EMC Test Report

Project Number: 3958632
Report Number: 3958632EMC01 **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 22H, Part 24E, Part 27
Industry Canada: RSS-GEN, Issue 4: 2014
RSS-130, Issue 1: 2013
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	Pass
24.232(d) 27.50(d)(5)	RSS-130 (4.4) 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(c)(2) 27.53(h)	RSS-130 (4.6.1) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(6.5.1)	Band Edge / Conducted Spurious Emissions	< 43 +10log$_{10}$ ($P_{[Watts]}$) at band edge and for all out of band emissions		Pass
22.913(a)(2)	--	Effective Radiated Power	< 7 Watts max ERP	Radiated	Pass
27.50(b)(10)	--		< 3 Watts max ERP		
--	RSS-130 (4.4)	Equivalent Isotropically Radiated Power	< 5 Watts max ERP		Pass
--	RSS-132 (5.4)		< 11.5 Watts max ERP		Pass
24.232(c)	RSS-132 (5.4) RSS-133 (6.4)		< 2 Watts max EIRP		Pass
27.50(d)(4)	RSS-139 (6.4)		< 1 Watts max EIRP		Pass
2.1053 22.917(a) 24.238(a) 27.53(c)(2) 27.53(h)	RSS-GEN (6.13) RSS-130 (4.6) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139 (6.5.1)	Radiated Spurious Emissions	< 43 +10log$_{10}$ ($P_{[Watts]}$) at band edge and for all out of band emissions		Pass
2.1055 22.917(a) 24.238(a) 27.5(b) 27.5(h) 27.54	RSS-GEN (6.11) RSS-130 (4.3) 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,
Tx Frequency Range:	1850 - 1910 MHz (LTE Band 2) 1710 – 1755 MHz (LTE Band 4) 824 – 849 MHz (LTE Band 5) 704 – 716 MHz (LTE Band 17)
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)	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:	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 - LTE Band 2*

Max Power: 22.53dBm

UpLink Channel	UL Frequency (MHz)	BW (MHz)	# RB	Position	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
18607	1850.7	1.4	1	(RB_Pos:0)	21.60	0.53	22.13
18607	1850.7	1.4	1	(RB_Pos:5)	21.81	0.53	22.34
18607	1850.7	1.4	4	(RB_Pos:0)	21.71	0.53	22.24
18607	1850.7	1.4	4	(RB_Pos:2)	21.80	0.53	22.33
18607	1850.7	1.4	6	(RB_Pos:0)	20.75	0.53	21.28
18900	1880	1.4	1	(RB_Pos:0)	21.68	0.53	22.21
18900	1880	1.4	1	(RB_Pos:5)	21.56	0.53	22.09
18900	1880	1.4	4	(RB_Pos:0)	21.63	0.53	22.16
18900	1880	1.4	4	(RB_Pos:2)	21.61	0.53	22.14
18900	1880	1.4	6	(RB_Pos:0)	20.67	0.53	21.2
19193	1909.3	1.4	1	(RB_Pos:0)	20.75	0.54	21.29
19193	1909.3	1.4	1	(RB_Pos:5)	20.52	0.54	21.06
19193	1909.3	1.4	4	(RB_Pos:0)	20.76	0.54	21.3
19193	1909.3	1.4	4	(RB_Pos:2)	20.64	0.54	21.18
19193	1909.3	1.4	6	(RB_Pos:0)	19.66	0.54	20.2
18615	1851.5	3	1	(RB_Pos:0)	21.49	0.53	22.02
18615	1851.5	3	1	(RB_Pos:14)	21.83	0.53	22.36
18615	1851.5	3	8	(RB_Pos:0)	20.71	0.53	21.24
18615	1851.5	3	8	(RB_Pos:7)	20.93	0.53	21.46
18615	1851.5	3	15	(RB_Pos:0)	20.78	0.53	21.31
18900	1880	3	1	(RB_Pos:0)	21.69	0.53	22.22
18900	1880	3	1	(RB_Pos:14)	21.62	0.53	22.15
18900	1880	3	8	(RB_Pos:0)	20.76	0.53	21.29
18900	1880	3	8	(RB_Pos:7)	20.63	0.53	21.16
18900	1880	3	15	(RB_Pos:0)	20.74	0.53	21.27
19185	1909.9	3	1	(RB_Pos:0)	21.26	0.54	21.8
19185	1909.9	3	1	(RB_Pos:14)	20.47	0.54	21.01
19185	1909.9	3	8	(RB_Pos:0)	20.13	0.54	20.67
19185	1909.9	3	8	(RB_Pos:7)	19.76	0.54	20.3
19185	1909.9	3	15	(RB_Pos:0)	19.91	0.54	20.45
18625	1852.5	5	1	(RB_Pos:0)	21.67	0.53	22.2
18625	1852.5	5	1	(RB_Pos:24)	22.00	0.53	22.53
18625	1852.5	5	12	(RB_Pos:0)	20.80	0.53	21.33
18625	1852.5	5	12	(RB_Pos:13)	21.03	0.53	21.56
18625	1852.5	5	25	(RB_Pos:0)	20.95	0.53	21.48
18900	1880	5	1	(RB_Pos:0)	21.90	0.53	22.43
18900	1880	5	1	(RB_Pos:24)	21.52	0.53	22.05
18900	1880	5	12	(RB_Pos:0)	20.68	0.53	21.21
18900	1880	5	12	(RB_Pos:13)	20.65	0.53	21.18
18900	1880	5	25	(RB_Pos:0)	20.66	0.53	21.19
19175	1907.5	5	1	(RB_Pos:0)	21.55	0.54	22.09
19175	1907.5	5	1	(RB_Pos:24)	20.68	0.54	21.22
19175	1907.5	5	12	(RB_Pos:0)	20.49	0.54	21.03
19175	1907.5	5	12	(RB_Pos:13)	19.88	0.54	20.42
19175	1907.5	5	25	(RB_Pos:0)	20.14	0.54	20.68

UpLink Channel	UL Frequency (MHz)	BW (MHz)	# RB	Position	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
18650	1855	10	1	(RB_Pos:0)	21.57	0.53	22.1
18650	1855	10	1	(RB_Pos:49)	21.77	0.53	22.3
18650	1855	10	25	(RB_Pos:0)	20.92	0.53	21.45
18650	1855	10	25	(RB_Pos:25)	20.90	0.53	21.43
18650	1855	10	50	(RB_Pos:0)	20.76	0.53	21.29
18900	1880	10	1	(RB_Pos:0)	21.79	0.53	22.32
18900	1880	10	1	(RB_Pos:49)	21.46	0.53	21.99
18900	1880	10	25	(RB_Pos:0)	20.67	0.53	21.2
18900	1880	10	25	(RB_Pos:25)	20.49	0.53	21.02
18900	1880	10	50	(RB_Pos:0)	20.46	0.53	20.99
19150	1905	10	1	(RB_Pos:0)	21.70	0.54	22.24
19150	1905	10	1	(RB_Pos:49)	20.56	0.54	21.1
19150	1905	10	25	(RB_Pos:0)	20.51	0.54	21.05
19150	1905	10	25	(RB_Pos:25)	20.24	0.54	20.78
19150	1905	10	50	(RB_Pos:0)	20.23	0.54	20.77
18675	1857.5	15	1	(RB_Pos:0)	21.66	0.53	22.19
18675	1857.5	15	1	(RB_Pos:74)	21.78	0.53	22.31
18675	1857.5	15	36	(RB_Pos:0)	20.80	0.53	21.33
18675	1857.5	15	36	(RB_Pos:39)	20.85	0.53	21.38
18675	1857.5	15	75	(RB_Pos:0)	20.68	0.53	21.21
18900	1880	15	1	(RB_Pos:0)	21.89	0.53	22.42
18900	1880	15	1	(RB_Pos:74)	21.57	0.53	22.1
18900	1880	15	36	(RB_Pos:0)	20.64	0.53	21.17
18900	1880	15	36	(RB_Pos:39)	20.46	0.53	20.99
18900	1880	15	75	(RB_Pos:0)	20.43	0.53	20.96
19125	1902.5	15	1	(RB_Pos:0)	21.54	0.54	22.08
19125	1902.5	15	1	(RB_Pos:74)	20.66	0.54	21.2
19125	1902.5	15	36	(RB_Pos:0)	20.56	0.54	21.1
19125	1902.5	15	36	(RB_Pos:39)	20.28	0.54	20.82
19125	1902.5	15	75	(RB_Pos:0)	20.47	0.54	21.01
18700	1860	20	1	(RB_Pos:0)	21.80	0.53	22.33
18700	1860	20	1	(RB_Pos:99)	21.88	0.53	22.41
18700	1860	20	50	(RB_Pos:0)	20.78	0.53	21.31
18700	1860	20	50	(RB_Pos:50)	20.77	0.53	21.3
18700	1860	20	100	(RB_Pos:0)	20.82	0.53	21.35
18900	1880	20	1	(RB_Pos:0)	21.92	0.53	22.45
18900	1880	20	1	(RB_Pos:99)	21.52	0.53	22.05
18900	1880	20	50	(RB_Pos:0)	20.60	0.53	21.13
18900	1880	20	50	(RB_Pos:50)	20.49	0.53	21.02
18900	1880	20	100	(RB_Pos:0)	20.56	0.53	21.09
19100	1900	20	1	(RB_Pos:0)	21.47	0.54	22.01
19100	1900	20	1	(RB_Pos:99)	20.72	0.54	21.26
19100	1900	20	50	(RB_Pos:0)	20.46	0.54	21
19100	1900	20	50	(RB_Pos:50)	20.39	0.54	20.93
19100	1900	20	100	(RB_Pos:0)	20.60	0.54	21.14

3.6 *Test Data - LTE Band 4*

Max Power: 22.94dBm

UpLink Channel	UL Frequency (MHz)	BW (MHz)	# RB	Position	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
19957	1710.7	1.4	1	(RB_Pos:0)	22.19	0.52	22.71
19957	1710.7	1.4	1	(RB_Pos:5)	22.23	0.52	22.75
19957	1710.7	1.4	4	(RB_Pos:0)	22.2	0.52	22.72
19957	1710.7	1.4	4	(RB_Pos:2)	22.17	0.52	22.69
19957	1710.7	1.4	6	(RB_Pos:0)	21.19	0.52	21.71
20175	1732.5	1.4	1	(RB_Pos:0)	22.25	0.52	22.77
20175	1732.5	1.4	1	(RB_Pos:5)	22.22	0.52	22.74
20175	1732.5	1.4	4	(RB_Pos:0)	22.29	0.52	22.81
20175	1732.5	1.4	4	(RB_Pos:2)	22.28	0.52	22.8
20175	1732.5	1.4	6	(RB_Pos:0)	21.3	0.52	21.82
20393	1754.3	1.4	1	(RB_Pos:0)	22.24	0.53	22.77
20393	1754.3	1.4	1	(RB_Pos:5)	22.18	0.53	22.71
20393	1754.3	1.4	4	(RB_Pos:0)	22.29	0.53	22.82
20393	1754.3	1.4	4	(RB_Pos:2)	22.26	0.53	22.79
20393	1754.3	1.4	6	(RB_Pos:0)	21.35	0.53	21.88
19965	1711.5	3	1	(RB_Pos:0)	21.05	0.52	21.57
19965	1711.5	3	1	(RB_Pos:14)	21.97	0.52	22.49
19965	1711.5	3	8	(RB_Pos:0)	21.21	0.52	21.73
19965	1711.5	3	8	(RB_Pos:7)	21.09	0.52	21.61
19965	1711.5	3	15	(RB_Pos:0)	21.1	0.52	21.62
20175	1732.5	3	1	(RB_Pos:0)	21.24	0.52	21.76
20175	1732.5	3	1	(RB_Pos:14)	22.38	0.52	22.9
20175	1732.5	3	8	(RB_Pos:0)	21.28	0.52	21.8
20175	1732.5	3	8	(RB_Pos:7)	21.33	0.52	21.85
20175	1732.5	3	15	(RB_Pos:0)	21.3	0.52	21.82
20385	1753.5	3	1	(RB_Pos:0)	21.25	0.53	21.78
20385	1753.5	3	1	(RB_Pos:14)	22.16	0.53	22.69
20385	1753.5	3	8	(RB_Pos:0)	21.33	0.53	21.86
20385	1753.5	3	8	(RB_Pos:7)	21.29	0.53	21.82
20385	1753.5	3	15	(RB_Pos:0)	21.34	0.53	21.87
19975	1712.5	5	1	(RB_Pos:0)	22.26	0.52	22.78
19975	1712.5	5	1	(RB_Pos:24)	22.08	0.52	22.6
19975	1712.5	5	12	(RB_Pos:0)	21.17	0.52	21.69
19975	1712.5	5	12	(RB_Pos:13)	21.02	0.52	21.54
19975	1712.5	5	25	(RB_Pos:0)	20.95	0.52	21.47
20175	1732.5	5	1	(RB_Pos:0)	22.16	0.52	22.68
20175	1732.5	5	1	(RB_Pos:24)	22.23	0.52	22.75
20175	1732.5	5	12	(RB_Pos:0)	21.16	0.52	21.68
20175	1732.5	5	12	(RB_Pos:13)	21.38	0.52	21.9
20175	1732.5	5	25	(RB_Pos:0)	21.18	0.52	21.7
20375	1752.5	5	1	(RB_Pos:0)	22.36	0.53	22.89
20375	1752.5	5	1	(RB_Pos:24)	22.13	0.53	22.66
20375	1752.5	5	12	(RB_Pos:0)	21.32	0.53	21.85
20375	1752.5	5	12	(RB_Pos:13)	21.24	0.53	21.77
20375	1752.5	5	25	(RB_Pos:0)	21.26	0.53	21.79

UpLink Channel	UL Frequency (MHz)	BW (MHz)	# RB	Position	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
20000	1715	10	1	(RB_Pos:0)	22.09	0.52	22.61
20000	1715	10	1	(RB_Pos:49)	21.98	0.52	22.5
20000	1715	10	25	(RB_Pos:0)	20.99	0.52	21.51
20000	1715	10	25	(RB_Pos:25)	20.92	0.52	21.44
20000	1715	10	50	(RB_Pos:0)	20.89	0.52	21.41
20175	1732.5	10	1	(RB_Pos:0)	22.06	0.52	22.58
20175	1732.5	10	1	(RB_Pos:49)	22.41	0.52	22.93
20175	1732.5	10	25	(RB_Pos:0)	21.06	0.52	21.58
20175	1732.5	10	25	(RB_Pos:25)	21.25	0.52	21.77
20175	1732.5	10	50	(RB_Pos:0)	20.95	0.52	21.47
20350	1750	10	1	(RB_Pos:0)	22.29	0.53	22.82
20350	1750	10	1	(RB_Pos:49)	22.33	0.53	22.86
20350	1750	10	25	(RB_Pos:0)	21.21	0.53	21.74
20350	1750	10	25	(RB_Pos:25)	21.2	0.53	21.73
20350	1750	10	50	(RB_Pos:0)	21.01	0.53	21.54
20025	1717.5	15	1	(RB_Pos:0)	22.13	0.52	22.65
20025	1717.5	15	1	(RB_Pos:74)	22.02	0.52	22.54
20025	1717.5	15	36	(RB_Pos:0)	20.9	0.52	21.42
20025	1717.5	15	36	(RB_Pos:39)	20.85	0.52	21.37
20025	1717.5	15	75	(RB_Pos:0)	20.85	0.52	21.37
20175	1732.5	15	1	(RB_Pos:0)	22.02	0.52	22.54
20175	1732.5	15	1	(RB_Pos:74)	22.42	0.52	22.94
20175	1732.5	15	36	(RB_Pos:0)	21.23	0.52	21.75
20175	1732.5	15	36	(RB_Pos:39)	20.92	0.52	21.44
20175	1732.5	15	75	(RB_Pos:0)	20.91	0.52	21.43
20325	1747.5	15	1	(RB_Pos:0)	22.35	0.52	22.87
20325	1747.5	15	1	(RB_Pos:74)	22.11	0.52	22.63
20325	1747.5	15	36	(RB_Pos:0)	21.11	0.52	21.63
20325	1747.5	15	36	(RB_Pos:39)	21.11	0.52	21.63
20325	1747.5	15	75	(RB_Pos:0)	21.1	0.52	21.62
20050	1720	20	1	(RB_Pos:0)	22.27	0.52	22.79
20050	1720	20	1	(RB_Pos:99)	22.15	0.52	22.67
20050	1720	20	50	(RB_Pos:0)	20.86	0.52	21.38
20050	1720	20	50	(RB_Pos:50)	20.84	0.52	21.36
20050	1720	20	100	(RB_Pos:0)	20.91	0.52	21.43
20175	1732.5	20	1	(RB_Pos:0)	22	0.52	22.52
20175	1732.5	20	1	(RB_Pos:99)	22.41	0.52	22.93
20175	1732.5	20	50	(RB_Pos:0)	20.81	0.52	21.33
20175	1732.5	20	50	(RB_Pos:50)	21.19	0.52	21.71
20175	1732.5	20	100	(RB_Pos:0)	21.13	0.52	21.65
20300	1745	20	1	(RB_Pos:0)	22.31	0.52	22.83
20300	1745	20	1	(RB_Pos:99)	22.04	0.52	22.56
20300	1745	20	50	(RB_Pos:0)	21.25	0.52	21.77
20300	1745	20	50	(RB_Pos:50)	21.1	0.52	21.62
20300	1745	20	100	(RB_Pos:0)	21.2	0.52	21.72

3.7 *Test Data - LTE Band 5*

Max Power: 22.50dBm

UpLink Channel	UL Frequency (MHz)	BW (MHz)	# RB	Position	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
20407	824.7	1.4	1	(RB_Pos:0)	21.52	0.35	21.87
20407	824.7	1.4	1	(RB_Pos:5)	21.62	0.35	21.97
20407	824.7	1.4	4	(RB_Pos:0)	21.57	0.35	21.92
20407	824.7	1.4	4	(RB_Pos:2)	21.68	0.35	22.03
20407	824.7	1.4	6	(RB_Pos:0)	20.68	0.35	21.03
20525	836.5	1.4	1	(RB_Pos:0)	22.14	0.35	22.49
20525	836.5	1.4	1	(RB_Pos:5)	22.06	0.35	22.41
20525	836.5	1.4	4	(RB_Pos:0)	22.15	0.35	22.5
20525	836.5	1.4	4	(RB_Pos:2)	22.12	0.35	22.47
20525	836.5	1.4	6	(RB_Pos:0)	21.15	0.35	21.5
20643	848.5	1.4	1	(RB_Pos:0)	21.88	0.35	22.23
20643	848.5	1.4	1	(RB_Pos:5)	21.87	0.35	22.22
20643	848.5	1.4	4	(RB_Pos:0)	21.98	0.35	22.33
20643	848.5	1.4	4	(RB_Pos:2)	21.97	0.35	22.32
20643	848.5	1.4	6	(RB_Pos:0)	20.93	0.35	21.28
20415	825.5	3	1	(RB_Pos:0)	21.46	0.35	21.81
20415	825.5	3	1	(RB_Pos:14)	21.49	0.35	21.84
20415	825.5	3	8	(RB_Pos:0)	20.73	0.35	21.08
20415	825.5	3	8	(RB_Pos:7)	20.73	0.35	21.08
20415	825.5	3	15	(RB_Pos:0)	20.68	0.35	21.03
20525	836.5	3	1	(RB_Pos:0)	22.08	0.35	22.43
20525	836.5	3	1	(RB_Pos:14)	22.09	0.35	22.44
20525	836.5	3	8	(RB_Pos:0)	21.14	0.35	21.49
20525	836.5	3	8	(RB_Pos:7)	21.11	0.35	21.46
20525	836.5	3	15	(RB_Pos:0)	21.16	0.35	21.51
20635	847.5	3	1	(RB_Pos:0)	21.82	0.35	22.17
20635	847.5	3	1	(RB_Pos:14)	21.87	0.35	22.22
20635	847.5	3	8	(RB_Pos:0)	20.88	0.35	21.23
20635	847.5	3	8	(RB_Pos:7)	20.97	0.35	21.32
20635	847.5	3	15	(RB_Pos:0)	21	0.35	21.35
20425	826.5	5	1	(RB_Pos:0)	21.62	0.35	21.97
20425	826.5	5	1	(RB_Pos:24)	21.78	0.35	22.13
20425	826.5	5	12	(RB_Pos:0)	20.66	0.35	21.01
20425	826.5	5	12	(RB_Pos:13)	20.68	0.35	21.03
20425	826.5	5	25	(RB_Pos:0)	20.65	0.35	21
20525	836.5	5	1	(RB_Pos:0)	22.01	0.35	22.36
20525	836.5	5	1	(RB_Pos:24)	22.08	0.35	22.43
20525	836.5	5	12	(RB_Pos:0)	21.11	0.35	21.46
20525	836.5	5	12	(RB_Pos:13)	21.1	0.35	21.45
20525	836.5	5	25	(RB_Pos:0)	21.13	0.35	21.48
20625	846.5	5	1	(RB_Pos:0)	21.87	0.35	22.22
20625	846.5	5	1	(RB_Pos:24)	22.02	0.35	22.37
20625	846.5	5	12	(RB_Pos:0)	20.81	0.35	21.16
20625	846.5	5	12	(RB_Pos:13)	20.95	0.35	21.3
20625	846.5	5	25	(RB_Pos:0)	20.88	0.35	21.23
20450	829	10	1	(RB_Pos:0)	21.47	0.35	21.82
20450	829	10	1	(RB_Pos:49)	21.92	0.35	22.27
20450	829	10	25	(RB_Pos:0)	20.68	0.35	21.03
20450	829	10	25	(RB_Pos:25)	20.88	0.35	21.23
20450	829	10	50	(RB_Pos:0)	20.73	0.35	21.08
20525	836.5	10	1	(RB_Pos:0)	21.84	0.35	22.19
20525	836.5	10	1	(RB_Pos:49)	21.89	0.35	22.24
20525	836.5	10	25	(RB_Pos:0)	21.14	0.35	21.49
20525	836.5	10	25	(RB_Pos:25)	21.11	0.35	21.46
20525	836.5	10	50	(RB_Pos:0)	21.02	0.35	21.37
20600	844	10	1	(RB_Pos:0)	21.88	0.35	22.23
20600	844	10	1	(RB_Pos:49)	21.9	0.35	22.25
20600	844	10	25	(RB_Pos:0)	20.86	0.35	21.21
20600	844	10	25	(RB_Pos:25)	20.9	0.35	21.25
20600	844	10	50	(RB_Pos:0)	20.81	0.35	21.16

3.8 *Test Data - LTE Band 17*

Max Power: 21.48dBm

UpLink Channel	UL Frequency (MHz)	BW (MHz)	# RB	Position	Measured Power (dBm)	Cable Loss (dB)	Conducted Power (dBm)
23755	706.5	5	1	(RB_Pos:0)	21.16	0.32	21.48
23755	706.5	5	1	(RB_Pos:24)	21.04	0.32	21.36
23755	706.5	5	12	(RB_Pos:0)	20.13	0.32	20.45
23755	706.5	5	12	(RB_Pos:12)	19.92	0.32	20.24
23755	706.5	5	24	(RB_Pos:0)	20.02	0.32	20.34
23790	710	5	1	(RB_Pos:0)	20.88	0.32	21.2
23790	710	5	1	(RB_Pos:24)	20.63	0.32	20.95
23790	710	5	12	(RB_Pos:0)	19.93	0.32	20.25
23790	710	5	12	(RB_Pos:12)	19.68	0.32	20
23790	710	5	24	(RB_Pos:0)	19.75	0.32	20.07
23825	713.5	5	1	(RB_Pos:0)	20.66	0.32	20.98
23825	713.5	5	1	(RB_Pos:24)	21.02	0.32	21.34
23825	713.5	5	12	(RB_Pos:0)	19.61	0.32	19.93
23825	713.5	5	12	(RB_Pos:12)	19.93	0.32	20.25
23825	713.5	5	24	(RB_Pos:0)	19.74	0.32	20.06
23780	709	10	50	(RB_Pos:0)	19.81	0.32	20.13
23780	709	10	1	(RB_Pos:0)	20.96	0.32	21.28
23780	709	10	1	(RB_Pos:25)	20.84	0.32	21.16
23780	709	10	1	(RB_Pos:49)	20.66	0.32	20.98
23780	709	10	25	(RB_Pos:0)	19.99	0.32	20.31
23780	709	10	25	(RB_Pos:24)	19.68	0.32	20
23790	710	10	50	(RB_Pos:0)	19.69	0.32	20.01
23790	710	10	1	(RB_Pos:0)	21.01	0.32	21.33
23790	710	10	1	(RB_Pos:25)	20.76	0.32	21.08
23790	710	10	1	(RB_Pos:49)	20.77	0.32	21.09
23790	710	10	25	(RB_Pos:0)	19.93	0.32	20.25
23790	710	10	25	(RB_Pos:24)	19.58	0.32	19.9
23800	711	10	50	(RB_Pos:0)	19.71	0.32	20.03
23800	711	10	1	(RB_Pos:0)	20.98	0.32	21.3
23800	711	10	1	(RB_Pos:25)	20.58	0.32	20.9
23800	711	10	1	(RB_Pos:49)	20.86	0.32	21.18
23800	711	10	25	(RB_Pos:0)	19.89	0.32	20.21
23800	711	10	25	(RB_Pos:24)	19.71	0.32	20.03

4 Peak to Average Ratio

4.1 *Test Result*

Test Description	Basic Standards	Test Result
Peak to Average Ratio	24.232(d) 27.50(d)(5) RSS-130 (4.4) RSS-132 (5.4) RSS-133 (6.4) RSS-139 (6.4)	Compliant

4.2 *Test Method*

KDB document 971168 D01 Power Meas License Digital Systems v02r02 was used to determine peak-to-average ratio. For the LTE 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 and the worst-case setting was determined to be 3MHz cell bandwidth, 1RB (center), and QPSK modulation except for Band 17 where a 5MHz cell bandwidth was used.

4.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	46.1 %
Atmospheric Pressure:	97.4 kPa

4.4 *Test Equipment*

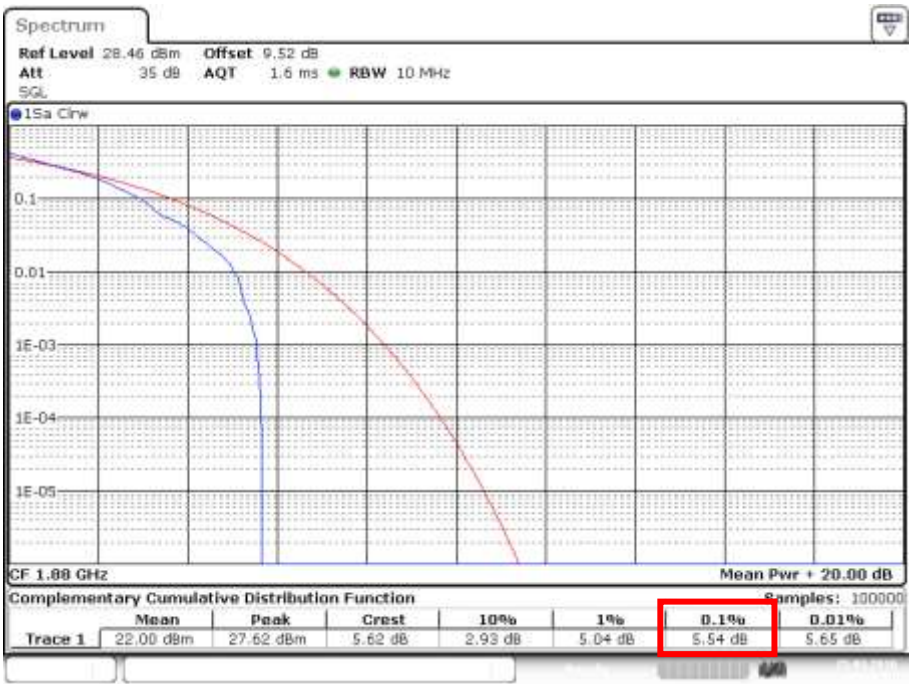
Test Date: 25 March 2016

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

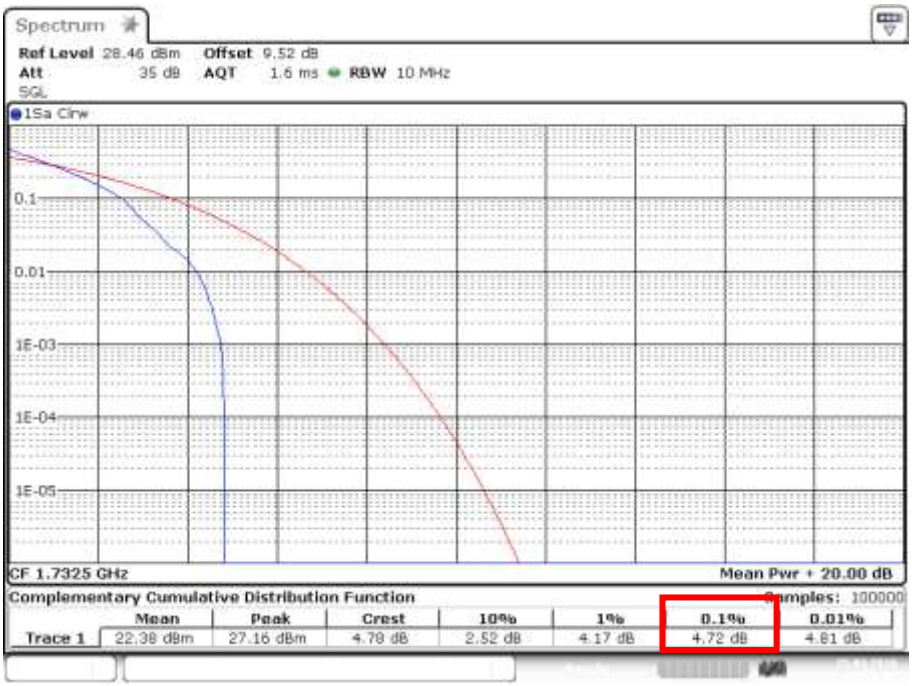
4.5 *Test Data*

LTE Band 2



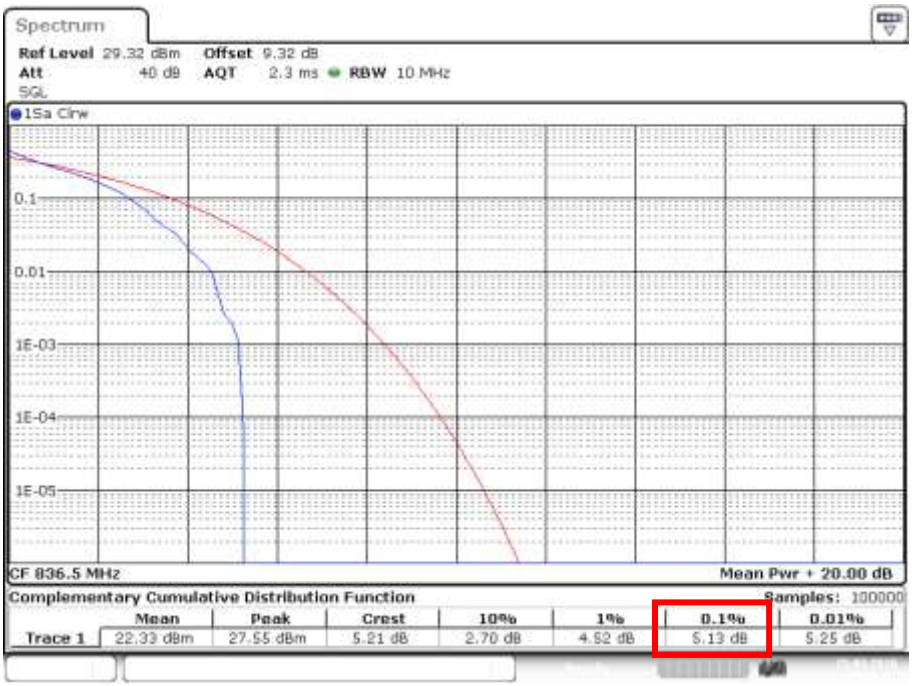
Date: 25.MAR.2016 09:18:31

LTE Band 4



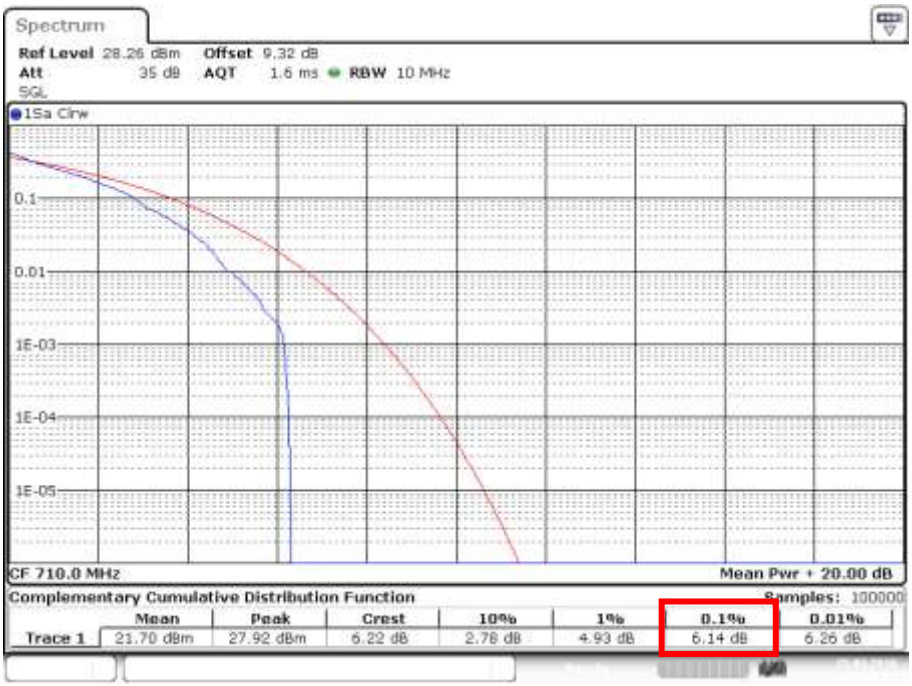
Date: 25.MAR.2016 09:19:47

LTE Band 5



Date: 25.MAR.2016 09:36:12

LTE Band 17



Date: 25.MAR.2016 09:32:09

5 Occupied Bandwidth

5.1 *Test Result*

Test Description	Basic Standards	Test Result
Occupied Bandwidth	2.1049 22.917(a) 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. All resource blocks were explored. Worst-case results are reported.

