TEST REPORT

No. I17Z60036-SRD01

for

MOBIWIRE MOBILES (NINGBO) CO.,LTD

Connected mobile with printer

MODEL NAME: Mobiprint3

FCC ID: QPN-3Q-MOBIPRINT3

with

Hardware Version: V02

Software Version: V03

Issued Date: 2017-02-15

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检测
TESTING
CNAS L0570

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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1. Test Laboratory

1.1. Testing Location

Company Name:	CTTL Beijing, Telecommunication Metrology Center of MIIT
Address:	No 52, Huayuanbei Road, Haidian District, Beijing, P.R.China
Postal Code:	100191
Telephone:	+86-10-62304633-2678
Fax:	+86-10-62304633-2504

1.2. Testing Environment

Ambient Temperature:	15 ~ 25 ℃
Relative Humidity:	30 ~ 60 %
Air pressure	860 ~ 1060 mbar

1.3. Project Data

Receipt of Sample:	2017-01-16
Testing Start Date:	2017-01-17
Testing End Date:	2017-02-15

1.4. Signature

Zheng Mengxuan

(Prepared this test report)

Zhu Liang

(Reviewedthis test report)

LvSongdong

(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name:	Mobiwire SAS
Address:	79 AVENUE FRANCOIS ARAGO 92017 NANTERRE CEDEX France.
Country:	France
Contact	Di AI
Tel：	+33 1 78 14 09 58
Email:	di.ai@mobiwire.com

2.2. Manufacturer Information

Company Name:	MOBIWIRE MOBILES (NINGBO) CO.,LTD
Address:	No.999,Dacheng East Road,Fenghua City,Zhejiang
Country:	China
Contact	Xu linzhong
Tel：	0574 59555707
Email:	Linzhong.xu@mobiwire.com.cn

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3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

Description:	connected mobile with printer
FCC ID	QPN-3Q-MOBIPRINT3
With NFC Function:	Yes
Frequency:	13.56 MHz
Antenna:	Internal
Operation Voltage:	6.6VDC to 8.4VDC (nominal: 7.4VDC)
Operation Temperature:	-20°C to +55°C

Note1: Photographs of EUT are shown in ANNEX B of this test report. For component list, please refer to documents of the manufacturer.

3.2. Internal Identification of EUT Used during the Test

Mobile phone identification

EUT ID*	SN or IMEI	HW Version	SW Version
I760036UT03a	358154081052435	V02	V03

*EUT ID: is used to identify the test sample in the lab internally.

3.3. Internal Identification of AE Used during the Test

AE ID*	Description	SN	Reversion
AE1	Battery	/	1760036BA002
AE2	power supply	/	1760036AE001
AE3	RFID Card	/	/

AE1

Model	/
Manufacturer	PRC
Capacitance	2600mAh
Nominal voltage	7.4V

AE2

Model	S048CM0900500
Manufacturer	MobiWire
Length of cable	160cm

AE3

Type	/
Manufacturer	/
Type of card	PICC

*AE ID: is used to identify the test sample in the lab internally.

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3.4. General Description

Equipment Under Test (EUT) is a connected mobile with printer with integrated antenna.
Manuals and specifications of the EUT were provided to fulfil the test.
Samples undergoing test were selected by the client.
Manufacturer's declaration: NFC work does not depend on other access methods, such as WLAN, GPRS, etc.

3.5. EUT Set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set. NFC01	EUT1 + AE1 + AE2 + AE3	--
Set. NFC02	EUT1	--
Set. NFC03	EUT1 + AE3	

The Transmit State of NFC: the NFC function is on. The EUT will transmit the NFC data and command continuously during the test.
The Transmit State of without modulation: The EUT will transmit the CW signal at the operating frequency

Note：The test data is the worst case in this NFC test report.

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4. Reference Documents

4.1. Documents Supplied by the Applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Regulations and Standards

The following documents listed in this section are referred for testing.

Reference	Title	Version
CFR 47 Part 2	Part 2 — Frequency Allocations and Radio Treaty Matters; General Rules and Regulations.	2015
CFR 47 Part 15	Part 15 — Radio Frequency Devices. Subpart C — Intentional Radiators. § 15.35 Measurement detector functions and bandwidths. § 15.207 Conducted limits. § 15.209 Radiated emission limits, general requirements. § 15.215 Additional provisions to the general radiated emission limitations. § 15.225 Operation within the band 13.110–14.010 MHz.	2015
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.	2014

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5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-1 (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m/10m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Fully-Anechoic Chamber FAC-3 (8.6m×6.1m×3.85m) did not exceed following limits along the testing:

Temperature	Min. = 15 ℃, Max. = 25 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1 to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

Conducted Chamber did not exceed following limits along the testing:

Temperature	Min. = 15 ℃, Max. = 25 ℃
Relative humidity	Min. = 30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Control Room did not exceed following limits along the testing:

Temperature	Min. = 15 ℃, Max. = 25 ℃
Relative humidity	Min. =30 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

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6. SUMMARY OF TEST RESULTS

6.1. Summary of Test Results

No	Test Cases	Clause in Regulation	Section in This Report	Verdict
1	Electric Field Strength of Fundamental Emissions	CFR 47 § 15.225(a)	A.1	P(Set. NFC03)
2	Electric Field Strength of Outside the Allocated Bands	CFR 47 § 15.225(b) CFR 47 § 15.225(c)		P(Set. NFC03)
3	Electric Field Radiated Emissions	CFR 47 § 15.209	A.2	P(Set. NFC01)
		CFR 47 § 15.225(d)	A.3	P(Set. NFC01)
4	Frequency Tolerance	CFR 47 § 15.225(e)	A.4	P(Set. NFC02)
5	20dB Bandwidth	CFR 47 § 15.215(c)	A.5	P(Set. NFC02, 03)
6	Conducted Emissions	CFR 47 § 15.207	A.6	P(Set. NFC01)
The measurement is carried out according to ANSI C63.4. See **ANNEX A** for details.				

