

EMC Test Report

Project Number: 3958632

Report Number: 3958632EMC02

Revision Level: 0

Client: Deere & Company

Equipment Under Test: Modular Telematics Gateway 4G LTE

Model: MA4G

FCC ID: OV5-MA4G

IC ID: 11137A-MA4G

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: 10 May 2016

Test Result: Compliant

Tested by:


Fabian Nica, Senior 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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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: Deere & Company
Address: One John Deere Place
City, State, Zip, Country: Moline, IL 61265, 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: Modular Telematics Gateway 4G LTE
Model Number: MA4G
Serial Number: PCMA4GF100254 (Conducted)
PCMA4GF100285 (Radiated)
FCC ID: OV5-MA4G
IC ID: 11137A-MA4G
IMEI Number: 004401081651966 (Conducted)
004401081652279 (Radiated)

Rated Voltage: 9.0 - 32.0 Vdc
Test Voltage: 12 Vdc
826.4– 846.6 MHz (WCDMA Band V)
Tx Frequency Range: 1710 – 1755 MHz (WCDMA Band IV)
1852.4– 1907.6 MHz (WCDMA Band II)

FCC Classification: PCS Licensed Transmitter PCB
Type: Pre Production

Sample Received Date: 18 March 2016
Dates of testing: 22 March - 28 April 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: 24.1 °C

Relative Humidity: 45.6 %

Atmospheric Pressure: 97.9 kPa

3.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
CMW500 WIDEBAND RADIO COMMUNICATIONS TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2019
MULTIFLEX COAXIAL CABLE	141	HUBER&SUHNER	B095585	4-Aug-2016

- 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.

3.5 Test Data

Uplink Channel	UL Frequency (MHz)	Subtest	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
9262	1852.4	Subtest1	21.55	0.54	22.09
9400	1880	Subtest1	20.86	0.54	21.4
9538	1907.6	Subtest1	21.34	0.54	21.88
9262	1852.4	Subtest2	20.23	0.54	20.77
9400	1880	Subtest2	20.24	0.54	20.78
9538	1907.6	Subtest2	20.02	0.54	20.56
9262	1852.4	Subtest3	19.77	0.54	20.31
9400	1880	Subtest3	20.47	0.54	21.01
9538	1907.6	Subtest3	19.35	0.54	19.89
9262	1852.4	Subtest4	20.51	0.54	21.05
9400	1880	Subtest4	20.51	0.54	21.05
9538	1907.6	Subtest4	20.18	0.54	20.72
9262	1852.4	Subtest5	21.6	0.54	22.14
9400	1880	Subtest5	21.37	0.54	21.91
9538	1907.6	Subtest5	21.42	0.54	21.96
1313	1712.6	Subtest1	22.15	0.51	22.66
1450	1740	Subtest1	22.55	0.51	23.06
1512	1752.4	Subtest1	21.99	0.53	22.52
1313	1712.6	Subtest2	20.77	0.51	21.28
1450	1740	Subtest2	21.42	0.51	21.93
1512	1752.4	Subtest2	21.08	0.53	21.61
1313	1712.6	Subtest3	20.4	0.51	20.91
1450	1740	Subtest3	20.93	0.51	21.44
1512	1752.4	Subtest3	21.19	0.53	21.72
1313	1712.6	Subtest4	21.09	0.51	21.6
1450	1740	Subtest4	21.59	0.51	22.1
1512	1752.4	Subtest4	21.76	0.53	22.29
1313	1712.6	Subtest5	22.16	0.51	22.67
1450	1740	Subtest5	22.36	0.51	22.87
1512	1752.4	Subtest5	22.45	0.53	22.98
4132	826.4	Subtest1	22.01	0.35	22.36
4175	835	Subtest1	21.64	0.35	21.99
4233	846.4	Subtest1	22.08	0.35	22.43
4132	826.6	Subtest2	20.78	0.35	21.13
4175	835	Subtest2	21.02	0.35	21.37
4233	846.6	Subtest2	20.68	0.35	21.03
4132	826.6	Subtest3	20.98	0.35	21.33
4175	835	Subtest3	20.73	0.35	21.08
4233	846.6	Subtest3	20.38	0.35	20.73
4132	826.6	Subtest4	21.16	0.35	21.51
4175	835	Subtest4	21.35	0.35	21.7
4233	846.6	Subtest4	20.95	0.35	21.3
4132	826.6	Subtest5	21.94	0.35	22.29
4175	835	Subtest5	22.31	0.35	22.66
4233	846.6	Subtest5	22.05	0.35	22.4

Band II Max: 22.14dBm (0.164W)

Band IV Max: 23.06dBm (0.202W)

Band V Max: 22.66dBm (0.185W)

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: 23.8 °C

Relative Humidity: 46.6 %

Atmospheric Pressure: 97.8 kPa

4.4 Test Equipment

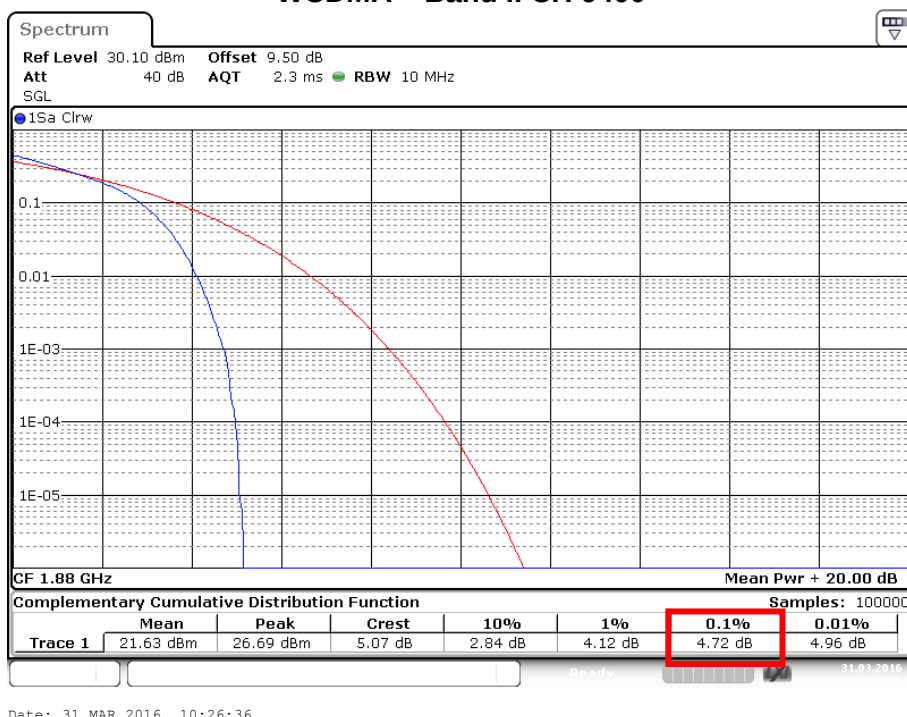
Test Date: 31 March 2016

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017
CMW500 WIDEBAND RADIO COMMUNICATIONS TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2019
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	5-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079824	4-Aug-2016

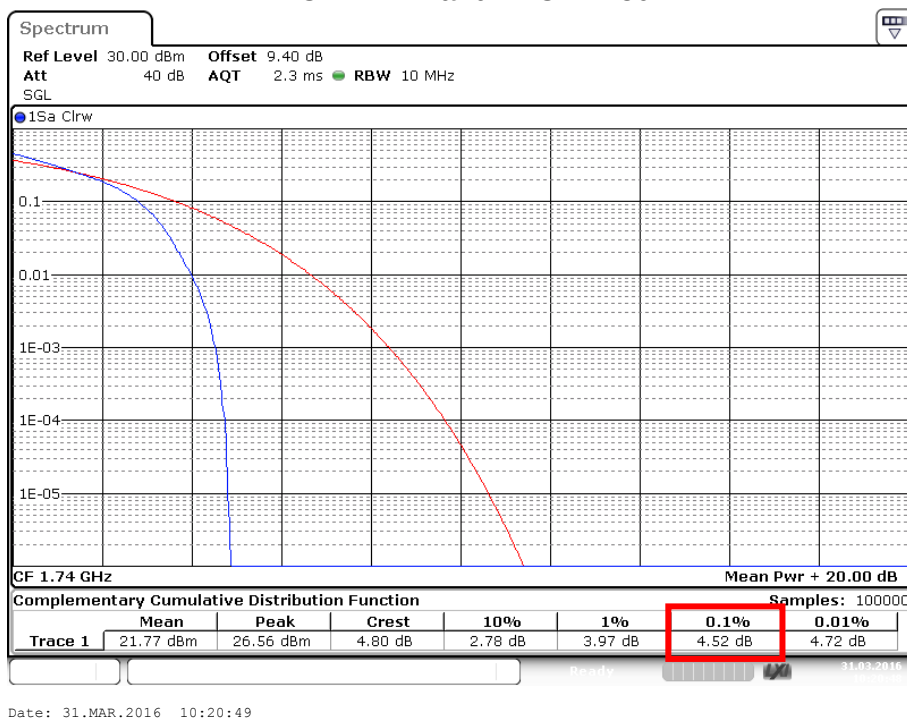
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle and the FSV .is on a 2 year calibration cycle

4.5 Test Data

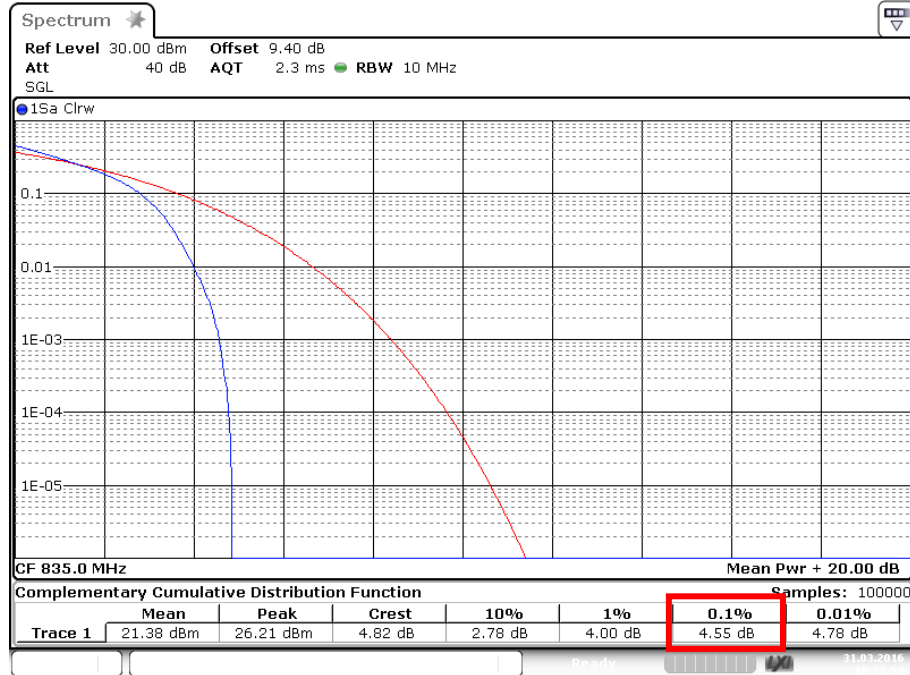
WCDMA – Band II CH 9400



WCDMA – Band IV CH 1450



WCDMA – Band V CH 4175



Date: 31.MAR.2016 10:27:55

5 Occupied Bandwidth

5.1 Test Result

Test Description	Basic Standards	Test Result
Occupied Bandwidth	FCC Part 2.1049 FCC Part 22.917(a) FCC Part 24.238(a) 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: 23.9 °C

Relative Humidity: 45.4 %

Atmospheric Pressure: 97.9 kPa

5.4 Test Equipment

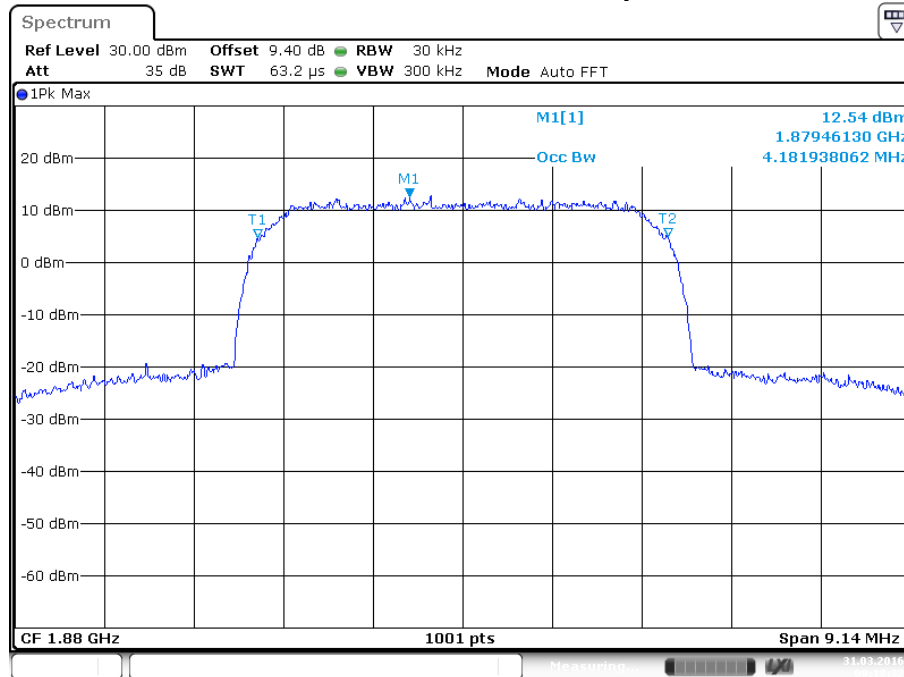
Test Date: 31 March 2016

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017
CMW500 WIDEBAND RADIO COMMUNICATIONS TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2019
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	5-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079824	4-Aug-2016

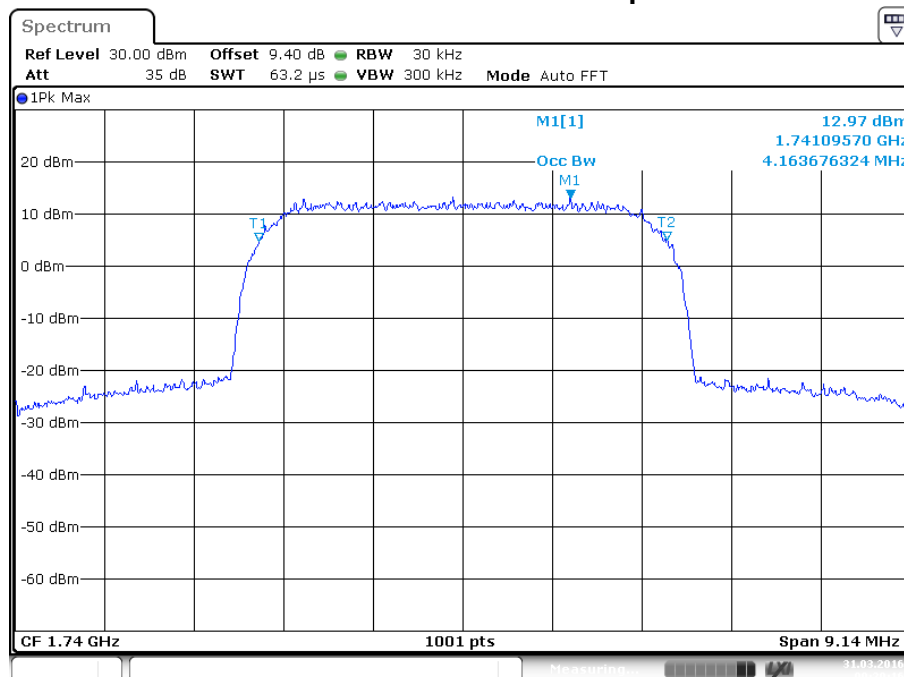
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle and the FSV .is on a 2 year calibration cycle

5.5 Test Data

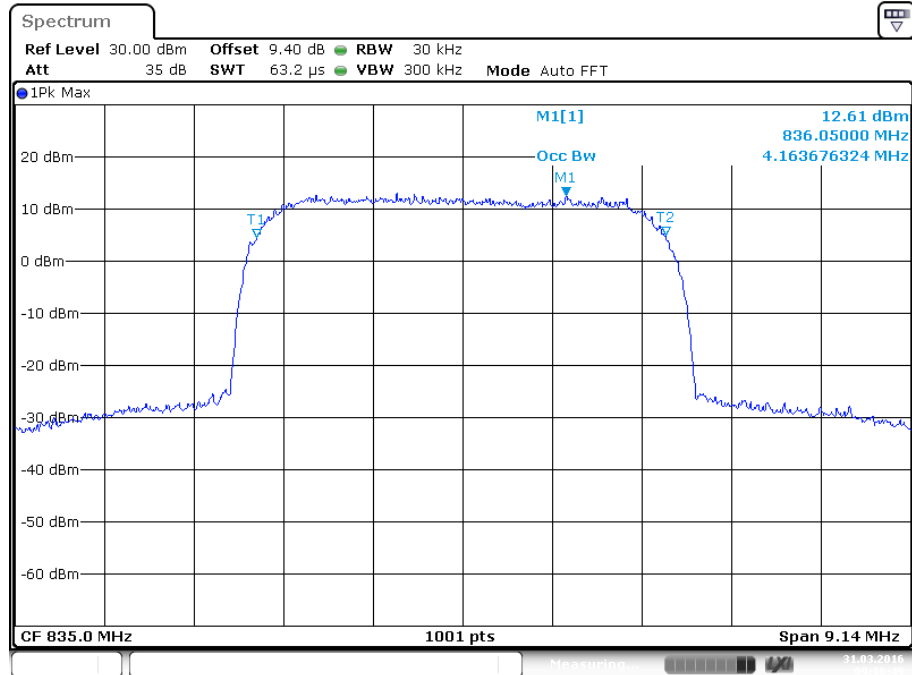
WCDMA – Band II CH 9400 - 99% Occupied Bandwidth



