

## APPENDIX H OF TEST REPORT T60821\_F

### TEST SAMPLE TEST PLAN

FCC ID: QVL-MIP9  
Manufacturer: BQT Solutions (Australia) Pty Ltd  
Test Sample: Contactless Smart Card Reader  
Model: MiP9 and 900-PAC  
Serial Number: None

Date: 29<sup>th</sup> August 2006

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# EMC TEST PLAN

## For the

### BQT MiP9

# SMARTCARD READER

Document No.	Description	By	Date
DC26901A	Initial Release	PJJ	24-Jun-05
DC26901B	Updated clock frequency details	PJJ	29-Jun-05
DC26901C	Added RC oscillator frequency details	PJJ	30-Jun-05
DC26901D	Updated PCB revision	PJJ	8-Aug-06
DC26901E	Added FCC wiring diagram	PJJ	18-Sep-06

BQT Solutions Document Release Approval							
Checked by		Check Date		Approved by		Approval Date	

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## 1 PRODUCT DESCRIPTION

The BQT MiP9 is a contactless smartcard reader designed for keyless entry and other personnel identification and entry purposes. The MiP9 family of products share a common PCB, with the models differing only in their data interface configurations. See table below:

Model	Interface
MiP9	Wiegand
BT900-W	Wiegand (Rebadged MiP9)
900-PAC	Serial Tx

The MiP9 and BT900-W models use a pair of open collector drivers to provide a Wiegand interface, whilst the 900-PAC uses only one of these open collector drivers to provide a Serial Tx interface. The electrical interfaces for the MiP9 and BT900-W models are identical, whilst the 900-PAC differs only in that a pull-up resistor (R18) on its Serial Tx output is not fitted.

A MiP9 is being provided for testing. So as to gain approval for both interface types (Wiegand & Serial Tx), radiated emissions testing is to be undertaken with the pull-up resistor R18 fitted (Wiegand case) and then re-tested with R18 removed (Serial Tx case).

The MiP9 is powered from a single 12 Volt DC supply and is connected to a generic controller unit for data transfer. Both power supply and data cabling lengths are between 3m and 1200m for a normal installation.

## 2 SPECIFICATIONS RELEVANT TO EMC

Clock Frequencies	MIFARE 13.56MHz +/- 30ppm, MIFARE IF 847.5kHz +/- 30ppm, Processor 11.0592MHz +/-30ppm Processor RC Oscillator 7.3728MHz +/-2.5% Processor Watchdog Oscillator 400kHz +20% / -30%
Microprocessor	Philips P89LPC935FDH
Case style & material	Plastic – no metal coating
Power Supply	Internal linear 5V regulated

## 3 EUT TESTING CONFIGURATION

The MiP9 is to be tested on a table top in the configurations shown in Fig.1 and Fig.2. The cable lengths on the table shall comply with the minimum required under the particular test standard. The MiP9 will be connected to a Controller and Power Supply as shown. These units will be remote from the test table in all testing performed. To replicate the normal operation of the MiP9 a suitable smartcard is to be placed upon the reader's antenna where it will automatically be read repeatedly.

## 4 EUT BUILD DETAILS

Model Number/Name	MiP9
Version	Wiegand
Serial Number	
PCB Revision(s)	PC26902B (MiP9 Rev 5.1)
Software revision(s)	
Manufacturer	BQT Solutions

## 5 TESTING REQUIRED

Emissions Radiated	Comment
FCC Part 15.209 & 15.225	
EN 300 330 Part 1 & 2	
EN 301 489 Part 1	
EN 55022	
<b>Emissions Conducted</b>	
FCC Part 15.207	
EN 300 330 Part 1 & 2	
EN 301 489 Part 1	
EN 61000_3-2	Current Harmonics
EN 61000-3-3	Voltage Fluctuations & Flicker
<b>Immunity Radiated</b>	
EN 61000-4-3	RF radiated Immunity
<b>Immunity Conducted</b>	
EN 61000-4-2	Electrostatic Discharge
EN 61000-4-4	Fast Transients
EN 61000-4-5	Surges
EN 61000-4-6	Conducted RF
EN 61000-4-11	Voltage dips & interruptions
<b>SELV</b>	
EN 60950	

## 6 EMISSIONS TESTING

### 6.1 Radiated

#### 6.1.1 Classifications

Classification	Relevant Clause	Class
Product	ETSI EN 300 330 / 7.1.4	1
Transmitter Power		2
Receiver	ETSI EN 300 330 / 4.1.1	3
Duty Cycle	ETSI EN 300 330 / 7.5	4

### 6.1.2 Requirements

The following tests are to be performed and reported.

