

# TEST REPORT FROM RFI GLOBAL SERVICES LTD

Test of: Tecnologica Ingenieria Calidad y Ensayos S.A.  
(ALTER TECHNOLOGY GROUP SPAIN)  
On behalf of NAVENTO TECHNOLOGIES – AVANZIT GROUP  
N-Card

To: FCC Part 22: 2007 (Subpart H) and  
FCC Part 24: 2007 (Subpart E)  
(Requested Parts Only)

**Test Report Serial No:**  
RFI/RPTE3/RP49598JD01A

**Supersedes Test Report Serial No:**  
RFI/RPTE2/RP49598JD01A

**This Test Report Is Issued Under The Authority  
Of Steve Flooks, Radio Performance Group Service  
Leader:**



pp Brian Watson

<b>Checked By:</b> Brian Watson	 <b>Report Copy No:</b> PDF01
<b>Issue Date:</b> 10 July 2008	<b>Test Dates:</b> 13 May 2008 to 15 May 2008

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## **1. Client Information**

<b>Company Name:</b>	Tecnologica Ingenieria Calidad y Ensayos S.A. (ALTER TECHNOLOGY GROUP SPAIN) On behalf of NAVENTO TECHNOLOGIES – AVANZIT GROUP
<b>Address:</b>	C/de la Majada 3 Tres Cantos Madrid 28760 Spain
<b>Contact Name:</b>	Ms E Santiago

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## **2. Equipment Under Test (EUT)**

The following information (with the exception of the Date of Receipt) has been supplied by the client:

### **2.1. Description of EUT**

The equipment under test is a Location device.

### **2.2. Identification of Equipment Under Test (EUT)**

<b>Description:</b>	Location Device
<b>Brand Name:</b>	NAVENTO
<b>Model Name or Number:</b>	NCARD
<b>Serial Number:</b>	01013264
<b>Hardware Version Number:</b>	4.2
<b>Software Version Number:</b>	3.11
<b>FCC ID Number:</b>	WAUNCARD-01
<b>Country of Manufacture:</b>	Spain
<b>Date of Receipt:</b>	13 May 2008

<b>Description:</b>	Location Device (Unit used for EIRP measurements)
<b>Brand Name:</b>	NAVENTO
<b>Model Name or Number:</b>	NCARD
<b>Serial Number:</b>	01012639
<b>Hardware Version Number:</b>	4.2
<b>Software Version Number:</b>	3.11
<b>FCC ID Number:</b>	WAUNCARD-01
<b>Country of Manufacture:</b>	Spain
<b>Date of Receipt:</b>	13 May 2008

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### **2.3. Accessories**

The following accessories were supplied with the EUT:

<b>Description:</b>	AC Mains USB Charger
<b>Brand Name:</b>	TRAVEL CHARGER
<b>Model Name or Number:</b>	None Stated
<b>Serial Number:</b>	None Stated
<b>Cable Length and Type:</b>	1.5 m, USB to mini USB
<b>Connected to Port:</b>	USB

### **2.4. Support Equipment**

No support equipment was used to exercise the EUT during testing.

### **2.5. Modifications Incorporated in EUT**

During the course of testing the EUT was not modified except to allow continuous transmission for testing purposes (the device typically transmits for less than one second in ten minutes when in normal use). The device also has a “sleep mode” where it powers down if not moves after several minutes. This feature was turned off for testing purposes.

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## **2.6. Additional Information Related to Testing**

<b>Power Supply Requirement:</b>	Internal battery supply of 5 V DC
<b>Intended Operating Environment:</b>	Residential, Commercial and Light Industry
<b>Equipment Category:</b>	GSM
<b>Type of Unit:</b>	Portable (standalone battery powered device)

### **GPS**

<b>Receive Frequency Range:</b>	1575.42 MHz single Frequency		
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Single Channel	N/A	1575.42

### **FCC Part 22**

<b>Transmit Frequency Range:</b>	824 MHz to 849 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	128	824.2
	Middle	190	836.6
	Top	251	848.8
<b>Receive Frequency Range:</b>	869 MHz to 894 MHz		
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	128	869.2
	Middle	190	881.6
	Top	251	893.9
<b>Maximum Power Output (ERP):</b>	16.3 dBm		

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**Additional Information Related to Testing (Continued)**

**FCC Part 24**

<b>Transmit Frequency Range:</b>	1850 MHz to 1910 MHz		
<b>Transmit Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	512	1850.2
	Middle	660	1879.8
	Top	810	1909.8
<b>Receive Frequency Range:</b>	1930 MHz to 1990 MHz		
<b>Receive Channels Tested:</b>	<b>Channel ID</b>	<b>Channel Number</b>	<b>Channel Frequency (MHz)</b>
	Bottom	512	1930.2
	Middle	660	1959.8
	Top	810	1989.8
<b>Maximum Power Output (EIRP):</b>	15.0 dBm		

**2.7. Port Identification**

<b>Port</b>	<b>Description</b>	<b>Type/Length</b>
1.	Battery charger	USB, <3m

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### **3. Test Specification, Methods and Procedures**

<b>Reference:</b>	FCC Part 22: 2007 Subpart H (Cellular Radiotelephone Service)
<b>Title:</b>	Code of Federal Regulations, Part 22 (47CFR22) Personal Communication Services.

