

NFC TEST REPORT

No.I20Z60959-IOT13

for

OnePlus Technology (Shenzhen) Co., Ltd.

Smart Phone

BE2028,BE2025,BE2026

FCC ID : 2ABZ2-EF170

with

Hardware Version: 16

Software Version: 10.5.5.BE88CB

Issued Date: 2020-10-13

Note:

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The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL-Telecommunication Technology Labs, CAICT

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REPORT HISTORY

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I20Z60959-IOT13	Rev.0	1st edition	2020-10-13

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1. Test Laboratory

1.1. Introduction & Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China 100191

Location 2: CTTL(BDA)

Address: No.18A, Kangding Street, Beijing Economic-Technology
Development Area, Beijing, P. R. China 100176

Location 3: CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,
Haidian District, Beijing, P. R. China 100191

1.3. Testing Environment

Normal Temperature: 15-35°C
Extreme Temperature: -20/+50°C
Normal Relative Humidity: 20-75%
Normal Air Pressure: 86Kpa-106Kpa

1.4. Project data

Testing Start Date: 2020-09-29
Testing End Date: 2020-10-10

1.5. Signature



Zhou Bin
(Prepared this test report)



Pang Shuai
(Reviewed this test report)



Zhu Liang
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: OnePlus Technology (Shenzhen) Co., Ltd.

Address: 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen

City: Shenzhen

Postal Code: /

Country: CHINA

Contact: Ariel Cheng

Telephone: 86 755 61898696-7023

E-mail: ariel.cheng@oneplus.com

2.2. Manufacturer Information

Company Name: OnePlus Technology (Shenzhen) Co., Ltd.

Address: 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen

City: Shenzhen

Postal Code: /

Country: CHINA

Contact: Ariel Cheng

Telephone: 86 755 61898696-7023

E-mail: ariel.cheng@oneplus.com

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

3.1. About EUT

Description	Smart Phone
Model name	BE2028,BE2025,BE2026
Brand name	ONEPLUS
FCC ID	2ABZ2-EF170
CDMA Frequency Band(s)	Band class 0/1/10
UMTS Frequency Band(s)	FDD I/II/IV/V/VIII
GSM Frequency Band(s)	GSM900/1800/1900/850
E-UTRA Frequency Band(s)	FDD1/2/3/4/5/7/8/12/13/17/20/25/26/28/28a/28b/66/71 TDD38/39/40/41
5G NR FR1 Band(s)	n2/5/25/41/66/71
Extreme Temperature	-10/+55°C
Nominal Voltage	3.87V
Extreme High Voltage	4.45V
Extreme Low Voltage	3.45V

Note: As declared by the manufacturer,the only difference among products BE2028,BE2025 and BE2026 is different model names for different clients. Except this, the others are the same.

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
83a	990016800151654	16	10.5.5.BE88CB	2020-09-29
81a	990016800151597	16	10.5.5.BE88CB	2020-09-30

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	/
AE3	Charger	/
AE4	Charger	/
AE5	Charger	/
AE6	USB	/
AE7	USB	/
AE8	Charger	NO TEST

AE1

Model BLP815
 Manufacturer /
 Length of cable /

AE3

Model WC0506A51JH
 Manufacturer Huizhou Golden Lake Industrial Co., Ltd.
 Length of cable /

AE4

Model WC030B51HK
 Manufacturer SHENZHEN HUNTKEY ELECTRIC CO LTD
 Length of cable /

AE5

Model WC0506A51GB
 Manufacturer /
 Length of cable /

AE6

Model /
 Manufacturer /
 Length of cable /

AE7

Model /
 Manufacturer /
 Length of cable /

AE8

Model WC0506A52GB
 Manufacturer /
 Length of cable /

*AE ID: is used to identify the ancillary equipment in the lab internally.

3.4. EUT Set-ups

Table 1: Eut Set-ups

EUT Set-up No.	Combination of EUT and AE	Remarks
Set.NFC01-1	81a + AE1 + AE3 + AE6/ AE7	--
Set.NFC01-2	81a + AE1 + AE4 + AE6/ AE7	--
Set.NFC01-3	81a + AE1 + AE5 + AE6/ AE7	--
Set.NFC02	81a + AE1	--
Set. NFC03	83a	--



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 without modulation: The EUT will transmit the CW signal at the Hoperating frequency.

4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters, referring to Annex A for detailed information, are supplied by the client or manufacturer, which are the bases of testing.

4.2. Reference Documents for testing

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.	2018
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.	2018
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Test Results

5.1. Summary of Test Results

Table 2: 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)	B.1	P(Set. NFC02)
2	Electric Field Strength of Outside the Allocated Bands	CFR 47 § 15.225(b) CFR 47 § 15.225(c)		P(Set. NFC02)
3	Electric Field Radiated Emissions	CFR 47 § 15.209 CFR 47 § 15.225(d)	B.2	P(Set. NFC01-1/ Set. NFC01-2/ Set. NFC01-3)
			B.3	P(Set. NFC01-1/ Set. NFC01-2/ Set. NFC01-3)
4	Frequency Tolerance	CFR 47 § 15.225(e)	B.4	P(Set. NFC03)
5	20dB Bandwidth	CFR 47 § 15.215(c)	B.5	P(Set. NFC03)
6	Conducted Emissions	CFR 47 § 15.207	B.6	P(Set. NFC01-1/ Set. NFC01-2/ Set. NFC01-3)
The measurement is carried out according to ANSI C63.10. See ANNEX B for details.				

Test Conditions:

For this report, all the test cases listed above were tested under normal Temperature, Voltage, humidity and Air Pressure except the Frequency Tolerance test case. The specific conditions of Frequency Tolerance test case are listed in section B.4.3

See Table 3 for terms for result verdict:

Table 3 Terms for result verdict

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

5.2. Statements

The test cases listed in Section 5.1 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.

6. Test Facilities Utilized

Table 4: Test Facilities Utilized

NO.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE	CAL. INTERVAL
1.	Spectrum Analyzer	RSA3408A	B010277	Tektronix	2021-09-24	1 Year
2.	Climatic chamber	SH242	93008658	ESPEC	2021-01-18	1 Year
3.	Test Receiver	ESU26	100235	Rohde & Schwarz	2021-03-03	1 Year
4.	BiLog Antenna	VULB9163	9163-1223	Schwarzbeck	2021-03-18	1 Year
5.	LISN	ENV216	101200	Rohde & Schwarz	2021-05-17	1 Year
6.	Test Receiver	ESCI 7	100344	Rohde & Schwarz	2021-02-26	1 Year
7.	H-field Antenna	HFH2-Z2	829324/007	R&S	2020-12-03	1 Year

Test Item	Test Software and Version	Software Vendor
Radiated Continuous Emission	EMC32 V9.01.00	R&S
Conducted Emission	EMC32 V8.51	R&S

7. Measurement Uncertainty

Table 5: Measurement Uncertainty

Item	Uncertainty
Frequency Tolerance	$U = 77 \text{ Hz}$, $k=2$
20dB Bandwidth	$U = 77 \text{ Hz}$, $k=2$
Radiated Emissions (<1GHz)	$U = 5.40 \text{ dB}$, $k=2$
Conducted emission	$U = 3.08 \text{ dB}$, $k=2$

ANNEX A: EUT parameters

/

ANNEX B: Detailed Test Results

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

B.1.1. Reference

See Clause 4, Clause 5 of ANSI C63.10-2013 generally.