#### Transmitter

Test	Relevant Clause	
Radiated H-Field	ETSI EN 300 330-1 / 7.2.1	YES
RF Carrier current		N/A
Radiated E-field		N/A
Spurious emissions		YES

#### Receiver

Test	Relevant Clause	
Adjacent channel selectivity		N/A
Blocking or desensitisation		N/A
Receiver spurious radiation	ETSI EN 300 330-1 / 7.4	YES

### 6.1.3 Performance Criteria

The EUT must meet the limits of

- ETSI EN 300 330-1
- ETSI EN 300 330-2
- ETSI EN 301 489-1 [EN 55022].

## 6.2 Conducted

### 6.2.1 HARMONIC CURRENT EMISSIONS

#### 6.2.1.1 Requirements

Testing is to be performed using the procedures and criteria contained in EN61000-3-2 and ETSI 301 489.

### 6.2.2 VOLTAGE FLUCTUATIONS AND FLICKER

#### 6.2.2.1 Requirements

Testing is to be performed using the procedures and criteria contained in EN61000-3-3 and ETSI 301 489.

## 7 IMMUNITY TESTING

### 7.1 Radiated

#### 7.1.1 Requirements

Testing is to be performed using the procedures and criteria contained in EN61000-4-3 and ETSI 301 489.

#### 7.1.2 Frequency Range

80 to 1000 and 1400 to 2000 MHz with a step increment of 1% of the current test frequency.

#### 7.1.3 Field Strength

3 V/m with 1kHz, 80% amplitude modulation

#### **7.1.4 Performance Criteria**

The EUT does not provide a continuous communications link and as such under clause 6.3 of ETSI EN 301 489-1 the following performance criteria shall be applied.

- Degradation of operation permitted during test.
- Erroneous data transmission is permitted.
- No performance degradation permitted after testing complete.

## **7.2 Conducted**

### **7.2.1 ELECTROSTATIC DISCHARGE TESTING**

#### **7.2.1.1 Requirements**

Testing is to be performed using the procedures and criteria contained in EN61000-4-2 and ETSI EN 301 489.

#### **7.2.1.2 Types of Discharges**

Air and contact discharges are to be applied.

#### **7.2.1.3 Application Points**

Discharges are to be applied to all operator accessible areas of the EUT

#### **7.2.1.4 Number of Discharges**

At least ten (10) single discharges are to applied at each point.

#### **7.2.1.5 Severity Level**

Air discharge:	Level 4 (8kV)
Contact Discharge:	Level 2 (4kV)

All intermediate levels are to be tested as per the requirements of EN 61000-4-2.

#### **7.2.1.6 Performance Criteria**

The EUT does not provide a continuous communications link and as such under clause 6.3 of ETSI EN 301 489-1 the following performance criteria shall be applied.

- Degradation of operation permitted during test.
- Erroneous data transmission is permitted.
- No performance degradation permitted after testing complete.

### **7.2.2 ELECTRICAL FAST TRANSIENT BURST TESTING**

#### **7.2.2.1 Requirements**

Testing is to be performed using the procedures and criteria contained in EN61000-4-4 and ETSI EN 301 489 levels required.

#### **7.2.2.2 Lines to be Tested**

Mains power line and data cable greater than 3m in length are to be tested.



#### 7.2.2.3 Duration of Test

Nominal 5 minutes on all cables.

#### 7.2.2.4 Polarity Of Test Voltage

Both polarities are mandatory.

#### 7.2.2.5 Severity Level

DC Power Line - Level 1 (0.5 kV)

Data Line - Level 1 (0.5 kV).

#### 7.2.2.6 Performance Criteria

The EUT does not provide a continuous communications link and as such under clause 6.3 of ETSI EN 301 489-1 the following performance criteria shall be applied.

- Degradation of operation permitted during test.

- Erroneous data transmission is permitted.

- No performance degradation permitted after testing complete.

### 7.2.3 ELECTRICAL FAST TRANSIENTS BURST TEST

#### 7.2.3.1 Requirements

Testing is to be performed using the procedures and criteria contained in EN61000-4-5 and ETSI EN 301 489 levels required.

#### 7.2.3.2 Lines to be Tested

Mains power line and Telecommunications cable greater than 3m.

#### 7.2.3.3 Duration of Test

As per the requirements of EN 61000-4-5.

#### 7.2.3.4 Severity Level

Power Line - Level 2 (1kV to ground & 0.5kV line to line)

Telecommunications line - Level 1 (0.5 kV).

#### 7.2.3.5 Performance Criteria

The EUT does not provide a continuous communications link and as such under clause 6.3 of ETSI EN 301 489-1 the following performance criteria shall be applied.

- Degradation of operation permitted during test.

- Erroneous data transmission is permitted.

- No performance degradation permitted after testing complete.

### 7.2.4 CONDUCTED RF, Common Mode

#### 7.2.4.1 Requirements

Testing is to be performed using the procedures and criteria contained in

EN61000-4-6 and ETSI 301 489 levels required.