<b>Reference:</b>	FCC Part 24: 2007 Subpart E (Broadband PCS)
<b>Title:</b>	Code of Federal Regulations, Part 24 (47CFR24) Personal Communication Services.

#### **3.1. Methods and Procedures**

The methods and procedures used were as detailed in:

ANSI/TIA-603-B-2003

Land Mobile Communications Equipment, Measurements and performance Standards

ANSI C63.2 (1987)

Title: American National Standard for Instrumentation - Electromagnetic noise and field strength.

ANSI C63.4 (2003)

Title: American National Standard Methods of Measurement of Electromagnetic Emissions from Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

ANSI C63.5 (1988)

Title: American National Standard for the Calibration of antennas used for Radiated Emission measurements in Electromagnetic Interference (EMI) control.

ANSI C63.7 (1988)

Title: American National Standard Guide for Construction of Open Area Test Sites for performing Radiated Emission Measurements.

CISPR 16-1: (1999)

Title: Specification For Radio Disturbance and Immunity Measuring Apparatus and Methods. Part 1: Radio Disturbance and Immunity Measuring Apparatus.

#### **3.2. Definition of Measurement Equipment**

The measurement equipment used complied with the requirements of the standards referenced in the methods & procedures Section above. Appendix 1 contains a list of the test equipment used.

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#### **4. Deviations from the Test Specification**

There were no deviations from the test specification.

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## **5. Operation of the EUT during Testing**

### **5.1. Operating Modes**

The EUT was tested in the following operating modes, unless otherwise stated.

- Using internal batteries, except for conducted AC mains spurious emissions tests where the device was powered from the AC charger.
- The EUT was tested in Idle mode and transmitting in GSM mode.

### **5.2. Configuration and Peripherals**

The EUT was tested in the following configuration unless otherwise stated:

- The EUT was configured for idle mode for radiated emissions testing and transmitting GSM 850/1900 on Bottom, Middle and Top channels for output power.

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## **6. Summary of Test Results**

### **FCC Part 22**

<b>Range of Measurements</b>	<b>Specification Reference</b>	<b>Port Type</b>	<b>Compliance Status</b>
Receiver/Idle AC Conducted Spurious Emissions (150 kHz to 30 MHz)	15.107	AC Mains Input	Complied
Receiver/Idle Radiated Emissions	15.109	Enclosure	Complied
Transmitter Effective Radiated Power (ERP)	22.913(a)	Antenna	Complied

### **FCC Part 24**

<b>Range of Measurements</b>	<b>Specification Reference</b>	<b>Port Type</b>	<b>Compliance Status</b>
Idle Mode AC Conducted Spurious Emissions (150 kHz to 30 MHz)	15.107	AC Mains Input	Complied
Idle Mode Radiated Spurious Emissions	15.109	Enclosure	Complied
Transmitter Effective Isotropic Radiated Power (EIRP)	24.232	Antenna	Complied

### **6.1. Location of Tests**

All the measurements described in this report were performed at the premises of RFI Global Services Ltd, Ewhurst Park, Ramsdell, Basingstoke, Hampshire, RG26 5RQ.

### **6.2. Site Registration Numbers**

- FCC: 90895
- IC: 3485

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## **7. Measurements, Examinations and Derived Results**

### **7.1. General Comments**

This Section contains test results only.

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to Section 8 for details of measurement uncertainties.

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## **7.2. Test Results – FCC Part 22 (Subpart H)**

### **7.2.1. Receiver/Idle Mode AC Conducted Spurious Emissions: Section 15.107**

Tests were performed using the test methods detailed in ANSI C63.4 Section 7.

#### **Results:**

#### **Quasi-Peak Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
1.174000	Neutral	45.6	56.0	10.4	Complied
1.290000	Neutral	46.4	56.0	9.6	Complied
1.350000	Neutral	45.9	56.0	10.1	Complied
1.466000	Neutral	46.8	56.0	9.2	Complied
1.530000	Live	41.8	56.0	14.2	Complied
1.590000	Live	39.7	56.0	16.3	Complied
1.646000	Live	44.9	56.0	11.1	Complied
1.706000	Live	41.6	56.0	14.4	Complied
1.766000	Live	39.2	56.0	16.8	Complied
1.822000	Neutral	43.1	56.0	12.9	Complied

