
REPORT ON

Limited FCC CFR 47: Parts 15B and C Testing in support of an
Application for Grant of Equipment Authorisation
of a Symbol STB3478 NGIS Cradle

FCC ID: H9P2164381

Report No OR612339/02 Issue 1

September 2004

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Support of an Application for Grant of Equipment Authorisation
of a Symbol STB3478 NGIS Cradle

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DATED

08-10-04

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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: Parts 15 B & C. The sample tested was found to comply with the requirements defined in the applied rules.

Test Engineers;



A Guy



G Lawler



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SECTION 1

REPORT SUMMARY

Limited FCC CFR 47: Part 15B & C Testing in support of an
Application for Grant of Equipment Authorisation
of a Symbol STB3478 NGIS Cradle



1.1 STATUS

EQUIPMENT UNDER TEST	Symbol Technologies STB3478 NGIS Cradle
OBJECTIVE	To undertake measurements to determine the Equipment Under Test's (EUT's) compliance with the specification.
NAME AND ADDRESS OF CLIENT	Symbol Technologies Inc One Symbol Plaza Holtsville 11742-1300, New York United States of America
TYPE NUMBER	STB3478-C0007WW
PART NUMBER	STB3478-C0007WW
SERIAL NUMBER	ALP80243
HARDWARE VERSION	Rev 7(To be released as Rev A)
DECLARED VARIANTS	None
TEST SPECIFICATION ISSUE/DATE	FCC CFR 47: Part 15, Subparts B & C October 2003
NUMBER OF ITEMS TESTED	One
SECURITY CLASSIFICATION OF EUT	Commercial In Confidence
INCOMING RELEASE DATE	Declaration of Build Status 6 th September 2004
DISPOSAL REFERENCE NUMBER DATE	Held pending disposal Not Applicable Not Applicable
ORDER NUMBER DATE	4500393869 10 th September 2004
START OF TEST FINISH OF TEST	8 th September 2004 15 th September 2004
RELATED DOCUMENTS	ANSI C63.4 2001. Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz. FCC Public Notice document (DA 00-705 released 30 March 2000) FCC Public Notice document FCC 04-165 (ET Docket No 03-201 released 12 July 2004)



1.2 INTRODUCTION

The information contained within this report is intended to show limited verification of compliance of the Symbol Technologies Inc STB3478 NGIS Cradle to the requirements of FCC Specification Part 15C.

Testing was carried out in support of an application for Grant of Equipment Authorisation in the name of Symbol Technologies Inc.

1.3 PRODUCT INFORMATION

1.3.1 Technical Description

The Equipment Under Test (EUT) was a STB3478 NGIS Cradle. The STB3478 NGIS Cradle is designed for use with the associated family of NGIS Bluetooth Scanners. The cradle offers Bluetooth Connectivity to the scanner, as well as supporting a multi-interface for connection to a peripheral device.

The terminal utilizes the approved Symbol 21-64381 Bluetooth Module. FCC ID numbers are detailed in Section 1.3.4 "Declaration of Build Status".

1.3.2 Modes of Operation

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

Applicable testing was carried out with the EUT transmitting at maximum power or receiving as detailed in Section 1.3.3 "Test Configuration".

1.3.3 Test Configuration

1.3.3.1 Bluetooth Mode

Bluetooth Transmitting on the following channels and frequencies;

Channel 2: 2402MHz
Channel 41: 2441MHz
Channel 80: 2480MHz

BLUETOOTH Receiving on the following channels and frequencies;

Channel 2: 2402MHz
Channel 41: 2441MHz
Channel 80: 2480MHz

1.3.3.2 For Conducted Emissions in accordance with FCC Subpart 15B, the EUT was put into Charging Mode with no transmit. This was established by placing an LS3478 Scanner into the STB3478 Charger.



