



EMC TEST REPORT

Applicant ID TECH
Product ViVOpay Kiosk III; ViVOpay Kiosk III SRED
Brand ID TECH
Model ViVOpay Kiosk III; ViVOpay Kiosk III SRED
Report No. RXA1703-0053EMC01R1
Issue Date April 19, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **draft EN 301489-1 V2.2.0/ Final draft EN 301489-3 V2.1.1**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

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Summary of measurement results

No.	Test Type	Standard	Conclusion	Mode	Remarks
1	Radiated Emission	EN 55032 :2015	PASS	1, 2	/
2	Conducted Emission	EN 55032 :2015	PASS	1, 2	/
3	Harmonic Current Emission	EN 61000-3-2:2014	PASS	1, 2	/
4	Voltage fluctuation and flicker	EN 61000-3-3: 2013	PASS	1, 2	/
5	Electrostatic discharge	EN 61000-4-2: 2009	PASS	1, 2	Performance Criterion TT/TR
6	RF electromagnetic Field	EN 61000-4-3:2006+ A1:2008+A2:2010	PASS	1, 2	Performance Criterion CT/CR
7	Fast transients common mode	EN 61000-4-4:2012	PASS	1, 2	Performance Criterion TT/TR
8	Surge	EN 61000-4-5:2014	PASS	1, 2	Performance Criterion TT/TR
9	Radio frequency common mode	EN 61000-4-6:2014	PASS	1, 2	Performance Criterion CT/CR
10	Power Frequency Magnetic Field	EN 61000-4-8: 2010	PASS	1, 2	Performance Criterion TT/TR
11	Voltage dips and interruptions	EN 61000-4-11:2004	PASS	1, 2	Performance Criterion TT/TR
Date of Testing: March13, 2017~ March17, 2017					

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.
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2 General Description of Equipment under Test

2.1 Client Information

Applicant	ID TECH
Applicant address	10721 Walker Street Cypress, CA 90630 United States
Manufacturer	ID TECH
Manufacturer address	10721 Walker Street Cypress, CA 90630 United States

2.2 General information

EUT Description	
Product Name:	ViVOpay Kiosk III; ViVOpay Kiosk III SRED
Model Number:	ViVOpay Kiosk III; ViVOpay Kiosk III SRED
SN:	controller A: 532T998513 controller D: 532T998593 antenna B: 615T553602 antenna C: 453T556805
HW Version:	80136110
SW Version:	80136120
Power Supply:	AC adapter
Antenna Type:	Internal Antenna
Frequency:	NFC: TX: 13.56MHz RX: 13.56MHz
Modulation:	NFC: ASK
EUT Accessory	
Adapter	Manufacturer: DVE Model: DSA-12PFA-05 FEU 075100 Input: 100-240Vac 50/60Hz 0.5A Output: 7.5Vdc 1A
Cable 1	Manufacturer: PRIME TECHNOLOGY INC Model: 80136204 135cm
Cable 2	Manufacturer: PRIME TECHNOLOGY INC Model: 80136218 18cm
Remark: 1.The information of the EUT is declared by the manufacturer. Please refer to the specifications or user manual for details. 2. The EUT don't have standard Adapter. The adapter used for testing in this report is the after-market accessory.	

Model	Grop
ViVOpay Kiosk III	IDVK-300001(controller A) & IDVK-310100(normal antenna B)
	IDVK-300001(controller A) & IDVK-330100(35 degree antenna C)
ViVOpay Kiosk III SRED	IDVK-308021(controller D) & IDVK-310100(normal antenna B)
	IDVK-308021(controller D) & IDVK-330100(35 degree antenna C)
Note: There is more than one controller (controller A and controller D) and Antenna (Antenna B and Antenna C), each grop (AB/AC/DB/DC) should be applied throughout the compliance test respectively, however, only the worst case (controller D & Antenna C) will be recorded in this report.	

2.3 Applied Standards

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

Test standards

draft ETSI EN 301 489-1 V2.2.0

Final draft ETSI EN 301 489-3 V2.1.1

Reference standard

EN 55032:2015 Class B

EN 55024:2010

EN 61000-3-2:2014

EN 61000-3-3:2013

EN 61000-4-2:2009

EN 61000-4-3:2006+A1:2008+A2:2010

EN 61000-4-4:2012

EN 61000-4-5:2014

EN 61000-4-6:2014

EN 61000-4-8:2010

EN 61000-4-11:2004

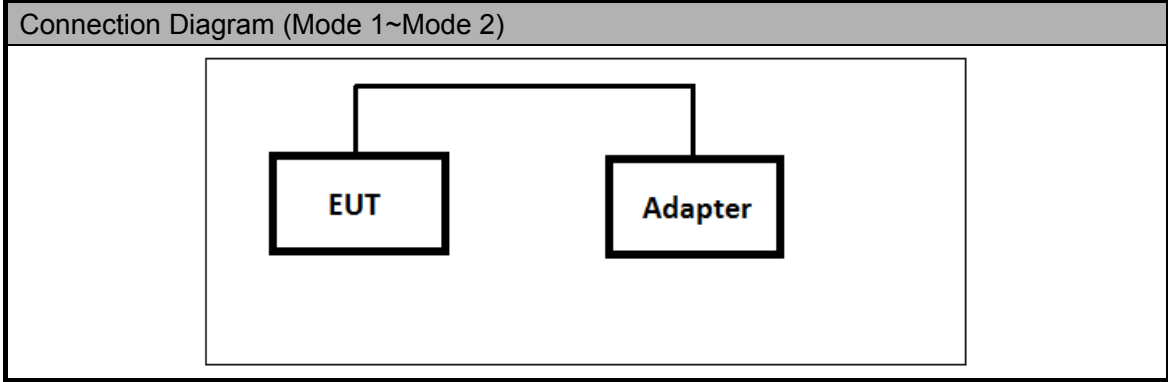
2.4 Test Configuration

Test Mode

Test Mode	
Mode 1:	Adapter + USB cable + NFC +Idle
Mode 2:	Adapter + USB cable + NFC +Traffic

During the test, the preliminary test was performed in all modes, mode 1 is selected as the worst condition. The test data of the worst-case condition was recorded in this report as follows.

System Configurations



3 Test Conditions of 301489 Series Standards

3.1 Special Conditions of Applied Standards for EUT

Below each section is special condition applied for each application of EUT.

Emission

Standards	Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 8
EN301 489-3		No special conditions shall apply to UE in the scope of the present document.

Immunity

Standards	Reference to clauses in EN 301 489-1 [1]	Special product-related conditions, additional to or modifying the test conditions in EN 301 489-1 [1], clause 9
EN301489-3		No special conditions are relevant for products covered in the present document.

3.2 Exclusion Band

Standards	Exclusion band
EN301489-3	<p>Exclusion band for transmitters</p> <p>The exclusion band shall be those frequencies specified in the relevant radio standard as the operating frequency band and the Out of Band domain.</p> <p>Where this is not so specified the exclusions bands shall be as below:</p> <p>For transmitters operating, or intended to operate, in a channelized frequency band, the exclusion band is five times (i.e. $\pm 250\%$) the maximum operating channel width (OCW) allowed for that service, centred around the operating frequency.</p> <p>For wide band transmitters, i.e. transmitters in a non-channelized frequency band, the exclusion band is twice the intended operating frequency band centred around the centre frequency of the intended operating frequency band.</p> <p>The exclusion band shall only apply when the EUT is in transmit mode of operation.</p> <p>Exclusion bands for receivers</p> <p>No exclusion band applies.</p>

4 Performance criteria

Criteria	Performance criteria
CT/CR	<p>During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended.</p> <p>At the conclusion of the test, the EUT shall operate as intended with no loss of user control functions or stored data, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.</p> <p>The EUT shall operate as its intended operating condition during and after the test.</p> <p>GPRS:</p> <p>The BLER of the GPRS shall be no greater than 10% and measure during each individual exposure in the test sequence.</p> <p>LTE:</p> <p>The Throughput of the LTE shall be $\geq 95\%$ of the maximum throughput of the reference measurement channel, and measure during each individual exposure in the test sequence.</p> <p>USB Link:</p> <p>During the test storage devices shall maintain normal operation both in read/write and in stand-by conditions.</p> <p>The EUT shall show no loss of user control functions or stored data during and after the test.</p> <p>The EUT shall show no unintentional responses when it is in idle condition.</p>
TT/TR	<p>After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended.</p> <p>At the conclusion of each exposure the EUT shall operate with no user noticeable loss of the communication link. At the conclusion of the total test comprising the series of individual exposures, the EUT shall operate as intended with no loss of user control functions or stored data, as declared by the manufacturer, and the communication link shall have been maintained. In addition to confirming the above performance during a call, the test shall also be performed in idle mode, and the transmitter shall not unintentionally operate.</p> <p>USB Link:</p> <p>During and after the test failures which can be recovered by read and write retries are permissible (temporary delay in processing caused by this process is acceptable).</p>

