

# EMC Test Report

**Project Number:** 4049639

**Report Number:** 4049639EMC01

**Revision Level:** 0

**Client:** Continental Automotive Systems, Inc.

**Equipment Under Test:** Wireless Modem Module

**Model:** CUW

**FCC ID:** LHJ-CUW

**FCC Rule Parts:** Part 24E

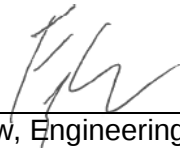
**Industry Canada:** RSS-GEN, Issue 4

**RSS-133, Issue 6**

**Report issued on:** 09 November 2016

**Test Result:** Compliant

**Tested by:**

  
Fendy Liauw, Engineering Technician

**Reviewed by:**

  
Jeremy Pickens, Senior EMC Engineer

**Remarks:**

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or Testing done by SGS International Electrical Approvals in connection with distribution or use of the product described in this report must be approved by SGS international Electrical Approvals in writing.

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# 1 Summary of Test Results

| Reference Sections  |                                   | Test Description                         | Test Limit                                                                       | Test Condition | Test Result |
|---------------------|-----------------------------------|------------------------------------------|----------------------------------------------------------------------------------|----------------|-------------|
| FCC                 | IC                                |                                          |                                                                                  |                |             |
| 2.1046              | RSS-GEN (6.12)                    | Conducted Output Power                   | N/A                                                                              | Conducted      | Pass        |
| 24.232(d)           | RSS-133 (6.4)                     | Peak-to-Average Ratio                    | <13 dB                                                                           |                | Pass        |
| 2.1049<br>24.238(a) | RSS-GEN (6.6)<br>RSS-133 (2.3)    | Occupied Bandwidth                       | N/A                                                                              |                | Reported    |
| 2.1051<br>24.238(a) | RSS-133 (6.5.1)                   | Band Edge / Conducted Spurious Emissions | $< 43 + 10\log_{10}(P_{[Watts]})$ at band edge and for all out of band emissions |                | Pass        |
| 2.1055<br>24.238(a) | RSS-GEN (6.11)<br>RSS-133 (6.3)   | Frequency Stability                      | <2.5 ppm                                                                         |                | Pass        |
| 24.232(c)           | RSS-133 (6.4)                     | Effective Isotropic Radiated Power       | < 1 Watts max EIRP                                                               | Radiated       | Pass        |
| 2.1053<br>24.238(a) | RSS-GEN (6.13)<br>RSS-133 (6.5.1) | Radiated Spurious Emissions              | $< 43 + 10\log_{10}(P_{[Watts]})$ at band edge and for all out of band emissions |                | Pass        |

## 1.1 Modifications Required to Compliance

None

## 2 General Information

### 2.1 Client Information

Name: Continental Automotive System, Inc.  
Address: 21440 West Lake Cook Road  
City, State, Zip, Country: Deer Park, IL 60010, USA

### 2.2 Test Laboratory

Name: SGS North America, Inc.  
Address: 620 Old Peachtree Road NW, Suite 100  
City, State, Zip, Country: Suwanee, GA 30024, USA

### 2.3 General Information of EUT

Type of Product: Wireless Modem Module  
Model Number: CUW  
Serial Number: Not Labeled

FCC ID: LHJ- CUW

IMEI Number: 352599076105365

Rated Voltage: 10.2 – 13.8 Vdc  
Test Voltage: 12 Vdc,  
Tx Frequency Range: 1850 - 1910 MHz (WCDMA Band II)

FCC Classification: PCS Licensed Transmitter PCB  
Type: Pre Production

Sample Received Date: 26 September 2016  
Dates of testing: 20 October – 09 November 2016

### 2.4 Operating Modes and Conditions

The EUT was exercised by connecting a CMW communications tester to the device. The CMW was used to control signaling and channel during testing.

### 3 RF Output Power

#### 3.1 Test Result

| Test Description | Basic Standards                   | Test Result |
|------------------|-----------------------------------|-------------|
| RF Output Power  | FCC Part 2.1046<br>RSS-GEN (6.12) | Compliant   |

#### 3.2 Test Method

The EUT was directly connected to a Radio Communication Tester (CMW 500) and a radio link was established. The output power of the EUT was set to maximum value by using the maximum power setting on the CMW. The output power was measured using the CMW internal measurement functions.

#### 3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 22.2 °C

Relative Humidity: 52.4%

Atmospheric Pressure: 97.9 kPa

#### 3.4 Test Equipment

Test Date: 20-Oct-2016

Tester: JOP

| Equipment                              | Model  | Manufacturer    | Asset Number | Cal Due Date |
|----------------------------------------|--------|-----------------|--------------|--------------|
| WIDEBAND RADIO<br>COMMUNICATION TESTER | CMW500 | ROHDE & SCHWARZ | B094874      | 19-Jan-2018  |
| RF CABLE                               | 141    | HUBER & SUHNER  | B095585      | 26-Jul-2017  |

- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 2 year calibration cycle.

### 3.5 Test Data - WCDMA Band II

Max Power: 22.55 dBm / 0.180W

| Band   | UpLink Channel | UL Frequency (MHz) | Subtest  | Modulation | Measured Power (dBm) | Cable Loss (dB) | Conducted Power (dBm) |
|--------|----------------|--------------------|----------|------------|----------------------|-----------------|-----------------------|
| Band 2 | 9262           | 1852.4             | Subtest1 | QPSK       | 21.78                | 0.53            | 22.31                 |
| Band 2 | 9400           | 1880               | Subtest1 | QPSK       | 21.76                | 0.53            | 22.29                 |
| Band 2 | 9538           | 1907.6             | Subtest1 | QPSK       | 21.51                | 0.53            | 22.04                 |
| Band 2 | 9262           | 1852.4             | Subtest2 | QPSK       | 21.69                | 0.53            | 22.22                 |
| Band 2 | 9400           | 1880               | Subtest2 | QPSK       | 21.8                 | 0.53            | 22.33                 |
| Band 2 | 9538           | 1907.6             | Subtest2 | QPSK       | 21.59                | 0.53            | 22.12                 |
| Band 2 | 9262           | 1852.4             | Subtest3 | QPSK       | 21.17                | 0.53            | 21.7                  |
| Band 2 | 9400           | 1880               | Subtest3 | QPSK       | 21.24                | 0.53            | 21.77                 |
| Band 2 | 9538           | 1907.6             | Subtest3 | QPSK       | 20.98                | 0.53            | 21.51                 |
| Band 2 | 9262           | 1852.4             | Subtest4 | QPSK       | 21.13                | 0.53            | 21.66                 |
| Band 2 | 9400           | 1880               | Subtest4 | QPSK       | 21.12                | 0.53            | 21.65                 |
| Band 2 | 9538           | 1907.6             | Subtest4 | QPSK       | 20.98                | 0.53            | 21.51                 |
| Band 2 | 9262           | 1852.4             | Subtest1 | QPSK       | 21.78                | 0.53            | 22.31                 |
| Band 2 | 9262           | 1852.4             | Subtest1 | 16QAM      | 21.71                | 0.53            | 22.24                 |
| Band 2 | 9400           | 1880               | Subtest1 | QPSK       | 21.76                | 0.53            | 22.29                 |
| Band 2 | 9400           | 1880               | Subtest1 | 16QAM      | 21.74                | 0.53            | 22.27                 |
| Band 2 | 9538           | 1907.6             | Subtest1 | QPSK       | 21.51                | 0.53            | 22.04                 |
| Band 2 | 9538           | 1907.6             | Subtest1 | 16QAM      | 21.5                 | 0.53            | 22.03                 |
| Band 2 | 9262           | 1852.4             | Subtest2 | QPSK       | 21.69                | 0.53            | 22.22                 |
| Band 2 | 9262           | 1852.4             | Subtest2 | 16QAM      | 21.81                | 0.53            | 22.34                 |
| Band 2 | 9400           | 1880               | Subtest2 | QPSK       | 21.8                 | 0.53            | 22.33                 |
| Band 2 | 9400           | 1880               | Subtest2 | 16QAM      | 21.8                 | 0.53            | 22.33                 |
| Band 2 | 9538           | 1907.6             | Subtest2 | QPSK       | 21.59                | 0.53            | 22.12                 |
| Band 2 | 9538           | 1907.6             | Subtest2 | 16QAM      | 21.57                | 0.53            | 22.1                  |
| Band 2 | 9262           | 1852.4             | Subtest3 | QPSK       | 21.17                | 0.53            | 21.7                  |
| Band 2 | 9262           | 1852.4             | Subtest3 | 16QAM      | 21.15                | 0.53            | 21.68                 |
| Band 2 | 9400           | 1880               | Subtest3 | QPSK       | 21.24                | 0.53            | 21.77                 |
| Band 2 | 9400           | 1880               | Subtest3 | 16QAM      | 21.22                | 0.53            | 21.75                 |
| Band 2 | 9538           | 1907.6             | Subtest3 | QPSK       | 20.98                | 0.53            | 21.51                 |
| Band 2 | 9538           | 1907.6             | Subtest3 | 16QAM      | 21.08                | 0.53            | 21.61                 |
| Band 2 | 9262           | 1852.4             | Subtest4 | QPSK       | 21.13                | 0.53            | 21.66                 |
| Band 2 | 9262           | 1852.4             | Subtest4 | 16QAM      | 21.16                | 0.53            | 21.69                 |
| Band 2 | 9400           | 1880               | Subtest4 | QPSK       | 21.12                | 0.53            | 21.65                 |
| Band 2 | 9400           | 1880               | Subtest4 | 16QAM      | 21.25                | 0.53            | 21.78                 |
| Band 2 | 9538           | 1907.6             | Subtest4 | QPSK       | 20.98                | 0.53            | 21.51                 |
| Band 2 | 9538           | 1907.6             | Subtest4 | 16QAM      | 21.08                | 0.53            | 21.61                 |
| Band 2 | 9262           | 1852.4             | Subtest1 | QPSK       | 21.02                | 0.53            | 21.55                 |
| Band 2 | 9400           | 1880               | Subtest1 | QPSK       | 21.08                | 0.53            | 21.61                 |
| Band 2 | 9538           | 1907.6             | Subtest1 | QPSK       | 21.43                | 0.53            | 21.96                 |
| Band 2 | 9262           | 1852.4             | Subtest2 | QPSK       | 20.5                 | 0.53            | 21.03                 |
| Band 2 | 9400           | 1880               | Subtest2 | QPSK       | 20.11                | 0.53            | 20.64                 |
| Band 2 | 9538           | 1907.6             | Subtest2 | QPSK       | 20.26                | 0.53            | 20.79                 |
| Band 2 | 9262           | 1852.4             | Subtest3 | QPSK       | 20.67                | 0.53            | 21.2                  |
| Band 2 | 9400           | 1880               | Subtest3 | QPSK       | 20.24                | 0.53            | 20.77                 |
| Band 2 | 9538           | 1907.6             | Subtest3 | QPSK       | 20.41                | 0.53            | 20.94                 |
| Band 2 | 9262           | 1852.4             | Subtest4 | QPSK       | 20.62                | 0.53            | 21.15                 |
| Band 2 | 9400           | 1880               | Subtest4 | QPSK       | 20.83                | 0.53            | 21.36                 |
| Band 2 | 9538           | 1907.6             | Subtest4 | QPSK       | 20.43                | 0.53            | 20.96                 |
| Band 2 | 9262           | 1852.4             | Subtest5 | QPSK       | 21.5                 | 0.53            | 22.03                 |
| Band 2 | 9400           | 1880               | Subtest5 | QPSK       | 22.02                | 0.53            | 22.55                 |
| Band 2 | 9538           | 1907.6             | Subtest5 | QPSK       | 21.3                 | 0.53            | 21.83                 |

