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Report On

FCC Testing of the
Frontier Silicon Ltd Venice 8 FS2028 Radio Module
In accordance with FCC Part 15.207

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FCC ID: YYX-HA-FS2028-F

Document 75910757 Report 04 Issue 1

January 2011



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PREPARED FOR

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PREPARED BY


N Bennett
Senior Administrator

APPROVED BY


K Archer
Authorised Signatory

DATED

19 January 2011

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

Test Engineer(s);


G Lawler





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SECTION 1

REPORT SUMMARY

FCC Testing of the
Frontier Silicon Ltd Venice 8 FS2028 Radio Module
In accordance with FCC Part 15.207



1.1 INTRODUCTION

The information contained in this report is intended to show verification of the Frontier Silicon Ltd Venice 8 FS2028 Radio Module to the requirements of FCC CFR 47 Part 15.207.

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	Frontier Silicon Ltd
Model Number(s)	Venice 8 FS2028 Radio Module
Serial Number(s)	RAD100905
Number of Samples Tested	1
Test Specification/Issue/Date	FCC CFR 47 Part 15.207: 2009
Incoming Release Date	Declaration of Build Status 15 November 2010
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	FS081034 20 August 2010
Start of Test	18 January 2011
Finish of Test	18 January 2011
Name of Engineer(s)	G Lawler
Related Document(s)	ANSI C63.4: 2003



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1.2 BRIEF SUMMARY OF RESULTS

A brief summary of results for each configuration, in accordance with FCC CFR 47 Part 15.207 is shown below.

Configuration 1 : Stand Alone AC Power						
Section	Spec Clause	Test Description	Mode	Mod State	Result	Base Standard
2.1	15.207	Conducted Emissions (AC Power Port)	802.11(b) Worst Case Tx	0	Pass	ANSI C63.4
			802.11(g) Worst Case Tx	0	Pass	



1.3 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	Venice 8 FS2028 Radio Module
MANUFACTURER	Frontier Silicon Ltd
TYPE	
PART NUMBER	HA-FS2028-Fxxxxxx (xxxxxx=customer variant)
HARDWARE VERSION	FS0114-5 (Revision 5)
SOFTWARE VERSION	IR3.1 SDK V3.1.3
TRANSMITTER OPERATING RANGE	2.4-2.4835GHz
RECEIVER OPERATING RANGE	2.4-2.4835GHz
COUNTRY OF ORIGIN	China
INTERMEDIATE FREQUENCIES	N/A
EMISSION DESIGNATOR(S): (i.e. G1D, GXW)	22M0D1D
MODULATION TYPES: (i.e. GMSK, QPSK)	802.11b = DSSS , 802.11g = OFDM
HIGHEST INTERNALLY GENERATED FREQUENCY	2.4835GHz
OUTPUT POWER (W or dBm)	15dBm (nominal at antenna port)
FCC ID	YYX-HA-FS2028-F
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	The Venice 8 FS2028 is a radio module supporting Internet radio (WiFi or Ethernet), Audio Streaming (WiFi, Ethernet or USB), iPod/iPhone control and FM-RDS reception when installed in a consumer audio product.
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	Not supplied with module. Has onboard regulator.
MANUFACTURER	
TYPE	
PART NUMBER	
VOLTAGE	
COUNTRY OF ORIGIN	

Signature

Date

15/11/2010

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.



1.4 PRODUCT INFORMATION

1.4.1 Technical Description

The Equipment Under Test (EUT) was a Frontier Silicon Ltd Venice 8 FS2028 Radio Module. A full technical description can be found in the manufacturer's documentation.

1.4.2 Test Configuration

Configuration 1 : Stand Alone AC Power

The EUT was configured in accordance with FCC CFR 47 Part 15.207.

1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
DC Power	<3.0m	Mains Lead	3 core	No
Ethernet	Not applicable	Ethernet Port	Multicore	No

1.4.4 Modes of Operation

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

Mode 1 – 802.11(b) Worst Case Tx

Mode 2 – 802.11(g) Worst Case Tx

For 802.11(b) the worst case was a data rate of 11 Mbps as declared by the customer.

For 802.11(g) the worst case was a data rate of 54 Mbps as declared by the customer.



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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 or test laboratories as appropriate.