<EN301489-3>

Class 1 SRD equipment		
Criteria	During test	During test After test
A	Operate as intended No loss of function For equipment with primary function type II the minimum performance shall be 12 dB SINAD No unintentional responses	Operate as intended. For equipment with primary function type II the communication link shall be maintained No loss of function. No degradation of performance. No loss of stored data or user Programmable functions.
B	May be loss of function (one or more) No unintentional responses	Operate as intended Lost function(s) shall be self-recoverable No degradation of performance No loss of stored data or user programmable functions
Class 2 SRD equipment		
Criteria	During test	During test After test
A	Operate as intended No loss of function For equipment with primary function type II the minimum performance shall be 6 dB SINAD No unintentional responses	Operate as intended For equipment with primary function type II the communication link shall be maintained. No loss of function No degradation of performance No loss of stored data or user programmable functions
B	May be loss of function (one or more). No unintentional responses.	Operate as intended. Lost function(s) shall be self-recoverable. No degradation of performance. No loss of stored data or user programmable functions.
Class 3 SRD equipment		
Criteria	During test	After test
A and B	May be loss of function (one or more) No unintentional responses	Operate as intended, for equipment with primary function type II, the communication link may be lost, but shall be recoverable by user. No degradation of performance Lost functions shall be self-recoverable

CLAUSE 6.4 to 6.7 of EN301489-3	
Criteria	Performance criteria
CT	<p>For equipment with primary function type I or II including ancillary equipment tested on a standalone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.</p> <p>For equipment with primary function type II or type III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.</p> <p>Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.</p>
CR	<p>For equipment with primary function type I or II, including ancillary equipment tested on a standalone basis, the performance criteria A of the applicable class as given in clause 6.3 shall apply.</p> <p>For equipment with primary function type II or III that requires a communication link that is maintained during the test, it shall be verified by appropriate means supplied by the manufacturer that the communication link is maintained during each individual exposure in the test sequence.</p> <p>Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.</p>
TT	<p>For equipment with primary function type I or II, including ancillary equipment tested on a standalone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.</p> <p>For equipment with primary function type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.</p> <p>Where the EUT is a transmitter, tests shall be repeated with the EUT in standby mode to ensure that any unintentional transmission does not occur.</p>
TR	<p>For equipment with primary function type I or II, including ancillary equipment tested on a standalone basis, the performance criteria B of the applicable class as given in clause 6.3 shall apply, except for power interruptions exceeding a certain time the performance criteria deviations are specified in clause 7.2.2.</p> <p>For equipment with primary function type II or type III that requires a communication link that is maintained during the test, this shall be verified by appropriate means supplied by the manufacturer during each individual exposure in the test sequence.</p> <p>Where the EUT is a transceiver, under no circumstances shall the transmitter operate unintentionally during the test.</p>

5 Emission Test

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

5.1 Radiated Emission

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. Sweep the whole frequency band through the range from 30MHz to 5 times the highest frequency or 6 GHz, whichever is less. 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 spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna.

Below 1GHz, RBW is set to 100 kHz and VBW is set to 300kHz. Above 1GHz, RBW is set to 1MHz and VBW is set to 3MHz.

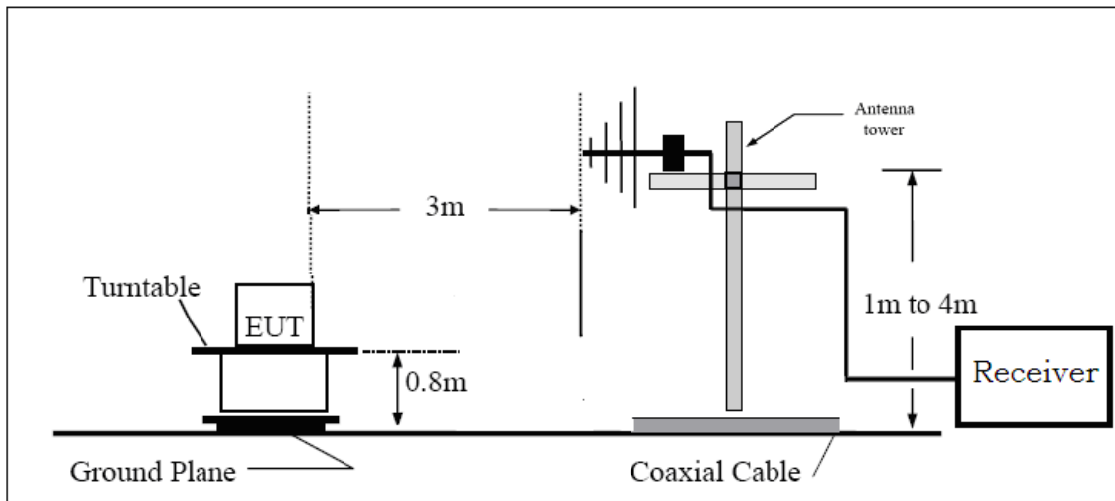
At the beginning of the measurement, the battery is completely discharged.

Final Detection: 30M-1GHz: Quasi-Peak

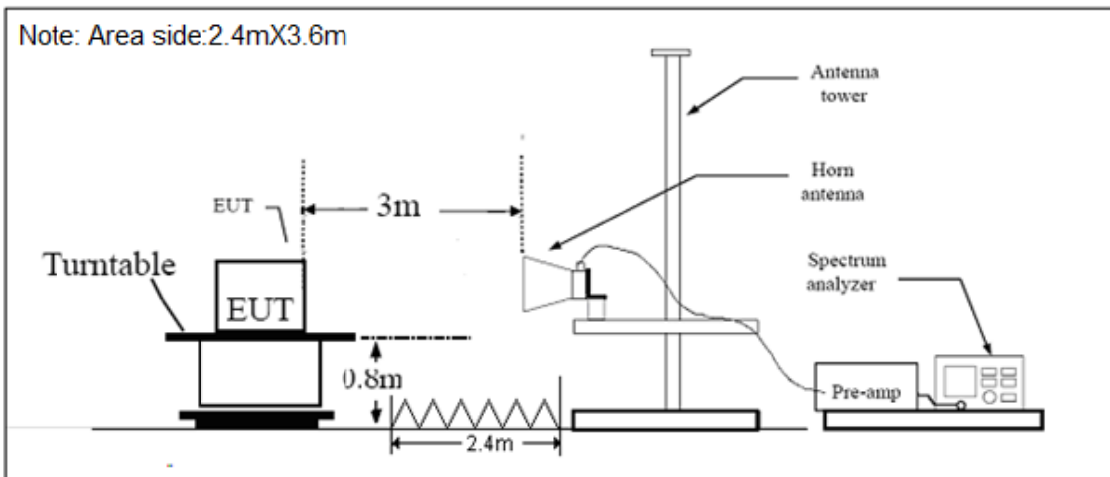
1G-6GHz: Peak+Average

Test Setup

Below 1 GHz



Above 1GHz



Limits

Frequency (MHz)	Quasi-peak (dBµV/m)		Measurement distance (m)
30 -230	40		3
230-1000	47		3
Frequency (MHz)	Peak (dBµV/m)	Average (dBµV/m)	Measurement distance (m)
1000 -3000	70	50	3
3000- 6000	74	54	3

Test Result

Refer to the section 7.1 of this report for test data.

5.2 Conducted Emission

Methods of Measurement

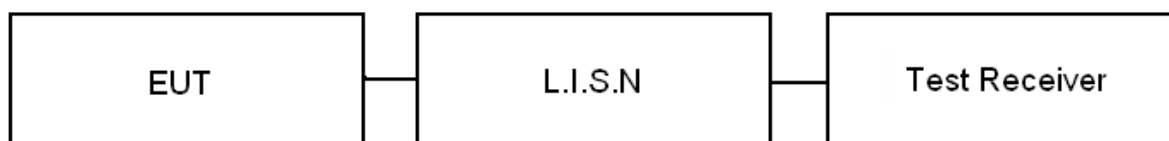
The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. All telecommunication and signal ports must be correctly terminated using either appropriate associated equipment or a representative termination during the measurement of the conducted disturbances at the mains.