## 4 Peak to Average Ratio

### 4.1 Test Result

| Test Description      | Basic Standards            | Test Result |
|-----------------------|----------------------------|-------------|
| Peak to Average Ratio | 24.232(d)<br>RSS-133 (6.4) | Pass        |

### 4.2 Test Method

KDB document 971168 D01 Power Meas License Digital Systems v02r02 was used to determine peak-to-average ratio. For the measurements, Clause 5.7.1 was used which defined the measurement method using the CCDF function of the spectrum analyzer. Measurements were recorded at the mid channels at the highest power.

### 4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.5 °C

Relative Humidity: 36.3%

Atmospheric Pressure: 98.7 kPa

### 4.4 Test Equipment

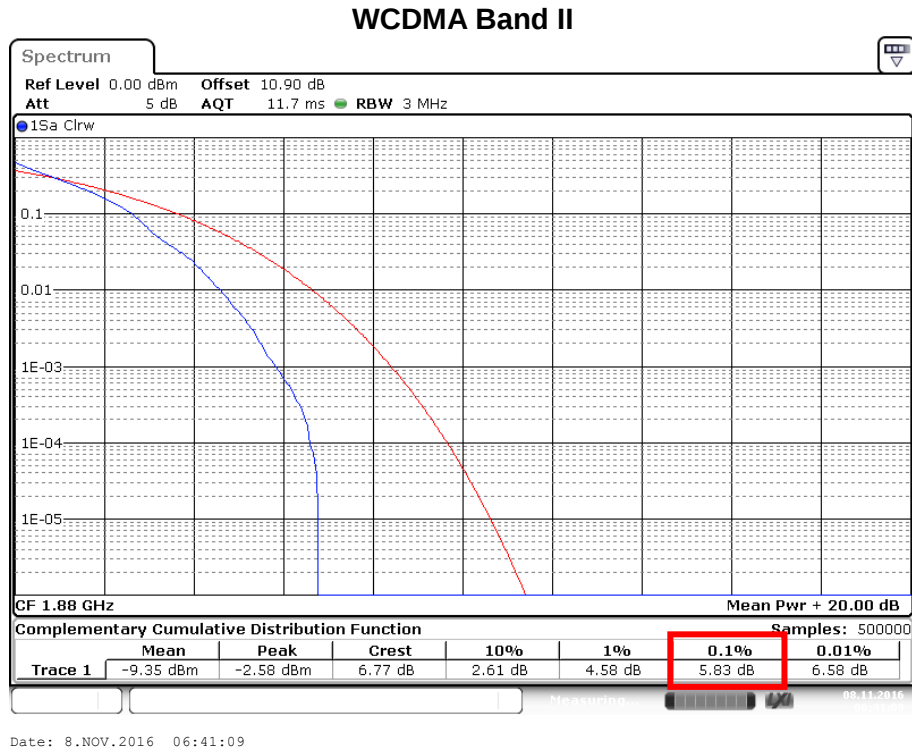
Test Date: 7-Nov-2016

Tester: JOP

| Equipment                              | Model        | Manufacturer    | Asset Number | Cal Due Date |
|----------------------------------------|--------------|-----------------|--------------|--------------|
| WIDEBAND RADIO<br>COMMUNICATION TESTER | CMW500       | ROHDE & SCHWARZ | B094874      | 19-Jan-2018  |
| RF CABLE                               | 1134         | GORE            | B094785      | 26-Jul-2017  |
| POWER SPLITTER                         | ZFRSC-183-S+ | MINI-CIRCUITS   | B101743      | 28-Jul-2017  |
| SIGNAL ANALYZER                        | FSV30        | ROHDE & SCHWARZ | B085749      | 8-Oct-2017   |

- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 and FSV are a 2 year calibration cycle

## 4.5 Test Data



## 5 Occupied Bandwidth

### 5.1 Test Result

| Test Description   | Basic Standards                                      | Test Result |
|--------------------|------------------------------------------------------|-------------|
| Occupied Bandwidth | 2.1049<br>24.238(a)<br>RSS-GEN(6.6)<br>RSS-133 (2.3) | Reported    |

### 5.2 Test Method

KDB document 971168 D01 Power Meas License Digital Systems v02r02, Clause 4 was used to determine the occupied measurement.

The 99% measurement function of the spectrum analyzer was used.

The measurement was conducted at the center channel of each band.

### 5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.5 °C

Relative Humidity: 36.3%

Atmospheric Pressure: 98.7 kPa

### 5.4 Test Equipment

Test Date: 7-Nov-2016

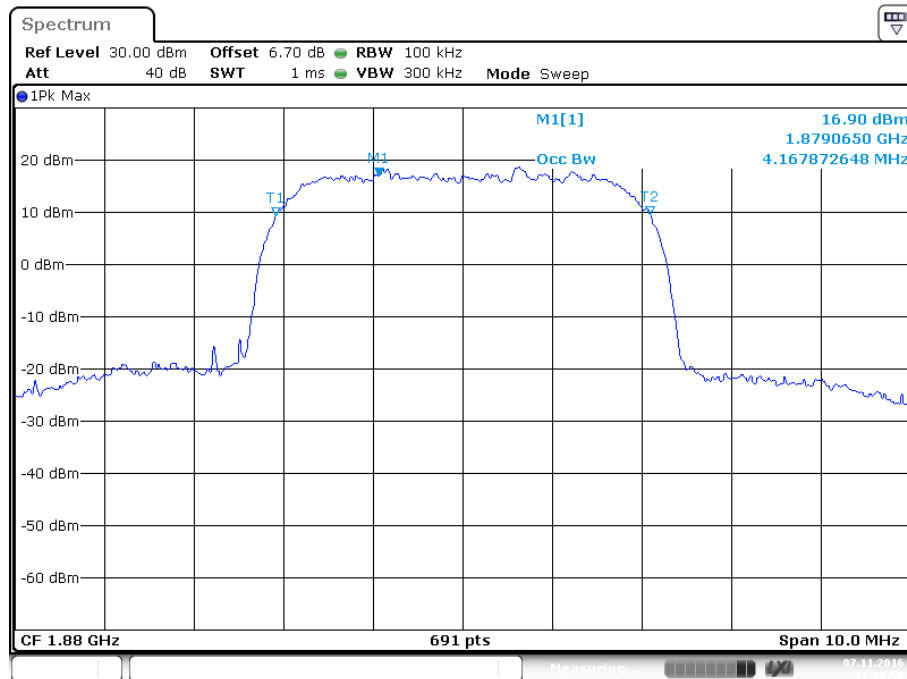
Tester: JOP

| Equipment                              | Model        | Manufacturer    | Asset Number | Cal Due Date |
|----------------------------------------|--------------|-----------------|--------------|--------------|
| WIDEBAND RADIO<br>COMMUNICATION TESTER | CMW500       | ROHDE & SCHWARZ | B094874      | 19-Jan-2018  |
| RF CABLE                               | 1134         | GORE            | B094785      | 26-Jul-2017  |
| POWER SPLITTER                         | ZFRSC-183-S+ | MINI-CIRCUITS   | B101743      | 28-Jul-2017  |
| SIGNAL ANALYZER                        | FSV30        | ROHDE & SCHWARZ | B085749      | 8-Oct-2017   |

- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 and FSV are a 2 year calibration cycle

## 5.5 Test Data

### WCDMA – Band II CH 9400 - 99% Bandwidth



Date: 7.NOV.2016 17:18:58

## 6 Band Edge and Conducted Spurious Emissions

### 6.1 Test Result

| Test Description                           | Basic Standards                        | Test Result |
|--------------------------------------------|----------------------------------------|-------------|
| Conducted spurious emissions and Band Edge | 2.1051<br>24.238(a)<br>RSS-133 (6.5.1) | Pass        |

### 6.2 Test Method

KDB document 971168 D01 Power Meas License Digital Systems v02r02, Clause 6 was used to measure spurious emissions at the antenna terminals.

