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Report On

FCC and Industry Canada Testing of the
Sepura plc SRG3900 Vehicle Mounted Tetra Radio

COMMERCIAL-IN-CONFIDENCE

FCC ID: XX6SRG3900UW
IC ID: 8739A-SRG3900UW

Document 75908189 Report 02 Issue 4

March 2010



Product Service

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

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Sepura plc SRG3900 Vehicle Mounted Tetra Radio

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DATED

09 March 2010

ENGINEERING STATEMENT

The measurements shown in this report were made in accordance with the procedures described on test pages. All reported testing was carried out on a sample equipment to demonstrate limited compliance with FCC CFR 47: Part 15B and RSS-Gen. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

A Guy

This report has been re-issued to Issue 4 to correct typographical errors.



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SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Sepura plc SRG3900 Vehicle Mounted Tetra Radio



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Sepura plc, SRG3900 Vehicle Mounted Tetra Radio to the requirements of FCC CFR 47 Part 15B and RSS-Gen.

Objective	To perform FCC and Industry Canada Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Sepura plc
Model Number(s)	SRG3900 Vehicle Mounted Tetra Radio
Serial Number(s)	2PN000219VA
Software Version	-
Hardware Version	Production
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B: 2007 RSS-Gen: Issue 2: 2007
Incoming Release Date	Declaration of Build Status 10 December 2009
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	315351/T0201 19 November 2009
Start of Test	23 December 2009
Finish of Test	23 December 2009
Name of Engineer(s)	A Guy
Related Document(s)	ANSI 63.4: 2003

Testing in this report is referenced to FCC CFR 47 Part 15: 2009. At the time of testing the 2009 version was not on our Schedule of Accreditation, the clauses tested have been assessed against the 2007 version and there are no changes to the testing performed therefore the testing meets the requirements of the 2009 version.



1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 15B and RSS-Gen is shown below.

Configuration 1 - Mono Console & Handset Base Console							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.1	15.109	4.9	Radiated Emissions (Enclosure Port)	Idle	0	Pass	ANSI 63.4
				460.025MHz Receive/GPS Listening	0	Pass	
	15.107		Conducted Emissions (AC Power Port)			N/A	ANSI 63.4

Configuration 2 - Colour Console & Handset Base Console							
Section	Spec Clause		Test Description	Mode	Mod State	Result	Base Standard
	FCC	IC					
2.1	15.109	4.9	Radiated Emissions (Enclosure Port)	Idle	0	Pass	ANSI 63.4
				460.025MHz Receive/GPS Listening	0	Pass	
	15.107		Conducted Emissions (AC Power Port)			N/A	ANSI 63.4

N/A – Not Applicable



1.3 DECLARATION OF BUILD STATUS

MAIN EUT				
MANUFACTURING DESCRIPTION	Tetra Mobile/Gateway terminal			
MANUFACTURER	Sepura			
TYPE	SRG3900			
PART NUMBER	n/a			
SERIAL NUMBER	2PN000219VA			
HARDWARE VERSION	Production			
SOFTWARE VERSION	-			
TRANSMITTER OPERATING RANGE	407MHz to 473MHz			
RECEIVER OPERATING RANGE	407MHz to 473MHz			
COUNTRY OF ORIGIN	UK			
INTERMEDIATE FREQUENCIES	69.25MHz			
ITU DESIGNATION OF EMISSION	25K0Q1D			
HIGHEST INTERNALLY GENERATED FREQUENCY	Fc (TX)x4/3 MHz or Fc (RX)+69.25MHz			
OUTPUT POWER (W or dBm)	10 Watts			
FCC ID	XX6SRG3900UW			
INDUSTRY CANADA ID	8739A-SRG3900UW			
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Tetra Mobile/Gateway terminal			
ANCILLARIES (if applicable)				
MANUFACTURING DESCRIPTION	Handset	RSM	Fist Mic	Hands-free kit
MANUFACTURER	ADI	ADI	ADI	ADI
TYPE				
PART NUMBER	300 00061	300-00444	300 00062	300 00085
SERIAL NUMBER				
COUNTRY OF ORIGIN	Taiwan	Taiwan	Taiwan	Taiwan
ANCILLARIES (if applicable)				
MANUFACTURING DESCRIPTION	Console	Console	HBC	AIU
MANUFACTURER	Sepura	Sepura	Sepura	Sepura
TYPE	Standard	Colour		
PART NUMBER	300 00149	300 00771	300 00669	300 00217
SERIAL NUMBER				
COUNTRY OF ORIGIN	UK	UK	UK	UK

Signature

Date

10 December 2009

D of B S Serial No

75908189

Note: This document has been prepared to enable manufacturers with no mechanism for producing their own Declaration of Build Status, to declare the build state of the equipment submitted for test.

No responsibility will be accepted by TÜV Product Service as to the accuracy of the information declared in this document by the manufacturer.



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Sepura plc, SRG3900 Vehicle Mounted Tetra Radio as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.



Equipment Under Test



1.4.2 Test Configuration

Configuration 1: Mono Console & Handset Base Console

The EUT was configured in accordance with FCC CFR 47 Part 15B and RSS-Gen.

Configuration 2: Colour Console & Handset Base Console

The EUT was configured in accordance with FCC CFR 47 Part 15B and RSS-Gen.

1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
DC Power	1.5m	DC Power Lead	2 core	No
Data	1.5m	Mono or Colour Console	Multicore	No
Signal	1.0m	Hands free Microphone Cable	Multicore	No
Earth	1.0m	Earth	Braid	No

1.4.4 Modes of Operation

Modes of operation of each EUT during testing were as follows:

Mode 1 - Idle

Mode 2 - 460.025MHz Receive/GPS Listening/GPS Listening*

* The customer has stated that the worst case for Receive Emissions would be with the EUT in GPS listening mode rather than GPS Receive.



