

EMC VERIFICATION SUMMARY

Pursuant To EMC Directive 2004/108/EC

Applicant :	TFE Hong Kong Limited 7/F., Gemmy Factory Building, 12 Hung To Road, Kwun Tong, Kowloon, Hong Kong.
Equipment Under Test (EUT):	
Product Description:	BridgeMate
Model:	TG0277
Manufacturer:	TFE Hong Kong Limited
Sample Receipt Date:	24 Mar 2010
Test Conducted Date:	24 Mar 2010 to 08 Apr 2010
Issue Date:	08 Apr 2010
Test Site Location:	Roof Top and 2 nd Floor, Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong.
Relevant Standard(s):	EN 55014-1 : 2006 (EN 55022 : 2006+A1) EN 55014-2 : 1997+A1 (EN 61000-4-2 : 1995+A1+A2)
Conclusion:	The sample as received complied with the EMC requirement. Submitted sample was tested under manufacture's specified performance level for EN 55014-2 (EN 61000-4-2) standard.

When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

Prepared and Checked by:

Approved by:

Signed on File
Kan Chung Ting, Clement
Engineer

Lam Hon Ming, Kenneth
Senior Lead Engineer

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Table of Contents

1	General Information.....	3
1.1	Client Information.....	3
1.2	General Description.....	3
1.3	Details of EUT.....	3
1.4	Description of Peripherals.....	3
2	Test Summary.....	4
3	Test Specifications.....	5
3.1	Standards.....	5
3.2	EUT Operation Condition.....	5
4	Radiated Emission Measurements.....	6
4.1	Operating Environment.....	6
4.2	Test Setup and Procedure.....	6
4.3	Test Equipment.....	7
4.4	Radiated Emission Limits.....	7
4.5	Uncertainty of Radiated Emission.....	7
4.6	Radiated Emission Test Data.....	8
5	Performance Criteria for Immunity test.....	10
6	Electrostatic Discharge.....	11
6.1	Operating Environment.....	11
6.2	Test Setup and Procedure.....	11
6.3	Test Equipment.....	13
6.4	Required Performance Criterion.....	13
6.5	Test Results.....	13
	Appendix A1: External Photo of EUT.....	14

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited

Report No.: HK10031072-1

1. General Information

1.1 Client Information

Applicant: TFE Hong Kong Limited

1.2 General Description of EUT

Product Description: BridgeMate
Model No.: TG0277
Serial No.: Not Labelled

1.3 Details of EUT

Rated Voltage: DC 4.5V
Cables: N/A

For more detail features, please refer to user's Manual.

1.4 Description of Peripherals

- a) Support Equipment
N/A
- b) Cable
N/A
- c) Adaptor
N/A

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

2. Test Summary

Test	Standard	Result
Radiated Emission	EN 55014-1 (EN 55022)	Pass
Electrostatic Discharge	EN 55014-2 (EN 61000-4-2)	Pass

Remark:

The EUT has been tested/evaluated and pass the above EN standard without modification.

The production units are required to conform to the initial sample as received when the units are placed on the market.

Submitted sample was tested under manufacture's specified performance level for EN 55014-2 (EN 61000-4-2) standard.

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

3. Test Specifications

3.1 Standards

The radiated emission test was performed according to the procedures in EN55022. Test results are in compliance with the requirements of EN55014-1.

All the immunity tests were performed according to the procedures in the relative standards. Test results are in compliance with the requirements of EN55014-2.

The EUT setup configuration please refers to the photo of test configuration in item.

3.2 EUT Operation Condition

The EUT was powered by DC 4.5V and was running in accordance with the manufacturer's operation manual.