7.2.4.2 Lines to be Tested

Mains power line and data cable greater than 3m in length are to be tested.

7.2.4.3 Frequency Range

150kHz to 80 MHz. With 1kHz 80% amplitude modulation

7.2.4.4 Severity Level

Line - Level 2 – 3Volts rms

7.2.4.5 Performance Criteria

The EUT does not provide a continuous communications link and as such under clause 6.3 of ETSI EN 301 489-1 the following performance criteria shall be applied.

- Degradation of operation permitted during test.

- Erroneous data transmission is permitted.

- No performance degradation permitted after testing complete.

## 7.2.5 VOLTAGE DIPS and INTERRUPTIONS

7.2.5.1 Requirements

Testing is to be performed using the procedures and criteria contained in EN61000-4-11 and ETSI 301 489 levels required.

7.2.5.2 Voltage Limits

30% dip for 10ms

60% dip for 100ms

95% dip for 5000ms

7.2.5.3 Performance Criteria

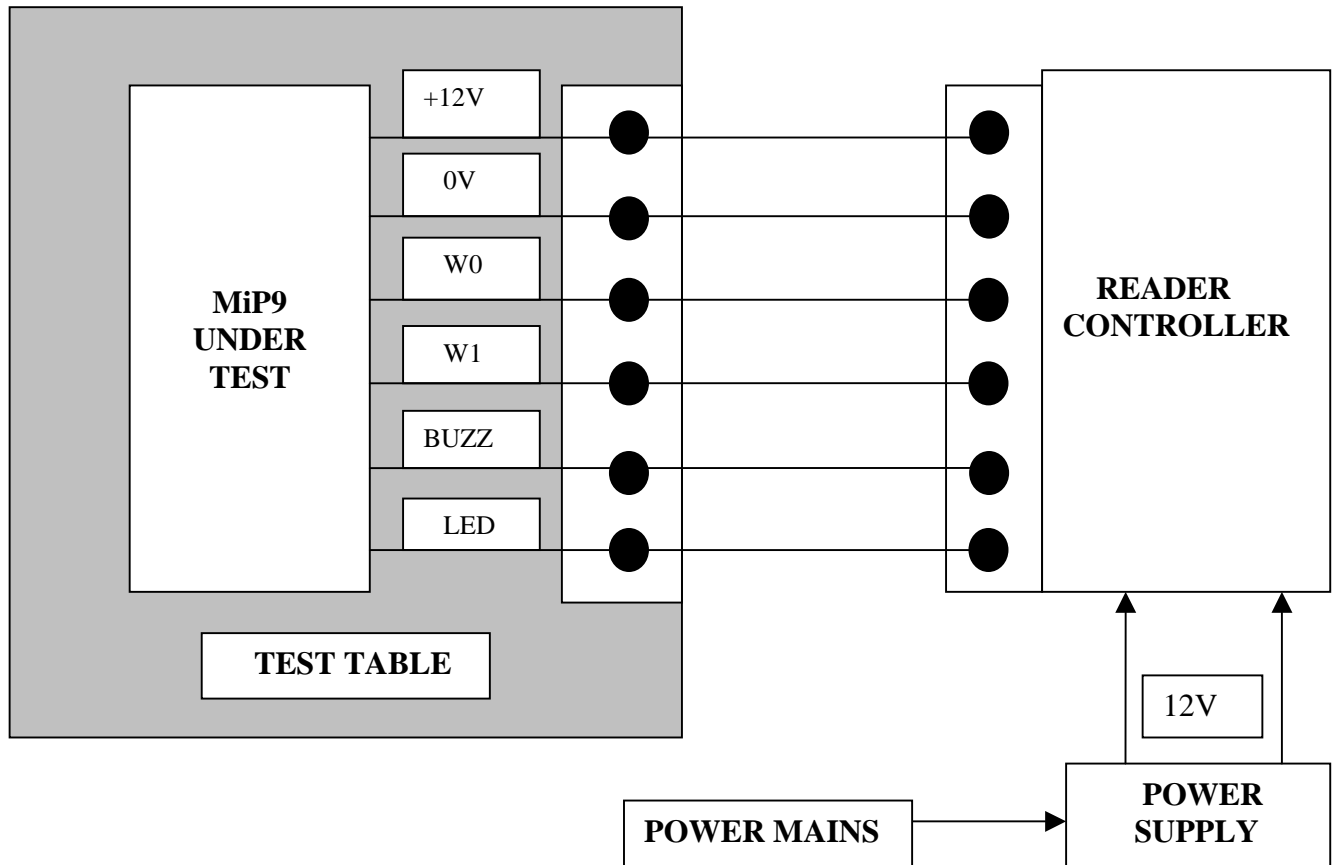
Criteria as specified in ETSI 301 489-1 clause 9.7.3. All operating anomalies are to be reported.

