MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
33439 WESTERN AVENUE ! UNION CITY, CALIFORNIA 94587 ! PHONE (510) 489-6300 ! FAX (510) 489-6372

June 14, 2006

LGC Wireless
2540 Junction Avenue
San Jose, CA 95134

Dear Tom Macall,

Enclosed is the EMC test report for compliance testing of the LGC Wireless, FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU, tested to the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 90, Subpart I for Private Land and Mobile Radio Services and Part 15B for Unintentional Radiators.

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.

Boonmanus Seelapasay
Documentation Department

Reference: (\LGC Wireless\EMCS20025-FCC90)

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Electromagnetic Compatibility Criteria
Test Report

For the

LGC Wireless
FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU

Tested under

The FCC Verification Rules
Contained in Title 47 of the CFR, Part 90, Subpart I
for Private Land Mobile Radio Services

MET Report: EMCS20025-FCC90

June 14, 2006

Prepared For:

LGC Wireless
2540 Junction Avenue
San Jose, CA 95134

Prepared By:
MET Laboratories, Inc.
4855 Patrick Henry Dr., Building 6
Santa Clara, CA 95054

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MET Report: EMCS20025-FCC90

Shawn McMillen
Electromagnetic Compatibility Lab

Boonmanus Seelapasay
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, Subpart I of the FCC Rules under normal use and maintenance.

Tony Permsombut, Lab Manager
Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	June 14, 2006	Initial Issue.

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
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GR-1089-CORE	***(GR)*** **G**eneral **R**equirement(s) imposed by the NEBS standard, **(*CORE*) C**entral **O**ffice **R**ecovery **E**xpress (AT&T), ***(1089)*** specifies various parts of the General Requirements under Bellcore Technical Standard, Requirements for Electromagnetic Compatibility and Electrical Safety - Generic Criteria for Network Telecommunications Equipment
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**er**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**er**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**micro**henry
µ	**micro**farad
µs	**micro**seconds
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

I. Executive Summary

A. Purpose of Test

An EMC evaluation was performed to determine compliance of the LGC Wireless FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU, with the requirements of Part 90 Subpart I and Part 15 Subpart B. 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 FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU. LGC Wireless should retain a copy of this document which should be kept on file for at least two years after the manufacturing of the FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU, has been **permanently** discontinued.

B. Testing Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90, Subpart I. All tests were conducted using measurement procedure ANSI TIA/EIA-603-A-2004.

FCC Reference	Description	Results
Transmitter Mode (TX)		
§2.1046, §90.205	RF Output Power	Compliant
§2.1049, §90.209	Occupied Bandwidth	Compliant
§2.1051, §90.210	Spurious Emissions at antenna terminals	Compliant
§2.1053	Field Strength of Spurious Emissions	Compliant
§2.1055, §90.213	Frequency Stability	Compliant
TIA/EIA-603.3.2.6	Audio Frequency Response	N/A
TIA/EIA-603.3.2.6	Audio Low-Pass Filter Response	N/A
TIA/EIA-603.3.2.6	Modulation Limiting	N/A
§90.214	Transient Frequency Behavior	N/A
Receiver Mode (RX)		
15.107	AC Power Line Conducted Emissions	Compliant
15.109	Radiated Spurious Emissions	Compliant

II. Equipment Configuration

A. Overview

MET Laboratories, Inc. was contracted by LGC Wireless to perform testing on the FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU under purchase order number 717037.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the LGC Wireless., FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU.

An EMC evaluation to determine compliance of the TB 4.9 with the requirements of Part 90, Subpart I, 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. LGC Wireless 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.

Model(s) Tested:	FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU		
Model(s) Covered:	FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU		
EUT Specifications:	Primary Power Source: 120 VAC		
	FCC ID: NOOFSN-809019-1		
	Type of Modulations:	16QAM	
	Max RF Output Power800MHz:	Peak - 26.9 dBm	Average - 23.15 dBm
	Max RF Output Power900MHz:	Peak - 25.7 dBm	Average - 23.01 dBm
	EUT Frequency Ranges:	iDEN 800 MHz	Downlink: 851-869 MHz
			Uplink: 806-824 MHz
		iDEN 900 MHz	Downlink: 935-941 MHz
			Uplink: 896-902 MHz
	Equipment Class:	AMP	
Analysis:	The results obtained relate only to the item(s) tested.		
Environmental Test Conditions:	Temperature (15-35º C)		
	Relative Humidity (30-60%)		
	Barometric Pressure (860-1060 mbar)		
Evaluated by:	Shawn McMillen		
Date(s):	June 14, 2006		

B. References

CFR 47, Part 90, Subpart I	Federal Communication Commission, Code of Federal Regulations, Title 47, Part 90: General Technical Standards
CFR 47, Part 15, Subpart B	Electromagnetic Compatibility: Criteria for Radio Frequency Devices
ANSI C63.4:2003	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical And Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/NCSL Z540-1-1994	Calibration Laboratories and Measuring and Test Equipment - General Requirements
ANSI/ISO/IEC 17025:2000	General Requirements for the Competence of Testing and Calibration Laboratories
EIA/TIA-603-A-2004	Land Mobile FM or PM Communication Equipment Measurement and Performance Standards

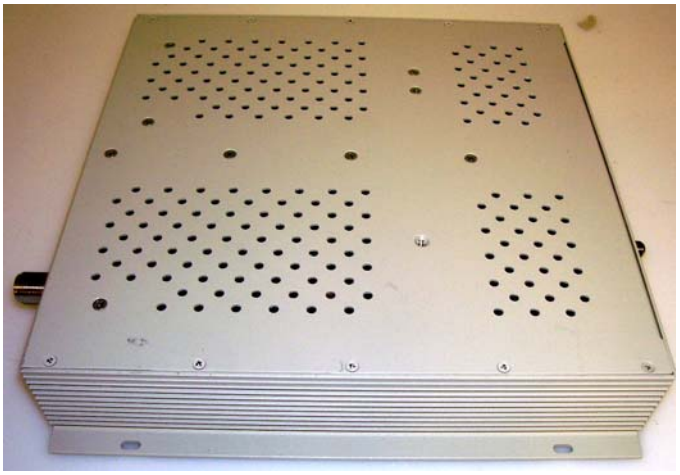
C. Test Site

All testing was performed at MET Laboratories, Inc., 4855 Patrick Henry Drive, Building 6, Santa Clara, CA 95054. 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. In accordance with §2.948(d), MET Laboratories has been accredited by the National Voluntary Laboratory Accreditation Program (Lab Code: 100273-0).

D. Description of Test Sample

The LGC Wireless FSN-1-MH-1Main Hub, FSN-EH-1 Expansion Hub, and FSN809019-1 RAU, is an RF amplification and distribution system. In the downlink direction, the Main Hub (MH) unit receives an RF signal, from a base station or antenna system, which is then converted to IF signal. The IF signal is sent to the Expansion Hub (EH) via fiber link. The expansion hub distributes the IF signal to the remote access unit (RAU) via coax cable. The RAU then converts the IF to RF signal which is outputted to an antenna. In the Uplink direction the signal is received from the antenna by the RAU, which is processed back to the base station via the expansion and main hubs. The coax connection from expansion hub to remote unit also carries 54VDC power the remote unit.



Photograph 1. LGC Wireless FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU

