




Test Certificate

A sample of the following product received on February 23, 2009 and tested on February 25, March 18 and March 20, 2009 complied with the requirements of,

- EN 301 489-1 V1.8.1 “Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements”
- EN 301 489-17 V1.3.2 “Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for 2,4 GHz wideband transmission systems, 5 GHz high performance RLAN equipment and 5,8 GHz Broadband Data Transmitting Systems”

given the measurement uncertainties as detailed in Elliott report R74980.

Summit Data Communications Inc.
802.11abg Compact Flash Card model SDC-
MCF10AG



Mark E. Hill
Staff Engineer

Summit Data
Communications Inc.

Printed Name



2016-01

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*EMC Test Report
On Radio Equipment and Telecommunications Terminal
Equipment (R&TTE)*

*EN 301 489-1 v1.8.1
EN 301 489-17 V1.3.2*

802.11abg Compact Flash Card model SDC-MCF10AG

COMPANY: Summit Data Communications Inc.
526 South Market, Suite 805
Akron, OH 44311

TEST SITE(S): Elliott Laboratories
684 W. Maude Avenue
Sunnyvale, CA 94085

REPORT DATE: March 26, 2009

FINAL TEST DATES: February 25, March 18 and March 20, 2009

AUTHORIZED SIGNATORY:

A handwritten signature in blue ink, appearing to read "Mark E. Hill", written over a horizontal line.

Mark E. Hill
Staff Engineer
Elliott Laboratories.



Testing Cert #2016-01

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REVISION HISTORY

Rev#	Date	Comments	Modified By
1	May 13, 2009	First release	

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SCOPE

The European Committee for Electrotechnical Standardization (CENELEC), the European Telecommunications Standards Institute (ETSI) and the International Electrotechnical Commission (IEC) publish standards regarding the electromagnetic compatibility of electronic devices. Electromagnetic compatibility tests have been performed on the Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG in accordance with these standards.

Electromagnetic compatibility test data has been taken pursuant to the following standards. Tests were performed in accordance with the current, published versions of the basic standards referenced below as outlined in Elliott Laboratories test procedures. The test data has been provided as an appendix to this report for reference.

Standard	Title	Standard Date
EN 301 489-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements	2008-04
EN 301 489-17	Electromagnetic compatibility and Radio spectrum Matters (ERM); ElectroMagnetic Compatibility (EMC) standard for radio equipment; Part 17: Specific conditions for 2,4 GHz wideband transmission systems, 5 GHz high performance RLAN equipment and 5,8 GHz Broadband Data Transmitting Systems	2008-04

OBJECTIVE

The objective of the manufacturer is to declare conformity with one of the essential requirements of the R&TTE Directive 1999/5/EC.

In order to demonstrate compliance, the manufacturer or a contracted laboratory makes measurements and takes the necessary steps to ensure that the equipment complies with the appropriate technical standards.

STATEMENT OF COMPLIANCE

The tested sample of Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG complied with the requirements of:

Standard/Regulation	Version	Standard Date
EN 301 489-1	1.8.1	2008-04
EN 301 489-17	1.3.2	2008-04

given the performance criteria as specified by the manufacturer.

The test results recorded herein are based on a single type test of the Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG and therefore apply only to the tested sample. The sample was selected and prepared by Jerry Pohmurski of Summit Data Communications Inc.

Maintenance of compliance is the responsibility of the manufacturer. Any modification of the product that could result in increased emissions should be checked to ensure compliance has been maintained (i.e., printed circuit board layout changes, different enclosure, different line filter or power supply, harnessing and/or interface cable changes, etc.).

DEVIATIONS FROM THE STANDARD

No deviations were made from the published requirements listed in the scope of this report.

TEST RESULTS

The following tests were performed on the Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG. The results are based upon performance criteria defined by the manufacturer. The actual test results and associated performance criteria are contained within an appendix of this report.

EMISSIONS TESTING

Test	Port	Basic Standard	Level	Compliance Status
Radiated Emissions	Enclosure	EN 55022	N/A – Note 1	
Conducted Emissions	AC Power	EN 55022	44.1dB μ V @ 0.159MHz (-21.4dB)	Pass
Conducted Emissions	DC Power	EN 55022	N/A Note 2	
Harmonic Current Emissions	AC Power	EN 61000-3-2	N/A – Note 3	
Voltage Fluctuations	AC Power	EN 61000-3-3		
Conducted Emissions - Telecom	??	EN 55022	N/A – Note 4	

Note 1 – This test is only applicable to ancillary equipment. The radiated emissions requirements for radio equipment are covered under the Radio standard.

Note 2 – The EUT does not have a DC power port that would connect to a cable longer than 3m.

Note 3 – The EUT is rated less than 50watts.

Note 4 – The EUT does not have any telecommunication ports.

IMMUNITY TESTING

Test	Basic Standard	Level Required	Level Tested	Criterion Met	Status
ElectroStatic Discharge	EN 61000-4-2	4 kV CD, 8 kV AD	4 kV CD, 8 kV AD	A / TT / TR	Complied
Radio frequency Electromagnetic Field	EN 61000-4-3	80-1400 MHz 1400-2700 MHz 3 V/m, 80% 1 KHz AM	80-1400 MHz 1400-2700 MHz 3 V/m, 80% 1 KHz AM	A / CT / CR	Complied
Fast Transients Common Mode – AC Power Ports	EN 61000-4-4	N/A – Note 1			
Fast Transients Common Mode DC Power Ports	EN 61000-4-4	N/A – Note 2			
Fast Transients Common Mode - Signal, Control, and Telecommunications Ports	EN 61000-4-4	N/A – Note 3			
Surge, AC Power Port	EN 61000-4-5	N/A – Note 1			
Surge, Telecommunications ports	EN 61000-4-5	N/A – Note 3			
Vehicular Surges	ISO 7637-1, ISO 7637-2	N/A - Note 4			
Radio frequency Common Mode,, AC Power Port	EN 61000-4-6	N/A – Note 1			
Radio frequency Common Mode, DC Power Ports	EN 61000-4-6	N/A – Note 2			
Radio frequency Common Mode, Signal, Control, and Telecommunications Ports	EN 61000-4-6	N/A – Note 3			
Voltage Dips and Interrupts	EN 61000-4-11	N/A – Note 1			
<p>Note 1 – The does not possess an AC power port. Note 2 –The EUT does not have any DC power ports. Note 3 – The EUT does not have any signal ports that are intended to connect to cables longer than 3m in length Note 4 – The EUT is not intended to be used in a vehicular environment.</p>					

MEASUREMENT UNCERTAINTIES

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the test results be included in the report. The measurement uncertainties given below are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a 95% confidence level and were calculated in accordance with NAMAS document LAB 34. For emissions tests, the uncertainties were calculated using the approach described in CISPR 16-4-2:2003 and the levels were found to be below levels of Ucispr and therefore no adjustment of the data for measurement uncertainty is required.

