



# FCC Test Report

## FCC ID: 2ALKI-P20

Product Name:	Smart POS / Wireless POS
Trademark:	N/A
Model Name:	P20
Prepared For:	Wuhan Tianyu Information Industry Co., Ltd.
Address:	HUST Industry Park, East-Lake Development Zone, Wuhan 430223, Hubei, China
Prepared By:	Shenzhen BCTC Technology Co., Ltd.
Address:	NO.101, Yousong Road, Longhua New District, Shenzhen, Guangdong, P.R.China
Test Date:	Jun. 10 – Jul. 01, 2017
Date of Report:	Jul. 01, 2017
Report No.:	BCTC-FY170603965-3E



### VERIFICATION OF COMPLIANCE

**Applicant's name** ..... : Wuhan Tianyu Information Industry Co., Ltd.  
**Address** ..... : HUST Industry Park, East-Lake Development Zone, Wuhan 430223, Hubei, China  
**Manufacture's Name** ..... : Wuhan Tianyu Information Industry Co., Ltd.  
**Address** ..... : HUST Industry Park, East-Lake Development Zone, Wuhan 430223, Hubei, China


#### Product description


**Product name** ..... : Smart POS / Wireless POS  
**Trademark:** N/A  
**Model Name:** P20  
**Test procedure** : FCC CFR Title 47 Part 2: 2016  
 FCC CFR Title 47 Part 27: 2016  
 ANSI/ TIA/ EIA-603-D-2010  
 FCC KDB 971168 D01 Power Meas. License Digital Systems v02v02

This device described above has been tested by BCTC, and the test results show that the equipment under test (EUT) is in compliance with the requirements. And it is applicable only to the tested sample identified in the report.

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**Test Result** : **Pass**

**Testing Engineer** :   
 \_\_\_\_\_  
 Eric Yang

**Reviewer Supervisor** :   
 \_\_\_\_\_  
 Jade Yang

**Approved & Authorized Manager** :   
 \_\_\_\_\_  
 Carson Zhang



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## 1.TEST SUMMARY

Test Items	Test Requirement	Result
RF Output Power	2.1046 22.913 (a) 24.232 (c) 27.50(h.2) 27.50(d.4)	PASS
Peak-to-Average Ratio	24.232 (d) 27.50(d)	PASS
Bandwidth	2.1049 22.905 22.917 24.238 27.53(a)	PASS
Spurious Emissions at Antenna Terminal	2.1051 22.917 (a) 24.238 (a) 27.53(h) 27.53(m)(4)	PASS
Field Strength of Spurious Radiation	2.1053 22.917 (a) 24.238 (a) 27.53(h) 27.53(m)(4)	PASS
Out of band emission	22.917 (a) 24.238 (a) 27.53(h) 27.53(m)(4)	PASS
Frequency Stability	2.1055 22.355 24.235 27.5(h) 27.54	PASS
Maximum Permissible Exposure (SAR)	1.1307 2.1093	PASS



## 2.GENERAL PRODUCT INFORMATION

### 2.1. Description of Device (EUT)

Product Name:	Smart POS / Wireless POS
Trademark	N/A
Model No.:	P20
Model Difference	N/A
Operation Frequency:	RF ID:13.56MHz LTE-TDD Band XXXXI:2496-2690MHz
Modulation technology:	NFC: ASK LTE-TDD with QPSK, 16QAM Modulation
Antenna Type:	Internal Antenna
Antenna gain:	1.5dBi (NFC) 2.0dBi (TDD)
Power supply:	DC 3.7V from battery DC 5V from adapter
Adapter	Model:SAP050200CN-C I/P: AC 100-240V 50/60Hz O/P: DC 5V 2.0A
Class	3

### 2.2. Product Function

Refer to Technical Construction Form and User Manual.

### 2.3. Measurement Uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 1.38\text{dB}$
2	RF power,conducted	$\pm 0.16\text{dB}$
3	Spurious emissions,conducted	$\pm 0.21\text{dB}$
4	All emissions,radiated(<1G)	$\pm 4.68\text{dB}$
5	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$



## 2.4. Independent Operation Modes

Test channels:

LTE BAND 41			
BW	Test Channel	UL Channel	Frequency(MHz)
5	Low	39675	2498.5
5	Middle	40620	2593
5	High	41565	2468.7
10	Low	39700	2501
10	Middle	40620	2593
10	High	41540	2685
15	Low	39725	2503.5
15	Middle	41515	2682.5
15	High	40620	2593
20	Low	39750	2506
20	Middle	41490	2680
20	High	40620	2593

Note 1: both QPSK&16QAM modulation has been measured;

Note 2: The worst condition was recorded in the test report if no other modes test data.

## 2.5. Test Facilities

### Site Description

- Name of Firm : Shenzhen BCTC Technology Co., Ltd.
- Site Location : NO.101, Yousong Road, Longhua New District,  
Shenzhen, Guangdong, P.R.China
- Lab Qualifications : Certificated by Industry Canada  
Registration No.: 12655A  
Date of registration: January 19, 2015
- Certificated by FCC, USA  
Registration No.: 187086  
Date of registration: November 28, 2014
- Certificated by CNAS China  
Registration No.: CNAS L6046  
Date of registration: February 3, 2013



## 2.6. List of Test and Measurement Instruments

### 2.6.1. For conducted emission at the mains terminals test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
843 Shielded Room	ChengYu	843 Room	843	2016.08.27	2017.08.26
EMI Receiver	R&S	ESCI	101421	2016.08.27	2017.08.26
LISN	Schwarzbeck	NSLK8127	8127739	2016.08.27	2017.08.26
Attenuator	R&S	ESH3-Z2	BCTC021E	2016.08.27	2017.08.26
843 Cable 1#	FUJIKURA	843C1#	001	2016.08.27	2017.08.26

### 2.6.2. For radiated test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Test Receiver	R&S	ESPI	101318	2016.08.27	2017.08.26
System Simulator	Agilent	E5515C	GB43130252	2016.08.27	2017.08.26
Power Splitter	Weinschel	1506A	NW534	2016.08.27	2017.08.26
Bilog Antenna	SCHWARZBECK	VULB9160	VULB9160-3369	2016.08.27	2017.08.26
Bilog Antenna	TESEQ	CBL6111D	31217	2016.08.27	2017.08.26
Loop antenna	ARA	PLA-1030/B	1029	2016.06.07	2017.06.06
Spectrum Analyzer	Agilent	E4411B	MY4511235	2016.07.06	2017.07.05
Signal Amplifier	SCHWARZBECK	BBV9718	9718-270	2016.08.27	2017.08.26
Signal Amplifier	Agilent	8449B	3008A00213	2016.08.27	2017.08.26
RF Cable	R&S	R203	R20X	2016.08.27	2017.08.26
MULTI-DEVICE Controller	ETS-LINDGREEN	31250	126821	N/A	N/A
Horn Antenna	EM	EM-AH-10180	2011071402	2016.07.06	2017.07.05
Horn Antenna	EM	EM-AH-10180	2011071401	2016.07.06	2017.07.05
Horn Antenna	Schwarzbeck	BBHA 9170	9170-181	2016.07.06	2017.07.05
Spectrum Analyzer	Agilent	8593E	3911A03928	2016.08.27	2017.08.26
Spectrum Analyzer	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
Signal Amplifier	DAZE	ZN3380B	11235	2016.08.27	2017.08.26
High Pass filter	KANGMAI	WHKX1.0/1.5G-10SS	40	2016.08.27	2017.08.26
Filter	COM-MW	ZBSF-C836.5-25-X	BCTC042	2016.08.27	2017.08.26
Filter	COM-MW	ZBSF-C1747.5-75-X2	BCTC045	2016.08.27	2017.08.26
Filter	COM-MW	ZBSF-C1880-60-X2	BCTC047	2016.08.27	2017.08.26
Splitter	Agilent	11435B	1125162	2016.08.27	2017.08.26
<b>RF CONDUCTED TEST</b>					
System Simulator	Agilent	E5515C	GB43130252	2016.08.27	2017.08.26
Spectrum Analyzer	Agilent	E4407B	MY45108040	2016.08.27	2017.08.26
DC Power Supply	LongWei	PS-305D	010965682	2016.08.27	2017.08.26
Constant temperature and humidity box	GF	GTH-800-40-2P	MAA9906-012	2016.08.27	2017.08.26
Universal radio communication tester	R&S	CMU200	115295	2016.08.27	2017.08.26
Wideband Radio Communication Tester	R&S	CMW500	103976	2016.08.27	2017.08.26



### 3. TEST SET-UP

#### 3.1. Principle of Configuration Selection

**Emission:** The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the Operating Instructions.

#### 3.2. Block Diagram of Test Set-up

System Diagram of Connections between EUT and Simulators



(EUT: Smart POS / Wireless POS)

#### 3.3. Test Environment:

Ambient conditions in the test laboratory:

Items	Actual
Temperature (°C)	21~23
Humidity (%RH)	50~65



## 4. EMISSION TEST RESULTS

### 4.1. EFFECTIVE (ISOTROPIC) RADIATED POWER

#### 4.1.1. Limit

Test Requirement:	FCC Part 2.1046, 22.913 (a), 24.232 (c), 27.50(h.2); 27.50(d.4)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

#### 4.1.2. Test Setup

Conducted method:

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



Radiated method:

1. The setup of EUT is according with per TIA/EIA Standard 603D:2010.
2. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.
3. The frequency range up to tenth harmonic of the fundamental frequency was investigated.
4. Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

#### 4.1.3. Test Result

Here the lowest, middle and highest channels are selected to perform testing to verify the conducted RF output power of the EUT.



The conducted power tables are as follows:

BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
5MHz	39675	2498.5	QPSK	1	0	23.01	23.0±1	/
				1	49	23	23.0±1	/
				1	99	22.9	23.0±1	/
				12	0	22.16	22.0±1	1.0
				12	24	22.14	22.0±1	1.0
				12	49	22.14	22.0±1	1.0
				25	0	22.04	22.0±1	1.0
			16QAM	1	0	22.12	22.0±1	1.0
				1	49	21.98	22.0±1	1.0
				1	99	22.25	22.0±1	1.0
				12	0	21.73	21.0±1	2.0
				12	24	21.75	21.0±1	2.0
				12	49	21.97	21.0±1	2.0
				25	0	21.66	21.0±1	2.0
	40620	2593	QPSK	1	0	23.45	23.0±1	/
				1	49	23.46	23.0±1	/
				1	99	23.45	23.0±1	/
				12	0	22.46	22.0±1	1.0
				12	24	22.46	22.0±1	1.0
				12	49	22.51	22.0±1	1.0
				25	0	22.53	22.0±1	1.0
			16QAM	1	0	22.06	22.0±1	1.0
				1	49	22.34	22.0±1	1.0
				1	99	22.35	22.0±1	1.0
				12	0	21.69	21.0±1	2.0
				12	24	21.6	21.0±1	2.0
				12	49	21.66	21.0±1	2.0
				25	0	21.56	21.0±1	2.0
	41565	2687.5	QPSK	1	0	23.04	23.0±1	/
				1	49	23.11	23.0±1	/
1				99	23.08	23.0±1	/	
12				0	22.9	22.0±1	1.0	
12				24	22.01	22.0±1	1.0	
12				49	22.13	22.0±1	1.0	
25				0	22.23	22.0±1	1.0	
16QAM			1	0	22.14	22.0±1	1.0	
			1	49	22.11	22.0±1	1.0	
			1	99	22.05	22.0±1	1.0	
			12	0	21.69	21.0±1	2.0	
			12	24	21.55	21.0±1	2.0	
			12	49	21.57	21.0±1	2.0	
			25	0	21.47	21.0±1	2.0	



BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
10MHz	39700	2501	QPSK	1	0	22.96	23.0±1	/
				1	49	23.07	23.0±1	/
				1	99	22.99	23.0±1	/
				25	0	22.11	22.0±1	1.0
				25	24	22.16	22.0±1	1.0
				25	49	22.08	22.0±1	1.0
				50	0	22.2	22.0±1	1.0
			16QAM	1	0	22.04	22.0±1	1.0
				1	49	22.08	22.0±1	1.0
				1	99	22.85	22.0±1	1.0
				25	0	21.81	21.0±1	2.0
				25	24	21.76	21.0±1	2.0
				25	49	21.56	21.0±1	2.0
				50	0	21.55	21.0±1	2.0
	40620	2593	QPSK	1	0	23.38	23.0±1	/
				1	49	23.48	23.0±1	/
				1	99	23.09	23.0±1	/
				25	0	22.46	22.0±1	1.0
				25	24	22.53	22.0±1	1.0
				25	49	22.41	22.0±1	1.0
				50	0	22.44	22.0±1	1.0
			16QAM	1	0	22.44	22.0±1	1.0
				1	49	22.73	22.0±1	1.0
				1	99	22.5	22.0±1	1.0
				25	0	21.91	21.0±1	2.0
				25	24	21.89	21.0±1	2.0
				25	49	21.86	21.0±1	2.0
				50	0	21.82	21.0±1	2.0
	41540	2685	QPSK	1	0	23.09	23.0±1	/
				1	49	23.05	23.0±1	/
1				99	22.78	23.0±1	/	
25				0	22.17	22.0±1	1.0	
25				24	22.04	22.0±1	1.0	
25				49	22.06	22.0±1	1.0	
50				0	22.05	22.0±1	1.0	
16QAM			1	0	22.11	22.0±1	1.0	
			1	49	22.09	22.0±1	1.0	
			1	99	22.04	22.0±1	1.0	
			25	0	21.71	21.0±1	2.0	
			25	24	21.82	21.0±1	2.0	
			25	49	21.74	21.0±1	2.0	
			50	0	21.67	21.0±1	2.0	



BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
15MHz	39725	2503.5	QPSK	1	0	23.32	23.0±1	/
				1	49	23.17	23.0±1	/
				1	99	22.93	23.0±1	/
				36	0	22.21	22.0±1	1.0
				36	24	22.12	22.0±1	1.0
				36	49	22.13	22.0±1	1.0
				75	0	22.15	22.0±1	1.0
			16QAM	1	0	22.74	22.0±1	1.0
				1	49	22.62	22.0±1	1.0
				1	99	22.89	22.0±1	1.0
				36	0	21.97	21.0±1	2.0
				36	24	21.87	21.0±1	2.0
				36	49	21.85	21.0±1	2.0
				75	0	21.6	21.0±1	2.0
	40620	2593	QPSK	1	0	23.58	23.0±1	/
				1	49	23.38	23.0±1	/
				1	99	23.44	23.0±1	/
				36	0	22.51	22.0±1	1.0
				36	24	22.45	22.0±1	1.0
				36	49	22.42	22.0±1	1.0
				75	0	22.45	22.0±1	1.0
			16QAM	1	0	22.42	22.0±1	1.0
				1	49	22.17	22.0±1	1.0
				1	99	22.3	22.0±1	1.0
				36	0	21.56	21.0±1	2.0
				36	24	21.47	21.0±1	2.0
				36	49	21.59	21.0±1	2.0
				75	0	21.58	21.0±1	2.0
	41515	2682.5	QPSK	1	0	23.2	23.0±1	/
				1	49	22.99	23.0±1	/
1				99	22.73	23.0±1	/	
36				0	22.25	22.0±1	1.0	
36				24	22.06	22.0±1	1.0	
36				49	21.92	22.0±1	1.0	
75				0	22.09	22.0±1	1.0	
16QAM			1	0	22.27	22.0±1	1.0	
			1	49	22.13	22.0±1	1.0	
			1	99	22.23	22.0±1	1.0	
			36	0	21.76	21.0±1	2.0	
			36	24	21.66	21.0±1	2.0	
			36	49	21.52	21.0±1	2.0	
			75	0	21.51	21.0±1	2.0	



BW(MHz)	Ch	Freq(MHz)	Mode	UL RB Allocation	UL RB Offset	Average Power (dbm)	Tune up limited(dBm)	MPR (dB)
20MHz	39750	2506	QPSK	1	0	23.21	23.0±1	/
				1	49	23.35	23.0±1	/
				1	99	23.01	23.0±1	/
				50	0	22.21	22.0±1	1.0
				50	24	22.18	22.0±1	1.0
				50	49	22.1	22.0±1	1.0
				100	0	22.14	22.0±1	1.0
			16QAM	1	0	22.29	22.0±1	1.0
				1	49	22.3	22.0±1	1.0
				1	99	22.33	22.0±1	1.0
				50	0	21.86	21.0±1	2.0
				50	24	21.79	21.0±1	2.0
				50	49	21.69	21.0±1	2.0
				100	0	21.64	21.0±1	2.0
	40620	2593	QPSK	1	0	23.58	23.0±1	/
				1	49	23.44	23.0±1	/
				1	99	23.34	23.0±1	/
				50	0	22.56	22.0±1	1.0
				50	24	22.56	22.0±1	1.0
				50	49	22.45	22.0±1	1.0
				100	0	22.5	22.0±1	1.0
			16QAM	1	0	22.45	22.0±1	1.0
				1	49	22.16	22.0±1	1.0
				1	99	22.26	22.0±1	1.0
				50	0	21.67	21.0±1	2.0
				50	24	21.66	21.0±1	2.0
				50	49	21.67	21.0±1	2.0
100				0	21.54	21.0±1	2.0	
41490	2680	QPSK	1	0	23.68	23.0±1	/	
			1	49	23.8	23.0±1	/	
			1	99	23.1	23.0±1	/	
			50	0	22.42	22.0±1	1.0	
			50	24	22.24	22.0±1	1.0	
			50	49	22	22.0±1	1.0	
			100	0	22.18	22.0±1	1.0	
		16QAM	1	0	22.96	22.0±1	1.0	
			1	49	22.71	22.0±1	1.0	
			1	99	22.38	22.0±1	1.0	
			50	0	21.76	21.0±1	2.0	
			50	24	21.62	21.0±1	2.0	
			50	49	21.61	21.0±1	2.0	
			100	0	21.51	21.0±1	2.0	

Note: Measurement Uncertainty: ±2.6 dB.



