

TEST REPORT

Reference No...... : WTS18S05113665-1W V1
FCC ID : 2AG32EG7010A
Applicant..... : Baicells Technologies Co., Ltd.
Address..... : 3F, Hui Yuan Development Building, No.1 Shangdi Information Industry Base, Haidian Dist., Beijing, China
Manufacturer : The same as above
Address..... : The same as above
Product..... : LTE Outdoor CPE
Model(s) : EG7010A
Brand Name..... : BaiCells
Standards..... : FCC CFR Title 47 Part 2
FCC CFR Title 47 Part 90 Subpart Z: 2017
Date of Receipt sample : 2018-05-21
Date of Test : 2018-05-22 to 2018-06-07
Date of Issue..... : 2018-06-12
Test Result..... : Pass

Remarks:

The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

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2 Laboratories Introduction

Waltek Services (Shenzhen) Co., Ltd is a professional third-party testing and certification laboratory with multi-year product testing and certification experience, established strictly in accordance with ISO/IEC 17025 requirements, and accredited by ILAC (International Laboratory Accreditation Cooperation) member. A2LA (American Association for Laboratory Accreditation) of USA, Meanwhile, Waltek has got recognition as registration and accreditation laboratory from EMSD (Electrical and Mechanical Services Department), and American Energy star, FCC(The Federal Communications Commission), CEC(California energy efficiency), IC(Industry Canada). It's the strategic partner and data recognition laboratory of international authoritative organizations, such as Intertek(ETL-SEMKO), TÜV Rheinland, TÜV SÜD, etc.



Waltek Services (Shenzhen) Co., Ltd is one of the largest and the most comprehensive third party testing laboratory in China. Our test capability covered four large fields: safety test. Electro Magnetic Compatibility (EMC), and energy performance, wireless radio. As a professional, comprehensive, justice international test organization, we still keep the scientific and rigorous work attitude to help each client satisfy the international standards and assist their product enter into globe market smoothly.

Test Facility:**A. Accreditations for Conformity Assessment (International)**

Country/Region	Accreditation Body	Scope	Note
USA	A2LA (Certificate No.: 4243.01)	FCC ID \ DOC \ VOC	1
Canada		IC ID \ VOC	2
Japan		MIC-T \ MIC-R	-
Europe		EMCD \ RED	-
Taiwan		NCC	-
Hong Kong		OFCA	-
Australia		RCM	-
India		International Services	WPC
Thailand	NTC		-
Singapore	IDA		-
Note:			
1. FCC Designation No.: CN1201. Test Firm Registration No.: 523476.			
2. IC Canada Registration No.: 7760A			

B. TCBs and Notify Bodies Recognized Testing Laboratory.

Recognized Testing Laboratory of ...	Notify body number
TUV Rheinland	Optional.
Intertek	
TUV SUD	
SGS	
Phoenix Testlab GmbH	0700
Element Materials Technology Warwick Ltd	0891
Timco Engineering, Inc.	1177
Eurofins Product Service GmbH	0681

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4 Revision History

Test report No.	Date of Receipt sample	Date of Test	Date of Issue	Purpose	Comment	Approved
WTS18S05113 665-1W	2018-05-21	2018-05-22 to 2018-06-07	2018-06-08	original	-	Replaced
WTS18S05113 665-1W V1	2018-05-21	2018-05-22 to 2018-06-07	2018-06-12	Version 1	Updated	Valid

5 General Information

5.1 General Description of E.U.T.

Product:	LTE Outdoor CPE
Model(s):	EG7010A
Model Description:	N/A
Storage Location:	Internal Storage
Note:	N/A

5.2 Details of E.U.T.

Operation Frequency:	LTE Band 43: 3652.5~3697.5MHz
Type of Modulation:	LTE: QPSK, 16QAM
Antenna installation:	LTE: Internal antenna
Antenna Gain:	LTE: 14dBi
Ratings:	DC 24V, 0.5A
Number of transmitter chains:	LTE: 2TX*4RX (MIMO)

The device supports MIMO 2TX*4RX, and the MIMO works with STBC(Space-Time Block Coding).The antenna is omnidirectional, does not support any directional gain in any modes.

MIMO rate, antennas use two different streams, from this side, if RX side need to decode MIMO, data between the two stream should be correlated. The device transmits simultaneously in multiple channels in single frequency bands and uses carrier aggregation techniques.

Directional gain =GANT + 10 log (ANT_N) dBi

5.3 Channel List

Normal

5MHz		10MHz	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	3652.5	Low	3655
Middle	3675	Middle	3675
High	3697.5	High	3695
15MHz		20MHz	
Channel	Frequency (MHz)	Channel	Frequency (MHz)
Low	3657.5	Low	3660
Middle	3675	Middle	3675
High	3692.5	High	3690

5.4 Test Mode

All test mode(s) and condition(s) mentioned were considered and evaluated respectively by performing full tests, the worst data were recorded and reported.

Test Mode	Description
Data Mode (QPSK)	Keep the EUT in data communicating mode (QPSK). (5MHz, 10MHz, 15MHz, 20MHz)
Data Mode (16QAM)	Keep the EUT in data communicating mode (16QAM). (5MHz, 10MHz, 15MHz, 20MHz)

5.5 Subcontracted

Whether parts of tests for the product have been subcontracted to other labs:

☐ Yes ☒ No

If Yes, list the related test items and lab information:

Test Lab: N/A

Lab address: N/A

Test items: N/A

6 Test Summary

Test Items	Test Requirement	Result
	FCC	
RF Output Power	Part 2.1046 Part 90.1321	PASS
Modulation Characteristics	Part 2.1047	PASS
99% & -26 dB Occupied Bandwidth	Part 2.1049 Part 90.209	PASS
Emission Mask	Part 90.210(b)	PASS
Spurious Emissions at Antenna Terminal	Part 2.1051 Part 90.1323	PASS
Field Strength of Spurious Radiation	Part 2.1053 Part 90.1323	PASS
Frequency stability vs. temperature	Part 2.1055(a)(1)(b) Part 90.213(a)	PASS
Frequency stability vs. voltage	Part 2.1055(d)(1)(2) Part 90.213(a)	PASS

Pass: The EUT complies with the essential requirements in the standard.

Note 1: According to FCC KDB 662911 D01 Multiple Transmitter Output v02r01 & KDB 971168 D01 Power Means License Digital Systems v03r01.

Note 2: EUT was on continue transmit mode, the duty cycle was 100%.

7 Equipment Used during Test

7.1 Equipments List

Conducted Emissions Test Site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	100947	2017-09-12	2018-09-11
2.	LISN	R&S	ENV216	101215	2017-09-12	2018-09-11
3.	Cable	Top	TYPE16(3.5M)	-	2017-09-12	2018-09-11
Conducted Emissions Test Site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMI Test Receiver	R&S	ESCI	101155	2017-09-12	2018-09-11
2.	LISN	SCHWARZBECK	NSLK 8128	8128-289	2017-09-12	2018-09-11
3.	Limiter	York	MTS-IMP-136	261115-001-0024	2017-09-12	2018-09-11
4.	Cable	LARGE	RF300	-	2017-09-12	2018-09-11
3m Semi-anechoic Chamber for Radiation Emissions Test site 1#						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1	Spectrum Analyzer	R&S	FSP	100091	2018-04-29	2019-04-28
2	Active Loop Antenna	Beijing Dazhi	ZN30900A	-	2018-04-09	2019-04-08
3	Trilog Broadband Antenna	SCHWARZBECK	VULB9163	336	2018-04-09	2019-04-08
4	Coaxial Cable (below 1GHz)	Top	TYPE16(13M)	-	2017-09-12	2018-09-11
5	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9120 D	667	2018-04-09	2019-04-08
6	Broad-band Horn Antenna	SCHWARZBECK	BBHA 9170	335	2018-04-09	2019-04-08
7	Broadband Preamplifier	COMPLIANCE DIRECTION	PAP-1G18	2004	2018-04-13	2019-04-12
8	Coaxial Cable (above 1GHz)	Top	1GHz-25GHz	EW02014-7	2018-04-13	2019-04-12
9	Universal Radio Communication Tester	R&S	CMU 200	112461	2018-04-13	2019-04-12
10	Signal Generator	R&S	SMR20	100046	2017-09-12	2018-09-11
11	Smart Antenna	SCHWARZBECK	HA08	-	2018-04-09	2019-04-08
3m Semi-anechoic Chamber for Radiation Emissions Test site 2#						
Item	Equipment	Manufacturer	Model No.	Serial No	Last Calibration Date	Calibration Due Date

1	Test Receiver	R&S	ESCI	101296	2018-04-13	2019-04-12
2	Trilog Broadband Antenna	SCHWARZBECK	VULB9160	9160-3325	2018-04-09	2019-04-08
3	Amplifier	Compliance pirection systems inc	PAP-0203	22024	2018-04-13	2019-04-12
4	Cable	HUBER+SUHNER	CBL2	525178	2018-04-13	2019-04-12
RF Conducted Testing						
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Calibration Date	Calibration Due Date
1.	EMC Analyzer (9k~26.5GHz)	Agilent	E7405A	MY45114943	2017-09-12	2018-09-11
2.	Spectrum Analyzer (9k-6GHz)	R&S	FSL6	100959	2017-09-12	2018-09-11
3.	Universal Radio Communication Tester	R&S	CMU 200	112461	2018-04-13	2019-04-12
4	Signal Analyzer (9k~26.5GHz)	Agilent	N9010A	MY50520207	2017-09-12	2018-09-11

7.2 Measurement Uncertainty

Parameter	Uncertainty
Conducted Emission	± 3.64 dB(AC mains 150KHz~30MHz)
Radiated Spurious Emissions	± 5.08 dB (Bilog antenna 30M~1000MHz)
	± 5.47 dB (Horn antenna 1000M~25000MHz)
Radio Frequency	± 1 x 10 ⁻⁷ Hz
RF Power	± 0.42 dB
RF Power Density	± 0.7dB
Conducted Spurious Emissions	± 2.76 dB (9kHz~26500MHz)
Confidence interval: 95%. Confidence factor:k=2	

7.3 Test Equipment Calibration

All the test equipments used are valid and calibrated by CEPREI Certification Body that address is No.110 Dongguan Zhuang RD. Guangzhou, P.R.China.

8 Transmit Output Power and PSD

Test Requirement:	FCC part90.1321(a)
Test Method:	FCC part2.1046 ANSI C63.26-2015
Test Mode:	Data communicating mode
Limit:	FCC: (a) Base and fixed stations are limited to 25 watts/25 MHz equivalent isotropically radiated power (EIRP). In any event, the peak EIRP powerdensity shall not exceed 1 Watt in any one-megahertz slice of spectrum. (b) In addition to the provisions in paragraph (a) of this section, transmitters operating in the 3650-3700 MHz band that emit multipledirectional beams, simultaneously or sequentially, for the purpose of directing signals to individual receivers or to groups of receivers provided theemissions comply with the following: (1) Different information must be transmitted to each receiver. (2) If the transmitter employs an antenna system that emits multiple directional beams but does not emit multiple directional beamssimultaneously, the total output power conducted to the array or arrays that comprise the device, <i>i.e.</i>, the sum of the power supplied to allantennas, antenna elements, staves, etc. and summed across all carriers or frequency channels, shall not exceed the limit specified in paragraph(a) of this section, as applicable. The directional antenna gain shall be computed as follows: (i) The directional gain, in dBi, shall be calculated as the sum of 10 log (number of array elements or staves) plus the directional gain, in dBi,of the individual element or stave having the highest gain. (ii) A lower value for the directional gain than that calculated in paragraph (b)(2)(i) of this section will be accepted if sufficient evidence ispresented, <i>e.g.</i>, due to shading of the array or coherence loss in the beam-forming. (3) If a transmitter employs an antenna that operates simultaneously on multiple directional beams using the same or different frequencychannels and if transmitted beams overlap, the power shall be reduced to ensure that the aggregate power from the overlapping beams does notexceed the limit specified in paragraph (b)(2) of this section. In addition, the aggregate power transmitted simultaneously on all beams shall notexceed the limit specified in paragraph (b)(2) of this section by more than 8 dB. (4) Transmitters that emit a single directional beam shall operate under the provisions of paragraph (b)(2) of this section.

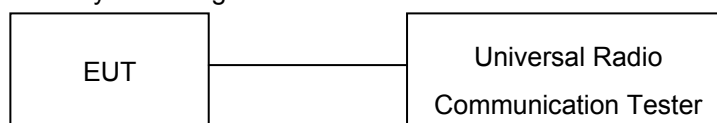
8.1 EUT Operation

Operating Environment :

Temperature:	22.4 °C
Humidity:	52.2 % RH
Atmospheric Pressure:	101.3kPa

8.2 Test Procedure

Conducted method: The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.



8.3 Test Result

Transmit Output Power								
5MHz Bandwidth								
Modulation	Test Channel	RB Size/ RB Offset	Chain 0 OutputPower (dBm/5MHz)	Chain 1 Output Power (dBm/5MHz)	Total Power (dBm/5MHz)	Antenna Gain (dBi)	EIRP (dBm/5MHz)	EIRP Limit(dBm/5MHz)
QPSK	Low	1/0	15.32	15.4	18.37	17	35.37	37.01
		1/12	15.33	15.42	18.39	17	35.39	
		1/24	15.35	15.44	18.41	17	35.41	
		12/0	15.59	15.67	18.64	17	35.64	
		12/6	15.51	15.64	18.59	17	35.59	
		12/11	15.47	15.55	18.52	17	35.52	
		25/0	15.55	15.68	18.63	17	35.63	
	Middle	1/0	15.26	15.35	18.32	17	35.32	37.01
		1/12	15.24	15.38	18.32	17	35.32	
		1/24	15.3	15.39	18.36	17	35.36	
		12/0	15.43	15.51	18.48	17	35.48	
		12/6	15.36	15.48	18.43	17	35.43	
		12/11	15.39	15.41	18.41	17	35.41	
		25/0	15.41	15.55	18.49	17	35.49	
	High	1/0	14.87	15.17	18.03	17	35.03	37.01
		1/12	14.86	15.14	18.01	17	35.01	
		1/24	14.89	15.17	18.04	17	35.04	
		12/0	15.36	15.44	18.41	17	35.41	
		12/6	15.32	15.48	18.41	17	35.41	
		12/11	15.25	15.33	18.30	17	35.30	
		25/0	15.58	15.66	18.63	17	35.63	
16QAM	Low	1/0	15.23	15.37	18.31	17	35.31	37.01
		1/12	15.52	15.55	18.55	17	35.55	
		1/24	15.07	15.04	18.07	17	35.07	
		12/0	15.23	15.34	18.30	17	35.30	
		12/6	15.41	15.32	18.38	17	35.38	
		12/11	15.21	15.35	18.29	17	35.29	
		25/0	15.22	15.36	18.30	17	35.30	
	Middle	1/0	15.45	15.56	18.52	17	35.52	37.01
		1/12	15.74	15.85	18.81	17	35.81	
		1/24	15.51	15.82	18.68	17	35.68	
		12/0	15.63	15.73	18.69	17	35.69	
		12/6	15.55	15.71	18.64	17	35.64	
		12/11	15.61	15.74	18.69	17	35.69	

		25/0	15.66	15.82	18.75	17	35.75	37.01
	High	1/0	15.29	15.42	18.37	17	35.37	
		1/12	15.28	15.35	18.33	17	35.33	
		1/24	15.34	15.23	18.30	17	35.30	
		12/0	15.31	15.42	18.38	17	35.38	
		12/6	15.33	15.52	18.44	17	35.44	
		12/11	15.47	15.48	18.49	17	35.49	
		25/0	15.53	15.64	18.60	17	35.60	
10MHz Bandwidth								
Modulation	Test Channel	RB Size/ RB Offset	Chain 0 Output Power (dBm/10MHz)	Chain 1 Output Power (dBm/10MHz)	Total Power (dBm/10MHz)	Antenna Gain (dBi)	EIRP (dBm/10MHz)	EIRP Limit(dBm/10MHz)
QPSK	Low	1/0	15.35	15.43	18.40	17	35.40	40.02
		1/24	15.53	15.48	18.52	17	35.52	
		1/49	15.73	15.59	18.67	17	35.67	
		25/0	15.42	15.36	18.40	17	35.40	
		25/12	15.58	15.44	18.52	17	35.52	
		25/24	15.64	15.5	18.58	17	35.58	
		50/0	15.77	15.63	18.71	17	35.71	
	Middle	1/0	15.12	15.15	18.15	17	35.15	40.02
		1/24	15.37	15.41	18.40	17	35.40	
		1/49	15.5	15.45	18.49	17	35.49	
		25/0	14.99	15.08	18.05	17	35.05	
		25/12	15.18	15.24	18.22	17	35.22	
		25/24	15.36	15.31	18.35	17	35.35	
		50/0	15.41	15.37	18.40	17	35.40	
	High	1/0	15.23	15.17	18.21	17	35.21	40.02
		1/24	15.25	15.28	18.28	17	35.28	
		1/49	15.18	15.24	18.22	17	35.22	
		25/0	15.04	15.13	18.10	17	35.10	
		25/12	14.96	15.08	18.03	17	35.03	
		25/24	15.01	15.11	18.07	17	35.07	
		50/0	15.19	15.17	18.19	17	35.19	
16QAM	Low	1/0	15.17	15.32	18.26	17	35.26	40.02
		1/24	15.21	15.36	18.30	17	35.30	
		1/49	15.32	15.44	18.39	17	35.39	
		25/0	15.22	15.38	18.31	17	35.31	
		25/12	15.11	15.32	18.23	17	35.23	
		25/24	15.28	15.35	18.33	17	35.33	
		50/0	15.31	15.42	18.38	17	35.38	
	Middle	1/0	15.36	15.49	18.44	17	35.44	
		1/24	15.41	15.43	18.43	17	35.43	
1/49		15.45	15.39	18.43	17	35.43		

		25/0	15.32	15.44	18.39	17	35.39		
		25/12	15.38	15.46	18.43	17	35.43		
		25/24	15.37	15.43	18.41	17	35.41		
		50/0	15.41	15.58	18.51	17	35.51		
	High	1/0	15.29	15.35	18.33	17	35.33	40.02	
		1/24	15.36	15.44	18.41	17	35.41		
		1/49	15.34	15.49	18.43	17	35.43		
		25/0	15.28	15.36	18.33	17	35.33		
		25/12	15.38	15.52	18.46	17	35.46		
		25/24	15.41	15.48	18.46	17	35.46		
		50/0	15.46	15.53	18.51	17	35.51		
	15MHz Bandwidth								
	Modulation	Test Channel	RB Size/ RB Offset	Chain 0 OutputPower (dBm/15MHz)	Chain 1 Output Power (dBm/15MHz)	Total Power (dBm/15MHz)	Antenna Gain (dBi)	EIRP (dBm/15MHz)	EIRP Limit(dBm/15MHz)
QPSK	Low	1/0	15.38	15.42	18.41	17	35.41	41.78	
		1/37	15.58	15.62	18.61	17	35.61		
		1/74	15.77	15.78	18.79	17	35.79		
		36/0	14.95	14.96	17.97	17	34.97		
		36/16	15.37	15.42	18.41	17	35.41		
		36/35	15.59	15.61	18.61	17	35.61		
		75/0	15.68	15.65	18.68	17	35.68		
	Middle	1/0	15.32	15.2	18.27	17	35.27	41.78	
		1/37	15.46	15.54	18.51	17	35.51		
		1/74	15.66	15.84	18.76	17	35.76		
		36/0	14.71	14.7	17.72	17	34.72		
		36/16	15.18	15.36	18.28	17	35.28		
		36/35	15.41	15.73	18.58	17	35.58		
		75/0	15.38	15.65	18.53	17	35.53		
	High	1/0	15.15	15.23	18.20	17	35.20	41.78	
		1/37	15.27	15.35	18.32	17	35.32		
		1/74	15.35	15.38	18.38	17	35.38		
		36/0	15.37	15.35	18.37	17	35.37		
		36/16	15.44	15.47	18.47	17	35.47		
		36/35	15.29	15.41	18.36	17	35.36		
		75/0	15.38	15.46	18.43	17	35.43		
16QAM	Low	1/0	15.33	15.52	18.44	17	35.44	41.78	
		1/37	15.45	15.54	18.51	17	35.51		
		1/74	15.26	15.41	18.35	17	35.35		
		36/0	15.44	15.48	18.47	17	35.47		
		36/16	15.39	15.45	18.43	17	35.43		
		36/35	15.37	15.48	18.44	17	35.44		
		75/0	15.51	15.66	18.60	17	35.60		