### 6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.5 °C

Relative Humidity: 36.3%

Atmospheric Pressure: 98.7 kPa

### 6.4 Test Equipment

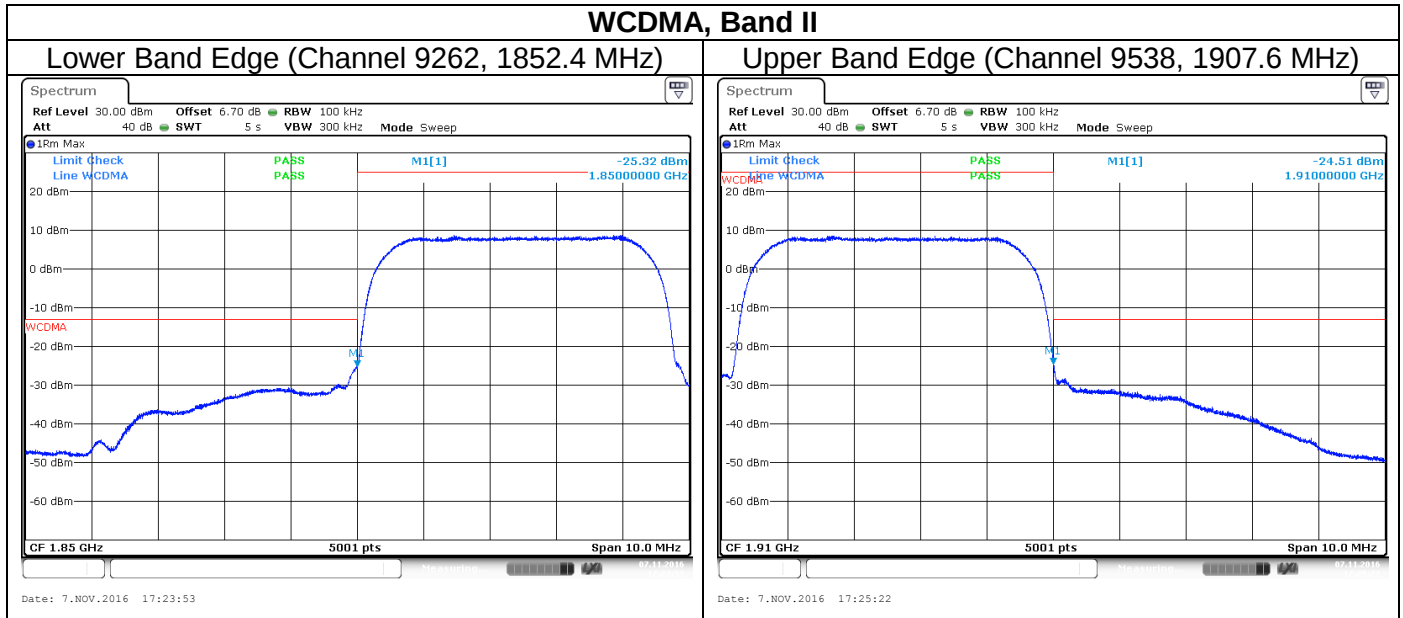
Test Date: 7-Nov-2016

Tester: JOP

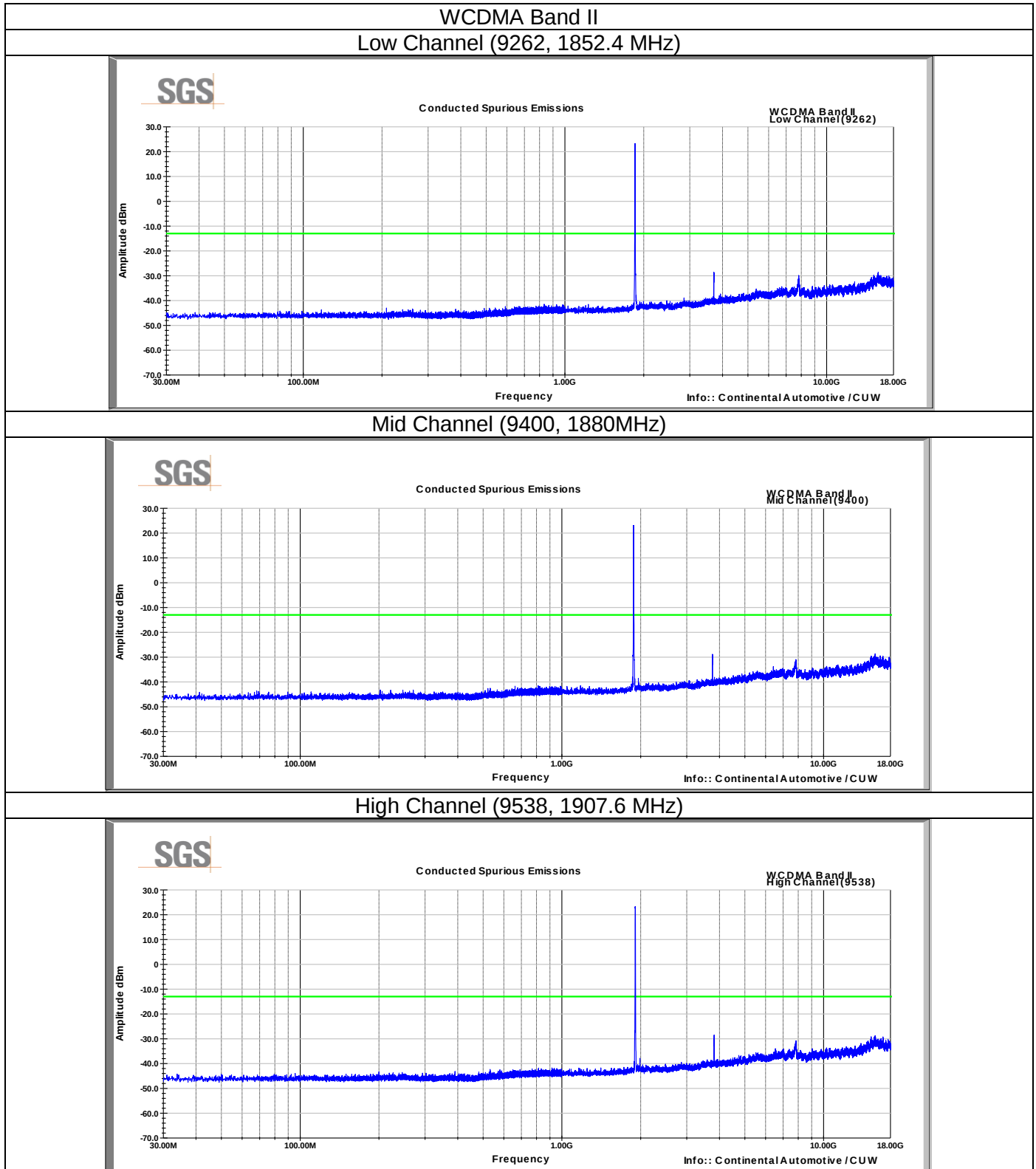
| Equipment                           | Model        | Manufacturer    | Asset Number | Cal Due Date |
|-------------------------------------|--------------|-----------------|--------------|--------------|
| WIDEBAND RADIO COMMUNICATION TESTER | CMW500       | ROHDE & SCHWARZ | B094874      | 19-Jan-2018  |
| RF CABLE                            | 1134         | GORE            | B094785      | 26-Jul-2017  |
| POWER SPLITTER                      | ZFRSC-183-S+ | MINI-CIRCUITS   | B101743      | 28-Jul-2017  |
| SIGNAL ANALYZER                     | FSV30        | ROHDE & SCHWARZ | B085749      | 8-Oct-2017   |

- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 and FSV are a 2 year calibration cycle

## 6.5 Test Data - Band Edge



## 6.6 Test Data - Conducted Spurious Emissions



## 7 Effective Radiated Power

### 7.1.1 Test Result

| Test Description                   | Basic Standards            | Test Result |
|------------------------------------|----------------------------|-------------|
| Effective Isotropic Radiated Power | 24.232(c)<br>RSS-133 (6.4) | Pass        |

### 7.1.2 Test Method

Because the CUW is provided with a coaxial port but no antenna, ERP/EIRP measurements were taken by applying the maximum output power including tolerances. A max antenna gain of 6dBi was declared by the manufacturer.

