



# RF TEST REPORT

**Applicant** ZTE Corporation  
**FCC ID** SRQ-ZTEA2023G  
**Product** 5G NR Multi model smart phone  
**Model** ZTE A2023G  
**Report No.** R2204A0354-R8V1  
**Issue Date** June 2, 2022

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC CFR47 Part 15C (2021)**. 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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Approved by: Kai Xu

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Version	Revision description	Issue Date
Rev.0	Initial issue of report.	May 28, 2022
Rev.1	Update information.	June 2, 2022

Note: This revised report (Report No. R2204A0354-R8V1) supersedes and replaces the previously issued report (Report No. R2204A0354-R8). Please discard or destroy the previously issued report and dispose of it accordingly.



## Summary of measurement results

Number	Test Case	Clause in FCC rules	Verdict
1	20 dB bandwidth	2.1049	PASS
2	Frequency Stability Tolerance	15.225(e)	PASS
3	Radiated Emissions	15.225 (a) (b) (c) (d) and 15.209	PASS
4	Conducted Emissions	15.207	PASS

Date of Testing: April 27, 2022 ~ May 9, 2022  
Date of Sample Received: April 12, 2022

Note: PASS: The EUT complies with the essential requirements in the standard.  
FAIL: The EUT does not comply with the essential requirements in the standard.

All indications of Pass/Fail in this report are opinions expressed by TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.



## 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 any government agencies.

### 1.2. Test facility

#### **FCC (Designation number: CN1179, Test Firm Registration Number: 446626)**

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

#### **A2LA (Certificate Number: 3857.01)**

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

### 1.3. Testing Location

Company: TA Technology (Shanghai) Co., Ltd.  
Address: No.145, Jintang Rd, Tangzhen Industry Park, Pudong  
City: Shanghai  
Post code: 201201  
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## 2. General Description of Equipment under Test

### 2.1. Applicant and Manufacturer Information

<b>Applicant</b>	ZTE Corporation
<b>Applicant address</b>	ZTE Plaza, #55 Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, China
<b>Manufacturer</b>	ZTE Corporation
<b>Manufacturer address</b>	ZTE Plaza, #55 Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, China

### 2.2. General information

EUT Description	
Model	ZTE A2023G
SN	327324660004
Hardware Version	ZTE A2023GHW1.0
Software Version	MyOS12.0.2_A2023G_GLB
Power Supply	Battery / AC adapter
Antenna Type	Internal Antenna
Antenna Connector	A permanently attached antenna (meet with the standard FCC Part 15.203 requirement)
Test Mode	NFC-B
Modulation Type	ASK, BPSK
Operating Frequency Range(s)	13.56MHz
Rated Power Supply Voltage	3.89V
Operating Voltage	Minimum: 3.7V    Maximum: 4.45V
Operating Temperature	Lowest: -10°C    Highest: +40°C
Testing Temperature	Lowest: -20°C    Highest: +50°C
EUT Accessory	
Adapter	Manufacturer: ShenZhen KunXing Technology Co., Ltd. Model: STC-A59152050AC-Z
Battery	Manufacturer: Zhuhai Cosmx Battery Co., Ltd. Model: Li3949T44P8h806459
Earphone 1	Manufacturer: JUWEI ELECTRONICS CO.,LTD Model: JWEP1092-Z01
Earphone 2	Manufacturer: ShenZhen FDC Electronic Co.,Ltd Model: DEM-9A



USB Cable 1	Manufacturer: King Power Electronics Co., Ltd Model: TC20-TC20-W-100-M-6A-HSF
USB Cable 2	Manufacturer: Luxshare-ICT Co., Ltd Model: TC20-TC20-W-100-M-6A-HSF
Type-C to 3.5 mm Headphone Jack	Manufacturer: HUIZHOU JUWEI ELECTRONICS CO., LTD Model: HMZ24
<p>Note: The EUT is sent from the applicant to TA and the information of the EUT is declared by the applicant.</p> <p>2. There is more than one USB cable/ Earphone, each one should be applied throughout the compliance test respectively, and however, only the worst case (USB cable 2) will be recorded in this report.</p>	



### 3. Applied Standards

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

**Test standards:**

**FCC CFR47 Part 15C (2021)**

**ANSI C63.10-2013**

**Reference standard:**

**FCC CFR47 Part 2 (2021)**





## 4. Test Configuration

### Test Mode

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

## 5. Test Case

### 5.1. 20dB Bandwidth

#### Ambient condition

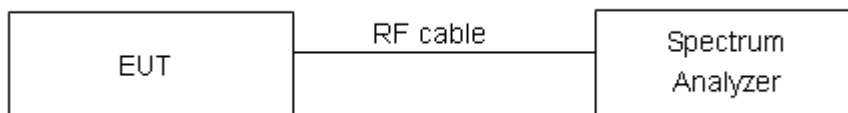
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

#### Method of Measurement

The EUT was connected to the spectrum analyzer through an external attenuator (20dB) and a known loss cable. RBW is set to 10 kHz; VBW is set to 3 times the RBW on spectrum analyzer.

Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

#### Test Setup



#### Limits

No specific occupied bandwidth requirements in part 2.1049.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 2$ ,  $U = 936$  Hz.

