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Report On

FCC and Industry Canada Testing of the
Sepura plc STP8040 Portable Tetra Radio
In accordance with FCC CFR 47 Part 15 and
Industry Canada RSS-210

COMMERCIAL-IN-CONFIDENCE

FCC ID: XX6STP8040
IC ID: 8739A-STP8000

Document 75908190 Report 02 Issue 2

March 2010

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COMMERCIAL-IN-CONFIDENCE

REPORT ON

FCC and Industry Canada Testing of the
Sepura plc STP8040 Portable Tetra Radio
In accordance with FCC CFR 47 Part 15 and RSS-210

Document 75908190 Report 02 Issue 1

March 2010

PREPARED FOR

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Authorised Signatory

C Gould
Authorised Signatory

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 15 and RSS-210. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;

R A Blagg

G Lawler

This test report has be up issued to Issue 2 make changes to the Industry Canada ID and to change the issue date of the FCC Part 15 used.

Product Service

CONTENTS

SECTION 1

REPORT SUMMARY

FCC and Industry Canada Testing of the
Sepura plc STP8040 Portable Tetra Radio
In accordance with FCC CFR 47 Part 15 and RSS-210

1.1 INTRODUCTION

The information contained in this report is intended to show verification of the FCC and Industry Canada Testing of the Sepura plc, STP8040 Portable Tetra Radio to the requirements of FCC CFR 47 Part 15 and RSS-210.

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)	STP8040 Portable Tetra Radio
Serial Number(s)	2PN400922G4Y1P5
Number of Samples Tested	One
Test Specification/Issue/Date	FCC CFR 47 Part 15: 2007 RSS-210: Issue 7: 2007
Disposal Reference Number Date	Held Pending Disposal Not Applicable Not Applicable
Order Number Date	315350/T0201 19 November 2009
Start of Test	10 December 2009
Finish of Test	05 January 2010
Name of Engineer(s)	R A Blagg G Lawler
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 the tests carried out in accordance with FCC CFR 47 Part 15 and RSS-210 is shown below.

Section	Spec Clause		Test Description	Mode	Result	Comments
	FCC	IC				
2.1	15.247 (a)(1)	A8.1(a)	20dB Bandwidth	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.2	15.247 (b)(3)	A8.4(2)	Maximum Peak Conducted Output Power	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.3	15.247 (b)(3)	A8.4(2)	EIRP Peak Power	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.4	15.247 (d)	A8.5	Spurious Emissions	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.5	15.247 (a)(1)(iii)	A8.1(d)	Channel Dwell Time	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.6	15.247 (a)(1)	A8.1(b)	Channel Separation	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.7	15.247 (a)(1)(iii)	A8.1(d)	Number of Hopping Channels	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	
2.8	15.247 (a)(2)	A8.2 (a)	Radiated Emissions (Enclosure Port)	Transmit Bottom	Pass	
				Transmit Middle	Pass	
				Transmit Top	Pass	

1.3 DECLARATION OF BUILD STATUS

MAIN EUT			
MANUFACTURING DESCRIPTION	Tetra Handheld terminal		
MANUFACTURER	Sepura		
TYPE	STP8040 (STP8140)		
PART NUMBER	n/a		
SERIAL NUMBER	2PN400922G4Y10S and 2PN400922G4Y1P5		
HARDWARE VERSION	Production		
SOFTWARE VERSION	-		
TRANSMITTER OPERATING RANGE	407MHz to 473MHz and 2402MHz-2480MHz		
RECEIVER OPERATING RANGE	407MHz to 473MHz and 2402MHz-2480MHz		
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, GPS Module clock on chip 3.145GHZ		
OUTPUT POWER (W or dBm)	1.8 Watts		
FCC ID	XX6 STP8040		
INDUSTRY CANADA ID	8739A-STP8000		
TECHNICAL DESCRIPTION (a brief description of the intended use and operation)	Tetra Handheld terminal		
BATTERY/POWER SUPPLY			
MANUFACTURING DESCRIPTION	Lithium Polymer		
MANUFACTURER	Varta		
TYPE	Standard	Hi Cap	
PART NUMBER	300 00634,	300 00635	
VOLTAGE	7.4Vdc		
COUNTRY OF ORIGIN	Indonesia		
ANCILLARIES (if applicable)			
MANUFACTURING DESCRIPTION	Advanced RSM	Ear Hanger	
MANUFACTURER	JDI	Lowe	
TYPE			
PART NUMBER	300-00388		
SERIAL NUMBER			
COUNTRY OF ORIGIN	Taiwan	UK	

Signature ____________________

Date 10 December 2009

D of B S Serial No 75908190

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, STP8040 Portable 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: Stand Alone Powered

The EUT was configured as a standalone item and powered via a 7.4 V battery.

1.4.3 EUT Cable / Port Identification

Port	Max Cable Length specified	Usage	Type	Screened
Signal	1.0m	Fist Microphone	Multicore	No

1.4.4 Modes of Operation

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

Mode 1 – 2402 MHz Transmit Bottom

Mode 2 – 2441 MHz Transmit Middle

Mode 3 – 2480 MHz Transmit Top

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

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 via a 7.4 V battery.

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.

SECTION 2

TEST DETAILS

FCC and Industry Canada Testing of the
Sepura plc STP8040 Portable Tetra Radio
In accordance with FCC CFR 47 Part 15 and RSS-210

2.1 20dB BANDWIDTH

2.1.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (a)(1)
RSS-210, Clause A8.1(a)

2.1.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.1.3 Date of Test and Modification State

10 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

The EUT was transmitted at maximum power at all data rates via a cable to the Spectrum Analyser. The Analyser settings were adjusted to display the resultant trace on screen. The peak point of the trace was measured and the markers positioned to give the –20dBc points of the displayed spectrum.

2.1.6 Environmental Conditions

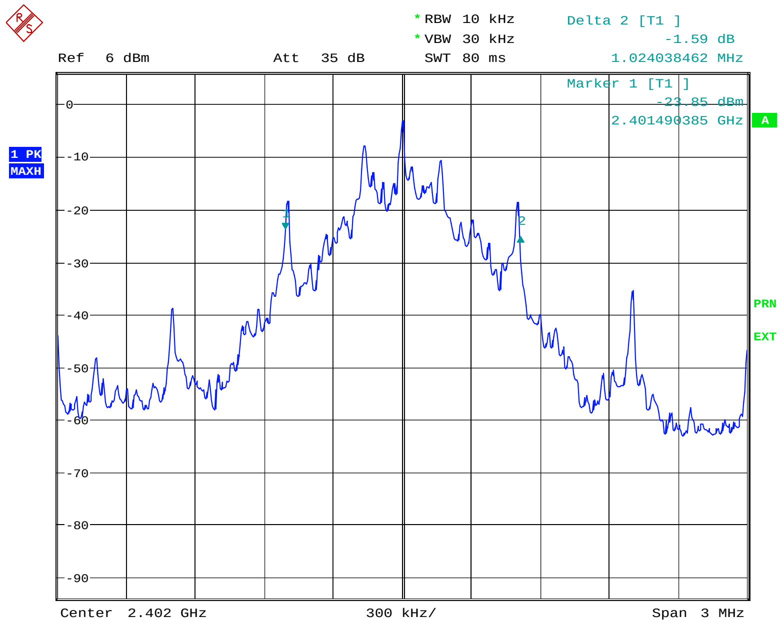
	10 December 2009
Ambient Temperature	23.9°C
Relative Humidity	32.4%

2.1.7 Test Results

Frequency (MHz)	Data Rate (Mbps)	20dB Bandwidth (kHz)
2402	DH1	1024
	DH3	1019
	DH5	1019
2441	DH1	1019
	DH3	1019
	DH5	1024
2480	DH1	1019
	DH3	1019
	DH5	1019

2402 MHz

DH1



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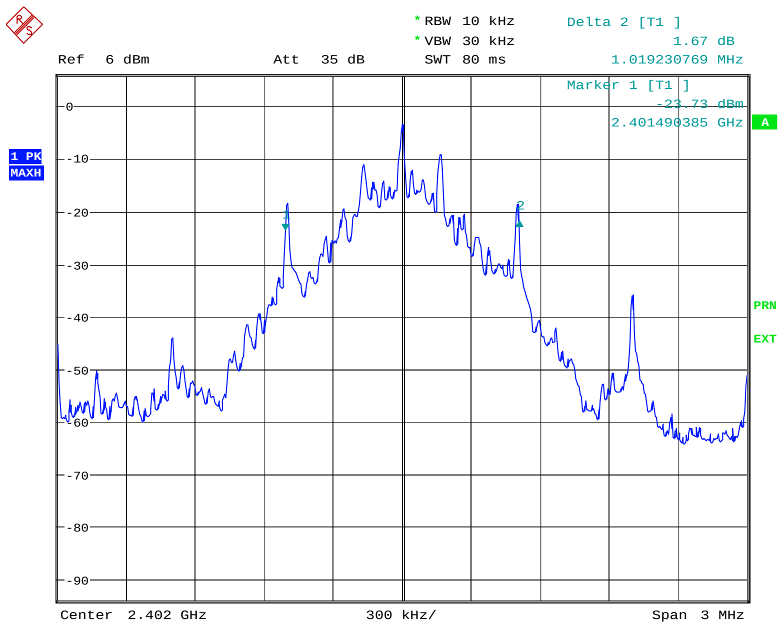
DH3



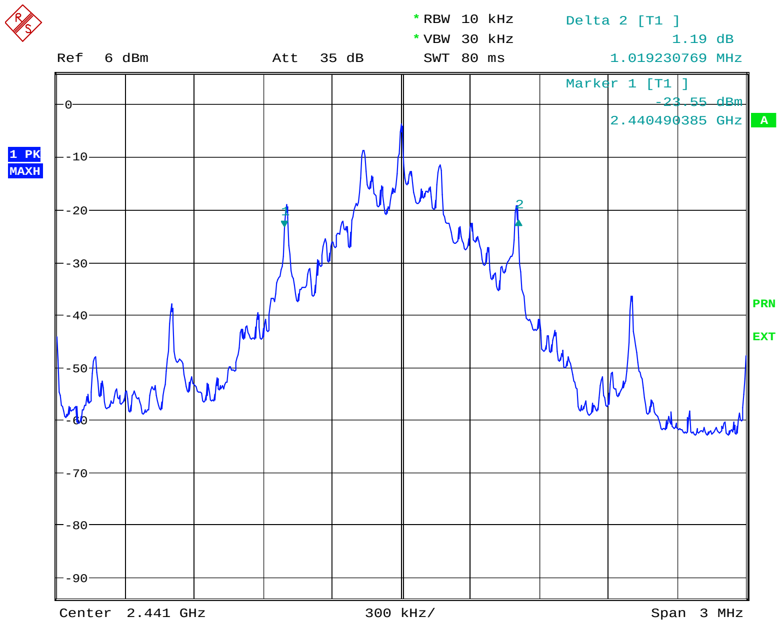
Date: 11.DEC.2009 11:10:33

DH5


RBW 10 kHz
VBW 30 kHz
SWT 80 ms
Ref 6 dBm
Att 35 dB
Delta 2 [T1]
0.97 dB
1.019230769 MHz
Marker 1 [T1]
-23.29 dBm
2.401490385 GHz
1 PK
MAXH
A
PRN
EXT
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 2.402 GHz
300 kHz/
Span 3 MHz
Date: 10.DEC.2009 17:11:37

2441 MHz

DH1



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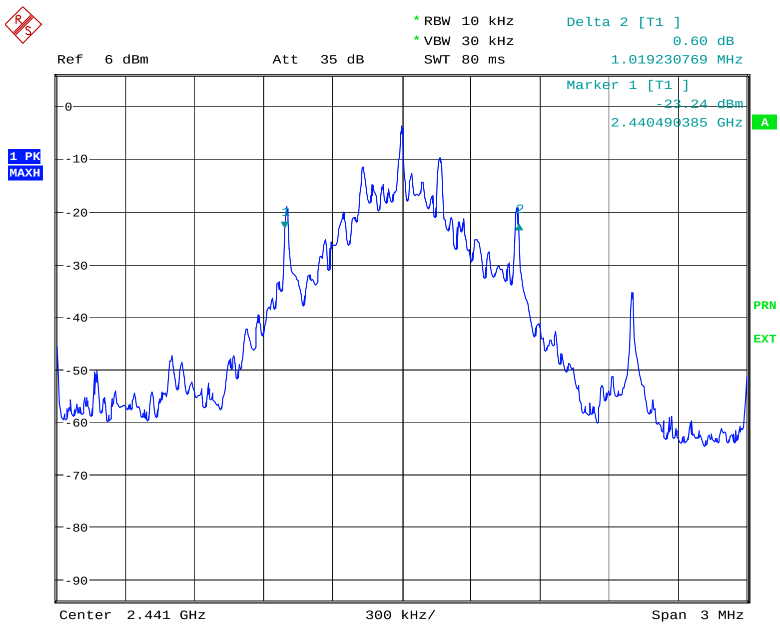
DH3



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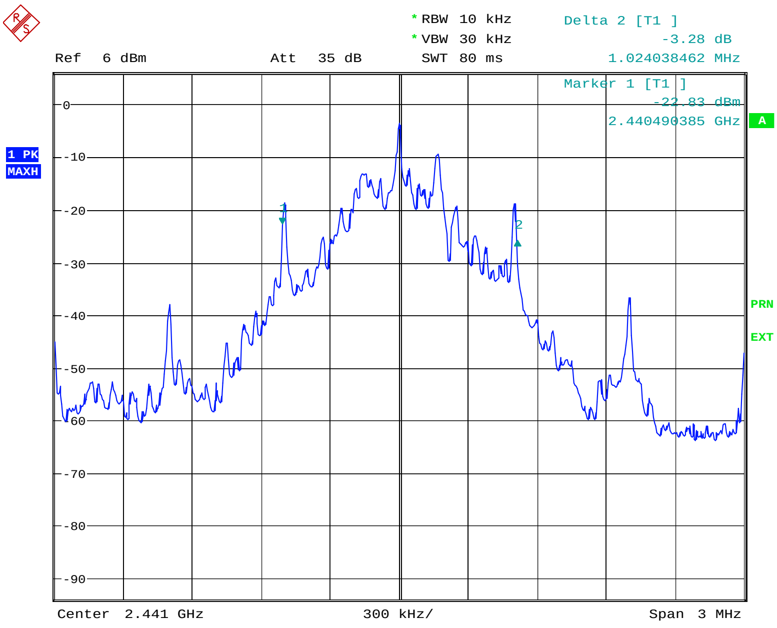
DH5



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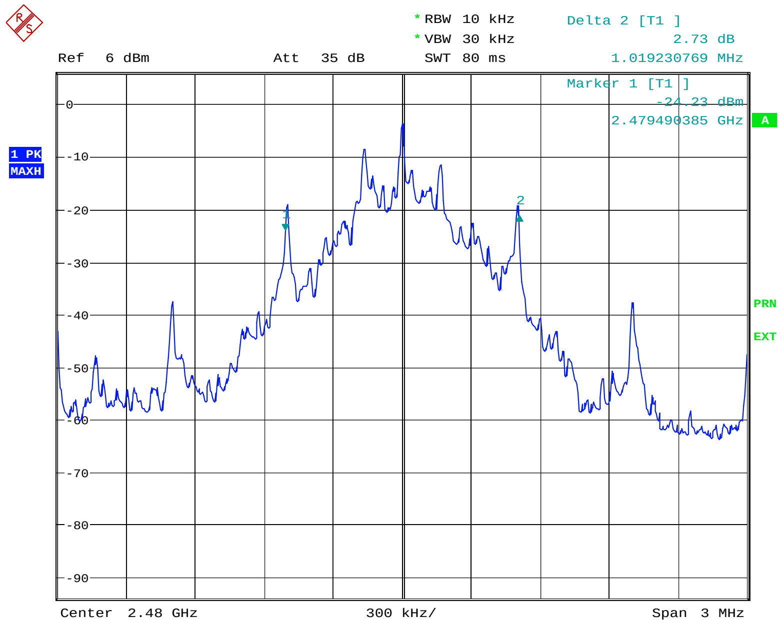
2480 MHz

DH1



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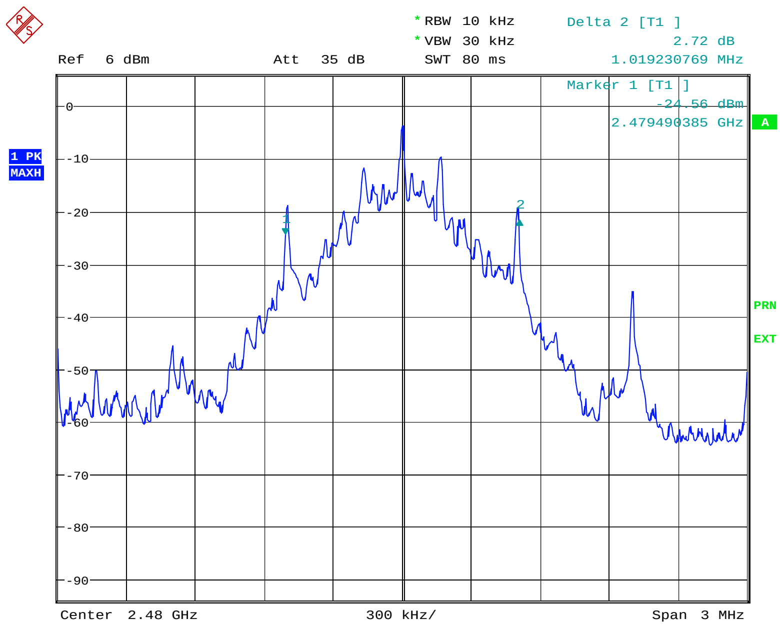
DH3



Date: 11.DEC.2009 11:14:40

DH5

Date: 10.DEC.2009 16:56:45

Product Service

2.2 MAXIMUM PEAK CONDUCTED OUTPUT POWER

2.2.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (b)(3)
RSS-210, Clause A8.4(2)

2.2.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.2.3 Date of Test and Modification State

10 December 2009 - 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 Procedure

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

2.2.6 Environmental Conditions

	10 December 2009
Ambient Temperature	23.4°C
Relative Humidity	24.1%

2.2.7 Test Results

7.4 V DC

Frequency (MHz)	Maximum Peak Conducted Output Power					
	dBm			mW		
	DH1	DH3	DH5	DH1	DH3	DH5
2402	4.19	4.50	4.49	2.624	2.818	2.812
2441	4.09	4.45	4.47	2.564	2.799	2.799
2480	4.20	4.50	4.48	2.630	2.818	2.805

Limit Clause

15.247 (b)(1) for FCC

The maximum peak conducted output power of the intentional radiator shall not exceed the following:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

A8.4 (2) for RSS-210

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W. Except as provided in Section A8.4(5), the e.i.r.p shall not exceed 4W.

2.3 EIRP PEAK POWER

2.3.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (b)(3)
RSS-210, Clause A8.4(4)

2.3.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.3.3 Date of Test and Modification State

04 to 05 January 2010 - Modification State 0

2.3.4 Test Equipment Used

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

2.3.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15C and RSS-210.

