Emissions Test Report

EUT Name: SpeedTouch Wireless Modem

EUT Model: 3EC18883DD

FCC ID: JF6-0101

FCC Title 47, Part 15, Subpart B

Prepared for:

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Report/Issue Date: 18 May 2001
Report Number: 0931ALC

Statement of Compliance

Manufacturer:	Alcatel USA 2912 Wake Forest Road Raleigh, NC 27609 919-850-5332
Requester / Applicant:	Dave Hollis
Name of Equipment:	SpeedTouch Wireless Modem Model No. 3EC18883DD
FCC ID:	JF6-0101
Type of Equipment:	Information Technology Equipment (ITE)
Class of Equipment:	Class B
Application of Regulations:	FCC Title 47, Part 15, Subpart B
Test Dates:	Start Date to End Date

Guidance Documents:

Emissions: FCC 47 CFR Part 15

Test Methods:

Emissions: ANSI C63.4:1992

The electromagnetic compatibility test and documented data described in this report has been performed and recorded by Flextronics Compliance Laboratories, in accordance with the standards and procedures listed herein. As the responsible authorized agent of the EMC laboratory, I hereby declare that a sample of one, of the equipment described above, has been shown to be compliant with the EMC requirements of the stated regulations and standards based on these results. If any special accessories and/or modifications were required for compliance, they are listed in the Executive Summary of this report.

This report must not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. This report contains data that are not covered by NVLAP accreditation. This report shall not be reproduced except in full, without the written authorization of the laboratory.

Michael Cantwell

18 May 2001

Michael Cantwell, PE, NCE
Operations Manager
NVLAP Signatory

Date

1 Executive Summary

1.1 Scope

This report is intended to document the status of conformance with the requirements of the FCC Title 47, Part 15, Subpart B based on the results of testing performed on *Start Date* through *End Date* on the *SpeedTouch Wireless Modem* Model No. *3EC18883DD* manufactured by Alcatel USA. This report only applies to the specific samples tested under the stated test conditions. It is the responsibility of the manufacturer to assure that additional production units of this model are manufactured with identical or EMI equivalent electrical and mechanical components. This report is further intended to document changes and modifications to the EUT throughout it's life cycle. All documentation will be included as a supplement.

1.2 Purpose

Testing was performed to evaluate the EMC performance of the EUT in accordance with the applicable requirements, procedures, and criteria defined in the application of regulations and application of standards listed in this report.

1.3 Summary of Test Results

Table 1 - Summary of Test Results

Emission	Test Method(s)	Test Parameters	Result
Radiated Emissions	ANSI C63.4:1992	30 MHz to 1000 MHz, Class B	compliant
Conducted Emissions	ANSI C63.4:1992	450 kHz to 30 MHz, Class B	compliant

1.4 Summary of Evaluation Results

The following equipment was evaluated against the product tested with respect to the electrical, mechanical, and functional similarities found in the EMC Test Plan. It was determined that the EMC performance with respect to the Standard would be equal to or better than the product tested.

Table 2 – Equivalent Products

Product Evaluated	
Model Number	Part Number

1.5 Special Accessories

No special accessories were necessary in order to achieve compliance.

1.6 Equipment Modifications

No modifications were found to be necessary in order to achieve compliance.

2 Laboratory Information

2.1 Accreditations & Endorsements

2.1.1 US Federal Communications Commission

Flextronics Compliance Laboratories is accredited by the commission for performing testing services for the general public on a fee basis. This laboratory has been fully described in reports dated May 12, 1997, submitted to the FCC, and accepted by letter dated June 25, 1997 (31040/SIT 1300F2). The laboratory scope of accreditation includes: Title 47 CFR Part 15, 18, and 90. The accreditation is updated every 3 years.

2.1.2 NIST / NVLAP

Flextronics Compliance Laboratories is accredited by the National Voluntary Laboratory Accreditation Program which is administered under the auspices of the National Institute of Standards and Technology. The laboratory has been assessed and accredited in accordance with ISO Guide 25 and ISO 9002 (Lab code 200094-0). The scope of laboratory accreditation includes emission and immunity testing. The accreditation is updated annually.

2.1.3 TUV Rheinland of North America, Inc.

TUV Rheinland of North America, Inc. is a Nationally Recognized Testing Laboratory (NRTL). Flextronics Compliance Laboratories has been assessed and approved in accordance with EN 45001 and has been authorized to carry out EMC tests based on a Contract for the Co-Operation of TUV Rheinland of N.A., Inc with a Sub-Contracted EMC Laboratory.

2.1.4 NEMKO

NEMKO is a Nationally Recognized Testing Laboratory (NRTL). Flextronics Compliance Laboratories has been assessed and approved in accordance with EN 45001 and Nemko Document ELA 10 (Aut. No.: ELA 185).

2.1.5 Japan - VCCI

The Voluntary Control Council for Interference by Information Technology Equipment (VCCI) is a group that consists of Information Technology Equipment (ITE) manufacturers and EMC test laboratories. The purpose of the Council is to take voluntary control measures against electromagnetic interference from Information Technology Equipment, and thereby contribute to the development of a socially beneficial and responsible state of affairs in the realm of Information Technology Equipment in Japan. Flextronics Compliance Laboratories has been assessed and approved in accordance with the Regulations for Voluntary Control Measures. (Registration No. R-1174 and C-1236).

2.1.6 Acceptance By Mutual Recognition Arrangement

The United States has an established agreement with specific countries under the Asia Pacific Laboratory Accreditation Corporation (APLAC) Mutual Recognition Arrangement. Under this agreement, all Flextronics Compliance Laboratories' test results and test reports within the scope of the laboratory NIST / NVLAP accreditation will be accepted by each member country.

2.2 Test Facilities

All of the test facilities are located at 762 Park Ave., Youngsville, North Carolina 27596, USA.

2.2.1 Emission Test Facility

The Open Area Test Site and AC Line Conducted measurement facility used to collect the radiated and conducted data has been constructed in accordance with ANSI C63.7:1992. The site has been measured in accordance with and verified to comply with the theoretical normalized site attenuation requirements of ANSI C63.4:1992, at a test distance of 3 and 10 meters. This site has been described in reports dated May 12, 1997, submitted to the FCC, and accepted by letter dated June 25, 1997 (31040/SIT 1300F2). The site is listed with the FCC and accredited by NVLAP (code 200094-0).

2.2.2 Immunity Test Facility

ESD, EFT, Surge, PQF: These tests are performed in an environmentally controlled room with a 3.7m x 3.7m x 3.175mm thick aluminum floor connected to PE ground. For ESD testing, tabletop equipment is placed on an insulated mat with a surface resistivity of 10^9 Ohms/square on a 1.6m x 0.8m x 0.8m high non-conductive table with a 3.175mm aluminum top (Horizontal Coupling Plane). The HCP is connected to the main ground plane via a low impedance ground strap through two 470 k? resistors. The Vertical Coupling Plane consists of an aluminum plate 50cm x 50cm x 3.175mm thick. The VCP is connected to the main ground plane via a low impedance ground strap through two 470 k? resistors. For each of the other tests, the HCP is removed.

RF Field Immunity testing is performed in a 7.3m x 3.7m x 3.2m anechoic chamber.

RF Conducted and Magnetic Field Immunity testing is performed on a 4.9m x 3.7m x 3.175mm thick aluminum ground plane which is connected to one end of the anechoic chamber.

All test areas allow a minimum distance of 1 meter from the EUT to walls or conducting objects.

2.3 Measurement Uncertainty

Two types of measurement uncertainty are expressed in this report, per *ISO Guide To The Expression Of Uncertainty In Measurement*, 1st addition, 1995.

The Combined Standard Uncertainty is the standard uncertainty of the result of a measurement when that result is obtained from the values of a number of other quantities, equal to the positive square root of a sum of terms, the terms being the variances or co-variances of these other quantities weighted according to how the measurement result varies with changes in these quantities. The term standard uncertainty is the result of a measurement expressed as a standard deviation.

The Expanded Uncertainty defines an interval about the result of a measurement that may be expected to encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand. The fraction may be viewed as the coverage probability or level of confidence of the interval.

The Flextronics Compliance Laboratories test system for conducted emissions is defined as the LISN, spectrum analyzer, coaxial cables, and pads. The test system for radiated emissions is defined as the antenna, spectrum analyzer, pre-amplifier, coaxial cables, and pads. The conducted test system has a combined standard uncertainty of ? 1.2 dB. The radiated test system has a combined standard uncertainty of ? 1.6 dB. The expanded uncertainty at a level of 95% confidence is obtained by multiplying the combined standard uncertainty by a coverage factor of 2. Compliance criteria are not based on measurement uncertainty.

2.4 Calibration Traceability

All measurement instrumentation are traceable to the National Institute of Standards and Technology (NIST). Measurement method complies with ANSI/NCSL Z540-1-1994 and ISO Guide 25.

