



Product Service

**Choose certainty.
Add value.**

Report On

FCC Testing of the
Pace Plc
16x4 Hybrid Gateway Cable Set Top Box

COMMERCIAL-IN-CONFIDENCE

Document 75926325 Report 01 Issue 1

April 2014



Product Service

TÜV SÜD Product Service, Octagon House, Concorde Way, Segensworth North,
Fareham, Hampshire, United Kingdom, PO15 5RL
Tel: +44 (0) 1489 558100. Website: www.tuv-sud.co.uk

COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC Testing of the
Pace Plc
16x4 Hybrid Gateway Cable Set Top Box

Document 75926325 Report 01 Issue 1

April 2014

PREPARED FOR

Pace Plc
Victoria Road
Saltaire
Shipley
West Yorkshire
United Kingdom
BD18 3LF

PREPARED BY

Jo-Anne Hindmarsh
Project Administrator

APPROVED BY

David West
Authorised Signatory

DATED

22 April 2014

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. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineer(s);

Thomas Genders

Gary Steele



**CONTENTS**

Section	Page No
1	REPORT SUMMARY 3
1.1	Introduction 4
1.2	Brief Summary of Results 5
1.3	Declaration of Build Status 6
1.4	Product Information 7
1.5	Test Conditions 10
1.6	Deviations From the Standard 10
1.7	Modification Record 10
2	TEST DETAILS 11
2.1	Conducted Emissions (AC Power Port) 12
2.2	Radiated Emissions (Enclosure Port) 15
3	TEST EQUIPMENT USED 21
3.1	Test Equipment Used 22
3.2	Measurement Uncertainty 23
4	PHOTOGRAPHS 24
4.1	Test Set Up Photographs 25
5	ACCREDITATION, DISCLAIMERS AND COPYRIGHT 26
5.1	Accreditation, Disclaimers and Copyright 27



Product Service

SECTION 1

REPORT SUMMARY

FCC Testing of the
Pace Plc
16x4 Hybrid Gateway Cable Set Top Box



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Pace Plc, 16x4 Hybrid Gateway Cable Set Top Box to the requirements of FCC CFR 47 Part 15B.

Objective	To perform FCC Testing to determine the Equipment Under Test's (EUT's) compliance with the Test Specification, for the series of tests carried out.
Manufacturer	Pace Plc
Model Number(s)	PX013ANM
Serial Number(s)	D2201403001
Software Version	E118 1_48
Hardware Version	0.323 (1.323.4.84)
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15B: 2012
Test Plan/Issue/Date	Not Applicable
Incoming Release Date	Declaration of Build Status 14 April 2014
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	5169222 28 March 2014
Start of Test	31 March 2014
Finish of Test	31 March 2014
Name of Engineer(s)	T Genders G Steele
Related Document(s)	ANSI C63.4: 2009



Product Service

1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results in accordance with FCC CFR 47 Part 15B is shown below.

Configuration 1 - Normal						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.107	Conducted Emissions (AC Power Port)	Normal	0	Pass	ANSI 63.4
2.2	15.109	Radiated Emissions (Enclosure Port)	Normal	0	Pass	ANSI 63.4

N/A – Not Applicable; N/R – Not Requested; N/T – Not Tested



Product Service

1.3 DECLARATION OF BUILD STATUS

Manufacturer Calcomp Electronics (Thailand)

Country of Origin Thailand

UK Agent Pace Plc

Description 16x4 Hybrid Gateway Cable Set Top Box

Model Number PX013ANM

Declared Variants PX013ANC

Part Number E1183415000

Serial Number D22014030001

Drawing Number PD12-2126A2A

Build Status Design Verification (DV)

Software Issue E118 1_48

Firmware Issue 0.323 (1.323.4.84)

Highest Frequency 933MHz DDR - 1.5GHz Burst SATA main PCB / 2.4GHz Zigbee Front Panel
(Generated or used within EUT [FCC testing only])

Signature
Representatives of
Customer

A handwritten signature in black ink, appearing to read 'J. Ryan', written over a horizontal line.

Date

14th April 2014

BSD Serial Number

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 SÜD Product Service as to the accuracy of the information declared in this document by the manufacturer.



Product Service

1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Pace Plc, 16x4 Hybrid Gateway Cable Set Top Box as shown in the photograph below. A full technical description can be found in the manufacturer's documentation.

