



## TEST REPORT

**No. B18N01018-LTE**

for

**RED Technologies LLC**

**Mobile phone**

**Model Name: H1A1000**

**FCC ID: 2AOYWH1A1000**

with

**Hardware Version: DVT**

**Software Version: HiA1000.005ho.01.00.01d.403**

**Issued Date: 2018-07-25**

**Note:**

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

**Test Laboratory:**

Designation Number: CN1210

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**REPORT HISTORY**

Report Number	Revision	Description	Issue Date
B18N01018-LTE	Rev.0	1 <sup>st</sup> edition	2018-07-13
B18N01018-LTE	Rev.1	1 <sup>st</sup> edition	2018-07-25

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## **1. Test Laboratory**

### **1.1. Testing Location**

Company Name: Shenzhen Academy of Information and Communications Technology  
Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China  
Postal Code: 518026  
Telephone: +86(0)755-33322000  
Fax: +86(0)755-33322001

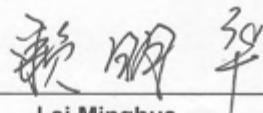
### **1.2. Testing Environment**

Normal Temperature: 15-35°C  
Relative Humidity: 20-75%

### **1.3. Project data**

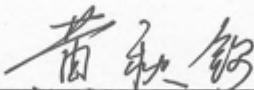
Testing Start Date: 2018-06-25  
Testing End Date: 2018-07-25

### **1.4. Signature**



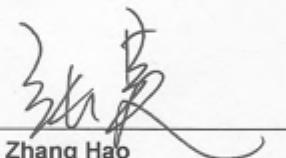
Lai Minghua

(Prepared this test report)



Huang Qiuqin

(Reviewed this test report)



Zhang Hao

(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: RED Technologies LLC  
Address /Post: 34 Parker, Irvine, California, United States  
Contact Person: Doug Kwon  
Contact Email: Doug.kwon@Red.com  
Telephone: 9492067900 ext 7794  
Fax: /

### **2.2. Manufacturer Information**

Company Name: RED Technologies LLC  
Address /Post: 34 Parker, Irvine, California, United States  
Contact Person: Doug Kwon  
Contact Email: Doug.kwon@Red.com  
Telephone: 9492067900 ext 7794  
Fax: /

### **3. Equipment Under Test (EUT) and Ancillary Equipment (AE)**

#### **3.1. About EUT**

Description	Mobile phone
Model Name	H1A1000
FCC ID	2AOYWH1A1000
Frequency Bands	LTE Band 14,26
Antenna	Integrated
Extreme vol. Limits	3.65VDC to 4.3VDC (nominal: 3.85VDC)
Extreme temp. Tolerance	-30°C to +50°C

#### **3.2. Internal Identification of EUT used during the test**

EUT ID*	IMEI	HW Version	SW Version	Sample Arrival Date
UT01aa	/	DVT	HiA1000.005ho.01.00 .01d.403	2018-06-25

\*EUT ID: is used to identify the test sample in the lab internally.

#### **3.3. Internal Identification of AE used during the test**

AE ID*	Description
AE1	Battery
AE2	Charger
AE1	
Model	/
Manufacturer	/
Capacitance	/
AE2	
Model	/
Manufacturer	/

\*AE ID: is used to identify the test sample in the lab internally.

#### **3.4. General Description**

The Equipment Under Test (EUT) is a model TD-LTE mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

#### **4. Reference Documents**

The following documents listed in this section are referred for testing.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 2	FREQUENCY ALLOCATIONS AND RADIO TREATY MATTERS; GENERAL RULES AND REGULATIONS	10-1-17 Edition
FCC Part 90	PRIVATE LAND MOBILE RADIO SERVICES	10-1-17 Edition
ANSI/TIA-603-E	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards	2016
ANSI C63.26	American National Standard of Procedures for Compliance Testing of Licensed Transmitters Used in Licensed Radio Service	2015
KDB 971168 D01	Measurement Guidance for Certification of Licensed Digital Transmitters	v03

## **5. LABORATORY ENVIRONMENT**

**Control room / conducted chamber** did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

**Fully-anechoic chamber 2** (8.6 meters × 6.1 meters × 3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

**Semi-anechoic chamber 2 / Fully-anechoic chamber 3** (10 meters × 6.7 meters × 6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	<±3.5 dB, 3 m distance
Site voltage standing-wave ratio ( $S_{VSWR}$ )	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

## 6. SUMMARY OF TEST RESULTS

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

### LTE Band 14

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/90.635	A.1	P
2	Field Strength of Spurious Radiation	2.1053/90.691	A.2	P
3	Frequency Stability	2.1055/90.213	A.3	P
4	Occupied Bandwidth	2.1049/90.1215	A.4	P
5	Emission Bandwidth	2.1049/90.1215	A.5	P
6	Band Edge Compliance	2.1051/90.691	A.6	P
7	Conducted Spurious Emission	2.1051/90.691	A.7	P
8	Peak to Average Power Ratio	KDB971168 D01(5.7.1)	A.8	P

### LTE Band 26

Items	Test Name	Clause in FCC rules	Section in this report	Verdict
1	Output Power	2.1046/90.635	A.1	P
2	Field Strength of Spurious Radiation	2.1053/90.691	A.2	P
3	Frequency Stability	2.1055/90.213	A.3	P
4	Occupied Bandwidth	2.1049/90.1215	A.4	P
5	Emission Bandwidth	2.1049/90.1215	A.5	P
6	Band Edge Compliance	2.1051/90.691	A.6	P
7	Conducted Spurious Emission	2.1051/90.691	A.7	P
8	Peak to Average Power Ratio	KDB971168 D01(5.7.1)	A.8	P

## **7. Test Equipments Utilized**

NO.	Description	TYPE	Manufacture	series number	CAL DUE DATE
1	Test Receiver	ESR7	R&S	101676	2018-11-29
2	BiLog Antenna	VULB9163	Schwarzbeck	9163 329	2020-02-27
3	Horn Antenna	3117	ETS-lindgren	00066577	2019-04-05
4	Horn Antenna	QSH-SL-18-26-S-20	Q-par	17013	2020-01-15
5	Antenna	SBA 9113	Schwarzbeck	814	/
6	Antenna	SBA 9112	Schwarzbeck	302	/
7	Antenna	QWH-SL-18-40-K-SG	Q-par	15979	2020-01-16
8	preamplifier	83017A	Agilent	MY39501110	/
9	Signal Generator	SMB100A	R&S	179725	2018-11-29
10	Fully Anechoic Chamber	FACT3-2.0	ETS-Lindgren	1285	2019-11-27
11	Spectrum Analyzer	FSV40	R&S	101192	2019-05-22
12	Universal Radio Communication Tester	CMW500	R&S	152499	2018-07-19
13	Universal Radio Communication Tester	CMW500	R&S	129146	2019-04-24
14	Spectrum Analyzer	FSU	R&S	200679	2018-12-13
15	Temperature Chamber	SH-241	ESPECs	92007516	2018-11-14
16	DC Power Supply	U3606A	Agilent Technologies	MY50450012	2018-11-14

### **Test software**

Item	Name	Vesion
Radiated	EMC32	Version 10.01.00

## **ANNEX A: MEASUREMENT RESULTS**

### **A.1 OUTPUT POWER**

#### **Reference**

FCC: CFR Part 2.1046, 90.635

#### **A.1.1 Summary**

During the process of testing, the EUT was controlled via Rhode & Schwarz Digital Radio Communication tester (CMW500) to ensure max power transmission and proper modulation.

This result contains peak output power and ERP/EIRP measurements for the EUT.

In all cases, output power is within the specified limits.

#### **A.1.2 Conducted**

##### **A.1.2.1 Method of Measurements**

The EUT was set up for the max output power with pseudo random data modulation.

These measurements were done at 3 frequencies (bottom, middle and top of operational frequency range) for each bandwidth.

##### **A.1.2.2 Measurement result**

###### **LTE Band 14**

Antenna Gain: -2.11dBi

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
QPSK	790.5	23305	5	1	0	21.8	19.7	
				1	24	21.2	19.1	
				12	6	21.2	19.1	
				25	0	21.6	19.5	
	793	23330		1	0	21.2	19.1	
				1	24	21.2	19.1	
				12	6	21.6	19.5	
				25	0	21.8	19.7	
	795.5	23355		1	0	21.2	19.1	
				1	24	21.2	19.1	
				12	6	21.6	19.5	
				25	0	21.8	19.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
16QAM	790.5	23305	5	1	0	20.8	18.7	
				1	24	20.3	18.2	
				12	6	20.4	18.3	
				25	0	20.2	18.1	
	793	23330		1	0	20.4	18.3	
				1	24	20.2	18.1	
				12	6	20.8	18.7	
				25	0	20.3	18.2	
	795.5	23355		1	0	20.4	18.3	
				1	24	20.2	18.1	
				12	6	20.8	18.7	
				25	0	20.5	18.4	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)
QPSK	793	23330	10	1	0	22.6	20.5
				1	49	22.5	20.4
				24	12	21.6	19.5
				50	0	21.6	19.5

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)
16QAM	793	23330	10	1	0	22.2	20.1
				1	24	22.1	20.0
				12	6	20.7	18.6
				25	0	20.6	18.5

Note: Expanded measurement uncertainty is  $U = 0.488$  dB,  $k = 1.96$

**LTE Band 26**

Antenna Gain:-2.33dBi

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
QPSK	814.7	26697	1.4	1	0	22.2	19.9	
				1	5	22.1	19.8	
				3	2	22.1	19.8	
				6	0	21.1	18.8	
				1	0	22.0	19.7	
				1	5	22.1	19.8	
	831.5	26865		3	2	22.1	19.8	
				6	0	21.1	18.8	
				1	0	21.8	19.5	
				1	5	21.8	19.5	
				3	2	21.9	19.6	
				6	0	20.8	18.5	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
16QAM	814.7	26697	1.4	1	0	21.1	18.8	
				1	5	21.2	18.9	
				3	2	21.4	19.1	
				6	0	20.2	17.9	
				1	0	21.2	18.9	
				1	5	21.2	18.9	
	831.5	26865		3	2	21.0	18.7	
				6	0	20.1	17.8	
				1	0	21.0	18.7	
				1	5	21.0	18.7	
				3	2	21.1	18.8	
				6	0	19.9	17.6	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
QPSK	815.5	26705	3	1	0	22.3	20.0	
				1	14	22.1	19.8	
				8	4	21.2	18.9	
				15	0	21.3	19.0	
	831.5	26865		1	0	22.1	19.8	
				1	14	22.2	19.9	
				8	4	21.2	18.9	
				15	0	21.1	18.8	
	847.5	27025		1	0	22.0	19.7	
				1	14	21.9	19.6	
				8	4	21.0	18.7	
				15	0	21.0	18.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
16QAM	815.5	26705	3	1	0	21.9	19.6	
				1	14	21.8	19.5	
				8	4	20.4	18.1	
				15	0	20.3	18.0	
	831.5	26865		1	0	21.3	19.0	
				1	14	21.3	19.0	
				8	4	20.1	17.8	
				15	0	20.2	17.9	
	847.5	27025		1	0	21.1	18.8	
				1	14	21.1	18.8	
				8	4	20.0	17.7	
				15	0	20.1	17.8	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
QPSK	816.5	26715	5	1	0	22.4	20.1	
				1	24	22.2	19.9	
				12	6	21.2	18.9	
				25	0	21.2	18.9	
	831.5	26865		1	0	22.2	19.9	
				1	24	22.2	19.9	
				12	6	21.1	18.8	
				25	0	21.2	18.9	
	846.5	27015		1	0	22.0	19.7	
				1	24	22.0	19.7	
				12	6	21.0	18.7	
				25	0	21.0	18.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
16QAM	816.5	26715	5	1	0	21.3	19.0	
				1	24	21.2	18.9	
				12	6	20.2	17.9	
				25	0	20.3	18.0	
	831.5	26865		1	0	21.5	19.2	
				1	24	21.4	19.1	
				12	6	20.2	17.9	
				25	0	20.2	17.9	
	846.5	27015		1	0	21.1	18.8	
				1	24	21.0	18.7	
				12	6	20.0	17.7	
				25	0	20.1	17.8	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
QPSK	819	26740	10	1	0	22.3	20.0	
				1	49	22.1	19.8	
				24	12	21.2	18.9	
				50	0	21.2	18.9	
	831.5	26865		1	0	22.1	19.8	
				1	49	22.1	19.8	
				24	12	21.2	18.9	
				50	0	21.2	18.9	
	844	26990		1	0	22.2	19.9	
				1	49	22.0	19.7	
				24	12	21.0	18.7	
				50	0	21.1	18.8	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
16QAM	819	26740	10	1	0	21.8	19.5	
				1	49	21.7	19.4	
				24	12	20.3	18.0	
				50	0	20.2	17.9	
	831.5	26865		1	0	21.3	19.0	
				1	49	21.3	19.0	
				24	12	20.2	17.9	
				50	0	20.2	17.9	
	844	26990		1	0	21.3	19.0	
				1	49	21.1	18.8	
				24	12	20.0	17.7	
				50	0	20.1	17.8	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
QPSK	821.5	26765	15	1	0	22.3	20.0	
				1	74	22.0	19.7	
				40	18	21.2	18.9	
				75	0	21.2	18.9	
	831.5	26865		1	0	22.2	19.9	
				1	74	22.1	19.8	
				40	18	21.2	18.9	
				75	0	21.2	18.9	
	841.5	26965		1	0	22.2	19.9	
				1	74	21.9	19.6	
				40	18	21.1	18.8	
				75	0	21.0	18.7	

Modulation	Carrier frequency (MHz)	UL Channel	BW	RB Size	RB Offset	Conducted Average (dBm)	EIRP Average(dBm)	
16QAM	821.5	26765	15	1	0	21.9	19.6	
				1	74	21.7	19.4	
				40	18	20.2	17.9	
				75	0	20.2	17.9	
	831.5	26865		1	0	21.4	19.1	
				1	74	21.3	19.0	
				40	18	20.3	18.0	
				75	0	20.2	17.9	
	841.5	26965		1	0	21.7	19.4	
				1	74	21.4	19.1	
				40	18	20.1	17.8	
				75	0	20.1	17.8	

### A.1.3 Radiated

#### A.1.3.1 Description

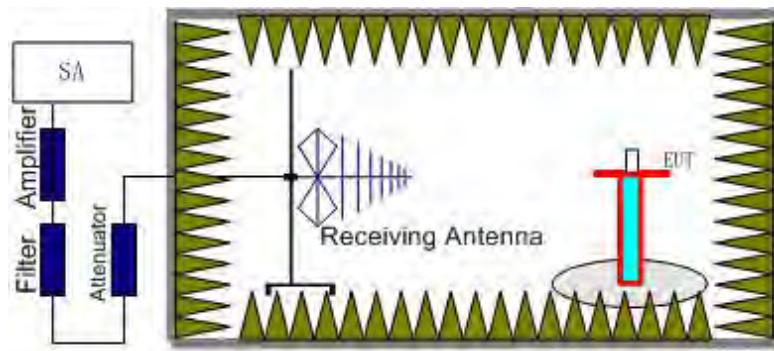
This is the test for the maximum radiated power from the EUT.

Rule Part 90.635 specifies, "Mobile/portable stations are limited to 2 watts e.i.r.p. Peak power" and 90.635 specifies that "Peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms-equivalent voltage."

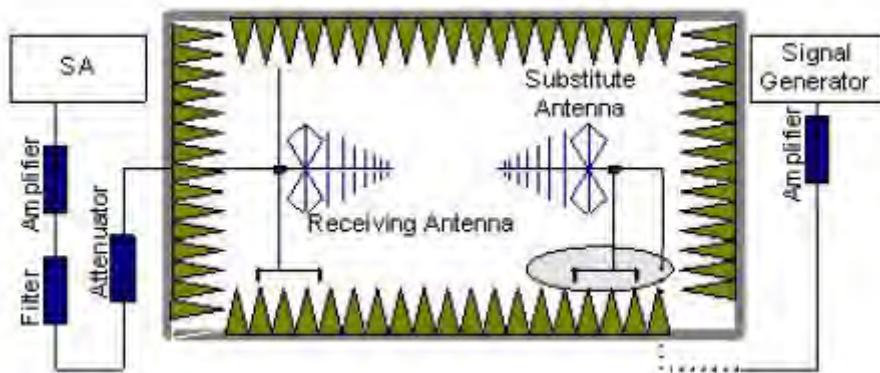
#### A.1.3.2 Method of Measurement

The measurements procedures in TIA-603-E-2016 are used.

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all transmit frequencies in three channels (High, Middle, Low) were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as  $(P_r)$ .
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, a substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF signal source for the frequency band of interest is connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{Mea}$ ) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded ( $P_r$ ). The power of signal source ( $P_{Mea}$ ) is recorded.

The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. An amplifier should be connected to the Signal Source output port. And the cable should be connected between the amplifier and the substitution antenna.

The cable loss ( $P_{cl}$ ), the substitution antenna Gain ( $G_a$ ) and the amplifier Gain ( $P_{Ag}$ ) should be recorded after test.

5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $ERP = EIRP - 2.15dB$ .

**A.1.3.3 Measurement result****LTE Band 14**

Frequency (MHz)	Peak ERP (dBm)	PcaCable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
788.0	21.11	-3.4	8.3	2.15	18.36	Vertical
793.0	21.01	-3.4	8.3	2.15	18.26	Vertical
797.9	20.72	-3.4	8.3	2.15	17.97	Vertical

**LTE Band 26**

Frequency (MHz)	Peak ERP (dBm)	PcaCable loss(dB)	Ga Antenna Gain (dB)	Correction (dB)	Pmea (dBm)	Polarization
815.58	20.27	-3.4	8.3	2.15	17.52	Vertical
831.50	21.08	-3.4	8.3	2.15	18.33	Vertical
847.42	20.96	-3.4	8.3	2.15	18.21	Vertical

**ANALYZER SETTINGS:**

RBW = VBW = 8MHz for occupied bandwidths equal to or less than 5MHz.

RBW = VBW = 20MHz for occupied bandwidths equal to or greater than 10MHz.

Note: The maximum value of expanded measurement uncertainty for this test item is  $U =$

4.92dB(30MHz-3GHz)/4.88dB(3GHz-18GHz)/5.66dB(18GHz-40GHz),  $k = 2$

## A.2 FIELD STRENGTH OF SPURIOUS RADIATION

### Reference

FCC: CFR 2.1053, 90.691.

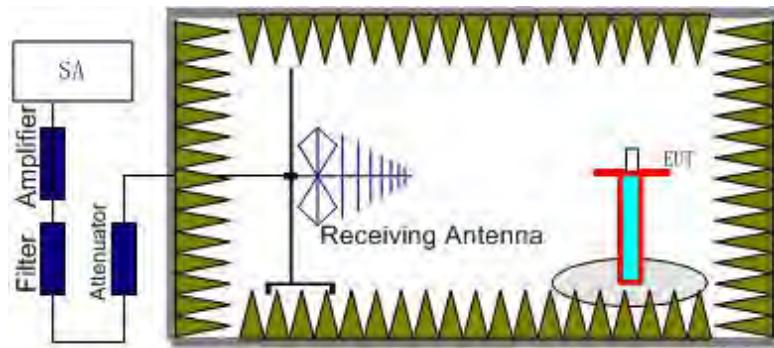
#### A.2.1 Measurement Method

The measurements procedures in TIA-603-E-2016 are used. This measurement is carried out in fully-anechoic chamber FAC-3.

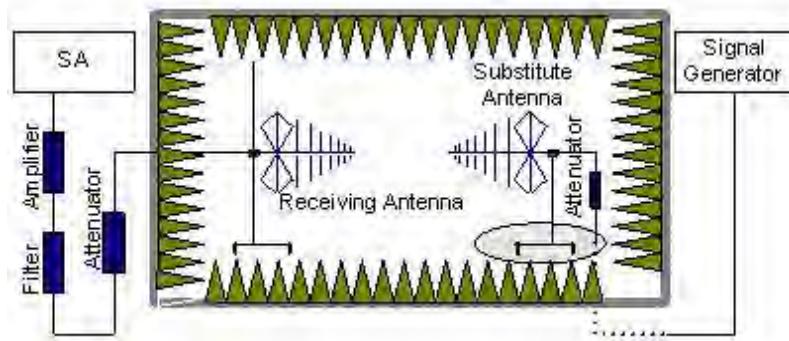
The spectrum was scanned from 30 MHz to the 10th harmonic of the highest frequency generated within the equipment, which is the transmitted carrier. The resolution bandwidth is set 1MHz as outlined in Part 90.691. The spectrum was scanned with the mobile station transmitting at carrier frequencies that pertain to low, mid and high channels of the LTE Bands 14, 26

**The procedure of radiated spurious emissions is as follows:**

1. EUT was placed on a 1.5 meter high non-conductive stand at a 3 meter test distance from the receive antenna. A receiving antenna was placed on the antenna mast 3 meters from the EUT for emission measurements. The height of receiving antenna is 1.5m. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT through 360° and adjusting the receiving antenna polarization. The radiated emission measurements of all non-harmonic and harmonics of the transmit frequency through the 10th harmonic were measured with peak detector.



2. The EUT is then put into continuously transmitting mode at its maximum power level during the test. And the maximum value of the receiver should be recorded as (Pr).
3. The EUT shall be replaced by a substitution antenna. The test setup refers to figure below.



In the chamber, an substitution antenna for the frequency band of interest is placed at the reference point of the chamber. An RF Signal source for the frequency band of interest is

connected to the substitution antenna with a cable that has been constructed to not interfere with the radiation pattern of the antenna. A power ( $P_{\text{Mea}}$ ) is applied to the input of the substitution antenna. Adjust the level of the signal generator output until the value of the receiver reaches the previously recorded ( $P_r$ ). The power of signal source ( $P_{\text{Mea}}$ ) is recorded. The test should be performed by rotating the test item and adjusting the receiving antenna polarization.

4. The Path loss ( $P_{\text{pl}}$ ) between the Signal Source with the Substitution Antenna and the Substitution Antenna Gain ( $G_a$ ) should be recorded after test.  
An amplifier should be connected in for the test.  
The Path loss ( $P_{\text{pl}}$ ) is the summation of the cable loss and the gain of the amplifier.
5. This value is EIRP since the measurement is calibrated using an antenna of known gain (unit: dBi) and known input power.
6. ERP can be calculated from EIRP by subtracting the gain of the dipole,  $\text{ERP} = \text{EIRP} - 2.15\text{dB}$ .

#### **A.2.2 Measurement Results**

Radiated emissions measurements were made only at the upper, middle, and lower carrier frequencies of the LTE Bands 14, 26. It was decided that measurements at these three carrier frequencies would be sufficient to demonstrate compliance with emissions limits because it was seen that all the significant spurs occur well outside the band and no radiation was seen from a carrier in one block of the LTE Bands 14, 26 into any of the other blocks. The equipment must still, however, meet emissions requirements with the carrier at all frequencies over which it is capable of operating and it is the manufacturer's responsibility to verify this.

**LTE Band 14**

Channel 23280

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.37	-52.82	-13	Vertical
1665.85	-51.50	-13	Vertical
2535.18	-43.53	-13	Vertical
2574.04	-44.40	-13	Horizontal
8965.21	-40.22	-13	Vertical
9970.91	-36.29	-13	Vertical

Channel 23330

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.58	-52.54	-13	Vertical
1665.36	-50.78	-13	Vertical
2536.33	-43.98	-13	Horizontal
2577.31	-44.09	-13	Horizontal
8962.84	-39.38	-13	Vertical
9968.96	-36.67	-13	Vertical

Channel 23379

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.10	-52.94	-13	Vertical
1667.82	-51.21	-13	Vertical
2536.08	-43.65	-13	Horizontal
2573.63	-43.45	-13	Vertical
8962.10	-40.20	-13	Vertical
9971.35	-36.29	-13	Vertical

**LTE Band 26**

Channel 26740

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1646.60	-52.53	-13	Vertical
1668.20	-51.26	-13	Vertical
2534.31	-43.83	-13	Vertical
2576.54	-43.59	-13	Horizontal
8962.29	-40.18	-13	Vertical
9969.72	-36.49	-13	Vertical

Channel 26865

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1649.38	-52.79	-13	Vertical
1667.75	-51.10	-13	Vertical
2532.88	-44.10	-13	Horizontal
2576.47	-44.01	-13	Vertical
8962.54	-39.88	-13	Vertical
9969.87	-36.04	-13	Vertical

Channel 26990

Frequency (MHz)	Power (dBm)	Limited (dBm)	Polarization
1648.82	-52.38	-13	Vertical
1667.62	-51.44	-13	Horizontal
2534.08	-43.57	-13	Vertical
2576.60	-44.23	-13	Vertical
8962.61	-40.20	-13	Vertical
9970.18	-36.79	-13	Vertical

Note: The maximum value of expanded measurement uncertainty for this test item is  $U = 4.92\text{dB}(30\text{MHz}-3\text{GHz})/4.88\text{dB}(3\text{GHz}-18\text{GHz})/5.66\text{dB}(18\text{GHz}-40\text{GHz})$ ,  $k = 2$

### **A.3 FREQUENCY STABILITY**

#### **Reference**

FCC: CFR Part 2.1055, 90.213.

#### **A.3.1 Method of Measurement**

In order to measure the carrier frequency under the condition of AFC lock, it is necessary to make measurements with the EUT in a "call mode". This is accomplished with the use of R&S CMW500 DIGITAL RADIO COMMUNICATION TESTER.

1. Measure the carrier frequency at room temperature.
2. Subject the EUT to overnight soak at -30°C.
3. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on middle channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
4. Repeat the above measurements at 10°C increments from -30°C to +50°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
5. Re-measure carrier frequency at room temperature with nominal voltage. Vary supply voltage from minimum voltage to maximum voltage, in 0.1Volt increments re-measuring carrier frequency at each voltage. Pause at nominal voltage for 1.5 hours unpowered, to allow any self-heating to stabilize, before continuing.
6. Subject the EUT to overnight soak at +50°C.
7. With the EUT, powered via nominal voltage, connected to the CMW500 and in a simulated call on the centre channel, measure the carrier frequency. These measurements should be made within 2 minutes of Powering up the EUT, to prevent significant self-warming.
8. Repeat the above measurements at 10 °C increments from +50°C to -30°C. Allow at least 1.5 hours at each temperature, unpowered, before making measurements.
9. At all temperature levels hold the temperature to +/- 0.5°C during the measurement procedure.

#### **A.3.2 Measurement Limit**

According to the JTC standard the frequency stability of the carrier shall be accurate to within 0.1 ppm of the received frequency from the base station. This accuracy is sufficient to meet Sec. 90.213, Frequency Stability. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. As this transceiver is considered "Hand carried, battery powered equipment" Section 2.1055(d) (2) applies. This requires that the lower voltage for frequency stability testing be specified by the manufacturer. This transceiver is specified to operate with an input voltage of between 3.65VDC and 4.3VDC, with a nominal voltage of 3.85VDC. Operation above or below these voltage limits is prohibited by transceiver software in order to prevent improper operation as well as to protect components from overstress. These voltages represent a tolerance from -5.4% to 10.8%. For the purposes of measuring frequency stability these voltage limits are to be used.

**A.4.3 Measurement results**
**LTE Band 14**

Band	BW	Test Result (ppm)@NV		Test Result (ppm)@NT	
		Temperature(°C)		Voltage	
14	5	-30	0.003	LV	0.001
		-20	0.004		
		-10	0.000		
		0	0.000		
		10	-0.004		
	10	20	0.002	HV	0.005
		30	0.004		
		40	0.004		
		50	0.001		
		-30	-0.003		
		-20	-0.003	LV	0.001
		-10	0.002		
		0	-0.002		
		10	0.003		
		20	-0.002		
		30	0.000		
		40	-0.006		
		50	0.001		

## LTE Band 26

Band	BW	Test Result (ppm)@NV		Test Result (ppm)@NT	
		Temperature(°C)		Voltage	
26	1.4	-30	0.000	LV	-0.001
		-20	0.000		
		-10	0.014		
		0	0.002		
		10	-0.009		
		20	0.019	HV	-0.008
		30	-0.009		
		40	0.002		
		50	-0.003		
		-30	0.001	LV	0.004
26	3	-20	0.002		
		-10	-0.001		
		0	0.000		
		10	0.003		
		20	0.002	HV	0.001
		30	0.005		
		40	0.004		
		50	0.005		
		-30	-0.001	LV	0.005
		-20	0.002		
26	5	-10	0.007		
		0	0.001		
		10	0.000		
		20	-0.002	HV	0.006
		30	0.004		
		40	0.005		
		50	0.010		
		-30	-0.001	LV	0.002
		-20	0.009		
		-10	0.003		
26	10	0	-0.004		
		10	0.002		
		20	0.005	HV	0.005
		30	-0.002		
		40	0.004		
		50	0.013		

15	-30 -20 -10 0 10	0.005 0.006 0.004 0.005 0.007	LV	0.006
			HV	0.004

Expanded measurement uncertainty is 10Hz, k = 2

## **A.4 OCCUPIED BANDWIDTH**

### **Reference**

FCC: CFR Part 2.1049, 90.1215.

### **A.4.1 Occupied Bandwidth Results**

Occupied bandwidth measurements are only provided for selected frequencies in order to reduce the amount of submitted data. Data were taken at the extreme and mid frequencies of the US Cellular/PCS frequency bands. The table below lists the measured 99% BW. Spectrum analyzer plots are included on the following pages.

The measurement method is from KDB 971168 4.2:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least  $10\log(\text{OBW} / \text{RBW})$  below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

## LTE Band 14

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
14	790.5	23305	5	1	0	0.217	Fig.1	0.239	Fig.5
				1	24	0.217	Fig.2	0.239	Fig.6
				12	6	2.171	Fig.3	2.171	Fig.7
				25	0	4.493	Fig.4	4.493	Fig.8



Fig.1

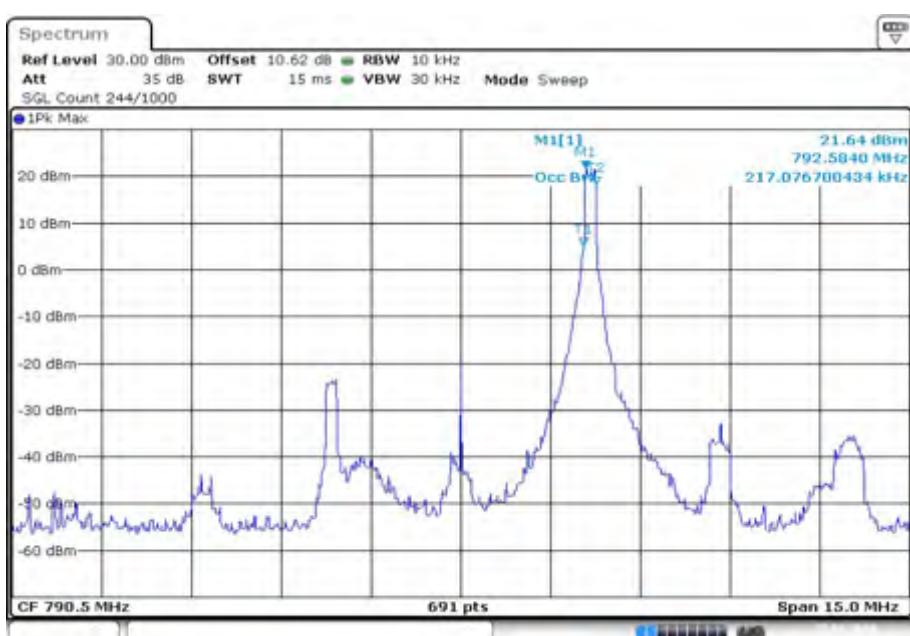


Fig.2

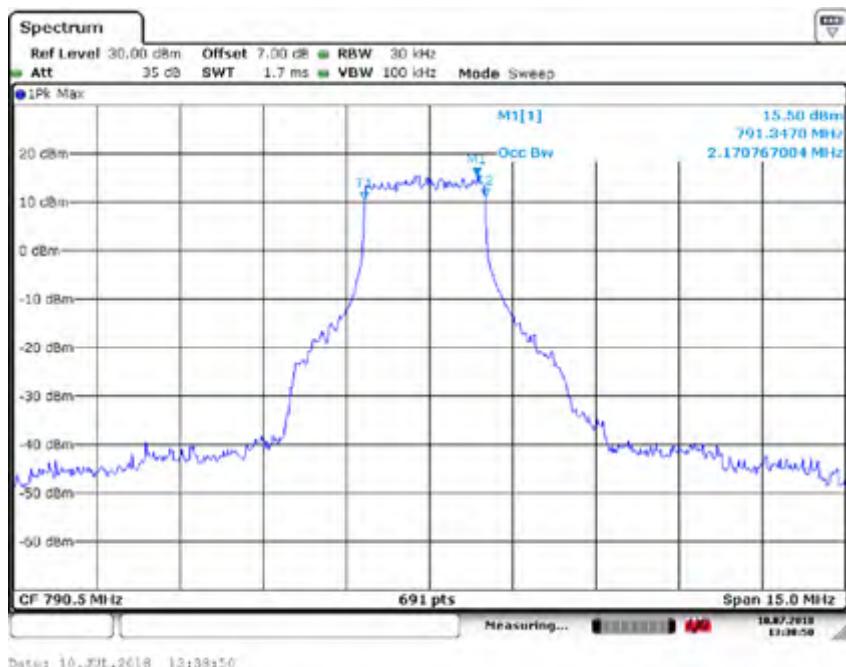


Fig.3

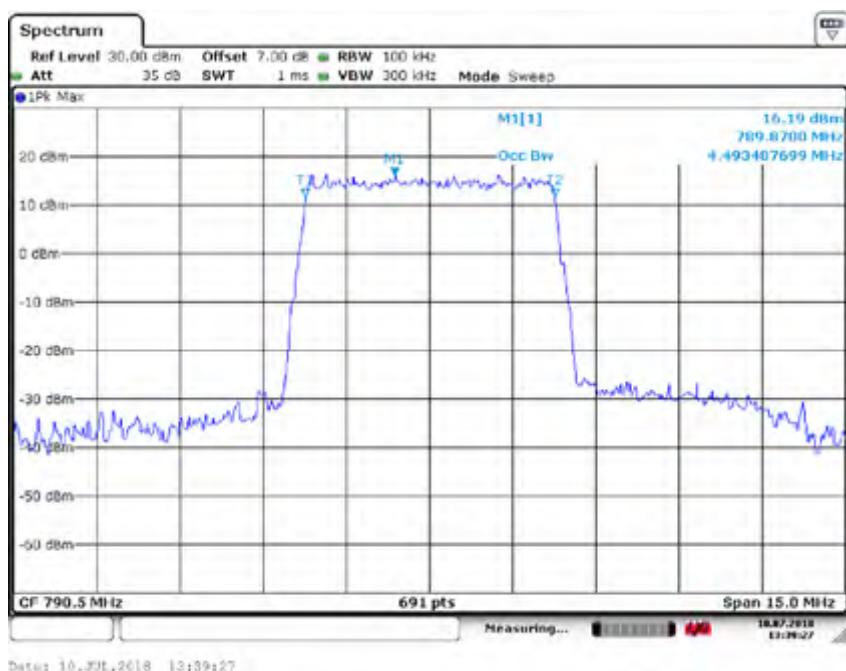


Fig.4

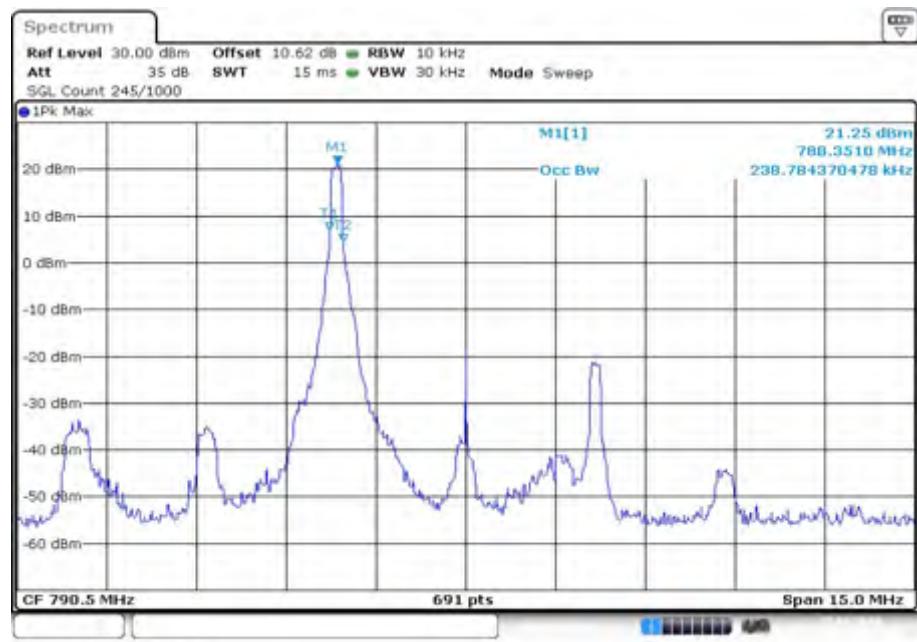


Fig.5

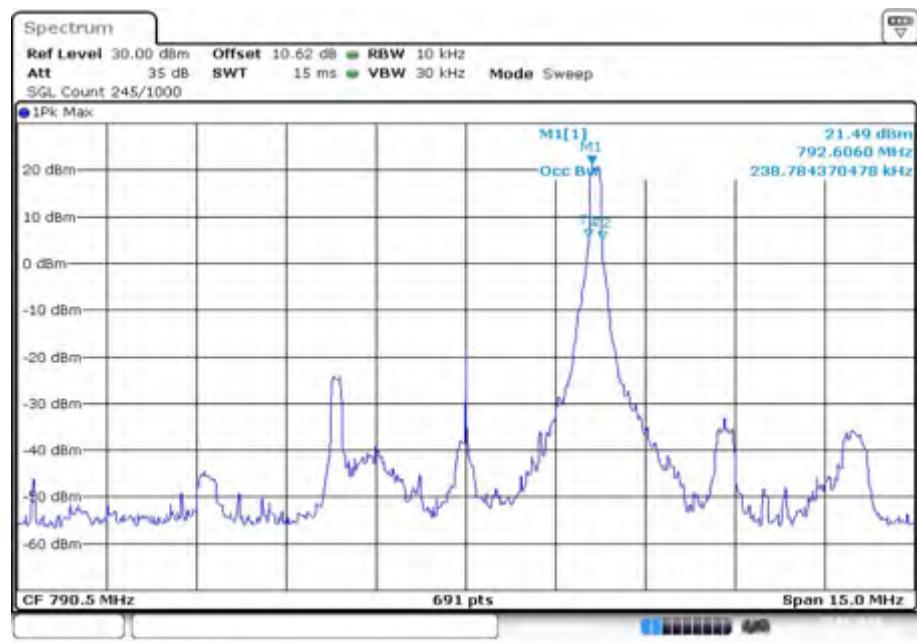


Fig.6

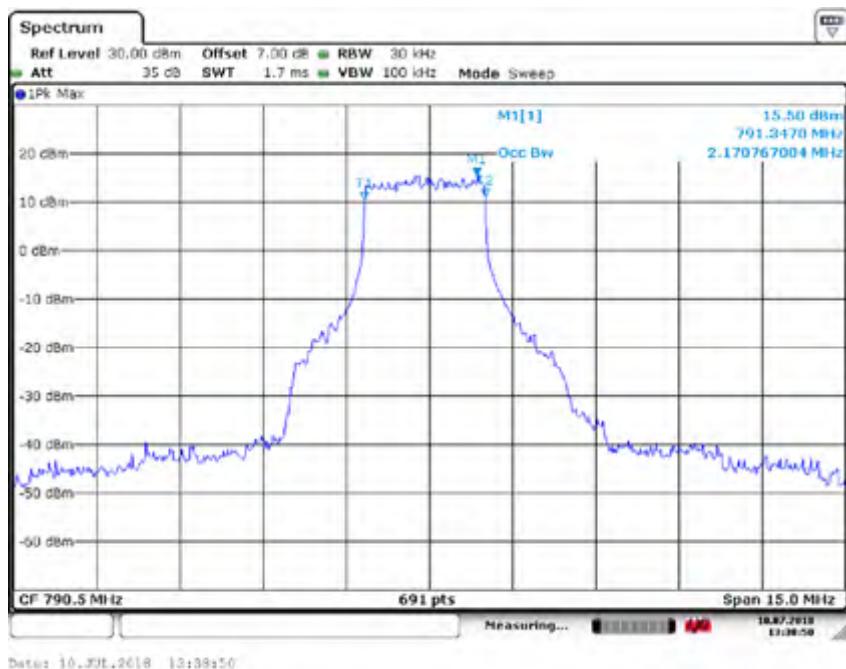


Fig.7

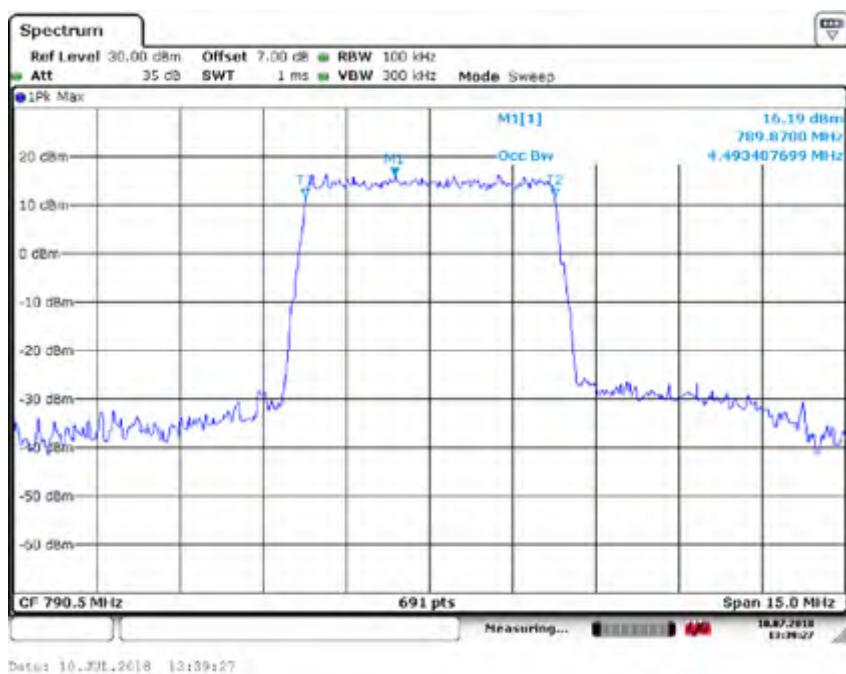
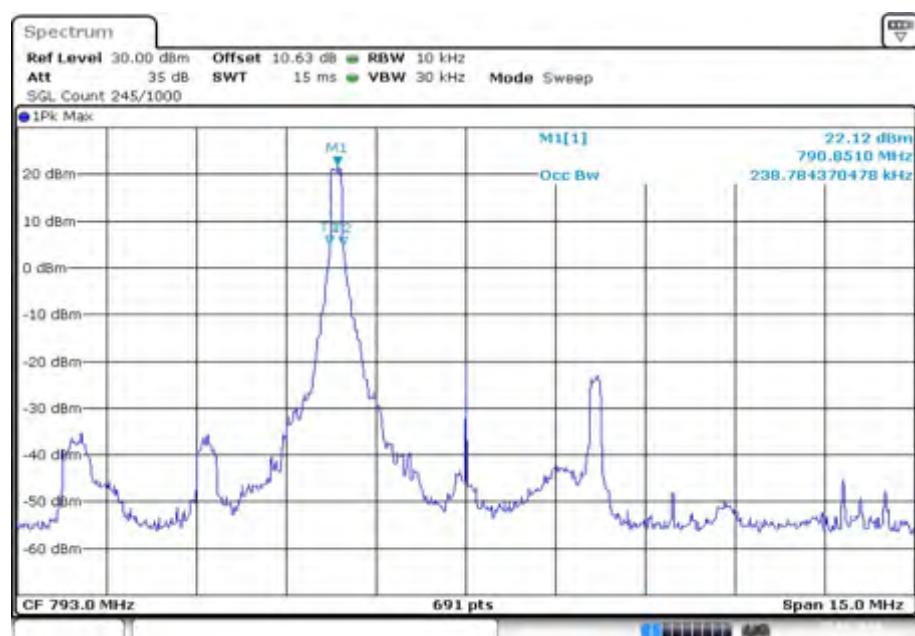


Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.239	Fig.1	0.239	Fig.5
14	793	23330	5	1	0	0.239	Fig.1	0.239	Fig.5
				1	24	0.239	Fig.2	0.239	Fig.6
				12	6	2.192	Fig.3	2.192	Fig.7
				25	0	4.515	Fig.4	4.515	Fig.8



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Fig.1

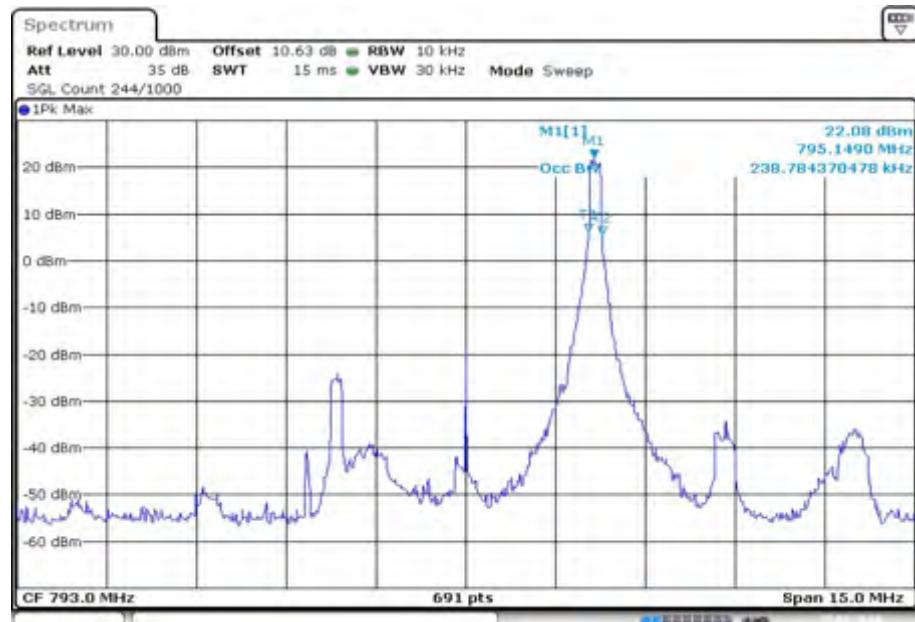


Fig.2

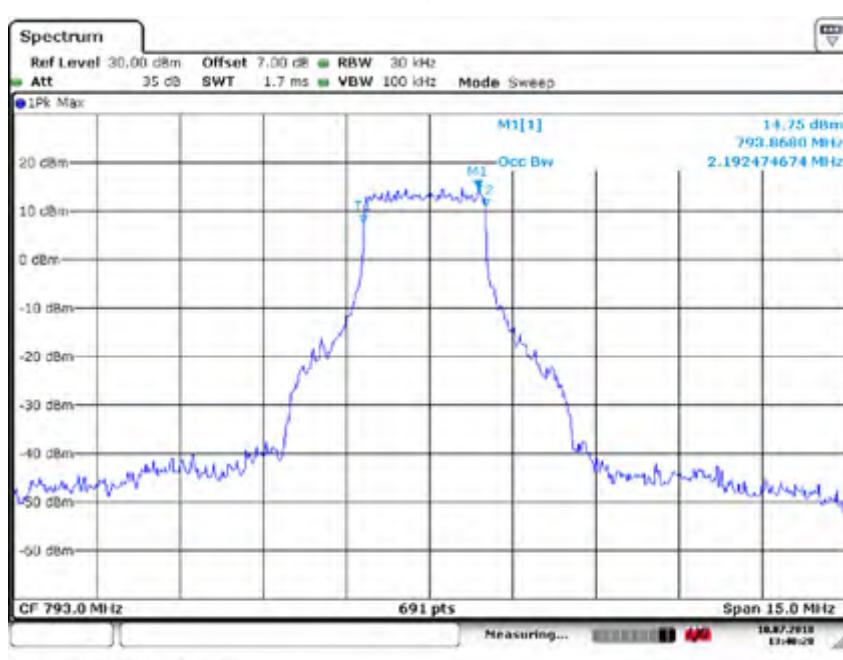


Fig.3

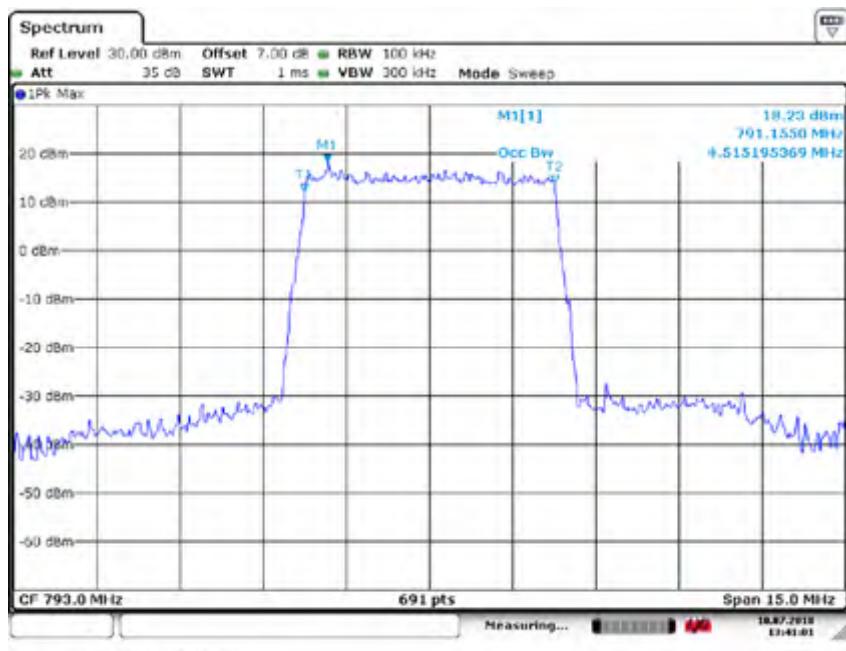


Fig.4

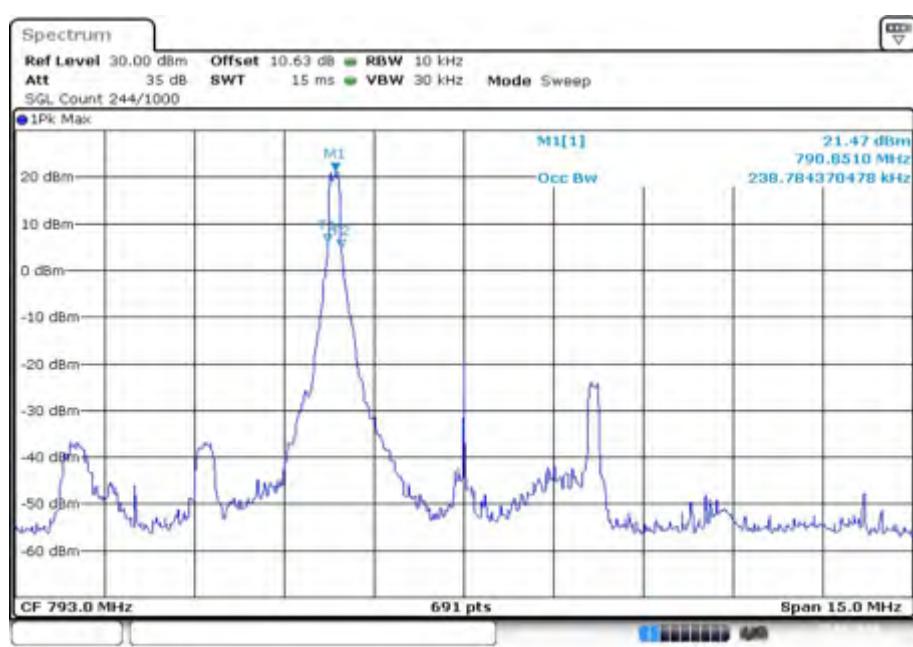


Fig.5



Fig.6

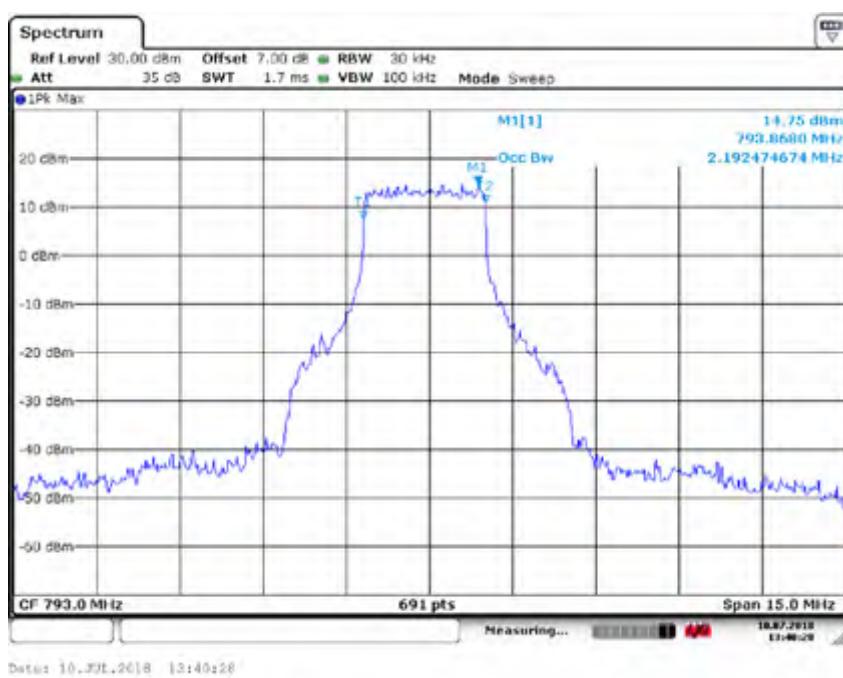


Fig.7

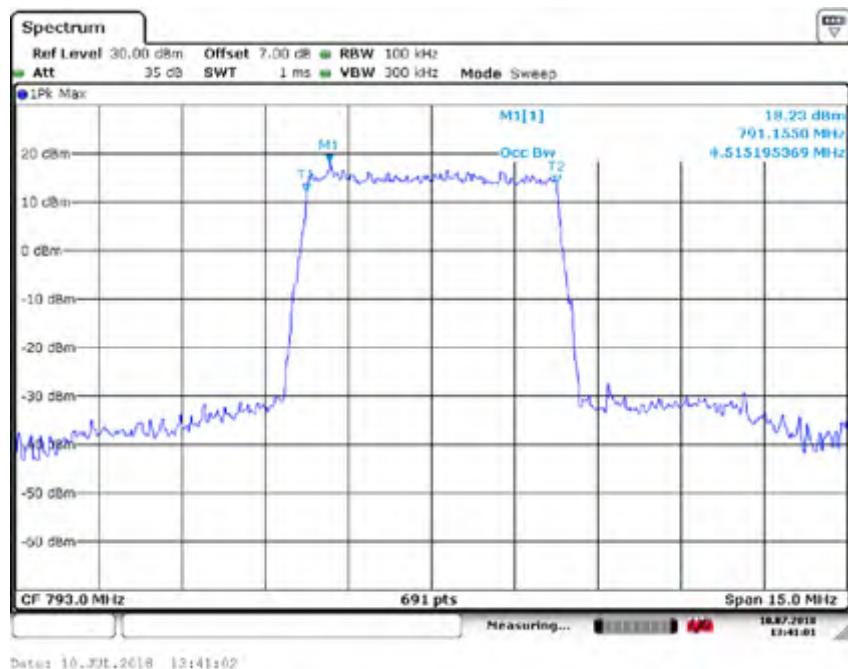
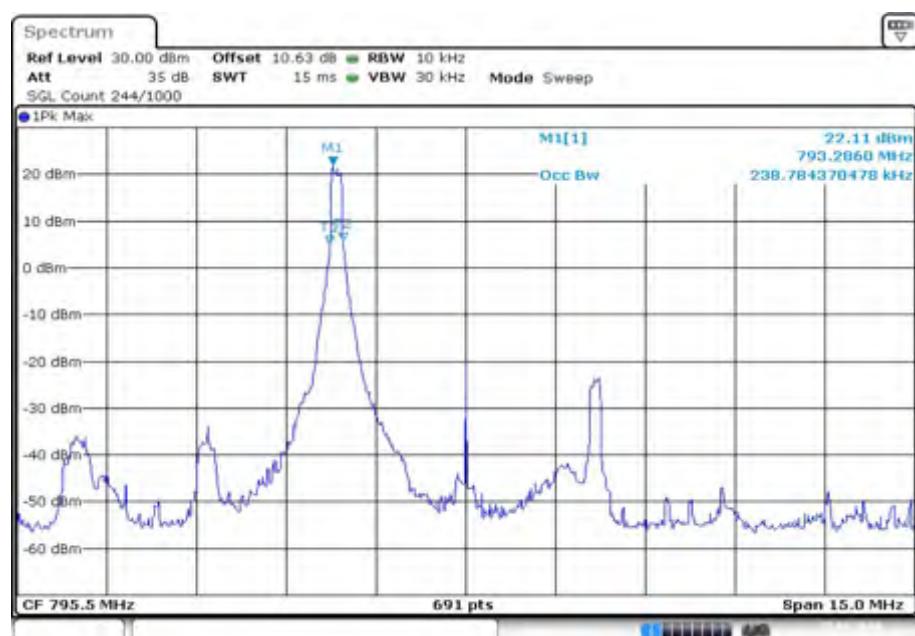


Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.239	Fig.1	0.195	Fig.5
14	795.5	23355	5	1	0	0.239	Fig.1	0.195	Fig.5
				1	24	0.217	Fig.2	0.239	Fig.6
				12	6	2.171	Fig.3	2.171	Fig.7
				25	0	4.515	Fig.4	4.515	Fig.8



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Fig.1

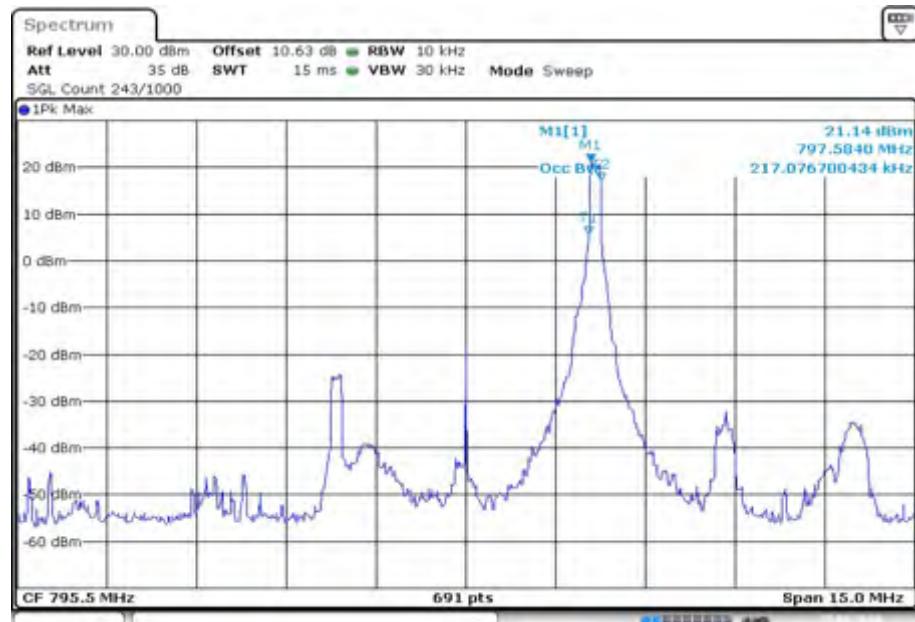


Fig.2

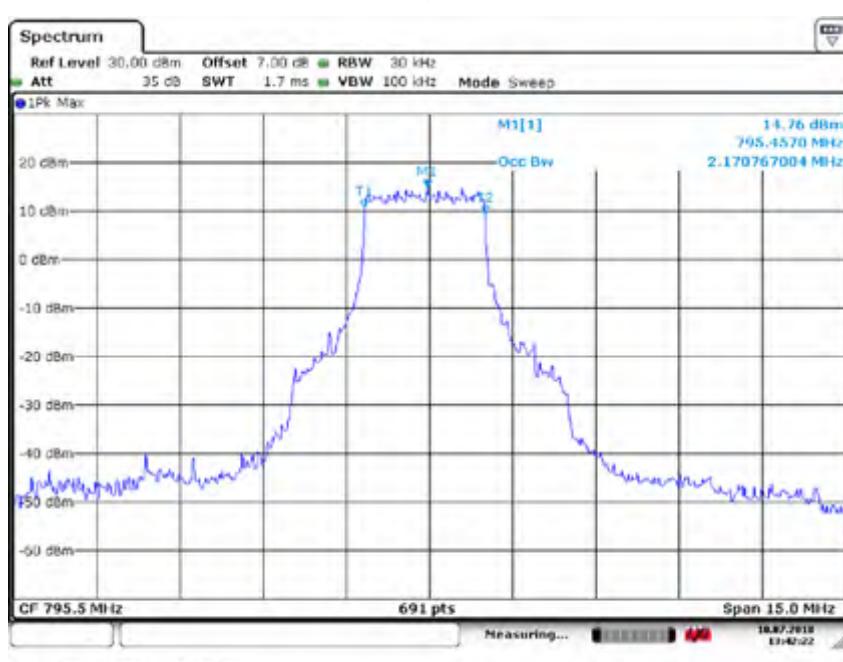


Fig.3

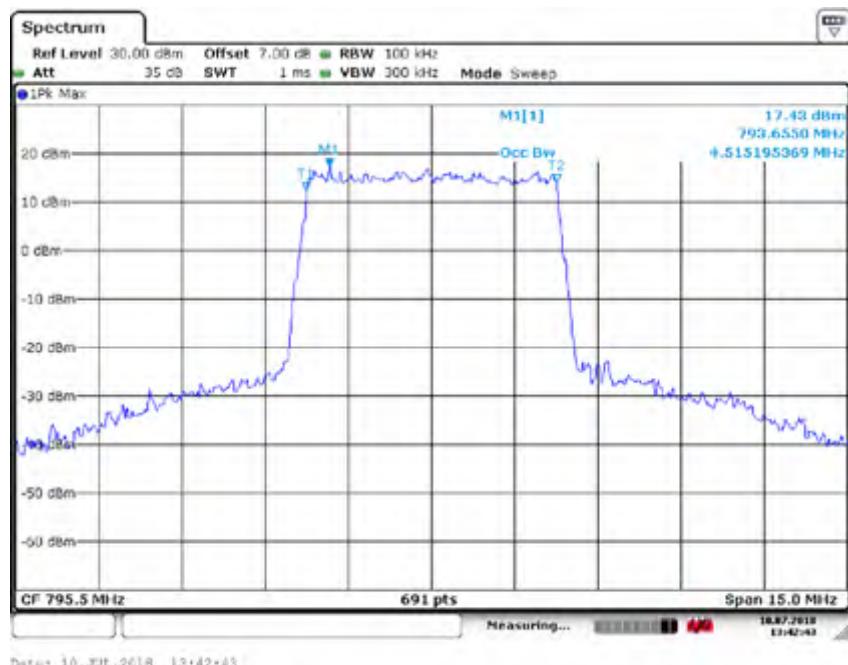


Fig.4

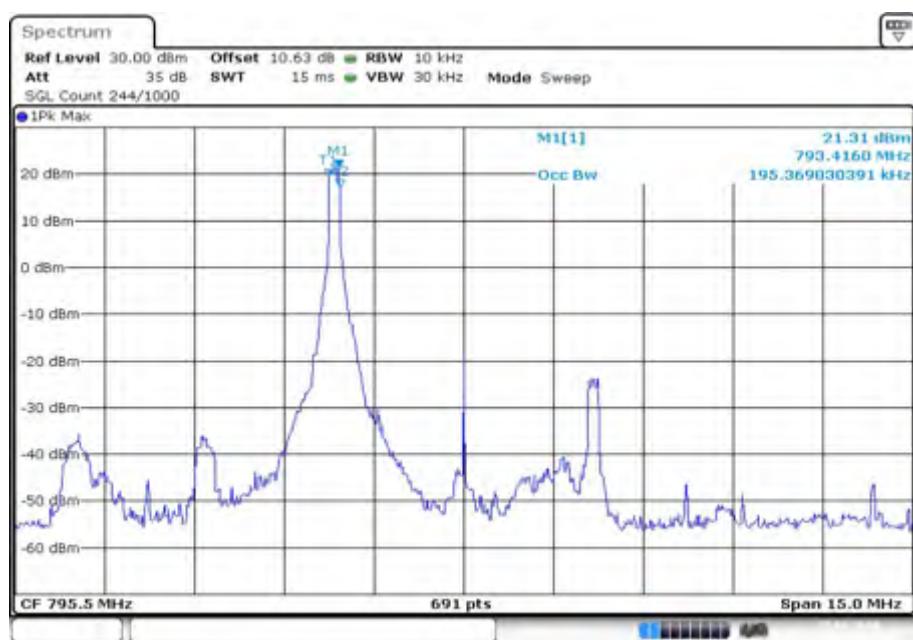


Fig.5

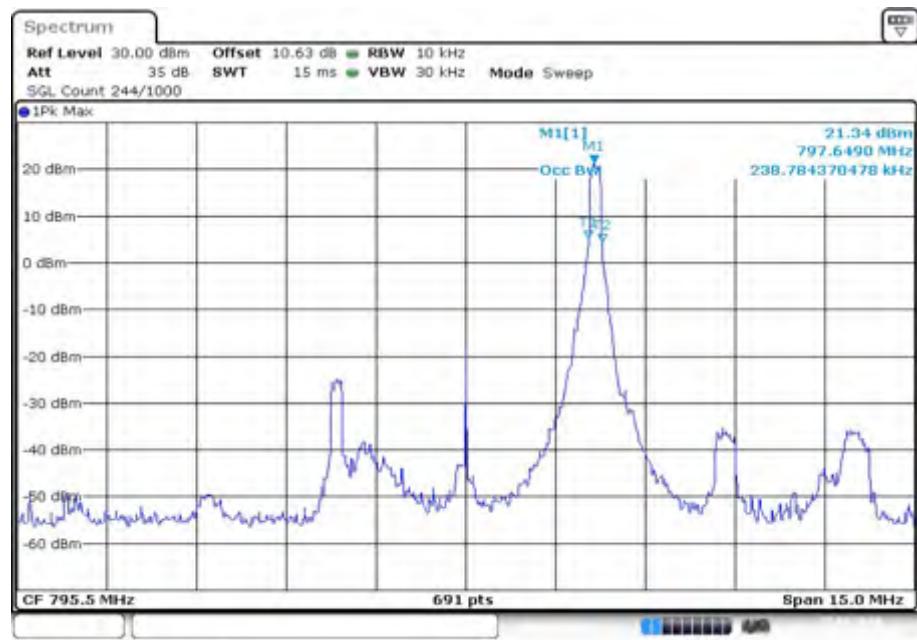


Fig.6

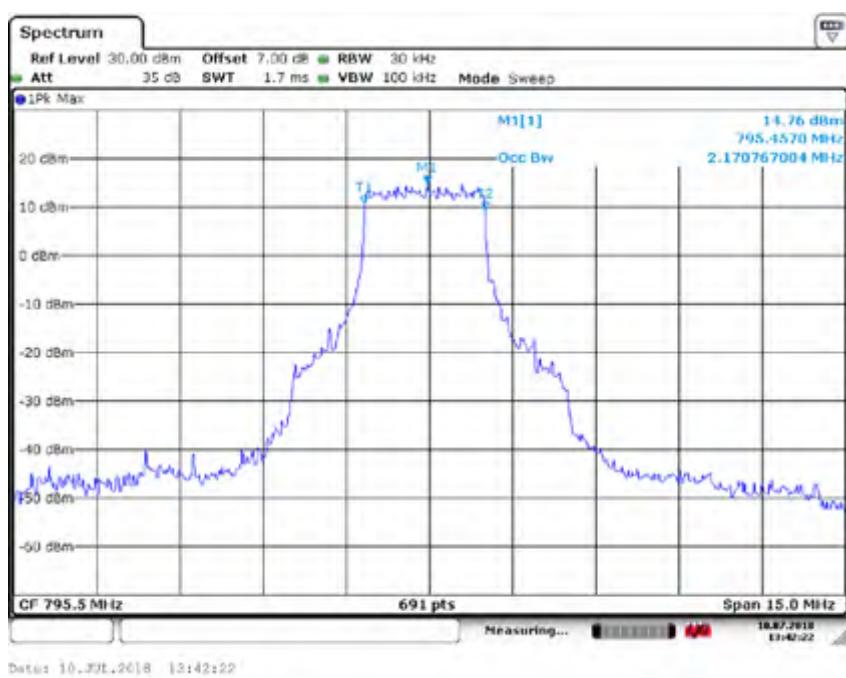


Fig.7

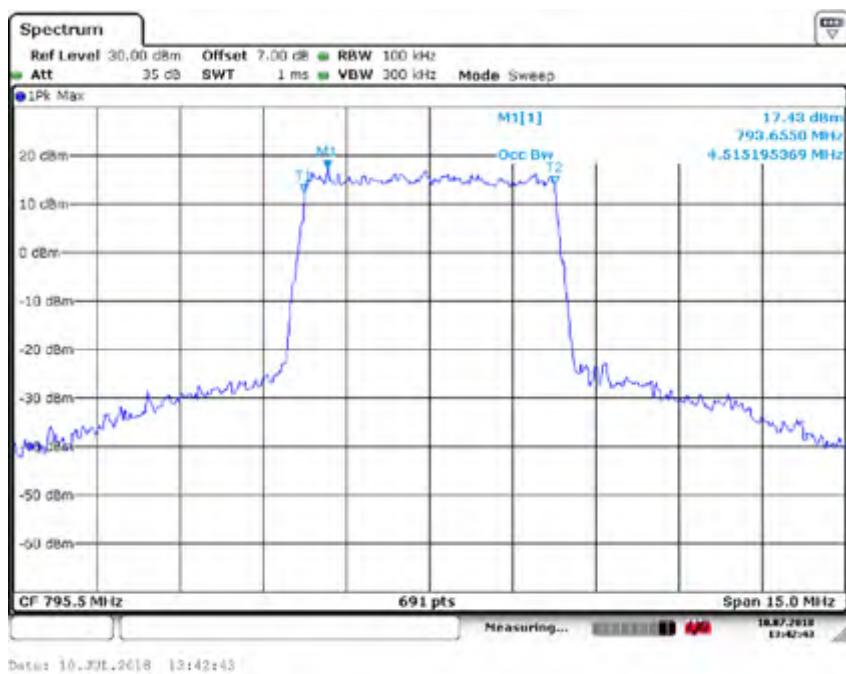


Fig.8

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
14	793	23330	10	1	0	0.217	Fig.1	0.217	Fig.5
				1	49	0.217	Fig.2	0.217	Fig.6
				24	12	4.385	Fig.3	4.342	Fig.7
				50	0	9.074	Fig.4	9.030	Fig.8

