

Test Report

Report No.: MTi160413E003

Date of issue: Jul. 16, 2016

Sample Description: Wireless POS Terminal

Model(s): G3

Applicant: Shenzhen Xinguodu Technology Co., Ltd.

Address: 17/A, Jinsong Building Tairan Industry And Trading Garden
Shenzhen China

Date of Test: Jun. 04, 2016 to Jul. 14, 2016

Shenzhen Microtest Co., Ltd.
<http://www.mtitest.com>



Table of Contents

1	General description.....	5
1.1	Feature of equipment under test (EUT).....	5
1.2	Test frequency channel.....	5
1.3	EUT operation mode	5
1.4	Test conditions.....	5
1.5	Testing site	5
1.6	Ancillary equipment list.....	6
1.7	Measurement uncertainty	6
2	List of test equipment	7
3	Test Result	8
3.1	Maximum output power and peak to average ratio.....	8
3.2	Occupied bandwidth	10
3.3	Conducted spurious emissions.....	13
3.4	Spurious emission at band edge	20
3.5	Radiated spurious emission	23
3.6	Frequency stability.....	24

Test Result Certification	
Applicant's name:	Shenzhen Xinguodu Technology Co., Ltd.
Address:	17/A, Jinsong Building Tairan Industry And Trading Garden Shenzhen China
Manufacture's Name:	Shenzhen Xinguodu Technology Co., Ltd.
Address:	17/A, Jinsong Building Tairan Industry And Trading Garden Shenzhen China
Product description	
Product name:	Wireless POS Terminal
Trademark:	NEXGO
Model name:	G3
Standards:	FCC Part 22 Subpart H FCC Part 24 Subpart E
Test Procedure:	FCC Part 2 ANSI TIA-603-D: 2010

This device described above has been tested by Shenzhen Toby Technology Co., Ltd. and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

Tested by:

David Chen

David Chen

Jul. 16, 2016

Reviewed by:

Leon Chen

Leon Chen

Jul. 16, 2016

Approved by:

Ares Liu

Ares Liu

Jul. 16, 2016

Summary of Test Result

Item	FCC Part No.	Description of Test	Result
1	2.1046, 22.913(a); 24.232(c)	Maximum output power and peak to average radio	Pass
		Transmitter Radiated Power (EIRP/ERP)	
2	2.1049; 22.917(b); 24.238(b)	Occupied Bandwidth	Pass
3	2.1051; 22.917(a); 24.238(a)	Conducted spurious emissions	Pass
4	2.1051; 22.917(b); 24.238(b)	Spurious emissions at band edge	Pass
5	2.1053; 22.917(a); 24.238(a)	Radiated spurious emissions	Pass
6	2.1055; 22.355; 24.235	Frequency Stability	Pass

1 General description

1.1 Feature of equipment under test (EUT)

Product name:	Wireless POS Terminal
Model name:	G3
Operating frequency range:	WCDMA band V: (TX: 826.4MHz~846.6MHz, RX: 871.4MHz~891.6MHz) WCDMA band II: (TX: 1852.4MHz~1907.6MHz, RX: 1932.4MHz~1989.6MHz)
Modulation type:	QPSK
Power supply:	DC 7.4V form Polymer-Li-ion battery
Adapter information:	Model: HKA02108525-8A Input: 100-240V~0.8A 50/60Hz Output: 8.5V 2.5A

1.2 Test frequency channel

Channel	WCDMA band II	WCDMA band V
Low	1852.4MHz	826.4MHz
Middle	1880MHz	835MHz
High	1907.6MHz	846.6MHz

1.3 EUT operation mode

During testing, RF test program provided by the manufacture to control the Tx operation followed the test requirement. The EUT is configured to transmit continuously (duty cycle > 98 %) at the maximum power control level.

1.4 Test conditions

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 20°C~30°C
- Humidity: 30%~70%
- Atmospheric pressure: 98kPa~101kPa

1.5 Testing site

Test Site	Shenzhen Toby Technology Co., Ltd.
Test Site Location	1 A/F., Bldg.6, Yusheng Industrial Zone The National Road No.107 Xixiang Section 467, Shenzhen, Guangdong, China
FCC Registration No.:	811562
CNAS Registration No.:	CNAS L5813

1.6 Ancillary equipment list

Equipment	Model	S/N	Manufacturer	Certificate type
/	/	/	/	/

1.7 Measurement uncertainty

Measurement Uncertainty for a Level of Confidence of 95 %, $U=2xUc(y)$

RF frequency	1×10^{-7}
RF power, conducted	± 1 dB
Conducted emission(150kHz~30MHz)	± 2.5 dB
Radiated emission(30MHz~1GHz)	± 4.2 dB
Radiated emission (above 1GHz)	± 4.3 dB
Temperature	± 1 degree
Humidity	± 5 %

2 List of test equipment

Equipment	Manufacturer	Model	Serial No.	Calibration Due
Log-Bicon Antenna	MESS-ELEKTRO NIK	VULB 9160	3058	2016.12.11
Horn Antenna	Schwarzbeck	BBHA 9120D	631	2016.12.05
Horn Antenna	Schwarzbeck	BBHA 9170	373	2016.12.05
Test Cable	United Microwave	57793	1m	2016.12.05
Test Cable	United Microwave	A30A30-5006	10m	2016.12.05
Microwave Pre amplifier	Agilent	8449B	3008A01714	2016.12.05
Pre-Amplifier	Anritsu	MH648A	M09961	2016.12.05
EMI Test Receiver	R&S	ESPI-7	101318	2016.12.05
Spectrum analyzer	Agilent	E4470B	MY41441082	2017.06.01
Universal Radio Communication Tester	R&S	CMU200	160400005	2017.07.06
Dc Power Supply	GW	GPR-6030D	/	2017.07.06
Temperature & Humidity Chamber	GIANT FORCE	GTH-056P	GF-94454-1	2016.12.05

Note: the calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

3 Test Result

3.1 Maximum output power and peak to average ratio

3.1.1 Limit

For FCC 22.913: The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

For FCC 24.234: Mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

3.1.2 Test method

For Conducted output power:

- 1, Use a universal radio communication tester, the output power of EUT was measured at the antenna terminal. The path loss was calibrated and entered as an offset into the test equipment.
- 2, The EUT was configured to transmit on maximum power by the radio communication tester.
- 3, Measured the peak and average powers.

For EIRP & ERP:

The EUT was placed on a non-conductive rotating platform with 0.8 meter height. The radiated emission at the fundamental frequency was measured at 3 m with a test antenna and a spectrum analyzer with RBW=3 MHz, VBW=3 MHz and peak detector settings.