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

4. Radiated Emission Measurements

4.1 Operating Environment

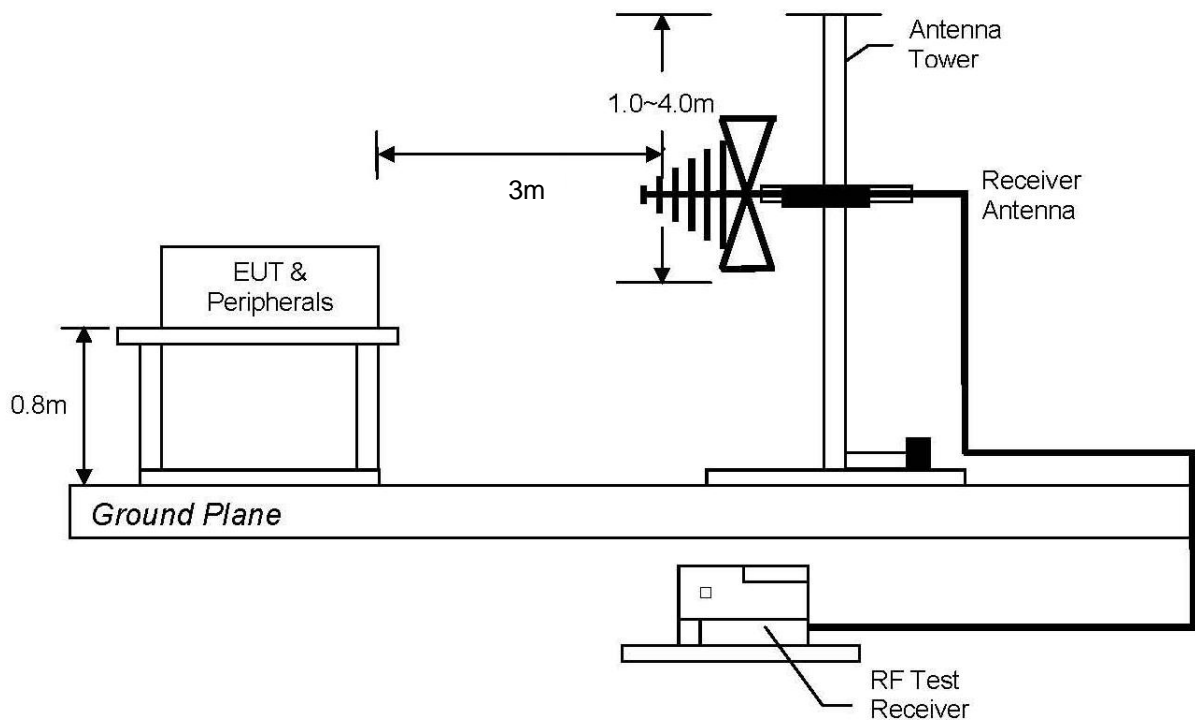
Temperature: $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$

Test Voltage: DC 4.5V

4.2 Test Setup and Procedure

The figure below shows the test setup, which is utilized to make these measurements.

The frequency spectrum from 30MHz to 1000MHz was investigated.



For tabletop equipment, the equipment under test was placed on the top of rotation table 0.8 meter above ground plane. For floor-standing equipment, the EUT and all cables were insulated, if required, from the ground plane by up to 12 mm of insulating material.

The table was 360 degrees to determine the position of the highest radiation.

EUT is set 3 meters from the EMI receiving antenna, which is mounted on a variable height mast. The antenna height is varied between one meter and four meters above ground to find the maximum value of the field strength. Both horizontal polarization and vertical polarization of the antenna are set to make the measurement. The bandwidth was setting on the EMI meter 120 kHz. Then the measured data will be converted to 10 meters data.

The levels are quasi peak value readings. The frequency spectrum from 30MHz to 1000MHz was investigated.

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

4.3 Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-0014	EMI Test Receiver	R&S	ESVS30	842807/001
EW-0446	Log Periodic Antenna	EMCO	3146	9905-5219
EW-0954	Biconical Antenna	EMCO	3104C	9911-4872
EW-2188	Spectrum Analyzer	AGILENTTECH	E4407B	MY45103609
EW-2375	14m Double Shield RF Cable (9kHz - 6GHz)	RADIALL	n m/br56/bnc m 14m	Nil
EW-2528	14m Double Shield RF Cable (20MHz - 6GHz)	RADIALL	nm/br5d/sma 14m	Nil

4.4 Radiated Emission Limits

According to EN55014-1 Clause 4.1.3, the field strength of radiated emission from the toy at a distance of 10 meters shall not exceed the following values:

Frequency MHz	Field Strength dB μ V/m
30 to 230	30
230 to 1000	37

4.5 Uncertainty of Radiated Emission

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277
Sample: 1/2

Report No.: HK10031072-1

4.6 Radiated Emission Test Data

Phase: Horizontal/ Vertical
Worst Case: Sound 'On'

EN 55022

Data Table

Radiated Disturbances Test Data (Pursuant to EN 55014-1)