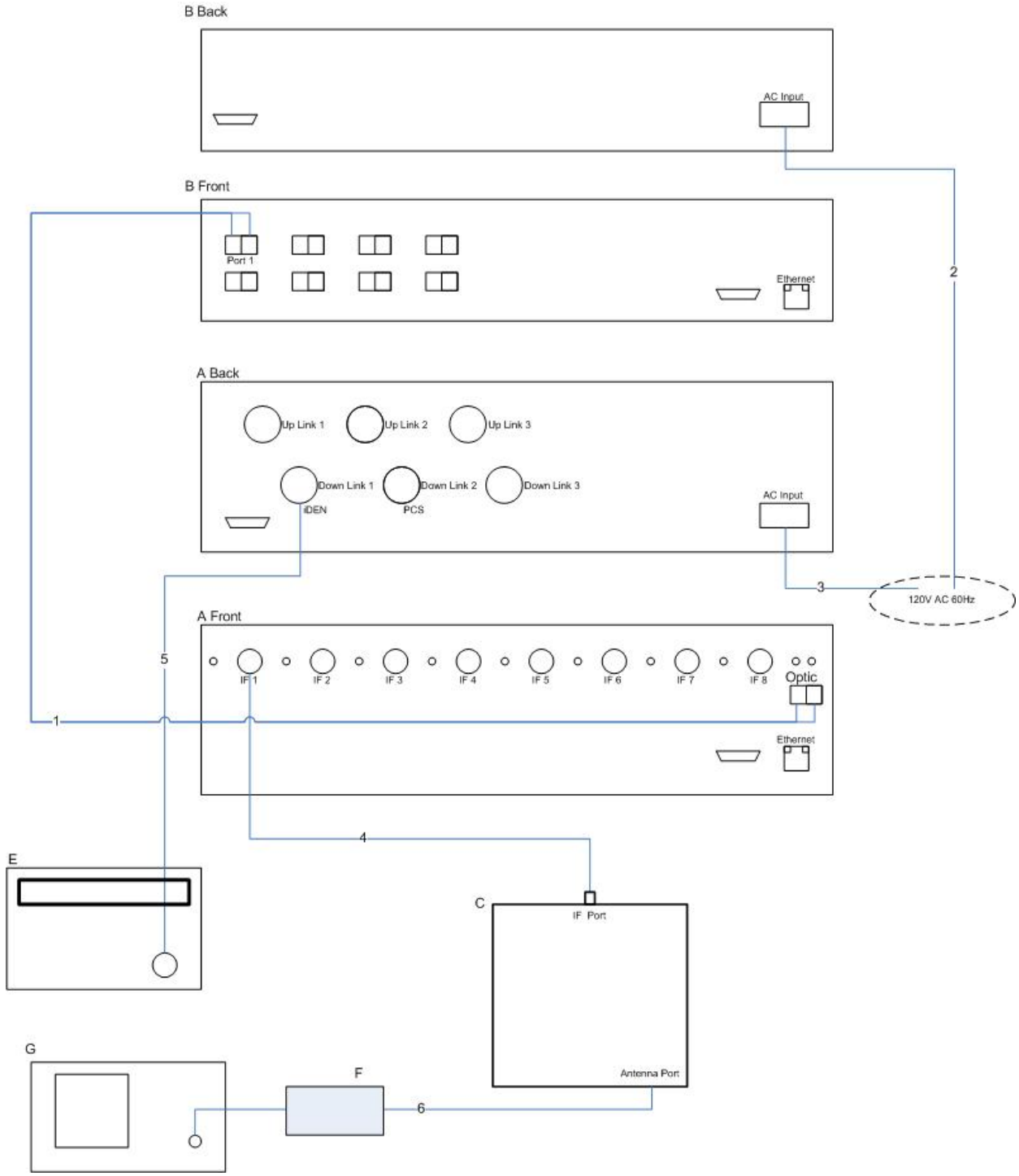


Figure 1. Block Diagram of Downlink Conducted Measurement

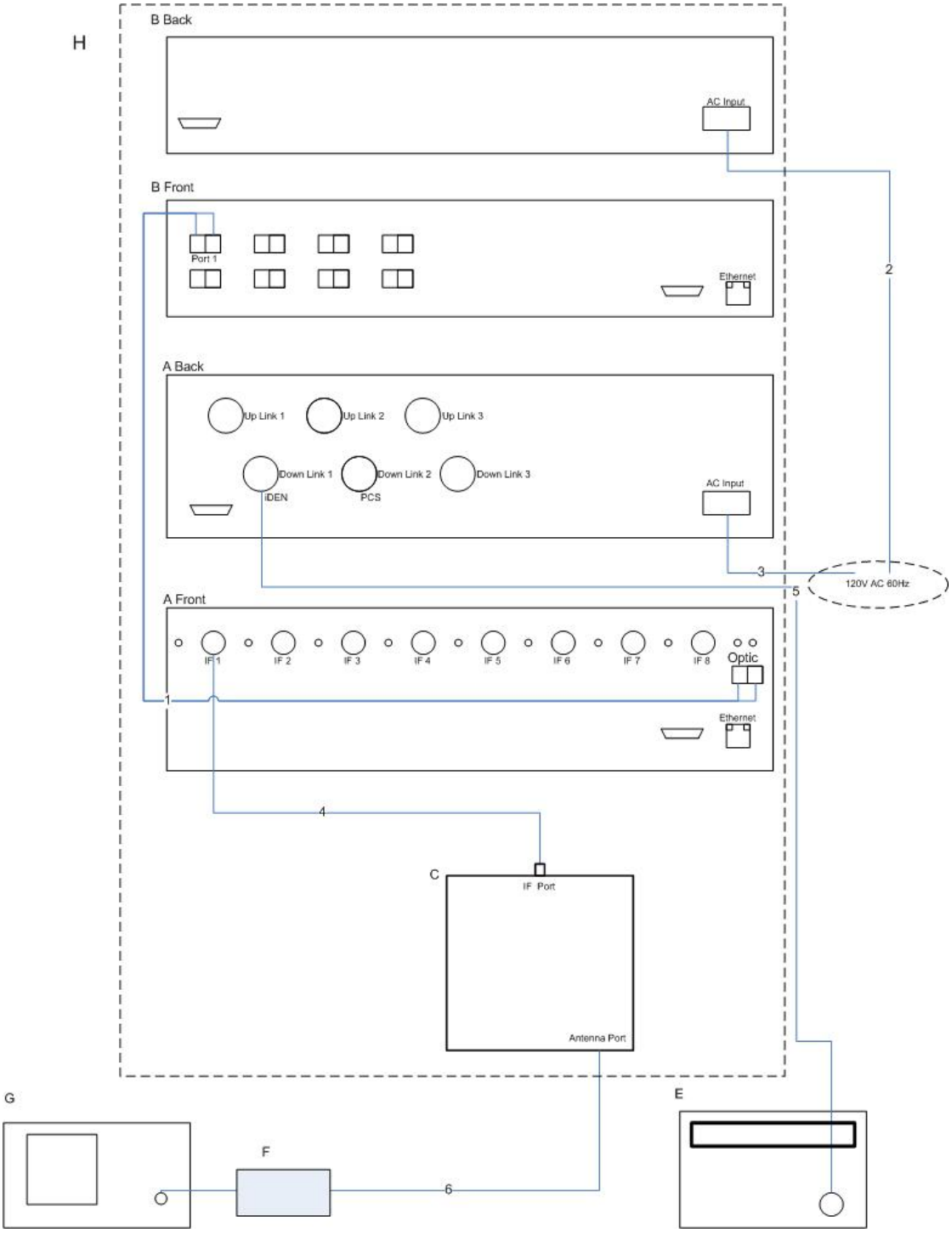


Figure 2. Block Diagram of Downlink Frequency Stability Measurement

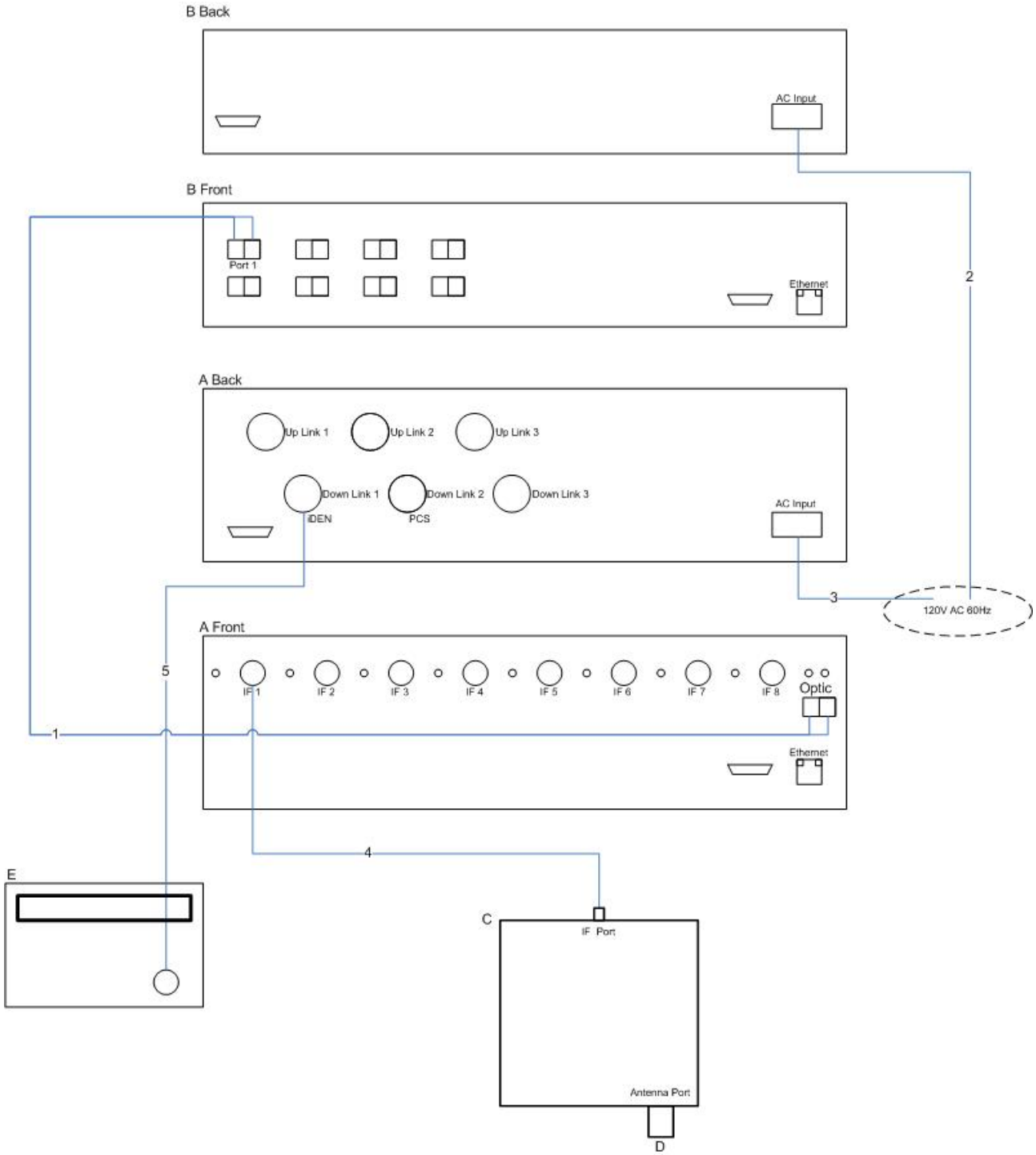


Figure 3. Block Diagram of Downlink Spurious Measurement

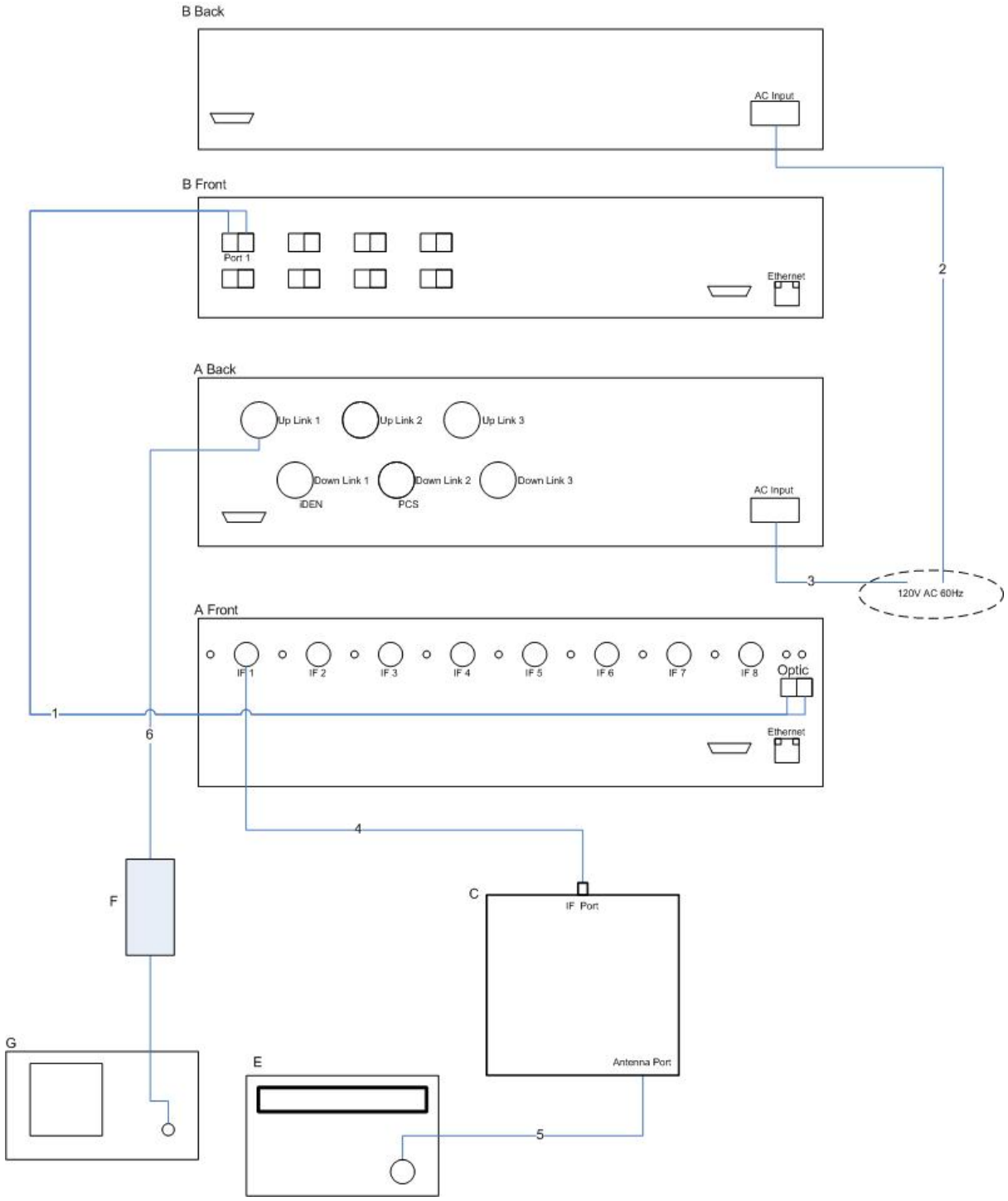


Figure 4. Block Diagram of Uplink Conducted Measurement

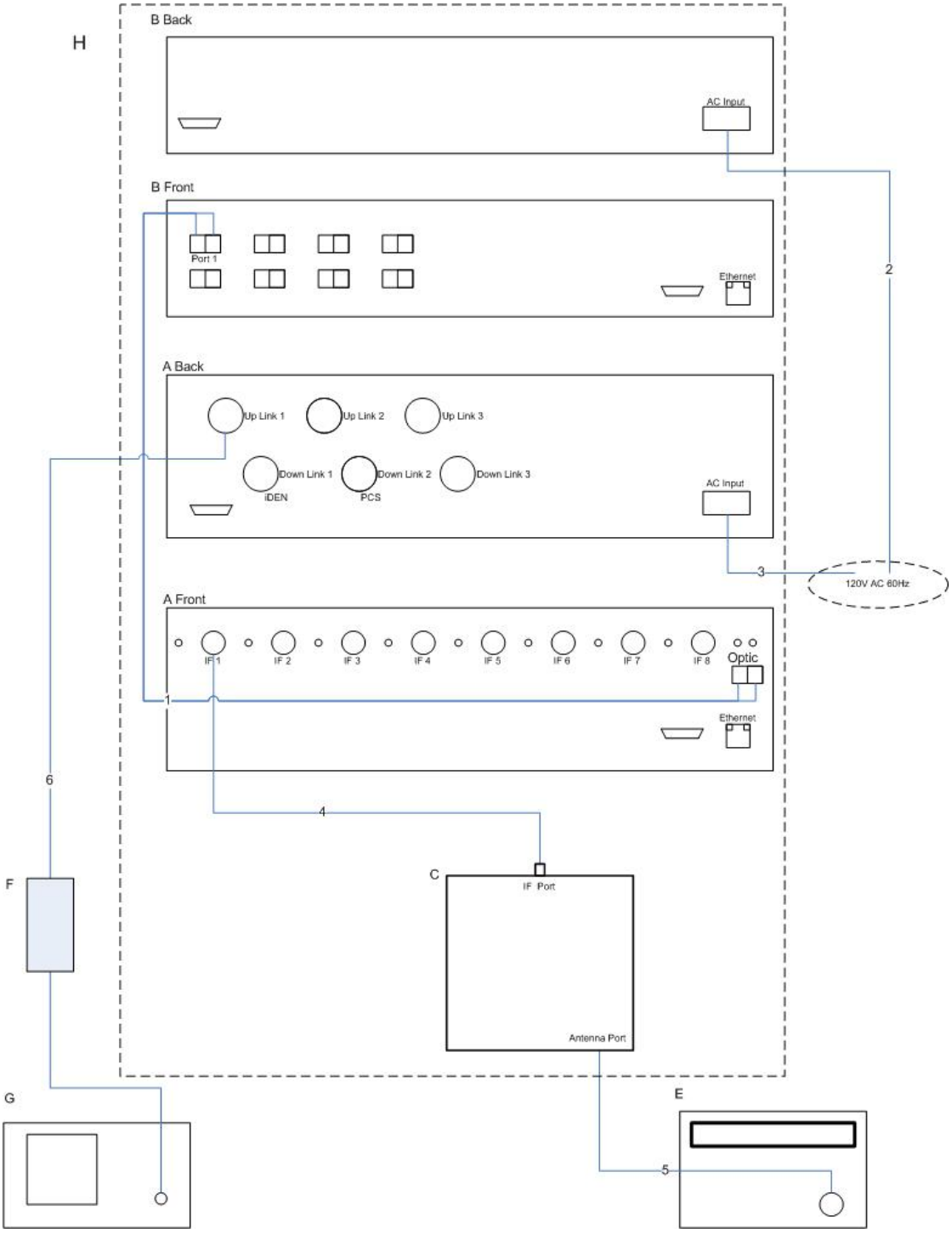


Figure 5. Block Diagram of Uplink Frequency Stability Measurement

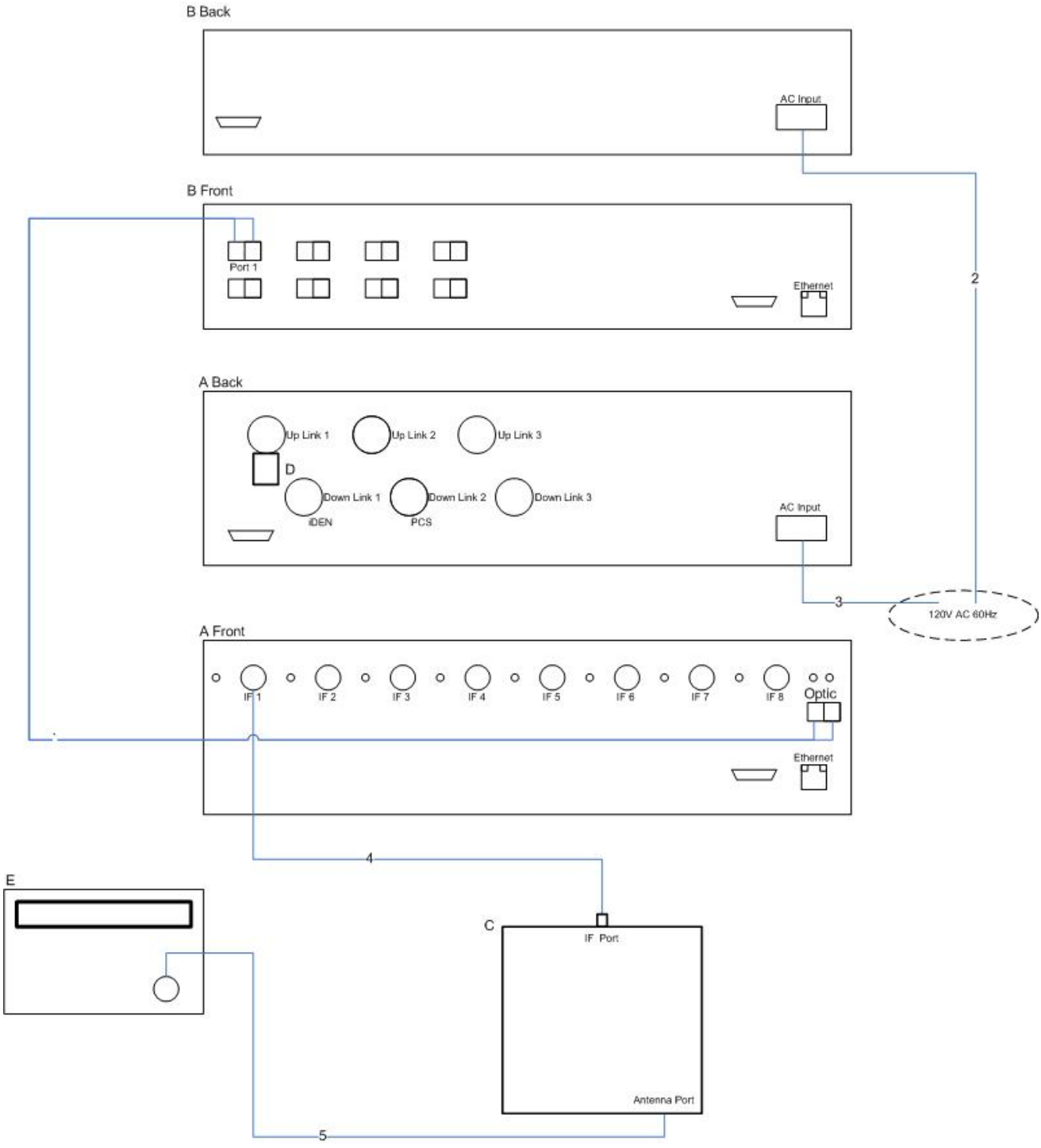


Figure 6. Block Diagram of Uplink Spurious Measurement

E. Equipment Configuration

The EUT was set up as outlined in Figure 1, Figure 2, Figure 3, Figure 4, Figure 5, and Figure 6. All cards, racks, etc., incorporated as part of the EUT is included in the following list.

Ref. ID	Name / Description	Model Number	Serial Number
A	Expansion Hub	710612-0	F0100HX8
B	Main Hub	710610-0 710612-0	F0100HX0 F0100HWR
C	RAU (Main board)	710690-0	F0100ZX0

Table 1. Equipment Configuration

F. Support Equipment

LGC Wireless supplied support equipment necessary for the operation and testing of the FSN-1-MH-1 Main Hub, FSN-EH-1 Expansion Hub and FSN 809019-1 RAU. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number
D	Signal Generator	HP	E4432B
E	50 Ohms Terminator	Narda	375BNB
F	Amplifier	Mini-Circuit	ZHL-4240W
G	Spectrum Analyzer	HP	E4407B

Table 2. Support Equipment

* - The 'Customer Supplied Calibration Data' column will be marked as either not applicable, not available, or will contain the calibration date supplied by the customer.

G. 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
Spurious, Radiated & Conducted Emission (Down-Link)						
1	A Front, Optic Tx Rx	Single Mode Optic	2	2	No	B, Port 1 Rx Tx
2	B Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
3	A Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
4	A Front, IF 1	Coax	1	30	Yes	C, IF Port
5	A Back, Down-Link 1	Coax	1	5	Yes	E
Spurious, Radiated & Conducted Emission (Up-Link)						
1	A Front, Optic Tx Rx	Single Mode Optic	2	2	No	B, Port 1 Rx Tx
2	B Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
3	A Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
4	A Front, IF 1	Coax	1	30	Yes	C, IF Port
5	C, Antenna Port	Coax	1	5	Yes	E
Conducted Measurement (Up-Link)						
1	A Front, Optic Tx Rx	Single Mode Optic	2	2	No	B, Port 1 Rx Tx
2	B Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
3	A Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
4	A Front, IF 1	Coax	1	30	Yes	C, IF Port
5	C, Antenna Port	Coax	1	5	Yes	E
6	A Back, Up-Link 1	Coax	1	1	Yes	F
Spurious Emission (Down-Link)						
1	A Front, Optic Tx Rx	Single Mode Optic	2	2	No	B, Port 1 Rx Tx
2	B Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
3	A Back, AC Input	AC PWR Cord	1	2	No	AC PWR Outlet
4	A Front, IF 1	Coax	1	30	Yes	C, IF Port
5	A Back, Down-Link 1	Coax	1	5	Yes	E
6	C, Antenna Port	Coax	1	1	Yes	F

Table 3. Ports and Cabling Information

H. Mode of Operation

Uplink mode: Simulation signal is being generated from Signal Generator then feed into Antenna port of RAF. Output is monitored by Spectrum analyzer through Hub's uplink port.

Downlink Mode: Simulation signal is being generated from Signal Generator then feed into Downlink port of hub. Output is monitored by Spectrum analyzer through RAU Antenna port.

I. Method of Monitoring EUT Operation

A Spectrum Analyzer and a Power Meter was use to monitor the EUT's transmitter channel and power output.

J. Modifications

a.) Modifications to EUT

No modifications were made to the EUT.

b.) Modifications to Test Standard

No modifications were made to the EUT.

K. Disposition of EUT

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

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

Electromagnetic Compatibility Criteria for Unintentional Radiators

§15.107 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 semi-anechoic 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. 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 found compliant with the Class A requirement(s) of this section.

Test Engineer(s): Elijah Garcia

Test Date(s): June 7, 2006

Conducted Emissions - Voltage, AC Power, Top Unit

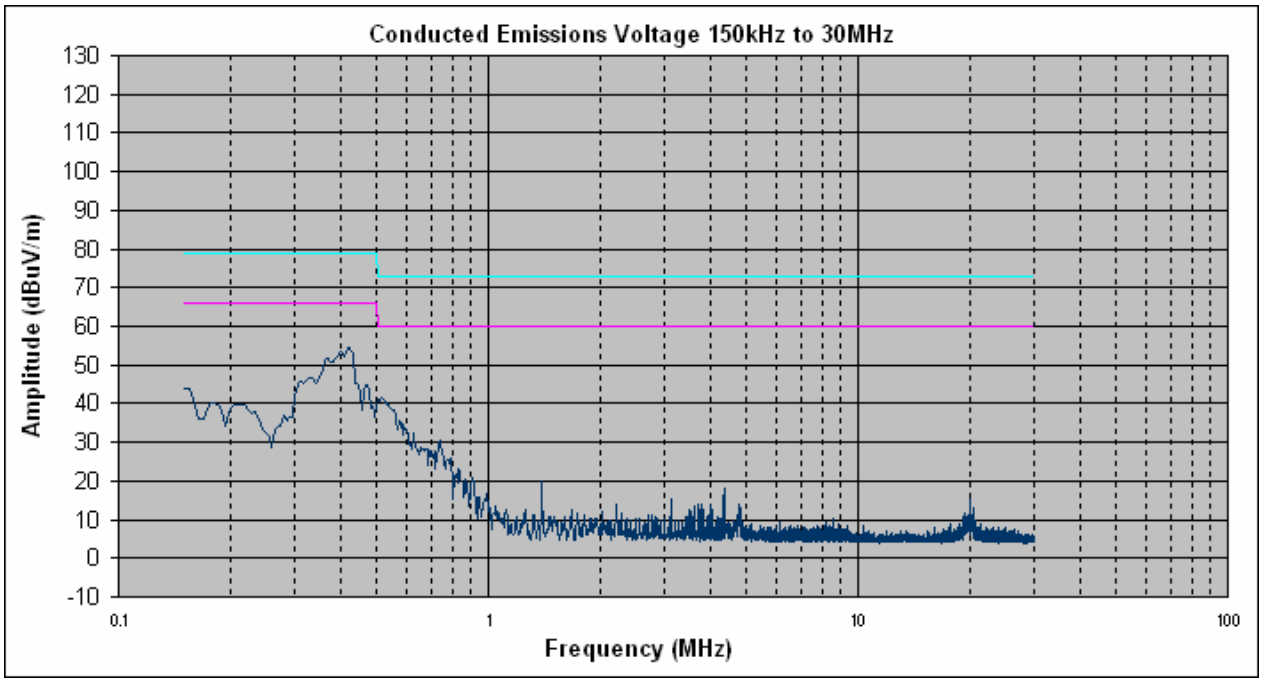
FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.209	31.83	79	Pass	-47.17	27.11	66	Pass	-38.89
0.412	51.83	79	Pass	-27.17	41.33	66	Pass	-24.67
0.745	26.11	73	Pass	-46.89	16.52	60	Pass	-43.48

Table 5. Conducted Emissions - Voltage, AC Power, Phase Line 120 VAC, Top Unit

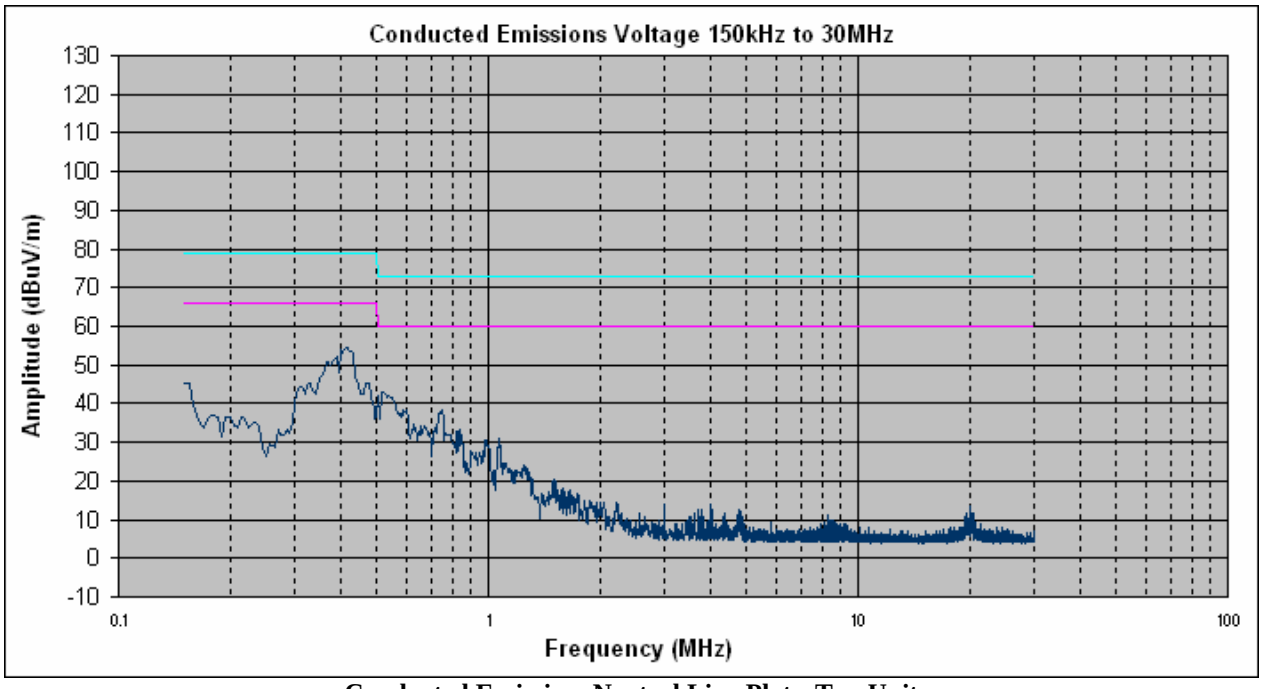
FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.165	29.58	79	Pass	-49.42	17.81	66	Pass	-48.19
0.208	28.82	79	Pass	-50.18	24.4	66	Pass	-41.6
0.414	51.15	79	Pass	-27.85	41.2	66	Pass	-24.8

Table 6. Conducted Emissions - Voltage, AC Power, Neutral Line 120 VAC, Top Unit

Conducted Emissions - Voltage, Worst Case Emissions, AC Power, Top Unit



Conducted Emission, Phase Line Plots, Top Unit



Conducted Emission, Neutral Line Plots, Top Unit

Conducted Emissions - Voltage, AC Power, Expansion Hub

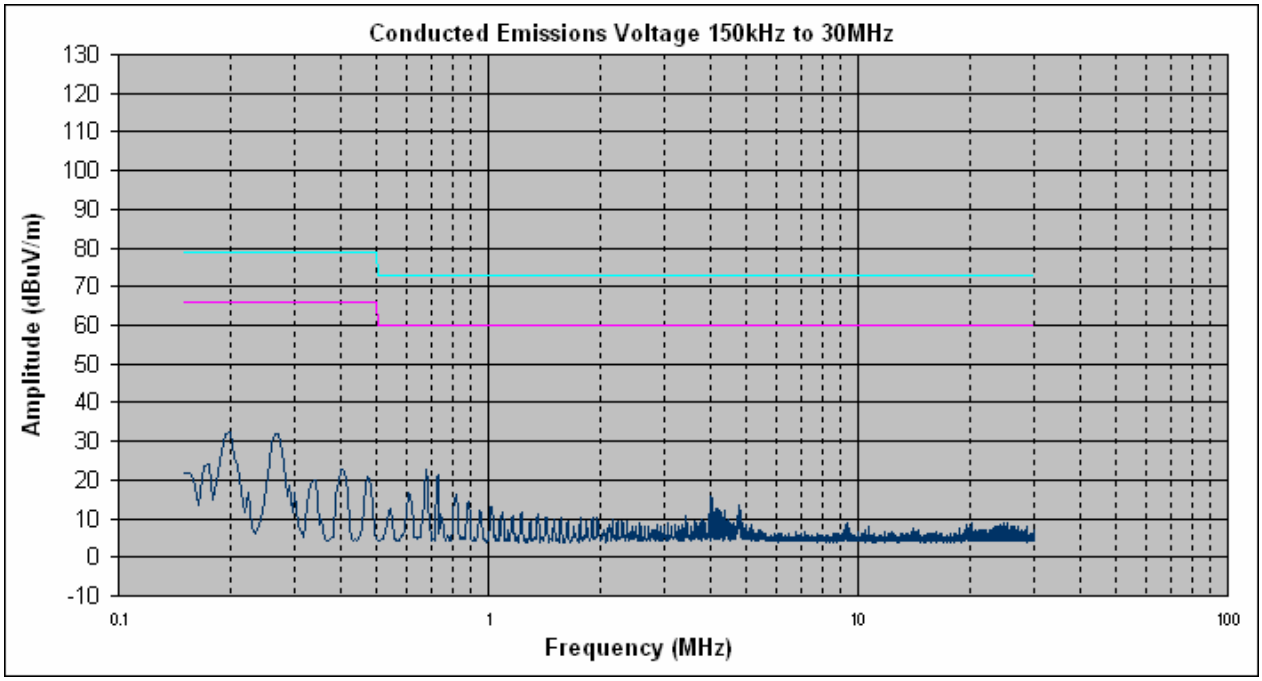
FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	Results QP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	Results AVG	Margin (dB) AVG
0.2	31.71	79	Pass	-47.29	28.57	66	Pass	-37.43
0.271	31.48	79	Pass	-47.52	31.31	66	Pass	-34.69
0.677	17.17	73	Pass	-55.83	15.62	60	Pass	-44.38

