COMPLIANCE TESTING REPORT

FCC TITLE 47 PART 15

SUBPARTS A & B (CLASS B)

Client:	Parcel Tools Pty Ltd
Address:	15/78 Reserve Road, Artarmon NSW 2064
Report Number:	0429PAR_C190MFT_fcca&b
Date of Testing:	15th and 16th April 2014
File Number:	PAR140324
Equipment Name:	Cubetape 190 Series
Equipment Model Number:	C190MFT
Equipment FCC ID:	N.A. – Declaration of Conformity approval procedure
Equipment Serial Number:	Not Supplied
Equipment Description:	Cubetape Mobile Data Capture Device
Result:	**COMPLIES** (Refer to Test Summary page for clarifications)
Tested by:	Steven Garnham
Approved by:	Colin Gan
Date of Issue:	29th April, 2014

AUSTEST (NSW) FCC REGISTRATION NUMBER 90455

DESIGNATION NUMBER AU0003 - REGISTRATION NUMBER 520620

Results appearing herein relate only to the sample(s) tested.

Table of Contents:

Report Revision History:

Date	Report Number	Changes
29th April 2014	0429PAR_C190MFT_fcca&b	Original Report.

1 TEST SUMMARY

Austest makes no claim regarding the consistency of production versions of the EUT.

The results in this report apply only to the tested EUT described in Section 3 of this report.

FCC Section	Test	Result	Notes
FCC Part 15, Subpart B – Unintentional Radiators			
15.107	Conducted Limits	COMPLIES	-
15.109	Radiated Emission Limits	COMPLIES	-

Notes (applicable only if referenced in "Notes" column of above summary table):
(i) EUT complies (the measurement results were below the applicable limits), but some emissions were within the range of measurement uncertainty of the limits.
(ii) EUT complies (when modified as described in Section 2 of this report).
(iii) There were deviations from the applied standard as described in Section 5.3 of this report.

Note: For compliance the EUT must comply with labelling requirements relating to the Bluetooth module:

The EUT incorporates an FCC modular approved, certified Bluetooth module, FCC ID QOQWT12.

This module is integrated into the EUT in a manner consistent with the module manufacturer's conditions for continued compliance and in compliance with the conditions stated in the FCC certificate with the EUT to be labelled in accordance with 15.212.

2 MODIFICATIONS

None.

3 EQUIPMENT UNDER TEST (EUT) DESCRIPTION

EUT Name:	Cubetape Mobile Data Capture Device
EUT Description:	Mobile Data Capture Device: tape measure digital display, barcode reader, Bluetooth, USB
EUT Model:	Cubetape 190 Series
EUT Serial Number:	Not Supplied
EUT FCC ID:	N.A. – Declaration of Conformity approval procedure
Manufacturer:	Parcel Tools
Power Supply & Rating:	Internal 3.7V LI-ion battery
Highest Clock/Operating Frequency:	48MHz
Transmit Frequency Range:	Incorporates an FCC modular approved certified Bluetooth module FCC ID QOQWT12
Transmit Power:	See FCC ID QOQWT12 approval
Modulation Technique:	See FCC ID QOQWT12 approval
Number of Channels:	See FCC ID QOQWT12 approval
Antenna Specifications:	See FCC ID QOQWT12 approval

EUT Operating Modes

Mode No.	Operating Mode Description
1	Being charged via USB port
2	Battery operation, barcode mode
3	Battery operation tape measure mode

4 EUT TEST SETUP & CONFIGURATION

Refer to the photographs in APPENDIX C – EUT TEST SETUP PHOTOGRAPHS for the EUT test setup and physical configuration.

Details of supporting equipment and cables used are listed as follows:

4.1 Supporting Equipment

Apple, iPod USB power adaptor, model A1205 W005B050, 100V-240V AC in, 5V@1Amp O/P.

Toshiba Notebook NB300.

4.2 Cables

Connection / Port	Connecting Cable	Source / Load
USB	Supplied 60cm	Laptop or USB power adaptor
USB	Test cable 1.8m	Laptop or USB power adaptor

The Supplied 60cm USB cable was replaced by a longer test cable to assess worst case conditions.