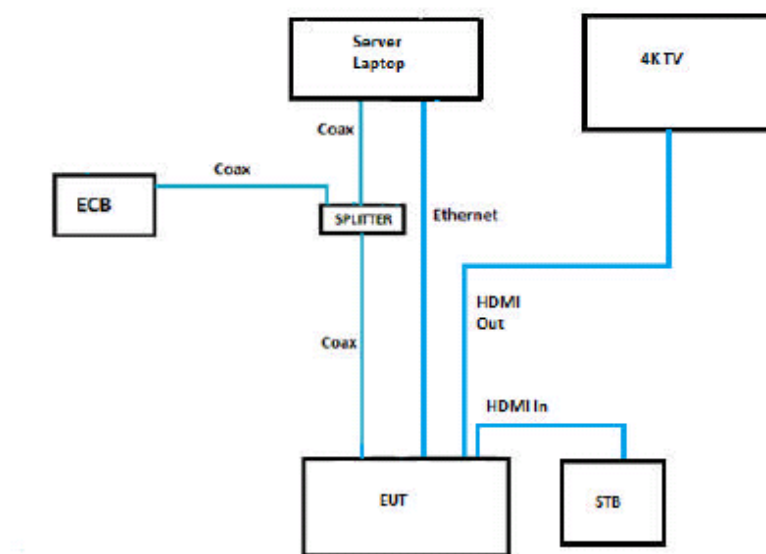


Equipment Under Test



1.4.2 Test Configuration

The EUT was set up and powered via 110V AC supply. The EUT was decoding a QAM test stream fed from a server laptop with AV displayed via an HDMI cable to a TV located outside the screened room. A MOCA connection was established via a co-axial link to an Ethernet to Coaxial bridge located outside of the screened room. The Ethernet was pinged from a laptop located outside the screened room. The HDMI input was connected to a set top box playing an AV file from an internal storage device.



Configuration 1: Normal

The EUT was configured in accordance with FCC CFR 47 Part 15B.

1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
Power	2m	Mains Lead	2 core	No
Cable In	10m	QAM stream + MoCA	75 Ohm Co-axial	Yes
Cable Out	1m	RF	75 Ohm Co-axial	Yes
Signal	10m	Ethernet	CAT5e	Yes
SD Video out	2m	SD Video	75 Ohm Co-axial	Yes
Left/Right Audio Out	2m	Analogue Audio	75 Ohm Co-axial	Yes
Signal	10m	HDMI Out	HDMI AV 3840 x 2160p	Yes
Signal	2m	HDMI In	HDMI 1920 x 1080	Yes
Signal	N/A	USB	USB pen drive	Yes
eSATA	1m	Not functional	SATA	Yes



Product Service

1.4.4 Modes of Operation

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

Mode 1 - Normal

Information on the specific test modes utilised are detailed in the test procedure for each individual test.



Product Service

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 110Vac supply.

FCC Accreditation
667968 Bearley, 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.



Product Service

SECTION 2

TEST DETAILS

FCC Testing of the
Pace Plc
16x4 Hybrid Gateway Cable Set Top Box



Product Service

2.1 CONDUCTED EMISSIONS (AC POWER PORT)**2.1.1 Specification Reference**

FCC CFR 47 Part 15B

2.1.2 Equipment Under Test

16x4 Hybrid Gateway Cable Set Top Box, S/N: D2201403001

2.1.3 Date of Test and Modification State

31 March 2014 - 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

2.1.6 Environmental Conditions

31 March 2014

Ambient Temperature 19.0°C

Relative Humidity 53%

Atmospheric Pressure 1013mbar



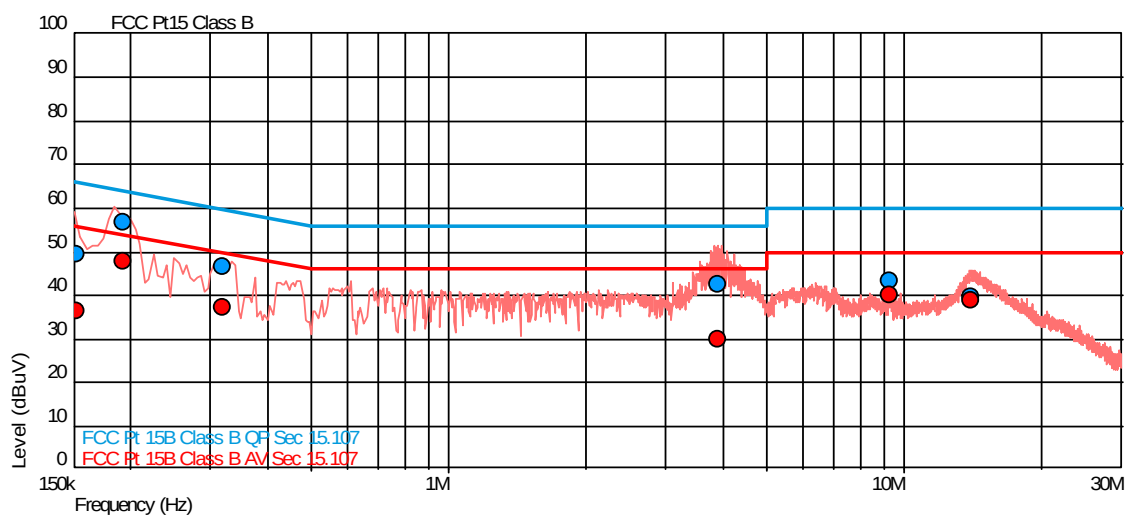
2.1.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15B for Conducted Emissions (AC Power Port).