5.3 *Test Site*

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature:	23.3 °C
Relative Humidity:	46.1 %
Atmospheric Pressure:	97.4 kPa

5.4 *Test Equipment*

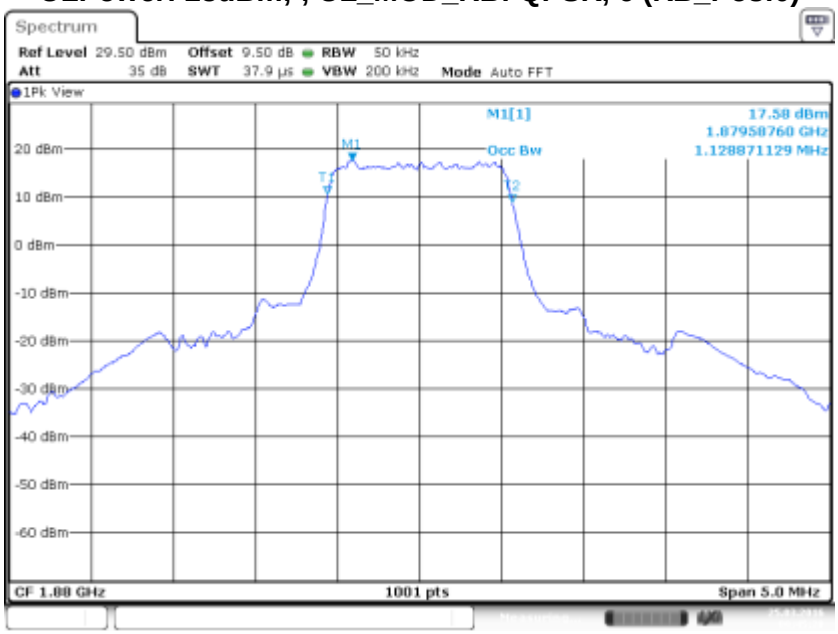
Test Date: 25 March 2016

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

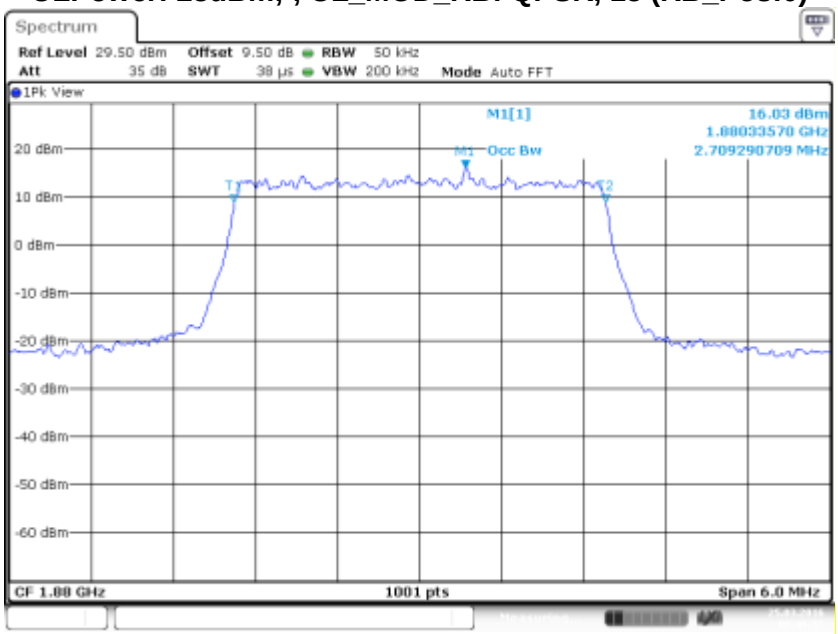
5.5 *Test Data*

LTE Band 2
Occupied Bandwidth: :@ULCH: 18900, BW: 1.4 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 6 (RB_Pos:0)



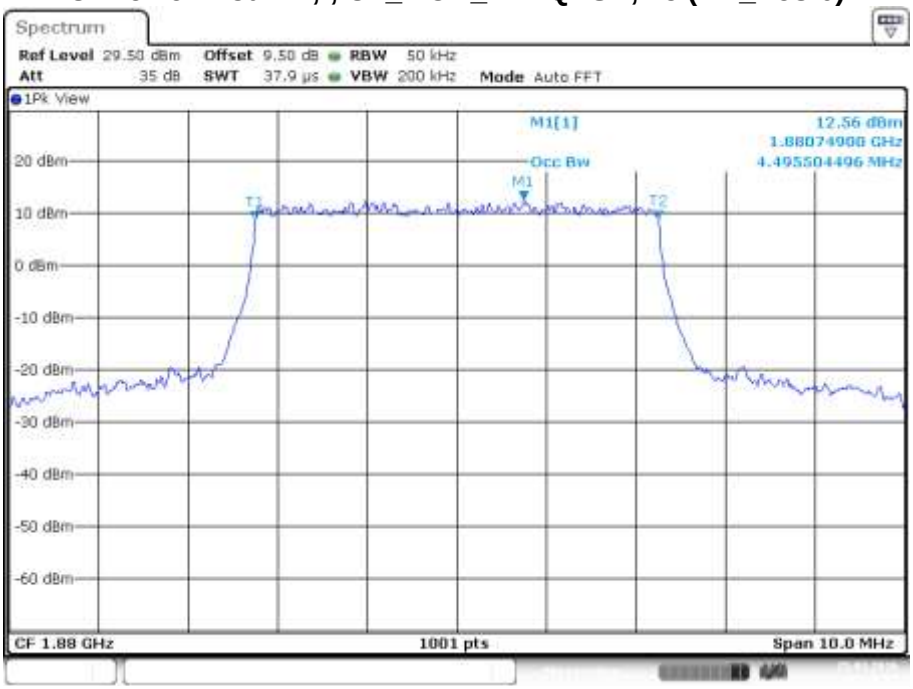
Date: 25.MAR.2016 09:45:29

LTE Band 2
Occupied Bandwidth: :@ULCH: 18900, BW: 3.0 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 15 (RB_Pos:0)



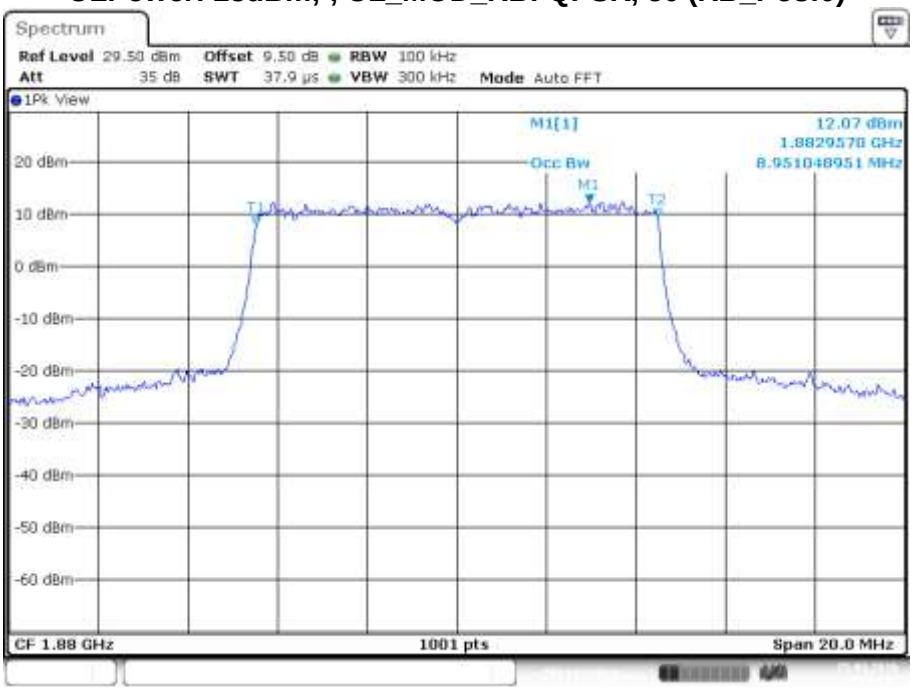
Date: 25.MAR.2016 09:46:58

LTE Band 2
Occupied Bandwidth: :@ULCH: 18900, BW: 5.0 MHz ,
ULPower: 23dBm; ; UL_MOD_RB: QPSK, 25 (RB_Pos:0)



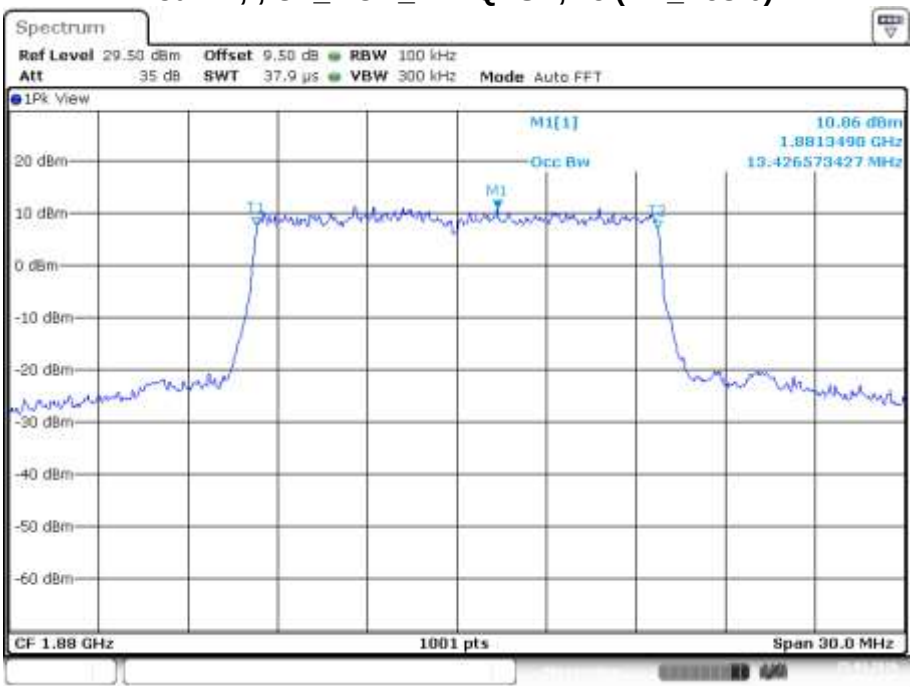
Date: 25.MAR.2016 09:48:28

LTE Band 2
Occupied Bandwidth: :@ULCH: 18900, BW: 10 MHz ,
ULPower: 23dBm; ; UL_MOD_RB: QPSK, 50 (RB_Pos:0)



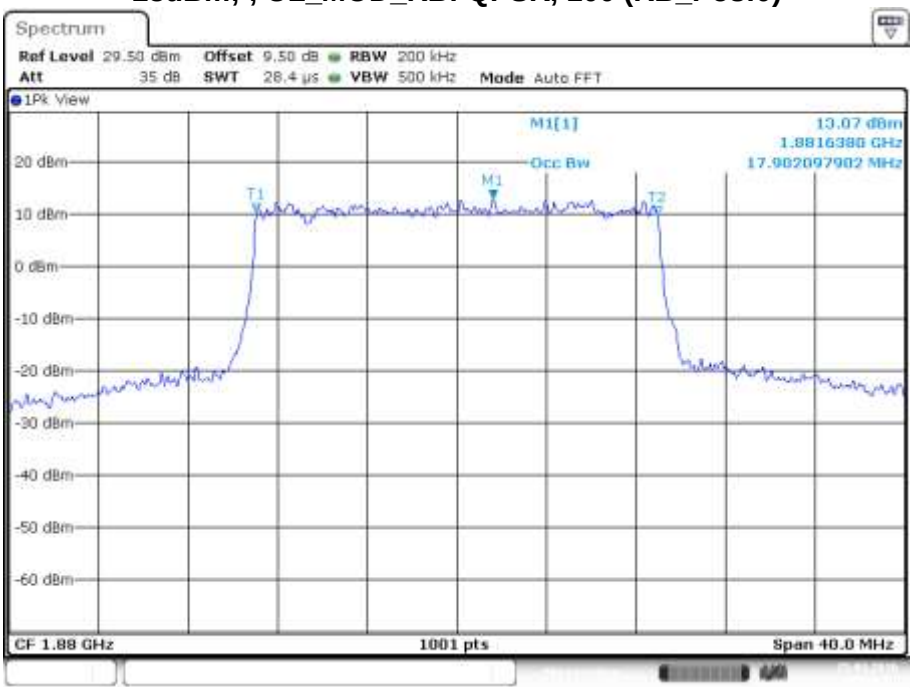
Date: 25.MAR.2016 09:53:26

LTE Band 2
Occupied Bandwidth: :@ULCH: 18900, BW: 15 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 75 (RB_Pos:0)



Date: 25.MAR.2016 09:54:40

LTE Band 2
Occupied Bandwidth: :@ULCH: 18900, BW: 20 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 100 (RB_Pos:0)

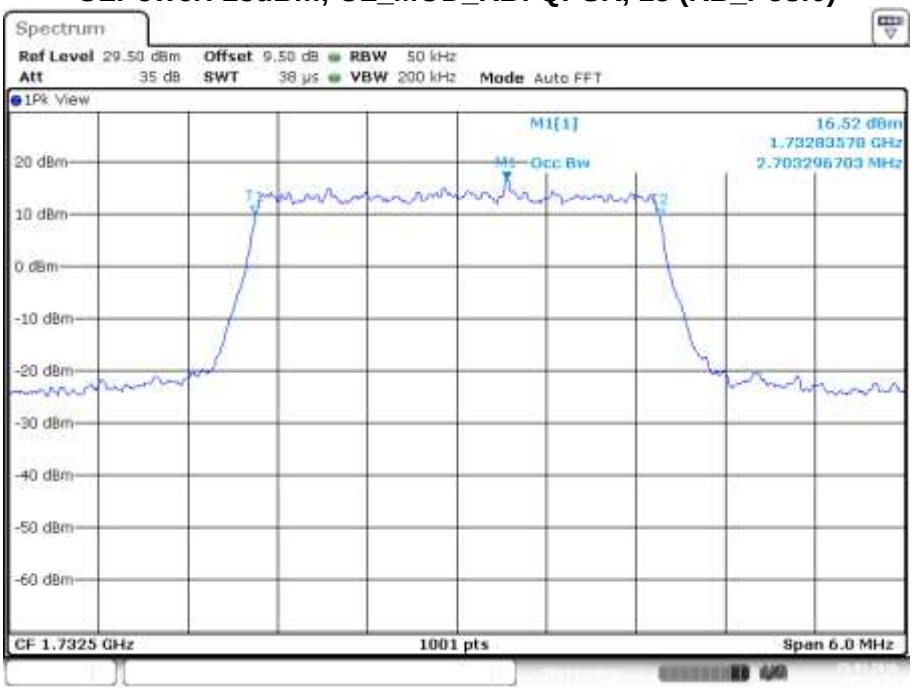


Date: 25.MAR.2016 09:56:02

LTE Band 4
Occupied Bandwidth: :@ULCH: 20175, BW: 1.4 MHz ,
ULPower: 23dBm; UL_MOD_RB: QPSK, 6 (RB_Pos:0)

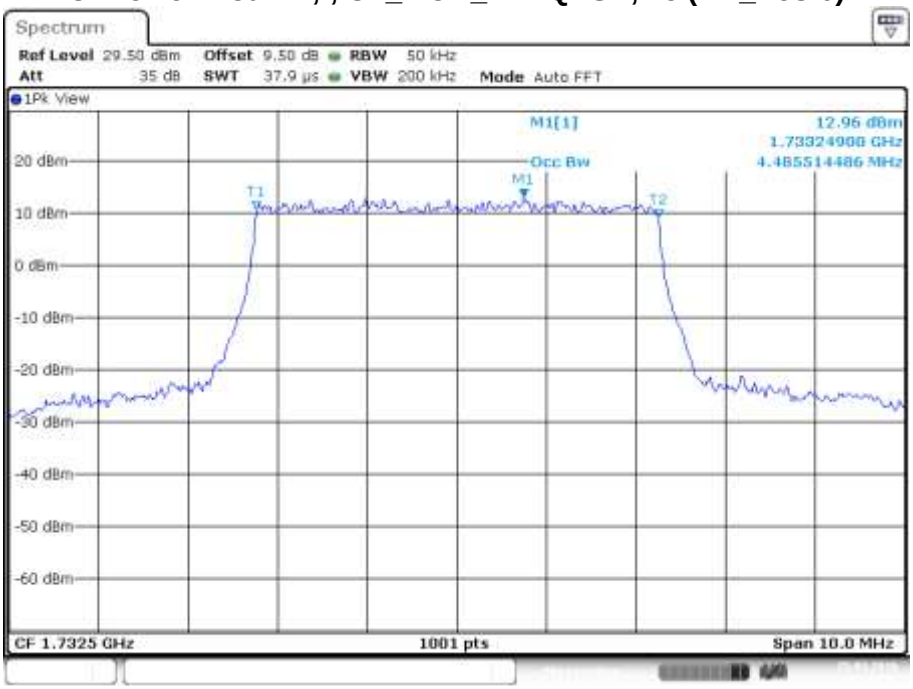
Date: 25.MAR.2016 10:19:09

LTE Band 4
Occupied Bandwidth: :@ULCH: 20175, BW: 3.0 MHz ,
ULPower: 23dBm; UL_MOD_RB: QPSK, 15 (RB_Pos:0)



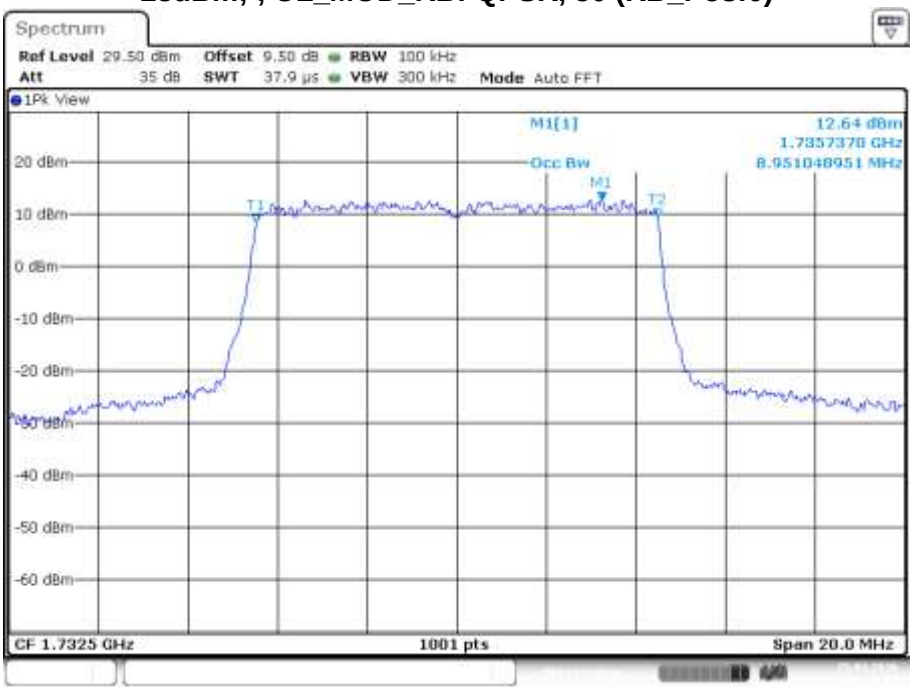
Date: 25.MAR.2016 10:18:09

LTE Band 4
Occupied Bandwidth: :@ULCH: 20175, BW: 5.0 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 25 (RB_Pos:0)



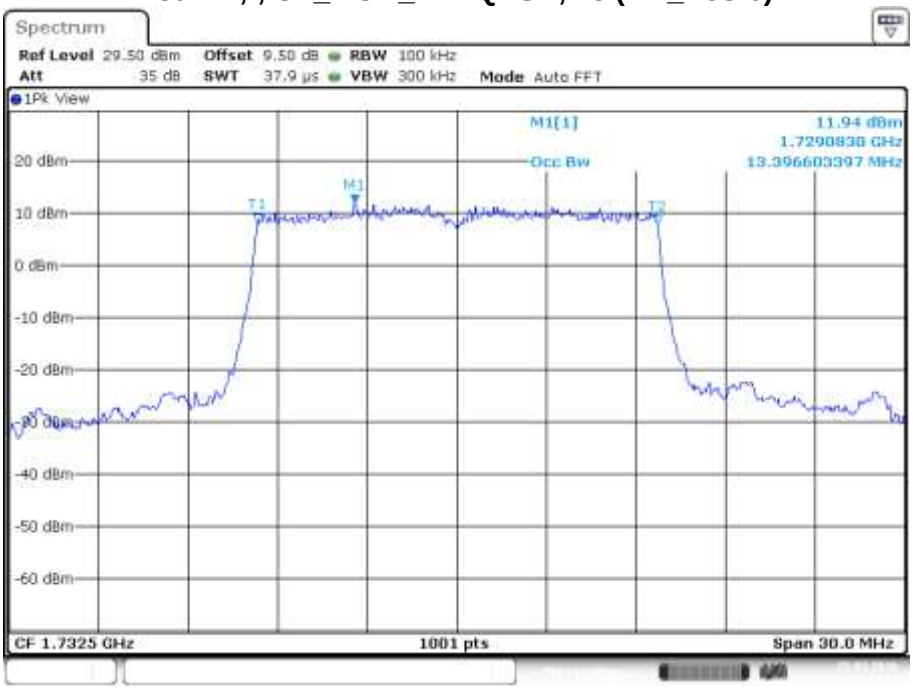
Date: 25.MAR.2016 10:17:16

LTE Band 4
Occupied Bandwidth: :@ULCH: 20175, BW: 10 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 50 (RB_Pos:0)



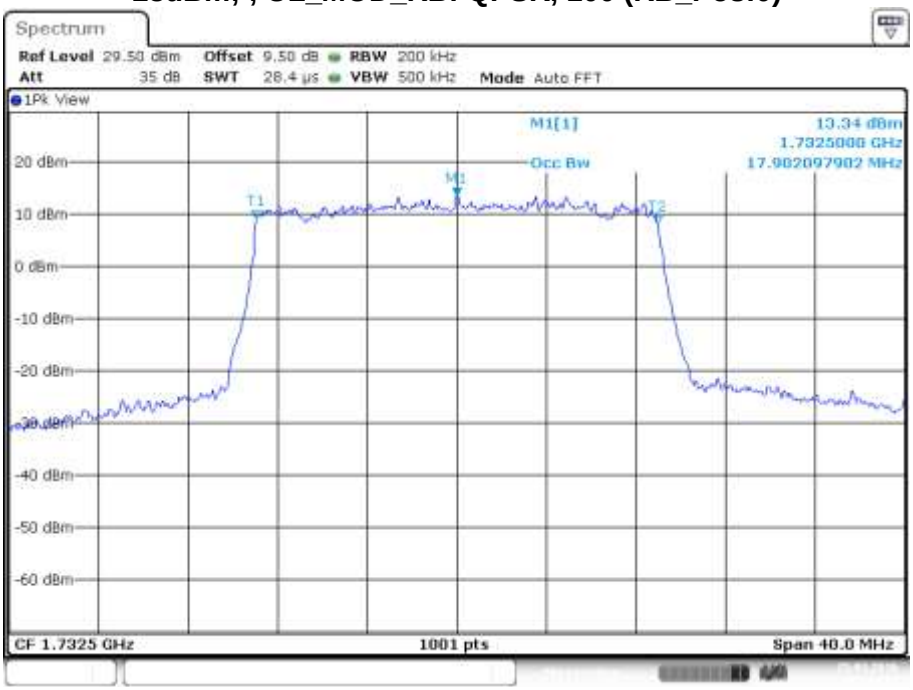
Date: 25.MAR.2016 10:16:20

LTE Band 4
Occupied Bandwidth: :@ULCH: 20175, BW: 15 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 75 (RB_Pos:0)



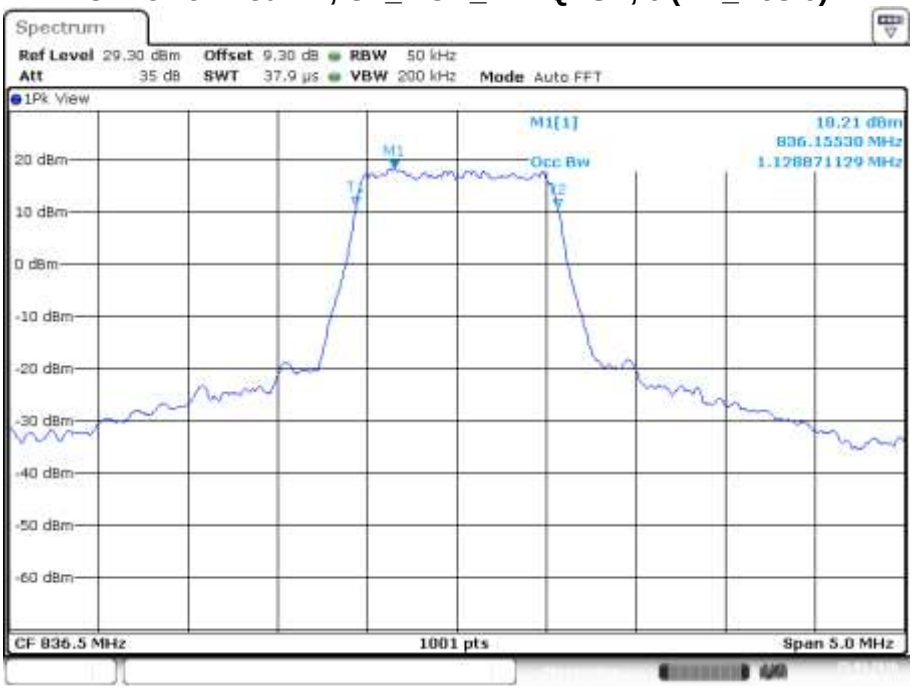
Date: 25.MAR.2016 10:15:18

LTE Band 4
Occupied Bandwidth: :@ULCH: 20175, BW: 20 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 100 (RB_Pos:0)



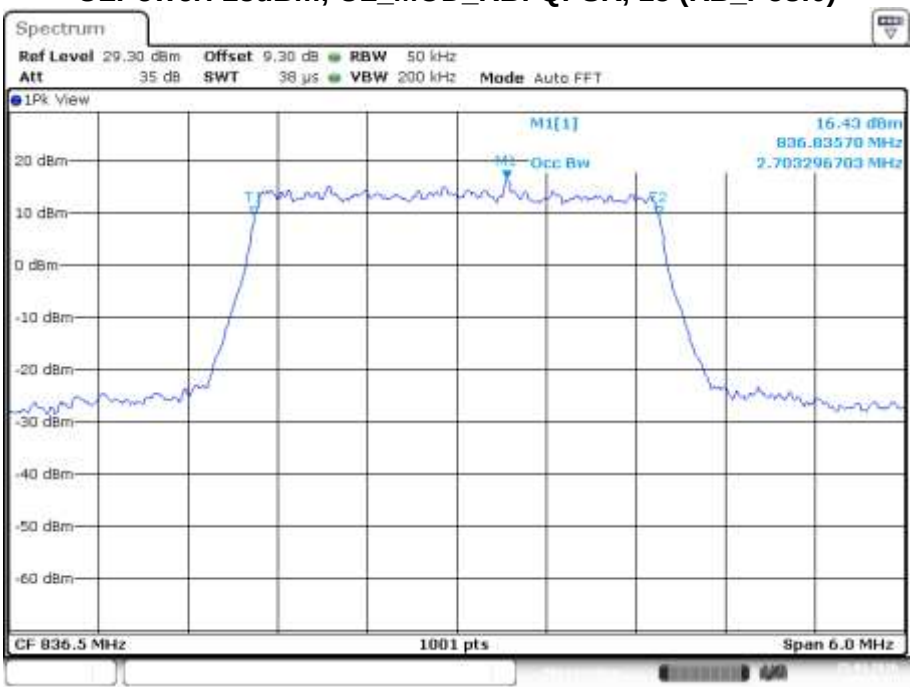
Date: 25.MAR.2016 10:14:15

LTE Band 5
Occupied Bandwidth: :@ULCH: 20525, BW: 1.4 MHz ,
ULPower: 23dBm; UL_MOD_RB: QPSK, 6 (RB_Pos:0)



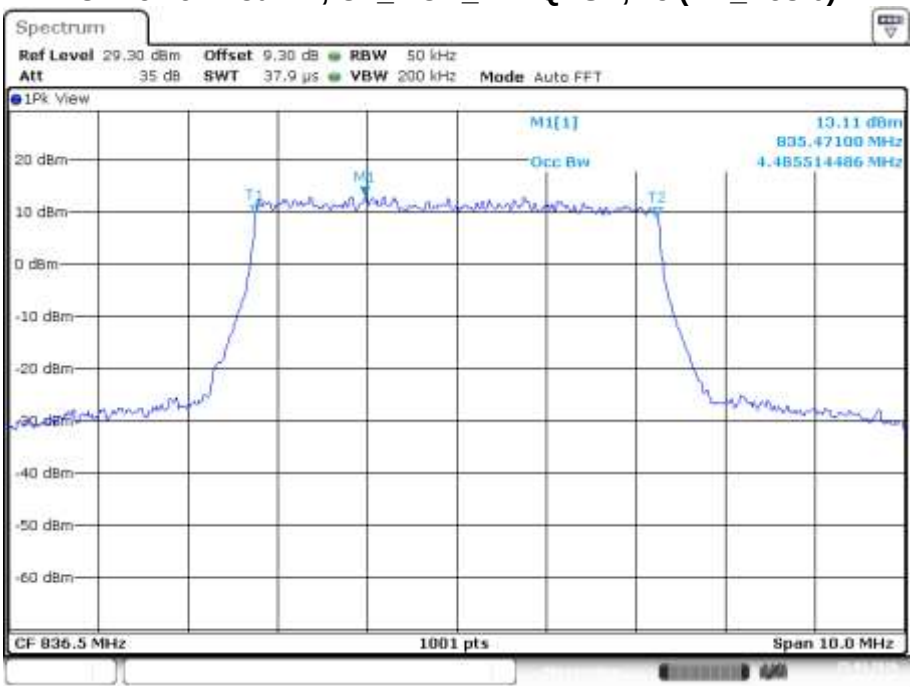
Date: 25.MAR.2016 10:21:33

LTE Band 5
Occupied Bandwidth: :@ULCH: 20525, BW: 3.0 MHz ,
ULPower: 23dBm; UL_MOD_RB: QPSK, 15 (RB_Pos:0)



