.5009	27.77	0.17	27.94	73	-45.06	20.4	0.17	20.57	60	-39.43
3.93	26.38	0.17	26.55	73	-46.45	10.37	0.17	10.54	60	-49.46

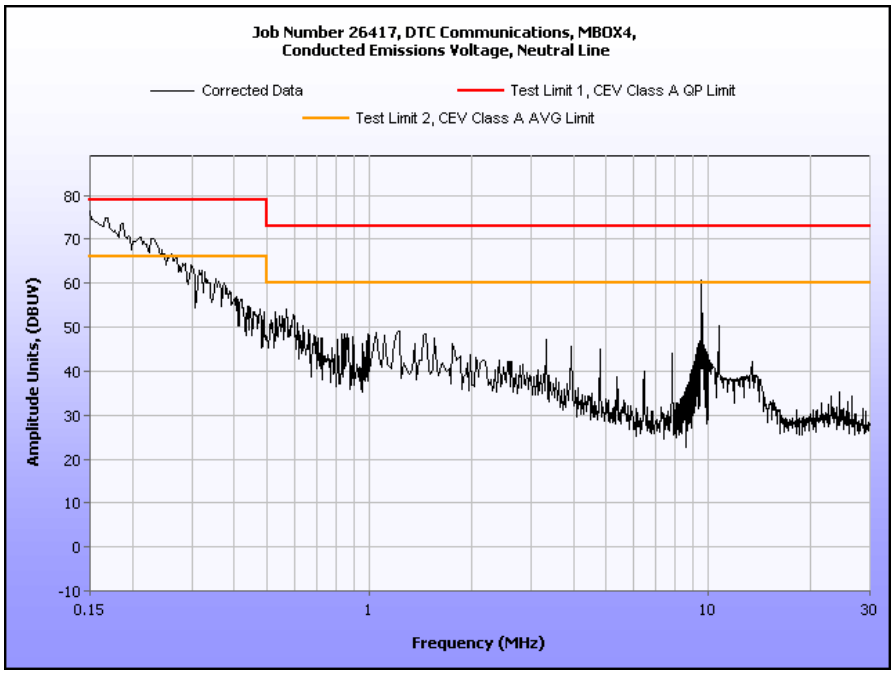
Table 7. Conducted Emissions - Voltage, AC Power, Phase Line, 120 VAC, 60 Hz (configuration 2)



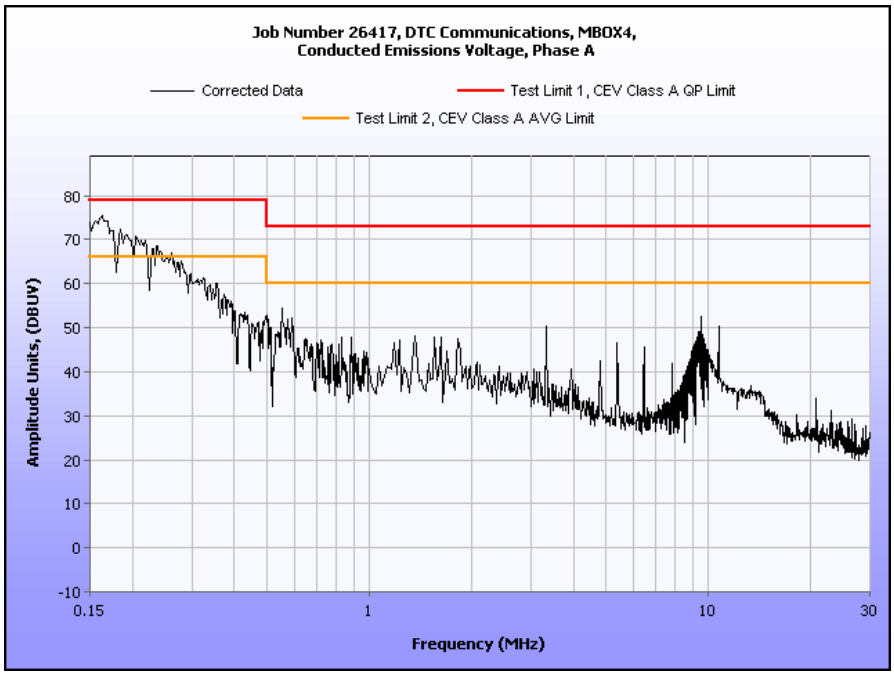
Plot 3. Conducted Emissions, Phase Line Plot (configuration 2)

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) Avg.	Limit (dBuV) Avg.	Margin (dB) Avg.
0.1503	69.46	0.08551	69.54551	79	-9.45449	54.56	0.08551	54.64551	66	-11.3545
0.1984	59.06	0.16728	59.22728	79	-19.7727	33.34	0.16728	33.50728	66	-32.4927
0.3312	44.53	0.17	44.7	79	-34.3	28.8	0.17	28.97	66	-37.03
0.5513	39.03	0.17	39.2	73	-33.8	24.08	0.17	24.25	60	-35.75
9.55	39.56	0.306	39.866	73	-33.134	35.15	0.306	35.456	60	-24.544
3.925	28.76	0.17	28.93	73	-44.07	23.49	0.17	23.66	60	-36.34

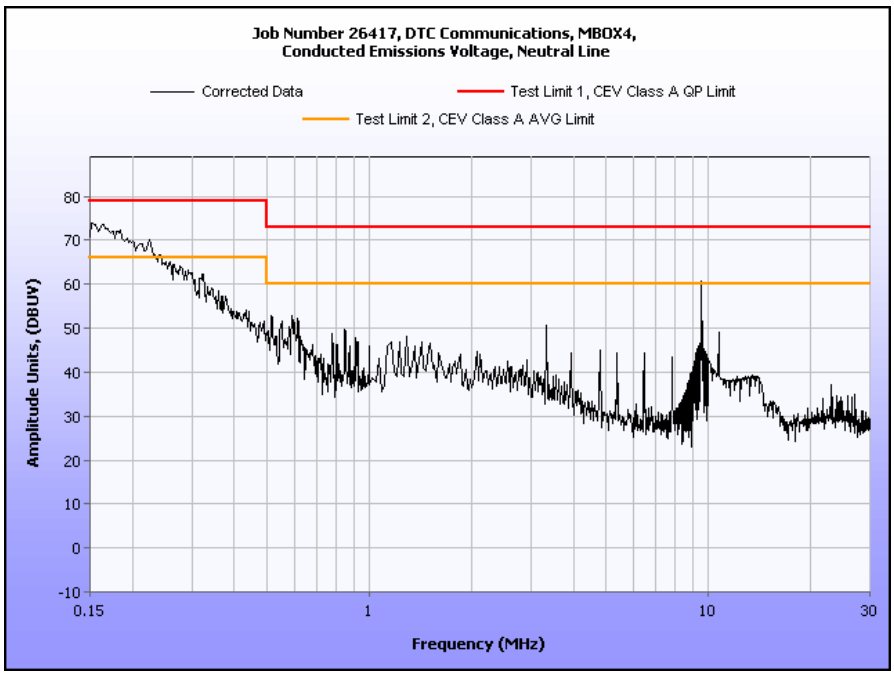
Table 8. Conducted Emissions - Voltage, AC Power, Neutral Line, 120 VAC, 60 Hz (configuration 2)



Plot 4 Conducted Emissions, Neutral Line Plot (configuration 2)



Plot 5. Conducted Emissions, Phase Line Plot (configuration 1)



Plot 6. Conducted Emissions, Neutral Line Plot (configuration 1)

Conducted Emission Limits Test Setup

Photograph 1. Conducted Emissions, Test Setup

3.2. Radiated Emissions Limits

Test Requirement(s): **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class A limits expressed in Table 9.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 9.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV) @ 10m	§15.109 (a),Class B Limit (dBµV) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 9. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures: The EUT was placed on a 0.8m-high non-conductive table inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

Scans were performed with the transmitters turned off. These scans were used to perform final emissions on frequencies of interest.

Test Results: The EUT was compliant with the Class B requirement(s) of this section. Measured emissions were below applicable limits.
The EUT was tested with out any third party wireless accessories and also with them installed. The EUT may use these third party wireless accessories in two different configurations:

1. Sony WIFI card (FCC ID: AK8SNCACFW5) and Sierra wireless modem (FCC ID: N7N-MC8781) or;
2. Sony WIFI card (FCC ID: AK8SNCACFW5) and Sierra wireless Modem (FCC ID: N7N-MC5725)

Pre-scans revealed that the emissions profiles for both configurations were similar. The amplitudes were slightly higher for the first configuration. Therefore, final measurements were only taken for configuration 1. Pre-scan for the second configuration is also shown in plot 9.

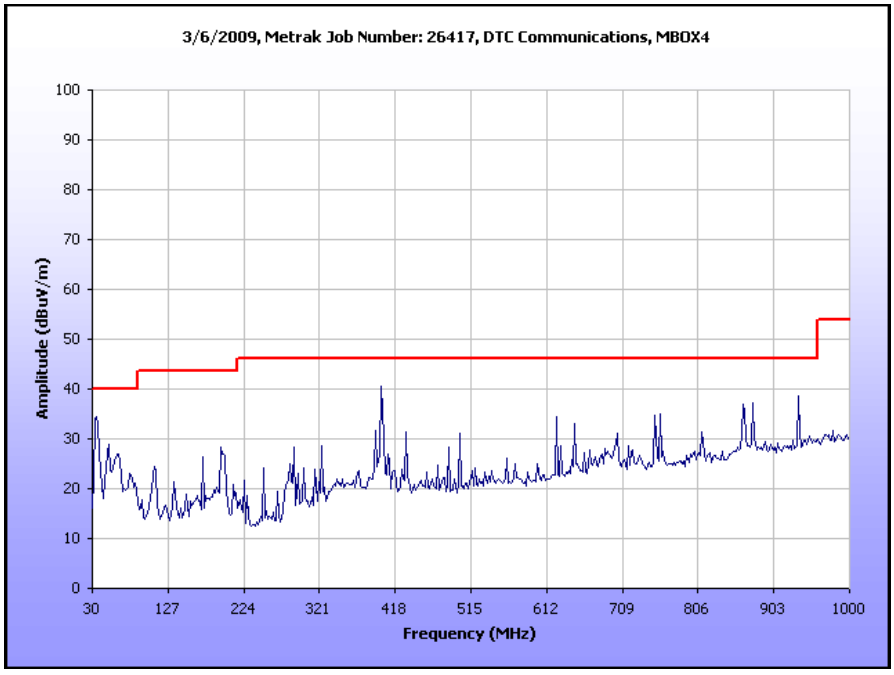
Test Engineer(s): Dusmantha Tennakoon

Test Date(s): 03/06/09 and 5/15/09

Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
36.784	144	H	3.63	8.35	8.03	0.17	0.00	16.55	40.00	-23.45
36.784	0	V	1.00	26.18	6.80	0.17	0.00	33.15	40.00	-6.85
109.178	182	H	1.81	9.49	7.25	0.26	0.00	17.00	43.50	-26.50
109.178	246	V	1.00	14.18	7.58	0.26	0.00	22.03	43.50	-21.47
400.003	137	H	1.18	19.98	15.50	1.87	0.00	37.35	46.00	-8.65
400.003	53	V	2.13	20.60	15.50	1.87	0.00	37.97	46.00	-8.03
624.982	80	H	1.10	18.57	19.70	2.41	0.00	40.68	46.00	-5.32
624.982	1	V	2.81	11.44	20.10	2.41	0.00	33.95	46.00	-12.05
874.994	31	H	1.28	13.22	22.40	3.19	0.00	38.81	46.00	-7.19
874.994	325	V	1.12	12.87	21.90	3.19	0.00	37.96	46.00	-8.04
933.302	302	H	2.47	7.66	22.97	3.51	0.00	34.13	46.00	-11.87
933.302	30	V	1.00	10.50	22.97	3.51	0.00	36.97	46.00	-9.03

Table 10. Radiated Emissions Limits, Test Results (without any wireless accessories)

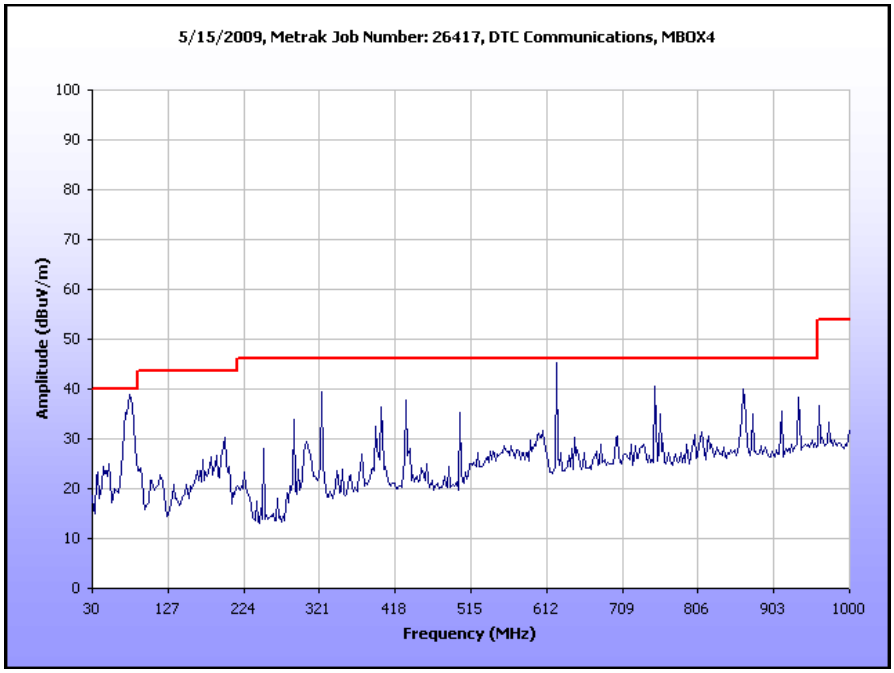


Plot 7. Radiated Emissions, Pre-Scan (without any wireless accessories)

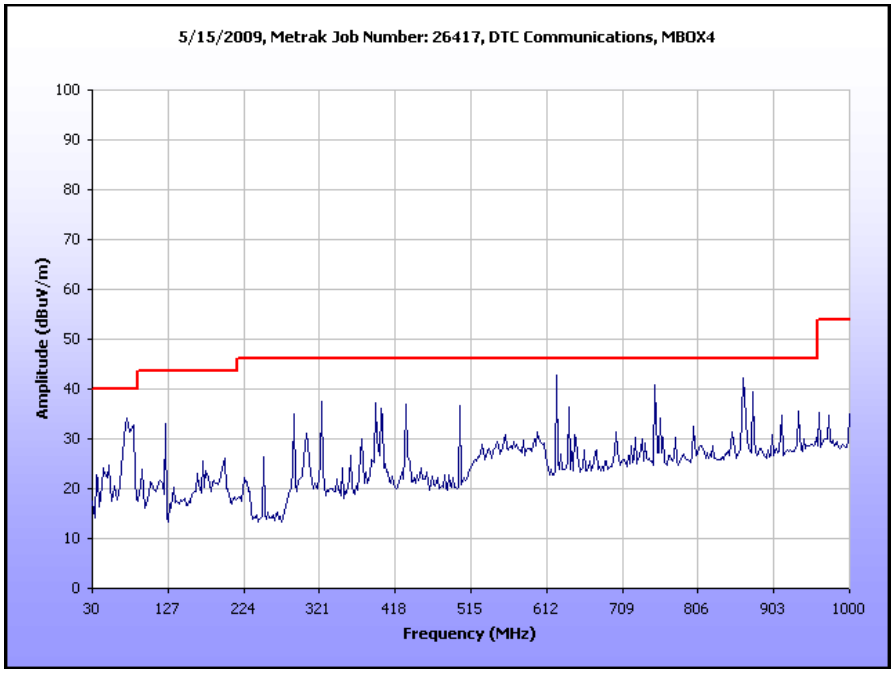
Radiated Emissions Limits Test Results, Class B

Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
81.507	277	H	1.00	11.52	7.36	0.26	0.00	19.14	40.00	-20.86
81.507	245	V	1.00	26.48	6.74	0.26	0.00	33.48	40.00	-6.52
323.984	110	H	1.45	24.27	13.68	1.58	0.00	39.53	46.00	-6.47
323.984	346	V	1.00	21.34	14.10	1.58	0.00	37.02	46.00	-8.98
431.992	320	H	1.00	18.13	16.22	2.02	0.00	36.37	46.00	-9.63
431.992	209	V	1.00	15.70	16.66	2.02	0.00	34.38	46.00	-11.62
624.974	211	H	1.40	19.40	19.70	2.41	0.00	41.51	46.00	-4.49
624.974	254	V	1.00	14.88	20.10	2.41	0.00	37.39	46.00	-8.61
750.001	109	H	1.40	15.49	21.00	2.94	0.00	39.43	46.00	-6.57
750.001	15	V	1.00	12.73	21.20	2.94	0.00	36.87	46.00	-9.13
863.992	328	H	1.54	17.18	22.30	3.17	0.00	42.65	46.00	-3.35
863.992	337	V	1.68	9.87	21.82	3.17	0.00	34.86	46.00	-11.14

Table 11. Radiated Emissions Limits, Test Results (configuration 1)

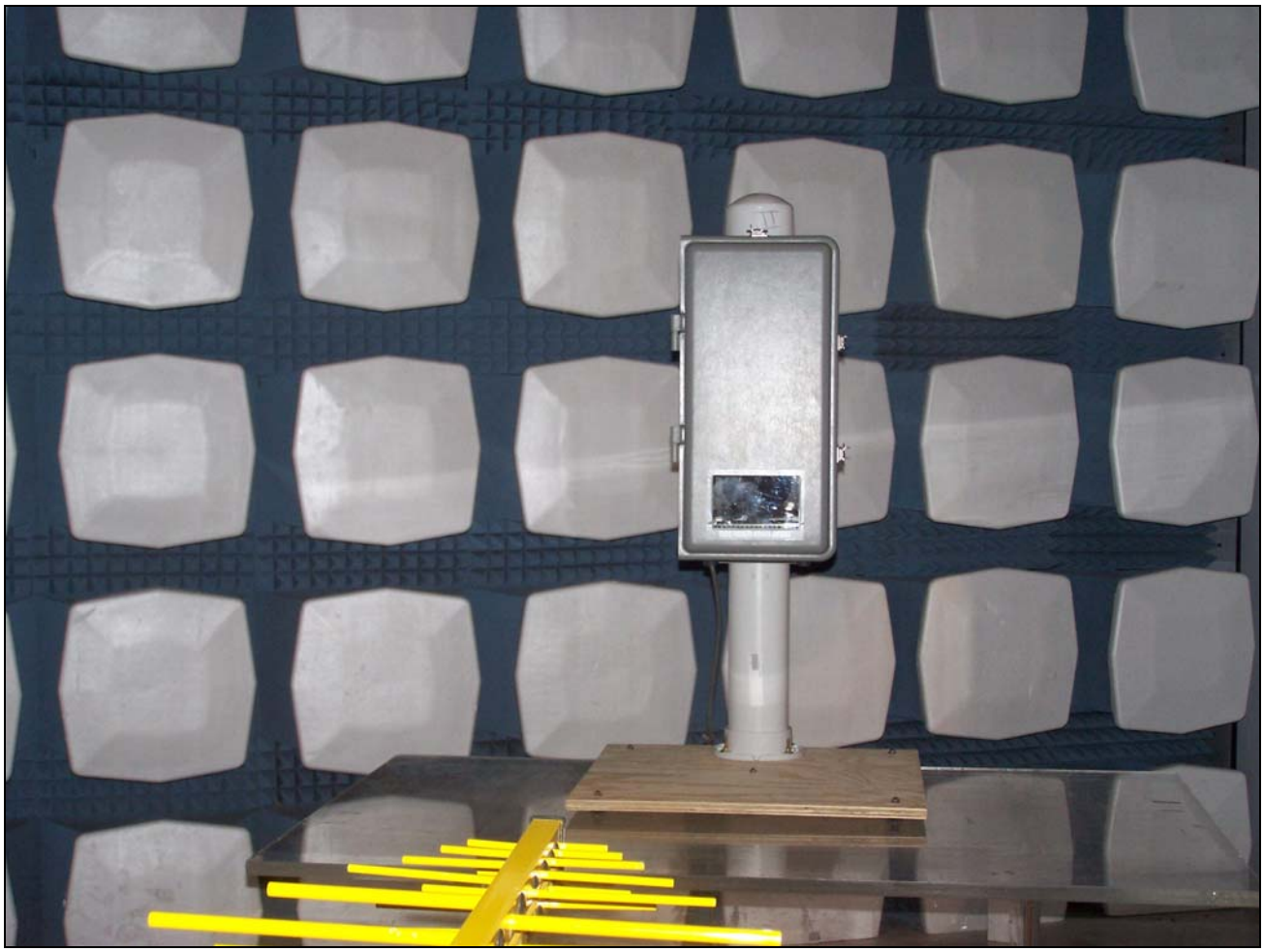


Plot 8. Radiated Emissions, Pre-Scan (configuration 1)



Plot 9. Radiated Emissions, Pre-Scan (configuration 2)

Radiated Emission Limits Test Setup



Photograph 2. Radiated Emission Limits, Test Setup

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

4. Electromagnetic Compatibility RF Power Output Requirements

4.1. RF Power Output

Test Requirement(s): **§2.1046 and §90.215**

Test Procedures: As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals of the EUT.

A laptop was connected to EUT to control the RF power output, modulation, and frequency channel. The EUT was connected through an attenuator to a Spectrum Analyzer capable of making power measurements. Measurements were made at the low, mid, and high channels for each channel bandwidth.

Test Results: Equipment complies with 47CFR 2.1046 and 90.215.

Channel Bandwidth (MHz)	Frequency (MHz)	Conducted Power (dBm)	Conducted Power (W)	Limit (W)
1.25	2451	30.39	1.09	5
	2466	30.37	1.09	5
	2482.5	30.23	1.05	5
2.5	2451.25	30.35	1.08	5
	2466	30.18	1.04	5
	2482.5	30.07	1.02	5
6	2453	30.58	1.14	5
	2466	30.49	1.12	5
	2480.5	30.39	1.09	5
7	2453.5	30.41	1.1	5
	2466	30.28	1.07	5
	2480	30.2	1.05	5
8	2454	30.41	1.1	5
	2466	30.46	1.11	5
	2479.5	30.34	1.08	5

Table 12. RF Power Output, Test Results

Test Engineer(s): Dusmantha Tennakoon

Test Date(s): 03/09/09

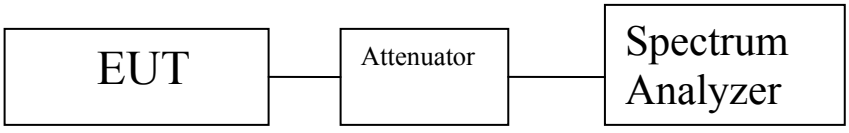
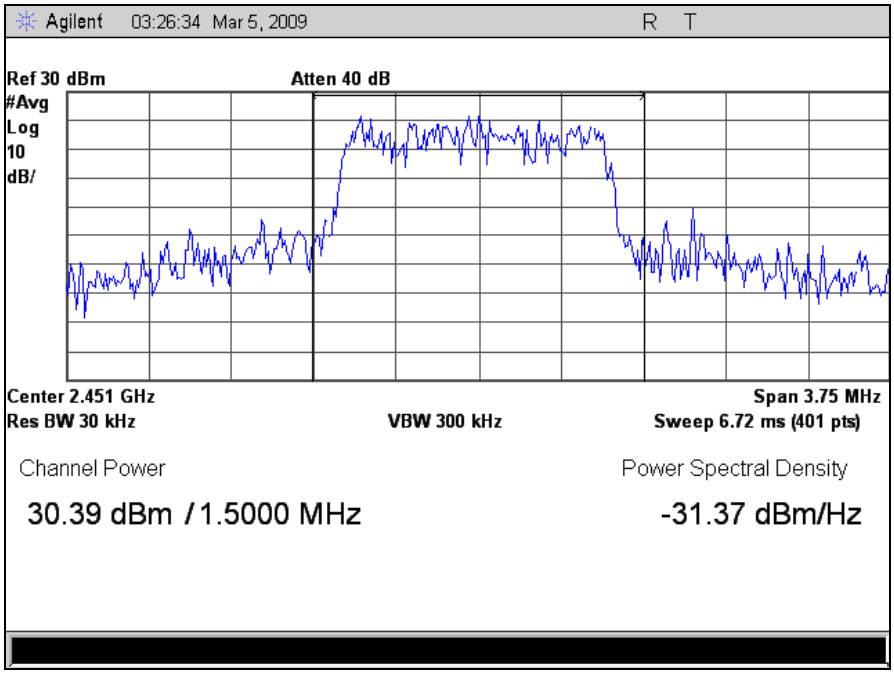
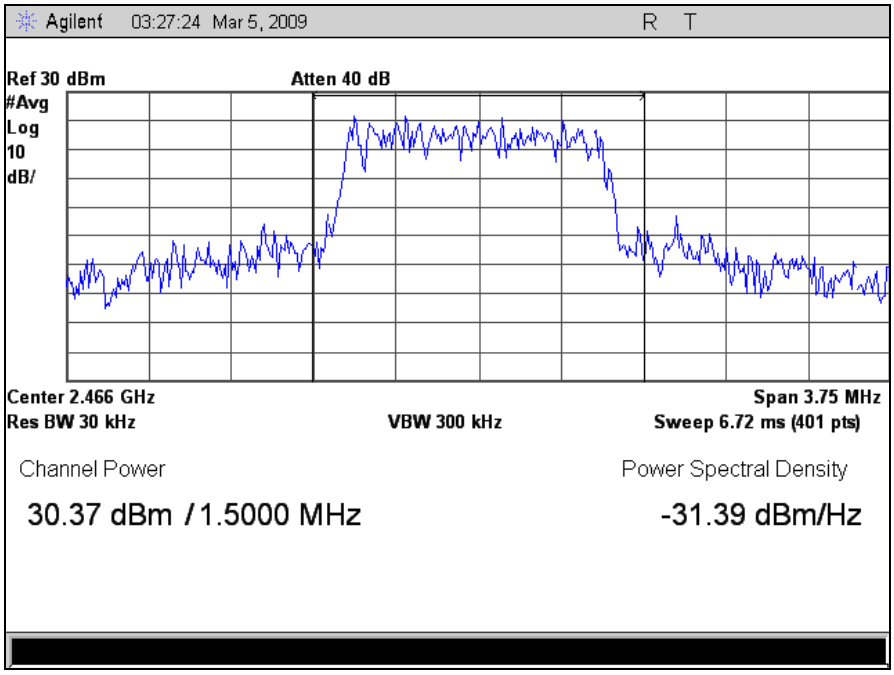


