



TEST REPORT

No. I21Z62218-WMD05

for

vivo Mobile Communication Co., Ltd.

Mobile Phone

Model Name: V2127

FCC ID: 2AUCY-V2127V

with

Hardware Version: MP_0.1

Software Version: PD2166EF_EX_A_3.6.0

Issued Date: 2022-02-18

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.

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:

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I21Z62218-WMD05	Rev.0	1st edition	2022-02-18

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 17025:2017 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.

1.2. Testing Location

Location 1: CTTL(huayuan North Road)

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

1.3. Testing Environment

Normal Temperature: 15-35℃
Relative Humidity: 20-80%

1.4. Project data

Testing Start Date: 2022-01-15
Testing End Date: 2022-02-10

1.5. Signature



Dong Yuan
(Prepared this test report)



Zhang Yufeng
(Reviewed this test report)



Zhao Hui Lin
Deputy Director of the laboratory
(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: vivo Mobile Communication Co., Ltd.
Address /Post: No.1, vivo Road, Chang'an, Dongguan, Guangdong, China
Contact: xiangjianfeng
Email: xiangjianfeng@vivo.com
Telephone: 18823710059

2.2. Manufacturer Information

Company Name: vivo Mobile Communication Co., Ltd.
Address /Post: No.1, vivo Road, Chang'an, Dongguan, Guangdong, China
Contact: xiangjianfeng
Email: xiangjianfeng@vivo.com
Telephone: 18823710059

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

3.1. About EUT

Description	Mobile Phone
Model	V2127
FCC ID	2AUCY-V2127V
Antenna	Embedded
Extreme vol. Limits	3.6VDC to 4.45VDC (nominal: 3.87VDC)
Extreme temp. Tolerance	-10°C to +55°C

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

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	HW Version	SW Version	Date of receipt
UT01a	861904059958729/ 861904059958737	MP_0.1	PD2166EF_EX_A_3.6.0	2021-12-07

*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
AE1	Battery

AE1

Model	B-T6
Manufacturer	Dongguan NVT Technology Co.,Ltd
Capacitance	5000mAh

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



4. Reference Documents

4.1. Documents supplied by applicant

EUT parameters 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
FCC Part 22	PUBLIC MOBILE SERVICES	10-1-20 Edition
ANSI C63.26	American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services	2015
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v03r01



5. Laboratory Environment

Shielding chamber did not exceed following limits along the RF testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =20 %, Max. = 80 %

6. Summary Of Test Result

CDMA 800

Items	List	Clause in FCC rules	Verdict
1	Output Power	22.913(a)	P
2	Frequency Stability	2.1055/22.355	P
3	Occupied Bandwidth	2.1049(h)(i)	P
4	Emission Bandwidth	22.917(b)	P
5	Band Edge Compliance	22.917(b)	P
6	Conducted Spurious Emission	2.1057/22.917	P

Terms used in Verdict column

P	Pass. The EUT complies with the essential requirements in the standard.
NP	Not Performed. The test was not performed by CTTL.
NA	Not Applicable. The test was not applicable.
BR	Re-use test data from basic model report.
F	Fail. The EUT does not comply with the essential requirements in the standard.

All the test results are based on normal power.

ANT13 supports CDMA 800.

ANT41 supports CDMA 800.

Explanation of worst-case configuration

The worst-case scenario for all measurements is based on the conducted output power measurement investigation results unless otherwise stated. The test results shown in the following sections represent the worst case emission. Output power is tested for each antenna. The other test cases only test the antenna with the worst value on output power, which are CDMA 800-ANT41.

7. Test Equipments Utilized

Description	Type	Series Number	Manufacture	Cal Due Date	Calibration Interval
Spectrum Analyzer	FSV30	101576	R&S	2022-05-09	1 Year
Wireless Communications Test Set	8960(E5515C)	MY48360950	Agilent	2022-10-01	25 Months
Climatic chamber	SH-242	93008556	ESPEC	2023-12-23	3 Years

Annex A: Measurement Results

A.1 Output Power

A.1.1 Summary

During the process of testing, the EUT was controlled via Agilent Wireless Communications Test Set (8960(E5515C)) to ensure max power transmission and proper modulation.