## 8 SAFETY

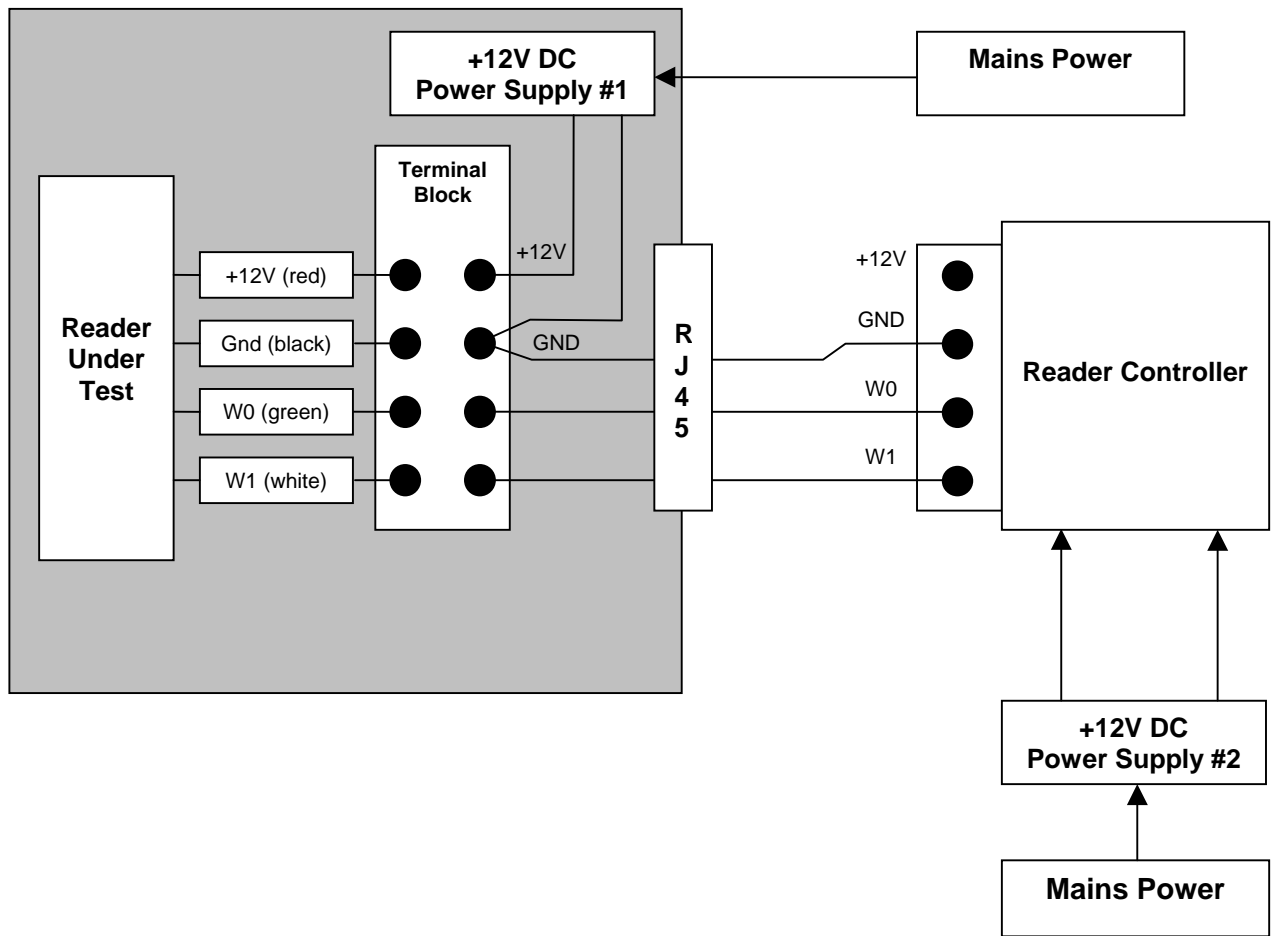
## 9 SELV

## EUT TESTING CONFIGURATION

**Fig. 1**



**Note:** Cable lengths are defined as per Section “1. Product Description” (page 4)



**Fig 2. Power and signal interconnections required to test a card reader for FCC.**

Note that there is no +12V DC connection between the “Reader Under Test” and the “Reader Controller”.

- Ensure that the +12V wire from the RJ45 connector is disconnected from the terminal block and insulated to avoid the possibility of short circuits.
- Ensure that the +12V wire is disconnected from the “Reader Controller” output terminal, and insulated to avoid the possibility of short circuits.

Power Supply #1 should be a Powermaster switch mode power supply, model #30D12150P (or equivalent)

Power Supply #2 may be a linear bench supply or a Powermaster supply as described above

**Note: Cable lengths are defined as per Section “1. Product Description” (page 4)**