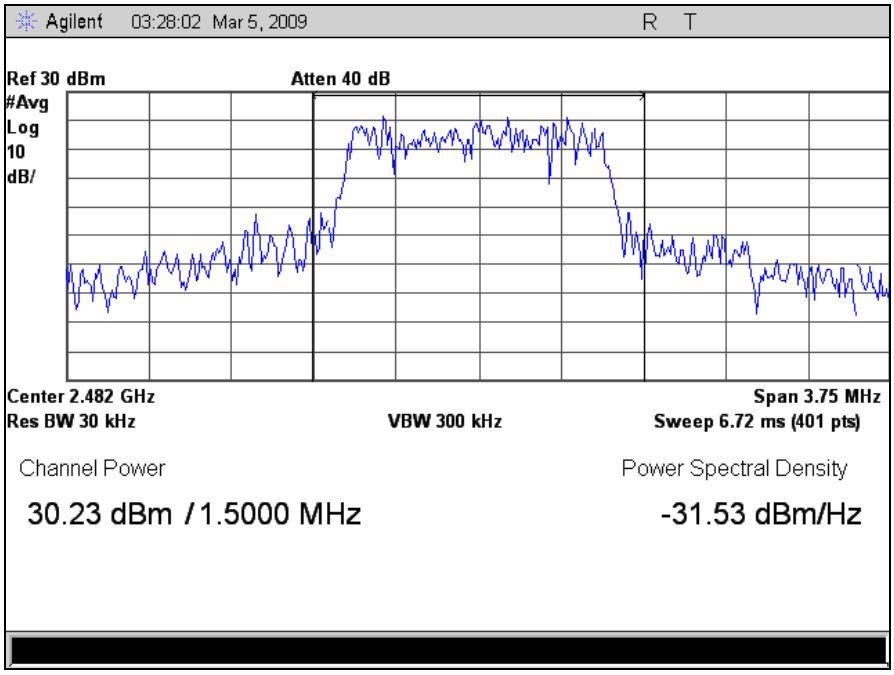
Figure 1. RF Power Output Test Setup



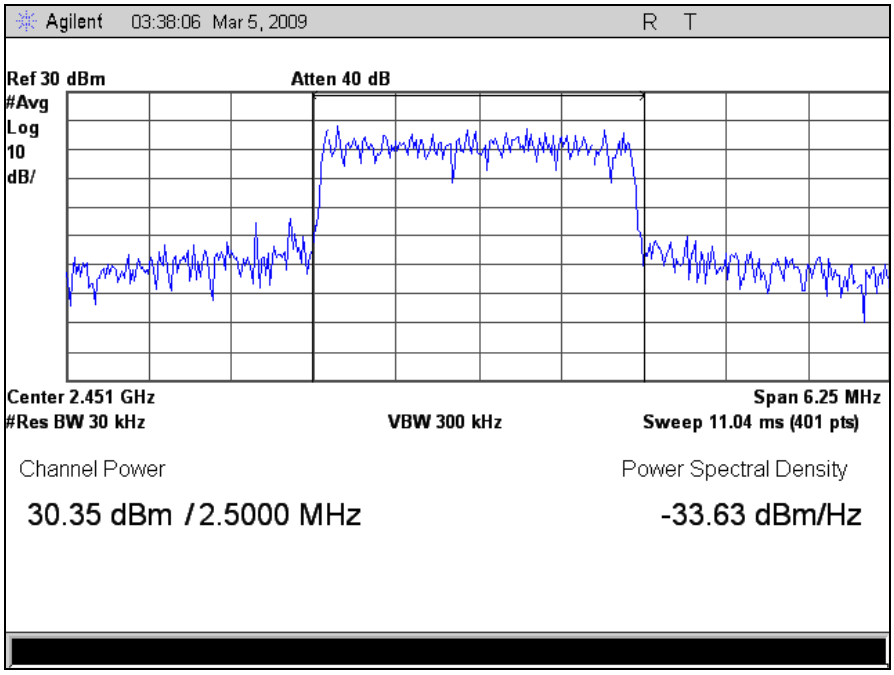
Plot 10. RF Power Output, Low Channel, 1.25 MHz



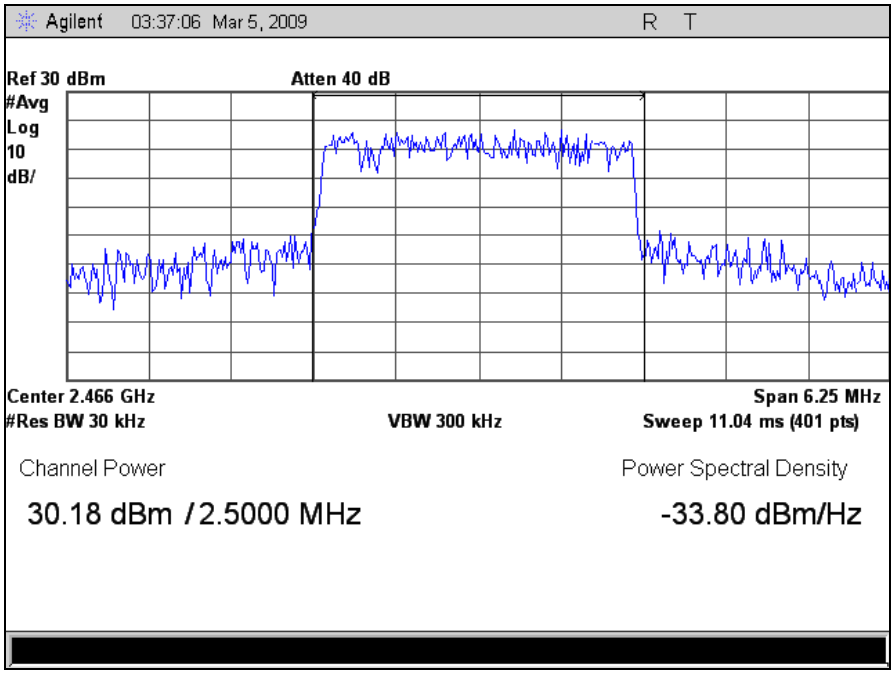
Plot 11. RF Power Output, Mid Channel, 1.25 MHz



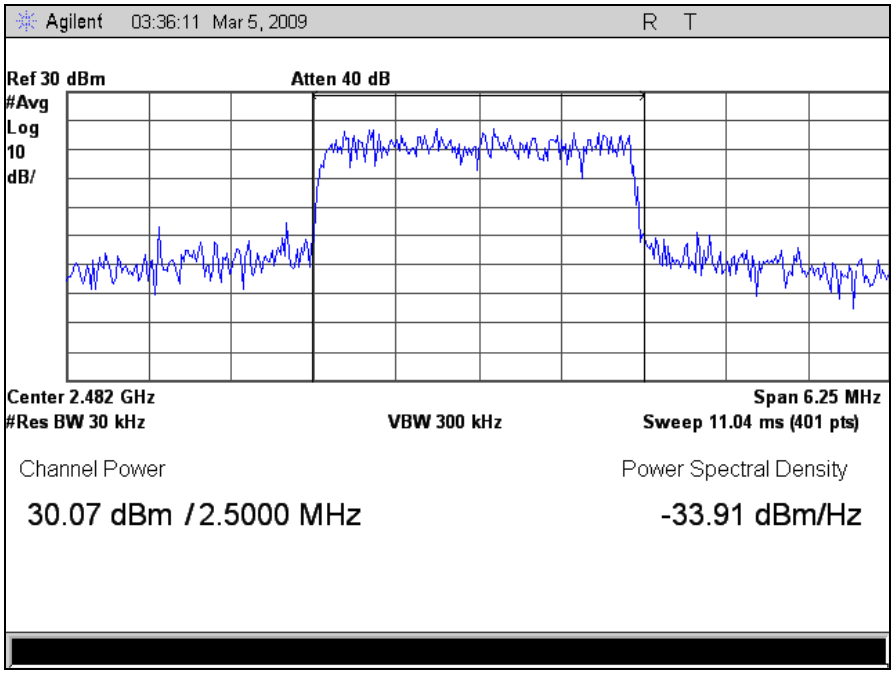
Plot 12. RF Power Output, High Channel, 1.25 MHz



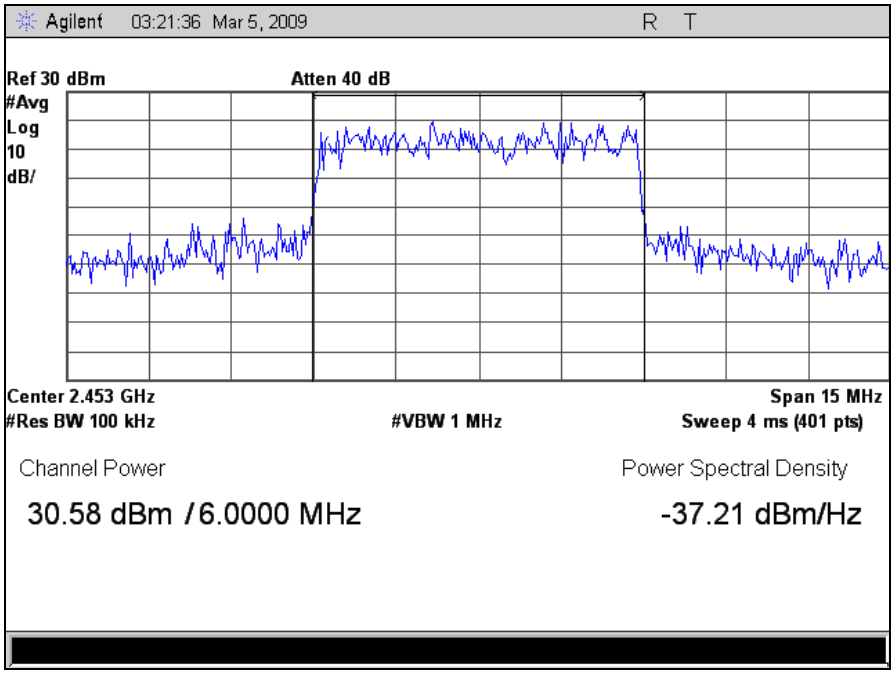
Plot 13. RF Power Output, Low Channel, 2.5 MHz



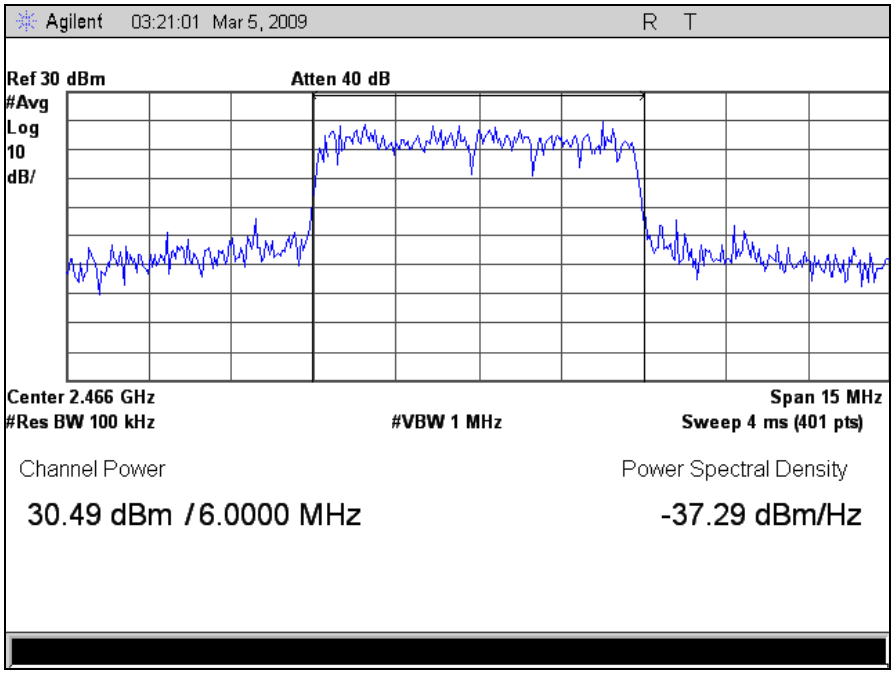
Plot 14. RF Power Output, Mid Channel, 2.5 MHz



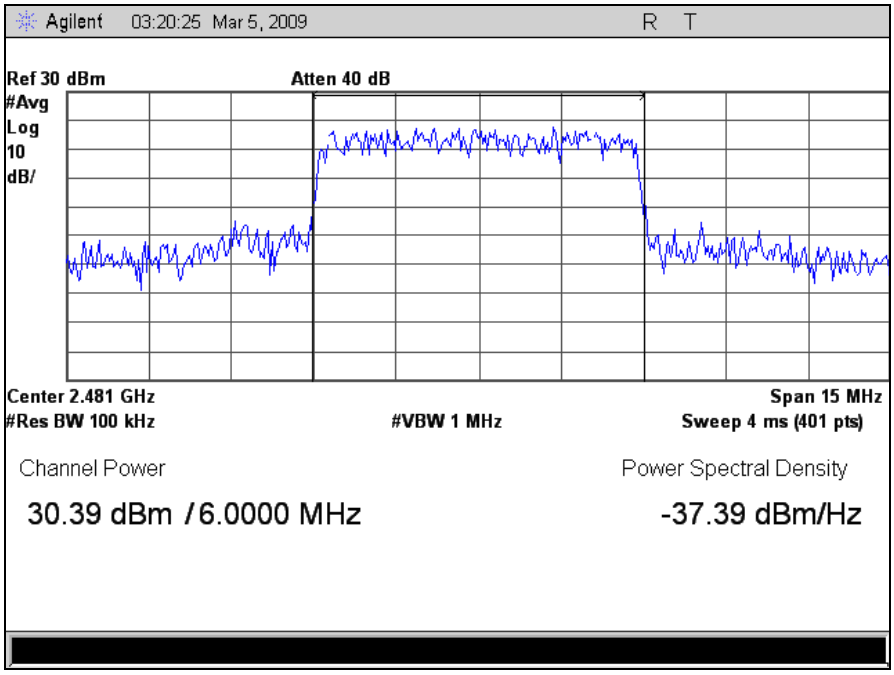
Plot 15. RF Power Output, High Channel, 2.5 MHz



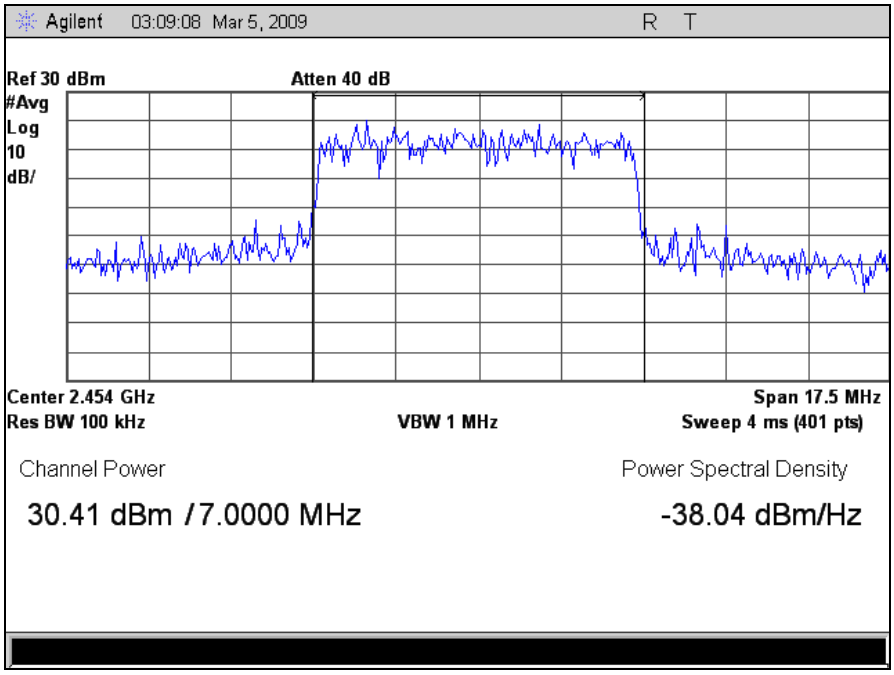
Plot 16. RF Power Output, Low Channel, 6 MHz



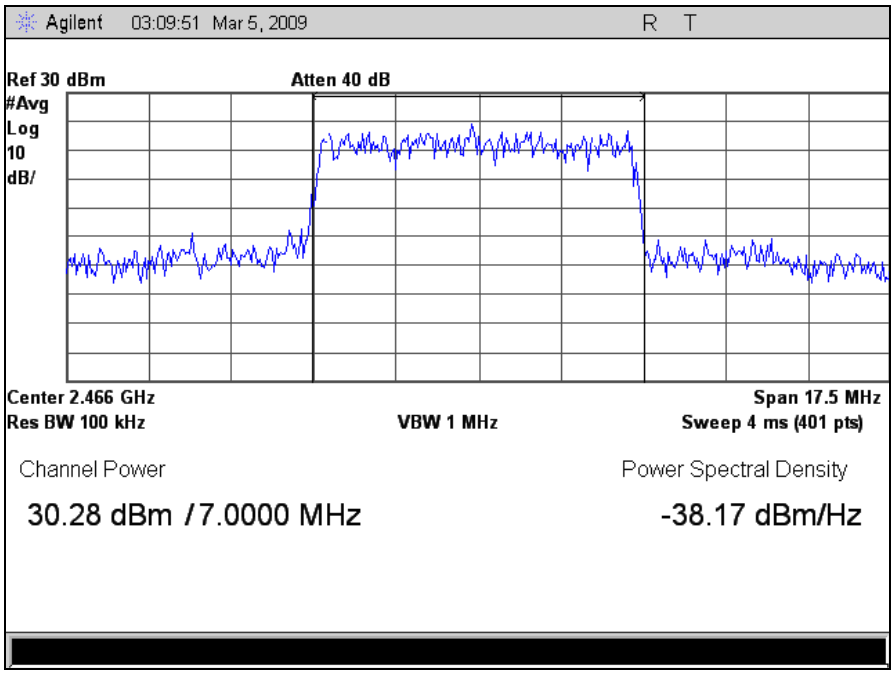
Plot 17. RF Power Output, Mid Channel, 6 MHz



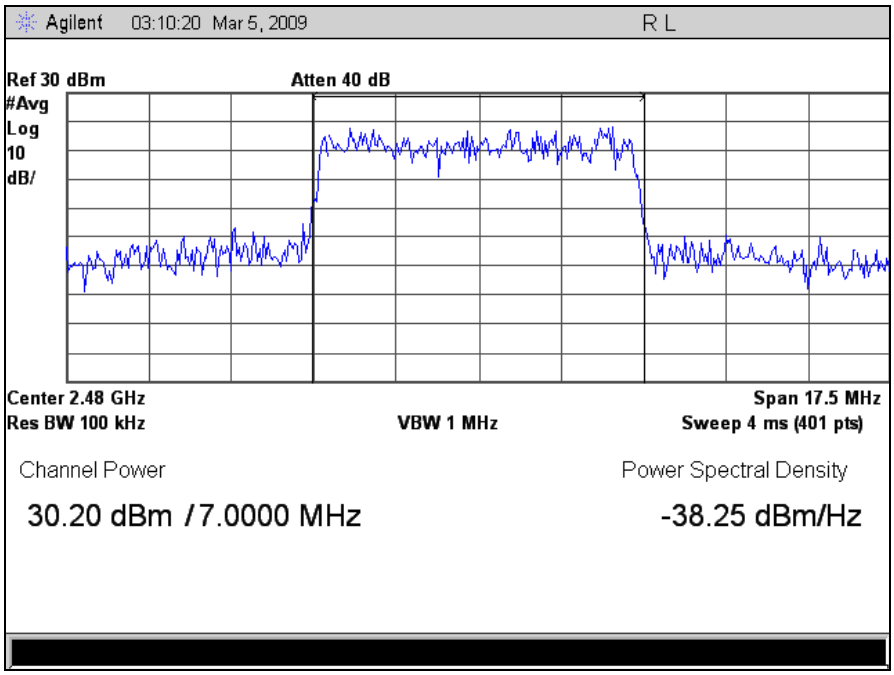
Plot 18. RF Power Output, High Channel, 6 MHz



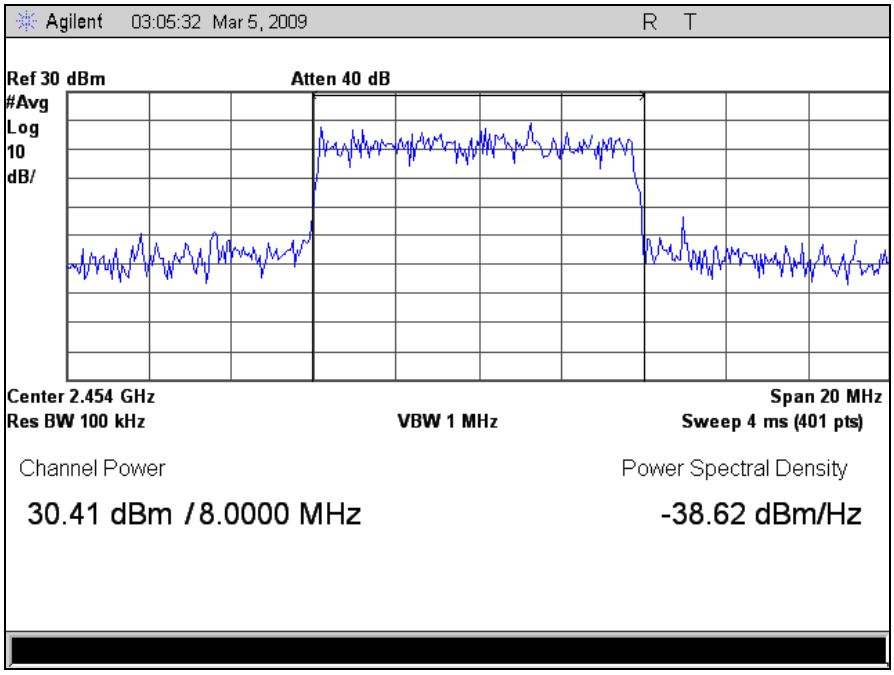
Plot 19. RF Power Output, Low Channel, 7 MHz



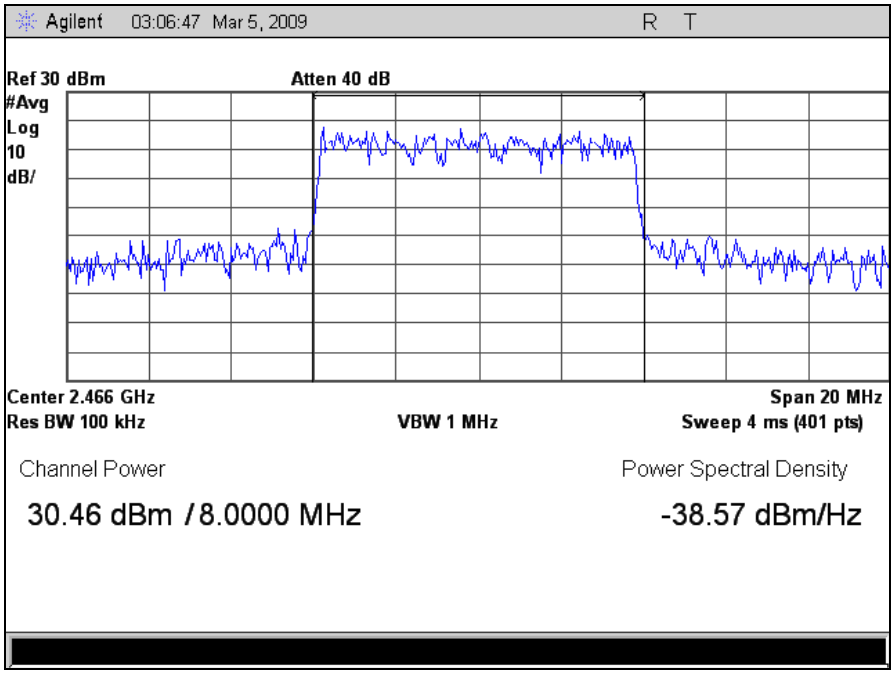
Plot 20. RF Power Output, Mid Channel, 7 MHz



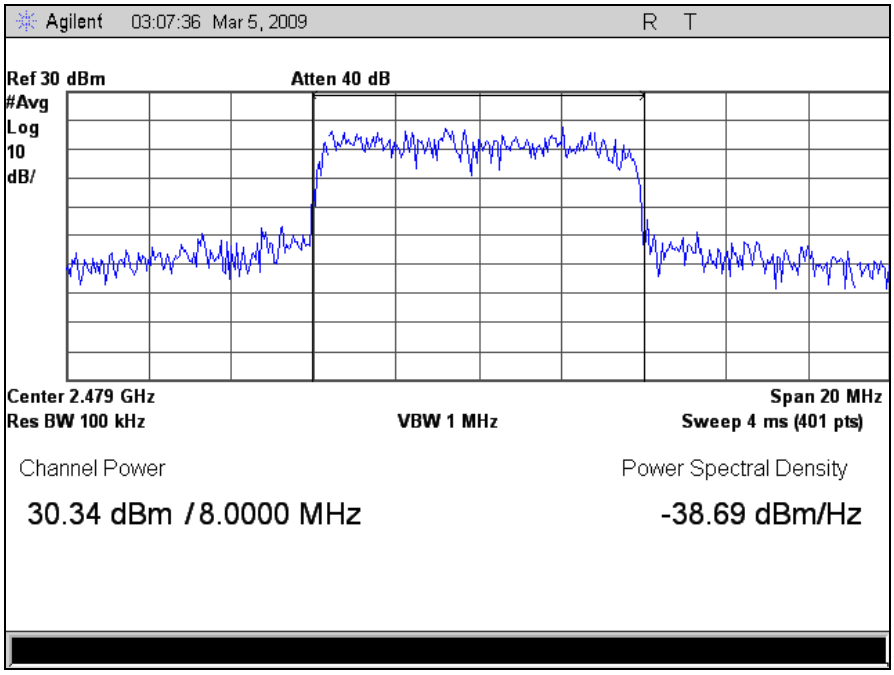
Plot 21. RF Power Output, High Channel, 7 MHz



Plot 22. RF Power Output, Low Channel, 8 MHz



Plot 23. RF Power Output, Mid Channel, 8 MHz



Plot 24. RF Power Output, High Channel, 8 MHz

5. Electromagnetic Compatibility Occupied Bandwidth Requirements

5.1. Occupied Bandwidth (Emission Mask)

Test Requirement(s): **§2.1049 and §90.210 with FCC 04-265 (Emissions Mask B)**

Test Procedures: As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made at the RF output terminals of the EUT.