WCDMA – Band IV CH 1450 - 99% Occupied Bandwidth



WCDMA – Band V CH 4175 - 99% Occupied Bandwidth



Date: 31.MAR.2016 09:16:49

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: 23.7 °C

Relative Humidity: 46.6 %

Atmospheric Pressure: 97.8 kPa

Test Date: 31 March 2016

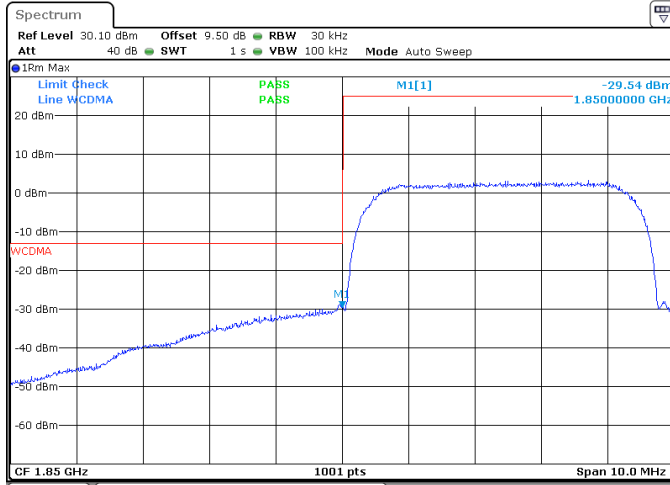
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017
CMW500 WIDEBAND RADIO COMMUNICATIONS TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2019
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	5-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079824	4-Aug-2016

- 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 and the FSV .is on a 2 year calibration cycle

6.4 Test Data

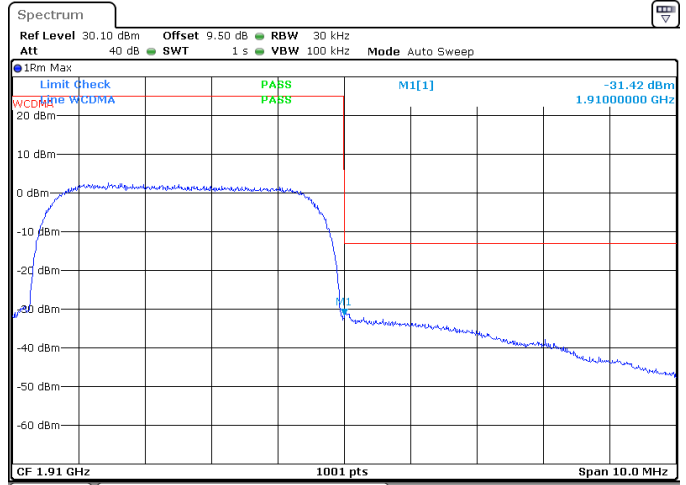
WCDMA, Band II

Lower Band Edge (Channel 9262, 1852.4 MHz)



Date: 31.MAR.2016 10:56:33

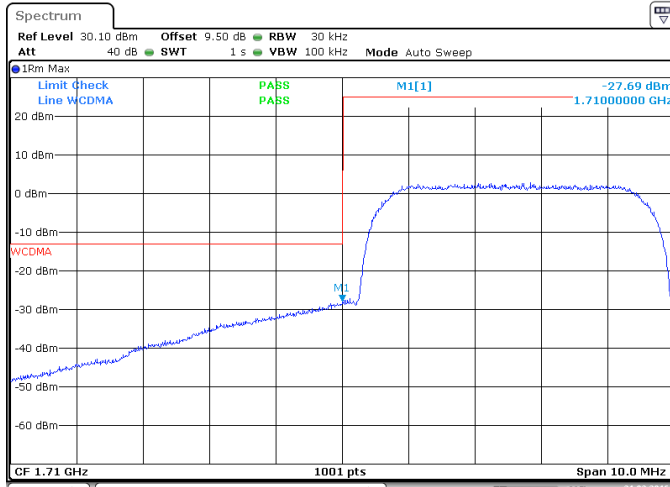
Upper Band Edge (Channel 9538, 1907.6 MHz)



Date: 31.MAR.2016 10:57:42

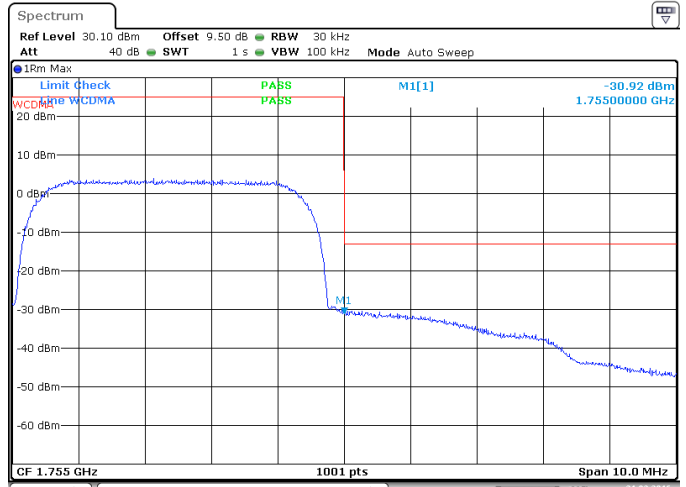
WCDMA, Band IV

Lower Band Edge (Channel 1313, 1712.6 MHz)



Date: 31.MAR.2016 11:04:32

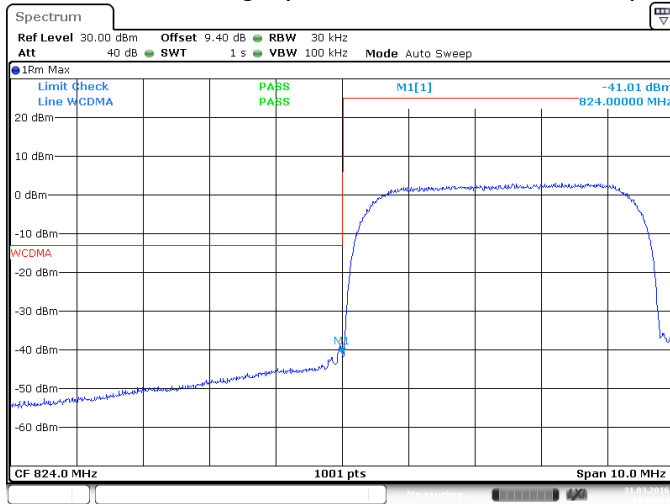
Upper Band Edge (Channel 1512, 1752.4 MHz)



Date: 31.MAR.2016 11:06:49

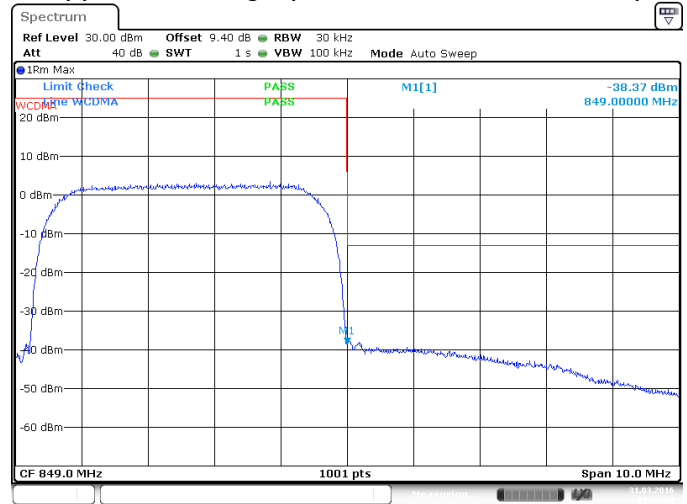
WCDMA, Band V

Lower Band Edge (Channel 4132, 826.4 MHz)



Date: 31.MAR.2016 10:50:05

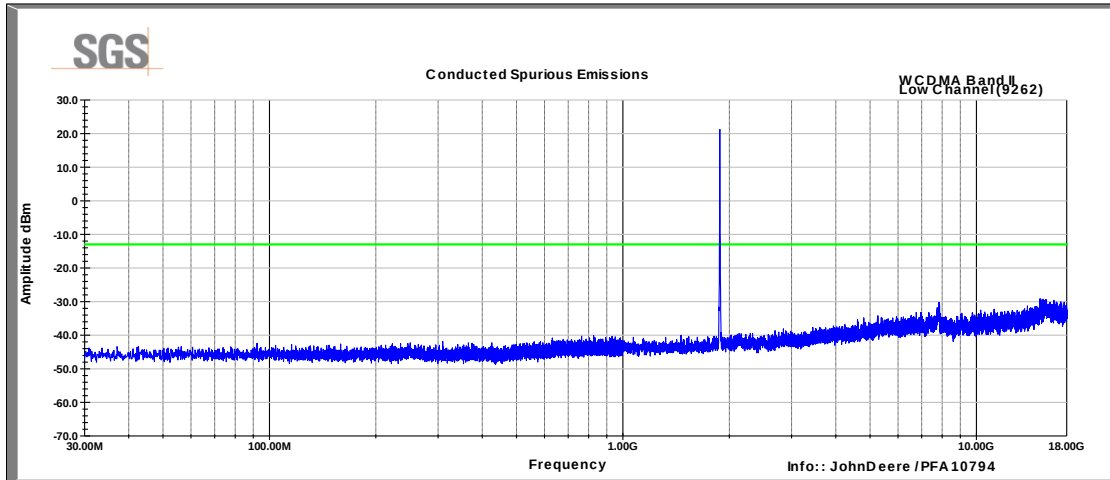
Upper Band Edge (Channel 4233, 846.6 MHz)