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.3.6 Environmental Conditions

	04 January 2010	05 January 2010
Ambient Temperature	16°C	16°C
Relative Humidity	29%	29%
Atmospheric Pressure	1013mbar	1013mbar

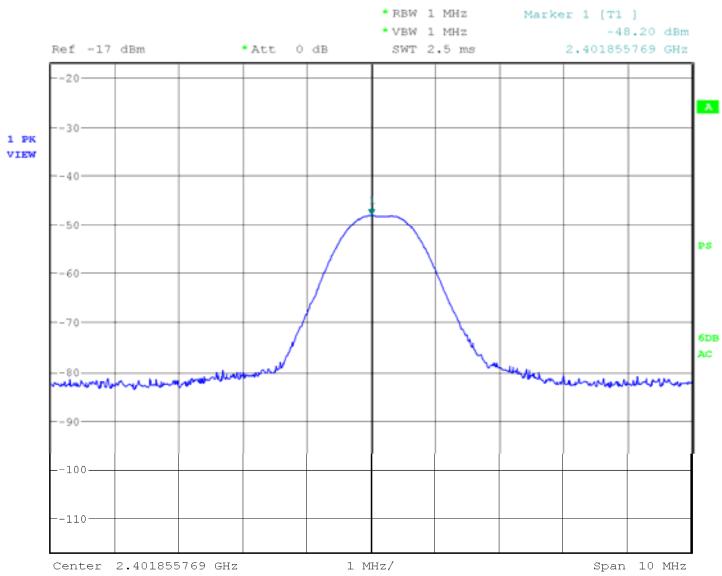
2.3.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C and RSS-210 for EIRP Peak Power.

<u>The test results are shown below.</u>

<u>Configuration 1 - Mode 1</u>

Frequency GHz	Result (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Result (W)	FCC Limit (W)	IC Limit (W)
2.402	-2.0	30	36	0.001	1	4

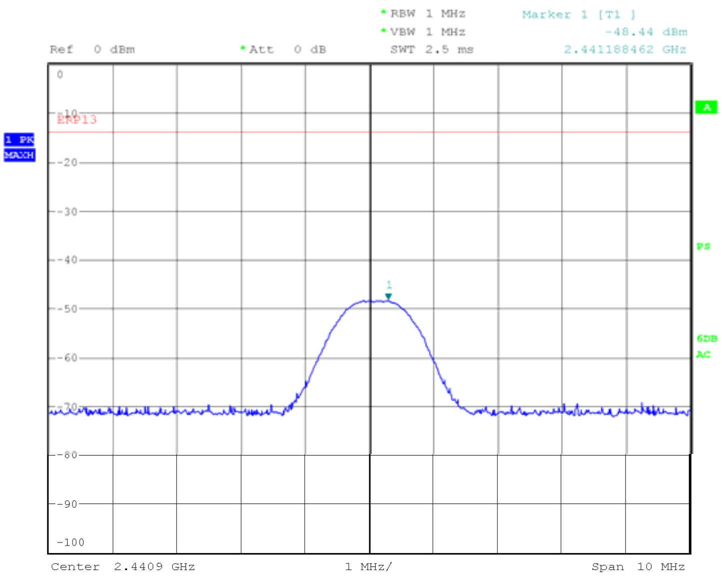


Date: 4.JAN.2010 23:07:43

Product Service

<u>Configuration 1 - Mode 2</u>

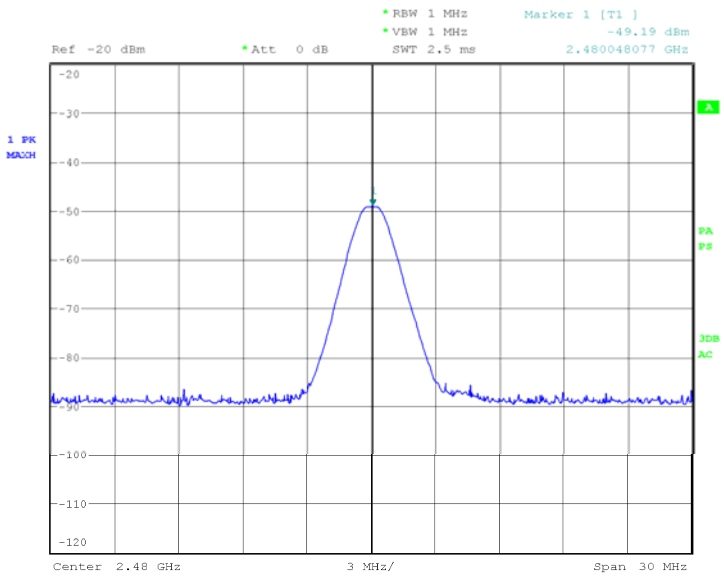
Frequency GHz	Result (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Result (W)	FCC Limit (W)	IC Limit (W)
2.441	-0.8	30	36	0.001	1	4



Date: 13.JAN.2010 00:23:32

Configuration 1 - Mode 3

Frequency GHz	Result (dBm)	FCC Limit (dBm)	IC Limit (dBm)	Result (W)	FCC Limit (W)	IC Limit (W)
2.480	-2.2	30	36	0.001	1	4



Date: 4.JAN.2010 23:59:57

2.4 SPURIOUS EMISSIONS

2.4.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (d)
RSS-210, Clause A8.5

2.4.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.4.3 Date of Test and Modification State

14 December 2009 - Modification State 0

2.4.4 Test Equipment Used

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

2.4.5 Test Procedure

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

In accordance with Part 15.247(c), the Spurious Conducted Emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 9 kHz to 25 GHz. The EUT was set to transmit on full power and frequency hopping on all channels. The resolution and video bandwidths were set to 100kHz in accordance with Part 15.247. The spectrum analyser detector was set to Max Hold.

With the EUT transmitting at maximum power, the Spectrum Analyser was set to Max Hold and the fundamental peak measured in a RBW and VBW of 100kHz. This level was used to determine the limit line as displayed on the plots of -20dBc.

The maximum path loss across each measurement band was used as the reference level offset to ensure worst case results.

2.4.6 Environmental Conditions

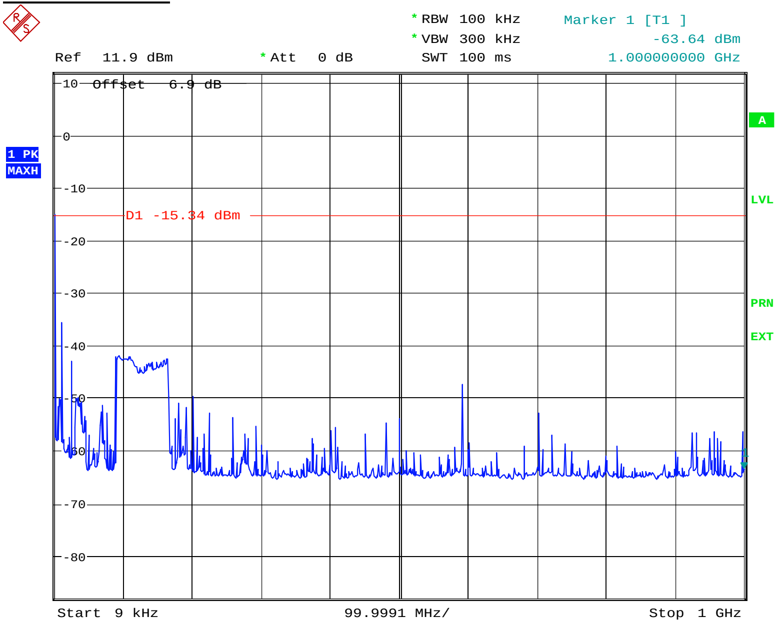
	14 December 2009
Ambient Temperature	24.3°C
Relative Humidity	27.7%

2.4.7 Test Results

7.4 V DC Supply

DH1

9kHz to 1GHz



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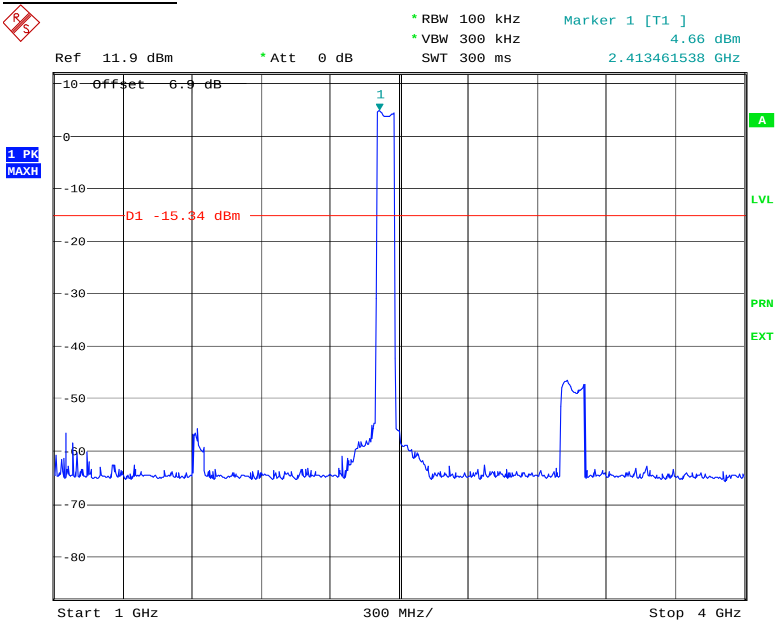
1GHz to 4GHz



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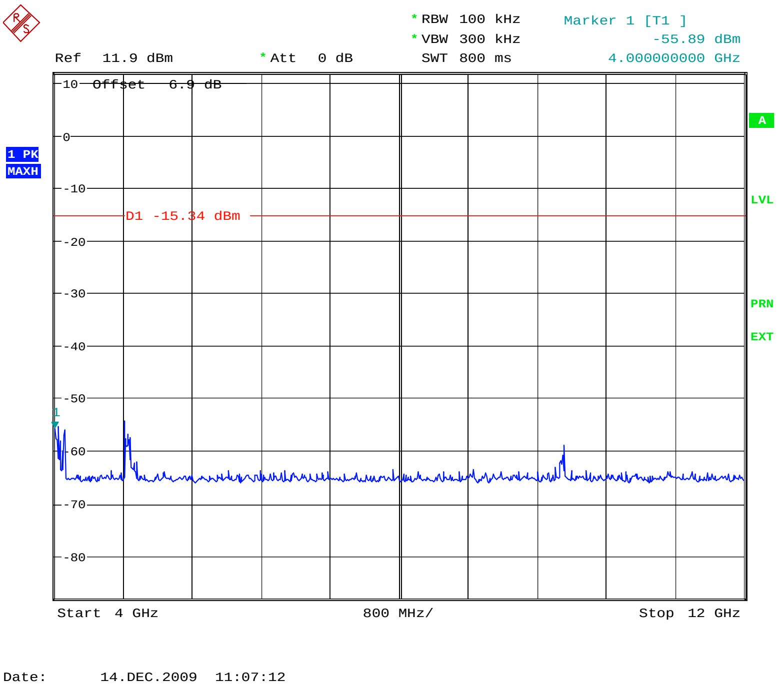
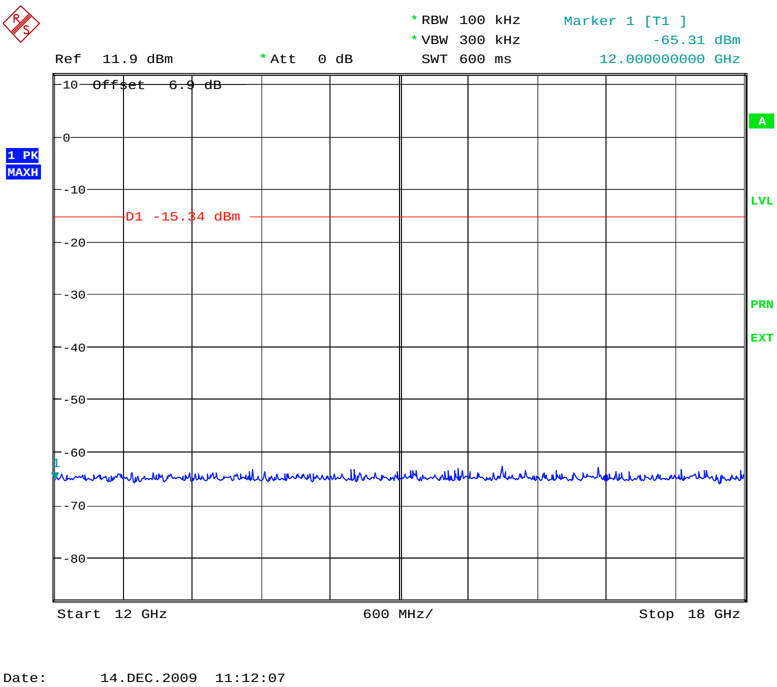
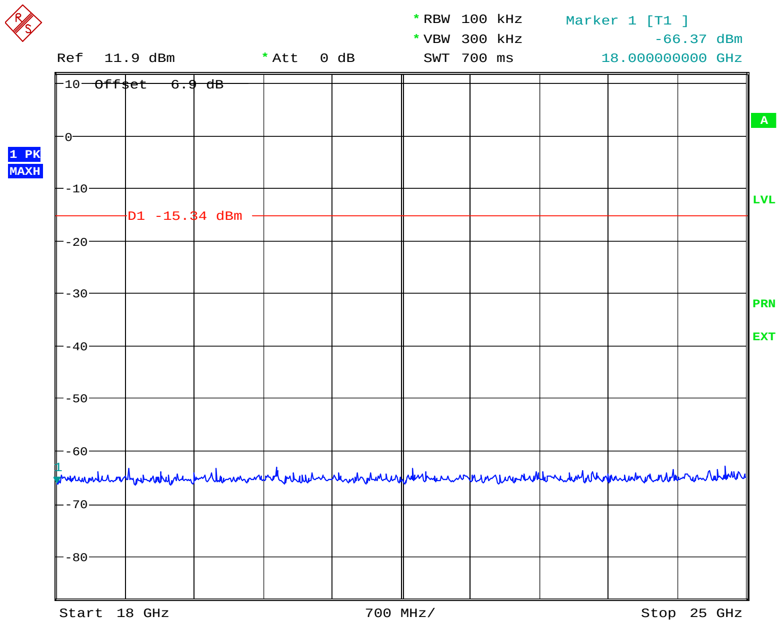
4GHz to 12GHz



12GHz to 18GHz



18GHz to 25GHz



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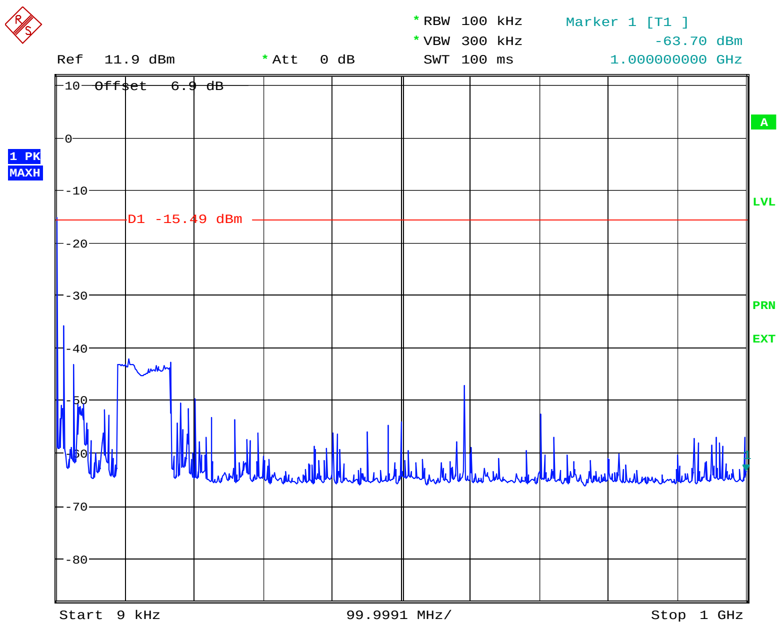
DH3

9kHz to 1GHz



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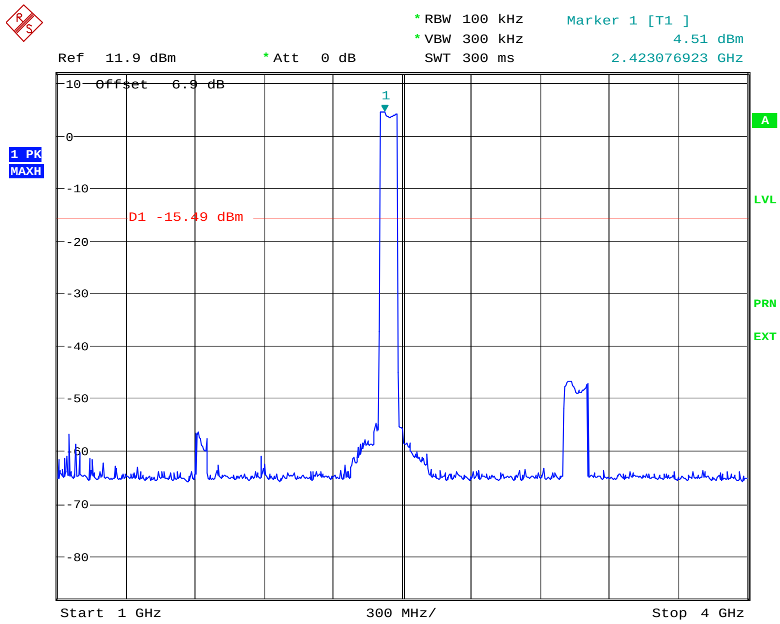
1GHz to 4GHz



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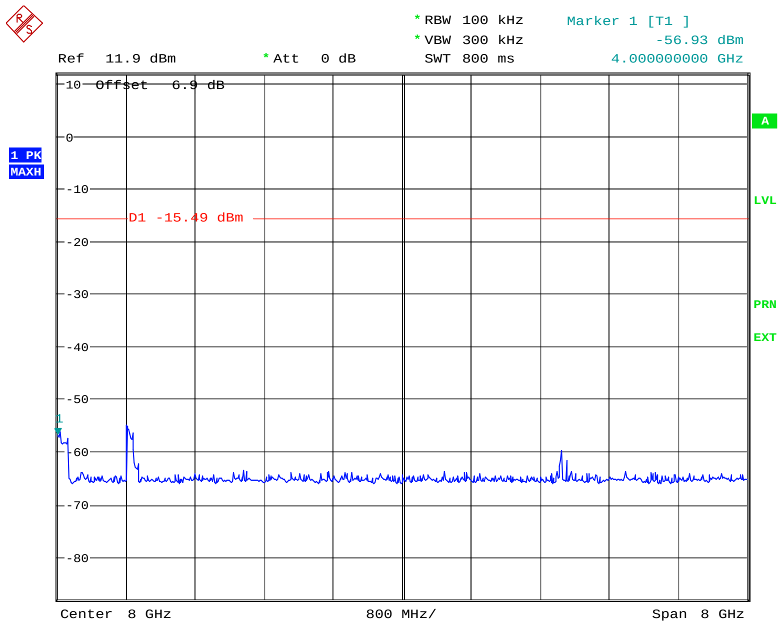
4GHz to 12GHz



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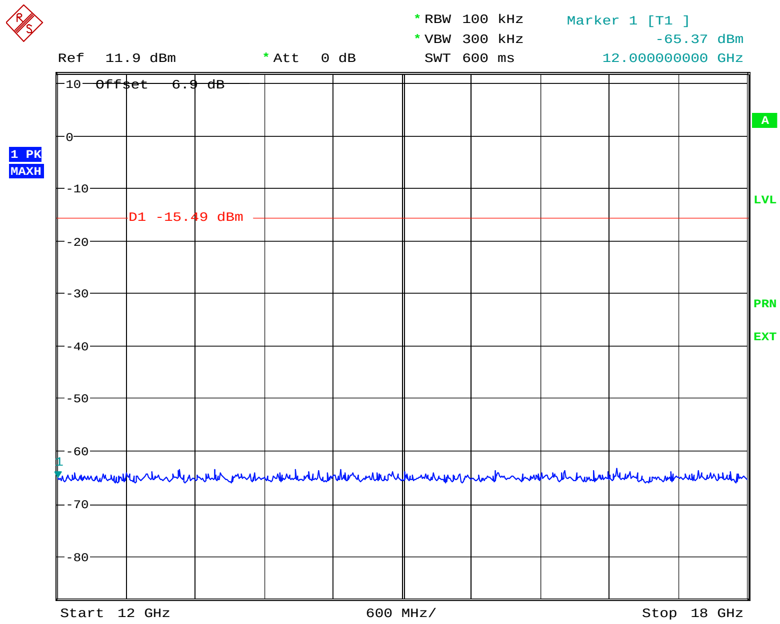
12GHz to 18GHz