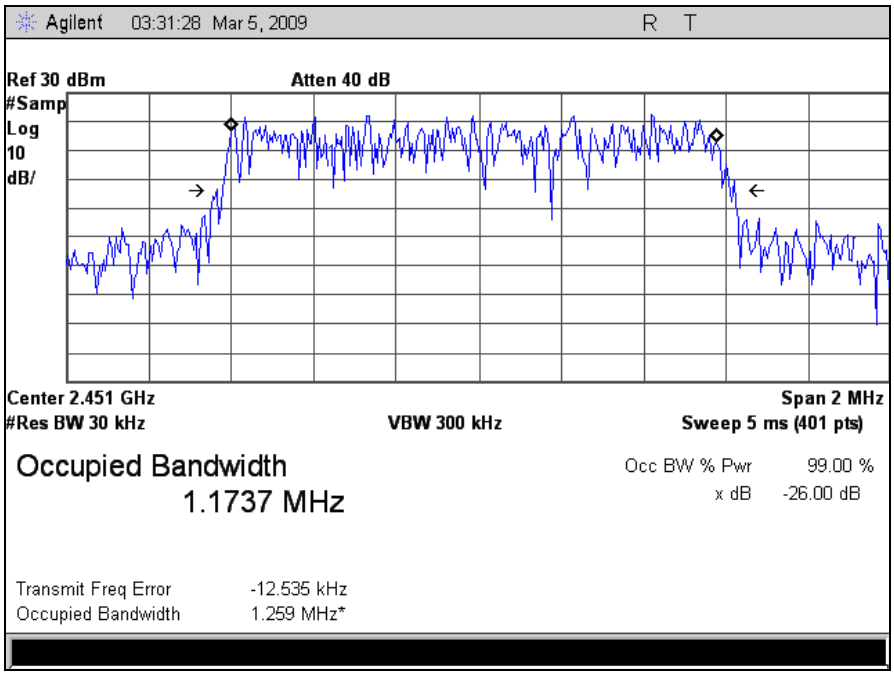
A laptop was connected to EUT to control the RF power output, m and frequency channel. The EUT was connected through an attenuator to a Spectrum Analyzer. The measured highest Average Power was set relative to zero dB reference. The RBW of the Spectrum Analyzer was set to at least 1% of the channel bandwidth. The EUT power was adjusted at the maximum output power level. Measurements were carried out at the low, mid and high channels of the TX band.

Test Results: Equipment complies with Section 2.1049 and 90.210 with FCC 04-265 (Emission Mask B). The EUT does not exceed the Emission Masks limit. Although the EUT does no inject an audio subcarrier into the transmitted RF signal, emissions mask B has been used since mask C is inappropriate in that it does not allow for spread spectrum carriers within the designated bandwidth.

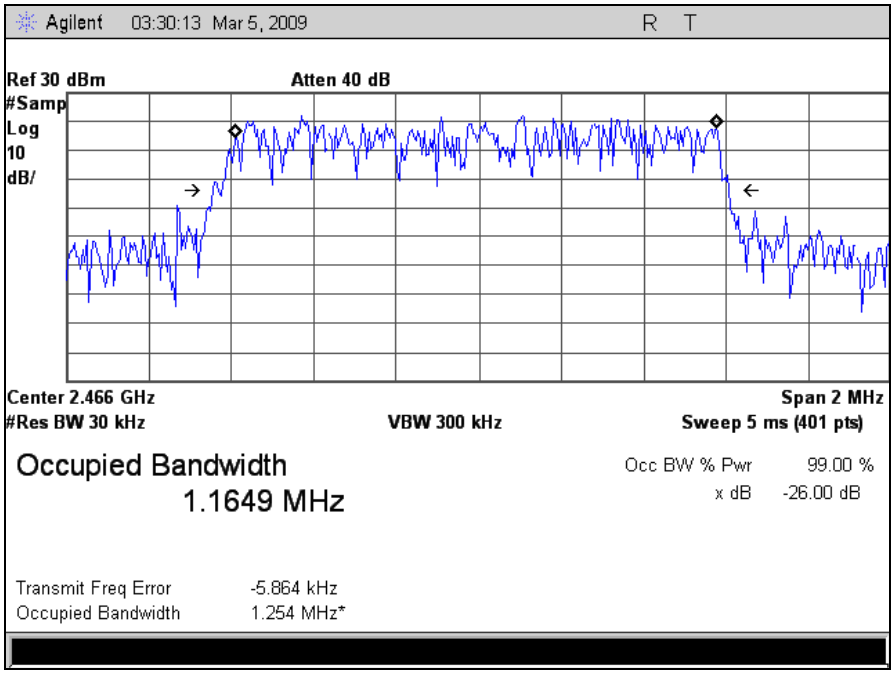
The following pages show measurements of Emission Mask plots:

Test Engineer(s): Dusmantha Tennakoon

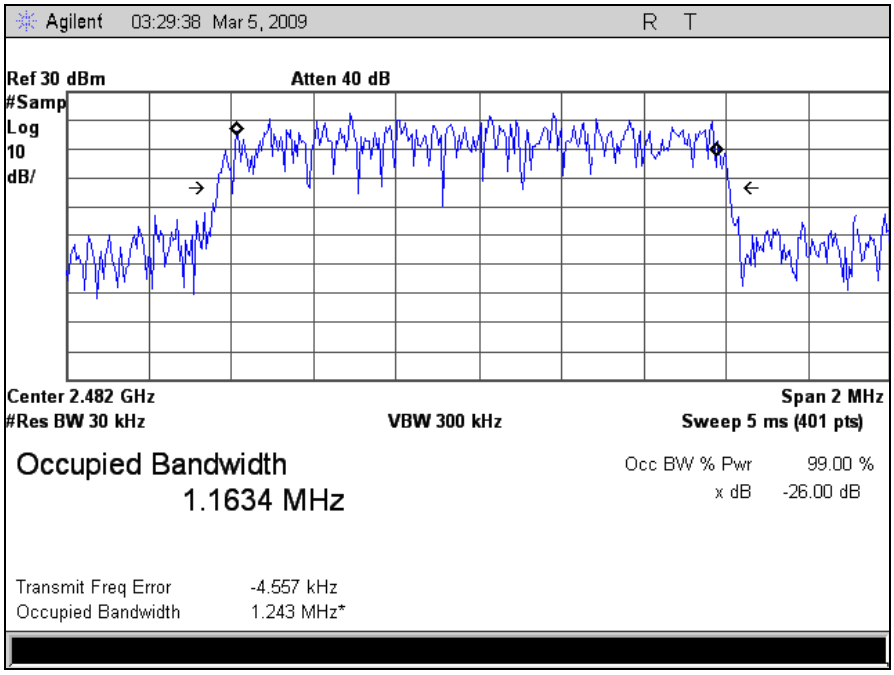
Test Date(s): 03/10/09



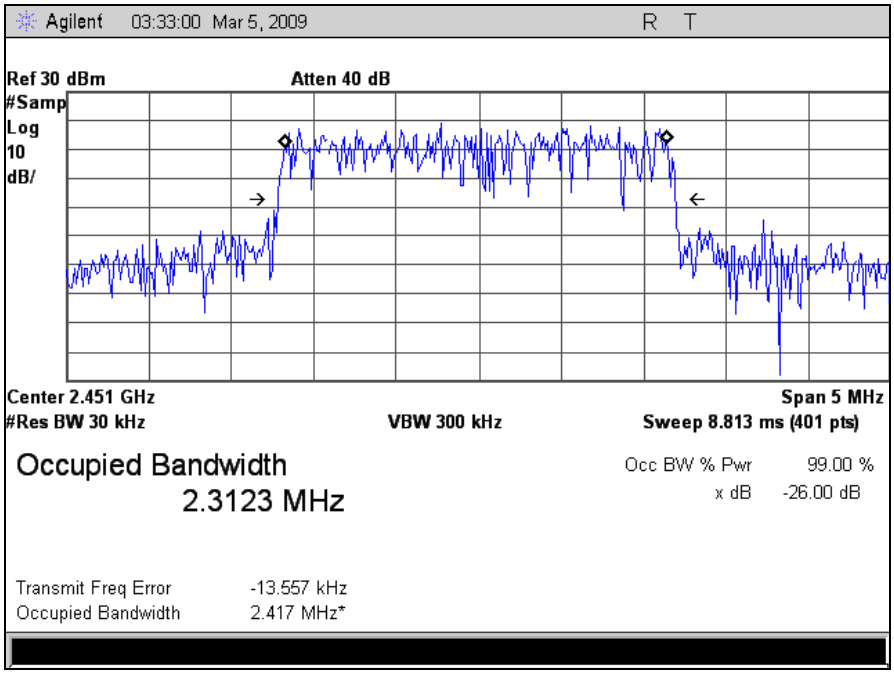
Plot 25. Occupied Bandwidth, Low Channel, 1.25 MHz



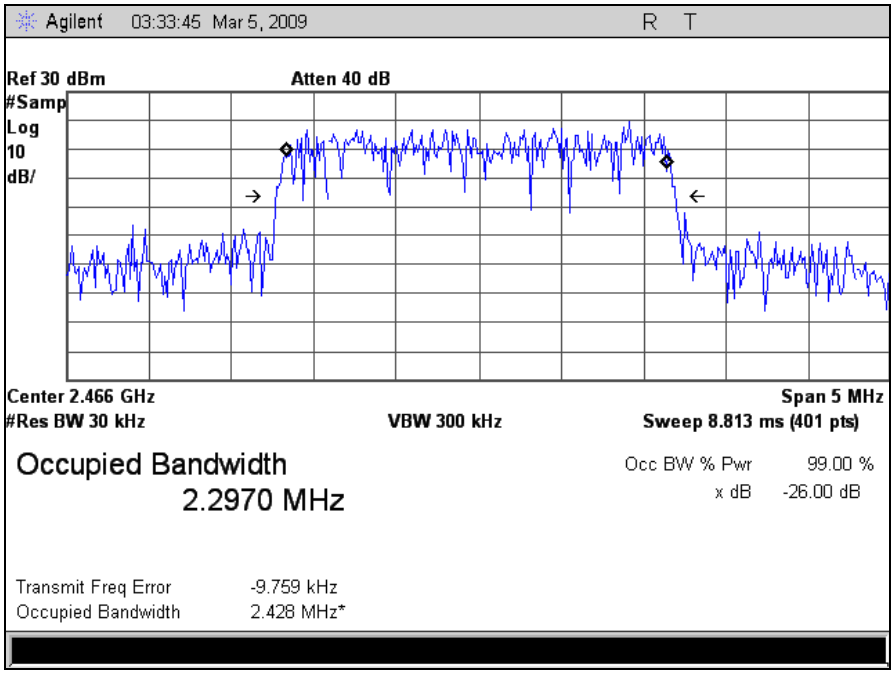
Plot 26. Occupied Bandwidth, Mid Channel, 1.25 MHz



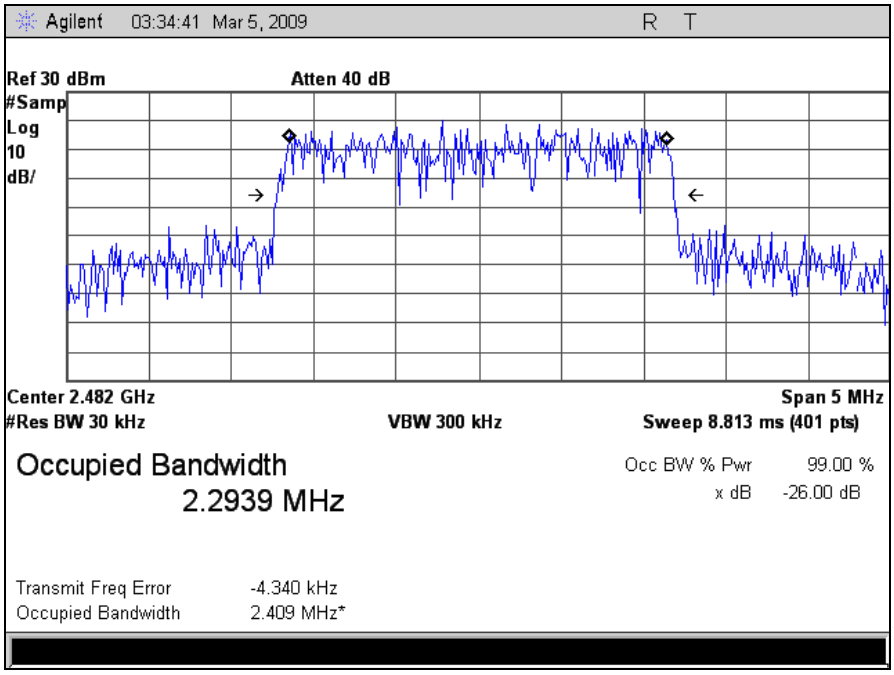
Plot 27. Occupied Bandwidth, High Channel, 1.25 MHz



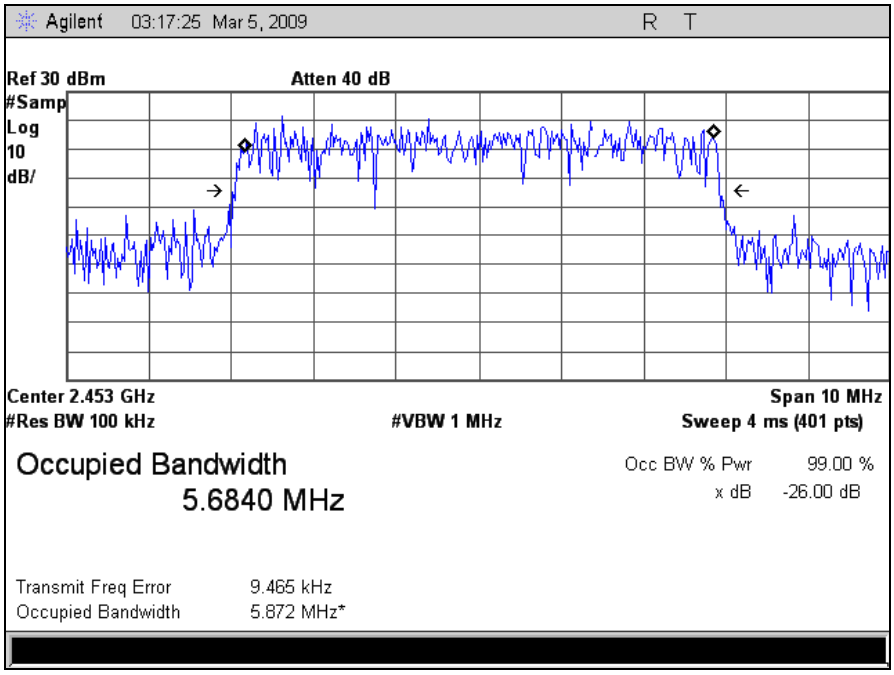
Plot 28. Occupied Bandwidth, Low Channel, 2.5 MHz



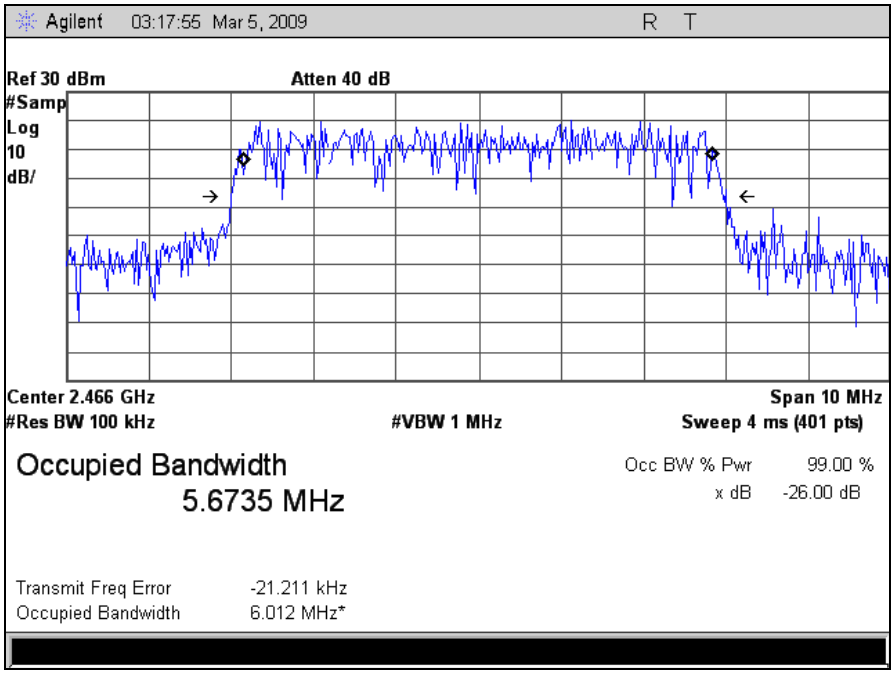
Plot 29. Occupied Bandwidth, Mid Channel, 2.5 MHz



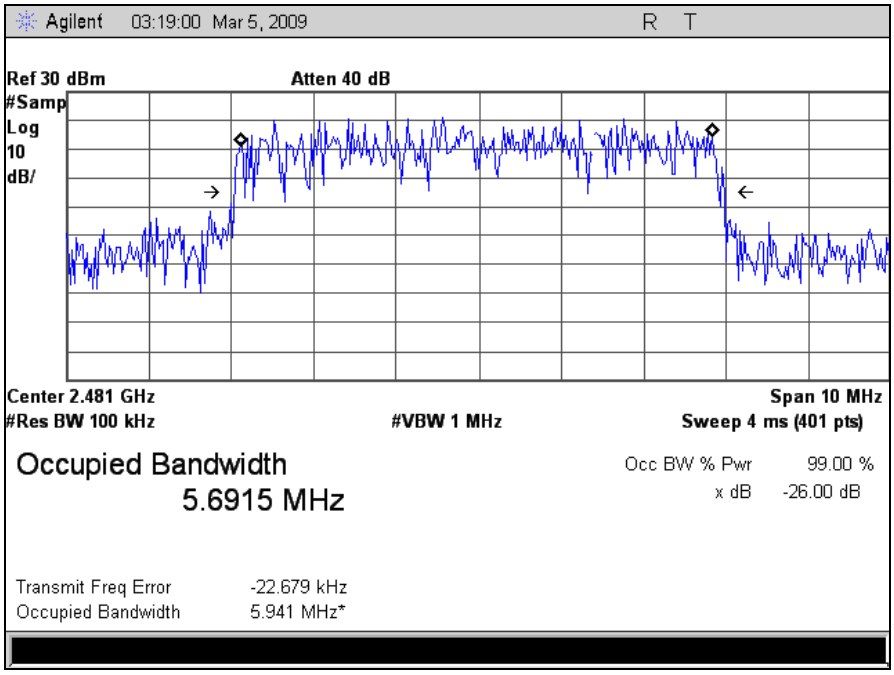
Plot 30. Occupied Bandwidth, High Channel, 2.5 MHz



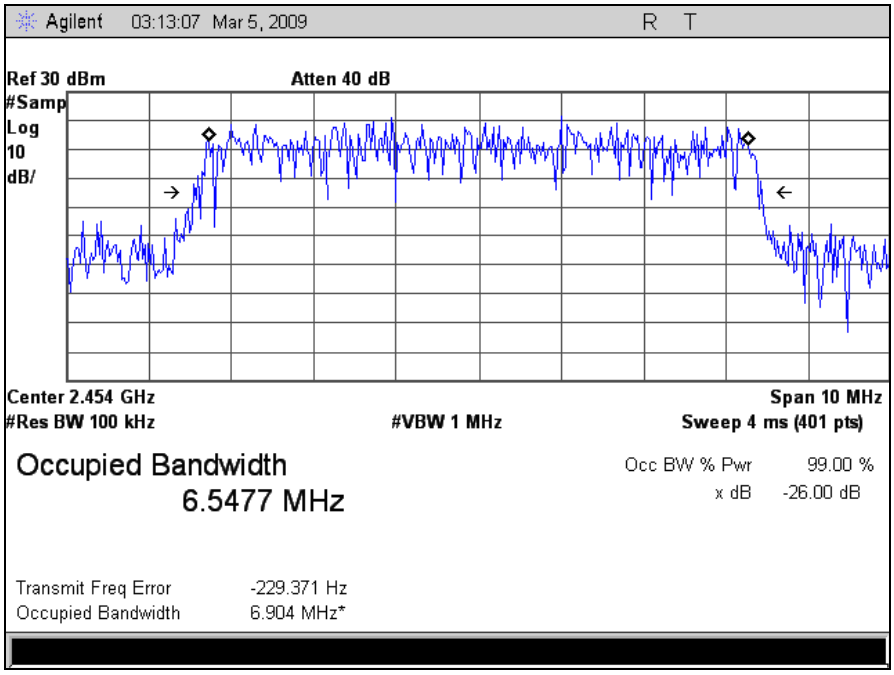
Plot 31. Occupied Bandwidth, Low Channel, 6 MHz



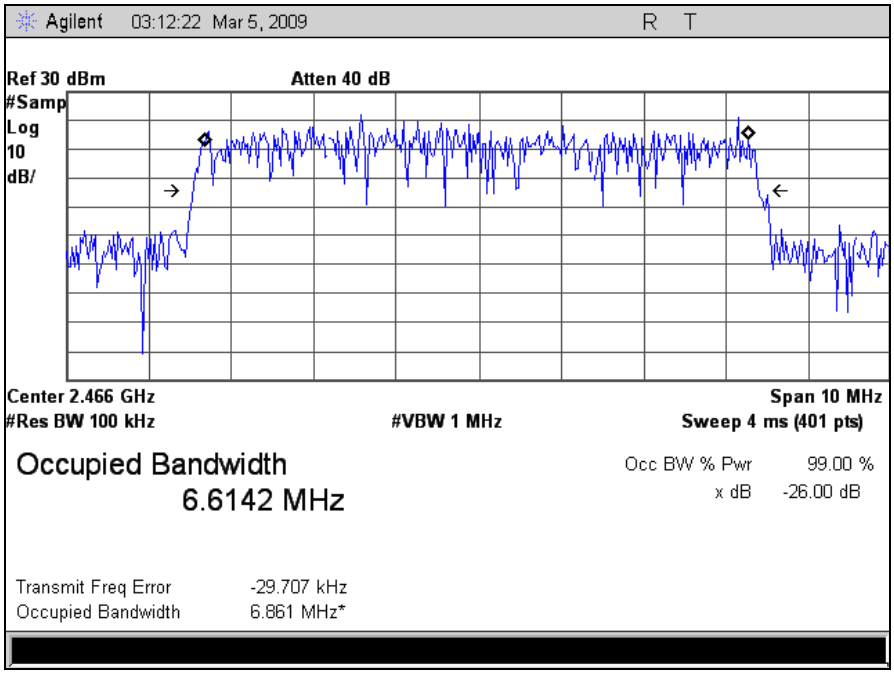
Plot 32. Occupied Bandwidth, Mid Channel, 6 MHz