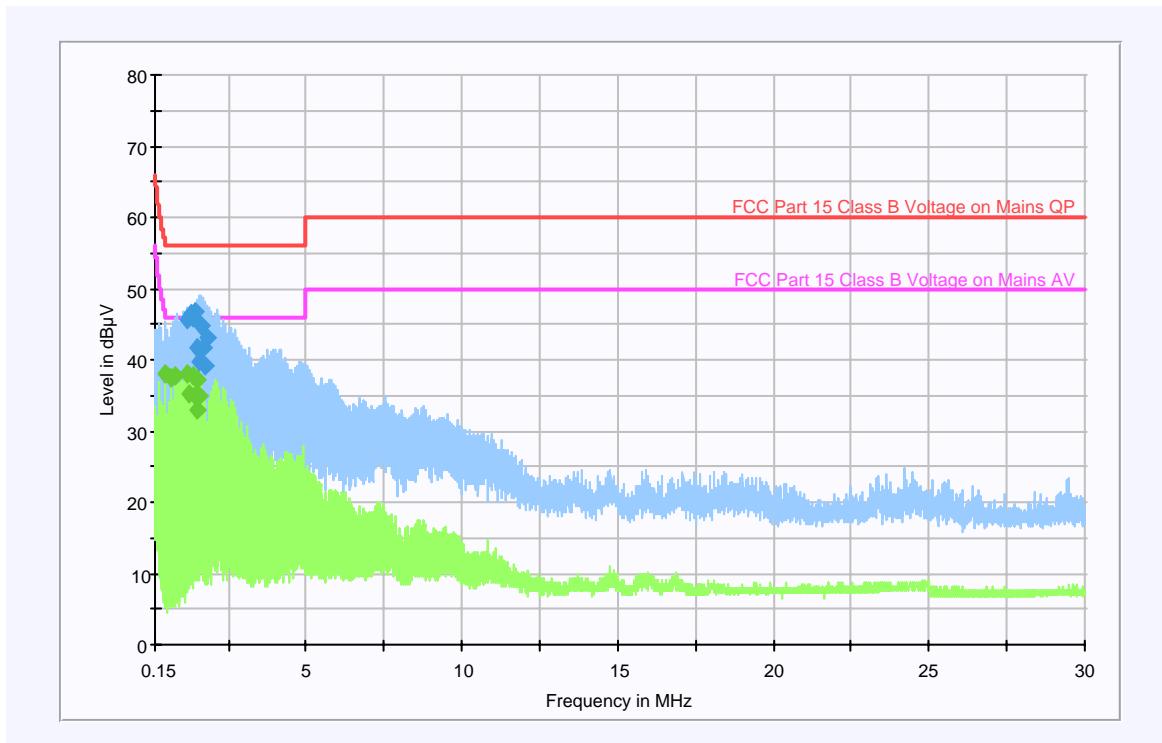
#### **Average Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.470000	Neutral	38.0	46.5	8.5	Complied
0.646000	Neutral	37.5	46.0	8.5	Complied
0.822000	Neutral	37.7	46.0	8.3	Complied
1.174000	Neutral	37.9	46.0	8.1	Complied
1.234000	Neutral	35.3	46.0	10.7	Complied
1.350000	Neutral	37.9	46.0	8.1	Complied
1.410000	Neutral	34.9	46.0	11.1	Complied
1.470000	Neutral	32.8	46.0	13.2	Complied

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**Receiver/Idle Mode AC Conducted Spurious Emissions: Section 15.107 (Continued)**

*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.*

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### **7.2.2. Receiver/Idle Mode Radiated Spurious Emissions**

Tests were performed using the test methods detailed in ANSI C63.4 Section 8.

#### **Results:**

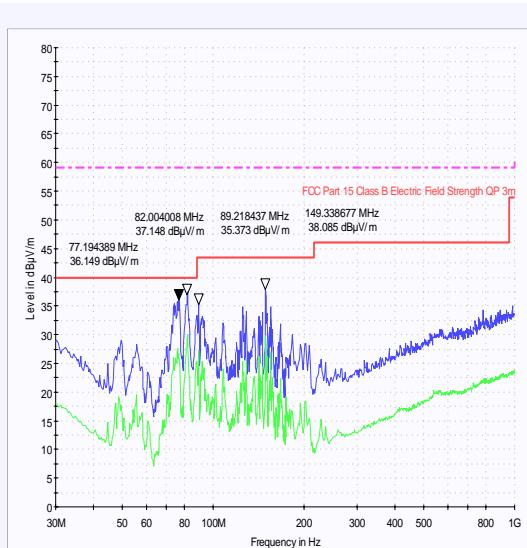
#### **Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)**

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
77.194389	Vertical	22.0	40.0	18.0	Complied
82.004008	Vertical	24.0	40.0	16.0	Complied
89.218437	Vertical	36.6	43.5	6.9	Complied
147.338677	Vertical	21.7	43.5	21.8	Complied

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**Receiver/Idle Mode Radiated Spurious Emissions (Continued)**

*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.*

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### 7.2.3. Receiver/Idle Mode Radiated Spurious Emissions

#### Results:

#### Electric Field Strength Measurements (Frequency Range: 1 to 12.75 GHz)

##### Peak Level

Frequency (GHz)	Antenna Polarity	Detector Level (dB $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
12.541	Vertical	42.7	5.5	48.2	74.0	25.8	Complied

##### Average Level

Frequency (GHz)	Antenna Polarity	Detector Level (dB $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
12.541	Vertical	42.7	5.5	48.2	54.0	5.8	Complied

