

# FCC PART 27

## MEASUREMENT AND TEST REPORT

For

**elco**

1 Rue Galilée 56270 Ploemeur France

**FCC ID:2AEBFS5160Q4G**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Smart Phone
<b>Test Engineer:</b> Mike Hu	<i>Mike Hu</i>
<b>Report Number:</b> RSZ150304004-00E	
<b>Report Date:</b> 2015-03-25	
<b>Reviewed By:</b> Jimmy Xiao	<i>Jimmy Xiao</i>
<b>Prepared By:</b> RF Engineer	
Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>	

**Note:** This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

## **TABLE OF CONTENTS**

<b>GENERAL INFORMATION.....</b>	<b>4</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	4
OBJECTIVE .....	4
RELATED SUBMITTAL(S)/GRANT(S).....	4
TEST METHODOLOGY .....	4
TEST FACILITY .....	5
<b>SYSTEM TEST CONFIGURATION.....</b>	<b>6</b>
JUSTIFICATION .....	6
EQUIPMENT MODIFICATIONS .....	6
SUPPORT EQUIPMENT LIST AND DETAILS .....	6
BLOCK DIAGRAM OF TEST SETUP .....	6
<b>SUMMARY OF TEST RESULTS .....</b>	<b>7</b>
<b>FCC §1.1307(B) &amp; §27.52 &amp; §2.1093 - RF EXPOSURE INFORMATION.....</b>	<b>8</b>
APPLICABLE STANDARD .....	8
TEST RESULT .....	8
<b>FCC §2.1047 - MODULATION CHARACTERISTIC .....</b>	<b>9</b>
<b>FCC § 2.1046 &amp; § 27.50 - RF OUTPUT POWER.....</b>	<b>10</b>
APPLICABLE STANDARDS.....	10
TEST PROCEDURE .....	10
TEST EQUIPMENT LIST AND DETAILS.....	10
TEST DATA .....	10
<b>FCC §2.1049 &amp; §27.53 - OCCUPIED BANDWIDTH.....</b>	<b>24</b>
APPLICABLE STANDARDS.....	24
TEST PROCEDURE .....	24
TEST EQUIPMENT LIST AND DETAILS.....	24
TEST DATA .....	24
<b>FCC §2.1051 &amp; §27.53- SPURIOUS EMISSIONS AT ANTENNA TERMINALS .....</b>	<b>87</b>
APPLICABLE STANDARDS.....	87
TEST PROCEDURE .....	87
TEST EQUIPMENT LIST AND DETAILS.....	87
TEST DATA .....	87
<b>FCC §2.1053 &amp; §27.53 - SPURIOUS RADIATED EMISSIONS .....</b>	<b>98</b>
APPLICABLE STANDARDS.....	98
TEST PROCEDURE .....	98
TEST EQUIPMENT LIST AND DETAILS.....	99
TEST DATA .....	99
<b>FCC §27.53 - BAND EDGES.....</b>	<b>101</b>
APPLICABLE STANDARDS.....	101
TEST PROCEDURE .....	101
TEST EQUIPMENT LIST AND DETAILS.....	101
TEST DATA .....	101
<b>FCC §2.1055 &amp; §27.54 - FREQUENCY STABILITY.....</b>	<b>142</b>
APPLICABLE STANDARDS.....	142

TEST PROCEDURE .....142

TEST EQUIPMENT LIST AND DETAILS.....142

TEST DATA .....142

## GENERAL INFORMATION

---

### Product Description for Equipment under Test (EUT)

The *elco*'s product, model number: *S5160Q 4G (FCC ID:2AEBFS5160Q4G)* or the "EUT" as referred to in this report is a *Smart Phone*, which measures approximately: 14.5 cm (L) x 7.3 cm (W) x 0.9 cm (H), rated input voltage: DC 3.7 V battery or DC 5.0V from adapter.

#### Adapter Information:

Model: S5160Q 4G

Input: AC100-240V, 50/60Hz, 0.2A

Output: DC 5.0V, 1000mA

*\*All measurement and test data in this report was gathered from production sample serial number: 1503019 (Assigned by BACL, Shenzhen). The EUT supplied by the applicant was received on 2015-03-04*

### Objective

This type approval report is prepared on behalf of *elco* in accordance with Part 2, Part 27 of the Federal Communication Commissions rules.

The objective is to determine the compliance of EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability, and band edge.

### Related Submittal(s)/Grant(s)

FCC Part 15B JBP, FCC Part 22H&24E PCE, Part 15.247 DSS&DTS submissions with FCC ID: 2AEBFS5160Q4G.

### Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA-1037, TIA/EIA 603-D.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## **Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp.(Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on December 06, 2010. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

## SYSTEM TEST CONFIGURATION

### Justification

The EUT was configured for testing according to TIA/EIA-603-D.

The final qualification test was performed with the EUT operating at normal mode.

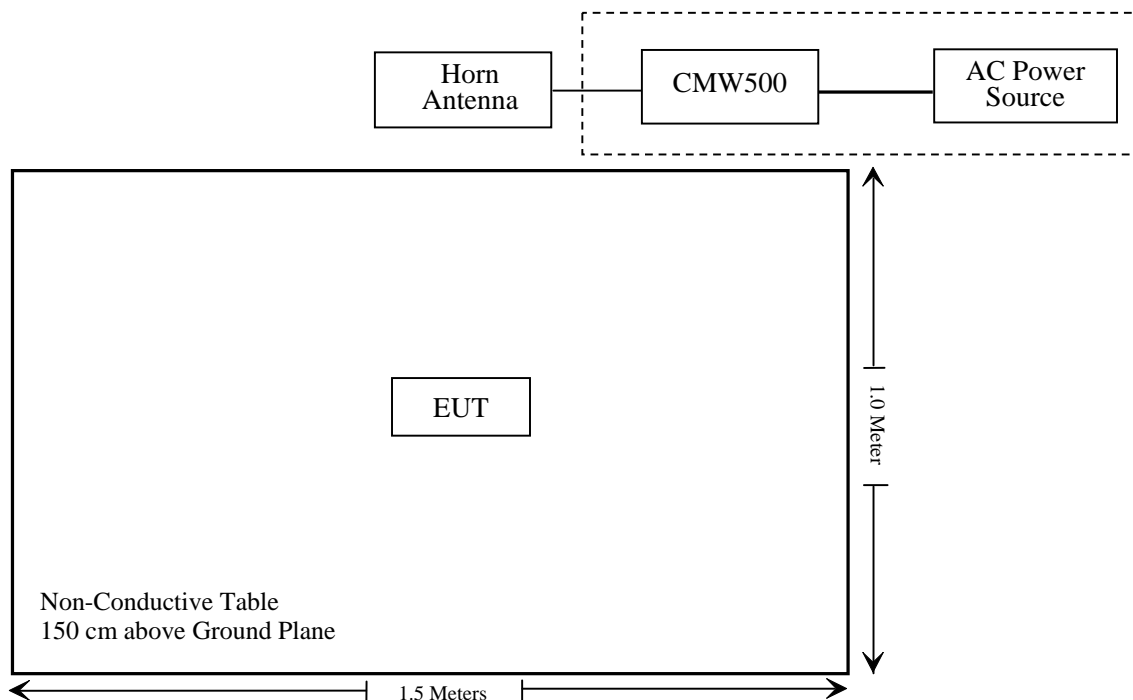
### Equipment Modifications

No modifications were made to the EUT.

### Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.0002K50

### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

FCC Rules	Description of Test	Result
§1.1307 (b)(1), §2.1093, §27.52	RF Exposure Information	Compliance*
§2.1046; §27.50 (d) (i)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; §27.53 (c)	Occupied Bandwidth	Compliance
§ 2.1051; §27.53(c) (g)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; §27.53 (c) (g)	Spurious Radiated Emissions	Compliance
§27.53 (c) (g)	Band Edge	Compliance
§ 2.1055; §27.54	Frequency stability	Compliance

Note: \* Please refer to SAR report released by BACL, report number: RSZ150304004-20.

---

## **FCC §1.1307(b) & §27.52 & §2.1093 - RF EXPOSURE INFORMATION**

---

### **Applicable Standard**

FCC§1.1307 and §2.1093.

### **Test Result**

Compliance, please refer to the SAR report: RSZ150304004-20.



---

## **FCC §2.1047 - MODULATION CHARACTERISTIC**

---

According to FCC § 2.1047(d), Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

## FCC § 2.1046 & § 27.50 - RF OUTPUT POWER

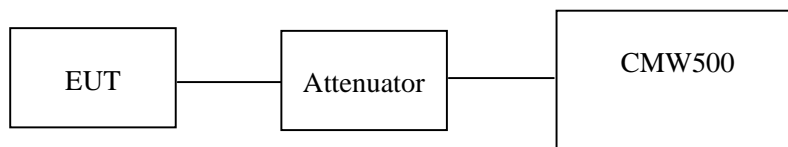
### Applicable Standards

According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.  
According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.  
The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

### Test Procedure

*Conducted method:*

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



*Radiated method:*

TIA603-D section 2.2.17

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101122	2014-09-25	2015-09-25
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
HP	Synthesized Sweeper	8341B	2624A00116	2014-06-03	2015-06-03
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22
Sunol Sciences	Horn Antenna	DRH-118	A052304	2014-12-01	2015-11-30

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	20~22 °C
Relative Humidity:	50~52 %
ATM Pressure:	101.0 kPa

*The testing was performed by Mike Hu from 2015-03-12 to 2015-03-20*

**Conducted Power****Band 4:****Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.34	22.42	22.42
		RB Size=1, RB Offset=2	22.42	22.43	22.43
		RB Size=1, RB Offset=5	22.42	22.54	22.33
		RB Size=3, RB Offset=0	22.23	22.26	22.34
		RB Size=3, RB Offset=1	22.38	22.30	22.28
		RB Size=3, RB Offset=2	22.23	22.31	22.34
		RB Size=6, RB Offset=0	21.98	22.03	22.10
	16QAM	RB Size=1, RB Offset=0	21.98	22.02	22.06
		RB Size=1, RB Offset=2	22.41	22.41	22.43
		RB Size=1, RB Offset=5	22.15	22.25	22.28
		RB Size=3, RB Offset=0	22.42	22.47	22.48
		RB Size=3, RB Offset=1	22.14	22.21	22.29
		RB Size=3, RB Offset=2	22.47	22.40	22.43
		RB Size=6, RB Offset=0	22.18	22.25	22.33
3.0	QPSK	RB Size=1, RB Offset=0	22.29	22.01	22.05
		RB Size=1, RB Offset=7	21.66	21.73	21.79
		RB Size=1, RB Offset=14	22.31	22.39	22.40
		RB Size=8, RB Offset=0	22.11	22.16	22.20
		RB Size=8, RB Offset=4	21.65	21.68	21.71
		RB Size=8, RB Offset=7	22.06	22.09	22.14
		RB Size=15, RB Offset=0	21.91	22.01	22.09
	16QAM	RB Size=1, RB Offset=0	21.99	22.08	22.17
		RB Size=1, RB Offset=7	22.65	22.02	22.04
		RB Size=1, RB Offset=14	22.02	22.04	22.10
		RB Size=8, RB Offset=0	22.05	22.11	22.12
		RB Size=8, RB Offset=4	22.33	22.36	22.40
		RB Size=8, RB Offset=7	22.15	22.23	22.32
		RB Size=15, RB Offset=0	22.00	22.02	22.09

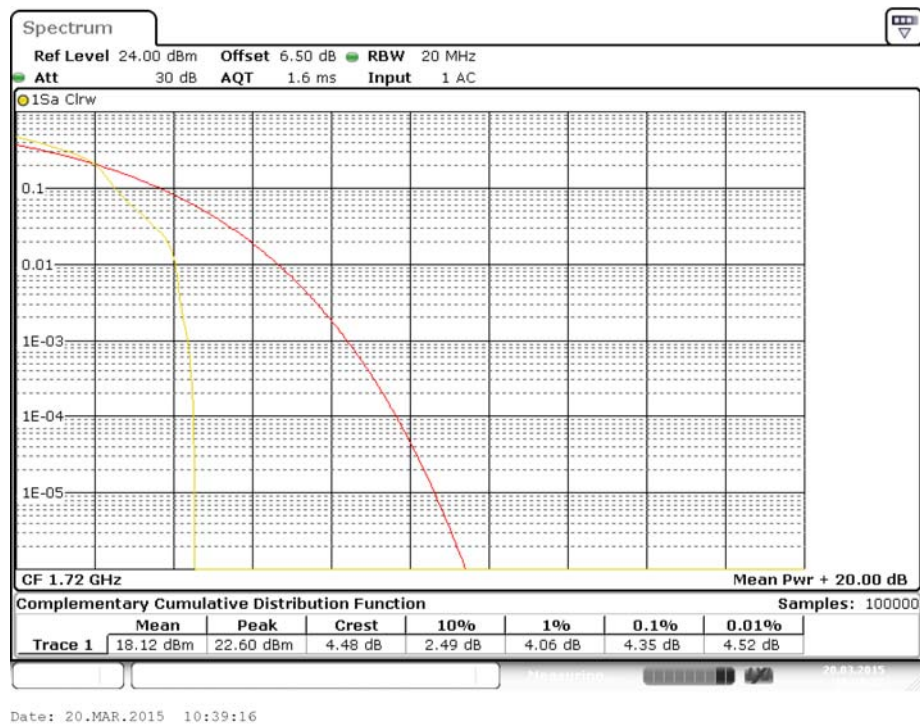
Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.37	22.46	22.56
		RB Size=1, RB Offset=12	22.36	22.43	22.49
		RB Size=1, RB Offset=24	22.04	22.05	22.10
		RB Size=12, RB Offset=0	21.95	22.02	22.07
		RB Size=12, RB Offset=6	21.99	22.03	22.03
		RB Size=12, RB Offset=11	21.88	21.96	21.97
		RB Size=25, RB Offset=0	22.00	22.09	22.12
	16QAM	RB Size=1, RB Offset=0	22.01	22.07	22.10
		RB Size=1, RB Offset=12	21.96	22.06	22.15
		RB Size=1, RB Offset=24	21.99	22.03	22.05
		RB Size=12, RB Offset=0	21.07	21.17	21.23
		RB Size=12, RB Offset=6	20.86	20.95	21.02
		RB Size=12, RB Offset=11	21.99	22.04	22.13
		RB Size=25, RB Offset=0	21.88	21.90	21.94
10.0	QPSK	RB Size=1, RB Offset=0	22.26	22.36	22.45
		RB Size=1, RB Offset=24	22.30	22.31	22.32
		RB Size=1, RB Offset=49	22.42	22.45	22.40
		RB Size=25, RB Offset=0	22.33	22.43	22.39
		RB Size=25, RB Offset=12	22.30	22.39	22.41
		RB Size=25, RB Offset=24	22.06	22.06	22.12
		RB Size=50, RB Offset=0	22.25	22.30	22.30
	16QAM	RB Size=1, RB Offset=0	22.40	22.50	22.56
		RB Size=1, RB Offset=24	22.36	22.43	22.44
		RB Size=1, RB Offset=49	22.12	22.15	22.24
		RB Size=25, RB Offset=0	21.93	21.99	22.01
		RB Size=25, RB Offset=12	22.00	22.03	22.11
		RB Size=25, RB Offset=24	21.97	22.06	22.07
		RB Size=50, RB Offset=0	22.03	22.12	22.21

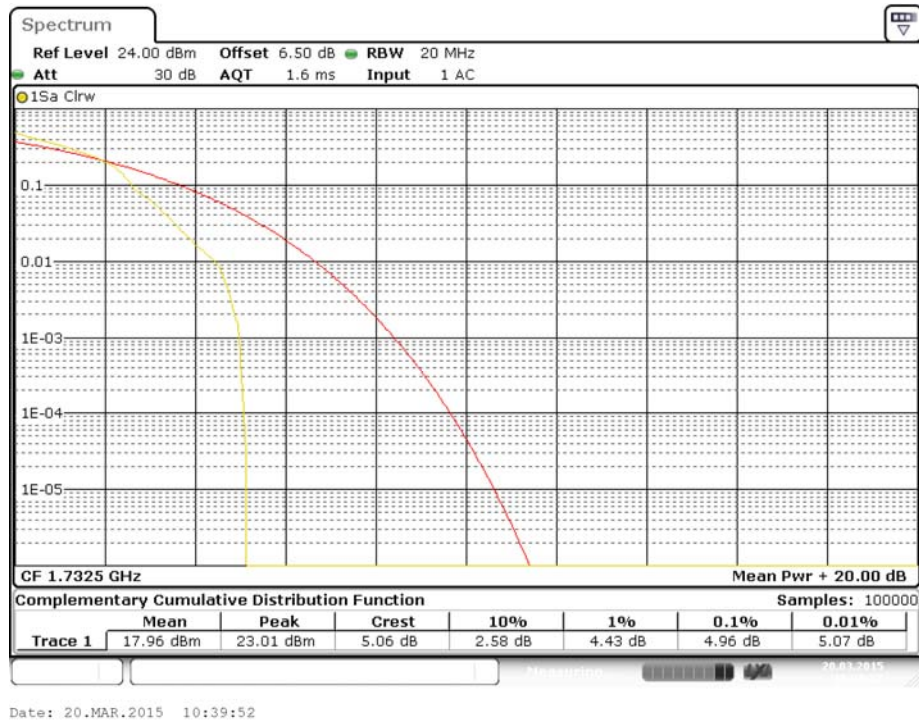
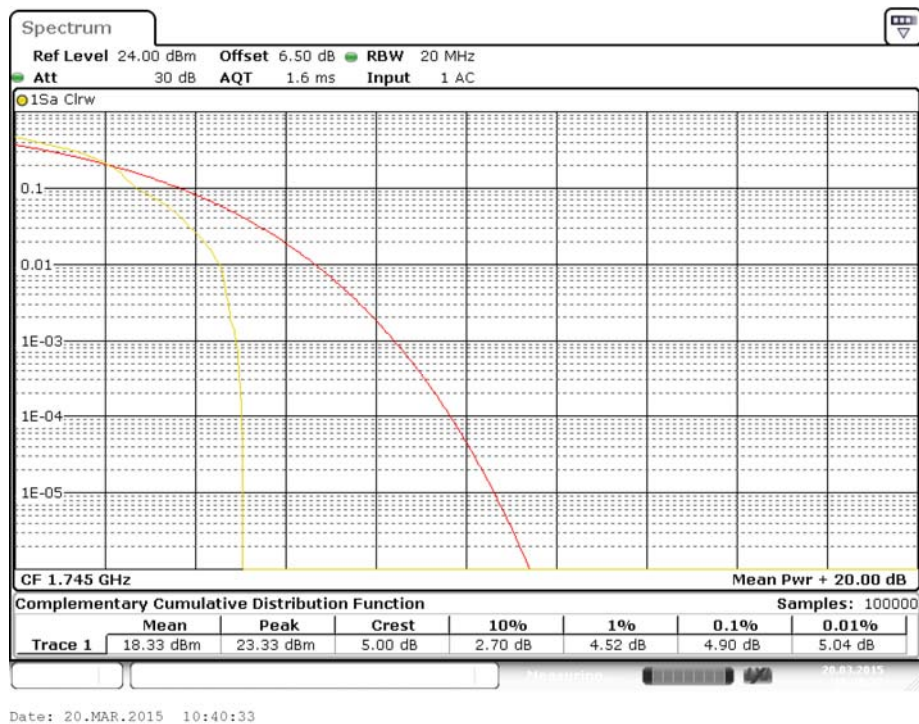
Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.24	22.04	22.11
		RB Size=1, RB Offset=37	21.94	21.98	22.06
		RB Size=1, RB Offset=74	21.98	22.05	22.10
		RB Size=36, RB Offset=0	22.28	22.36	22.40
		RB Size=36, RB Offset=18	22.12	22.12	22.20
		RB Size=36, RB Offset=37	21.97	22.01	22.03
		RB Size=75, RB Offset=0	22.33	22.42	22.45
	16QAM	RB Size=1, RB Offset=0	22.06	22.14	22.20
		RB Size=1, RB Offset=37	21.98	22.06	22.10
		RB Size=1, RB Offset=74	22.24	22.27	22.37
		RB Size=36, RB Offset=0	22.28	22.33	22.37
		RB Size=36, RB Offset=18	22.32	22.36	22.44
		RB Size=36, RB Offset=37	22.64	22.40	22.35
		RB Size=75, RB Offset=0	22.23	22.24	22.28
20.0	QPSK	RB Size=1, RB Offset=0	22.50	22.57	22.61
		RB Size=1, RB Offset=49	21.97	22.00	22.07
		RB Size=1, RB Offset=99	22.37	22.03	22.09
		RB Size=50, RB Offset=0	21.68	21.77	21.82
		RB Size=50, RB Offset=24	22.27	22.29	22.31
		RB Size=50, RB Offset=49	22.06	22.11	22.20
		RB Size=100, RB Offset=0	21.58	21.66	21.71
	16QAM	RB Size=1, RB Offset=0	21.99	22.08	22.15
		RB Size=1, RB Offset=49	21.89	21.99	22.07
		RB Size=1, RB Offset=99	21.98	22.03	22.08
		RB Size=50, RB Offset=0	22.14	22.36	22.01
		RB Size=50, RB Offset=24	21.96	22.01	22.03
		RB Size=50, RB Offset=49	21.98	22.08	22.14
		RB Size=100, RB Offset=0	21.10	21.15	21.20

**EIRP:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Middle Channel									
1732.5	85.18	243	1.5	H	14.1	0.97	9.40	22.53	30
1732.5	84.23	114	1.4	V	13.3	0.97	9.40	21.73	30

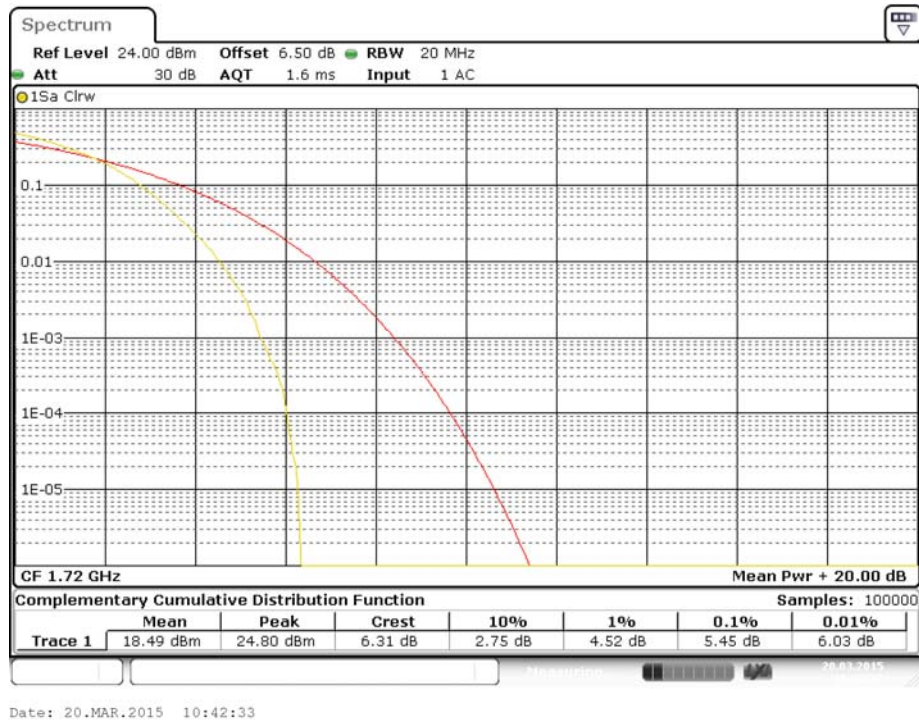
Modulation	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit (dB)	Result
16QAM (1RB Size)	4.48	5.06	5.00	≤ 13	PASS
16QAM (100RB Size)	6.31	6.31	6.27	≤ 13	PASS

**20.0 MHz PAR– Low Channel (16QAM, 1RB Size)**

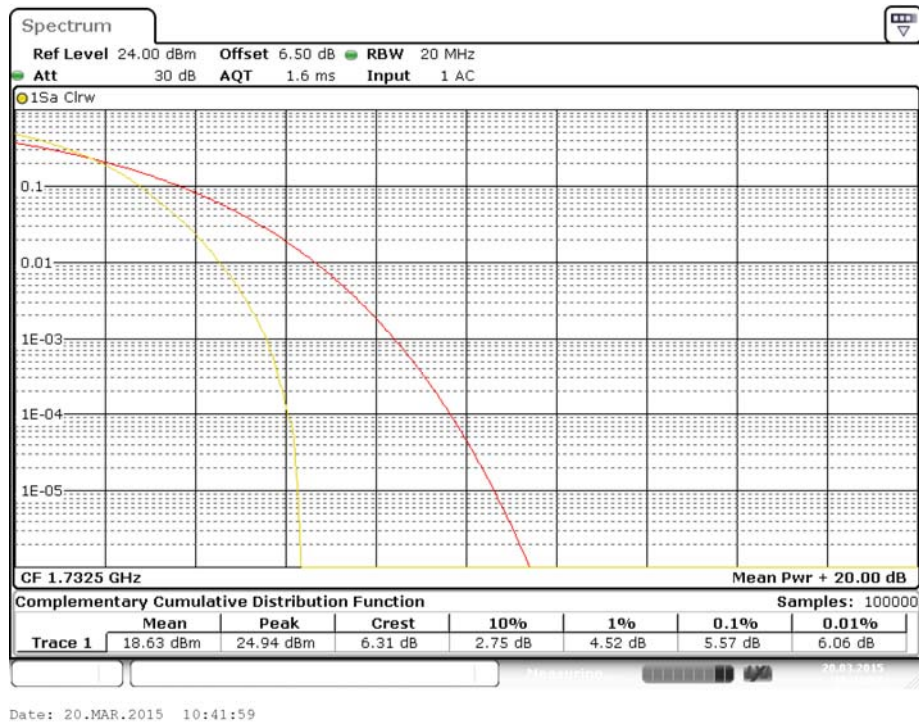
**20.0 MHz PAR– Middle Channel (16QAM, 1RB Size)****20.0 MHz PAR– High Channel (16QAM, 100RB Size)**



20.0 MHz PAR– Low Channel (16QAM, 100RB Size)

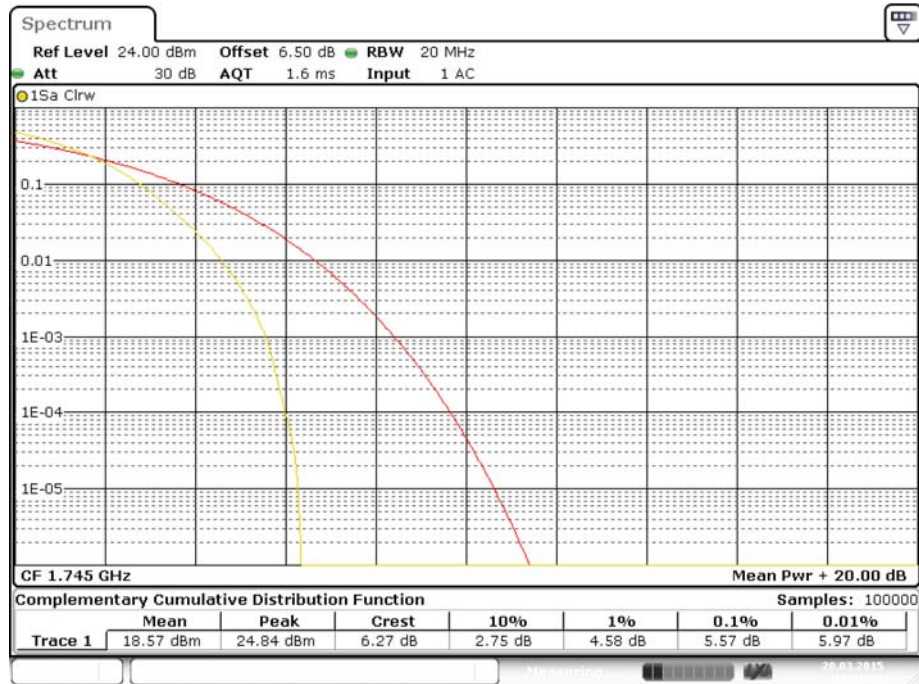


20.0 MHz PAR– Middle Channel (16QAM, 100RB Size)





### 20.0 MHz PAR- High Channel (16QAM, 100RB Size)



**Band 7:****Maximum Output Power**

<b>Bandwidth (MHz)</b>	<b>Modulation</b>	<b>RB size/RB Offset</b>	<b>Low Channel (dBm)</b>	<b>Middle Channel (dBm)</b>	<b>High Channel (dBm)</b>
5.0	QPSK	RB Size=1, RB Offset=0	21.51	21.58	21.63
		RB Size=1, RB Offset=12	21.59	21.67	21.69
		RB Size=1, RB Offset=24	21.98	22.00	22.02
		RB Size=12, RB Offset=0	21.89	21.91	21.97
		RB Size=12, RB Offset=6	22.00	22.06	22.07
		RB Size=12, RB Offset=11	22.00	22.08	22.15
		RB Size=25, RB Offset=0	21.94	21.94	21.96
	16QAM	RB Size=1, RB Offset=0	21.97	21.98	22.01
		RB Size=1, RB Offset=12	21.09	21.18	21.22
		RB Size=1, RB Offset=24	20.86	20.92	20.92
		RB Size=12, RB Offset=0	21.98	22.05	22.07
		RB Size=12, RB Offset=6	22.32	22.40	22.43
		RB Size=12, RB Offset=11	22.04	22.05	22.08
		RB Size=25, RB Offset=0	21.99	22.02	22.12
10.0	QPSK	RB Size=1, RB Offset=0	21.65	21.68	21.75
		RB Size=1, RB Offset=24	22.01	22.10	22.11
		RB Size=1, RB Offset=49	21.69	21.72	21.78
		RB Size=25, RB Offset=0	21.69	21.77	21.86
		RB Size=25, RB Offset=12	21.76	21.82	21.82
		RB Size=25, RB Offset=24	21.59	21.61	21.67
		RB Size=50, RB Offset=0	21.57	21.64	21.67
	16QAM	RB Size=1, RB Offset=0	22.04	22.04	22.04
		RB Size=1, RB Offset=24	21.94	22.00	22.03
		RB Size=1, RB Offset=49	22.07	22.09	22.15
		RB Size=25, RB Offset=0	21.99	22.05	22.07
		RB Size=25, RB Offset=12	21.98	22.06	22.09
		RB Size=25, RB Offset=24	22.01	22.08	22.18
		RB Size=50, RB Offset=0	21.11	21.20	21.23

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.22	22.25	22.27
		RB Size=1, RB Offset=37	22.99	23.07	23.12
		RB Size=1, RB Offset=74	22.55	22.60	22.67
		RB Size=36, RB Offset=0	22.42	22.51	22.57
		RB Size=36, RB Offset=18	22.08	22.17	22.24
		RB Size=36, RB Offset=37	22.06	22.16	22.17
		RB Size=75, RB Offset=0	22.28	22.37	22.43
	16QAM	RB Size=1, RB Offset=0	21.71	21.74	21.83
		RB Size=1, RB Offset=37	21.90	21.92	21.93
		RB Size=1, RB Offset=74	21.62	21.71	21.74
		RB Size=36, RB Offset=0	21.63	21.72	21.81
		RB Size=36, RB Offset=18	22.00	22.00	22.09
		RB Size=36, RB Offset=37	21.75	21.84	21.88
		RB Size=75, RB Offset=0	21.72	21.80	21.82
20.0	QPSK	RB Size=1, RB Offset=0	21.68	21.71	21.79
		RB Size=1, RB Offset=49	22.06	22.14	22.21
		RB Size=1, RB Offset=99	21.70	21.74	21.83
		RB Size=50, RB Offset=0	21.68	21.71	21.78
		RB Size=50, RB Offset=24	21.73	21.74	21.80
		RB Size=50, RB Offset=49	21.56	21.64	21.71
		RB Size=100, RB Offset=0	21.58	21.61	21.68
	16QAM	RB Size=1, RB Offset=0	22.02	22.08	22.16
		RB Size=1, RB Offset=49	21.92	22.02	22.11
		RB Size=1, RB Offset=99	22.02	22.05	22.06
		RB Size=50, RB Offset=0	22.01	22.11	22.14
		RB Size=50, RB Offset=24	21.98	22.01	22.02
		RB Size=50, RB Offset=49	22.02	22.07	22.07
		RB Size=100, RB Offset=0	21.15	21.21	21.28

**Radiated Power:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		Limit (dBm)
Middle Channel									
2535.0	83.24	142	1.3	H	15.8	1.70	8.60	22.7	33
2535.0	81.46	29	1.8	V	14.0	1.70	8.60	20.9	33

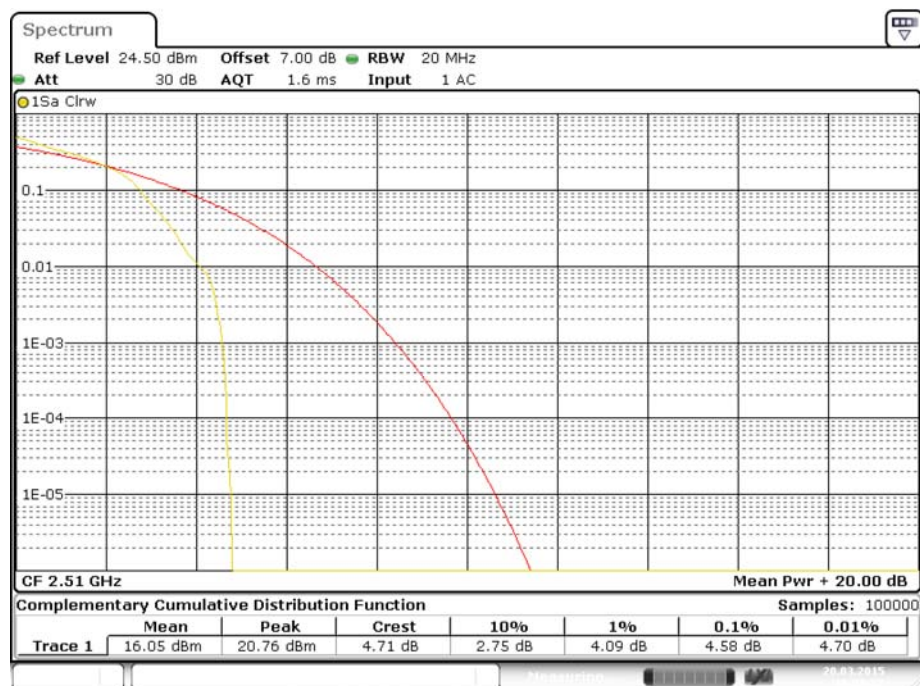
**Note:**

All above data were tested with no amplifier.

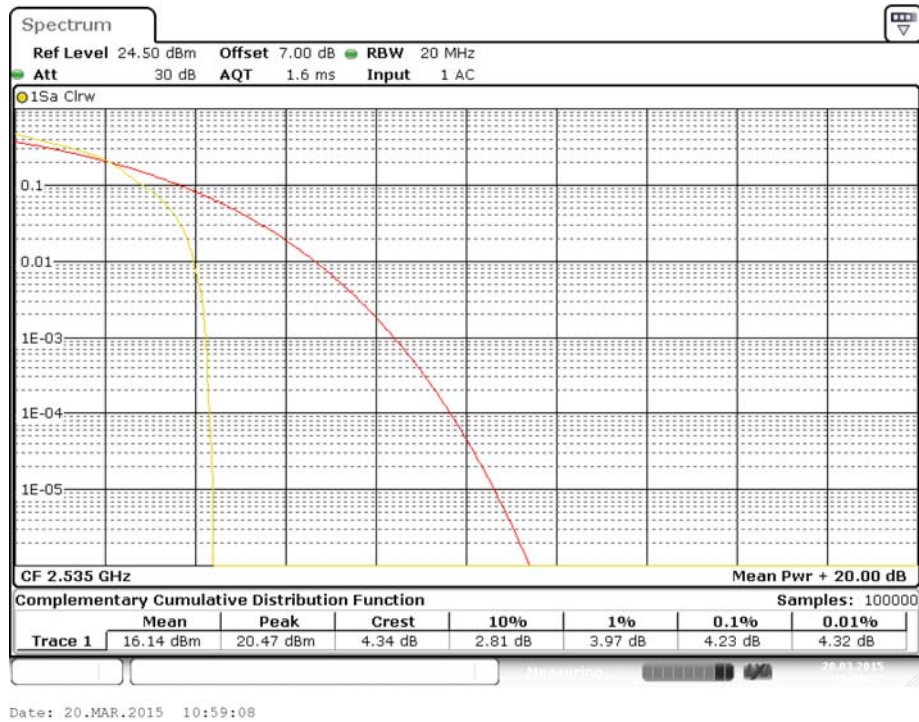
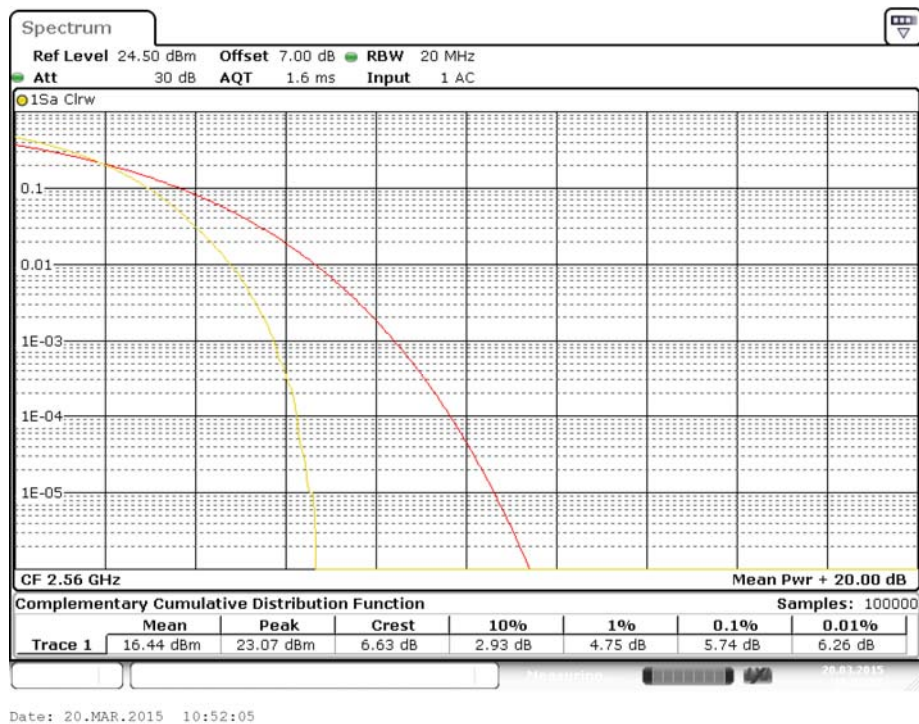
Absolute Level = SG Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

Modulation	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit (dB)	Result
16QAM (1RB Size)	4.71	4.34	6.63	≤ 13	PASS
16QAM (100RB Size)	6.73	5.55	3.96	≤ 13	PASS

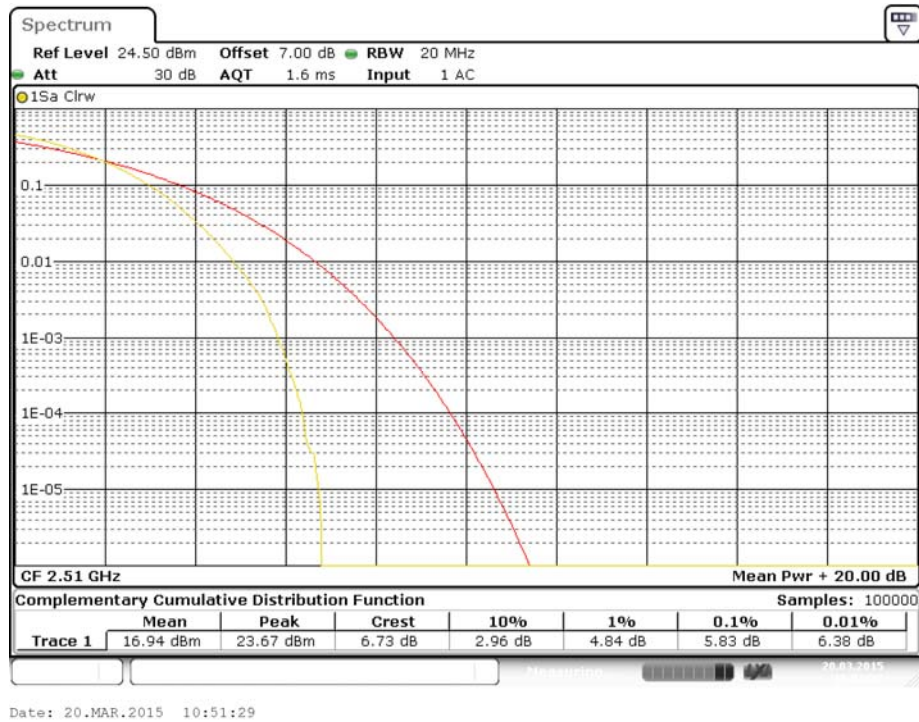
**20.0 MHz PAR– Low Channel (16QAM, 1RB Size)**

Date: 20.MAR.2015 10:50:53

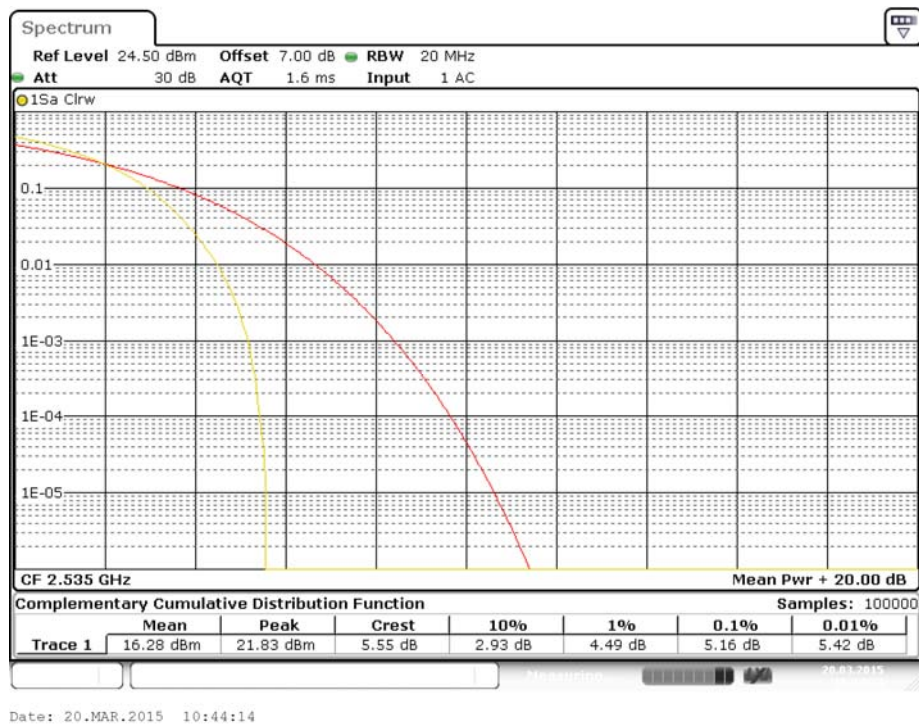
**20.0 MHz PAR– Middle Channel (16QAM, 1RB Size)****20.0 MHz PAR– High Channel (16QAM, 100RB Size)**



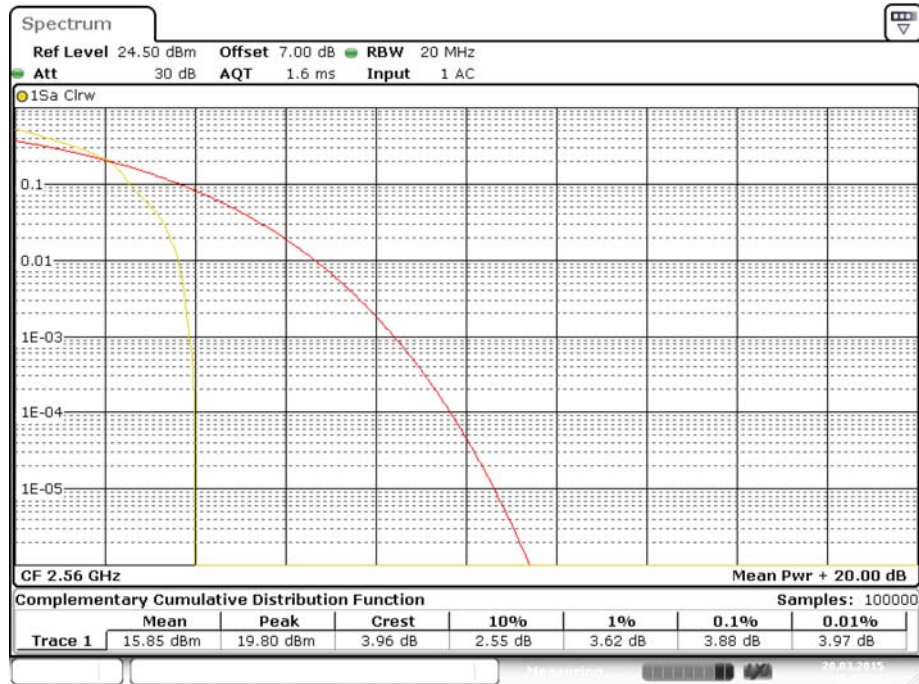
## 20.0 MHz PAR– Low Channel (16QAM, 100RB Size)



## 20.0 MHz PAR– Middle Channel (16QAM, 100RB Size)



20.0 MHz PAR- High Channel (16QAM, 100RB Size)



Date: 20.MAR.2015 10:52:37

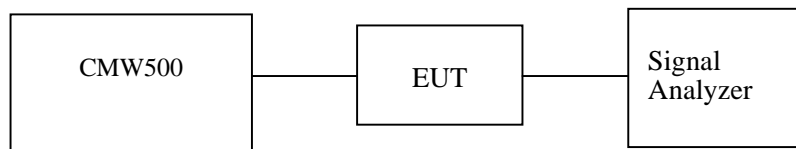
## FCC §2.1049 & §27.53 - OCCUPIED BANDWIDTH

### Applicable Standards

FCC 47 §2.1049 and §27.53.

### Test Procedure

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



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	25~26 °C
Relative Humidity:	55~56 %
ATM Pressure:	100.5~101.0 kPa

*The testing was performed by Mike Hu from 2015-03-06 to 2015-03-25*

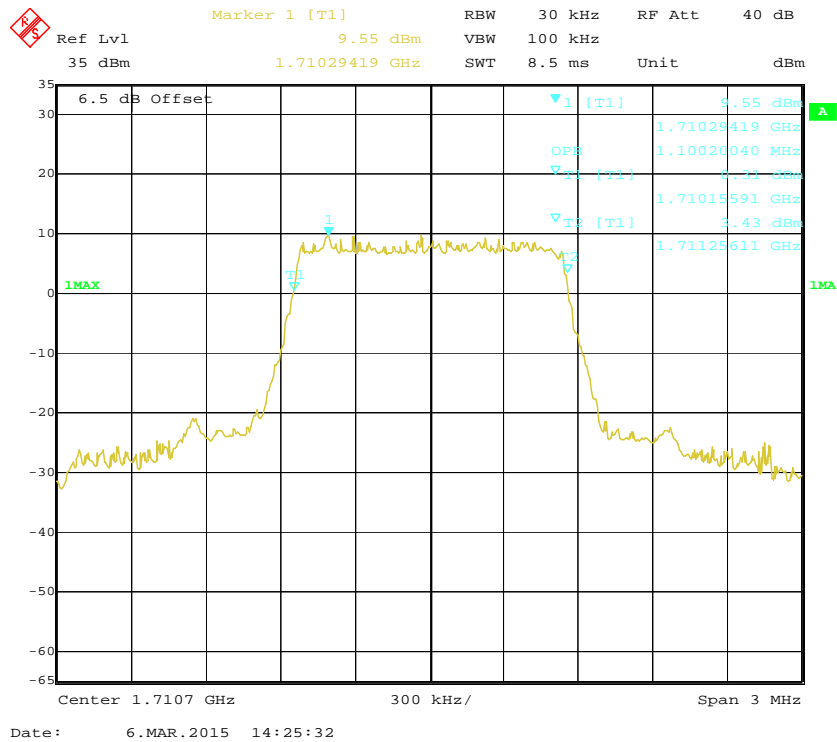


**Band 4:**

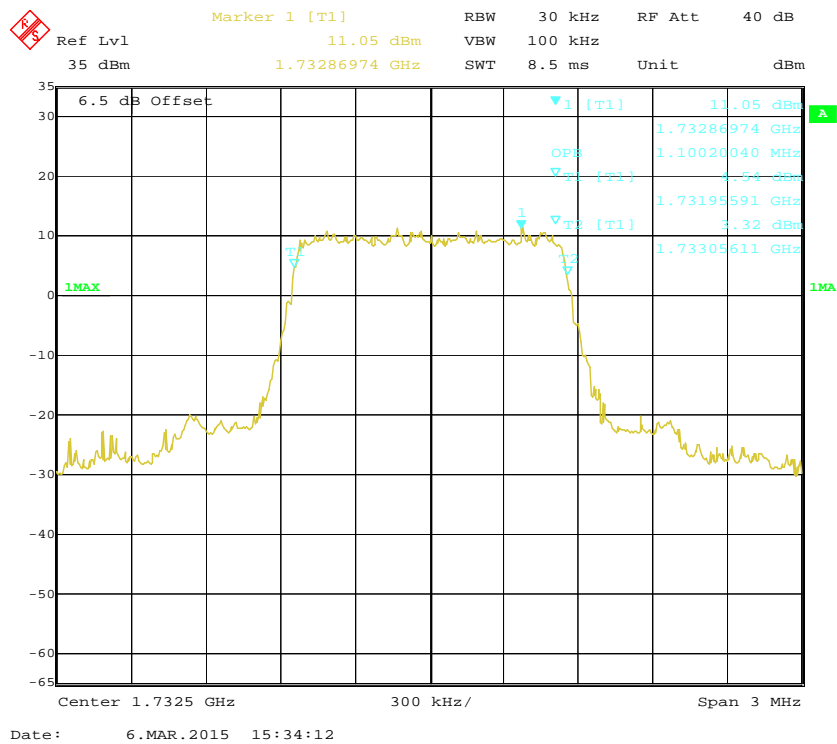
99% Occupied Bandwidth		Low channel (MHz)	Middle channel (MHz)	High channel (MHz)
1.4 MHz	QPSK	1.10	1.10	1.11
	16QAM	1.10	1.10	1.10
3.0 MHz	QPSK	2.75	2.77	2.75
	16QAM	2.77	2.75	2.74
5.0 MHz	QPSK	4.53	4.51	4.53
	16QAM	4.53	4.51	4.53
10.0 MHz	QPSK	9.06	9.10	9.10
	16QAM	9.06	9.10	9.10
15.0 MHz	QPSK	13.53	13.47	13.53
	16QAM	13.53	13.47	13.53
20.0 MHz	QPSK	18.12	17.96	18.04
	16QAM	18.04	17.96	18.12

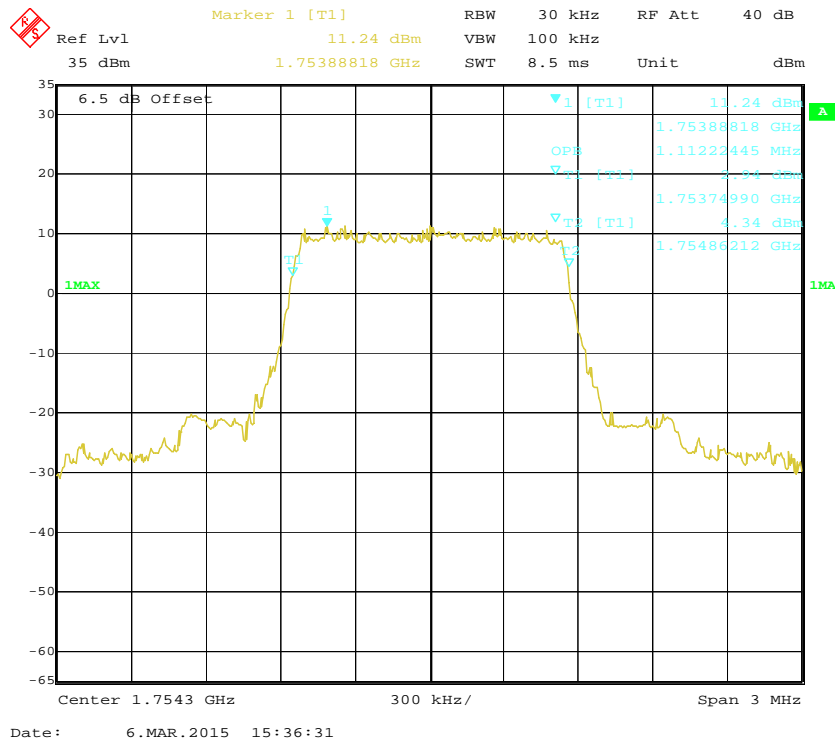
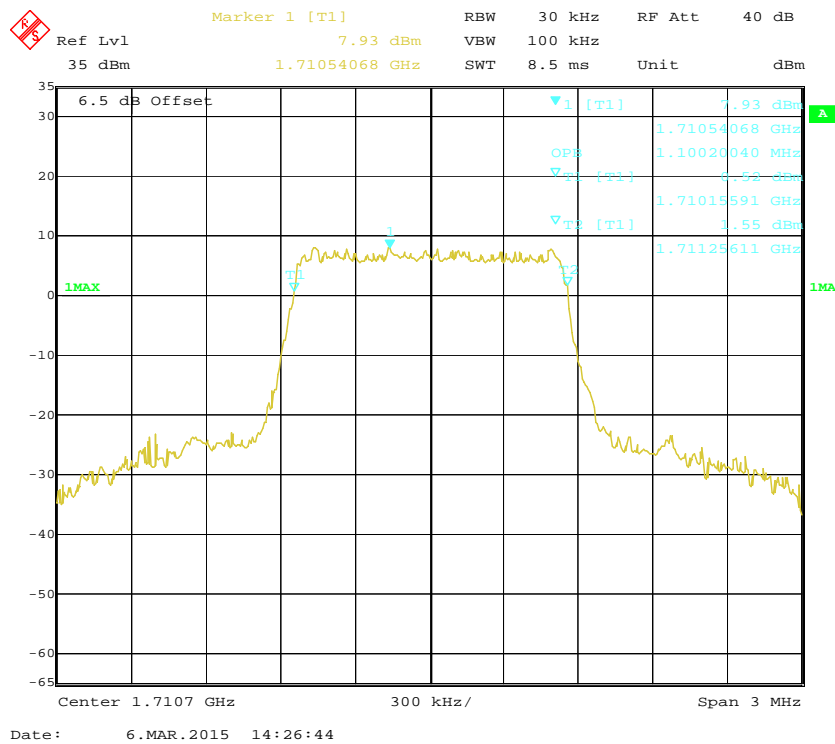
26 dB Emission Bandwidth		Low channel (MHz)	Middle channel (MHz)	High channel (MHz)
1.4 MHz	QPSK	1.33	1.30	1.31
	16QAM	1.30	1.30	1.32
3.0 MHz	QPSK	3.11	3.11	3.13
	16QAM	3.09	3.10	3.13
5.0 MHz	QPSK	5.07	5.01	5.01
	16QAM	5.03	5.03	5.01
10.0 MHz	QPSK	10.26	10.34	10.26
	16QAM	10.26	10.14	10.22
15.0 MHz	QPSK	14.85	14.79	14.97
	16QAM	14.79	14.79	14.85
20.0 MHz	QPSK	19.96	19.96	19.96
	16QAM	19.88	19.72	19.80

### QPSK (1.4 MHz) - 99% Occupied Bandwidth, Low channel



### QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



**QPSK (1.4 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Low channel**

Ref Lvl 35 dBm  
 Marker 1 [T1] 9.97 dBm  
 RBW 30 kHz  
 VBW 100 kHz  
 SWT 8.5 ms  
 Unit dBm

