



# TEST REPORT

No. I19Z62252-EMC01

for

**TCL Communication Ltd.**

**LTE Mobile WiFi Router**

**Model Name: MW43TM**

**FCC ID: 2ACCJB117**

with

**Hardware Version: 03**

**Software Version: MW43\_ZZ\_02.00\_01**

**Issued Date: 2020-02-20**

**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

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

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: [ctl\\_terminals@caict.ac.cn](mailto:ctl_terminals@caict.ac.cn), website: [www.caict.ac.cn](http://www.caict.ac.cn)



## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I19Z62252-EMC01	Rev.0	1 <sup>st</sup> edition	2020-02-20

Note: the latest revision of the test report supersedes all previous version.

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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 (CN0066). The detail accreditation scope can be found on NVLAP website.

## **2. Test Laboratory**

### **2.1. Testing Location**

#### **CTTL(huayuan North Road)**

Address: No. 52, Huayuan North Road, Haidian District, Beijing,  
P. R. China100191

#### **CTTL(BDA)**

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

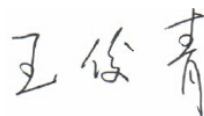
### **2.2. Testing Environment**

Normal Temperature: 15-35° C  
Relative Humidity: 20-75%

### **2.3. Project data**

Testing Start Date: 2020-01-09  
Testing End Date: 2020-02-20

### **2.4. Signature**



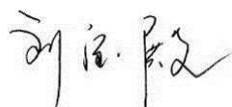
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**Wang Junqing**  
**(Prepared this test report)**



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**Zhang Ying**  
**(Reviewed this test report)**



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**Liu Baodian**  
**Deputy Director of the laboratory**  
**(Approved this test report)**



### **3. Client Information**

#### **3.1. Applicant Information**

Company Name: TCL Communication Ltd.  
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong  
Contact Person Gong Zhizhou  
Contact Email zhizhou.gong@tcl.com  
Telephone: 0086-755-36611722  
Fax: 0086-755-36612000-81722

#### **3.2. Manufacturer Information**

Company Name: TCL Communication Ltd.  
Address: 5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong  
Contact Person Gong Zhizhou  
Contact Email zhizhou.gong@tcl.com  
Telephone: 0086-755-36611722  
Fax: 0086-755-36612000-81722

## **4. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

### **4.1. About EUT**

Description	LTE Mobile WiFi Router
Model Name	MW43TM
FCC ID	2ACCJB117
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 3.8VDC)

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of CTTL, Telecommunication Technology Labs, CAICT.

### **4.2. Internal Identification of EUT used during the test**

<b>EUT ID*</b>	<b>SN or IMEI</b>	<b>HW Version</b>	<b>SW Version</b>
EUT1	015659000001186	03	MW43_ZZ_02.00_01

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

### **4.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>	<b>SN</b>	<b>Remarks</b>
AE1	Battery	/	/
AE3	Charger	/	CH001/004
AE5	USB Cable	/	DC012/022

#### AE1

Model	TLi043F1/CAB4300004C1
Manufacturer	Shenzhen BYD Lithium Battery Company Limited
Capacitance	4400mAh
Nominal voltage	3.7 V

#### AE3

Model	UC13US
Manufacturer	Huizhou Puan Electronics Co., Ltd
Length of cable	/

#### AE5

Model	CDA0000123C2
Manufacturer	SHENGHUA
Length of cable	/

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

Note: The USB cables are shielded.



#### 4.4. EUT set-ups

<b>EUT set-up No.</b>	<b>Combination of EUT and AE</b>	<b>Remarks</b>
Set.1	EUT1+ AE1+ AE3+ AE5	Charger with 2G/3G/4G receiver mode

Note:

The device supports GSM 850/1900/900/1800 and UMTS FDD Band 1/2/4/5 and E-UTRA FDD Band 2/4/5/12/25/26/66/71 and TDD Band 41. It has WLAN (802.11a/b/g/n/ac, 802.11n supports 20MHz and 40MHz bandwidth, 802.11ac supports 20MHz and 40MHz and 80MHz bandwidth) functions.

