



# EMC TEST REPORT

**Applicant** ZTE Corporation  
**FCC ID** SRQ-WF821B  
**Product** LTE CPE  
**Brand** ZTE  
**Model** WF821/WF821A/WF821+  
**Report No.** RXA1711-0382EMC  
**Issue Date** December 15, 2017

TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **FCC Code CFR47 Part15B (2017)/ ANSI C63.4 (2014)**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

*Wei Liu*

*Guangchang Fan*

*Performed by: Wei Liu/ Manager*

*Approved by: Guangchang Fan/ Director*

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### Summary of measurement results

Number	Test Case	Clause in FCC Rules	Conclusion
1	Radiated Emission	15.109, ANSI C63.4-2014	PASS
2	Conducted Emission	15.107, ANSI C63.4-2014	PASS
Date of Testing: December 1, 2017 ~ December 11, 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.

## 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 (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.

### **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-10766)**

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

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

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



### 1.3 Testing Location

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

### 2.1 Client Information

<b>Applicant</b>	ZTE Corporation
<b>Applicant address</b>	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China
<b>Manufacturer</b>	ZTE Corporation
<b>Manufacturer address</b>	ZTE Plaza, Keji Road South, Hi-Tech, Industrial Park, Nanshan District, Shenzhen, Guangdong, P.R.China

### 2.2 General information

EUT Description	
Device Type:	Portable Device
Product Name:	LTE CPE
Model Number:	WF821/WF821A/WF821+
IMEI:	6212017480400004
HW Version:	V5.0
SW Version:	WF821_V1.0.0B01
Antenna Type:	Internal Antenna
Test Mode:	EUT with PC Idle Mode
EUT Accessory	
Adapter	Manufacturer: AQUILSTARPRECISIONINDUSTRIAL(SHENZHEN)CO., LTD Model: ASSA65A-120100
Auxiliary test equipment	
PC	PC Manufacturer: Dell Model: E5430 (SN : R98M9 A02)
Remark: The information of the EUT is declared by the manufacturer.	



## 2.3 Applied Standards

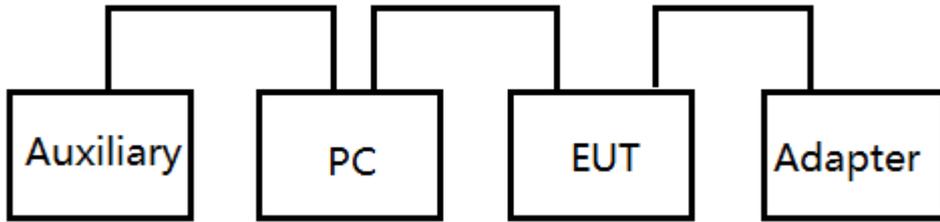
According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

### Test standards

**FCC Code CFR47 Part15B (2017)**

**ANSI C63.4 (2014)**

## 2.4 Test Configuration



### 3 Test Case Results

#### 3.1 Radiated Emission

##### Ambient condition

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

##### Methods of Measurement

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The distance between EUT and receive antenna should be 3 meters. During the test, the EUT was operating in its typical mode. The test method is according to ANSI C63.4-2014. Sweep the whole frequency band through the range from 30MHz to the 5th harmonic of the carrier. During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated signal level.

The data of cable loss and antenna factor has been calibrated in full testing frequency range before the testing. During the test, the EUT is worked at maximum output power.

Set the spectrum analyzer in the following:

Below 1GHz:

RBW=100 kHz / VBW=300 kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=1MHz / VBW=3MHz/ Sweep=AUTO