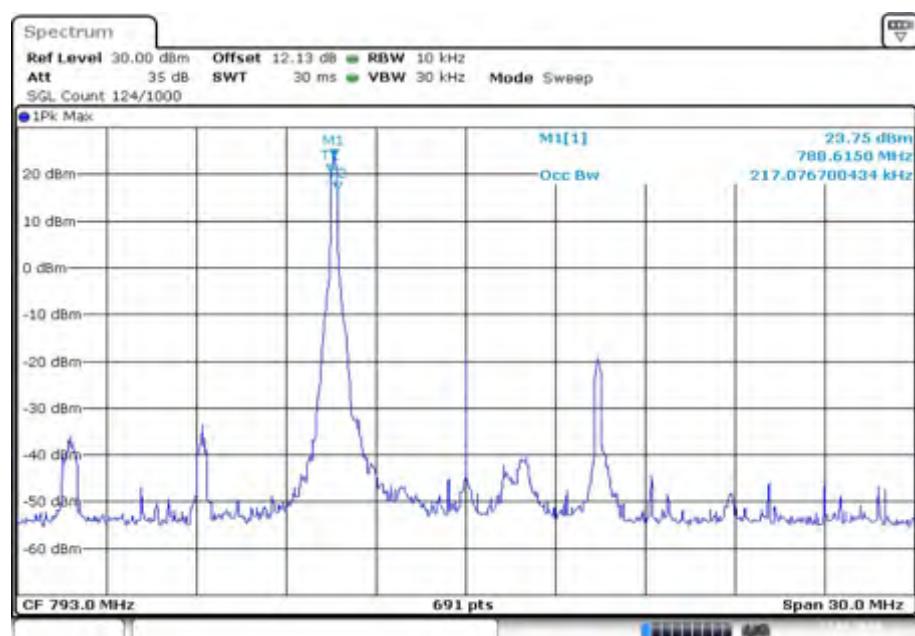
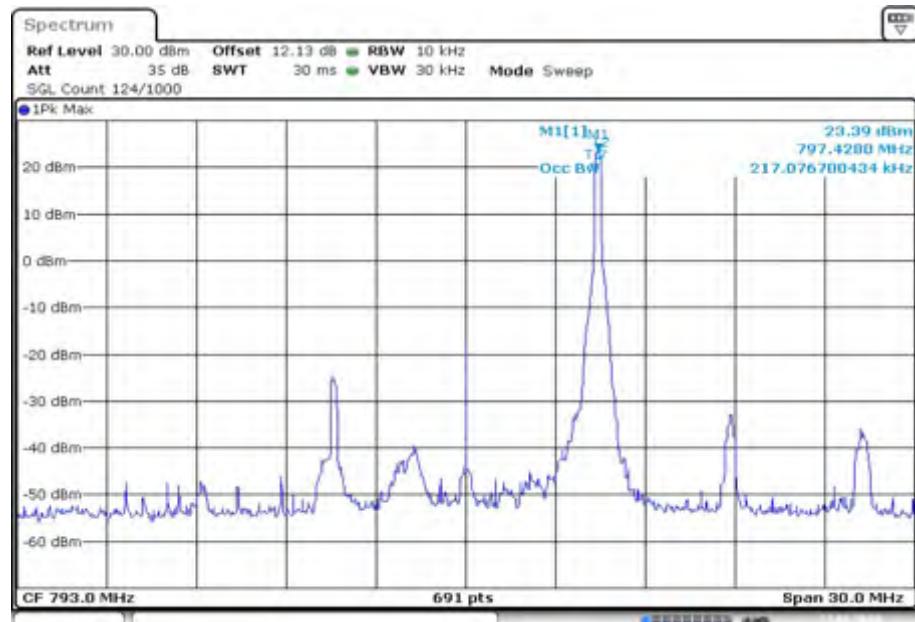
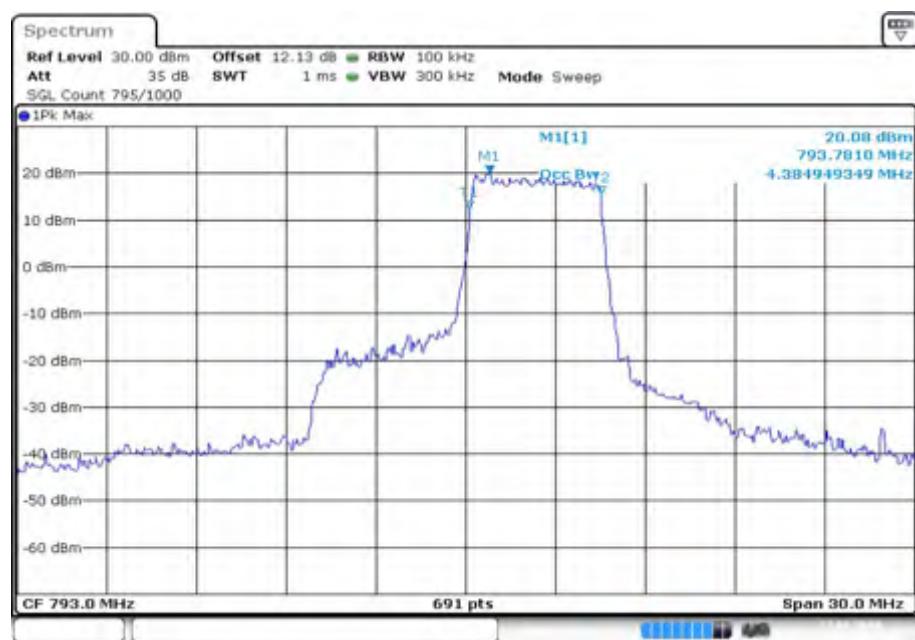


Fig.1



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Fig.2



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Fig.3

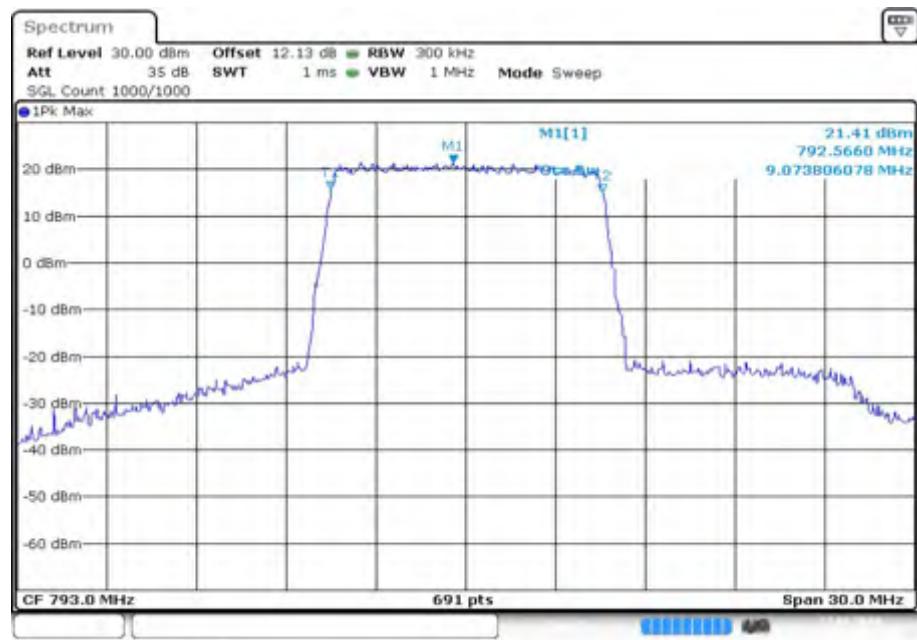


Fig.4

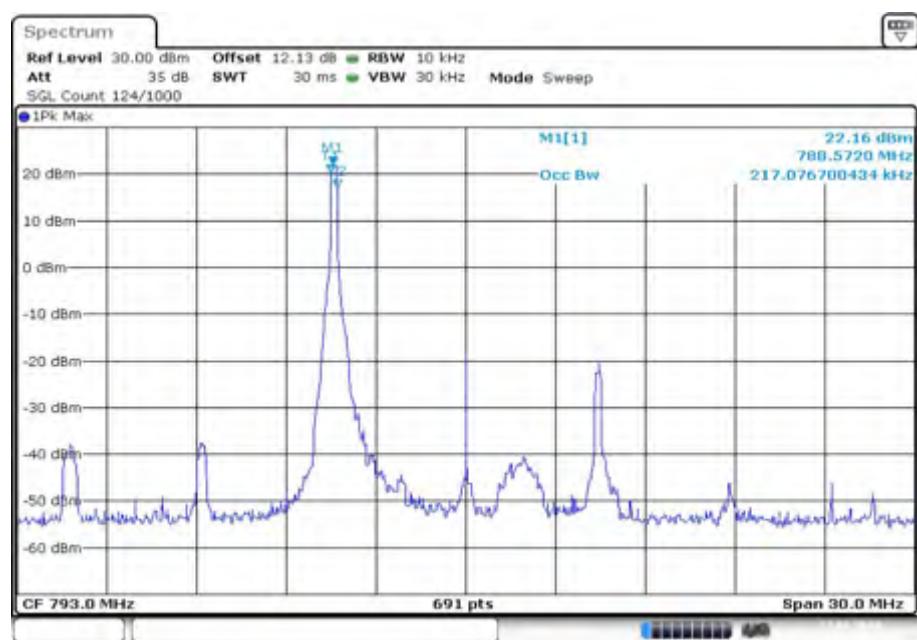


Fig.5

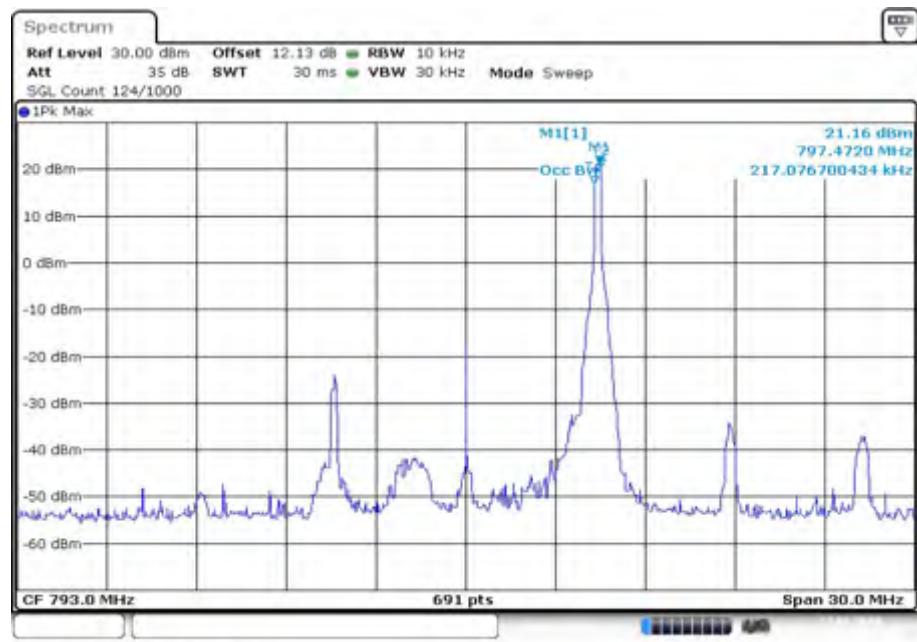


Fig.6

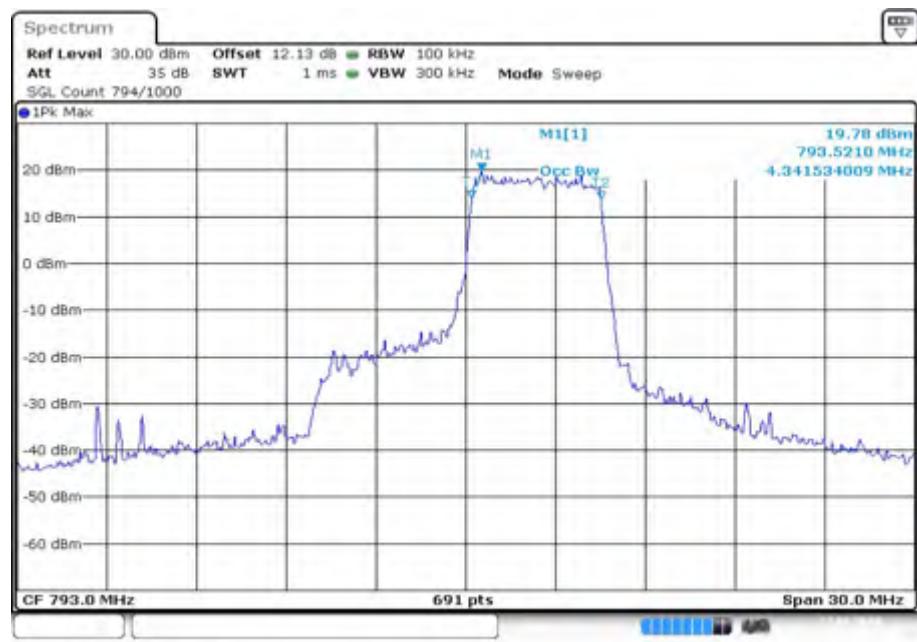
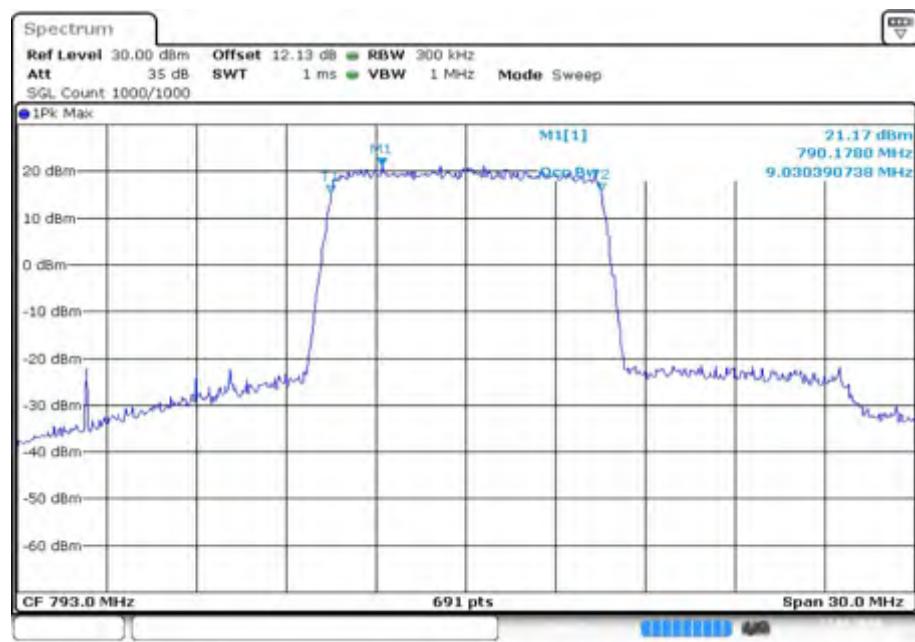


Fig.7



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Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.217	Fig.1	0.217	Fig.5
14	793	23330	10	1	0	0.217	Fig.1	0.217	Fig.5
				1	49	0.217	Fig.2	0.217	Fig.6
				24	12	4.342	Fig.3	4.342	Fig.7
				50	0	9.074	Fig.4	9.074	Fig.8

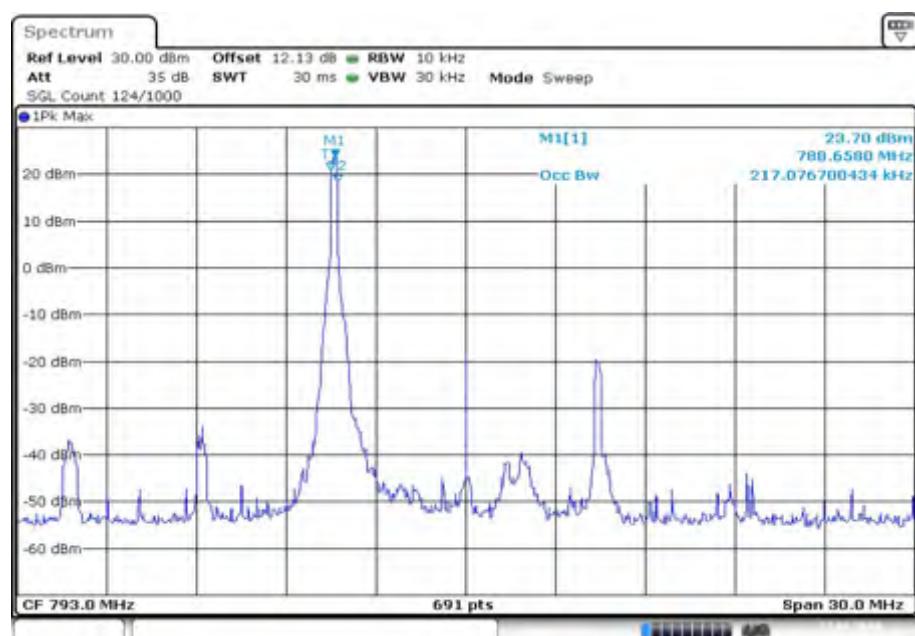


Fig.1

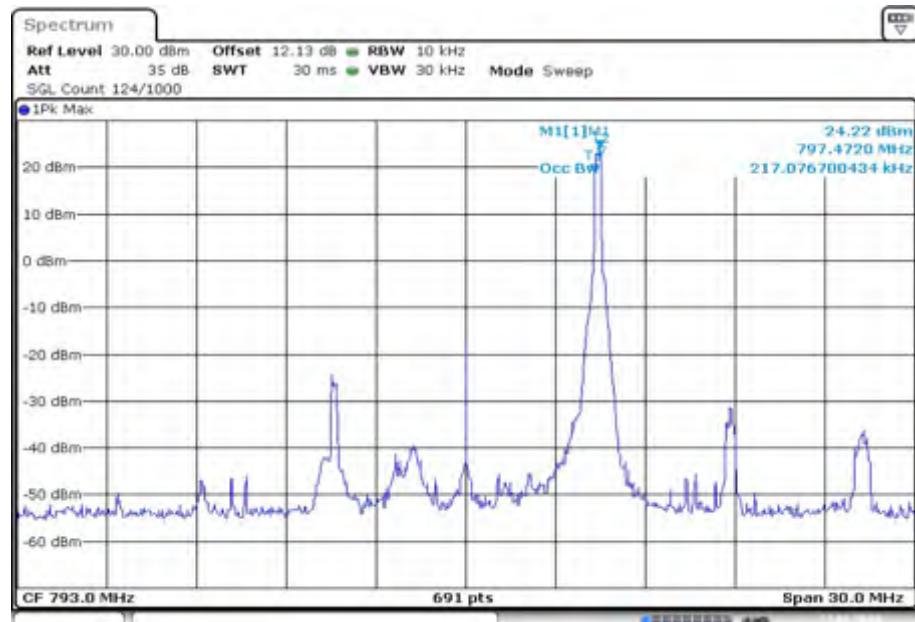


Fig.2

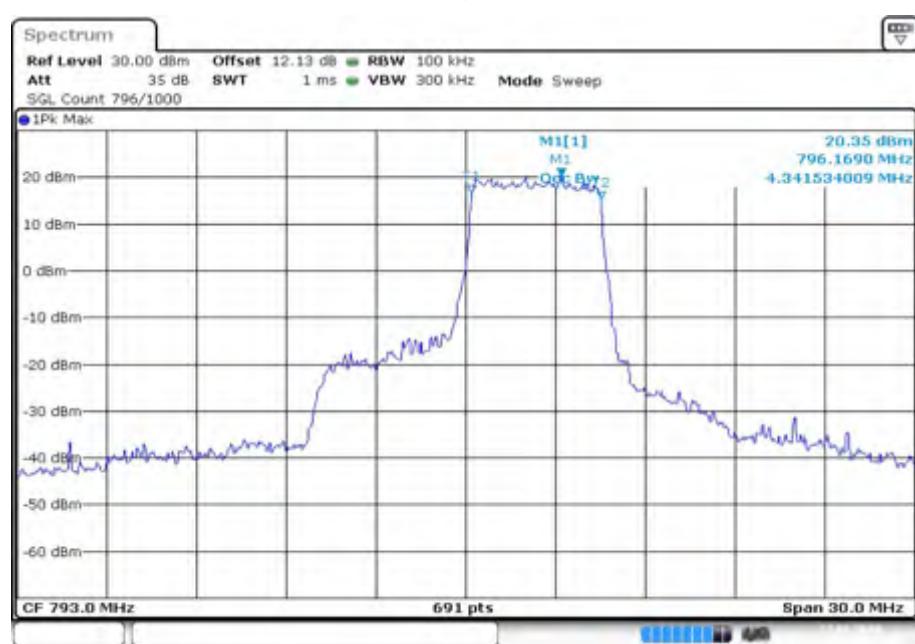


Fig.3

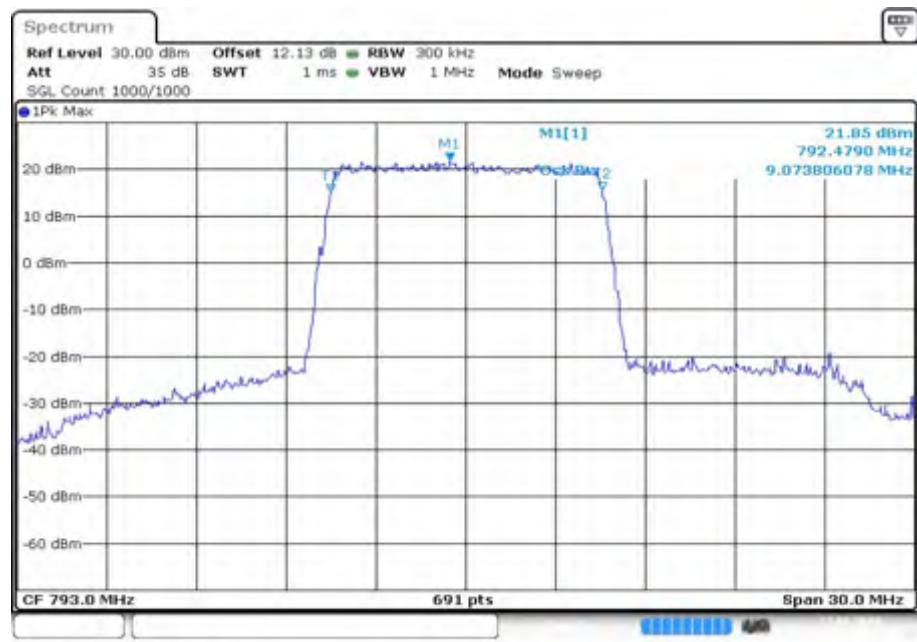


Fig.4

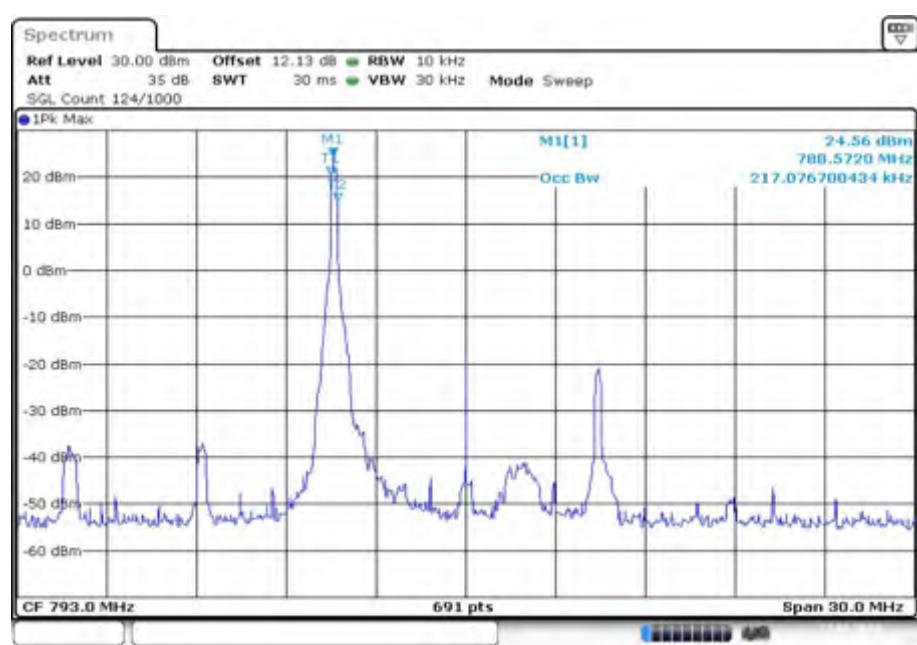


Fig.5

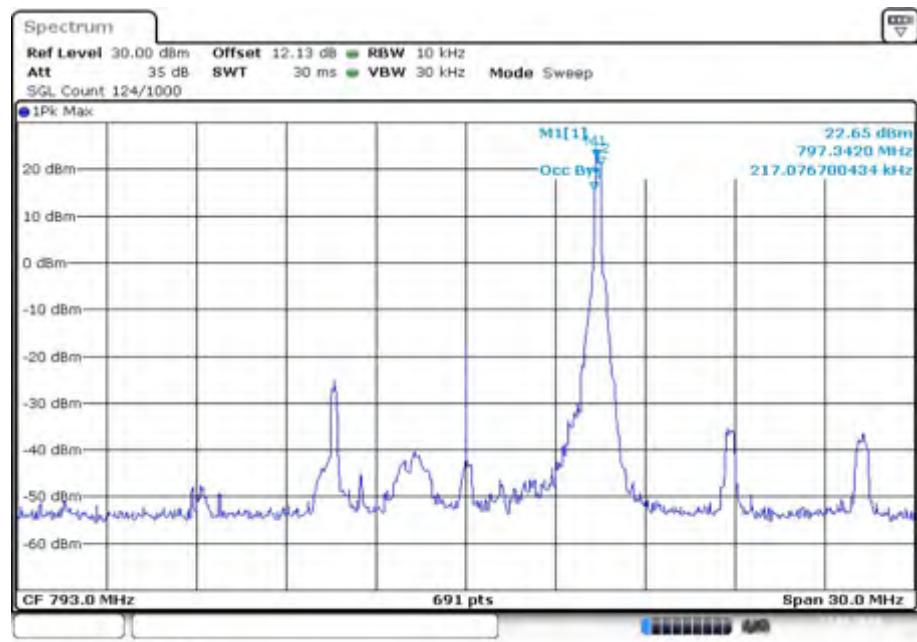


Fig.6

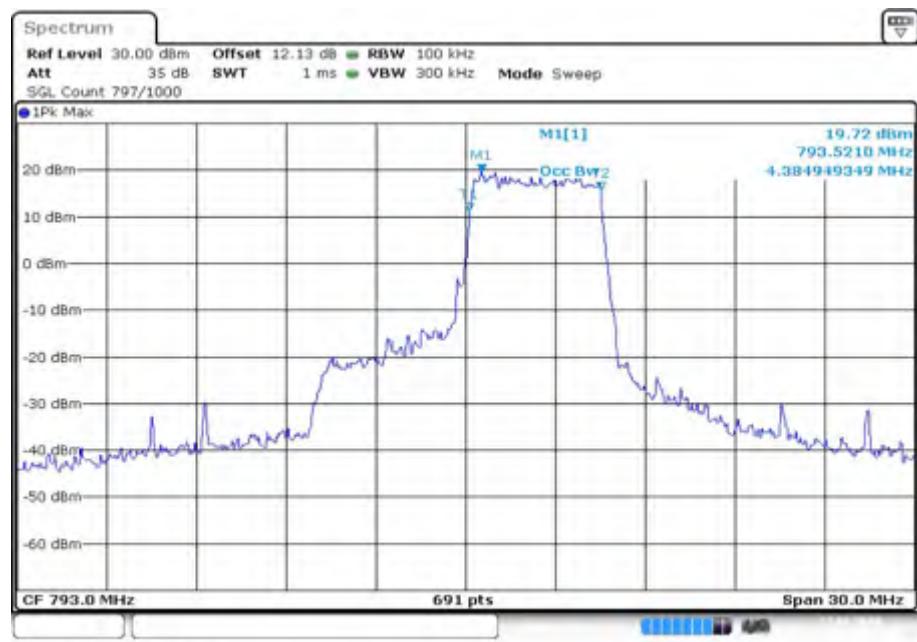
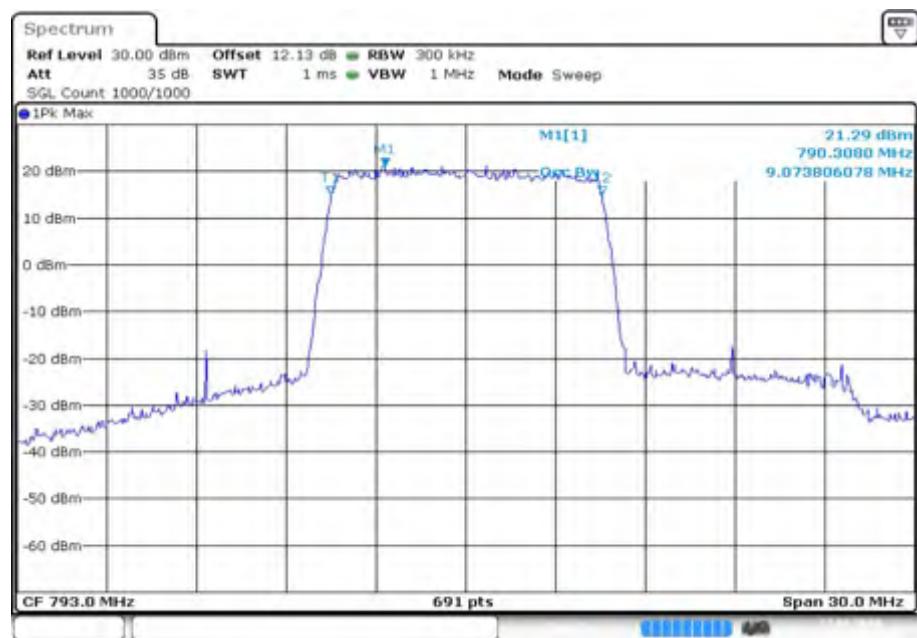


Fig.7



Date: 13.MAR.2018 14:07:04

Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
14	793	23330	10	1	0	0.217	Fig.1	0.217	Fig.5
				1	49	0.217	Fig.2	0.217	Fig.6
				24	12	4.342	Fig.3	4.342	Fig.7
				50	0	9.074	Fig.4	9.030	Fig.8

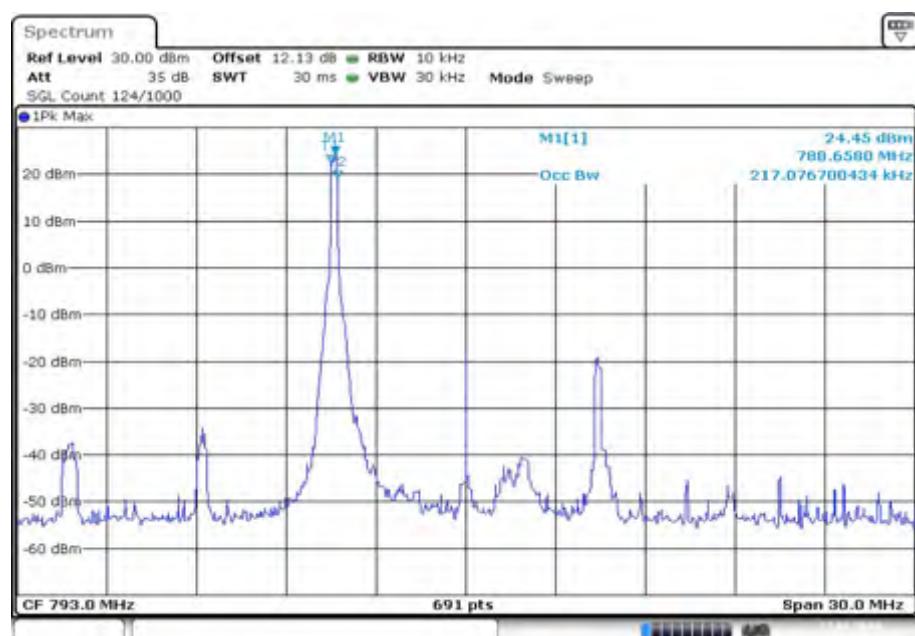


Fig.1

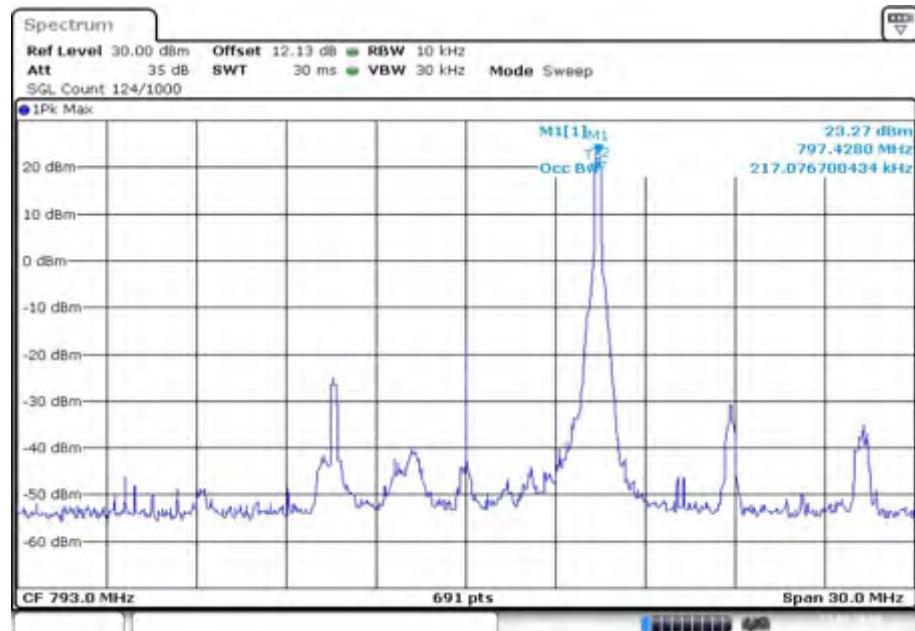


Fig.2

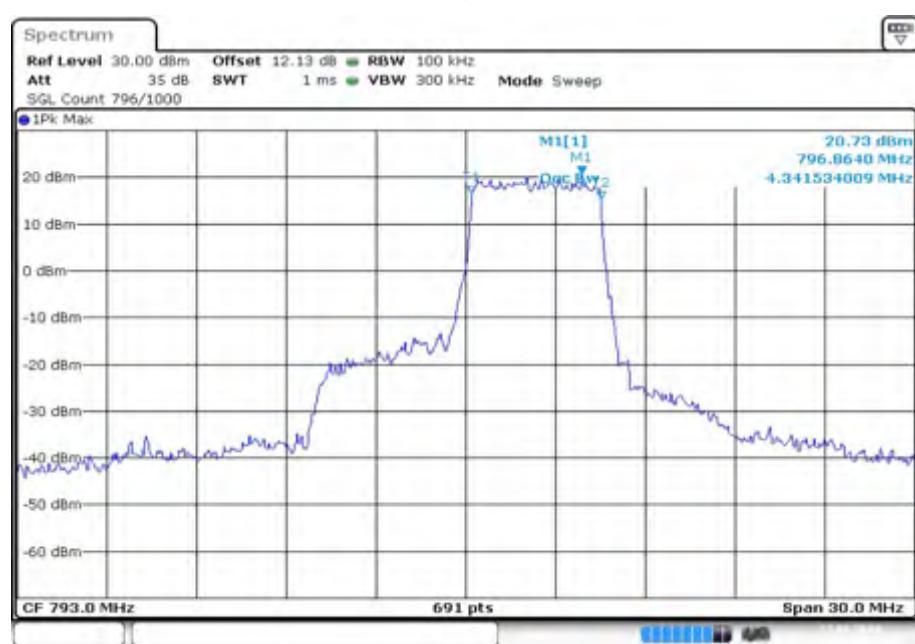


Fig.3

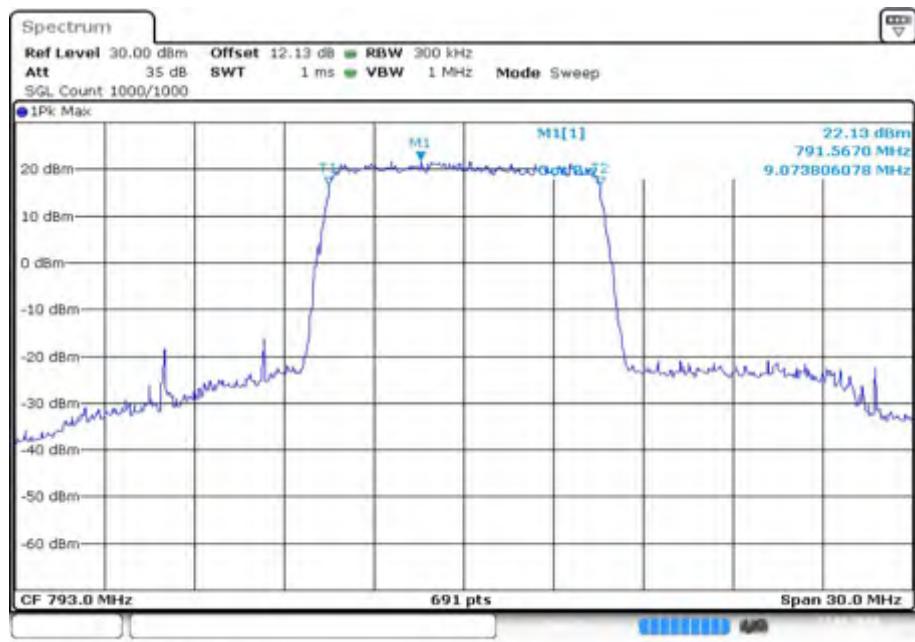


Fig.4

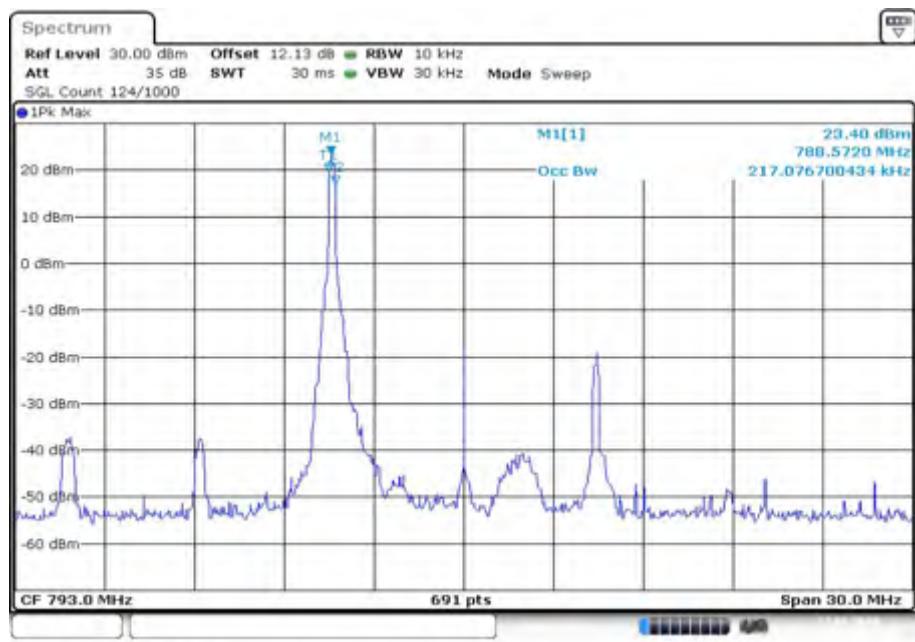


Fig.5

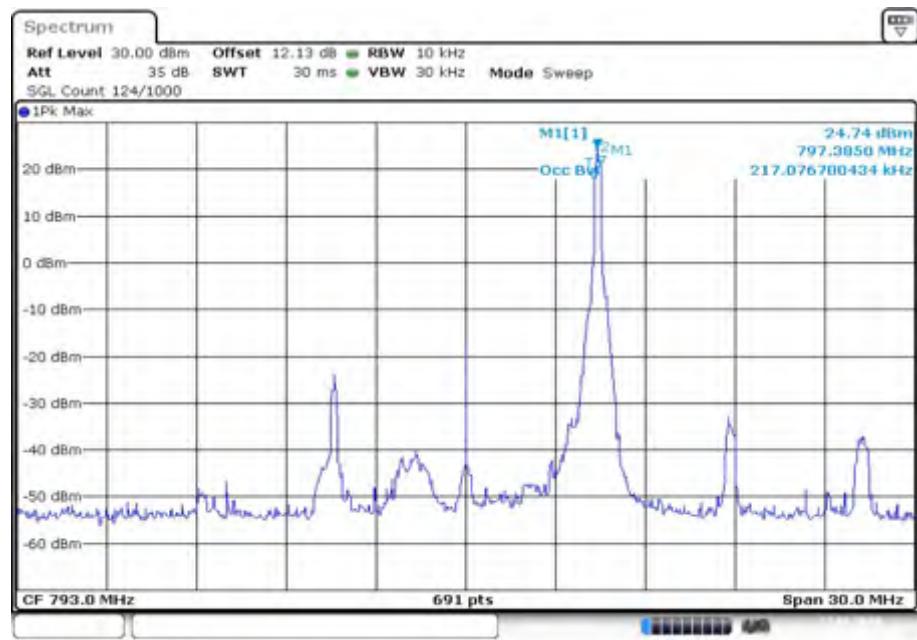


Fig.6

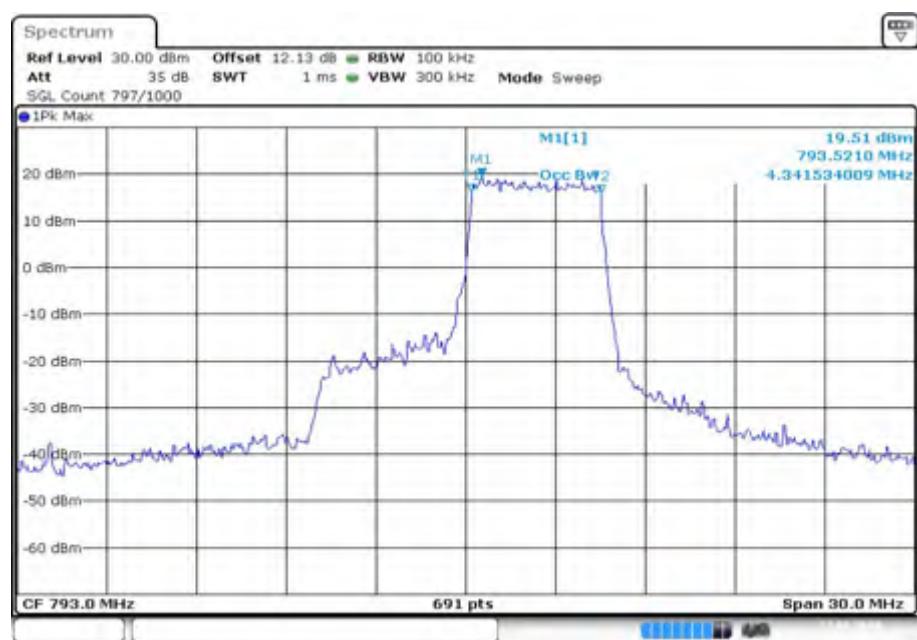
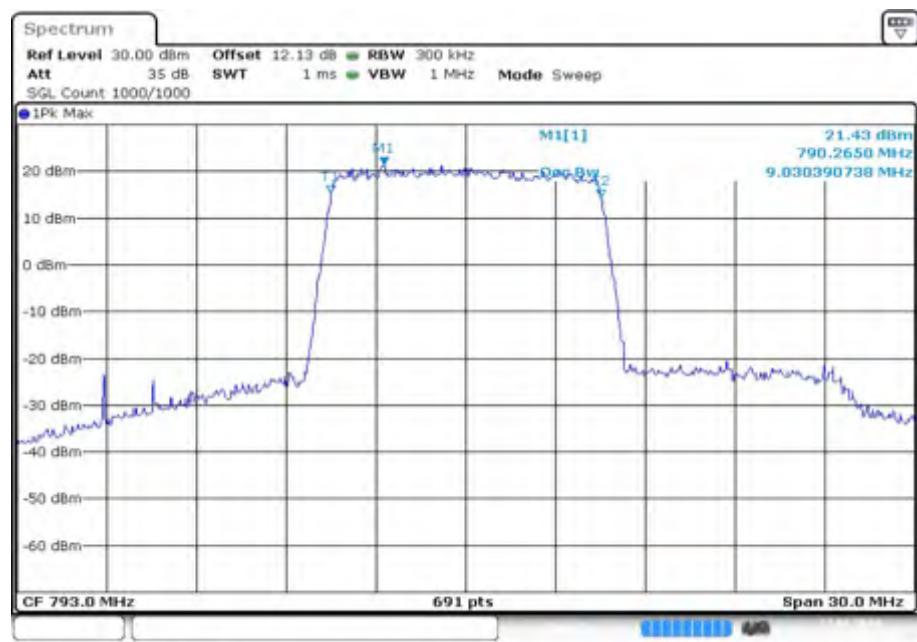


Fig.7



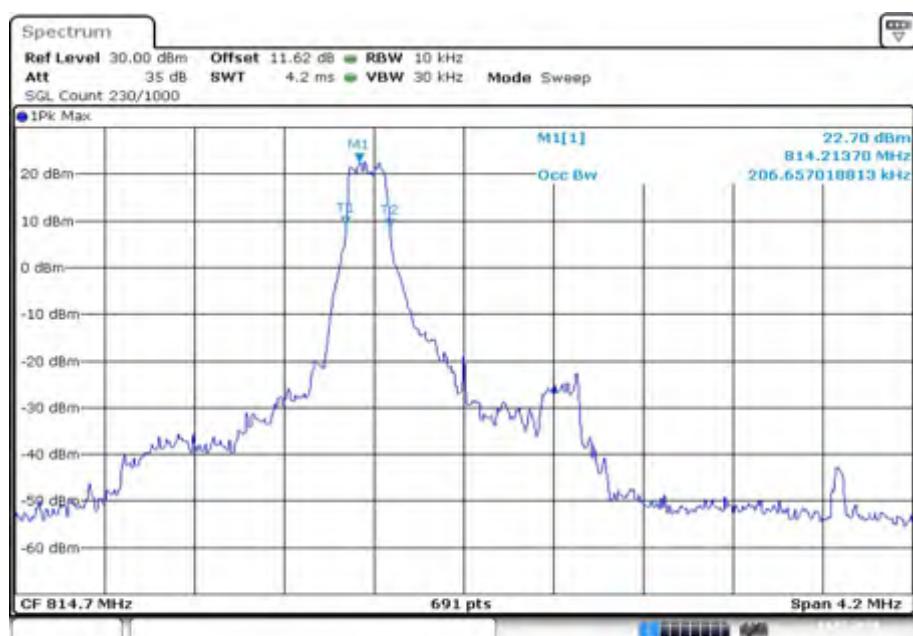
Date: 13.MAR.2018 14:15:19

Fig.8

Note: Expanded measurement uncertainty is  $U = 3428\text{Hz}$ ,  $k = 2$

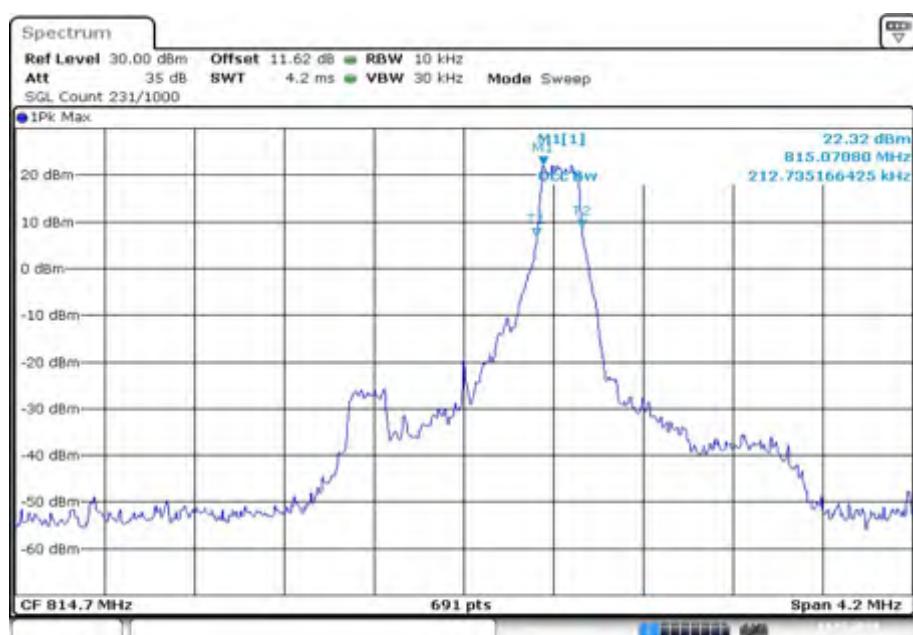
## LTE Band 26

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
26	814.7	26697	1.4	1	0	0.207	Fig.1	0.213	Fig.5
				1	5	0.213	Fig.2	0.213	Fig.6
				3	2	0.565	Fig.3	0.571	Fig.7
				6	0	1.094	Fig.4	1.094	Fig.8



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Fig.1



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Fig.2

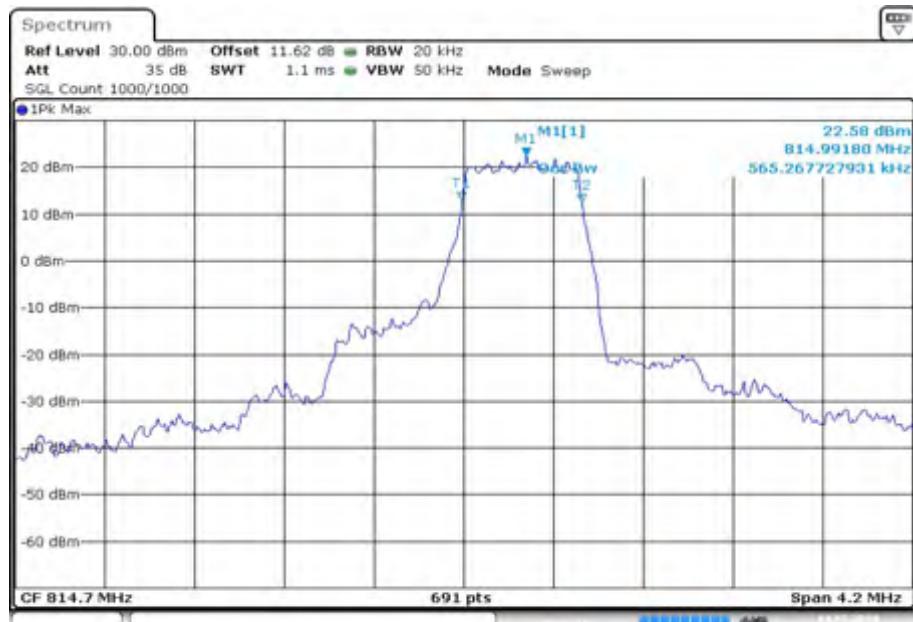


Fig.3

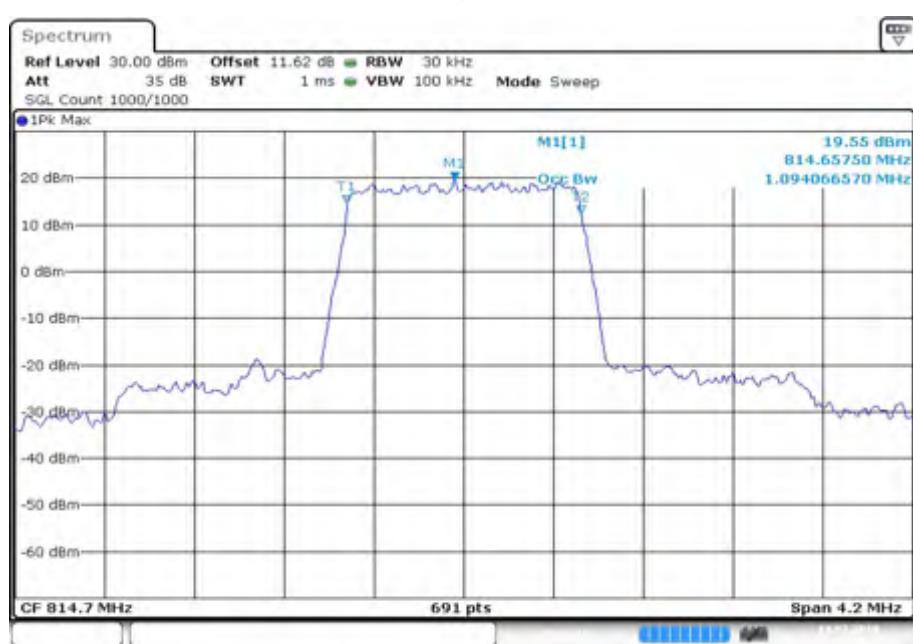


Fig.4

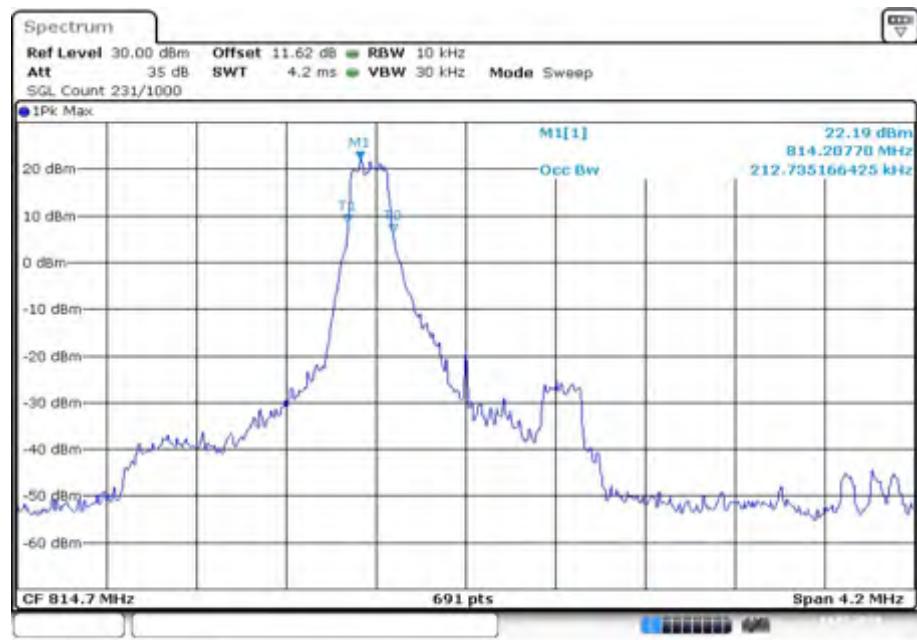


Fig.5

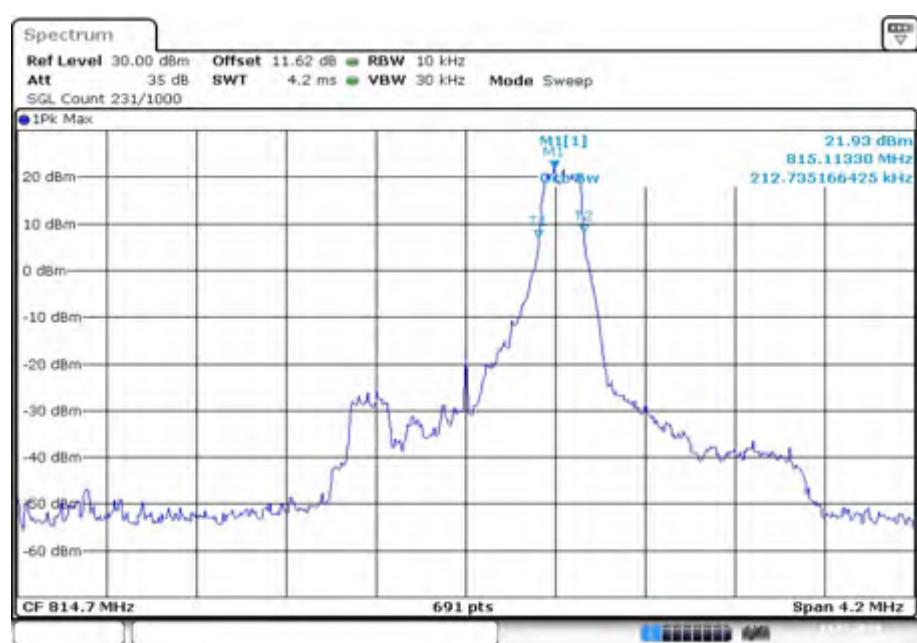


Fig.6



Fig.7

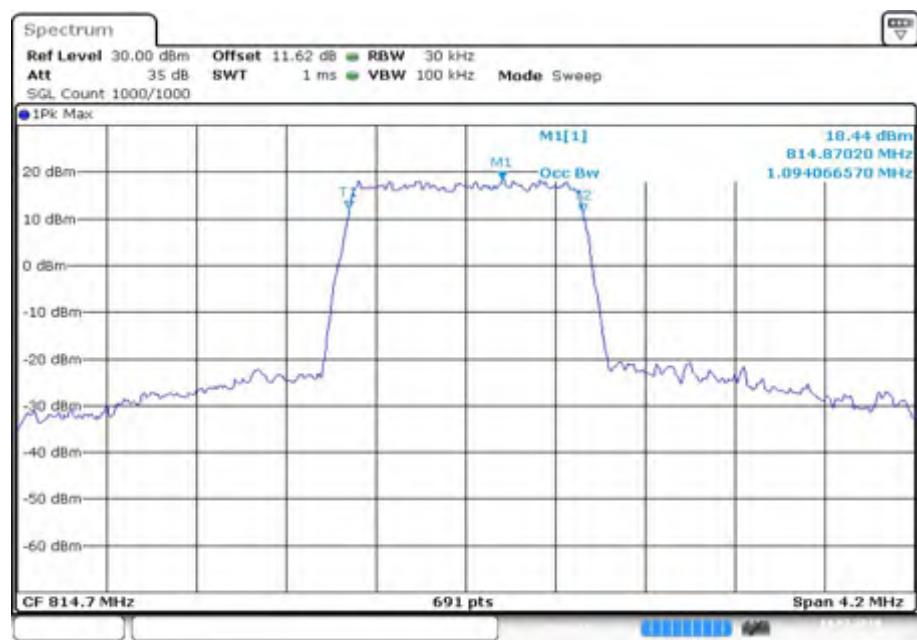


Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.207	Fig.1	0.213	Fig.5
26	831.5	26865	1.4	1	0	0.207	Fig.1	0.213	Fig.5
				1	5	0.207	Fig.2	0.207	Fig.6
				3	2	0.565	Fig.3	0.571	Fig.7
				6	0	1.094	Fig.4	1.100	Fig.8

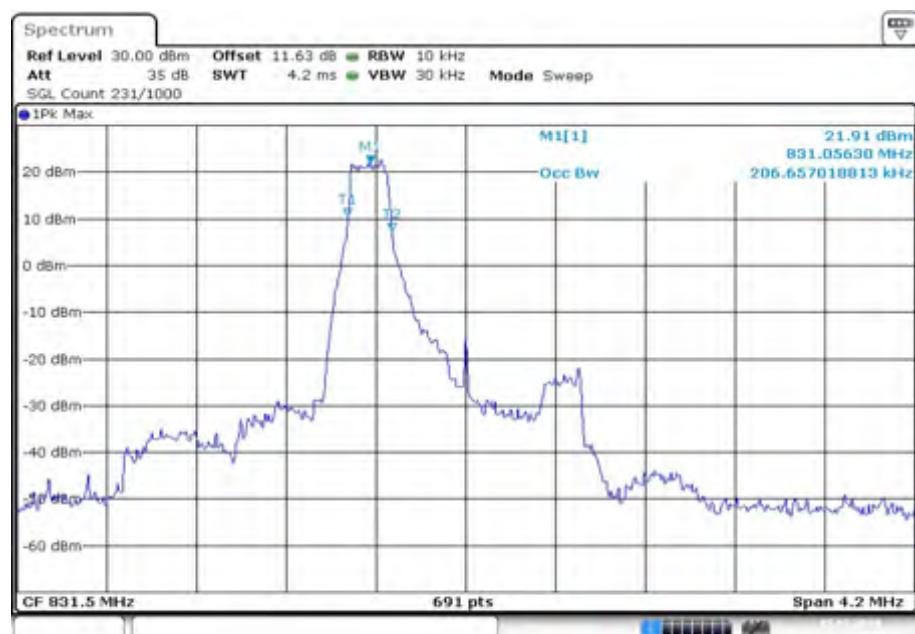


Fig.1

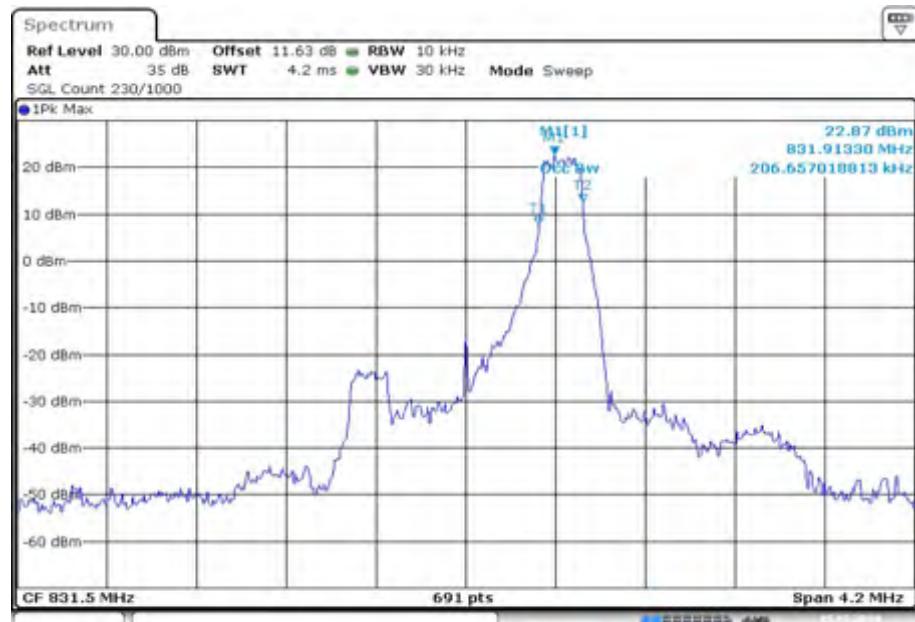


Fig.2

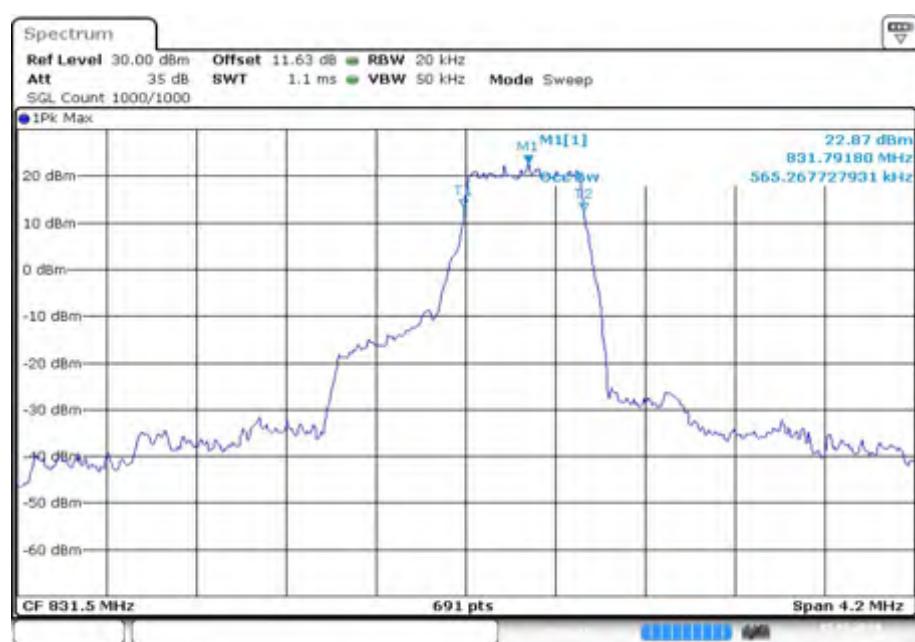


Fig.3

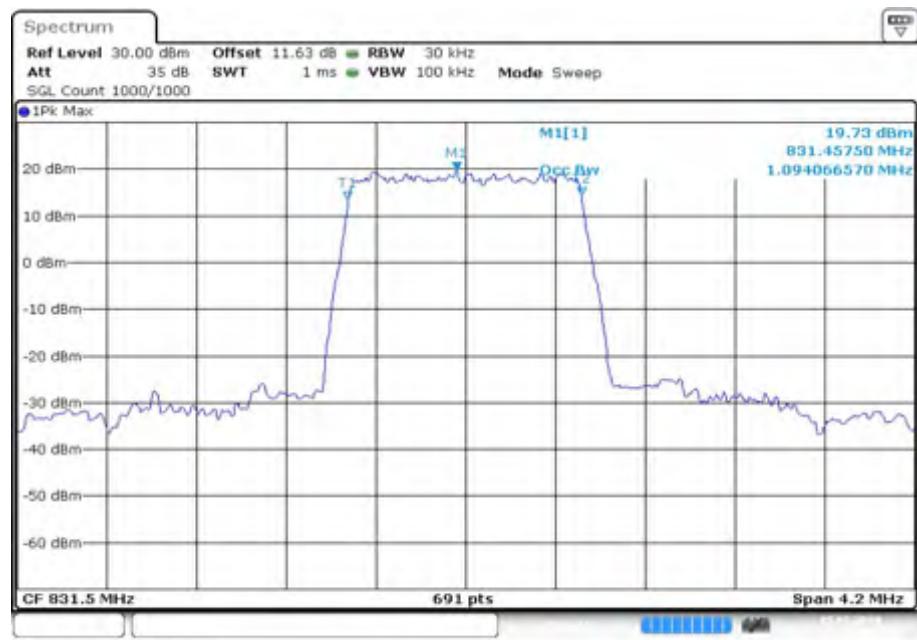


Fig.4

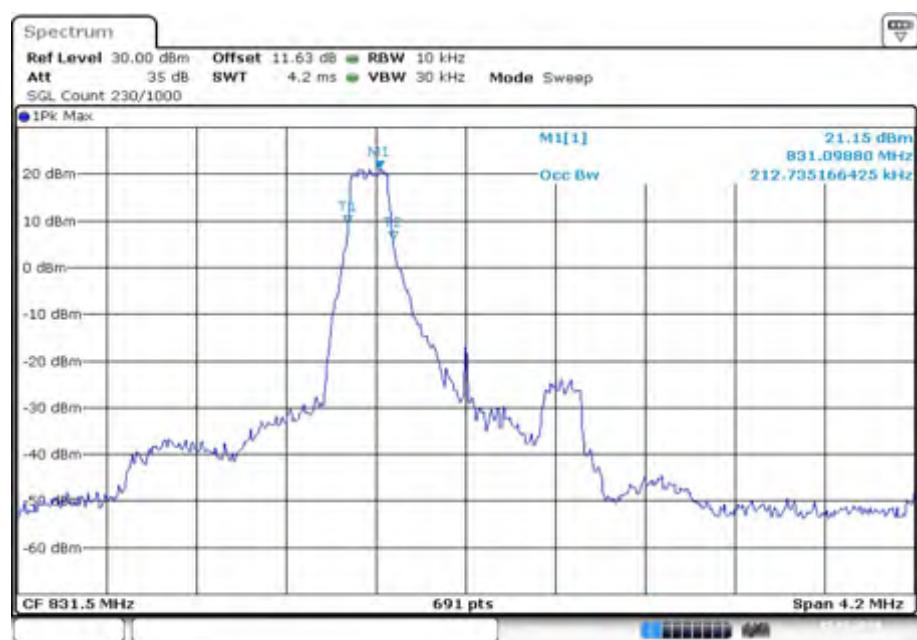


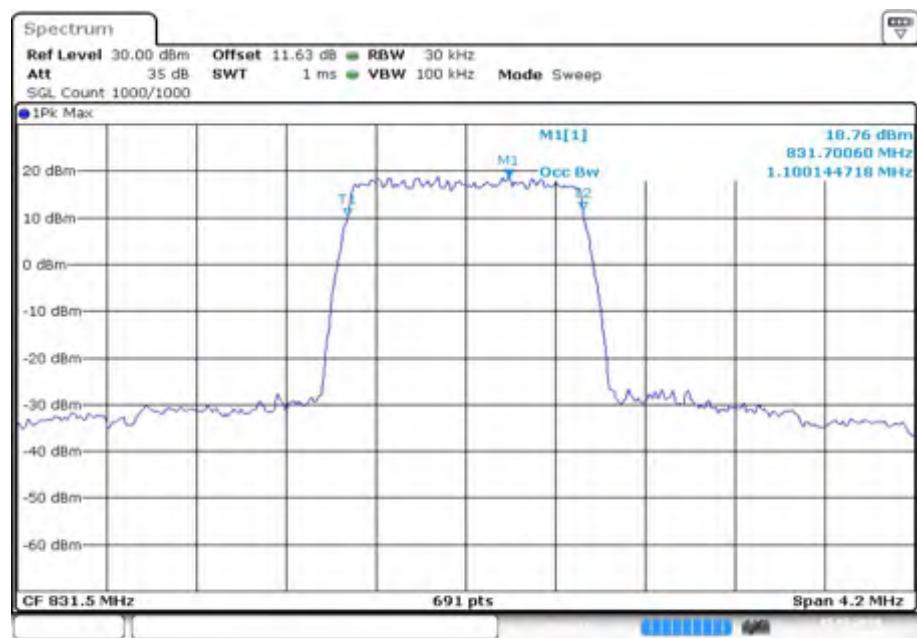
Fig.5



Fig.6



Fig.7



Date: 15.MAR.2018 02:54:50

Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.207	Fig.1	0.213	Fig.5
26	848.3	27033	1.4	1	0	0.207	Fig.1	0.213	Fig.5
				1	5	0.213	Fig.2	0.207	Fig.6
				3	2	0.565	Fig.3	0.565	Fig.7
				6	0	1.094	Fig.4	1.100	Fig.8