The test results are shown below.

Configuration 1 - Mode 1

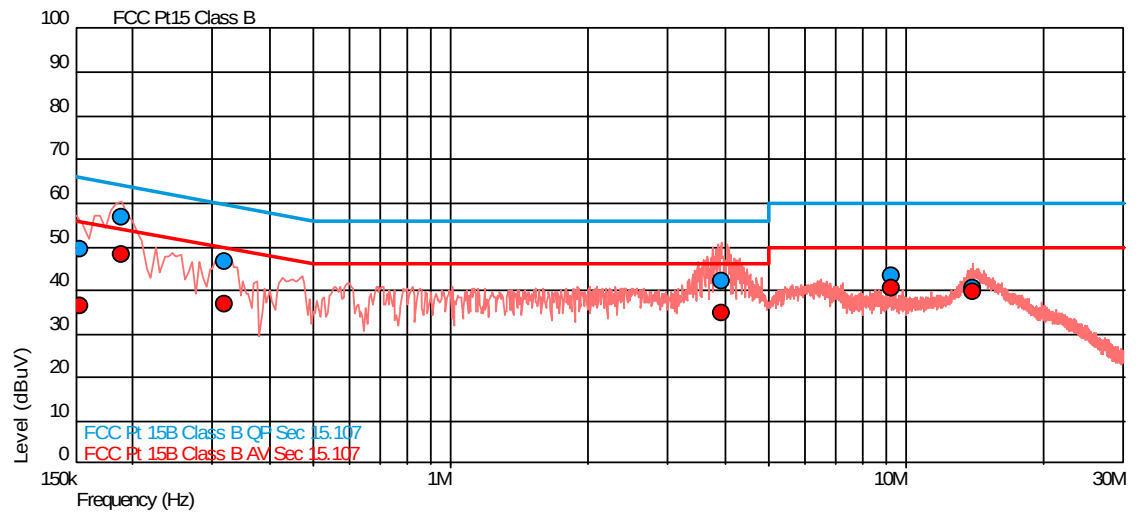
Live Line



Frequency (MHz)	QP Level (dBUV)	QP Limit (dBUV)	QP Margin (dBUV)	AV Level (dBUV)	AV Limit (dBUV)	AV Margin (dBUV)
0.152	49.3	65.9	-16.5	36.6	55.9	-19.3
0.194	56.8	63.9	-7.1	47.7	53.9	-6.1
0.317	46.7	59.8	-13.1	37.0	49.8	-12.8
3.899	42.4	56.0	-13.6	29.7	46.0	-16.3
9.301	43.1	60.0	-16.9	39.9	50.0	-10.1
14.010	39.5	60.0	-20.5	38.9	50.0	-11.1



Neutral Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.154	49.6	65.8	-16.2	36.2	55.8	-19.6
0.189	56.9	64.1	-7.2	48.0	54.1	-6.1
0.317	46.5	59.8	-13.3	36.9	49.8	-12.8
3.916	42.0	56.0	-14.0	34.9	46.0	-11.1
9.300	43.4	60.0	-16.6	40.4	50.0	-9.6
13.951	40.5	60.0	-19.5	39.5	50.0	-10.5