Table 7. Conducted Emissions - Voltage, AC Power, Phase Line 120 VAC, Expansion Hub

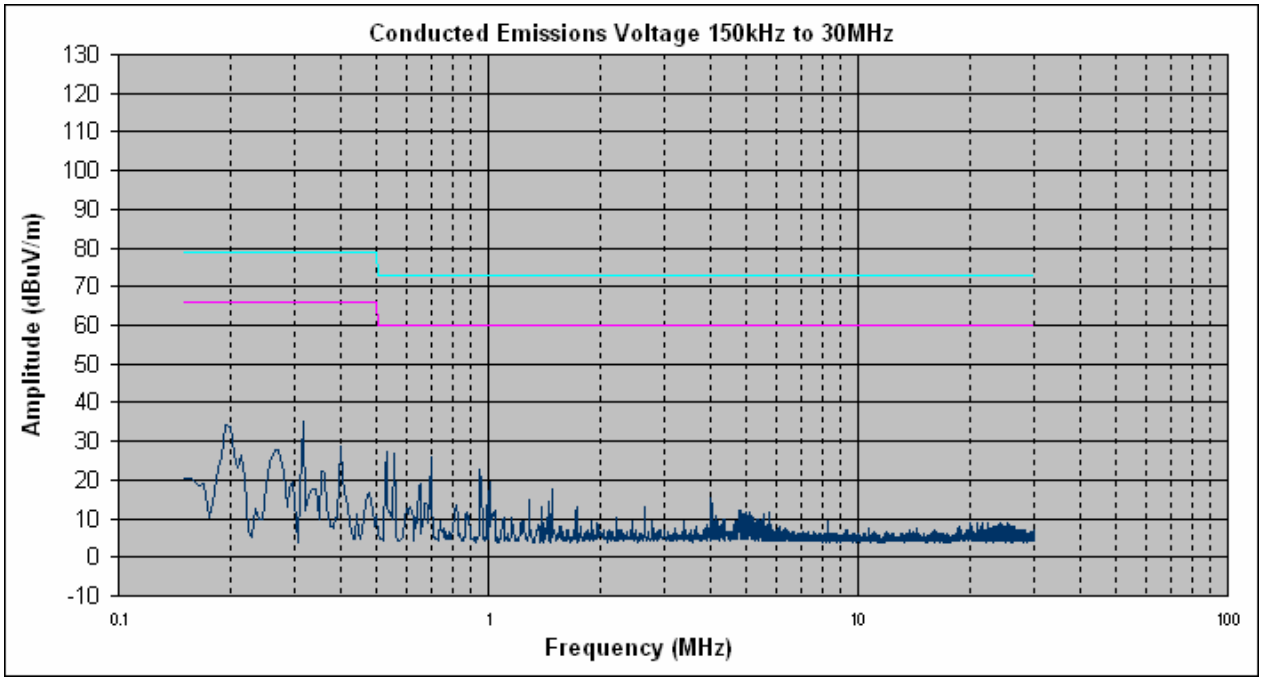
FREQ. (MHz)	Corrected Amplitude (dBuV) QP	Limit (dBuV) QP	ResultsQP	Margin (dB) QP	Corrected Amplitude (dBuV) AVG	Limit (dBuV) AVG	ResultsAVG	Margin (dB) AVG
0.202	29.77	79	Pass	-49.23	24.1	66	Pass	-41.9
0.271	26.99	79	Pass	-52.01	25.43	66	Pass	-40.57
0.407	16.51	79	Pass	-62.49	15.33	66	Pass	-50.67

Table 8. Conducted Emissions - Voltage, AC Power, Neutral Line 120 VAC, Expansion Hub

Conducted Emissions - Voltage, Worst Case Emissions, AC Power, Expansion Hub



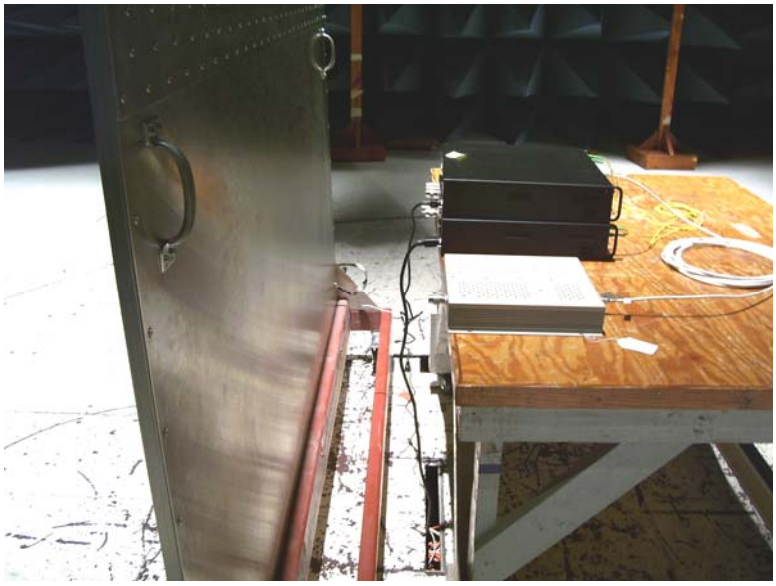
Conducted Emission, Phase Line Plots, Expansion Hub



Conducted Emission, Neutral Line Plots, Expansion Hub

Conducted Emission Limits Test Setup

Photograph 2. Conducted Emissions Test Setup, Front View



Photograph 3. Conducted Emissions Test Setup, Back View

Electromagnetic Compatibility Criteria for Unintentional Radiators

§15.109 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 B 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 wooden table inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 10 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.

Test Results: The EUT was found compliant with the Class A requirement(s) of this section.

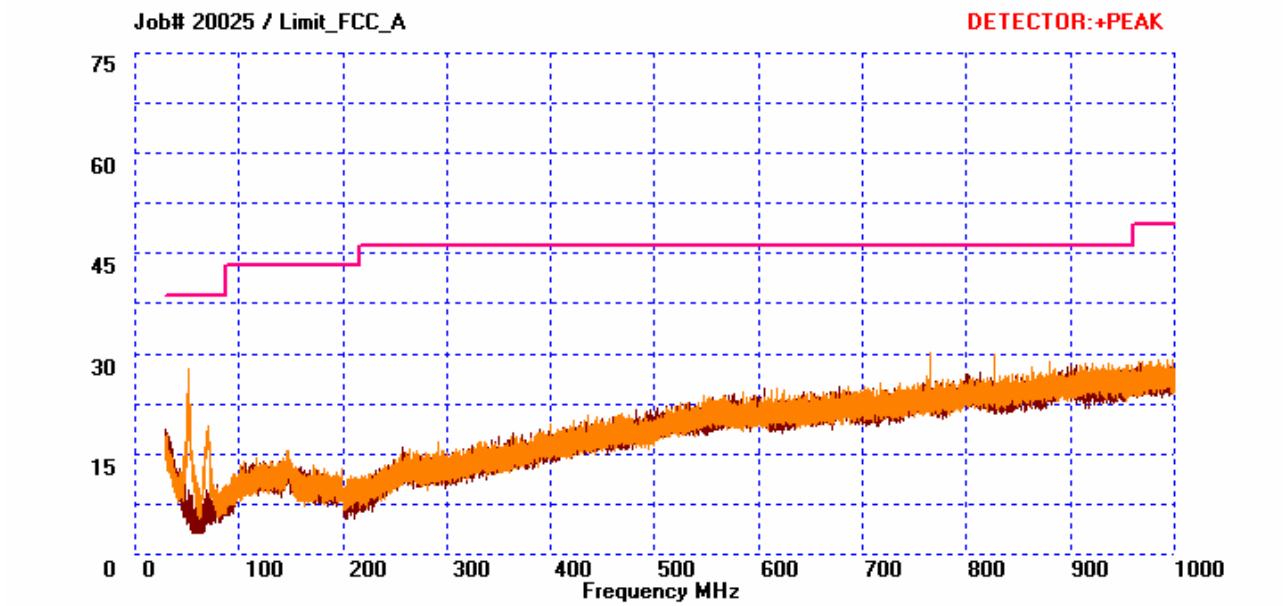
Test Engineer(s): Elijah Garcia

Test Date(s): June 7, 2006

Radiated Emissions Limits Test Results, Class A, 30 MHz to 1 GHz

Frequency (MHz)	Antenna Polarity (H/V)	EUT Azimuth (Degrees)	Antenna HEIGHT (m)	Uncorrected Amplitude QP Detector (dBuv)	Antenna Correction Factor (dB/m) (+)	Cable Loss (dB) (+)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
32.24	V	360	1	-4.82	15.90	0.94	12.03	39.00	-26.97
33.1	H	0	1.45	-3.20	16.65	0.95	14.40	39.00	-24.60
51.92	V	290	1.63	15.25	7.02	1.18	23.44	39.00	-15.56
69.88	V	211	1	11.62	5.48	1.38	18.48	39.00	-20.53
765.04	V	247	1.94	12.24	19.95	5.27	37.46	46.40	-8.94
826.04	V	219	1	7.63	19.72	5.58	32.92	46.40	-13.48

Table 10. Radiated Emissions Limits Test Results, Class A, 30 MHz to 1 GHz



Radiated Emissions, Test Results, Class A, 30 MHz to 1 GHz

Radiated Emissions Limits Test Results, Class A, 1 GHz to 10 GHz

Frequency (GHz)	Azimuth (Degrees)	Antenna Polarity (H/V)	Height (m)	Raw Amp. @ 3m (Avg)	P.Amp (dB)	Ant.Cor. Factor (dB/m)	Cable Loss (dB)	Dist.Cor Factor (dB)	EUT Field Strength Final Amp. (dBuV/m)	Limit per FCC pt 15 @ 3m (dBuV/m)	Delta (dB)
1.65	201	H	1	53.82	35.21	25.90	2.75	10.46	36.80	49.5	-12.70
1.65	358	V	1.02	53.23	35.21	25.81	2.75	10.46	36.13	49.5	-13.37
1.72	180	V	2.7	50.02	35.23	26.14	2.85	10.46	33.32	49.5	-16.18
2	275	H	1.3	62.65	35.23	26.25	2.86	10.46	46.07	49.5	-3.43
3.177	357	H	1.05	56.04	35.52	30.61	4.17	10.46	44.84	49.5	-4.66
***3.177**	**2**	**V**	**1.02**	**59.62**	**35.52**	**30.42**	**4.17**	**10.46**	**48.23**	**49.5**	**-1.27**
3.45	300	H	1.42	55.04	35.33	31.18	4.36	10.46	44.78	49.5	-4.72
3.45	192	V	1.5	55.1	35.33	30.97	4.36	10.46	44.64	49.5	-4.86
3.825	200	V	1	43.04	35.15	32.13	4.61	10.46	34.17	49.5	-15.33

Table 11. Radiated Emissions Limits Test Results, Class A, 1 GHz to 10 GHz

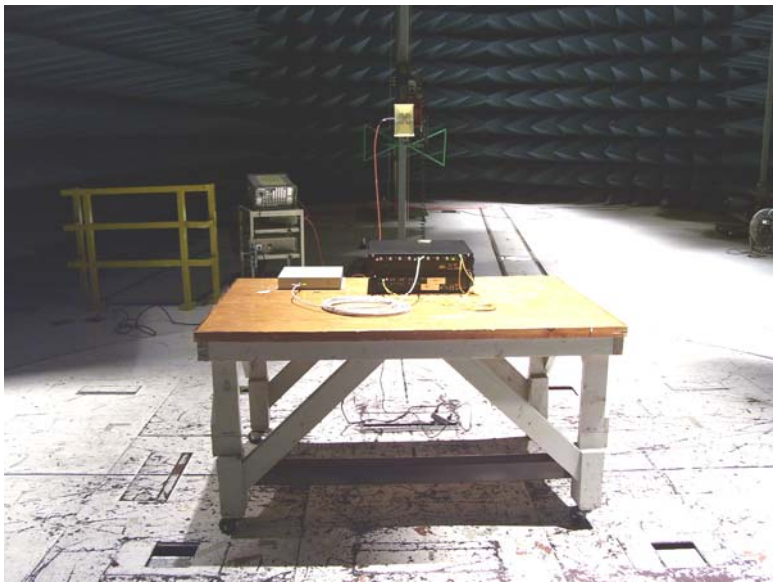
Note 1: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.

Radiated Emission Limits Test Setup, 30 MHz to 1 GHz

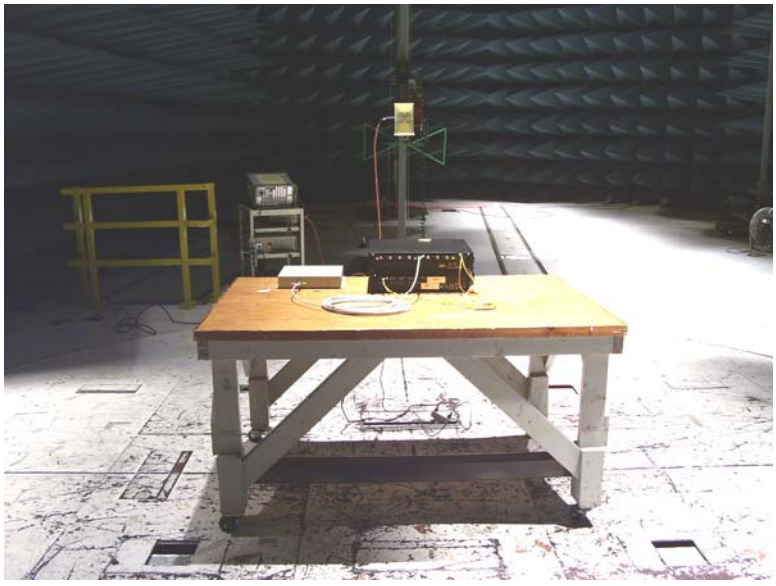
Photograph 4. Radiated Emission Limits Test Setup, 30 MHz to 1 GHz, Front View

Photograph 5. Radiated Emission Limits Test Setup, 30 MHz to 1 GHz, Back View

Radiated Emission Limits Test Setup, 1 GHz to 10 GHz



Photograph 6. Radiated Emission Limits Test Setup, 1 GHz to 10 GHz, Front View



Photograph 7. Radiated Emission Limits Test Setup, 1 GHz to 10 GHz, Back View

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

Electromagnetic Compatibility Criteria Intentional Radiators

§2.1046 RF Power Output

Test Requirement(s): **§2.1046 and §90.205**

Test Procedures: As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected through a Directional Coupler to a Spectrum Analyzer to monitor the frequency and to a Power Meter to measure the Peak and Average power. The EUT power was adjusted enough to produce maximum output power as specified in the owner's manual. The output power was then recorded with peak and average reading. Measurements were made at the low, mid and high channels.

Test Results: Equipment complies with 47CFR 2.1046 and 90.205

All RF Power output measurements were direct connection to RF output Terminal of EUT from a Power Meter.

800MHz iDEN Downlink				
Modulation	**Frequency (MHz)**	**Input Power dBm (mW)**	**Peak Output Power dBm (mW)**	**Modulated Output Power dBm (mW)**
16QAM	851	8dBm	26.41	22.35
16QAM	860	8dBm	26.90	23.15
16QAM	869	8dBm	25.32	21.98
800MHz iDEN Uplink				
Modulation	**Frequency (MHz)**	**Input Power dBm (mW)**	**Peak Output Power dBm (mW)**	**Modulated Output Power dBm (mW)**
16QAM	809	-33dBm	-13.50	-19.98
16QAM	815	-33dBm	-12.95	-18.47
16QAM	824	-33dBm	-13.58	-20.59

900MHz iDEN Downlink				
Modulation	**Frequency (MHz)**	**Input Power dBm (mW)**	**Peak Output Power dBm (mW)**	**Modulated Output Power dBm (mW)**
16QAM	935	8dBm	25.70	22.78
16QAM	938	8dBm	25.57	23.01
16QAM	941	8dBm	25.23	22.10
900MHz iDEN Uplink				
Modulation	**Frequency (MHz)**	**Input Power dBm (mW)**	**Peak Output Power dBm (mW)**	**Modulated Output Power dBm (mW)**
16QAM	896	-33dBm	-13.30	-19.42
16QAM	899	-33dBm	-12.82	-18.04
16QAM	902	-33dBm	-12.78	-17.84

Test Engineer(s): Shawn McMillen

Test Date(s): June 9, 2006

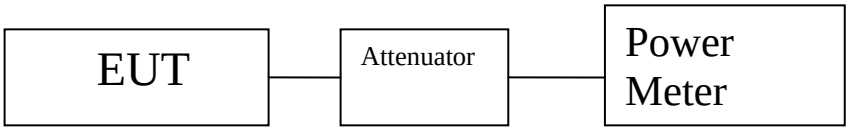


Figure 7. RF Power Output Test Setup

Electromagnetic Compatibility Criteria Intentional Radiators

§2.1049 Occupied Bandwidth

Test Requirement(s): **§2.1049 and §90.209**

Test Procedures: As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter monitoring the power output level.

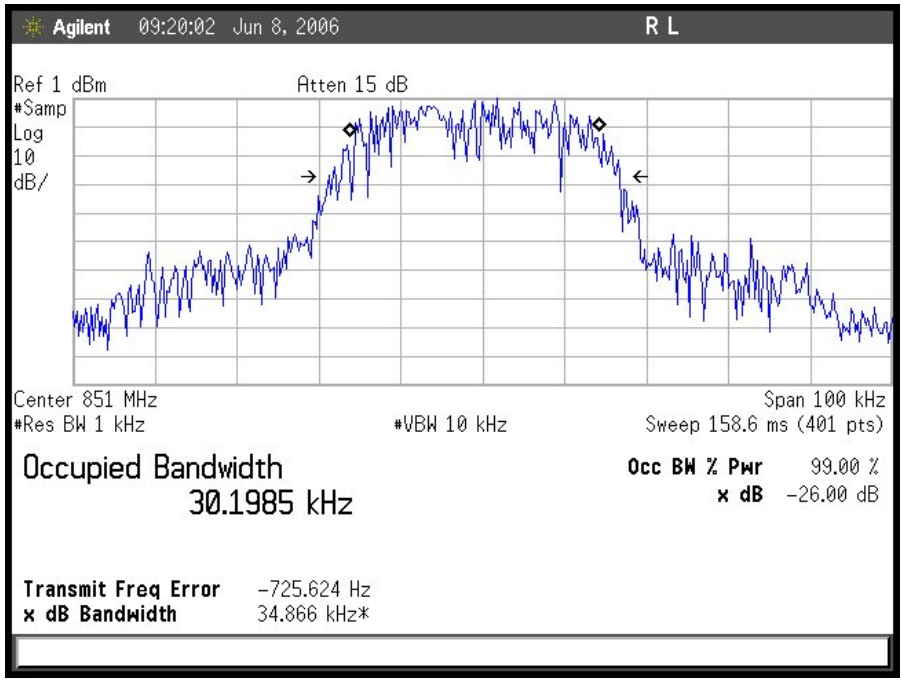
A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer and a Power Meter to monitor the output power level. The measured highest Average Power was set relative to zero dB reference. The RBW of the Spectrum Analyzer was set to at 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 90.209.