#### Test Results

Refer to the section 6.1 of this report for test data.

## 5.2. Frequency Stability

### Ambient condition

Temperature	Relative humidity
21°C ~25°C	40%~60%

### Method of Measurement

#### 1. Frequency Stability (Temperature Variation)

The temperature inside the climate chamber is varied from -20°C to +50°C in 10°C step size,

(1) With all power removed, the temperature was decreased to 0°C and permitted to stabilize for three hours.

(2) Measure the carrier frequency with the test equipment in a “call mode”. These measurements should be made within 1 minute of powering up the mobile station, to prevent significant self warming.

(3) Repeat the above measurements at 10°C increments from -20°C to +50°C. Allow at least 1.5 hours at each temperature, un-powered, before making measurements.

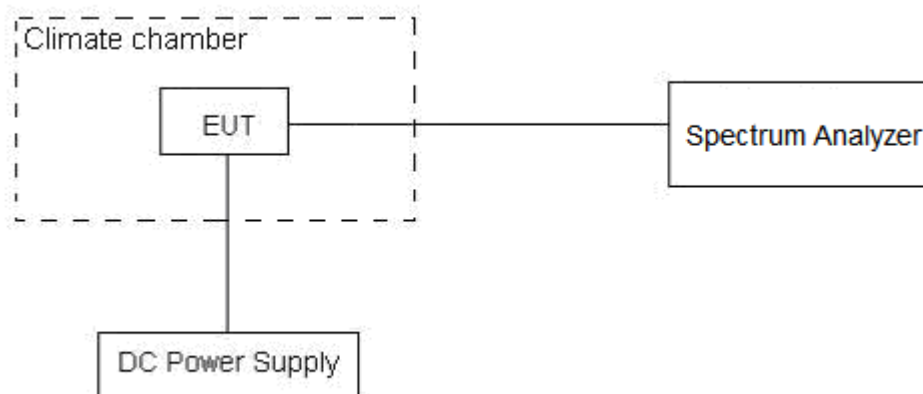
#### 2. Frequency Stability (Voltage Variation)

The frequency stability shall be measured with variation of primary supply voltage as follows:

**Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

This transceiver is specified to operate with an input voltage of between 3.7V and 4.45 V, with a nominal voltage of 3.89V.

### Test setup





## Limits

Rule Part 15.225 (e) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency over a temperature variation of  $-20$  degrees to  $+ 50$  degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

## Measurement Uncertainty

The assessed measurement uncertainty to ensure 99.75% confidence level for the normal distribution is with the coverage factor  $k = 3$ ,  $U = 0.01\text{ppm}$ .

## Test Results

Refer to the section 6.2 of this report for test data.

### 5.3. Radiates Emission

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	102.5kPa

#### Method of Measurement

The test set-up was made in accordance to the general provisions of ANSI C63.10. The Equipment Under Test (EUT) was set up on a non-conductive table in the semi-anechoic chamber. The test was performed at the distance of 3 m between the EUT and the receiving antenna. The radiated emissions measurements were made in a typical installation configuration.

Sweep the whole frequency band through the range from 9 kHz to the 10th harmonic of the carrier, and the emissions less than 20 dB below the permissible value are reported.

During the test, below 30MHz, the center of the loop shall be 1 meters; above 30MHz, 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 turntable 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. The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing.

Set the spectrum analyzer in the following:

#### Out-of-band

Below 30MHz

RBW=9KHz, VBW=30KHz, detector=peak;

Above 30MHz,

RBW=100KHz, VBW=300KHz, Detector=peak

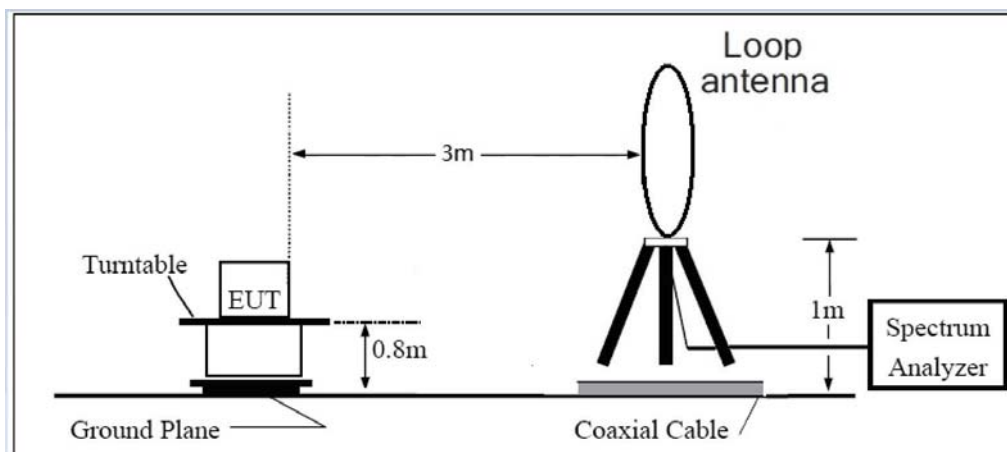
#### In-band

RBW=9KHz, VBW=30KHz, detector=peak;