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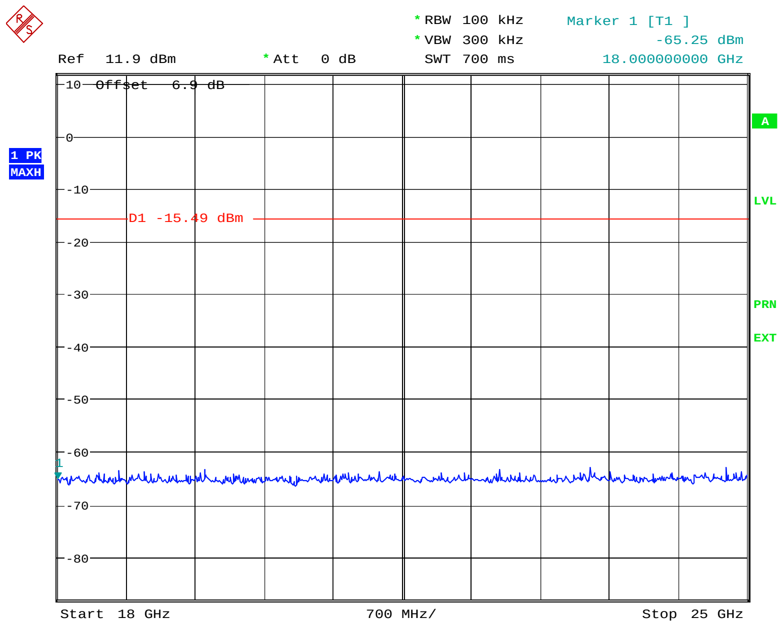
18GHz to 25GHz



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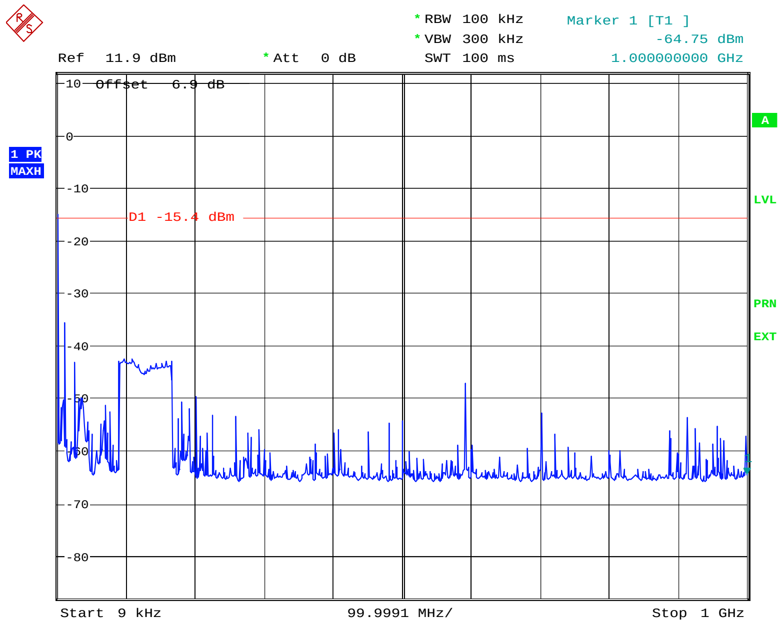
DH5

9kHz to 1GHz



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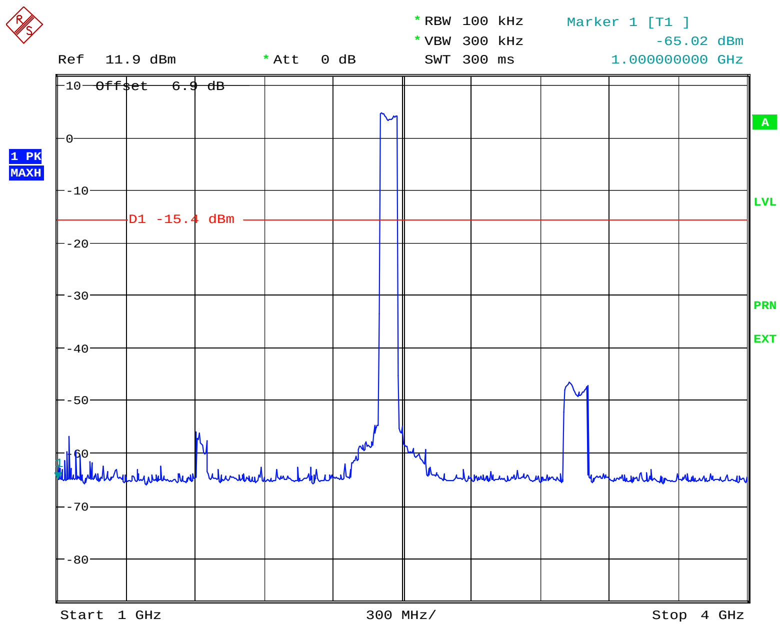
1GHz to 4GHz



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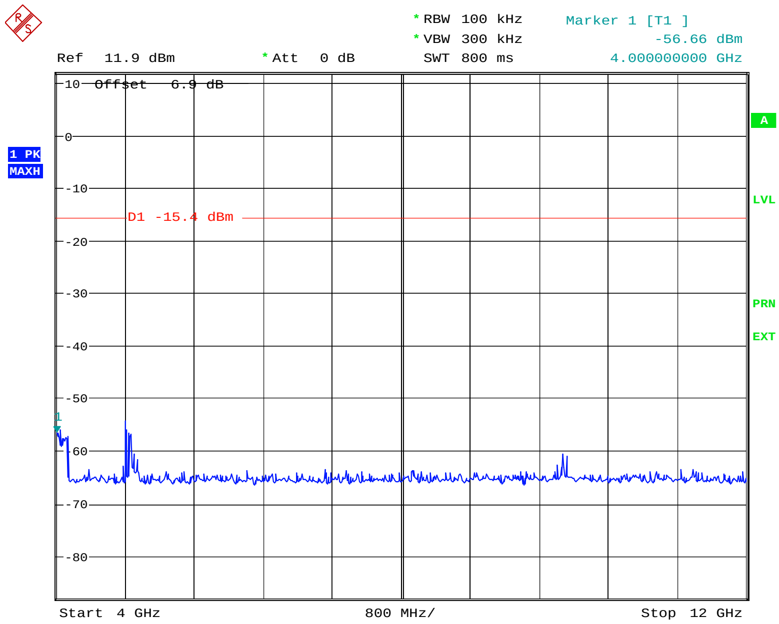
4GHz to 12GHz



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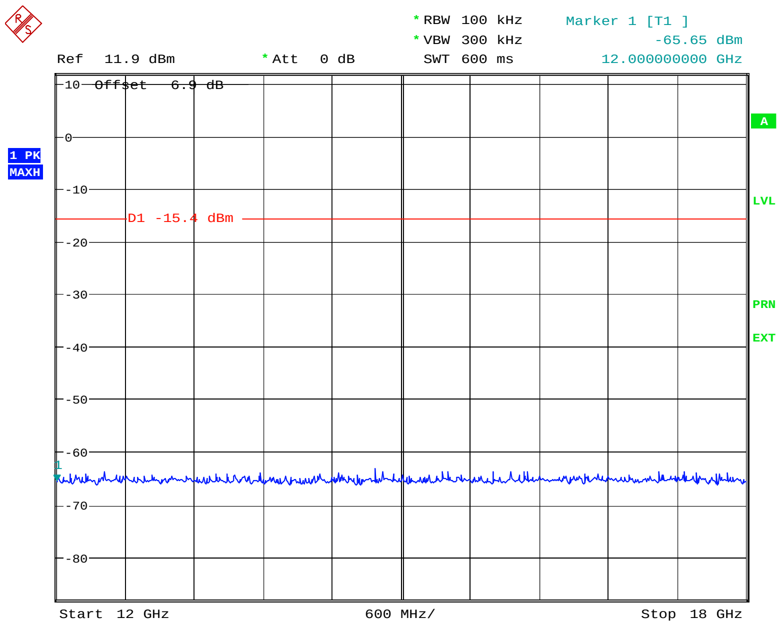
12GHz to 18GHz



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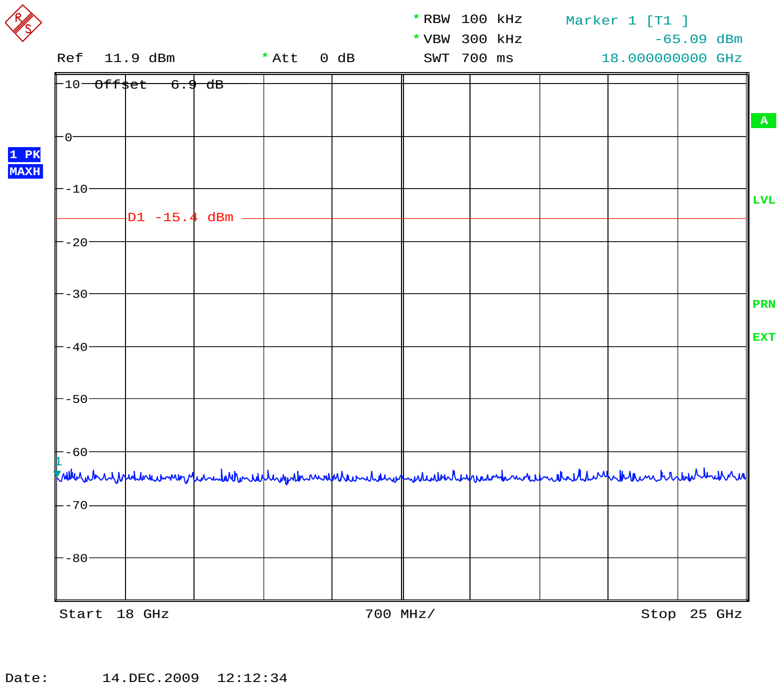
18GHz to 25GHz



2.5 CHANNEL DWELL TIME

2.5.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (a)(1)(iii)
RSS-210, Clause A8.1(d)

2.5.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.5.3 Date of Test and Modification State

11 December 2009 - Modification State 0

2.5.4 Test Equipment Used

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

2.5.5 Test Procedure

Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

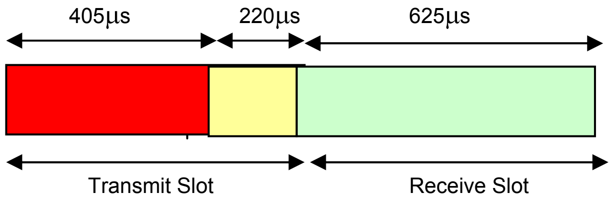
The Bluetooth system hops at a rate of 1600 times per second. Thus, this equates to 1600 timeslots in 1 second.

The DH1 data rate operates on a Transmit on 1 timeslot and Receive on 1 timeslot basis. Thus, in 1 second, there are 800 Transmit timeslots and 800 Receive timeslots.

Thus:

$$1 \text{ Timeslot} = \frac{1}{1600} = 625\mu s$$

In 1 transmit timeslot, the transmit on time is only 405µs. 220µs is reserved as off time for the synthesizer to re-tune ready for the next transmit frequency. The following timeslot is a receive slot. This process continues assuming the data rate remains the same.



DH1 Timeslot Arrangement Showing One Complete Transmit and Receive Cycle

So, with 800 Tx and 800 Rx timelsots, the transmitter is on for 800 x 405µs = 0.324 seconds.

$$\therefore \quad \frac{\text{Total Tx Time On}}{\text{No of Channels}} = \frac{0.324}{80} = 4.05\text{ms}$$

So, in 32 seconds, the transmitter dwell time per channel is:

$$32 \times 4.05\text{ms} = 0.1296 \text{ seconds}$$

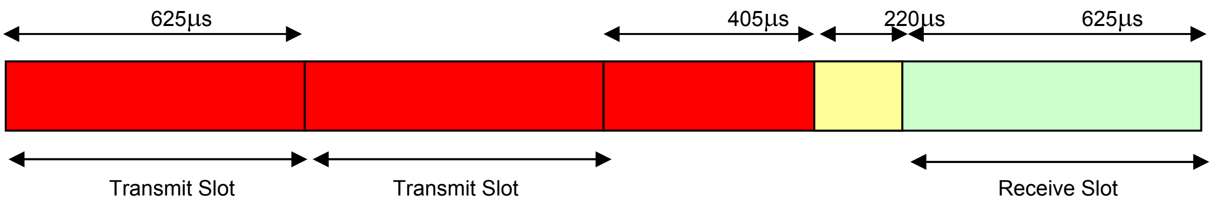
With data rate DH3, the data payload is higher and can use up to 3 timeslots. When more than one timeslot is used, the frequency does not hop and transmission is continuous on all 3 slots, (ie. no receive slot in-between the 3 transmit slots). The 220µs off time for synthesizer re-tuning at the end of a slot is only used on the final slot. Thus, for one cycle, there are 3 transmit timeslots. 2 are 625µs long and the final slot is transmitting for 405µs.

The DH3 data rate operates on a Transmit on 3 timeslots and Receives on 1 timeslot basis, (assuming maximum data payload). The frequency-hopping rate is the same. Thus, in 1 second, there are 1200 Transmit timeslots and 400 Receive timeslots.

Thus:

1 Timeslot $= \frac{1}{1600} =$ 625µs

The first 2 Transmit timeslots are transmitting for the complete 625µs. In the third transmit slot, the transmit on time is only 405µs. 220µs is reserved as off time for the synthesizer to re-tune ready for the next transmit frequency. The following timeslot is a receive slot. This process continues assuming the data rate remains the same.



DH3 Timeslot Arrangement Showing One Complete Transmit and Receive Cycle, (Maximum Payload)

Thus, the transmitter for one complete transmit and receive cycle would be on for:

Tx (2 x 625µs) + (1 x 405µs) = 1.655ms

So:

800 x 625µs = 0.5 seconds
400 x 405µs = 0.162 seconds

Thus: 0.5 + 0.162 = 0.662 seconds

$\therefore \quad \frac{\text{Total Tx Time On}}{\text{No Of Channels}} = \frac{0.662}{80} = 8.275\text{ms}$

So, in 32 seconds, the transmitter dwell time per channel is:

32 x 8.275ms = 0.2648 seconds

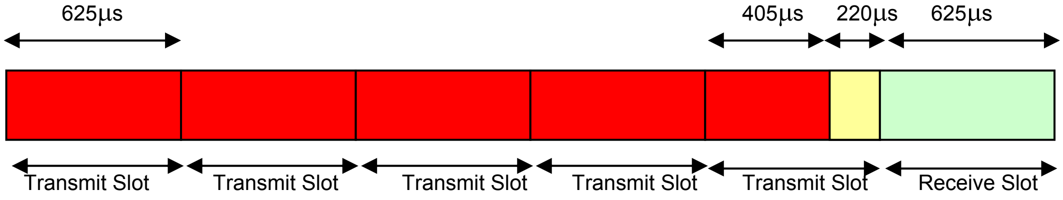
With data rate DH5, the data payload is higher and can use up to 5 timeslots. When more than one timeslot is used, the frequency does not hop and transmission is continuous on all 5 slots, (ie. no receive slot in-between the 5 transmit slots). The 220µs off time for synthesizer re-tuning at the end of a slot is only used on the final slot. Thus, for one cycle, there are 5 transmit timeslots. 4 are 625µs long and the final slot is transmitting for 405µs.

The DH5 data rate operates on a Transmit on 5 timeslots and Receives on 1 timeslot basis, (assuming maximum data payload). The frequency-hopping rate is the same. Thus, in 1 second, there are 1333.3 Transmit timeslots and 266.7 Receive timeslots.

Thus:

1 Timeslot = $\frac{1}{1600}$ = 625µs

The first 4 Transmit timeslots are transmitting for the complete 625µs. In the fifth transmit slot, the transmit on time is only 405µs. 220µs is reserved as off time for the synthesizer to re-tune ready for the next transmit frequency. The following timeslot is a receive slot. This process continues assuming the data rate remains the same.



DH5 Timeslot Arrangement Showing One Complete Transmit and Receive Cycle, (Maximum Payload)

Thus, the transmitter for one complete transmit and receive cycle would be on for:

Tx (2 x 625µs) + (1 x 405µs) = 2.905ms

So:

1066.7 x 625µs = 0.666 seconds
266.7 x 405µs = 0.108 seconds

Thus: 0.666 + 0.108 = 0.774 seconds

$\therefore$ $\frac{\text{Total Tx Time On}}{\text{No Of Channels}} = \frac{0.774}{80}$ = 9.675ms

So, in 32 seconds, the transmitter dwell time per channel is:

32 x 9.675ms = 0.31 seconds

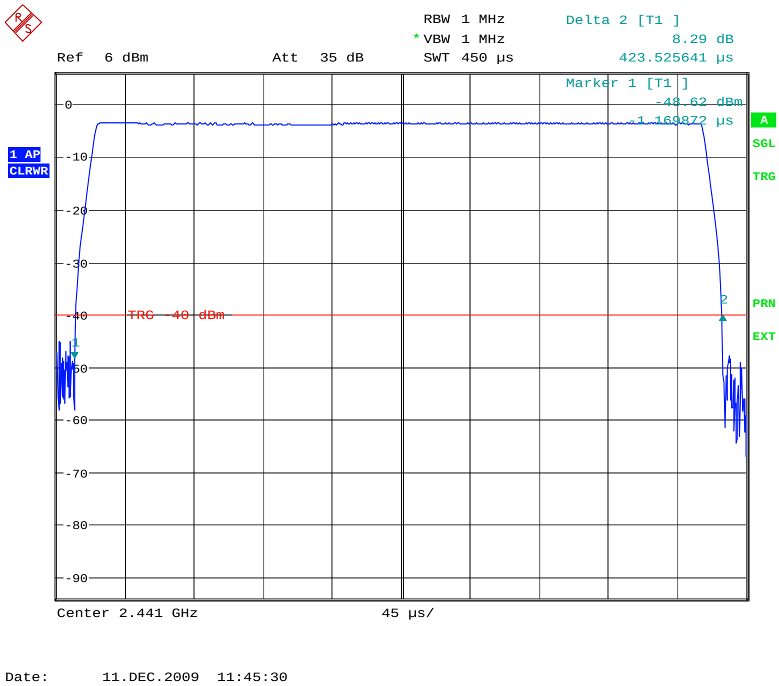
2.5.6 Environmental Conditions

	11 December 2009
Ambient Temperature	24.1-24.6°C
Relative Humidity	23.8-24.5%

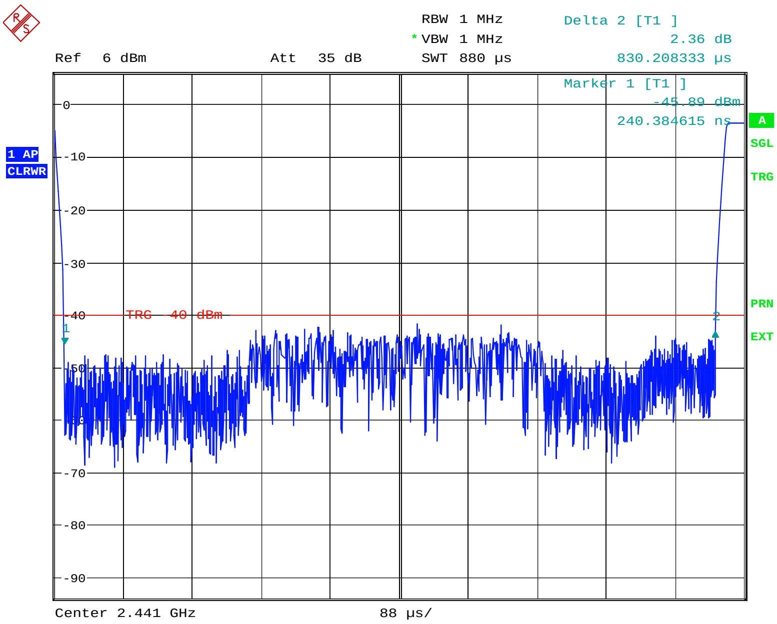
2.5.7 Test Results

DH1

On



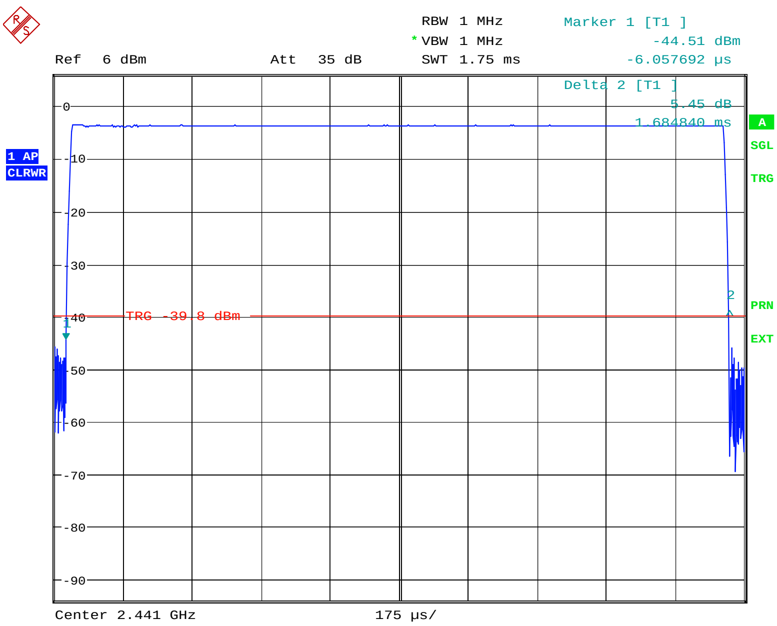
Off



Date: 11.DEC.2009 11:54:39

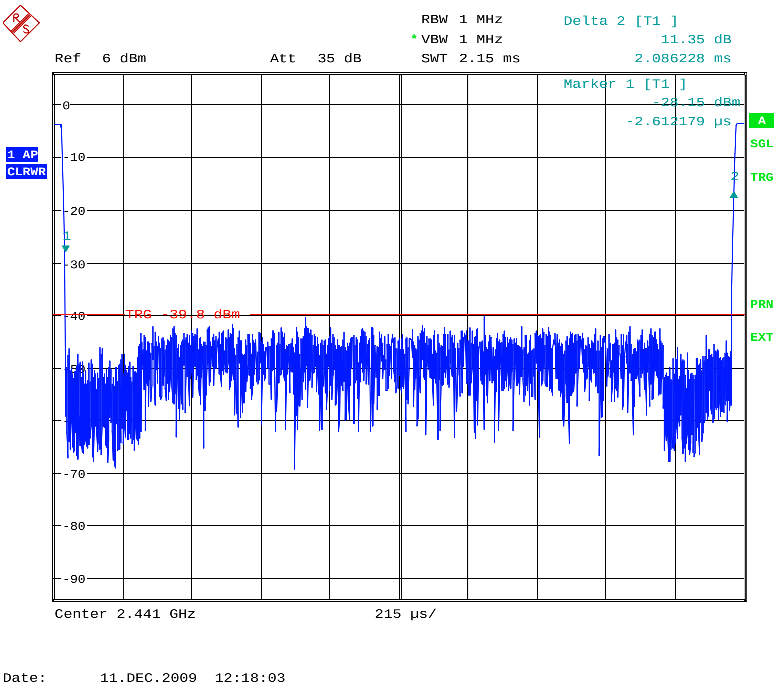
DH3

On



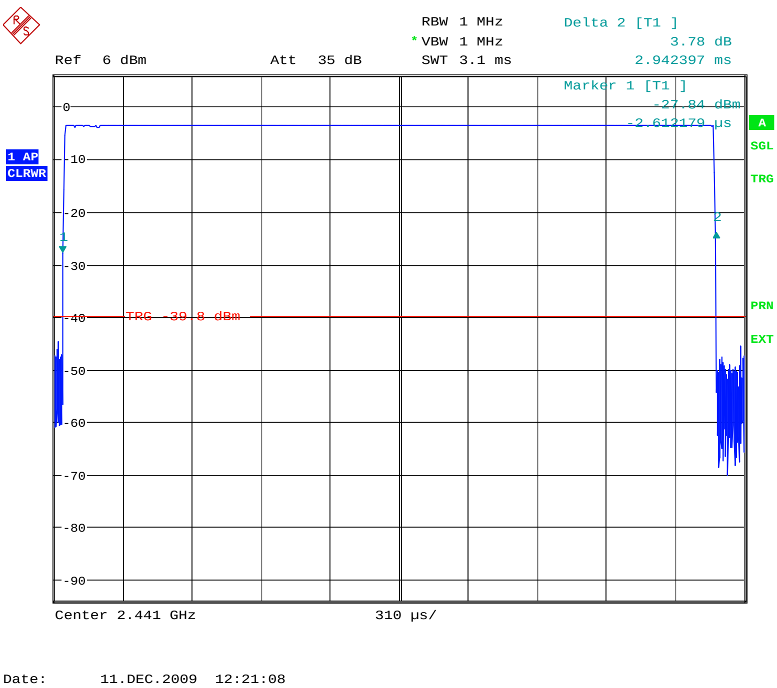
Date: 11.DEC.2009 12:16:07

Off

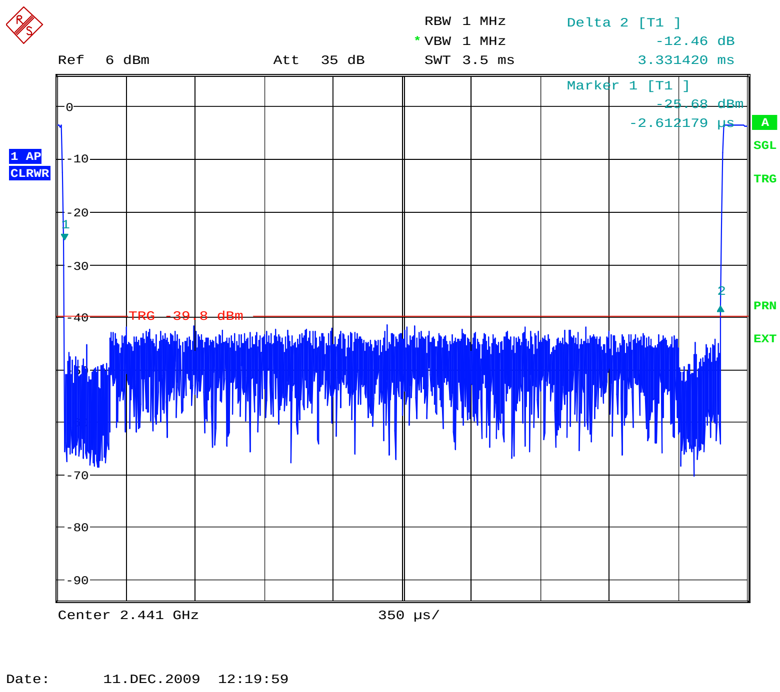

RBW 1 MHz
*VBW 1 MHz
SWT 2.15 ms
Delta 2 [T1]
11.35 dB
2.086228 ms
Ref 6 dBm
Att 35 dB
Marker 1 [T1]
-28.15 dBm
-2.612179 µs
1 AP
CLRWR
A
SGL
TRG
PRN
EXT
TRG -39.8 dBm
Center 2.441 GHz
215 µs/
Date: 11.DEC.2009 12:18:03

DH5

On


RBW 1 MHz
*VBW 1 MHz
SWT 3.1 ms
Delta 2 [T1]
3.78 dB
2.942397 ms
Ref 6 dBm
Att 35 dB
Marker 1 [T1]
-27.84 dBm
-2.612179 µs
1 AP
CLRWR
A
SGL
TRG
PRN
EXT
TRG -39.8 dBm
Center 2.441 GHz
310 µs/
Date: 11.DEC.2009 12:21:08

Off



RBW 1 MHz
* VBW 1 MHz
SWT 3.5 ms
Delta 2 [T1]
-12.46 dB
3.331420 ms
Ref 6 dBm
Att 35 dB
Marker 1 [T1]
-25.68 dBm
-2.612179 µs
1 AP
CLRWR
A
SGL
TRG
PRN
EXT
TRG -39.8 dBm
0
-10
-20
-30
-40
-70
-80
-90
Center 2.441 GHz
350 µs/
Date: 11.DEC.2009 12:19:59

2.6 CHANNEL SEPARATION

2.6.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (a)(1)
RSS-210, Clause A8.1(b)

2.6.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.6.3 Date of Test and Modification State

11 December 2009 - Modification State 0

2.6.4 Test Equipment Used

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

2.6.5 Test Procedure

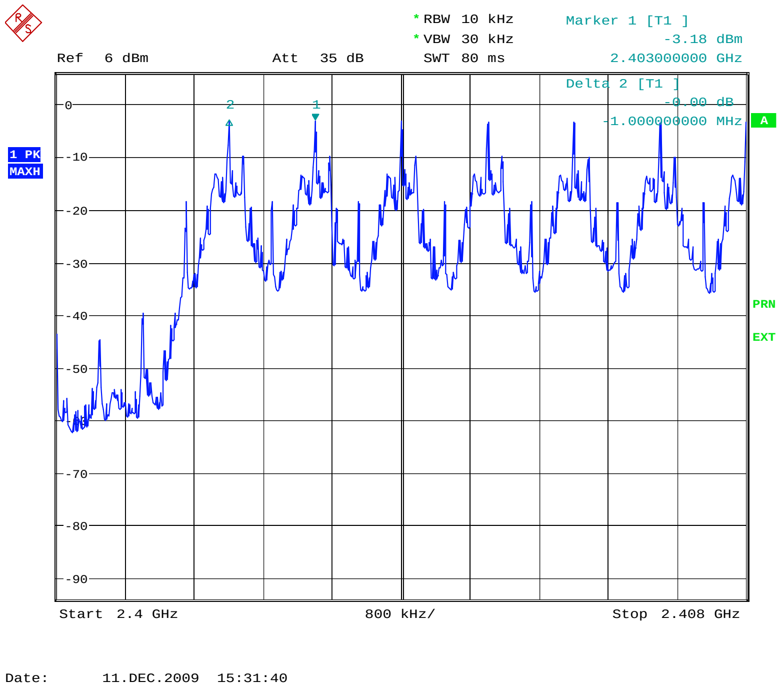
Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

The EUT was transmitted at maximum power into a Spectrum Analyser. The trace was set to Max Hold to store several adjacent channels on screen. Using the marker delta function, the markers were positioned to show the separation between adjacent channels.

2.6.6 Environmental Conditions

	11 December 2009
Ambient Temperature	24.7°C
Relative Humidity	26.5%

2.6.7 Test Results



Limit Clause

15.247 (a)(1) for FCC
A8.1(b) for RSS-210

Limit	>25kHz

2.7 NUMBER OF HOPPING CHANNELS

2.7.1 Specification Reference

FCC CFR 47 Part 15, Clause 15.247 (a)(1)(iii)
RSS-210, Clause A8.1(d)

2.7.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.7.3 Date of Test and Modification State

11 December 2009 - Modification State 0

2.7.4 Test Equipment Used

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

The EUT was connected to a Spectrum Analyser via a cable. The EUT was set to transmit on maximum power and hopping on all channels. The span was adjusted to show the individual channels. To reasonably display the number of channels, the occupied band was split into four traces. The display trace was set to Max Hold and the plots recorded.

2.7.5 Test Procedure

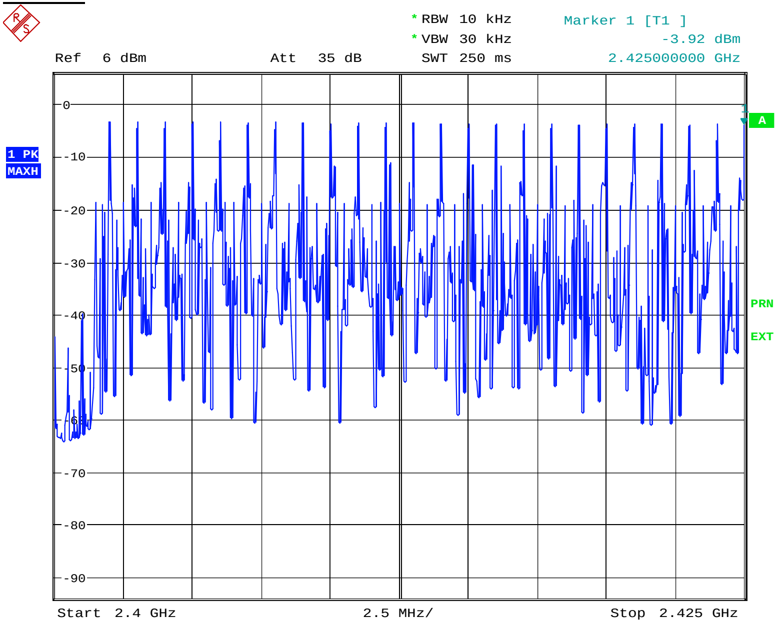
Test Performed in accordance with FCC CFR 47 Part 15 and RSS-210.

2.7.6 Environmental Conditions

	11 December 2009
Ambient Temperature	24.1°C
Relative Humidity	27.1%

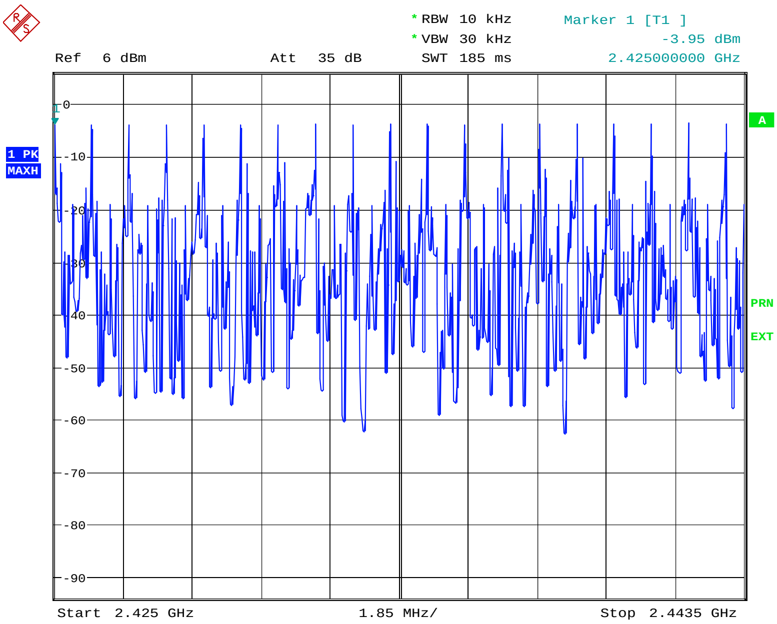
2.7.7 Test Results

0 to 23



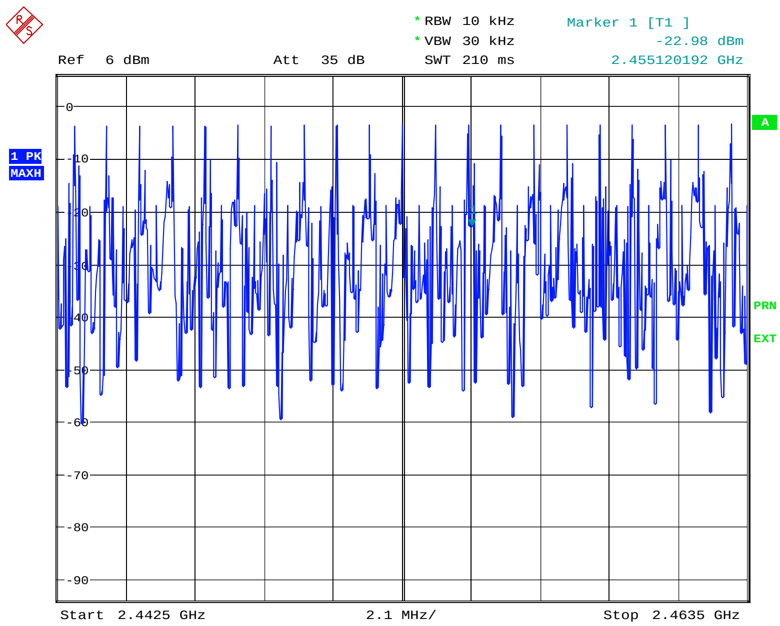
Date: 11.DEC.2009 15:56:07

23 to 43



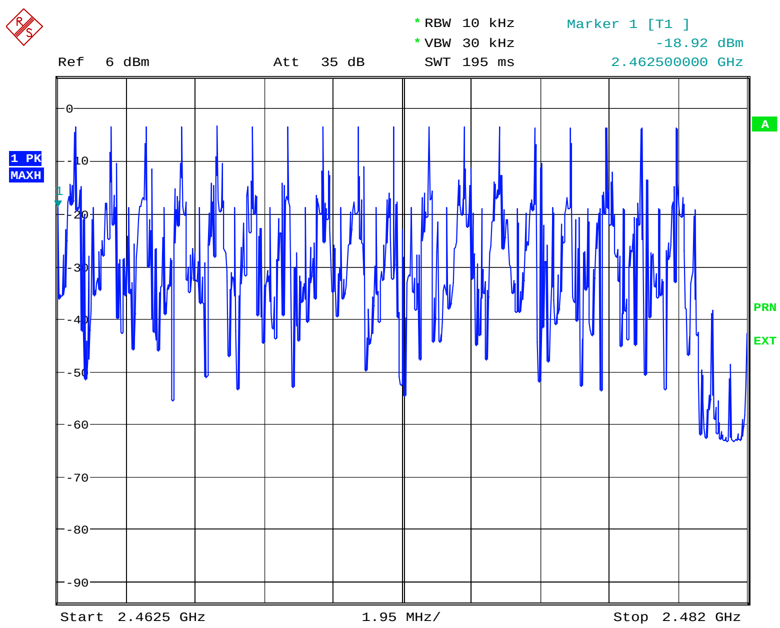
Date: 11.DEC.2009 16:00:18

43 to 63



Date: 11.DEC.2009 16:05:54

64 to 79



Date: 11.DEC.2009 16:14:58

Limit Clause

15.247 (a)(1)(iii) for FCC and A8.1(d) for RSS-210

Limit	≥75 channels

2.8 RADIATED EMISSIONS (ENCLOSURE PORT)

2.8.1 Specification Reference

FCC CFR 47 Part 15C, Clause 15.247 (a)(2)
RSS-210, Clause A8.2(a)

2.8.2 Equipment Under Test

STP8040 Portable Tetra Radio, S/N: 2PN40092294Y10S

2.8.3 Date of Test and Modification State

05 January 2010 - Modification State 0

2.8.4 Test Equipment Used

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

2.8.5 Test Method and Operating Modes

The test was applied in accordance with the test method requirements of FCC CFR 47 Part 15C and RSS-210.