Product Service

2.2 RADIATED EMISSIONS (ENCLOSURE PORT)

2.2.1 Specification Reference

FCC CFR 47 Part 15B

2.2.2 Equipment Under Test

16x4 Hybrid Gateway Cable Set Top Box, S/N: D2201403001

2.2.3 Date of Test and Modification State

31 March 2014 - Modification State 0

2.2.4 Test Equipment Used

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

2.2.5 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

2.2.6 Environmental Conditions

31 March 2014

Ambient Temperature 18.5 to 19.4°C

Relative Humidity 51 to 54%

Atmospheric Pressure 1013mbar

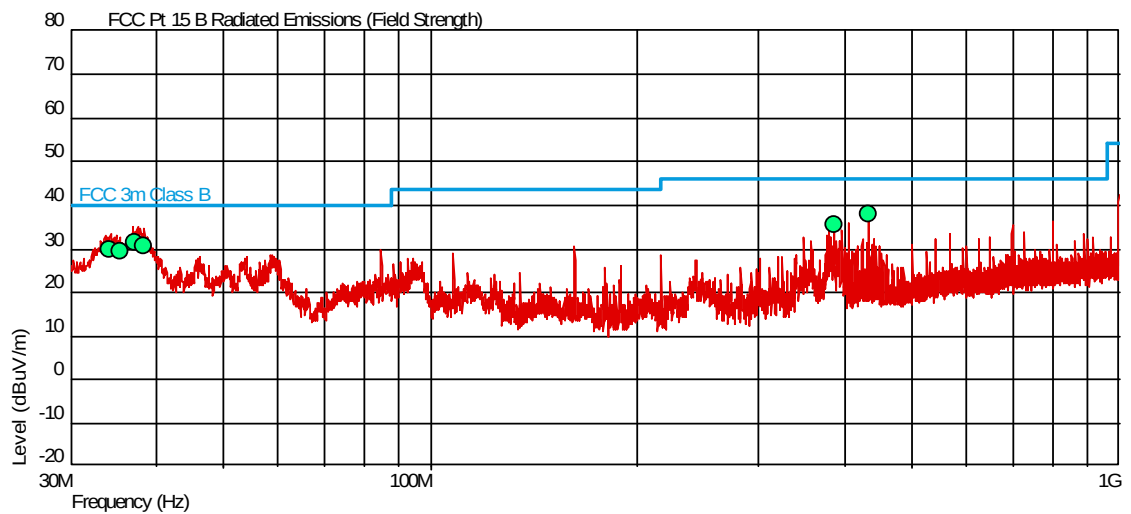


2.2.7 Test Results

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

The test results are shown below.

