COMMUNICATION CERTIFICATION LABORATORY

1940 West Alexander Street
Salt Lake City, UT 84119
801-972-6146

Test Report

Certification

Test Of:

IX-59BTINF

FCC ID:

BD6IPBTINF

Test Specification:

FCC PART 15, Subpart C

Test Report Serial No:1815

Applicant:

Iwatsu America, Inc.
8001 Jetstar Drive
Irving, TX 75063

Date of Tests: September 17, 2008

Issue Date: September 18, 2008

Accredited Testing Laboratory By:

NVLAP Lab Code 100272-0

CERTIFICATION OF ENGINEERING REPORT

This report has been prepared by Communication Certification Laboratory to document compliance of the device described below with the requirements of Federal Communications Commission (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

- Applicant: Iwatsu America, Inc.
- Manufacturer: Iwatsu Electric Co., Ltd. and Iwatsu (Malaysia) SDN. BHD.
- Brand Name: Iwatsu
- Model Number: IX-59BTINF
- FCC ID Number: BD6IPBTINF

On this 18th day of September 2008, I, individually, and for Communication Certification Laboratory, certify that the statements made in this engineering report are true, complete, and correct to the best of my knowledge, and are made in good faith.

Although NVLAP has accredited the Communication Certification Laboratory EMC testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

COMMUNICATION CERTIFICATION LABORATORY

Norman P Hansen

Tested by: Norman P. Hansen
EMC Technician

TABLE OF CONTENTS

SECTION 1.0 CLIENT INFORMATION

1.1 Applicant:

Company Name: Iwatsu America, Inc.
8001 Jetstar Drive
Irving, TX 75063

Contact Name: Yuji Nomura
Title: Engineering Manager

1.2 Manufacturers:

Company Name: Iwatsu Electric Co., Ltd.
7-41 Chome, Kugayama, Suginami-Ki
Tokyo, 168 Japan

Company Name: Iwatsu (Malaysia) SDN. BHD.
Kawasan Perusahaan Tuanku Jaafar
71450 Sg. Gadut, Seremban, Negeri
Sembilan, Malaysia

SECTION 2.0 EQUIPMENT UNDER TEST (EUT)

2.1 Identification of EUT:

Brand Name:	Iwatsu
Model Number:	IX-59BTINF
Serial Number:	None
Country of Manufacture:	Japan and Malaysia

2.2 Description of EUT:

The IX-59BTINF is a Bluetooth transceiver that is installed in an IX-5910 or IX-5930 keyset. The IX-59BTINF connects with many types of Bluetooth headsets allowing hands-free conversations over the telephone.

This report covers the transmitter that is required to meet the requirements of FCC Part 15, Subpart C. The circuitry subject to FCC Part 15, Subpart B is to be covered in separate testing and report.

2.3 EUT and Support Equipment:

The FCC ID numbers for all the EUT and support equipment used during the test are listed below:

Brand Name Model Number	FCC ID Number	Description	Name of Interface Ports / Interface Cables
BN: Iwatsu MN: IX-59BTINF (Note 1)	BD6IPBTINF	Bluetooth Transceiver	See Section 2.4
BN: Iwatsu MN: IX-5930	DoC	IP Telephone Keyset	LAN/Cat 5 cable with RJ45 connectors
BN: Iwatsu MN: Enterprise-CS	Verification	Phone System	LAN/Cat 5 cables with RJ45 connectors
BN: Dell MN: D620	DoC	Laptop Computer	LAN/Cat 5 cable with RJ45 connectors
BN: TRENDnet MN: TEG-S50TXE	DoC	5 port LAN switch	Ethernet/Cat 5 cable w/RJ45 connectors

Brand Name Model Number	FCC ID Number	Description	Name of Interface Ports / Interface Cables
BN: TRENDnet MN: TE100-S8P	DoC	8 port LAN hub	Ethernet/Cat 5 cable w/RJ45 connectors
BN: Netgear MN: GS605	DoC	Ethernet Router	LAN/Cat 5 cables with RJ45 connectors

Note: (1) EUT
(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.

2.4 Interface Ports on EUT:

Name of Ports	No. of Ports Fitted to EUT	Cable Descriptions/Length
Interface	1	Direct connection to host IX-5930 PCB

2.5 Modification Incorporated/Special Accessories on EUT:

There were no modifications or special accessories required to comply with the specification.

Signature: ______________________________

Typed Name: Yuji Nomura

Title: Engineering Manager

SECTION 3.0 TEST SPECIFICATION, METHODS & PROCEDURES

3.1 Test Specification:

Title: FCC PART 15, Subpart C (47 CFR 15)

Purpose of Test: The tests were performed to demonstrate initial compliance.

3.2 Requirements:

3.2.1 §15.203 Antenna Requirement

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

3.2.2 §15.207 Conducted Limits

(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 the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5*	66 to 56*	56 to 46*
0.5 – 5	56	46
5 - 30	60	50

*Decreases with the logarithm of the frequency.

3.2.3 §15.247 Operation within the bands 902 – 928 MHz, 2400 – 2483.5 MHz, and 5725 – 5850 MHz

(a) Operation under the provisions of this Section is limited to frequency hopping and digitally modulated intentional radiators that comply with the following provisions:

(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

(i)For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

(ii) Frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies. The maximum 20 dB bandwidth of the hopping channel is 1 MHz. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

(2) Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

(b) The maximum peak conducted output power of the intentional radiator shall not exceed the following:

(1) For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

(2) For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels, as permitted under paragraph (a)(1)(i) of this section.

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

(4) The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if

transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(c) Operation with directional antenna gains greater than 6 dBi.

(1) Fixed point-to-point operation:

(i) Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

(ii) Systems operating in the 5725-5850 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted output power.

(iii) Fixed, point-to-point operation, as used in paragraphs (c)(4)(i) and (c)(4)(ii) of this section, excludes the use of point-to-multipoint systems, omnidirectional applications, and multiple co-located intentional radiators transmitting the same information. The operator of the spread spectrum or digitally modulated intentional radiator or, if the equipment is professionally installed, the installer is responsible for ensuring that the system is used exclusively for fixed, point-to-point operations. The instruction manual furnished with the intentional radiator shall contain language in the installation instructions informing the operator and the installer of this responsibility.

(2) In addition to the provisions in paragraphs (b)(1), (b)(3), (b)(4) and (c)(1)(i) of this section, transmitters operating in the 2400-2483.5 MHz band that emit multiple directional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided the emissions comply with the following:

(i) Different information must be transmitted to each receiver.

(ii) If the transmitter employs an antenna system that emits multiple directional beams but does not do [the word “do” should be deleted from this sentence] emit multiple directional beams simultaneously, the total output power conducted to the array or arrays that comprise the device, i.e., the sum of the power supplied to all antennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph (b)(1) or (b)(3) of this section, as applicable. However, the total conducted output power shall be reduced by 1 dB below the specified limits for each 3 dB that the directional gain of the antenna/antenna array exceeds 6 dBi. The directional antenna gain shall be computed as follows:

(A) The directional gain shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain of the element or stave having the highest gain.

(B) A lower value for the directional gain than that calculated in paragraph (c)(2)(ii)(A) of this section will be accepted if sufficient evidence is presented, e.g., due to shading of the array or coherence loss in the beamforming.

(iii) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequency channels, the power supplied to each emission beam is subject to the power limit specified in paragraph (c)(2)(ii) of this section. If transmitted beams overlap, the power shall be reduced to ensure that their aggregate power does not exceed the limit specified in paragraph (c)(2)(ii) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall not exceed the limit specified in paragraph (c)(2)(ii) of this section by more than 8 dB.

(iv) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (c)(1) of this section.

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

(f) For the purposes of this section, hybrid systems are those that employ a combination of both frequency hopping and digital modulation techniques. The frequency hopping operation of the hybrid system, with the direct sequence or digital modulation operation turned off, shall have an average time of occupancy on any frequency not to exceed 0.4 seconds within a time period in seconds equal to the number of hopping frequencies employed multiplied by 0.4. The digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

(g) Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

(h) The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

(i) Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission's guidelines. See § 1.1307(b)(1) of this Chapter.

Note: Spread spectrum systems are sharing these bands on a noninterference basis with systems supporting critical Government requirements that have been allocated the usage of these bands, secondary only to ISM equipment operated under the provisions of Part 18 of this Chapter. Many of these Government systems are airborne radiolocation systems that emit a high EIRP which can cause interference to other users. Also, investigations of the effect of spread spectrum interference to U. S. Government operations in the 902-928 MHz band may require a future decrease in the power limits allowed for spread spectrum operation.

3.3 Test Procedure:

The testing was performed according to the procedures in ANSI C63.4 (2003). Testing was performed at CCL’s Wanship open area test site #2, located at 29145 Old Lincoln Highway, Wanship, UT. This site has been fully described in a report submitted to the FCC, and was accepted in a letter dated June 6, 2006 (90504).

CCL is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Lab Code: 100272-0, which is effective until September 30, 2008.

For radiated emissions testing at 30 MHz or above that is performed at distances closer than the specified distance, an inverse proportionality factor of 20 dB per decade is used to normalize the measured data for determining compliance.

SECTION 4.0 OPERATION OF EUT DURING TESTING

4.1 Operating Environment:

Power Supply: 120 VAC/60 Hz to IX-5930 host keyset power supply

4.2 Operating Modes:

The worst-case emissions were with the IX-59BTINF installed in the IX-5930 keyset and transmitting constantly. The IX-59BTINF was tested at the lowest frequency, middle frequency, and the highest frequency to meet the requirements of §15.31(m).

4.3 EUT Exercise Software:

Iwatsu America, Inc. software was used to control the IX-59BTINF transmitter.

SECTION 5.0 SUMMARY OF TEST RESULTS

5.1 FCC Part 15, Subpart C

5.1.1 Summary of Tests:

Section	Environmental Phenomena	Frequency Range (MHz)	Result
15.203	Antenna Requirement	N/A	Complied
15.207	Conducted Disturbance at Mains Ports	0.15 to 30	Complied
15.247(a)	Transmitter Channel Characteristics	2400 – 2483.5	Complied
15.247(b)	Transmitter Output Power	2400 – 2483.5	Complied
15.247(c)	Operation with Directional Antenna Gains Greater than 6 dBi	2400 – 2483.5	Not Applicable
15.247(d)	Conducted Emissions at the Antenna Port	30 - 24835	Complied
15.247(d)	Radiated Emissions in the Restricted Bands	30 - 24835	Complied
15.247(e)	3 kHz Power Spectral Density	2400 – 2483.5	Not Applicable
15.247(f)	Hybrid Systems	2400 – 2483.5	Not Applicable
15.247(g)	Channel Usage	2400 – 2483.5	Complied
15.247(h)	Channel Hopset Coordination	2400 – 2483.5	Complied
15.247(i)	RF Exposure	2400 – 2483.5	Complied

5.2 Result

In the configuration tested, the EUT complied with the requirements of the specification.

SECTION 6.0 MEASUREMENTS, EXAMINATIONS AND DERIVED RESULTS

6.1 General Comments:

This section contains the test results and determinations only. Details of the test methods used and a list of the test equipment used during the measurements can be found in Appendix 1 of this report.

6.2 Test Results:

6.2.1 §15.203 Antenna Requirement

The antenna is soldered to the PCB and totally contained within the housing of the EUT. The antenna is not user replaceable which meets the requirements of this paragraph.