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

Configuration 1 - Mode 1
- Mode 2
- Mode 3

2.8.6 Environmental Conditions

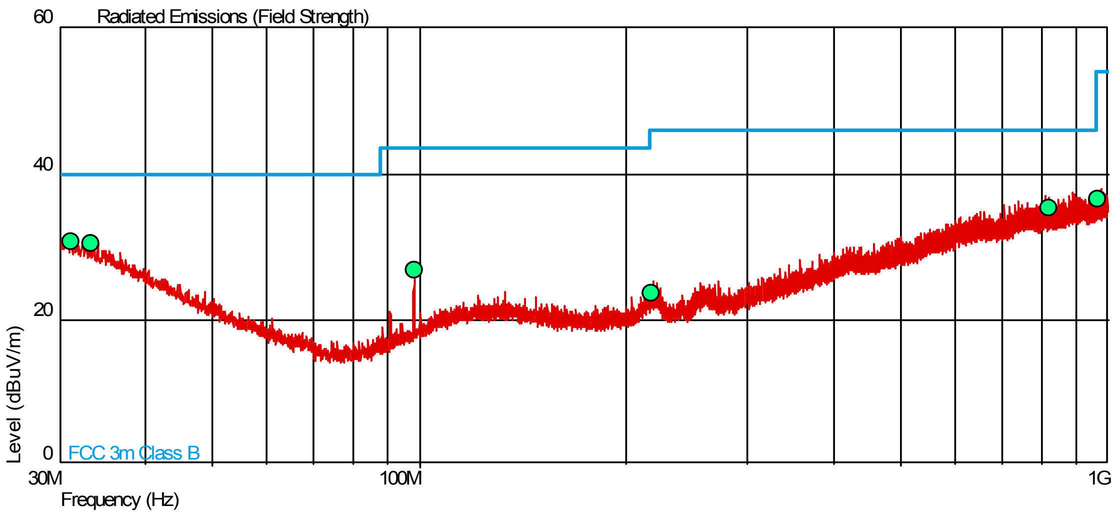
	05 January 2010
Ambient Temperature	16°C
Relative Humidity	29%
Atmospheric Pressure	1013mbar

2.8.7 Test Results

For the period of test the EUT met the requirements of FCC CFR 47 Part 15C and RSS-210 2009 for Radiated Emissions (Enclosure Port).

The test results are shown below.

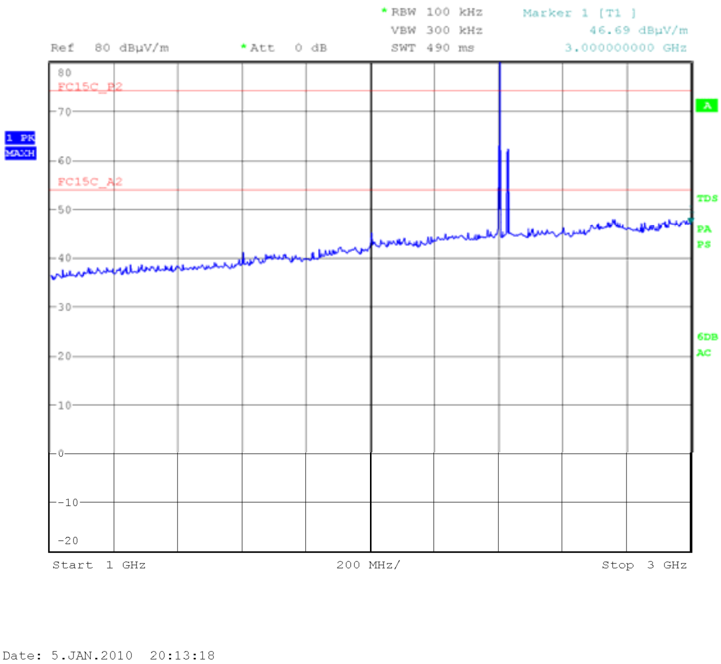
Configuration 1 - Mode 1



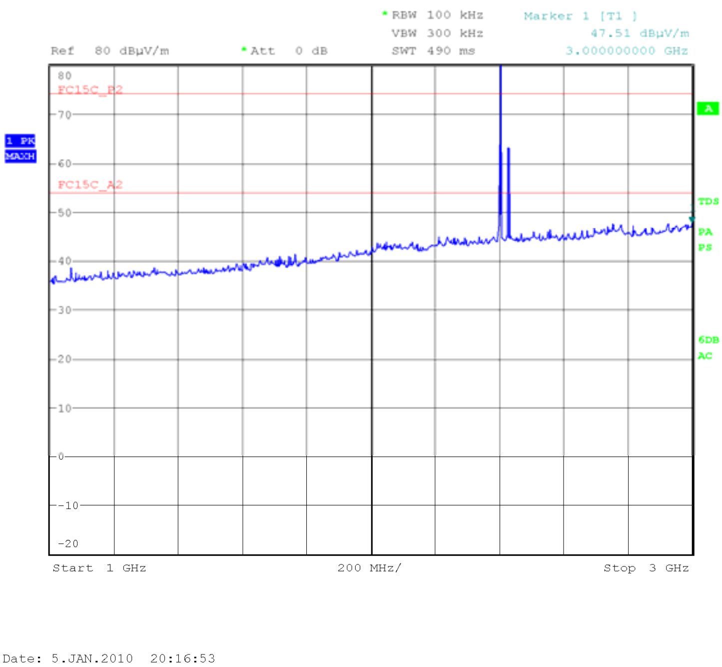
Frequency (MHz)	QP Level (dBuV/m)	QP Level (uV/m)	QP Limit (dBuV/m)	QP Limit (uV/m)	QP Margin (dBuV/m)	QP Margin (uV/m)	Angle (deg)	Height (m)	Polarity
31.164	30.7	34.3	40.0	100	-9.3	65.7	0	1.00	Vertical
33.324	30.3	32.7	40.0	100	-9.7	67.3	0	1.00	Horizontal
98.146	26.8	21.9	43.5	150	-16.7	128.1	0	1.00	Vertical
217.393	23.5	15.0	46.0	200	-22.5	185.0	0	1.00	Vertical
820.100	35.1	56.9	46.0	200	-10.9	143.1	0	1.00	Vertical
970.191	36.5	66.8	54.0	501	-17.5	434.2	0	1.00	Vertical