### 7.2 Test Site

SGS EMC Laboratory, Suwanee, GA

### 7.3 Test Equipment

None

### 7.4 Test Data

| Band of Operation |           | Conducted Power w/tolerance | Antenna Gain | Cable Loss | Average EIRP |      | Distance (R) | Power Density EIRP <sub>avg</sub> /(4πR <sup>2</sup> ) | FCC                | % of Limit | Verdict |
|-------------------|-----------|-----------------------------|--------------|------------|--------------|------|--------------|--------------------------------------------------------|--------------------|------------|---------|
| Type              | MHz       | dBm                         |              |            | dBm          | mW   | cm           | mW                                                     | mW/cm <sup>2</sup> |            |         |
| WCDMA Band II     | 1850-1910 | 25.0                        | 6.0          | 1.0        | 30.0         | 1000 | 20           | 0.199                                                  | 1.00               | 20%        | Pass    |

## 8 Radiated Spurious Emissions

### 8.1 Test Result

| Test Description            | Basic Standards                                                       |                                                                                        | Test Result |
|-----------------------------|-----------------------------------------------------------------------|----------------------------------------------------------------------------------------|-------------|
| Radiated Spurious Emissions | 2.1053<br>24.238(a)<br>27.53(c)(2)<br>27.53(h)<br>ANSI/TIA-603-D-2010 | RSS-GEN (6.13)<br>RSS-130 (4.6)<br>RSS-132 (5.5)<br>RSS-133 (6.5.1)<br>RSS-139 (6.5.1) | Pass        |

### 8.2 Test Method

The levels are measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10<sup>th</sup> harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least  $43 + 10 \log (P)$  dB. Compliance is based on the use of a spectrum analyzer employing a resolution bandwidth of 1 MHz or greater. In the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of a least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emissions 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 EUT was manipulated through each of its three orthogonal axes with the measurement oriented in both vertical and horizontal polarizations.

A radio link was established between EUT and Radio Communications Tester. The output power of the EUT was set to maximum value by using the maximum power setting on the Radio Communications Tester.

The measurements were performed at the low, middle, and high channels.

### 8.3 Test Site

SGS 3m Chamber, Suwanee, GA (validated to ANS C63.4: 2014 below and above 1GHz)

#### Environmental Conditions

Temperature: 23.30 °C  
Relative Humidity: 45.4 %  
Atmospheric Pressure: 98.37 kPa

## 8.4 Test Equipment

Test Date: 28-Oct-2016

Tester: FL

| Equipment                              | Model        | Manufacturer    | Asset Number | Cal Due Date |
|----------------------------------------|--------------|-----------------|--------------|--------------|
| ANTENNA, BILOG                         | CBL 6143A    | TESEQ           | B085931      | 1-Dec-2016   |
| RF CABLE                               | SF106        | HUBER & SUHNER  | B079716      | 27-Jul-2017  |
| WIDEBAND RADIO<br>COMMUNICATION TESTER | CMW500       | ROHDE & SCHWARZ | B085757      | 3-Nov-2016   |
| RF CABLE                               | SF106        | HUBER & SUHNER  | B079713      | 27-Jul-2017  |
| EMI TEST RECEIVER                      | ESU40        | ROHDE & SCHWARZ | B079629      | 20-Jun-2017  |
| RF CABLE                               | SF106        | HUBER & SUHNER  | B079712      | 27-Jul-2017  |
| LOW NOISE AMPLIFIER                    | TS-PR18      | ROHDE & SCHWARZ | B094463      | 16-Feb-2017  |
| RF CABLE                               | SF106        | HUBER & SUHNER  | B085892      | 27-Jul-2017  |
| DRG HORN (MEDIUM)                      | 3117         | ETS LINDGREN    | B079699      | 26-Apr-2017  |
| RF CABLE                               | SUCOFLEX 100 | HUBER & SUHNER  | B108523      | 4-Aug-2017   |
| FILTER, BAND REJECT                    | BRC50720     | MICRO-TRONICS   | B079784      | 28-Jul-2017  |
| FILTER, HIGH PASS                      | HPM50110     | MICRO-TRONICS   | B079792      | 28-Jul-2017  |
| RF CABLE                               | SF102        | HUBER & SUHNER  | B079822      | 27-Jul-2017  |
| RF CABLE                               | SF102        | HUBER & SUHNER  | B079824      | 27-Jul-2017  |
| LOW NOISE AMPLIFIER                    | NSP1840-HG   | MITEQ           | B087572      | 29-Jul-2017  |

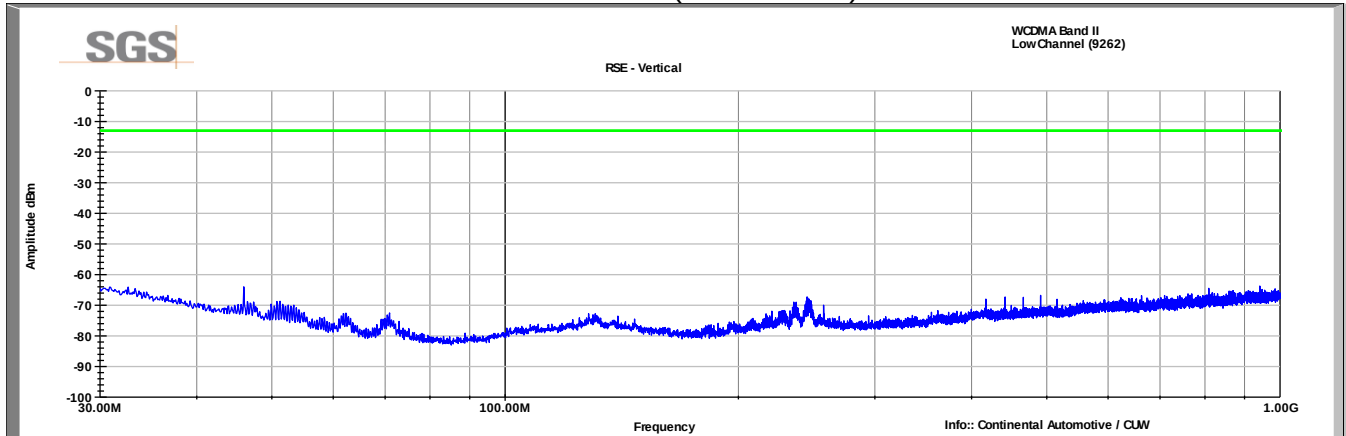
- Unless otherwise noted, equipment is on a 1 year calibration cycle.