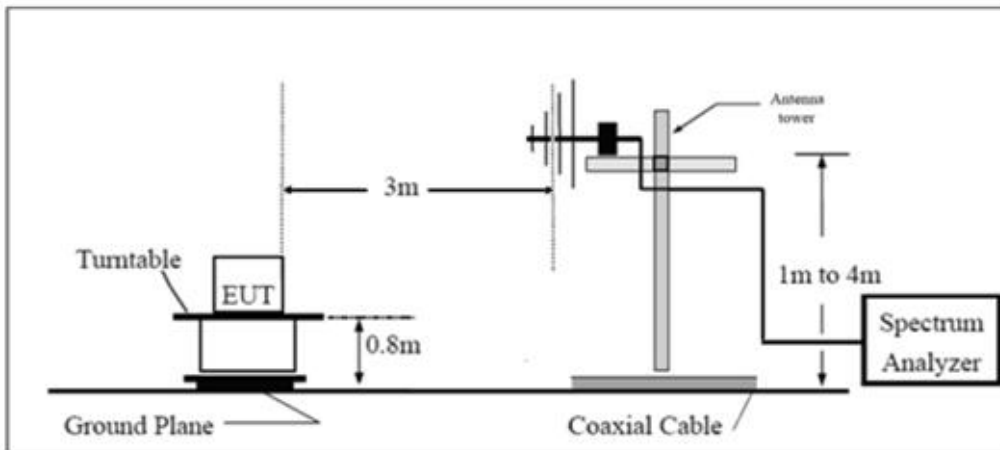
The field strength of spurious emission was measured in the following position: EUT stand-up position (Z axis), lie-down position (X, Y axis). The worst emission was found in lie-down position (X axis) and the loop antenna is vertical, the other antennas are vertical and horizontal.

#### Test setup

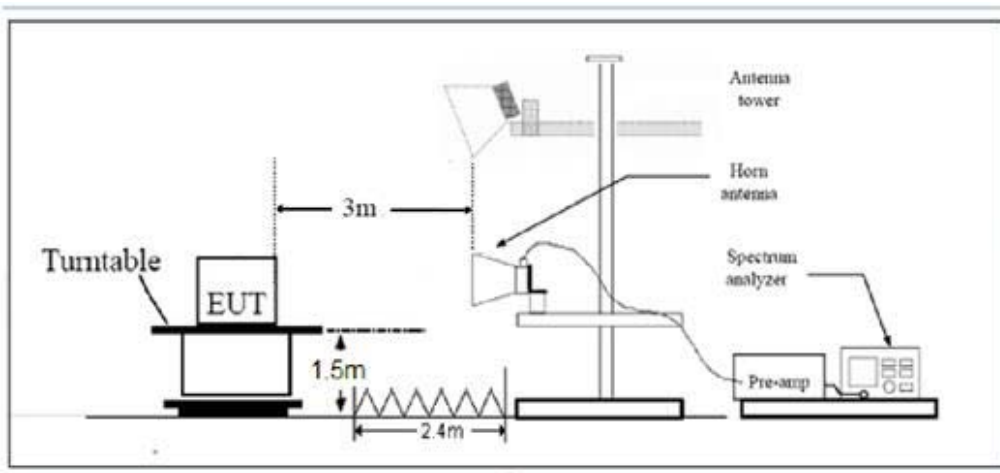
##### 9kHz~~~ 30MHz



30MHz ~ 1GHz



Above 1GHz



Note: Area side:2.4mX3.6m

**Limits**

Clause 15.225(a) the field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

Clause 15.225(b) within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

Clause 15.225(c) within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

Clause 15.225(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
0.009–0.490	2400/F(kHz)	128.519dBuV/m -93.8dBuV/m
0.490–1.705	24000/F(kHz)	73.8dBuV/m -62.969dBuV/m
1.705–30.0	30	69.5 dBuV/m



30-88	100	40 dBuV/m
88-216	150	43.5 dBuV/m
216-960	200	46 dBuV/m
Above960	500	54 dBuV/m

When using other measurement distance, according to the standard C63.10, If that point is closer to the EUT than  $\lambda/2\pi$  and the limit distance is greater than  $\lambda/2\pi$ , the data was extrapolated to the specified measurement distance of 30m using extrapolation factor as specified in §6.4.4.2. Extrapolation Factor =  $40\log(d \text{ near filed}/ d \text{ measure}) + 20\log(d \text{ limit} / d \text{ near filed})$   
 \*\*Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

§15.209 (d) The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

### Measurement Uncertainty

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

Frequency	Uncertainty
9KHz-30MHz	3.55 dB
30MHz-200MHz	4.02 dB
200MHz-1GHz	3.28 dB
Above 1GHz	3.70 dB

### Test Results

Refer to the section 6.3 of this report for test data.