1.3.4 DECLARATION OF BUILD STATUS

MAIN EUT	
MANUFACTURING DESCRIPTION	NGIS Cradle (Bluetooth Enabled)
MANUFACTURER	Symbol Technologies Inc
TYPE	STB3478
PART NUMBER	STB3478-C0007WW
SERIAL NUMBER	ALP80240, ALP80243
HARDWARE VERSION	Rev 7 (To be released as Rev A)
COUNTRY OF ORIGIN	USA
UK AGENT	Symbol Technologies Inc
FCC ID	H9P2164381
INDUSTRY CANADA ID	1549D-2164381
TECHNICAL DESCRIPTION	The STB3478 NGIS Cradle designed for use with the associated family of NGIS Bluetooth Scanners. The cradled offers Bluetooth Connectivity to the scanner, as well as supporting a multi-interface for connection to a peripheral device.
BATTERY/POWER SUPPLY	
MANUFACTURING DESCRIPTION	230V/120V AC power supply
MANUFACTURER	America Skynet Electronics
PART NUMBER	50-14000-101
HARDWARE VERSION	Rev E
VOLTAGE	100-250 V AC
COUNTRY OF ORIGIN	Taiwan
MODULE	
MANUFACTURING DESCRIPTION	Symbol Bluetooth Module
MANUFACTURER	Symbol Technologies Inc
TYPE	21-64381
PART NUMBER	21-64381-02
POWER	100mW (+20dBm - Class 1)
TRANSMITTER OPERATING RANGE	2400 – 2483.5MHz
RECEIVER OPERATING RANGE	2400 – 2483.5MHz
INTERMEDIATE FREQUENCIES	Not Applicable (Direct conversion)
ITU DESIGNATION OF EMISSION	1M00F1D
FCC ID	H9P2164381
INDUSTRY CANADA ID	1549D-2164381
DHSS/FHSS/COMBINED OR OTHER	FHSS
ANCILLARIES	
MANUFACTURING DESCRIPTION	RS-232 Cable
MANUFACTURER	Symbol Technologies Inc.
PART NUMBER	25-32465-20
SERIAL NUMBER	Not Serialised
HARDWARE VERSION	Rev C

The unit used for the internal photographs in this report was not the EUT, but was supplied as an identical unit for photographs only. It is declared as being the same build status as the EUT.

Signature

Date
D of B S Serial No

6th September 2004
OR612339-01

BABT formally certifies that the manufacturer's declaration as reproduced in this report, is a true and accurate record of the original received from the applicant.



1.4 BRIEF SUMMARY OF RESULTS

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

A brief summary of the tests carried out is shown below.

Test	Spec Clause	Test Description	Result
2.1	15.107	Conducted Emissions on Power Lines	Pass
2.2	15.205	Measurement at Band Edge	Pass
2.3	15.207	Conducted Emissions on Power Lines	Pass
2.4	15.247(b)(2)	Maximum Peak Output Power (Radiated)	Pass
2.5	15.247(c)	Spurious Radiated Emissions	Pass



1.5 TEST CONDITIONS

The EUT was set-up simulating a typical user installation and was tested in accordance with the applicable specification.

For all tests, the Symbol STB3478 NGIS Cradle was powered by a Symbol 50-14000-101 120V, 60Hz Power Supply Unit.

1.6 DEVIATIONS FROM THE STANDARD

No deviation from Standard occurred during testing.

1.7 MODIFICATION RECORD

Not Applicable.

1.9 ALTERNATIVE TEST SITE

No alternative test site was used.



SECTION 2

TEST DETAILS

Limited FCC CFR 47: Part 15 B Testing in support of an
Application for Grant of Equipment Authorisation
Of a Symbol STB3478 NGIS Cradle



2.1 CONDUCTED EMISSIONS ON POWER LINES

2.1.1 Specification Reference

FCC CFR 47: Part 15 Subpart B, Section 15.107

2.1.2 Equipment Under Test

STB3478 NGIS Cradle

2.1.3 Date of Test

15th September 2004

2.1.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.1” within the Test Equipment Used table shown in Section 3.1.

2.1.5 Test Procedure

Test performed in accordance with ANSI C63.4.

Conducted Emission Measurements were undertaken within the semi-anechoic chamber. Emissions were measured on the Live and Neutral Lines in turn.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines are presented in the following tables.

The EUT was supplied from a 120V, 60Hz supply.



2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart B, Section 15.107 for Conducted Emissions on the Live and Neutral Lines.

Measurements were made with the EUT in Charging Mode (see Section 1.3.3 for details).

Live Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.2047	37.9	50.4	53.4	63.4
0.2390	28.6	39.5	52.1	62.1
0.3073	25.6	35.1	50.1	60.1
0.3414	26.4	33.3	49.2	59.2
0.7855	29.2	29.2	46.0	56.0
11.8890	22.1	27.6	50.0	60.0

The margin between the specification requirements and all other emissions were 32.4dB or more below the specified Quasi-Peak limit and 27.9dB or more below the Average limit.

Neutral Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.2052	39.0	51.2	53.4	63.4
0.2733	27.9	38.6	51.0	61.0
0.3763	27.5	31.9	48.4	58.4
0.7185	30.5	30.4	46.0	56.0
11.6991	31.8	33.7	50.0	60.0
17.8611	28.1	33.8	50.0	60.0

The margin between the specification requirements and all other emissions were 19dB or more below the specified Quasi-peak limit and 29dB or more below the specified Average limit.



