

EMC Test Report

Project Number: 4022869

Report Number: 4022869EMC02

Revision Level: 0

Client: Continental Automotive Systems, Inc.

Equipment Under Test: Wireless Modem Module

Model: BL28NA-001

FCC ID: LHJ-BL28NA001

IC ID: 2807E-BL28NA001

FCC Rule Parts: Part 2, Part 22(H), Part 24(E) , Part 27

Industry Canada: RSS-GEN, Issue 4: 2014

RSS-132, Issue 3: 2013

RSS-133 Issue 6: 2013

RSS-139, Issue 3: 2015

Report issued on: 12 September 2016

Test Result: Compliant

Tested by:


Fabian Nica, Senior 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.

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Table of Contents

1	SUMMARY OF TEST RESULTS.....	4
1.1	MODIFICATIONS REQUIRED TO COMPLIANCE	4
2	GENERAL INFORMATION.....	5
2.1	CLIENT INFORMATION	5
2.2	TEST LABORATORY	5
2.3	GENERAL INFORMATION OF EUT	5
2.4	OPERATING MODES AND CONDITIONS	5
3	RF OUTPUT POWER	6
3.1	TEST RESULT.....	6
3.2	TEST METHOD.....	6
3.3	TEST SITE	6
3.4	TEST EQUIPMENT	6
3.5	TEST DATA.....	7
4	PEAK TO AVERAGE RATIO	8
4.1	TEST RESULT.....	8
4.2	TEST METHOD.....	8
4.3	TEST SITE	8
4.4	TEST EQUIPMENT	8
4.5	TEST DATA.....	9
5	OCCUPIED BANDWIDTH	11
5.1	TEST RESULT.....	11
5.2	TEST METHOD.....	11
5.3	TEST SITE	11
5.4	TEST EQUIPMENT	11
5.5	TEST DATA.....	12
6	BAND EDGE AND CONDUCTED SPURIOUS EMISSIONS.....	14
6.1	TEST RESULT.....	14
6.2	TEST METHOD.....	14
6.3	TEST SITE	14
6.4	TEST EQUIPMENT	14
6.5	TEST DATA.....	15
6.6	CONDUCTED SPURIOUS EMISSIONS PLOT	17
7	EFFECTIVE RADIATED POWER.....	20
7.2	TEST SITE	20
7.3	TEST EQUIPMENT	20
7.4	TEST DATA.....	20
8	RADIATED SPURIOUS EMISSIONS.....	21
8.1	TEST RESULT.....	21
8.2	TEST METHOD.....	21
8.3	TEST SITE	21
8.4	TEST EQUIPMENT	22
8.5	TEST DATA.....	23
9	FREQUENCY STABILITY	44
9.1	TEST RESULT.....	44



9.2 TEST METHOD..... 44

9.3 TEST SITE 44

9.4 TEST EQUIPMENT 44

9.5 TEST DATA..... 45

10 REVISION HISTORY 48

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	Reported
24.232(d) 27.50(d)(5)	RSS-132 (5.4) RSS-133 (6.4) RSS-139 (6.4)	Peak-to-Average Ratio	<13 dB		Pass
2.1049 22.917(a) 24.238(a)	RSS-GEN(6.6) RSS-133 (2.3) RSS-139(2.3)	Occupied Bandwidth	N/A		Reported
2.1051 22.917(a) 24.238(a) 27.53(h)	RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emissions	$< 43 + 10\log_{10}(P_{\text{Watts}})$ at band edge and for all out of band emissions		Pass
22.913(a)(2)	--	Effective Radiated Power	< 7 Watts max ERP	Radiated	Pass
--	RSS-132 (5.4)	Equivalent Isotropically Radiated Power	< 11.5 Watts max ERP		Pass
24.232(c)	RSS-133 (6.4) SRSP-510 (5.1.2)		< 2 Watts max EIRP		Pass
27.50(d)(4)	RSS-139 (6.5)		< 1 Watt max EIRP		Pass
2.1053 22.917(a) 24.238(a) 27.53(h)	RSS-GEN (6.13) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139 (6.5.1)	Radiated Spurious Emissions	$< 43 + 10\log_{10}(P_{\text{Watts}})$ at band edge and for all out of band emissions		Pass
2.1055 22.917(a) 24.238(a) 27.5(h) 27.54	RSS-GEN (6.11) RSS-132 (5.3) RSS-133 (6.3) RSS-139 (6.3)	Frequency Stability	<2.5 ppm		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: BL28NA-001
Serial Number: Not Labeled

FCC ID: LHJ-BL28NA001
IC ID: 2807E-BL28NA001

IMEI Number: 004401810126637

Rated Voltage: 10.2 – 13.8 Vdc
Test Voltage: 12 Vdc

Tx Frequency Range: 826.4– 846.6 MHz (WCDMA Band V)
1712.6 – 1752.4 (WCDMA Band IV)
1852.4– 1907.6 MHz (WCDMA Band II)

FCC Classification: PCS Licensed Transmitter PCB
Type: Pre Production

Sample Received Date: 05 August 2016
Dates of testing: 05 – 26 August 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 RSS-GEN (6.12)	Reported

3.2 Test Method

A radio link was established between EUT and Radio Communication Tester. The output power of the EUT was set to maximum value by using the maximum power setting on the Radio Communications Tester. The CMW500 was used to measure the output power.

The measurements were conducted at the low, middle, and high channel.

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 23.3 °C
Relative Humidity: 42.5%
Atmospheric Pressure: 98.2 kPa

3.4 Test Equipment

Test Date: 8-Aug-2016

Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
WIDEBAND RADIO 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

Band	UpLink Channel	UL Frequency (MHz)	Subtest	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
Band 2	9262	1852.4	Subtest1	22.55	0.53	23.08
Band 2	9400	1880	Subtest1	22.42	0.53	22.95
Band 2	9538	1907.6	Subtest1	22.69	0.53	23.22
Band 2	9262	1852.4	Subtest2	21.34	0.53	21.87
Band 2	9400	1880	Subtest2	21.47	0.53	22
Band 2	9538	1907.6	Subtest2	21.55	0.53	22.08
Band 2	9262	1852.4	Subtest3	21.74	0.53	22.27
Band 2	9400	1880	Subtest3	21.6	0.53	22.13
Band 2	9538	1907.6	Subtest3	21.69	0.53	22.22
Band 2	9262	1852.4	Subtest4	22.34	0.53	22.87
Band 2	9400	1880	Subtest4	22.19	0.53	22.72
Band 2	9538	1907.6	Subtest4	21.82	0.53	22.35
Band 2	9262	1852.4	Subtest5	22.58	0.53	23.11
Band 2	9400	1880	Subtest5	22.76	0.53	23.29
Band 2	9538	1907.6	Subtest5	22.56	0.53	23.09
Band 4	1313	1712.6	Subtest1	24.19	0.51	24.7
Band 4	1450	1740	Subtest1	23.69	0.51	24.2
Band 4	1512	1752.4	Subtest1	23.39	0.51	23.9
Band 4	1313	1712.6	Subtest2	23.08	0.51	23.59
Band 4	1450	1740	Subtest2	22.57	0.51	23.08
Band 4	1512	1752.4	Subtest2	21.93	0.51	22.44
Band 4	1313	1712.6	Subtest3	23.23	0.51	23.74
Band 4	1450	1740	Subtest3	22.7	0.51	23.21
Band 4	1512	1752.4	Subtest3	22.35	0.51	22.86
Band 4	1313	1712.6	Subtest4	23.34	0.51	23.85
Band 4	1450	1740	Subtest4	22.85	0.51	23.36
Band 4	1512	1752.4	Subtest4	22.42	0.51	22.93
Band 4	1313	1712.6	Subtest5	23.93	0.51	24.44
Band 4	1450	1740	Subtest5	23.63	0.51	24.14
Band 4	1512	1752.4	Subtest5	23.45	0.51	23.96
Band 5	4132	826.4	Subtest1	23.41	0.34	23.75
Band 5	4175	835	Subtest1	23.28	0.34	23.62
Band 5	4233	846.6	Subtest1	23.27	0.34	23.61
Band 5	4132	826.6	Subtest2	21.65	0.34	21.99
Band 5	4175	835	Subtest2	22.12	0.34	22.46
Band 5	4233	846.6	Subtest2	22.08	0.34	22.42
Band 5	4132	826.6	Subtest3	21.59	0.34	21.93
Band 5	4175	835	Subtest3	22.26	0.34	22.6
Band 5	4233	846.6	Subtest3	22.25	0.34	22.59
Band 5	4132	826.6	Subtest4	22.33	0.34	22.67
Band 5	4175	835	Subtest4	22.36	0.34	22.7
Band 5	4233	846.6	Subtest4	22	0.34	22.34
Band 5	4132	826.6	Subtest5	23.24	0.34	23.58
Band 5	4175	835	Subtest5	22.94	0.34	23.28
Band 5	4233	846.6	Subtest5	22.83	0.34	23.17

Band V Max: 23.75dBm (0.237W)

Band IV Max: 24.7dBm (0.295W)

Band II Max: 23.29dBm (0.213W)

4 Peak to Average Ratio

4.1 Test Result

Test Description	Basic Standards	Test Result
Peak to Average Ratio	FCC 24.232(d) FCC 27.50(d)(5) RSS-132 (5.4) RSS-133 (6.4) RSS-139 (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: 23.3 °C
Relative Humidity: 42.5%
Atmospheric Pressure: 98.2 kPa

4.4 Test Equipment

Test Date: 16-Aug-2016

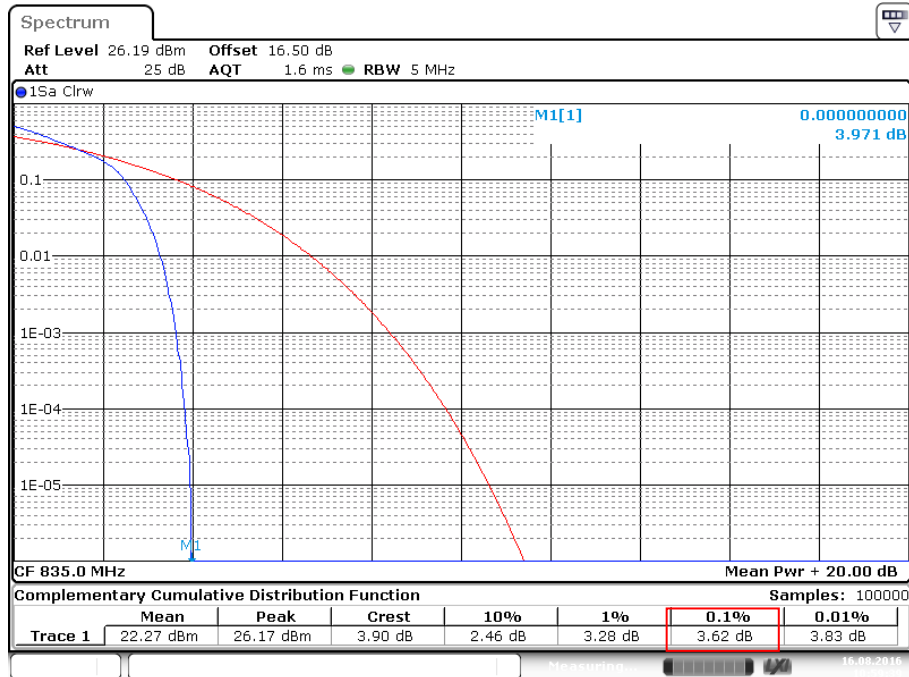
Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2018
RF CABLE	141	HUBER & SUHNER	B095585	26-Jul-2017
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	28-Jul-2017
10dB fixed Attenuator	BW-S10W2	MINI-CIRCUITS	15033	CNR
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017

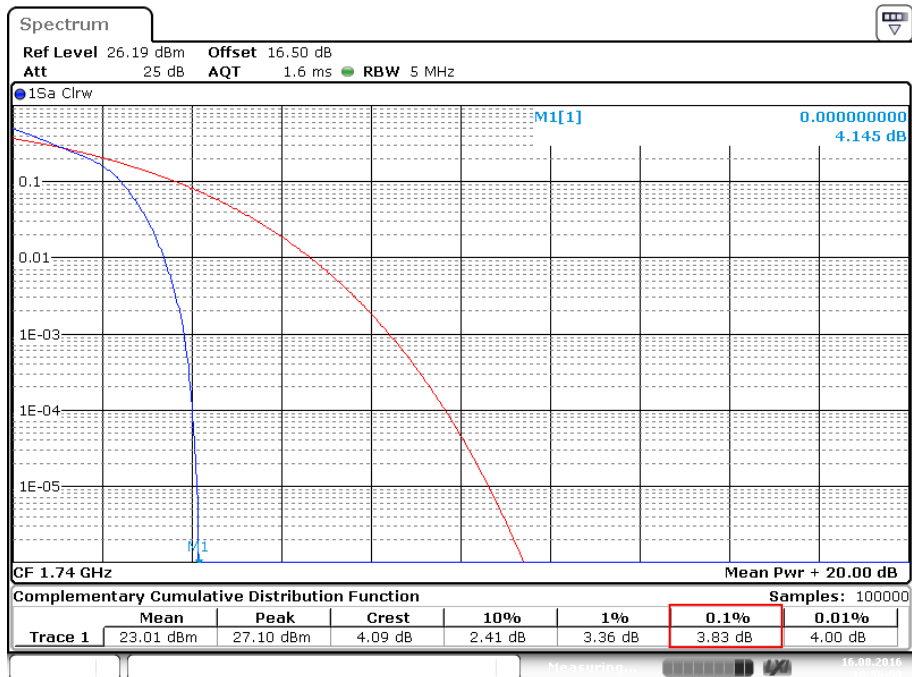
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 and FSV are a 2 year calibration cycle

4.5 Test Data

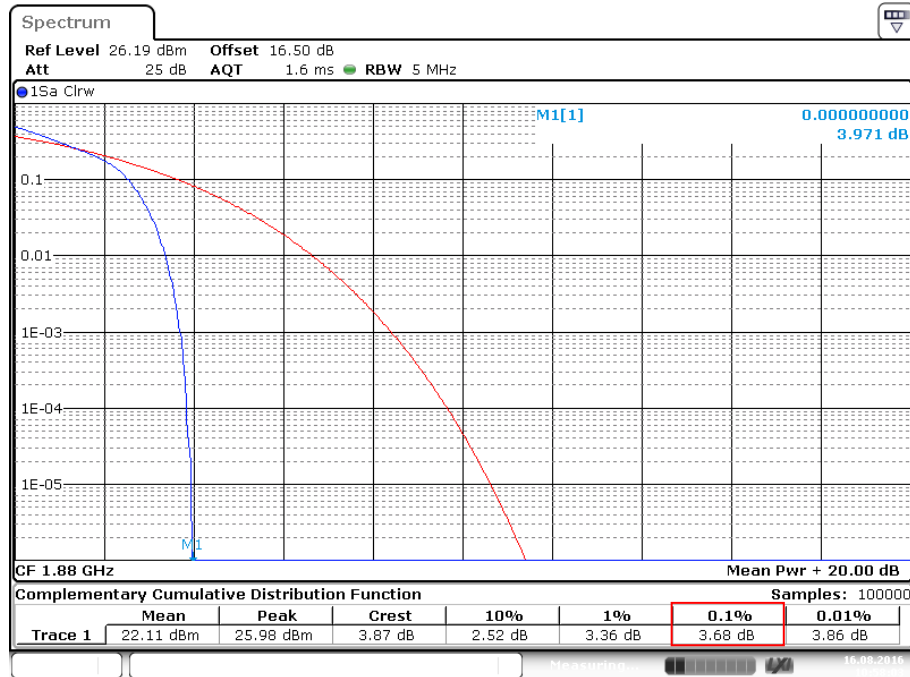
WCDMA Band V



Band IV



Band II



Date: 16.AUG.2016 10:58:04

5 Occupied Bandwidth

5.1 Test Result

Test Description	Basic Standards	Test Result
Occupied Bandwidth	FCC Part 2.1049 RSS-GEN(6.6) RSS-133 (2.3) RSS-139(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: 23.3 °C
Relative Humidity: 42.5%
Atmospheric Pressure: 98.2 kPa

5.4 Test Equipment

Test Date: 16-Aug-2016

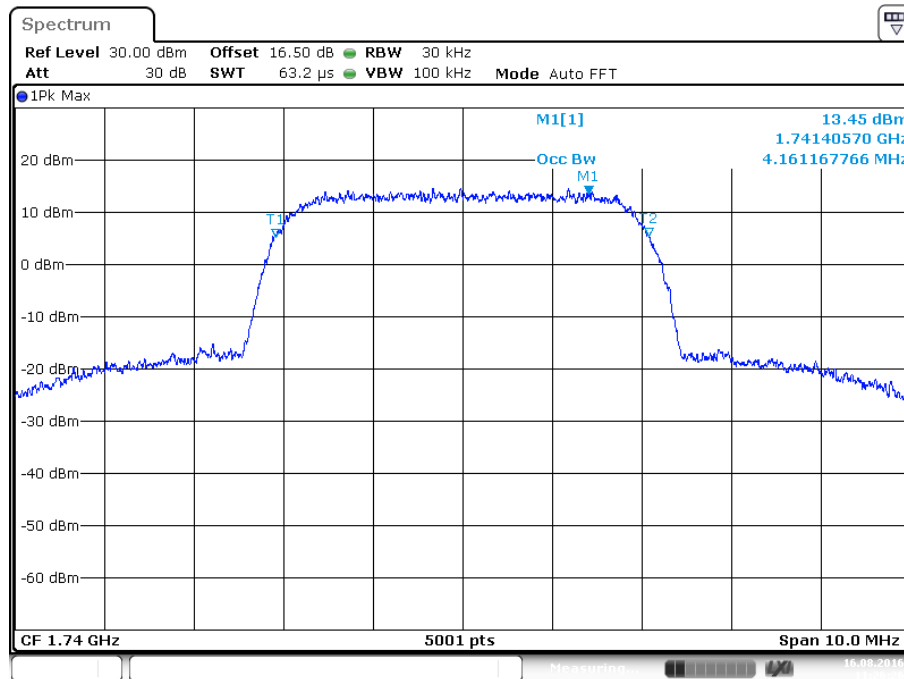
Tester: JOP

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2018
RF CABLE	141	HUBER & SUHNER	B095585	26-Jul-2017
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	28-Jul-2017
10dB fixed Attenuator	BW-S10W2	MINI-CIRCUITS	15033	CNR
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017