**ERP and EIRP  
LTE Band 41**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	RX Antenna		Substituted			Absolute Level (dBm)	Part 27	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
LTE Band 41 Channel 39675 – 5MHz – QPSK										
2498.50	76.57	83	1.9	H	2.57	0.43	10.60	12.74	33	-20.26
2498.50	81.12	318	2.2	V	5.84	0.43	10.60	16.01	33	-16.99
LTE Band 41 Channel 40620 – 5MHz – QPSK										
2593.00	78.34	14	1.6	H	4.34	0.43	10.60	14.51	33	-18.49
2593.00	81.77	333	1.6	V	6.49	0.43	10.60	16.66	33	-16.34
LTE Band 41 Channel 41565 – 5MHz – QPSK										
2687.50	79.06	67	1.8	H	4.95	0.43	10.60	15.12	33	-17.88
2687.50	81.75	114	1.7	V	6.56	0.43	10.60	16.73	33	-16.27
LTE Band 41 Channel 39675 – 5MHz – 16QAM										
2498.50	77.45	214	1.5	H	3.45	0.43	10.60	13.62	33	-19.38
2498.50	81.07	176	1.1	V	5.79	0.43	10.60	15.96	33	-17.04
LTE Band 41 Channel 40620 – 5MHz – 16QA										
2593.00	77.97	151	1.7	H	3.97	0.43	10.60	14.14	33	-18.86
2593.00	81.93	322	1.6	V	6.65	0.43	10.60	16.82	33	-16.18
LTE Band 41 Channel 41565 – 5MHz – 16QAM										
2687.50	76.43	199	1.3	H	2.32	0.43	10.60	12.49	33	-2051
2687.50	81.17	288	1.4	V	5.98	0.43	10.60	16.15	33	-16.85
LTE Band 41 Channel 39700 – 10MHz – QPSK										
2501.00	79.64	49	1.4	H	5.64	0.43	10.60	15.81	33	-17.19
2501.00	81.86	298	1.9	V	6.58	0.43	10.60	16.75	33	-16.25
LTE Band 41 Channel 40620 – 10MHz – QPSK										
2593.00	76.24	53	2.3	H	2.24	0.43	10.60	12.41	33	-20.59
2593.00	81.01	322	2.0	V	5.73	0.43	10.60	15.90	33	-17.10
LTE Band 41 Channel 41540 – 10MHz – QPSK										
2685.00	77.91	94	2.4	H	3.80	0.43	10.60	13.97	33	-19.03
2685.00	81.47	100	1.9	V	6.28	0.43	10.60	16.45	33	-16.55
LTE Band 41 Channel 39700 – 10MHz – 16QAM										
2501.00	79.87	178	2.1	H	5.87	0.43	10.60	16.04	33	-16.96
2501.00	81.68	262	1.1	V	6.40	0.43	10.60	16.57	33	-16.43
LTE Band 41 Channel 40620 – 10MHz – 16QAM										
2593.00	76.59	70	1.4	H	2.59	0.43	10.60	12.76	33	-20.24
2593.00	81.59	178	1.5	V	6.31	0.43	10.60	16.48	33	-16.52
LTE Band 41 Channel 41540 – 10MHz – 16QAM										
2685.00	78.29	177	2.2	H	4.18	0.43	10.60	14.35	36	-18.65
2685.00	81.26	222	1.9	V	6.07	0.43	10.60	16.24	36	-16.76
LTE Band 41 Channel 39725 – 15MHz – QPSK										
2503.50	76.68	304	1.5	H	2.68	0.43	10.60	12.85	33	-20.15
2503.50	81.90	137	2.0	V	6.62	0.43	10.60	16.79	33	-16.21



Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	RX Antenna		Substituted			Absolute Level (dBm)	Part 27	
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable (dB)	Antenna Gain (dB)		Limit (dBm)	Margin (dB)
LTE Band 41 Channel 40620 – 15MHz – QPSK										
2593.00	78.87	94	2.3	H	4.87	0.43	10.60	15.04	33	-17.96
2593.00	81.72	163	1.0	V	6.44	0.43	10.60	16.61	33	-16.39
LTE Band 41 Channel 41515 – 15MHz – QPSK										
2682.50	79.16	172	1.2	H	5.05	0.43	10.60	15.22	33	-17.78
2682.50	81.53	175	1.3	V	6.34	0.43	10.60	16.51	33	-16.49
LTE Band 41 Channel 39725 – 15MHz – 16QAM										
2503.50	78.88	37	2.3	H	4.88	0.43	10.60	15.05	33	-17.95
2503.50	81.61	81	1.2	V	6.33	0.43	10.60	16.50	33	-16.50
LTE Band 41 Channel 40620 – 15MHz – 16QAM										
2593.00	78.43	245	1.9	H	4.43	0.43	10.60	14.60	33	-18.40
2593.00	81.59	192	1.4	V	6.31	0.43	10.60	16.48	33	-16.52
LTE Band 41 Channel 41515 – 15MHz – 16QAM										
2682.50	78.89	127	1.3	H	4.78	0.43	10.60	14.95	33	-18.05
2682.50	81.76	103	2.3	V	6.57	0.43	10.60	16.74	33	-16.26
LTE Band 41 Channel 39750 – 20MHz – QPSK										
2506.00	78.47	248	2.1	H	4.47	0.43	10.60	14.64	33	-18.36
2506.00	81.76	357	1.7	V	6.48	0.43	10.60	16.65	33	-16.35
LTE Band 41 Channel 40620 – 20MHz – QPSK										
2593.00	77.51	130	1.4	H	3.51	0.43	10.60	13.68	33	-19.32
2593.00	81.95	175	1.1	V	6.67	0.43	10.60	16.84	33	-16.16
LTE Band 41 Channel 41490 – 20MHz – QPSK										
2680.00	77.81	229	2.1	H	3.70	0.43	10.60	13.87	33	-19.13
2680.00	81.17	345	1.7	V	5.98	0.43	10.60	16.15	33	-16.85
LTE Band 41 Channel 39750 – 20MHz – 16QAM										
2506.00	78.89	105	1.1	H	4.89	0.43	10.60	15.06	33	-17.94
2506.00	81.90	216	2.1	V	6.62	0.43	10.60	16.79	33	-16.21
LTE Band 41 Channel 40620 – 20MHz – 16QAM										
2593.00	79.76	197	2.4	H	5.76	0.43	10.60	15.93	33	-17.07
2593.00	81.71	310	1.9	V	6.43	0.43	10.60	16.60	33	-16.40
LTE Band 41 Channel 41490 – 20MHz – 16QAM										
2680.00	78.04	8	1.7	H	3.93	0.43	10.60	14.10	33	-18.90
2680.00	81.88	158	1.6	V	6.69	0.43	10.60	16.86	33	-16.14

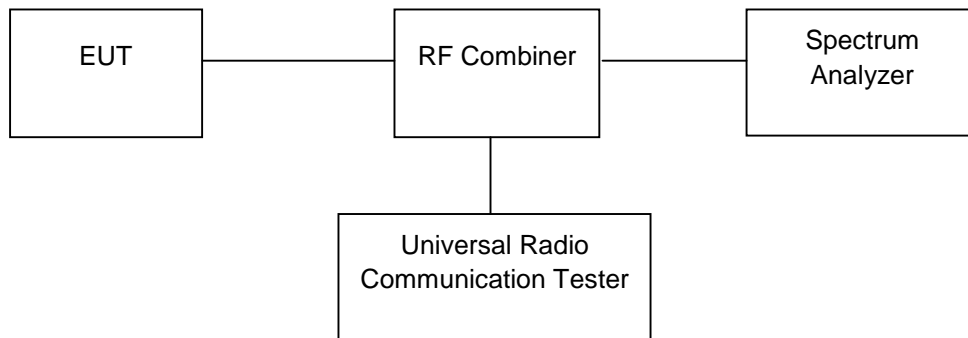
## 4.2. Peak-to-Average Ratio

### 4.2.1. Limit

Test Requirement:	24.232 (d), 27.50(d)
Test Method:	N/A
Test Mode:	TX transmitting

### 4.2.2. Test Setup

1. The EUT was connected to spectrum analyzer and system simulator via a power divider.
2. Set EUT to transmit at maximum output power.
3. When the duty cycle is less than 98%, then signal gating will be implemented on the spectrum analyzer by triggering from the system simulator.
4. Set the CCDF (Complementary Cumulative Distribution Function) option of the spectrum analyzer. Record the maximum PAPR level associated with a probability of 0.1%.



### 4.2.3. Test Result

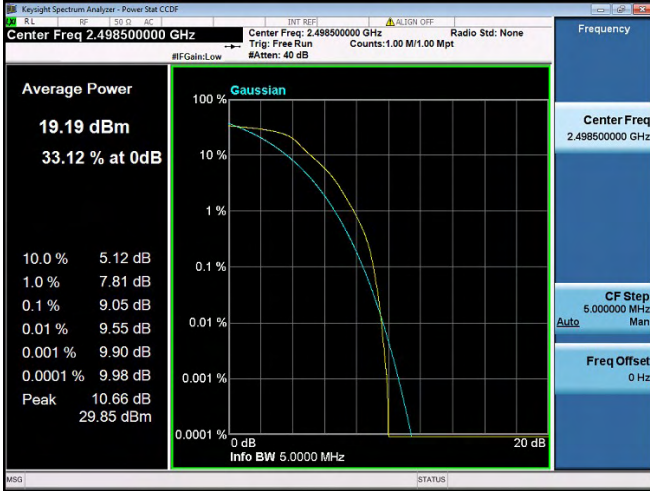




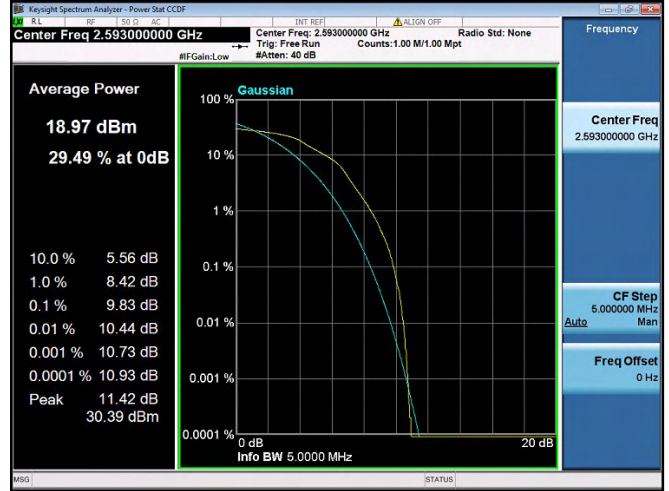
BW(MHz)	Channel	Frequency (MHz)	Modulation	PAR Percent (%)	PAR (dB)	Upper Limit (dB)	Result
5	39675	2498.5	QPSK	0.1	9.05	13	Pass
			16QAM	0.1	9.45	13	Pass
5	40620	2593	QPSK	0.1	8.91	13	Pass
			16QAM	0.1	9.83	13	Pass
5	41565	2687.5	QPSK	0.1	8.96	13	Pass
			16QAM	0.1	9.54	13	Pass
10	39700	2501	QPSK	0.1	8.85	13	Pass
			16QAM	0.1	8.68	13	Pass
10	40620	2593	QPSK	0.1	8.76	13	Pass
			16QAM	0.1	9.44	13	Pass
10	41540	2685	QPSK	0.1	9.11	13	Pass
			16QAM	0.1	9.35	13	Pass
15	39725	2503.5	QPSK	0.1	9.06	13	Pass
			16QAM	0.1	9.66	13	Pass
15	40620	2593	QPSK	0.1	9.37	13	Pass
			16QAM	0.1	10.89	13	Pass
15	41515	2682.5	QPSK	0.1	8.03	13	Pass
			16QAM	0.1	9.37	13	Pass
20	39750	2506	QPSK	0.1	9.54	13	Pass
			16QAM	0.1	9.40	13	Pass
20	40620	2593	QPSK	0.1	9.45	13	Pass
			16QAM	0.1	9.36	13	Pass
20	41490	2680	QPSK	0.1	8.79	13	Pass
			16QAM	0.1	9.37	13	Pass



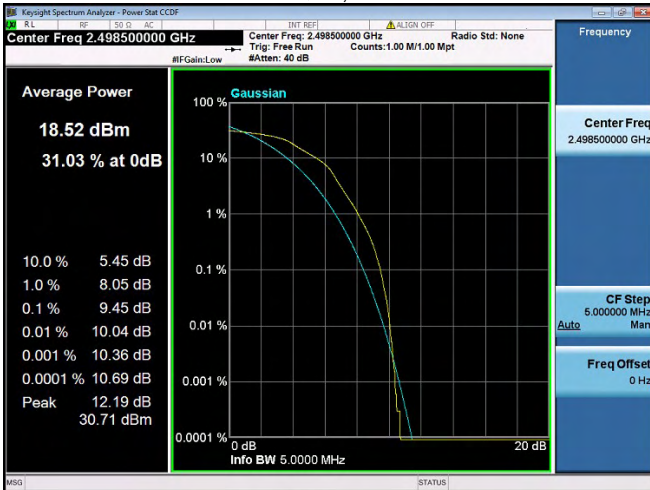
Subtest:1, Channel:39675, Bandwidth:5, Modulation:QPSK, RB Number: 25



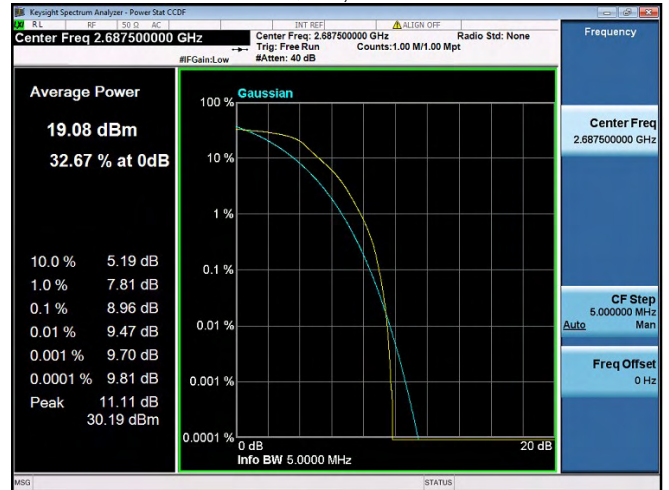
Subtest:4, Channel:40620, Bandwidth:5, Modulation:16QAM, RB Number: 25,



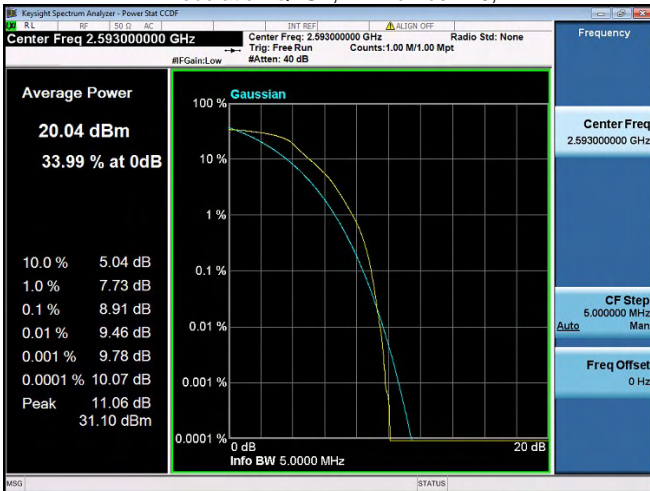
Subtest:2, Channel:39675, Bandwidth:5, Modulation:16QAM, RB Number: 25



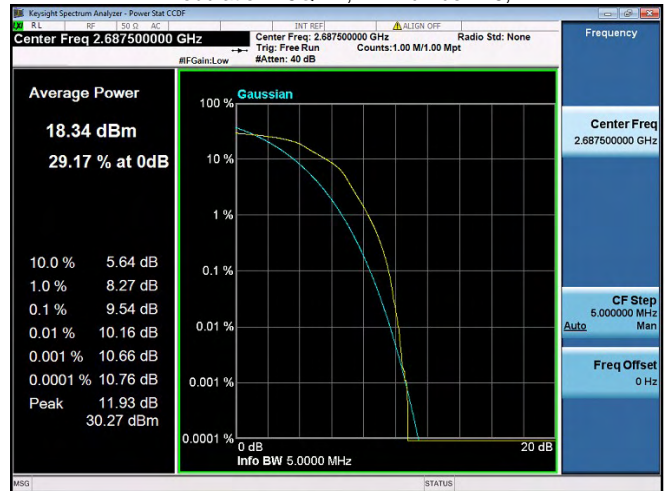
Subtest:5, Channel:41565, Bandwidth:5, Modulation:QPSK, RB Number: 25