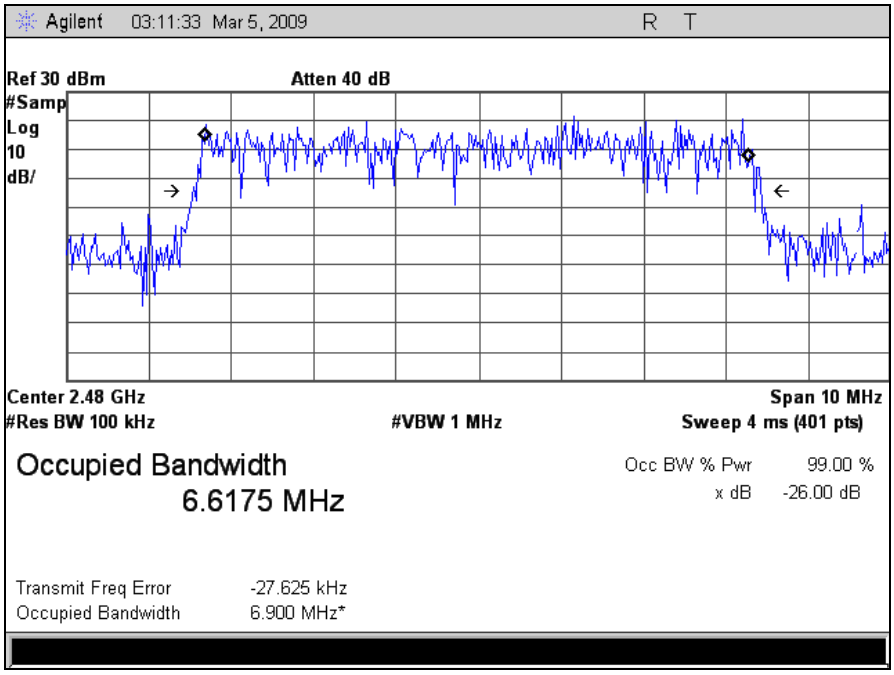
Plot 33. Occupied Bandwidth, High Channel, 6 MHz



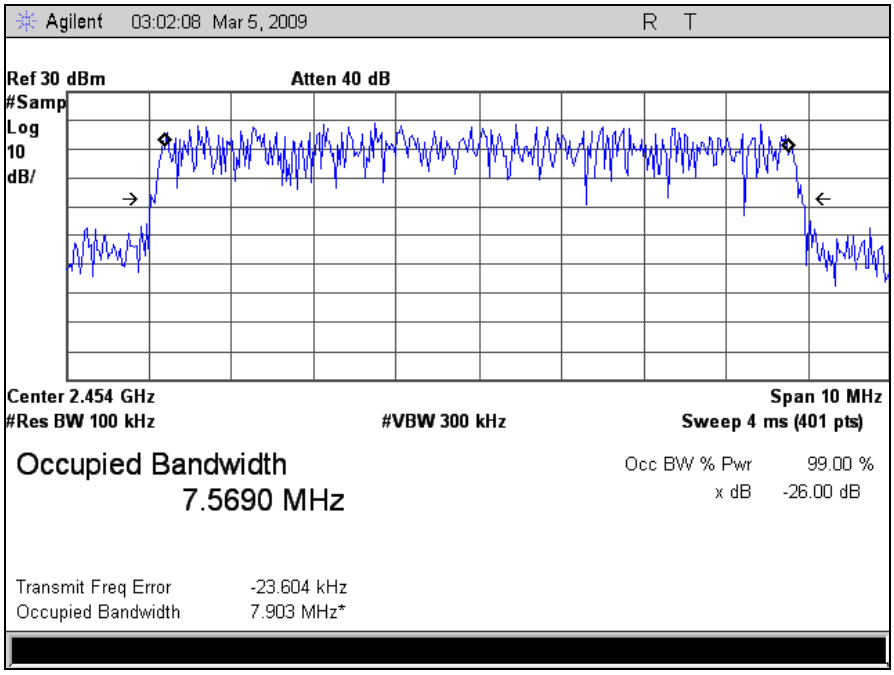
Plot 34. Occupied Bandwidth, Low Channel, 7 MHz



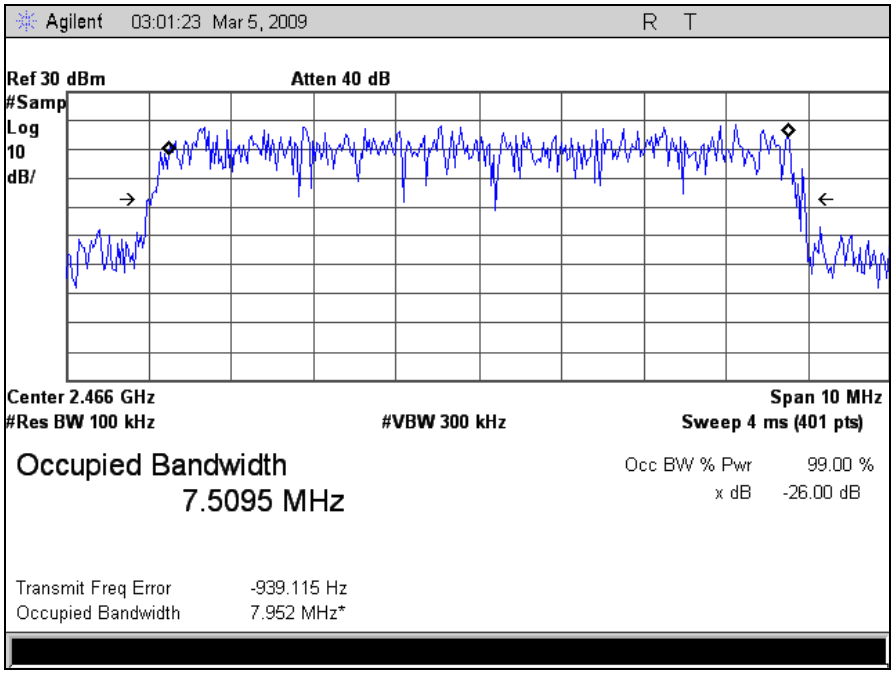
Plot 35. Occupied Bandwidth, Mid Channel, 7 MHz



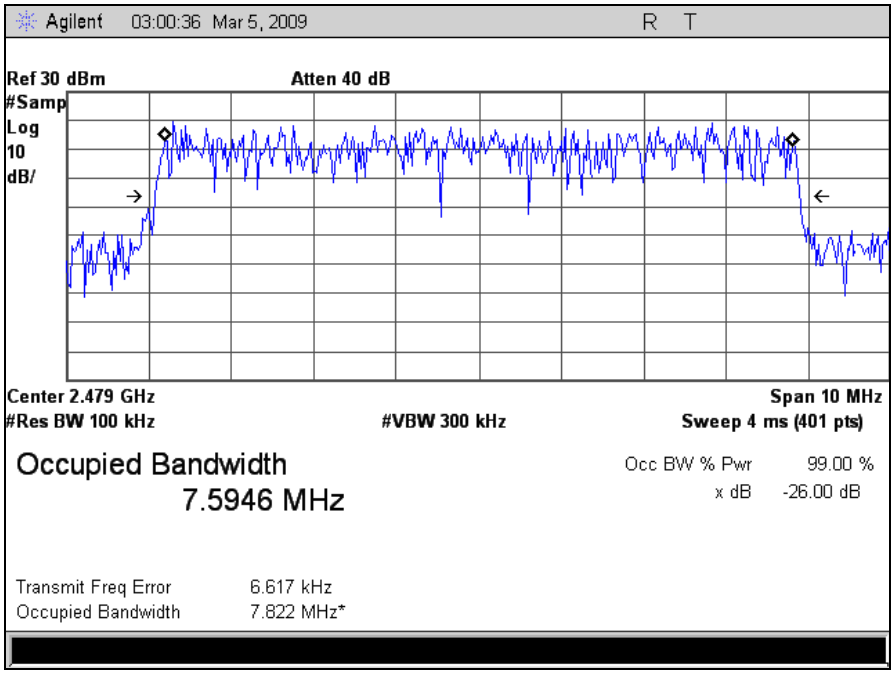
Plot 36. Occupied Bandwidth, High Channel, 7 MHz



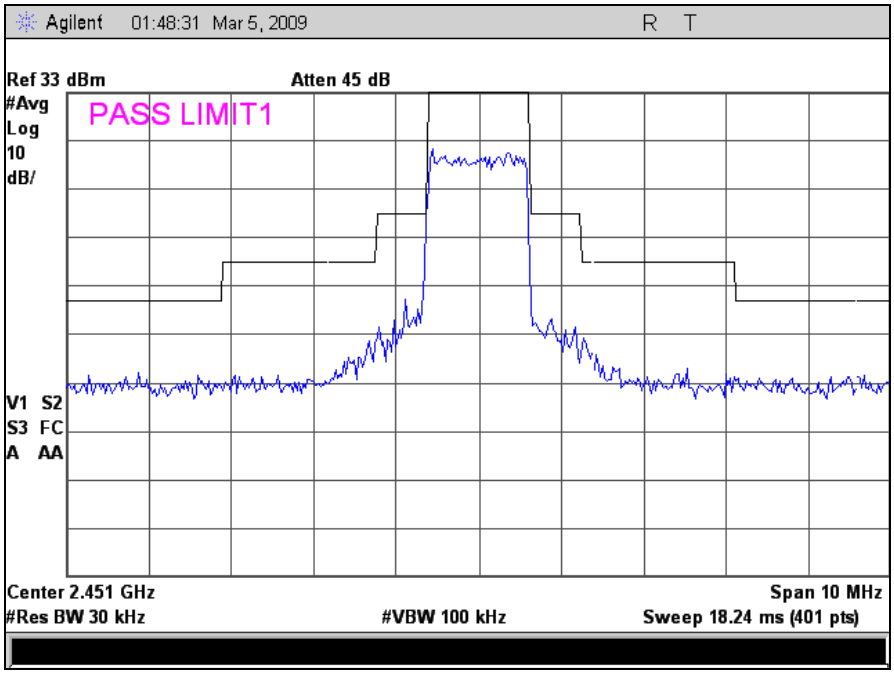
Plot 37. Occupied Bandwidth, Low Channel, 8 MHz



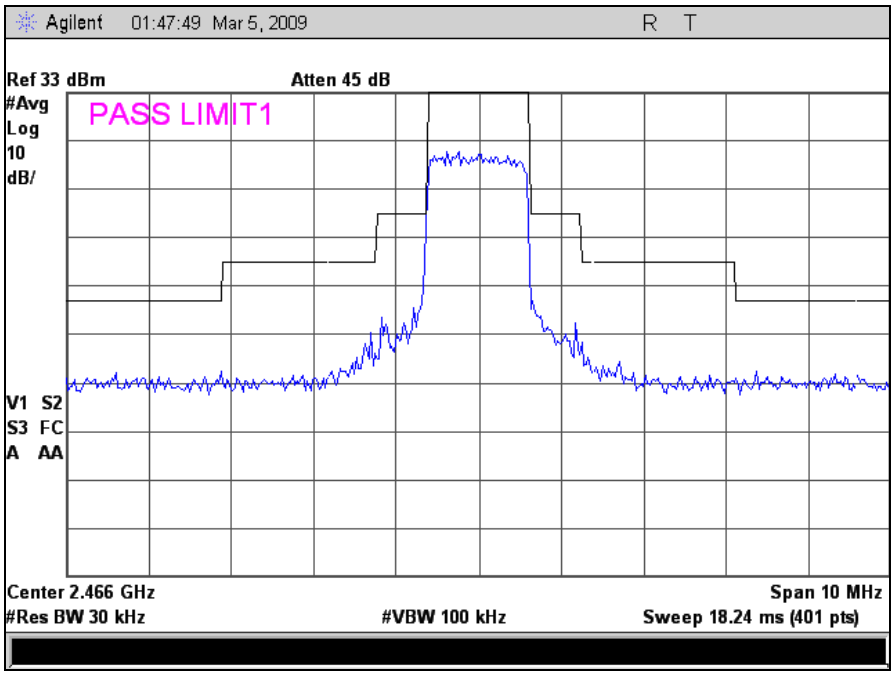
Plot 38. Occupied Bandwidth, Mid Channel, 8 MHz



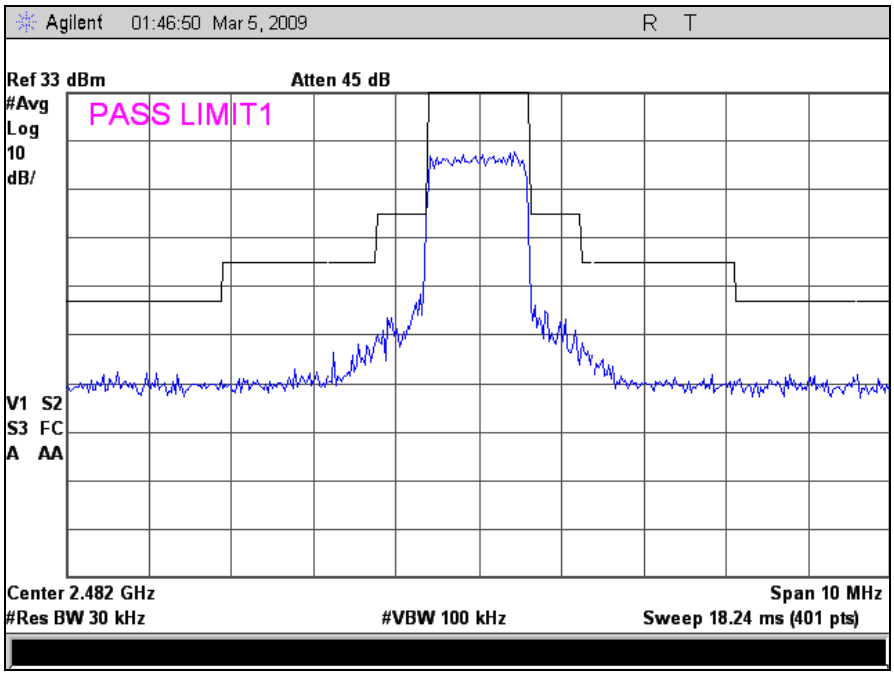
Plot 39. Occupied Bandwidth, High Channel, 8 MHz



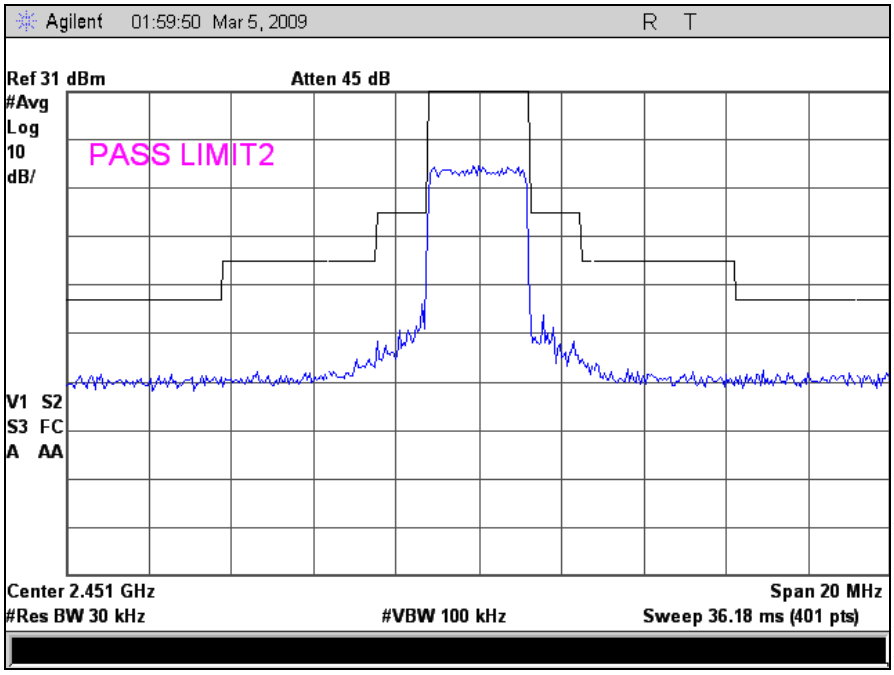
Plot 40. Emission Mask, Low Channel, 1.25 MHz



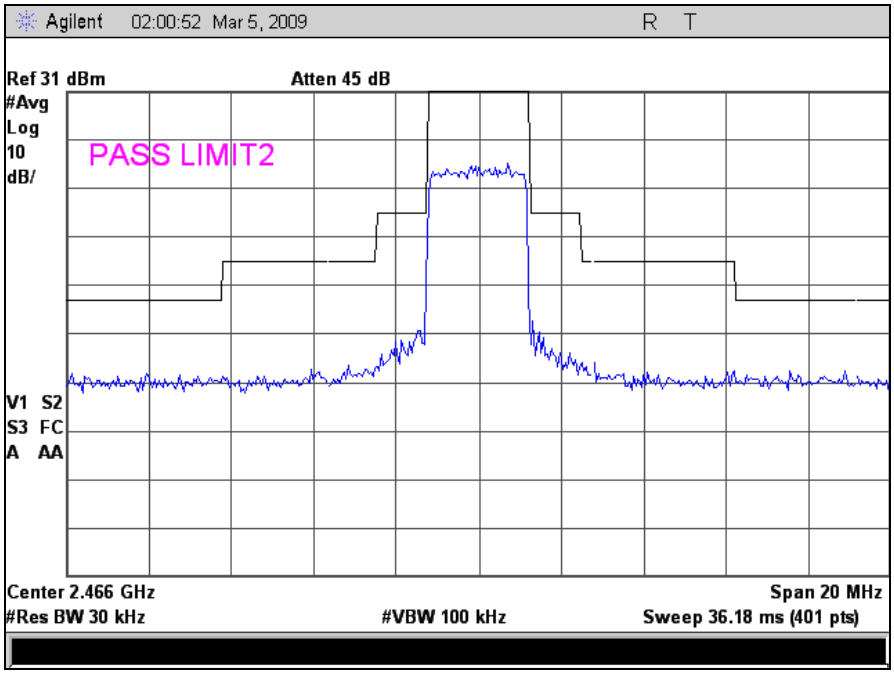
Plot 41. Emission Mask, Mid Channel, 1.25 MHz



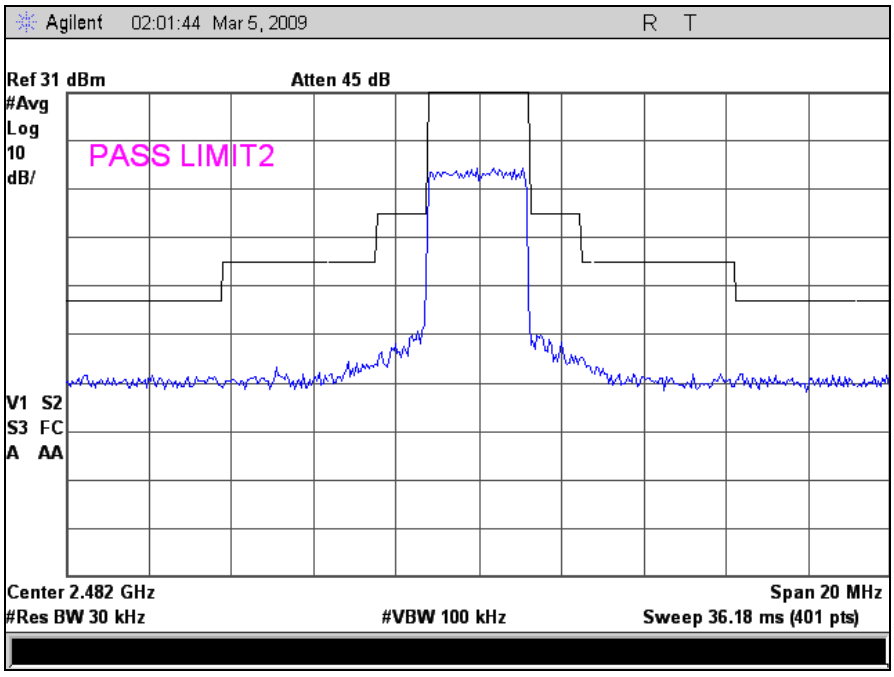
Plot 42. Emission Mask, High Channel, 1.25 MHz



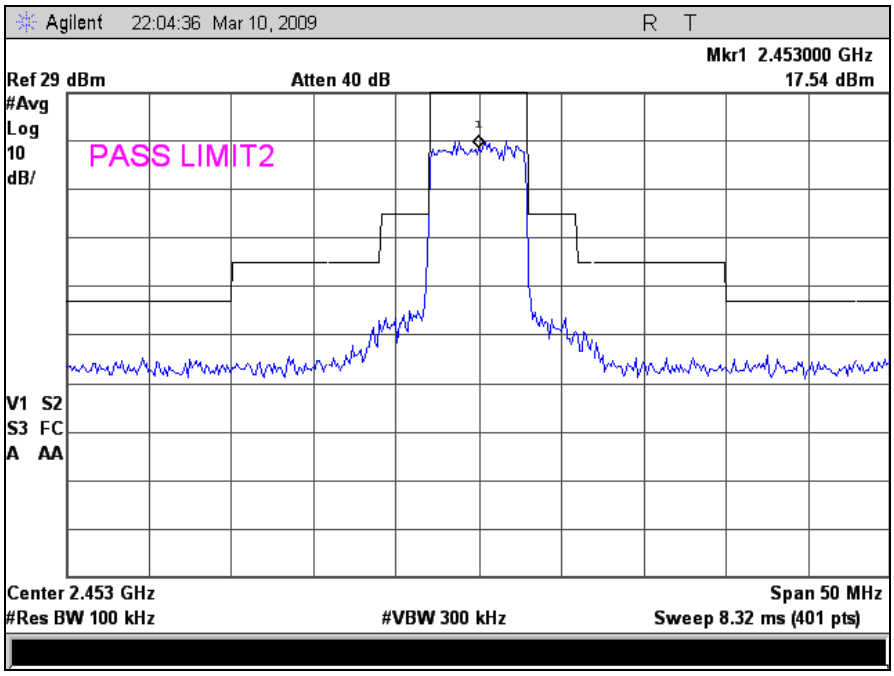
Plot 43. Emission Mask, Low Channel, 2.5 MHz



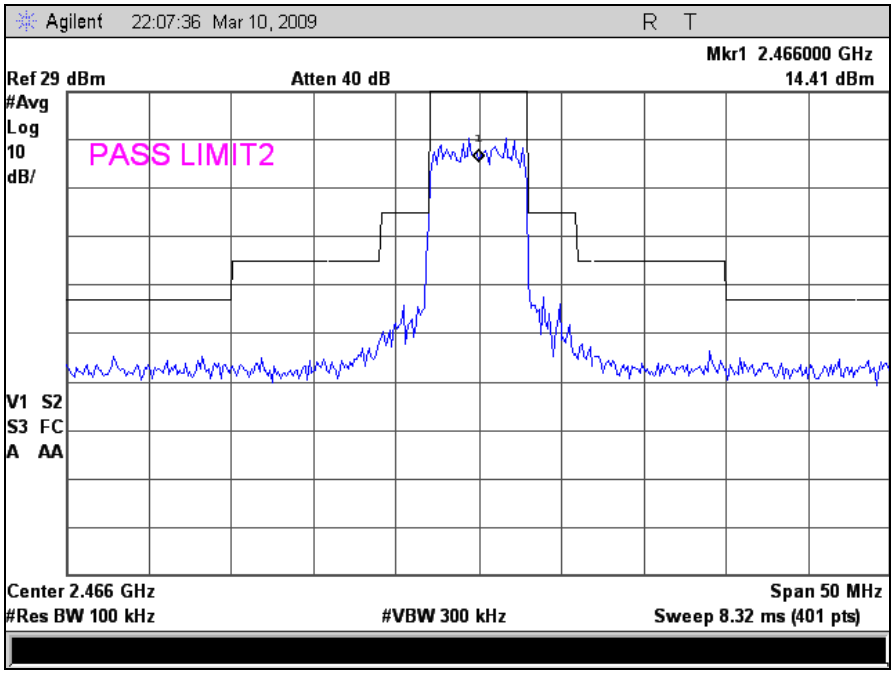
Plot 44. Emission Mask, Mid Channel, 2.5 MHz



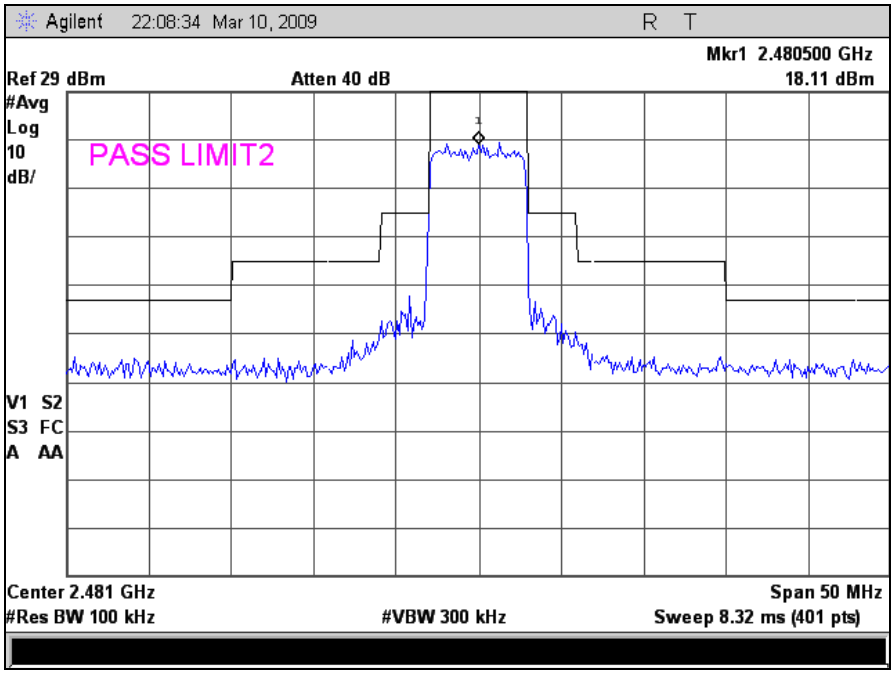
Plot 45. Emission Mask, High Channel, 2.5 MHz