#### Note(s):

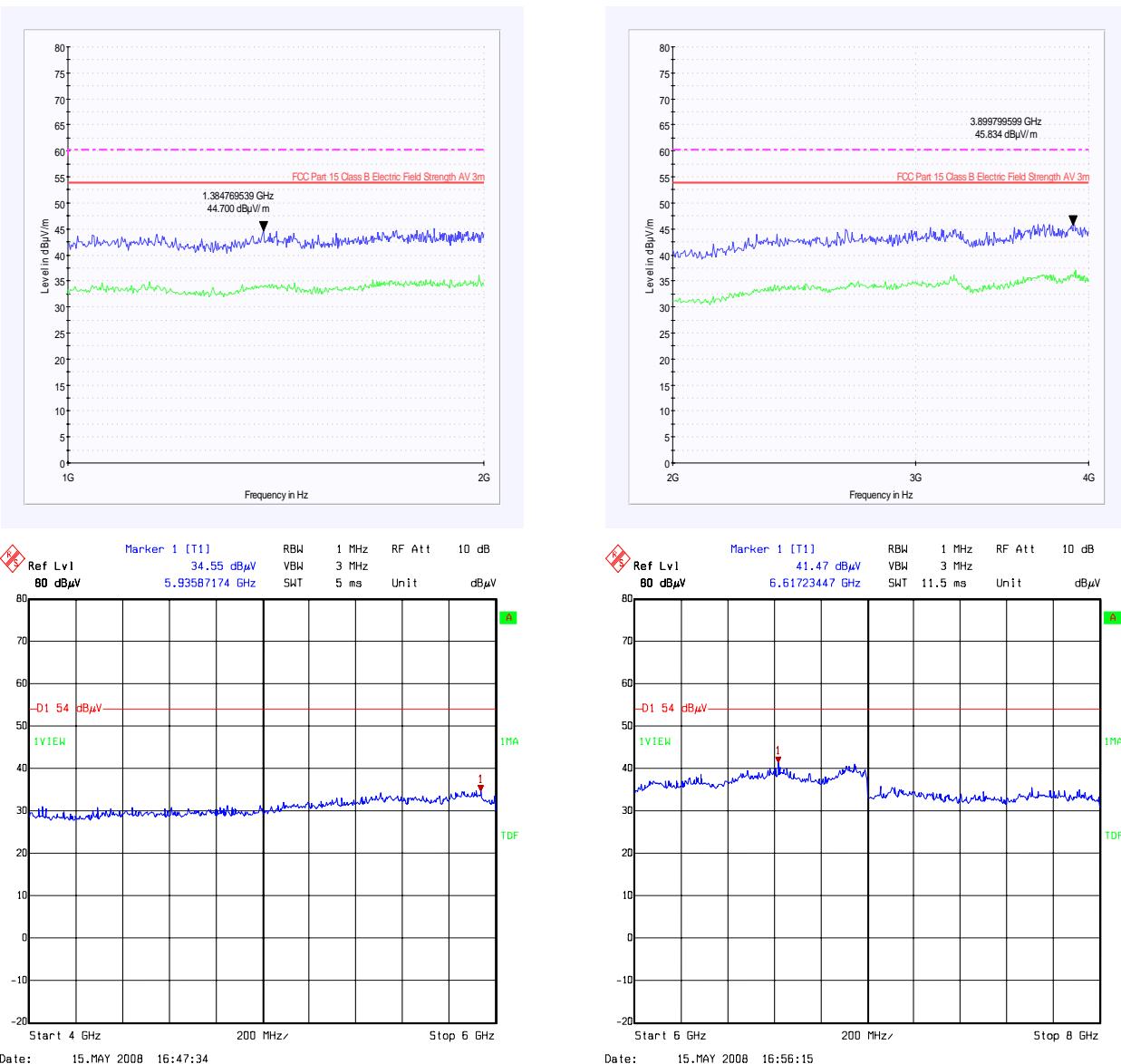
1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.

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**Receiver/Idle Mode Radiated Spurious Emissions (Continued)**

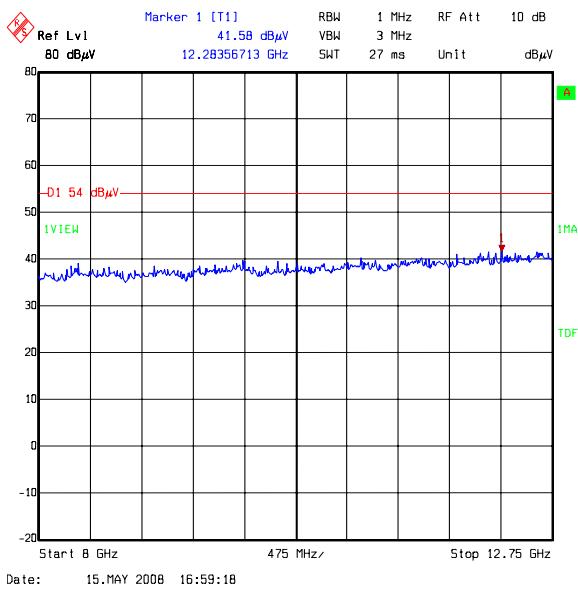


*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

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**Receiver/Idle Mode Radiated Spurious Emissions (Continued)**

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#### **7.2.4. Transmitter Effective Radiated Power (ERP)**

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2.

#### **Results:**

Channel	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Result
Bottom	824.2	14.2	38.4	24.2	Complied
Middle	836.6	15.2	38.4	23.2	Complied
Top	848.8	16.3	38.4	22.1	Complied

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### **7.3. Test Results – FCC Part 24 (Subpart E)**

#### **7.3.1. Receiver/Idle AC Conducted Spurious Emissions**

Tests were performed using the test methods detailed in ANSI C63.4 Section 7

#### **Results:**

#### **Quasi-Peak Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
1.174000	Neutral	45.6	56.0	10.4	Complied
1.290000	Neutral	46.4	56.0	9.6	Complied
1.350000	Neutral	45.9	56.0	10.1	Complied
1.466000	Neutral	46.8	56.0	9.2	Complied
1.530000	Live	41.8	56.0	14.2	Complied
1.590000	Live	39.7	56.0	16.3	Complied
1.646000	Live	44.9	56.0	11.1	Complied
1.706000	Live	41.6	56.0	14.4	Complied
1.766000	Live	39.2	56.0	16.8	Complied
1.822000	Neutral	43.1	56.0	12.9	Complied

