



**Shenzhen Global Test Service Co.,Ltd.**

No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

# TEST REPORT

## FCC Part 22 Subpart H / Part 24 Subpart E

**Report Reference No.....:** GTS20190726008-1-3-2

**FCC ID.....:** S8U-IDD-213LA

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Date of issue.....: Aug.12, 2019

**Testing Laboratory Name .....** **Shenzhen Global Test Service Co.,Ltd.**

Address ..... No.7-101 and 8A-104,Building 7 and 8,DCC Cultural and Creative Garden No.98,Pingxin North Road,Shangmugu,Pinghu Street, Longgang District,Shenzhen,Guangdong,China

**Applicant's name .....** **Sinocastel Co.,Ltd.**

Address ..... 5/F,5th Building,Software Park ,No. 2 Gaoxin C. 3rd RoadHi-Tech. Industrial Park,Shenzhen, China

**Test specification .....**

Standard ..... **FCC CFR Title 47 Part 2, Part 22H, Part 24E**  
**ANSI/TIA-603-E-2016**  
**KDB 971168 D01**

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**Test item description.....:** OBD Vehicle Tracking Device

Trade Mark ..... OBD-Smart

**Manufacturer.....:** **Sinocastel Co.,Ltd.**

Model/Type reference.....: IDD-213LA

Listed Models .....: IDD-213LA-L

Ratings .....: DC 9-36V

Modulation .....: QPSK

Hardware version .....: IDD-213L MAIN-V2.2

Software version .....: V1.0

Frequency.....: UMTS Band II, UMTS Band V

Result.....: **PASS**

# TEST REPORT

|                   |                      |               |
|-------------------|----------------------|---------------|
| Test Report No. : | GTS20190726008-1-3-2 | Aug.12, 2019  |
|                   |                      | Date of issue |

Equipment under Test : OBD Vehicle Tracking Device

Model /Type : IDD-213LA

Listed Models : IDD-213LA-L

**Applicant** : **Sinocastel Co.,Ltd.**

Address : 5/F,5th Building,Software Park ,No. 2 Gaoxin C. 3rd  
RoadHi-Tech. Industrial Park,Shenzhen, China

**Manufacturer** : **Sinocastel Co.,Ltd.**

Address : 5/F,5th Building,Software Park ,No. 2 Gaoxin C. 3rd  
RoadHi-Tech. Industrial Park,Shenzhen, China

|                    |               |
|--------------------|---------------|
| <b>Test result</b> | <b>Pass *</b> |
|--------------------|---------------|

\* In the configuration tested, the EUT complied with the standards specified page 4.

The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

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# 1 SUMMARY

## 1.1 TEST STANDARDS

The tests were performed according to following standards:

[FCC Part 2](#): FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS

[FCC Part 22 Subpart H](#): PRIVATE LAND MOBILE RADIO SERVICES.

[FCC Part 24 Subpart E](#): PUBLIC MOBILE SERVICES

[ANSI/TIA-603-E-2016](#): Land Mobile FM or PM Communications Equipment Measurement and Performance Standards.

[ANSI C63.26-2015](#): IEEE/ANSI Standard for Compliance Testing of Transmitters Used in Licensed Radio Services

[FCC KDB971168D01](#) Power Meas License Digital Systems

### Test Description

| Test Item                              | Section in CFR 47                                    | Result |
|----------------------------------------|------------------------------------------------------|--------|
| RF Output Power                        | Part 2.1046<br>Part 22.913 (a)(2)<br>Part 24.232 (c) | Pass   |
| Peak-to-Average Ratio                  | Part 24.232 (d)                                      | Pass   |
| 99% & -26 dB Occupied Bandwidth        | Part 2.1049<br>Part 22.917                           | Pass   |
| Spurious Emissions at Antenna Terminal | Part 2.1051<br>Part 22.917 (a)<br>Part 24.238 (a)    | Pass   |
| Field Strength of Spurious Radiation   | Part 2.1053<br>Part 22.917 (a)<br>Part 24.238 (a)    | Pass   |
| Out of band emission, Band Edge        | Part 22.917 (a)<br>Part 24.238 (a)                   | Pass   |
| Frequency stability                    | Part 2.1055<br>Part 22.355<br>Part 24.235            | Pass   |

## 1.2 Address of the test laboratory

### Shenzhen Global Test Service Co.,Ltd.

No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.4:2014 and CISPR 16-1-4:2010 SVSWR requirement for radiated emission above 1GHz.

## 1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

### FCC-Registration No.: 165725

Shenzhen Global Test Service Co.,Ltd EMC Laborns Commission. The acceptance letter from the FCC is maintained in our files.

atory has been registered and fully described in a report filed with the (FCC) Federal Communicatio

### A2LA-Lab Cert. No.: 4758.01

Shenzhen Global Test Service Co.,Ltd. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2005 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

### CNAS-Lab Code: L8169

Shenzhen Global Test Service Co.,Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2005 General Requirements) for the Competence of Testing and Calibration Laboratories. Date of Registration: Dec. 11, 2015. Valid time is until Dec. 10, 2024.

## 1.4 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01"Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 1"and TR-100028-02 "Electromagnetic compatibilityand Radio spectrum Matters (ERM);Uncertainties in the measurementof mobile radio equipment characteristics;Part 2 " and is documented in the Shenzhen Global Test Service Co.,Ltd.quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Hereafter the best measurement capability for Shenzhen Global Test Service Co.,Ltd.is reported:

| Test                                | Range      | Measurement Uncertainty | Notes |
|-------------------------------------|------------|-------------------------|-------|
| Radiated Emission                   | 30~1000MHz | 4.10 dB                 | (1)   |
| Radiated Emission                   | 1~18GHz    | 4.32 dB                 | (1)   |
| Radiated Emission                   | 18-40GHz   | 5.54 dB                 | (1)   |
| Conducted Disturbance               | 0.15~30MHz | 3.12 dB                 | (1)   |
| Conducted Power                     | 9KHz~18GHz | 0.61 dB                 | (1)   |
| Spurious RF Conducted Emission      | 9KHz~40GHz | 1.22 dB                 | (1)   |
| Band Edge Compliance of RF Emission | 9KHz~40GHz | 1.22 dB                 | (1)   |
| Occupied Bandwidth                  | 9KHz~40GHz | -                       | (1)   |

(1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

## 2 GENERAL INFORMATION

### 2.1 Environmental conditions

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

|                     |         |
|---------------------|---------|
| Normal Temperature: | 25°C    |
| Relative Humidity:  | 55 %    |
| Air Pressure:       | 101 kPa |

### 2.2 General Description of EUT

|                        |                                         |
|------------------------|-----------------------------------------|
| Product Name:          | OBD Vehicle Tracking Device             |
| Model/Type reference:  | IDD-213LA                               |
| Power supply:          | DC 12.0V from battery                   |
| <b>WCDMA</b>           |                                         |
| Operation Band:        | FDD Band II & Band V                    |
| Power Class:           | Power Class 3                           |
| Modulation Type:       | QPSK for WCDMA/HSUPA/HSDPA              |
| WCDMA Release Version: | R99                                     |
| HSDPA Release Version: | Release 7, CAT14                        |
| HSUPA Release Version: | Release 6, CAT6                         |
| Antenna type:          | FPC antenna                             |
| Antenna gain:          | FDD Band V:1.21dBi, FDD Band II:1.46dBi |

Note: For more details, refer to the user's manual of the EUT.