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1.5 TEST CONDITIONS

For all tests the EUT was set up in accordance with the relevant test standard and to represent typical operating conditions. Tests were applied with the EUT situated in a shielded enclosure, test laboratories or an open test area as appropriate.

The EUT was powered from a 13.2V DC power supply unit .

FCC Accreditation
90987 Octagon House, Fareham Test Laboratory

Industry Canada Accreditation
IC2932B-1 Octagon House, Fareham Test Laboratory

1.6 DEVIATIONS FROM THE STANDARD

No deviations from the applicable test standards or test plan were made during testing.

1.7 MODIFICATION RECORD

No modifications were made to the EUT during testing.



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SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Sepura plc SRG3900 Vehicle Mounted Tetra Radio



Product Service

2.1 RADIATED EMISSIONS (ENCLOSURE PORT)

2.1.1 Specification Reference

FCC CFR 47 Part 15B, Clause 15.109
RSS-Gen, Clause 4.9

2.1.2 Equipment Under Test

SRG3900 Vehicle Mounted Tetra Radio, S/N: 2PN000219VA

2.1.3 Date of Test and Modification State

23 December 2009 - Modification State 0

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified in Section 3.1.

2.1.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of ANSI 63.4.

The test was performed with the EUT in the following configurations and modes of operation:

Configuration 1 - Mode 1
 - Mode 2
Configuration 2 - Mode 1
 - Mode 2

2.1.6 Environmental Conditions

	23 December 2009
Ambient Temperature	18.5 - 19°C
Relative Humidity	27 - 28%
Atmospheric Pressure	987mbar

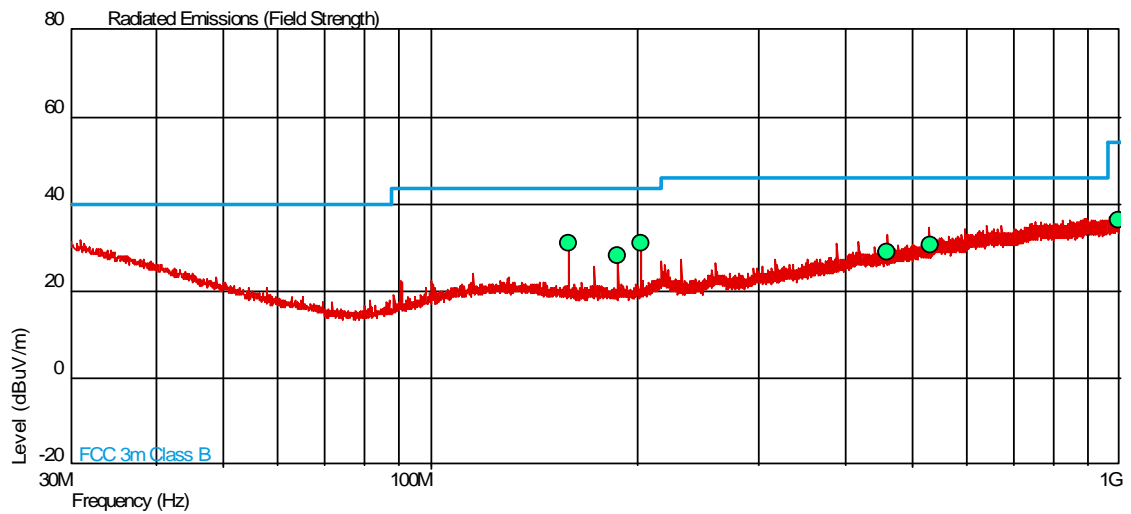


2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B and RSS-Gen for Radiated Emissions (Enclosure Port).

The test results are shown below.

Configuration 1 - Mode 1



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
158.412	31.0	35.5	43.5	150	-12.5	114.5	140	1.00	Vertical
187.212	28.1	25.4	43.5	150	-15.4	124.6	174	1.00	Vertical
201.609	30.9	35.1	43.5	150	-12.6	114.9	219	1.70	Horizontal
460.539	29.0	28.2	46.0	200	-17.0	171.8	34	1.00	Vertical
531.297	30.5	33.5	46.0	200	-15.5	166.5	360	1.00	Horizontal
995.232	36.3	65.3	54.0	501	-17.7	435.7	0	1.00	Horizontal

1GHz to 6GHz

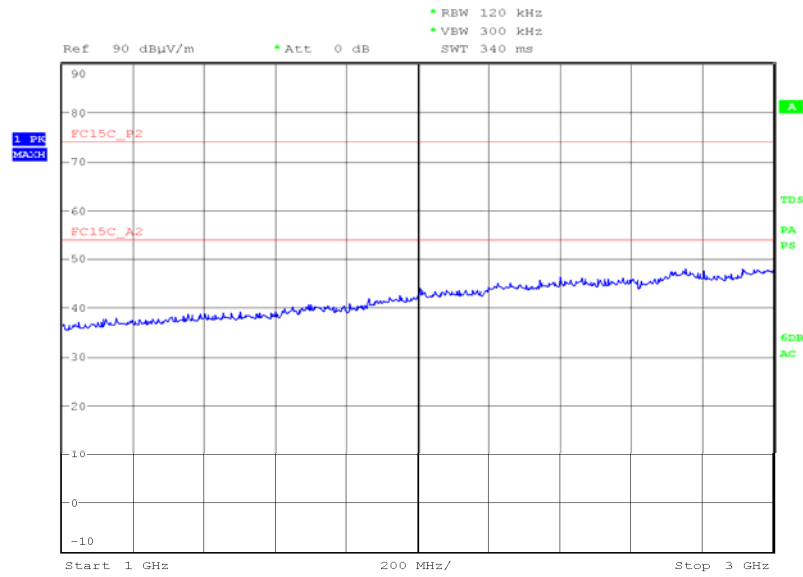
No emissions were detected within 23dB of the Peak limit and 3dB of the average limit.