B.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:

Table B-1: Measurement bandwidth

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

The E-field measured at 3m is calculated as:

$$\text{E-field (dB}\mu\text{V/m)} = \text{Rx (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{AF@3m (dB/m)}$$

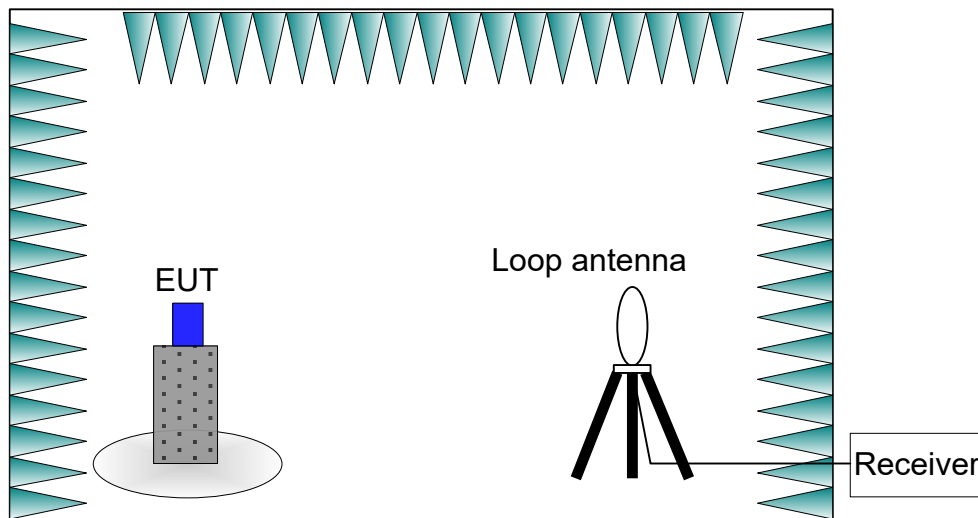


Figure B-1: Measurement Setup

B.1.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC(See 3.4).

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 °C.

B.1.4. Limits

Table B-2: Limits

Frequency Range (MHz)	E-field Strength Limit @ 30 m ($\mu\text{V/m}$)	E-field Strength Limit @ 3 m (dB $\mu\text{V/m}$)
13.560 $\pm$ 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: Extrapolation(dB) = $40\log_{10}(\text{Measurement Distance}/\text{Specification Distance})$		

B.1.5. Measurement Results

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

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

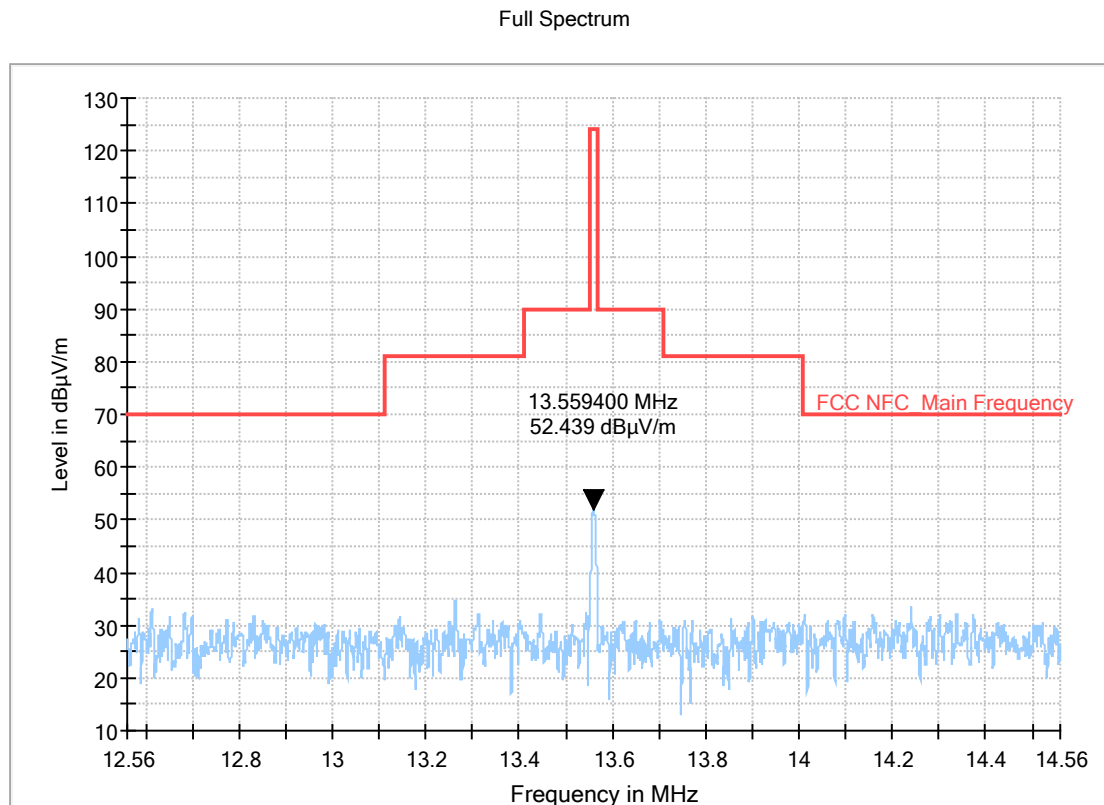


Figure B-2: Measurement results for Electric Field Strength of Fundamental and Outside the Allocated bands

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

B.2.1. Reference

See Clause 6.4 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

B.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:

Table B-3: Measurement bandwidth

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:

$$\text{E-field (dB}\mu\text{V/m)} = \text{Rx (dB}\mu\text{V)} + \text{Cable Loss (dB)} + \text{AF@3m (dB/m)}$$

