中国认可
国际互认
检测
TESTING
CNAS L2264

EMC TEST REPORT

Applicant	Shanghai Dingli Information Technology LTD.
FCC ID	2AKNC-MERCURY
Product	NFC reader/writer
Brand	VeChain
Model	MERCURY
Report No.	RXA1612-0284EMC02R3
Issue Date	January 17, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2016)/ ANSI C63.4 (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Wei Liu

Performed by: Wei Liu/ Manager

Guangchang Fan

Approved by: Guangchang Fan/ Director

TA Technology (Shanghai) Co., Ltd.

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Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	15.107, ANSI C63.4-2014	PASS
Test Date: December 13, 2016~ December 22, 2016			

1 Test Laboratory

1.1 Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **TA technology (shanghai) co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein .Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above. This report must not be used by the client to claim product certification, approval, or endorsement by CNAS or any government agencies.

1.2 Test facility

CNAS (accreditation number: L2264)

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS).

FCC (recognition number is 428261)

TA Technology (Shanghai) Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

IC (recognition number is 8510A)

TA Technology (Shanghai) Co., Ltd. has been listed by industry Canada to perform electromagnetic emission measurement.

VCCI (recognition number is C-4595, T-2154, R-4113, G-766**)**

TA Technology (Shanghai) Co., Ltd. has been listed by industry Japan to perform electromagnetic emission measurement.

A2LA (Certificate Number: 3857.01)

TA Technology (Shanghai) Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

1.3 Testing Location

Company:	TA Technology (Shanghai) Co., Ltd.
Address:	No.145, Jintang Rd, Tangzhen Industry Park, Pudong Shanghai, China
City:	Shanghai
Post code:	201201
Country:	P. R. China
Contact:	Xu Kai
Telephone:	+86-021-50791141/2/3
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E-mail:	xukai@ta-shanghai.com

2 General Description of Equipment under Test

2.1 Client Information

Applicant	Shanghai Dingli Information Technology LTD.
Applicant address	building 12 Anding Fang, 284 Jiangsu Road, Shanghai, P.R.China
Manufacturer	Shanghai Dingli Information Technology LTD.
Manufacturer address	building 12 Anding Fang, 284 Jiangsu Road, Shanghai, P.R.China

2.2 General information

EUT Description	
Device Type:	Portable Device
Product Name:	NFC reader/writer
Model Number:	MERCURY
HW Version:	V03-1
SW Version:	V1.0
SN:	/
Antenna Type:	Internal Antenna
Used Host Product:	PC Manufacturer: lenovo Model: Thinkpad T540p (SN : SL10E37685)
Test Mode:	Transfer Data Mode
Auxiliary Equipment	
Mifare Card	Model: mifare s50 card Manufactor: Shanghai Estar Technology Co.,Ltd
Remark: The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details.	

2.3 Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Test standards
FCC Code CFR47 Part15B (2016)
ANSI C63.4 (2014)

3 Test Case Results

3.1 Radiated Emission

Ambient condition

Temperature	Relative humidity	Pressure
24°C~26°C	45%~50%	102.5kPa

Methods of Measurement

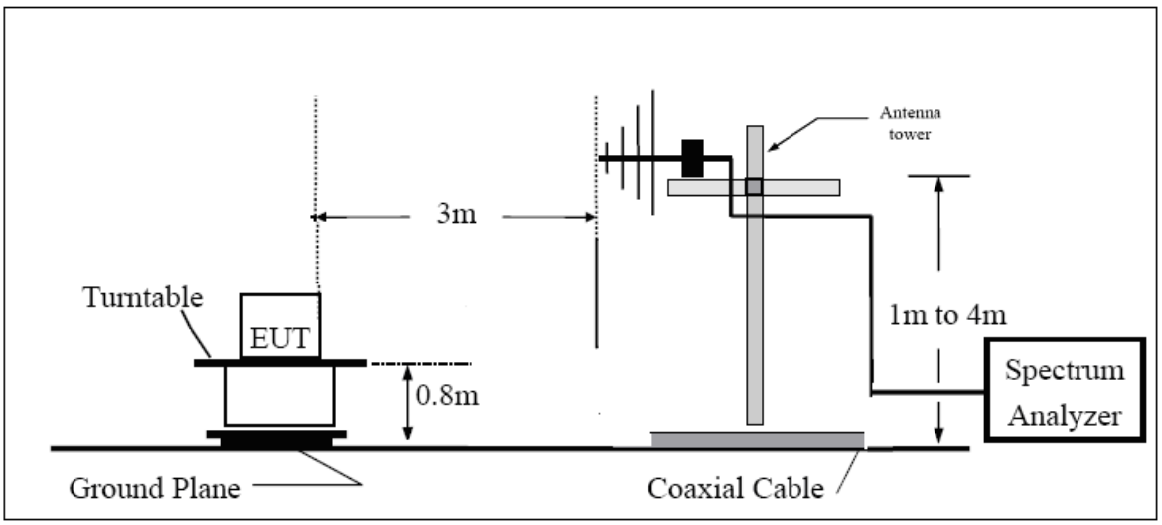
The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.
The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.
Set the spectrum analyzer in the following:
Below 1GHz:
RBW=100 kHz / VBW=300 kHz / Sweep=AUTO
Above 1GHz:
(a) PEAK: RBW=1MHz VBW=3MHz/ Sweep=AUTO
(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