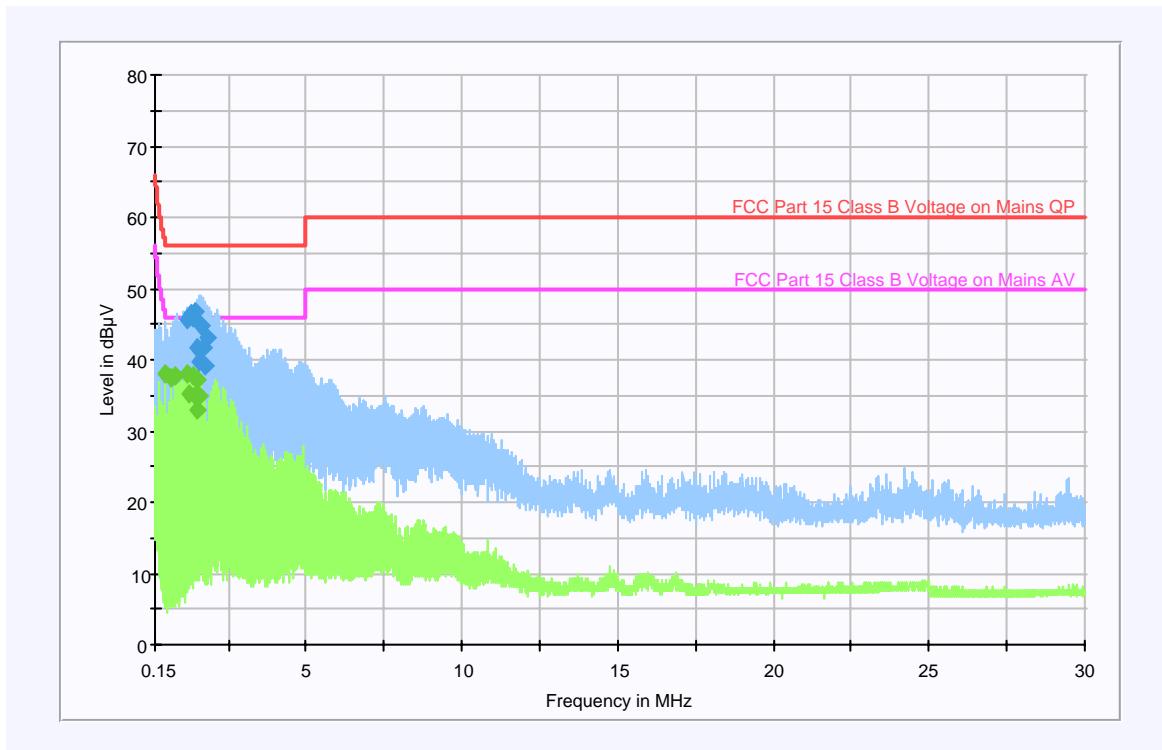
#### **Average Detector Measurements on Live and Neutral Lines**

Frequency (MHz)	Line	Level (dB $\mu$ V)	Limit (dB $\mu$ V)	Margin (dB)	Result
0.470000	Neutral	38.0	46.5	8.5	Complied
0.646000	Neutral	37.5	46.0	8.5	Complied
0.822000	Neutral	37.7	46.0	8.3	Complied
1.174000	Neutral	37.9	46.0	8.1	Complied
1.234000	Neutral	35.3	46.0	10.7	Complied
1.350000	Neutral	37.9	46.0	8.1	Complied
1.410000	Neutral	34.9	46.0	11.1	Complied
1.470000	Neutral	32.8	46.0	13.2	Complied
1.526000	Neutral	37.1	46.0	8.9	Complied
1.586000	Neutral	34.8	46.0	11.2	Complied

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**Receiver/Idle AC Conducted Spurious Emissions: Section (Continued)**

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### **7.3.2. Receiver Radiated Spurious Emissions**

Tests were performed using the test methods detailed in ANSI C63.4 Section 8

#### **Results:**

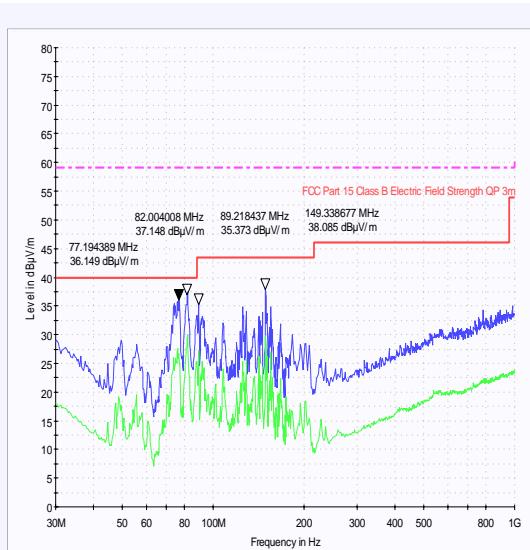
#### **Electric Field Strength Measurements (Frequency Range: 30 to 1000 MHz)**