	Middle	1/0	15.23	15.41	18.33	17	35.33	41.78
		1/37	15.52	15.56	18.55	17	35.55	
		1/74	15.31	15.38	18.36	17	35.36	
		36/0	15.25	15.31	18.29	17	35.29	
		36/16	15.42	15.52	18.48	17	35.48	
		36/35	15.37	15.38	18.39	17	35.39	
		75/0	15.34	15.42	18.39	17	35.39	
	High	1/0	15.41	15.43	18.43	17	35.43	41.78
		1/37	15.37	15.42	18.41	17	35.41	
		1/74	15.31	15.47	18.40	17	35.40	
		36/0	15.27	15.36	18.33	17	35.33	
		36/16	15.33	15.42	18.39	17	35.39	
		36/35	15.36	15.47	18.43	17	35.43	
		75/0	15.33	15.45	18.40	17	35.40	
20MHz Bandwidth								
Modulation	Test Channel	RB Size/ RB Offset	Chain 0 Output Power (dBm/20MHz)	Chain 1 Output Power (dBm/20MHz)	Total Power (dBm/20MHz)	Antenna Gain (dBi)	EIRP (dBm/20MHz)	EIRP Limit(dBm/20MHz)
QPSK	Low	1/0	15.17	15.28	18.24	17	35.24	43.03
		1/49	15.26	15.35	18.32	17	35.32	
		1/99	15.27	15.42	18.36	17	35.36	
		50/0	15.36	15.43	18.41	17	35.41	
		50/24	15.21	15.36	18.30	17	35.30	
		50/49	15.35	15.41	18.39	17	35.39	
		100/0	15.42	15.55	18.50	17	35.50	
	Middle	1/0	14.95	15.19	18.08	17	35.08	43.03
		1/49	15.03	15.25	18.15	17	35.15	
		1/99	15.13	15.39	18.27	17	35.27	
		50/0	14.99	15.18	18.10	17	35.10	
		50/24	15.17	15.26	18.23	17	35.23	
		50/49	15.34	15.42	18.39	17	35.39	
		100/0	15.38	15.47	18.44	17	35.44	
	High	1/0	15.15	15.24	18.21	17	35.21	43.03
		1/49	15.26	15.34	18.31	17	35.31	
		1/99	15.18	15.32	18.26	17	35.26	
		50/0	15.29	15.31	18.31	17	35.31	
		50/24	15.37	15.41	18.40	17	35.40	
		50/49	15.27	15.35	18.32	17	35.32	
		100/0	15.31	15.38	18.36	17	35.36	
16QAM	Low	1/0	15.23	15.35	18.30	17	35.30	43.03
		1/49	15.29	15.32	18.32	17	35.32	
		1/99	15.22	15.25	18.25	17	35.25	
		50/0	15.16	15.31	18.25	17	35.25	

		50/24	15.25	15.36	18.32	17	35.32	
		50/49	15.21	15.28	18.26	17	35.26	
		100/0	15.23	15.33	18.29	17	35.29	
	Middle	1/0	15.25	15.32	18.30	17	35.30	43.03
		1/49	15.25	15.34	18.31	17	35.31	
		1/99	15.24	15.37	18.32	17	35.32	
		50/0	15.28	15.42	18.36	17	35.36	
		50/24	15.25	15.32	18.30	17	35.30	
		50/49	15.16	15.34	18.26	17	35.26	
		100/0	15.38	15.52	18.46	17	35.46	
	High	1/0	15.21	15.36	18.30	17	35.30	43.03
		1/49	15.27	15.31	18.30	17	35.30	
		1/99	15.24	15.36	18.31	17	35.31	
		50/0	15.34	15.41	18.39	17	35.39	
		50/24	15.33	15.37	18.36	17	35.36	
		50/49	15.29	15.38	18.35	17	35.35	
		100/0	15.31	15.42	18.38	17	35.38	

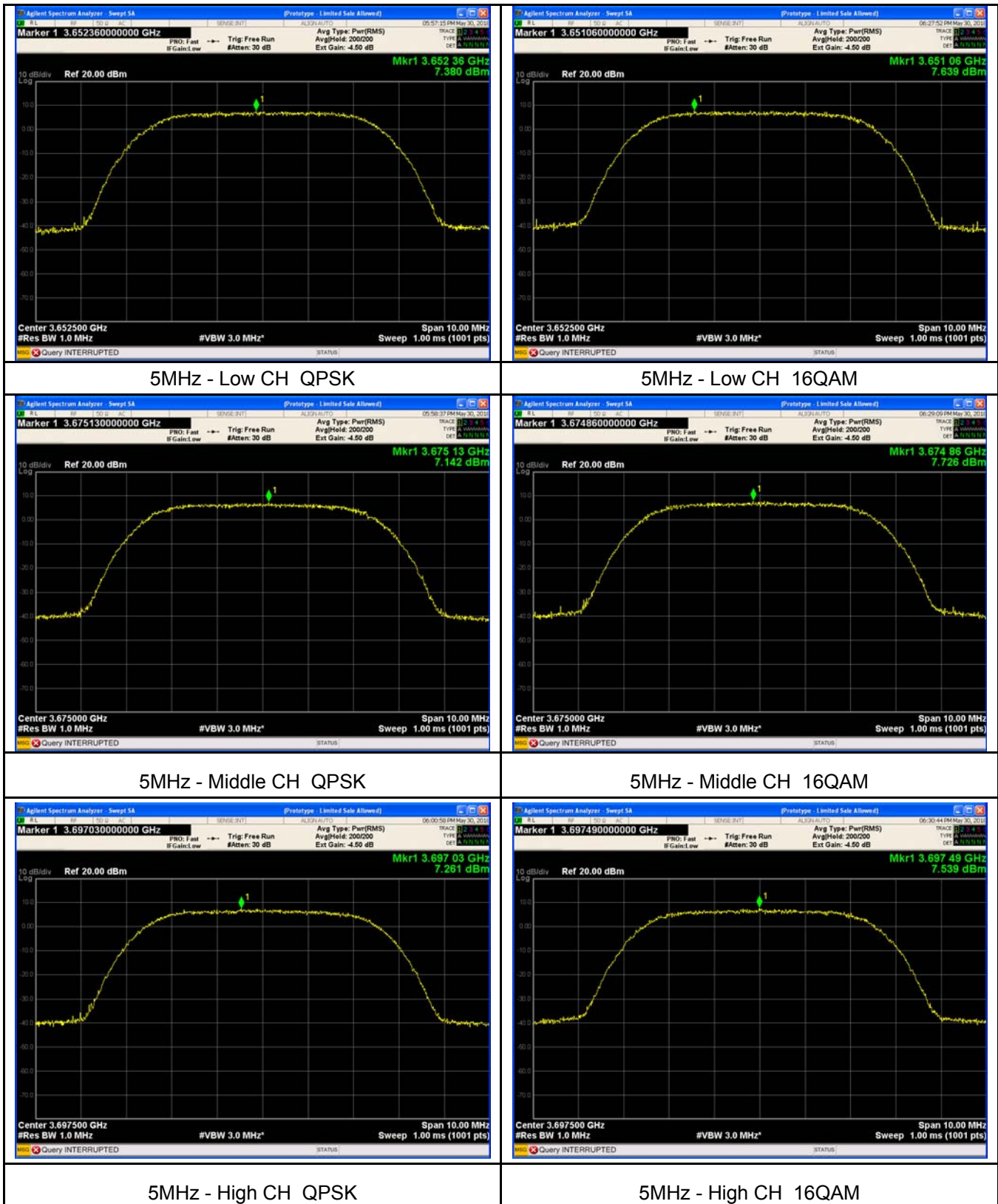
Note: $\text{Limit} = 30\text{dBm} + 10\log(\text{bandwidth}/25\text{MHz})$

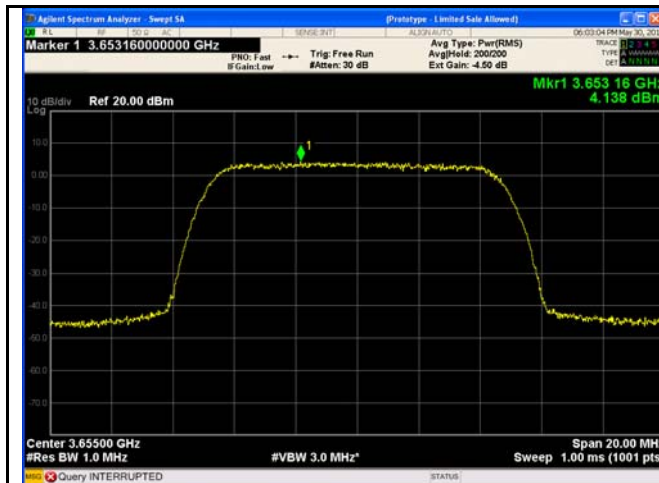
Remark: Directional antenna Gain = Antenna Gain + $10 \lg(\text{ANT}_N) = 14.0 + 10 \lg(2) = 17.0\text{dBi}$

PSD (Full RB Size)								
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
5	QPSK	Low	7.380	7.907	10.66	17.0	27.66	30.0
		Middle	7.142	7.744	10.46	17.0	27.46	
		High	7.261	7.418	10.35	17.0	27.35	
	16QAM	Low	7.639	7.993	10.83	17.0	27.83	
		Middle	7.726	7.375	10.56	17.0	27.56	
		High	7.539	7.337	10.45	17.0	27.45	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
10	QPSK	Low	4.138	4.253	7.21	17.0	24.21	30.0
		Middle	4.137	4.468	7.32	17.0	24.32	
		High	4.086	4.045	7.08	17.0	24.08	
	16QAM	Low	4.454	4.618	7.55	17.0	24.55	
		Middle	4.286	4.858	7.59	17.0	24.59	
		High	4.257	4.370	7.32	17.0	24.32	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
15	QPSK	Low	2.783	3.188	6.00	17.0	23.00	30.0
		Middle	2.515	3.061	5.81	17.0	22.81	
		High	2.578	3.179	5.90	17.0	22.90	
	16QAM	Low	3.073	3.013	6.05	17.0	23.05	
		Middle	2.953	3.247	6.11	17.0	23.11	
		High	3.057	2.974	6.03	17.0	23.03	
Bandwidth (MHz)	Modulation	Test Channel	Chain 0 PSD (dBm/MHz)	Chain 1 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Antenna Gain (dBi)	EIRP density (dBm/MHz)	EIRP density Limit (dBm/MHz)
20	QPSK	Low	1.815	2.036	4.94	17.0	21.94	30.0
		Middle	1.742	1.834	4.80	17.0	21.80	
		High	1.593	1.468	4.54	17.0	21.54	
	16QAM	Low	2.185	1.822	5.02	17.0	22.02	
		Middle	1.947	1.697	4.83	17.0	21.83	
		High	2.160	1.248	4.74	17.0	21.74	

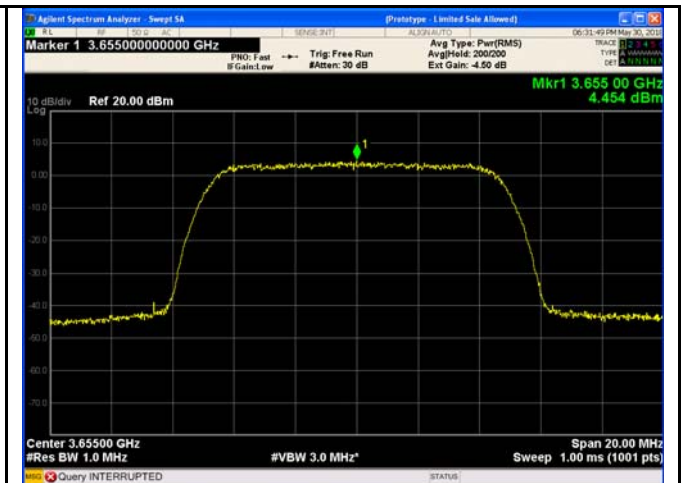
Remark: Directional antenna Gain = Antenna Gain + 10 lg (ANT_N) = 14.0+10 lg (2)=17.0dBi