Product Service

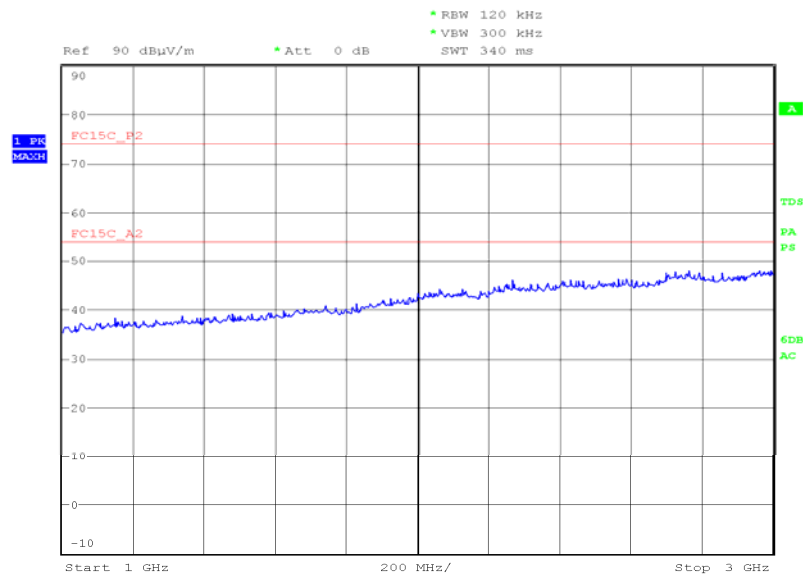
1GHz to 3GHz

Vertical



Date: 24.DEC.2009 04:20:39

Horizontal



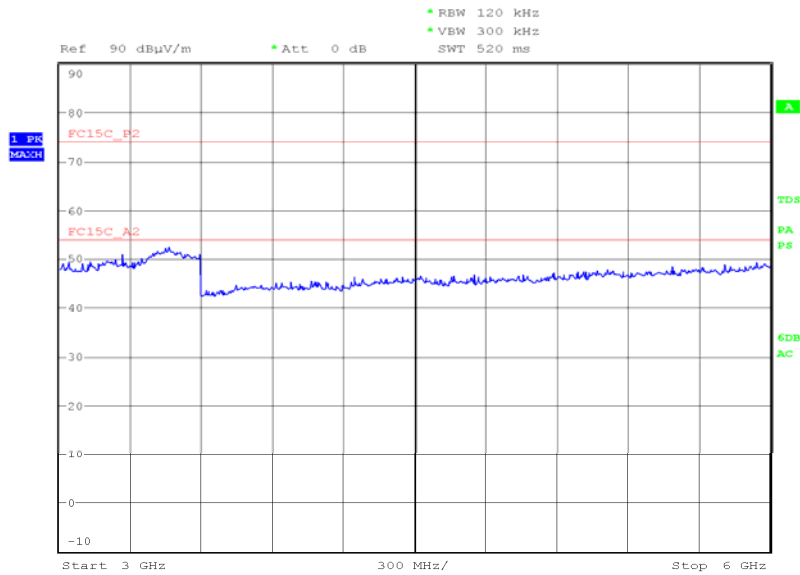
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Product Service