Test Conditions:

For this report, all the test cases listed above were tested under normal Temperature, Voltage, Humidity, and Air Pressure. The specific conditions are as following:

Temperature	T min	-20 ℃
	T nom	25 ℃
	T max	55 ℃
Voltage	V min	3.6 V
	V nom	3.8 V
	V max	4.2 V
Humidity	H nom	44%
Air Pressure	A nom	1010 mbar

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6.2. Terms Used in the Summary of Test Results

Terms Used in Condition Column:

T nom	Normal Temperature
T min	Low Temperature
T max	High Temperature
V nom	Normal Voltage
V min	Low Voltage
V max	High voltage
H nom	Norm Humidity
A nom	Norm Air Pressure

Terms Used in Verdict Column:

P	Pass, The EUT complies with the essential requirements in the standard.
NP	Not Perform, The test was not performed by CTTL
NA	Not Applicable, The test was not applicable
F	Fail, The EUT does not comply with the essential requirements in the standard

Abbreviations:

AC	Alternating Current
AFH	Adaptive Frequency Hopping
BW	Band Width
E.I.R.P.	equivalent isotropical radiated power
ISM	Industrial, Scientific and Medical
RF	Radio Frequency
Tx	Transmitter

6.3. Statements

The test cases listed in Section 6.1 of this report for the EUT specified in Section 3 were performed by CTTL according to the reference documents in Section 4.

The EUT meets all applicable requirements of the regulations and standards in Section 4.2.

This report only deals with the NFC function among the features described in section 3.

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7. Test Equipments Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE
1.	Thermal Chamber	PL-2G	343074	ESPEC	2017-05-12
2.	Spectrum Analyzer	RSA3408A	B 010277	Tektronix	2017-05-27
3.	H-field Antenna	HFH2-Z2	829324/0007	R&S	2017-12-16
4.	EMI Antenna	VULB 9163	9163-235	Schwarzbeck	2017-03-02
5.	Test Receiver	ESCI	100344	R&S	2017-03-01
6.	Universal Radio Communication Tester	CMW500	143008	R&S	2017-12-01
7.	Universal Radio Communication Tester	CMW500	116588	R&S	2017-12-01
8.	Spectrum Analyzer	E4440A	MY48250642	Agilent	2017-03-03
9.	LISN	ESH2-Z5	829991/012	R&S	2017-04-11

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ANNEX A: MEASUREMENT RESULTS

A.1. Electric Field Strength of Fundamental and Outside the Allocated bands

A.1.1. Reference

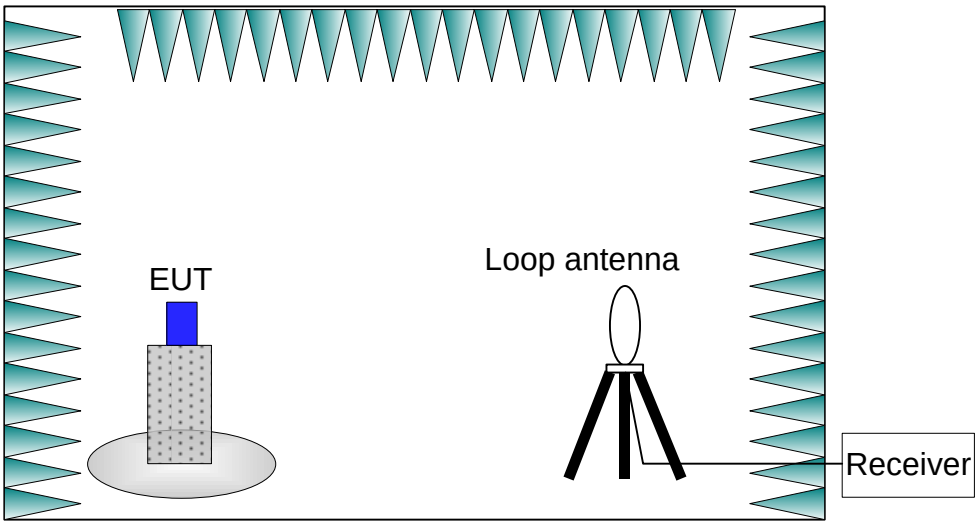
See Clause 13.5, Clause 13.4, Clause 8, and Annex E of ANSI C63.4-2014 specifically.
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2014 generally.

A.1.2. Measurement Methods

The transmitter carrier output levels (E-Field) from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
12.56-14.56	10/30 kHz

The E-field measured at 3m is calculated as:
E-field (dBμV/m) = Rx (dBμV) + Cable Loss (dB) + AF@3m (dB/m)



A.1.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).
The EUT is powered by a travel adapter.
During the measurements, the ambient temperature of the electromagnetic anechoic chamber is

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in the range of 15 ~ 25 ℃.