This result is max output power conducted measurements for the EUT.

In all cases, output power is within the specified limits.

A.1.2 Method of Measurements

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies, 824.7MHz, 836.52MHz and 848.31MHz for CDMA 800 band (bottom, middle and top of operational frequency range) for each bandwidth.

A1.3 Measurement results

CDMA 800-ANT13

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)		
		1x RTT	1xEVDO	
			Rel0	RevA
1013	824.70	19.92	19.87	19.95
384	836.52	19.98	19.87	19.95
777	848.31	19.91	19.89	19.92

CDMA 800-ANT41

Measurement result

Channel	Frequency(MHz)	Channel power(dBm)		
		1x RTT	1xEVDO	
			Rel0	RevA
1013	824.70	19.87	20.04	20.02
384	836.52	19.98	20.00	20.02
777	848.31	19.95	20.03	20.04

A.2 Frequency Stability

A.2.1 Method of Measurement

Frequency stability is a measure of the frequency drift due to temperature and supply voltage variations, with reference to the frequency measured at +20 °C and rated supply voltage. Two reference points are established at the applicable unwanted emissions limit using a RBW equal to the RBW required by the unwanted emissions specification of the applicable regulatory standard. These reference points measured using the lowest and highest channel of operation shall be identified as F_L and F_H respectively.

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of Agilent 8960(E5515C) Wireless Communications Test Set.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the 8960(E5515C) and in a simulated call on channel 384 for CDMA 800 and channel 600 for 1900 measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Remeasure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments remeasuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the 8960(E5515C) and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10°C decrements from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d)(2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of the lower, higher and nominal voltage. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress.

A.2.2 Measurement results

CDMA 800

Frequency Error vs Temperature

Temperature(°C)	Voltage(V)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
20	3.87	824.013	848.996	0.50	0.0006
50					
40					
30					
10					
0					
-10					
-20					
-30					

Frequency Error vs Voltage

Voltage(V)	Temperature(°C)	F _L (MHz)	F _H (MHz)	Offset(Hz)	Frequency error(ppm)
3.6	20	824.013	848.996	0.26	0.0003
4.45				-0.53	0.0006

A.3 Occupied Bandwidth

A.3.1 Occupied Bandwidth Results

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages. The measurement method is from ANSI C63.26:

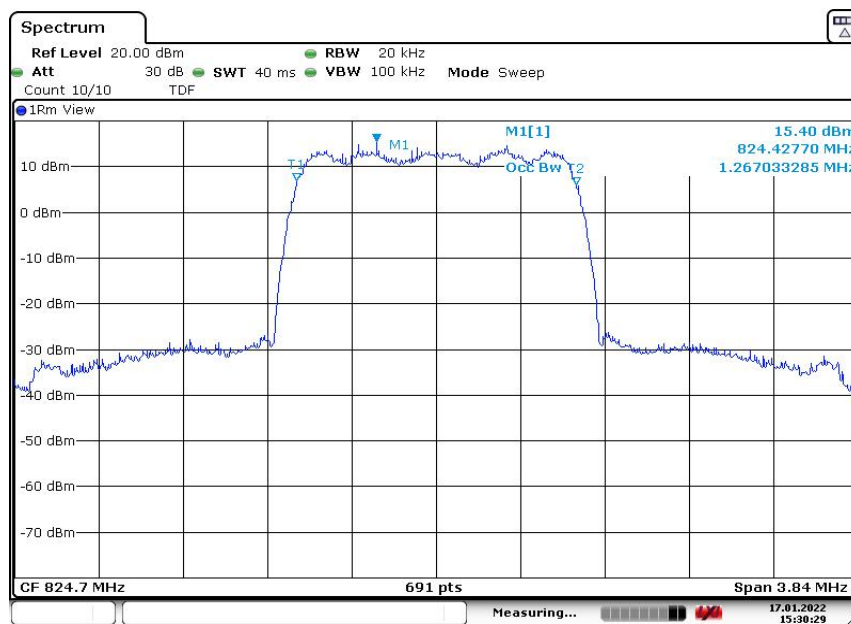
- The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts.
- The nominal IF filter 3 dB bandwidth (RBW) shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times$ RBW.
- Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- Set the detection mode to peak, and the trace mode to max-hold.