The frequency band range is from 150 kHz to 30MHz. RBW is set to 9 kHz and VBW is set to 30 kHz on spectrum analyzer. During the test, the EUT was operating in its typical mode. Connect the AC or DC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. The measurement result should include both L line and N line.

At the beginning of the measurement, the battery is completely discharged.

Final Detection: Quasi-Peak+Average

Test Setup



Limits

Frequency (MHz)	Conducted Limits(dB μ V)	
	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.

Test Result

Refer to the section 7.2 of this report for test data.

5.3 Harmonic Current Emission

Methods of Measurement

The EUT is to be powered from a clean (low distortion) 230V 50Hz AC Power source. The set-up and test methods were according to EN 61000-3-2.

The measurement of harmonic currents shall be performed as follows:

1. For each harmonic order, measure the 1.5 s smoothed r.m.s.
2. Calculate the arithmetic average of the measured values from the DFT time windows,

The value of the input power to be used for the calculation of limits shall be determined as follows:

1. Measure the 1.5 s smoothed active input power in each DFT time window;
2. Determine the maximum of the measured values of power from the DFT time windows over the entire duration of the test.

Limits

Harmonic order n	Maximum permissible Harmonic current A
Odd harmonic	
3	2.30
5	1.14
7	0.77
9	0.40
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 \frac{15}{n}$
Even harmonic	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 \frac{8}{n}$

Test Result

Refer to the section 7.3 of this report for test data.

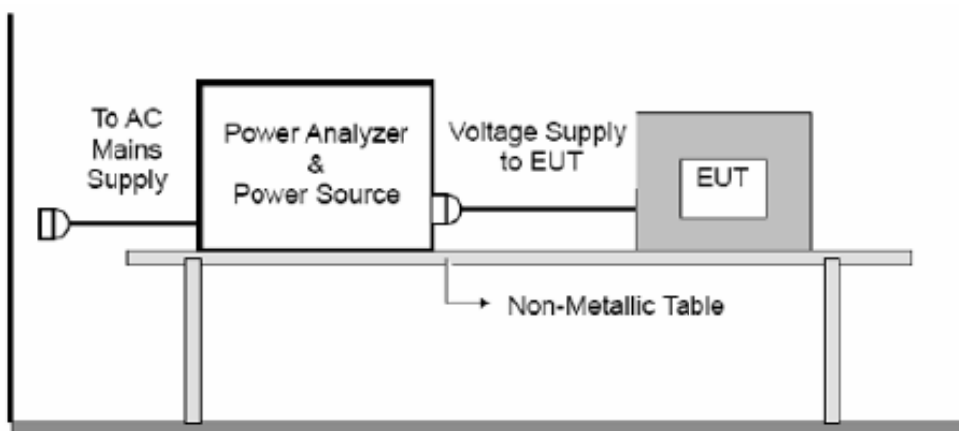
5.4 Voltage fluctuation and flicker

Methods of Measurement

The EUT is to be powered from a clean (low distortion) 230V 50Hz AC Power Port source. The formal test ran 10mins and over a 2 hour period. The values of P_{st} , $d(t)$, d_{max} and d_c is measured. The set-up and test methods were according to EN 61000-3-3.

Whether the equipment operates with automatic, mixed or manual control, the measurements shall be made under normal load, or conditions for adequate heat discharge, and under normal operating conditions.

Test Setup



Limits

1. The value of P_{st} shall not be greater than 1,0;
2. The value of P_{it} shall not be greater than 0,65;
3. The value of $d(t)$ during a voltage change shall not exceed 3,3 % for more than 500 ms;
4. The relative steady-state voltage change, d_c , shall not exceed 3,3 %;
5. The maximum relative voltage change d_{max} , shall not exceed
 - a) 4 % without additional conditions;
 - b) 6 % for equipment which is:
 - switched manually, or
 - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

Test Result

Refer to the section 7.4 of this report for test data.

6 Immunity Test

Ambient condition

Temperature	Relative humidity	Pressure
23°C ~26°C	45%~50%	101.5kPa

6.1 Electrostatic Discharge

Methods of Measurement

The set-up and test methods were according to EN 61000-4-2.

During the test, the EUT was operating in its typical mode.

The EUT is placed on a non-metallic table of 80cm height above the ground reference plane.

A horizontal coupling plane (HCP) is placed on the table. The EUT and its cables shall be isolated from the coupling plane by an insulating support (0.5 ± 0.05) mm in thickness.

Details of the points tested were presented in below:

Test Points	Specification Level			
	±2kV,±4kV Contact Discharges		±2kV,±4kV, ±8kV Air Discharges	
	Positive	Negative	Positive	Negative
Horizontal Coupling Plane-front	√	√	N/A	N/A
Horizontal Coupling Plane-rear	√	√	N/A	N/A
Horizontal Coupling Plane-left	√	√	N/A	N/A
Horizontal Coupling Plane-right	√	√	N/A	N/A
Vertical Coupling Plane-front	√	√	N/A	N/A
Vertical Coupling Plane-rear	√	√	N/A	N/A
Vertical Coupling Plane-left	√	√	N/A	N/A
Vertical Coupling Plane-right	√	√	N/A	N/A
screw	√	√	N/A	N/A
Metal frame	√	√	N/A	N/A
Enclosure	N/A	N/A	√	√
gap	N/A	N/A	√	√

√ The EUT's performance at this test point when the ESD pulse was applied.

Test Specifications

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible.

Test Result

Refer to the section 7.5 of this report for test data.

6.2 RF Electromagnetic Field (RS)

Methods of Measurement

The set-up and test methods were according to EN 61000-4-3.

Before testing, the intensity of the established of field strength is checked by the field sensor for the calibration, after that the EUT is placed in the center of the enclosure on a wooden table.

During the test, the EUT was operating in its typical mode.

The EUT was tested for back side, front side, left side, right side, top side, and bottom side.

The test for front side was found to be the worst mode, and this mode was recorded. The test frequency range is from 80MHz to 1000MHz and 1400MHz to 2700MHz, severity level of 3V/m.

The operator shall observe whether the communication link is maintained. RXQUAL is measured by simulator base station. Use an audio analyzer such as UPV to measure uplink and downlink speech output levels to see whether audio breakthroughs are at least 35 dB less than reference measurement values of audio calibration.

A communication link is set up with a Base Station Simulator by air link, monitoring the status of communication through Base Station Simulator.

Test Specifications

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended.

Test Result

Refer to the section 7.6 of this report for test data.

6.3 Fast Transients Common Mode (EFT)

Methods of Measurement

The set-up and test methods were according to EN 61000-4-4.

The test intended to show the immunity of the EUT when subjected to type of transient interference such as originating from switching transients. Bursts consisting of a number of transient are employed, coupled into power supply, control and signal inputs of EUT, The transients must be short rise-time, the repetition rate and the low energy.

The EUT is arranged and connected according to its normal installation requirements. The length of the signal and power lines between the coupling device (clamp) and the EUT is $0.5\text{m}\pm 0.05\text{m}$. If a non-detachable cable more than 0.5m long with the equipment, the excess length of this cable is gathered into a flat coil with 0.4m diameter and situated at a distance of 0.1m above the ground reference plane. Bursts of 5ns/50ns pluses at a repetition rate of 5kHz with a duration of 15ms and period of 300ms, applied in both polarities between power supply terminals (including the protective earth) and a reference ground plane, or via a capacitance coupling clamp onto I/O circuits and communication lines for 3 minutes. The test level is 1kV on power supply, 0.5kV on I/O signal, data and control lines. The 0.5kV is applicable only to ports interfacing with cables whose total length according to the manufacturer's functional specification may exceed 3m.

Test Specifications

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended.

Test Result

Refer to the section 7.7 of this report for test data.

6.4 Surge

Methods of Measurement

The set-up and test methods were according to EN 61000-4-5.

The test level for ac mains power input ports shall be 2 kV line to ground, and 1 kV line to line, with the output impedance of the surge generator as given in EN 61000-4-5.