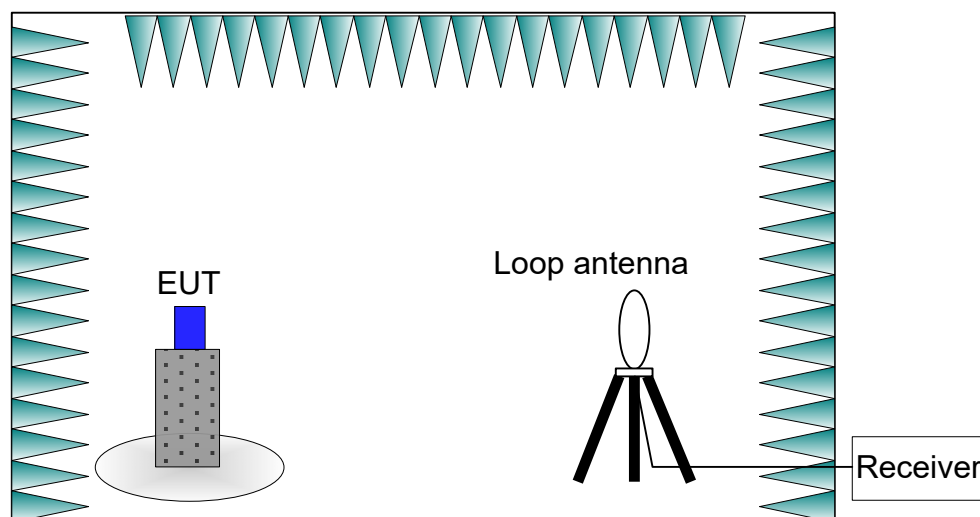


Figure B-3: Measurement Setup

B.2.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC(See 3.4).

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 °C.

B.2.4. Limits

Table B-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:

$$\text{Extrapolation(dB)} = 40\log_{10}(\text{Measurement Distance}/\text{Specification Distance})$$

B.2.5. Measurement Results

Measurement results of normal conditions see Figure B-4 for different set-ups of EUT. The results displayed take into account applicable antenna factors and cable losses.

Conclusions: Set.NFC01-1, **PASS**.

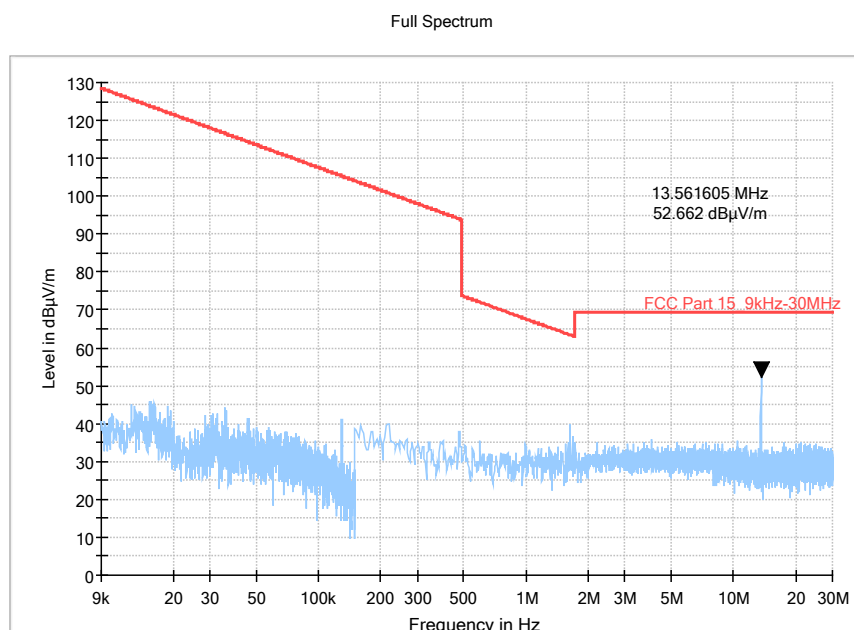


Figure B-4: Measurement results for Electric Field Radiated Emissions (< 30MHz)

Conclusions: Set.NFC01-2, **PASS.**

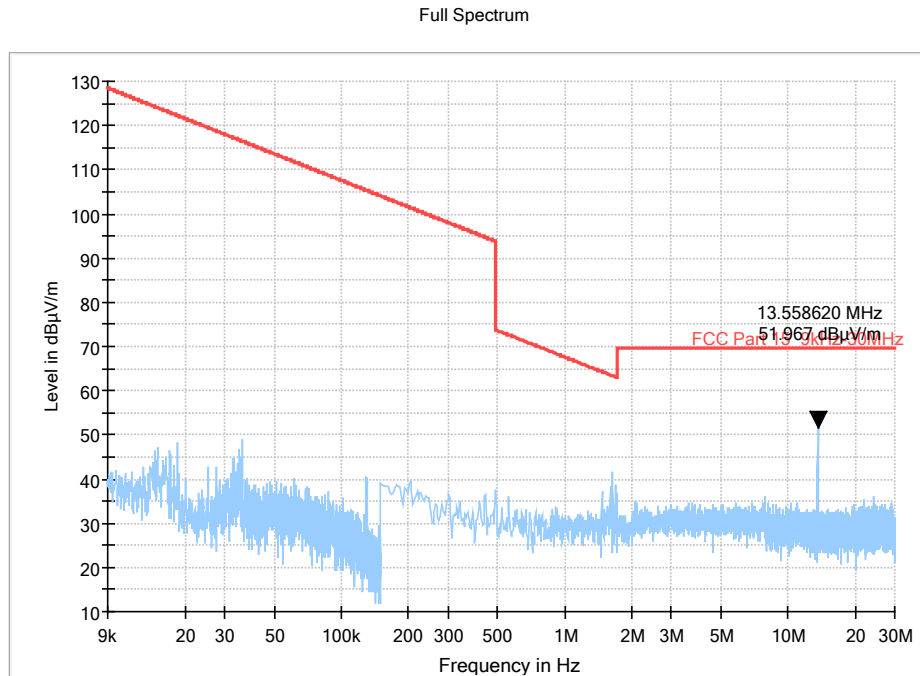


Figure B-5: Measurement results for Electric Field Radiated Emissions (< 30MHz)