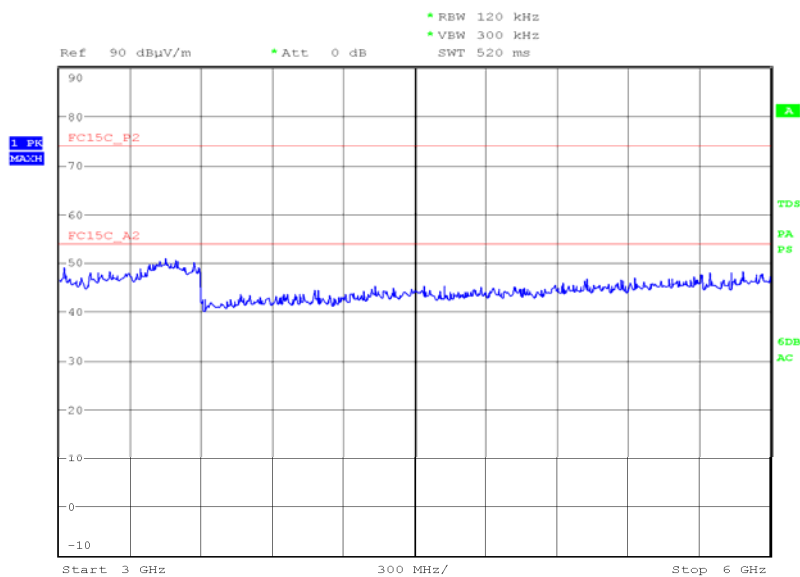
3GHz to 6GHz

Vertical



Date: 24.DEC.2009 04:14:21

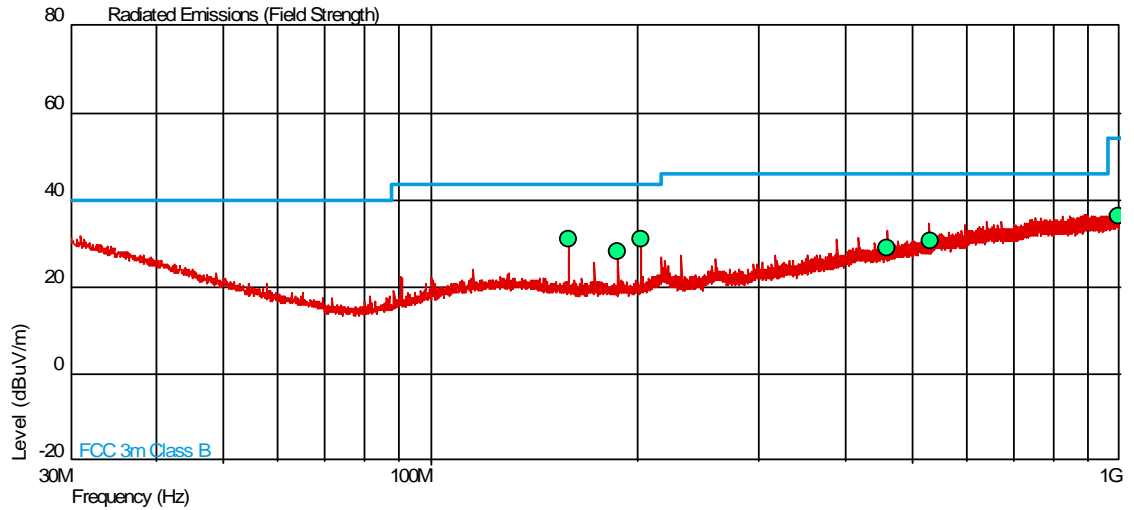
Horizontal



Date: 24.DEC.2009 04:00:47



Configuration 1 - Mode 2



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
158.412	31.0	35.5	43.5	150	-12.5	114.5	140	1.00	Vertical
187.212	28.1	25.4	43.5	150	-15.4	124.6	174	1.00	Vertical
201.609	30.9	35.1	43.5	150	-12.6	114.9	219	1.70	Horizontal
460.539	29.0	28.2	46.0	200	-17.0	171.8	34	1.00	Vertical
531.297	30.5	33.5	46.0	200	-15.5	166.5	360	1.00	Horizontal
995.232	36.3	65.3	54.0	501	-17.7	435.7	0	1.00	Horizontal

1GHz to 6GHz

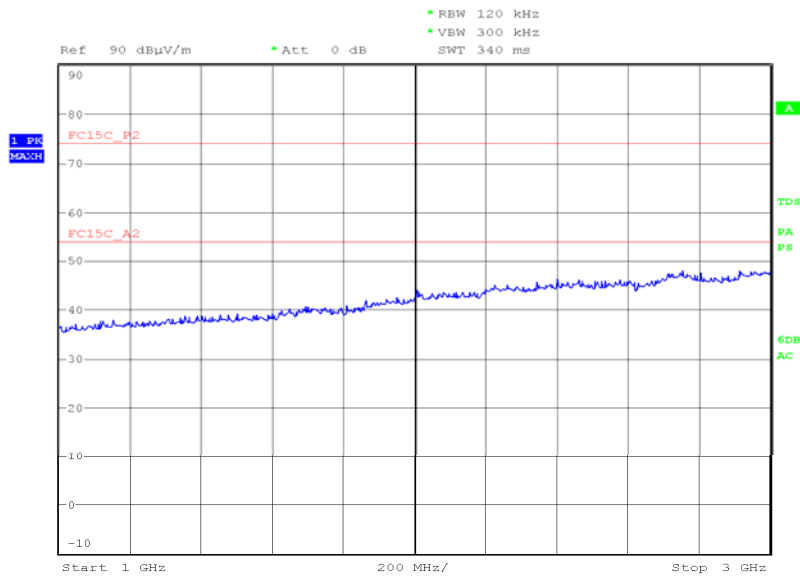
No emissions were detected within 23dB of the Peak limit and 3dB of the average limit.



Product Service

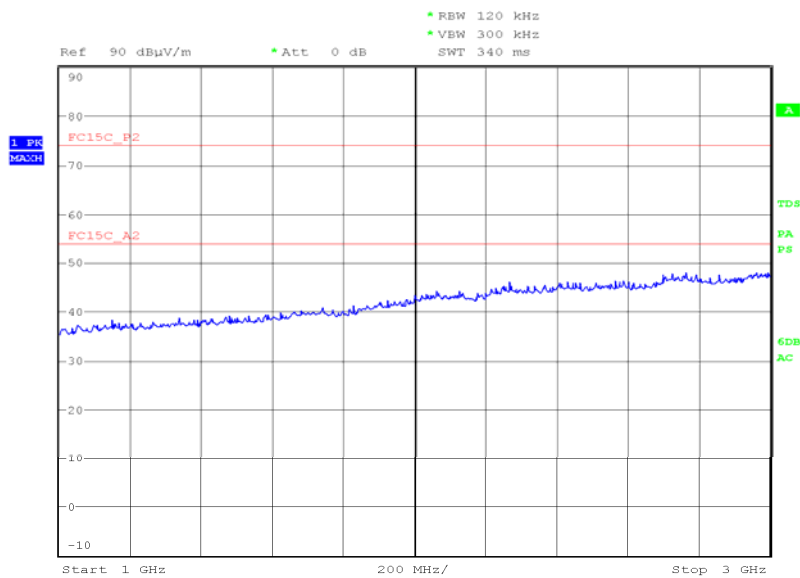
1GHz to 3GHz

Vertical



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Horizontal



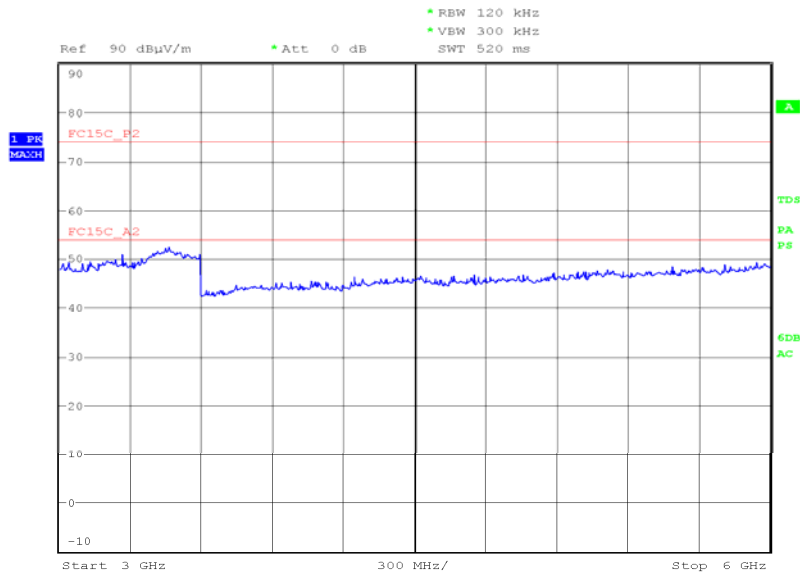
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Product Service