The test generator shall provide the 1.2/50 μ s pulse as defined in EN 61000-4-5

The object of this section is to establish a common reference for evaluating the performance of equipment when subjected to high-energy disturbances on the power and interconnection lines. The test is to find the reaction of the EUT under specified operational conditions caused by surge voltages from switching and lighting effects at certain threat levels.

Test Specifications

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended.

Test Result

Refer to the section 7.8 of this report for test data.

6.5 Radio Frequency Common Mode (CS)

Methods of Measurement

The set-up and test methods were according to EN 61000-4-6.

The applied level was Amplitude Modulated by a 1 kHz sinusoidal signal to a modulation depth of 80%.

Most electronic product is in some manner affected by environmental electromagnetic radiation; the performance will be degraded or totally un-function. The object of this part is to evaluate the susceptibility of the EUT whether it can operate property in the electromagnetic environment.

The operator shall observe whether the communication link is maintained. RXQUAL is measured by simulator base station. Use an audio analyzer such as UPV to measure uplink and downlink speech output levels to see whether audio breakthroughs are at least 35 dB less than reference measurement values of audio calibration. The test is performed as CR and CT mode.

A communication link is set up with a Base Station Simulator by air link, monitoring the status of communication through Base Station Simulator.

Test Specifications

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer when the apparatus is used as intended.

Test Result

Refer to the section 7.9 of this report for test data.

6.6 Power Frequency Magnetic Field

Methods of Measurement

The equipment was configured and connected to satisfy its functional requirements. It shall be placed on the GRP with the interposition of a 0.1m-thick insulating support.

The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.

The power supply, input and output circuits shall be connected to the sources of power supply, control and signal.

The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

Test Result

Refer to the section 7.10 of this report for test data.

6.7 Voltage dips and interruptions

Methods of Measurement

The set-up and test methods were according to EN 61000-4-11.

The section of EN 61000-4-11 defines the immunity test methods and range of preferred test levels for electrical and electronic equipment connected to low – voltage power supply for voltage dips and short interruptions. EN 61000-4-11 applied to electrical and electronic equipment having a rated input current not exceeding 16A per phase.

Test Specifications

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended.

Test Result

Refer to the section 7.11 of this report for test data.

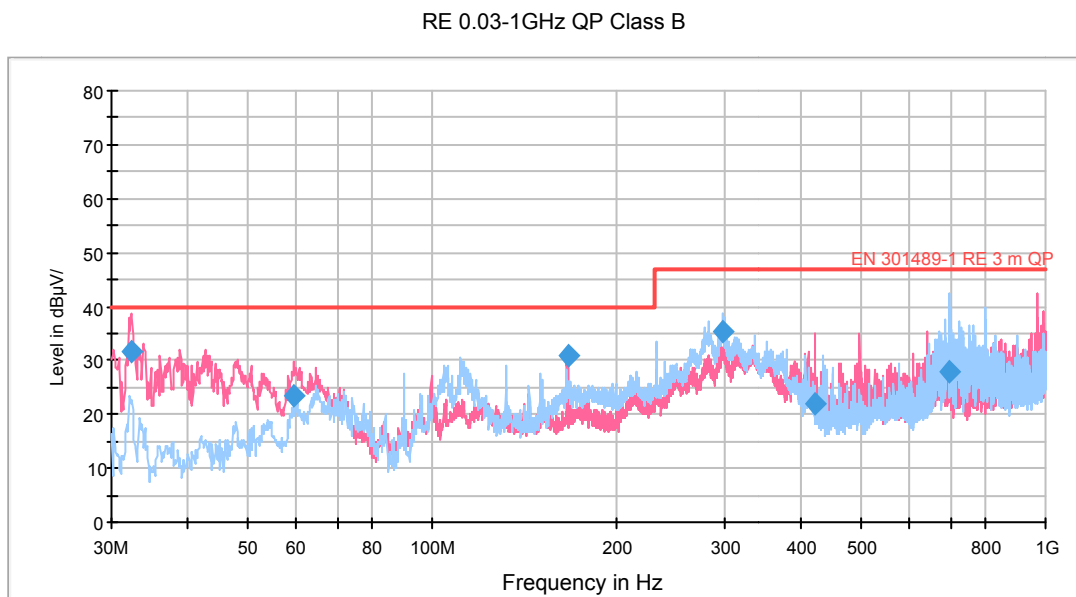
7 Graph and Test Data

During the test, the preliminary test was performed in all modes with all frequency bands, mode 2 with NFC are selected as the worst condition. The test data of the worst-case condition was recorded in this report.

7.1 Radiated Emission

The following graphs display the maximum values of horizontal and vertical by software. For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.

NFC mode 1 is the worst case traffic



Radiated Emission 30M-1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
32.283750	31.8	54.3	105.0	V	240.0	-22.5	8.2	40.0
59.525000	23.3	46.4	100.0	V	264.0	-23.1	16.7	40.0
166.265000	30.7	59.0	100.0	V	94.0	-28.3	9.3	40.0
298.750000	35.2	58.4	105.0	H	208.0	-23.2	11.8	47.0
420.000000	21.9	42.4	105.0	V	138.0	-20.5	25.1	47.0
696.935000	28.1	43.2	100.0	H	80.0	-15.1	18.9	47.0

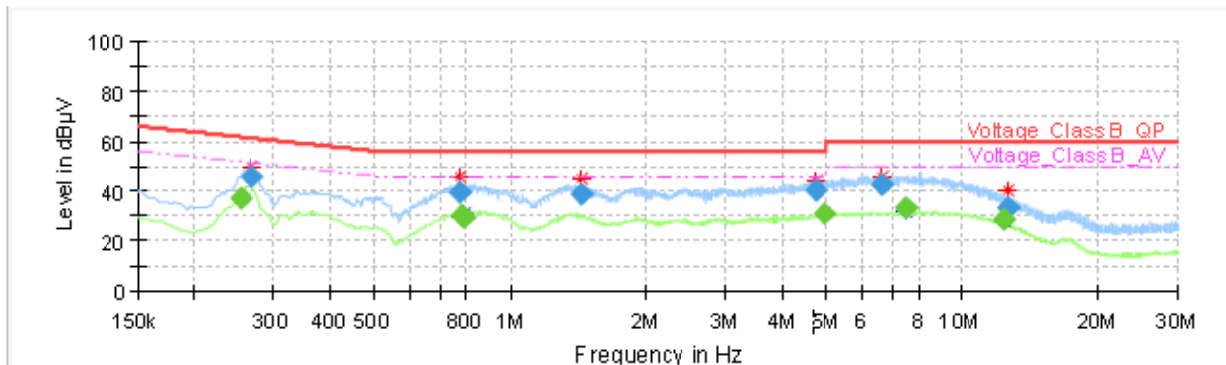
Remark: 1. Quasi-Peak = Reading value + Correction factor

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

3. Margin = Limit – Quasi-Peak

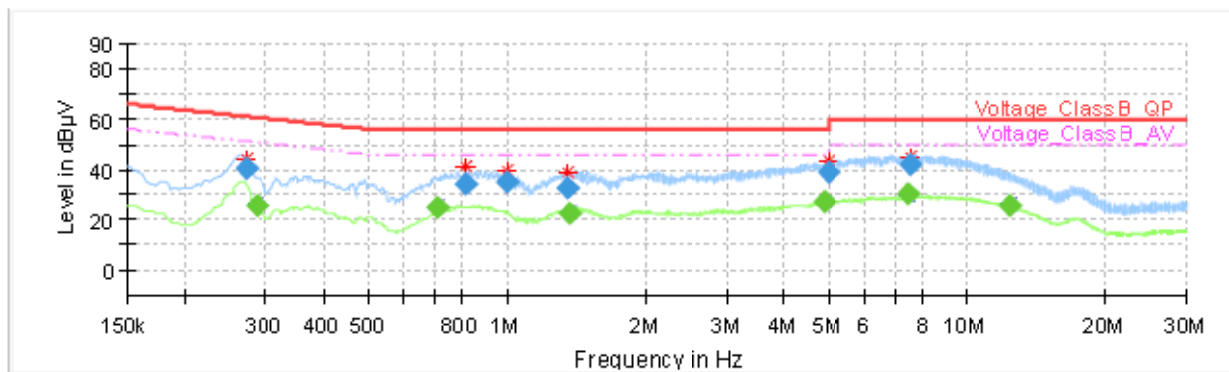
7.2 Conducted Emission

NFC mode 1 is the worst case traffic



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.253500	---	37.30	51.64	14.34	1000.0	9.000	L1	ON	19.1
0.267000	45.76	---	61.21	15.45	1000.0	9.000	L1	ON	19.1
0.768750	39.77	---	56.00	16.23	1000.0	9.000	L1	ON	19.2
0.784500	---	30.34	46.00	15.66	1000.0	9.000	L1	ON	19.2
0.789000	---	29.82	46.00	16.18	1000.0	9.000	L1	ON	19.2
1.439250	38.99	---	56.00	17.01	1000.0	9.000	L1	ON	19.2
4.744500	40.39	---	56.00	15.61	1000.0	9.000	L1	ON	19.1
4.967250	---	31.07	46.00	14.93	1000.0	9.000	L1	ON	19.1
6.648000	42.52	---	60.00	17.48	1000.0	9.000	L1	ON	19.1
7.469250	---	33.05	50.00	16.95	1000.0	9.000	L1	ON	19.2
12.376500	---	28.54	50.00	21.46	1000.0	9.000	L1	ON	19.4
12.700500	33.11	---	60.00	26.89	1000.0	9.000	L1	ON	19.5