Conclusions: Set.NFC01-3, **PASS.**

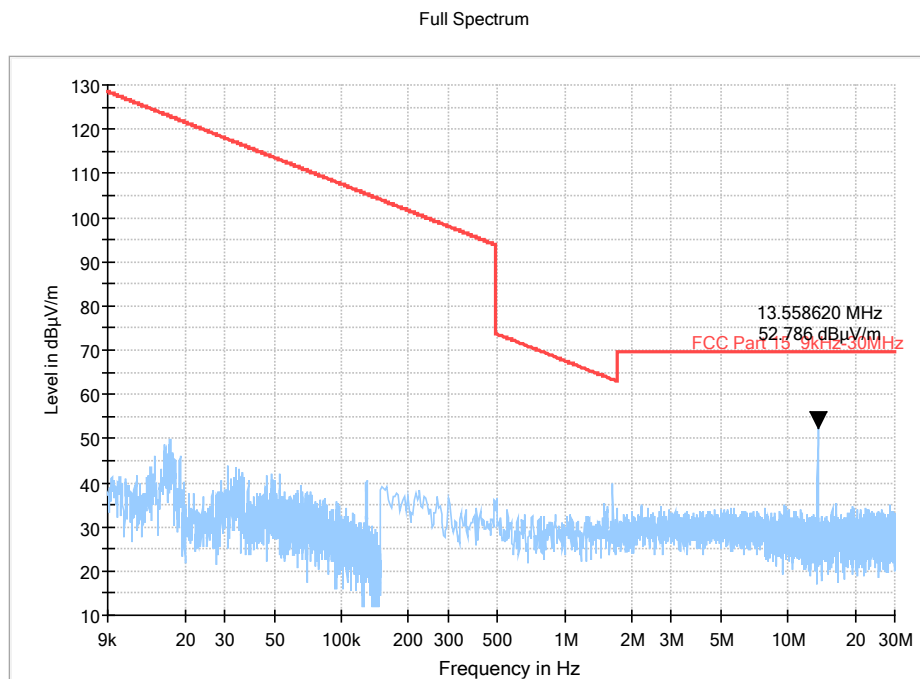


Figure B-6: Measurement results for Electric Field Radiated Emissions (< 30MHz)

B.3. Electric Field Radiated Emissions ($\geq 30\text{MHz}$)

B.3.1. Reference

See Clause 6.5 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

B.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. 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:

Table B-5: Measurement bandwidth

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

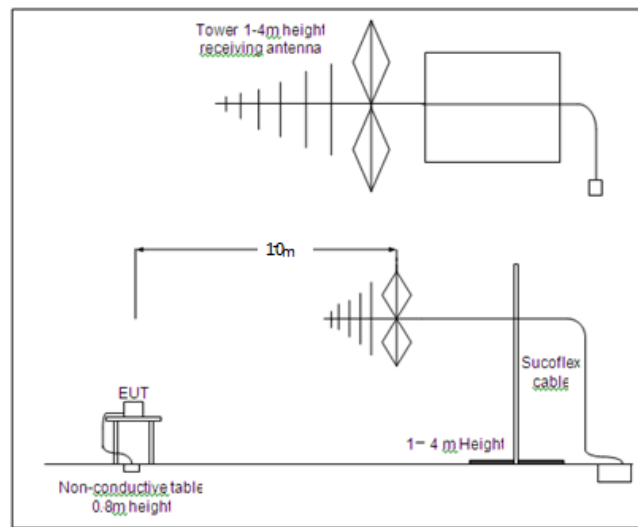


Figure B-7: Measurement Setup

B.3.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC(See 3.4).

The EUT had been connected to a travel adapter.

During the measurements, the ambient temperature of the electromagnetic anechoic chamber is in the range of 15 ~ 25 °C.

B.3.4. Limits

Table B-6: 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

B.3.5. Measurement Results

Measurement results of normal conditions see Figure B-6 for different set-ups of EUT. The results displayed take into account applicable antenna factors and cable losses.

Conclusions: Set.NFC01-1, **PASS**.

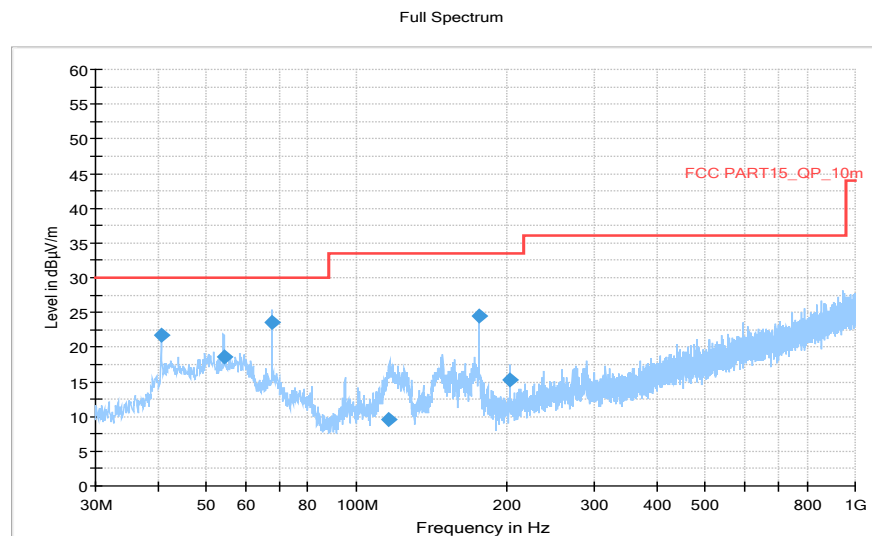


Figure B-8: Measurement results for Electric Field Radiated Emissions ($\geq 30\text{MHz}$)

Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
40.670000	21.68	30.00	8.32	279.0	V	204.0
54.213000	18.64	30.00	11.36	99.0	V	191.0
67.770000	23.54	30.00	6.46	213.0	V	286.0
116.164000	9.65	33.50	23.87	125.0	V	-8.0
176.276000	24.55	33.50	8.97	102.0	V	30.0
203.376000	15.23	33.50	18.29	103.0	V	182.0

Conclusions: Set.NFC01-2, PASS.