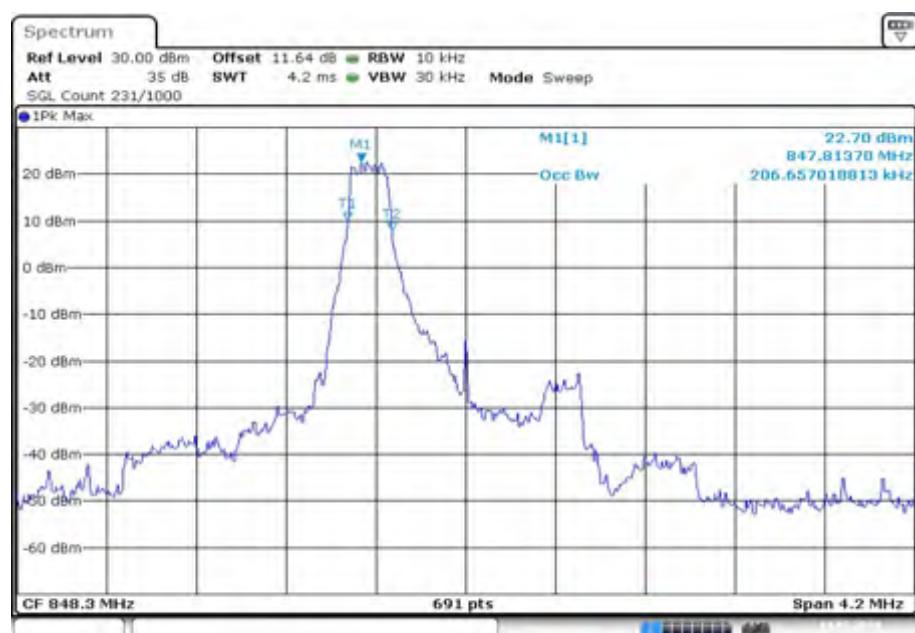
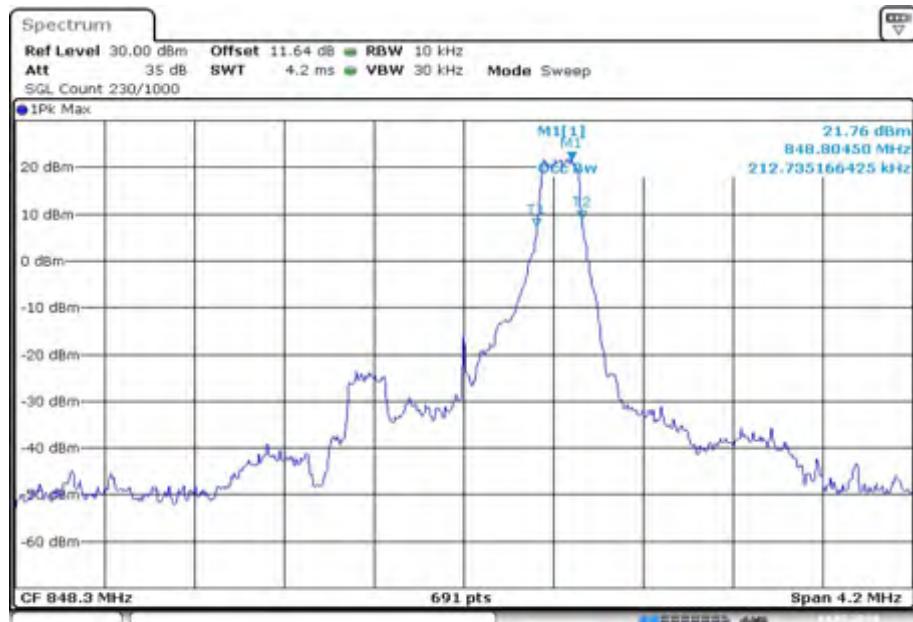
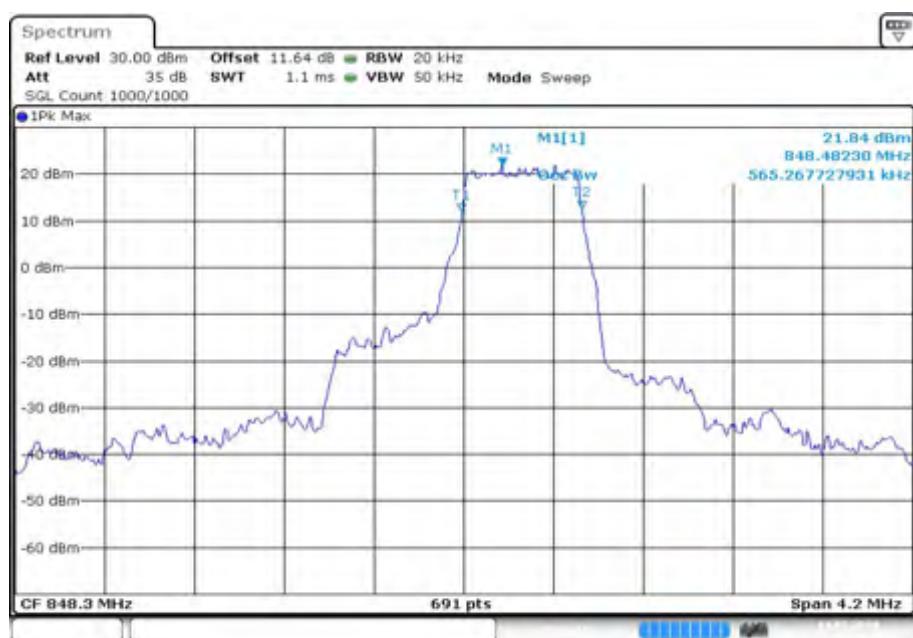


Fig.1



Date: 14 MAR 2018 14:46:46

Fig.2



Date: 14 MAR 2018 14:47:27

Fig.3

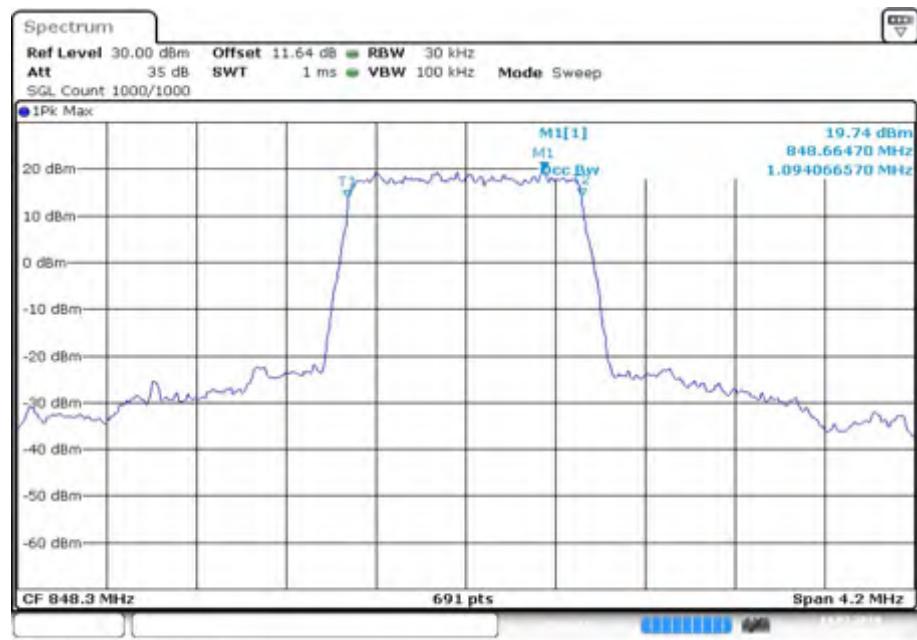


Fig.4

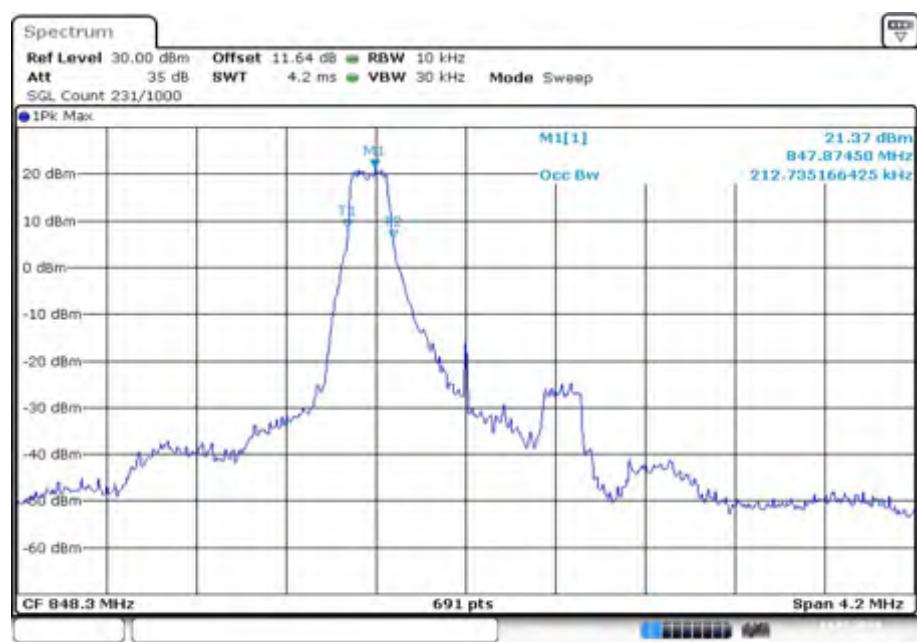


Fig.5

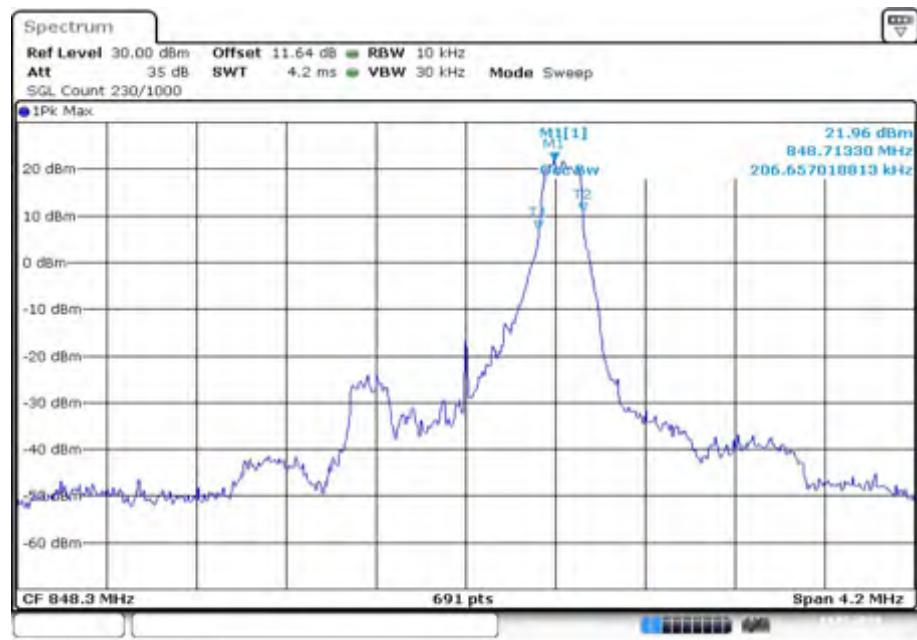


Fig.6

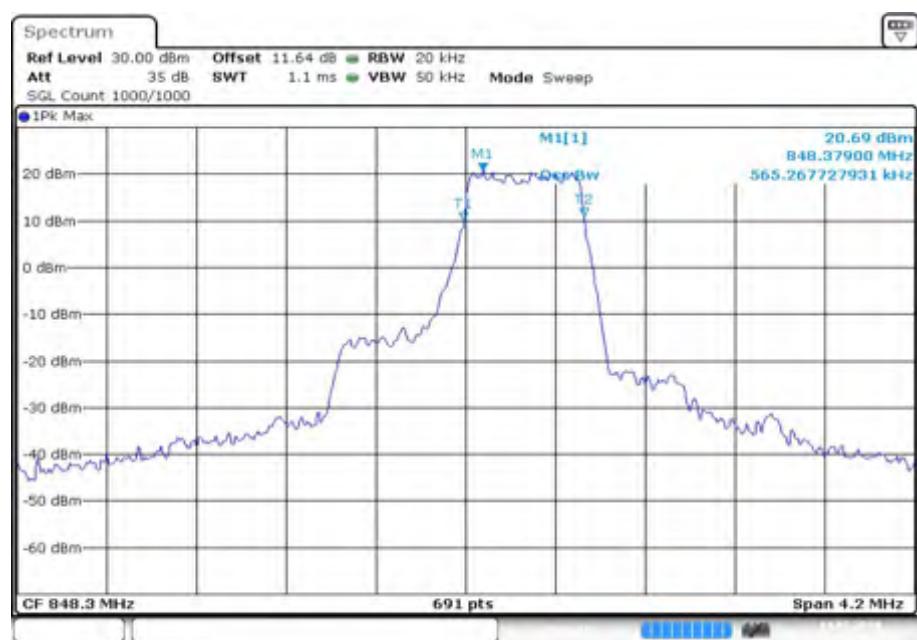
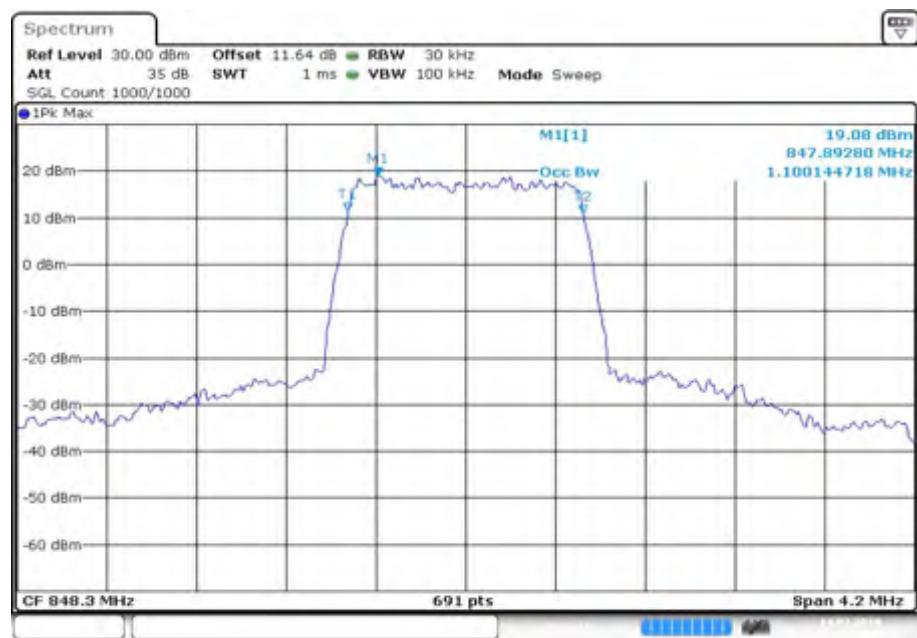


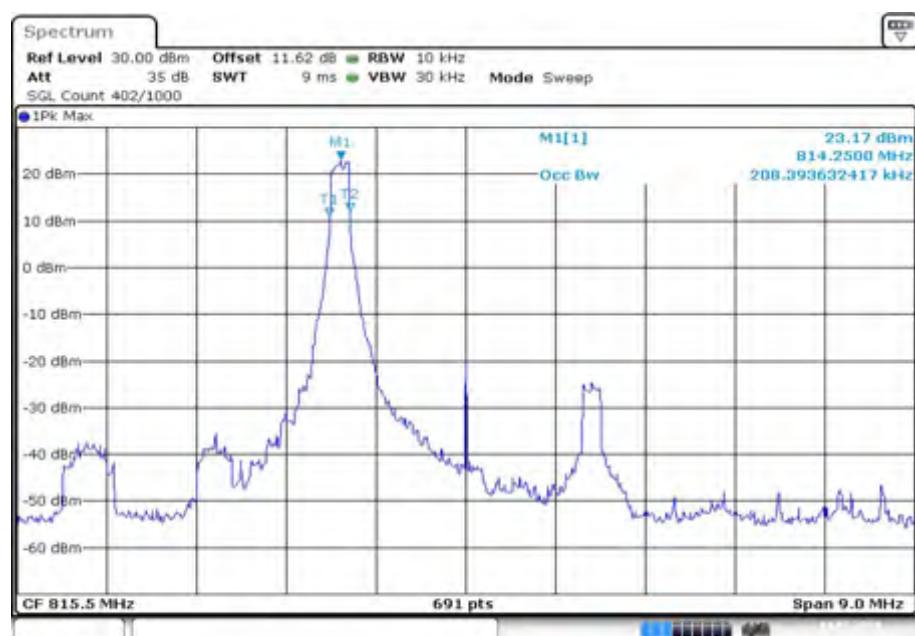
Fig.7



Date: 14 MAR 2018 14:50:54

Fig.8

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.208	Fig.1	0.208	Fig.5
26	815.5	26705	3	1	0	0.208	Fig.1	0.208	Fig.5
				1	14	0.221	Fig.2	0.221	Fig.6
				8	4	1.472	Fig.3	1.446	Fig.7
				15	0	2.735	Fig.4	2.735	Fig.8



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Fig.1

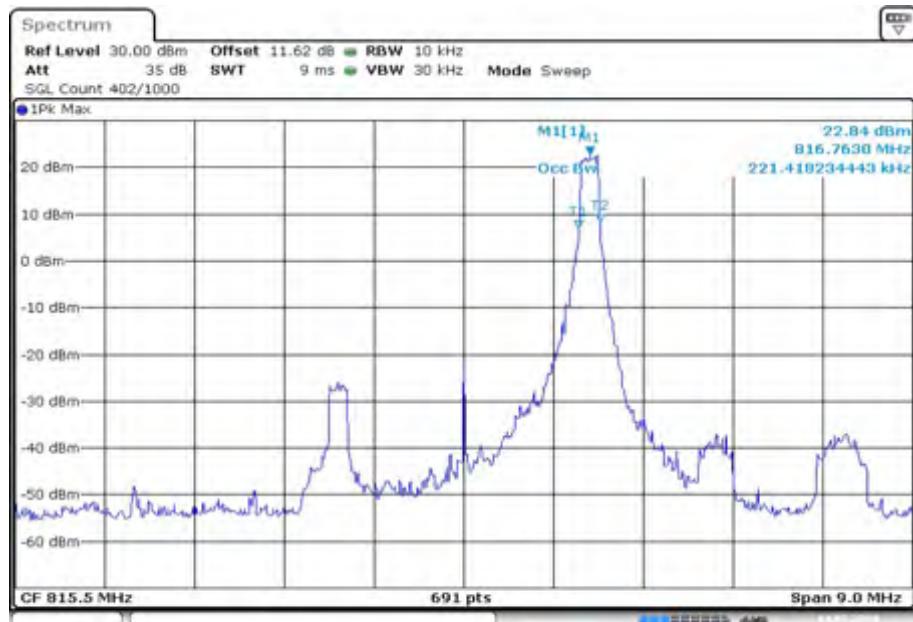


Fig.2



Fig.3

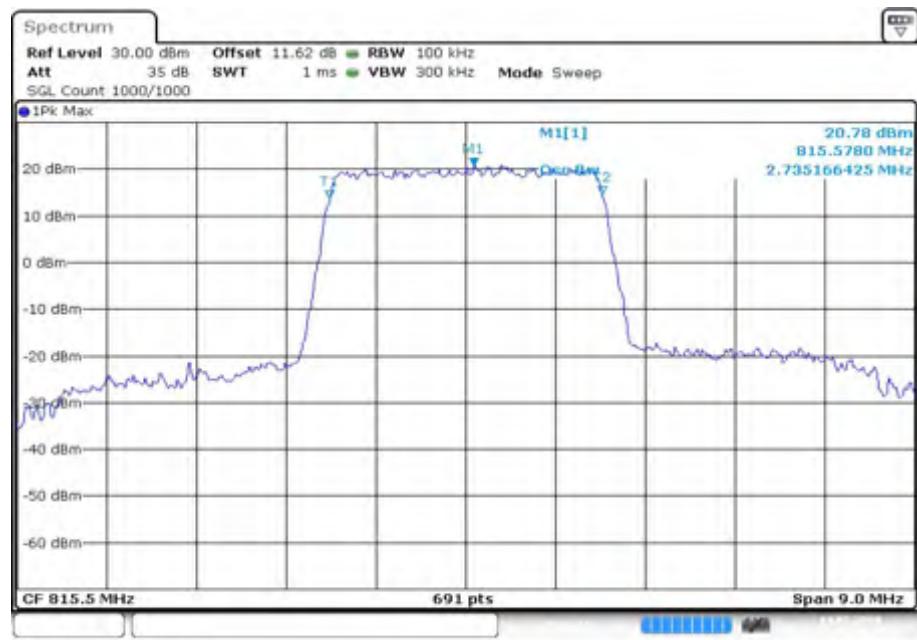


Fig.4

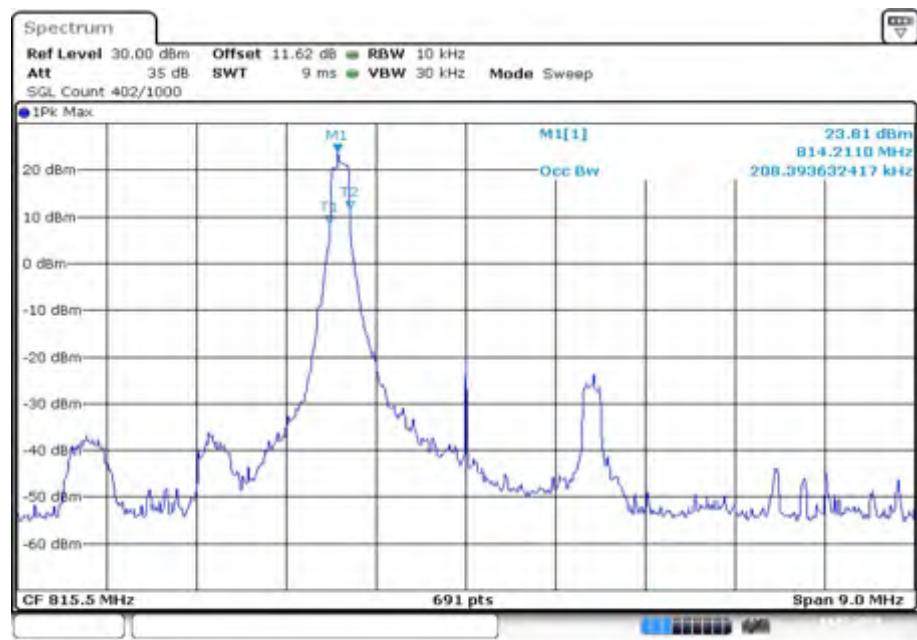


Fig.5

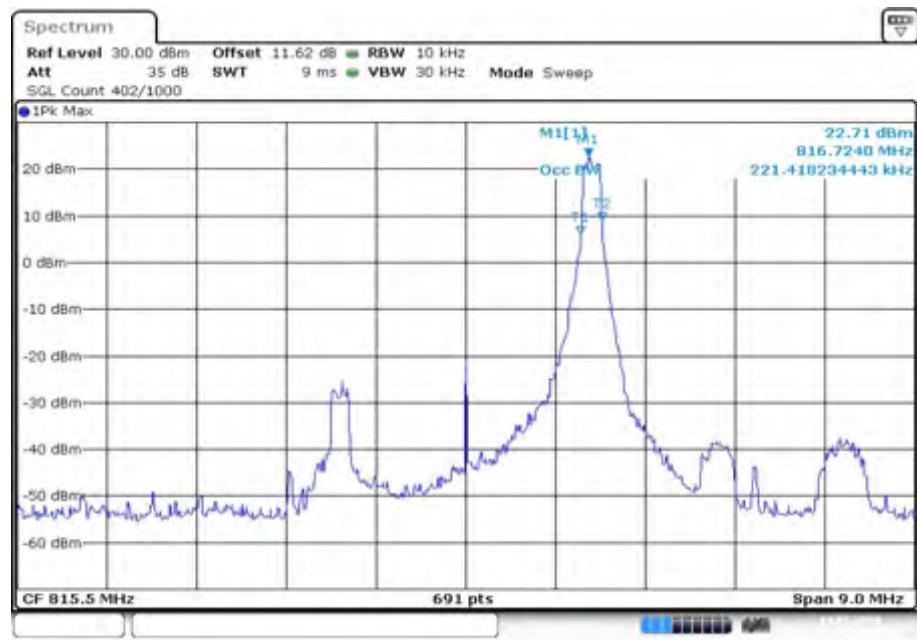


Fig.6

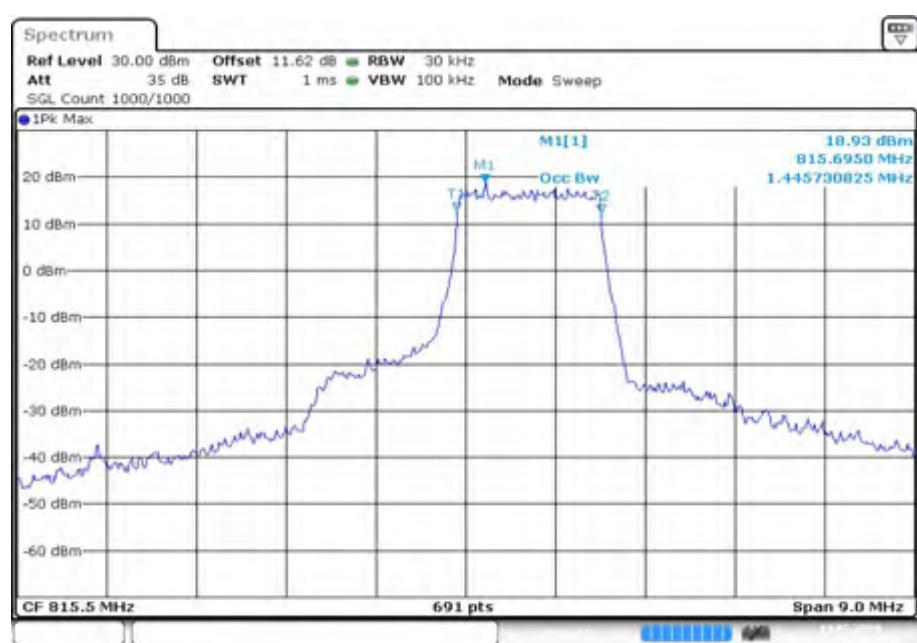
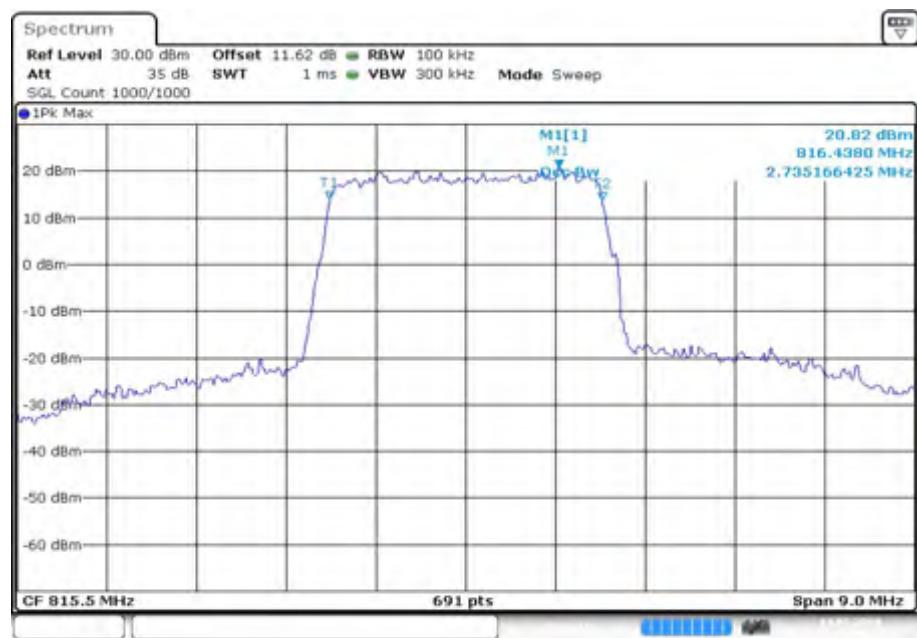


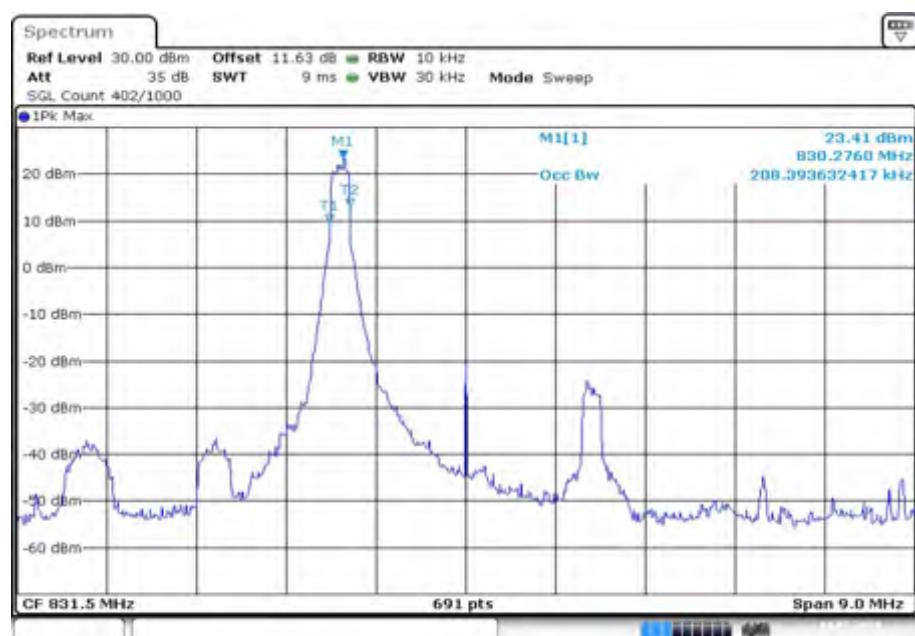
Fig.7



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Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.208	Fig.1	0.221	Fig.5
26	831.5	26865	3	1	0	0.208	Fig.1	0.221	Fig.5
				1	14	0.221	Fig.2	0.221	Fig.6
				8	4	1.446	Fig.3	1.459	Fig.7
				15	0	2.735	Fig.4	2.735	Fig.8



Date: 14.MAR.2018 15:04:41

Fig.1

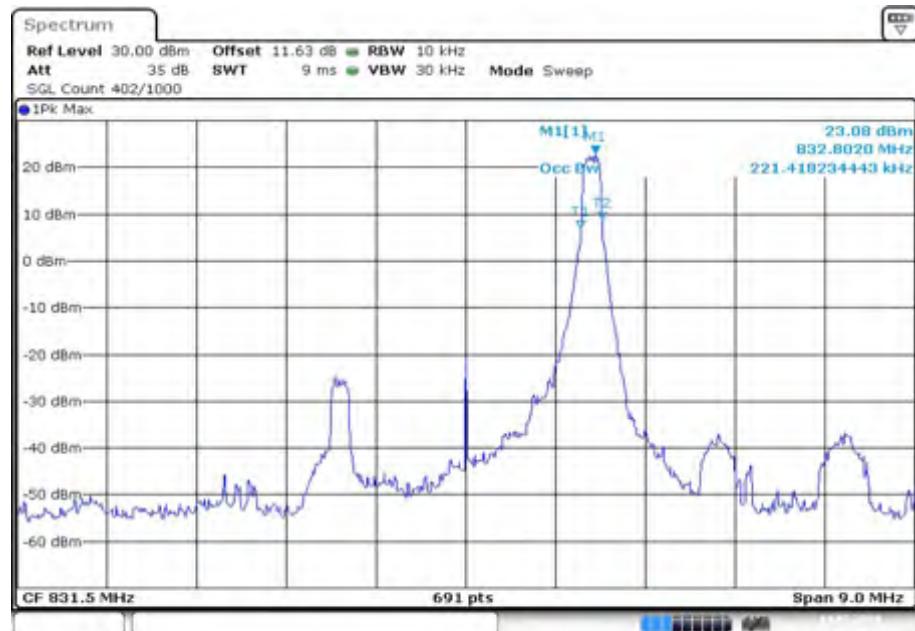


Fig.2

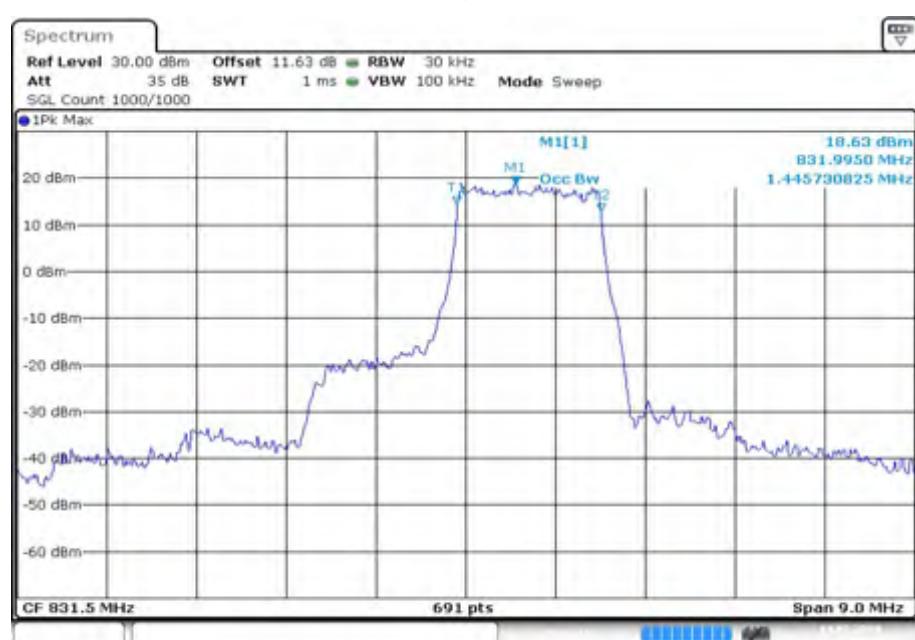


Fig.3

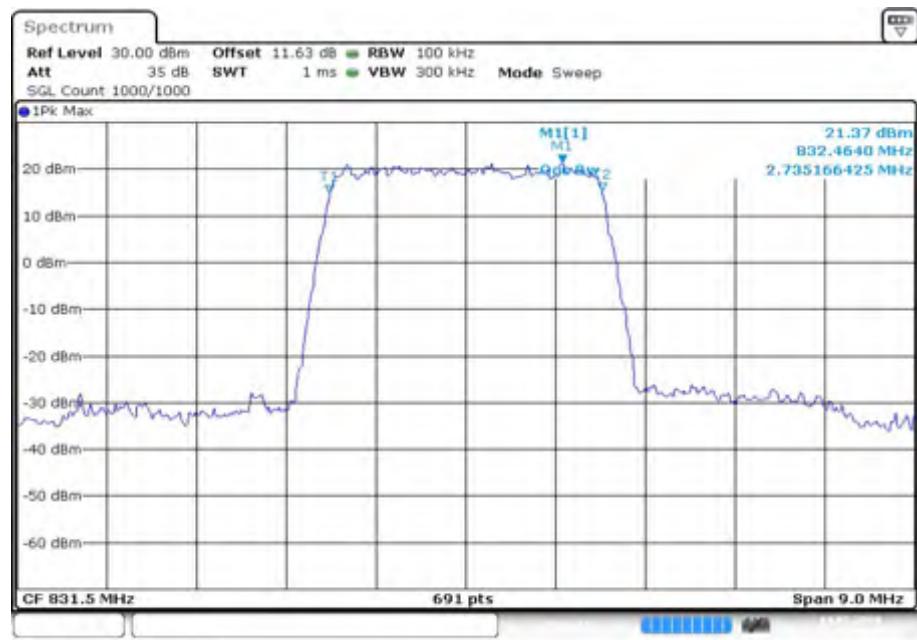


Fig.4

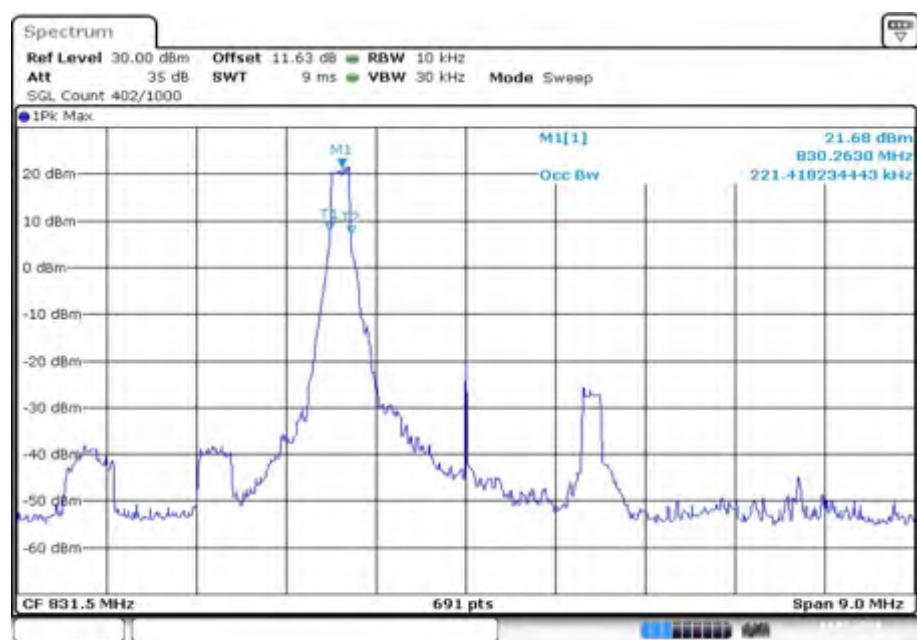


Fig.5

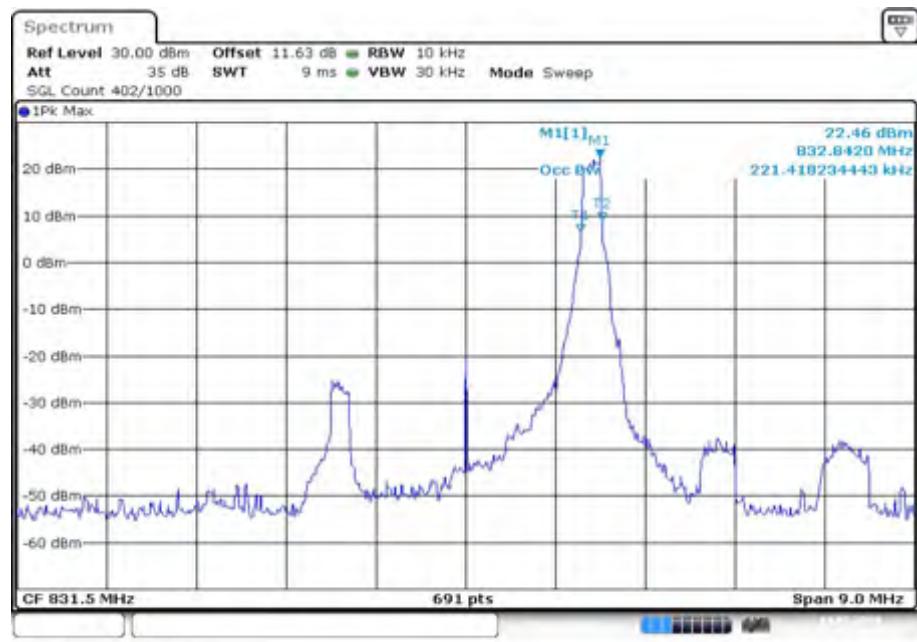


Fig.6

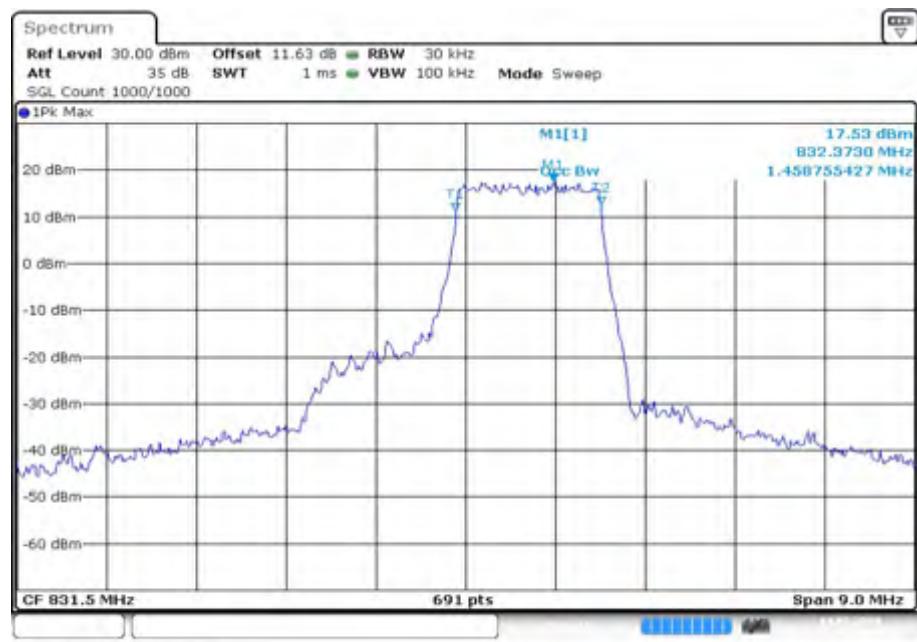


Fig.7

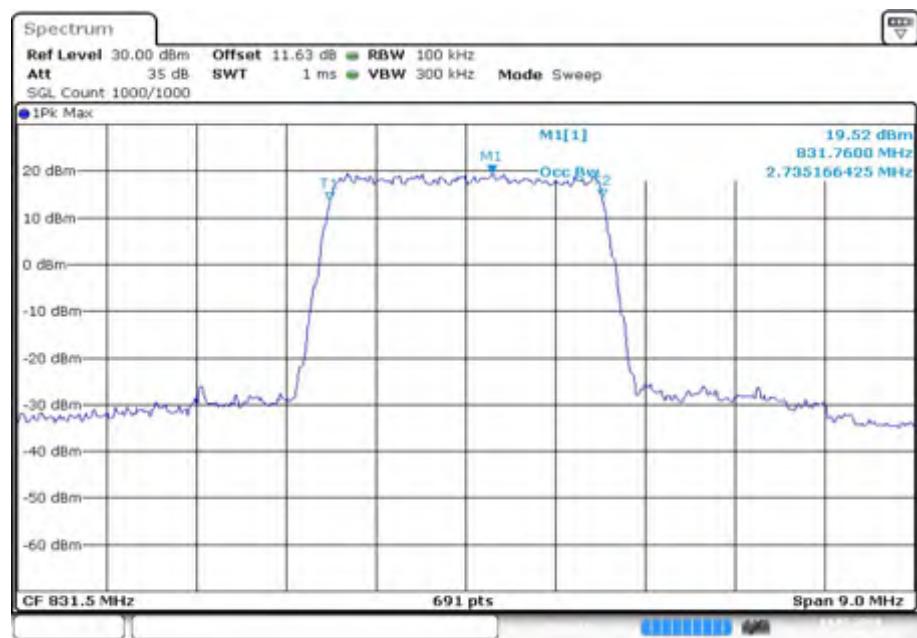


Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.208	Fig.1	0.221	Fig.5
26	847.5	27025	3	1	0	0.208	Fig.1	0.221	Fig.5
				1	14	0.221	Fig.2	0.221	Fig.6
				8	4	1.459	Fig.3	1.459	Fig.7
				15	0	2.748	Fig.4	2.735	Fig.8

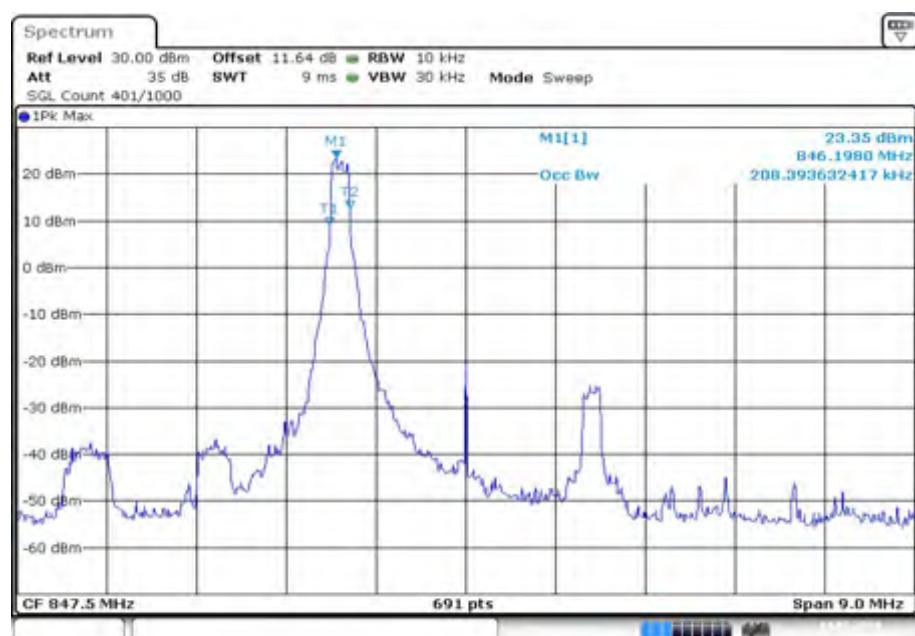
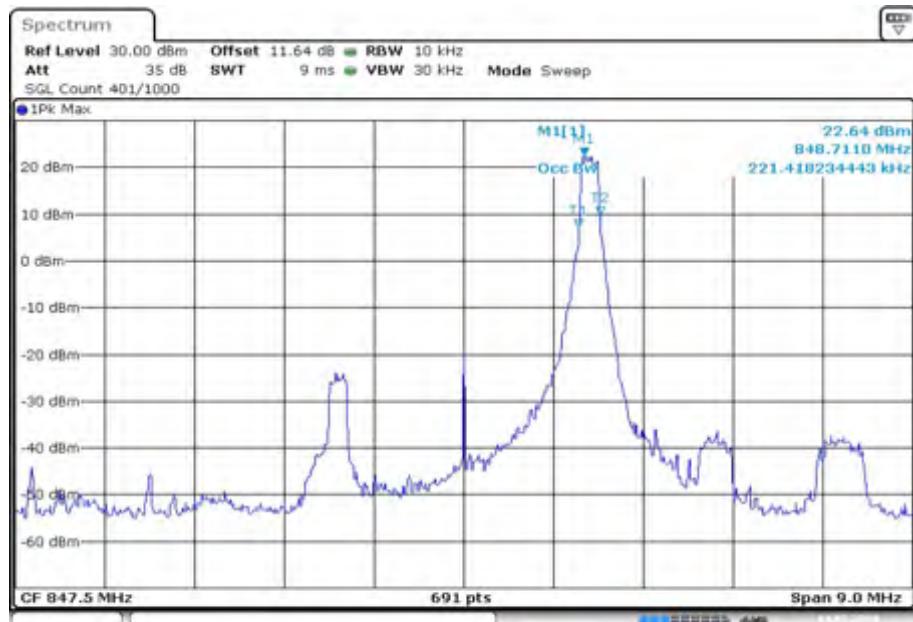
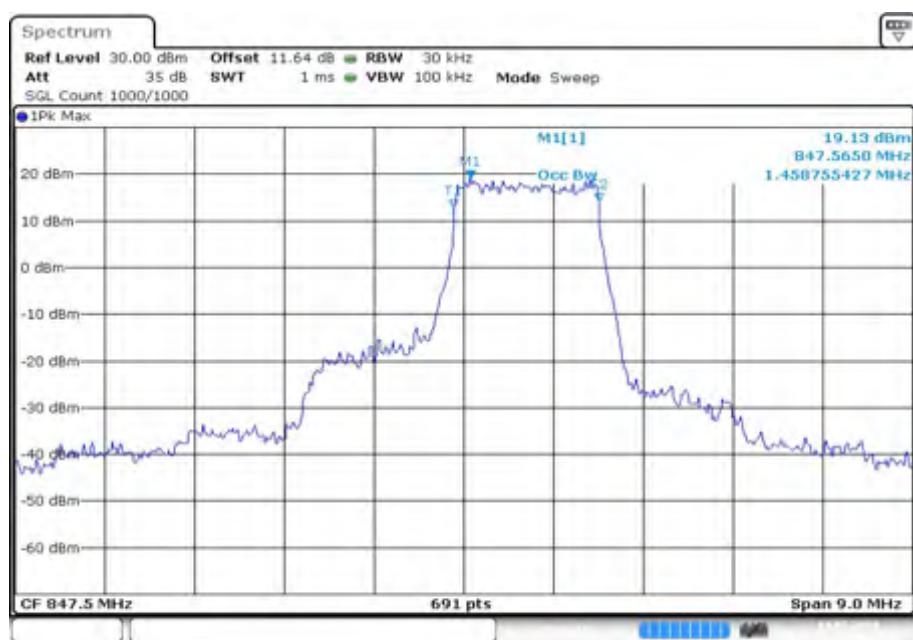


Fig.1



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Fig.2



Date: 14 MAR 2018 15:14:26

Fig.3

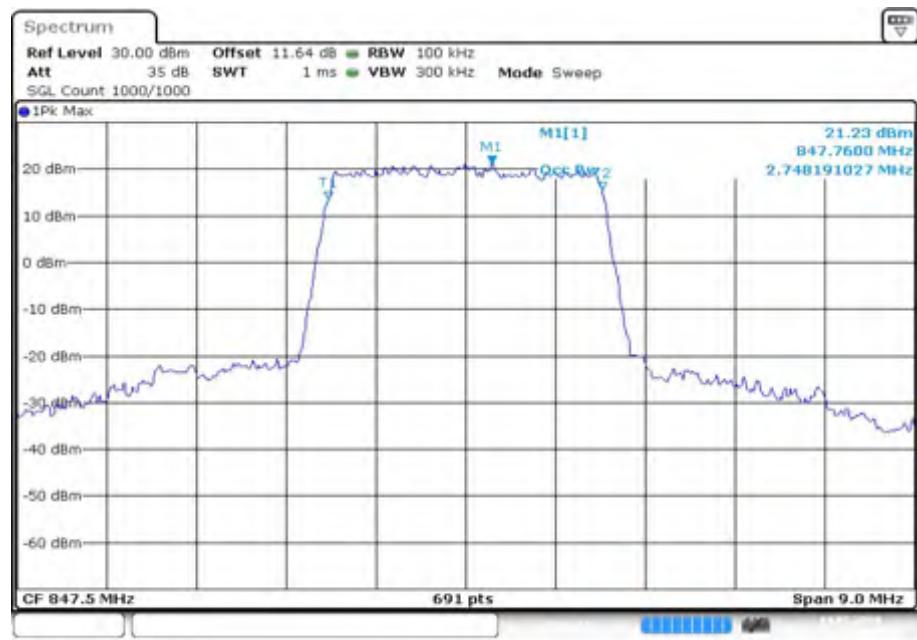


Fig.4



Fig.5

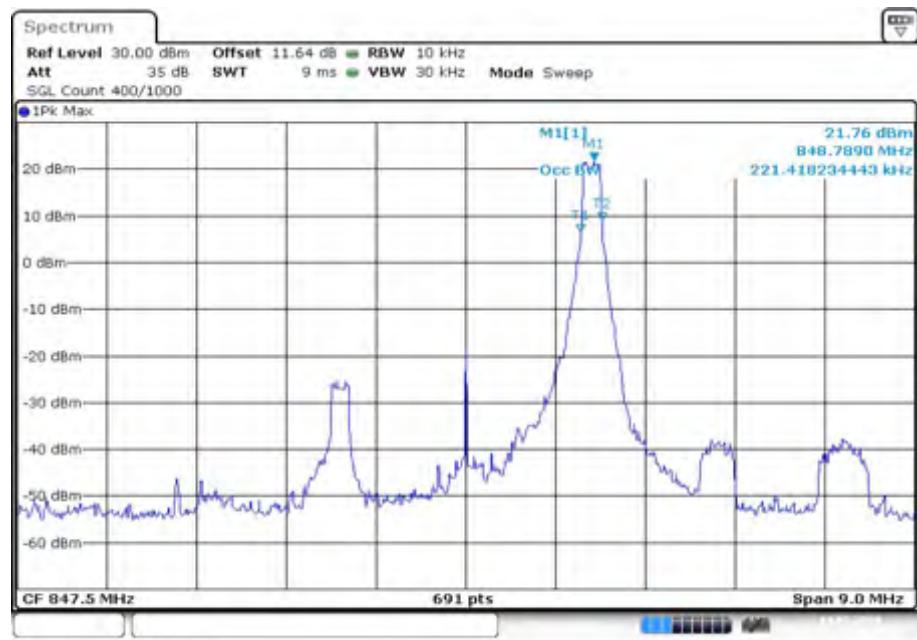


Fig.6

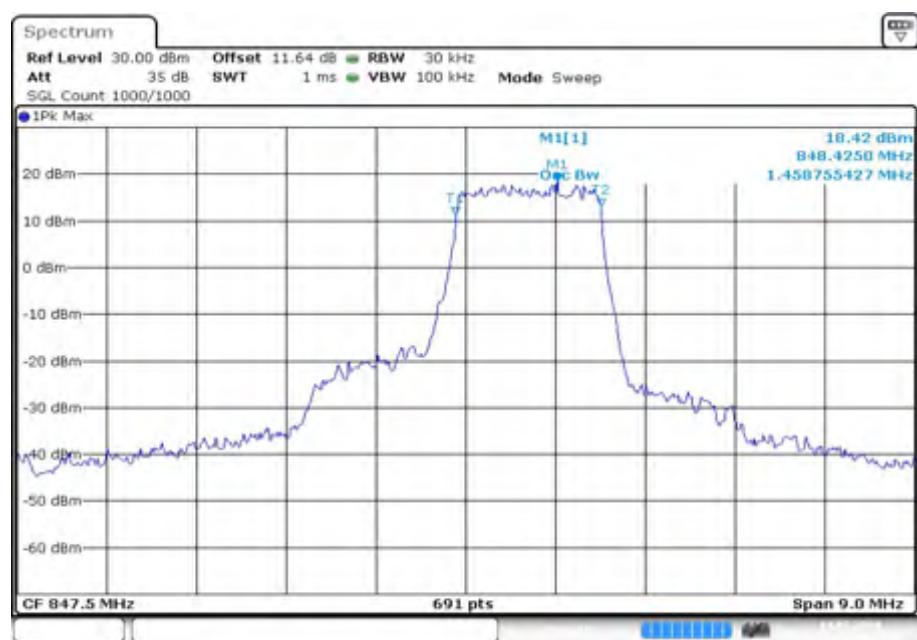
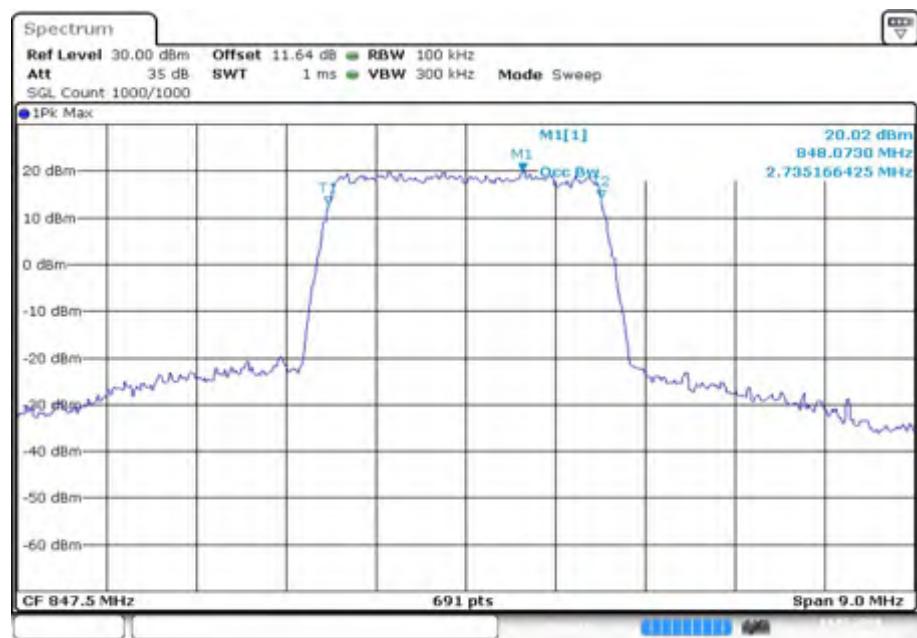


Fig.7



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Fig.8

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.217	Fig.1	0.239	Fig.5
26	816.5	26715	5	1	0	0.217	Fig.1	0.239	Fig.5
				1	24	0.239	Fig.2	0.239	Fig.6
				12	6	2.171	Fig.3	2.171	Fig.7
				25	0	4.537	Fig.4	4.493	Fig.8