Frequency (MHz)	Antenna Polarity	Quasi Peak Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
77.194389	Vertical	22.0	40.0	18.0	Complied
82.004008	Vertical	24.0	40.0	16.0	Complied
89.218437	Vertical	36.6	43.5	6.9	Complied
147.338677	Vertical	21.7	43.5	21.8	Complied

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**Receiver Radiated Spurious Emissions (Continued)**

*Note: This plot is a pre-scan and for indication purposes only. For final measurements, see accompanying tables.*

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### 7.3.3. Receiver Radiated Spurious Emissions (Continued)

#### Results:

##### Electric Field Strength Measurements (Frequency Range: 1 to 12.75 GHz)

##### Peak Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dB $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
12.541	Vertical	42.7	5.5	48.2	74.0	25.8	Complied

##### Average Level:

Frequency (GHz)	Antenna Polarity	Detector Level (dB $\mu$ V)	Transducer Factor (dB)	Actual Level (dB $\mu$ V/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Result
12.541	Vertical	42.7	5.5	48.2	54.0	5.8	Complied

#### Note(s):

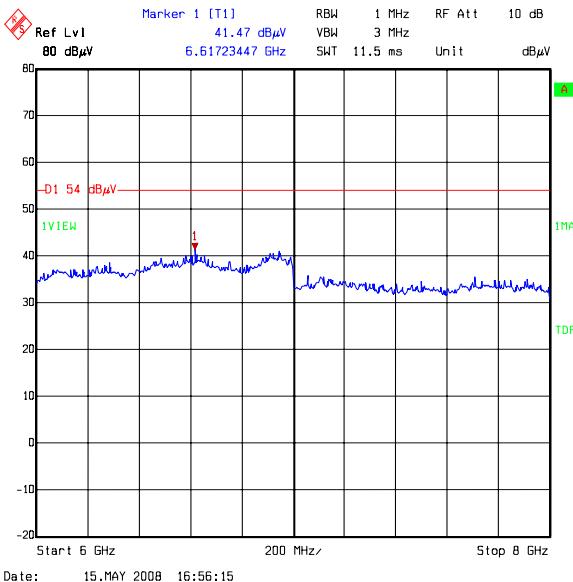
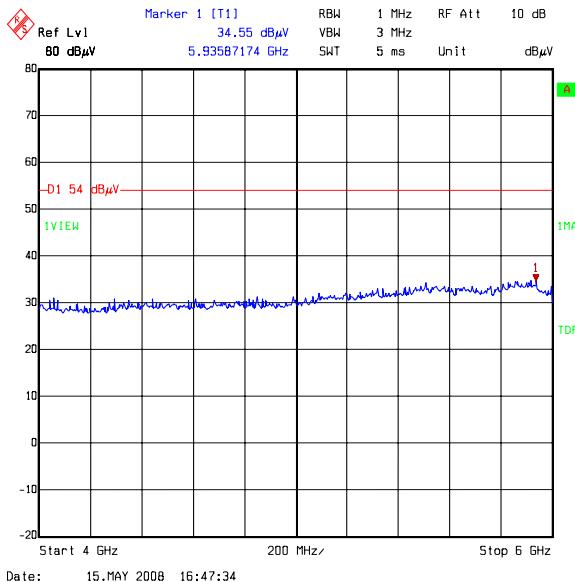
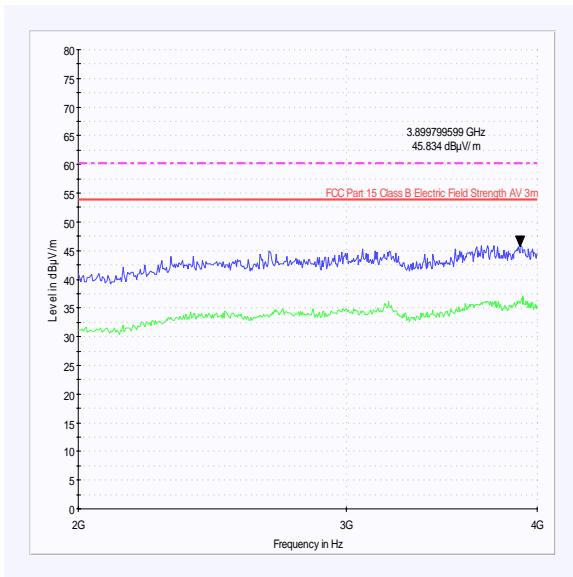
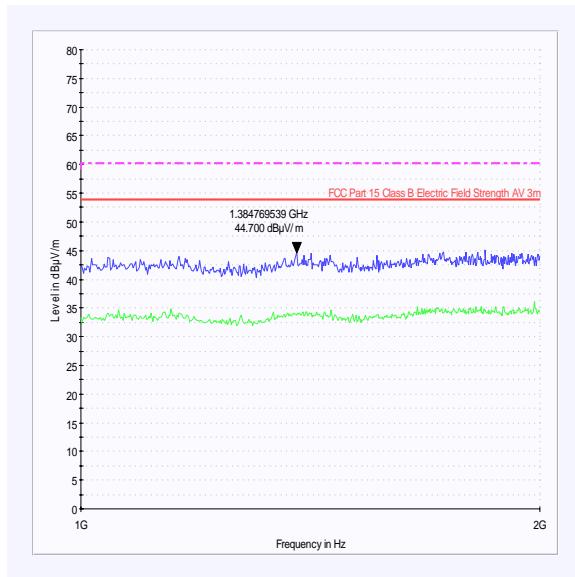
1. No spurious emissions were detected above the noise floor of the measuring receiver; therefore, the highest peak noise floor reading of the measuring receiver was recorded as shown in the table above. The peak level was compared to the average limit as opposed to being compared to the peak limit because this is the more onerous limit.

