REPORT No.: SZ18060250W05

TEST REPORT

APPLICANT	:	Entel PCS Telecomunicaciones S.A.
PRODUCT NAME	:	Smartphone
MODEL NAME	:	Smart 9
BRAND NAME	:	ÖWN
FCC ID	:	2AO8VSMART9
STANDARD(S)	:	47 CFR Part 24, Subpart E 47 CFR Part 27, Subpart L&M
TEST DATE	:	2018-07-04 to 2018-07-11
ISSUE DATE	:	2018-07-11

Tested by: Su Hang

Su Hang (Test Engineer)

Approved by: Peng Hu

Peng Huarui (Supervisor)

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MORLAB

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Change History		
Issue	**Date**	**Reason for change**
1.0	2018-07-11	First edition

1. Technical Information

Note: Provide by applicant.

1.1. Applicant and Manufacturer Information

Applicant:	Entel PCS Telecomunicaciones S.A.
Applicant Address:	Costanera Sur 2760, Torre C, Piso 18, las condes,Santiago,Chile
Manufacturer:	Shenzhen Tinno Mobile Technology Corp.
Manufacturer Address:	4/F.,H-3 Building,OCT Eastern Industrial Park. NO.1 XiangShan East Road.,Nan Shan District,Shenzhen,P.R.China.

1.2. Equipment Under Test (EUT) Description

Product Name:	Smartphone	
Serial No:	(N/A, marked #1 by test site)	
Hardware Version:	V1.0	
Software Version:	OWN_SMART_9_8.0	
Modulation Type:	QPSK, 16QAM	
Operation Band:	Band 2 / 4 / 7	
Frequency Range:	LTE Band 2	Tx: 1850MHz -1910MHz
		Rx: 1930MHz -1990MHz
	LTE Band 4	Tx: 1710MHz -1755MHz
		Rx: 2110MHz - 2155MHz
	LTE Band 7	Tx: 2500MHz - 2570MHz
		Rx: 2500MHz - 2570MHz
Channel Bandwidth	LTE Band 2	1.4MHz, 3 MHz, 5 MHz, 10MHz, 15 MHz, 20 MHz
	LTE Band 4	1.4MHz, 3 MHz, 5 MHz, 10MHz, 15 MHz, 20 MHz
	LTE Band 7	5 MHz, 10MHz, 15 MHz, 20 MHz
Emission Designator:	1M11G7D (LTE Band 2, QPSK, BW 1.4MHz) 1M10W7D (LTE Band 2, 16QAM, BW 1.4MHz) 2M72G7D (LTE Band 2, QPSK, BW 3MHz) 2M71 W7D (LTE Band 2, 16QAM, BW 3MHz) 4M53G7D (LTE Band 2, QPSK, BW 5MHz) 4M52W7D (LTE Band 2, 16QAM, BW 5MHz) 9M01G7D (LTE Band 2, QPSK, BW 10MHz) 9M00W7D (LTE Band 2, 16QAM, BW 10MHz)	

	13M55G7D (LTE Band 2, QPSK, BW 15MHz) 13M55W7D (LTE Band 2, 16QAM, BW 15MHz) 18M12G7D (LTE Band 2, QPSK, BW 20MHz) 18M12W7D (LTE Band 2, 16QAM, BW 20MHz) 1M13G7D (LTE Band 4, QPSK, BW 1.4MHz) 1M12W7D (LTE Band 4, 16QAM, BW 1.4MHz) 2M73G7D (LTE Band 4, QPSK, BW 3MHz) 2M72W7D (LTE Band 4, 16QAM, BW 3MHz) 4M56G7D (LTE Band 4, QPSK, BW 5MHz) 4M55W7D (LTE Band 4, 16QAM, BW 5MHz) 9M06G7D (LTE Band 4, QPSK, BW 10MHz) 9M04W7D (LTE Band 4, 16QAM, BW 10MHz) 13M59G7D (LTE Band 4, QPSK, BW 15MHz) 13M58W7D (LTE Band 4, 16QAM, BW 15MHz) 18M01G7D (LTE Band 4, QPSK, BW 20MHz) 17M99W7D (LTE Band 4, 16QAM, BW 20MHz) 4M52G7D (LTE Band 7, QPSK, BW 5MHz) 4M53W7D (LTE Band 7, 16QAM, BW 5MHz) 8M99G7D (LTE Band 7, QPSK, BW 10MHz) 9M00W7D (LTE Band 7, 16QAM, BW 10MHz) 13M45G7D (LTE Band 7, QPSK, BW 15MHz) 13M45W7D (LTE Band 7, 16QAM, BW 15MHz) 18M01G7D (LTE Band 7, QPSK, BW 20MHz) 18M04W7D (LTE Band 7, 16QAM, BW 20MHz)	
Antenna Type:	PIFA Antenna	
Antenna Gain:	LTE Band2:	-1.0 dBi
	LTE Band4/7:	-3.0 dBi
Operating voltage:	Normal(NV):	3.85V
	Lowest(LV):	3.55V
	Highest(HV):	4.4V

Note 1: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.3. Test Standards and Results

The objective of the report is to perform testing according to Part 2, Part 24 and Part 27 for the EUT FCC ID Certification:

No	Identity	Document Title
1	47 CFR Part 2	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 24	Personal Communications Services
3	47 CFR Part 27	Miscellaneous Wireless Communications Services

Test detailed items/section required by FCC rules and results are as below:

Section	Description	Test Date	Test Engineer	Result
2.1046	Transmitter Conducted Output Power	Jul 05, 2018	Tu Ya'nan	PASS
2.1049	Occupied Bandwidth	Jul 09, 2018	Tu Ya'nan	PASS
2.1055, 24.235, 27.54	Frequency Stability	Jul 09, 2018	Tu Ya'nan	PASS
24.232(d), 27.50(d)(5)	Peak to Average Radio	Jul 11, 2018	Tu Ya'nan	PASS
2.1051, 24.238, 27.53(g)(h), 27.53(m)(4)	Conducted Spurious Emissions	Jul 09, 2018	Tu Ya'nan	PASS
2.1051, 24.238, 27.53(g)(h), 27.53(m)(4)	Band Edge	Jul 05&09, 2018	Tu Ya'nan	PASS
24.232(c), 27.50(c)(10) 27.50(d)(4), 27.50(h)(2)	Equivalent Isotropic Radiated Power	Jul 04, 2018	Wu Zhongwen	PASS
2.1051, 24.238, 27.53(g)(h), 27.53(m)(4)	Radiated Spurious Emissions	Jul 04, 2018	Wu Zhongwen	PASS
Note: The tests were performed according to the method of measurements prescribed in KDB971168 D01 v03 (Oct 27, 2017) and ANSI/TIA-603-E-2016.				

1.4. Environmental Conditions

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

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

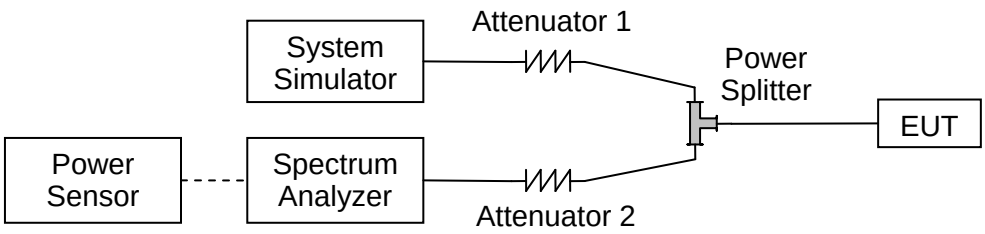
2. 47 CFR Part 2, Part 24E & 27L&27M Requirements

2.1. Transmitter Conducted Output Power

2.1.1. Requirement

According to FCC section 2.1046(a), for transmitters other than single sideband, independent sideband and controlled carrier radiotelephone, power output shall be measured at the RF output terminals when the transmitter is adjusted in accordance with the tune-up procedure to give the values of current and voltage on the circuit elements specified in FCC section 2.1033(c)(8).

2.1.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.1.3. Test procedure

KDB 971168 D01v03 Section 5.2 and ANSI/TIA-603-E-2016.

2.1.4. Result

LTE Band2						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				18700	18900	19100
Frequency (MHz)				1860	1880	1900
20	QPSK	1	0	23.11	22.51	22.52
20	QPSK	1	49	22.85	**23.15**	22.63
20	QPSK	1	99	22.76	22.97	22.33
20	QPSK	50	0	22.76	22.39	22.22
20	QPSK	50	24	22.28	22.04	22.08
20	QPSK	50	50	22.26	22.12	22.11
20	QPSK	100	0	22.18	22.15	22.17
20	16QAM	1	0	22.14	22.38	22.08
20	16QAM	1	49	22.63	22.47	22.37
20	16QAM	1	99	22.56	21.96	22.57
20	16QAM	50	0	22.81	22.13	22.41
20	16QAM	50	24	22.67	21.94	22.53
20	16QAM	50	50	22.52	22.02	22.37
20	16QAM	100	0	22.48	22.28	21.06
Channel				18675	18900	19125
Frequency (MHz)				1857.5	1880	1902.5
15	QPSK	1	0	22.92	22.26	22.57
15	QPSK	1	37	22.95	22.48	22.69
15	QPSK	1	74	23.12	22.39	22.34
15	QPSK	36	0	22.56	22.28	22.39
15	QPSK	36	20	22.37	22.43	22.25
15	QPSK	36	39	22.35	21.82	22.43
15	QPSK	75	0	22.03	21.93	22.05
15	16QAM	1	0	21.98	22.26	22.69
15	16QAM	1	37	21.85	22.69	22.28
15	16QAM	1	74	22.01	22.48	22.17
15	16QAM	36	0	21.99	22.43	22.39
15	16QAM	36	20	22.21	22.29	22.41
15	16QAM	36	39	22.12	22.16	22.22
15	16QAM	75	0	21.36	22.28	22.33

Channel				18650	18900	19150
Frequency (MHz)				1855	1880	1905
10	QPSK	1	0	23.08	23.05	23.09
10	QPSK	1	25	23.13	23.04	23.06
10	QPSK	1	49	23.02	23.06	23.07
10	QPSK	25	0	22.25	22.14	22.03
10	QPSK	25	12	22.13	22.18	22.13
10	QPSK	25	25	22.35	22.15	22.37
10	QPSK	50	0	22.04	22.16	22.16
10	16QAM	1	0	22.94	22.46	22.20
10	16QAM	1	25	22.78	22.14	22.18
10	16QAM	1	49	22.33	22.17	22.39
10	16QAM	25	0	22.49	22.19	22.28
10	16QAM	25	12	22.43	22.26	22.12
10	16QAM	25	25	22.14	22.17	22.08
10	16QAM	50	0	21.88	21.15	21.24
Channel				18625	18900	19175
Frequency (MHz)				1852.5	1880	1907.5
5	QPSK	1	0	23.11	22.70	22.60
5	QPSK	1	12	22.99	22.45	22.28
5	QPSK	1	24	22.94	22.48	23.01
5	QPSK	12	0	22.73	22.23	22.23
5	QPSK	12	7	22.66	22.05	22.15
5	QPSK	12	13	22.54	22.06	22.02
5	QPSK	25	0	22.75	21.92	21.84
5	16QAM	1	0	22.86	22.81	22.16
5	16QAM	1	12	22.05	22.69	22.38
5	16QAM	1	24	22.99	22.37	22.29
5	16QAM	12	0	22.08	22.58	22.03
5	16QAM	12	7	22.76	22.56	22.05
5	16QAM	12	13	22.65	22.43	22.09
5	16QAM	25	0	22.63	22.23	21.68

Channel				18615	18900	19185
Frequency (MHz)				1851.5	1880	1908.5
3	QPSK	1	0	23.04	23.07	23.03
3	QPSK	1	8	23.06	23.02	23.09
3	QPSK	1	14	23.01	23.01	23.05
3	QPSK	8	0	22.00	22.11	22.28
3	QPSK	8	4	22.03	22.16	22.39
3	QPSK	8	7	22.09	22.17	22.30
3	QPSK	15	0	22.02	22.19	22.29
3	16QAM	1	0	22.04	22.12	22.22
3	16QAM	1	8	22.08	21.86	22.28
3	16QAM	1	14	22.03	21.81	22.26
3	16QAM	8	0	22.68	21.85	22.36
3	16QAM	8	4	22.39	21.91	22.23
3	16QAM	8	7	22.26	21.83	22.17
3	16QAM	15	0	22.95	21.05	21.06
Channel				18607	18900	19193
Frequency (MHz)				1850.7	1880	1909.3
1.4	QPSK	1	0	22.67	22.83	22.77
1.4	QPSK	1	3	23.03	23.06	23.08
1.4	QPSK	1	5	23.12	22.99	23.01
1.4	QPSK	3	0	23.02	23.08	23.04
1.4	QPSK	3	1	23.01	22.39	23.04
1.4	QPSK	3	3	22.93	22.26	23.07
1.4	QPSK	6	0	23.05	22.14	22.42
1.4	16QAM	1	0	22.14	22.08	22.33
1.4	16QAM	1	3	22.20	21.97	22.51
1.4	16QAM	1	5	22.16	22.00	22.38
1.4	16QAM	3	0	22.17	21.95	22.43
1.4	16QAM	3	1	22.06	21.93	22.47
1.4	16QAM	3	3	21.82	21.82	22.12
1.4	16QAM	6	0	20.97	21.01	21.51

LTE Band4						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				20050	20175	20300
Frequency (MHz)				1720	1732.5	1745
20	QPSK	1	0	22.53	23.04	23.20
20	QPSK	1	49	22.97	**23.34**	23.03
20	QPSK	1	99	22.83	23.15	22.97
20	QPSK	50	0	23.23	23.07	23.19
20	QPSK	50	24	22.16	22.04	22.31
20	QPSK	50	50	22.06	22.99	22.02
20	QPSK	100	0	22.08	22.12	22.17
20	16QAM	1	0	22.61	22.11	22.17
20	16QAM	1	49	22.31	22.15	21.94
20	16QAM	1	99	22.24	21.78	21.53
20	16QAM	50	0	22.39	21.49	21.29
20	16QAM	50	24	22.16	21.58	21.23
20	16QAM	50	50	22.17	21.33	21.99
20	16QAM	100	0	21.08	21.07	21.94
Channel				20025	20175	20325
Frequency (MHz)				1717.5	1732.5	1747.5
15	QPSK	1	0	23.16	23.28	23.28
15	QPSK	1	37	23.05	23.27	23.13
15	QPSK	1	74	23.29	23.21	23.01
15	QPSK	36	0	22.25	22.14	22.39
15	QPSK	36	20	22.38	22.49	22.26
15	QPSK	36	39	22.43	22.32	22.18
15	QPSK	75	0	22.04	22.11	22.01
15	16QAM	1	0	22.65	22.25	22.17
15	16QAM	1	37	22.14	22.40	22.00
15	16QAM	1	74	22.38	21.79	21.68
15	16QAM	36	0	22.46	21.58	21.39
15	16QAM	36	20	22.23	21.31	21.34
15	16QAM	36	39	22.17	21.18	21.06
15	16QAM	75	0	21.11	21.94	21.01

Channel				20000	20175	20350
Frequency (MHz)				1715	1732.5	1750
10	QPSK	1	0	23.27	22.99	22.81
10	QPSK	1	25	23.06	23.18	22.85
10	QPSK	1	49	22.81	23.14	22.80
10	QPSK	25	0	22.05	22.14	22.94
10	QPSK	25	12	22.10	22.99	22.91
10	QPSK	25	25	22.01	22.93	22.02
10	QPSK	50	0	22.05	22.06	22.05
10	16QAM	1	0	22.50	22.25	22.14
10	16QAM	1	25	22.43	22.03	22.08
10	16QAM	1	49	22.05	21.92	21.90
10	16QAM	25	0	21.96	21.96	21.94
10	16QAM	25	12	21.91	22.14	22.02
10	16QAM	25	25	21.83	22.15	21.98
10	16QAM	50	0	21.01	21.04	21.90
Channel				19975	20175	20375
Frequency (MHz)				1712.5	1732.5	1752.5
5	QPSK	1	0	23.31	22.43	22.90
5	QPSK	1	12	23.11	22.39	22.94
5	QPSK	1	24	22.49	22.41	22.85
5	QPSK	12	0	22.67	22.44	22.76
5	QPSK	12	7	22.36	22.35	22.77
5	QPSK	12	13	22.03	22.21	22.65
5	QPSK	25	0	22.47	22.16	22.46
5	16QAM	1	0	22.58	22.24	22.25
5	16QAM	1	12	22.69	22.19	22.38
5	16QAM	1	24	22.65	22.15	22.67
5	16QAM	12	0	22.33	21.92	22.43
5	16QAM	12	7	22.30	21.94	22.19
5	16QAM	12	13	22.23	21.98	22.23
5	16QAM	25	0	22.58	22.99	22.31