L Line



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.271500	40.33	---	61.07	20.74	1000.0	9.000	N	ON	19.1
0.287250	---	26.03	50.60	24.57	1000.0	9.000	N	ON	19.2
0.710250	---	24.93	46.00	21.07	1000.0	9.000	N	ON	19.3
0.813750	33.89	---	56.00	22.11	1000.0	9.000	N	ON	19.2
1.007250	35.34	---	56.00	20.66	1000.0	9.000	N	ON	19.2
1.360500	32.43	---	56.00	23.57	1000.0	9.000	N	ON	19.2
1.371750	---	22.84	46.00	23.16	1000.0	9.000	N	ON	19.2
4.897500	---	27.35	46.00	18.65	1000.0	9.000	N	ON	19.1
4.996500	39.07	---	56.00	16.93	1000.0	9.000	N	ON	19.1
7.476000	---	29.93	50.00	20.07	1000.0	9.000	N	ON	19.2
7.507500	42.03	---	60.00	17.97	1000.0	9.000	N	ON	19.2
12.333750	---	25.78	50.00	24.22	1000.0	9.000	N	ON	19.4

N Line

7.3 Harmonic Current Emission

NFC mode 1 is the worst case traffic

Average harmonic current results				
Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	7.910E-3			
2	535.647E-6	0.055	972.00E-3	PASS
3	5.850E-3	0.283	2.07	PASS
4	528.682E-6	0.137	387.00E-3	PASS
5	5.836E-3	0.569	1.03	PASS
6	387.762E-6	0.144	270.00E-3	PASS
7	5.674E-3	0.819	693.00E-3	PASS
8	437.786E-6	0.211	207.00E-3	PASS
9	5.547E-3	1.541	360.00E-3	PASS
10	427.371E-6	0.258	165.60E-3	PASS
11	5.382E-3	1.812	297.00E-3	PASS
12	453.891E-6	0.329	138.00E-3	PASS
13	5.196E-3	2.749	189.00E-3	PASS
14	409.441E-6	0.346	118.29E-3	PASS
15	4.958E-3	3.672	135.00E-3	PASS
16	362.635E-6	0.350	103.50E-3	PASS
17	4.678E-3	3.928	119.11E-3	PASS
18	329.072E-6	0.358	92.00E-3	PASS
19	4.424E-3	4.151	106.58E-3	PASS
20	327.995E-6	0.396	82.80E-3	PASS
21	4.140E-3	4.293	96.43E-3	PASS
22	305.824E-6	0.406	75.28E-3	PASS
23	3.819E-3	4.338	88.05E-3	PASS
24	272.560E-6	0.395	68.99E-3	PASS
25	3.507E-3	4.330	81.00E-3	PASS
26	267.494E-6	0.420	63.69E-3	PASS
27	3.195E-3	4.260	75.00E-3	PASS
28	226.532E-6	0.383	59.14E-3	PASS
29	2.871E-3	4.112	69.83E-3	PASS
30	205.565E-6	0.372	55.20E-3	PASS
31	2.559E-3	3.917	65.32E-3	PASS
32	215.151E-6	0.416	51.75E-3	PASS
33	2.246E-3	3.660	61.36E-3	PASS
34	288.403E-6	0.592	48.71E-3	PASS
35	1.951E-3	3.372	57.86E-3	PASS
36	200.769E-6	0.436	46.00E-3	PASS
37	1.663E-3	3.038	54.73E-3	PASS
38	205.509E-6	0.472	43.58E-3	PASS



39	1.397E-3	2.691	51.92E-3	PASS
40	204.541E-6	0.494	41.40E-3	PASS

Maximum harmonic current results

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	8.444E-3			
2	728.465E-6	0.034	2.16	PASS
3	6.102E-3	0.133	4.60	PASS
4	628.476E-6	0.073	860.00E-3	PASS
5	6.134E-3	0.269	2.28	PASS
6	463.288E-6	0.077	600.00E-3	PASS
7	5.805E-3	0.377	1.54	PASS
8	518.588E-6	0.113	460.00E-3	PASS
9	5.648E-3	0.706	800.00E-3	PASS
10	527.885E-6	0.143	368.00E-3	PASS
11	5.466E-3	0.828	660.00E-3	PASS
12	536.725E-6	0.175	306.66E-3	PASS
13	5.272E-3	1.255	420.00E-3	PASS
14	479.663E-6	0.182	262.86E-3	PASS
15	5.020E-3	1.673	300.00E-3	PASS
16	405.441E-6	0.176	230.00E-3	PASS
17	4.748E-3	1.794	264.70E-3	PASS
18	386.963E-6	0.189	204.44E-3	PASS
19	4.512E-3	1.905	236.84E-3	PASS
20	395.781E-6	0.215	184.00E-3	PASS
21	4.210E-3	1.965	214.28E-3	PASS
22	356.880E-6	0.213	167.28E-3	PASS
23	3.891E-3	1.989	195.66E-3	PASS
24	354.034E-6	0.231	153.32E-3	PASS
25	3.620E-3	2.011	180.00E-3	PASS
26	328.356E-6	0.232	141.54E-3	PASS
27	3.284E-3	1.970	166.66E-3	PASS
28	290.836E-6	0.221	131.42E-3	PASS
29	2.959E-3	1.907	155.18E-3	PASS
30	273.532E-6	0.223	122.66E-3	PASS
31	2.672E-3	1.840	145.16E-3	PASS
32	280.607E-6	0.244	115.00E-3	PASS
33	2.313E-3	1.696	136.36E-3	PASS
34	426.710E-6	0.394	108.24E-3	PASS
35	2.014E-3	1.566	128.58E-3	PASS
36	261.110E-6	0.255	102.22E-3	PASS
37	1.766E-3	1.452	121.62E-3	PASS
38	261.775E-6	0.270	96.84E-3	PASS
39	1.477E-3	1.280	115.38E-3	PASS



40	270.572E-6	0.294	92.00E-3	PASS
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Maximum harmonic voltage results

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.31	100.135		
2	108.55E-3	0.047	0.2	PASS
3	64.58E-3	0.028	0.9	PASS
4	44.38E-3	0.019	0.2	PASS
5	50.36E-3	0.022	0.4	PASS
6	32.77E-3	0.014	0.2	PASS
7	58.73E-3	0.026	0.3	PASS
8	24.54E-3	0.011	0.2	PASS
9	85.88E-3	0.037	0.2	PASS
10	8.57E-3	0.004	0.2	PASS
11	63.55E-3	0.028	0.1	PASS
12	15.86E-3	0.007	0.1	PASS
13	34.64E-3	0.015	0.1	PASS
14	35.20E-3	0.015	0.1	PASS
15	63.62E-3	0.028	0.1	PASS
16	34.87E-3	0.015	0.1	PASS
17	30.30E-3	0.013	0.1	PASS
18	14.98E-3	0.007	0.1	PASS
19	46.32E-3	0.020	0.1	PASS
20	24.83E-3	0.011	0.1	PASS
21	56.39E-3	0.025	0.1	PASS
22	19.79E-3	0.009	0.1	PASS
23	40.58E-3	0.018	0.1	PASS
24	5.96E-3	0.003	0.1	PASS
25	24.63E-3	0.011	0.1	PASS
26	21.01E-3	0.009	0.1	PASS
27	42.38E-3	0.018	0.1	PASS
28	16.96E-3	0.007	0.1	PASS
29	42.18E-3	0.018	0.1	PASS
30	9.84E-3	0.004	0.1	PASS
31	23.45E-3	0.010	0.1	PASS
32	16.59E-3	0.007	0.1	PASS
33	29.51E-3	0.013	0.1	PASS
34	17.00E-3	0.007	0.1	PASS
35	43.37E-3	0.019	0.1	PASS
36	10.44E-3	0.005	0.1	PASS
37	35.45E-3	0.015	0.1	PASS
38	11.95E-3	0.005	0.1	PASS
39	26.69E-3	0.012	0.1	PASS
40	14.06E-3	0.006	0.1	PASS