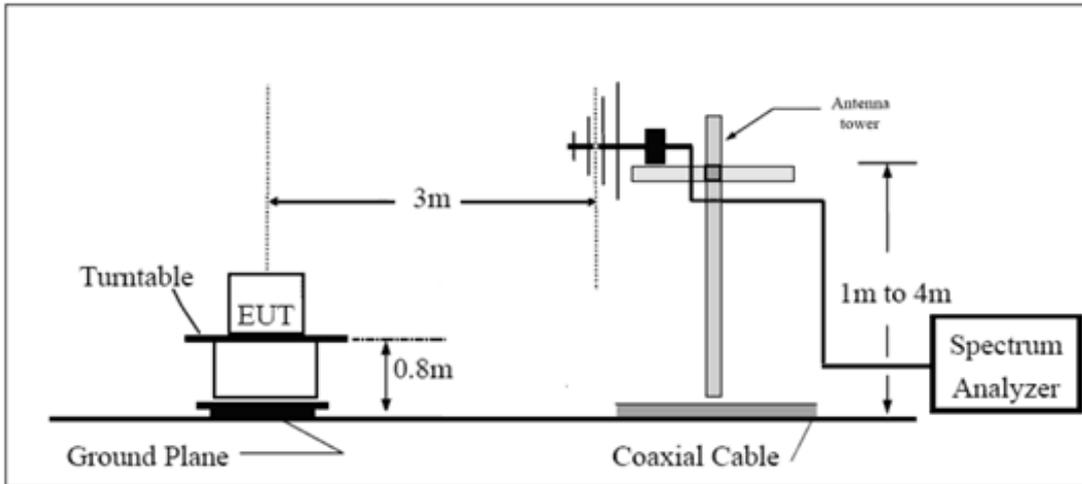
(b) AVERAGE: RBW=1MHz / VBW=3MHz / Sweep=AUTO

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

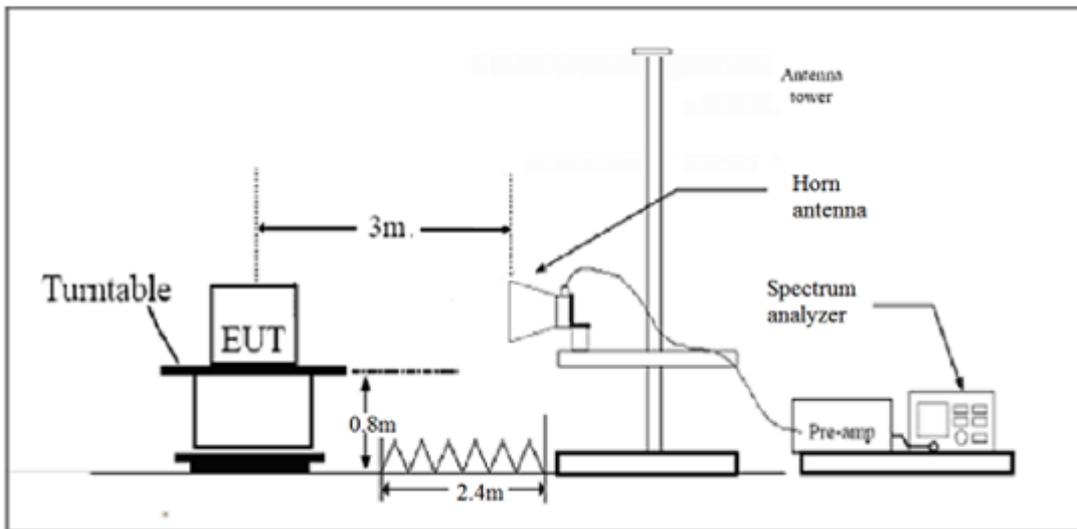
During the test, EUT connected power supply, and EUT is connected to a laptop via a network cable in the case of communication.