A.1.4. Limits

Frequency Range (MHz)	E-field Strength Limit @ 30 m (μV/m)	E-field Strength Limit @ 3 m (dBμV/m)
13.560 ± 0.007	+15,848	124
13.410 to 13.553 13.567 to 13.710	+334	90
13.110 to 13.410 13.710 to 14.010	+106	81
Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula: $\text{Extrapolation(dB)} = 40\log_{10}(\text{Measurement Distance}/\text{Specification Distance})$		

A.1.5. Measurement Results

Measurement results of normal conditions see Figure A-1 for different set-ups of EUT. The result displayed take into account applicable antenna factors and cable losses.

Conclusions: Set. NFC03, **PASS**.

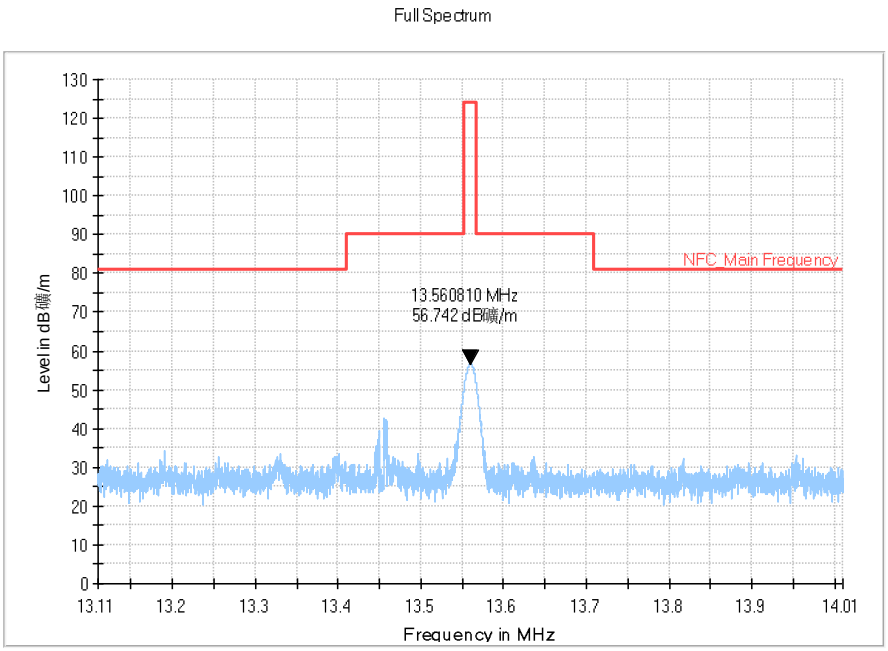

Figure A-1: Set. NFC03

A.1.6. Measurement Uncertainty

Measurement uncertainty: *U* = 4.0 dB, k=2.

A.2. Electric Field Radiated Emissions (< 30MHz)

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A.2.1. Reference

See Clause 13.4, Clause 8 and Annex E of ANSI C63.4-2014 specifically.
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2014 generally.

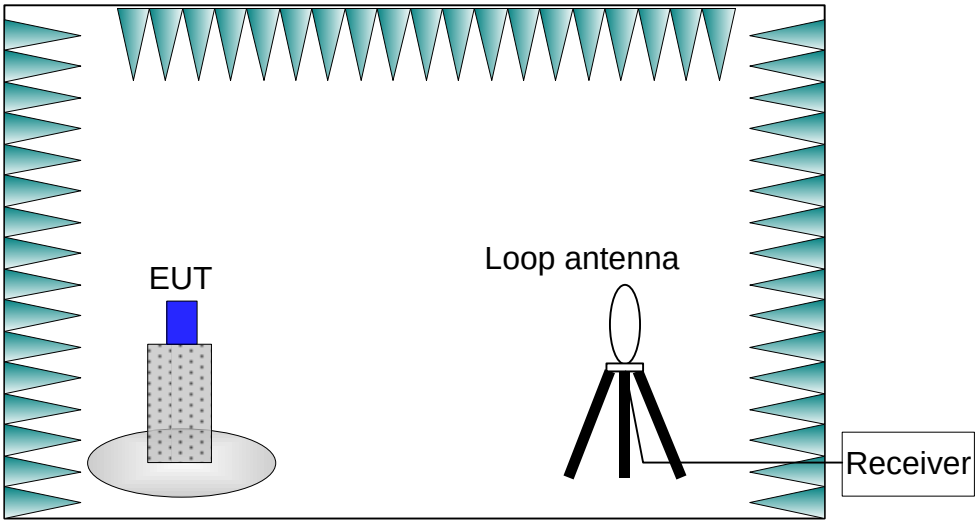
A.2.2. Measurement Methods

The transmitter carrier output levels (E-Field) from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The E-field is measured with a shielded loop antenna connected to a measurement receiver. Detected E-field was maximized by rotating the EUT through 360° and adjusting the receiving antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
0.009-0.15	100/300 Hz
0.15-30	10/30 kHz

The E-field measured at 3m is calculated as:
E-field (dBμV/m) = Rx (dBμV) + Cable Loss (dB) + AF@3m (dB/m)



A.2.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).
The EUT is powered by a travel adapter.
During the measurements, the ambient temperature of the electromagnetic anechoic chamber is in the range of 15 ~ 25 ℃.