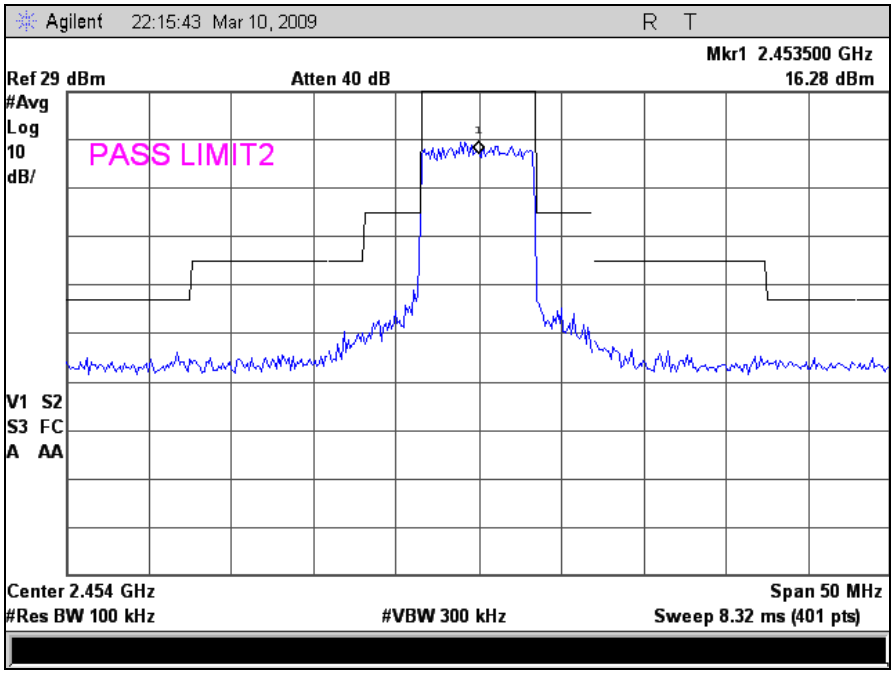
Plot 46. Emission Mask, Low Channel, 6 MHz



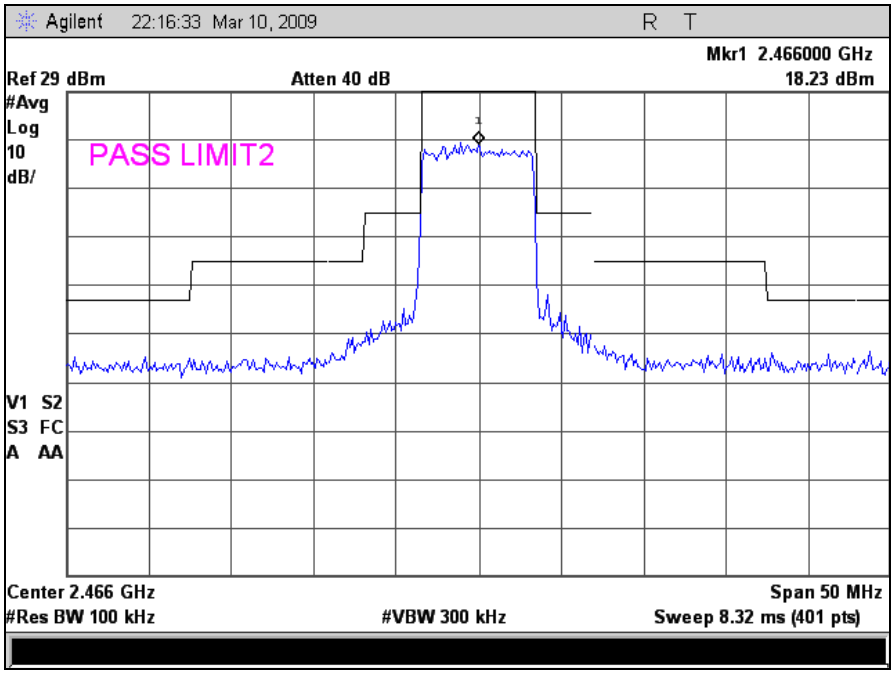
Plot 47. Emission Mask, Mid Channel, 6 MHz



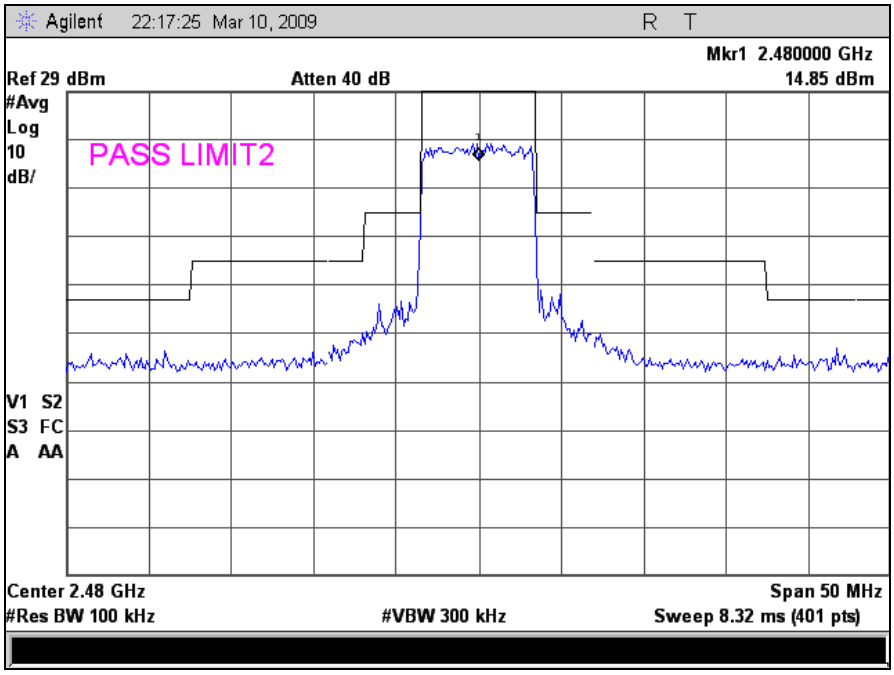
Plot 48. Emission Mask, High Channel, 6 MHz



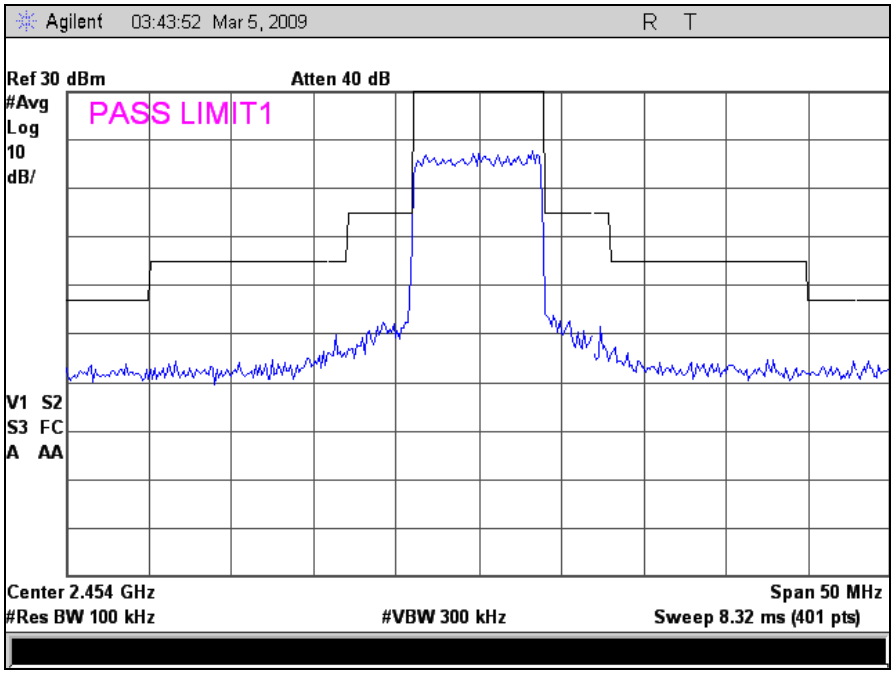
Plot 49. Emission Mask, Low Channel, 7 MHz



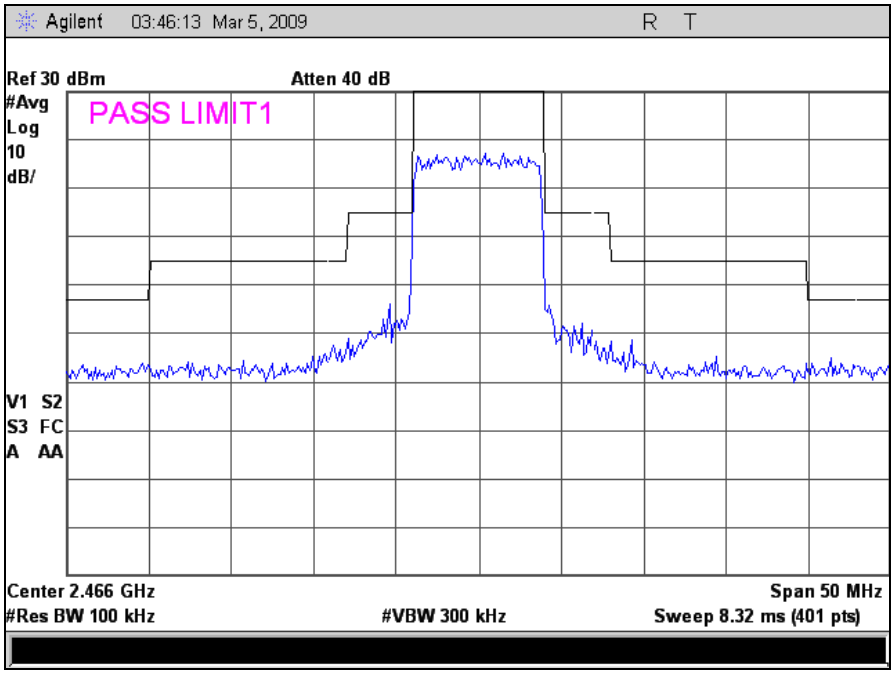
Plot 50. Emission Mask, Mid Channel, 7 MHz



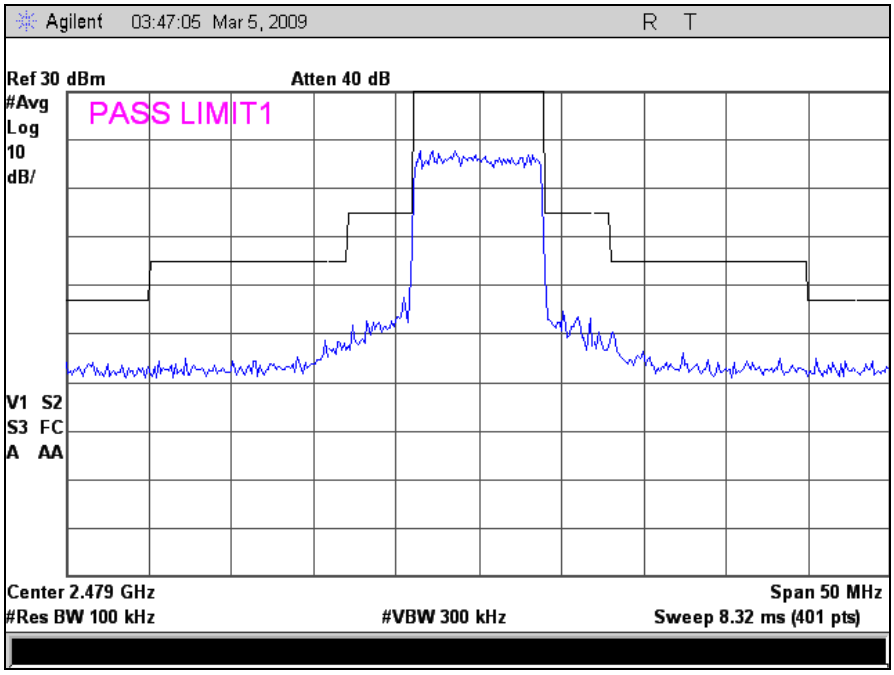
Plot 51. Emission Mask, High Channel, 7 MHz



Plot 52. Emission Mask, Low Channel, 8 MHz



Plot 53. Emission Mask, Mid Channel, 8 MHz



Plot 54. Emission Mask, High Channel, 8 MHz

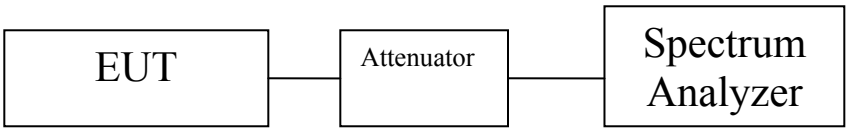


Figure 2. Occupied Bandwidth (Emission Mask) Test Setup

6. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements

6.1. Spurious Emissions at Antenna Terminals

Test Requirement(s): **§2.1051 and §90.210(M) with FCC 04-265**

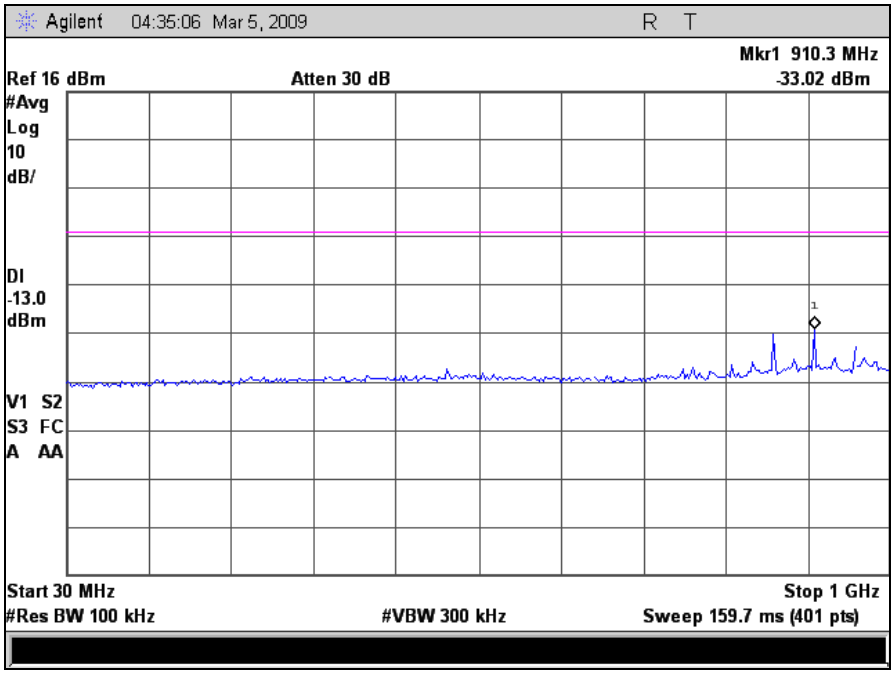
Test Procedures: As required by 47 CFR 2.1051, *spurious emissions at antenna terminal measurements* were made at the RF output terminals of the EUT.

A laptop was connected to EUT to control the RF power output, modulation, and frequency channel. The EUT was connected through an attenuator to a Spectrum Analyzer. The Spectrum Analyzer was set to sweep 30 MHz and up to 10th harmonic of the fundamental or 40GHz which ever is the lesser. Measurements were made at the low, mid and high channels.

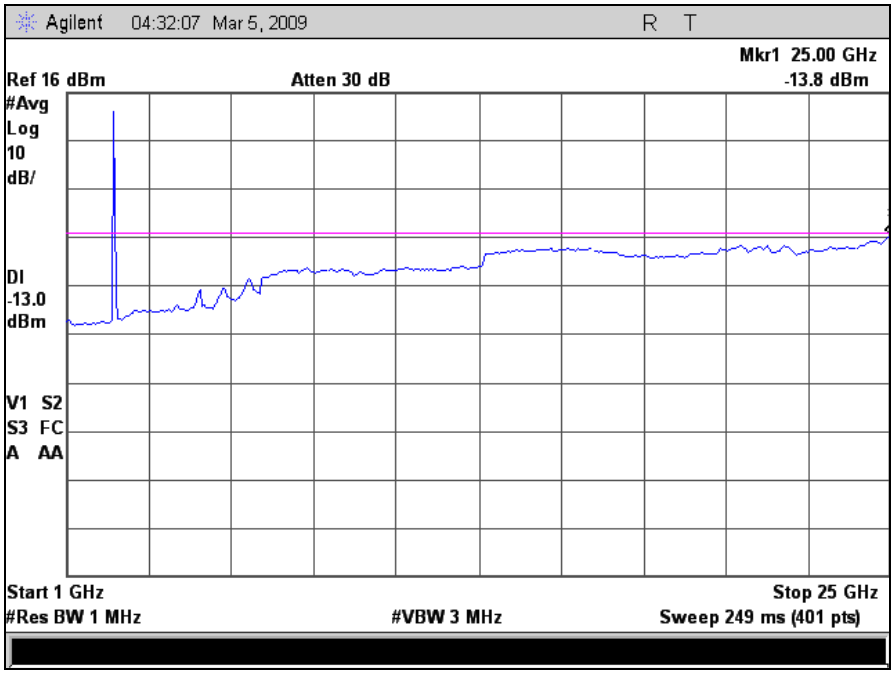
Test Results: Equipment complies with Section 2.1051 and 90.210(M) with FCC 04-265.

Test Engineer(s): Dusmantha Tennakoon

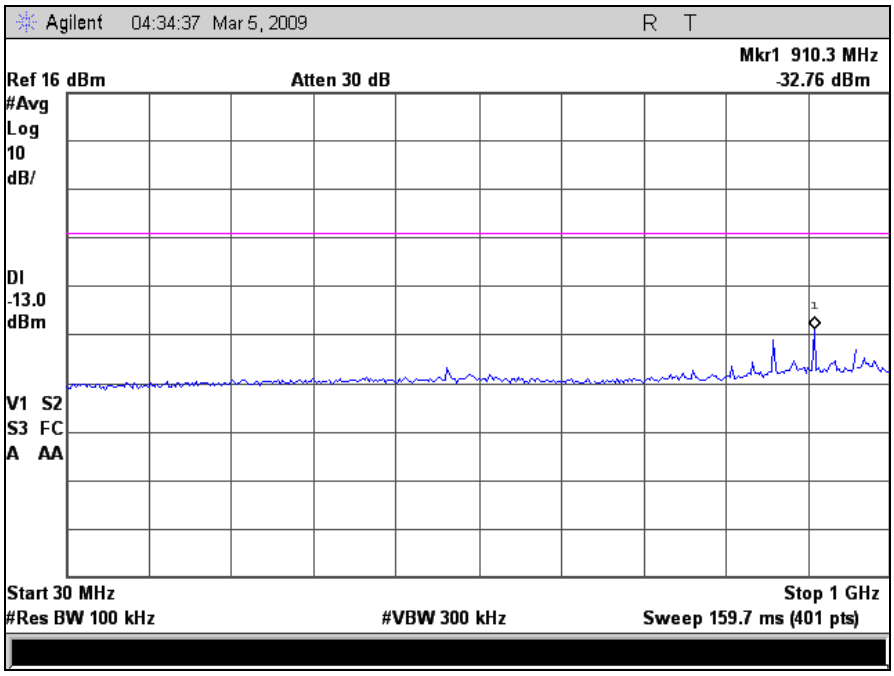
Test Date(s): 03/09/09



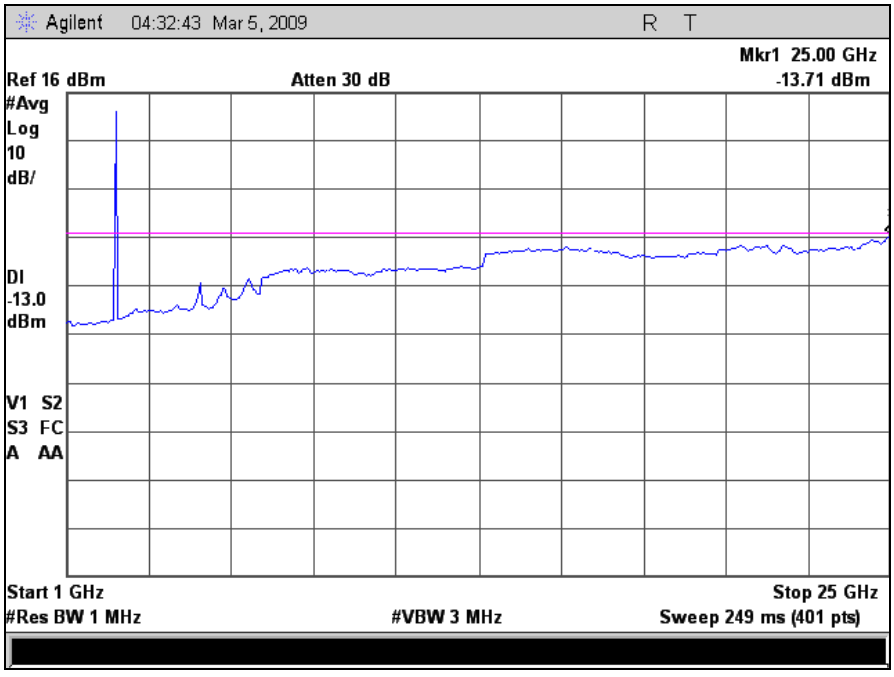
Plot 55. Conducted Spurious Emissions, Low Channel, 1.25 MHz, 30 MHz – 1 GHz



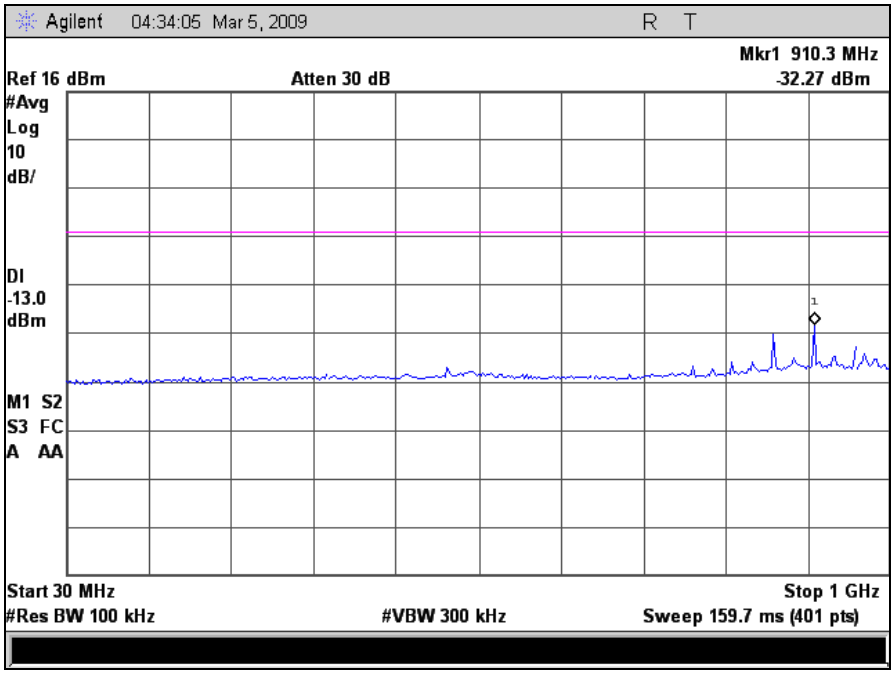
Plot 56. Conducted Spurious Emissions, Low Channel, 1.25 MHz, 1 GHz – 25 GHz



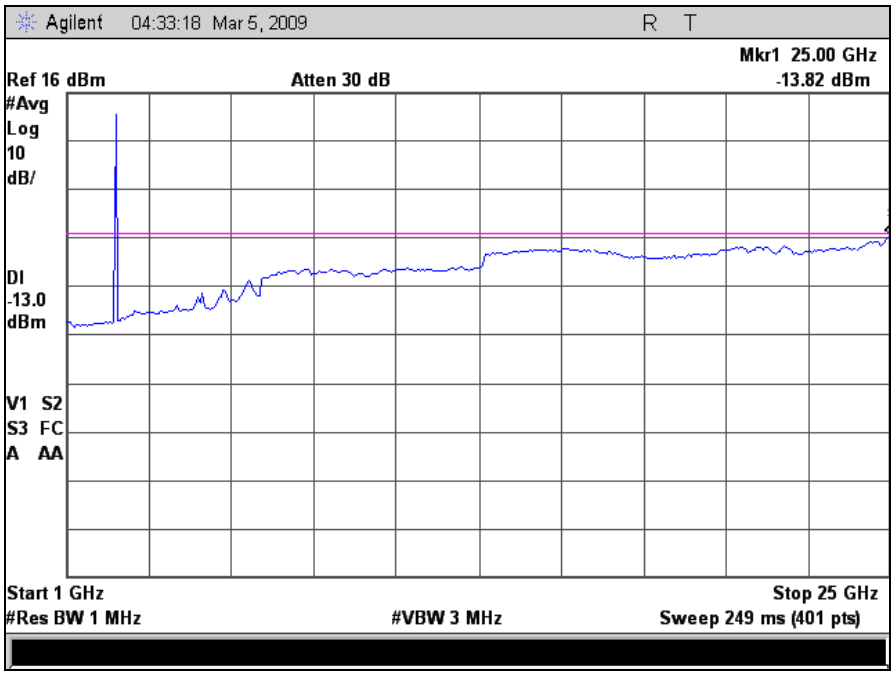
Plot 57. Conducted Spurious Emissions, Mid Channel, 1.25 MHz, 30 MHz – 1 GHz