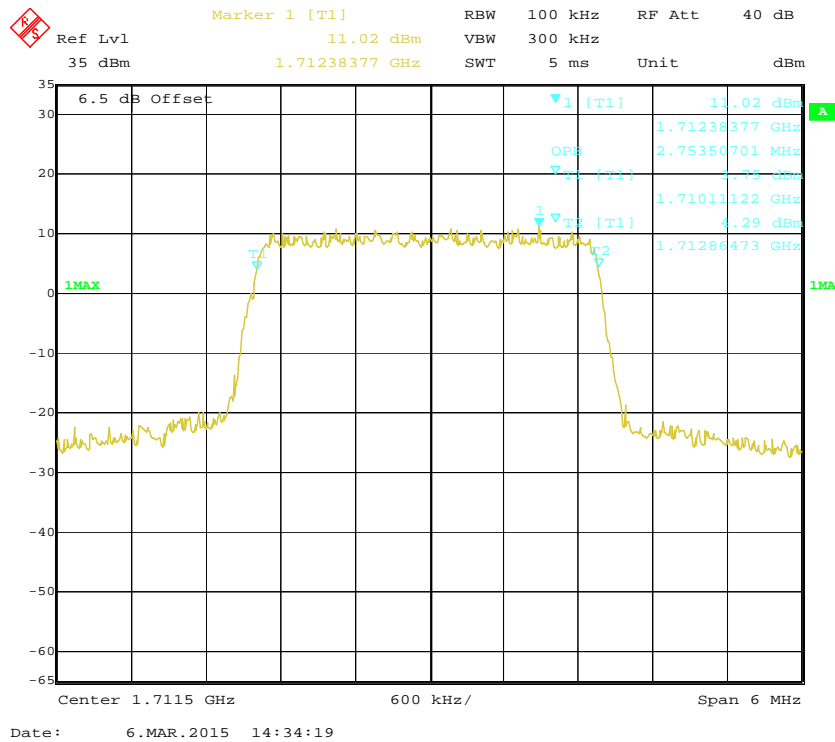
6.5 dB Offset  
 1 [T1] 9.97 dBm  
 1.73255711 GHz  
 1.10020040 MHz  
 1.73195591 GHz  
 1.73305611 GHz

1MAX  
 1  
 1 [T1] 9.97 dBm  
 1.73255711 GHz  
 1.10020040 MHz  
 1.73195591 GHz  
 1.73305611 GHz

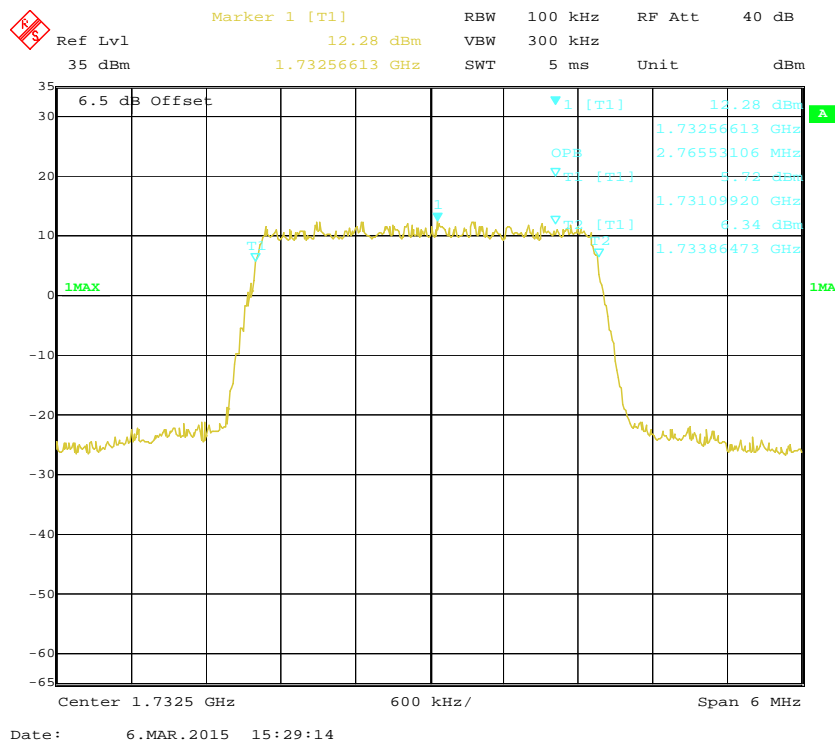
Center 1.7325 GHz  
 300 kHz/  
 Span 3 MHz

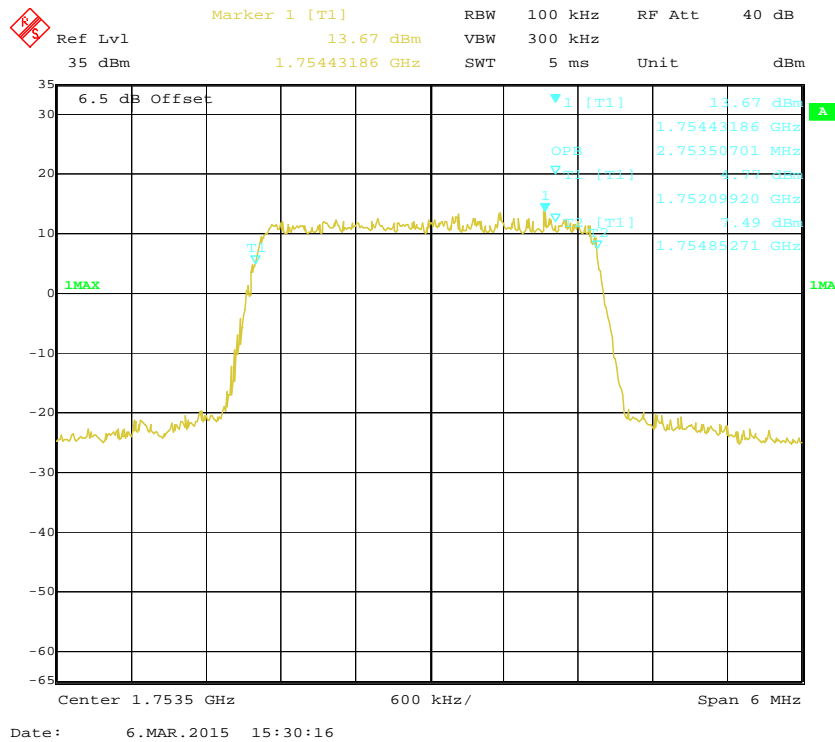
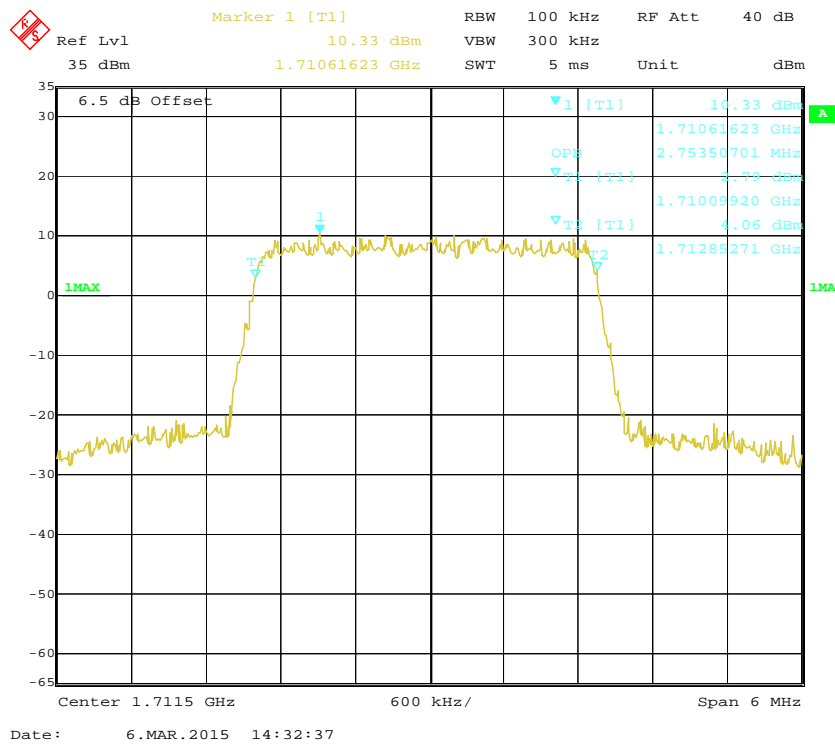
[illegible]

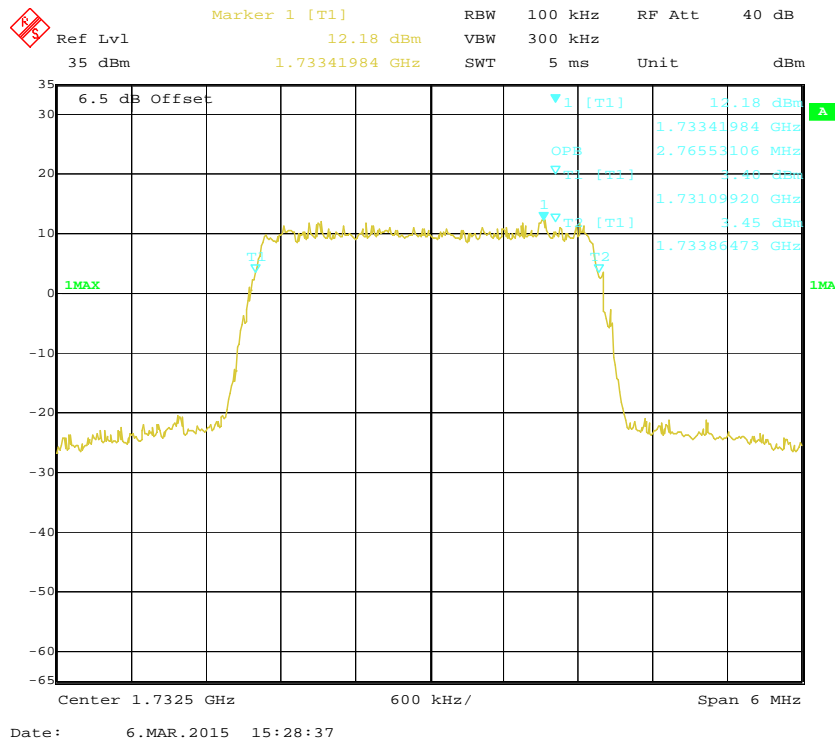
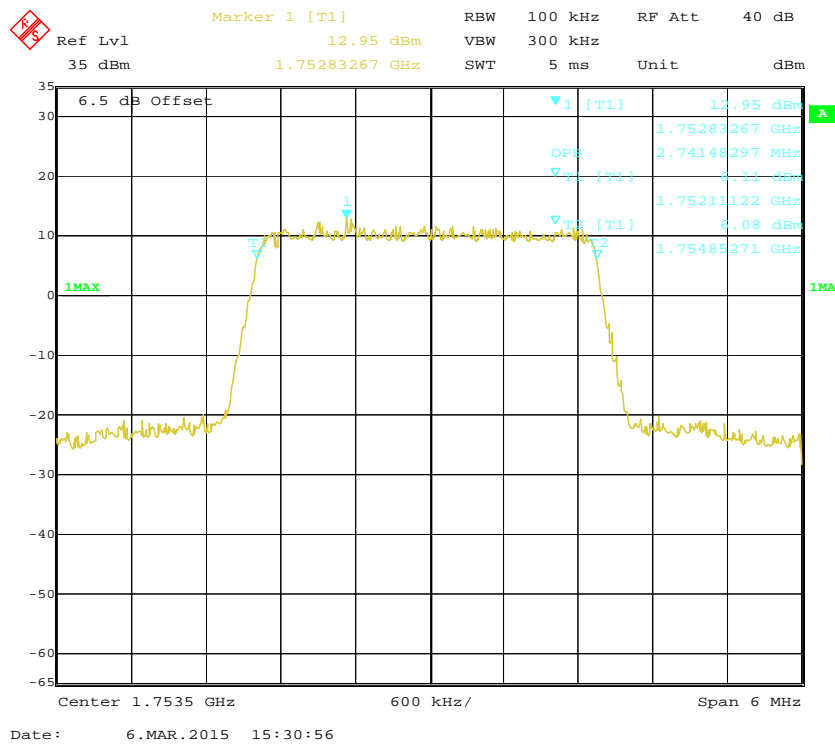
### QPSK (3.0 MHz) - 99% Occupied Bandwidth, Low channel



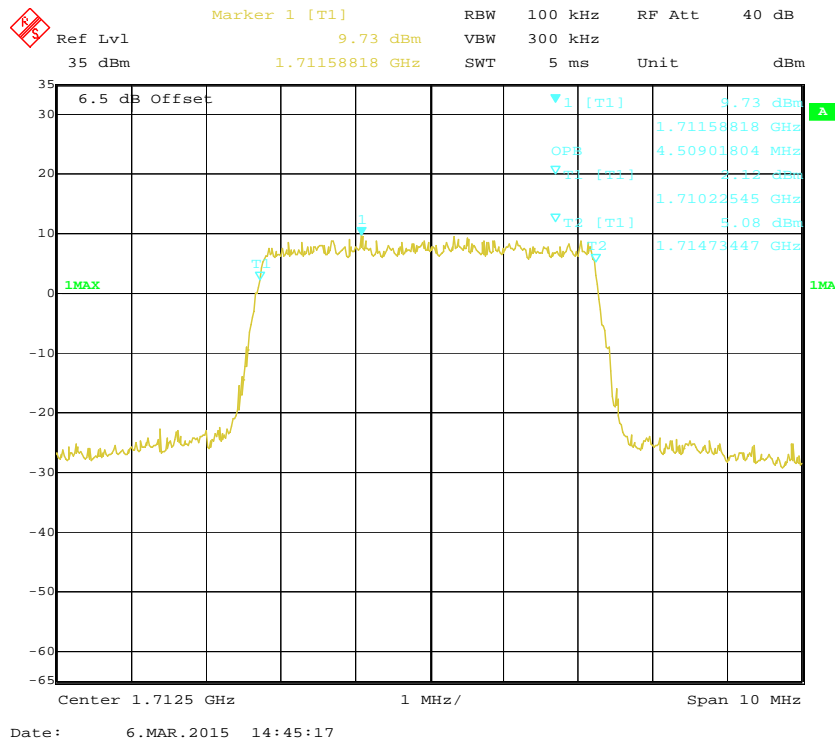
### QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



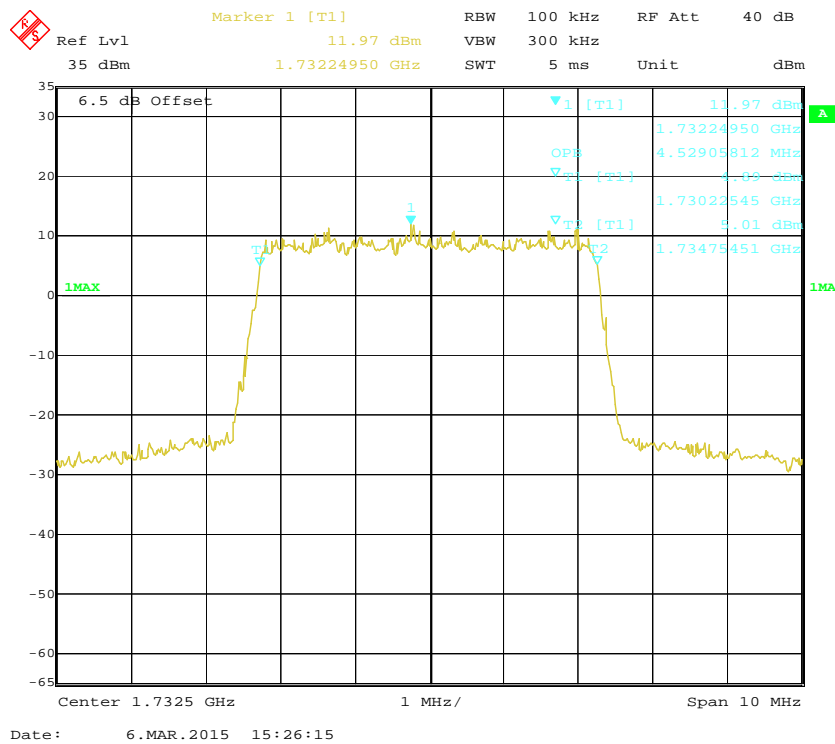
**QPSK (3.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Low channel**

**16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (3.0 MHz) - 99% Occupied Bandwidth, High channel**

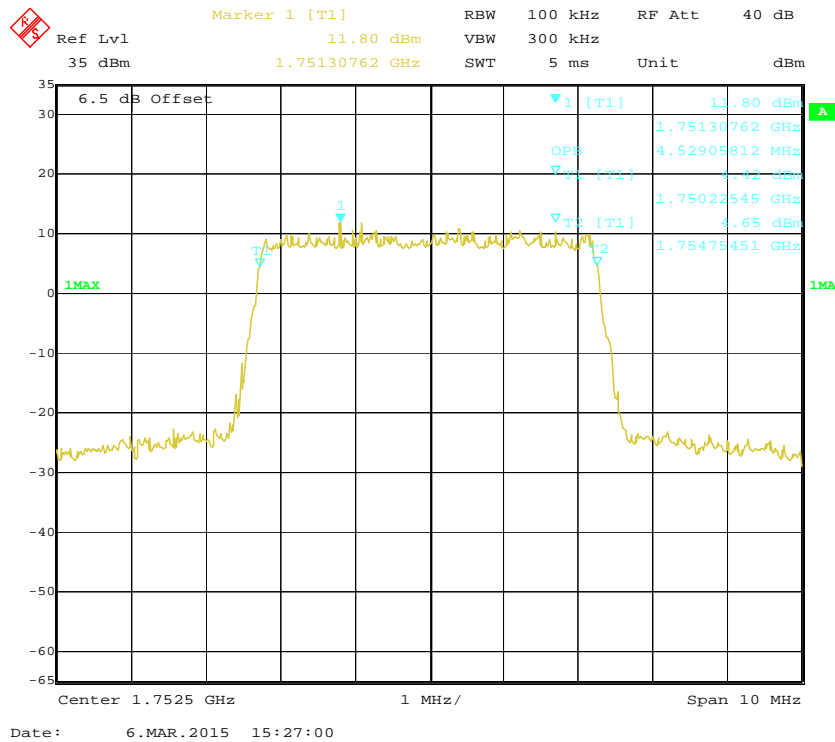
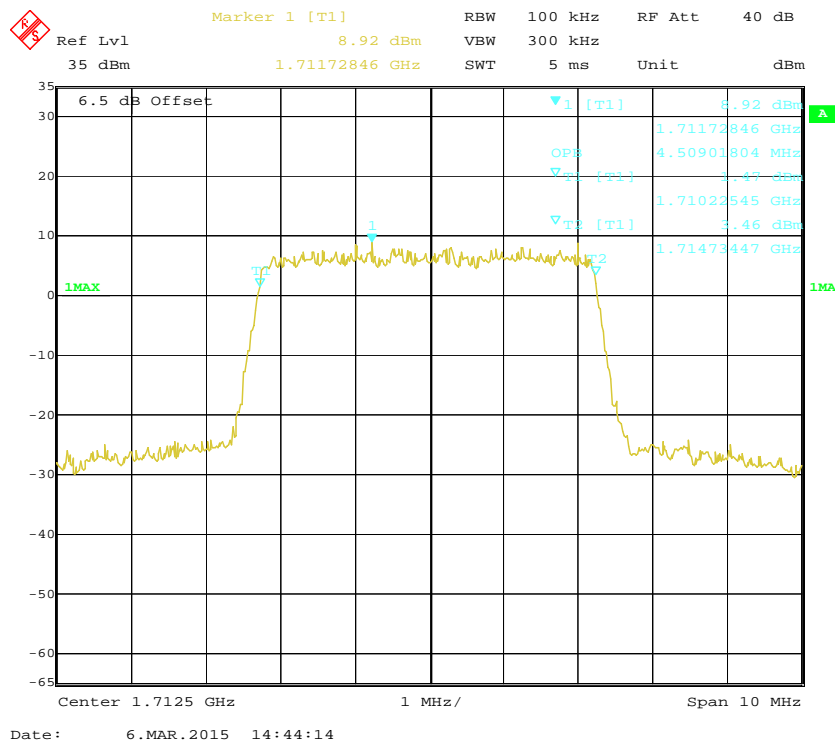
### QPSK (5.0 MHz) - 99% Occupied Bandwidth, Low channel

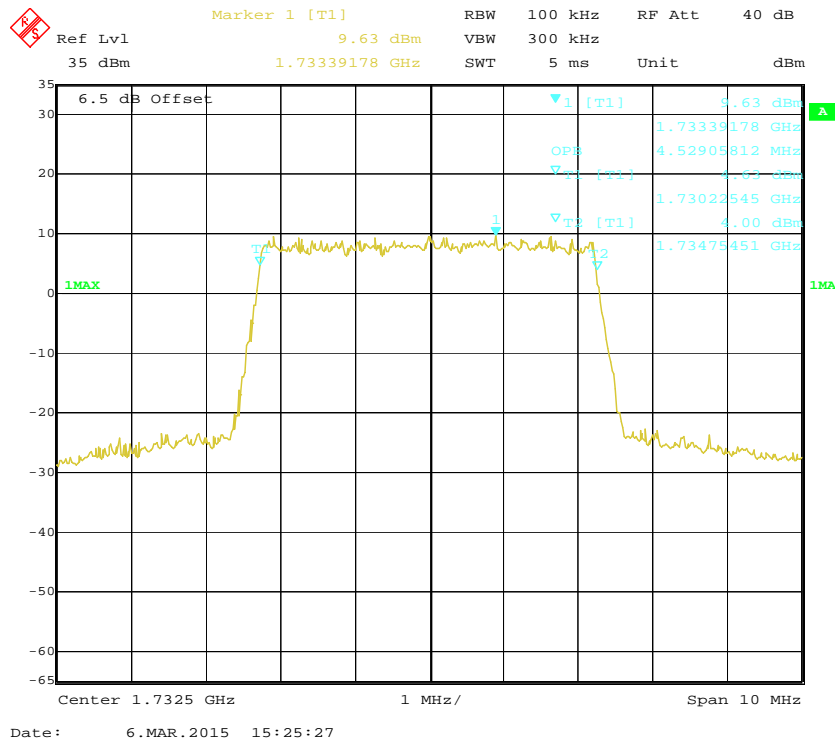
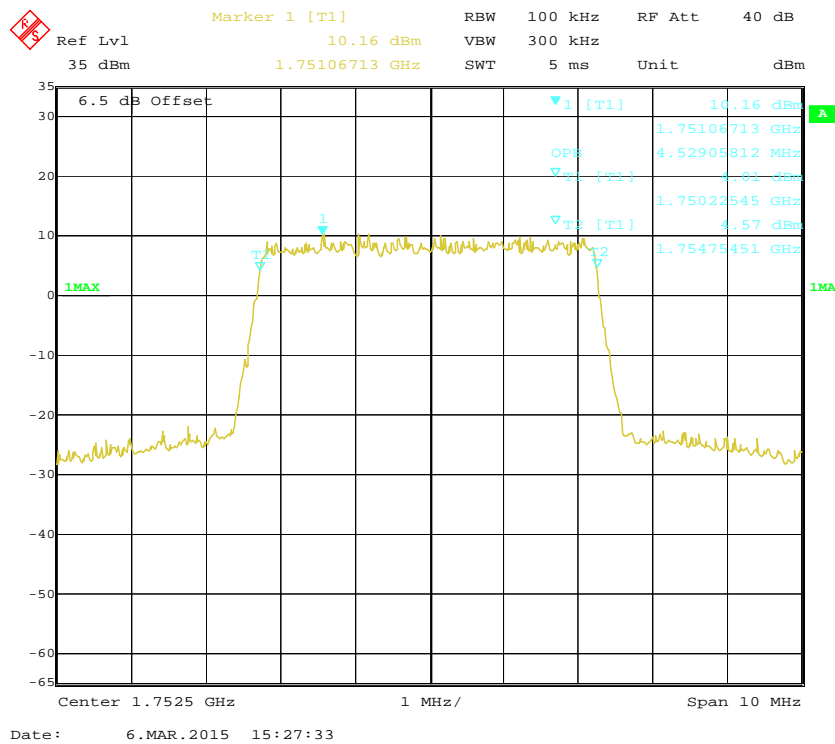


### QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel

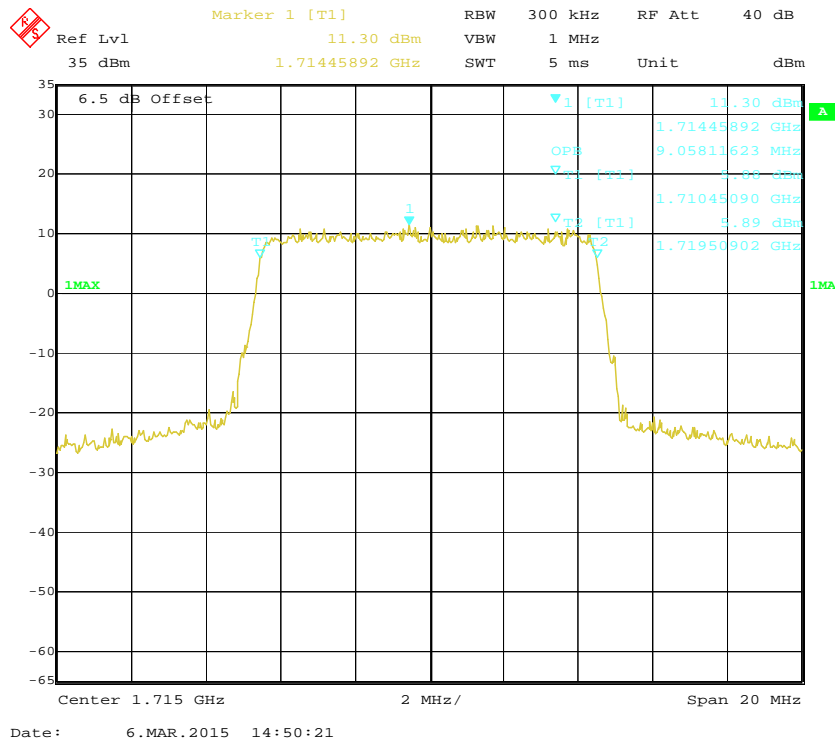




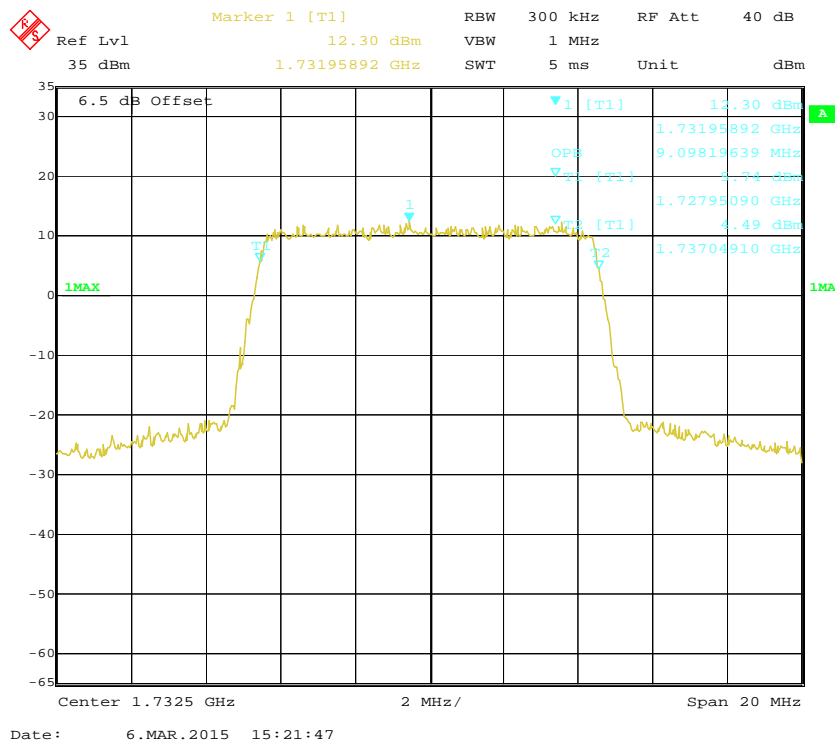
**QPSK (5.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Low channel**

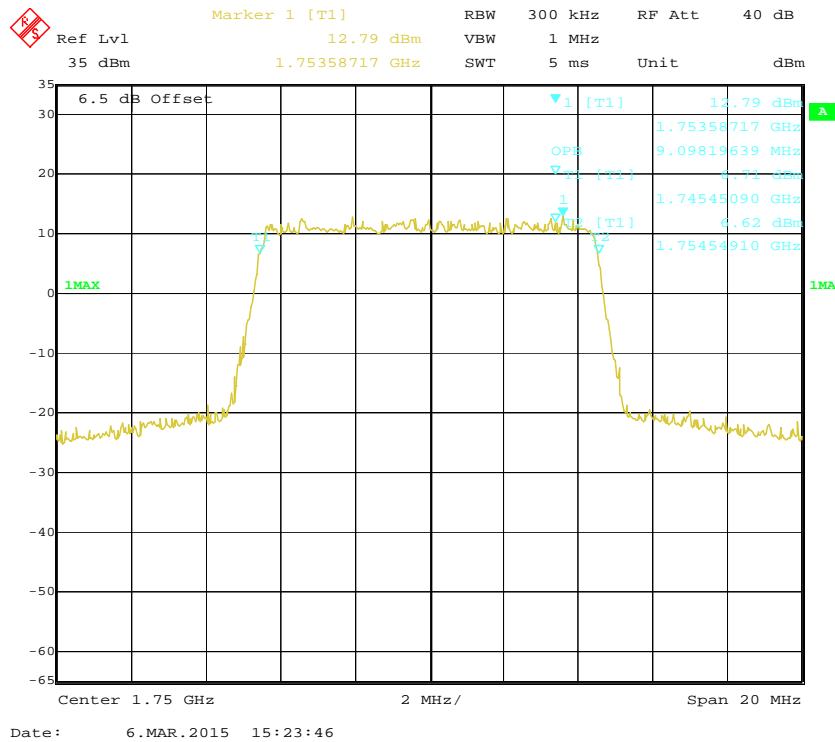
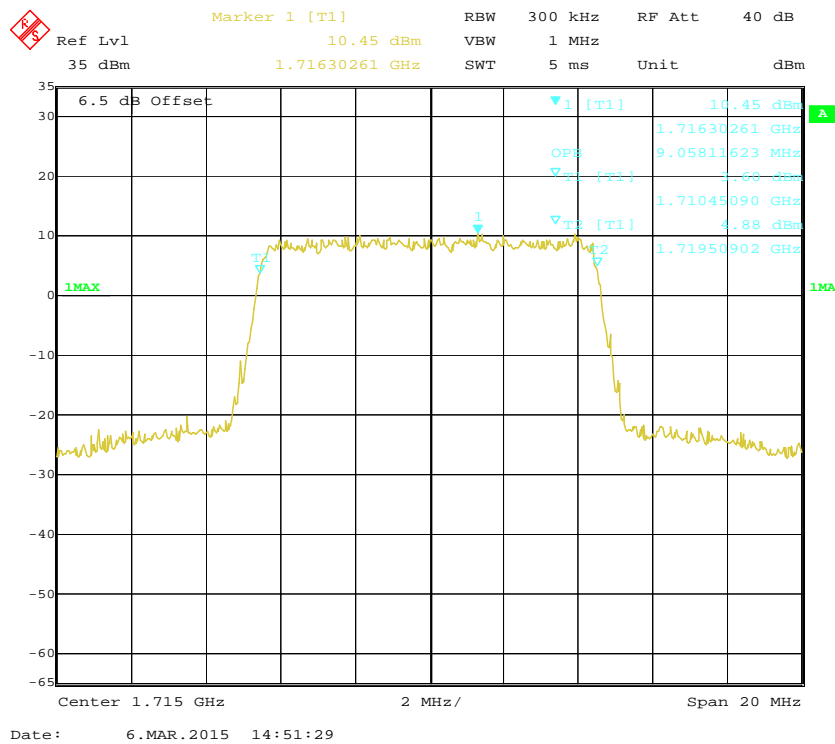
**16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (5.0 MHz) - 99% Occupied Bandwidth, High channel**

### QPSK (10.0 MHz) - 99% Occupied Bandwidth, Low channel



### QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



**QPSK (10.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Low channel**

Marker 1 [T1] RBW 300 kHz RF Att 40 dB

Ref Lvl 11.66 dBm VBW 1 MHz

35 dBm 1.73316132 GHz SWT 5 ms Unit dBm

6.5 dB Offset

11.66 dBm

1.73316132 GHz

9.09819639 MHz

1.72795090 GHz

3.85 dBm

1.73704910 GHz

Center 1.7325 GHz 2 MHz/ Span 20 MHz

Date: 6.MAR.2015 15:22:27

Ref Lvl 35 dBm

Marker 1 [T1] 11.71 dBm

RBW 300 kHz RF Att 40 dB

VBW 1 MHz

SWT 5 ms Unit dBm

6.5 dB Offset

1MAX

1 [T1] 11.71 dBm

1.75386774 GHz

OPB 9.09819639 MHz

1 [T1] 1.46 dBm

1.74545090 GHz

4.90 dBm

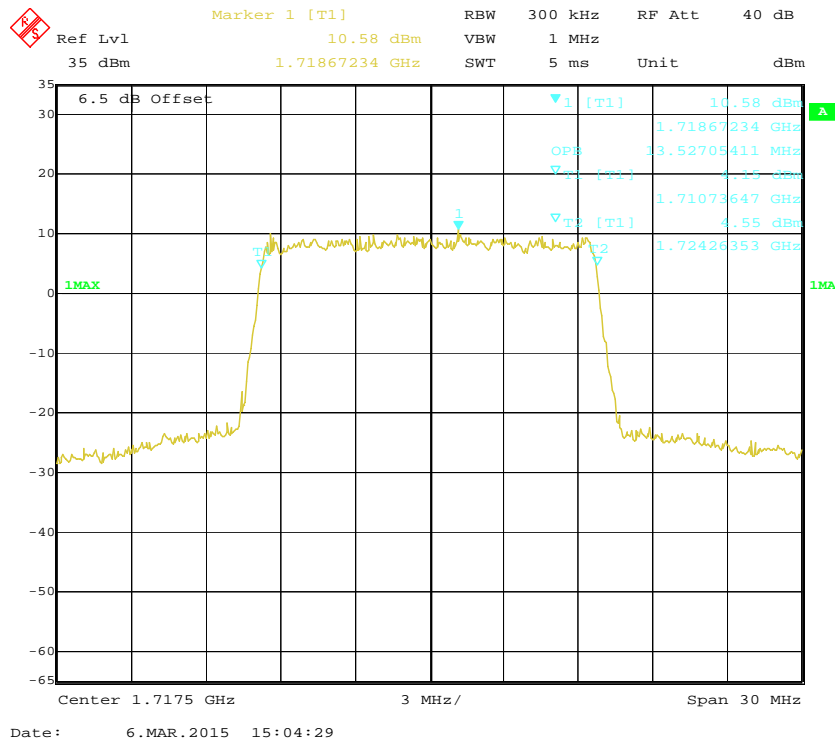
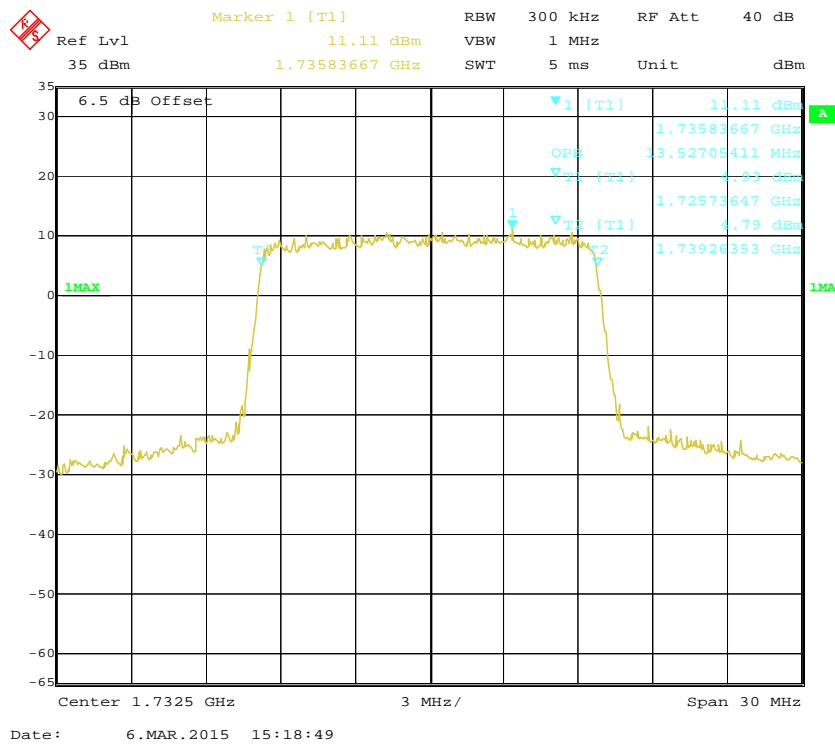
1.75454910 GHz

Center 1.75 GHz

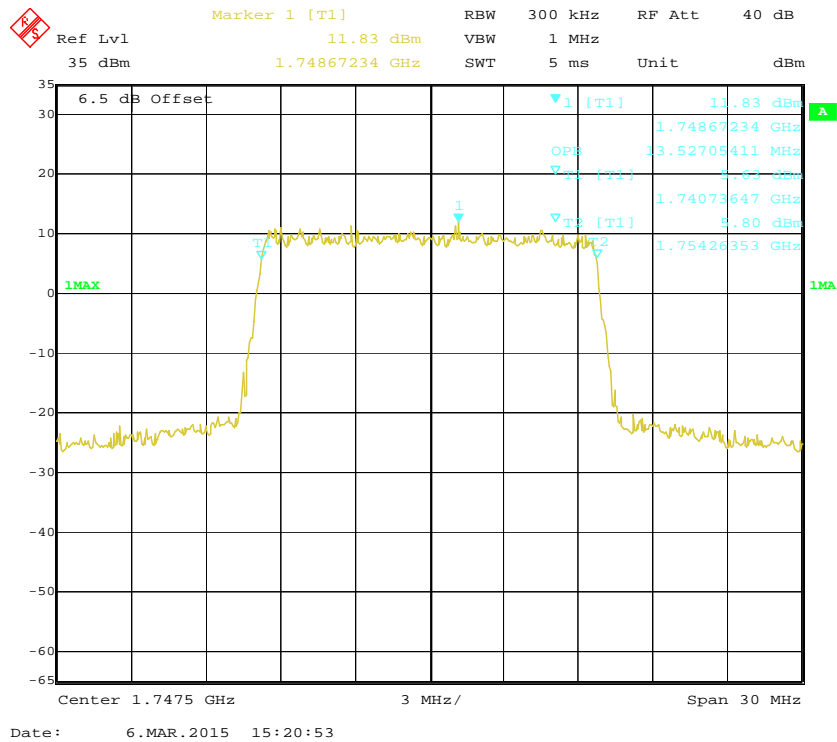
2 MHz/

Span 20 MHz

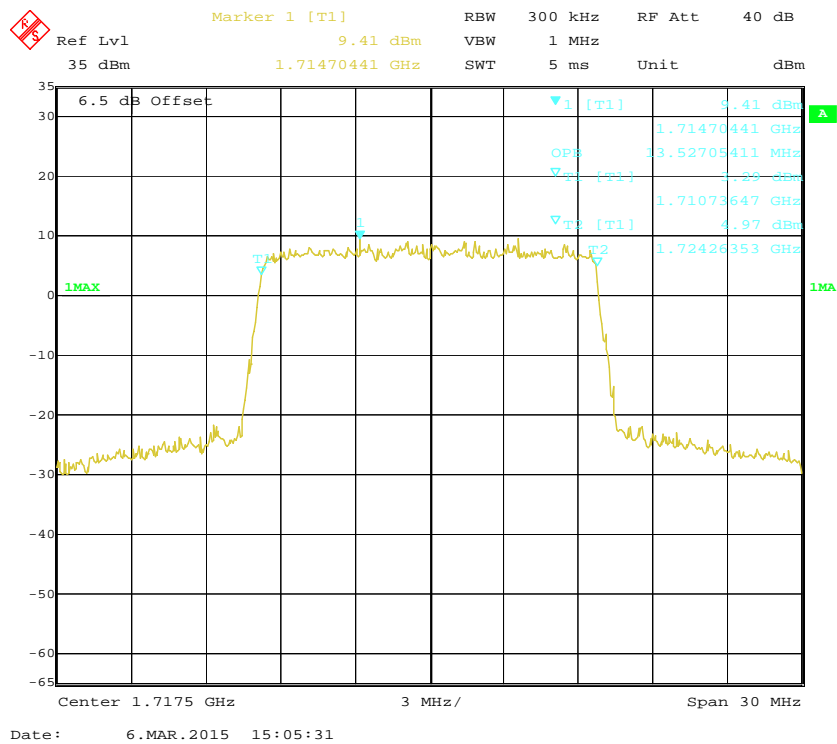
Date: 6.MAR.2015 15:23:07

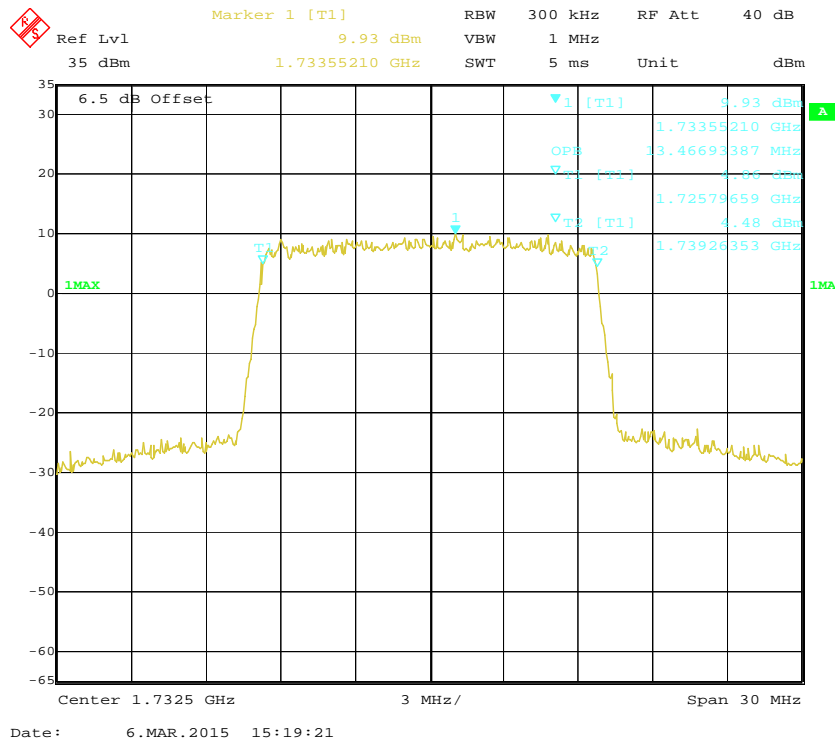
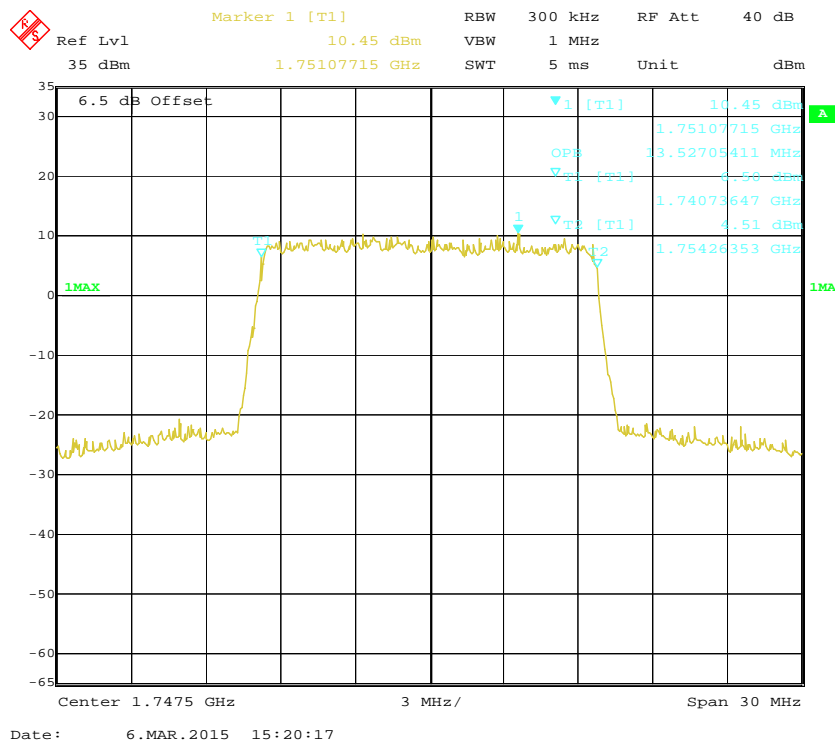
**QPSK (15.0 MHz) - 99% Occupied Bandwidth, Low channel****QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

### QPSK (15.0 MHz) - 99% Occupied Bandwidth, High channel



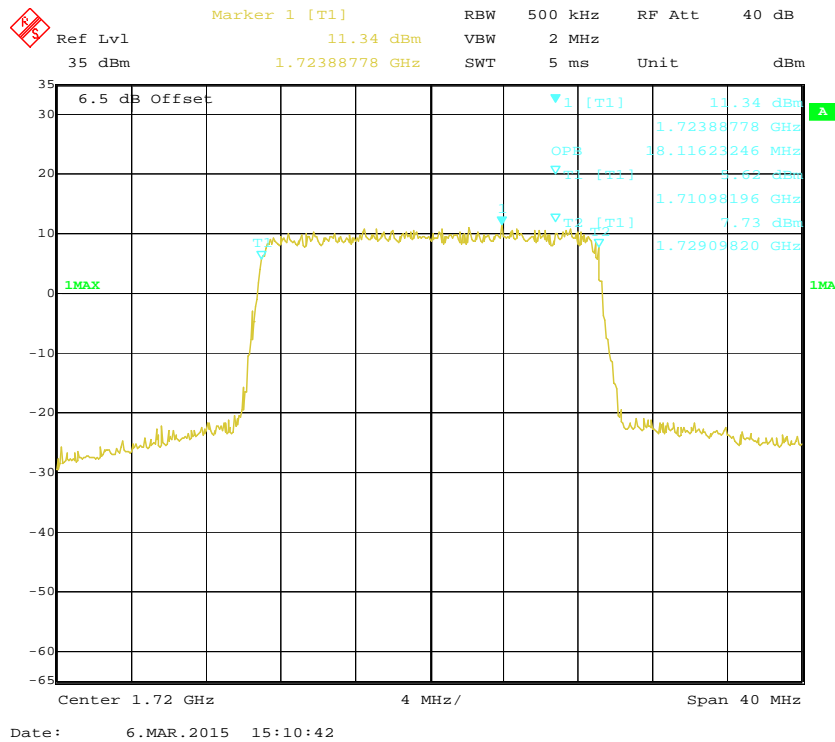
### 16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Low channel



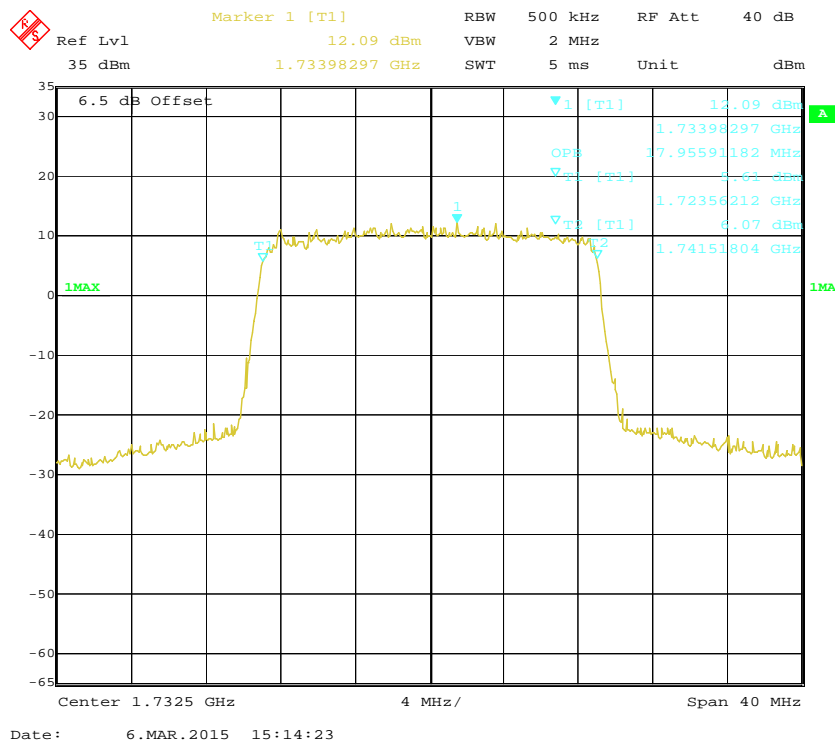
**16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (15.0 MHz) - 99% Occupied Bandwidth, High channel**

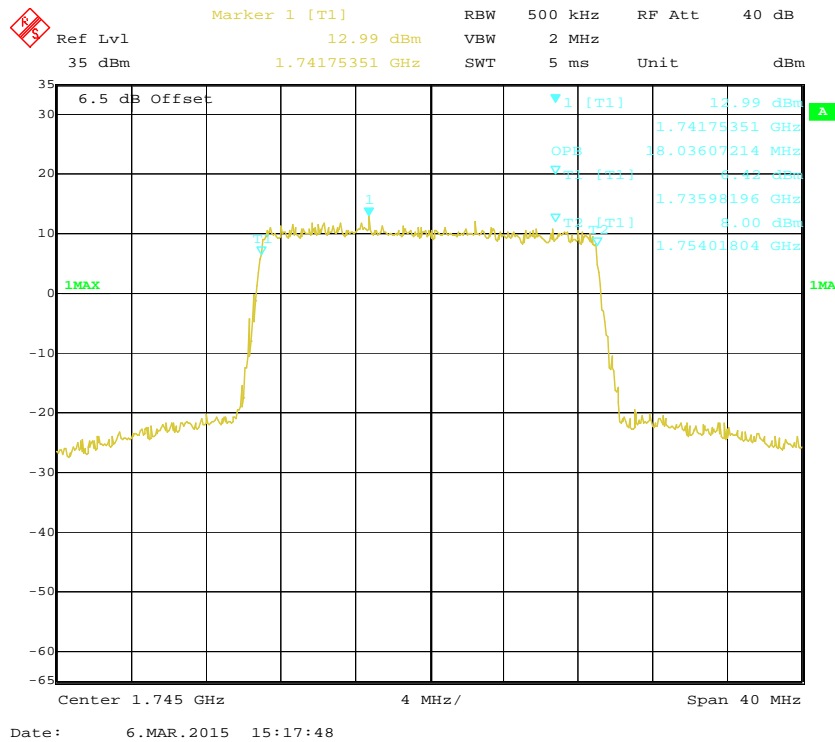
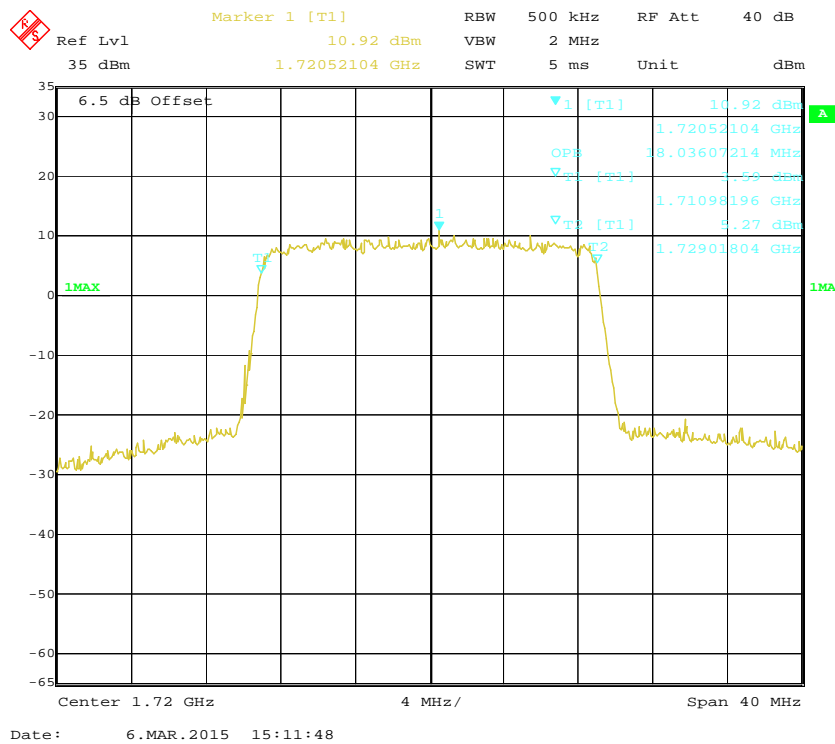


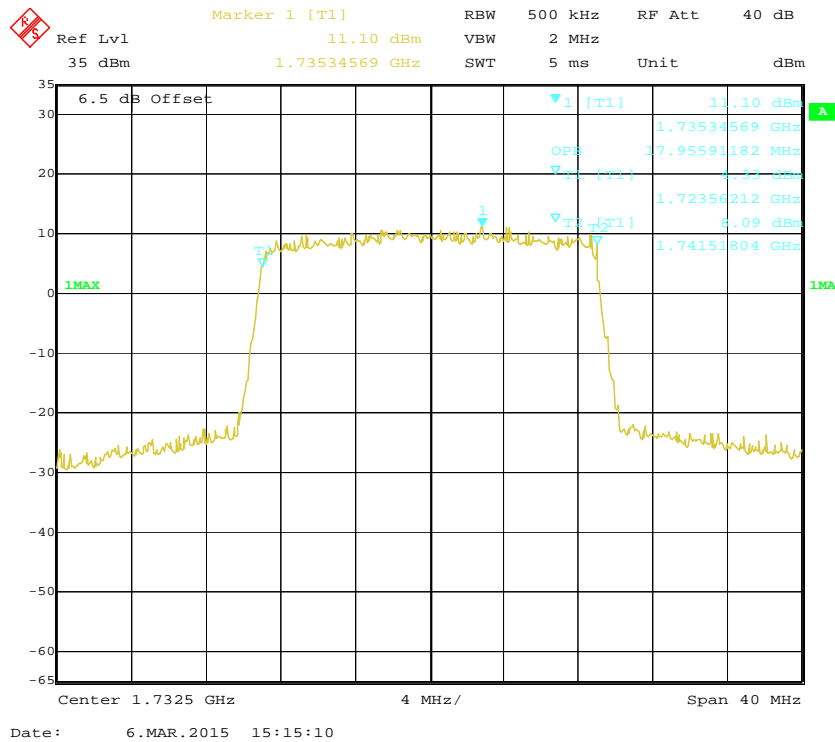
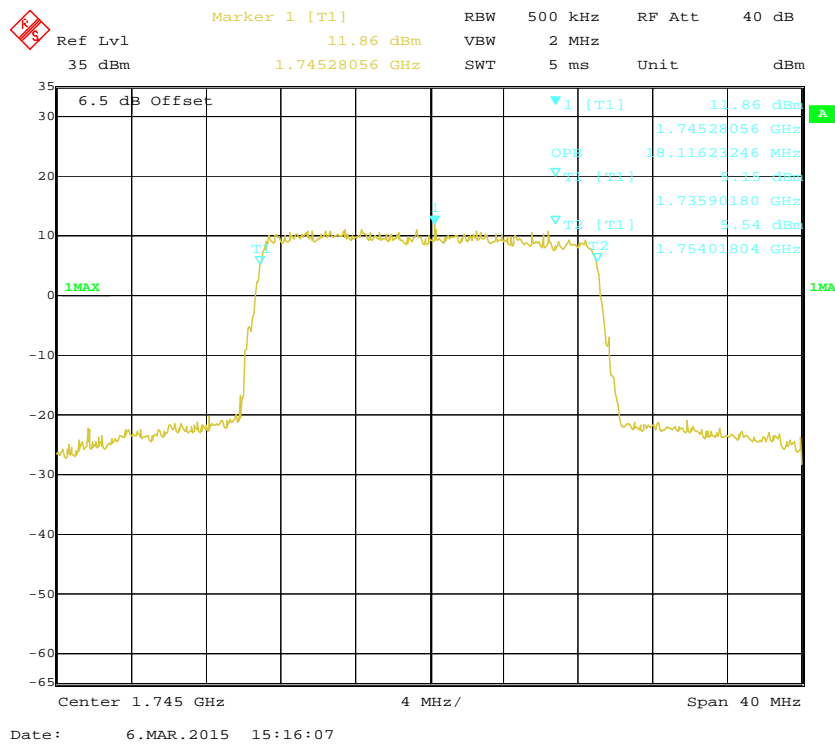
### QPSK (20.0 MHz) - 99% Occupied Bandwidth, Low channel