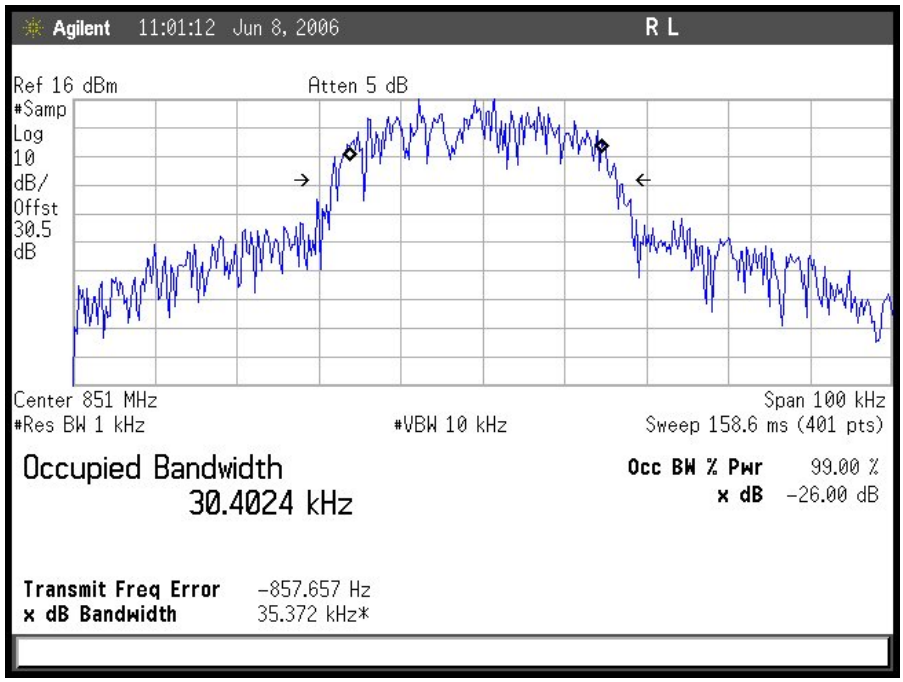
The following pages show measurements of occupied band widths going into and out of the EUT:

Test Engineer(s): Shawn McMillen

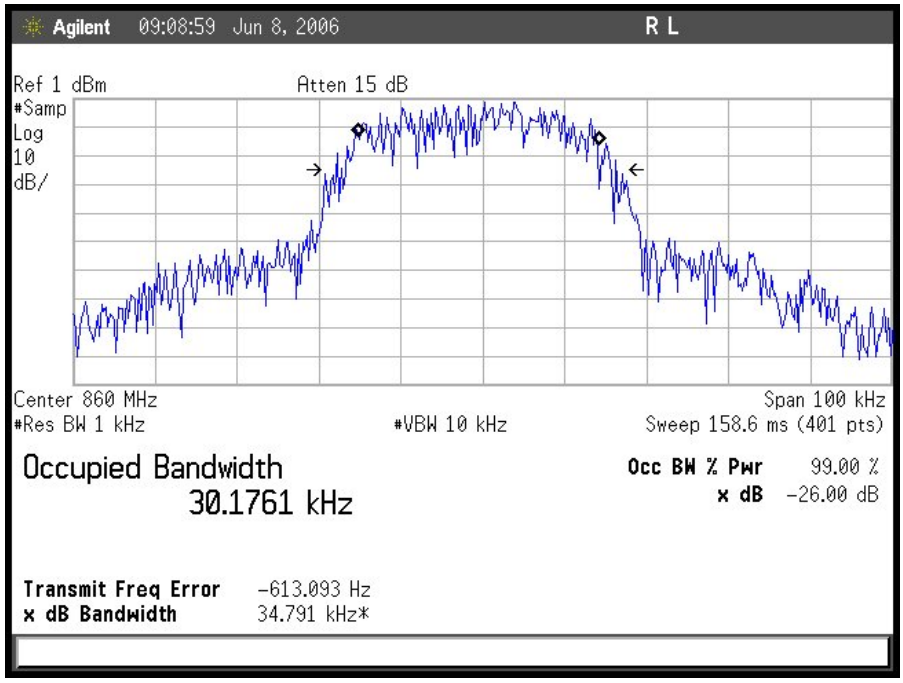
Test Date(s): June 8, 2006



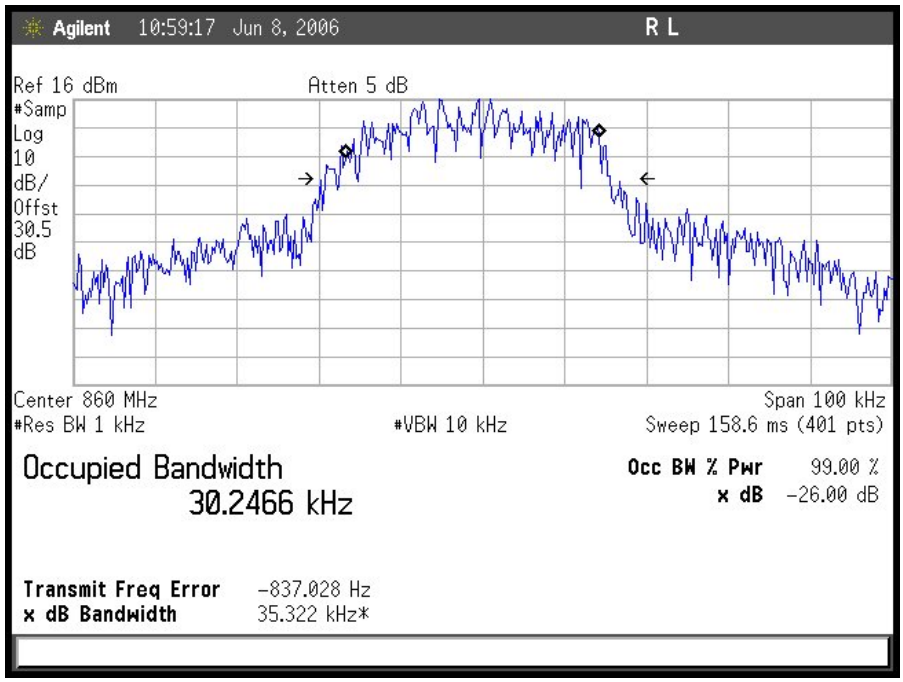
Plot 1. Occupied Bandwidth Downlink Low CH In 800 MHz Band



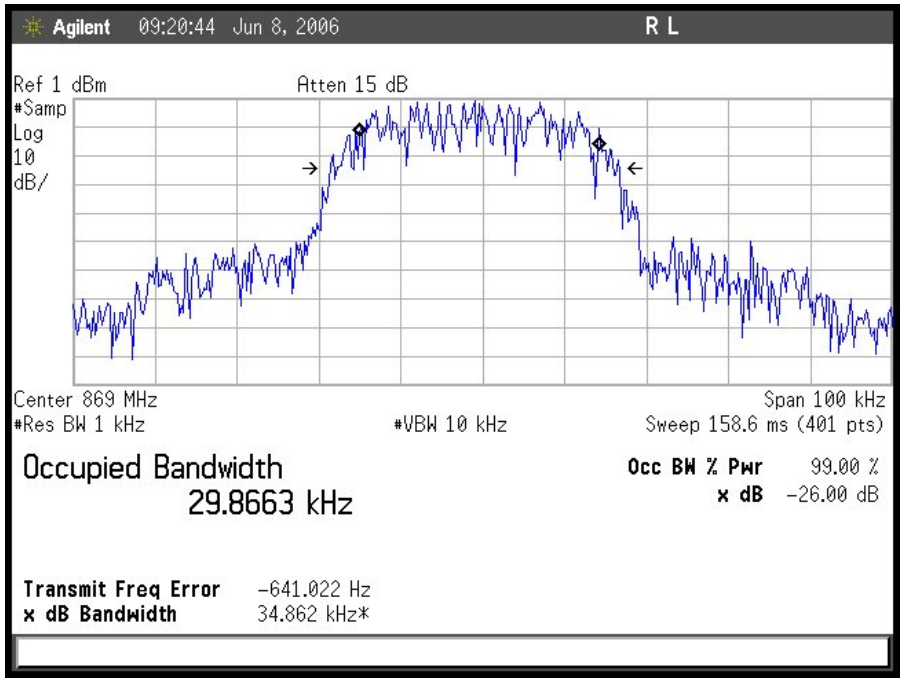
Plot 2. Occupied Bandwidth Downlink Low CH Out 800 MHz Band



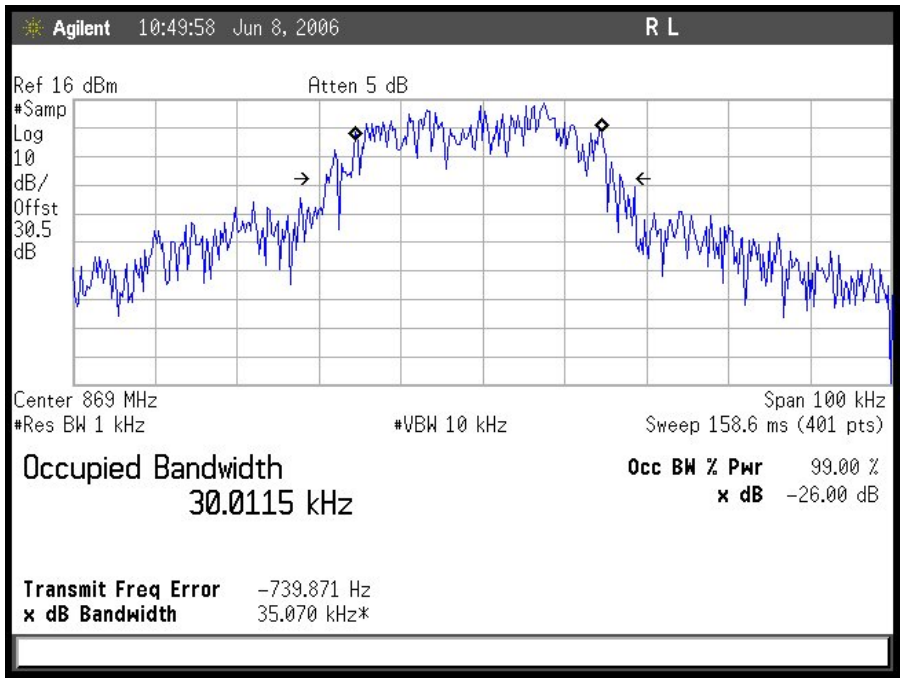
Plot 3. Occupied Bandwidth Downlink Mid CH In 800 MHz Band



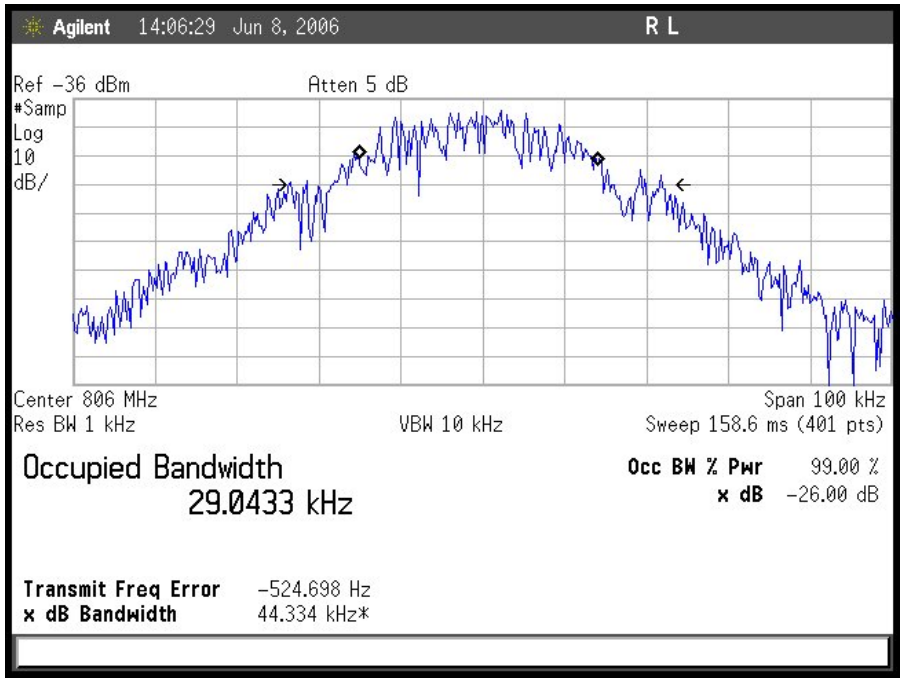
Plot 4. Occupied Bandwidth Downlink Mid CH Out 800 MHz Band



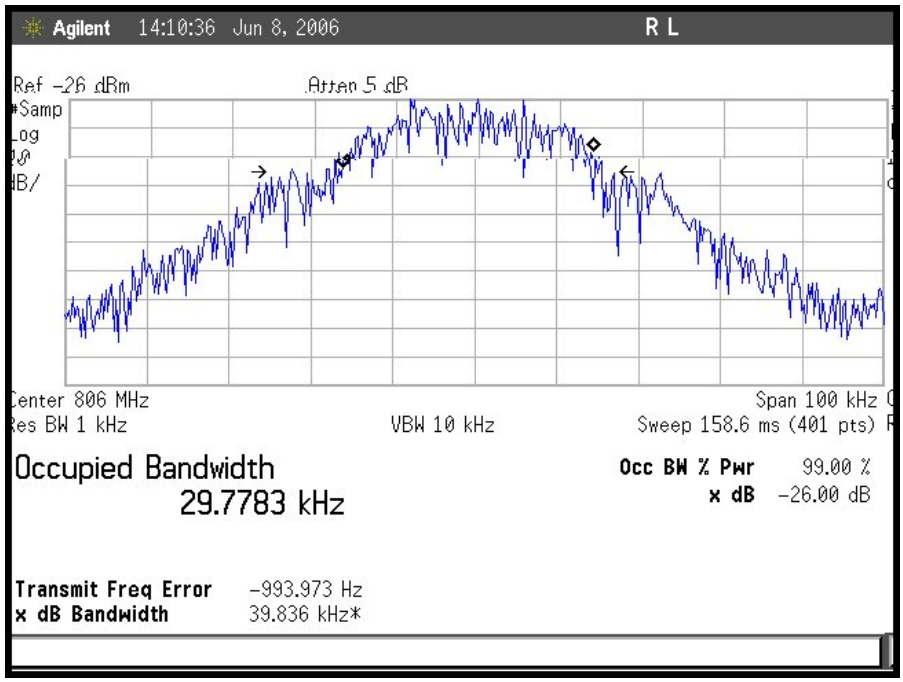
Plot 5. Occupied Bandwidth Downlink Hi CH In 800 MHz Band



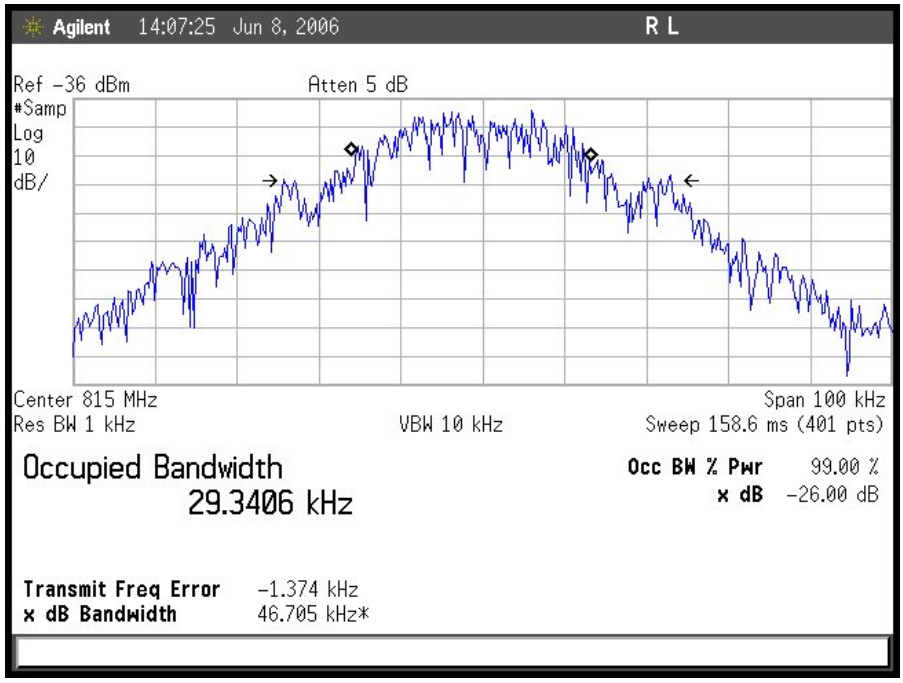
Plot 6. Occupied Bandwidth Downlink Hi CH Out 800 MHz Band



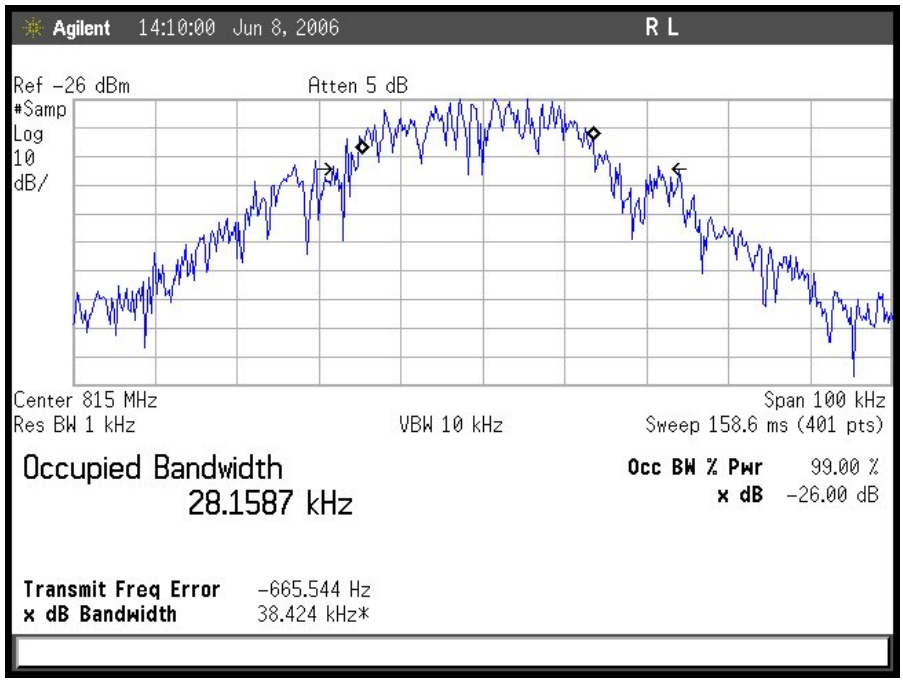
Plot 7. Occupied Bandwidth Uplink Low CH In 800 MHz Band



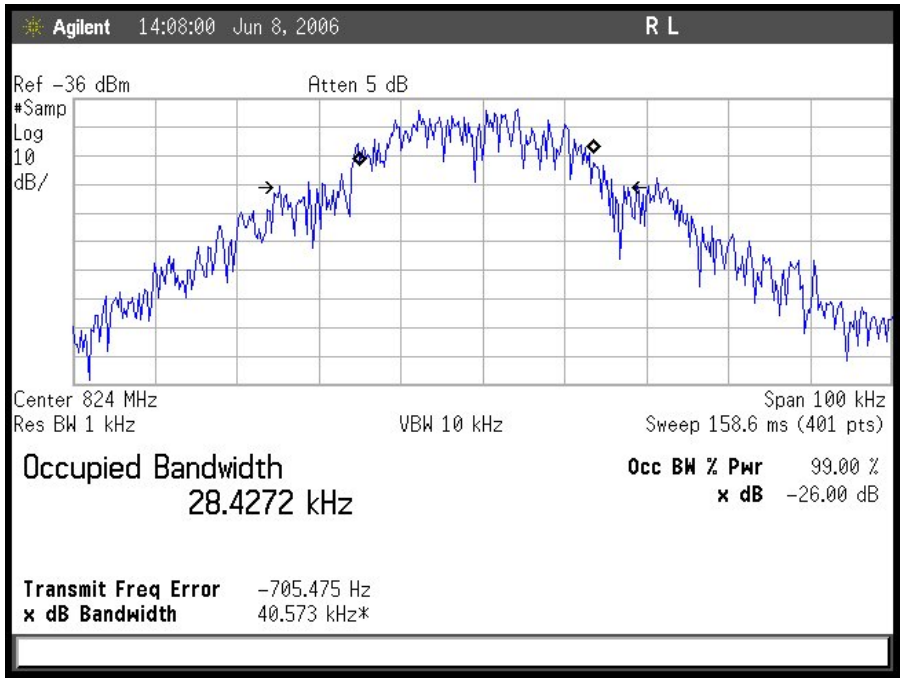
Plot 8. Occupied Bandwidth Uplink Low CH Out 800 MHz Band



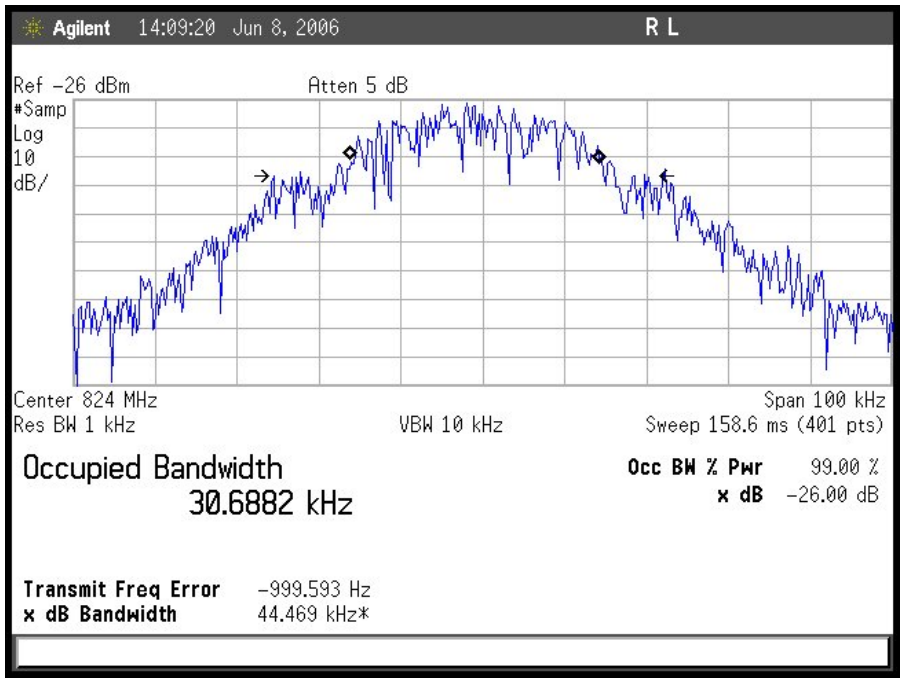
Plot 9. Occupied Bandwidth Uplink Mid CH In 800 MHz Band



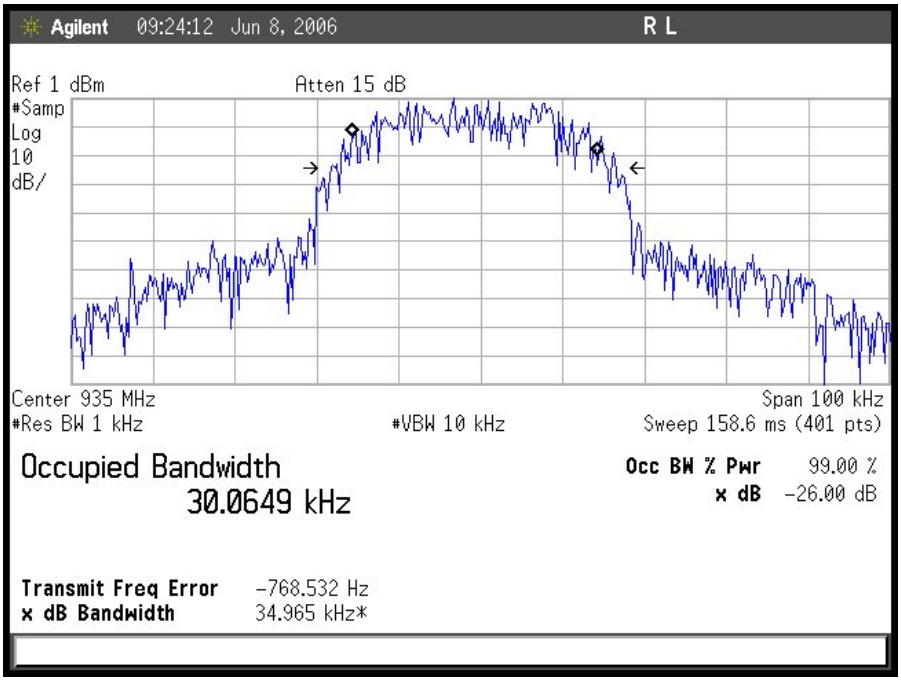
Plot 10. Occupied Bandwidth Uplink Mid CH Out 800 MHz Band



