

Laboratory Test Report

ELECTROMAGNETIC COMPATIBILITY

for the

TPDK5C Handportable Transceiver

Tested In accordance with

47CFR 15.109 & 15.111

Report Revision: 1
Issue Date: 5 March 2019
FCC ID: CASTPDK5C

PREPARED BY: L. M. White


Test Technician

CHECKED & APPROVED BY: M. C. James


Laboratory Technical Manager



Tests indicated as not accredited are outside the laboratory's scope of accreditation.

This document must not be reproduced except in full, without the written permission of the Compliance Laboratory Manager.

TELTEST Laboratories (A Division of Tait International Ltd) Telephone: 64 3 358 3399
PO Box 1645, 558 Wairakei Road, Christchurch, New Zealand. FAX: 64 3 359 4632

FCC ID: CASTPDK5C

TABLE OF CONTENTS

REVISION HISTORY	3
INTRODUCTION.....	4
REPORT PREPARED FOR.....	4
DESCRIPTION OF SAMPLE.....	4
STATEMENT OF COMPLIANCE	4
TEST CONDITIONS.....	4
MEASUREMENT FREQUENCY RANGE FOR UNINTENTIONAL RADIATORS	5
TEST RESULTS	6
RADIATED SPURIOUS EMISSIONS – UNINTENTIONAL RADIATOR.....	6
CONDUCTED SPURIOUS EMISSIONS - RECEIVER	8
TEST EQUIPMENT LIST.....	10
TEST SETUP DETAILS	11

Revision History

Date	Revision	Comments
5 March 2019	1	Initial test report

Introduction

Type Approval Testing of the
TPDK5C

Serial No 26111472

762 → 870 MHz

in accordance with:

47CFR 15.109 & 15.111

Report Prepared For

Tait International Ltd
245 Wooldridge Road
Harewood
Christchurch 8051
New Zealand

Description of Sample

Manufacturer: Tait International Limited
Equipment: Handportable Transceiver
Type: TPDK5C
Product Code: T03-00068-KCAZ

Quantity: 1

HARDWARE & SOFTWARE

	Analogue, FFSK and DMR tests	P25 tests
Hardware ID	TPDB3X-K500_0001	TPDB3X-K500_0001
Boot Code	QPD3B_S00_3.05.07.0001	QPD3B_S00_3.05.07.0001
DSP	QPD3A_E00_2.19.05.0054	QPD3A_A02_2.13.03.0039
Radio Application	QPD3F_E00_2.19.05.0054	QPD3F_A00_2.13.03.0039
Firmware Package	QI93P_E00_2.19.05.0054	QI94P_A02_2.13.03.0039
FPGA Image	QPD3G_S00_1.12.14.0001	QPD3G_S00_1.12.14.0001

Statement of Compliance

The TPDK5C Handportable transceiver as tested in this report was found to conform to the following standards:

47CFR 15.109 & 15.111

Test Conditions

Environmental Conditions

All testing was performed between 21 → 27 February 2019, and under the following conditions:

Ambient Temperature: 15° C → 30° C
Relative Humidity: 20% → 75%
Standard Test Voltage: 7.5 V_{DC}

Measurement Frequency Range for Unintentional Radiators

The measured frequency range is determined in accordance with FCC 47CFR 15.33 (b) (1)

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement (MHz)	Upper frequency selected for test
Below 1.705	30	☐
1.705 – 108	1000	☐
108 – 500	2000	☐
500 – 1000	5000	☒
Above 1000	5 th Harmonic of highest frequency or 40 GHz, whichever is lower	☐ MHz

Test Results

RADIATED SPURIOUS EMISSIONS – Unintentional Radiator

Note: This test is not accredited

SPECIFICATION: FCC 47 CFR 15.109

GUIDE: TIA-603E 2.1.1

MEASUREMENT PROCEDURE: Direct Measurement

Initial Scan:

1. The EUT is placed in the S-Line TEM cell and emissions are measured from 30 MHz to 800 MHz. Any emission within 10 dB of the limit is then re-tested on the OATS.
2. The EUT is placed in the reverberation chamber and emissions are measured from 800 MHz to the upper frequency required. Any emission within 10 dB of the limit is then re-tested on the OATS.

OATS Measurement:

1. The EUT is placed on a wooden turntable at a distance of three metres from the test antenna. The output terminal is connected to an RF dummy load.
2. The test antenna is raised from 1 m to 4 m to obtain a maximum reading; the turntable is then rotated through 360° to obtain the maximum response of each spurious emission. Valid emissions are determined by switching the EUT on and off.
3. The maximum response of each spurious emission is recorded.