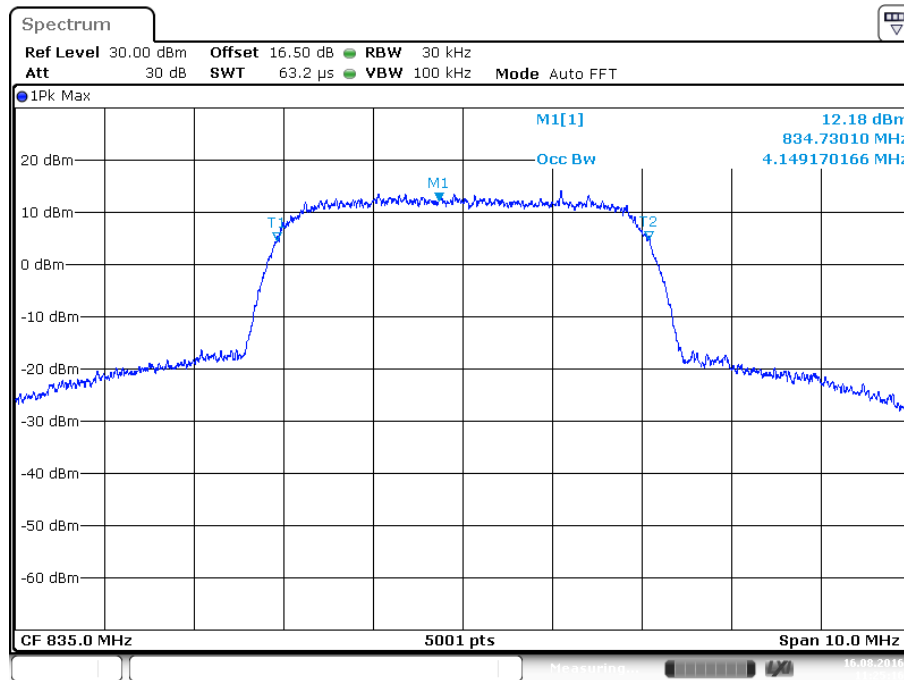
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 and FSV are a 2 year calibration cycle

5.5 Test Data

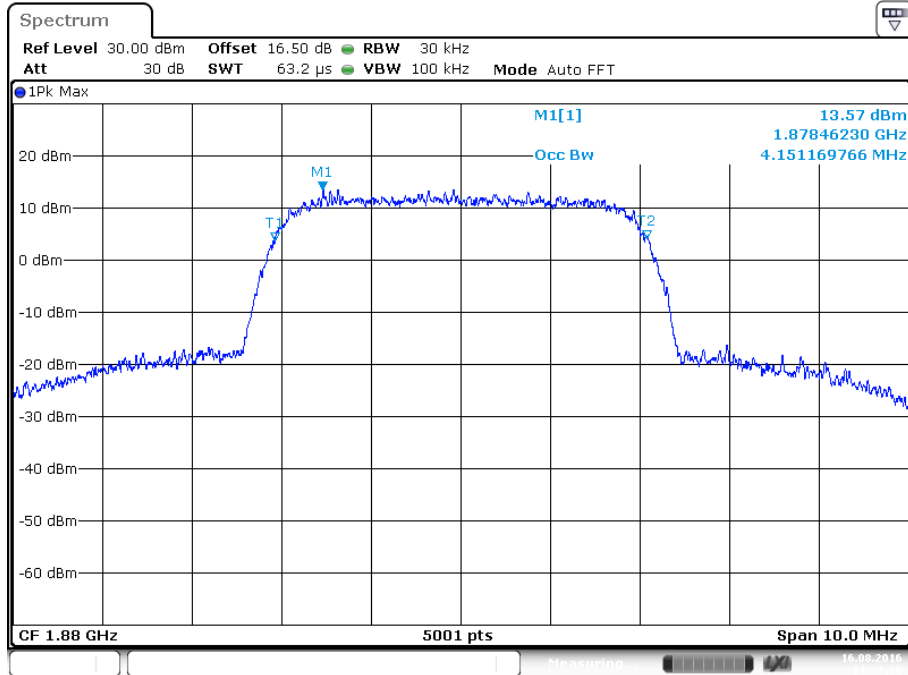
WCDMA – Band IV CH 1450 - 99% Bandwidth



WCDMA – Band V CH 4175 - 99% Bandwidth



WCDMA – Band II CH 9400 - 99% Bandwidth



Date: 16.AUG.2016 11:27:21

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 22.917(a) 24.238(a) 27.53(h) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(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: 23.3 °C
Relative Humidity: 42.5%
Atmospheric Pressure: 98.2 kPa

6.4 Test Equipment

Test Date: 16-Aug-2016

Tester: JOP

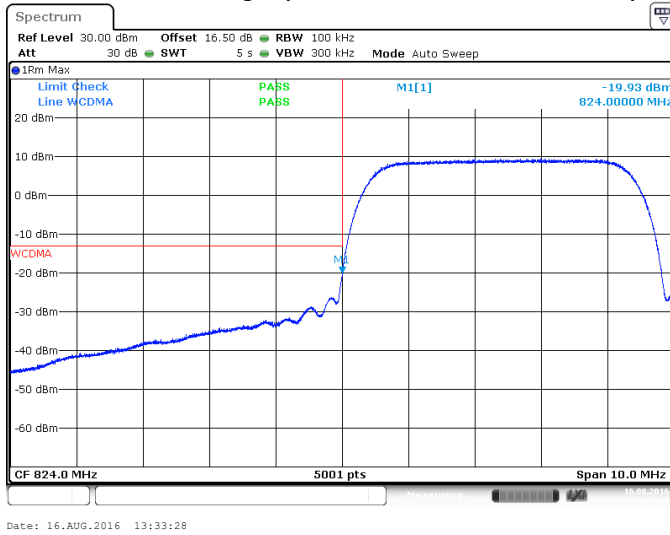
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2018
RF CABLE	141	HUBER & SUHNER	B095585	26-Jul-2017
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	28-Jul-2017
10dB fixed Attenuator	BW-S10W2	MINI-CIRCUITS	15033	CNR
SIGNAL 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

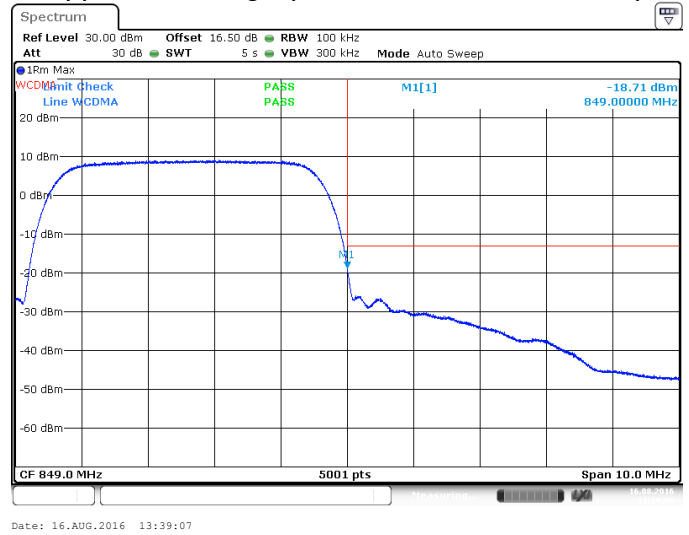
6.5 Test Data

WCDMA, Band V

Lower Band Edge (Channel 4132, 826.4 MHz)

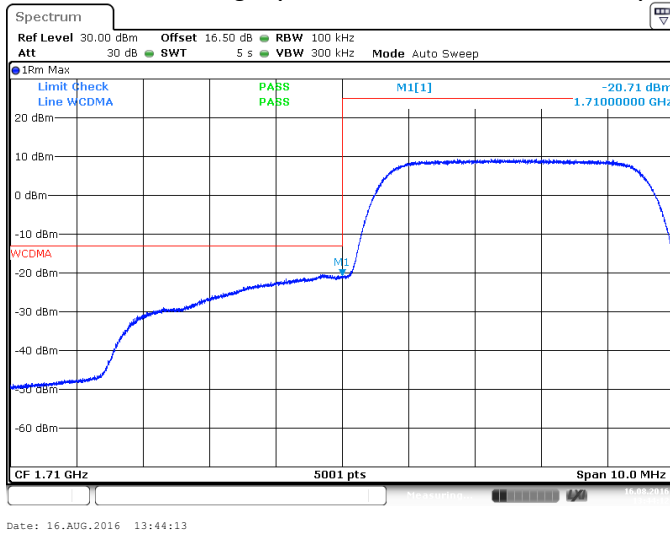


Upper Band Edge (Channel 4233, 846.6 MHz)



WCDMA, Band IV

Lower Band Edge (Channel 1313, 1712.6 MHz)

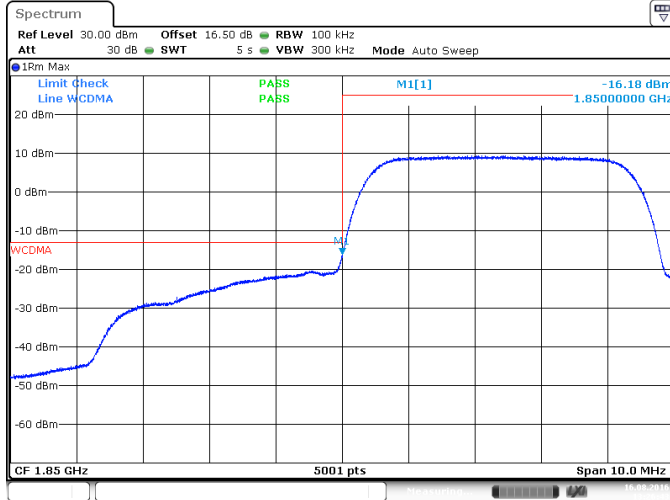


Upper Band Edge (Channel 1512, 1752.4 MHz)



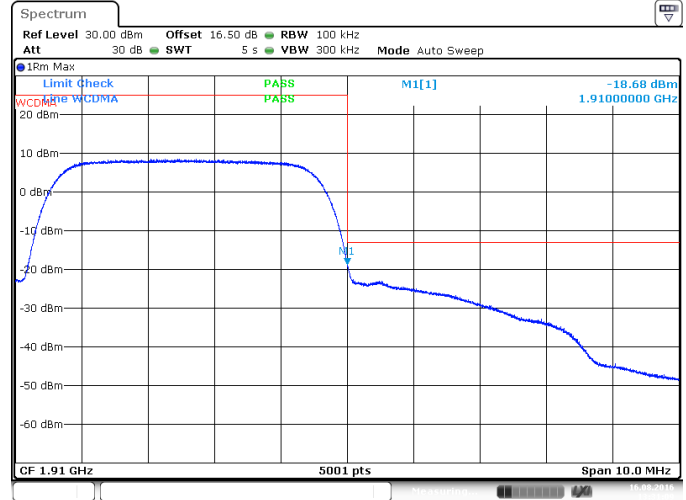
WCDMA, Band II

Lower Band Edge (Channel 9262, 1852.4 MHz)



Date: 16.AUG.2016 13:26:44

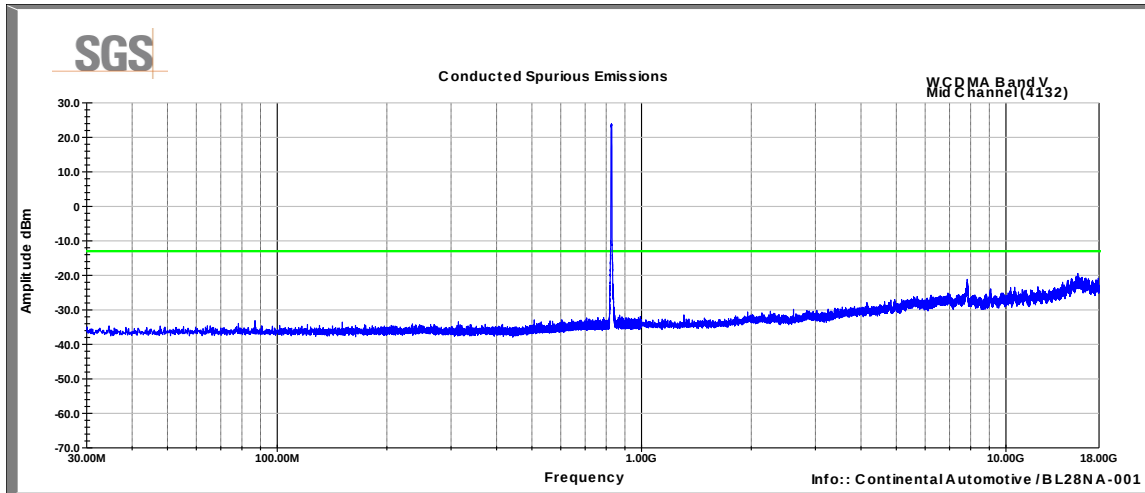
Upper Band Edge (Channel 9538, 1907.6 MHz)