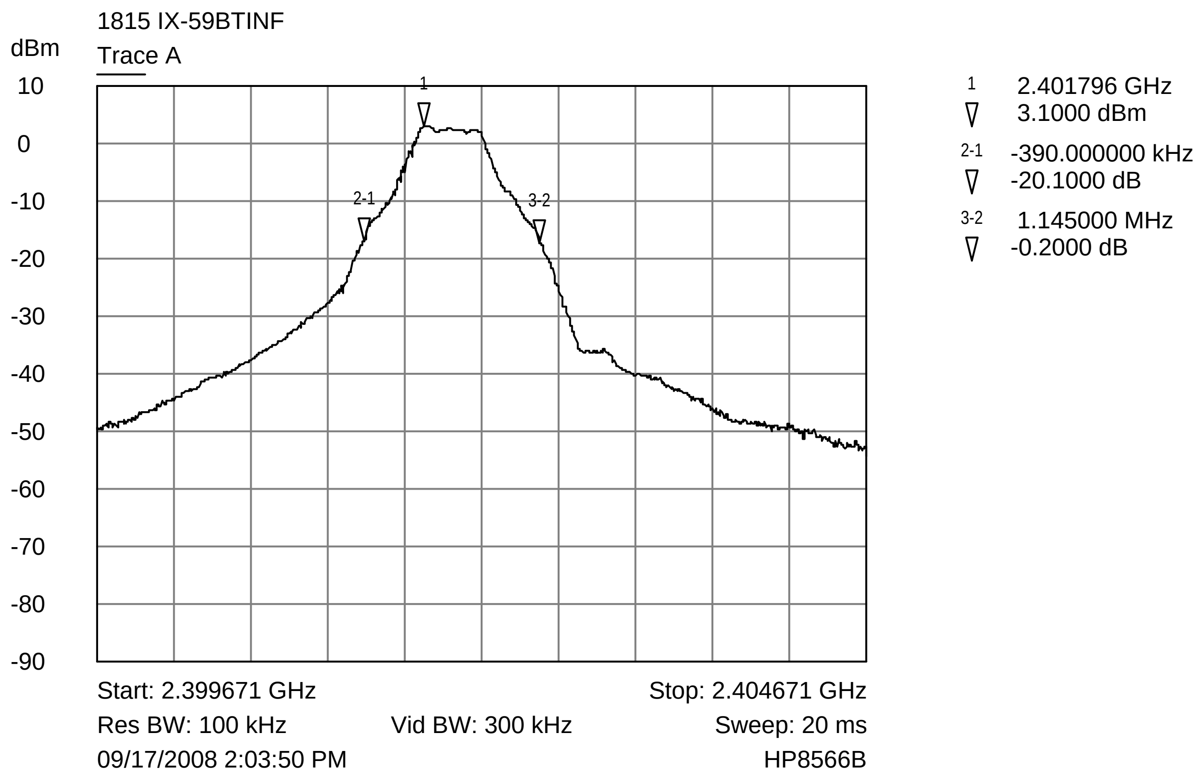
6.2.2 §15.207

Frequency (MHz)	Host IX-5930 Power Supply AC Mains Lead	Detector	Measured Level (dBμV)	Limit (dBμV)	Margin (dB)
0.46	Hot Lead	Quasi-Peak (Note 2)	46.0	56.8	-10.8
0.46	Hot Lead	Average (Note 2)	38.6	46.8	-8.2
0.54	Hot Lead	Quasi-Peak (Note 2)	45.6	56.0	-10.4
0.54	Hot Lead	Average (Note 2)	38.4	46.0	-7.6
0.81	Hot Lead	Quasi-Peak (Note 2)	43.6	56.0	-12.4
0.81	Hot Lead	Average (Note 2)	33.1	46.0	-12.9
0.90	Hot Lead	Peak (Note 1)	46.7	56.0	-9.3
0.90	Hot Lead	Peak (Note 1)	36.3	46.0	-9.7
1.28	Hot Lead	Peak (Note 1)	41.2	56.0	-14.8
1.36	Hot Lead	Peak (Note 1)	42.1	46.0	-3.9
0.18	Neutral Lead	Quasi-Peak (Note 2)	54.5	64.3	-9.8
0.18	Neutral Lead	Average (Note 2)	50.0	54.3	-4.3
0.45	Neutral Lead	Quasi-Peak (Note 2)	46.5	56.9	-10.4
0.45	Neutral Lead	Average (Note 2)	38.6	46.9	-8.3
0.54	Neutral Lead	Quasi-Peak (Note 2)	47.3	56.0	-8.7
0.54	Neutral Lead	Average (Note 2)	39.2	46.0	-6.8
0.90	Neutral Lead	Quasi-Peak (Note 2)	47.3	56.0	-8.7
0.90	Neutral Lead	Average (Note 2)	37.3	46.0	-8.7

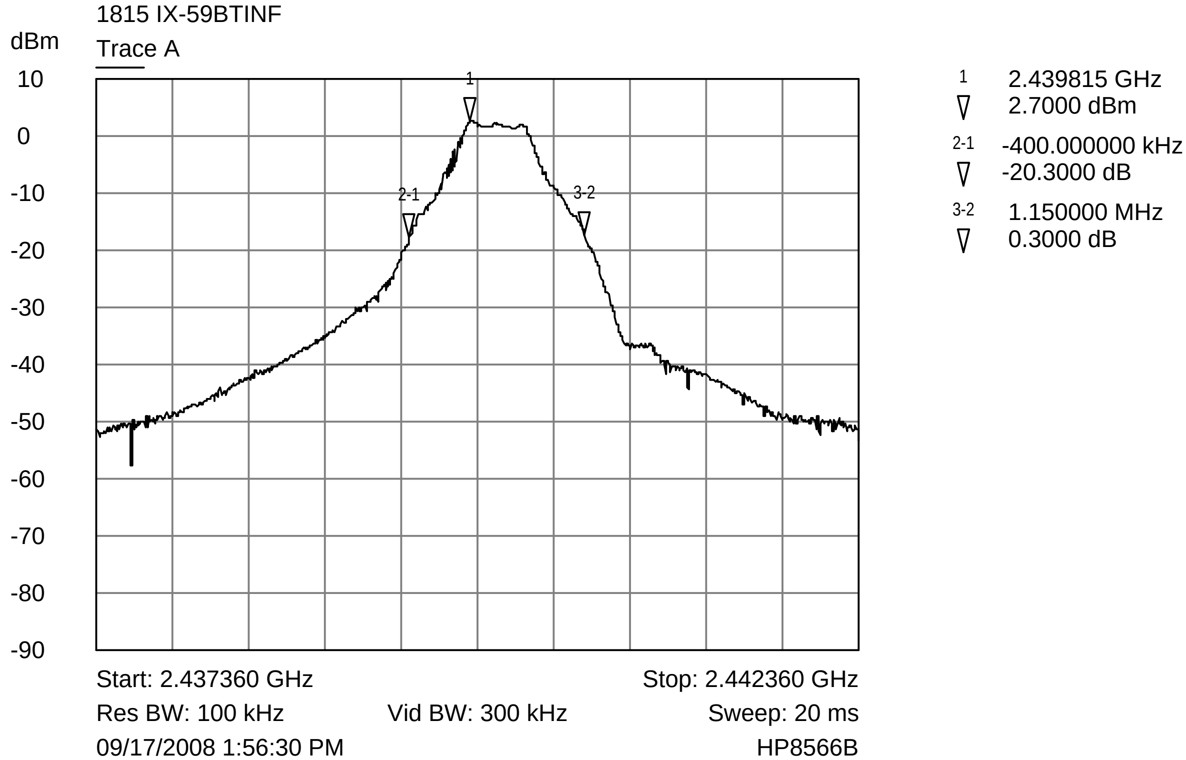
Frequency (MHz)	Host IX-5930 Power Supply AC Mains Lead	Detector	Measured Level (dBμV)	Limit (dBμV)	Margin (dB)
1.18	Neutral Lead	Quasi-Peak (Note 2)	43.3	56.0	-12.7
1.18	Neutral Lead	Average (Note 2)	32.3	46.0	-13.7
1.27	Neutral Lead	Quasi-Peak (Note 2)	46.5	56.0	-9.5
1.27	Neutral Lead	Average (Note 2)	34.8	46.0	-11.2

6.2.3.1 §15.247(a)(1)

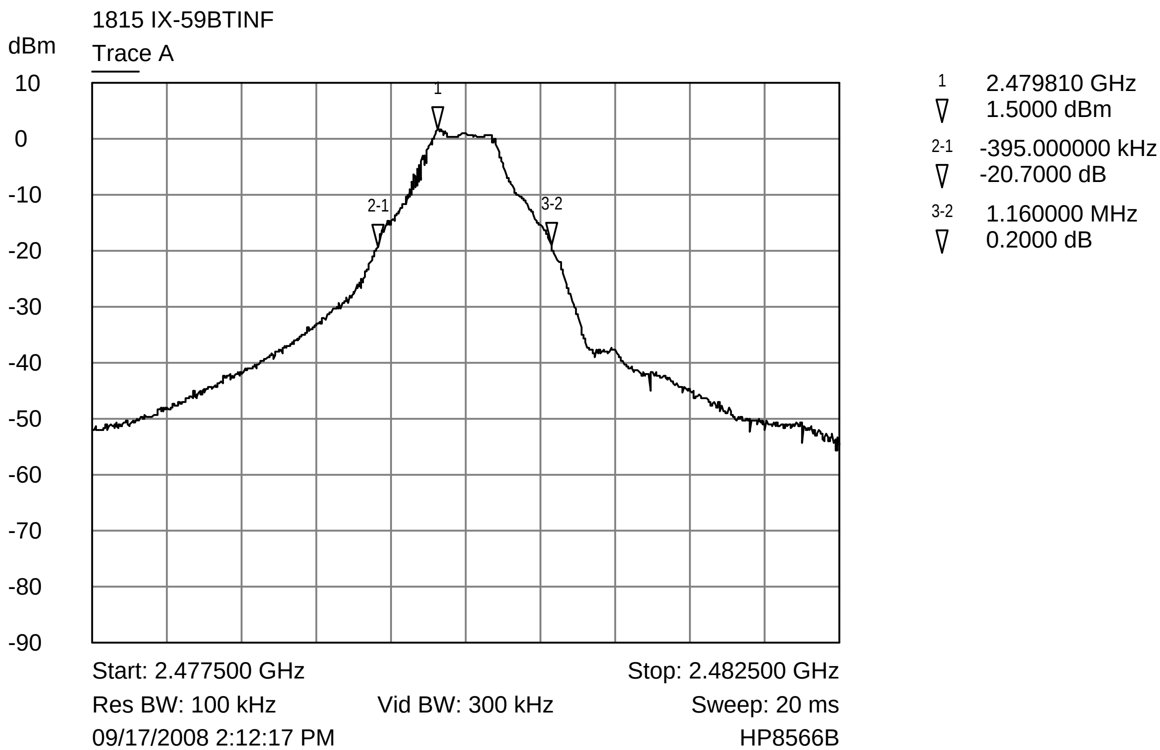
The EUT shall have the hopping channels separated by the greater of 25 kHz or two-thirds of the hopping channel 20 dB bandwidth. The 20 dB bandwidth is 1160 kHz. The hopping channels must be separated by 733.33 kHz (1160 kHz x 2/3). The channel separation is 1000 kHz. See the plots below:



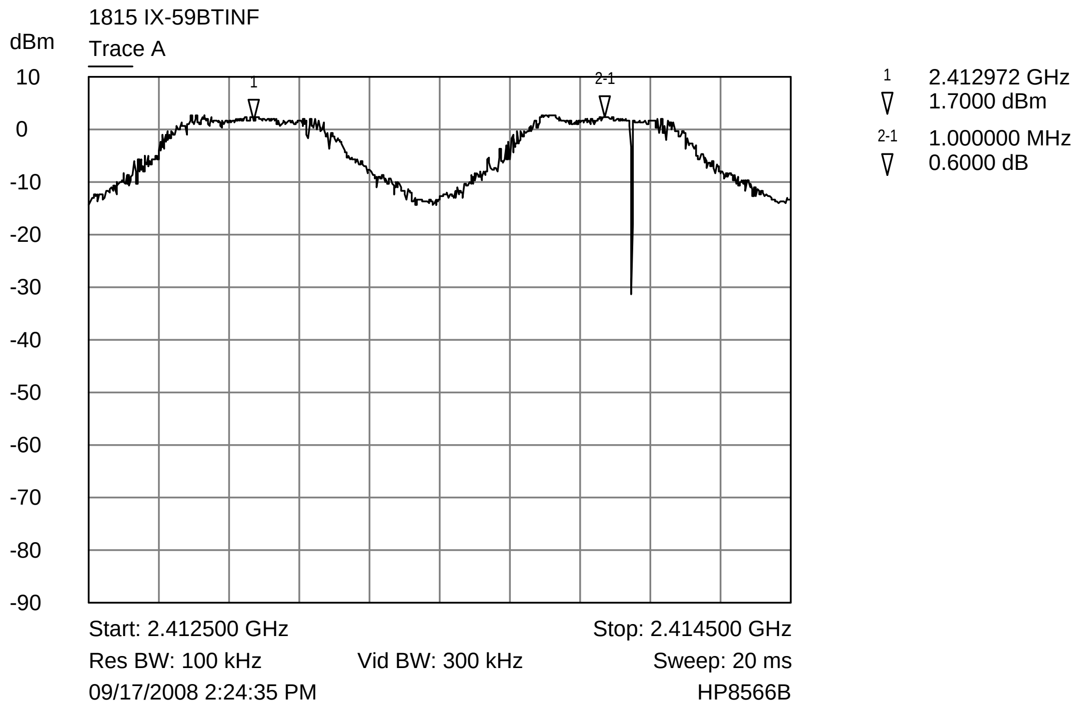
Trace A lower channel bandwidth plot



Trace A middle channel bandwidth plot



Trace A upper channel band width plot



Trace A channel spacing

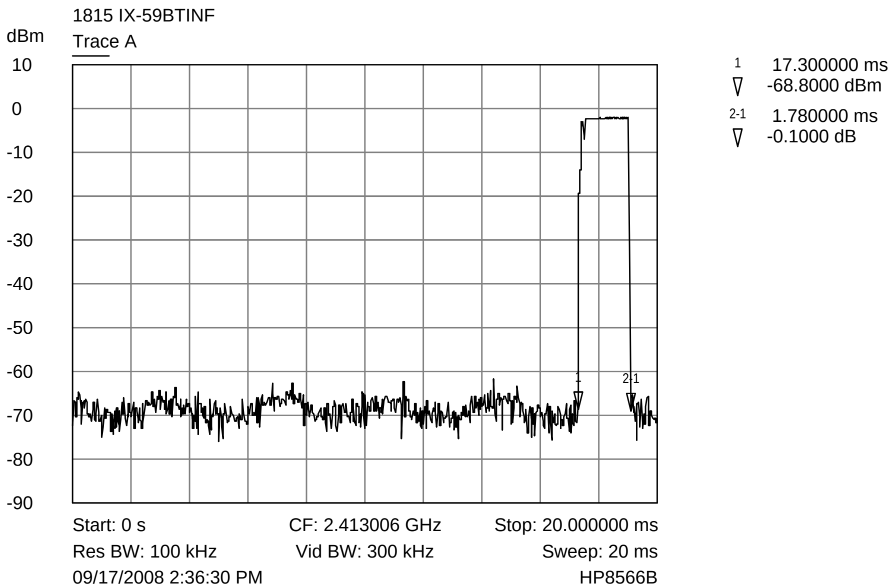
The EUT hops to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency is used equally on the average by each transmitter. See Exhibit 12 (Operational Description)of the submittal files. The receiver has input bandwidths that match the hopping channel bandwidths of the corresponding transmitter and shifts frequencies in synchronization with the transmitted signals.

6.2.3.2 §15.247(a)(1)(i)

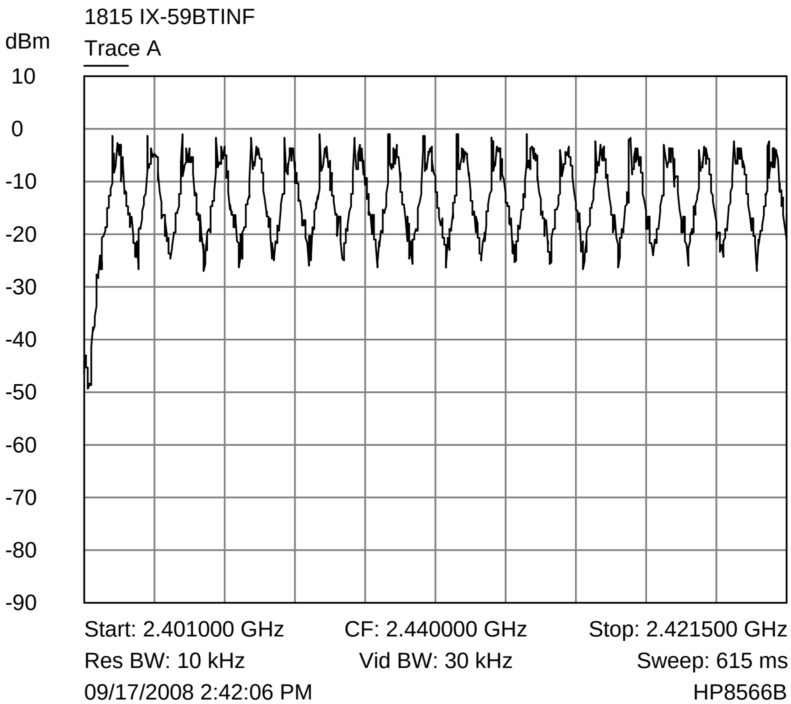
The EUT has a channel bandwidth of 1160 kHz (see the plots of 6.2.3.1) and uses 79 channels. The IX-59BTINF has a maximum hopping rate of 1600 hops per second when using a slot size of 1. If larger packet sizes are sent using multi-slots, the number of hops per second decreases. Using 3 slots per hop gives a hopping rate of 533 (1600/3). At a hop rate of 533 per second, each channel is hit 6.747 times per second (533 hops per second/79 channels). A slot size of 3 results in a 1.78 millisecond dwell time per hop. See the plot below. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels (0.4 seconds x 79 channels = 31.6 seconds). The average time of occupancy per channel calculation is shown below:

533 hops/second/79 channels = 6.747 hits/channel/second
6.747 hits/second x 1.78 ms dwell time/hop = 12 ms/second
12 ms/second x 31.6 seconds = 379.2 ms

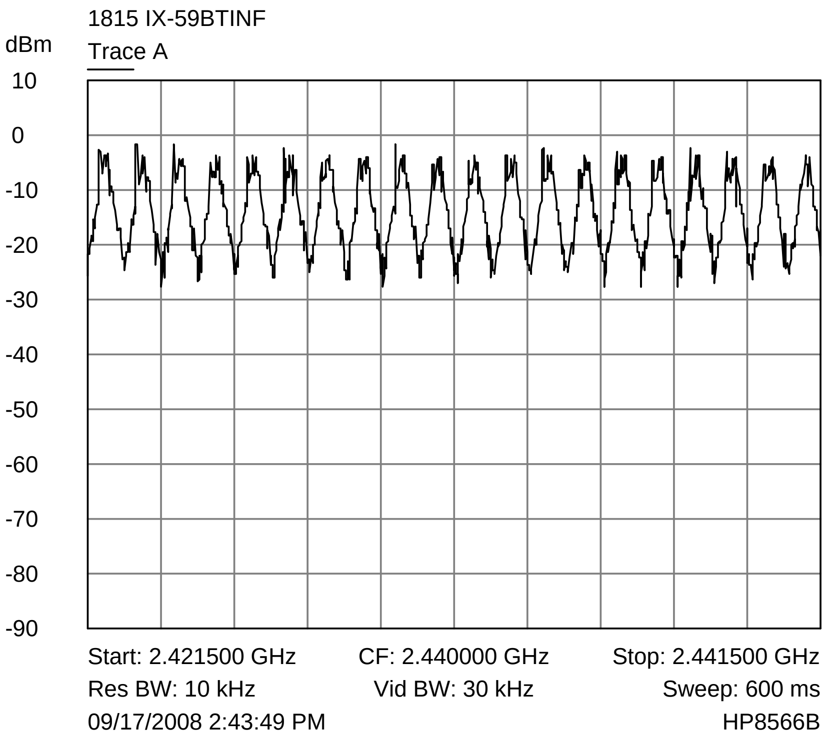
The average time of channel occupancy is 379.2 milliseconds within any 31.6 second time frame.