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A.2.4. Limits

Frequency Range (MHz)	E-field Strength Limit @ 30m (mV/m)	E-field Strength Limit @ 3m (dBμV/m)
0.009-0.490	2400/F(kHz)	129-94
0.490-1.705	24000/F(kHz)	74-63
1.705-30	30	70
Note: Where the limits have been defined at one distance, and a signal level measured at another, the limits have been extrapolated using the following formula: $\text{Extrapolation(dB)} = 40\log_{10}(\text{Measurement Distance}/\text{Specification Distance})$		

A.2.5. Measurement Results

Measurement results of normal conditions see Figure A-2 for different set-ups of EUT. The result displayed take into account applicable antenna factors and cable losses.

Conclusions: Set. NFC01, **PASS**.

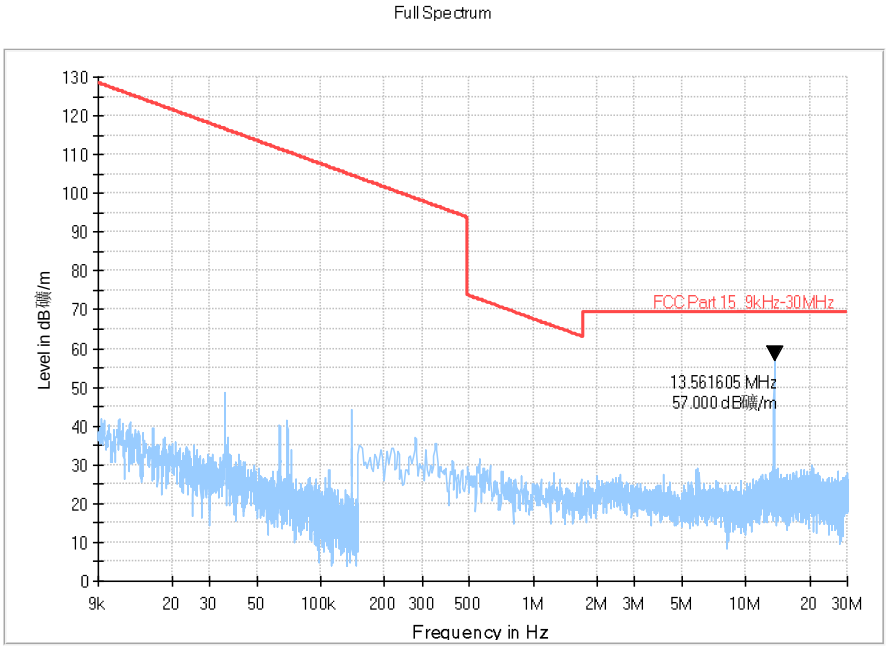

Figure A-2: Set. NFC01

A.2.6. Measurement Uncertainty

Measurement uncertainty: U = 4.0 dB, k=2.

A.3. Electric Field Radiated Emissions (≥30MHz)

A.3.1. Reference

See Clause 13.4, Clause 8, and Annex E of ANSI C63.4-2014 specifically.

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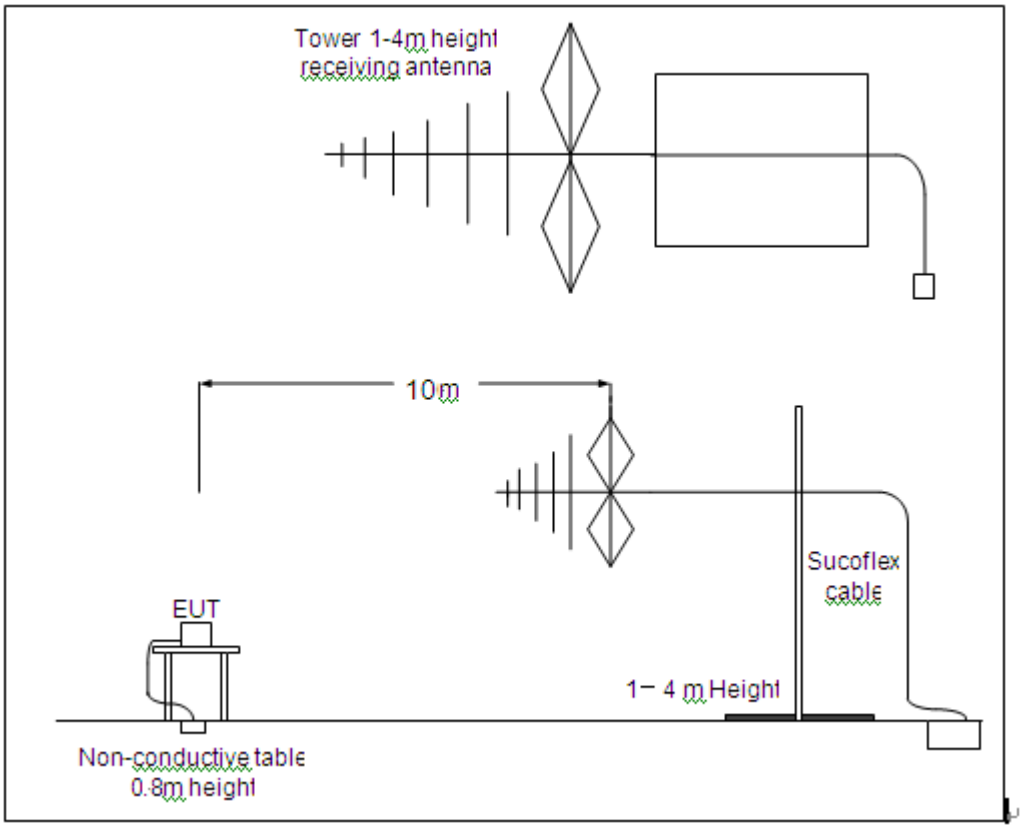
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2014 generally.