## 8.5 Test Data

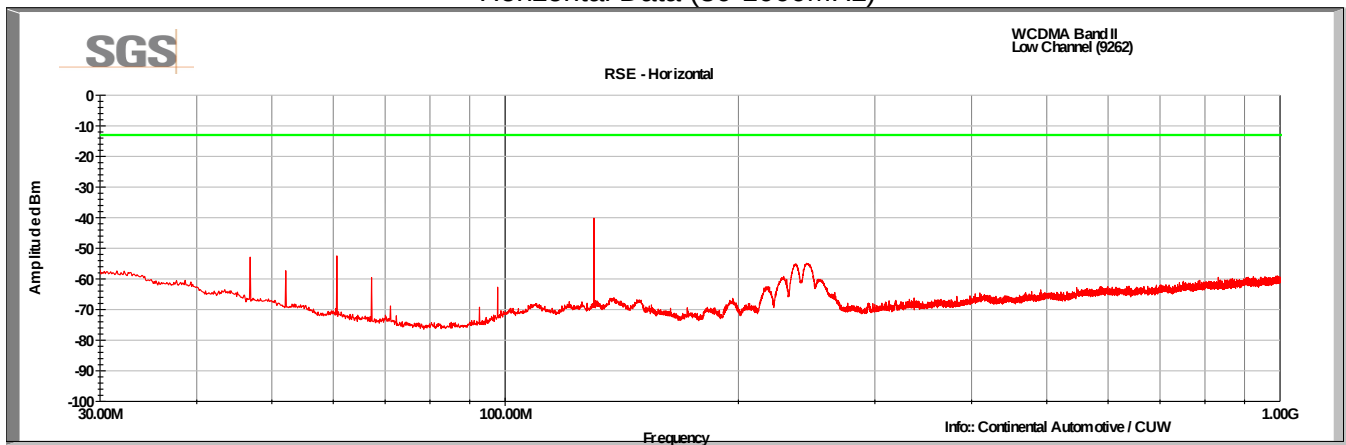
### WCDMA Band 2

#### Low Channel (9262)

#### Vertical Data (30-1000MHz)



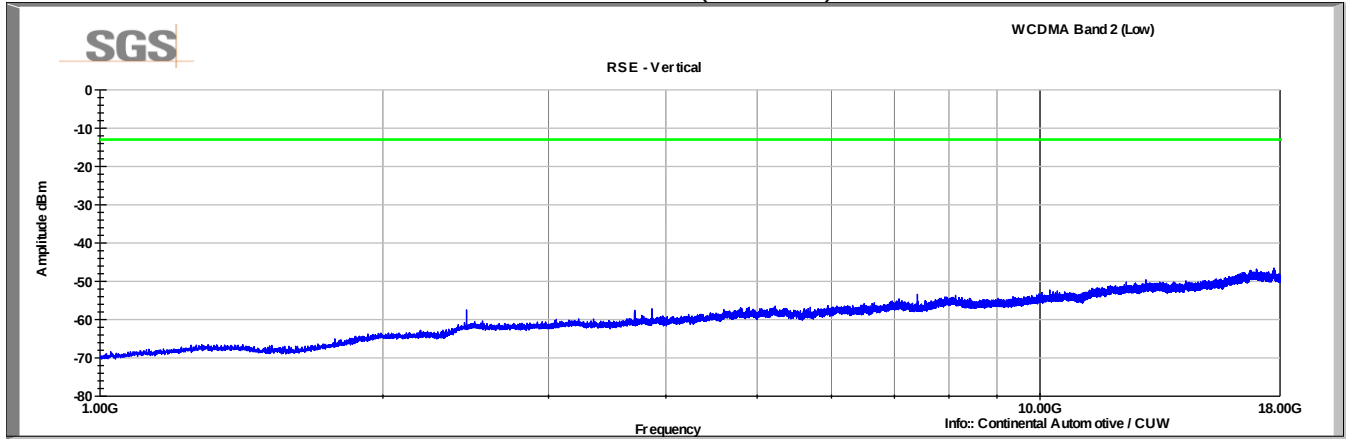
#### Horizontal Data (30-1000MHz)



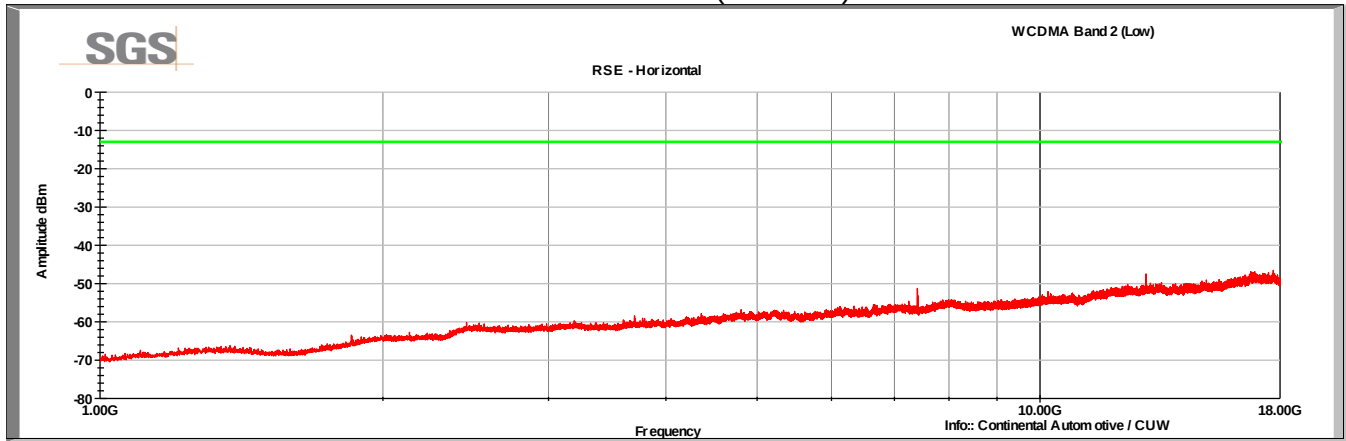
## WCDMA Band 2

### Low Channel (9262)

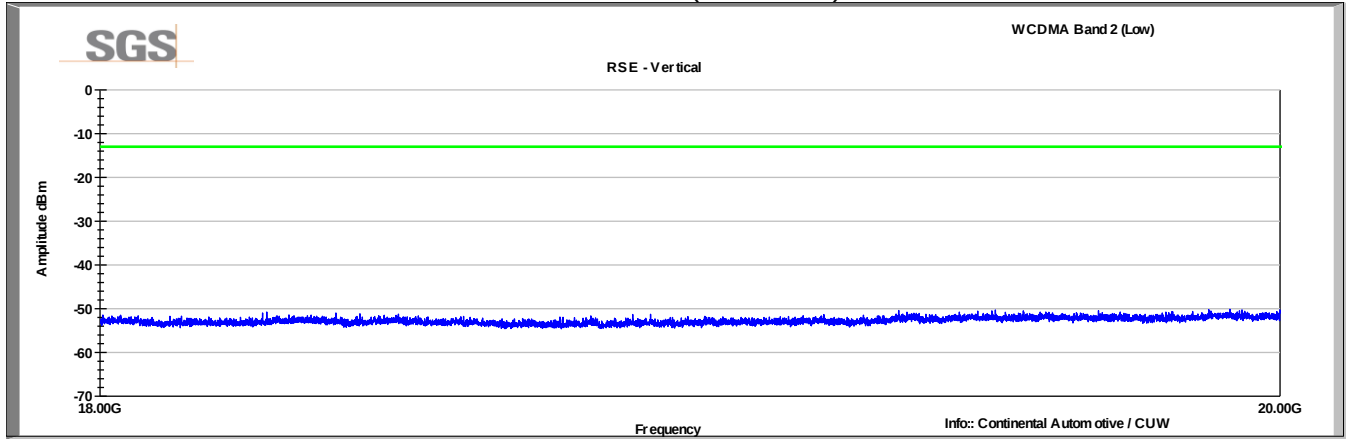
### Vertical Data (1-18GHz)



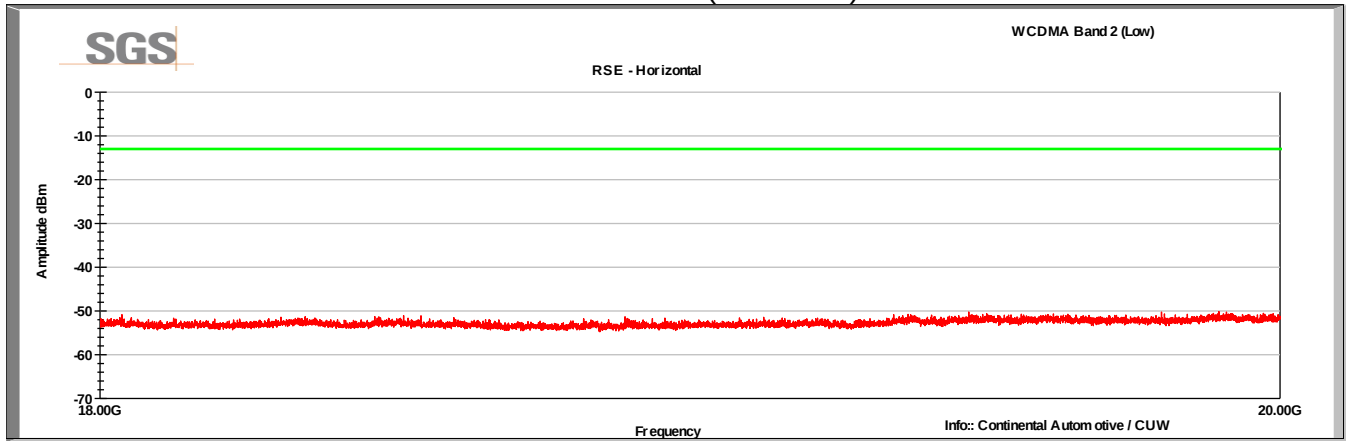
### Horizontal Data (1-18GHz)



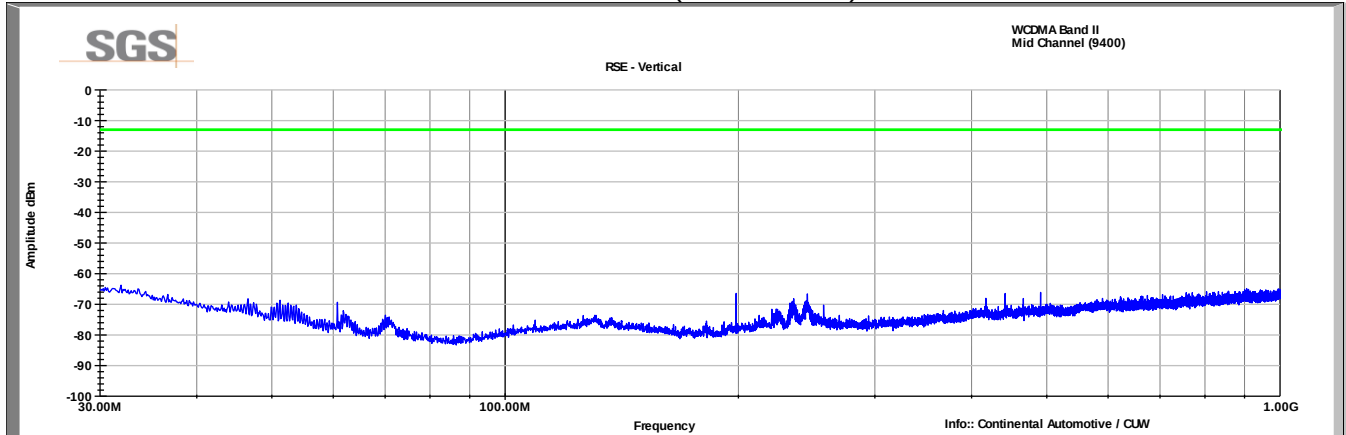
WCDMA Band 2  
Low Channel (9262)  
Vertical Data (18-20GHz)