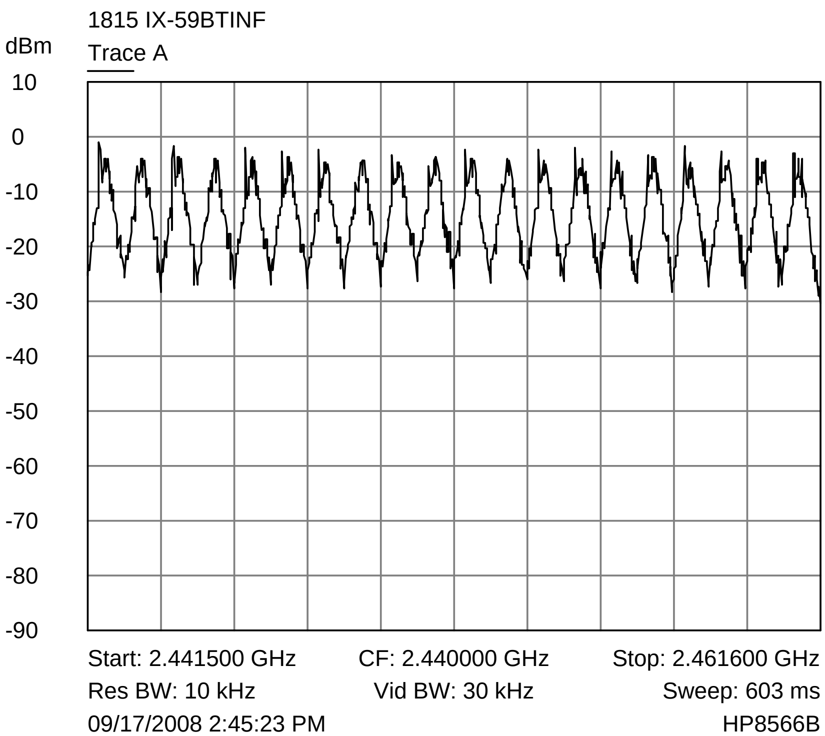
Trace A dwell



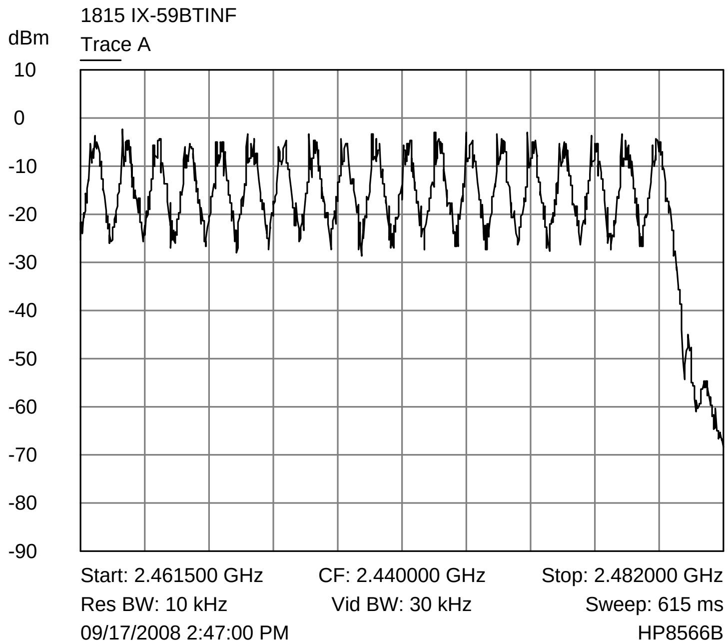
Trace A lower 20 channels



Trace A lower middle 20 channels



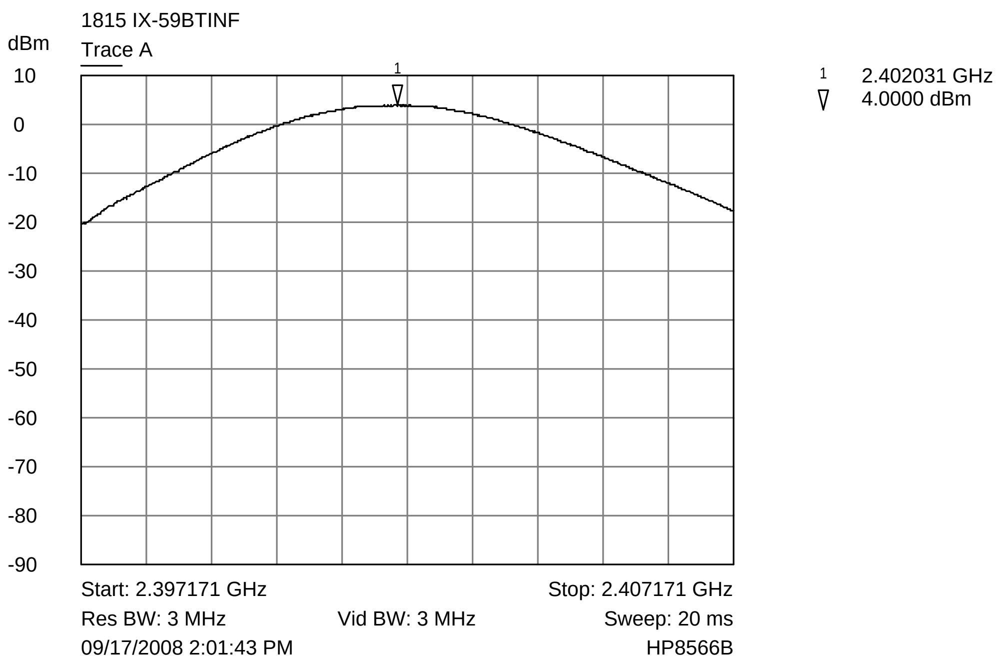
Trace A upper middle 20 channels



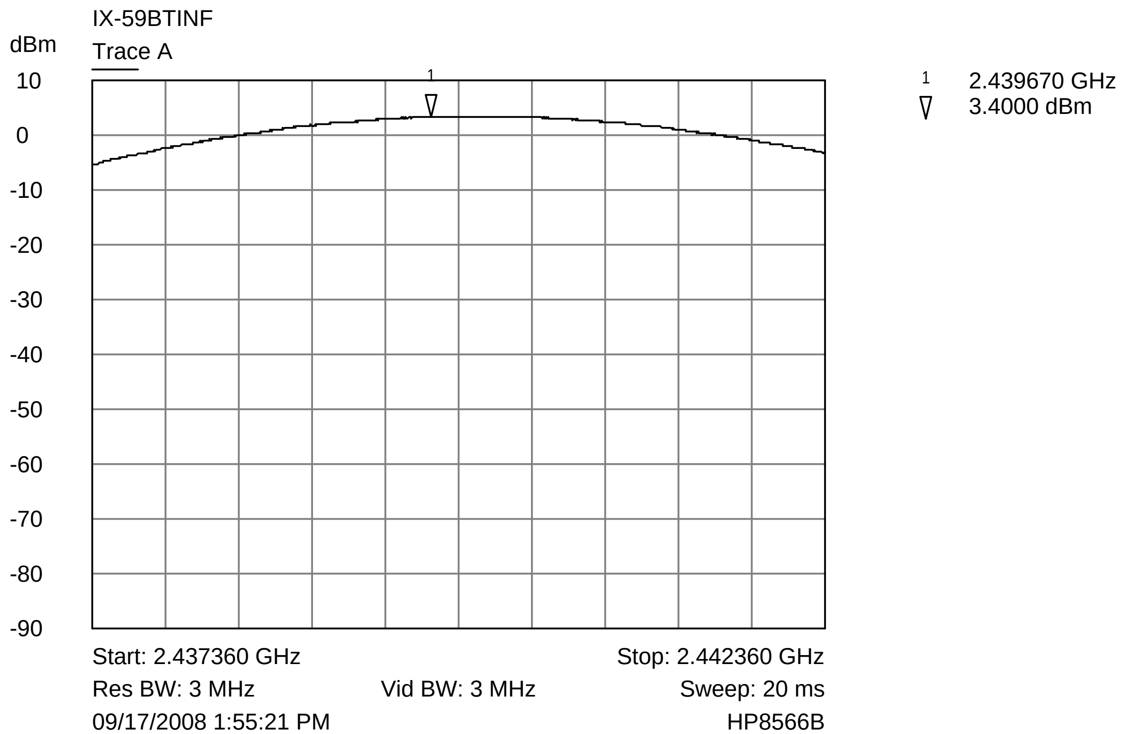
Trace A upper 19 channels

6.2.4 §15.247(b)(2) Peak Conducted Power Requirement

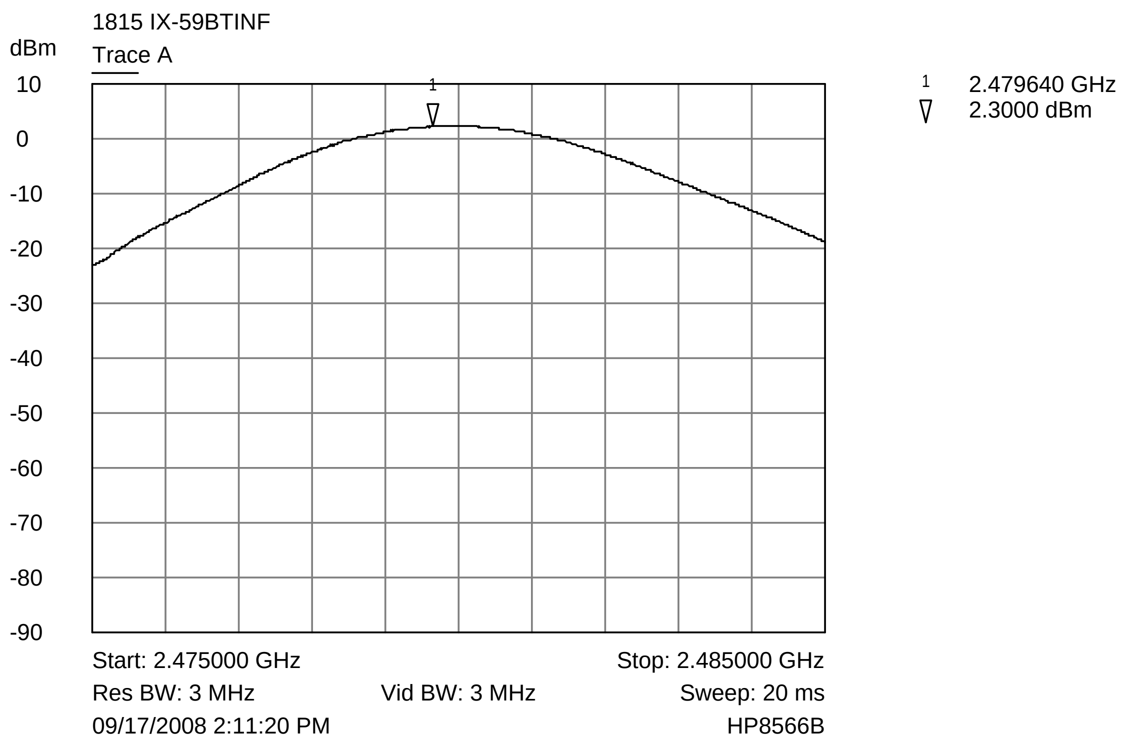
The EUT has a measured peak conducted power of 4.0 dBm or 2.51 mW. The limit for this device is 1 W or 30 dBm. See the plots below.



Trace A lower channel output power plot



Trace A middle channel output power plot



Trace A upper channel output power plot

6.2.5 §15.247(d) Spurious Emission Measurements

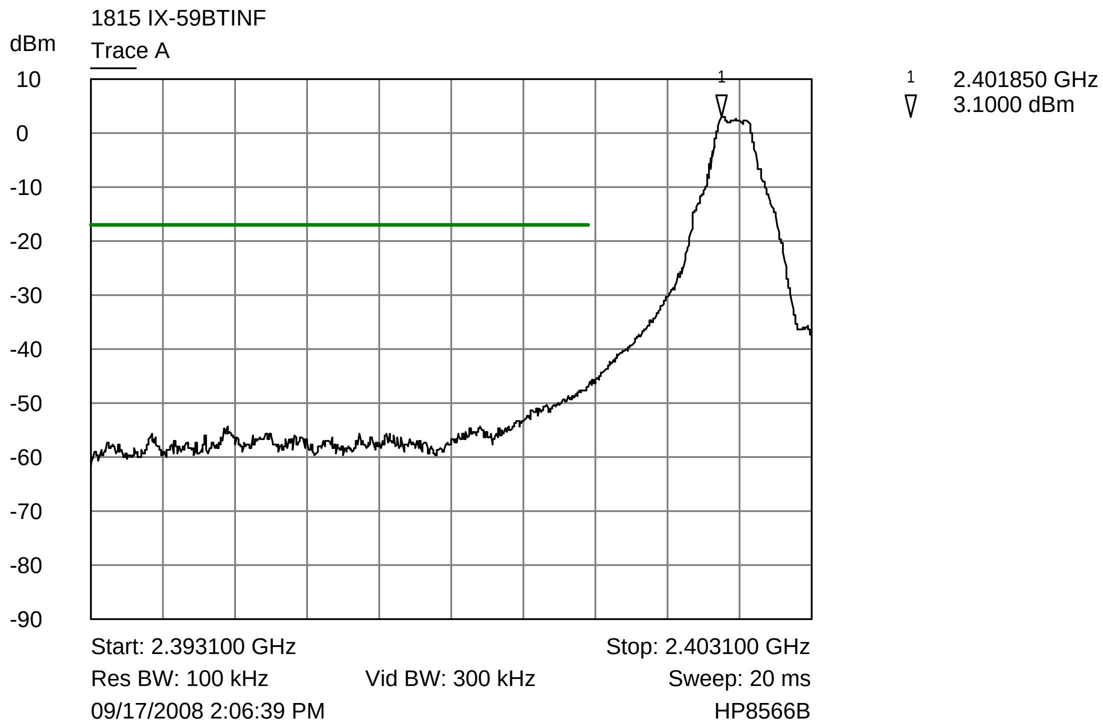
6.2.5.1 Conducted Measurements at the Antenna Port