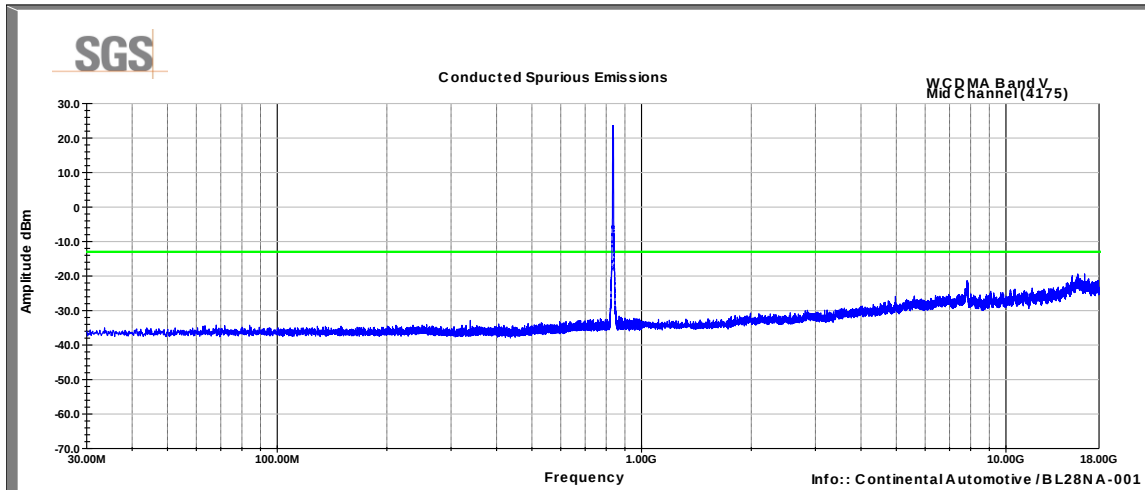
Date: 16.AUG.2016 13:31:09

6.6 Conducted Spurious Emissions Plot

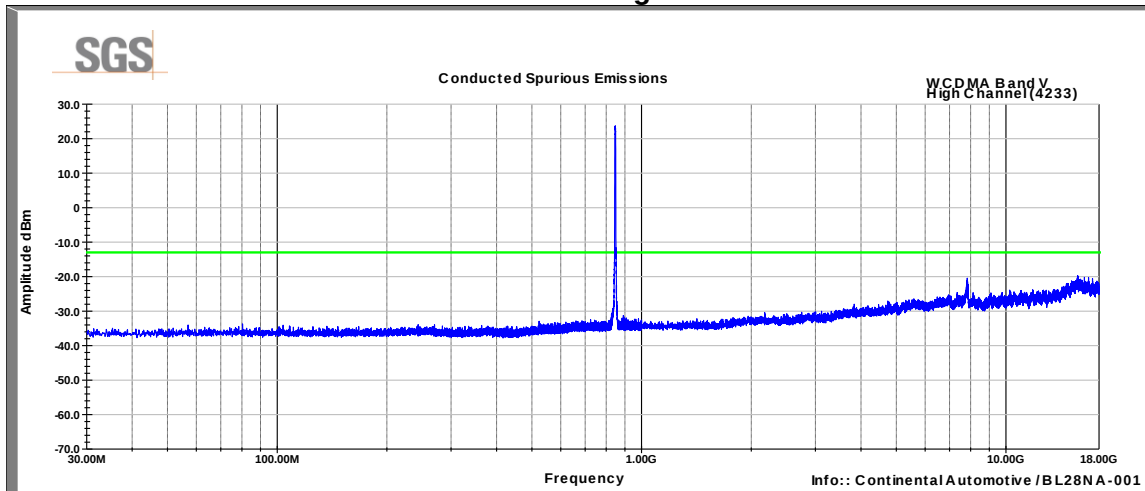
WCDMA Band V Low Channel



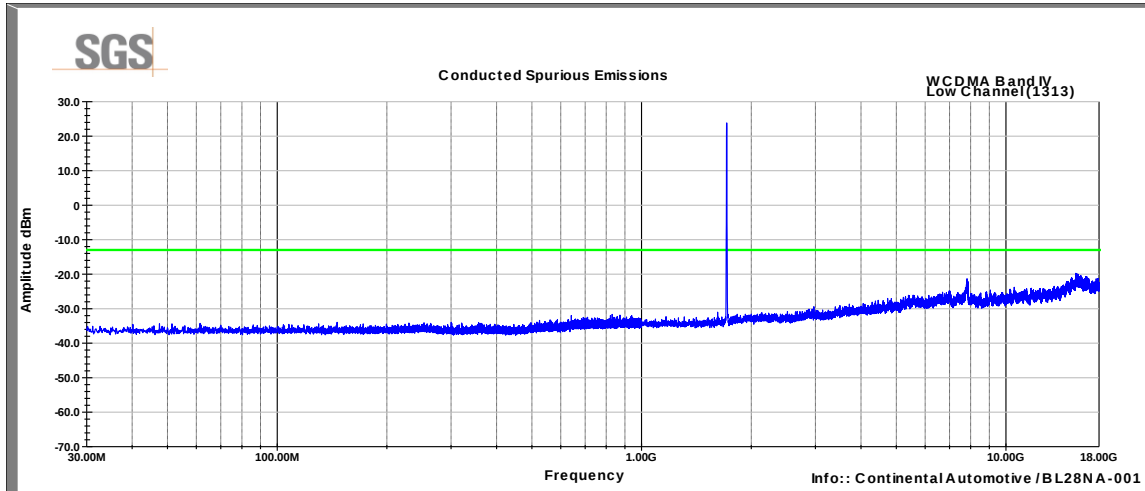
WCDMA Band V Mid Channel



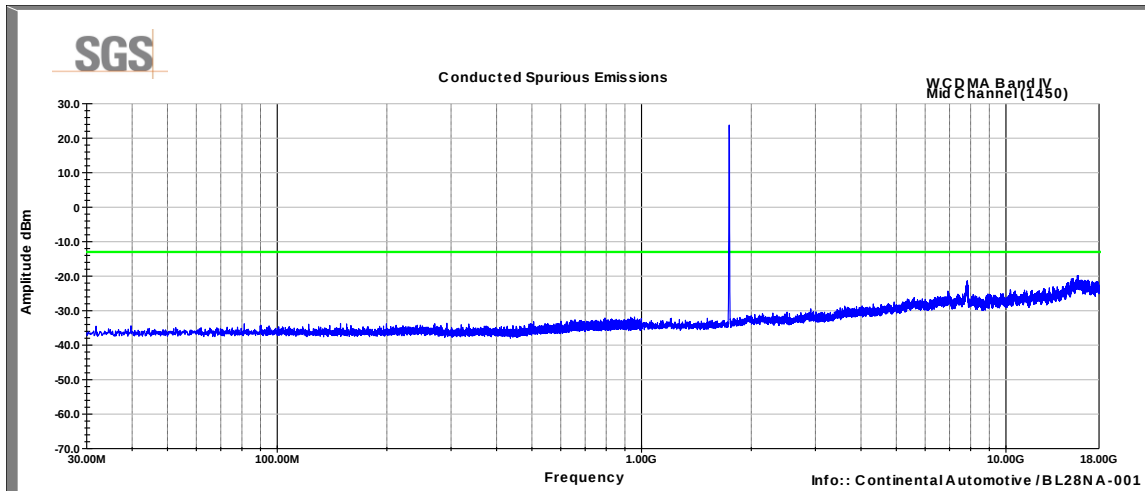
WCDMA Band V High Channel



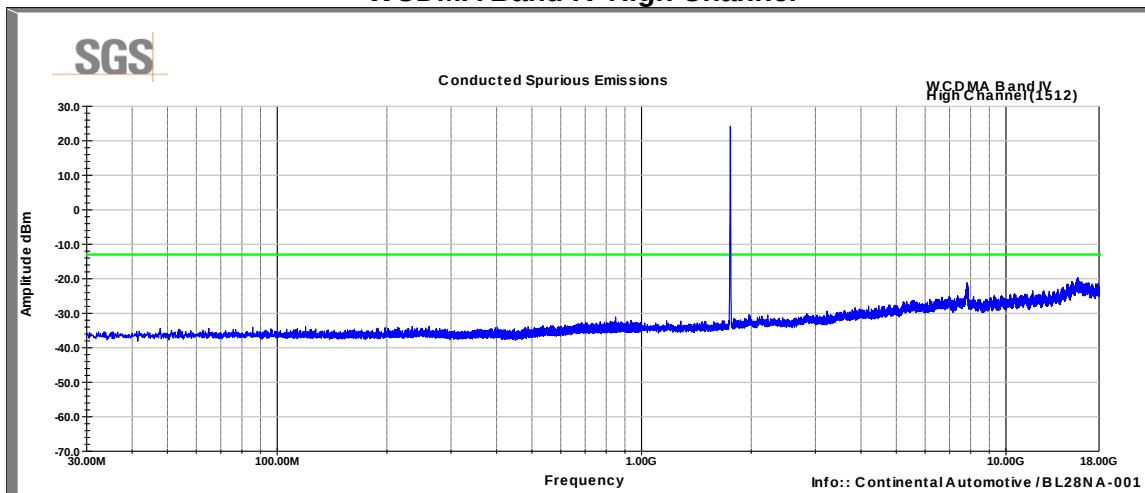
WCDMA Band IV Low Channel



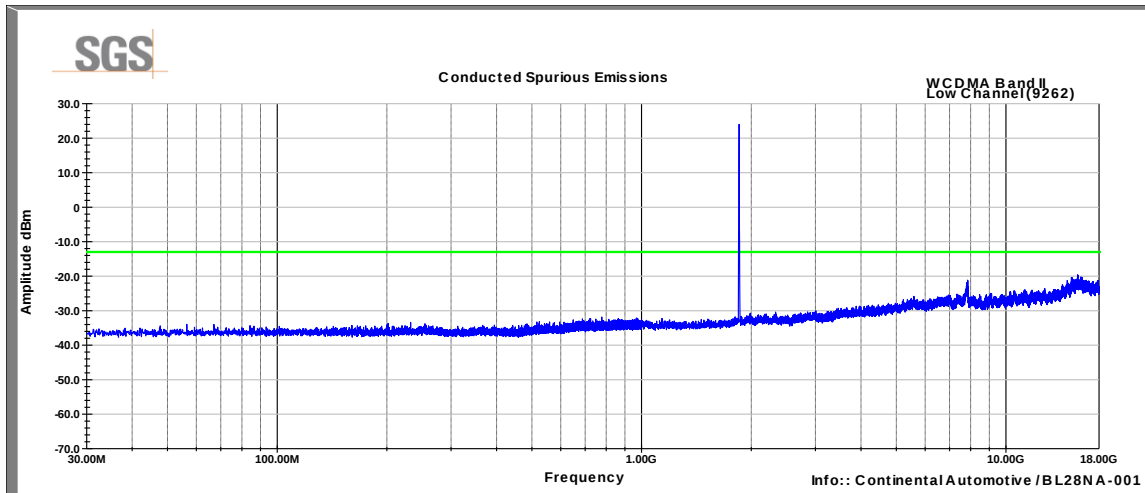
WCDMA Band IV Mid Channel



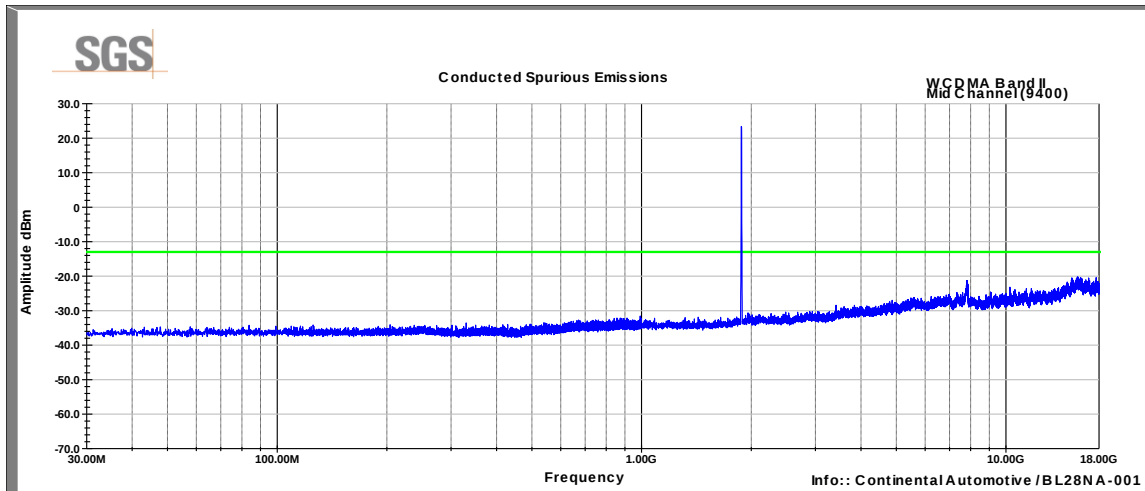
WCDMA Band IV High Channel



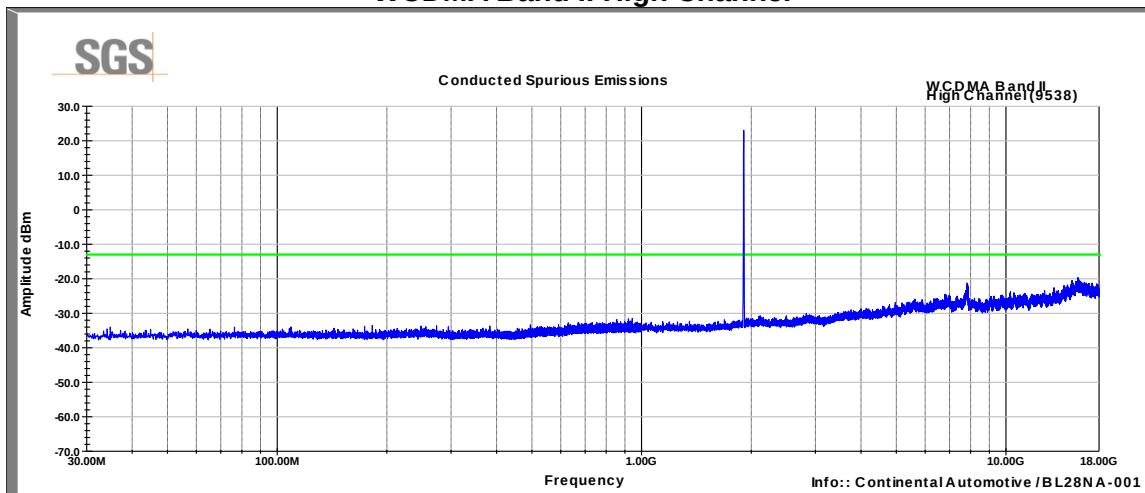
WCDMA Band II Low Channel



WCDMA Band II Mid Channel



WCDMA Band II High Channel



7 Effective Radiated Power

7.1.1 Test Result

Test Description	Basic Standards	Test Result
Effective Radiated Power	FCC Part 22.913(a)(2) RSS-132 5.4	Pass
Effective Isotropic Radiated Power	24.232(c) RSS-133 6.4	Pass

7.1.2 Test Method

Because the device is provided with a coaxial port but no antenna, ERP/EIRP measurements were taken by measuring the conducted output power and defining the maximum gain antenna that may be used while maintaining compliance with the applicable limits.

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 dBm	Antenna Gain	Cable Loss	Average EIRP		Distance (R) cm	Power Density $EIRP_{Avg}/(4\pi R^2)$ mW	FCC mW/cm ²	% of Limit	Verdict
Type	MHz				dBm	mW					
WCDMA Band II	1850-1910	23.3	7.0	1.0	29.3	851	20	0.169	1.00	17%	Pass
WCDMA Band IV	1710-1755	24.7	7.0	1.0	30.7	1175	20	0.234	1.00	23%	Pass
WCDMA Band V	824-849	23.8	7.0	1.0	29.8	955	20	0.190	0.55	35%	Pass

Band of Operation		Conducted Power w/tolerance dBm	Antenna Gain	Cable Loss	Average EIRP		Distance (R) cm	Power Density $EIRP_{Avg}/(4\pi R^2)$ mW	IC mW/cm ²	% of Limit	Verdict
Type	MHz				dBm	mW					
WCDMA Band II	1850-1910	23.3	7.0	1.0	29.3	851	20	0.169	0.45	38%	Pass
WCDMA Band IV	1710-1755	24.7	7.0	1.0	30.7	1175	20	0.234	0.42	55%	Pass
WCDMA Band V	824-849	23.8	7.0	1.0	29.8	955	20	0.190	0.26	74%	Pass

Note: Antenna gain was determined from maximum gain while still meeting the RF exposure requirements.

8 Radiated Spurious Emissions

8.1 Test Result

Test Description	Basic Standards		Test Result
Radiated Spurious Emissions	FCC Part 2.1053 FCC Part 22.917(a) FCC Part 24.238(a) ANSI/TIA-603-D-2010	RSS-GEN (6.13) RSS-132 5.5 RSS-133 6.5	Pass

8.2 Test Method

The levels of the carrier and the various conducted spurious and harmonics frequencies 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 10th 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 conducted at the low, middle, and high channels in RC3/SO55 which was determined to be the worst case operating mode.

8.3 Test Site

SGS 3m Chamber, Suwanee, GA (validated to ANS C63.4: 2009 below and above 1GHz)
 Environmental Conditions

Temperature: 23.3 °C
 Relative Humidity: 53.9 %
 Atmospheric Pressure: 98.02 kPa

8.4 Test Equipment

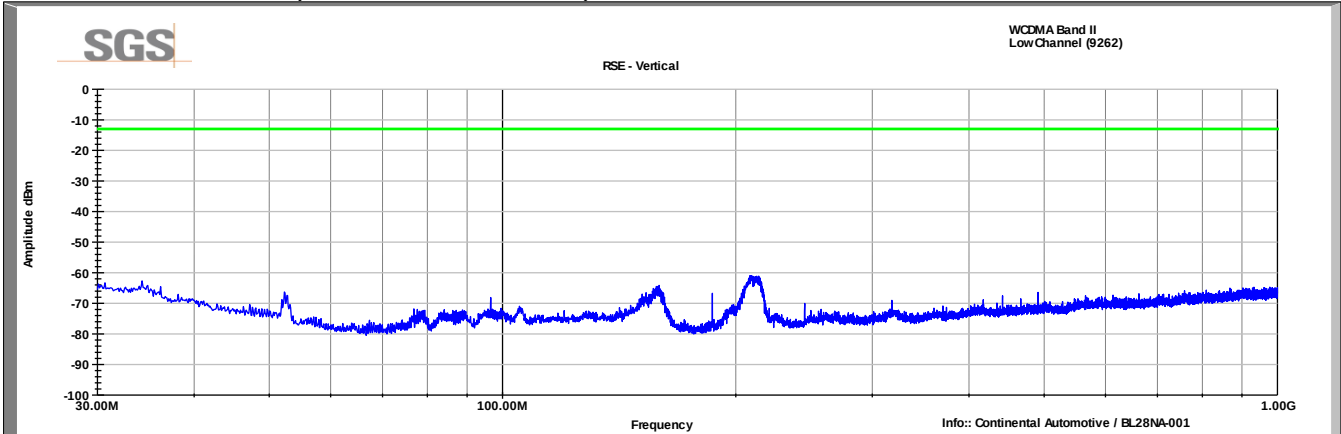
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, BILOG	CBL 6143A	TESEQ	B085931	1-Dec-2016
RF CABLE	SF106	HUBER & SUHNER	B079716	27-Jul-2017
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE & SCHWARZ	B085757	3-Nov-2016
RF CABLE	SF106	HUBER & SUHNER	B079713	27-Jul-2017
EMI TEST RECEIVER	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	SF102	HUBER & SUHNER	B079822	27-Jul-2017
RF CABLE	SF102	HUBER & SUHNER	B079824	27-Jul-2017
DRG HORN (SMALL)	3116B	ETS LINDGREN	B079695	15-Jul-2017
LOW NOISE AMPLIFIER	NSP1840-HG	MITEQ	B087572	29-Jul-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

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

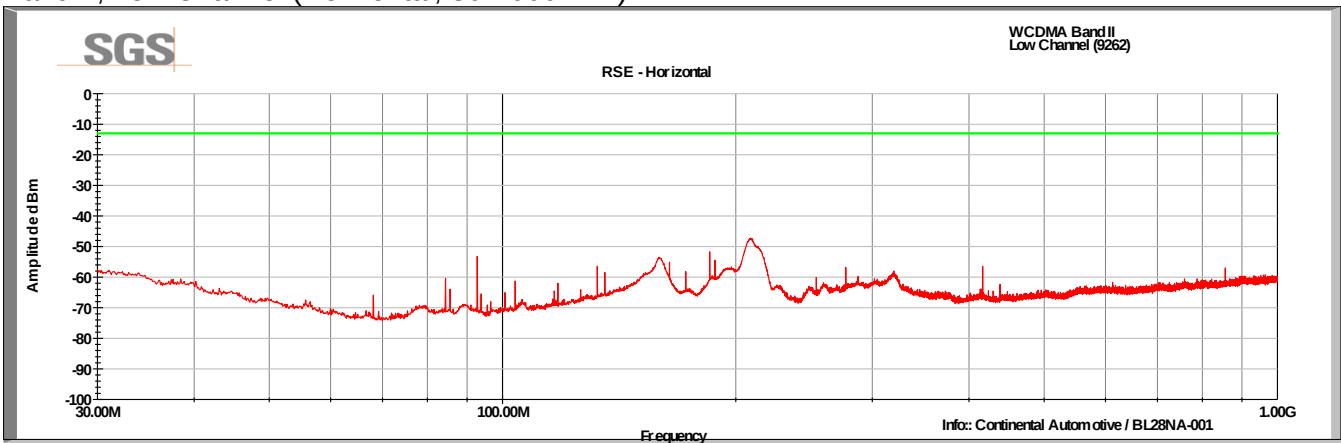
8.5 Test Data

Test Date(s): 21 - 24 August 2015

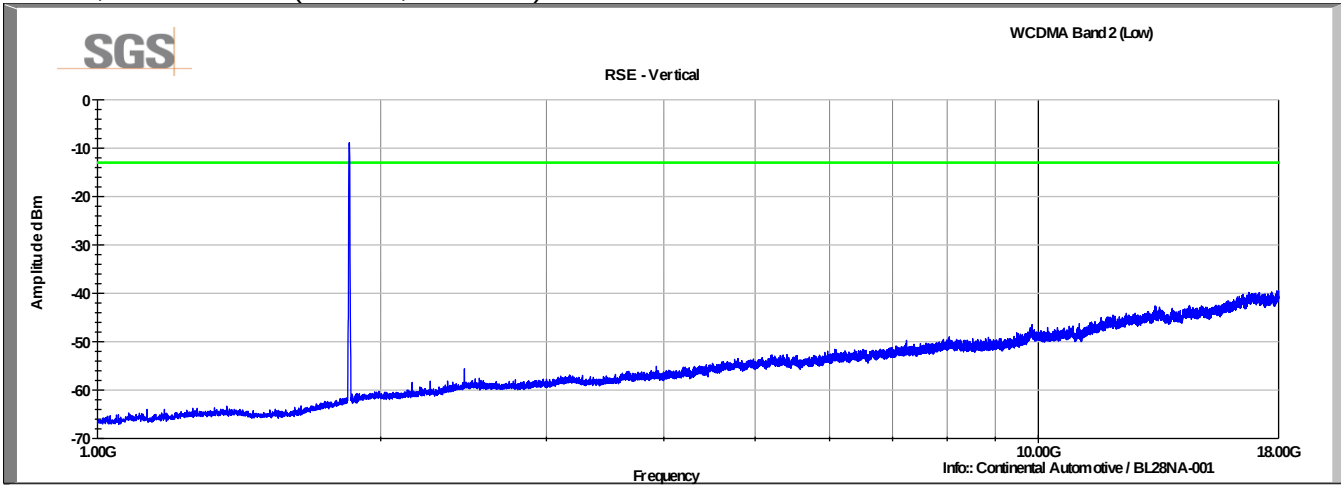
Band II, Low Channel (Vertical, 30-1000MHz)