The EUT was powered via Frontier Silicon Test Platform FS0117-1 from an AC adapter using a 110V AC supply

FCC Accreditation
90987 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 Testing of the
Frontier Silicon Ltd Venice 8 FS2028 Radio Module
In accordance with FCC Part 15.207



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

FCC CFR 47 Part 15.207, Clause 15.207

2.1.2 Equipment Under Test

Venice 8 FS2028 Radio Module, S/N: RAD100905

2.1.3 Date of Test and Modification State

18 January 2011 - 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 FCC CFR 47 Part 15.

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

Configuration 1 - Mode 1
 - Mode 2

2.1.6 Environmental Conditions

18 January 2011

Ambient Temperature 20.3°C

Relative Humidity 33.0%



2.1.7 Test Results

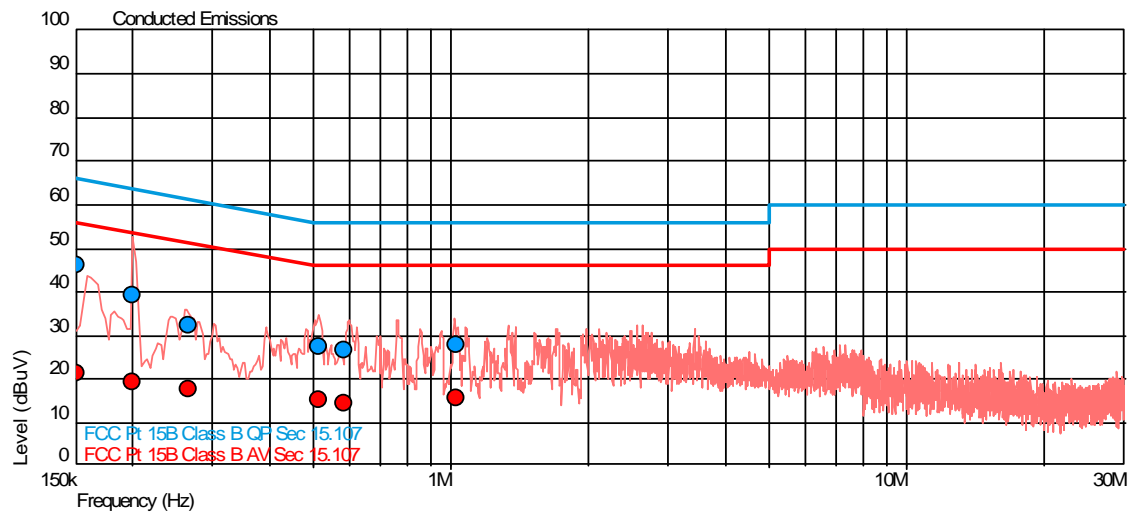
For the period of test the EUT met the requirements of FCC CFR 47 Part 15 for Conducted Emissions (AC Power Port).

The test results are shown below.