The conducted spurious emissions, in any 100 kHz bandwidth outside the operating band, must be attenuated to at least 20 dB below the measured fundamental emission level. The measured level was 3.1 dBm; therefore, the spurious conducted emissions must be attenuated below –16.9 dBm. See the tables and plots below:

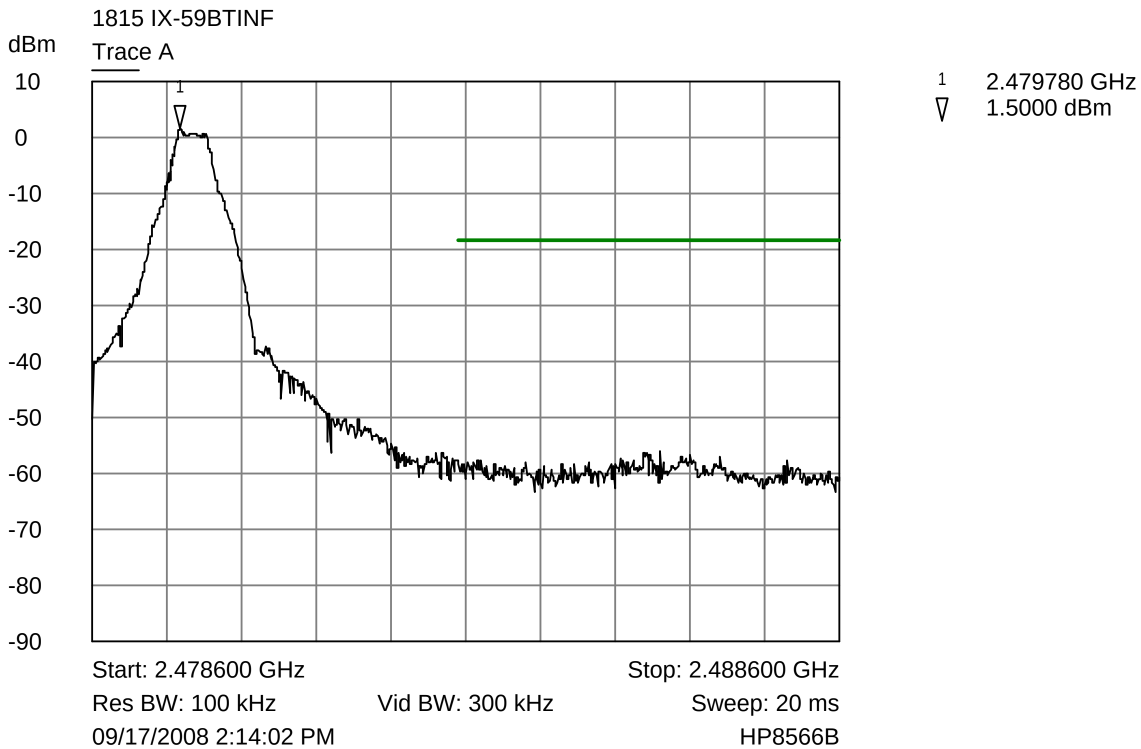
2402 MHz			
Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Margin (dB)
4804	-74.7	-16.9	-57.8
7206	-70.0	-16.9	-53.1
9608	-70.9	-16.9	-54.0
12010	-70.9	-16.9	-54.0
14412	-66.1	-16.9	-49.2
16814	-64.6	-16.9	-47.7
19216	-61.6	-16.9	-44.7
21618	-60.2	-16.9	-43.3
24020	-58.0	-16.9	-41.1

2440 MHz			
Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Margin (dB)
4880	-72.9	-16.9	-56.0
7320	-68.7	-16.9	-51.8
9760	-70.2	-16.9	-53.3
12200	-71.4	-16.9	-54.5
14640	-66.2	-16.9	-49.3
17080	-65.1	-16.9	-48.2
19520	-60.8	-16.9	-43.9
21960	-58.7	-16.9	-41.8
24400	-58.0	-16.9	-41.1

2480 MHz			
Frequency (MHz)	Measurement (dBm)	Limit (dBm)	Margin (dB)
4960	-74.2	-16.9	-57.3
7440	-71.1	-16.9	-54.2
9920	-70.1	-16.9	-53.2
12400	-71.1	-16.9	-54.2
14880	-65.8	-16.9	-48.9
17360	-65.9	-16.9	-49.0
19840	-61.1	-16.9	-44.2
22320	-60.7	-16.9	-43.8
24800	-58.0	-16.9	-41.1



Trace A lower channel band edge plot



Trace A upper channel band edge plot

6.2.5.2 Radiated Spurious Emission Measurements

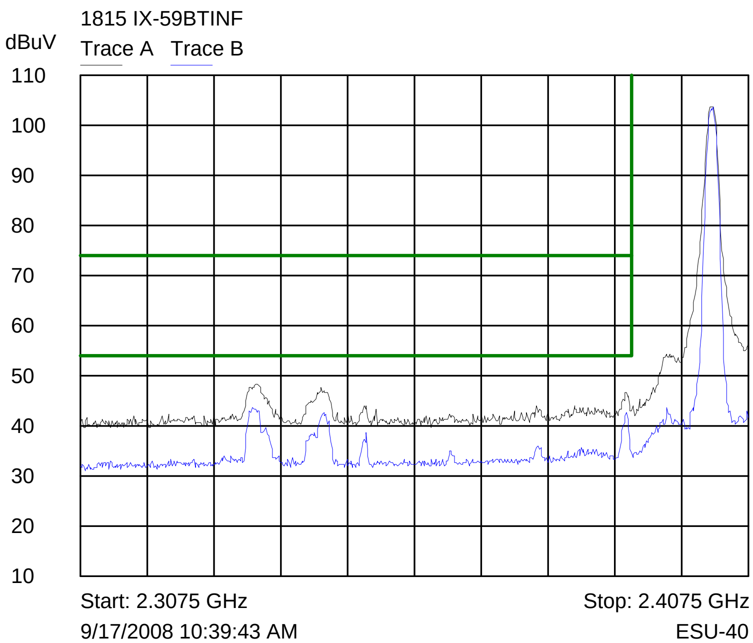
The radiated spurious emissions that fall in restricted bands, as specified in §15.205, must comply with the limits of §15.209. See the tables and plots below:

2402 MHz							
Frequency (MHz)	Detection Mode	Antenna Polarity	Receiver Reading (dBμV)	Correction Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4804.0	Peak	Vertical	21.4	36.0	57.4	74.0	-16.6
4804.0	Average	Vertical	8.0	36.0	44.0	54.0	-10.0
4804.0	Peak	Horizontal	21.7	36.0	57.7	74.0	-16.3
4804.0	Average	Horizontal	8.2	36.0	44.2	54.0	-9.8
7206.0	Peak	Vertical	22.1	40.3	62.4	74.0	-11.6
7206.0	Average	Vertical	8.1	40.3	48.4	54.0	-5.6
7206.0	Peak	Horizontal	21.9	40.3	62.2	74.0	-11.8
7206.0	Average	Horizontal	7.9	40.3	48.2	54.0	-5.8
12010.0	Peak	Vertical	14.9	44.5	59.4	74.0	-14.6
12010.0	Average	Vertical	0.6	44.5	45.1	54.0	-8.9
12010.0	Peak	Horizontal	15.0	44.5	59.5	74.0	-14.6
12010.0	Average	Horizontal	0.6	44.5	45.1	54.0	-8.9

2440 MHz							
Frequency (MHz)	Detection Mode	Antenna Polarity	Receiver Reading (dBμV)	Correction Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4880.0	Peak	Vertical	14.8	36.2	51.0	74.0	-23.0
4880.0	Average	Vertical	7.3	36.2	43.5	54.0	-10.5
4880.0	Peak	Horizontal	13.6	36.2	49.8	74.0	-24.2
4880.0	Average	Horizontal	5.9	36.2	42.1	54.0	-11.9
7320.0	Peak	Vertical	18.4	40.6	59.0	74.0	-15.0
7320.0	Average	Vertical	3.6	40.6	44.2	54.0	-9.8
7320.0	Peak	Horizontal	18.2	40.6	58.8	74.0	-15.2
7320.0	Average	Horizontal	3.5	40.6	44.1	54.0	-9.9
12200.0	Peak	Vertical	14.0	44.5	58.5	74.0	-15.5
12200.0	Average	Vertical	0.5	44.5	45.0	54.0	-9.0
12200.0	Peak	Horizontal	14.5	44.5	59.0	74.0	-15.0
12200.0	Average	Horizontal	0.5	44.5	45.0	54.0	-9.0

2480 MHz							
Frequency (MHz)	Detection Mode	Antenna Polarity	Receiver Reading (dBμV)	Correction Factor (dB)	Field Strength (dBμV/m)	Limit (dBμV/m)	Margin (dB)
4960.0	Peak	Vertical	19.9	36.3	56.2	74.0	-17.8
4960.0	Average	Vertical	6.0	36.3	42.3	54.0	-11.7
4960.0	Peak	Horizontal	20.0	36.3	56.3	74.0	-17.7
4960.0	Average	Horizontal	6.4	36.3	42.7	54.0	-11.3
7440.0	Peak	Vertical	19.9	40.9	60.8	74.0	-13.2
7440.0	Average	Vertical	6.1	40.9	47.0	54.0	-7.0
7440.0	Peak	Horizontal	19.8	40.9	60.7	74.0	-13.3
7440.0	Average	Horizontal	6.2	40.9	47.1	54.0	-6.9
12400.0	Peak	Vertical	16.5	44.5	58.0	74.0	-16.0
12400.0	Average	Vertical	0.2	44.5	44.7	54.0	-9.3
12400.0	Peak	Horizontal	13.7	44.5	58.2	74.0	-15.8
12400.0	Average	Horizontal	0.2	44.5	44.7	54.0	-9.3

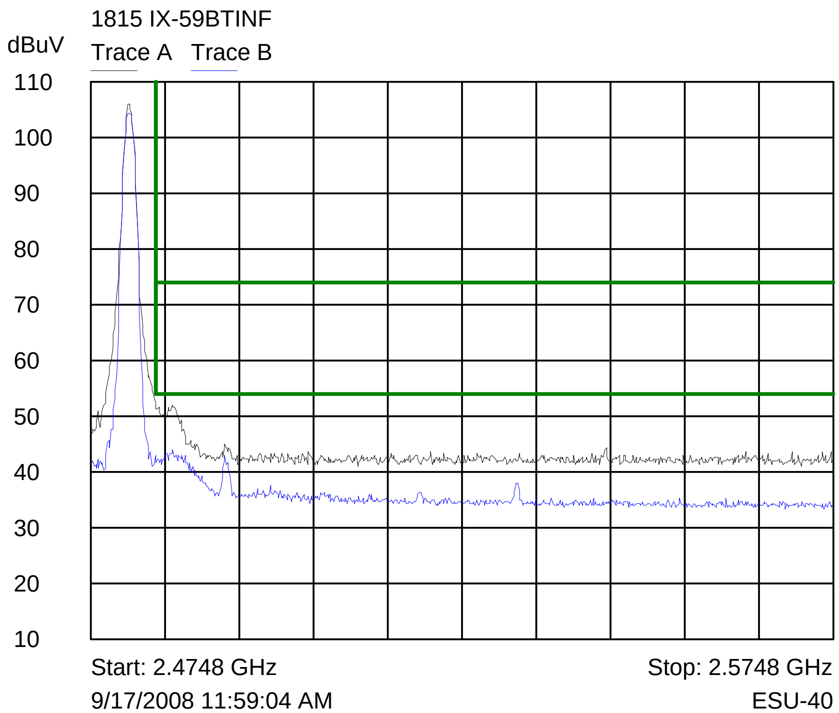
No other emissions in the restricted bands were seen from the EUT using a 1 meter measurement distance. Noise floor was greater than 6 dB below the average limit.