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**Receiver Radiated Spurious Emissions (Continued)**



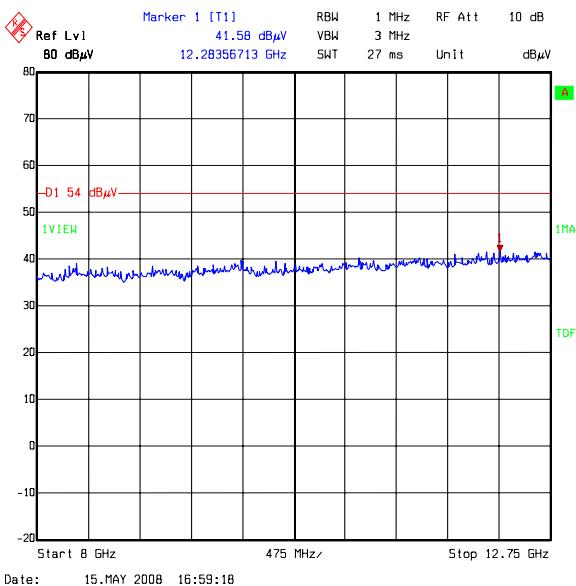
*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

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### Receiver Radiated Spurious Emissions (Continued)



*Note: These plots are pre-scans and for indication purposes only. For final measurements, see accompanying tables.*

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#### **7.3.4. Transmitter Effective Isotropic Radiated Power (EIRP)**

Tests were performed using the test methods detailed in ANSI TIA-603-C-2004 referencing FCC CFR Part 2

#### **Results:**

Channel	Measured Frequency (MHz)	Antenna Polarity	Maximum Transmitter EIRP (dBm)	Limit EIRP (dBm)	Margin (dB)	Result
Bottom	1850.2	Horizontal	9.9	33.0	23.1	Complied
Middle	1879.8	Horizontal	12.3	33.0	20.7	Complied
Top	1909.8	Horizontal	15.0	33.0	18.0	Complied

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## **8. Measurement Uncertainty**

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently, the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor, such that a confidence level of approximately 95% is maintained. For the purposes of this document “approximately” is interpreted as meaning “effectively” or “for most practical purposes”.

<b>Measurement Type</b>	<b>Range</b>	<b>Confidence Level (%)</b>	<b>Calculated Uncertainty</b>
AC Conducted Spurious Emissions	0.15 MHz to 30 MHz	95%	±3.25 dB
Effective Radiated Power (ERP)	Not applicable	95%	±1.78 dB
Effective Isotropic Radiated Power (EIRP)	Not applicable	95%	±1.78 dB
Radiated Spurious Emissions	30 MHz to 1000 MHz	95%	±5.26 dB
Radiated Spurious Emissions	1 GHz to 26 GHz	95%	±1.78 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty, the published guidance of the appropriate accreditation body is followed.

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### **Appendix 1. Test Equipment Used**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
A028	Antenna	Eaton	91888-2	304	08 Jun 2006	36
A031	Antenna	Eaton	91889-2	557	08 Jun 2006	36
A059	Antenna	EMCO	3146	8902-2378	25 Feb 2008	12
A1037	Antenna	Chase EMC Ltd	CBL6112B	2413	13 Feb 2008	12
A1069	Single Phase LISN	Rohde & Schwarz	ESH3-Z5	837469/012	07 Mar 2008	12
A1516	Universal Radio Communications Tester	Rohde & Schwarz	CMU200	1100.0008.02	Calibration not required	-
A1830	Pulse Limiter	Rhode & Schwarz	ESH3-Z2	100668	16 Jan 2008	12
A1850	GPS Antenna Amplifier	Precision Test Systems	GPS35 Option 03	35-169	Calibration not required	-
A253	Antenna	Flann Microwave	12240-20	128	17 Nov 2006	36
A255	Antenna	Flann Microwave	16240-20	519	17 Nov 2006	36
A259	Antenna	Chase	CBL6111	1513	13 Mar 2007	18
A392	Attenuator	Suhner	6803.17.B	None	Calibration not required	-
A512	Antenna	EMCO	3115	3993	Calibration not required	-
C1072	Cable	Rosenberger	FA210a1030M5050	Not Stated	Calibrated before use	-
C1155	Cable	Huber & Suhner	Sucoflex 104PA	1522/4PA	Calibrated before use	-
C1167	Cable	Rosenberger Micro-Coax	FA210A1030007070	43190-01	Calibrated before use	-
C1168	Cable	Rosenberger Micro-Coax	FA210A1030007070	43190-02	Calibrated before use	-
C151	Cable	Rosenberger	UFA210A-1-1181-70x70	None	Calibrated before use	-
C348	Cable	Rosenberger	UFA210A-1-1181-70x70	2993	Calibrated before use	-
C363	Cable	Rosenberger	RG142	None	Calibrated before use	-