Configuration 1 - Mode 1

Bottom Channel

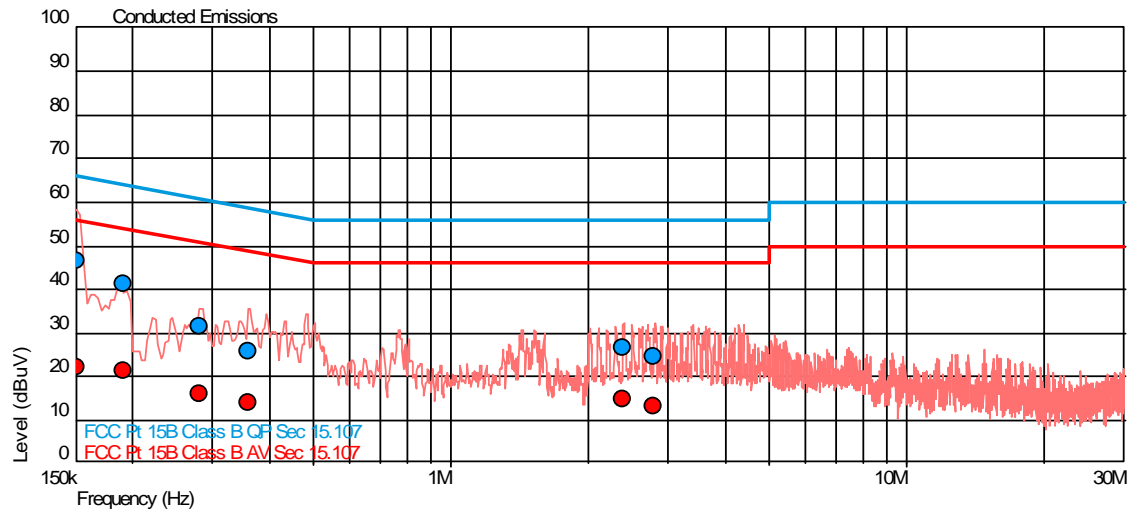
Live Line



Frequency (MHz)	QP Level (dBUV)	QP Limit (dBUV)	QP Margin (dBUV)	AV Level (dBUV)	AV Limit (dBUV)	AV Margin (dBUV)
0.150	46.2	66.0	-19.8	21.5	56.0	-34.5
0.200	39.3	63.6	-24.3	19.3	53.6	-34.3
0.266	32.2	61.2	-29.0	17.5	51.2	-33.7
0.515	27.6	56.0	-28.4	15.2	46.0	-30.8
0.581	26.7	56.0	-29.3	14.4	46.0	-31.6
1.028	28.0	56.0	-28.0	15.5	46.0	-30.5



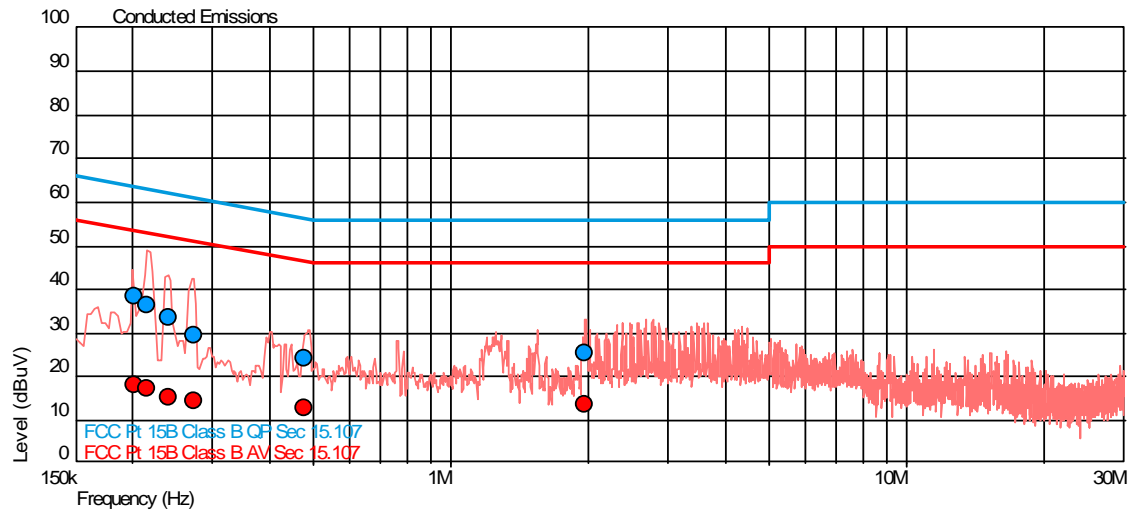
Neutral Line



Frequency (MHz)	QP Level (dBUV)	QP Limit (dBUV)	QP Margin (dBUV)	AV Level (dBUV)	AV Limit (dBUV)	AV Margin (dBUV)
0.150	46.5	66.0	-19.5	22.0	56.0	-34.0
0.192	41.1	64.0	-22.8	21.2	54.0	-32.7
0.280	31.7	60.8	-29.1	16.1	50.8	-34.7
0.360	25.8	58.7	-32.9	14.1	48.7	-34.6
2.384	26.7	56.0	-29.3	15.0	46.0	-31.0
2.772	24.8	56.0	-31.2	13.3	46.0	-32.7