### 5.4. Conducted Emission

#### Ambient condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

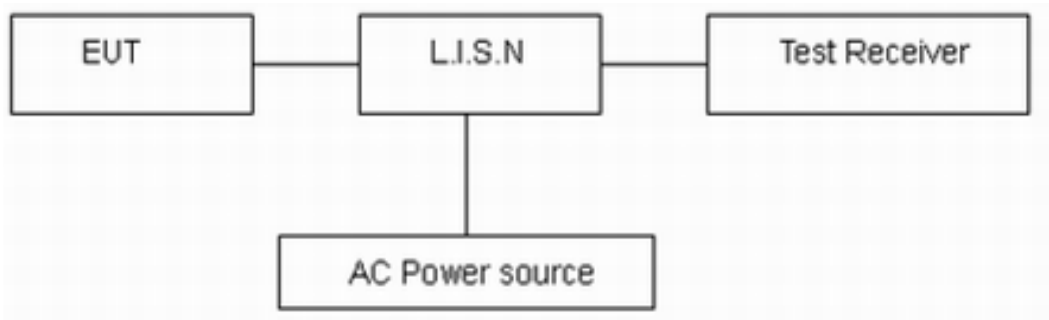
#### Methods of Measurement

The EUT is placed on a non-metallic table of 80cm height above the horizontal metal reference ground plane. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.10. Connect the AC power line of the EUT to the L.I.S.N. Use EMI receiver to detect the average and Quasi-peak value. RBW is set to 9 kHz, VBW is set to 30kHz.

The measurement result should include both L line and N line.

The test is in transmitting mode.

#### Test Setup



Note: AC Power source is used to change the voltage 110V/60Hz.

#### Limits

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency (MHz)	Conducted Limits(dBμV)	
	Quasi-peak	Average
0.15 - 0.5	66 to 56 *	56 to 46*
0.5 - 5	56	46
5 - 30	60	50

\*: Decreases with the logarithm of the frequency.





## Measurement Uncertainty

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

## Test Results

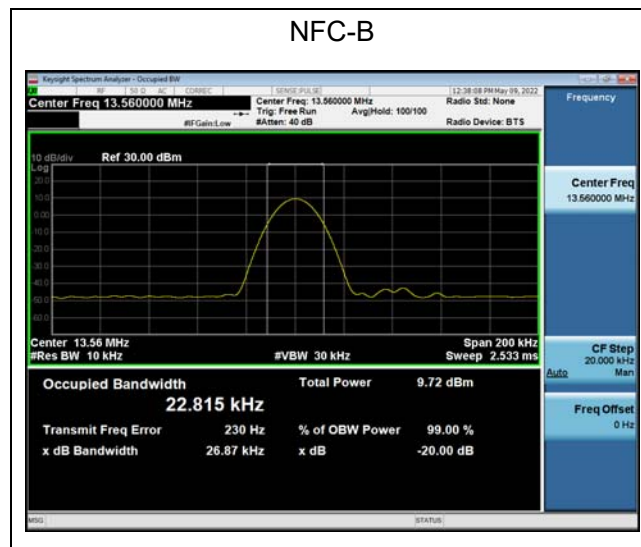
Refer to the section 6.4 of this report for test data.

## 6. Test Results

### 6.1. 20dB Bandwidth

#### NFC-B

Carrier frequency (MHz)	99% Bandwidth (kHz)	20dB Bandwidth (kHz)	Conclusion
13.56MHz	22.815	26.87	PASS





## 6.2. Frequency Stability

### NFC-B

Test status	Frequency				Tolerance (MHz)			
	13.56MHz				1min	2min	5min	10min
	1min	2min	5min	10min				
-20°C/3.89 V	13.559346	13.559349	13.559335	13.559343	0.000654	0.000651	0.000665	0.000657
-10°C/3.89 V	13.559337	13.559343	13.559327	13.559338	0.000663	0.000657	0.000673	0.000662
0°C/3.89 V	13.559327	13.559335	13.559320	13.559328	0.000673	0.000665	0.000680	0.000672
10°C/3.89 V	13.559321	13.559331	13.559312	13.559320	0.000679	0.000669	0.000688	0.000680
20°C/3.89 V	13.559312	13.559330	13.559311	13.559313	0.000688	0.000670	0.000689	0.000687
30°C/3.89 V	13.559312	13.559321	13.559302	13.559309	0.000688	0.000679	0.000698	0.000691
40°C/3.89 V	13.559306	13.559315	13.559294	13.559307	0.000694	0.000685	0.000706	0.000693
50°C/3.89 V	13.559306	13.559310	13.559288	13.559297	0.000694	0.000690	0.000712	0.000703
20°C/3.7V	13.559306	13.559306	13.559283	13.559287	0.000694	0.000694	0.000717	0.000713
20°C/4.45V	13.559302	13.559299	13.559282	13.559284	0.000698	0.000701	0.000718	0.000716