Configuration 1 - Mode 1

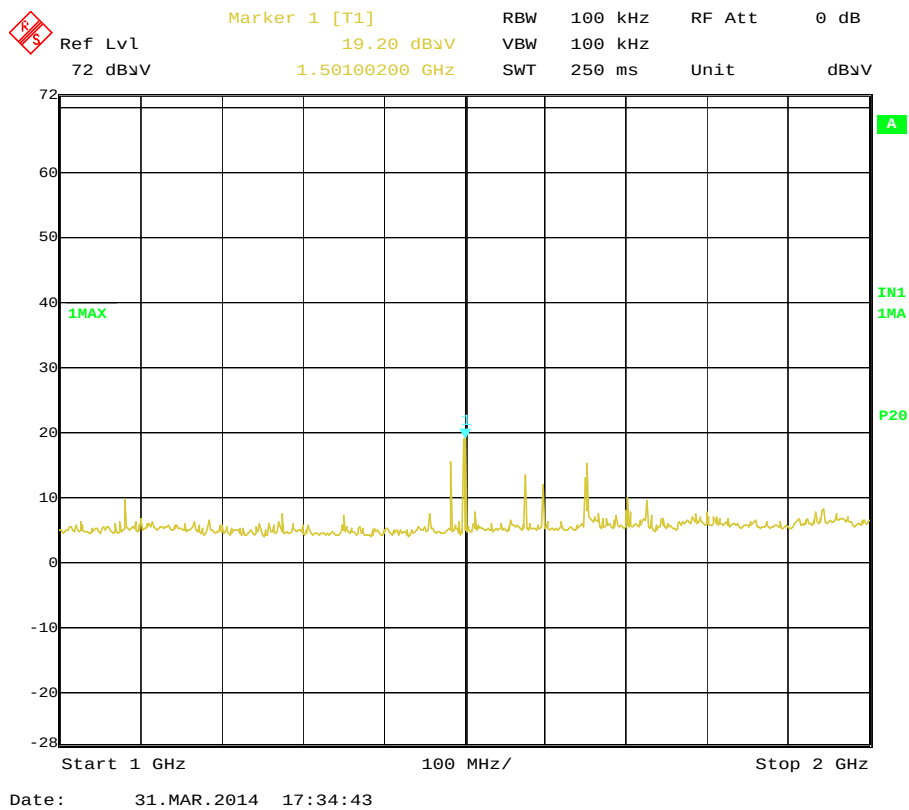


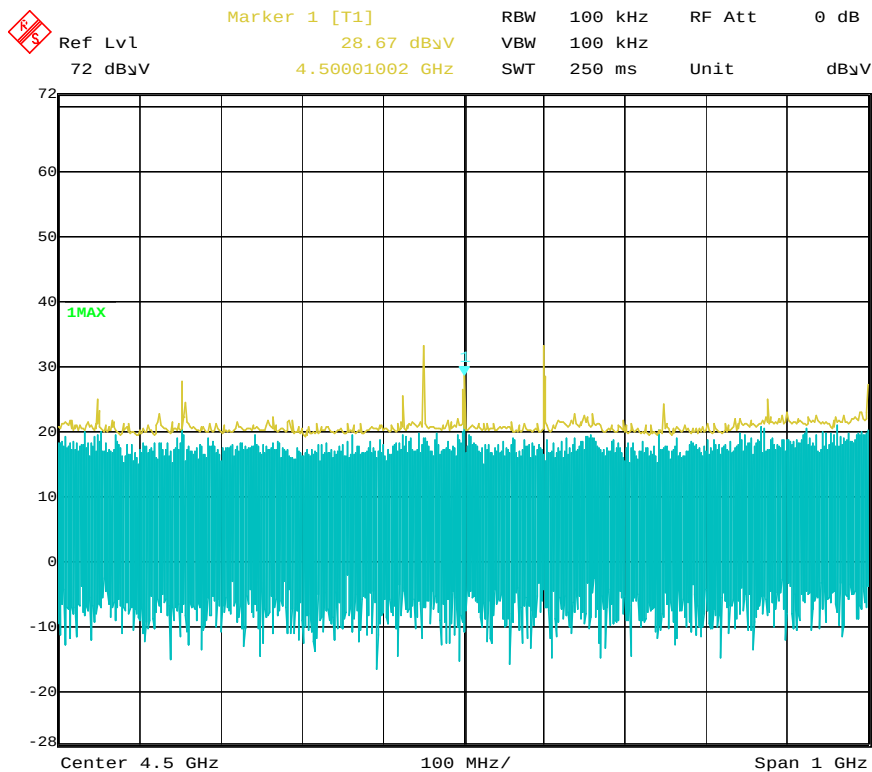
Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	Angle(Deg)	Height(m)	Polarity
34.236	29.6	40.0	-10.4	0.00	1.00	Vertical
35.453	29.6	40.0	-10.4	0.00	1.00	Vertical
37.083	31.5	40.0	-8.5	0.00	1.00	Vertical
38.311	30.4	40.0	-9.6	0.00	1.00	Vertical
385.093	35.6	46.0	-10.4	0.00	1.00	Horizontal
431.996	37.8	46.0	-8.2	0.00	1.00	Horizontal