Peak and Average limits and traces shown

Trace A Peak detection - Lower band edge plot

Trace B Average detection - lower band edge plot



Peak and Average limits and traces shown

Trace A Peak detection - Lower band edge plot

Trace B Average detection - upper band edge plot

6.2.5.3 Sample Field Strength Calculation for Radiated Measurements:

The field strength is calculated by adding the Correction Factor (Antenna Factor + Cable Factor), to the measured level from the receiver. The receiver amplitude reading is compensated for any amplifier gain. The basic equation with a sample calculation is shown below:

FS = RA + CF Where

FS = Field Strength
RA = Receiver Amplitude Reading (Receiver Reading - Amplifier Gain)
CF = Correction Factor (Antenna Factor + Cable Factor)

Assume a receiver reading of 42.5 dBµV is obtained from the receiver, an amplifier gain of 26.5 dB and a correction factor of 8.5 dB/m. The field strength is calculated by subtracting the amplifier gain and adding the correction factor, giving a field strength of 24.5 dBµV/m, FS = (42.5 - 26.5) + 8.5 = 24.5 dBµV/m.

6.2.6 §15.247(g) Channel Usage

The EUT meets the requirements of this section as described in Exhibit 12 (Operational Description) of the submittal files.

6.2.7 §15.247(h) Channel Coordination

The EUT meets the requirements of this section as described in Exhibit 12 (Operational Description) of the submittal files.

6.2.8 §15.247(i) Exposure to RF Energy

MPE data and calculations are found in Exhibit 11 of the submittal files.

APPENDIX 1 TEST PROCEDURES AND TEST EQUIPMENT

A1.1 Conducted Disturbance at Mains Ports:

The conducted disturbance at mains ports from the EUT was measured using a spectrum analyzer with a quasi-peak adapter for peak, quasi-peak and average readings. The quasi-peak adapter uses a bandwidth of 9 kHz, with the spectrum analyzer's resolution bandwidth set at 100 kHz, for readings in the 150 kHz to 30 MHz frequency ranges.

The conducted disturbance at mains ports measurements are performed in a screen room using a (50 Ω/50 μH) Line Impedance Stabilization Network (LISN).

Where mains flexible power cords are longer than 1 m, the excess cable is folded back and forth as far as possible so as to form a bundle not exceeding 0.4 m in length.

Where the EUT is a collection of devices with each device having its own power cord, the point of connection for the LISN is determined from the following rules:

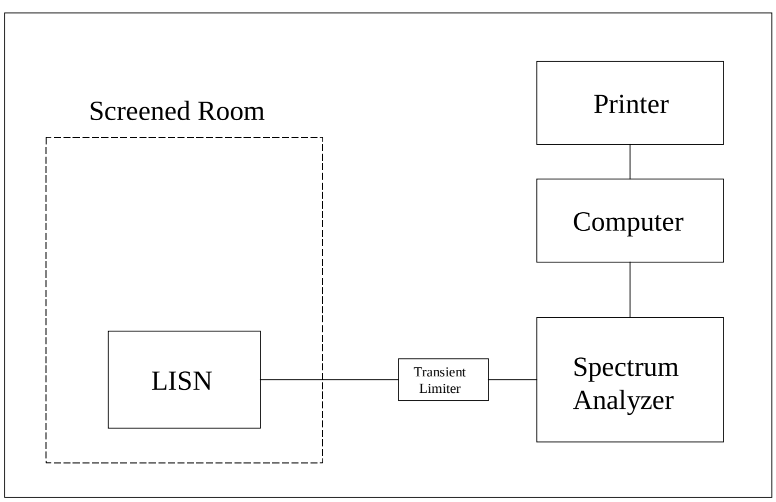
a) Each power cord, which is terminated in a mains supply plug, shall be tested separately.
b) Power cords, which are not specified by the manufacturer to be connected via a host unit, shall be tested separately.
c) Power cords which are specified by the manufacturer to be connected via a host unit or other power supplying equipment shall be connected to that host unit and the power cords of that host unit connected to the LISN and tested.
d) Where a special connection is specified, the necessary hardware to effect the connection is supplied by the manufacturer for the testing purpose.
e) When testing equipment with multiple mains cords, those cords not under test are connected to an artificial mains network (AMN) different than the AMN used for the mains cord under test.

For AC mains port testing, desktop EUT are placed on a non-conducting table at least 0.8 meters from the metallic floor and placed 40 cm from the vertical coupling plane (copper plating in the wall behind EUT table). Floor standing equipment is placed directly on the earth grounded floor.

Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Wanship Open Area Test Site #2	CCL	N/A	N/A	10/24/2007
Test Software	CCL	Conducted Emissions	Revision 1.2	N/A
Spectrum Analyzer	Hewlett Packard	8566B	2332A02726	04/29/2008
Quasi-Peak Detector	Hewlett Packard	85650A	2043A00287	04/02/2008
LISN	EMCO	3825/2	9508-2435	03/13/2008
Conductance Cable Wanship Site #2	CCL	Cable J	N/A	12/31/2007
Transient Limiter	Hewlett Packard	11947A	3107A02266	12/31/2007

An independent calibration laboratory or CCL personnel calibrates all the equipment listed above at intervals defined in ANSI C63.4:2003 Section 4.4 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to tractability is on file and is available for examination upon request.

Conducted Emissions Test Setup



A1.2 Radiated Disturbance:

The radiated disturbance from the EUT was measured using a spectrum analyzer with a quasi-peak adapter for peak and quasi-peak readings. A preamplifier with a fixed gain of 26 dB and a power amplifier with a fixed gain of 22 dB were used to increase the sensitivity of the measuring instrumentation. The quasi-peak adapter uses a bandwidth of 120 kHz, with the spectrum analyzer's resolution bandwidth set at 1 MHz, for readings in the 30 to 1000 MHz frequency ranges.

A biconilog antenna was used to measure the frequency range of 30 to 1000 MHz, at a distance of 3 meters from the EUT. The readings obtained by these antennas are correlated to the levels obtained with a tuned dipole antenna by adding antenna factors. A double-ridged guide antenna was used to measure the emissions at frequencies above 1000 MHz at a distance of 3 and/or 1 meter from the EUT.

The configuration of the EUT was varied to find the maximum radiated emission. The EUT was connected to the peripherals listed in Section 2.3 via the interconnecting cables listed in Section 2.4. A technician manually manipulated these interconnecting cables to obtain worst-case radiated disturbance. The EUT was rotated 360 degrees, and the antenna height was varied from 1 to 4 meters to find the maximum radiated emission. Where there was multiple interface ports all of the same type, cables are either placed on all of the ports or cables added to these ports until the emissions do not increase by more than 2 dB.

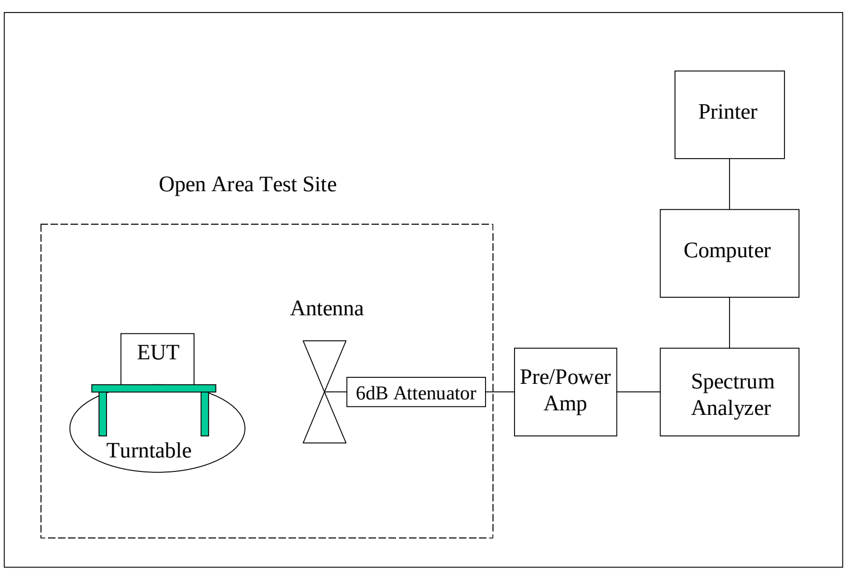
Desktop EUT are measured on a non-conducting table 0.8 meters above the ground plane. The table is placed on a turntable, which is level with the ground plane. For equipment normally placed on floors, the equipment shall be placed directly on the turntable.

Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Wanship Open Area Test Site #2	CCL	N/A	N/A	10/24/2007
Test Software	CCL	Radiated Emissions	Revision 1.3	N/A
Analyzer/Receiver	Rohde & Schwarz	ESU 1302.6005.40	100064	06/23/2008
Spectrum Analyzer	Hewlett Packard	8566B	2332A02726	04/29/2008
Quasi-Peak Detector	Hewlett Packard	85650A	2043A00287	04/02/2008

Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Biconilog Antenna	EMCO	3142	9601-1009	10/10/2007
Double Ridged Guide Antenna	EMCO	3115	9604-4779	03/17/2008
Amplifier	Hewlett Packard	11975A	2738A2030	05/18/2006
Harmonic Mixer	Hewlett Packard	11970K	3003A05756	04/19/2006
High Frequency Amplifier	Miteq	AFS4-01001800-43-10P-4	1096455	05/29/2007
20’ High Frequency Cable	Utiflex	UFA210A-1-2400-30050U	1175	04/01/2008
3 Meter Radiated Emissions Cable Wanship Site #2	CCL	Cable K	N/A	12/31/2007
Pre/Power-Amplifier	Hewlett Packard	8447F	3113A05161	08/28/2008
6 dB Attenuator	Hewlett Packard	8491A	32835	12/31/2007

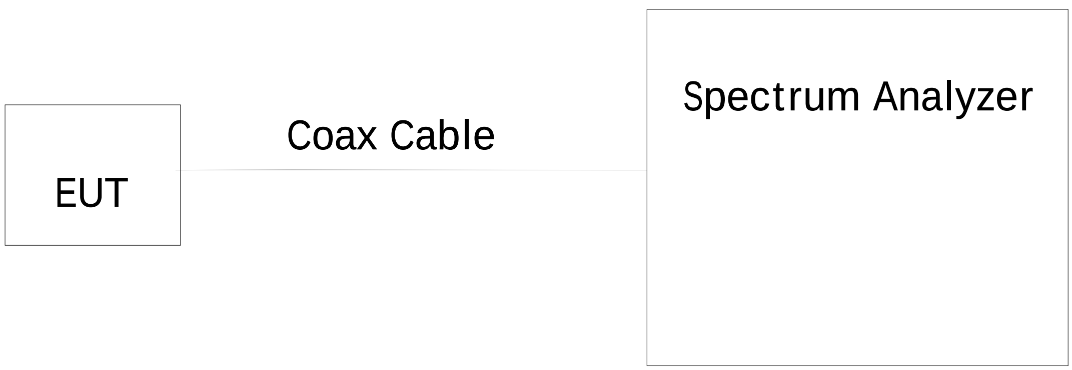
An independent calibration laboratory or CCL personnel calibrates all the equipment listed above at intervals defined in ANSI C63.4:2003 Section 4.4 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to tractability is on file and is available for examination upon request.