3 Product Information

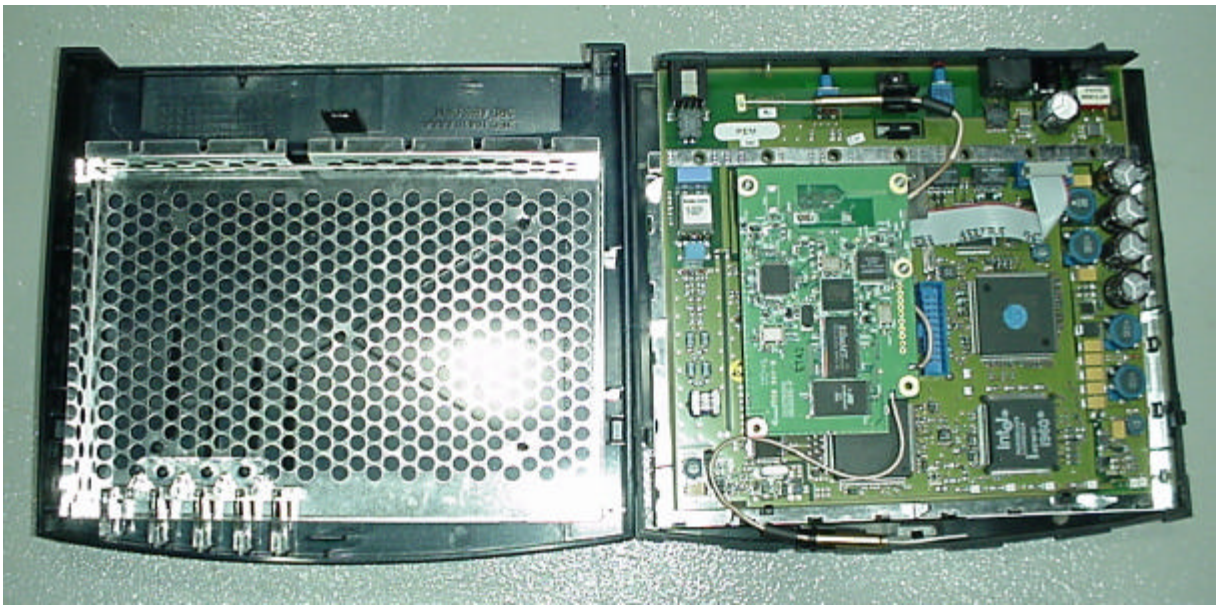


Figure 1 – Photo of EUT (with cover removed)

3.1 Product Description

The EUT contained a radio, model WX1513, manufactured by GemTek Technology Co., Ltd (FCC Grantee Code MXF).

This radio has been approved in a final product under FCC ID: MXF-WX1500. A test report (No. RF89081018) prepared by Advance Data Technology Corporation (No. 47, 14 Ling, Chia Pau Tsuen, Lin Kuo Hsiang, Taipei, Taiwan, R.O.C.) contains the transmitter data.

This complete radio, including antennas, is used within the Alcatel Speed Touch Wireless Modem.

Further information for all equipment used in the tested system, including: descriptions of cables, clock and microprocessor frequencies, EMI critical components, and accessory equipment has been supplied by the manufacturer and is listed in the EMC Test Plan found in Section 6.

3.2 Equipment Configuration

A description and justification of the equipment configuration is given in the EMC Test Plan. The EUT was tested as described in the EMC Test Plan and was configured and operated in a manner consistent with its intended use. The EUT was connected to rated power and allowed to warm up to normal operating conditions. The placement of the EUT system components was guided by the test standard and selected to represent typical installation conditions.

In the case of an EUT that can operate in more than one configuration, preliminary testing was performed to determine the configuration that produced maximum radiation.

The final configuration was selected to produce worse case radiation and place the EUT in the most susceptible state. There were no deviations from the description of the Equipment Configuration given in the EMC Test Plan.

3.3 Operation Mode

A description and justification of the operation mode is given in the EMC Test Plan.

In the case of an EUT that can operate in more than one state, preliminary testing was performed to determine the operating mode that produced maximum radiation.

The final operating mode was selected to produce worse case radiation and place the EUT in the most susceptible state. There were no deviations from the description of the Operation Mode given in the EMC Test Plan.

4 Emissions

4.1 Radiated Emissions

Testing was performed in accordance with ANSI C63.4:1992. These test methods are listed under the laboratory's NVLAP Scope of Accreditation. This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.1.1 Test Methodology

4.1.1.1 Preliminary Test

A test program that controls instrumentation and data logging was used to automate the preliminary RF emission test procedure. The frequency range of interest was divided into sub-ranges to yield a frequency resolution of approximately 300 kHz and provide a reading at each frequency for each 6° of turntable rotation. For each frequency sub-range the turntable was rotated 360° while peak emission data was recorded and plotted over the frequency range of interest in horizontal and vertical antenna polarization's.

Preliminary emission profile testing was performed inside the anechoic chamber. The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the floor. The EUT was positioned as shown in the setup photographs. The receiving antenna was placed at a distance of 3m at a fixed height of 1.5m.

Measurement equipment was located outside of the chamber. A video camera was placed inside the chamber to view the EUT.

4.1.1.2 Final Test

For each frequency measured, the peak emission was maximized by manipulating the receiving antenna from 1 to 4 meters above the ground plane and placing it at the position that produced the maximum signal strength reading. The turntable was then rotated through 360° while observing the peak signal and placing the EUT at the position that produced maximum radiation. The six highest emissions relative to the limit were measured unless such emissions were more than 20 dB below the limit. If less than six emissions are within 20 dB of the limit, than the noise level of the receiver is measured at frequencies where emissions are expected. Multiples of all oscillator and microprocessor frequencies were also checked.

Final testing was performed on the Open Area Test Site (OATS). The EUT was placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane. The placement of EUT and cables were the same as for preliminary testing and is shown in the setup photographs.

4.1.1.3 Deviations

There were no deviations from this test methodology.

4.1.2 Test Results

Section 4.1.2.1 contains preliminary test data as well as any engineering data used to determine any modifications or special accessories. Section 4.1.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.5 and 1.6.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

4.1.2.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 1 Radiated Emissions

Tracking # 0931ALC Page 1 of 4

Manufacturer	Alcatel USA	**Date**	24 April 2001
Witness	Dave Hollis	**Temp / Hum in**	73 Deg F / 44% rh
EUT Name	SpeedTouch Wireless Modem	**Temp / Hum out**	
EUT Model	3EC18883DD	**Line AC / Freq**	120 VAC / 60 Hz
EUT Serial	None	**RBW / VBW**	120 kHz / 300 kHz
Specification	FCC 47 CFR Part 15	**Detector**	Peak
Test Method	ANSI C63.4:1992	**Dist / Ant Used**	3m

Emission Freq (MHz)	ANT Polar (H/V)	ANT Pos (m)	Table Pos (deg)	FIM Value (dBuV)	Amp Gain (dB)	Cable Loss (dB)	ANT Factor (dB/m)	E-Field Value (dBuV/m)	3 Meter Limit (dBuV/m)	Spec Margin (dB)
70.65	V	1	69	14.67	0.00	0.89	9.51	25.06	40.00	-14.94
141.30	H	2.9	290	14.52	0.00	1.07	-1.00	14.59	43.50	-28.91
141.30	V	1.2	347	12.15	0.00	1.07	-1.00	12.22	43.50	-31.28
212.00	H	1.8	269	20.31	0.00	1.39	11.38	33.08	43.50	-10.42
282.60	V	1	124	18.24	0.00	1.49	13.45	33.19	46.00	-12.81
335.60	H	1	56	22.14	0.00	1.90	15.02	39.07	46.00	-6.93
353.30	V	1	70	16.22	0.00	1.64	16.27	34.12	46.00	-11.88
371.00	H	1	51	23.48	0.00	1.71	15.58	40.77	46.00	-5.23
406.30	H	1	278	21.06	0.00	1.76	16.67	39.49	46.00	-6.51
415.10	H	1	69	19.11	0.00	1.78	16.70	37.59	46.00	-8.41
441.60	H	1	60	22.51	0.00	1.87	17.04	41.42	46.00	-4.58
441.60	V	1.3	151	17.34	0.00	1.87	16.93	36.15	46.00	-9.85
512.30	H	2	69	14.98	0.00	1.97	18.40	35.35	46.00	-10.65
565.30	V	1	147	12.90	0.00	2.09	17.92	32.90	46.00	-13.10
635.90	V	1	65	11.89	0.00	2.23	19.52	33.64	46.00	-12.36
706.60	V	1	69	16.10	0.00	2.30	20.46	38.86	46.00	-7.14
777.20	H	2.1	328	5.80	0.00	2.41	21.19	29.39	46.00	-16.61
777.20	V	1	39	10.56	0.00	2.41	20.49	33.45	46.00	-12.55
918.50	H	1	179	8.88	0.00	2.57	24.17	35.62	46.00	-10.38
925.00	H	1	180	6.52	0.00	2.55	24.20	33.27	46.00	-12.73

Spec Margin = E-Field Value - Limit, E-Field Value = FIM Value - Amp Gain + Cable Loss + ANT Factor ? Uncertainty

Combined Standard Uncertainty $u_c(y)$ = ? 1.6dB Expanded Uncertainty $U = ku_c(y)$ k = 2 for 95% confidence