A.3.2. Measurement Methods

The electric field radiated emissions from the EUT are measured in a semi-anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 10m from the receiving antenna. The receiving antennas connected to a measurement receiver comply with Clause 15 of ANSI C63.2-1996 and Clause 4.1.5 of ANSI C63.4-2014. In order to search for maximum field strength emitted from the EUT, the receiving antenna can be moved between the height of 1.0 m to 4.0 m. Detected E-field was maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna positions for both vertical and horizontal antenna polarizations. The maximization processes were repeated with the EUT positioned respectively in its three orthogonal axes. The measurements were performed with the peak detector and if required, the quasi-peak detector.

The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
30-1000	120kHz



A.3.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).

EUT1 had been connected to a travel adapter.

During the measurements, the ambient temperature of the electromagnetic anechoic chamber is

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in the range of 15 ~ 25 ℃.

A.3.4. Limits

Frequency Range (MHz)	E-field Strength Limit @ 3m (mV/m)	E-field Strength Limit @ 3m (dBμV/m)	E-field Strength Limit @ 10m (dBμV/m)
30-88	100	40	30
88-216	150	43.5	33.5
216-960	200	46	36
960-1000	500	54	44

A.3.5. Measurement Results

Measurement results of normal conditions see Figure A-3 for different set-ups of EUT. The result displayed take into account applicable antenna factors and cable losses.

Conclusions: Set. NFC01, **PASS**.

A.3.6. Measurement Uncertainty

Measurement uncertainty: *U* =3.9 dB, k=2

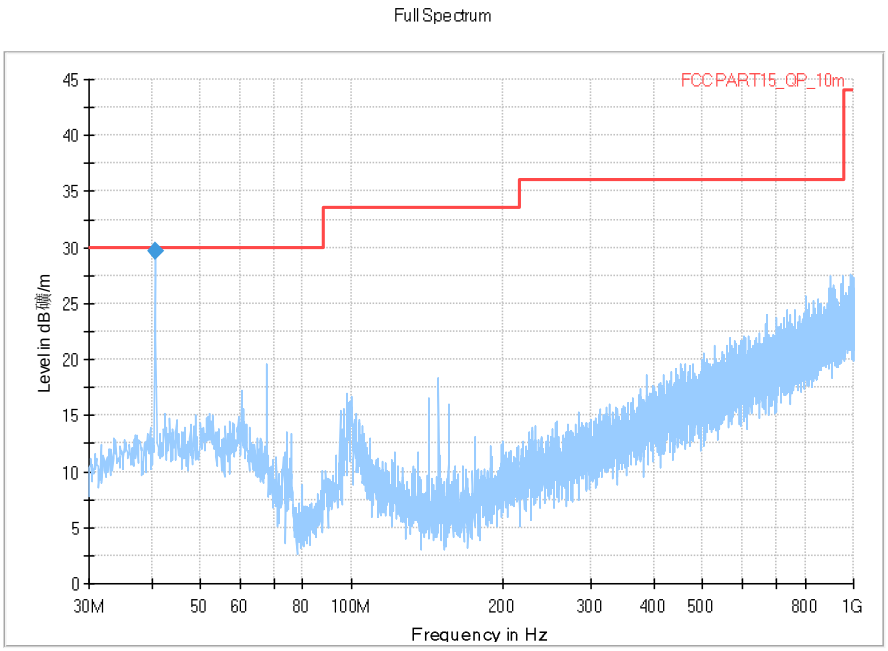

Figure A-3: Set. NFC01

Final_Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)

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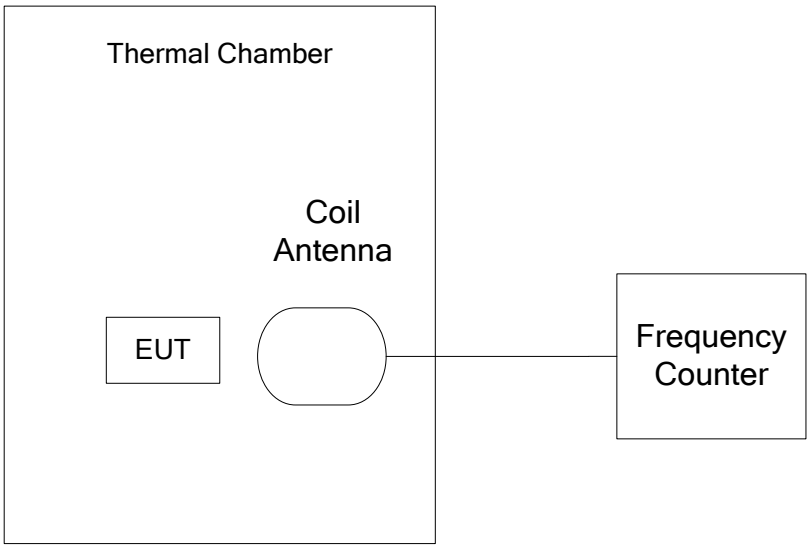
40.670000	29.71	30.00	0.29	1000.0	120.000	225.0	V	95.0

A.4. Frequency Tolerance

A.4.1. Reference

See Clause 13.6 of ANSI C63.4-2014 specifically.
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2014 generally.