The radiated emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in stand-up position (Z axis) and the worst case was recorded.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup

Below 1GHz



Note: Area side: 2.4mX3.6m

Antenna Tower meets ANSI C63.4 requirements for measurements above 1 GHz by keeping the antenna aimed at the EUT during the antenna's ascent/ descent along the antenna mast.

Limits

Frequency (MHz)	Field Strength (dBμV/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5th harmonic of the highest frequency or 40GHz,which is lower	54 74	Average Peak

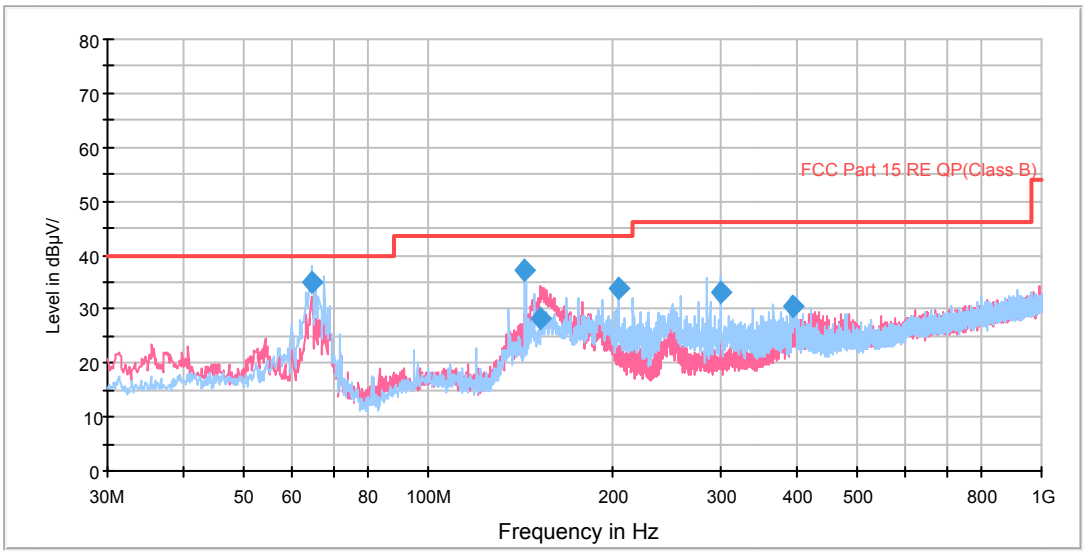
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 3.92 dB.

Test Results

The following graphs display the maximum values of horizontal and vertical by software.

RE 0.03-1GHz QP Class B



Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
64.557500	35.0	45.7	125.0	H	342.0	10.7	5.0	40.0
144.015000	37.3	46.2	125.0	H	321.0	8.9	6.2	43.5
152.783750	28.3	37.6	100.0	V	329.0	9.3	15.2	43.5
204.033750	34.0	46.2	125.0	H	0.0	12.2	9.5	43.5
300.023750	33.0	48.5	100.0	H	0.0	15.5	13.0	46.0
393.265000	30.6	48.4	100.0	H	321.0	17.8	15.4	46.0