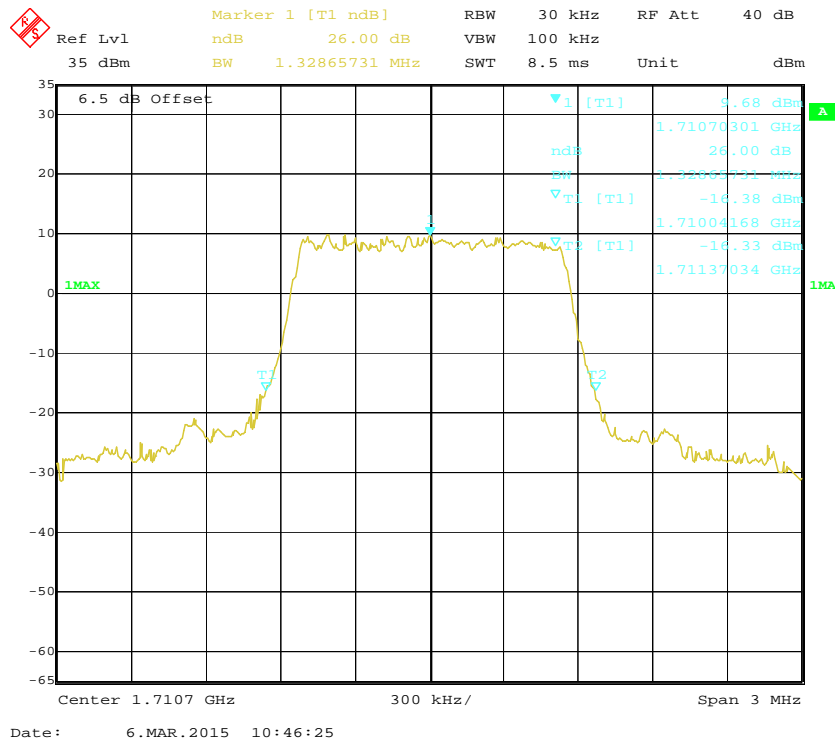
### QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



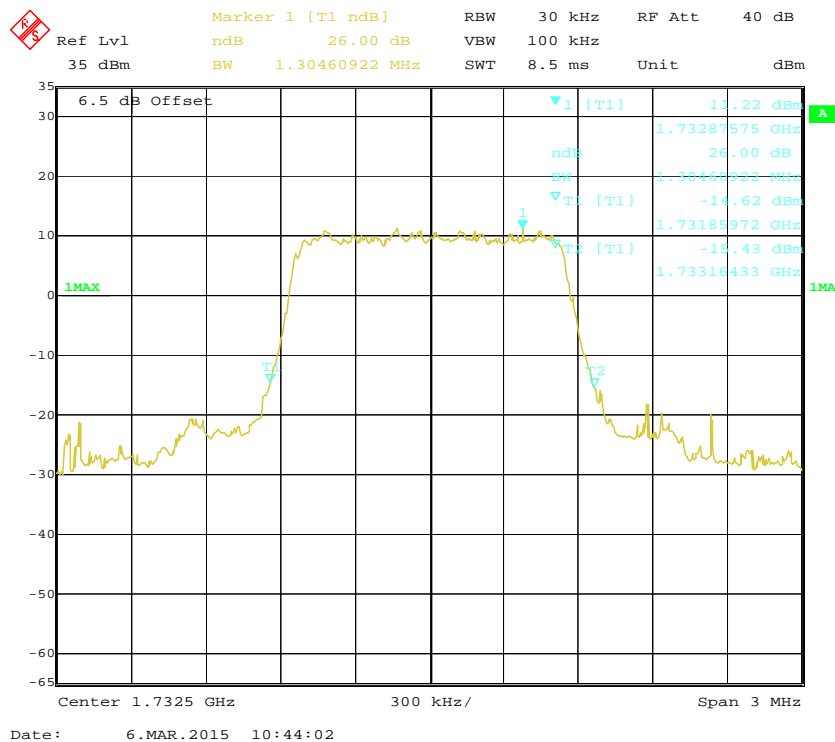
**QPSK (20.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Low channel**

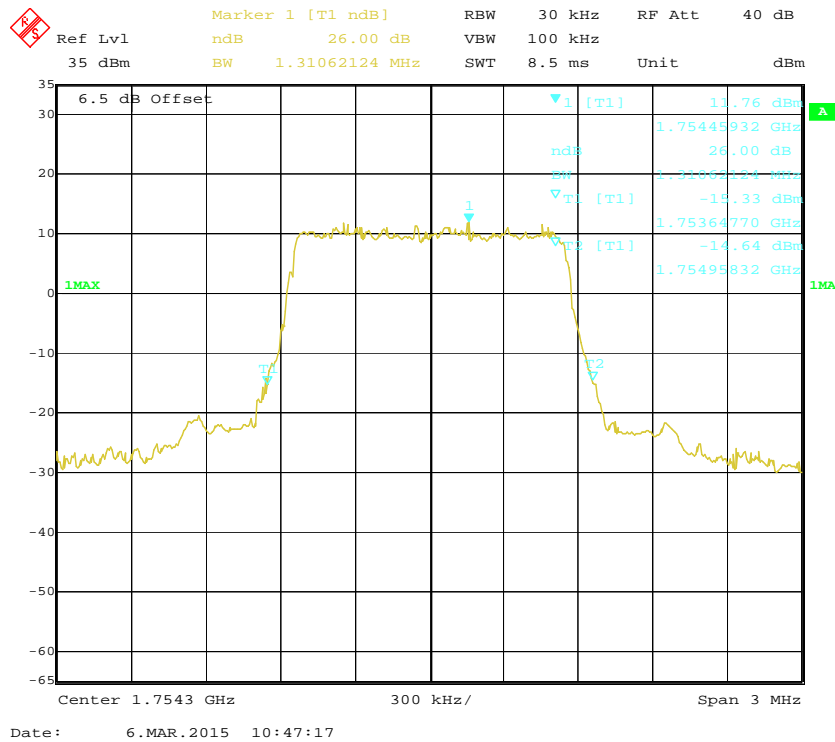
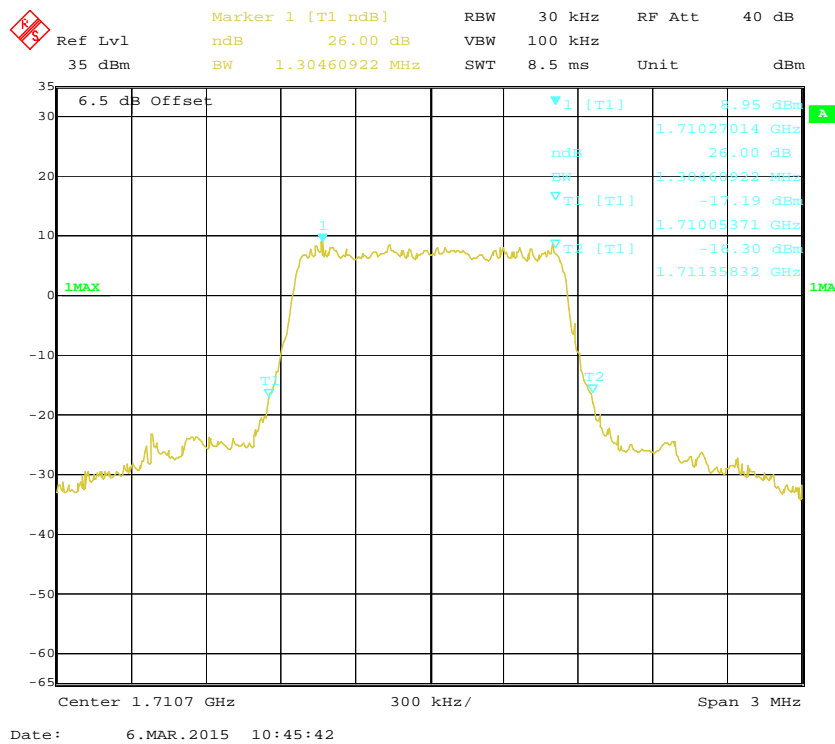
**16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, High channel**

## QPSK (1.4 MHz) - 26 dB Bandwidth, Low channel

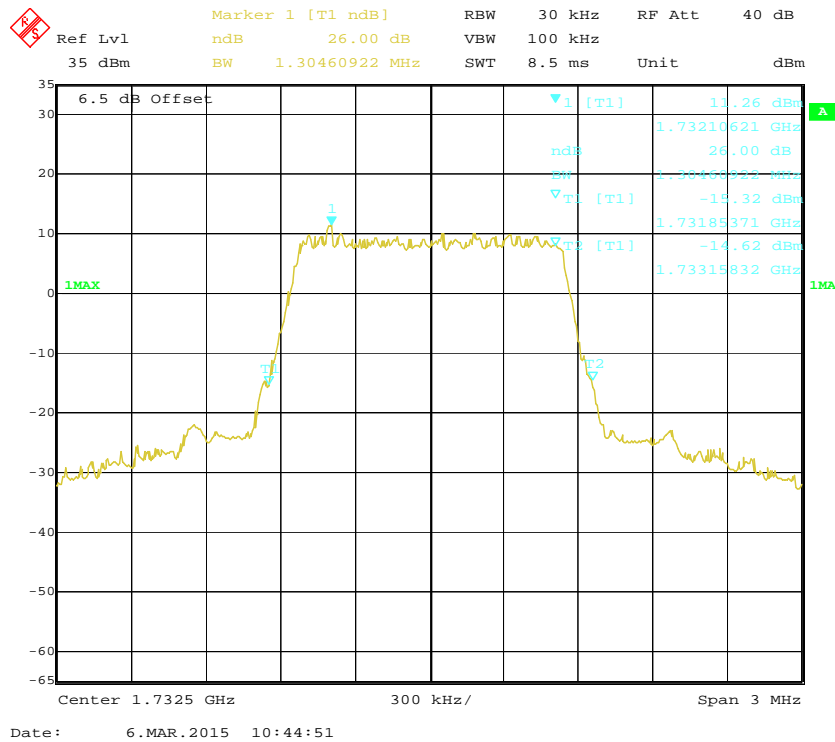


## QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel

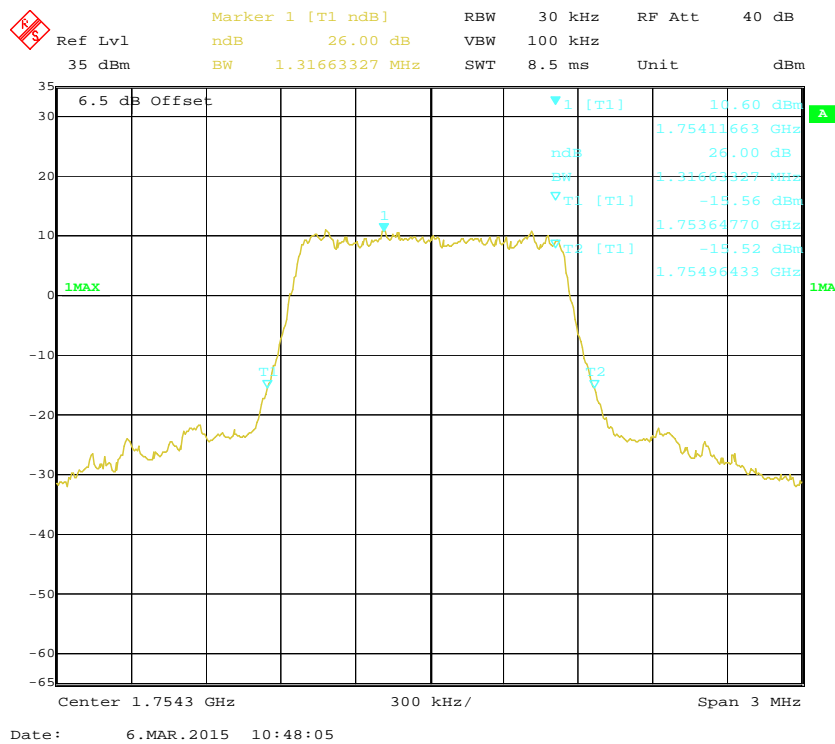


**QPSK (1.4 MHz) - 26 dB Bandwidth, High channel****16-QAM (1.4 MHz) - 26 dB Bandwidth, Low channel**

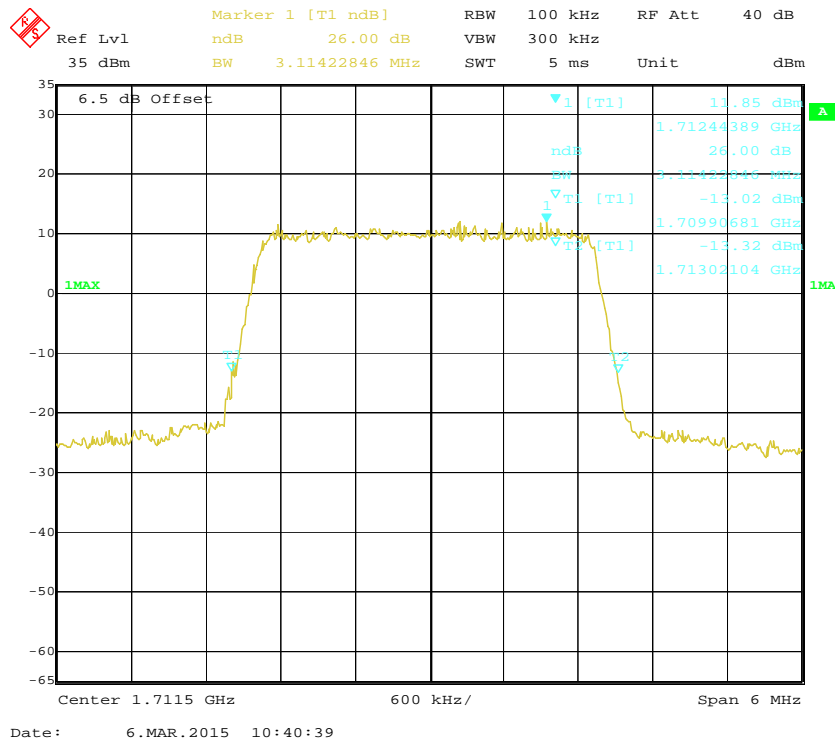
## 16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



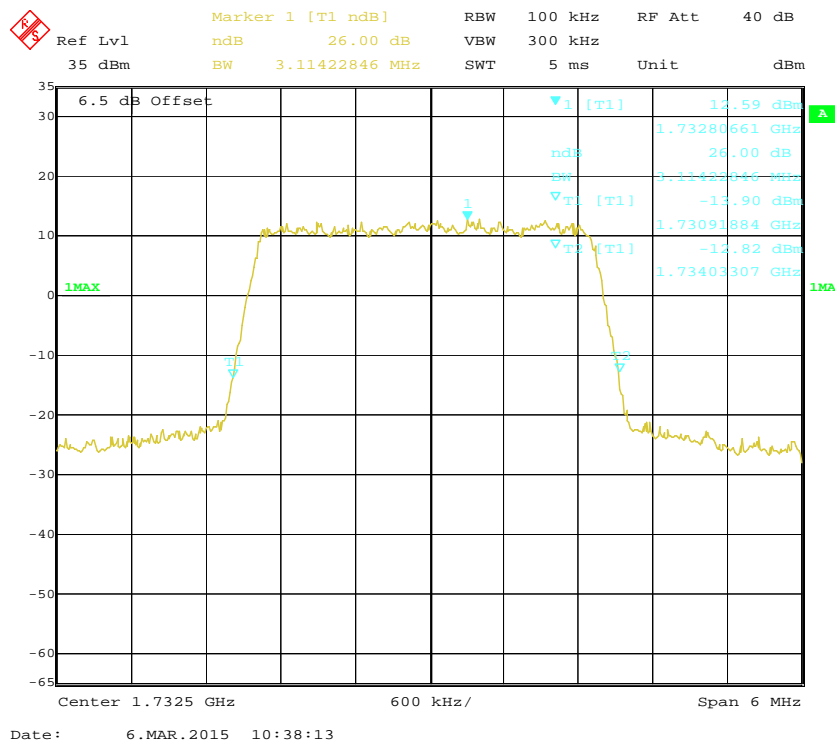
## 16-QAM (1.4 MHz) - 26 dB Bandwidth, High channel

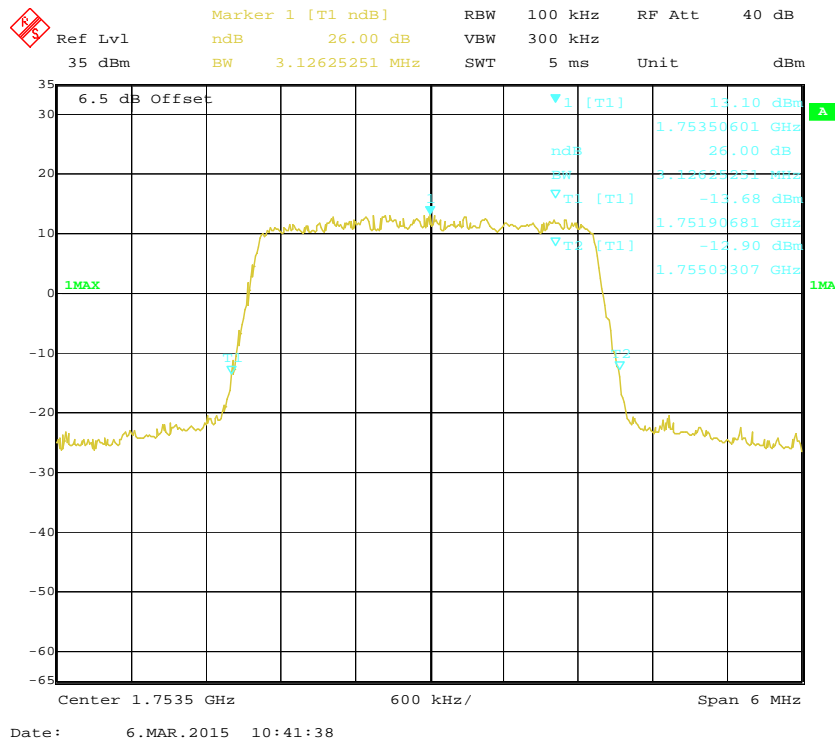
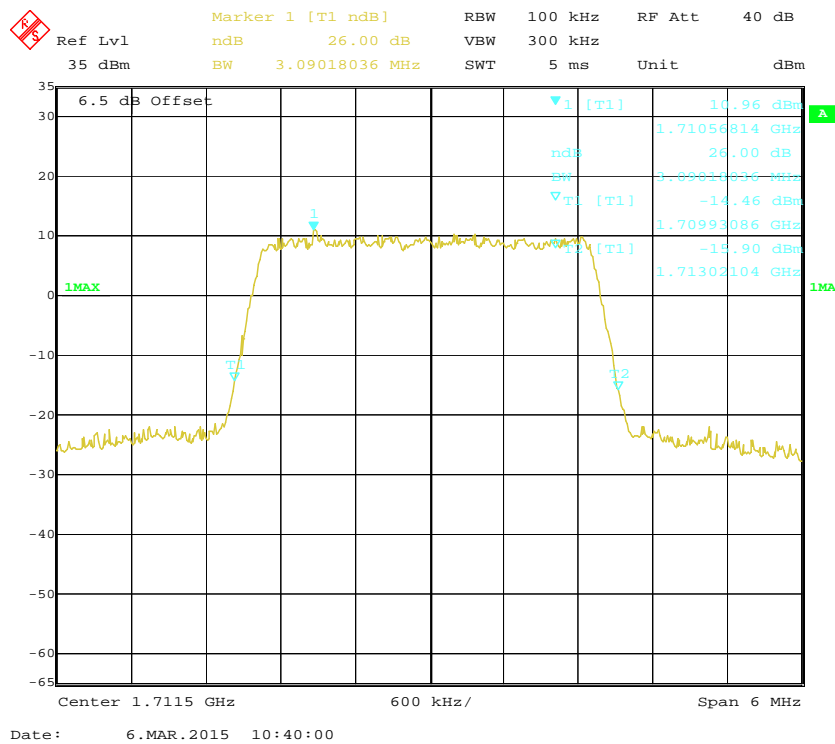


## QPSK (3.0 MHz) - 26 dB Bandwidth, Low channel

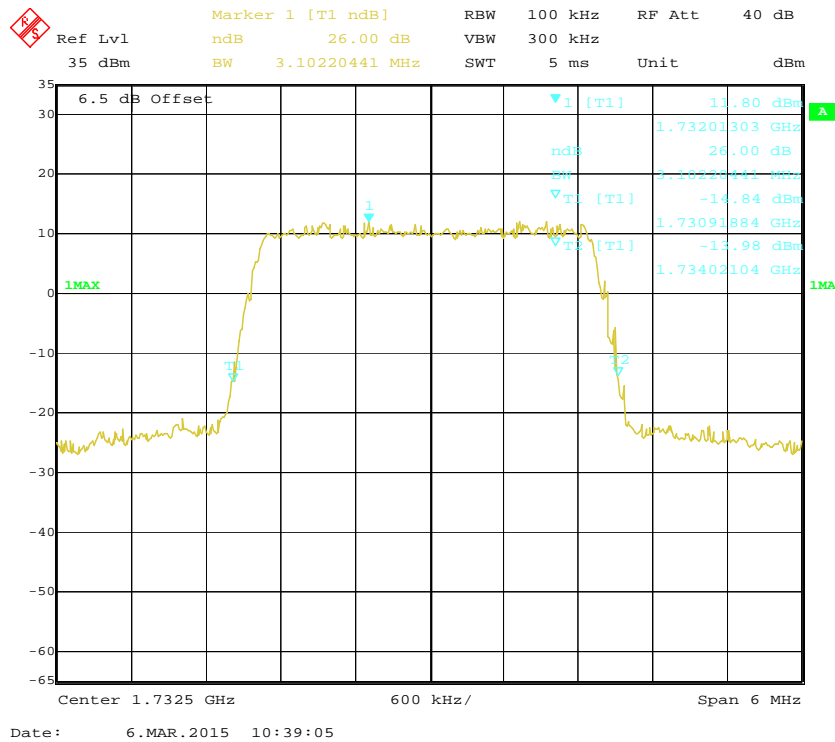
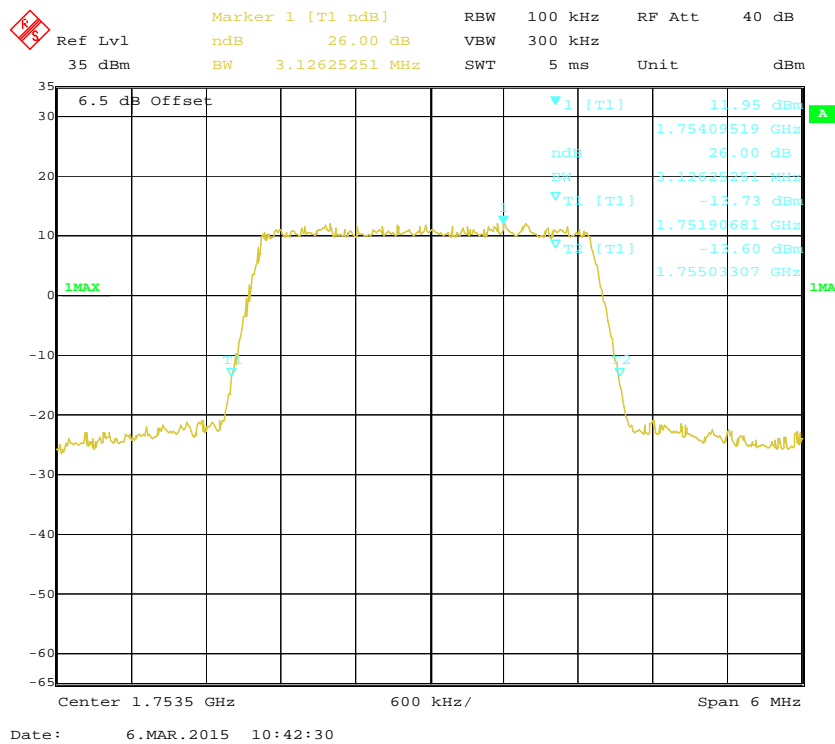


## QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel

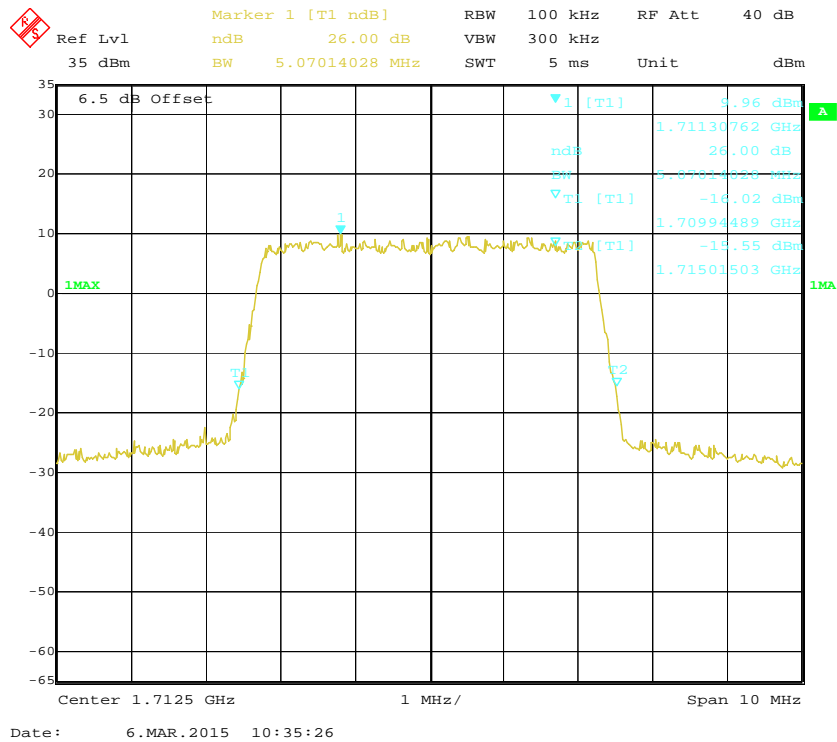


**QPSK (3.0 MHz) - 26 dB Bandwidth, High channel****16-QAM (3.0 MHz) - 26 dB Bandwidth, Low channel**

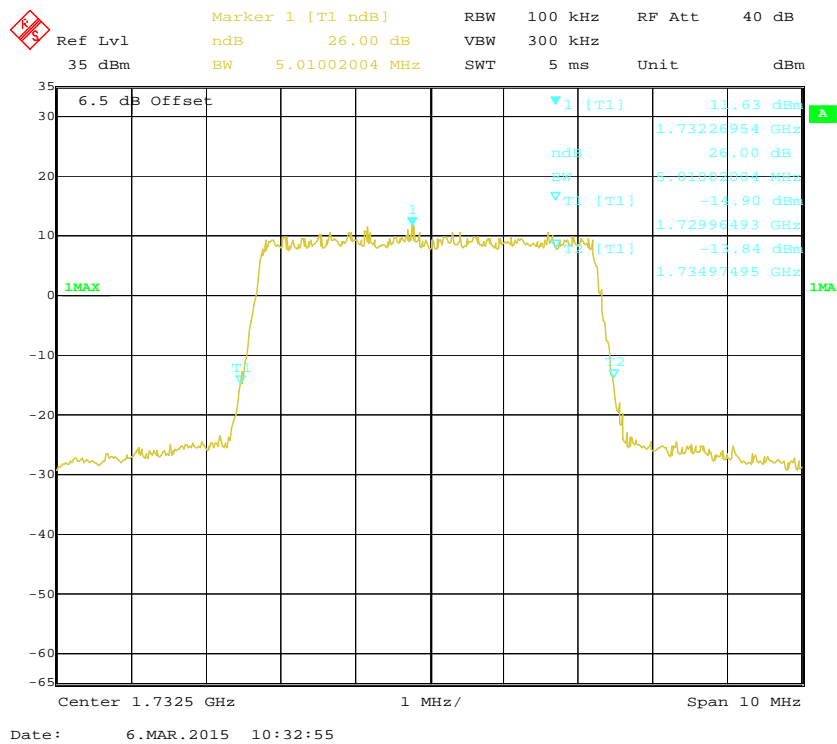


**16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (3.0 MHz) - 26 dB Bandwidth, High channel**

## QPSK (5.0 MHz) - 26 dB Bandwidth, Low channel



## QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



6.5 dB Offset

Ref Lvl 35 dBm

Marker 1 [T1 ndB] 26.00 dB

ndB 26.00 dB

SW 5.01002004 MHz

RBW 100 kHz

VBW 300 kHz

RF Att 40 dB

SWT 5 ms

Unit dBm

11.89 dBm

1.75034569 GHz

26.00 dB

5.01002004 MHz

-15.43 dBm

1.74998497 GHz

-14.37 dBm

1.75499499 GHz

Center 1.7525 GHz

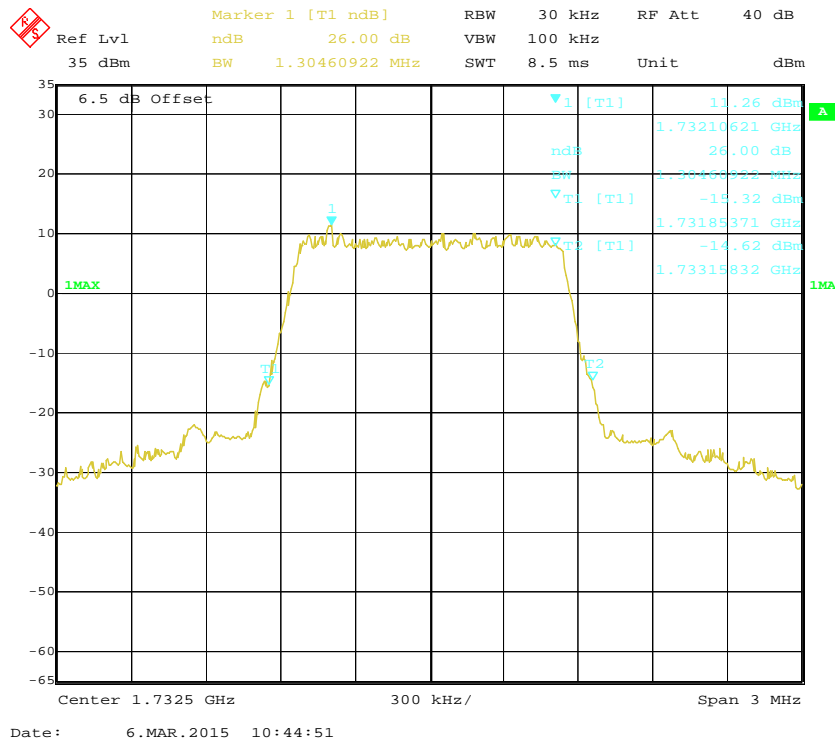
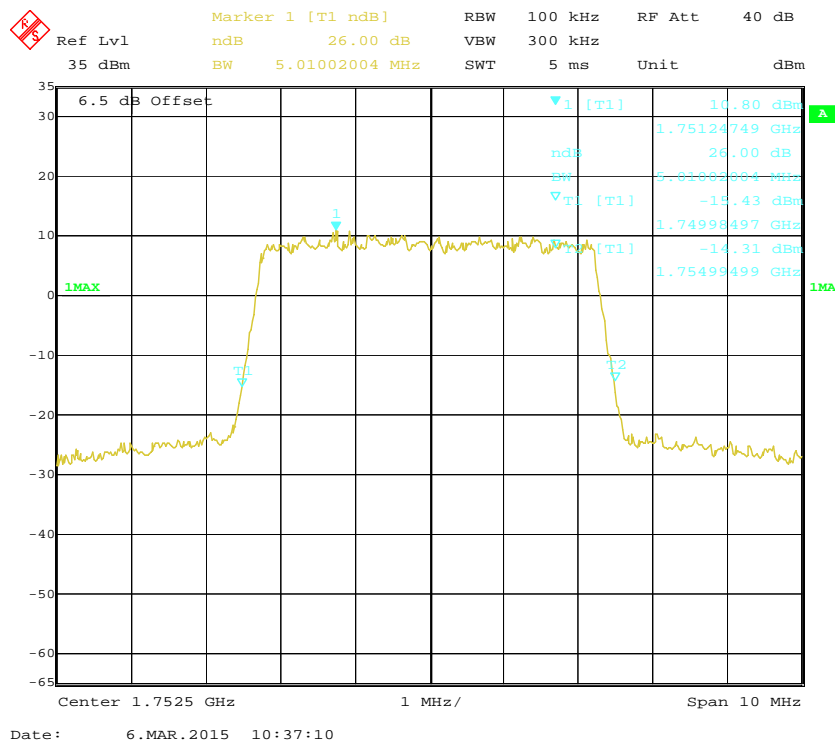
1 MHz/

Span 10 MHz

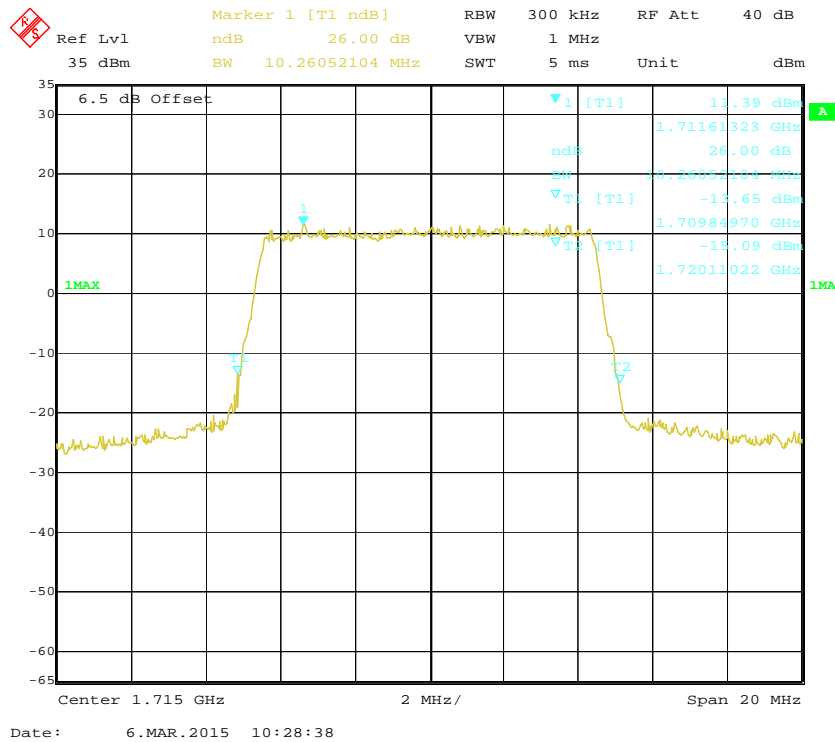
Date: 6.MAR.2015 10:36:28

Ref Lvl 35 dBm  
 Marker 1 [T1 ndB] 26.00 dB  
 BW 5.03006012 MHz  
 RBW 100 kHz  
 VBW 300 kHz  
 RF Att 40 dB  
 SWT 5 ms  
 Unit dBm

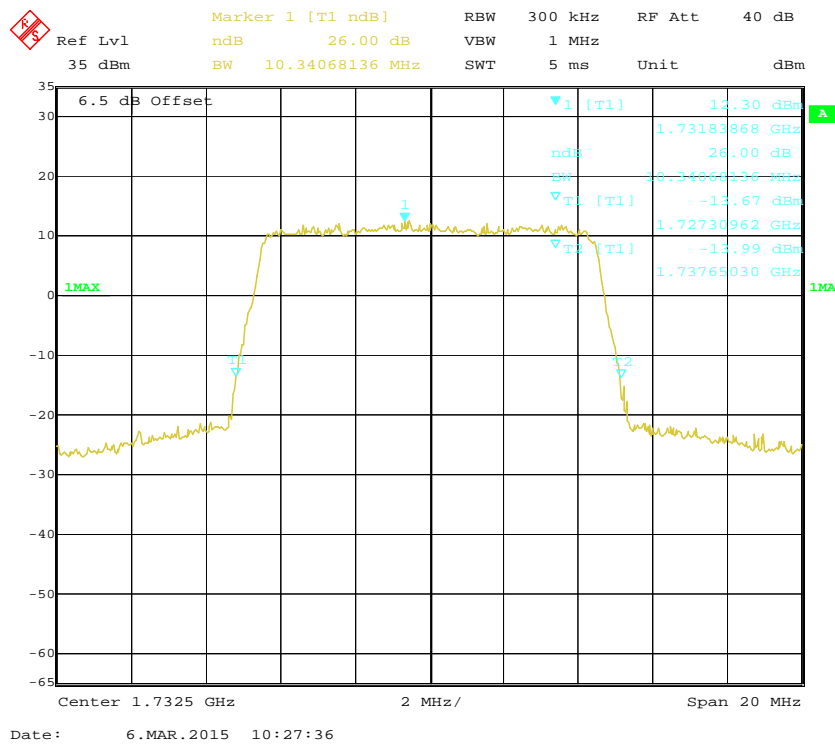
6.5 dB Offset  
 1MAX  
 T1  
 T2  
 1.7125 GHz  
 1 MHz/  
 Span 10 MHz  
 Date: 6.MAR.2015 10:34:46

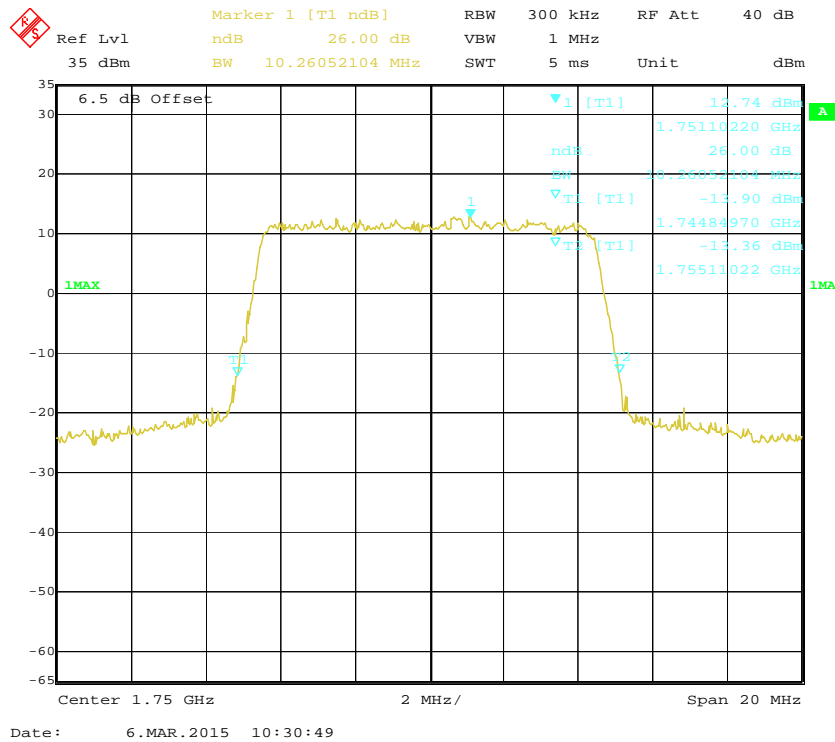
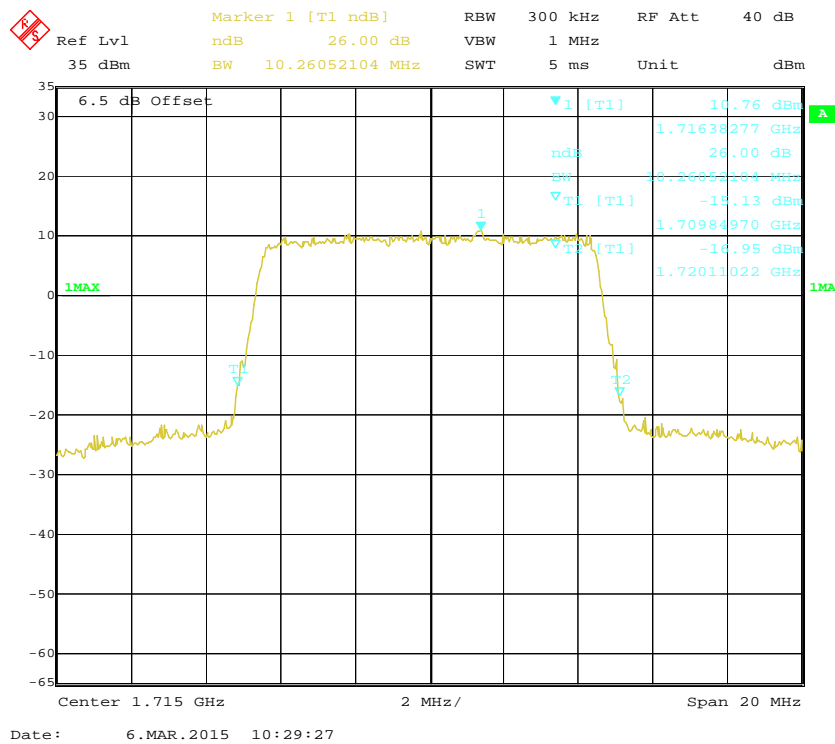
**16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (5.0 MHz) - 26 dB Bandwidth, High channel**

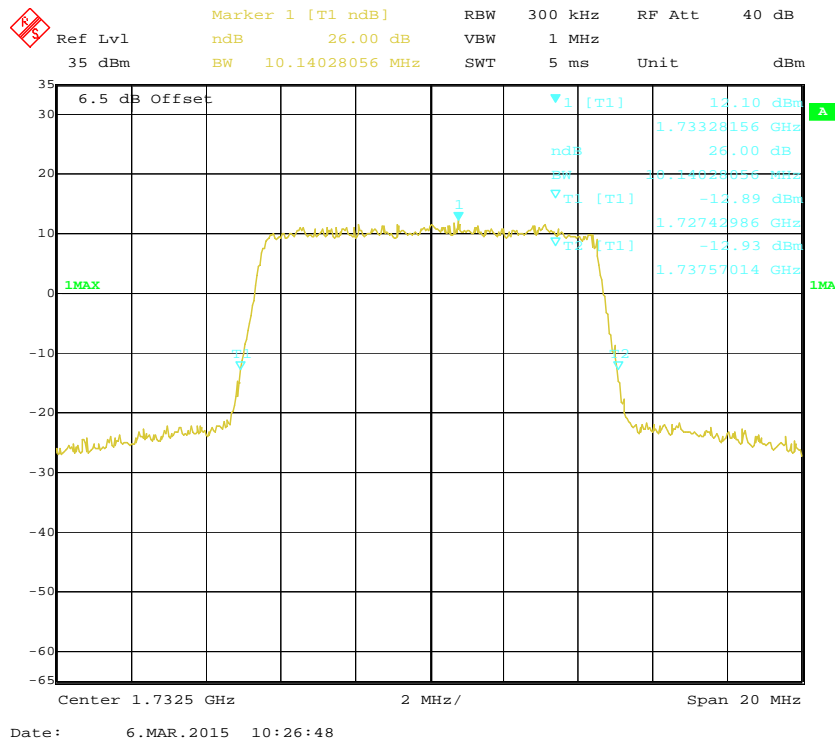
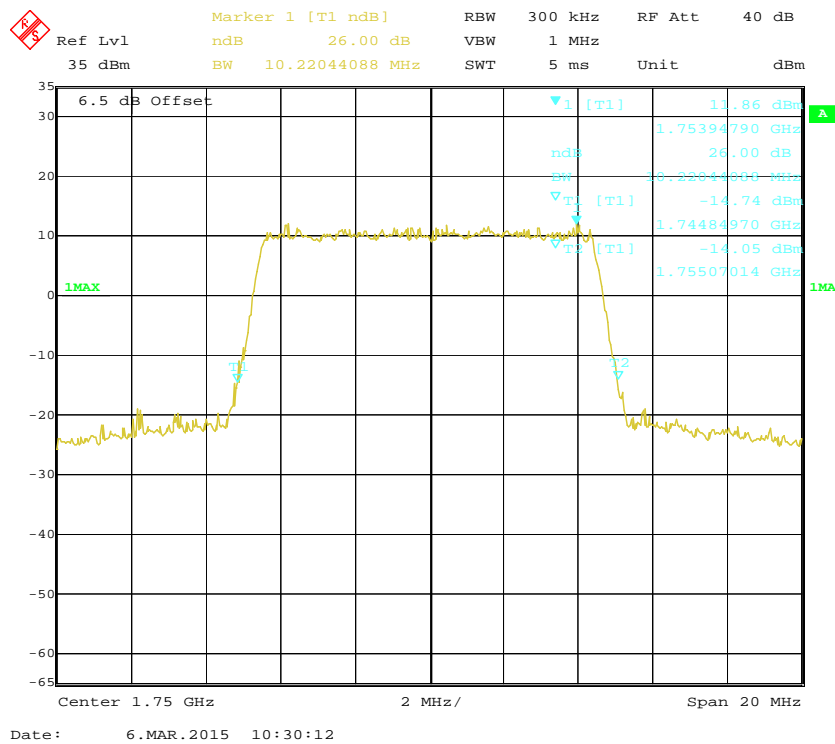
## QPSK (10.0 MHz) - 26 dB Bandwidth, Low channel



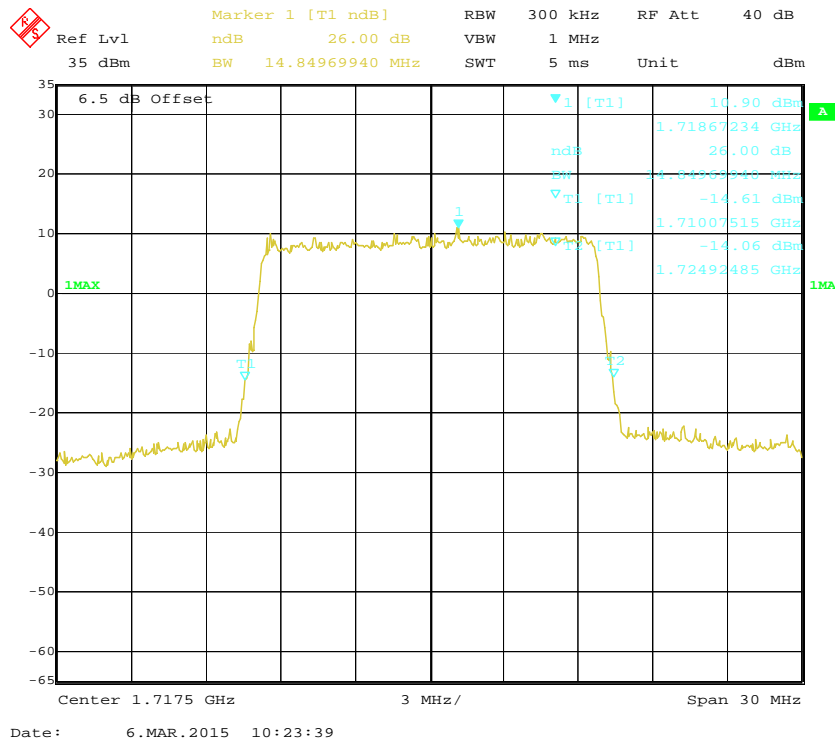
## QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



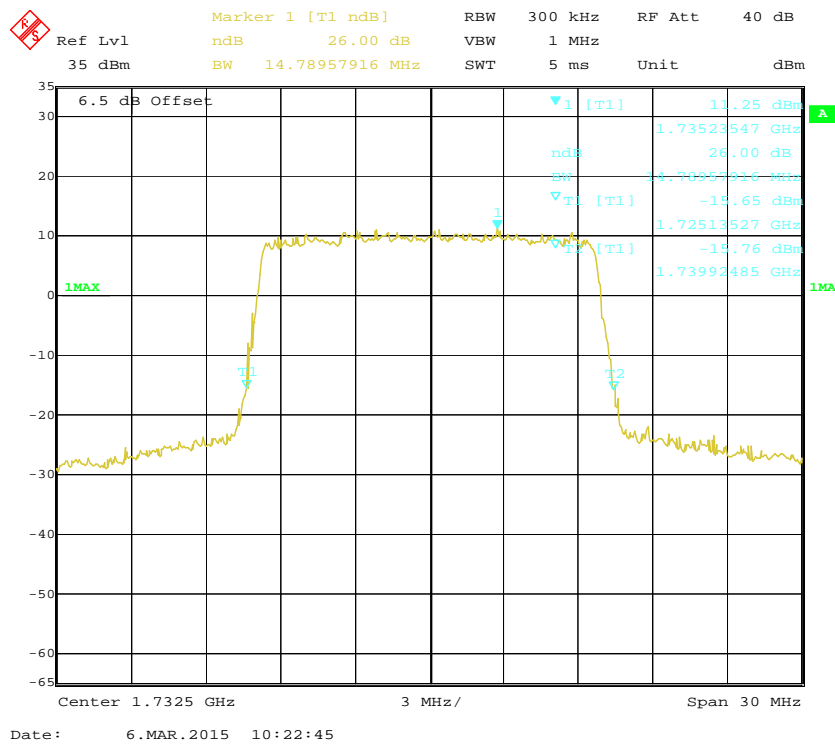
**QPSK (10.0 MHz) - 26 dB Bandwidth, High channel****16-QAM (10.0 MHz) - 26 dB Bandwidth, Low channel**

**16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (10.0 MHz) - 26 dB Bandwidth, High channel**

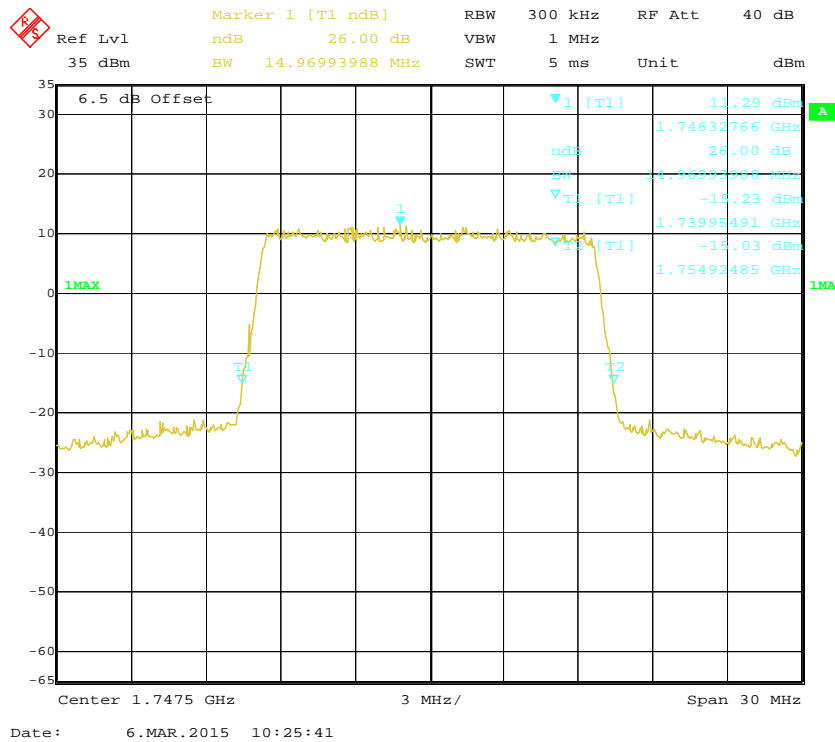
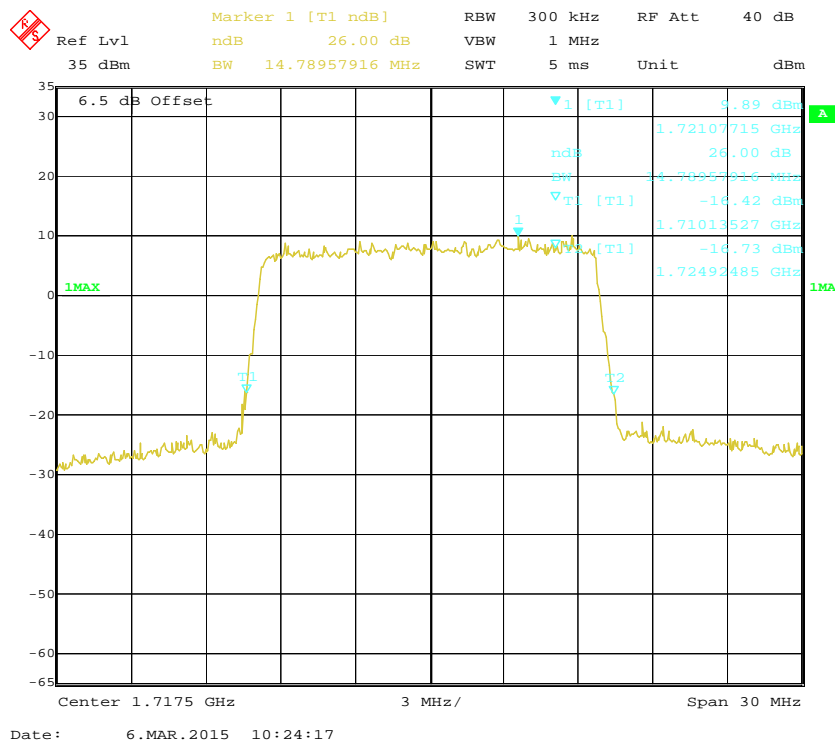
## QPSK (15.0 MHz) - 26 dB Bandwidth, Low channel



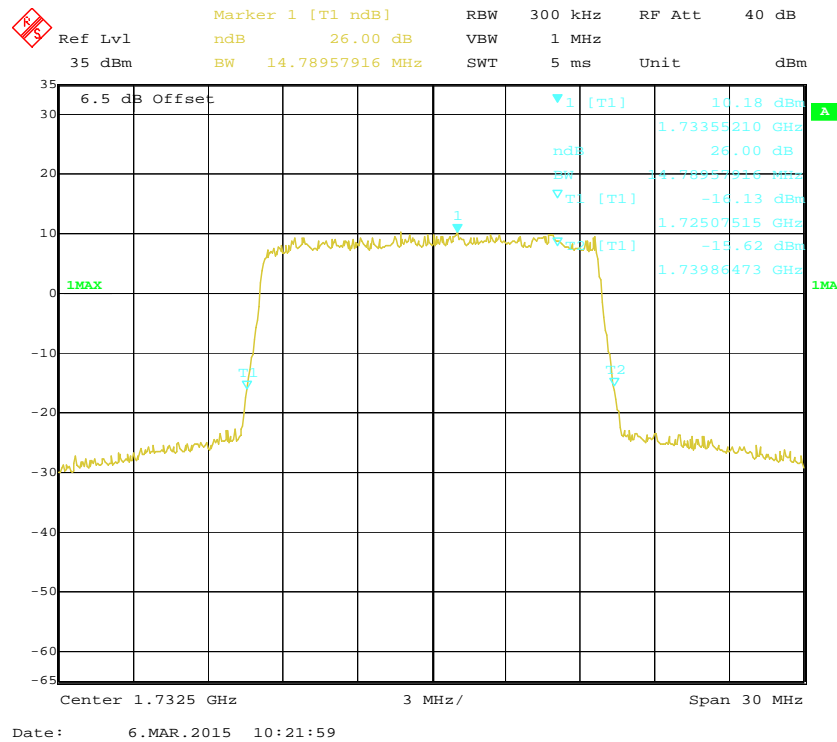
## QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