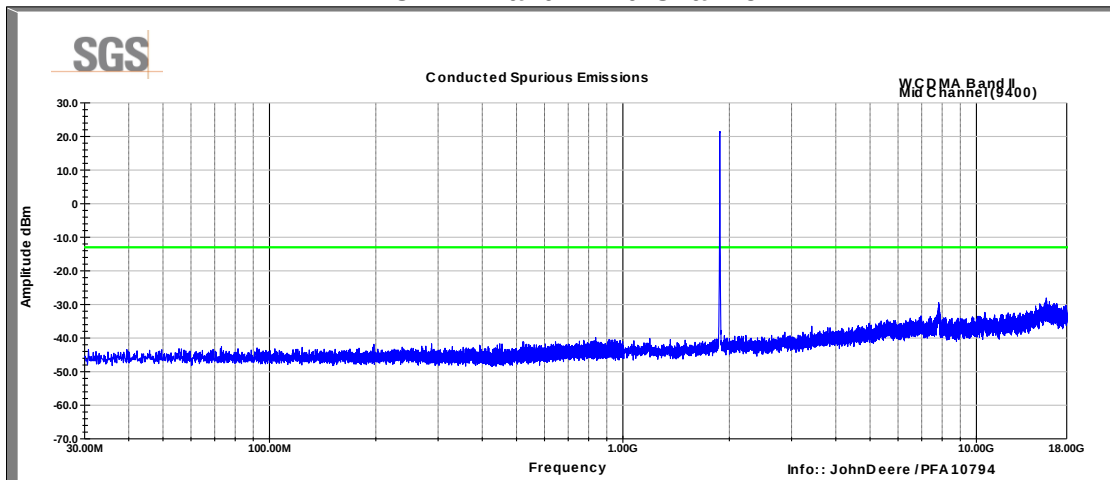
Date: 31.MAR.2016 10:52:03

6.5 Conducted Spurious Emissions Plot

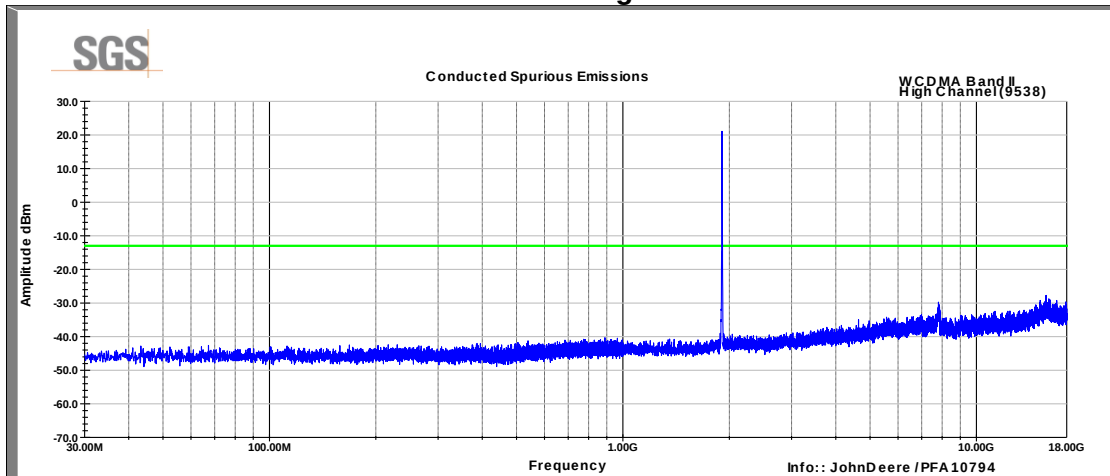
WCDMA Band II Low Channel



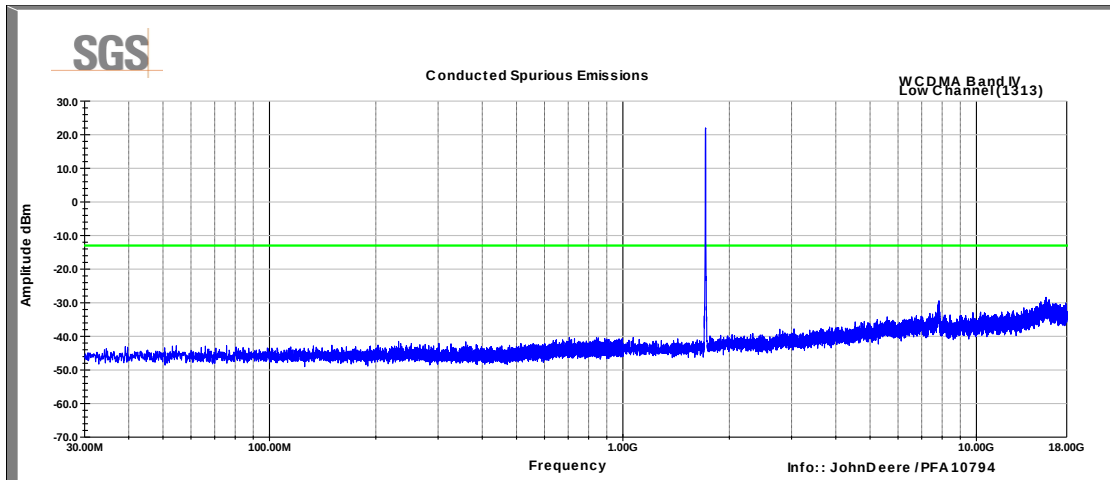
WCDMA Band II Mid Channel



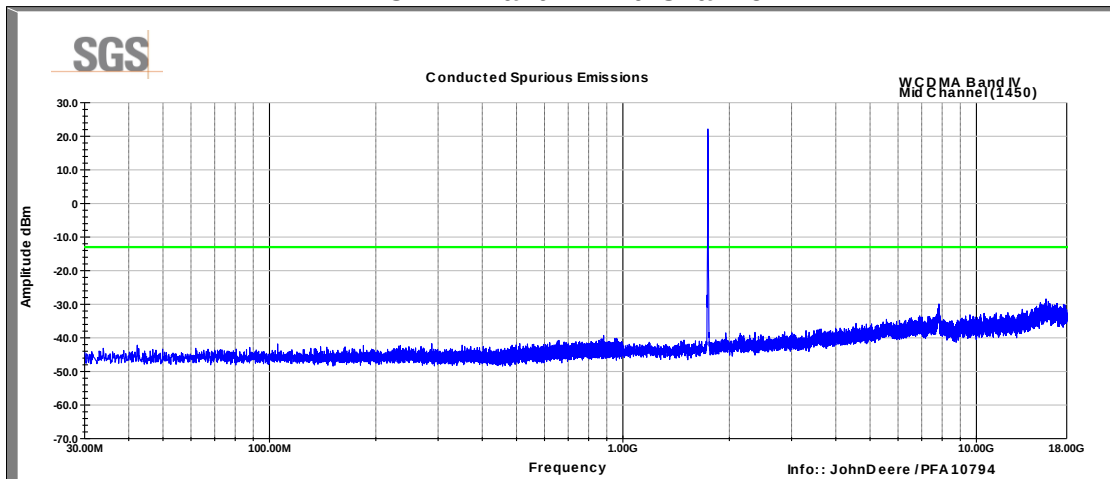
WCDMA Band II High Channel



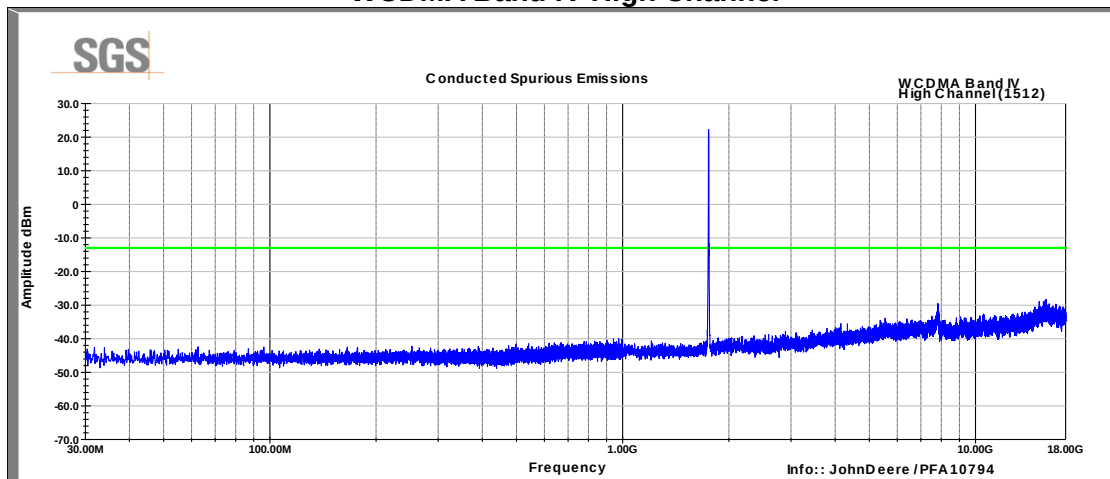
WCDMA Band IV Low Channel



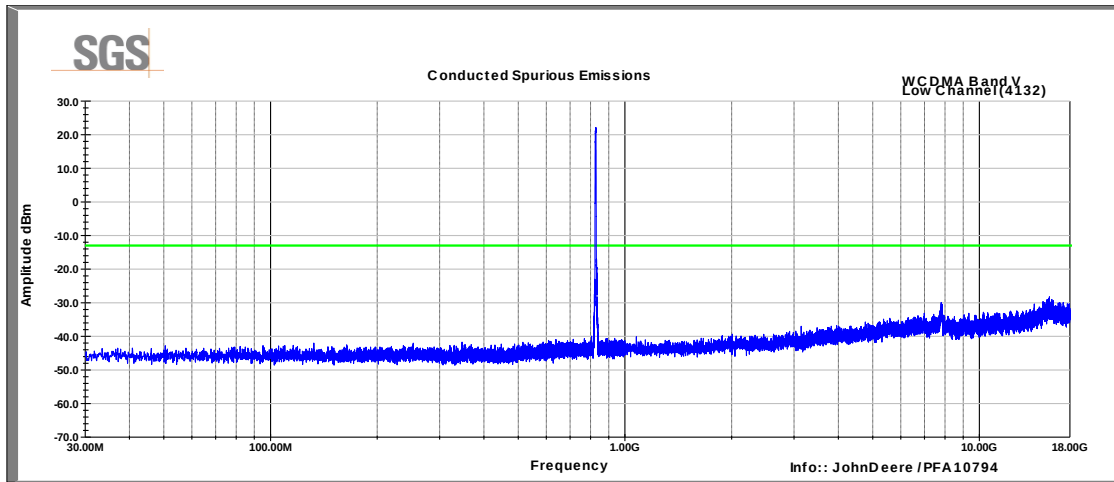
WCDMA Band IV Mid Channel



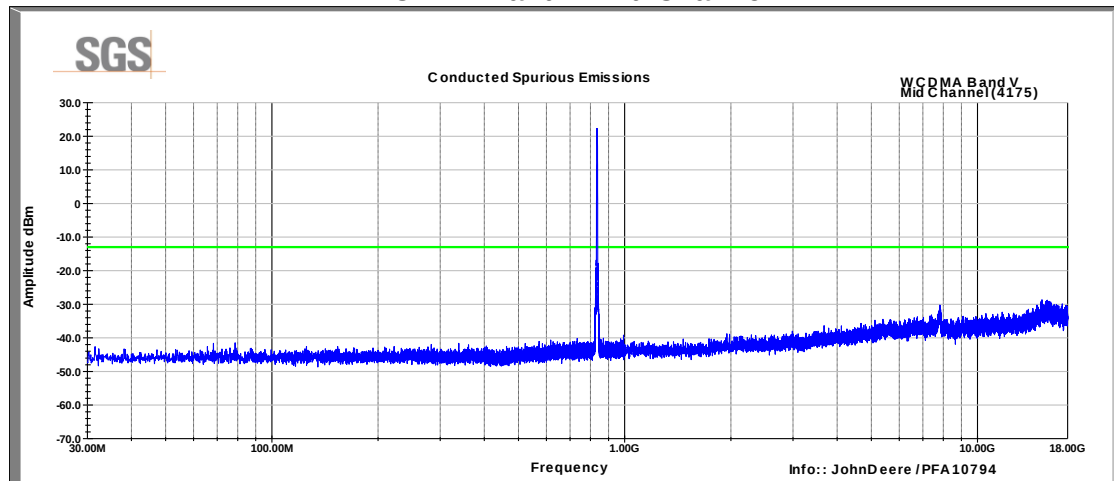
WCDMA Band IV High Channel



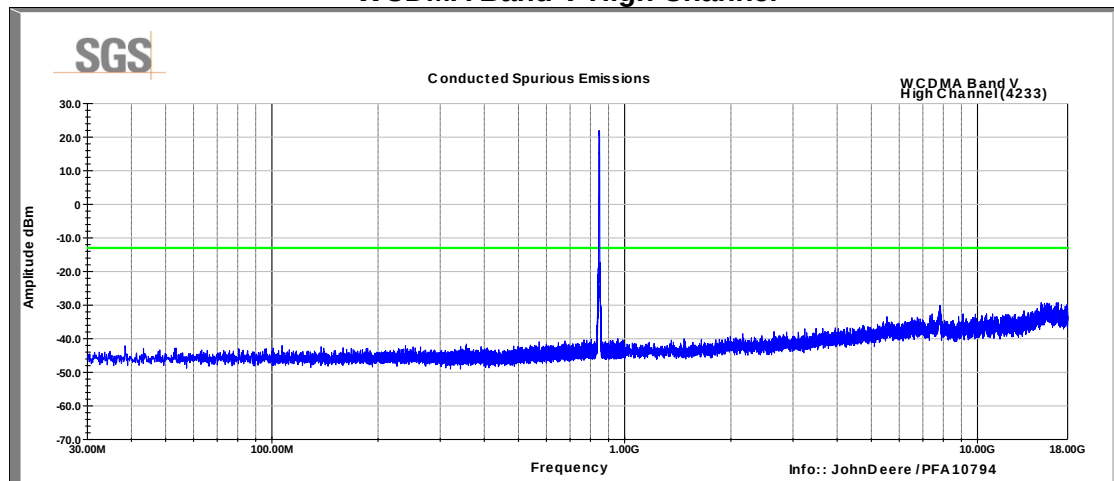
WCDMA Band V Low Channel



WCDMA Band V Mid Channel



WCDMA Band V 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

The device has two cellular ports that connect to the antenna. For ERP/EIRP calculations, the highest gain between the ports was used for each band.

7.2 Test Site

SGS EMC Laboratory, Suwanee, GA

7.3 Test Equipment

None

7.4 Test Data

Band	Max Power dBm	Antenna Gain dBd/dBi	Cable Loss, dB	ERP/EIRP (dBm)	ERP/EIRP Limit, dBm		Result	
					FCC	IC	FCC	IC
WCDMA Band 5 / 826.6	21.45	-0.26	0	21.19	38.5	38.5	PASS	PASS
WCDMA Band 5 / 835	22.22	-0.26	0	21.96	38.5	38.5	PASS	PASS
WCDMA Band 5 / 846.4	22.04	-0.26	0	21.78	38.5	38.5	PASS	PASS
WCDMA Band 4 / 1712.6	22.16	1.7	0	23.86	30	30	PASS	PASS
WCDMA Band 4 / 1740.0	22.22	1.7	0	23.92	30	30	PASS	PASS
WCDMA Band 4 / 1752.4	22.7	1.7	0	24.4	30	30	PASS	PASS
WCDMA Band 2 / 1852.6	22.08	2.31	0	24.39	33	33	PASS	PASS
WCDMA Band 2 / 1880	21.9	2.31	0	24.21	33	33	PASS	PASS
WCDMA Band 2 / 1907.4	21.37	2.31	0	23.68	33	33	PASS	PASS

Note: Although there will always be a length of cable between the antenna ports and antenna, the limits were met while applying a 0dB cable loss.

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-C-2004	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.

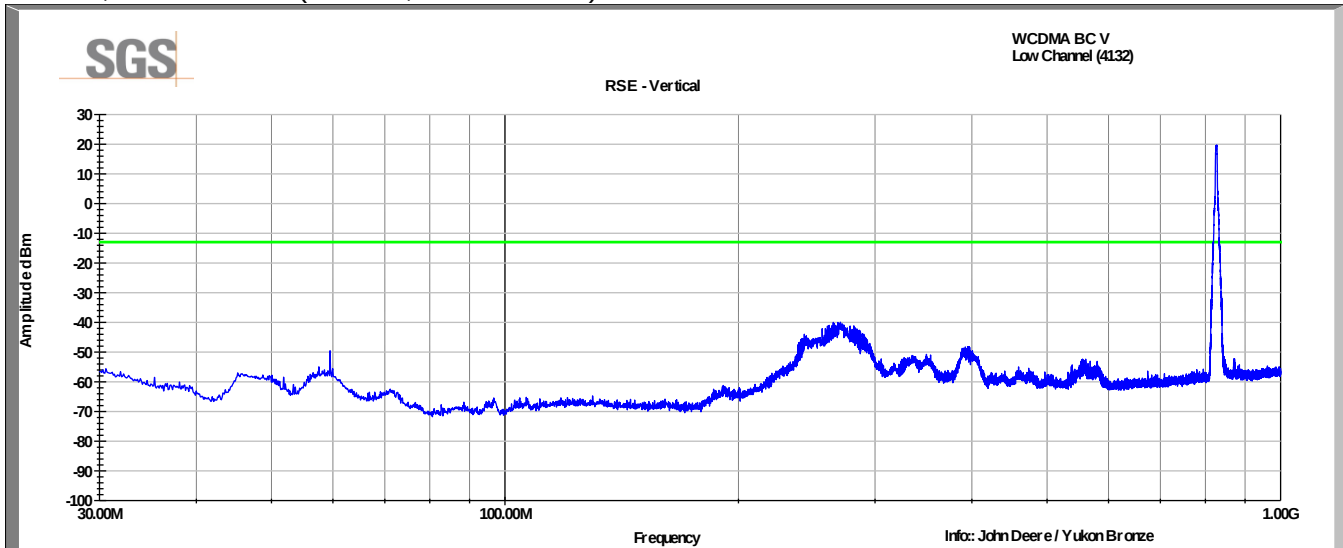
8.3 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
ANTENNA, BILOG	JB6	SUNOL	B079690	21-Oct-2016
RF CABLE - 7000MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079716	3-Aug-2016
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	ROHDE & SCHWARZ	B079788	21-Oct-2017
RF CABLE - 7500MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079713	CNR
TYPE N CABLE	104PE	HUBER&SUHNER	B079793	4-Aug-2016
EMI TEST RECEIVER	ESU40	ROHDE & SCHWARZ	B079629	4-Aug-2016
RF CABLE - 7000MM (10KHZ - 18GHZ)	SF106	HUBER&SUHNER	B079712	3-Aug-2016
PREAMPLIFIER	TS-PR18	ROHDE & SCHWARZ	15003	24-Aug-2016
PREAMPLIFIER	TS-PR18	ROHDE & SCHWARZ	B094463	16-Feb-2017
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079822	4-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079824	4-Aug-2016
DRG HORN (SMALL)	3116B	ETS-LINDGREN	B079697	29-Mar-2017
FIXED GAIN AMPLIFIER	NSP1840-HG	MITEQ	B087572	15-Oct-2016
RF CABLE	SF106	HUBER&SUHNER	B085892	3-Aug-2016
6DB ATTENUATOR 50 Ohm	15542	Mini Circuit	15017	3-Aug-2016
DRG HORN (MEDIUM)	3117	ETS-LINDGREN	B079691	9-Jul-2016

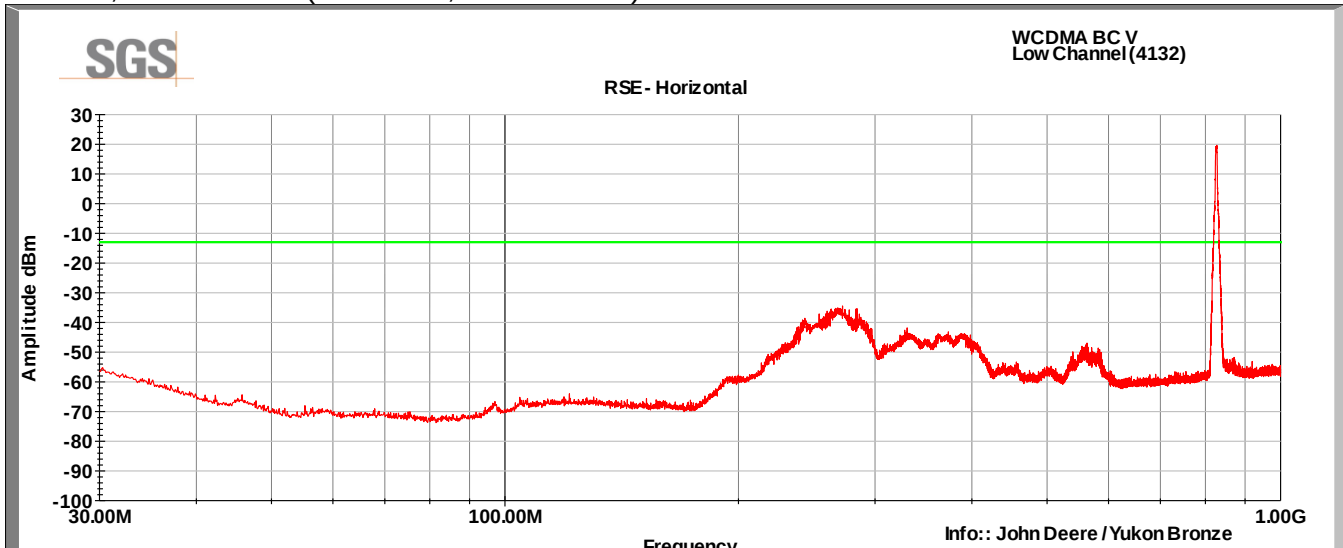
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle

8.4 Test Data

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

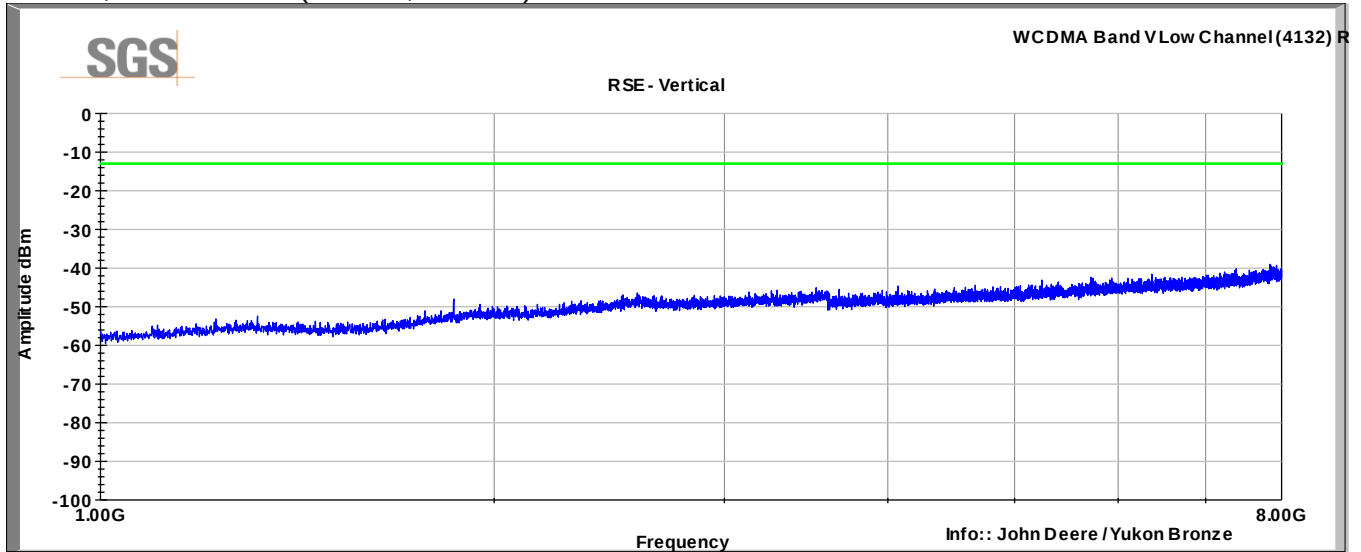


Band V, Low Channel (Horizontal, 30-1000MHz)