2.1 CONDUCTED EMISSIONS ON POWER LINES - continued

2.1.7 Set Up Photograph –



Conducted Emissions Set Up Photograph



SECTION 2

TEST DETAILS

Limited FCC CFR 47: Part 15 C Testing in support of an
Application for Grant of Equipment Authorisation
Of a Symbol STB3478 NGIS Cradle



2.2 MEASUREMENT AT THE BAND EDGE (MARKER DELTA METHOD)

2.2.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.205

2.2.2 Equipment Under Test

STB3478 NGIS Cradle

2.2.3 Date of Test

9th September 2004

2.2.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as "Section 2.2" within the Test Equipment Used table shown in Section 3.1.

2.2.5 Test Procedure

Test Performed in accordance with FCC Public Notice document (DA 00-705 released 30 March 2000).



2.2 MEASUREMENT AT THE BAND EDGE (MARKER DELTA METHOD) - continued

2.2.6 Test Results

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.205 for Band Edge Measurements.

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

Step 1

Bottom Channel Fundamental Field Strength Measurement.

Peak measurements performed utilising a Resolution Bandwidth and Video Bandwidth of 1MHz. Average measurements performed utilising a Resolution Bandwidth of 1MHz and Video Bandwidth of 10Hz.

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Average Field Strength
MHz	H/V	cm	deg	dB μ V/m	dB μ V/m
2402	H	121	5	112.2	94.4

Step 2

Determine Marker delta amplitude between 2402MHz (the fundamental) and 2390MHz (the Band Edge under investigation).

Using a span of 30MHz with Resolution Bandwidth and Video Bandwidth of 300kHz.

Marker Delta Amplitude = 59.1dB

Step 3

Subtracting the Marker Delta obtained from Step 2 from the 2402MHz Field Strength measurement from Step 1, gives following Result:

Peak of 53.1dB μ V/m (Limit is 74.0dB μ V/m)

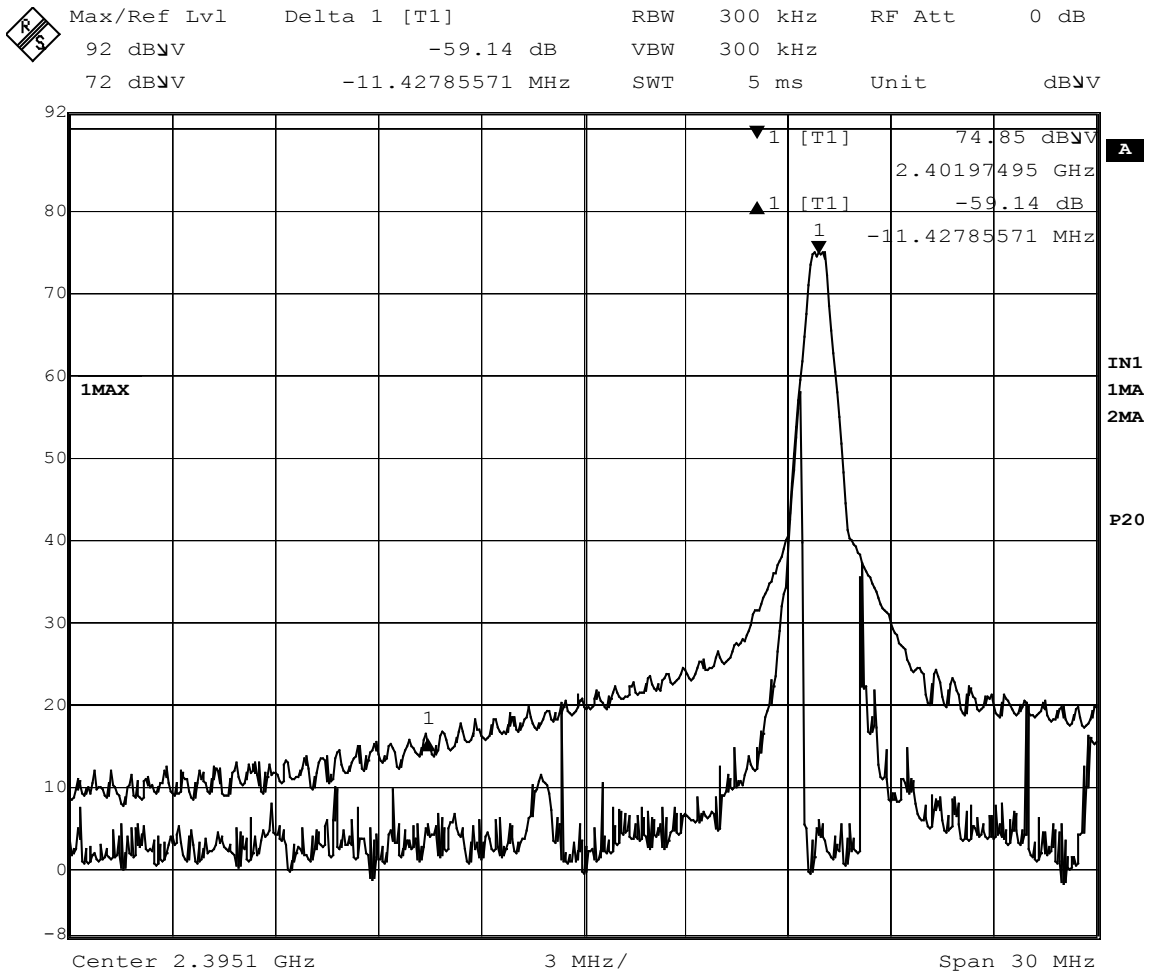
Average of 35.3dB μ V/m (Limit is 54.0dB μ V/m)