Full Spectrum

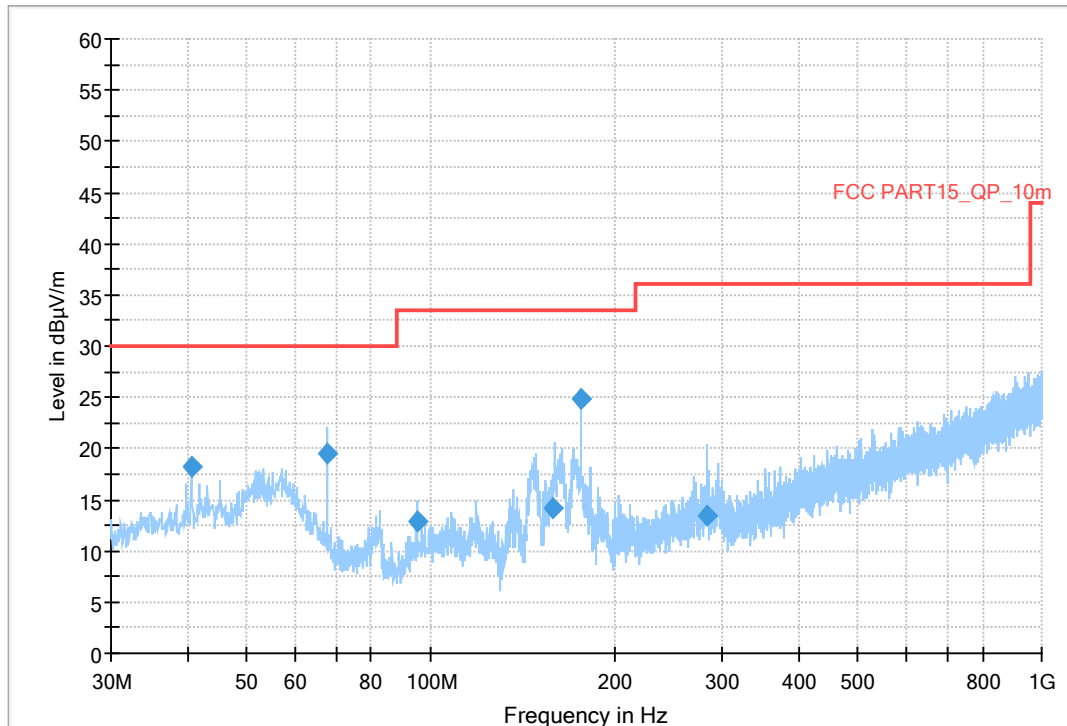


Figure B-9: Measurement results for Electric Field Radiated Emissions ($\geq 30\text{MHz}$)

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
40.670000	18.15	30.00	11.85	103.0	V	252.0
67.770000	19.60	30.00	10.40	226.0	V	-11.0
94.893000	12.92	33.50	20.60	102.0	V	1.0
159.084000	14.23	33.50	19.29	97.0	V	61.0
176.276000	24.77	33.50	8.75	105.0	V	30.0
283.322000	13.52	36.00	22.50	107.0	V	120.0

Conclusions: Set.NFC01-3, PASS.

Full Spectrum

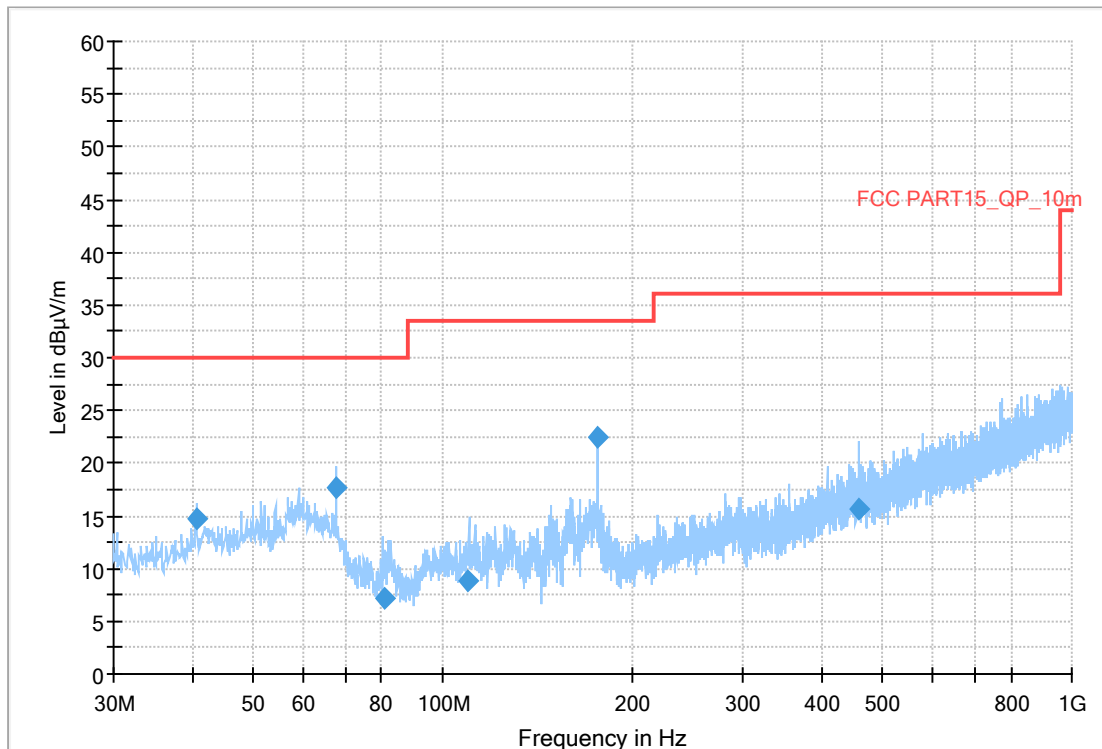


Figure B-10: Measurement results for Electric Field Radiated Emissions ($\geq 30\text{MHz}$)

Final_Result

Frequency (MHz)	QuasiPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)
40.670000	14.74	30.00	15.26	135.0	V	300.0
67.793000	17.59	30.00	12.41	187.0	V	-15.0
80.643000	7.23	30.00	22.77	199.0	V	30.0
109.942000	8.84	33.50	24.68	192.0	V	-14.0
176.276000	22.45	33.50	11.07	103.0	V	97.0
460.056000	15.69	36.00	20.33	110.0	V	113.0

B.4. Frequency Tolerance

B.4.1. Reference

See Clause 6.8 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

B.4.2. Measurement Methods

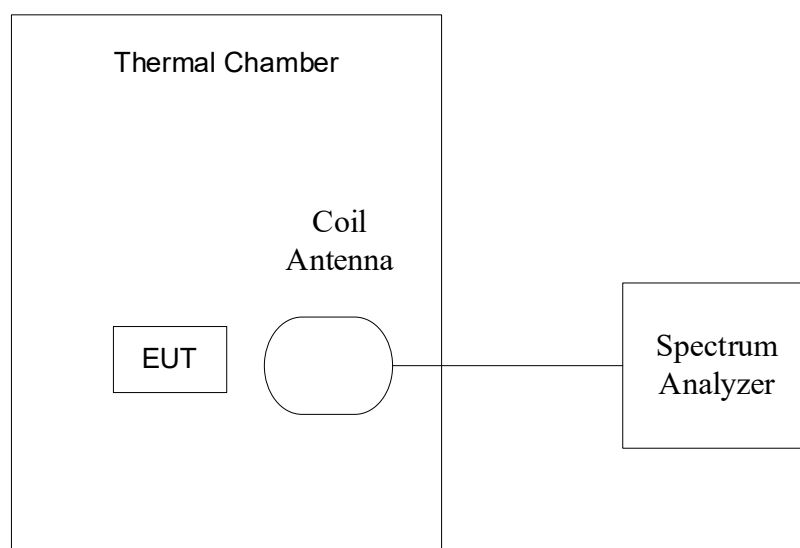


Figure B-11: Measurement Setup

The transmitter output signal was picked up by coil antenna connected to the spectrum analyzer. 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.

B.4.3. EUT Operating Mode and Test Conditions

The measurement of EUT was carried out under the transmit state of without modulation(See 3.4).