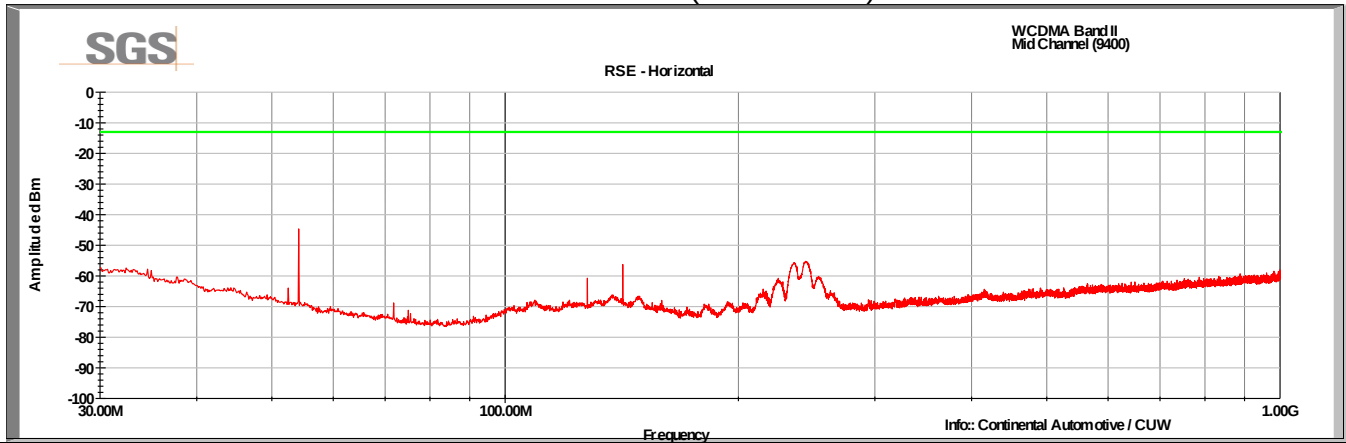
Horizontal Data (18-20GHz)



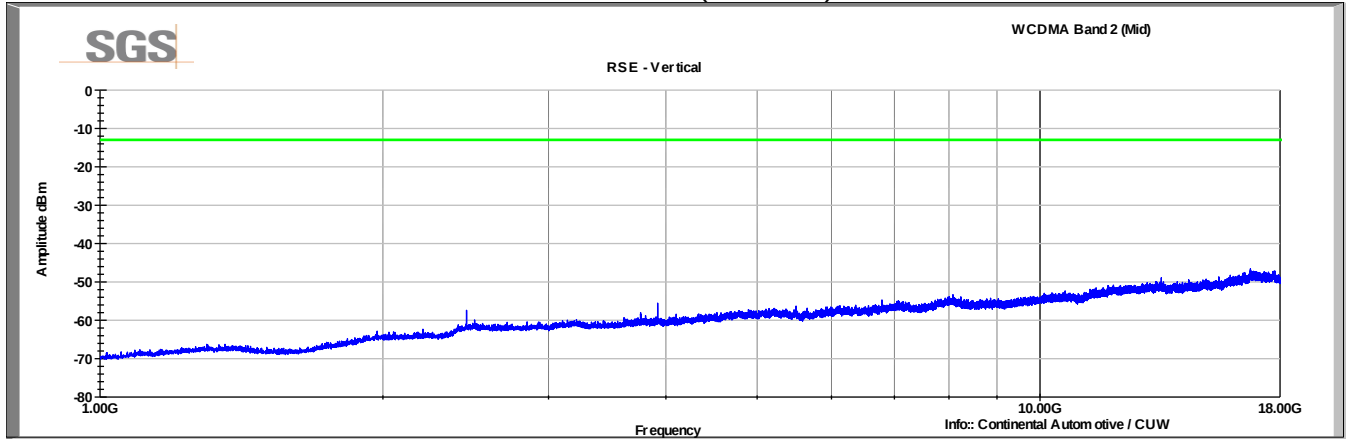
WCDMA Band 2  
Mid Channel (9400)  
Vertical Data (30-1000MHz)



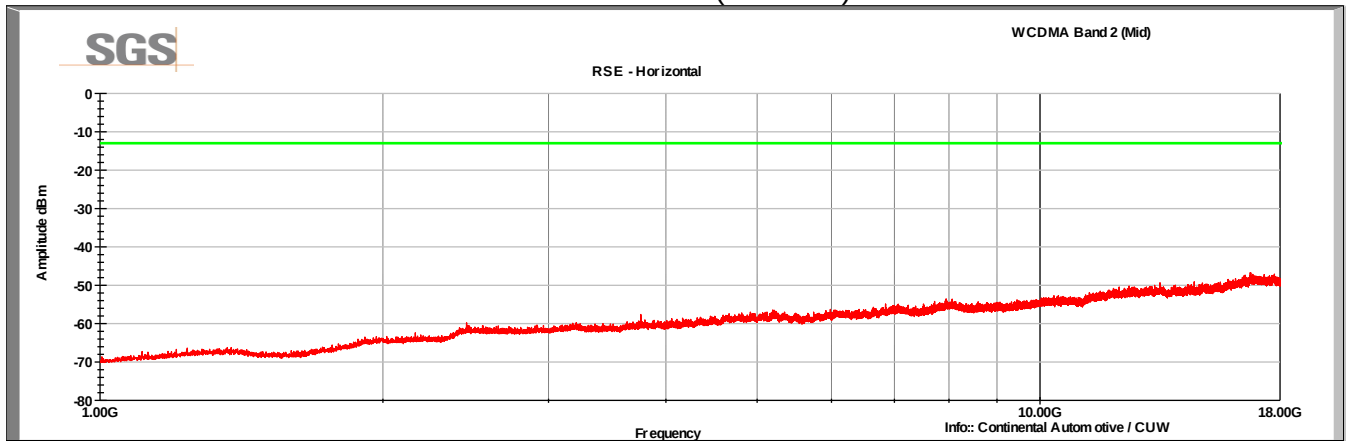
Horizontal Data (30-1000MHz)



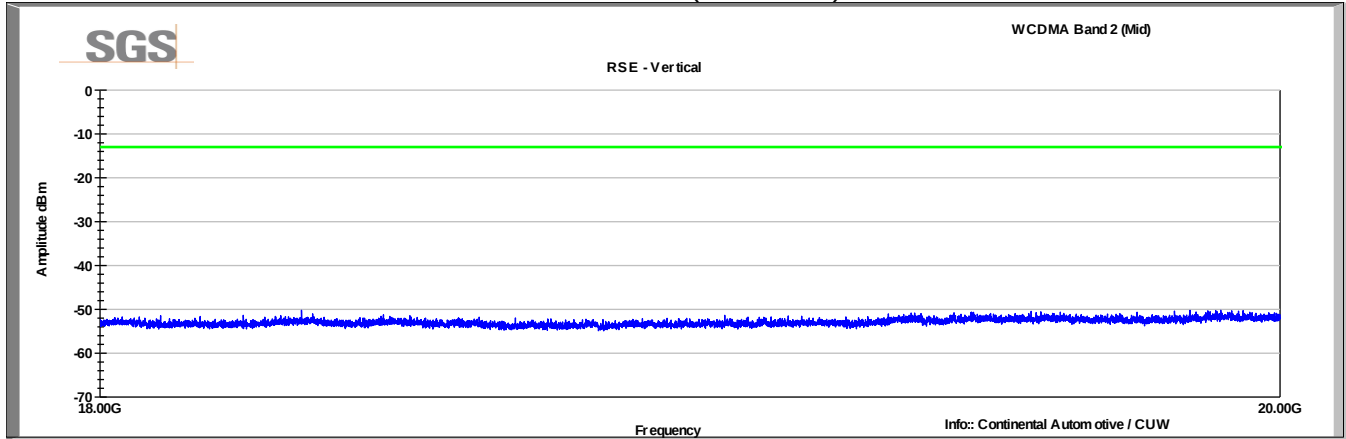
WCDMA Band 2  
Mid Channel (9400)  
Vertical Data (1-18GHz)