Subtest:3, Channel:40620, Bandwidth:5, Modulation:QPSK, RB Number: 25,

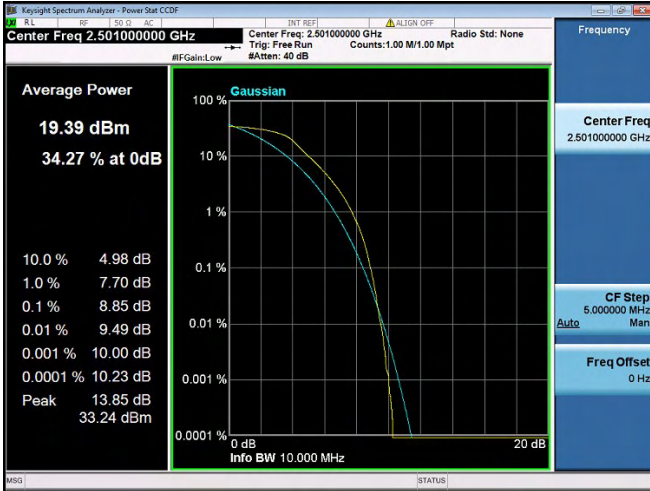


Subtest:6, Channel:41565, Bandwidth:5, Modulation:16QAM, RB Number: 25,

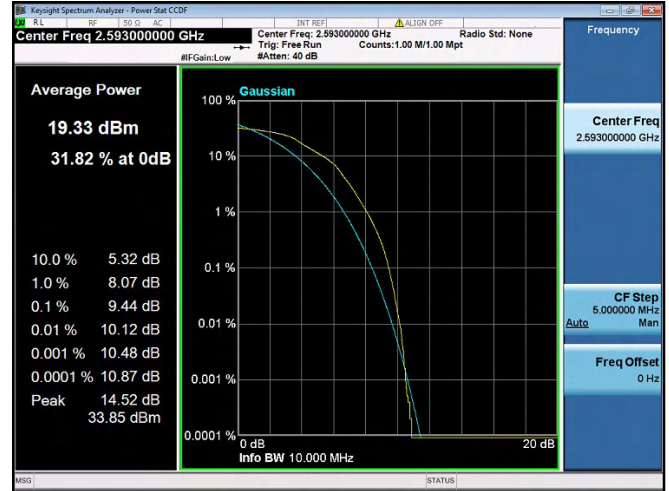




Subtest:7, Channel:39700, Bandwidth:10,  
Modulation:QPSK, RB Number: 50,



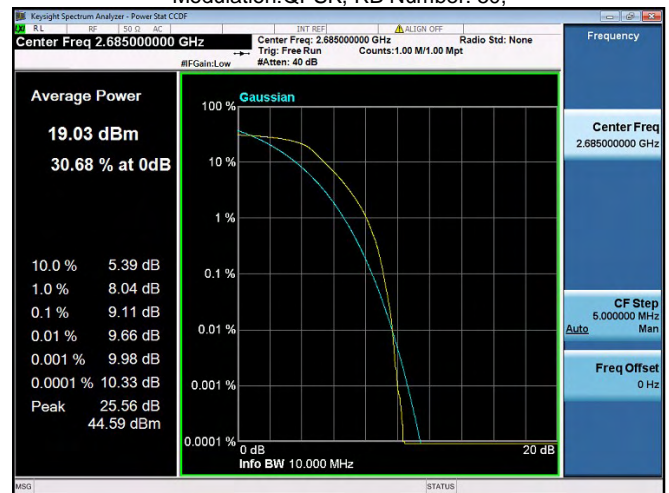
Subtest:10, Channel:40620, Bandwidth:10,  
Modulation:16QAM, RB Number: 50,



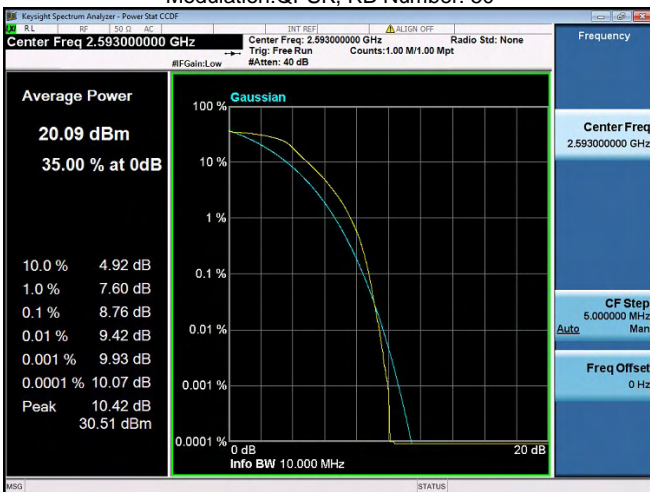
Subtest:8, Channel:39700, Bandwidth:10,  
Modulation:16QAM, RB Number: 50



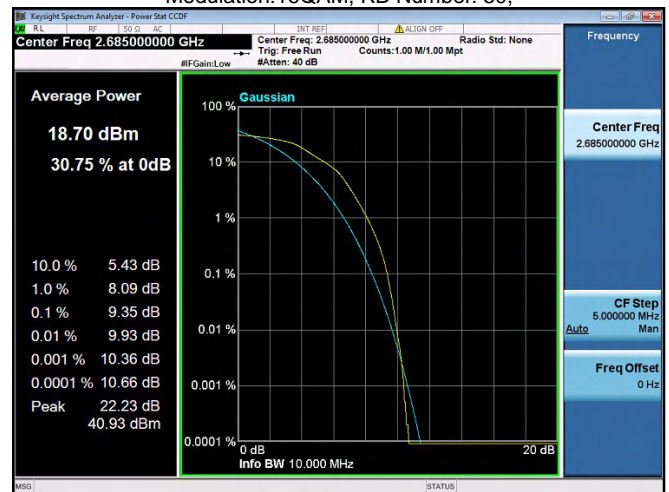
Subtest:11, Channel:41540, Bandwidth:10,  
Modulation:QPSK, RB Number: 50,



Subtest:9, Channel:40620, Bandwidth:10,  
Modulation:QPSK, RB Number: 50

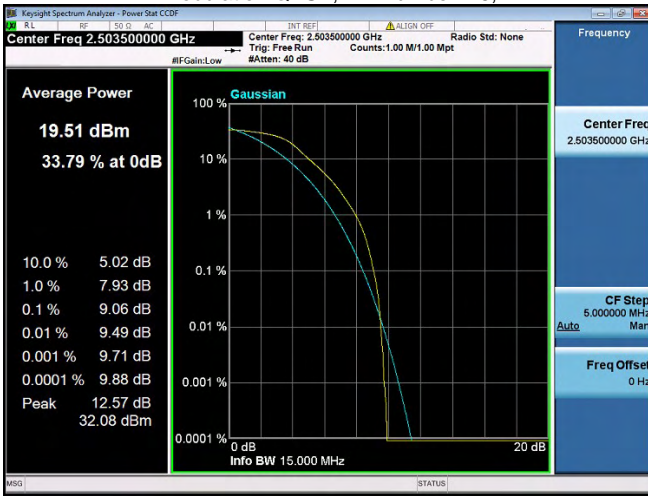


Subtest:12, Channel:41540, Bandwidth:10,  
Modulation:16QAM, RB Number: 50,

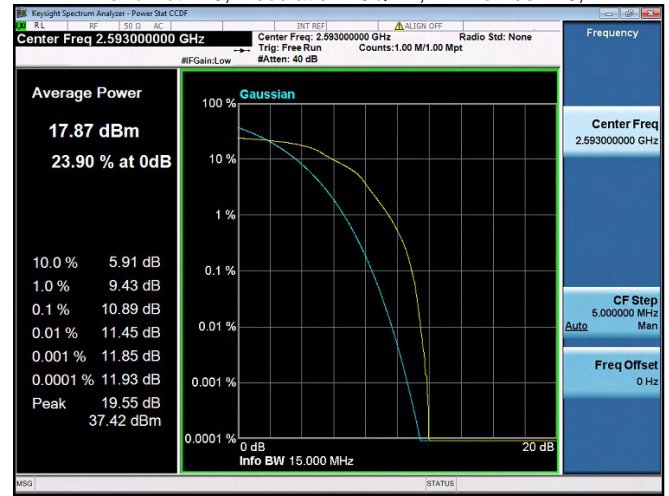




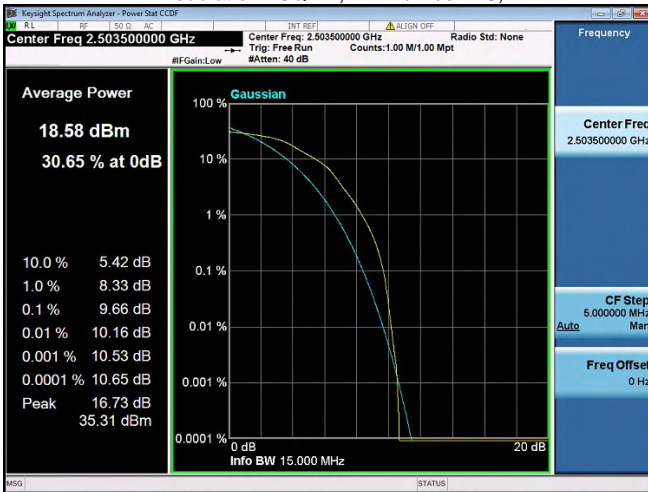
Subtest:13, Channel:39725, Bandwidth:15, Modulation:QPSK, RB Number: 75,



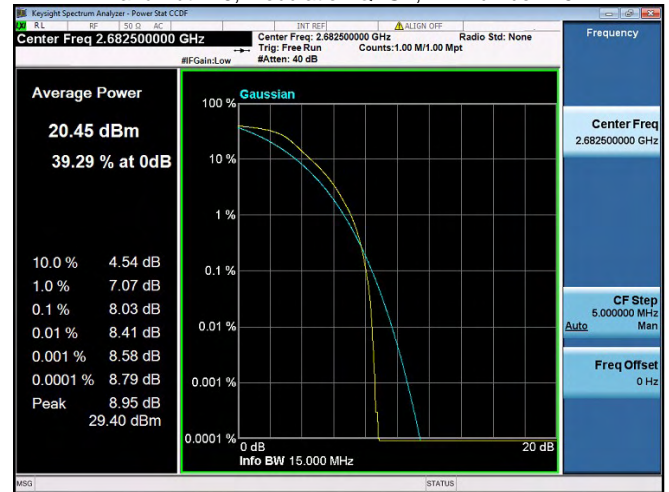
Subtest:16, Channel:40620, Bandwidth:15, Modulation:16QAM, RB Number: 75,



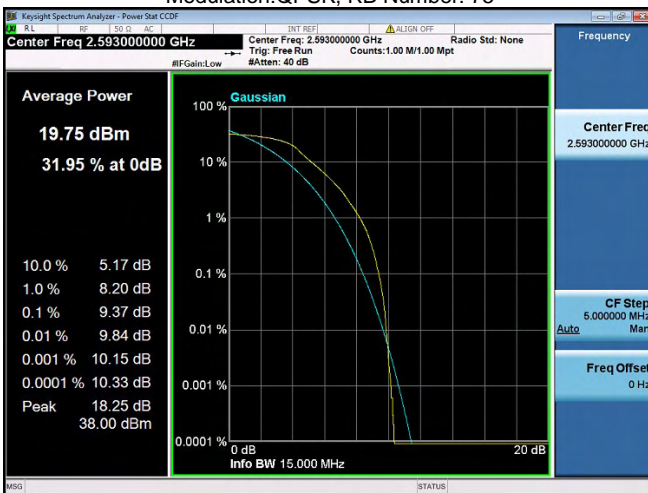
Subtest:14, Channel:39725, Bandwidth:15, Modulation:16QAM, RB Number: 75,



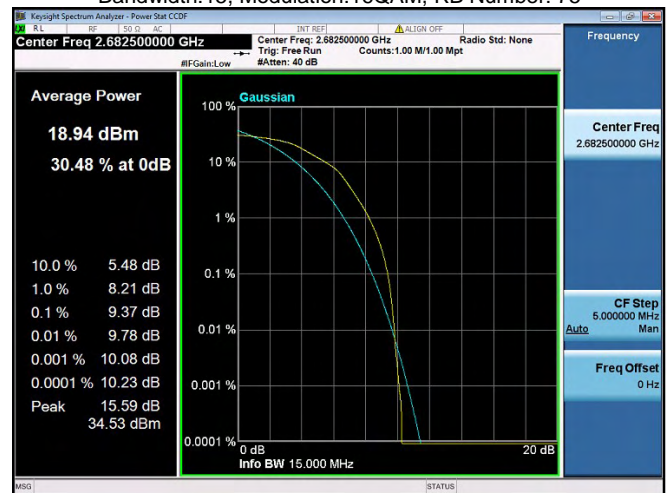
Subtest:17, Channel:41515, Bandwidth:15, Modulation:QPSK, RB Number: 75



Subtest:15, Channel:40620, Bandwidth:15, Modulation:QPSK, RB Number: 75

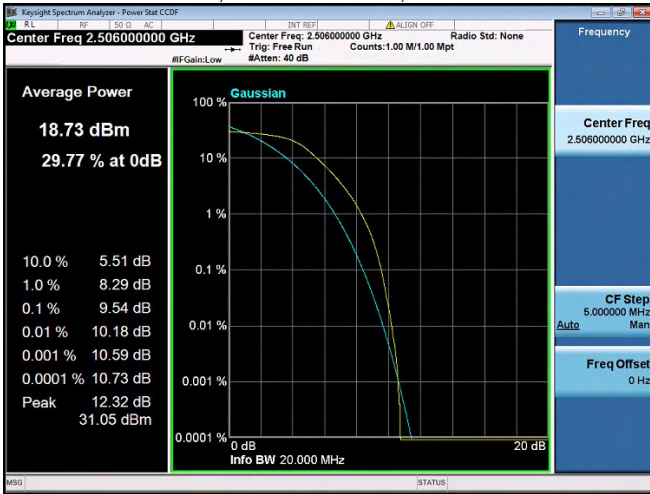


Subtest:18, Channel:41515, Bandwidth:15, Modulation:16QAM, RB Number: 75

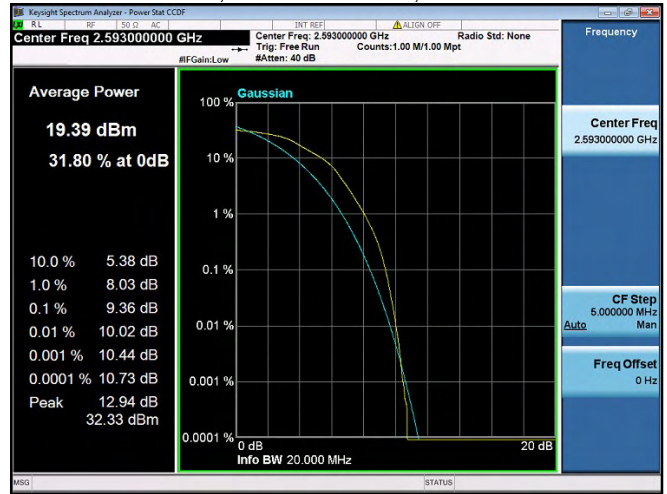




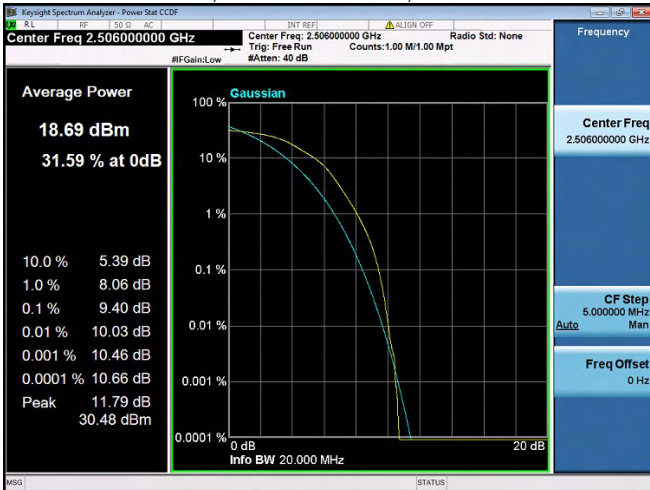
Subtest:19, Channel:39750,  
Bandwidth:20, Modulation:QPSK, RB Number: 100



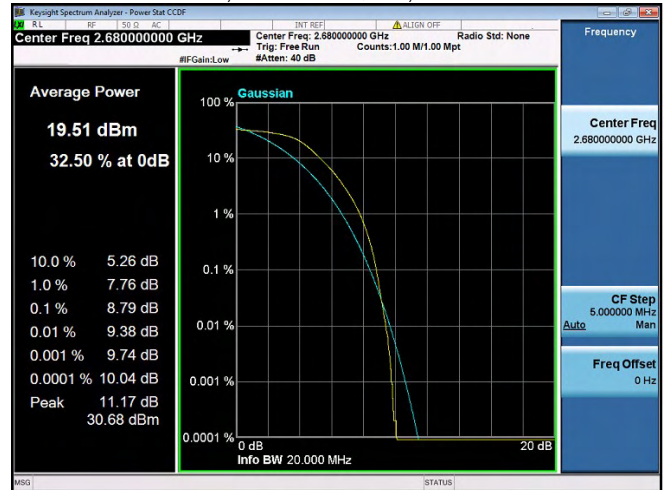
Subtest:22, Channel:40620,  
Bandwidth:20, Modulation:16QAM, RB Number: 100