LIMIT CLAUSE: FCC 47CFR 15.109

EMISSION FREQUENCY (MHz)	µVolts / Metre @ 3 Metres
30 → 88	100
88 → 216	150
216 → 960	200
960 →	500

Measurement Uncertainty (dB)	±4.6 dB
------------------------------	---------

RADIATED SPURIOUS EMISSIONS – Unintentional Radiator

SPECIFICATION: FCC 47CFR 15.109

12.5 kHz Channel Spacing 769.1 MHz Receive / 762.1 MHz Tx Standby	
Emission Frequency (MHz)	Level (µV/m)
~	~
12.5 kHz Channel Spacing 852.5 MHz Receive / 804.9 MHz Tx Standby	
Emission Frequency (MHz)	Level (µV/m)
~	~
12.5 kHz Channel Spacing 868.9 MHz Receive / 869.0 MHz Tx Standby	
Emission Frequency (MHz)	Level (µV/m)
~	~
Measurement Uncertainty (dB)	±4.6 dB
No emissions were detected within 10 dB of Limit.	

CONDUCTED SPURIOUS EMISSIONS - Receiver

SPECIFICATION: FCC 47CFR 15.111

GUIDE: TIA-603E 2.1.2

MEASUREMENT PROCEDURE:

1. Refer Annex A for Equipment set up.
2. The measurement frequency range is from 30 MHz to the upper frequency limit as determined by FCC 47 CFR 15.33.
3. Spurious emissions which were attenuated more than 20 dB below the limit were not recorded.
4. Rx and Tx (Standby) ports are tested separately.

LIMIT CLAUSE: FCC 47CFR 15.111

MEASUREMENT RESULTS:

12.5 kHz Channel Spacing 769.1 MHz Receive / 762.1 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
814.202	0.04
12.5 kHz Channel Spacing 769.1 MHz Receive / 774.9 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
814.202	0.04
12.5 kHz Channel Spacing 769.1 MHz Receive / 788.1 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
814.202	0.04
12.5 kHz Channel Spacing 852.5 MHz Receive / 804.9 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
807.402	0.03
12.5 kHz Channel Spacing 852.5 MHz Receive / 806.1 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
807.402	0.03

Conducted Spurious Emissions - continued

12.5 kHz Channel Spacing 852.5 MHz Receive / 816.0 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
807.402	0.03
12.5 kHz Channel Spacing 852.5 MHz Receive / 852.0 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
807.402	0.03
12.5 kHz Channel Spacing 868.9 MHz Receive / 869.0 MHz Tx Standby	
Emission Frequency (MHz)	Level (nW)
823.802	0.02
Measurement Uncertainty	≤12.75 GHz ± 3.0 dB
No other emissions were detected within 20 dB of Limit.	

LIMITS:

LIMIT	2 nW
-------	------

TEST EQUIPMENT LIST

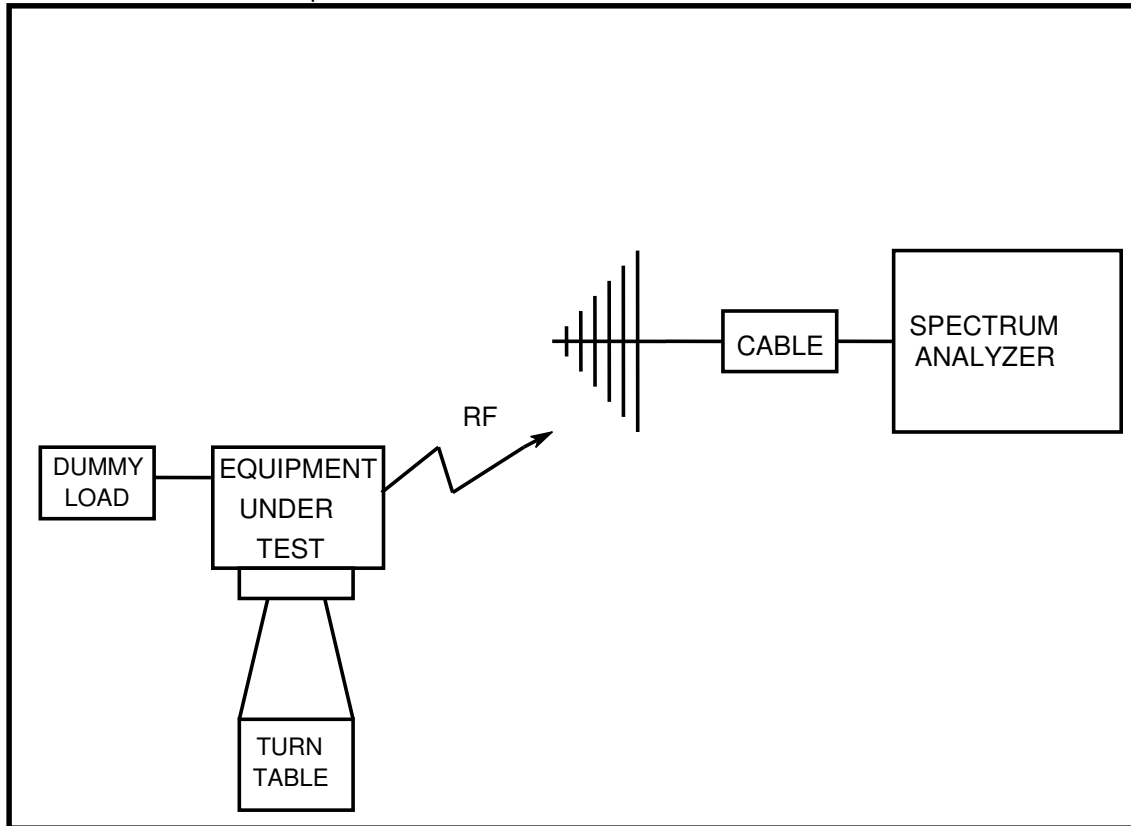
Equipment Type	Information	Manufacturer	Model No	Serial No#	Tait ID	Cal Due
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-885	E4857	
Antenna	Reverb - 1-18GHz DRG	Schwarzbeck	BBHA 9120 D	9120D-884	E4858	
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack2	E4623	17-Oct-19
Coax Cable	2m Black	Suhner	RG214HF/Nm/ Nm/2000	TeltestBlack3	E4624	17-Oct-19
Coax Cable	Reverb - 4.5m Multiflex 141	TeltestBlue6	MF 141	TeltestBlue6	E4843	18-Oct-19
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue5	MF 141	TeltestBlue5	E4844	18-Oct-19
Coax Cable	Reverb - 2m Multiflex 141	TeltestBlue4	MF 141	TeltestBlue4	E4845	18-Oct-19
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue3	MF 141	TeltestBlue3	E4846	18-Oct-19
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue2	MF 141	TeltestBlue2	E4847	18-Oct-19
Coax Cable	Reverb - 1m Multiflex 141	TeltestBlue1	MF 141	TeltestBlue1	E4848	18-Oct-19
Coax Cable	2.5m Blue	Suhner	Sucoflex 104A	33449/4PEA	E4997	19-Oct-19
Coax Cable	3m Blue	Suhner	Sucoflex 126EA	503429/126EA	E5015	19-Oct-19
Filter High Pass/ Notch	550 to 885MHz	Tait		N/A	E3785	25-Sep-19
Power Supply	TREVA1	Agilent	HP6032A	MY41000319	E4045	24-Sep-20
RF Amplifier	+21.7 dB 1GHz	Tait	ZFL-1000LN	E3660	E3360	17-Apr-19
RF Amplifier	Pre-amplifier	Agilent	87405C	MY47010688	E4941	2-Oct-19
RF Attenuator	20dB 50W	Weinschel	24-20-44	AW1266	E3562	17-Oct-19
RF Chamber	S-LINE TEM CELL	Rohde & Schwarz	1089.9296.02	338232/003	E3636	12-Sep-20
RF Chamber	Reverb - Stirrer controller for reverb chamber	Teseq	Stirrer Controller	29765.1	E4854	
RF Chamber	Reverb - 0.5 - 18GHz Reverberation Chamber	Teseq	RVC XS	29765	E4855	
RF Load	50W	Weinschel	F1426	AE2490	E3624	18-Oct-19
Signal Generator	Analog 4GHz	Agilent	E4422B	GB40050320	E3788	27-Sep-19
Spectrum Analyser	26.5GHz	Agilent	PXA N9030A	MY49432161	E4907	27-Oct-20
Temp & Humidity datalogger		Hobo	U21-011	10134276	E4981	22-Apr-19
Testware	Reverb Emissions		June 2018	-	-	
Testware	S-Line Radiated Emissions		April 2018	-	-	

* NOTE: Items without calibration dates are calibrated immediately before use, or set using calibrated instruments.

ANNEX A

Test Setup Details

Radiated Emissions Set up.



Conducted Emissions Set up.