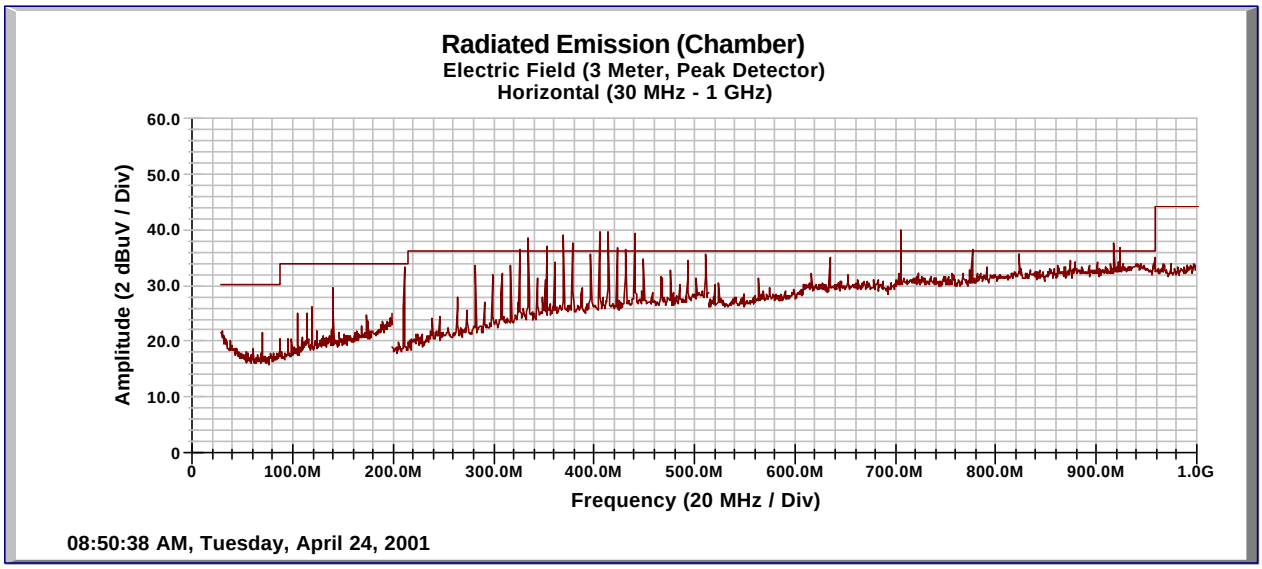
Notes:

Performed by Jim Hope (Name / Signature) Date 24 April 2001

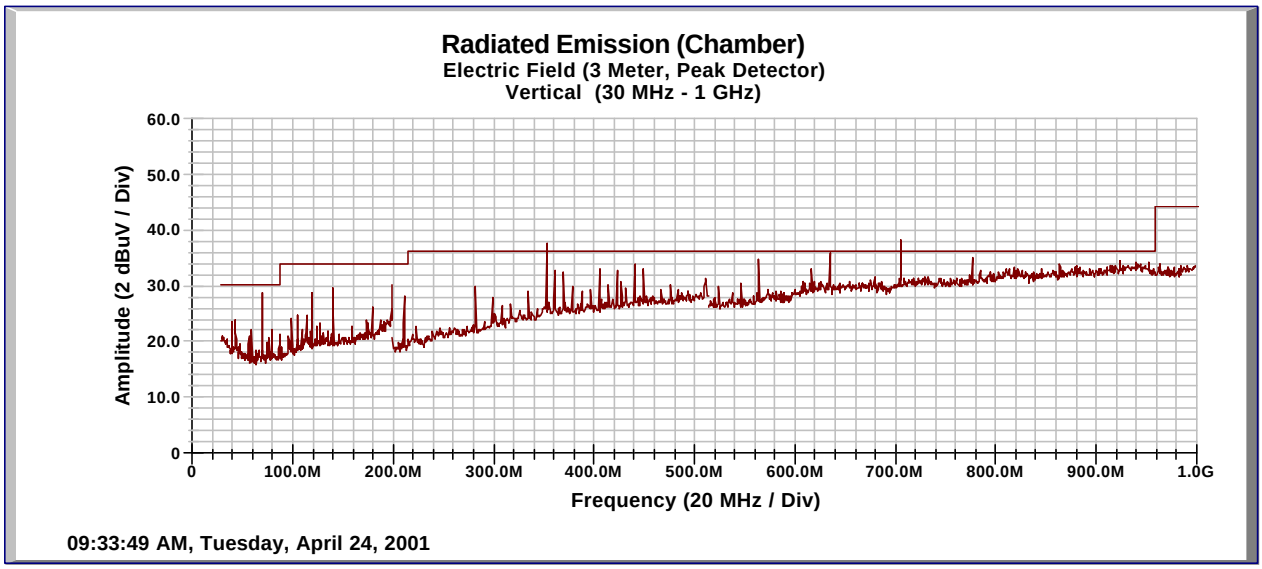
EMC Supervisor (Name / Signature) Date

SOP 1 Radiated Emissions | Tracking # 0931ALC | Page 2 of 4

Manufacturer	Alcatel USA	**Date**	24 April 2001
Witness	Dave Hollis	**Temp / Hum in**	73 Deg F / 44% rh
EUT Name	SpeedTouch Wireless Modem	**Temp / Hum out**	
EUT Model	3EC18883DD	**Line AC / Freq**	120 VAC / 60 Hz
EUT Serial	None	**RBW / VBW**	120 kHz / 300 kHz
Specification	FCC 47 CFR Part 15	**Detector**	Peak
Test Method	ANSI C63.4:1992	**Dist / Ant Used**	
Configuration	Original		