(2) During the measurement, the EUT was enforced in maximum power and linked with the Base Station. The highest was recorded from analyzer power level (LVT) from the 360 degrees rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.

(3) Effective Isotropic Radiated Power (EIRP) was measured by substitution method according to TIA/EIA-603-D. The EUT was replaced by dipole antenna (for frequency below 1 GHz) or Horn antenna (for frequency above 1 GHz) at same location with same polarize of receiver antenna and then a known power of each measure frequency from S.G. was applied into the dipole antenna or Horn antenna through a TX cable, and then recorded the maximum Analyzer reading through raised and lowered the test antenna.

The EUT's EIRP and ERP was calculated with the correction factor:

$$\text{ERP} = \text{S.G. Level} + \text{Antenna Gain Cord. (dBd)} - \text{Cable Loss (dB)}$$

$$\text{EIRP} = \text{S.G. Level} + \text{Antenna Gain Cord. (dBi)} - \text{Cable Loss (dB)}$$

3.1.3 Test Result

Conducted power and peak to average ratio

Channel	Peak power (dBm)	Average power (dBm)	Peak to average ratio (dB)	Limit (dBm)
WCDMA band II				
1852.4MHz	24.67	21.3	3.37	38.5
1880MHz	25.09	21.58	3.51	38.5
1907.6MHz	23.77	20.38	3.39	38.5
WCDMA band V				
826.4MHz	23.78	20.19	3.59	33
835MHz	23.52	20.15	3.37	33
846.6MHz	23.82	20.18	3.64	33

EIRP&ERP

Channel (MHz)	Measurement (dBm)	Limits (dBm)	Result
WCDMA band II			
1852.4MHz	23.38	38.5	Pass
1880MHz	24.71	38.5	
1907.6MHz	23.05	38.5	
WCDMA band V			
826.4MHz	24.85	33	Pass
835MHz	24.27	33	
846.6MHz	25.19	33	