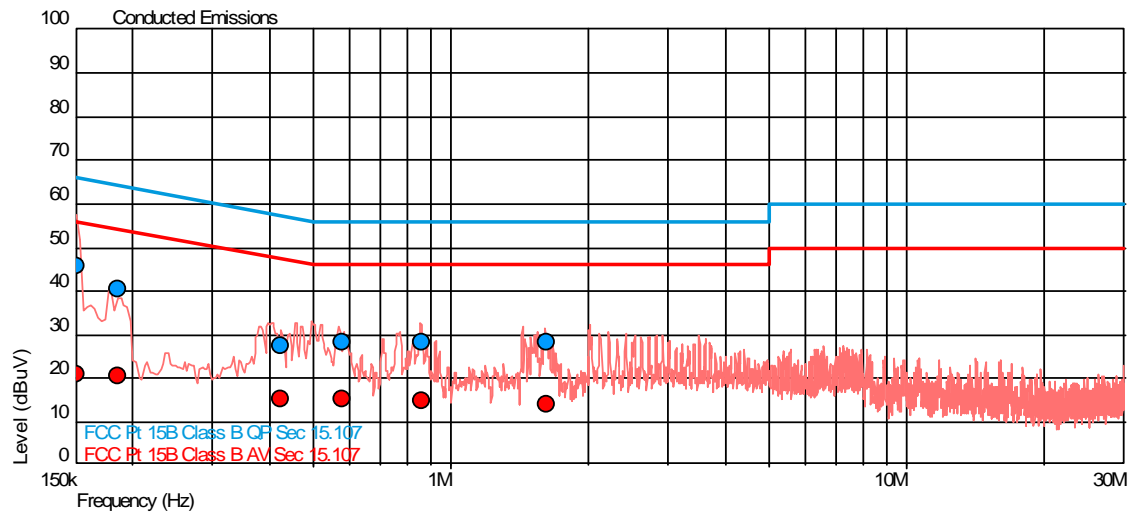
Product Service

Middle ChannelLive Line

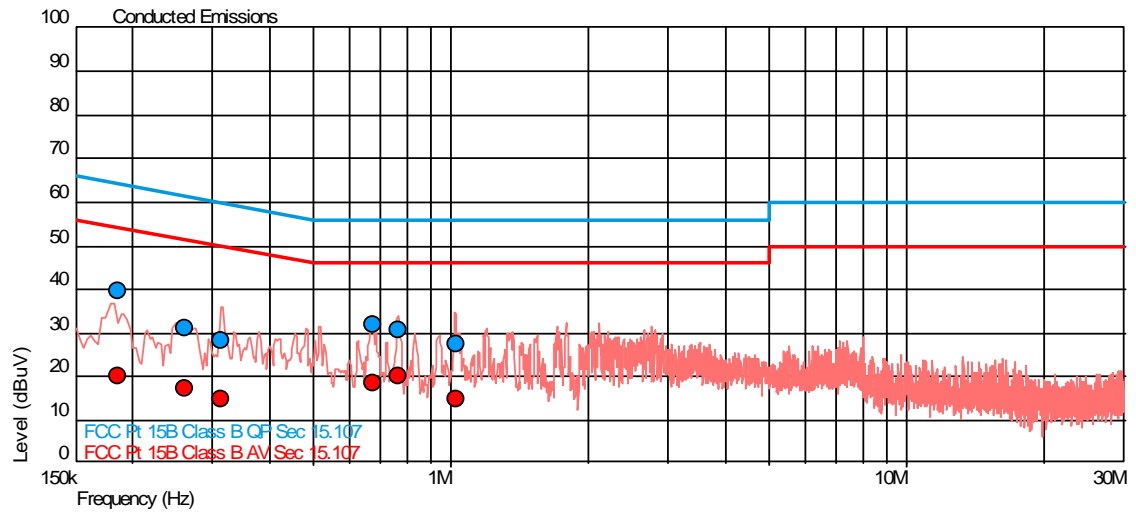
Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.201	38.3	63.6	-25.3	18.3	53.6	-35.3
0.216	36.5	63.0	-26.5	17.2	53.0	-35.7
0.240	33.4	62.1	-28.7	15.4	52.1	-36.7
0.272	29.4	61.1	-31.7	14.6	51.1	-36.4
0.477	24.1	56.4	-32.3	12.9	46.4	-33.4
1.964	25.5	56.0	-30.5	13.7	46.0	-32.3



Neutral Line



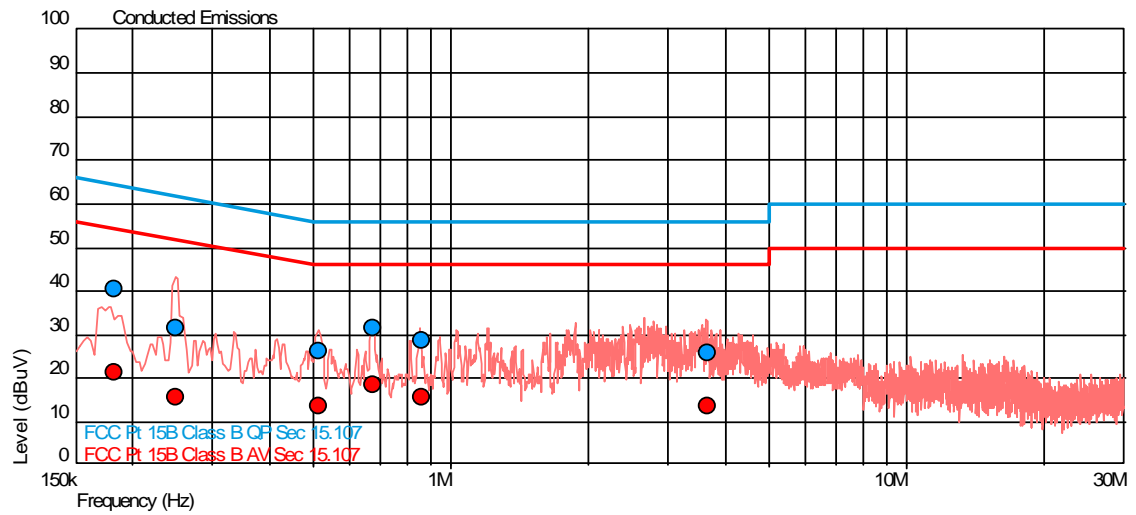
Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	45.6	66.0	-20.4	21.0	56.0	-35.0
0.186	40.5	64.2	-23.7	20.3	54.2	-33.9
0.424	27.4	57.4	-29.9	15.2	47.4	-32.2
0.575	28.3	56.0	-27.7	15.1	46.0	-30.9
0.862	28.3	56.0	-27.7	14.8	46.0	-31.2
1.622	28.1	56.0	-27.9	13.9	46.0	-32.1