Radiated Emissions Test Setup



A1.3 Measurements at the Antenna Port

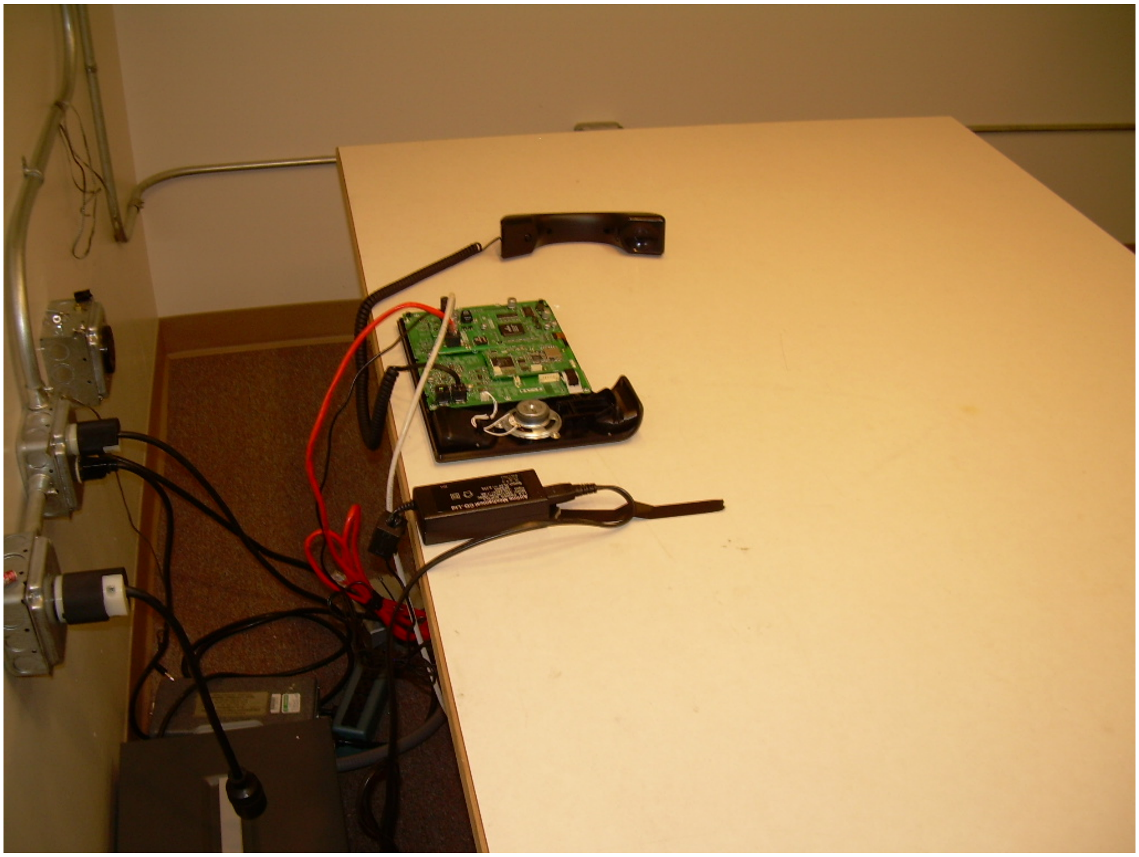
Type of Equipment	Manufacturer	Model Number	Serial Number	Date of Last Calibration
Spectrum Analyzer	Hewlett Packard	8566B	2332A02726	04/29/2008
Quasi-Peak Detector	Hewlett Packard	85650A	2043A00287	04/02/2008
Cable	CCL	Coax w/SMA	001175	04/01/2008
6 dB Attenuator	Hewlett Packard	8491A	32835	12/31/2007



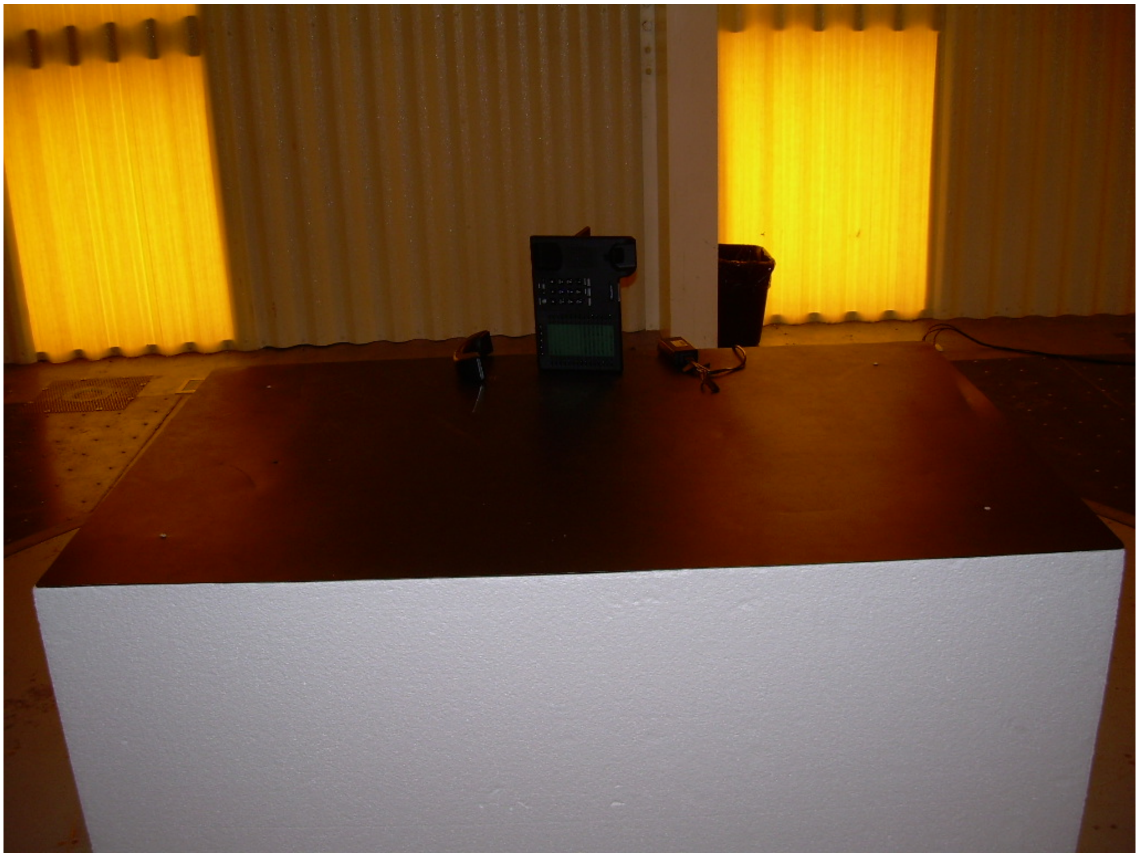
APPENDIX 2 PHOTOGRAPHS

Photograph 1 – Front View Conducted Emission at the AC Mains

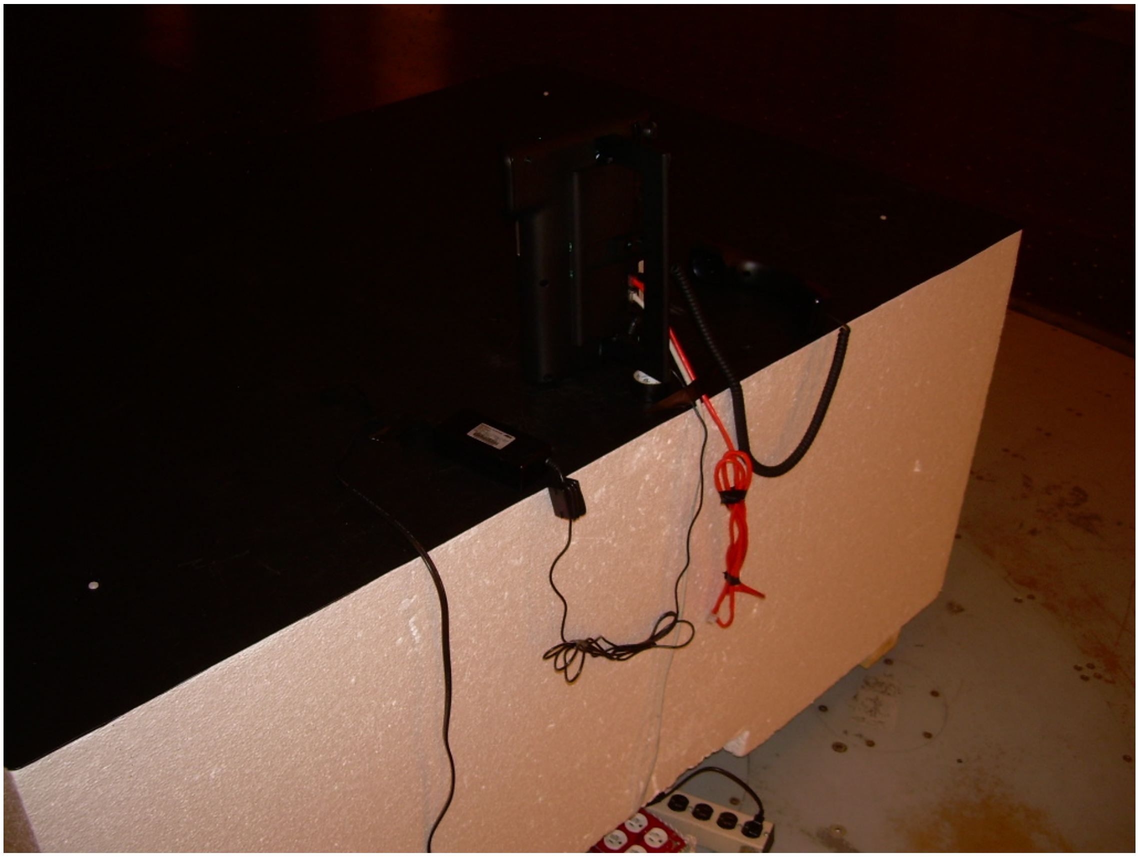
Photograph 2 – Back View Conducted Emission at the AC Mains



Photograph 3 – Front View Radiated Spurious Emissions
Configuration – On Edge Placement