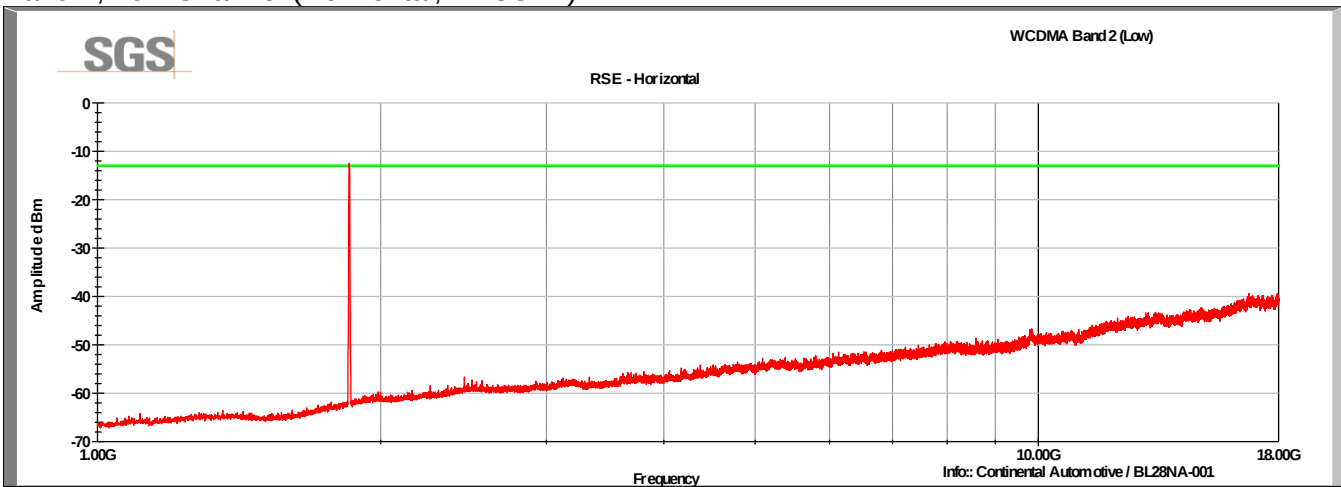
Band II, Low Channel (Horizontal, 30-1000MHz)



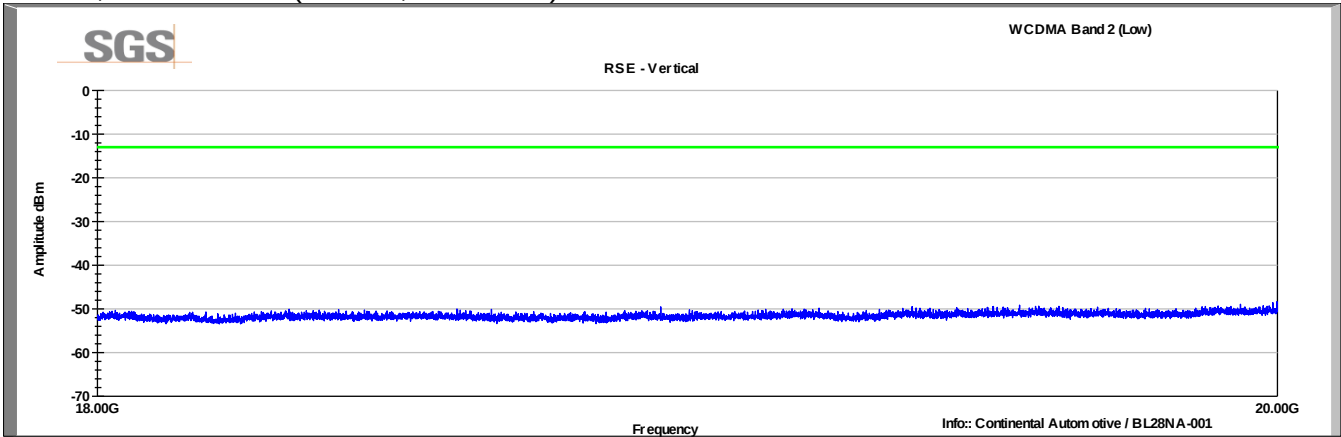
Band II, Low Channel (Vertical, 1-18GHz)



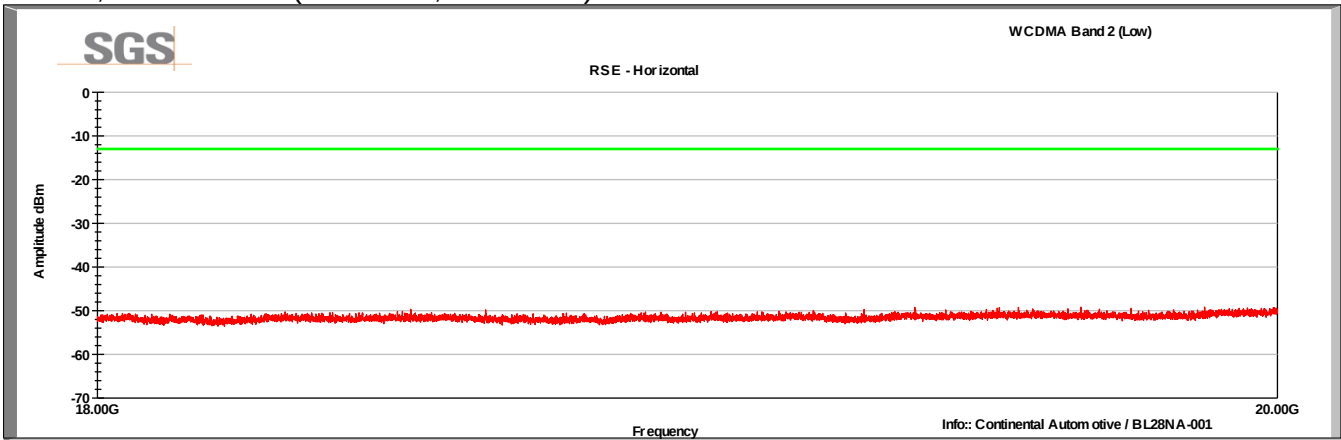
Band II, Low Channel (Horizontal, 1-18GHz)



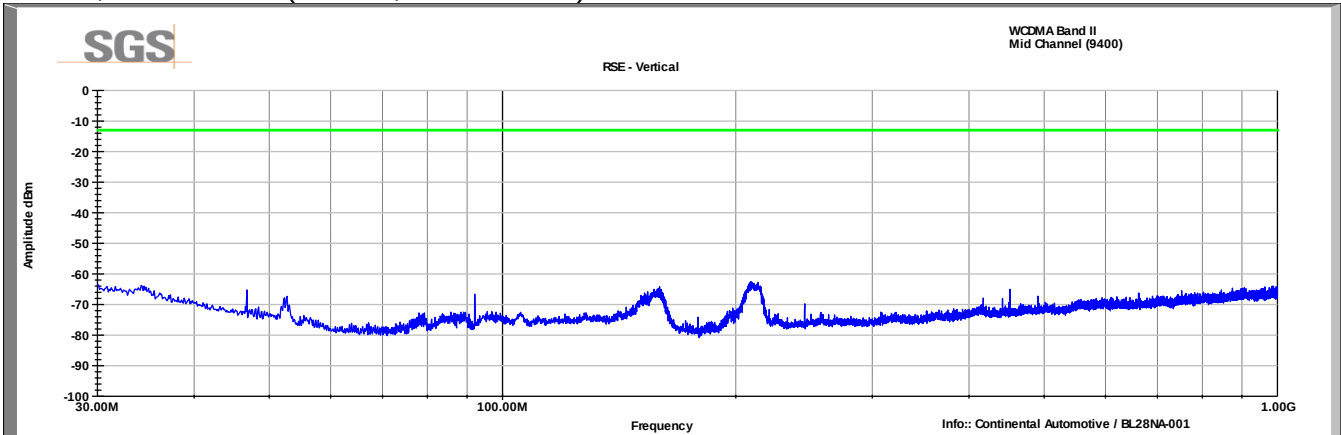
Band II, Low Channel (Vertical, 18-20GHz)



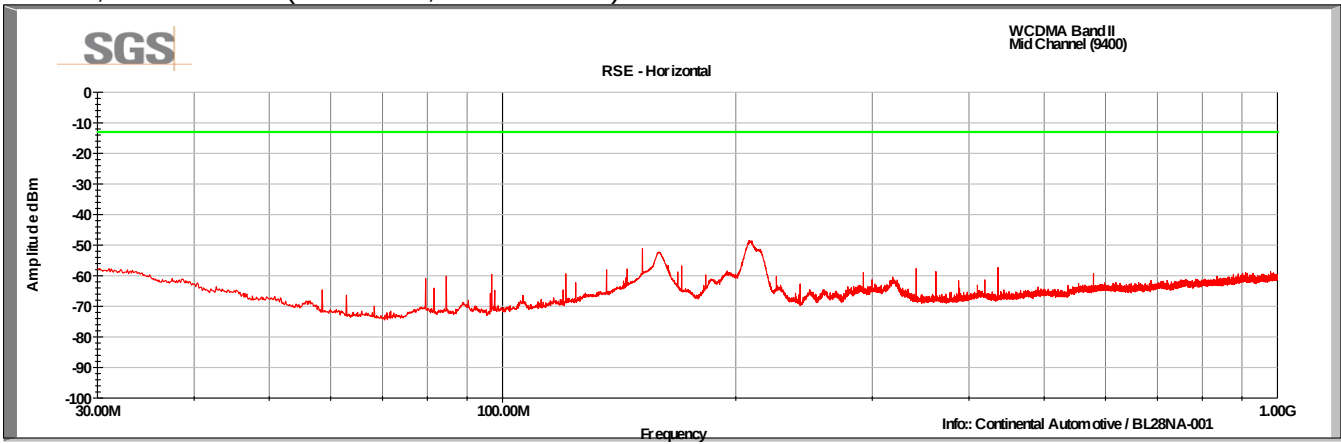
Band II, Low Channel (Horizontal, 18-20GHz)



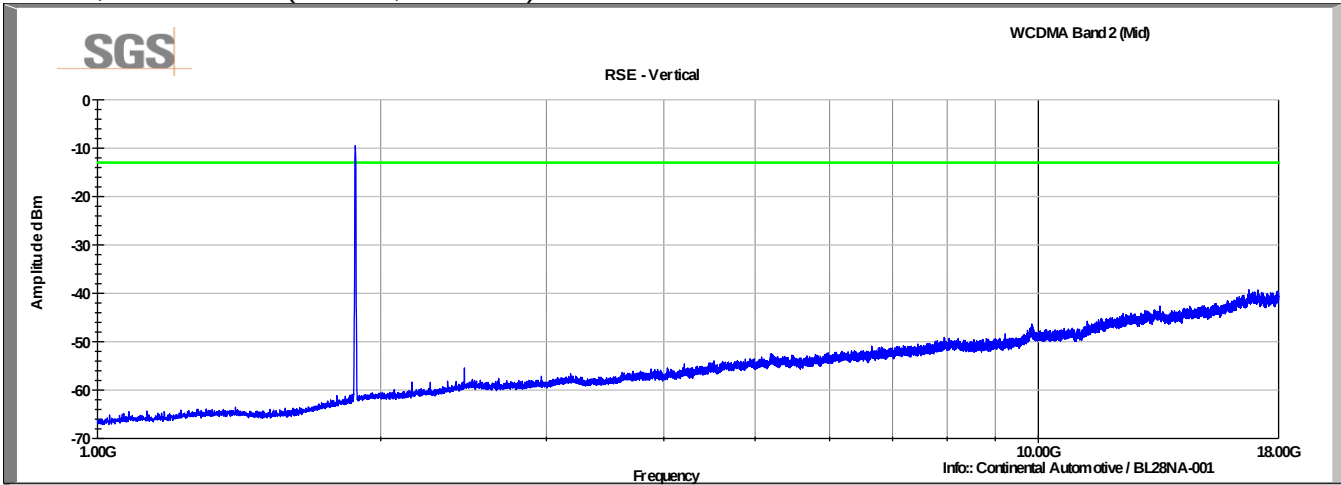
Band II, Mid Channel (Vertical, 30-1000MHz)



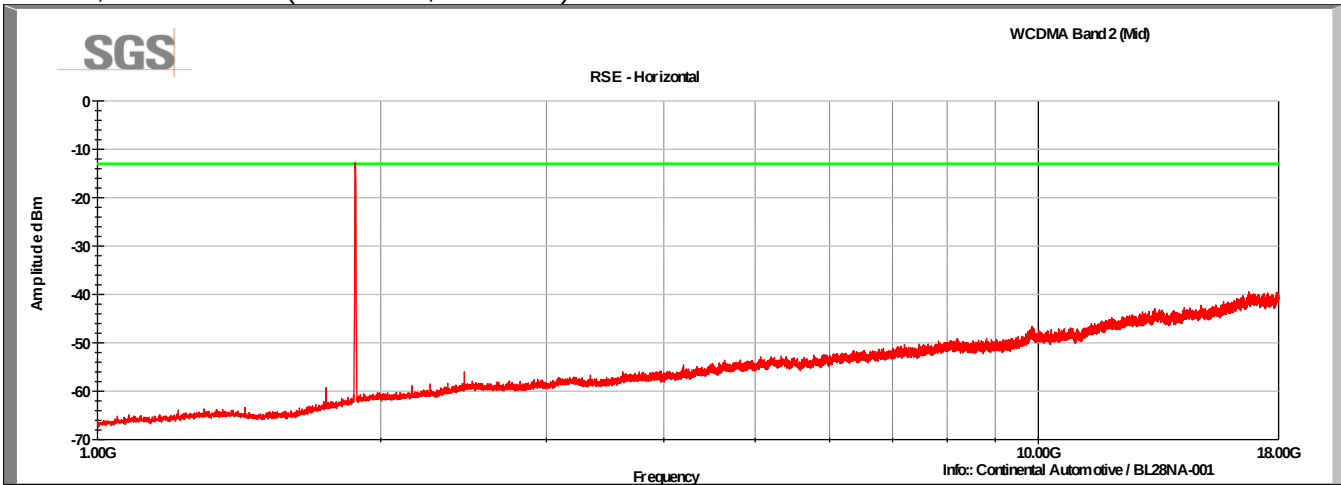
Band II, Mid Channel (Horizontal, 30-1000MHz)



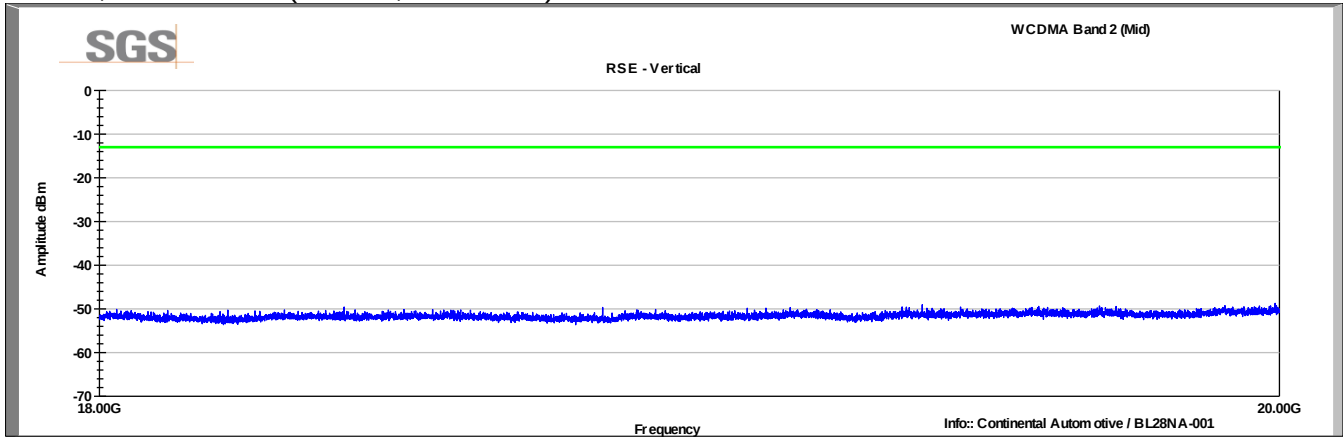
Band II, Mid Channel (Vertical, 1-18GHz)



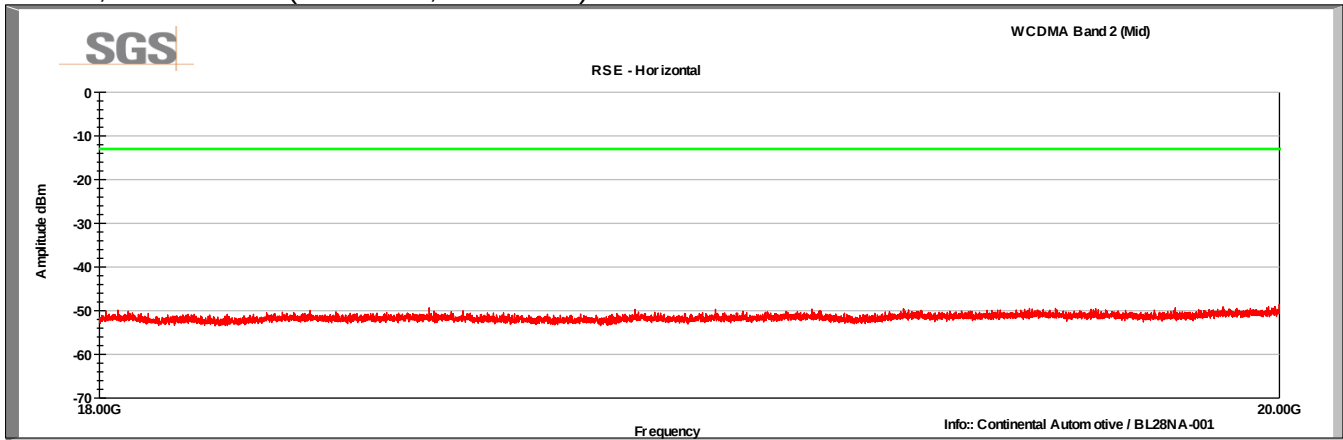
Band II, Mid Channel (Horizontal, 1-18GHz)