Measurement Type	Measurement Unit	Frequency Range	Expanded Uncertainty
Conducted Emissions	dBuV	0.15 to 30 MHz	± 2.4 dB
Radiated Emissions	dBuV/m	30 to 1000 MHz	± 3.6 dB
AC Current Harmonics	Amps	50 to 2,000 Hz	± 0.12 %
AC Voltage Flicker	Voltage	N/A	± 0.12 %
	Pst, Plt	N/A	± 3.46 %
Radiated Immunity	V/m	80 – 2500 MHz	- 26.3%, + 29.97%
ESD	KV	N/A	± 8.6 %
Fast Transients	Voltage	N/A	± 5.98 %
	Timing	N/A	± 8.60 %
Surge	Voltage	N/A	± 4.92 %
RF Common Mode (CDN method)	Vrms	0.15 –80 MHz	-12.64 %, +13.33 %
RF Common Mode (BCI method)	Vrms	0.15 –80 MHz	-13.45 %, +15.32 %
Voltage Dips	Voltage	N/A	± 2.32 %
	Timing	N/A	± 0.08 mS

EQUIPMENT UNDER TEST (EUT) DETAILS**GENERAL**

The Summit Data Communications Inc. 802.11abg Compact Flash Card model SDC-MCF10AG is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC \pm 5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

The sample was received on February 23, 2009 and tested on February 25, March 18 and March 20, 2009. The EUT consisted of the following component(s):

Manufacturer	Model	Description	Serial Number
Summit Data Communications Inc.	MCF10AG	802.11AG Mini Compact Flash Module with antenna connectors	

EUT CLASSIFICATION

The EUT is a radio module that can be used in either fixed use or portable applications.

ENCLOSURE

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

MODIFICATIONS

The EUT did not require modifications during testing in order to comply with the specification.

SUPPORT EQUIPMENT

The following equipment was used as local support equipment for testing:

Manufacturer	Model	Description	Serial Number
HP	iPAQ	PDA	2CK5510KZ2

The following equipment was used as remote support equipment for testing:

Manufacturer	Model	Description	Serial Number
HP		Spectrum Analyzer	
Lenovo	ThinkPad	Laptop	L3-A2740 08/02
Airlink	AR430W	Switch	30008256167
Cisco	AIR-AP1131AG-A-K9	Access Point	FTX1040T17J
Cisco	POE30U-560(G)	POE	P74902126A1

EUT INTERFACE PORTS

The I/O cabling configuration during testing was as follows:

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Antenna	Antenna	RF Cable	Unshielded	0.1
DC	Power Adaptor	2 Wire	Unshielded	1.5
AC Power Adaptor	AC Mains	-	-	

EUT OPERATION DURING EMISSIONS TESTING

During emissions testing the EUT was configured to continuously transmit.

EUT OPERATION DURING IMMUNITY TESTING

TX Mode - During immunity test the EUT was exercised by pinging to and from a remote laptop thru the wireless connection. Normal operation is indicated by continues pinging to and from the remote laptop.

RX Mode - During immunity test the EUT was tested in RX mode. A spectrum analyzer was used to verify that the EUT does not transmit during the test. Normal operation is indicated by observing the spectrum analyzer for and transmission.

EUT PERFORMANCE CRITERIA**Criterion A /CT / CR:**

TX Mode - the EUT shall continue to successfully ping to and from the remote computer.

RX Mode - the EUT shall not have any un-intentional transmissions.

Criterion B / TT / TR:

TX Mode - the EUT shall recover error free transmission to the remote computer without user intervention.

EMISSIONS TEST SITE**GENERAL INFORMATION**

Final test measurements were taken on February 25, 2009 at the Elliott Laboratories Anechoic Chambers and/or Open Area Test Site(s) listed below. The test sites contain separate areas for radiated and conducted emissions testing. The sites conform to the requirements of ANSI C63.4: 2003 American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz and CISPR 16-1-4:2007 - Specification for radio disturbance and immunity measuring apparatus and methods Part 1-4: Radio disturbance and immunity measuring apparatus Ancillary equipment Radiated disturbances below 1 GHz. They are registered with the VCCI and are on file with the FCC.

Site	Registration Numbers			Location
	VCCI	FCC	Canada	
SVOATS #1	C469	90592	IC 2845-1	684 West Maude Ave, Sunnyvale CA 94085-3518

In the case of Open Area Test Sites, ambient levels are at least 6 dB below the specification limits with the exception of predictable local TV, radio, and mobile communications traffic.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent requirements.

CONDUCTED EMISSIONS CONSIDERATIONS

Conducted emissions testing is performed in conformance with ANSI C63.4 and CISPR 22. Mains port measurements are made with the EUT connected to the public power network through nominal, standardized RF impedance, which is provided by a line impedance stabilization network, known as a LISN. A LISN is inserted in series with each current-carrying conductor in the EUT power cord. Telecommunication port measurements are made with the network cable connected through an ISN appropriate to the type of cable employed.