2.2 MEASUREMENT AT THE BAND EDGE (MARKER DELTA METHOD) - continued

2.2.6 Test Results - continued

Plot for Bottom Channel 2402MHz



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2.2 MEASUREMENT AT THE BAND EDGE (MARKER DELTA METHOD) - continued

2.2.6 Test Results - continued

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.205 for Band Edge Measurements.

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

Step 1

Top Channel Fundamental Field Strength Measurement

Peak measurements performed utilising a Resolution Bandwidth and Video Bandwidth of 1MHz.
Average measurements performed utilising a Resolution Bandwidth of 1MHz and Video Bandwidth of 10Hz.

Frequency	Antenna Polarisation	Height	Azimuth	Peak Field Strength	Average Field Strength
MHz	H/V	cm	deg	dB μ V/m	dB μ V/m
2480	H	110	18	110.1	94.6

Step 2

Determine Marker delta amplitude between 2480MHz (the fundamental) and 2483.5MHz (the Band Edge under investigation).

Using a span of 30MHz with Resolution Bandwidth and Video Bandwidth of 300kHz.

Marker Delta Amplitude = 52.0dB

Step 3

Subtracting the Marker Delta obtained from Step 2 from the 2483.5MHz Field Strength measurement from Step 1, gives following Result

Peak of 58.1dB μ V/m (Limit is 74.0dB μ V/m)

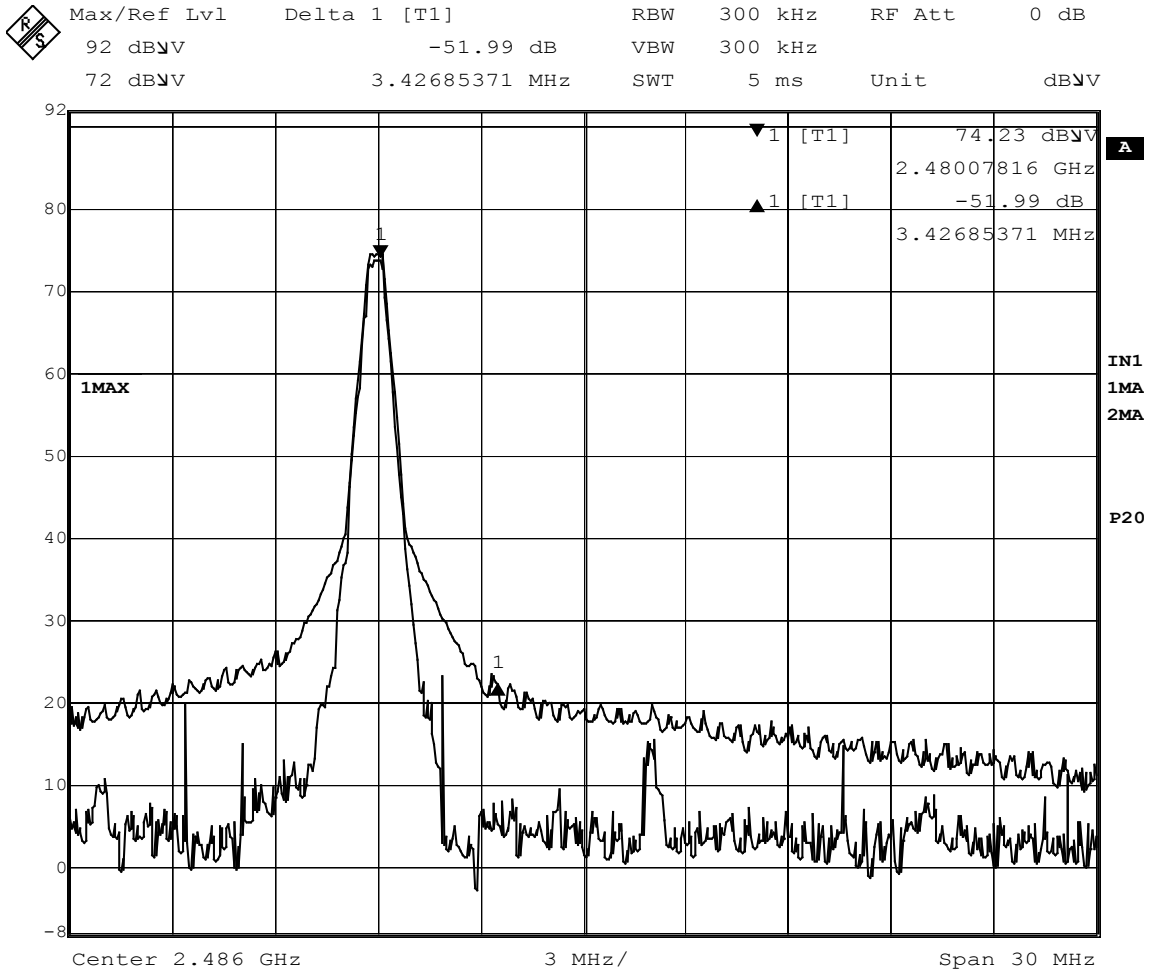
Average of 42.6dB μ V/m (Limit is 54.0dB μ V/m)