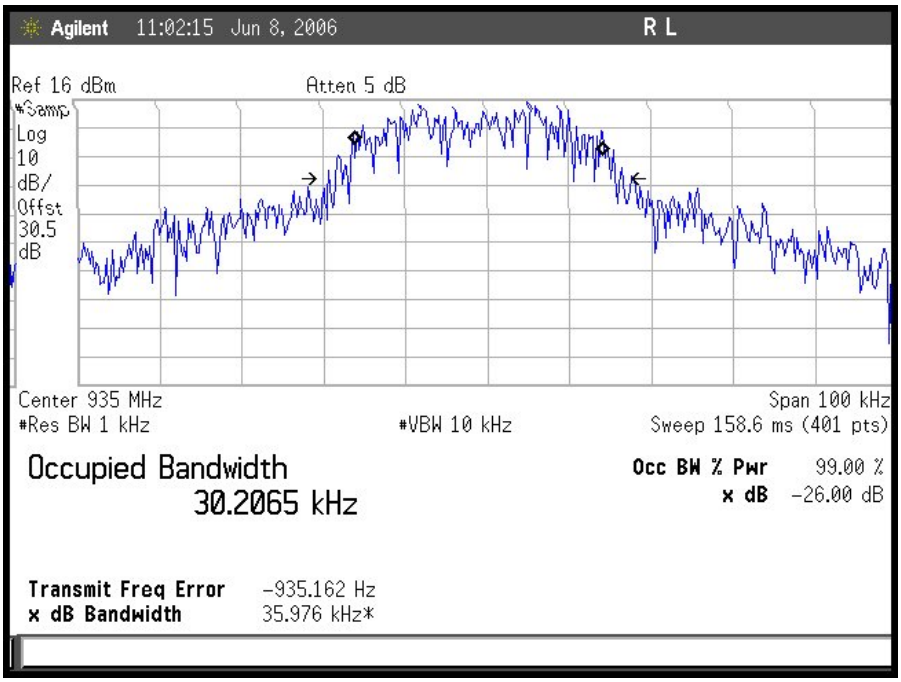
Plot 11. Occupied Bandwidth Uplink Hi CH In 800 MHz Band



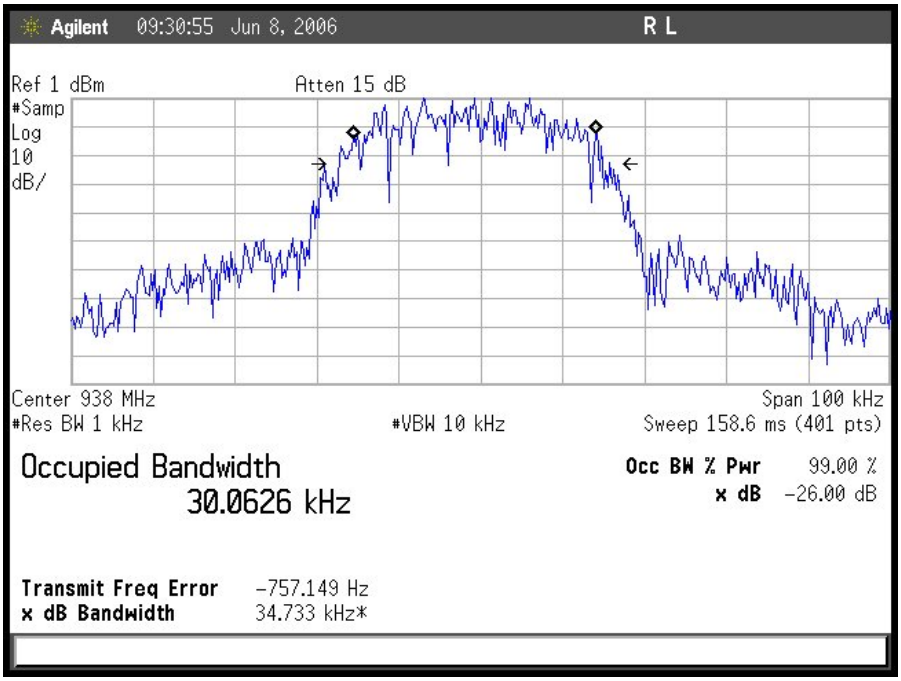
Plot 12. Occupied Bandwidth Uplink Hi CH Out 800 MHz Band



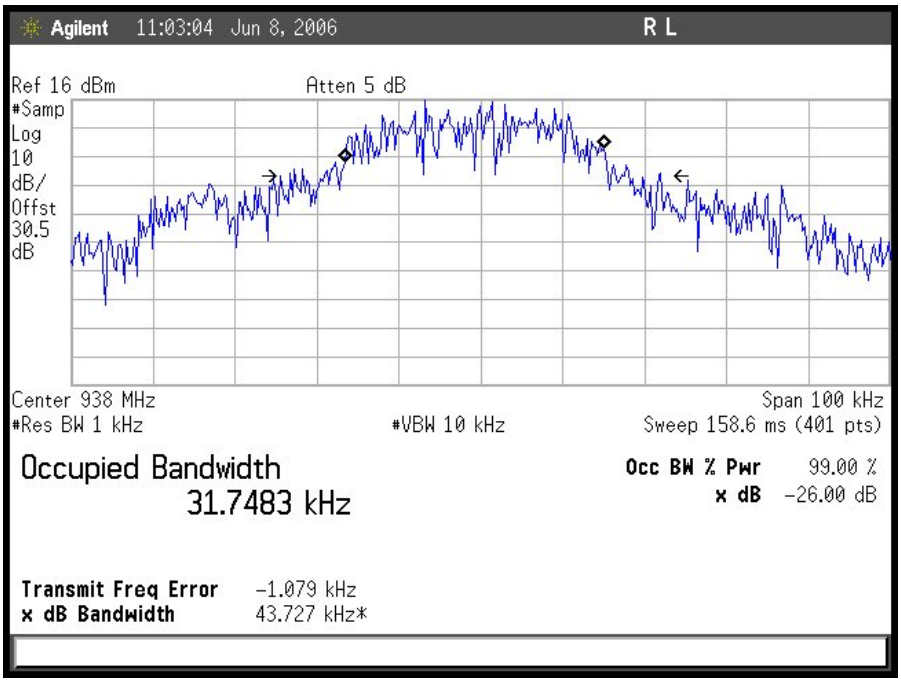
Plot 13. Occupied Bandwidth Downlink Low CH In 900 MHz Band



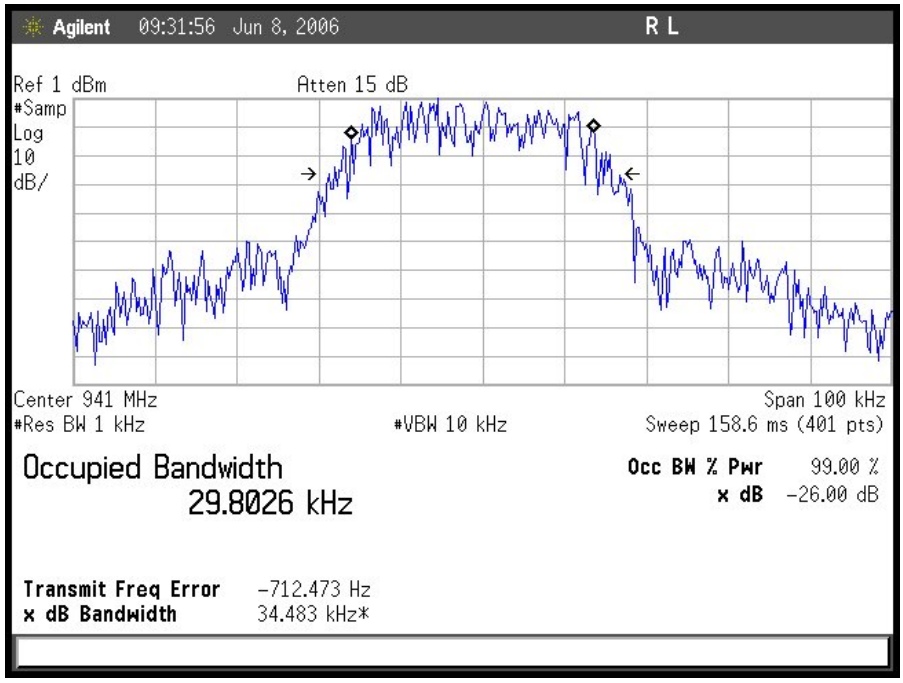
Plot 14. Occupied Bandwidth Downlink Low CH Out 900 MHz Band



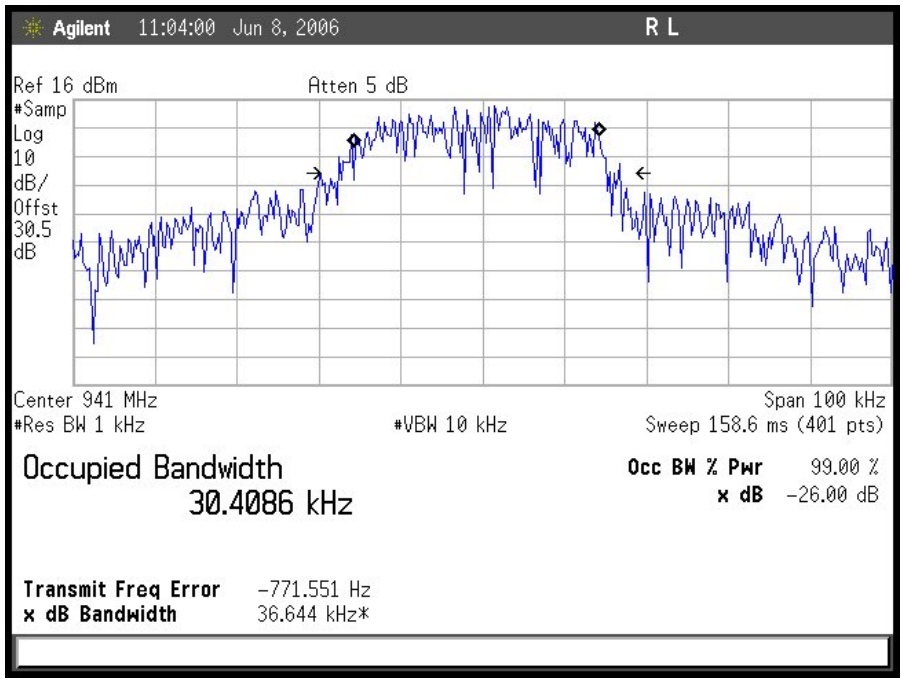
Plot 15. Occupied Bandwidth Downlink Mid CH In 900 MHz Band



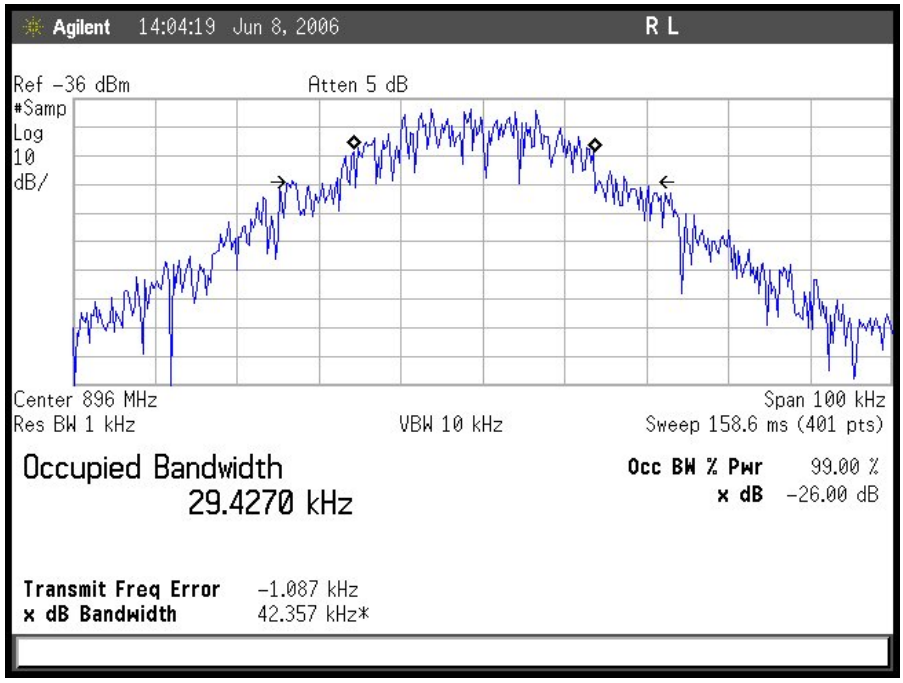
Plot 16. Occupied Bandwidth Downlink Mid CH Out 900 MHz Band



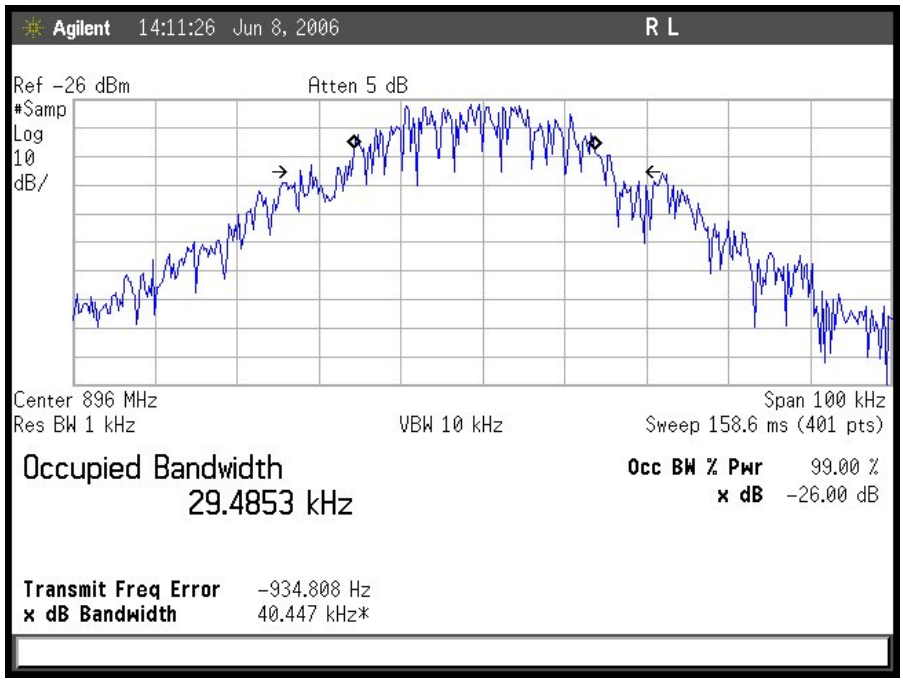
Plot 17. Occupied Bandwidth Downlink Hi CH In 900 MHz Band



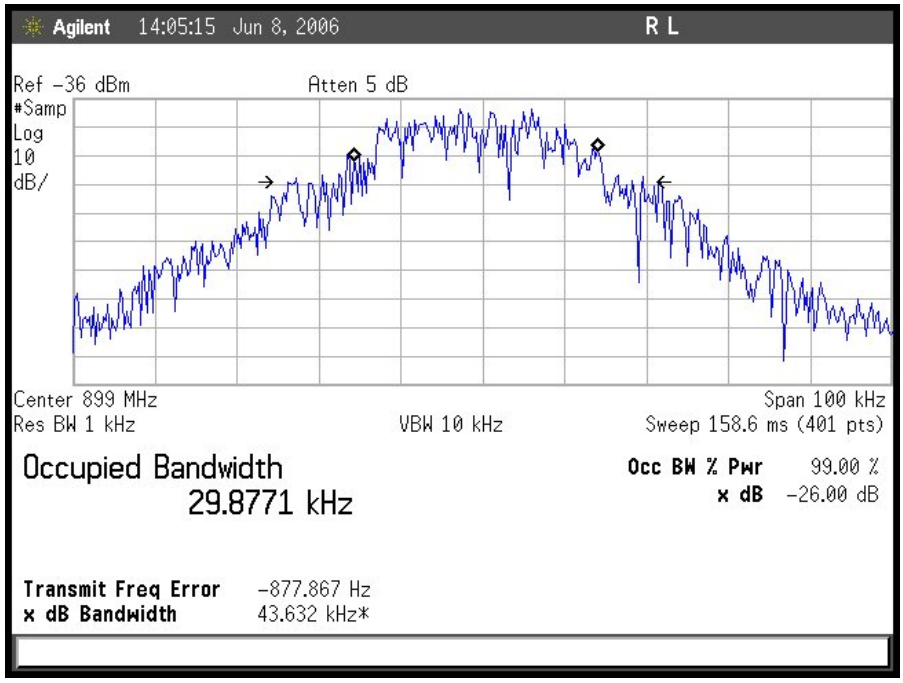
Plot 18. Occupied Bandwidth Downlink Hi CH Out 900 MHz Band



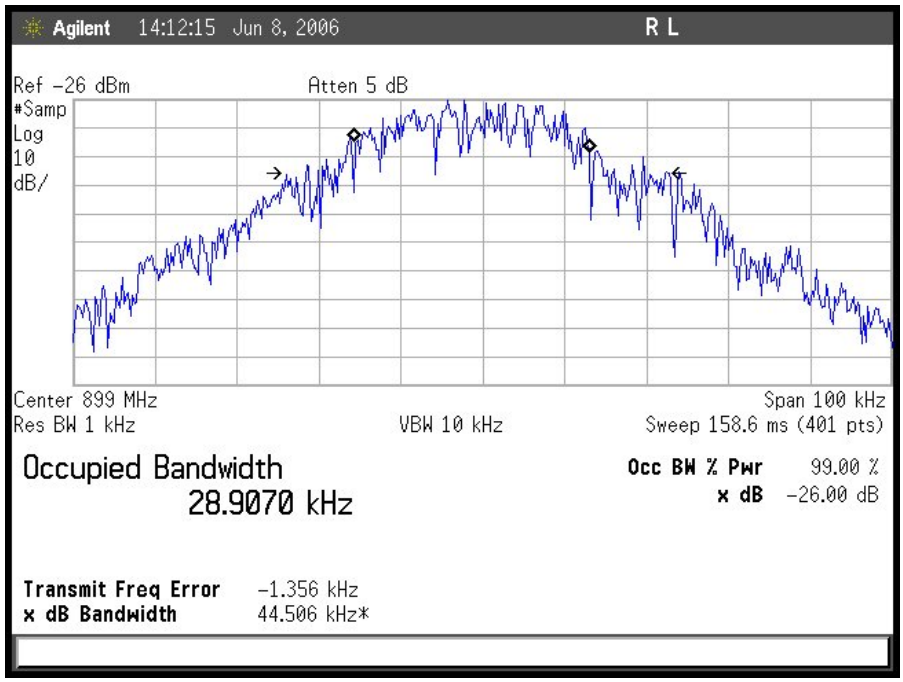
Plot 19. Occupied Bandwidth Uplink Low CH In 900 MHz Band



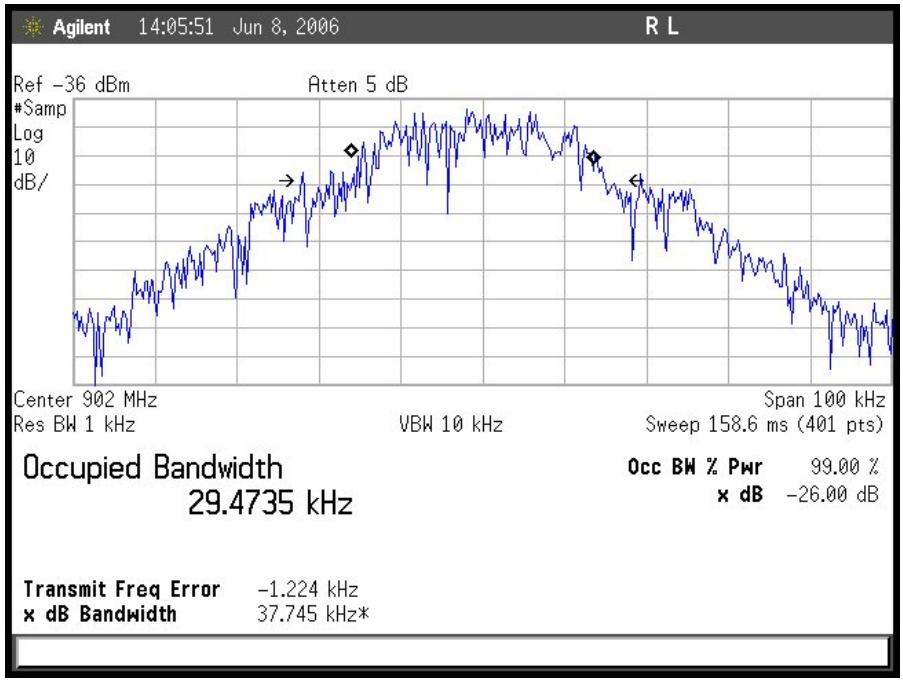
Plot 20. Occupied Bandwidth Uplink Low CH Out 900 MHz Band