Channel				19965	20175	20385
Frequency (MHz)				1711.5	1732.5	1753.5
3	QPSK	1	0	23.26	23.14	22.88
3	QPSK	1	8	23.12	22.99	22.99
3	QPSK	1	14	22.61	23.12	22.95
3	QPSK	8	0	22.14	22.08	22.04
3	QPSK	8	4	22.13	22.03	22.08
3	QPSK	8	7	22.89	22.02	22.89
3	QPSK	15	0	22.12	22.09	22.97
3	16QAM	1	0	22.57	22.04	22.07
3	16QAM	1	8	22.77	22.03	21.85
3	16QAM	1	14	22.76	21.84	21.61
3	16QAM	8	0	22.64	21.86	21.36
3	16QAM	8	4	22.56	21.91	21.83
3	16QAM	8	7	22.35	21.93	21.90
3	16QAM	15	0	21.28	21.22	21.81
Channel				19957	20175	20393
Frequency (MHz)				1710.7	1732.5	1754.3
1.4	QPSK	1	0	23.27	23.02	22.89
1.4	QPSK	1	3	23.26	23.07	23.07
1.4	QPSK	1	5	23.17	23.07	22.54
1.4	QPSK	3	0	23.29	23.11	22.92
1.4	QPSK	3	1	23.11	23.10	22.96
1.4	QPSK	3	3	22.94	23.16	22.98
1.4	QPSK	6	0	23.10	22.11	22.96
1.4	16QAM	1	0	22.77	22.22	21.99
1.4	16QAM	1	3	22.81	22.27	22.09
1.4	16QAM	1	5	22.78	22.16	22.00
1.4	16QAM	3	0	22.58	22.33	22.01
1.4	16QAM	3	1	22.65	22.26	22.04
1.4	16QAM	3	3	22.43	22.02	22.03
1.4	16QAM	6	0	21.52	21.22	21.13

LTE Band7						
BW [MHz]	Modulation	RB Size	RB Offset	Average Power Low Ch. / Freq.	Average Power Middle Ch. / Freq.	Average Power High Ch. / Freq.
Channel				20850	21100	21350
Frequency (MHz)				2510	2535	2560
20	QPSK	1	0	22.58	**22.65**	22.48
20	QPSK	1	49	21.91	22.57	22.61
20	QPSK	1	99	21.19	22.28	21.90
20	QPSK	50	0	22.13	22.24	22.34
20	QPSK	50	24	21.92	21.88	21.92
20	QPSK	50	50	21.82	21.39	21.81
20	QPSK	100	0	21.68	21.86	22.12
20	16QAM	1	0	21.49	22.60	21.95
20	16QAM	1	49	21.68	21.83	22.57
20	16QAM	1	99	22.32	21.54	21.52
20	16QAM	50	0	22.22	21.48	22.01
20	16QAM	50	24	22.12	21.29	21.88
20	16QAM	50	50	22.08	21.26	21.98
20	16QAM	100	0	21.90	22.50	22.27
Channel				20825	21100	21375
Frequency (MHz)				2507.5	2535	2562.5
15	QPSK	1	0	21.97	22.58	22.63
15	QPSK	1	37	21.78	21.85	22.60
15	QPSK	1	74	22.62	21.50	21.57
15	QPSK	36	0	21.67	21.74	22.56
15	QPSK	36	20	21.65	21.65	21.88
15	QPSK	36	39	21.79	21.03	21.18
15	QPSK	75	0	21.22	21.44	21.79
15	16QAM	1	0	21.34	22.35	22.26
15	16QAM	1	37	21.29	21.48	21.96
15	16QAM	1	74	22.24	21.11	21.85
15	16QAM	36	0	21.69	21.92	21.39
15	16QAM	36	20	21.92	21.29	21.29
15	16QAM	36	39	22.02	21.65	21.62
15	16QAM	75	0	21.43	21.62	21.07

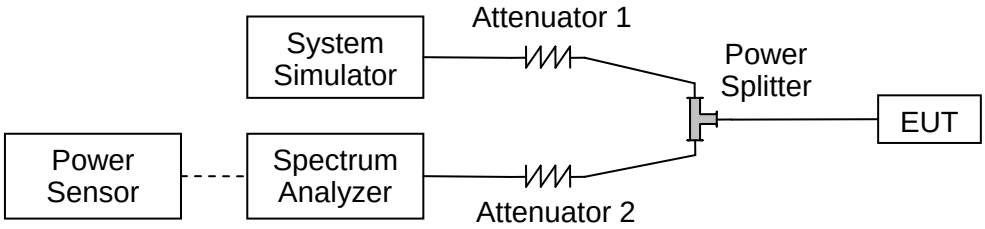
Channel				20800	21100	21400
Frequency (MHz)				2505	2535	2565
10	QPSK	1	0	21.44	22.33	22.34
10	QPSK	1	25	22.06	21.68	22.63
10	QPSK	1	49	22.39	21.43	21.91
10	QPSK	25	0	21.54	21.40	22.51
10	QPSK	25	12	21.95	21.25	21.69
10	QPSK	25	25	22.01	21.98	21.19
10	QPSK	50	0	21.76	21.24	21.99
10	16QAM	1	0	21.43	21.91	22.62
10	16QAM	1	25	21.99	21.30	21.96
10	16QAM	1	49	22.37	21.04	21.15
10	16QAM	25	0	21.75	21.15	21.36
10	16QAM	25	12	21.62	21.98	21.55
10	16QAM	25	25	21.26	21.95	21.59
10	16QAM	50	0	21.91	21.41	21.08
Channel				20775	21100	21425
Frequency (MHz)				2502.5	2535	2567.5
5	QPSK	1	0	21.25	21.35	21.54
5	QPSK	1	12	21.48	21.00	21.27
5	QPSK	1	24	21.31	21.79	21.64
5	QPSK	12	0	21.43	21.57	21.26
5	QPSK	12	7	21.18	21.44	21.32
5	QPSK	12	13	21.80	21.20	21.13
5	QPSK	25	0	21.59	21.42	21.72
5	16QAM	1	0	21.24	21.80	22.11
5	16QAM	1	12	21.13	21.98	21.77
5	16QAM	1	24	21.72	21.23	21.24
5	16QAM	12	0	21.25	21.22	21.95
5	16QAM	12	7	21.18	21.11	21.95
5	16QAM	12	13	21.29	21.09	21.00
5	16QAM	25	0	21.89	21.67	21.98

2.2. Occupied Bandwidth

2.2.1. Requirement

According to FCC section 2.1049, the occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.Occupied bandwidth is also known as the 99% emission bandwidth.

2.2.2. Test Description



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.2.3. Test procedure

KDB 971168 D01v03 Section 4.1 and ANSI/TIA-603-E-2016.

2.2.4. Test Result

LTE Band 2, BW: 1.4MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
18607	1850.7	1.1036	1.330	1.1004	1.296
18900	1880.0	1.1081	1.298	1.1009	1.318
19192	1909.2	1.0989	1.298	1.0886	1.243

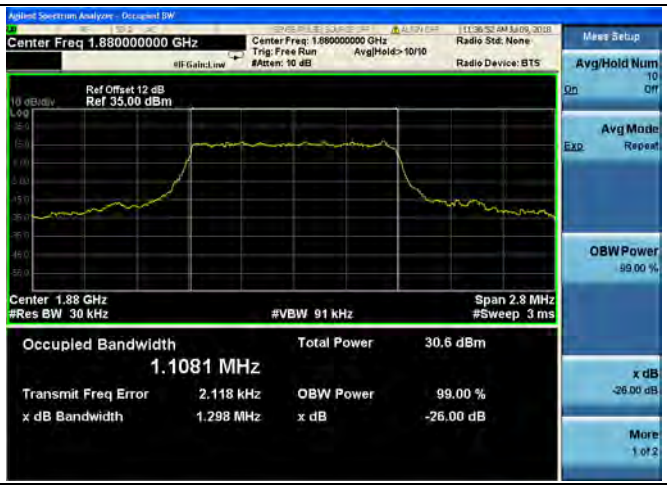
LTE Band 2, BW: 3MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
18615	1851.5	2.7162	3.012	2.6982	2.955
18900	1880.0	2.7129	3.011	2.7112	3.021
19184	1908.4	2.7049	2.941	2.7104	3.010
LTE Band 2, BW: 5MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
18625	1852.5	4.5159	5.032	4.5177	5.012
18900	1880.0	4.5167	5.041	4.5180	5.052
19175	1907.5	4.5287	5.030	4.5120	4.872
LTE Band 2, BW: 10MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
18650	1855.0	8.9883	9.679	8.9769	9.825
18900	1880.0	9.0091	10.13	9.0028	9.877
19150	1905.0	9.0133	9.981	8.9723	9.643
LTE Band 2, BW: 15MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
18675	1857.5	13.471	14.74	13.437	14.58
18900	1880.0	13.547	14.79	13.507	14.72
19125	1902.5	13.534	14.78	13.546	14.69
LTE Band 2, BW: 20MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
18700	1860.0	17.969	20.68	17.998	20.28
18900	1880.0	18.058	19.84	18.105	19.97
19100	1900.0	18.122	20.90	18.118	20.62

LTE Band 2 99%&26dB Bandwidth

1.4MHz/QPSK/Low CH

1.4MHz/16QAM/Low CH

1.4MHz/QPSK/Mid CH



1.4MHz/16QAM/Mid CH

1.4MHz/QPSK/High CH	1.4MHz/16QAM/High CH

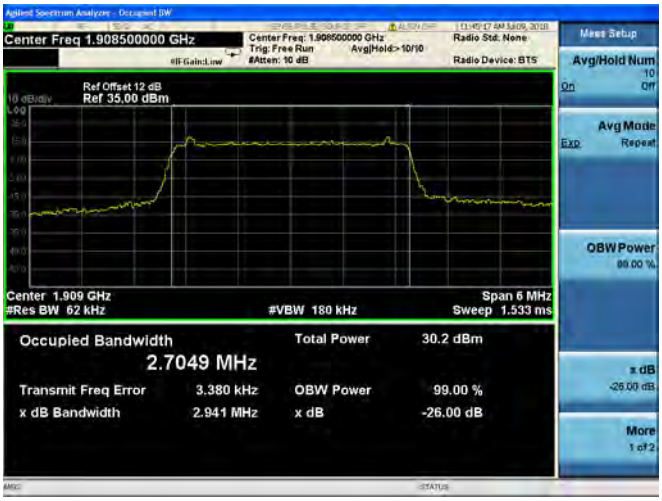
3MHz/QPSK/Low CH

3MHz/16QAM/Low CH

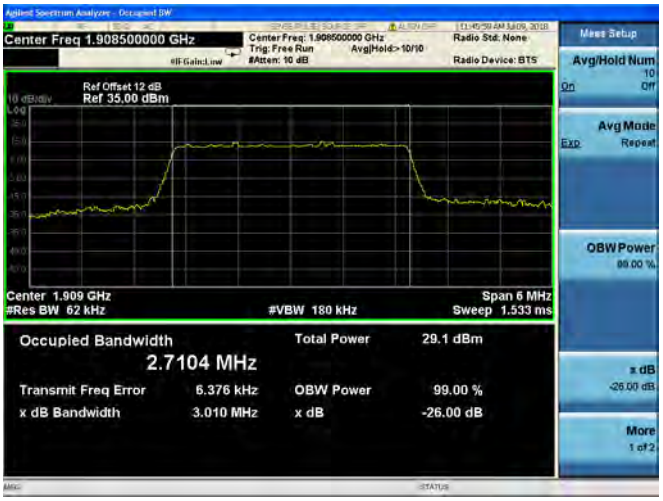
3MHz/QPSK/Mid CH

3MHz/16QAM/Mid CH

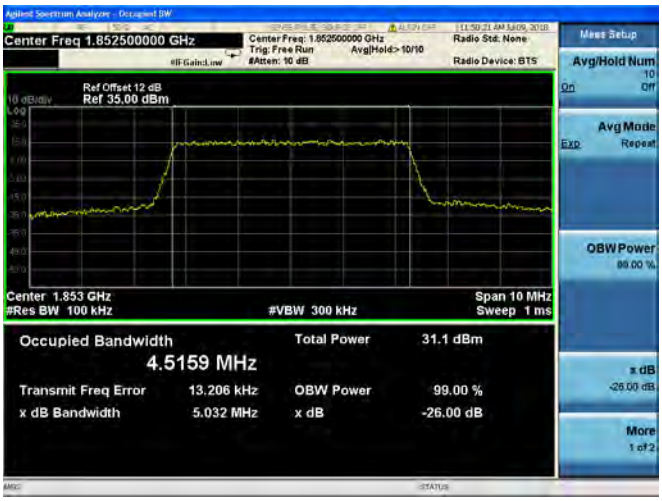
3MHz/QPSK/High CH



3MHz/16QAM/High CH



5MHz/QPSK/Low CH

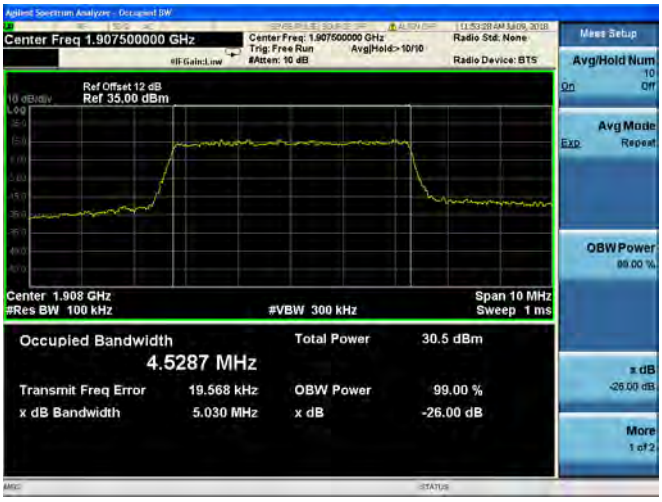


5MHz/16QAM/Low CH

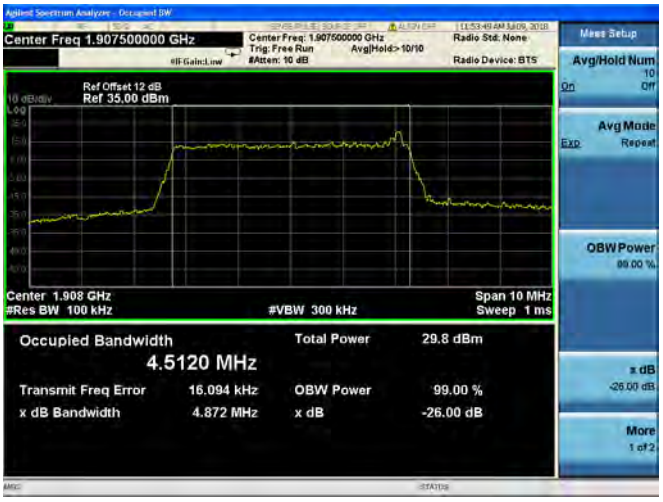
5MHz/QPSK/Mid CH

5MHz/16QAM/Mid CH

5MHz/QPSK/High CH



5MHz/16QAM/High CH



10MHz/QPSK/Low CH

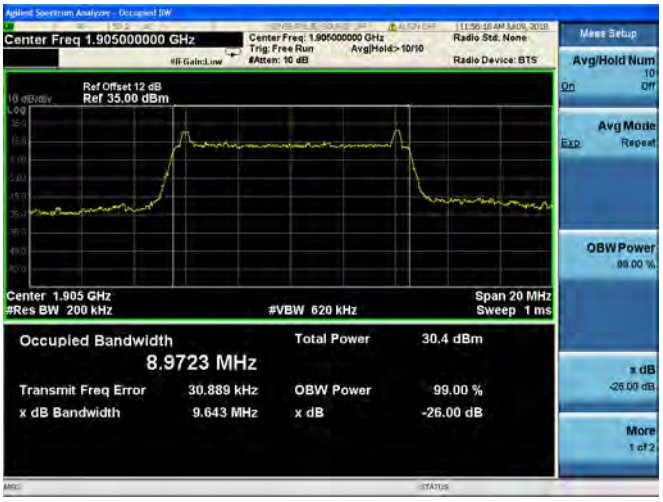
10MHz/16QAM/Low CH

10MHz/QPSK/Mid CH

10MHz/16QAM/Mid CH

10MHz/QPSK/High CH

10MHz/16QAM/High CH



15MHz/QPSK/Low CH

15MHz/16QAM/Low CH

15MHz/QPSK/Mid CH

15MHz/16QAM/Mid CH

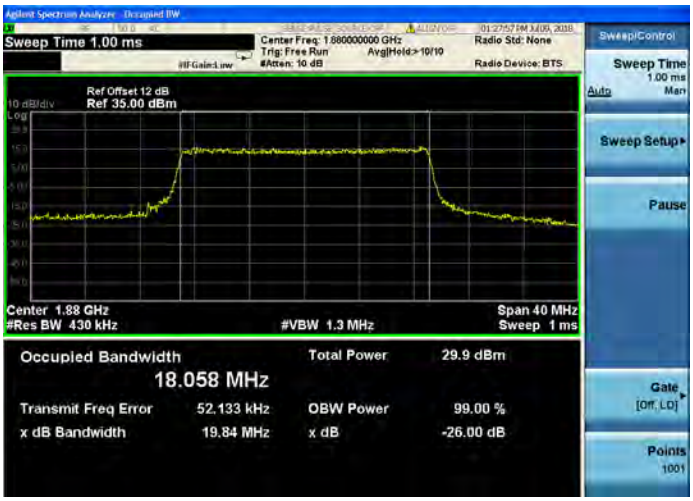
15MHz/QPSK/High CH

15MHz/16QAM/High CH

20MHz/QPSK/Low CH

20MHz/16QAM/Low CH

20MHz/QPSK/Mid CH



20MHz/16QAM/Mid CH

20MHz/QPSK/High CH

20MHz/16QAM/High CH

LTE Band 4, BW: 1.4MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
19957	1710.7	1.1319	2.015	1.1239	2.123
20175	1732.5	1.1065	1.364	1.1093	1.349
20392	1754.2	1.1078	1.319	1.1002	1.312
LTE Band 4, BW: 3MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
19965	1711.5	2.7320	4.657	2.7201	4.788
20175	1732.5	2.7074	3.042	2.7085	2.998
20384	1753.4	2.7150	3.004	2.7070	3.019
LTE Band 4, BW: 5MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
19975	1712.5	4.5567	7.342	4.5531	6.597
20175	1732.5	4.5148	4.980	4.5264	5.020
20375	1752.5	4.5146	5.000	4.5290	5.005
LTE Band 4, BW: 10MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20000	1715.0	9.0621	13.76	9.0397	11.66
20175	1732.5	8.9837	10.04	8.9839	9.846
20350	1750.0	9.0339	10.03	9.0216	10.04
LTE Band 4, BW: 15MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20025	1717.5	13.519	14.99	13.530	15.29
20175	1732.5	13.592	20.55	13.577	20.19
20325	1747.5	13.543	14.93	13.523	14.85