2.2 MEASUREMENT AT THE BAND EDGE (MARKER DELTA METHOD) - continued

2.2.6 Test Results - continued

Plot for Top Channel 2480MHz



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2.3 CONDUCTED EMISSIONS ON POWER LINES

2.3.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.207

2.3.2 Equipment Under Test

STB3478 NGIS Cradle

2.3.3 Date of Test

15th September 2004

2.3.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.3” within the Test Equipment Used table shown in Section 3.1.

2.3.5 Test Procedure

Test performed in accordance with ANSI C63.4.

Conducted Emission Measurements were undertaken within the semi-anechoic chamber. Emissions were measured on the Live and Neutral Lines in turn.

Emissions were formally measured using a Quasi-Peak and Average Detectors, which meet the CISPR requirements. The details of the worst-case emissions for the Live and Neutral Lines are presented in the following tables.

The EUT was supplied from a 120V, 60Hz supply.



2.3 CONDUCTED EMISSIONS ON POWER LINES - continued

2.3.6 Test Results

The EUT met the Class B requirements of FCC CFR 47: Part 15 Subpart C, Section 15.207 for Conducted Emissions on the Live and Neutral Lines.

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

EUT Tx on Bottom Channel (2402MHz) – Live Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.1705	36.5	50.3	54.9	64.9
0.1715	36.2	50.2	54.9	64.9
0.2049	37.5	49.6	53.4	63.4
2.5939	27.6	31.8	46.0	56.0
4.5050	28.2	29.8	56.0	46.0
8.9412	34.4	35.4	50.0	60.0

The margin between the specification requirements and all other emissions were 32dB or more below the specified Quasi-Peak limit and 18dB or more below the Average limit.

EUT Tx on Bottom Channel (2402MHz) – Neutral Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.2048	37.9	49.4	53.4	63.4
2.6949	31.8	34.1	46.0	56.0
4.4687	30.9	33.4	46.0	56.0
6.9247	32.0	32.8	50.0	60.0
8.5620	35.7	36.6	50.0	60.0
17.7725	33.7	35.2	50.0	60.0

The margin between the specification requirements and all other emissions were 19dB or more below the specified Quasi-peak limit and 29dB or more below the specified Average limit.



2.3 CONDUCTED EMISSIONS ON POWER LINES - continued

2.3.6 Test Results - continued

EUT Tx on Middle Channel (2441MHz) – Live Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.1571	24.4	43.5	55.6	65.6
0.1705	33.2	49.0	54.9	64.9
0.2046	37.2	49.1	53.4	63.4
2.6942	28.1	32.0	46.0	56.0
8.7647	34.2	35.2	50.0	60.0

The margin between the specification requirements and all other emissions were 22dB or more below the specified Quasi-Peak limit and 31dB or more below the Average limit.