EMISSIONS MEASUREMENT INSTRUMENTATION

RECEIVER SYSTEM

An EMI receiver as specified in CISPR 16-1-1 is used for emissions measurements. The receivers used can measure over the frequency range of 9 kHz up to 7 GHz. These receivers allow both ease of measurement and high accuracy to be achieved. The receivers have Peak, Average, and CISPR (Quasi-peak) detectors built into their design so no external adapters are necessary. The receiver automatically sets the required bandwidth for the CISPR detector used during measurements.

For measurements above the frequency range of the receivers, a spectrum analyzer is utilized because it provides visibility of the entire spectrum along with the precision and versatility required to support engineering analysis. Average measurements above 1000 MHz are performed on the spectrum analyzer using the linear-average method with a resolution bandwidth of 1 MHz and a video bandwidth of 10 Hz.

INSTRUMENT CONTROL COMPUTER

The receivers utilize either a Rohde & Schwarz EZM Spectrum Monitor/Controller or contain an internal Spectrum Monitor/Controller to view and convert the receiver measurements to the field strength at an antenna or voltage developed at the LISN measurement port, which is then compared directly with the appropriate specification limit. This provides faster, more accurate readings by performing the conversions described under Sample Calculations within the Test Procedures section of this report. Results are printed in a graphic and/or tabular format, as appropriate. A personal computer is used to record all measurements made with the receivers.

The Spectrum Monitor provides a visual display of the signal being measured. In addition, the controller or a personal computer runs automated data collection programs that control the receivers. This provides added accuracy since all site correction factors, such as cable loss and antenna factors are added automatically.

LINE IMPEDANCE STABILIZATION NETWORK (LISN)

Line conducted emission measurements utilize a fifty microhenry Line Impedance Stabilization Network as the monitoring point. The LISN used also contains a 250 uH CISPR adapter. This network provides for calibrated radio frequency noise measurements by the design of the internal low pass and high pass filters on the EUT and measurement ports, respectively.

IMPEDANCE STABILIZATION NETWORK (ISN)

Telecommunication port conducted emission measurements utilize an Impedance Stabilization Network with a 150 ohm termination impedance and specific longitudinal conversion loss as the voltage monitoring point. This network provides for calibrated radio frequency noise measurements by the design of the internal circuitry on the EUT and measurement ports, respectively. For current measurements, a current probe with a uniform frequency response and less than 1 ohm insertion impedance is used.

FILTERS/ATTENUATORS

External filters and precision attenuators are often connected between the receiving antenna or LISN and the receiver. This eliminates saturation effects and non-linear operation due to high amplitude transient events.

ANTENNAS

A biconical antenna is used to cover the range from 30 MHz to 300 MHz and a log periodic antenna is utilized from 300 MHz to 1000 MHz. Narrowband tuned dipole antennas are used over the entire 30 to 1000 MHz frequency range for precision measurements of field strength. Above 1000 MHz, a horn antenna is used. The antenna calibration factors are included in site factors that are programmed into the test receivers.

ANTENNA MAST AND EQUIPMENT TURNTABLE

The antennas used to measure the radiated electric field strength are mounted on a non-conductive antenna mast equipped with a motor-drive to vary the antenna height.

ANSI C63.4 specifies that the test height above ground for table mounted devices shall be 80 centimeters. Floor mounted equipment shall be placed on the ground plane if the device is normally used on a conductive floor or separated from the ground plane by insulating material up to 12 mm thick if the device is normally used on a non-conductive floor. During radiated measurements, the EUT is positioned on a motorized turntable in conformance with this requirement.

EMISSIONS TEST PROCEDURES**EUT AND CABLE PLACEMENT**

The standards require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate the worst case orientation that can be expected from a typical installation, so far as practicable. To this end, the position of the unit and associated cabling is varied within the guidelines of ANSI C63.4, and the worst case orientation is used for final measurements.

CONDUCTED EMISSIONS (MAINS)

Conducted emissions are measured at the plug end of the power cord supplied with the EUT. Excess power cord length is wrapped in a bundle between 30 and 40 centimeters in length near the center of the cord. Preliminary measurements are made to determine the highest amplitude emission relative to the specification limit for all the modes of operation. Placement of system components and varying of cable positions are performed in each mode. A final peak mode scan is then performed in the position and mode for which the highest emission was noted on all current carrying conductors of the power cord. Emissions that have peak values close to the specification limit are also measured in the quasi-peak and average detection modes to determine compliance except when the amplitude of the emission when measured with the quasi-peak detector is more than 10 dB below the specification limit for average measurements. In this case only quasi-peak measurements are performed.

SAMPLE CALCULATIONS**SAMPLE CALCULATIONS - CONDUCTED EMISSIONS**

Receiver readings are compared directly to the conducted emissions specification limit (decibel form). The calculation is as follows:

$$R_r - S = M$$

where:

R_r = Receiver Reading in dBuV

S = Specification Limit in dBuV

M = Margin to Specification in +/- dB

IMMUNITY TEST DESCRIPTIONS

GENERAL INFORMATION

Final tests were performed on March 18 and March 20, 2009 at the Elliott Laboratories Test Sites located at 684 West Maude Ave, Sunnyvale, CA 94085-3518.

Considerable engineering effort has been expended to ensure that the facilities conform to all pertinent CENELEC and IEC standards.

IMMUNITY MEASUREMENT INSTRUMENTATION

ELECTROSTATIC DISCHARGE TEST SYSTEM

An ESD simulator is used for all testing. It is capable of applying electrostatic discharges in both contact discharge mode to 8 kV and air discharge mode to 15 kV in both positive and negative polarities in accordance with the EN 61000-4-2 basic EMC publication.

ELECTROMAGNETIC FIELD TEST SYSTEM

A signal generator and power amplifiers are used to provide a signal at the appropriate power and frequency to an antenna to obtain the required electromagnetic field at the position of the EUT in accordance with the EN61000-4-3 basic EMC publication.

INSTRUMENT CALIBRATION

All test equipment is regularly checked to ensure that performance is maintained in accordance with the manufacturer's specifications. An appendix of this report contains the list of test equipment used and calibration information.