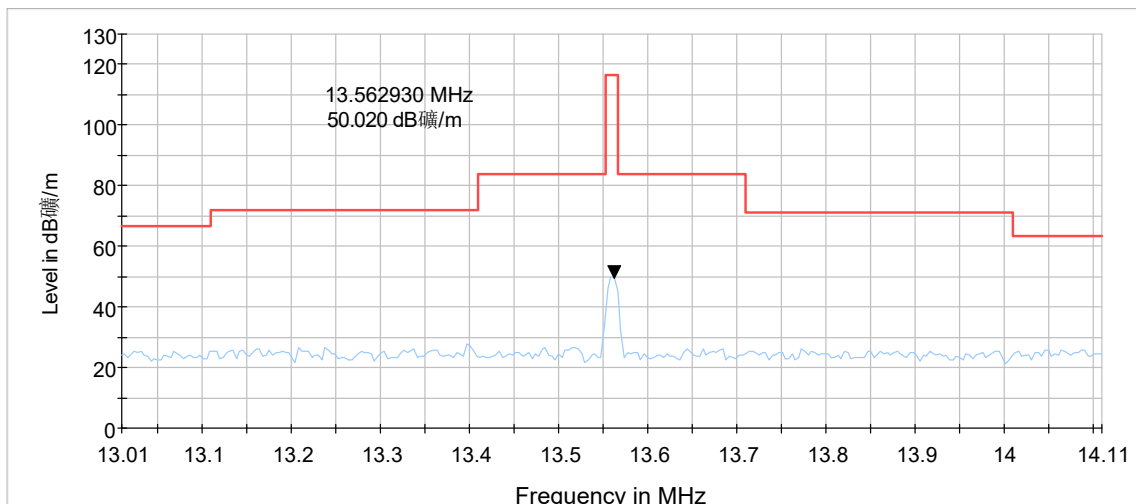
Test status	Tolerance (%)				Limit(%)	Conclusion
	1min	2min	5min	10min		
-20°C/3.89 V	0.004824	0.004799	0.004906	0.004848	0.01	PASS
-10°C/3.89 V	0.004892	0.004848	0.004964	0.004885	0.01	PASS
0°C/3.89 V	0.004961	0.004904	0.005018	0.004955	0.01	PASS
10°C/3.89 V	0.005011	0.004937	0.005070	0.005015	0.01	PASS
20°C/3.89 V	0.005072	0.004940	0.005078	0.005068	0.01	PASS
30°C/3.89 V	0.005075	0.005010	0.005151	0.005092	0.01	PASS
40°C/3.89 V	0.005115	0.005052	0.005207	0.005110	0.01	PASS
50°C/3.89 V	0.005115	0.005089	0.005251	0.005183	0.01	PASS
20°C/3.7V	0.005116	0.005122	0.005284	0.005255	0.01	PASS
20°C/4.45V	0.005147	0.005170	0.005295	0.005278	0.01	PASS

### 6.3. Radiates Emission

The test is in transmitting all mode, NFC-B was selected as the worst condition. The test data of the worst-case condition was recorded in this report.

A font (Level in dB $\mu$ V/m) in the test plot = (level in dB  $\mu$  V/m)