EUT Tx on Middle Channel (2441MHz) – Neutral Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.2047	37.7	49.2	53.4	63.4
0.2388	29.3	40.6	52.1	62.1
0.4092	22.4	29.0	47.7	57.7
2.6603	32.0	34.2	46.0	56.0
3.2060	28.1	32.9	46.0	56.0
8.5607	35.8	36.7	50.0	60.0

The margin between the specification requirements and all other emissions were 22dB or more below the specified Quasi-peak limit and 24dB or more below the specified Average limit.



2.3 CONDUCTED EMISSIONS ON POWER LINES - continued

2.3.6 Test Results - continued

EUT Tx on Top Channel (2480MHz) – Live Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.1712	33.0	48.8	54.9	64.9
0.1804	26.9	40.2	54.5	64.5
0.2044	37.2	49.1	53.4	63.4
0.2728	27.7	38.2	51.0	61.0
2.6600	27.7	31.6	46.0	56.0
8.4235	34.1	35.3	50.0	60.0

The margin between the specification requirements and all other emissions were 31dB or more below the specified Quasi-Peak limit and 22dB or more below the Average limit.

EUT Tx on Top Channel (2480MHz) – Neutral Line

Emission Frequency (MHz)	Average Level (dB μ V)	Quasi-Peak Level (dB μ V)	Average Limit (dB μ V)	Quasi-Peak Limit (dB μ V)
0.1577	24.8	43.5	55.6	65.6
0.1819	26.2	40.3	54.4	64.4
0.2047	37.6	49.1	53.4	63.4
0.2387	29.1	40.4	52.3	62.3
2.7281	32.0	34.2	46.0	56.0
6.9229	31.5	32.6	50.0	60.0

The margin between the specification requirements and all other emissions were 27dB or more below the specified Quasi-peak limit and 30dB or more below the specified Average limit.



2.4 MAXIMUM PEAK OUTPUT POWER (Radiated Method)

2.4.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.247(b)(2)

2.4.2 Equipment Under Test

STB3478 NGIS Cradle

2.4.3 Date of Test

8th September 2004

2.4.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.4” within the Test Equipment Used table shown in Section 3.1.

2.4.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

The EUT contains an integral antenna and therefore the Maximum Peak Output Power was made using the EIRP method.

The Spectrum Analyser was tuned to the test frequency. The device Output Power setting was controlled as specified in the Product Information, Section 1.5 of this document. The device was then rotated through 360 degrees until the highest power level was observed in both horizontal and vertical polarisation. The device was then replaced with a substitution antenna, whose input signal level into the antenna was adjusted until the received level matched that of the previously detected emission.



2.4 MAXIMUM PEAK OUTPUT POWER (Radiated Method) - continued

2.4.6 Test Results - continued

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(b)(2) for Maximum Peak Output Power.

Measurements were made with the EUT in Bluetooth (see Section 1.3.3 for details).

Frequency (MHz)	Result EIRP (dBm)	Result EIRP (mW)
2402	13.1	20.6
2441	12.0	15.8
2480	13.5	22.4
Limit	<+36dBm or <4W	



2.5 SPURIOUS RADIATED EMISSIONS

2.5.1 Specification Reference

FCC CFR 47: Part 15 Subpart C, Section 15.247(c)

2.5.2 Equipment Under Test

STB3478 NGIS Cradle

2.5.3 Date of Test

13th September 2004

2.5.4 Test Equipment Used

The major items of test equipment used for the above tests are identified as “Section 2.5” within the Test Equipment Used table shown in Section 3.1.

2.5.5 Test Procedure

Test Performed in accordance with ANSI C63.4.

FCC CFR 47: Part 15 Subpart C, Section 15.247(c), for Radiated Emissions also requires Sections 15.205 and 15.209 to be applied.

A preliminary profile of the Spurious Radiated Emissions was obtained by operating the EUT on a remotely controlled turntable within a semi-anechoic chamber. Measurements of emissions from the EUT were obtained with the Measurement Antenna in both Horizontal and Vertical Polarisations. The profiling produced a list of the worst-case emissions together with the EUT azimuth and antenna polarisation.

Using the information from the preliminary profiling of the EUT. The list of emissions was then confirmed or updated under Anechoic Chamber (3 metres) conditions. Emission levels were maximised by adjusting the antenna height, antenna polarisation and turntable azimuth.

Emissions identified within the range 30MHz – 1GHz were then formally measured using a CISPR Quasi-Peak detector.

Emissions identified within the range 1GHz – 26GHz were then formally measured using Peak and Average Detectors, as appropriate.