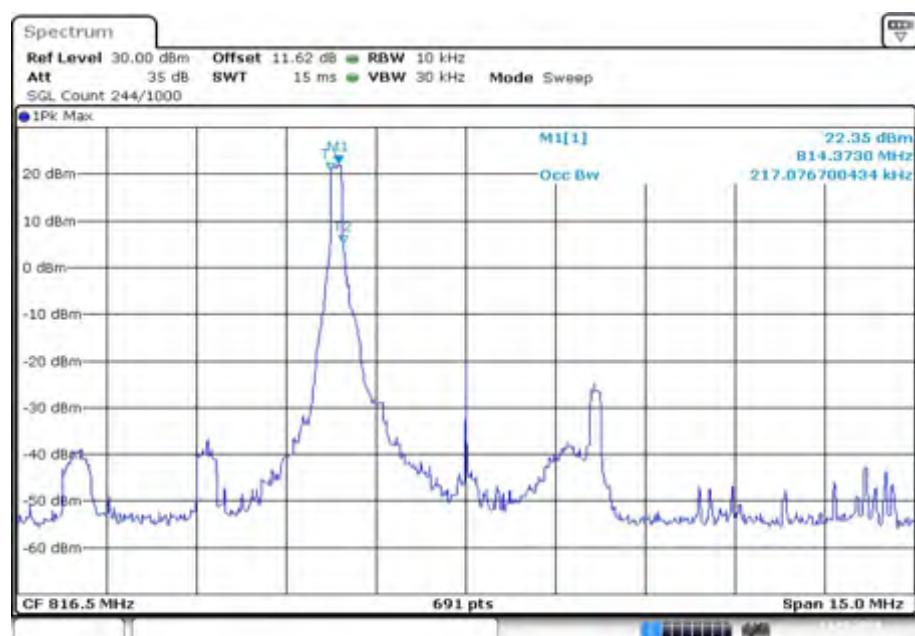


Fig.1

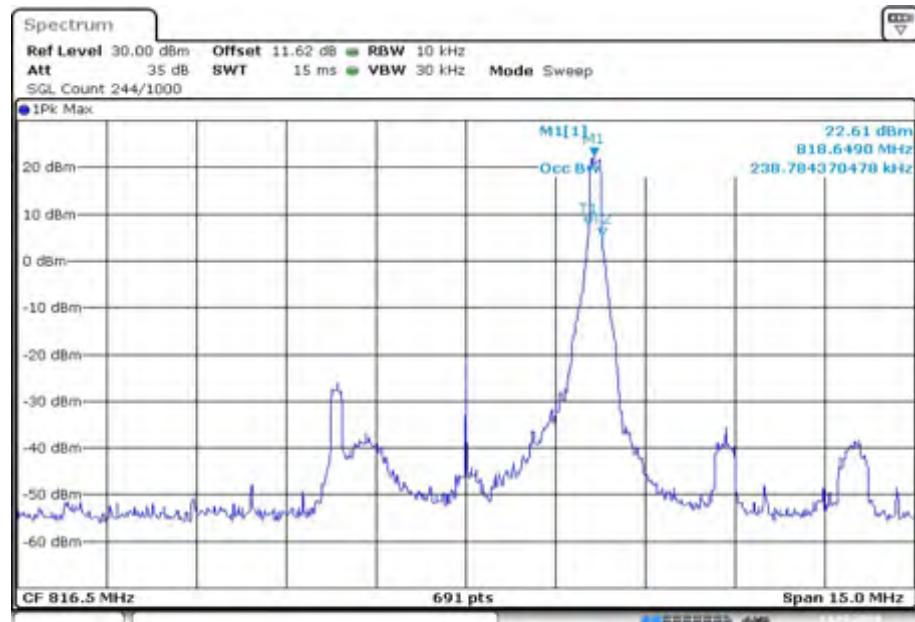


Fig.2

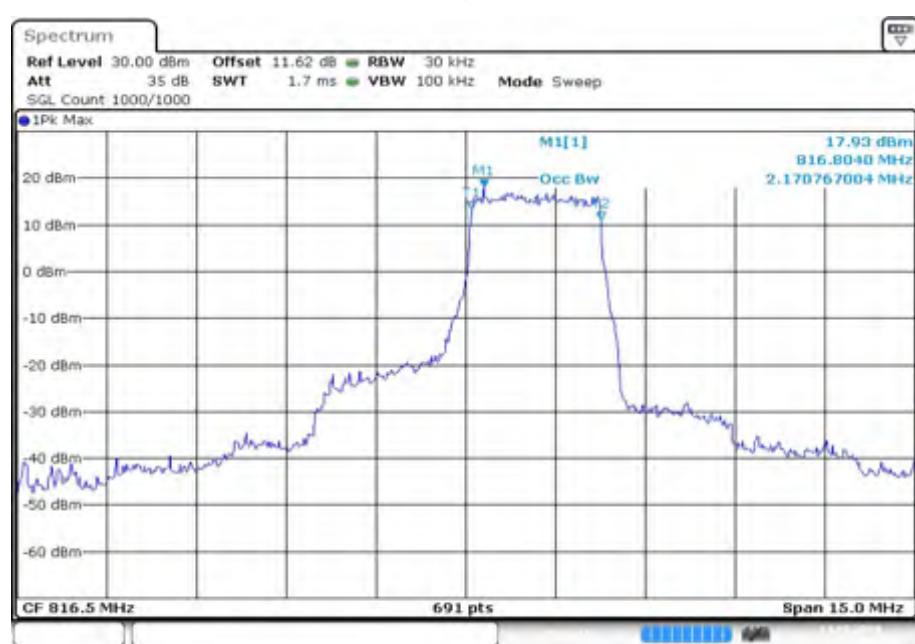


Fig.3

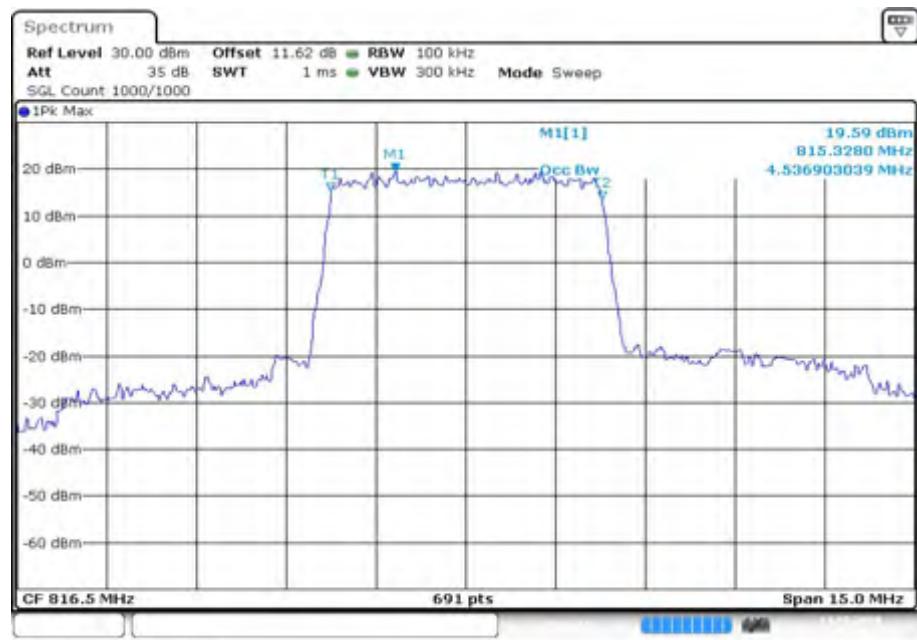


Fig.4

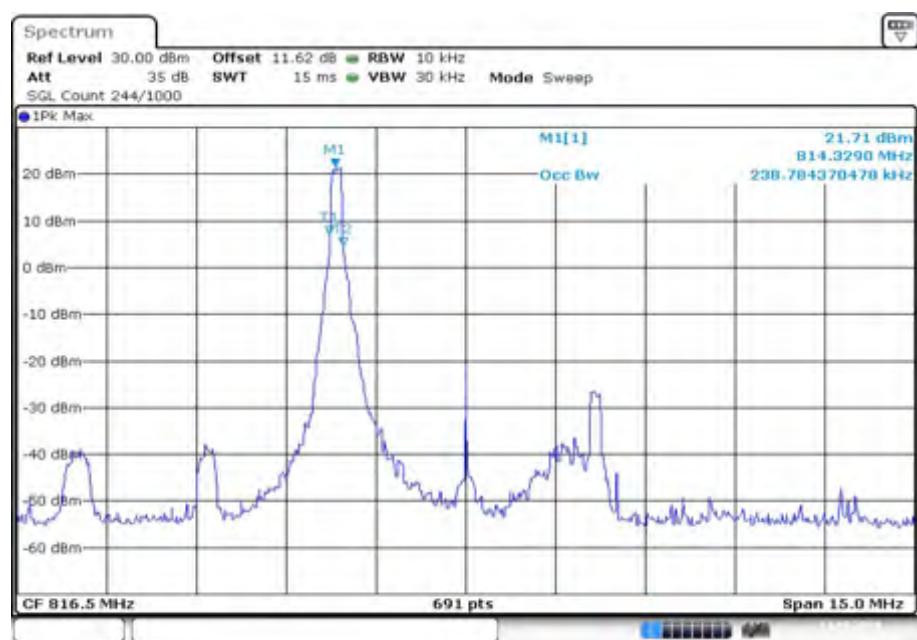


Fig.5

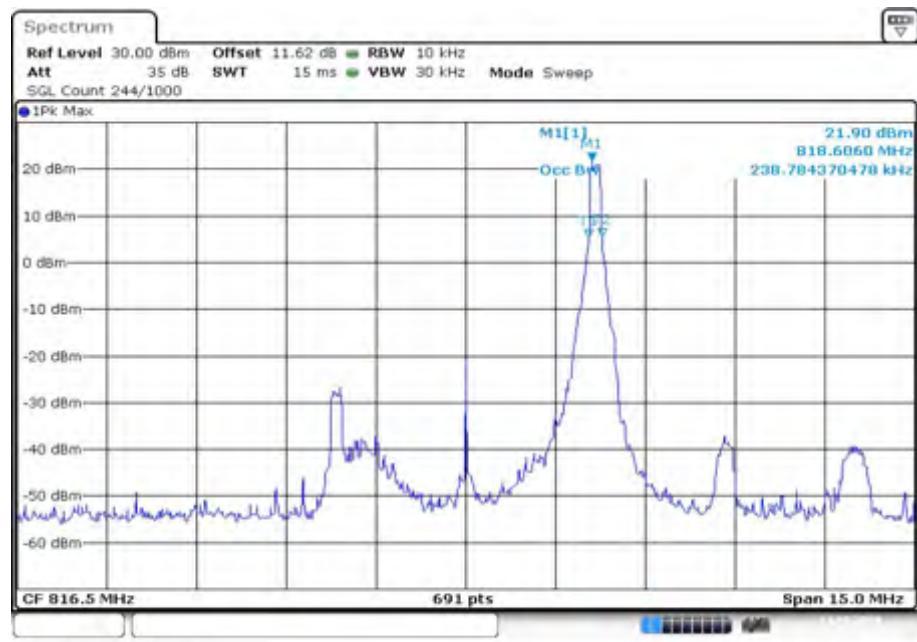


Fig.6

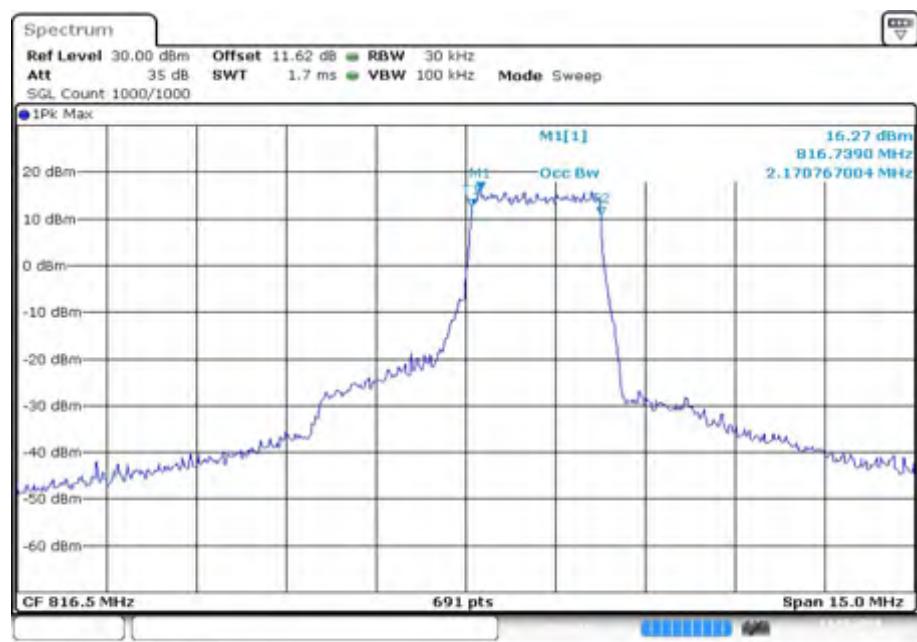


Fig.7

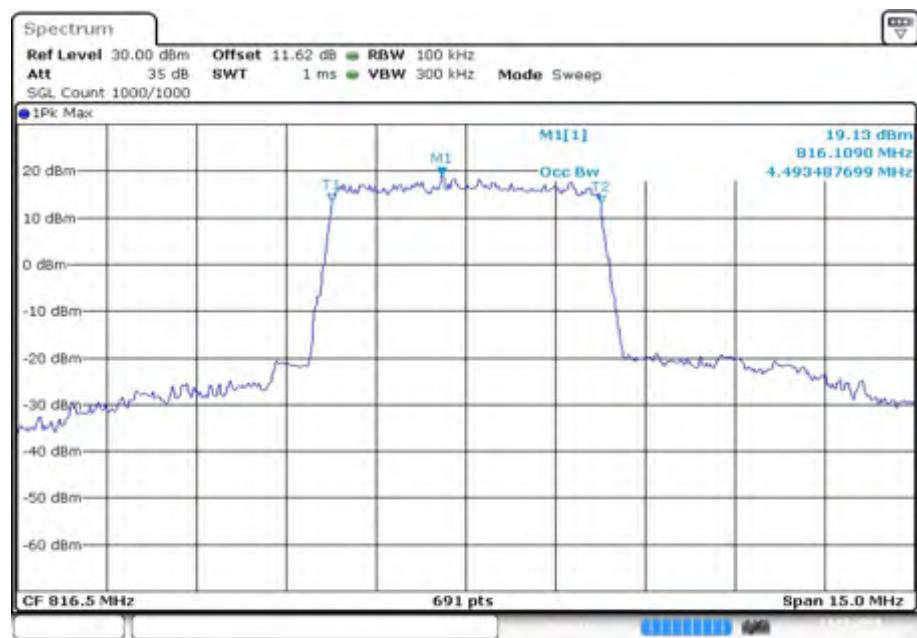


Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.239	Fig.1	0.239	Fig.5
26	831.5	26865	5	1	0	0.239	Fig.1	0.239	Fig.5
				1	24	0.217	Fig.2	0.239	Fig.6
				12	6	2.171	Fig.3	2.171	Fig.7
				25	0	4.515	Fig.4	4.515	Fig.8

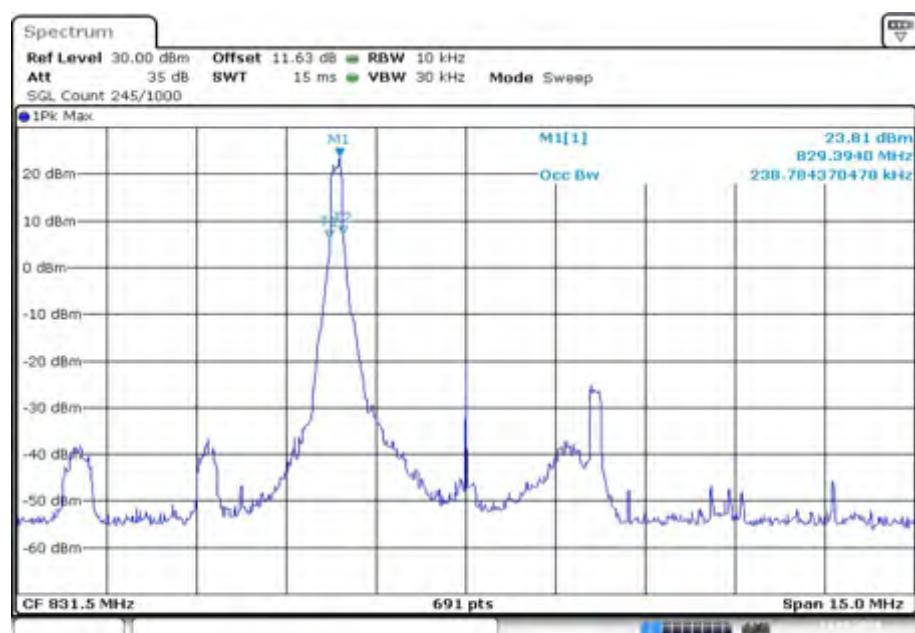


Fig.1

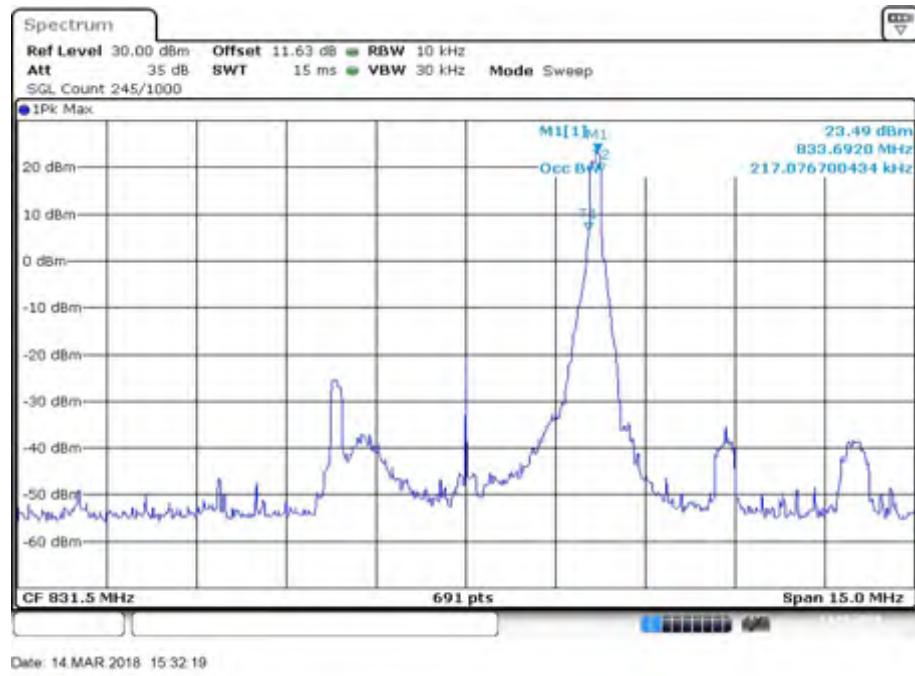


Fig.2

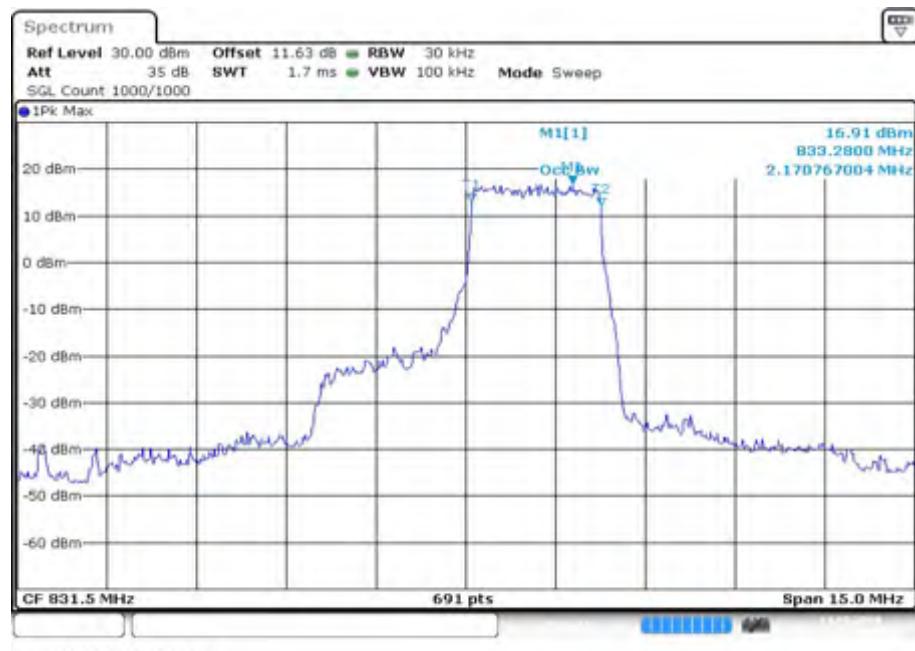


Fig.3

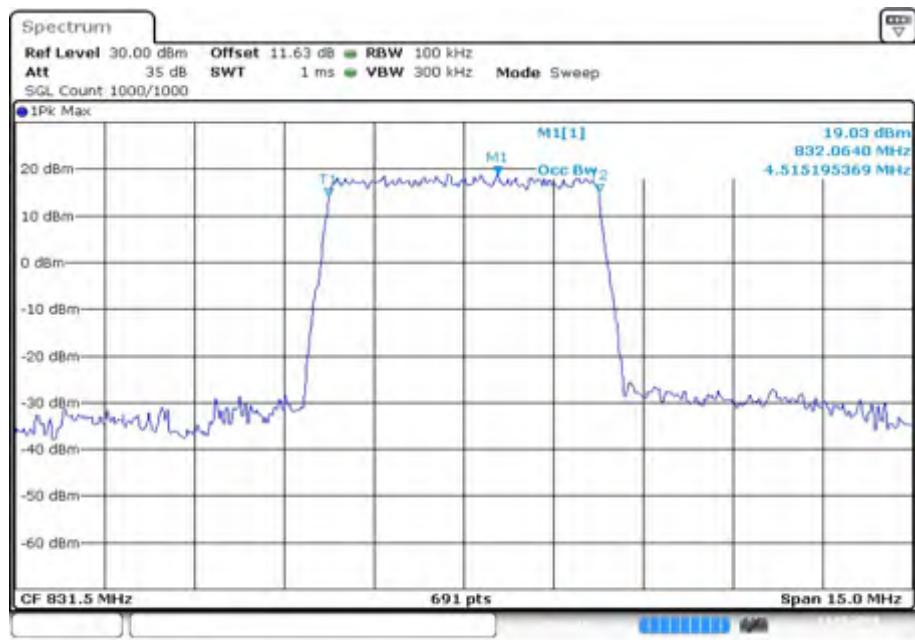


Fig.4

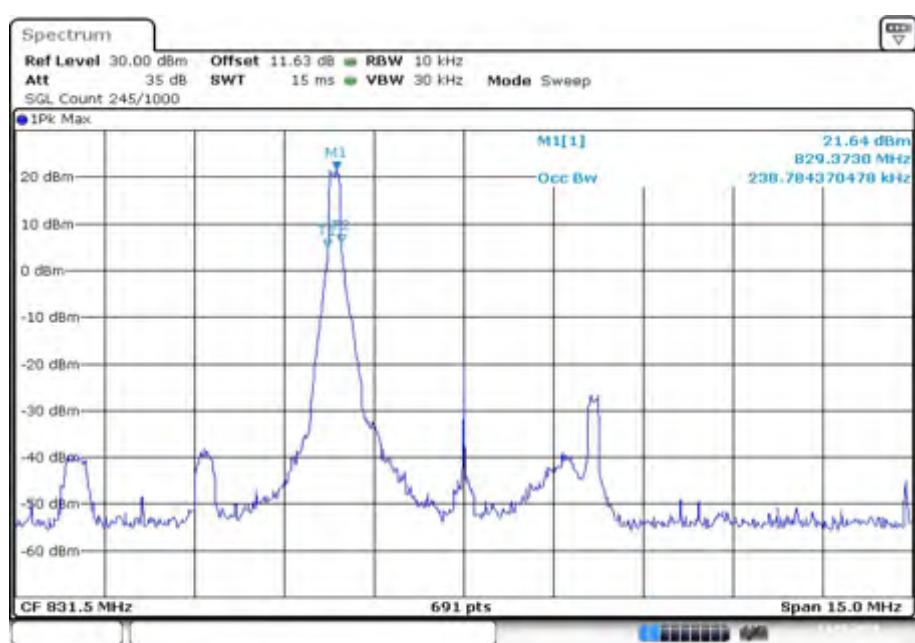


Fig.5

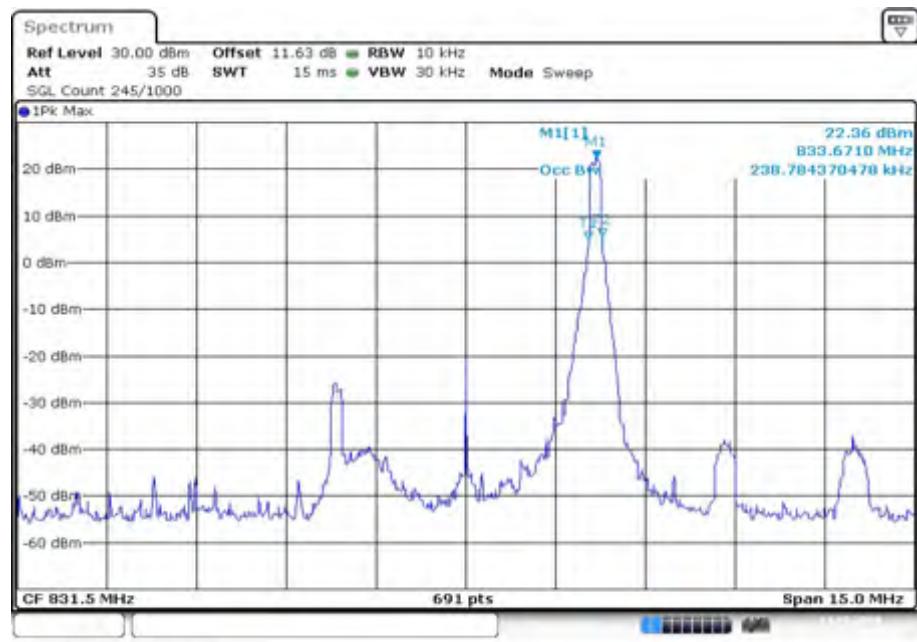


Fig.6

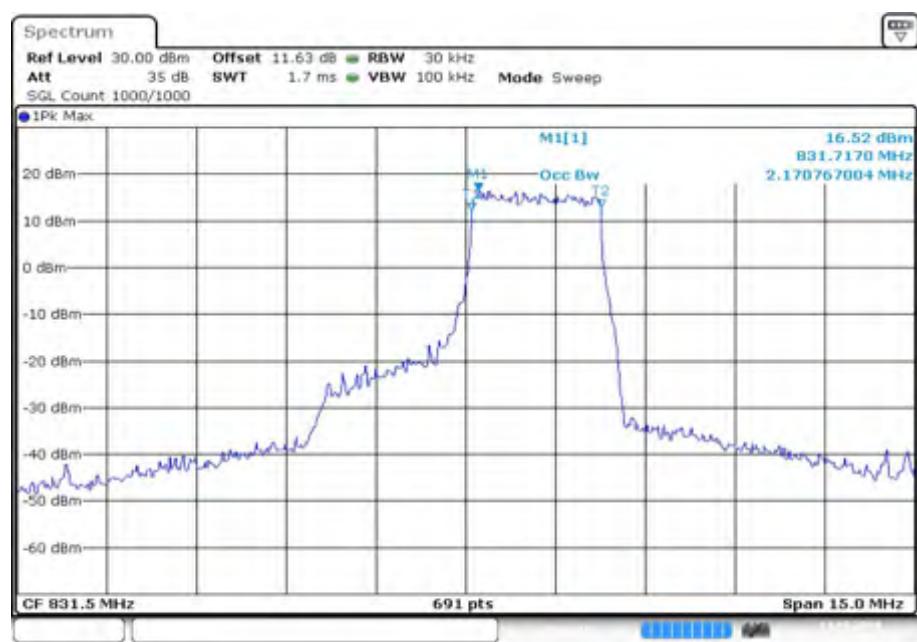


Fig.7

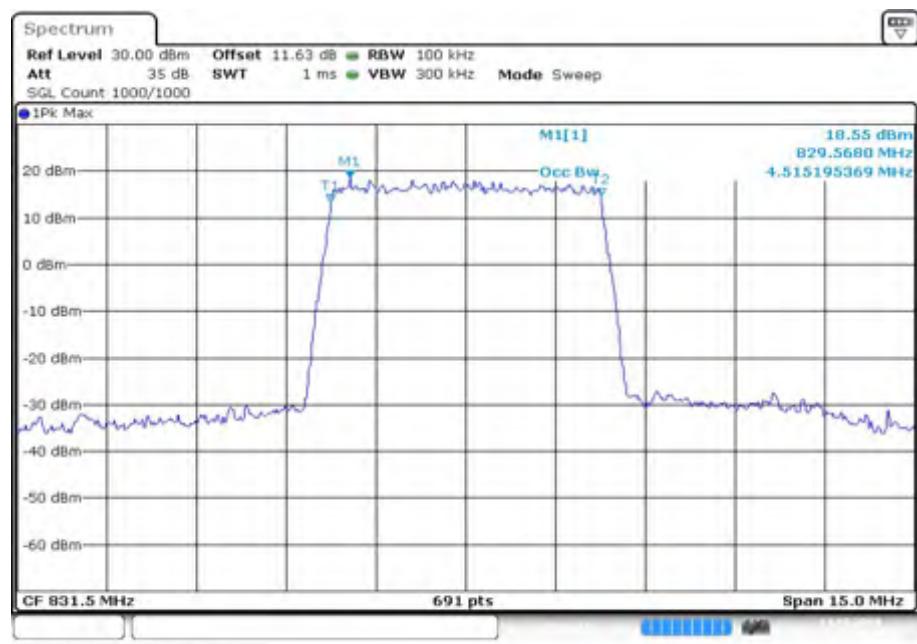


Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.239	Fig.1	0.195	Fig.5
26	846.5	27015	5	1	0	0.239	Fig.1	0.195	Fig.5
				1	24	0.217	Fig.2	0.239	Fig.6
				12	6	2.192	Fig.3	2.171	Fig.7
				25	0	4.515	Fig.4	4.515	Fig.8

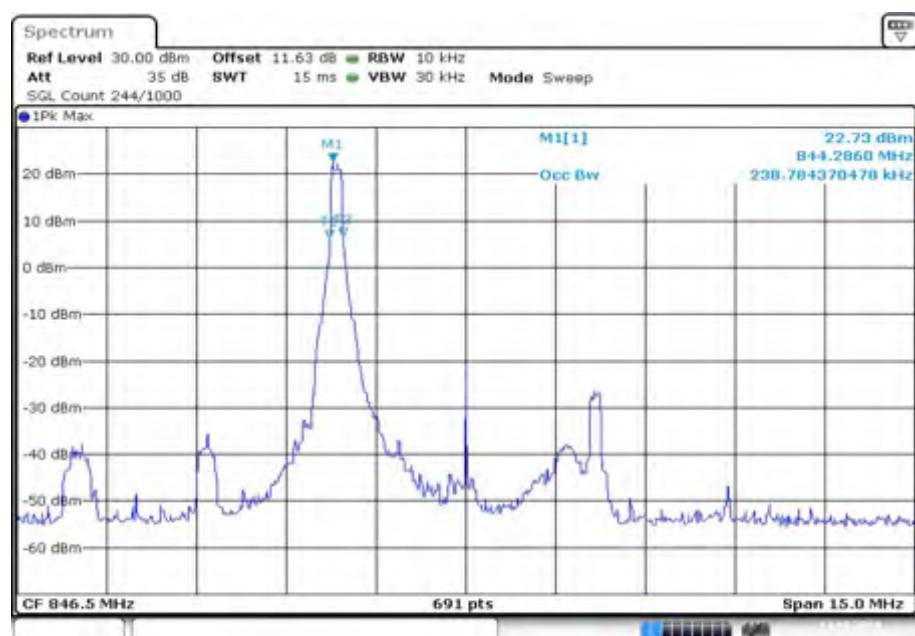


Fig.1

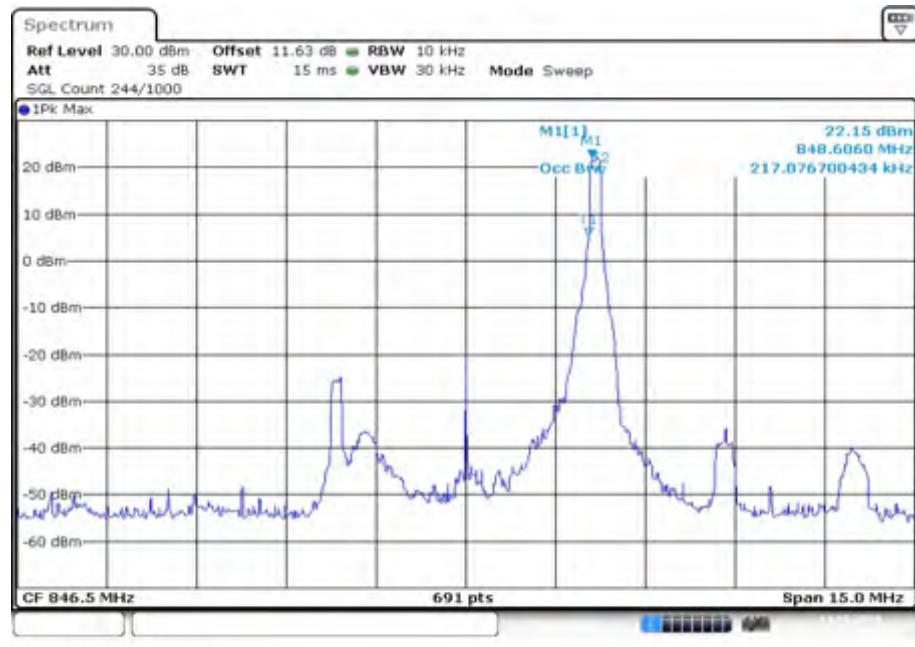


Fig.2



Fig.3

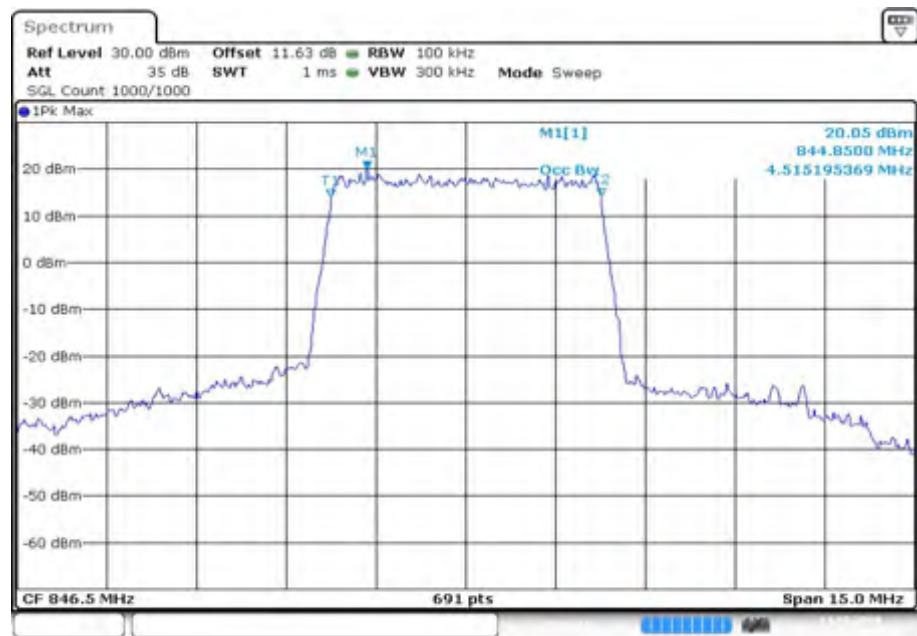


Fig.4

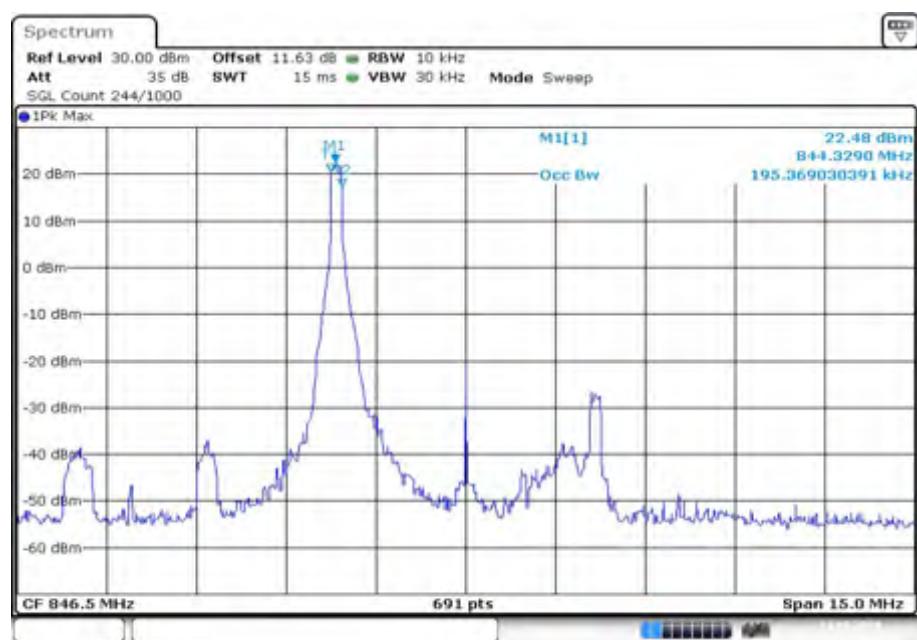


Fig.5

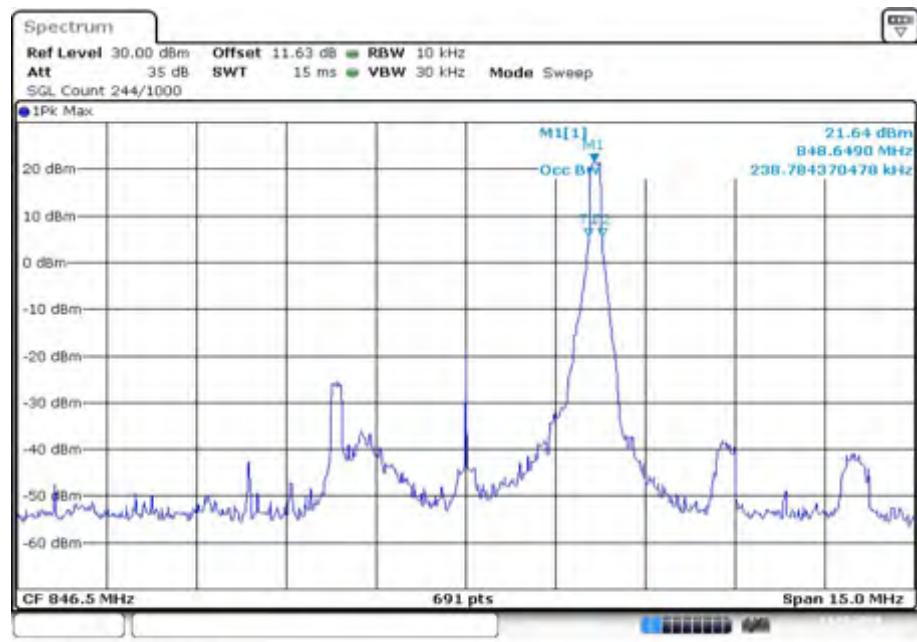


Fig.6

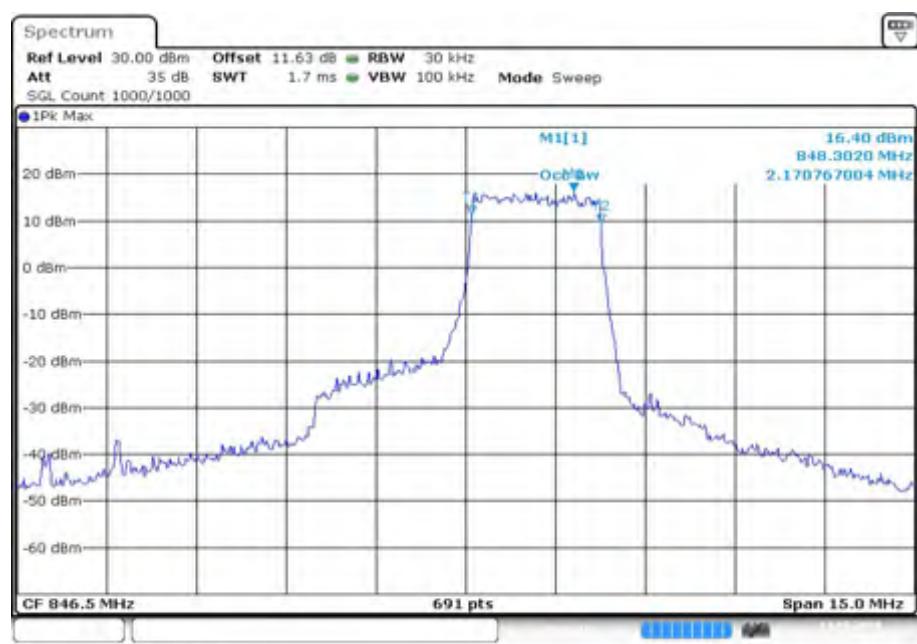


Fig.7

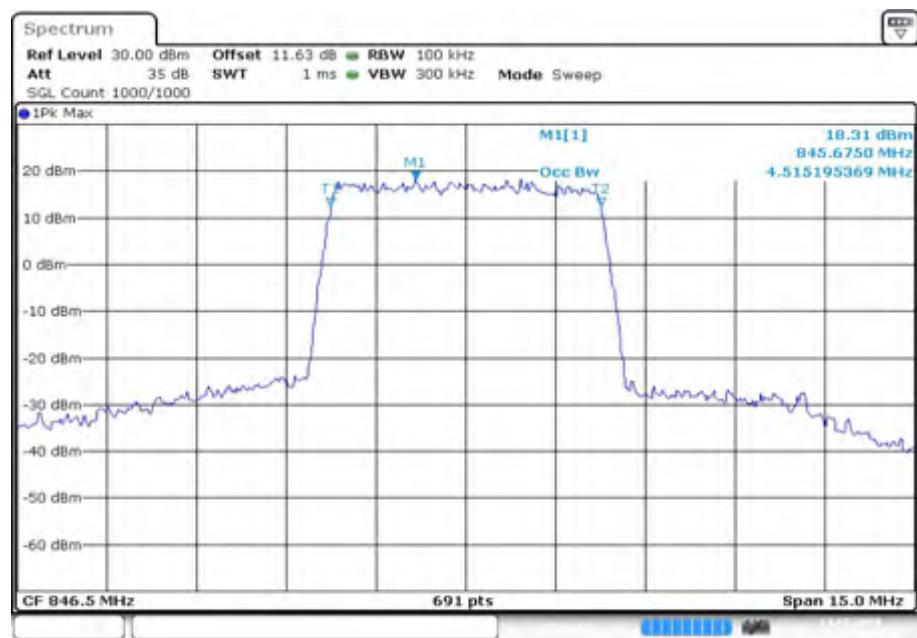


Fig.8

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
26	819	26740	10	1	0	0.217	Fig.1	0.217	Fig.5
				1	49	0.217	Fig.2	0.260	Fig.6
				24	12	4.342	Fig.3	4.385	Fig.7
				50	0	9.074	Fig.4	9.074	Fig.8

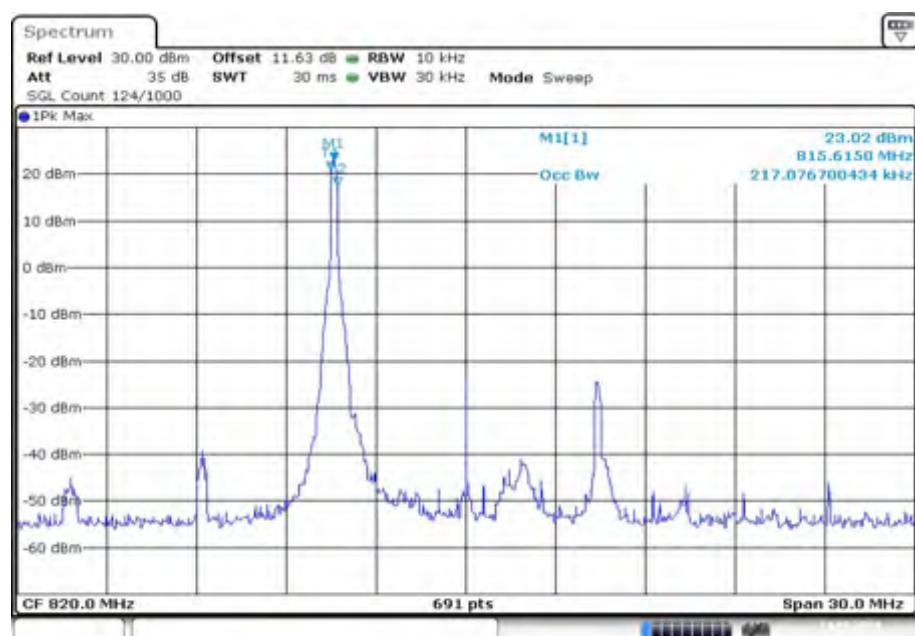
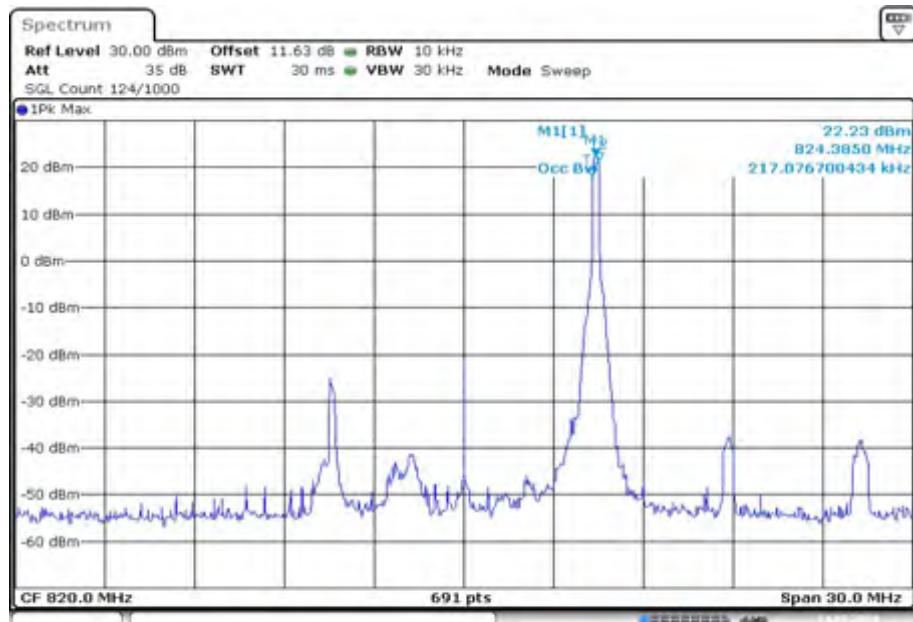
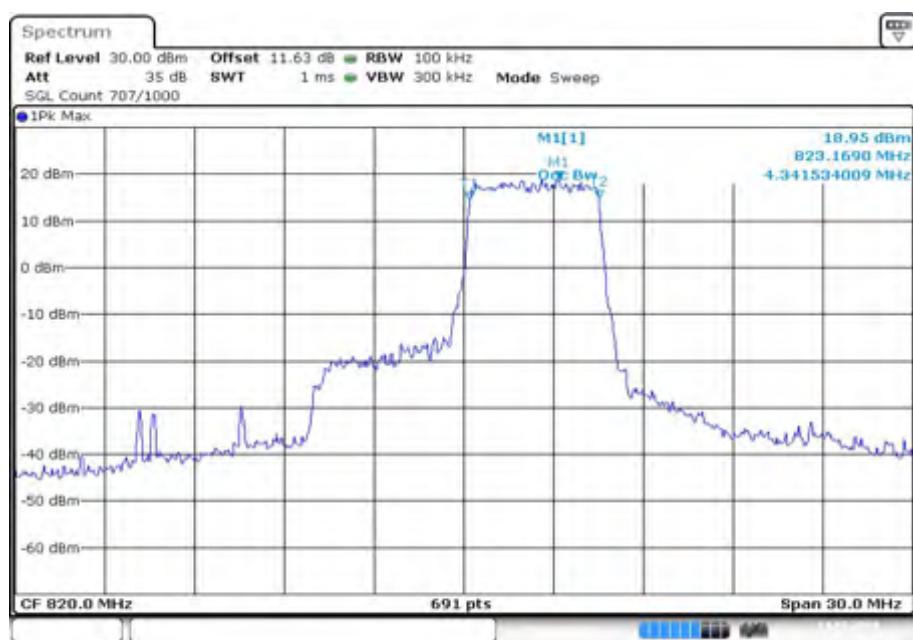


Fig.1



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Fig.2



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Fig.3

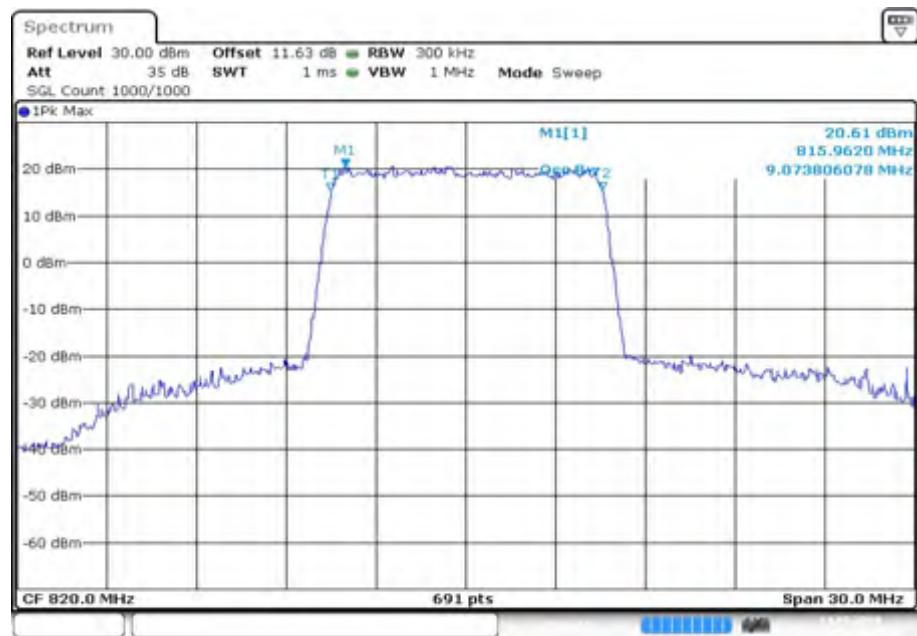


Fig.4

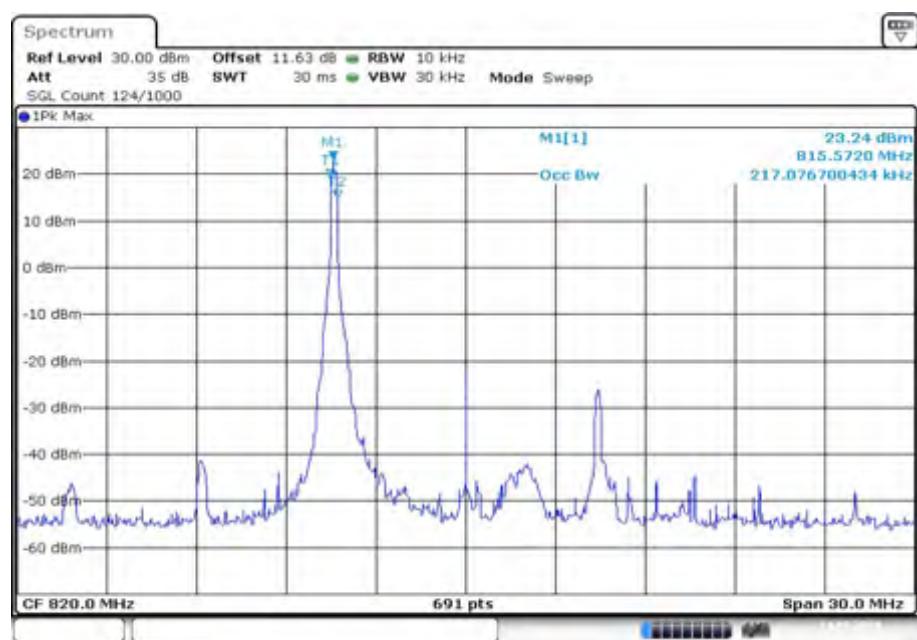


Fig.5

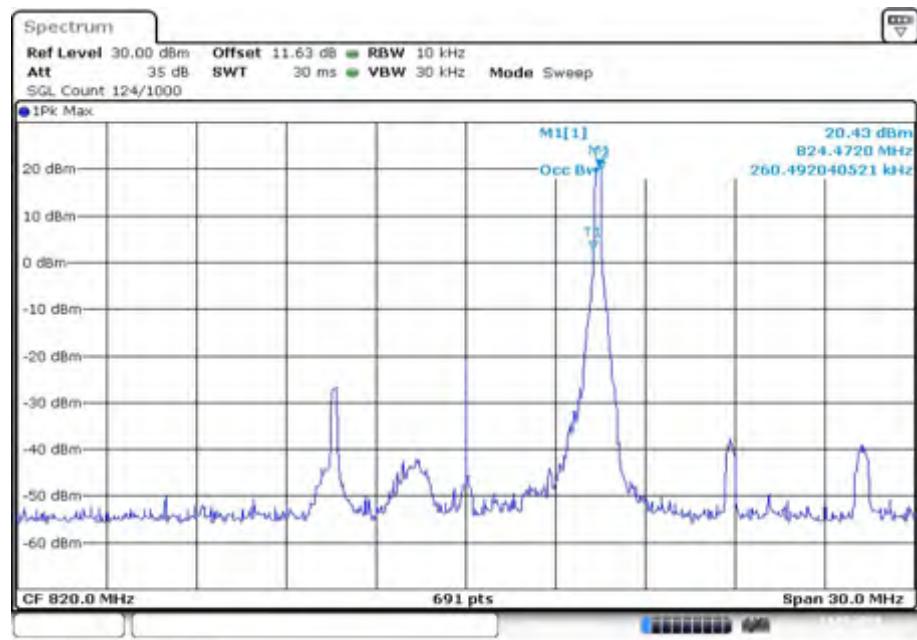


Fig.6

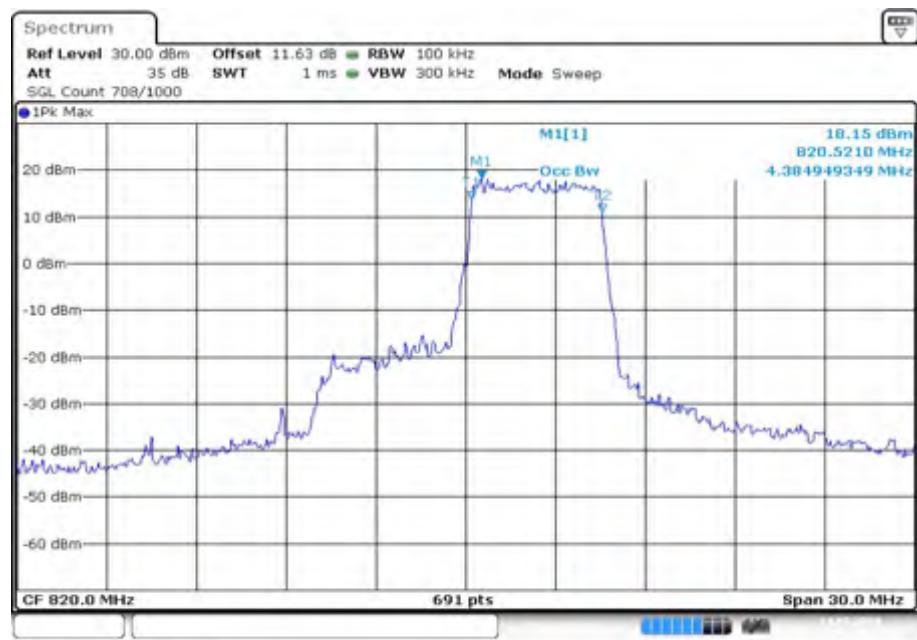


Fig.7

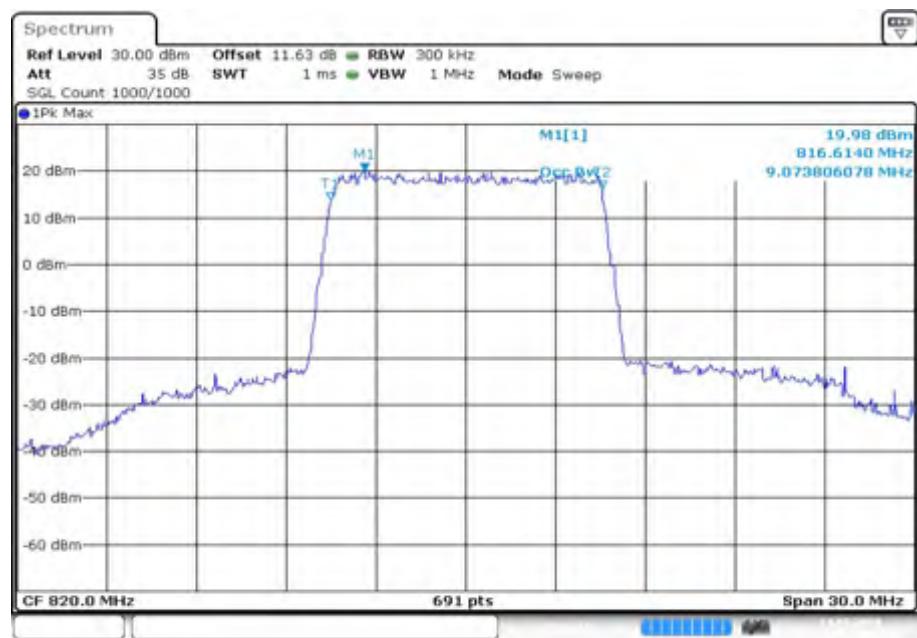


Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)		
						QPSK		16-QAM
26	831.5	26865	10	1	0	0.217	Fig.1	0.217
				1	49	0.217	Fig.2	0.217
				24	12	4.342	Fig.3	4.342
				50	0	9.074	Fig.4	9.030

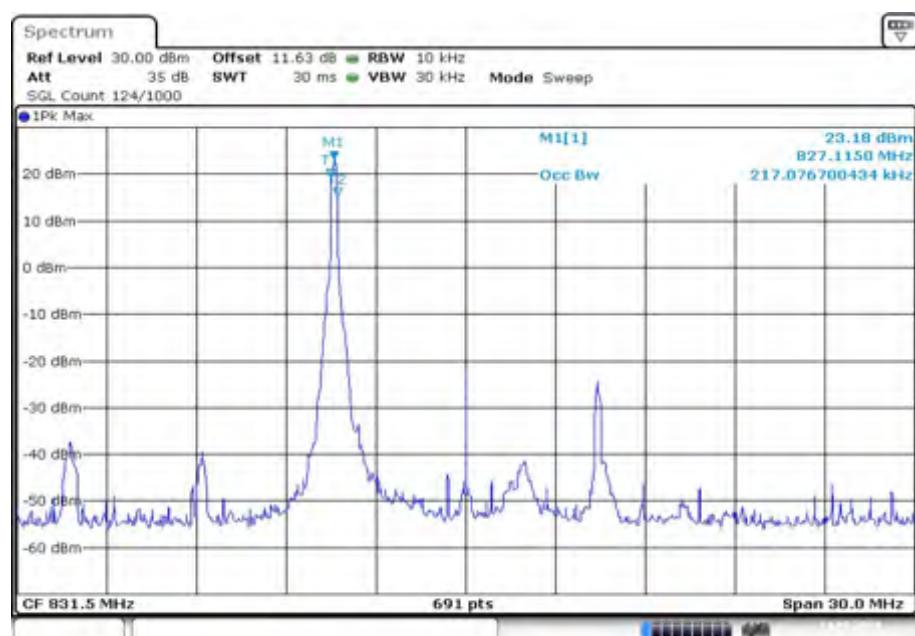
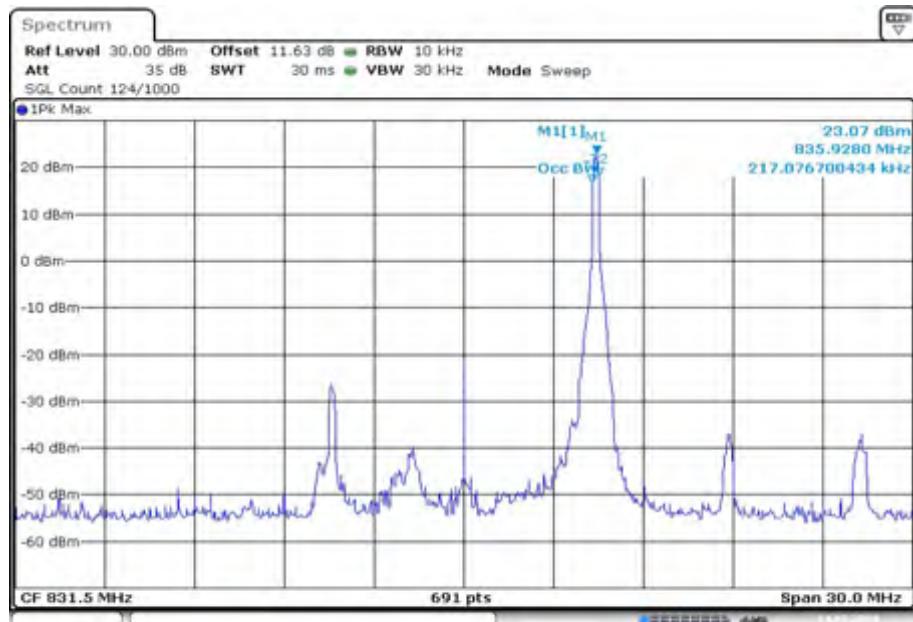
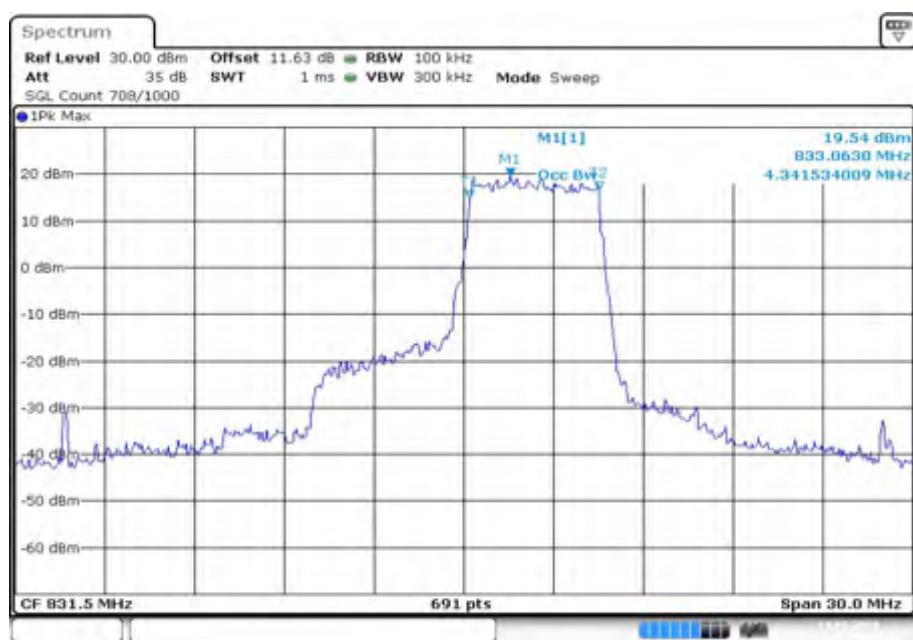


Fig.1



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Fig.2



Date: 14 MAR 2018 16:00:02

Fig.3

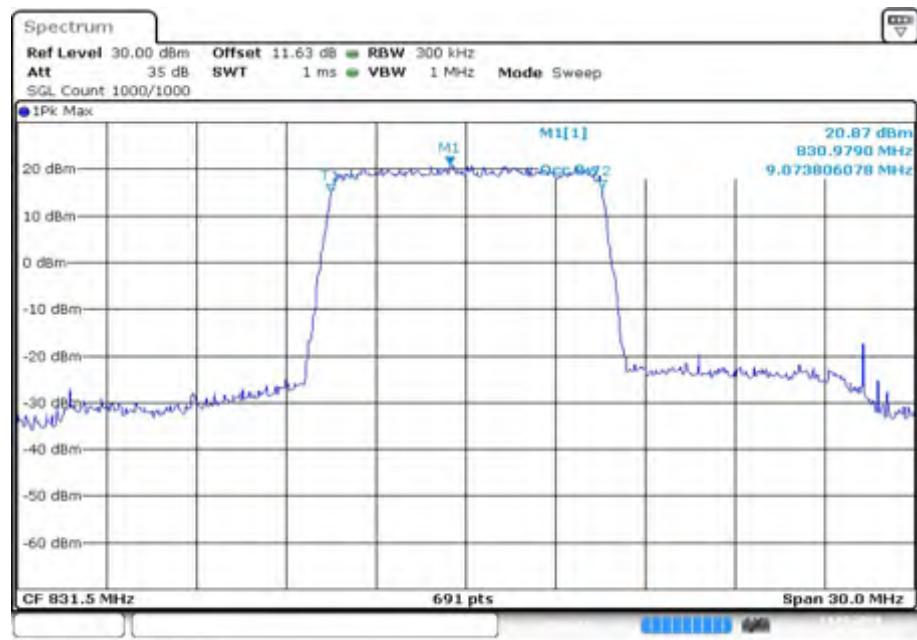


Fig.4

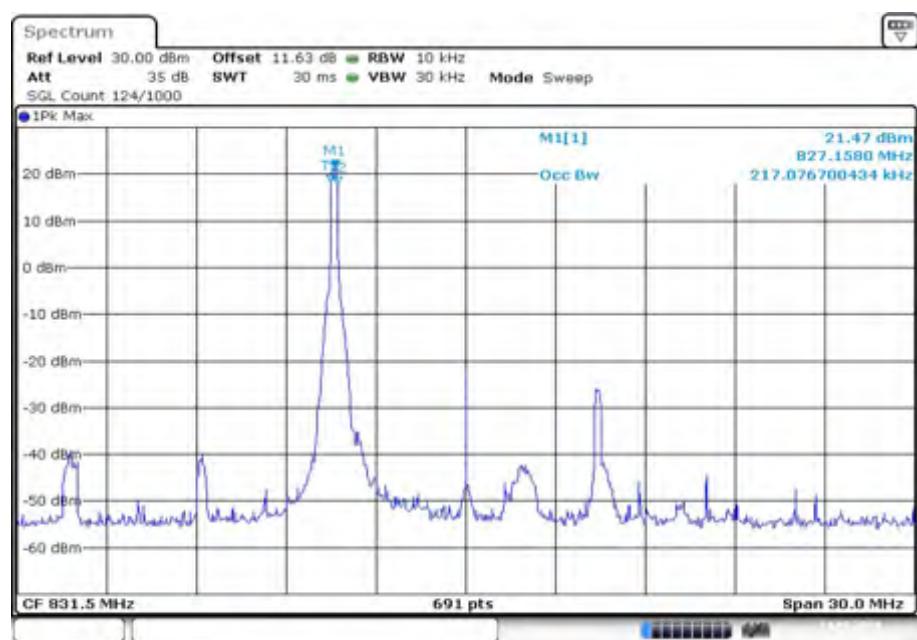


Fig.5

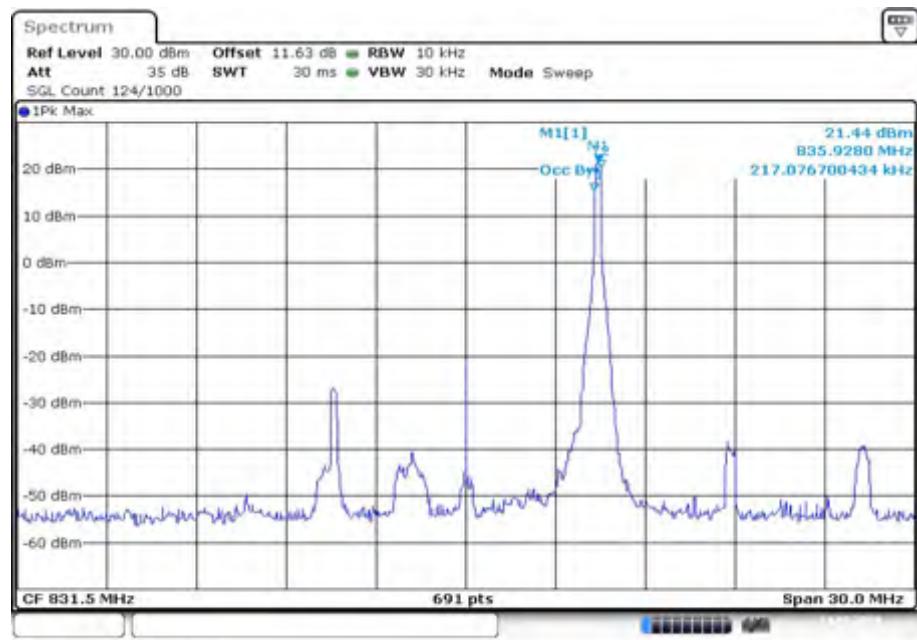


Fig.6

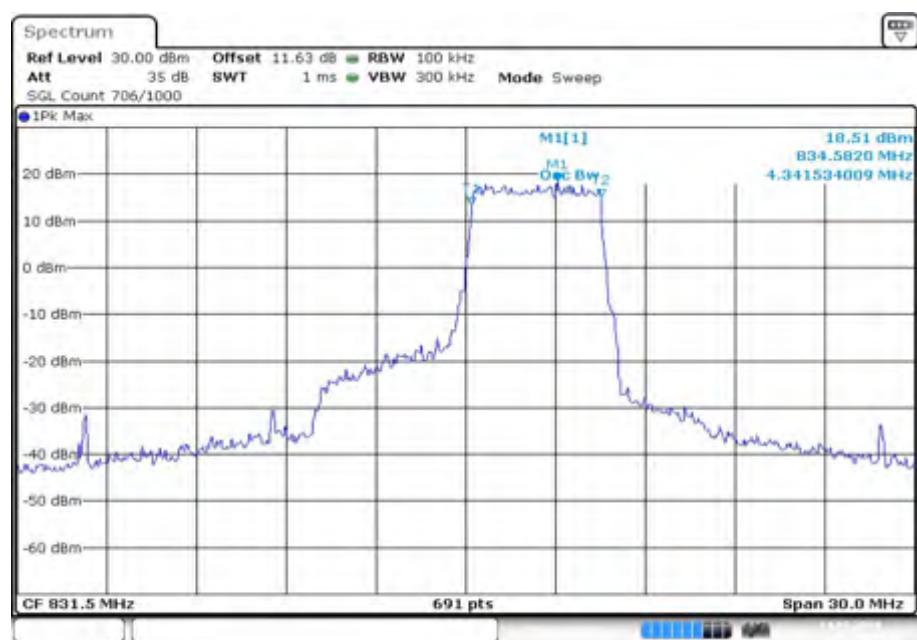


Fig.7

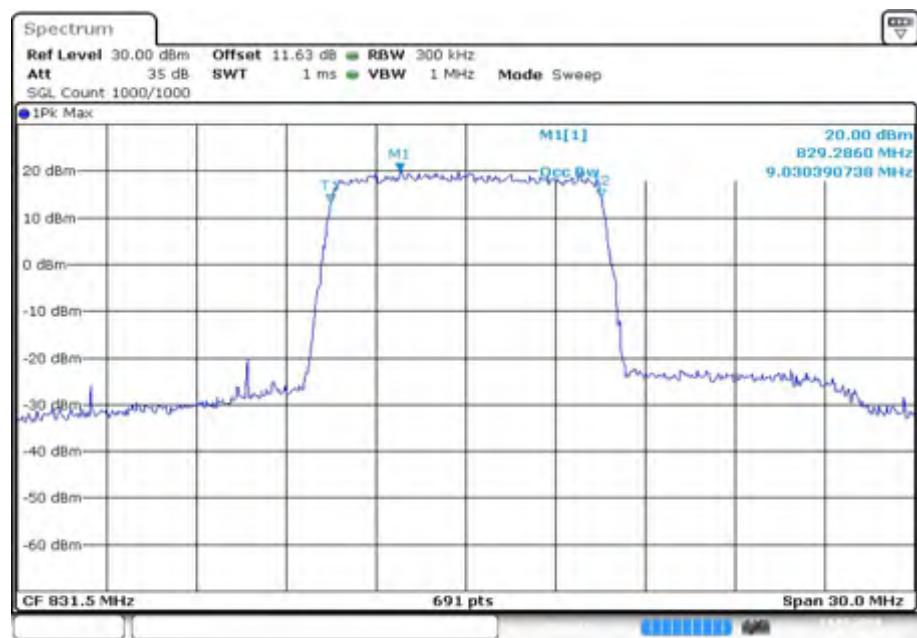


Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
26	844	26990	10	1	0	0.217	Fig.1	0.217	Fig.5
				1	49	0.217	Fig.2	0.217	Fig.6
				24	12	4.342	Fig.3	4.342	Fig.7
				50	0	9.030	Fig.4	9.030	Fig.8