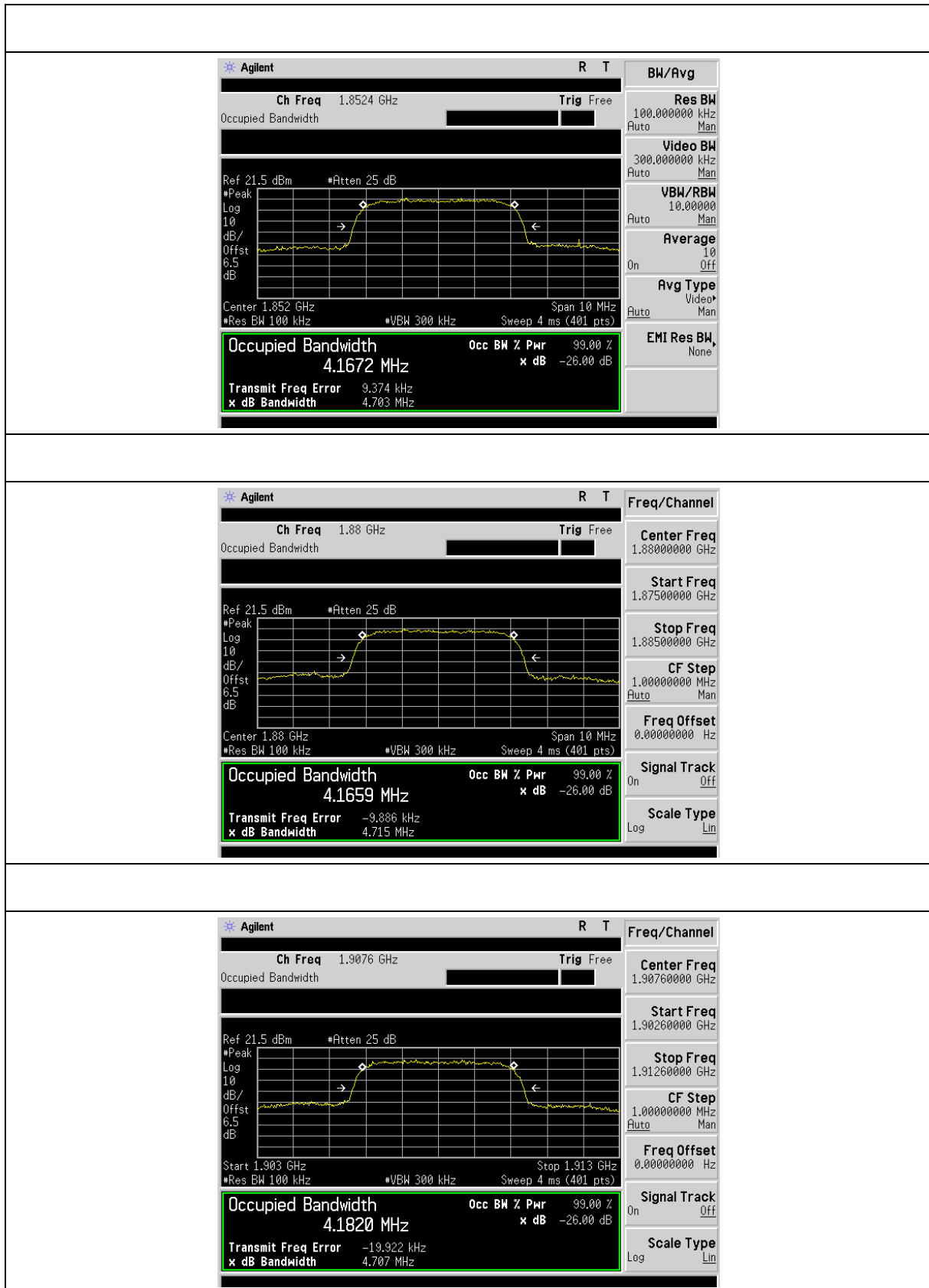
3.2 Occupied bandwidth

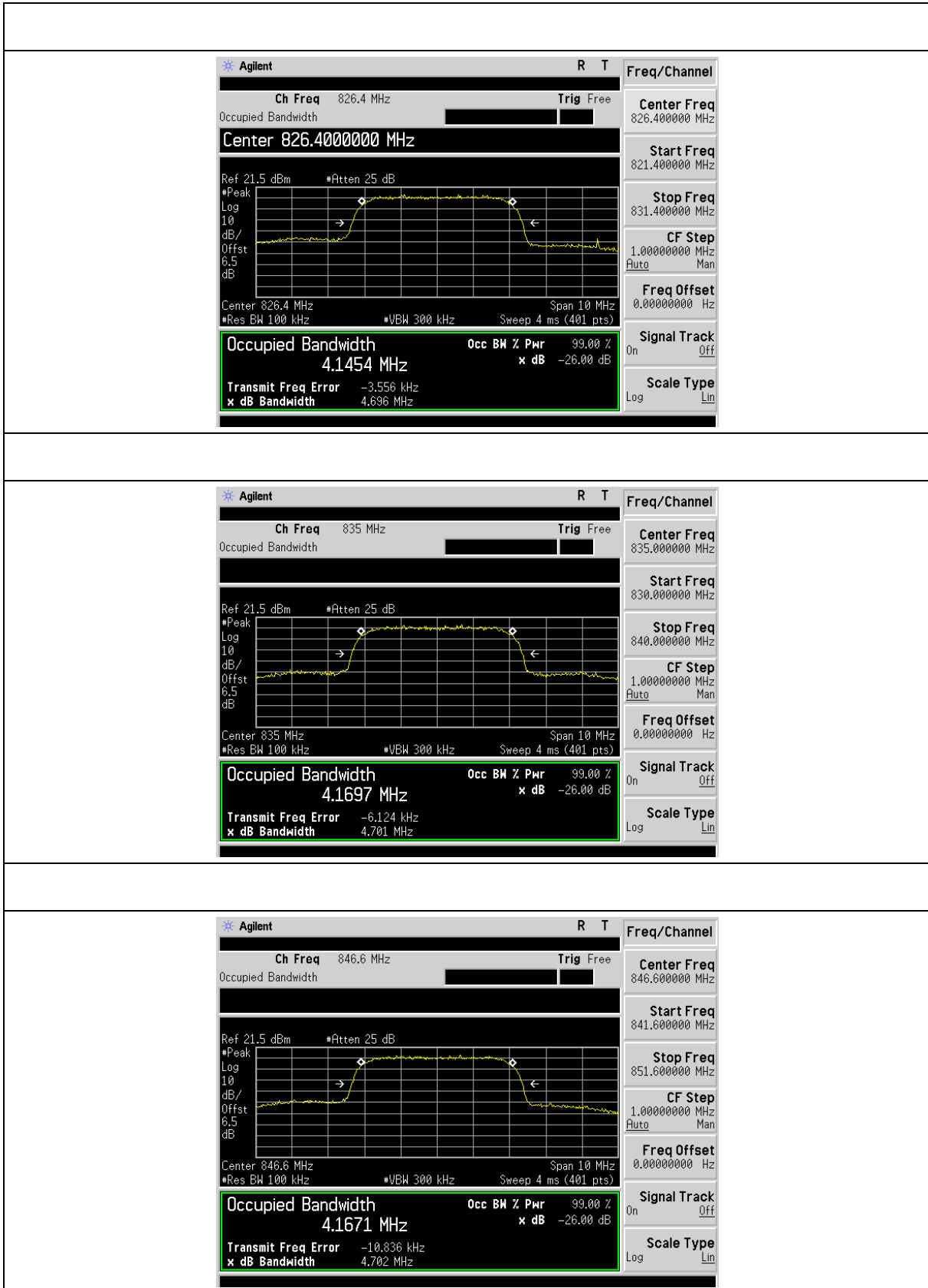
3.2.1 Test method

- 1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- 2, The resolution bandwidth of the Spectrum Analyzer is set to at least 1% of the occupied bandwidth.
- 3, The low, middle and the high channels are selected to perform tests respectively.
- 4, Set the frequency range of the Spectrum Analyzer suitably to capture the waveform; search peak; make a line whose value is 26dB lower than the peak; mark two points which the line intersected the waveform at; finally record the delta of the two points as the occupied bandwidth and the plot.
- 4, Set the Spectrum Analyzer Occupied bandwidth function to measure the 99% occupied bandwidth.

3.2.2 Test result

Channel	26dB emission bandwidth (MHz)	99% occupied bandwidth (MHz)
WCDMA band II		
1852.4MHz	4.703	4.1672
1880MHz	4.715	4.1659
1907.6MHz	4.707	4.182
WCDMA band V		
826.4MHz	4.696	4.1454
835MHz	4.701	4.1697
846.6MHz	4.702	4.1671