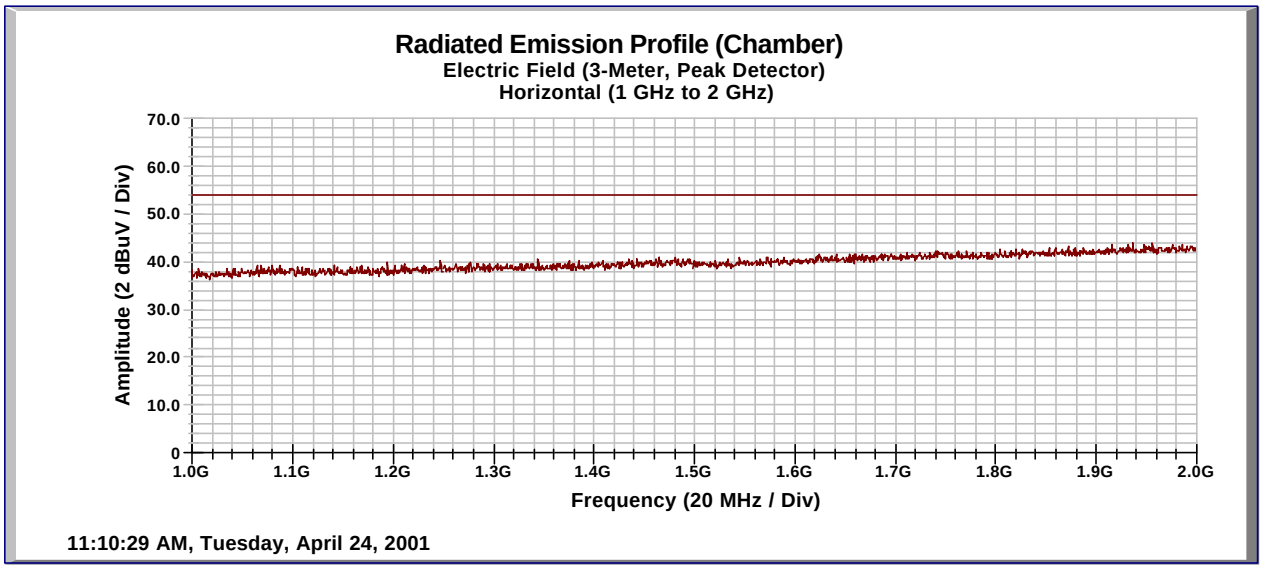


Configuration

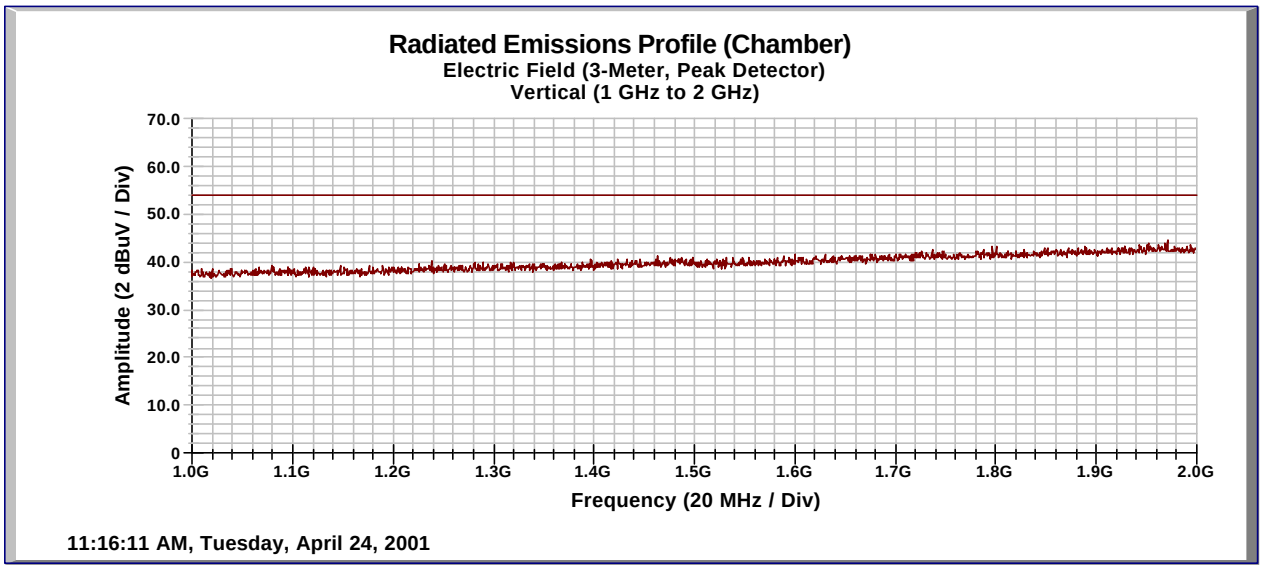


SOP 1 Radiated Emissions | Tracking # 0931ALC | Page 3 of 4

Manufacturer	Alcatel USA	**Date**	24 April 2001
Witness	Dave Hollis	**Temp / Hum in**	73 Deg F / 44% rh
EUT Name	SpeedTouch Wireless Modem	**Temp / Hum out**	
EUT Model	3EC18883DD	**Line AC / Freq**	120 VAC / 60 Hz
EUT Serial	None	**RBW / VBW**	120 kHz / 300 kHz
Specification	FCC 47 CFR Part 15	**Detector**	Peak
Test Method	ANSI C63.4:1992	**Dist / Ant Used**	
Configuration			

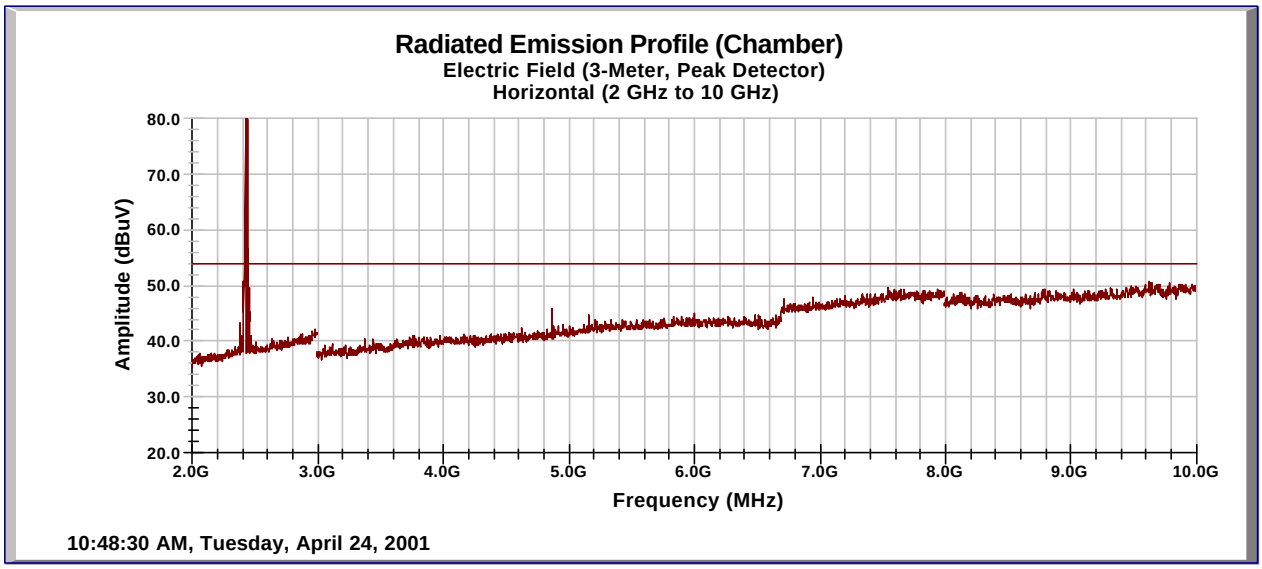


Configuration

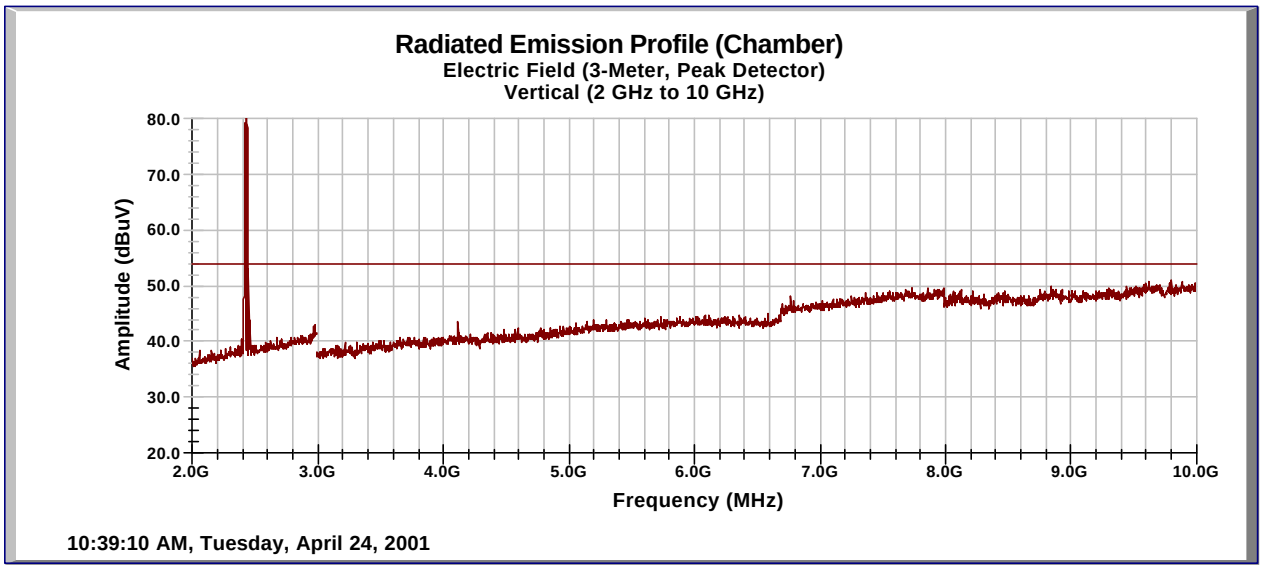


SOP 1 Radiated Emissions | Tracking # 0931ALC | Page 4 of 4

Manufacturer	Alcatel USA	**Date**	24 April 2001
Witness	Dave Hollis	**Temp / Hum in**	73 Deg F / 44% rh
EUT Name	SpeedTouch Wireless Modem	**Temp / Hum out**	
EUT Model	3EC18883DD	**Line AC / Freq**	120 VAC / 60 Hz
EUT Serial	None	**RBW / VBW**	120 kHz / 300 kHz
Specification	FCC 47 CFR Part 15	**Detector**	Peak
Test Method	ANSI C63.4:1992	**Dist / Ant Used**	
Configuration			



Configuration



4.1.2.2 Engineering Data

The data recorded in this section includes pre-scans, informational, and engineering data included for reference only. This data may include plots showing peak emissions in both horizontal and vertical antenna polarizations and used to select worst-case operating modes and configurations to identify frequencies that require measurement on the Open Area Test Site (OATS). If any modifications or special accessories were required, the supporting data is contained in this section.