**Test Setup**

**Below 1GHz**



**Above 1GHz**



Note: Area side:2.4mX3.6m

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

**Limits**

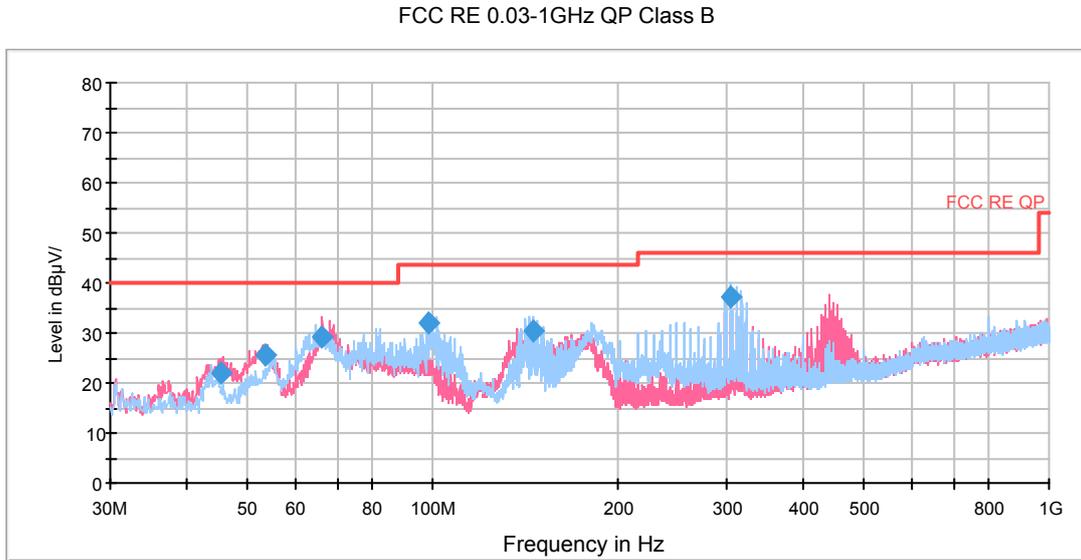
Frequency (MHz)	Field Strength (dB $\mu$ V/m)	Detector
30 -88	40.0	Quasi-peak
88-216	43.5	Quasi-peak
216 – 960	46.0	Quasi-peak
960-1000	54.0	Quasi-peak
1000-5 <sup>th</sup> harmonic of the highest frequency or 40GHz, which is lower	54 74	Average Peak

**Measurement Uncertainty**

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .  $U = 3.704$  dB.

**Test Results**

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.

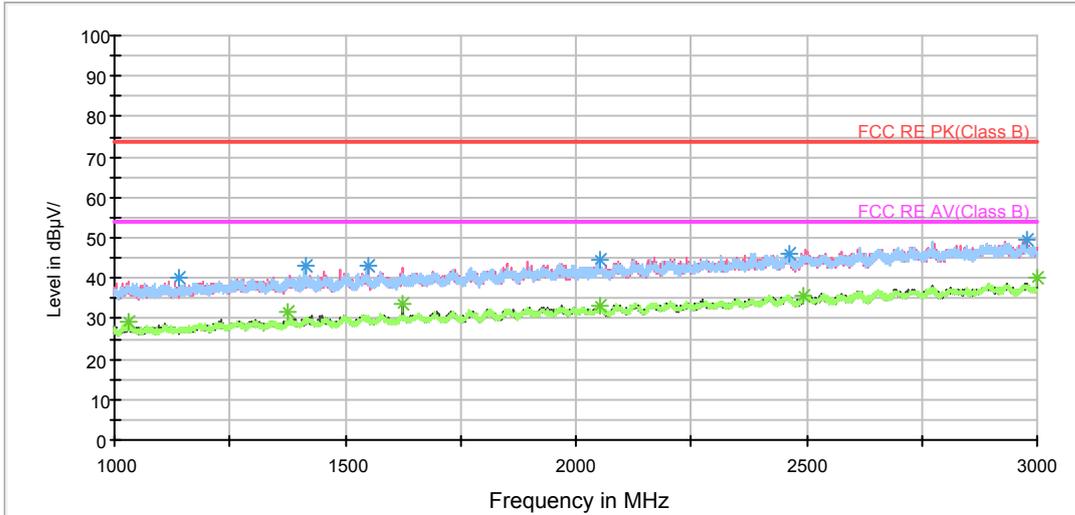


Radiated Emission from 30MHz to 1GHz

Frequency (MHz)	Quasi-Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
45.274000	22.1	8.9	100.0	V	169.0	13.2	17.9	40.0
53.589000	25.7	12.9	100.0	V	160.0	12.8	14.3	40.0
66.278000	29.2	19.0	100.0	V	306.0	10.2	10.8	40.0
98.425000	31.9	18.8	400.0	H	217.0	13.1	11.6	43.5
145.276000	30.4	21.4	175.0	H	103.0	9.0	13.1	43.5
303.774000	37.0	21.2	100.0	H	323.0	15.8	9.0	46.0

- Remark:**
1. Quasi-Peak = Reading value + Correction factor
  2. Correction Factor = Antenna factor+ Insertion loss(cable loss+amplifier gain)
  3. Margin = Limit – Quasi-Peak