3.3 Conducted spurious emissions

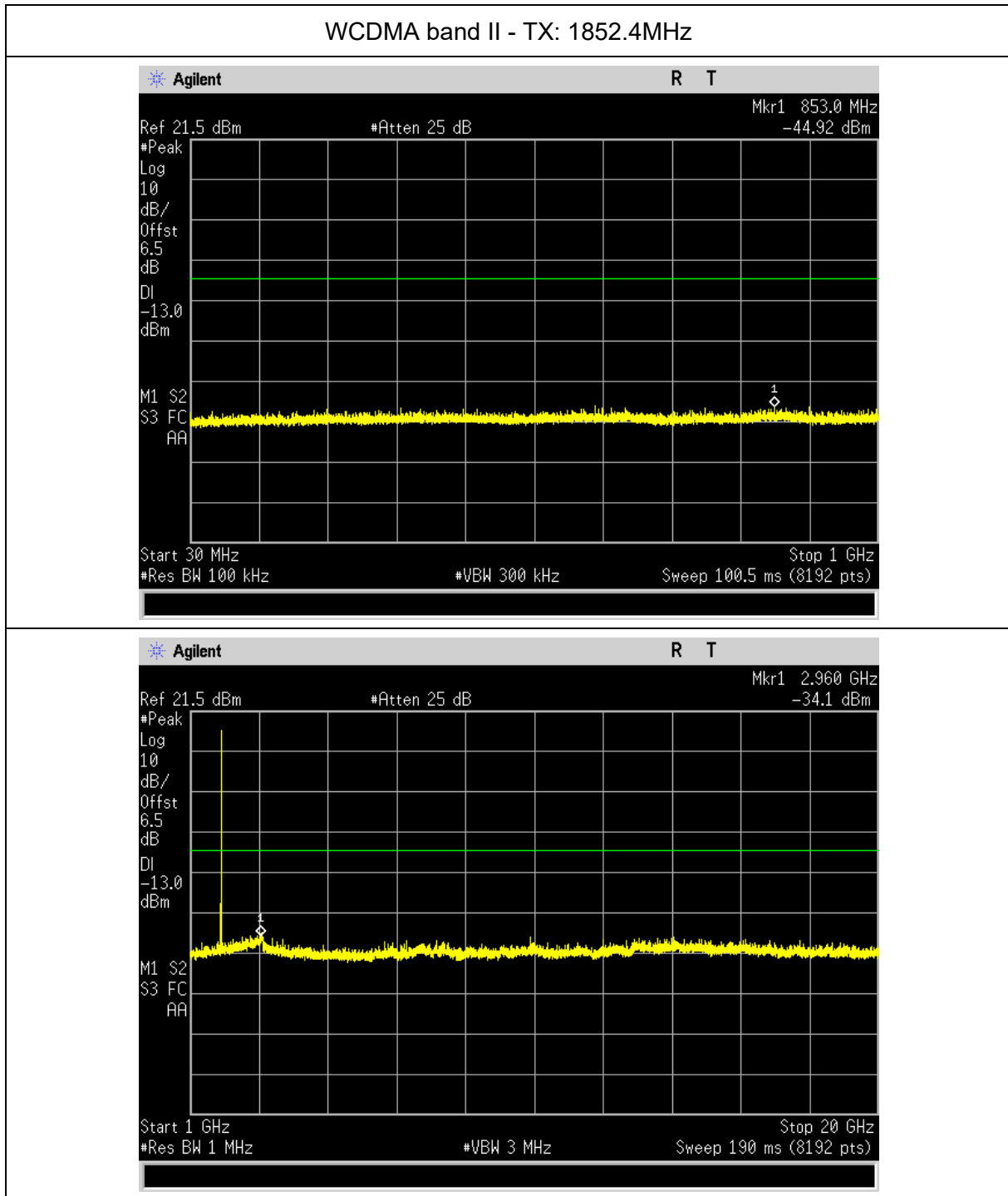
3.3.1 Limits

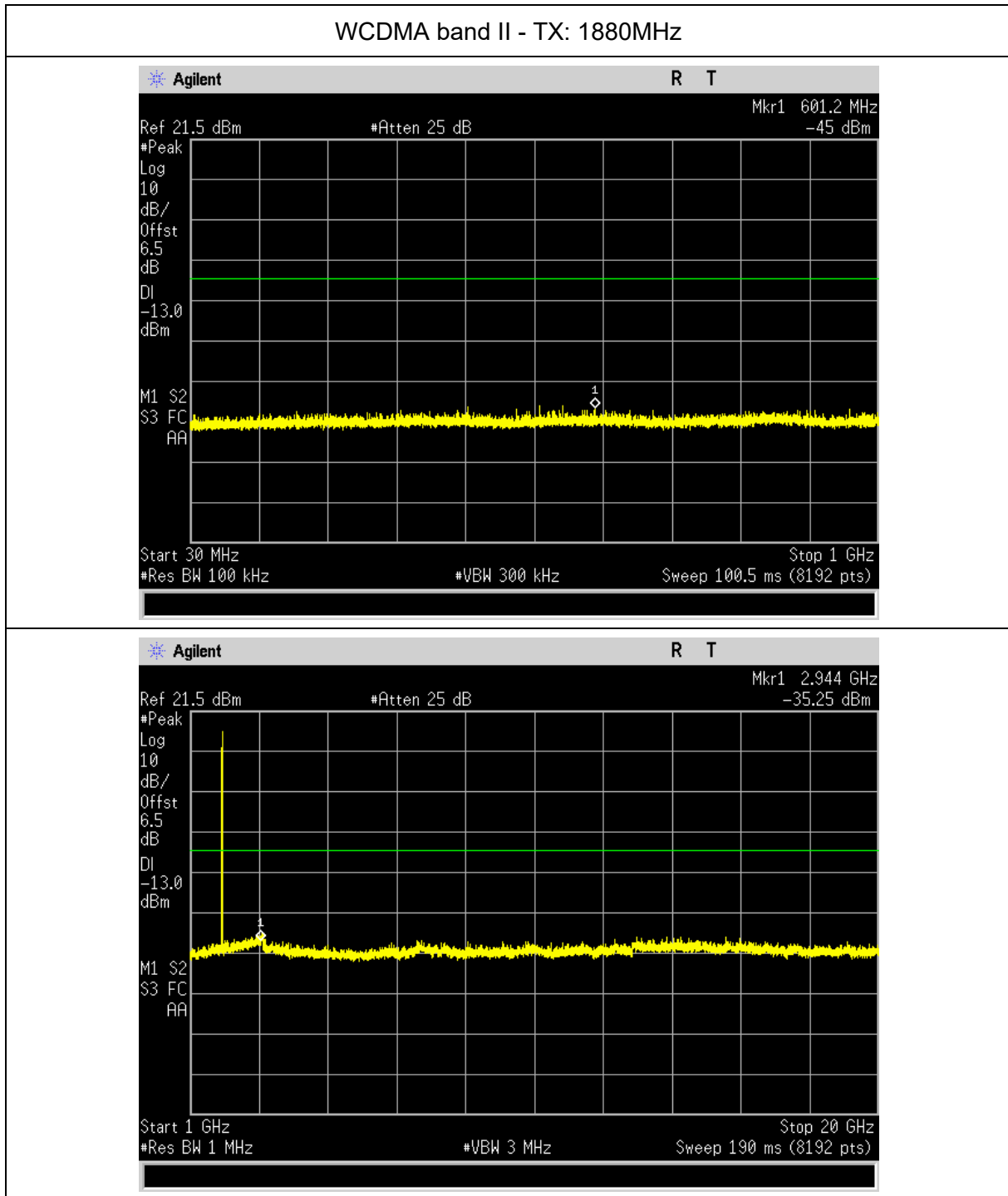
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10\log(P)$ dB