EUT PLACEMENT – IMMUNITY TESTING

EN 61000-4-2 specifies that the EUT shall be placed above a ground reference plane. For tabletop equipment, the standard specifies that a 1.6 by 0.8 meter metal sheet, connected to the reference ground plane via a metal strap with two 470 k Ω resistors in series, shall be placed on a 0.8m high, non-conductive table. The EUT and attached cables are isolated from this metal sheet by 0.5 millimeter thick insulating material. EN61000-4-2 states that floor mounted equipment shall be placed on insulating supports so that the equipment and associated interface cables are 10 centimeters above the reference ground plane. During the tests, the EUT was positioned over a ground reference plane in conformance with these requirements.

EN61000-4-3 specifies that the test be performed in a shielded chamber meeting the field uniformity requirements described in this basic EMC publication. Tabletop EUTs are to be placed on an 80 cm high, non-conducting table and floor mounted equipment shall be positioned 10 cm above the floor of the chamber. During the EN61000-4-3 test, the EUT was positioned in a shielded, anechoic test chamber in conformance with this requirement.

IMMUNITY TEST PROCEDURES

EUT AND CABLE PLACEMENT

The EUT and any peripherals are located at the center of the table for tabletop devices and in the center of the ground plane with the insulating support for floor-standing devices. The standards require that interconnecting cables be connected to the available ports of the unit and that the placement of the unit and the attached cables simulate a typical installation, so far as practicable.

APPLICATION OF ELECTROSTATIC DISCHARGES

The points of application of the test discharges directly to the EUT are determined after consideration of the parts of the EUT that are accessible to the operator during normal operation. Contact and air discharges are applied to the EUT. Contact discharges are also applied to the coupling planes to simulate nearby ESD events.

APPLICATION OF ELECTROMAGNETIC FIELD

The electromagnetic field is established at the front edge of the EUT.

The frequency test signal is swept across the frequency range of the test using a forward power level necessary to obtain the required field strength at the EUT. The field is amplitude modulated using a 1KHz sine wave to a depth of 80% in accordance with EN 61000-4-3.

The test is repeated with each of the four sides of the EUT facing the field generating antenna. For small, portable products the test is also performed with the top and bottom sides of the EUT facing the antenna.

Appendix A Test Equipment Calibration Data

1 Page

Conducted Emissions - AC Power Ports, 25-Feb-09**Engineer: Suhaila Khushzad**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Elliott Laboratories	LISN, FCC / CISPR	LISN-3, OATS	304	31-Jul-09
Hewlett Packard	EMC Spectrum Analyzer, 9 kHz - 6.5 GHz	8595EM	787	19-Apr-09
Rohde & Schwarz	Test Receiver, 9 kHz-2750 MHz	ESCS 30	1337	02-Oct-09

Radiated Immunity, 80 - 2000 MHz, 19-20-Mar-09**Engineer: Vishal Narayan , Luis Cabrera**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
EMCO	Antenna, Biconilog Transmitting	3143	180	N/A
Elliott Laboratories	RI, 61000-4-3 (3rd Ed.), 1.0-2.7 GHz	Chamber #1 Ve	203	12-Jul-10
Elliott Laboratories	RI, -4-3 (3rd Ed.)+NEBS, 80MHz-1.0 GHz	Chamber #1 Ve	203	12-Mar-10
Instruments For Industry	Amplifier 0.01 - 250 MHz (500W), 200 - 1000 MHz (100W)	CMX5001	637	01-Jan-50
Instruments For Industry	Wideband Amp., 0.01-250 MHz, 15W	5300	638	N/A
Instruments For Industry	Wideband Amp., 200-1000 MHz	SMCC100	640	N/A
Werlatone	Directional Coupler, 80-1000 MHz, 40dB, 200W	C3910	917	N/A
Rohde & Schwarz	Power Meter, Dual Channel	NRVD	1071	01-Jul-09
EMCO	Antenna, Horn, 1-18 GHz	3115	1242	N/A
Fluke Mfg Co	Attenuator, 6 dB, DC-1 GHz	Y9303	1289	25-Aug-09
Fischer Custom Comm.	Decoupling Network,.15 - 230 MHz	F-2031-DCN	1399	N/A
Werlatone	Directional Coupler, 800-2800 MHz, 30dB, 100w	C6529	1402	N/A
Amplifier Research	Field Probe, RF, 10 KHz - 1GHz	FP4000	1430	30-Sep-09
Rohde & Schwarz	Signal Generator, 100 kHz-4320 MHz	SMHU	1478	31-Dec-09
Amplifier Research	Amplifier, 0.8-4.2GHz, 50Watts	50S1G4A	1493	N/A
Rohde & Schwarz	Power Sensor 100 uW - 2 Watts (w/ 20 dB pad, SN BJ5155)	NRV-Z32	1536	12-Sep-09

ESD, 20-Mar-09**Engineer: Mehran Birgani**

<u>Manufacturer</u>	<u>Description</u>	<u>Model #</u>	<u>Asset #</u>	<u>Cal Due</u>
Schaffner	ESD Gun	NSG-435	1491	09-Dec-09

Appendix B Test Data Log Sheets

ELECTROMAGNETIC EMISSIONS

TEST LOG SHEETS

AND

MEASUREMENT DATA

T74693 13 Pages



EMC Test Data

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	EN 301 489-1v1.8.1 / -17v1.3.2	Environment:	-

EMC Test Data

For The

Summit Data Communications

Model

802.11abg Compact Flash Card

Date of Last Test: 3/20/2009



EMC Test Data

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
Contact:	Jerry Pohmurski	Account Manger:	Christine Krebill
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	EN 301 489-1v1.8.1 / -17v1.3.2	Environment:	-

EUT INFORMATION

The following information was collected during the test session(s).

General Description

The EUT is a 802.11ag compliant wireless LAN radio Module which is designed to provide wireless local area networking connectivity. Normally, the EUT would be embedded in various types of mobile and stationary computing devices such as handheld and vehicle mounted data terminals during operation. The EUT was, therefore, placed in this position during emissions testing to simulate the end user environment. The electrical rating of the EUT is 3.3 VDC \pm 5%. It's typical power consumption is 400mA (1320mW) while in transmit mode, 180mA (594mW) while in receive mode and 10mA (33mW) while in standby mode.