CDMA 800 (99% BW)

Channel	Occupied Bandwidth (99% BW)(MHz)
1013	1.267
384	1.267
777	1.267

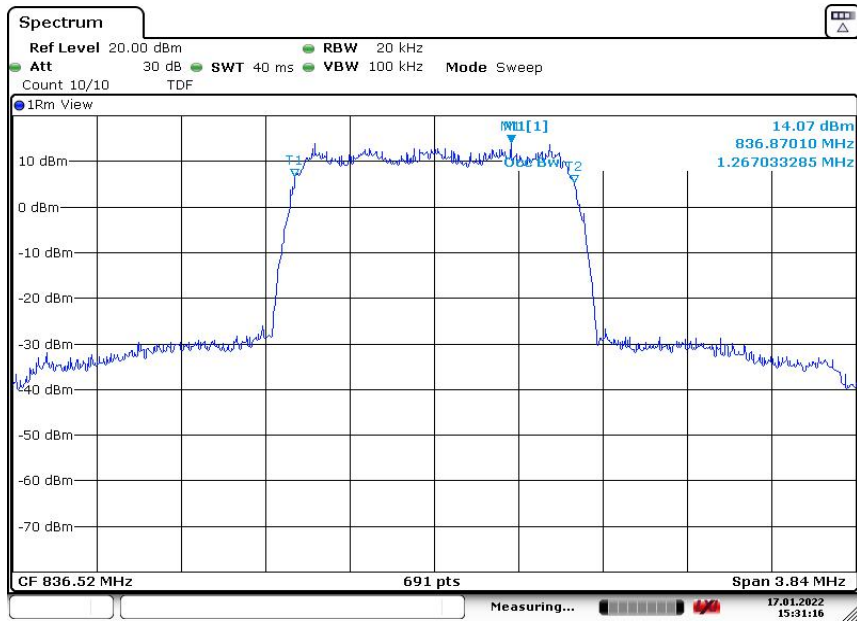
CDMA 800

Channel 1013-Occupied Bandwidth (99% BW)

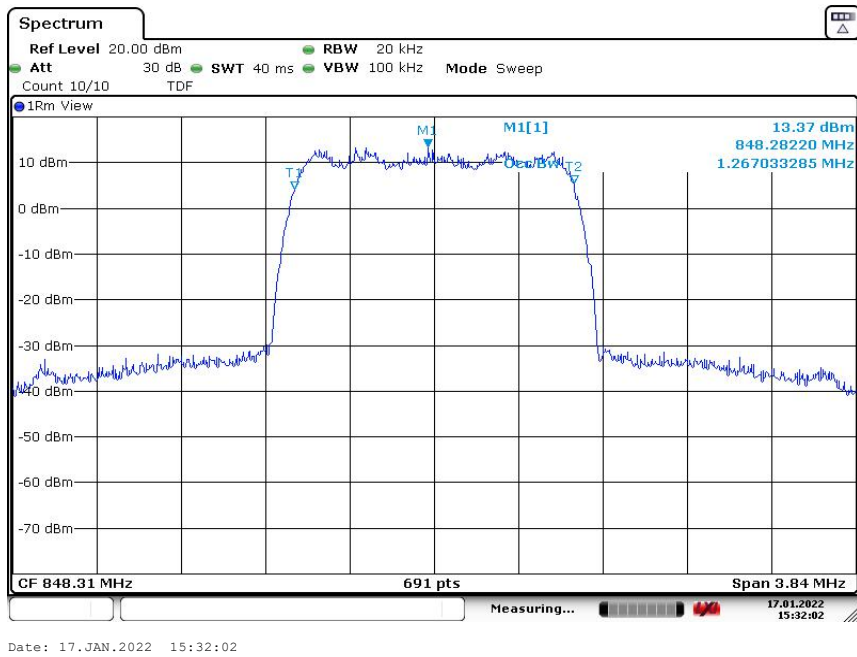


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Channel 384-Occupied Bandwidth (99% BW)