Test Plots for PSD Chain 0

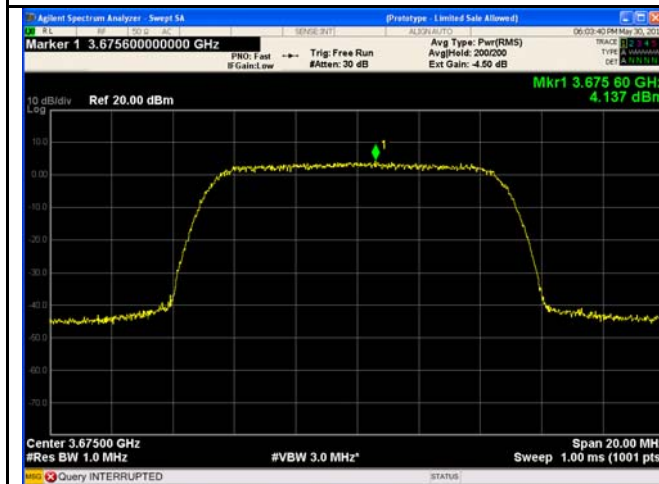




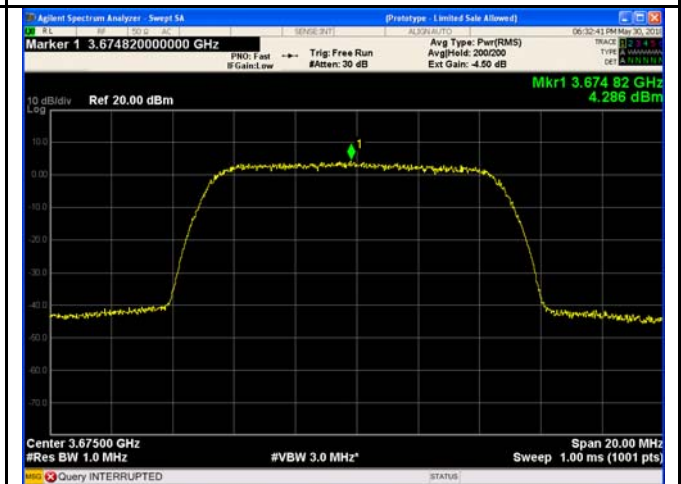
10MHz - Low CH QPSK



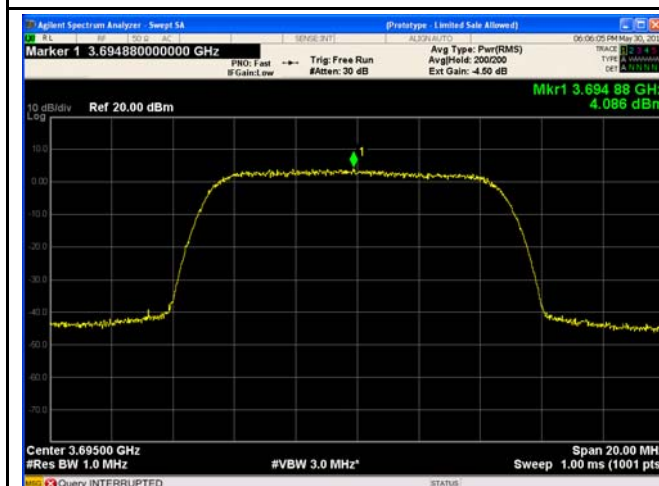
10MHz - Low CH 16QAM



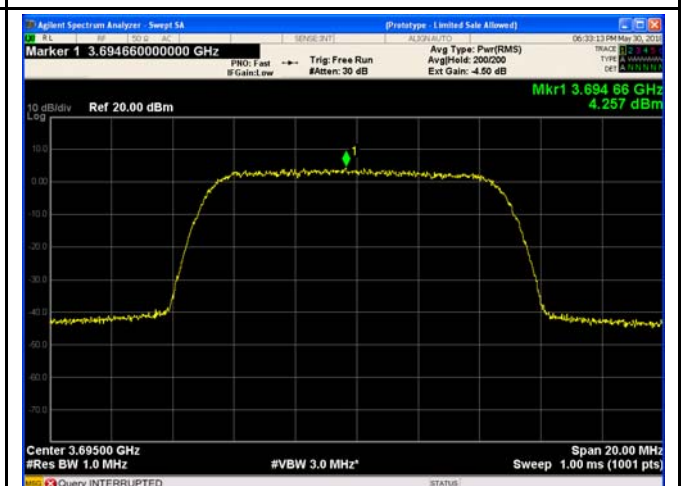
10MHz - Middle CH QPSK



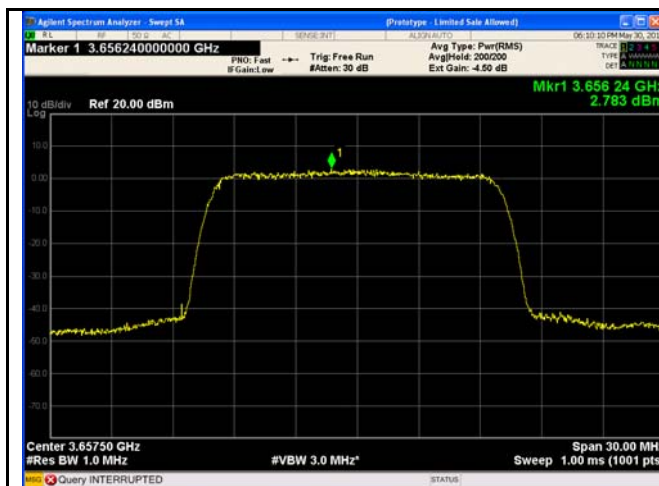
10MHz - Middle CH 16QAM



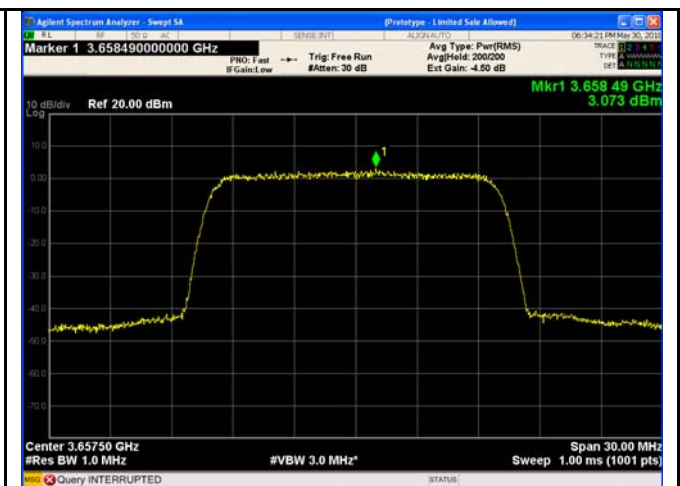
10MHz - High CH QPSK



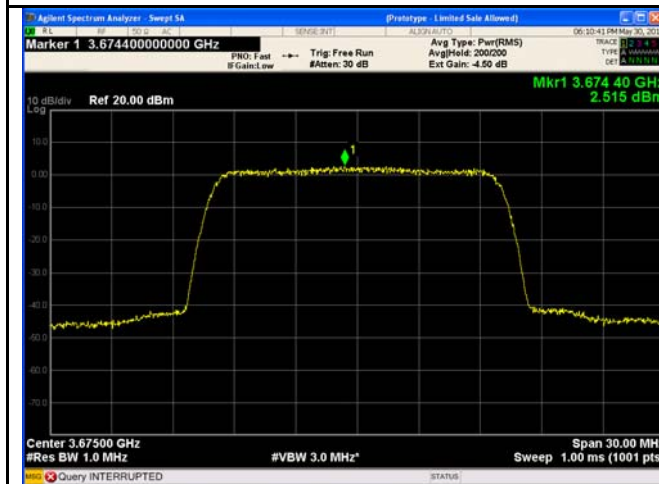
10MHz - High CH 16QAM



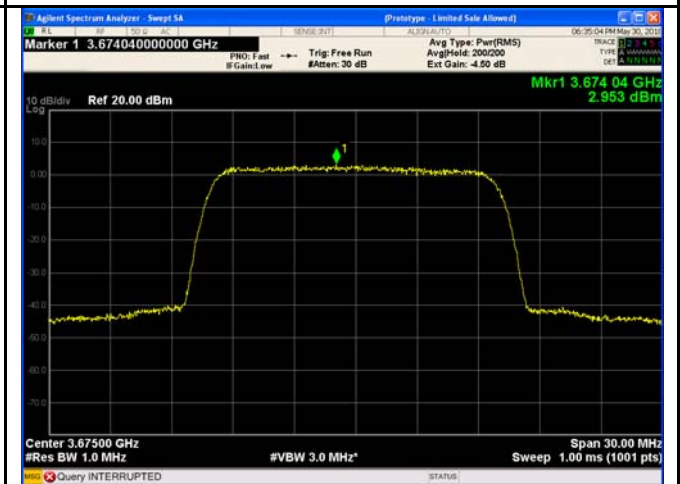
15MHz - Low CH QPSK



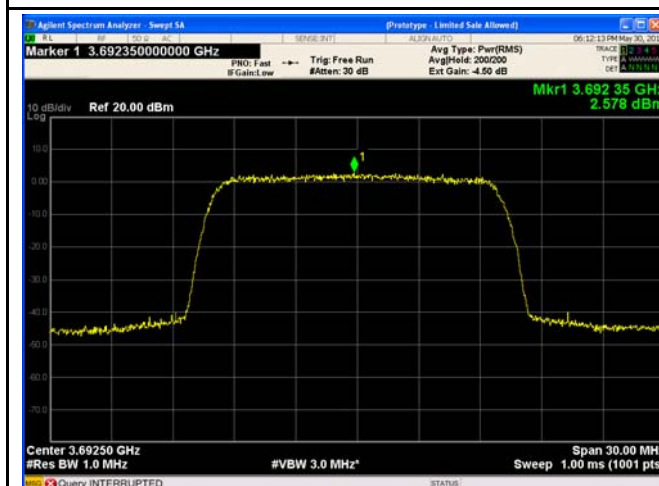
15MHz - Low CH 16QAM



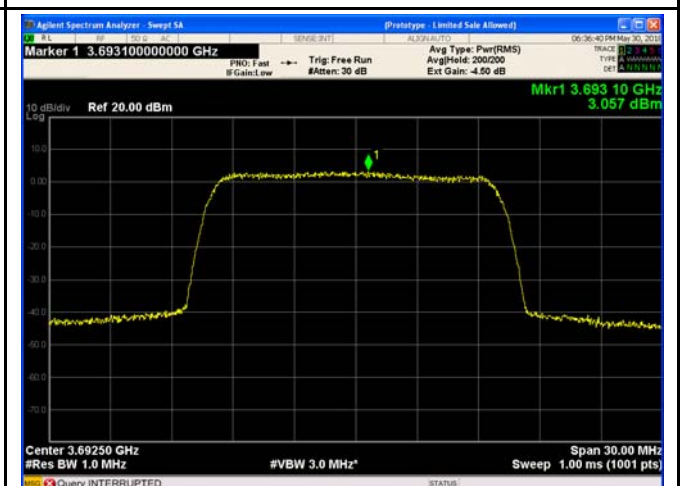
15MHz - Middle CH QPSK



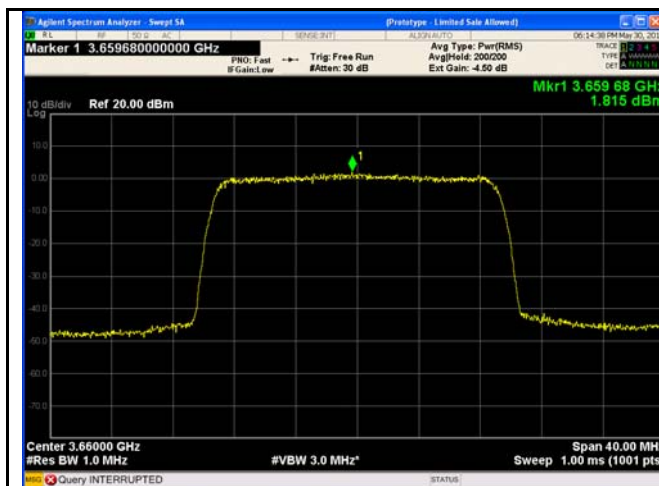
15MHz - Middle CH 16QAM



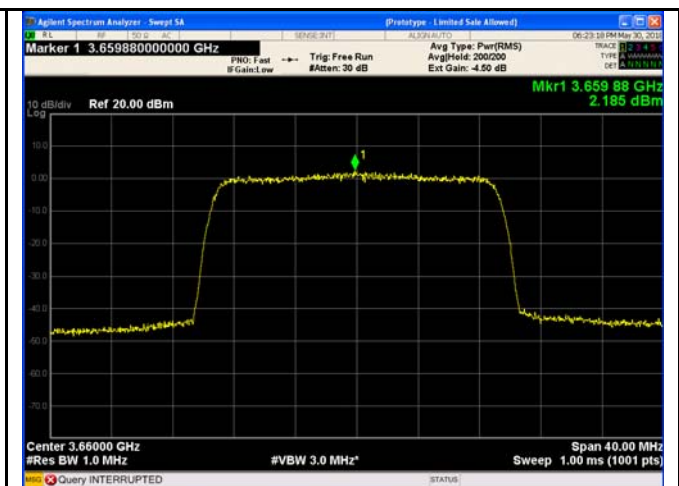
15MHz - High CH QPSK



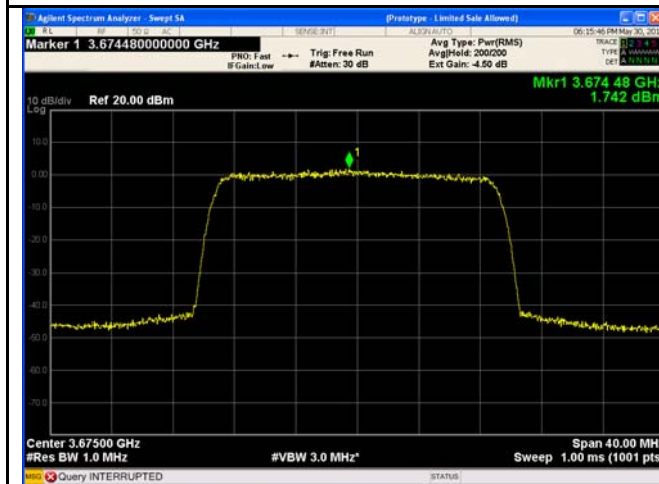
15MHz - High CH 16QAM



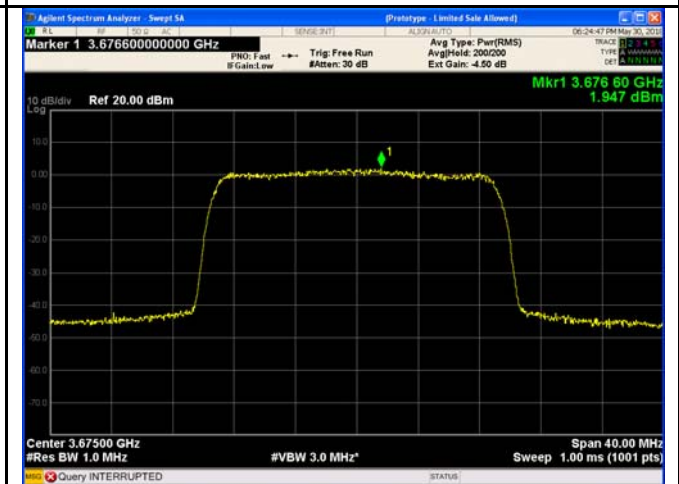
20MHz - Low CH QPSK



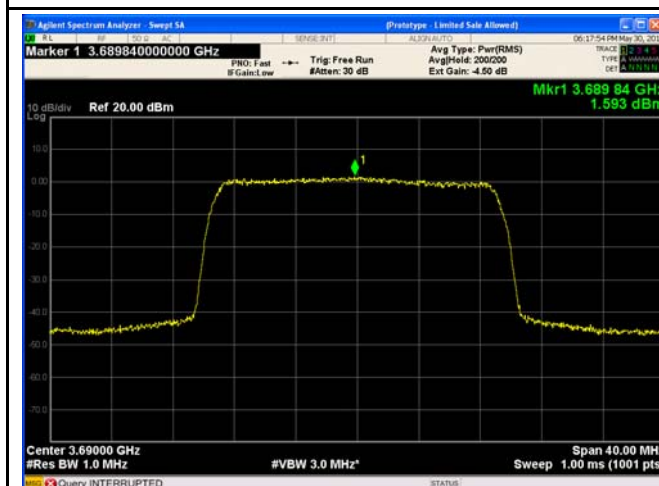
20MHz - Low CH 16QAM



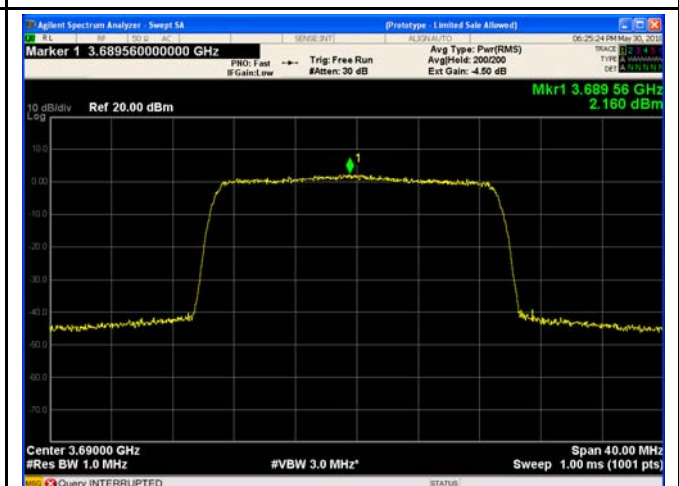
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM

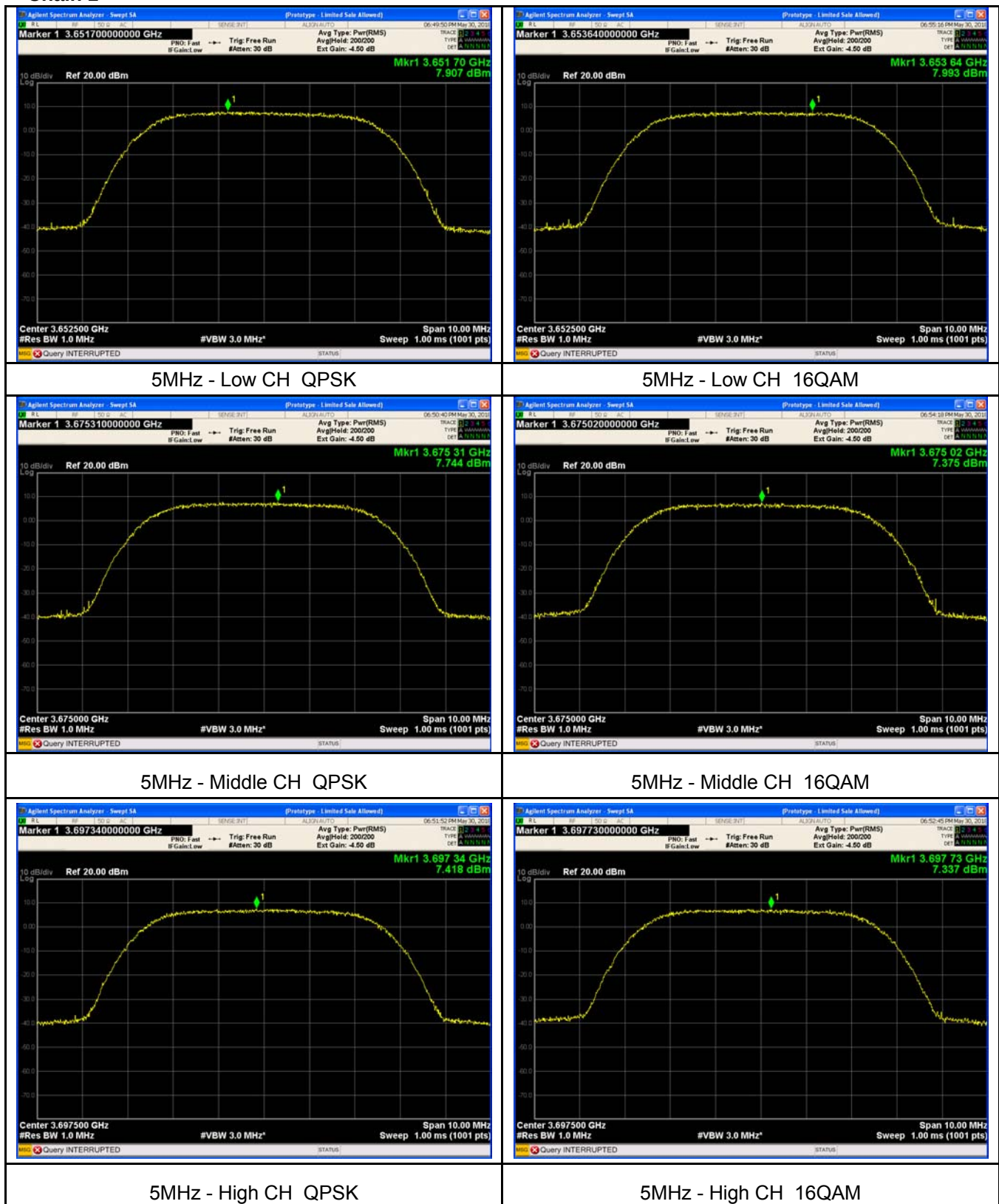


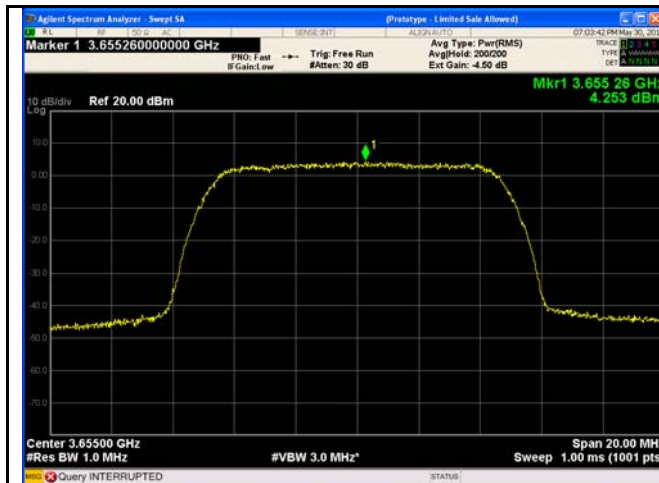
20MHz - High CH QPSK



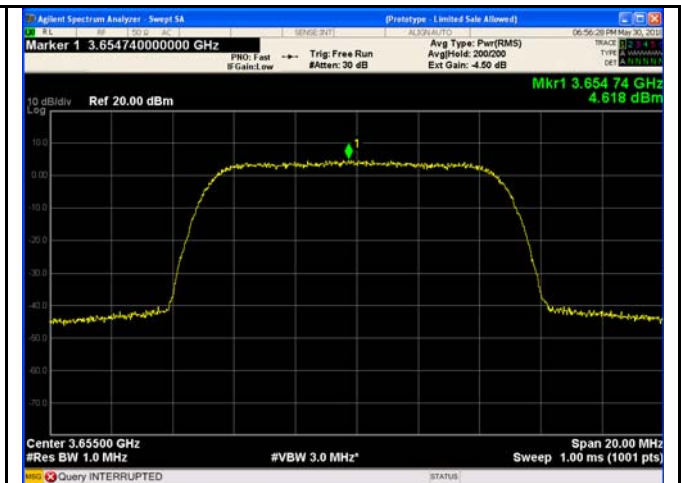
20MHz - High CH 16QAM

Chain 1

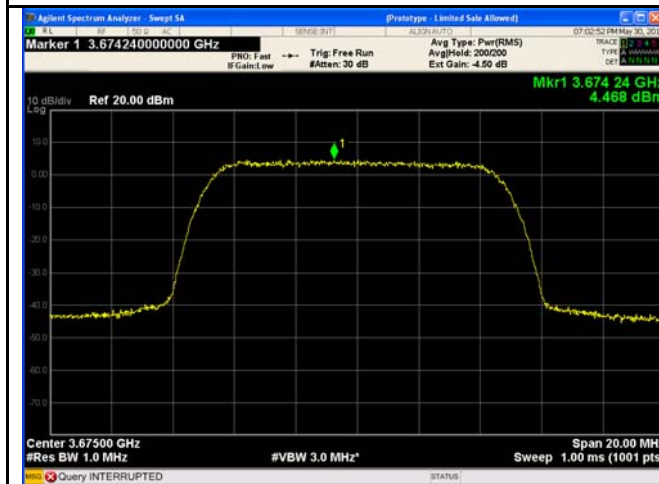




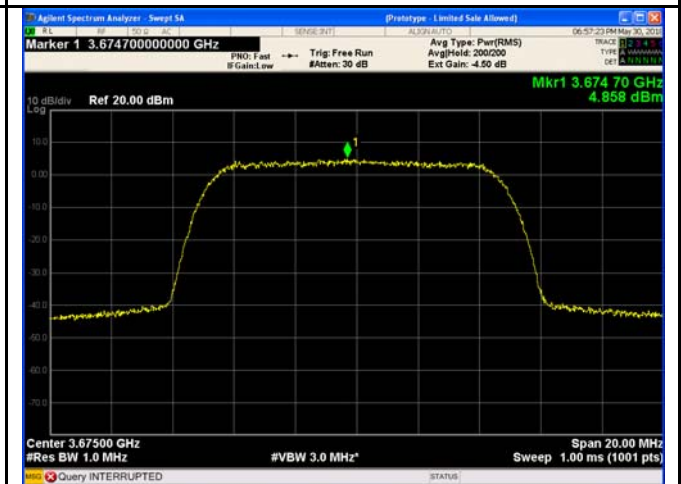
10MHz - Low CH QPSK



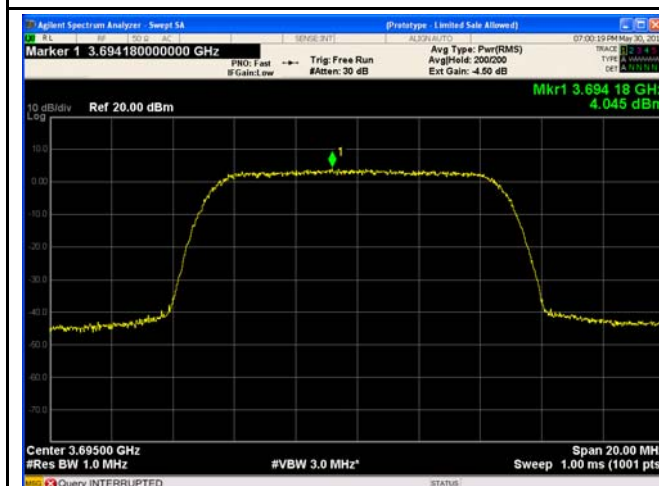
10MHz - Low CH 16QAM



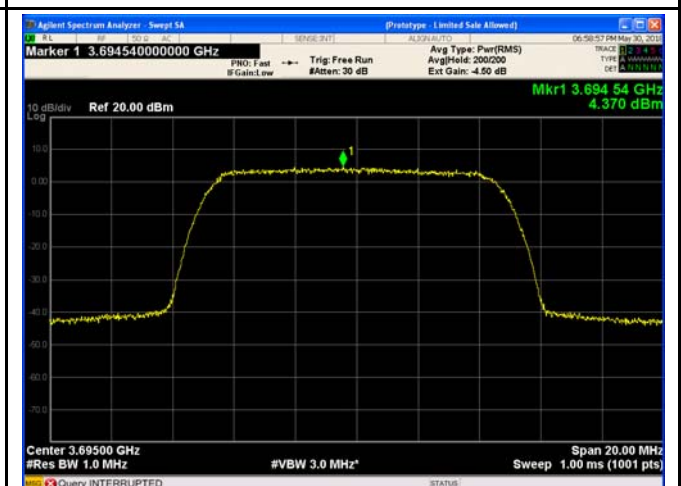
10MHz - Middle CH QPSK



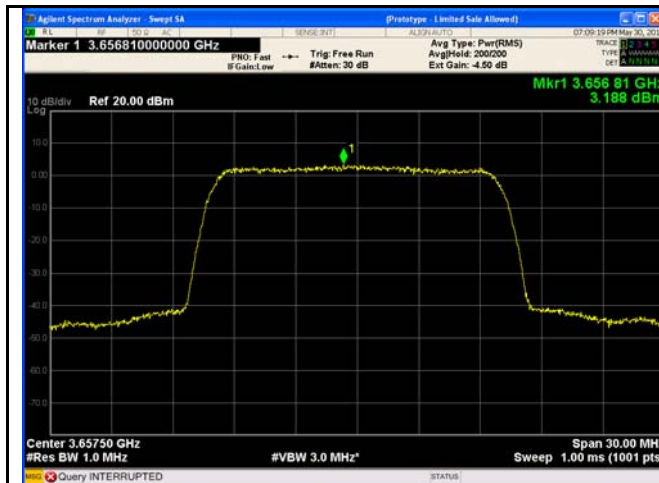
10MHz - Middle CH 16QAM



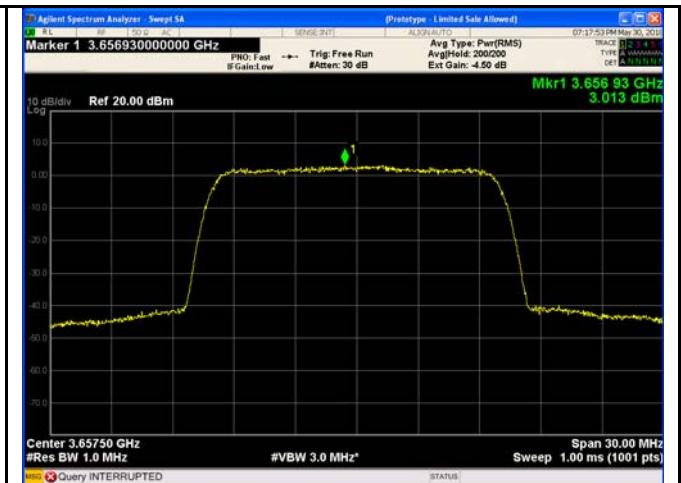
10MHz - High CH QPSK



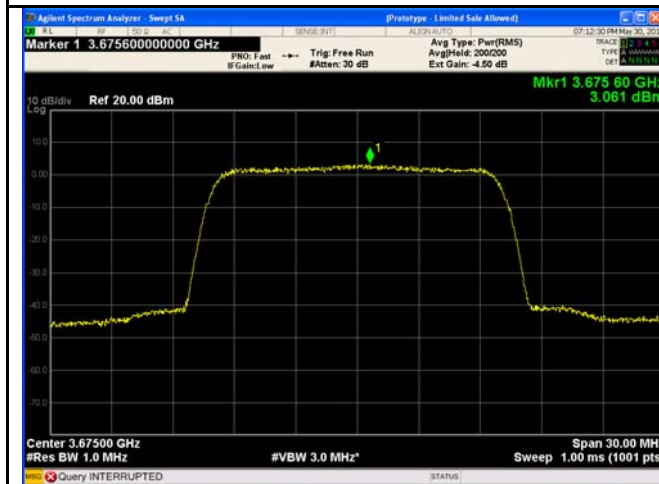
10MHz - High CH 16QAM



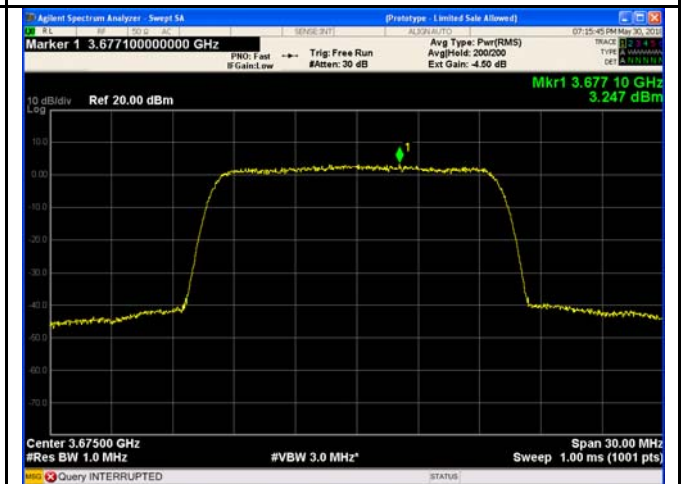
15MHz - Low CH QPSK



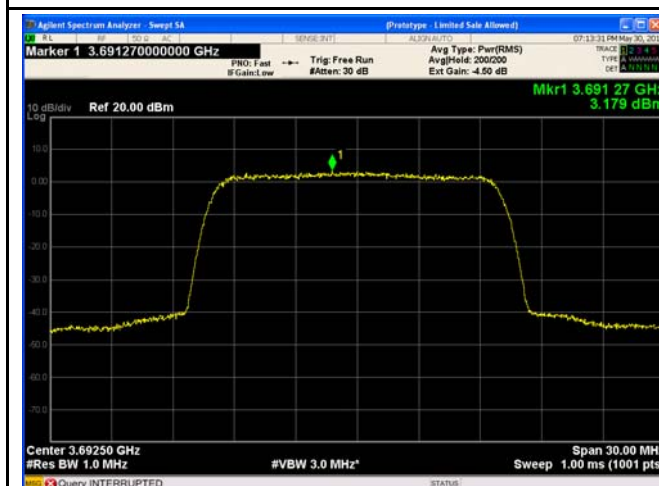
15MHz - Low CH 16QAM



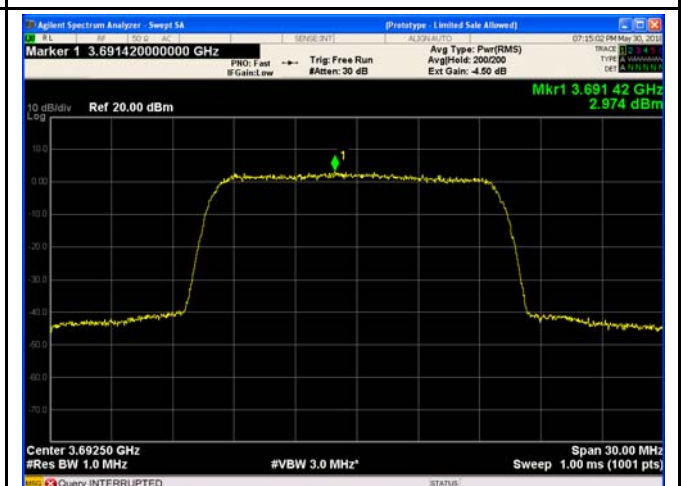
15MHz - Middle CH QPSK



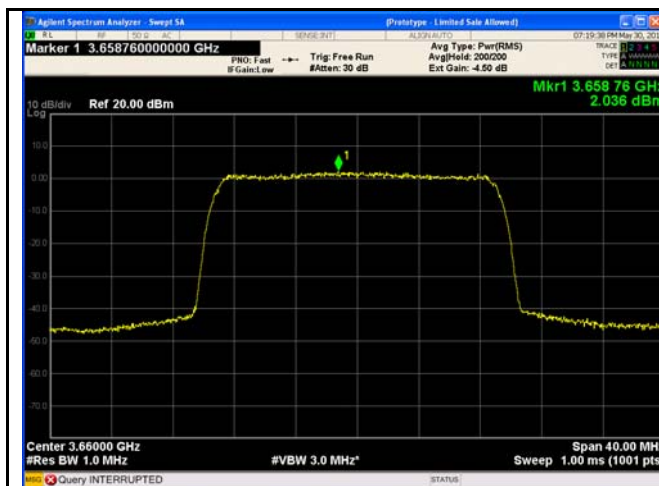
15MHz - Middle CH 16QAM



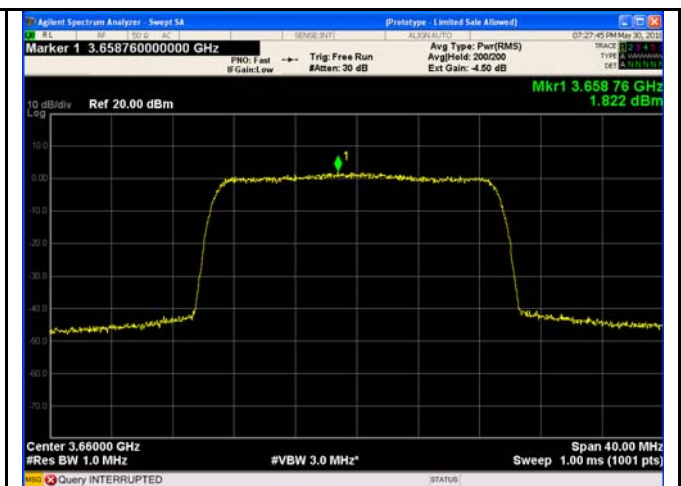
15MHz - High CH QPSK



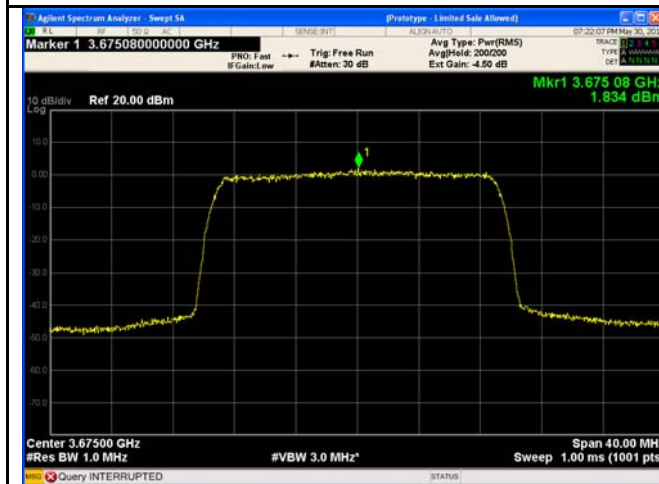
15MHz - High CH 16QAM



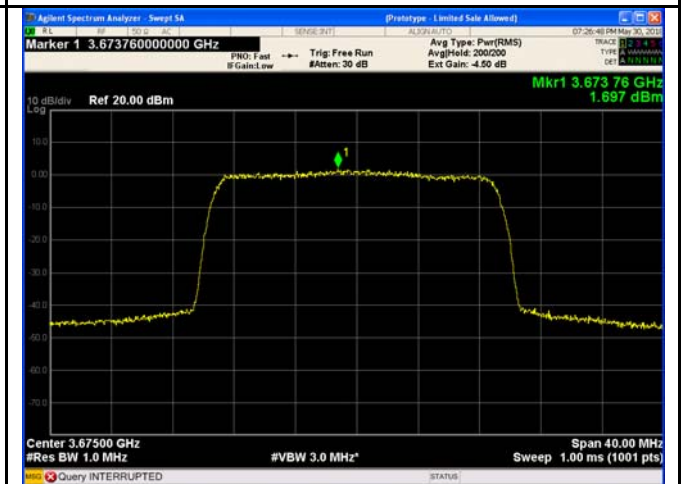
20MHz - Low CH QPSK



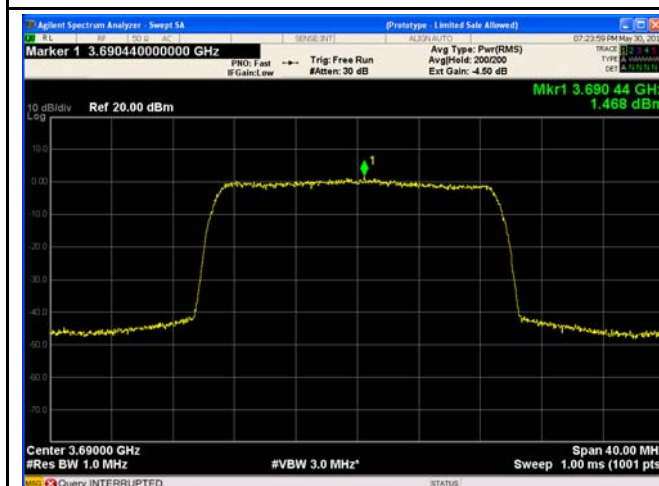
20MHz - Low CH 16QAM



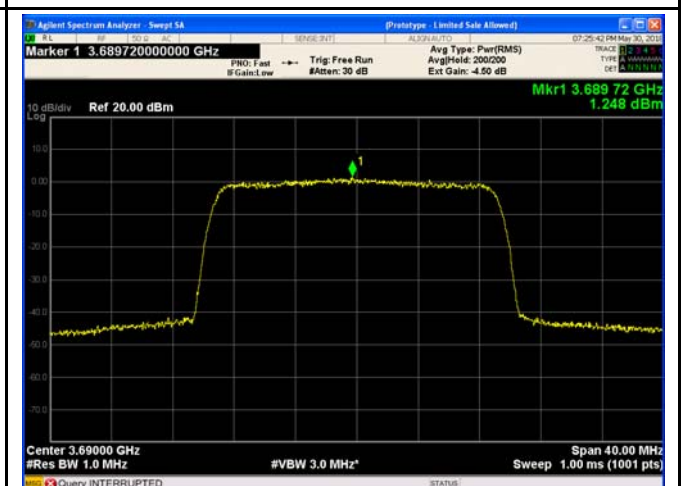
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM



20MHz - High CH QPSK



20MHz - High CH 16QAM

9 Occupy Bandwidth

Test Requirement:	FCC part 90.209
Test Method:	FCC part 2.1049 ANSI/TIA-603-E-2016
Test Mode:	Data communicating mode

9.1 EUT Operation

Operating Environment :

Temperature:	22.4 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.3kPa

9.2 Test Procedure

1. The EUT's output RF connector was connected with a short cable to the spectrum analyzer.
2. The transmitter shall be operated at its maximum carrier power measured under normal test conditions.
3. The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts.
4. The resolution bandwidth (RBW) shall be in the range of 1% to 5% of the occupied bandwidth (OBW) and video bandwidth (VBW) shall be approximately 3x RBW.

9.3 Test Result

Chain 0

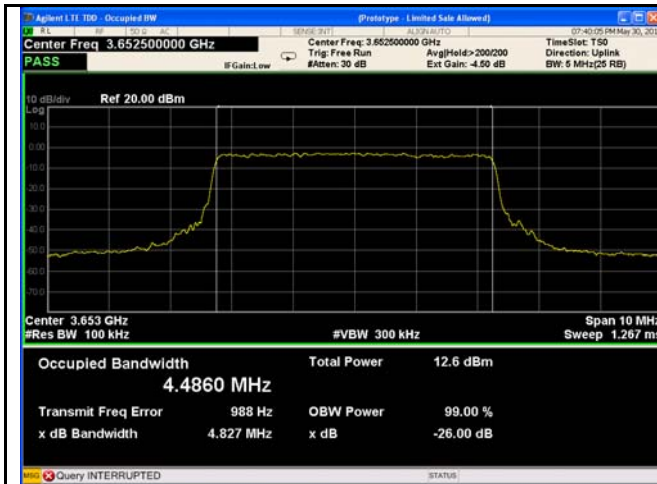
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
5	QPSK	Low	4.827	4.486
		Middle	4.871	4.496
		High	4.817	4.487
	16QAM	Low	4.851	4.489
		Middle	4.828	4.482
		High	4.846	4.480
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.299	8.913
		Middle	9.368	8.918
		High	9.314	8.910
	16QAM	Low	9.318	8.920
		Middle	9.337	8.930
		High	9.336	8.928
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
15	QPSK	Low	14.000	13.396
		Middle	14.070	13.401
		High	14.020	13.373
	16QAM	Low	14.030	13.392
		Middle	14.020	13.397
		High	14.050	13.399
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
20	QPSK	Low	18.510	17.838
		Middle	18.500	17.816
		High	18.540	17.825
	16QAM	Low	18.500	17.819
		Middle	18.500	17.827
		High	18.500	17.825

Chain 1

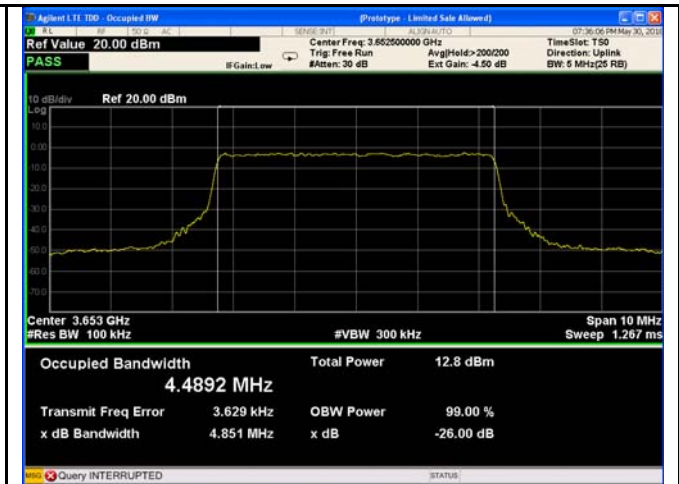
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
5	QPSK	Low	4.875	4.498
		Middle	4.798	4.491
		High	4.866	4.489
	16QAM	Low	4.852	4.480
		Middle	4.828	4.483
		High	4.805	4.493
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
10	QPSK	Low	9.364	8.917
		Middle	9.319	8.921
		High	9.297	8.927
	16QAM	Low	9.312	8.927
		Middle	9.296	8.911
		High	9.290	8.920
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
15	QPSK	Low	14.040	13.409
		Middle	14.020	13.394
		High	14.000	13.384
	16QAM	Low	14.010	13.390
		Middle	14.030	13.400
		High	14.010	13.407
Bandwidth (MHz)	Modulation	Test Channel	26dB Occupy bandwidth (MHz)	99% Occupy bandwidth (MHz)
20	QPSK	Low	18.510	17.855
		Middle	18.540	17.831
		High	18.500	17.829
	16QAM	Low	18.530	17.807
		Middle	18.530	17.850
		High	18.560	17.834