Equipment Under Test

Manufacturer	Model	Description	Serial Number	FCC ID
Summit Data Communications Inc.	MCF10AG	802.11AG Mini Compact Flash Module with antenna connectors		TWG-SDCMCF10AG

EUT Antenna (Intentional Radiators Only)

The antenna connects to the EUT via a standard u.f1 antenna connector, thereby meeting the requirements of FCC 15.203.

EUT Enclosure

The EUT does not have an enclosure as it is designed to be installed within the enclosure of a host computer or system.

Modification History

Mod. #	Test	Date	Modification
1			No modifications were made to the EUT during testing.
2			
3			

Modifications applied are assumed to be used on subsequent tests unless otherwise stated as a further modification.



EMC Test Data

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
Contact:	Jerry Pohmurski	Account Manger:	Christine Krebill
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	EN 301 489-1v1.8.1 / -17v1.3.2	Environment:	-

Test Configuration #1

The following information was collected during the test session(s).

Local Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
HP	iPAQ	PDA	2CK5510KZ2	

Remote Support Equipment

Manufacturer	Model	Description	Serial Number	FCC ID
HP		Spectrum Analyzer		-
Lenovo	ThinkPad	Laptop	L3-A2740 08/02	-
Airlink	AR430W	Switch	30008256167	-
Cisco	AIR-AP1131AG-A-K9	Access Point	FTX1040T17J	-
Cisco	POE30U-560(G)	POE	P74902126A1	-

Cabling and Ports

Port	Connected To	Cable(s)		
		Description	Shielded or Unshielded	Length(m)
Antenna	Antenna	RF Cable	Unshielded	0.1
DC	Power Adaptor	2 Wire	Unshielded	1.5
AC Power Adaptor	AC Mains	-	-	

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
		Account Manger:	Christine Krebill
Contact:	Jerry Pohmurski		
Emissions Standard(s):	FCC 15.247/RSS 210	Class:	-
Immunity Standard(s):	EN 301 489-1v1.8.1 / -17v1.3.2	Environment:	-

EUT Operation During Emissions Tests

During emissions testing the EUT was configured to continuously transmit.

EUT Operation During Immunity Tests (Transmit)

During immunity test the EUT was exercised by pinging to and from a remote laptop thru the wireless connection. Normal operation is indicated by continues pinging to and from the remote laptop.

EUT Operation During Immunity Tests (Receive)

During immunity test the EUT was tested in RX mode. A spectrum analyzer was used to verify that the EUT does not transmit during the test. Normal operation is indicated by observing the spectrum analyzer for and transmission.

Performance Criteria for Immunity Tests

Criterion A/CT/CR:

TX Mode - the EUT shall continue to successfully ping to and from the remote computer.

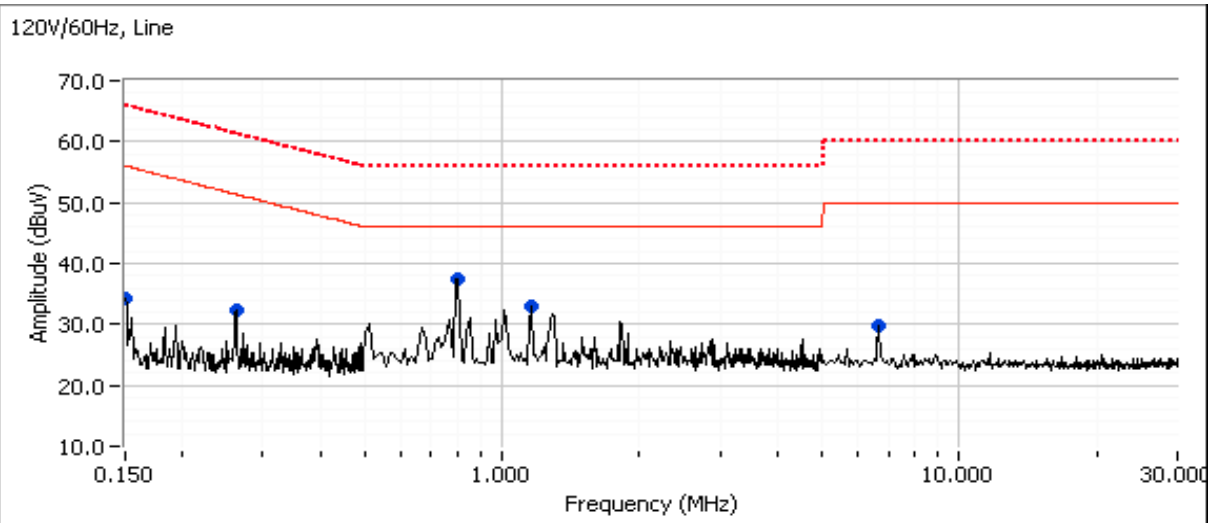
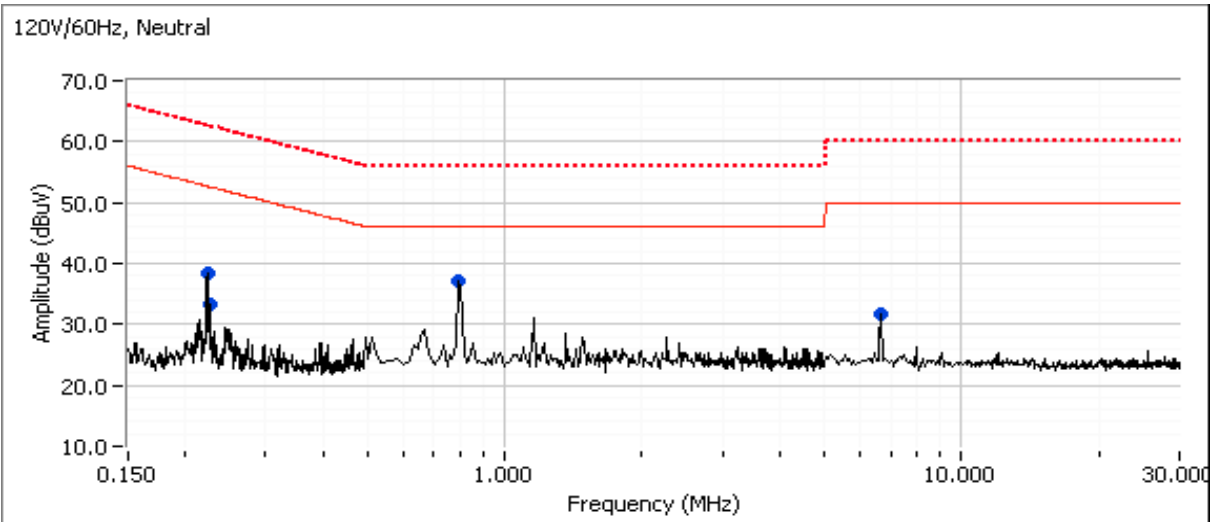
RX Mode - the EUT shall not have any un-intentional transmissions.