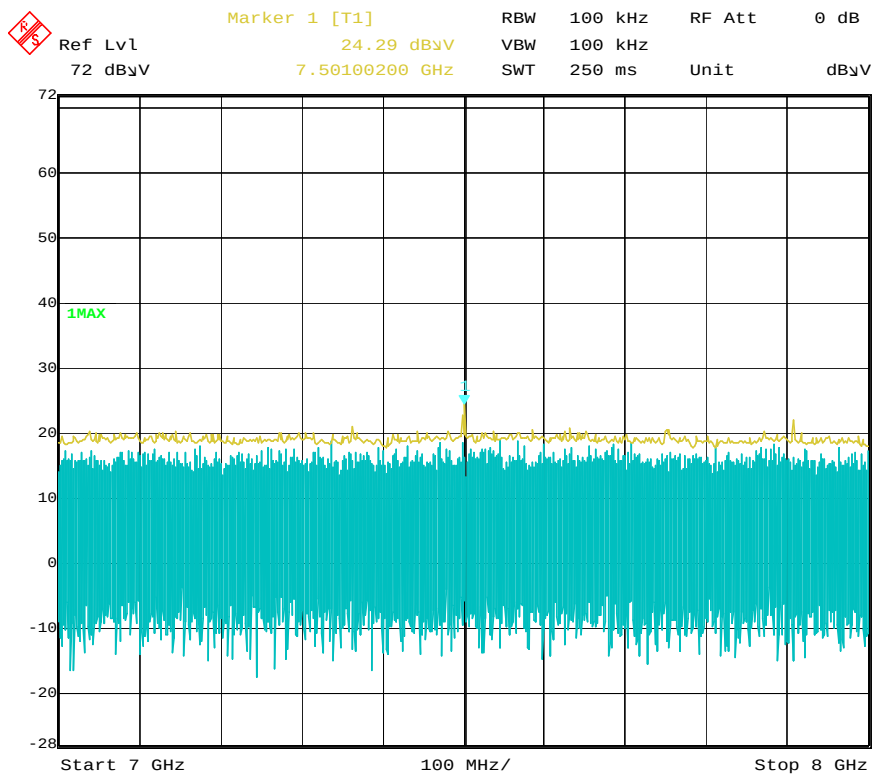
Table of Results for 1 – 15GHz

Freq. GHz	Ant Pol V/H	Ant Hgt Cm	EUT Arc Deg	Result Peak dBμV/m	Result Average dBμV/m	Peak Limit dBμV/m	Average Limit dBμV/m	Result
1.483	V	100	0	54.9	41.05	74	54	Pass
1.499	V	100	0	55.05	50	74	54	Pass
1.597	V	100	200	51.33	36.85	74	54	Pass
1.779	V	100	180	53.31	35.88	74	54	Pass
4.500	V	100	0	45.41	30.96	74	54	Pass
4.449	V	100	0	45.31	30.77	74	54	Pass