The measurements were performed at a 3m distance unless otherwise stated.



2.5 SPURIOUS RADIATED EMISSIONS - continued

2.5.5 Test Procedure - continued

The limits for Spurious Emissions Outside the Restricted Bands have been measured and calculated as shown in the table below:

Test Mode	Carrier Frequency GHz	Carrier Field Strength dB μ V/m	Limit for Spurious Outside Restricted Band (Carrier F S -20dB) dB μ V/m
Bluetooth	2402	110.2	90.2
Bluetooth	2441	110.6	90.6
Bluetooth	2480	110.0	90.0

The limits for Spurious Emissions Inside the Restricted Bands are in accordance with 15.205(a) & (b), which call up the limits in 15.209 (a)

Frequency Range MHz	Field Strength μ V/m	Quasi Peak Field Strength dB μ V/m	
30-88	100	40.0	
88-216	150	43.5	
216-960	200	46.0	
960-1000	500	54.0	
Above 1000	500	Average Field Strength dB μ V/m	Peak Field Strength dB μ V/m
		54.0	74.0



2.5 SPURIOUS RADIATED EMISSIONS - continued

2.5.6 Test Results

30MHz - 1GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 for Radiated Emissions (30MHz – 1GHz).

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

EUT Tx on Bottom Channel (2402MHz)

Emission Frequency	Pol	Hgt	Azm	Field Strength at 3m		Specification Limit	
				MHz	H/V	cm	deg
34.48	V	100	14	35.5	59.6	40.0	100.0
44.79	V	100	360	31.7	38.5	40.0	100.0
377.35	V	160	0	36.2	64.6	46.0	200.0
480.07	V	100	187	37.7	76.7	46.0	200.0
600.14	V	100	0	41.6	120.2	46.0	200.0
650.10	V	169	300	39.1	90.2	46.0	200.0

EUT Tx on Middle Channel (2441MHz)

Emission Frequency	Pol	Hgt	Azm	Field Strength at 3m		Specification Limit	
				MHz	H/V	cm	deg
35.08	V	100	0	35.0	56.2	40.0	100.0
377.70	V	100	13	36.1	63.8	46.0	200.0
480.08	V	100	180	37.6	75.9	46.0	200.0
550.11	V	100	22	40.0	100.0	46.0	200.0
600.13	V	100	360	42.5	133.4	46.0	200.0
650.14	V	100	331	38.1	80.4	46.0	200.0



2.5 SPURIOUS RADIATED EMISSIONS - continued

2.12.6 Test Results – continued

30MHz - 1GHz Frequency Range

EUT Tx on Top Channel (2480MHz)

Emission Frequency	Pol	Hgt	Azm	Field Strength at 3m		Specification Limit	
				MHz	H/V	cm	deg
34.81	V	100	001	35.2	57.5	40.0	100.0
377.80	V	100	12	37.2	72.5	46.0	200.0
500.11	V	100	179	34.9	55.6	46.0	200.0
600.10	V	100	2	40.9	110.9	46.0	200.0
650.15	V	100	329	37.1	71.6	46.0	200.0
786.46	H	100	51	37.5	75.0	46.0	200.0

ABBREVIATIONS FOR ABOVE TABLES

H	Horizontal Polarisation	V	Vertical Polarisation
Pol	Polarisation	Hgt	Height
deg	degree	Azm	Azimuth



2.5 SPURIOUS RADIATED EMISSIONS - continued

2.5.6 Test Results - continued

1GHz - 26GHz Frequency Range

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 for Radiated Emissions (1GHz – 26GHz).

Measurements were made with the EUT in Bluetooth Mode (see Section 1.3.3 for details).

EUT Tx on Bottom Channel (2402MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz	H/V	cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
2.370	H	121	7	55.0	74.0	44.7	54.0
4.804	V	168	83	46.4	74.0	37.2	54.0

EUT Tx on Middle Channel (2441MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz	H/V	cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
2.376	H	120	7	52.5	74.0	42.5	54.0
4.882	V	159	74	44.8	74.0	35.1	54.0



2.5 SPURIOUS RADIATED EMISSIONS - continued

2.5.6 Test Results - continued

1GHz - 26GHz Frequency Range - continued

Equipment Designation: Intentional Radiator.

The EUT met the requirements of FCC CFR 47: Part 15 Subpart C, Section 15.247(c), 15.205 and 15.209 for Radiated Emissions (1GHz – 26GHz).