Remark: 1. Quasi-Peak = Reading value + Correction factor

2. Correction Factor = Antenna factor+ Insertion loss (cable loss+amplifier gain)

3. Margin = Limit – Quasi-Peak

3.2 Conducted Emission

Ambient condition

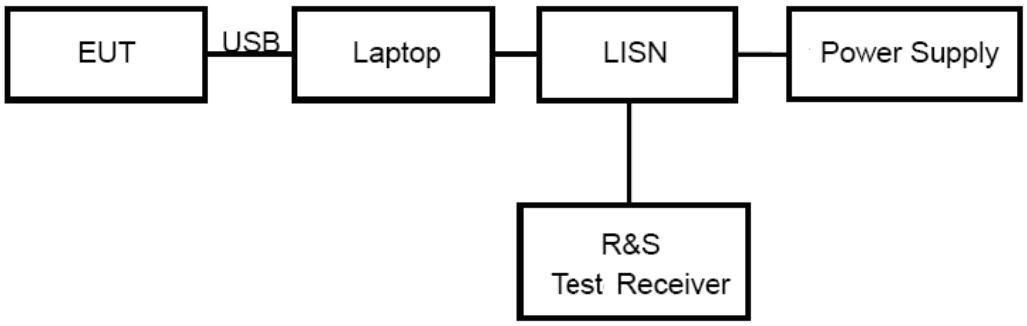
Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz. The measurement result should include both L line and N line.

During the test, EUT is connected to a laptop via a USB cable in the case of Transfer Data mode. The EUT is used as the peripheral equipment of the PC. The data is transferred from EUT to PC; PC is connected to server via a long LAN cable.

Test Setup



Note: Power Supply is AC Power source and it is used to change the voltage 120V/60Hz.

Limits

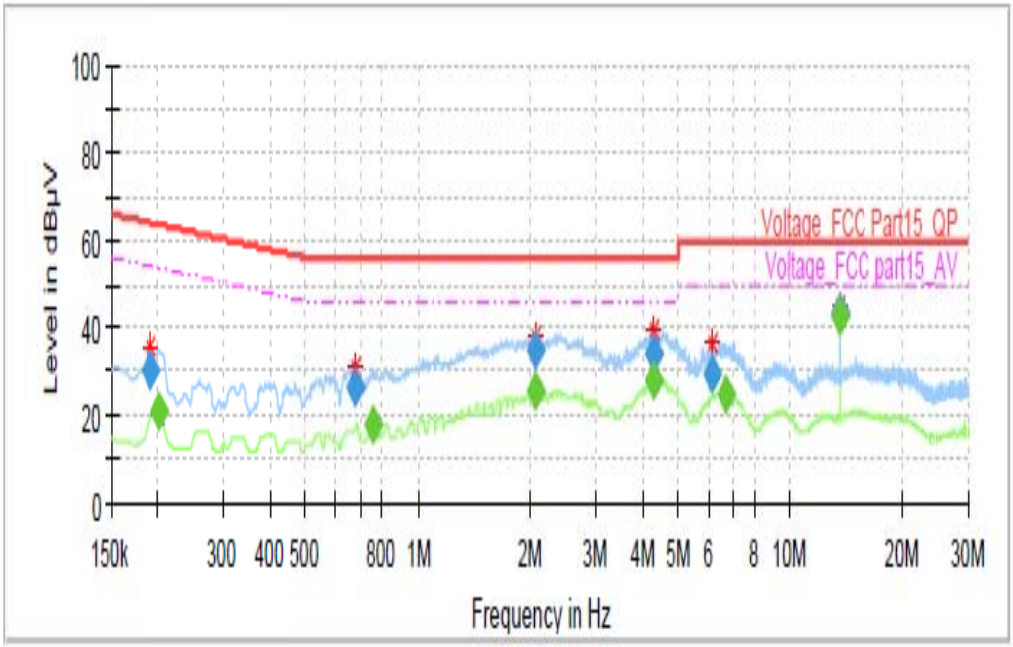
Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46 *
0.5 - 5	56	46
5 - 30	60	50
*: Decreases with the logarithm of the frequency.		

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor *k* = 1.96. U= 2.69 dB.

Test Results

Following plots, Blue trace uses the peak detection; Green trace uses the average detection.