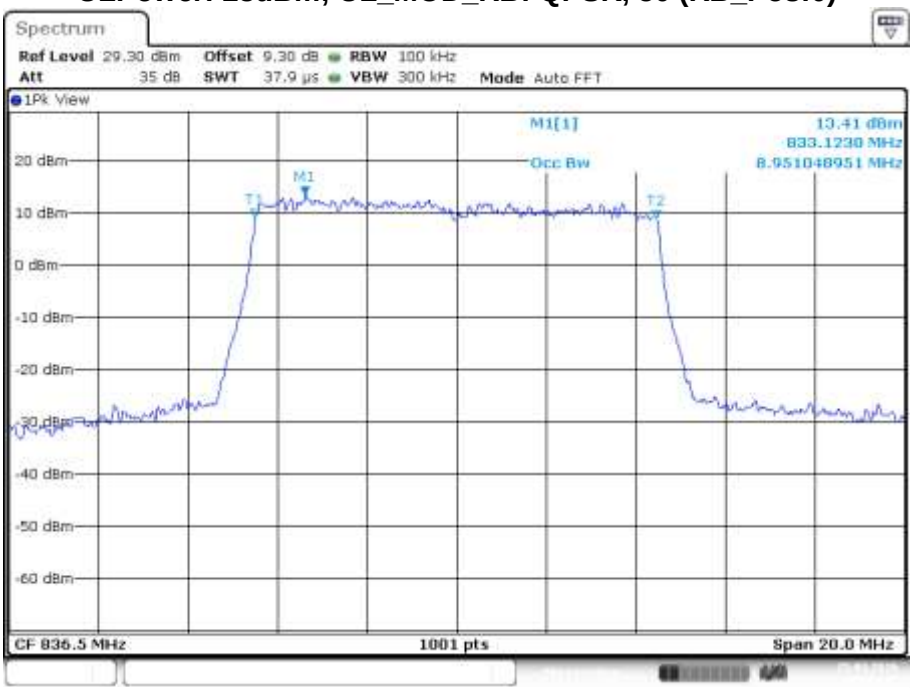
Date: 25.MAR.2016 10:22:28

LTE Band 5
Occupied Bandwidth: :@ULCH: 20525, BW: 5.0 MHz ,
ULPower: 23dBm; UL_MOD_RB: QPSK, 25 (RB_Pos:0)



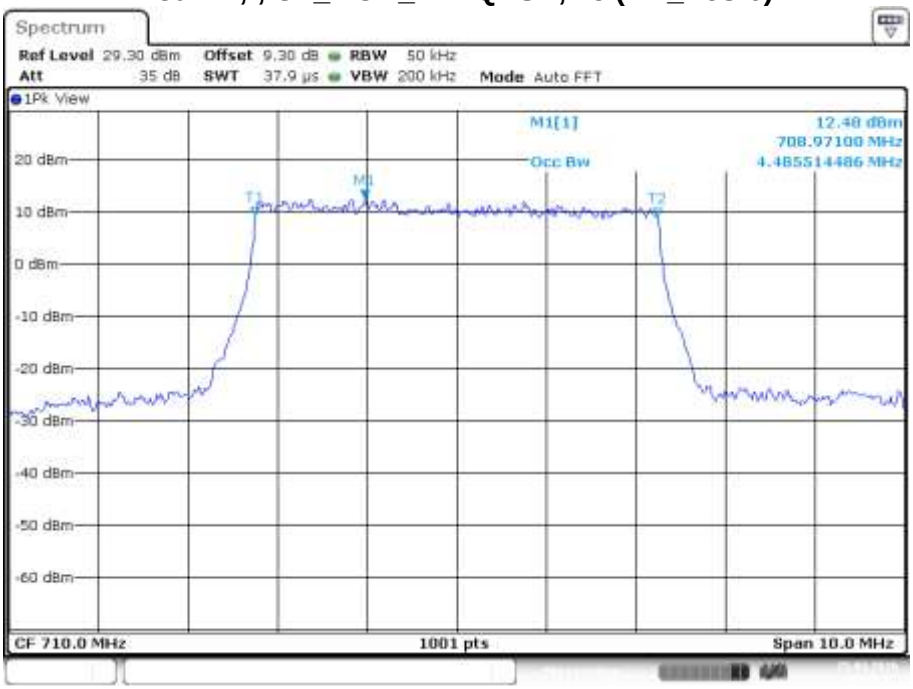
Date: 25.MAR.2016 10:23:48

LTE Band 5
Occupied Bandwidth: :@ULCH: 20525, BW: 10 MHz ,
ULPower: 23dBm; UL_MOD_RB: QPSK, 50 (RB_Pos:0)



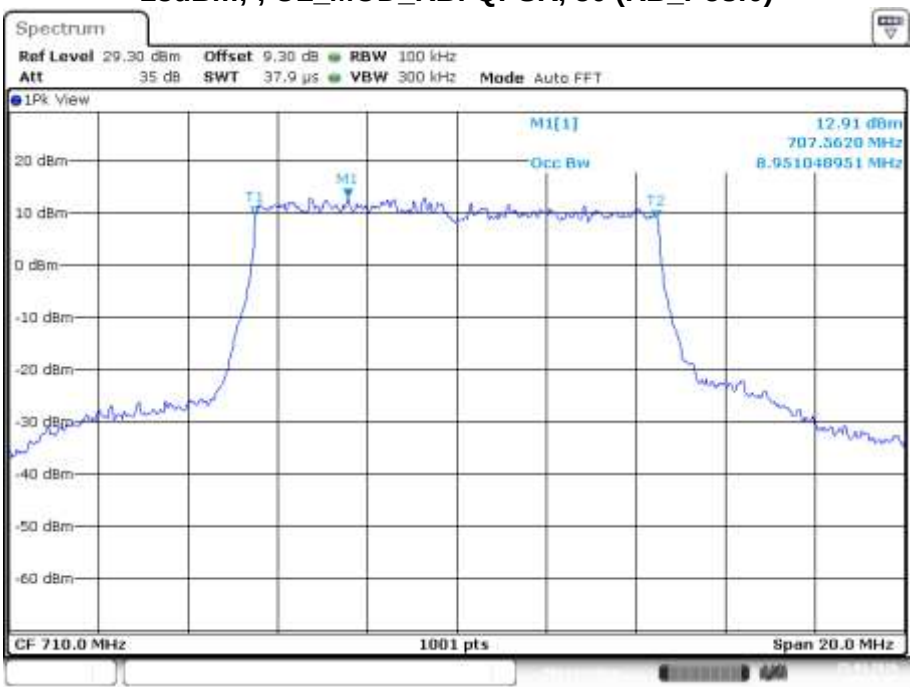
Date: 25.MAR.2016 10:24:48

LTE Band 17
Occupied Bandwidth: :@ULCH: 23230, BW: 5 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 25 (RB_Pos:0)



Date: 25.MAR.2016 10:27:47

LTE Band 17
Occupied Bandwidth: :@ULCH: 23230, BW: 10 MHz , ULPower: 23dBm; ; UL_MOD_RB: QPSK, 50 (RB_Pos:0)



Date: 25.MAR.2016 10:26:49

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(c)(2) 27.53(h) RSS-130 (4.6.1) RSS-132 (5.5) RSS-133 (6.5.1) RSS-139(6.5.1)	Compliant

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:	24.2 °C
Relative Humidity:	39.7 %
Atmospheric Pressure:	97.6 kPa

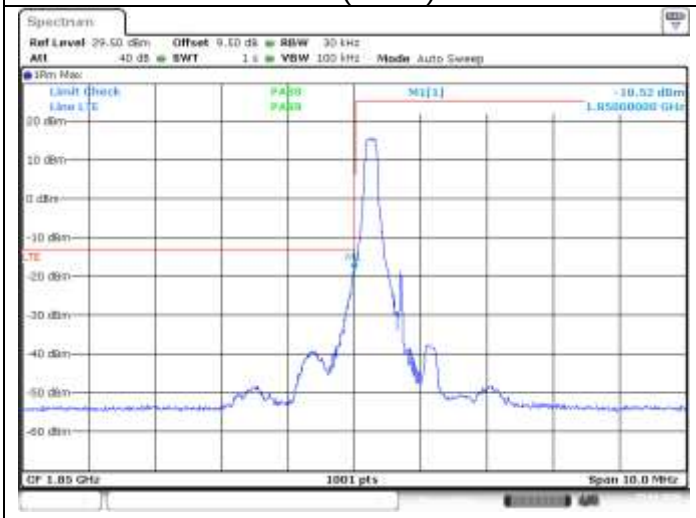
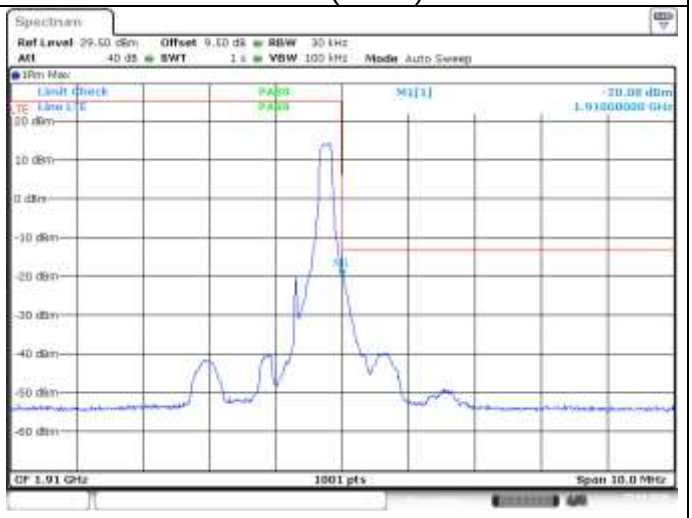
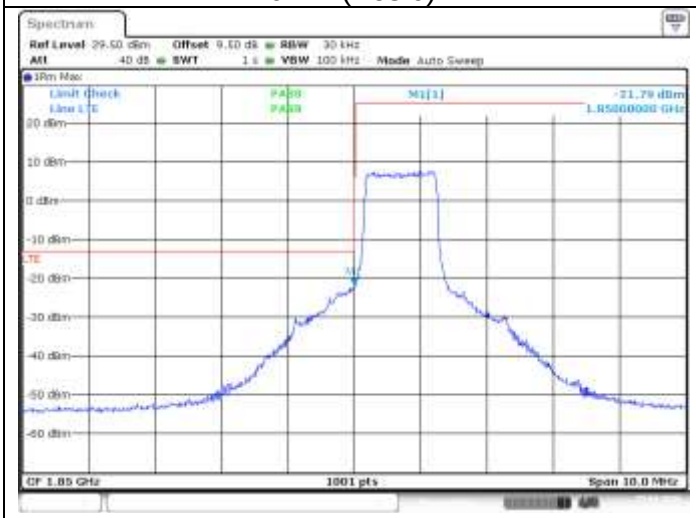
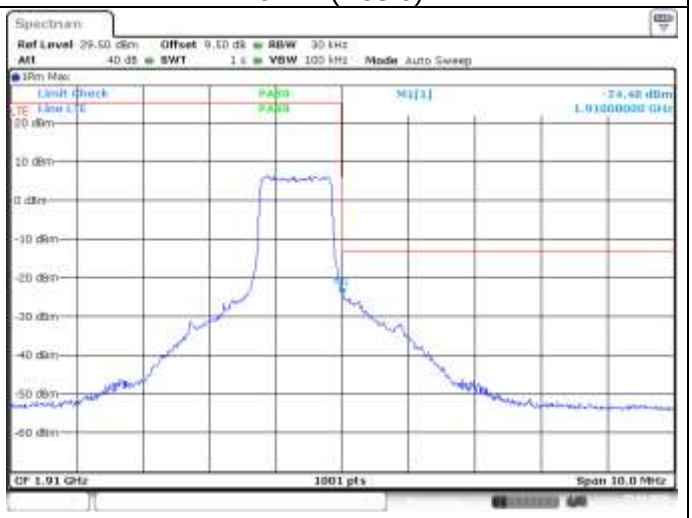
6.4 *Test Equipment*

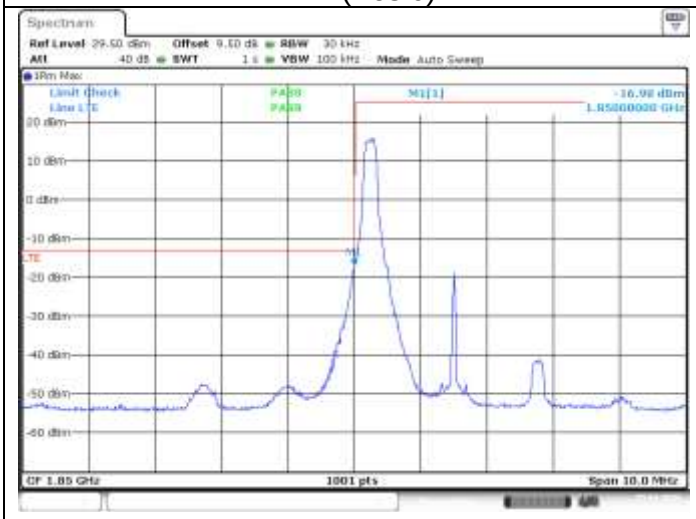
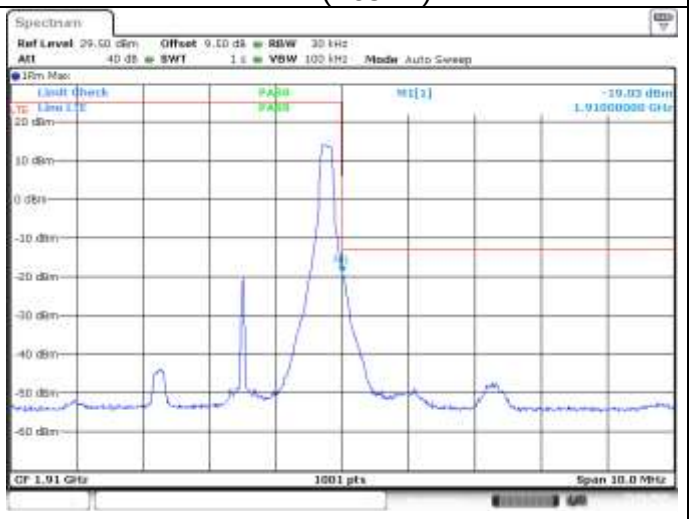
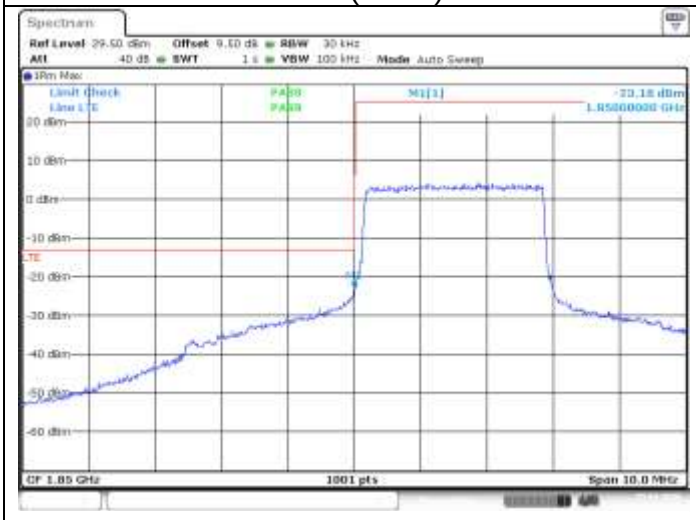
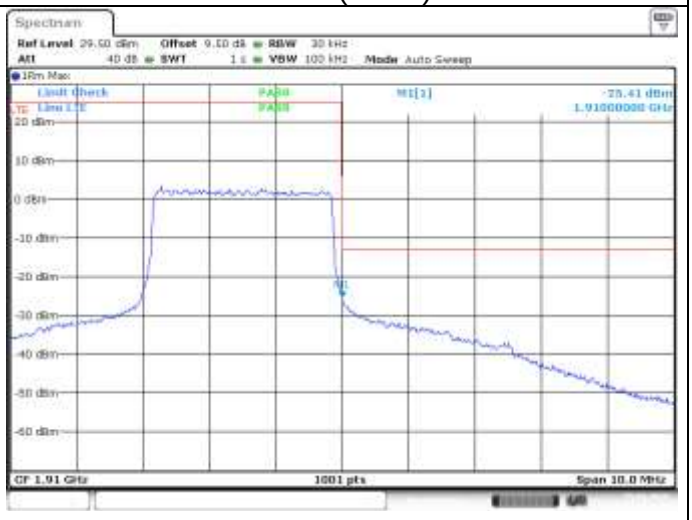
Test Date: 25 March 2016

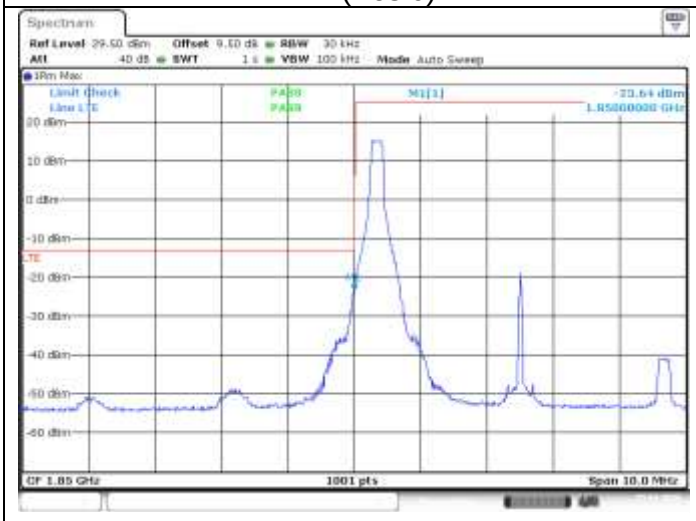
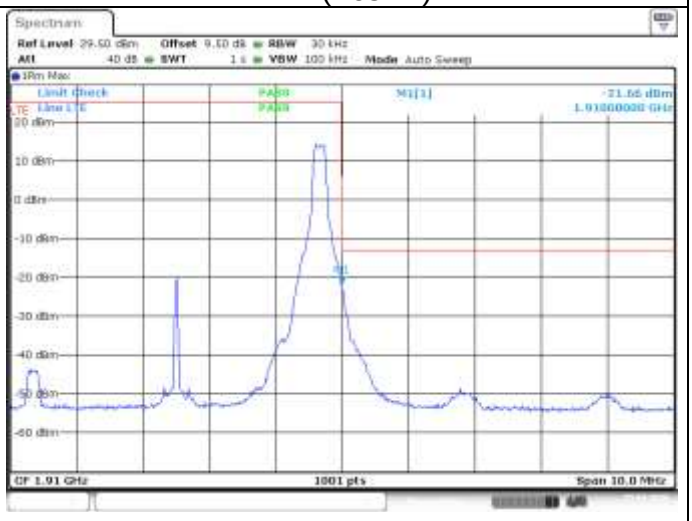
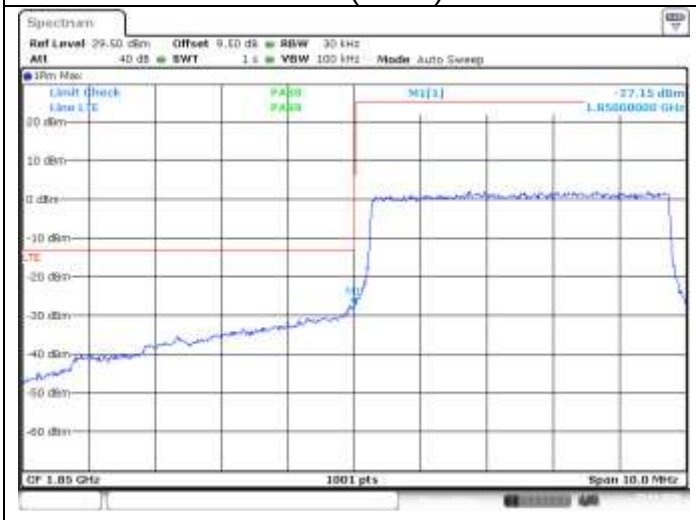
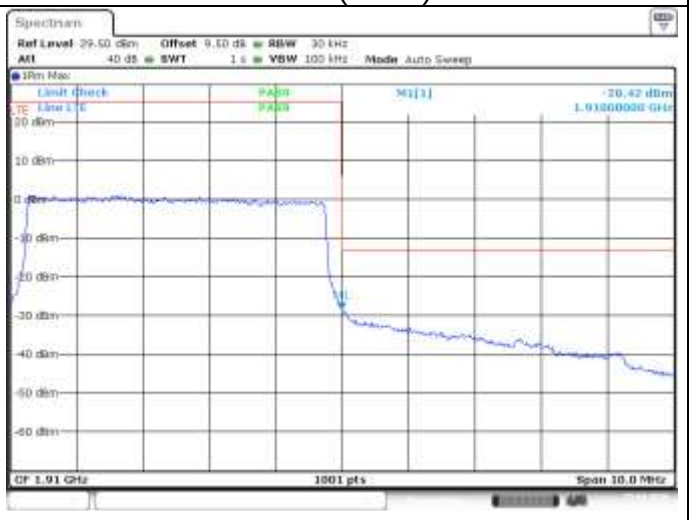
Equipment	Model	Manufacturer	Asset Number	Cal Due Date
SIGNAL ANALYZER	FSV30	ROHDE & SCHWARZ	B085749	8-Oct-2017
CMW500 WIDEBAND RADIO COMMUNICATIONS TESTER	CMW500	ROHDE & SCHWARZ	B094874	19-Jan-2019
POWER SPLITTER	ZFRSC-183-S+	MINI-CIRCUITS	B101743	5-Aug-2016
COAXIAL CABLE	SUCOFLEX 102	HUBER&SUHNER	B079824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

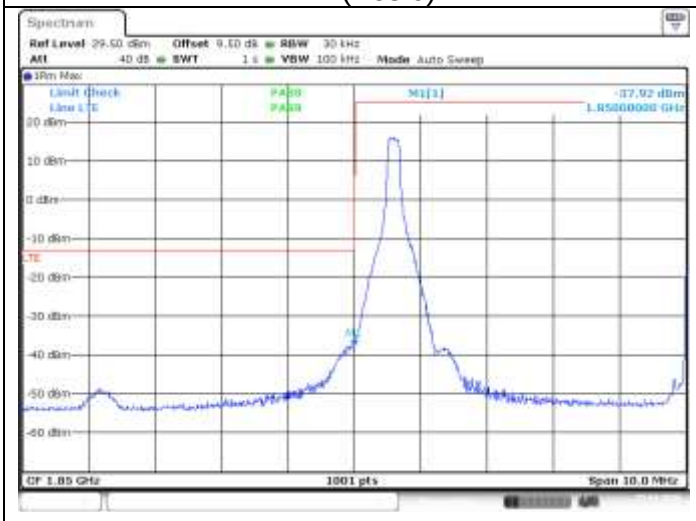
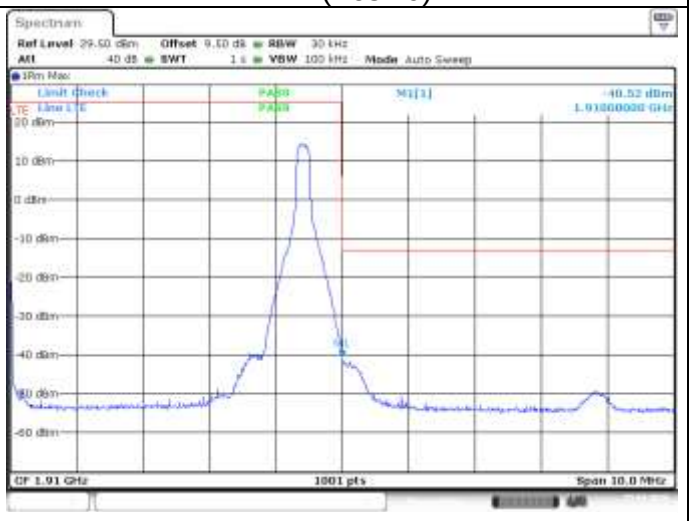
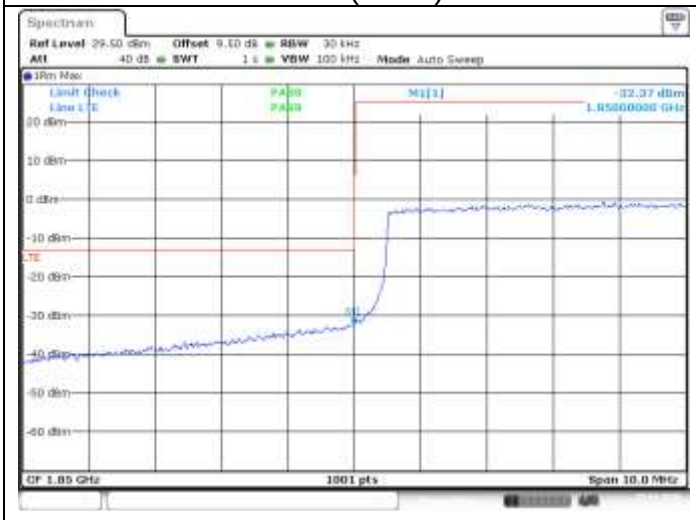
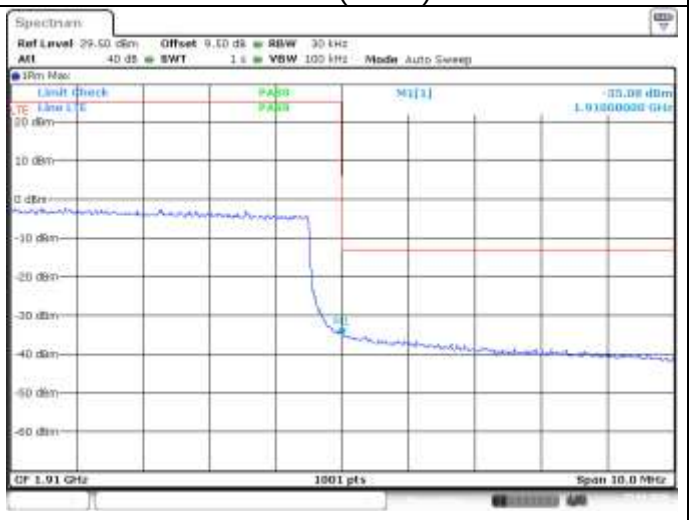
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle and the FSV .is on a 2 year calibration cycle

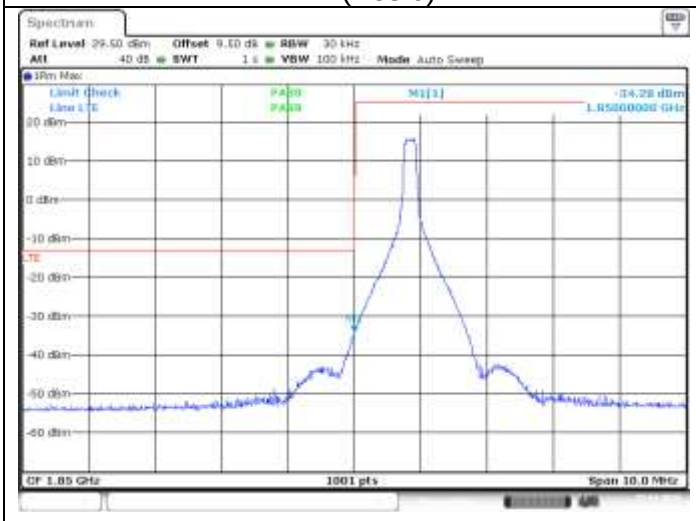
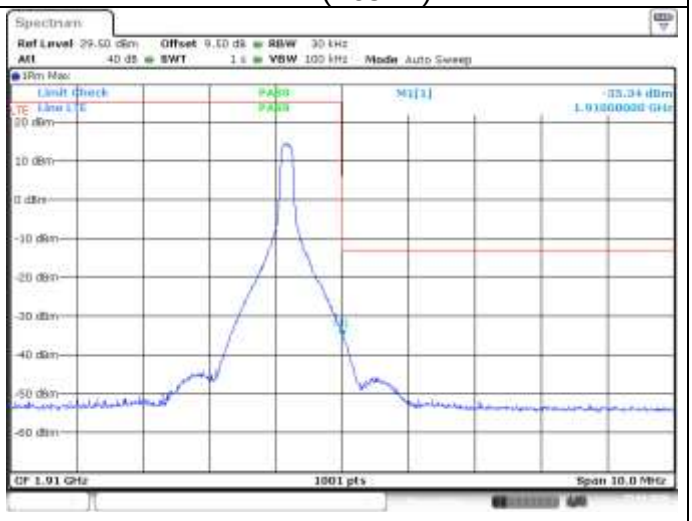
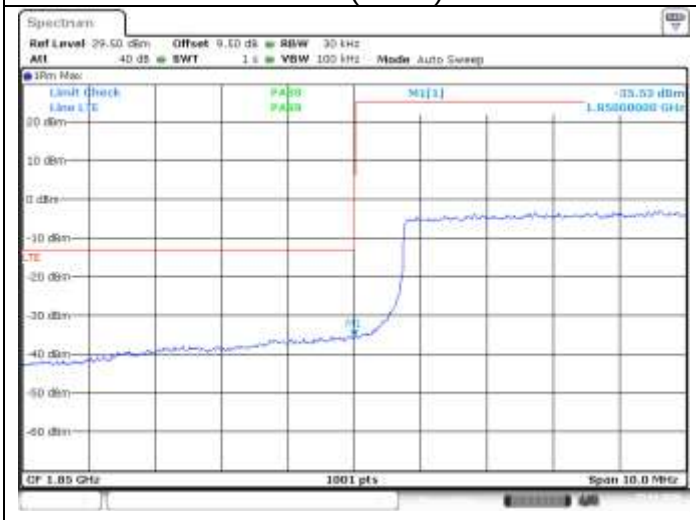
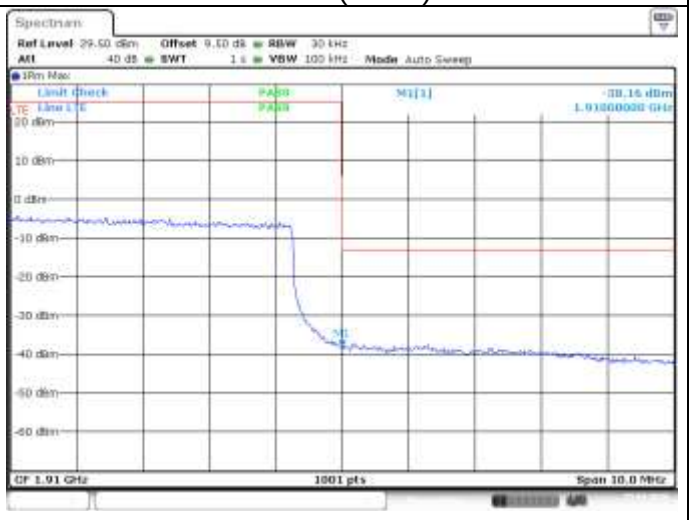
6.5 *Test Data - Band Edge*