A.4.2. Measurement Methods



The transmitter output signal was picked up by coil antenna connected to the frequency counter. The center frequency was measured with 30Hz RBW and 1kHz span.
During the test, the EUT was placed in a thermal chamber until thermal balance and lasting appropriate time.

A.4.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of without modulation (See 3.5).
EUT1 had been not connected to a travel adapter.
Operation Temperature: T min, T nom, and T max with V nom.
Operation Voltage: V min and V max with T nom.

A.4.4. Test Layouts

See A.4.2.

A.4.5. Limits

The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency.

A.4.6. Measurement Results

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Measurement results see Table A-1 for different test conditions.
Conclusions: Set. NFC02, **PASS**.

Table A-1: Frequency Stability VS Temperature and Voltage

Temperature	Voltage	Frequency Error (MHz)			
		Startup	2 Min Later	5 Min Later	10 Min Later
T min	V nom	13.5601375	13.5599800	13.5599975	13.5599980
T max	V nom	13.5599979	13.5600172	13.5600657	13.5600561
T nom	V nom	13.5599831	13.5599882	13.5599963	13.5599894
T nom	V min	13.5599813	13.5601750	13.5599875	13.5599738
T nom	V max	13.5599738	13.5599875	13.5600150	13.5599975

Temperature	Voltage	Frequency Error (%)			
		Startup	2 Min Later	5 Min Later	10 Min Later
T min	V nom	0.001	0.000	0.000	0.000
T max	V nom	0.000	0.000	0.000	0.000
T nom	V nom	0.000	0.000	0.000	0.000
T nom	V min	0.000	0.001	0.000	0.000
T nom	V max	0.000	0.000	0.000	0.000

A.4.7. Measurement Uncertainty

Measurement uncertainty: U =77 Hz, k=2

A.5. 20dB Bandwidth

A.5.1. Reference

See Clause 13.7 of ANSI C63.4-2014 specifically.
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2014 generally.

A.5.2. Measurement Methods

The transmitter output signal was picked up by coil antenna to the spectrum analyzer.
The transmitter output signal was picked up by coil antenna connected to the spectrum analyzer. The bandwidth of the center frequency was measured with 140Hz RBW, 420Hz VBW and 14kHz span.

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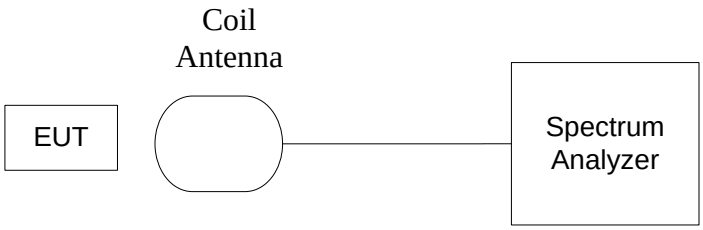

A.5.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC and without modulation (See 3.5).

EUT had been not connected to a travel adapter..

During the measurements, the ambient temperature is in the range of 15 ~ 25 ℃.

A.5.4. Test Layouts

See A.5.2.

A.5.5. Limits

The 20dB bandwidth shall be less than 80% of the permitted frequency band. For 13.56 MHz NFC, the permitted frequency band is 14kHz, so the limit is 11.2 kHz.

A.5.6. Measurement Results

Measurement results see Figure A-4.

Conclusions: Set. NFC02 and NFC03, **PASS**.

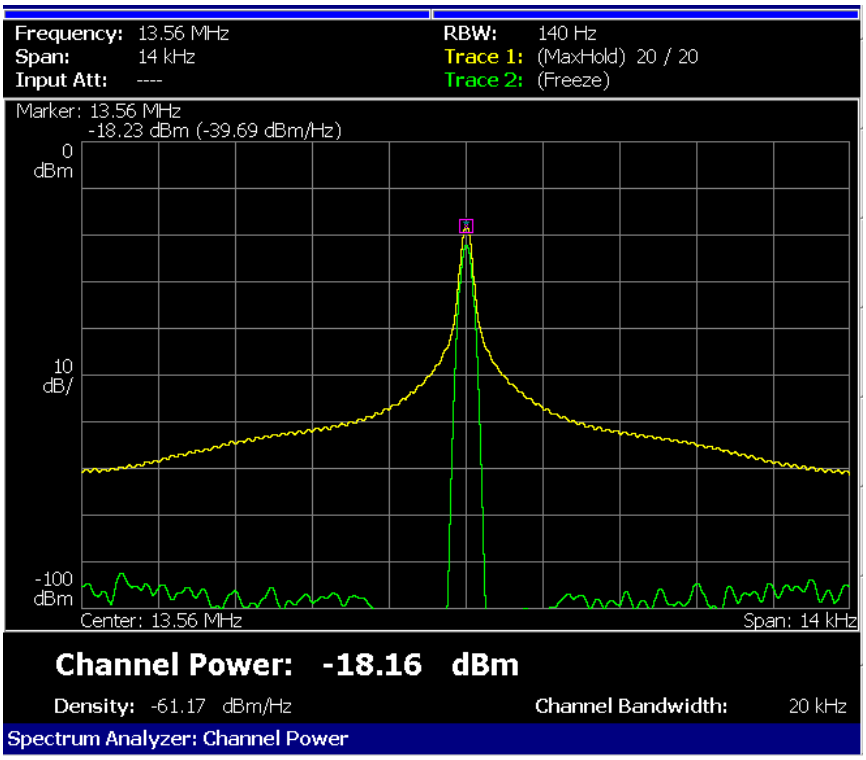

Figure A-4: Test result of EUT1 at test set. NFC02

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A.5.7. Measurement Uncertainty