RE 1G-3GHz PK+AV

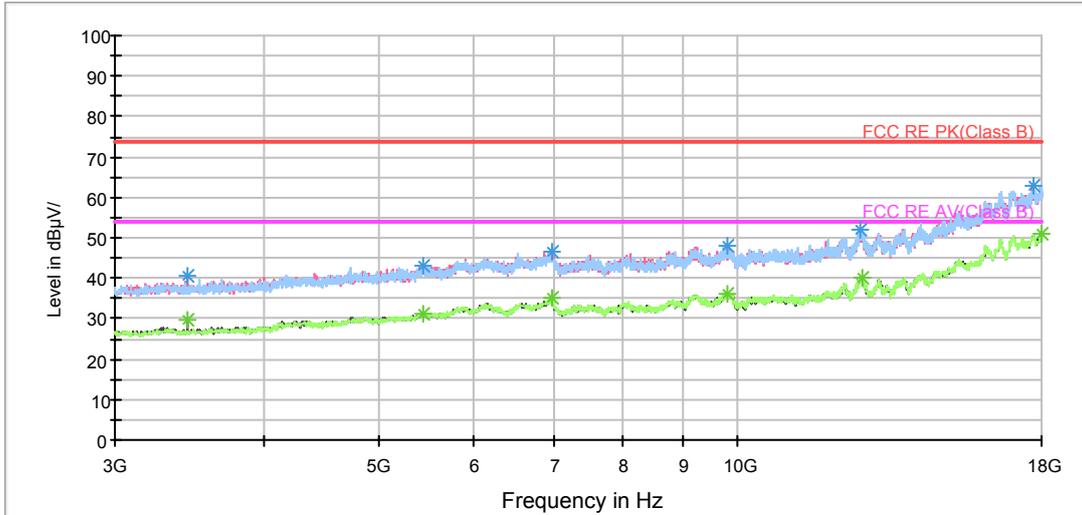


Radiated Emission from 1GHz to 3GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1141.500000	40.1	48.6	100.0	H	126.0	-8.5	33.9	74
1414.500000	43.2	50.2	100.0	H	155.0	-7.0	30.8	74
1549.250000	43.0	49.3	100.0	V	178.0	-6.3	31.0	74
2052.250000	44.4	47.6	100.0	H	100.0	-3.2	29.6	74
2460.750000	46.2	46.7	100.0	V	335.0	-0.5	27.8	74
2976.250000	49.5	47.3	100.0	V	160.0	2.2	24.5	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
1028.750000	29.2	38.3	100.0	H	143.0	-9.1	24.8	54
1375.000000	31.8	38.9	100.0	H	208.0	-7.1	22.2	54
1625.750000	33.8	38.6	100.0	V	0.0	-4.8	20.2	54
2052.750000	33.1	36.3	100.0	V	143.0	-3.2	20.9	54
2495.000000	35.9	35.8	100.0	V	275.0	0.1	18.1	54
3000.000000	40.3	38.0	100.0	V	335.0	2.3	13.7	54

RE 3-18GHz PK+AV



Radiated Emission from 3GHz to 18GHz

Frequency (MHz)	Peak (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3450.000000	40.6	42.8	150.0	V	275.0	-2.2	33.4	74
5446.875000	42.9	40.1	150.0	V	335.0	2.8	31.1	74
6995.625000	46.3	39.8	150.0	V	287.0	6.5	27.7	74
9787.500000	48.1	38.2	150.0	V	275.0	9.9	25.9	74
12697.500000	52.2	38.1	150.0	V	0.0	14.1	21.8	74
17700.000000	62.9	38.2	150.0	V	0.0	24.7	11.1	74

Frequency (MHz)	Average (dBuV/m)	Reading value (dBuV/m)	Height (cm)	Polarization	Azimuth (deg)	Correct Factor (dB)	Margin (dB)	Limit (dBuV/m)
3450.000000	29.5	31.7	150.0	V	275.0	-2.2	24.5	54
5435.625000	31.3	28.4	150.0	V	214.0	2.9	22.7	54
6995.625000	35.1	28.6	150.0	V	287.0	6.5	18.9	54
9795.000000	36.2	26.3	150.0	H	2.0	9.9	17.8	54
12706.875000	40.1	26.1	150.0	V	359.0	14.0	13.9	54
17996.250000	51.0	25.6	150.0	H	296.0	25.4	3.0	54