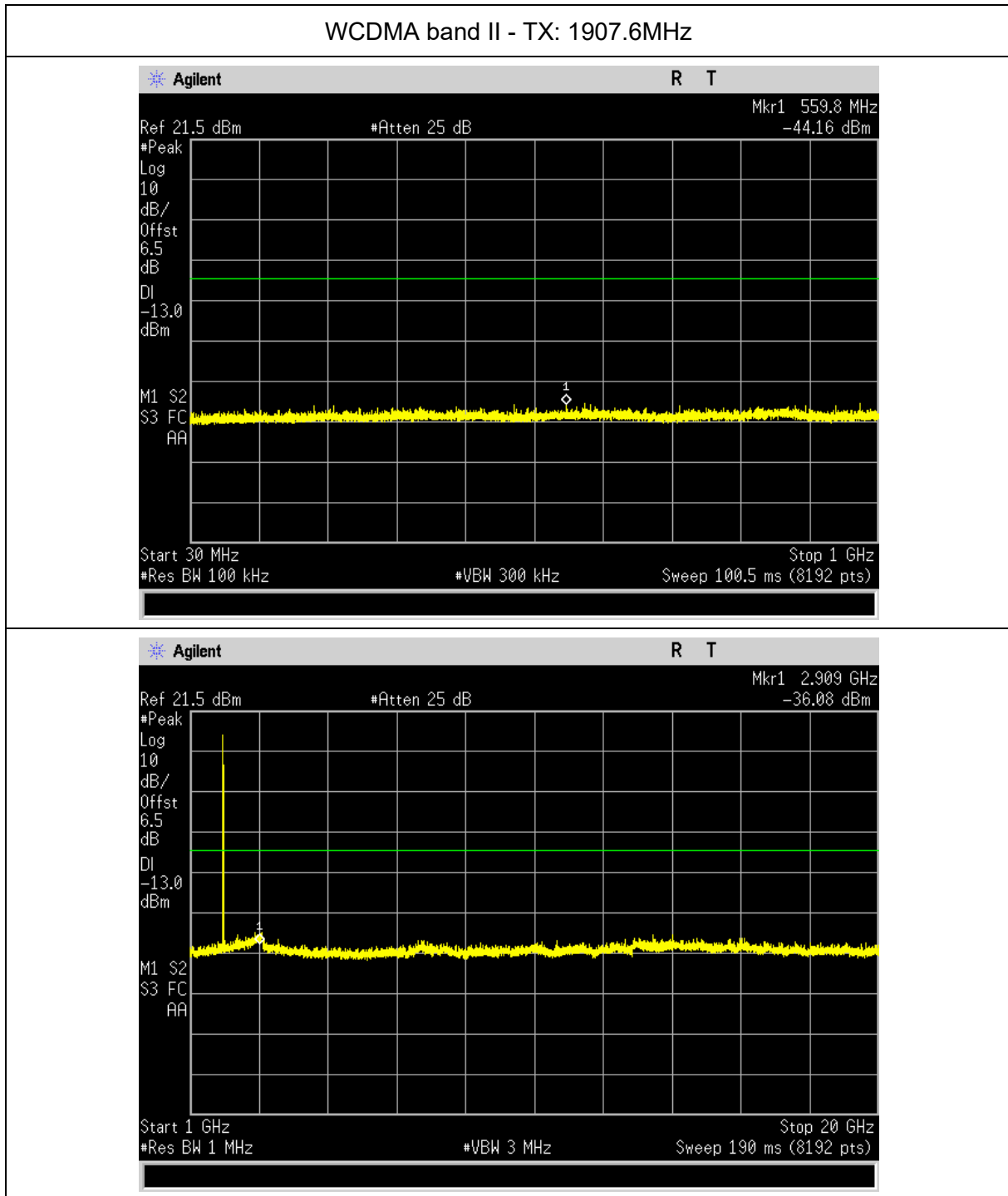
3.3.2 Test method

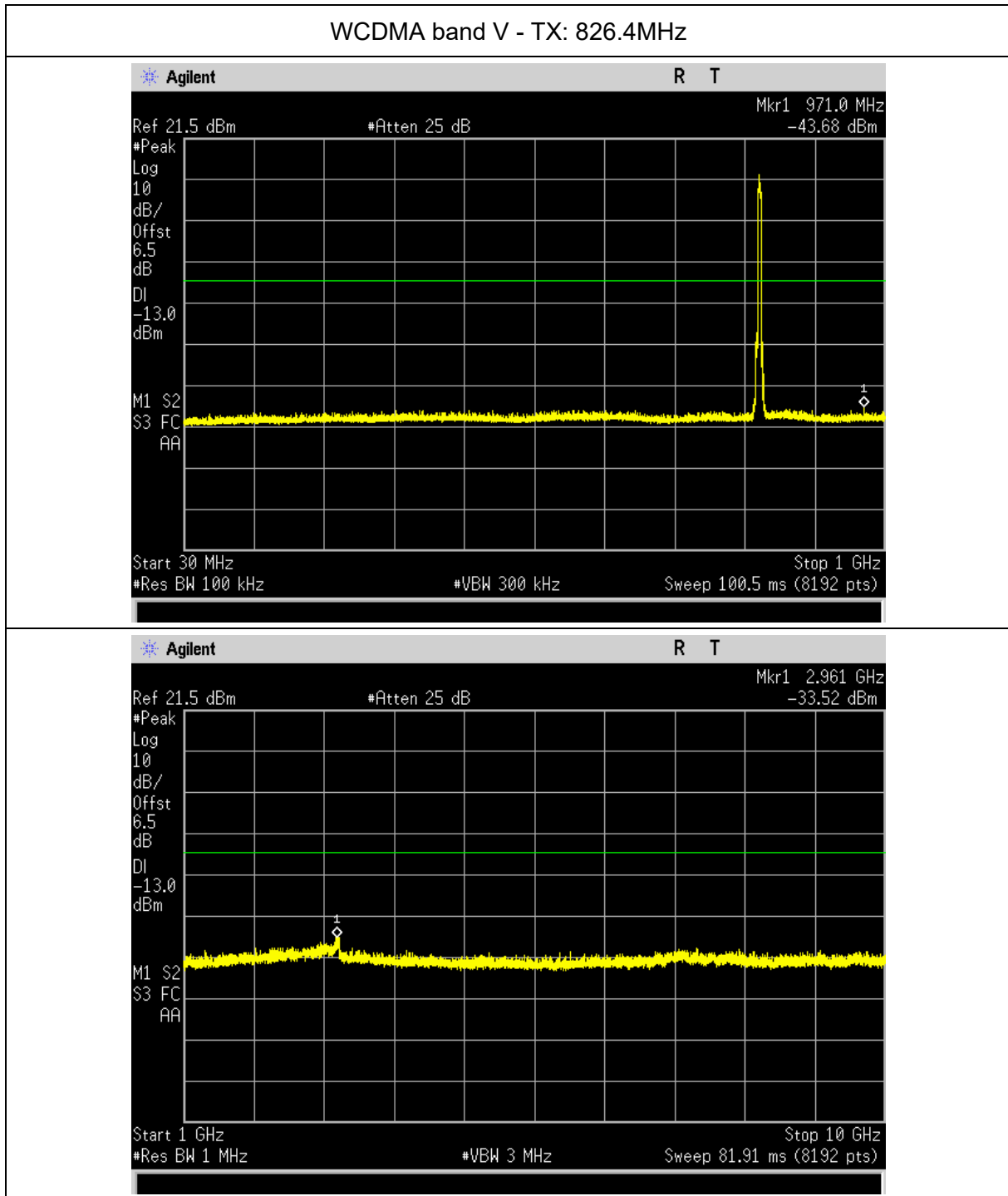
- 1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- 2, Spectrum Setting:
 - Frequency bellow 1 GHz: RBW=100 kHz, VBW=300 kHz.
 - Frequency above 1 GHz: RBW=1 MHz, VBW=3 MHz.
- 3, The low, middle and high channels of each band and mode's spurious emissions for 30 MHz to 10th Harmonic were measured by Spectrum analyzer.