### 2.3 Description of Test Modes and Test Frequency

The EUT has been tested under typical operating condition. The CUM200 used to control the EUT staying in continuous transmitting and receiving mode for testing. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.

#### Test Frequency:

| FDD Band II |                 | FDD Band IV |                 | FDD Band V |                 |
|-------------|-----------------|-------------|-----------------|------------|-----------------|
| Channel     | Frequency (MHz) | Channel     | Frequency (MHz) | Channel    | Frequency (MHz) |
| 9262        | 1852.4          | 1312        | 1712.4          | 4132       | 826.40          |
| 9400        | 1880.0          | 1413        | 1732.6          | 4182       | 836.60          |
| 9538        | 1907.6          | 1513        | 1752.6          | 4233       | 846.60          |

### 2.4 Test Modes

The test mode(s) are selected according to relevant radio technology specifications.

| Test Mode | Test Modes Description        |
|-----------|-------------------------------|
| Mode 1    | WCDMA system, QPSK modulation |
| Mode 2    | HSDPA system, QPSK modulation |
| Mode 3    | HSUPA system, QPSK modulation |

Note:

- As WCDMA, HSDPA and HSUPA with the same emission designator, test result recorded in this report at the worst case Mode 1 only after exploratory scan.

## 2.5 Equipments Used during the Test

| Test Equipment             | Manufacturer   | Model No.             | Serial No.   | Calibration Date | Calibration Due Date |
|----------------------------|----------------|-----------------------|--------------|------------------|----------------------|
| LISN                       | R&S            | ENV216                | 3560.6550.08 | 2018/09/20       | 2019/09/19           |
| LISN                       | R&S            | ESH2-Z5               | 893606/008   | 2018/09/20       | 2019/09/19           |
| Bilog Antenna              | Schwarzbeck    | VULB9163              | 976          | 2018/09/20       | 2019/09/19           |
| Bilog Antenna              | Schwarzbeck    | VULB9163              | 979          | 2018/09/20       | 2019/09/19           |
| EMI Test Receiver          | R&S            | ESCI7                 | 101102       | 2018/09/20       | 2019/09/19           |
| Spectrum Analyzer          | Agilent        | N9020A                | MY48010425   | 2018/09/20       | 2019/09/19           |
| Spectrum Analyzer          | R&S            | FSP40                 | 100019       | 2018/06/05       | 2019/06/04           |
| Controller                 | EM Electronics | Controller EM 1000    | N/A          | N/A              | N/A                  |
| Horn Antenna               | Schwarzbeck    | BBHA 9120D            | 01622        | 2018/09/20       | 2019/09/19           |
| Horn Antenna               | Schwarzbeck    | BBHA 9120D            | 01652        | 2018/09/20       | 2019/09/19           |
| Active Loop Antenna        | SCHWARZBECK    | FMZB1519              | 1519-037     | 2018/09/20       | 2019/09/19           |
| Broadband Horn Antenna     | SCHWARZBECK    | BBHA 9170             | 971          | 2018/09/20       | 2019/09/19           |
| Amplifier                  | Schwarzbeck    | BBV 9743              | #202         | 2018/09/20       | 2019/09/19           |
| Amplifier                  | EMCI           | EMC051845B            | 980355       | 2018/09/20       | 2019/09/19           |
| Temperature/Humidity Meter | Gangxing       | CTH-608               | 02           | 2018/09/20       | 2019/09/19           |
| High-Pass Filter           | K&L            | 9SH10-2700/X12750-O/O | KL142031     | 2018/09/20       | 2019/09/19           |
| High-Pass Filter           | K&L            | 41H10-1375/U12750-O/O | KL142032     | 2018/09/20       | 2019/09/19           |
| RF Cable(below 1GHz)       | HUBER+SUHNER   | RG214                 | RE01         | 2018/09/20       | 2019/09/19           |
| RF Cable(above 1GHz)       | HUBER+SUHNER   | RG214                 | RE02         | 2018/09/20       | 2019/09/19           |
| Data acquisition card      | Agilent        | U2531A                | TW53323507   | 2018/09/20       | 2019/09/19           |
| Power Sensor               | Agilent        | U2021XA               | MY5365004    | 2018/09/20       | 2019/09/19           |
| EMI Test Software          | R&S            | ES-K1                 | V1.7.1       | 2018/09/20       | 2019/09/19           |
| EMI Test Software          | JS Tonscend    | JS32-RE               | 2.0.1.5      | 2018/09/20       | 2019/09/19           |
| EMI Test Software          | Audix          | E3                    | 2..1.1       | 2018/09/20       | 2019/09/19           |

## 2.6 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: S8U-IDD-213LA filing to comply with of the FCC Part 22 and Part 24 Rules.

## 2.7 Modifications

No modifications were implemented to meet testing criteria.

### 3 TEST CONDITIONS AND RESULTS

#### 3.1 Output Power

##### LIMIT

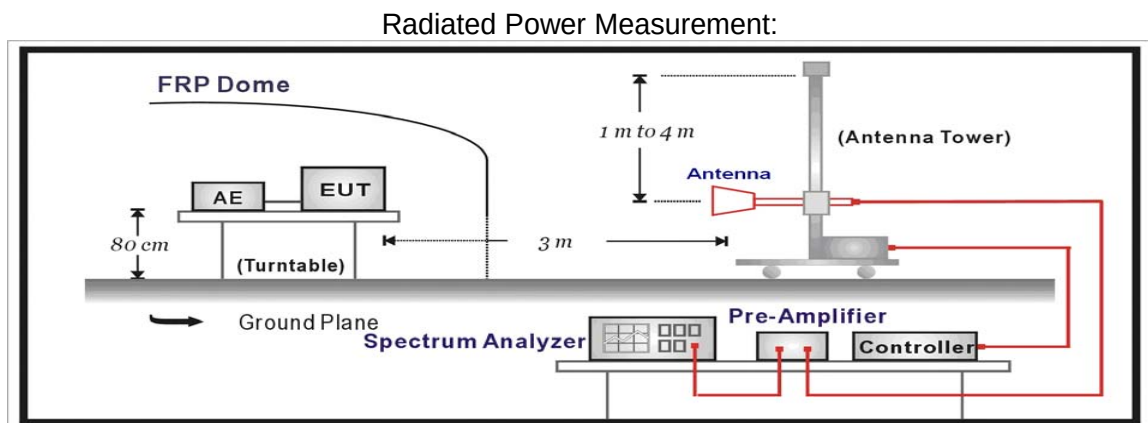
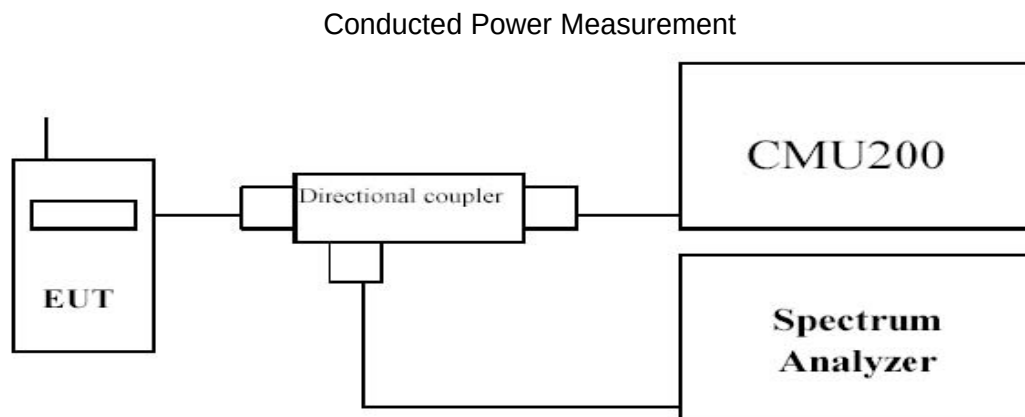
GSM850/WCDMA Band V: 7W

PCS1900/WCDMA Band II: 2W

WCDMA Band IV: 1W

The Peak-to-Average Ratio (PAR) of the transmission may not exceed 13 dB.