Top ChannelLive Line

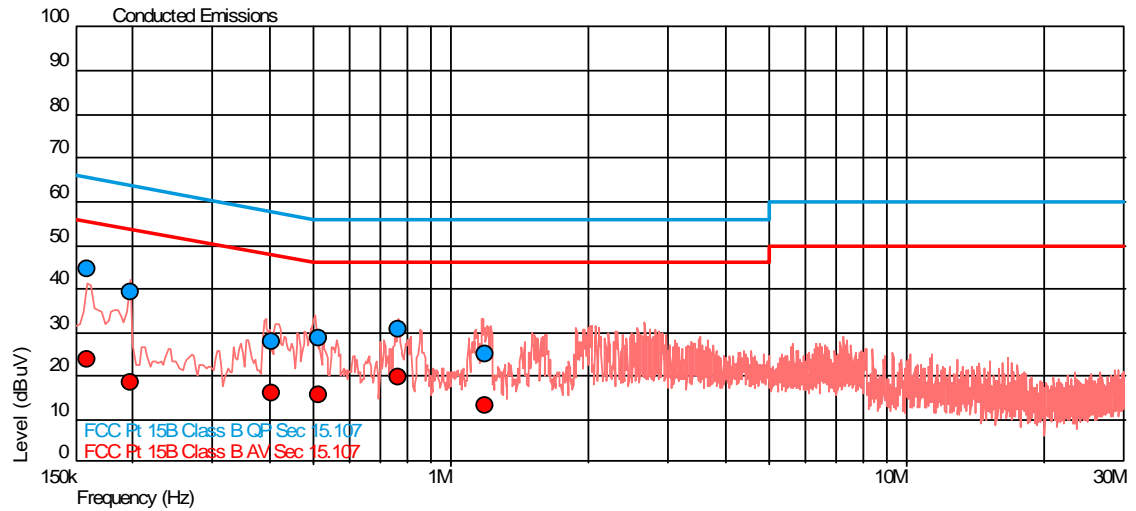
Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.185	39.7	64.3	-24.6	20.3	54.3	-33.9
0.260	31.1	61.4	-30.4	17.2	51.4	-34.3
0.312	28.4	59.9	-31.5	14.6	49.9	-35.3
0.676	32.0	56.0	-24.0	18.4	46.0	-27.6
0.766	30.8	56.0	-25.2	20.0	46.0	-26.0
1.023	27.4	56.0	-28.6	15.0	46.0	-31.0