3.3.3 Test result

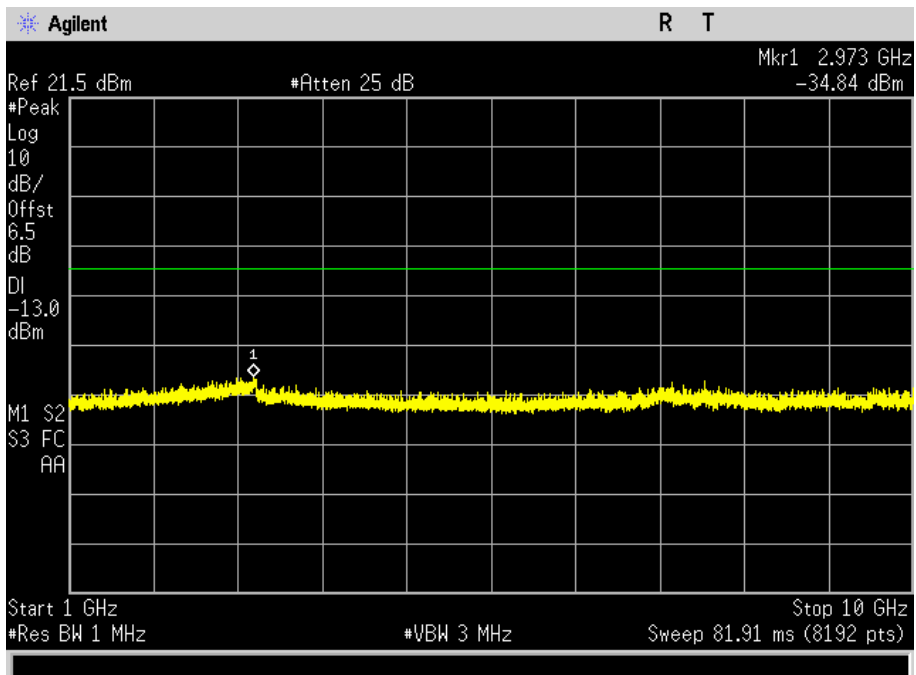
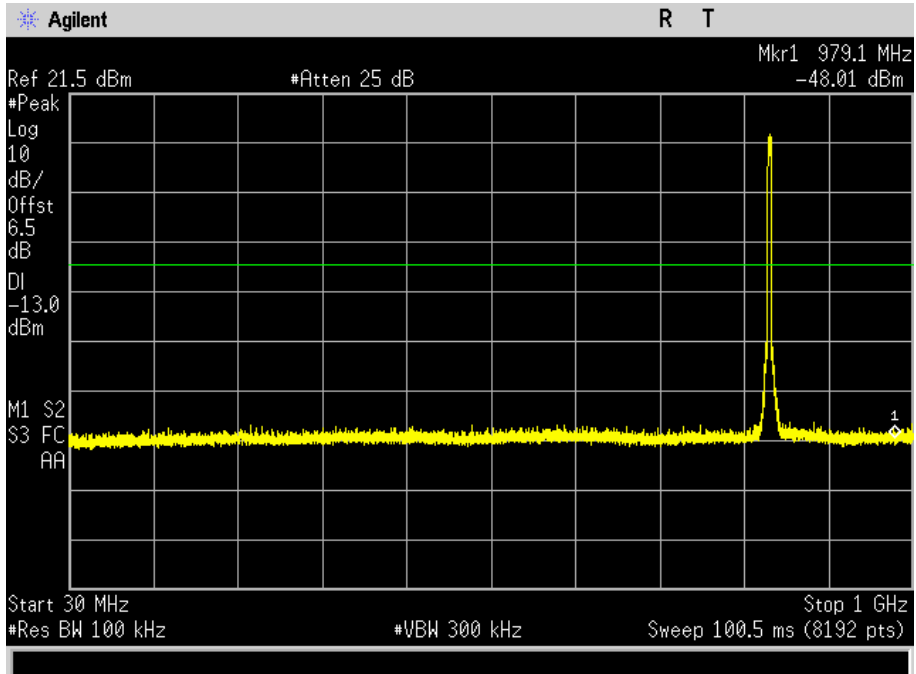