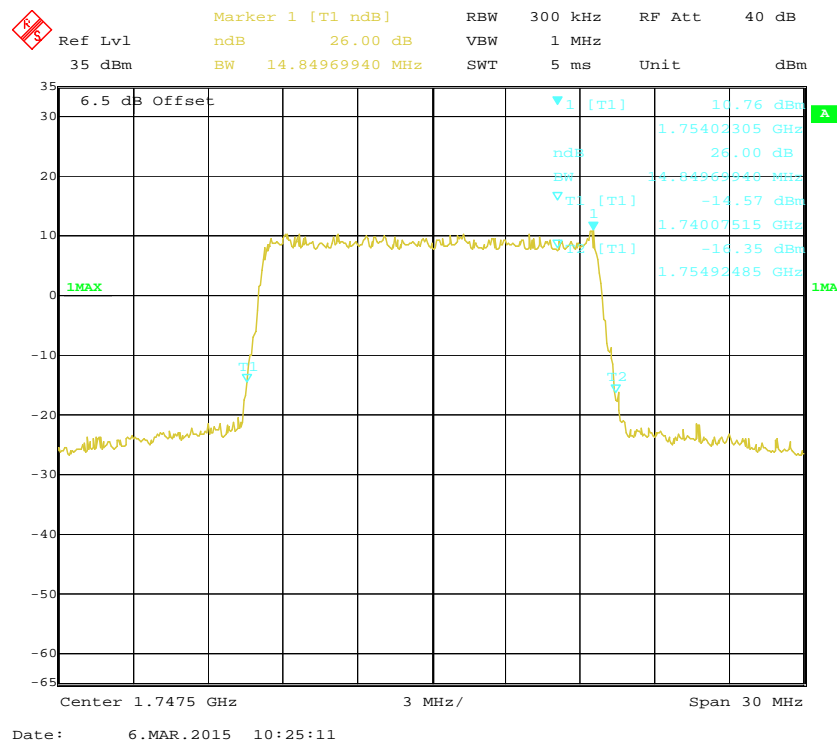


**QPSK (15.0 MHz) - 26 dB Bandwidth, High channel****16-QAM (15.0 MHz) - 26 dB Bandwidth, Low channel**

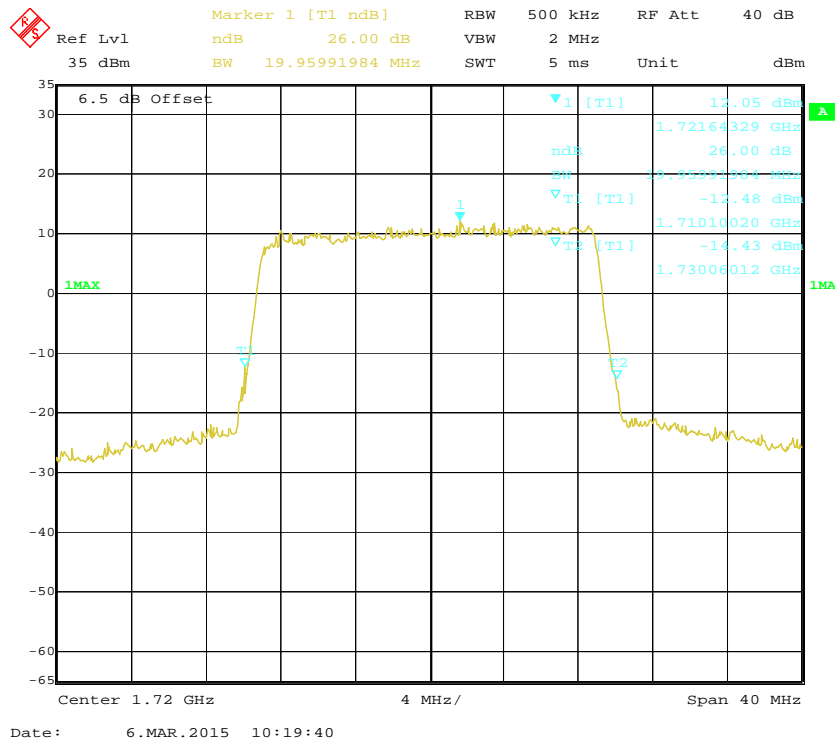
### 16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



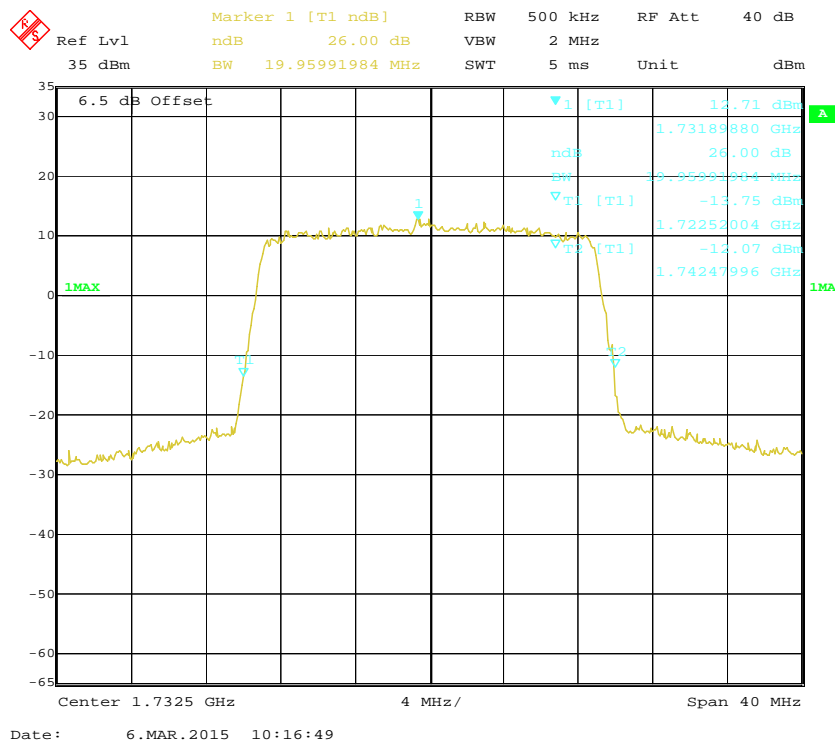
### 16-QAM (15.0 MHz) - 26 dB Bandwidth, High channel



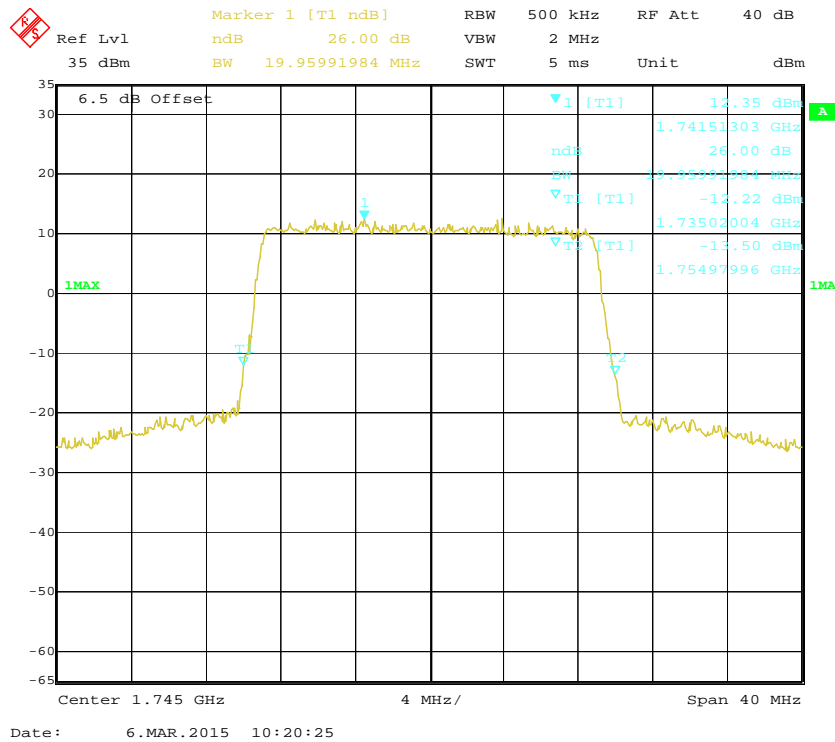
### QPSK (20.0 MHz) - 26 dB Bandwidth, Low channel



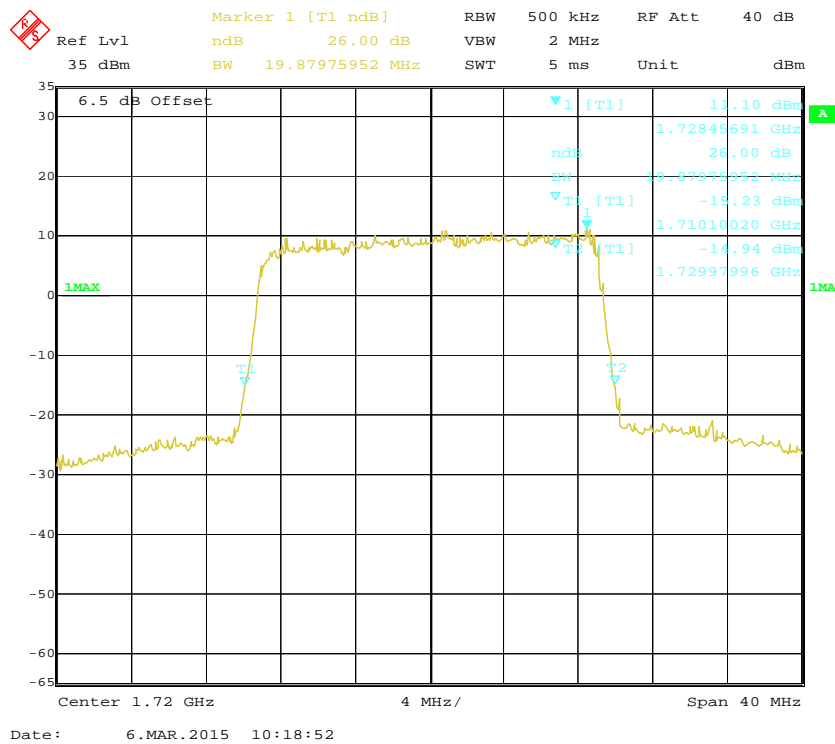
### QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel

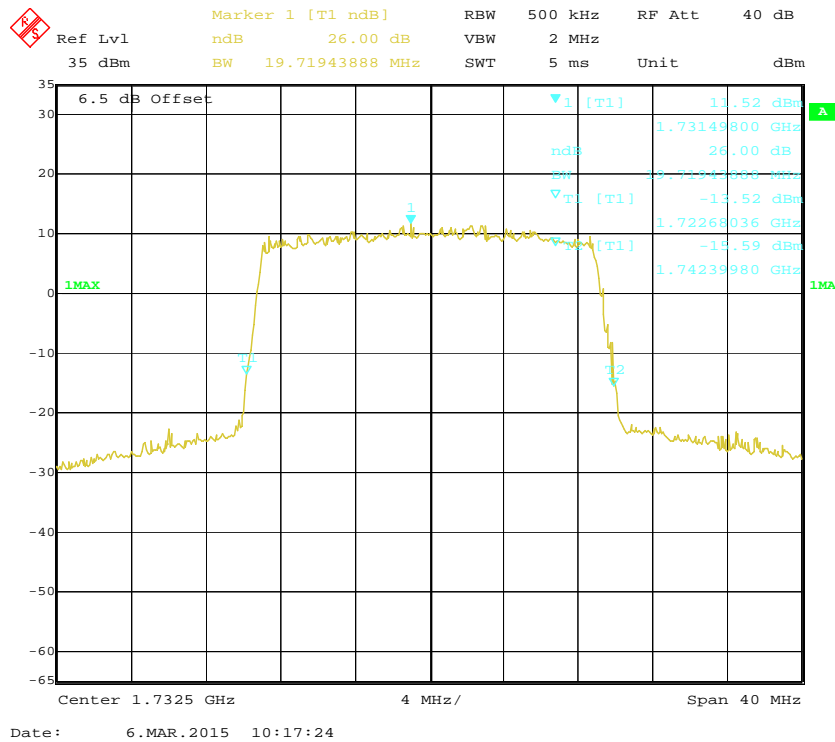
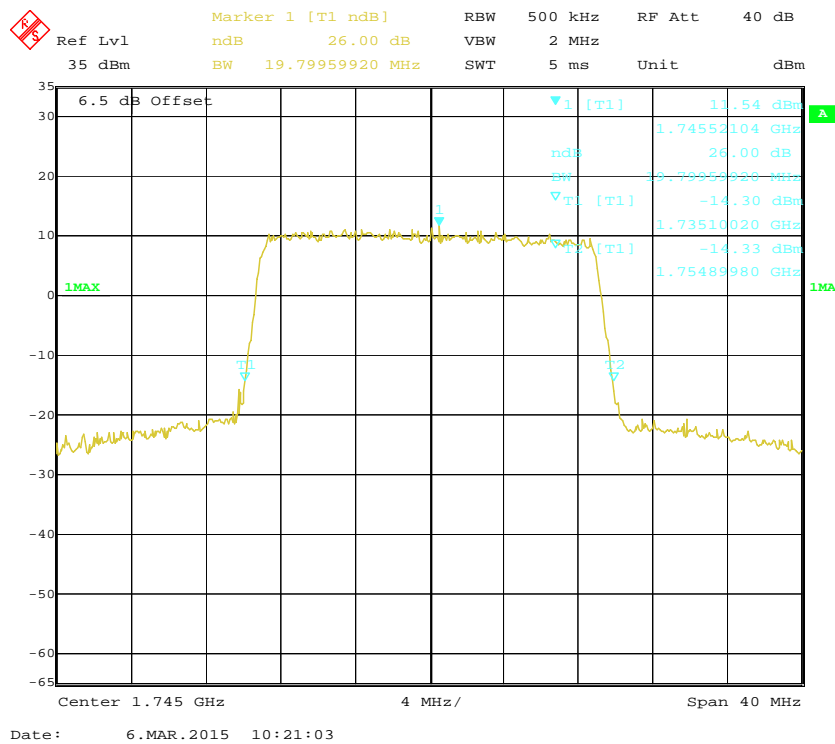


## QPSK (20.0 MHz) - 26 dB Bandwidth, High channel



## 16-QAM (20.0 MHz) - 26 dB Bandwidth, Low channel



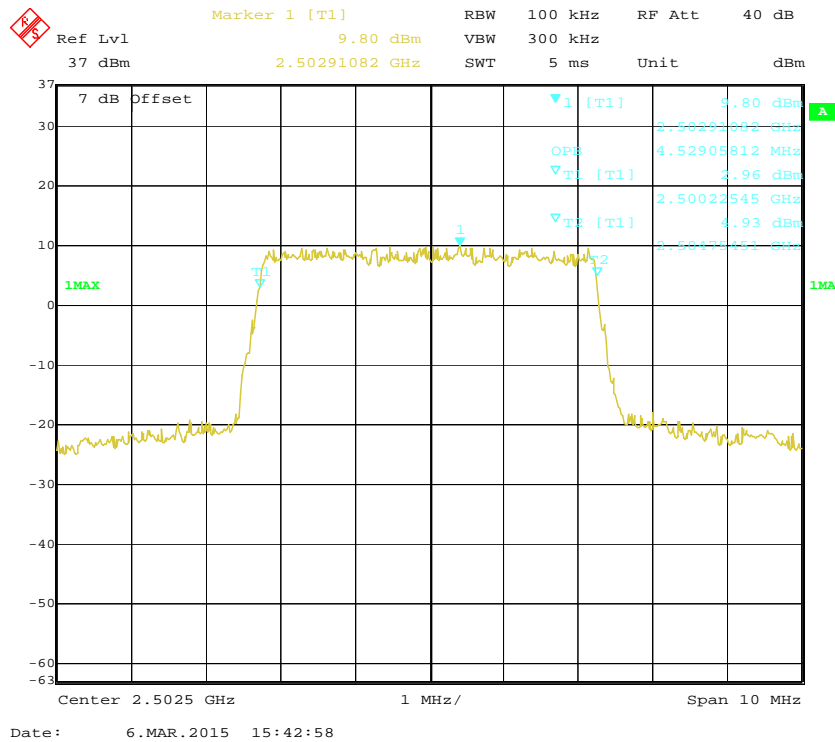
**16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (20.0 MHz) - 26 dB Bandwidth, High channel**

**Band 7:**

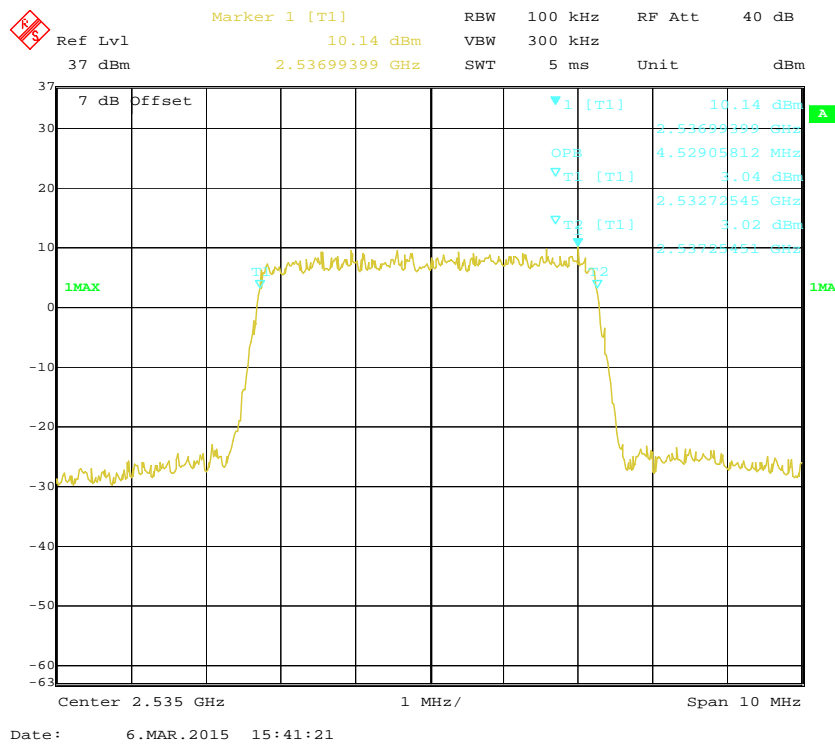
99% Occupied Bandwidth		Low channel (MHz)	Middle channel (MHz)	High channel (MHz)
5.0 MHz	QPSK	4.53	4.53	4.51
	16QAM	4.53	4.53	4.53
10.0 MHz	QPSK	9.10	9.10	9.10
	16QAM	9.10	9.10	9.10
15.0 MHz	QPSK	13.47	13.59	13.47
	16QAM	13.53	13.53	13.59
20.0 MHz	QPSK	18.04	18.04	18.04
	16QAM	18.12	18.12	18.04

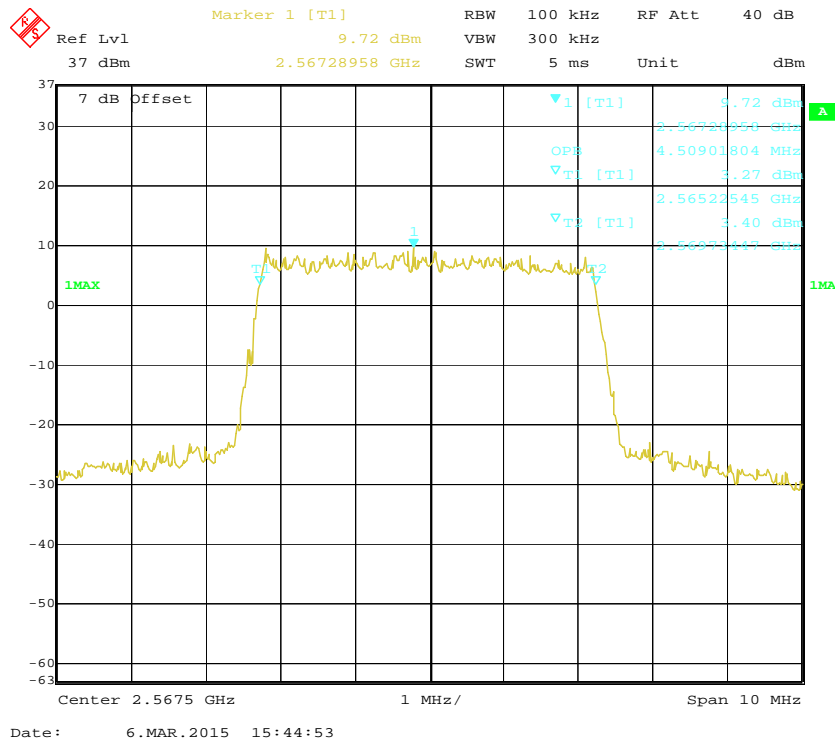
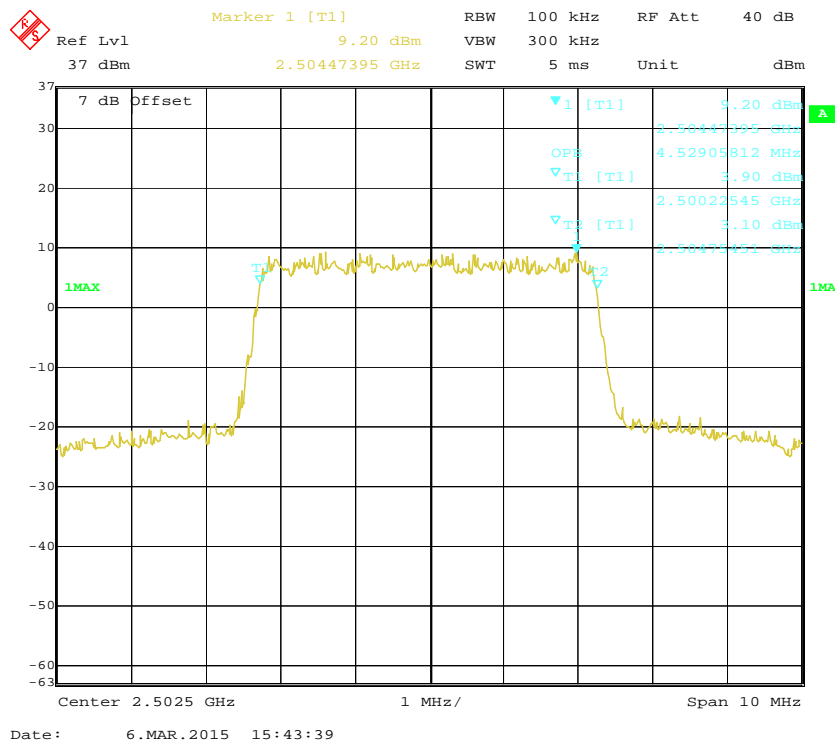
26 dB Emission Bandwidth		Low channel (MHz)	Middle channel (MHz)	High channel (MHz)
5.0 MHz	QPSK	5.03	5.03	5.03
	16QAM	5.07	5.03	5.01
10.0 MHz	QPSK	10.30	10.34	10.30
	16QAM	10.34	10.26	10.22
15.0 MHz	QPSK	14.79	14.97	14.91
	16QAM	14.85	14.85	14.85
20.0 MHz	QPSK	19.80	19.88	19.96
	16QAM	19.88	20.04	19.96

### QPSK (5.0 MHz) - 99% Occupied Bandwidth, Low channel



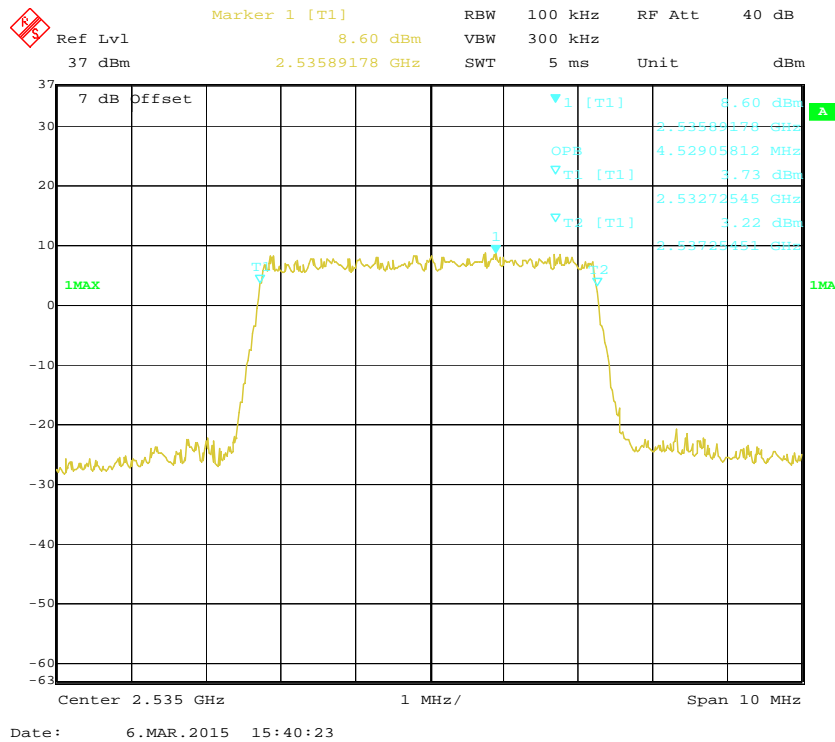
### QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



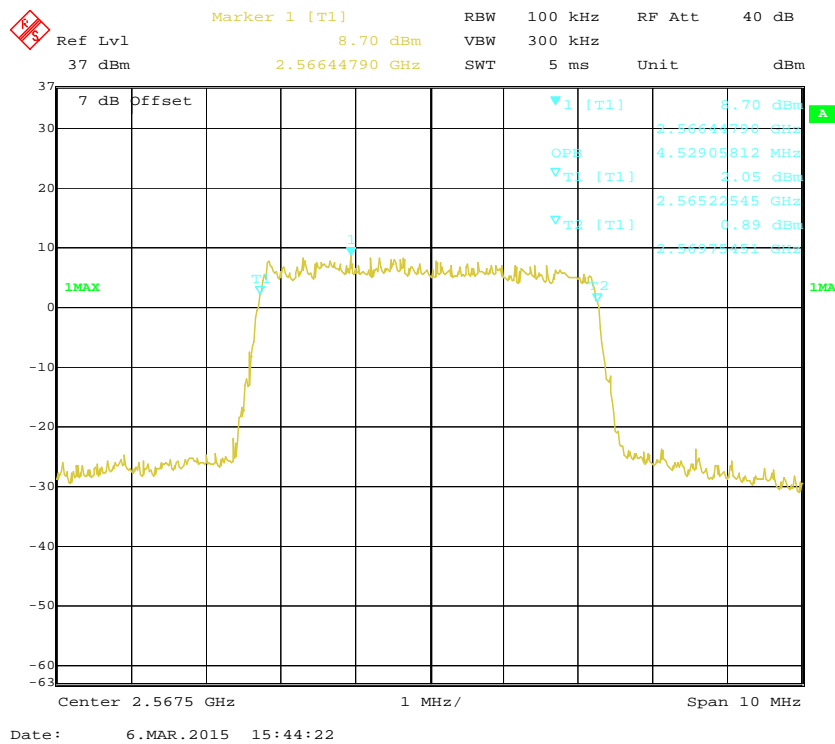
**QPSK (5.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Low channel**



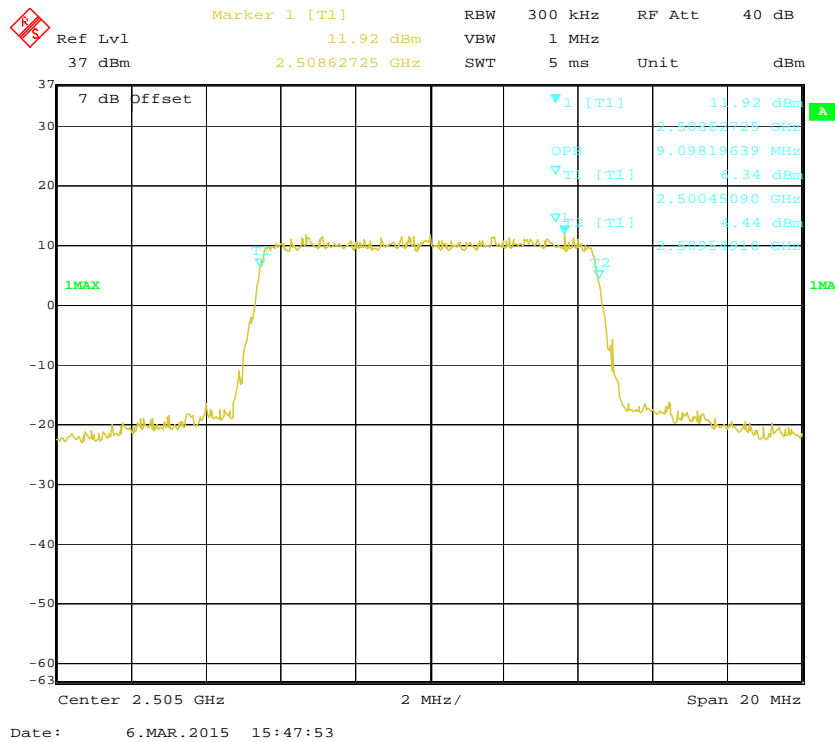
### 16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



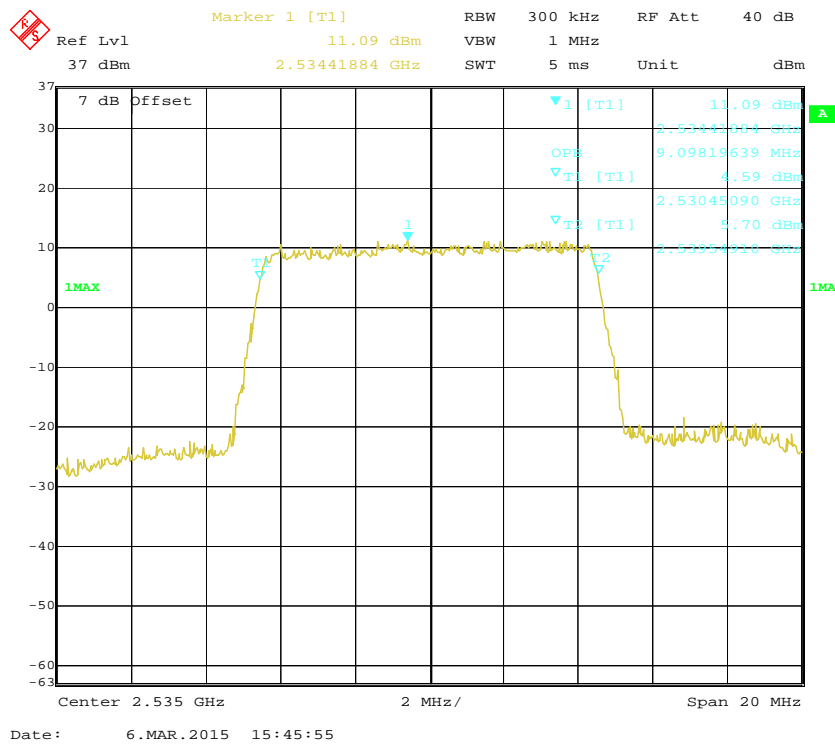
### 16-QAM (5.0 MHz) - 99% Occupied Bandwidth, High channel

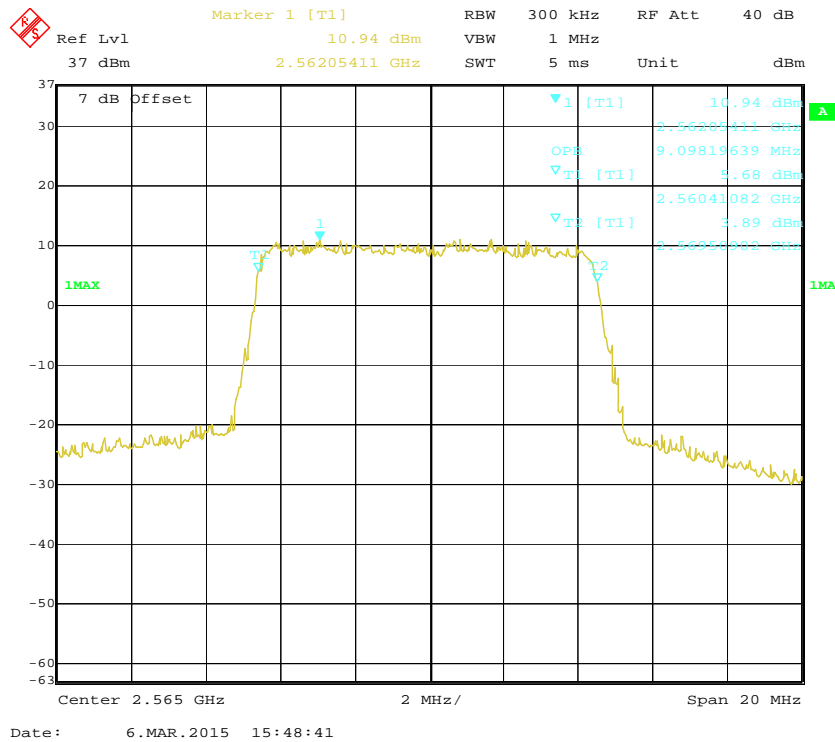
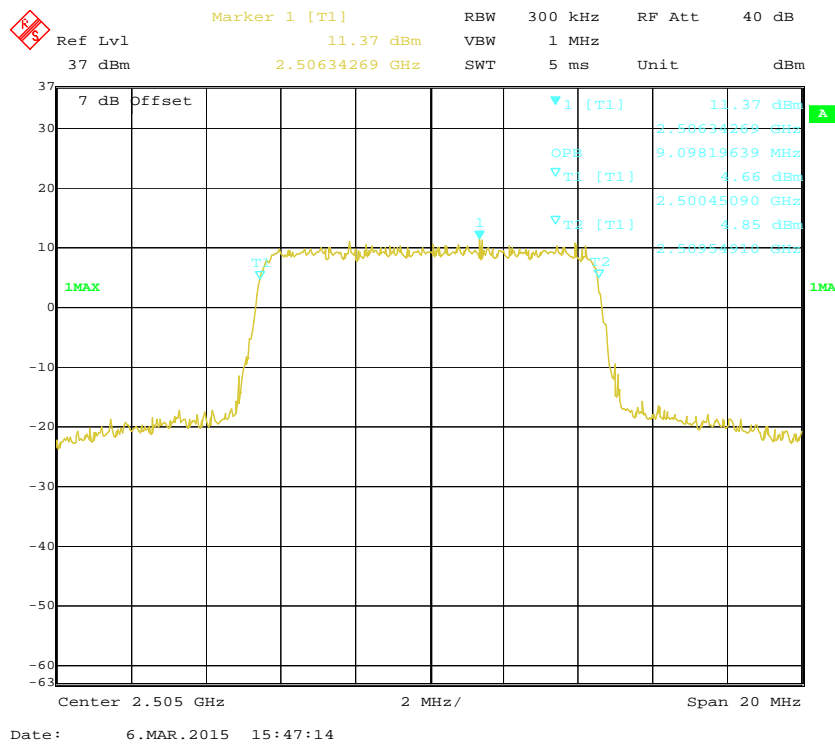


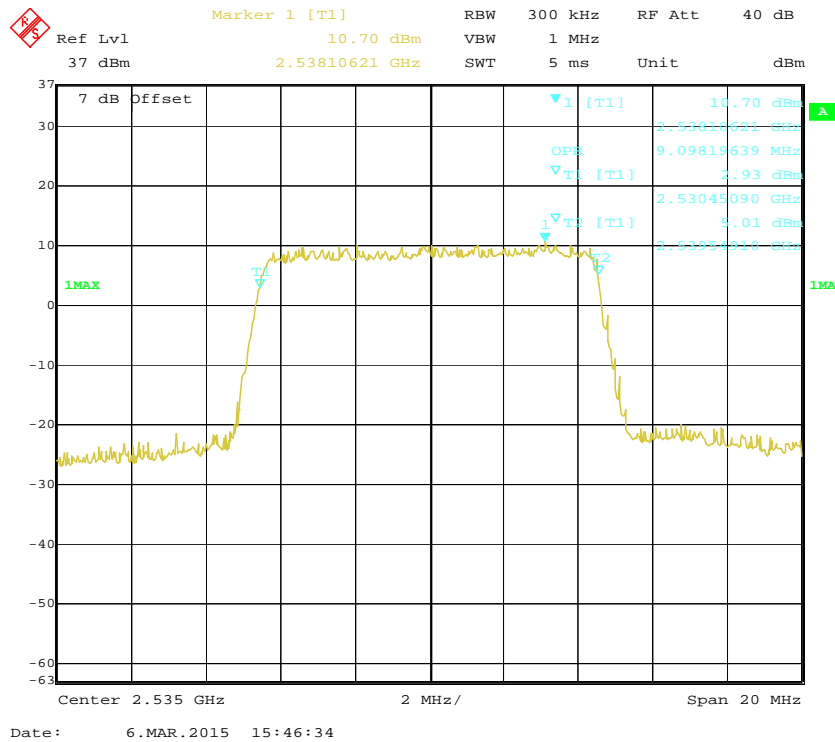
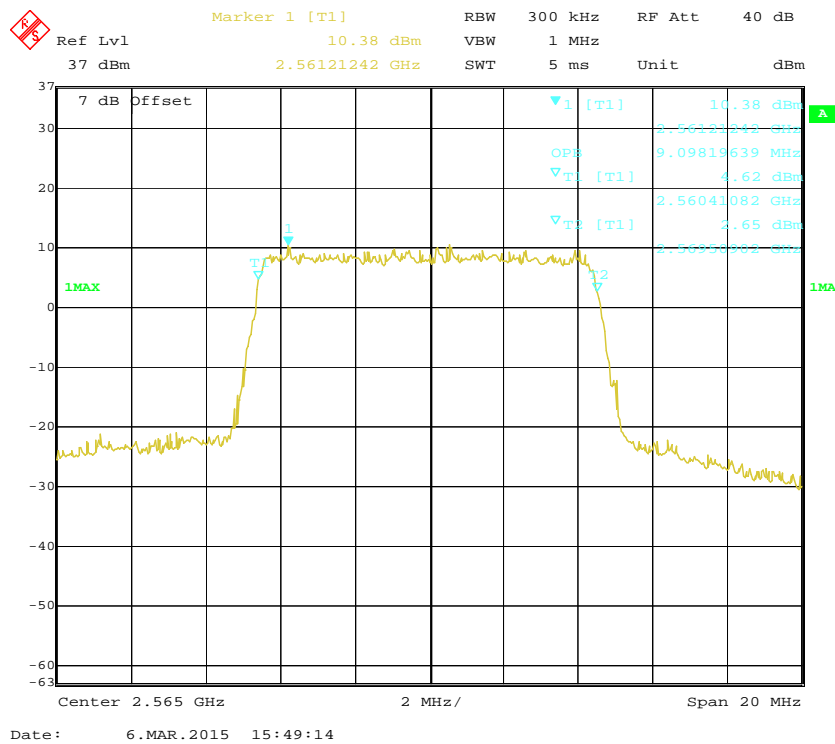
### QPSK (10.0 MHz) - 99% Occupied Bandwidth, Low channel

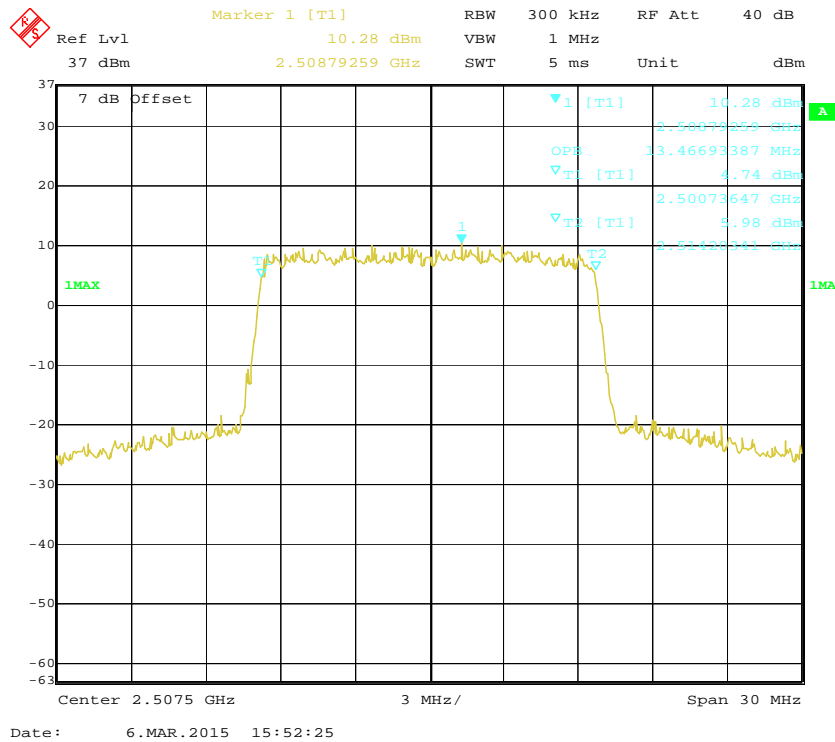
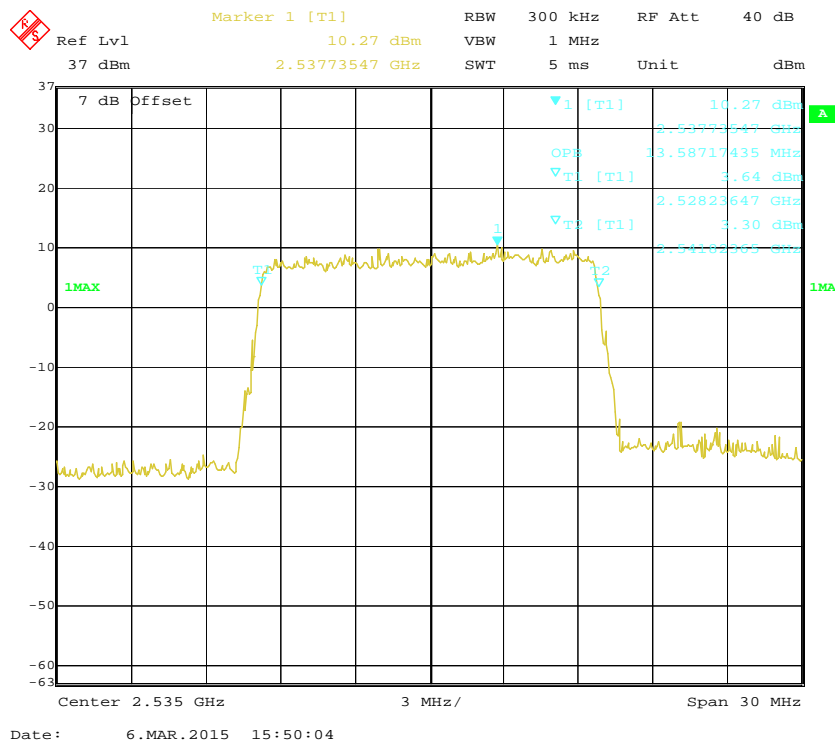


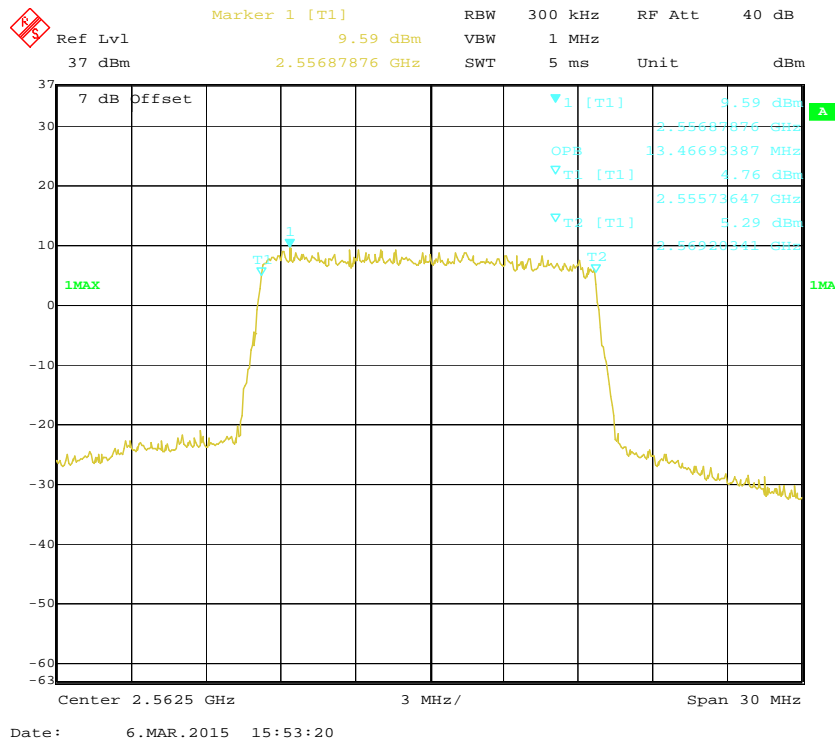
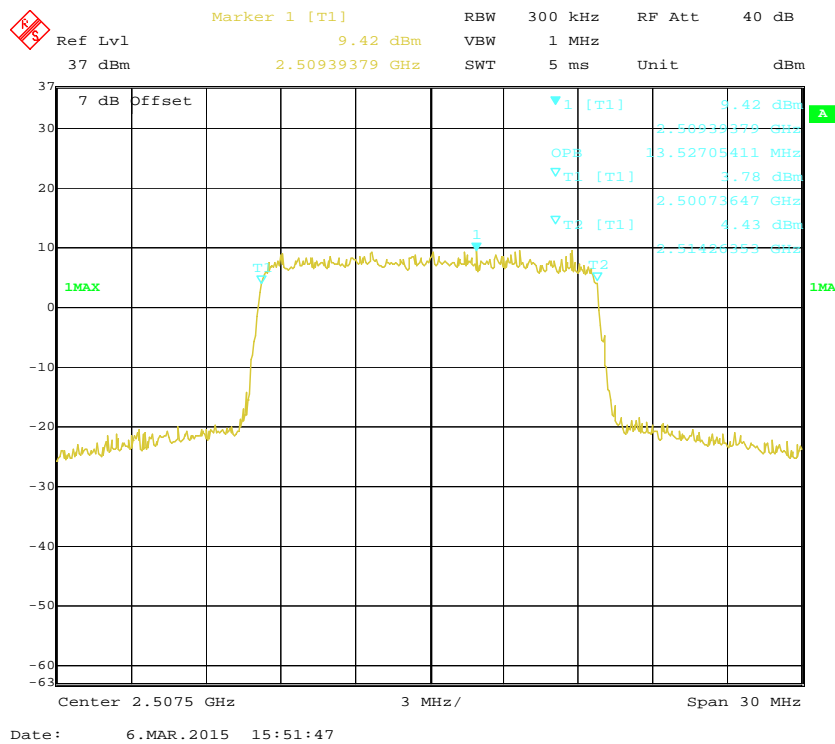
### QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



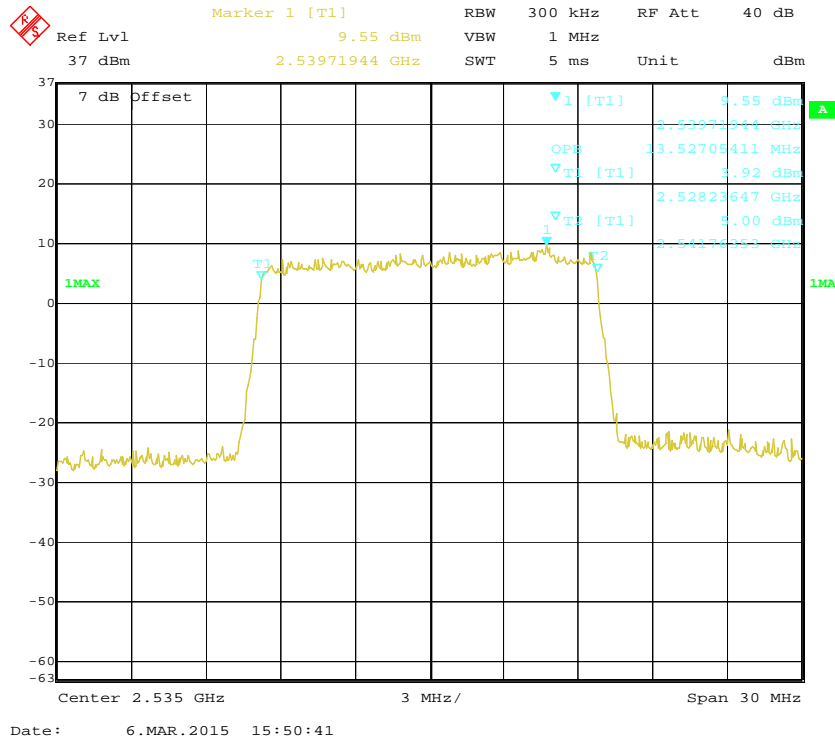
**QPSK (10.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Low channel**

**16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (10.0 MHz) - 99% Occupied Bandwidth, High channel**

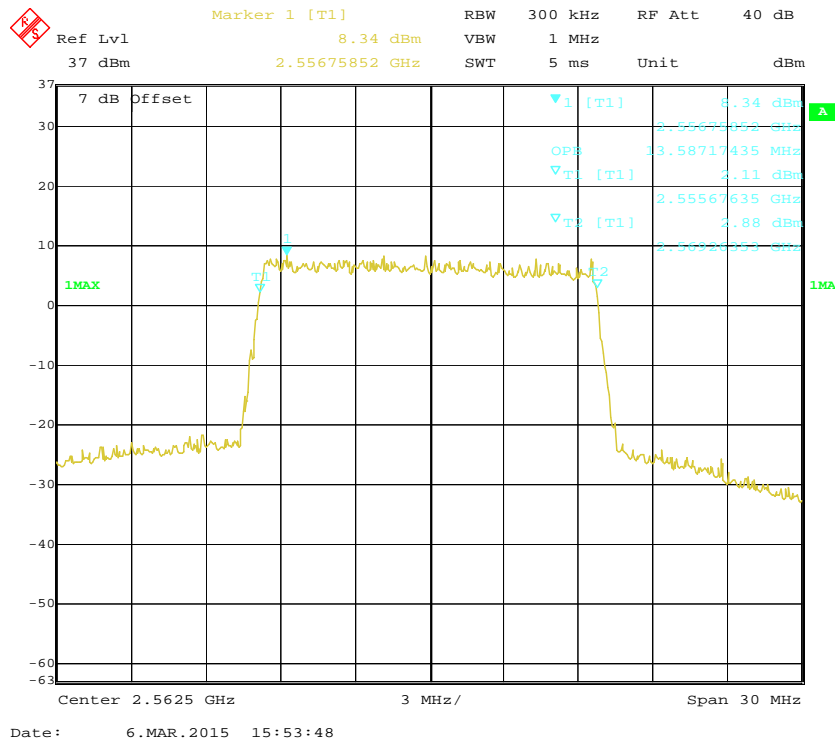
**QPSK (15.0 MHz) - 99% Occupied Bandwidth, Low channel****QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel**

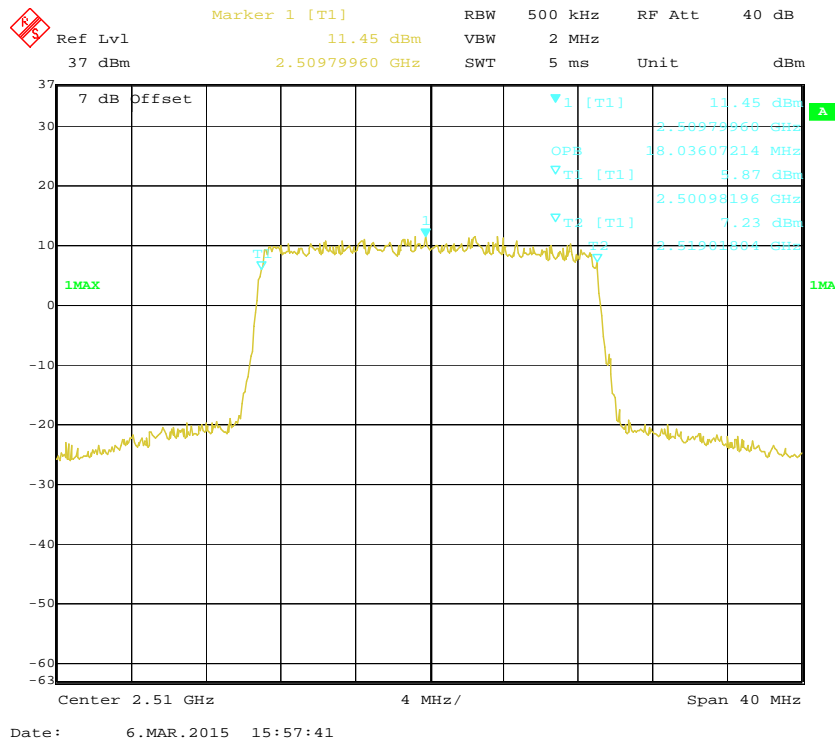
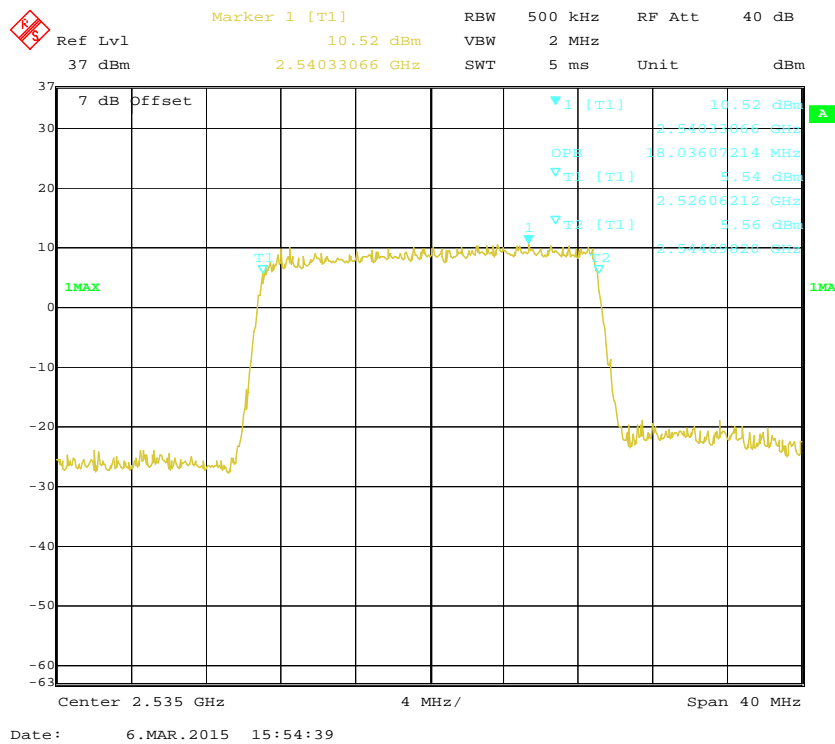
**QPSK (15.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Low channel**