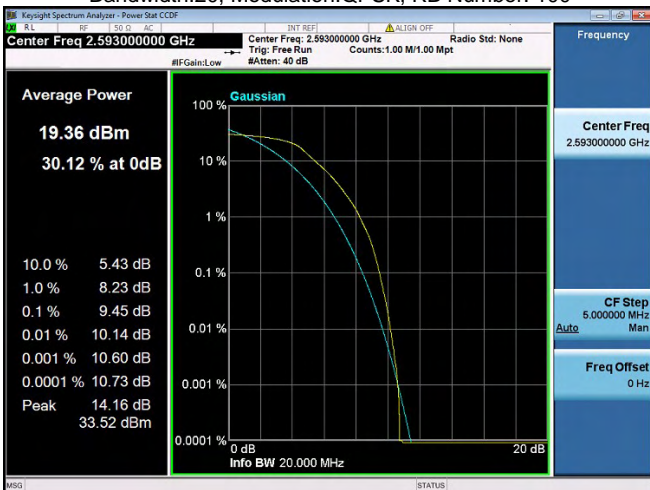
Subtest:20, Channel:39750,  
Bandwidth:20, Modulation:16QAM, RB Number: 100



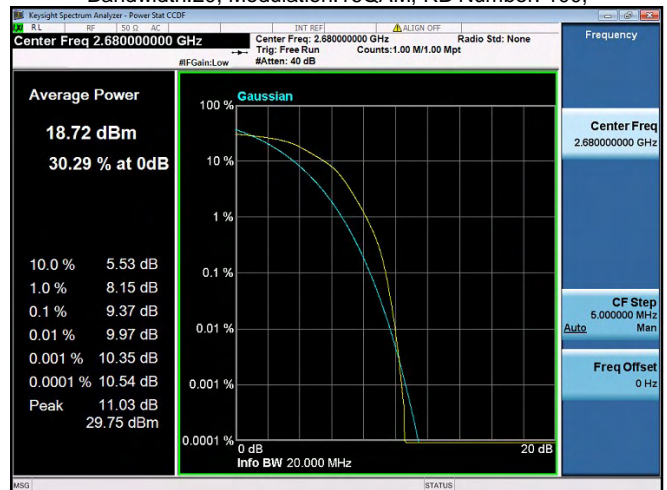
Subtest:23, Channel:41490,  
Bandwidth:20, Modulation:QPSK, RB Number: 100



Subtest:21, Channel:40620,  
Bandwidth:20, Modulation:QPSK, RB Number: 100



Subtest:24, Channel:41490,  
Bandwidth:20, Modulation:16QAM, RB Number: 100



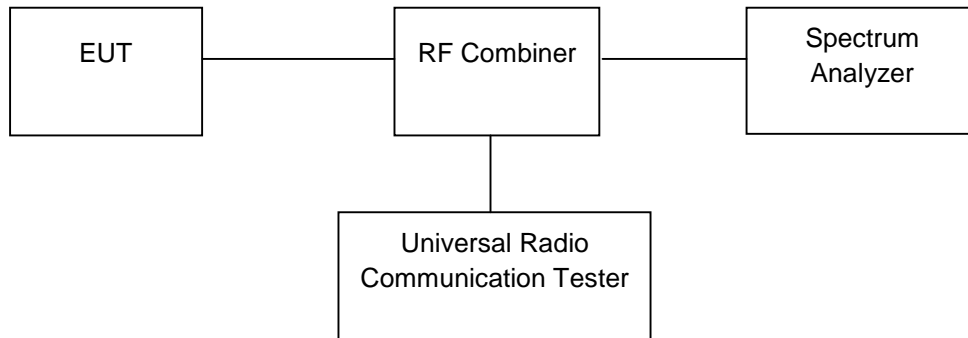
## 4.3. Bandwidth

### 4.3.1. Limit

Test Requirement:	FCC Part 2.1049, 22.917, 22.905, 24.238, 27.53(a)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 4.3.2. Test Setup

The RF output of the transmitter was connected to the wireless test set and the spectrum analyzer through sufficient attenuation.  
The resolution bandwidth of the spectrum analyzer was set in the range of 1 to 5 % of the anticipated OBW and the 26 dB & 99%bandwidth was recorded..



### 4.3.3. Test Result



**LTE Band 41 (Part 27):**

BW(MHz)	Channel	Frequency (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
5	39675	2498.5	QPSK	4.49	4.83
			16QAM	4.49	4.82
5	40620	2593	QPSK	4.49	4.78
			16QAM	4.49	4.82
5	41565	2687.5	QPSK	4.48	4.79
			16QAM	4.49	4.82
10	39700	2501	QPSK	8.91	9.33
			16QAM	8.92	9.36
10	40620	2593	QPSK	8.91	9.35
			16QAM	8.91	9.32
10	41540	2685	QPSK	8.92	9.33
			16QAM	8.91	9.38
15	39725	2503.5	QPSK	13.45	14.24
			16QAM	13.45	14.22
15	40620	2593	QPSK	13.44	14.23
			16QAM	13.45	14.25
15	41515	2682.5	QPSK	13.43	14.24
			16QAM	13.44	14.22
20	39750	2506	QPSK	17.87	18.74
			16QAM	17.87	18.73
20	40620	2593	QPSK	17.87	18.75
			16QAM	17.87	18.75
20	41490	2680	QPSK	17.87	18.75
			16QAM	17.87	18.74



Test Plots  
LTE Band 41(Part 27)