The device contains receivers which tune and operate between 30MHz-960MHz in the following bands: GSM850, WCDMA850 and LTE Band 5/12/26/71. All licensed band receivers that tune in the range of 30MHz-960MHz are investigated, only the worst case emissions are reported.

## **5. Reference Documents**

### **5.1. Reference Documents for testing**

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

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 15, Subpart B	Radio frequency devices - Unintentional Radiators	2016
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

Note: The test methods have no deviation with standards.



## 6. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-2 (10 meters×6.7meters×6.1meters) 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	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 10 m distance
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

**Shielded room** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz, >60dB; 1MHz—1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

## 7. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	NA	Not applicable
	F	Fail

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	CTTL(BDA)
2	Conducted Emission	15.107(a)	B.2	P	CTTL(huayuan North Road)

## 8. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	Rohde & Schwarz	1 year	2020-10-30
2	BiLog Antenna	VULB9163	9163-514	Schwarzbeck	1 year	2020-03-02
3	Dual-Ridge Waveguide Horn Antenna	3117	00139065	ETS-Lindgren	1 year	2020-11-10
4	EMI Antenna	3116	2663	ETS-Lindgren	1 Year	2020-05-31
5	Vector Signal Analyzer	FSV40	101047	Rohde & Schwarz	1 year	2020-05-16
6	Universal Radio Communication Tester	CMW500	159408	R&S	1 year	2020-03-03
7	Test Receiver	ESCI3	100344	R&S	1 year	2020-03-14
8	LISN	ENV216	101200	R&S	1 year	2020-03-14

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 Radiated Emission**

#### **Reference**

FCC: CFR Part 15.109(a).

#### **A.1.1 Method of measurement**

The field strength of radiated emissions from the unintentional radiator (USB mode of MS and charging mode of MS) at distances of 10 meters (for 30MHz-1GHz) and 3 meters (for above 1GHz) is tested. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 8.3.

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3/10 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

#### **A.1.2 EUT Operating Mode**

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

#### **A.1.3 Measurement Limit**

Frequency range (MHz)	Field strength limit ( $\mu\text{V}/\text{m}$ )		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

Note: the above limit is for 3 meters test distance. 10 meters' limit is got by converting.

#### **A.1.4 Test Condition**

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/1MHz	15	Peak, Average

### A.1.5 Measurement Results

A "reference path loss" is established and the  $A_{Rpl}$  is the attenuation of "reference path loss". It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}} = P_{\text{Mea}} + G_A + G_{\text{PL}}$$

Where

$G_A$ : Antenna factor of receive antenna

$G_{\text{PL}}$ : Path Loss

$P_{\text{Mea}}$ : Measurement result on receiver.

Measurement uncertainty (worst case):  $U = 5.44 \text{ dB}$ ,  $k=2$ .

#### Measurement results for Set.1:

##### Charging Mode/Average detector

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17019.000	41.7	-26.6	41.7	26.58	54.0	12.3	V
16944.000	41.6	-27.1	41.7	27.03	54.0	12.4	V
17903.500	41.6	-26.2	41.3	26.49	54.0	12.4	V
16960.000	41.6	-27.0	41.7	26.90	54.0	12.4	H
17079.500	41.6	-26.2	41.6	26.16	54.0	12.4	V
16948.000	41.6	-27.0	41.7	26.96	54.0	12.4	V

##### Charging Mode/Peak detector

Frequency (MHz)	Measurement Result (dB $\mu$ V/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dB $\mu$ V)	Limit (dB $\mu$ V/m)	Margin (dB)	Antenna Pol. (H/V)
17460.500	54.9	-26.3	41.2	39.96	74.0	19.1	V
17650.500	54.8	-26.5	41.2	40.06	74.0	19.2	H
17154.000	54.2	-26.2	41.5	38.88	74.0	19.8	H
17097.000	54.0	-26.1	41.6	38.45	74.0	20.0	H
17049.500	54.0	-26.4	41.6	38.70	74.0	20.0	V
17748.000	53.9	-26.5	41.2	39.23	74.0	20.1	H