Test Plots

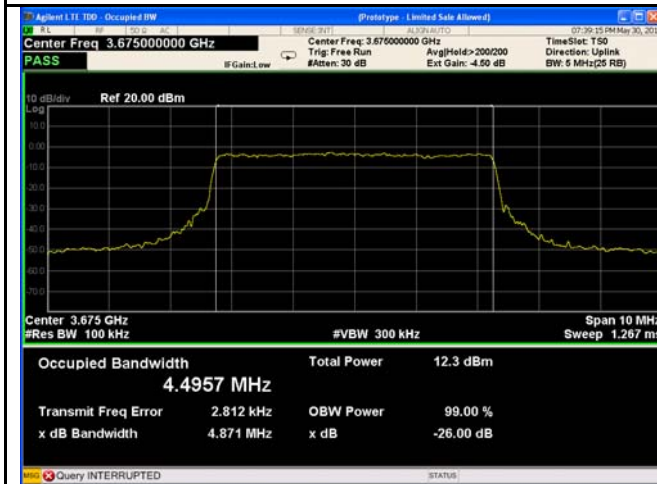
Chain 0



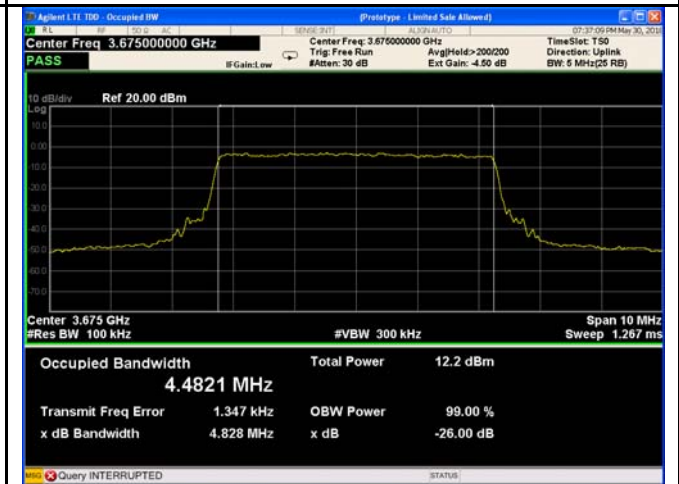
5MHz - Low CH QPSK



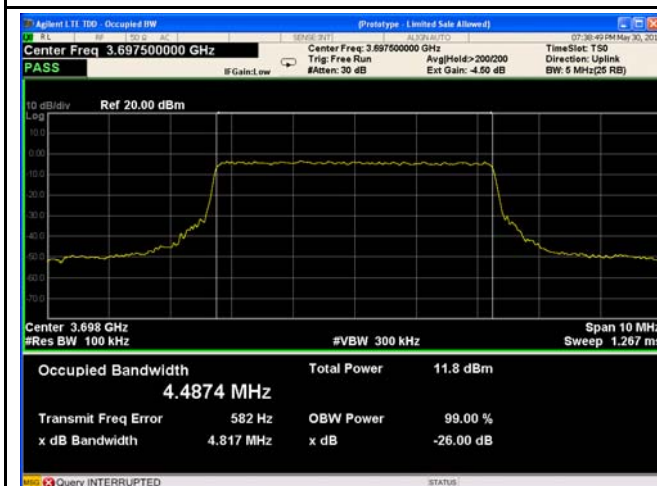
5MHz - Low CH 16QAM



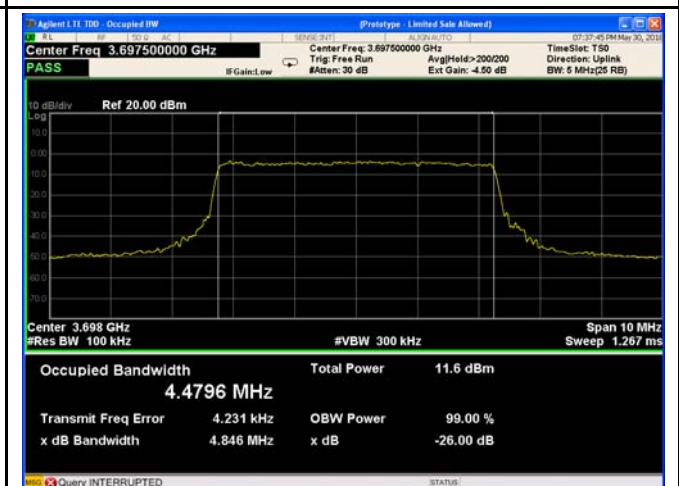
5MHz - Middle CH QPSK



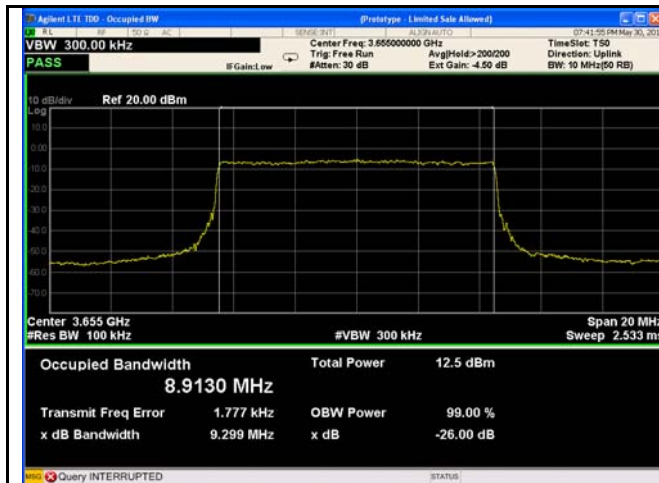
5MHz - Middle CH 16QAM



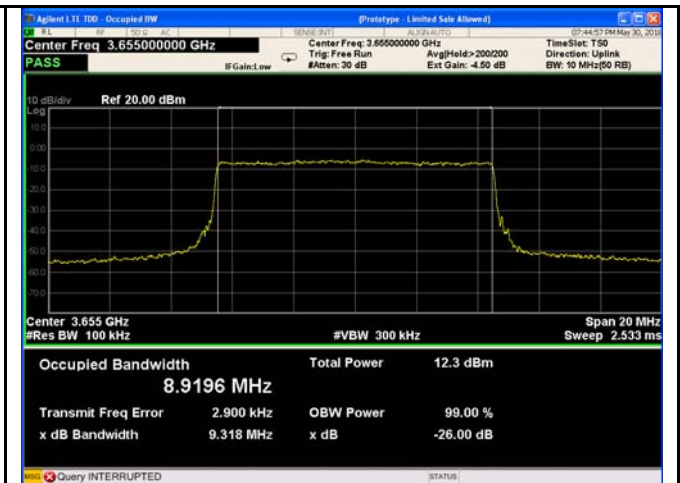
5MHz - High CH QPSK



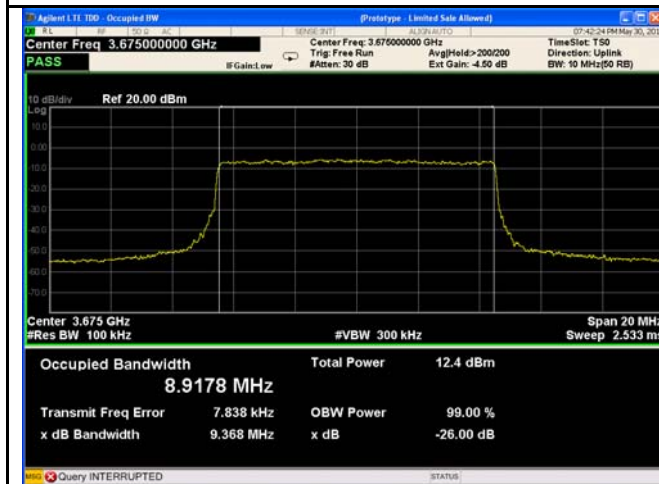
5MHz - High CH 16QAM



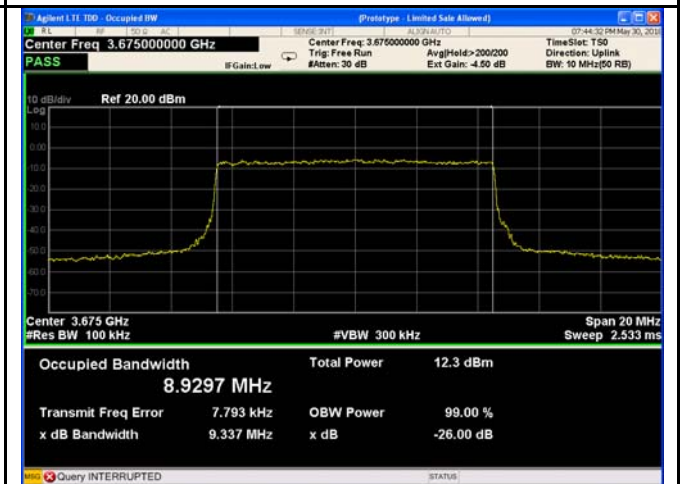
10MHz - Low CH QPSK



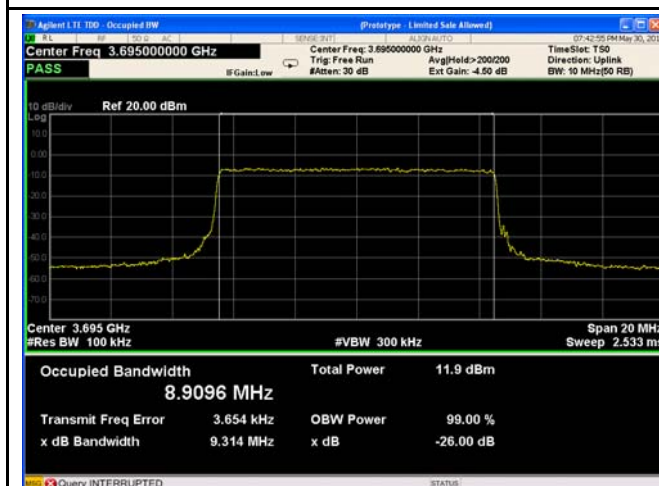
10MHz - Low CH 16QAM



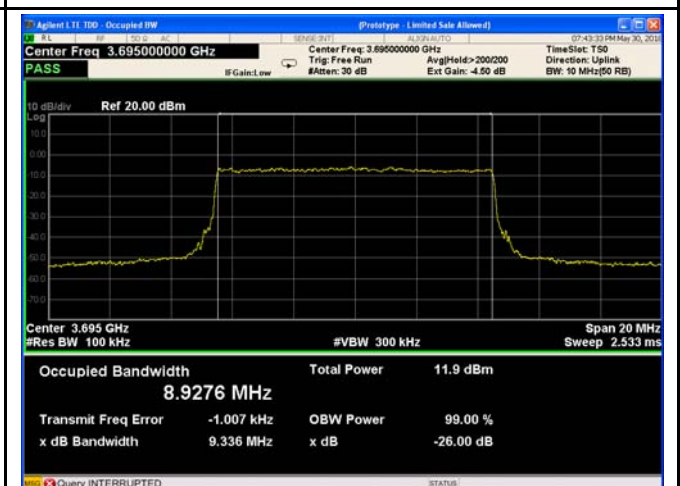
10MHz - Middle CH QPSK



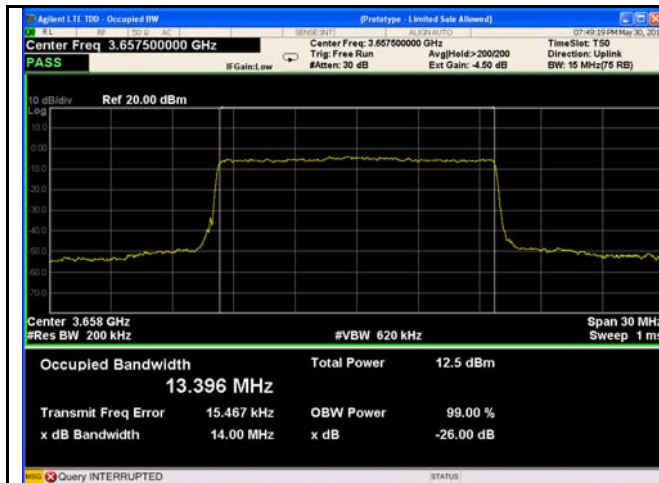
10MHz - Middle CH 16QAM



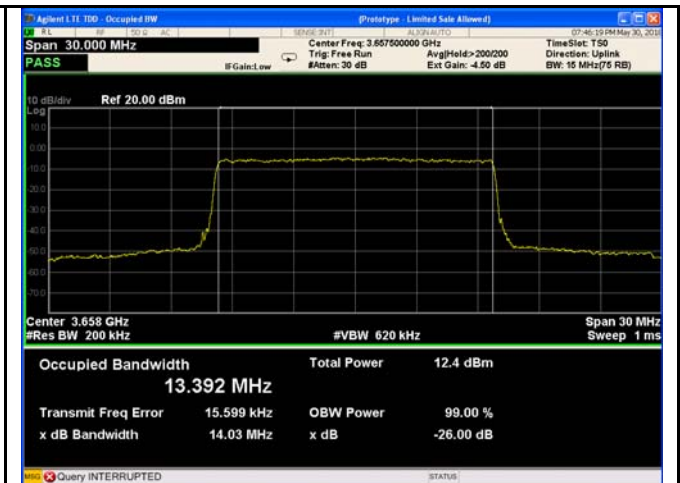
10MHz - High CH QPSK



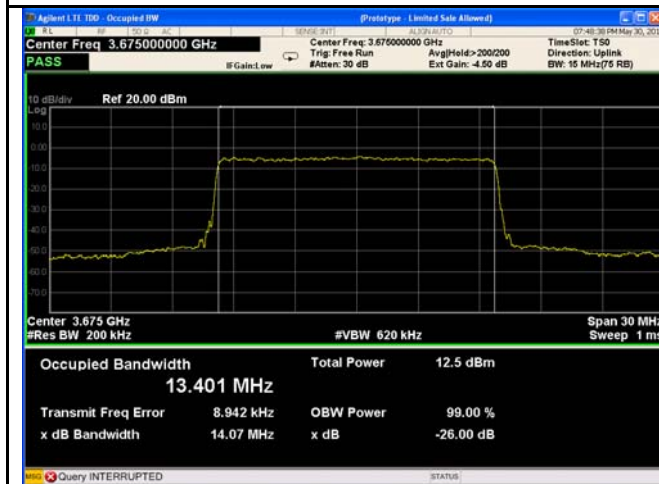
10MHz - High CH 16QAM



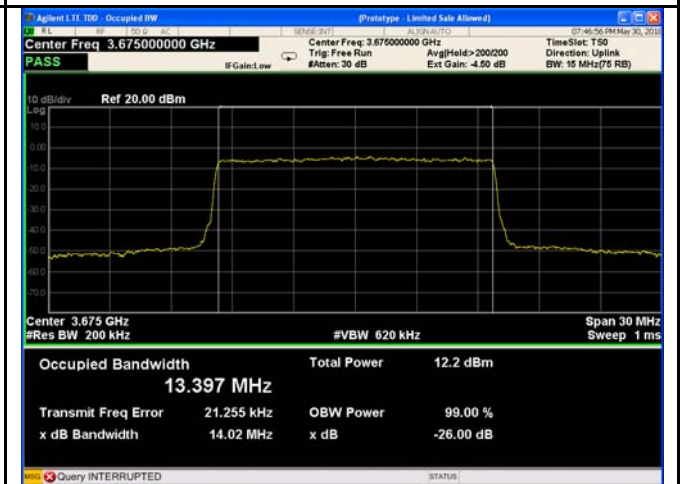
15MHz - Low CH QPSK



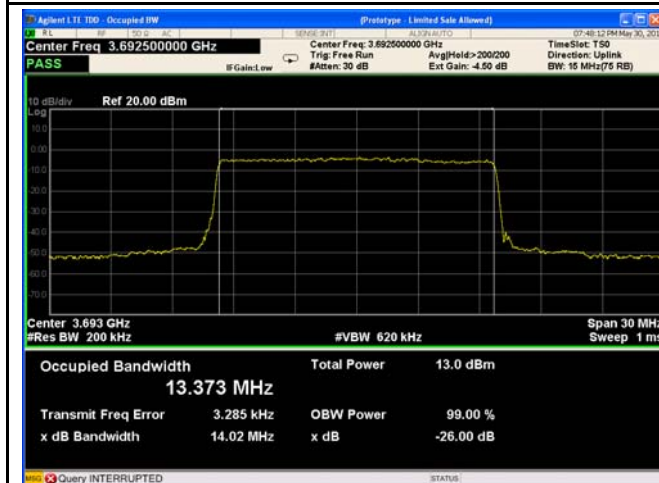
15MHz - Low CH 16QAM



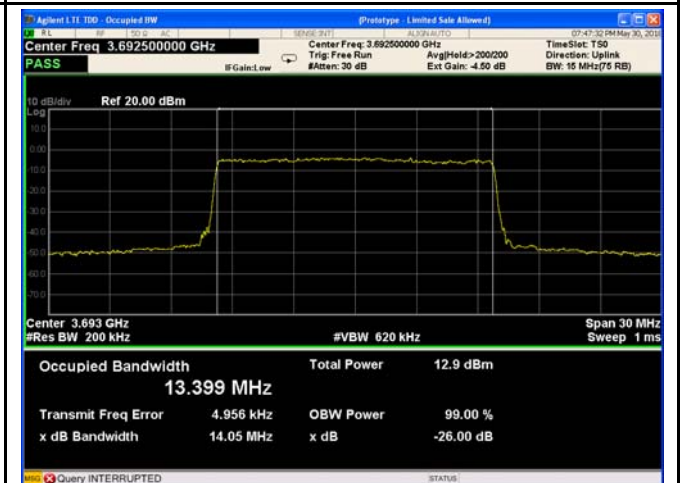
15MHz - Middle CH QPSK



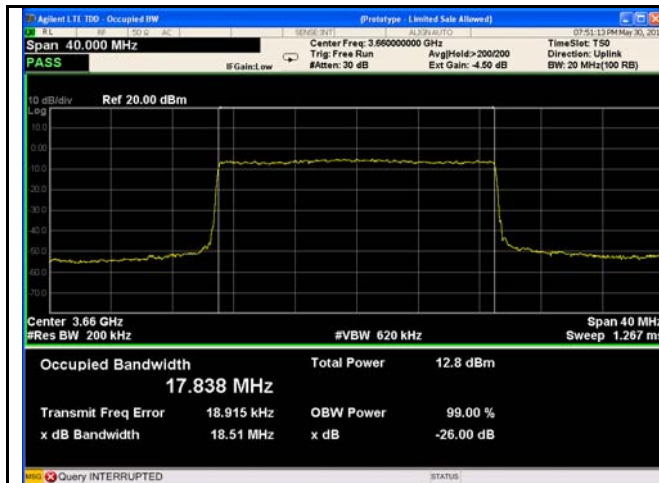
15MHz - Middle CH 16QAM



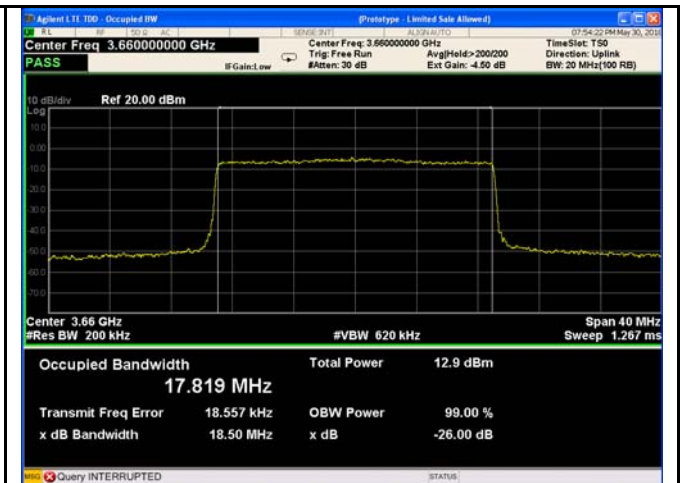
15MHz - High CH QPSK



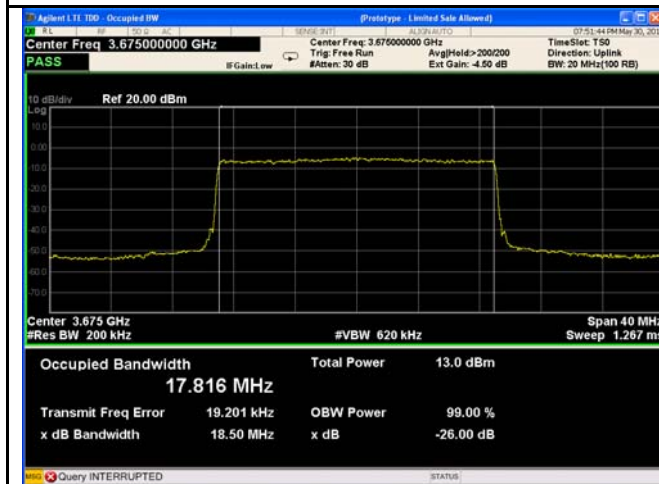
15MHz - High CH 16QAM



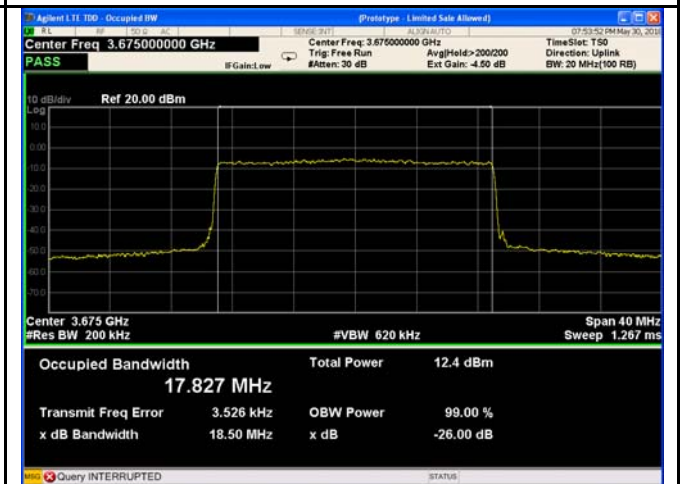
20MHz - Low CH QPSK



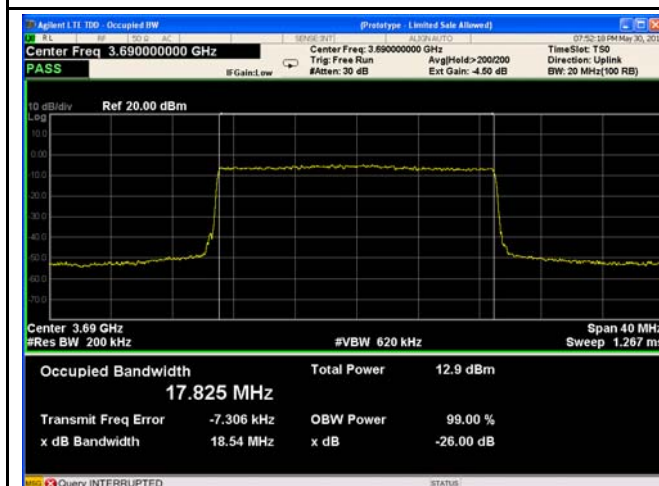
20MHz - Low CH 16QAM



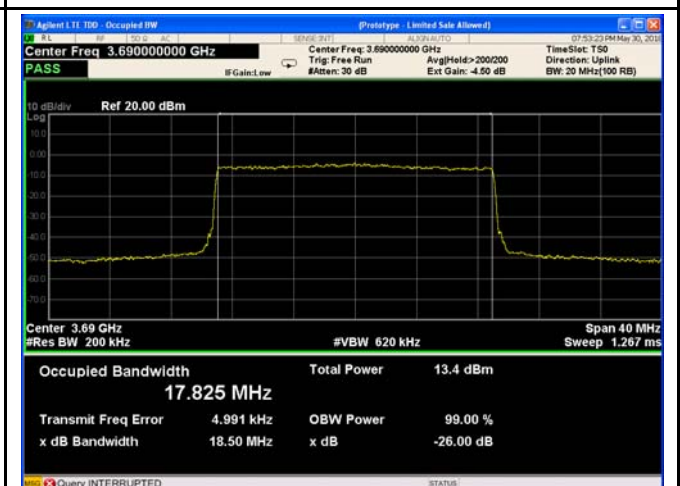
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM

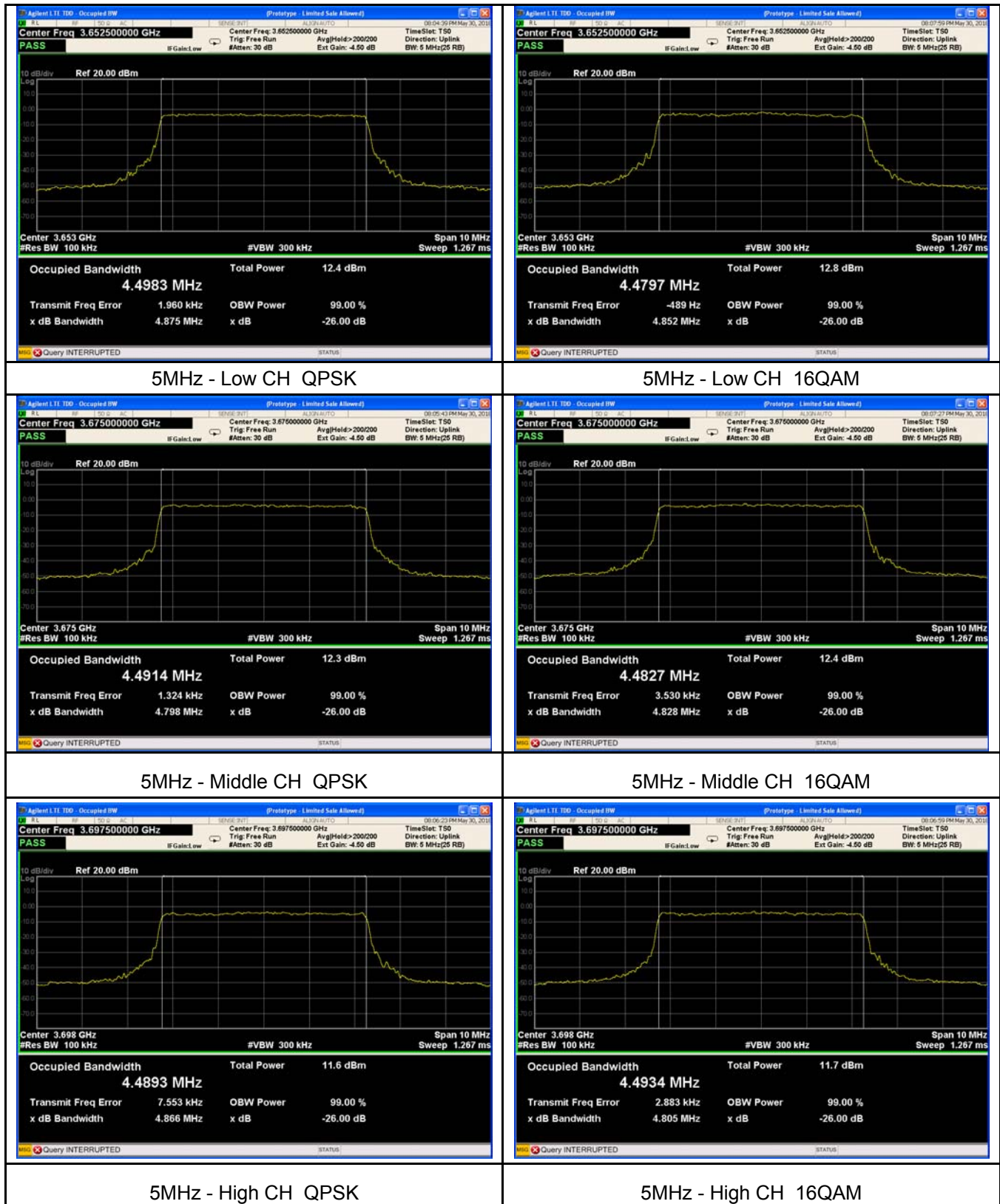


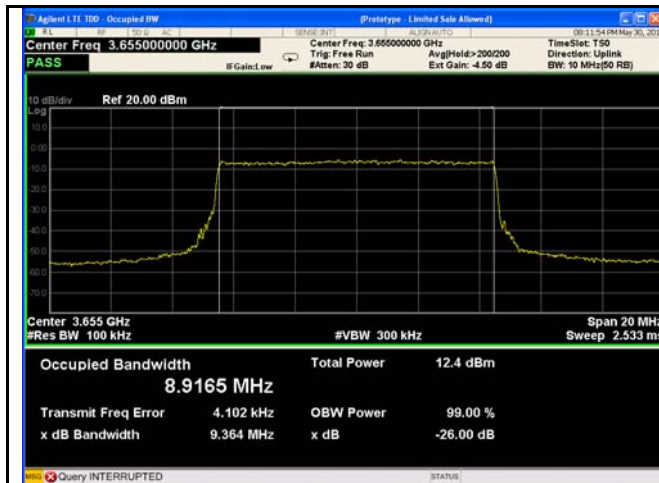
20MHz - High CH QPSK



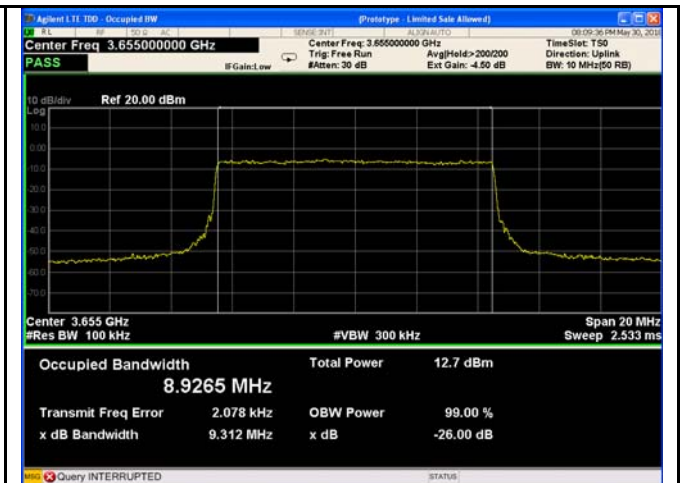
20MHz - High CH 16QAM

Chain 1

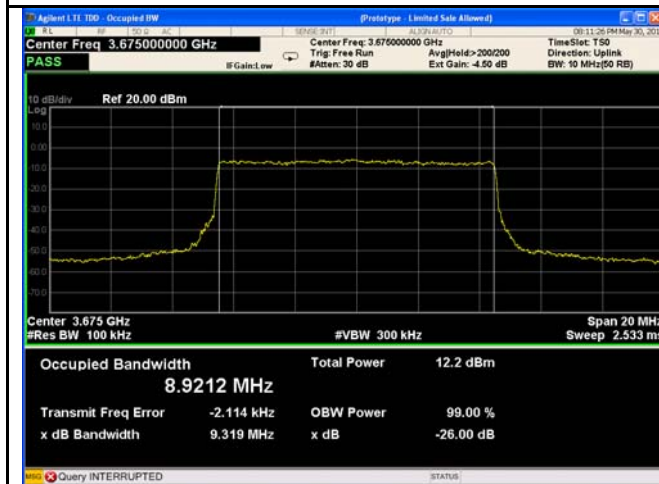




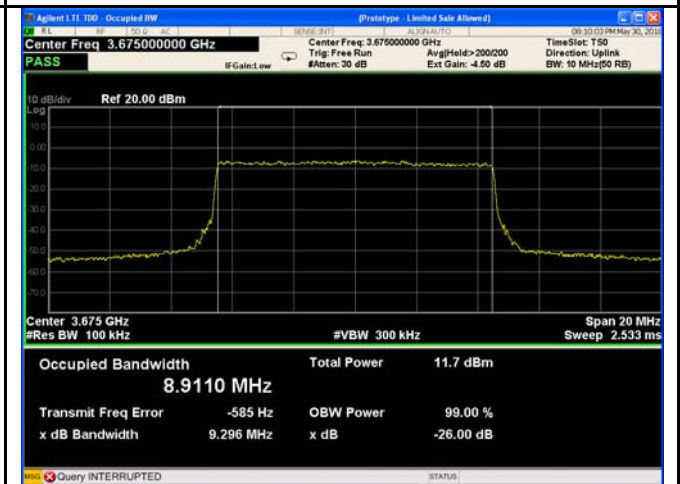
10MHz - Low CH QPSK



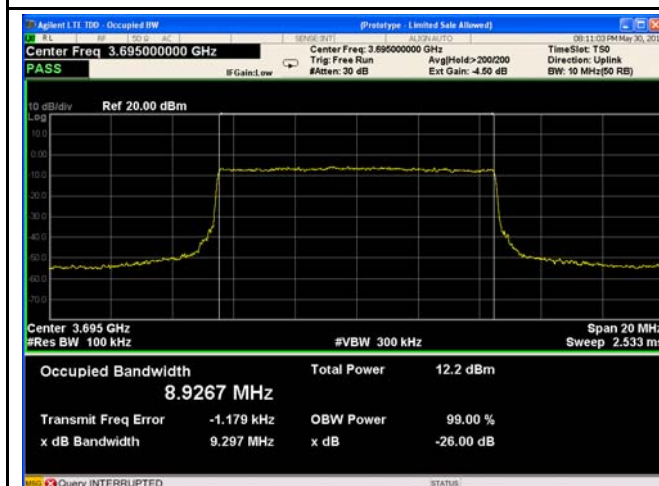
10MHz - Low CH 16QAM



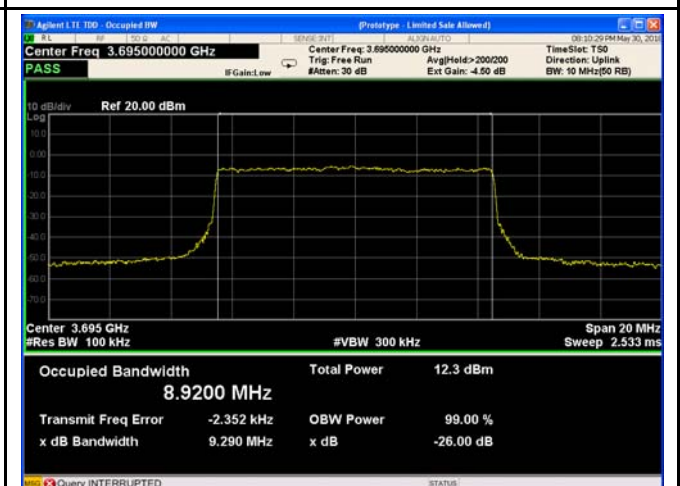
10MHz - Middle CH QPSK



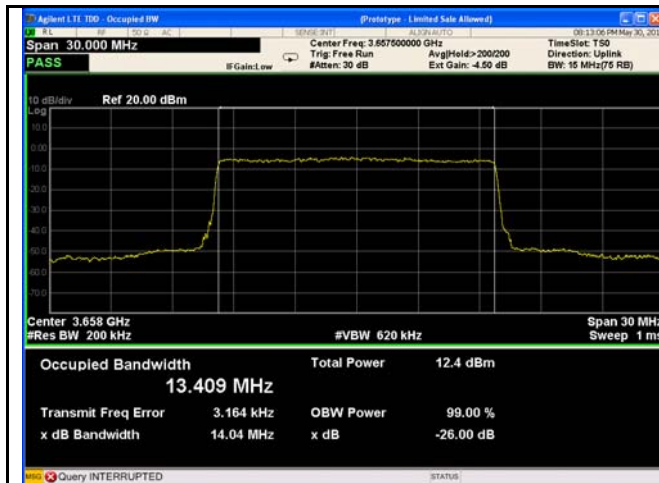
10MHz - Middle CH 16QAM



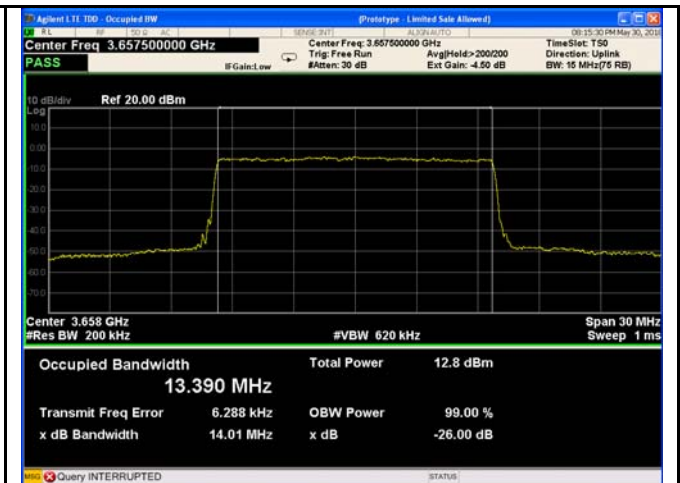
10MHz - High CH QPSK



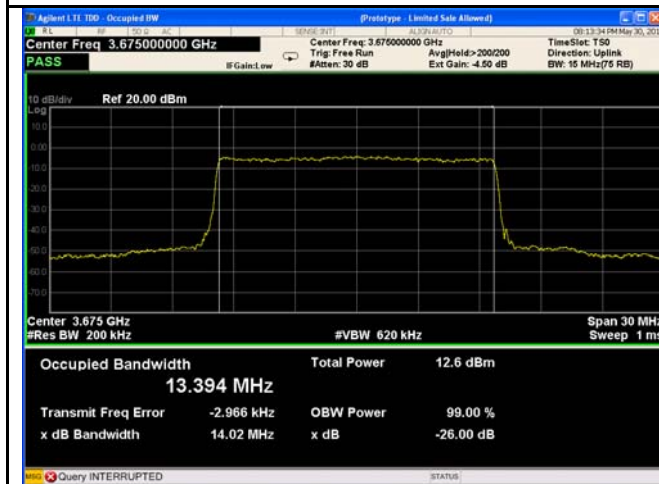
10MHz - High CH 16QAM



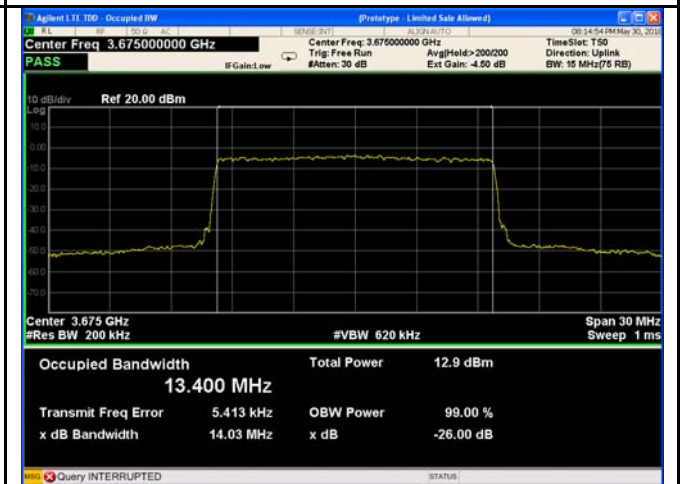
15MHz - Low CH QPSK



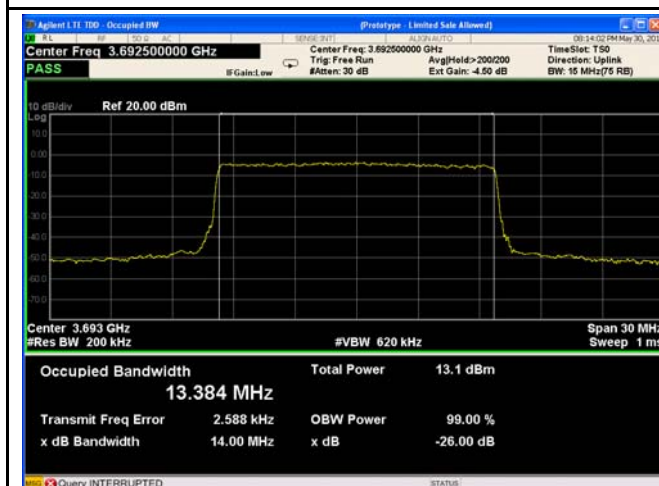
15MHz - Low CH 16QAM



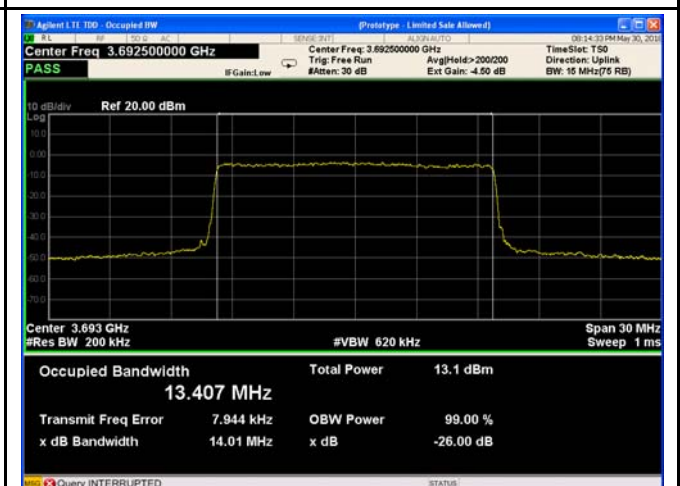
15MHz - Middle CH QPSK



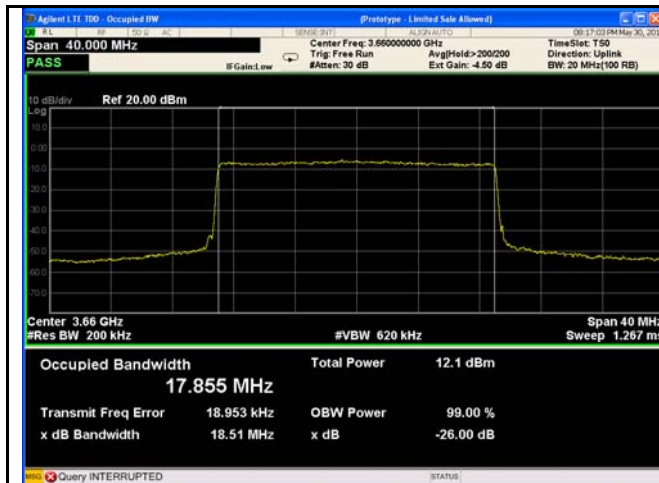
15MHz - Middle CH 16QAM



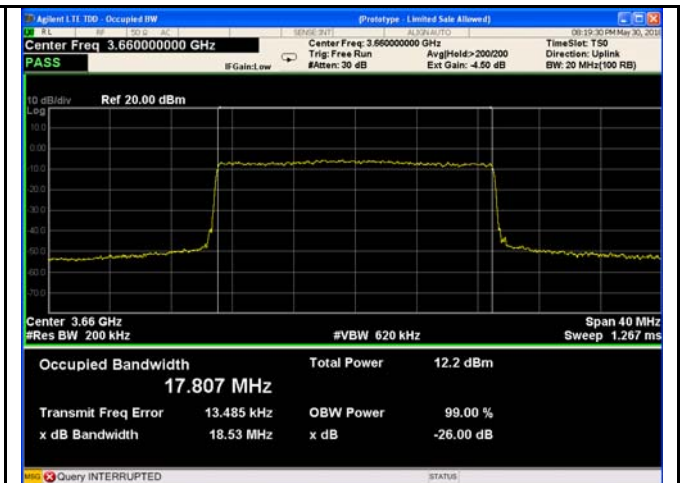
15MHz - High CH QPSK



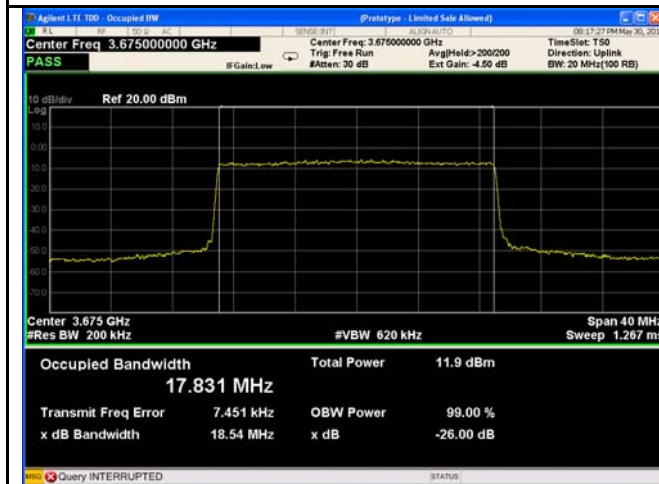
15MHz - High CH 16QAM



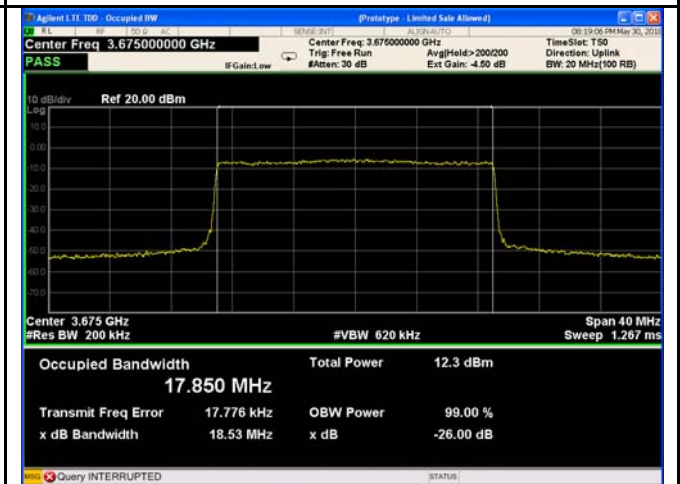
20MHz - Low CH QPSK



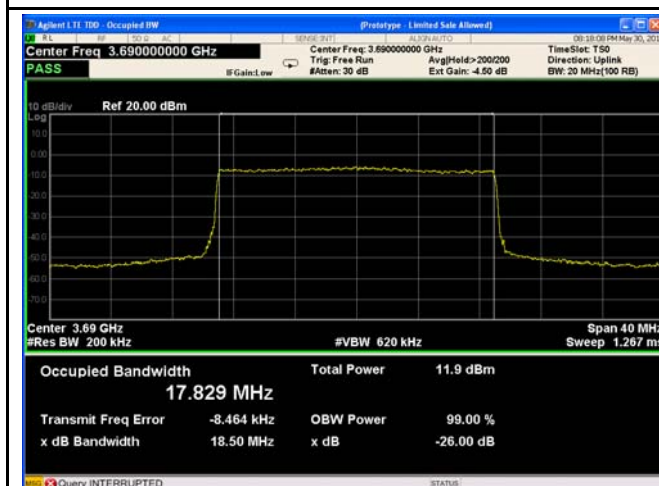
20MHz - Low CH 16QAM



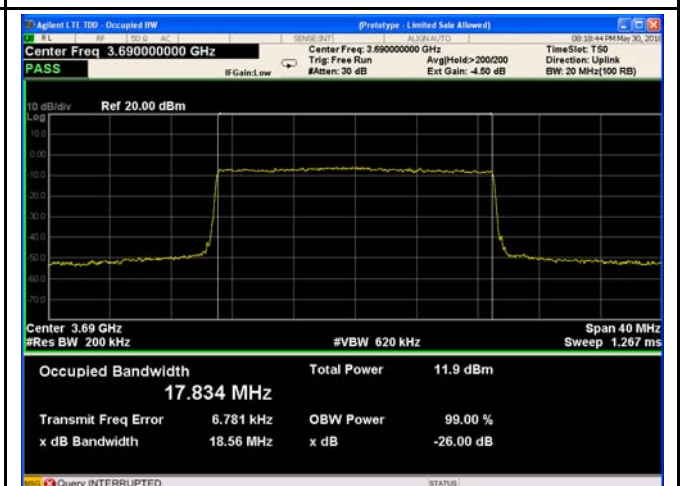
20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM



20MHz - High CH QPSK