LTE Band 4, BW: 20MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20050	1720.0	17.923	19.50	17.942	19.52
20175	1732.5	18.006	22.41	17.985	19.67
20300	1745.0	17.982	19.61	17.940	19.40

LTE Band 4 99%&26dB Bandwidth

1.4MHz/QPSK/Low CH

1.4MHz/16QAM/Low CH

1.4MHz/QPSK/Mid CH

1.4MHz/16QAM/Mid CH

1.4MHz/QPSK/High CH	1.4MHz/16QAM/High CH

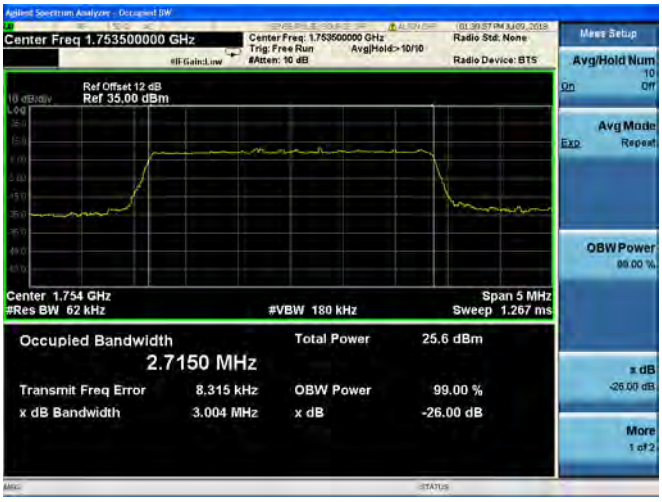
3MHz/QPSK/Low CH

3MHz/16QAM/Low CH

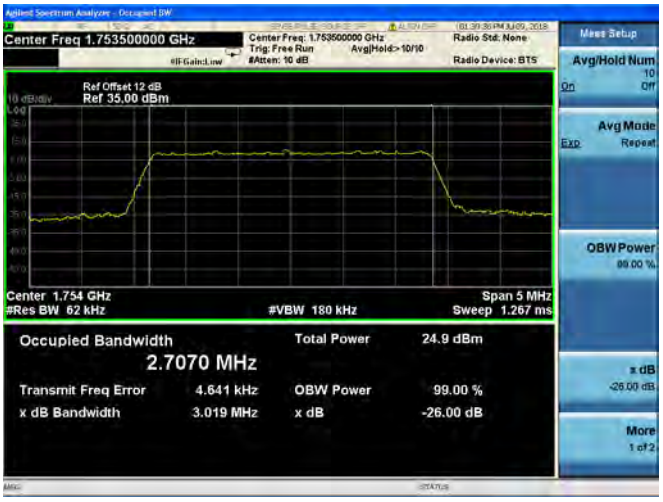
3MHz/QPSK/Mid CH

3MHz/16QAM/Mid CH

3MHz/QPSK/High CH



3MHz/16QAM/High CH



5MHz/QPSK/Low CH

5MHz/16QAM/Low CH

5MHz/QPSK/Mid CH

5MHz/16QAM/Mid CH

5MHz/QPSK/High CH

5MHz/16QAM/High CH

10MHz/QPSK/Low CH

10MHz/16QAM/Low CH

10MHz/QPSK/Mid CH

10MHz/16QAM/Mid CH

10MHz/QPSK/High CH

10MHz/16QAM/High CH

15MHz/QPSK/Low CH

15MHz/16QAM/Low CH

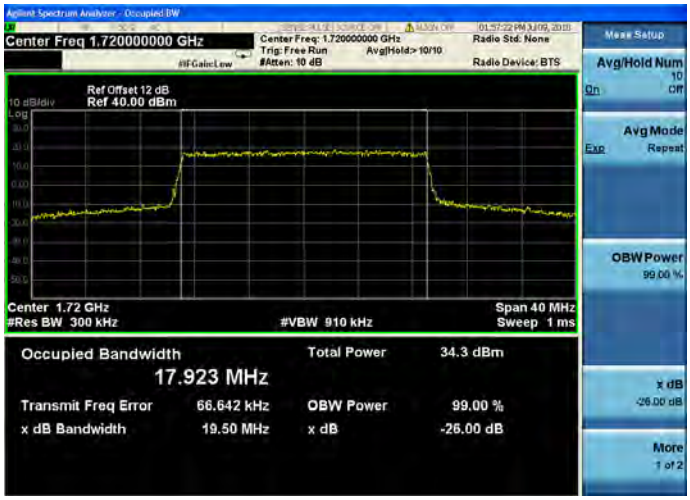
15MHz/QPSK/Mid CH

15MHz/16QAM/Mid CH

15MHz/QPSK/High CH

15MHz/16QAM/High CH

20MHz/QPSK/Low CH



20MHz/16QAM/Low CH

20MHz/QPSK/Mid CH

20MHz/16QAM/Mid CH

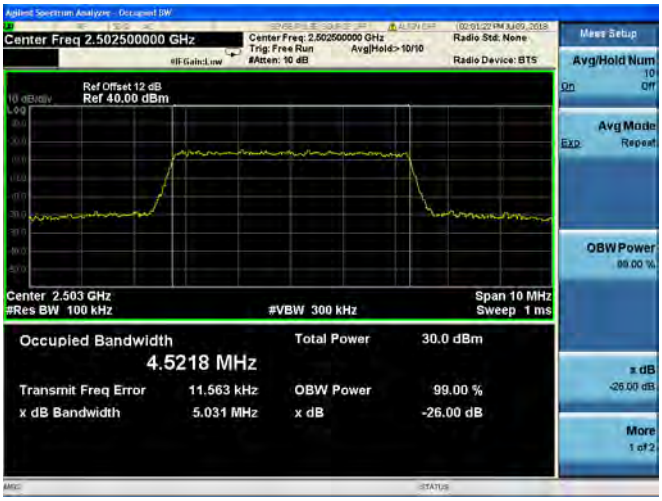
20MHz/QPSK/High CH

20MHz/16QAM/High CH

LTE Band 7, BW: 5MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20775	2502.5	4.5218	5.031	4.5250	5.042
21100	2535.0	4.5208	4.978	4.5140	5.107
21425	2567.5	4.5071	4.981	4.5198	5.000
LTE Band 7, BW: 10MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20800	2505.0	8.9891	9.999	8.9725	9.791
21100	2535.0	8.9870	9.909	8.9955	9.835
21400	2565.0	8.9790	9.905	8.9682	9.876
LTE Band 7, BW: 15MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20825	2507.5	13.445	14.59	13.453	14.59
21100	2535.0	13.418	14.45	13.416	14.49
21375	2562.5	13.444	14.61	13.435	14.52
LTE Band 7, BW: 20MHz					
Channel	Frequency (MHz)	QPSK		16QAM	
		99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)
20850	2510.0	18.010	19.57	18.039	19.78
21100	2535.0	17.937	19.36	17.904	19.37
21350	2560.0	17.971	19.61	17.934	19.47

LTE Band 7 99%&26dB Bandwidth

5MHz/QPSK/Low CH



5MHz/16QAM/Low CH

5MHz/QPSK/Mid CH

5MHz/16QAM/Mid CH

5MHz/QPSK/High CH	5MHz/16QAM/High CH

10MHz/QPSK/Low CH

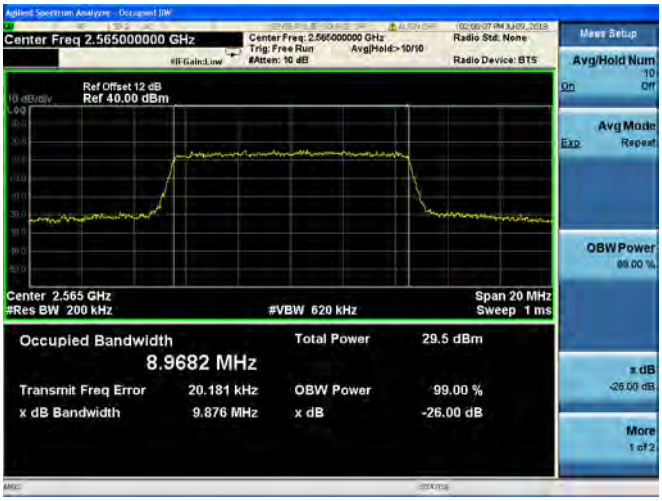
10MHz/16QAM/Low CH

10MHz/QPSK/Mid CH

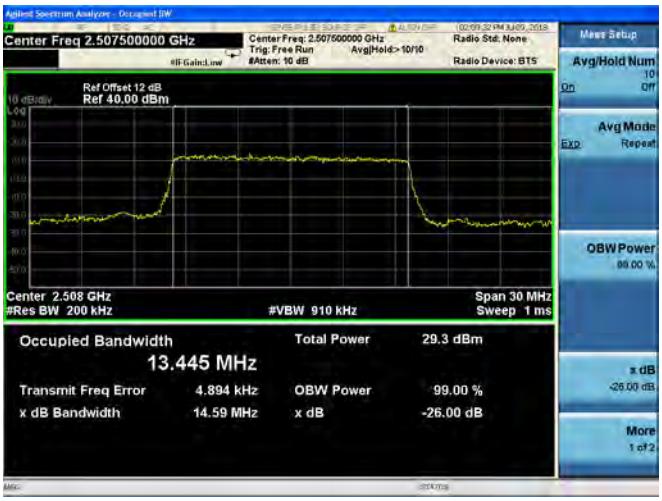
10MHz/16QAM/Mid CH

10MHz/QPSK/High CH

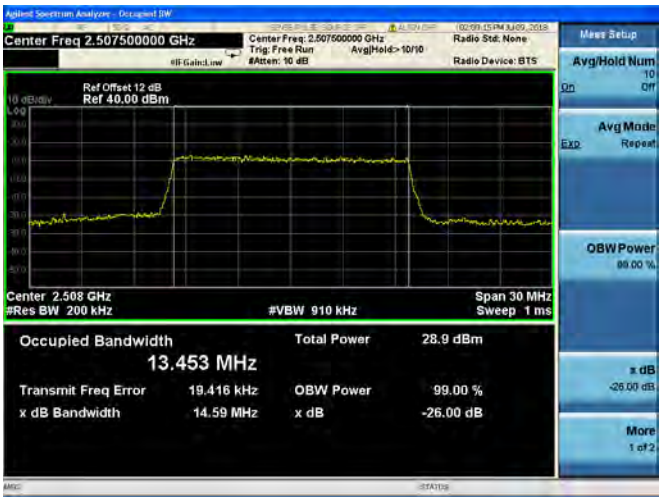
10MHz/16QAM/High CH



15MHz/QPSK/Low CH

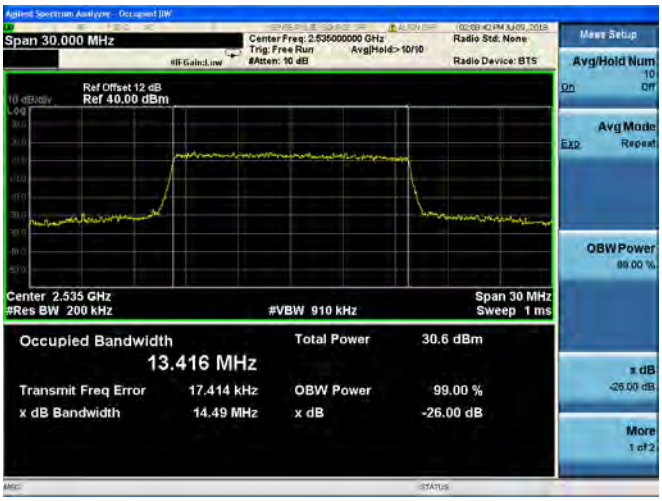


15MHz/16QAM/Low CH

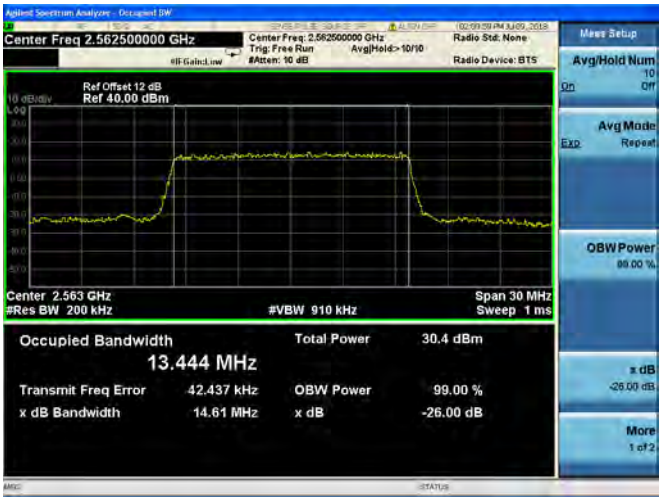


15MHz/QPSK/Mid CH

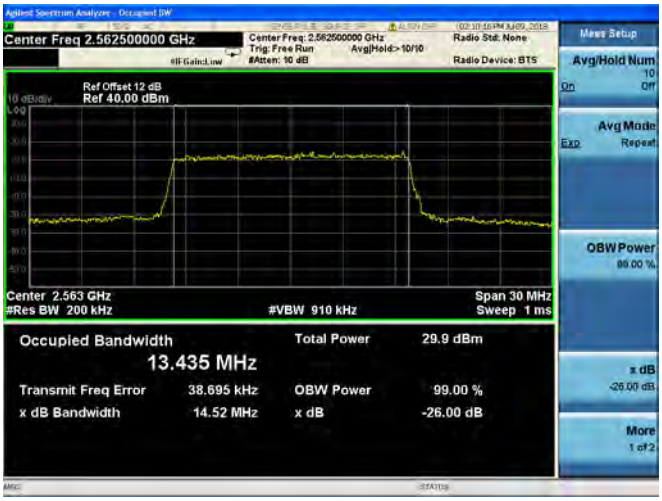
15MHz/16QAM/Mid CH



15MHz/QPSK/High CH



15MHz/16QAM/High CH

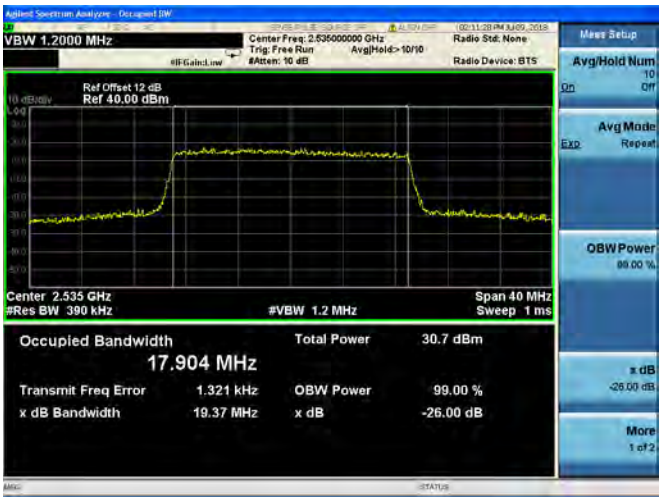


20MHz/QPSK/Low CH

20MHz/16QAM/Low CH

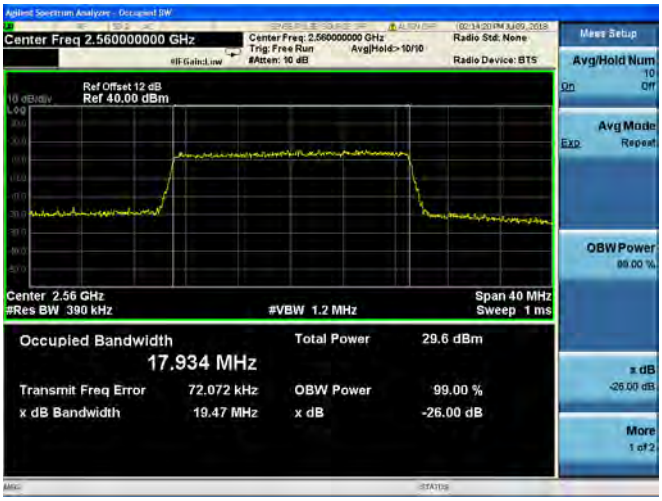
20MHz/QPSK/Mid CH

20MHz/16QAM/Mid CH



20MHz/QPSK/High CH

20MHz/16QAM/High CH



2.3. Frequency Stability

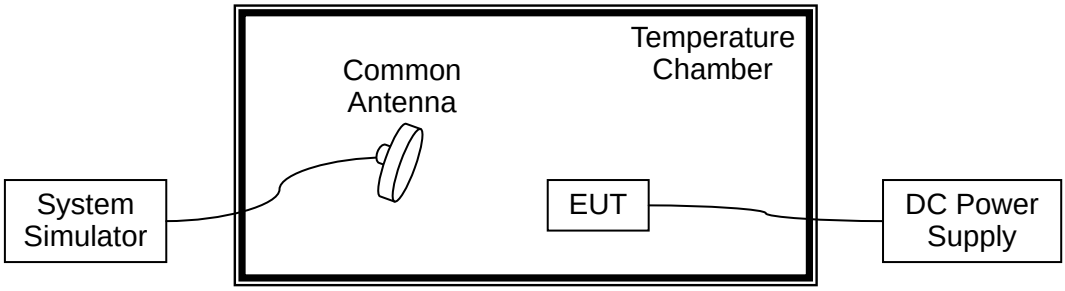
2.3.1. Requirement

According to FCC section 2.1055 & 27.54&24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. According to FCC section 2.1055, the test conditions are:

(a) The temperature is varied from -30°C to +50°C at intervals of not more than 10°C.