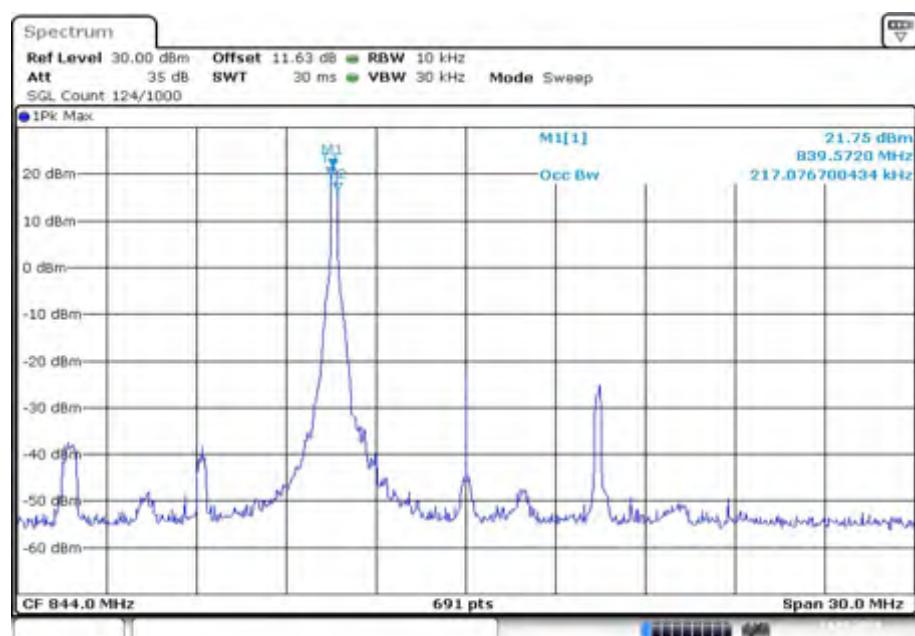


Fig.1

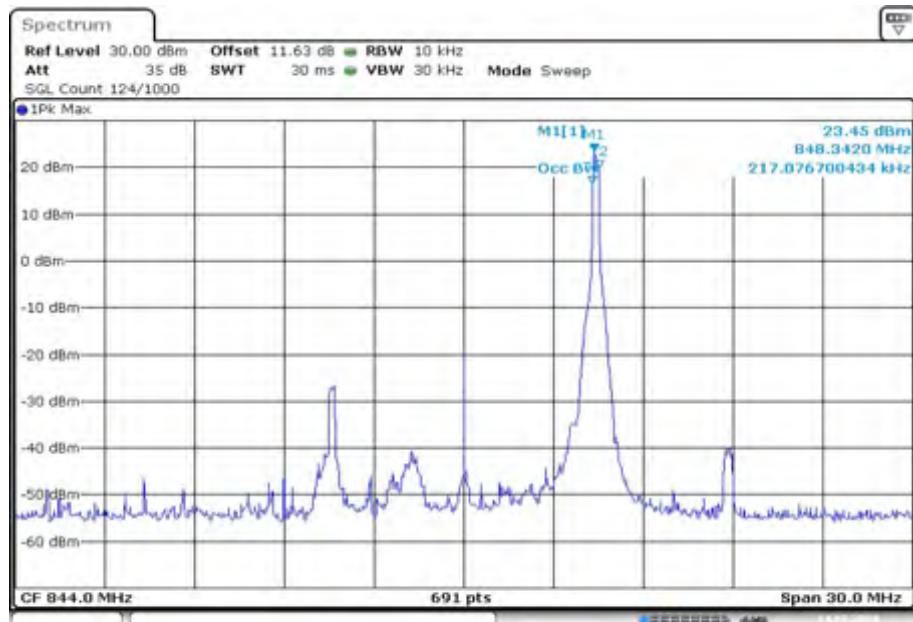


Fig.2



Fig.3



Fig.4

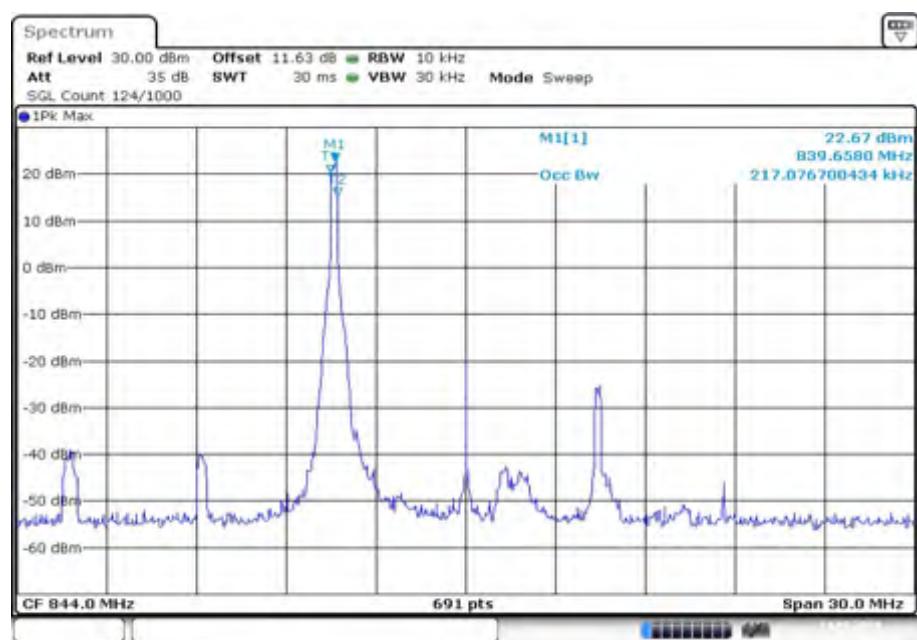


Fig.5

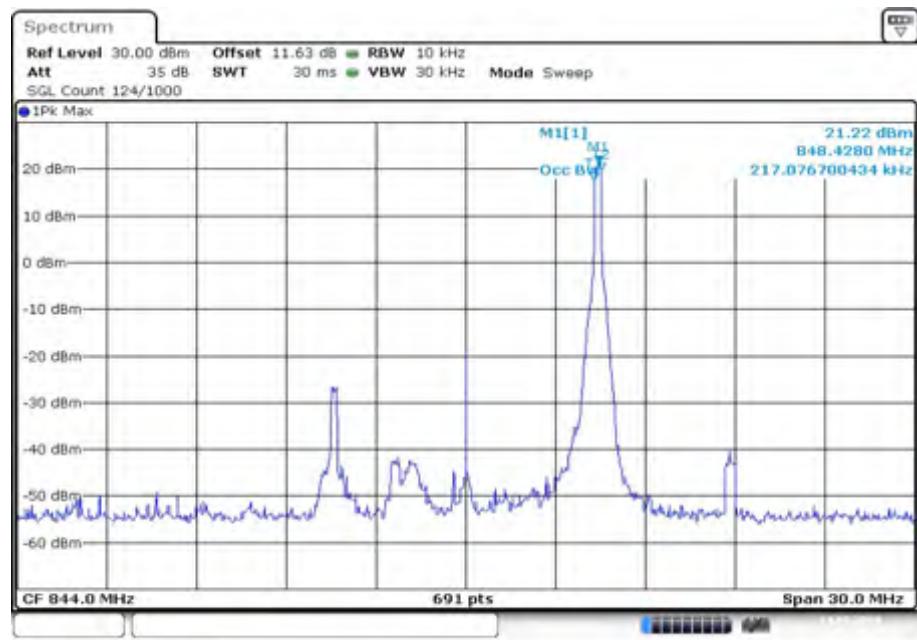


Fig.6



Fig.7

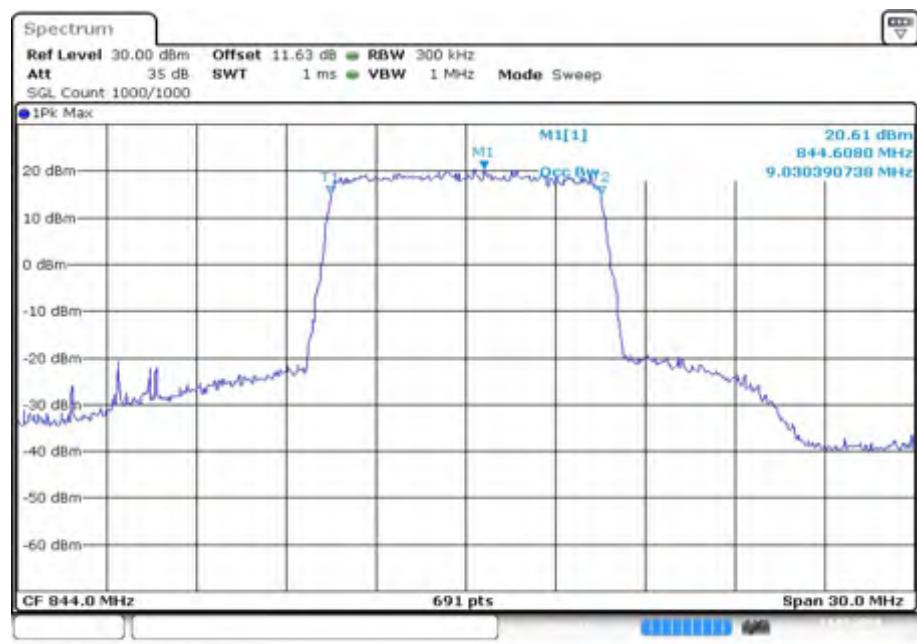


Fig.8

Band	Carrier frequency (MHz)	Channel( Low)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
26	821.5	26765	15	1	0	0.260	Fig.1	0.260	Fig.5
				1	74	0.260	Fig.2	0.260	Fig.6
				40	18	7.229	Fig.3	7.229	Fig.7
				75	0	13.480	Fig.4	13.480	Fig.8

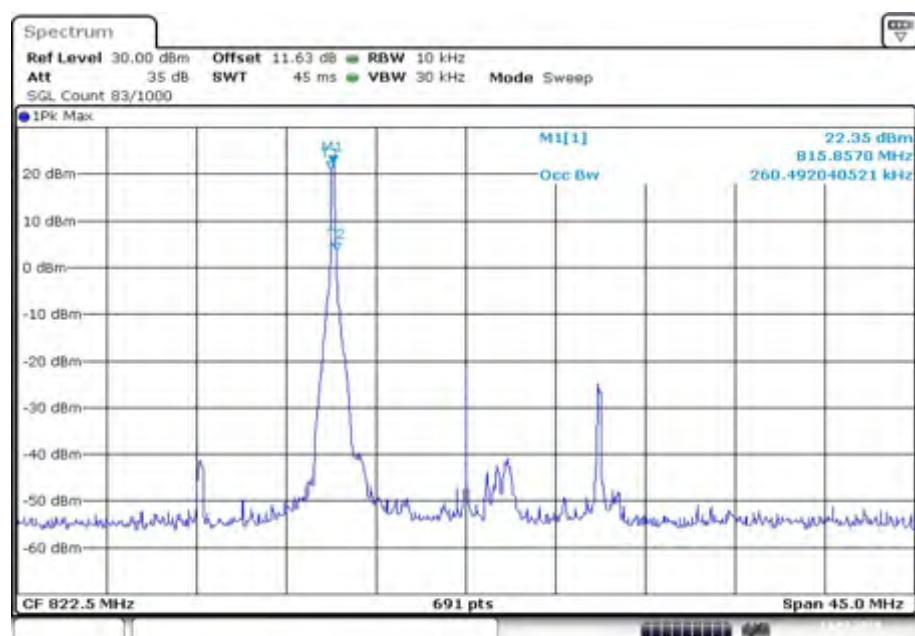


Fig.1

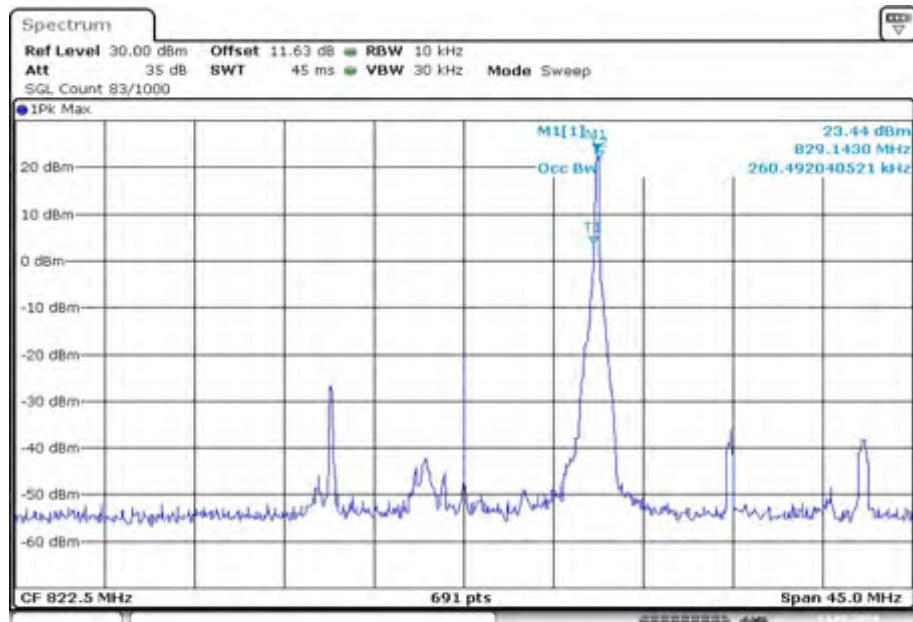


Fig.2

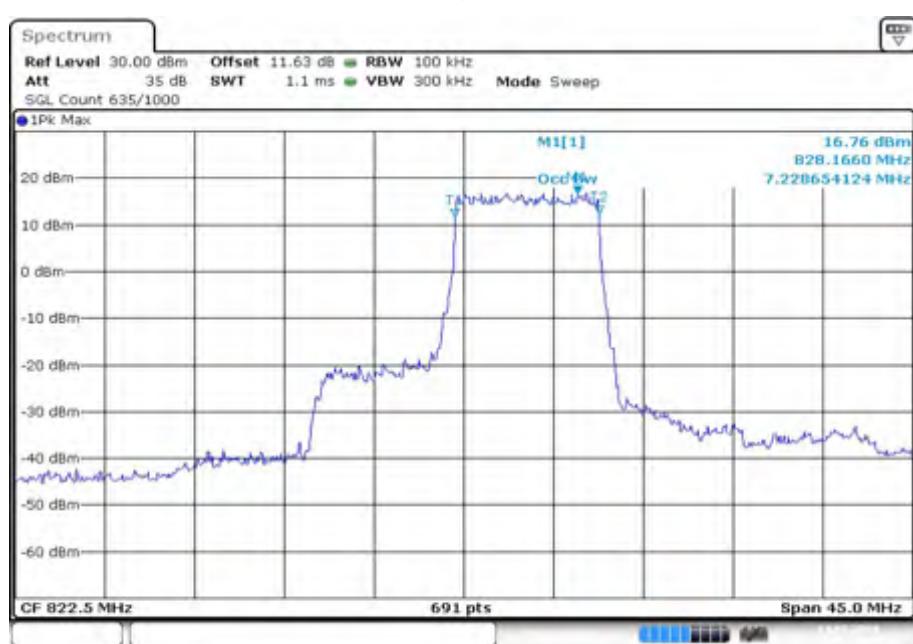
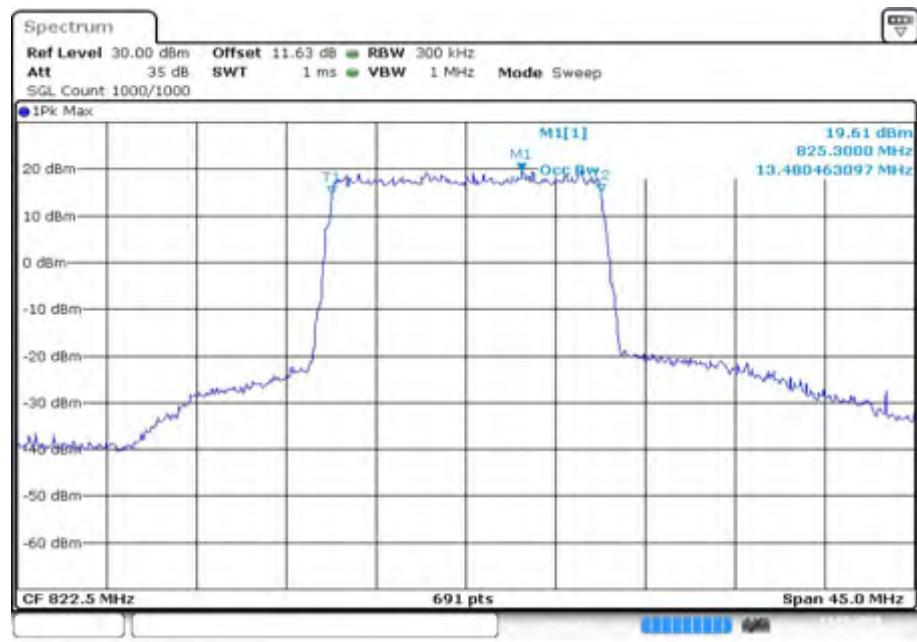
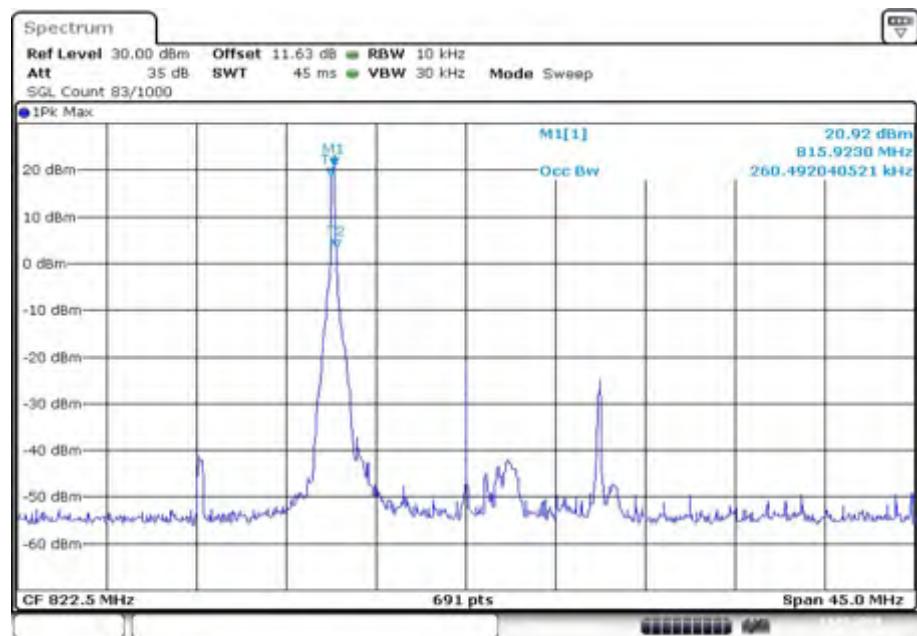


Fig.3



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Fig.4



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Fig.5

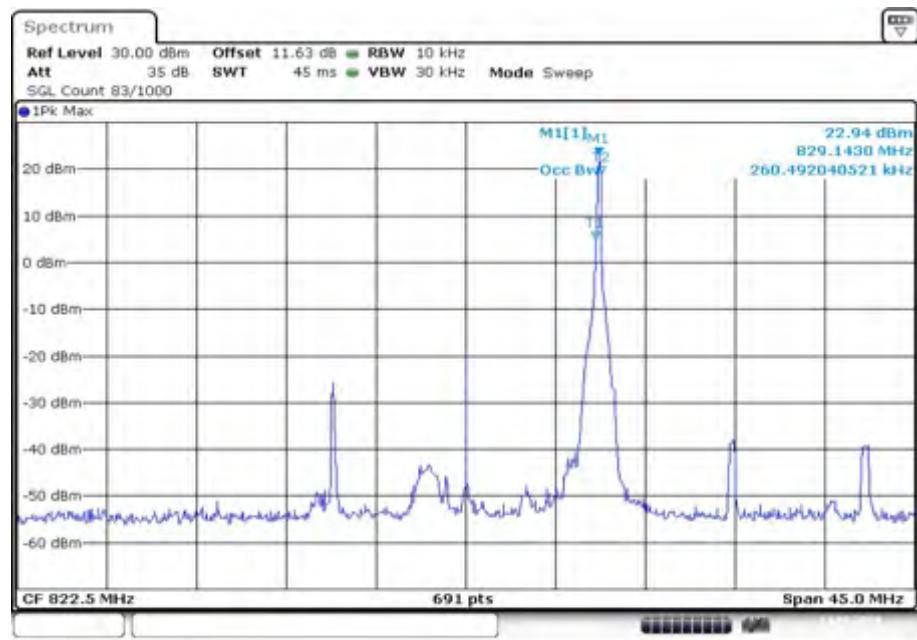


Fig.6

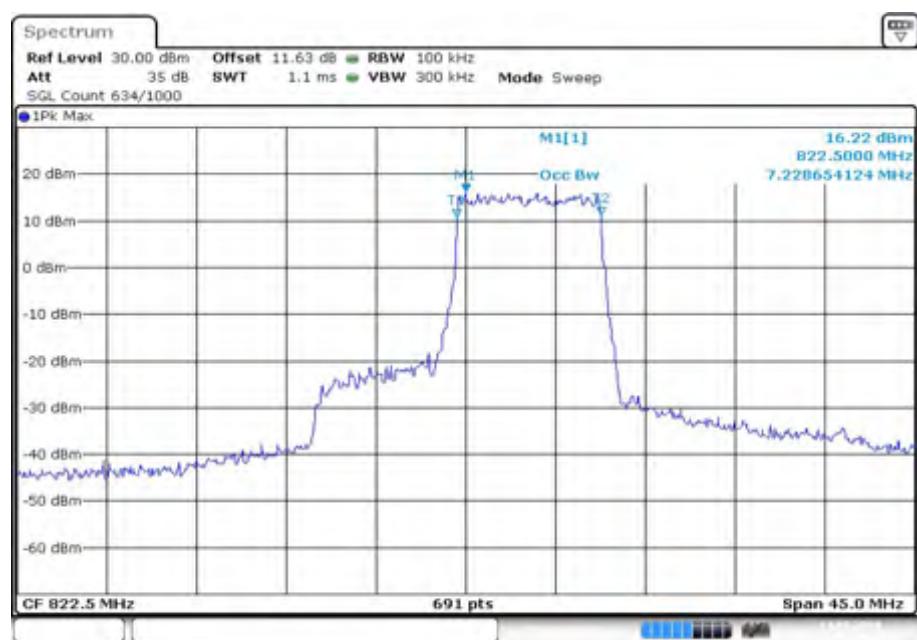


Fig.7



Fig.8

Band	Carrier frequency (MHz)	Channel( Mid)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.260	Fig.1	0.260	Fig.5
26	831.5	26865	15	1	0	0.260	Fig.1	0.260	Fig.5
				1	74	0.260	Fig.2	0.260	Fig.6
				40	18	7.229	Fig.3	7.229	Fig.7
				75	0	13.480	Fig.4	13.480	Fig.8

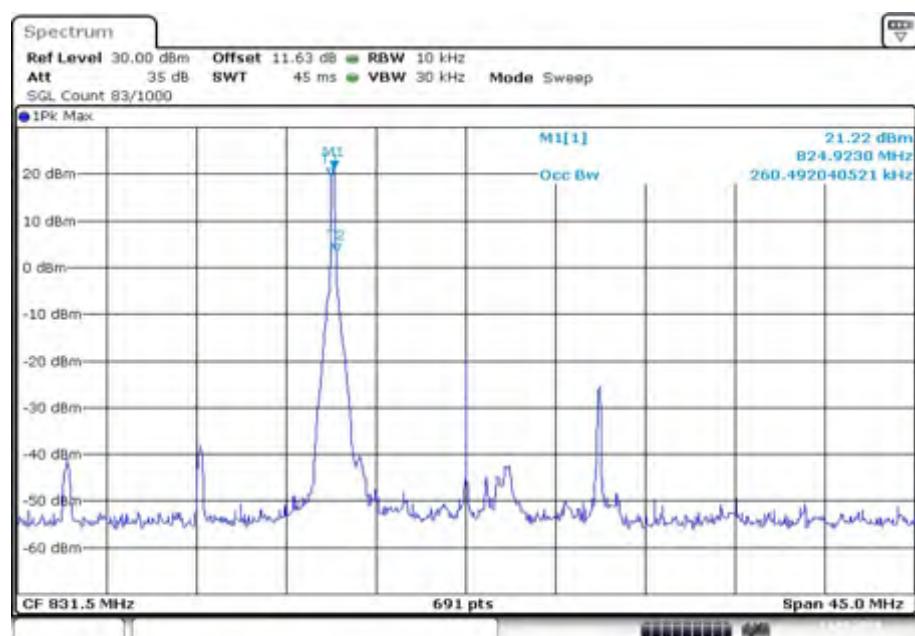


Fig.1

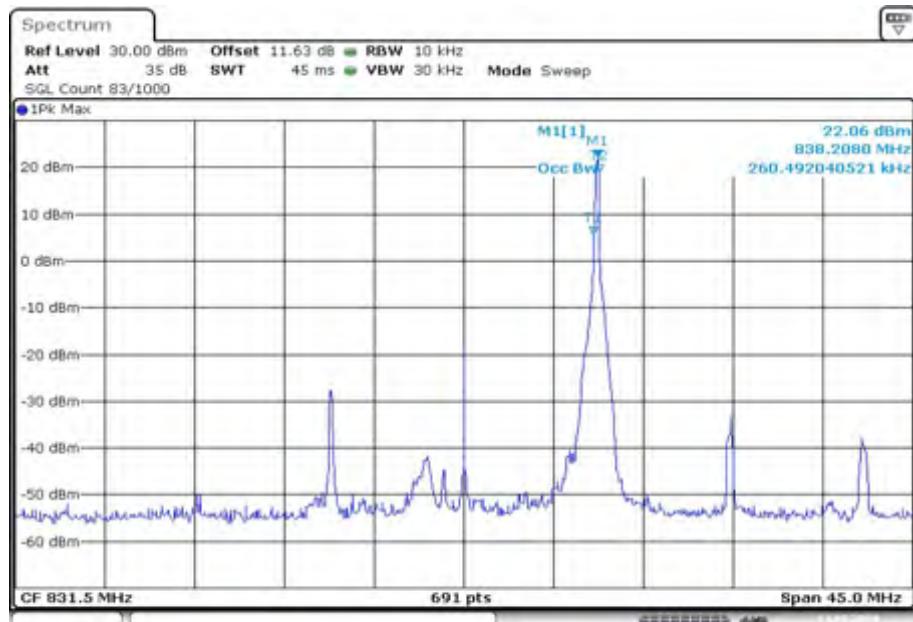


Fig.2

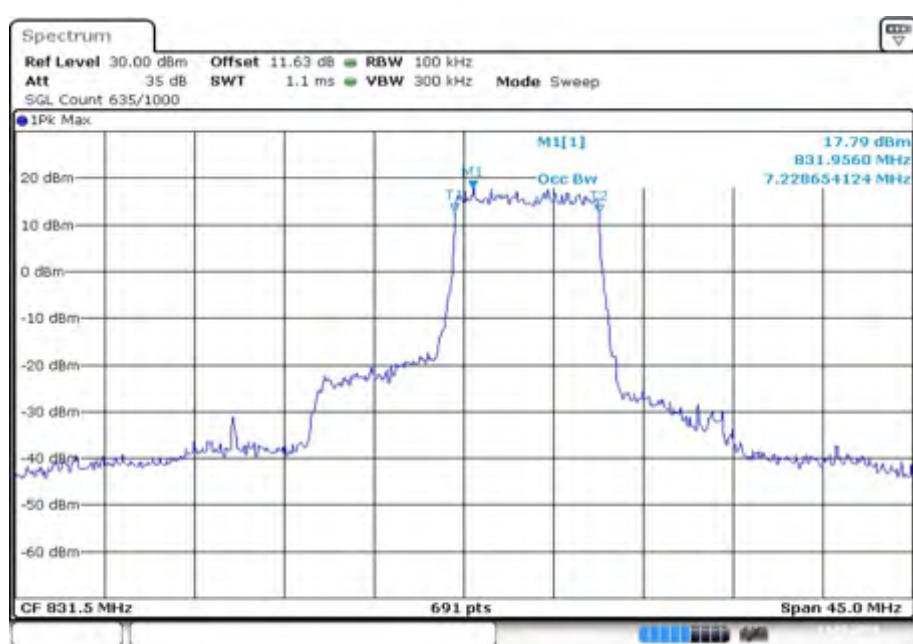


Fig.3

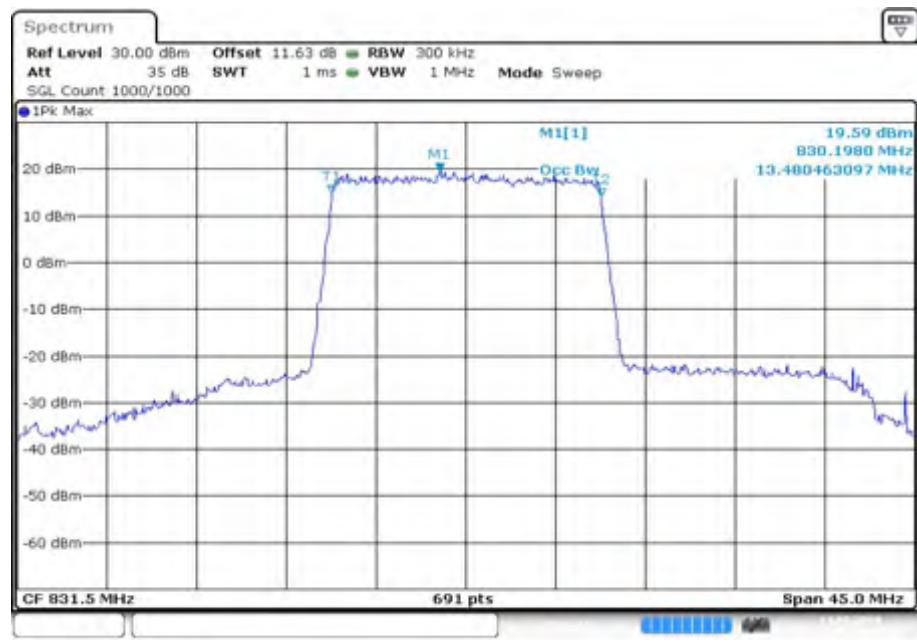


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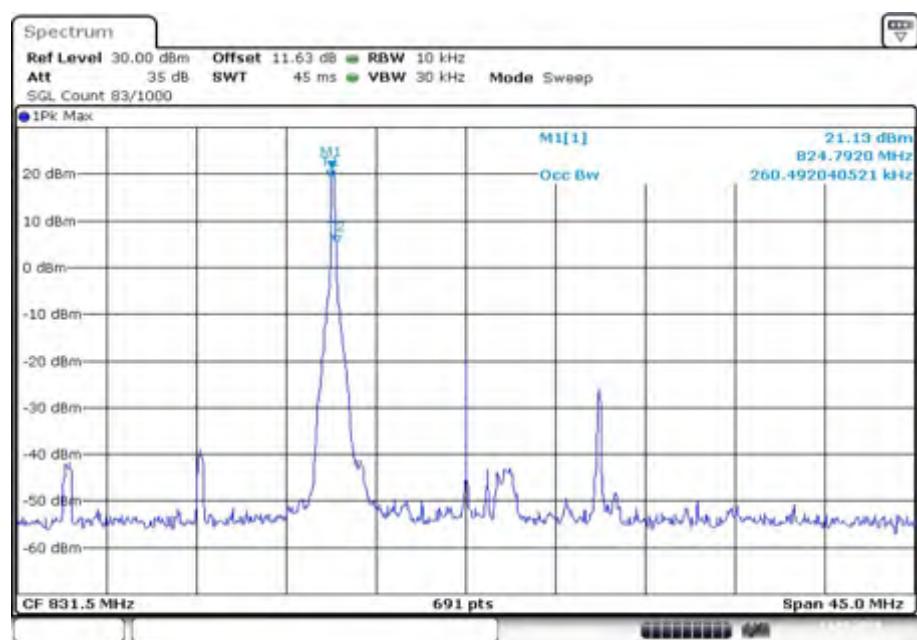


Fig.5

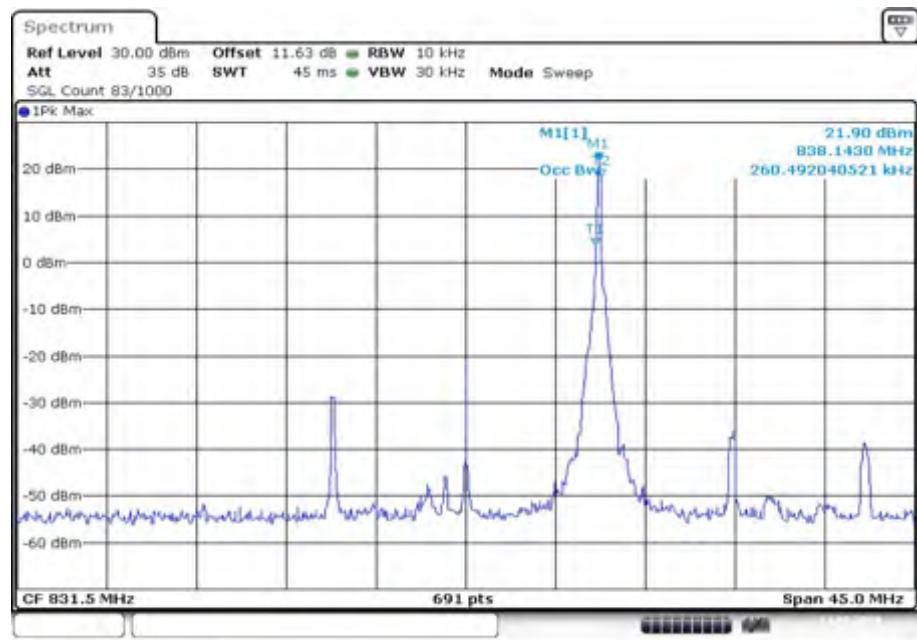


Fig.6

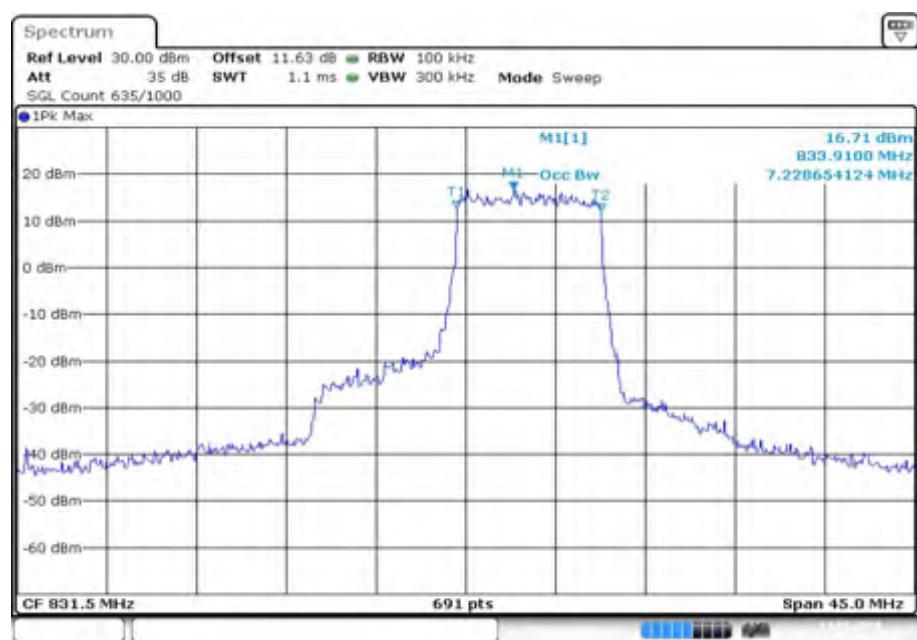


Fig.7



Fig.8

Band	Carrier frequency (MHz)	Channel( High)	BW	RB Size	RB Offset	Bandwidth of 99% Power (MHz)			
						QPSK		16-QAM	
						0.260	Fig.1	0.260	Fig.5
26	841.5	26965	15	1	0	0.260	Fig.1	0.260	Fig.5
				1	74	0.260	Fig.2	0.260	Fig.6
				40	18	7.229	Fig.3	7.164	Fig.7
				75	0	13.415	Fig.4	13.546	Fig.8

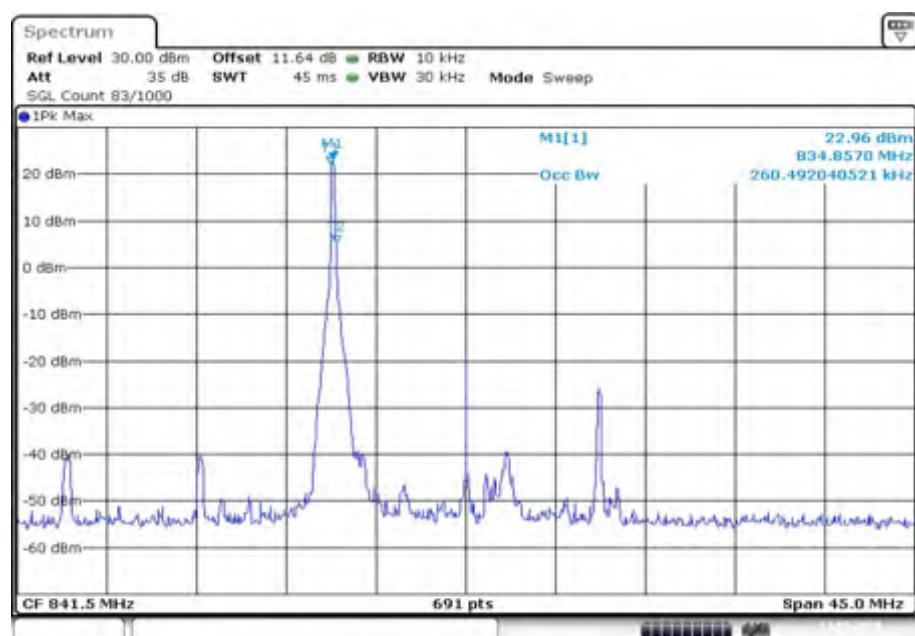


Fig.1

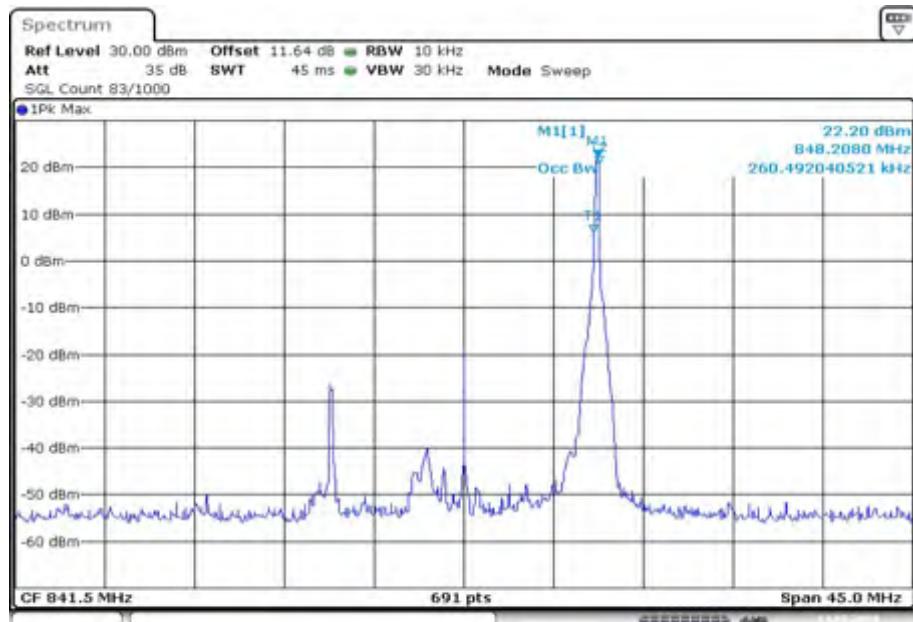


Fig.2

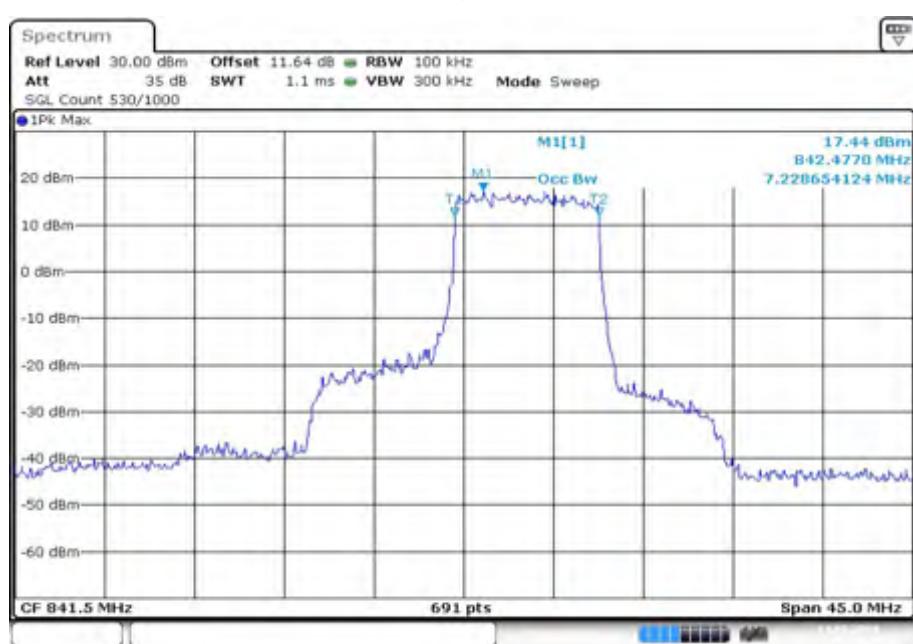


Fig.3

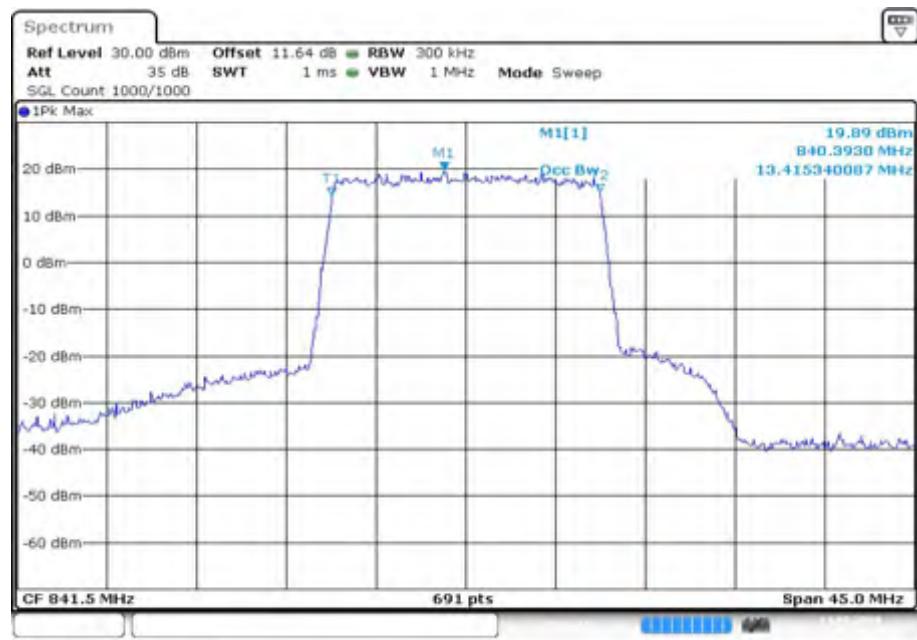


Fig.4

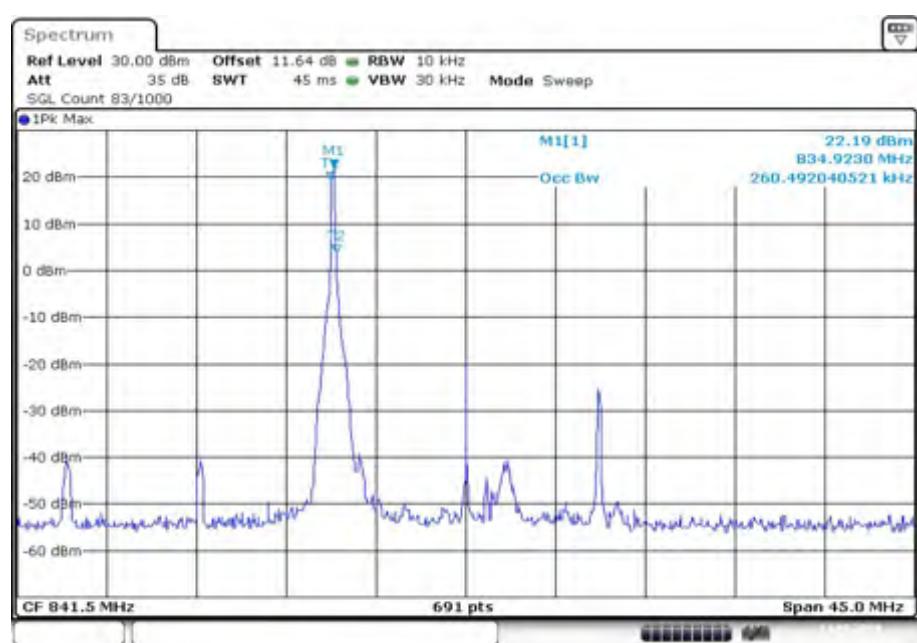


Fig.5

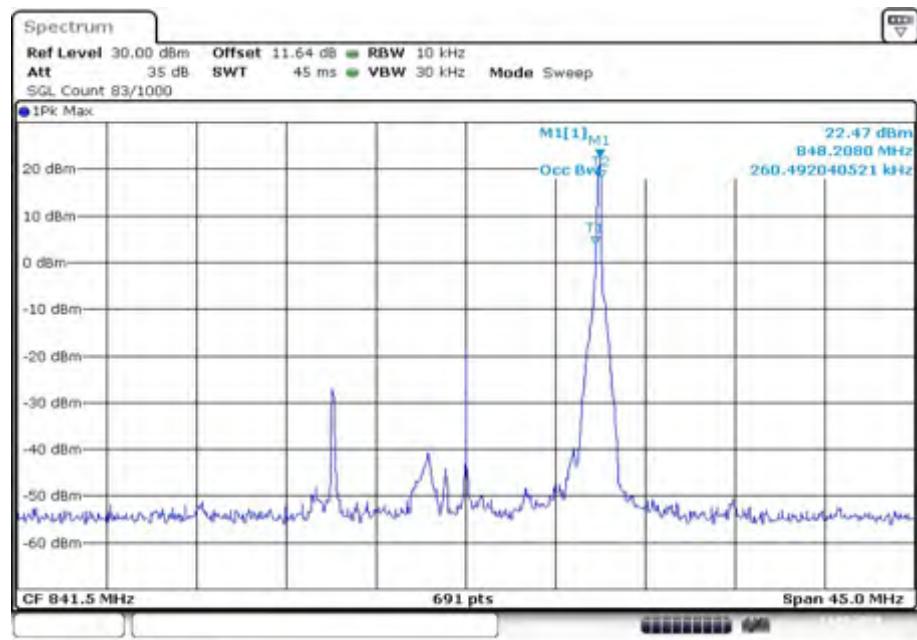


Fig.6

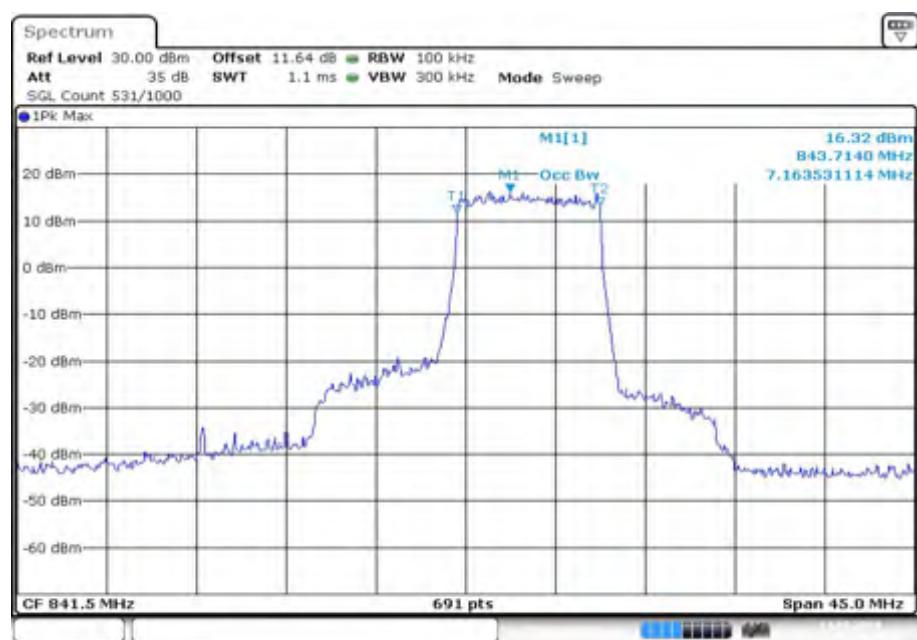
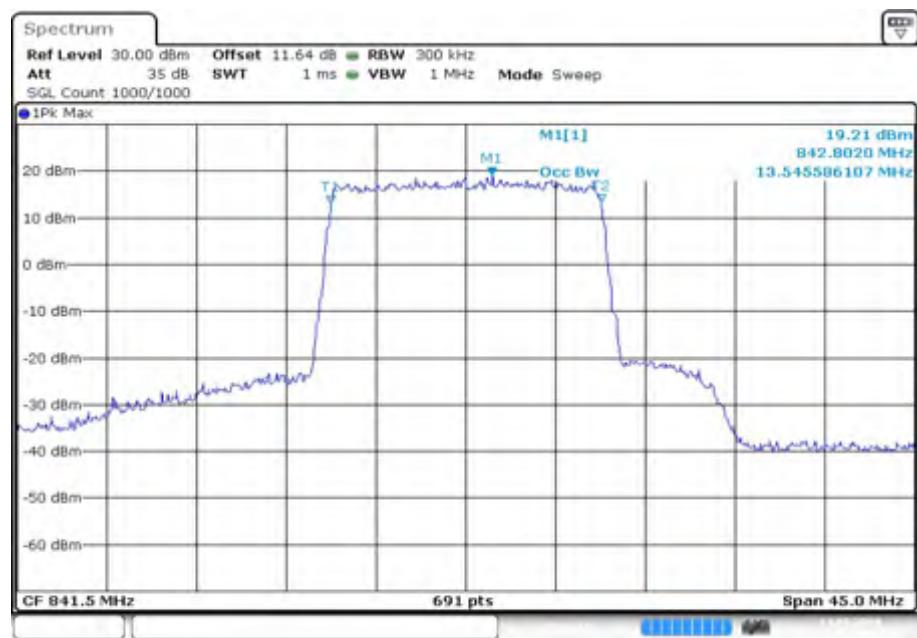


Fig.7



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Fig.8

## A.5 EMISSION BANDWIDTH

### Reference

FCC: CFR Part 2.1049, 90.1215

### A.5.1 Emission Bandwidth Results

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power. Table below lists the measured -26dBc BW. Spectrum analyzer plots are included on the following pages.

#### LTE Band 14

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
14	790.5	23305	5	1	0	0.369	Fig.1	0.412
				1	24	0.391	Fig.2	0.391
				12	6	2.713	Fig.3	2.713
				25	0	4.971	Fig.4	4.971

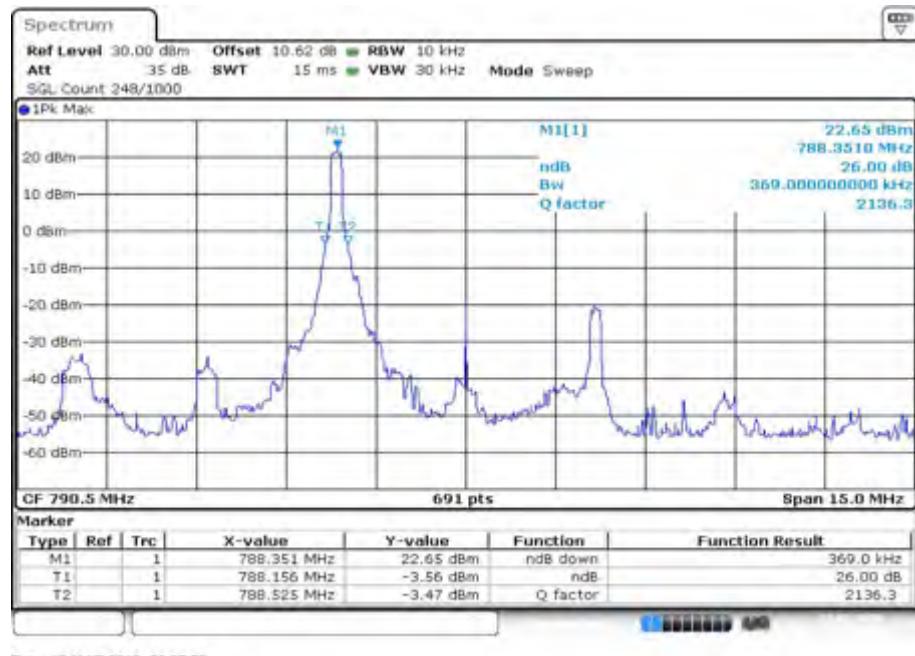


Fig.1

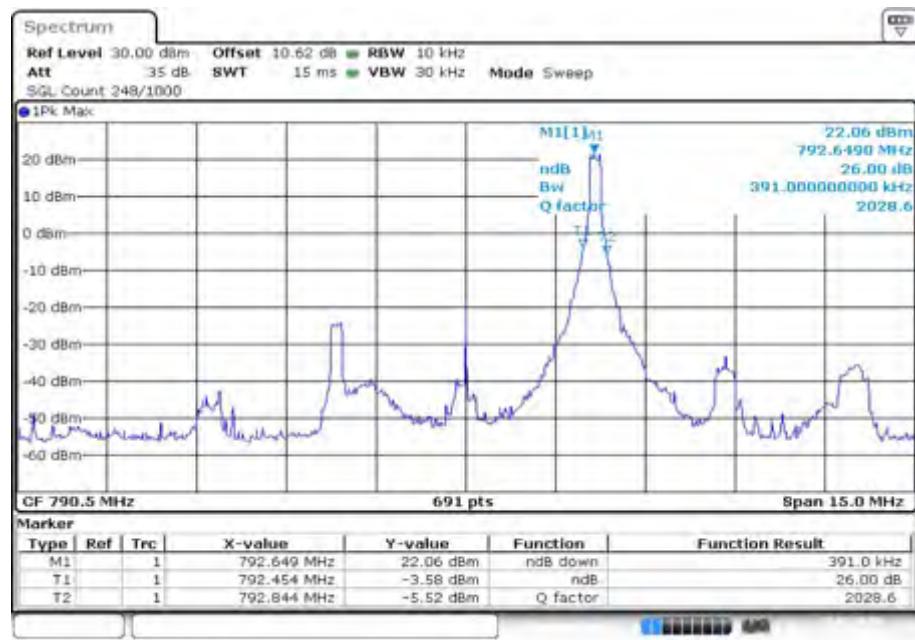


Fig.2

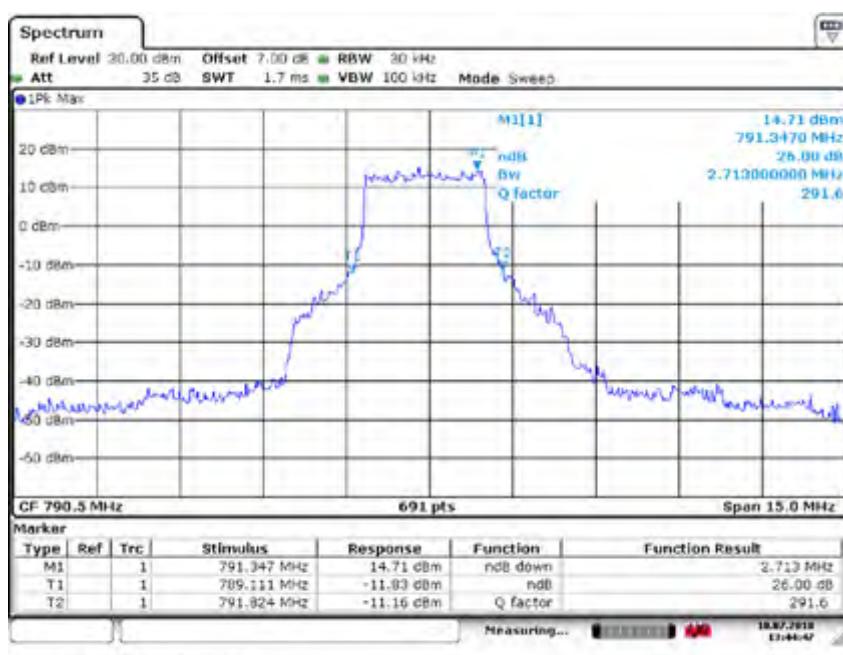


Fig.3

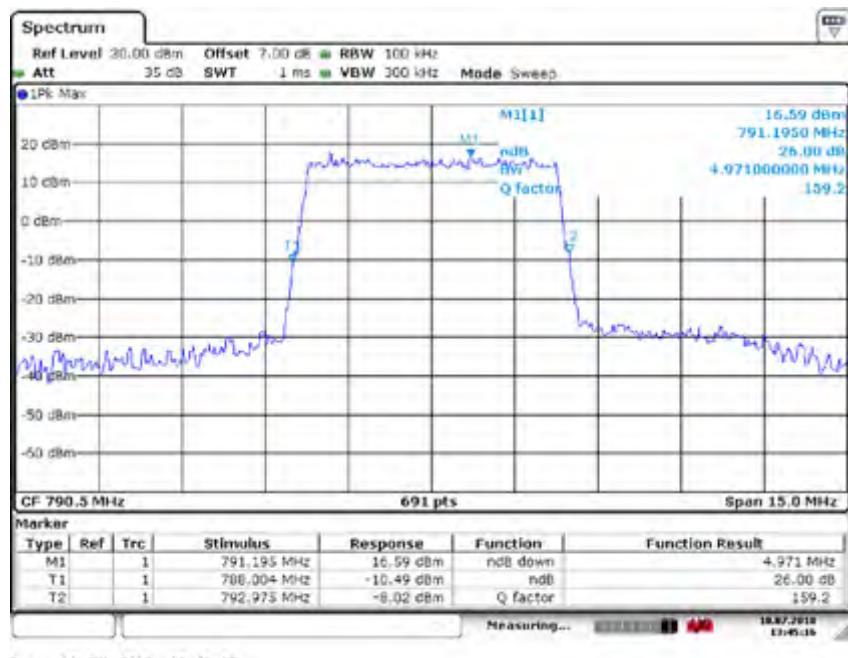


Fig.4

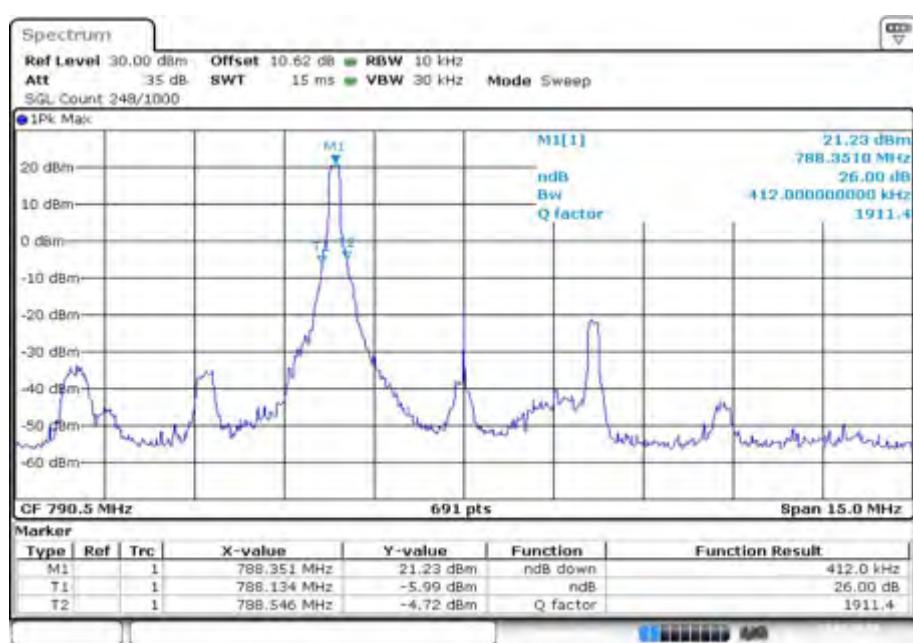


Fig.5

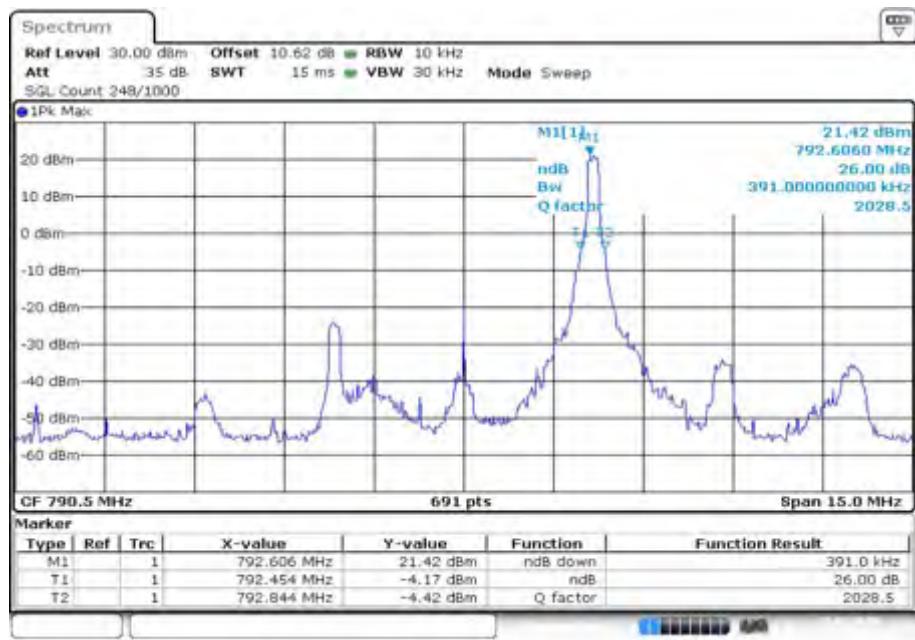


Fig.6

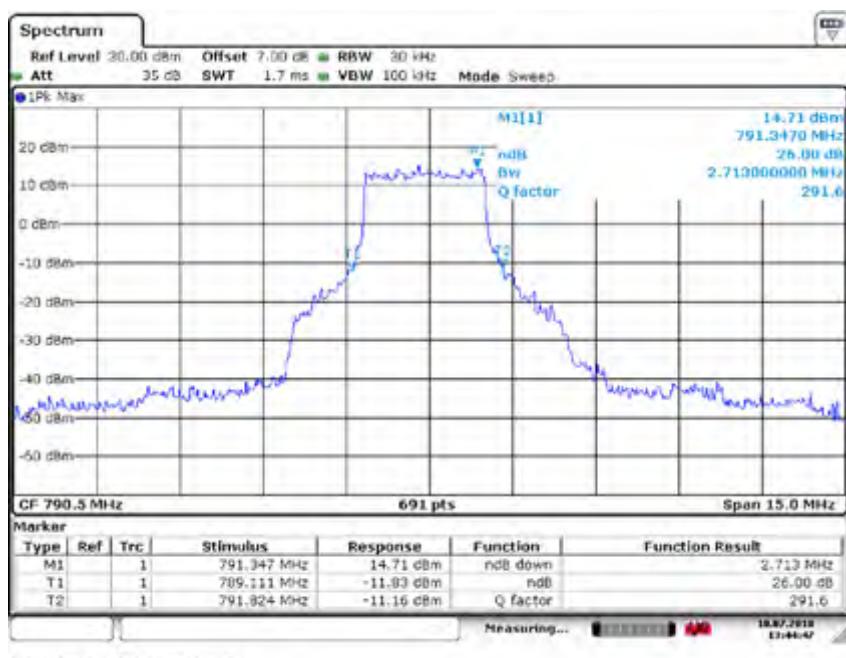


Fig.7



Fig.8

Band	Carrier frequency (MHz)	Channel (Mid)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
14	793	23330	5	1	0	0.369	Fig.1	0.391
				1	24	0.391	Fig.2	0.391
				12	6	2.692	Fig.3	2.692
				25	0	4.949	Fig.4	4.949

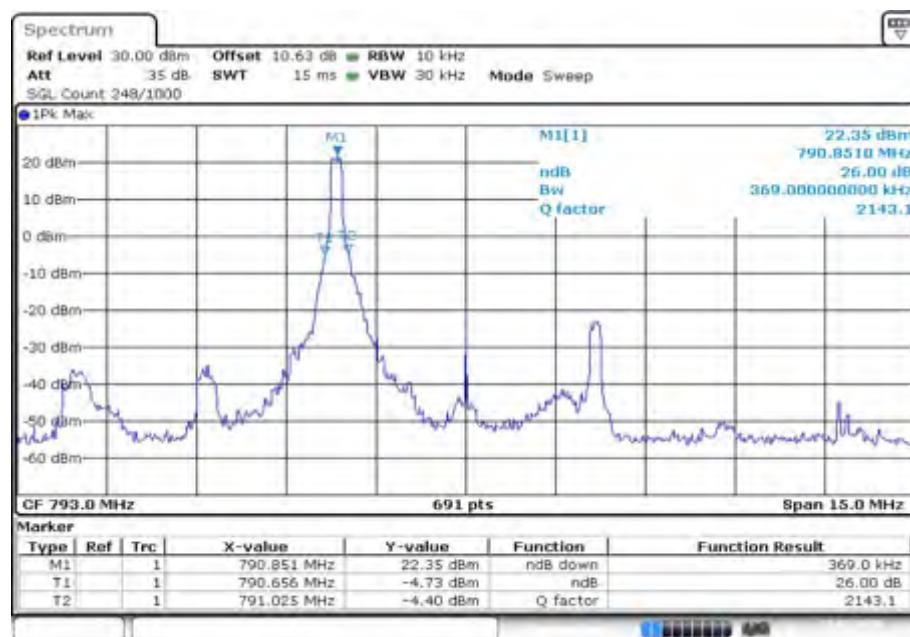
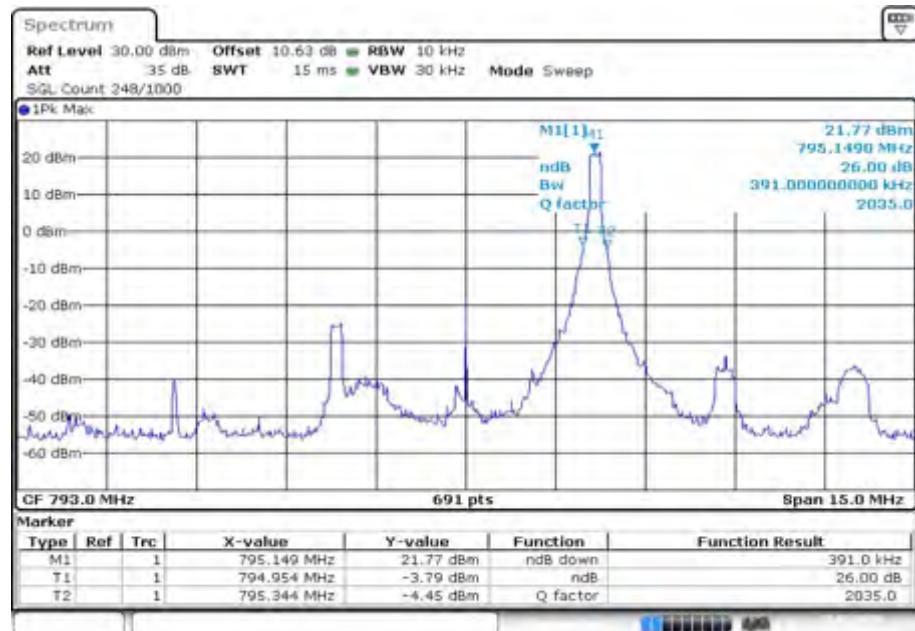
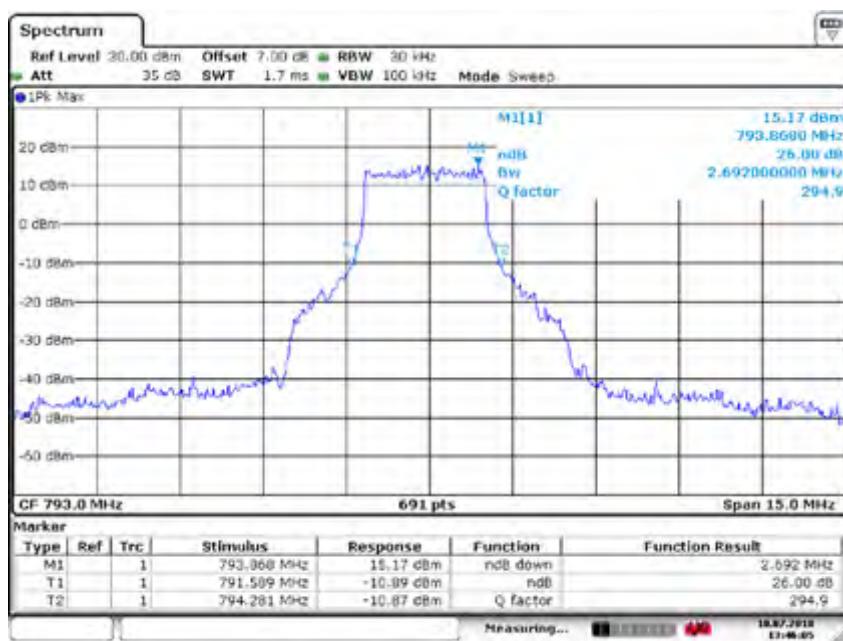