### Charging Mode, Set.1

15B RE 30MHz-1GHz

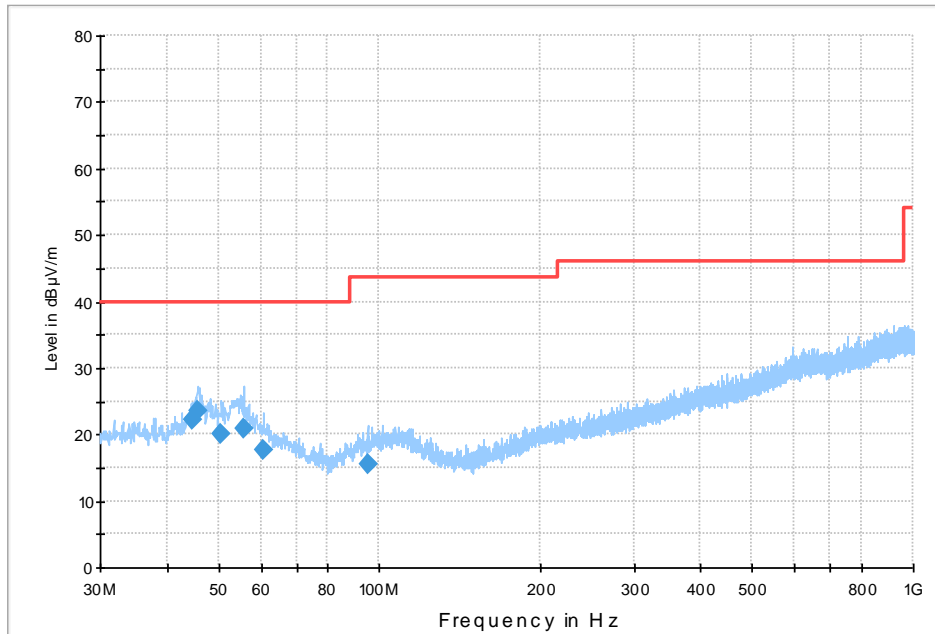
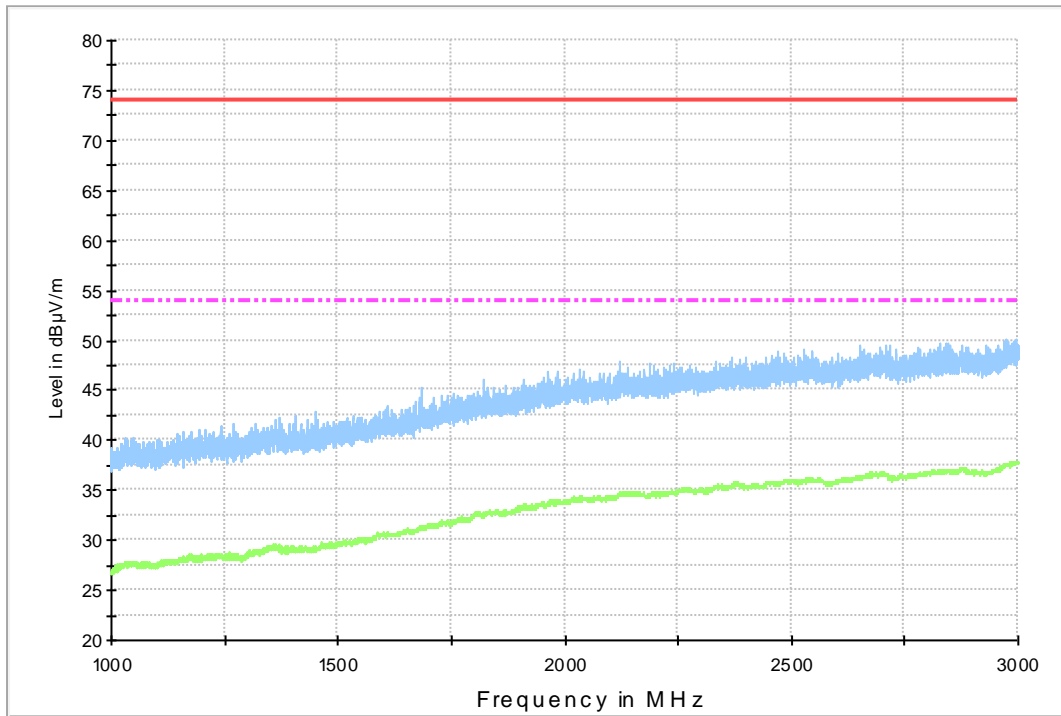