(b) For hand carried battery powered equipment, the primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacture. The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

2.3.2. Test Description



The EUT which is powered by the DC Power Supply directly, is located in the Temperature Chamber. The EUT is commanded by the System Simulator (SS) to operate at the maximum output power. A call is established between the EUT and the SS via a Common Antenna.

2.3.3. Test procedure

KDB 971168 D01v03 Section 9.0 and ANSI/TIA-603-E-2016.

2.3.4. Test Result

The nominal, highest and lowest extreme voltages are separately 3.8VDC, 4.35VDC and 3.6VDC, which are specified by the applicant; the normal temperature here used is 20°C. The frequency deviation limit is ±2.5ppm.

The testing was performed using one RB and Bandwidth setting for each band.

LTE Band 2 – QPSK - Channel 18900 – Frequency 1880.0MHz – RB 6/0 Limit: 1880.0MHz*1ppm=1880.0Hz				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Result**
100	3.85V	-30	24.89	PASS
100		-20	38.66	
100		-10	41.47	
100		0	13.21	
100		+10	10.35	
100		+20	-12.03	
100		+30	21.03	
100		+40	25.80	
100		+50	27.93	
115	4.40V	+20	13.71	
85	3.55V	+20	25.57	

LTE Band 4 – QPSK - Channel 20175 – Frequency 1732.5MHz – RB 6/0 Limit: 1732.5MHz*2.5ppm=4331.25Hz				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Result**
100	3.85V	-30	24.43	PASS
100		-20	-15.01	
100		-10	34.03	
100		0	44.86	
100		+10	41.87	
100		+20	31.00	
100		+30	38.12	
100		+40	17.07	
100		+50	29.71	
115	4.40V	+20	42.55	
85	3.55V	+20	33.57	

LTE Band 7 – QPSK - Channel 21100 – Frequency 2535MHz – RB 25/0 Limit: 2535MHz*2.5ppm=6337.5Hz				
Voltage (%)	**Power (VDC)**	**Temp (°C)**	**Fre. Dev. (Hz)**	**Result**
100	3.85V	-30	13.46	PASS
100		-20	-18.35	
100		-10	-20.61	
100		0	-18.43	
100		+10	-19.86	
100		+20	-13.49	
100		+30	-10.98	
100		+40	-16.94	
100		+50	-10.70	
115	4.40V	+20	-25.20	
85	3.55V	+20	-16.44	

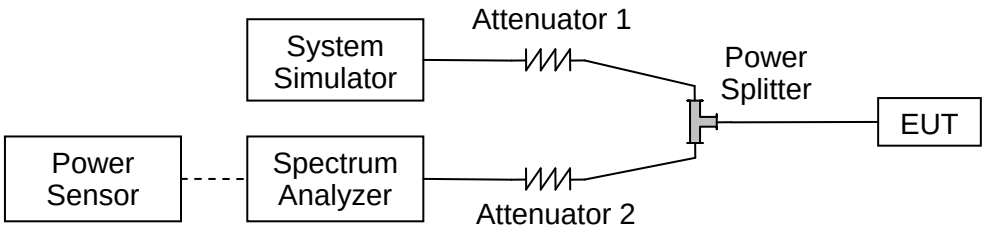
2.4. Peak to Average Ratio

2.4.1. Requirement

According to FCC section 24.232(d), the peak to average ratio (PAR) of the transmission may not exceed 13dB.

2.4.2. Test Description

A. Test Set:



The EUT is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. The EUT is commanded by the SS to operate at the maximum output power. A call is established between the EUT and the SS.

2.4.3. Test procedure

KDB 971168 D01v03 Section 5.7 and ANSI/TIA-603-E-2016.

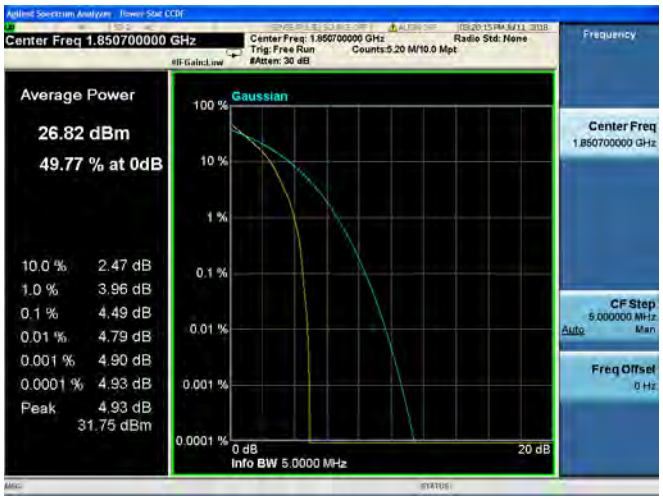
2.4.4. Test Result

Record the maximum PAPR level associated with a probability of 0.1%.

LTE Band 2, BW: 1.4MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18607	1850.7	4.49	5.11
18900	1880.0	4.33	5.15
19192	1909.2	4.15	5.39
LTE Band 2, BW: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18615	1851.5	4.48	5.28
18900	1880.0	4.96	5.32
19184	1908.4	4.55	5.35
LTE Band 2, BW: 5MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18625	1852.5	4.36	5.16
18900	1880.0	4.42	5.17
19175	1907.5	4.44	5.31
LTE Band 2, BW: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18650	1855.0	4.51	5.27
18900	1880.0	4.57	5.32
19150	1905.0	4.66	5.41
LTE Band 2, BW: 15MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18675	1857.5	4.71	5.39
18900	1880.0	4.82	5.47
19125	1902.5	4.84	5.54
LTE Band 2, BW: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18700	1860.0	4.61	5.35
18900	1880.0	4.67	5.37
19100	1900.0	4.78	5.48

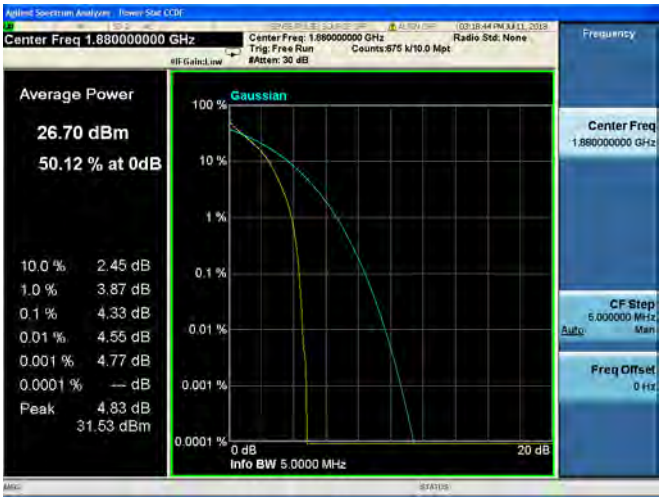
LTE Band 2 Peak to Average Ratio

1.4MHz/QPSK/Low CH

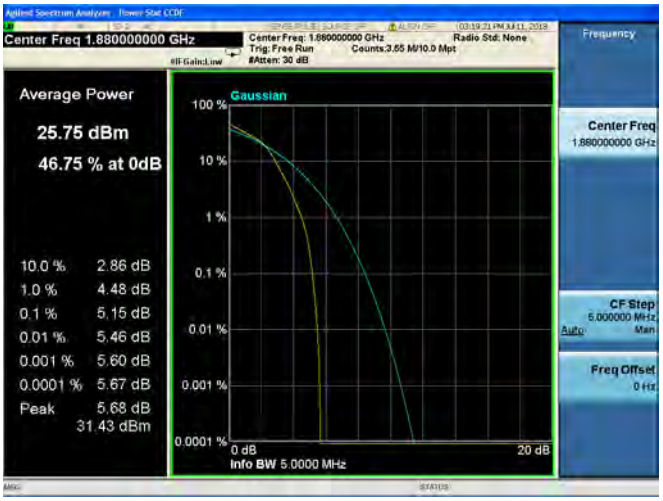


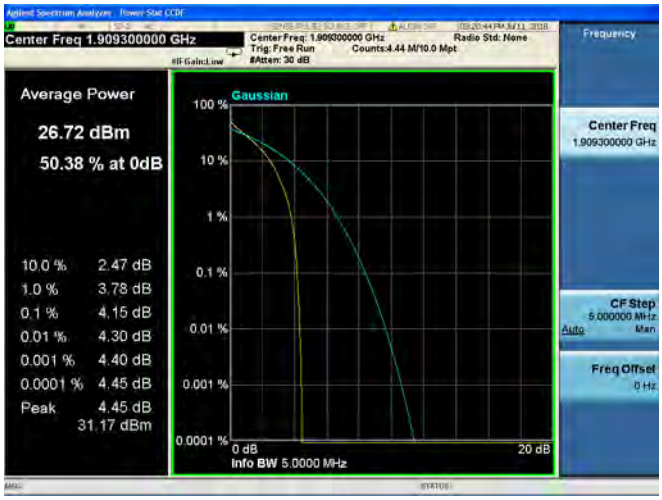
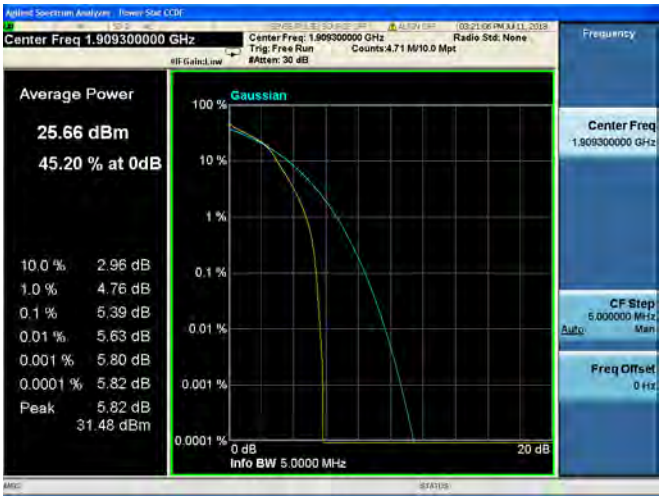
1.4MHz/16QAM/Low CH

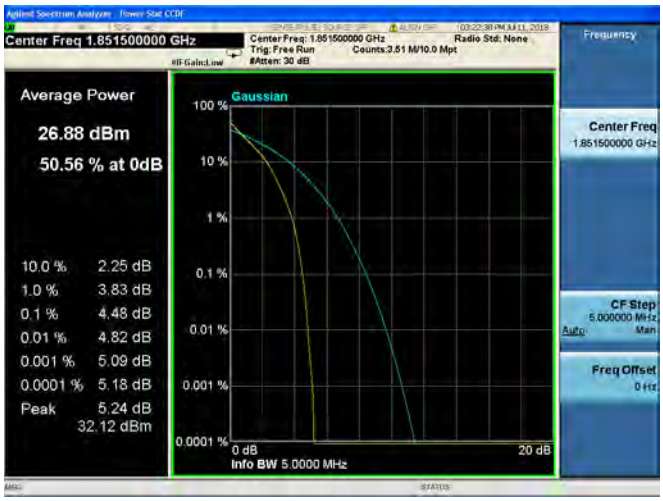
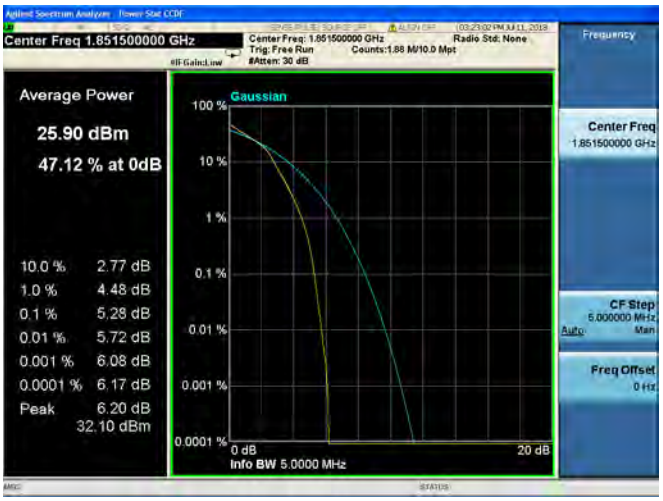
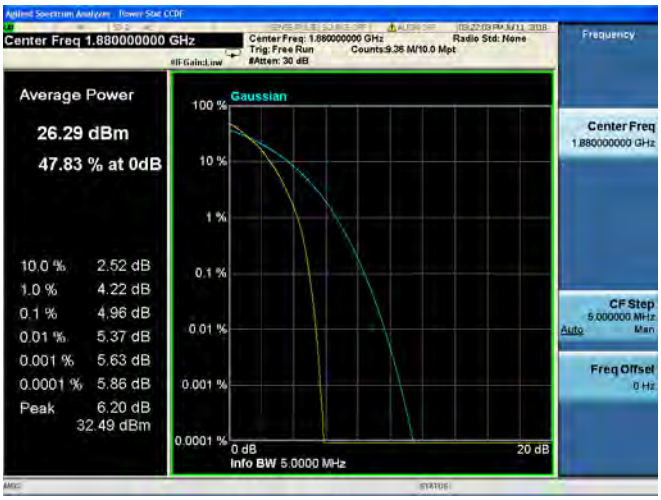
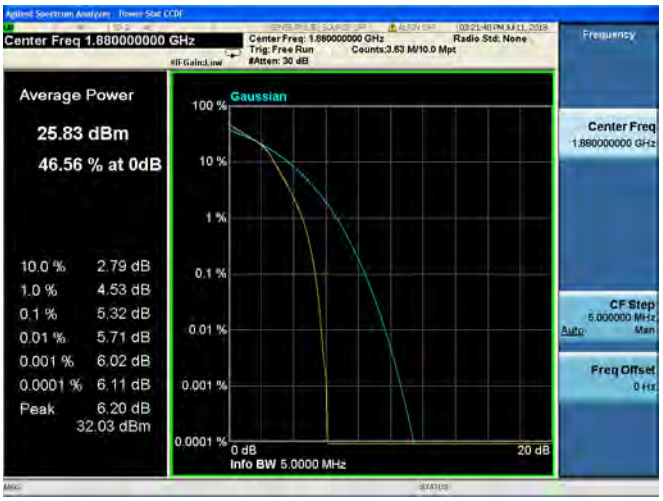
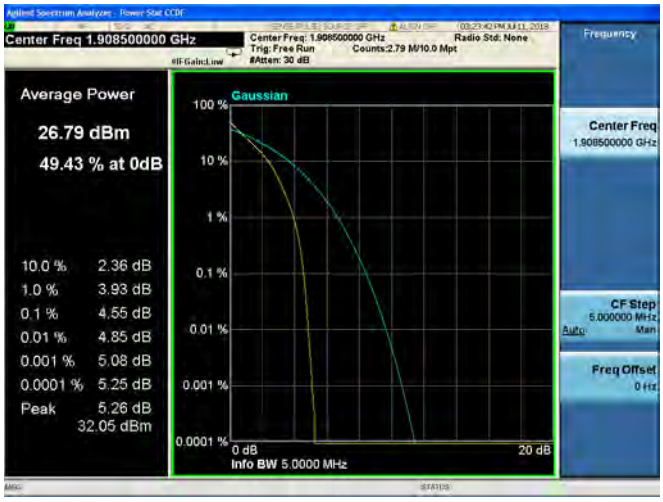
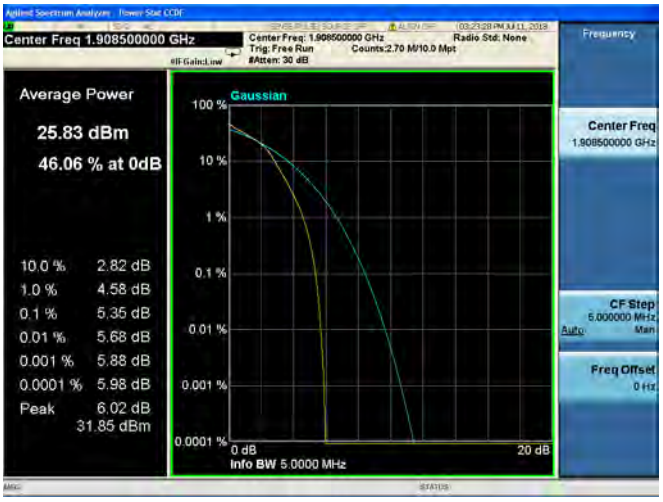
1.4MHz/QPSK/Mid CH