4.3 Transmitter Test Channels

N.A.

5 TEST SPECIFICATIONS

5.1 Accreditations & Listings

Austest Laboratories has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules and Test Site Criteria (ANSI C63.4-2009) by the FCC Laboratory Division for Certification testing under Parts 15 or 18 of the FCC Rules.

Austest Laboratories (NSW)'s Yarramalong test facilities are listed with the FCC under Registration Number 90455.

Austest Laboratories (NSW)'s Yarramalong test facilities are also accredited with the FCC under the ACMA-FCC APEC-TEL MRA. Designation Number AU0003 / Registration number 520620.

Austest Laboratories (NSW)'s Yarramalong test facilities are accredited by A2LA. The tests reported herein have been performed in accordance with its terms of accreditation.

5.2 Reference standards

FCC Title 47 Part 15
ANSI C63.4-2009

5.3 Deviations from Standards and/or Accreditations

None.

5.4 Test Facility

Testing was performed in New South Wales at Austest Laboratories (NSW)'s Yarramalong test facilities located at 46 Glenola Farm Lane in Yarramalong Valley, New South Wales, Australia.
Radiated emission testing is performed at an Open Area Test Site (OATS), where some ambient signals may exceed the continuous disturbance limit. The possibility of missing an emission during testing is removed by use of pre-scans, performed in a shielded enclosure, prior to the final OATS measurements.

5.5 Test Equipment

Test Equipment	Brand & Model	Serial No./ID	Cal. Due Date
EMI Receiver	HP 8574B	2403A06592 2408A00178 3146A01323 3107A01557	Jan. 2015
EMI measurement software	HP85869PC	-	Verified
Biconical Array Antenna	Emco EM6912	297	Jan. 2015
Log-Periodic Array Antenna	EMCO EM6950	298	Jan. 2015
RF cables	Suhner	-	Jan. 2015
Pre-Amplifier (25MHz-1GHz)	HP 8447E	2434A01957	Jan. 2015
LISN / AMN	COM-POWER LI-200	MEQ 80	Feb. 2015
AC Source Generator	Chroma 6512	-	Verified

5.6 Measurement Uncertainties

The following uncertainties are for a 95% level of confidence, based on a coverage factor, k=2.

Test	Measurement Uncertainty
Conducted Emissions (Austest NSW)	±2.6dB
Radiated Emissions (Austest NSW)	±4.7dB

6 FCC Part 15B, Section 15.107 - CONDUCTED LIMITS

Test Date:	16th April 2014	Temperature:	20 °C
Test Officer:	Steven Garnham	Humidity:	73%
Test Location:	Austest Laboratories (NSW)		

6.1 EUT Test Operating Mode

a. Internal battery being charged via USB port.

6.2 Test Method

a. Measurements are performed in accordance with ANSI C63.4-2009.
b. Set the EMI Receiver BW to 9kHz for the test.
c. Set up the EUT on a non-conductive table, 0.8m above a conductive ground plane, with the rear of the whole EUT setup 0.4m away from a conductive vertical reference plane (in electrical contact with the ground plane), and 0.8m away from any other conductive surface.
d. The EUT power is supplied through the EUT LISN. Power for supporting equipment (if any) is supplied through the supporting equipment LISN. Both LISNs are grounded to the ground plane and kept 0.8m away from the EUT test setup.
   As per ANSI C63.4:2009, clause 6.3.1.2, the associated power adaptor was connected to the LISN EUT terminals and the USB cable was used to connect the EUT.
e. Maintain the power cable length between the EUT and the EUT LISN between 0.8m to 1m. Bundle any excess power cable lengths together in the centre of the cable to form a bundle 30cm to 40cm long.
f. Drape all interconnection cables the table edge and keep them at least 40cm above the ground plane. Bundle any excess cables in the centre of the cable to form a bundle 30cm to 40cm long.
g. Conducted emission measurements are made on both Active and Neutral lines of the EUT.