Measurement uncertainty: *U* =77 Hz, k=2

A.6. Conducted emission

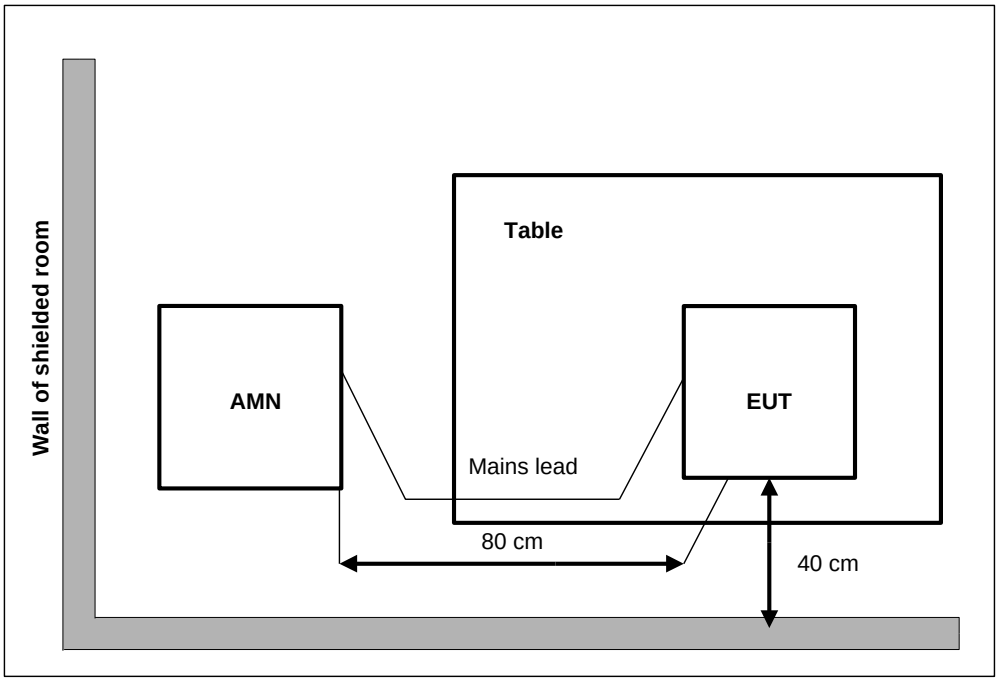
A.6.1. Reference

See Clause 13.3 and Clause 7 of ANSI C63.4-2014 specifically.
See Clause 4, Clause 5, and Clause 6 of ANSI C63.4-2014 generally.

A.6.2. Measurement Methods

The conducted emissions from the AC port of the EUT are measured in a shielding room. The EUT is connected to a Line Impedance Stabilization Network (LISN). An overview sweep with peak detection was performed. The measurements were performed with a quasi-peak detector and if required, an average detector.
The conducted emission measurements were made with the following detector of the test receiver: Quasi-Peak / Average Detector.
The measurement bandwidth is:

Frequency of Emission (MHz)	RBW/VBW
0.15-30	9kHz



A.6.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC (See 3.5).
The EUT is powered by a travel adapter.
During the measurements, the ambient temperature is in the range of 15 ~ 25 ℃.

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A.6.4. Limits

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Average Limit (dBμV)
0.15 to 0.5	66 to 56	56 to 46
0.5 to 5	56	46
5 to 30	60	50

A.6.5. Measurement Results

Measurement results see Figure A-5.

Conclusions: Set. NFC01, **PASS**.

Note: The measurement result at 13.56MHz is the fundamental emission of NFC signal.