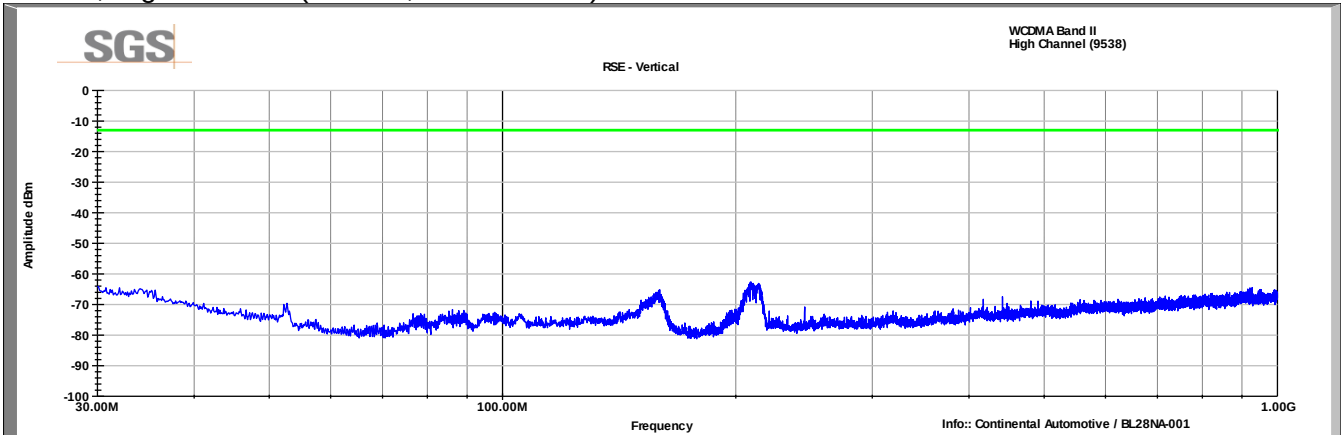
Band II, Mid Channel (Vertical, 18-20GHz)



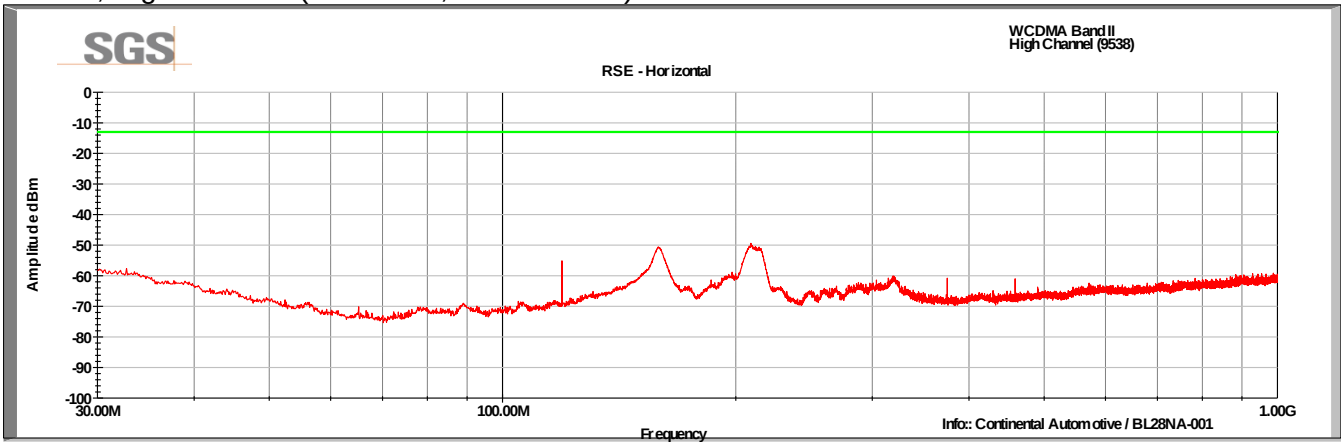
Band II, Mid Channel (Horizontal, 18-20GHz)



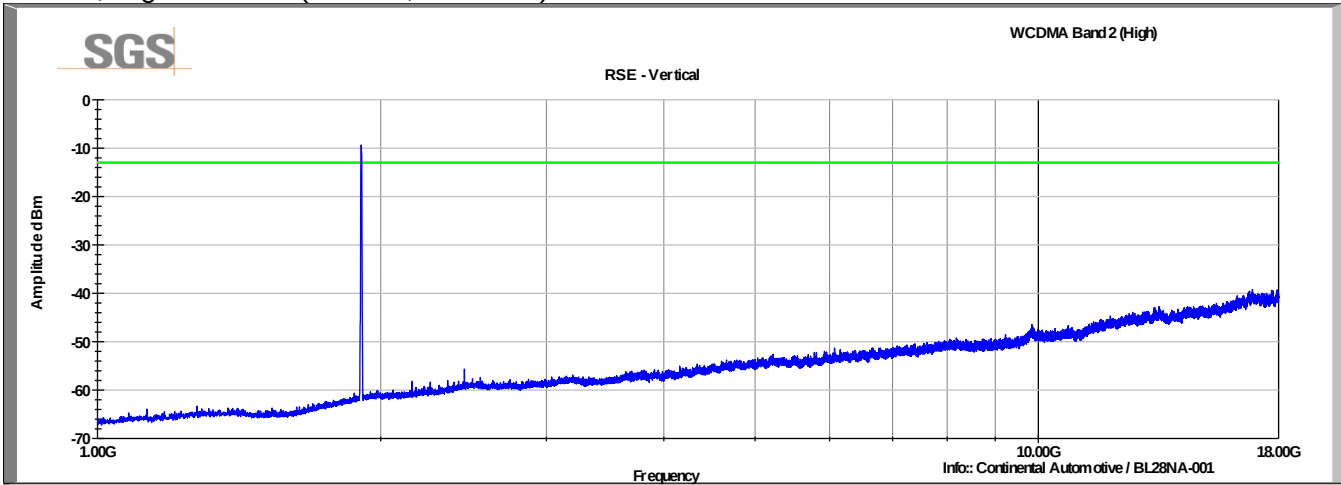
Band II, High Channel (Vertical, 30-1000MHz)



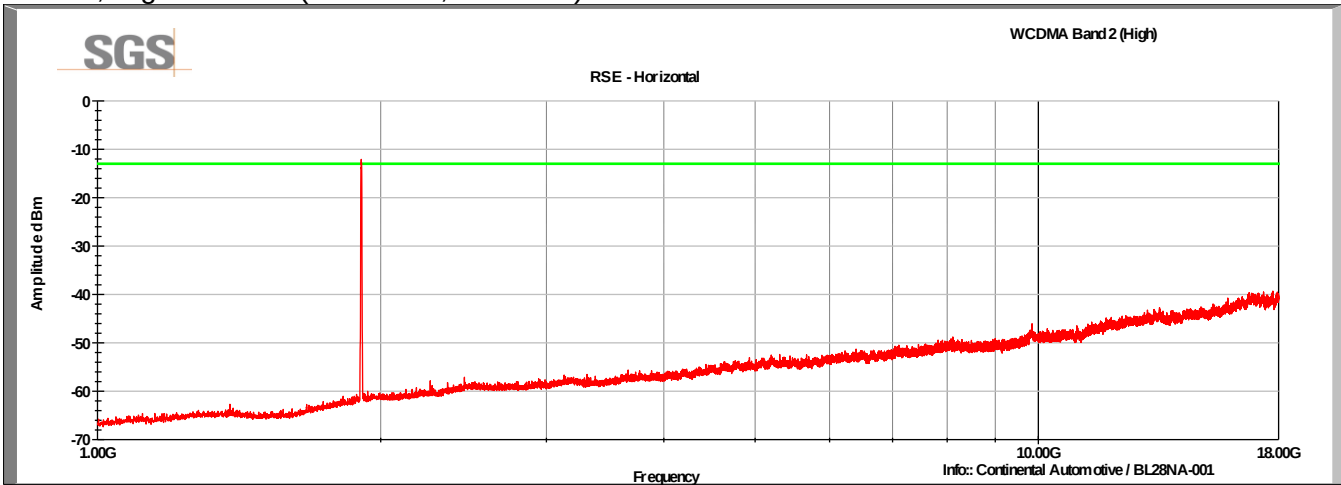
Band II, High Channel (Horizontal, 30-1000MHz)



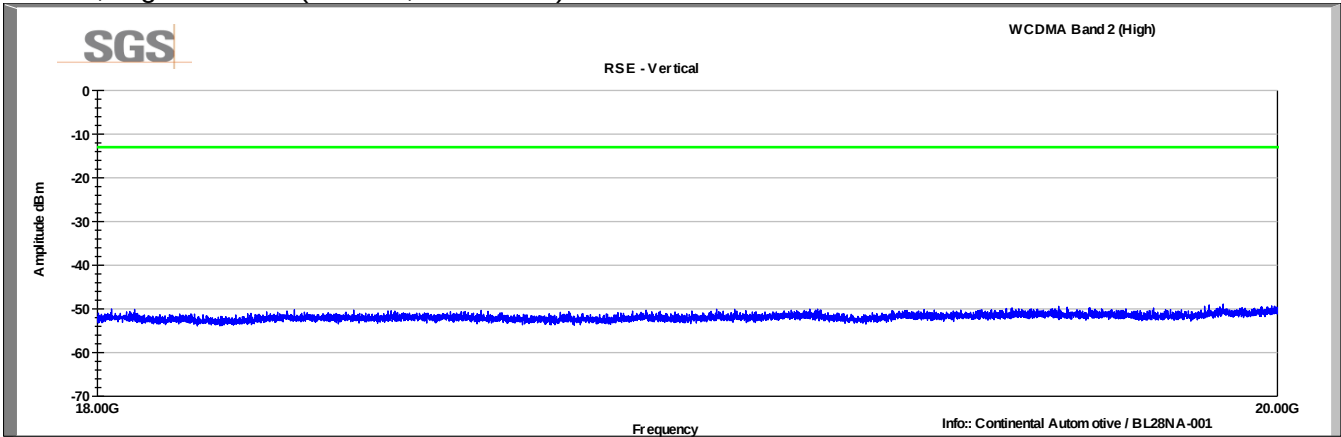
Band II, High Channel (Vertical, 1-18GHz)



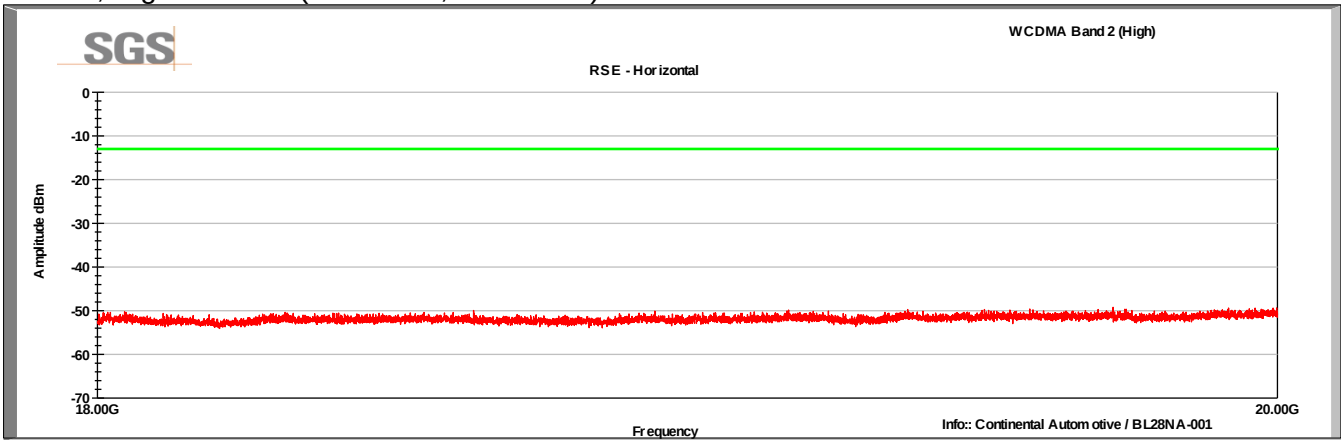
Band II, High Channel (Horizontal, 1-18GHz)



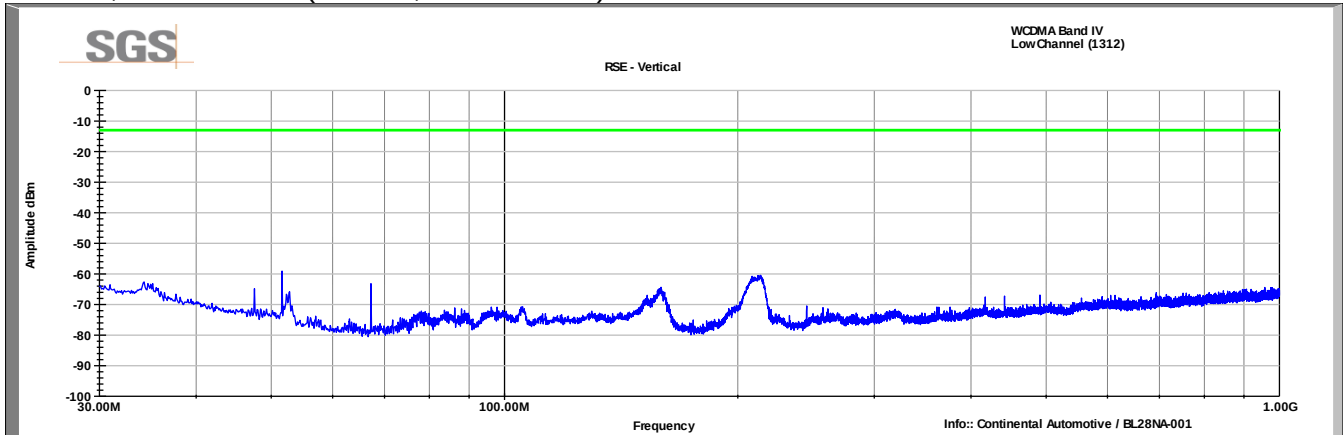
Band II, High Channel (Vertical, 18-20GHz)



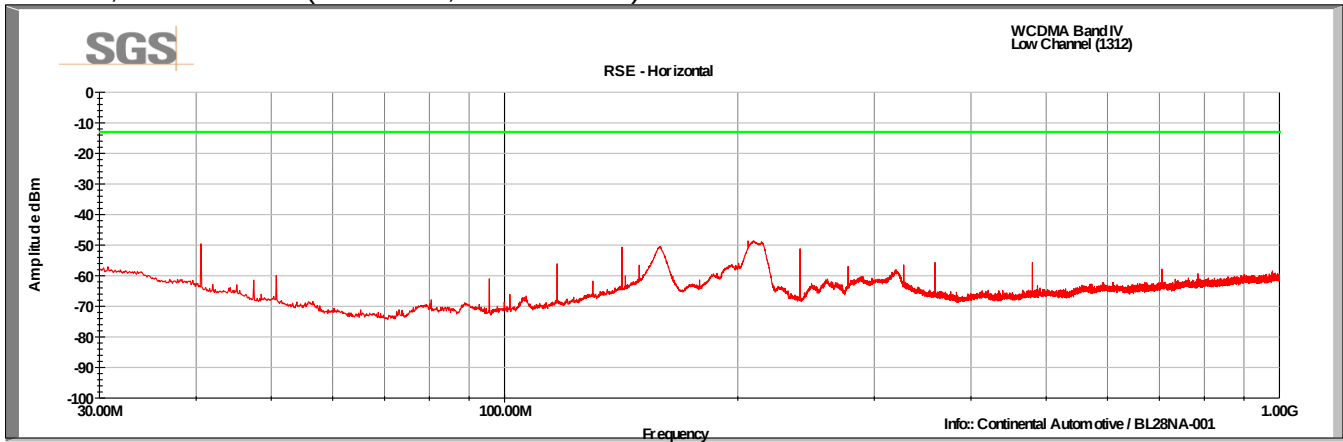
Band II, High Channel (Horizontal, 18-20GHz)



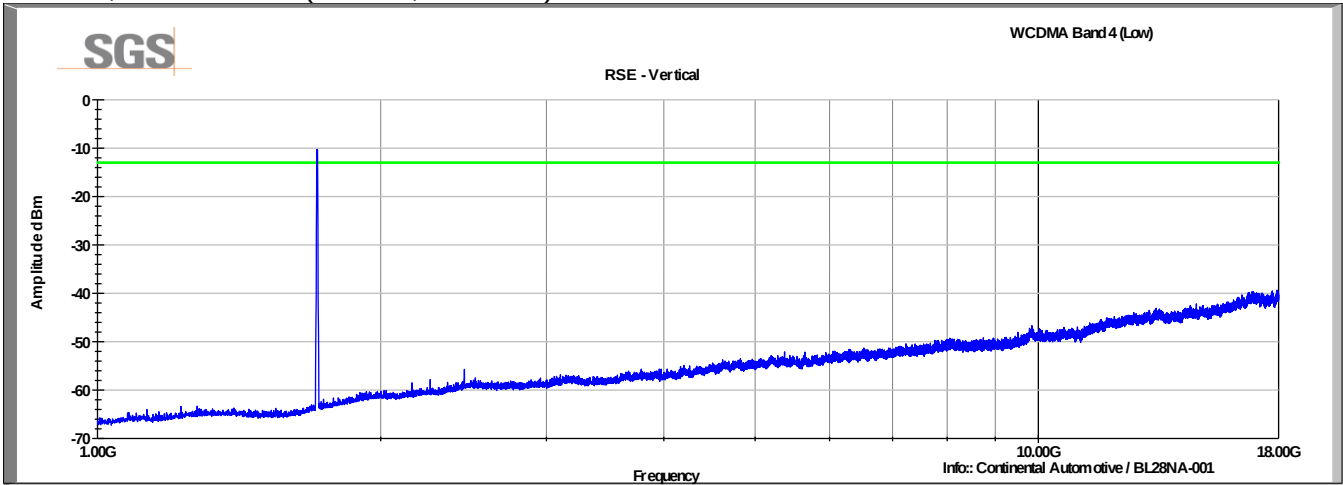
Band IV, Low Channel (Vertical, 30-1000MHz)