4.1.3 Photos

Figure 2 - Preliminary Radiated Emissions Test Setup (Chamber - Front)

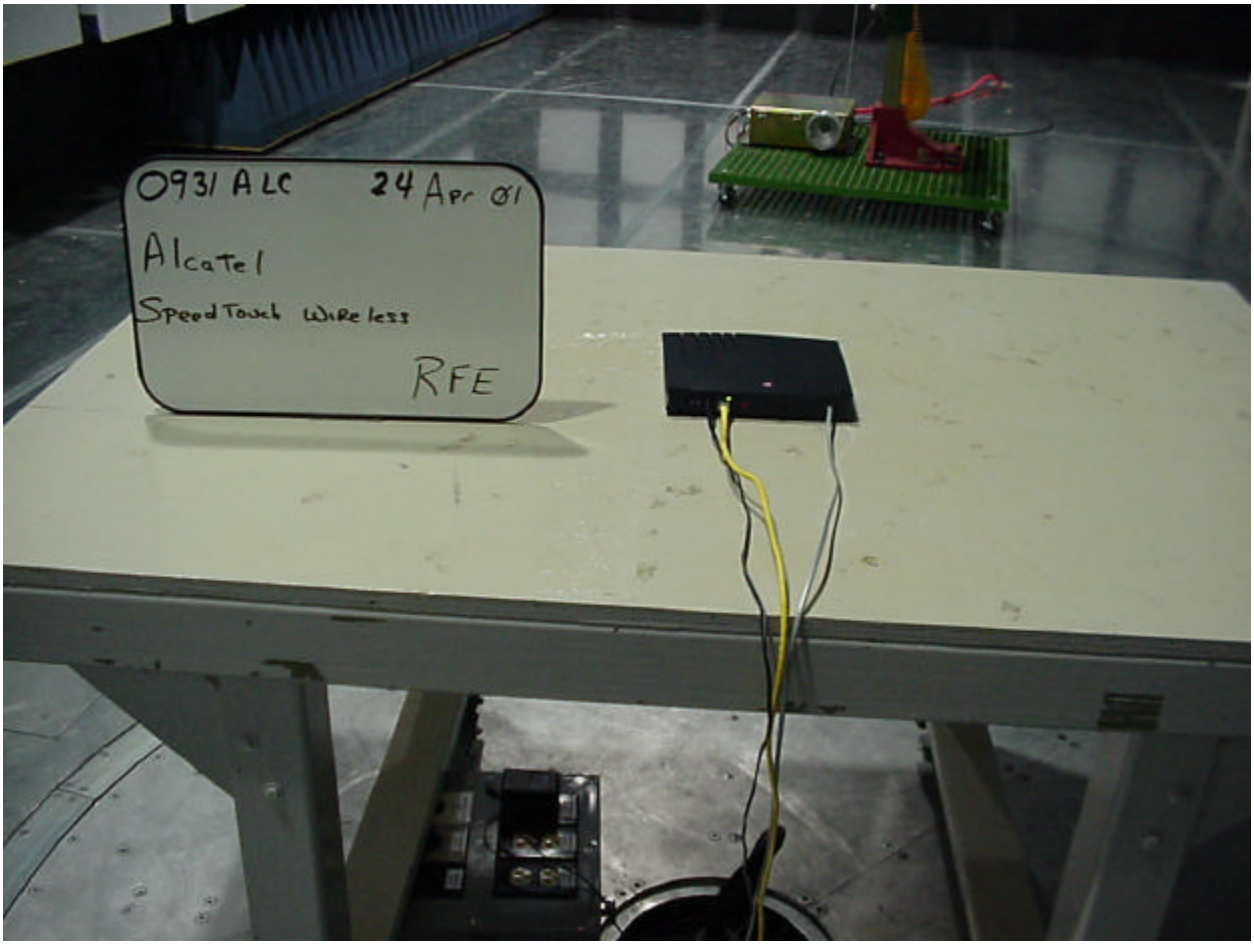


Figure 3 - Preliminary Radiated Emissions Test Setup (Chamber - Back)

4.1.4 Sample Calculation

The field strength is calculated by subtracting the Amplifier Gain and adding the Cable Loss and Antenna Correction Factor to the measured reading. The basic equation is as follows:

Field Strength (dB?V/m) = FIM - AMP + CBL + ACF

Where: FIM = Field Intensity Meter (dB?V)
AMP = Amplifier Gain (dB)
CBL = Cable Loss (dB)
ACF = Antenna Correction Factor (dB/m)

$$?V/m = 10^{\frac{dB?V/m}{20}}$$

4.2 Conducted Emissions

Testing was performed in accordance with ANSI C63.4:1992. These test methods are listed under the laboratory's NVLAP Scope of Accreditation.

This test measures the levels emanating from the EUT, thus evaluating the potential for the EUT to cause radio frequency interference to other electronic devices.

4.2.1 Test Methodology

A test program that controls instrumentation and data logging was used to automate the AC Power Line Conducted emission test procedure. The frequency range of interest was divided into sub-ranges such as to yield a frequency resolution of 9 kHz. For each frequency sub-range, each phase and neutral of the AC power line were measured with respect to ground. Measurements were performed using a set of 50?H / 50? LISNs.

Testing is either performed in the anechoic chamber or on PLC Site 2. The setup photographs clearly identify which site was used. The vertical ground plane used in the anechoic chamber is a 2m x 2m wooden frame that is covered with ¼ inch hardware cloth and is bonded to the horizontal ground plane.

In the case of tabletop equipment, the EUT is placed on a 1.0m x 1.5m non-conductive table 80cm above the ground plane and 40cm from a vertical ground reference plane. The rear of the EUT was positioned flush with the backside of the table and directly over the LISNs. The power and I/O cables were routed over the edge of the table and bundled approximately 40cm from the ground plane. Support equipment was powered from a separate LISN. Floor-standing equipment is placed directly on the ground plane.

4.2.1.1 Deviations

There were no deviations from this test methodology.

4.2.2 Test Results

Section 4.2.2.2 contains preliminary test data as well as any engineering data used to determine any modifications or special accessories. Section 4.2.2.1 lists the final measurement data under the worst case operating modes, configurations, and/or cable positions. It also reflects the results including any modifications and/or special accessories listed in Sections 1.5 and 1.6.

As originally tested, the EUT was found to be compliant to the requirements of the test standard(s).

Plots of the EUT's AC Line Conducted emissions are contained in the following sections. The plots show peak and/or average emissions and the corresponding peak and/or average limits. If the peak emissions are below the average limit, then the EUT is considered to pass and no average measurements are made. If the peak emissions are below the quasi-peak limit and the average emissions are below the average limit, then the EUT is considered to pass and no further measurements are made. Otherwise, individual frequencies are measured and compared to the corresponding limit for the detector used (quasi-peak or average).

4.2.2.1 Final Data

The data recorded in this section contains the final results under the worst-case conditions and with any modifications or special accessories implemented as the manufacturer intends.

SOP 2 Conducted Emissions — Tracking # 0931ALC Page 1 of 2

Manufacturer	**Alcatel USA**	**Date**	24 April 2001
Witness	**Dave Hollis**	**Temp / Hum**	75 deg F / 36% rh
EUT Name	**SpeedTouch Wireless** Modem	**Line AC / Freq**	120 VAC / 60 Hz
EUT Model	**3EC18883DD**	**RBW / VBW**	9 kHz / 30 kHz
EUT Serial	None	**Attenuation**	30 db Int
Specification	**FCC** 47 CFR Part 15	**Detector**	Peak/QP/Avg
Test Method	**ANSI C63.4:1992**	**LISNs Used**	5,6

Emission Freq (MHz)	Line ID (1,2,3,N)	FIM Quasi (dBuV)	FIM Ave (dBuV)	Cable Loss (dB)	LISN CF (dB)	-13dB For FCC BB Signal (Y/N)	FIM Value (dBuV)	Spec Limit (dB)	Spec Margin (dB)
.4749	2	32.78	16.11	0	0	Y	19.78	48.0	-28.12
.4777	1	21.5	4.78	0	0	Y	9.5	48.0	-38.5
.5612	1	27.48	16.98	0	0	Y	14.48	48.0	-33.52
.6435	1	26.45	17.29	0	0	Y	13.45	48.0	-34.55
.6445	2	29.63	27.04	0	0	N	29.63	48.0	-17.37
.7676	1	17.41	7.41	0	0	Y	4.41	48.0	-43.59

Spec Margin = FIM Value - Spec Limit ? Uncertainty
FIM Value = FIM Quasi + Cable Loss + LISN CF (if FIM Quasi - FIM Ave ? 6dB) then - 13dB

Combined Standard Uncertainty $u_c(y)$ = ? 1.2dB Expanded Uncertainty $U = k u_c(y)$ k = 2 for 95% confidence

Notes:

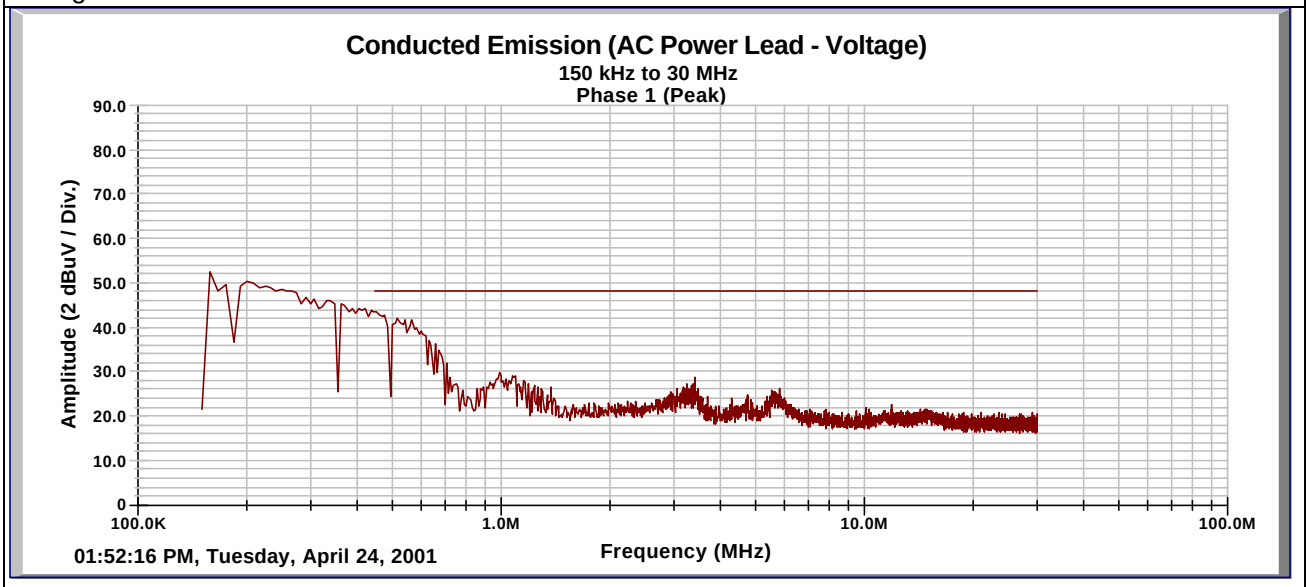
Performed by Jim Hope (Name / Signature) Date 24 April 2001