LTE band 41 - Low CH QPSK-5



LTE band 41 - Low CH 16QAM-5



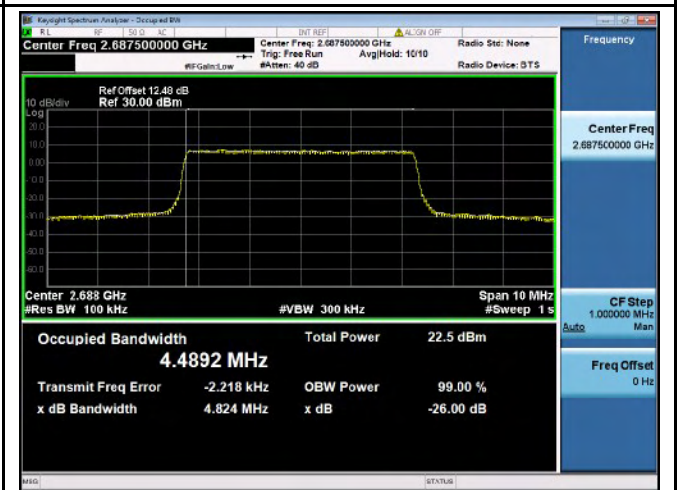
LTE band 41 - Middle CH QPSK-5



LTE band 41 - Middle CH 16QAM-5

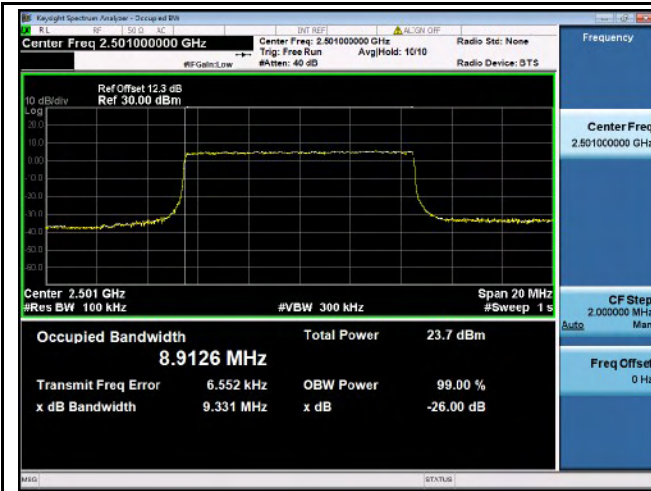


LTE band 41 - High CH QPSK-5



LTE band 41 - High CH 16QAM-5





LTE band 41 - Low CH QPSK-10



LTE band 41 - Low CH 16QAM-10



LTE band 41 - Middle CH QPSK-10



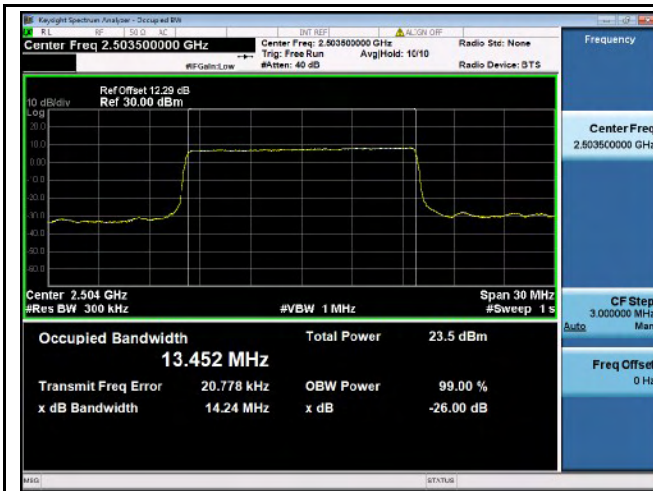
LTE band 41 - Middle CH 16QAM-10



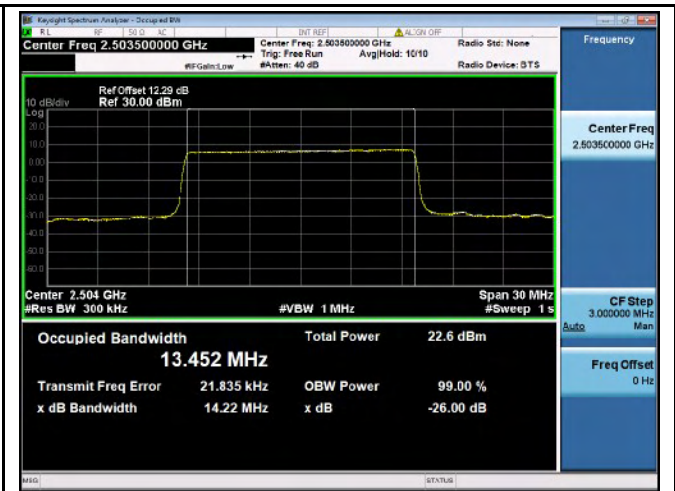
LTE band 41 - High CH QPSK-10



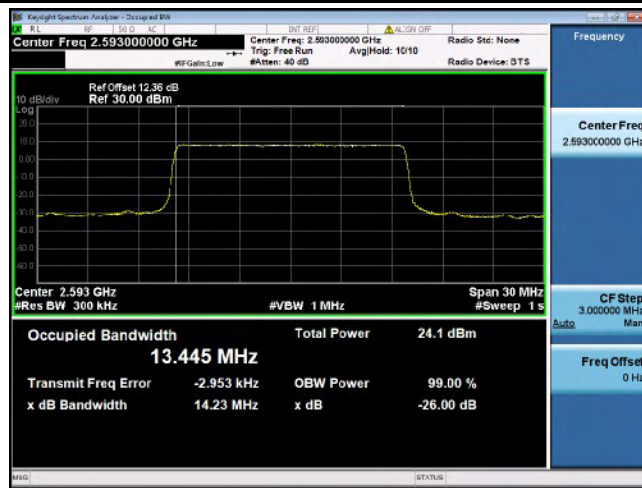
LTE band 41 - High CH 16QAM-10



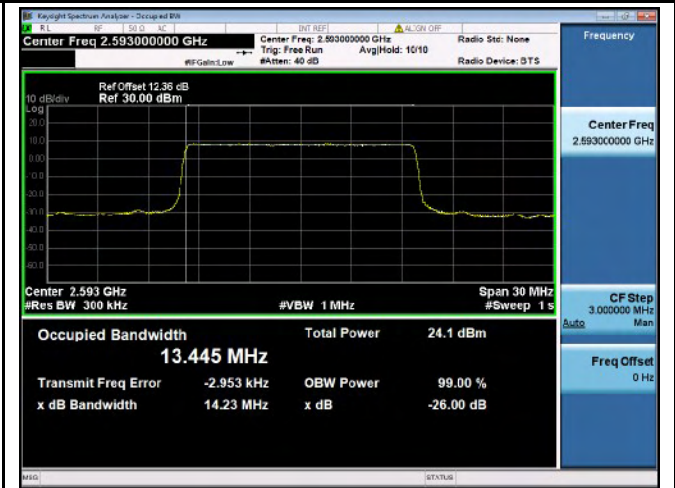
LTE band 41 - Low CH QPSK-15



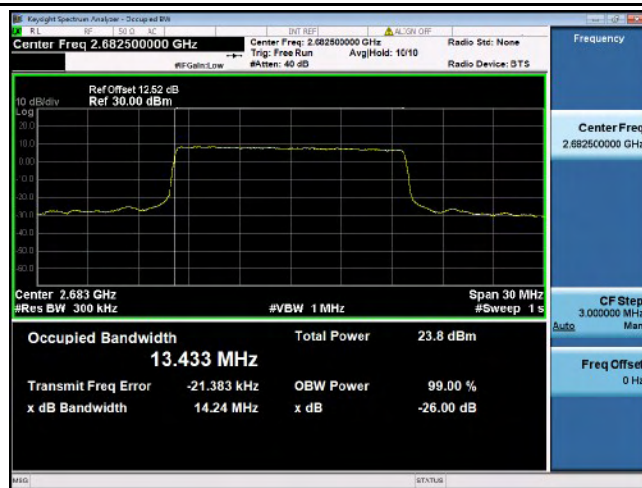
LTE band 41 - Low CH 16QAM-15



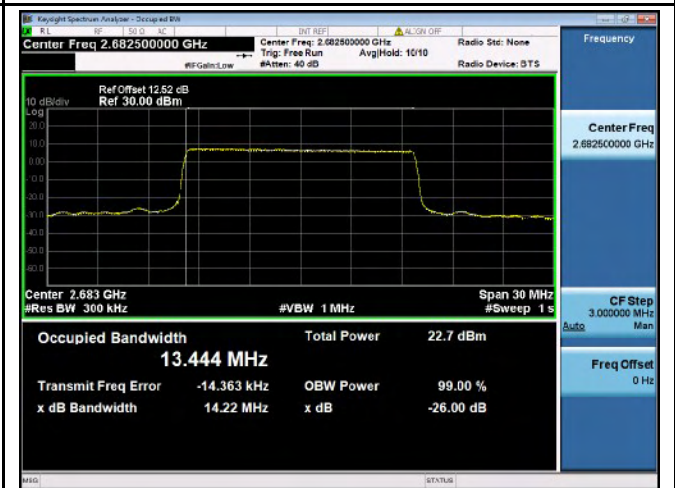
LTE band 41 - Middle CH QPSK-15



LTE band 41 - Middle CH 16QAM-15



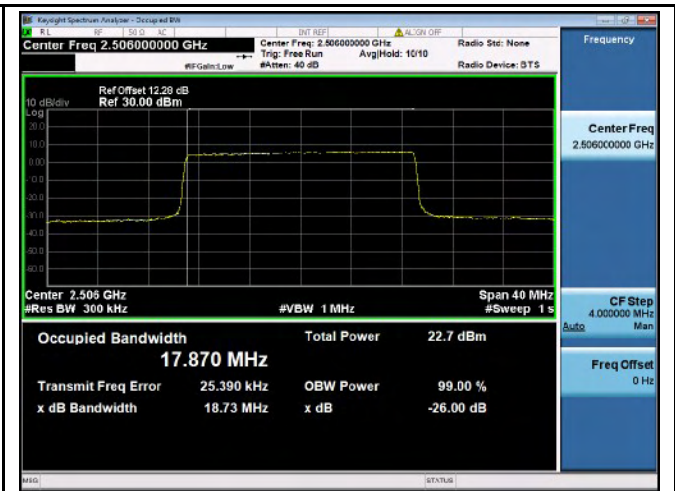
LTE band 41 - High CH QPSK-15



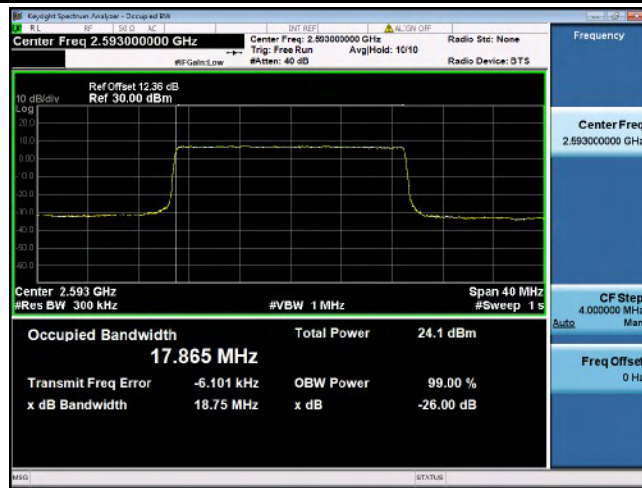
LTE band 41 - High CH 16QAM-15



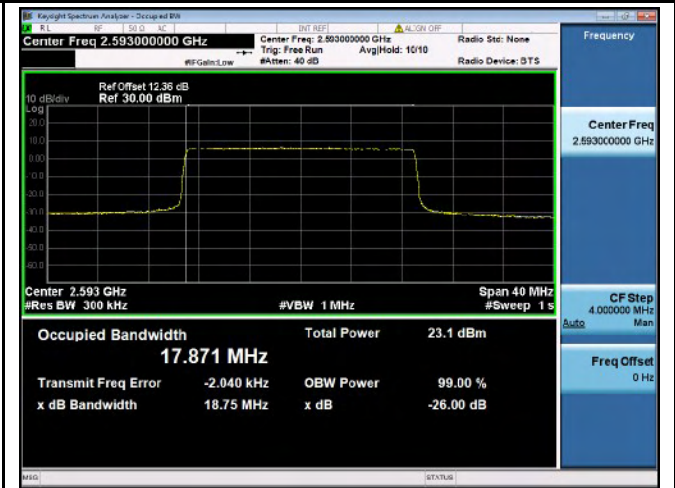
LTE band 41 - Low CH QPSK-20



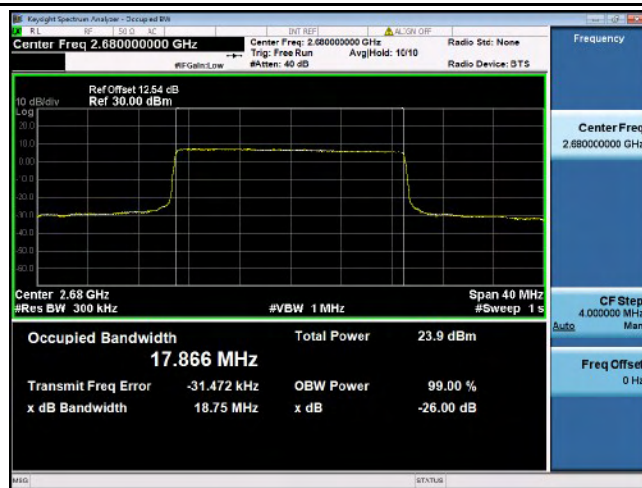
LTE band 41 - Low CH 16QAM-20



LTE band 41 - Middle CH QPSK-20



LTE band 41 - Middle CH 16QAM-20



LTE band 41 - High CH QPSK-20



LTE band 41 - High CH 16QAM-20

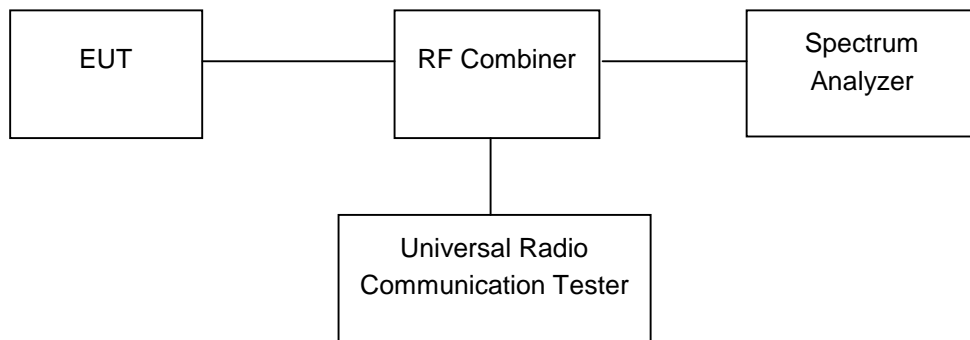
## 4.4. SPURIOUS EMISSION(Conducted and Radiated)

### 4.4.1. Limit

Test Requirement:	FCC Part 2.1051, 22.917(a), 24.238(a), 27.53(h), 27.53(m)(4)
Test Method:	TIA/EIA-603-D:2010 KDB971168 D01 v02r02
Test Mode:	TX transmitting

### 4.4.2. Test Setup

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonics.





## 4.4.3. Test Result

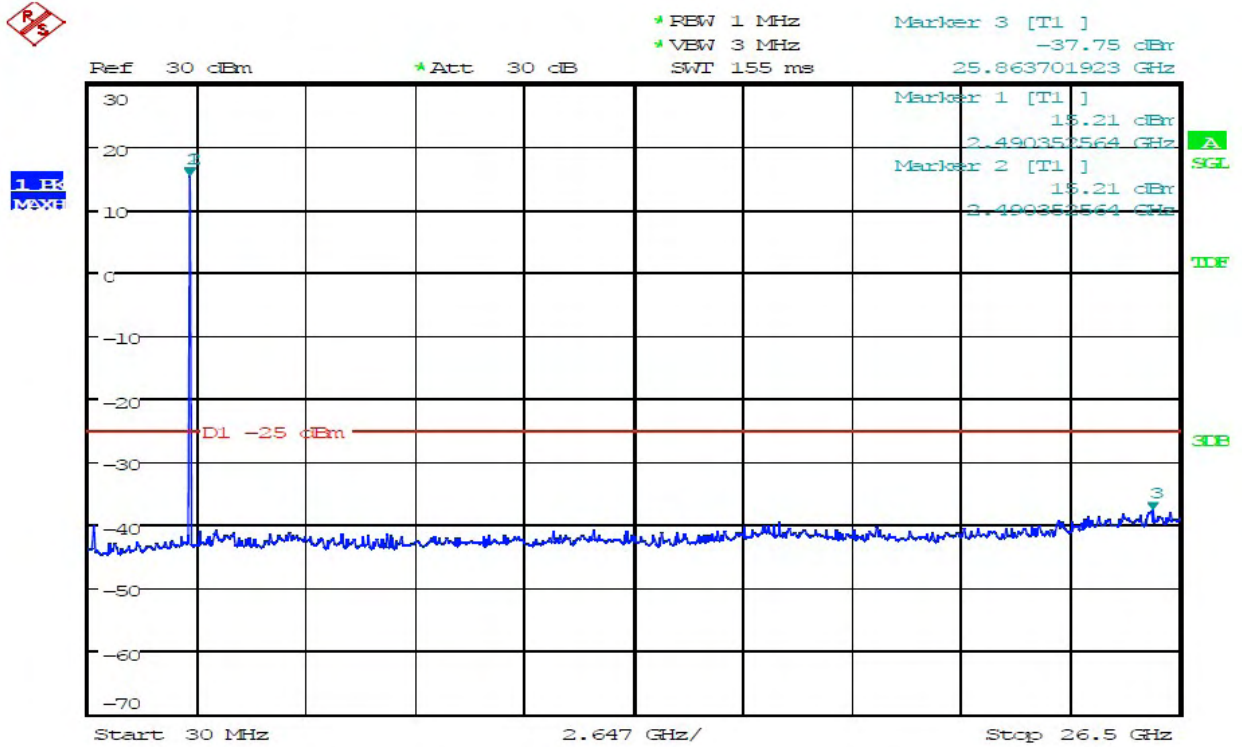
(Pre-measurement)

Bandwidth	Channel	Frequency (MHz)	Modulation	RB Size	RB Offset	Result
5	39675	2498.5	QPSK	25	LOW	PASS
5	39675	2498.5	Q16	25	LOW	PASS
5	41565	2687.5	QPSK	25	LOW	PASS
5	41565	2687.5	Q16	25	LOW	PASS
5	40620	2593	QPSK	25	LOW	PASS
5	40620	2593	Q16	25	LOW	PASS
10	39700	2501	QPSK	25	LOW	PASS
10	39700	2501	QPSK	50	LOW	PASS
10	39700	2501	Q16	25	LOW	PASS
10	39700	2501	Q16	50	LOW	PASS
10	41540	2685	QPSK	25	LOW	PASS
10	41540	2685	QPSK	50	LOW	PASS
10	41540	2685	Q16	25	LOW	PASS
10	41540	2685	Q16	50	LOW	PASS
10	40620	2593	QPSK	25	LOW	PASS
10	40620	2593	QPSK	50	LOW	PASS
10	40620	2593	Q16	25	LOW	PASS
10	40620	2593	Q16	50	LOW	PASS
15	39725	2053.5	QPSK	75	LOW	PASS
15	39725	2053.5	Q16	75	LOW	PASS
15	41515	2682.5	QPSK	75	LOW	PASS
15	41515	2682.5	Q16	75	LOW	PASS
15	40620	2593	QPSK	75	LOW	PASS
15	40620	2593	Q16	75	LOW	PASS
20	39750	2506	QPSK	50	LOW	PASS
20	39750	2506	QPSK	100	LOW	PASS
20	39750	2506	Q16	50	LOW	PASS
20	39750	2506	Q16	100	LOW	PASS
20	41490	2680	QPSK	50	LOW	PASS
20	41490	2680	QPSK	100	LOW	PASS
20	41490	2680	Q16	50	LOW	PASS
20	41490	2680	Q16	100	LOW	PASS
20	40620	2593	QPSK	50	LOW	PASS
20	40620	2593	QPSK	100	LOW	PASS
20	40620	2593	Q16	50	LOW	PASS
20	40620	2593	Q16	100	LOW	PASS