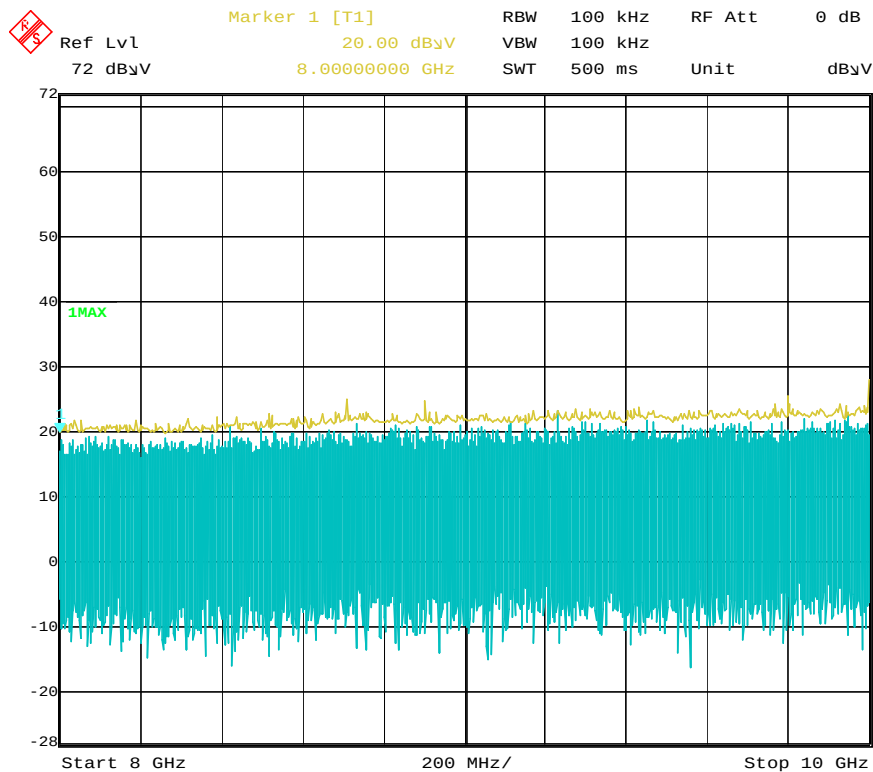
1 – 2 GHz

2 – 7 GHz

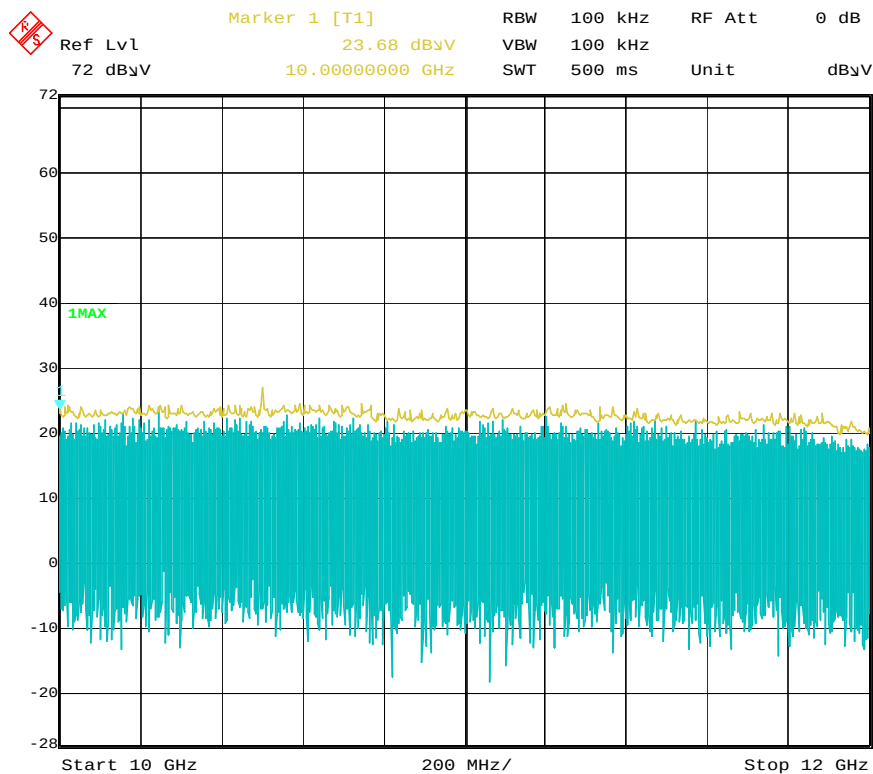
Date: 31.MAR.2014 17:57:29

7 – 8 GHz

Date: 31.MAR.2014 18:06:27

8 – 10 GHz

Date: 31.MAR.2014 18:21:19

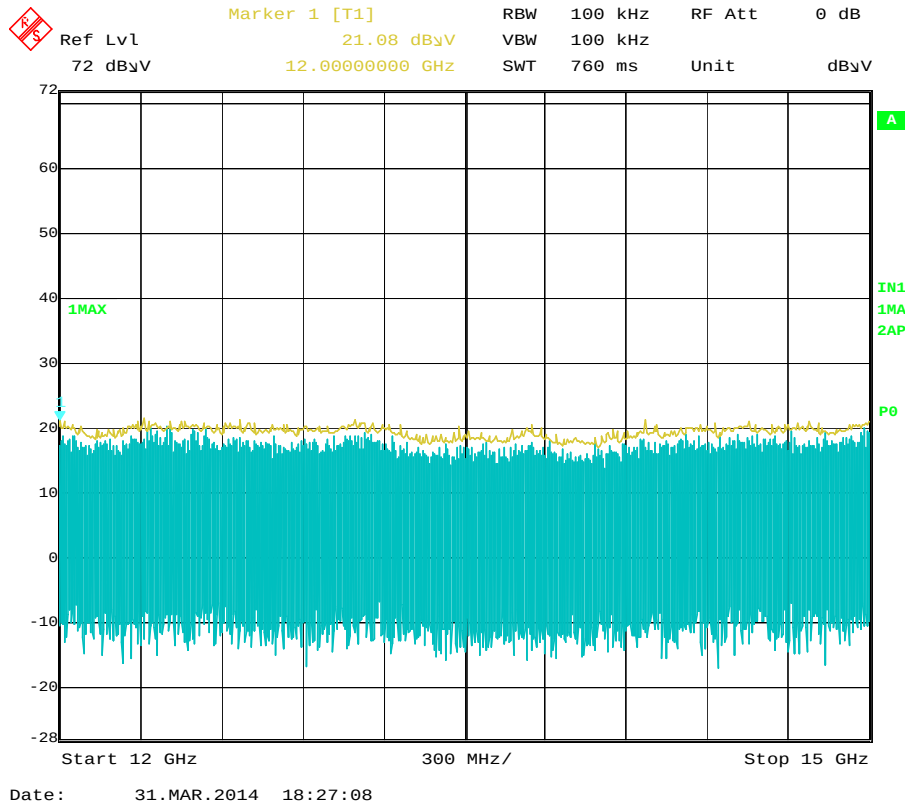
10 – 12 GHz

Date: 31.MAR.2014 18:24:29



Product Service

12 – 15 GHz





Product Service

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 - Conducted Emissions					
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	376	12	29-Apr-2014
Single Phase LISN	Rohde & Schwarz	ESH3-Z5	1674	12	25-Sep-2014
LISN	Rohde & Schwarz	ESH3-Z5	1820	12	14-Nov-2014
EMI Test Receiver	Rohde & Schwarz	ESIB26	2028	12	28-Nov-2014
Section 2.2 EMC - Radiated Emissions					
Turntable Controller	Various	RH253	1708	-	TU
Antenna (Double Ridge Guide)	EMCO	3115	1711	12	13-Dec-2014
Bilog Antenna	Schaffner	CBL6143	1858	24	5-Sep-2014
EMI Test Receiver	Rohde & Schwarz	ESIB26	2028	12	28-Nov-2014

TU – Traceability Unscheduled

OP MON – Output Monitored with Calibrated Equipment



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	5.2dB*
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 EN 61000-4-6: 2009