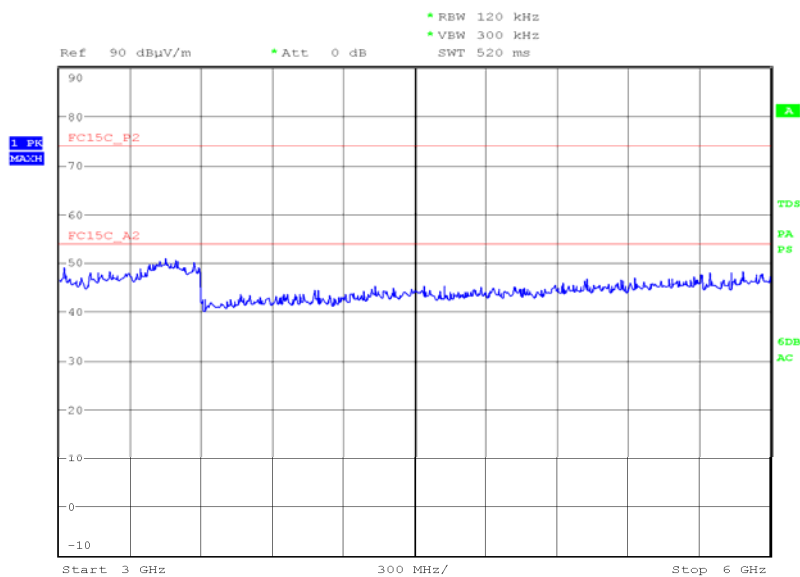
3GHz to 6GHz

Vertical



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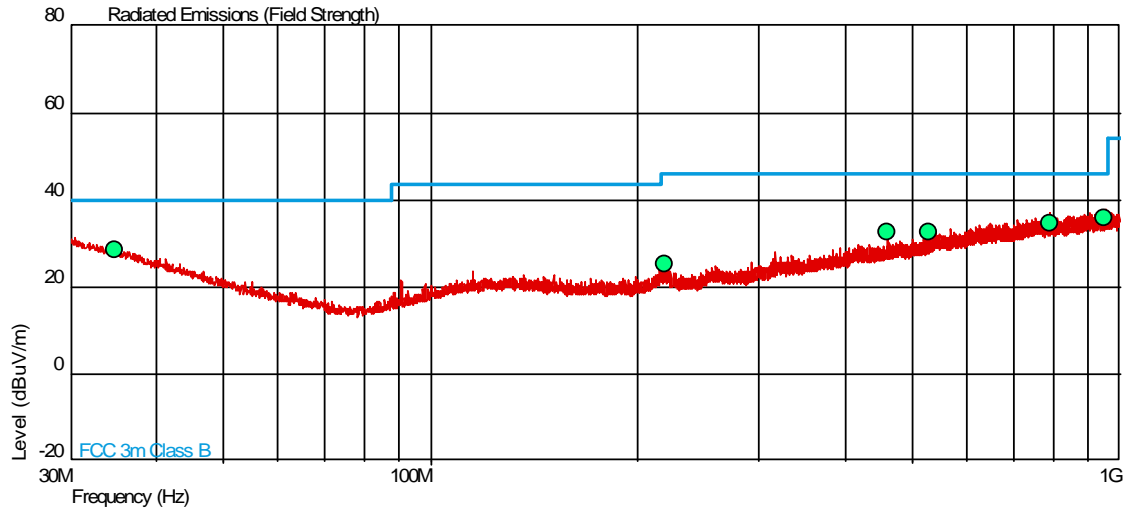
Horizontal



Date: 24.DEC.2009 04:00:47



Configuration 2 - Mode 1



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
34.803	28.4	26.3	40.0	100	-11.6	73.7	0	1.00	Horizontal
219.011	25.2	18.2	46.0	200	-20.8	181.8	110	1.00	Vertical
460.646	32.7	43.2	46.0	200	-13.3	156.8	21	1.00	Vertical
529.259	32.5	42.2	46.0	200	-13.5	157.8	66	1.00	Horizontal
791.079	34.6	53.7	46.0	200	-11.4	146.3	0	1.00	Horizontal
950.356	35.8	61.7	46.0	200	-10.2	138.3	0	1.00	Vertical

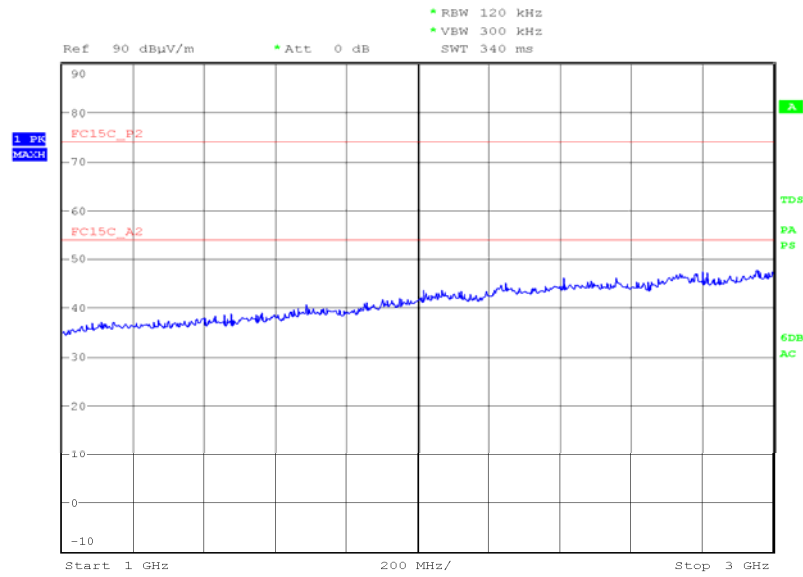
1GHz to 6GHz

No emissions were detected within 23dB of the Peak limit and 3dB of the average limit.