Harmonic current results - DS: 1

Hn	I _{eff} [A]	% of Limit	Limit [A]	Result
1	8.317E-3			
2	482.055E-6	0.045	1.08	PASS
3	5.739E-3	0.250	2.30	PASS
4	523.076E-6	0.122	430.00E-3	PASS
5	5.840E-3	0.512	1.14	PASS
6	339.112E-6	0.113	300.00E-3	PASS
7	5.591E-3	0.726	770.00E-3	PASS
8	402.447E-6	0.175	230.00E-3	PASS
9	5.541E-3	1.385	400.00E-3	PASS
10	392.624E-6	0.213	184.00E-3	PASS
11	5.403E-3	1.637	330.00E-3	PASS
12	424.328E-6	0.277	153.33E-3	PASS
13	5.169E-3	2.462	210.00E-3	PASS
14	411.106E-6	0.313	131.43E-3	PASS
15	4.949E-3	3.300	150.00E-3	PASS
16	350.815E-6	0.305	115.00E-3	PASS
17	4.683E-3	3.539	132.35E-3	PASS
18	327.535E-6	0.320	102.22E-3	PASS
19	4.400E-3	3.716	118.42E-3	PASS
20	308.916E-6	0.336	92.00E-3	PASS
21	4.155E-3	3.878	107.14E-3	PASS
22	313.686E-6	0.375	83.64E-3	PASS
23	3.821E-3	3.905	97.83E-3	PASS
24	245.295E-6	0.320	76.66E-3	PASS
25	3.503E-3	3.892	90.00E-3	PASS
26	228.337E-6	0.323	70.77E-3	PASS
27	3.163E-3	3.796	83.33E-3	PASS
28	226.874E-6	0.345	65.71E-3	PASS
29	2.892E-3	3.727	77.59E-3	PASS
30	196.192E-6	0.320	61.33E-3	PASS
31	2.575E-3	3.548	72.58E-3	PASS
32	233.390E-6	0.406	57.50E-3	PASS
33	2.257E-3	3.310	68.18E-3	PASS
34	268.747E-6	0.497	54.12E-3	PASS
35	1.917E-3	2.982	64.29E-3	PASS
36	200.811E-6	0.393	51.11E-3	PASS
37	1.656E-3	2.723	60.81E-3	PASS
38	222.565E-6	0.460	48.42E-3	PASS
39	1.386E-3	2.403	57.69E-3	PASS
40	226.015E-6	0.491	46.00E-3	PASS

Caution: Results related to the 100% limit values

Harmonic voltage results - DS: 1

Hn	Ueff [V]	Ueff [%]	Limit [%]	Result
1	230.29	100.126		
2	103.03E-3	0.045	0.2	PASS
3	58.20E-3	0.025	0.9	PASS
4	40.23E-3	0.017	0.2	PASS
5	49.39E-3	0.021	0.4	PASS
6	23.14E-3	0.010	0.2	PASS
7	53.79E-3	0.023	0.3	PASS
8	20.41E-3	0.009	0.2	PASS
9	74.89E-3	0.033	0.2	PASS
10	5.23E-3	0.002	0.2	PASS
11	54.03E-3	0.023	0.1	PASS
12	12.28E-3	0.005	0.1	PASS
13	31.89E-3	0.014	0.1	PASS
14	33.00E-3	0.014	0.1	PASS
15	58.15E-3	0.025	0.1	PASS
16	32.02E-3	0.014	0.1	PASS
17	21.56E-3	0.009	0.1	PASS
18	11.00E-3	0.005	0.1	PASS
19	43.04E-3	0.019	0.1	PASS
20	21.17E-3	0.009	0.1	PASS
21	53.93E-3	0.023	0.1	PASS
22	15.78E-3	0.007	0.1	PASS
23	35.04E-3	0.015	0.1	PASS
24	1.35E-3	0.001	0.1	PASS
25	18.87E-3	0.008	0.1	PASS
26	17.20E-3	0.007	0.1	PASS
27	36.46E-3	0.016	0.1	PASS
28	12.30E-3	0.005	0.1	PASS
29	39.37E-3	0.017	0.1	PASS
30	4.74E-3	0.002	0.1	PASS
31	17.39E-3	0.008	0.1	PASS
32	12.52E-3	0.005	0.1	PASS
33	26.00E-3	0.011	0.1	PASS
34	14.61E-3	0.006	0.1	PASS
35	38.54E-3	0.017	0.1	PASS
36	6.80E-3	0.003	0.1	PASS
37	30.51E-3	0.013	0.1	PASS
38	8.09E-3	0.004	0.1	PASS
39	23.41E-3	0.010	0.1	PASS
40	9.91E-3	0.004	0.1	PASS

7.4 Voltage fluctuation and flicker

NFC mode 1 is the worst case traffic

	EUT values	Limit	Result
Pst	0.028	1.00	PASS
Plt	0.028	0.65	PASS
dc [%]	0.000	3.30	PASS
dmax [%]	0.077	4.00	PASS
dt [s]	0.000	0.50	PASS

7.5 Electrostatic Discharge

NFC mode 1 is the worst case traffic

Transmitter				
Coupling		Voltage	Description	Conclusion
Direct Application	Air Discharge	±2kV	No fail detected	PASS
		±4kV	No fail detected	PASS
		±8kV	No fail detected	PASS
	Contact Discharge	±2kV	No fail detected	PASS
		±4kV	No fail detected	PASS
Horizontal Coupling Plane		±2kV	No fail detected	PASS
		±4kV	No fail detected	PASS
Vertical Coupling Plane		±2kV	No fail detected	PASS
		±4kV	No fail detected	PASS

7.6 RF Electromagnetic Field (RS)

NFC mode 1 is the worst case traffic

Range	Level	Modulation	Polarization	Description	Results
80-1000MHz	3V/m	80 % AM (1kHz)	Vertical	No fail detected	PASS
			Horizontal		
1400-2700MHz	3V/m	80 % AM (1kHz)	Vertical	No fail detected	PASS
			Horizontal		

7.7 Fast Transients Common Mode (EFT)

NFC mode 1 is the worst case traffic

Connected	Voltage	Test Line	Description	Conclusion
Power Line	±1.0 KV	L	No fail detected	PASS
Power Line	±1.0 KV	N	No fail detected	PASS
Power Line	±1.0 KV	L+N	No fail detected	PASS

7.8 Surge

NFC mode 1 is the worst case traffic

Connected	Voltage	Angle	Duration	Description	Conclusion
Power Line (L-N)	±1.0KV(1.2/50µs)	0	1 Minute / time	No fail detected	PASS
Power Line (L-N)	±1.0KV(1.2/50µs)	90	1 Minute / time	No fail detected	PASS
Power Line (L-N)	±1.0KV(1.2/50µs)	180	1 Minute / time	No fail detected	PASS
Power Line (L-N)	±1.0KV(1.2/50µs)	270	1 Minute / time	No fail detected	PASS

7.9 Radio Frequency Common Mode (CS)

NFC mode 1 is the worst case traffic

Range (MHz)	Level	Connected	Description	Conclusion
0.15-50	3Vrms	Power Port	No fail detected	PASS
50-80	3Vrms	Power Port	No fail detected	PASS

7.10 Power Frequency Magnetic Field

NFC mode 1 is the worst case traffic

Direction	Field Strength (A/m)	Performance Criterion	Required Passing Criterion	Results
X	3	A	A	PASS
Y	3	A	A	PASS
Z	3	A	A	PASS

7.11 Voltage dips and interruptions

NFC mode 1 is the worst case traffic

Level	Duration	Connected	Description	Conclusion
0%	0.5 Cycle	Power Port	No fail detected	PASS
0%	1 Cycle	Power Port	No fail detected	PASS
70%	25 Cycle	Power Port	No fail detected	PASS
0%	250 Cycle	Power Port	No fail detected	PASS

8 Uncertainty Measurement

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=1.96$.