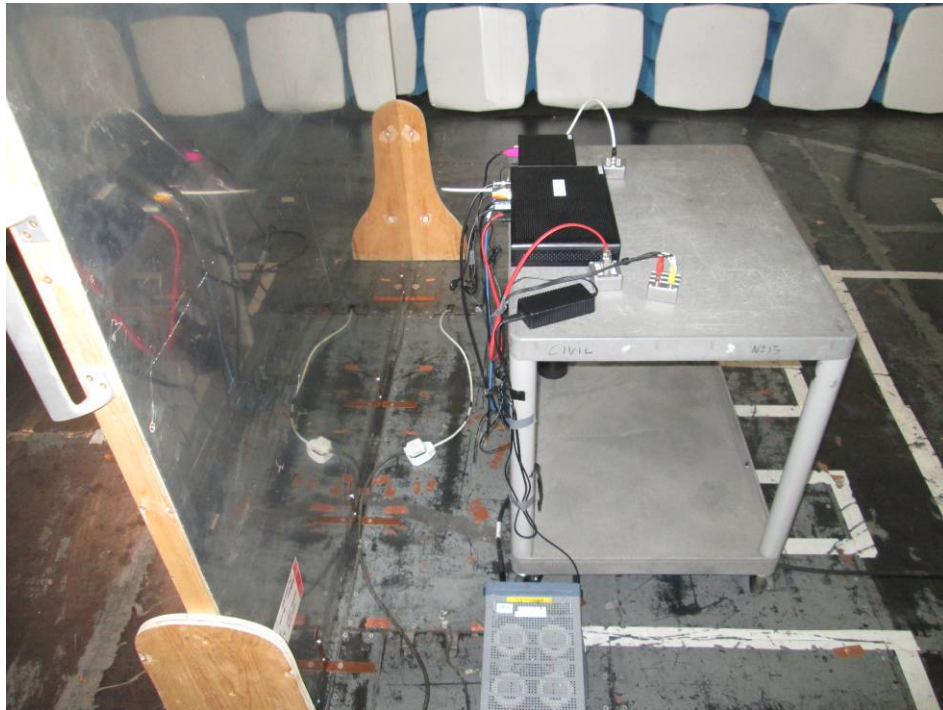


Product Service

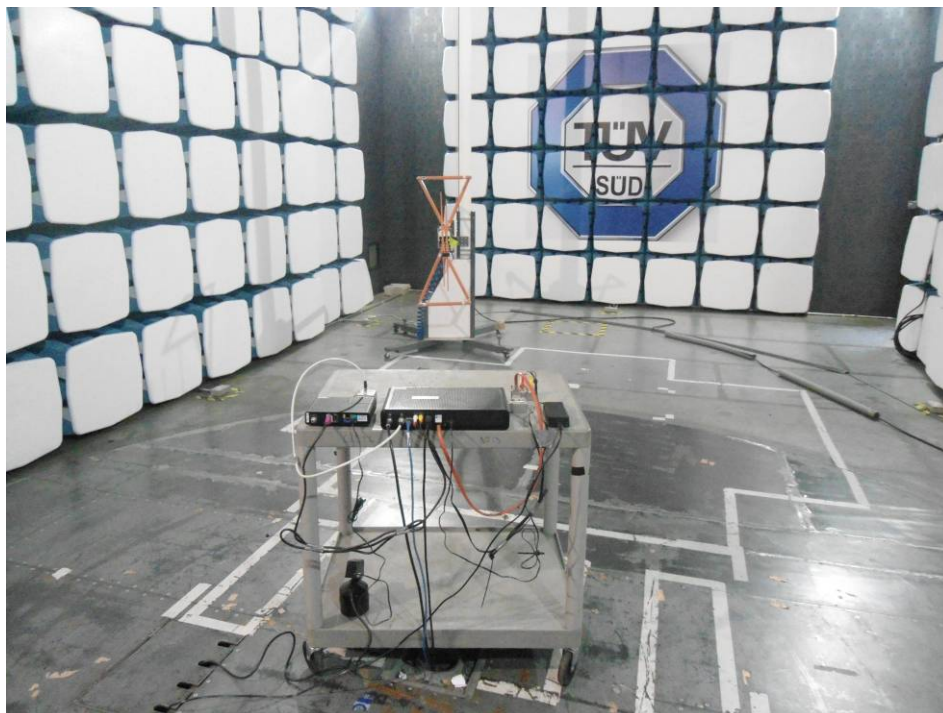
SECTION 4

PHOTOGRAPHS

4.1 TEST SET UP PHOTOGRAPHS



Conducted Emissions (AC Power Port)



Radiated Emissions (Enclosure Port)



Product Service

SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



Product Service

5.1 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).

This report must not be reproduced, except in its entirety, without the written permission of
TÜV SÜD Product Service

© 2014 TÜV SÜD Product Service