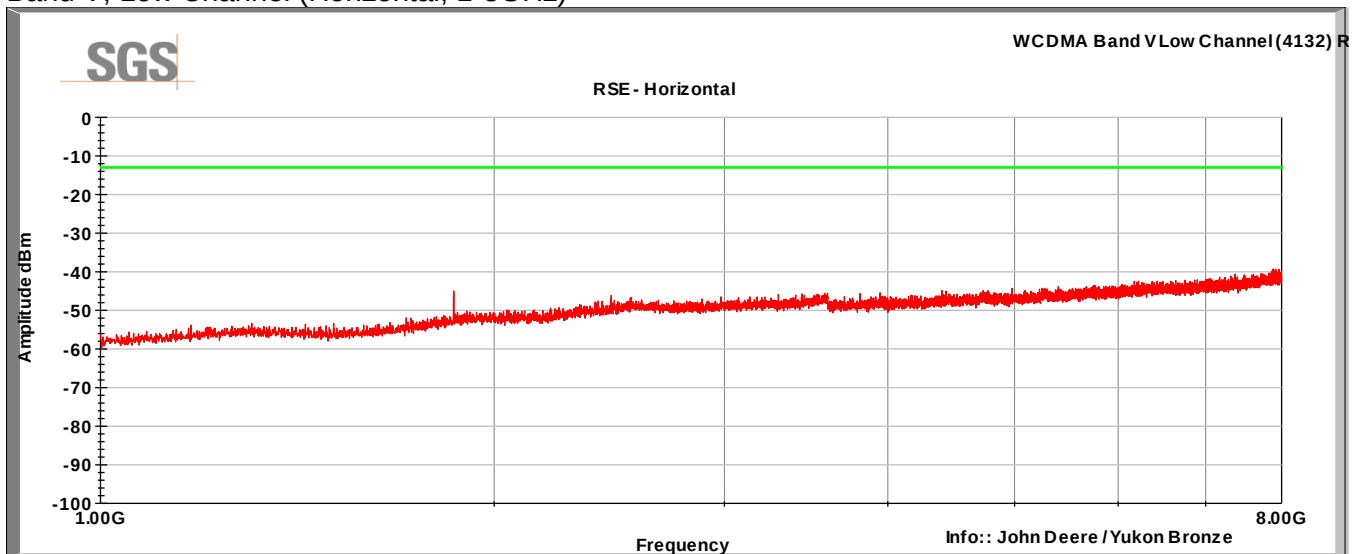


Worst case spurious emission: --34.5dBm @ 269.396MHz. 21.5dB margin

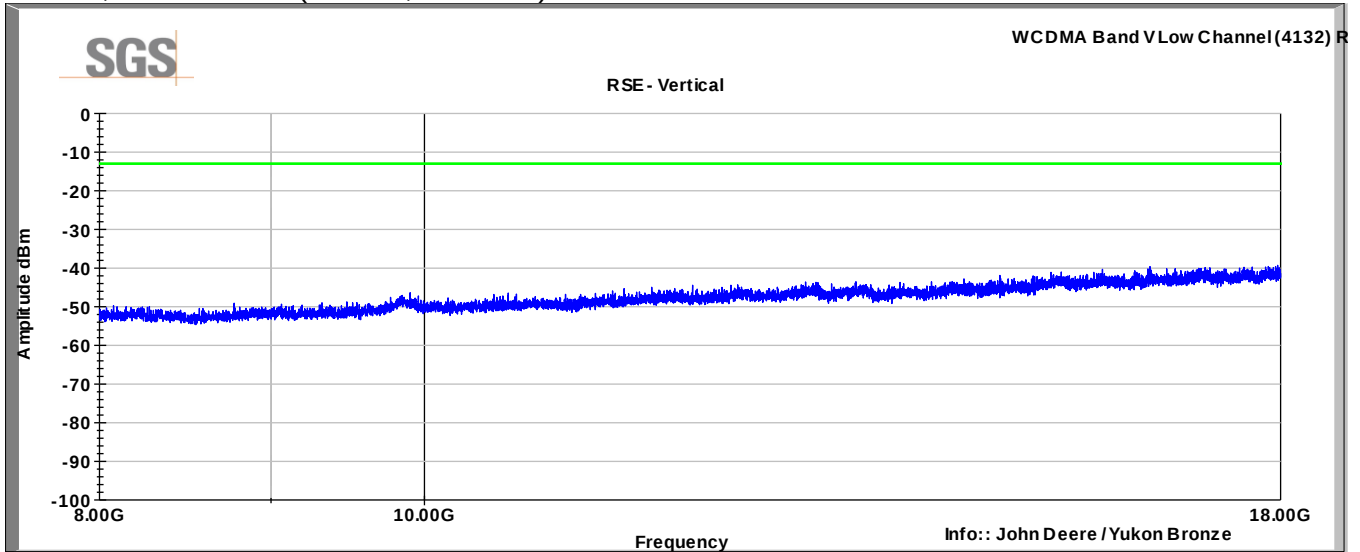
Band V, Low Channel (Vertical, 1-8GHz)



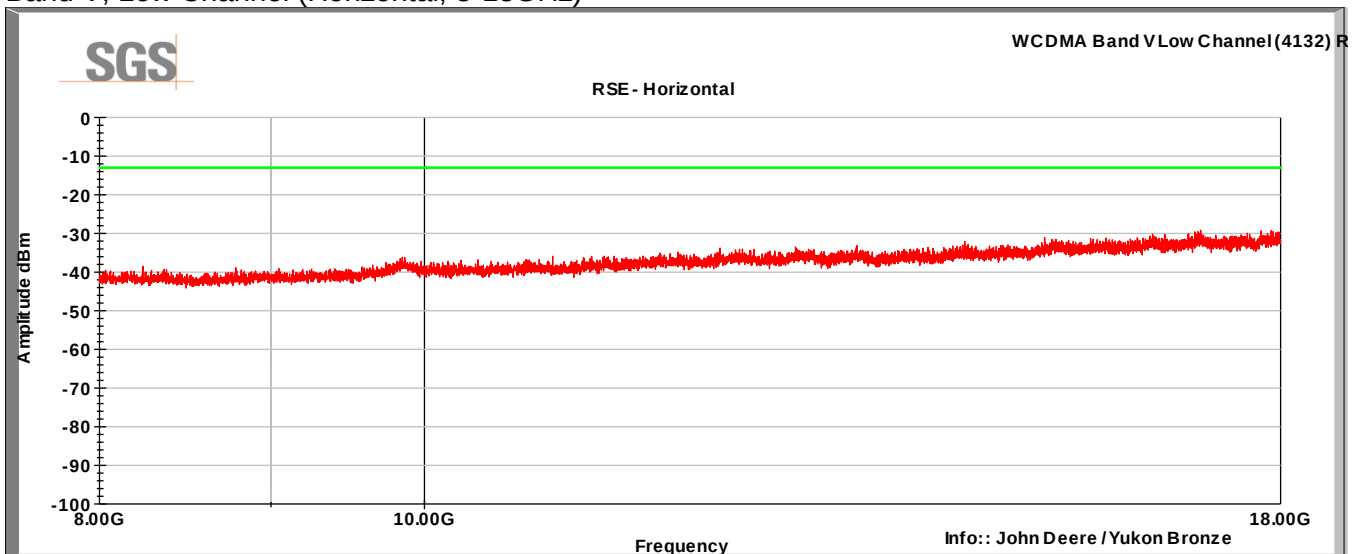
Band V, Low Channel (Horizontal, 1-8GHz)



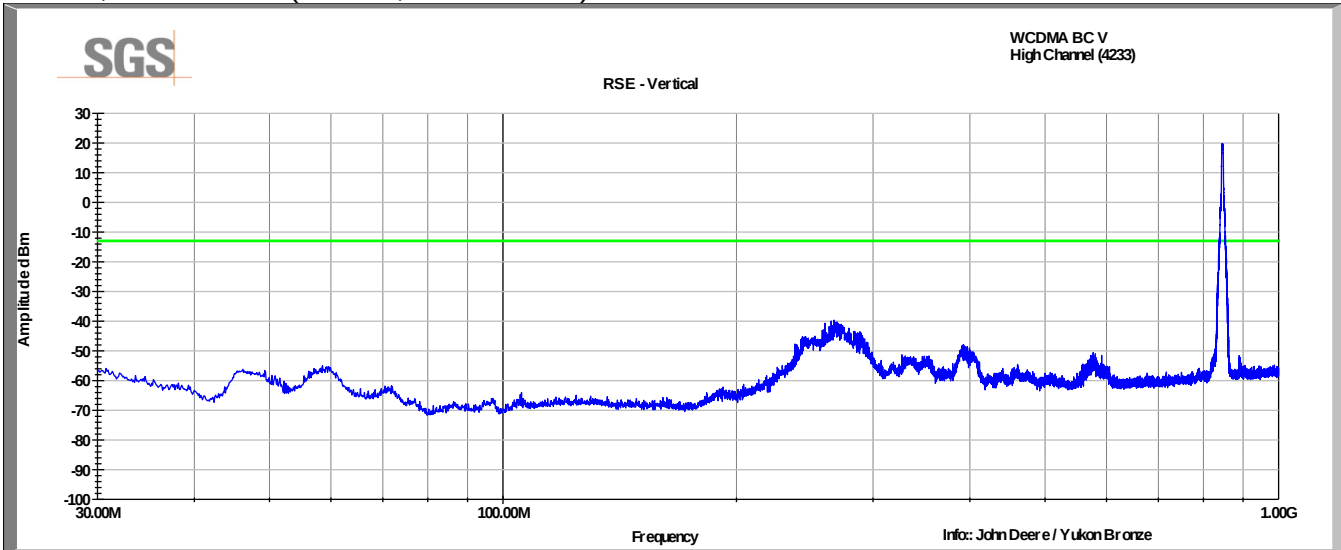
Band V, Low Channel (Vertical, 8-18GHz)



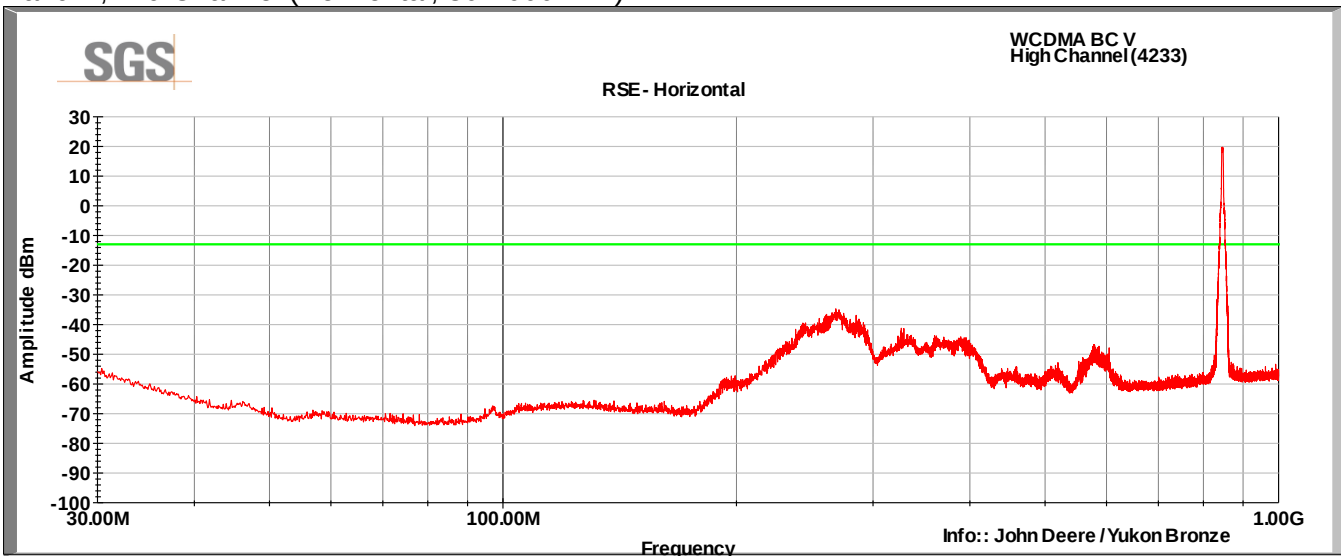
Band V, Low Channel (Horizontal, 8-18GHz)



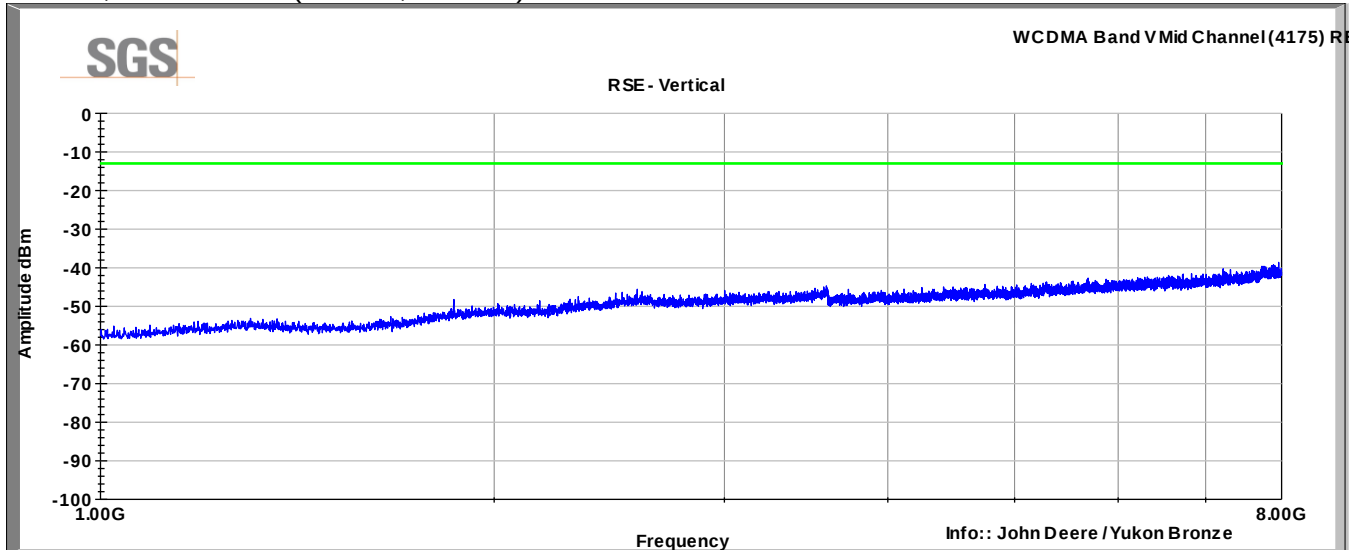
Band V, Mid Channel (Vertical, 30-1000MHz)



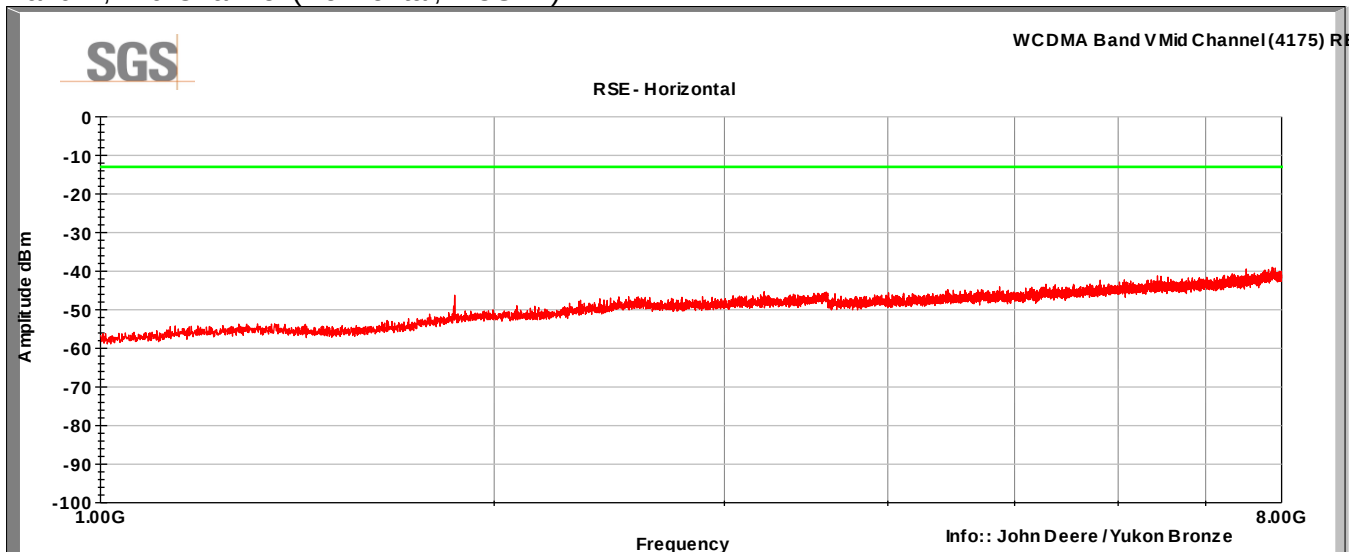
Band V, Mid Channel (Horizontal, 30-1000MHz)



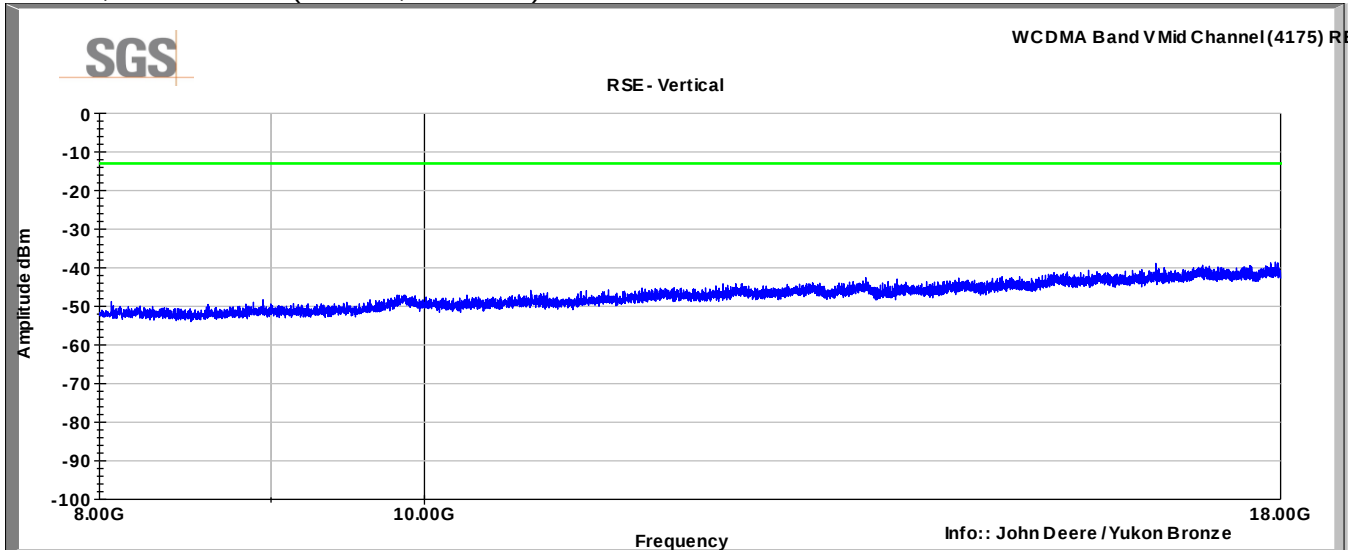
Band V, Mid Channel (Vertical, 1-8GHz)