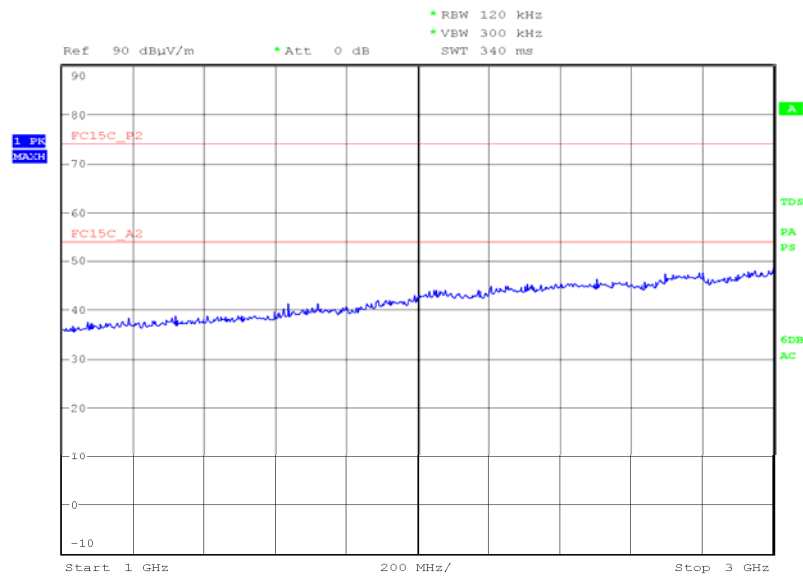
1GHz to 3GHz

Vertical



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Horizontal



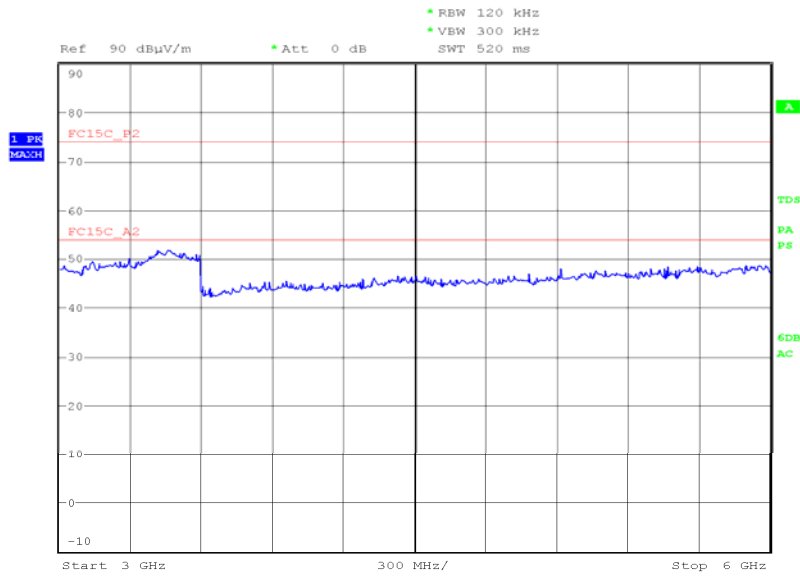
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Product Service