20MHz - High CH 16QAM

10 Emission Mask

Test Requirement:	FCC part 90.210(b)
Test Mode:	ANSI/TIA-603-E-2016
Limit:	Data communicating mode Emission Mask B. For transmitters that are equipped with an audio low-pass filter, the power of any emission must be attenuated below the unmodulated carrier power (P) as follows: (1) On any frequency removed from the assigned frequency by more than 50 percent, but not more than 100 percent of the authorized bandwidth: At least 25 dB. (2) On any frequency removed from the assigned frequency by more than 100 percent, but not more than 250 percent of the authorized bandwidth: At least 35 dB. (3) On any frequency removed from the assigned frequency by more than 250 percent of the authorized bandwidth: At least $43 + 10 \log (P)$ dB

10.1 EUT Operation

Operating Environment :	
Temperature:	22.5 °C
Humidity:	52.3% RH
Atmospheric Pressure:	101.3kPa

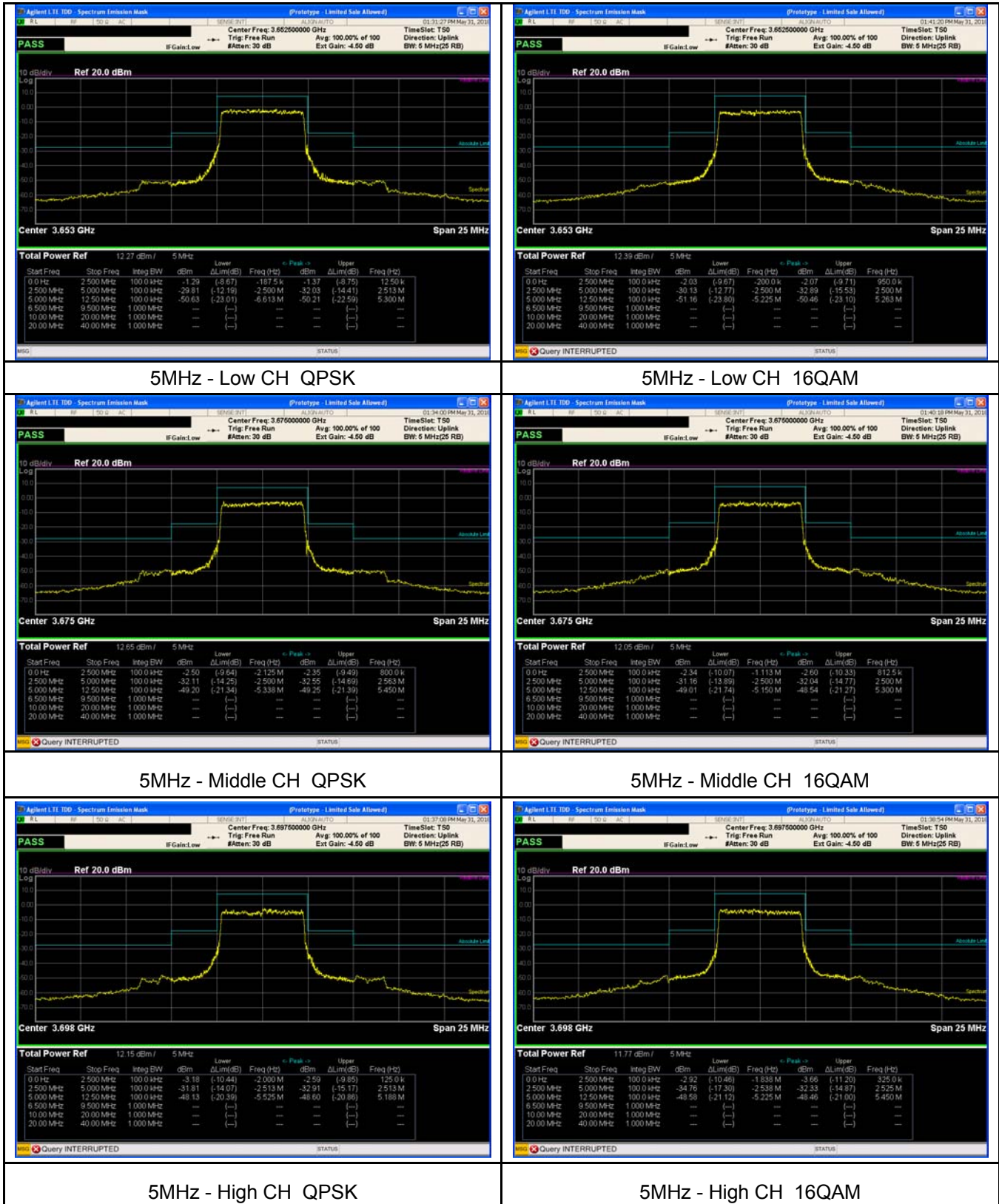
10.2 Test Procedure

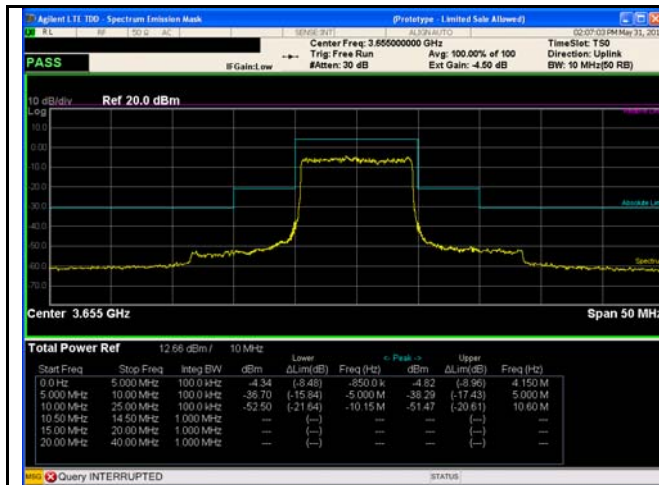
1. The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation.
2. RBW=100kHz, VBW=1MHz, Detector mode= RMS,
Trace mode: Power averaging over 100 sweeps

Note: For FCC part 90.210(b) 3, more than 250 percent emission was considered in radiated emission test items.