Neutral Line



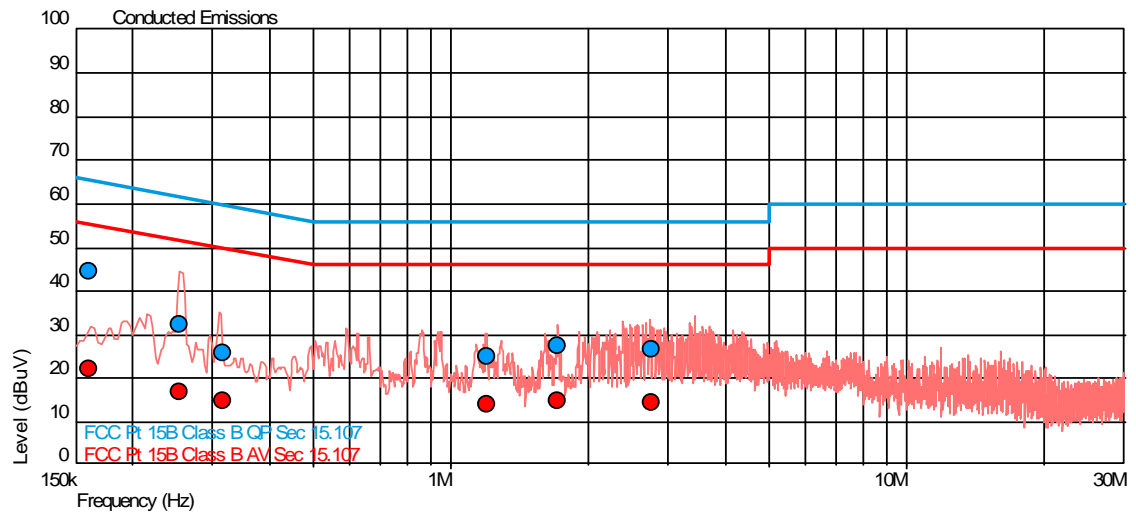
Frequency (MHz)	QP Level (dBUV)	QP Limit (dBUV)	QP Margin (dBUV)	AV Level (dBUV)	AV Limit (dBUV)	AV Margin (dBUV)
0.183	40.5	64.4	-23.9	21.5	54.4	-32.8
0.248	31.6	61.8	-30.2	15.6	51.8	-36.2
0.512	26.3	56.0	-29.7	13.7	46.0	-32.3
0.675	31.7	56.0	-24.3	18.3	46.0	-27.7
0.860	28.7	56.0	-27.3	15.5	46.0	-30.5
3.639	25.9	56.0	-30.1	13.6	46.0	-32.4

Configuration 1 - Mode 2Bottom ChannelLive Line

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.159	44.3	65.5	-21.2	23.6	55.5	-31.9
0.197	39.2	63.7	-24.6	18.6	53.7	-35.1
0.403	28.0	57.8	-29.8	16.2	47.8	-31.6
0.510	28.6	56.0	-27.4	15.6	46.0	-30.4
0.766	30.9	56.0	-25.1	19.8	46.0	-26.2
1.188	25.0	56.0	-31.0	13.3	46.0	-32.7



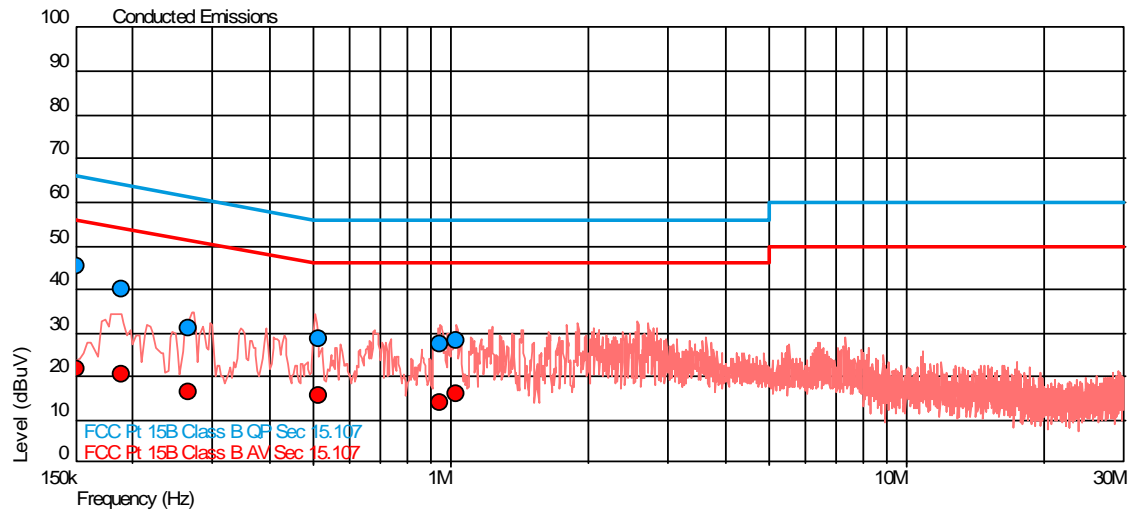
Neutral Line



Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.161	44.5	65.4	-20.9	22.3	55.4	-33.1
0.254	32.5	61.6	-29.1	16.8	51.6	-34.8
0.316	26.0	59.8	-33.8	14.9	49.8	-34.9
1.200	25.0	56.0	-31.0	13.9	46.0	-32.1
1.710	27.4	56.0	-28.6	14.9	46.0	-31.1
2.743	26.5	56.0	-29.5	14.5	46.0	-31.5