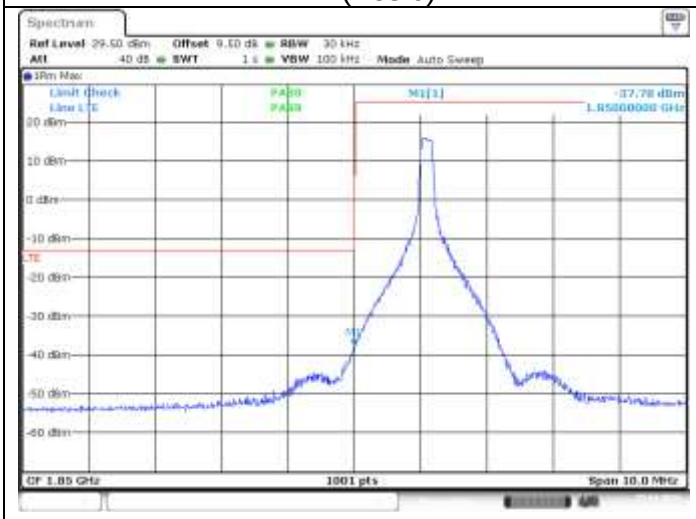
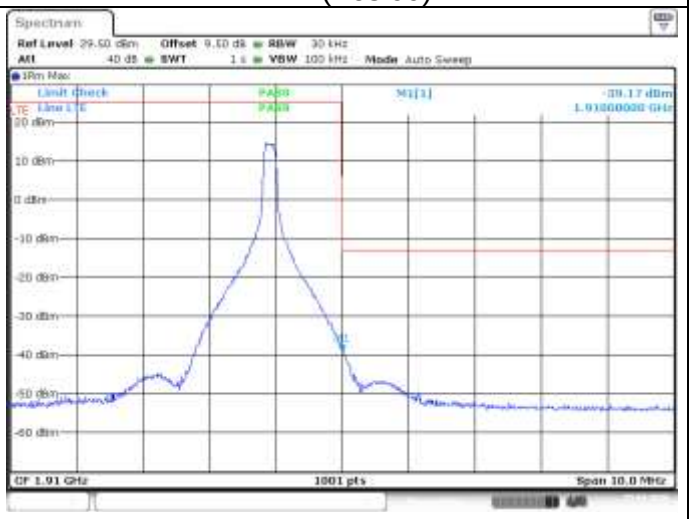
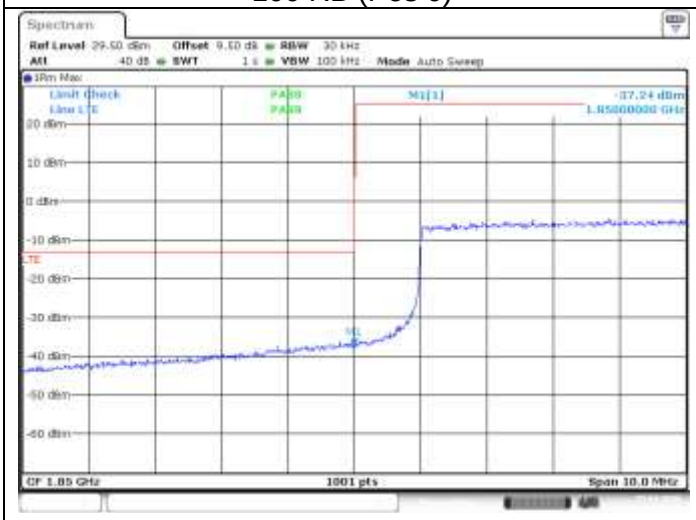
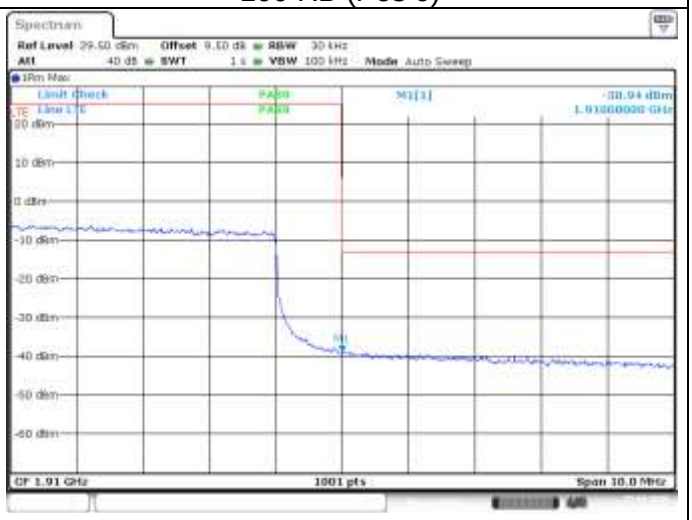
LTE Band 2, QPSK modulation, 1.4MHz	
Low Channel (18607)	High Channel (19193)
1 RB (Pos 0)	1 RB (Pos 5)
	
Date: 25.MAR.2016 10:57:55	Date: 25.MAR.2016 13:03:36
6 RB (Pos 0)	6 RB (Pos 0)
	
Date: 25.MAR.2016 10:59:02	Date: 25.MAR.2016 13:02:46

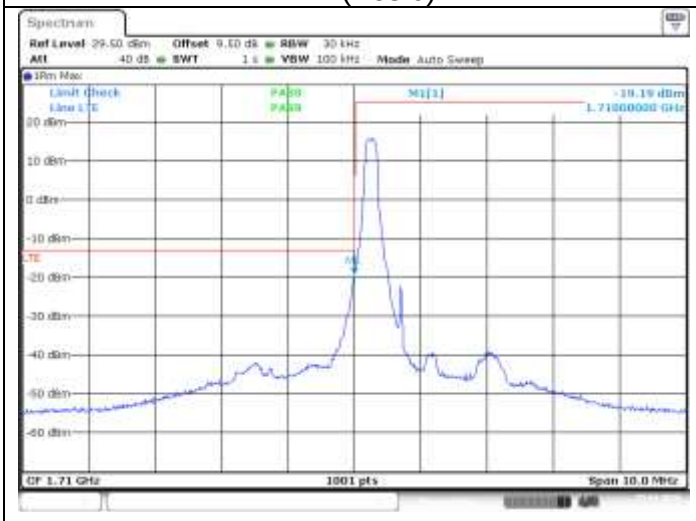
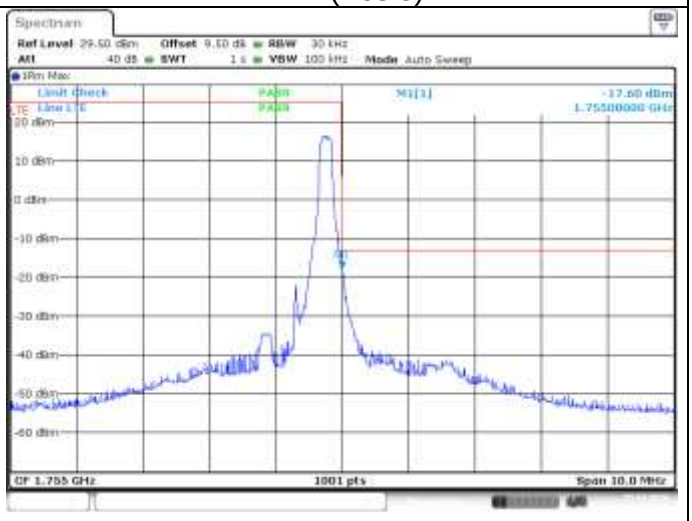
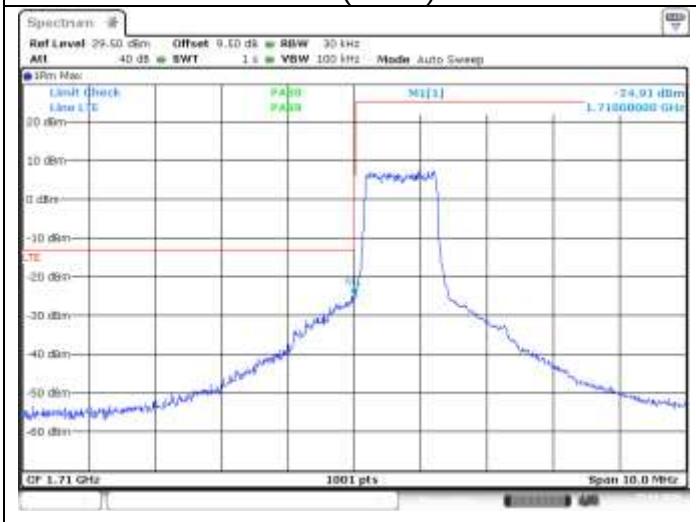
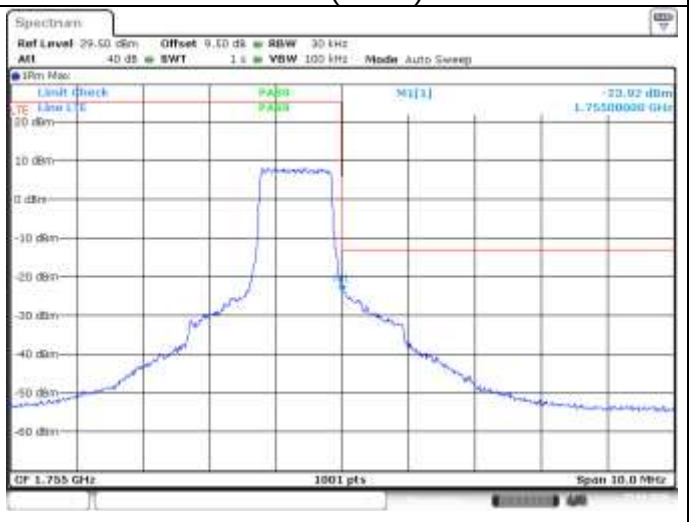
LTE Band 2, QPSK modulation, 3MHz	
Low Channel (18615)	High Channel (19185)
1 RB (Pos 0)	1 RB (Pos 14)
	
Date: 25.MAR.2016 11:01:55	Date: 25.MAR.2016 13:00:51
15 RB (Pos 0)	15 RB (Pos 0)
	
Date: 25.MAR.2016 11:00:53	Date: 25.MAR.2016 13:01:25

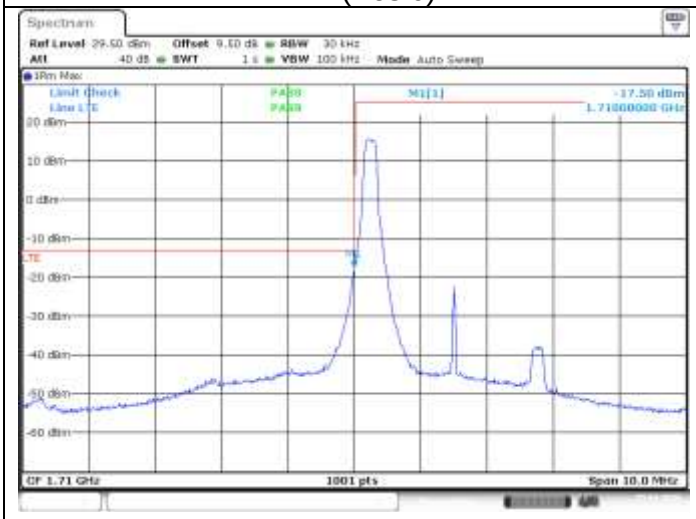
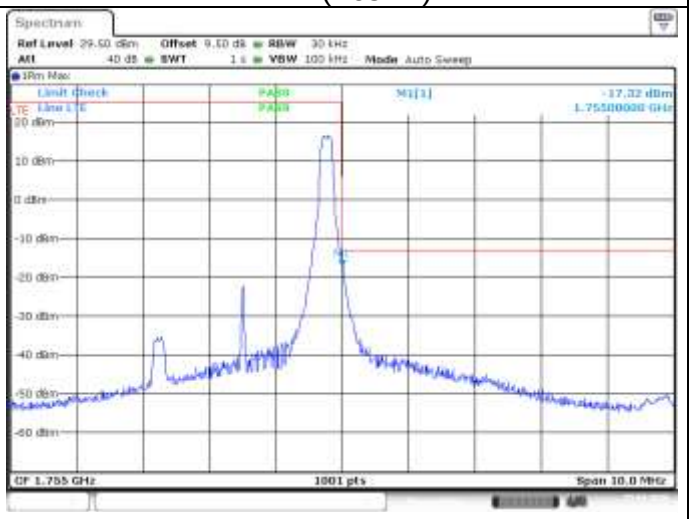
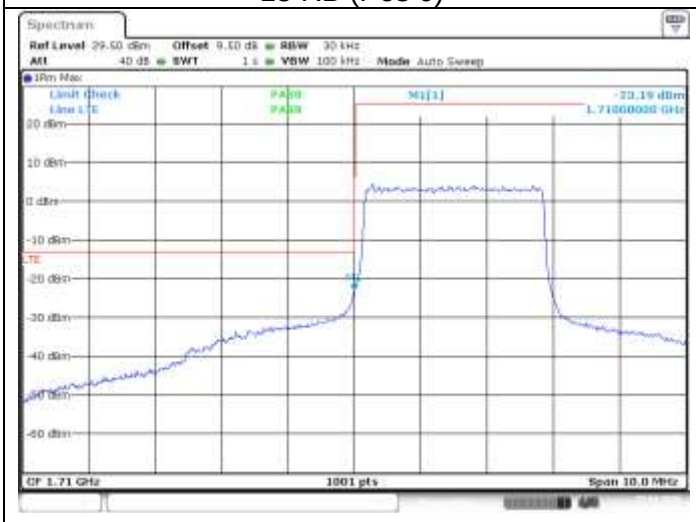
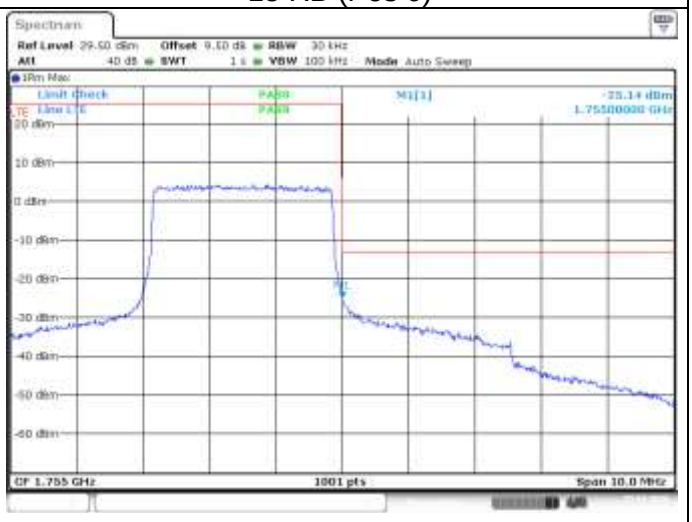
LTE Band 2, QPSK modulation, 5MHz	
Low Channel (18625)	High Channel (19175)
1 RB (Pos 0)	1 RB (Pos 24)
	
Date: 25.MAR.2016 11:07:13	Date: 25.MAR.2016 12:59:19
25 RB (Pos 0)	25 RB (Pos 0)
	
Date: 25.MAR.2016 11:06:28	Date: 25.MAR.2016 12:59:59

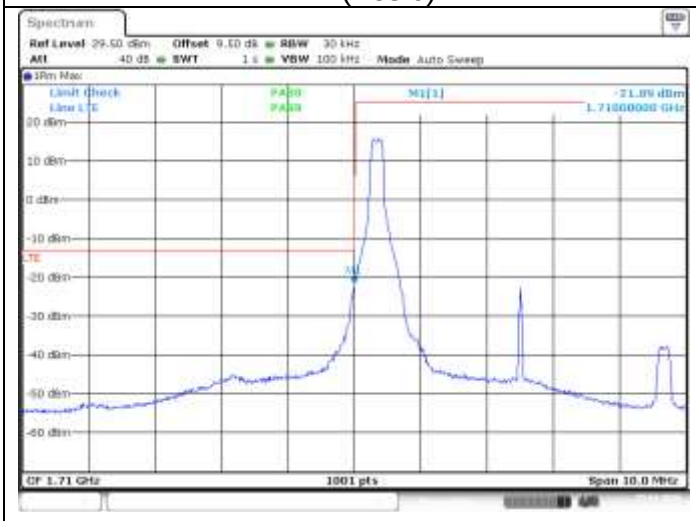
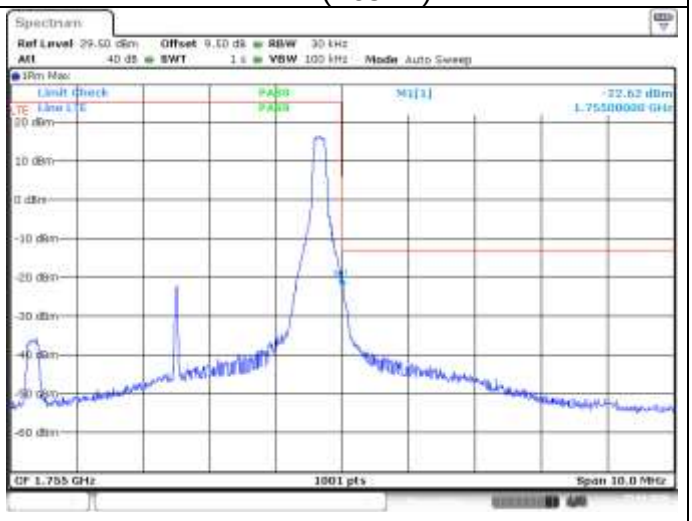
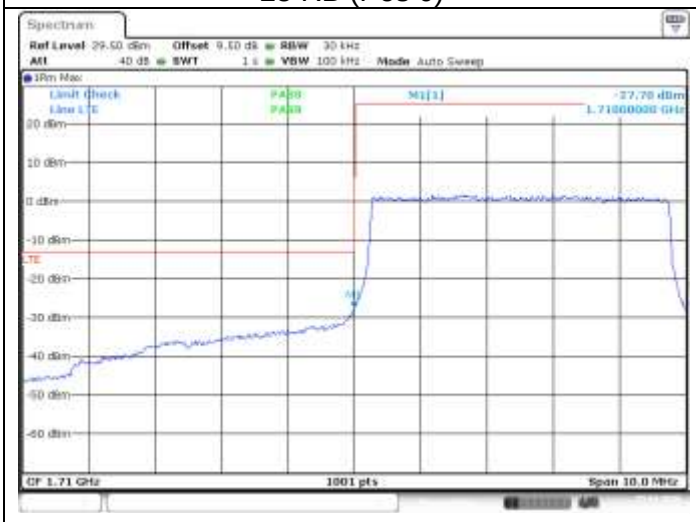
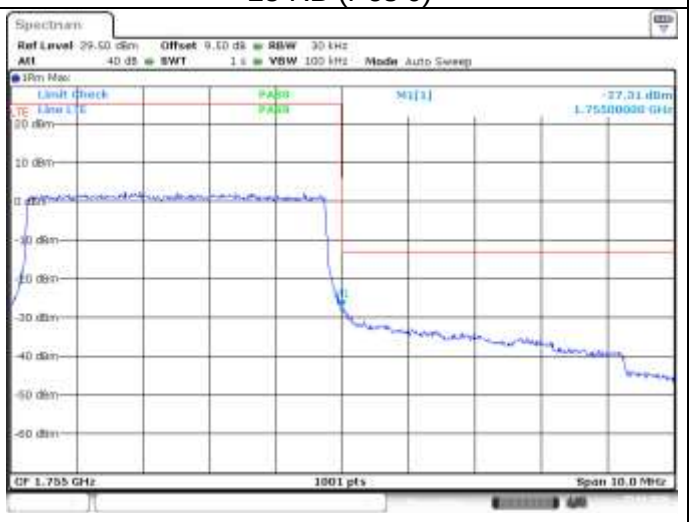
LTE Band 2, QPSK modulation, 10MHz	
Low Channel (18650)	High Channel (19150)
1 RB (Pos 0)	1 RB (Pos 49)
	
Date: 25.MAR.2016 11:11:12	Date: 25.MAR.2016 12:57:37
50 RB (Pos 0)	50 RB (Pos 0)
	
Date: 25.MAR.2016 11:09:47	Date: 25.MAR.2016 12:56:47

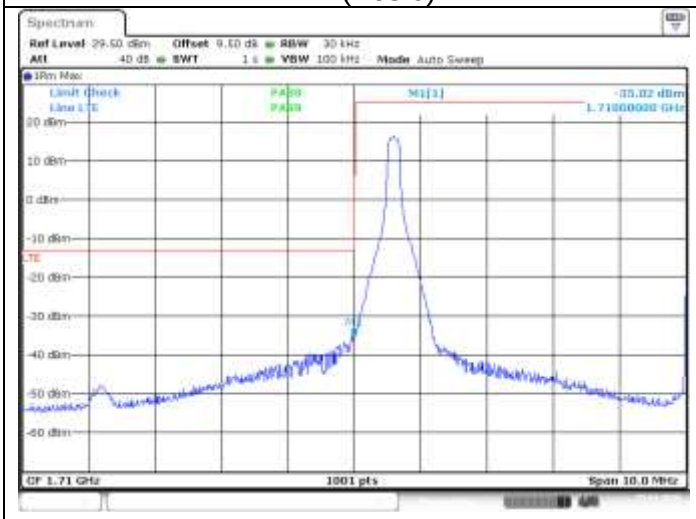
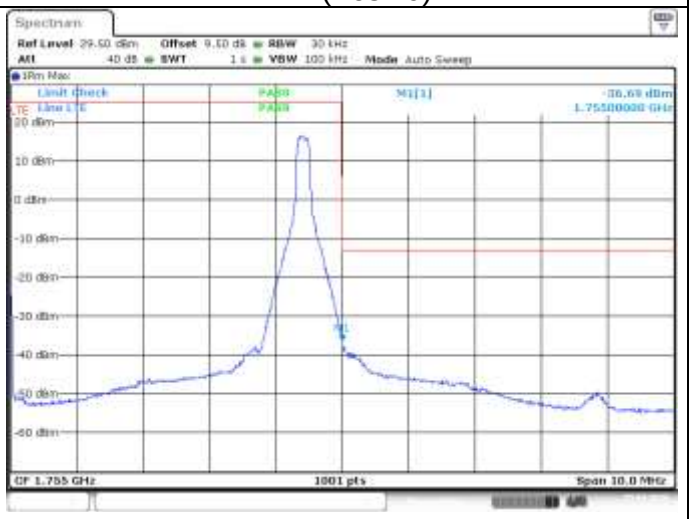
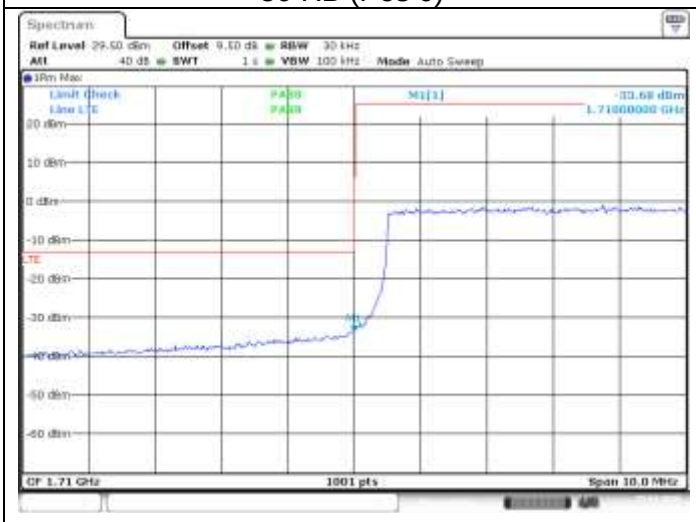
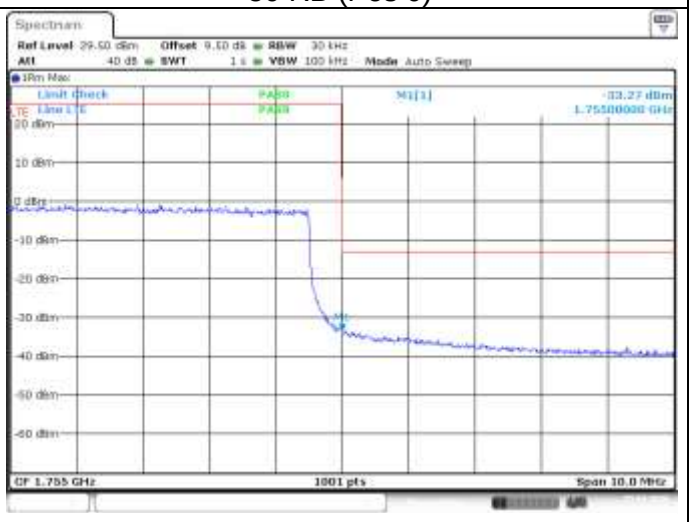
LTE Band 2, QPSK modulation, 15MHz	
Low Channel (18675)	High Channel (19125)
1 RB (Pos 0)	1 RB (Pos 74)
	
Date: 25.MAR.2016 11:15:38	Date: 25.MAR.2016 12:54:48
75 RB (Pos 0)	75 RB (Pos 0)
	
Date: 25.MAR.2016 11:14:53	Date: 25.MAR.2016 12:55:38

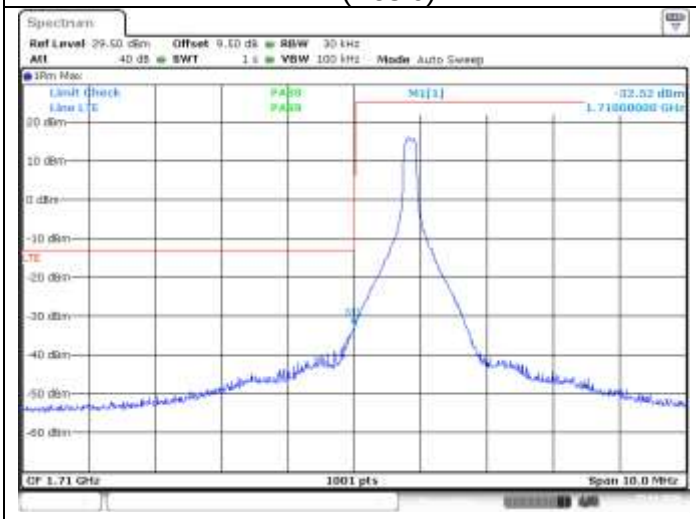
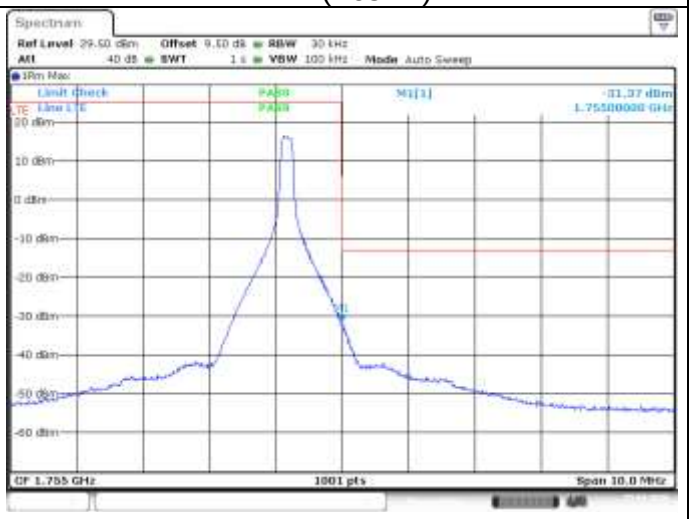
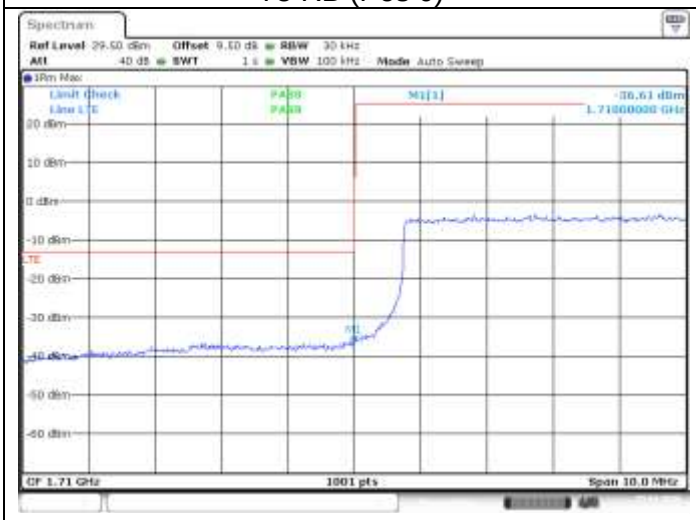
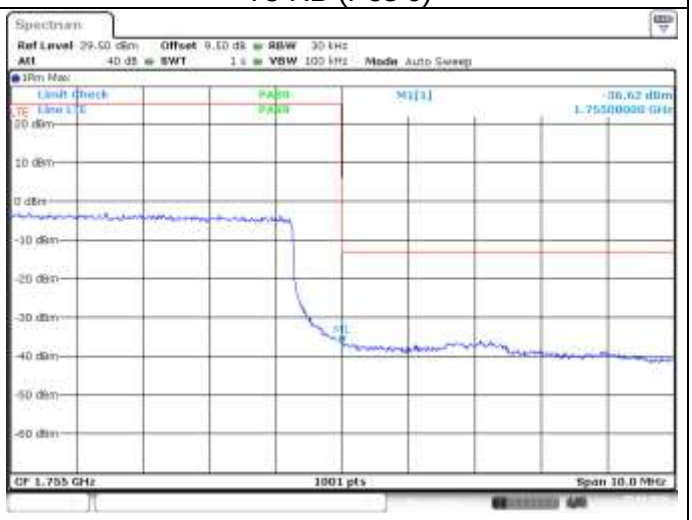
LTE Band 2, QPSK modulation, 20MHz	
Low Channel (18700)	High Channel (19100)
1 RB (Pos 0)	1 RB (Pos 99)
	
100 RB (Pos 0)	100 RB (Pos 0)
	

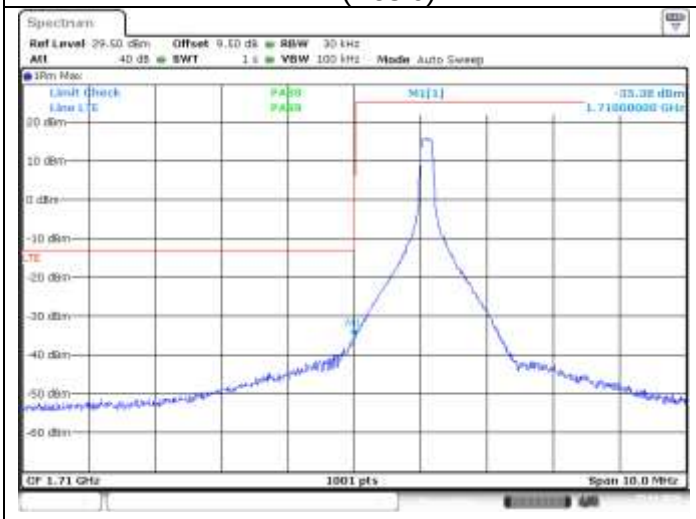
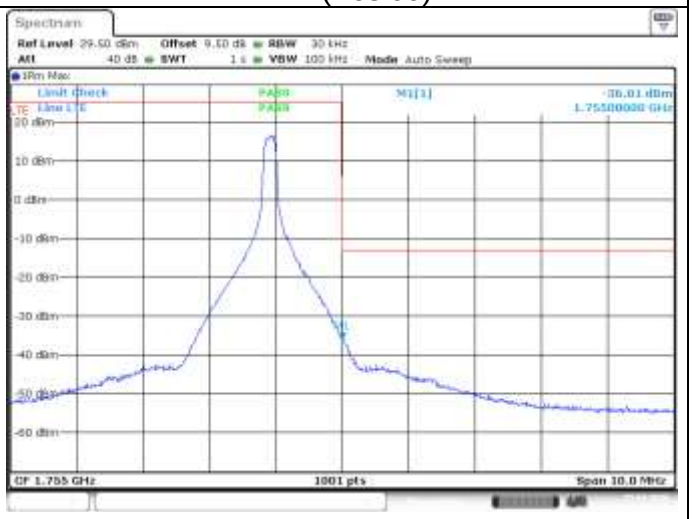
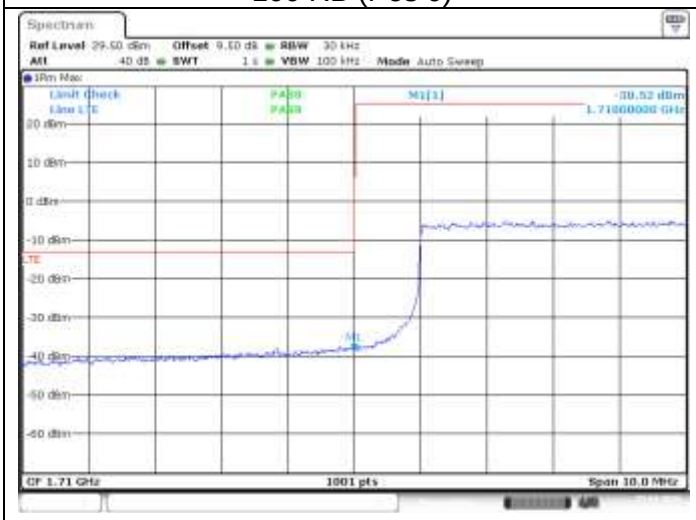
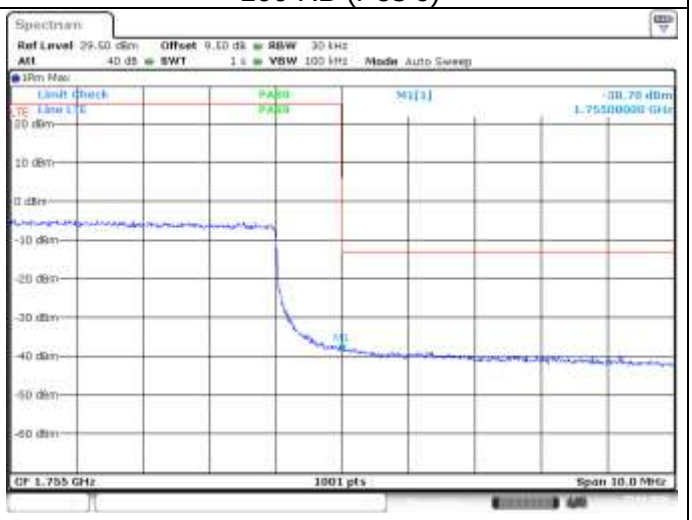
LTE Band 4, QPSK modulation, 1.4MHz	
Low Channel (19957)	High Channel (20393)
1 RB (Pos 0)	1 RB (Pos 5)
 Date: 25.MAR.2016 13:15:24	 Date: 25.MAR.2016 13:45:36
6 RB (Pos 0)	6 RB (Pos 0)
 Date: 25.MAR.2016 13:08:41	 Date: 25.MAR.2016 13:46:28