6.3 Sample Calculation Example

The final voltage levels were obtained from the measurement equipment software which automatically applied all the stored calibration factors. The calibration / correction factors were applied as follows:

$$V_c = V + L_{cbl} + L_{LISN} + L_{limiter}$$

Where:

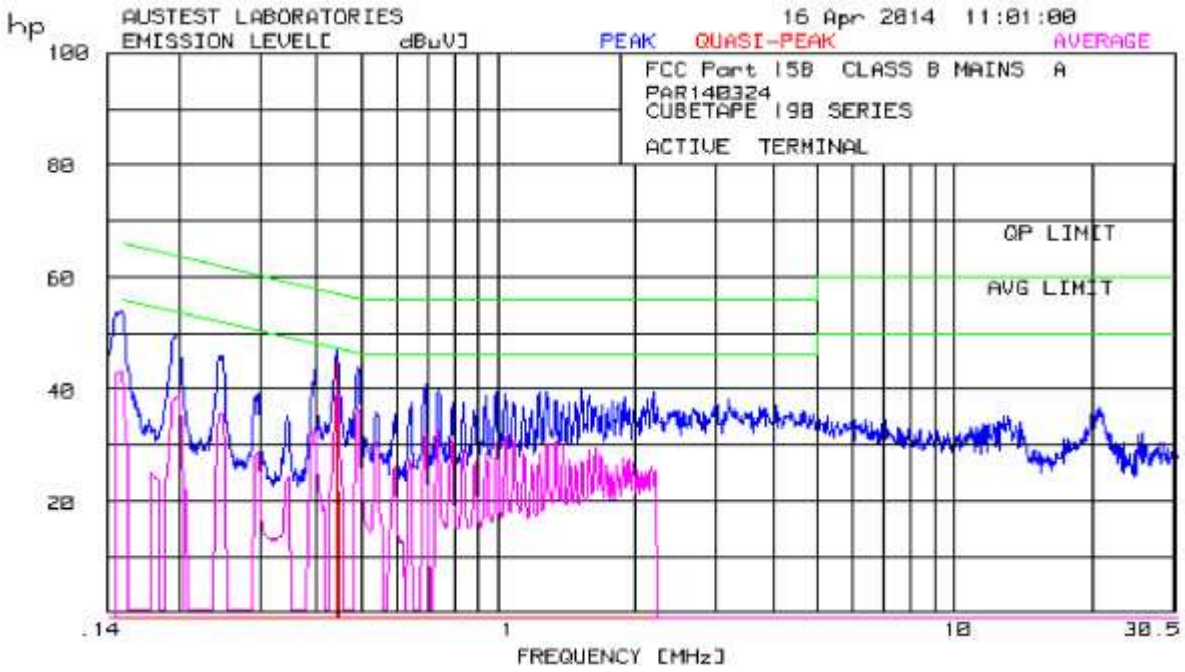
V_c	=	Corrected voltage level in dBµV for comparison to the limit.
V	=	EMI Receiver measured signal input voltage in dBµV.
L_{cbl}	=	Total cable insertion loss in dB.
L_{LISN}	=	Voltage division factor (insertion loss) of LISN in dB.
$L_{limiter}$	=	Insertion loss of voltage limiter, where applicable, in dB.

Frequency (MHz)	Receiver Level, V (dBµV)	L_{cbl} (dB)	L_{LISN} (dB)	$L_{limiter}$ (dB)	Corrected Level, V_c (dBµV)
1.0	40.0	0.1	0.1	N.A.	40.2