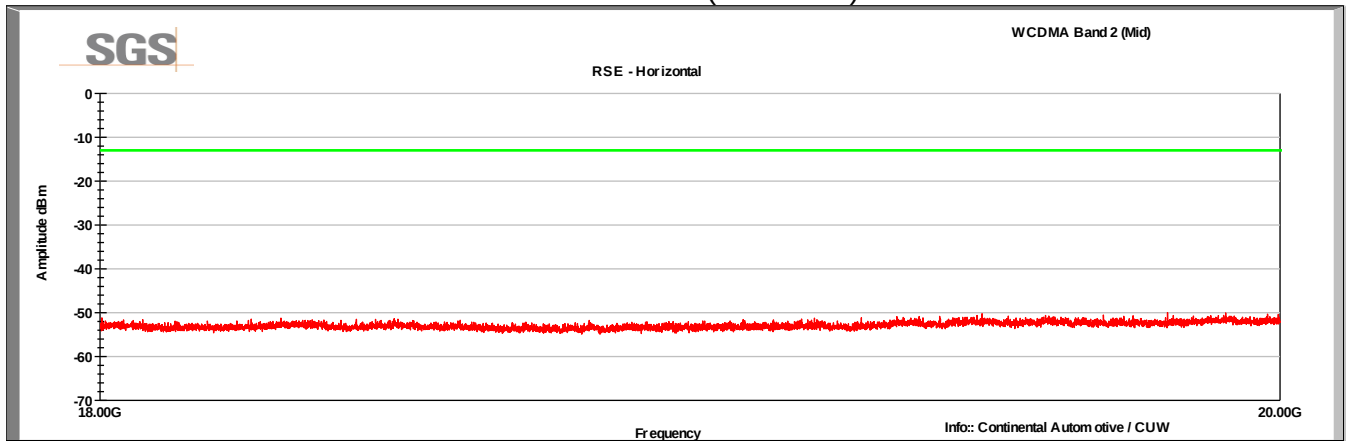
Horizontal Data (1-18GHz)



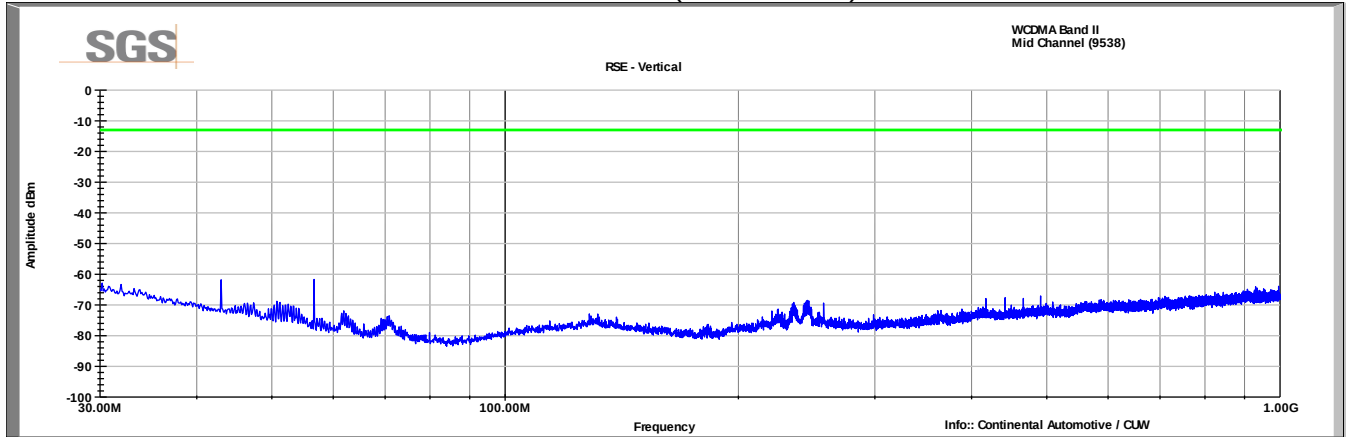
WCDMA Band 2  
Mid Channel (9400)  
Vertical Data (18-20GHz)



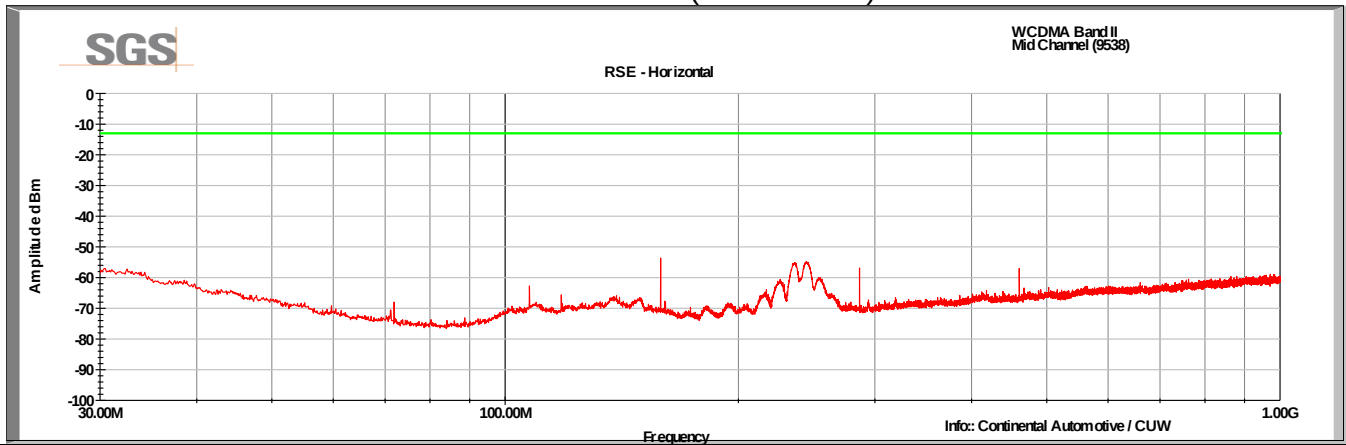
Horizontal Data (18-20GHz)



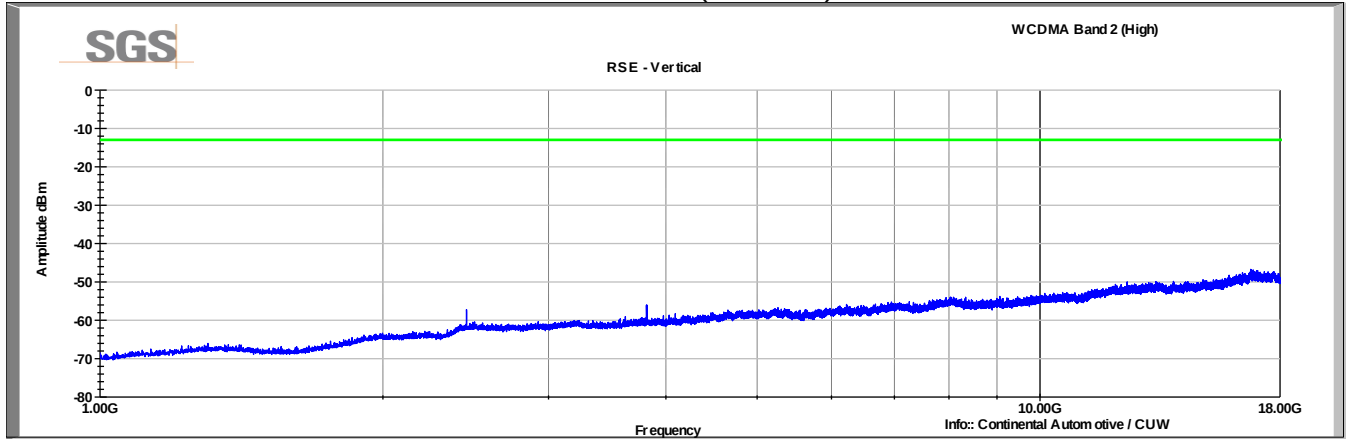
WCDMA Band 2  
High Channel (9538)  
Vertical Data (30-1000MHz)



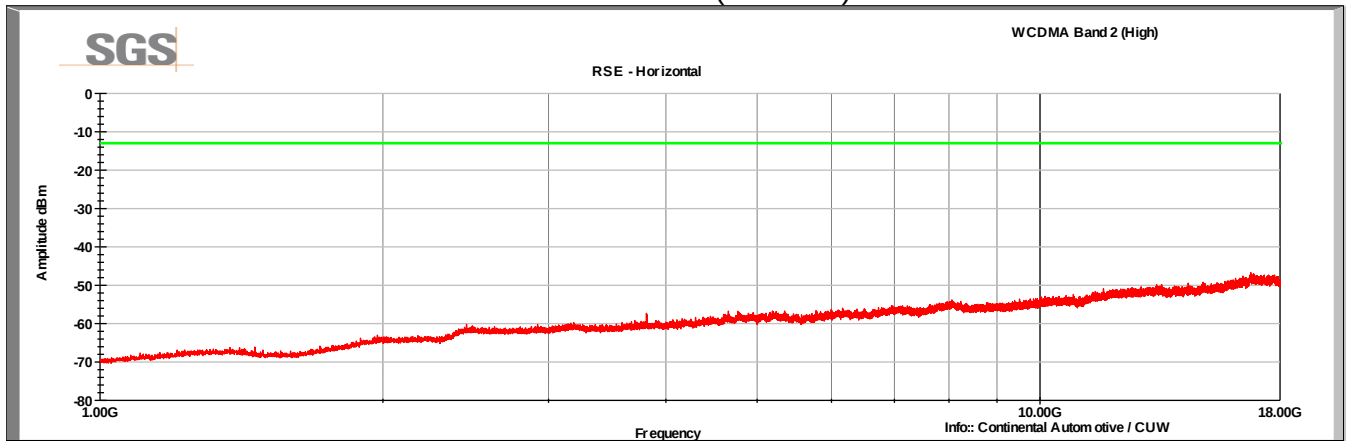
Horizontal Data (30-1000MHz)