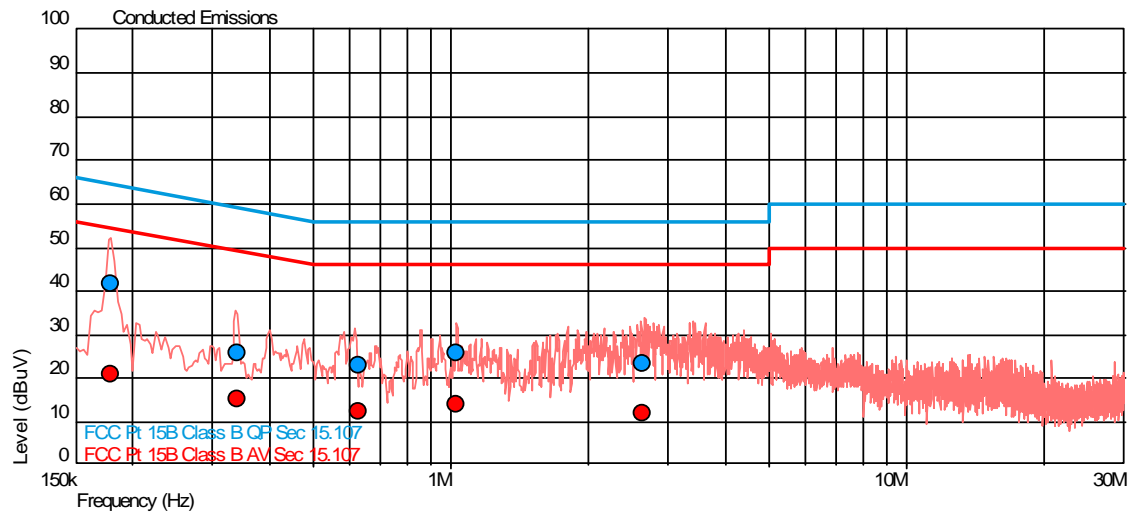
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Middle ChannelLive Line

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.150	45.4	66.0	-20.6	21.7	56.0	-34.3
0.189	40.2	64.1	-23.9	20.4	54.1	-33.7
0.266	31.0	61.2	-30.3	16.4	51.2	-34.9
0.511	28.9	56.0	-27.1	15.6	46.0	-30.4
0.949	27.6	56.0	-28.4	13.9	46.0	-32.1
1.028	28.2	56.0	-27.8	16.0	46.0	-30.0



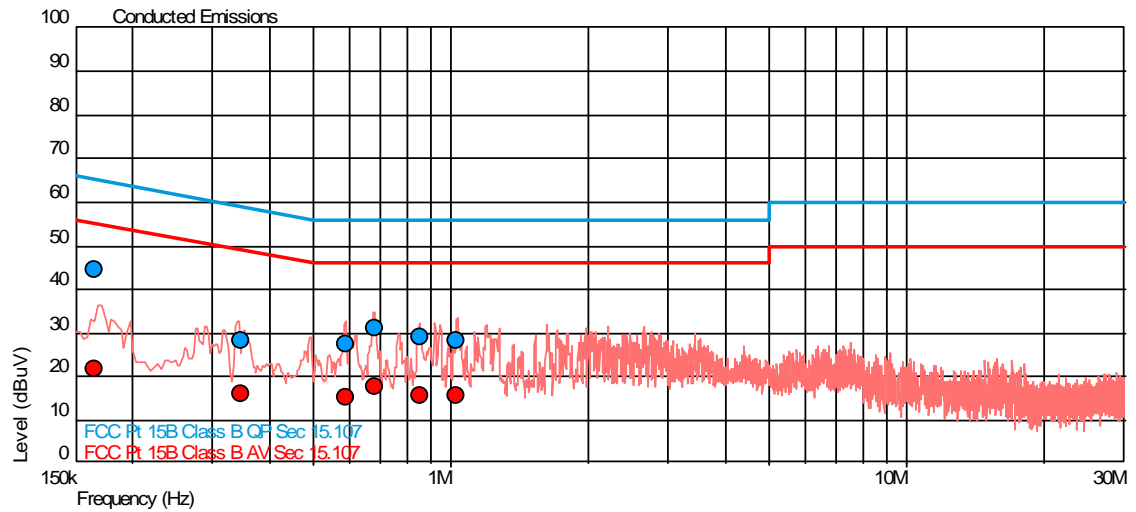
Product Service

Neutral Line

Frequency (MHz)	QP Level (dBUV)	QP Limit (dBUV)	QP Margin (dBUV)	AV Level (dBUV)	AV Limit (dBUV)	AV Margin (dBUV)
0.180	41.5	64.5	-23.0	21.0	54.5	-33.5
0.339	25.6	59.2	-33.6	15.3	49.2	-33.9
0.624	22.9	56.0	-33.1	12.3	46.0	-33.7
1.023	25.7	56.0	-30.3	14.2	46.0	-31.8
2.619	23.4	56.0	-32.6	12.2	46.0	-33.8