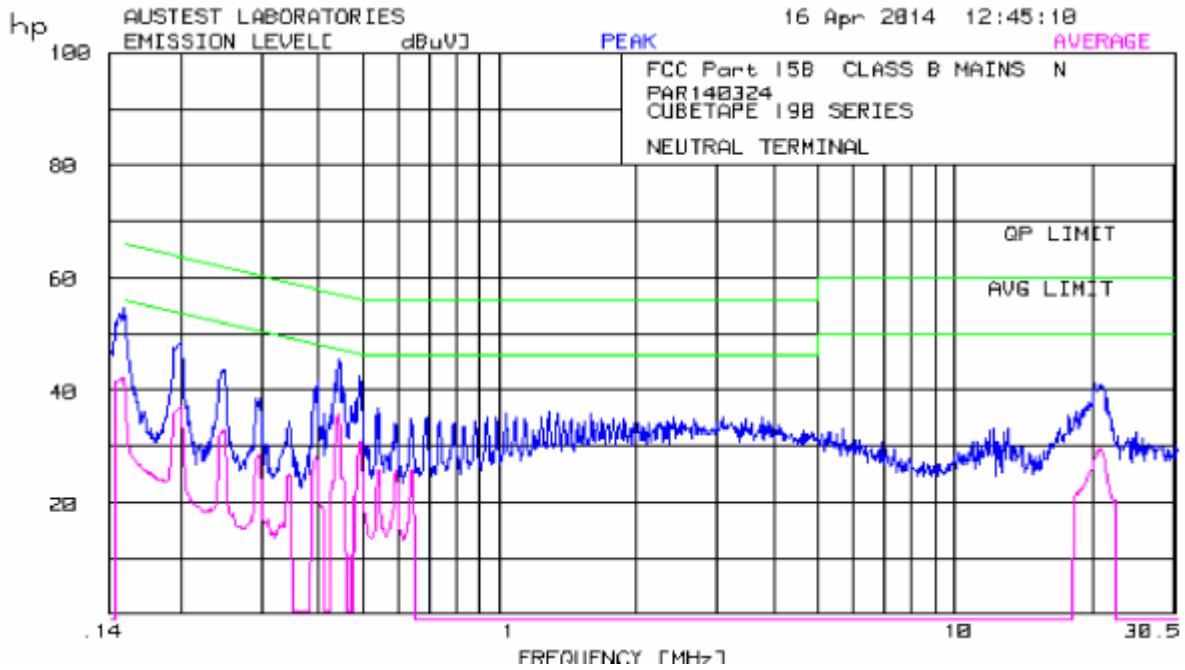
6.4 Test Results

The worst-case results are:

Terminal	Frequency (MHz)	QP Level (dBµV)	QP Limit (dBµV)	QP Pass Margin (dB)	AV Level (dBµV)	AV Limit (dBµV)	AV Pass Margin (dB)
Active	0.445	-	56.9	>10	39.4	46.9	7.5
Active	0.493	-	56.1	>10	36.5	46.1	9.6
Neutral	0.443	-	57.0	>10	35.8	47.0	11.2
Active	0.738	-	56.0	>10	32.4	46.0	13.6



Conducted Emissions Plot (Active Line)



Conducted Emissions Plot (Neutral Line)

7 FCC Part 15B, Section 15.109 - RADIATED EMISSION LIMITS

Test Date:	15th, 16th April 2014	Temperature:	22 °C
Test Officer:	Steven Garnham	Humidity:	70%
Test Location:	Austest Laboratories (NSW)		

7.1 EUT Operating Mode

a. Battery operation, barcode mode, USB to notebook.
b. Battery operation, tape measure mode, USB to notebook.

The Barcode mode produced slightly higher disturbance levels.

7.2 Test Method

a. Measurements are performed in accordance with ANSI C63.4-2009.
b. Set the measuring receiver BW settings to:
   i. 120kHz (30MHz to 1GHz) EMI Receiver BW.
   ii. 1MHz (above 1GHz) RBW, 1MHz or more VBW, using a Spectrum Analyser for Peak measurements.
   iii. 1MHz (above 1GHz) RBW, 10Hz VBW, using a Spectrum Analyser for Average measurements.
c. Set up the EUT on a non-conductive turntable, 0.8m above the OATS conductive ground plane.
   For measurements above 1GHz the ground plane between the EUT and the horn antenna was covered with pyramidal absorbers
d. To maximise emissions, rotate the EUT through 360° and adjust the measuring antenna height between 1m to 4m in the following antenna orientations:
   i. Biconical and Log-Periodic antennas (30MHz to 1GHz) - Both vertical and horizontal polarizations.
   ii. Horn antenna (above 1GHz) - Both vertical and horizontal polarizations.
e. Measure the maximised emission and repeat the above for all measurement frequencies.