Channel 777-Occupied Bandwidth (99% BW)



A.4 Emission Bandwidth

A.4.1 Emission Bandwidth Results

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The measurement method is from ANSI C63.26:

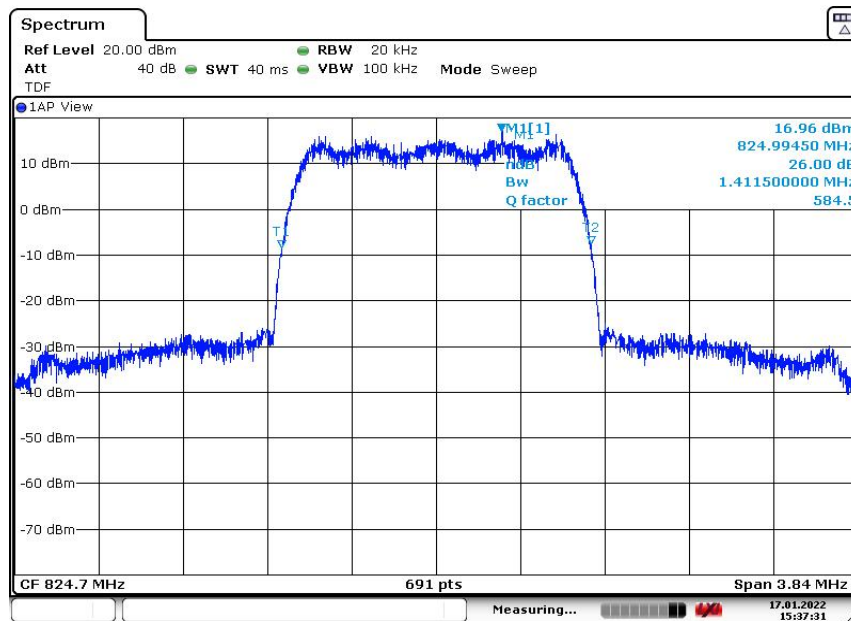
- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the spectrum analyzer shall be wide enough to see sufficient roll off of the signal to make the measurement.
- b) The nominal RBW shall be in the range of 1% to 5% of the anticipated OBW, and the VBW shall be set $\geq 3 \times \text{RBW}$.
- c) Set the reference level of the instrument as required to prevent the signal amplitude from exceeding the maximum spectrum analyzer input mixer level for linear operation.
- d) The dynamic range of the spectrum analyzer at the selected RBW shall be more than 10 dB below the target “-X dB” requirement, i.e., if the requirement calls for measuring the -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be at least 36 dB below the reference level.
- e) Set spectrum analyzer detection mode to peak, and the trace mode to max hold.

CDMA 800 (-26dBc BW)