EUT had not been connected to a travel adapter. The frequency stability was measured with the different voltage and temperature combinations:

- a) The nominal voltage 3.85V(See 3.1)was used and the temperature was varied from -20°C to +50°C in 10°C increments using an environmental chamber.
- b) The 20°C was used and the voltages were 3.6V, 3.85V and 4.4V (The extreme low voltage ,the nominal voltage and the extreme high voltage defined in section 3.1).

The details were as following:

Table B-7: Combinations of Voltage andTemperature

Test items	Voltage	Temperature
Frequency stability with respect to ambient temperature	3.87V	-20°C
		-10°C
		0°C
		10°C
		20°C
		30°C
		40°C
		50°C
Frequency stability when varying supply voltage	3.45V	20°C
	3.87V	
	4.45V	

B.4.4. Test Layouts

See B.4.2.

B.4.5. Limits

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

B.4.6. Measurement Results

Measurement results see Table B-9 for different test conditions.

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

Table B-8: Measurement results for Frequency Tolerance

Temperature	Voltage	Frequency (MHz)			
		Startup	2 Min Later	5 Min Later	10 Min Later
-20°C	3.87V	13.559819375	13.559824375	13.559825625	13.559826250
-10°C	3.87V	13.559828125	13.559828375	13.559828565	13.559828685
0°C	3.87V	13.559821250	13.559820625	13.559819375	13.559818750
10°C	3.87V	13.559808125	13.559803125	13.559801875	13.559801250
20°C	3.87V	13.559779375	13.559778125	13.559775625	13.559774375
30°C	3.87V	13.559756250	13.559753125	13.559749375	13.559746875
40°C	3.87V	13.559725625	13.559723125	13.559716875	13.559715625
50°C	3.87V	13.559711875	13.559709375	13.559708625	13.559707325
20°C	3.45V	13.559768750	13.559770625	13.559771875	13.559772025
20°C	4.45 V	13.559769375	13.559768750	13.559768925	13.559768975

Temperature	Voltage	Frequency Error (%)			
		Startup	2 Min Later	5 Min Later	10 Min Later
-20°C	3.87V	-0.001	-0.001	-0.001	-0.001
-10°C	3.87V	-0.001	-0.001	-0.001	-0.001
0°C	3.87V	-0.001	-0.001	-0.001	-0.001
10°C	3.87V	-0.001	-0.001	-0.001	-0.001
20°C	3.87V	-0.002	-0.002	-0.002	-0.002
30°C	3.87V	-0.002	-0.002	-0.002	-0.002

40°C	3.87V	-0.002	-0.002	-0.002	-0.002
50°C	3.87V	-0.002	-0.002	-0.002	-0.002
20°C	3.45V	-0.002	-0.002	-0.002	-0.002
20°C	4.45V	-0.002	-0.002	-0.002	-0.002

B.4.7. Measurement Uncertainty

Measurement uncertainty: $U = 77 \text{ Hz}$, $k=2$

B.5. 20dB Bandwidth

B.5.1. Reference

See Clause 6.9 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

B.5.2. Measurement Methods

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.

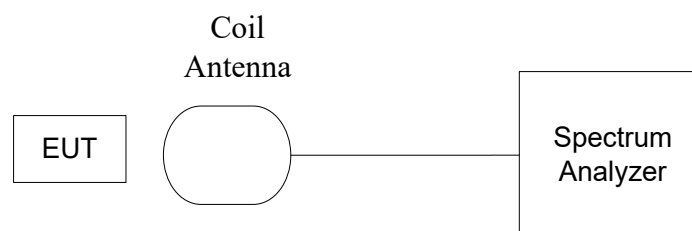


Figure B-12: Measurement Setup

B.5.3. EUT Operating Mode and Test Conditions

The measurement of EUT was carried out under the transmit state of NFC (See 3.4).

EUT had not been connected to a travel adapter.

During the measurements, the ambient temperature was in the range of 15 ~ 25 °C.

B.5.4. Test Layouts

See B.5.2.

B.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.

B.5.6. Measurement Results

Measurement results see Figure B-9.

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

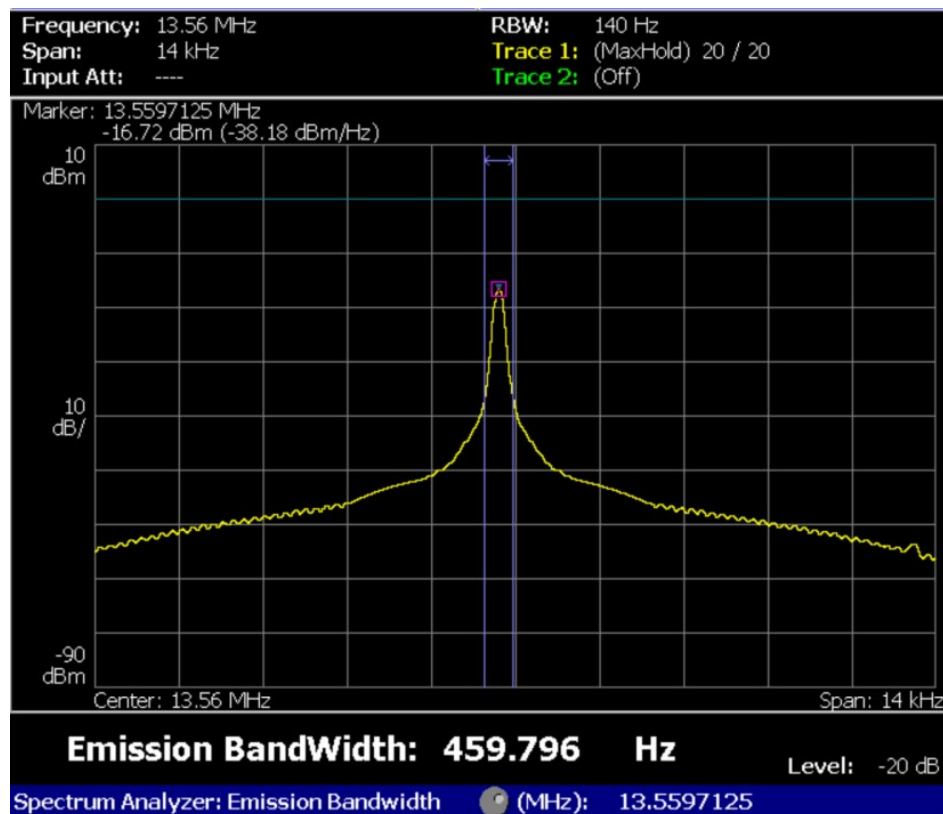


Figure B-13: Measurement results for 20dB Bandwidth

B.5.7. Measurement Uncertainty

Measurement uncertainty: $U = 77 \text{ Hz}$, $k=2$

B.6. Conducted emission

B.6.1. Reference

See Clause 6.2 of ANSI C63.10-2013 specifically.