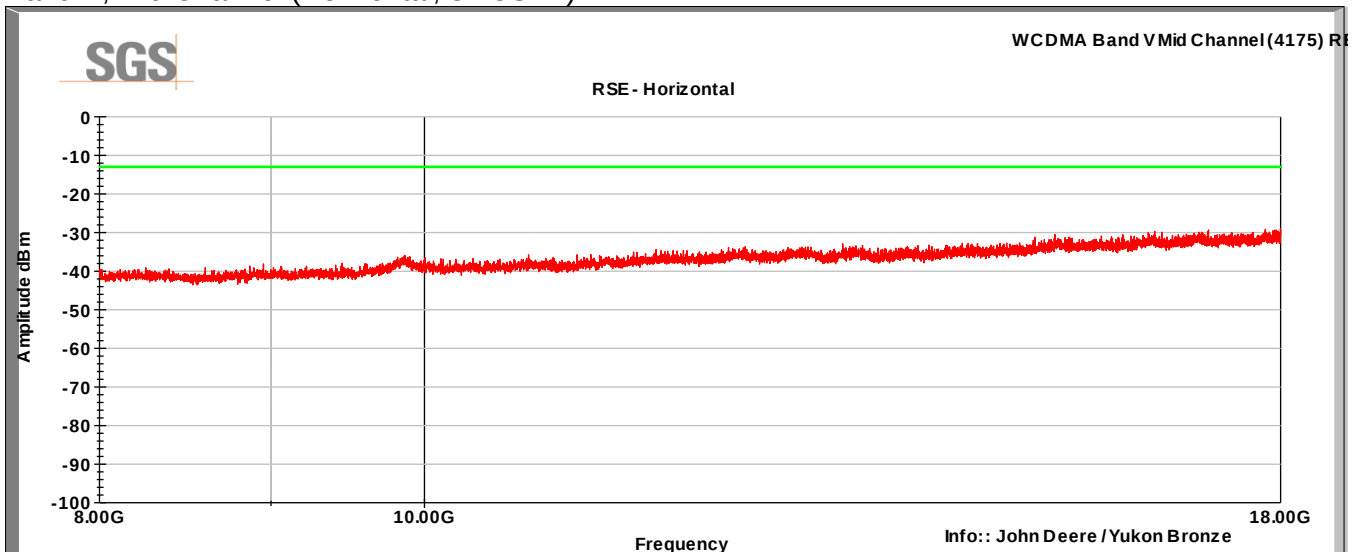
Band V, Mid Channel (Horizontal, 1-8GHz)



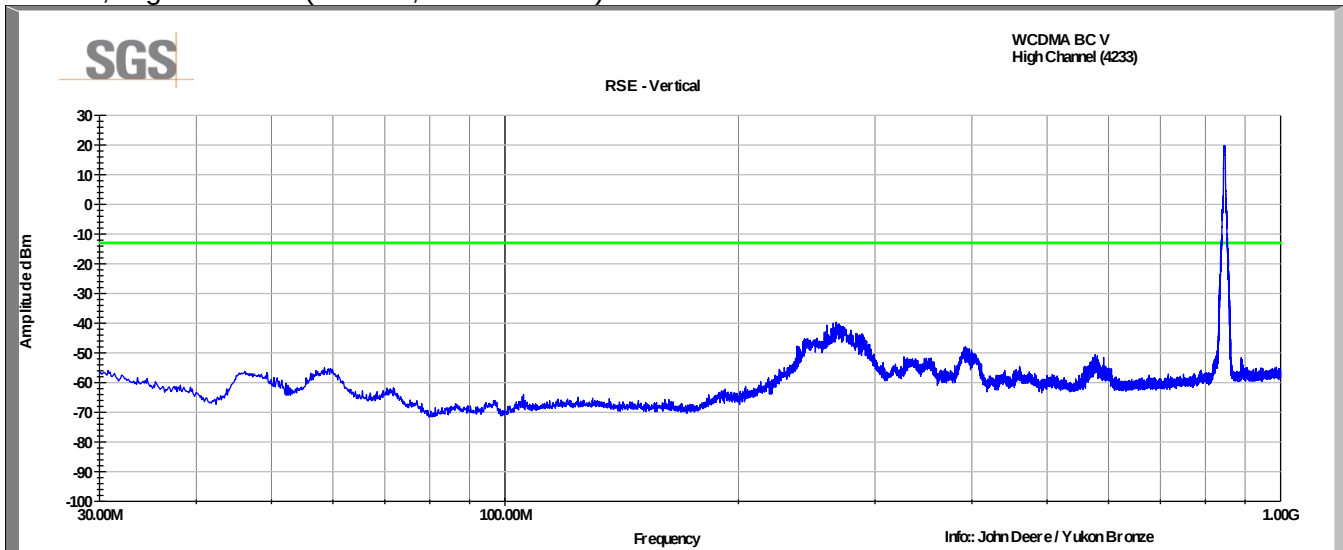
Band V, Mid Channel (Vertical, 8-18GHz)



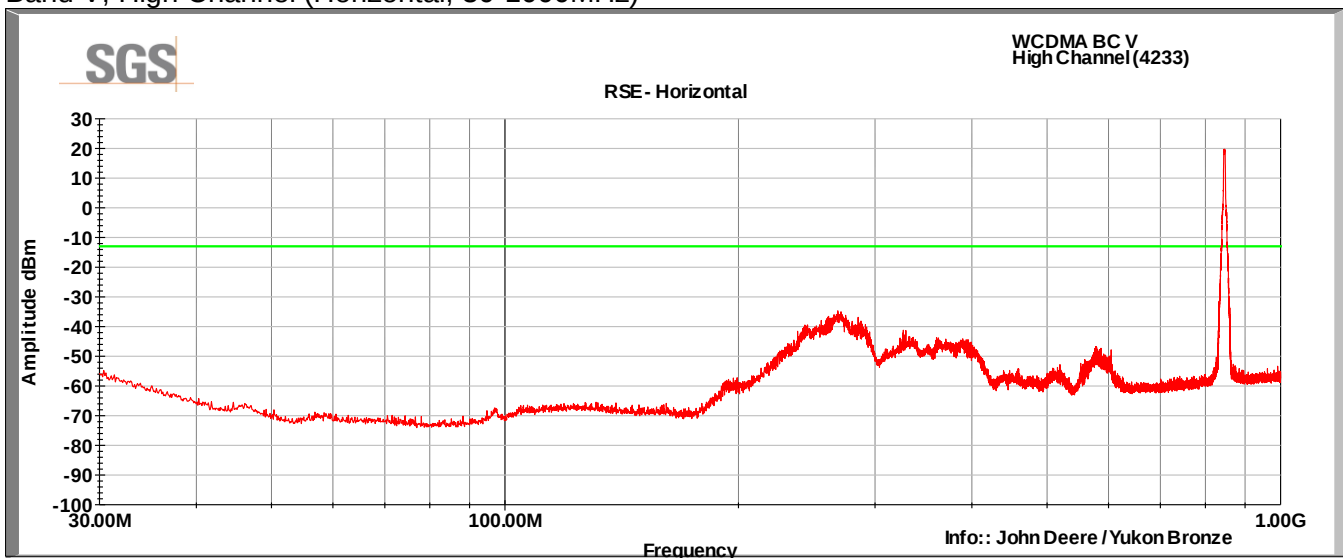
Band V, Mid Channel (Horizontal, 8-18GHz)



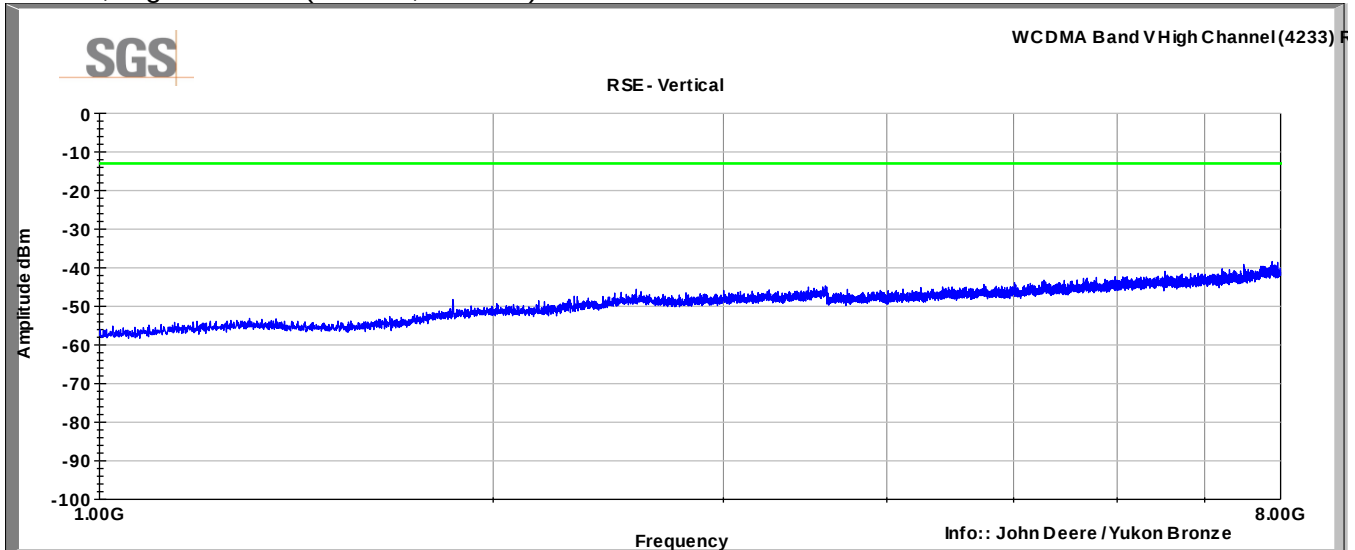
Band V, High Channel (Vertical, 30-1000MHz)



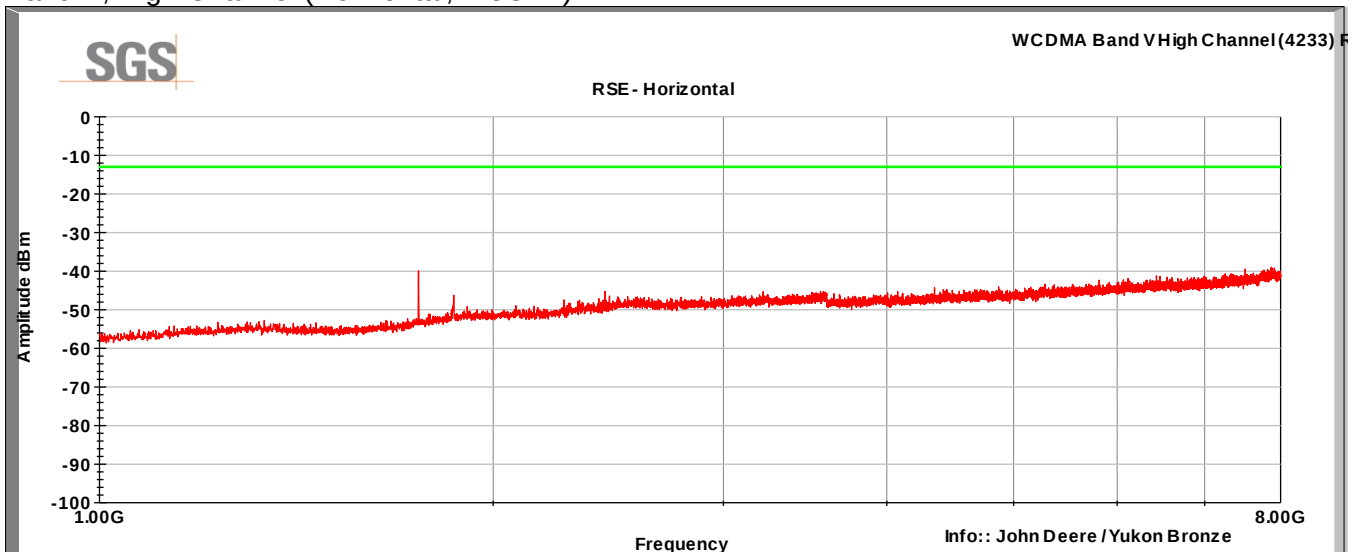
Band V, High Channel (Horizontal, 30-1000MHz)



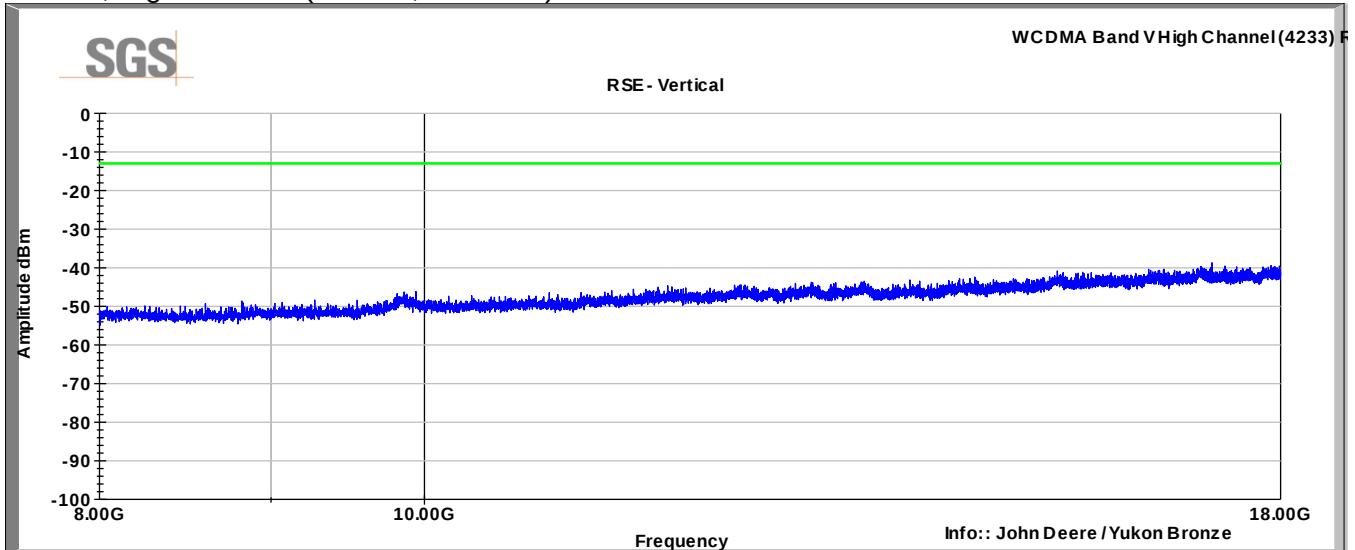
Band V, High Channel (Vertical, 1-8GHz)



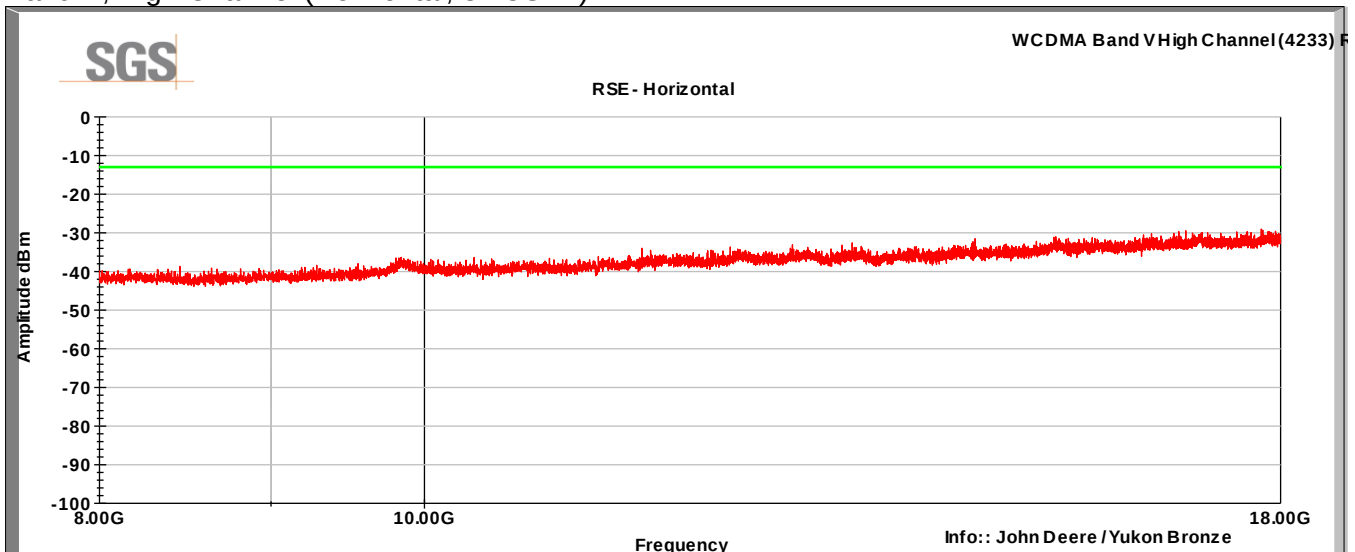
Band V, High Channel (Horizontal, 1-8GHz)



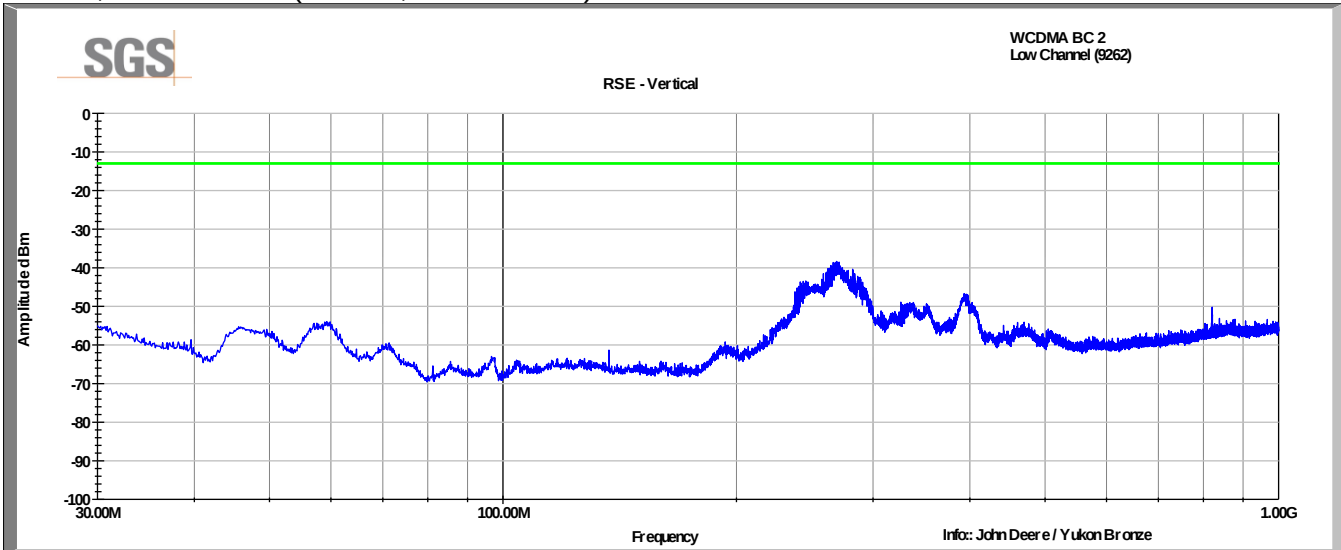
Band V, High Channel (Vertical, 8-18GHz)