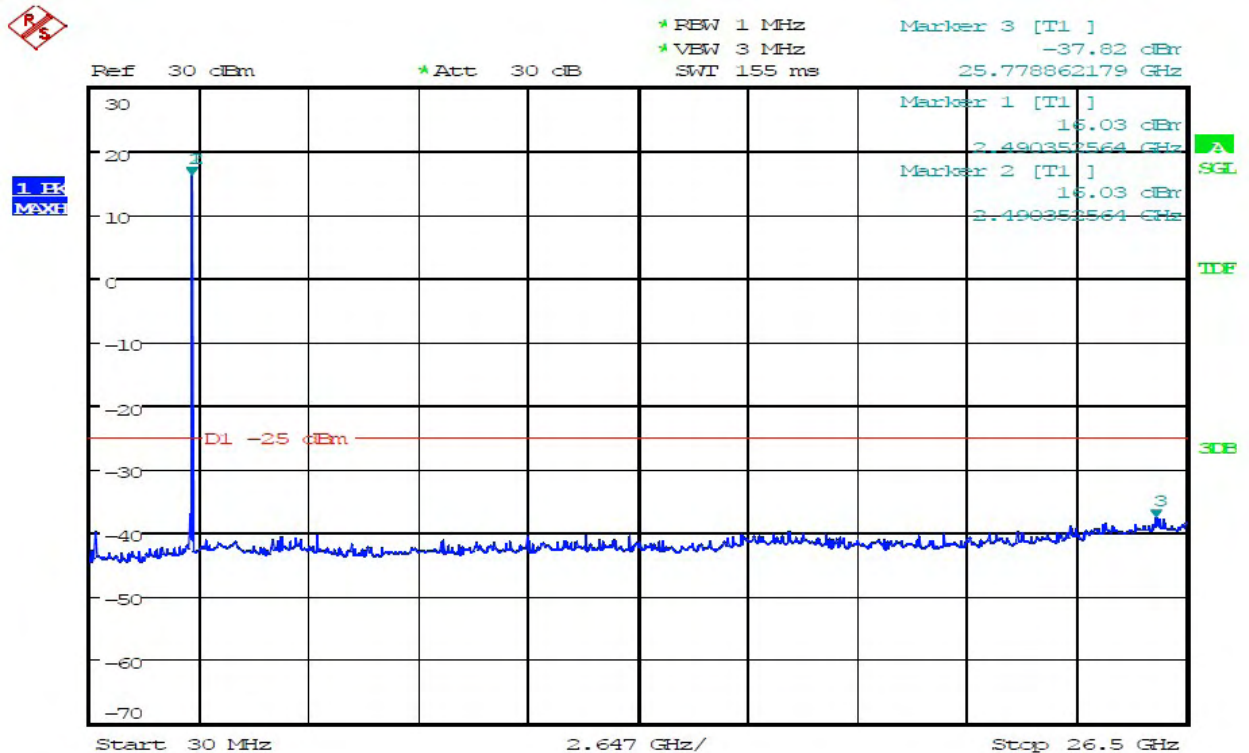


Test plot:  
Conducted method

BW5MHz-2498.5MHz,QPSK-25RB\_LOW@Pass

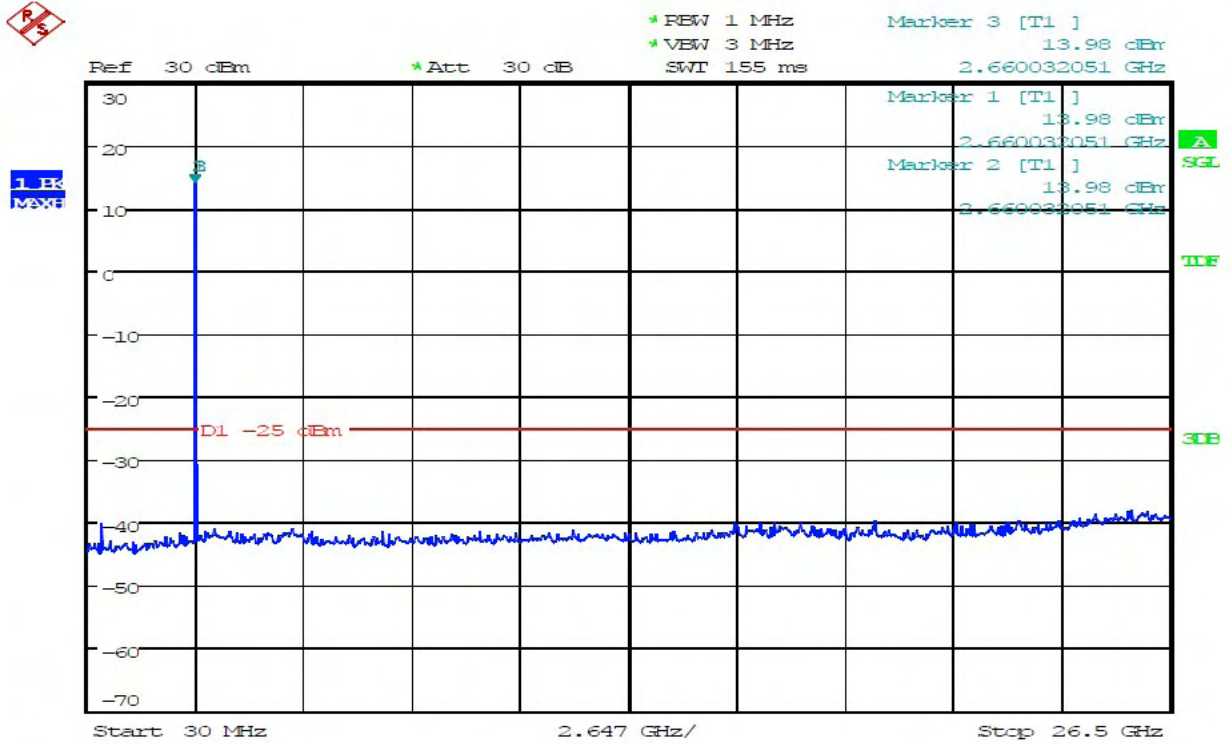


BW5MHz-2498.5MHz,Q16-25RB\_LOW@Pass

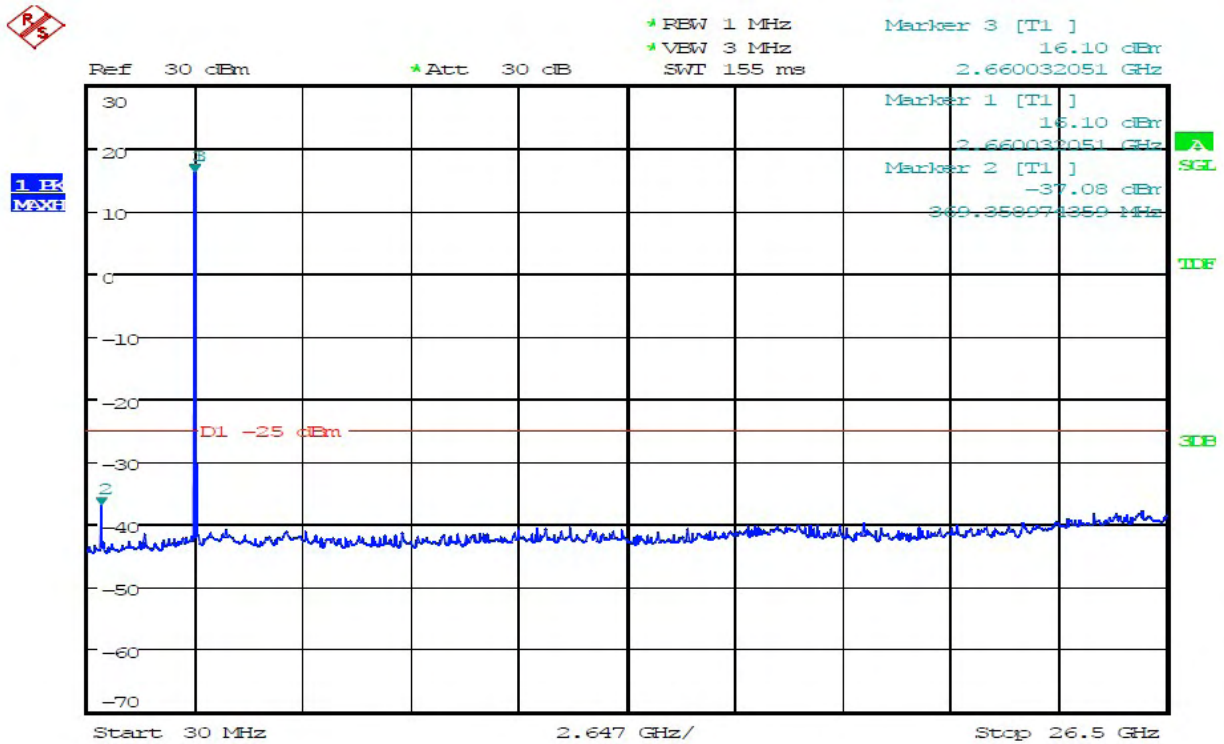




BW5MHz-2687.5MHz,QPSK-25RB\_LOW@Pass

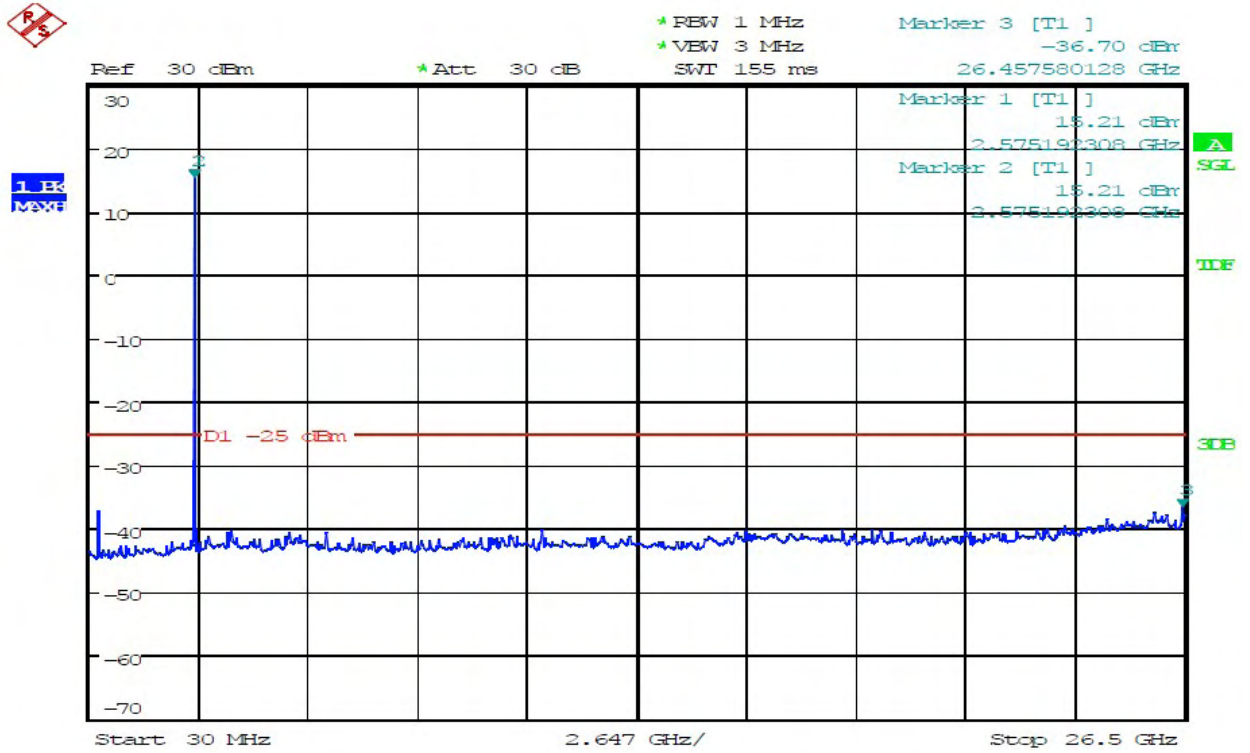


BW5MHz-2687.5MHz,Q16-25RB\_LOW@Pass

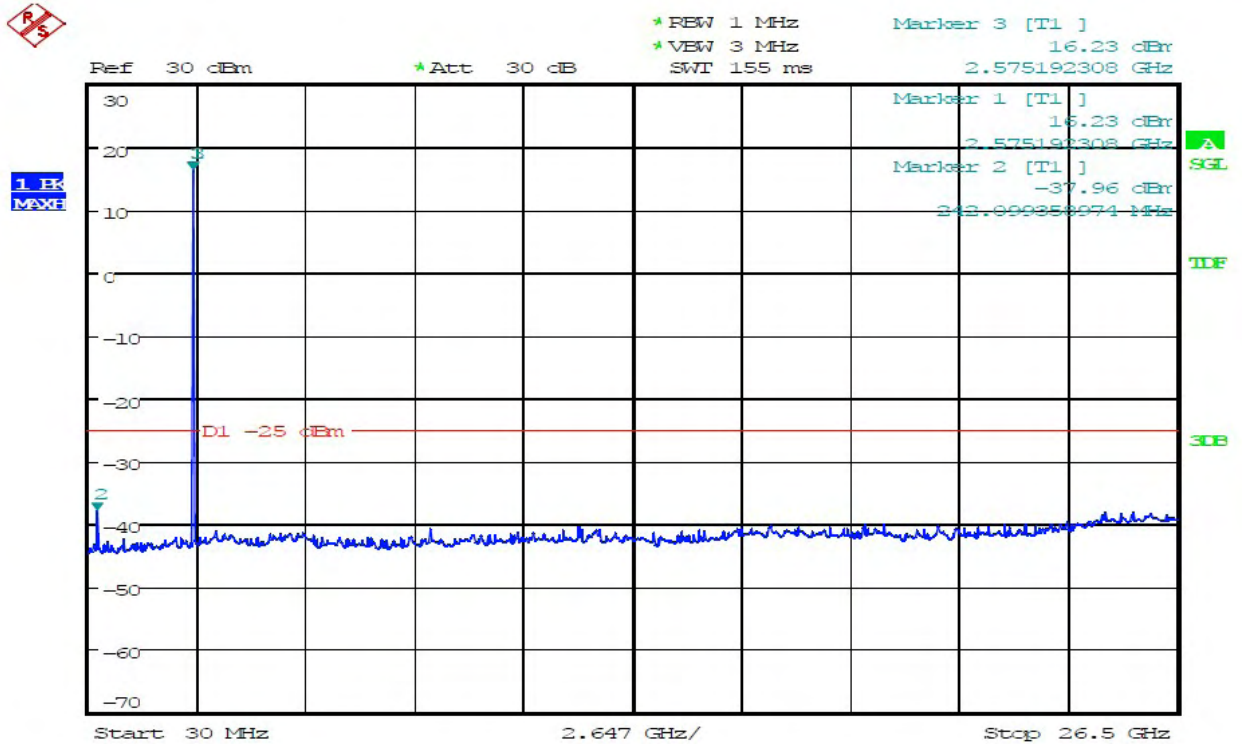




BW5MHz-2593MHz,QPSK-25RB\_LOW@Pass



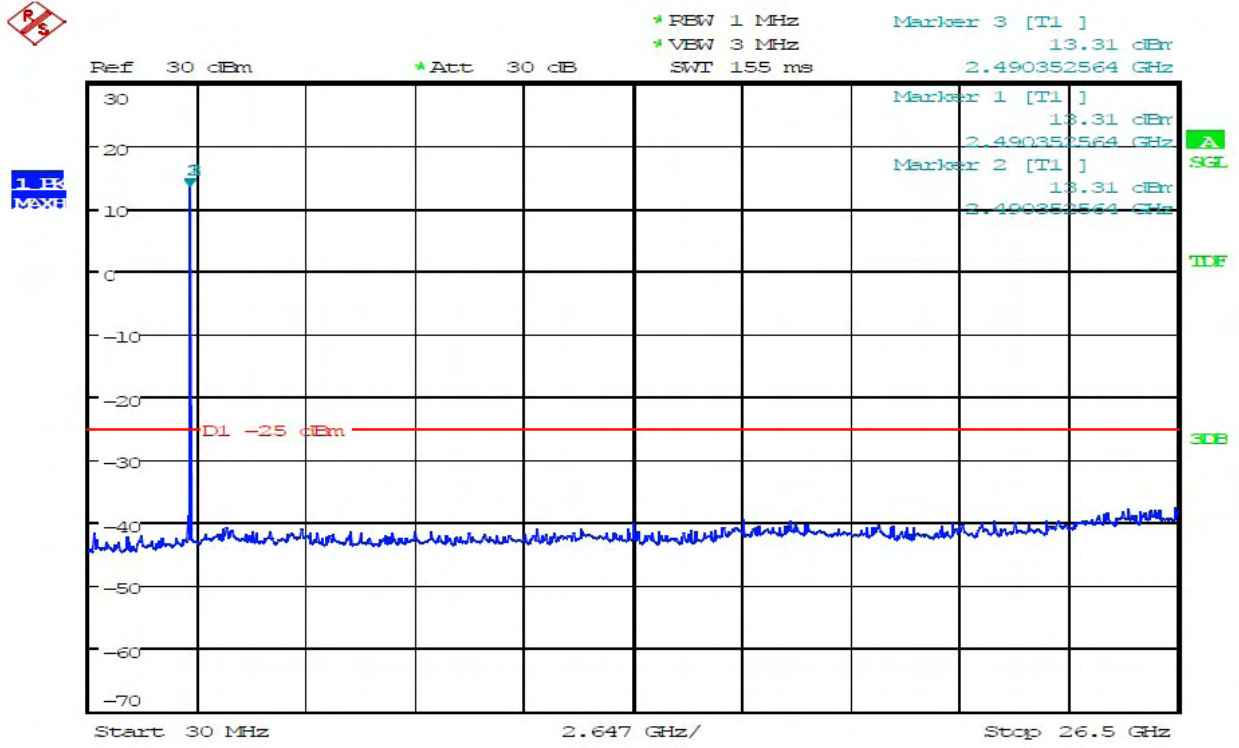
BW5MHz-2593MHz,Q16-25RB\_LOW@Pass



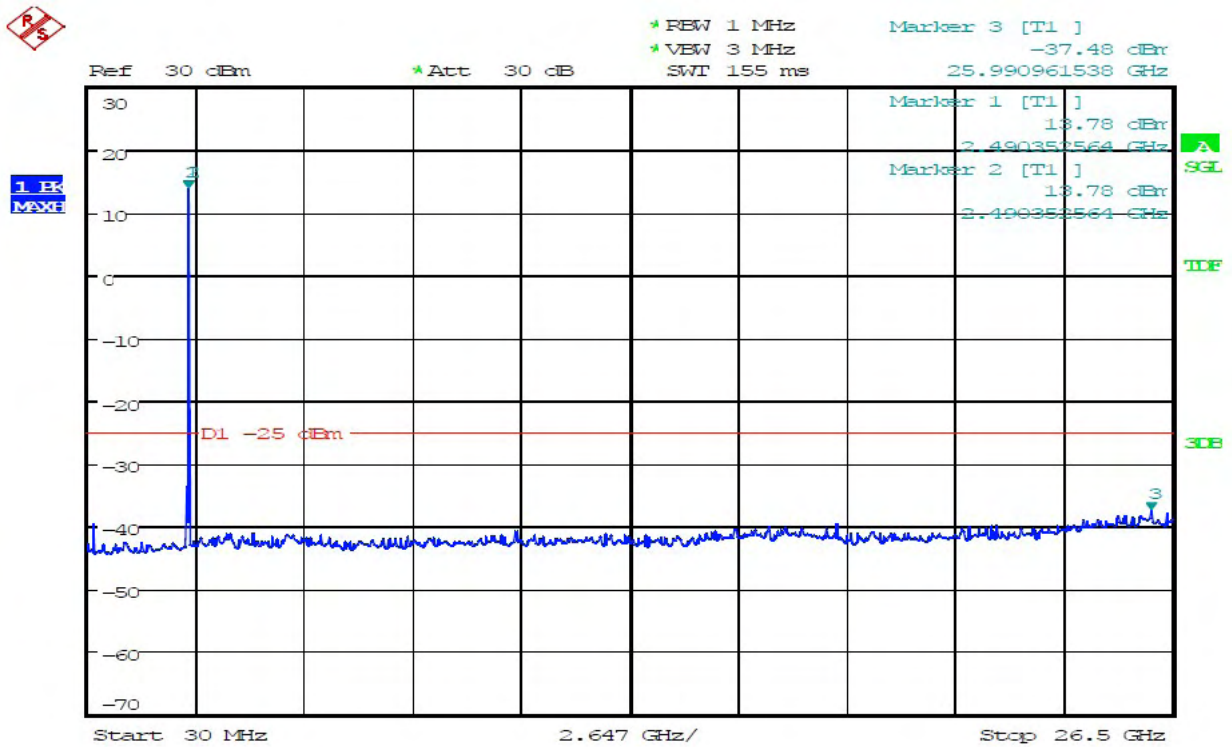