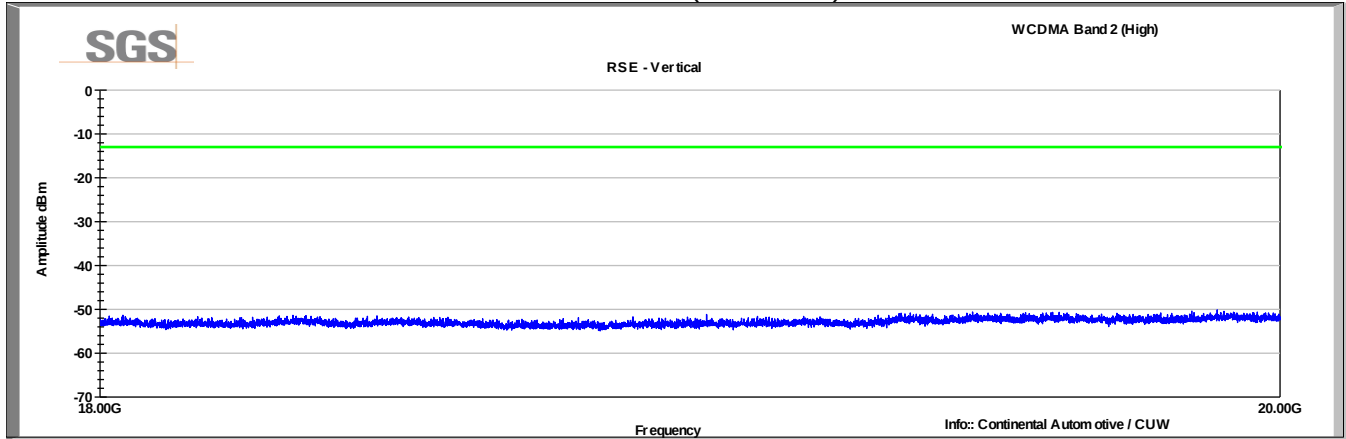
WCDMA Band 2  
High Channel (9538)  
Vertical Data (1-18GHz)



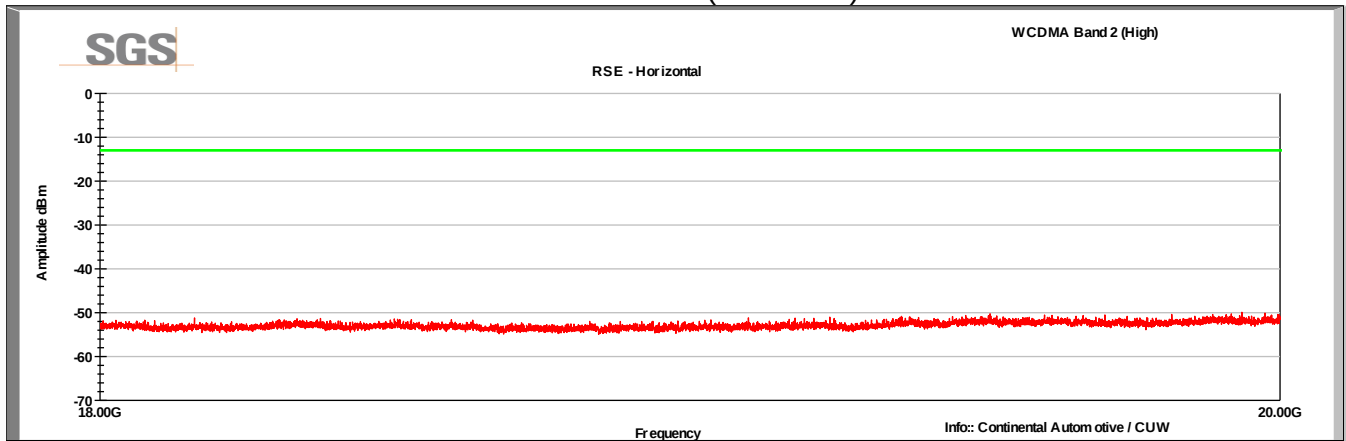
Horizontal Data (1-18GHz)



WCDMA Band 2  
High Channel (9538)  
Vertical Data (18-20GHz)



Horizontal Data (18-20GHz)



## 9 Frequency Stability

### 9.1 Test Result

| Test Description    | Basic Standards                                        | Test Result |
|---------------------|--------------------------------------------------------|-------------|
| Frequency Stability | 2.1055<br>24.238(a)<br>RSS-GEN (6.11)<br>RSS-133 (6.3) | Compliant   |

### 9.2 Test Method

The EUT was placed inside the Environmental Chamber and was left inside chamber to stabilize to set temperature for minimum of thirty minutes before any measurements were made. The EUT was tested at the middle channel of Band 2.

### 9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

### 9.4 Test Equipment

Test Date: 9-Nov-2016

Tester: JOP

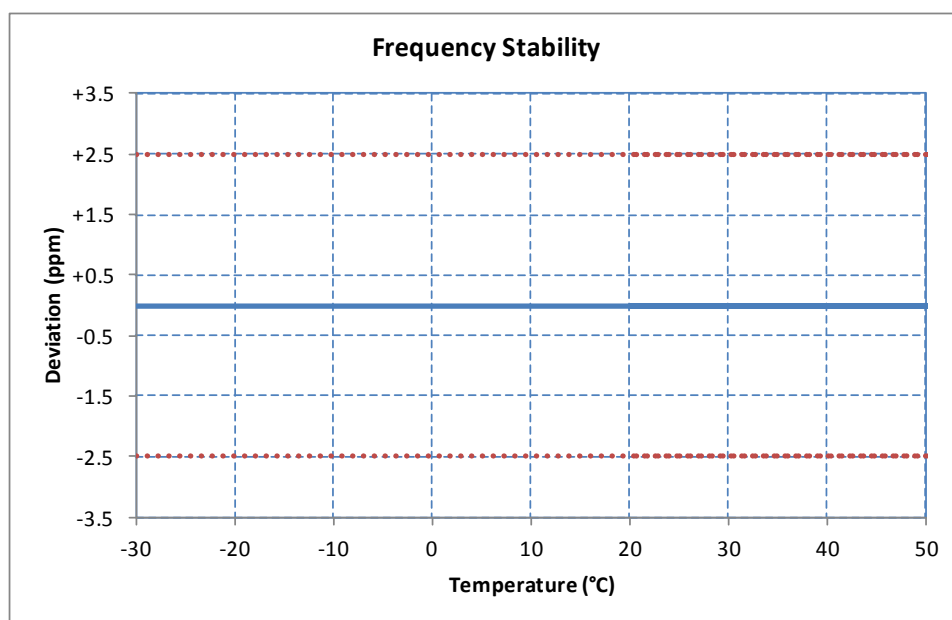
| Equipment                           | Model  | Manufacturer         | Asset Number | Cal Due Date |
|-------------------------------------|--------|----------------------|--------------|--------------|
| WIDEBAND RADIO COMMUNICATION TESTER | CMW500 | ROHDE & SCHWARZ      | B094874      | 19-Jan-2018  |
| ENVIRONMENTAL TEST CHAMBER          | T2RC   | TENNEY ENVIRONMENTAL | B094877      | CNR          |
| HANDHELD MULTIMETER                 | 87V    | FLUKE                | B079676      | 29-Jul-2017  |

- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle.

## 9.5 Test Data

Band 2, Channel 6400

| Voltage % | Power V <sub>DC</sub> | Temp °C   | Frequency Hz  | Freq Dev Hz | Freq Dev ppm | Deviation % |
|-----------|-----------------------|-----------|---------------|-------------|--------------|-------------|
| 100%      | 12.00                 | +20 (Ref) | 1,879,999,995 | -5          | -0.00        | -0.000000   |
| 100%      | 12.00                 | -30       | 1,879,999,999 | -1          | -0.00        | -0.000000   |
| 100%      | 12.00                 | -20       | 1,879,999,993 | -7          | -0.00        | -0.000000   |
| 100%      | 12.00                 | -10       | 1,879,999,992 | -8          | -0.00        | -0.000000   |
| 100%      | 12.00                 | 0         | 1,879,999,993 | -7          | -0.00        | -0.000000   |
| 100%      | 12.00                 | +10       | 1,879,999,992 | -8          | -0.00        | -0.000000   |
| 100%      | 12.00                 | +20       | 1,879,999,995 | -5          | -0.00        | -0.000000   |
| 100%      | 12.00                 | +30       | 1,879,999,992 | -8          | -0.00        | -0.000000   |
| 100%      | 12.00                 | +40       | 1,879,999,993 | -7          | -0.00        | -0.000000   |
| 100%      | 12.00                 | +50       | 1,879,999,993 | -7          | -0.00        | -0.000000   |
| 100%      | 12.00                 | +55       | 1,879,999,992 | -9          | -0.00        | -0.000000   |
| 115%      | 13.80                 | +20       | 1,879,999,991 | -9          | -0.00        | -0.000000   |
| 85%       | 10.20                 | +20       | 1,879,999,992 | -8          | -0.00        | -0.000000   |



## 10 Revision History

| Revision Level | Description of changes | Revision Date    |
|----------------|------------------------|------------------|
| 0              | Initial release        | 09 November 2016 |
|                |                        |                  |
|                |                        |                  |
|                |                        |                  |
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