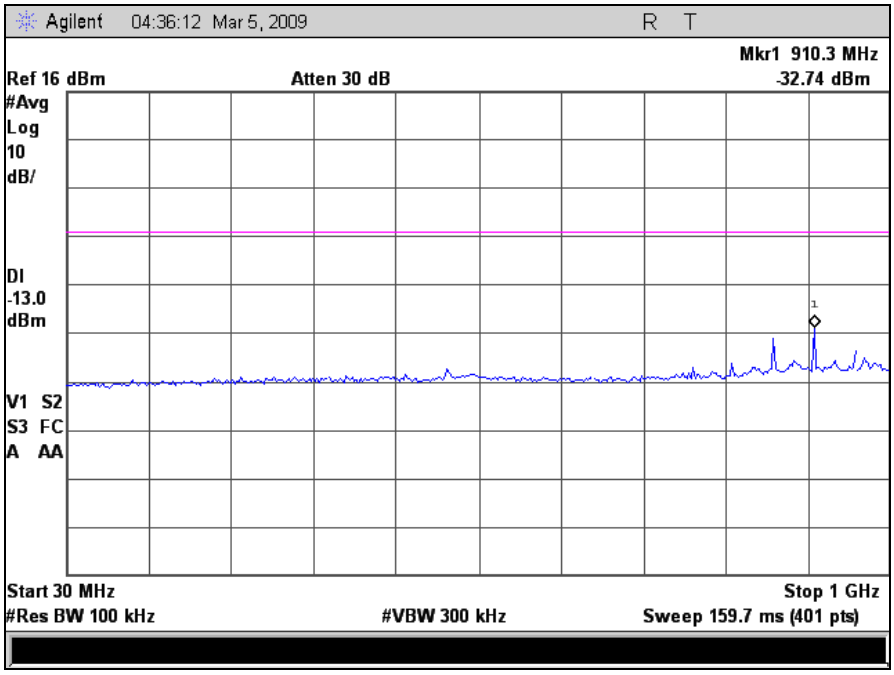
Plot 58. Conducted Spurious Emissions, Mid Channel, 1.25 MHz, 1 GHz – 25 GHz



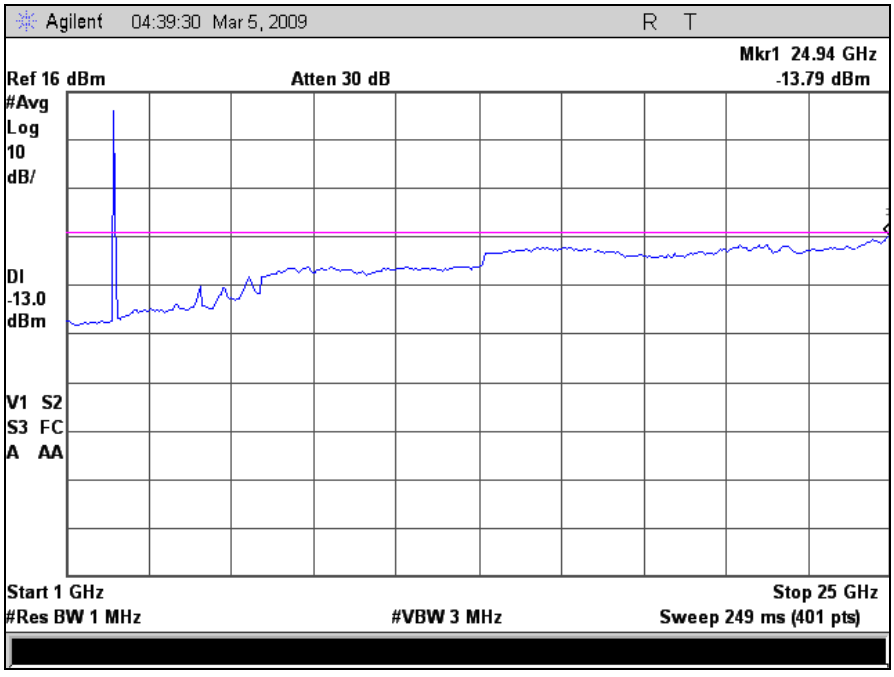
Plot 59. Conducted Spurious Emissions, High Channel, 1.25 MHz, 30 MHz – 1 GHz



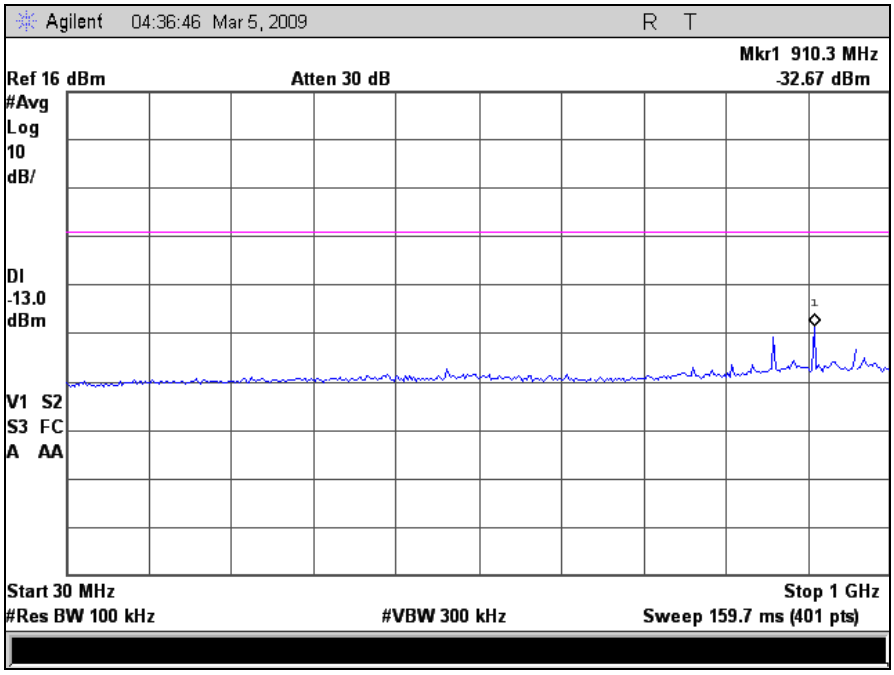
Plot 60. Conducted Spurious Emissions, High Channel, 1.25 MHz, 1 GHz – 25 GHz



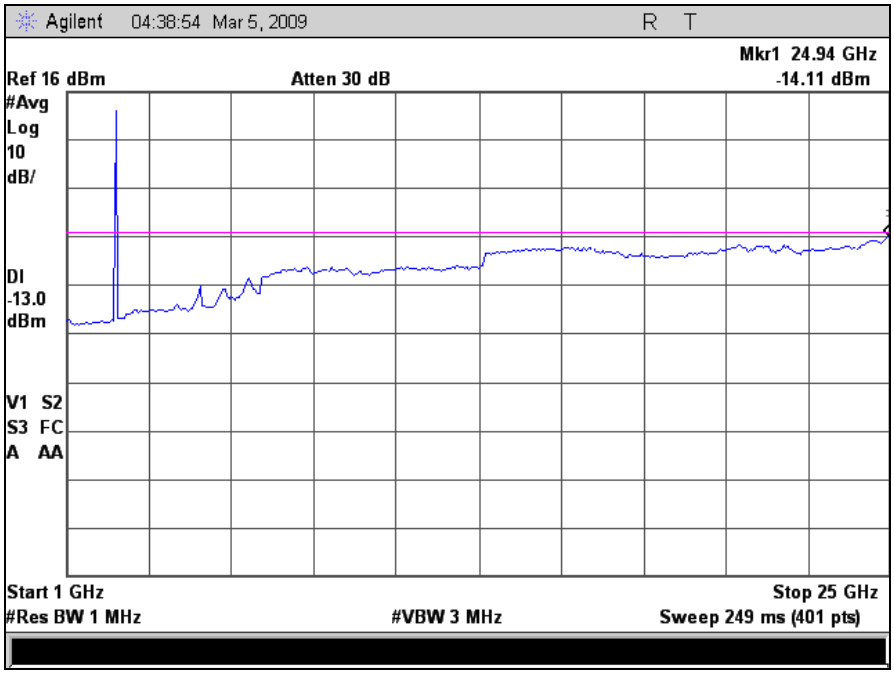
Plot 61. Conducted Spurious Emissions, Low Channel, 2.5 MHz, 30 MHz – 1 GHz



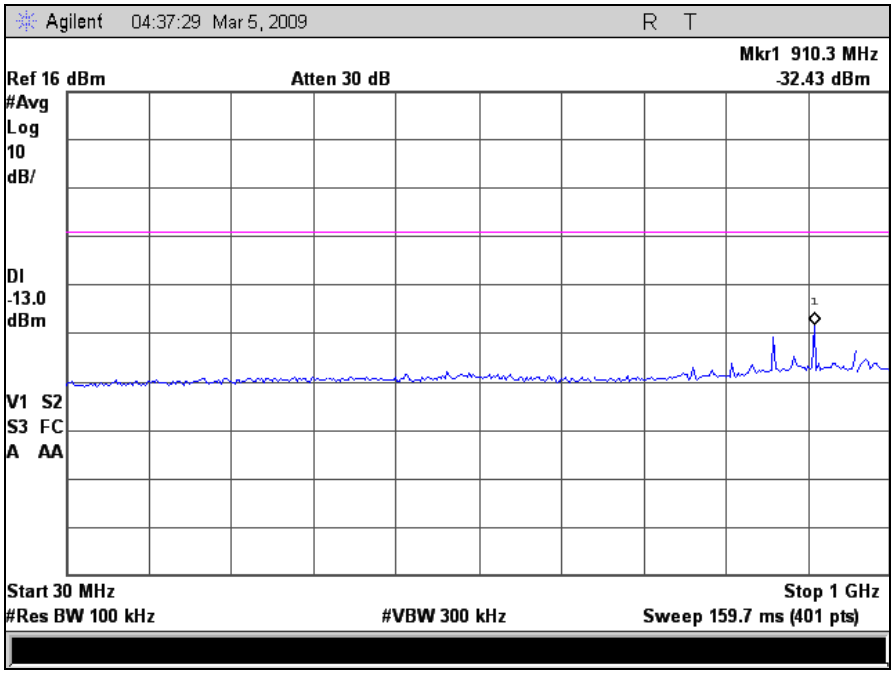
Plot 62. Conducted Spurious Emissions, Low Channel, 2.5 MHz, 1 GHz – 25 GHz



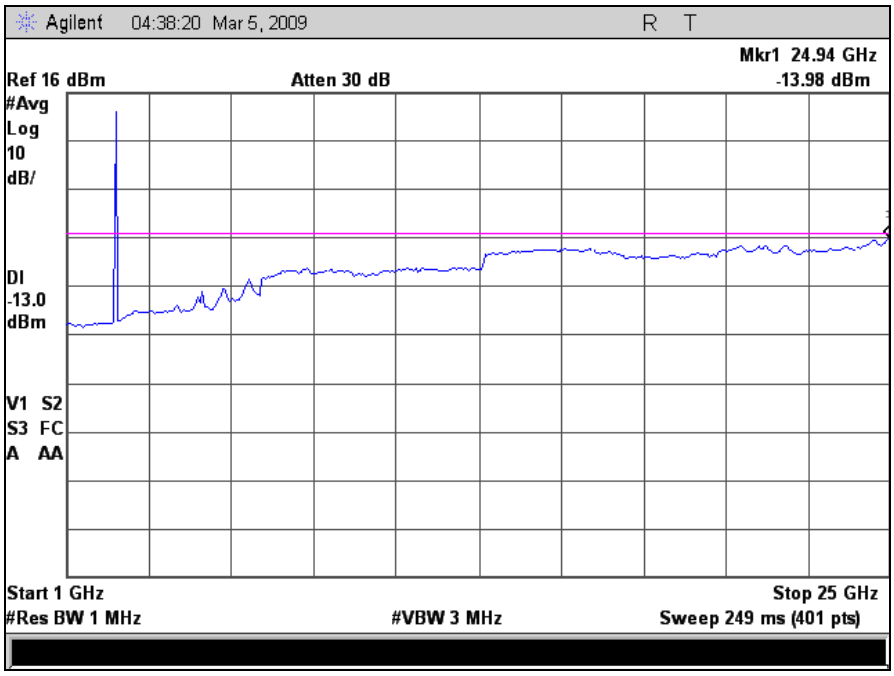
Plot 63. Conducted Spurious Emissions, Mid Channel, 2.5 MHz, 30 MHz – 1 GHz



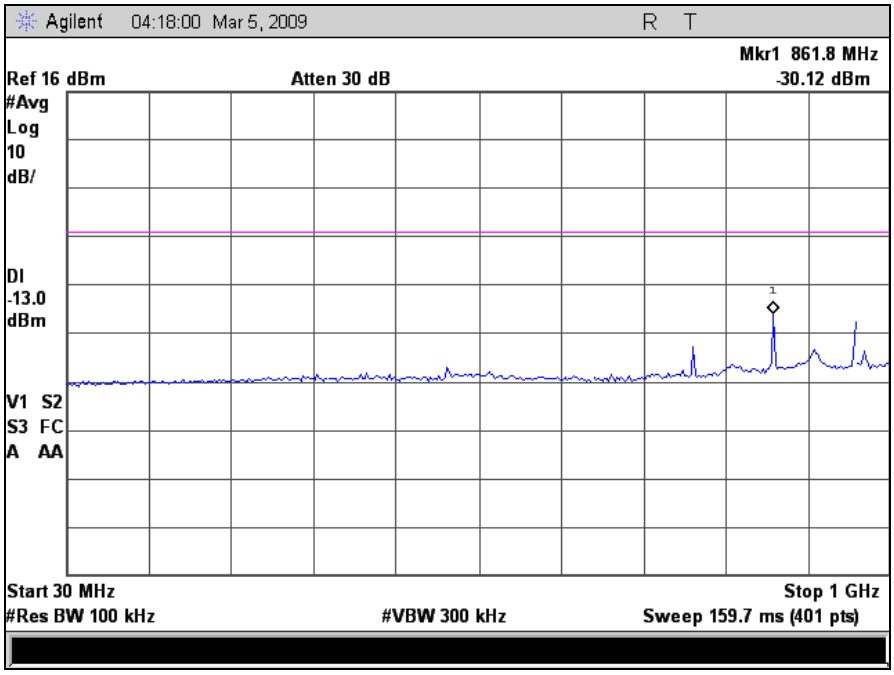
Plot 64. Conducted Spurious Emissions, Mid Channel, 2.5 MHz, 1 GHz – 25 GHz



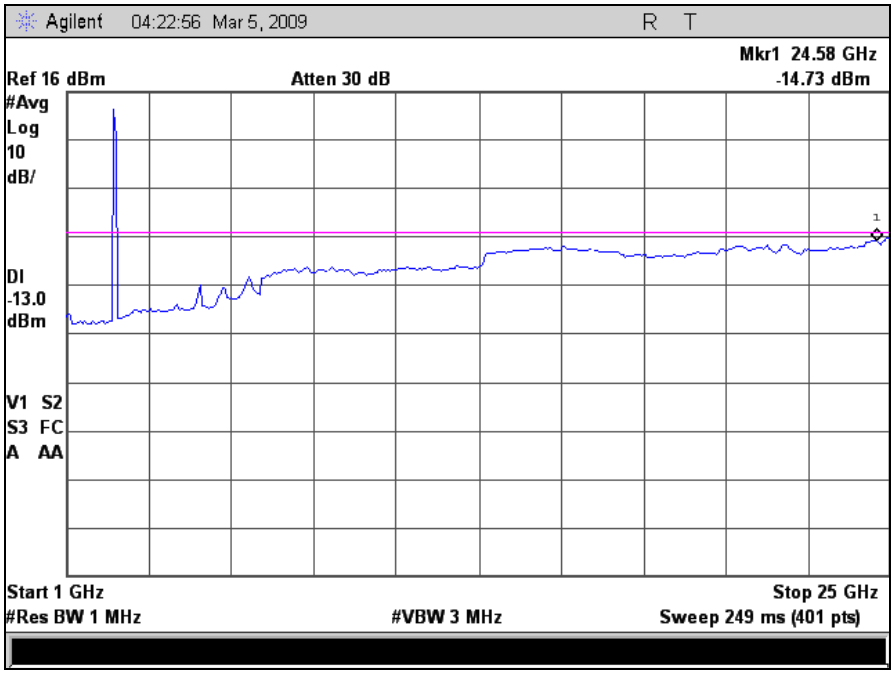
Plot 65. Conducted Spurious Emissions, High Channel, 2.5 MHz, 30 MHz – 1 GHz



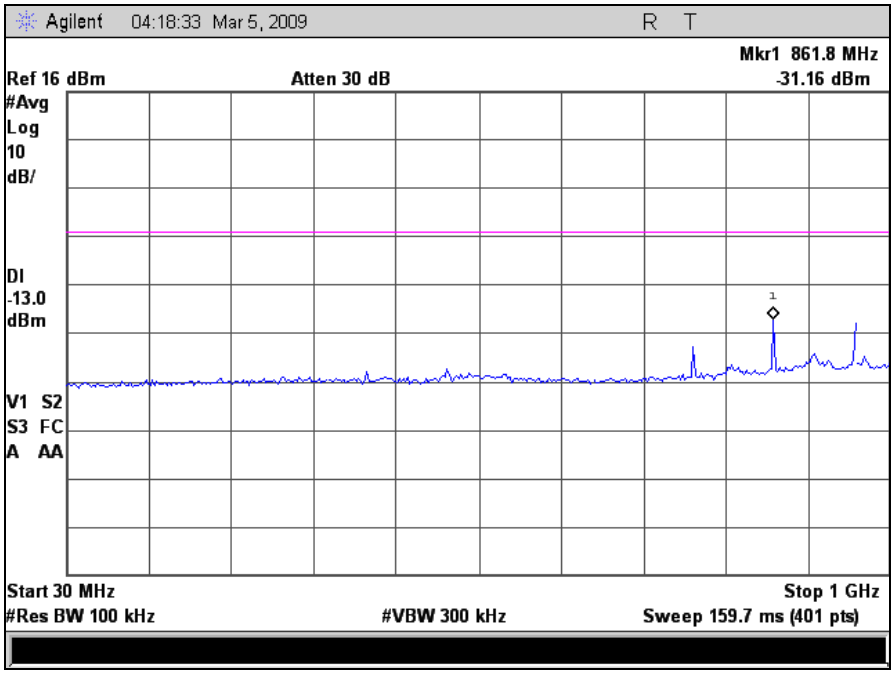
Plot 66. Conducted Spurious Emissions, High Channel, 2.5 MHz, 1 GHz – 25 GHz



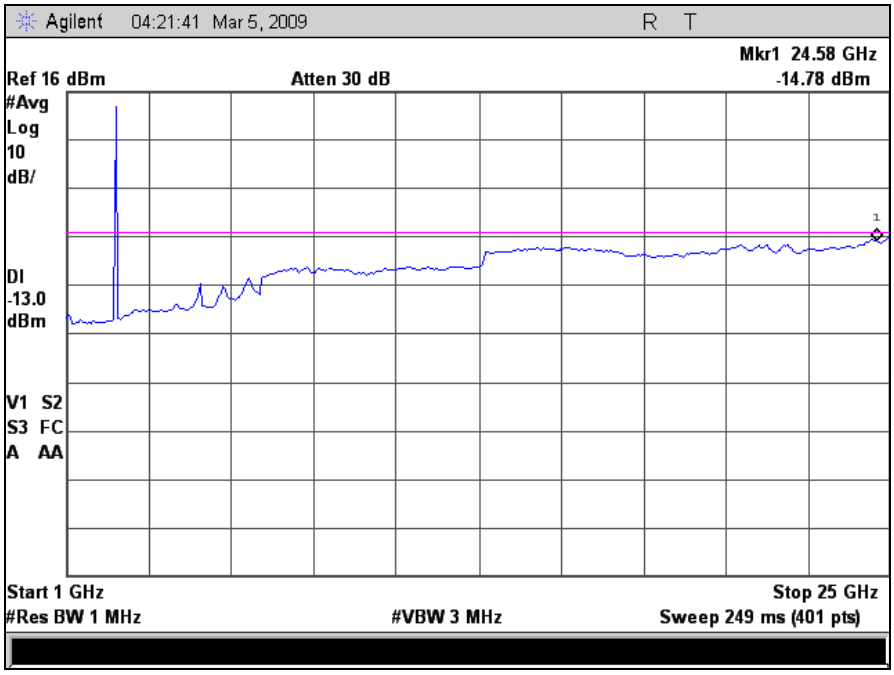
Plot 67. Conducted Spurious Emissions, Low Channel, 6 MHz, 30 MHz – 1 GHz



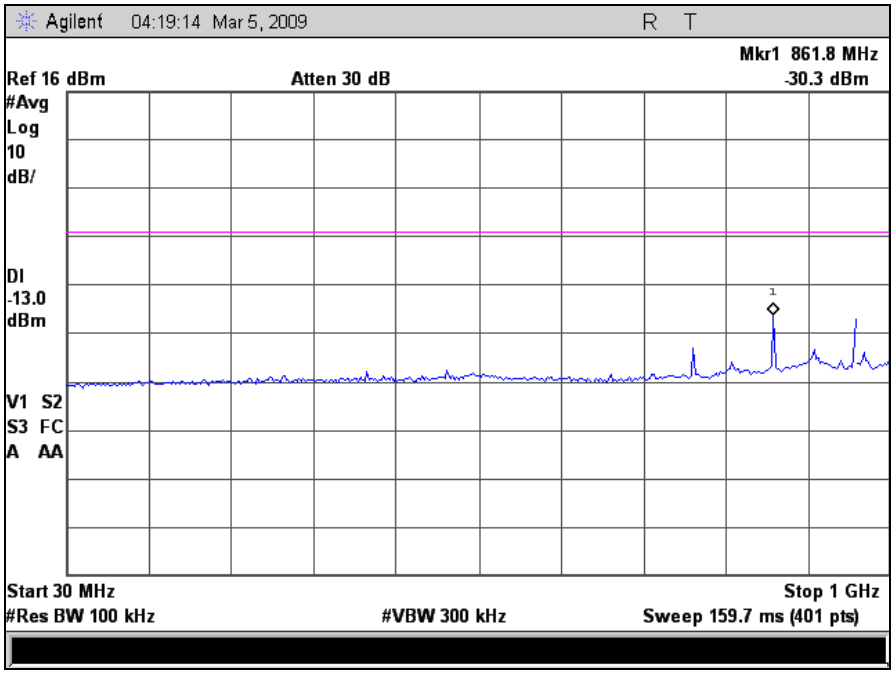
Plot 68. Conducted Spurious Emissions, Low Channel, 6 MHz, 1 GHz – 25 GHz



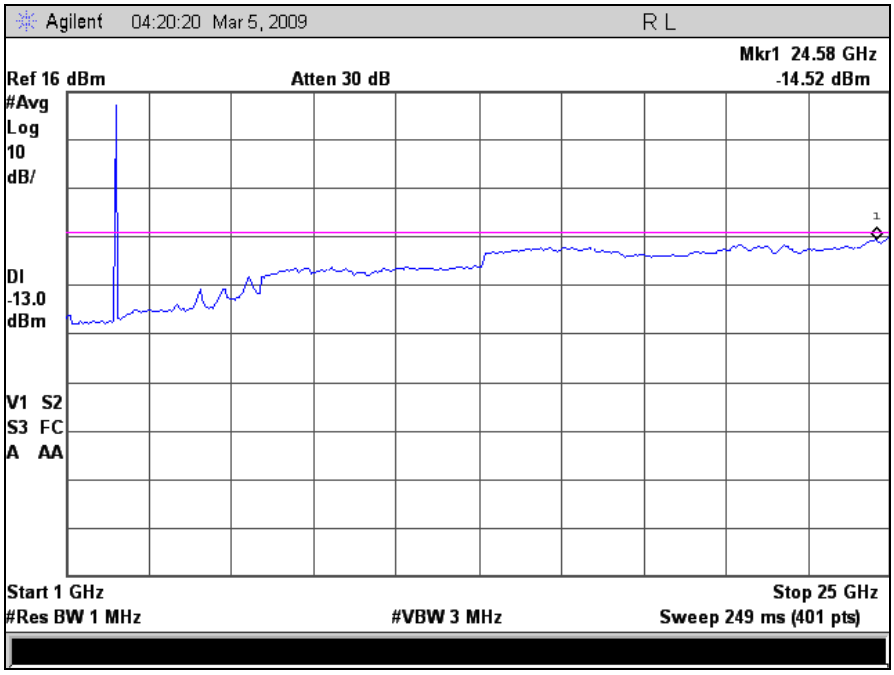
Plot 69. Conducted Spurious Emissions, Mid Channel, 6 MHz, 30 MHz – 1 GHz