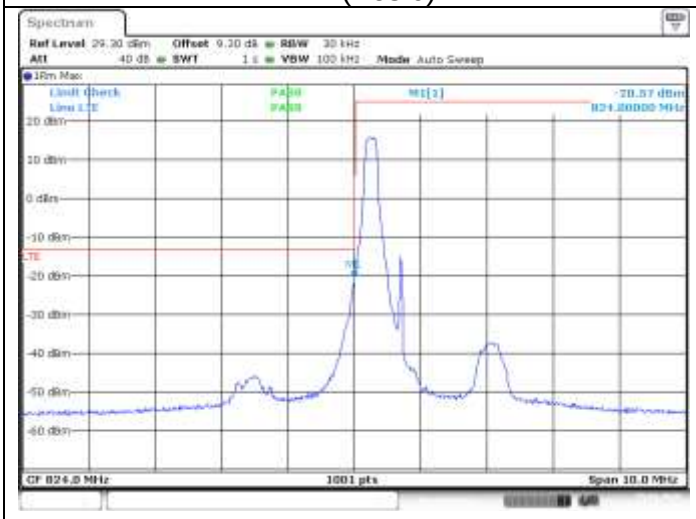
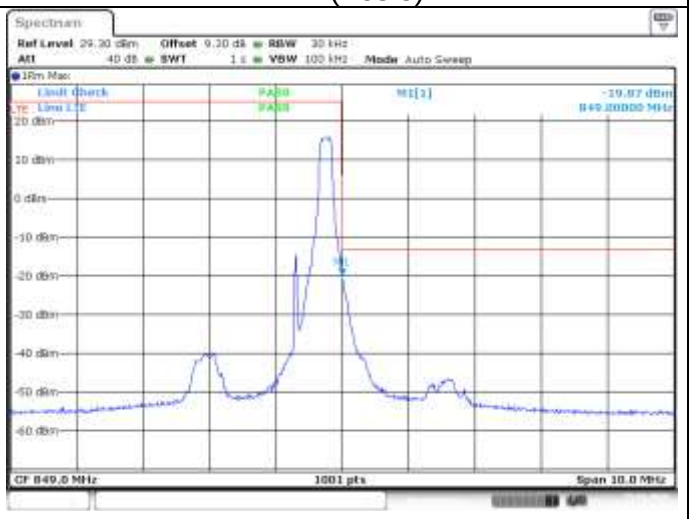
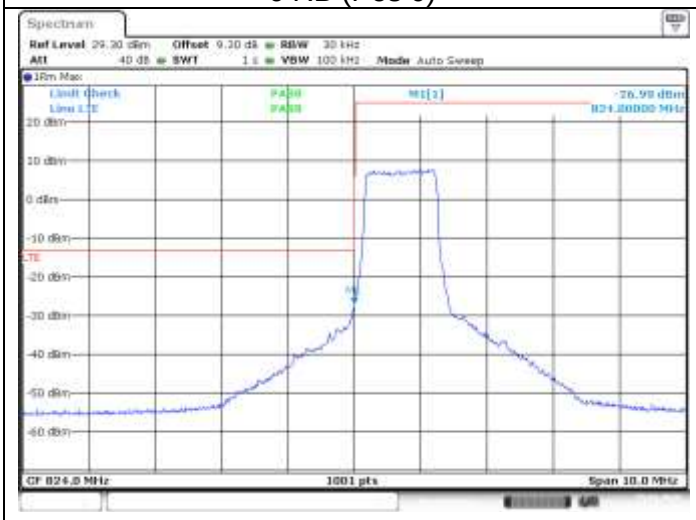
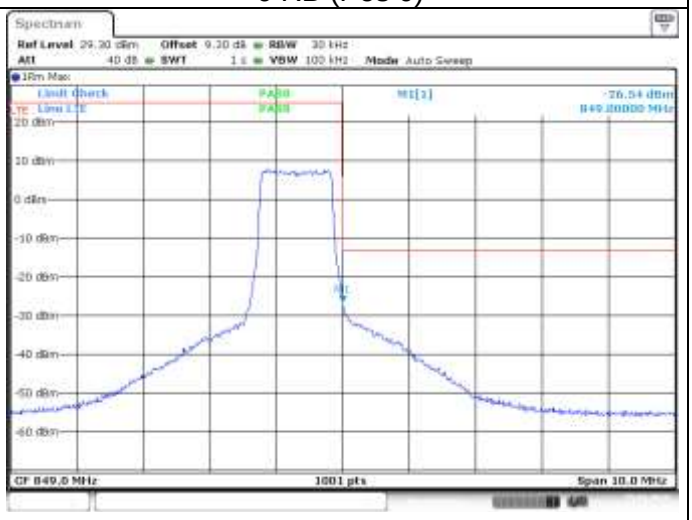
LTE Band 4, QPSK modulation, 3MHz	
Low Channel (19965)	High Channel (20385)
1 RB (Pos 0)	1 RB (Pos 14)
	
15 RB (Pos 0)	15 RB (Pos 0)
	

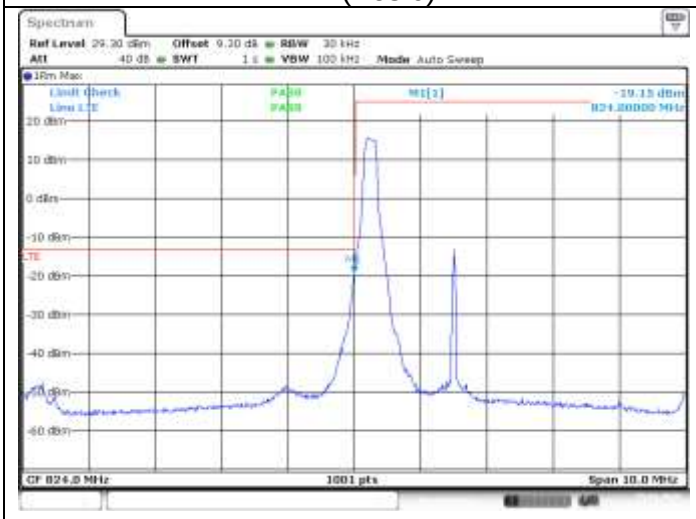
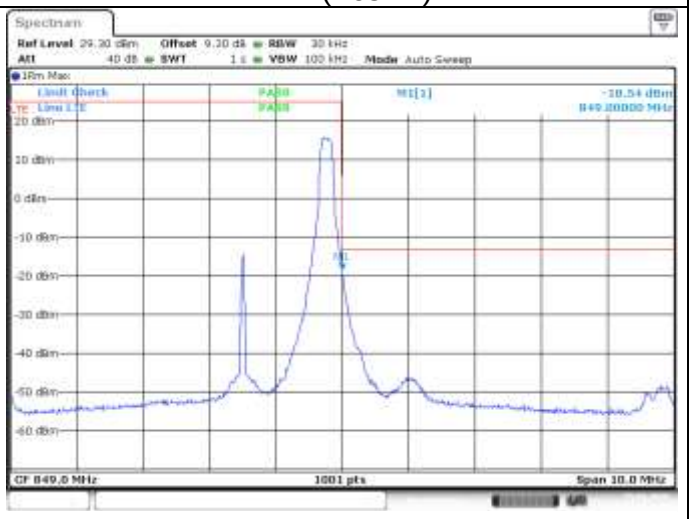
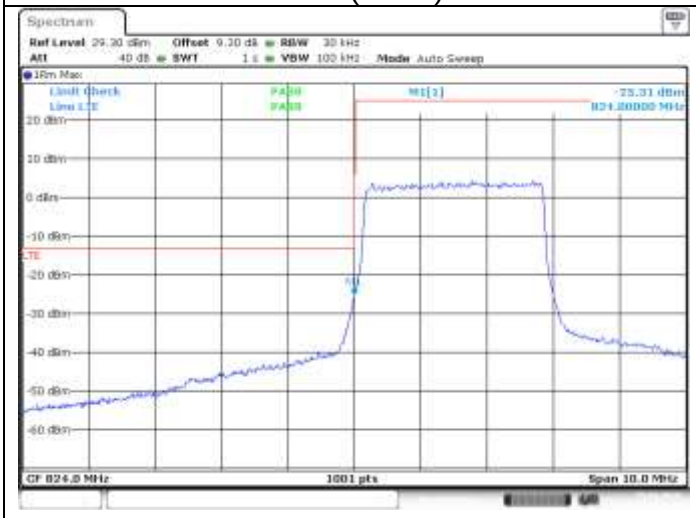
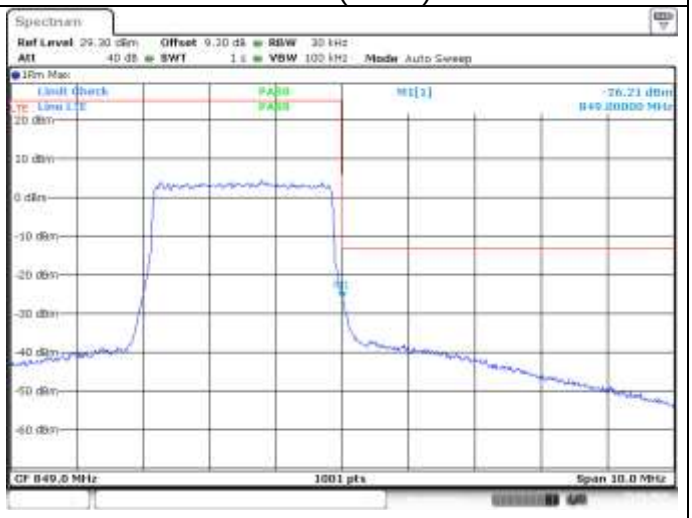
LTE Band 4, QPSK modulation, 5MHz	
Low Channel (19975)	High Channel (20375)
1 RB (Pos 0)	1 RB (Pos 24)
	
25 RB (Pos 0)	25 RB (Pos 0)
	

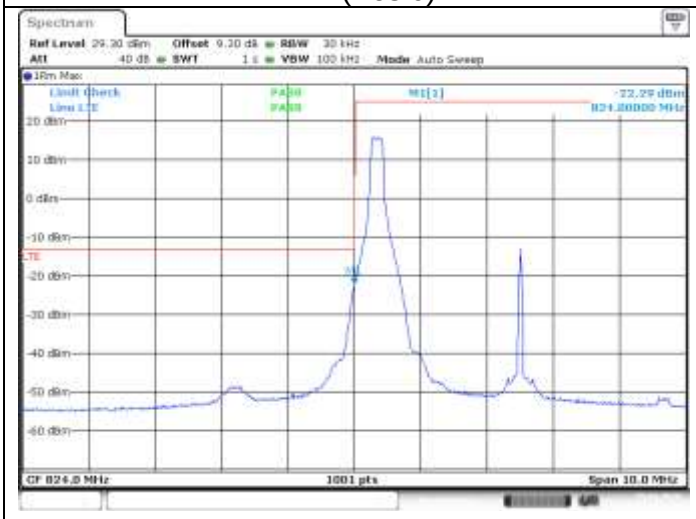
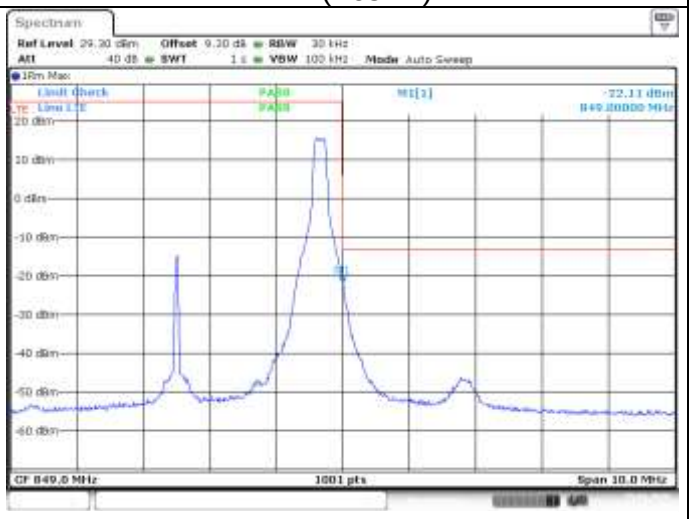
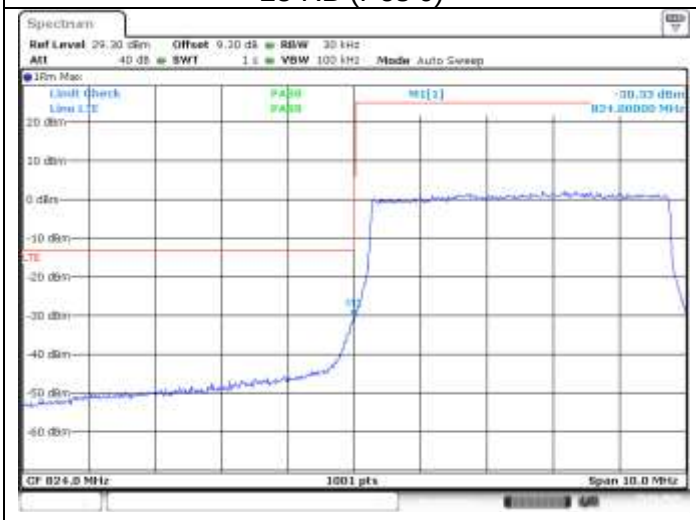
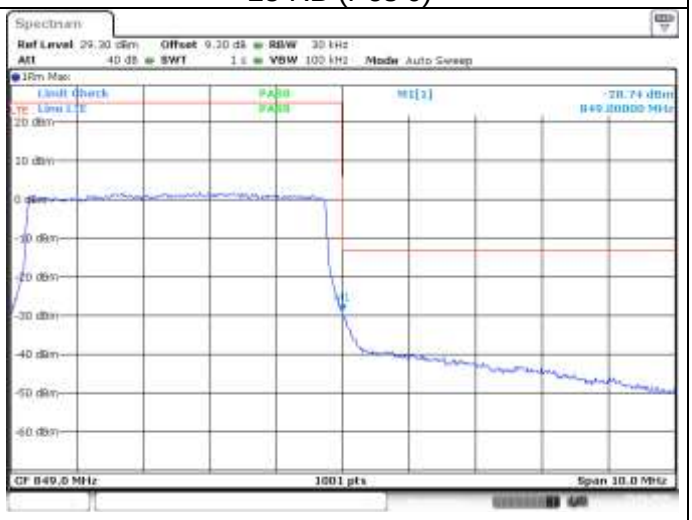
LTE Band 4, QPSK modulation, 10MHz	
Low Channel (20000)	High Channel (20350)
1 RB (Pos 0)	1 RB (Pos 49)
 Date: 25.MAR.2016 13:19:25	 Date: 25.MAR.2016 13:40:26
50 RB (Pos 0)	50 RB (Pos 0)
 Date: 25.MAR.2016 13:21:02	 Date: 25.MAR.2016 13:39:06

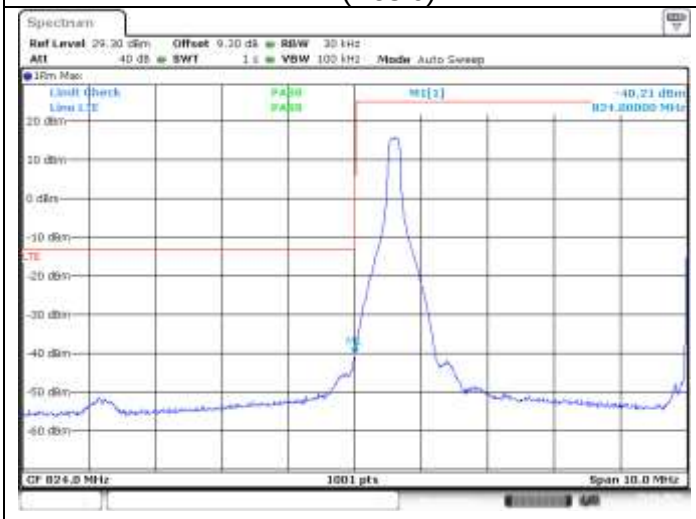
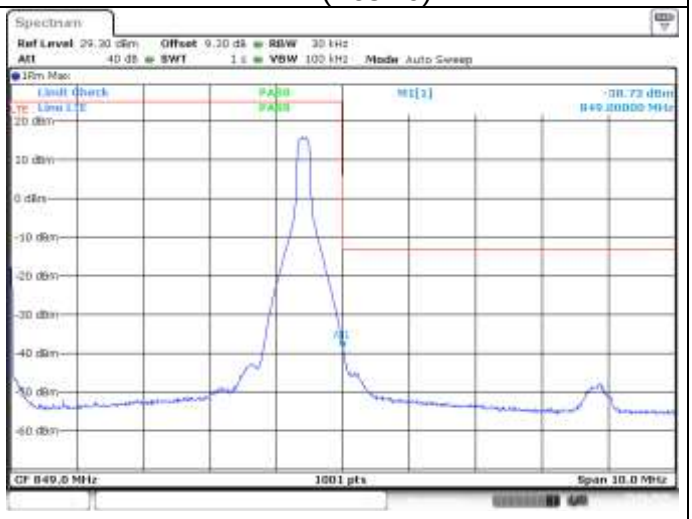
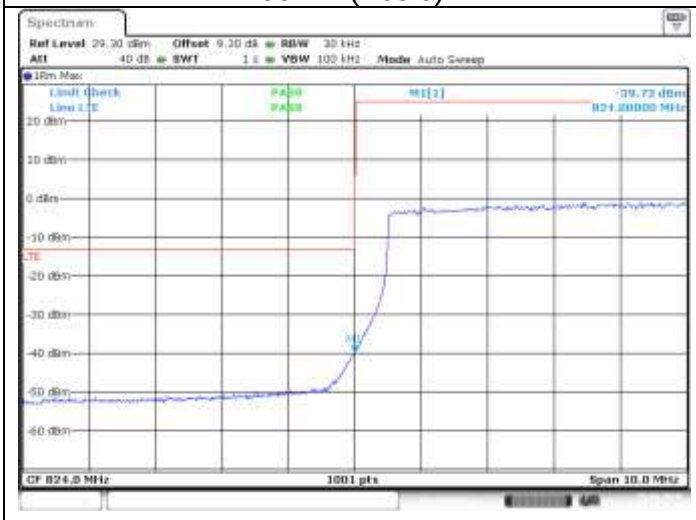
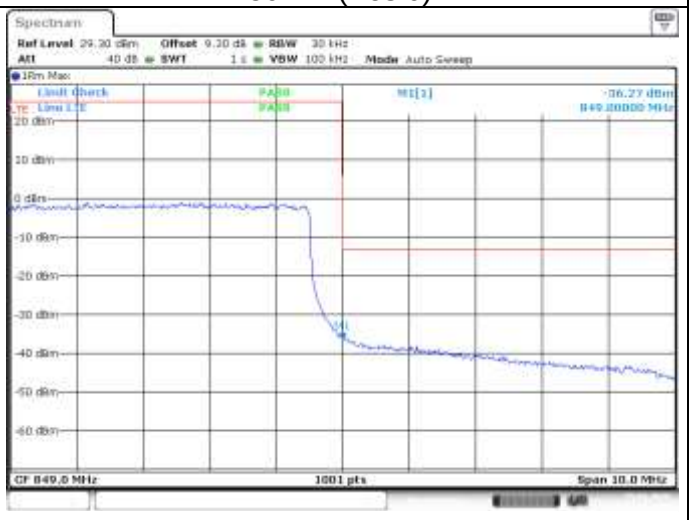
LTE Band 4, QPSK modulation, 15MHz	
Low Channel (20025)	High Channel (20325)
1 RB (Pos 0)	1 RB (Pos 74)
	
75 RB (Pos 0)	75 RB (Pos 0)
	

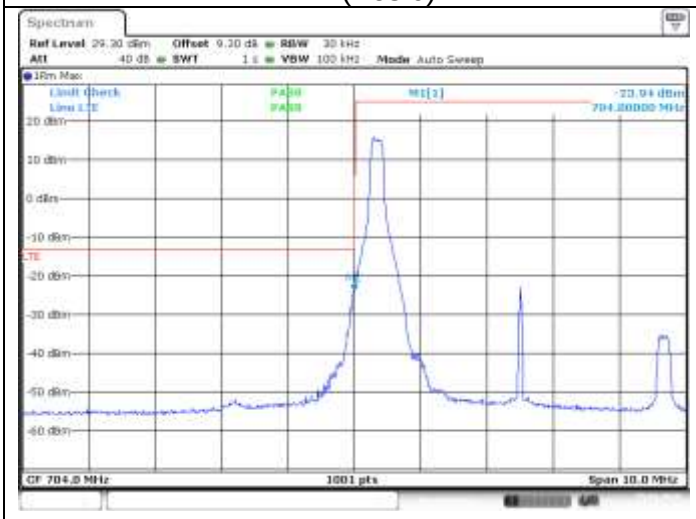
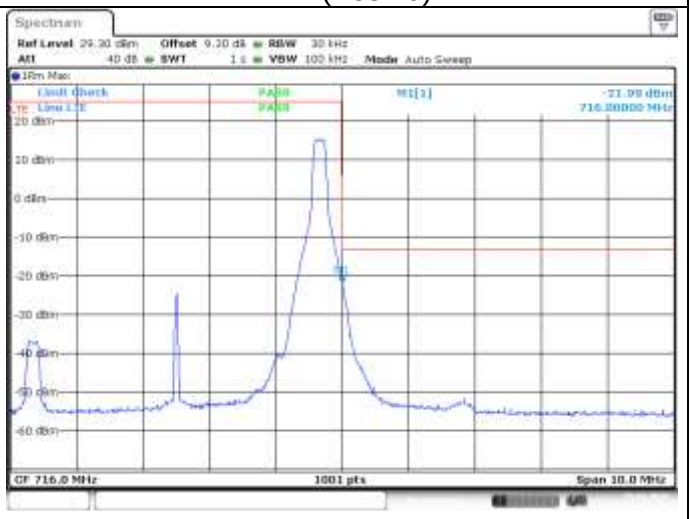
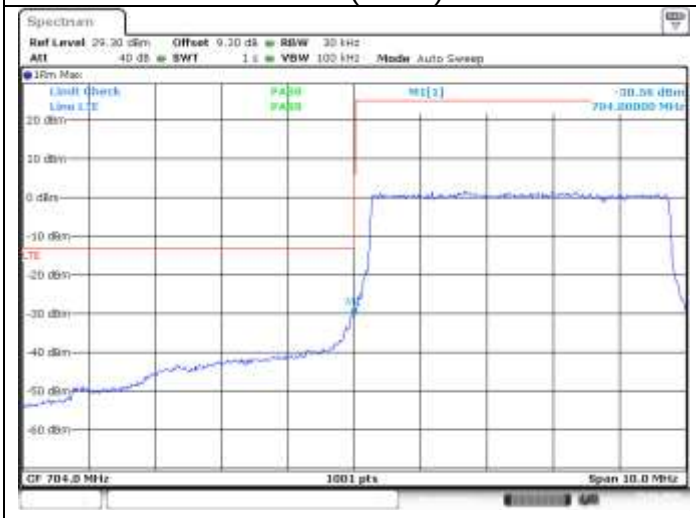
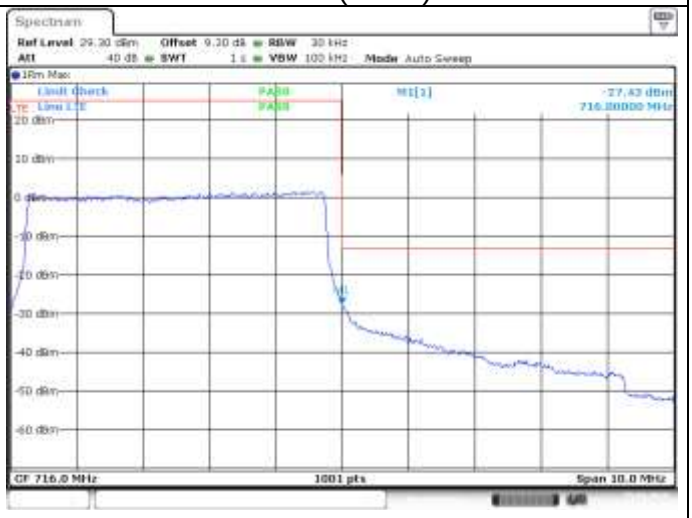
LTE Band 4, QPSK modulation, 20MHz	
Low Channel (20050)	High Channel (20300)
1 RB (Pos 0)	1 RB (Pos 99)
	
100 RB (Pos 0)	100 RB (Pos 0)
	

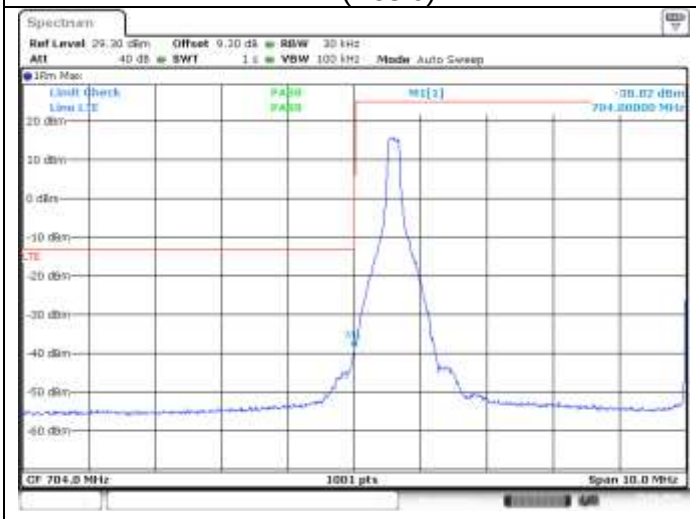
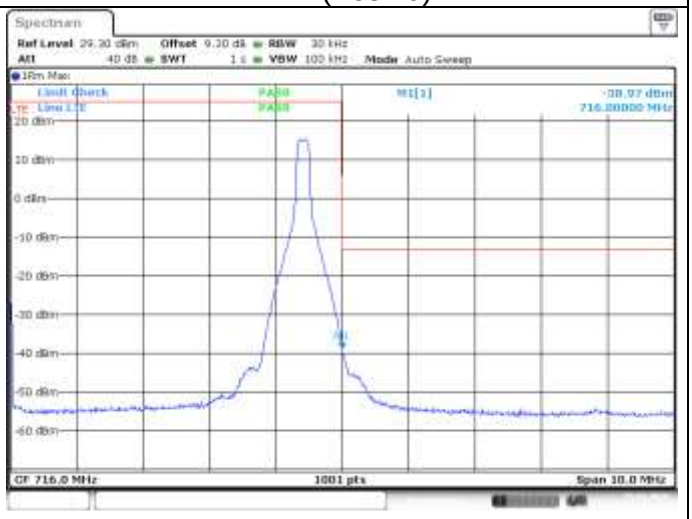
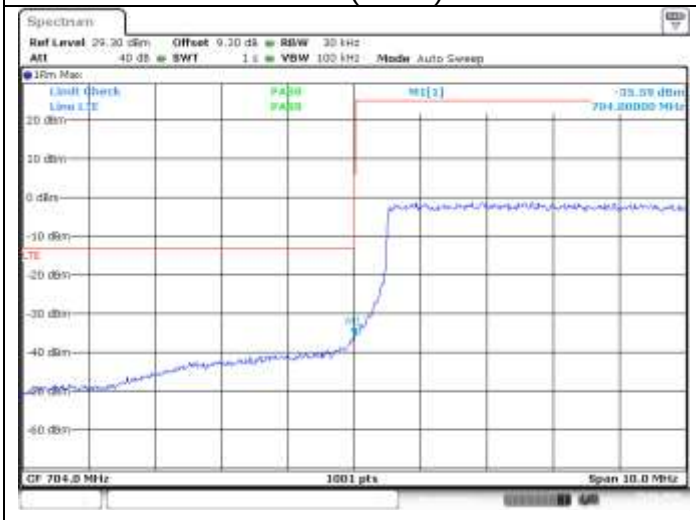
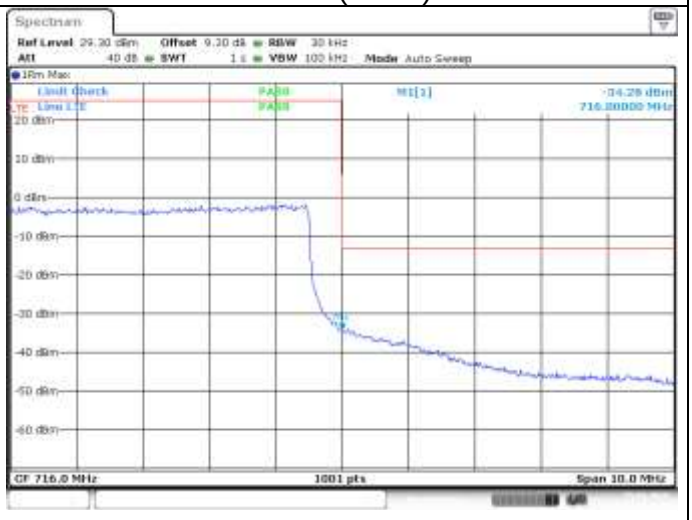
LTE Band 5, QPSK modulation, 1.4MHz	
Low Channel (20407)	High Channel (20643)
1 RB (Pos 0)	1 RB (Pos 5)
 Date: 25.MAR.2016 14:21:23	 Date: 25.MAR.2016 13:49:57
6 RB (Pos 0)	6 RB (Pos 0)
 Date: 25.MAR.2016 14:22:16	 Date: 25.MAR.2016 13:49:17

LTE Band 5, QPSK modulation, 3MHz	
Low Channel (20415)	High Channel (20635)
1 RB (Pos 0)	1 RB (Pos 14)
	
Date: 25.MAR.2016 14:19:59	Date: 25.MAR.2016 13:51:32
15 RB (Pos 0)	15 RB (Pos 0)
	
Date: 25.MAR.2016 14:20:31	Date: 25.MAR.2016 13:50:53

LTE Band 5, QPSK modulation, 5MHz	
Low Channel (20425)	High Channel (20625)
1 RB (Pos 0)	1 RB (Pos 24)
 Date: 25.MAR.2016 14:17:18	 Date: 25.MAR.2016 13:52:53
25 RB (Pos 0)	25 RB (Pos 0)
 Date: 25.MAR.2016 14:18:59	 Date: 25.MAR.2016 13:52:19

LTE Band 5, QPSK modulation, 10MHz	
Low Channel (20450)	High Channel (20600)
1 RB (Pos 0)	1 RB (Pos 49)
	
Date: 25.MAR.2016 13:57:57	Date: 25.MAR.2016 13:53:59
50 RB (Pos 0)	50 RB (Pos 0)
	
Date: 25.MAR.2016 13:57:17	Date: 25.MAR.2016 13:54:50

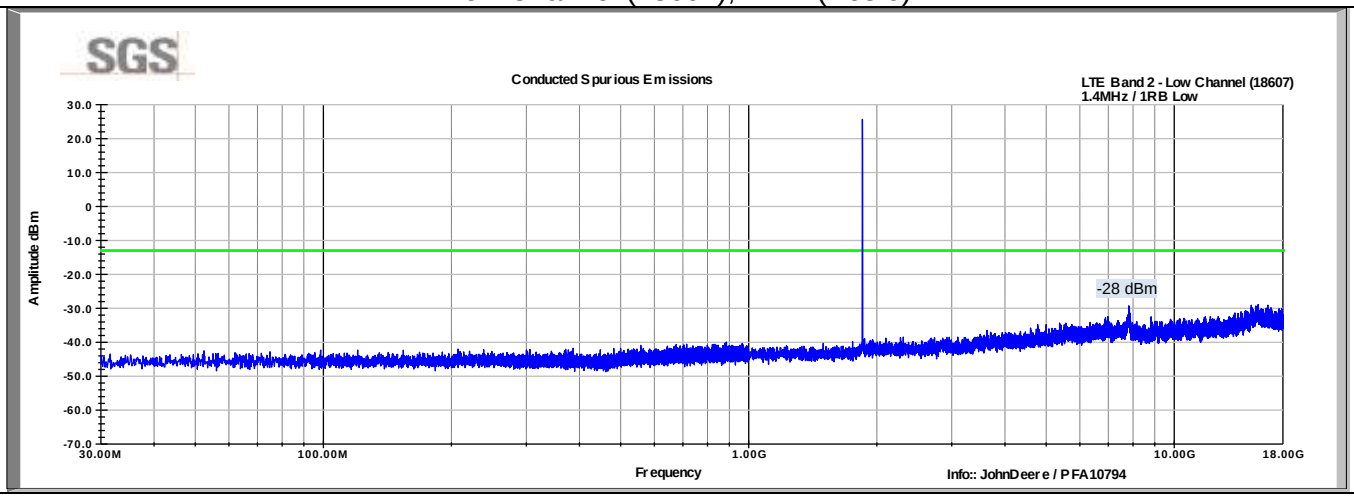
LTE Band17, QPSK modulation, 5MHz	
Low Channel (23755)	High Channel (23825)
1 RB (Pos 0)	1 RB (Pos 49)
	