1GHz to 3GHz

Vertical

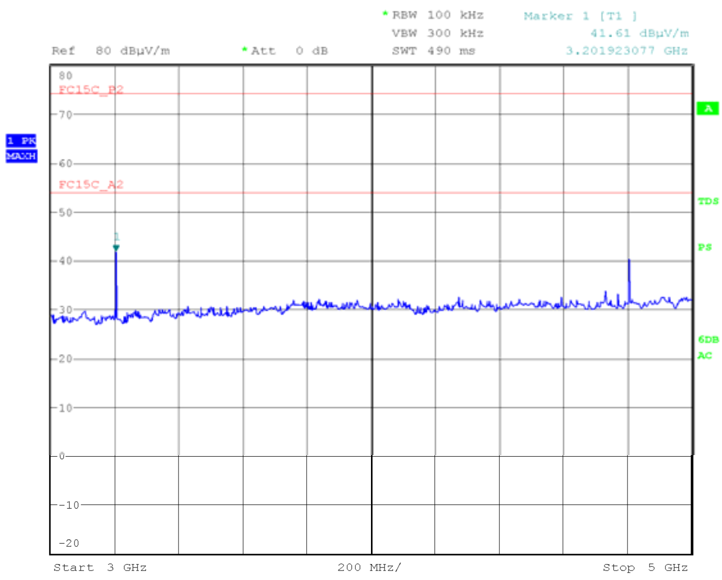


Horizontal



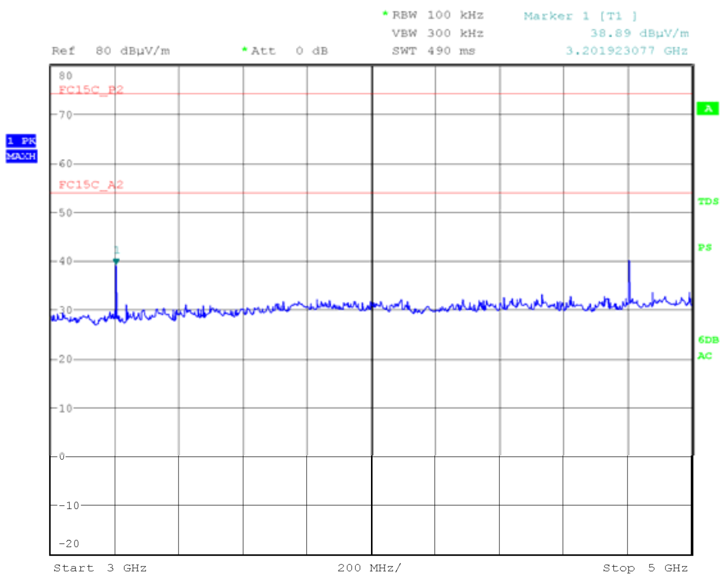
3GHz to 5GHz

Vertical



Date: 5.JAN.2010 20:29:56

Horizontal

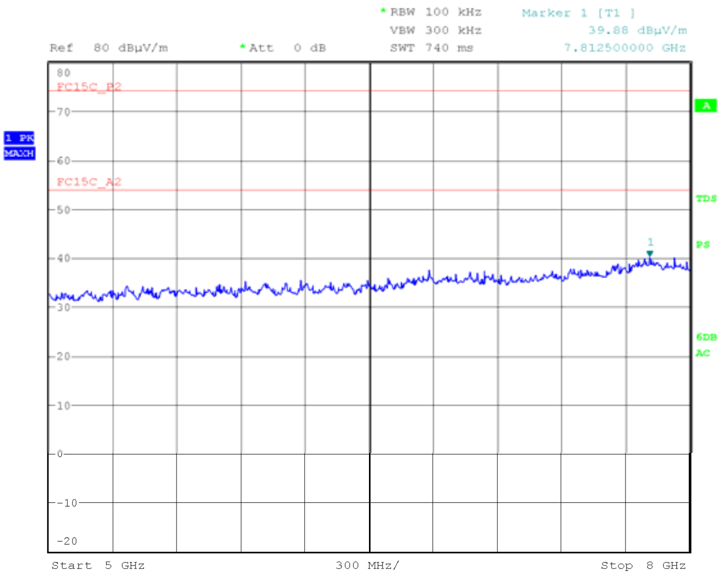


Date: 5.JAN.2010 20:33:40

Product Service

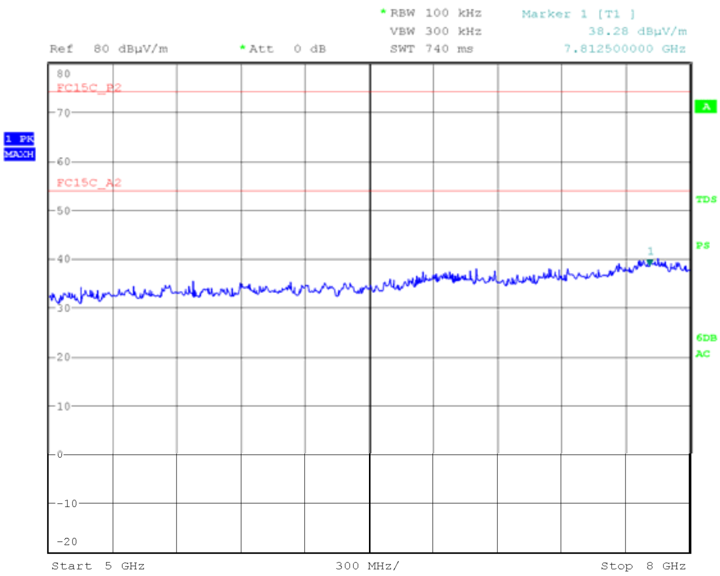
5GHz to 8GHz

Vertical



Date: 5.JAN.2010 20:31:04

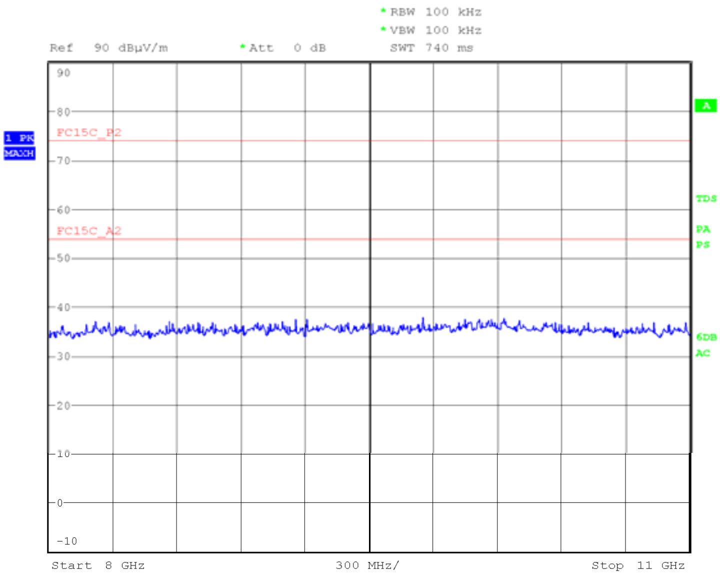
Horizontal



Date: 5.JAN.2010 20:32:31

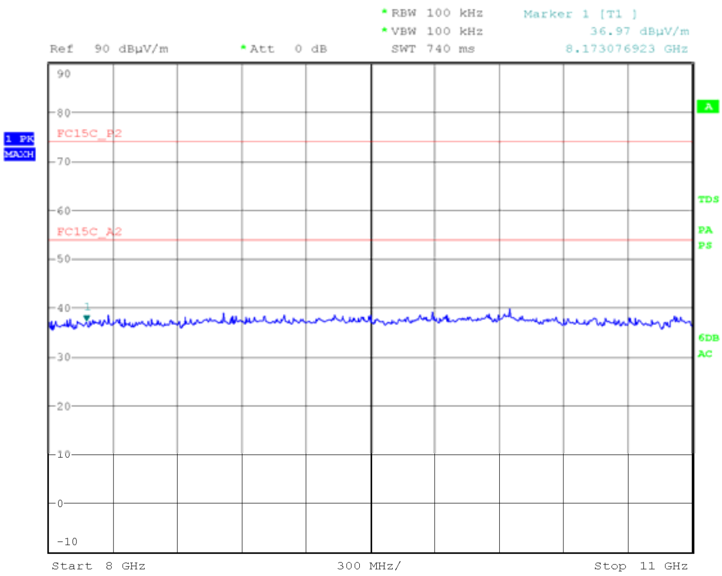
8GHz to 11GHz

Vertical



Date: 12.JAN.2010 17:53:04

Horizontal

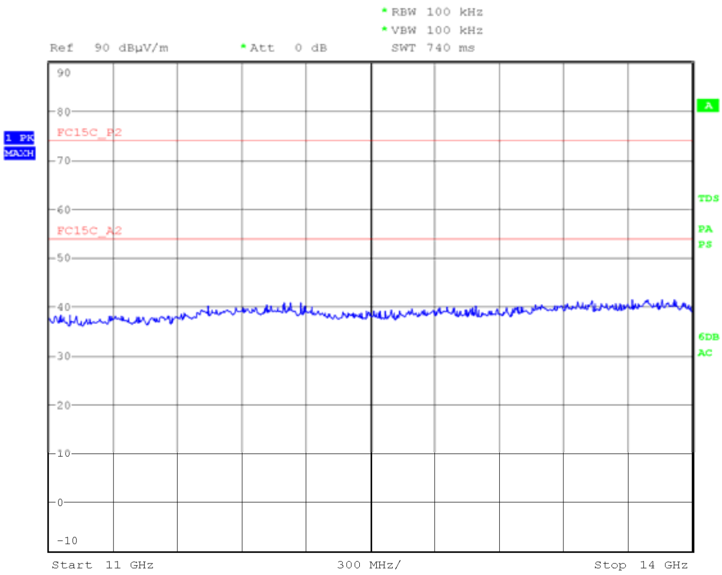


Date: 12.JAN.2010 18:11:30

Product Service

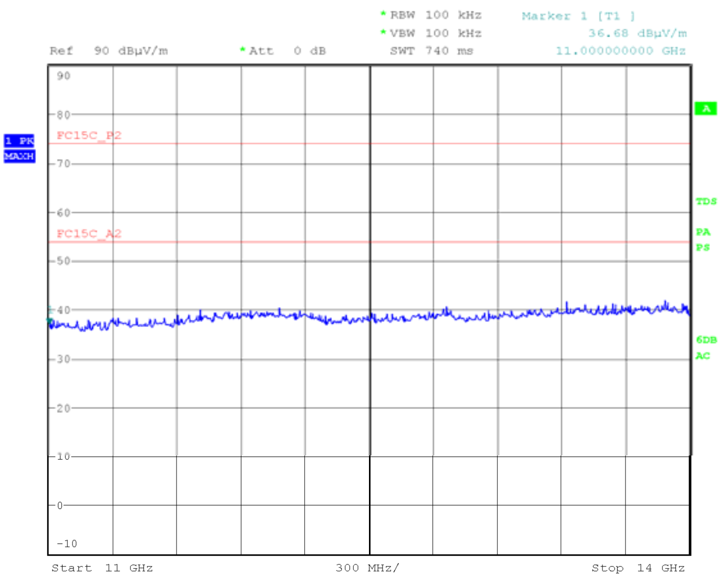
11GHz to 14GHz

Vertical



Date: 12.JAN.2010 17:56:25

Horizontal

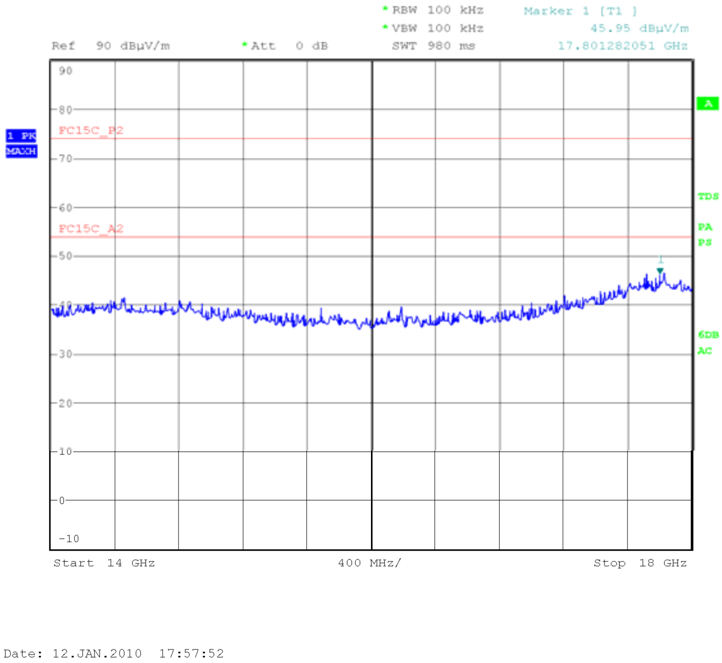


Date: 12.JAN.2010 18:13:02

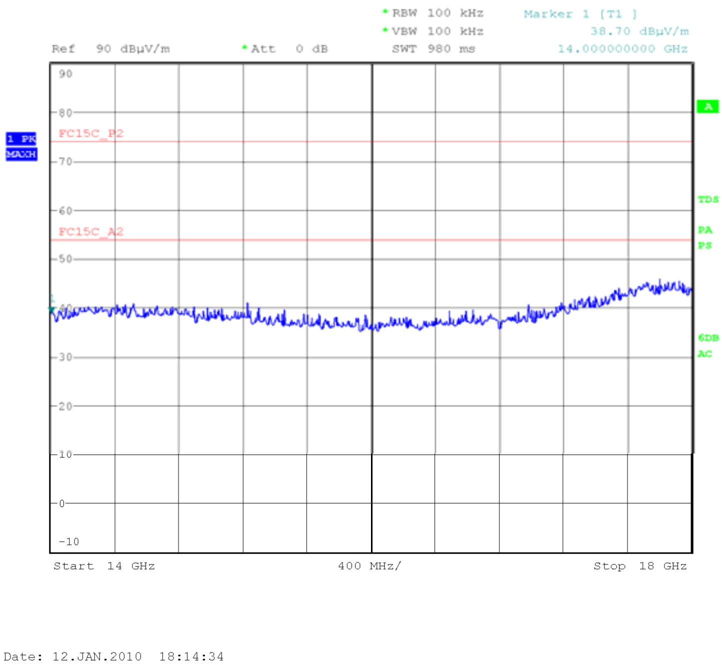
Product Service

14GHz to 18GHz

Vertical

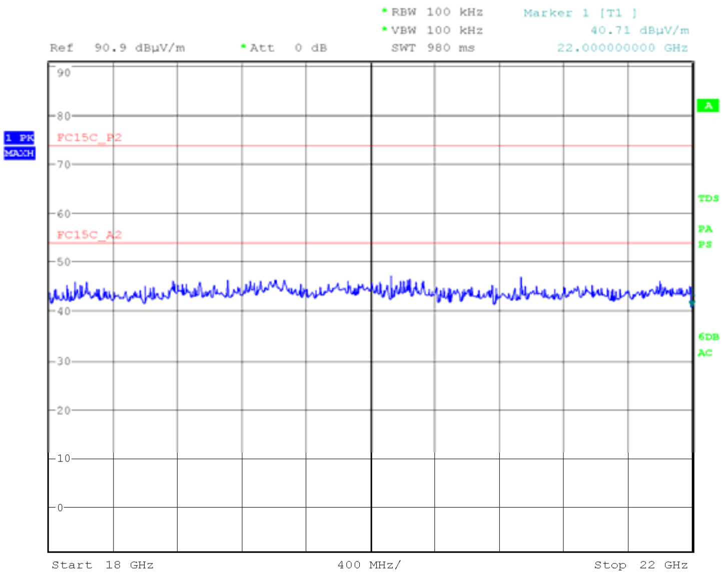


Horizontal



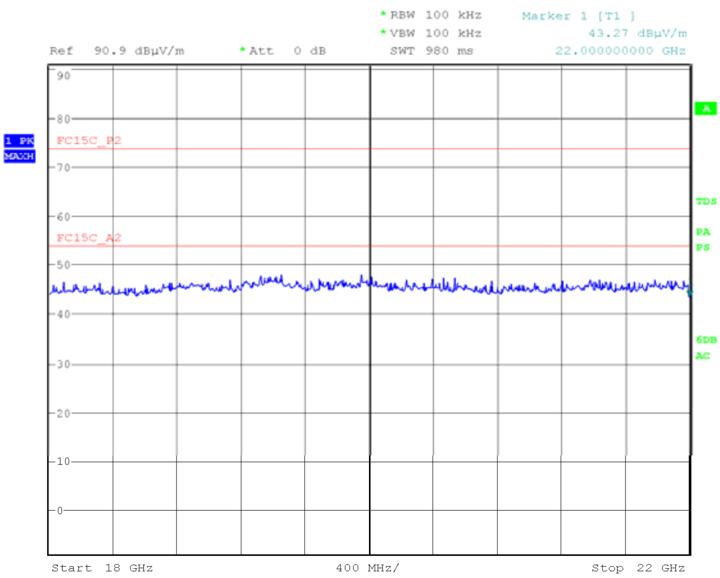
18GHz to 22GHz

Vertical



Date: 12.JAN.2010 19:48:12

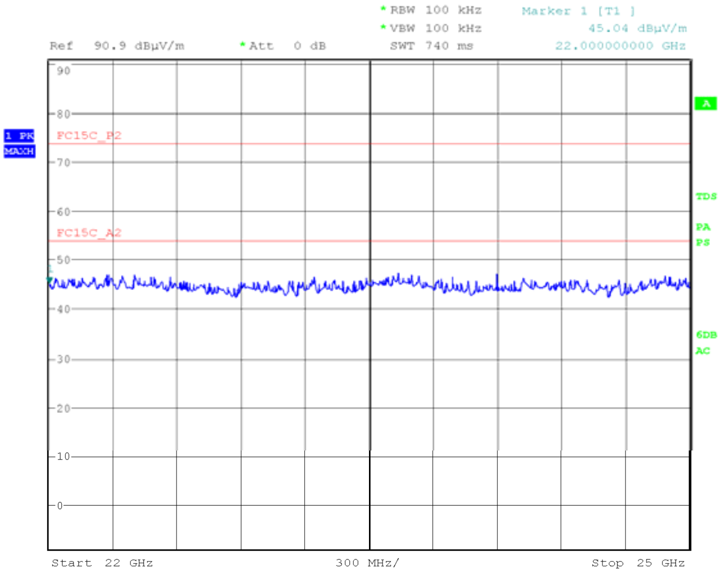
Horizontal



Date: 12.JAN.2010 19:53:20

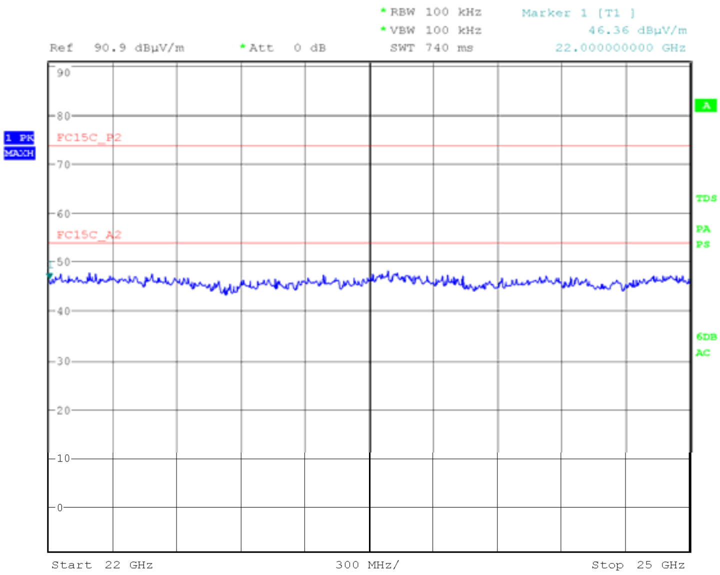
22GHz to 25GHz

Vertical



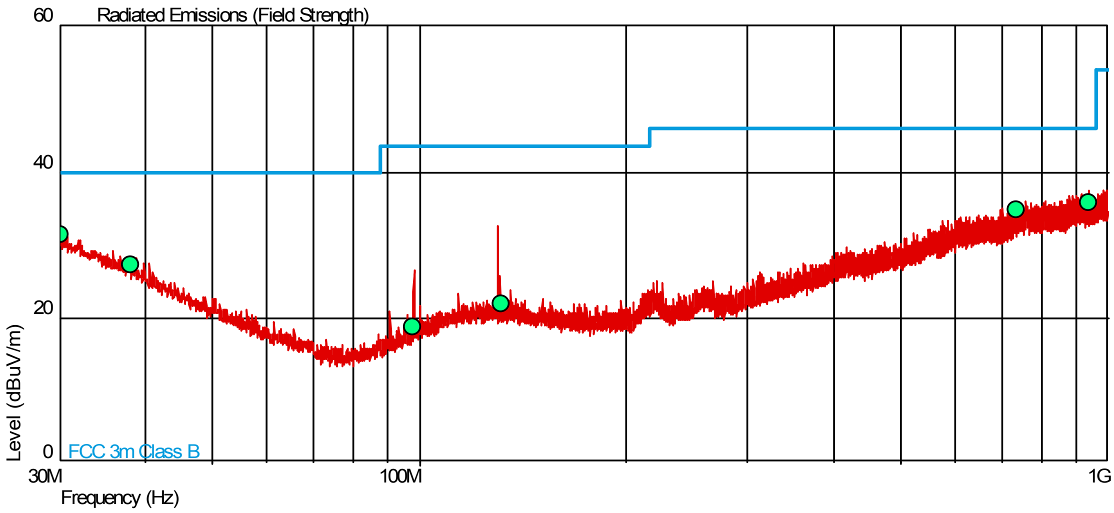
Date: 12.JAN.2010 19:50:55

Horizontal



Date: 12.JAN.2010 19:55:38

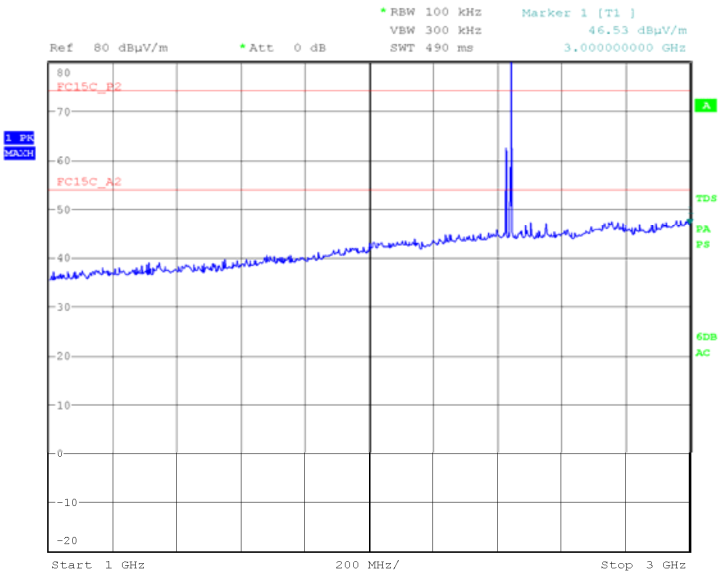
Configuration 1 - Mode 2



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
30.170	31.2	36.3	40.0	100	-8.8	63.7	0	1.00	Vertical
38.132	27.1	22.6	40.0	100	-12.9	77.4	0	1.00	Horizontal
97.748	18.7	8.6	43.5	150	-24.8	141.4	0	1.00	Vertical
131.400	21.8	12.3	43.5	150	-21.7	137.7	0	1.00	Vertical
738.478	34.7	54.3	46.0	200	-11.3	145.7	0	1.00	Horizontal
937.055	35.8	61.7	46.0	200	-10.2	138.3	0	1.00	Horizontal