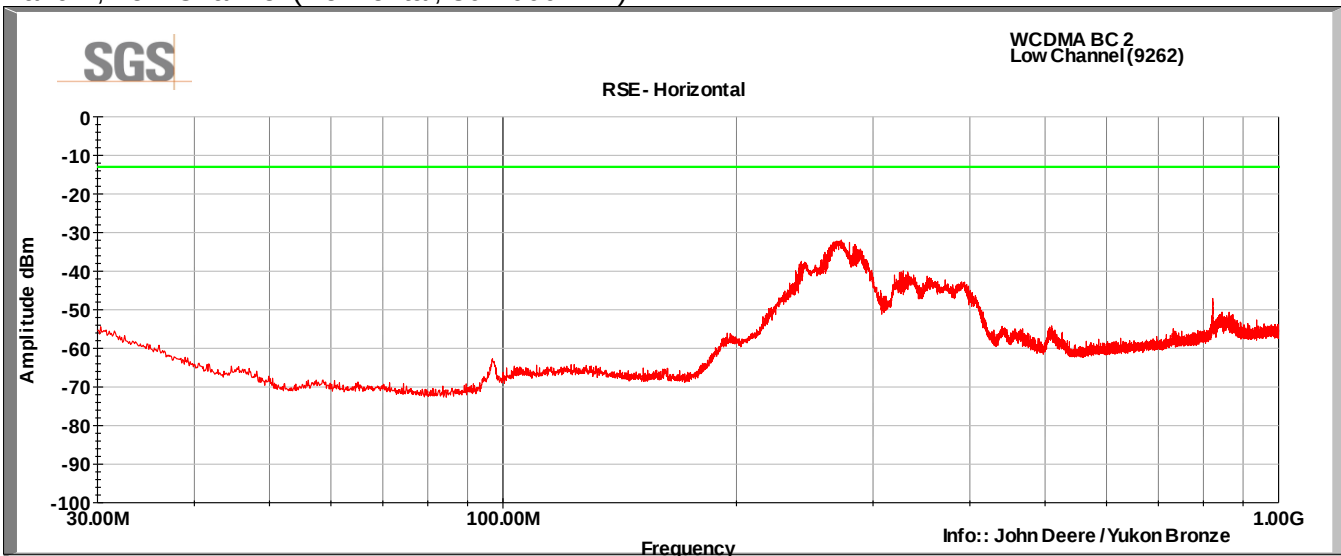
Band V, High Channel (Horizontal, 8-18GHz)



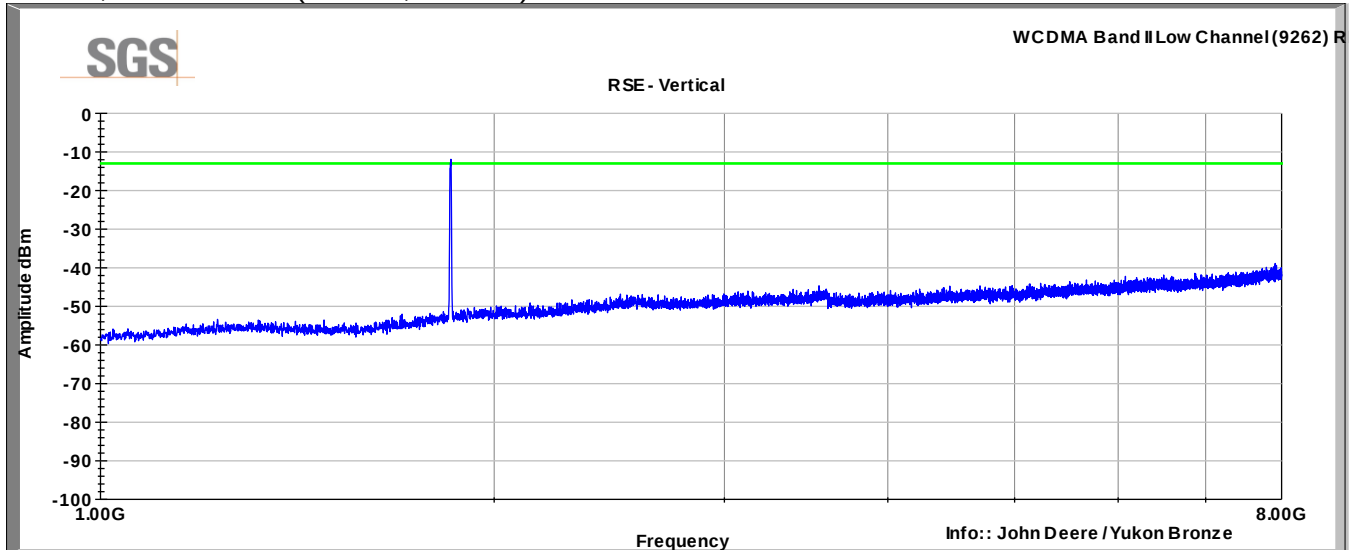
Band II, Low Channel (Vertical, 30-1000MHz)



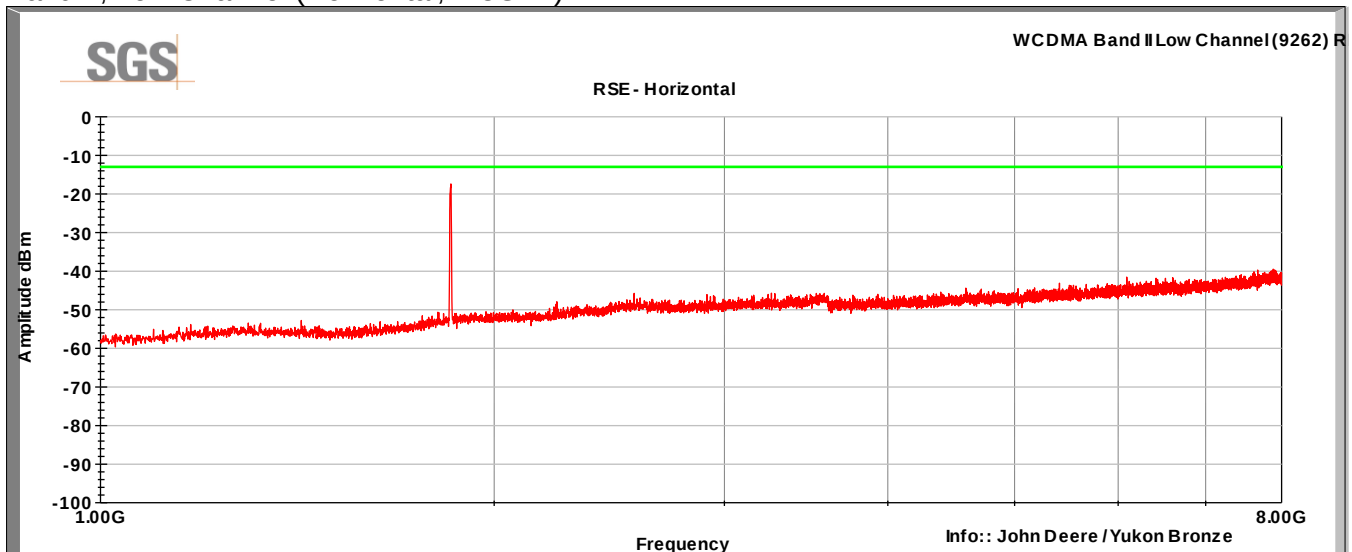
Band II, Low Channel (Horizontal, 30-1000MHz)



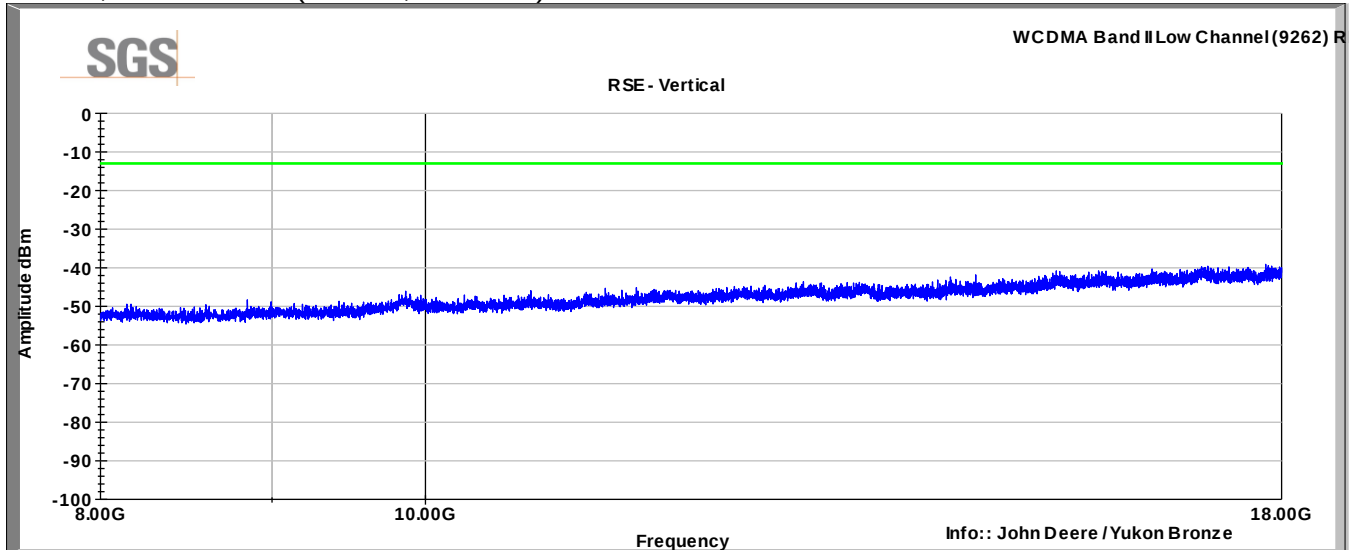
Band II, Low Channel (Vertical, 1-8GHz)



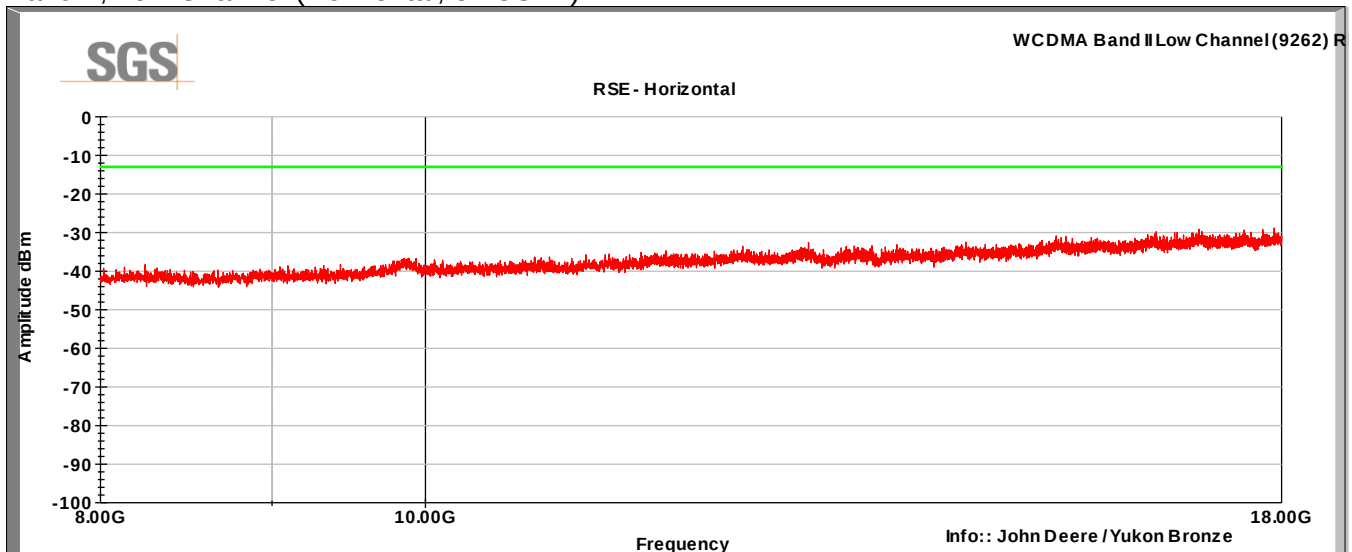
Band II, Low Channel (Horizontal, 1-8GHz)



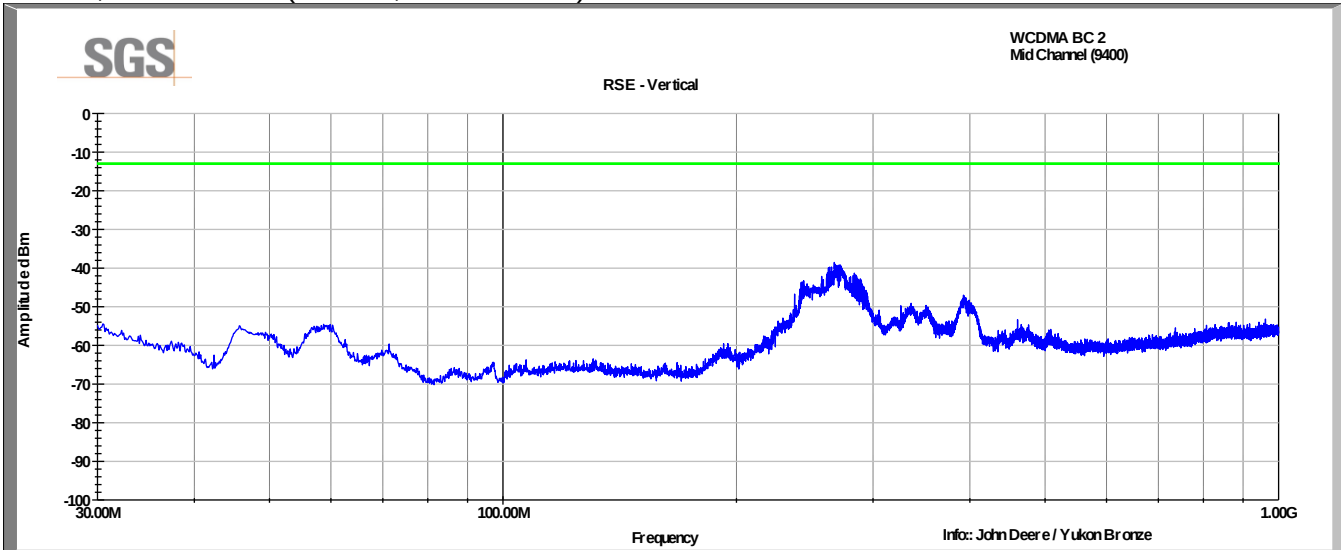
Band II, Low Channel (Vertical, 8-18GHz)



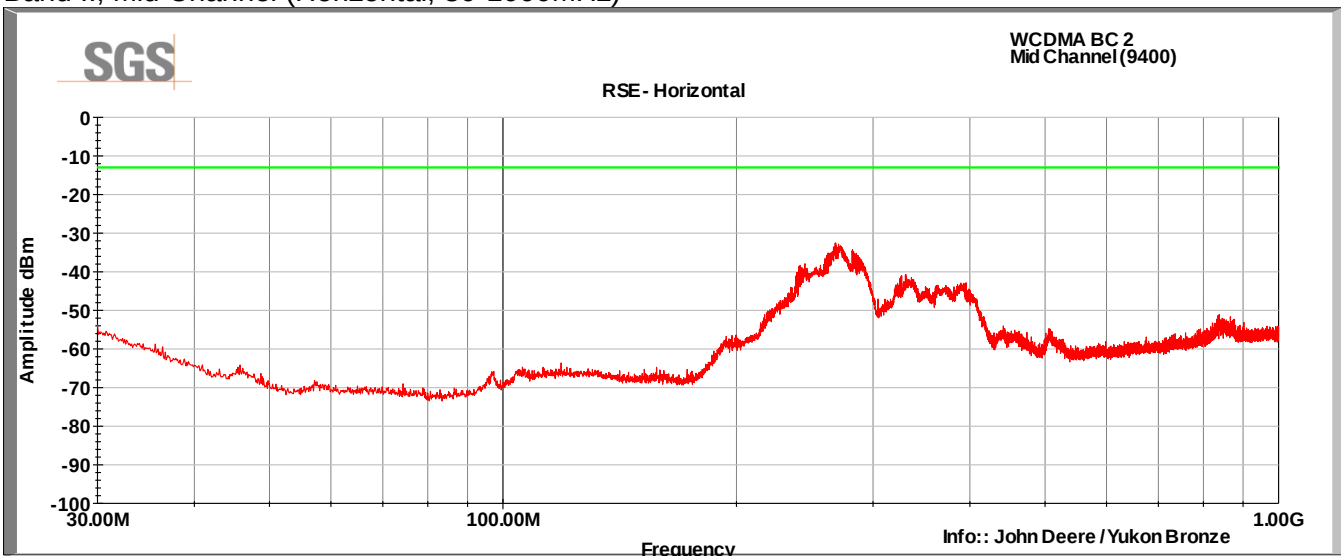
Band II, Low Channel (Horizontal, 8-18GHz)