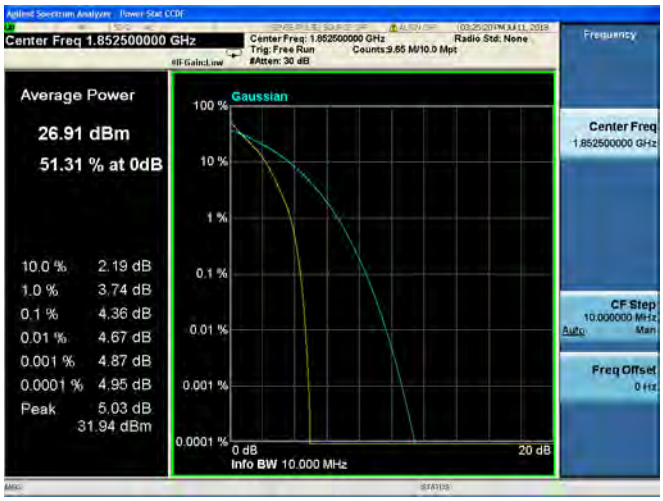
1.4MHz/16QAM/Mid CH



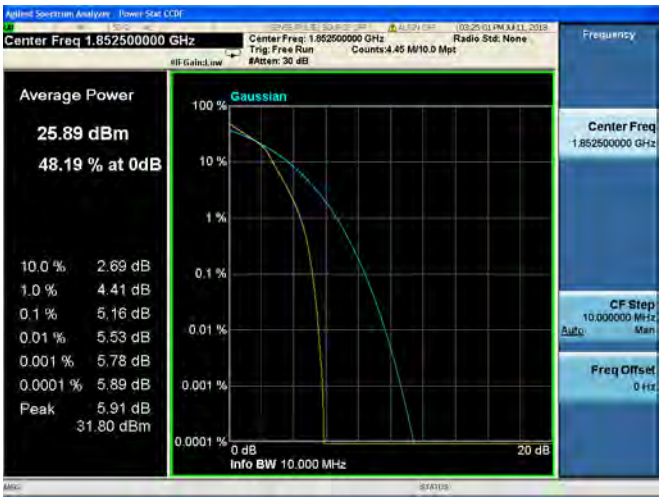
1.4MHz/QPSK/High CH	1.4MHz/16QAM/High CH
	

3MHz/QPSK/Low CH	3MHz/16QAM/Low CH
	
3MHz/QPSK/Mid CH	**3MHz/16QAM/Mid CH**
	
3MHz/QPSK/High CH	**3MHz/16QAM/High CH**
	

5MHz/QPSK/Low CH

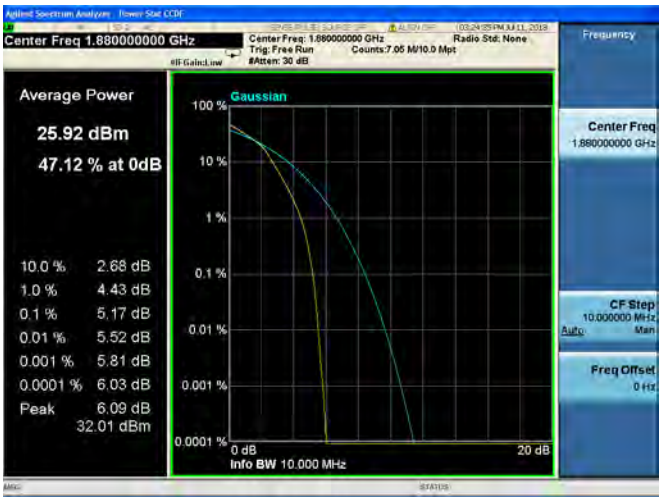


5MHz/16QAM/Low CH

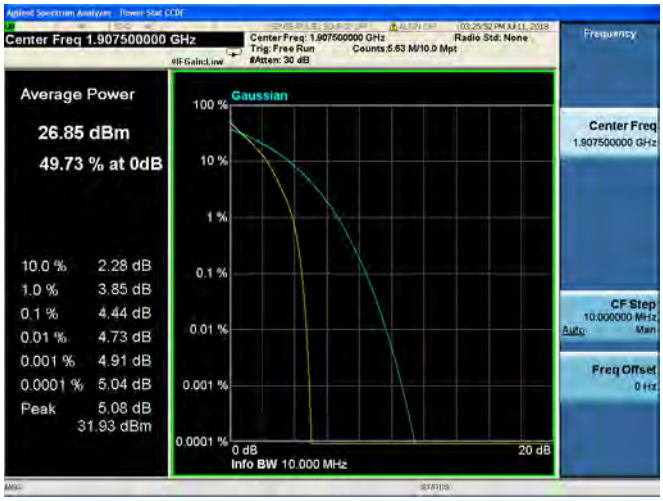


5MHz/QPSK/Mid CH

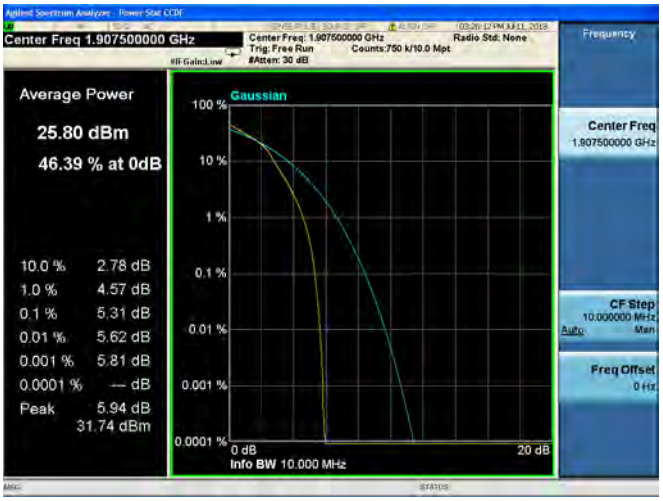
5MHz/16QAM/Mid CH

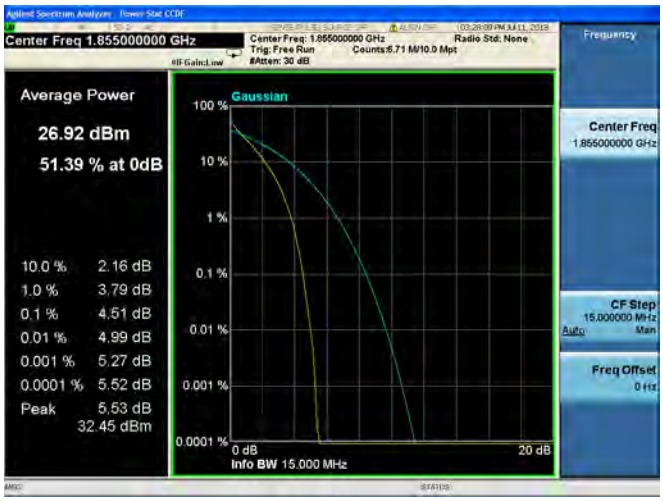
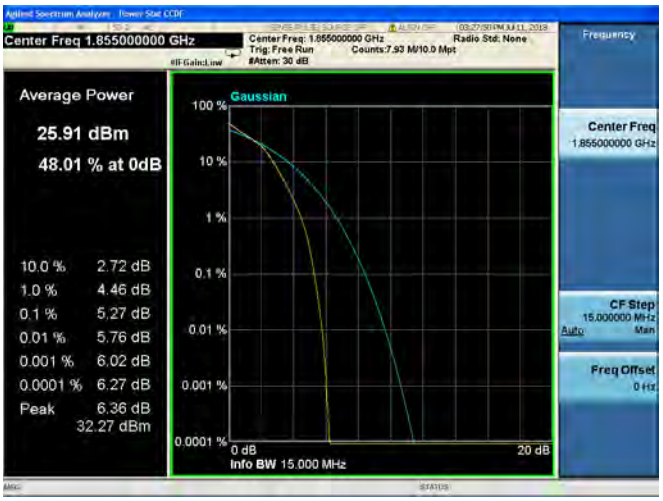
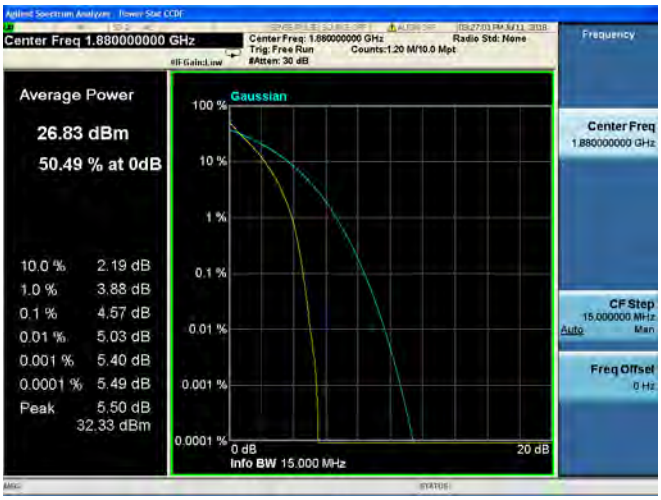
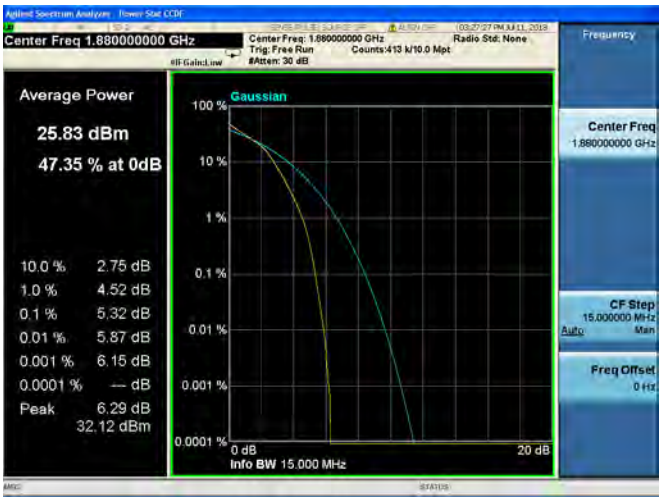
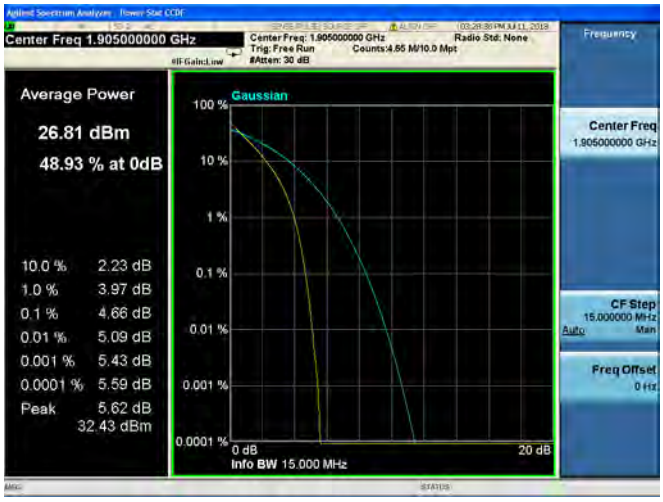
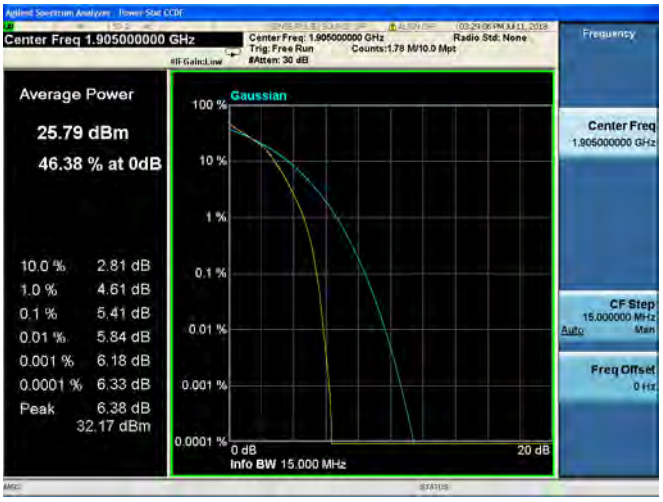


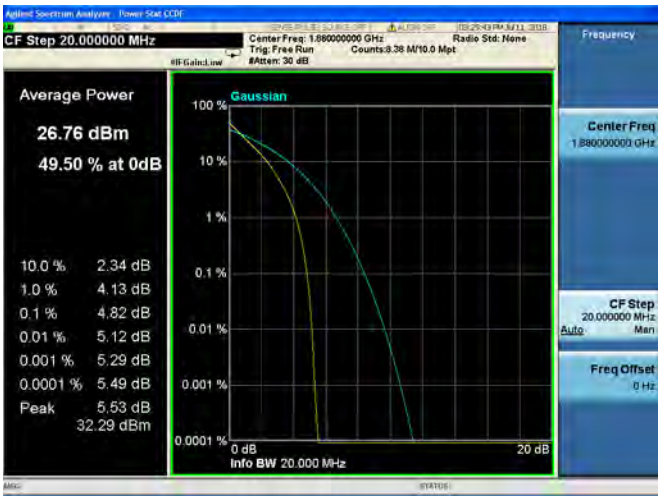
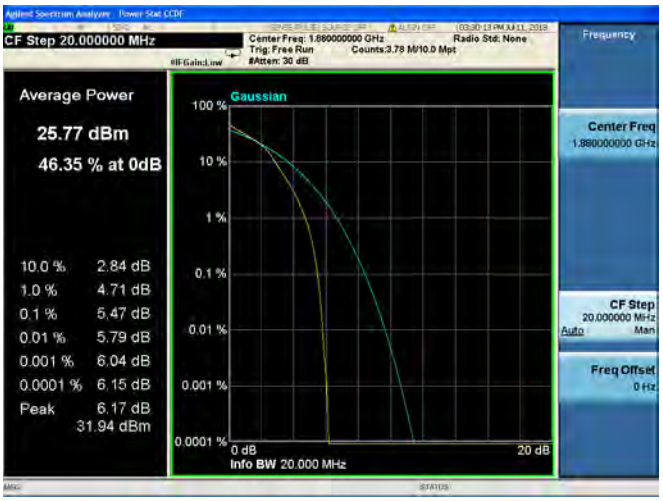
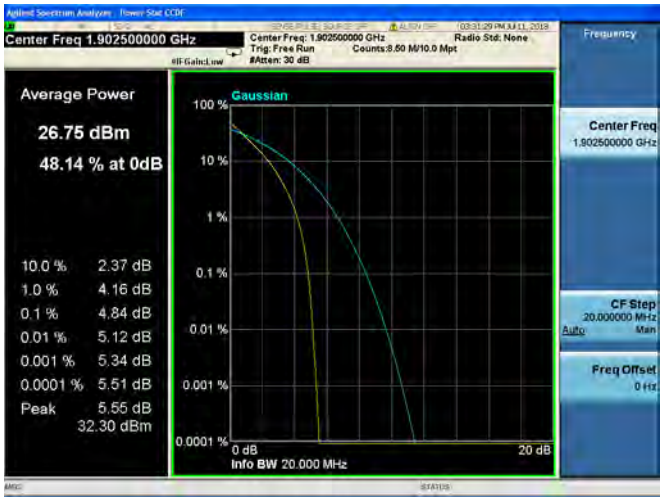
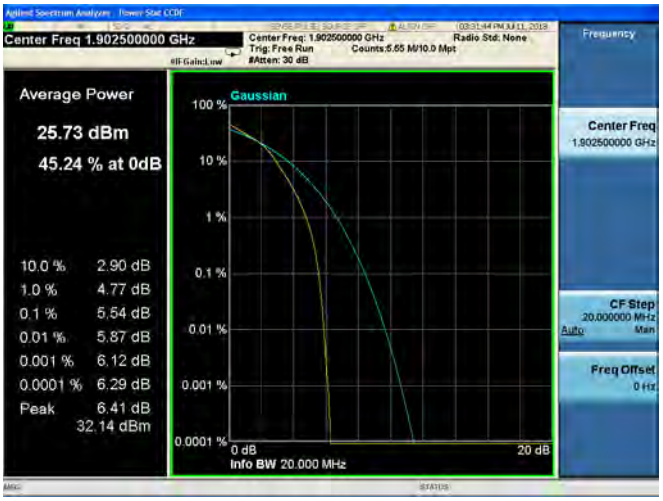
5MHz/QPSK/High CH