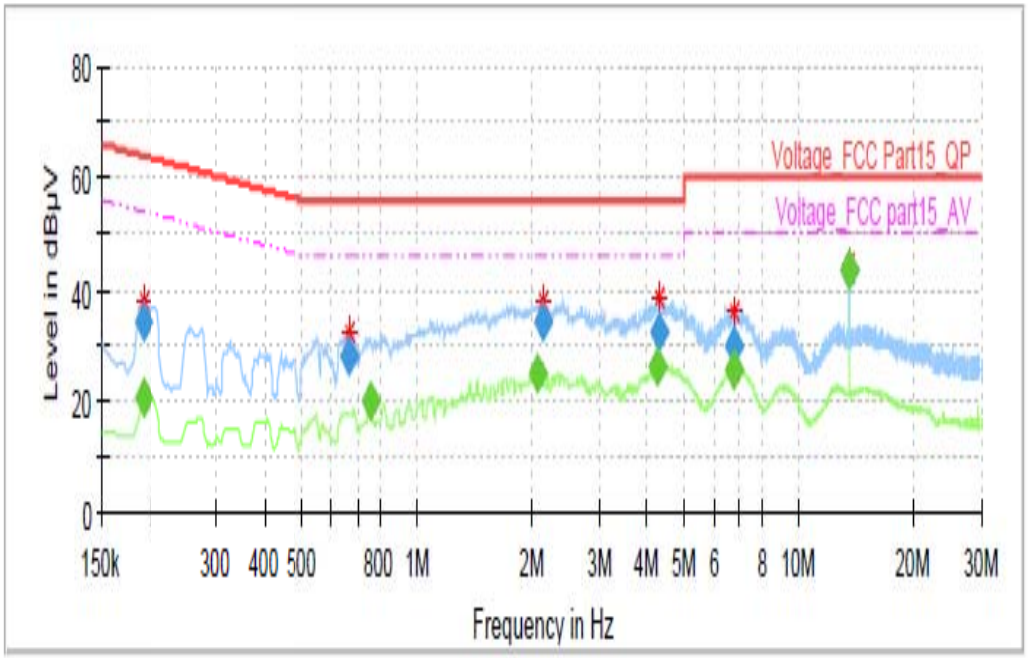


Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.190500	30.45	---	64.02	33.56	1000.0	9.000	L1	ON	19.2
0.201750	---	20.73	53.54	32.81	1000.0	9.000	L1	ON	19.2
0.678750	26.33	---	56.00	29.67	1000.0	9.000	L1	ON	19.3
0.755250	---	18.14	46.00	27.86	1000.0	9.000	L1	ON	19.2
2.067000	---	25.81	46.00	20.19	1000.0	9.000	L1	ON	19.1
2.069250	35.10	---	56.00	20.90	1000.0	9.000	L1	ON	19.1
4.269750	---	27.55	46.00	18.45	1000.0	9.000	L1	ON	19.1
4.278750	34.31	---	56.00	21.69	1000.0	9.000	L1	ON	19.1
6.144000	29.60	---	60.00	30.40	1000.0	9.000	L1	ON	19.1
6.684000	---	24.99	50.00	25.01	1000.0	9.000	L1	ON	19.1
13.560000	---	42.64	50.00	7.36	1000.0	9.000	L1	ON	19.5
13.560000	43.22	---	60.00	16.78	1000.0	9.000	L1	ON	19.5

L line

Conducted Emission from 150 KHz to 30 MHz



Final_Result

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.192750	---	20.33	53.92	33.59	1000.0	9.000	N	ON	19.2
0.192750	34.01	---	63.92	29.91	1000.0	9.000	N	ON	19.2
0.663000	27.86	---	56.00	28.14	1000.0	9.000	N	ON	19.3
0.755250	---	19.65	46.00	26.35	1000.0	9.000	N	ON	19.2
2.060250	---	25.09	46.00	20.91	1000.0	9.000	N	ON	19.1
2.136750	33.80	---	56.00	22.20	1000.0	9.000	N	ON	19.1
4.256250	---	26.17	46.00	19.83	1000.0	9.000	N	ON	19.1
4.310250	32.19	---	56.00	23.81	1000.0	9.000	N	ON	19.1
6.747000	---	25.30	50.00	24.70	1000.0	9.000	N	ON	19.1
6.803250	29.92	---	60.00	30.08	1000.0	9.000	N	ON	19.1
13.560000	---	43.21	50.00	6.79	1000.0	9.000	N	ON	19.5
13.560000	43.48	---	60.00	16.52	1000.0	9.000	N	ON	19.5