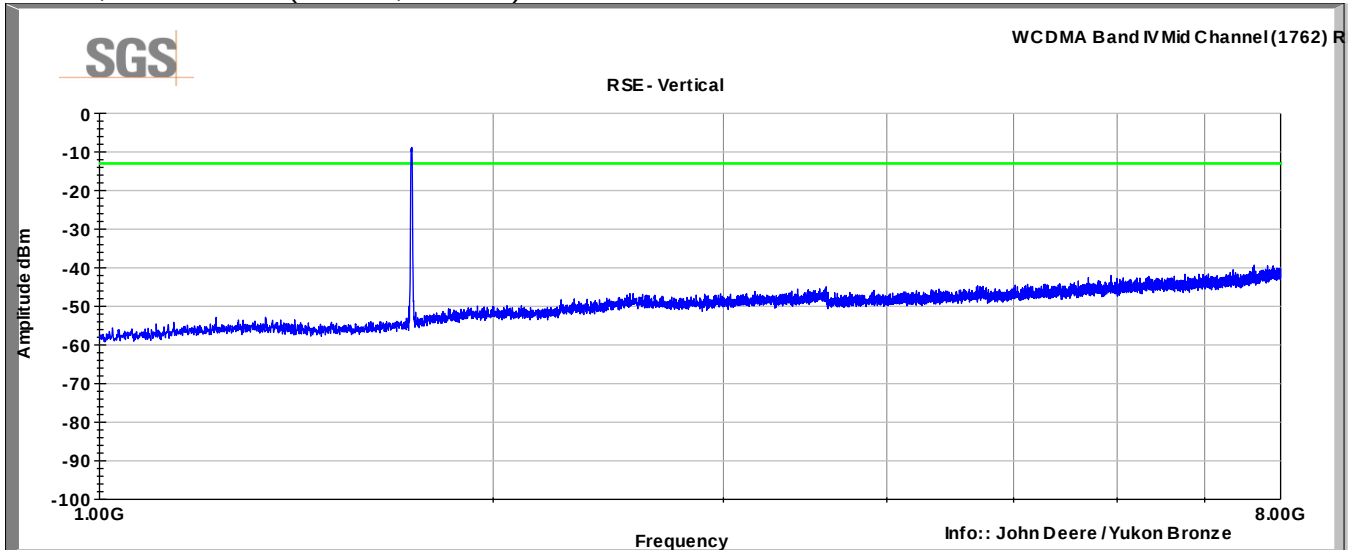
Band II, Mid Channel (Vertical, 30-1000MHz)



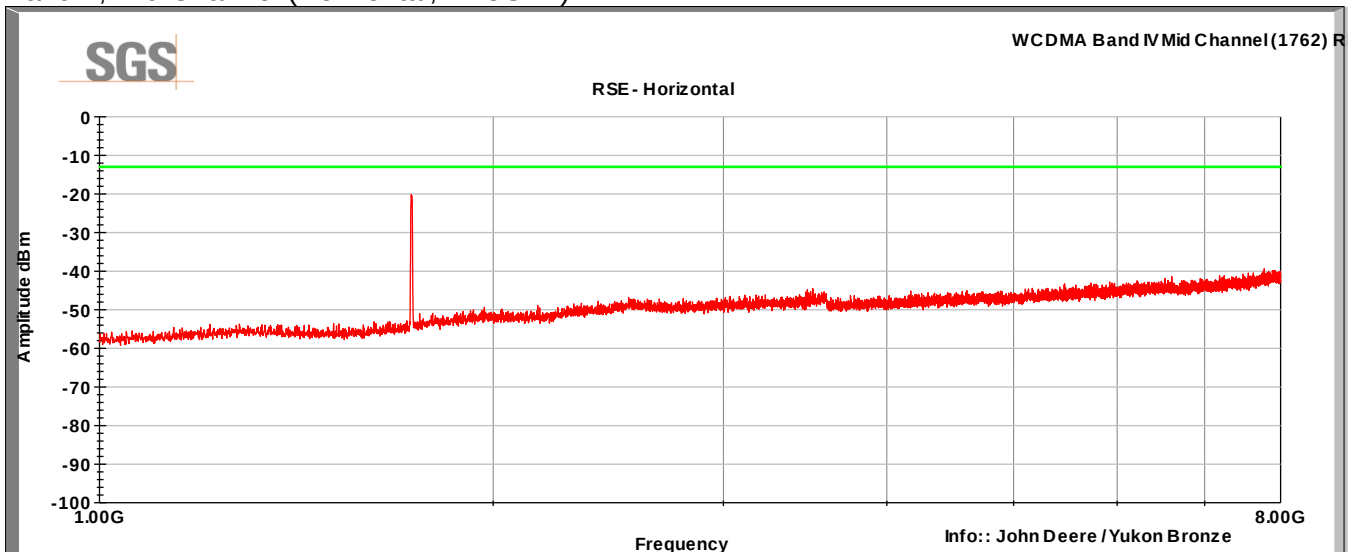
Band II, Mid Channel (Horizontal, 30-1000MHz)



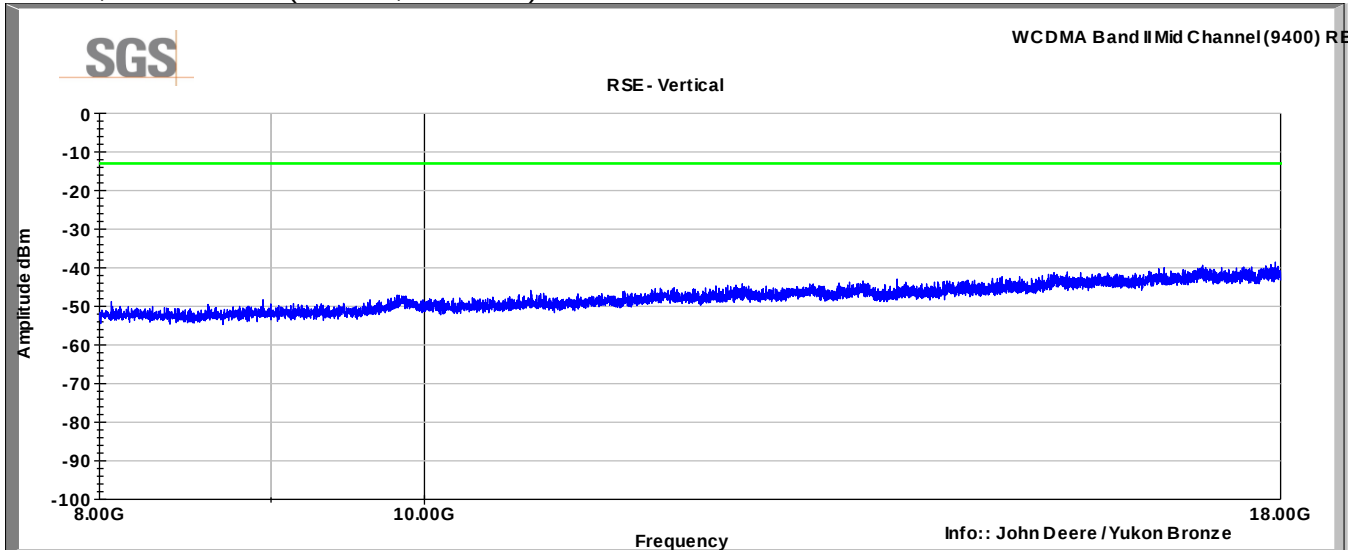
Band II, Mid Channel (Vertical, 1-8GHz)



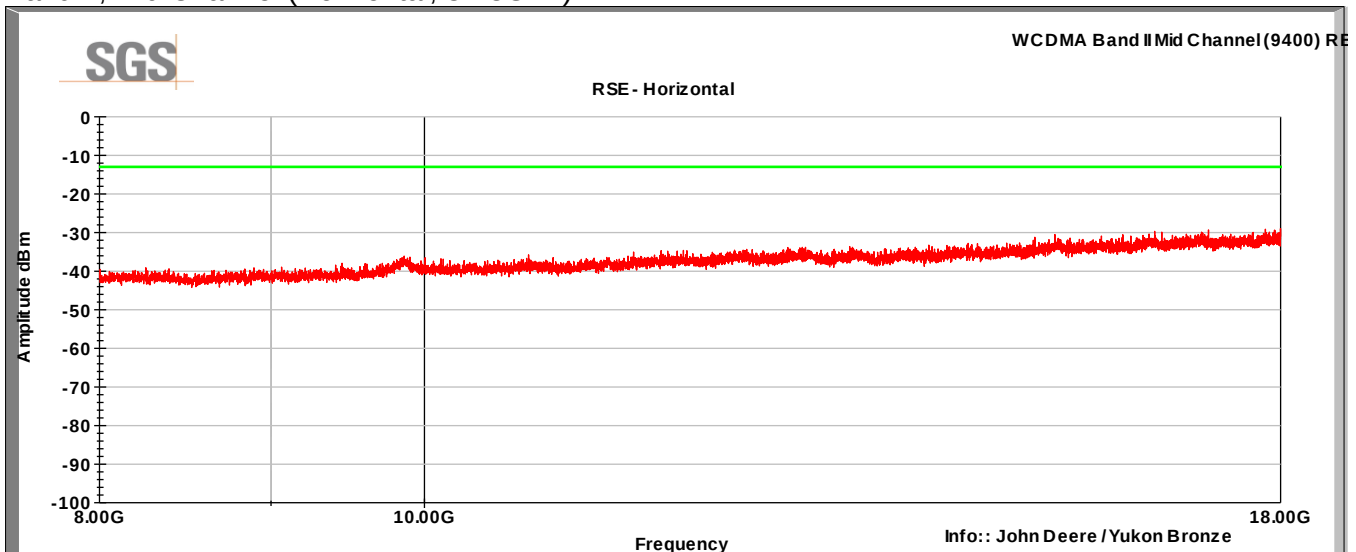
Band II, Mid Channel (Horizontal, 1- 8GHz)



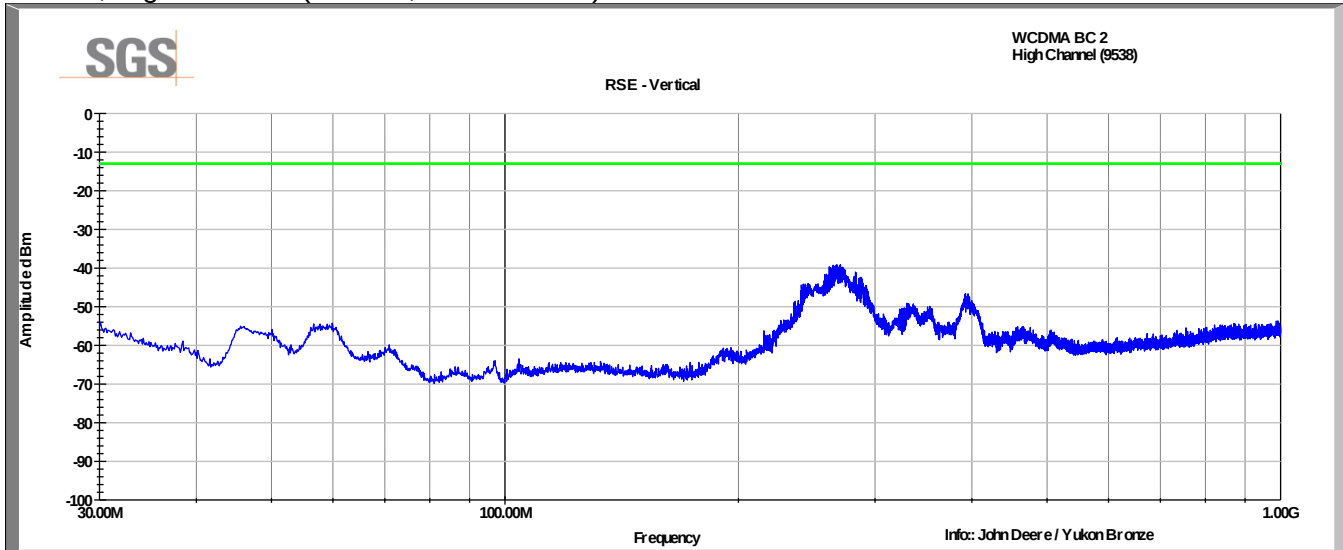
Band II, Mid Channel (Vertical, 8-18GHz)



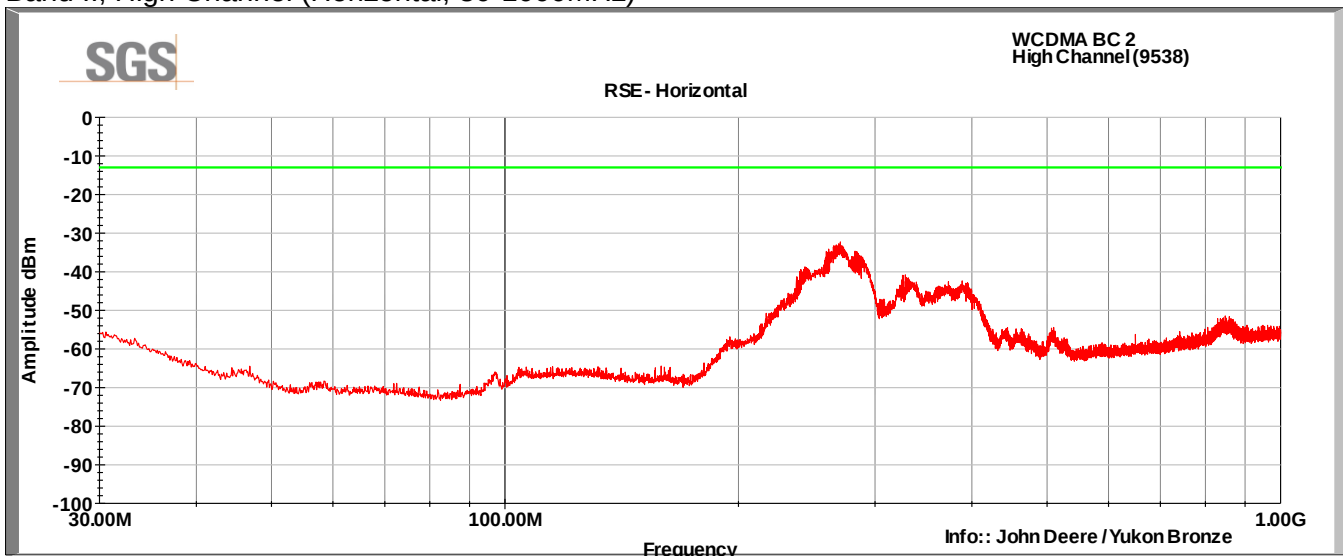
Band II, Mid Channel (Horizontal, 8-18GHz)



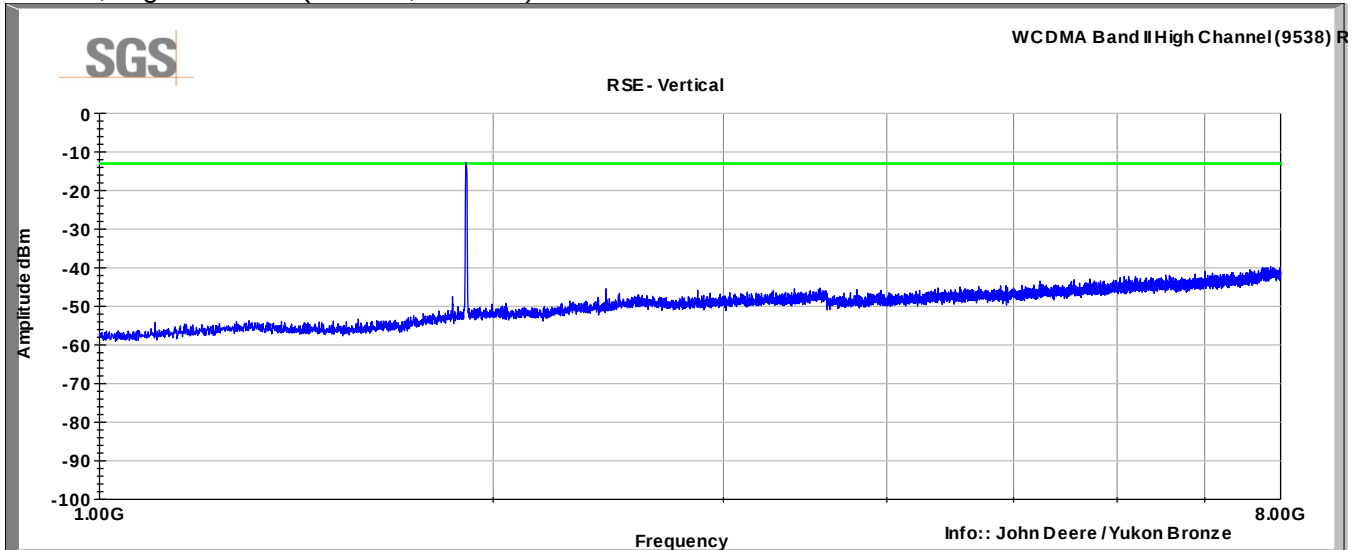
Band II, High Channel (Vertical, 30-1000MHz)