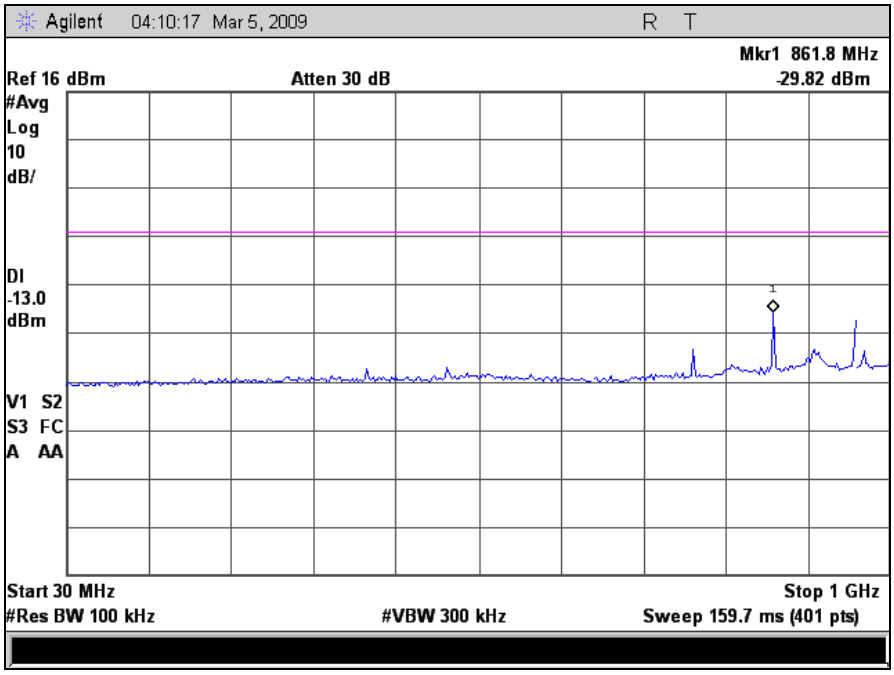
Plot 70. Conducted Spurious Emissions, Mid Channel, 6 MHz, 1 GHz – 25 GHz



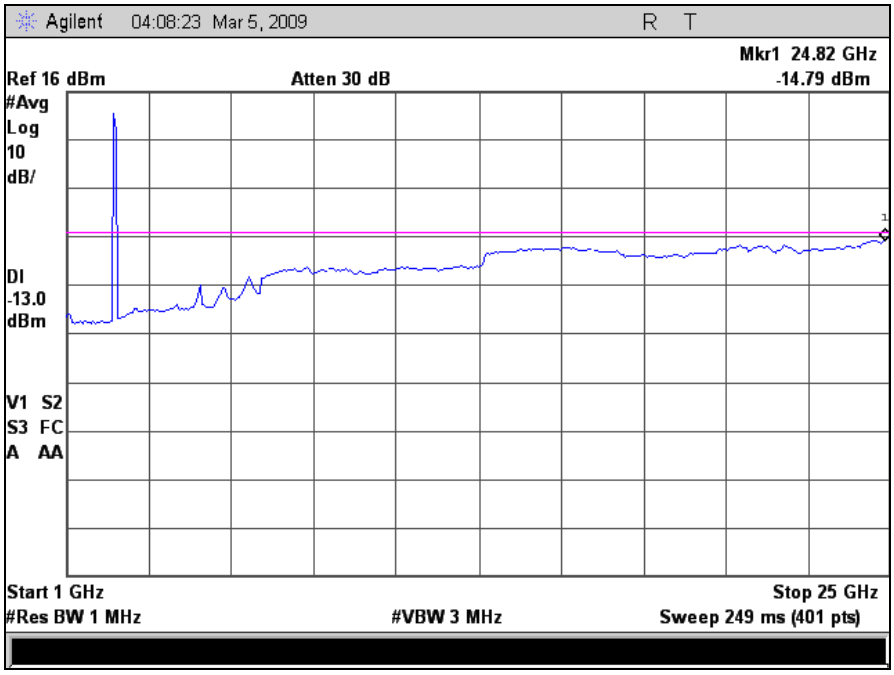
Plot 71. Conducted Spurious Emissions, High Channel, 6 MHz, 30 MHz – 1 GHz



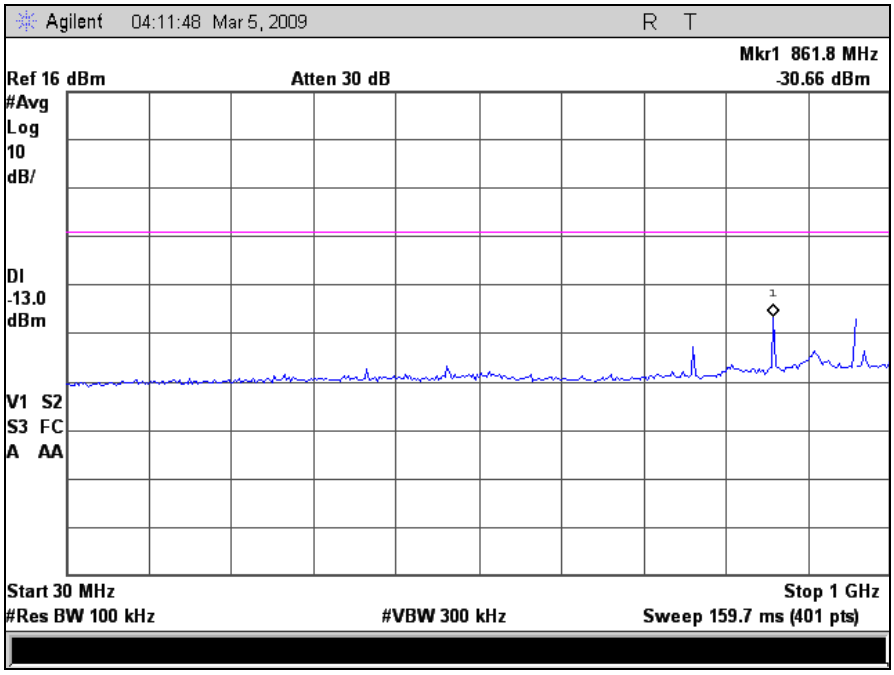
Plot 72. Conducted Spurious Emissions, High Channel, 6 MHz, 1 GHz – 25 GHz



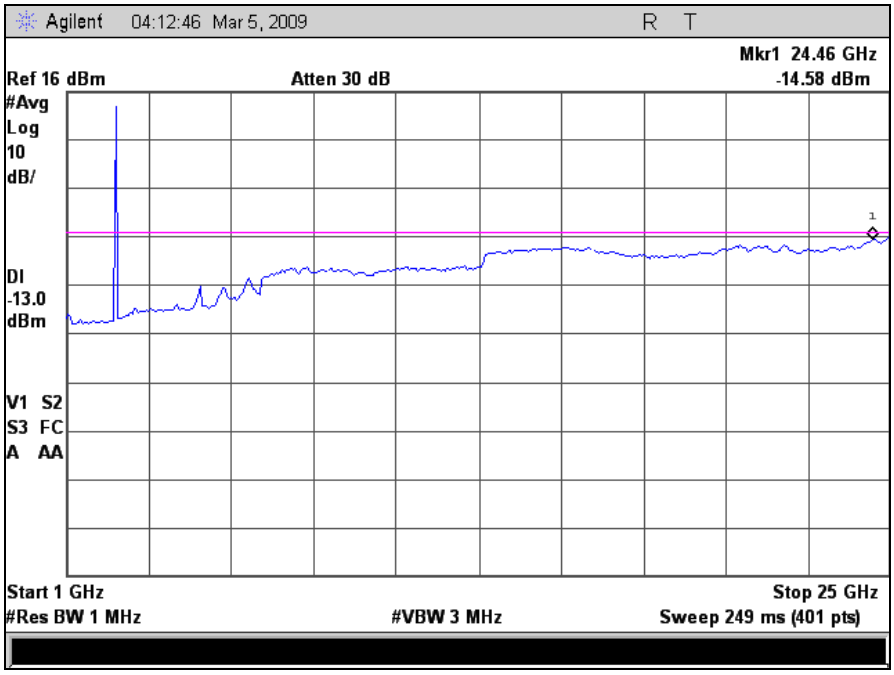
Plot 73. Conducted Spurious Emissions, Low Channel, 7 MHz, 30 MHz – 1 GHz



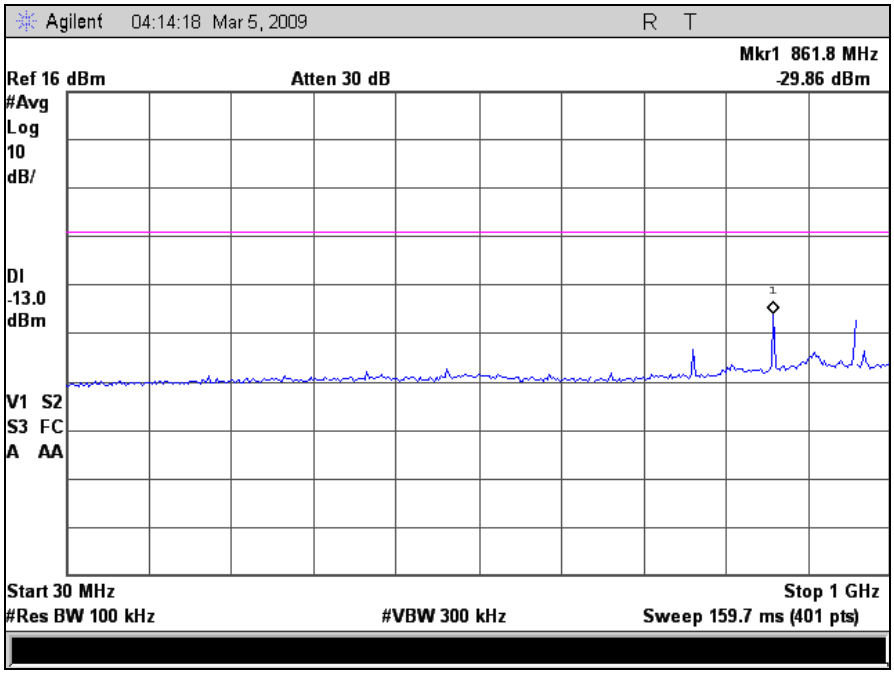
Plot 74. Conducted Spurious Emissions, Low Channel, 7 MHz, 1 GHz – 25 GHz



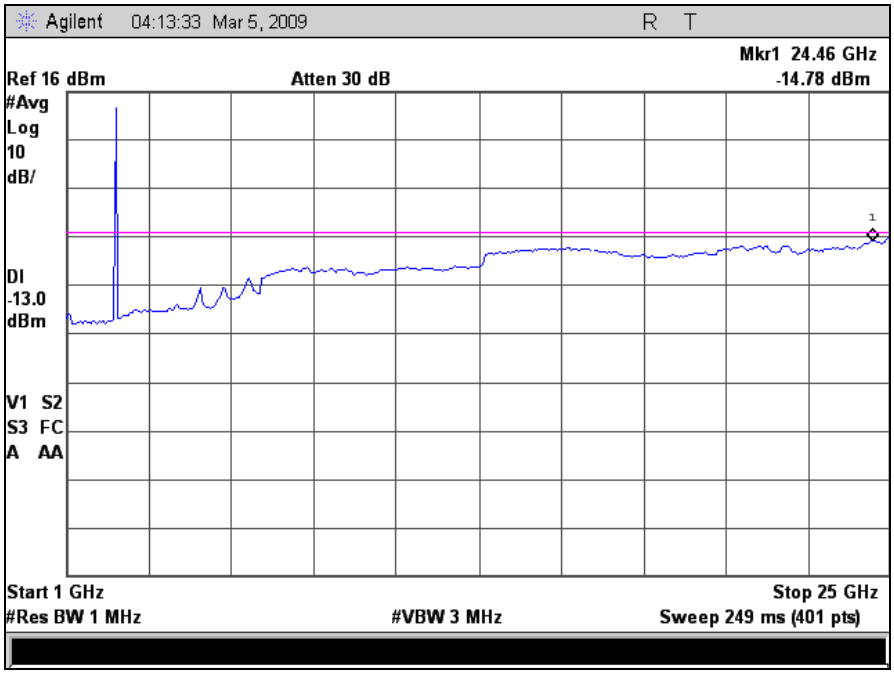
Plot 75. Conducted Spurious Emissions, Mid Channel, 7 MHz, 30 MHz – 1 GHz



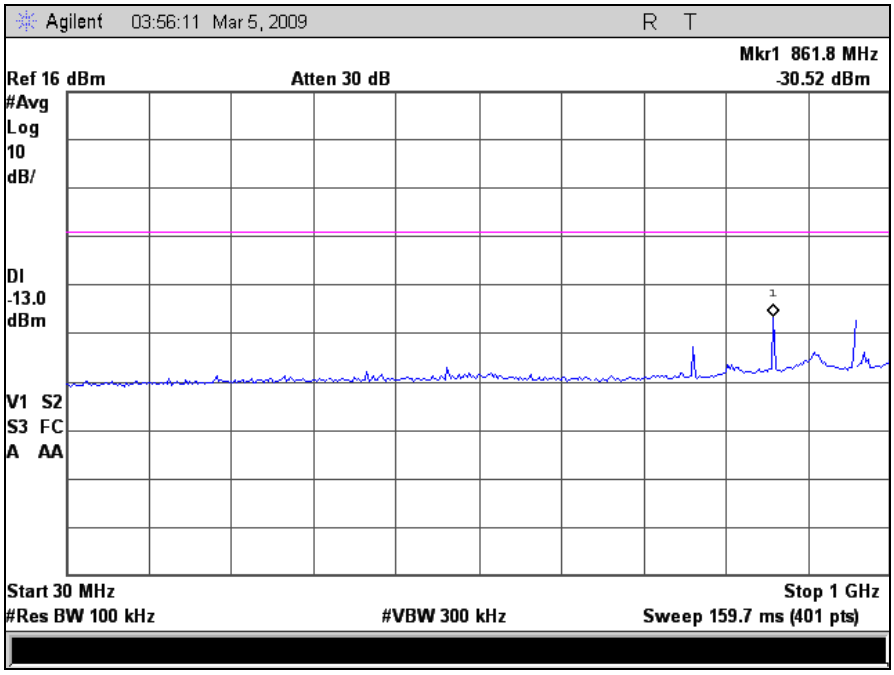
Plot 76. Conducted Spurious Emissions, Mid Channel, 7 MHz, 1 GHz – 25 GHz



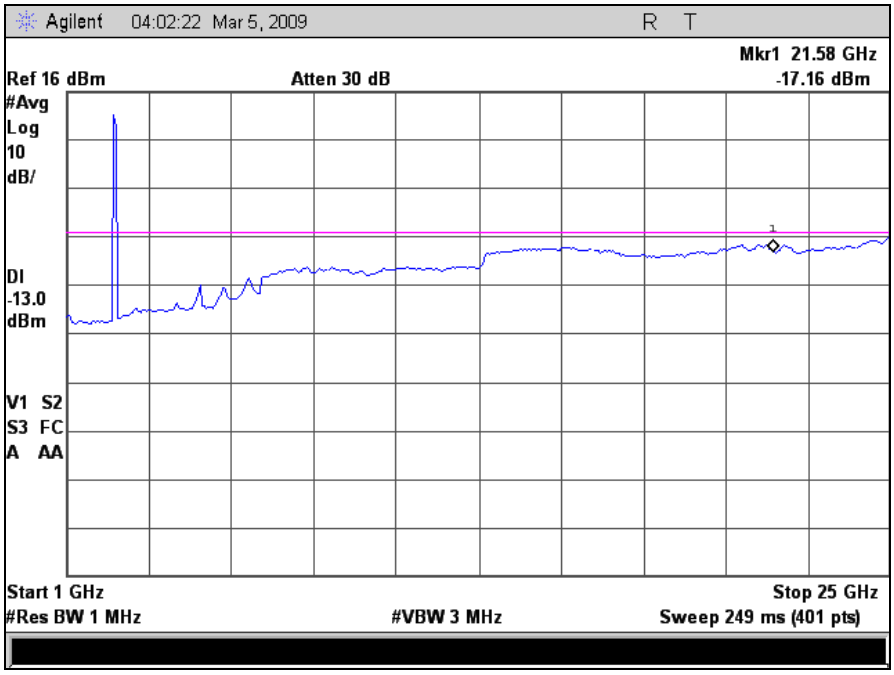
Plot 77. Conducted Spurious Emissions, High Channel, 7 MHz, 30 MHz – 1 GHz



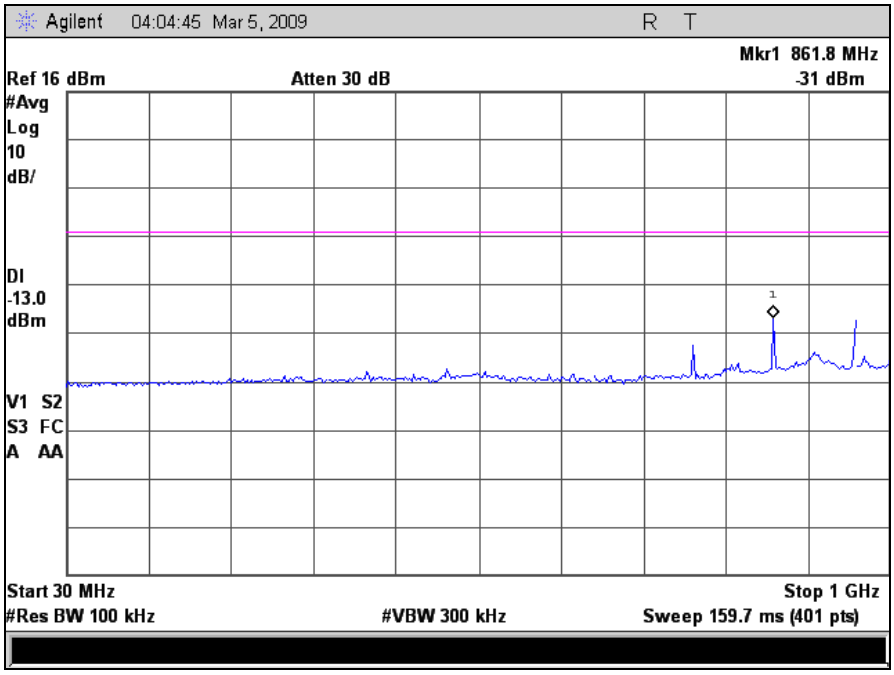
Plot 78. Conducted Spurious Emissions, High Channel, 7 MHz, 1 GHz – 25 GHz



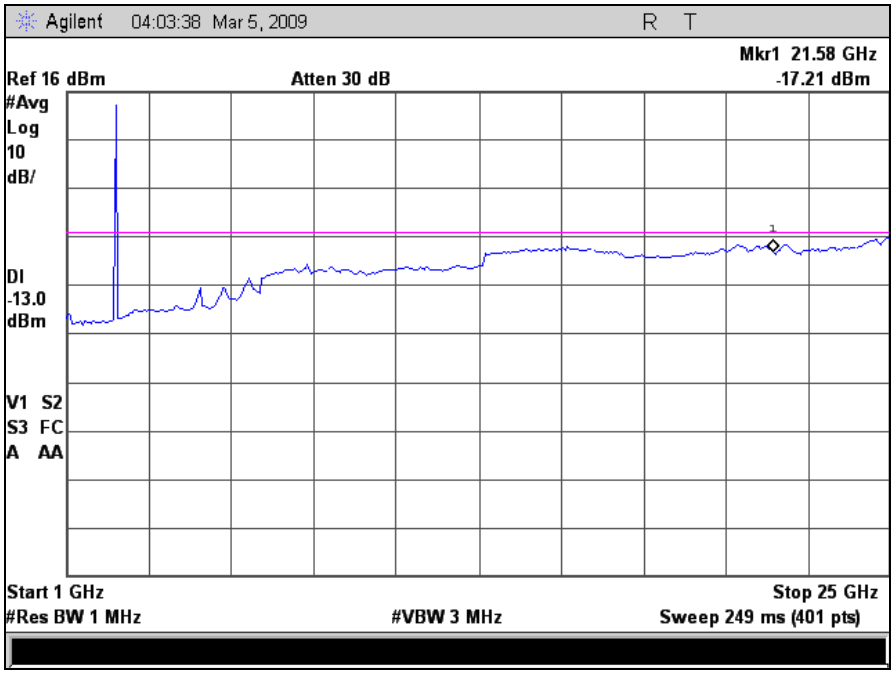
Plot 79. Conducted Spurious Emissions, Low Channel, 8 MHz, 30 MHz – 1 GHz



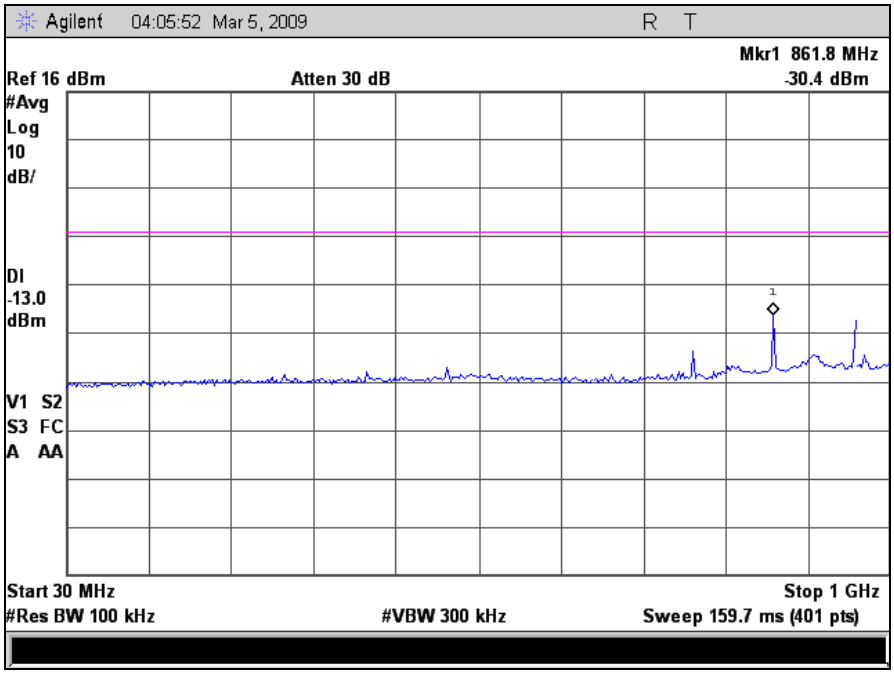
Plot 80. Conducted Spurious Emissions, Low Channel, 8 MHz, 1 GHz – 25 GHz



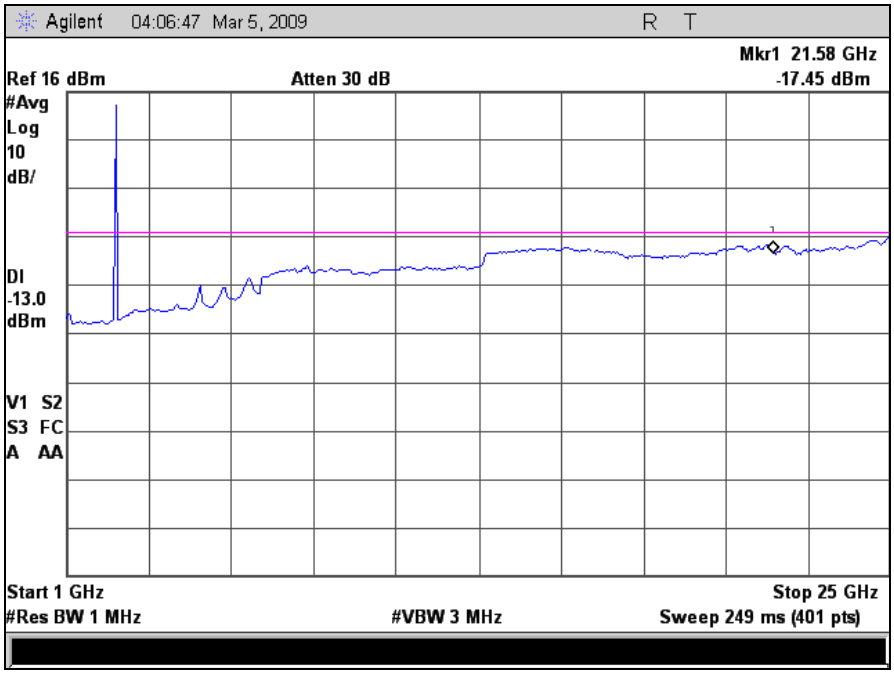
Plot 81. Conducted Spurious Emissions, Mid Channel, 8 MHz, 30 MHz – 1 GHz



Plot 82. Conducted Spurious Emissions, Mid Channel, 8 MHz, 1 GHz – 25 GHz



Plot 83. Conducted Spurious Emissions, High Channel, 8 MHz, 30 MHz – 1 GHz



Plot 84. Conducted Spurious Emissions, Low Channel, 8 MHz, 1 GHz – 25 GHz

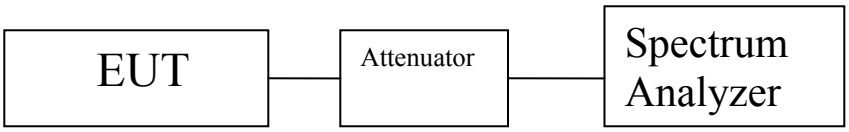


Figure 3. Spurious Emissions at Antenna Terminals Test Setup

Electromagnetic Compatibility Radiated Emissions Requirements

6.2. Radiated Spurious Emissions

Test Requirement(s): **§2.1053 and §90.210**

Test Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber. The EUT to antenna distance was varied in the following manner:
1 – 3 GHz, 1 m
3 – 6 GHz, 1 m
6 – 9 GHz, 0.75 m
9 – 11 GHz, 0.5 m
11 – 14 GHz, 0.4 m
14 – 18 GHz, 0.2 m

A 2.4 GHz notch filter and a pre-amp was used in the 3 – 18 GHz range. The plots were later combined to show emissions from 1 – 18 GHz.

The EUT's RF ports were terminated to 50 ohm loads. The EUT was set to transmit at the low, mid and high channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360^0 and the receiving antenna scanned from 1-4m in order to capture the maximum emission.