See Clause 4 and Clause 5 of ANSI C63.10-2013 generally.

B.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:

Table B-9: Measurement Bandwidth

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

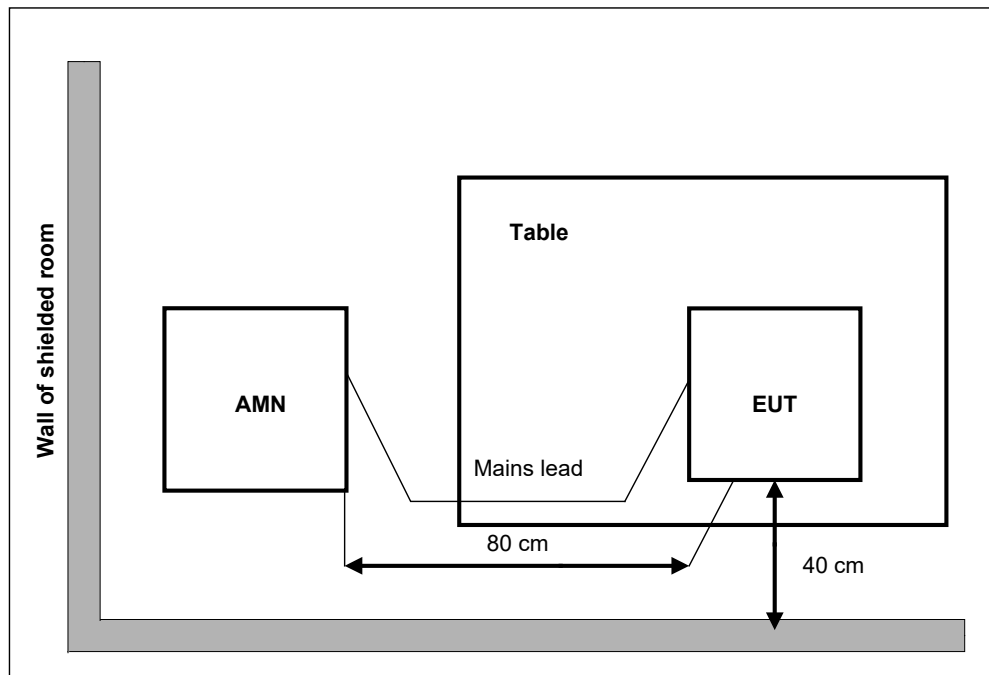


Figure B-14: Measurement Setup

B.6.3. EUT Operating Mode and Test Conditions

The measurement of EUT is carried out under the transmit state of NFC(See 3.4).

The EUT is powered by a travel adapter.

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

B.6.4. Limits

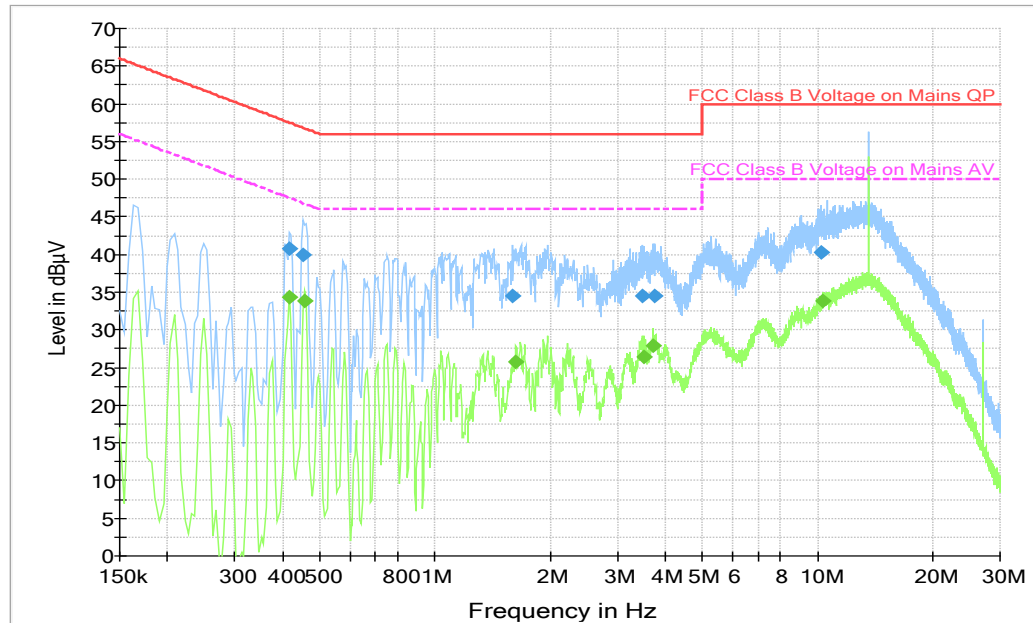
Table B-10: Limits

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

B.6.5. Measurement Results

Measurement results see Figure B-11.

Conclusions: Set.NFC01-1, **PASS**.



Note: the spike over the limit is the NFC carrier frequency and coming from the radio equipment.

Figure B-15: Measurement results for Conducted Emission

Final Result 1

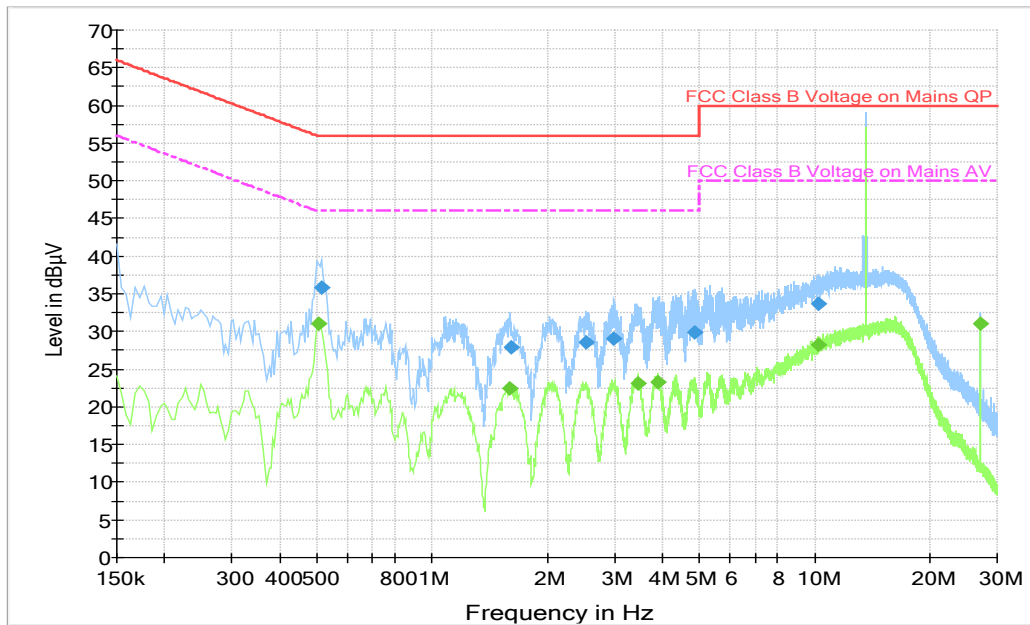
Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.415500	40.8	GND	N	10.0	16.8	57.5
0.451500	40.0	GND	N	10.0	16.8	56.8
1.594500	34.6	GND	N	10.0	21.4	56.0
3.471000	34.6	GND	N	10.1	21.4	56.0