### 16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel

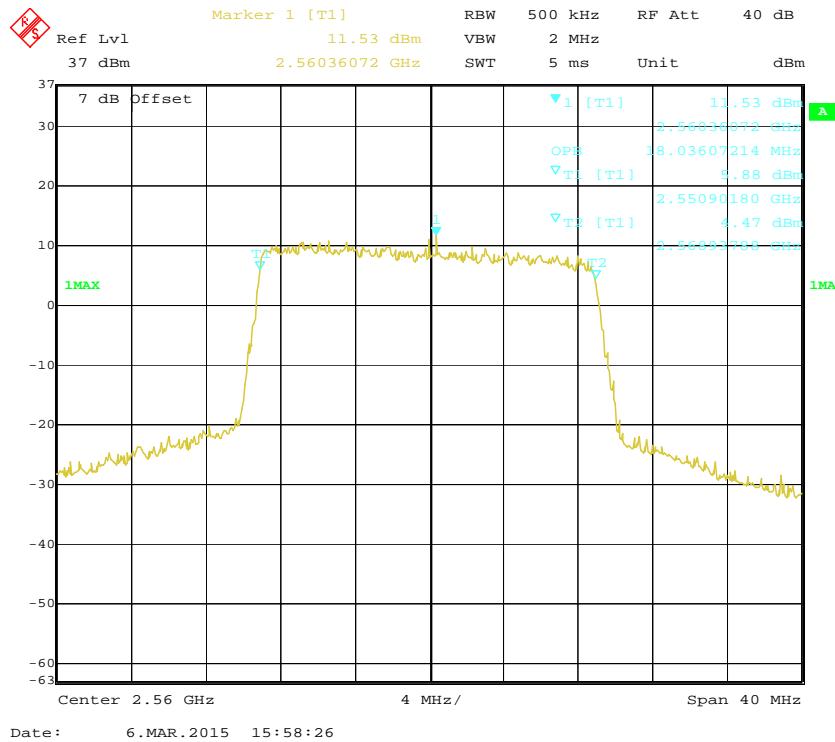
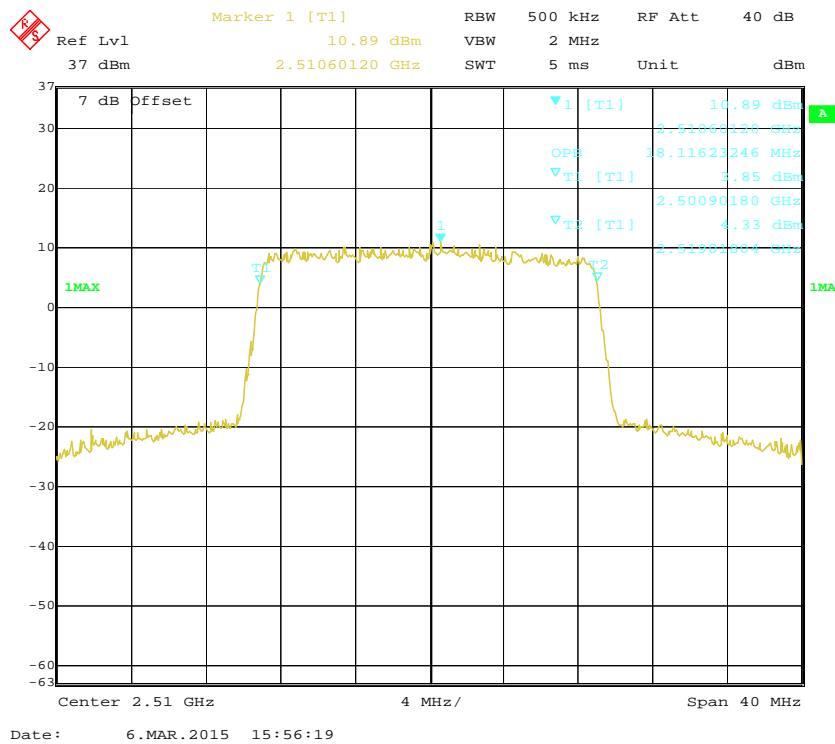


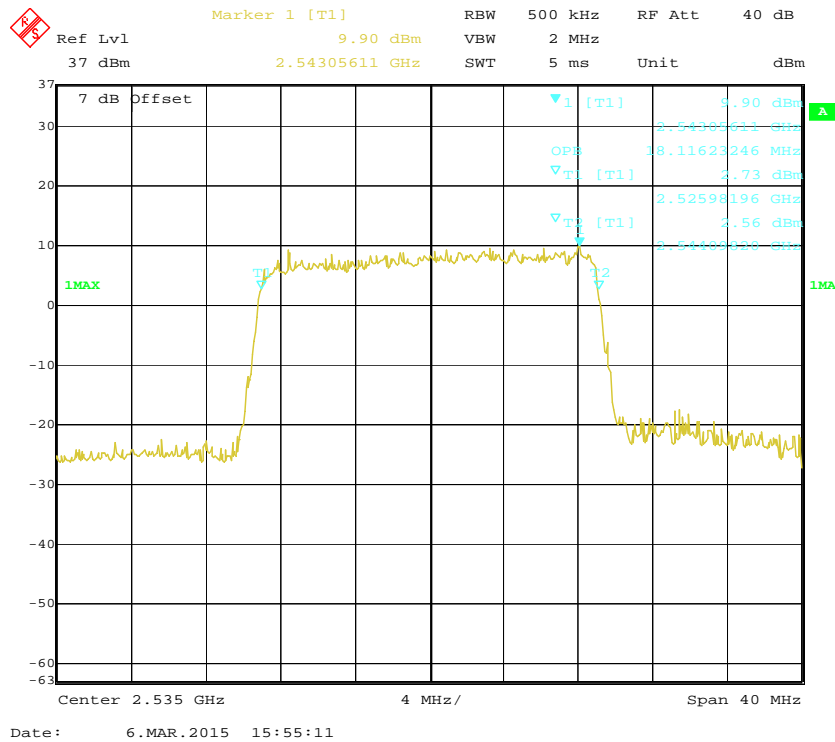
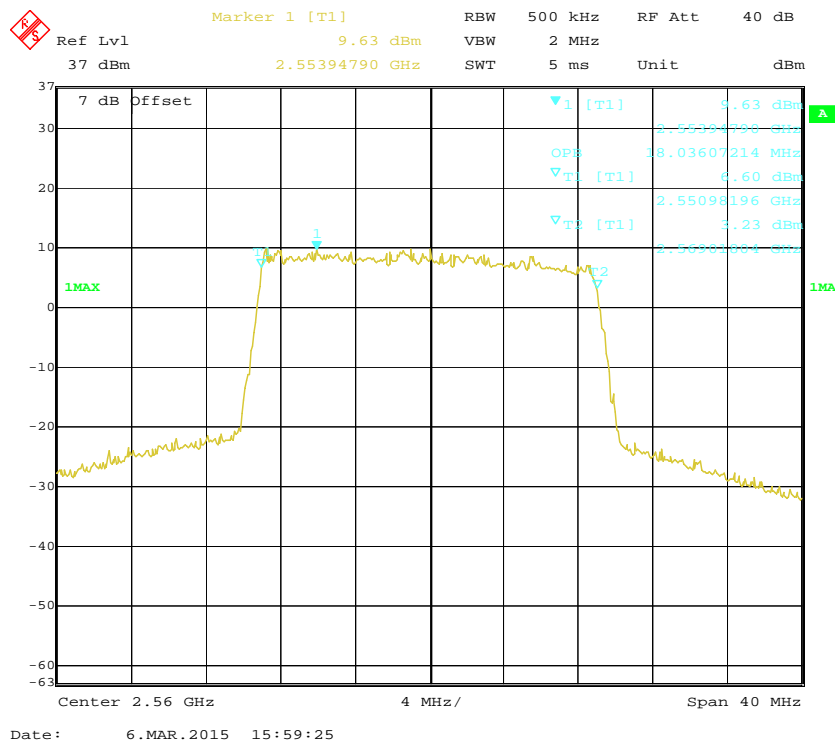
### 16-QAM (15.0 MHz) - 99% Occupied Bandwidth, High channel



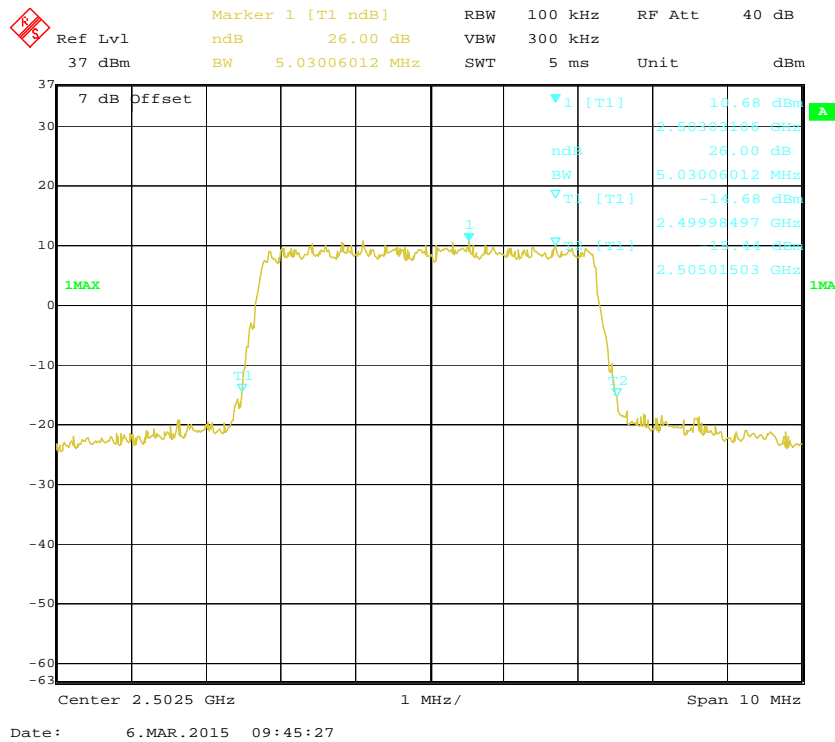
**QPSK (20.0 MHz) - 99% Occupied Bandwidth, Low channel****QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel**



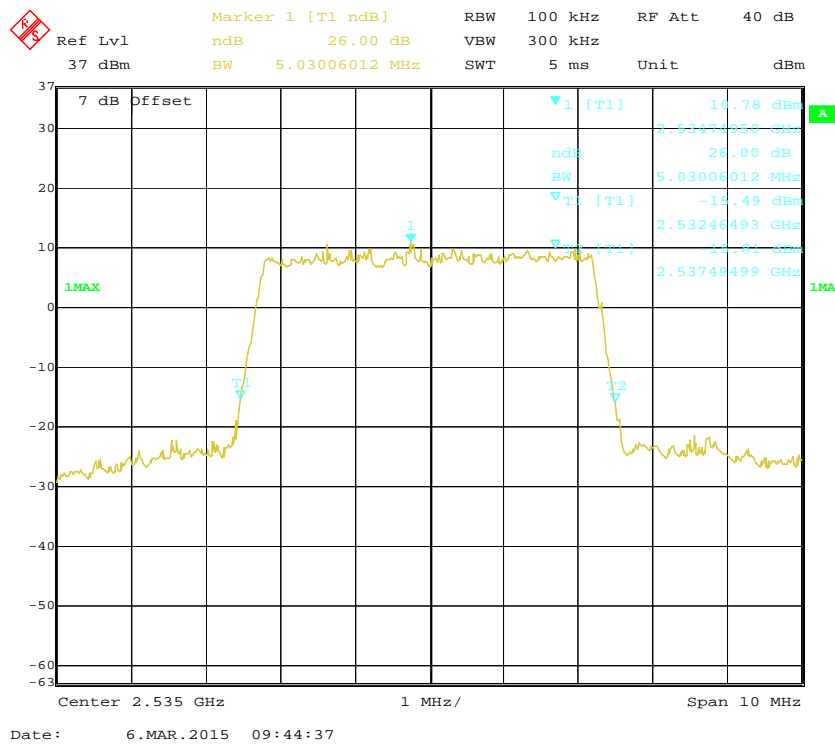
**QPSK (20.0 MHz) - 99% Occupied Bandwidth, High channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Low channel**

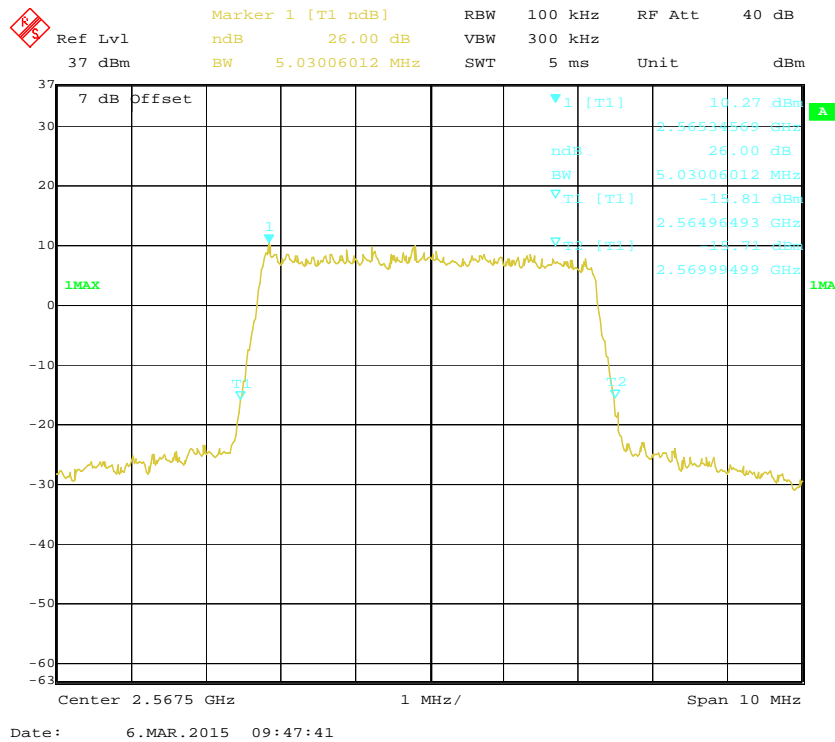
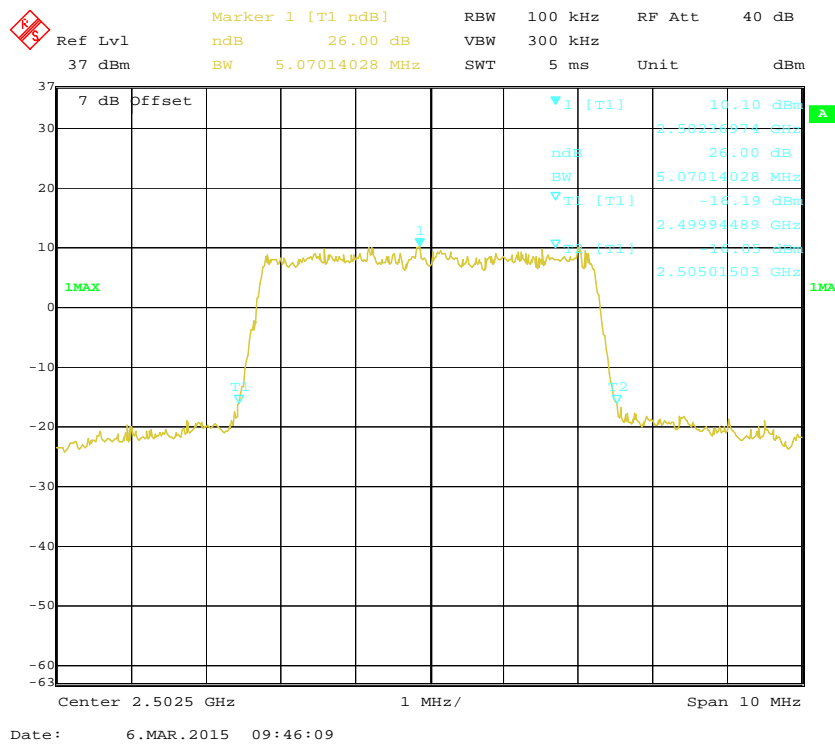
**16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel****16-QAM (20.0 MHz) - 99% Occupied Bandwidth, High channel**

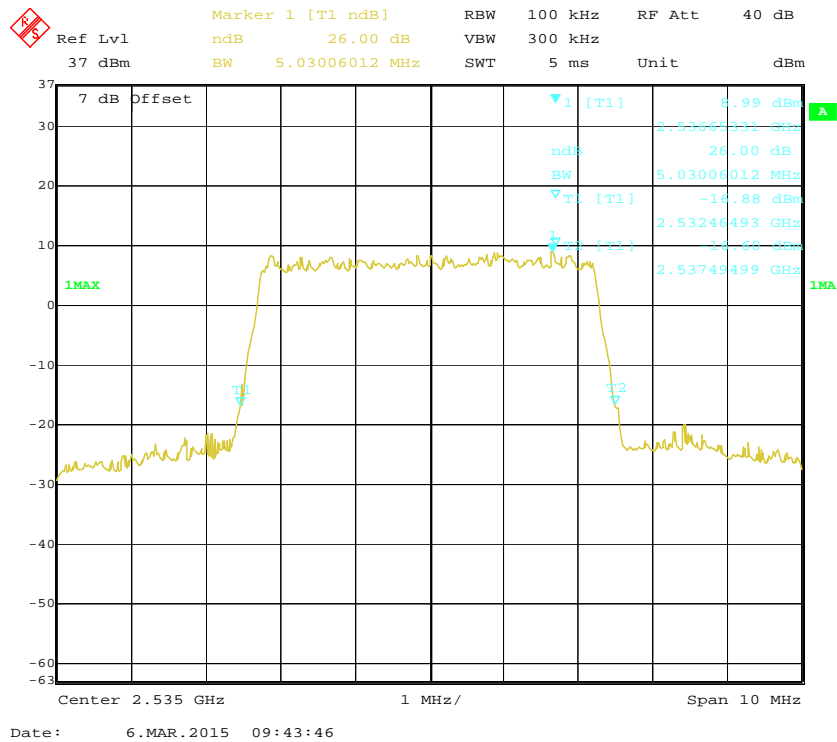
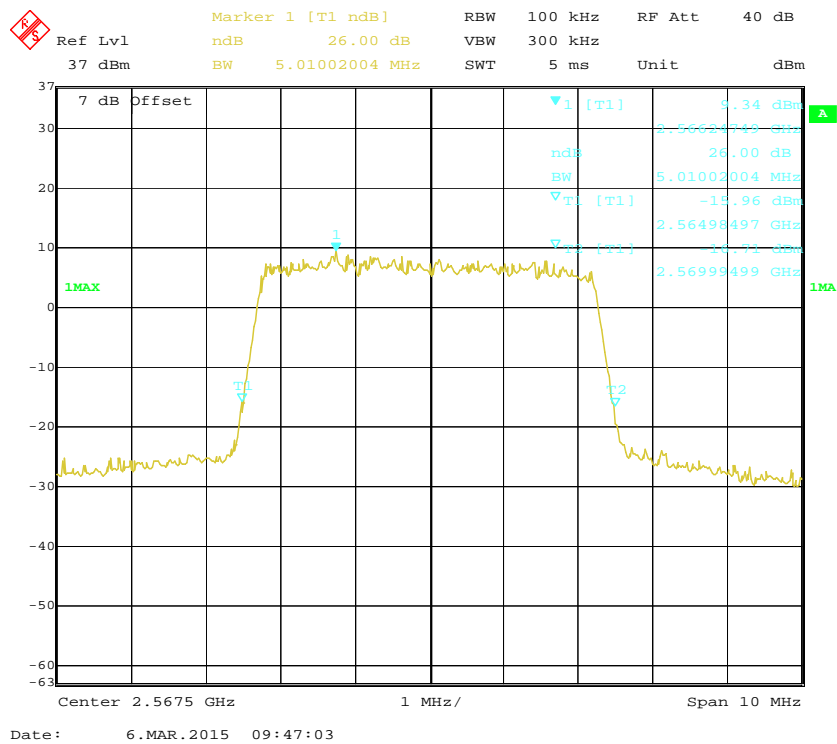
## QPSK (5.0 MHz) - 26 dB Bandwidth, Low channel



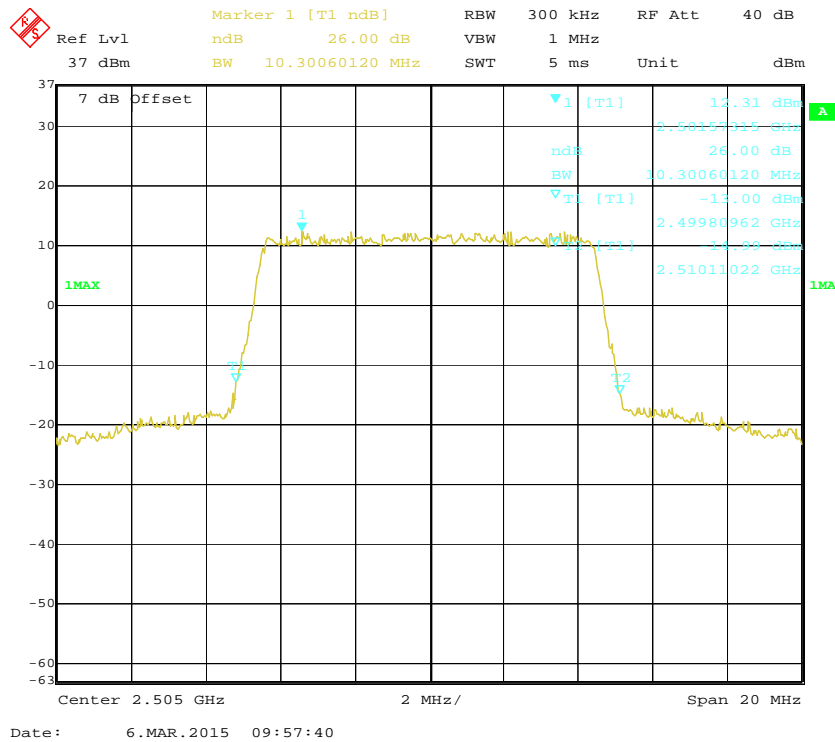
## QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



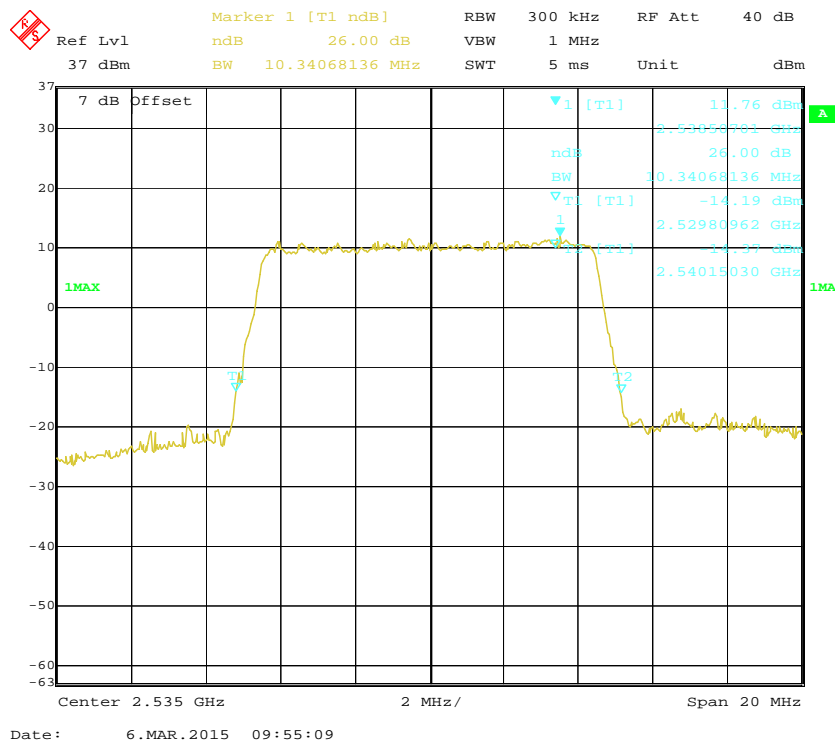
**QPSK (5.0 MHz) - 26 dB Bandwidth, High channel****16-QAM (5.0 MHz) - 26 dB Bandwidth, Low channel**

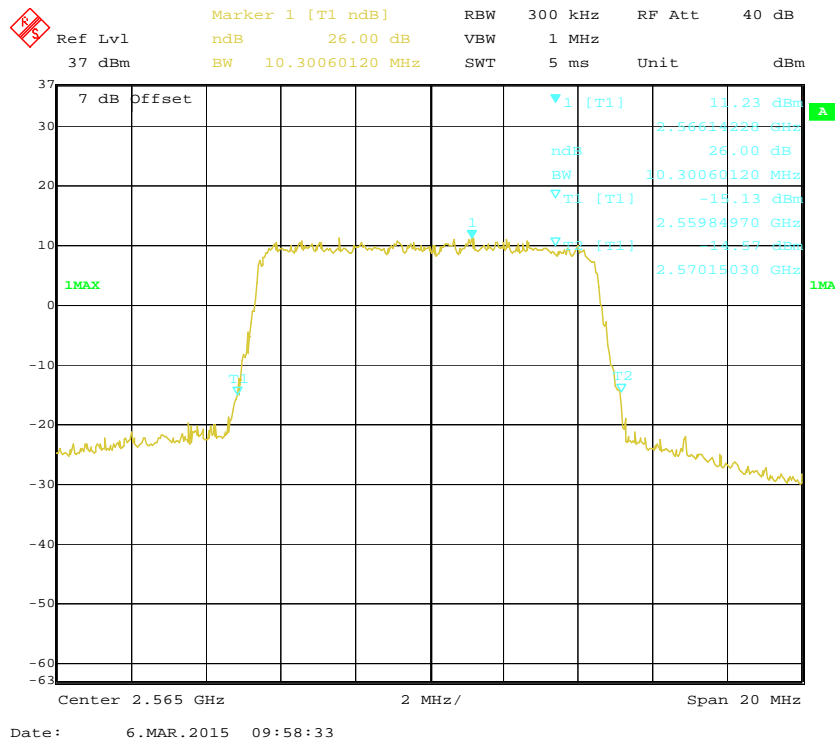
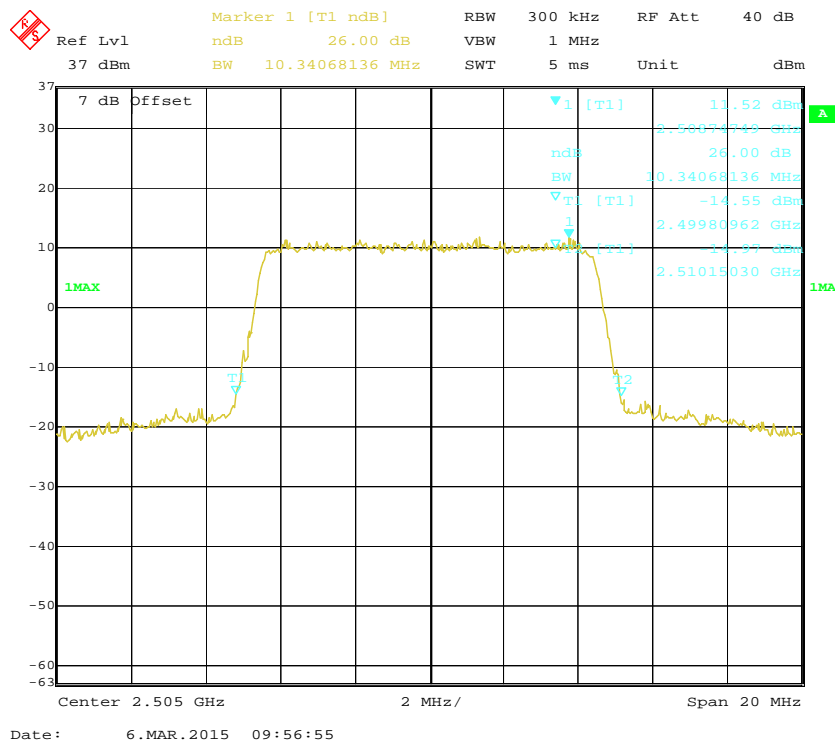
**16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (5.0 MHz) - 26 dB Bandwidth, High channel**

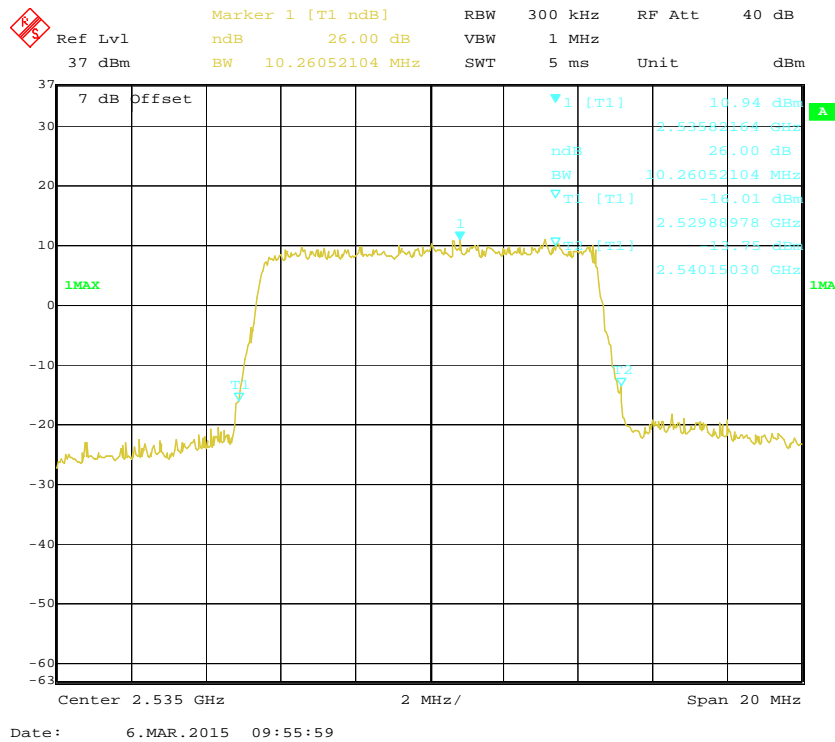
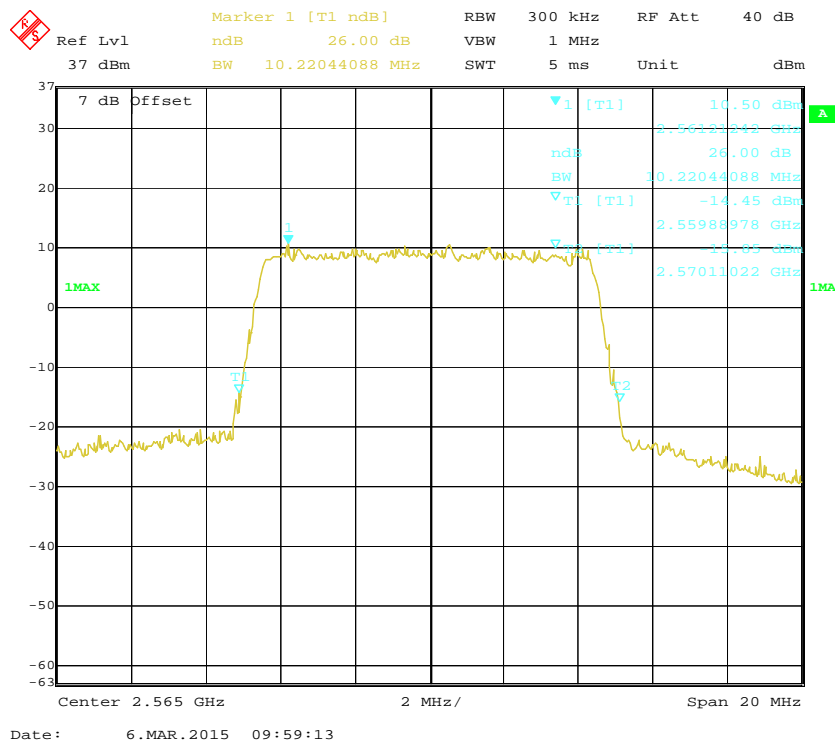
## QPSK (10.0 MHz) - 26 dB Bandwidth, Low channel



## QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel

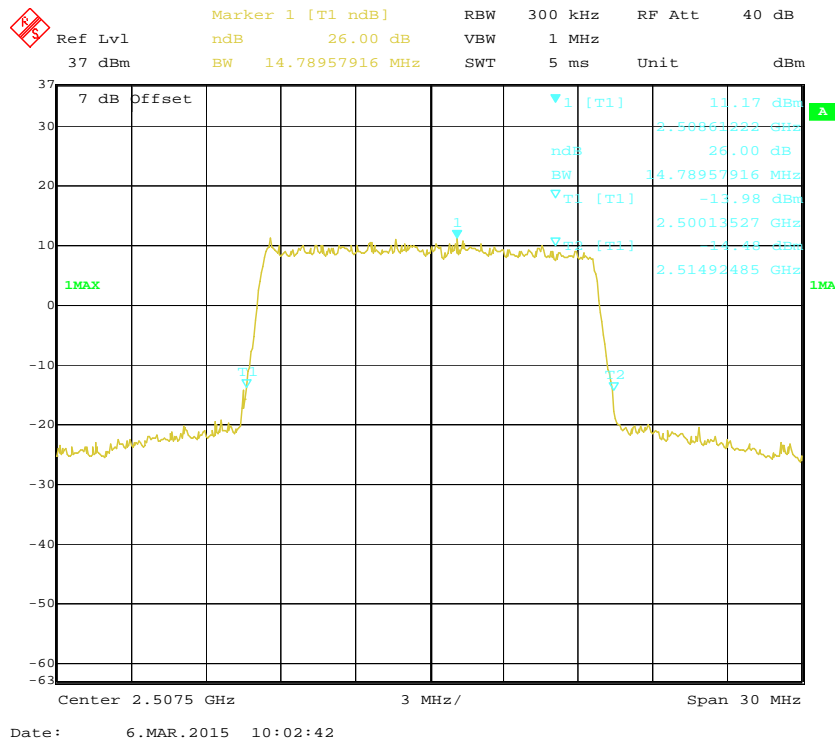


**QPSK (10.0 MHz) - 26 dB Bandwidth, High channel****16-QAM (10.0 MHz) - 26 dB Bandwidth, Low channel**

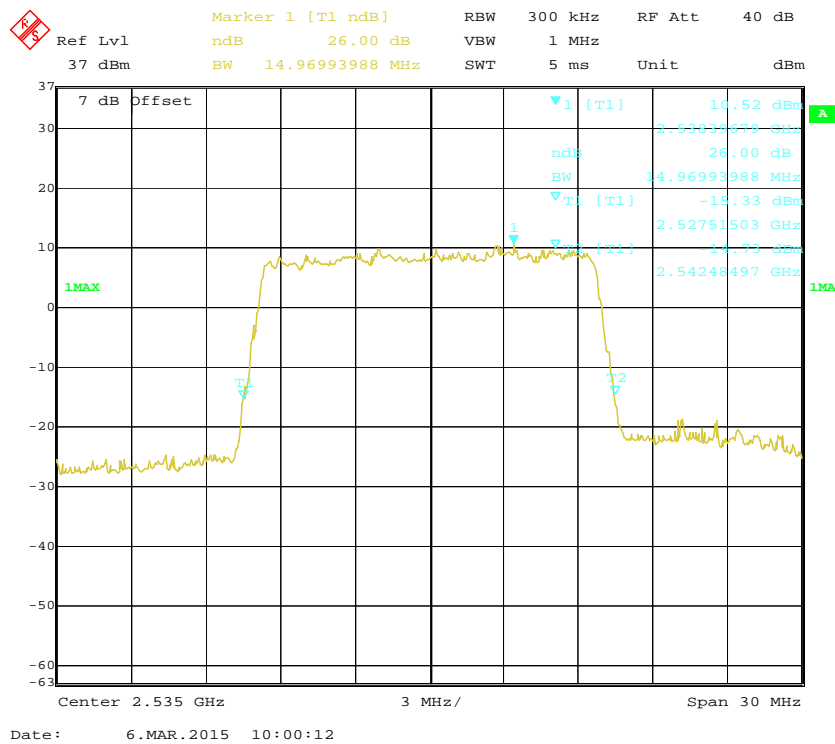
**16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (10.0 MHz) - 26 dB Bandwidth, High channel**



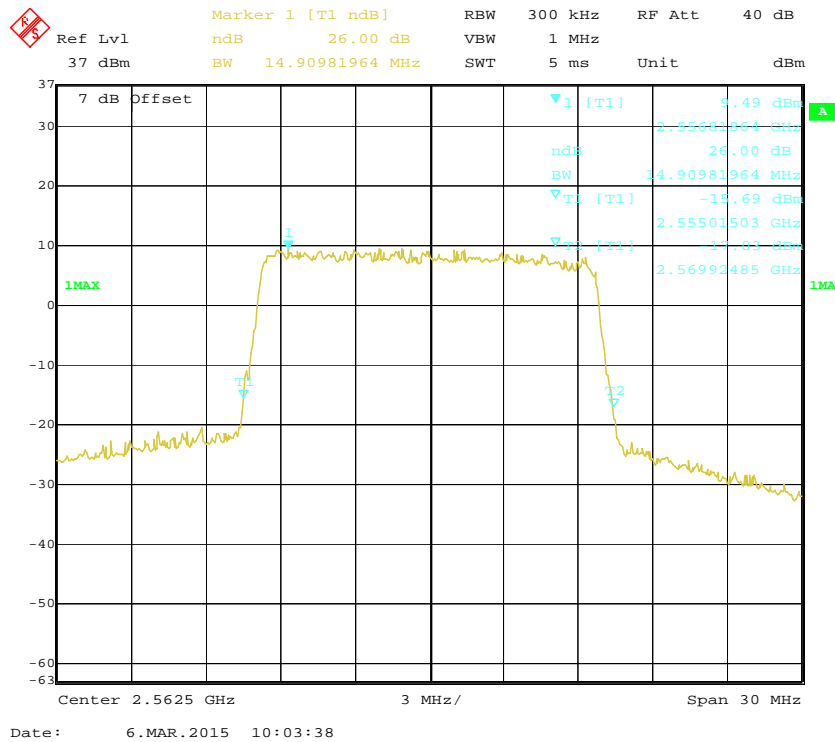
## QPSK (15.0 MHz) - 26 dB Bandwidth, Low channel



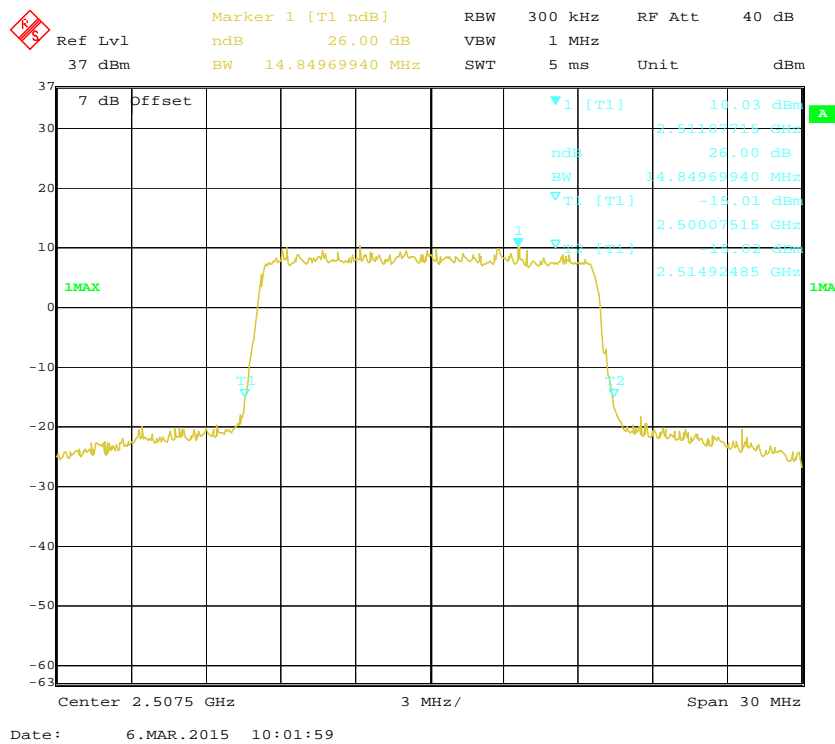
## QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel

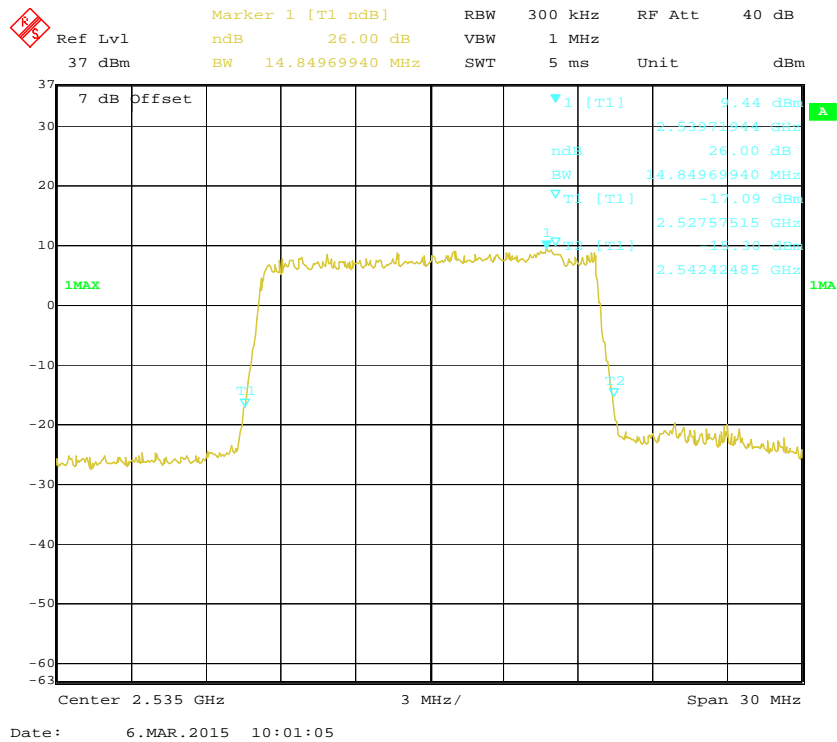
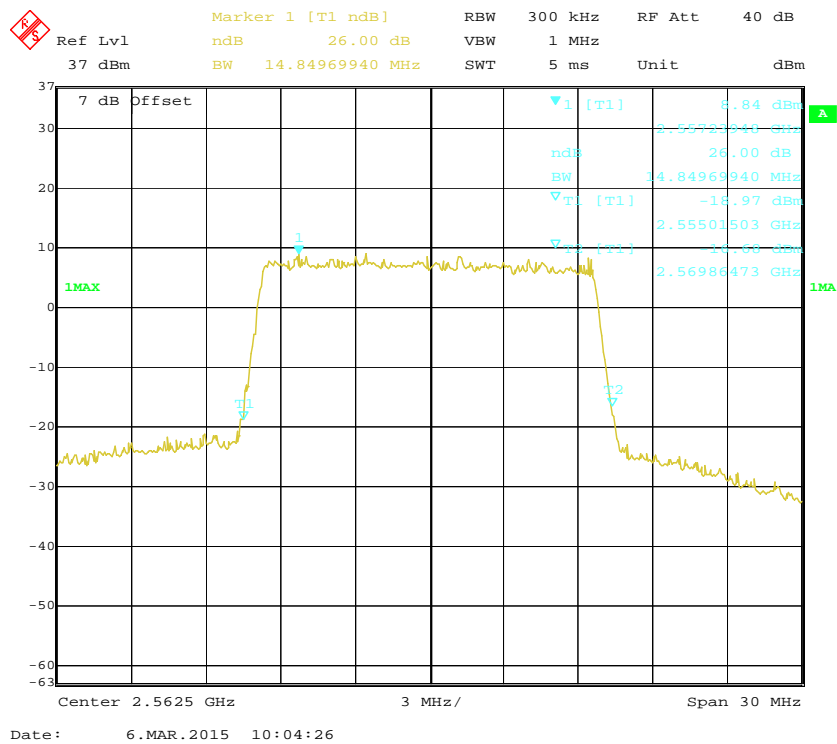


## QPSK (15.0 MHz) - 26 dB Bandwidth, High channel

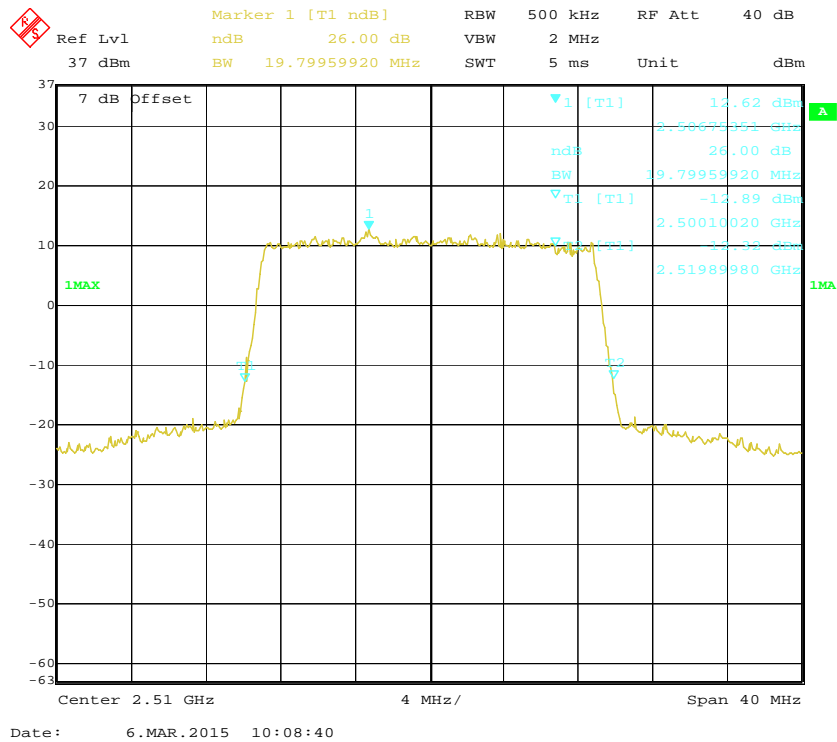


## 16-QAM (15.0 MHz) - 26 dB Bandwidth, Low channel

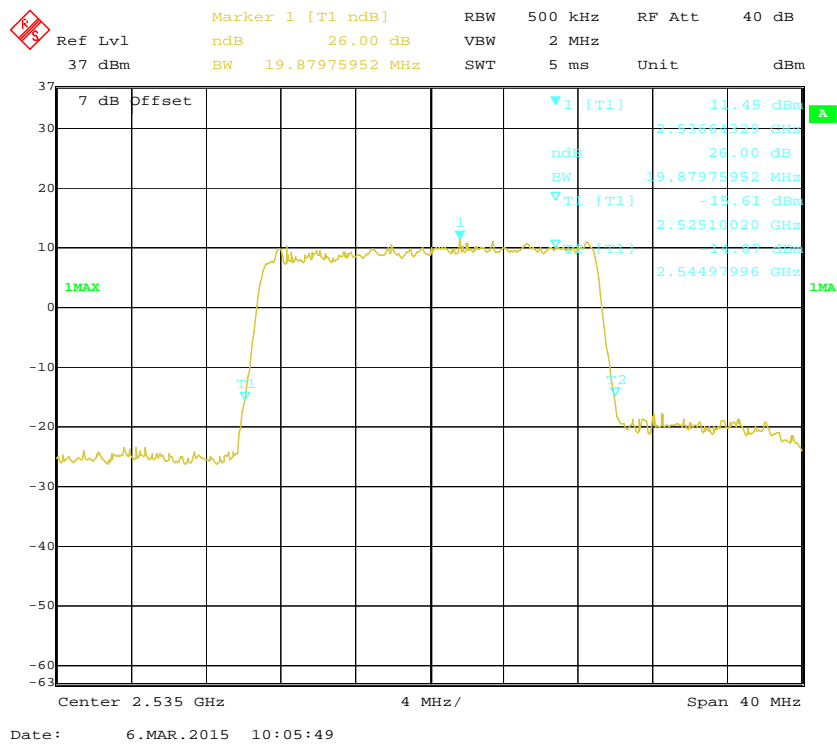


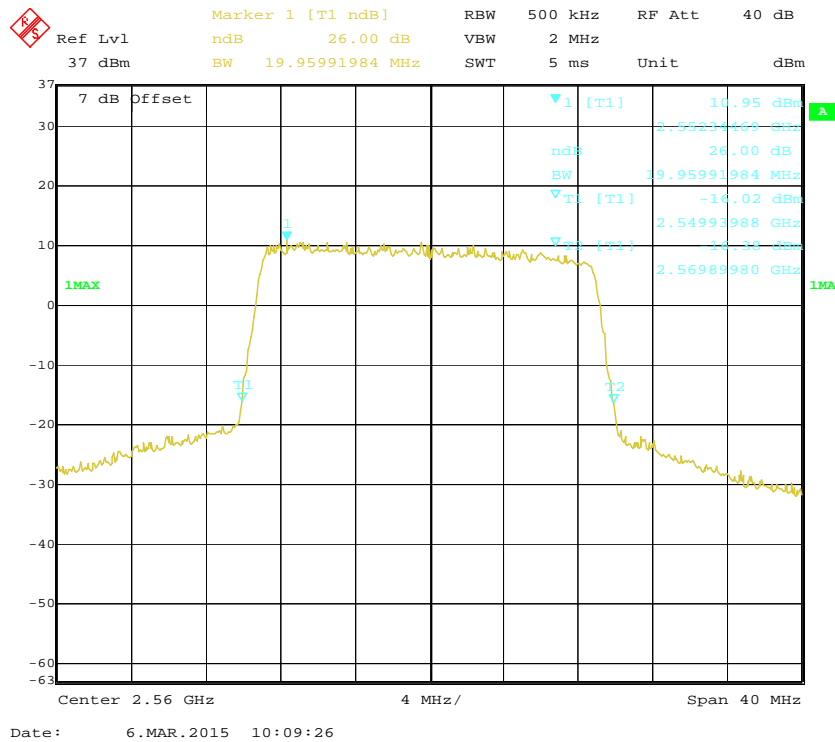
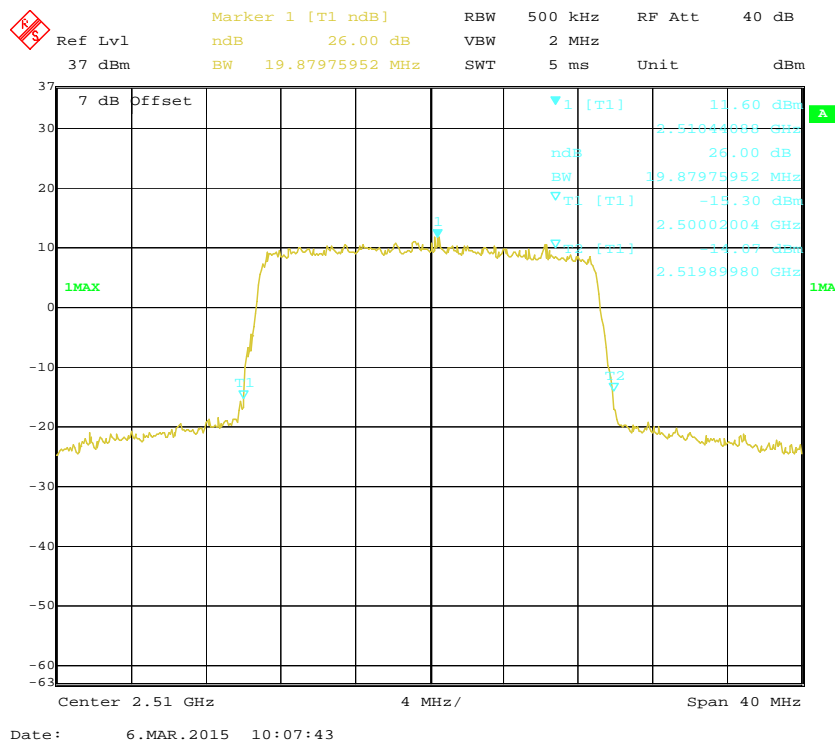
**16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel****16-QAM (15.0 MHz) - 26 dB Bandwidth, High channel**

## QPSK (20.0 MHz) - 26 dB Bandwidth, Low channel

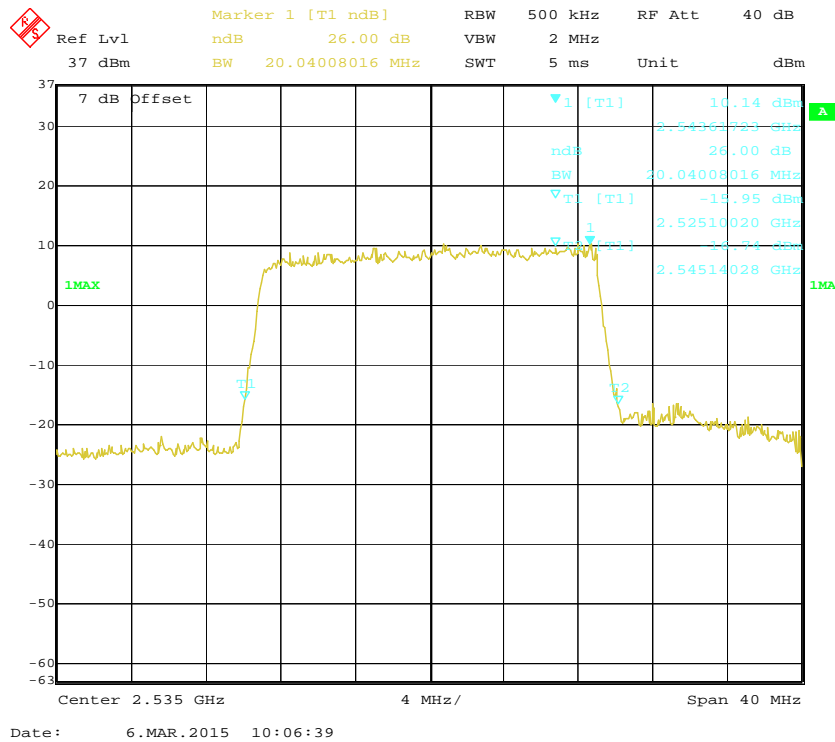


## QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel

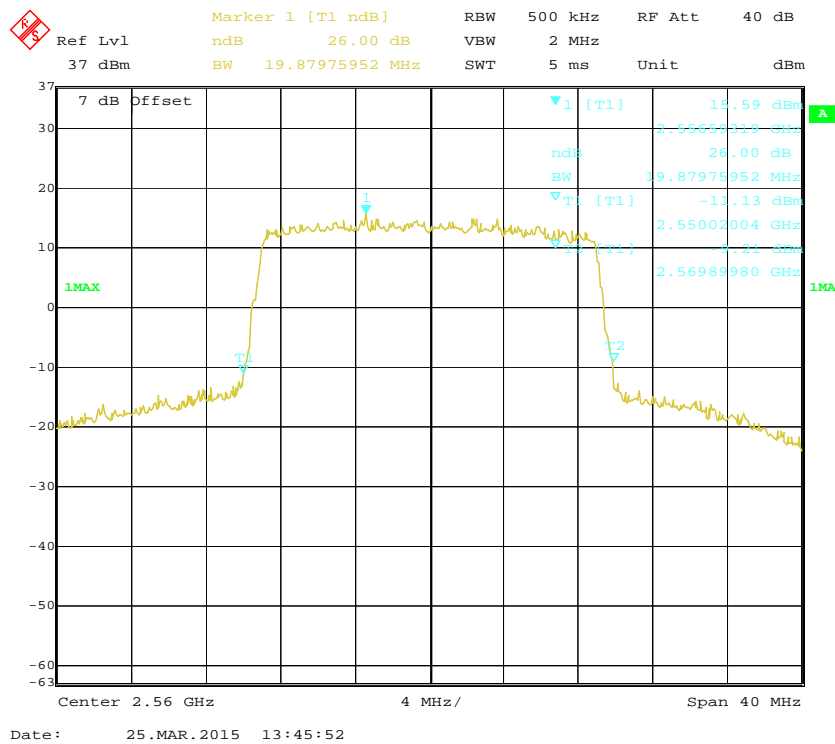


**QPSK (20.0 MHz) - 26 dB Bandwidth, High channel****16-QAM (20.0 MHz) - 26 dB Bandwidth, Low channel**

### 16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



### 16-QAM (20.0 MHz) - 26 dB Bandwidth, High channel



## FCC §2.1051 & §27.53- SPURIOUS EMISSIONS AT ANTENNA TERMINALS

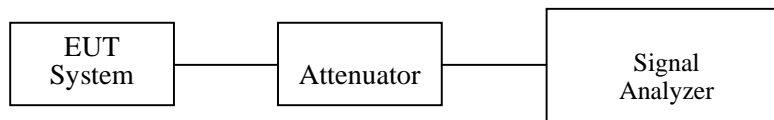
### Applicable Standards

FCC §2.1051 and §27.53.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

### Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidths of the spectrum analyzer were set at 100 kHz @ below 1GHz, 1MHz @ above 1GHz. sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