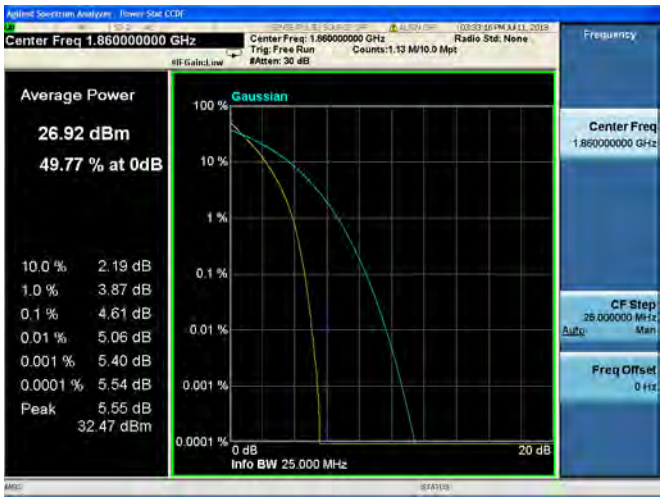
5MHz/16QAM/High CH



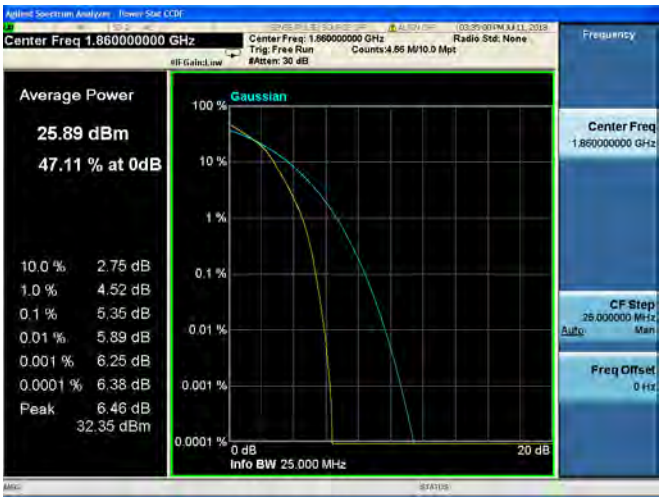
10MHz/QPSK/Low CH	10MHz/16QAM/Low CH
	
10MHz/QPSK/Mid CH	**10MHz/16QAM/Mid CH**
	
10MHz/QPSK/High CH	**10MHz/16QAM/High CH**
	

15MHz/QPSK/Low CH	15MHz/16QAM/Low CH
15MHz/QPSK/Mid CH	**15MHz/16QAM/Mid CH**
	
15MHz/QPSK/High CH	**15MHz/16QAM/High CH**
	

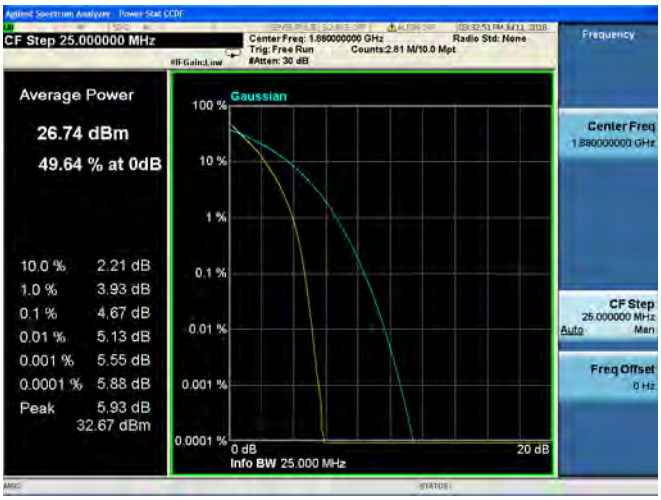
20MHz/QPSK/Low CH



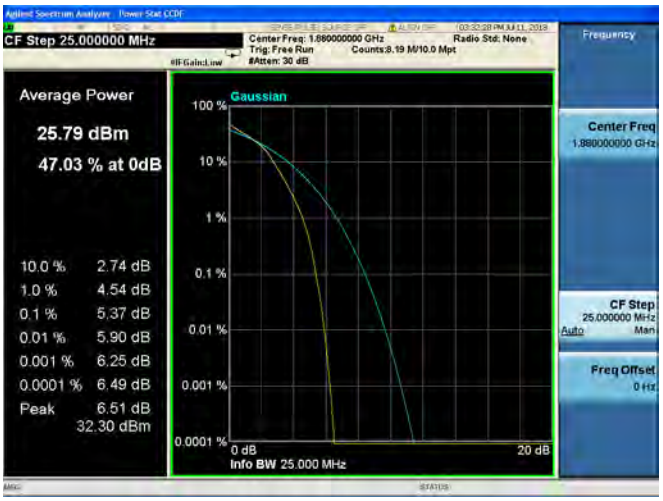
20MHz/16QAM/Low CH



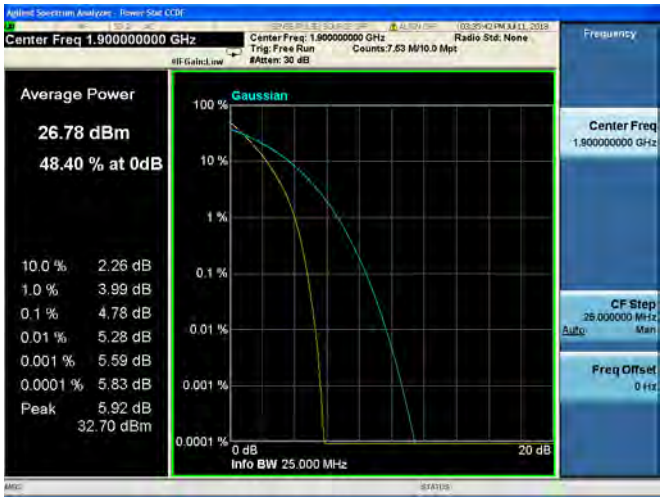
20MHz/QPSK/Mid CH



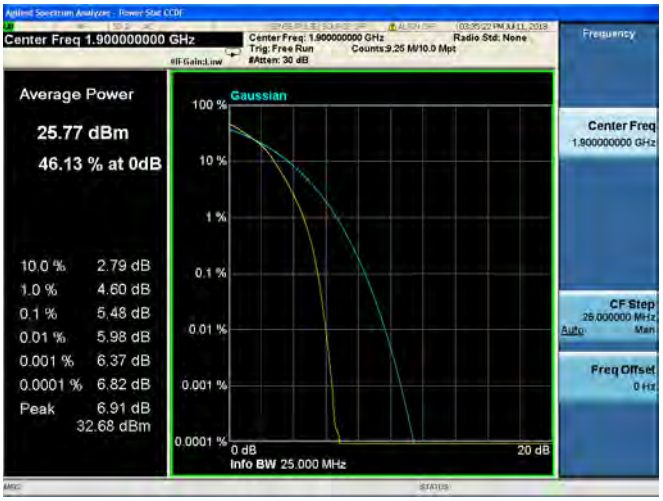
20MHz/16QAM/Mid CH



20MHz/QPSK/High CH



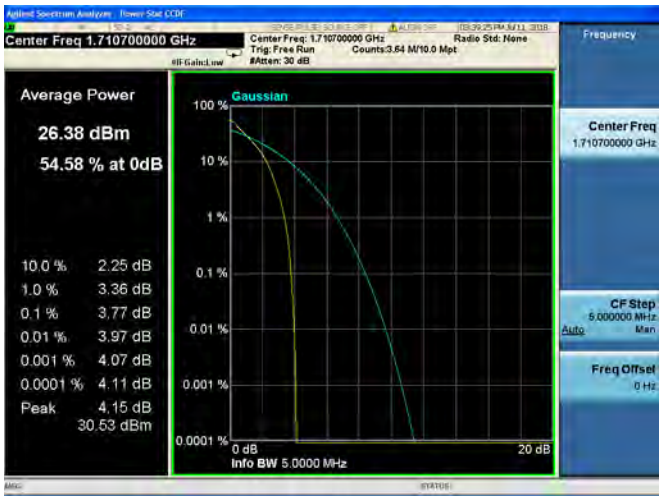
20MHz/16QAM/High CH



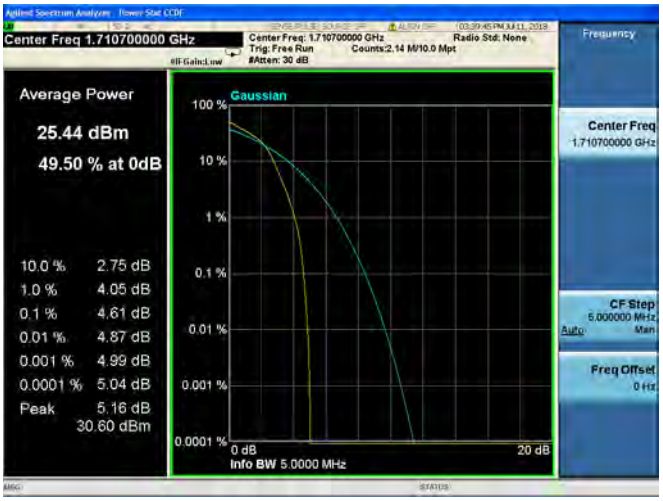
LTE Band 4, BW: 1.4MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18607	1850.7	3.77	4.61
18900	1880.0	3.56	4.40
19192	1909.2	3.78	4.67
LTE Band 4, BW: 3MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18615	1851.5	4.07	4.90
18900	1880.0	3.83	4.60
19184	1908.4	4.07	4.66
LTE Band 4, BW: 5MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18625	1852.5	3.93	4.79
18900	1880.0	3.55	4.38
19175	1907.5	3.86	4.67
LTE Band 4, BW: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18650	1855.0	4.26	5.05
18900	1880.0	3.86	4.61
19150	1905.0	4.07	4.88
LTE Band 4, BW: 15MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18675	1857.5	4.33	5.09
18900	1880.0	4.09	4.78
19125	1902.5	4.26	4.98
LTE Band 4, BW: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
18700	1860.0	4.16	4.95
18900	1880.0	4.04	4.77
19100	1900.0	4.20	4.94

LTE Band 4 Peak to Average Ratio

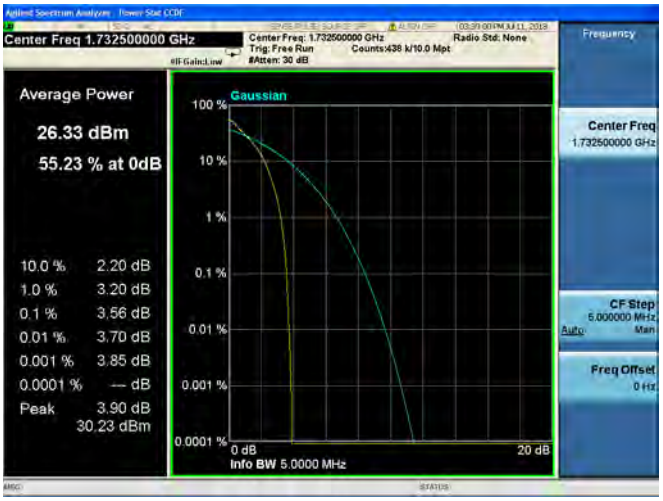
1.4MHz/QPSK/Low CH



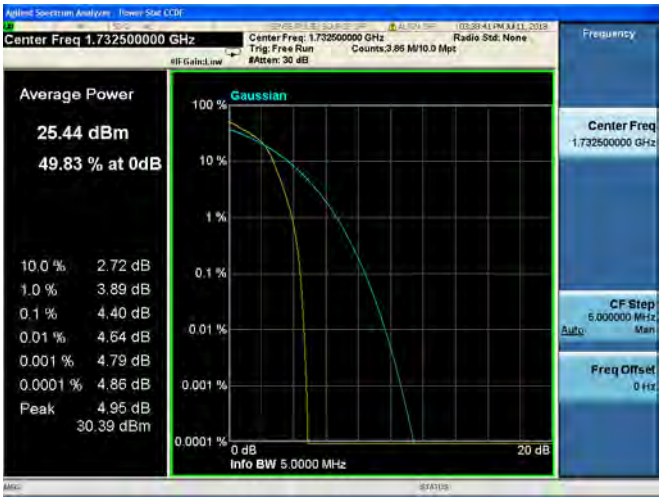
1.4MHz/16QAM/Low CH

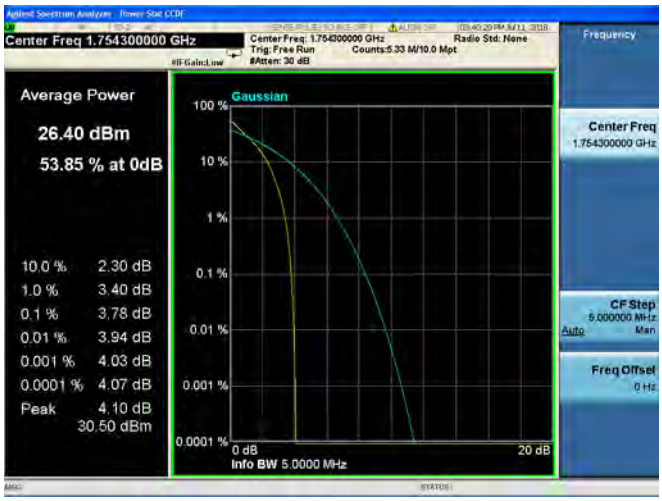
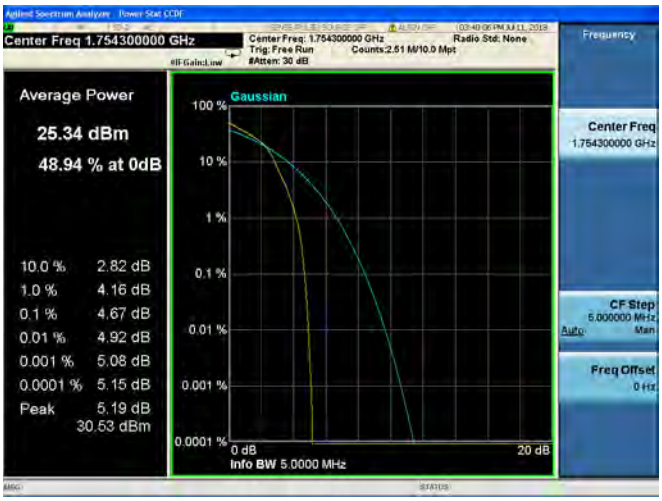