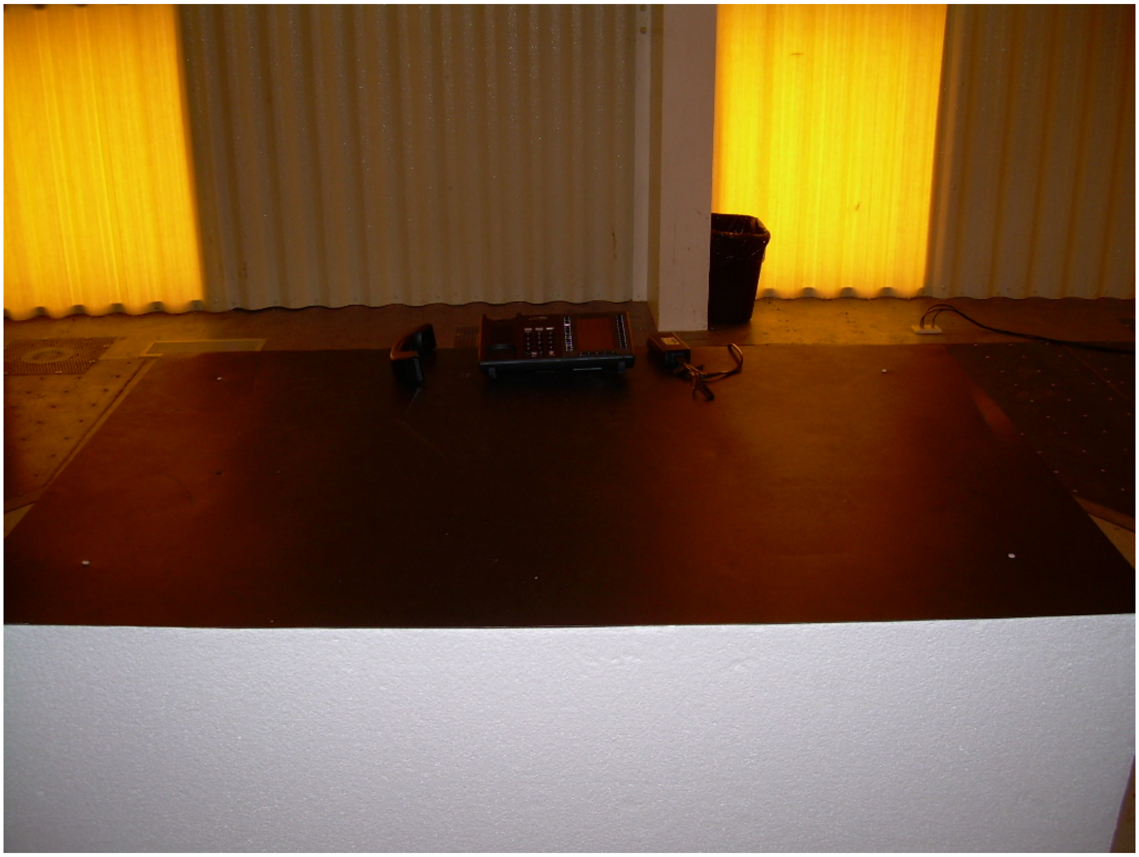


Photograph 4 – Back View Radiated Spurious Emissions Configuration – On Edge Placement



Photograph 5 – Front View Radiated Spurious Emissions Configuration – Vertical Placement

Photograph 6 – Front View Radiated Spurious Emissions
Configuration – Horizontal Placement



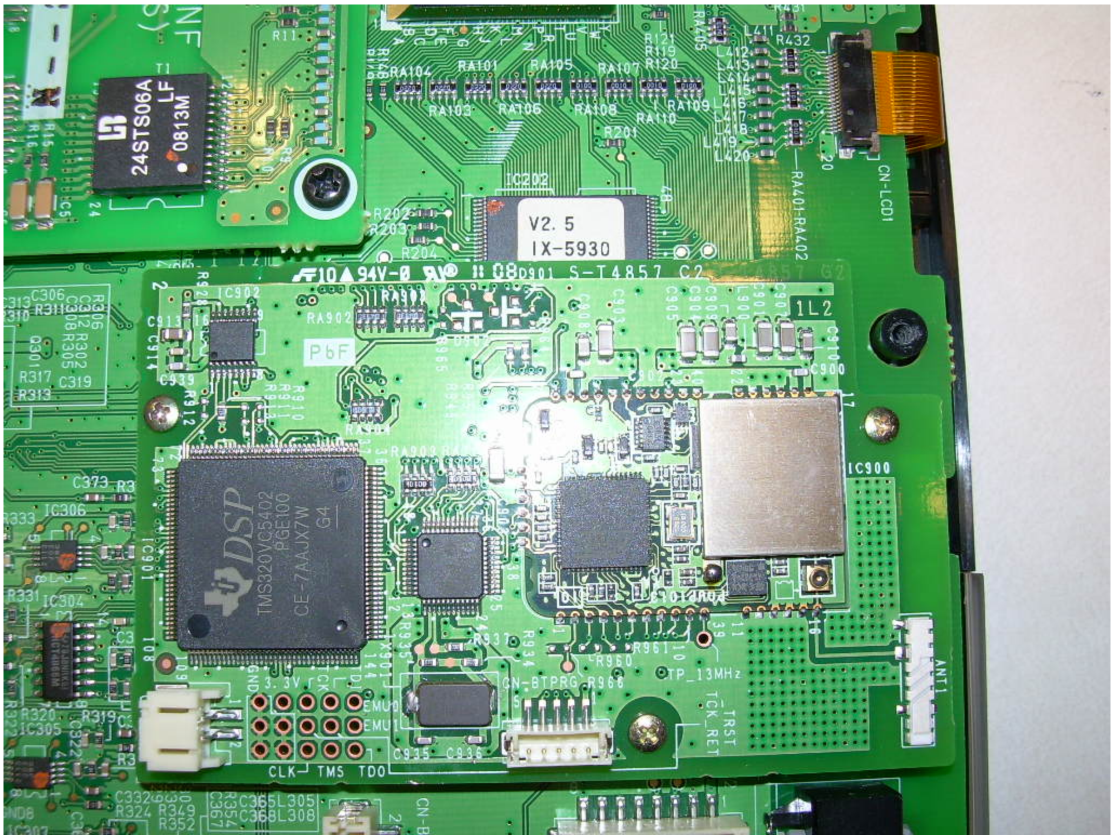
Photograph 7 – Top View of the IX-5930

Photograph 8 – Bottom View of the IX-5930

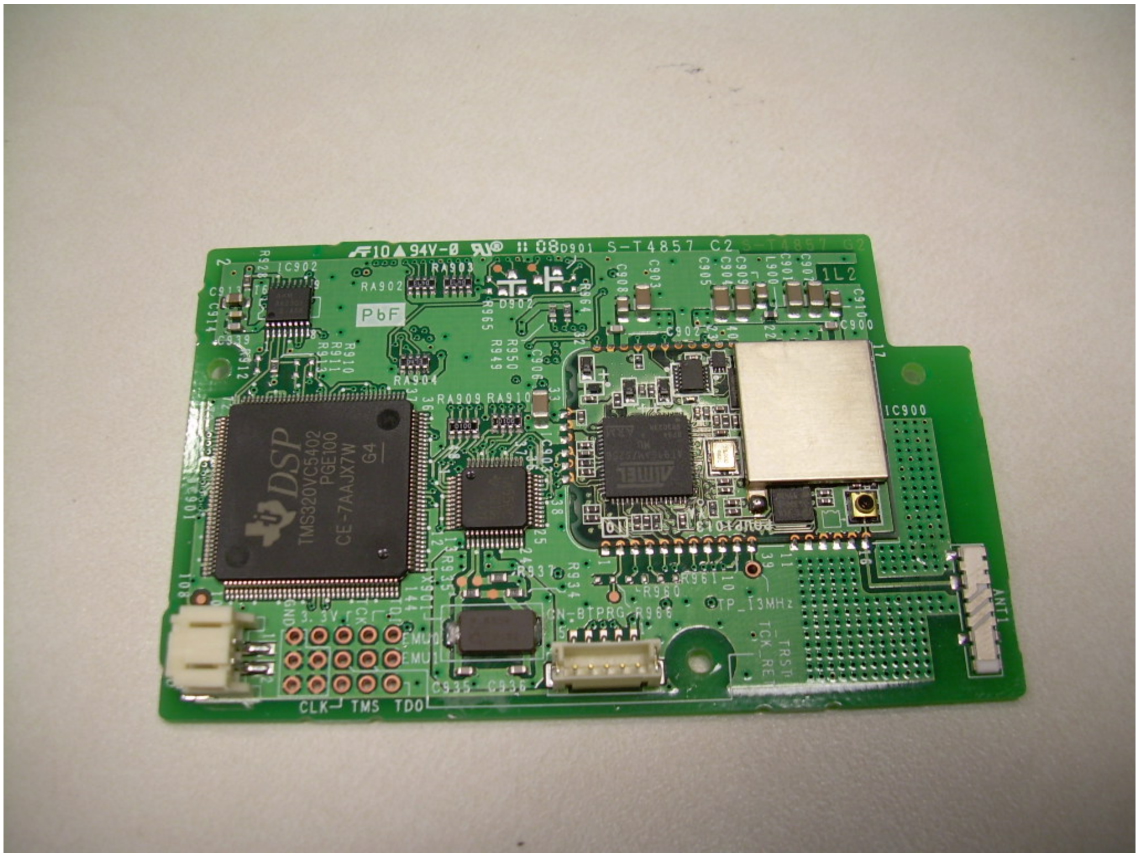
Photograph 9 - Top View of the IX-5910

Photograph 10 – Bottom View of the IX-5910

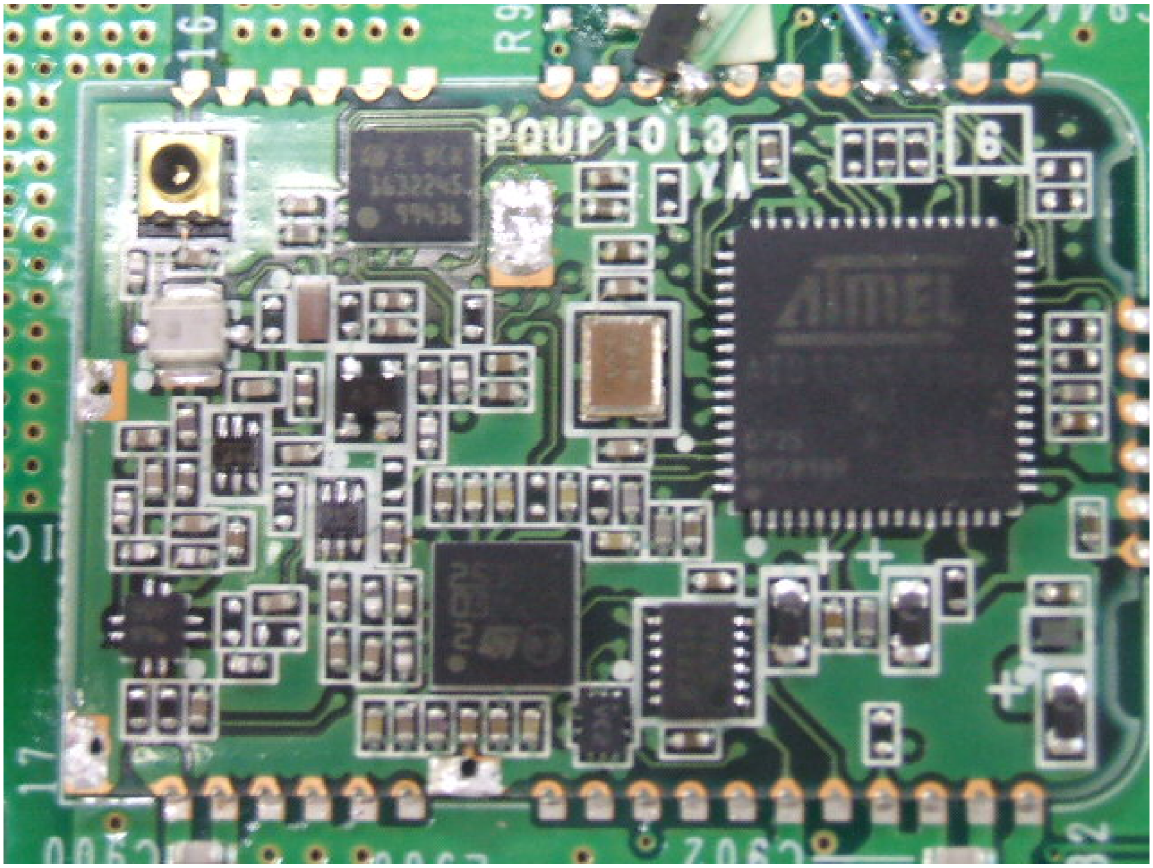
Photograph 11 – Internal View of the IX-5930 Showing IX-59BTINF Placement



Photograph 12 – Component Side of the IX-59BTINF



Photograph 13 – Circuitry Covered by the RF Shield



Photograph 14 – Trace Side of the IX-59BTINF