Fig.1



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Fig.2



Date: 10.JUL.2018 13:46:05

Fig.3

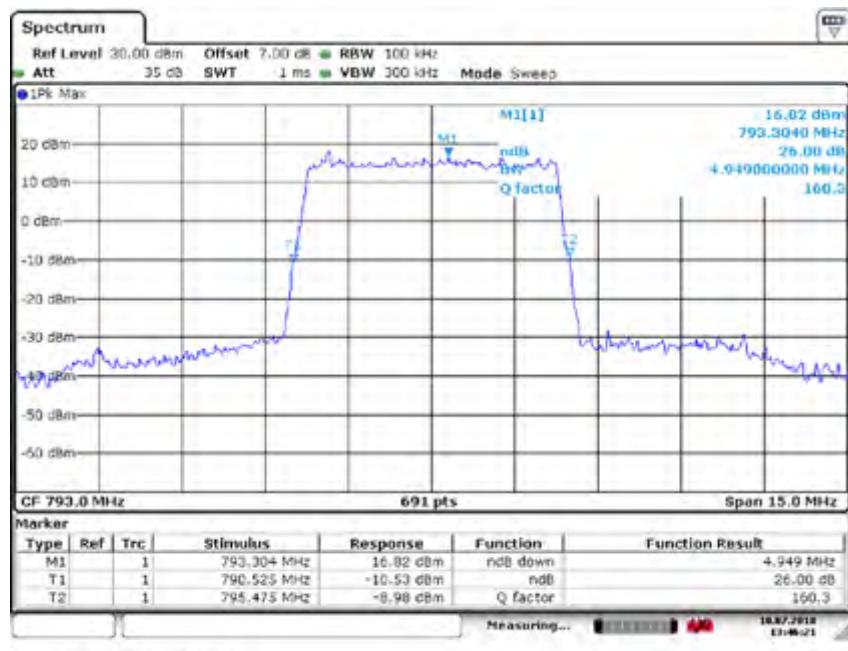


Fig.4

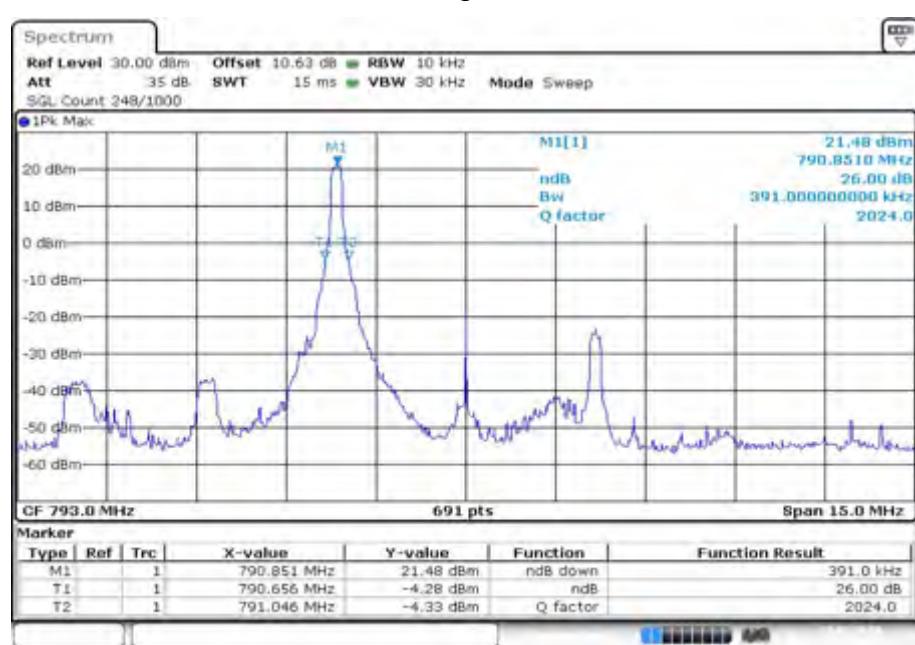


Fig.5

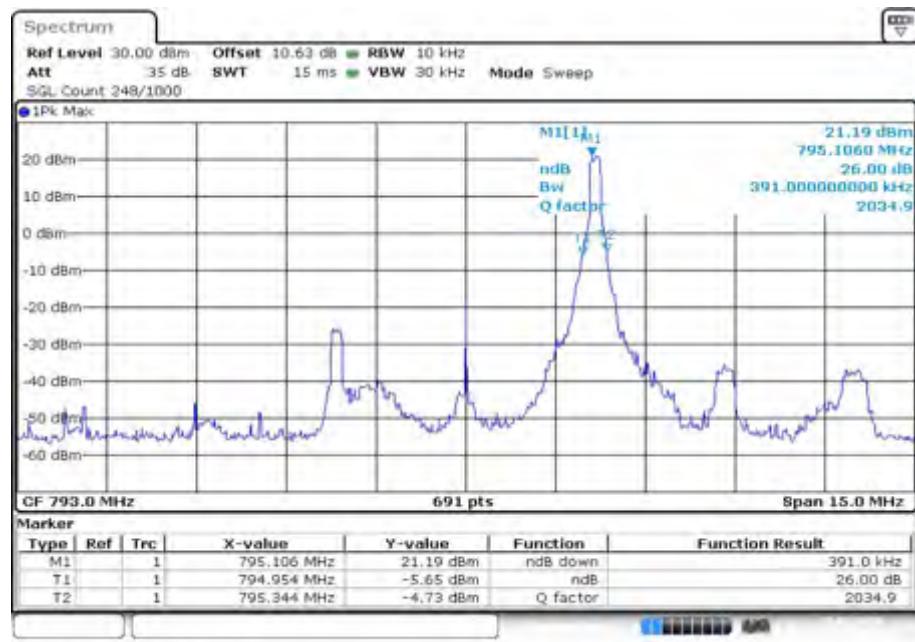


Fig.6

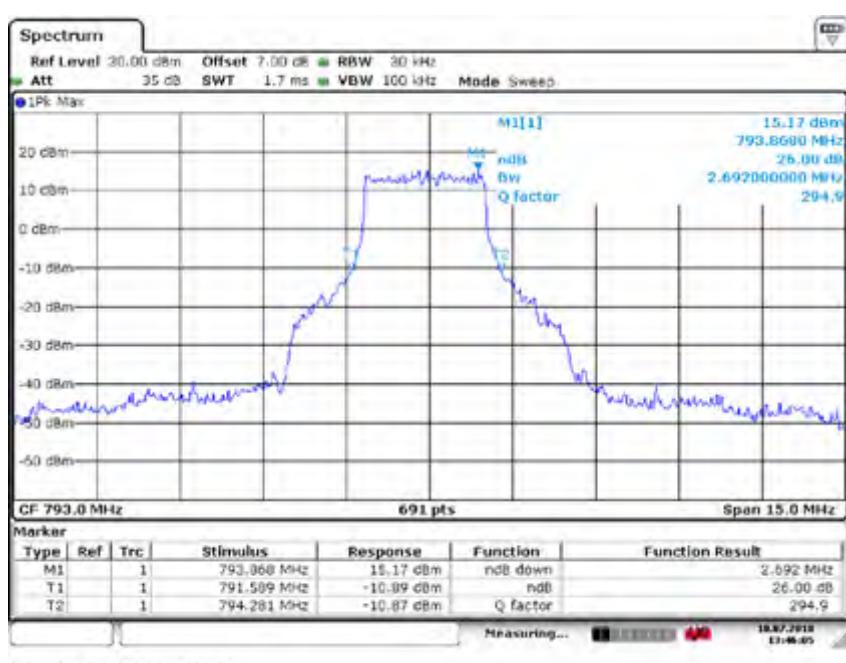


Fig.7

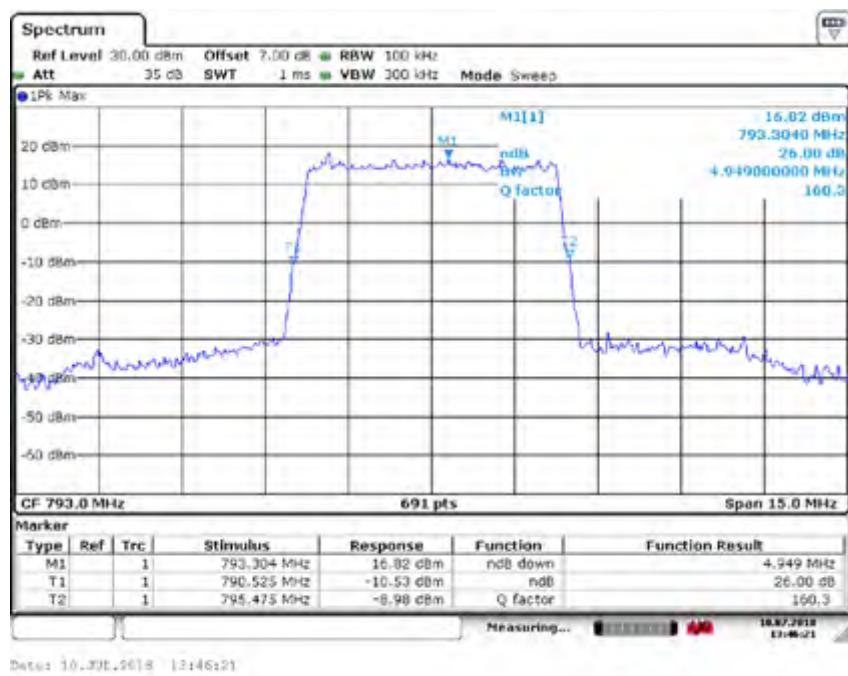


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
14	795.5	23355	5	1	0	0.369	Fig.1	0.369
				1	24	0.369	Fig.2	0.391
				12	6	2.692	Fig.3	2.692
				25	0	4.928	Fig.4	4.928



Fig.1

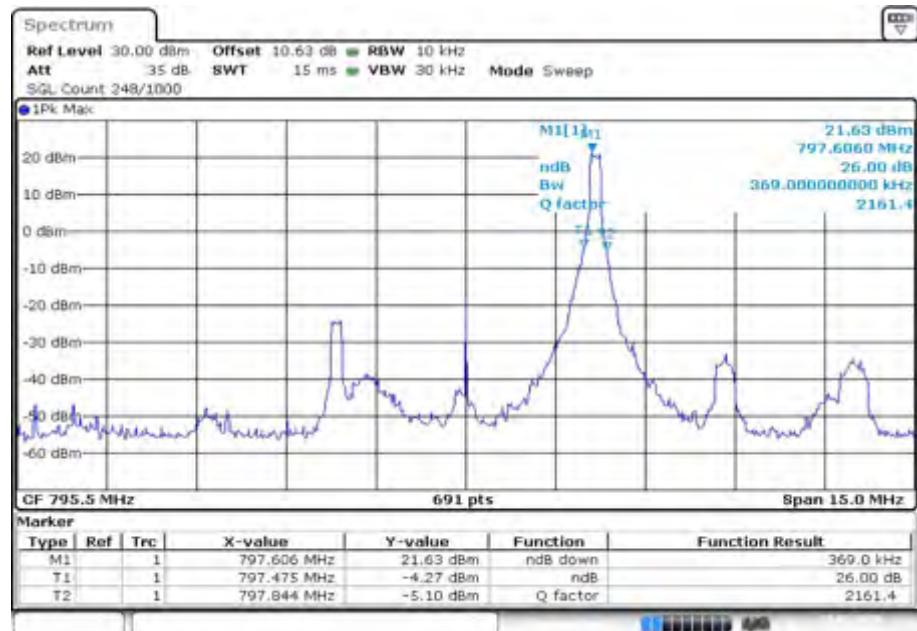


Fig.2

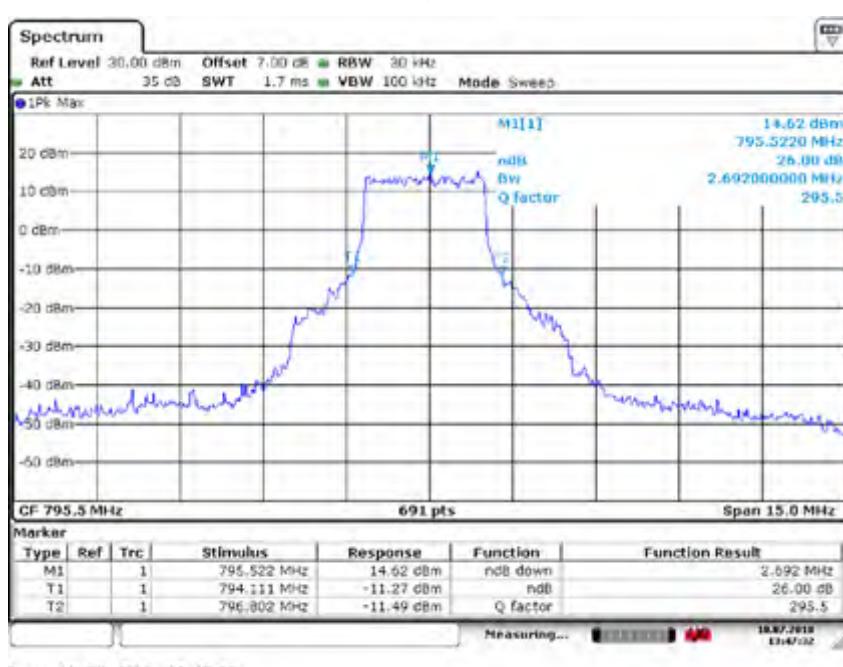


Fig.3

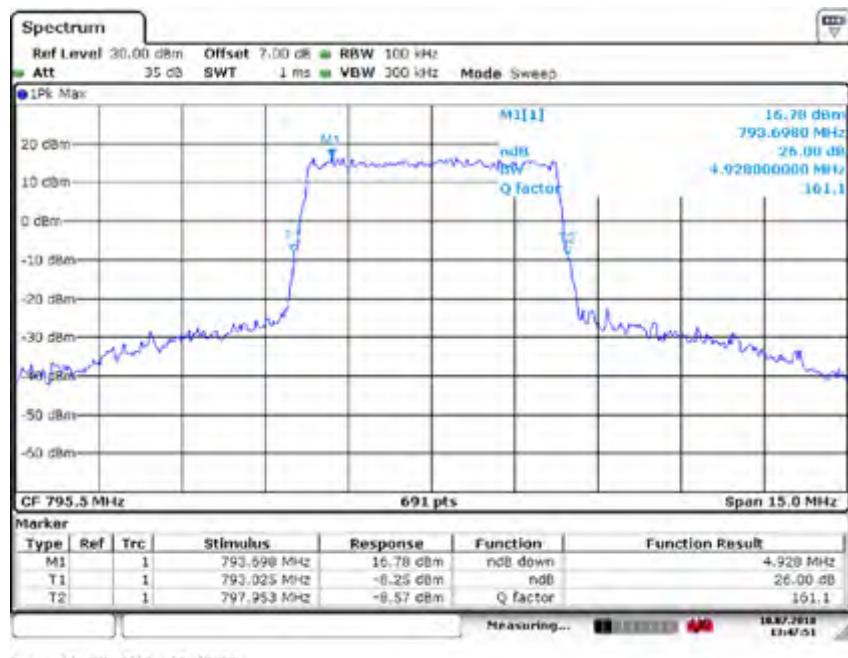


Fig.4

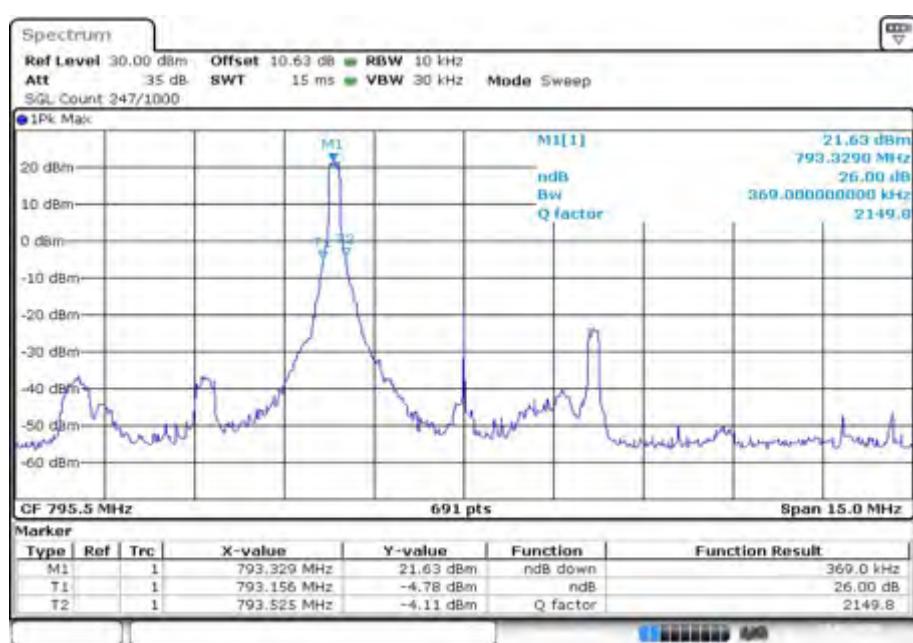


Fig.5

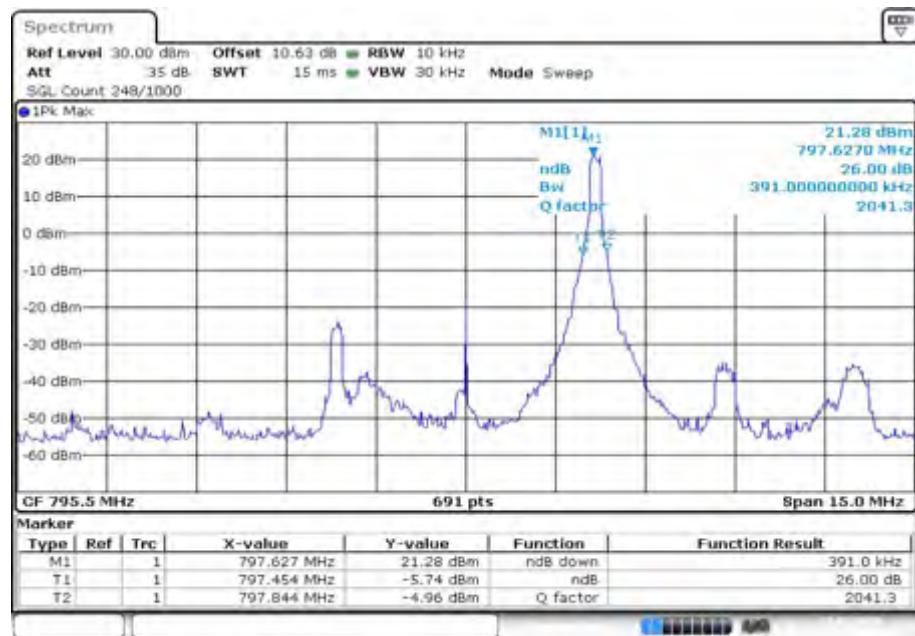


Fig.6

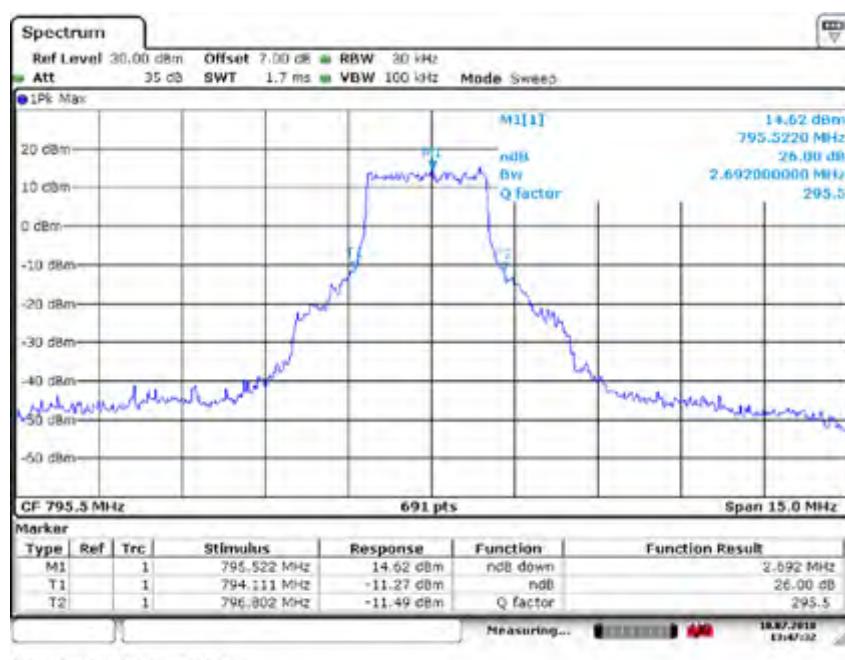


Fig.7



Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
14	793	23330	10	1	0	0.391	Fig.1	0.391
				1	49	0.391	Fig.2	0.478
				24	12	4.949	Fig.3	5.210
				50	0	9.986	Fig.4	9.942

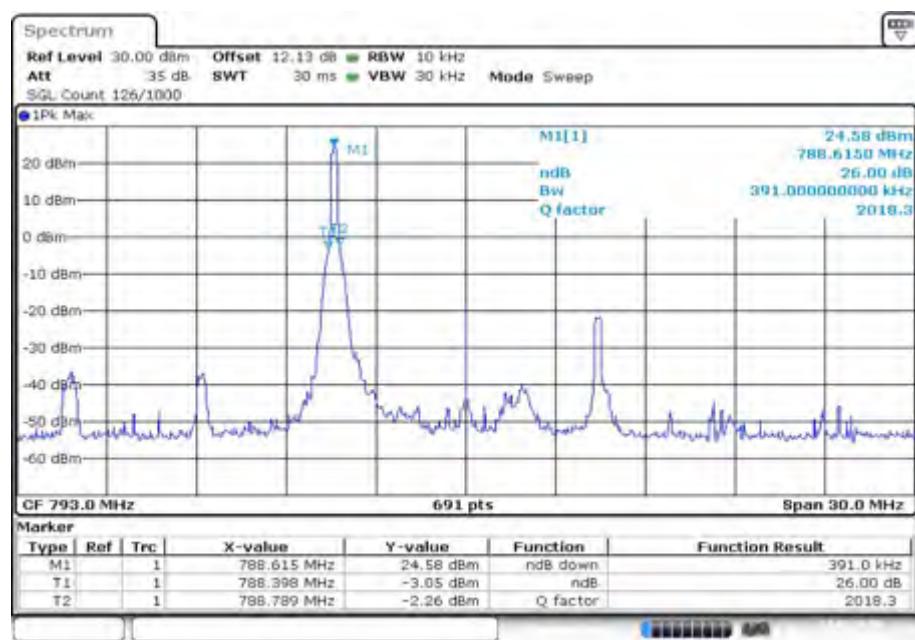


Fig.1

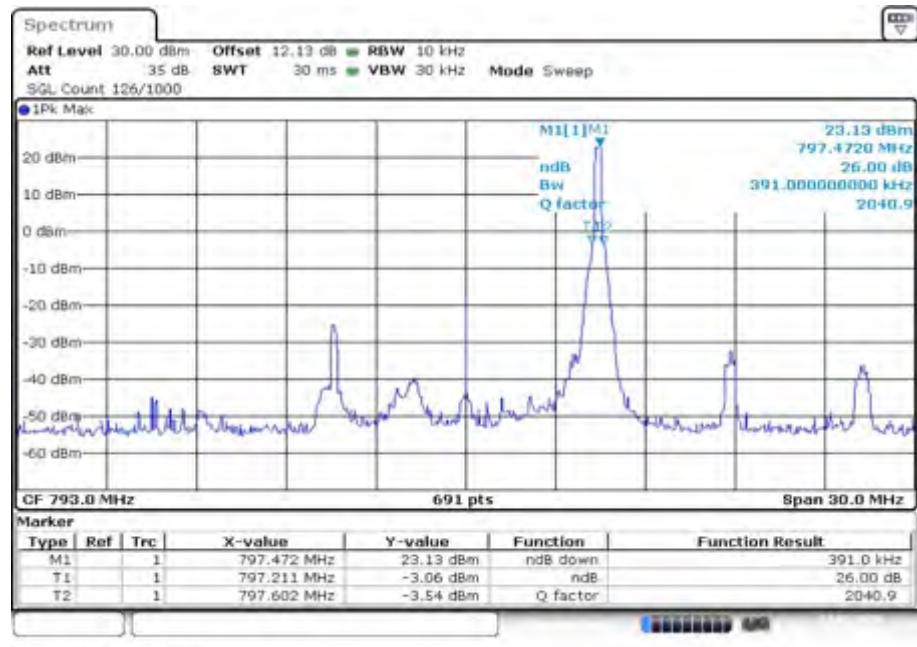


Fig.2

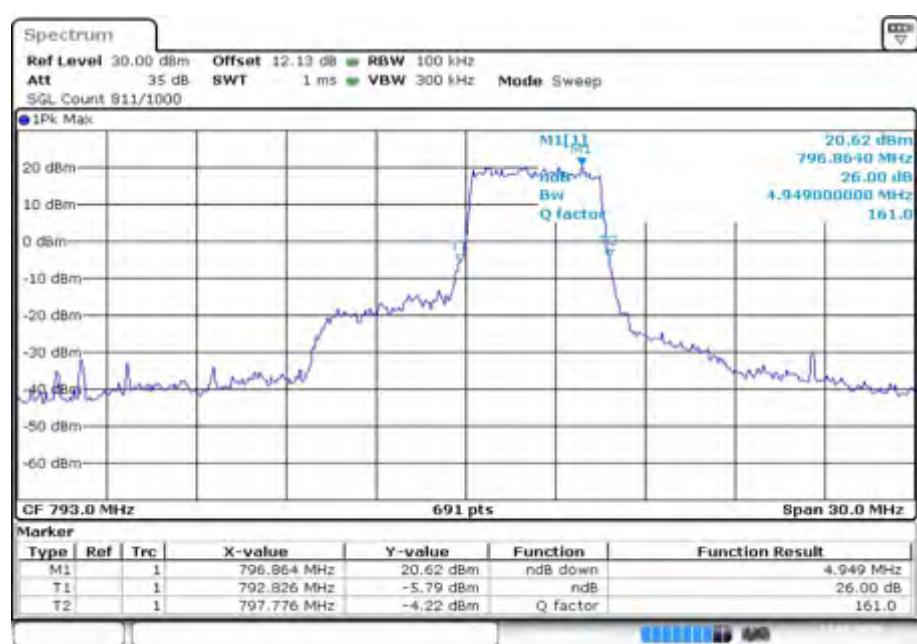


Fig.3

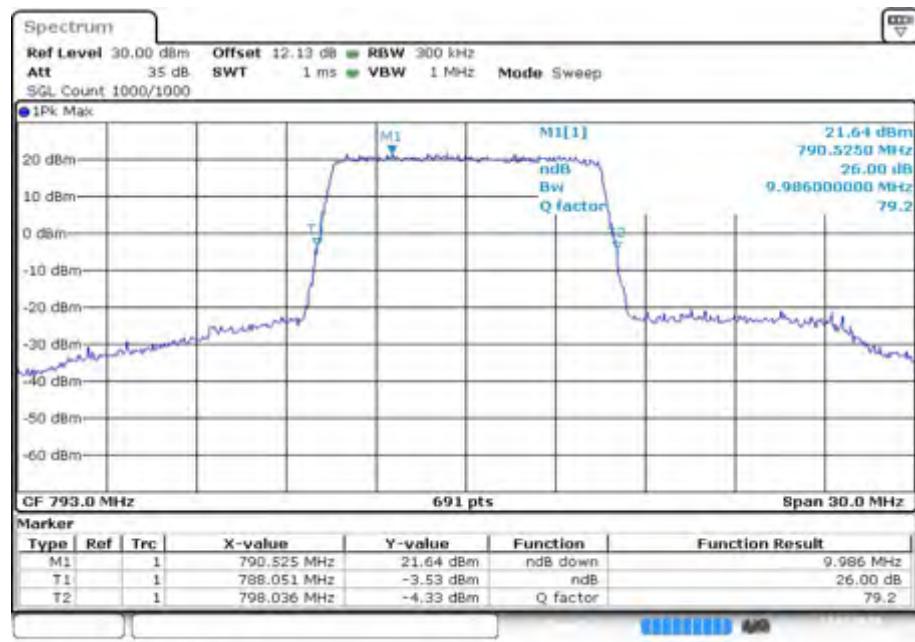


Fig.4

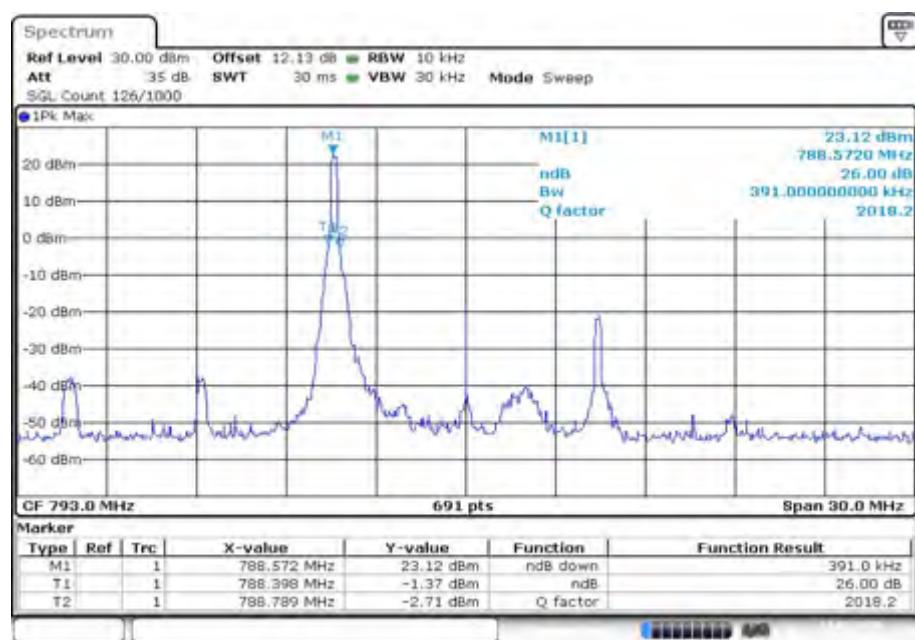


Fig.5

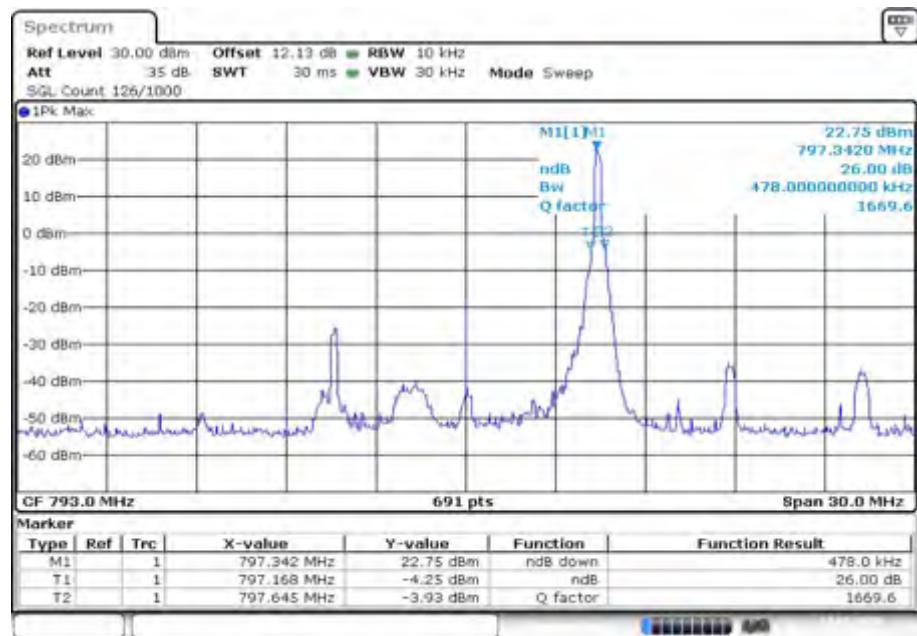


Fig.6

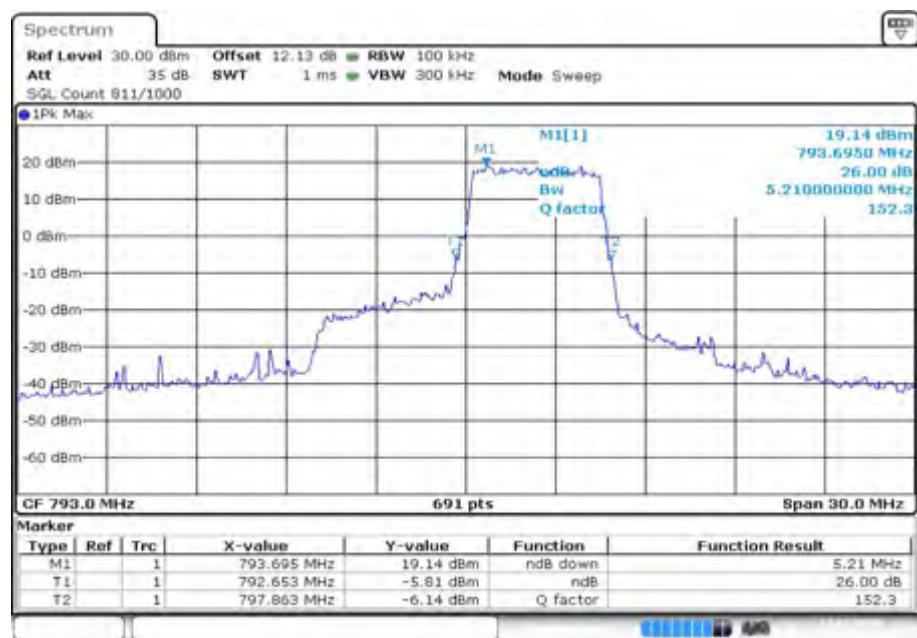


Fig.7

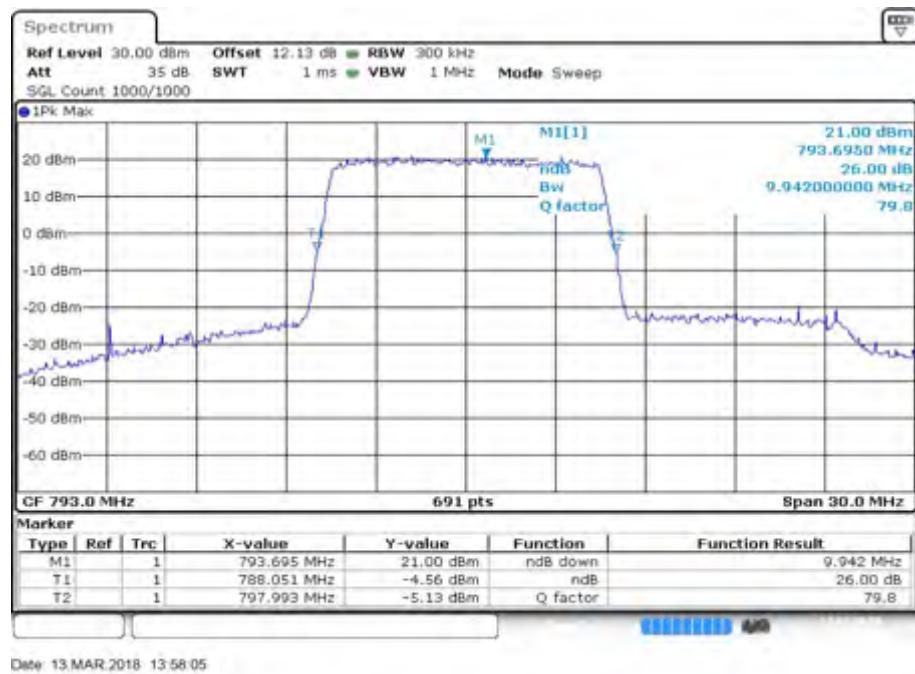


Fig.8

Band	Carrier frequency (MHz)	Channel (Mid)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
14	793	23330	10	1	0	0.391	Fig.1	0.434
				1	49	0.391	Fig.2	0.391
				24	12	4.949	Fig.3	5.166
				50	0	9.942	Fig.4	9.942

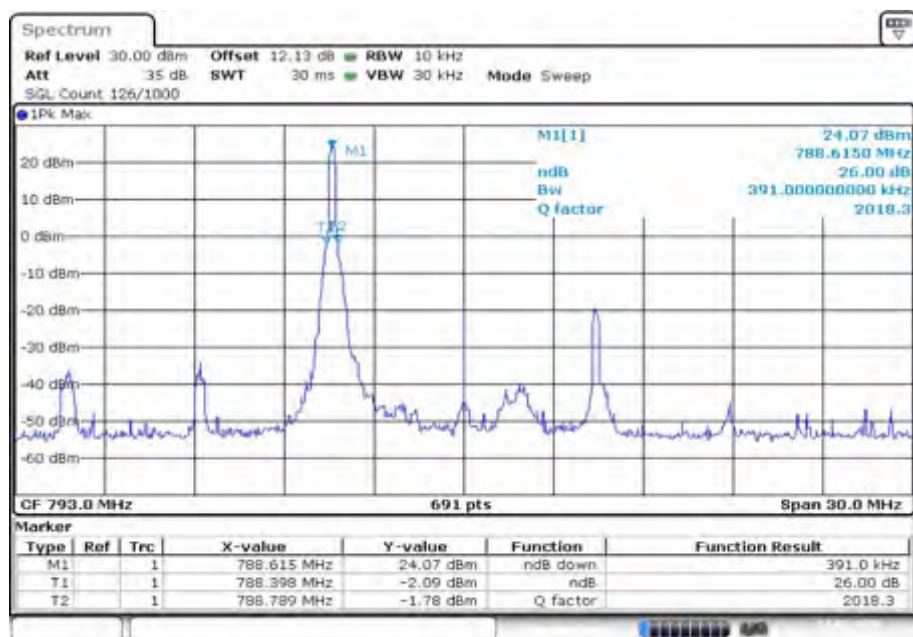


Fig.1

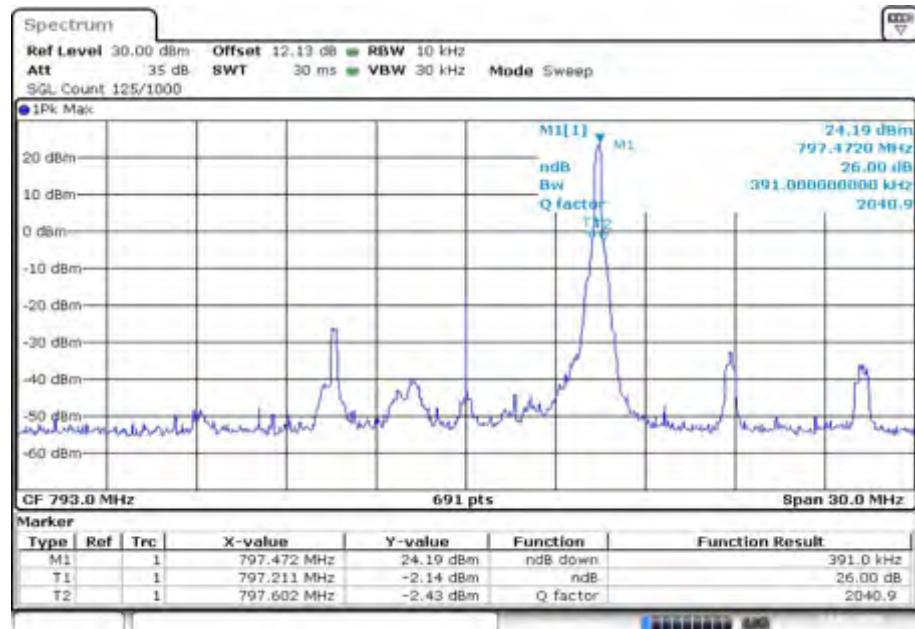


Fig.2

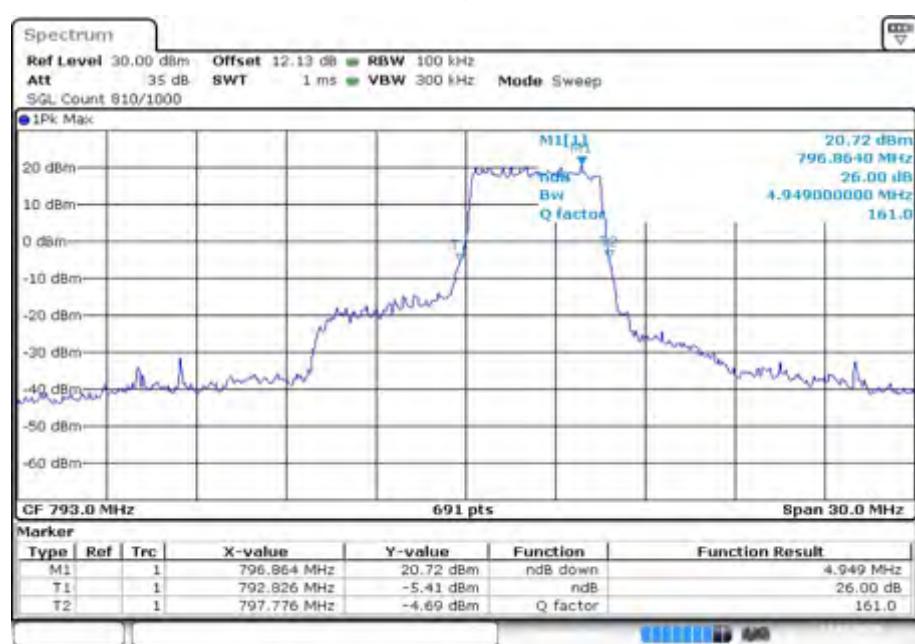


Fig.3

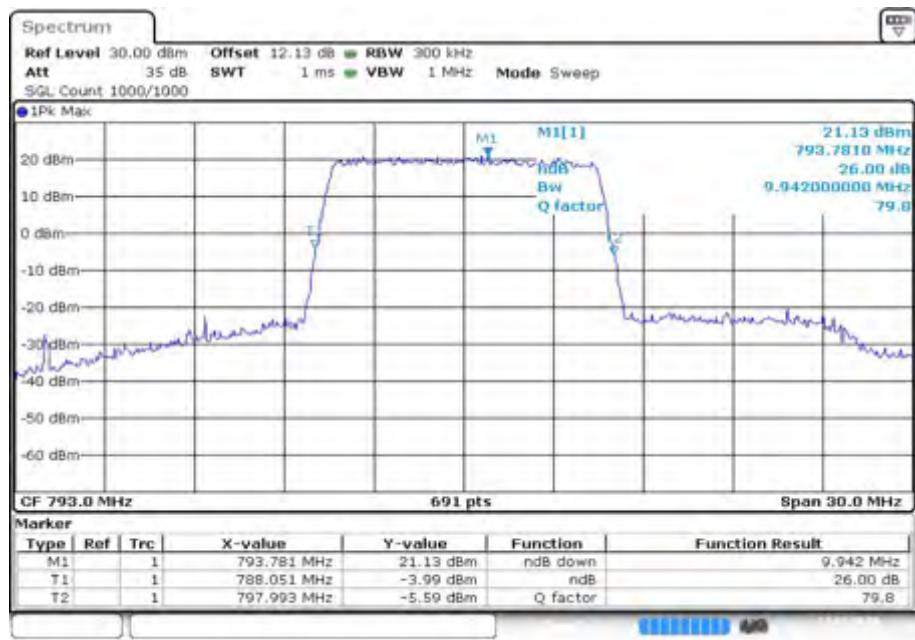


Fig.4

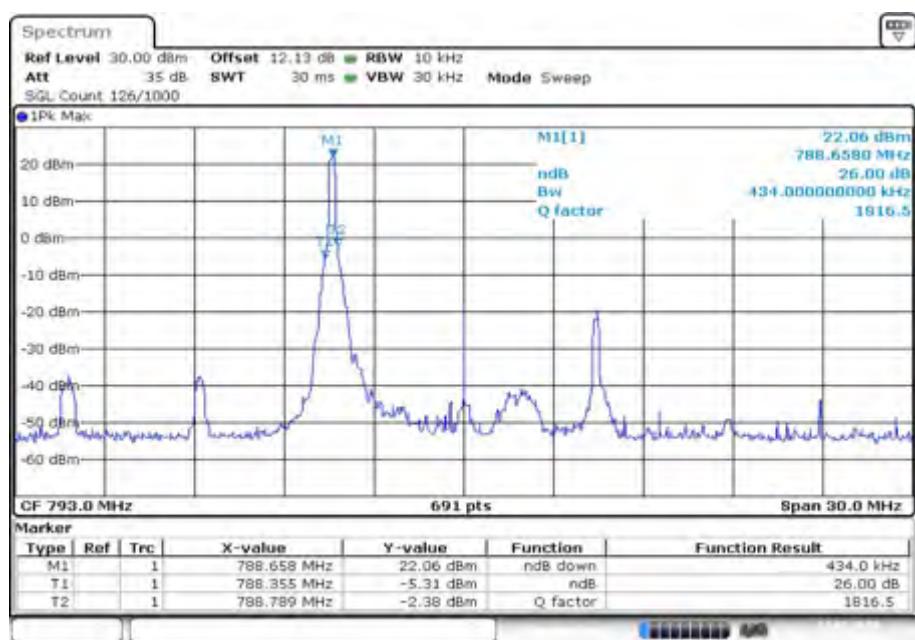


Fig.5

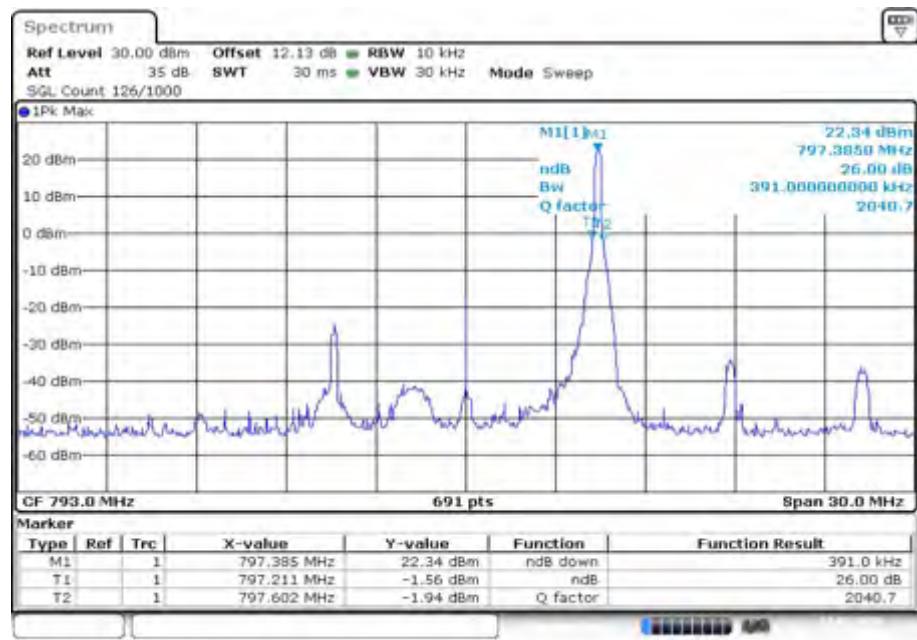


Fig.6

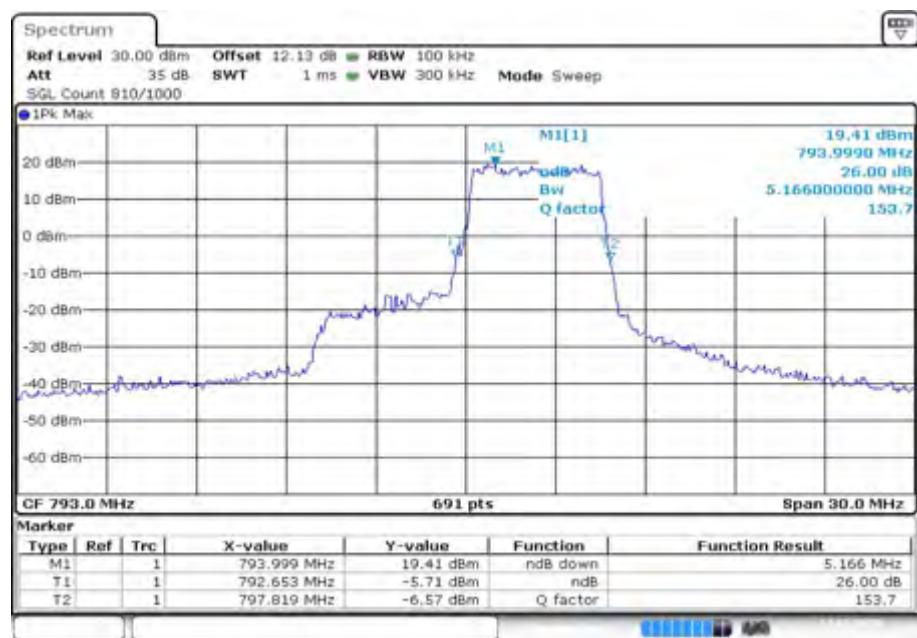


Fig.7

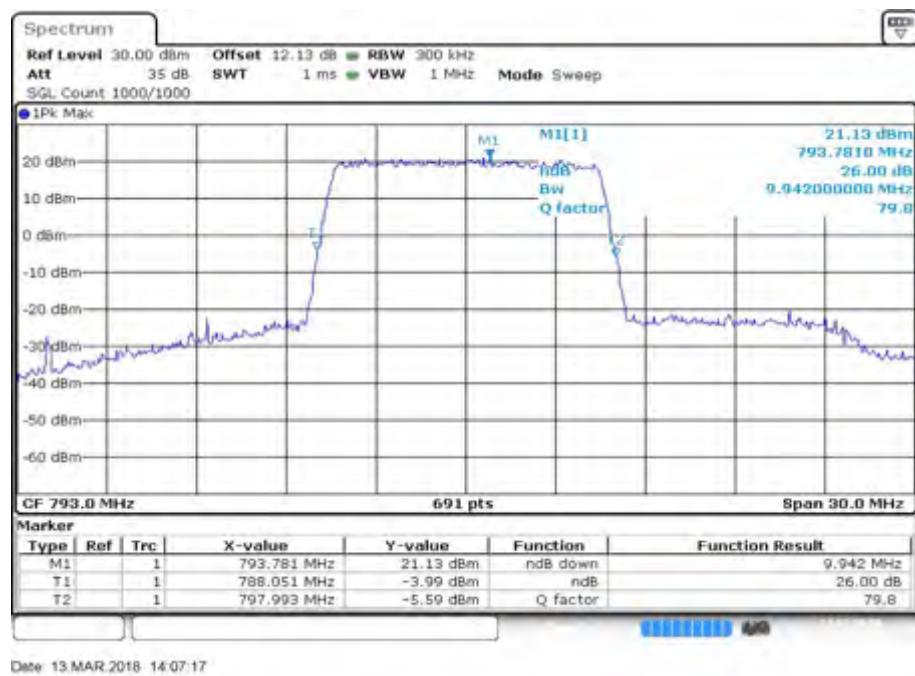


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
14	793	23330	10	1	0	0.391	Fig.1	0.391
				1	49	0.391	Fig.2	0.391
				24	12	4.993	Fig.3	5.166
				50	0	9.029	Fig.4	9.029

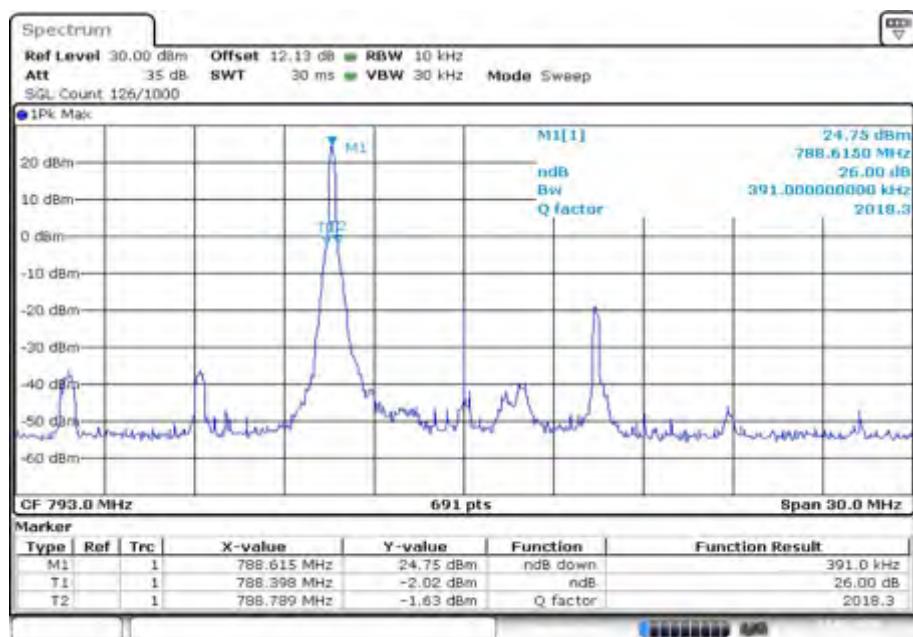


Fig.1

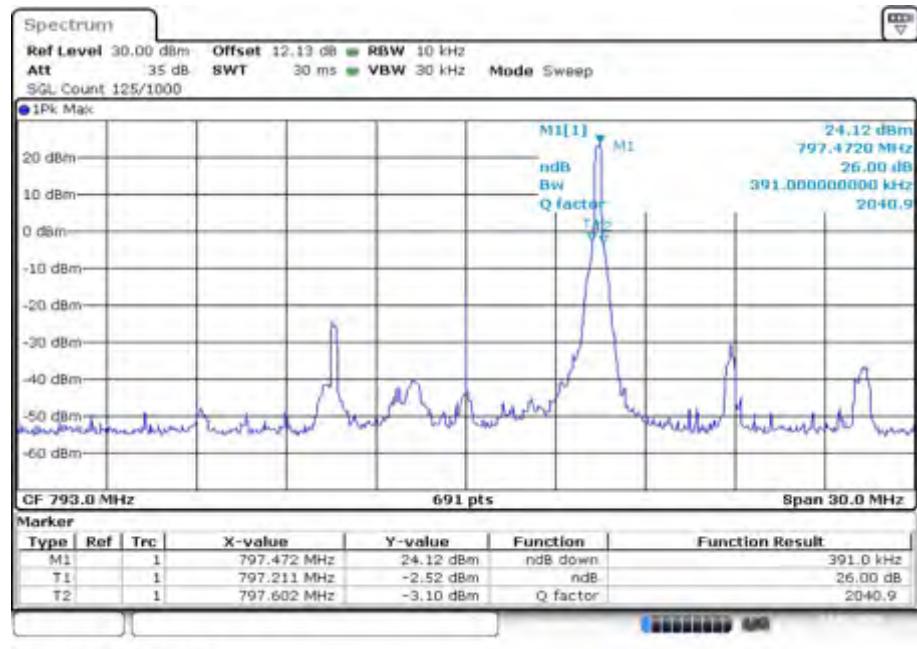


Fig.2

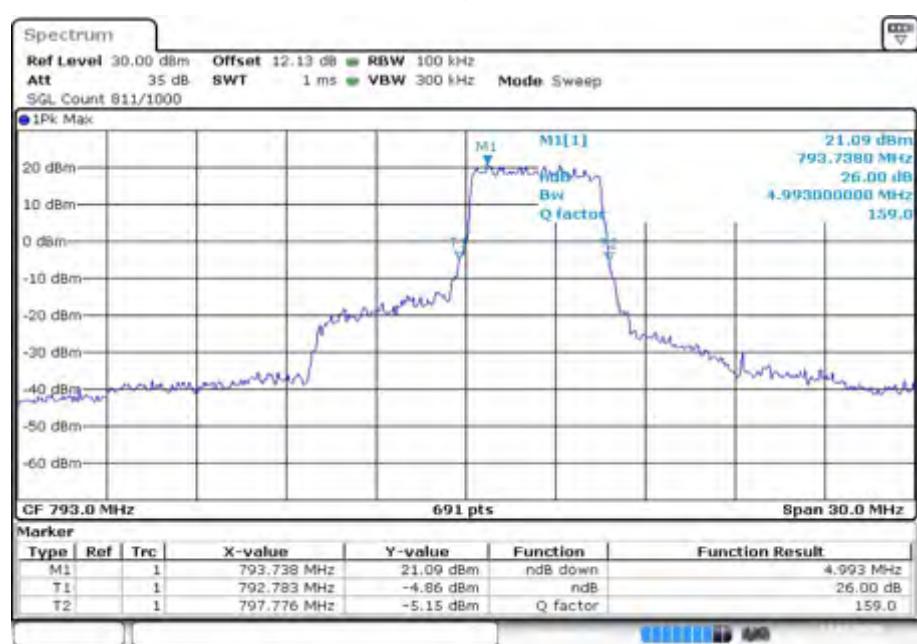


Fig.3

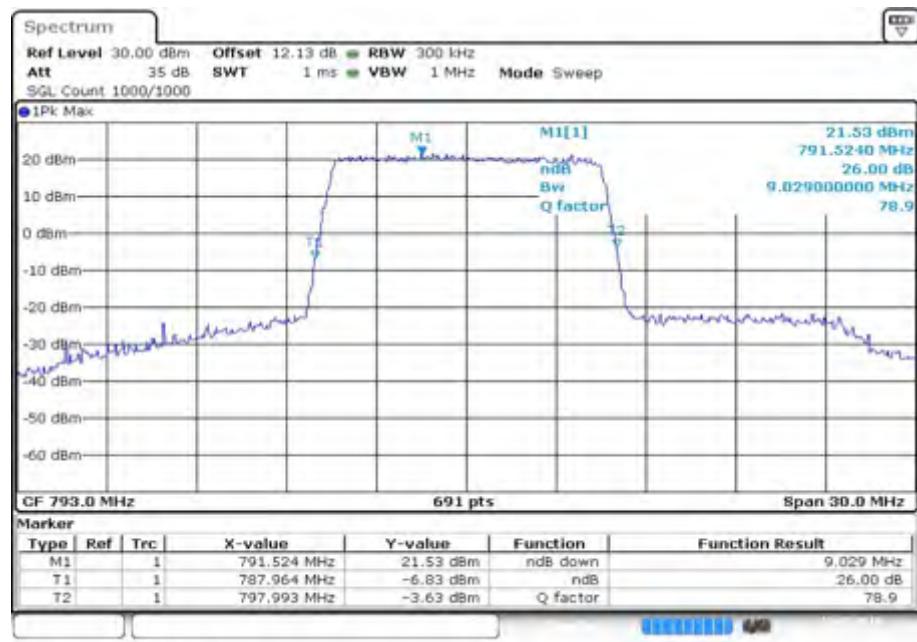


Fig.4

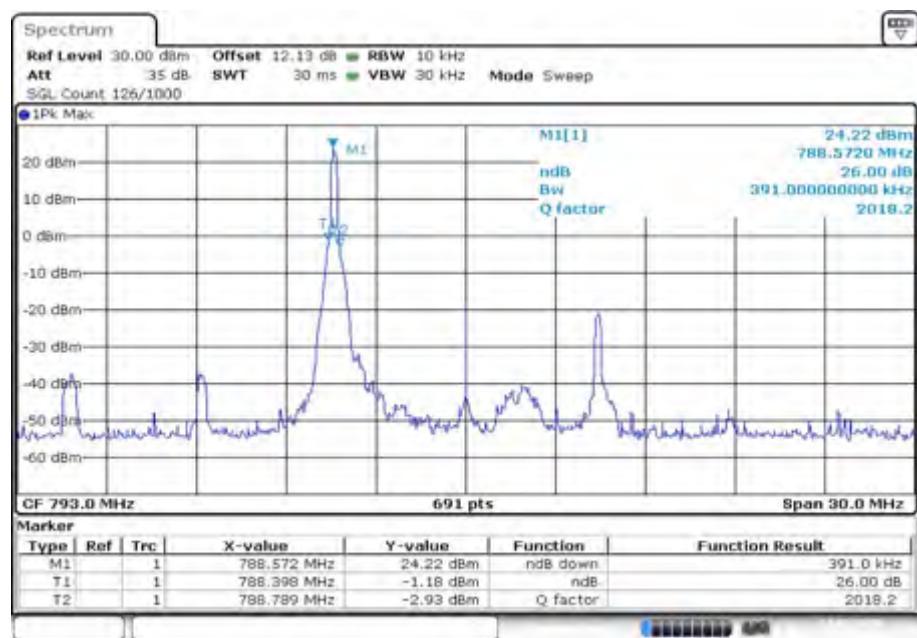


Fig.5

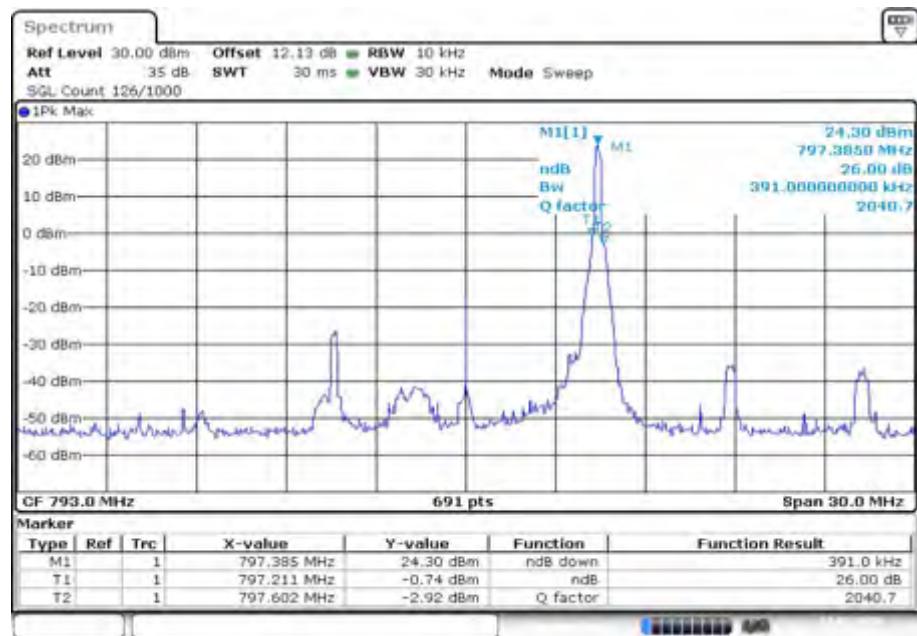


Fig.6

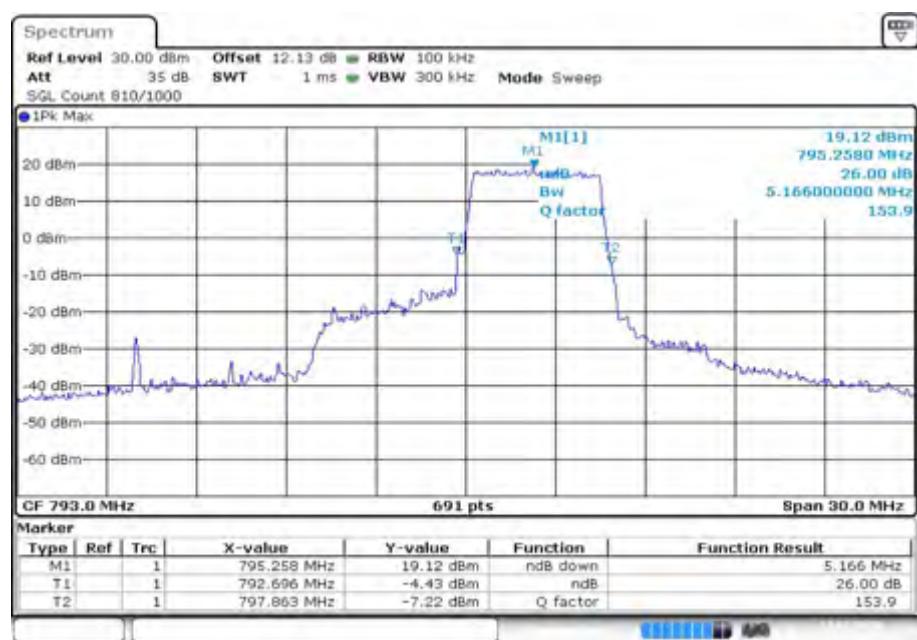


Fig.7

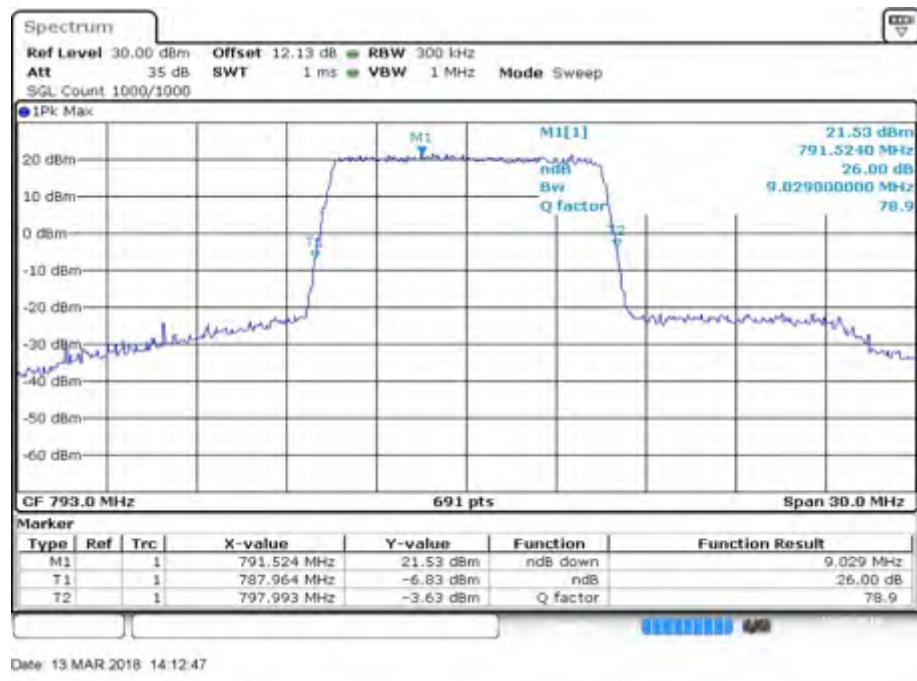


Fig.8

## LTE Band 26

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	814.7	26697	1.4	1	0	0.304	Fig.1	0.322
				1	5	0.310	Fig.2	0.304
				3	2	0.723	Fig.3	0.729
				6	0	1.246	Fig.4	1.252