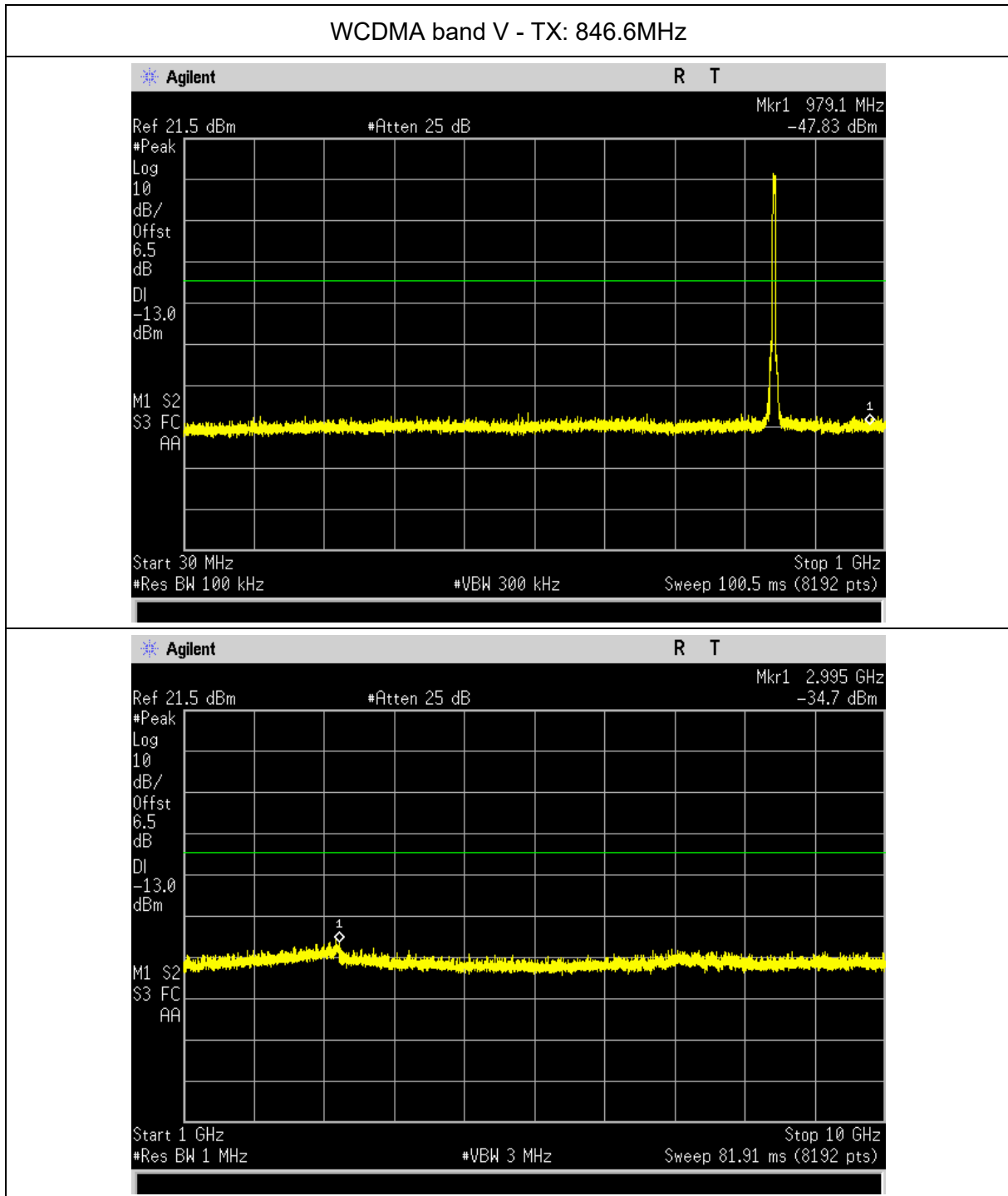






WCDMA band V - TX: 835MHz





3.4 Spurious emission at band edge

3.4.1 Limits

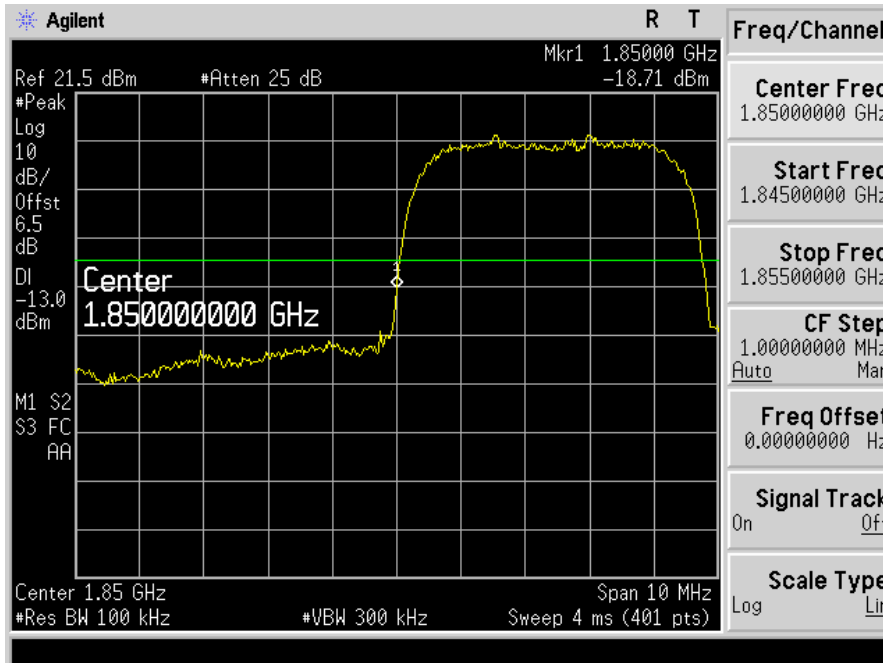
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43+10\log(P)$ dB

3.4.2 Test method

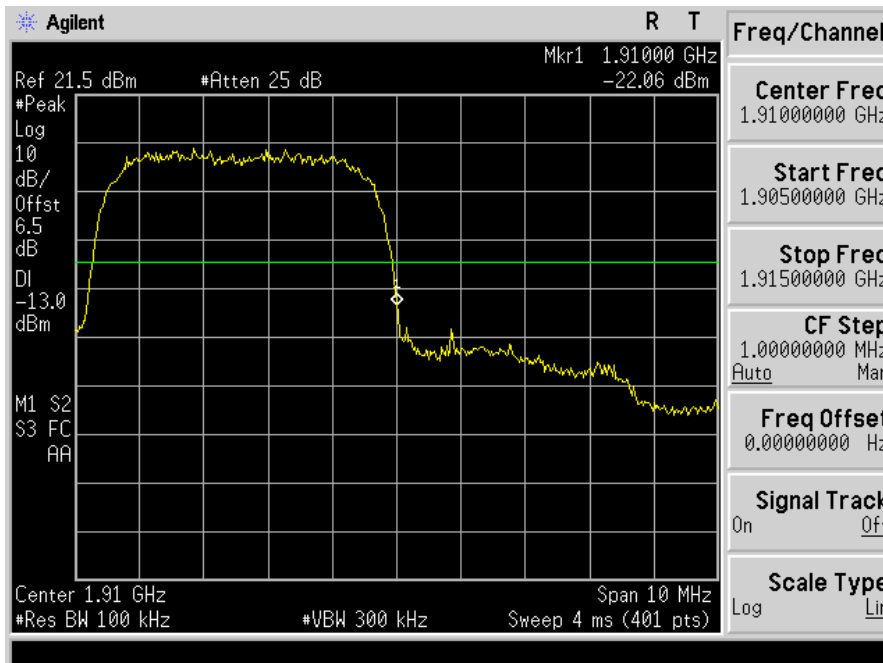
- 1, The EUT was directly connected to the spectrum analyzer and Base station via power splitter as show in the block diagram above.
- 2, Spectrum Setting:
 - GSM and PCS: RBW=3 kHz, VBW=10 kHz, Span 1 MHz, Detector: Peak Mode.
 - WCDMA: RBW=100 kHz, VBW=300 kHz, Span 5 MHz, Detector: Peak Mode.
- 3, The band edges of low and high channels for the highest RF powers were measured.