### 3.2 Conducted Emission

#### Ambient condition

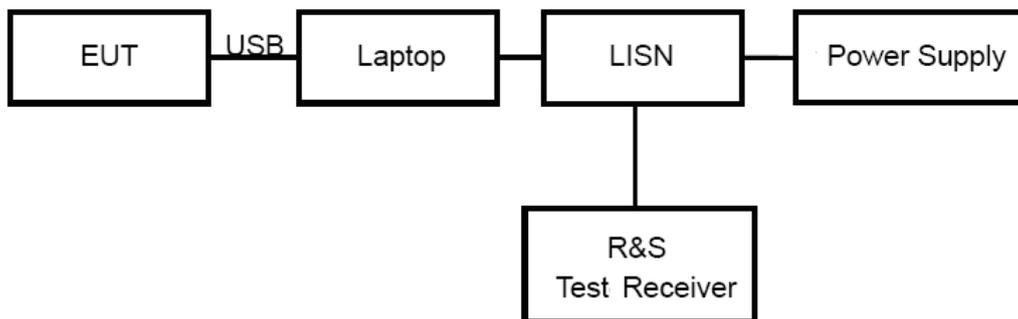
Temperature	Relative humidity	Pressure
24°C ~26°C	50%~55%	102.5kPa

#### Methods of Measurement

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

During the test, EUT connected power supply, and EUT is connected to a laptop via a network cable in the case of communication.

#### Test Setup



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

#### Limits

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

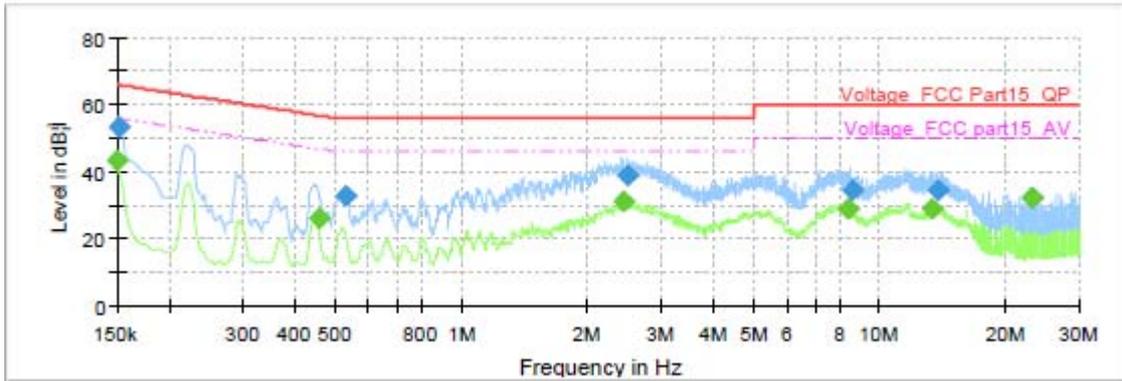
\*: Decreases with the logarithm of the frequency.

#### Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor  $k = 1.96$ .  $U = 2.57\text{dB}$ .

**Test Results**

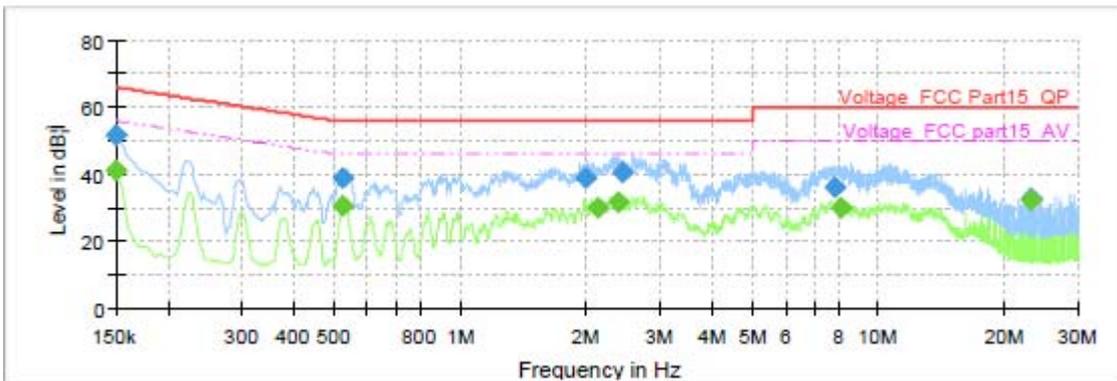
Following plots, Blue trace uses the peak detection; Green trace uses the average detection.