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**Test Equipment Used (Continued)**

RFI No.	Instrument	Manufacturer	Type No.	Serial No.	Date Last Calibrated	Cal. Interval (Months)
C461	Cable	Rosenberger	UFA210A-1-1182-704704	98H0305	Calibrated before use	-
C468	Cable	Rosenberger	UFA210A-1-3937-504504	98L0440	Calibrated before use	-
M023	Test Receiver	Rohde & Schwarz	ESVP	872 991/027	28 May 2008	12
M024	Spectrum Monitor	Rohde & Schwarz	EZM	873 952/006	Calibrated before use	-
M1242	Spectrum Analyser	Rohde & Schwarz, Inc.	FSEM30	845986/022	29 Nov 2007	12
M1263	Test Receiver	Rohde & Schwarz	ESIB7	100265	06 Feb 2008	12
S201	Open Area Test Site	RFI	1	None	09 May 2008	12
S202	Site 2	RFI	2	S202-15011990	28 Jan 2008	12
S212	Emissions Screened Room	RFI	12	None	Verified before use	-

**NB** In accordance with UKAS requirements, all the measurement equipment is on a calibration schedule.

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## **Appendix 2. Test Configuration Drawings**

This appendix contains the following drawings:

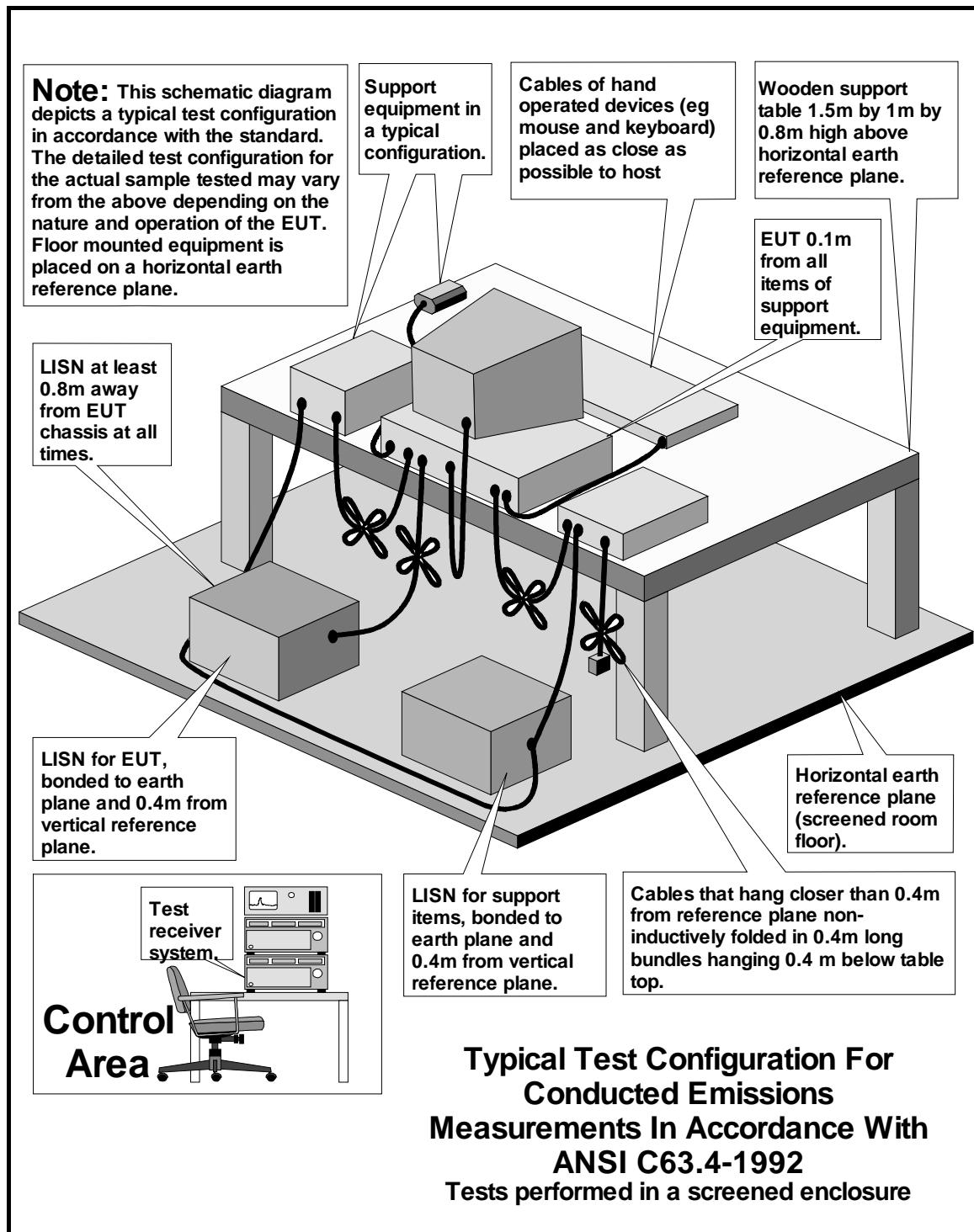
<b>Drawing Reference Number</b>	<b>Title</b>
DRG\49598JD01\EMICON	Test configuration for measurement of conducted emissions.
DRG\49598JD01\EMIRAD	Test configuration for measurement of radiated emissions.

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