BW10MHz-2501MHz,QPSK-50RB\_LOW@Pass

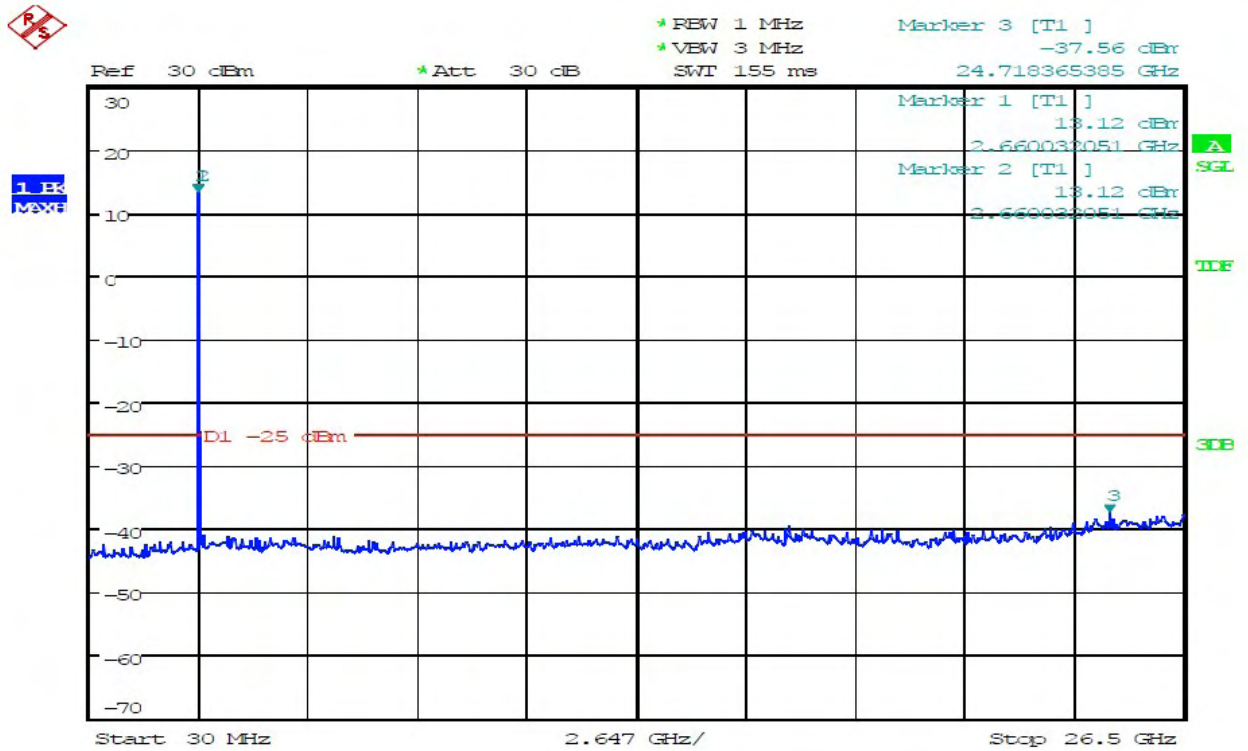


BW10MHz-2501MHz,Q16-50RB\_LOW@Pass

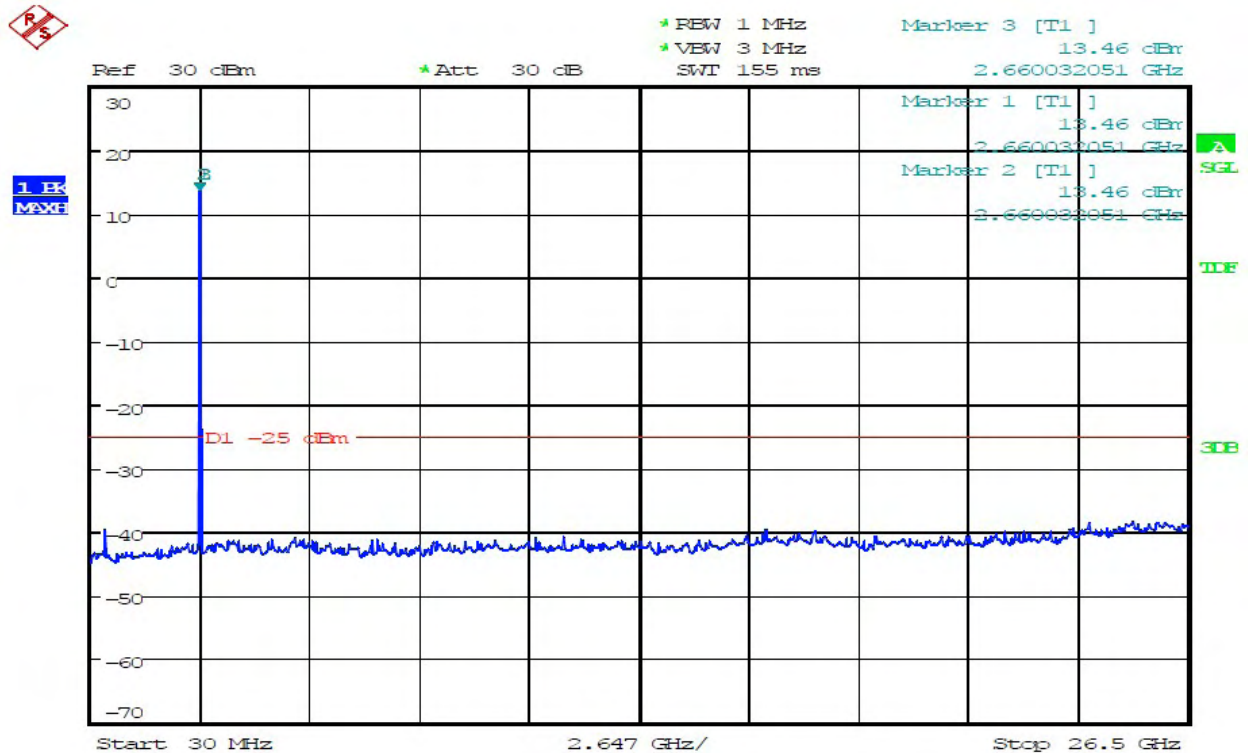




BW10MHz-2685MHz,QPSK-50RB\_LOW@Pass

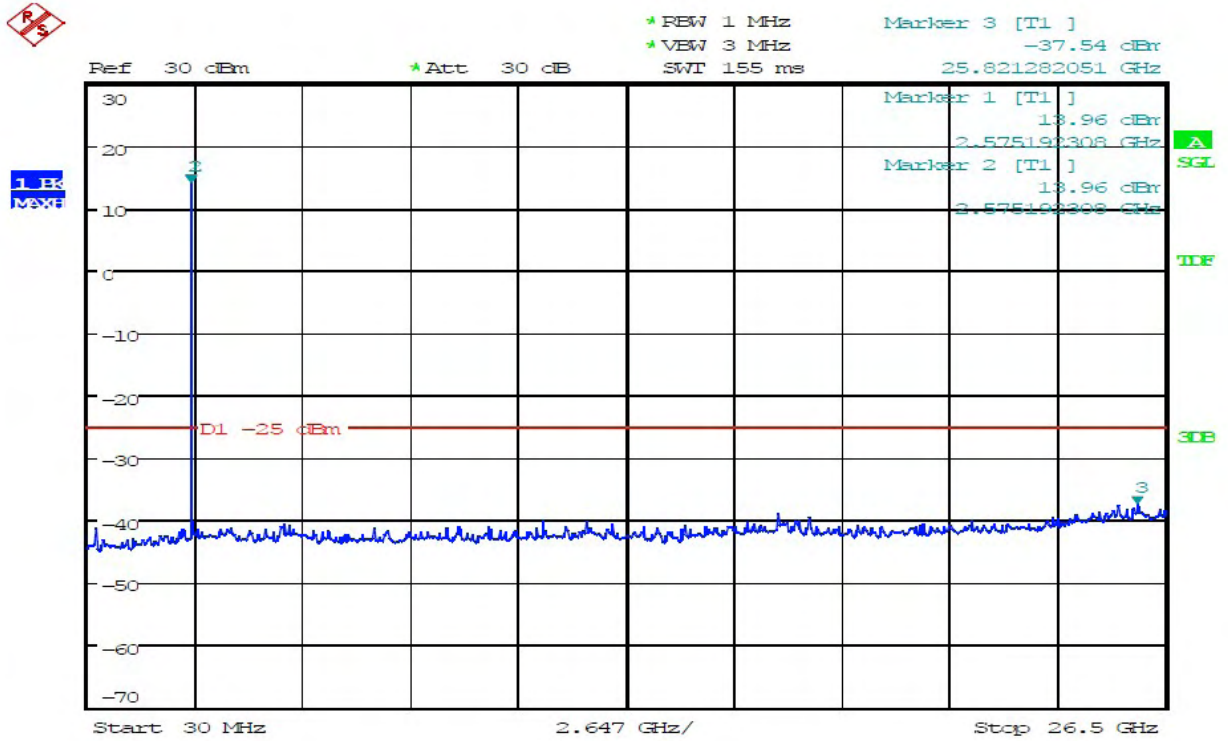


BW10MHz-2685MHz,Q16-50RB\_LOW@Pass

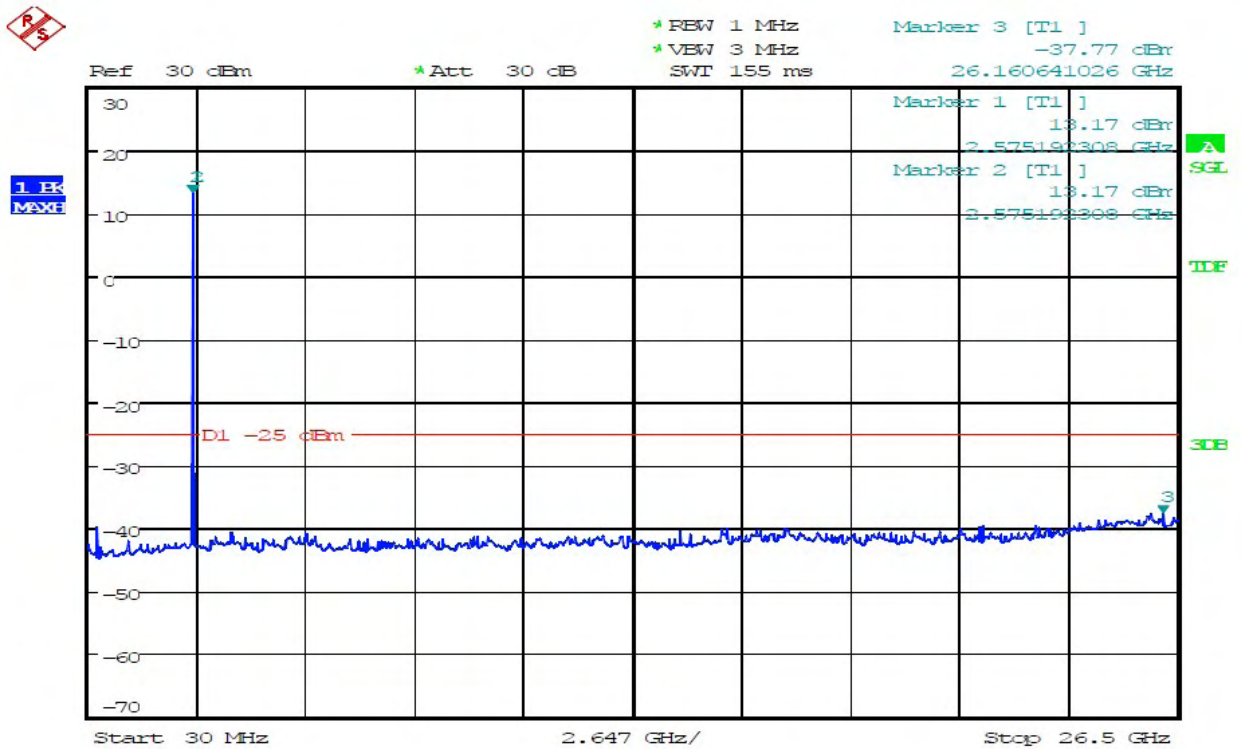




BW10MHz-2593MHz,QPSK-50RB\_LOW@Pass

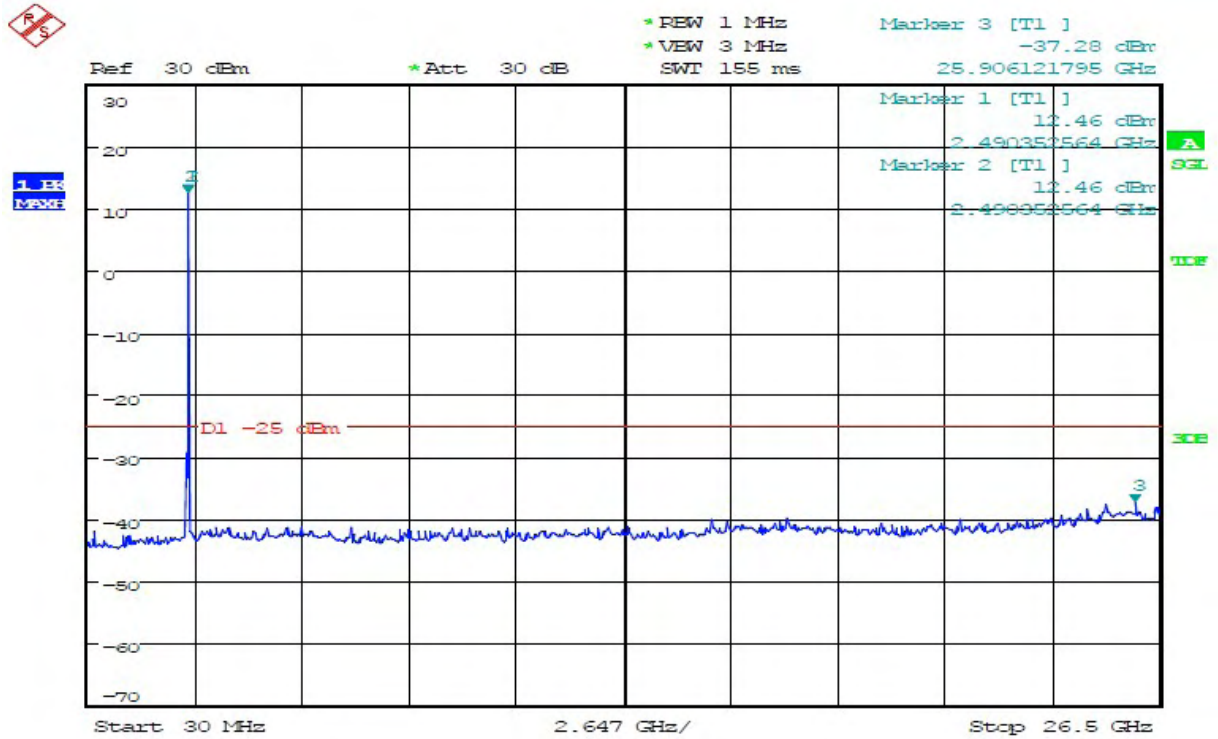


BW10MHz-2593MHz,Q16-50RB\_LOW@Pass

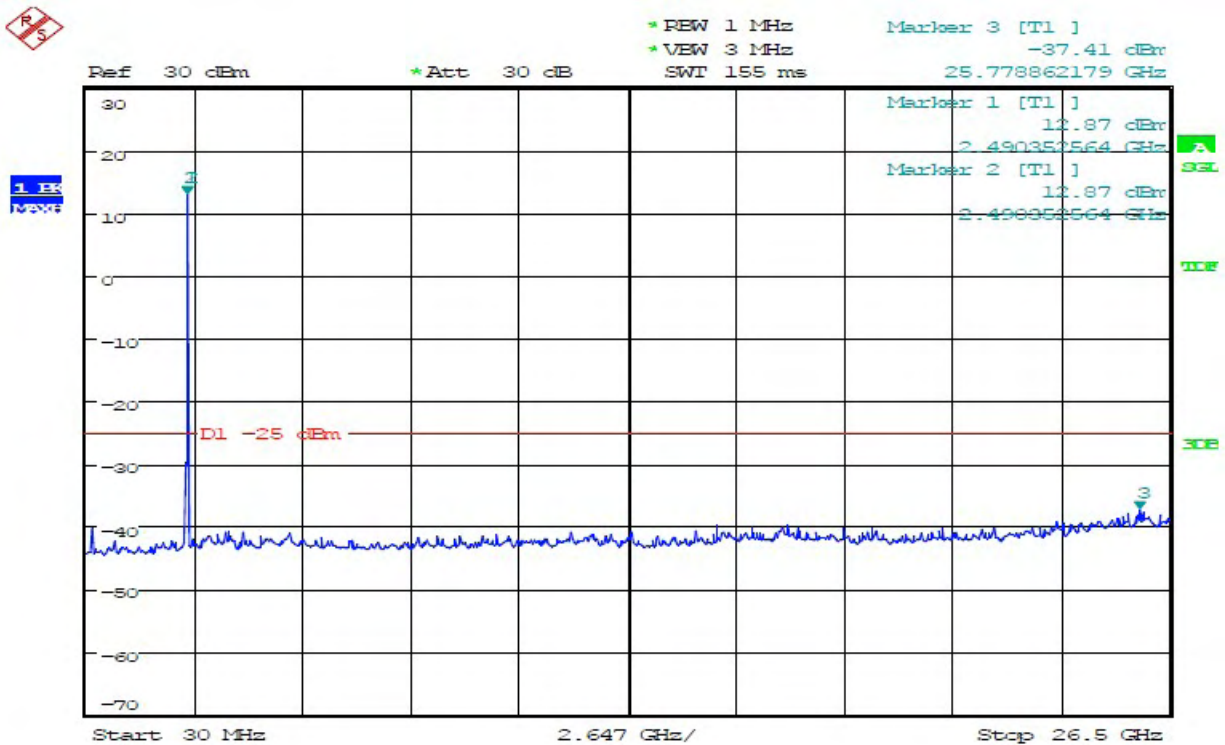




BW15MHz-2503.5MHz,QPSK-75RB\_LOW@Pass

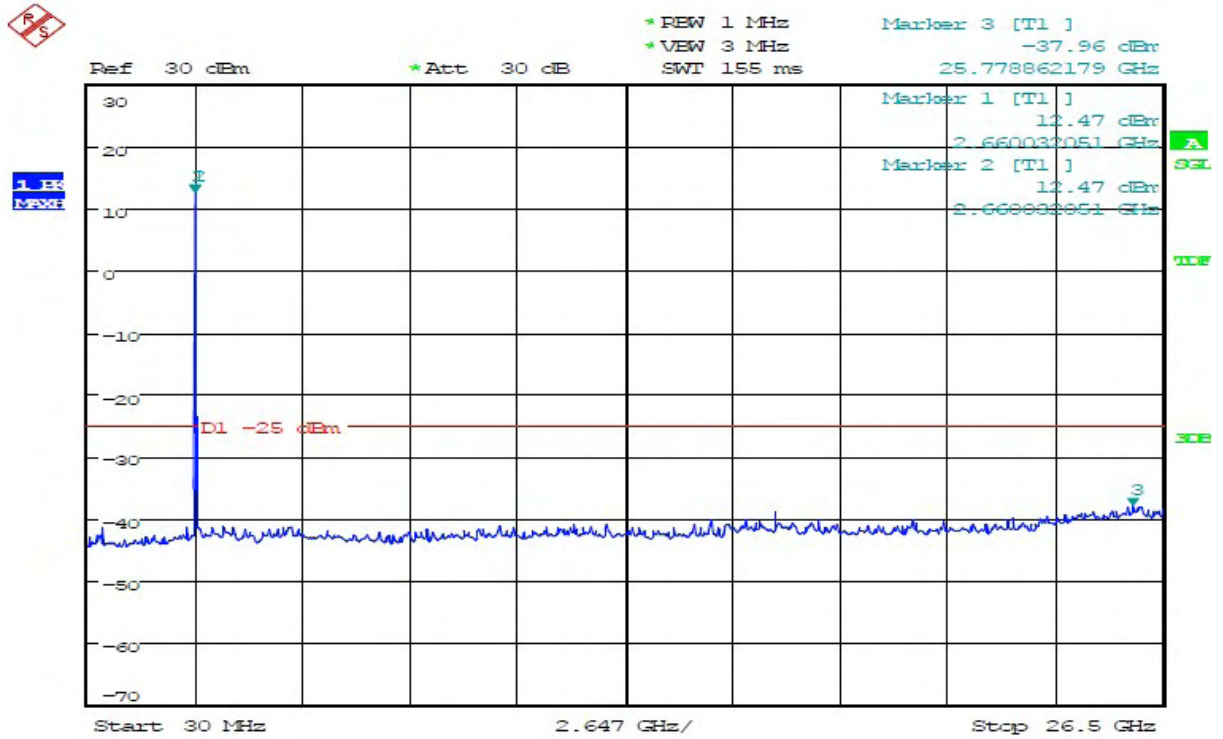


BW15MHz-2503.5MHz,Q16-75RB\_LOW@Pass