Channel	Emission Bandwidth (-26dBc BW)(MHz)
1013	1.412
384	1.412
777	1.417

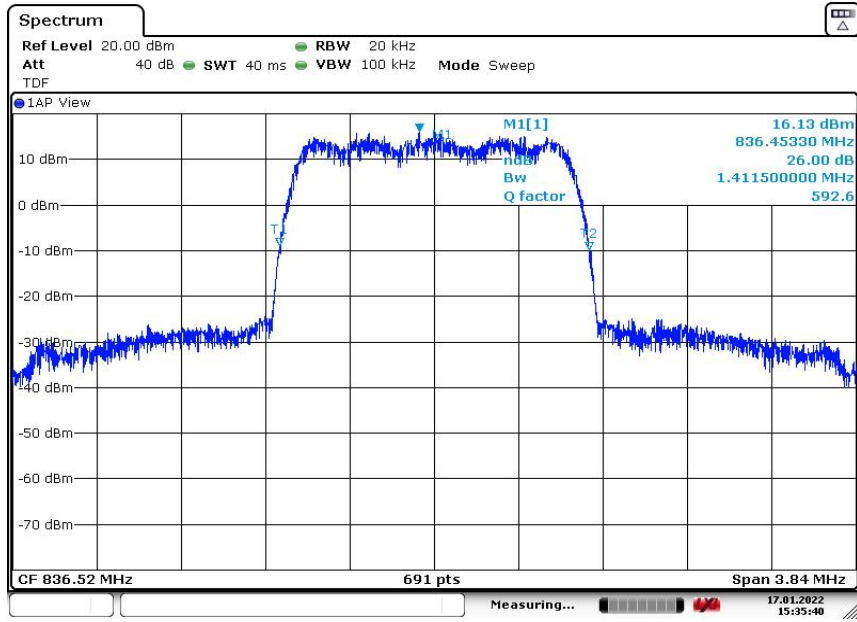
CDMA 800

Channel 1013-Emission Bandwidth (100% BW)



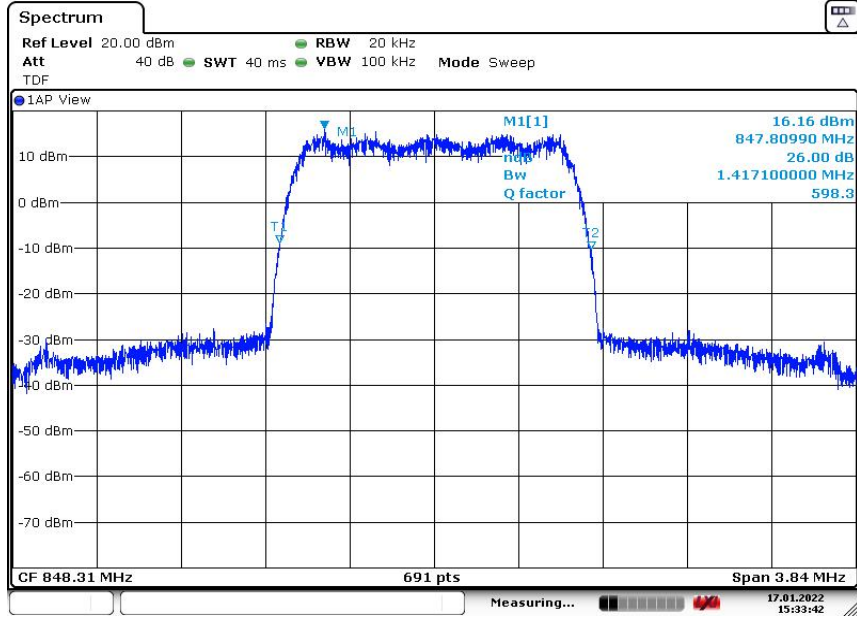
Date: 17. JAN. 2022 15:37:31

Channel 384-Emission Bandwidth (100% BW)



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Channel 777-Emission Bandwidth (100% BW)