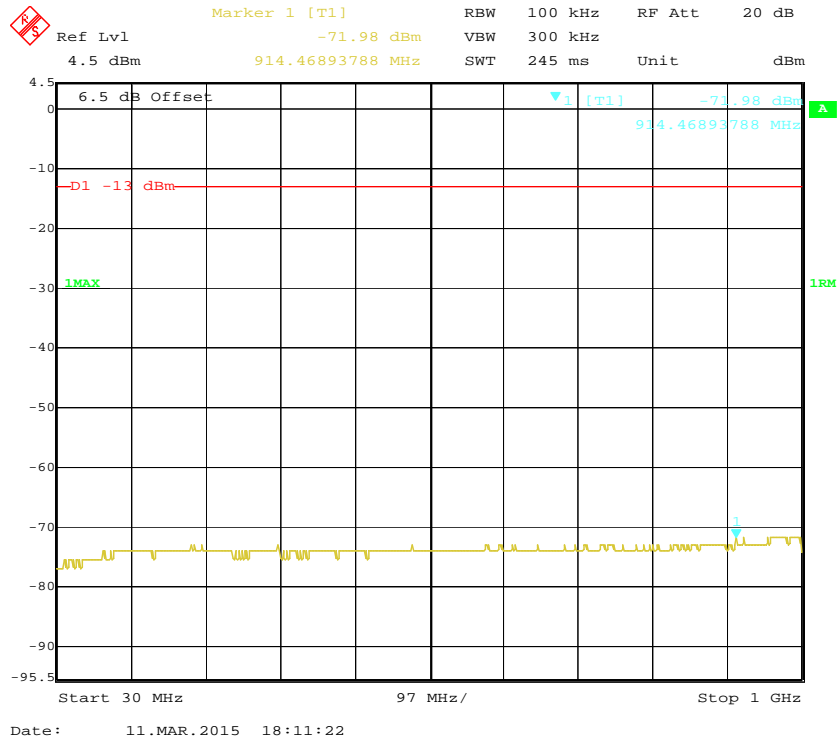
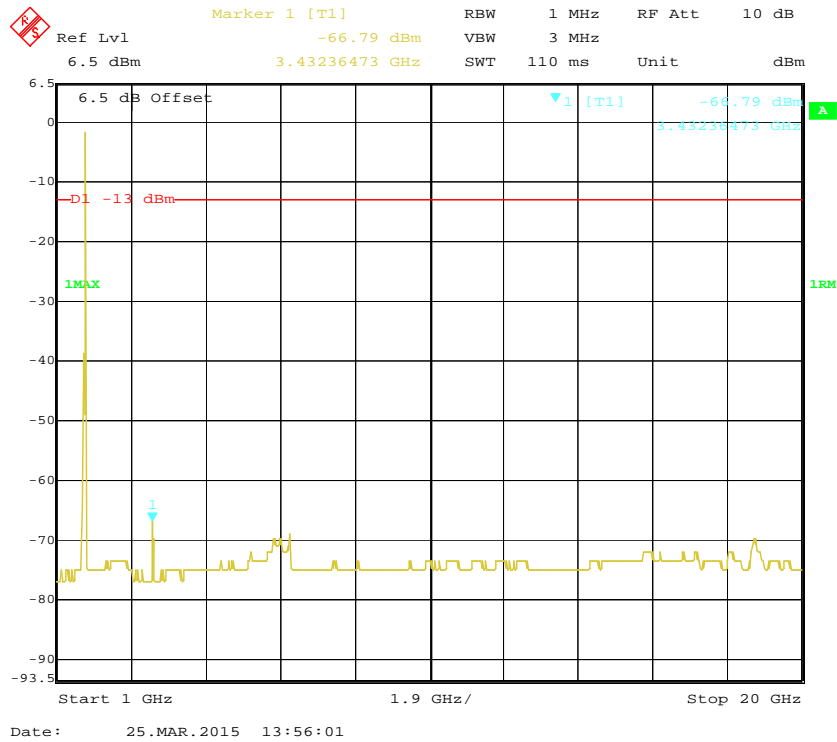
### Test Data

#### Environmental Conditions

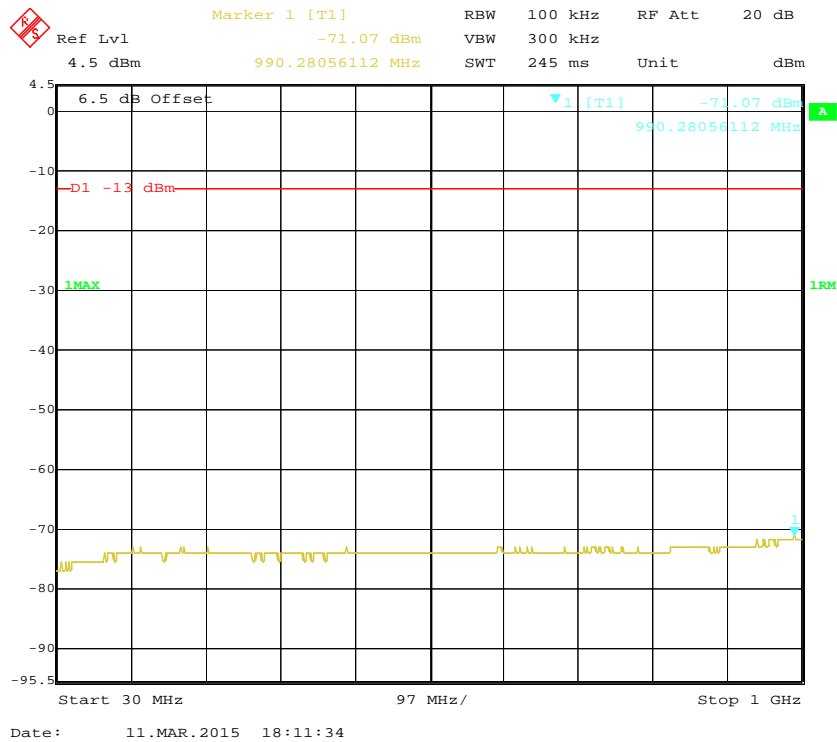
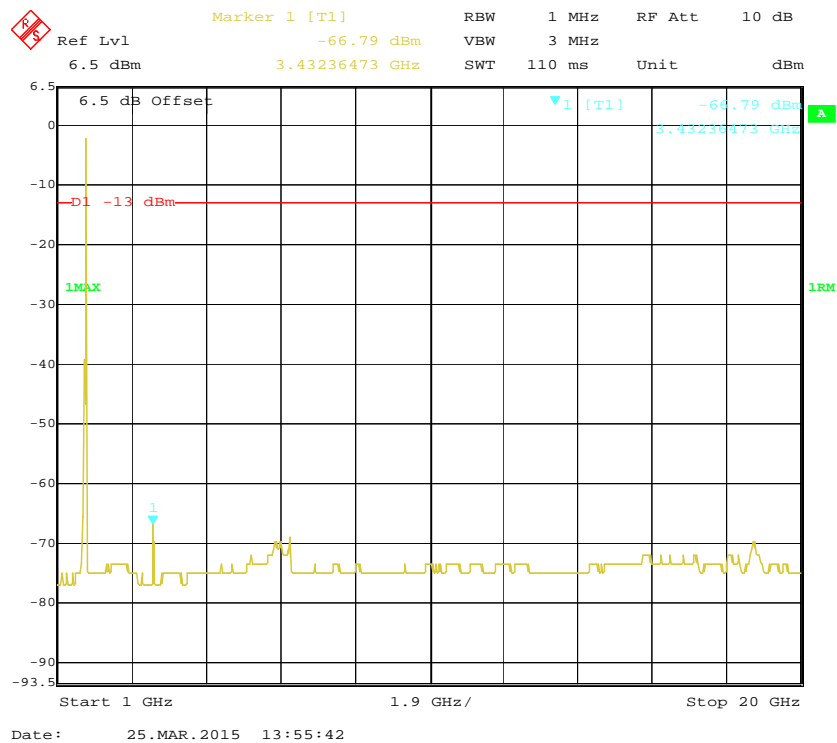
Temperature:	23~26 °C
Relative Humidity:	55~56 %
ATM Pressure:	100.0~100.5 kPa

*The testing was performed by Mike Hu from 2015-03-11.to 2015-03-25*

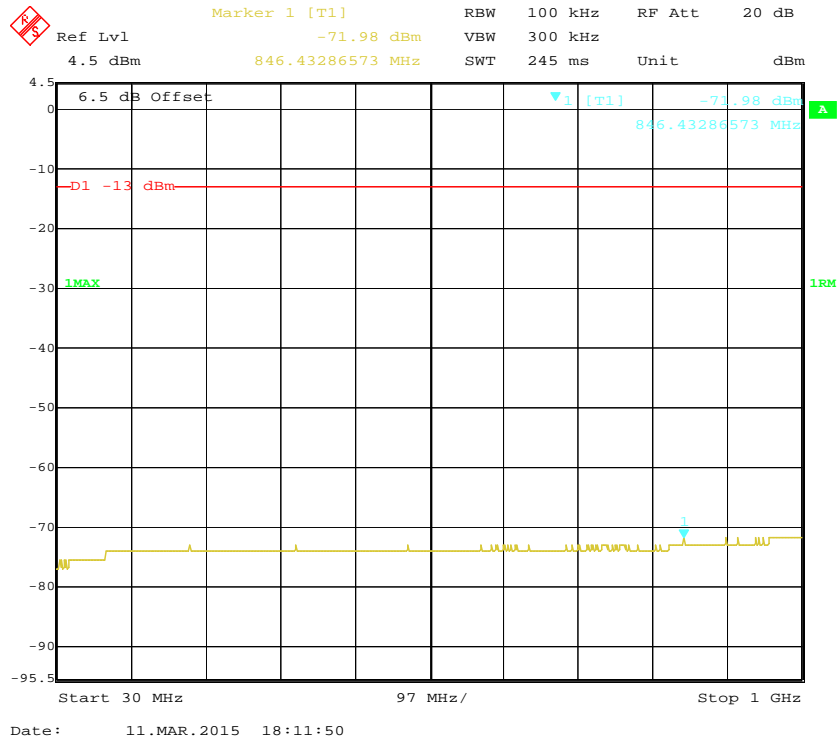
Please refer to the following plots.

**Band 4:****30 MHz - 1 GHz (1.4 MHz, Middle Channel)****1 GHz – 20 GHz (1.4 MHz, Middle Channel)**

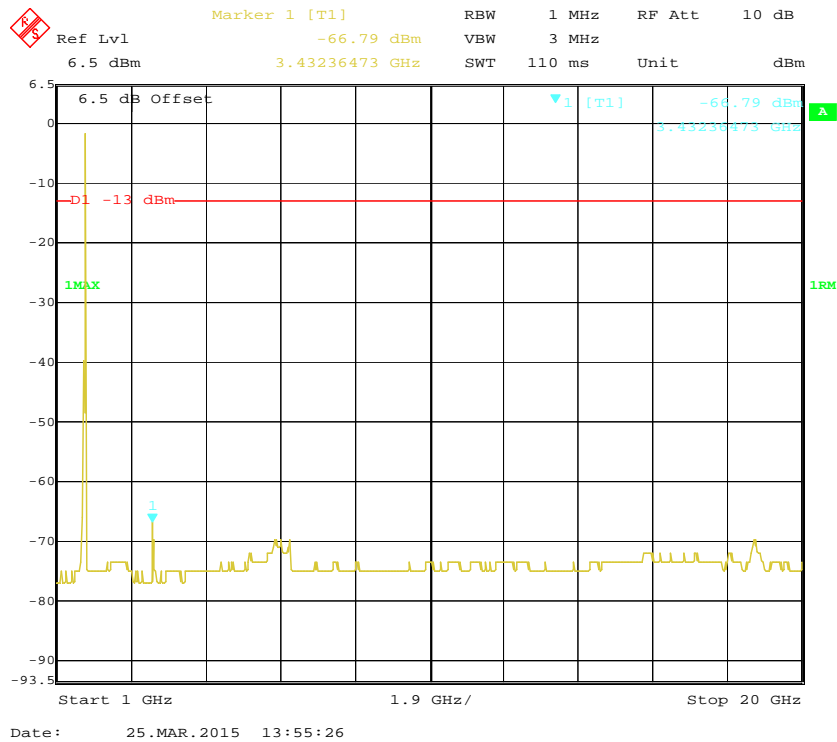


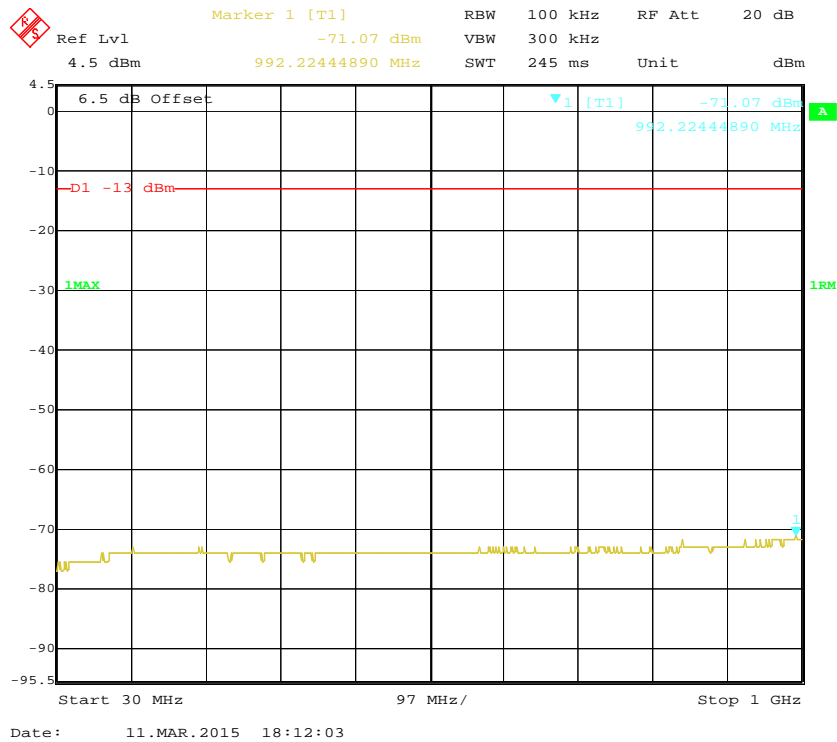
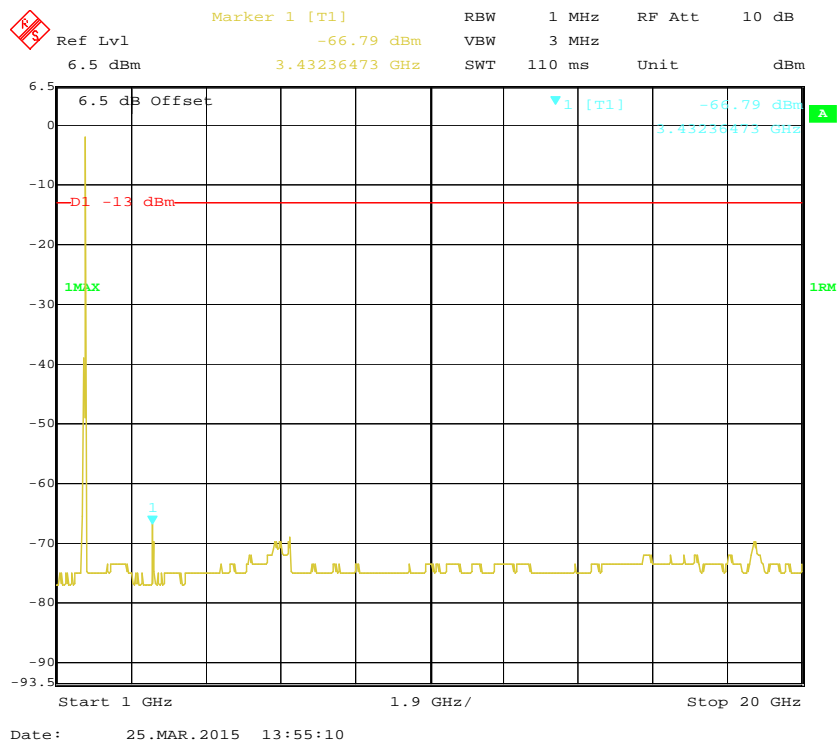
**30 MHz - 1 GHz (3.0 MHz, Middle Channel)****1 GHz – 20 GHz (3.0 MHz, Middle Channel)**

### 30 MHz - 1 GHz (5.0 MHz, Middle Channel)

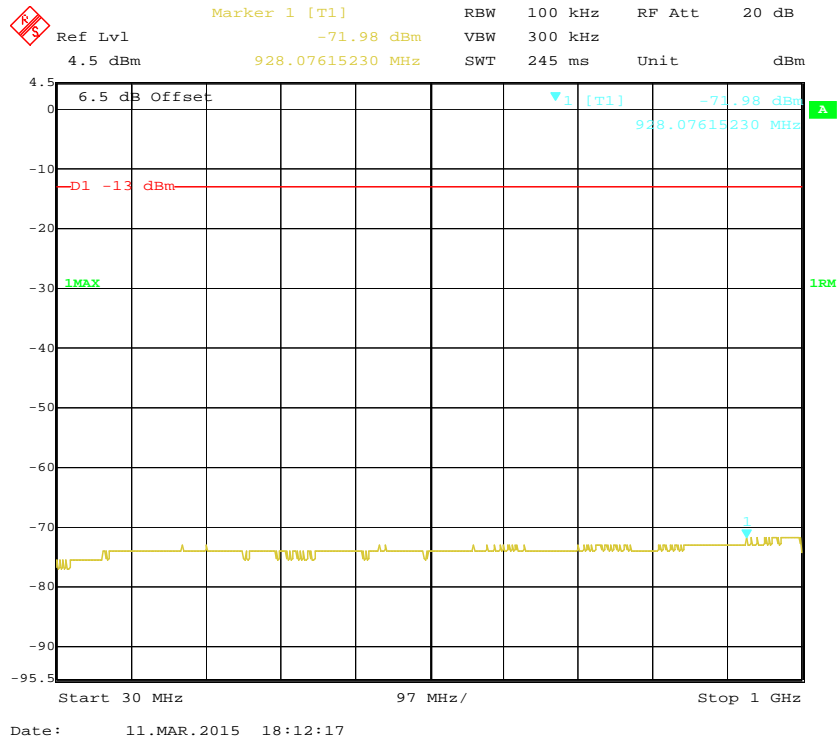


### 1 GHz – 20 GHz (5.0 MHz, Middle Channel)

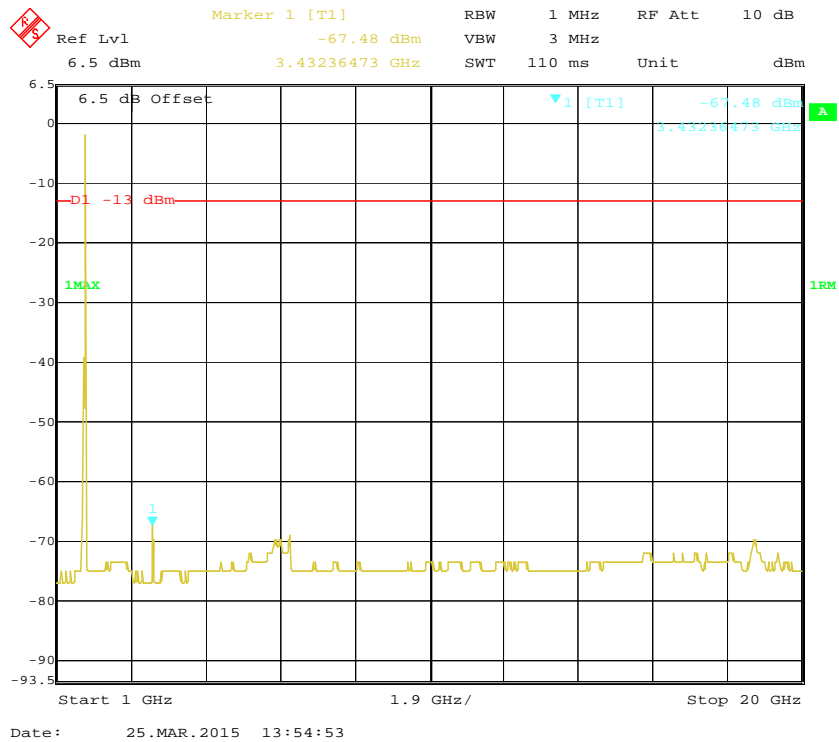


**30 MHz - 1 GHz (10.0 MHz, Middle Channel)****1 GHz - 20 GHz (10.0 MHz, Middle Channel)**

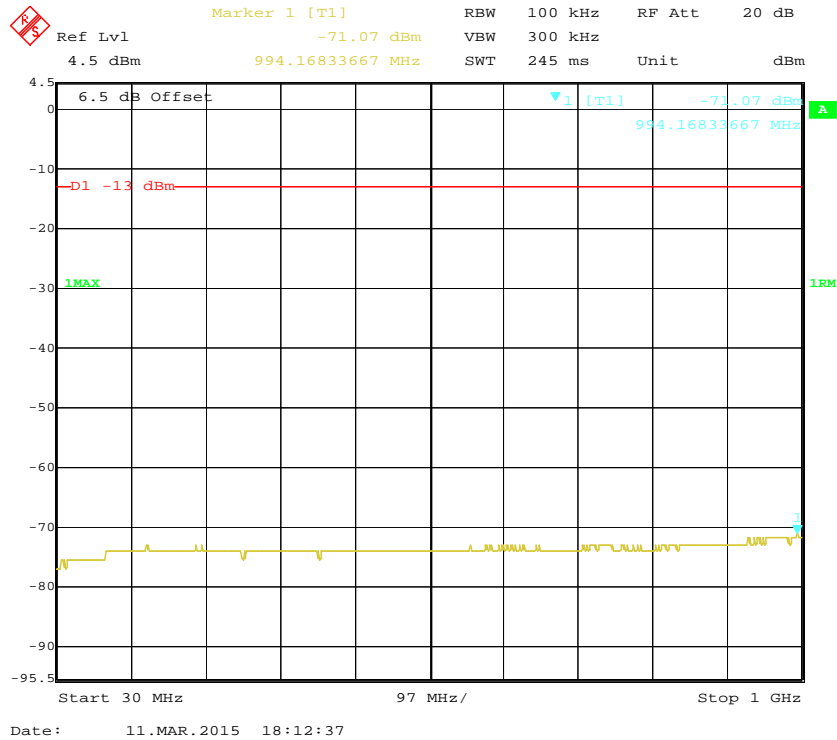
### 30 MHz - 1 GHz (15.0 MHz, Middle Channel)



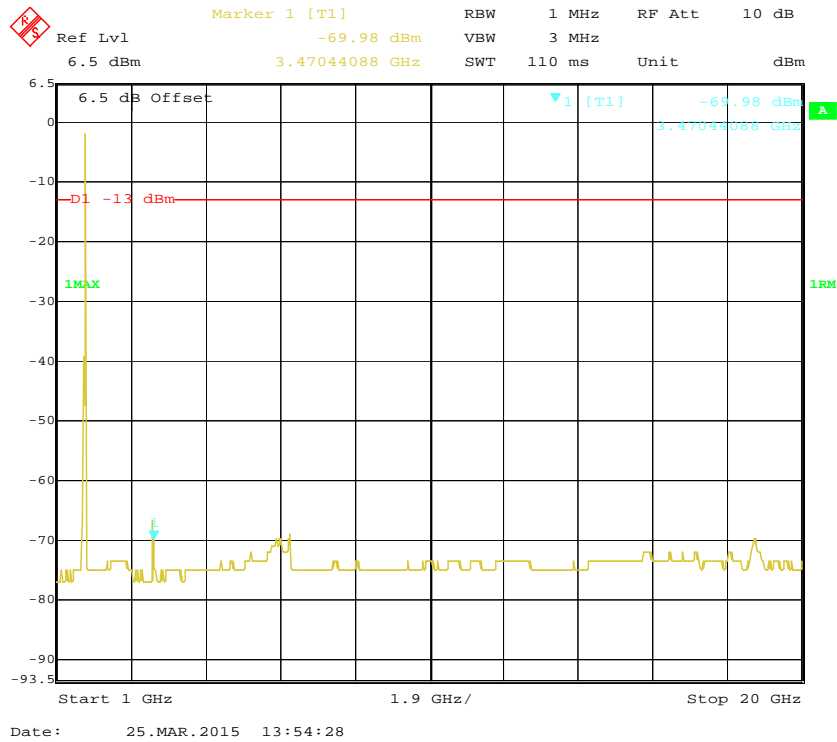
### 1 GHz - 20 GHz (15.0 MHz, Middle Channel)



### 30 MHz - 1 GHz (20.0 MHz, Middle Channel)

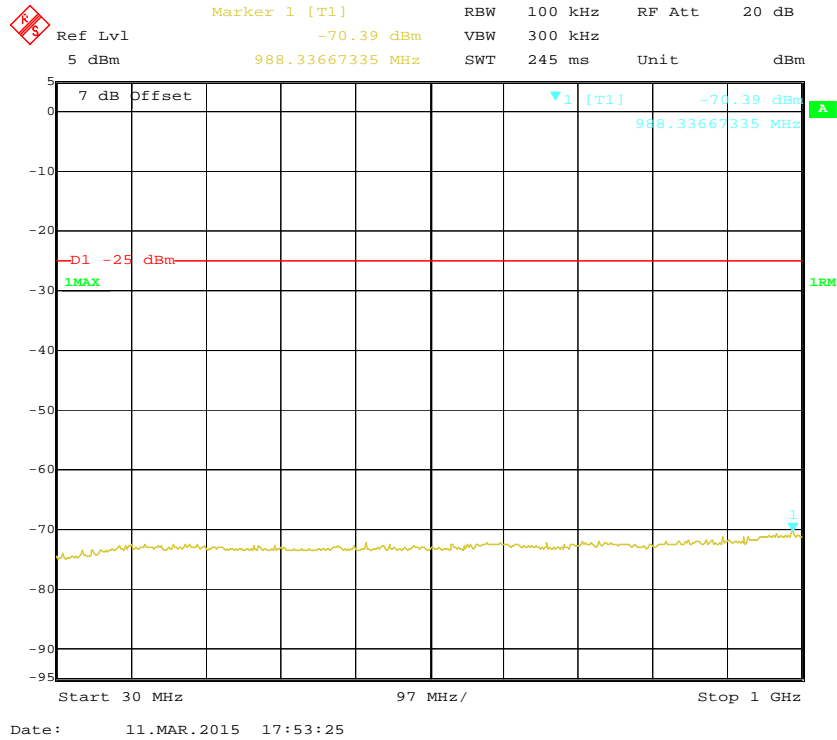


### 1 GHz - 20 GHz (20.0 MHz, Middle Channel)

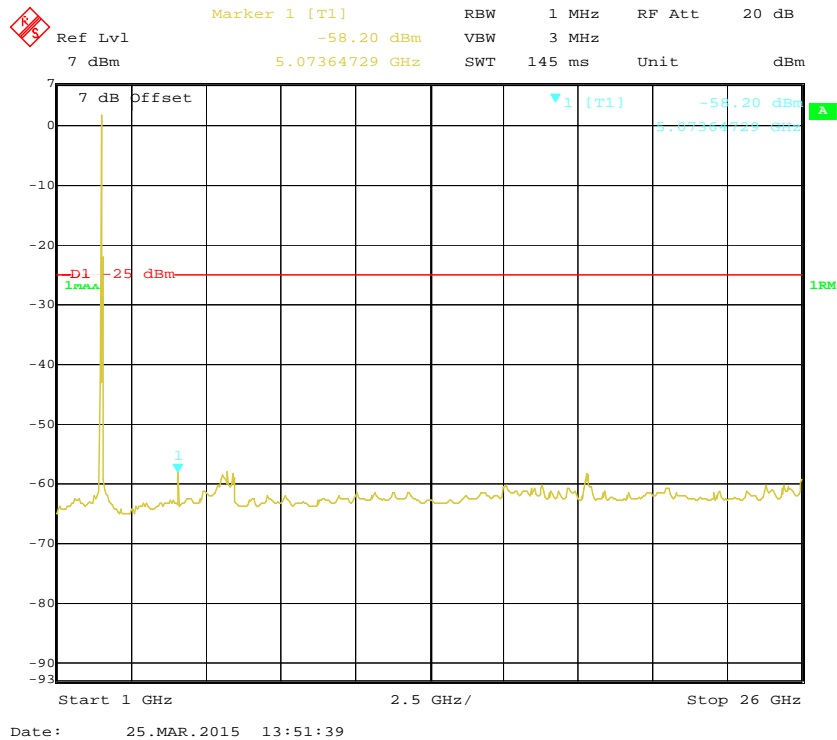


**Band 7:**

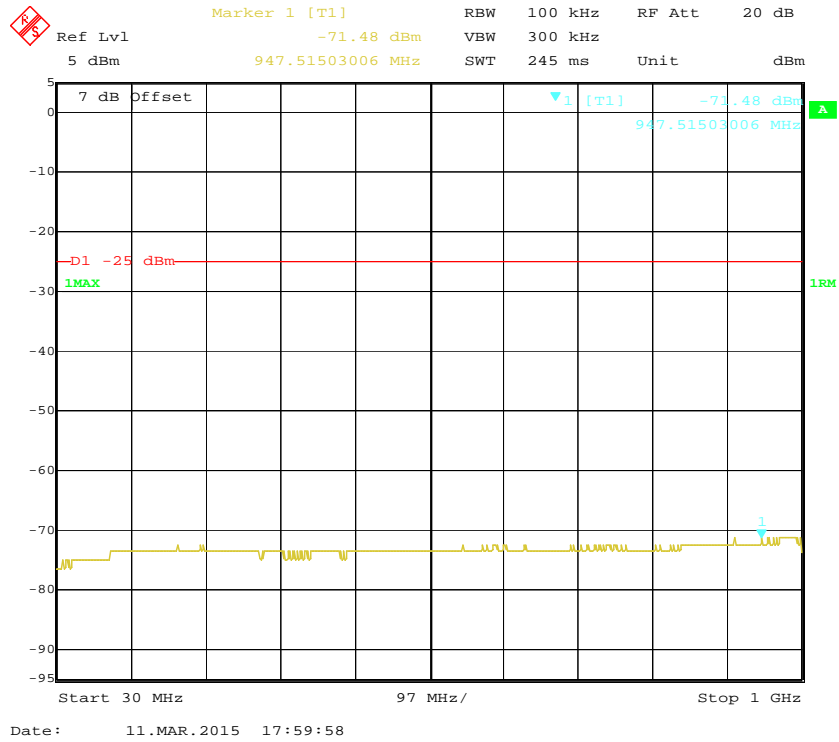
**30 MHz - 1 GHz (5.0 MHz, Middle Channel)**



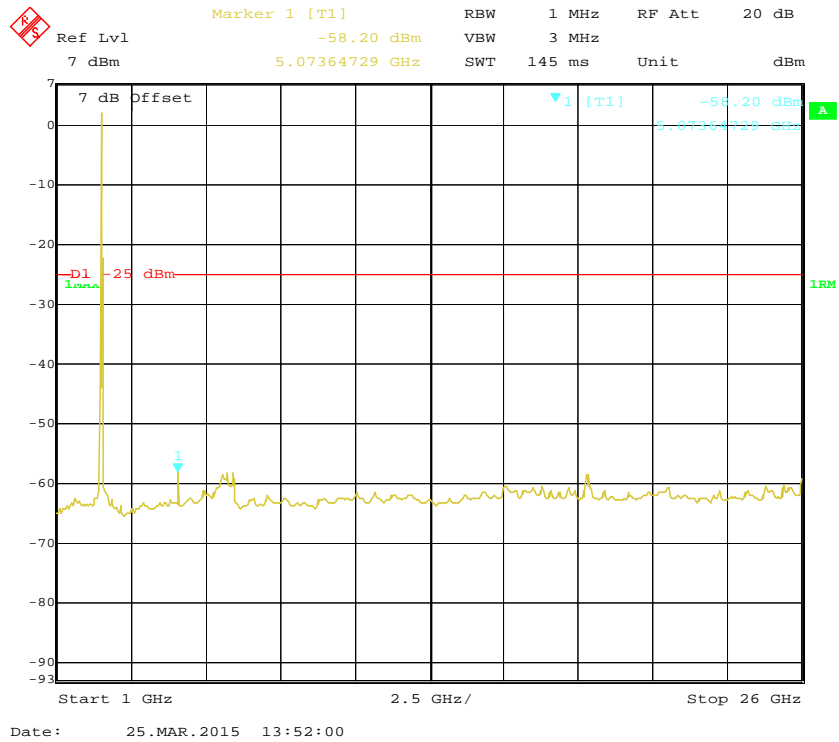
**1 GHz -26 GHz (5.0 MHz, Middle Channel)**



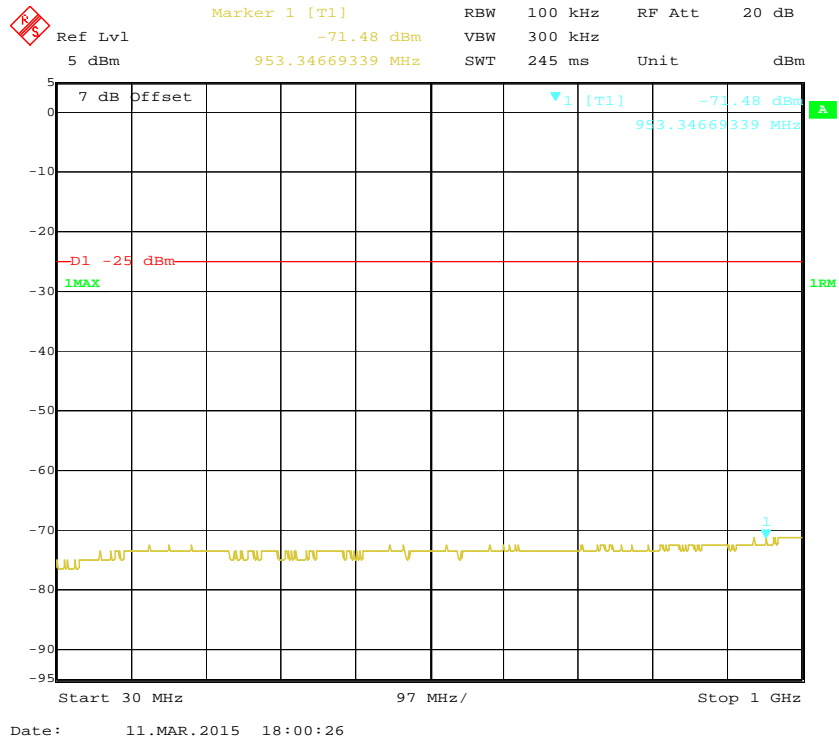
### 30 MHz - 1 GHz (10.0 MHz, Middle Channel)



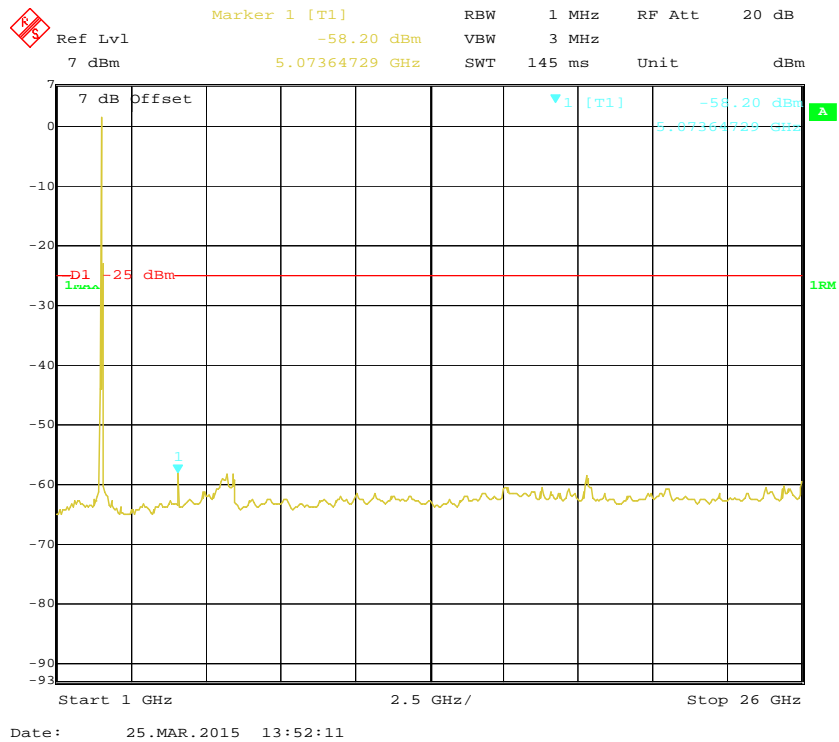
### 1 GHz - 26 GHz (10.0 MHz, Middle Channel)



### 30 MHz - 1 GHz (15.0 MHz, Middle Channel)

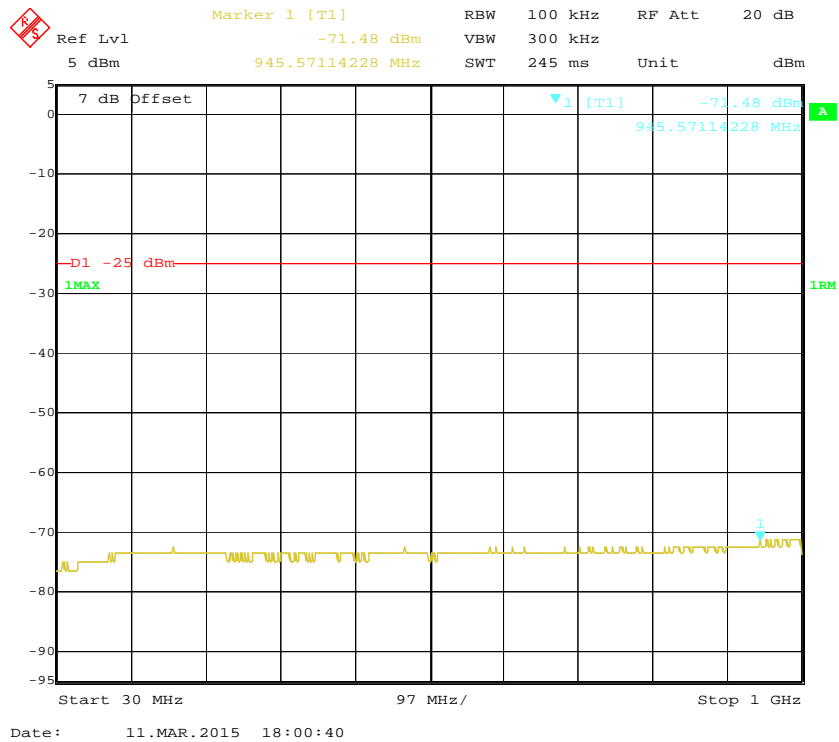


### 1 GHz - 26 GHz (15.0 MHz, Middle Channel)

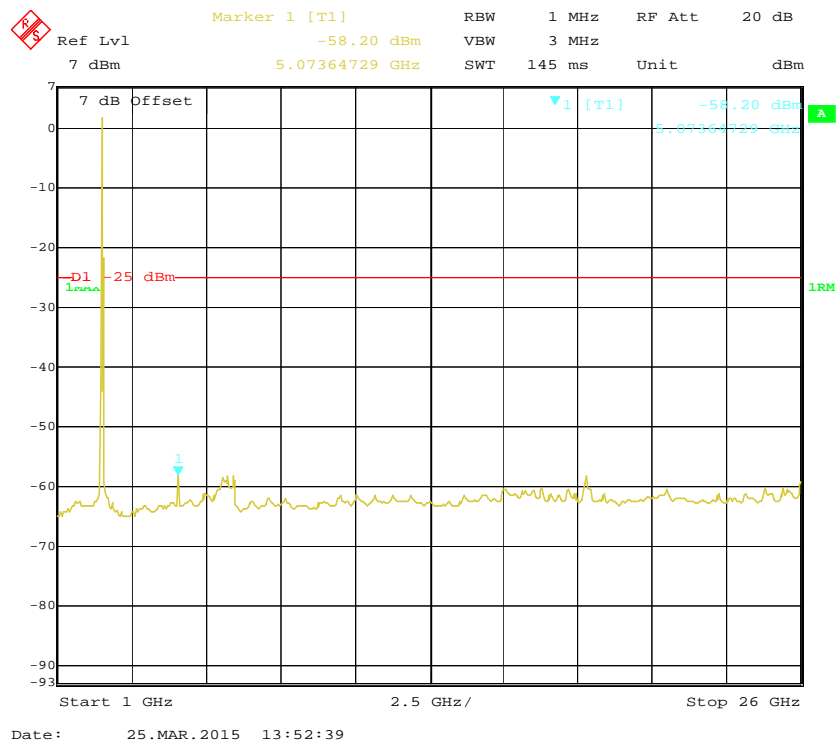




## 30 MHz - 1 GHz (20.0 MHz, Middle Channel)



## 1 GHz - 26 GHz (20.0 MHz, Middle Channel)



---

## FCC §2.1053 & §27.53 - SPURIOUS RADIATED EMISSIONS

---

### Applicable Standards

FCC § 2.1053 and § 27.53.

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log (P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log (P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log (P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log (P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log (P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

### Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB =  $10 \lg (\text{TX pwr in Watts}/0.001)$  – the absolute level

Spurious attenuation limit in dB =  $43 + 10 \log_{10} (\text{power out in Watts})$

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052304	2014-12-01	2015-11-30
Sunol Sciences	Broadband Antenna	JB3	A111513	2014-06-18	2017-06-17
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22
Mini-Circuits	Amplifier	ZVA-213+	N/A	NCR	NCR
HP	Amplifier	HP8447E	1937A01046	2014-05-06	2015-05-06
HP	Signal Generator	8341B	2624A00116	2014-06-03	2015-06-03
COM POWER	Dipole Antenna	AD-100	041000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2013-02-11	2016-02-10

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

**Test Data****Environmental Conditions**

<b>Temperature:</b>	25 °C
<b>Relative Humidity:</b>	48 %
<b>ATM Pressure:</b>	101.0 kPa

*The testing was performed by Mike Hu on 2015-03-17.*

*Test mode: Transmitting (Pre-scan with all the bandwidth, and worse case as below)*

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level	FCC Part 27	
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)	(dBm)	Limit (dBm)	Margin (dB)
<b>Band 4: 20 MHz, Middle Channel</b>										
131.6	27.34	51	2.5	H	-69.7	0.26	0	-69.96	-13	56.96
131.6	28.45	241	1.1	V	-68.5	0.26	0	-68.76	-13	55.76
3465.0	35.87	246	2.4	H	-48.1	1.90	10.00	-40.00	-13	27.00
3465.0	38.69	5	2.1	V	-45.9	1.90	10.00	-37.80	-13	24.80
<b>Band 7: 20 MHz, Middle Channel</b>										
131.6	28.35	265	1.7	H	-68.6	0.26	0	-68.86	-25	43.86
131.6	28.71	349	1.4	V	-68.3	0.26	0	-68.56	-25	43.56
5070.0	50.44	349	1.5	H	-32.7	2.30	10.10	-25.10	-25	0.10
5070.0	49.99	345	1.5	V	-34.0	2.30	10.10	-26.20	-25	1.20
7605.0	43.07	327	2.0	H	-41.5	4.70	10.80	-35.40	-25	10.40
7605.0	47.53	299	1.8	V	-35.5	4.70	10.80	-29.40	-25	4.40

**Note:**

- 1) Absolute Level = SG Level - Cable loss + Antenna Gain
- 2) Margin = Limit- Absolute Level

## FCC §27.53 - BAND EDGES

### Applicable Standards

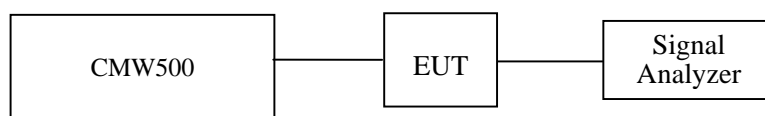
According to FCC §27.53, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $43 + 10 \log(P)$  dB.

For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$  dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than  $43 + 10 \log(P)$  dB on all frequencies between 2490.5 MHz and 2496 MHz and  $55 + 10 \log(P)$  dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

### Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 1% approximately of bandwidth.



### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	837405/023	2014-08-22	2015-08-22

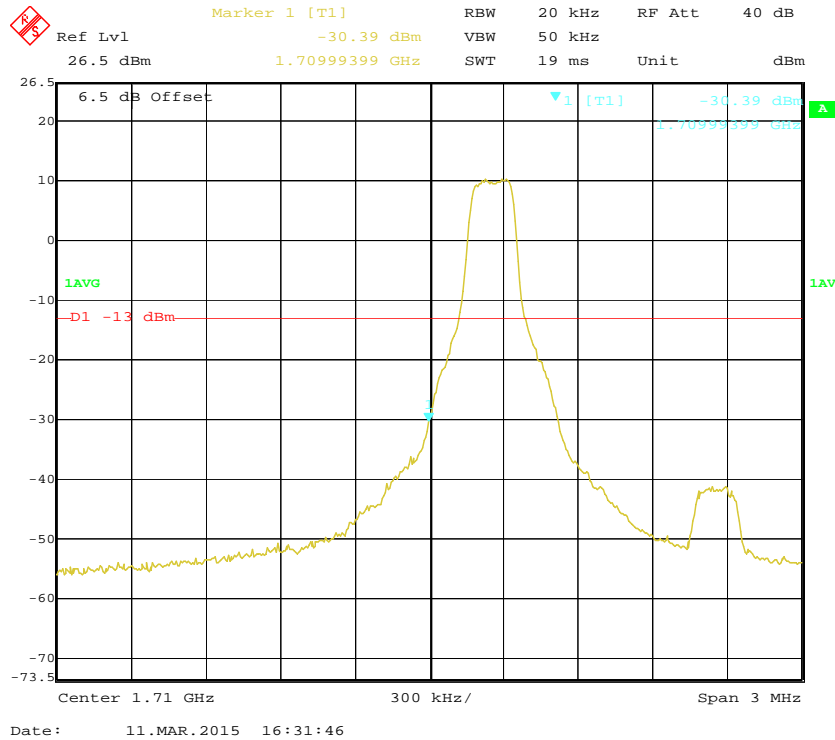
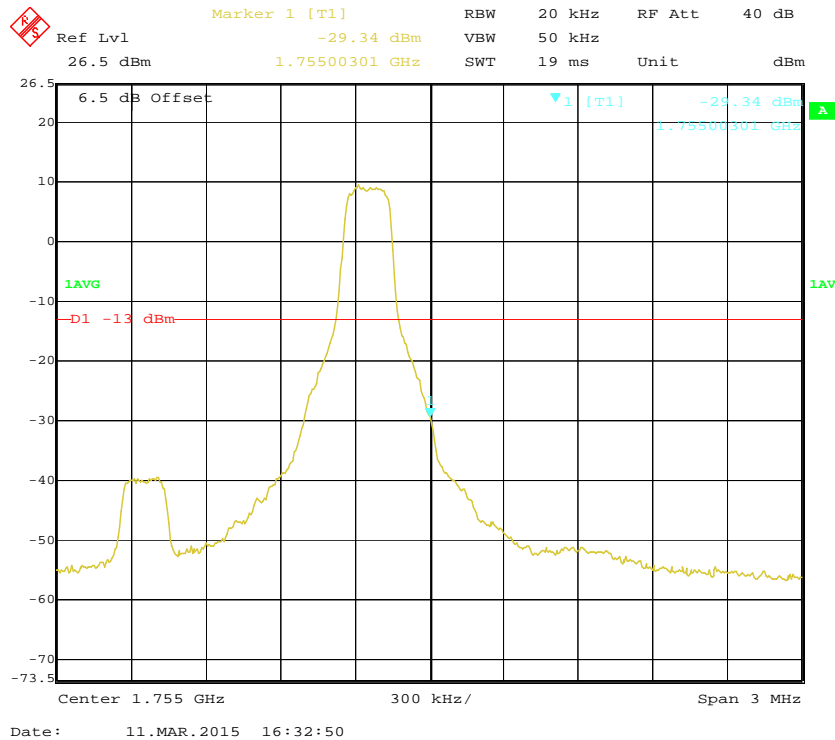
**\* Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

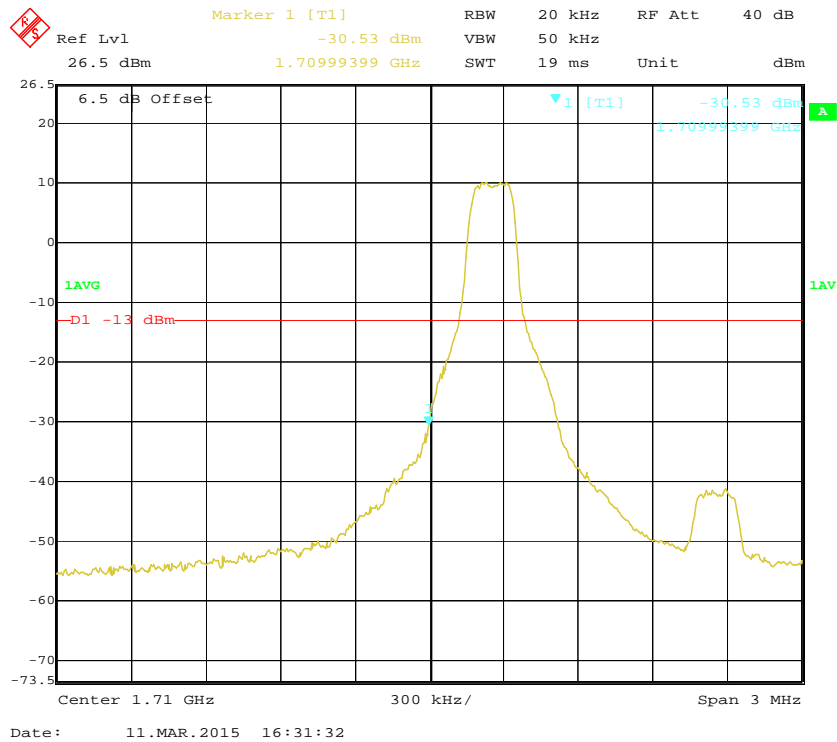
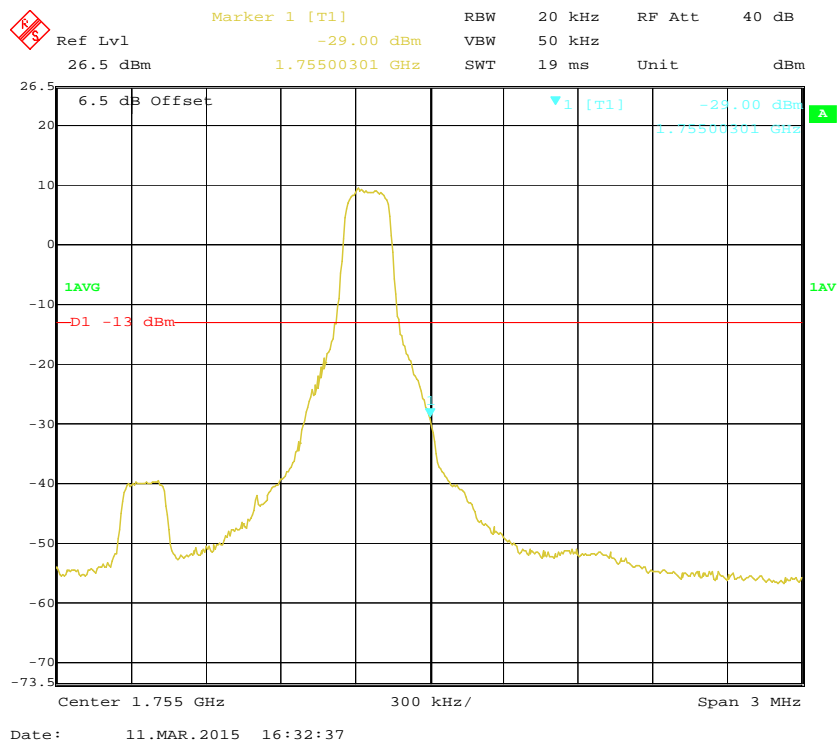
### Test Data

#### Environmental Conditions

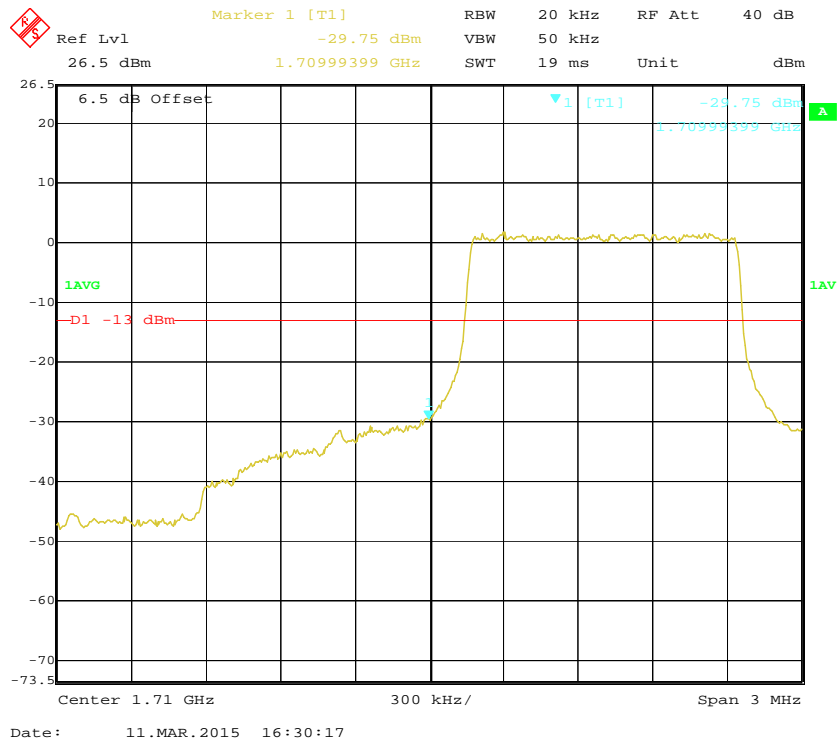
Temperature:	20 °C
Relative Humidity:	58 %
ATM Pressure:	101.0 kPa

*The testing was performed by Mike Hu on 2015-03-11.*

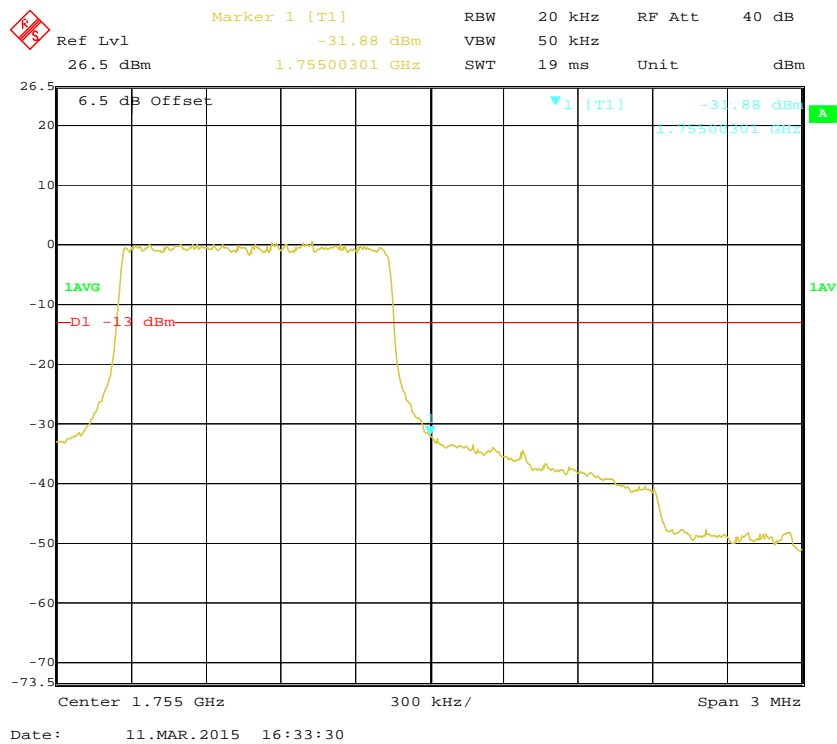
**Band 4:****QPSK (1.4 MHz, 1RB) - Left Band Edge****QPSK (1.4 MHz, 1RB) - Right Band Edge**