Date: 25.MAR.2016 14:30:18	Date: 25.MAR.2016 14:35:56
25 RB (Pos 0)	25 RB (Pos 0)
	
Date: 25.MAR.2016 14:29:06	Date: 25.MAR.2016 14:36:46

LTE Band 17, QPSK modulation, 10MHz	
Low Channel (23780)	High Channel (23800)
1 RB (Pos 0)	1 RB (Pos 49)
	
Date: 25.MAR.2016 14:31:45	Date: 25.MAR.2016 14:34:54
50 RB (Pos 0)	50 RB (Pos 0)
	
Date: 25.MAR.2016 14:32:50	Date: 25.MAR.2016 14:34:19

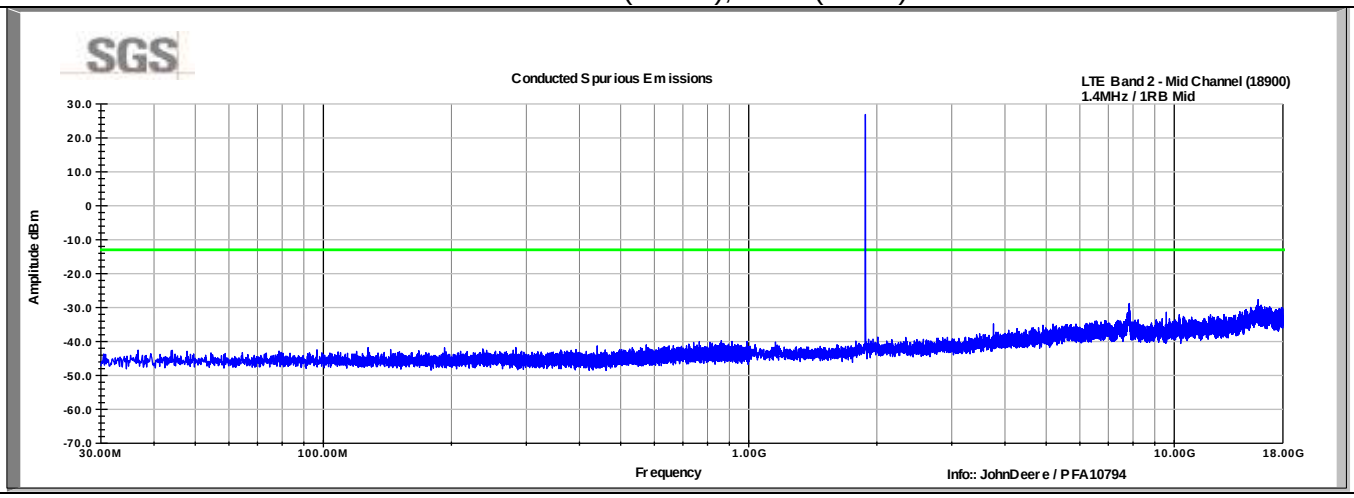
6.6 *Test Data - Conducted Spurious Emissions*

LTE Band 2, QPSK modulation, 1.4MHz

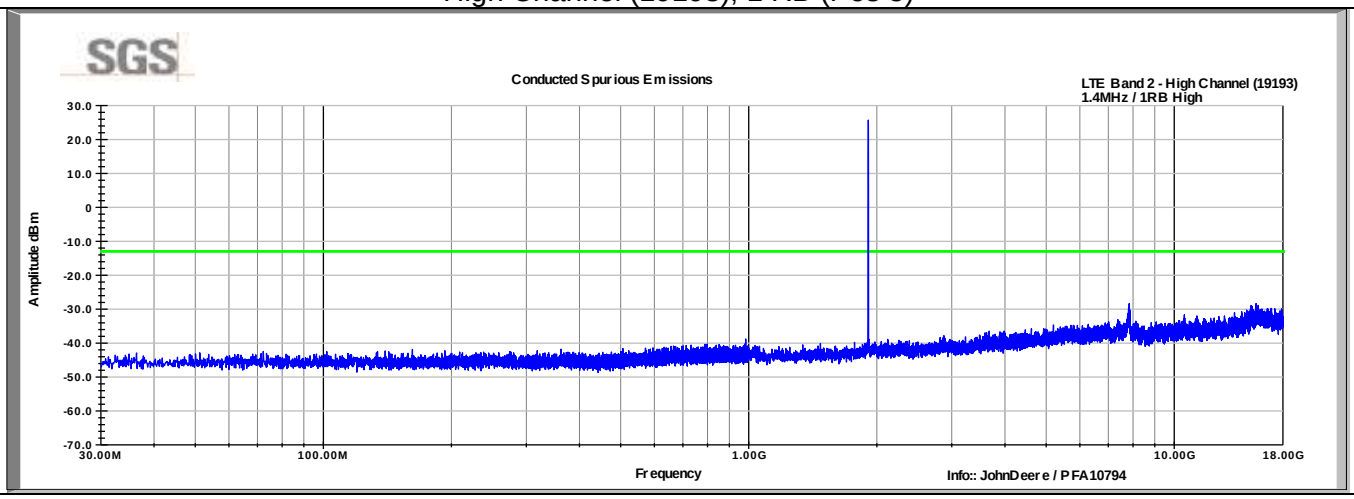
Low Channel (18607), 1 RB (Pos 0)



Mid Channel (18900), 1 RB (Pos 3)

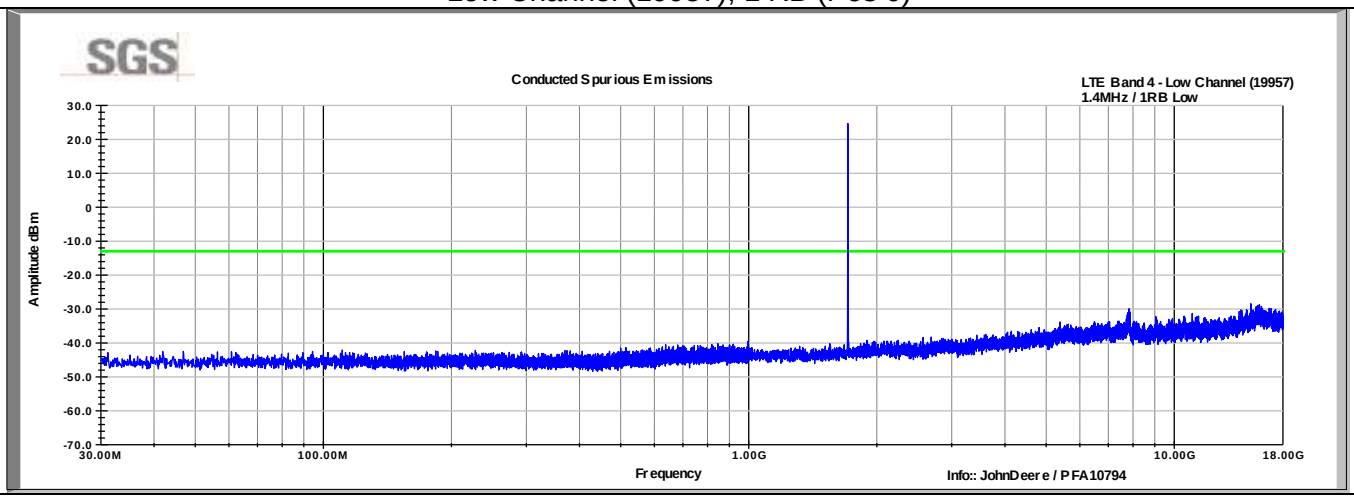


High Channel (19193), 1 RB (Pos 5)

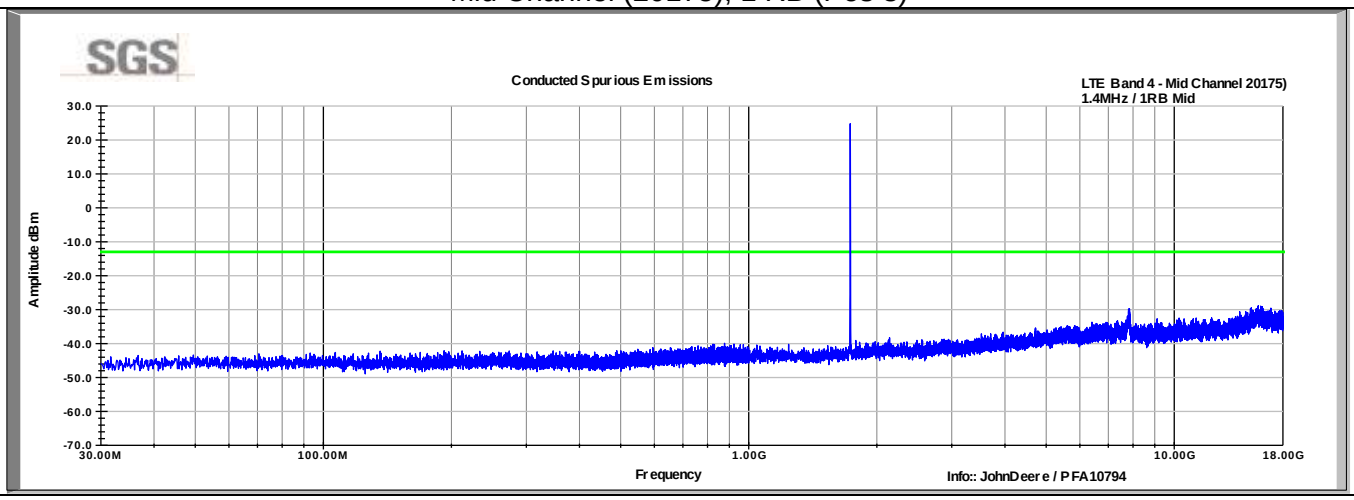


LTE Band 4, QPSK modulation, 1.4MHz

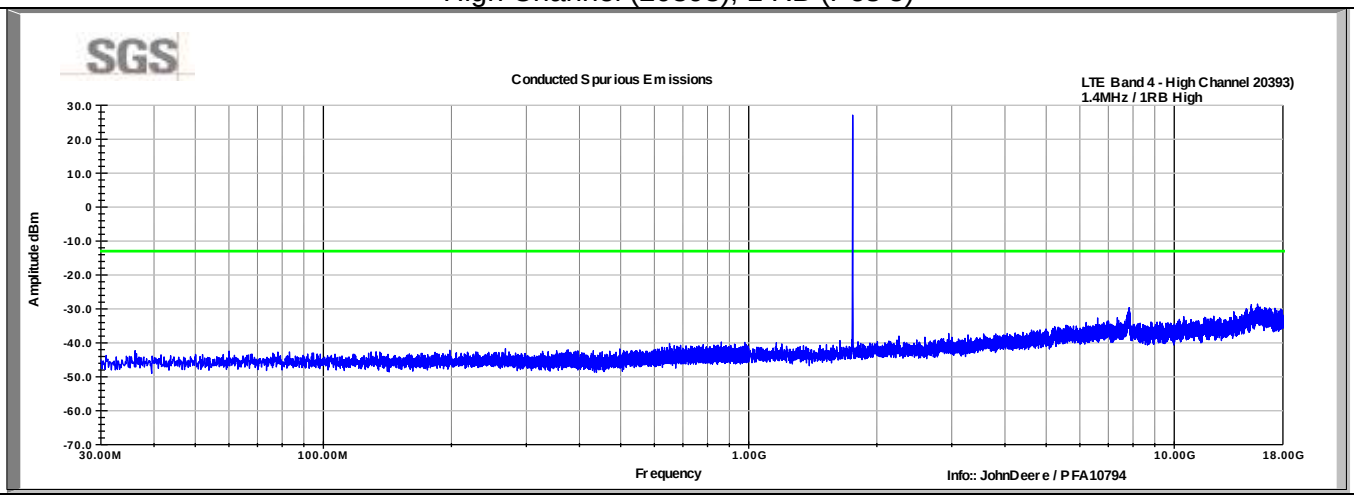
Low Channel (19957), 1 RB (Pos 0)



Mid Channel (20175), 1 RB (Pos 3)

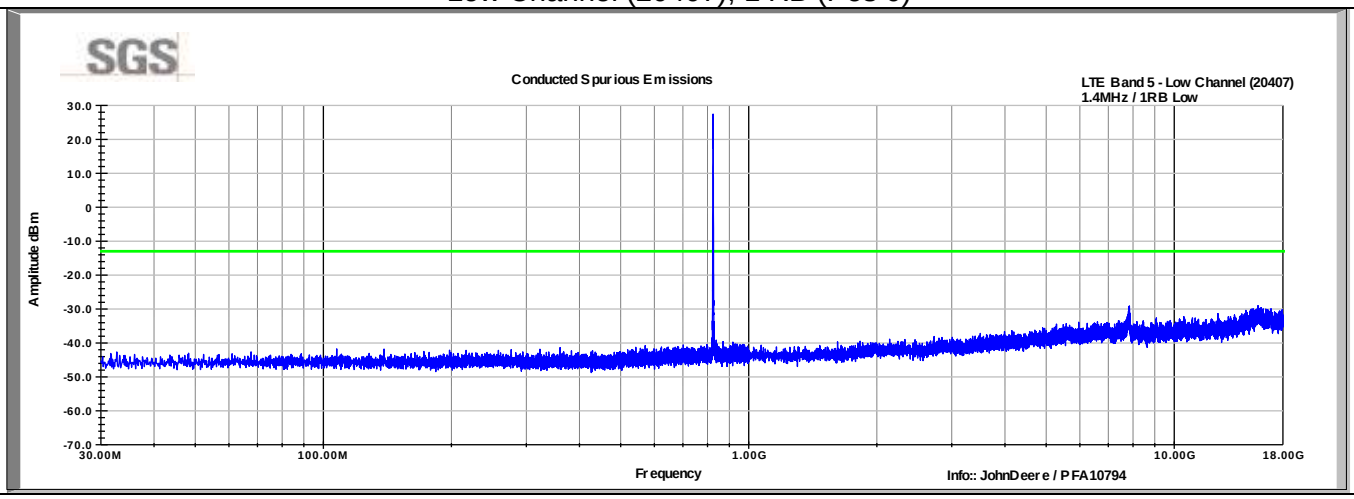


High Channel (20393), 1 RB (Pos 5)

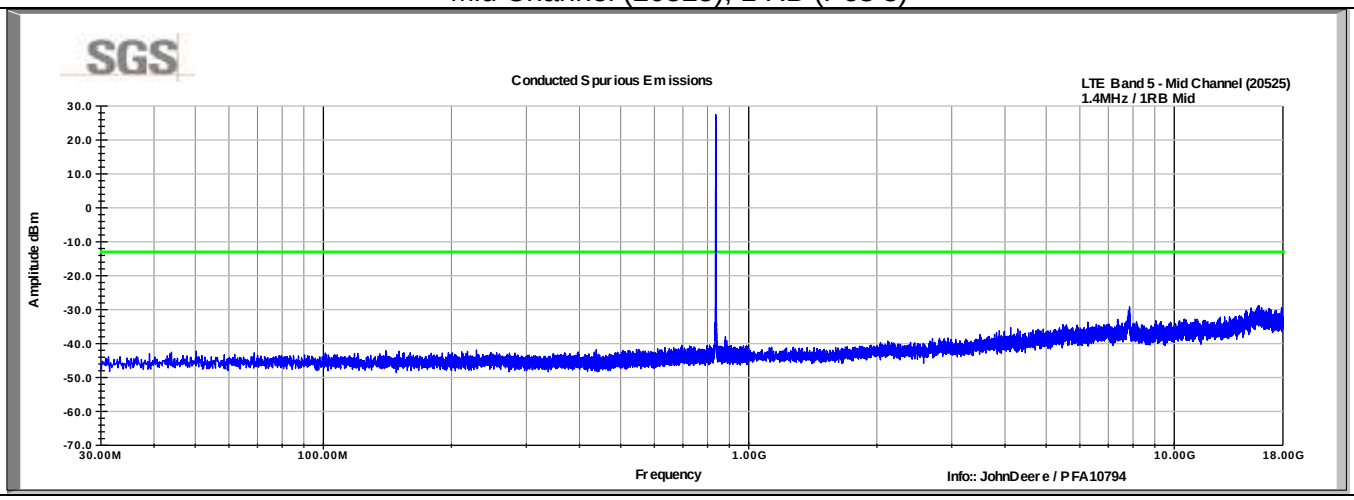


LTE Band 5, QPSK modulation, 1.4MHz

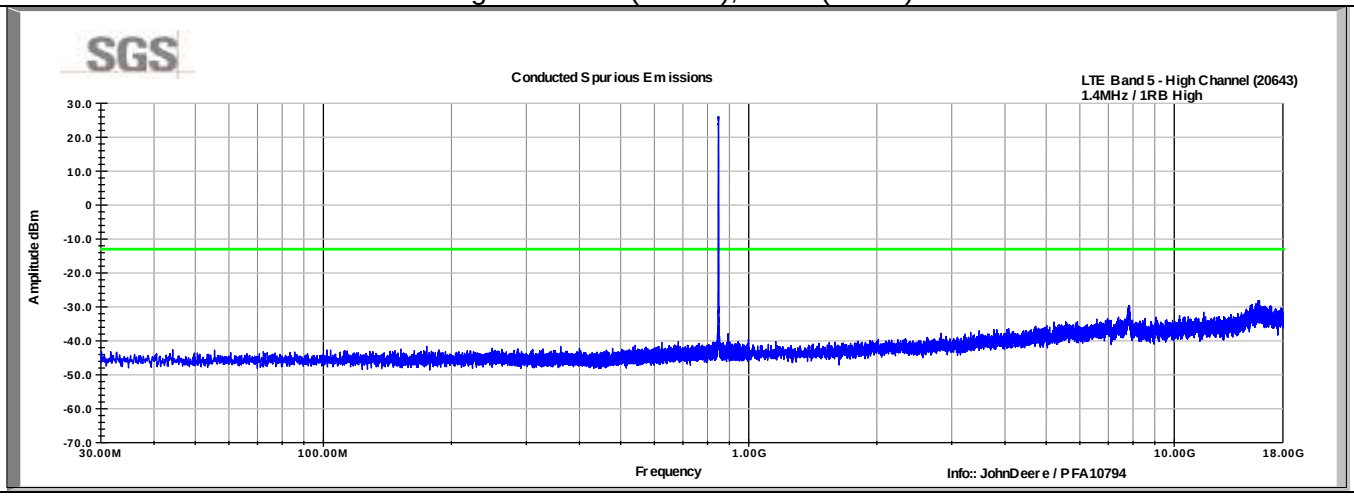
Low Channel (20407), 1 RB (Pos 0)



Mid Channel (20525), 1 RB (Pos 3)

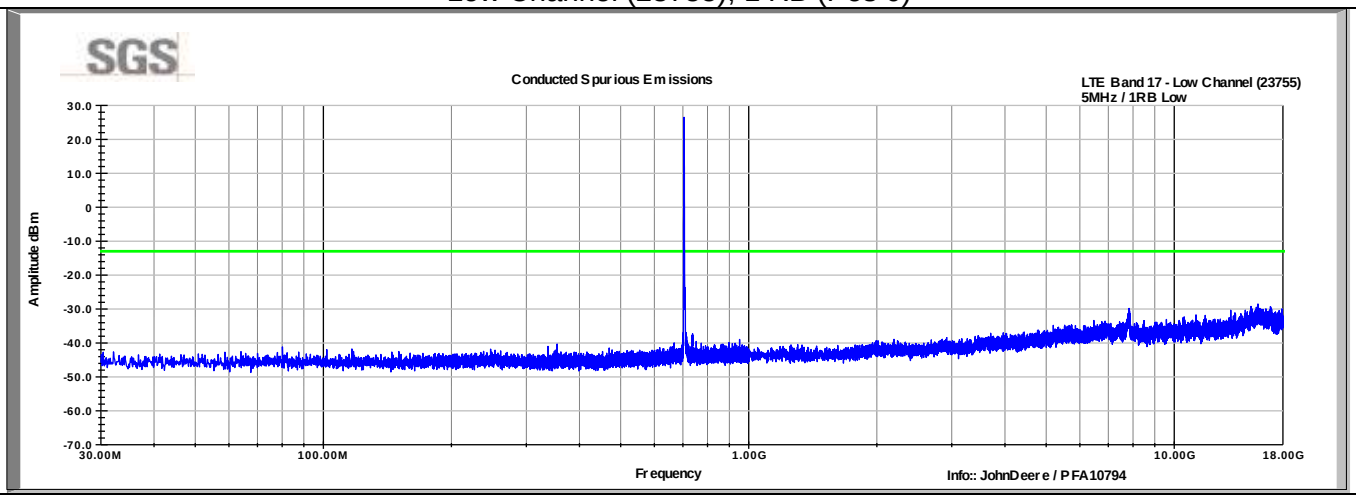


High Channel (20643), 1 RB (Pos 5)

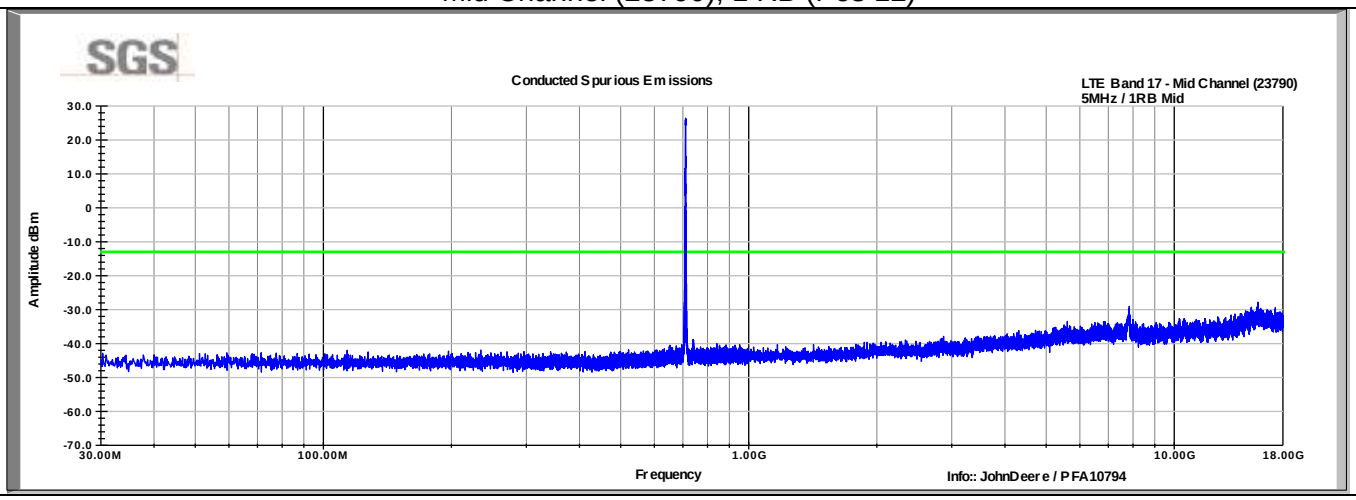


LTE Band 17, QPSK modulation, 5MHz

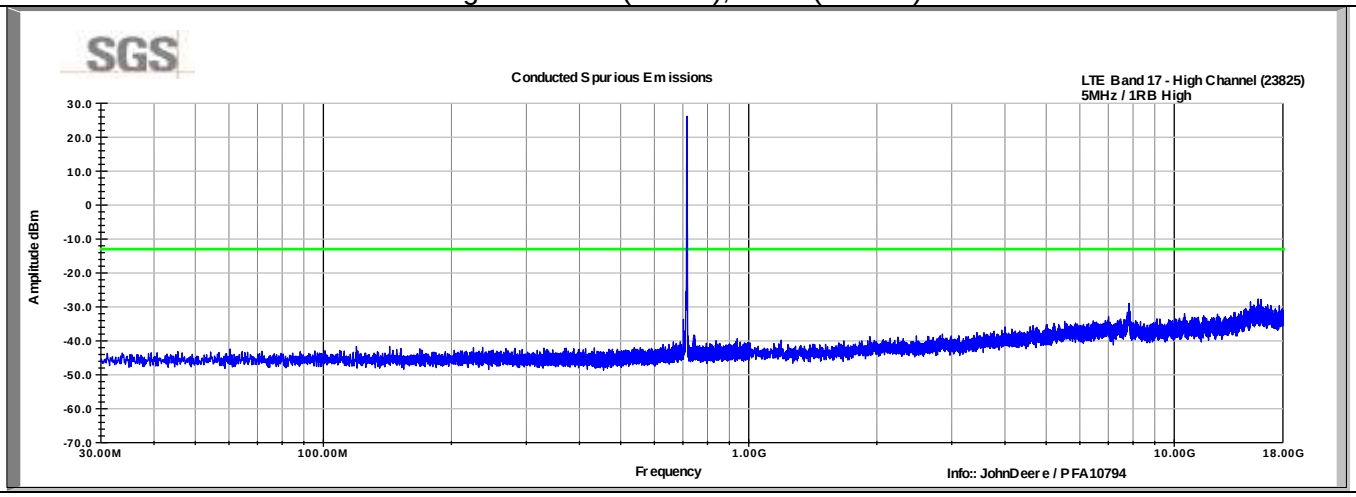
Low Channel (23755), 1 RB (Pos 0)



Mid Channel (23790), 1 RB (Pos 12)



High Channel (23825), 1 RB (Pos 24)



7 Effective Radiated Power

7.1.1 Test Result

Test Description	Basic Standards	Test Result
Effective Radiated Power	22.913(a)(2) 27.50 RSS-130 (4.4)	Pass
Effective Isotropic Radiated Power	24.232(c) 27.50(d)(4) RSS-132 (5.4) RSS-133 (6.4) RSS-139 (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
LTE Band 2	22.53	0.85	0	23.38	33	33	PASS	PASS
LTE Band 4	22.94	1.7	0	24.64	30	30	PASS	PASS
LTE Band 5	22.5	-0.26	0	22.24	38.5	38.5	PASS	PASS
LTE Band 17	21.48	2.31	0	23.79	34.8	37	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	2.1053 22.917(a) 24.238(a) 27.53(c)(2) 27.53(h) ANSI/TIA-603-C-2004	RSS-GEN (6.13) RSS-130 (4.6) RSS-132 (5.5) RSS-133 (6.5.1) 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 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.

The EUT cellular port was directly connected to a Radio Communications Tester 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 Radio Communications Tester.

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

8.3 *Test Site*

SGS 3m Chamber, Suwanee, GA

Environmental Conditions

Temperature:	24.2 °C
Relative Humidity:	43.2 %
Atmospheric Pressure:	98.1 kPa

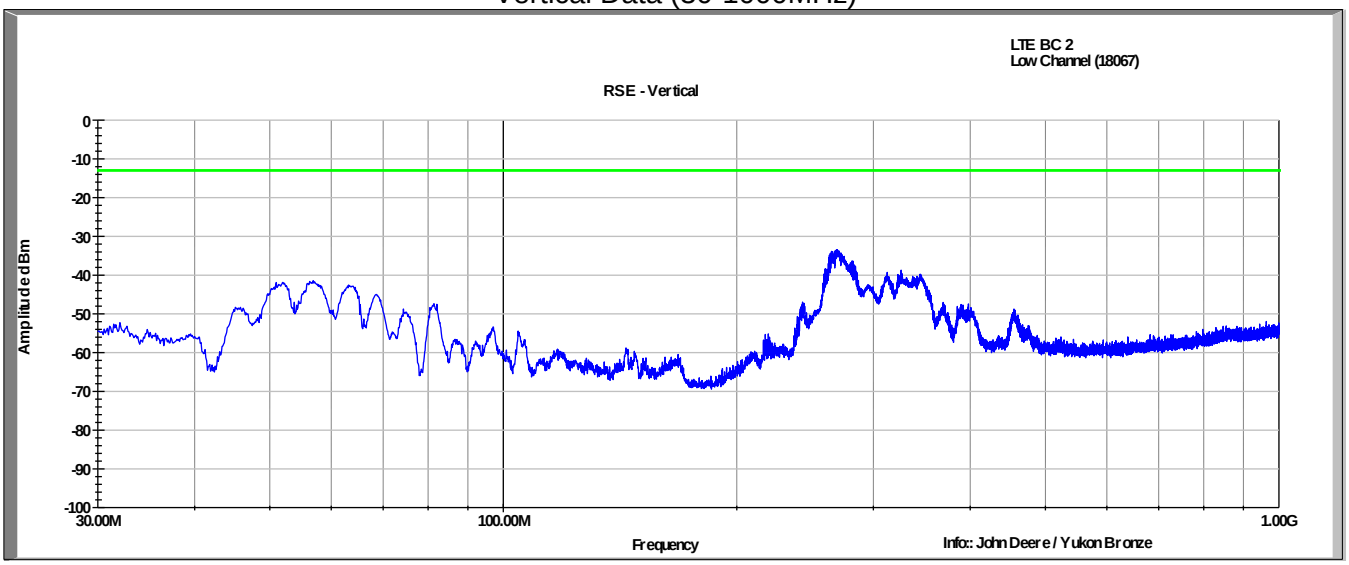
8.4 *Test Equipment*

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

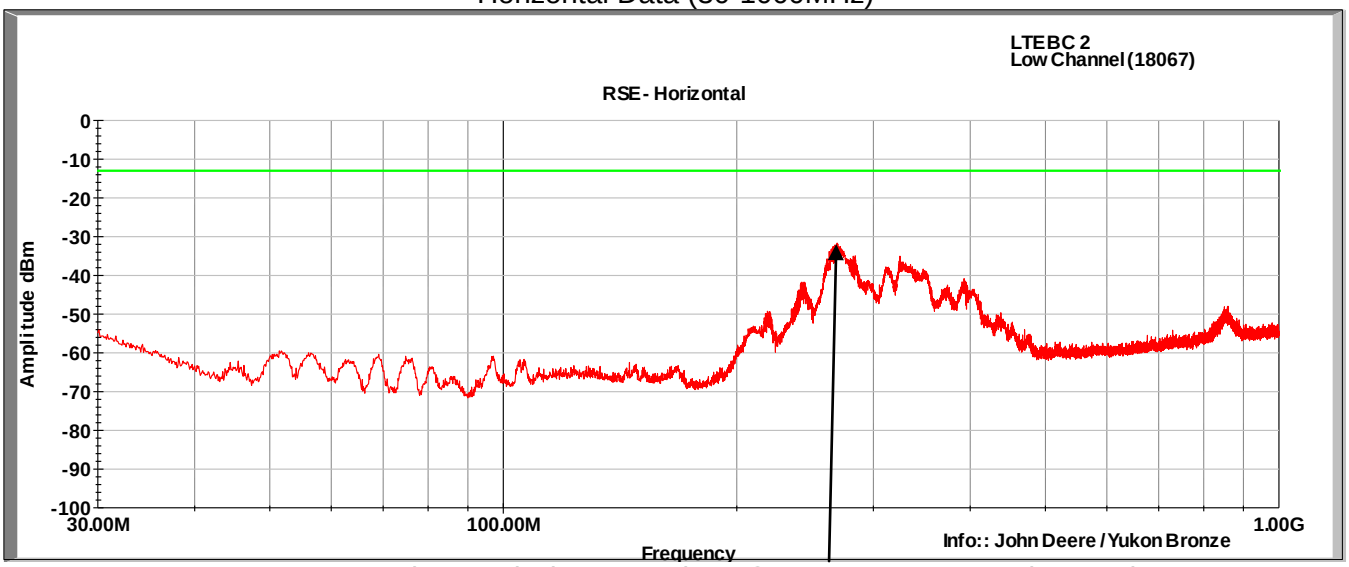
- Unless otherwise noted, equipment is on a 1 year calibration cycle.
- Based on manufacturer's specifications, the CMW-500 is on a 3 year calibration cycle.