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A.5 Band Edge Compliance

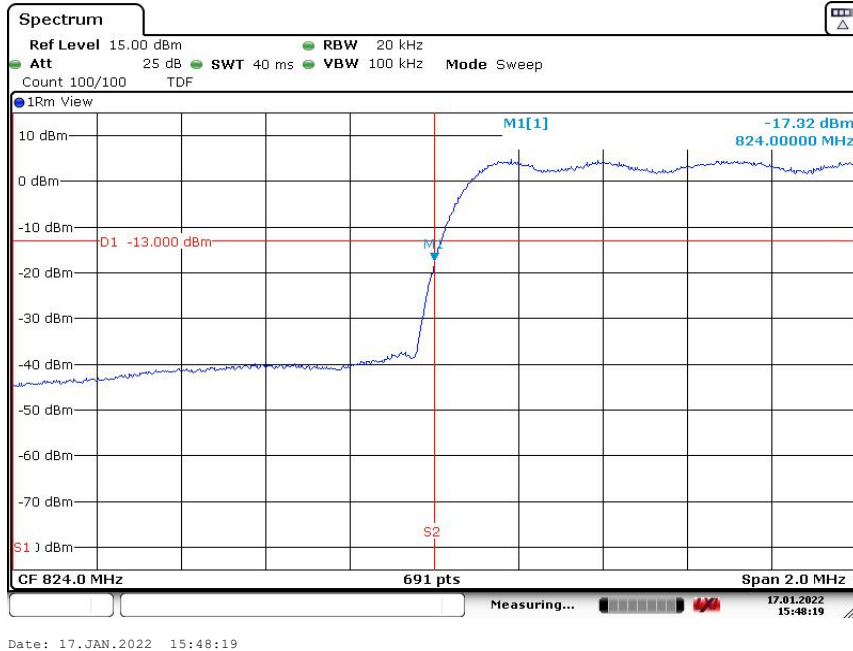
A.5.1 Measurement limit

Part 22.917 specifies that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

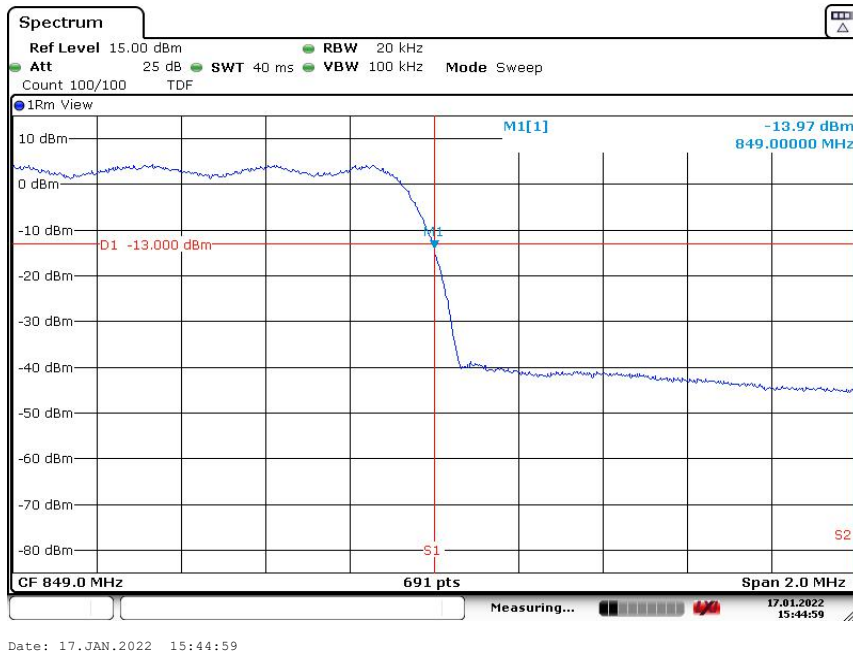
According to KDB 971168, a relaxation of the reference bandwidth is often provided for measurements within a specified frequency range at the edge of the authorized frequency block/band. This is often implemented by permitting the use of a narrower RBW (typically limited to a minimum RBW of 1% of the OBW) for measuring the out-of-band emissions without a requirement to integrate the result over the full reference bandwidth.

A.5.2 Measurement result

CDMA 800 BAND EDGE BLOCK-Channel 1013



HIGH BAND EDGE BLOCK-Channel 777



A.6 Conducted Spurious Emission

A.6.1 Measurement Method

The following steps outline the procedure used to measure the conducted emissions from the EUT.

1. In measuring unwanted emissions, the spectrum shall be investigated from 30 MHz or the lowest radio frequency signal generated in the equipment, whichever is lower, without going below 9 kHz, up to at least the frequency given below:
 - (a) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
 - (b) If the equipment operates at or above 10 GHz: to the fifth harmonic of the highest fundamental frequency or to 100 GHz, whichever is lower.
2. Determine EUT transmit frequencies: below outlines the band edge frequencies pertinent to conducted emissions testing.
3. The number of sweep points of spectrum analyzer is greater than $2 \times \text{span}/\text{RBW}$.