Case	Uncertainty
Radiated Emission 30MHz-200MHz	4.19 dB
Radiated Emission 200MHz-1GHz	3.63 dB
Radiated Emission 1GHz – 6GHz	3.68 dB
Conducted Emission	2.69 dB
Harmonic Current Emission	5.31%.
Voltage fluctuation and flicker	7.64%.
RF Electromagnetic Field (RS)	2.60dB
Radio Frequency Common Mode (CS)	2.76dB

9 Main Test Equipment

Name of Equipment	Type/Model	Manufacturer	Serial Number	Last Cal.	Cal. Due Date
Wideband radio communication tester	CMW 500	R&S	113645	2016-05-21	2017-05-20
Signal Analyzer	FSV30	R&S	100815	2016-12-16	2017-12-15
EMI Test Receiver	ESCI3	R&S	100948	2016-06-01	2017-05-31
TRILOG Broadband Antenna	VULB 9163	Schwarzbeck	9163-201	2014-12-06	2017-12-05
Double Ridged Waveguide 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
Artificial main network	ENV216	R&S	101171	2016-12-16	2017-12-15
Single phase Harmonics & Flicker Analyzer	DPA 500N	EM TEST	V0902104586	2015-06-26	2018-06-25
Electro-Static Discharger Generator	Nosieken	ESS-2002EX	ES1111144	2015-03-16	2017-03-15
Compact Simulator of Conducted Immunity	UCS 500N6	EM TEST	V0902104581	2015-06-26	2018-06-25
Audio Analyzer	UPV	R&S	101372	2016-05-21	2017-05-20
Power Amplifier	75A250A	AR	0331553	NA	NA
Power Amplifier	BLWA 0830 -160/100/40C	BONN	097490	NA	NA
Signal Generator	SMB100A	R&S	102594	2016-05-21	2017-05-20
High Gain Log-Periodic Antenna	HL046E	R&S	100063	NA	NA
Magnetic Antenna(PFMF)	EM Test	MS100	0708-27	2015-07-18	2018-07-17

ANNEX A: EUT Appearance and Test Setup

A.1 EUT Appearance



controller A & Antenna B



controller A & Antenna C
ViVOPay Kiosk III



controller D & Antenna B



controller D & Antenna C
ViVOpay Kiosk III SRED
Picture 1 Constituents of EUT



IDVK-300001 (controller A)



IDVK-308021 (controller D)



IDVK-310100 (normal antenna B)



IDVK-330100 (35 degree antenna C)