Polarization	Frequency (MHz)	Net at 3m (dB μ V/m)	Calculated Net at 10m (dB μ V/m)	Limit at 10m (dB μ V/m)	Margin (dB)
V	38.429	29.9	19.4	30	-10.6
V	45.571	33.4	22.9	30	-7.1
V	54.621	33.6	23.1	30	-6.9
H	108.894	34.1	23.6	30	-6.4
H	132.376	34.2	23.7	30	-6.3
H	192.429	33.2	22.7	30	-7.3

Notes: 1. Quasi-Peak Detector Data

2. Negative sign (-) in the margin column signify levels below the limit.

3. Frequency range scanned: 30 MHz to 1000 MHz

4. Only emissions significantly above equipment noise floor are reported.

5. Uncertainty : ± 4.8 dB at a level of confidence of 95%

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277
Sample: 1/2, 2/2, 3/4, 4/4

Report No.: HK10031072-1

Phase: Horizontal/ Vertical
Worst Case: Communicating Mode (4 Units)

EN 55022

Data Table

Radiated Disturbances Test Data (Pursuant to EN 55014-1)

Polarization	Frequency (MHz)	Net at 3m (dB μ V/m)	Calculated Net at 10m (dB μ V/m)	Limit at 10m (dB μ V/m)	Margin (dB)
V	38.096	29.9	19.4	30	-10.6
V	45.214	33.4	22.9	30	-7.1
V	54.671	33.6	23.1	30	-6.9
H	108.629	34.2	23.7	30	-6.3
H	132.486	34.1	23.6	30	-6.4
H	192.548	32.8	22.3	30	-7.7

Notes: 1. Quasi-Peak Detector Data

2. Negative sign (-) in the margin column signify levels below the limit.
3. Frequency range scanned: 30 MHz to 1000 MHz
4. Only emissions significantly above equipment noise floor are reported.
5. Uncertainty : ± 4.8 dB at a level of confidence of 95%

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

5. Performance Criteria for Immunity test

Performance Criterion A :

The apparatus shall continue to operate as intended during test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance Criterion B :

The apparatus shall continue to operate as intended after test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

Performance Criterion C :

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

6. Electrostatic Discharge

6.1 Operating Environment

Temperature: 23 °C Relative Humidity: 55 %
Atmospheric Pressure : 101.2 kPa

6.2 Test Setup and Procedure

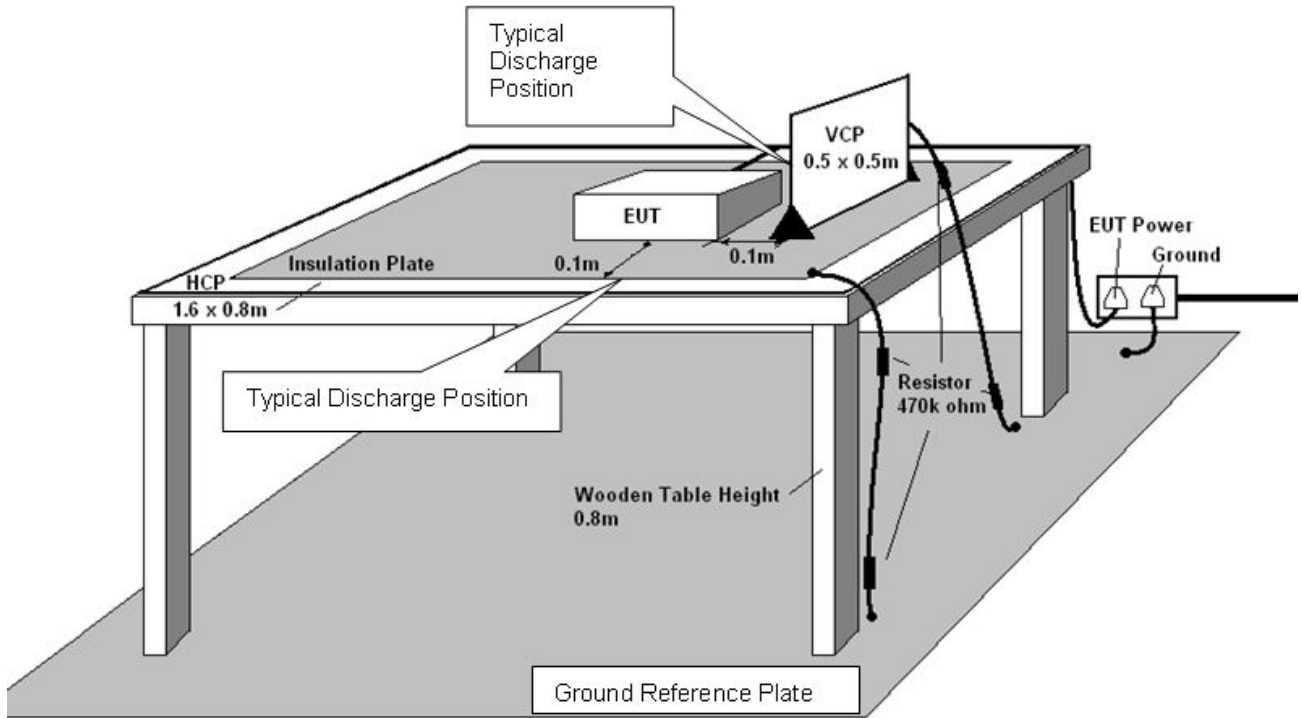
Basic Standard:	EN 61000-4-2	
Port:	Enclosure	
Required Performance Criterion:	C	
Level:	±8.0 kV (Air Discharge) ±4.0 kV (Contact Discharge) ±4.0 kV (Indirect Contact Discharge)	
Time Between Each Discharge:	1 second	
Test Mode:	Stand-by, Operating (Sound, LCD), Communication	
Test Setup:	Table-Top	
Test of Post-installation	N/A	
Test Point:	Air Discharge :	All insulated enclosure and seams All the points where contact discharge cannot be applied
	Contact :	All metal parts of the EUT
	HCP :	All sides of the EUT
	VCP :	Four faces of the EUT