1.4MHz/QPSK/Mid CH

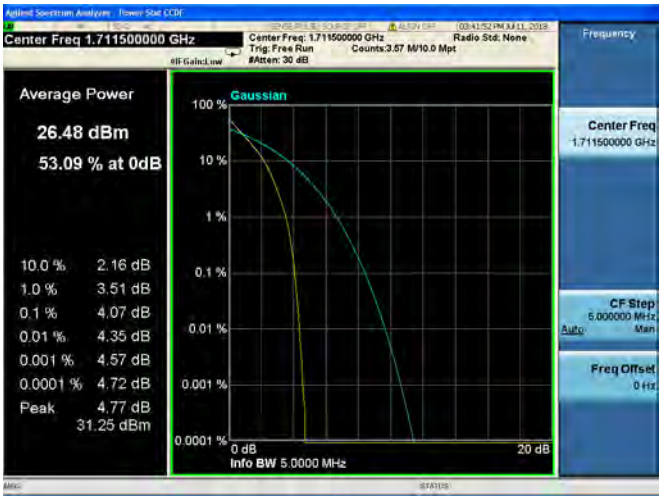


1.4MHz/16QAM/Mid CH

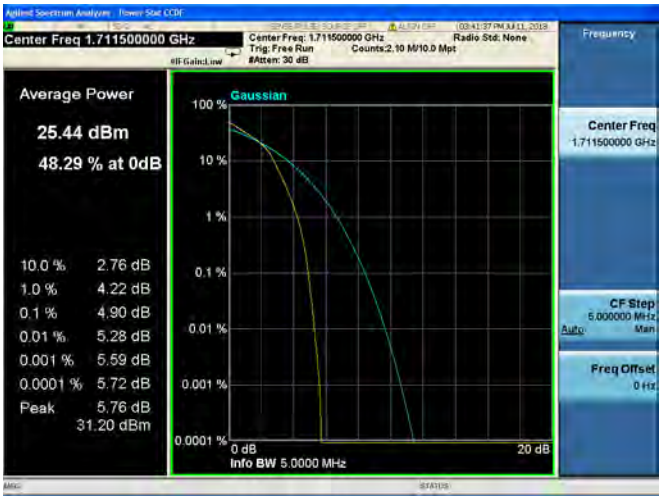


1.4MHz/QPSK/High CH	1.4MHz/16QAM/High CH
	

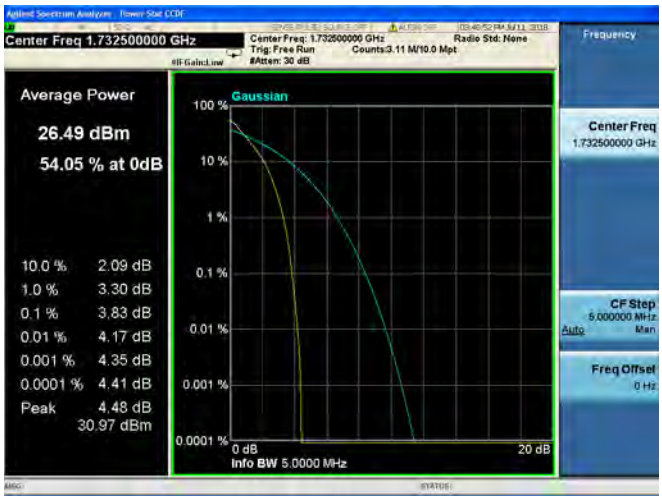
3MHz/QPSK/Low CH



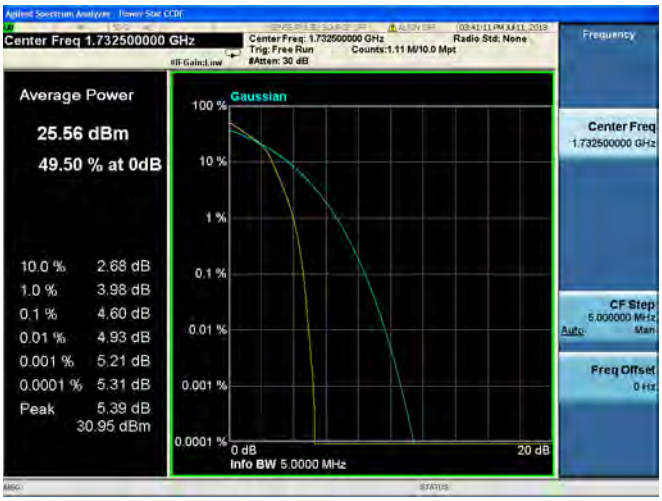
3MHz/16QAM/Low CH



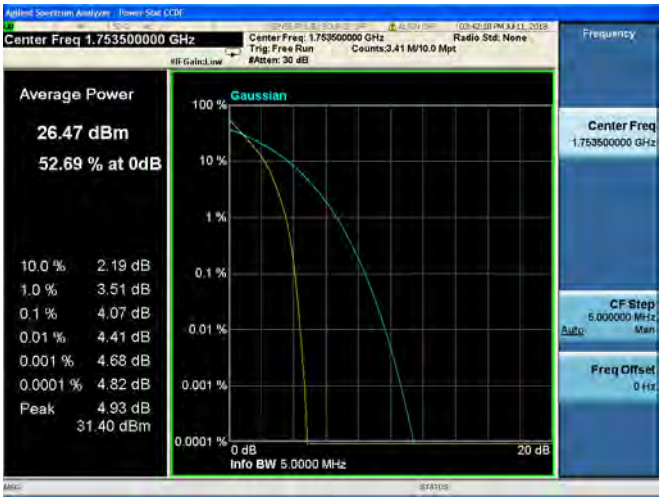
3MHz/QPSK/Mid CH



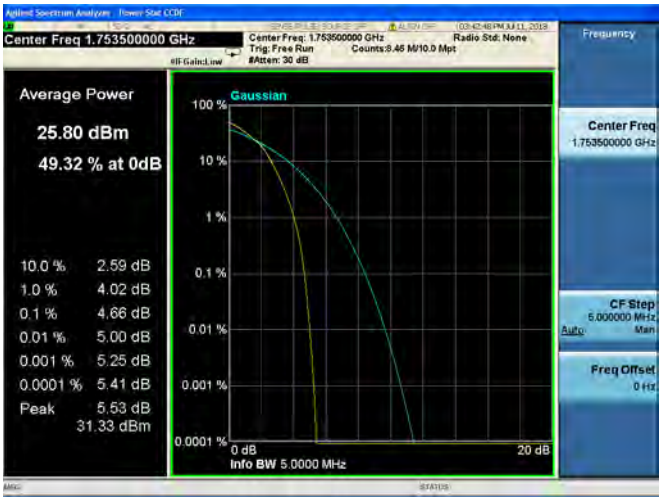
3MHz/16QAM/Mid CH



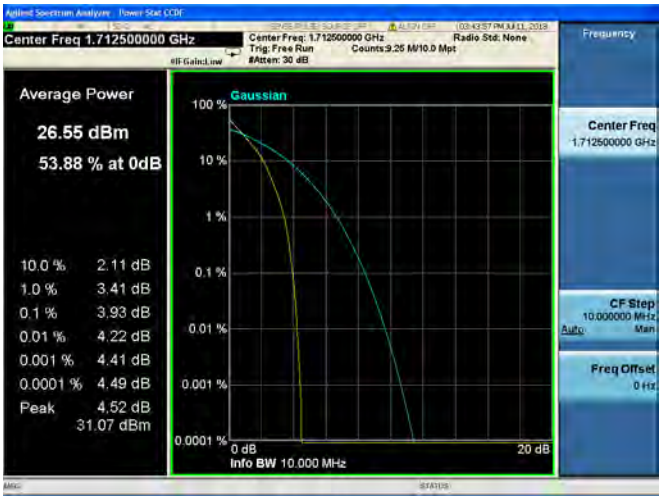
3MHz/QPSK/High CH



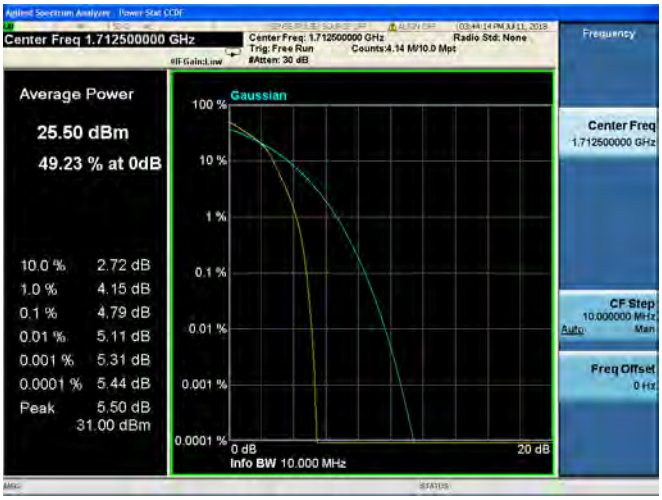
3MHz/16QAM/High CH



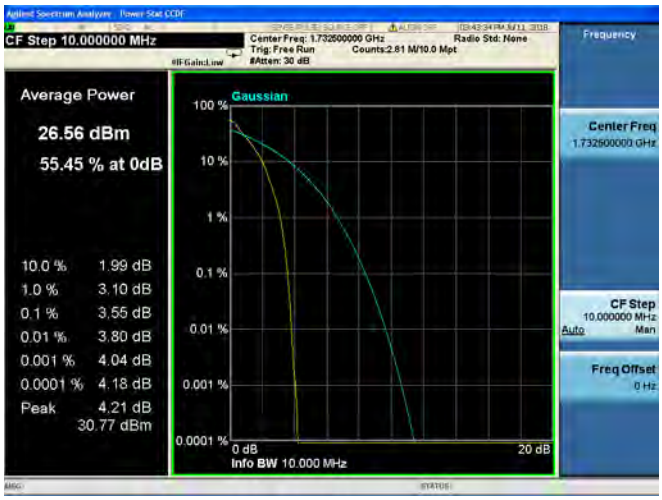
5MHz/QPSK/Low CH



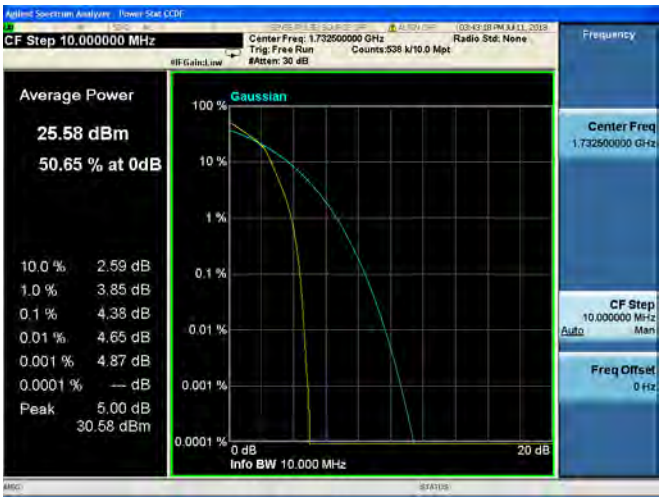
5MHz/16QAM/Low CH



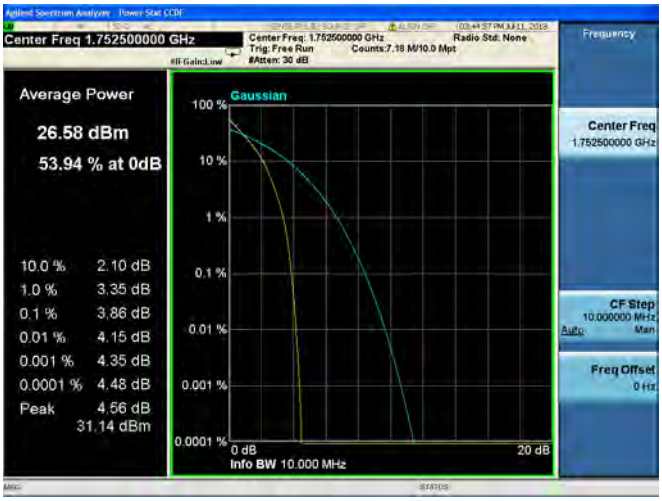
5MHz/QPSK/Mid CH



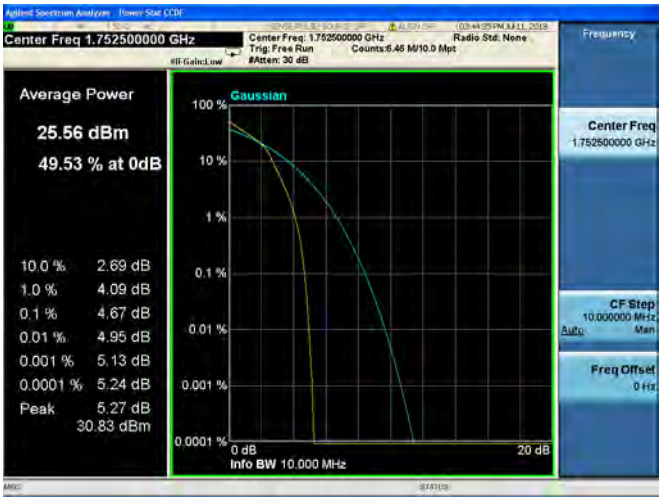
5MHz/16QAM/Mid CH



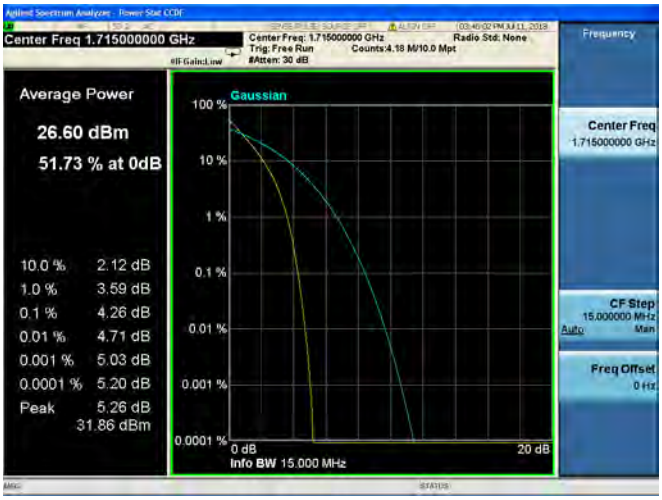
5MHz/QPSK/High CH



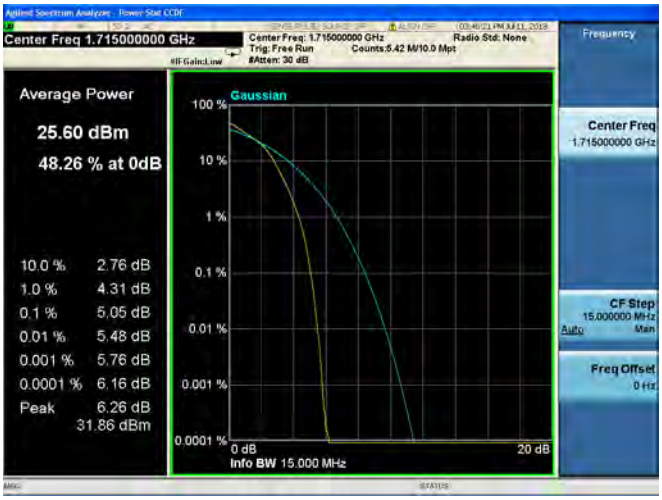
5MHz/16QAM/High CH



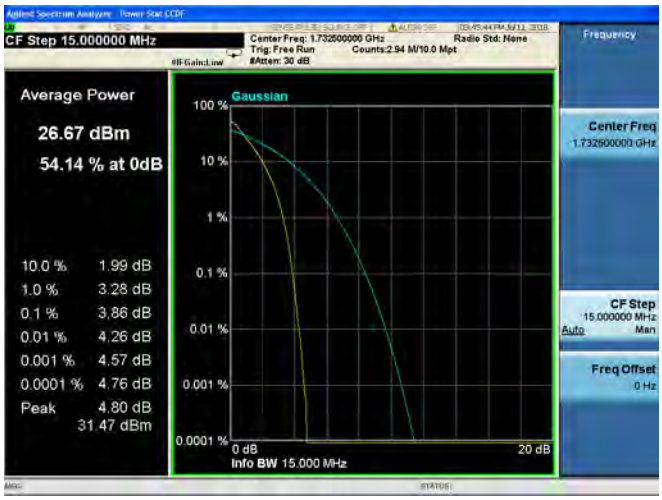
10MHz/QPSK/Low CH



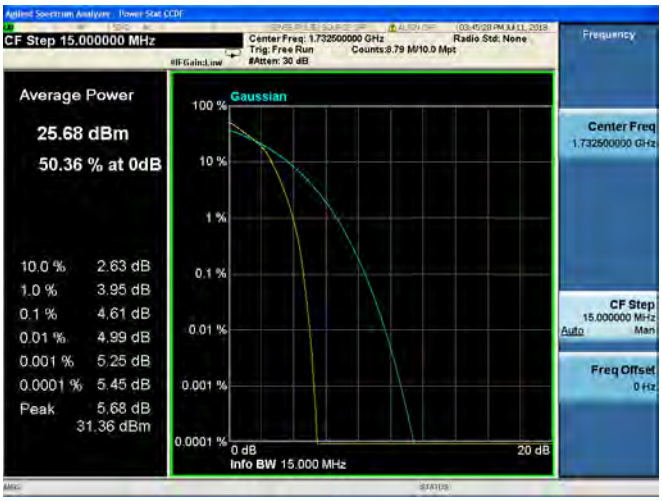
10MHz/16QAM/Low CH



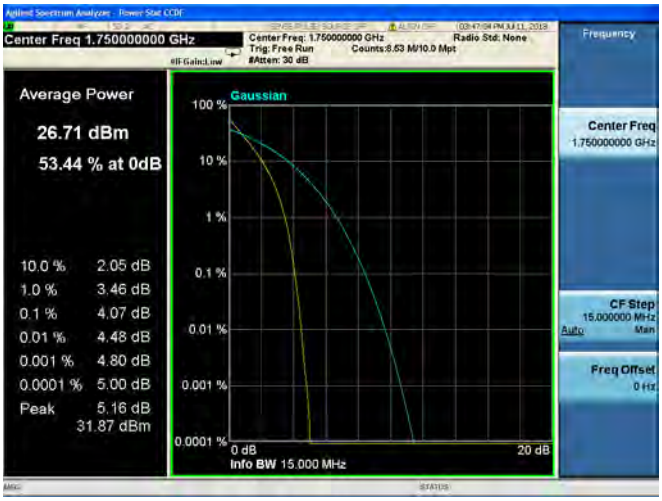
10MHz/QPSK/Mid CH



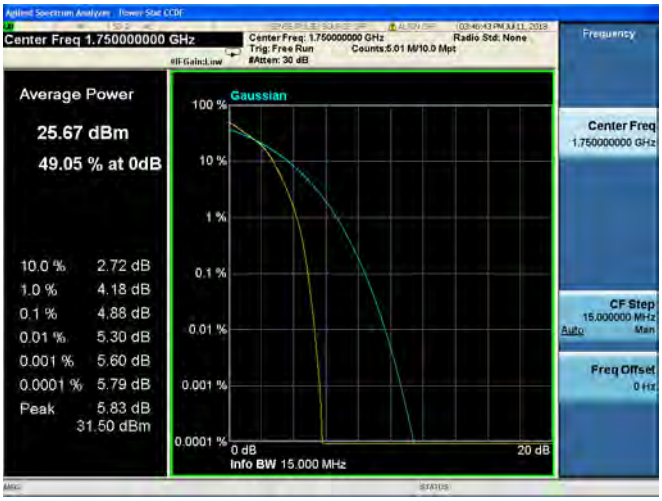
10MHz/16QAM/Mid CH



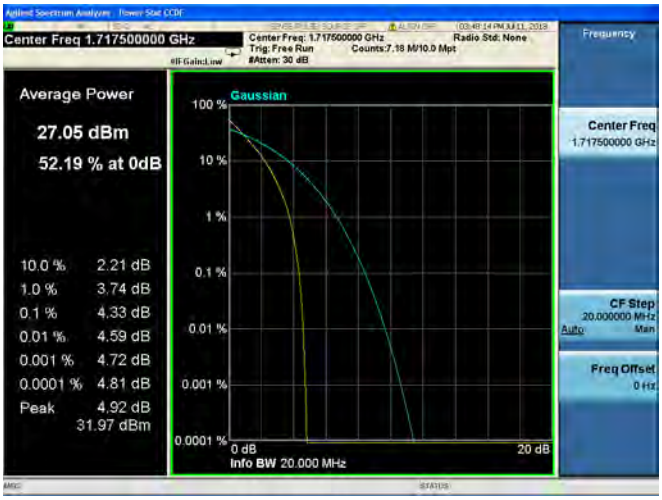
10MHz/QPSK/High CH



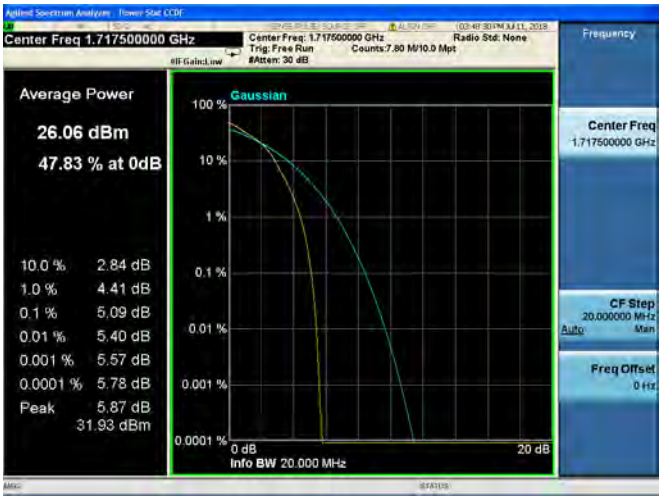
10MHz/16QAM/High CH



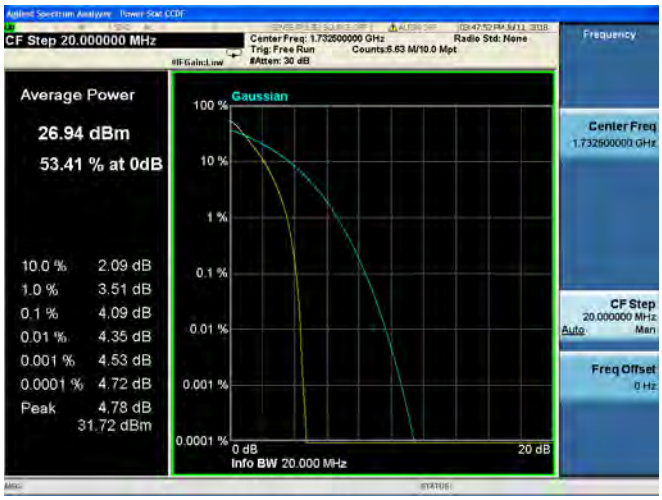
15MHz/QPSK/Low CH



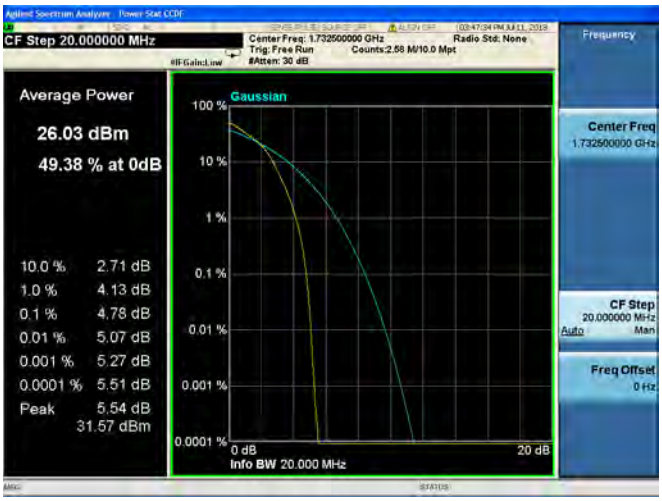
15MHz/16QAM/Low CH