a: EUT



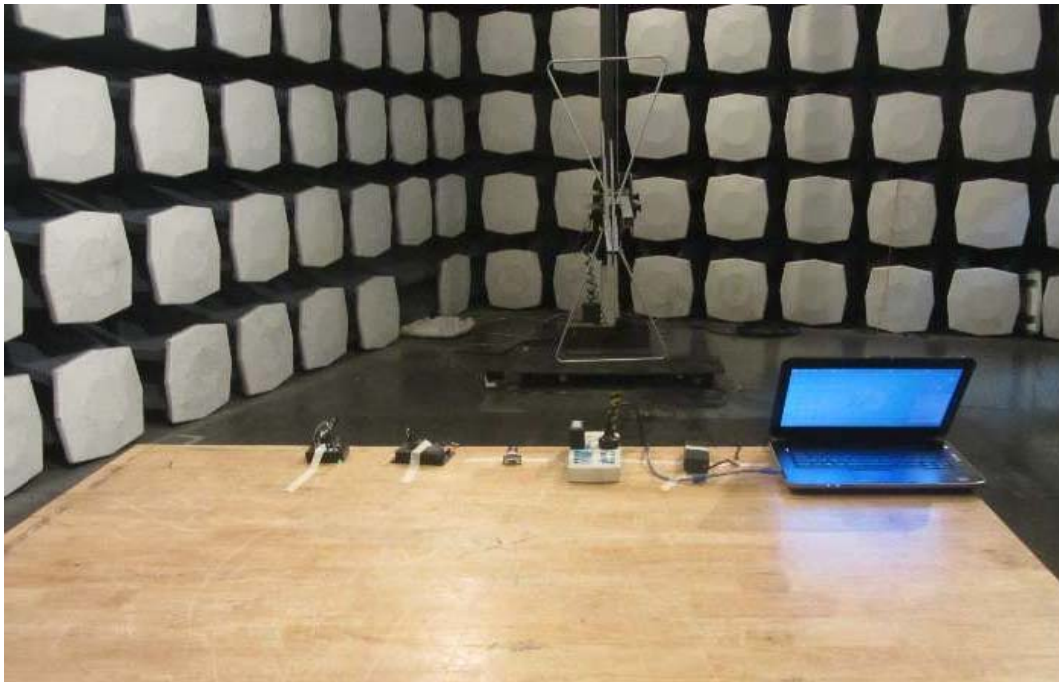
Cable 1



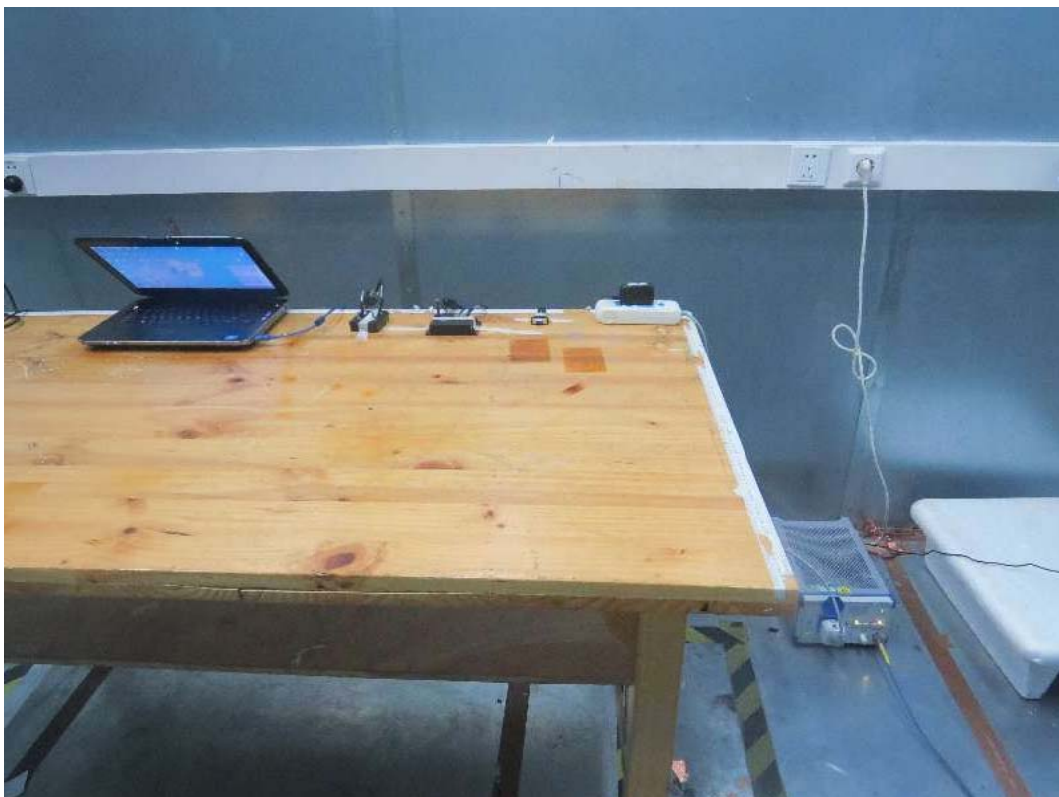
Cable 2

b: Cable

A.2 Test Setup



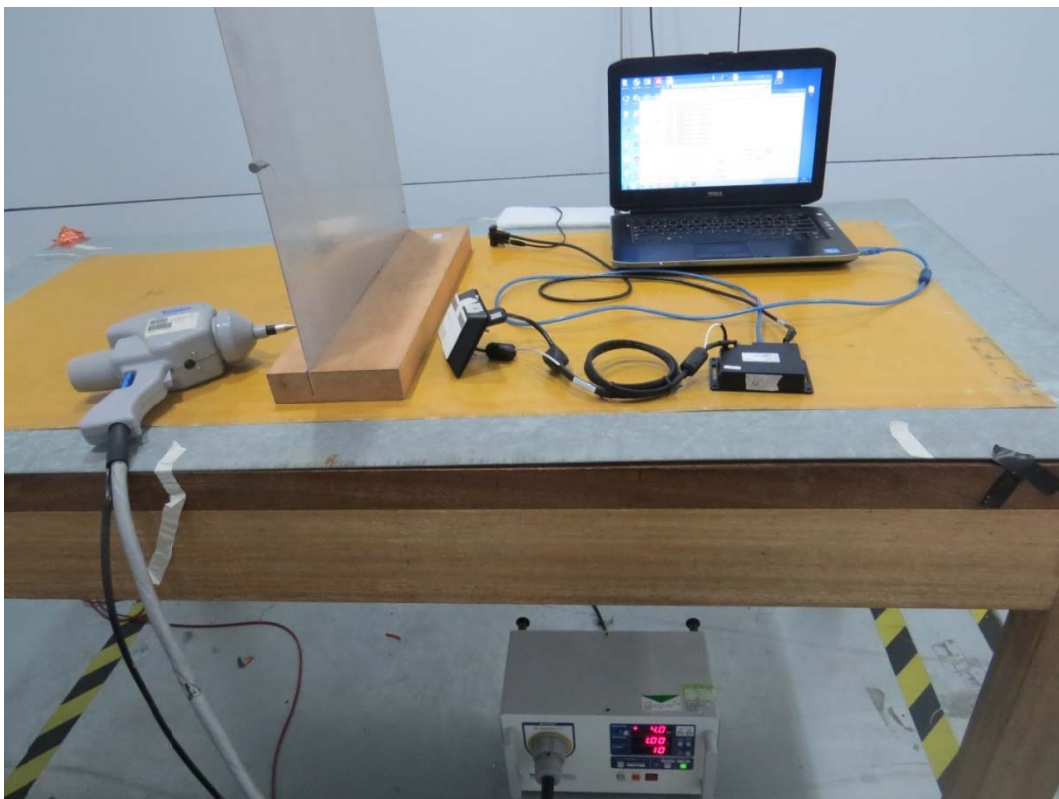
Picture 2 Radiated Emission Test Setup



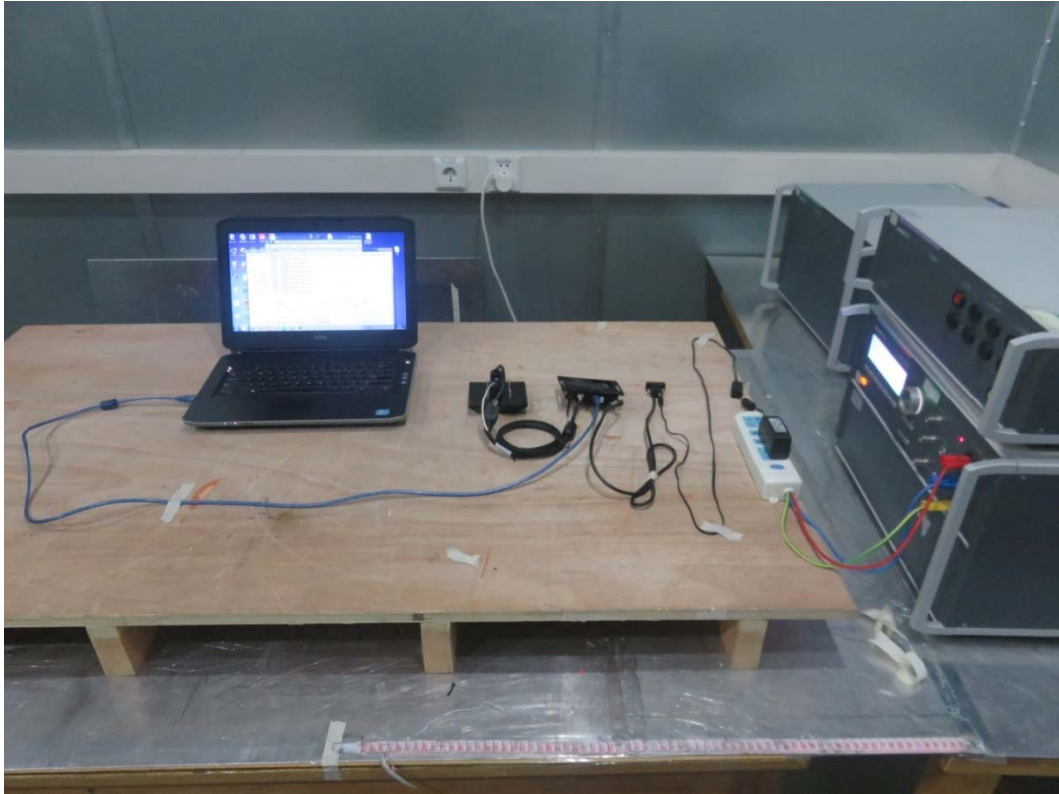
Picture 3 Conducted Emission Test Setup



Picture 4 Harmonic Current Emission & Voltage fluctuation and flicker Test Setup



Picture 5 Electrostatic Discharge Test Setup



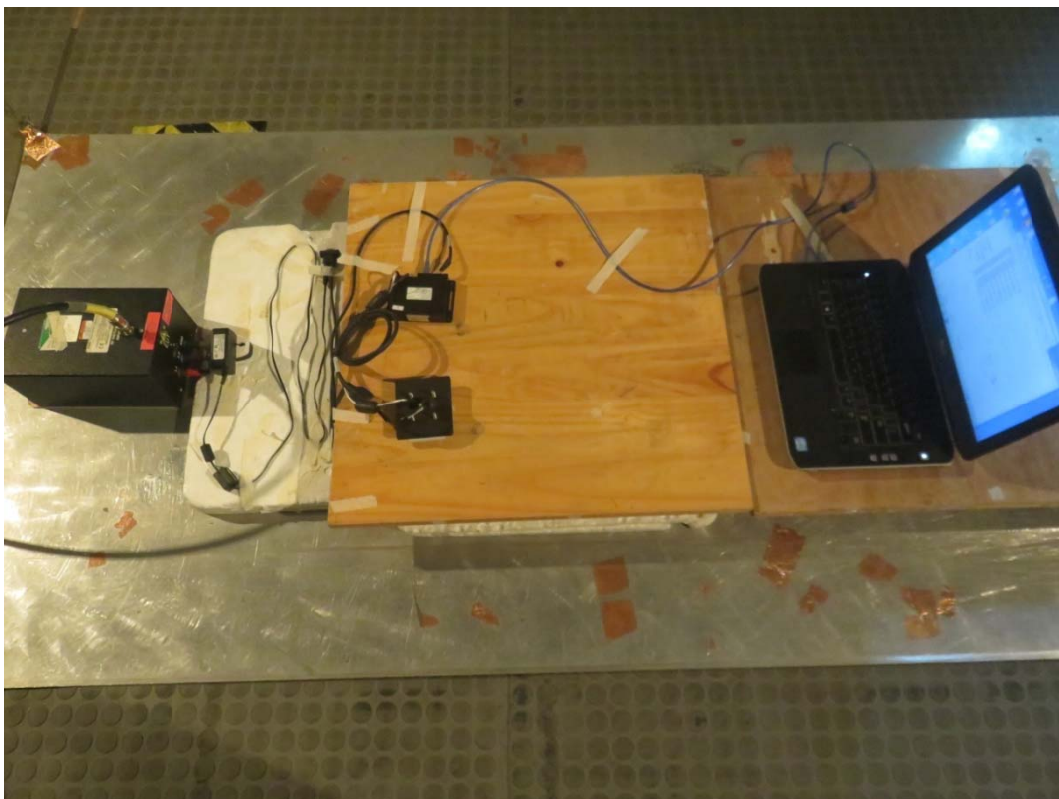
Picture 6 EFT & Surge & Dips Test Setup



Picture 7 RF Electromagnetic Field (RS) Test Setup



Picture 8 Power Frequency Magnetic Field



Picture 9: Radio Frequency Common Mode (CS) Test Setup