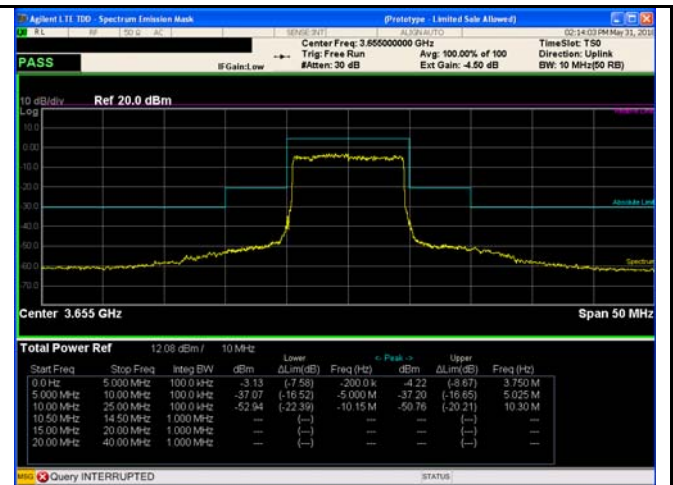
10.3 Test Result

Test Plots Chain 0

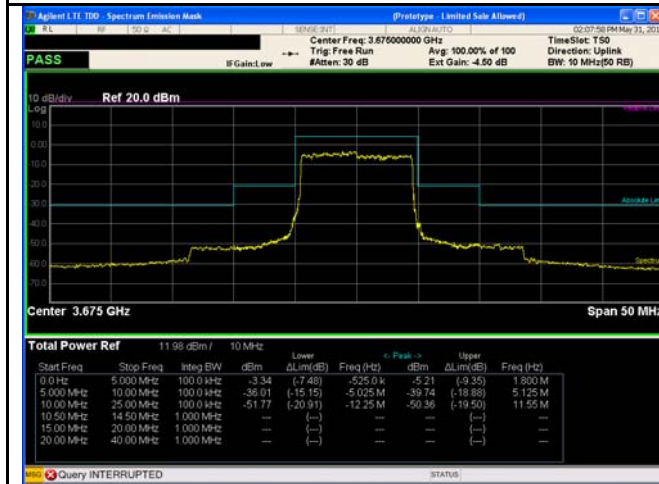




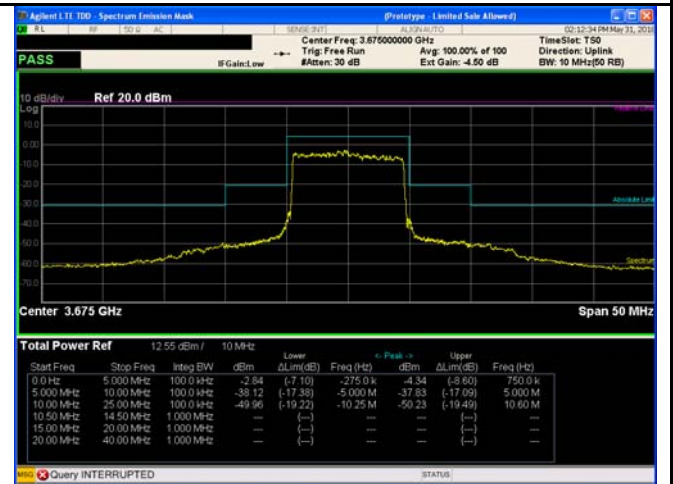
10MHz - Low CH QPSK



10MHz - Low CH 16QAM



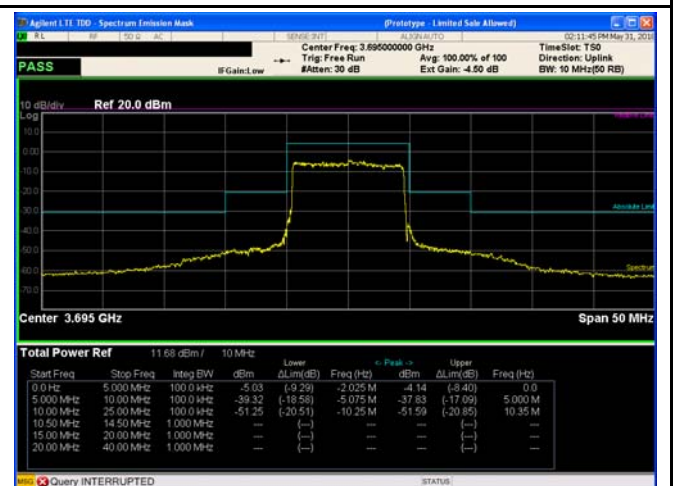
10MHz - Middle CH QPSK



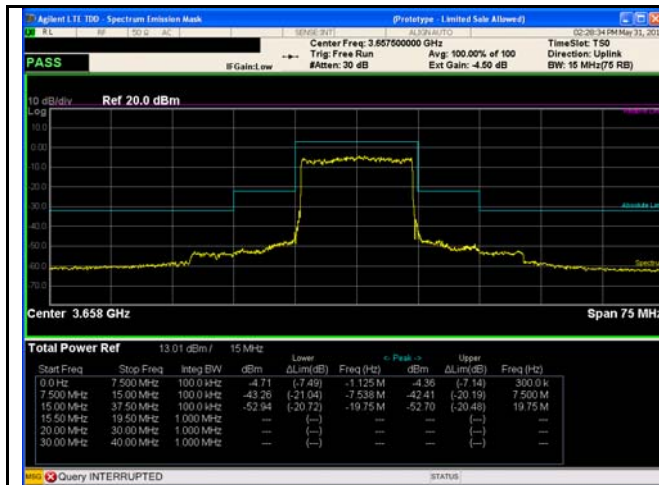
10MHz - Middle CH 16QAM



10MHz - High CH QPSK



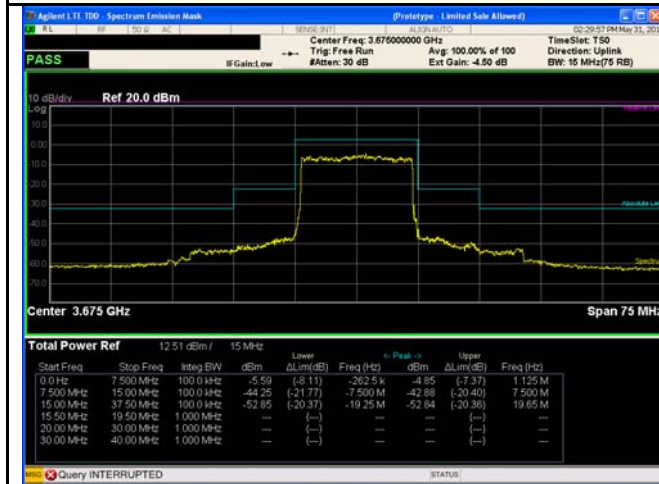
10MHz - High CH 16QAM



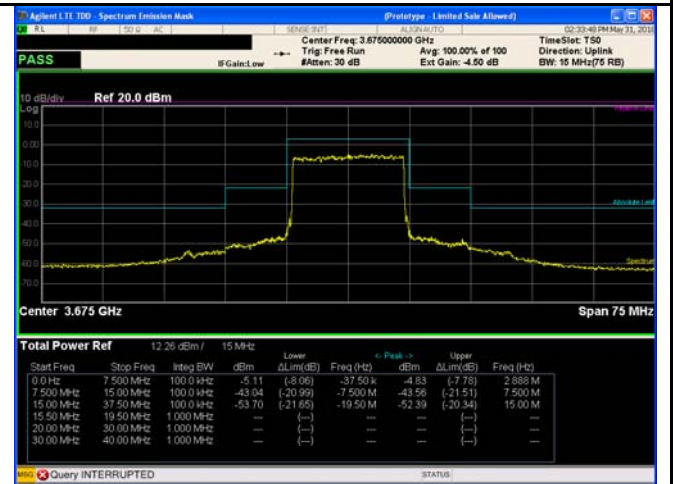
15MHz - Low CH QPSK



15MHz - Low CH 16QAM



15MHz - Middle CH QPSK



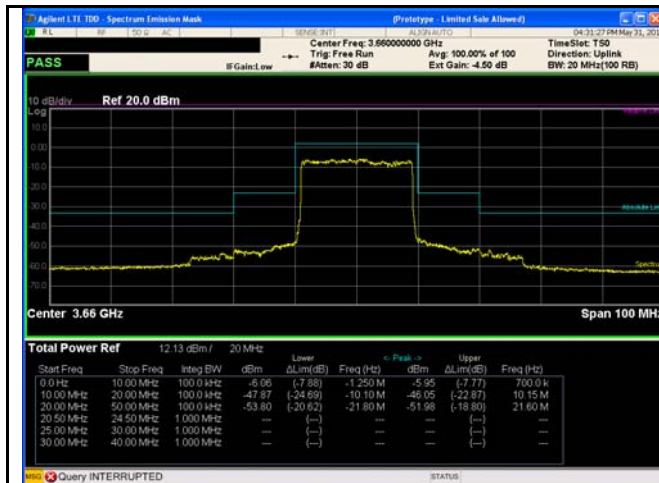
15MHz - Middle CH 16QAM



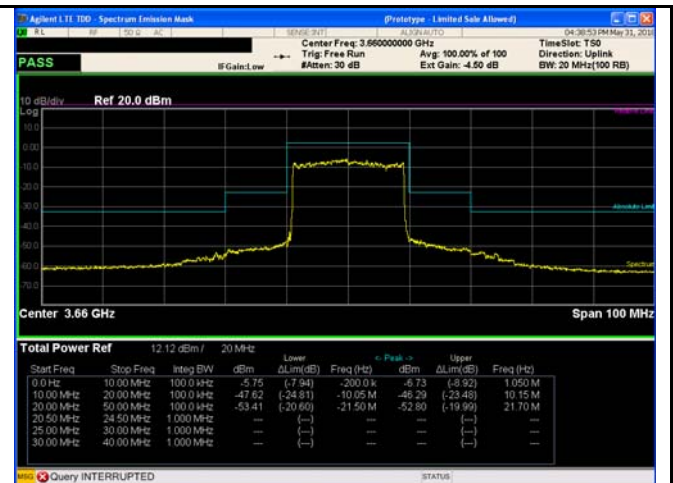
15MHz - High CH QPSK



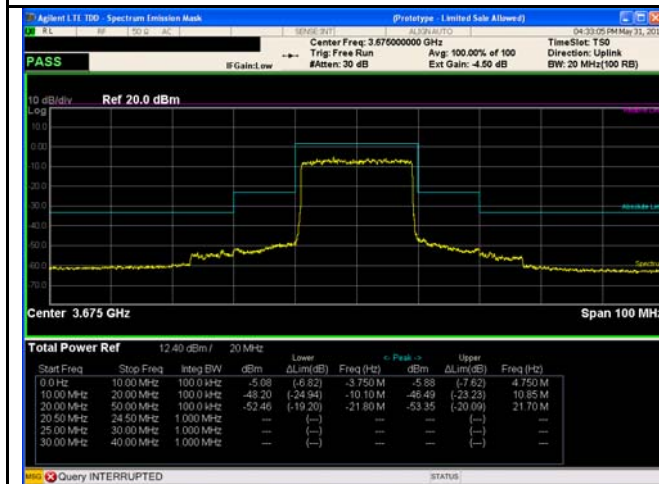
15MHz - High CH 16QAM



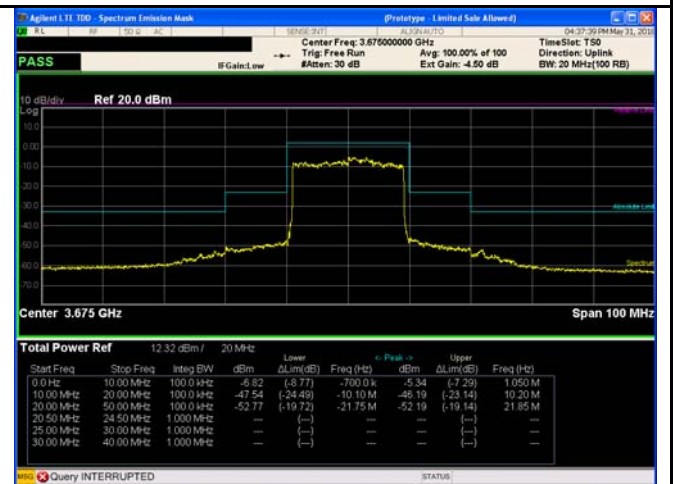
20MHz - Low CH QPSK



20MHz - Low CH 16QAM



20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM

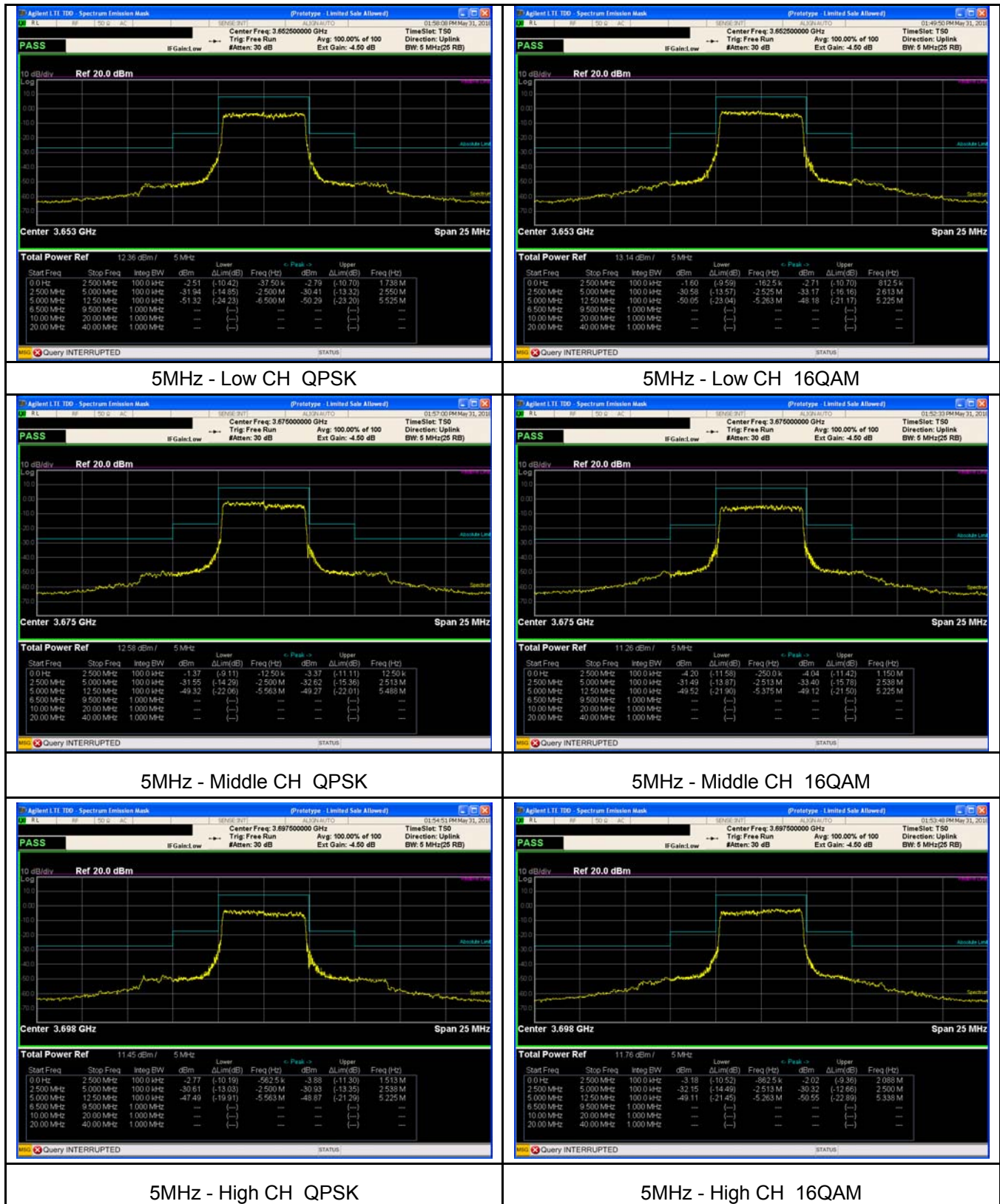


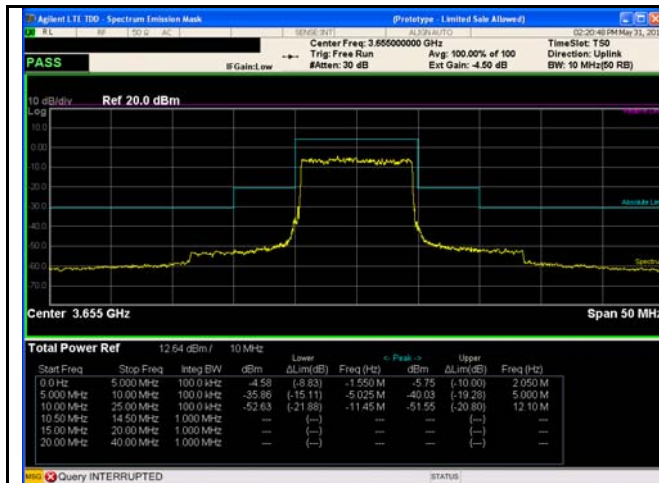
20MHz - High CH QPSK



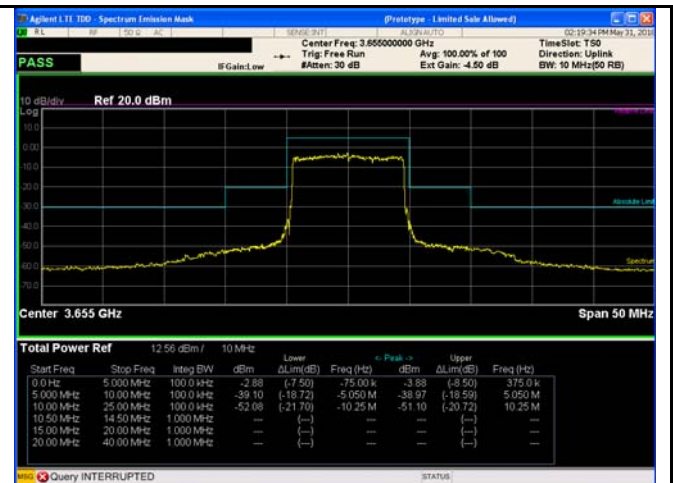
20MHz - High CH 16QAM

Chain 1

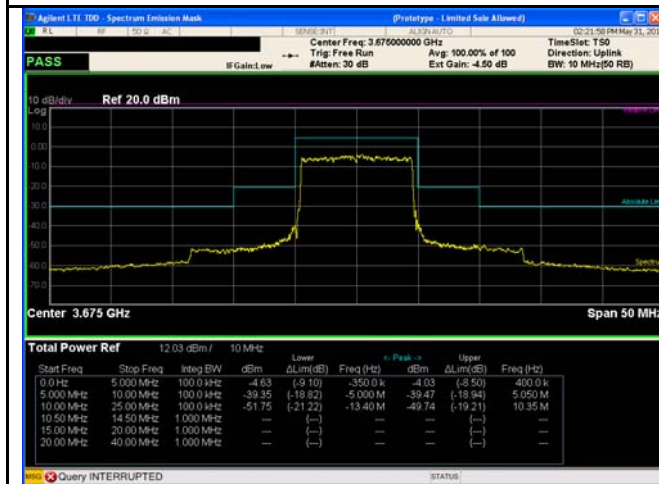




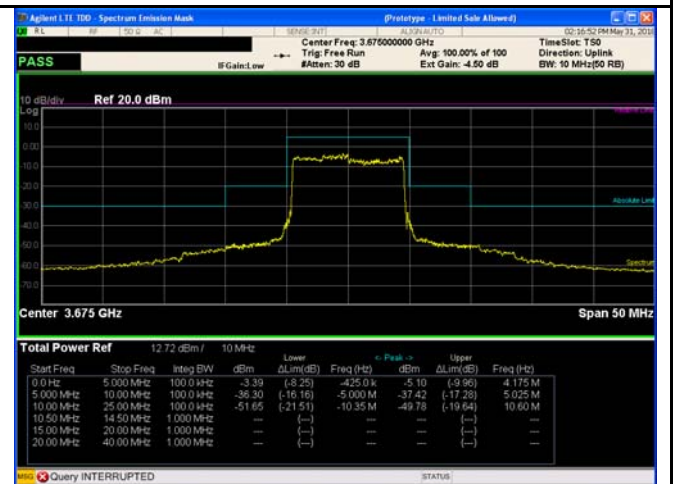
10MHz - Low CH QPSK



10MHz - Low CH 16QAM



10MHz - Middle CH QPSK



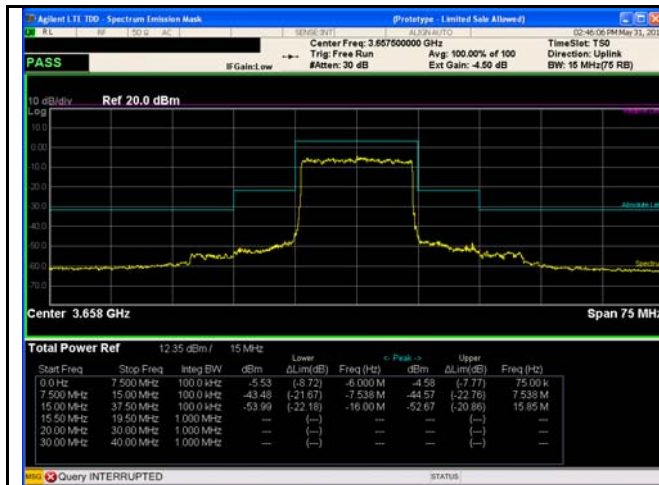
10MHz - Middle CH 16QAM



10MHz - High CH QPSK



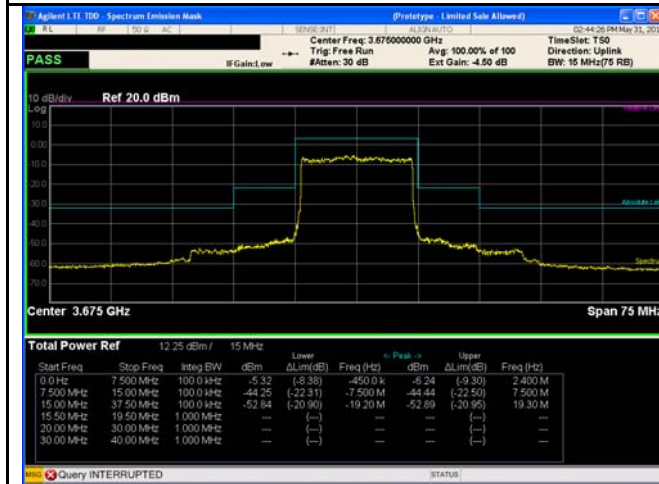
10MHz - High CH 16QAM



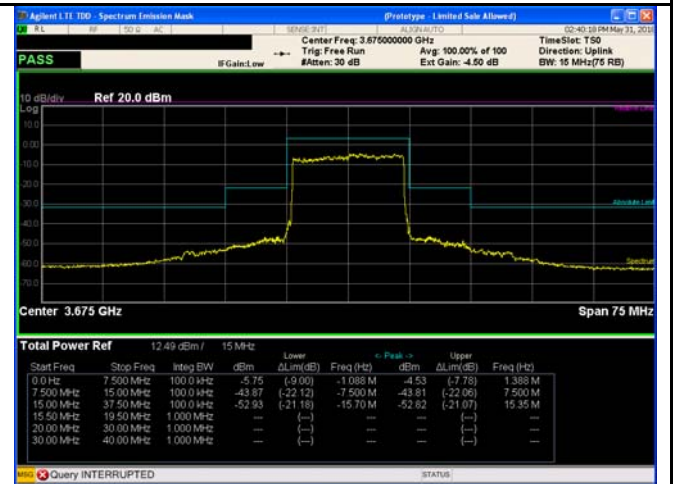
15MHz - Low CH QPSK



15MHz - Low CH 16QAM



15MHz - Middle CH QPSK



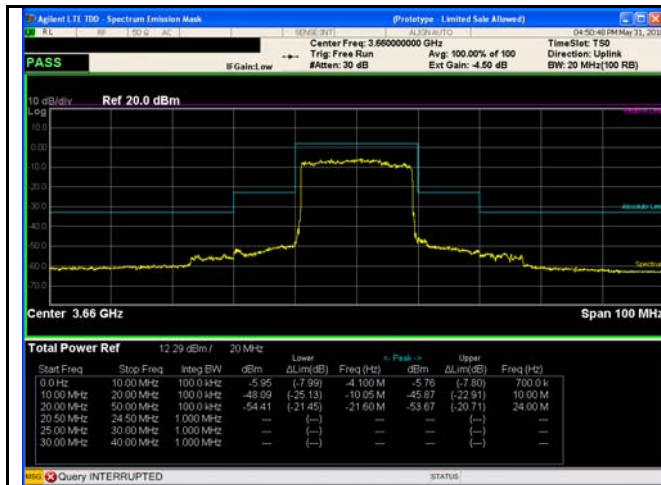
15MHz - Middle CH 16QAM



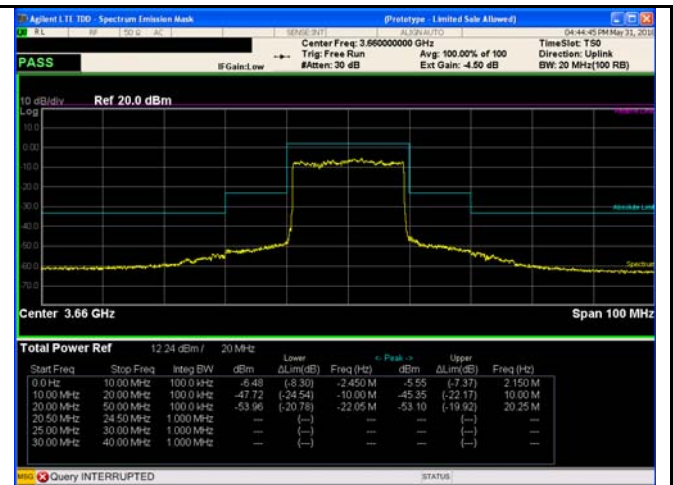
15MHz - High CH QPSK



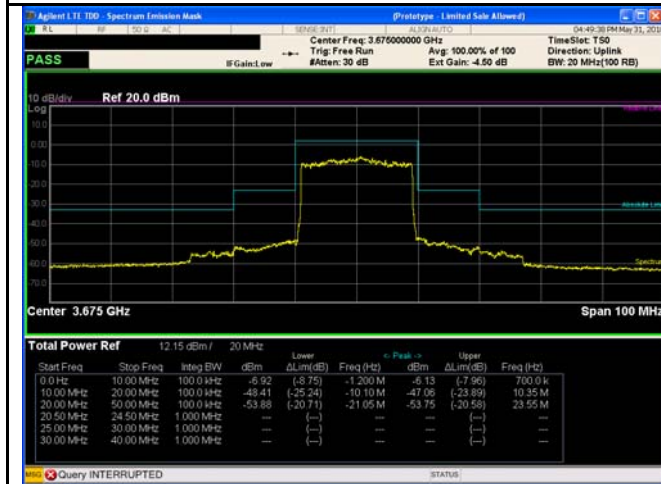
15MHz - High CH 16QAM



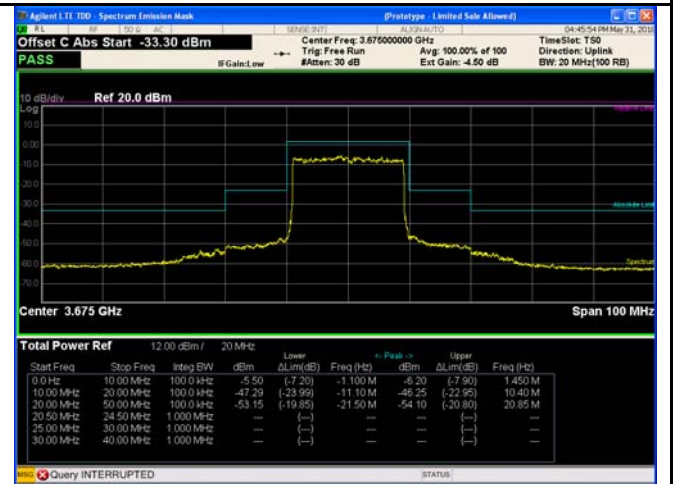
20MHz - Low CH QPSK



20MHz - Low CH 16QAM



20MHz - Middle CH QPSK



20MHz - Middle CH 16QAM



20MHz - High CH QPSK



20MHz - High CH 16QAM