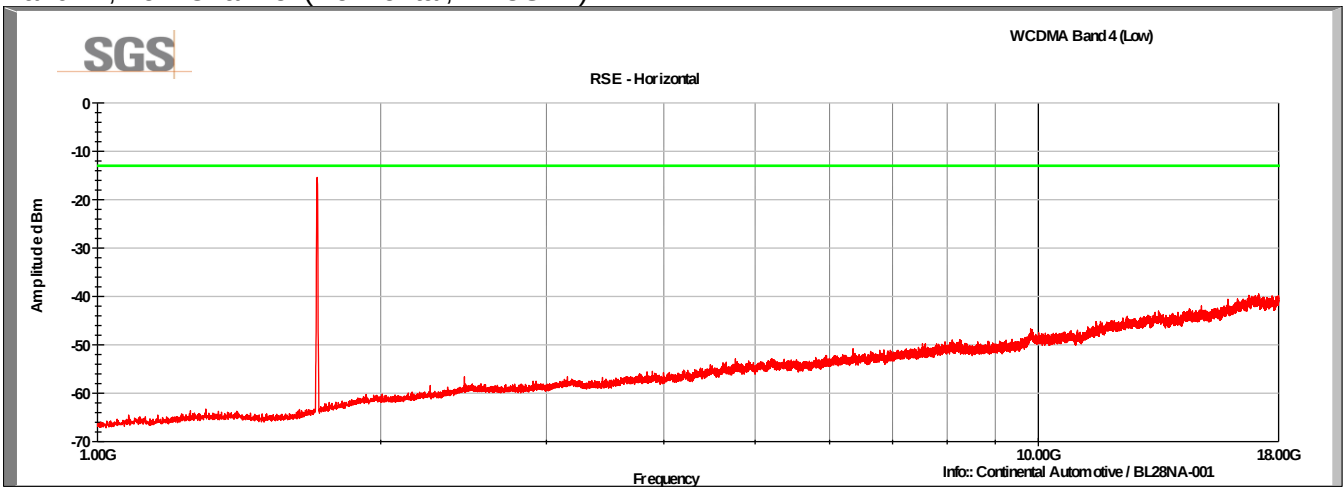
Band IV, Low Channel (Horizontal, 30-1000MHz)



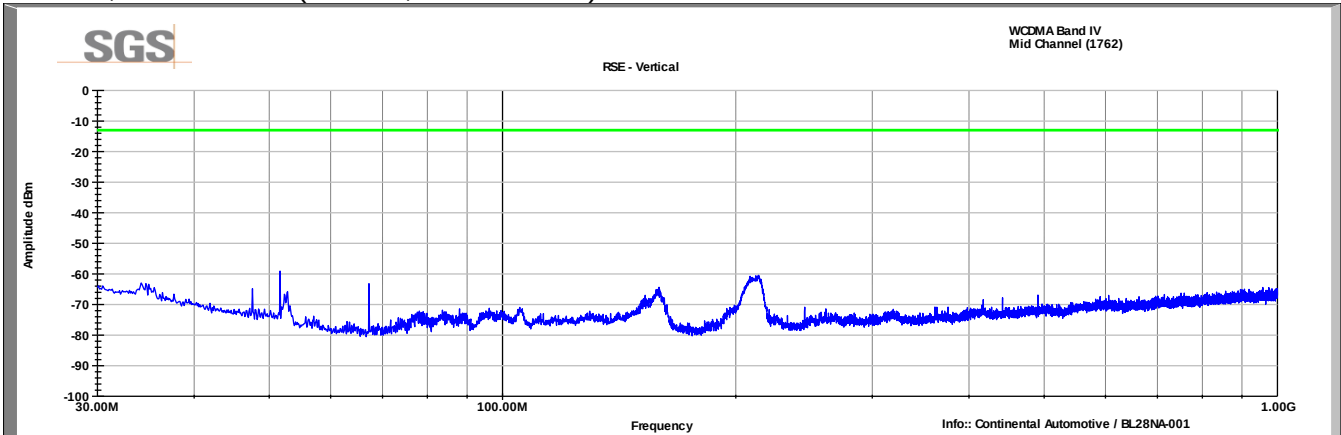
Band IV, Low Channel (Vertical, 1-18GHz)



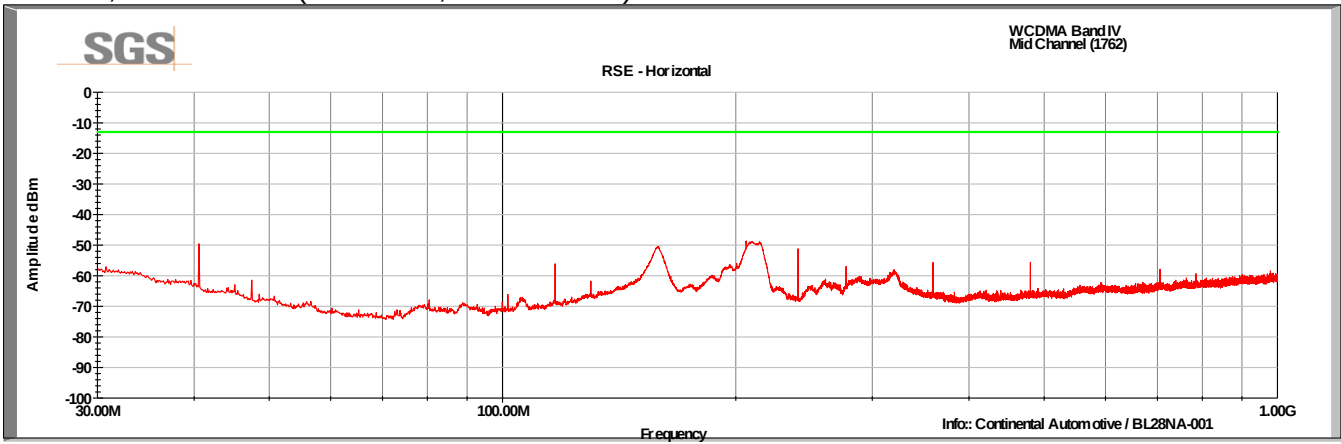
Band IV, Low Channel (Horizontal, 1-18GHz)



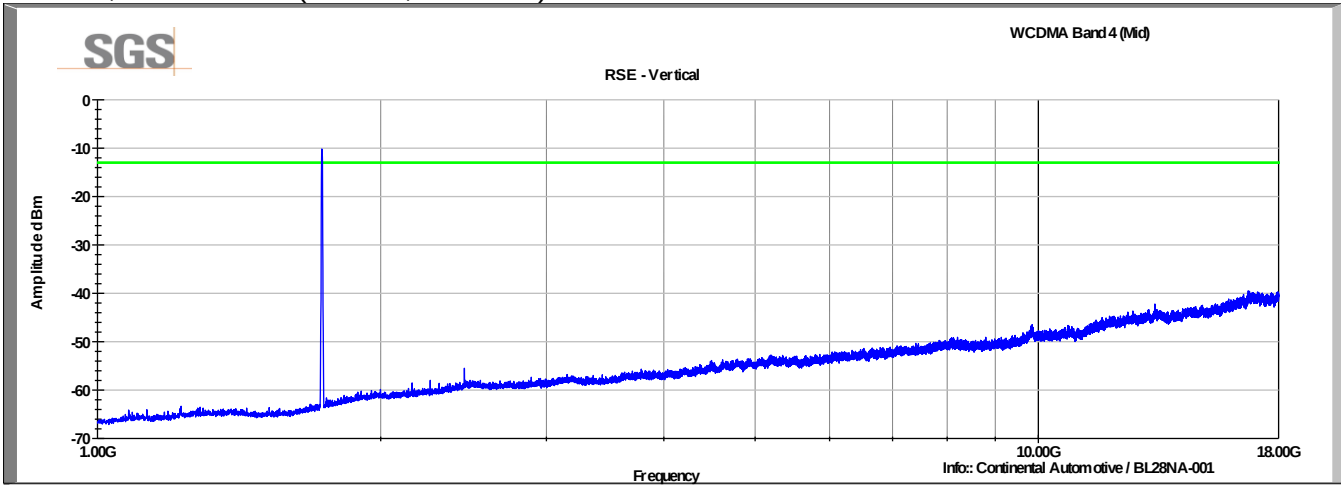
Band IV, Mid Channel (Vertical, 30-1000MHz)



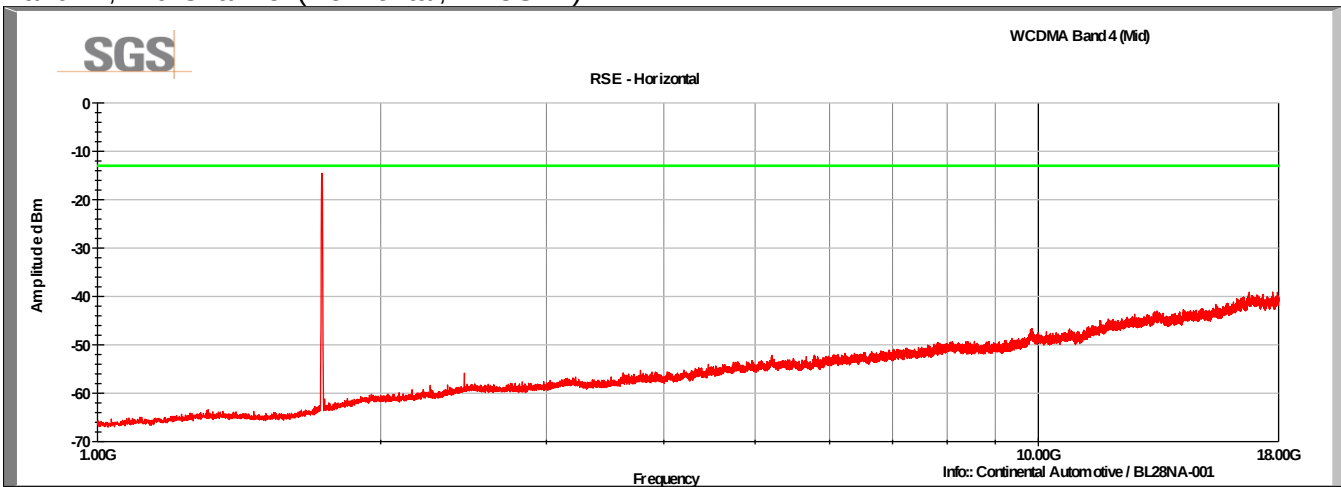
Band IV, Mid Channel (Horizontal, 30-1000MHz)



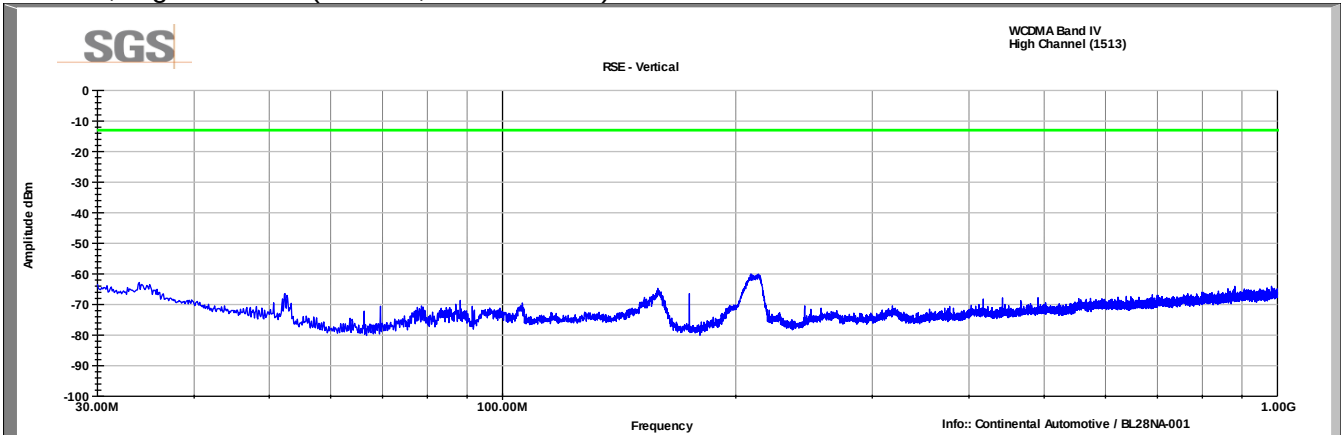
Band IV, Mid Channel (Vertical, 1-18GHz)



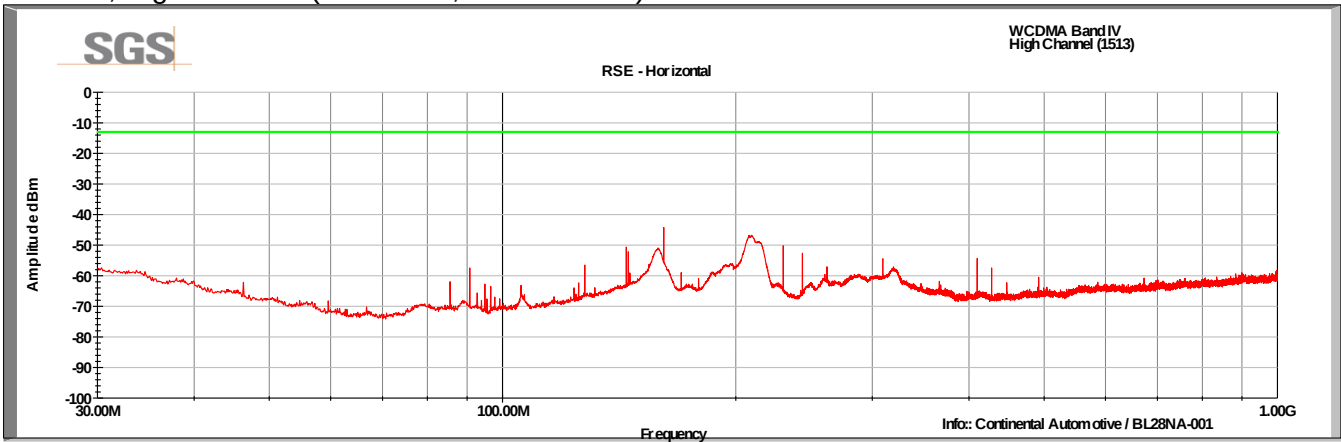
Band IV, Mid Channel (Horizontal, 1-18GHz)



Band IV, High Channel (Vertical, 30-1000MHz)

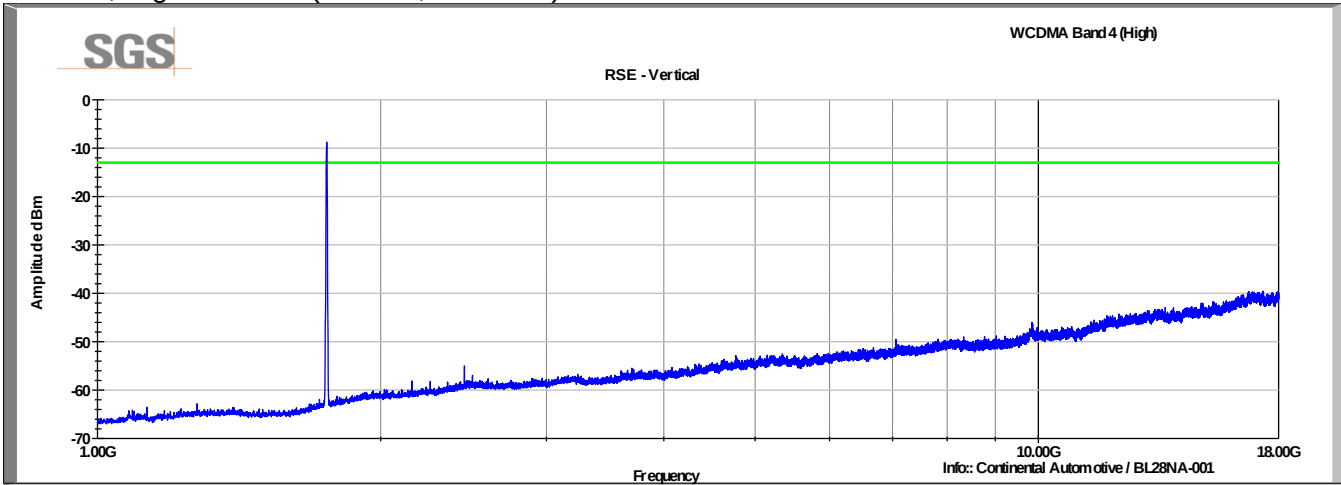


Band IV, High Channel (Horizontal, 30-1000MHz)

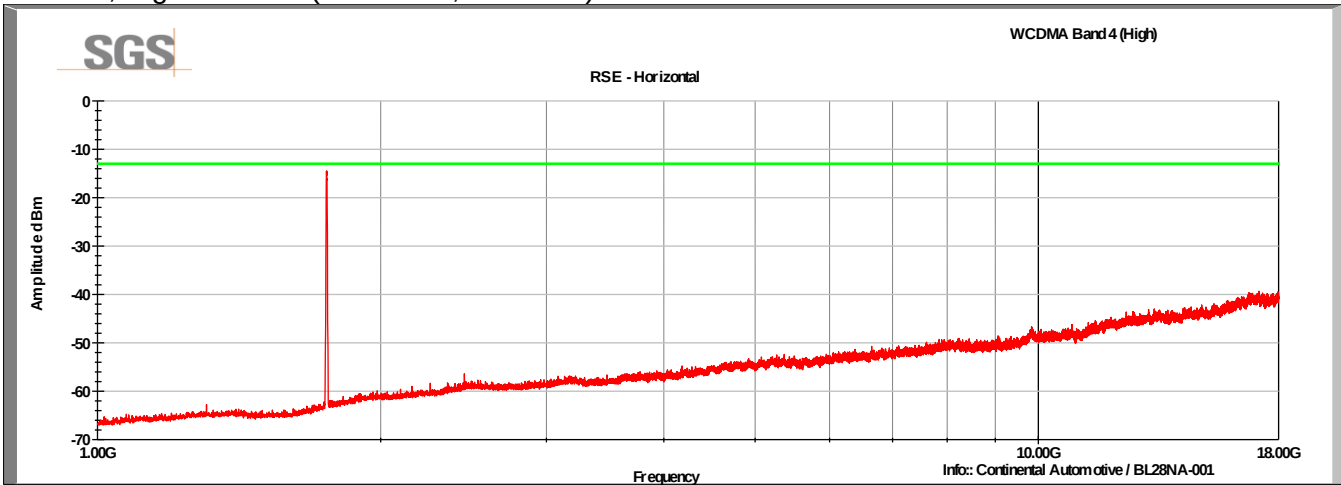


Worst-case spur: -44.2dBm @ 161.435MHz

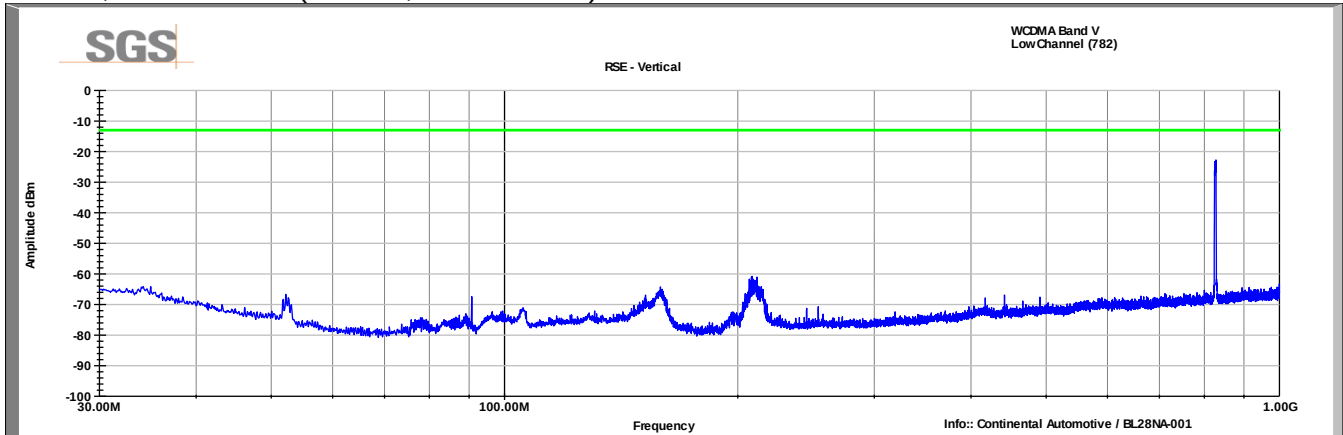
Band IV, High Channel (Vertical, 1-18GHz)