##### TEST CONFIGURATION



##### TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

##### **Conducted Power Measurement:**

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200 then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.

##### **Radiated Power Measurement:**

- The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- The output of the test antenna shall be connected to the measuring receiver.
- The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.



- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.

**TEST RESULTS****Conducted Measurement:**

| EUT Mode             | Channel | Frequency (MHz) | Avg.Burst Power (dBm) | Peak-to-Average Ratio (dB) | Limit (dBm) | Result |
|----------------------|---------|-----------------|-----------------------|----------------------------|-------------|--------|
| WCDMA Band II (QPSK) | 9262    | 1852.40         | 22.58                 | 3.44                       | 33.01       | Pass   |
|                      | 9400    | 1880.00         | 22.69                 | 3.75                       |             |        |
|                      | 9538    | 1907.60         | 22.46                 | 3.68                       |             |        |
| WCDMA Band V (QPSK)  | 4132    | 826.40          | 22.56                 | /                          | 38.45       | Pass   |
|                      | 4183    | 836.60          | 22.74                 | /                          |             |        |
|                      | 4233    | 846.60          | 22.65                 | /                          |             |        |

Note: 1. Peak-to-Average Ratio= maximum PK burst power-maximum Avg. burst power.

**Radiated Measurement:**

Note: 1. The field strength of radiation emission was measured in the following position: EUT stand-up position (Zaxis), lie-down position (X, Y axis). The data show in this report only with the worst case setup. After exploratory measurement the worst case of Z axis was reported.

Note: 2. We test the H direction and V direction and V direction is worse.

**WCDMA BAND II**

| Channel | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | P <sub>Ag</sub> (dB) | EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|---------|------------------------|----------------------|---------------------------------|----------------------|------------|-------------|-------------|--------------|
| 9262    | -17.32                 | 3.41                 | 10.24                           | 33.60                | 23.11      | 33.01       | 9.90        | V            |
| 9400    | -17.10                 | 3.49                 | 10.24                           | 33.60                | 23.25      | 33.01       | 9.76        | V            |
| 9538    | -17.19                 | 3.55                 | 10.23                           | 33.60                | 23.09      | 33.01       | 9.92        | V            |

**WCDMA BAND V**

| Channel | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | G <sub>a</sub> Antenna Gain(dB) | Correction (dB) | P <sub>Ag</sub> (dB) | ERP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|---------|------------------------|----------------------|---------------------------------|-----------------|----------------------|-----------|-------------|-------------|--------------|
| 4132    | -17.75                 | 2.42                 | 8.45                            | 2.15            | 36.82                | 22.95     | 38.45       | 15.50       | V            |
| 4183    | -17.49                 | 2.46                 | 8.45                            | 2.15            | 36.82                | 23.17     | 38.45       | 15.28       | V            |
| 4233    | -17.38                 | 2.53                 | 8.36                            | 2.15            | 36.82                | 23.12     | 38.45       | 15.33       | V            |

Remark:

1.  $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + P_{Ag}(dB) + G_a(dBi)$

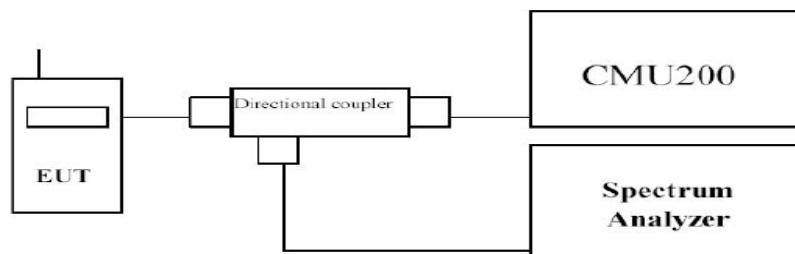
2.  $ERP = EIRP - 2.15dBi$  as EIRP by subtracting the gain of the dipole.