Plots were captured and corrected for antenna correction factor and cable loss. The electric field strength was converted to EIRP and graphed against a -13 dBm limit line. Spurious emissions for only 1.25/2.5/8 MHz bandwidths have been shown. The other bandwidths showed similar results and have not been incorporated into the test report. A typical emission plot from 30 – 1000 MHz has also been shown in Plot 79.

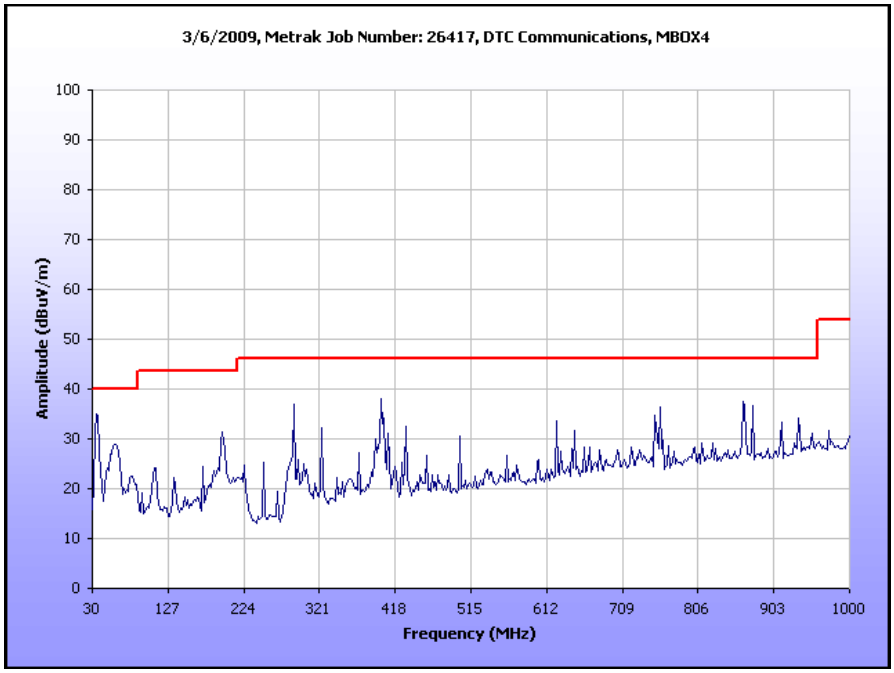
A RBW of 1 MHz was used for frequencies above 1 GHz and 100 kHz for below 1 GHz.

Test Results: Equipment complies with Section 2.1053 and 90.210.

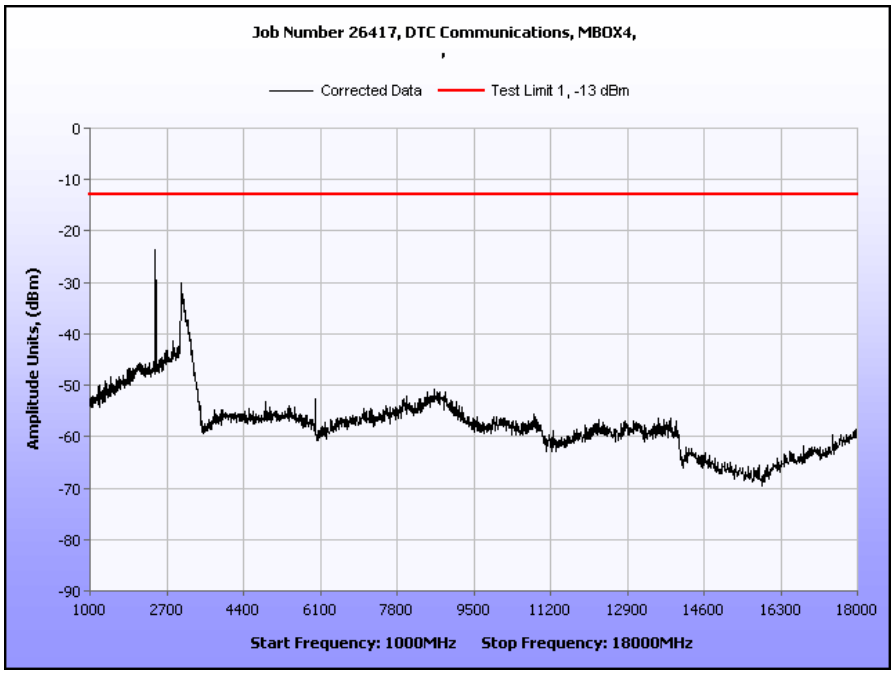
Test Engineer(s): Dusmantha Tennakoon

Test Date(s): 03/10/09

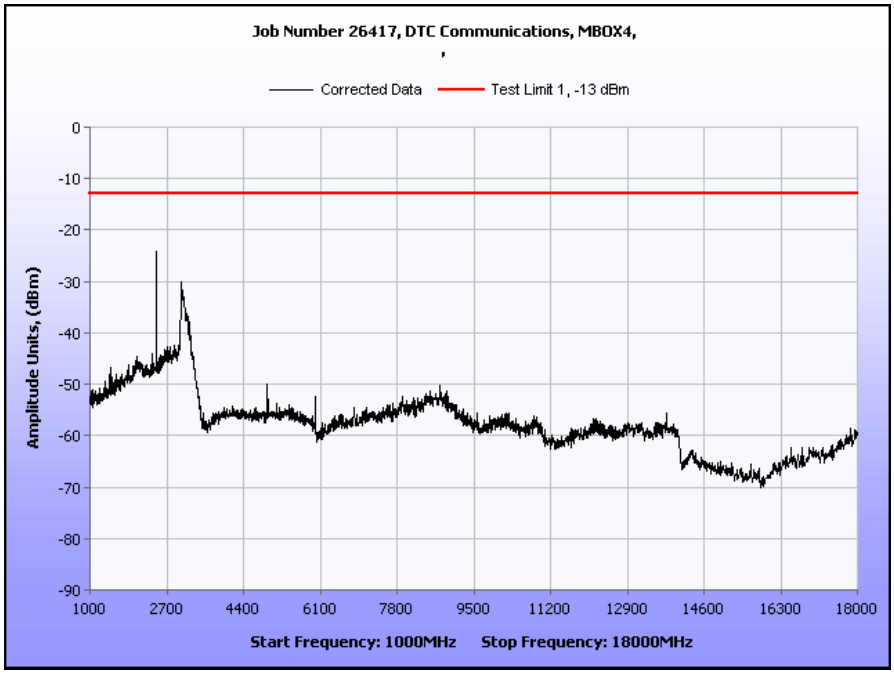
Radiated Emissions (Substitution Method) Test Results



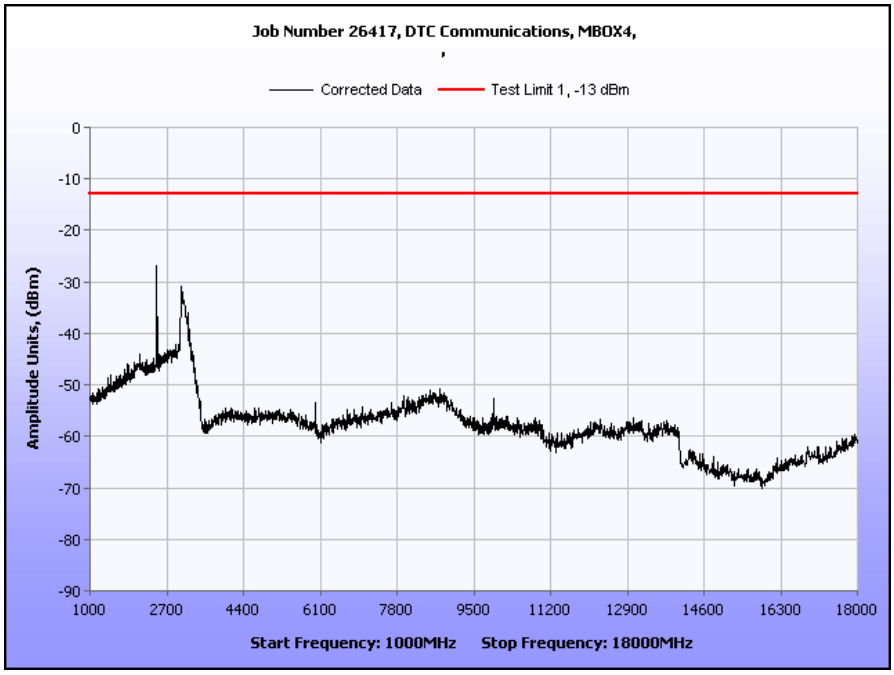
Plot 85. Radiated Spurious Emissions, Pre-Scan, 30 MHz – 1000 GHz, 50 Ohm Loads



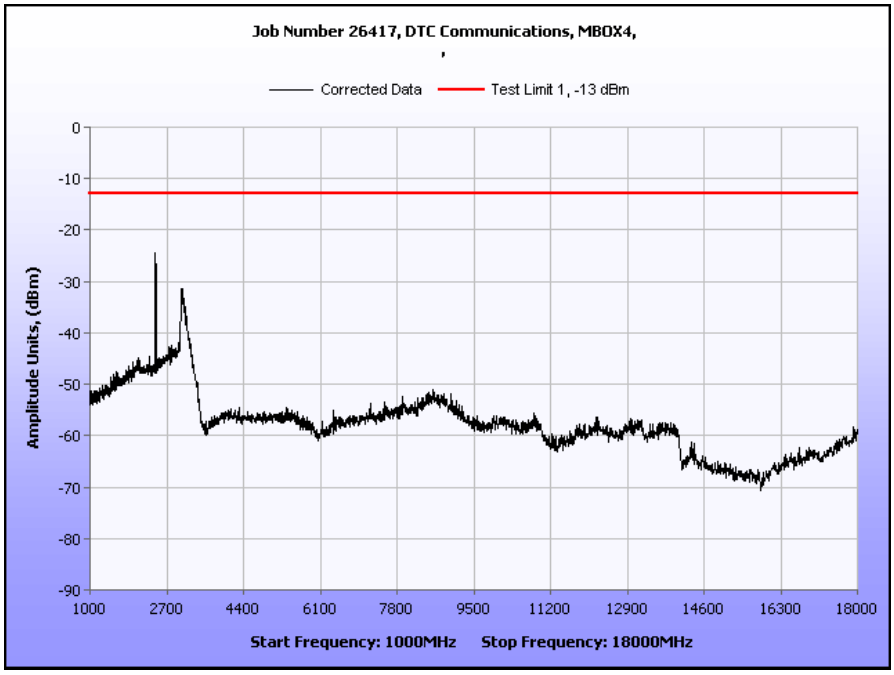
Plot 86. Radiated Spurious Emissions, Low Channel, 1.25 MHz, 1 GHz – 18 GHz



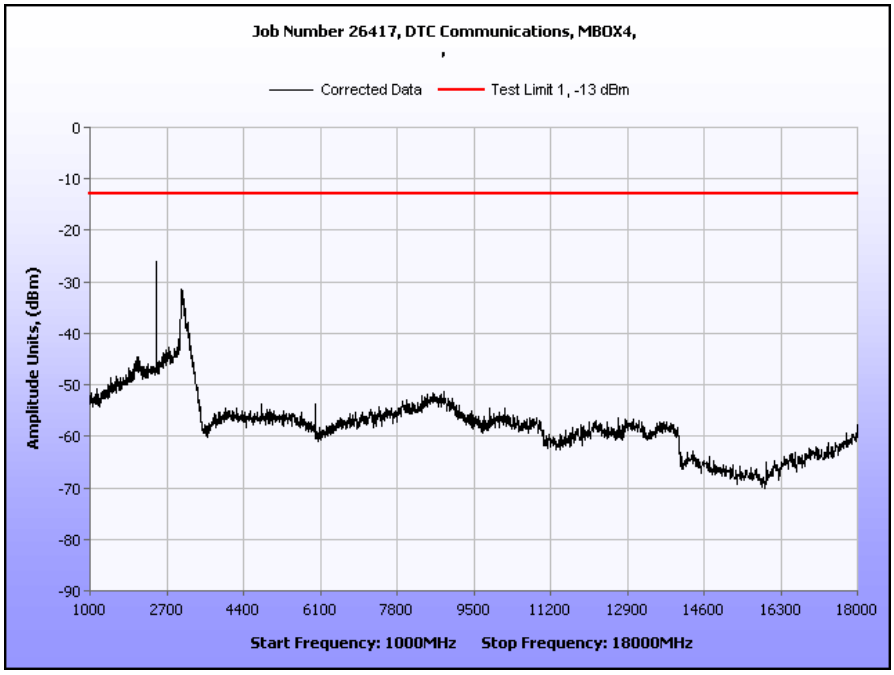
Plot 87. Radiated Spurious Emissions, Mid Channel, 1.25 MHz, 1 GHz – 18 GHz



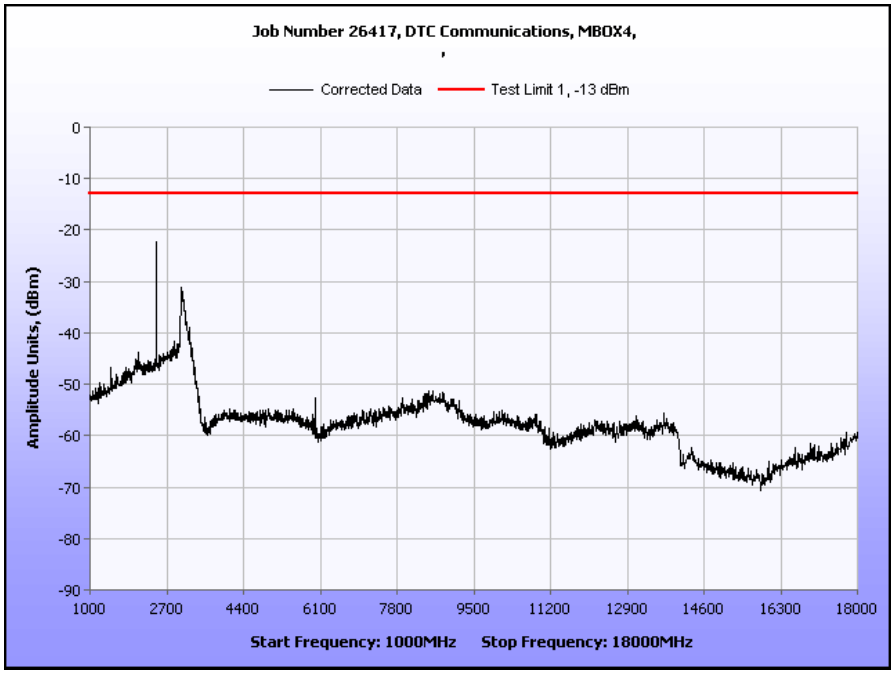
Plot 88. Radiated Spurious Emissions, High Channel, 1.25 MHz, 1 GHz – 18 GHz



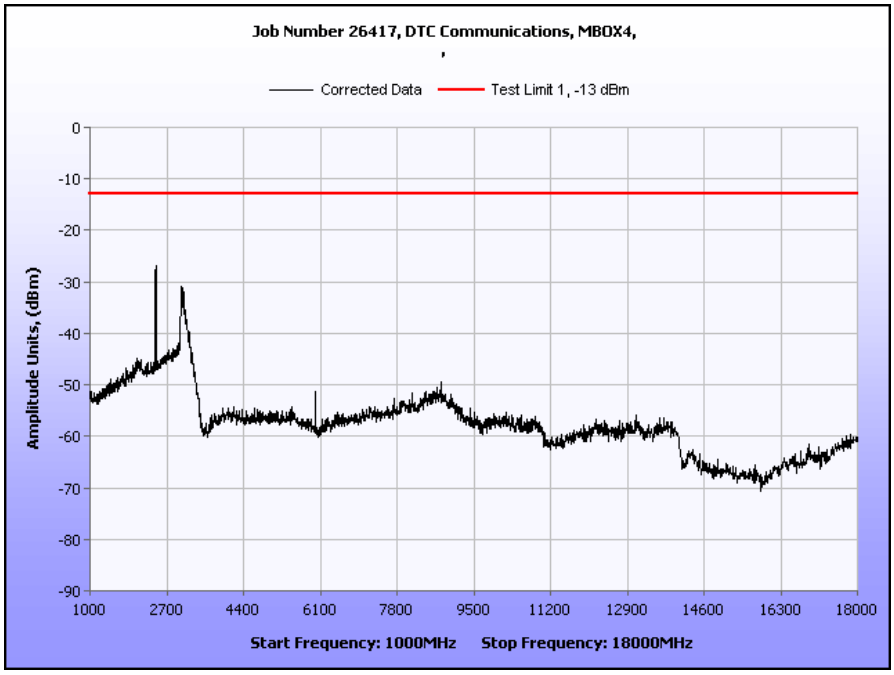
Plot 89. Radiated Spurious Emissions, Low Channel, 2.5 MHz, 1 GHz – 18 GHz



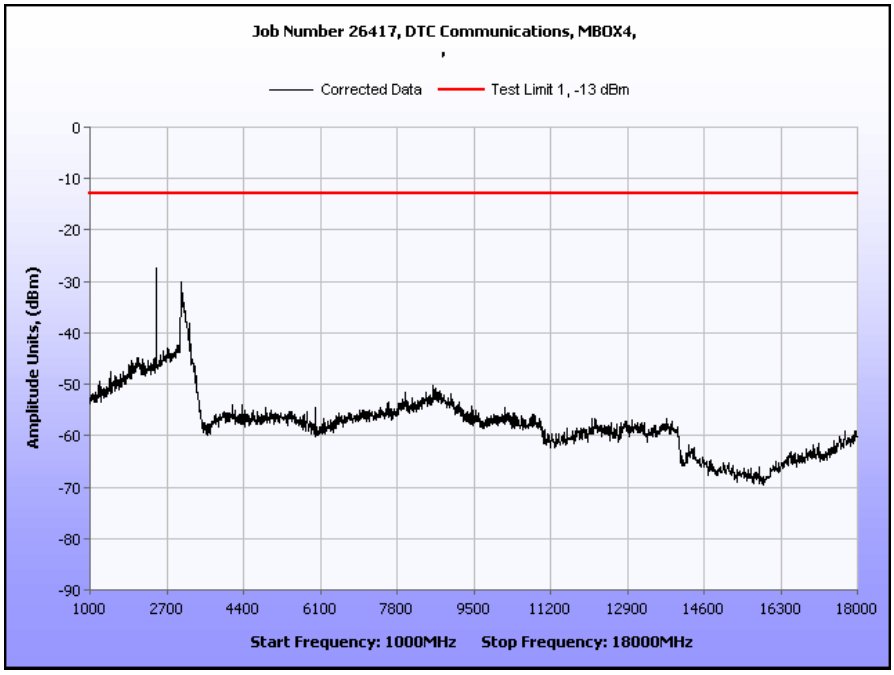
Plot 90. Radiated Spurious Emissions, Mid Channel, 2.5 MHz, 1 GHz – 18 GHz



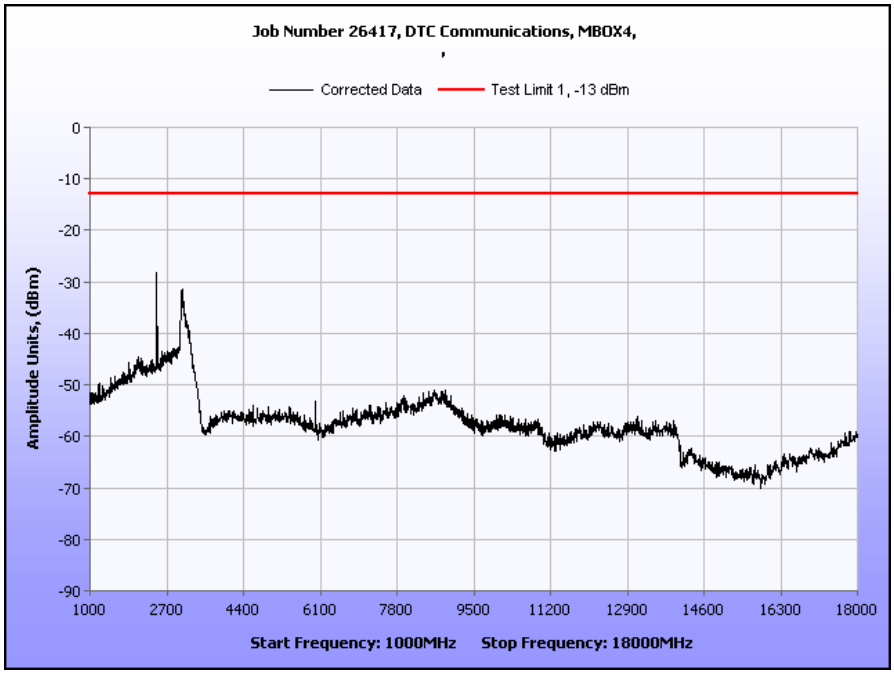
Plot 91. Radiated Spurious Emissions, High Channel, 2.5 MHz, 1 GHz – 18 GHz



Plot 92. Radiated Spurious Emissions, Low Channel, 8 MHz, 1 GHz – 18 GHz



Plot 93. Radiated Spurious Emissions, Mid Channel, 8 MHz, 1 GHz – 18 GHz



Plot 94. Radiated Spurious Emissions, High Channel, 8 MHz, 1 GHz – 18 GHz

Photograph 3. Radiated Emissions, Test Setup

7. Electromagnetic Compatibility Frequency Stability Requirements

7.1. Frequency Stability

Test Requirement(s): **§2.1055 and §90.213**

Test Procedures: As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals of the EUT.

The EUT was placed in an Environmental Chamber with all support equipments are outside of the chamber on a table. The EUT was set to transmit a modulated carrier. The reference frequency at 20°C was observed and put on 'view' under Trace 1 of the Spectrum Analyzer. As temperature or voltage was varied, the drift in frequency was observed in Trace 2. The frequency error was measured using delta markers between Trace 1 and 2. The frequency drift was investigated for every 10°C increment until the unit was stabilized then recorded the reading in tabular format with the temperature range of -30 to 50^{C}.

Voltage supplied to the EUT was 120 VAC reference temperature was at 20°C. The voltage was varied by ± 15 % of nominal

Test Results: Equipment complies with Section 2.1055 and 90.213

Test Engineer(s): Dusmantha Tennakoon

Test Date(s): 03/16/09

Frequency Stability Test Results

Reference Freq.: 2451.25 MHz at 20°C

Temperature (centigrade)	Drift (ppm)
50	1
40	1
30	0.7
20	Ref
10	0.5
0	0.7
-10	0.7
-20	0.5
-30	0.5

Table 13. Temperature vs. Frequency, Test Results

Reference Freq.: 2451.25 MHz at 120 VAC and 20°C

Measured voltage (+/- 15% of nominal)	Drift (ppm)
102	0.5
132*	0.5

Table 14. Frequency vs. Voltage Test Results

* The power supply is not designed to swing 115% of nominal voltage. It shuts down at 133 VAC.

A KDB inquiry was made and the FCC approved going only up to 132 VAC.

Photograph 4. Frequency Stability, Test Setup

8. Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1T4502	COMB GENERATOR	COM-POWER	CGC-255	09/08/2008	09/08/2009
1T4612	ESA-E SERIES SPECTRUM ANALYZER	AGILENT	E4407B	02/17/2009	02/17/2010
1T4503	SHIELDED ROOM	UNIVERSAL SHIELDING CORP	N/A	N/A	N/A
1T4627	THERMO/HYGROMETER	CONTROL COMPANY	S6-627-9	09/25/2007	09/25/2009
1T4565	LISN (24 AMP)	SOLAR ELECTRONICS	9252-50-R-24-BNC	09/25/2008	09/25/2009
1T4548	AC POWER SOURCE	CALIFORNIA INSTRUMENTS	1251P	SEE NOTE	
1T4377	TRUE RMS MULTIMETER	FLUKE	189	08/25/2008	08/25/2009
1T4632	THERMO/HYGROMETER	CONTROL COMPANY	S6-627-9	09/25/2007	09/25/2009
1T4300	SEMI-ANECHOIC CHAMBER # 1	EMC TEST SYSTEMS	NONE	02/17/2006	05/22/2009
1T4303	ANTENNA; BILOG	SCHAFNER - CHASE EMC	CBL6140A	07/07/2008	07/07/2009
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	04/18/2008	04/18/2009
1T2511	ANTENNA; HORN	EMCO	3115	07/29/2008	07/29/2009
1T4442	PRE-AMPLIFIER, MICROWAVE	MITEQ	AFS42-01001800-30-10P	SEE NOTE	
1T4592	RF FILTER KIT	VARIOUS	N/A	SEE NOTE	

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.

Certification & User's Manual Information

9. Certification Label & User's Manual Information

9.1. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

(a) The various types of radio communication transmitting devices described throughout this chapter.

(b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.

(c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.

(d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

(a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:

(1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or

(2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.

(d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.

(e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:

(i) Compliance testing;

(ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;

(iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or

(v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.

(e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.

(f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a provision that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart Y — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

(a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is to be operated.[1] *In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer*, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

(b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant, whichever is applicable.

§ 2.902 Certification.

(a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.

(b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

[1] In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart B (of Part 15), which deals with unintentional radiators.

§ 2.948 Description of measurement facilities.

(a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.

(1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.

(i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.

(ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

(2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

9.2. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

(a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:

(1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.

(2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.

(3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

§ 15.21 Information to user.

The user's manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

(a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

– Reorient or relocate the receiving antenna.
– Increase the separation between the equipment and receiver.
– Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
– Consult the dealer or an experienced radio/TV technician for help.

End of Report