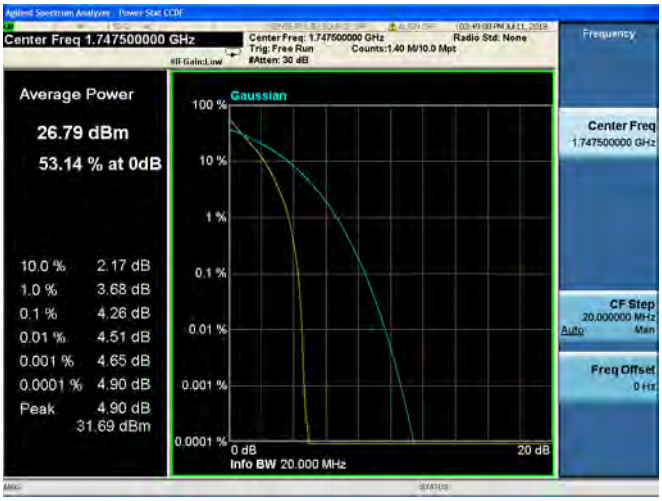
15MHz/QPSK/Mid CH



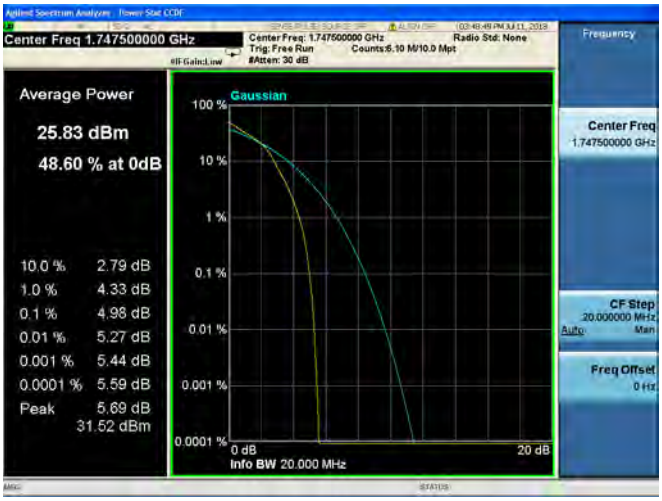
15MHz/16QAM/Mid CH



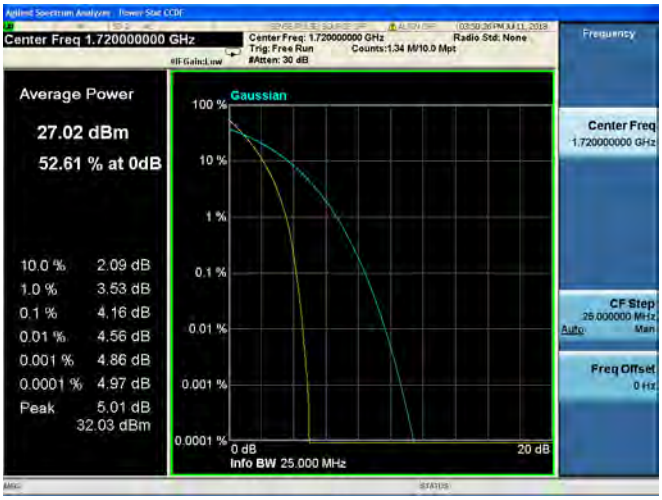
15MHz/QPSK/High CH



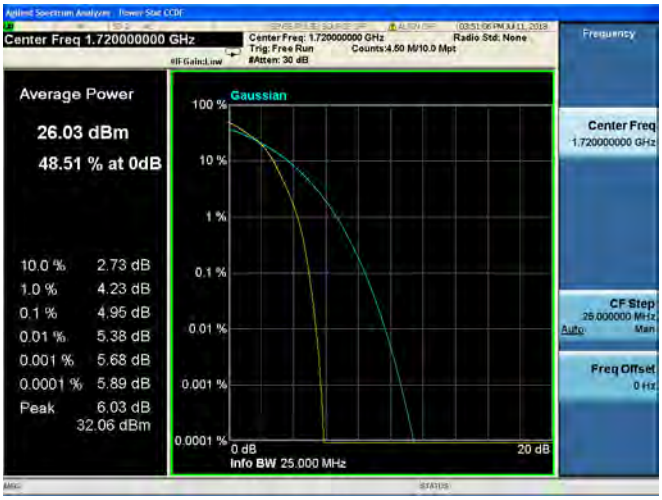
15MHz/16QAM/High CH



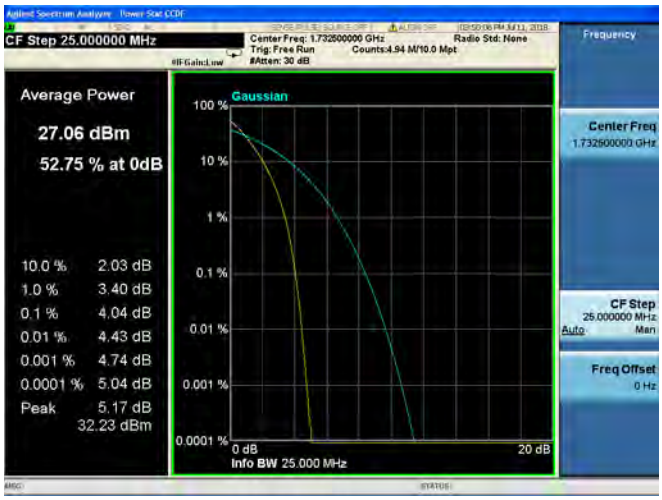
20MHz/QPSK/Low CH



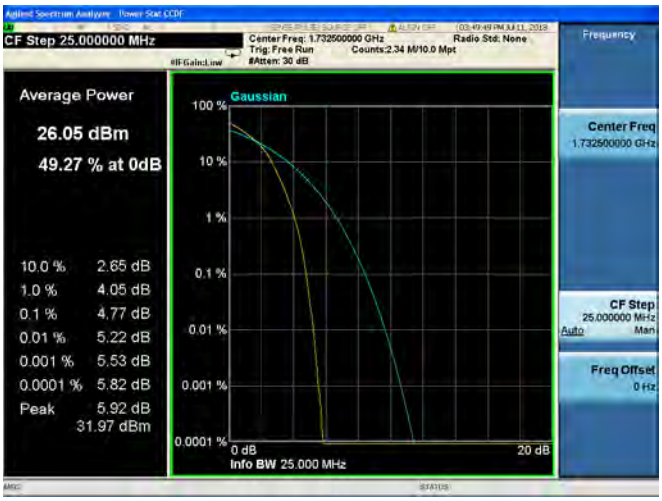
20MHz/16QAM/Low CH



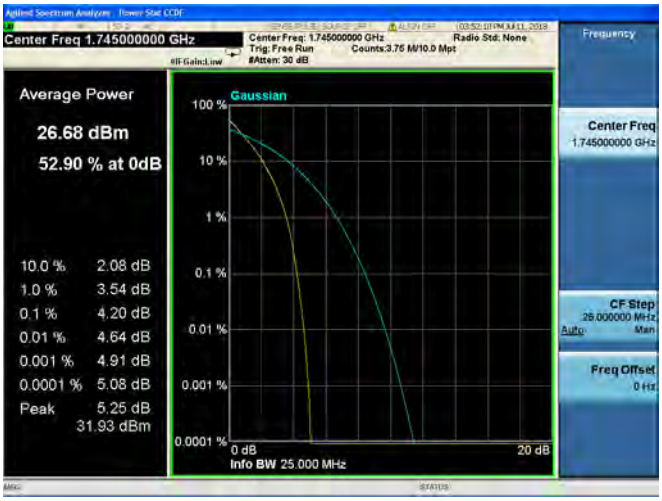
20MHz/QPSK/Mid CH



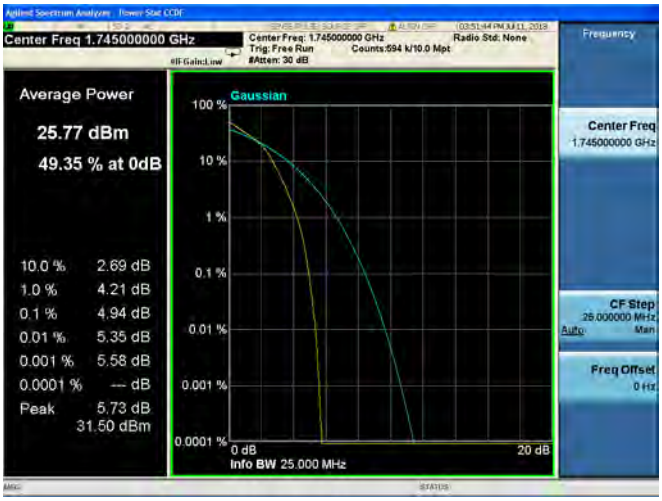
20MHz/16QAM/Mid CH



20MHz/QPSK/High CH



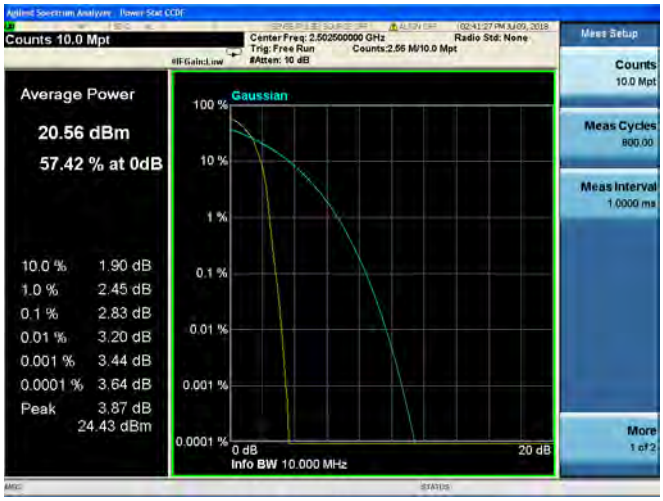
20MHz/16QAM/High CH



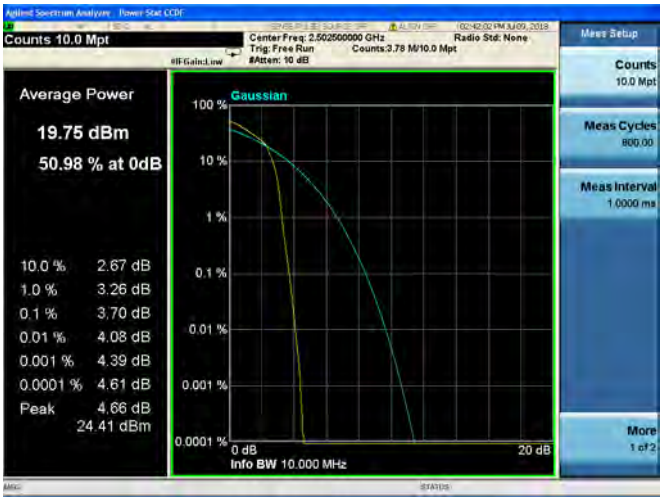
LTE Band 7, BW: 5MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
20775	2502.5	2.83	3.70
21100	2535.0	2.73	3.50
21425	2567.5	2.78	3.43
LTE Band 7, BW: 10MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
20800	2505.0	3.27	4.10
21100	2535.0	2.76	3.55
21400	2565.0	2.90	3.71
LTE Band 7, BW: 15MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
20825	2507.5	3.80	4.44
21100	2535.0	3.39	3.86
21375	2562.5	3.43	4.12
LTE Band 7, BW: 20MHz			
Channel	Frequency (MHz)	Peak to Average Ratio(dB)	
		QPSK	16QAM
20850	2510.0	3.46	4.14
21100	2535.0	2.63	3.27
21350	2560.0	3.28	3.88

LTE Band 7 Peak to Average Ratio

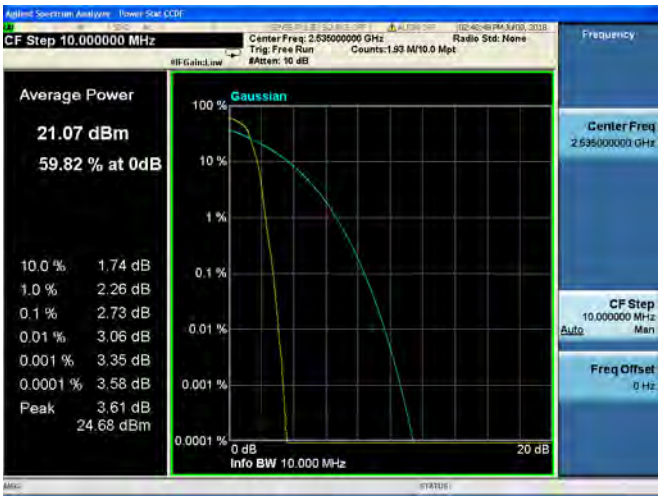
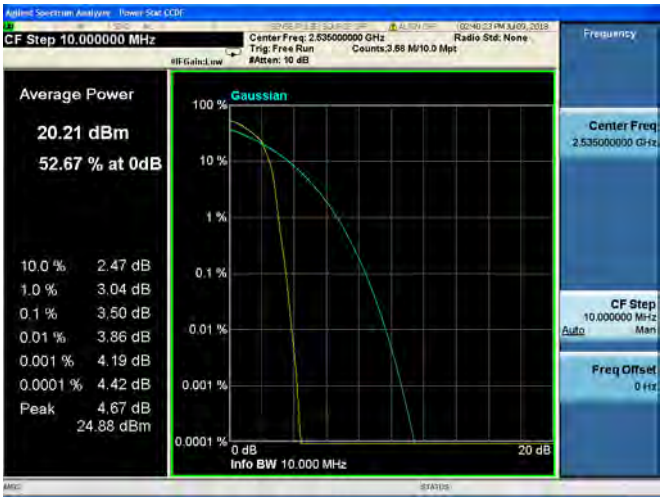
5MHz/QPSK/Low CH



5MHz/16QAM/Low CH



5MHz/QPSK/Mid CH



5MHz/16QAM/Mid CH