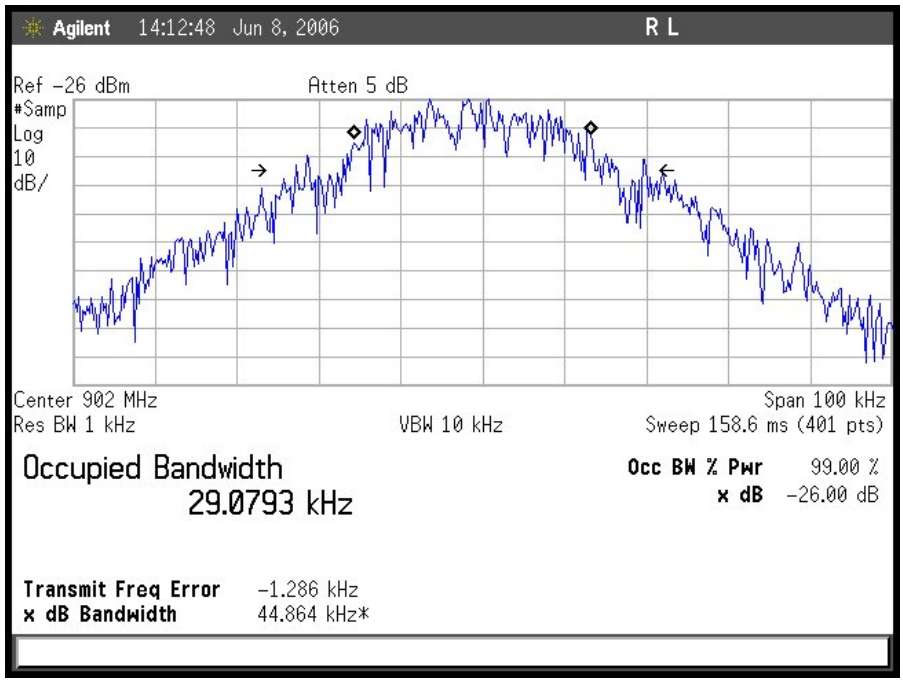
Plot 21. Occupied Bandwidth Uplink Mid CH In 900 MHz Band



Plot 22. Occupied Bandwidth Uplink Mid CH Out 900 MHz Band



Plot 23. Occupied Bandwidth Uplink Hi CH In 900 MHz Band



Plot 24. Occupied Bandwidth Uplink Hi CH Out 900 MHz Band

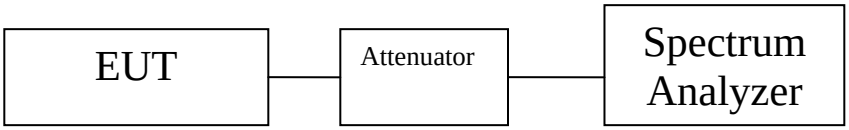


Figure 8. Occupied Bandwidth Test Setup

Electromagnetic Compatibility Criteria Intentional Radiators

§2.1051 Spurious Emissions at Antenna Terminals

Test Requirement(s): **§2.1051 and §90.210**

Test Procedures: As required by 47 CFR 2.1051, *spurious emissions at antenna terminal measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter.

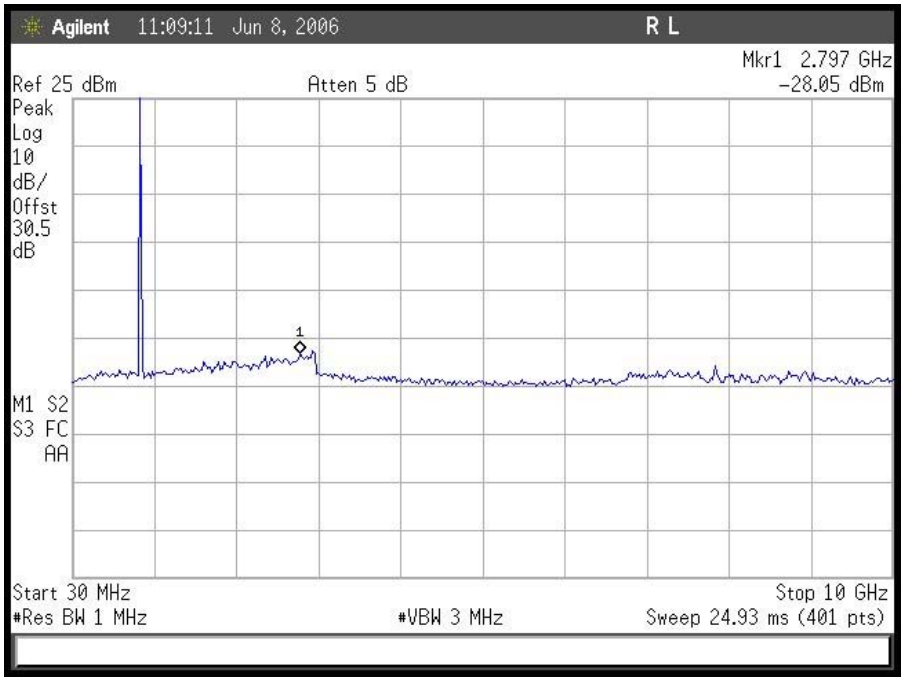
A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer and a Power Meter to monitor the output power level. The Spectrum Analyzer was set to sweep 30 MHz and up to 10^{th} harmonic of the fundamental or 40GHz which ever is the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

The Conducted Spurious Emissions *Limit* is obtained by the following:

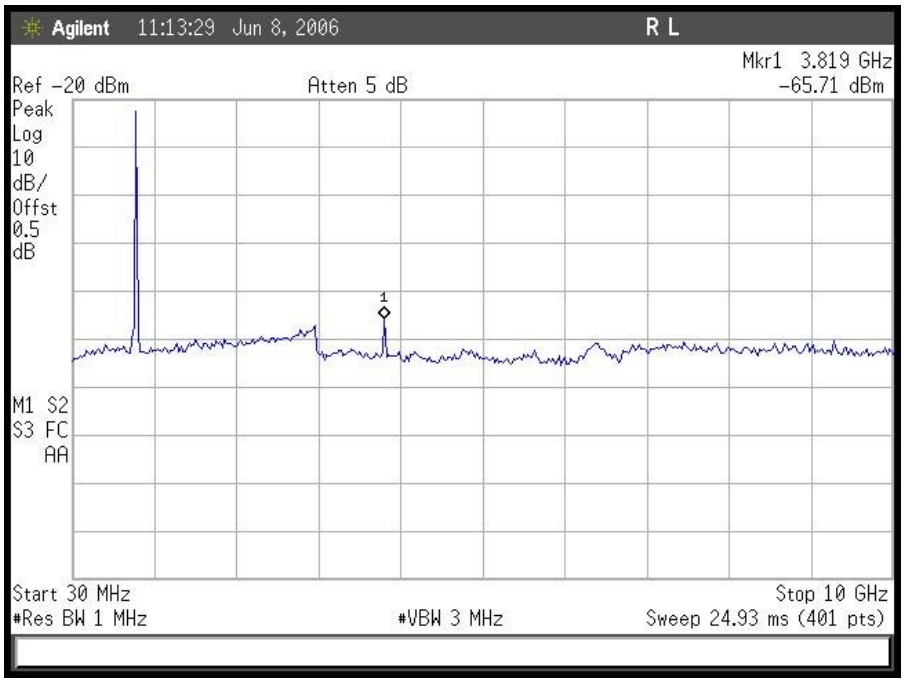
Test Results: Equipment complies with Section 2.1051 and 90.210.

Test Engineer(s): Shawn McMillen

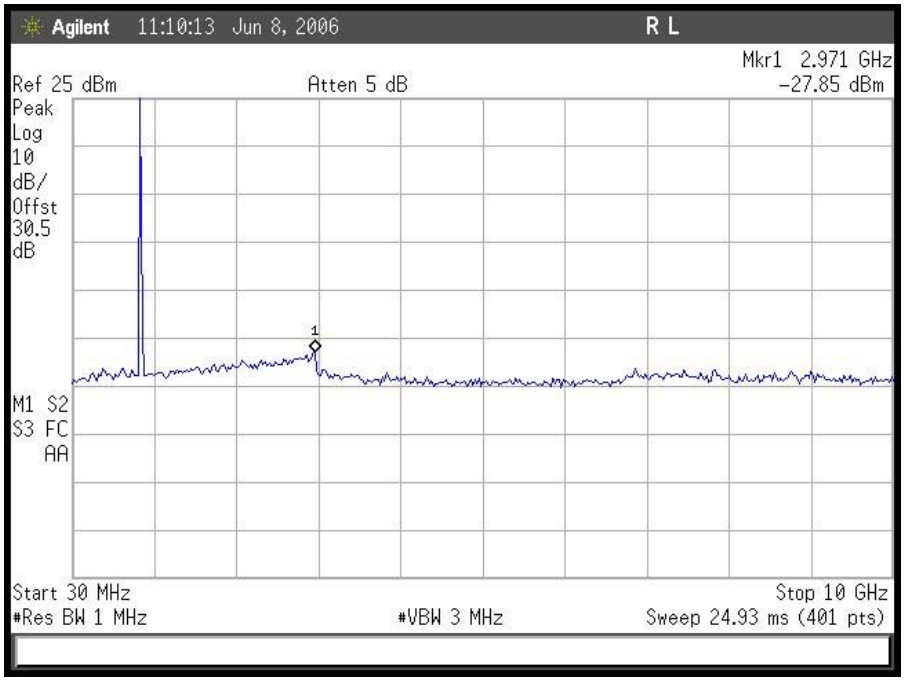
Test Date(s): June 8, 2006



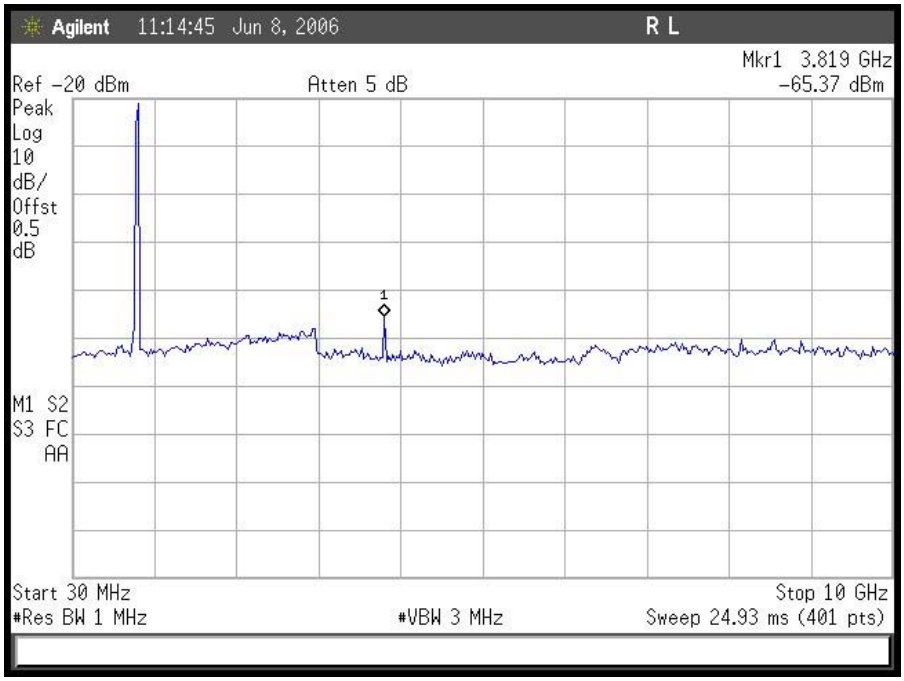
Plot 1. iDEN 800 MHz Conducted Spurious Emissions Low Ch Downlink



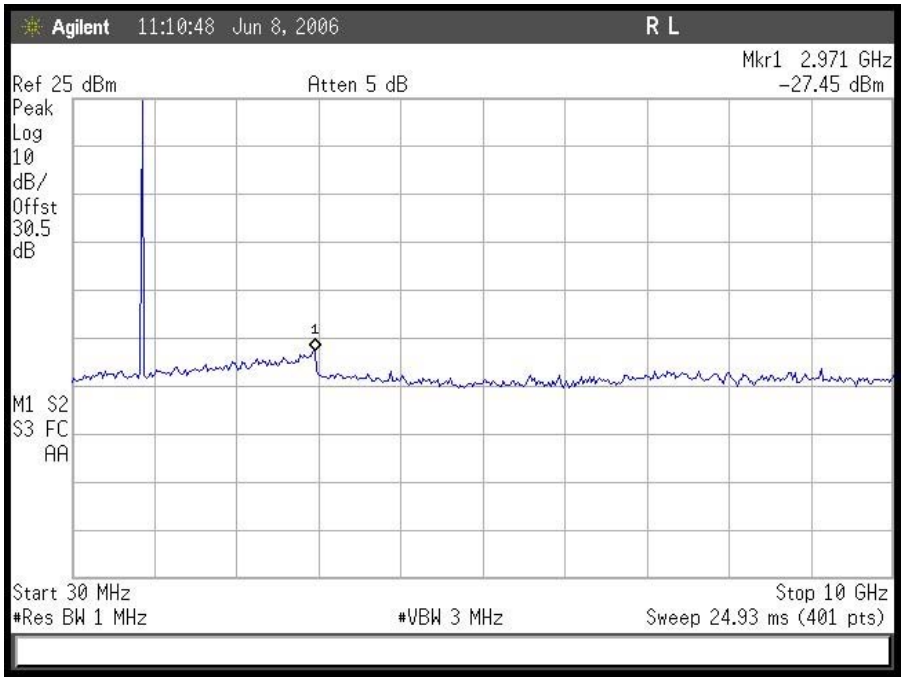
Plot 2. iDEN 800 MHz Conducted Spurious Emissions Low Ch Uplink



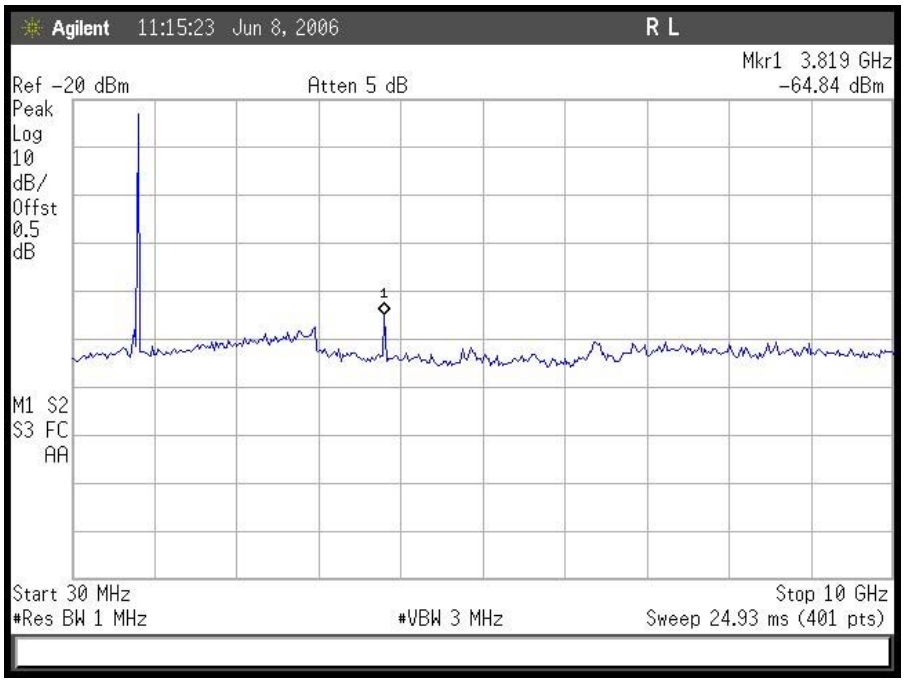
Plot 3. iDEN 800 MHz Conducted Spurious Emissions Mid Ch Downlink



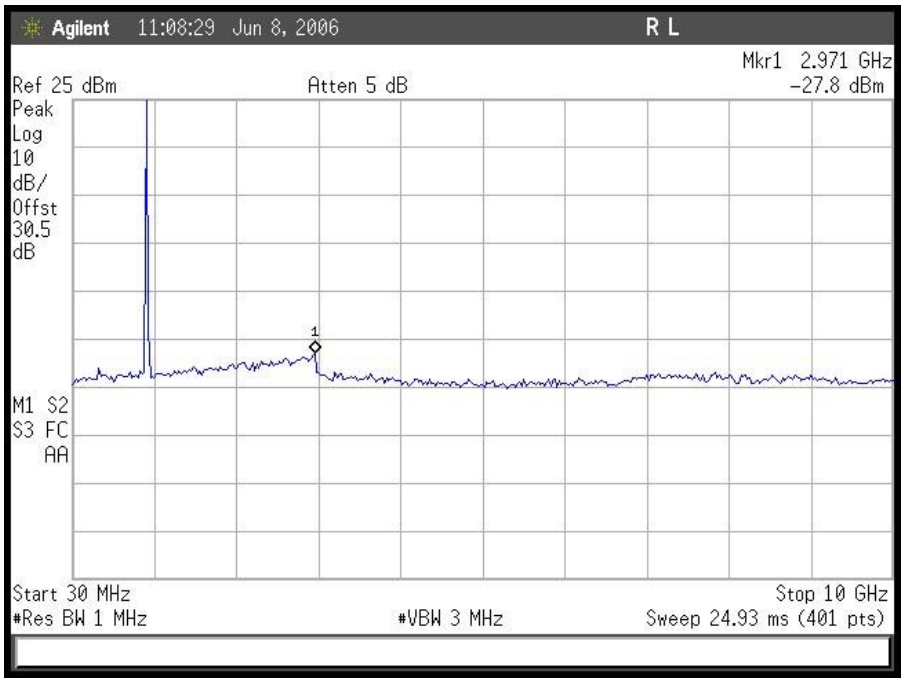
Plot 4. iDEN 800 MHz Conducted Spurious Emissions Mid Ch Uplink



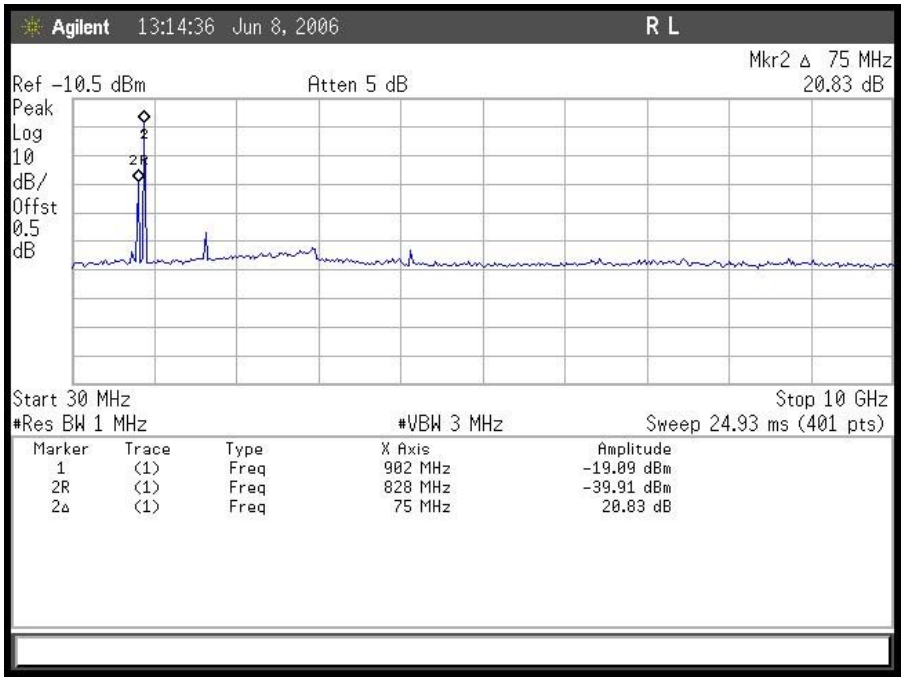
Plot 5. iDEN 800 MHz Conducted Spurious Emissions Hi Ch Downlink



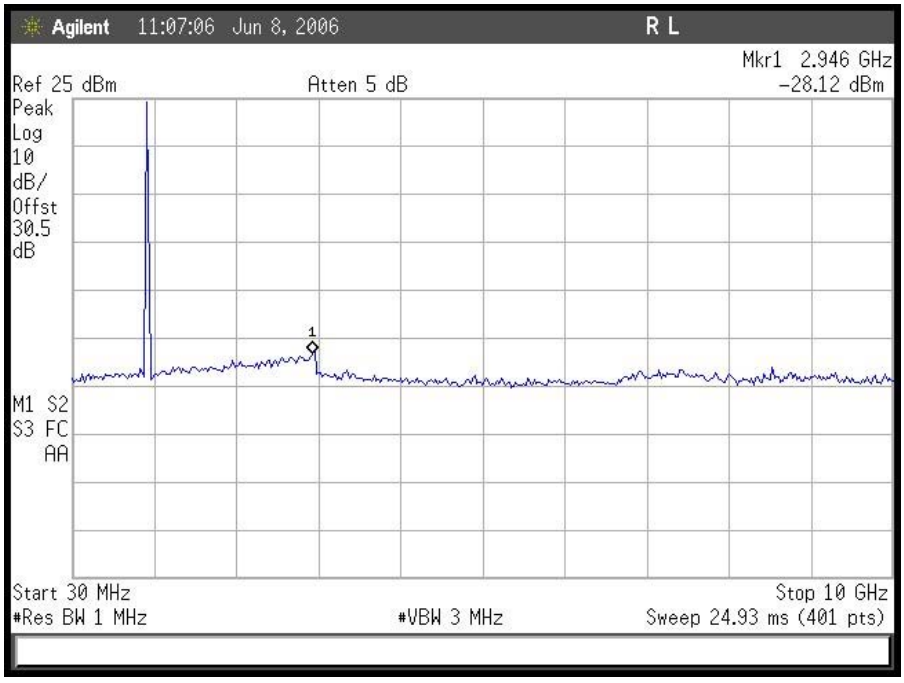
Plot 6. iDEN 800 MHz Conducted Spurious Emissions Hi Ch Uplink