INTERTEK TESTING SERVICES

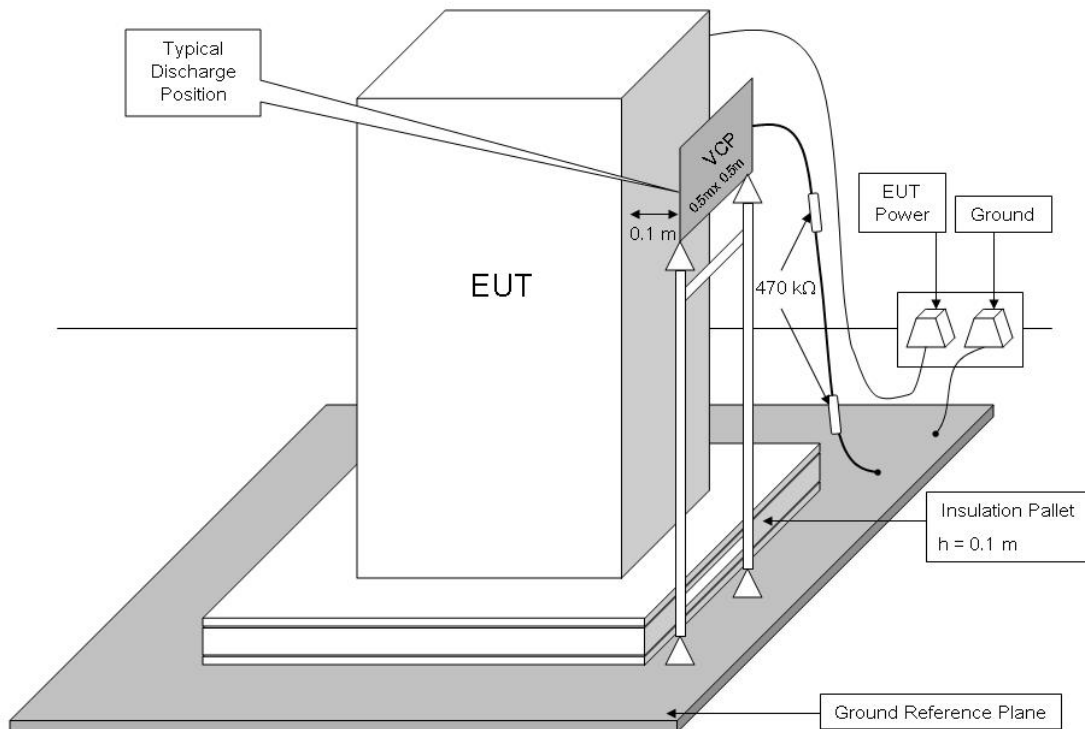
Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

The typical table-top test setup is as follow:



The typical floor-stand test setup is as follow:



INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

6.3 Test Equipment

Equipment No.	Equipment	Manufacturer	Model No.	Serial No.
EW-2282	ESD Gun	Schaffner	NSG435	5888

6.4 Required Performance Criterion

Apparatus shall fulfill the following requirement :

A performance criterion C should be applied to battery operated toys not using score or data entered by the user and with no internal clock frequency or oscillator frequency higher than 15MHz only.