EUT Tx on Top Channel (2480MHz)

Frequency	Antenna		Turntable	Peak Field Strength	Peak Limit	Average Field Strength	Average Limit
	Pol	Height	Azimuth				
GHz	H/V	cm	deg	dB μ V/m	dB μ V/m	dB μ V/m	dB μ V/m
2.384	H	119	17	53.3	74.0	41.0	54.0
4.960	V	150	85	45.1	74.0	36.0	54.0

ABBREVIATIONS FOR ABOVE TABLES

H Horizontal Polarisation
 Pol Polarisation
 deg degree

V Vertical Polarisation
 Hgt Height
 Azm Azimuth



2.5 SPURIOUS RADIATED EMISSIONS - continued

2.5.7 Set Up Photograph



Spurious Radiated Emissions Set Up Photograph



SECTION 3

TEST EQUIPMENT USED



3.1 TEST EQUIPMENT USED

Instrument	Manufacturer	Type No	EMC / INV No	Cal. Due
Section 2.2 & 2.5				
Spectrum Analyser	Hewlett Packard	8542E	2286	18/05/2005
Bilog Antenna	Chase	CBL 6143	2965	12/09/2005
Turntable Controller	No Data	HD 050	2528	TU
Antenna Mast	EMCO	1051-2	2182	TU
Screened Room 5	Siemens	EAC54300	2533	TU
Emi Test Receiver	Rohde & Schwarz	ESIB26	2989	08/04/2005
Low Noise Amplifier	Miteq Corps	AMF-3d-001080-18-13P	2457	TU
Solid State Amplifier	Avantek	AWT-18036	1081	26/06/2005
Signal Amplifier	Avantek	AMT-26177-33	2072	25/06/2005
Drg Horn Antenna	EMCO	3115	2297	07/07/2005
Drg Horn Antenna	EMCO	3115	2397	07/07/2005
Attenuator 10dB	Marconi	6534/3	1494	TU
Signal Generator	Hewlett Packard	8672A	411	02/03/2005
Drg Horn Antenna	Link Microtek Limited	AM180-HA-K-TU2	2945	24/06/2005
Signal Generator	Hewlett Packard	8673B	953	10/06/2005
3GHz High Pass Filter	RLC Electronics	F-100-3000-5-R	4969	10/03/2005
Section 2.1 & 2.3				
LISN	Rohde & Schwarz	ESH2-Z5	1584	02/10/2004
Transient Limiter	Hewlett Packard	11947A	2243	24/01/2005
Spectrum Analyser	Rohde & Schwarz	EZM	1416	TU
Test Receiver	Rohde & Schwarz	ESH3	1020	16/09/2004
Screened Room 5	Siemens	EAC54300	2533	TU
Section 2.4				
Turntable Controller	No Data	HD 050	2528	TU
Antenna Mast	EMCO	1051-2	2182	TU
Screened Room 5	Siemens	EAC54300	2533	TU
Emi Test Receiver	Rohde & Schwarz	ESIB26	2989	08/04/2005
Drg Horn Antenna	EMCO	3115	2297	07/07/2005
Drg Horn Antenna	EMCO	3115	2397	07/07/2005
Attenuator 10dB	Marconi	6534/3	1494	TU
Signal Generator	Hewlett Packard	8672A	411	02/03/2005



3.2 MEASUREMENT UNCERTAINTY

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

Test Discipline	Frequency / Parameter	MU
Radiated Emissions, Horn Antenna, AOATS	1GHz to 40GHz Amplitude	6.3dB*
Conducted Emissions, LISN	150kHz to 30MHz Amplitude	3.2dB*
Substitution Antenna, Radiated Field	30MHz to 18GHz Amplitude	2.6dB
Radiated Emissions, Bilog Antenna	30MHz to 1GHz Amplitude	5.1dB*

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

* In accordance with CISPR 16-4



SECTION 4

EUT PHOTOGRAPH



EUT PHOTOGRAPH



Front View



SECTION 5

ACCREDITATION, DISCLAIMERS AND COPYRIGHT



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).

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APPENDIX A

TITCHFIELD FCC SITE COMPLIANCE LETTER



FEDERAL COMMUNICATIONS COMMISSION

**Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046**

October 18, 2002

Registration Number: 90987

TUV Product Service Ltd
Segensworth Road
Titchfield
Fareham, Hampshire, PO15 5RH
United Kingdom
Attention: Kevan Adsetts

Re: Measurement facility located at Titchfield
Anechoic chamber (3 meters) and 3 & 10 meter OATS
Date of Listing: October 18, 2002

Gentlemen:

Your request for registration of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC rules. The information has, therefore, been placed on file and the name of your organization added to the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Thomas W Phillips
Electronics Engineer