3.4.3 Test result

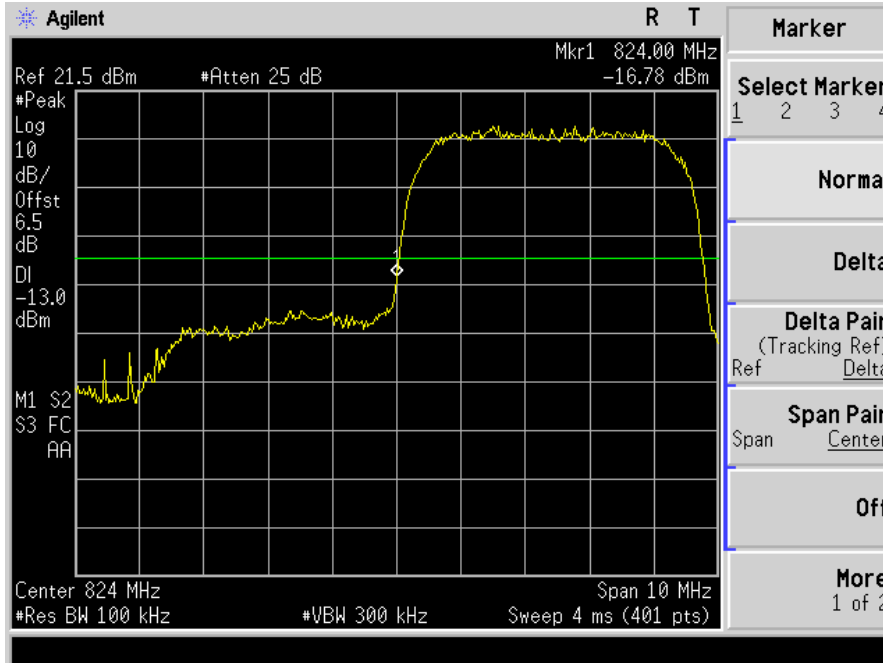
WCDMA band II - TX: 1852.4MHz



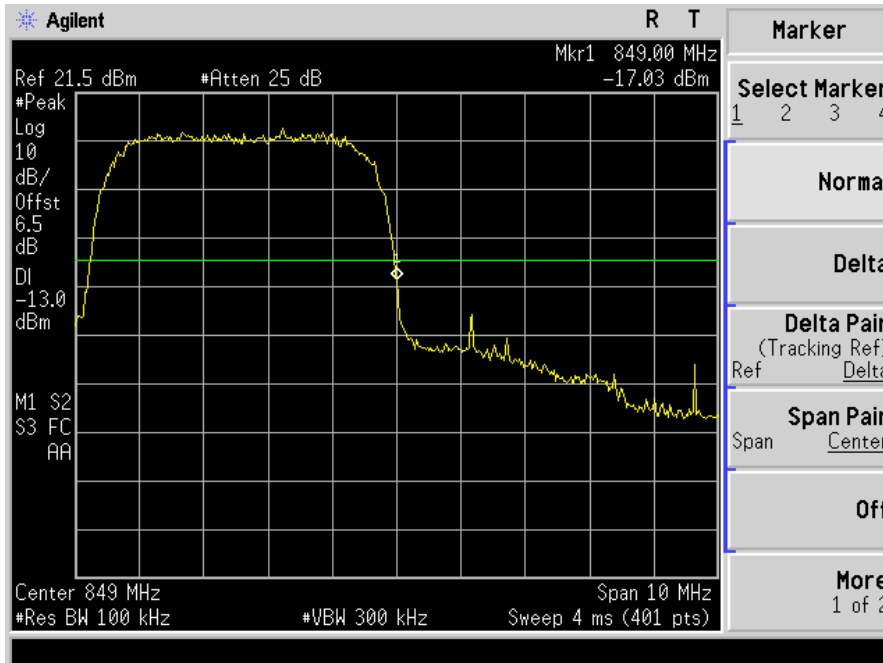
WCDMA band II - TX: 1907.6MHz



WCDMA band V - TX: 826.4MHz



WCDMA band V - TX: 846.6MHz



3.5 Radiated spurious emission

3.5.1 Limit

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

3.5.2 Test method

1. The test system setup as show in the block diagram above.
- 2, The EUT was placed on an non-conductive rotating platform in an anechoic chamber. The radiated spurious emissions from 30MHz to 10th harmonious of fundamental frequency were measured at 3 m with a test antenna and a spectrum analyzer with RBW=1 MHz, VBW=1 MHz, peak detector settings.
- 3, During the measurement, the EUT was enforced in maximum power and linked with a base station. All the spurious emissions at 3m were measured by rotation of the turntable and the test antenna raised and lowered over a range from 1 to 4 meters in both horizontally and vertically polarized orientations.
- 4, When found the maximum level of emissions from the EUT. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB= $10 \log(\text{TX power in Watts}/0.001)$ -the absolute level

Spurious attenuation limit in dB= $43+10 \log(\text{power out in Watts})$.

3.5.3 Test Result

WCDMA band II – TX 1880MHz

Frequency (MHz)	Ant. Polarization H / V	Measurement (dBm)	Limits (dBm)	Result
102.84	H	-65.34	-13	Pass
102.84	V	-64.93	-13	
3760	H	-58.77	-13	
3760	V	-57.49	-13	

WCDMA band V – TX 835MHz

Frequency (MHz)	Ant. Polarization H / V	Measurement (dBm)	Limits (dBm)	Result
102.84	H	-65.02	-13	Pass
102.84	V	-63.74	-13	
1670	H	-56.23	-13	
1670	V	-55.11	-13	

3.6 Frequency stability

3.6.1 Limit

For FCC part 22.355: the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances 2.5ppm for mobile \leq 3W condition.

For FCC part 24.235: The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

3.6.2 Test method

Test Procedures for Temperature Variation:

- 1, The EUT was set up in the thermal chamber and connected with the base station.
- 2, With power off, the temperature was decreased to -30°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 3, With power off, the temperature was raised in 10°C set up to 50°C and the EUT was stabilized for three hours. Power was applied and the maximum change in frequency was recorded within one minute.
- 4, measure the carrier frequency error.

Test Procedures for Voltage Variation:

- 1, The EUT was placed in a temperature chamber at $25\pm 5^{\circ}\text{C}$ and connected with the base station.
- 2, Reduce the primary supply voltage to the battery operating end point.
- 3, measure the carrier frequency error.

3.6.3 Test Result

WCDMA band II – TX: 1850MHz

Temperature (°C)	Voltage (V _{DC})	Carrier frequency deviation (Hz)	Deviation (ppm)
-30	7.4	-20	-0.011
-20		-21	-0.011
-10		-22	-0.012
0		-19	-0.01
10		-23	-0.012
20		-24	-0.013
30		-25	-0.013
40		-20	-0.011
50		-23	-0.012
60		-19	-0.01
25		-26	-0.014
Limit		2.5 (ppm)	
Result		PASS	

WCDMA band V – TX: 835MHz

Temperature (°C)	Voltage (V _{DC})	Carrier frequency deviation (Hz)	Deviation (ppm)
-30	7.4	-19	-0.023
-20		-17	-0.02
-10		-21	-0.025
0		-24	-0.029
10		-27	-0.032
20		-22	-0.026
30		-18	-0.022
40		-23	-0.028
50		-20	-0.024
60		-27	-0.032
25		-23	-0.028
Limit		/	
Result		PASS	

----END OF REPORT----