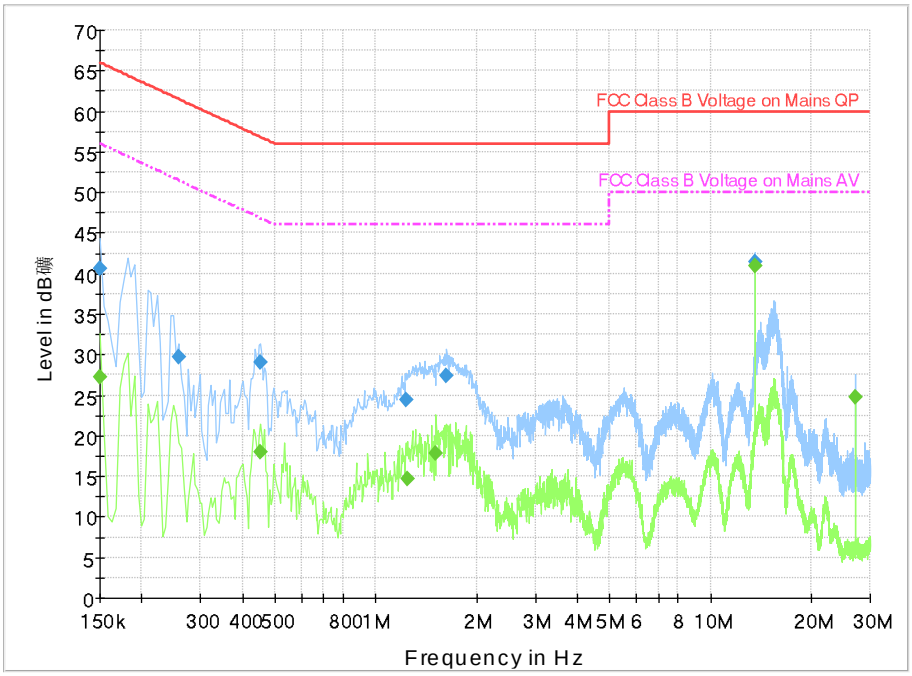

Figure A-5: Test result of EUT1 at test set. NFC01

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	40.6	2000.0	9.000	On	L1	20.2	25.4	66.0
0.258000	29.7	2000.0	9.000	On	L1	19.8	31.8	61.5
0.451500	29.0	2000.0	9.000	On	L1	19.9	27.9	56.8
1.230000	24.4	2000.0	9.000	On	L1	19.7	31.6	56.0
1.630500	27.5	2000.0	9.000	On	L1	19.7	28.6	56.0
13.560000	41.5	2000.0	9.000	On	L1	19.8	18.5	60.0

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Final Result 2

Frequency (MHz)	Average (dBμV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	27.3	2000.0	9.000	On	L1	20.2	28.7	56.0
0.451500	17.9	2000.0	9.000	On	N	19.9	28.9	46.8
1.243500	14.7	2000.0	9.000	On	N	19.7	31.3	46.0
1.513500	17.9	2000.0	9.000	On	L1	19.7	28.1	46.0
13.560000	41.0	2000.0	9.000	On	N	19.8	9.0	50.0
27.118500	24.8	2000.0	9.000	On	N	20.2	25.2	50.0

A.6.6. Measurement Uncertainty

Measurement uncertainty: U = 3.2 dB, k=2

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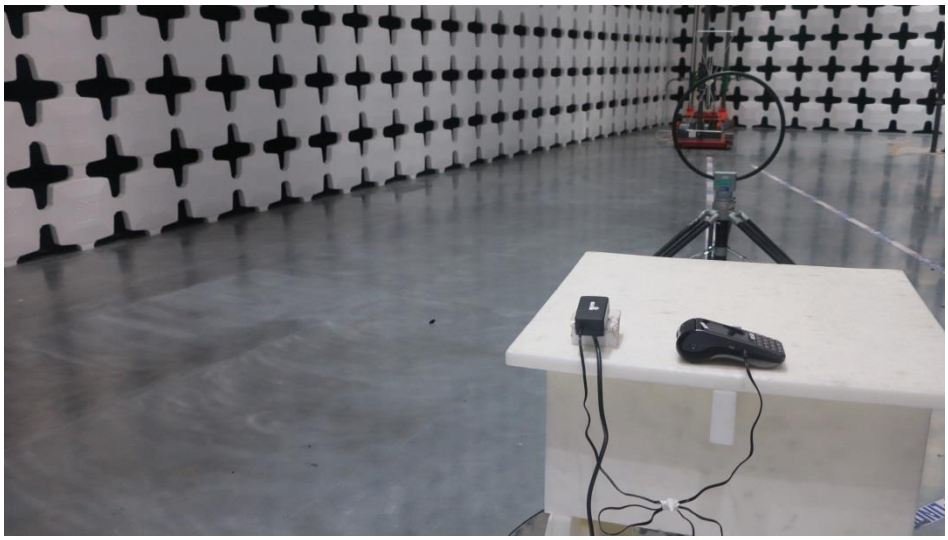
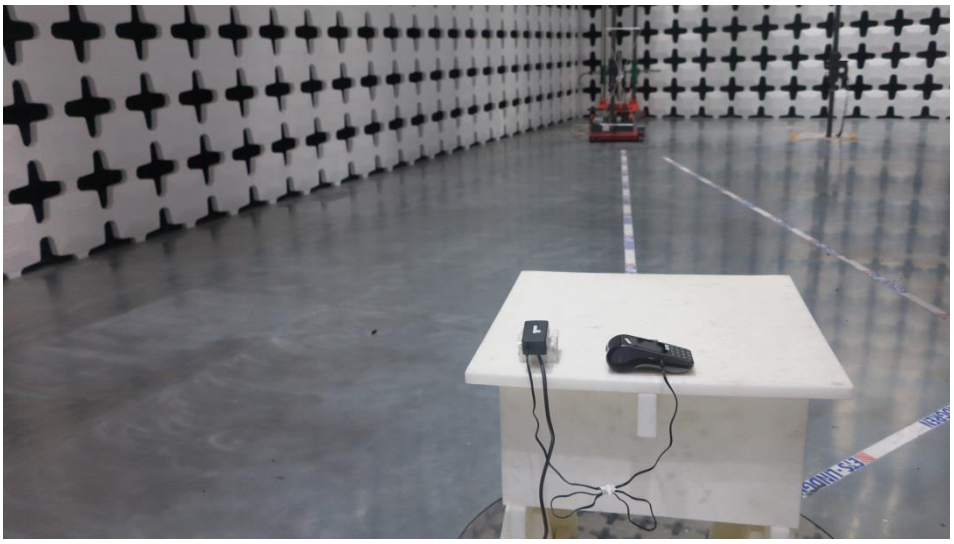
ANNEX C: TEST LAYOUT



Picture C-1: Field Strength Measurements (Below 30MHz)



Picture C-2: Field Strength Measurements (Above 30MHz)

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Picture C-3: Conducted Emissions Measurements

*****END OF REPORT*****

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