A.6.2 Measurement Limit

Part 22.917 specifies that the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

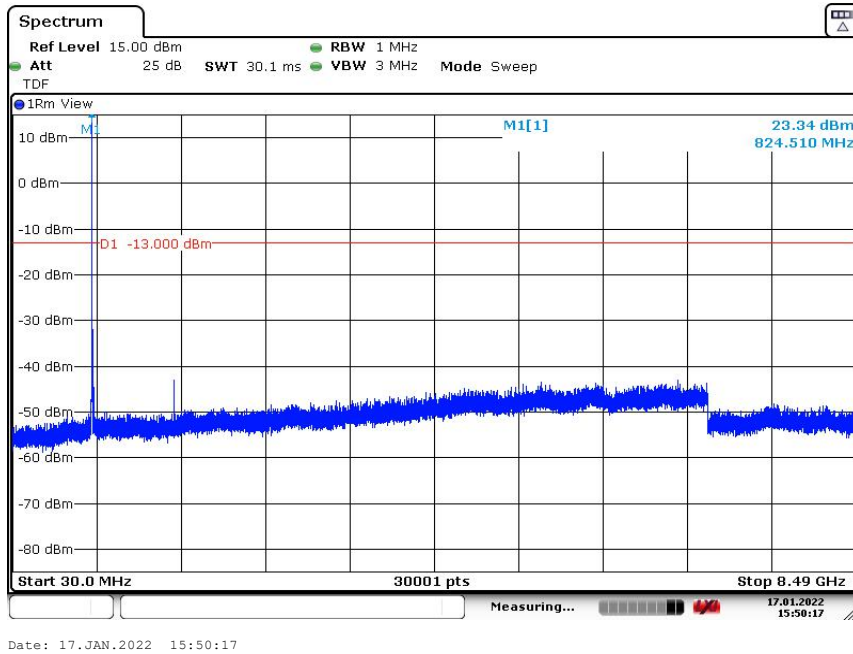
A.6.3 Measurement result

CDMA 800

Channel 1013: 30MHz –8.49GHz

Spurious emission limit –13dBm.

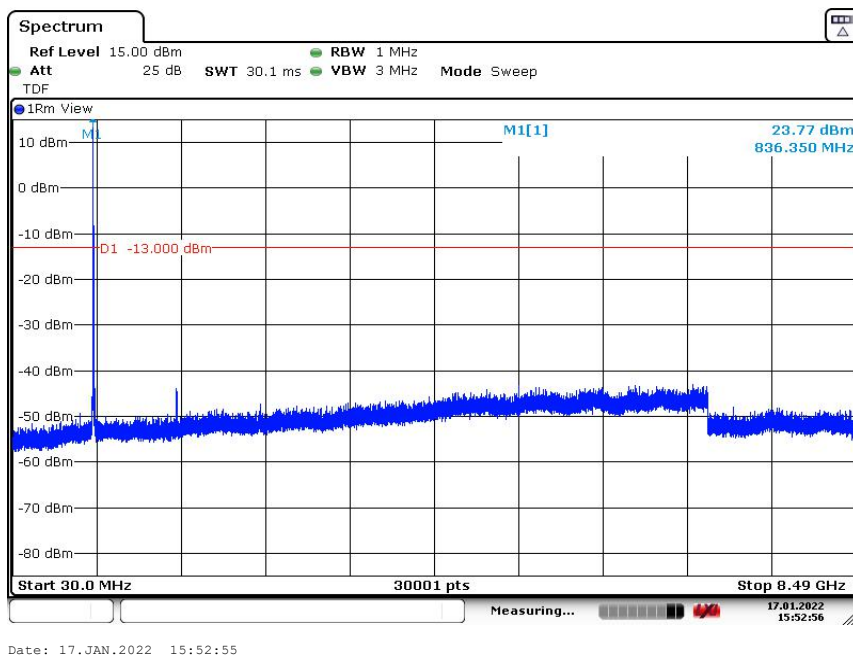
NOTE: peak above the limit line is the carrier frequency.