#### In-band

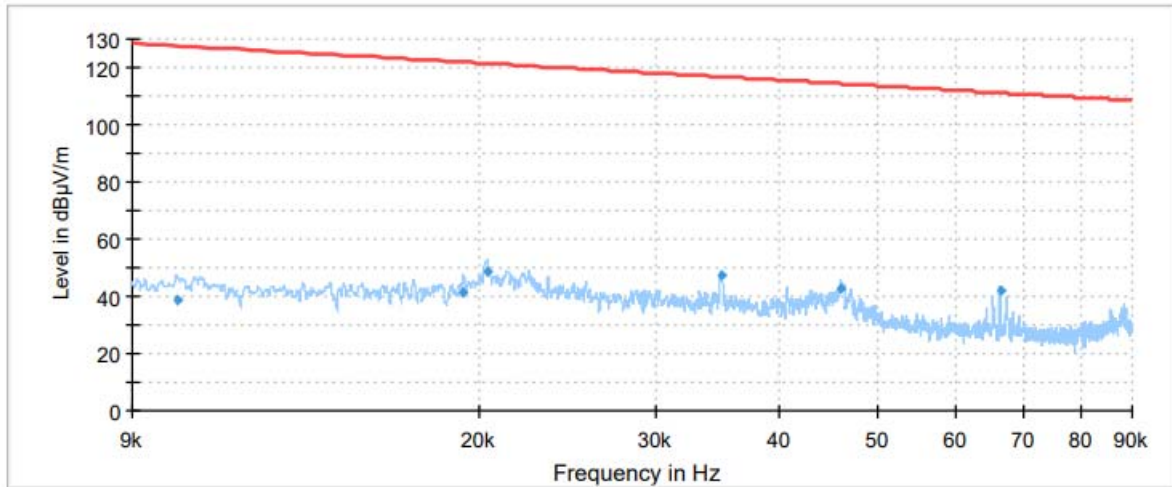


Radiates Emission from 13.11MHz to 14.01MHz

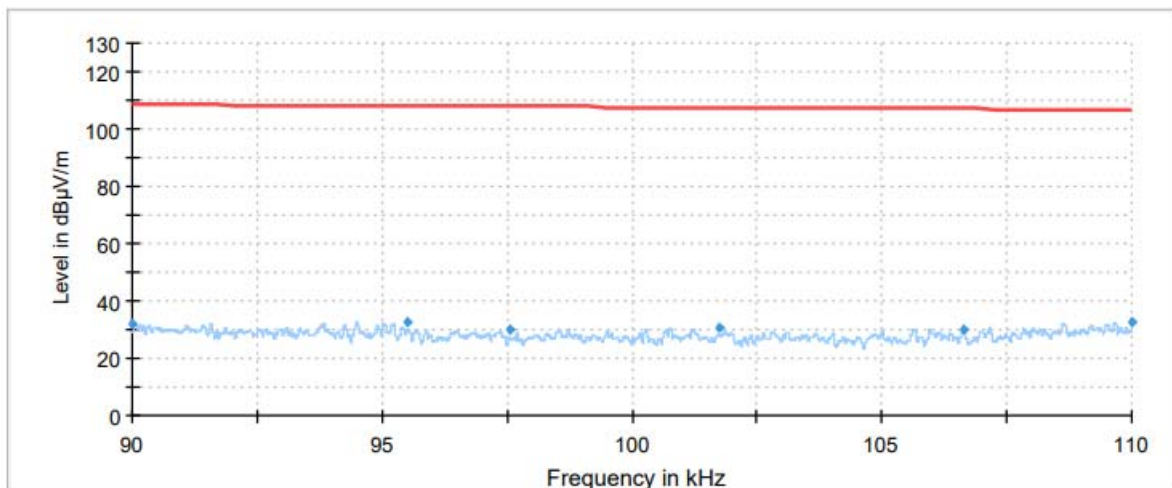
Note: This graph displays the maximum values of horizontal and vertical by software

**Out-of-band**

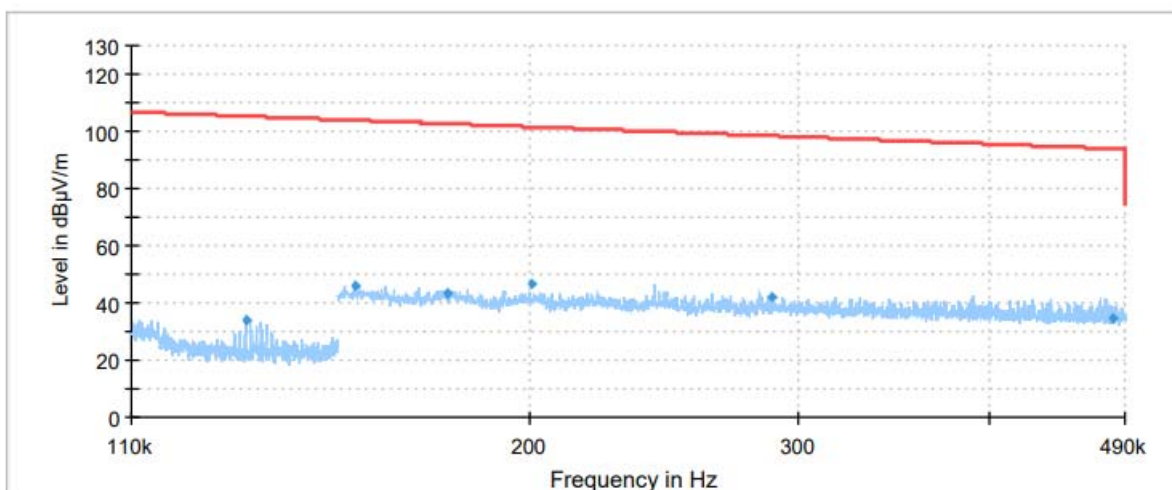
The following graphs display the maximum values of horizontal and vertical by software.  
 For above 1GHz, Blue trace uses the peak detection, Green trace uses the average detection.