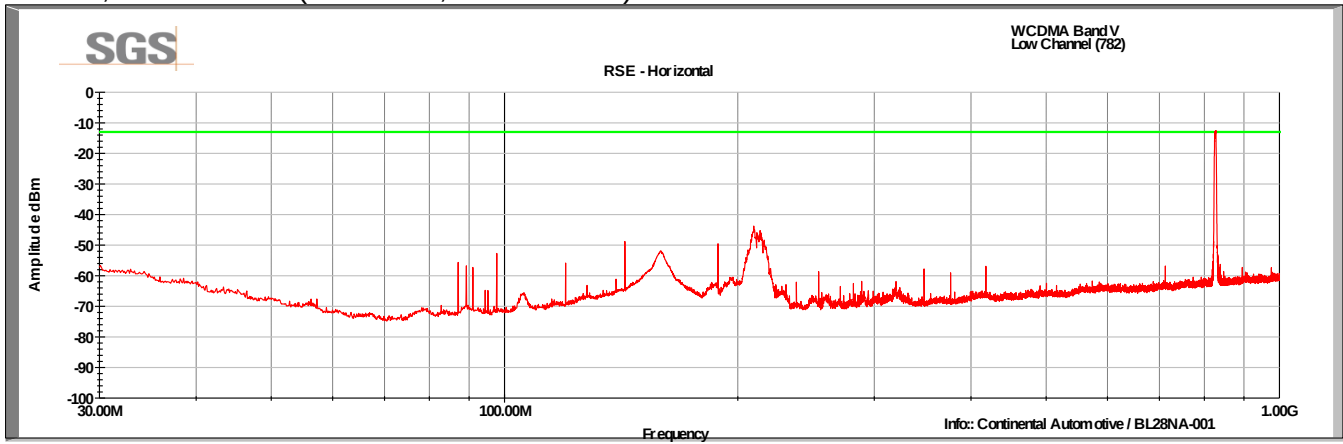
Band IV, High Channel (Horizontal, 1-18GHz)



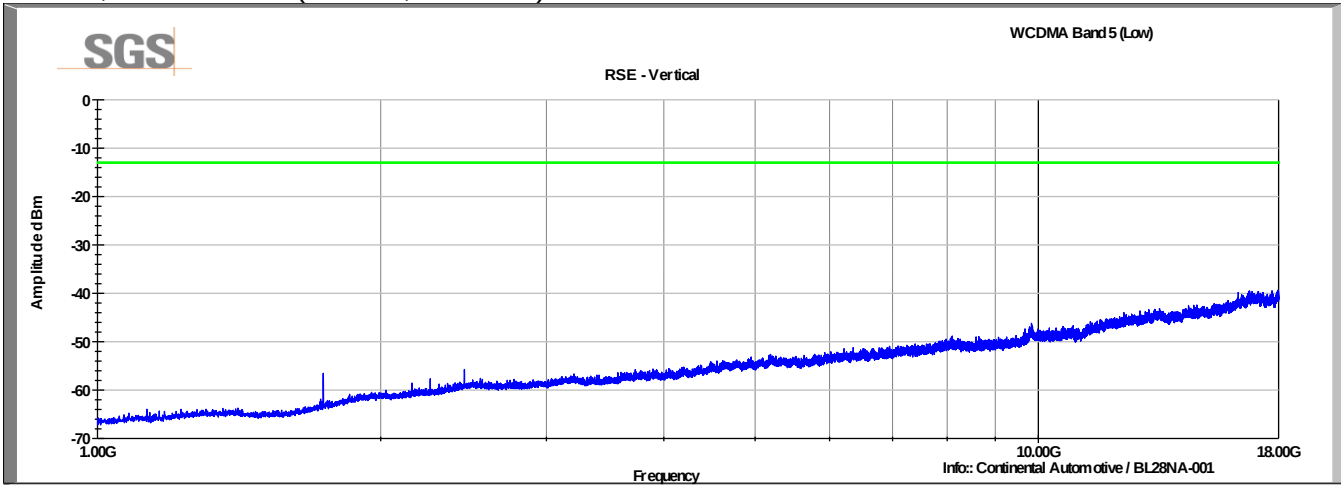
Band V, Low Channel (Vertical, 30-1000MHz)



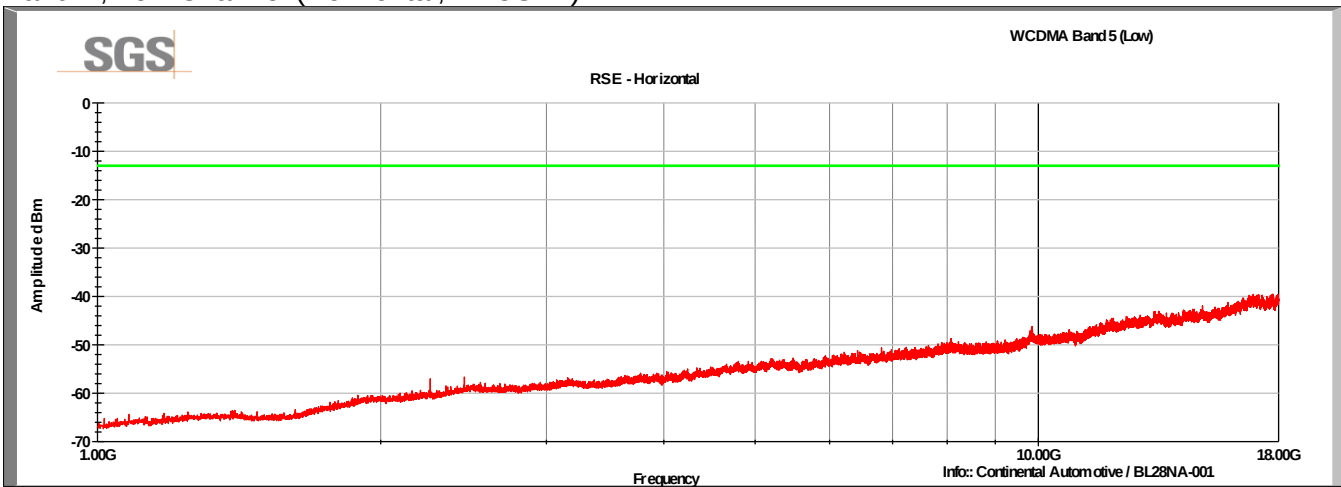
Band V, Low Channel (Horizontal, 30-1000MHz)



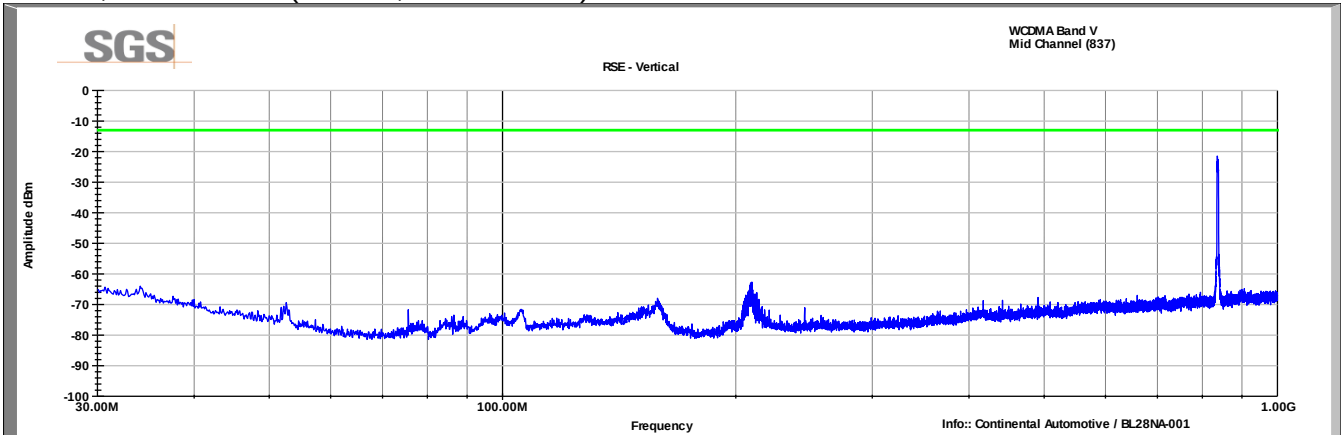
Band V, Low Channel (Vertical, 1-18GHz)



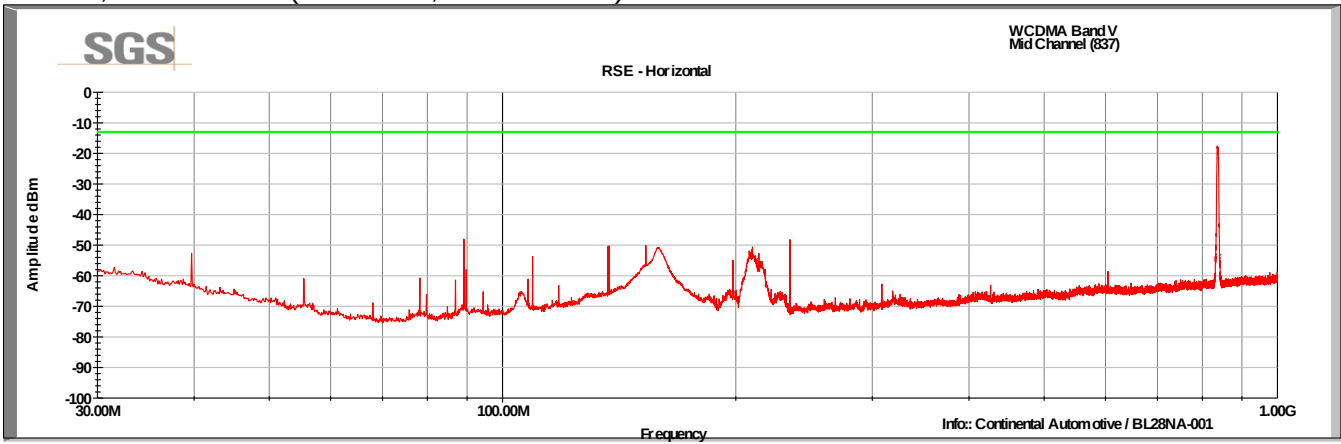
Band V, Low Channel (Horizontal, 1-18GHz)



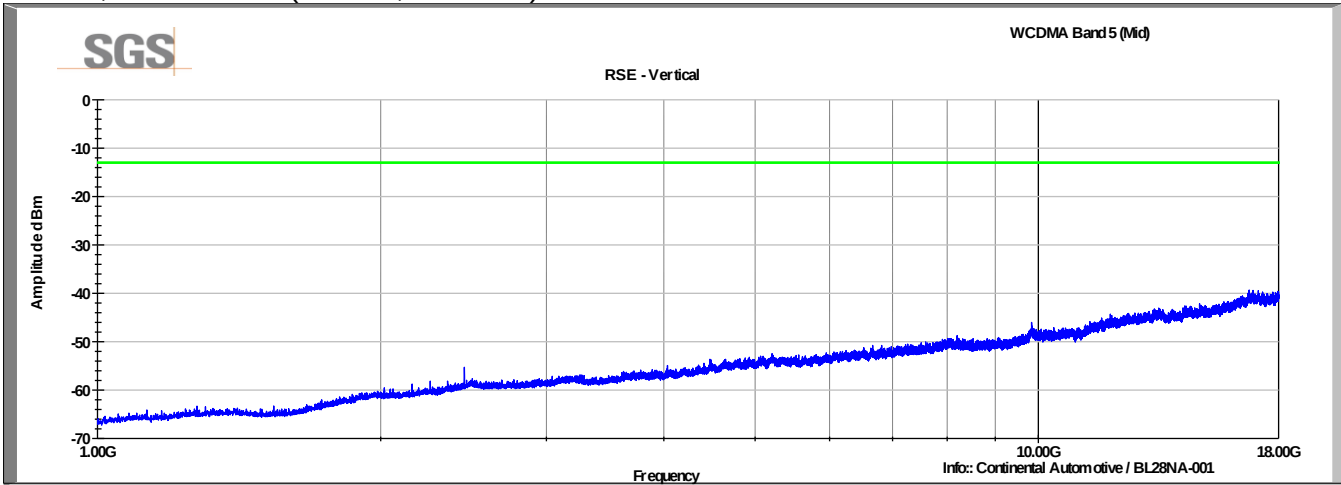
Band V, Mid Channel (Vertical, 30-1000MHz)



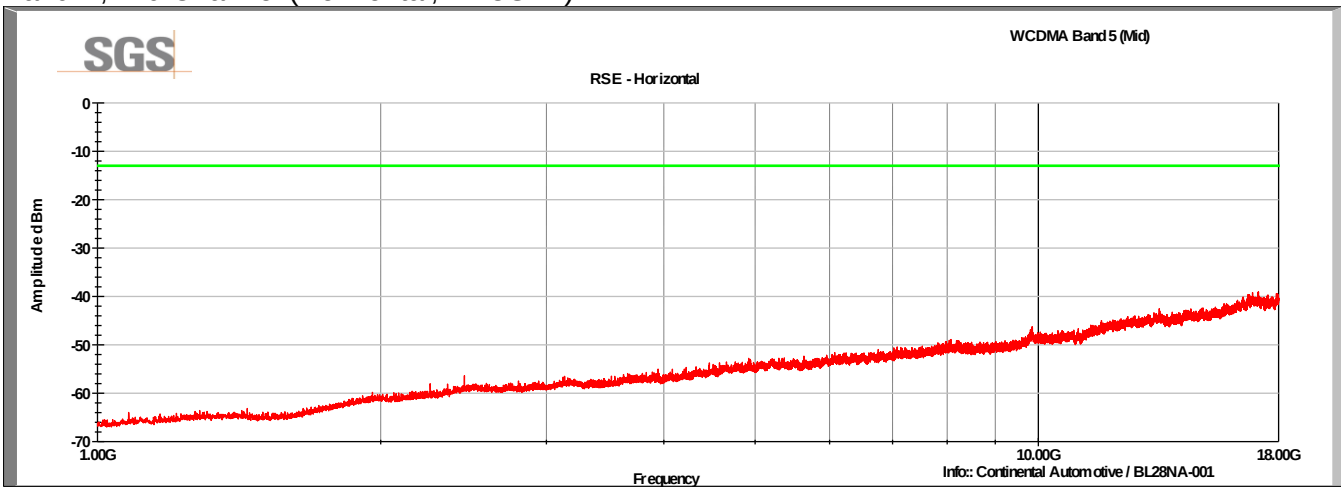
Band V, Mid Channel (Horizontal, 30-1000MHz)



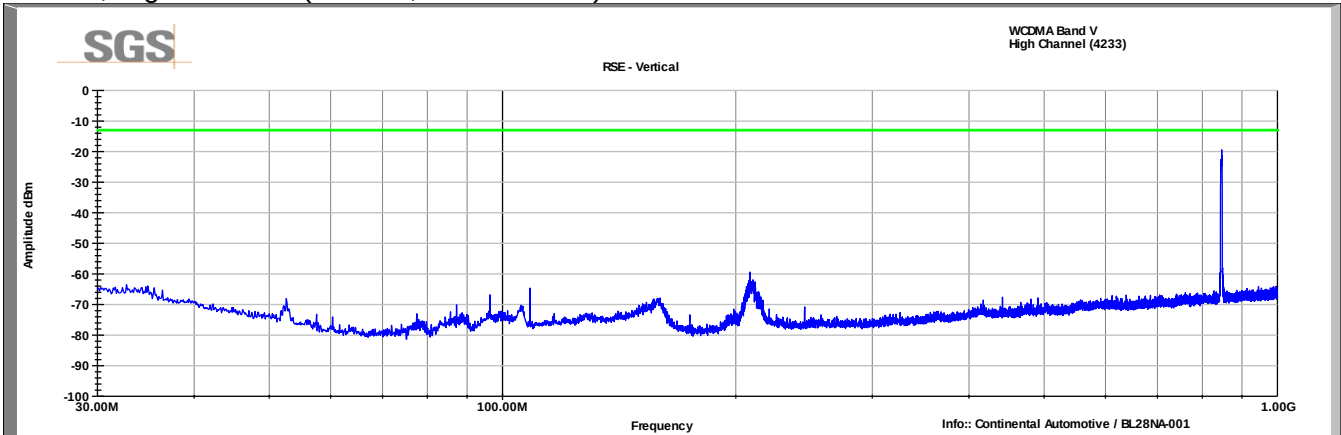
Band V, Mid Channel (Vertical, 1-18GHz)