## 3.2 Occupied Bandwidth

### LIMIT

N/A

### TEST CONFIGURATION



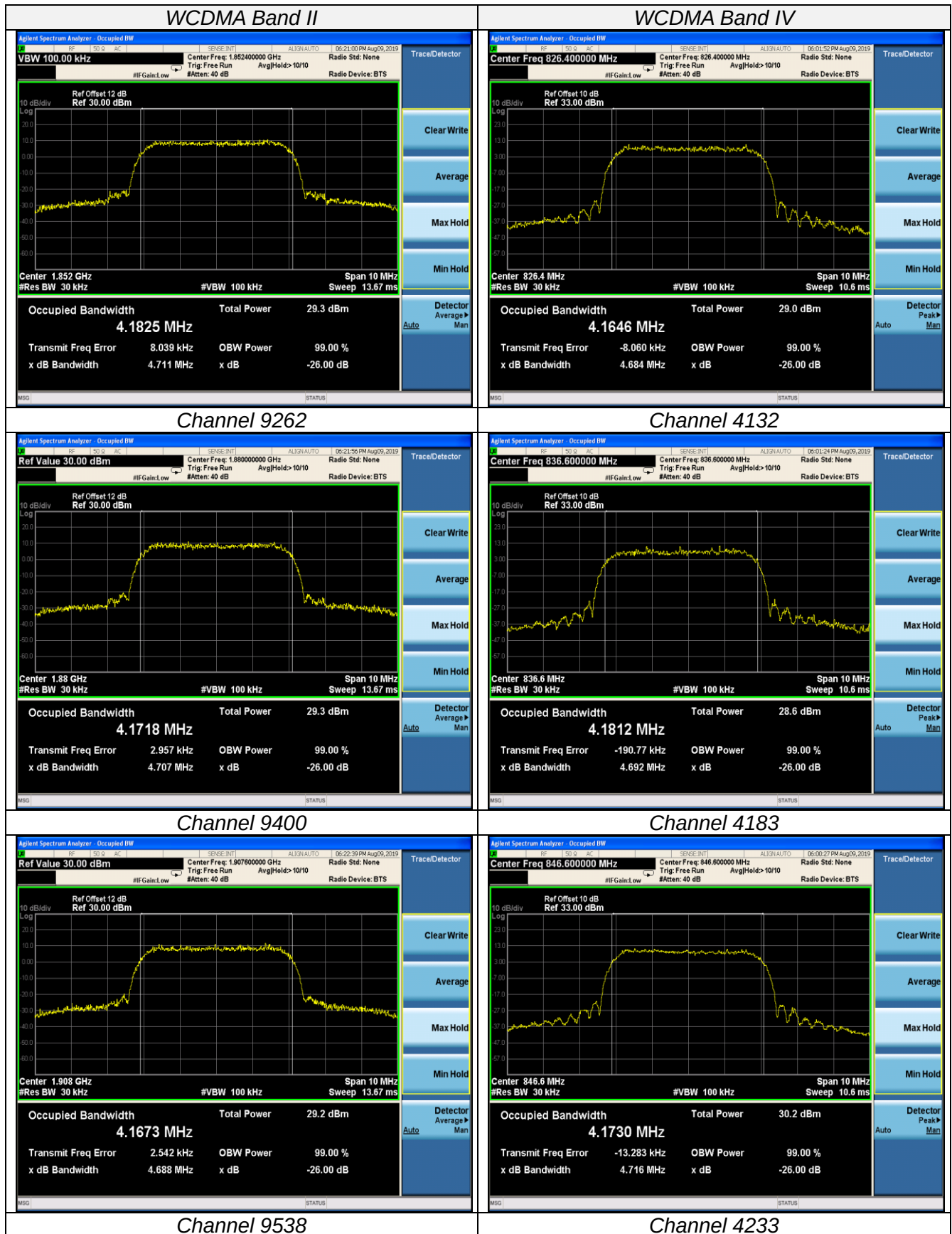
### TEST PROCEDURE

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer
2. RBW was set to about 1% of emission BW,  $VBW \geq 3$  times RBW.
3. -26dBc display line was placed on the screen (or 99% bandwidth), the occupied bandwidth is the delta frequency between the two points where the display line intersects the signal trace.

### TEST RESULTS

| EUT Mode             | Channel | Frequency (MHz) | 99% Occupy bandwidth (KHz) | -26dB bandwidth (KHz) |
|----------------------|---------|-----------------|----------------------------|-----------------------|
| WCDMA Band II (QPSK) | 9262    | 1852.4          | 4.1825                     | 4.711                 |
|                      | 9400    | 1880.0          | 4.1718                     | 4.707                 |
|                      | 9538    | 1907.6          | 4.1673                     | 4.688                 |
| WCDMA Band V (QPSK)  | 4132    | 826.4           | 4.1646                     | 4.684                 |
|                      | 4183    | 836.6           | 4.1812                     | 4.692                 |
|                      | 4233    | 846.6           | 4.1730                     | 4.716                 |

Test plots as follow:

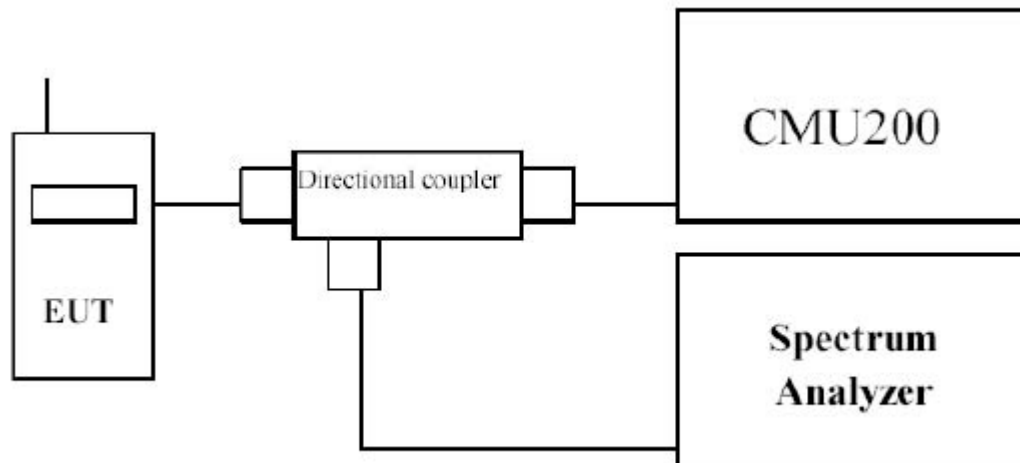


### 3.3 Band Edge compliance

#### 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.

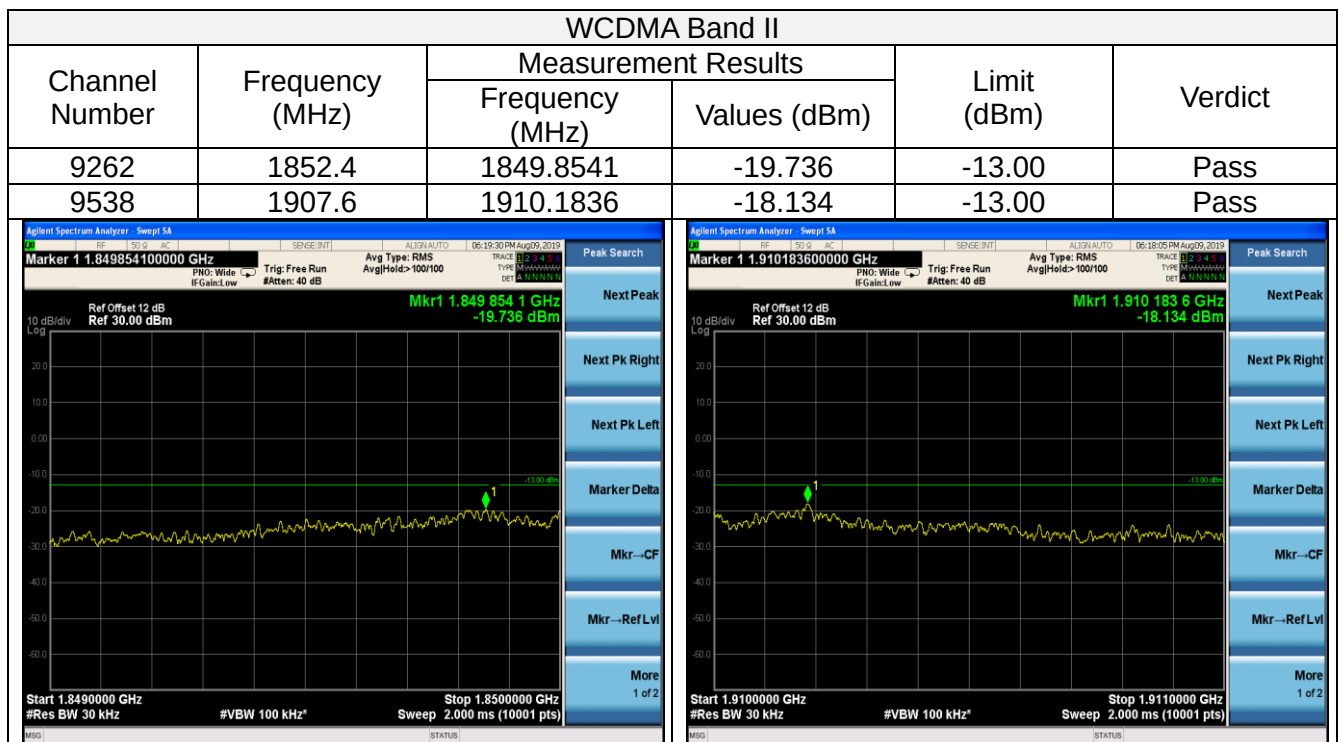
#### TEST CONFIGURATION

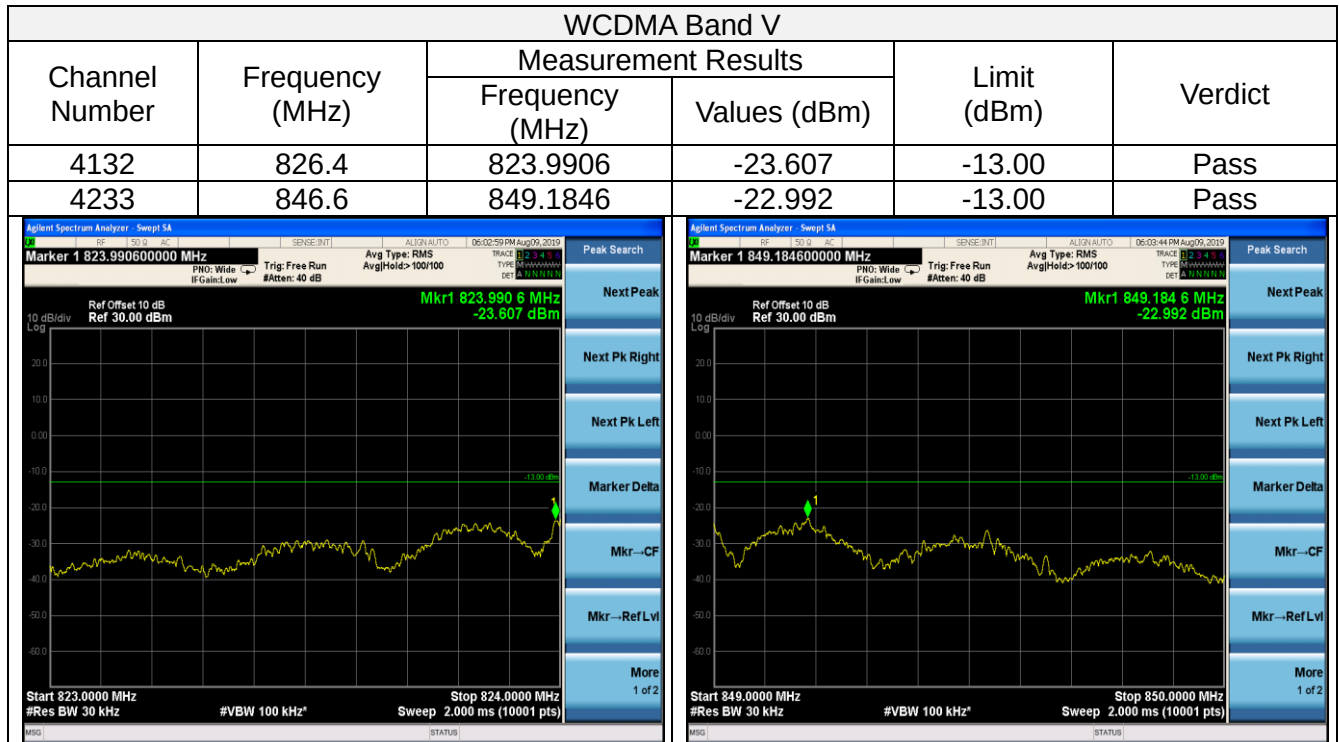


#### TEST PROCEDURE

In the 1MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to measure the out of band Emissions.

#### TEST RESULTS





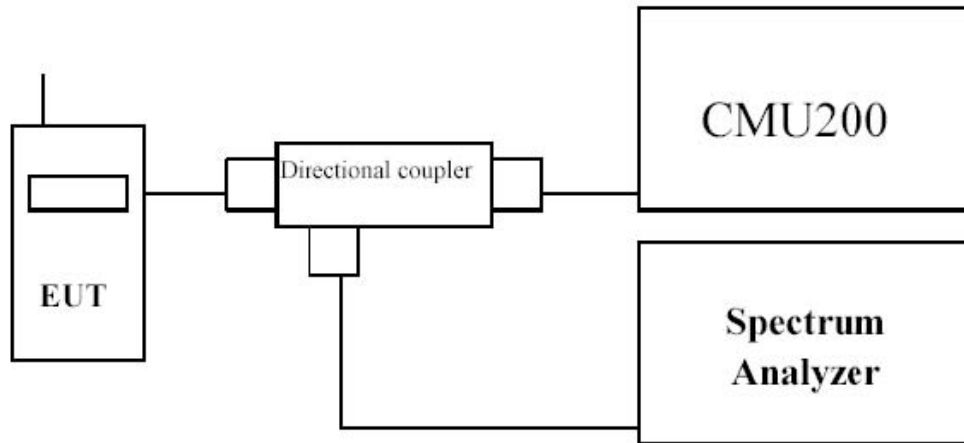
### 3.4 Spurious Emission

#### LIMIT

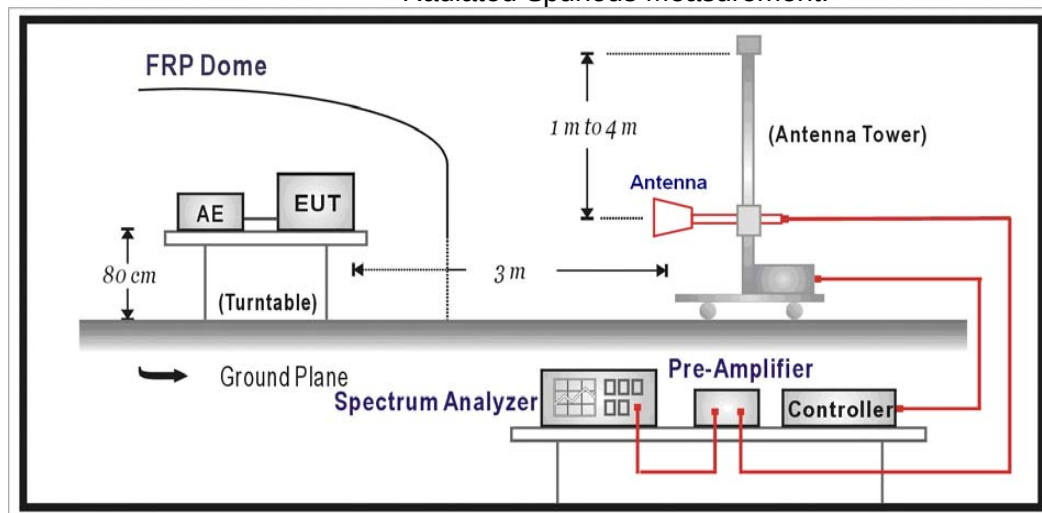
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10\log(P)$  dB.

#### TEST CONFIGURATION

Conducted Spurious Measurement:



Radiated Spurious Measurement:



#### TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

##### **Conducted Spurious Measurement:**

- Place the EUT on a bench and set it in transmitting mode.
- Connect a low loss RF cable from the antenna port to a spectrum analyzer and CMU200 by a Directional Couple.
- EUT Communicate with CMU200 then selects a channel for testing.
- Add a correction factor to the display of spectrum, and then test.
- The resolution bandwidth of the spectrum analyzer was set at 1MHz for Part 22 and 1MHz for Part 24, sufficient scans were taken to show the out of band Emission if any up to 10th harmonic.