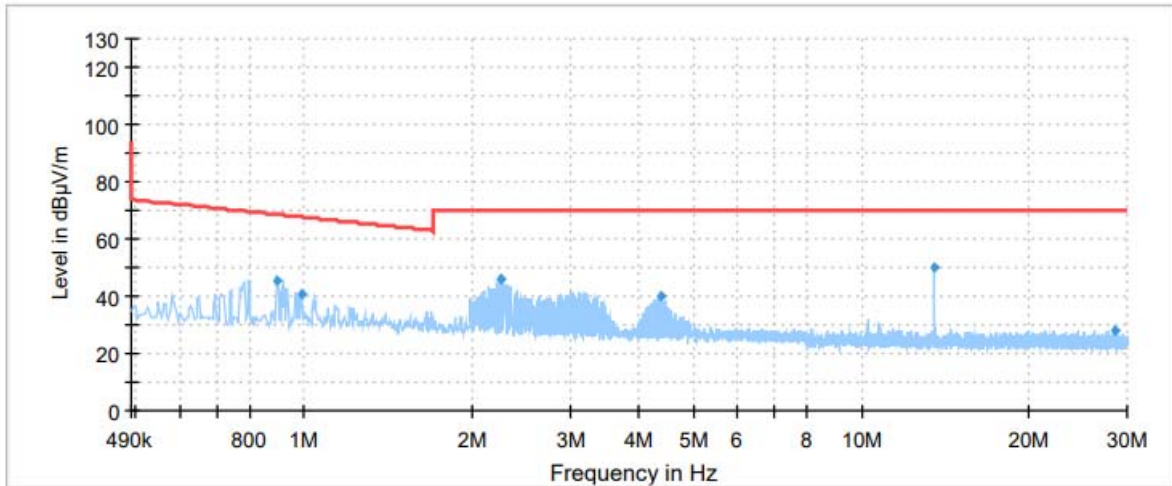
Radiates Emission from 9kHz to 90kHz



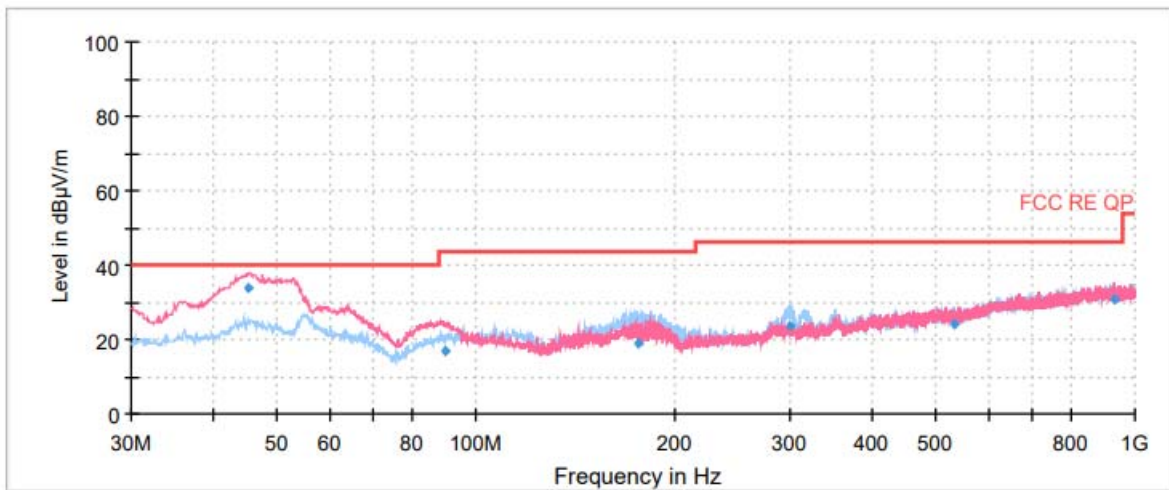
Radiates Emission from 90kHz to 110kHz



Radiates Emission from 110kHz to 490kHz



Radiates Emission from 490kHz to 30MHz



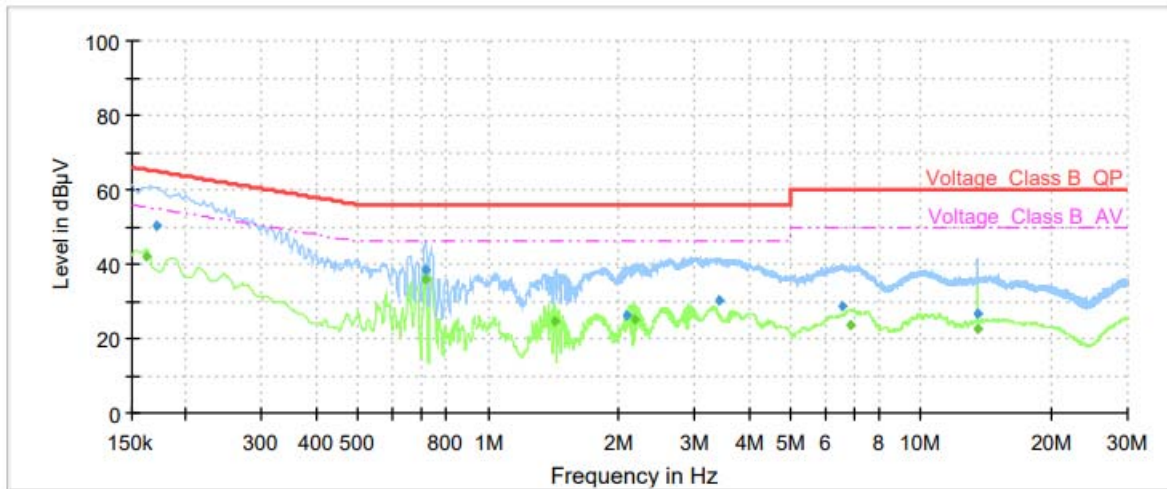
Radiates Emission from 30MHz to 1GHz

Note: This graph displays the maximum values of horizontal and vertical by software

Frequency (MHz)	Quasi-Peak (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
45.24	33.71	125.0	V	0.00	14	6.29	40.00
89.65	16.89	100.0	V	338.00	11	26.61	43.50
175.86	18.88	179.0	H	90.00	10	24.62	43.50
299.70	23.40	100.0	H	64.00	15	22.60	46.00
531.40	24.32	113.0	H	24.00	20	21.68	46.00
927.98	30.65	225.0	V	0.00	25	15.35	46.00