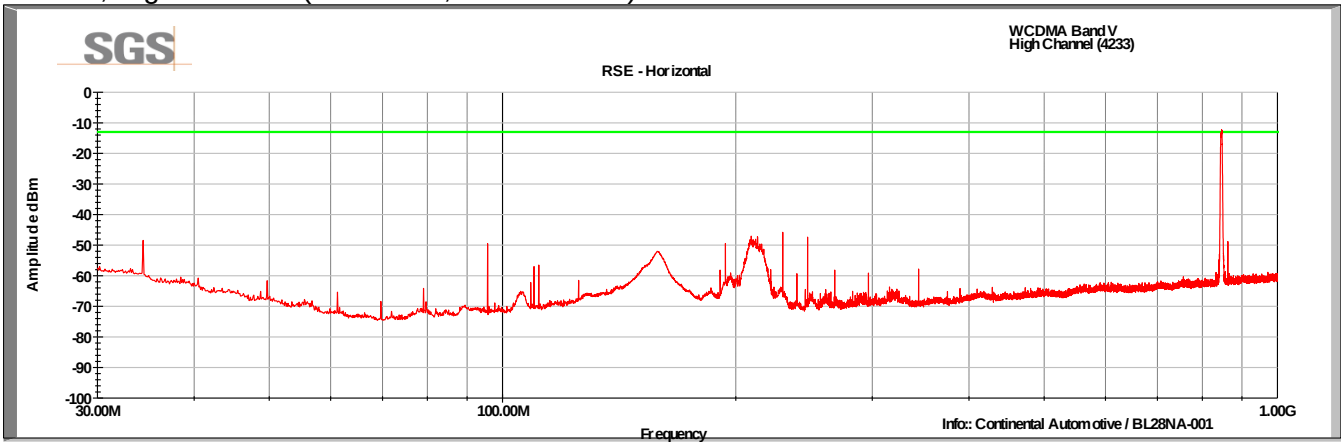
Band V, Mid Channel (Horizontal, 1-18GHz)



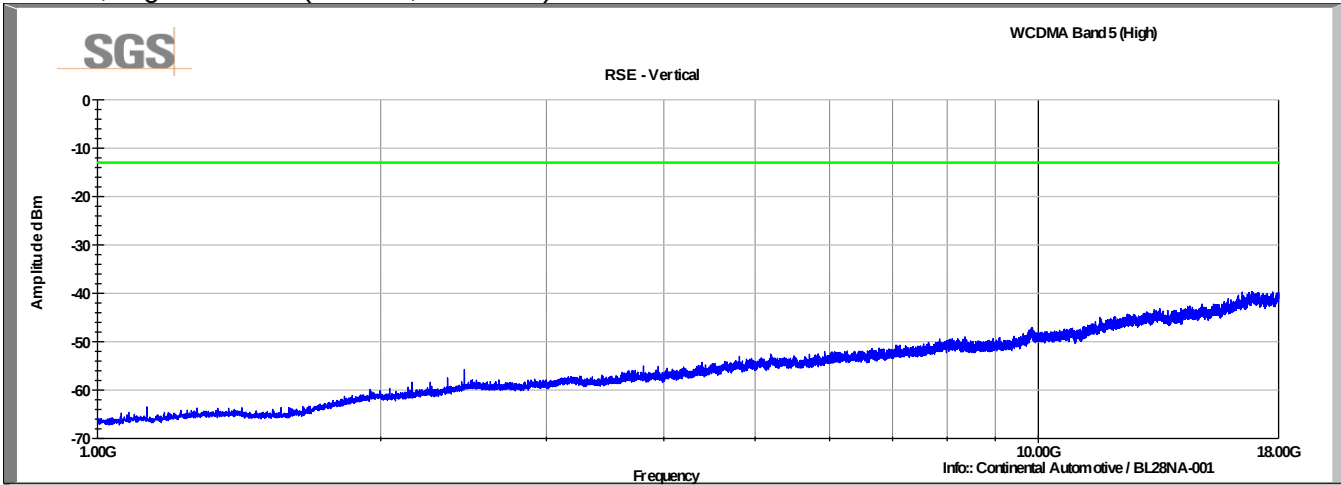
Band V, High Channel (Vertical, 30-1000MHz)



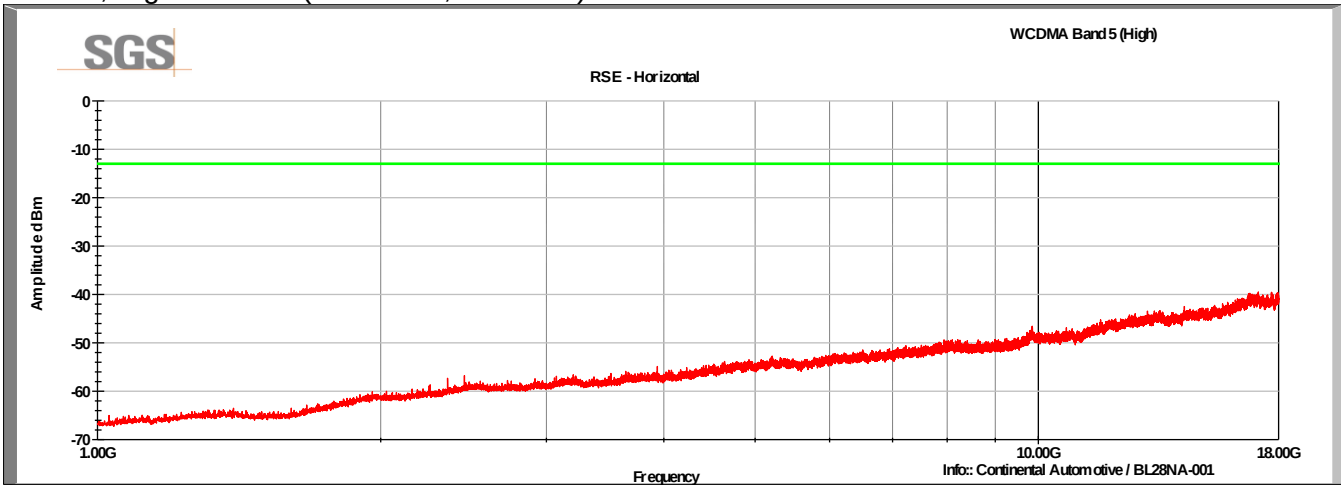
Band V, High Channel (Horizontal, 30-1000MHz)



Band V, High Channel (Vertical, 1-18GHz)



Band V, High Channel (Horizontal, 1-18GHz)



9 Frequency Stability

9.1 Test Result

Test Description	Basic Standards	Test Result
Frequency Stability	FCC Part 2.1055 FCC Part 22.917(a) FCC Part 24.238(a) RSS-GEN (6.11) RSS-132 5.3 RSS-132 6.3	Pass

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 WCDMA bands 2, 4, and 5.

9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

9.4 Test Equipment

Test Date: 9-Sep-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

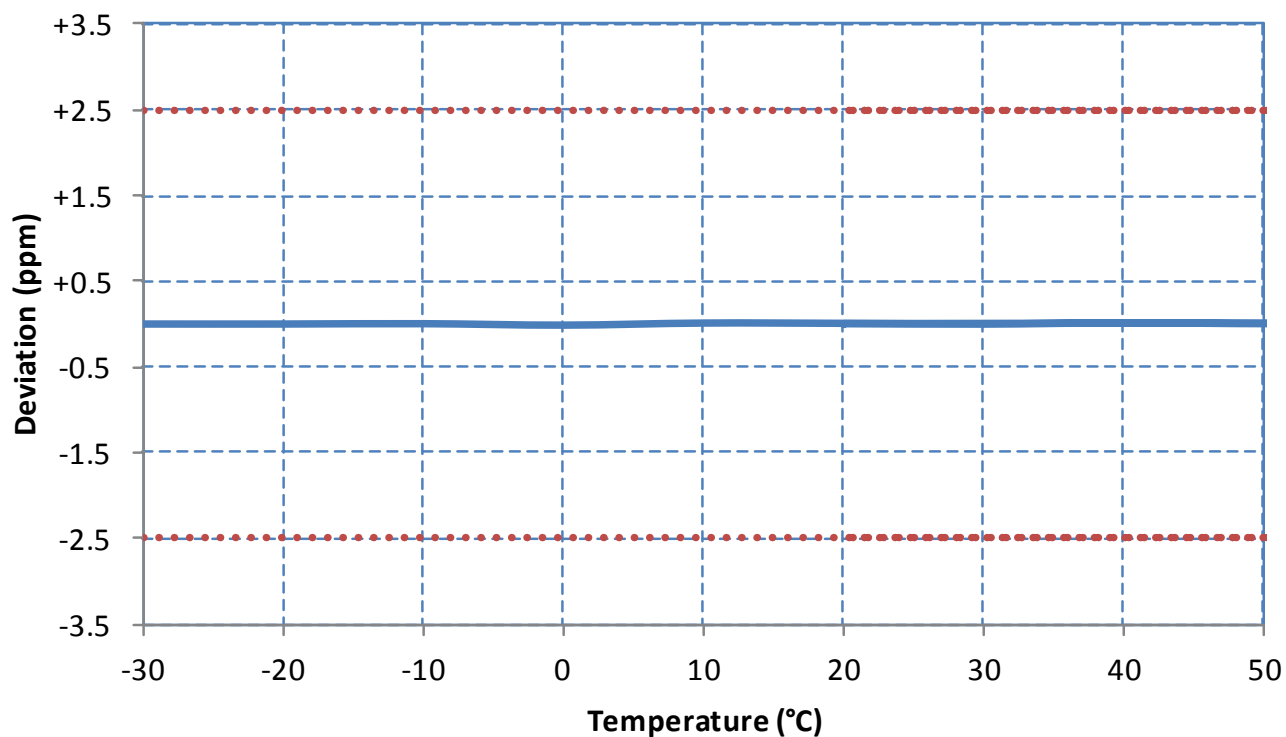
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle.

9.5 Test Data

WCDMA Band 2, Channel 9400 (1880MHz)

Voltage %	Power V _{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,880,000,002	+2	+0.00	+0.000000
100%	12.00	-30	1,879,999,999	-1	-0.00	-0.000000
100%	12.00	-20	1,879,999,999	-1	-0.00	-0.000000
100%	12.00	-10	1,880,000,000	+0	+0.00	+0.000000
100%	12.00	0	1,879,999,995	-5	-0.00	-0.000000
100%	12.00	+10	1,880,000,003	+3	+0.00	+0.000000
100%	12.00	+20	1,880,000,002	+2	+0.00	+0.000000
100%	12.00	+30	1,879,999,999	-1	-0.00	-0.000000
100%	12.00	+40	1,880,000,003	+3	+0.00	+0.000000
100%	12.00	+50	1,880,000,000	+0	+0.00	+0.000000
100%	12.00	+55	1,880,000,003	+3	+0.00	+0.000000
115%	13.80	+20	1,880,000,001	+1	+0.00	+0.000000
85%	10.20	+20	1,879,999,997	-3	-0.00	-0.000000

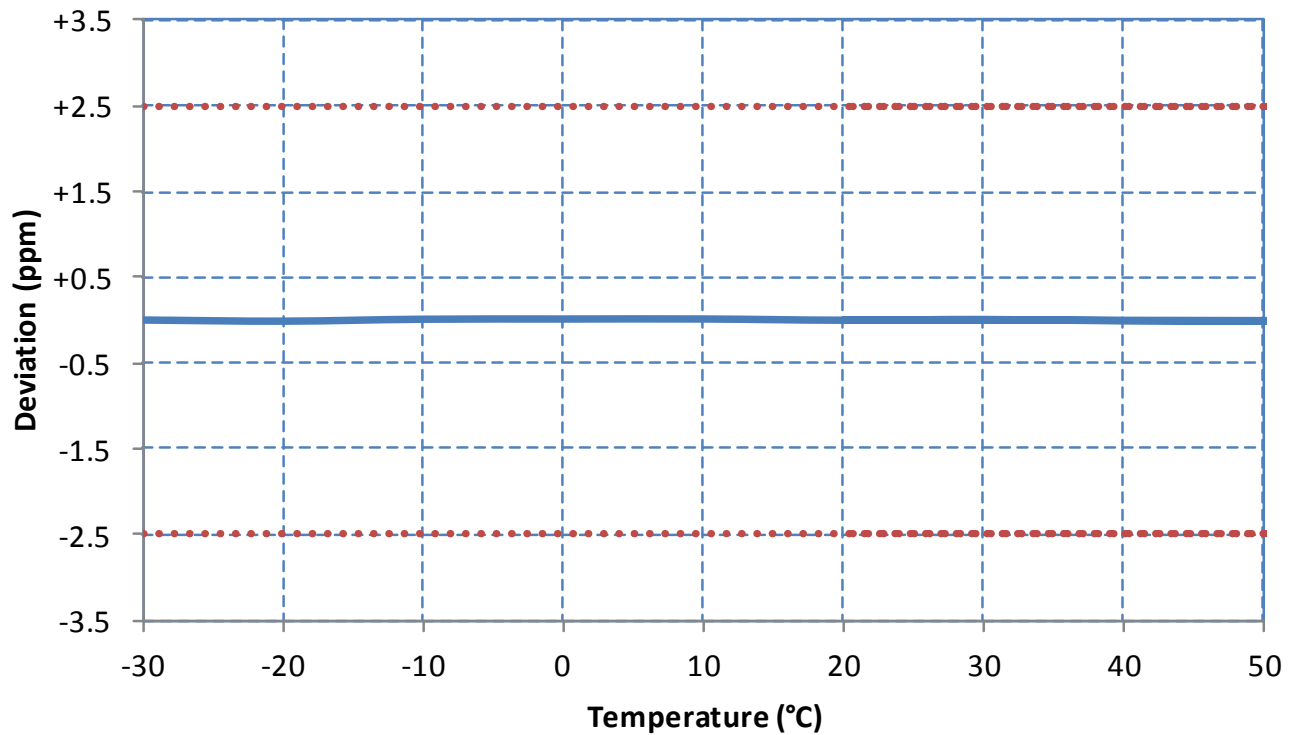
Frequency Stability



WCDMA Band 4, Channel 1450 (1740MHz)

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,740,000,005	+5	+0.00	+0.000000
100%	12.00	-30	1,740,000,007	+7	+0.00	+0.000000
100%	12.00	-20	1,739,999,997	-3	-0.00	-0.000000
100%	12.00	-10	1,740,000,013	+13	+0.01	+0.000001
100%	12.00	0	1,740,000,015	+15	+0.01	+0.000001
100%	12.00	+10	1,740,000,015	+15	+0.01	+0.000001
100%	12.00	+20	1,740,000,005	+5	+0.00	+0.000000
100%	12.00	+30	1,740,000,011	+11	+0.01	+0.000001
100%	12.00	+40	1,740,000,000	+0	+0.00	+0.000000
100%	12.00	+50	1,739,999,997	-3	-0.00	-0.000000
100%	12.00	+55	1,740,000,000	+0	+0.00	+0.000000
115%	13.80	+20	1,740,000,008	+8	+0.00	+0.000000
85%	10.20	+20	1,740,000,009	+9	+0.00	+0.000000

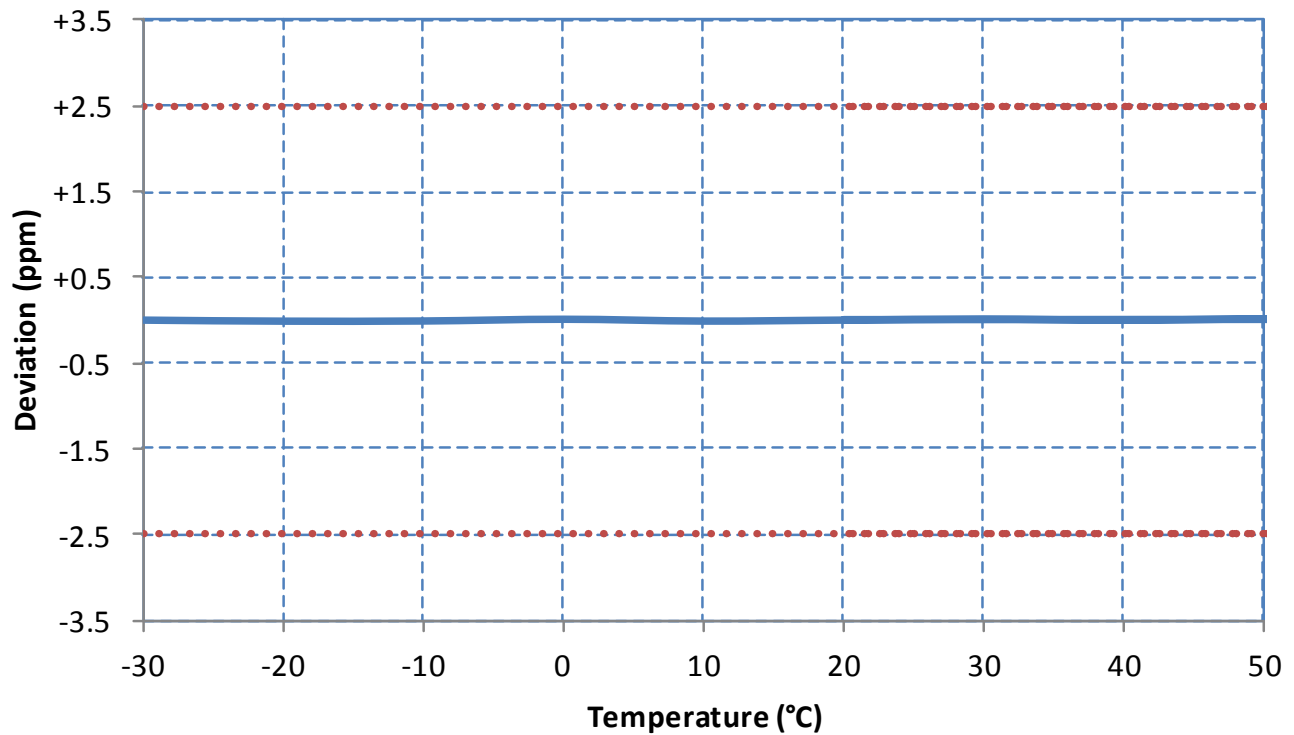
Frequency Stability



WCDMA, Band 5, Channel 4175 (835MHz)

Voltage %	Power V _{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	835,000,001	+1	+0.00	+0.000000
100%	12.00	-30	835,000,001	+1	+0.00	+0.000000
100%	12.00	-20	834,999,999	-1	-0.00	-0.000000
100%	12.00	-10	834,999,999	-1	-0.00	-0.000000
100%	12.00	0	835,000,002	+2	+0.00	+0.000000
100%	12.00	+10	834,999,999	-1	-0.00	-0.000000
100%	12.00	+20	835,000,001	+1	+0.00	+0.000000
100%	12.00	+30	835,000,002	+2	+0.00	+0.000000
100%	12.00	+40	835,000,001	+1	+0.00	+0.000000
100%	12.00	+50	835,000,003	+3	+0.00	+0.000000
100%	12.00	+55	835,000,002	+2	+0.00	+0.000000
115%	13.80	+20	835,000,002	+2	+0.00	+0.000000
85%	10.20	+20	835,000,002	+2	+0.00	+0.000000

Frequency Stability



10 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	12 September 2015
	-	
	-	