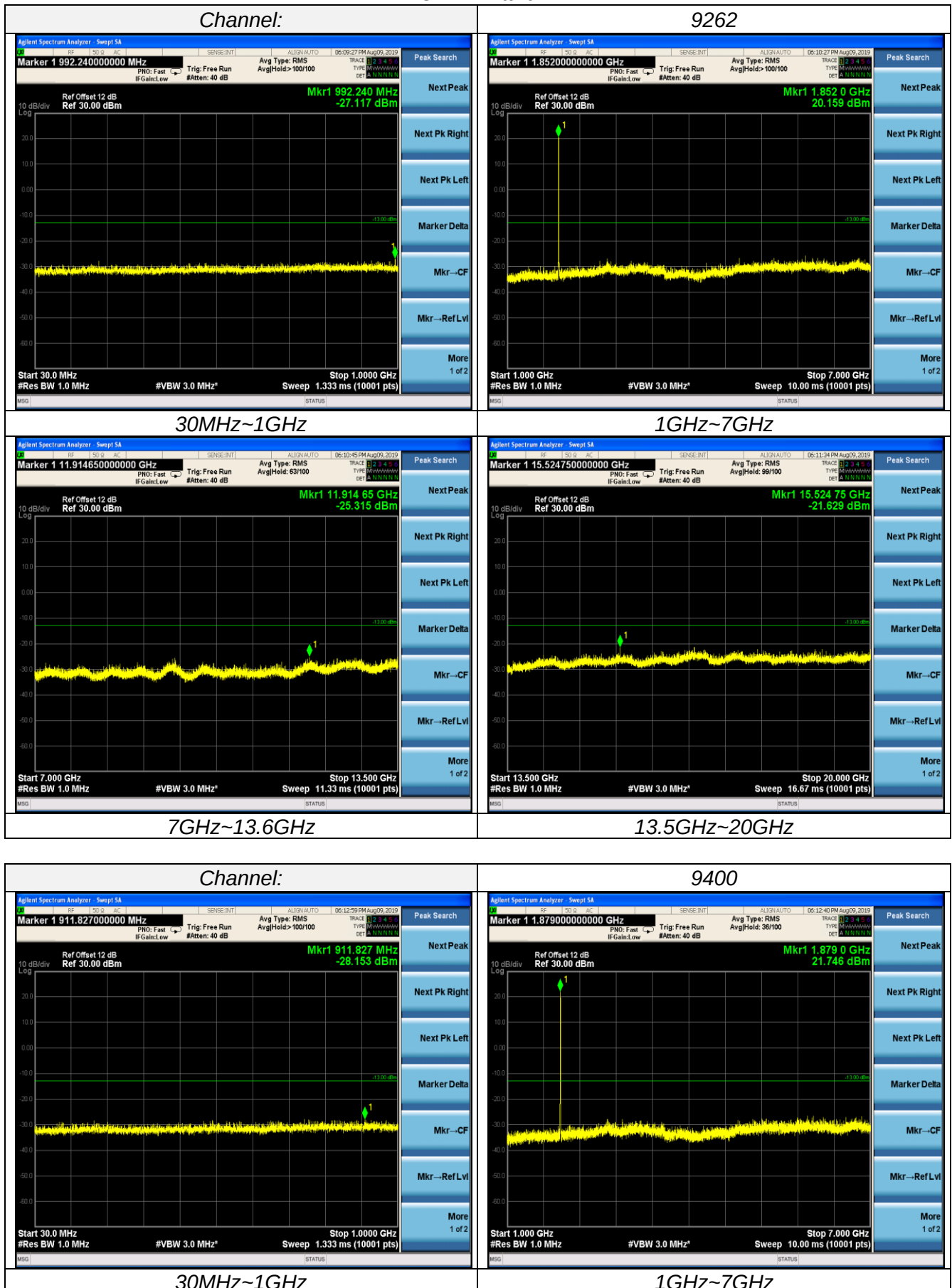
##### **Radiated Spurious Measurement:**

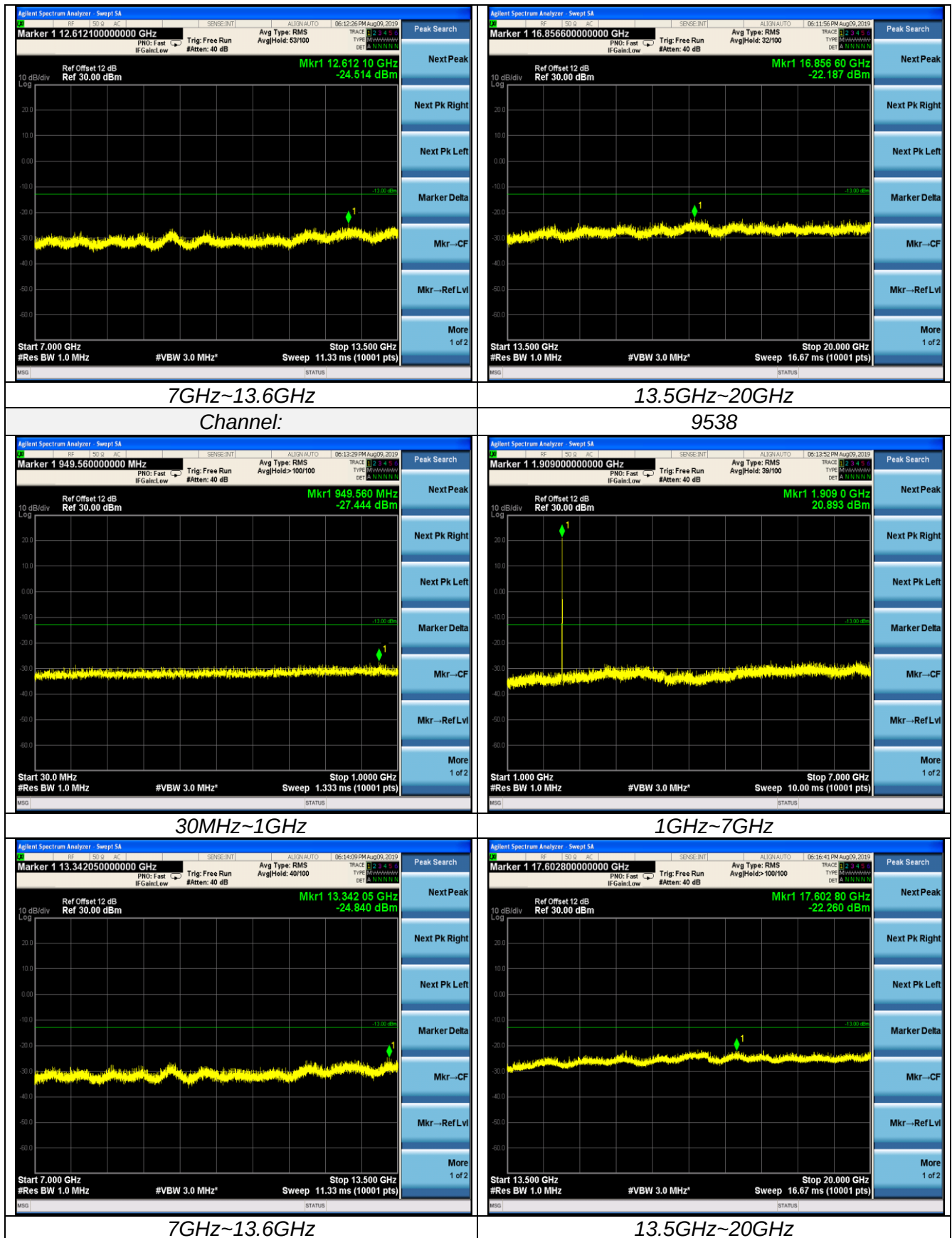
- a) The EUT shall be placed at the specified height on a support, and in the position closest to normal use as declared by provider.
- b) The test antenna shall be oriented initially for vertical polarization and shall be chosen to correspond to the frequency of the transmitter
- c) The output of the test antenna shall be connected to the measuring receiver.
- d) The transmitter shall be switched on and the measuring receiver shall be tuned to the frequency of the transmitter under test.
- e) The test antenna shall be raised and lowered through the specified range of height until a maximum signal level is detected by the measuring receiver.
- f) The transmitter shall then be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
- g) The test antenna shall be raised and lowered again through the specified range of height until a maximum signal level is detected by the measuring receiver.
- h) The maximum signal level detected by the measuring receiver shall be noted.
- i) The transmitter shall be replaced by a substitution antenna.
- j) The substitution antenna shall be orientated for vertical polarization and the length of the substitution antenna shall be adjusted to correspond to the frequency of the transmitter.
- k) The substitution antenna shall be connected to a calibrated signal generator.
- l) If necessary, the input attenuator setting of the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
- m) The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
- n) The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, that is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
- o) The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.
- p) The measure of the effective radiated power is the larger of the two levels recorded at the input to the substitution antenna, corrected for gain of the substitution antenna if necessary.
- q) The resolution bandwidth of the spectrum analyzer was set at 100 kHz for Part 22 and 1MHz for Part 24. The frequency range was checked up to 10th harmonic.