Criterion B/TT/TR:

TX Mode - the EUT shall recover error free transmission to the remote computer without user intervention.

Client: Summit Data Communications	Job Number: J74548
Model: 802.11abg Compact Flash Card	T-Log Number: T74640
	Account Manager: Christine Krebill
Contact: Jerry Pohmurski	
Standard: FCC 15.247/RSS 210	Class: -

Run #1: AC Power Port Conducted Emissions, 0.15 - 30MHz, 120V/60Hz

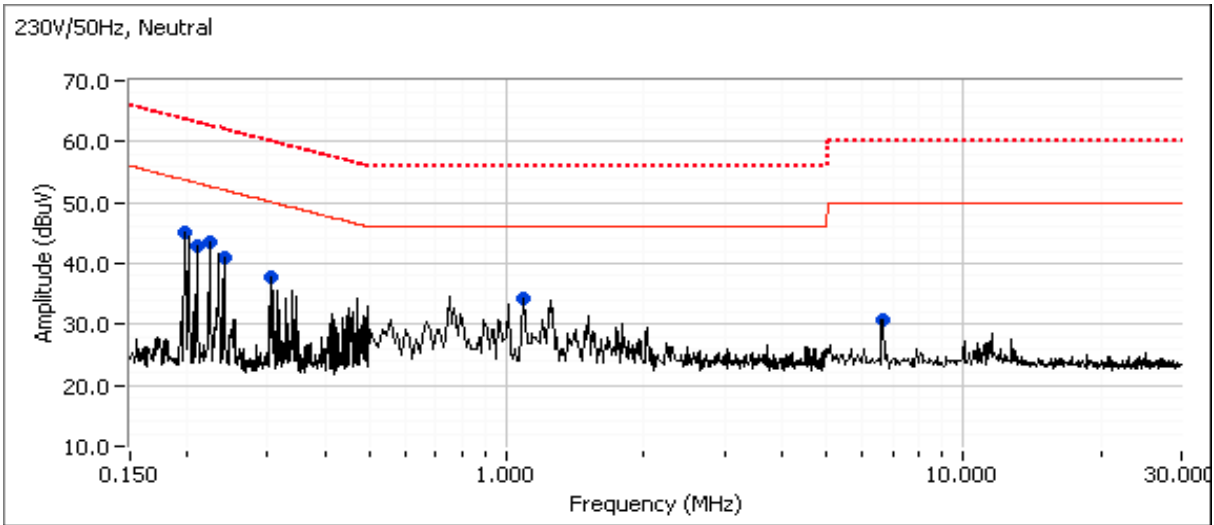
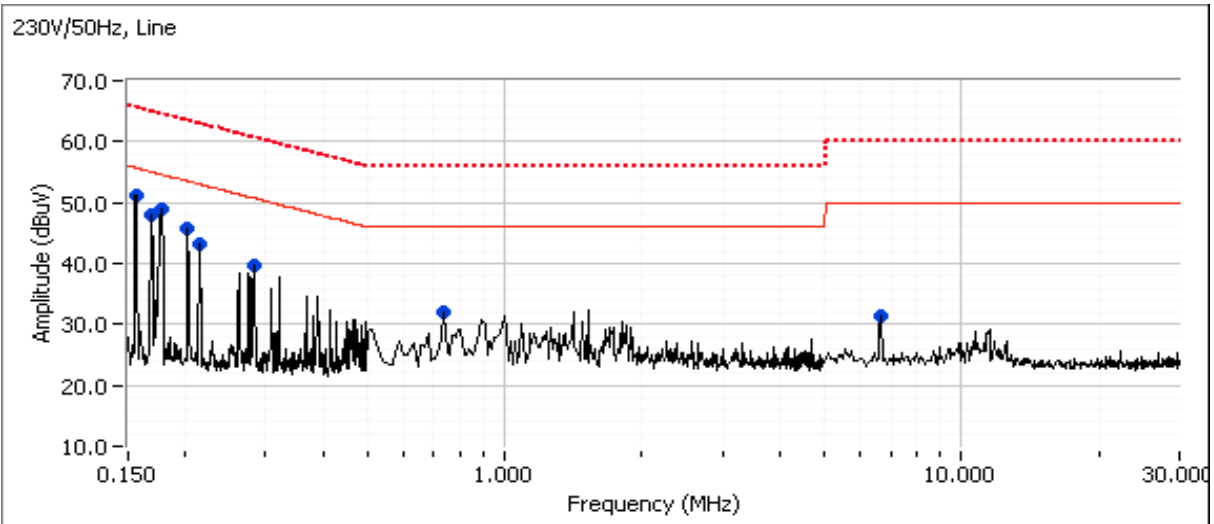


Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	-

Frequency MHz	Level dB μ V	AC Line	EN55022 B		Detector QP/Ave	Comments
			Limit	Margin		
0.810	31.1	Neutral	46.0	-14.9	AVG	AVG (0.100s)
0.810	34.9	Neutral	56.0	-21.1	QP	QP (1.000s)
0.811	23.0	Line	46.0	-23.0	AVG	AVG (0.100s)
1.169	19.7	Line	46.0	-26.3	AVG	AVG (0.100s)
0.811	27.9	Line	56.0	-28.1	QP	QP (1.000s)
0.262	32.9	Line	61.4	-28.5	QP	QP (1.000s)
0.225	33.0	Neutral	62.6	-29.6	QP	QP (1.000s)
0.224	32.3	Neutral	62.7	-30.4	QP	QP (1.000s)
1.169	24.2	Line	56.0	-31.8	QP	QP (1.000s)
0.262	18.3	Line	51.4	-33.1	AVG	AVG (0.100s)
0.152	31.5	Line	65.9	-34.4	QP	QP (1.000s)
6.481	7.6	Line	50.0	-42.4	AVG	AVG (0.100s)
0.152	12.8	Line	55.9	-43.1	AVG	AVG (0.100s)
6.657	15.4	Neutral	60.0	-44.6	QP	QP (1.000s)
6.657	5.2	Neutral	50.0	-44.8	AVG	AVG (0.100s)
6.481	14.9	Line	60.0	-45.1	QP	QP (1.000s)
0.225	3.0	Neutral	52.6	-49.6	AVG	AVG (0.100s)
0.224	2.6	Neutral	52.7	-50.1	AVG	AVG (0.100s)

Client: Summit Data Communications	Job Number: J74548
Model: 802.11abg Compact Flash Card	T-Log Number: T74640
	Account Manager: Christine Krebill
Contact: Jerry Pohmurski	
Standard: FCC 15.247/RSS 210	Class: -

Run #2: AC Power Port Conducted Emissions, 0.15 - 30MHz, 230V/50Hz



Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Standard:	FCC 15.247/RSS 210	Class:	-

Frequency MHz	Level dB μ V	AC Line	EN55022 B		Detector QP/Ave	Comments
			Limit	Margin		
0.159	44.1	Line	65.5	-21.4	QP	QP (1.000s)
0.168	43.1	Line	65.1	-22.0	QP	QP (1.000s)
0.177	42.0	Line	64.6	-22.6	QP	QP (1.000s)
0.199	39.7	Line	63.7	-24.0	QP	QP (1.000s)
0.211	38.6	Line	63.2	-24.6	QP	QP (1.000s)
0.195	39.0	Neutral	63.8	-24.8	QP	QP (1.000s)
0.681	20.5	Line	46.0	-25.5	AVG	AVG (0.100s)
0.212	37.3	Neutral	63.1	-25.8	QP	QP (1.000s)
0.221	36.5	Neutral	62.8	-26.3	QP	QP (1.000s)
0.242	34.4	Neutral	62.0	-27.6	QP	QP (1.000s)
0.279	32.7	Line	60.8	-28.1	QP	QP (1.000s)
0.306	30.1	Neutral	60.1	-30.0	QP	QP (1.000s)
0.681	25.8	Line	56.0	-30.2	QP	QP (1.000s)
1.107	25.7	Neutral	56.0	-30.3	QP	QP (1.000s)
1.107	12.7	Neutral	46.0	-33.3	AVG	AVG (0.100s)
0.242	17.3	Neutral	52.0	-34.7	AVG	AVG (0.100s)
0.221	16.9	Neutral	52.8	-35.9	AVG	AVG (0.100s)
0.306	12.1	Neutral	50.1	-38.0	AVG	AVG (0.100s)
0.212	14.8	Neutral	53.1	-38.3	AVG	AVG (0.100s)
0.159	16.9	Line	55.5	-38.6	AVG	AVG (0.100s)
0.177	14.8	Line	54.6	-39.8	AVG	AVG (0.100s)
0.168	15.1	Line	55.1	-40.0	AVG	AVG (0.100s)
0.195	13.4	Neutral	53.8	-40.4	AVG	AVG (0.100s)
6.562	9.2	Line	50.0	-40.8	AVG	AVG (0.100s)
0.211	12.2	Line	53.2	-41.0	AVG	AVG (0.100s)
0.199	12.6	Line	53.7	-41.1	AVG	AVG (0.100s)
0.279	8.0	Line	50.8	-42.8	AVG	AVG (0.100s)
6.999	7.2	Neutral	50.0	-42.8	AVG	AVG (0.100s)
6.562	15.0	Line	60.0	-45.0	QP	QP (1.000s)
6.999	14.3	Neutral	60.0	-45.7	QP	QP (1.000s)

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
		Account Manager:	Christine Krebill
Contact:	Jerry Pohmurski		
Immunity Standard(s):	EN 301 489-1v1.8.1 / -17v1.3.2	Environment:	-

ElectroStatic Discharge (EN 61000-4-2)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/20/2009	Config. Used: 1
Test Engineer: Mehran Birgani	Config Change: None
Test Location: ESD Lab	Host Unit Voltage 230V/50Hz

General Test Configuration

The EUT and all local support equipment were located on a 0.5-mm thick insulating layer above a horizontal coupling plane, 80 cm above a ground reference plane.

Unless otherwise stated, ten discharges at each voltage, and polarity, were applied to each test point listed. The VCP was located on the table top for table top devices and 80cm above the ground plane for floor standing equipment.

The determination as to the test point being a part of a conductive or non-conductive surface was based on testing the surface for conductivity using an ohmmeter.