8.5 *Test Data*

LTE Band 2, QPSK modulation, 1.4MHz
Low Channel (18607), 1 RB (Pos 0)
Vertical Data (30-1000MHz)

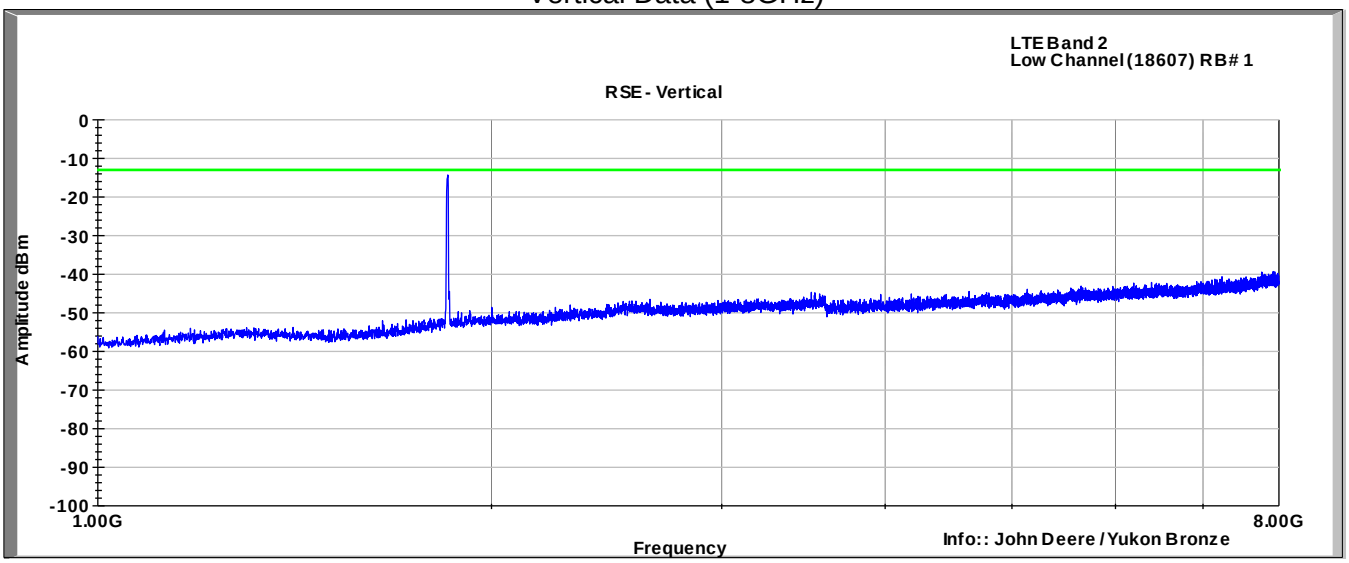


Horizontal Data (30-1000MHz)

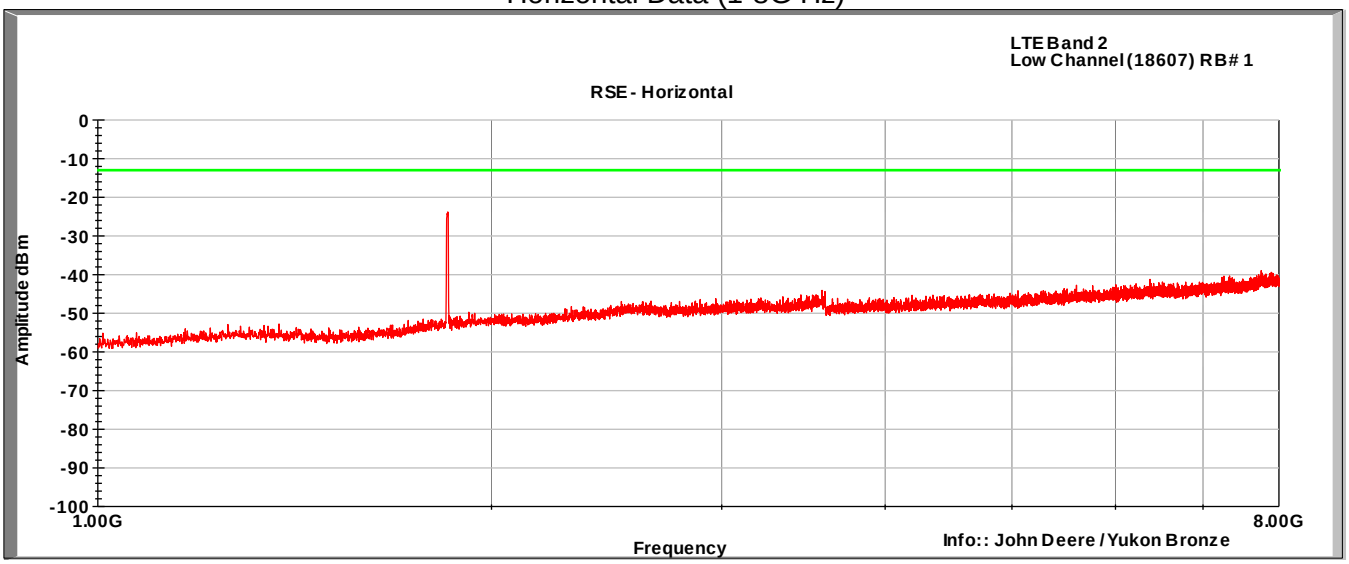


Worst case spurious emission: -31.7dBm @ 269.396MHz. 18.7dB margin

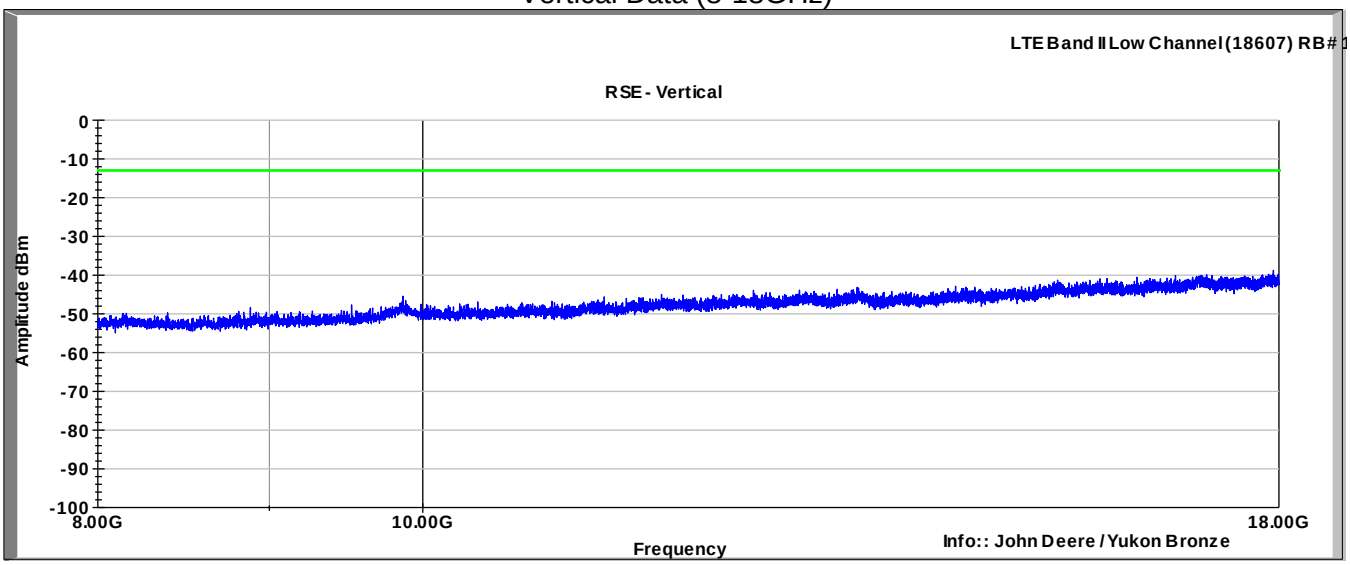
LTE Band 2, QPSK modulation, 1.4MHz
Low Channel (18607), 1 RB (Pos 0)
Vertical Data (1-8GHz)



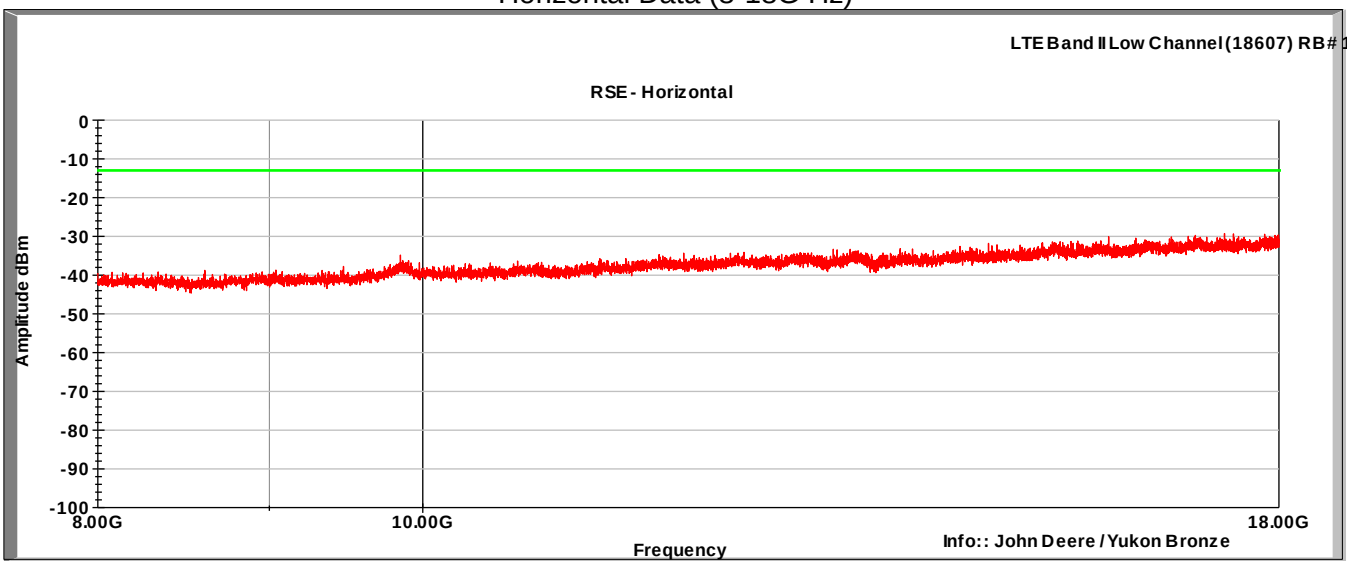
Horizontal Data (1-8G Hz)



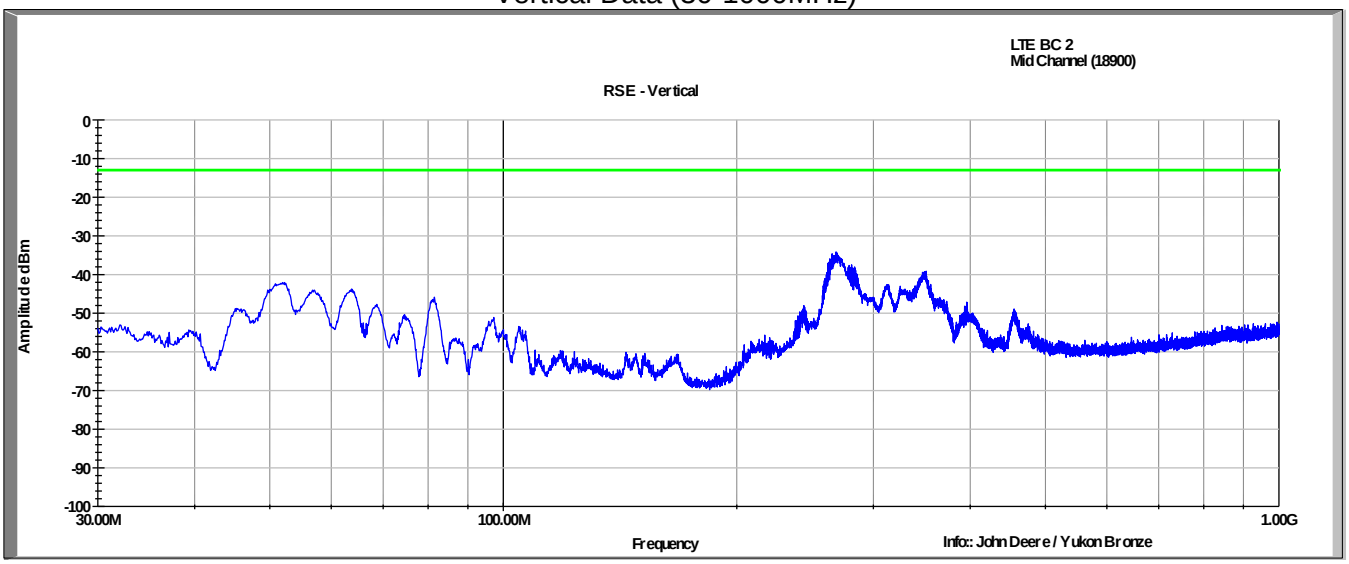
LTE Band 2, QPSK modulation, 1.4MHz
Low Channel (18607), 1 RB (Pos 0)
Vertical Data (8-18GHz)



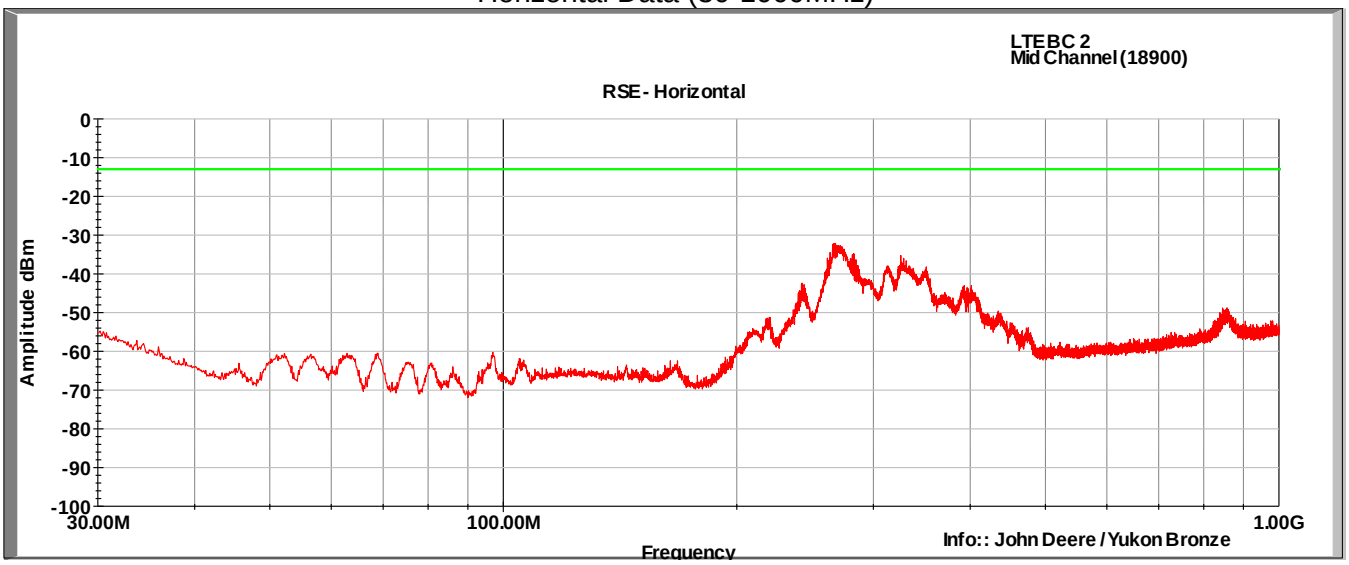
Horizontal Data (8-18G Hz)



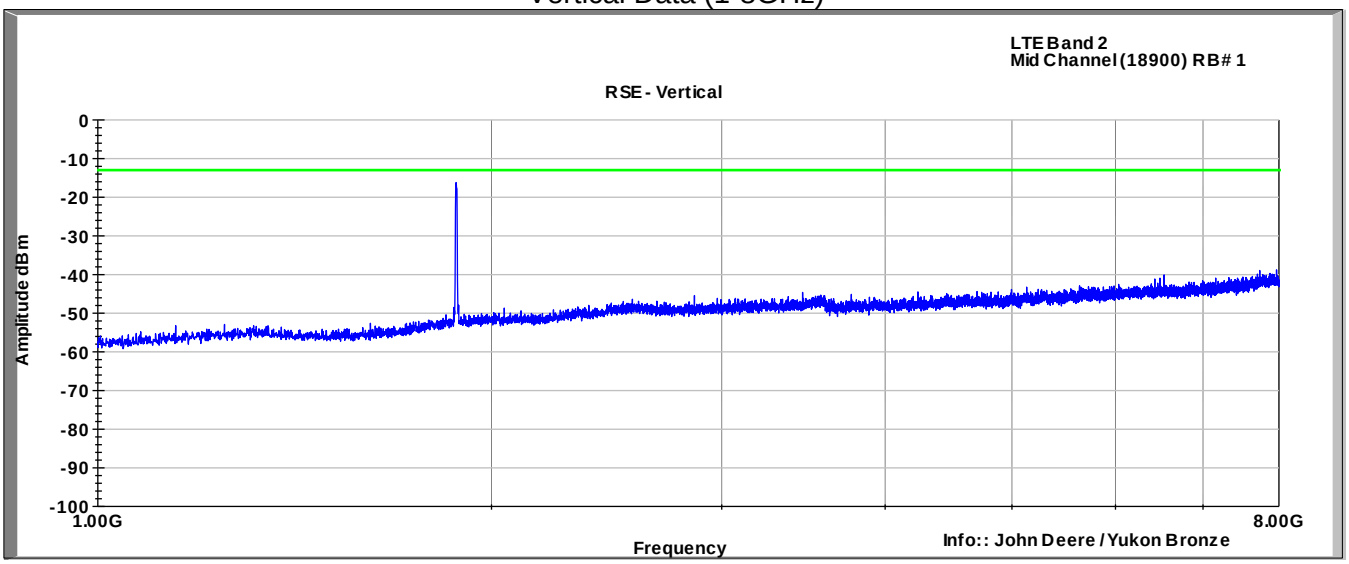
LTE Band 2, QPSK modulation, 1.4MHz
Mid Channel (18900), 1 RB (Pos 3)
Vertical Data (30-1000MHz)



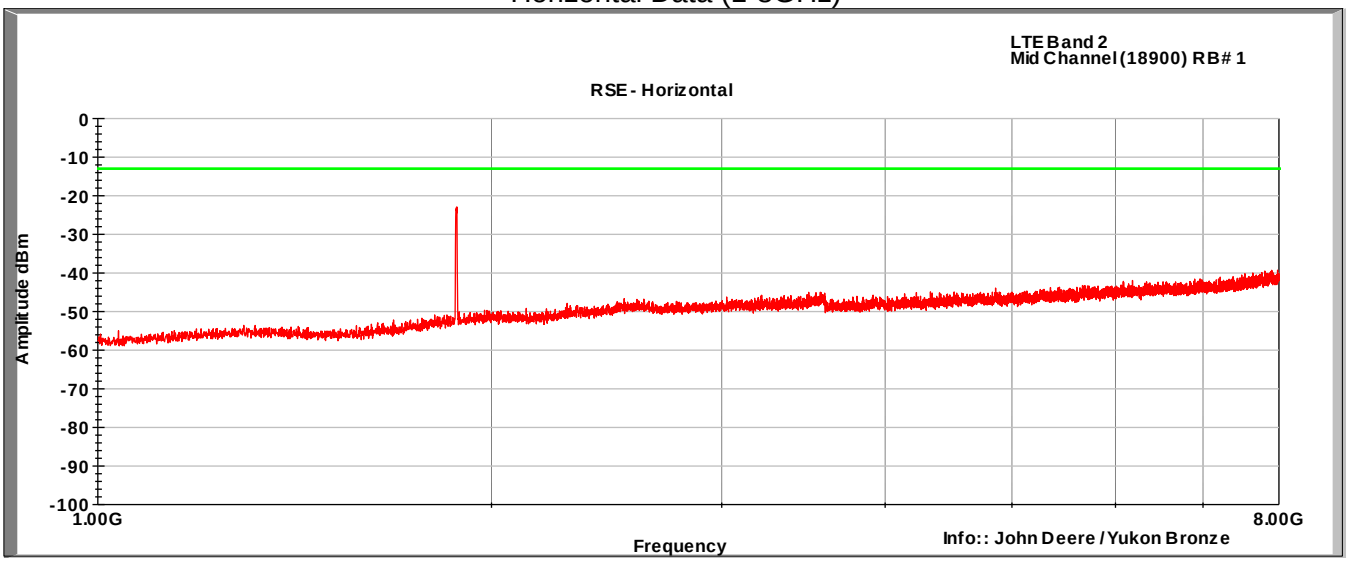
Horizontal Data (30-1000MHz)



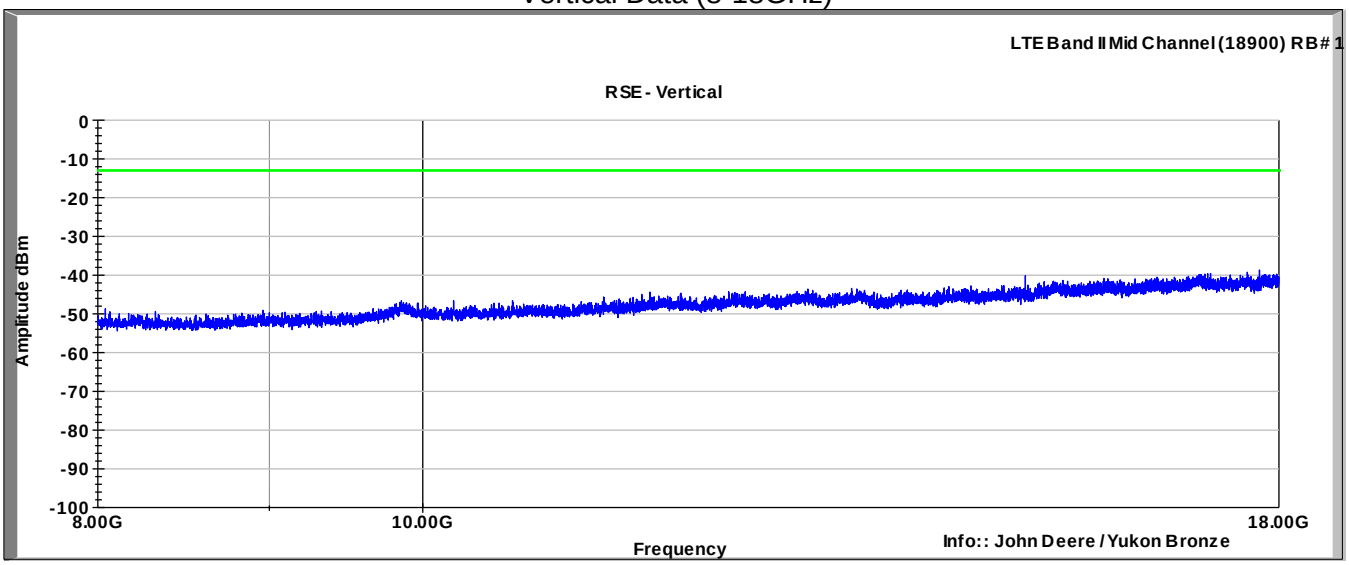
LTE Band 2, QPSK modulation, 1.4MHz
Mid Channel (18900), 1 RB (Pos 3)
Vertical Data (1-8GHz)



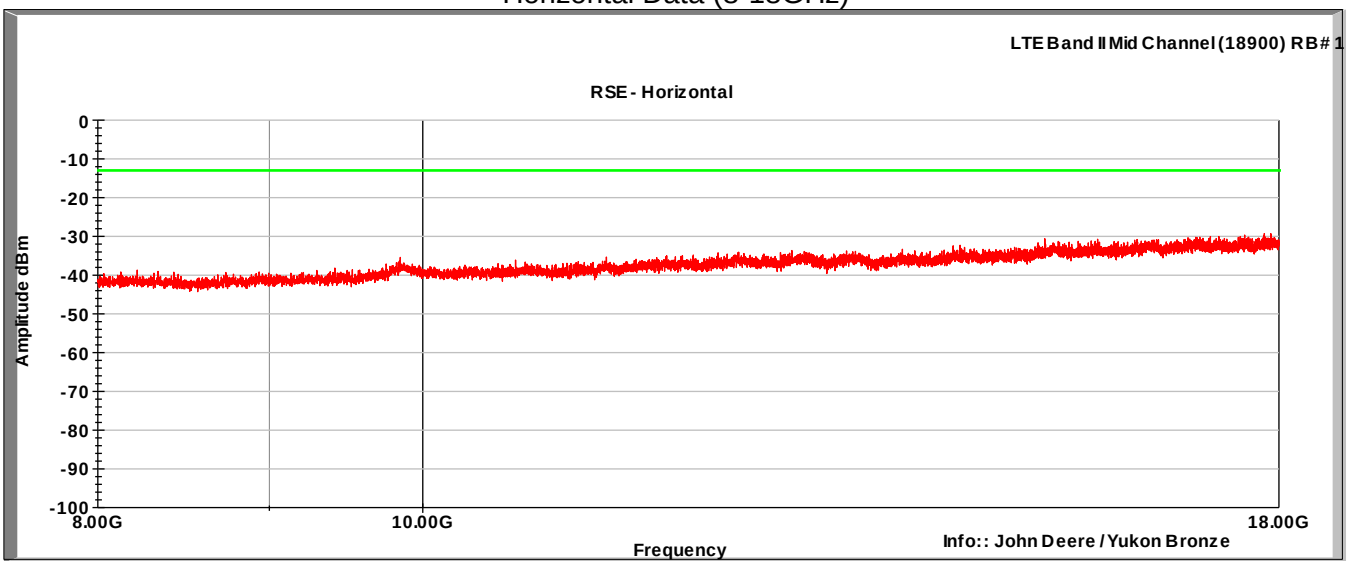
Horizontal Data (1-8GHz)



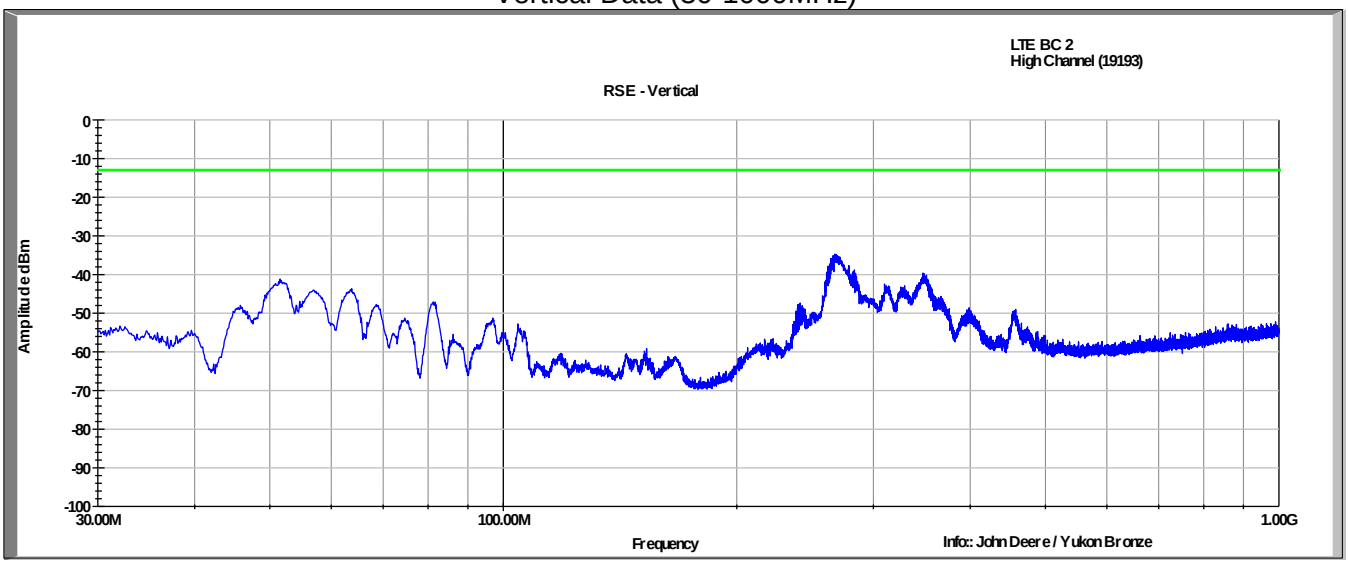
LTE Band 2, QPSK modulation, 1.4MHz
Mid Channel (18900), 1 RB (Pos 3)
Vertical Data (8-18GHz)



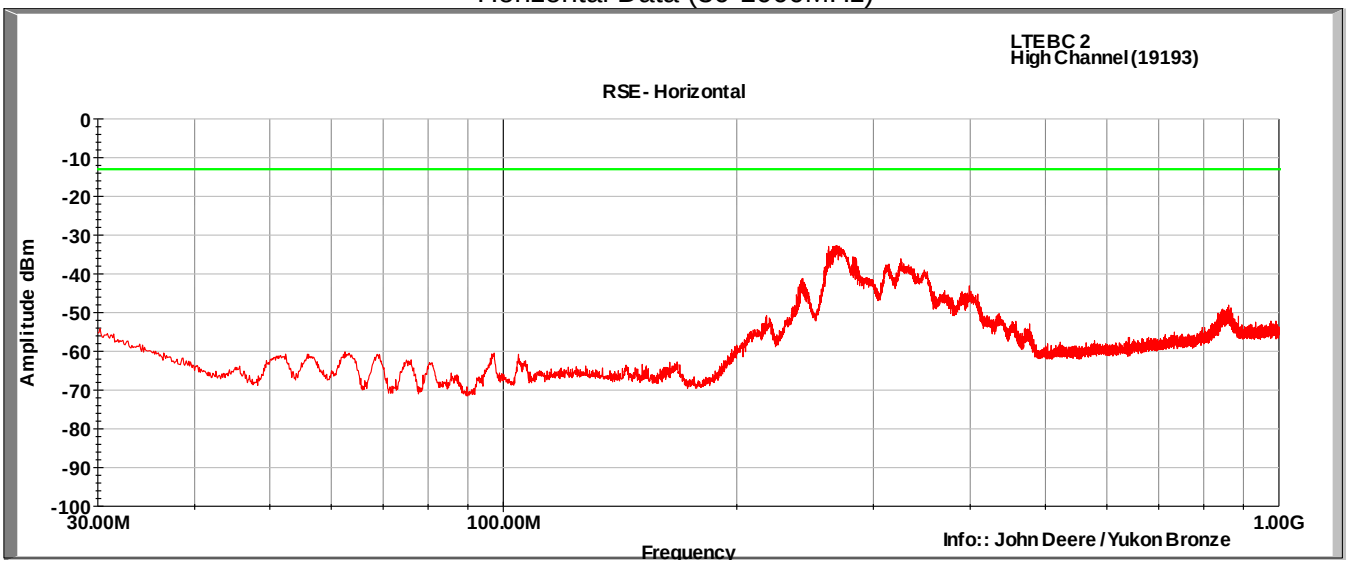
Horizontal Data (8-18GHz)



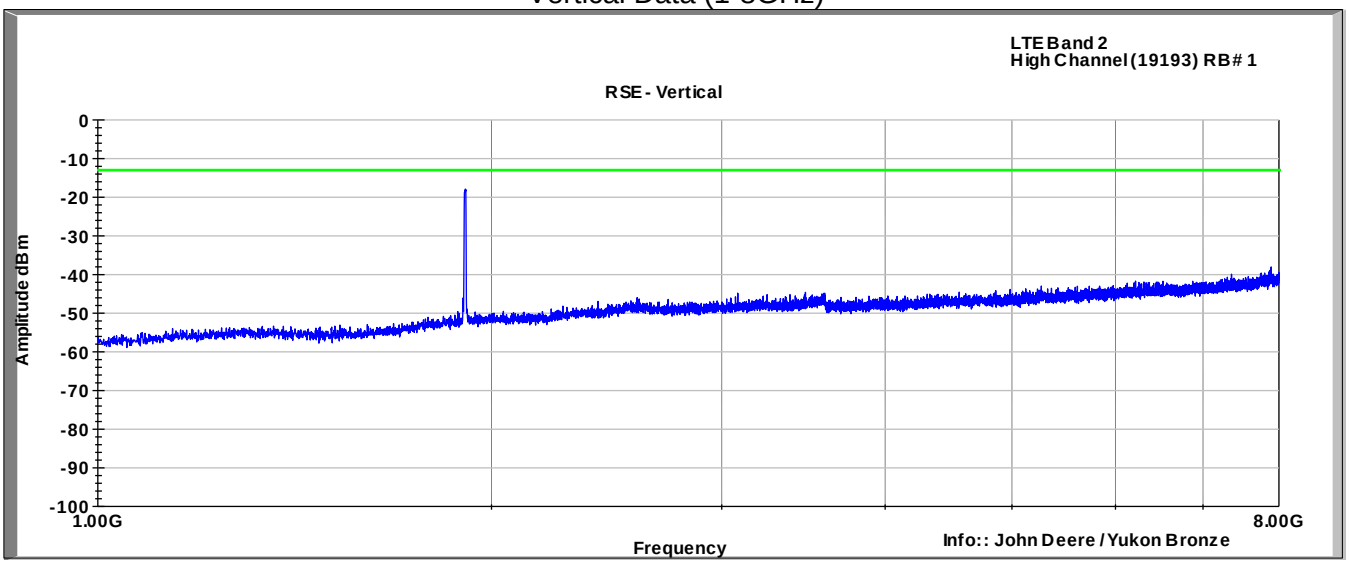
LTE Band 2, QPSK modulation, 1.4MHz
High Channel (19193), 1 RB (Pos 5)
Vertical Data (30-1000MHz)