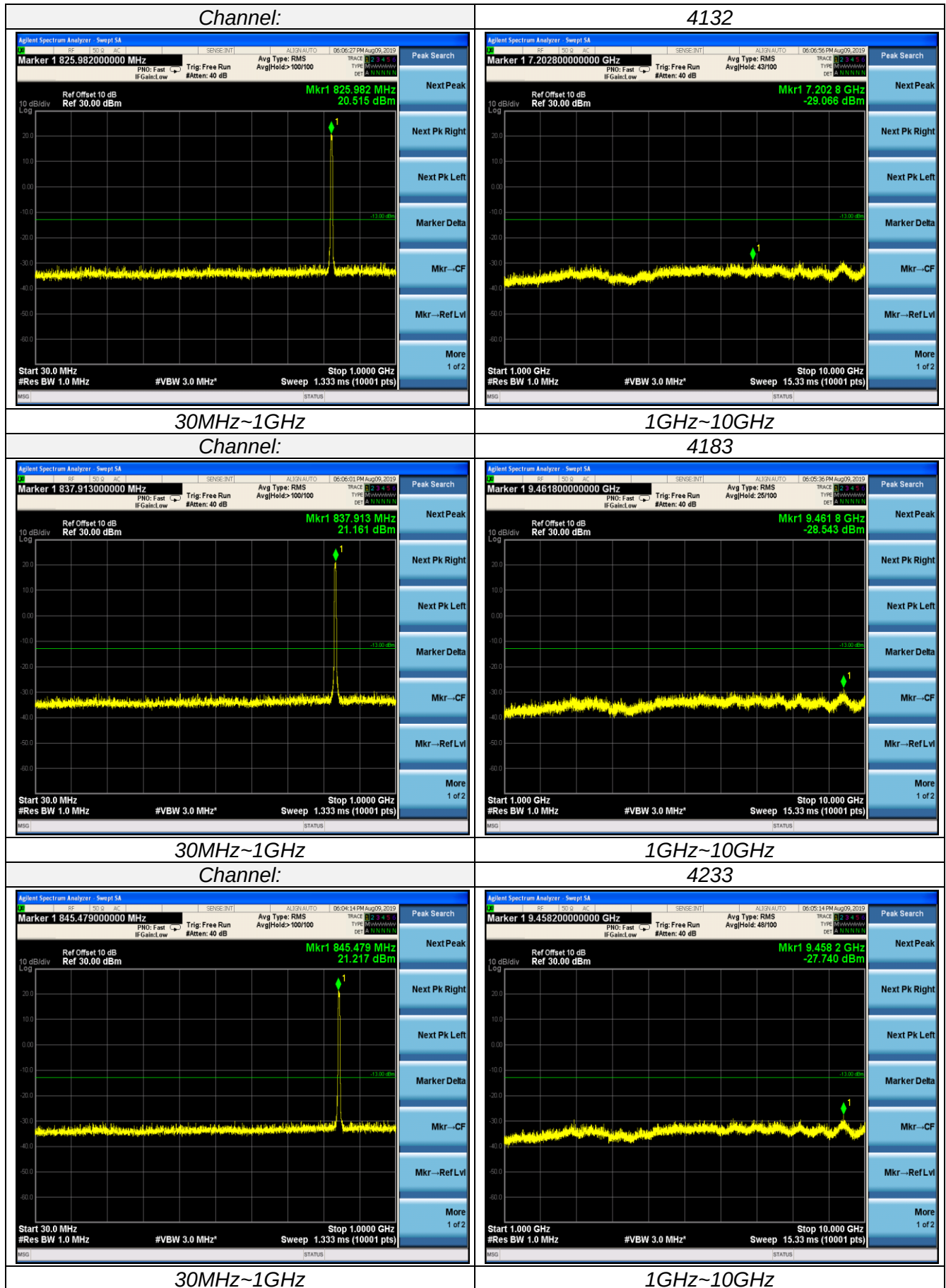
**TEST RESULTS**

Conducted Measurement:

**WCDMA Band II**



## WCDMA Band V



**Radiated Measurement:****WCDMA Band II**

| Channel | Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Distance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|---------|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 9262    | 3704.80         | -36.49                 | 4.27                 | 3.00     | 12.34                           | -28.42          | -13.00      | 15.42       | H            |
|         | 5557.20         | -39.79                 | 4.99                 | 3.00     | 13.52                           | -31.26          | -13.00      | 18.26       | H            |
|         | 3704.80         | -35.29                 | 4.27                 | 3.00     | 12.34                           | -27.22          | -13.00      | 14.22       | V            |
|         | 5557.20         | -37.82                 | 4.99                 | 3.00     | 13.52                           | -29.29          | -13.00      | 16.29       | V            |
| 9400    | 3760.00         | -37.83                 | 4.38                 | 3.00     | 12.34                           | -29.87          | -13.00      | 16.87       | H            |
|         | 5640.00         | -41.23                 | 5.01                 | 3.00     | 13.58                           | -32.66          | -13.00      | 19.66       | H            |
|         | 3760.00         | -36.83                 | 4.38                 | 3.00     | 12.34                           | -28.87          | -13.00      | 15.87       | V            |
|         | 5640.00         | -38.72                 | 5.01                 | 3.00     | 13.58                           | -30.15          | -13.00      | 17.15       | V            |
| 9538    | 3815.20         | -35.37                 | 4.47                 | 3.00     | 12.45                           | -27.39          | -13.00      | 14.39       | H            |
|         | 5722.80         | -41.01                 | 5.23                 | 3.00     | 13.66                           | -32.58          | -13.00      | 19.58       | H            |
|         | 3815.20         | -34.85                 | 4.47                 | 3.00     | 12.45                           | -26.87          | -13.00      | 13.87       | V            |
|         | 5722.80         | -38.85                 | 5.23                 | 3.00     | 13.66                           | -30.42          | -13.00      | 17.42       | V            |