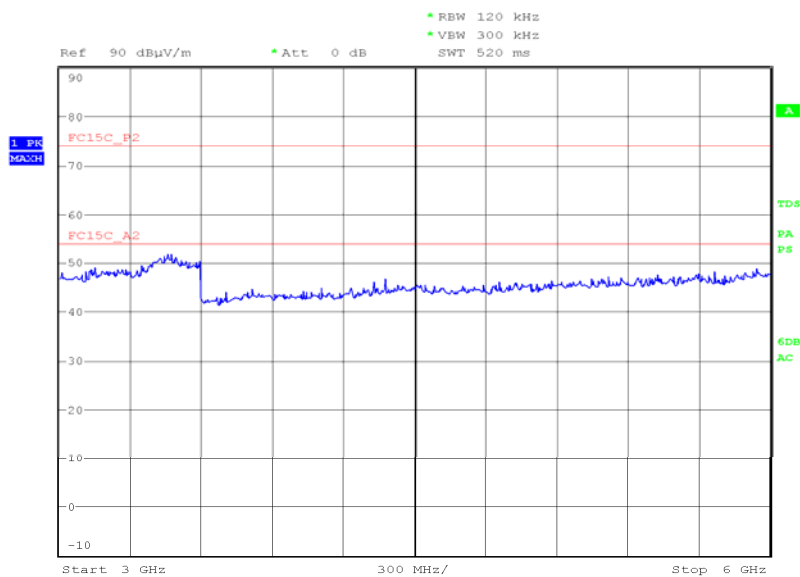
3GHz to 6GHz

Vertical



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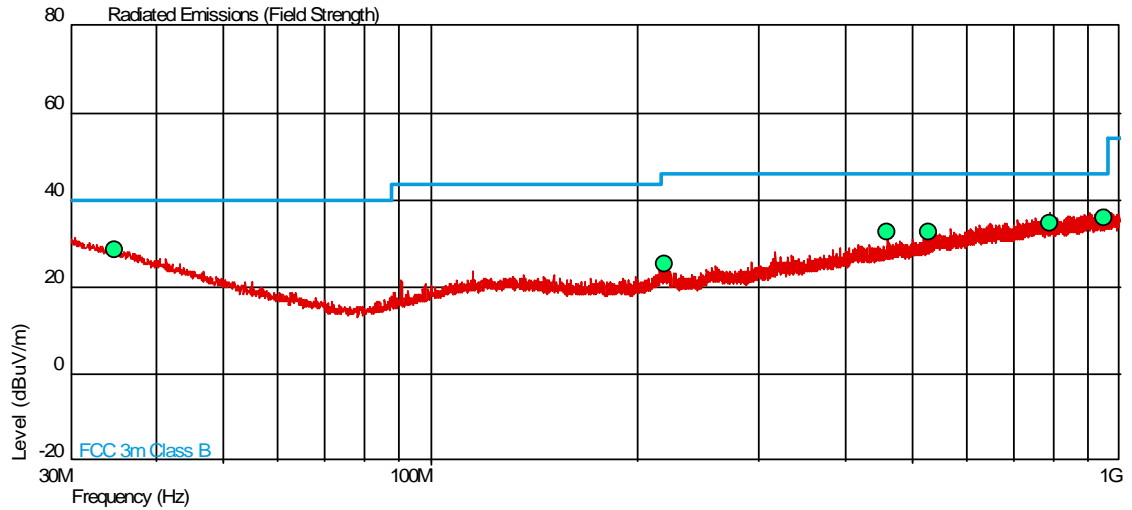
Horizontal



Date: 24.DEC.2009 02:48:47



Configuration 2 - Mode 2



Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (Deg)	Height (m)	Polarity
34.803	28.4	26.3	40.0	100	-11.6	73.7	0	1.00	Horizontal
219.011	25.2	18.2	46.0	200	-20.8	181.8	110	1.00	Vertical
460.646	32.7	43.2	46.0	200	-13.3	156.8	21	1.00	Vertical
529.259	32.5	42.2	46.0	200	-13.5	157.8	66	1.00	Horizontal
791.079	34.6	53.7	46.0	200	-11.4	146.3	0	1.00	Horizontal
950.356	35.8	61.7	46.0	200	-10.2	138.3	0	1.00	Vertical

1GHz to 6GHz

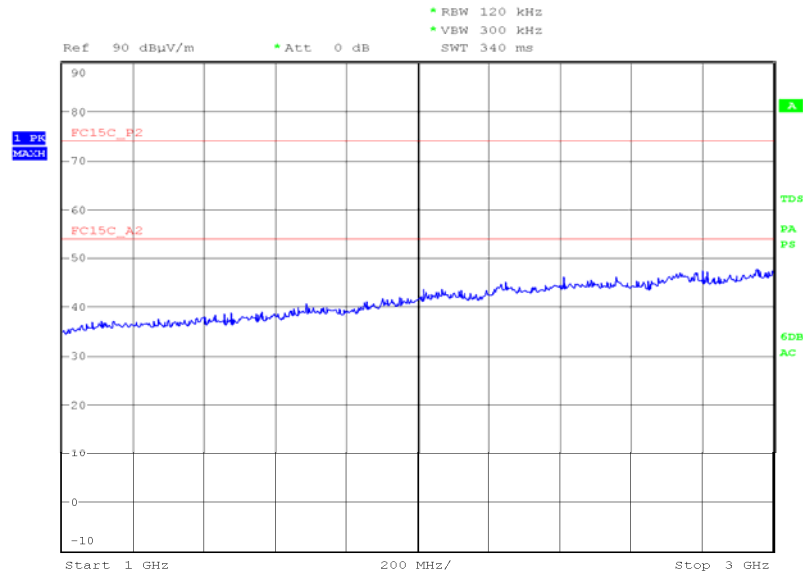
No emissions were detected within 23dB of the Peak limit and 3dB of the average limit.