N line
Conducted Emission from 150 KHz to 30 MHz

4 Main Test Equipment

Name	Type	Manufacturer	Serial Number	Last Cal.	Cal. Due Date
EMI Test Receiver	ESCI3	R&S	100948	2016-06-01	2017-05-31
Spectrum Analyzer	FSV30	R&S	100815	2015-12-17	2016-12-16
Spectrum Analyzer	FSV30	R&S	100815	2016-12-16	2017-12-15
Loop Antenna	FMZB1519	SCHWARZBECK	1519-047	2014-02-29	2017-02-28
Trilog Antenna	VULB 9163	SCHWARZBECK	9163-201	2014-12-06	2017-12-05
Horn Antenna	HF907	R&S	100126	2014-12-06	2017-12-05
Horn Antenna	3160-09	ETS-Lindgren	00102643	2015-01-30	2018-01-29
EMI Test Receiver	ESCS30	R&S	100138	2016-12-16	2017-12-15
LISN	ENV216	R&S	101171	2016-12-17	2019-12-16
Bore Sight Antenna mast	2171B	ETS	00058752	NA	NA

ANNEX A： The EUT Appearance and Test Configuration

A.1 EUT Appearance

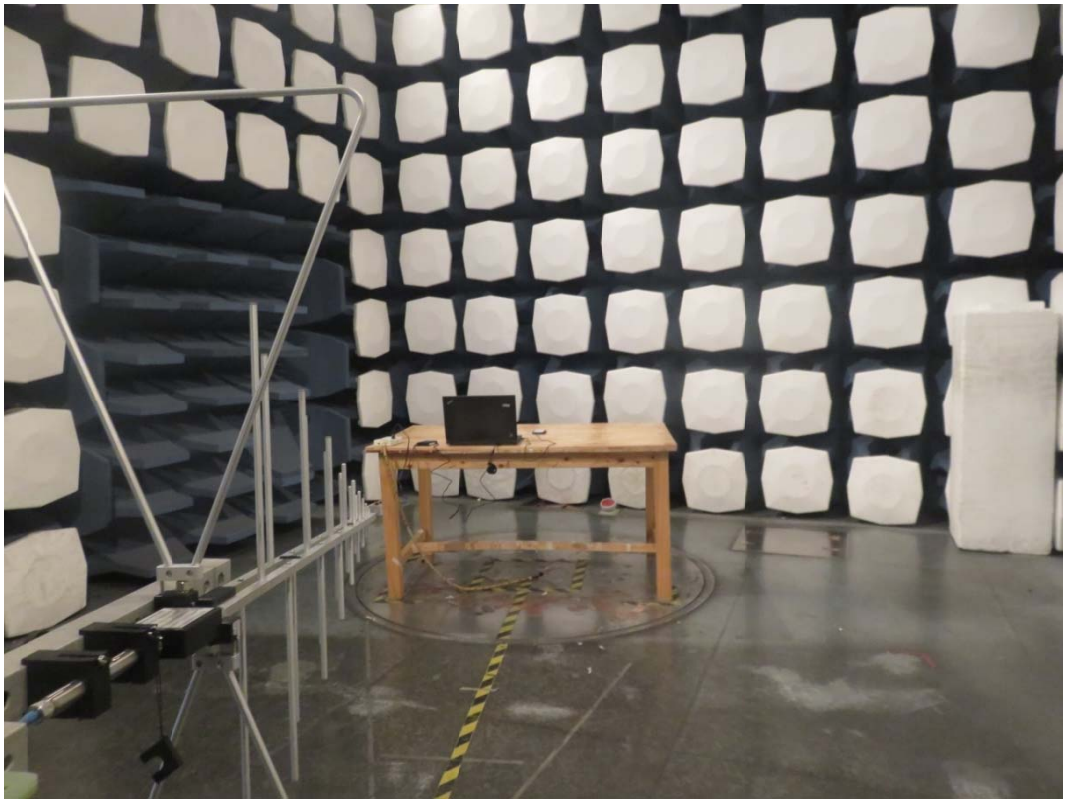
Front Side

Back Side

a: EUT

Picture 1 EUT

A.2 Test Setup



Below 1GHz

Picture 2 Radiated Emission Test Setup

Picture 3 Conducted Emission Test Setup

A.3 Host Product

A.4 Auxiliary Equipment

Mifare Card