**WCDMA Band V**

| Channel | Frequency (MHz) | P <sub>Mea</sub> (dBm) | P <sub>cl</sub> (dB) | Distance | G <sub>a</sub> Antenna Gain(dB) | Peak EIRP (dBm) | Limit (dBm) | Margin (dB) | Polarization |
|---------|-----------------|------------------------|----------------------|----------|---------------------------------|-----------------|-------------|-------------|--------------|
| 9262    | 1652.80         | -35.93                 | 3.02                 | 3.00     | 9.58                            | -29.37          | -13.00      | 16.37       | H            |
|         | 2479.20         | -39.65                 | 3.51                 | 3.00     | 10.72                           | -32.44          | -13.00      | 19.44       | H            |
|         | 1652.80         | -34.91                 | 3.02                 | 3.00     | 9.68                            | -28.25          | -13.00      | 15.25       | V            |
|         | 2479.20         | -37.89                 | 3.51                 | 3.00     | 10.72                           | -30.68          | -13.00      | 17.68       | V            |
| 9400    | 1673.20         | -35.13                 | 3.14                 | 3.00     | 9.61                            | -28.66          | -13.00      | 15.66       | H            |
|         | 2509.80         | -38.06                 | 3.59                 | 3.00     | 10.77                           | -30.88          | -13.00      | 17.88       | H            |
|         | 1673.20         | -32.73                 | 3.14                 | 3.00     | 9.61                            | -26.26          | -13.00      | 13.26       | V            |
|         | 2509.80         | -36.16                 | 3.59                 | 3.00     | 10.77                           | -28.98          | -13.00      | 15.98       | V            |
| 9538    | 1693.20         | -36.82                 | 3.24                 | 3.00     | 9.77                            | -30.29          | -13.00      | 17.29       | H            |
|         | 2539.80         | -40.78                 | 3.65                 | 3.00     | 10.89                           | -33.54          | -13.00      | 20.54       | H            |
|         | 1693.20         | -36.40                 | 3.24                 | 3.00     | 9.77                            | -29.87          | -13.00      | 16.87       | V            |
|         | 2539.80         | -38.81                 | 3.65                 | 3.00     | 10.89                           | -31.57          | -13.00      | 18.57       | V            |

Remark:

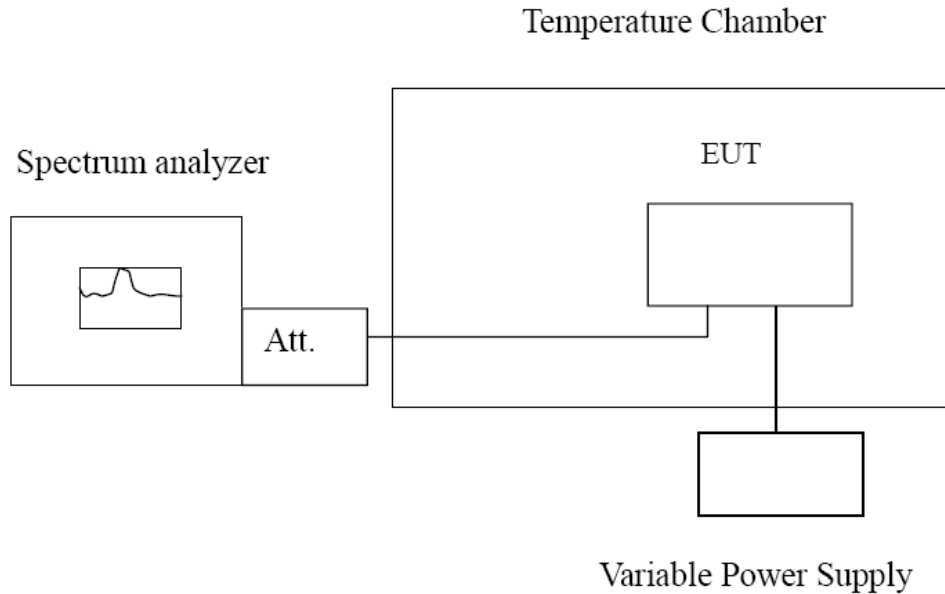
1.  $EIRP = P_{Mea}(dBm) - P_{cl}(dB) + G_a(dBi)$
2. We were not recorded other points as values lower than limits.
3.  $Margin = Limit - EIRP$

### 3.5 Frequency Stability under Temperature & Voltage Variations

#### LIMIT

Cellular Band:  $\pm 2.5$ ppm PCS Band: Within the authorized frequency block

#### TEST CONFIGURATION



#### TEST PROCEDURE

The EUT was setup according to EIA/TIA 603C

##### **Frequency Stability under Temperature Variations:**

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30°C. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C increased per stage until the highest temperature of +50°C reached.

##### **Frequency Stability under Voltage Variations:**

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ( $\pm 15\%$ ) and endpoint, record the maximum frequency change.

#### TEST RESULTS

| Reference Frequency: WCDMA Band II Middle channel=9400 channel=1880MHz |                  |                 |       |                                       |        |
|------------------------------------------------------------------------|------------------|-----------------|-------|---------------------------------------|--------|
| Voltage ( V )                                                          | Temperature (°C) | Frequency error |       | Limit (ppm)                           | Result |
|                                                                        |                  | Hz              | ppm   |                                       |        |
| 12.00                                                                  | -30              | 84.65           | 0.045 | Within the authorized frequency block | Pass   |
|                                                                        | -20              | 44.23           | 0.024 |                                       |        |
|                                                                        | -10              | 87.56           | 0.047 |                                       |        |
|                                                                        | 0                | 47.19           | 0.025 |                                       |        |
|                                                                        | 10               | 39.39           | 0.021 |                                       |        |
|                                                                        | 20               | 65.40           | 0.035 |                                       |        |
|                                                                        | 30               | 36.38           | 0.019 |                                       |        |
|                                                                        | 40               | 43.92           | 0.023 |                                       |        |
|                                                                        | 50               | 57.21           | 0.030 |                                       |        |
| 13.80                                                                  | 25               | 52.20           | 0.028 | 2.5                                   | Pass   |
| End point 10.20                                                        | 25               | 63.09           | 0.034 |                                       |        |

| Reference Frequency: WCDMA Band V Middle channel=4182 channel=836.6MHz |                  |                 |       |             |        |
|------------------------------------------------------------------------|------------------|-----------------|-------|-------------|--------|
| Voltage ( V )                                                          | Temperature (°C) | Frequency error |       | Limit (ppm) | Result |
|                                                                        |                  | Hz              | ppm   |             |        |
| 12.00                                                                  | -30              | 76.98           | 0.092 | 2.5         | Pass   |
|                                                                        | -20              | 44.74           | 0.053 |             |        |
|                                                                        | -10              | 33.38           | 0.040 |             |        |
|                                                                        | 0                | 63.03           | 0.075 |             |        |
|                                                                        | 10               | 41.69           | 0.050 |             |        |
|                                                                        | 20               | 55.91           | 0.067 |             |        |
|                                                                        | 30               | 41.77           | 0.050 |             |        |
|                                                                        | 40               | 91.75           | 0.110 |             |        |
|                                                                        | 50               | 84.25           | 0.101 |             |        |
| 13.80                                                                  | 25               | 66.18           | 0.079 | 2.5         | Pass   |
| End point 10.20                                                        | 25               | 87.63           | 0.105 |             |        |

#### 4 Test Setup Photos of the EUT



## **5 Photos of the EUT**

Reference to the test report No. GTS20190726008-1-3-1

**\*\*\*\*\* End of Report \*\*\*\*\***