Ambient Conditions:

Temperature:	21 °C
Relative Humidity:	47 %
Pressure:	1017 mb

Summary of Results

Run #	Test Performed	Level	Criteria/Result	Comments
1	ESD - Enclosure	± 4kV Contact ± 8kV Air	A /Pass	Transmit Mode
1	ESD - Enclosure	± 4kV Contact ± 8kV Air	A /Pass	Reveive Mode

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Summit Data Communications	Job Number: J74548
Model: 802.11abg Compact Flash Card	T-Log Number: T74640
Contact: Jerry Pohmurski	Account Manager: Christine Krebill
Immunity Standard(s): EN 301 489-1v1.8.1 / -17v1.3.2	Environment: -

Run #1: Electrostatic Discharge (Transmit Mode)

Indirect Discharges (To Coupling Planes)	Positive Polarity (kV)				Negative Polarity (kV)			
	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
Contact Mode	2	4	6	8	2	4	6	8
VCP (10cm from the Front, Rear, Left & Right sides of the EUT)	X	X			X	X		
HCP (10cm from the Front, Rear, Left & Right sides of the EUT)	X	X			X	X		

- Note: An "X" indicates that the unit continued to operate as intended. The EUT continued to transmit during the test. The EUT continued to ping to the laptop. The Laptop continued to ping the EUT during the test.
- Note: ND: No discharge was possible due to the lack of a discharge path to ground from the test point.
HCP: Horizontal Coupling Plane. VCP: Vertical Coupling Plane

Run #2: Electrostatic Discharge (Receive Mode)

Indirect Discharges (To Coupling Planes)	Positive Polarity (kV)				Negative Polarity (kV)			
	Level 1	Level 2	Level 3	Level 4	Level 1	Level 2	Level 3	Level 4
Contact Mode	2	4	6	8	2	4	6	8
VCP (10cm from the Front, Rear, Left & Right sides of the EUT)	X	X			X	X		
HCP (10cm from the Front, Rear, Left & Right sides of the EUT)	X	X			X	X		

- Note: An "X" indicates that the unit continued to operate as intended. The EUT continued to transmit during the test. The EUT continued to ping to the laptop. The Laptop continued to ping the EUT during the test.
- Note: ND: No discharge was possible due to the lack of a discharge path to ground from the test point.
HCP: Horizontal Coupling Plane. VCP: Vertical Coupling Plane

Client:	Summit Data Communications	Job Number:	J74548
Model:	802.11abg Compact Flash Card	T-Log Number:	T74640
Contact:	Jerry Pohmurski	Account Manager:	Christine Krebill
Immunity Standard(s):	EN 301 489-1v1.8.1 / -17v1.3.2	Environment:	-

Radiated Immunity (EN 61000-4-3)

Test Specific Details

Objective: The objective of this test session is to perform final qualification testing of the EUT with respect to the specification listed above.

Date of Test: 3/18/2009 19:09 Config. Used: 1
 Test Engineer: Vishal Narayan Config Change: None
 Test Engineer: Luis Cabrera
 Test Location: Chamber # 1 EUT Host Voltage: 230V / 50Hz

General Test Configuration

The EUT and all local support equipment were located on a turntable in an anechoic chamber. All remote support equipment was located outside the chamber. Interface cabling to the remote support equipment was routed along the floor and, where possible, passed through ferrite clamps at the exit point from the chamber.

Ambient Conditions: Temperature: 19.5 °C
 Rel. Humidity: 47 %

Summary of Results

Run #	Test Performed	Level	Criteria/Result	Comments
1	80 - 2700 MHz 1kHz 80% AM	3 V/m 1kHz 80% AM	A / PASS	Transmit Mode
2	80 - 2700 MHz 1kHz 80% AM	3 V/m 1kHz 80% AM	A / PASS	Receive Mode

Modifications Made During Testing

No modifications were made to the EUT during testing

Deviations From The Standard

No deviations were made from the requirements of the standard.

Client: Summit Data Communications	Job Number: J74548
Model: 802.11abg Compact Flash Card	T-Log Number: T74640
Contact: Jerry Pohmurski	Account Manager: Christine Krebill
Immunity Standard(s): EN 301 489-1v1.8.1 / -17v1.3.2	Environment: -

Run # 1: Radiated Immunity, 80 - 2700 MHz (EN61000-4-3) - Transmit Mode

Frequency:	80 - 1000 MHz	1.4 - 2.7 GHz
Step Size:	1 %	1 %
Dwell time:	2874 ms	2874 ms
Field Uniformity:	1.5m x 1.5m	1.5m x 1.0m
Test Distance:	3	2

Modulation Details	
Modulating Frequency:	1 kHz
Modulation:	AM
Depth / Deviation:	80%

Frequency Range (MHz)	Level V/m	Front		Left Side		Rear		Right		Top		Bottom	
		Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.
80 - 1000	3	X	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A
1400 - 2700	3	X	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A

Note: An "X" indicates that the unit continued to operate as intended. The EUT remained in Receive mode and did not transmit during the test. The Analyzer did not record and transmission during the test

Note 1: Tested frequencies detailed in EN 55024 in accordance with Annex A of the standard.

Run # 2: Radiated Immunity, 80 - 2700 MHz (EN61000-4-3) - Receive Mode

Frequency:	80 - 1000 MHz	1.4 - 2.7 GHz
Step Size:	1 %	1 %
Dwell time:	2874 ms	2874 ms
Field Uniformity:	1.5m x 1.5m	1.5m x 1.0m
Test Distance:	3	2

Modulation Details	
Modulating Frequency:	1 kHz
Modulation:	AM
Depth / Deviation:	80%

Frequency Range (MHz)	Level V/m	Front		Left Side		Rear		Right		Top		Bottom	
		Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.	Vert.	Horiz.
80 - 1000	3	X	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A
1400 - 2700	3	X	X	X	X	X	X	X	X	N/A	N/A	N/A	N/A

Note: An "X" indicates that the unit continued to operate as intended. The EUT remained in Receive mode and did not transmit during the test. The Analyzer did not record and transmission during the test

Note 1: Tested frequencies detailed in EN 55024 in accordance with Annex A of the standard.

Test files used for run 1 and 2:

The following calibration files from O:\EMC Stuff\Radiated Immunity Cal Files\2008\ were used:

- Position A, 1.8m antenna height 80 MHz - 1000 MHz H 3Vm.crf
- Position A, 1.8m antenna height 80 MHz - 1000 MHz V 3Vm.crf
- 9 point antenna at c' (2m from field) at 1.4m height 1000 MHz - 2700 MHz H 3Vm.crf
- 9 point antenna at c' (2m from field) at 1.4m height 1000 MHz - 2700 MHz V 3Vm.crf

Appendix C Conducted Emissions Test Configuration Photographs



Appendix D ESD Test Configuration Photographs



Appendix E Radiated Susceptibility Test Configuration Photographs