3.768000	34.6	GND	N	10.1	21.4	56.0
10.221000	40.2	GND	N	10.4	19.8	60.0

Final Result 2

Frequency (MHz)	Average (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.415500	34.3	GND	N	10.0	13.2	47.5
0.456000	33.9	GND	L1	10.0	12.9	46.8
1.630500	25.7	GND	N	10.0	20.3	46.0
3.520500	26.4	GND	N	10.1	19.6	46.0
3.727500	28.0	GND	N	10.1	18.0	46.0
10.347000	33.9	GND	N	10.4	16.1	50.0

Conclusions: Set.NFC01-2, PASS.



Note: the spike over the limit is the NFC carrier frequency and coming from the radio equipment.

Figure B-16: Measurement results for Conducted Emission

Final Result 1

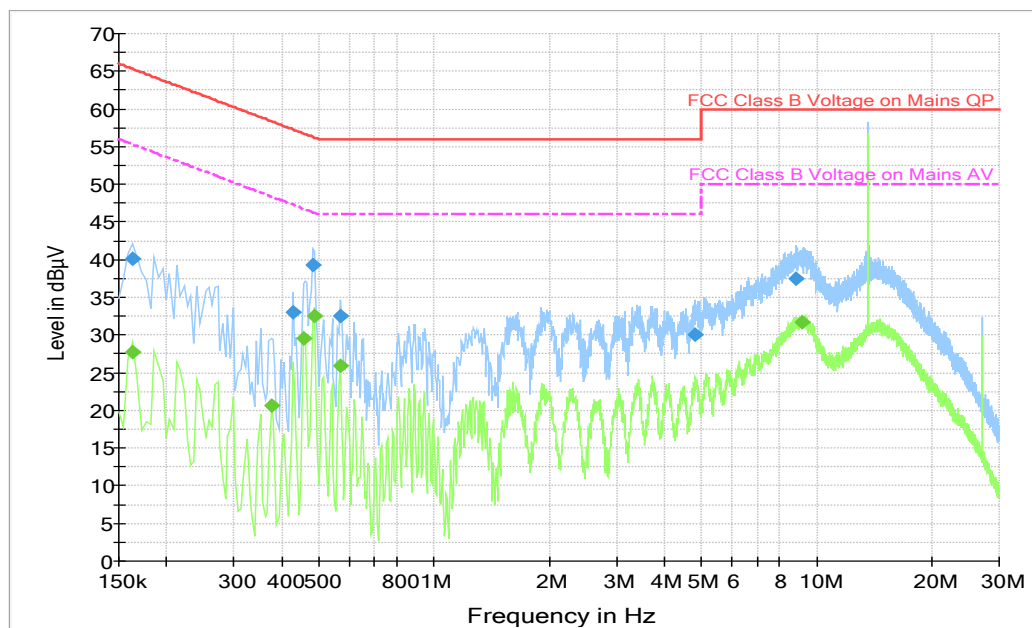
Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.514500	35.8	GND	N	10.0	20.2	56.0
1.608000	27.9	GND	N	10.0	28.1	56.0
2.526000	28.6	GND	N	10.1	27.4	56.0
2.994000	29.0	GND	N	10.1	27.0	56.0
4.875000	29.9	GND	N	10.2	26.1	56.0
10.234500	33.7	GND	N	10.4	26.3	60.0

Final Result 2

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.505500	31.1	GND	N	10.0	14.9	46.0

1.594500	22.4	GND	N	10.0	23.6	46.0
3.457500	23.1	GND	N	10.1	22.9	46.0
3.898500	23.2	GND	N	10.1	22.8	46.0
10.234500	28.2	GND	N	10.4	21.8	50.0
27.118500	31.0	GND	N	10.9	19.0	50.0

Conclusions: Set.NFC01-3, PASS.



Note: the spike over the limit is the NFC carrier frequency and coming from the radio equipment.

Figure B-17: Measurement results for Conducted Emission

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.163500	40.1	GND	L1	10.0	25.2	65.3
0.429000	33.0	GND	L1	10.0	24.3	57.3
0.483000	39.3	GND	L1	10.0	17.0	56.3
0.568500	32.5	GND	L1	10.0	23.5	56.0

4.812000	30.0	GND	N	10.2	26.0	56.0
8.808000	37.4	GND	N	10.3	22.6	60.0

Final Result 2

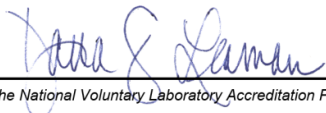
Frequency (MHz)	QuasiPeak (dB μ V)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)
0.163500	27.7	GND	L1	10.0	27.5	55.3
0.375000	20.6	GND	L1	10.0	27.7	48.4
0.456000	29.6	GND	N	10.0	17.2	46.8
0.487500	32.5	GND	N	10.0	13.7	46.2
0.568500	25.9	GND	L1	10.0	20.1	46.0
9.190500	31.8	GND	N	10.3	18.2	50.0

ANNEX C: Persons involved in this testing

Table C-1: Persons involved

Test Item	Tester
20dB Bandwidth	Zhou Bin
Frequency Tolerance	Zhou Bin
Electric Field Strength of Fundamental and Outside the Allocated bands	Wang Huan
Electric Field Radiated Emissions (< 30MHz)	Wang Huan
Electric Field Radiated Emissions (≥ 30 MHz)	Wang Huan
Conducted Emissions	Chen Tianwei

ANNEX D: Accreditation Certificate

United States Department of Commerce National Institute of Standards and Technology NVLAP[®] 	
Certificate of Accreditation to ISO/IEC 17025:2017	
NVLAP LAB CODE: 600118-0	
Telecommunication Technology Labs, CAICT Beijing China	
<i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i>	
Electromagnetic Compatibility & Telecommunications	
<i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).</i>	
2020-09-29 through 2021-09-30 <i>Effective Dates</i>	 <i>For the National Voluntary Laboratory Accreditation Program</i>

END OF REPORT