Frequency (MHz)	QuasiPeak (dB; iV)	Average (dB; iV)	Limit (dB; iV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	---	43.15	56.00	12.85	1000.0	9.000	L1	ON	19.6
0.152250	53.33	---	65.88	12.55	1000.0	9.000	L1	ON	19.6
0.456000	---	25.90	46.77	20.86	1000.0	9.000	L1	ON	19.6
0.530250	32.83	---	56.00	23.17	1000.0	9.000	L1	ON	19.6
2.449500	---	31.17	46.00	14.83	1000.0	9.000	L1	ON	19.6
2.508000	39.12	---	56.00	16.88	1000.0	9.000	L1	ON	19.6
8.373750	---	29.16	50.00	20.84	1000.0	9.000	L1	ON	19.8
8.614500	34.33	---	60.00	25.67	1000.0	9.000	L1	ON	19.8
13.393500	---	28.68	50.00	21.32	1000.0	9.000	L1	ON	19.9
13.789500	34.61	---	60.00	25.39	1000.0	9.000	L1	ON	20.0
23.127000	---	32.25	50.00	17.75	1000.0	9.000	L1	ON	20.0
23.129250	32.23	---	60.00	27.77	1000.0	9.000	L1	ON	20.0

L line

Conducted Emission from 150 KHz to 30 MHz



Frequency (MHz)	QuasiPeak (dB; iV)	Average (dB; iV)	Limit (dB; iV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.150000	---	40.93	56.00	15.07	1000.0	9.000	N	ON	19.7
0.150000	51.86	---	66.00	14.14	1000.0	9.000	N	ON	19.7
0.521250	---	30.74	46.00	15.26	1000.0	9.000	N	ON	19.6
0.525750	38.67	---	56.00	17.33	1000.0	9.000	N	ON	19.6
1.999500	38.80	---	56.00	17.20	1000.0	9.000	N	ON	19.6
2.127750	---	30.08	46.00	15.92	1000.0	9.000	N	ON	19.6
2.395500	---	31.49	46.00	14.51	1000.0	9.000	N	ON	19.6
2.433750	40.51	---	56.00	15.49	1000.0	9.000	N	ON	19.6
7.896750	36.17	---	60.00	23.83	1000.0	9.000	N	ON	19.7
8.106000	---	29.96	50.00	20.04	1000.0	9.000	N	ON	19.7
23.127000	---	32.30	50.00	17.70	1000.0	9.000	N	ON	19.9
23.127000	32.52	---	60.00	27.48	1000.0	9.000	N	ON	19.9

N line

Conducted Emission from 150 KHz to 30 MHz

## 4 Main Test Instrument

Name	Manufacturer	Type	Serial Number	Last Cal.	Cal. Due Date
Signal Analyzer	R&S	FSV30	100815	2016-12-16	2017-12-15
EMI Test Receiver	R&S	ESCI	100948	2017-05-20	2018-05-19
Loop Antenna	SCHWARZBECK	FMZB1519	1519-047	2017-02-18	2019-02-17
Trilog Antenna	SCHWARZBECK	VULB 9163	9163-201	2017-11-18	2020-11-17
Horn Antenna	R&S	HF907	100126	2014-12-06	2019-12-05
Horn Antenna	ETS-Lindgren	3160-09	00102643	2015-01-30	2018-01-29
EMI Test Receiver	R&S	ESCS30	100138	2016-12-16	2017-12-15
LISN	R&S	ENV216	101171	2016-12-16	2019-12-15
Bore Sight Antenna mast	ETS	2171B	00058752	NA	NA
Test software	EMC32	R&S	V9.26.0	NA	NA

## ANNEX A: The EUT Appearance and Test Configuration

### A.1 EUT Appearance



Front Side



Back Side

a: EUT



b: Adapter  
Picture 1 EUT

## A.2 Test Setup



a: Below 1GHz



b: Above 1GHz

**Picture 2 Radiated Emission Test Setup**



**Picture 3 Conducted Emission Test Setup**

### A.3 Auxiliary test equipment