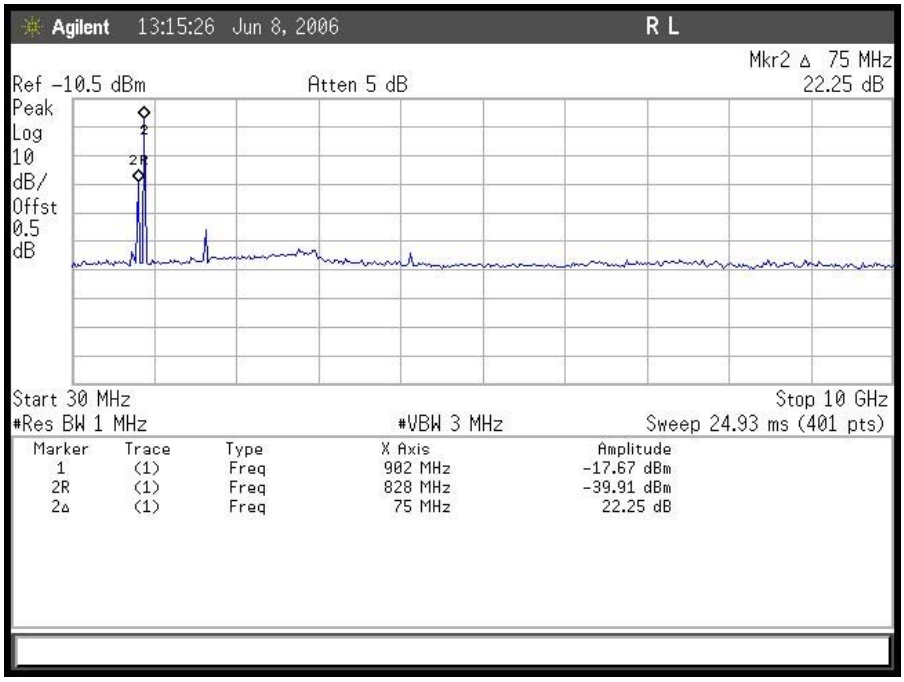
Plot 7. iDEN 900 MHz Conducted Spurious Emissions Low Ch Downlink



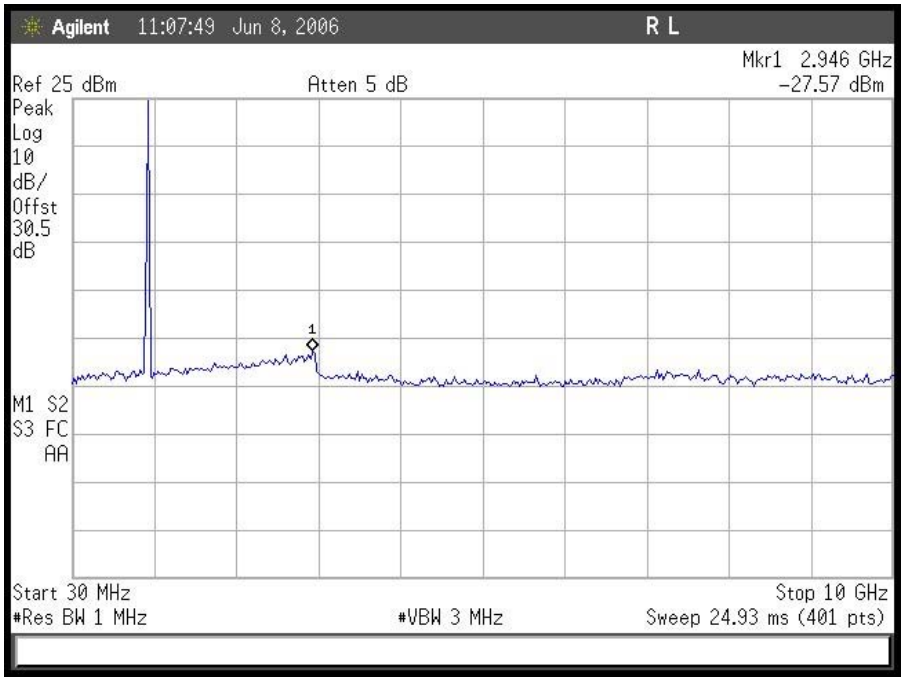
Plot 8. iDEN 900 MHz Conducted Spurious Emissions Low Ch Uplink



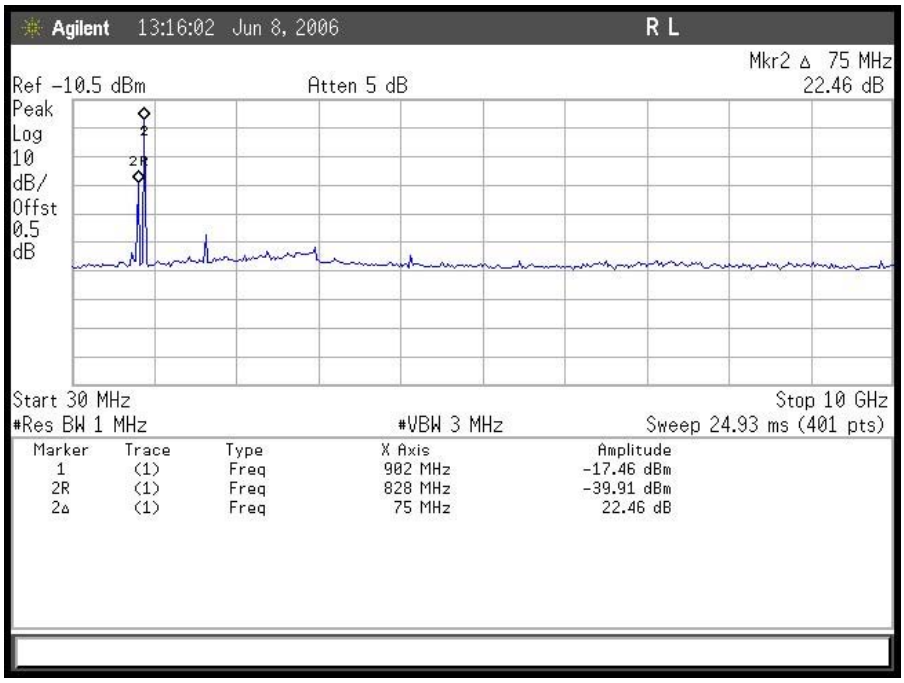
Plot 9. iDEN 900 MHz Conducted Spurious Emissions Mid Ch Downlink



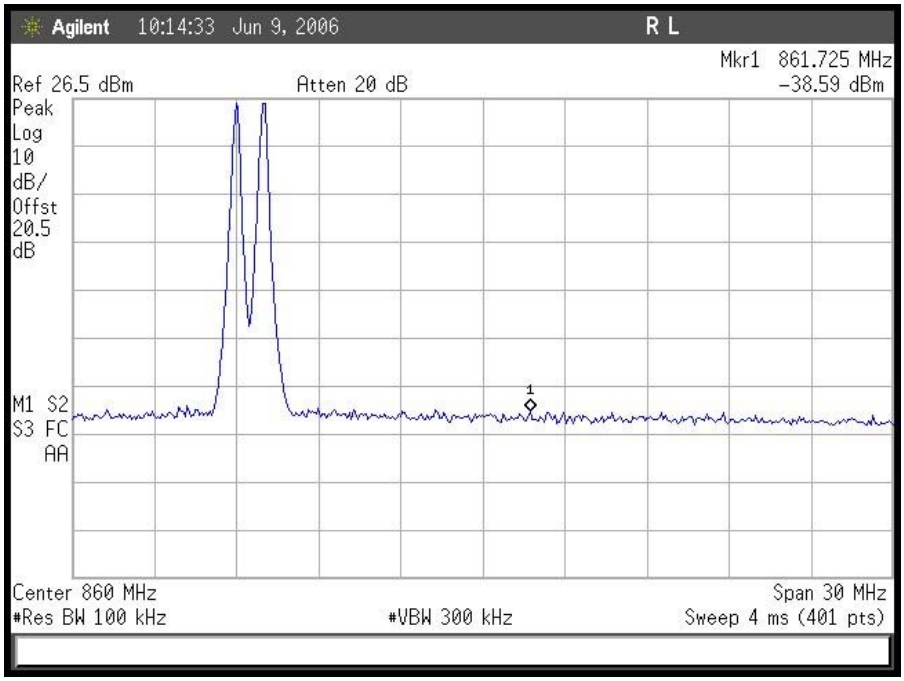
Plot 10. iDEN 900 MHz Conducted Spurious Emissions Mid Ch Uplink



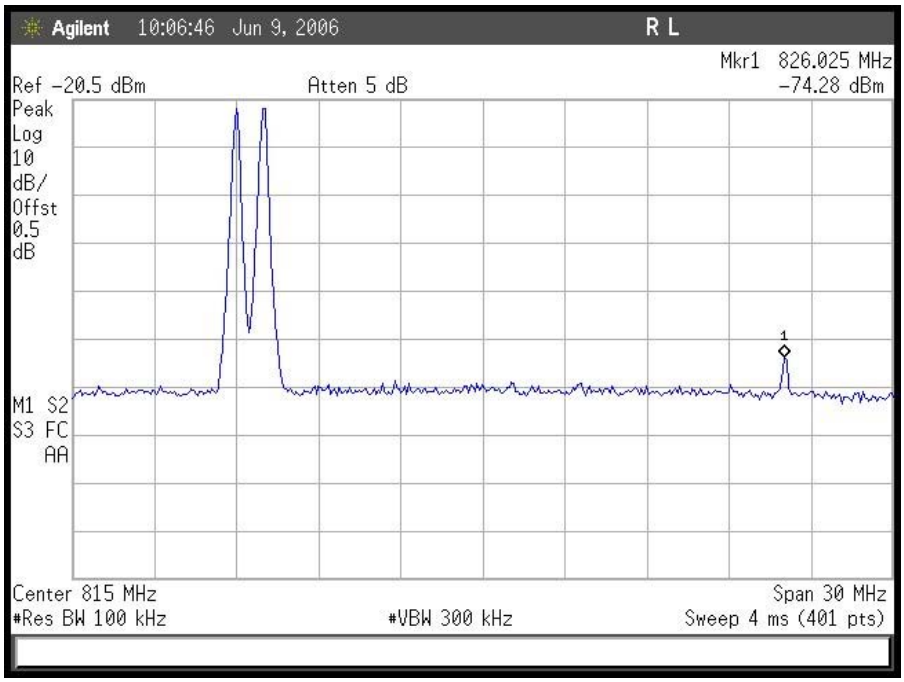
Plot 11. iDEN 900 MHz Conducted Spurious Emissions Hi Ch Downlink



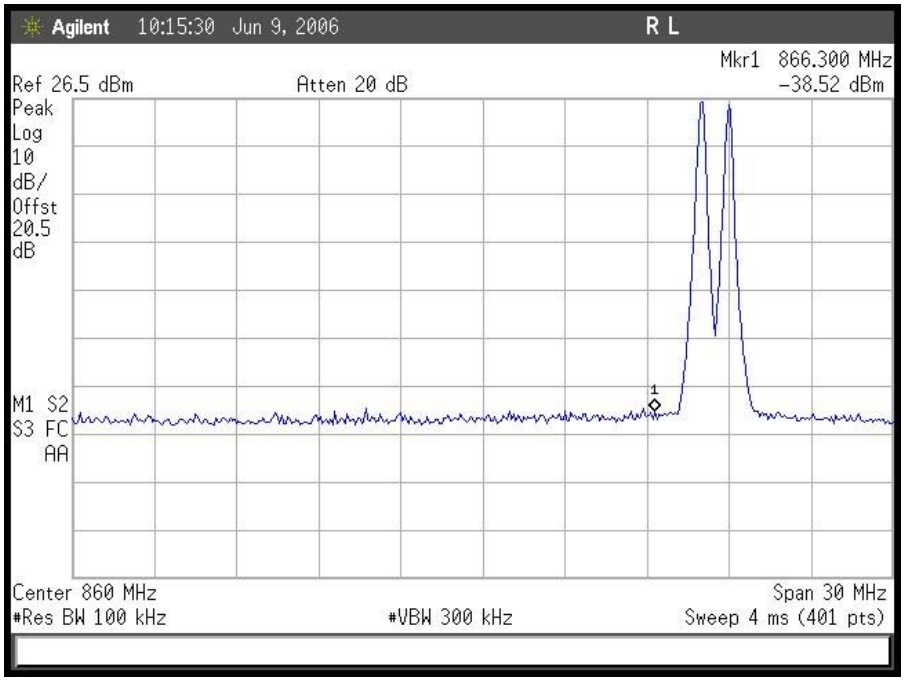
Plot 12. iDEN 900 MHz Conducted Spurious Emissions Hi Ch Uplink



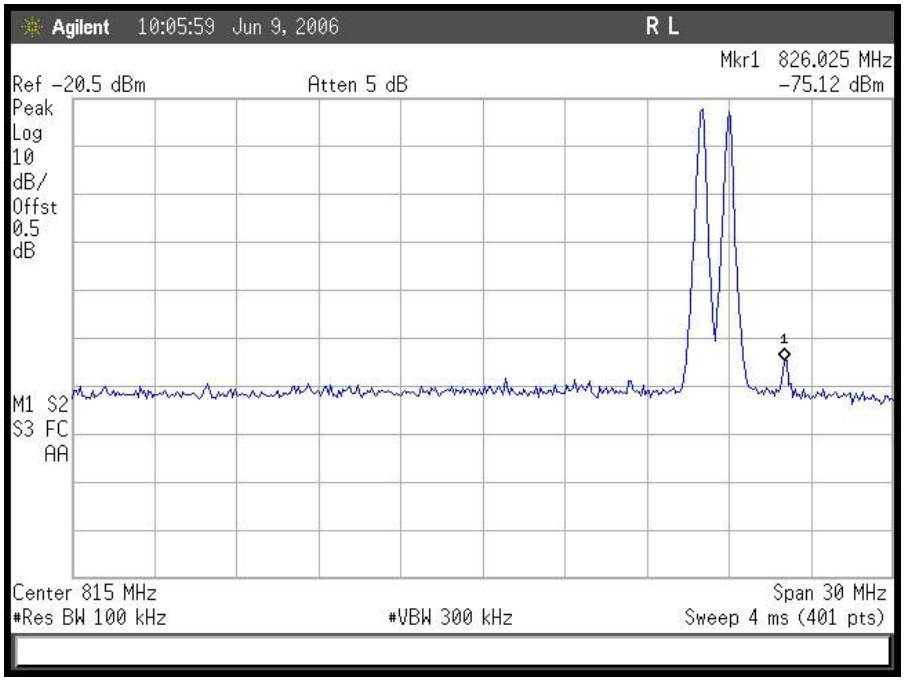
Plot 13. iDEN 800 MHz Intermodulation Low End Downlink



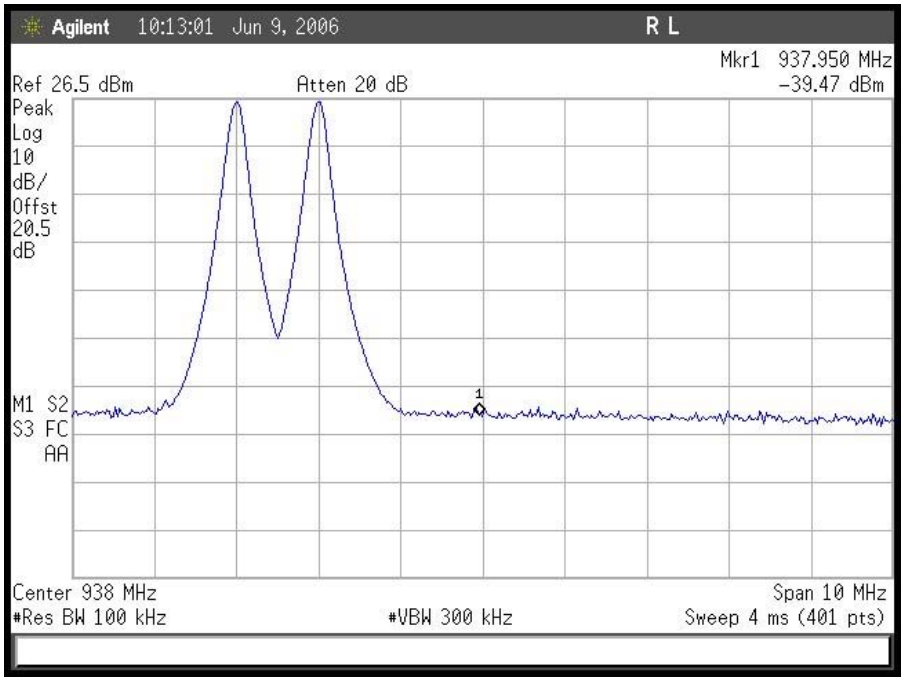
Plot 14. iDEN 800 MHz Intermodulation Low End Uplink



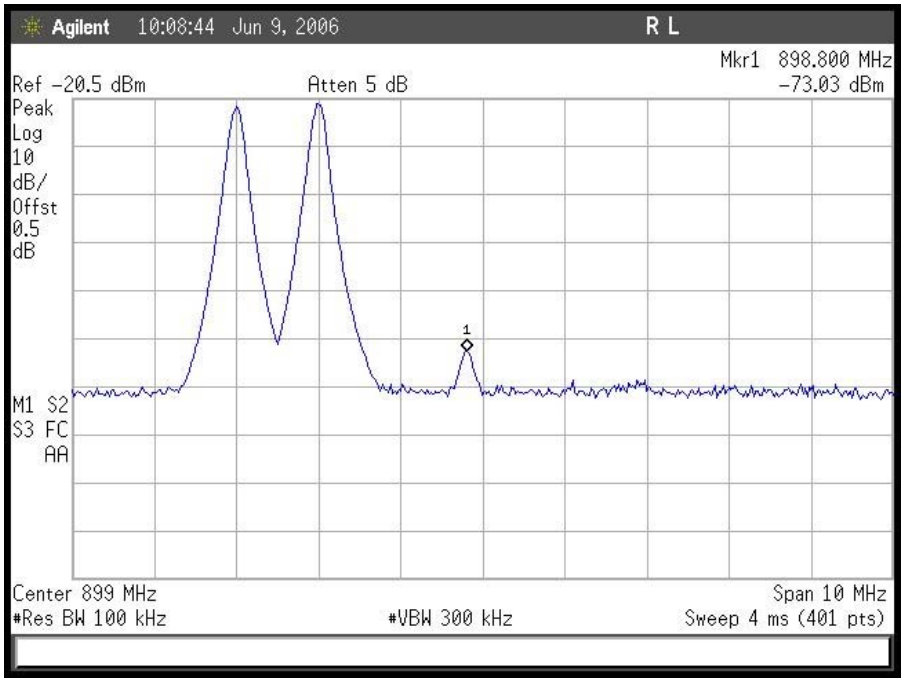
Plot 15. iDEN 800 MHz Intermodulation High End Downlink



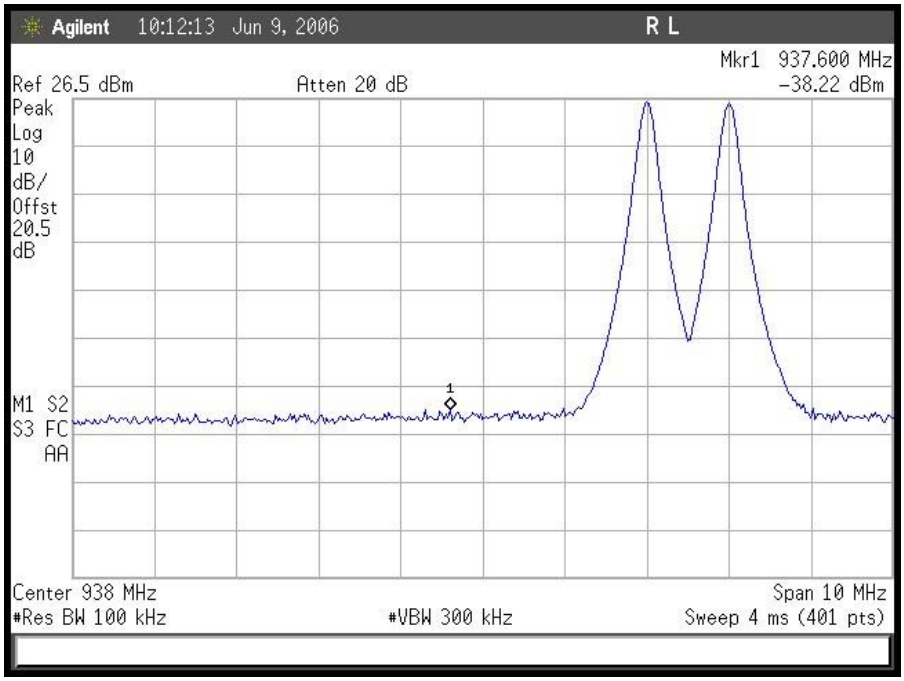
Plot 16. iDEN 800 MHz Intermodulation High End Uplink