Fig A.1 Radiated Emission from 30MHz to 1GHz

### Final\_Result

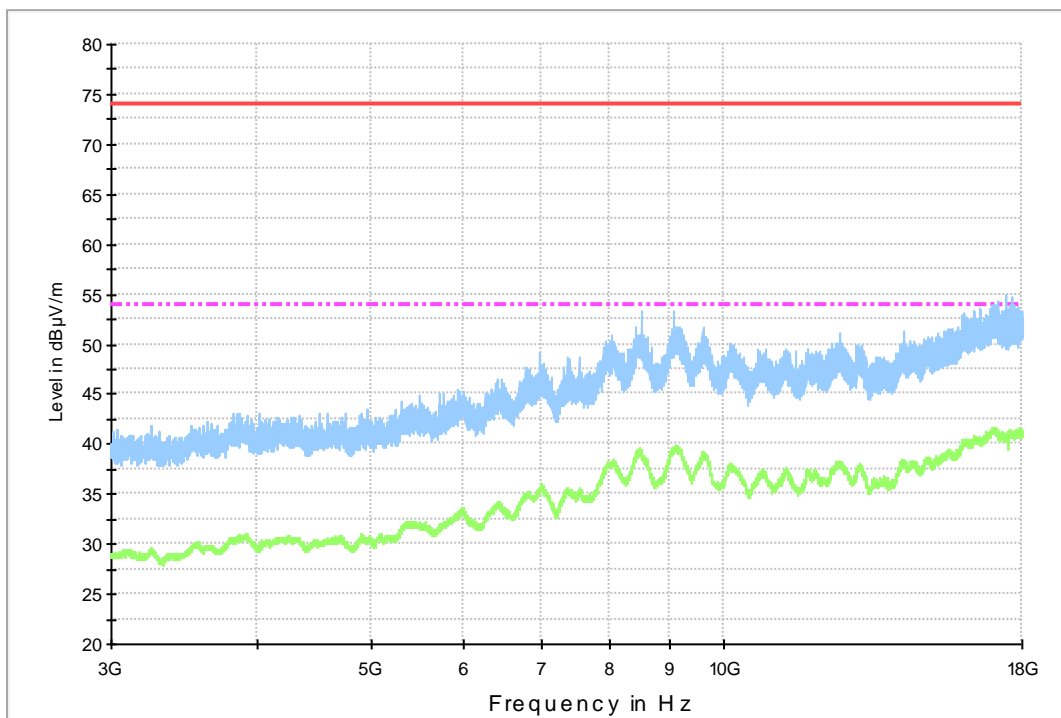
Frequency (MHz)	QuasiPeak (dBµV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dBµV/m)	Comment
44.550000	22.2	100.0	V	-36.0	-1.2	17.8	40.0	
45.811000	23.5	100.0	V	-29.0	-0.8	16.5	40.0	
50.661000	20.0	118.0	H	47.0	0.3	20.0	40.0	
55.802000	21.0	110.0	V	16.0	-0.8	19.0	40.0	
60.652000	17.7	100.0	H	-15.0	-1.8	22.3	40.0	
94.990000	15.5	119.0	H	33.0	-3.7	28.0	43.5	

15B RE - 1GHz-3GHz



**Fig A.2 Radiated Emission from 1GHz to 3GHz**

15b RE - 3GHz-18GHz



**Fig A.3 Radiated Emission from 3GHz to 18GHz**

## A.2 Conducted Emission

### Reference

FCC: CFR Part 15.107(a).

### A.2.1 Method of measurement

For equipment 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. Tested in accordance with the procedures of ANSI C63.4 – 2014, section 7.3.