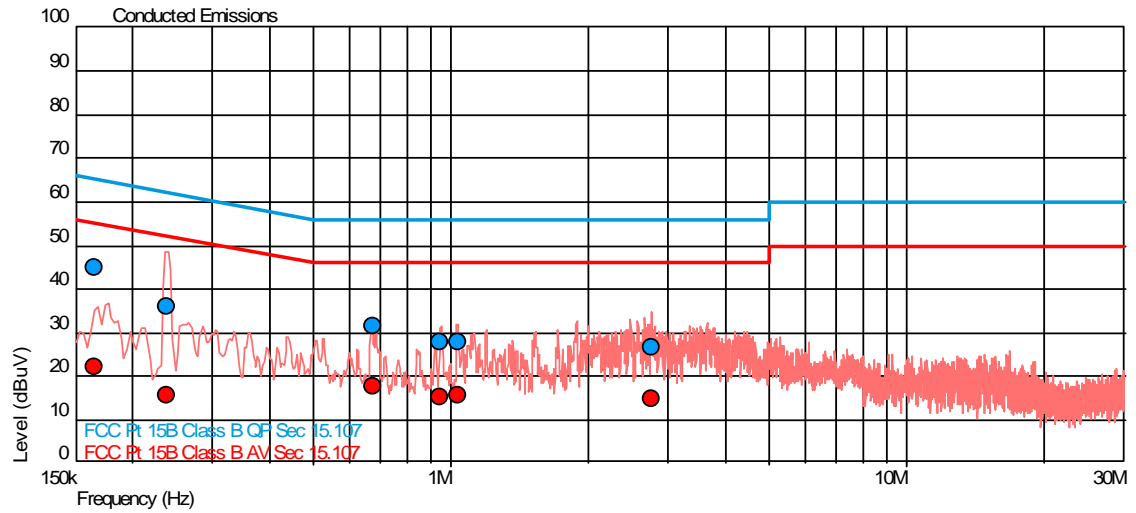
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Top ChannelLive Line

Frequency (MHz)	QP Level (dBuV)	QP Limit (dBuV)	QP Margin (dBuV)	AV Level (dBuV)	AV Limit (dBuV)	AV Margin (dBuV)
0.165	44.6	65.2	-20.5	21.7	55.2	-33.5
0.347	28.1	59.0	-30.9	16.0	49.0	-33.0
0.587	27.4	56.0	-28.6	15.2	46.0	-30.8
0.677	31.0	56.0	-25.0	17.7	46.0	-28.3
0.858	29.3	56.0	-26.7	15.5	46.0	-30.5
1.029	28.3	56.0	-27.7	15.7	46.0	-30.3



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Neutral Line

Frequency (MHz)	QP Level (dBUV)	QP Limit (dBUV)	QP Margin (dBUV)	AV Level (dBUV)	AV Limit (dBUV)	AV Margin (dBUV)
0.165	45.0	65.2	-20.2	22.3	55.2	-32.8
0.238	36.1	62.2	-26.1	15.5	52.2	-36.7
0.675	31.4	56.0	-24.6	17.7	46.0	-28.3
0.949	28.0	56.0	-28.0	15.1	46.0	-30.9
1.036	28.0	56.0	-28.0	15.7	46.0	-30.3
2.748	26.6	56.0	-29.4	15.0	46.0	-31.0



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SECTION 3

TEST EQUIPMENT USED



Product Service

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 - Conducted Emissions (AC Power Port)					
LISN (1 Phase)	Chase	MN 2050	336	12	25-Mar-2011
Screened Room (5)	Rainford	Rainford	1545	36	11-Feb-2011
Transient Limiter	Hewlett Packard	11947A	2378	12	22-Jun-2011
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	9-Sep-2011



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3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Conducted Emissions, ISN	150kHz to 30MHz Amplitude	2.1dB

* In accordance with CISPR 16-4-2



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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
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