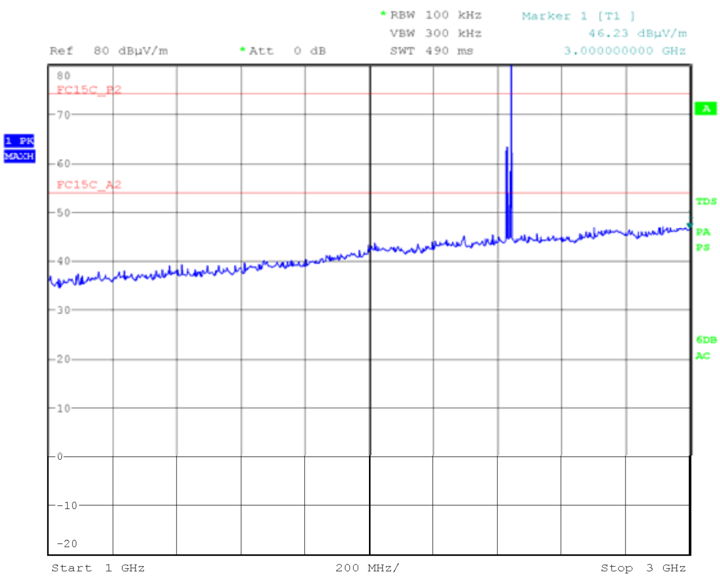
1GHz to 3GHz

Vertical



Date: 5.JAN.2010 20:06:11

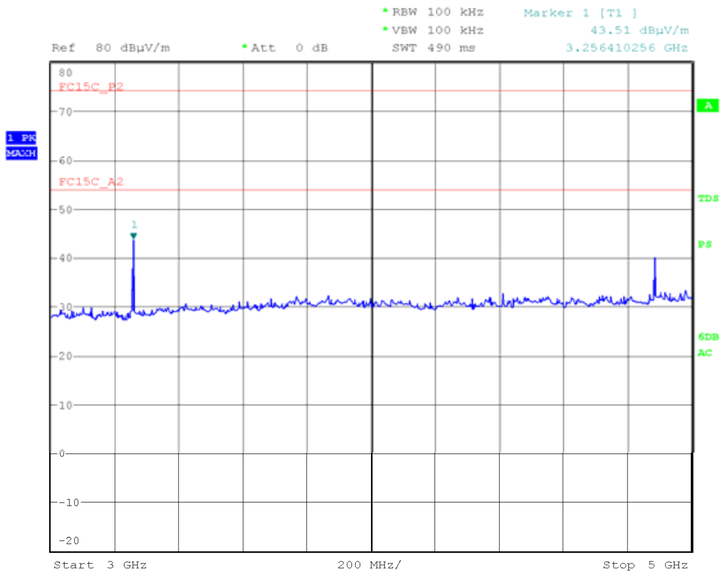
Horizontal



Date: 5.JAN.2010 20:02:54

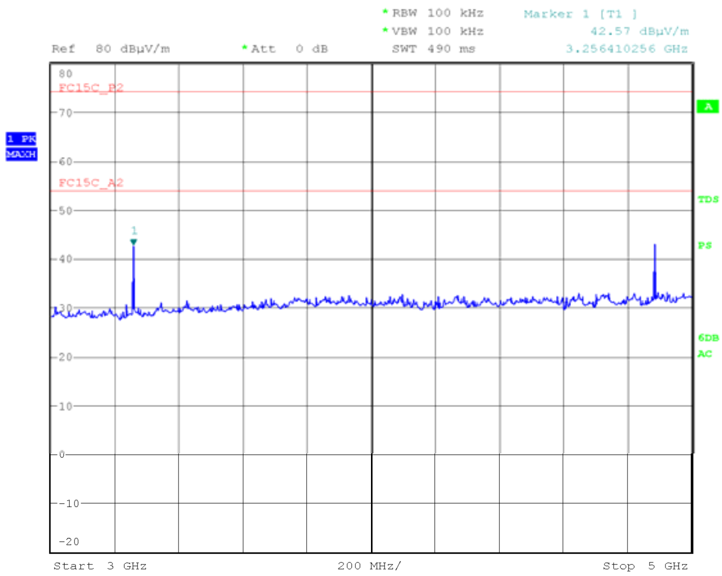
3GHz to 5GHz

Vertical



Date: 5.JAN.2010 20:59:20

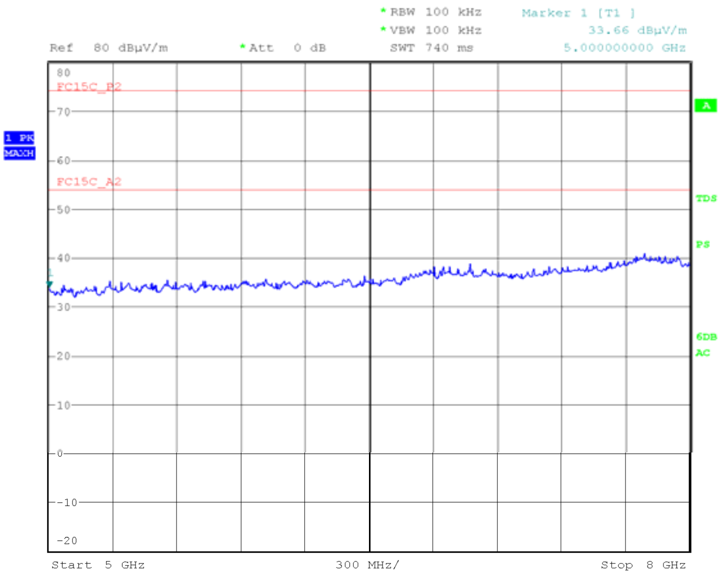
Horizontal



Date: 5.JAN.2010 21:10:26

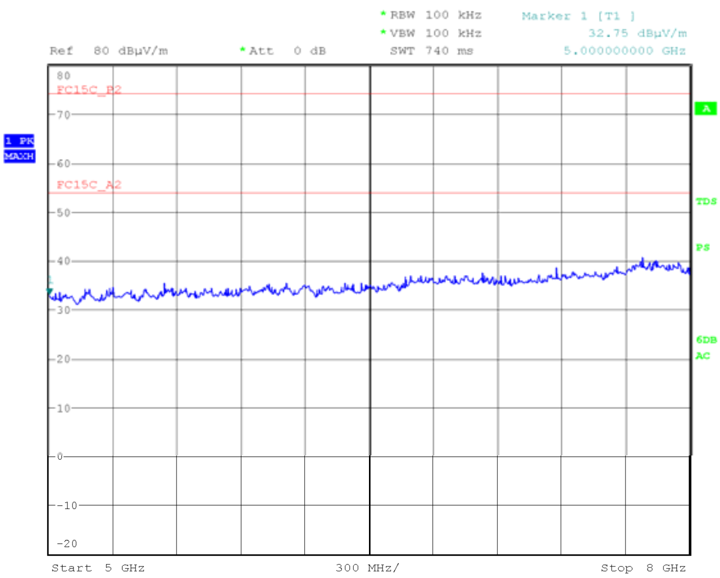
5GHz to 8GHz

Vertical



Date: 5.JAN.2010 21:27:01

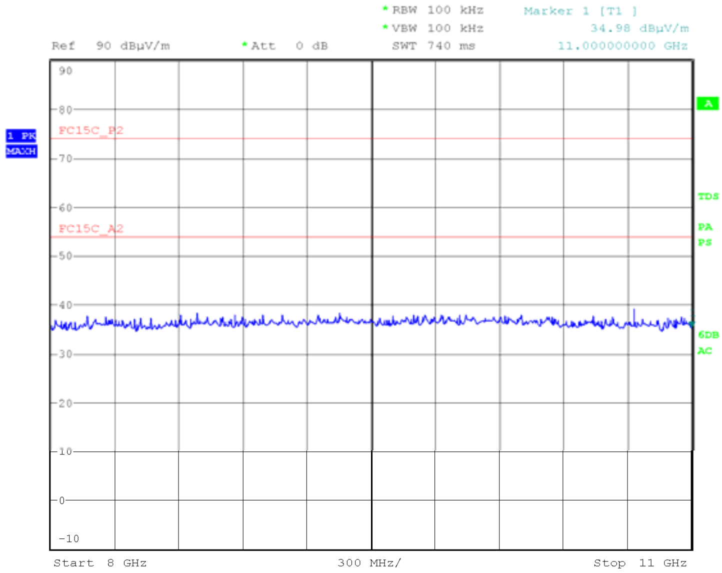
Horizontal



Date: 5.JAN.2010 21:13:15

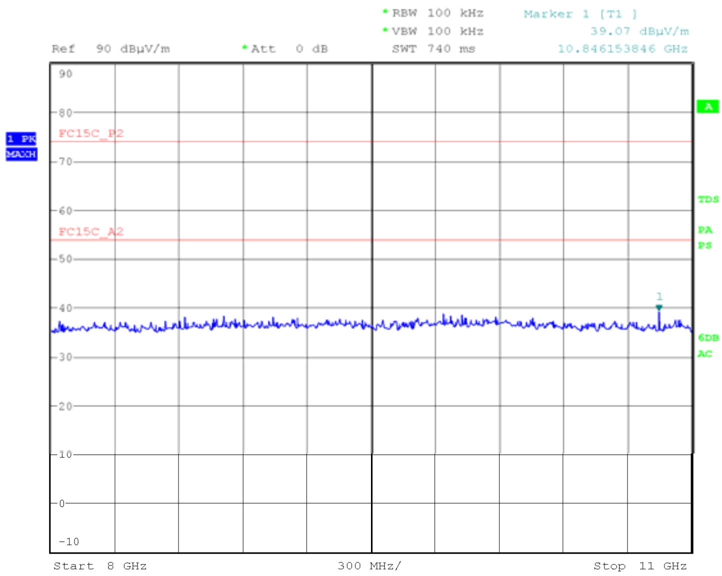
8GHz to 11GHz

Vertical



Date: 12.JAN.2010 18:24:57

Horizontal

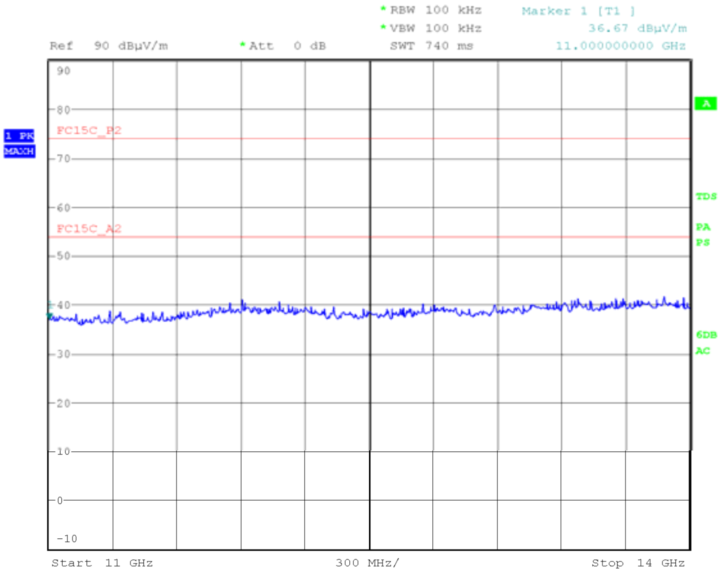


Date: 12.JAN.2010 18:18:17

Product Service

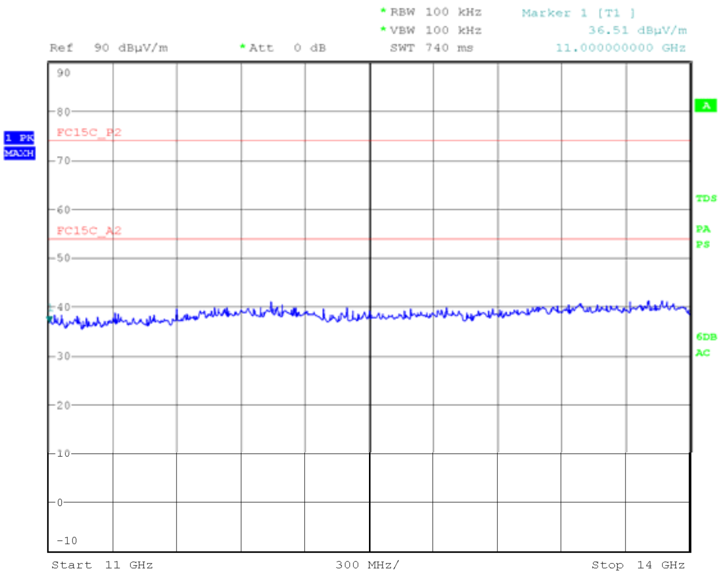
11GHz to 14GHz

Vertical



Date: 12.JAN.2010 18:26:41

Horizontal

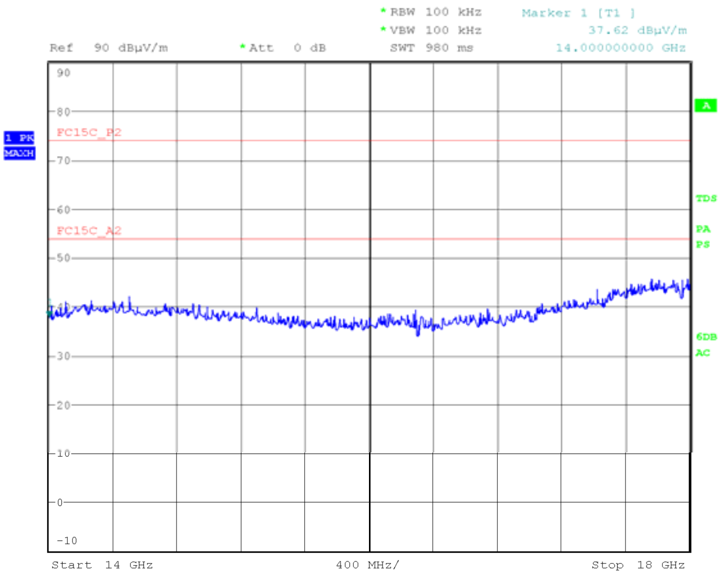


Date: 12.JAN.2010 18:19:30

Product Service

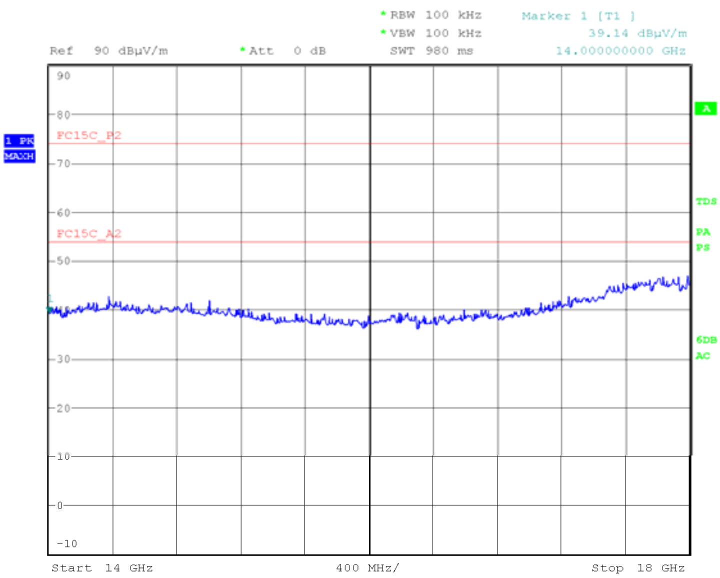
14GHz to 18GHz

Vertical



Date: 12.JAN.2010 18:23:35

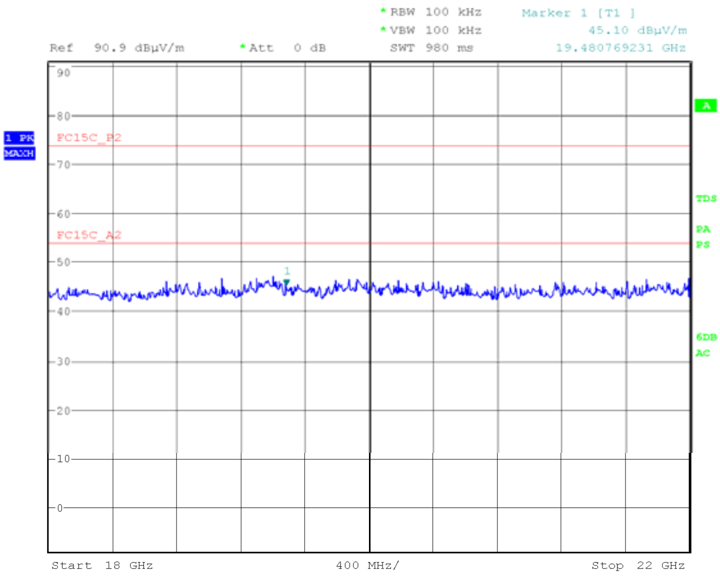
Horizontal



Date: 12.JAN.2010 18:20:15

18GHz to 22GHz

Vertical



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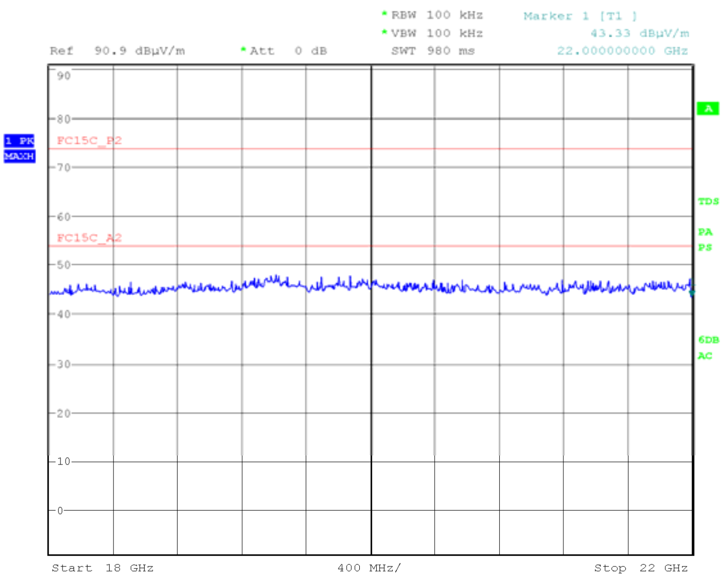
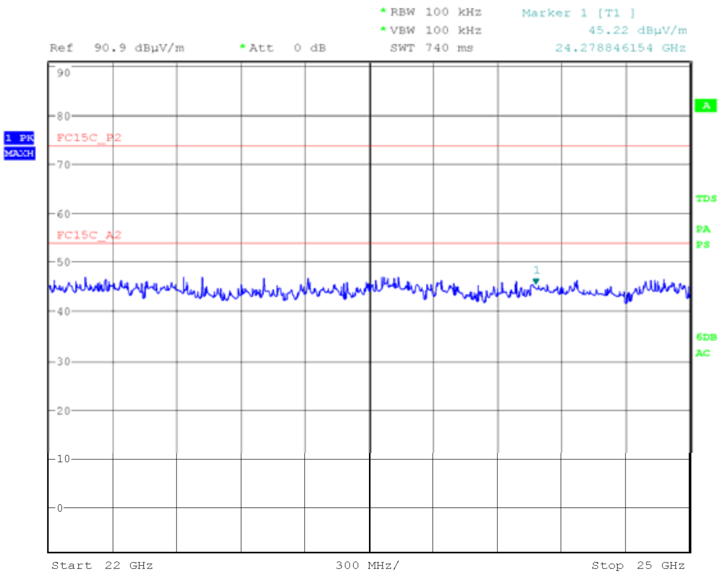
Horizontal



Date: 12.JAN.2010 19:40:22

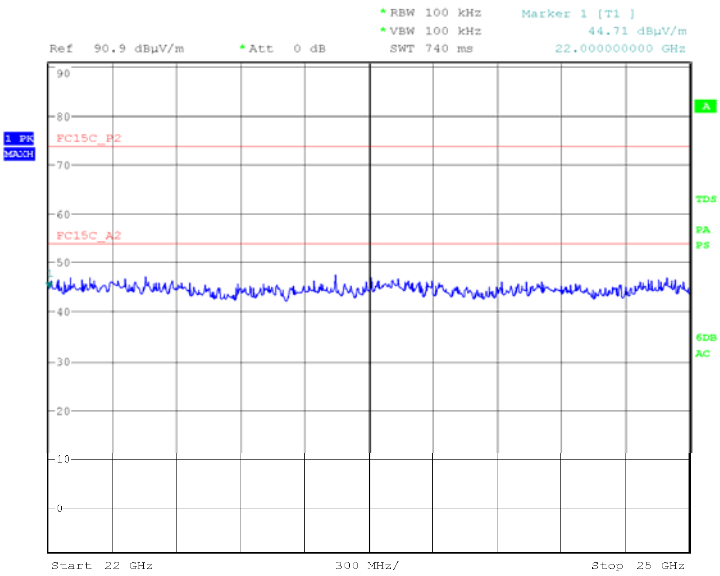
22GHz to 25GHz

Vertical



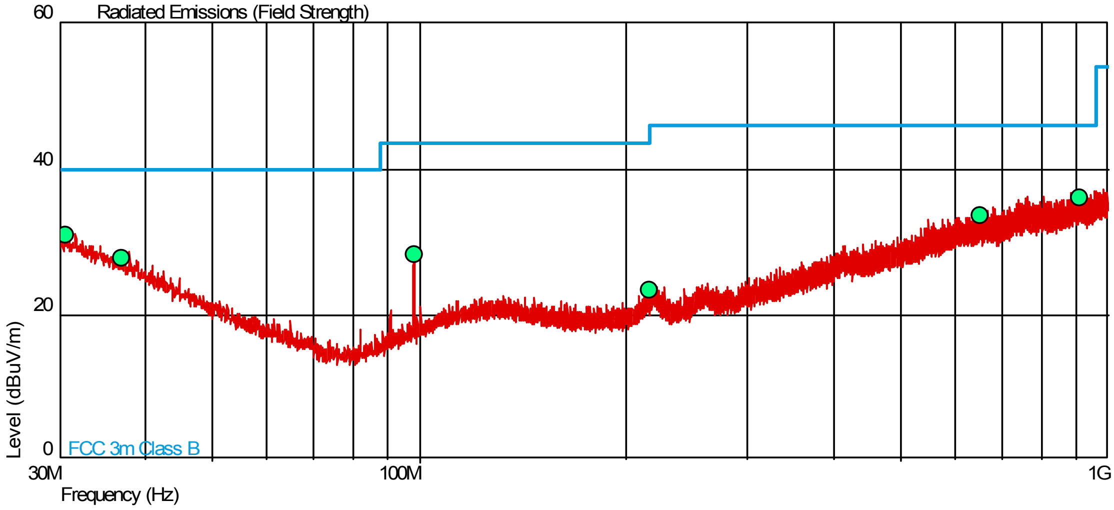
Date: 12.JAN.2010 19:38:03

Horizontal



Date: 12.JAN.2010 19:44:59

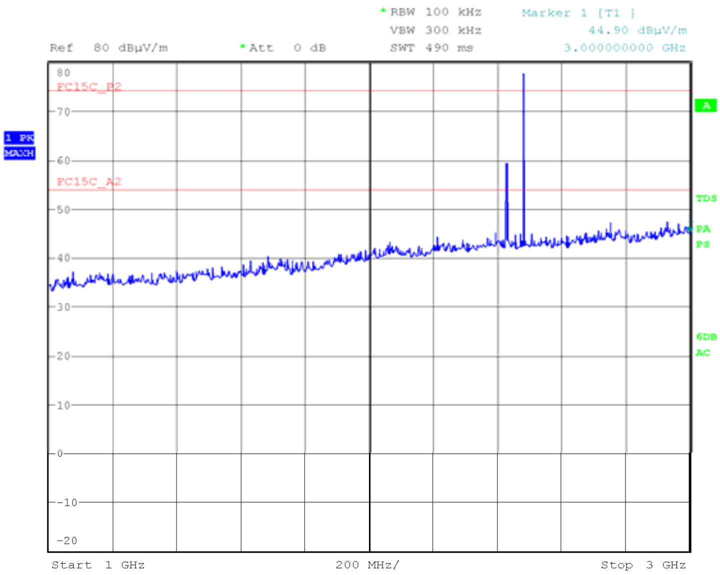
Configuration 1 - Mode 3



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
30.553	30.8	34.7	40.0	100	-9.2	65.3	0	1.00	Horizontal
36.847	27.7	24.3	40.0	100	-12.3	75.7	0	1.00	Horizontal
98.174	28.1	25.4	43.5	150	-15.4	124.6	0	1.00	Horizontal
216.608	23.4	14.8	46.0	200	-22.6	185.2	0	1.00	Vertical
653.414	33.4	46.8	46.0	200	-12.6	153.2	0	1.00	Vertical
910.237	35.9	62.4	46.0	200	-10.1	137.6	0	1.00	Vertical

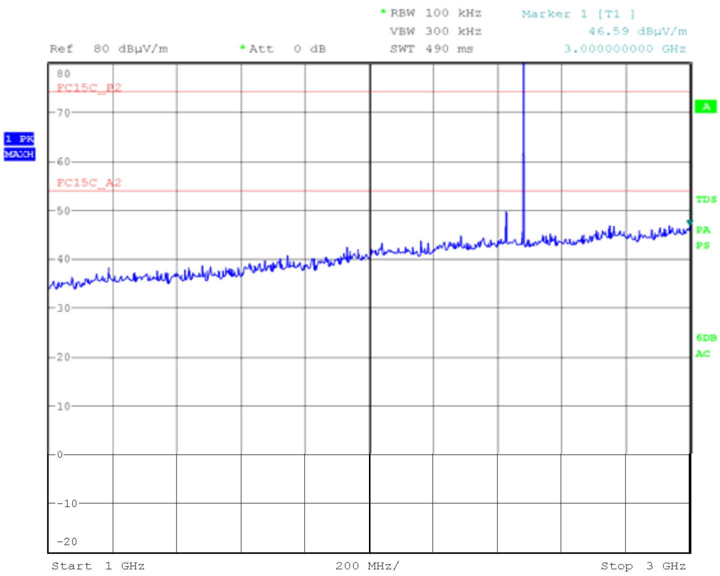
1GHz to 3GHz

Vertical



Date: 5.JAN.2010 19:58:56

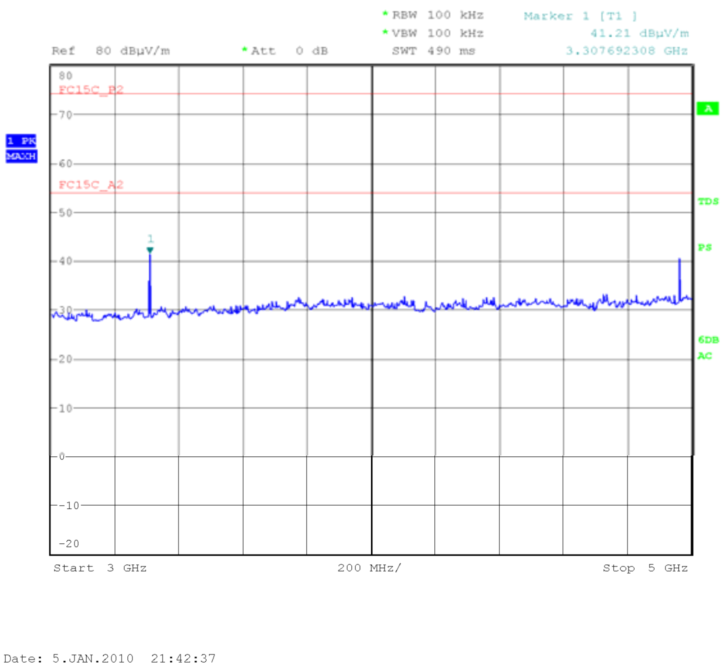
Horizontal



Date: 5.JAN.2010 20:00:50

3GHz to 5GHz

Vertical



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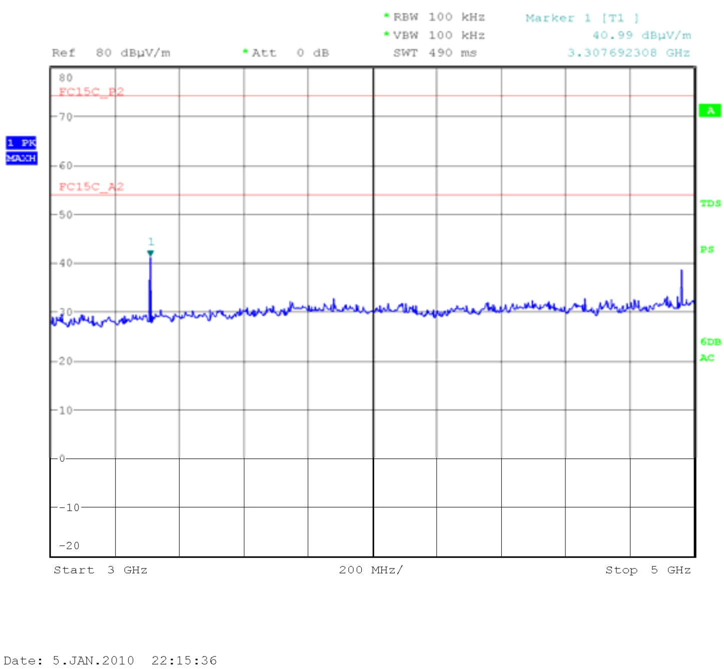
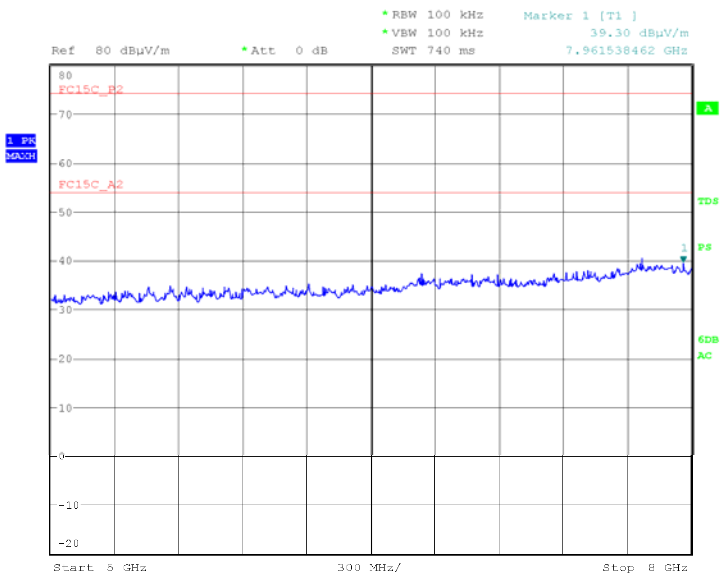