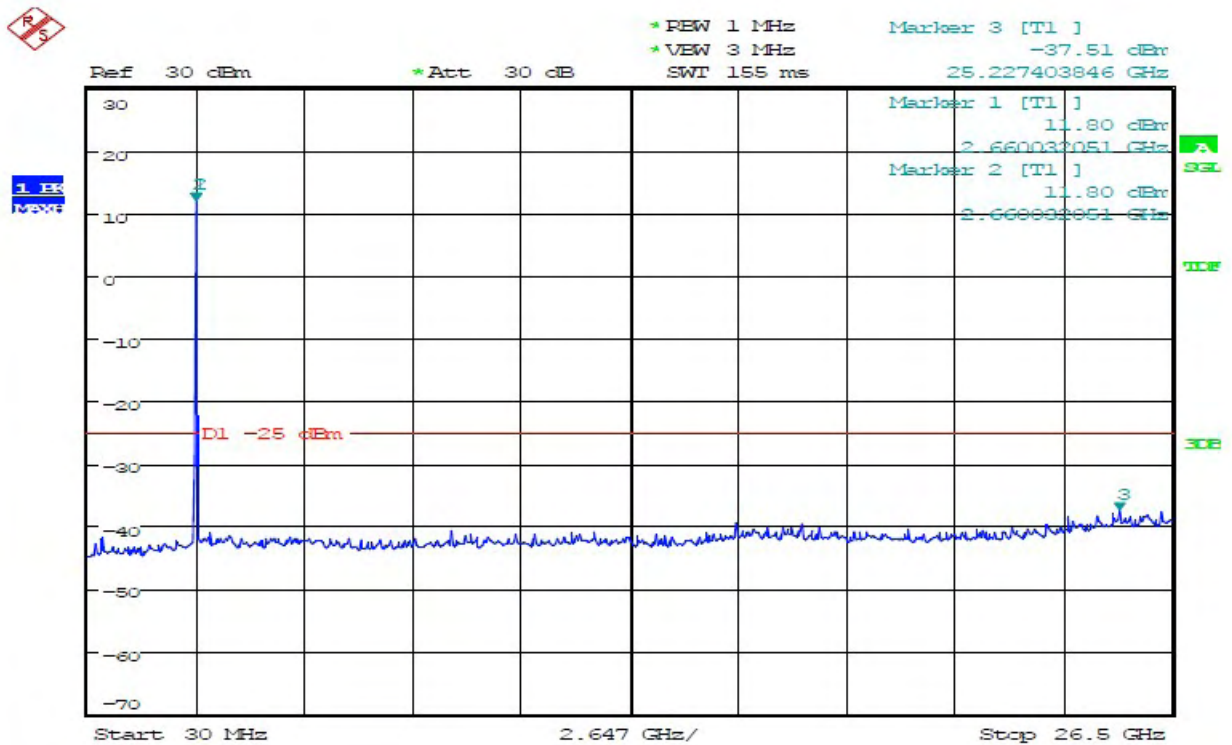




BW15MHz-2682.5MHz,QPSK-75RB\_LOW@Pass

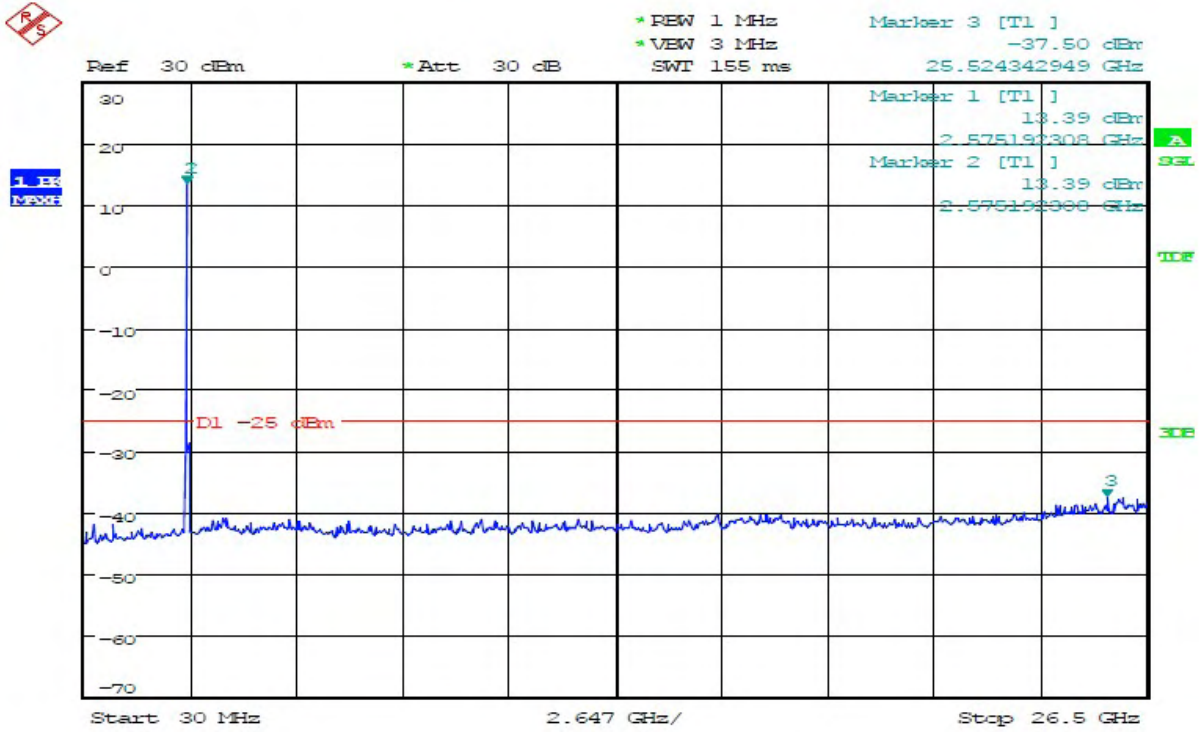


BW15MHz-2682.5MHz,Q16-75RB\_LOW@Pass

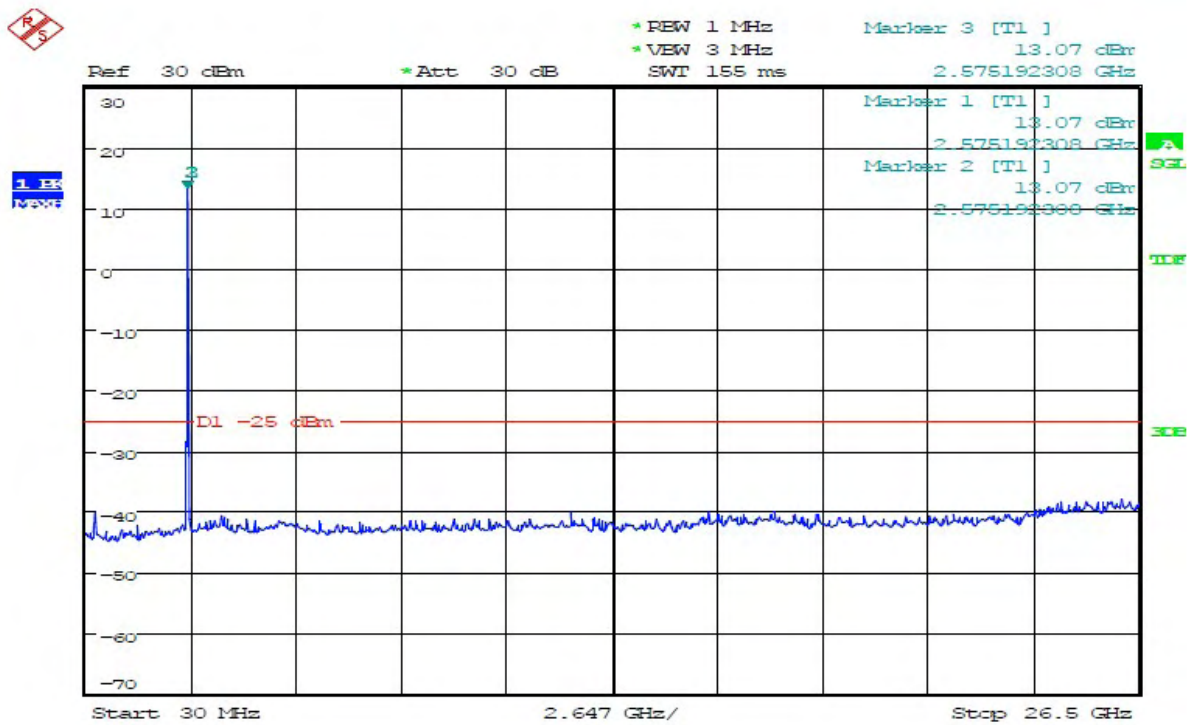




BW15MHz-2593MHz,QPSK-75RB\_LOW@Pass



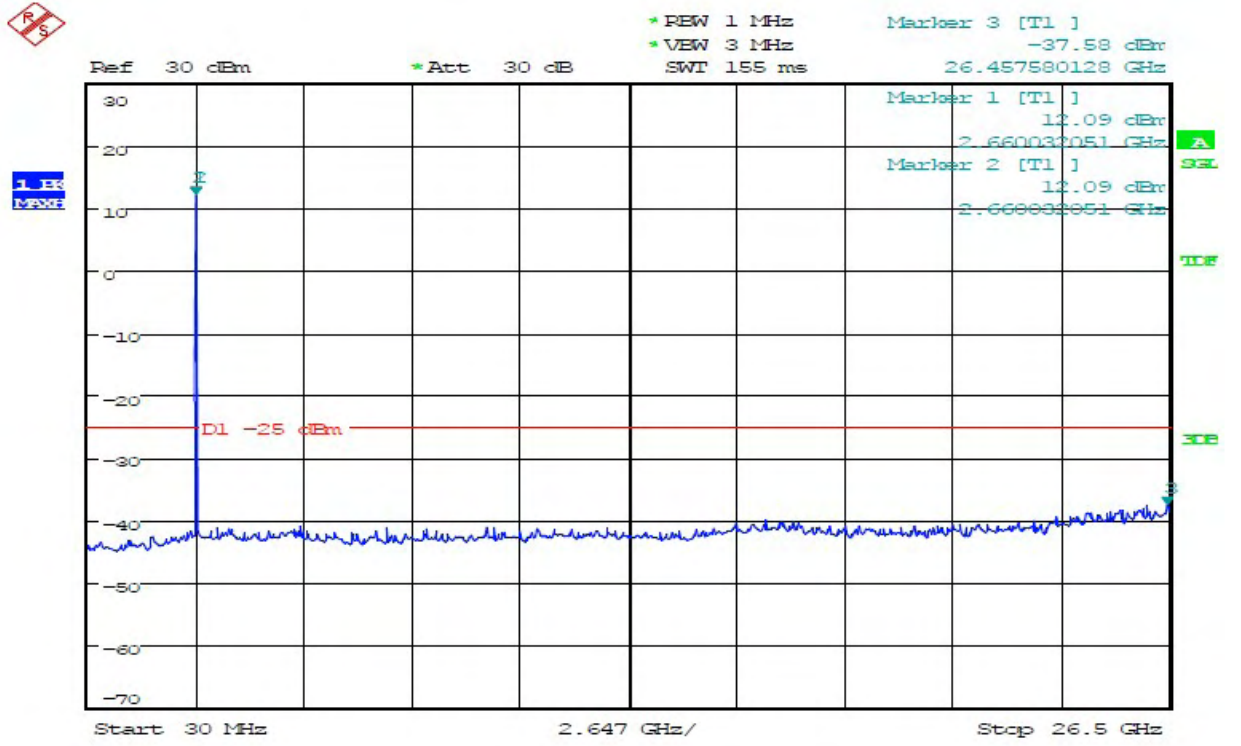
BW15MHz-2593MHz,Q16-75RB\_LOW@Pass



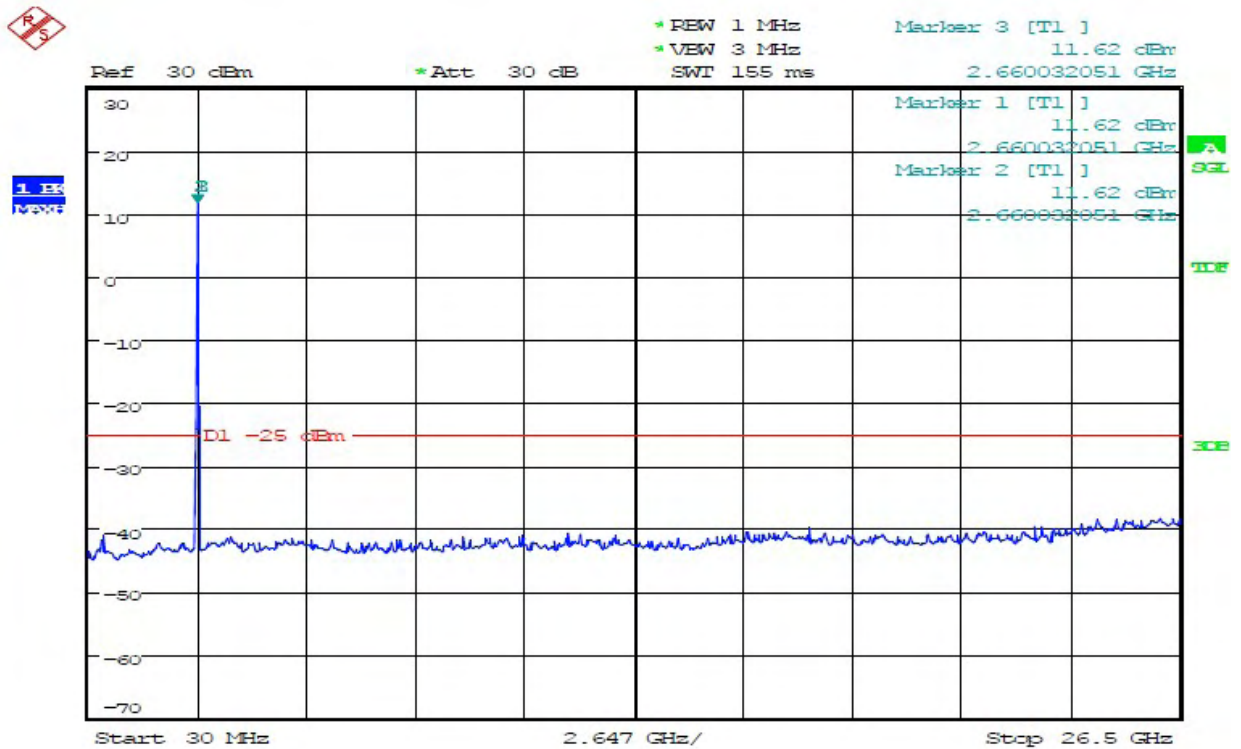




BW20MHz-2680MHz,QPSK-100RB\_LOW@Pass



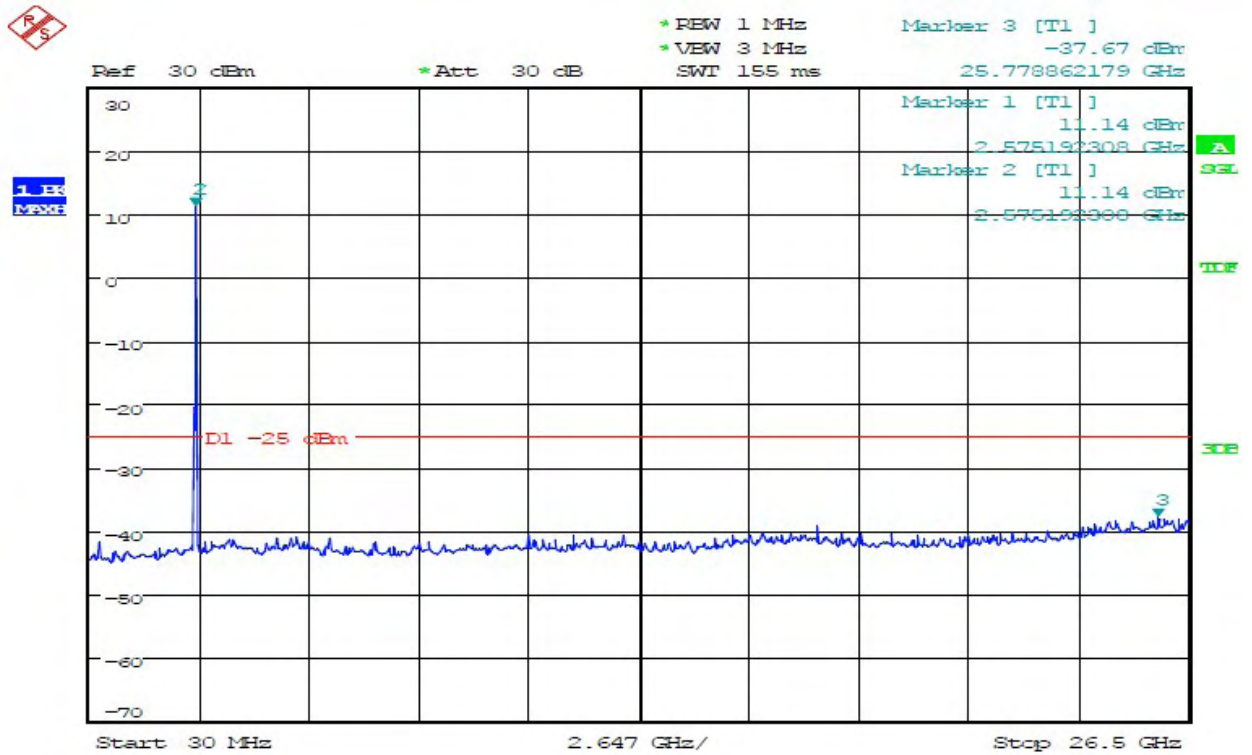
BW20MHz-2680MHz,Q16-100RB\_LOW@Pass







BW20MHz-2593MHz,QPSK-100RB\_LOW@Pass



BW20MHz-2593MHz,Q16-100RB\_LOW@Pass