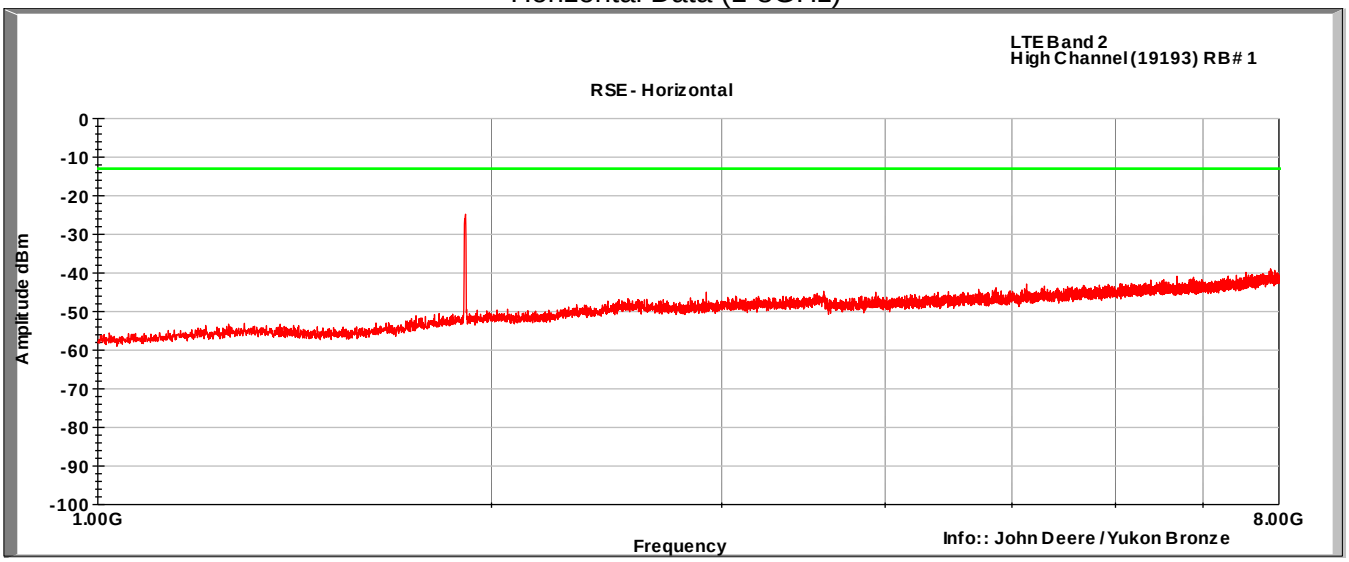
Horizontal Data (30-1000MHz)



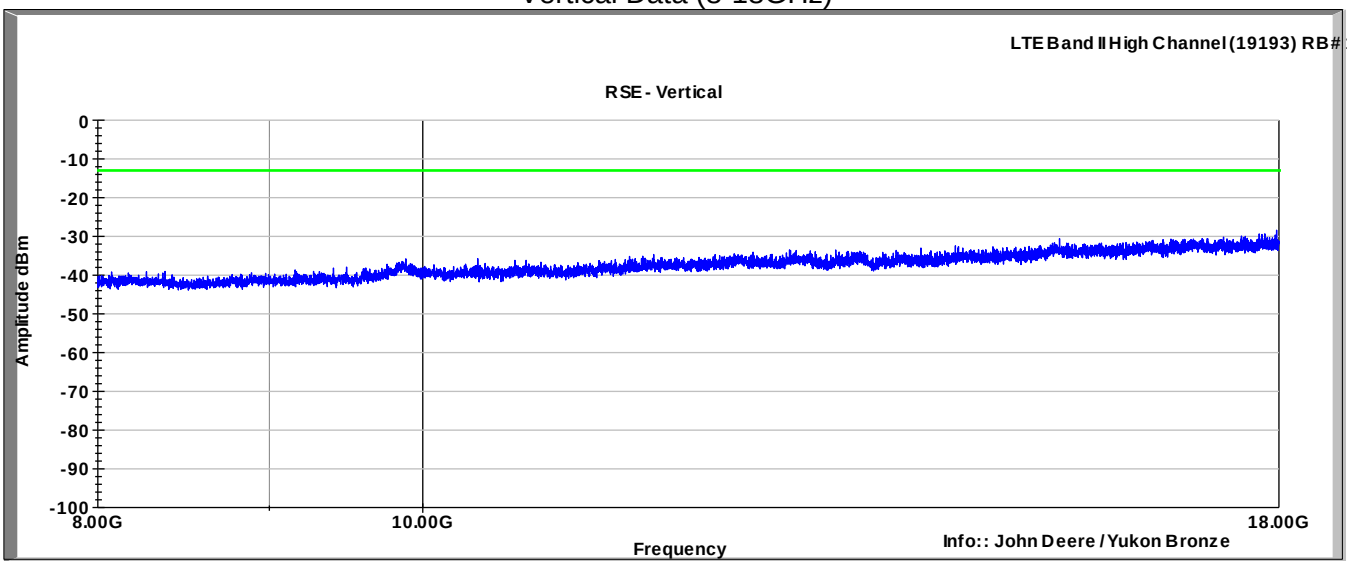
LTE Band 2, QPSK modulation, 1.4MHz
High Channel (19193), 1 RB (Pos 5)
Vertical Data (1-8GHz)



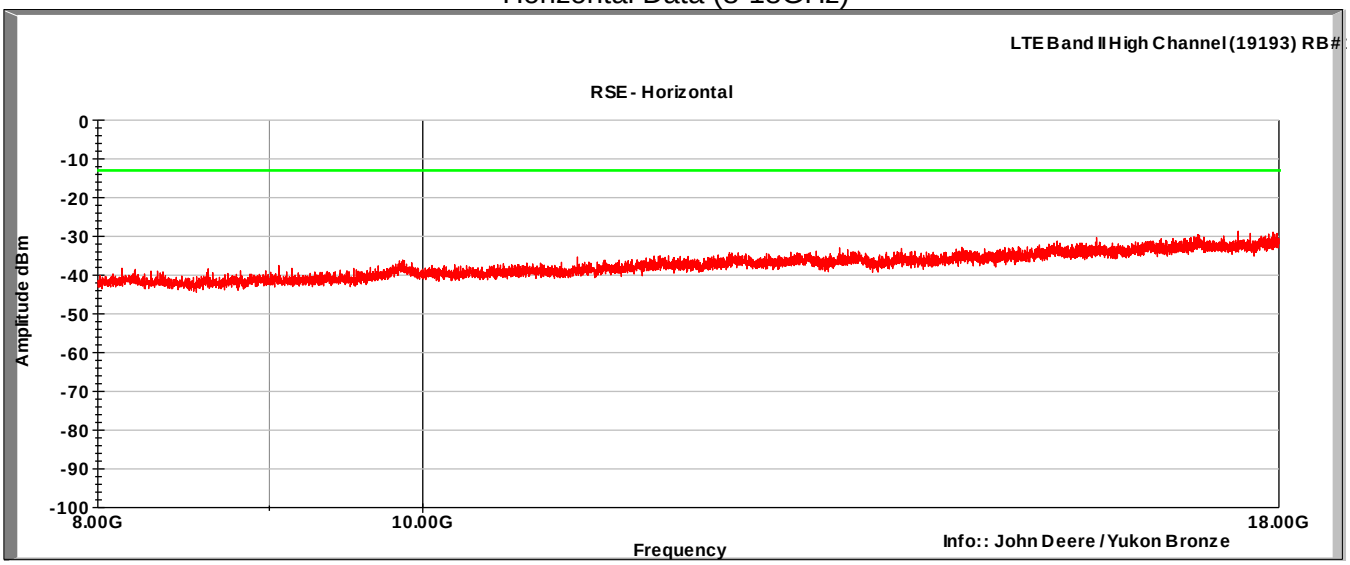
Horizontal Data (1-8GHz)



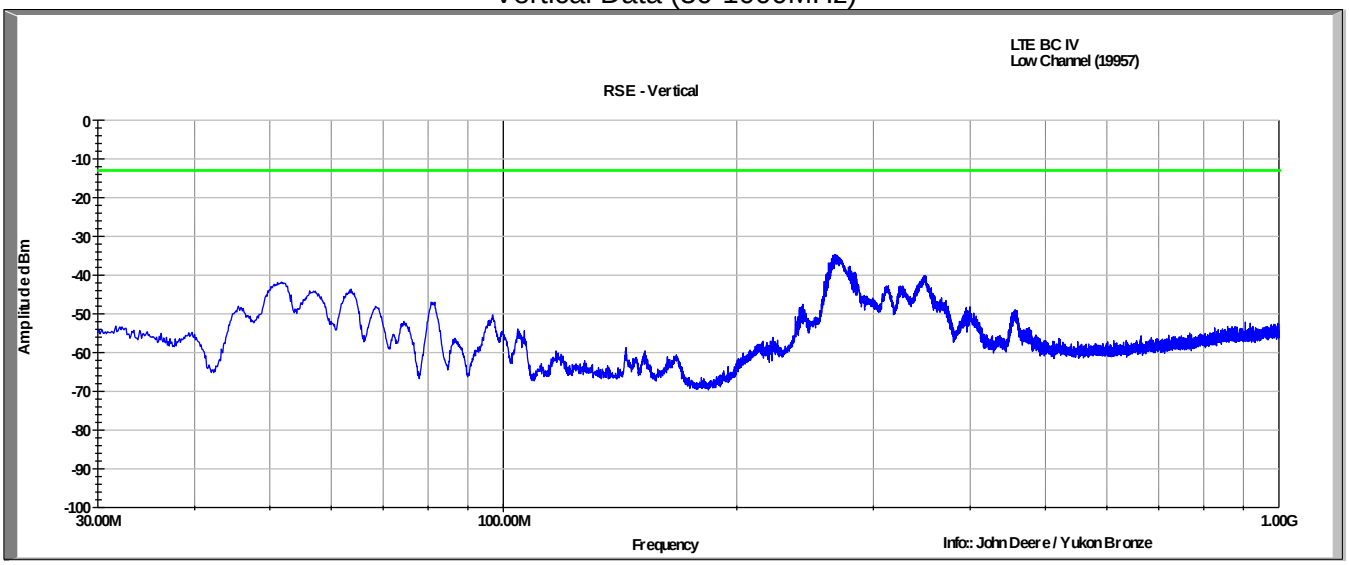
LTE Band 2, QPSK modulation, 1.4MHz
High Channel (19193), 1 RB (Pos 5)
Vertical Data (8-18GHz)



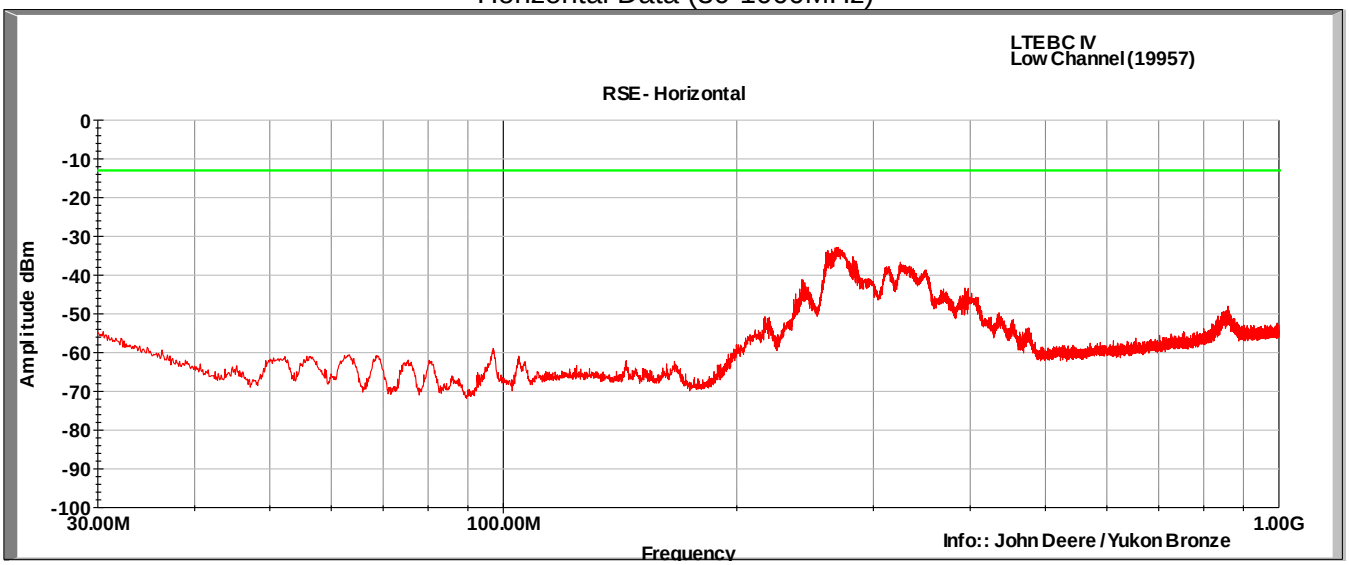
Horizontal Data (8-18GHz)



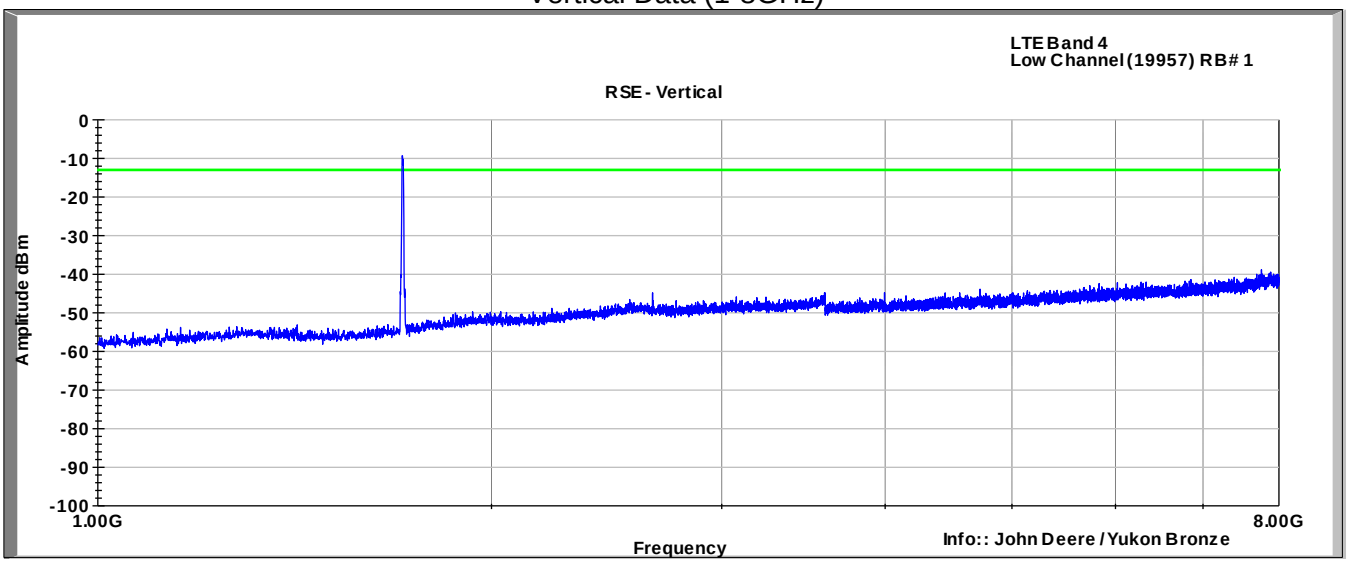
LTE Band 4, QPSK modulation, 1.4MHz
Low Channel (19957), 1 RB (Pos 0)
Vertical Data (30-1000MHz)



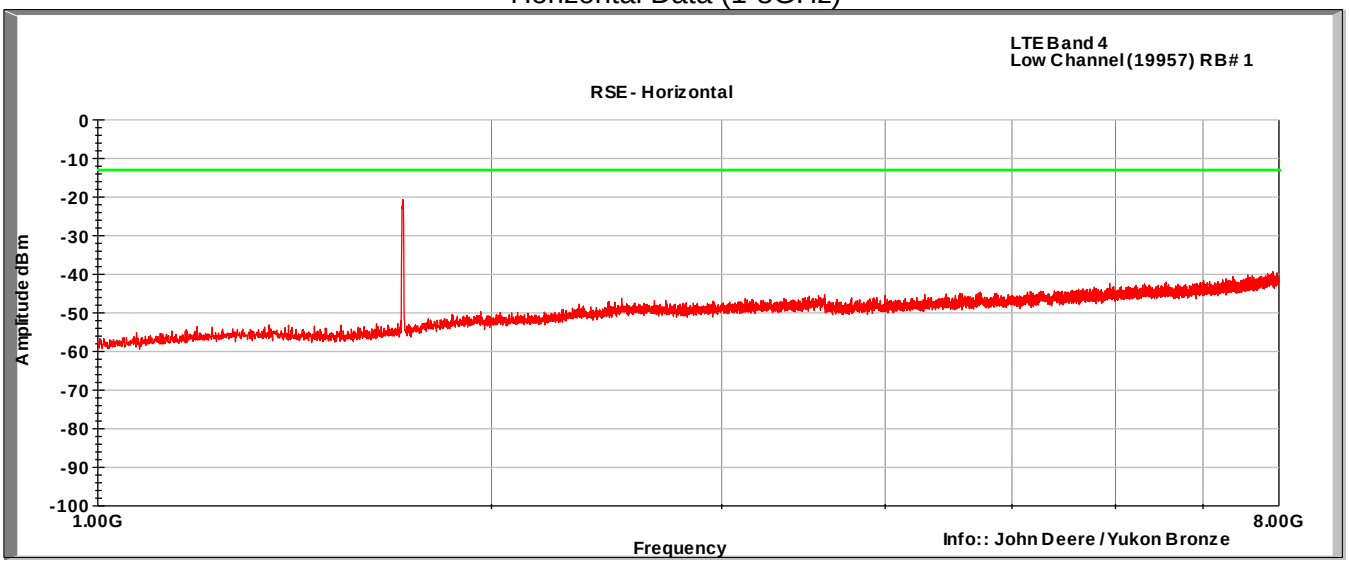
Horizontal Data (30-1000MHz)



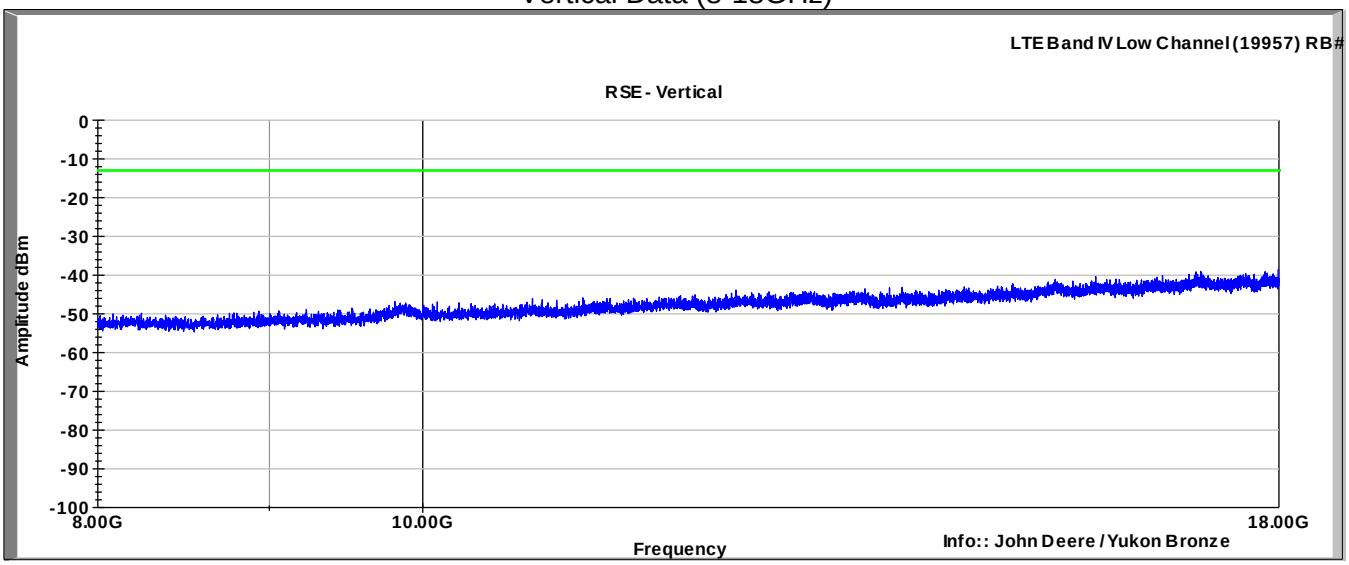
LTE Band 4, QPSK modulation, 1.4MHz
Low Channel (19957), 1 RB (Pos 0)
Vertical Data (1-8GHz)



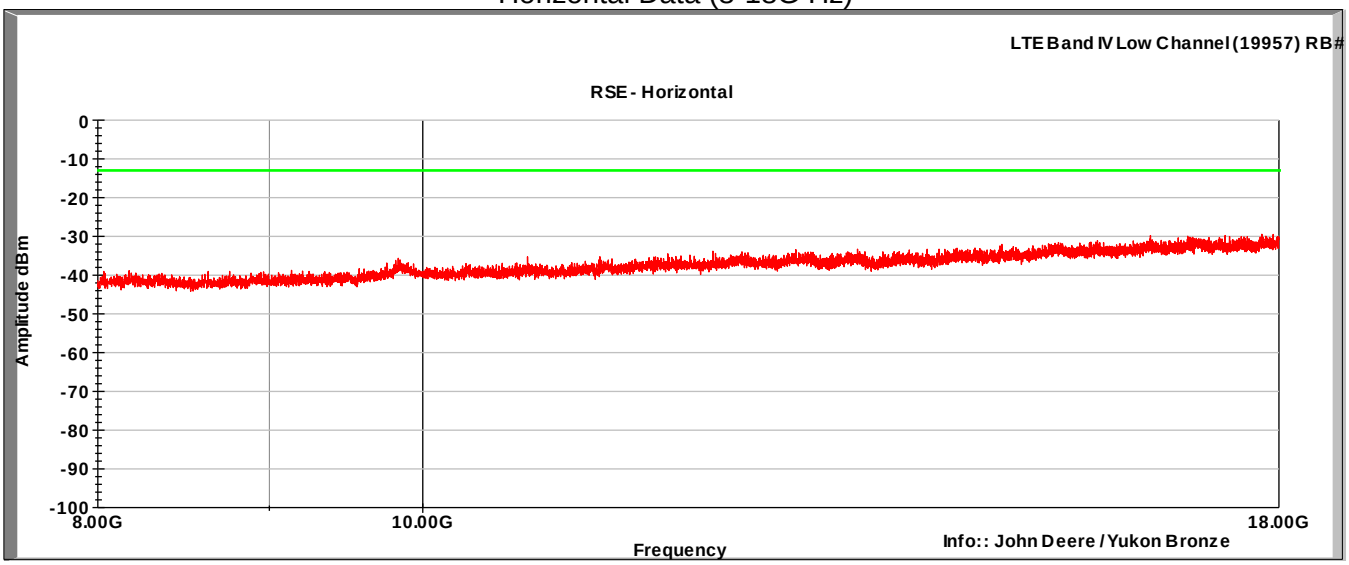
Horizontal Data (1-8GHz)



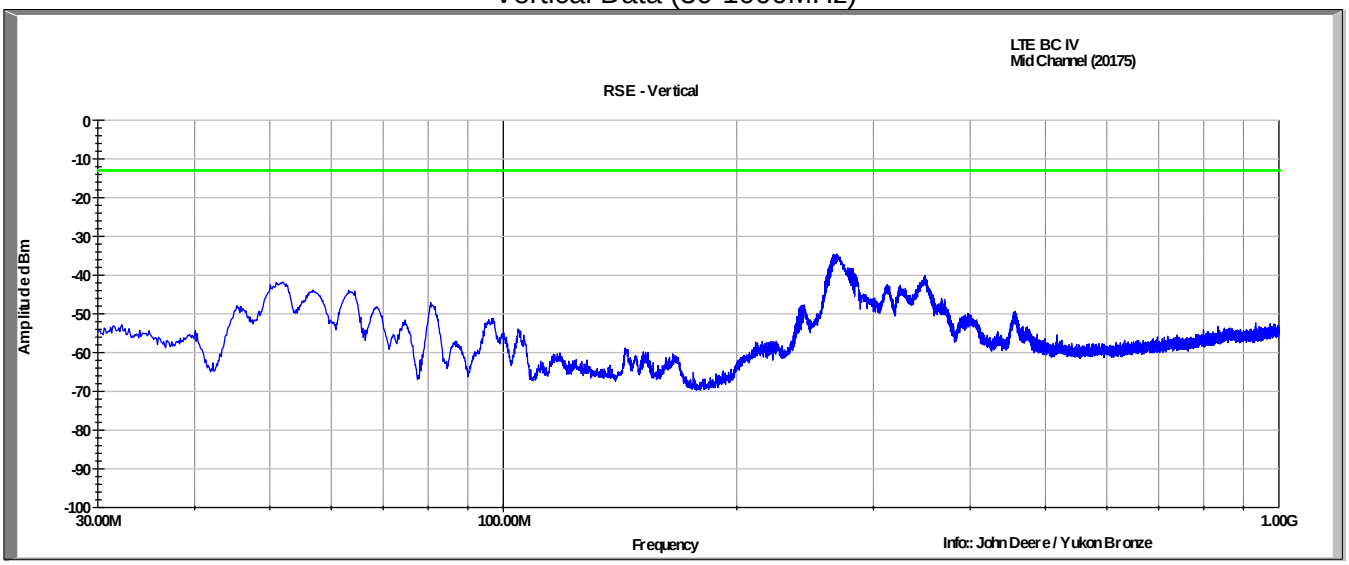
LTE Band 4, QPSK modulation, 1.4MHz
Low Channel (19957), 1 RB (Pos 0)
Vertical Data (8-18GHz)



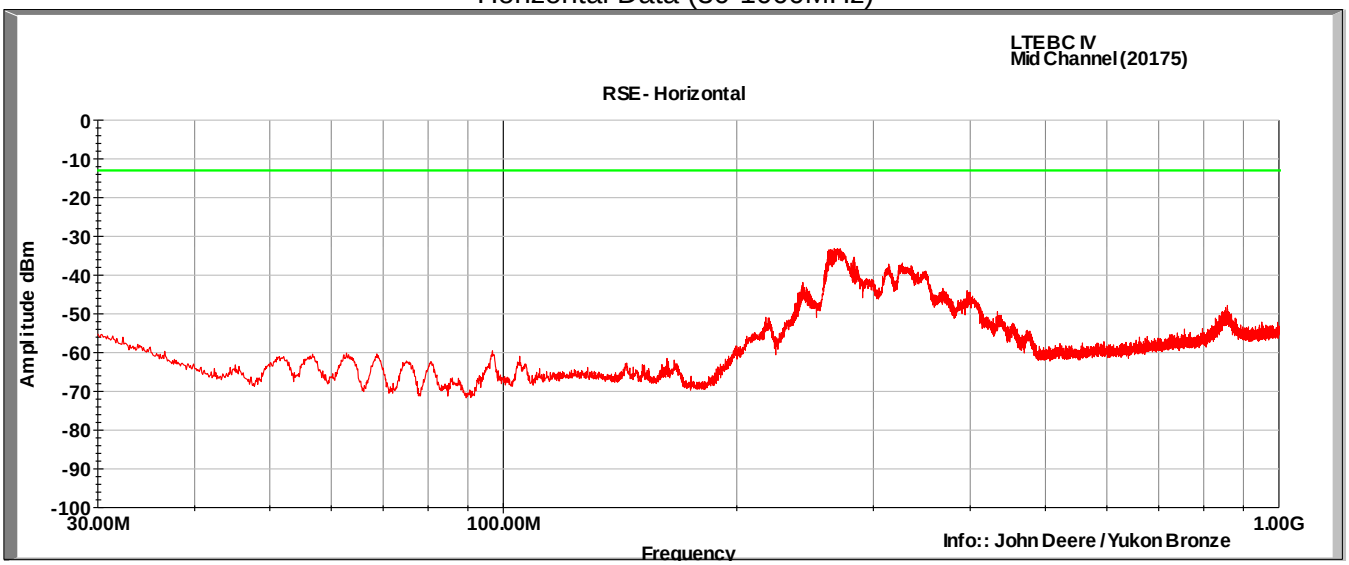
Horizontal Data (8-18G Hz)



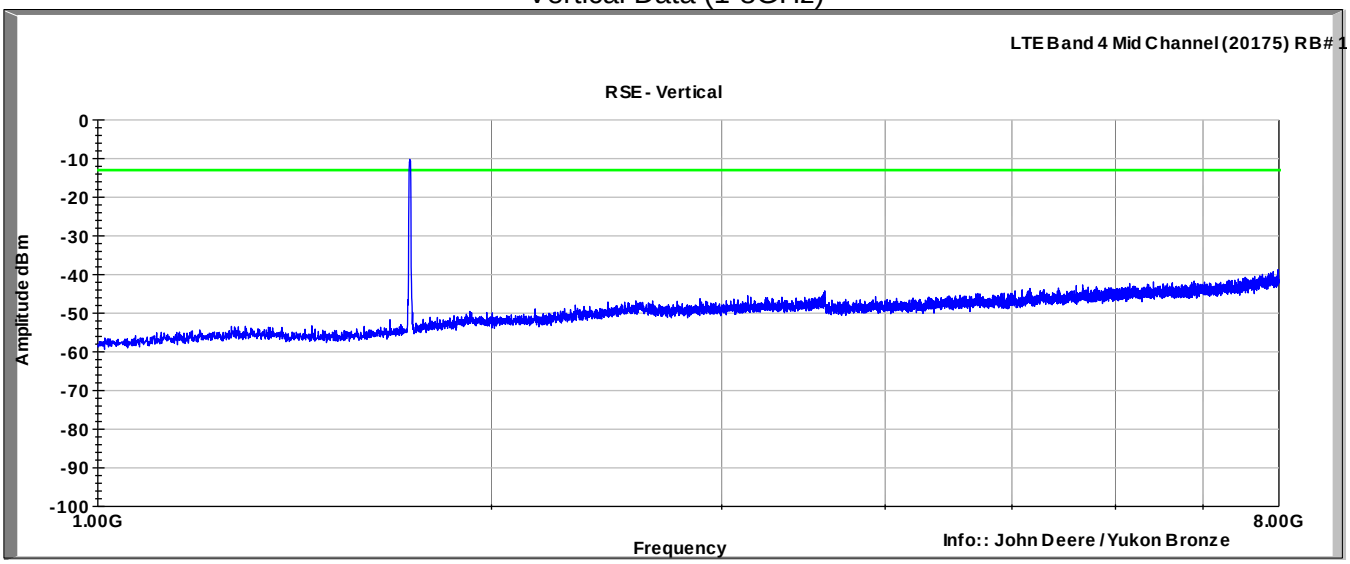
LTE Band 4, QPSK modulation, 1.4MHz
Mid Channel (20175), 1 RB (Pos 3)
Vertical Data (30-1000MHz)



Horizontal Data (30-1000MHz)



LTE Band 4, QPSK modulation, 1.4MHz
Mid Channel (20175), 1 RB (Pos 3)
Vertical Data (1-8GHz)



Horizontal Data (1-8GHz)