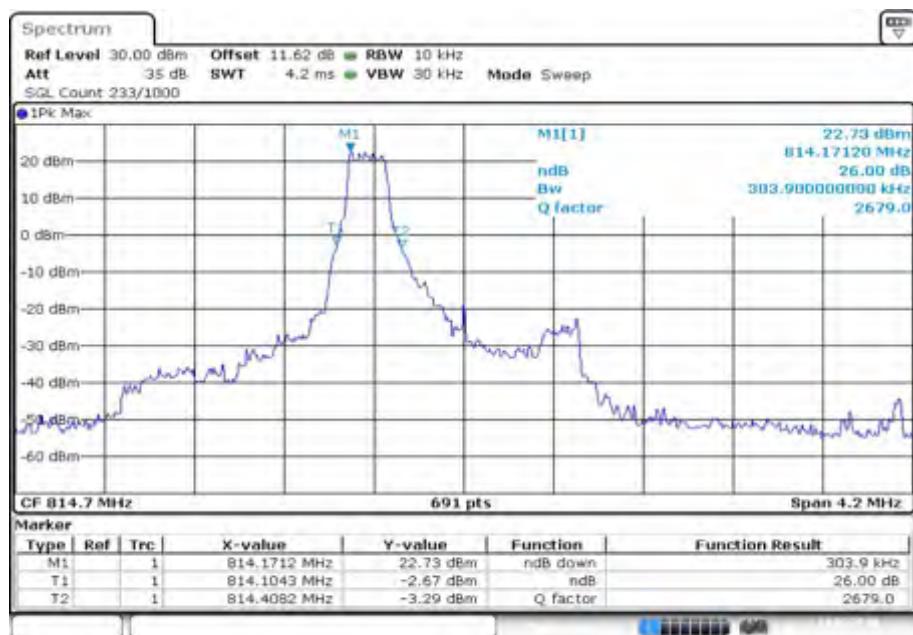


Fig.1



Fig.2



Fig.3

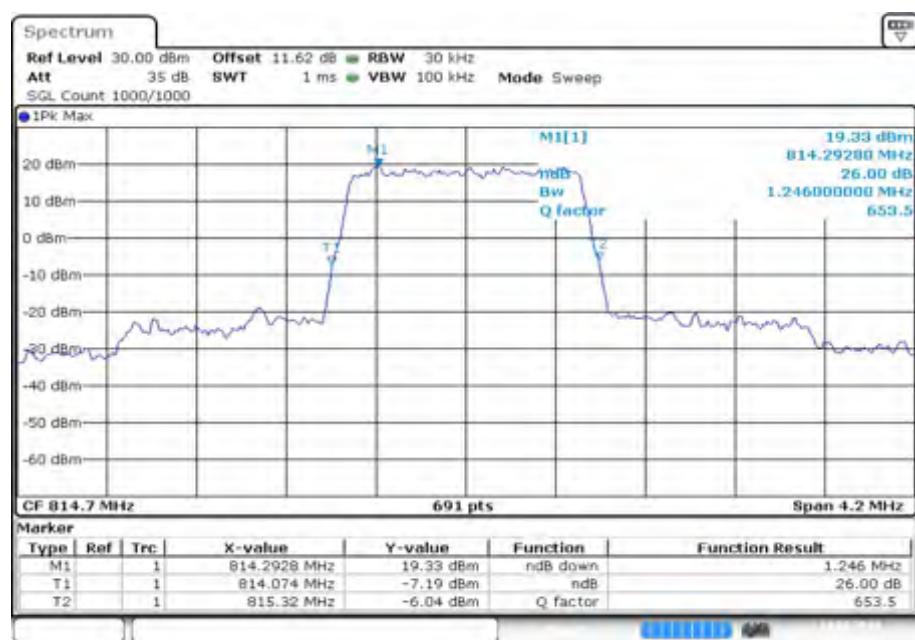


Fig.4

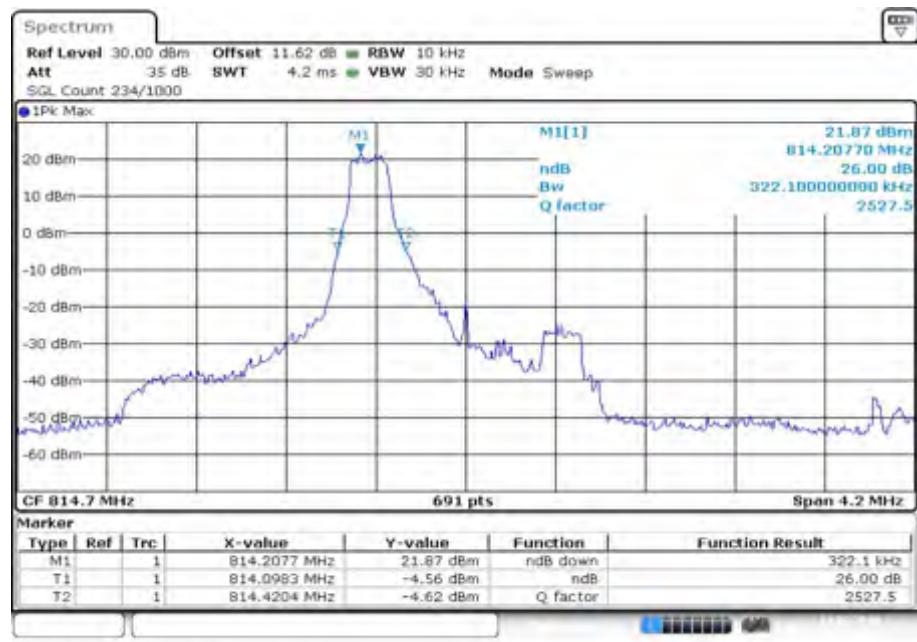


Fig.5



Fig.6



Fig.7

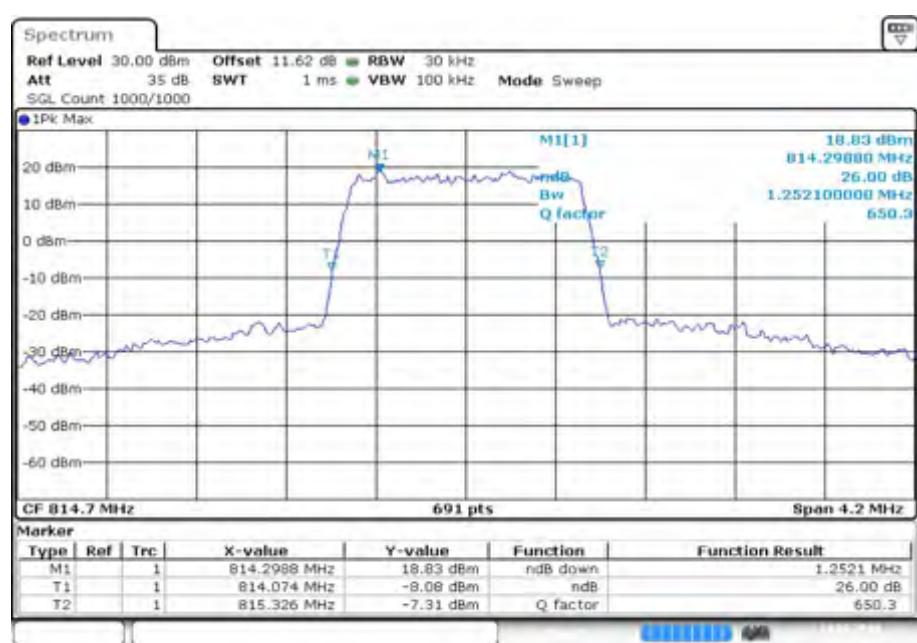


Fig.8

Band	Carrier frequency (MHz)	Channel (Mid)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	831.5	26865	1.4	1	0	0.310	Fig.1	0.316
				1	5	0.304	Fig.2	0.322
				3	2	0.705	Fig.3	0.723
				6	0	1.240	Fig.4	1.246

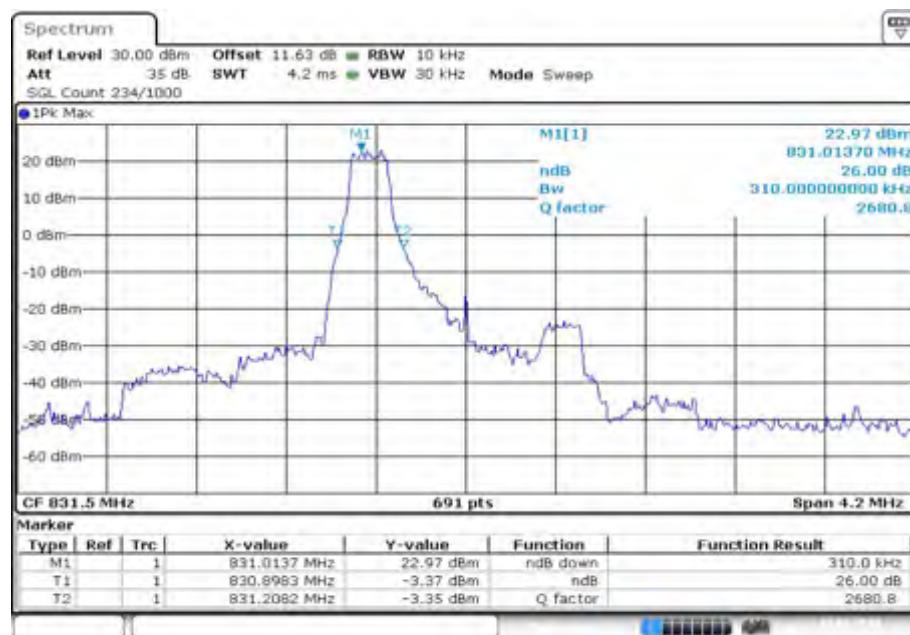


Fig.1



Fig.2



Fig.3

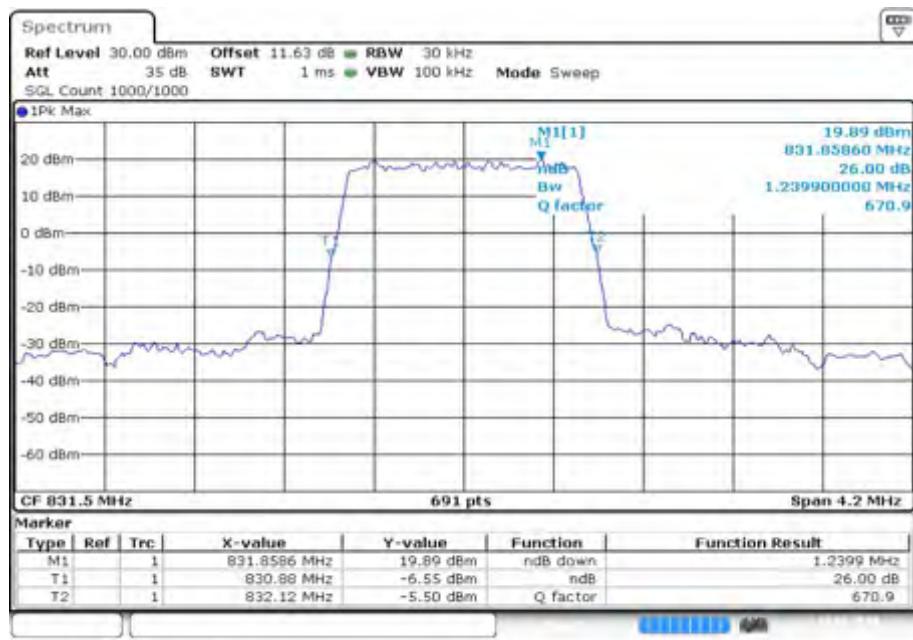


Fig.4

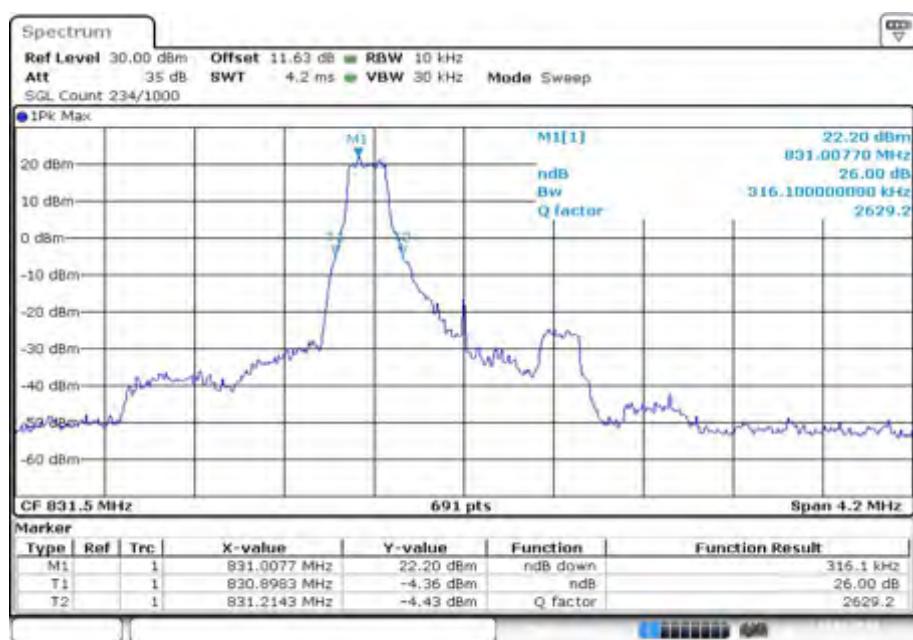


Fig.5



Fig.6



Fig.7

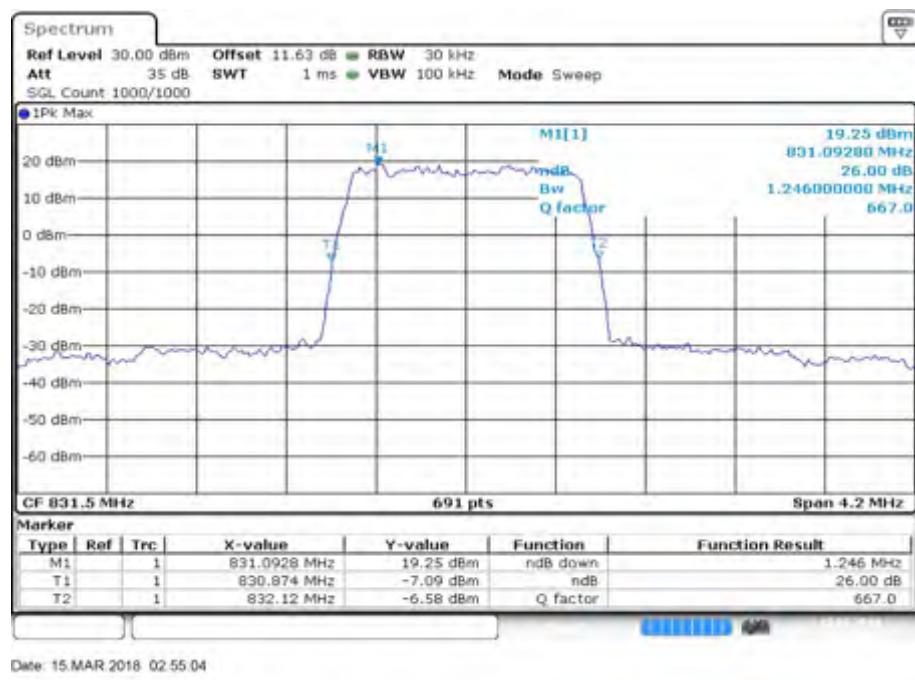


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	848.3	27033	1.4	1	0	0.310	Fig.1	0.310
				1	5	0.304	Fig.2	0.322
				3	2	0.723	Fig.3	0.723
				6	0	1.240	Fig.4	1.252

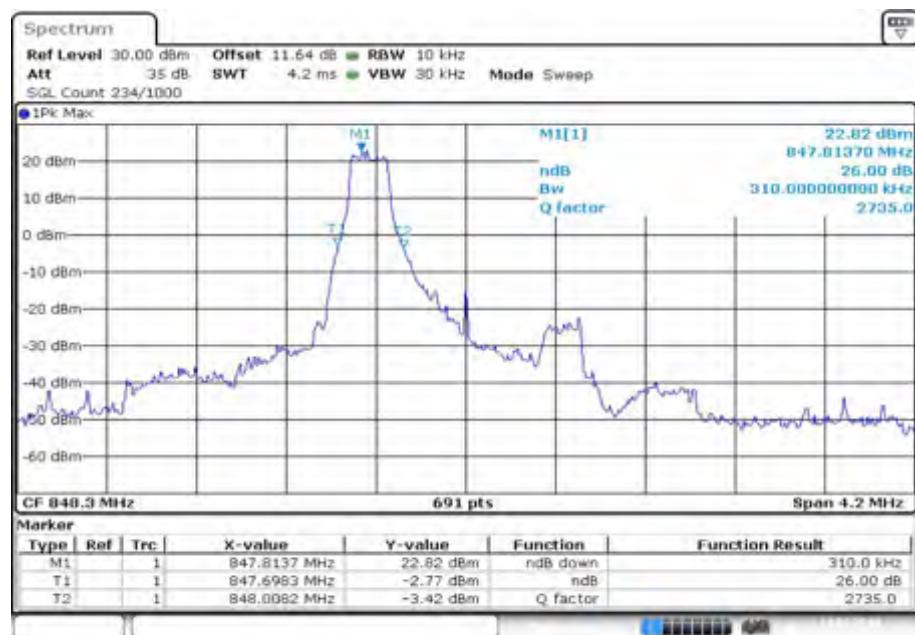


Fig.1



Fig.2



Fig.3

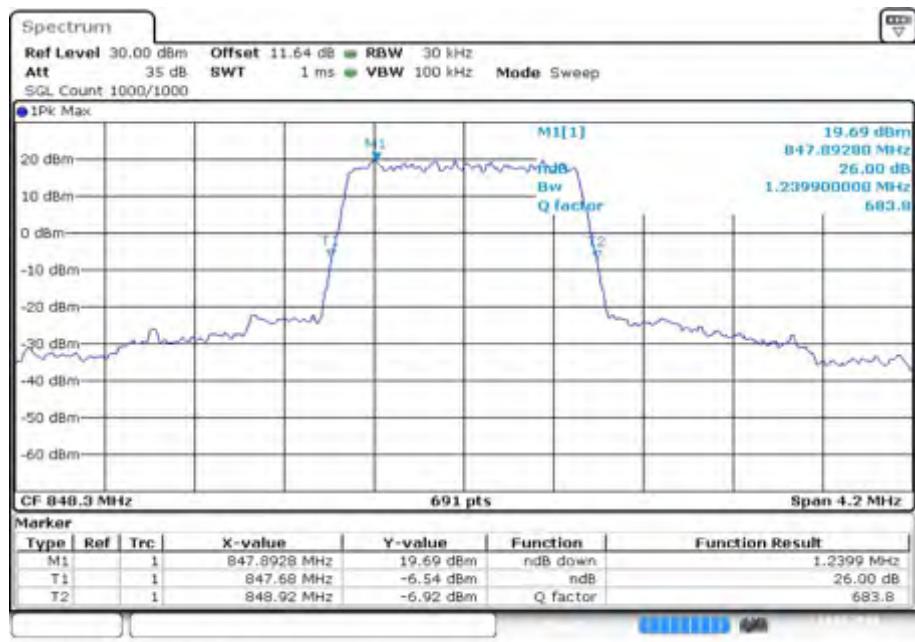


Fig.4

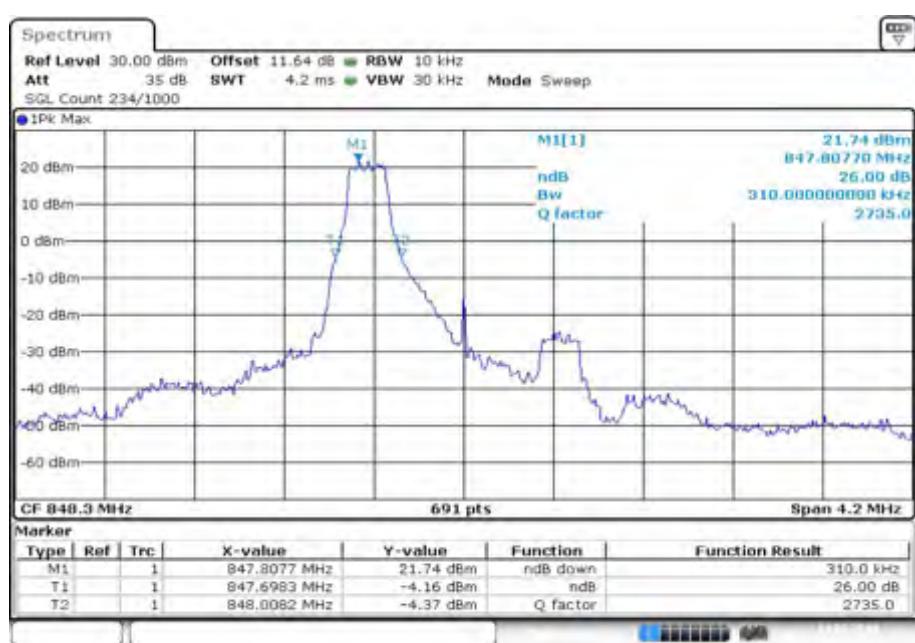


Fig.5

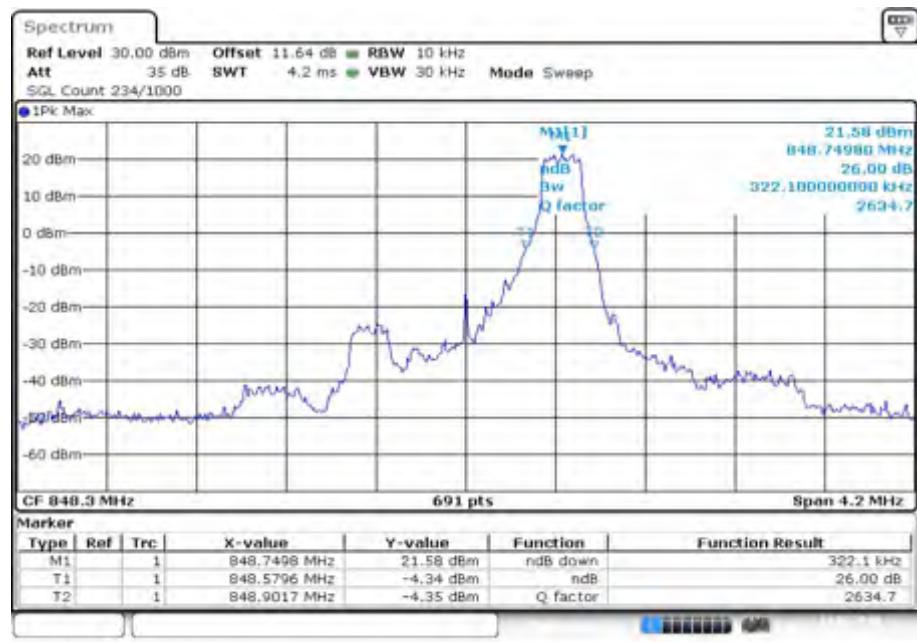


Fig.6



Fig.7

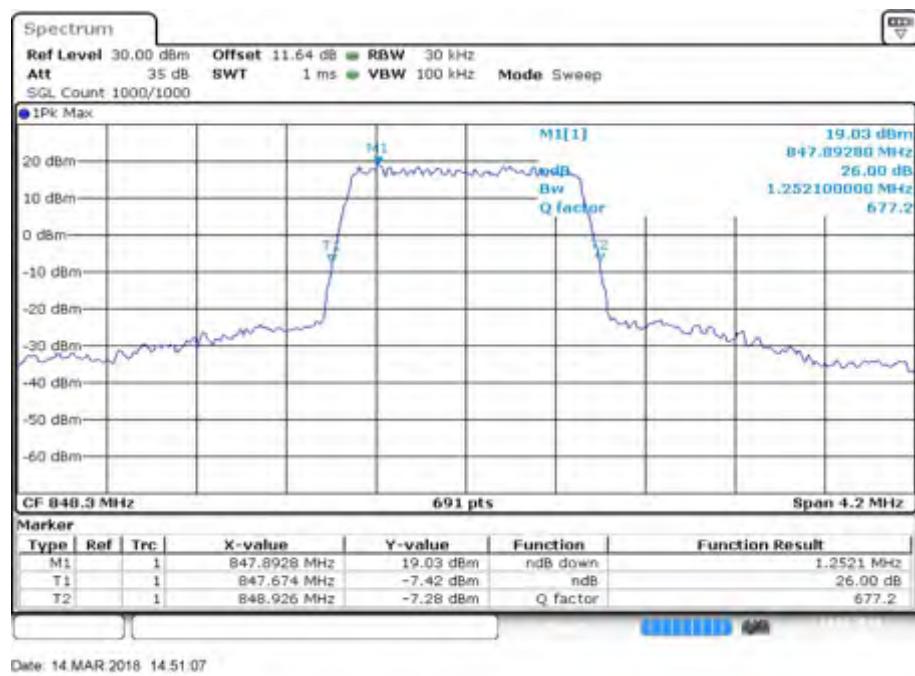


Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	818.5	26705	3	1	0	0.326	Fig.1	0.326
				1	14	0.339	Fig.2	0.313
				8	4	1.758	Fig.3	1.719
				15	0	2.274	Fig.4	2.274

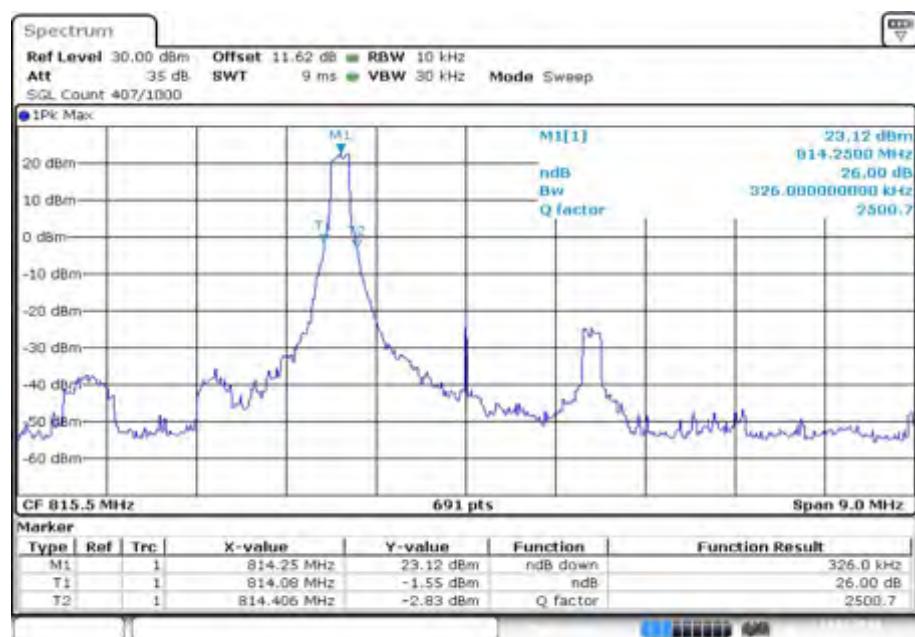


Fig.1



Date: 14-MAR-2018 14:56:18

Fig.2



Date: 14-MAR-2018 14:56:59

Fig.3

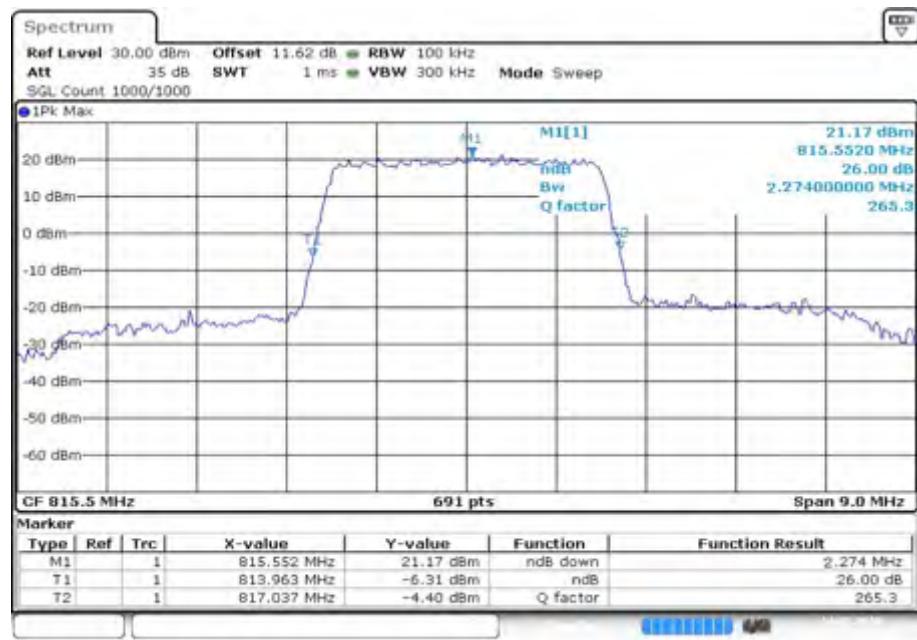


Fig.4

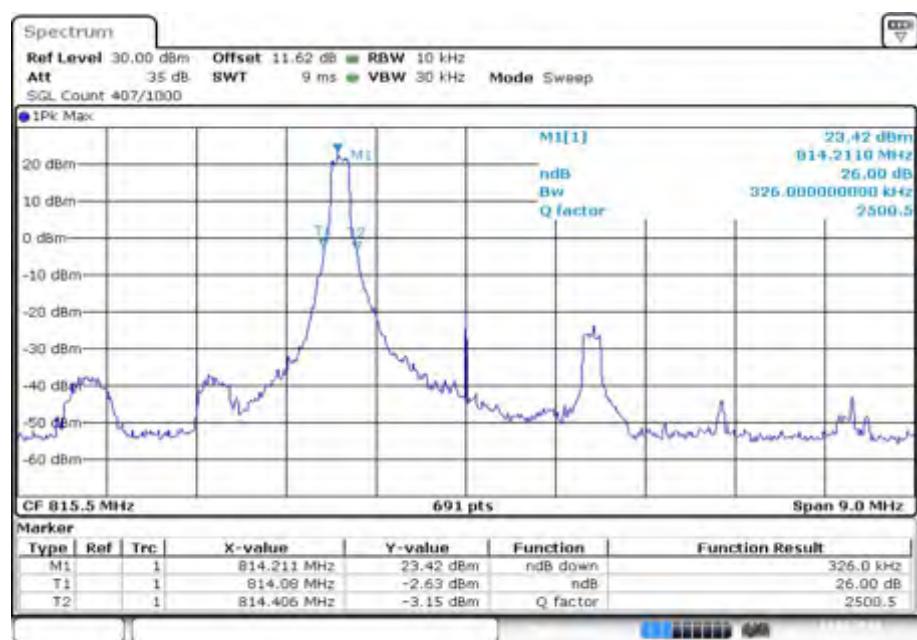


Fig.5

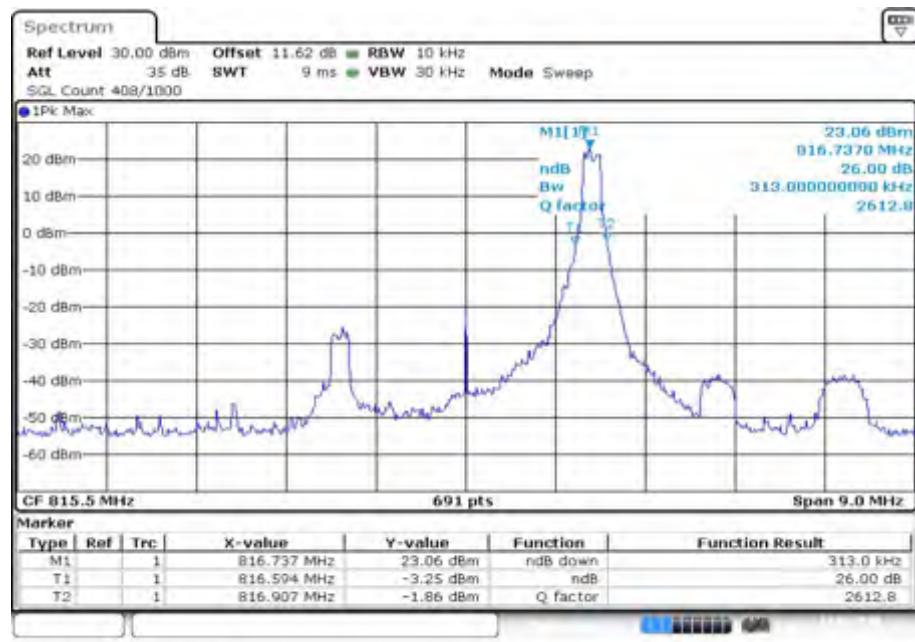


Fig.6



Fig.7

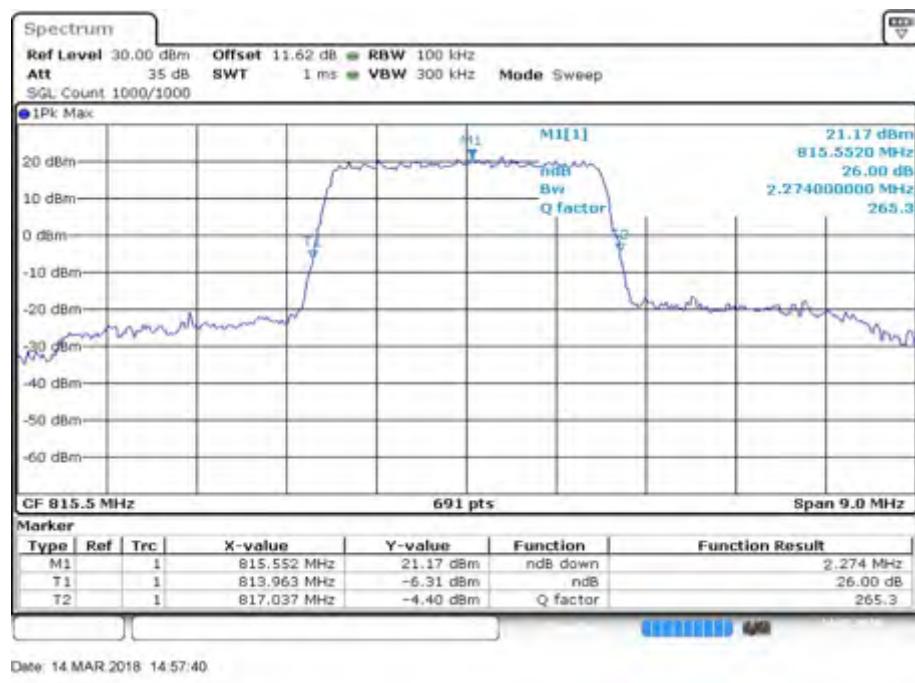


Fig.8

Band	Carrier frequency (MHz)	Channel (Mid)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	831.5	26865	3	1	0	0.339	Fig.1	0.339
				1	14	0.326	Fig.2	0.339
				8	4	1.706	Fig.3	1.745
				15	0	2.274	Fig.4	2.274

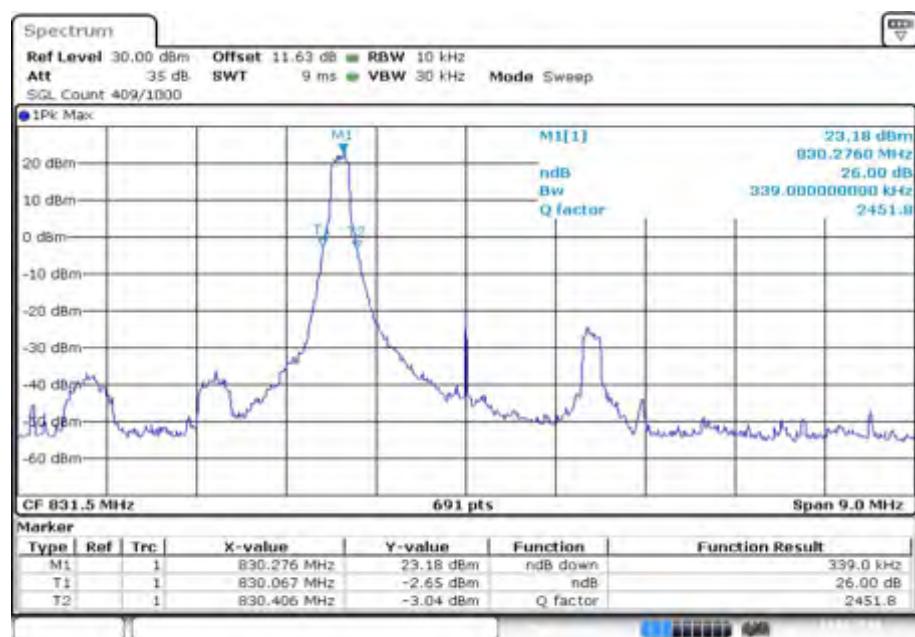


Fig.1

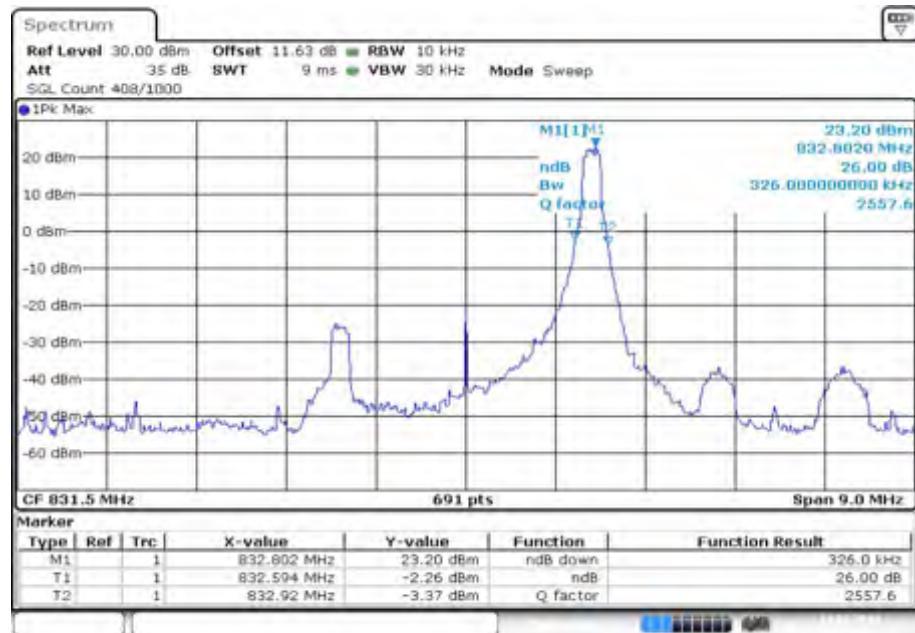


Fig.2

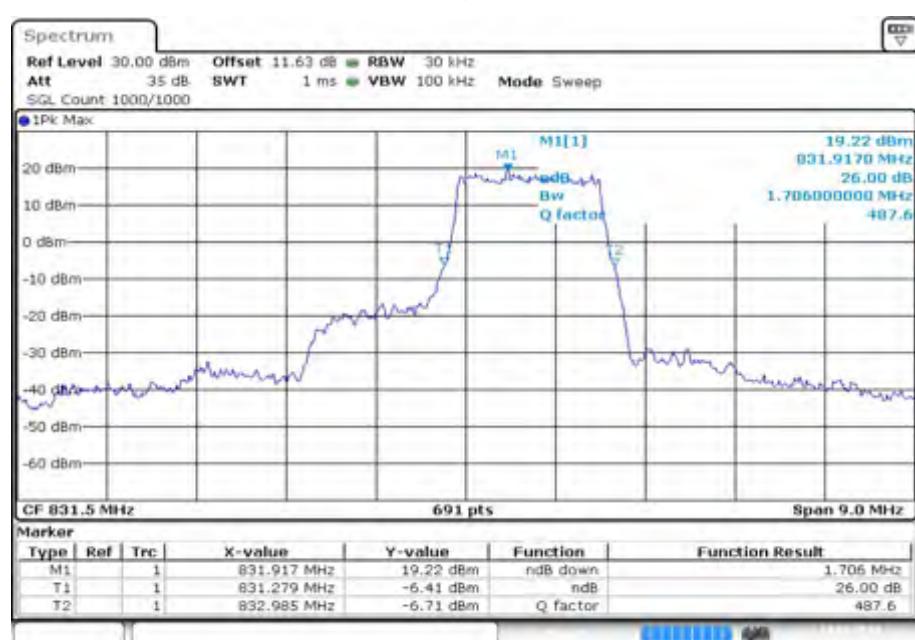


Fig.3

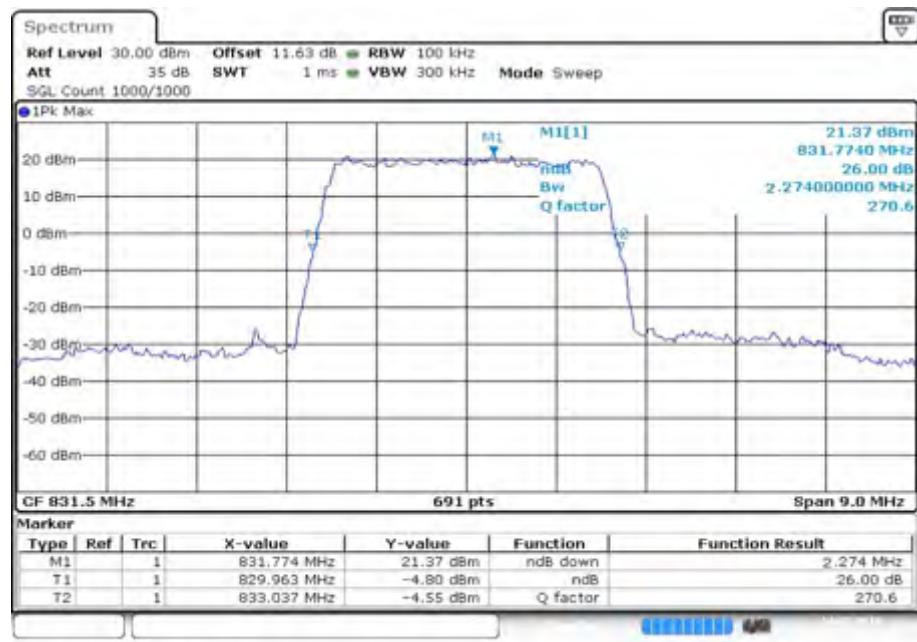


Fig.4

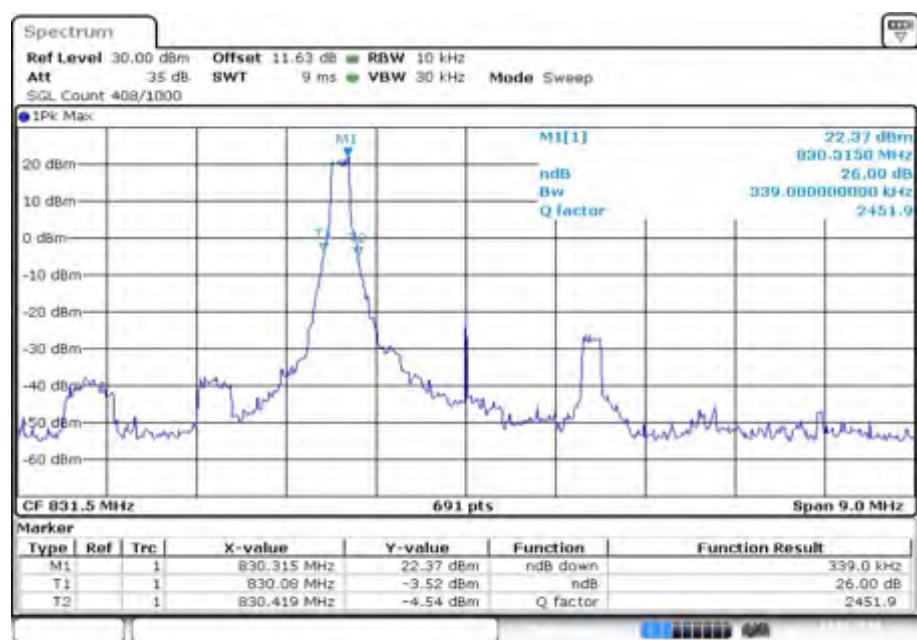


Fig.5

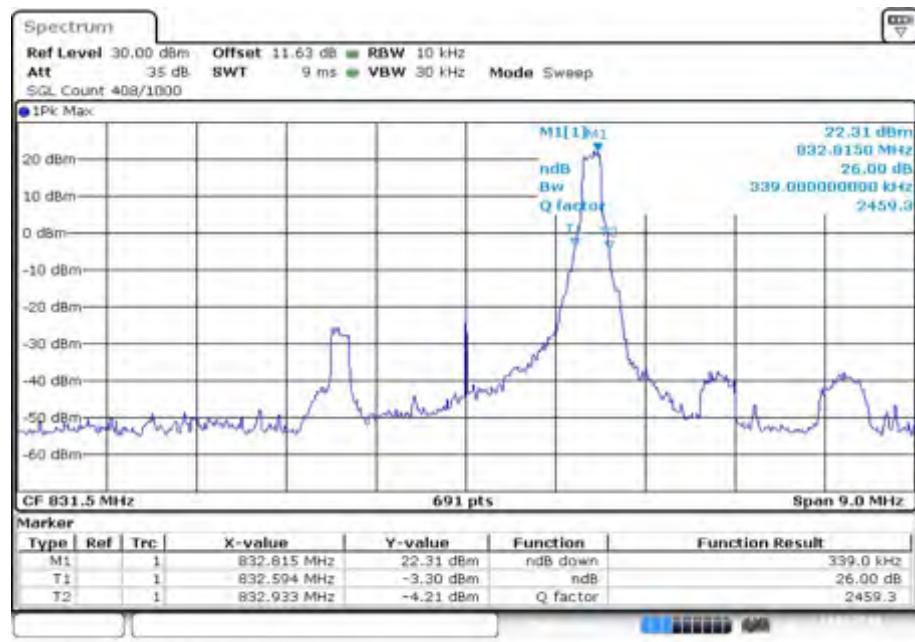


Fig.6



Fig.7

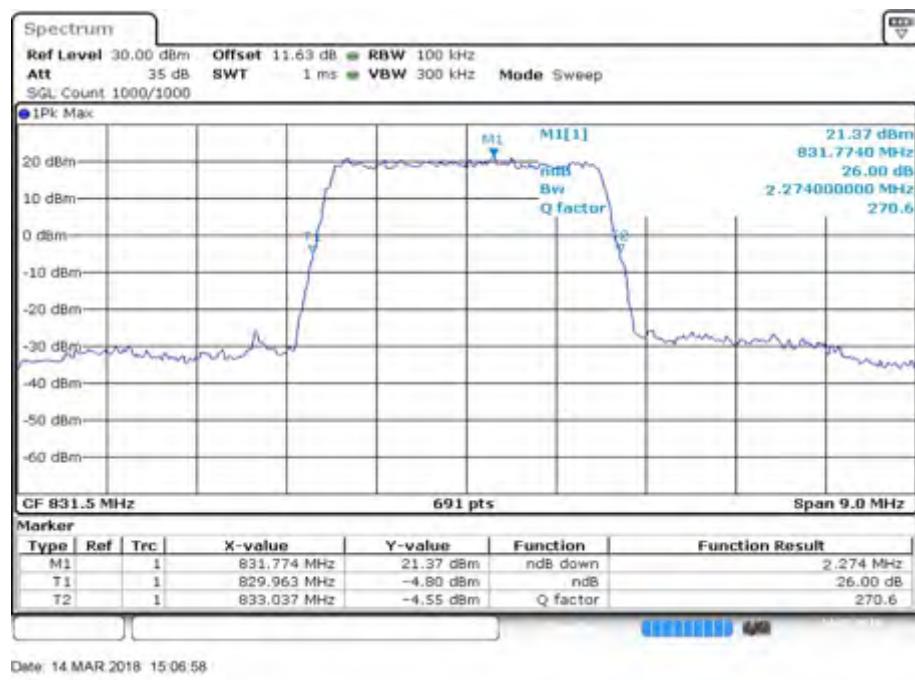


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	846.5	27015	3	1	0	0.339	Fig.1	0.326
				1	14	0.339	Fig.2	0.352
				8	4	1.693	Fig.3	1.719
				15	0	2.287	Fig.4	2.287

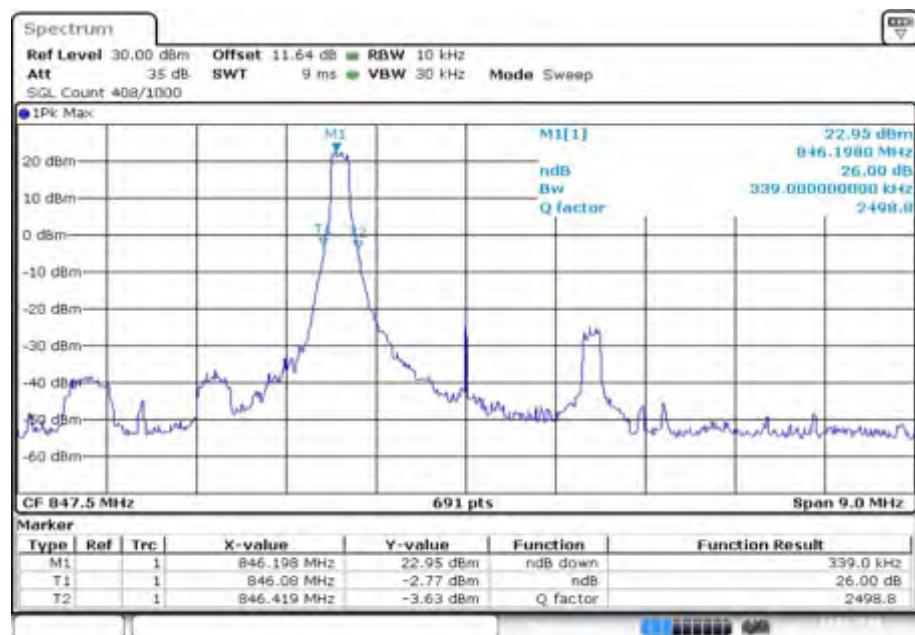


Fig.1

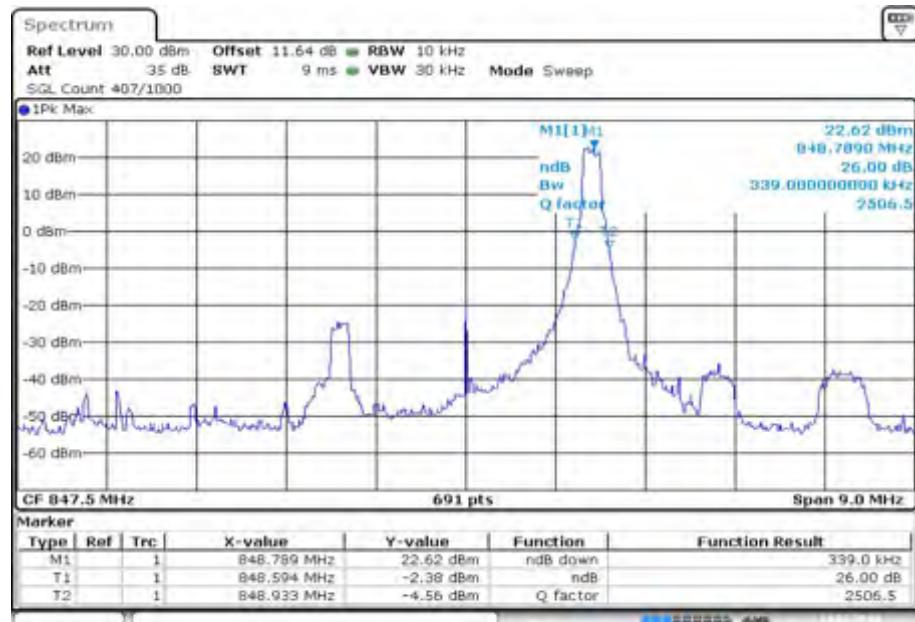


Fig.2

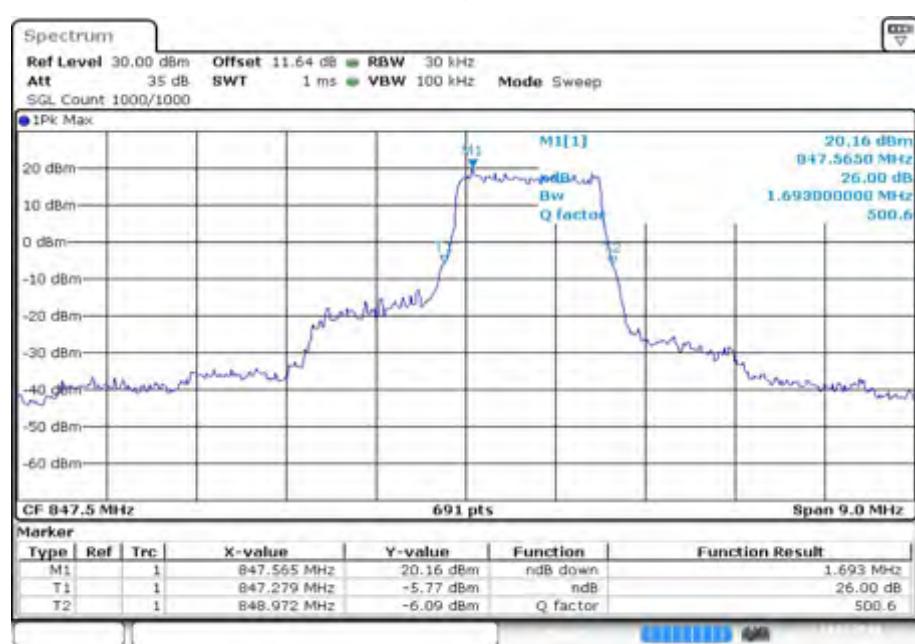


Fig.3

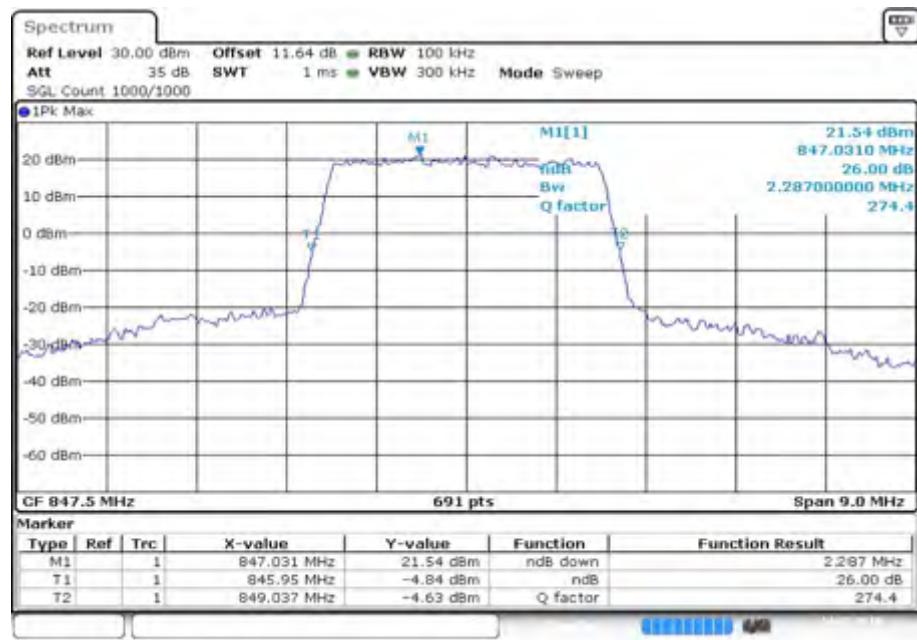


Fig.4

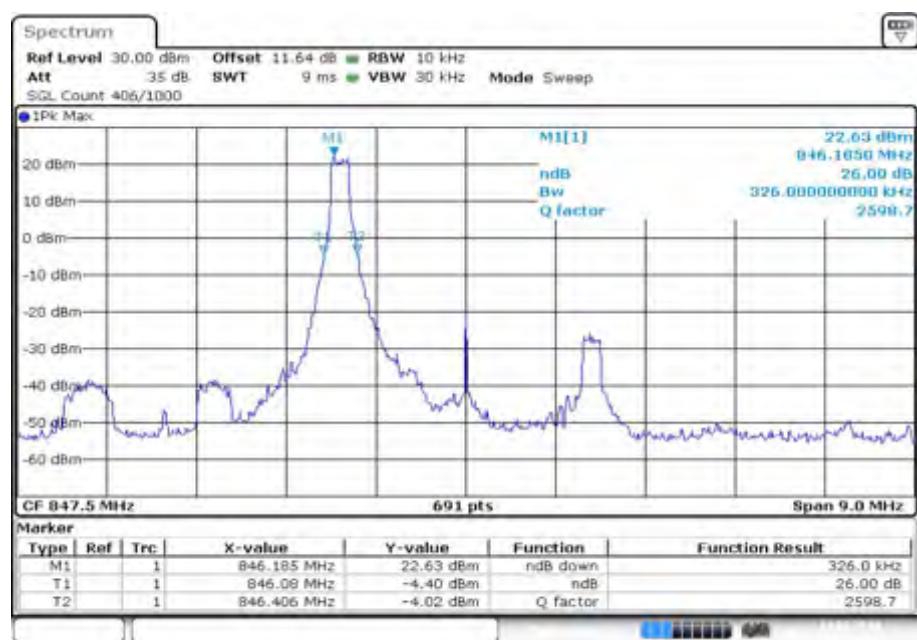


Fig.5

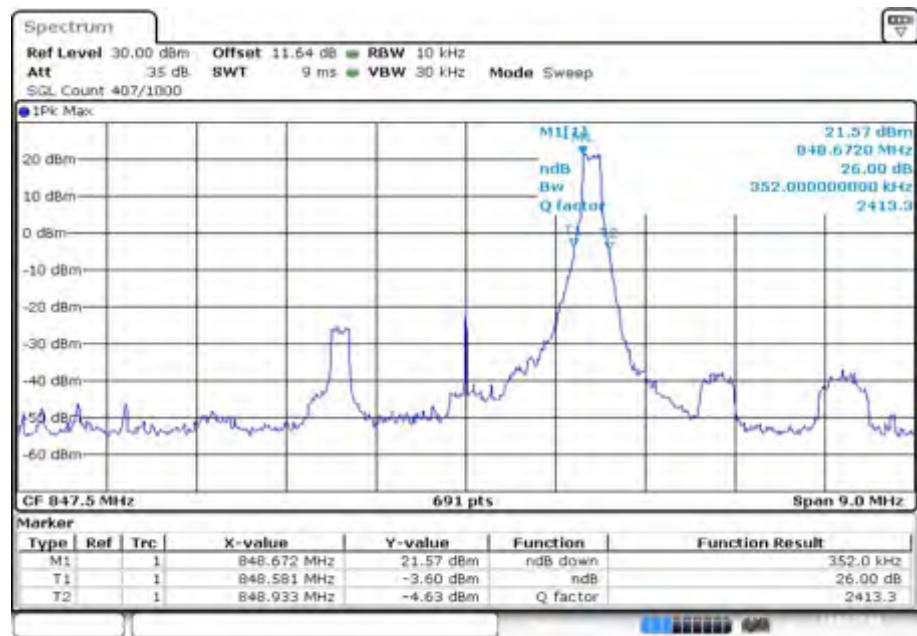


Fig.6



Fig.7

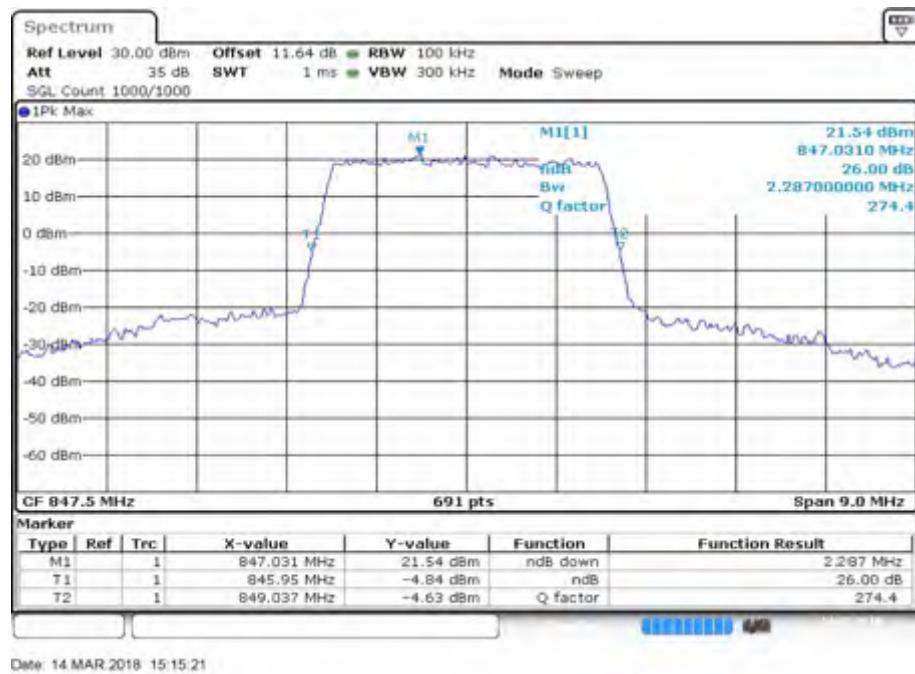


Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	816.5	26715	5	1	0	0.369	Fig.1	0.412
				1	24	0.391	Fig.2	0.369
				12	6	2.562	Fig.3	2.562
				25	0	4.971	Fig.4	4.971