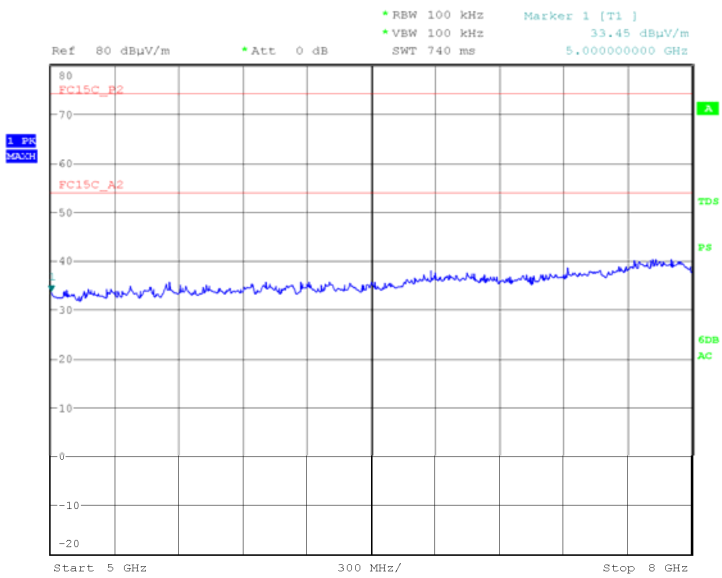
5GHz to 8GHz

Vertical



Date: 5.JAN.2010 21:57:06

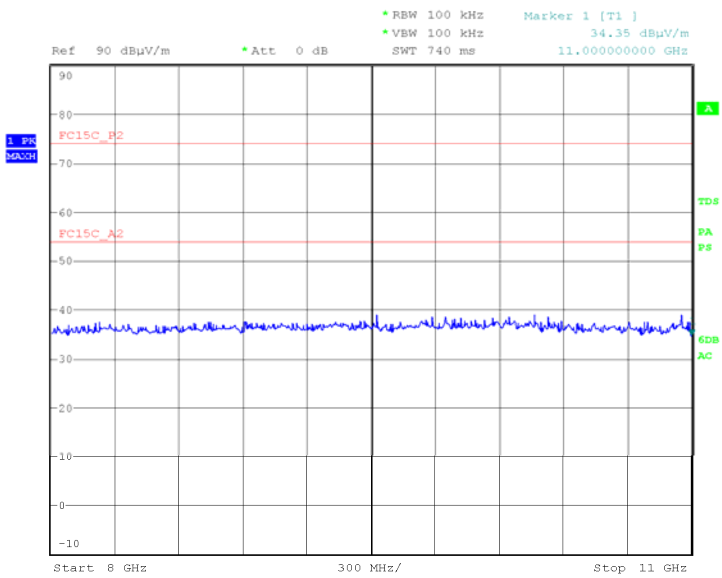
Horizontal



Date: 5.JAN.2010 22:14:28

8GHz to 11GHz

Vertical



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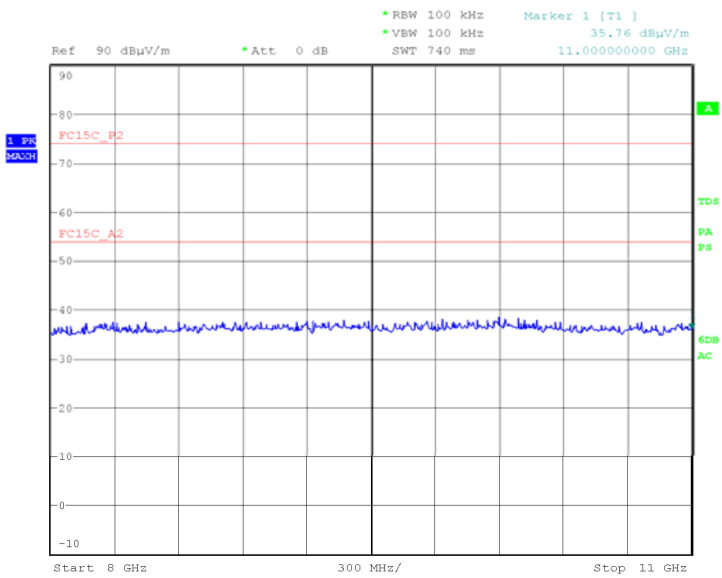
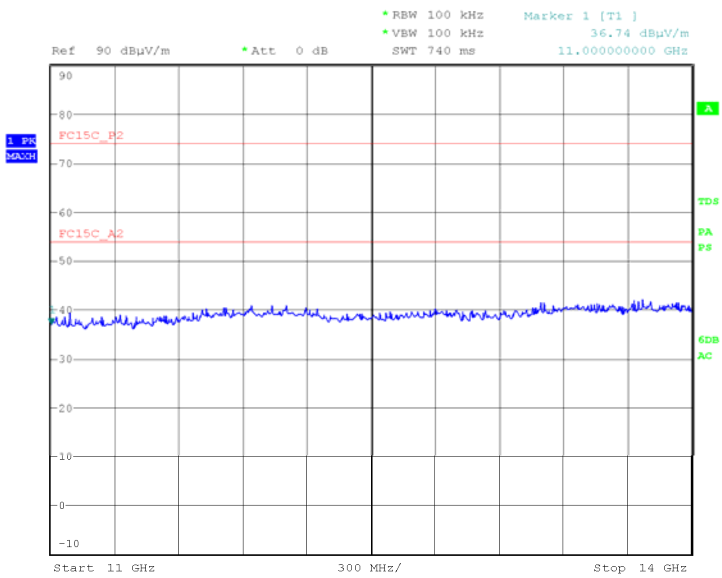
Horizontal



Date: 12.JAN.2010 18:52:56

11GHz to 14GHz

Vertical



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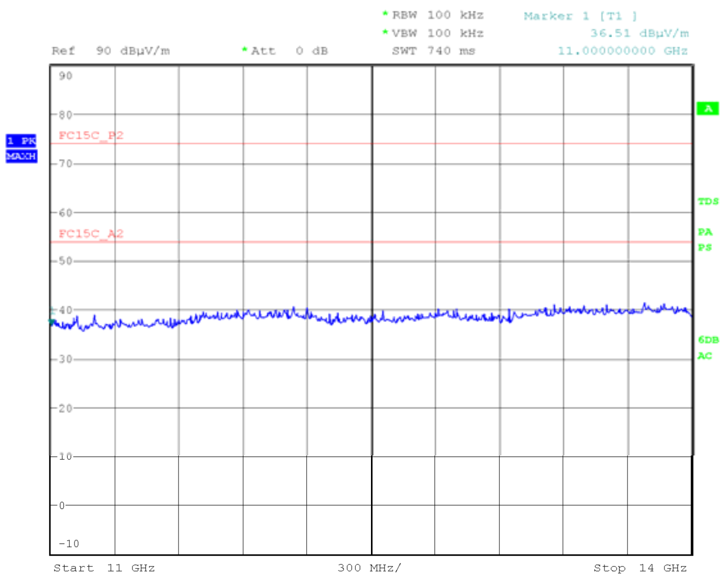
Horizontal



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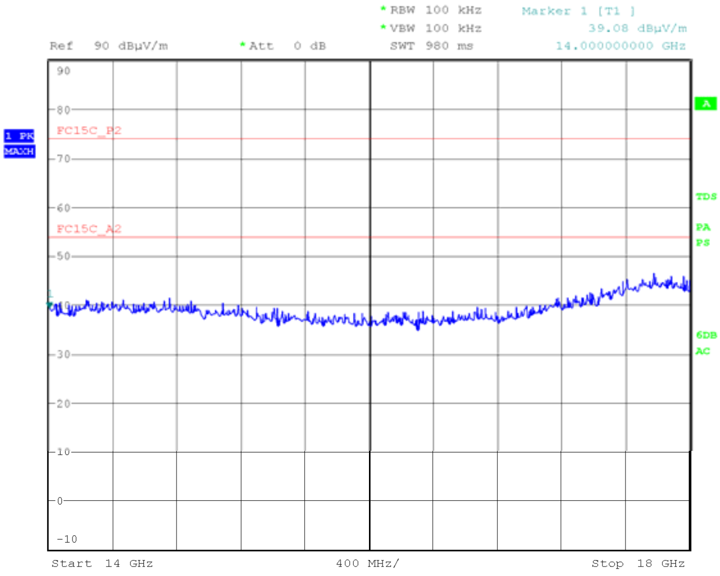
14GHz to 18GHz

Vertical



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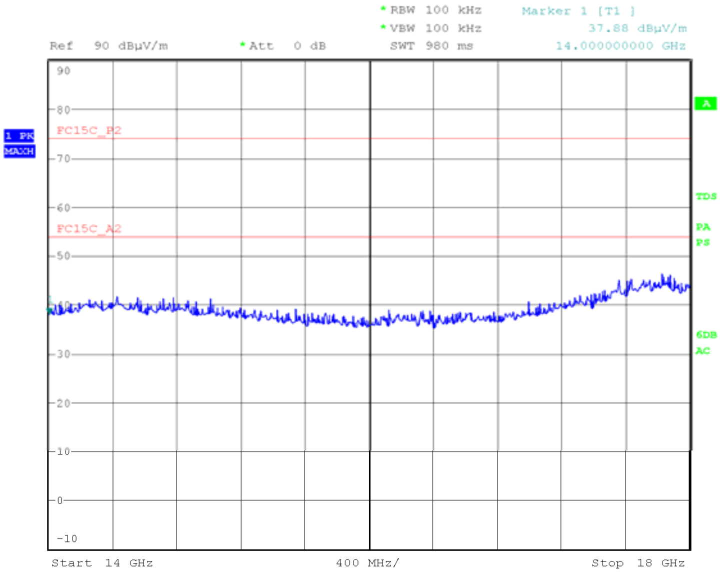

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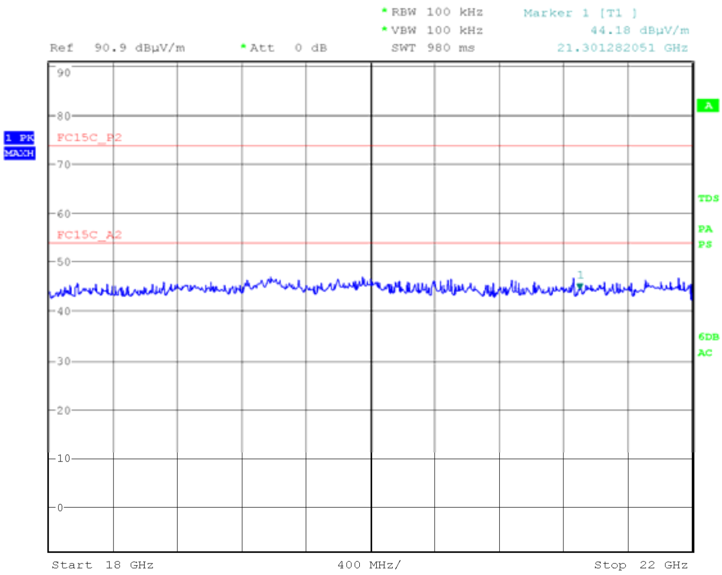
18GHz to 22GHz

Vertical



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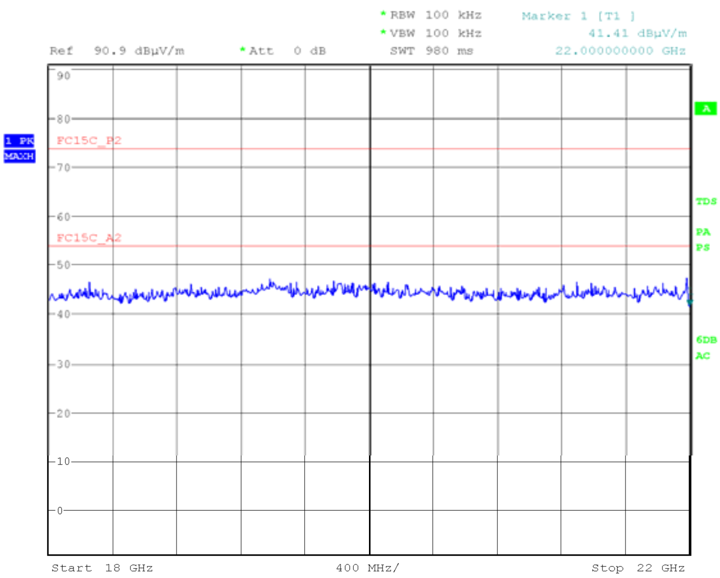
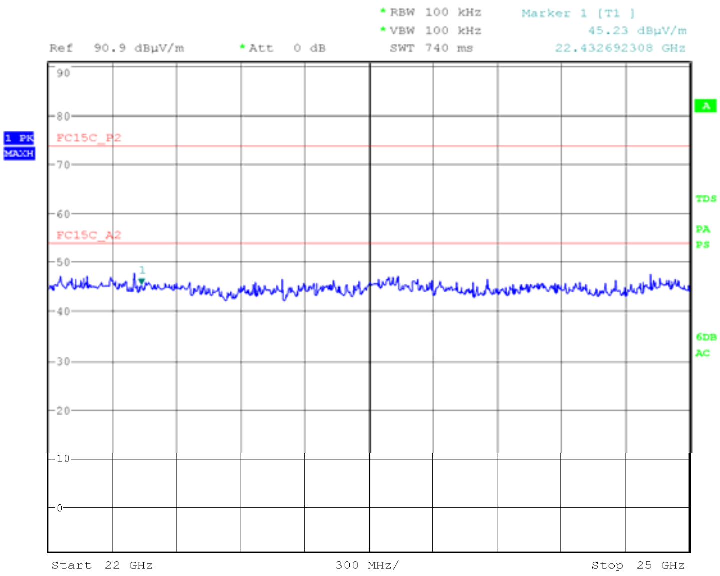
Horizontal



Date: 12.JAN.2010 19:20:03

22GHz to 25GHz

Vertical



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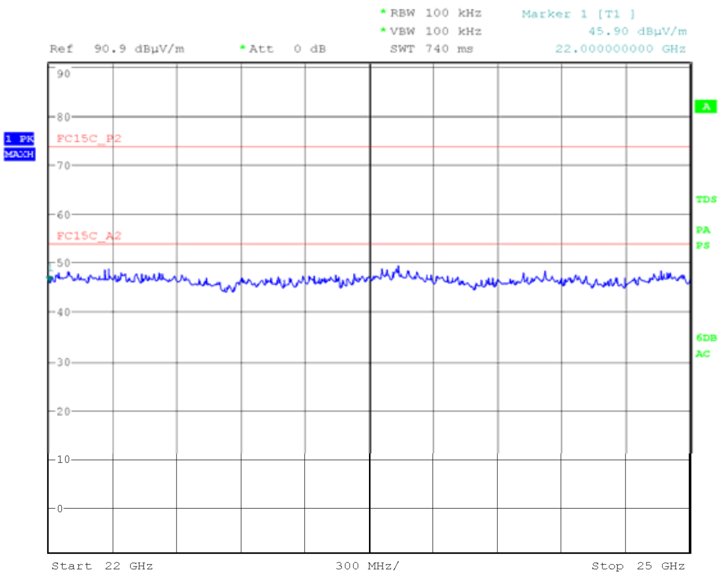
Horizontal



Date: 12.JAN.2010 19:30:01

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 - 20dB Bandwidth					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Section 2.2 - Maximum Peak Conducted Output Power					
Signal Generator	Hewlett Packard	ESG4000A	38	12	11-May-2010
Peak Power Analyser	Hewlett Packard	8990A	107	12	2-Feb-2010
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Power Sensor	Hewlett Packard	84812A	2743	-	TU
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Attenuator (30dB, 150W)	Narda	769-30	3369	12	19-May-2010
5 metre Tape Measure	Stanley	33-719	3549	-	TU
Section 2.3 & 2.8 EMC - Effective Radiated Power & 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
Antenna (Bilog)	Chase	CBL6143	2904	24	4-Dec-2011
Antenna (Log Periodic)	Schaffner	UPA6108	3108	12	4-Apr-2010
Signal Generator (10MHz to 40GHz)	Rohde & Schwarz	SMR40	3171	12	4-Aug-2010
EMI Test Receiver	Rohde & Schwarz	ESU40	3506	12	1-Sep-2010
Turntable	EMCO	1060-04	3693	-	TU

Product Service

Instrument	Manufacturer	Type No.	TE No.	Calibration Period (months)	Calibration Due
Section 2.4 - Conducted Spurious Emissions					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Network Analyser	Rohde & Schwarz	ZVA 40	3548	12	13-Feb-2010
Section 2.5 - Channel Dwell Time					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Section 2.6 - Frequency Range					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010
Section 2.7- Number of Hopping Channels					
True RMS Multimeter	Fluke	79 Series III	411	12	24-Jul-2010
Power Divider	Weinschel	1506A	603	12	19-Mar-2010
GPS Frequency Standard	Rapco	GPS-804/3	1312	6	4-Mar-2010
Cable (1m, sma(m) - sma(m)	Reynolds	262-0248-1000	2406	12	15-Oct-2010
Programmable Power Supply	Iso-tech	IPS 2010	2437	-	O/P Mon
Spectrum Analyser	Rohde & Schwarz	FSU26	2747	12	2-Nov-2010
Hygrometer	Rotronic	I-1000	2891	12	17-Apr-2010

TU – Traceability Unscheduled
OP/Mon – Output monitored using calibrated equipment

Product Service

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	26MHz to 2.5GHz Test Amplitude	1.4dB†
Conducted Susceptibility	100kHz to 250MHz Amplitude	1.8dB†
DC Input Ripple Immunity	Current Voltage	0.45% 0.91%
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
† In accordance with UKAS Lab 34

Product Service

SECTION 4

ACCREDITATION, DISCLAIMERS AND COPYRIGHT

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).