### 6.4. Conducted Emission

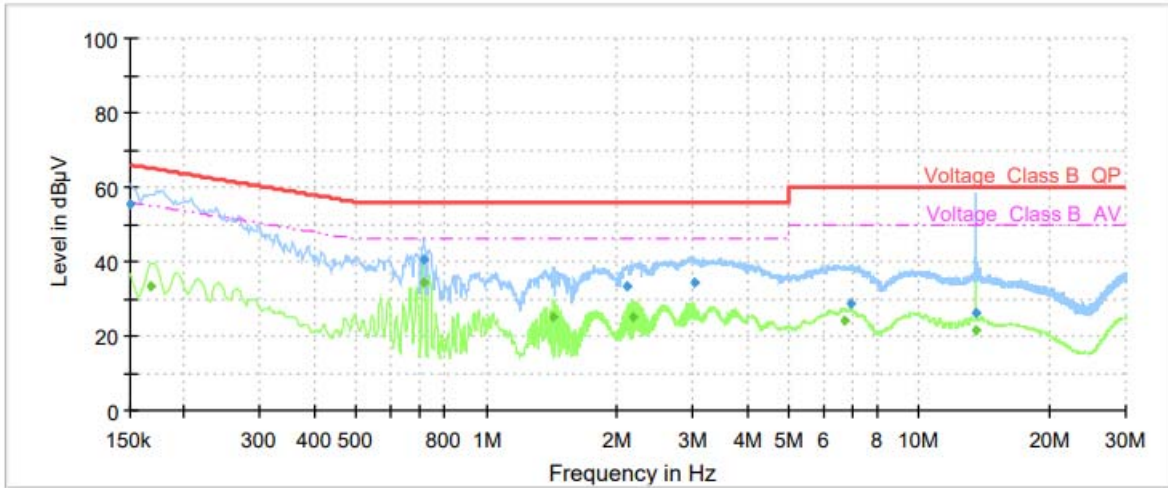
Following plots, Blue trace uses the peak detection and Green trace uses the average detection.



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.16	---	42.28	55.40	13.12	1000.00	9.000	L1	ON	21
0.17	50.09	---	64.95	14.86	1000.00	9.000	L1	ON	21
0.71	---	35.71	46.00	10.29	1000.00	9.000	L1	ON	20
0.72	38.58	---	56.00	17.42	1000.00	9.000	L1	ON	20
1.43	---	24.75	46.00	21.25	1000.00	9.000	L1	ON	20
2.08	26.23	---	56.00	29.77	1000.00	9.000	L1	ON	20
2.17	---	25.34	46.00	20.66	1000.00	9.000	L1	ON	20
3.40	30.06	---	56.00	25.94	1000.00	9.000	L1	ON	19
6.59	28.93	---	60.00	31.07	1000.00	9.000	L1	ON	19
6.86	---	23.42	50.00	26.58	1000.00	9.000	L1	ON	20
13.56	---	22.54	50.00	27.46	1000.00	9.000	L1	ON	20
13.56	26.89	---	60.00	33.11	1000.00	9.000	L1	ON	20

**Remark: Correct factor=cable loss + LISN factor**

L line Conducted Emission from 150 KHz to 30 MHz



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.15	55.42	---	66.00	10.58	1000.00	9.000	N	ON	21
0.17	---	33.22	55.06	21.84	1000.00	9.000	N	ON	21
0.71	---	34.26	46.00	11.74	1000.00	9.000	N	ON	20
0.72	40.62	---	56.00	15.38	1000.00	9.000	N	ON	20
1.43	---	25.28	46.00	20.72	1000.00	9.000	N	ON	20
2.11	33.38	---	56.00	22.62	1000.00	9.000	N	ON	20
2.17	---	25.25	46.00	20.75	1000.00	9.000	N	ON	20
3.02	34.52	---	56.00	21.48	1000.00	9.000	N	ON	19
6.68	---	24.04	50.00	25.96	1000.00	9.000	N	ON	20
6.91	28.65	---	60.00	31.35	1000.00	9.000	N	ON	20
13.56	---	21.28	50.00	28.72	1000.00	9.000	N	ON	20
13.56	26.31	---	60.00	33.69	1000.00	9.000	N	ON	20

Remark: Correct factor=cable loss + LISN factor

N line Conducted Emission from 150 KHz to 30 MHz





## 7. Main Test Instruments

Name	Manufacturer	Type	Serial Number	Calibration Date	Expiration Time
Spectrum Analyzer	R&S	FSV30	100815	2021-12-12	2022-12-11
DC Power Supply	GWINSTEK	GPS-3030D	GEP882653	2021-05-15	2022-05-14
EMI Test Receiver	R&S	ESCI	100948	2021-05-15	2022-05-14
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2020-04-02	2023-04-01
TRILOG Broadband Antenna	SCHWARZBECK	VULB 9163	391	2019-12-16	2022-12-15
EMI Test Receiver	R&S	ESR	101667	2021-05-16	2022-05-15
LISN	R&S	ENV216	101171	2020-12-13	2022-12-12
Spectrum Analyzer	Agilent	N9020A	MY52330084	2021-05-15	2022-05-14
TEMPERATURE CHAMBER	WEISS	VT4002	582261194500 10	2021-05-15	2022-05-14
RF Cable	Agilent	SMA 15cm	0001	2021-12-07	2022-06-06
Software	R&S	EMC32	9.26.0	/	/

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



## **ANNEX A: The EUT Appearance**

The EUT Appearance is submitted separately.



## **ANNEX B: Test Setup Photos**

**The Test Setup Photos is submitted separately.**