All other apparatus which is covered by this standard should meet a performance criterion B.

6.5 Test Results

EN 61000-4-2 Electrostatic Discharge

Discharge Type	No. of Discharge	Applied Voltage	Result (Pursuant to EN 55014-2 criterion C)
Contact Discharge	20	+4kV	OK *
		-4kV	OK *
Air Discharge	20	+8kV	OK *
		-8kV	OK *
Indirect HCP Discharge	20	+4kV	OK
		-4kV	OK
Indirect VCP Discharge	20	+4kV	OK
		-4kV	OK

* Temporary degradation or loss of function or performance which requires operator intervention or system reset.

For the EN 55014-2 (EN 61000-4-2) standard, the submitted sample was tested under the manufacturer's specified performance level. This performance level states that in an environment with electrostatic discharge, the unit may malfunction and require the user to reset the unit. User can reset the unit by pressing the reset button at the back or removing and replacing the batteries. This performance statement should be stated in the user instructions.

INTERTEK TESTING SERVICES

Applicant: TFE Hong Kong Limited
Model: TG0277

Report No.: HK10031072-1

Appendix A1: External Photo of EUT



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Guidelines On Issuing EC Declaration Of Conformity Pursuant To EMC Directive

To attest the compliance of apparatus with the relevant EMC Directive, an EC Declaration of Conformity shall be issued by the manufacturer or his authorised representative in the European Community, and the attached EC Declaration of Conformity template contains all mandatory requirements pursuant to EMC Directive 2004/108/EC. Please follow the steps listed below when preparing an EC Declaration of Conformity:

1. Provide the name and address of the manufacturer;
2. Provide the name and address of the authorised representative in the European Community, where applicable;
3. For Apparatus' Description, specify the brand name and any other information allowing for the description of the apparatus to which the EC Declaration of Conformity refers;
4. For Apparatus' Identification, specify the type, batch, serial number or any other information allowing for the identification of the apparatus to which the EC Declaration of Conformity refers;
5. Specify the relevant EMC Directive with which the apparatus are in compliance;
6. List all dated specifications under which conformity is declared to ensure the conformity of the apparatus with the relevant EMC Directive, you may refer the standards shown in the Test Verification of Conformity issued by Intertek;
7. Sign the EC Declaration of Conformity by the person empowered to bind the manufacturer or his authorised representative in the European Community. The Name, Position and Company of this person shall be specified for identification;
8. State the date of issuing the EC Declaration of Conformity.

NOTES:

- a. The EC Declaration of Conformity shall be held by the manufacturer or his authorised representative in the European Community at the disposal of the competent authorities for a period of at least ten years after the date on which such apparatus was last manufactured. If neither the manufacturer nor his authorised representative is established within the European Community, the obligation to hold the EC Declaration of Conformity at the disposal of the competent authorities shall lie with the person who places the apparatus on the European Community market.
- b. If EMC Directive 2004/108/EC is applied, the manufacturer shall draw up technical documentation according to Annex IV of this EMC Directive; and in addition to CE Marking, the apparatus shall also meet other marks and information as stated in Article 9 of the same EMC Directive.
- c. The EC Declaration of Conformity guidelines and template are for your reference only, you shall ensure that the EMC Directive 2004/108/EC are applied correctly.

EC Declaration of Conformity

I, the undersigned,

Manufacturer's Name: _____

Manufacturer's Address: _____

Authorised Representative's Name: _____

Authorised Representative's Address: _____

certify and declare under our sole responsibility that the following apparatus:

Apparatus' Description: _____

Apparatus' Identification: _____

conforms with the essential requirements of

Directive: _____

based on the following specifications applied:

Dated Specifications: _____

and therefore complies with the essential requirements and provisions of the EMC Directive.

Signature: _____

Full Name: _____

Position: _____

Company: _____

Date: _____