Channel 384: 30MHz –8.49GHz

Spurious emission limit –13dBm.

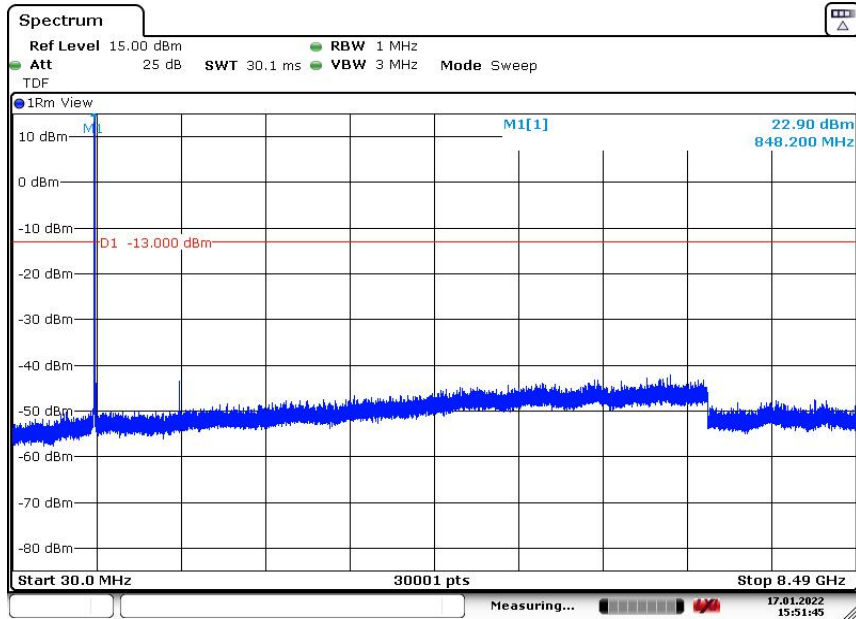
NOTE: peak above the limit line is the carrier frequency.



Channel 777: 30MHz –8.49GHz

Spurious emission limit –13dBm.

NOTE: peak above the limit line is the carrier frequency.



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ANNEX B: Accreditation Certificate

<p>United States Department of Commerce National Institute of Standards and Technology</p> <div style="display: flex; justify-content: space-around; align-items: center;"><div style="font-size: 2em; font-weight: bold; letter-spacing: 0.5em;">NVLAP[®]</div><div style="text-align: center;"></div></div> <hr/> <p style="font-size: 1.2em; font-weight: bold;">Certificate of Accreditation to ISO/IEC 17025:2017</p> <hr/> <p>NVLAP LAB CODE: 600118-0</p> <p style="text-align: center;">Telecommunication Technology Labs, CAICT Beijing China</p> <p style="text-align: center;"><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:</i></p> <p style="text-align: center;">Electromagnetic Compatibility & Telecommunications</p> <p style="text-align: center;"><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 Communique dated January 2009).</i></p> <table style="width: 100%; border: none;"><tr><td style="width: 40%; border: none;"><hr/><p style="text-align: center;">2021-09-29 through 2022-09-30 <i>Effective Dates</i></p></td><td style="width: 20%; border: none; text-align: center;"></td><td style="width: 40%; border: none; text-align: right;"><div style="text-align: right;"> For the National Voluntary Laboratory Accreditation Program</div></td></tr></table>		<hr/> <p style="text-align: center;">2021-09-29 through 2022-09-30 <i>Effective Dates</i></p>		<div style="text-align: right;"> For the National Voluntary Laboratory Accreditation Program</div>
<hr/> <p style="text-align: center;">2021-09-29 through 2022-09-30 <i>Effective Dates</i></p>		<div style="text-align: right;"> For the National Voluntary Laboratory Accreditation Program</div>		

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