### A.2.2 EUT Operating Mode

The MS is operating in the USB mode and charging mode. During the test MS is connected to a PC via a USB cable in the case of USB mode and is connected to a charger in the case of charging mode. The model of the PC is DELL M4000E-17, and the serial number of the PC is M706GWXD. The software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

Note: I/O information: Printer – USB, Mouse – PS/2, Keyboard – USB.

### A.2.3 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

\*Decreases with the logarithm of the frequency

### A.2.4 Test Condition in charging mode

Voltage (V)	Frequency (Hz)
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1



### A.2.5 Measurement Results

Measurement uncertainty:  $U= 3.38$  dB,  $k=2$ .

#### Charging Mode, Set.1

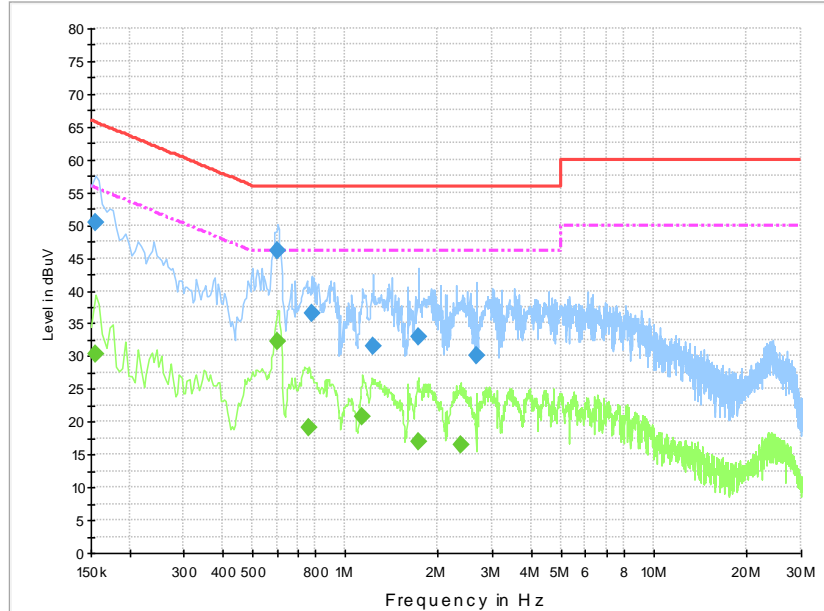


Fig A.4 Radiated Emission from 150kHz to 30MHz

#### Final Result 1

Frequency (MHz)	QuasiPeak (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	50.3	10000.	9.000	On	L1	28.0	15.4	65.8	
0.604500	46.1	10000.	9.000	On	L1	20.0	9.9	56.0	
0.780000	36.4	10000.	9.000	On	L1	20.0	19.6	56.0	
1.230000	31.5	10000.	9.000	On	L1	19.9	24.5	56.0	
1.734000	33.1	10000.	9.000	On	L1	19.8	22.9	56.0	
2.665500	30.2	10000.	9.000	On	N	19.8	25.8	56.0	

#### Final Result 2

Frequency (MHz)	Average (dBuV)	Meas. Time (ms)	Bandwidth (kHz)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBuV)	Comment
0.154500	30.4	10000.	9.000	On	L1	28.0	25.4	55.8	
0.604500	32.2	10000.	9.000	On	L1	20.0	13.8	46.0	
0.766500	19.0	10000.	9.000	On	L1	20.0	27.0	46.0	
1.140000	20.7	10000.	9.000	On	L1	19.8	25.3	46.0	
1.725000	17.1	10000.	9.000	On	N	19.8	28.9	46.0	
2.359500	16.4	10000.	9.000	On	L1	19.8	29.6	46.0	



## **ANNEX B: PERSONS INVOLVED IN THIS TESTING**

<b>Test Item</b>	<b>Test Software and Version</b>	<b>Software Vendor</b>	<b>Test operator</b>
Conducted Emission	EMC32 V8.5.2	R&S	Shi Suolan
Radiated Emission	EMC32 V9.01.00	R&S	Li Zongliang

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