Product Service

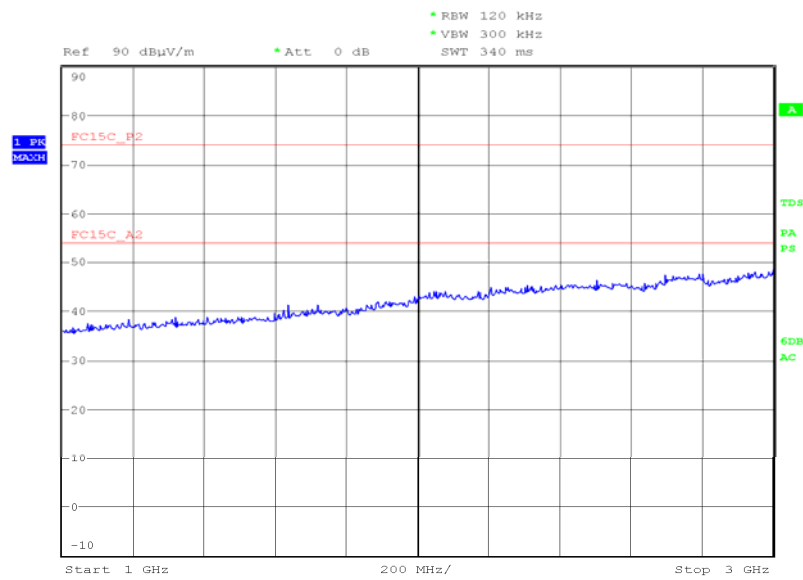
1GHz to 3GHz

Vertical



Date: 24.DEC.2009 02:37:31

Horizontal



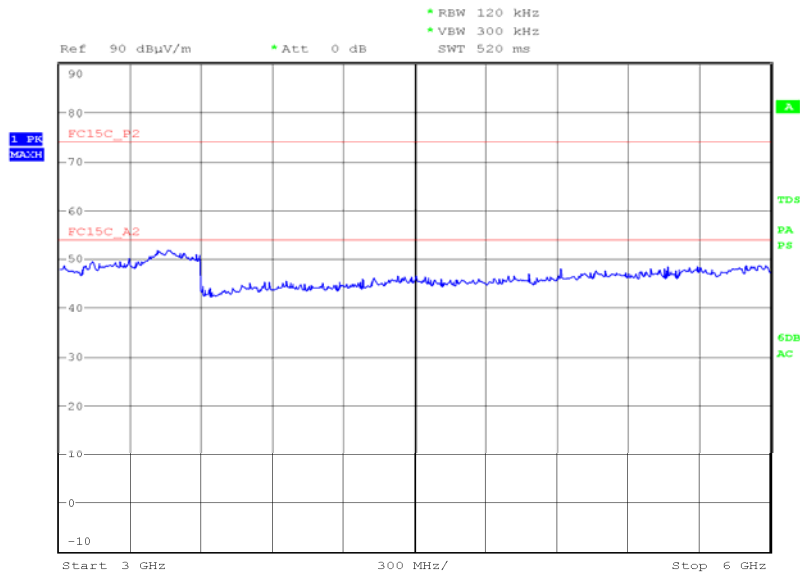
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Product Service

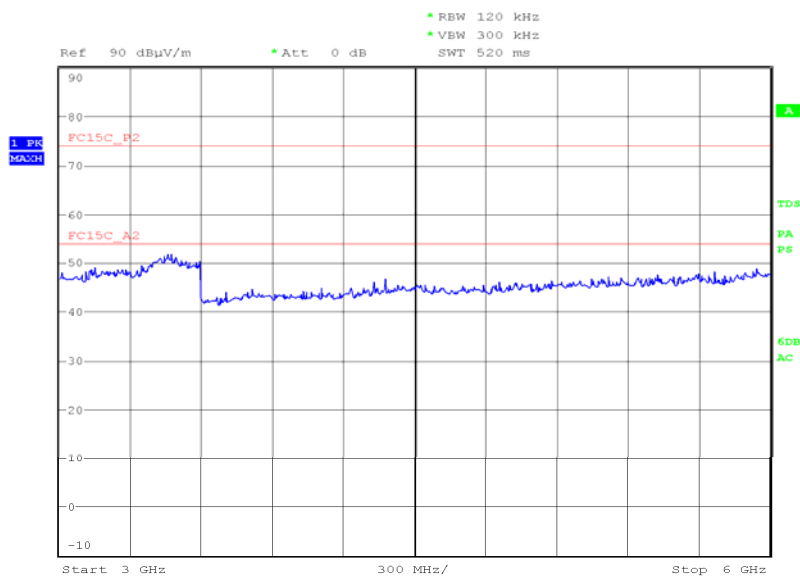
3GHz to 6GHz

Vertical



Date: 24.DEC.2009 02:46:58

Horizontal



Date: 24.DEC.2009 02:48:47



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SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

List of absolute measuring and other principal items of test equipment.

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.1 EMC - Radiated Emissions					
Load	Diamond Antenna	DL-30N	218	12	22-Jun-2010
Antenna (Double Ridge Guide, 1GHz-18GHz)	EMCO	3115	235	12	12-Oct-2010
Antenna (Bilog)	Schaffner	CBL6143	287	24	21-Jan-2010
Pre-Amplifier	Phase One	PS04-0085	1532	12	16-Sep-2010
Pre-Amplifier	Phase One	PS04-0086	1533	12	17-Sep-2010
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Turntable/Mast Controller	EMCO	2090	1610	-	TU
4GHz HPF	Sematron	F-100-4000-5-R	2245	-	TU
Cable (2m, SMA(m) - SMA(m))	Reynolds	262-0248-2000	2401	12	TU
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	1-Sep-2010
Turntable	EMCO	1060-04	3693	-	TU

TU – Traceability Unscheduled



3.2 MEASUREMENT UNCERTAINTY

For a 95% confidence level, the measurement uncertainties for defined systems are:-

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Bilog Antenna, AOATS	30MHz to 1GHz Amplitude	5.1dB*
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Discontinuous Interference	150kHz to 30MHz Amplitude	3.0dB*
Interference Power	30MHz to 300MHz Amplitude	3.0dB*
Radiated E-Field Susceptibility	10MHz to 6GHz Test Amplitude	2.0dB†
Conducted Susceptibility RF	50kHz to 1000MHz Amplitude	3.1dB•
	EM Clamp Method of Test	1.2dB•
	CDN Method of Test	1.1dB•
	BCI Clamp Method of Test	1.2dB•
Conducted Susceptibility LF	DC to 150kHz	1.0%†
Power Frequency Magnetic Field	50Hz/60Hz Amplitude	0.45%
Magnetic Emissions	9kHz to 30MHz Amplitude	3.4dB*
Magnetic Field/Flux iaw EN 50366	10Hz to 400kHz	2.64%
Harmonics and Flicker	The test was applied using proprietary equipment that meets the requirements of EN 61000-3-2 and EN 61000-3-3	—
Mains Voltage Variations and Interrupts	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-11	—
Fast Transient Burst	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-4	—
Electrostatic Discharge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2	—
Surge	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-5	—
Vehicle Transients	The test was applied using proprietary equipment that meets the requirements of ISO 7637-1 and 2	—
Compass Safe Distance	Azimuth Accuracy	0.10°

Worst case error for both Time and Frequency measurement 12 parts in 10^6 .

* In accordance with CISPR 16-4-2

† In accordance with UKAS Lab 34

• In accordance with EN61000-4-6



Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

4.1 ACCREDITATION, DISCLAIMERS AND COPYRIGHT



This report relates only to the actual item/items tested.

Our UKAS Accreditation does not cover opinions and interpretations and any expressed are outside the scope of our UKAS Accreditation.

Results of tests not covered by our UKAS Accreditation Schedule are marked NUA
(Not UKAS Accredited).

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