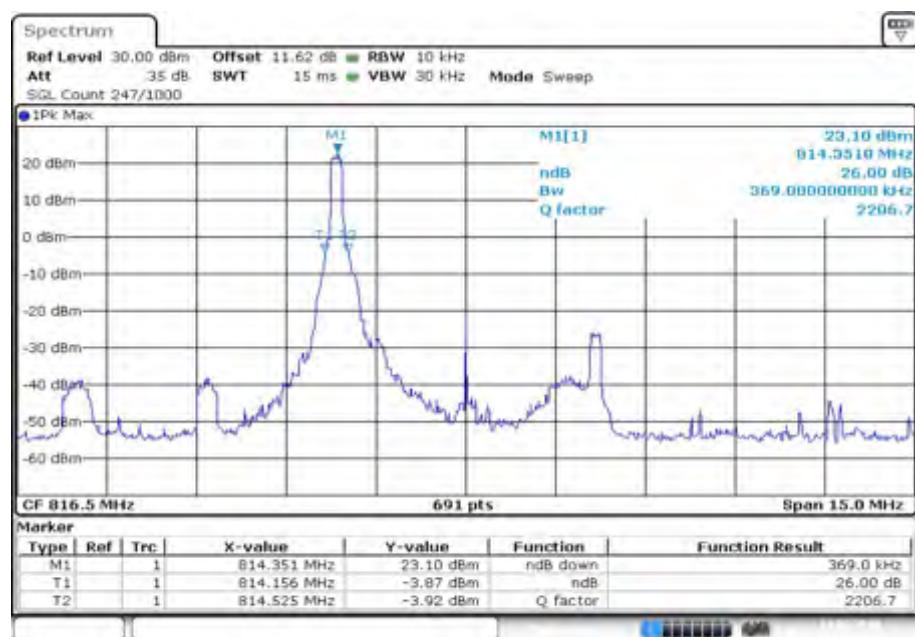


Fig.1

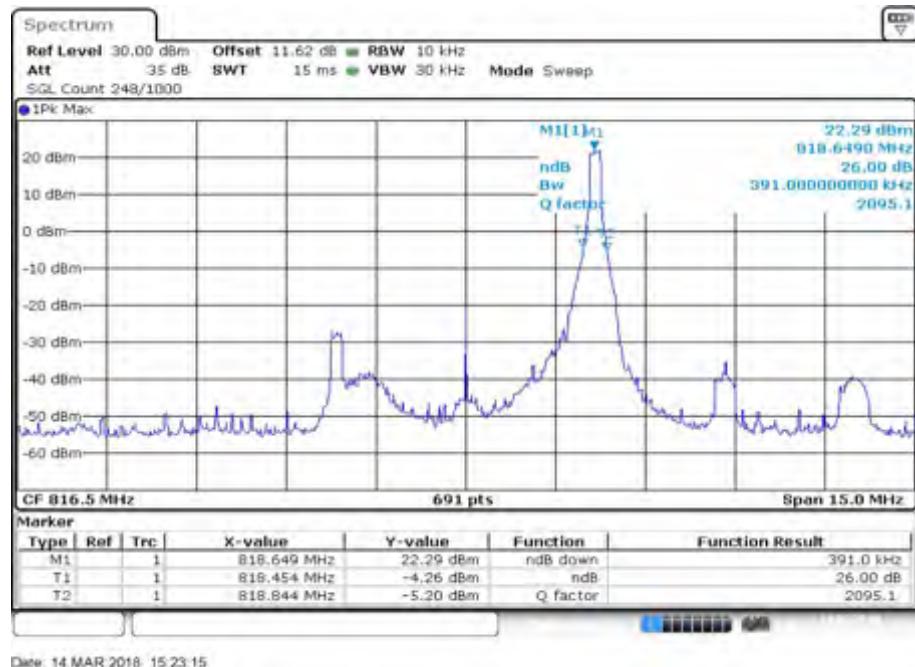


Fig.2

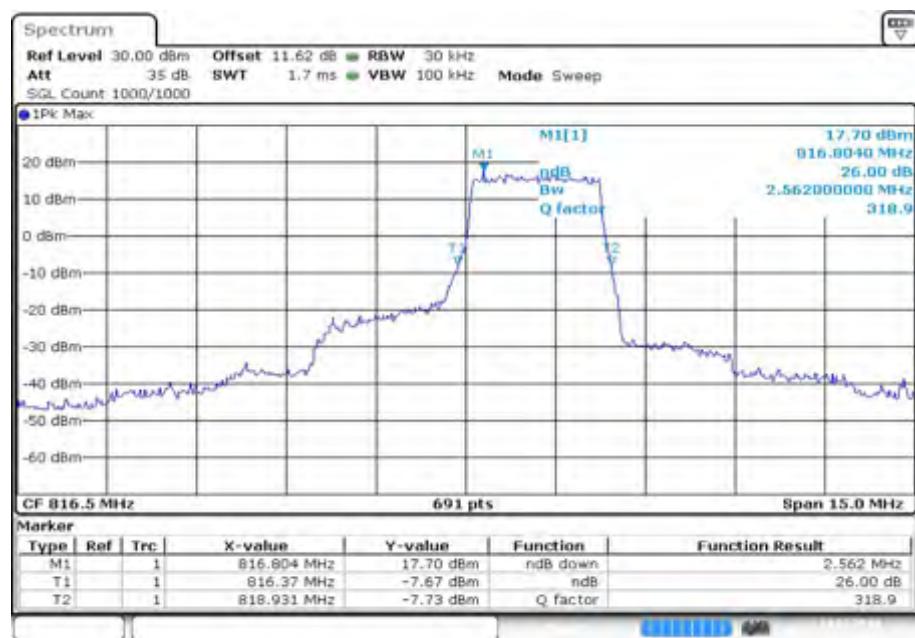


Fig.3

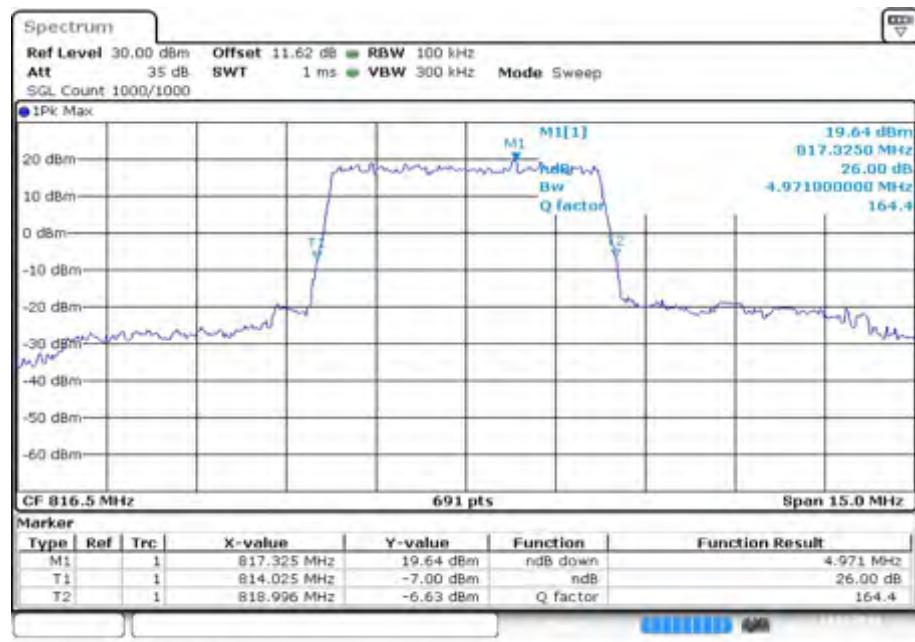


Fig.4

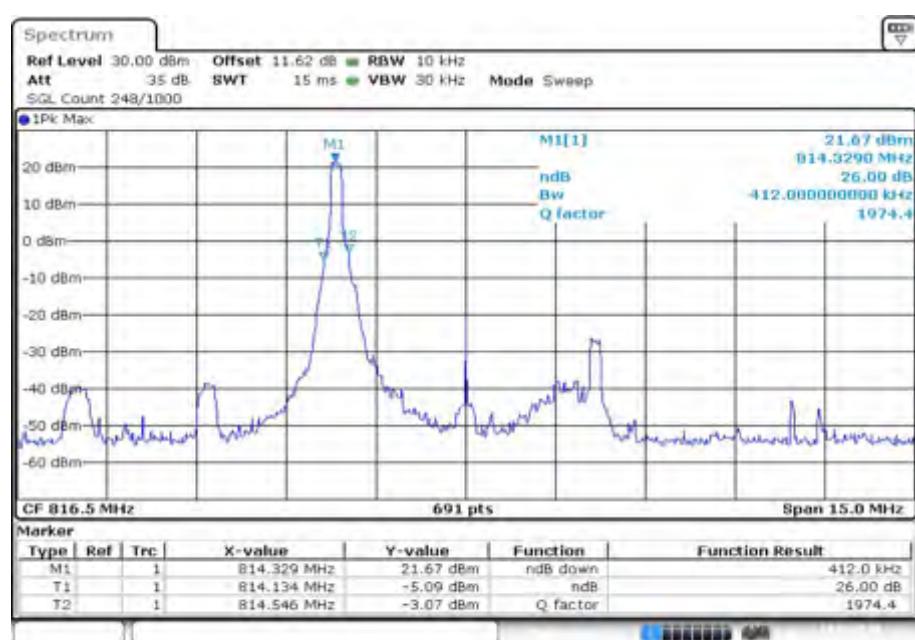


Fig.5

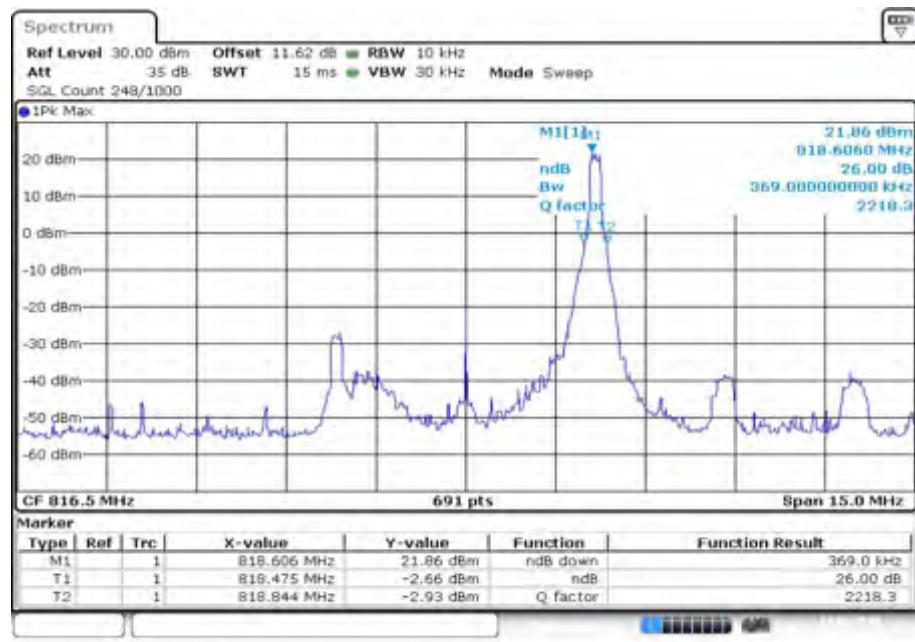


Fig.6

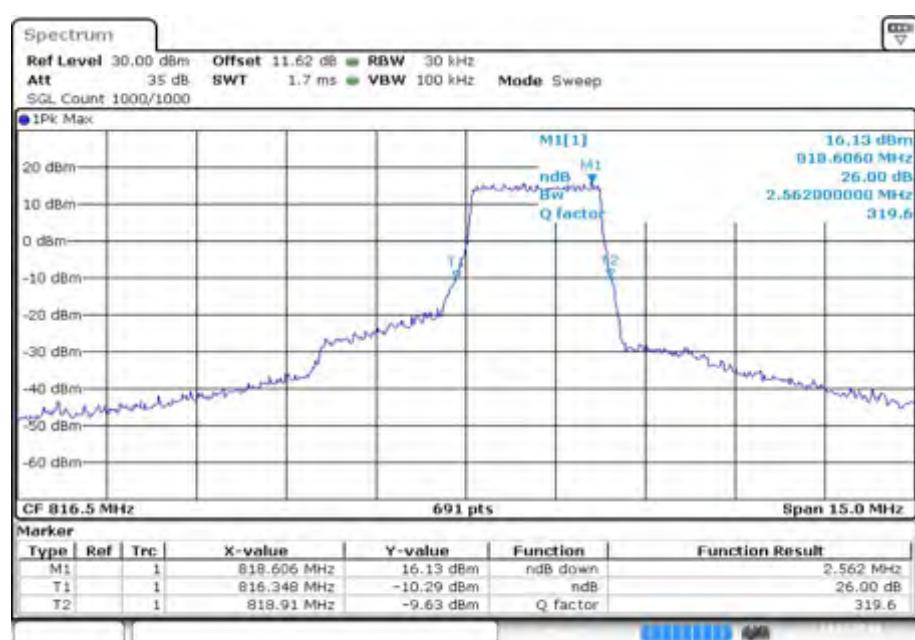


Fig.7

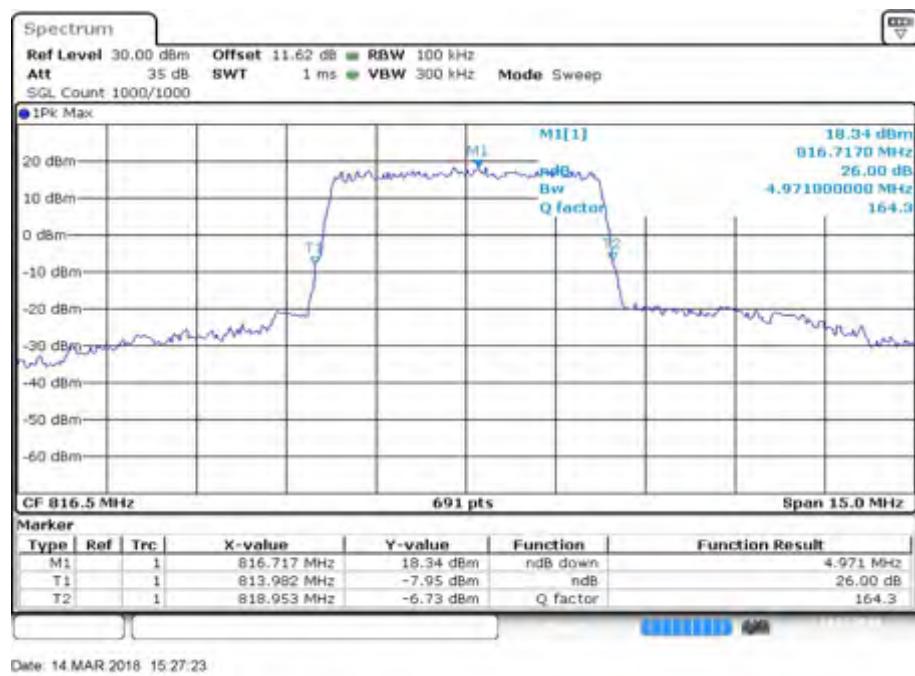


Fig.8

Band	Carrier frequency (MHz)	Channel (Mid)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	831.5	26865	5	1	0	0.369	Fig.1	0.391
				1	24	0.369	Fig.2	0.369
				12	6	2.583	Fig.3	2.540
				25	0	4.949	Fig.4	4.993

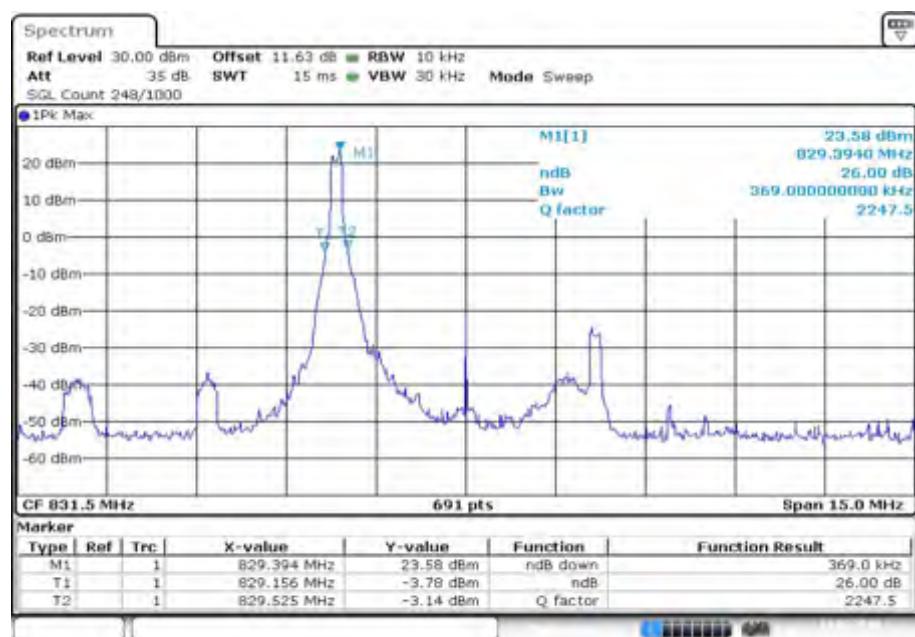


Fig.1

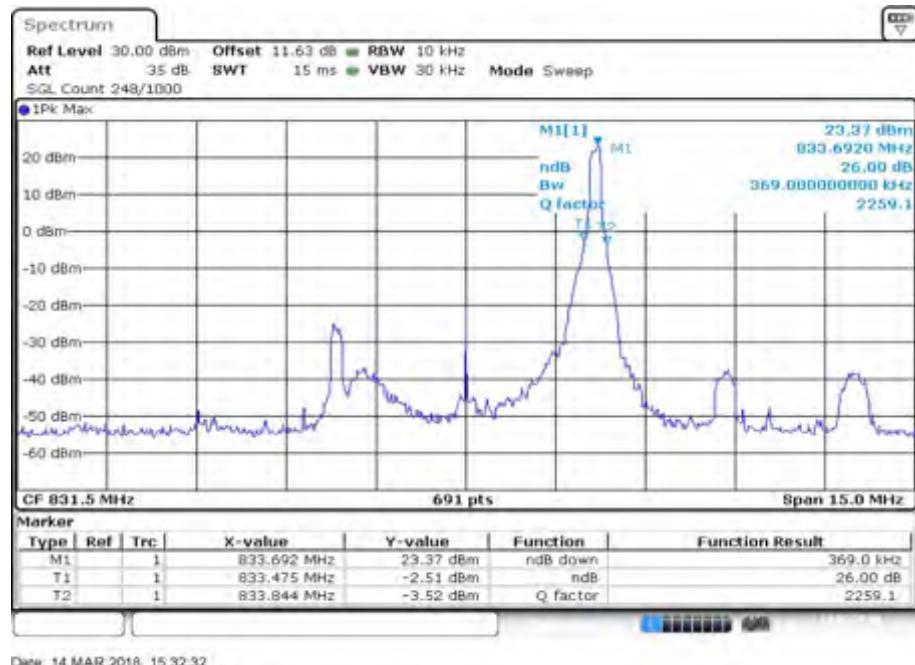


Fig.2

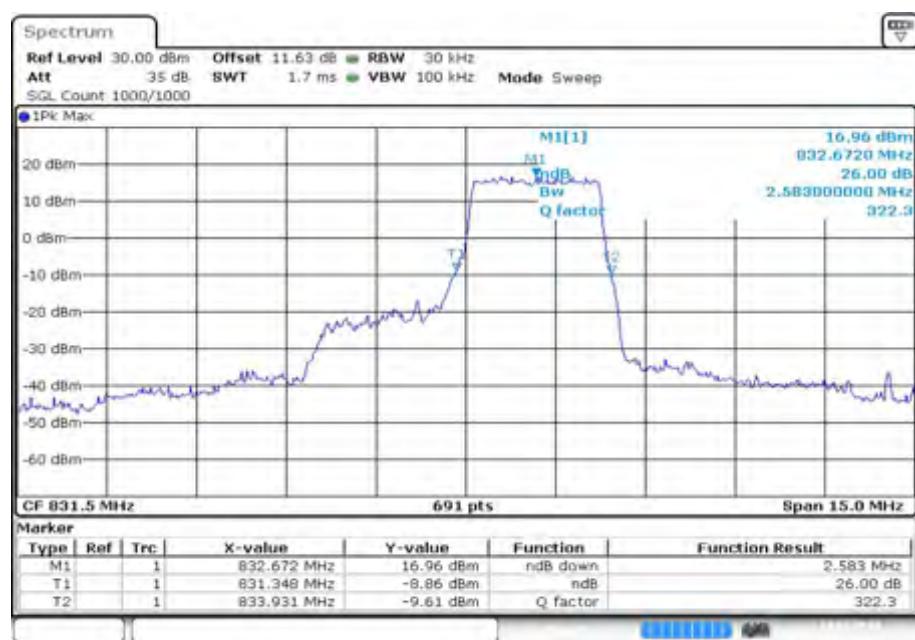


Fig.3

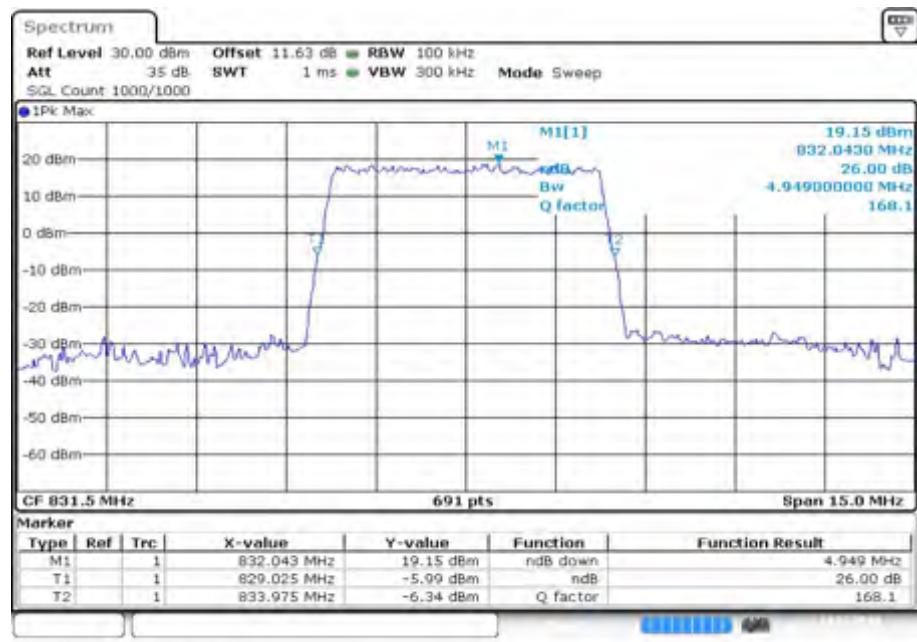


Fig.4

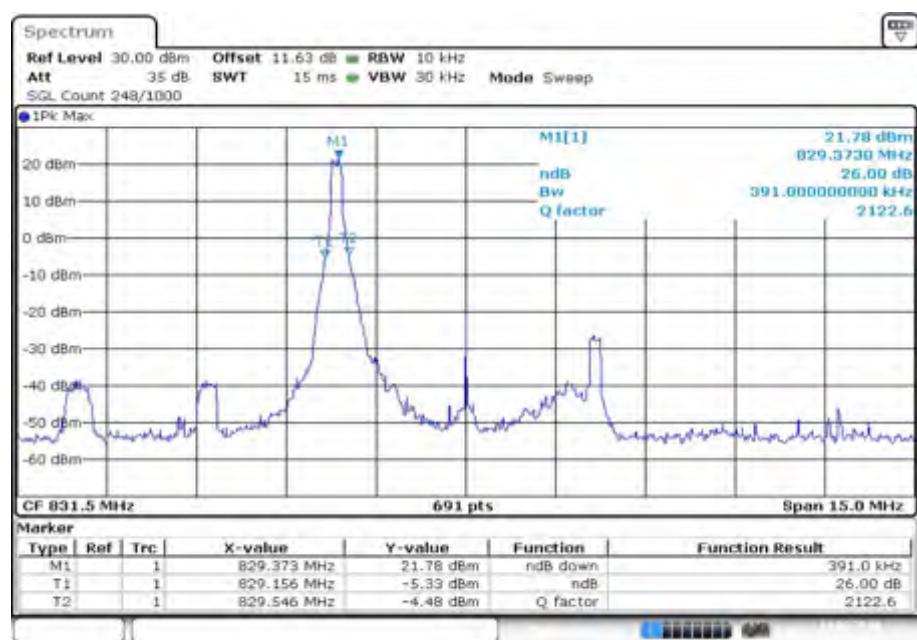


Fig.5

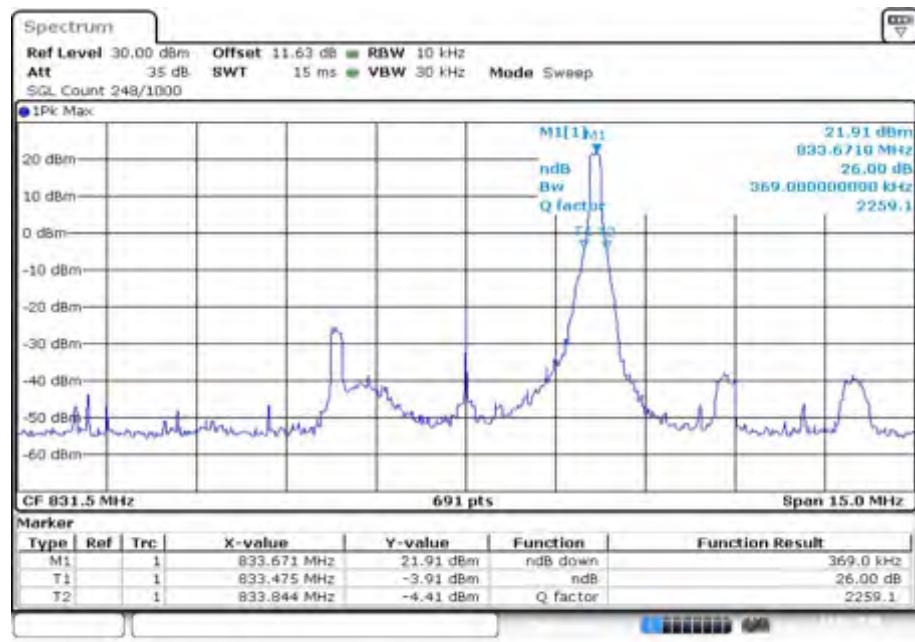


Fig.6

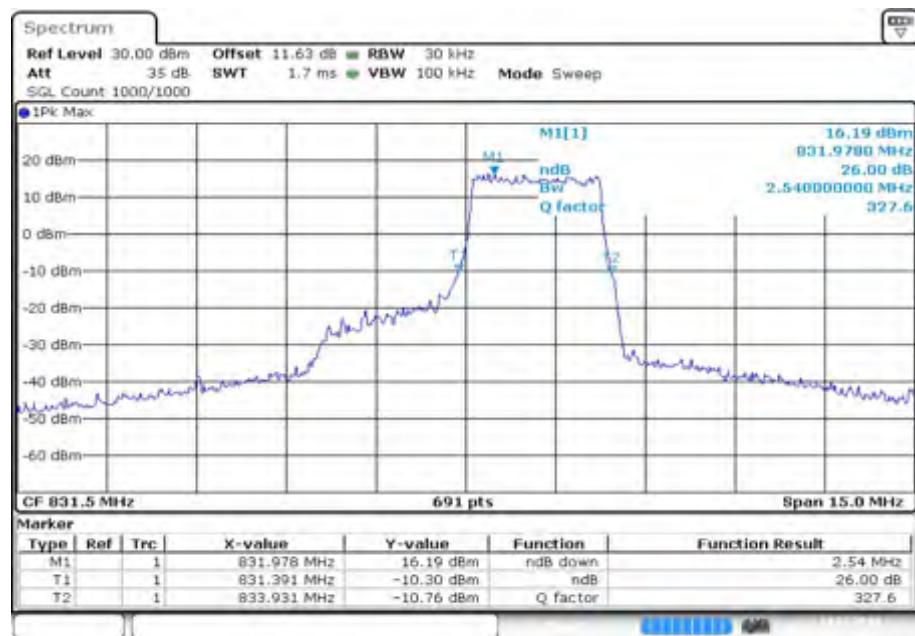


Fig.7

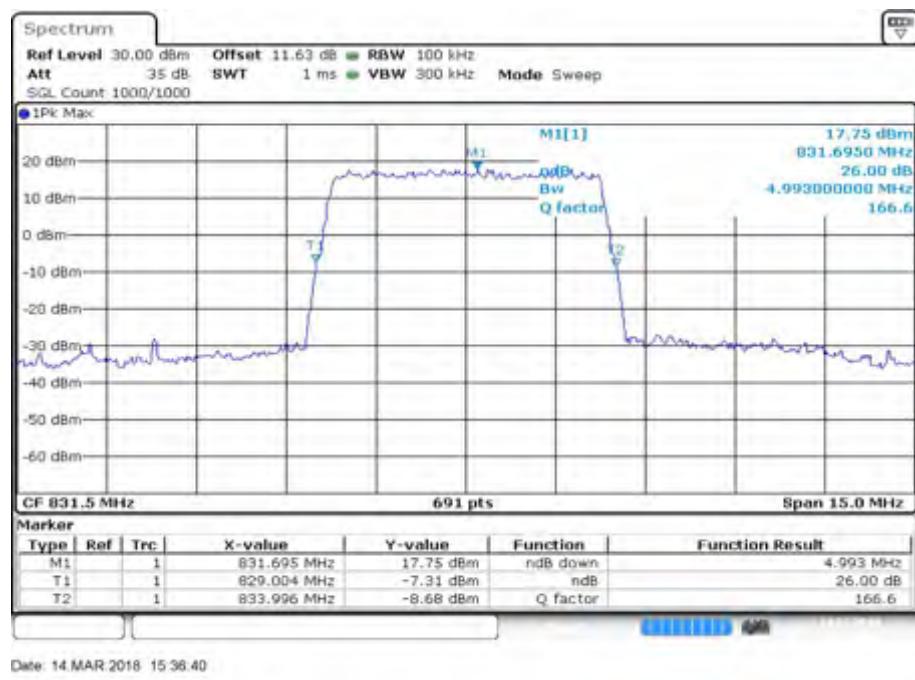


Fig.8

Band	Carrier frequency (MHz)	Channel (High)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	846.5	27015	5	1	0	0.391	Fig.1	0.347
				1	24	0.391	Fig.2	0.369
				12	6	2.562	Fig.3	2.540
				25	0	4.949	Fig.4	4.993

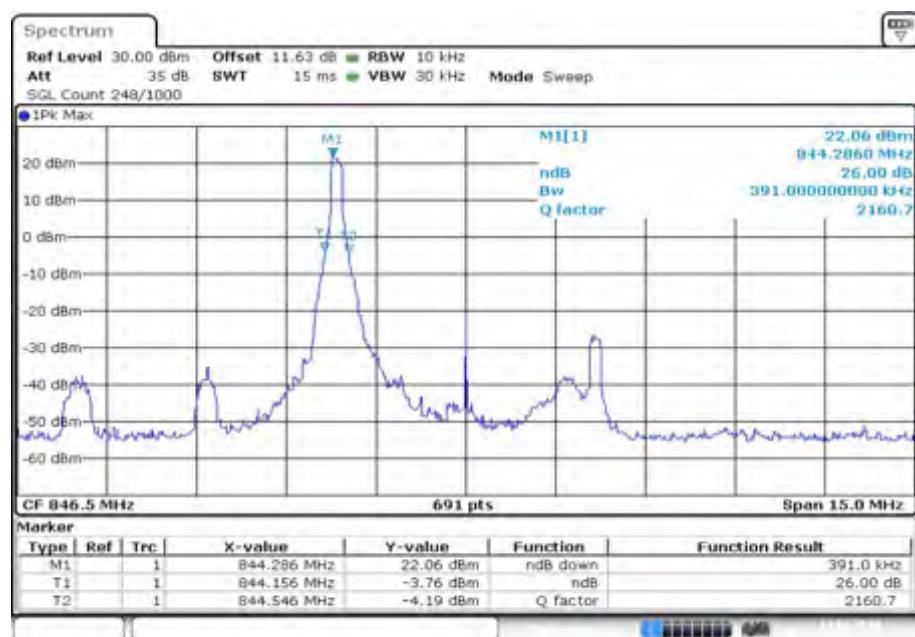


Fig.1

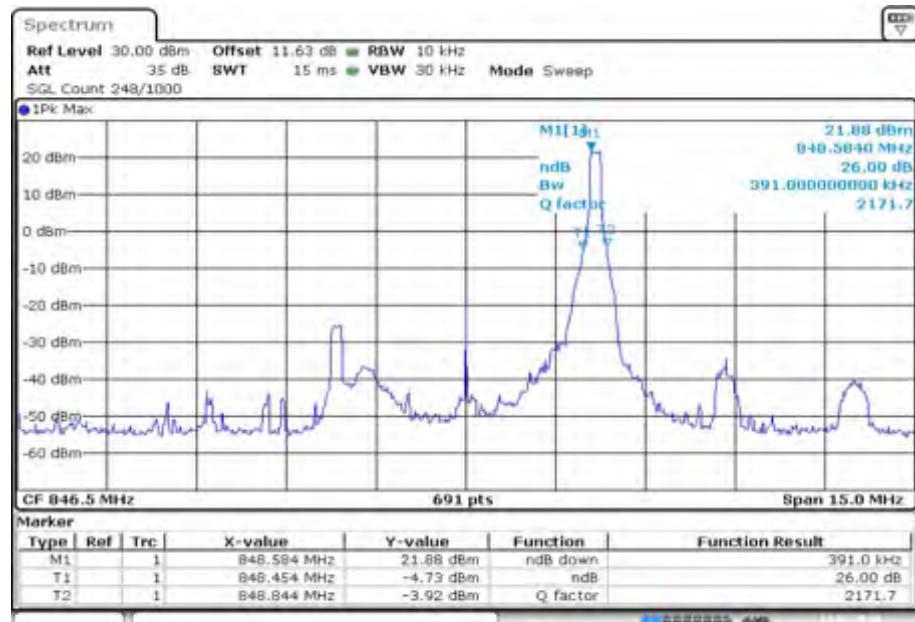


Fig.2

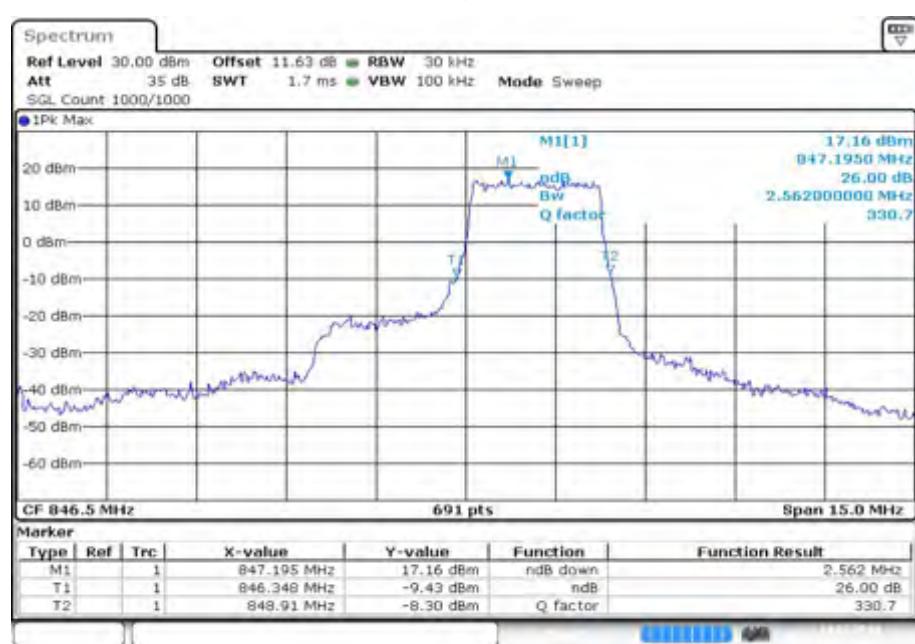


Fig.3

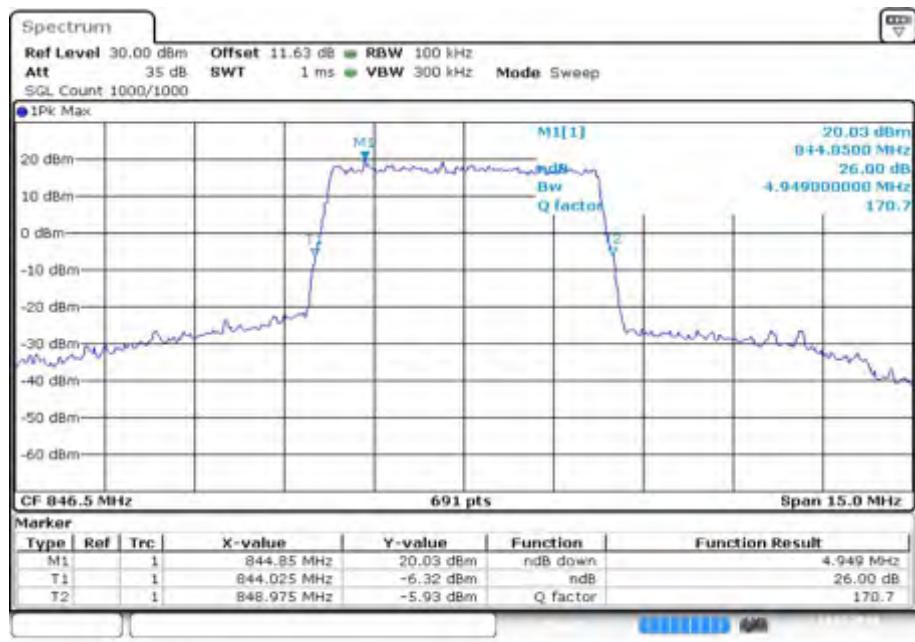


Fig.4

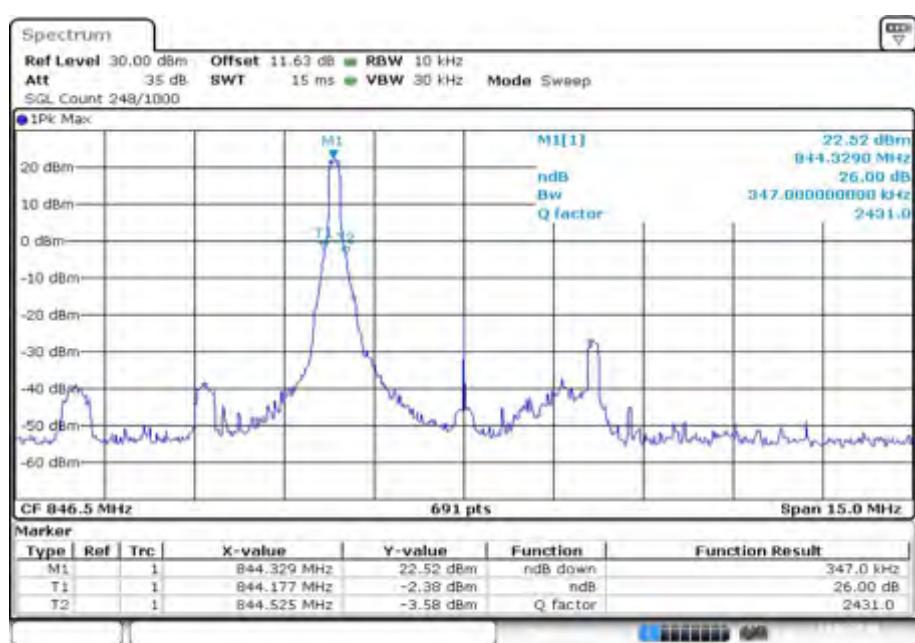


Fig.5

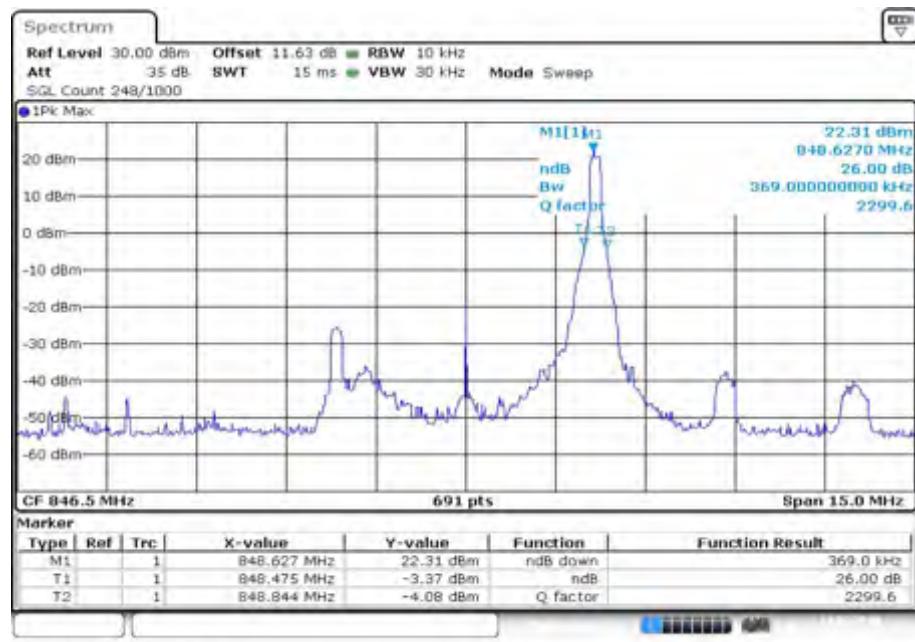


Fig.6

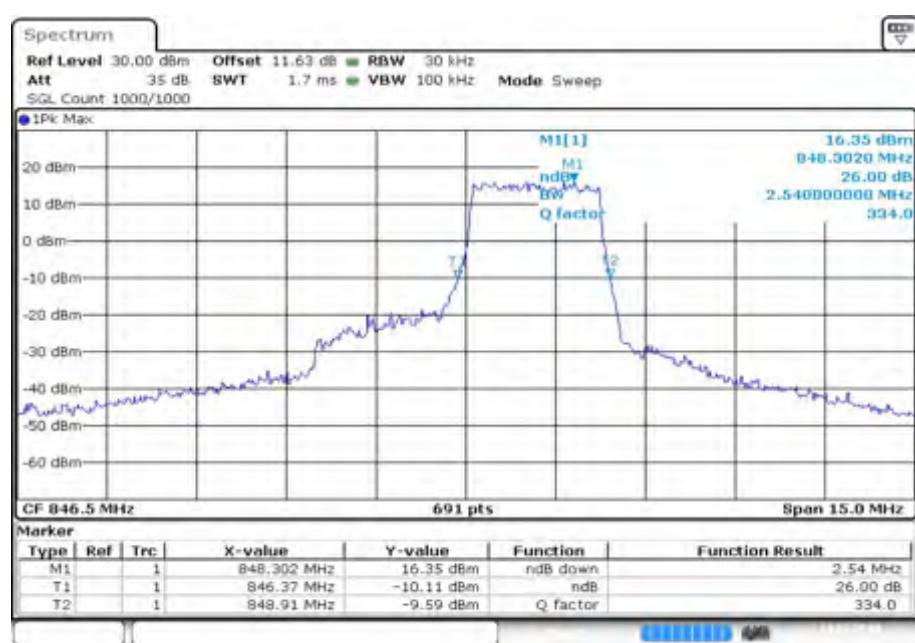


Fig.7

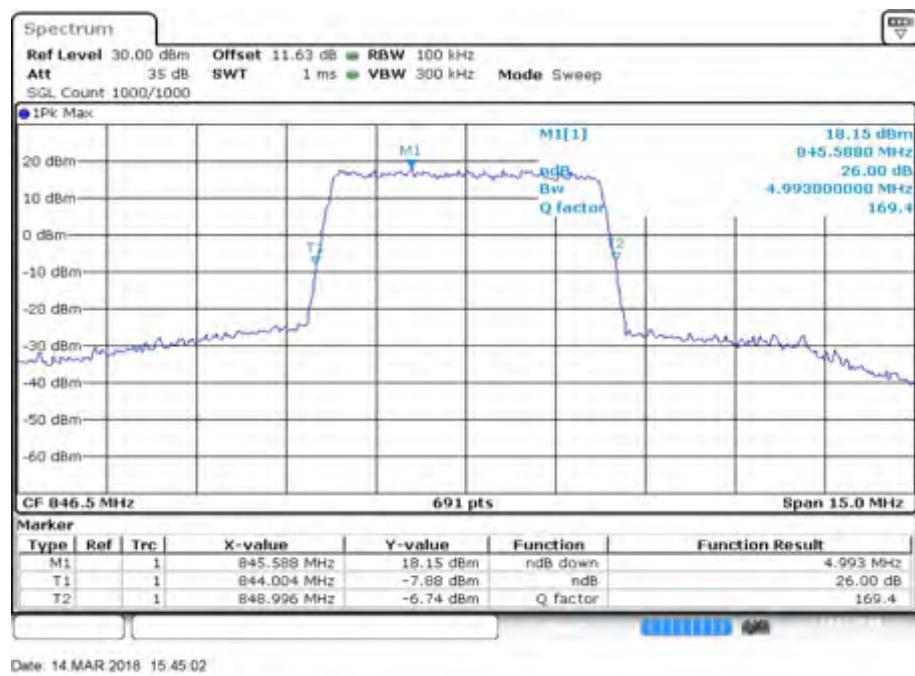


Fig.8

Band	Carrier frequency (MHz)	Channel (Low)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	819	26740	10	1	0	0.391	Fig.1	0.391
				1	49	0.391	Fig.2	0.391
				24	12	5.080	Fig.3	5.080
				50	0	9.986	Fig.4	9.986

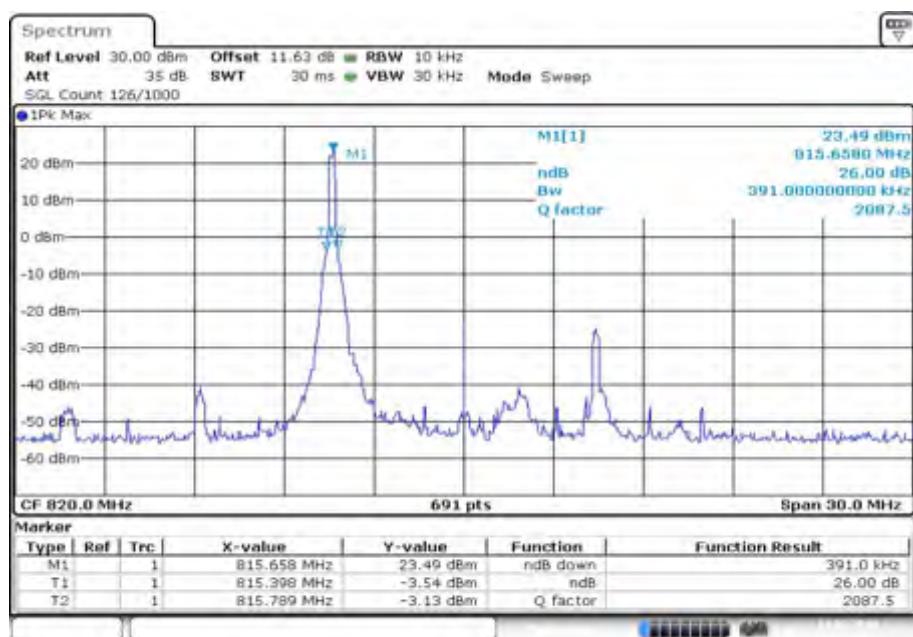


Fig.1

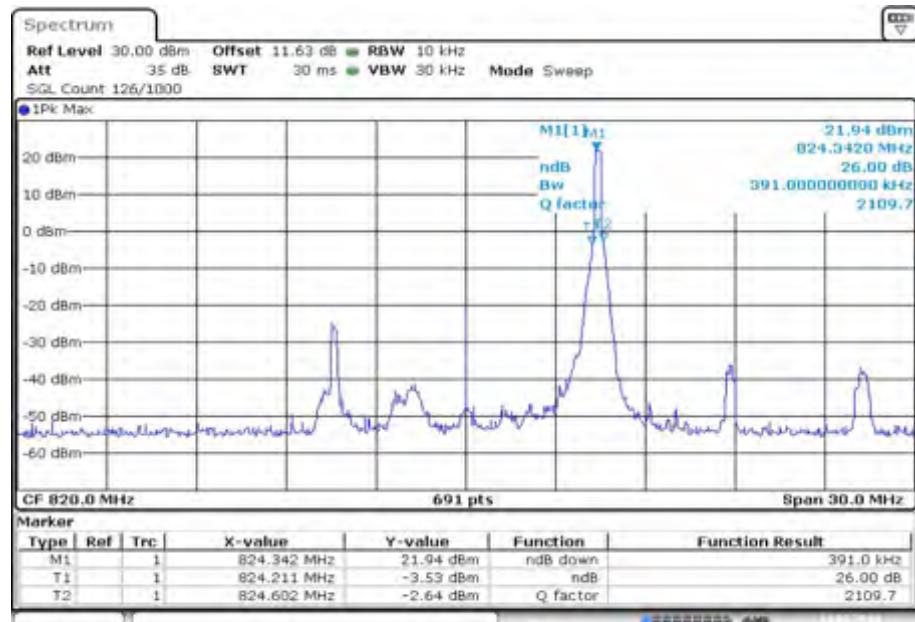


Fig.2



Fig.3

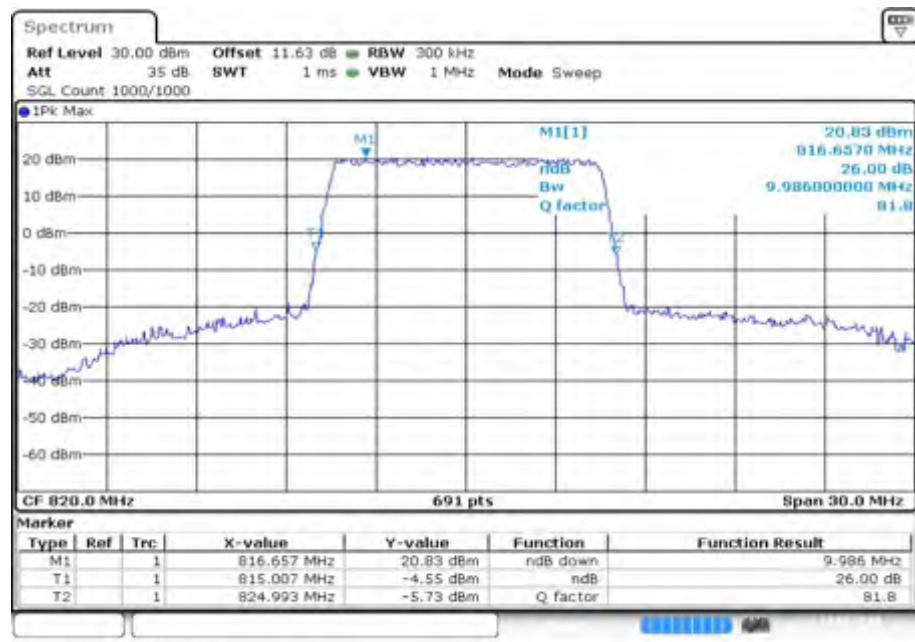


Fig.4

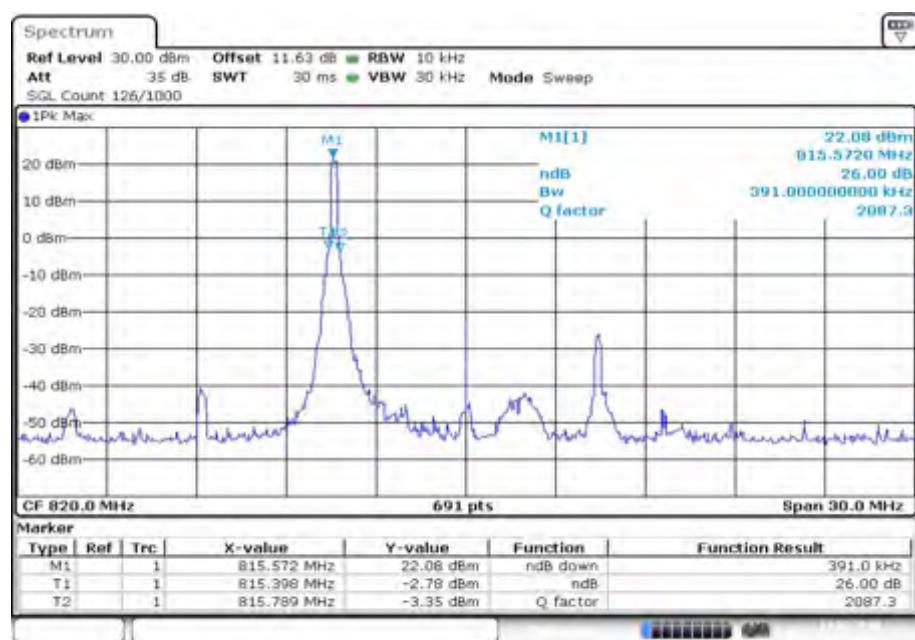


Fig.5

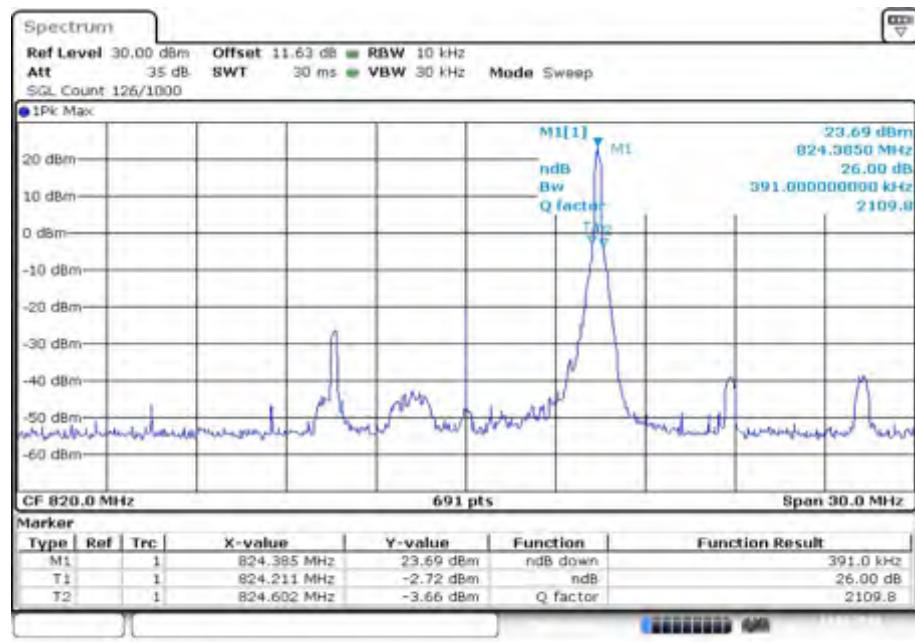


Fig.6

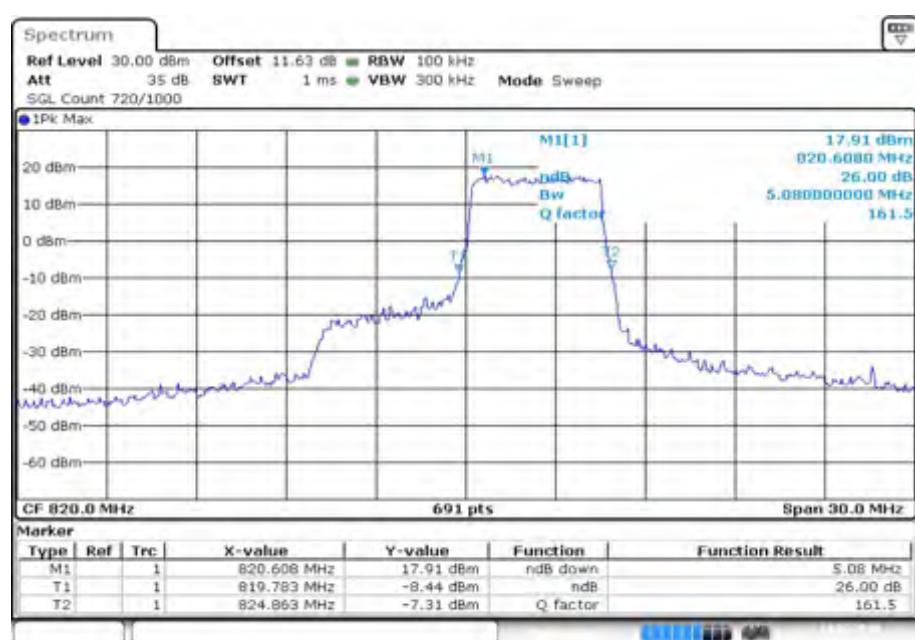


Fig.7

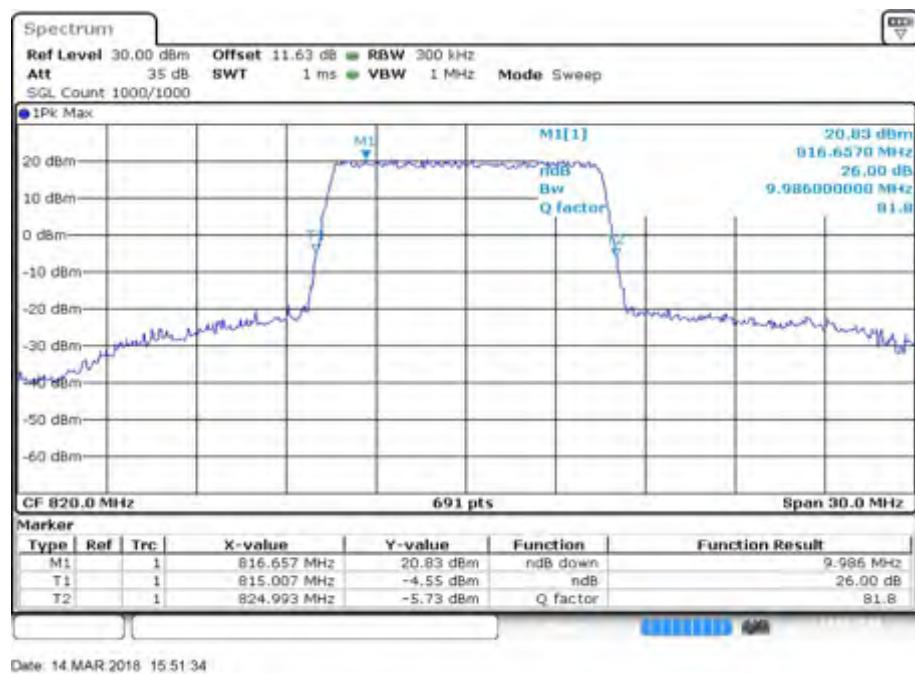


Fig.8

Band	Carrier frequency (MHz)	Channel (Mid)	BW	RB Size	RB Offset	Bandwidth of -26dB transmitter power (MHz)		
						QPSK		16-QAM
26	831.5	26865	10	1	0	0.391	Fig.1	0.391
				1	49	0.391	Fig.2	0.391
				24	12	5.080	Fig.3	5.036
				50	0	9.942	Fig.4	9.942

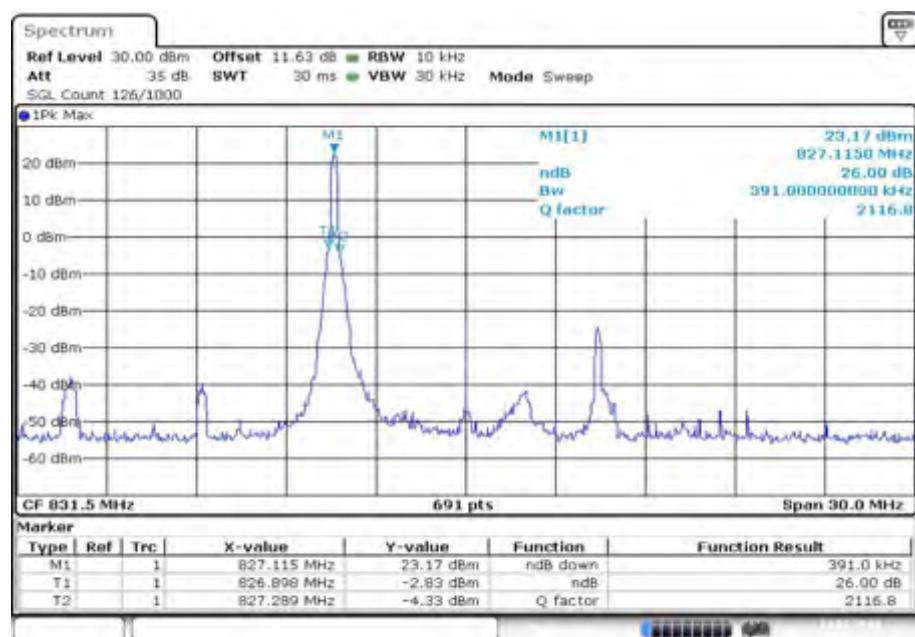


Fig.1

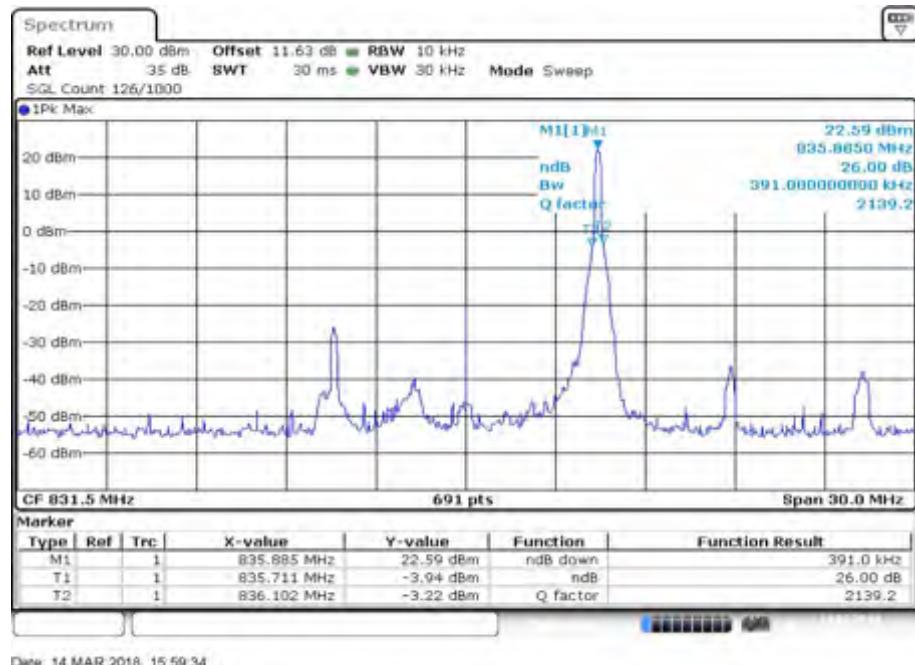


Fig.2

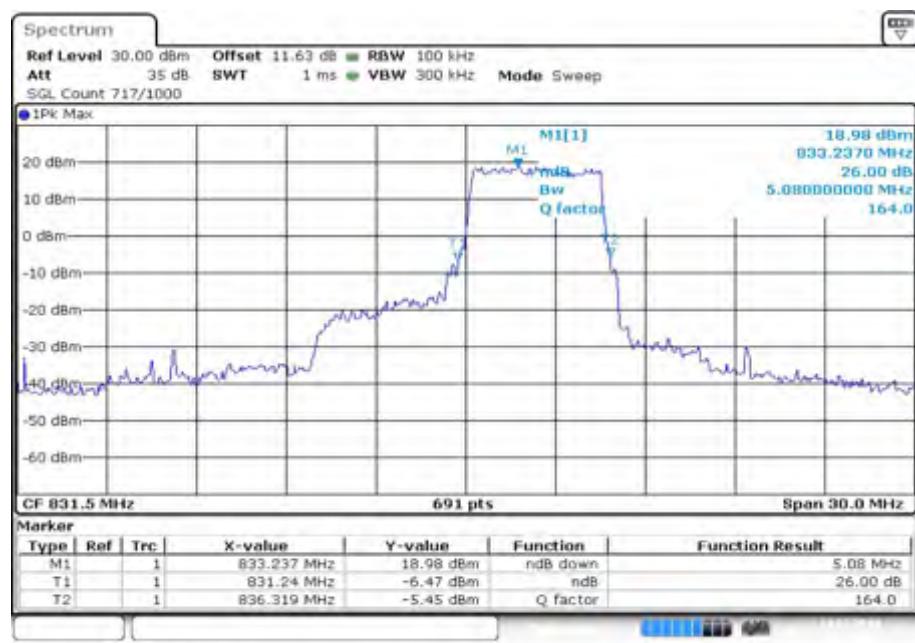


Fig.3

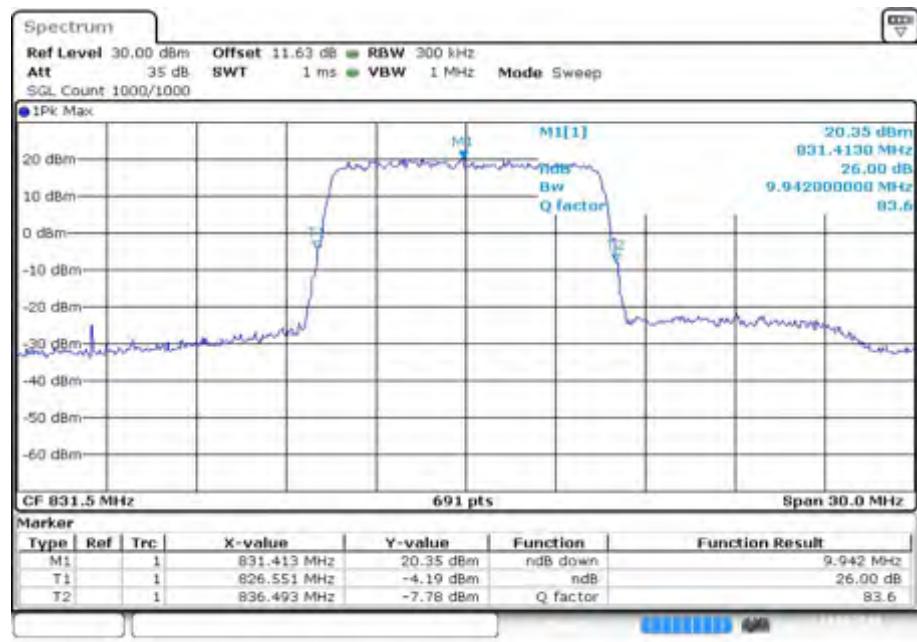


Fig.4

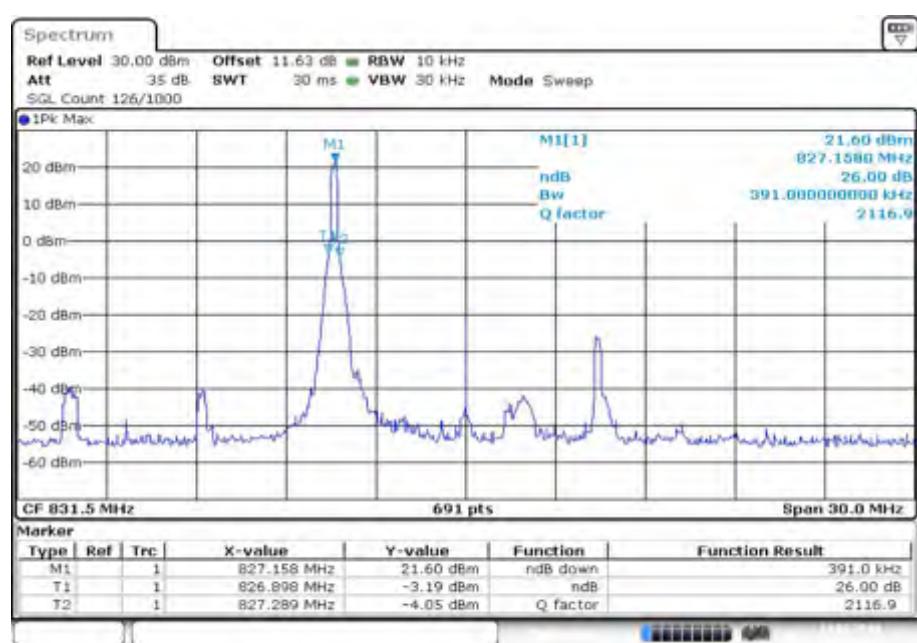


Fig.5

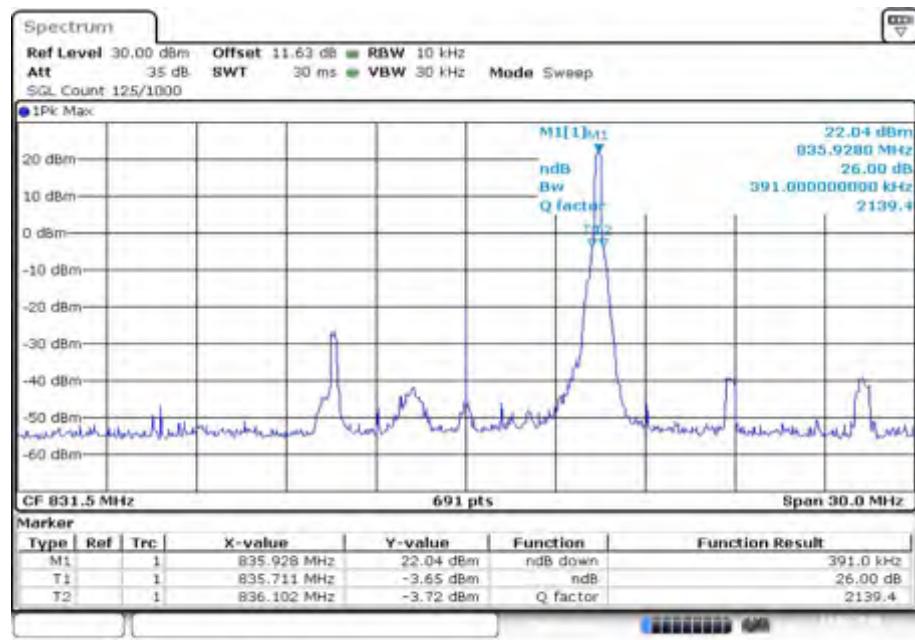


Fig.6

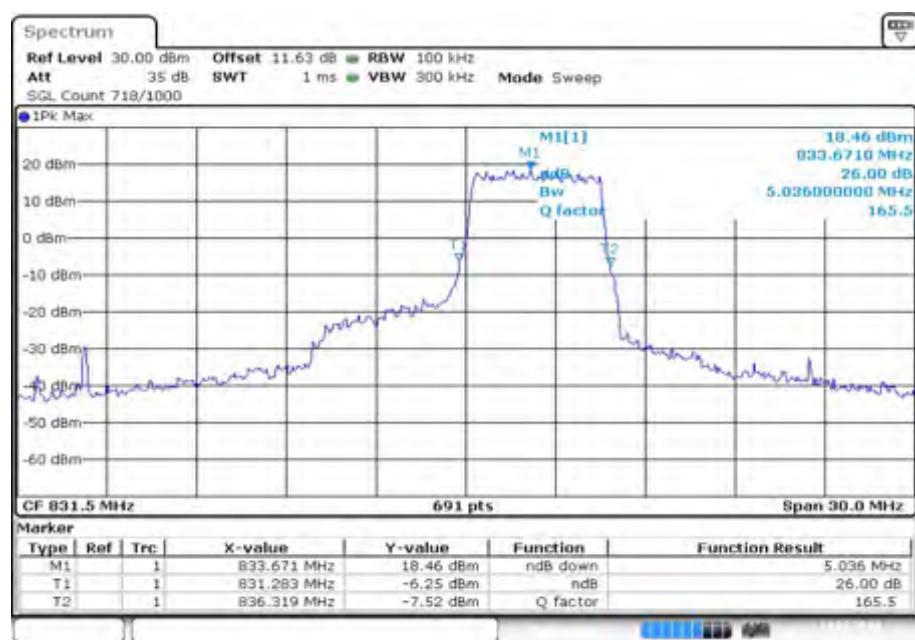


Fig.7

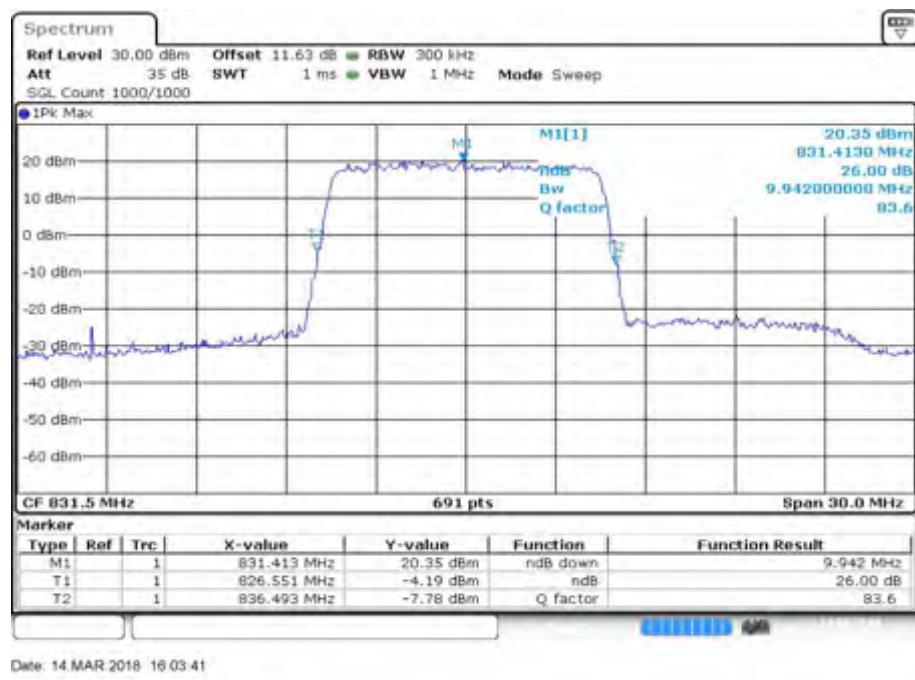


Fig.8