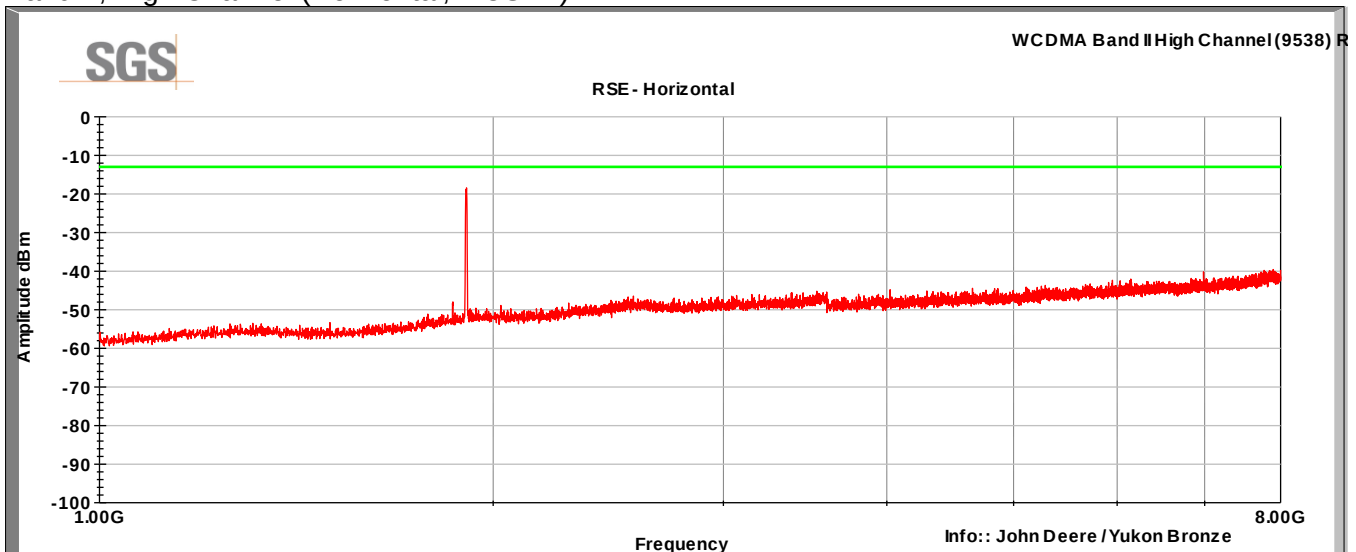
Band II, High Channel (Horizontal, 30-1000MHz)



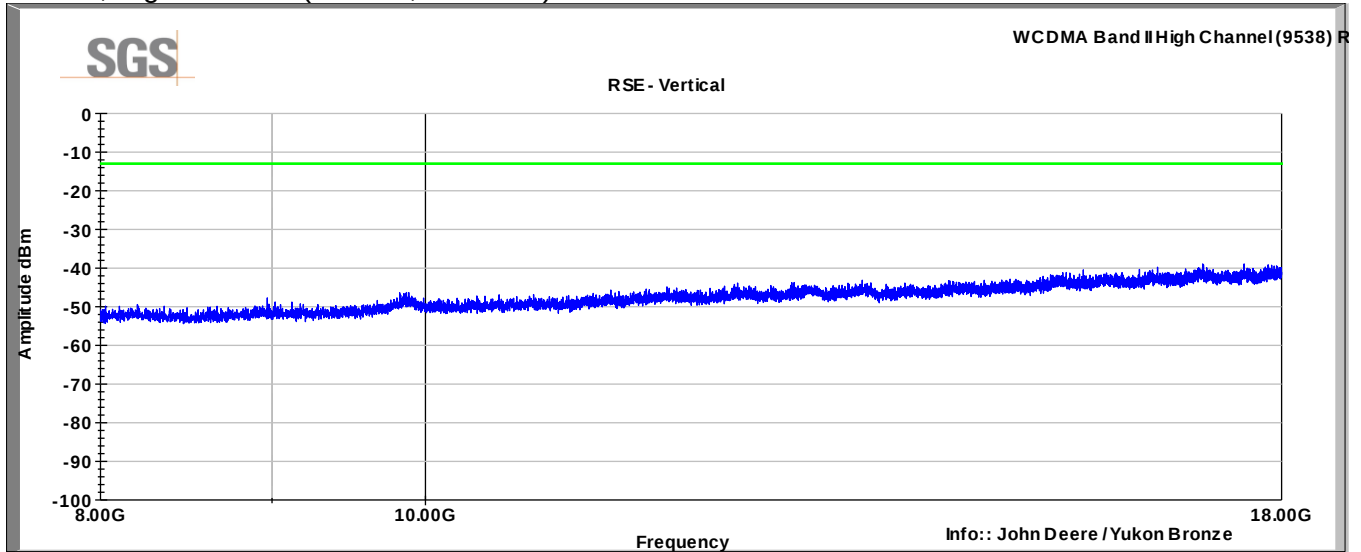
Band II, High Channel (Vertical, 1-8GHz)



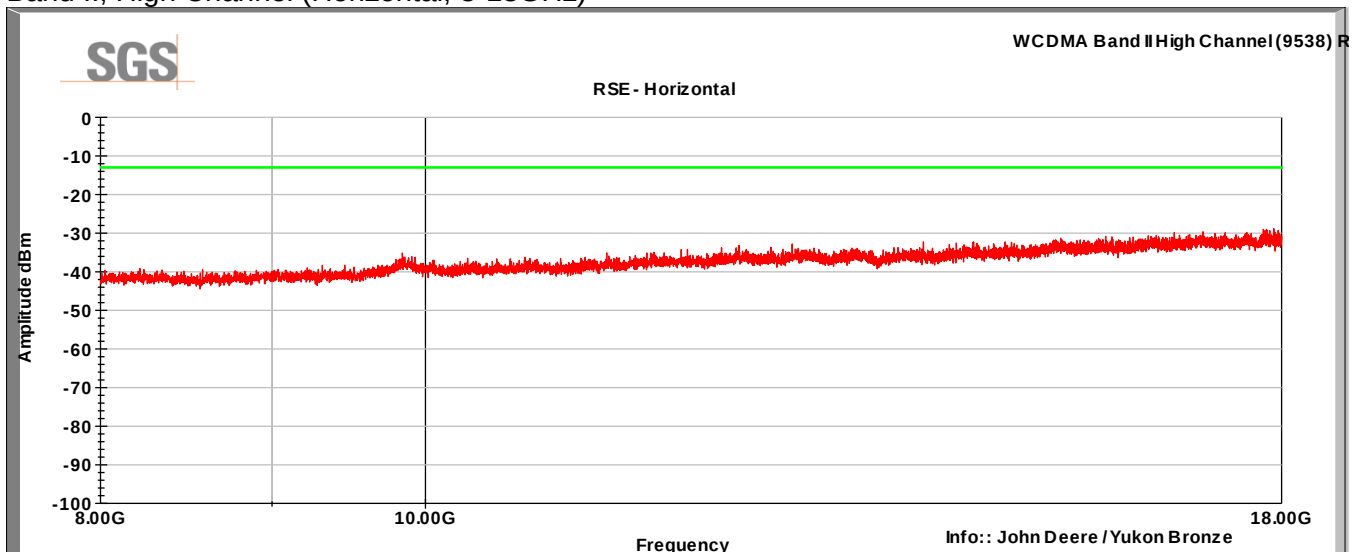
Band II, High Channel (Horizontal, 1-8GHz)



Band II, High Channel (Vertical, 8-18GHz)



Band II, High Channel (Horizontal, 8-18GHz)



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 Band II Channel 9400, Ban IV Channel 1450, and Band V Channel 4175.

9.3 Test Site

SGS EMC Laboratory, Suwanee, GA

9.4 Test Equipment

Equipment	Model	Manufacturer	Asset Number	Cal Due Date
CMW500 WIDEBAND RADIO COMMUNICATIONS TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2019
ENVIRONMENTAL TEST CHAMBER	T2RC	TENNEY ENVIRONMENTAL	B094877	CNR
HANDHELD MULTIMETER	87V	FLUKE	B079676	4-Aug-2016

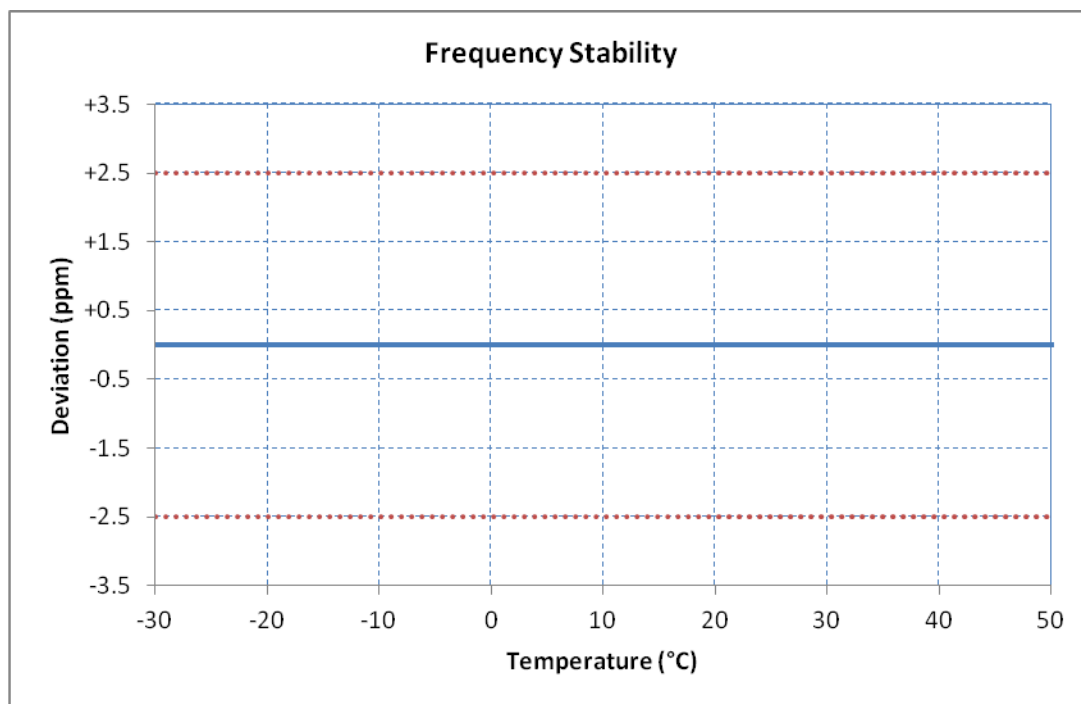
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle.

9.5 Test Data

Test Date: 08 April 2016

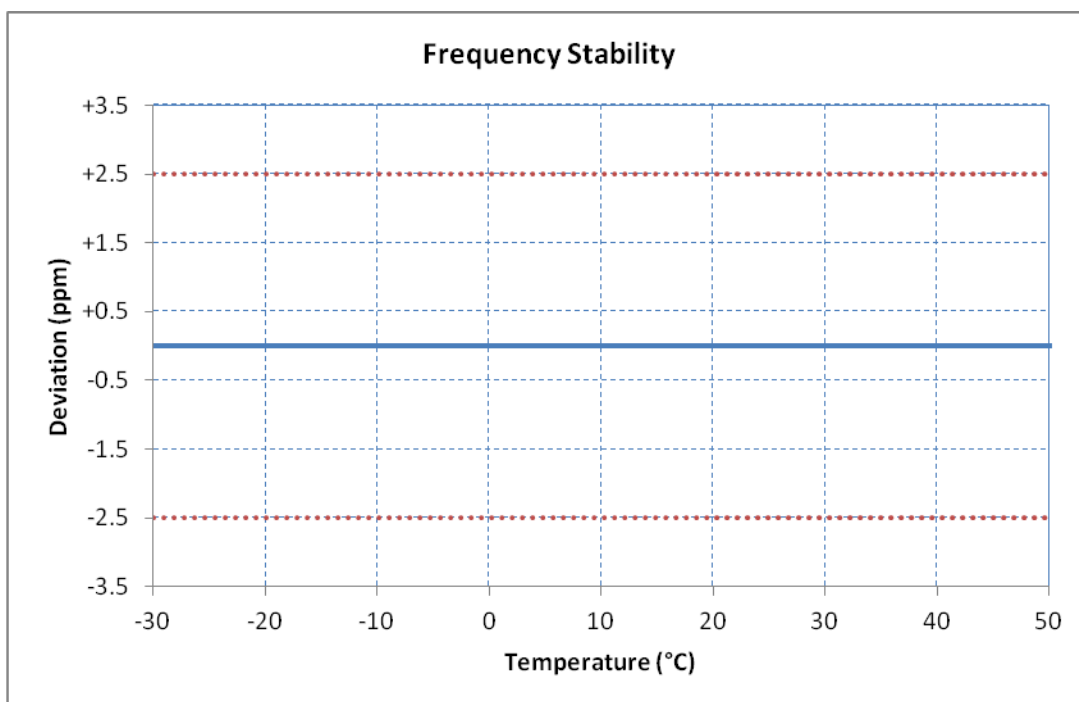
WCDMA Band 2, Channel 9400 (1880MHz)

Voltage %	Power V _{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	-30	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	-20	1,879,999,995	-5	-0.00	-0.000000
100%	12.00	-10	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	0	1,879,999,995	-5	-0.00	-0.000000
100%	12.00	+10	1,879,999,994	-6	-0.00	-0.000000
100%	12.00	+20	1,879,999,993	-7	-0.00	-0.000000
100%	12.00	+30	1,879,999,994	-6	-0.00	-0.000000
100%	12.00	+40	1,879,999,994	-6	-0.00	-0.000000
100%	12.00	+50	1,879,999,994	-6	-0.00	-0.000000
100%	12.00	+55	1,879,999,994	-6	-0.00	-0.000000
115%	13.80	+20	1,879,999,994	-6	-0.00	-0.000000
85%	10.20	+20	1,879,999,994	-6	-0.00	-0.000000



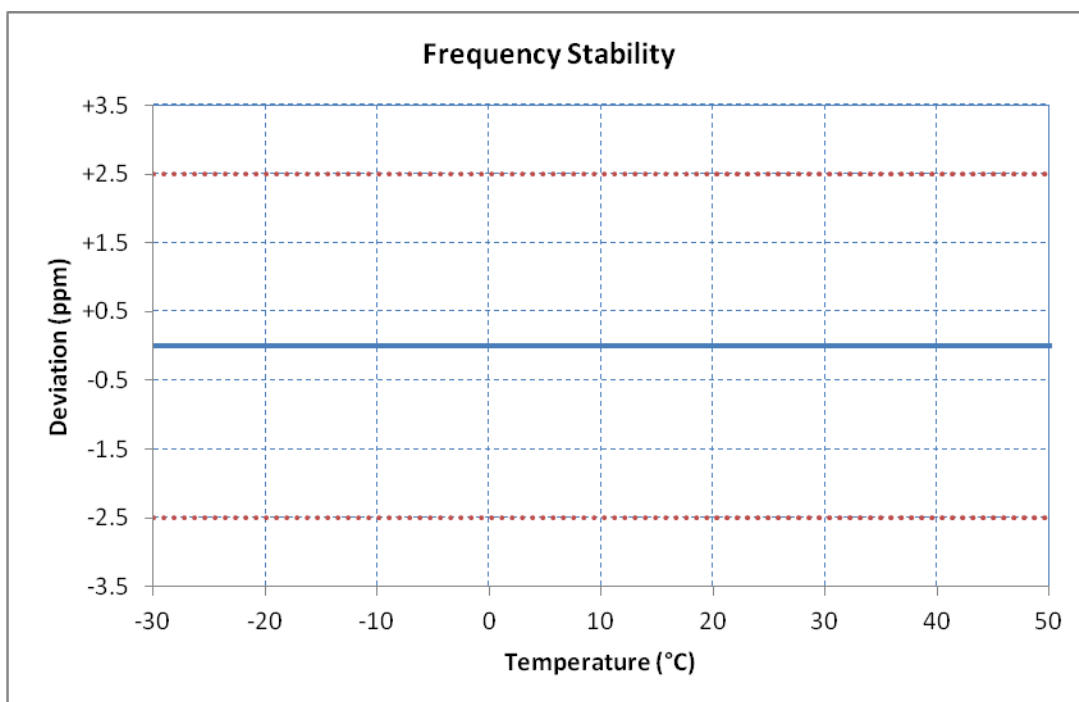
WCDMA Band 4, Channel 1450 (1740MHz)

Voltage %	Power V_{DC}	Temp °C	Frequency Hz	Freq Dev Hz	Freq Dev ppm	Deviation %
100%	12.00	+20 (Ref)	1,740,000,004	+4	+0.00	+0.000000
100%	12.00	-30	1,739,999,992	-8	-0.00	-0.000000
100%	12.00	-20	1,740,000,003	+3	+0.00	+0.000000
100%	12.00	-10	1,740,000,006	+6	+0.00	+0.000000
100%	12.00	0	1,740,000,003	+3	+0.00	+0.000000
100%	12.00	+10	1,740,000,003	+3	+0.00	+0.000000
100%	12.00	+20	1,740,000,004	+4	+0.00	+0.000000
100%	12.00	+30	1,739,999,997	-3	-0.00	-0.000000
100%	12.00	+40	1,739,999,994	-6	-0.00	-0.000000
100%	12.00	+50	1,739,999,992	-8	-0.00	-0.000000
100%	12.00	+55	1,739,999,992	-8	-0.00	-0.000000
115%	13.80	+20	1,739,999,997	-3	-0.00	-0.000000
85%	10.20	+20	1,739,999,997	-3	-0.00	-0.000000



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)	834,999,999	-1	-0.00	-0.000000
100%	12.00	-30	835,000,001	+1	+0.00	+0.000000
100%	12.00	-20	835,000,000	+0	+0.00	+0.000000
100%	12.00	-10	834,999,999	-1	-0.00	-0.000000
100%	12.00	0	835,000,000	-0	-0.00	-0.000000
100%	12.00	+10	834,999,998	-2	-0.00	-0.000000
100%	12.00	+20	834,999,999	-1	-0.00	-0.000000
100%	12.00	+30	835,000,000	-0	-0.00	-0.000000
100%	12.00	+40	835,000,000	-0	-0.00	-0.000000
100%	12.00	+50	835,000,000	+0	+0.00	+0.000000
100%	12.00	+55	835,000,000	+0	+0.00	+0.000000
115%	13.80	+20	835,000,000	-0	-0.00	-0.000000
85%	10.20	+20	835,000,000	-0	-0.00	-0.000000



10 Revision History

Revision Level	Description of changes	Revision Date
0	Initial release	10 May 2016
	-	