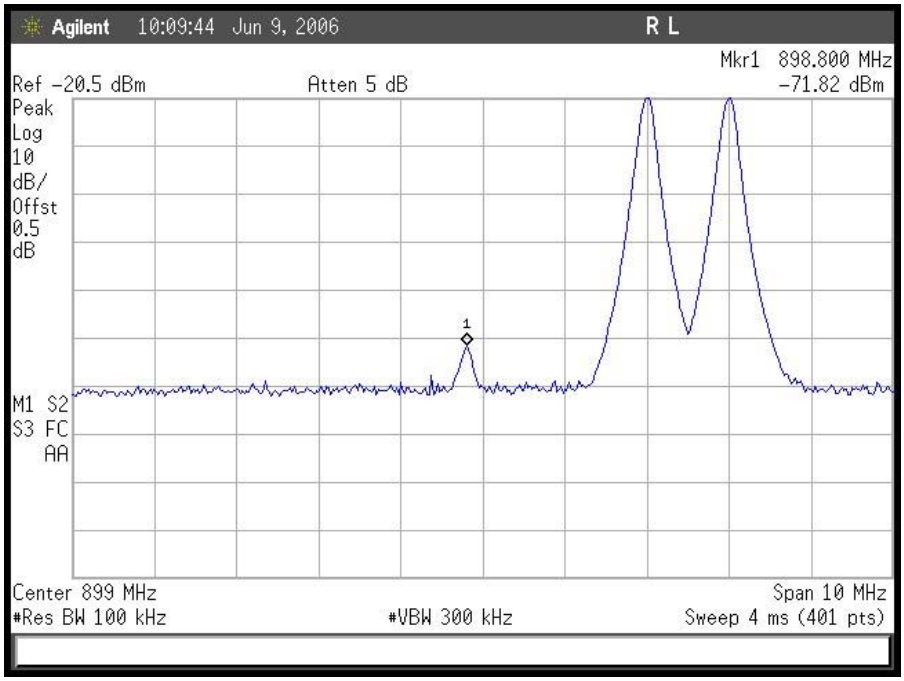
Plot 17. iDEN 900 MHz Intermodulation Low End Downlink



Plot 18. iDEN 900 MHz Intermodulation Low End Uplink



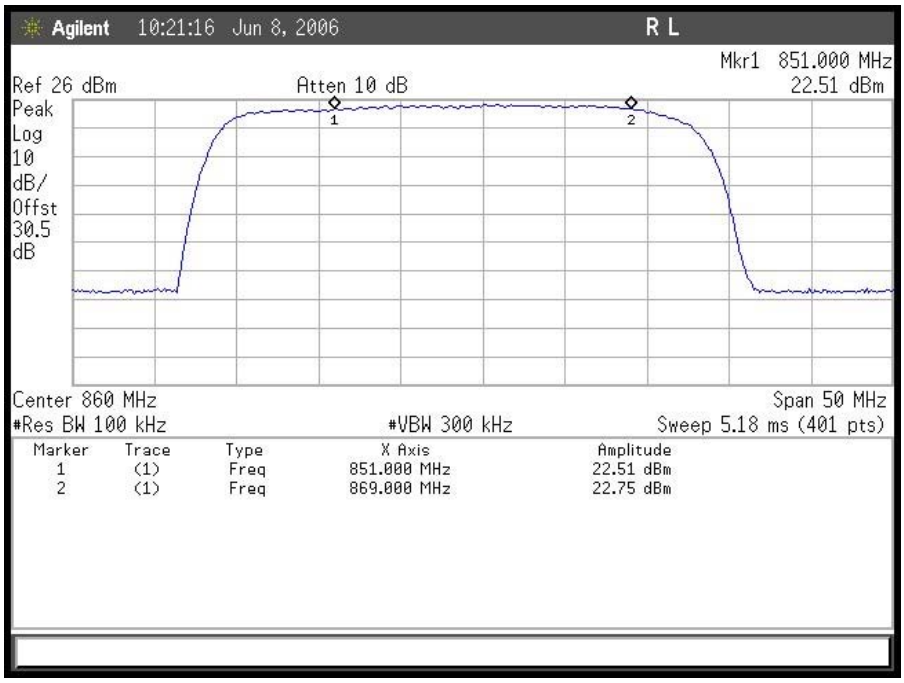
Plot 19. iDEN 900 MHz Intermodulation High End Downlink



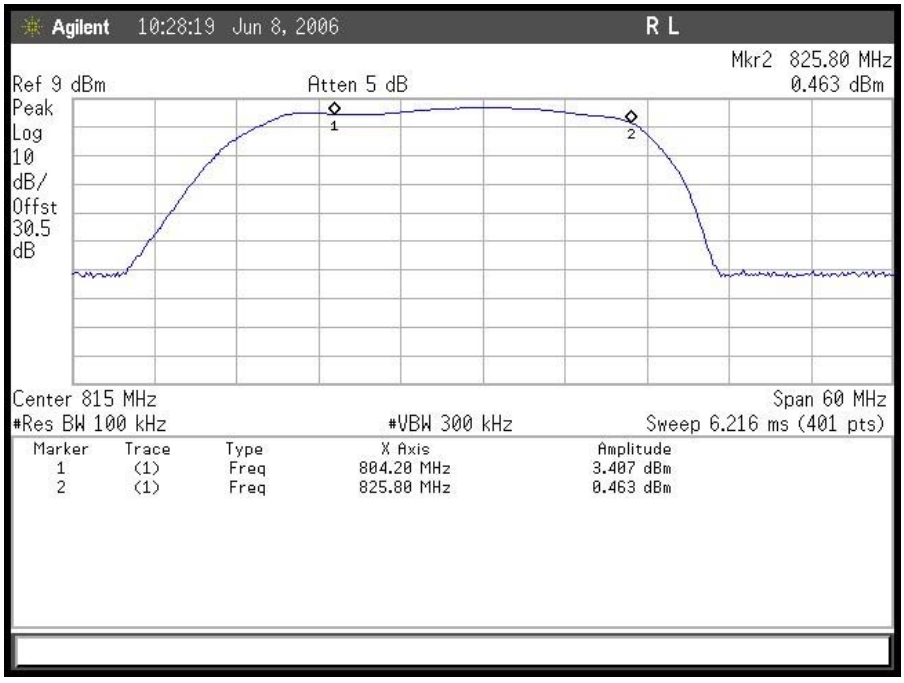
Plot 20. iDEN 900 MHz Intermodulation High End Uplink

Electromagnetic Compatibility Criteria Intentional Radiators

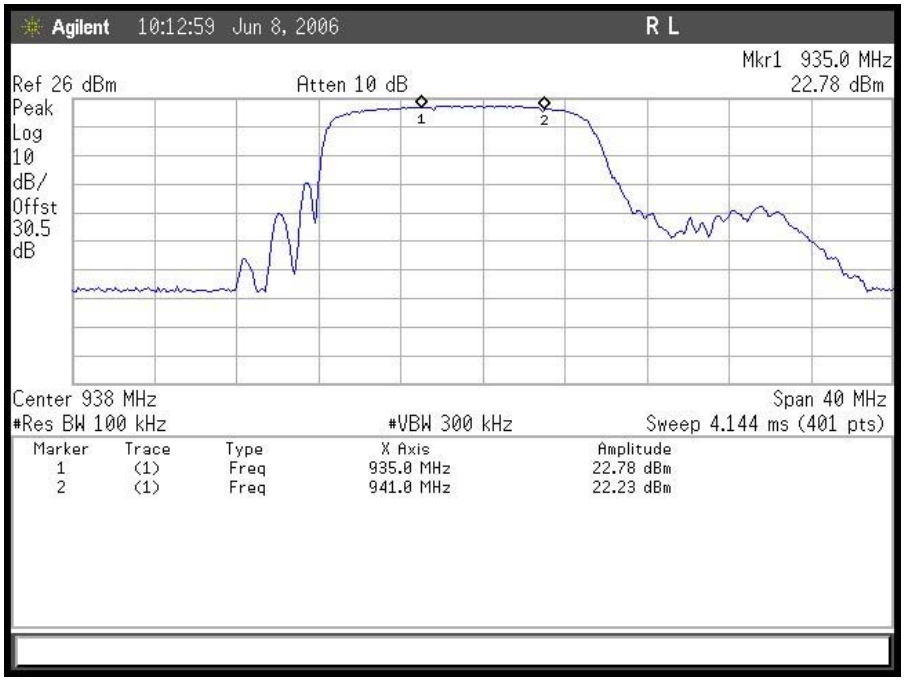
2-11-04/EAB/RF Out of Band Rejection



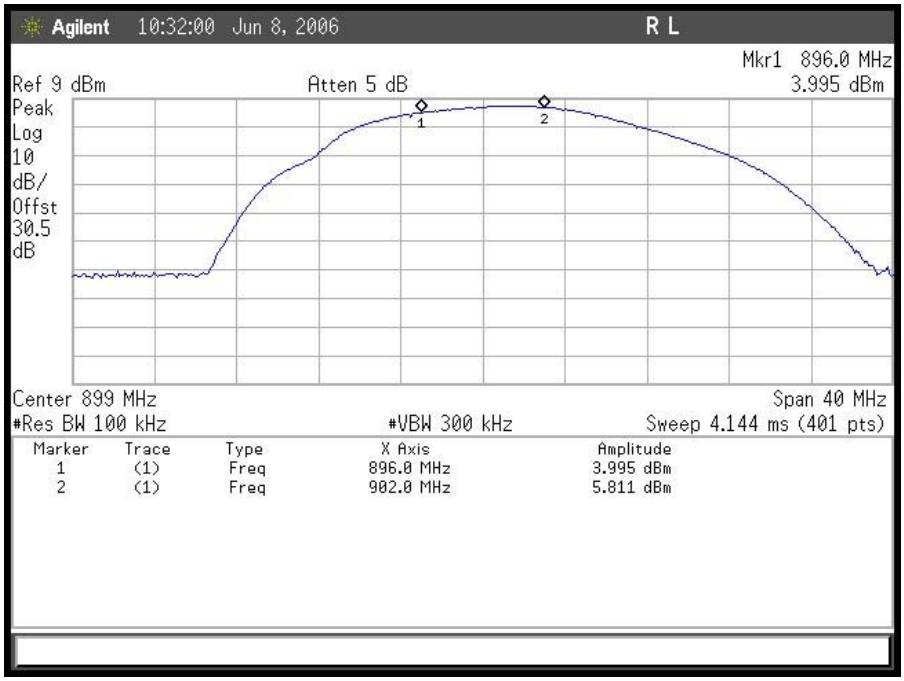
Plot 21. iDEN 800 MHz Out of Band Rejection Downlink



Plot 22. iDEN 800 MHz Out of Band Rejection Uplink



Plot 23. iDEN 900 MHz Out of Band Rejection Downlink



Plot 24. iDEN 900 MHz Out of Band Rejection Uplink

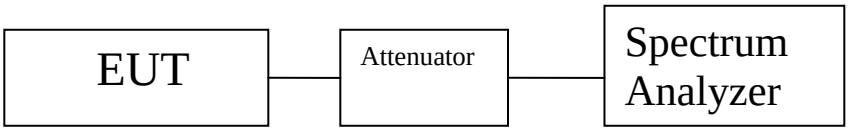


Figure 9. Spurious Emissions at Antenna Terminals Test Setup

Electromagnetic Compatibility Criteria Intentional Radiators

§2.1053 Radiated Emissions (Substitution Method)

Test Requirement(s): **§2.1053**

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-2004 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards."

Radiated emission measurements were performed inside a 10 meter semi-anechoic chamber. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. 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. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10^{th} or 40GHz, which ever was the lesser, were investigated.

Test Results: Equipment complies with Section 2.1053 and 90.210.

Test Engineer(s): Shawn McMillen

Test Date(s): June 8, 2006

Radiated Emissions (Substitution Method) Test Results

iDEN 800 MHz								
Frequency (MHz)	**Antenna Polarity (H/V)**	**Field Strength of Spurious Harmonics (dBm)**	**Substitution Antenna Gain (dBi)**	**Power into Substitution Antenna(dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin**	**Detector Type**
1702.0	H	-60.2	8.5	-48.2	-39.7	-13.0	26.7	Peak
1702.0	V	-60.5	8.5	-49.6	-41.1	-13.0	28.1	Peak
2553.0	H	-63.3	9.8	-52.2	-42.4	-13.0	29.4	Peak
2553.0	V	-65.2	9.8	-55.6	-45.8	-13.0	32.8	Peak
851 MHz								
Frequency (MHz)	**Antenna Polarity (H/V)**	**Field Strength of Spurious Harmonics (dBm)**	**Substitution Antenna Gain (dBi)**	**Power into Substitution Antenna(dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin**	**Detector Type**
1720.0	H	-60.8	8.5	-49.8	-41.3	-13.0	28.3	Peak
1720.0	V	-60.9	8.5	-47.6	-39.1	-13.0	26.1	Peak
2580.0	H	-64.2	9.8	-50.6	-40.8	-13.0	27.8	Peak
2580.0	V	-66.8	9.8	-53.3	-43.5	-13.0	30.5	Peak
860 MHz								
Frequency (MHz)	**Antenna Polarity (H/V)**	**Field Strength of Spurious Harmonics (dBm)**	**Substitution Antenna Gain (dBi)**	**Power into Substitution Antenna(dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin**	**Detector Type**
1738.0	H	-61.1	8.5	-50.1	-41.6	-13.0	28.6	Peak
1738.0	V	-60.7	8.5	-48.7	-40.2	-13.0	27.2	Peak
2607.0	H	-65.5	9.8	-52.8	-43.0	-13.0	30.0	Peak
2607.0	V	-64.8	9.8	-53.6	-43.8	-13.0	30.8	Peak
869 MHz								

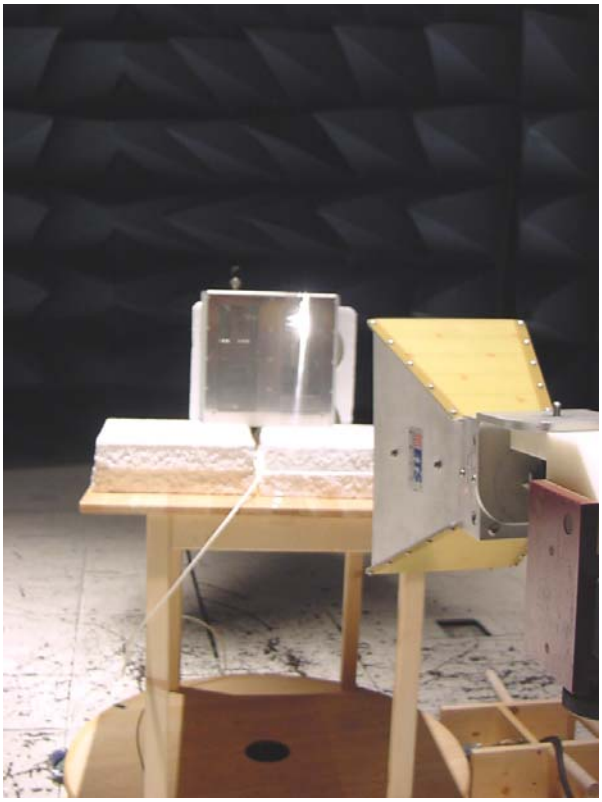
Notes: All other emissions were measured at the noise floor of the spectrum analyzer.

Radiated Emissions (Substitution Method) Test Results

iDEN 900 MHz								
Frequency (MHz)	**Antenna Polarity (H/V)**	**Field Strength of Spurious Harmonics (dBm)**	**Substitution Antenna Gain (dBi)**	**Power into Substitution Antenna(dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin**	**Detector Type**
1870.0	H	-57.2	8.5	-44.2	-35.7	-13.0	22.7	Peak
1870.0	V	-58.8	8.5	-43.5	-35.0	-13.0	22.0	Peak
2805.0	H	-55.3	9.8	-52.2	-42.4	-13.0	29.4	Peak
2805.0	V	-54.8	9.8	-53.6	-43.8	-13.0	30.8	Peak
935 MHz								
Frequency (MHz)	**Antenna Polarity (H/V)**	**Field Strength of Spurious Harmonics (dBm)**	**Substitution Antenna Gain (dBi)**	**Power into Substitution Antenna(dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin**	**Detector Type**
1876.0	H	-55.6	8.5	-48.9	-40.4	-13.0	27.4	Peak
1876.0	V	-58.7	8.5	-47.1	-38.6	-13.0	25.6	Peak
2814.0	H	-53.3	9.8	-52.8	-43.0	-13.0	30.0	Peak
2814.0	V	-52.9	9.8	-53.8	-44.0	-13.0	31.0	Peak
938 MHz								
Frequency (MHz)	**Antenna Polarity (H/V)**	**Field Strength of Spurious Harmonics (dBm)**	**Substitution Antenna Gain (dBi)**	**Power into Substitution Antenna(dBm)**	**EIRP (dBm)**	**Limit (dBm)**	**Margin**	**Detector Type**
1882.0	H	-52.2	8.5	-49.9	-41.4	-13.0	28.4	Peak
1882.0	V	-50.2	8.5	-50.2	-41.7	-13.0	28.7	Peak
2823.0	H	-49.9	9.8	-55.8	-46.0	-13.0	33.0	Peak
2823.0	V	-52.3	9.8	-56.9	-47.1	-13.0	34.1	Peak
941 MHz								

Notes: All other emissions were measured at the noise floor of the spectrum analyzer.

Radiated Emissions Spurious Test Setup



Photograph 8. Radiated Emission Spurious Test Setup

Electromagnetic Compatibility Criteria Intentional Radiators

§2.1055 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 using a Directional Coupler through a Spectrum Analyzer and Power Meter.

The EUT was placed in the Environmental Chamber and support equipments are outside the chamber on a table. The EUT was set to transmitter at a data rate corresponding to 20MHz BW. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations. The frequency drift was investigated for every 10^{C} increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -30 to 50^{C}.

Voltage supplied to EUT is 120 VAC reference temperature was done 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): Shawn McMillen

Test Date(s): June 13, 2006

Frequency Stability Test Results, iDEN 800 MHz

Reference Freq. = 859.999255MHz at 20°C

Temperature (Celsius)	Measured Freq (MHz)	Drift ppm
50	859.999246	0.010
40	859.999247	0.009
30	859.999247	0.009
20	Reference	
10	859.999245	0.012
0	859.999249	0.007
-10	859.999250	0.006
-20	859.999254	0.001
-30	859.999253	0.002

Reference: 120Vac at 20°C **Freq.** = 859.999255MHz

Measured Voltage(dc) +/-15% of nominal	Measured Freq (MHz)	Drift (Hz)
102	859.999255	0.000
138	859.999250	0.006

Frequency Stability Test Results, iDEN 900 MHz

Reference Freq. = 937.999261MHz at 20°C

Temperature (Celsius)	Measured Freq (MHz)	Drift ppm
50	937.999226	0.037
40	937.999227	0.036
30	937.999219	0.045
20	Reference	
10	937.999219	0.045
0	937.999217	0.047
-10	937.999202	0.063
-20	937.999200	0.065
-30	937.999202	0.063

Reference: 120Vac at 20°C **Freq.** = 937.999261MHz

Measured Voltage(dc) +/-15% of nominal	Measured Freq (MHz)	Drift (Hz)
102	937.999262	-0.001
138	937.999263	-0.002

V. Test Equipment

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
1S2034	COUPLER, DIRECTIONAL 1-20 GHz	KRYTAR	101020020	SEE NOTE	
1S2034	COUPLER, DIRECTIONAL 1-20 GHz	KRYTAR	101020020	SEE NOTE	
1S2041	COUPLER, BI DIRECTIONALCOAXIAL	NARDA	N/A	SEE NOTE	
1S2041	COUPLER, BI DIRECTIONALCOAXIAL	NARDA	N/A	SEE NOTE	
1S2121	PRE-AMPLIFIER	HEWLETT PACKARD	8449B	10/14/2005	10/14/2006
1S2128	Harmonic Mixer	Hewlett Packard	11970A	10/03/2003	10/03/2006
1S2129	Harmonic Mixer	Hewlett Packard	11970K	10/03/2003	10/03/2006
1S2184	BILOG ANTENNA	CHASE	CBL6112A	1/12/2005	1/12/2007
1S2198	ANTENNA, HORN	EMCO	3115	7/14/2005	7/14/2006
1S2202	ANTENNA, HORN, 1 METER	EMCO	3116	3/23/2005	3/23/2007
1S2263	CHAMBER, 10 METER	RANTEC	N2-14	7/25/2005	7/25/2006
1S2421	EMI RECEIVER	ROHDE&SCHWARZ	ESIB 7	2/9/2005	2/9/2007
1S2430	WIDEBAND POWER METER	ANRITSU COMPANY	ML2488A	1/12/2005	1/12/2007
1S2430	WIDEBAND POWER METER	ANRITSU COMPANY	ML2488A	1/12/2005	1/12/2007
1S2432	WIDEBAND POWER SENSOR	ANRITSU COMPANY	MA2491A	1/12/2005	1/12/2007
1S2432	WIDEBAND POWER SENSOR	ANRITSU COMPANY	MA2491A	1/12/2005	1/12/2007
1S2460	Analyzer, Spectrum 9 kHz-40GHz	Agilent	E4407B	07/06/2005	07/06/2008
N/A	HIGH PASS FILTER	MICRO-TRONICS	HPM13146	SEE NOTE	

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

VI. Certification & User's Manual Information

Certification Label & User's Manual Information

A. 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 I — 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.

B. 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 users 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