EMC Supervisor (Name / Signature) Date

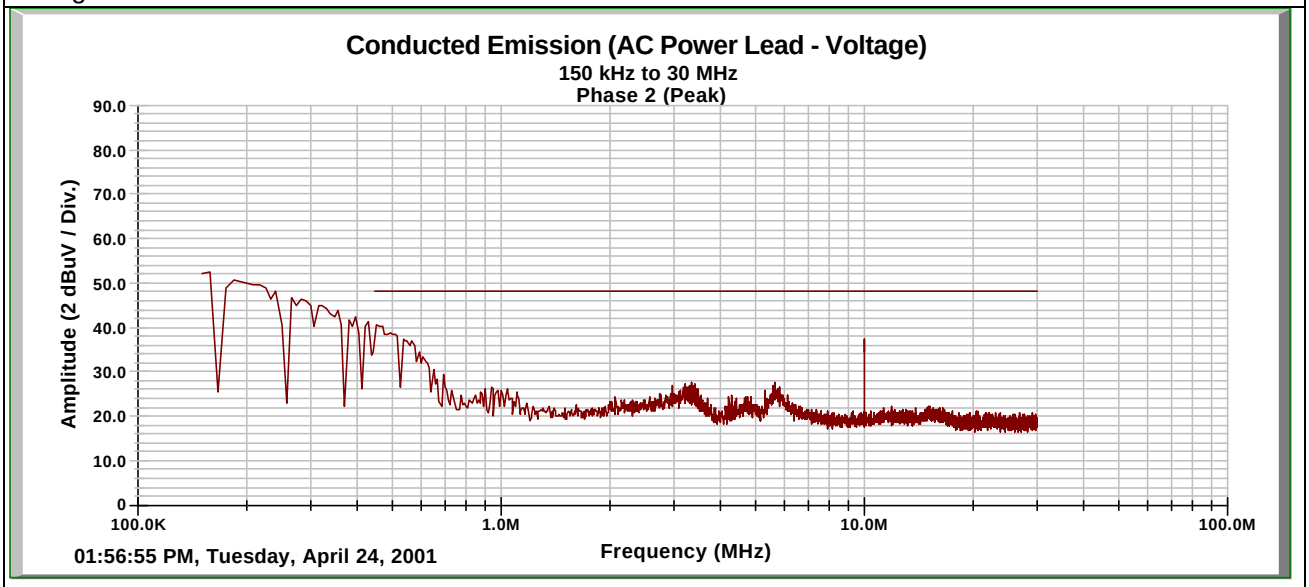
SOP 2 Conducted Emissions — Tracking # 0931ALC Page 2 of 2

Manufacturer	Alcatel USA	**Date**	24 April 2001
Witness	Dave Hollis	**Temp / Hum**	75 deg F / 36% rh
EUT Name	SpeedTouch Wireless Modem	**Line AC / Freq**	120 VAC / 60 Hz
EUT Model	3EC18883DD	**RBW / VBW**	9 kHz / 30 kHz
EUT Serial	None	**Attenuation**	30 db Int
Specification	FCC 47 CFR Part 15	**Detector**	Peak/QP/Avg
Test Method	ANSI C63.4:1992	**LISNs Used**	5,6

Configuration



Configuration



4.2.2.2 Engineering Data

The data recorded in this section includes pre-scans, informational, and engineering data included for reference only. This data was used to select worst-case operating modes and configurations to identify frequencies to measure. If any modifications or special accessories were required, the supporting data is contained in this section.

4.2.3 Photos

Figure 4 - Conducted Emissions Test Setup (Front)

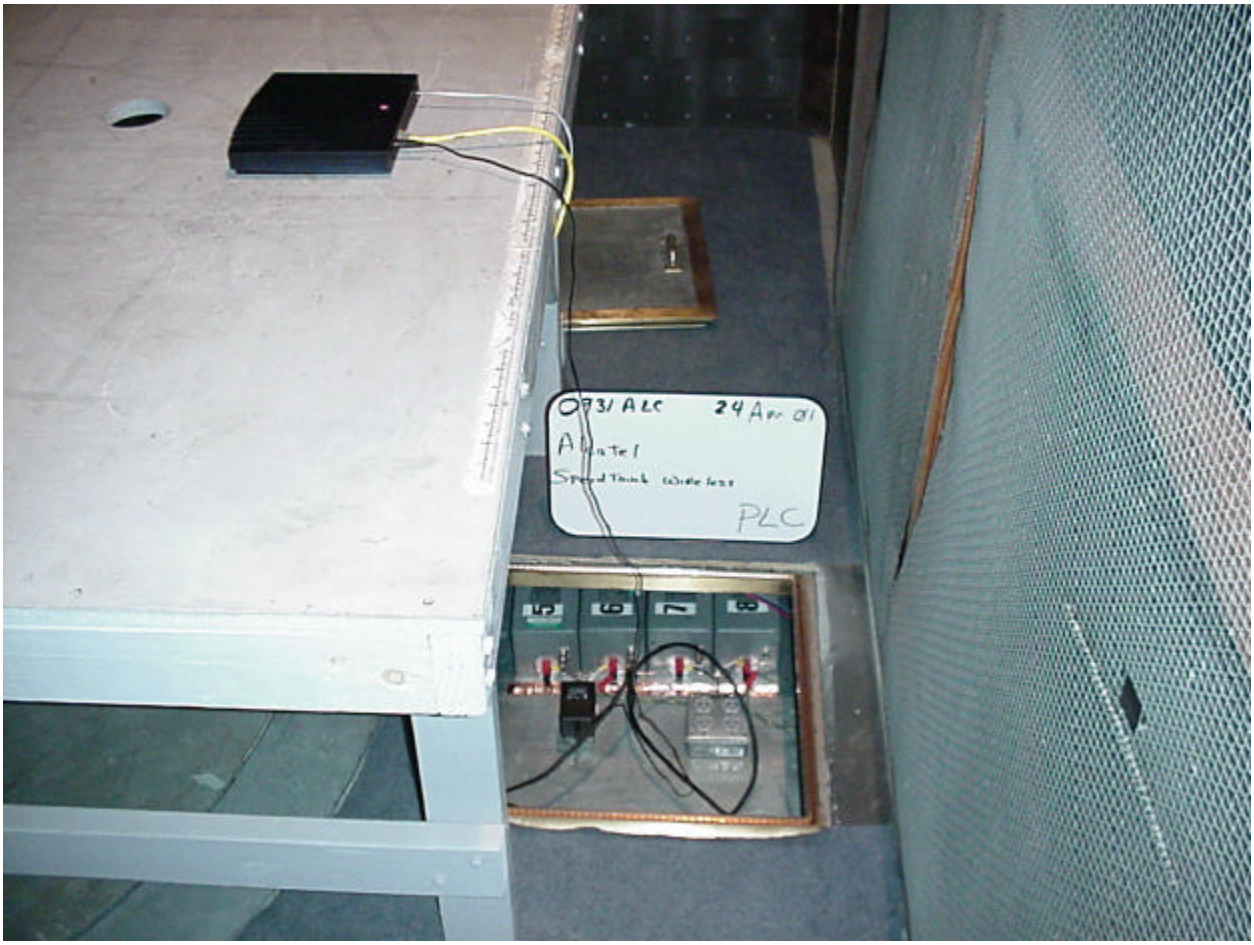


Figure 5 - Conducted Emissions Test Setup (Back)

4.2.4 Sample Calculation

The signal strength is calculated by adding the LISN Correction Factor and Cable Loss to the measured reading. The basic equation is as follows:

Field Strength (dB?V/m) = FIM + CBL + LCF

Where: FIM = Field Intensity Meter (dB?V)
CBL = Cable Loss (dB)
LCF = LISN Loss (dB)

$$?V/m = 10^{\frac{dB?V/m}{20}}$$

5 Test Equipment Use List

	Equipment	Manufacturer	Model #	Serial/Inst. #	Last Cal dd/mm/yy	Next Cal dd/mm/yy
SOP 1 - Radiated Emissions (Electric and Magnetic Field)						
	Amplifier, preamp	Hewlett Packard	8447D	1937A01766	14 Feb 01	14 Feb 02
	Amplifier, preamp	Hewlett Packard	8447D	2944A10139	30 Apr 01	01 May 02
	Amplifier, preamp	Agilent Technologies	8449B	3008A01480	15 Feb 01	15 Feb 02
	Amplifier, preamp	Hewlett Packard	8449B	3008A00268	15 Feb 01	15 Feb 02
	Ant. Biconical	AH Systems	SAS-200/544F	158	03 Jun 98	03 Jun 01
	Ant. Biconical	EMCO	3110B	3367	28 Nov 00	28 Nov 01
	Ant. BiconiLog	EMCO	3142	1006	02 Jan 01	02 Jan 02
	Ant. BiconiLog	EMCO	3142	1007	21 Sept 00	21 Sept 01
	Ant. BiconiLog	EMCO	3143	1138	CNR Condition II	SOP 1, 4
	Ant. Horn	EMCO	3115	5770	25 Oct 00	25 Oct 01
	Ant. Horn	EMCO	3115	2236	28 Oct 99	28 Oct 02
	Ant. Log Periodic	AH Systems	SAS-516	133	08 Dec 00	08 Dec 01
	Ant. Loop	EMCO	6502	3336	28 Apr 00	28 Oct 01
	Ant. Loop	EMCO	6511	0004-1175	20 Apr 00	20 Oct 01
	Ant. Rod	EMCO	3301B	4244	23 Mar 00	23 Sept 01
	Ant. Rod	EMCO	3303	3043	17 Oct 00	17 Oct 01
	Ant. Dipole Set BL 1-4	EMCO	3121C	9302-914	22 July 99	22 July 02
	Cable, Coax	Andrew	FSJ1-50A	001	07 Feb 01	07 Feb 02
	Cable, Coax	Andrew	FSJ1-50A	003	07 Feb 01	07 Feb 02
	Cable, Coax	Belden	RG-213	005	08 Feb 01	08 Feb 02
	Cable, Coax	Belden	9273 M17	006	08 Feb 01	08 Feb 02
	Cable, Coax	Andrew	FSJ1-50A	030	08 Feb 01	08 Feb 02
	Cable, Coax	Andrew	FSJ1-50A	033	05 Feb 01	05 Feb 02
	Cable, Coax	Andrew	FSJ1-50A	034	05 Feb 01	05 Feb 02
	Cable, Coax	Thermax	RG 142 B/U	035	30 Apr 01	01 May 02
	Cable, Coax	Andrew	FSJ1-50A	041	01 Mar 01	01 Mar 02
	Cable, Coax	Andrew	FSJ1-50A	042	01 Mar 01	01 Mar 02
	Cable, Coax	Andrew	FSJ1-50A	045	01 Mar 01	01 Mar 02
	Chamber, Anechoic	Universal Shielding	USC-26	241210	CNR Condition II	SOP 1, 4
	Chamber, Anechoic	Braden Shielding	5 meter	A67631	30 Mar 01	30 Mar 02
	Chamber, Shielded	Lindgren	10/10-8	6700	CNR Condition III	Not for Data
	Chamber, Screen	Lindgren	14-1/1-0	4126	CNR Condition III	Not for Data
	Data Table, 3m ant. Data	EMCI	Antfac3.dat	31421006-3m	26 Sept 00	26 Sept 01
	Data Table, 10m ant. Data	EMCI	Antfac10.dat	31421006-10m	26 Sept 00	26 Sept 01
	Data Table, Cable Loss	EMCI	Cablfac.dat	001	26 Sept 00	26 Sept 01
	Data Table, Preamp + Syst	EMCI	EMCWin.exe	002	26 Sept 00	26 Sept 01
	Noise Generator	York University	CNE III	Ser/98/66	CNR Condition II	Sop 1, 2
	OATS	EMCI	3-10-m	02	09 Apr 01	09 Apr 02
	Spectrum Analyzer	Agilent Tech.	E7405A	US39440157	20 Dec 00	20 Dec 01
	Spectrum Analyzer	Agilent Tech.	E7405A	US39440161	26 Dec 00	26 Dec 01
	Spectrum Analyzer	Hewlett Packard	8591A	3009A00692	04 Jan 01	04 Jan 02
	Spectrum Analyzer, QP	Hewlett Packard	8591A	3009A01066	21 Aug 00	21 Aug 01
	Spectrum Analyzer	Hewlett Packard	8591EM	3536A00559	26 Jan 01	26 Jan 02
SOP 2 - Conducted Emissions (AC/DC and Signal I/O)						
	Cable, Coax	Belden	RG-214	010	13 Feb 01	13 Feb 02

	Cable, Coax	Belden	RG-213	005	08 Feb 01	08 Feb 02
	Cable, Coax	Belden	RG-13	007	13 Feb 01	13 Feb 02
	Cable, Coax	Andrew	FSJ1-50A	034	05 Feb 01	05 Feb 02
	Cable, Coax	Andrew	FSJ1-50A	041	01 Mar 01	01 Mar 02
	Cable, Coax	Andrew	FSJ1-50A	045	01 Mar 01	01 Mar 02
	Cable, Coax	Andrew	FSJ1-50A	049	01 Mar 01	01 Mar 02
	Calibration Fixture	Fischer	FCC-BCICF-4	152	CNR Condition II	CNR Condition II
	Calibration Fixture	Fischer	FCC-801-2031-CF	203	CNR Condition II	CNR Condition II
	Current Probe	Fischer	F-33-1	474	16 Mar 01	16 Mar 02
	Current Probe	Fischer	F-33-1	565	30 Nov 00	30 Nov 01
	Current Probe	Fischer	F61	582	31 Oct 00	31 Oct 01
	Current Probe	SOLAR Electronics Co.	9119-1N	972550	26 Mar 01	26 Mar 02
	Limiter, Transient	Schaffner EMC	CFL-9206	1629	28 July 00	28 July 01
	Limiter, Transient	Schaffner EMC	CFL-9206	1630	28 July 00	28 July 01
	Limiter, Transient	Schaffner EMC	CFL-9206	1631	28 July 00	28 July 01
	LISN (1) 50?H/50?	Solar Electronics	8028-50-TS-24	944016	14 Mar 01	14 Mar 02
	LISN (2) 50?H/50?	Solar Electronics	8028-50-TS-24	9212106	14 Mar 01	14 Mar 02
	LISN (3) 50?H/50?	Solar Electronics	8028-50-TS-24	921295	14 Mar 01	14 Mar 02
	LISN (4) 50?H/50?	Solar Electronics	8028-50-TS-24	968441	14 Mar 01	14 Mar 02
	LISN (5) 50?H/50?	Solar Electronics	8028-50-TS-24	990441	14 July 00	14 July 01
	LISN (6) 50?H/50?	Solar Electronics	8028-50-TS-24	990443	17 July 00	17 July 01
	LISN (7) 50?H/50?	Solar Electronics	8028-50-TS-24	990442	17 July 00	17 July 01
	LISN (8) 50?H/50?	Solar Electronics	8028-50-TS-24	990444	17 July 00	17 July 01
	LISN (9) 50?H/50?	Solar Electronics	8616-50-TS-200-N	011040	30 Apr 01	30 Apr 02
	LISN (10) 50?H/50?	Solar Electronics	8616-50-TS-200-N	011041	30 Apr 01	30 Apr 02
	LISN (11) 50?H/50?	Solar Electronics	8616-50-TS-200-N	011042	30 Apr 01	30 Apr 02
	LISN (12) 50?H/50?	Solar Electronics	8616-50-TS-200-N	011043	30 Apr 01	30 Apr 02
	Noise Generator	York University	CNE III	Ser/98/66	CNR Condition II	Sop 1, 2
	Probe, Line	EMCO	3701	1189	27 Nov 00	27 Nov 01
	Spectrum Analyzer	Agilent Tec.	E7405A	US39440157	20 Dec 00	20 Dec 01
	Spectrum Analyzer	Agilent Tec.	E7405A	US39440161	26 Dec 00	26 Dec 01
	Spectrum Analyzer	Hewlett Packard	8591A	3009A00692	04 Jan 00	04 Jan 02
	Spectrum Analyzer, QP	Hewlett Packard	8591A	3009A01066	21 Aug 00	21 Aug 01
	Spectrum Analyzer	Hewlett Packard	8591EM	3536A00559	26 Jan 01	26 Jan 02
	TIMS Test Set	Agilent Technologies	4934A	USNFA00499	26 Jan 01	26 Jan 02
General Laboratory Equipment						
	Cable, Coax	Andrew	FSJ1-50A	040	01 Mar 01	01 Mar 02
	Cable, Coax	Andrew	FSJ1-50A	043	01 Mar 01	01 Mar 02
	Cable, Coax	Andrew	FSJ1-50A	046	01 Mar 01	01 Mar 02
	Meter, Multi	Fluke	79-3	69200606	21 Aug 00	21 Aug 01
	Meter, Temp/Humid/Barom	Fisher	02-400	01	22 Aug 00	22 Aug 01
	Meter, Temp/Humidity	Dickson Company	TH550	6215304	16 Apr 01	16 Apr 02

* Calibration of equipment past due for re-calibration will be performed expeditiously. If any equipment is found to be out of tolerance at that time, affected customers will be notified accordingly.