7.3 Sample Calculation Example

The final field strength levels were obtained from the measurement equipment software which automatically applied all the stored calibration factors. The calibration / correction factors were applied as follows:

$$E = V + AF + L_{cbl} - G_{pre}$$

Where:

E = Radiated Electric Field Strength in dBµV/m at the specified distance.
V = EMI Receiver measured signal input voltage in dBµV.
AF = Antenna Factor of the measuring antenna in dB/m.
L_{cbl} = Total cable insertion loss in dB.
G_{pre} = Preamplifier gain in dB.

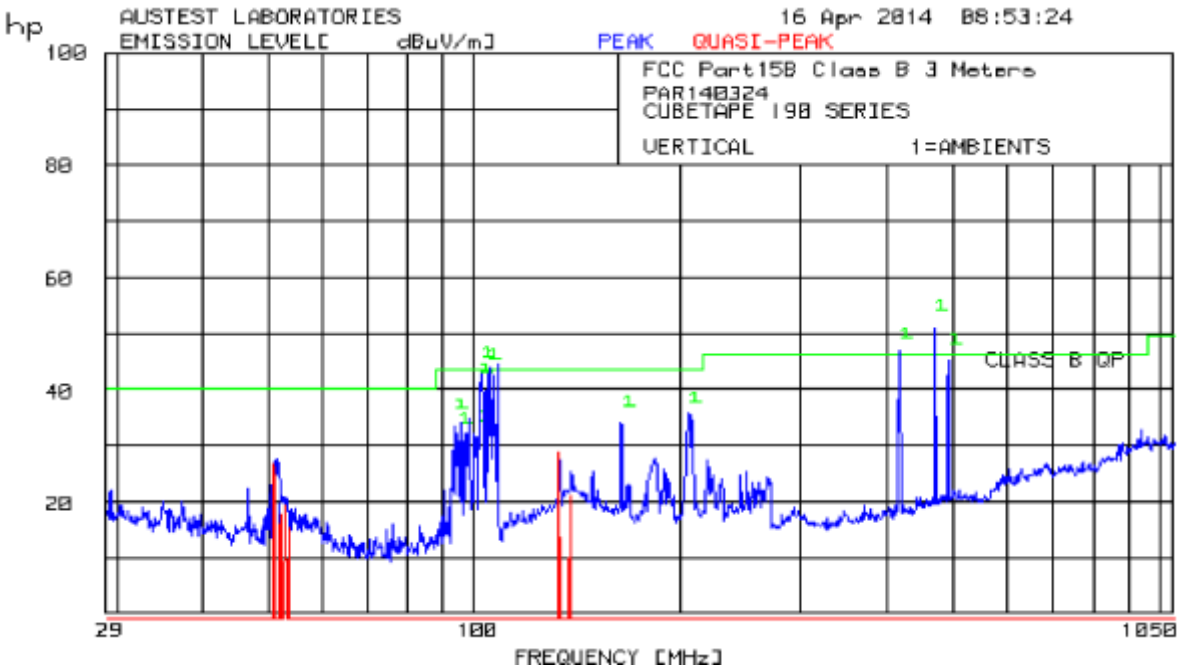
Frequency (MHz)	Receiver Level, V (dBµV)	AF (dB/m)	Lcbl (dB)	Gpre (dB)	Corrected Level, E (dBµV/m)
100.0	40.0	12.0	2.9	22.5	32.4