6 EMC Test Plan

The attached EMC test plan has been generated by the manufacturer and implemented as recorded in this test report.

6.1 Introduction

This manufacturer-supplied document provides a description of the Equipment Under Test (EUT), configuration(s), operating condition(s), and performance acceptance criteria. It is intended to provide the test laboratory with the essential information needed to perform the requested testing.

6.2 Customer

Table 3 – Manufacturer Information

Company Name:	Alcatel
Street Address:	2912 Wake Forest Road
City, State, Zip Code:	Raleigh, N.C.
Tel:	919 / 850-5000
Fax:	

Table 4 – Technical Contact Information

Contact Name	Telephone	Fax	Email address
David Hollis	919 / 850-5332	919 / 850-6670	David.L.Hollis@usa.alcatel.com

6.3 Equipment Under Test (EUT)

Table 5 – EUT Designation

Model Name:	SpeedTouch Wireless
Model Number:	3EC18883DD

6.3.1 Technical Description

The EUT is an ADSL modem and wireless hub. It connects to the telephone network over a normal telephone line. It connects to the computer equipment through a wireless link. It uses Asynchronous Digital Subscriber Line (ADSL) technology to achieve high data rates over normal twisted pair telephone cable.

It is a desktop modem having a plastic case. It is powered by a modular power supply that plugs into a 120 vac wall socket and is supported by the wall socket.

The modem communicates with up to 64 computers or computer equipment over a wireless link. It acts as a hub to provide wireless connectivity between all the computer equipment and to remote networks or internet providers over the telephone line.

I/O cables are: For the telco side it has an RJ11 telephone connector and a cord to plug into a wall type telephone socket. At the computer equipment side, it has one RJ45 connector for an Ethernet 10 mHz 10BaseT two pair cable. These allow connection to one computer and is used mainly for setting up the modem features and properties.

Weight 1.3 lb. Length 7.3 in. Height 1.25 in. Width 8.1 in.

6.3.2 Configuration(s)

The EUT is to be tested in two configurations. The first is shown in Figure 1 below. This is the configuration in which it is normally used and is intended for testing to Part 15 Section B.

In order to test the modem's radio for power output and spurious emissions, the modem must be disassembled and the transmitting antenna connected to the radio module replaced with a coaxial cable and connector. This allows the radio module to be connected directly to a spectrum analyzer. The ADSL Miniram is not needed for this testing so it is removed. That is the second configuration, shown in

Figure 2.

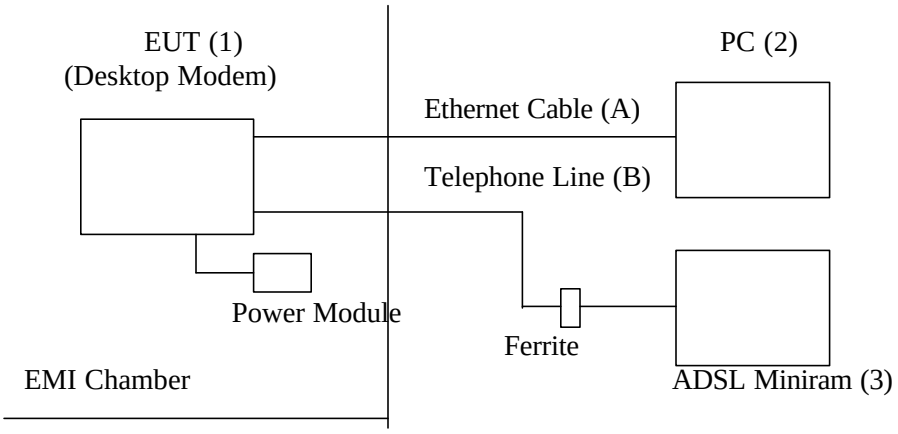


Figure 6 - Block Diagram of EUT Set-Up for Part 15 Section B

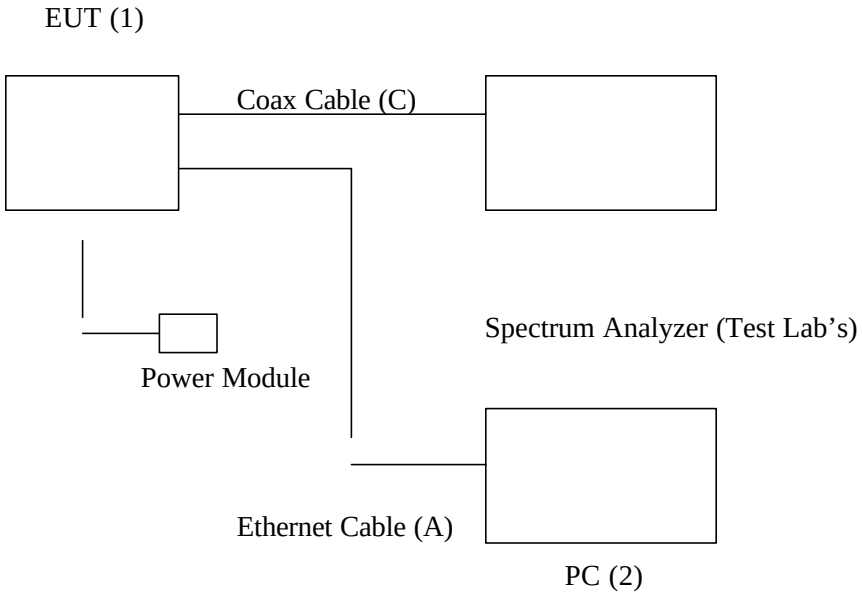


Figure 2 - Block Diagram of EUT Set-Up for Part 15 Radio Tests

Table 6 – Equipment Shown in Block Diagram

Des.	Manufacturer	Model No.	Revision	Serial No.	Description
1	Alcatel	3EC18883	DD	0090D014276	Wireless ADSL Modem
2	Dell	PPL			Laptop PC
3	Alcatel	3EC15912	AA	ALCL0037767	ADSL Miniram
4					
5					

Table 7 – Cables Shown in Block Diagram

Des.	Cable Function	Type of Cable (Data or Power)	Shielded or Unshielded	Length (m)
A	Ethernet modem to PC	Data	Unshielded	10
B	Telephone cable to modem	Data	Unshielded	10
C	Transmitter to Spectrum Analyzer	Data	Coax	0.2
D				
E				
F				
G				
H				

Table 8 – Subassemblies within EUT (Wireless Modem)

Des.	Manufacturer	Model No.	Revision	Serial No.	Description
1	Alcatel	3EC17752	AC	CP010690947	PC board assy. ADSL modem
1	Gemtek	WX-1513		MAC0090D0014281	Radio Module
1					
2					
2					
2					
3					
3					
3					

6.3.3 Operating Conditions

The EUT (modem) is operated under the following conditions in the Part 15 Section B tests (Figure 1):

1. The modem is synchronized with the Miniram at full bandwidth. They communicate over a DMT ADSL link. This is a series of 240 tones spaced every 4 kHz, from 40 kHz to 1.0 mHz. Each tone is modulated with 16 bit QAM modulation with an idle pattern when no data is being transmitted.
2. The modem is connected to the PC with an Ethernet link. The PC is used to configure the modem and that is its use in the test setup.
3. Note: The modem is transmitting pings every two seconds in this normal operating mode.

The EUT (modem) is operated under the following conditions in the Part 15 radio tests (Figure 2):

?? The modem is placed in the continuous transmission mode.

6.3.3.1 Software

The EUT (modem) has its normal operating software. The PC contains part of the factory testing and setup software in order to place the modem in the continuous transmission mode. That mode is normally only used for factory testing and setting of the transmitter power level.

6.3.3.2 Mode(s)

The modem boots up in its normal operating mode when you switch the power on. For the continuous transmission mode: Power up the PC and allow it to boot up and display the windows screen. Click on the "Continuoustxrx" icon. This will bring up a "nwn_testsignal3.vi" screen. Click on the START button. You can set the channel number as desired. Leave modulation on for the Part 15 EMI testing. Do not adjust the output power. To stop the testing, click on the STOP button located above the channel switch and click on the X at the upper right hand edge of the screen.

6.3.4 Performance Criteria (Required for Immunity Testing Only)

Immunity testing is not required.

6.3.5 Power Requirements

Table 9 - Power Requirements

Parameter	Value
Input Voltage	120 vac
Input Frequency	60 Hz
Input Current (rated)	0.1 amp (10 watts)
1?, 3?, or DC	1 phase
Plug Type	AC plug mount (brick)

6.3.6 Oscillator / Microprocessor Frequencies

Table 10 - Oscillator Frequency List

Frequency (MHz)	Description of Use
17.664 mHz	Modem clock
2.4 gHz	Radio transmission frequency

6.4 Equivalent Models

Table 11 - Models Equivalent to EUT

Model	Reason for Equivalence
none	