7.4 Test Results @ 3 meters

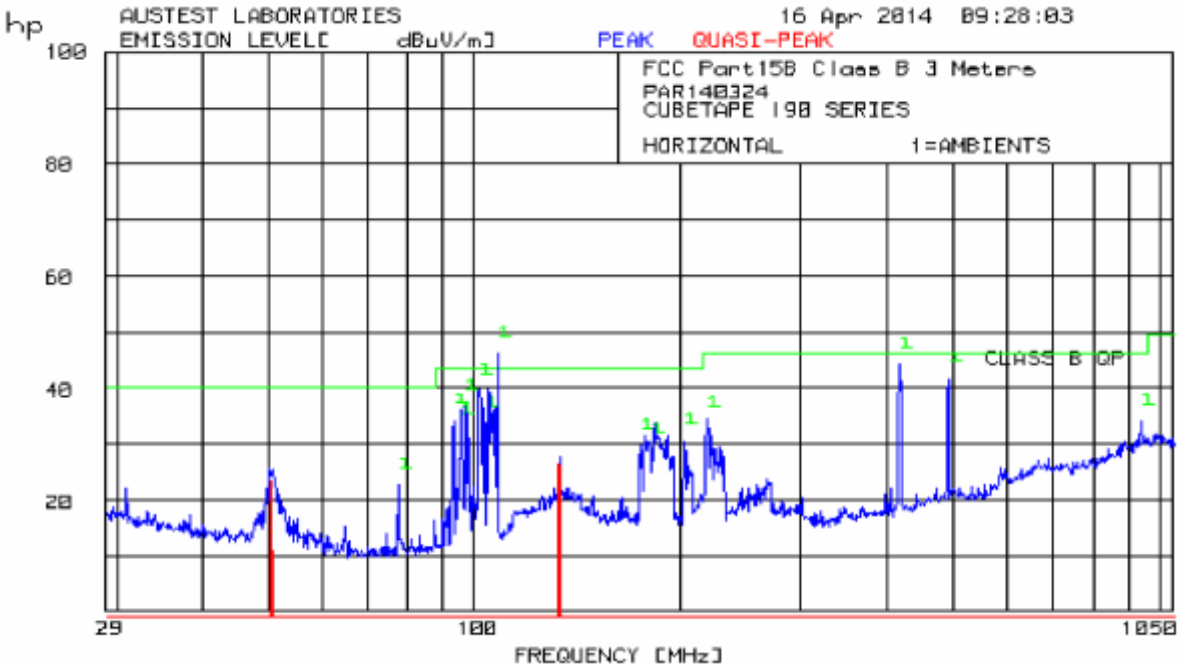
All measured disturbance levels were greater than 10dB below the Class B limits.

The worst-case results are: 30MHz to 1GHz

Frequency (MHz)	QP Level @ 3m (dBµV/m)	Antenna Pol	QP Limit @ 3m (dBµV/m)	QP Pass Margin (dB)
50.9	26.7	Vertical	40.0	13.3
132.7	28.8	Vertical	43.5	14.7
50.7	23.3	Horizontal	40.0	16.7
132.	26.2	Horizontal	43.5	17.3



Radiated Emissions Plot (Vertical Polarisation, 30MHz to 1GHz)



Radiated Emissions Plot (Horizontal Polarisation, 30MHz to 1GHz)

7.5 Test Results, >1000MHz

Measured at 3 Meters
Not applicable as the highest digital frequency used within the EUT was 48MHz.

8 FCC Part 15C, Section 15.203 – 15.249

Incorporates an FCC modular approved, certified Bluetooth module, FCC ID QOQWT12.

This module is integrated into the EUT in a manner consistent with the module manufacturer's conditions for continued compliance and in compliance with the conditions stated in the FCC certificate with the EUT to be labelled in accordance with 15.212.

APPENDIX A – PHOTOGRAPHIC RECORD OF EUT

EUT Front/Rear

EUT Rear/Bottom

EUT internal view

APPENDIX B – FCC LABELLING REQUIREMENTS

1. In accordance with section 15.19 (a) (3) the EUT should bear the following statement in a conspicuous location

   This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation

2. In accordance with section 15.21

   The user manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. In accordance with section 15.105(b)

   b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

   Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

   — Reorient or relocate the receiving antenna.

   — Increase the separation between the equipment and receiver.

   — Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

   — Consult the dealer or an experienced radio/TV technician for help.

APPENDIX C – EUT TEST SETUP PHOTOGRAPHS

Conducted Disturbance Test Setup

Conducted Disturbance Test Setup

Radiated Disturbance Test Setup

Radiated Disturbance Test Setup