**16-QAM (1.4 MHz, 1RB) - Left Band Edge****16-QAM (1.4 MHz, 1RB) - Right Band Edge**

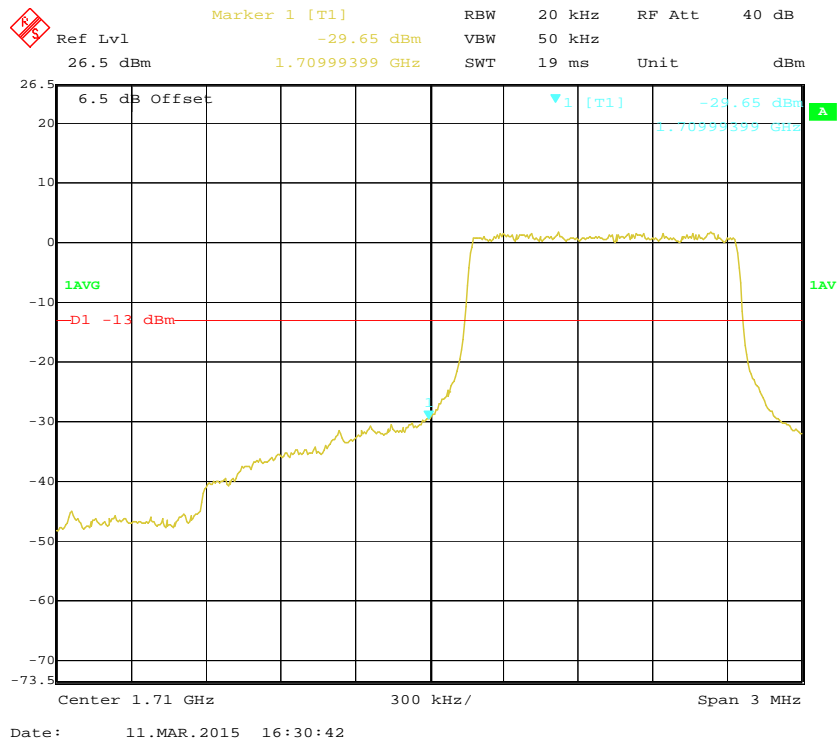
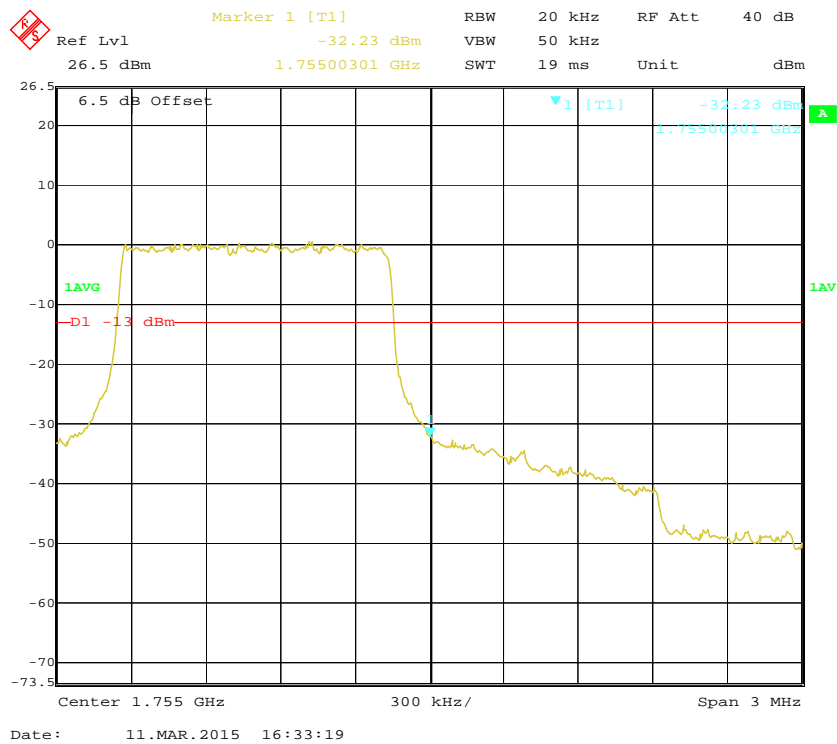
### QPSK (1.4 MHz, FULL RB) - Left Band Edge

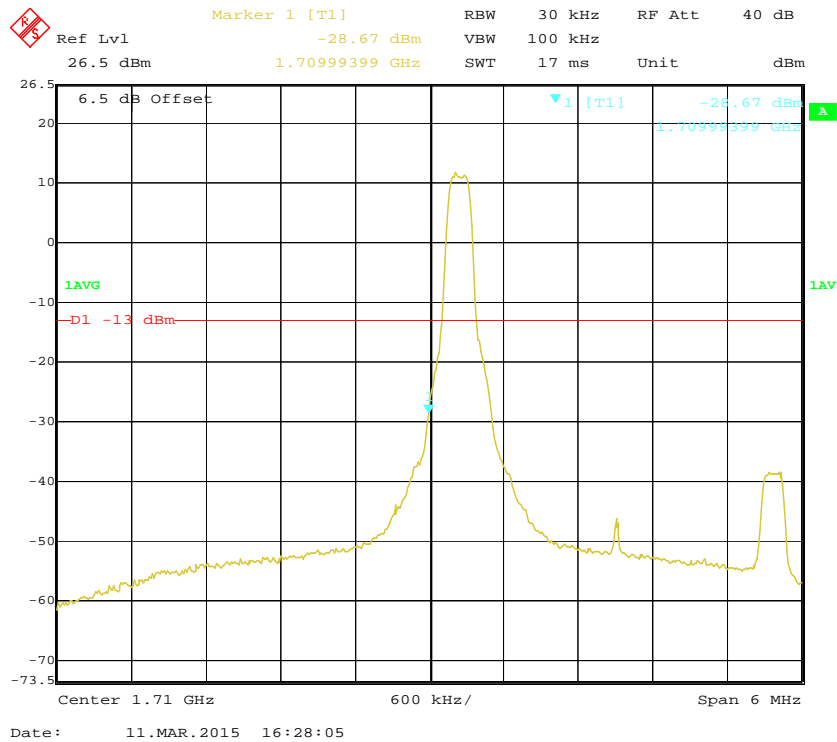
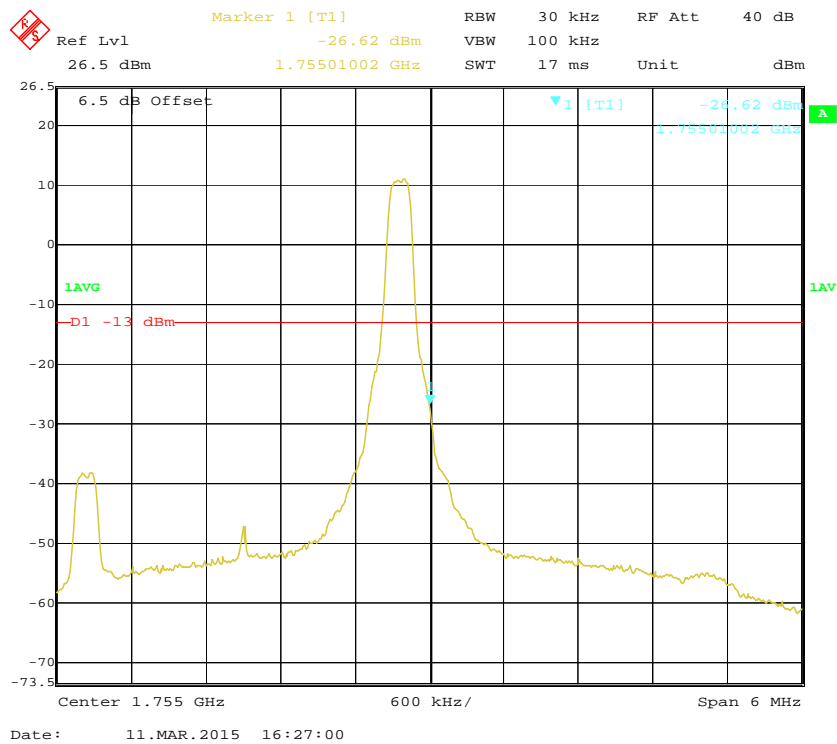


### QPSK (1.4 MHz, FULL RB) - Right Band Edge

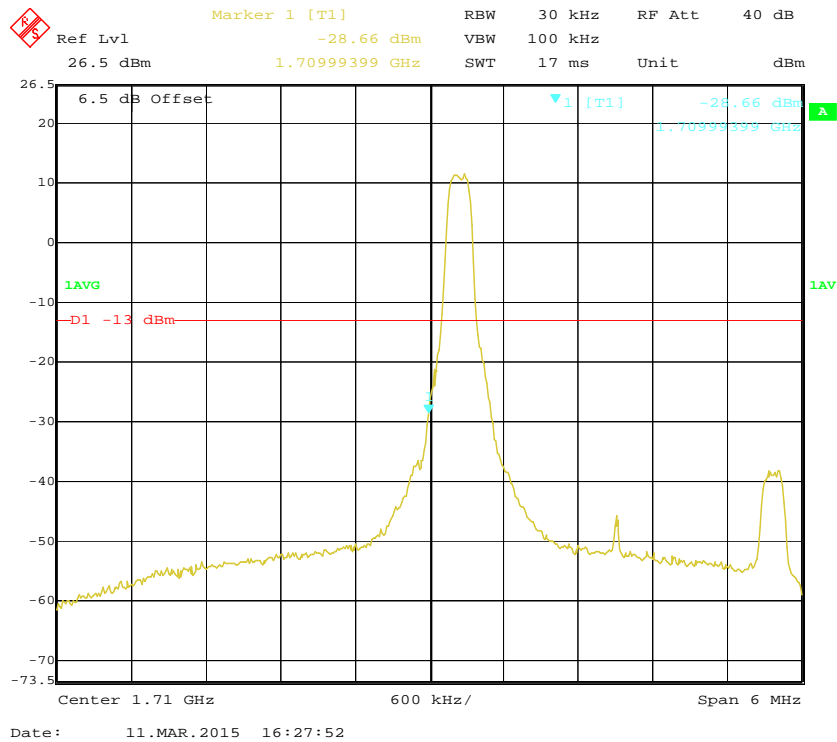




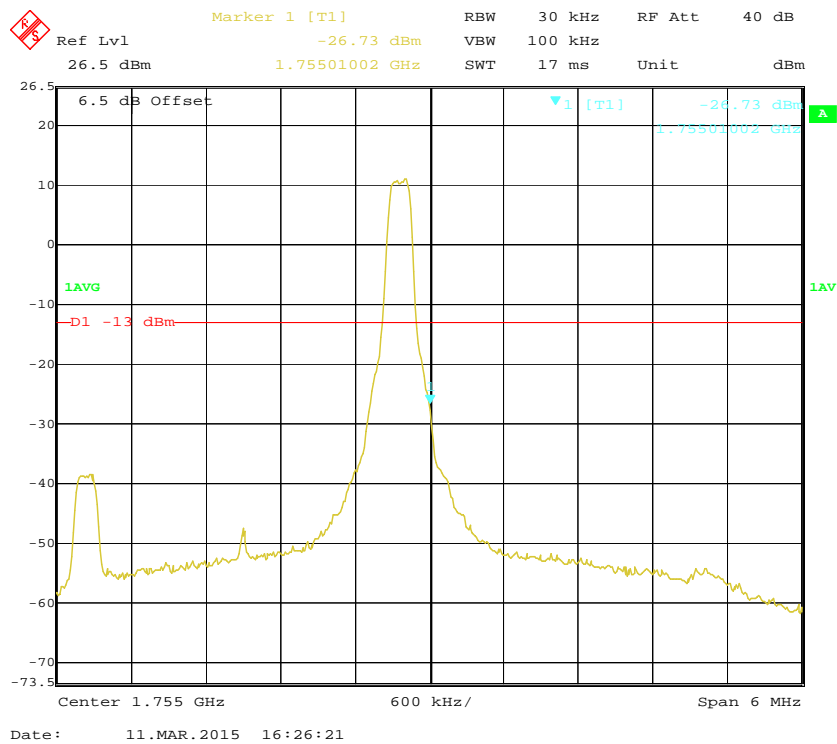
**16-QAM (1.4 MHz, FULL RB) - Left Band Edge****16-QAM (1.4 MHz, FULL RB) - Right Band Edge**

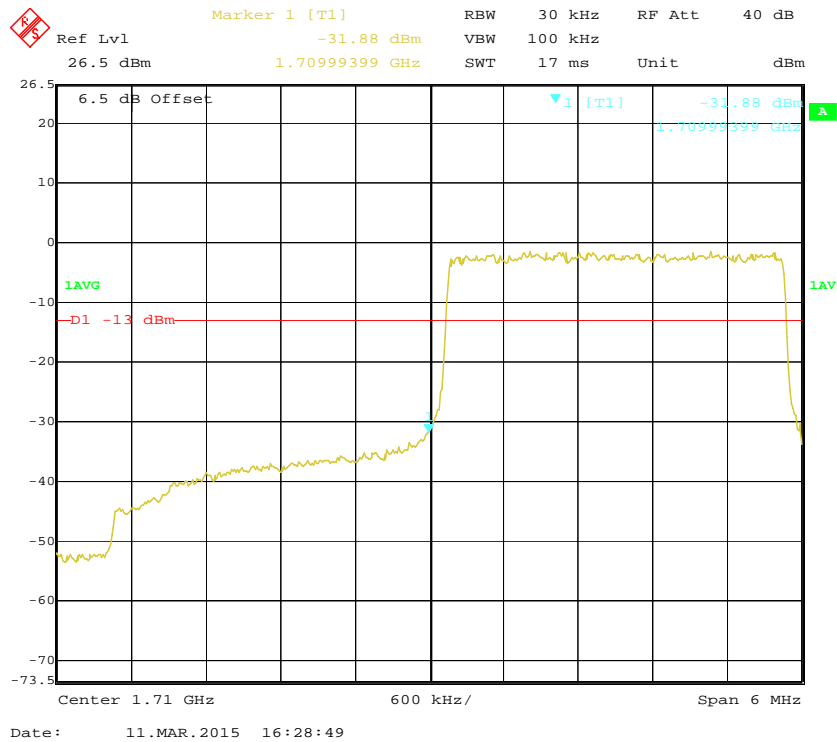
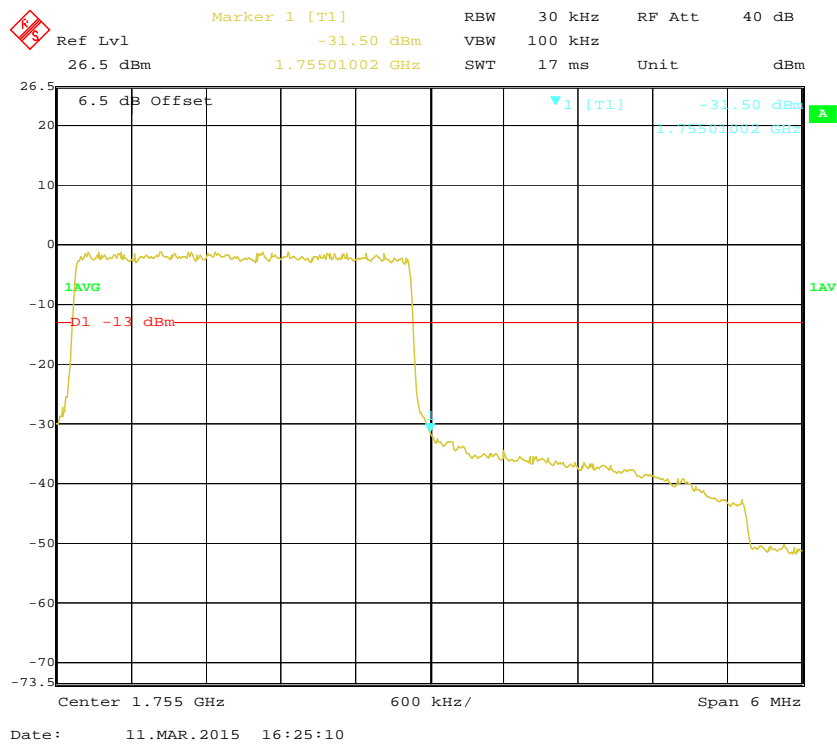
**QPSK (3.0 MHz, 1RB) - Left Band Edge****QPSK (3.0 MHz, 1RB) - Right Band Edge**

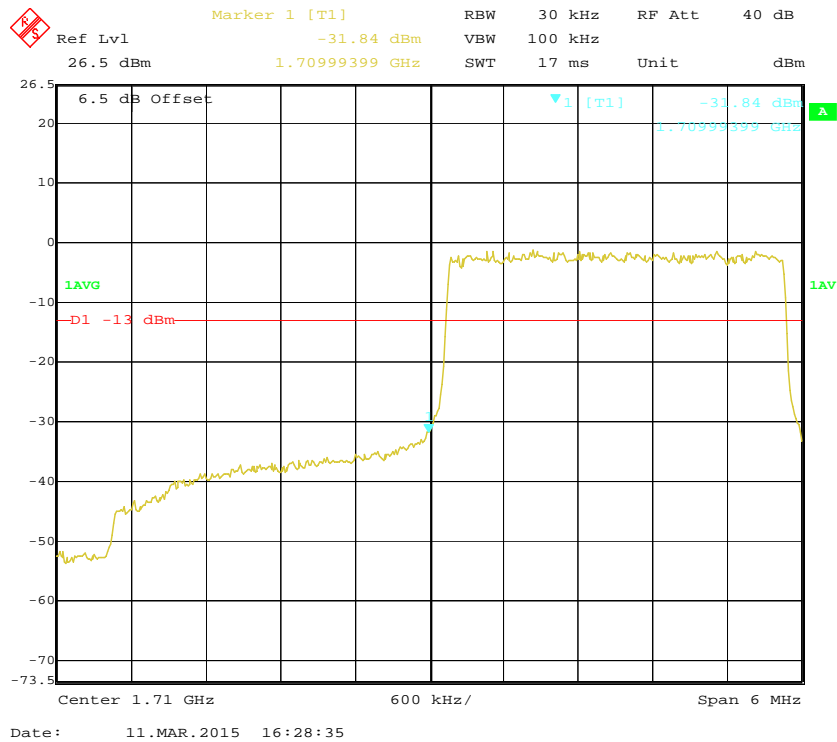
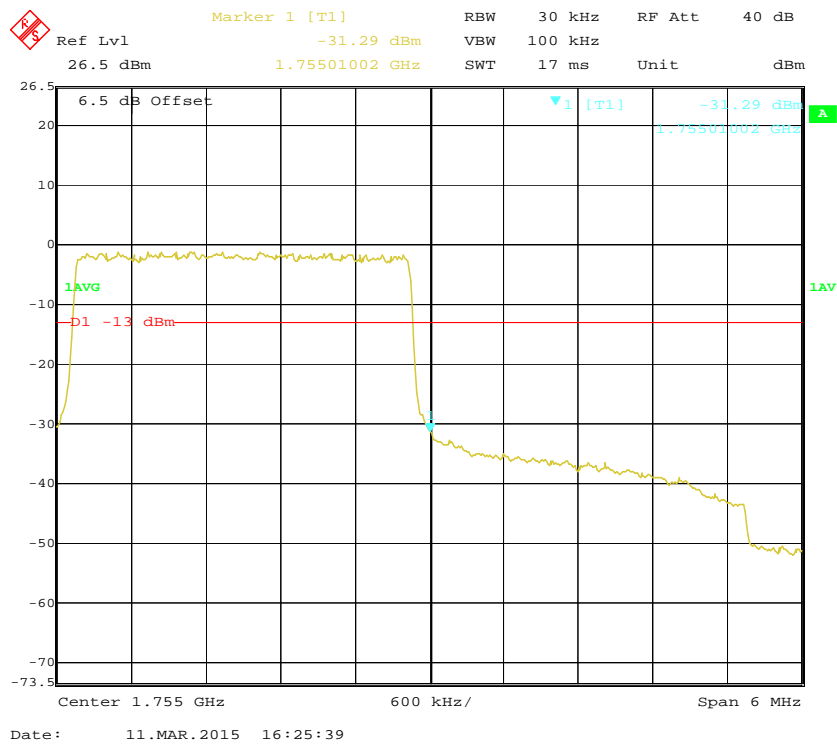
### 16-QAM (3.0 MHz, 1RB) - Left Band Edge



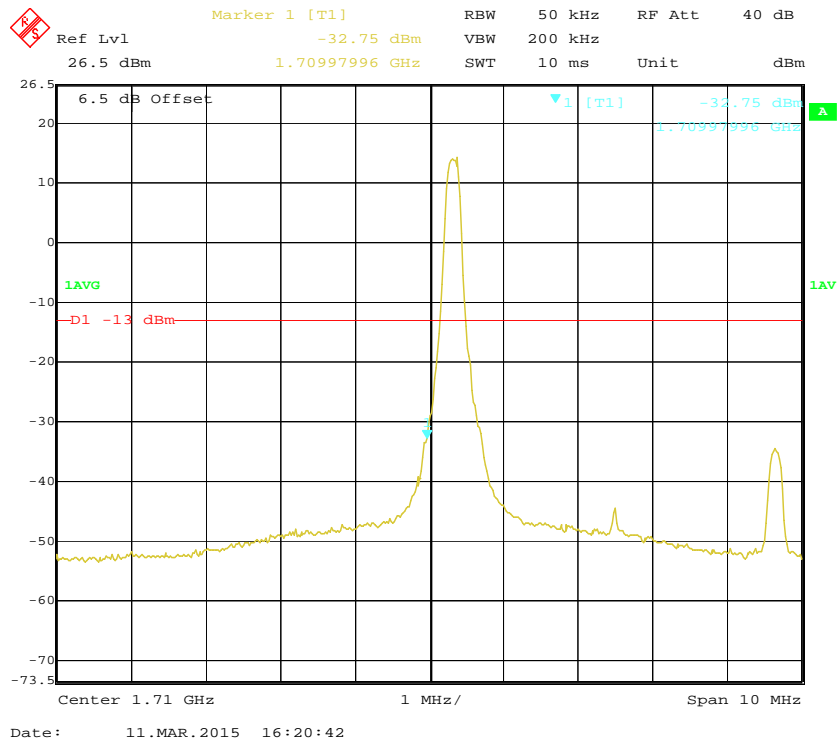
### 16-QAM (3.0 MHz, 1RB) - Right Band Edge



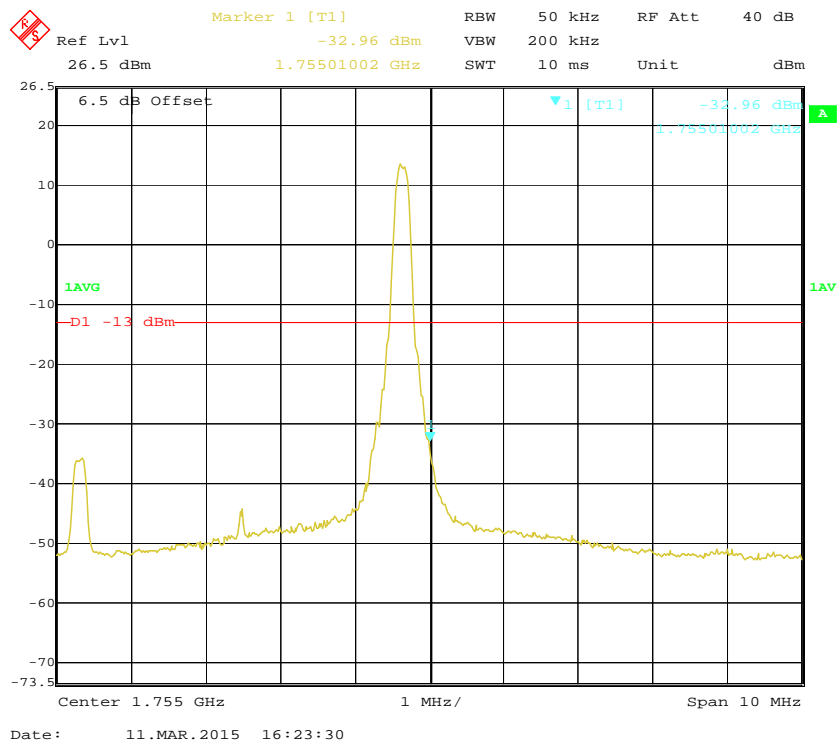
**QPSK (3.0 MHz, FULL RB) - Left Band Edge****QPSK (3.0 MHz, FULL RB) - Right Band Edge**

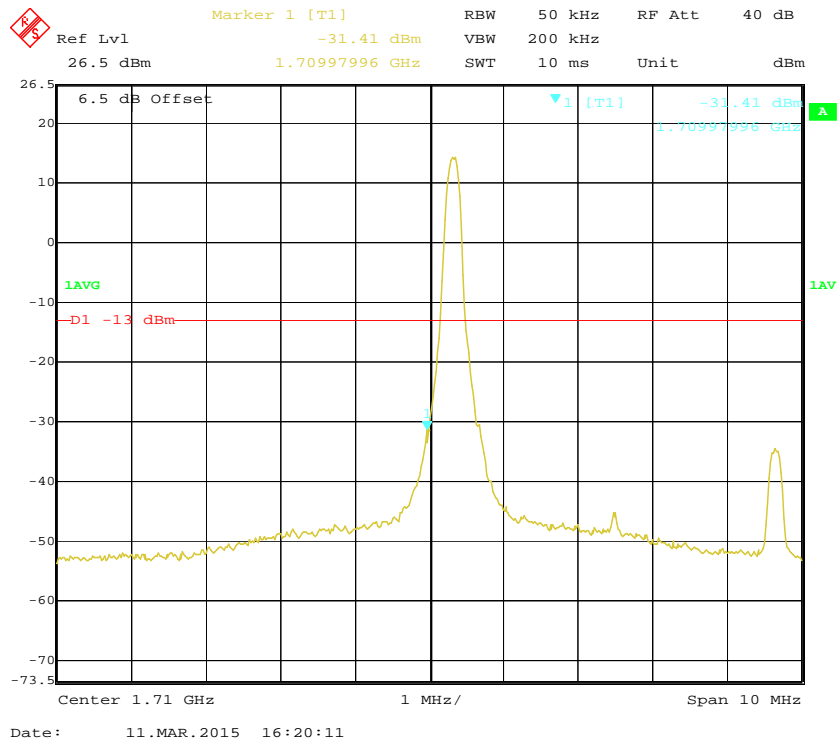
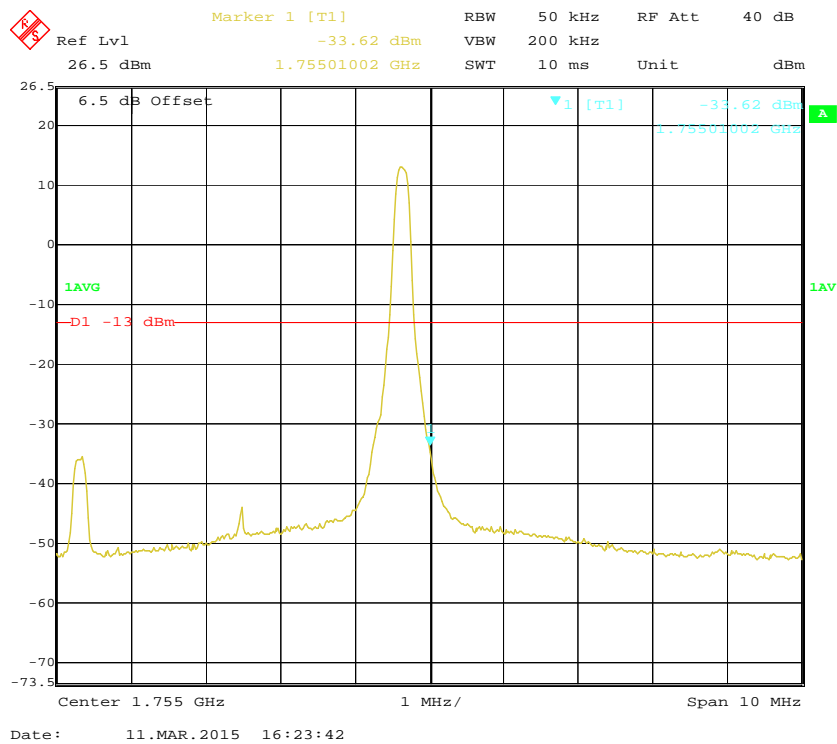
**16-QAM (3.0 MHz, FULL RB) - Left Band Edge****16-QAM (3.0 MHz, FULL RB) - Right Band Edge**

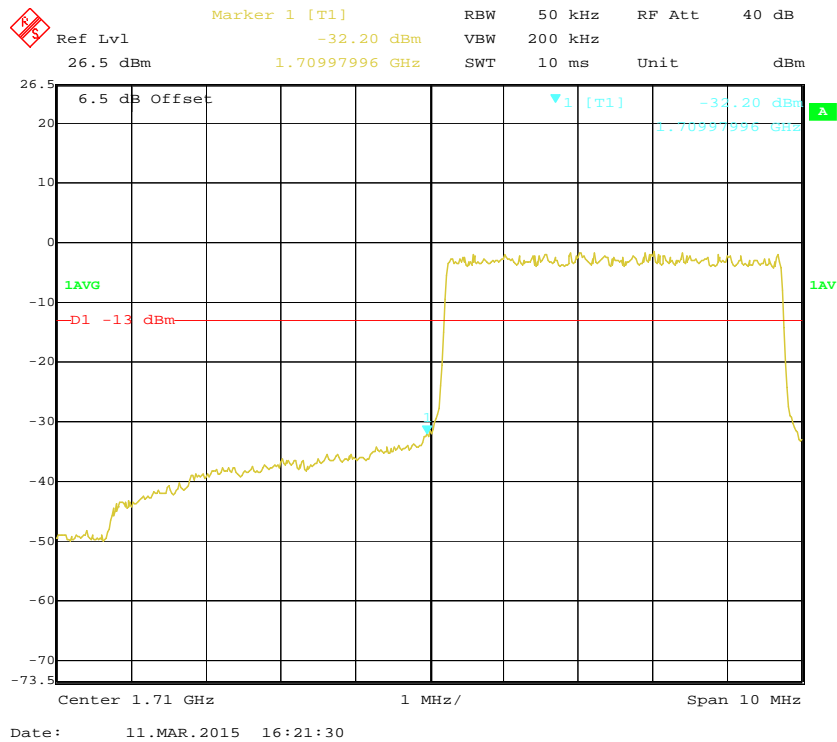
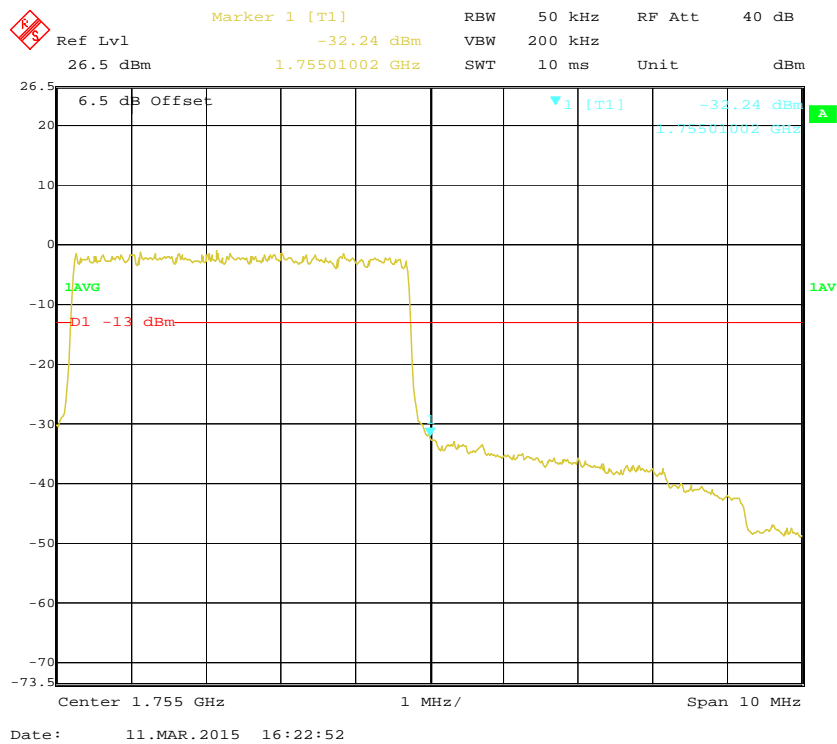
### QPSK (5.0 MHz, 1RB) - Left Band Edge



### QPSK (5.0 MHz, 1RB) - Right Band Edge

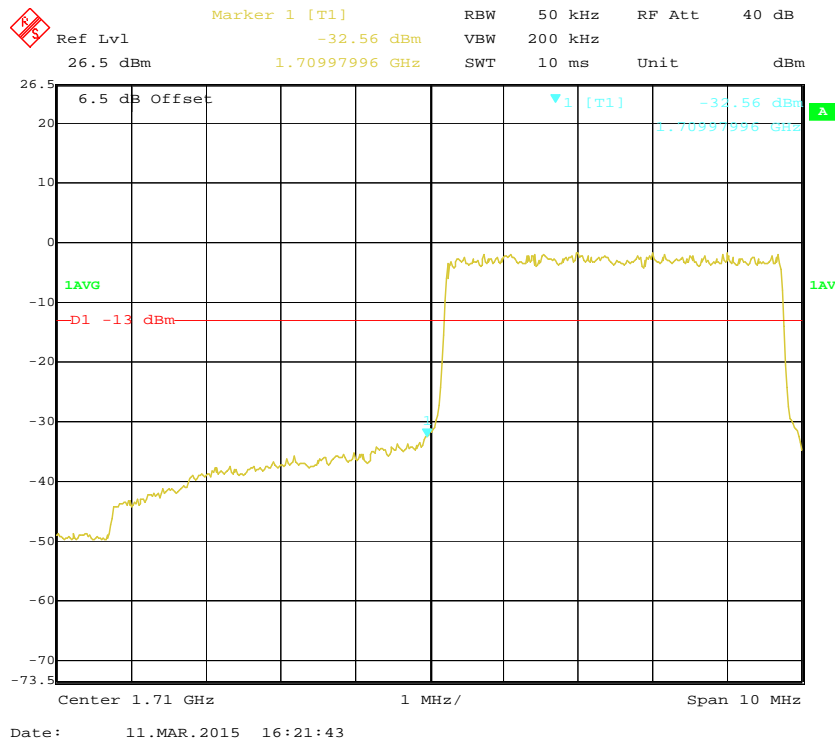


**16-QAM (5.0 MHz, 1RB) - Left Band Edge****16-QAM (5.0 MHz, 1RB) - Right Band Edge**

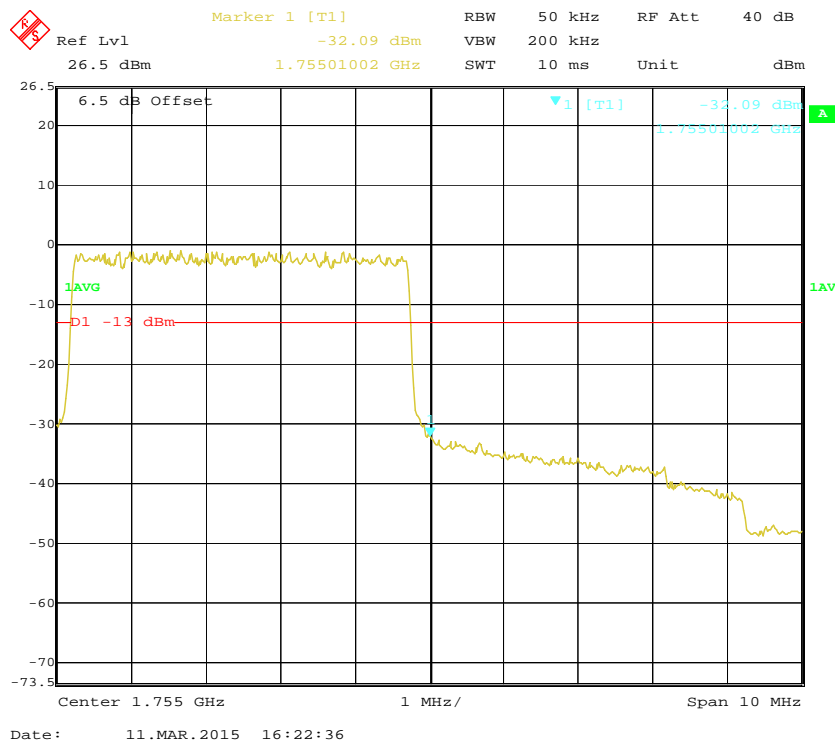
**QPSK (5.0 MHz, FULL RB) - Left Band Edge****QPSK (5.0 MHz, FULL RB) - Right Band Edge**



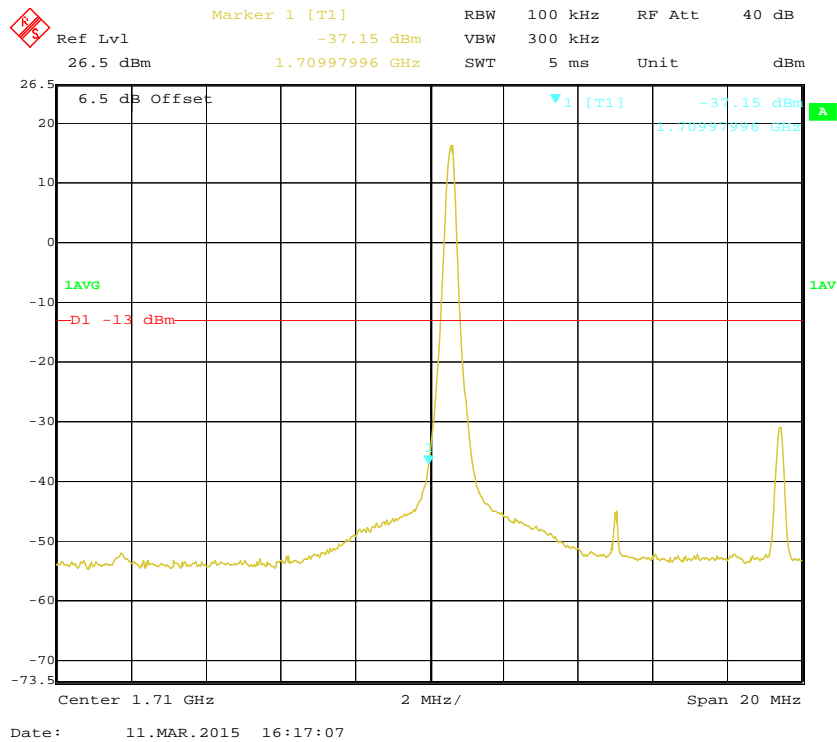
### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge



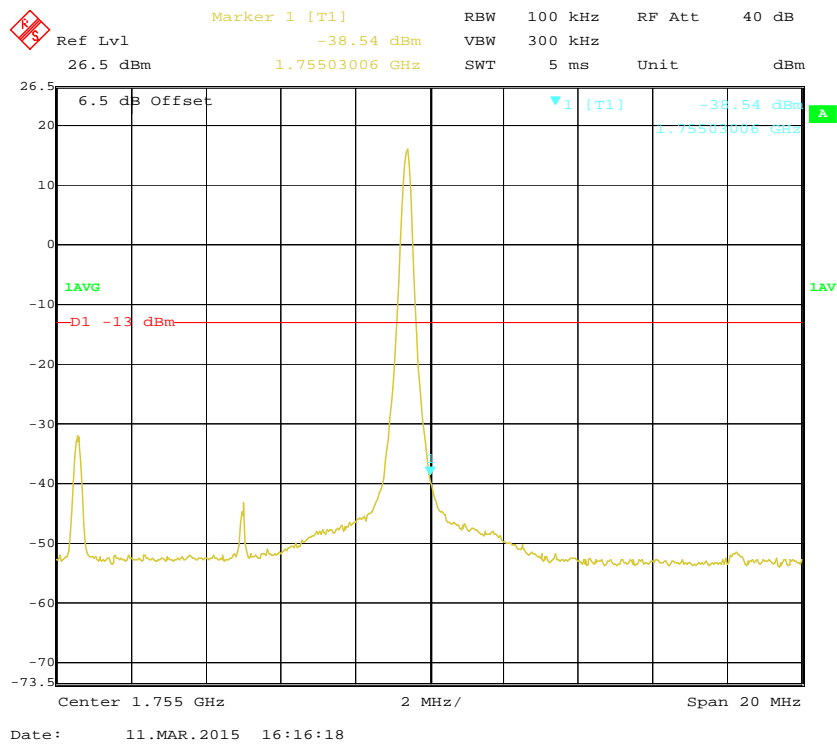
### 16-QAM (5.0 MHz, FULL RB) - Right Band Edge

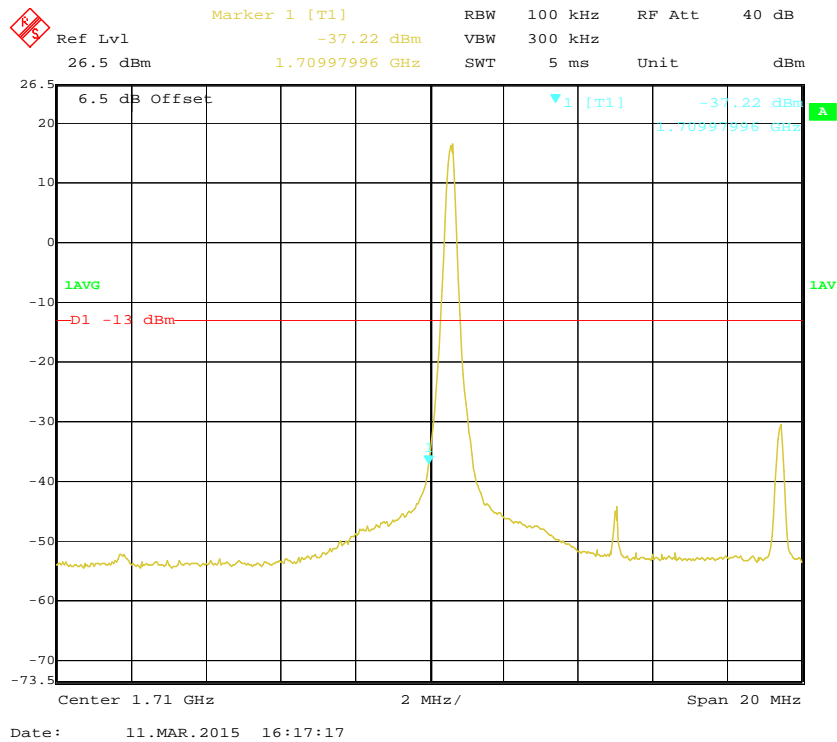
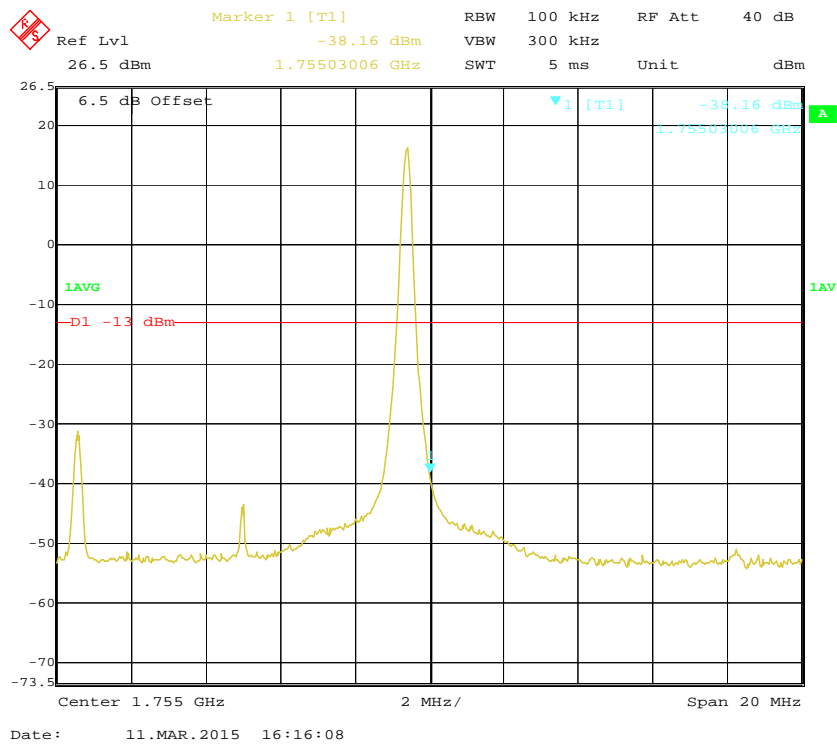


### QPSK (10.0 MHz, 1RB) - Left Band Edge

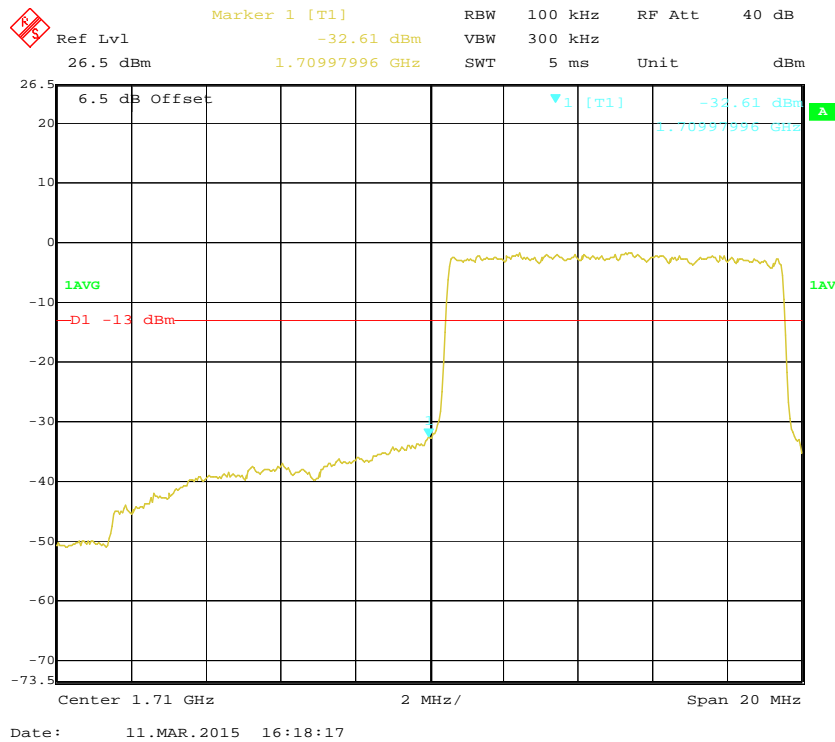


### QPSK (10.0 MHz, 1RB) - Right Band Edge

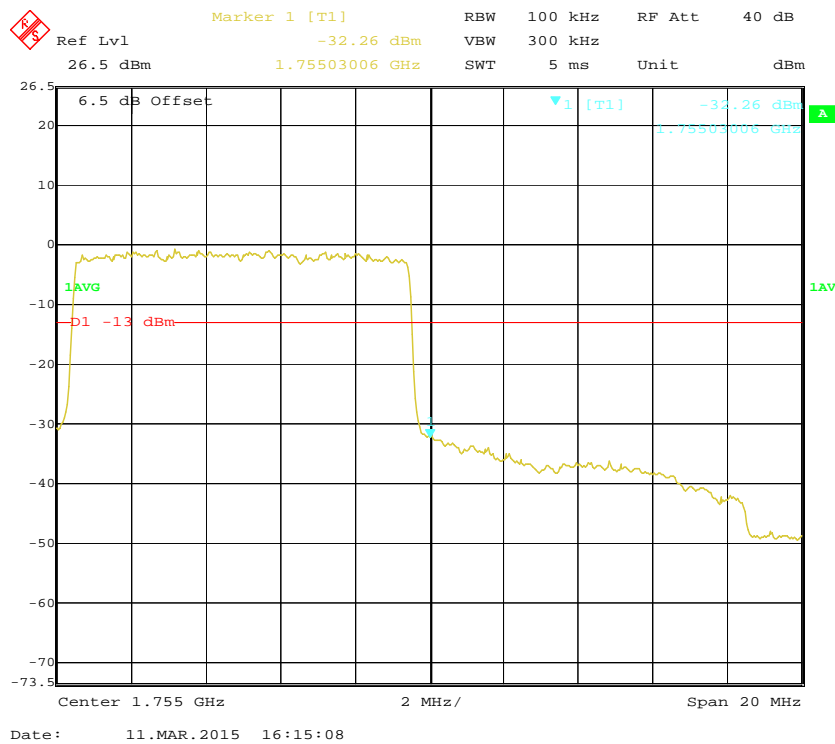


**16-QAM (10.0 MHz, 1RB) - Left Band Edge****16-QAM (10.0 MHz, 1RB) - Right Band Edge**

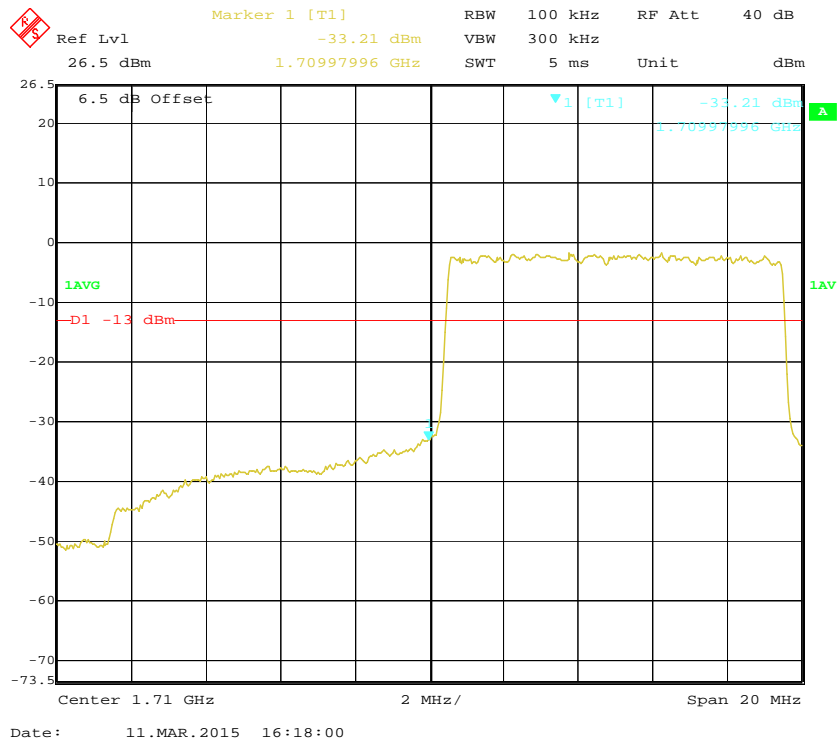
### QPSK (10.0 MHz, FULL RB) - Left Band Edge



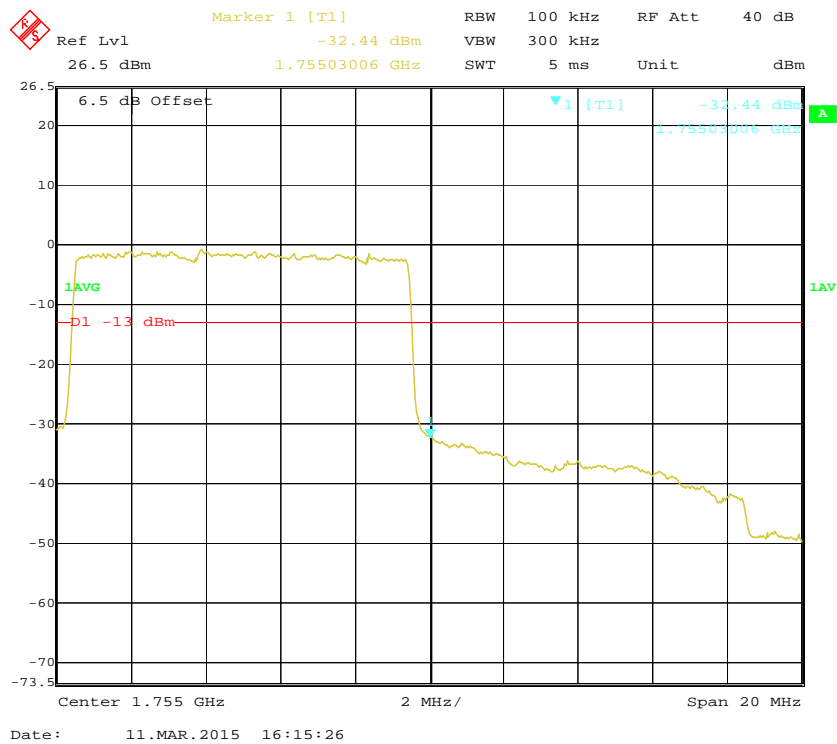
### QPSK (10.0 MHz, FULL RB) - Right Band Edge



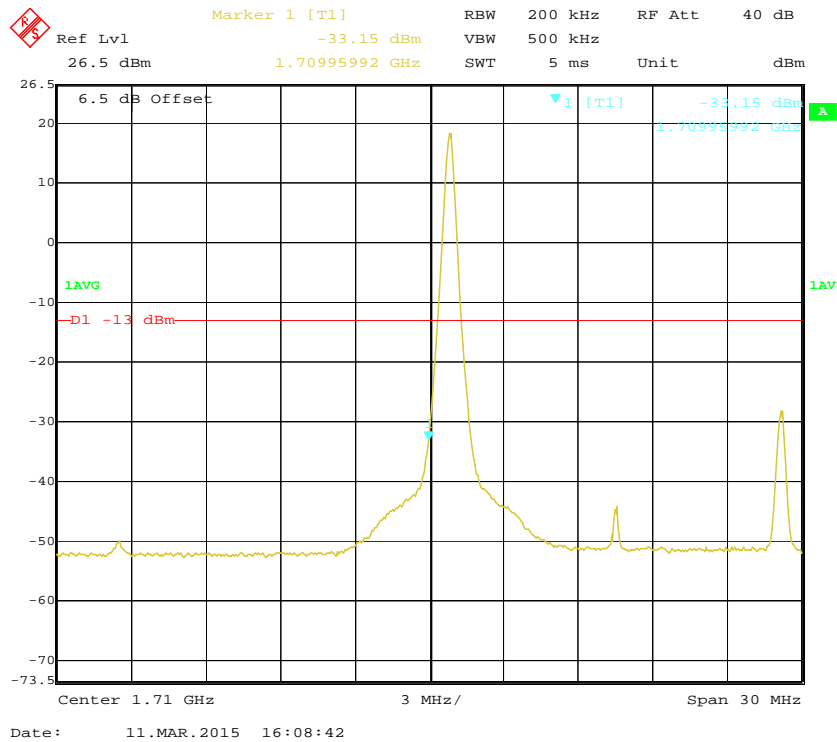
### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge



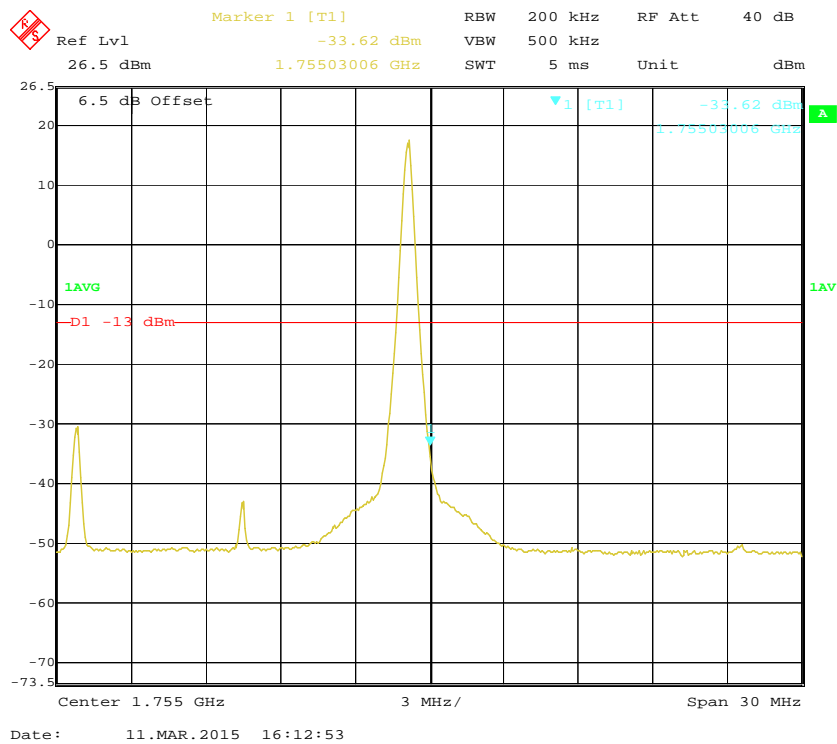
### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge

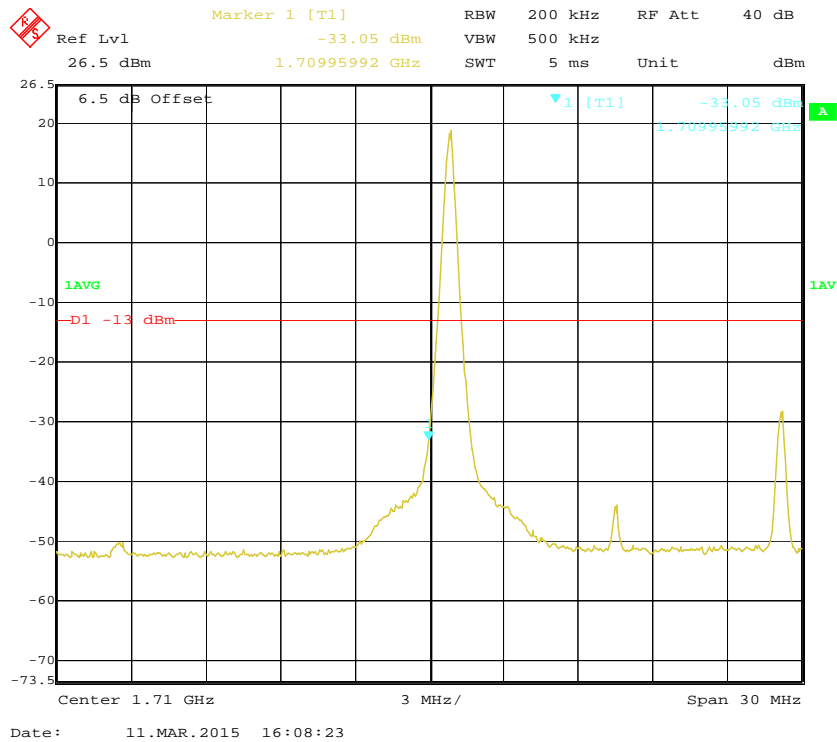
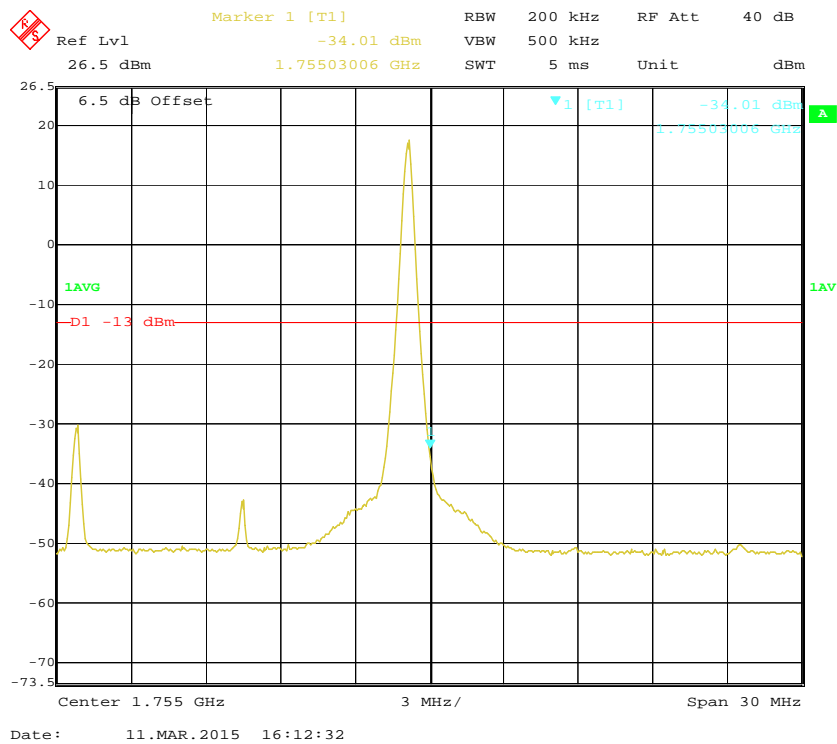


## QPSK (15.0 MHz, 1RB) - Left Band Edge

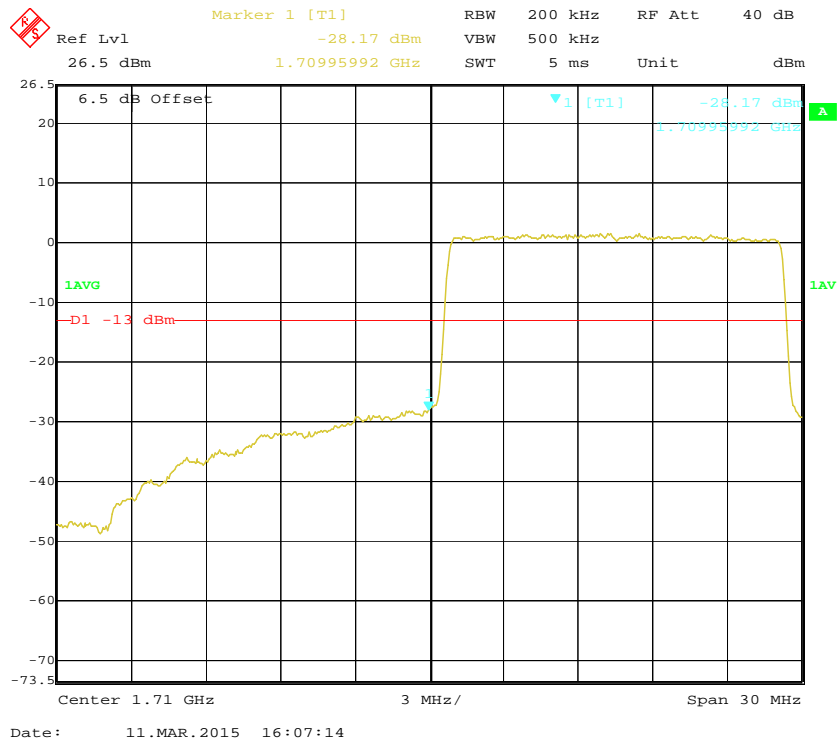


## QPSK (15.0 MHz, 1RB) - Right Band Edge

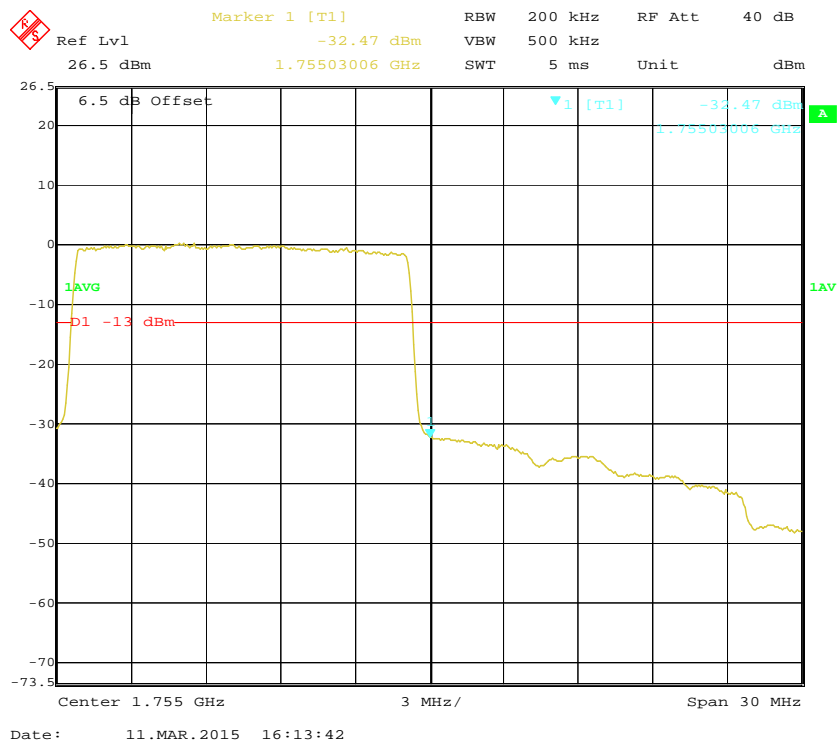


**16-QAM (15.0 MHz, 1RB) - Left Band Edge****16-QAM (15.0 MHz, 1RB) - Right Band Edge**

### QPSK (15.0 MHz, FULL RB) - Left Band Edge

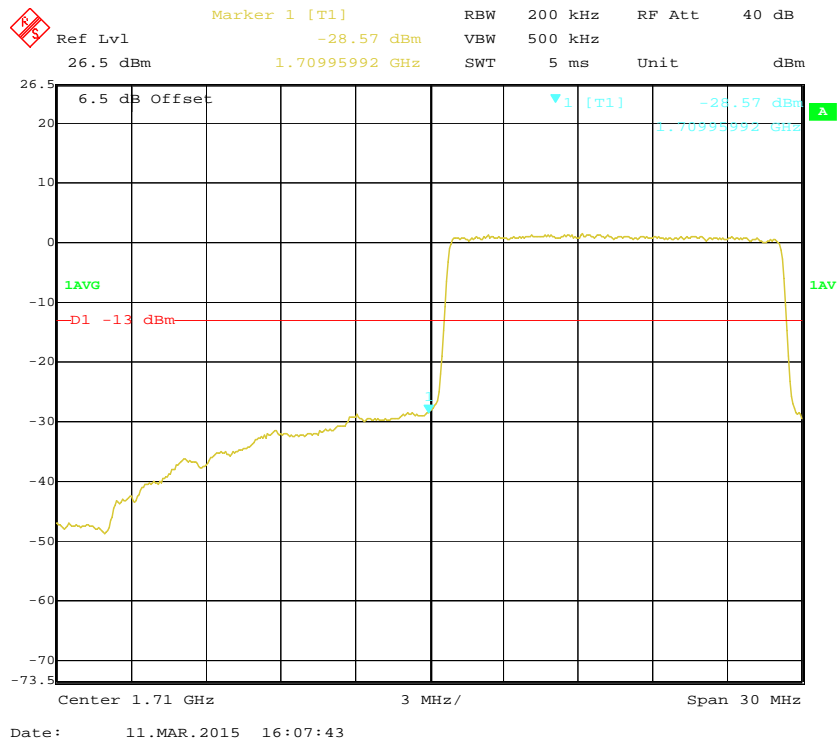


### QPSK (15.0 MHz, FULL RB) - Right Band Edge

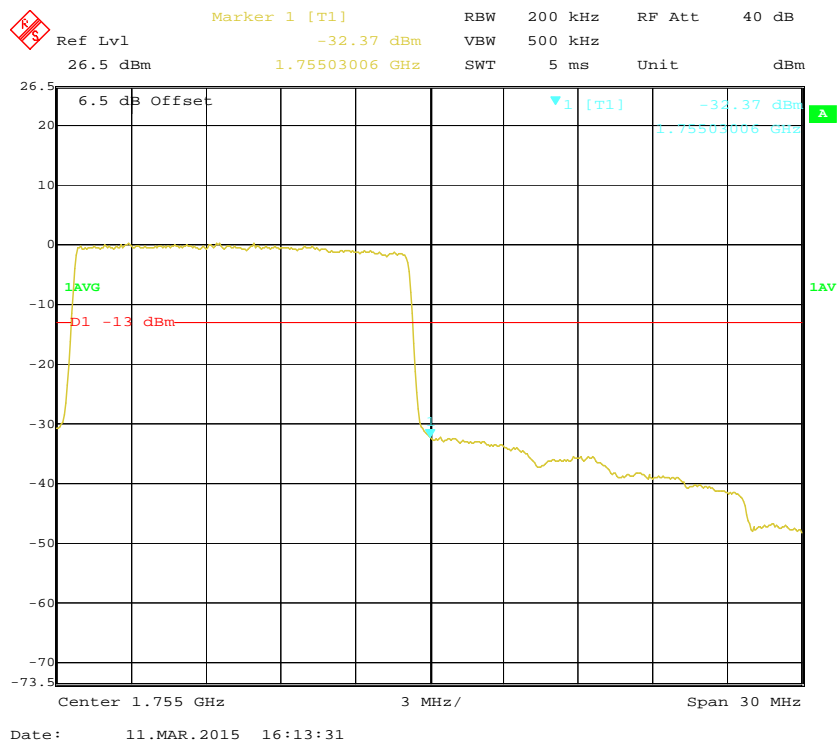




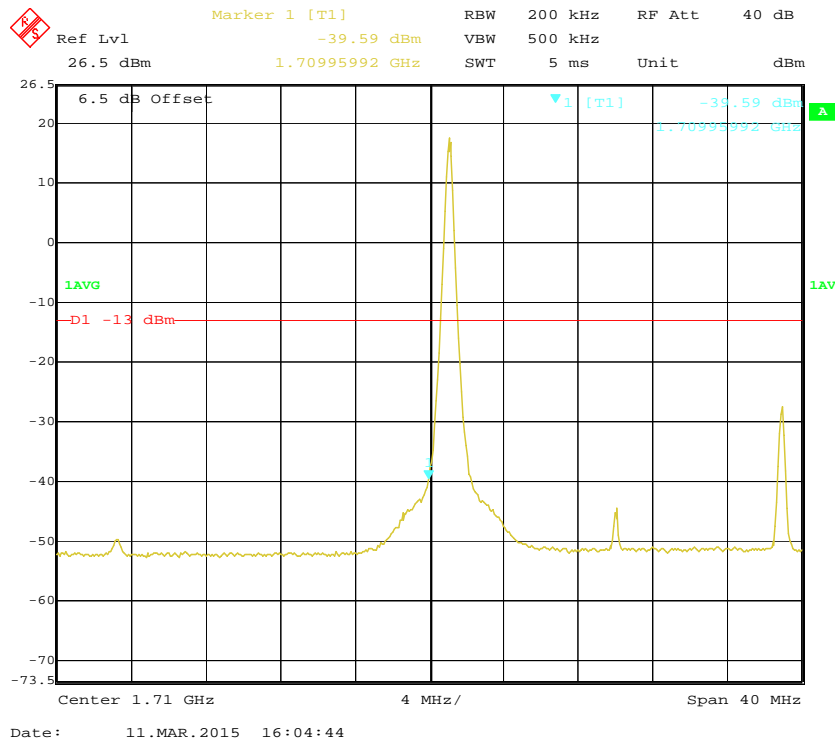
### 16-QAM (15.0 MHz, FULL RB) - Left Band Edge



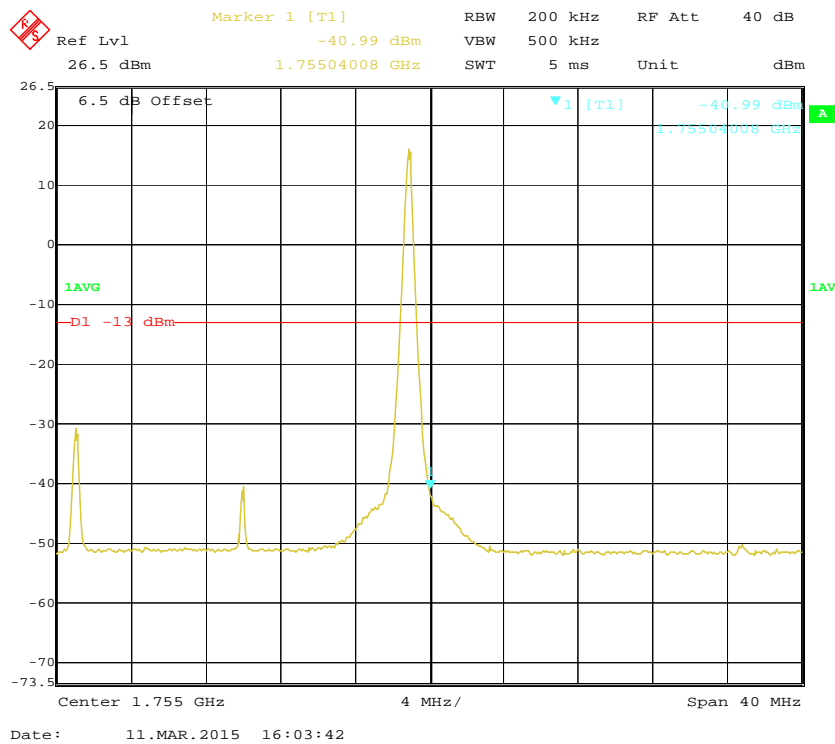
### 16-QAM (15.0 MHz, FULL RB) - Right Band Edge

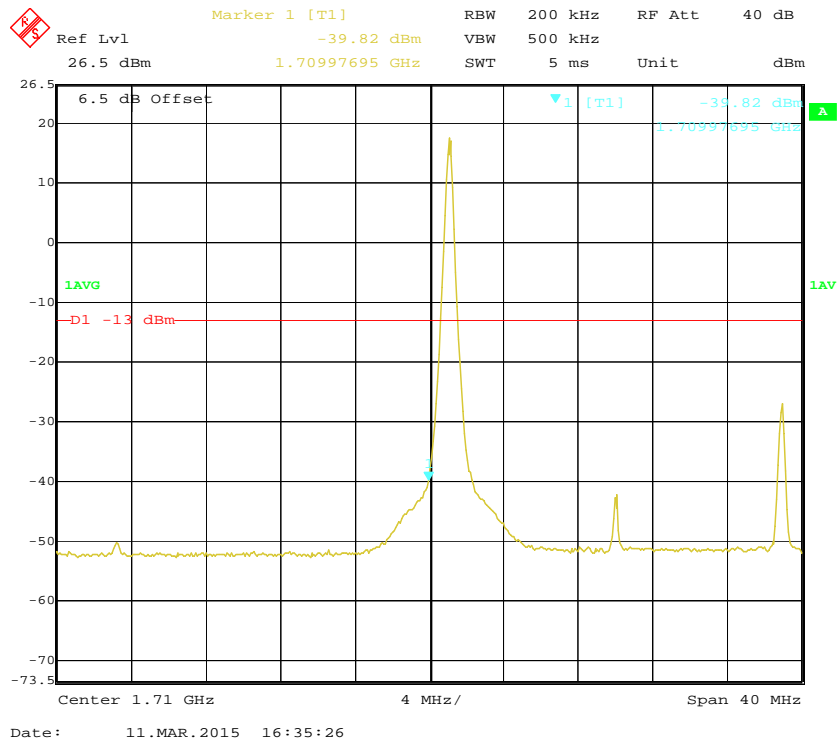
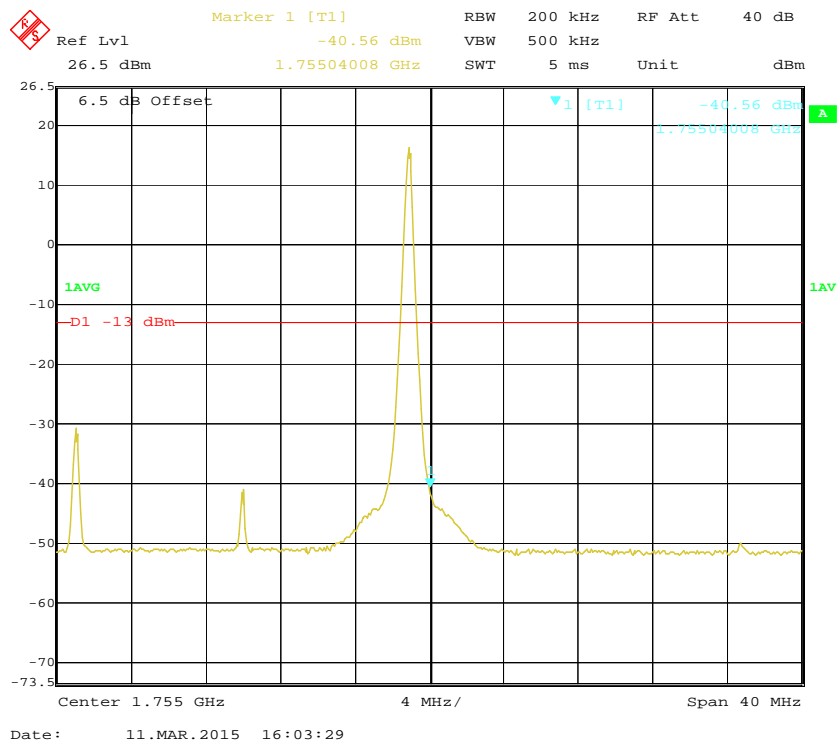


### QPSK (20.0 MHz, 1RB) - Left Band Edge

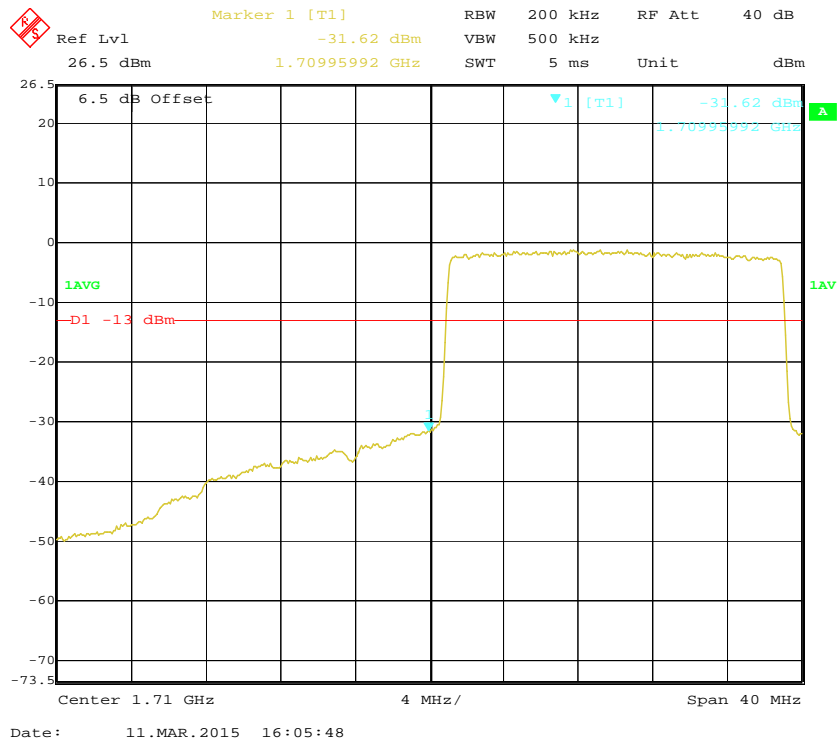


### QPSK (20.0 MHz, 1RB) - Right Band Edge

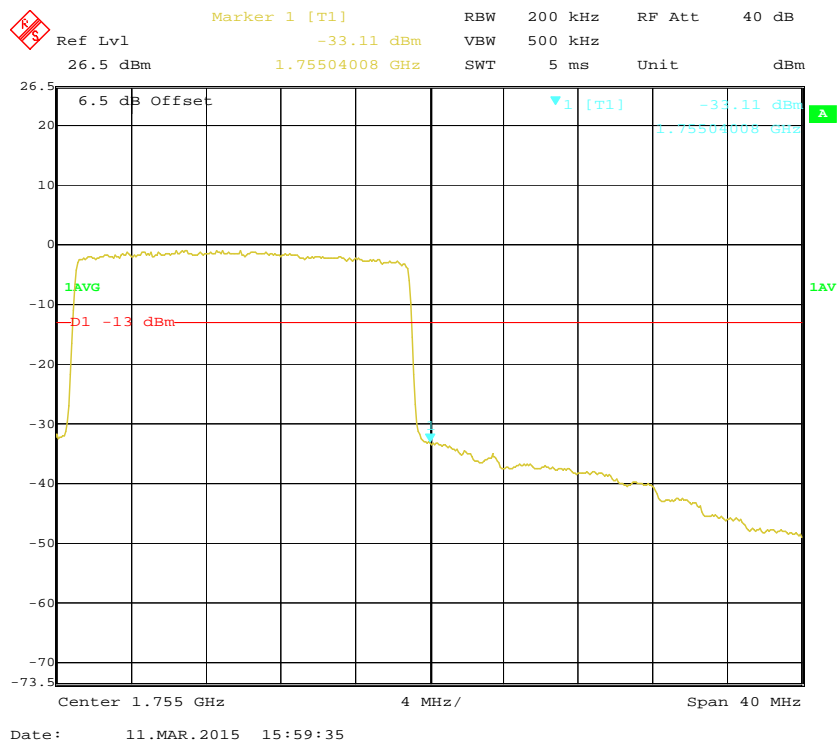


**16-QAM (20.0 MHz, 1RB) - Left Band Edge****16-QAM (20.0 MHz, 1RB) - Right Band Edge**

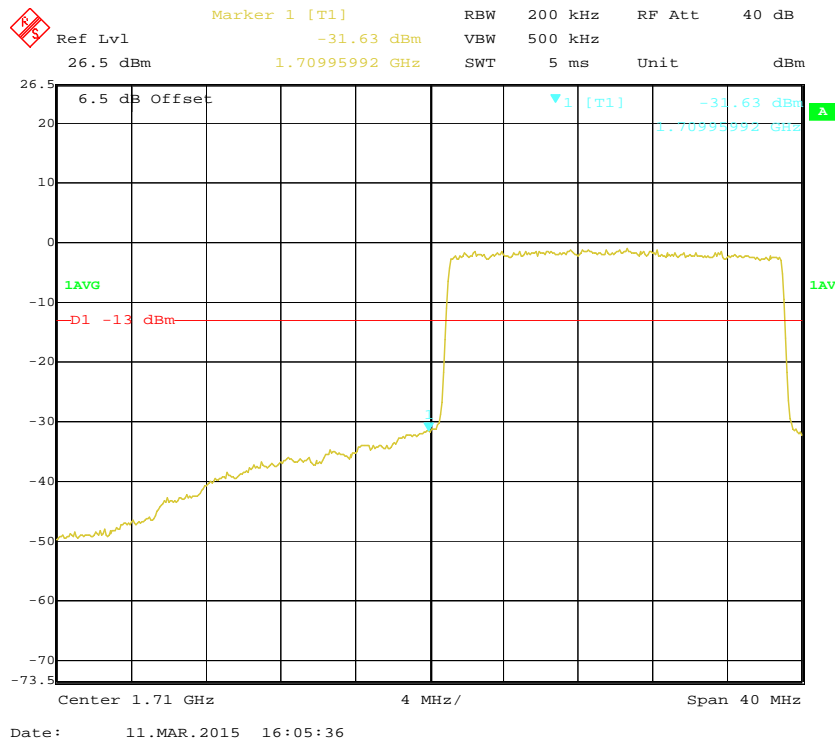
### QPSK (20.0 MHz, FULL RB) - Left Band Edge



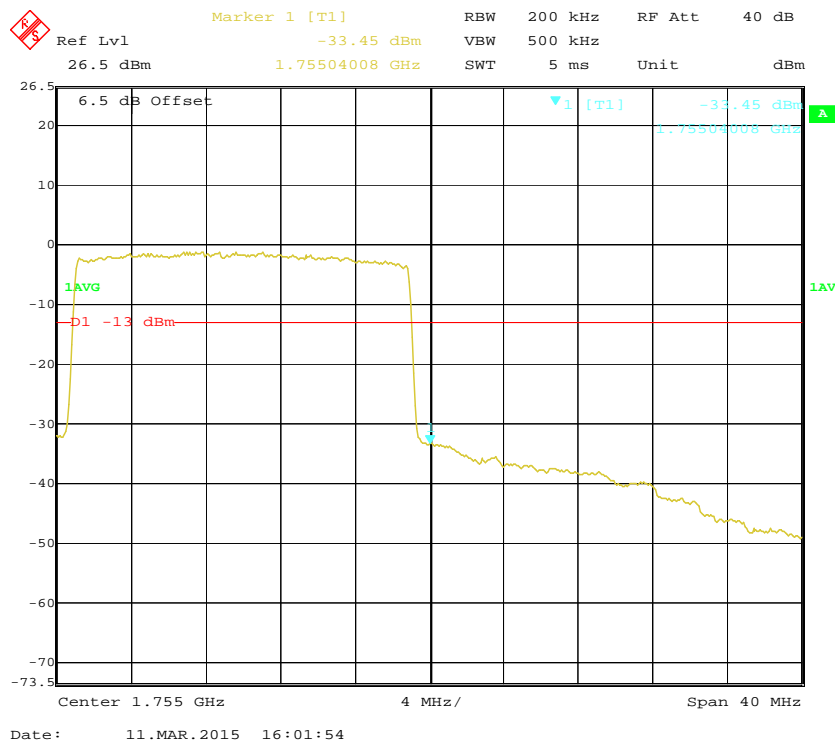
### QPSK (20.0 MHz, FULL RB) - Right Band Edge



### 16-QAM (20.0 MHz, FULL RB) - Left Band Edge

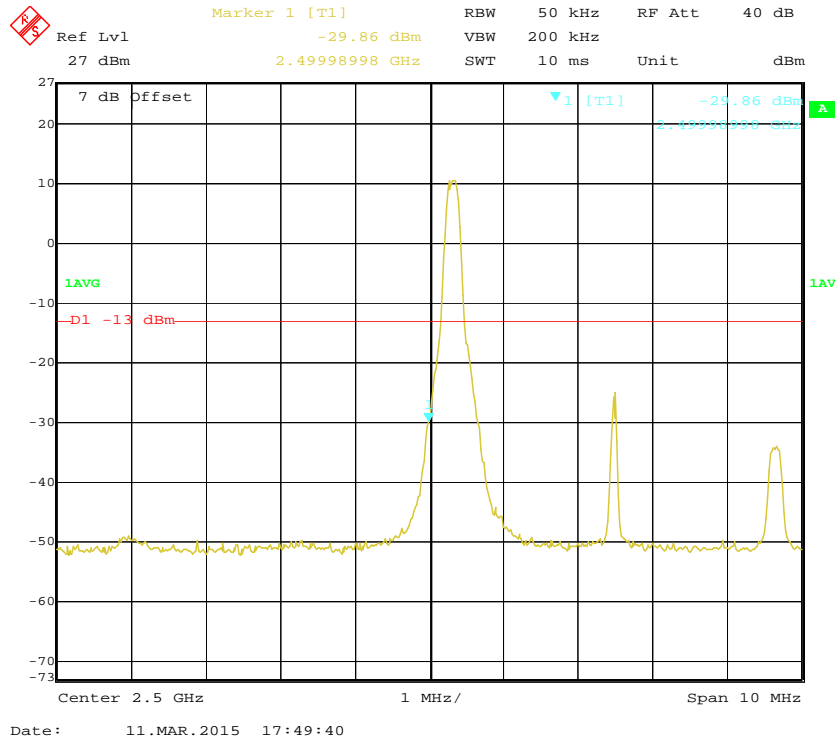


### 16-QAM (20.0 MHz, FULL RB) - Right Band Edge

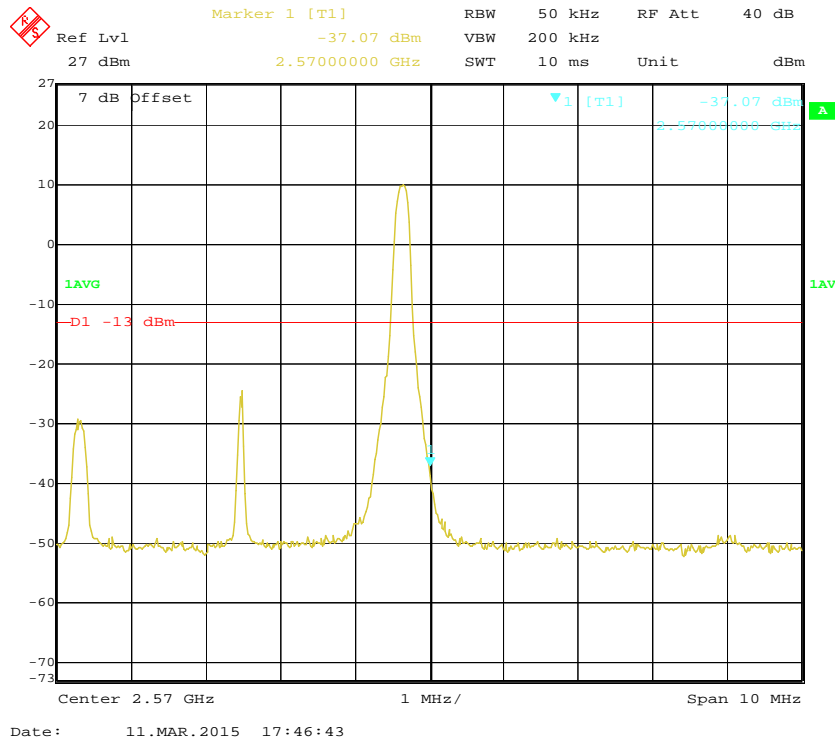


**Band 7:**

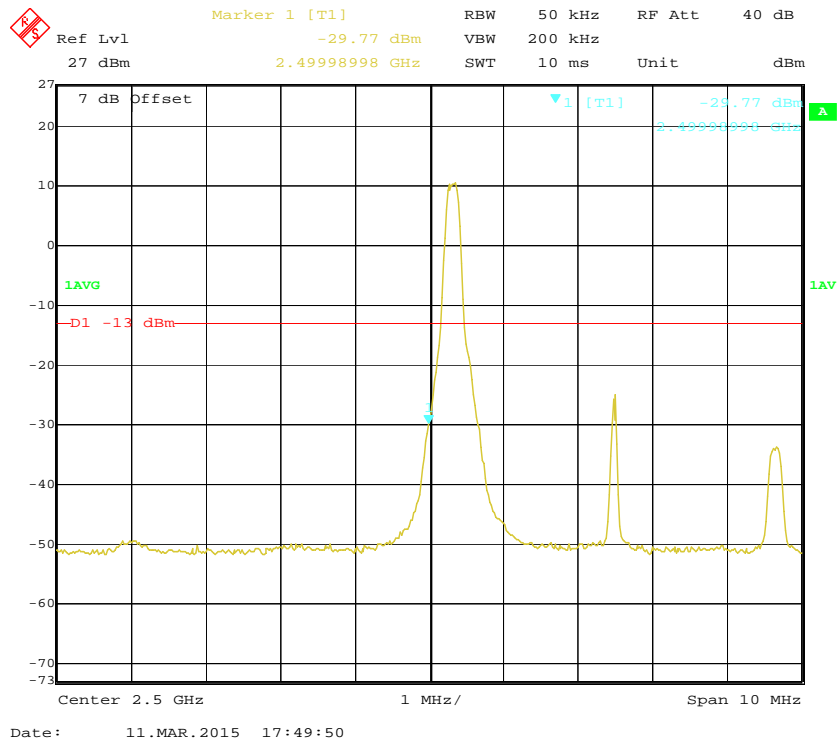
**QPSK (5.0 MHz, 1RB) - Left Band Edge**



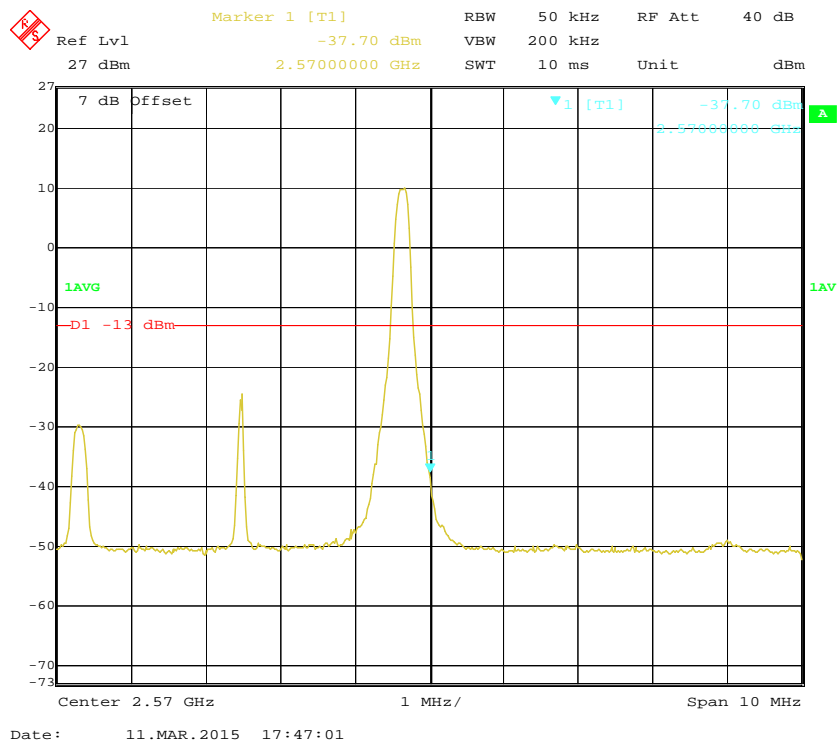
**QPSK (5.0 MHz, 1RB) - Right Band Edge**



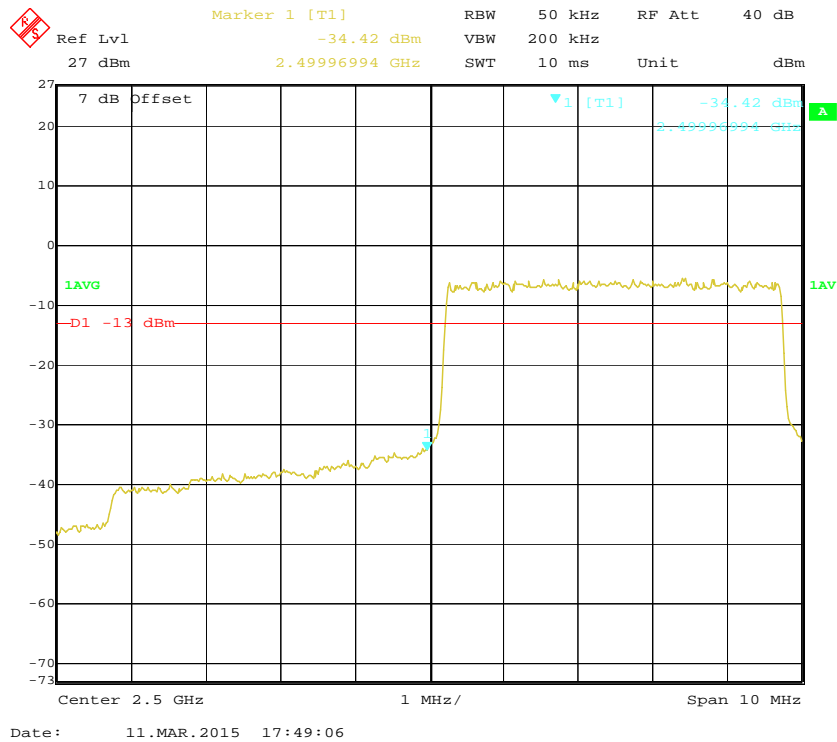
### 16-QAM (5.0 MHz, 1RB) - Left Band Edge



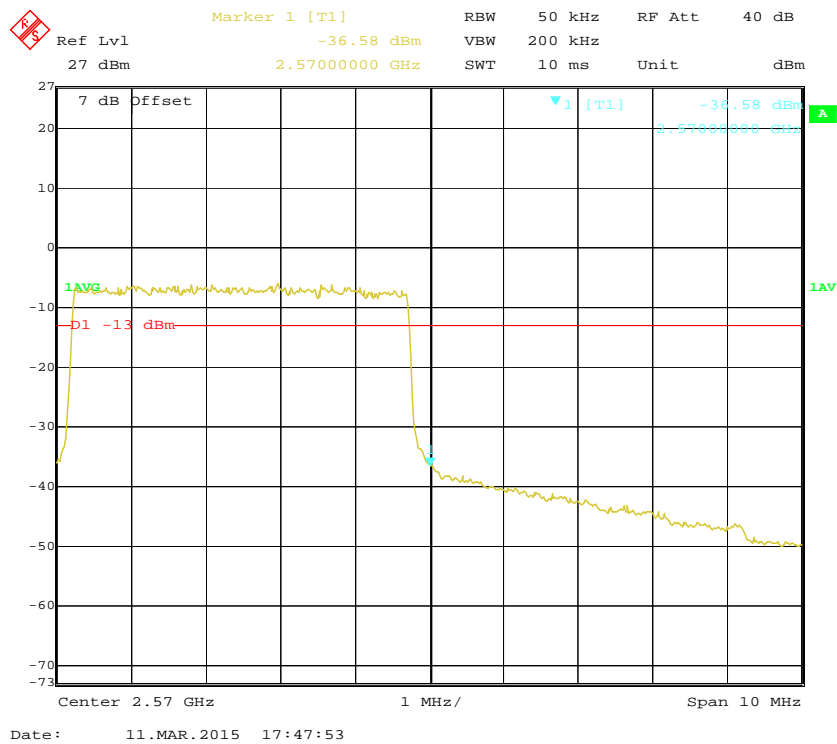
### 16-QAM (5.0 MHz, 1RB) - Right Band Edge



### QPSK (5.0 MHz, FULL RB) - Left Band Edge

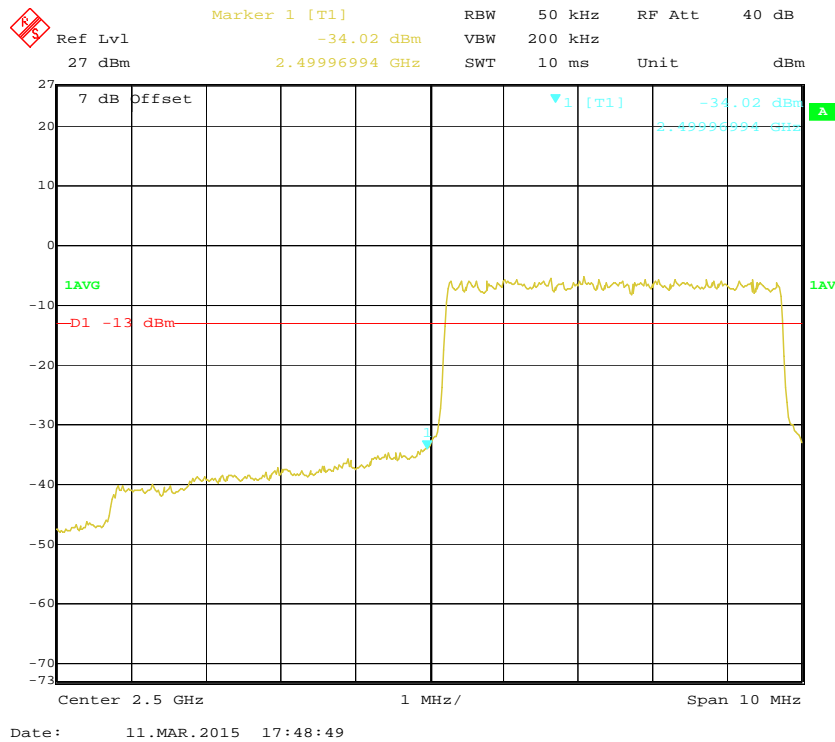


### QPSK (5.0 MHz, FULL RB) - Right Band Edge

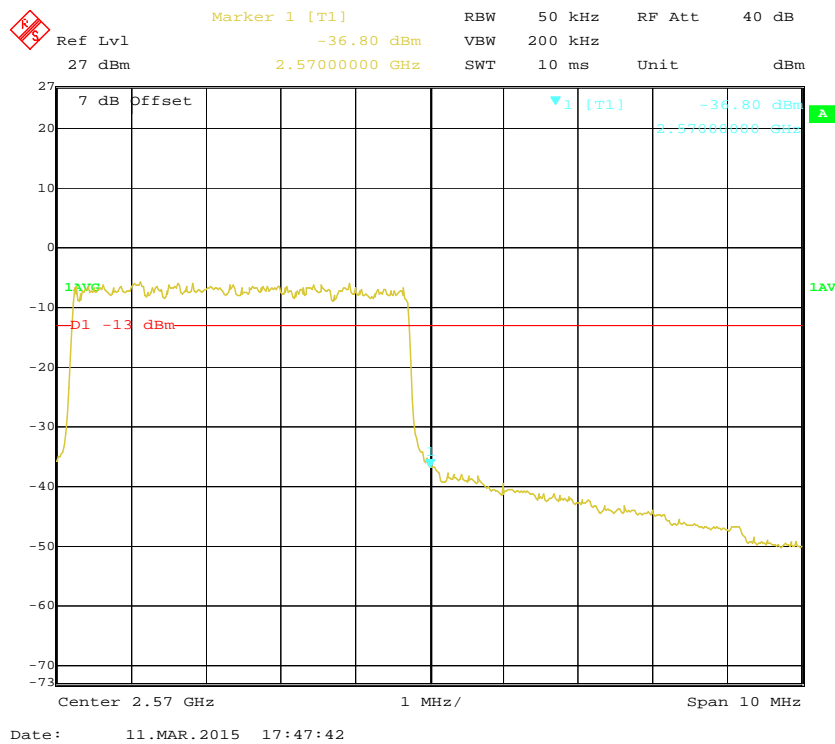




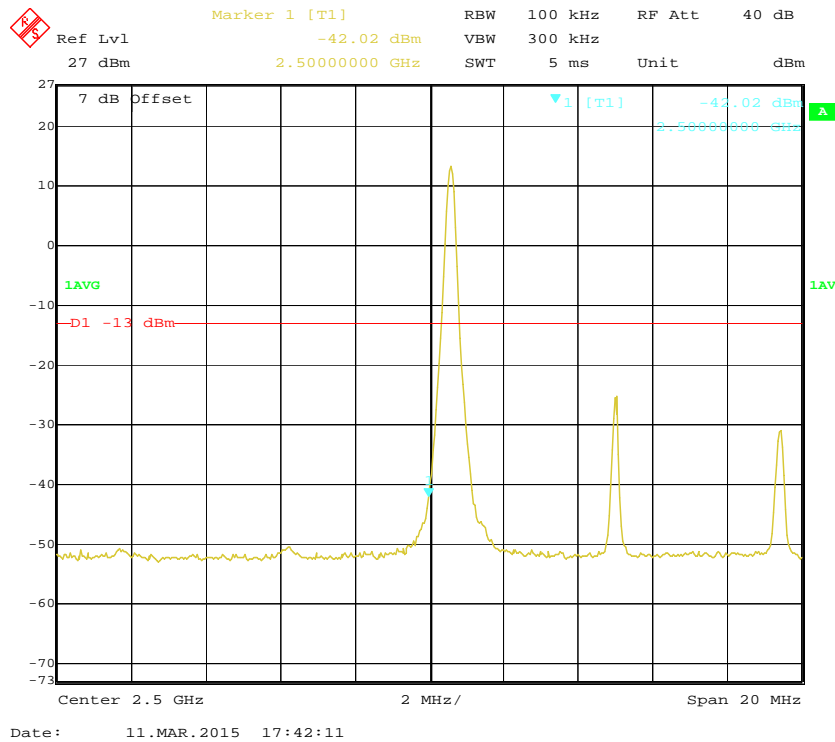
### 16-QAM (5.0 MHz, FULL RB) - Left Band Edge



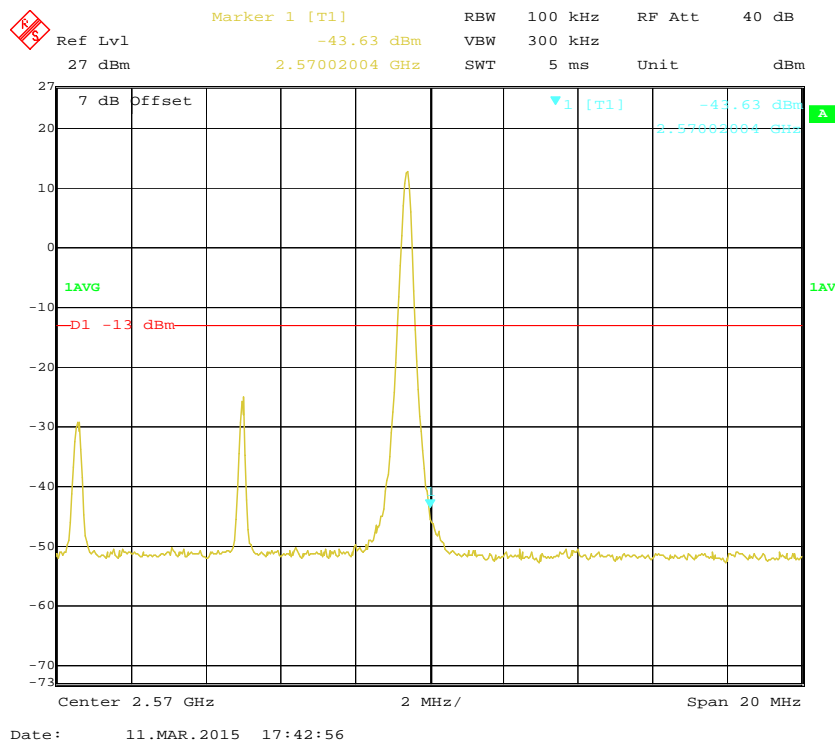
### 16-QAM (5.0 MHz, FULL RB) - Right Band Edge

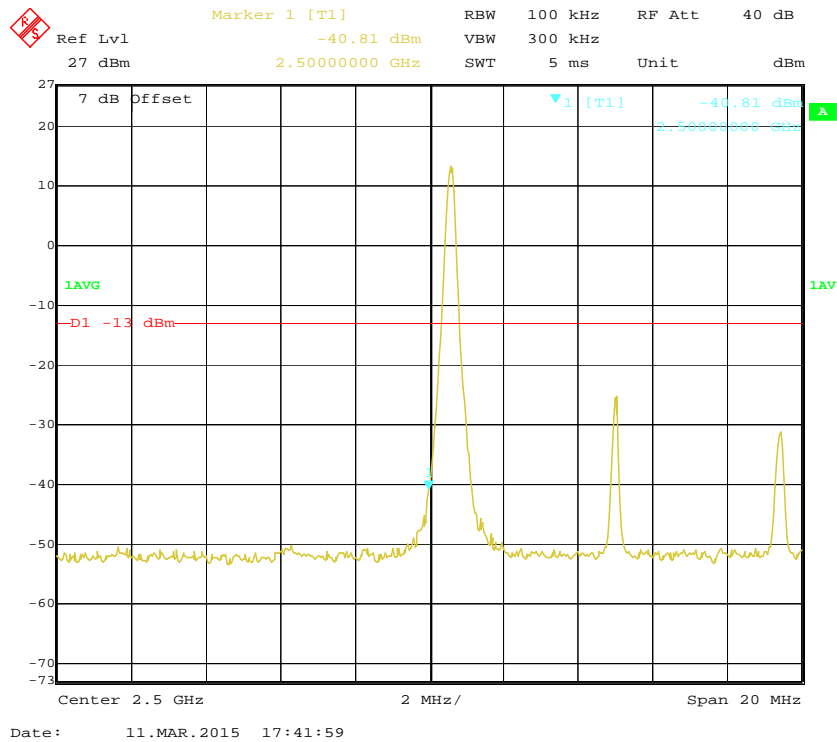
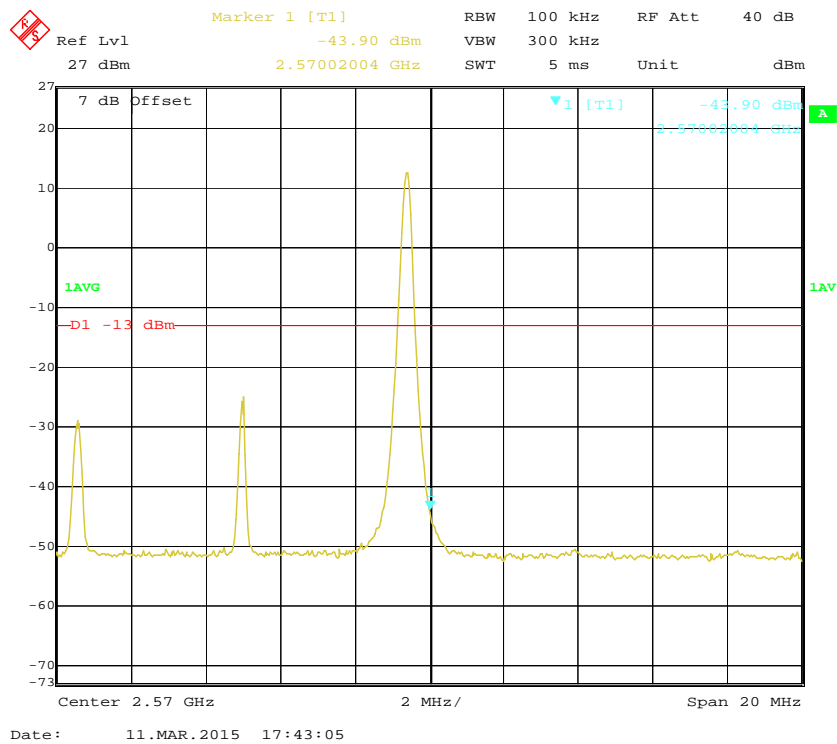


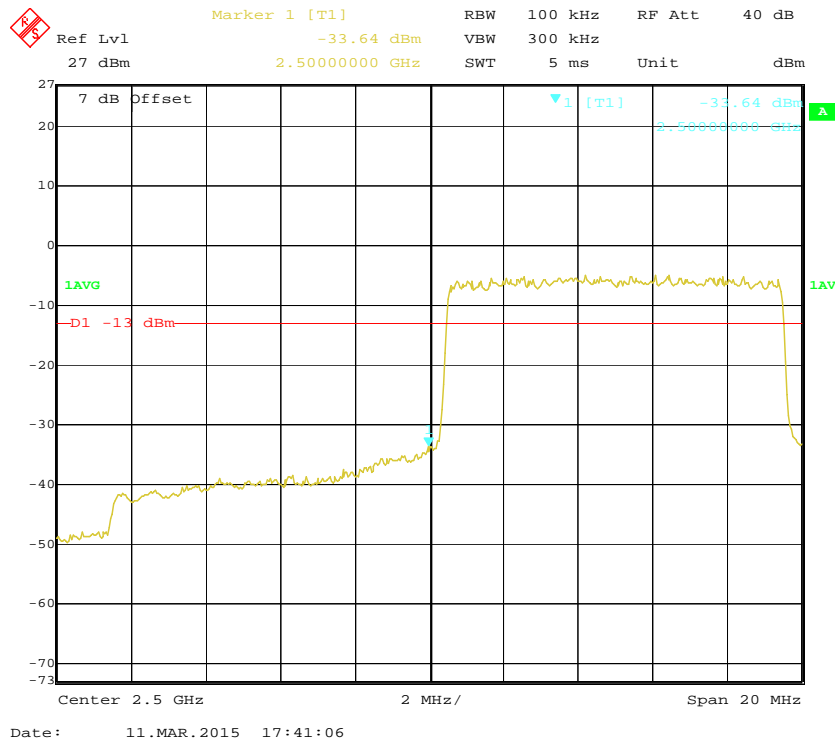
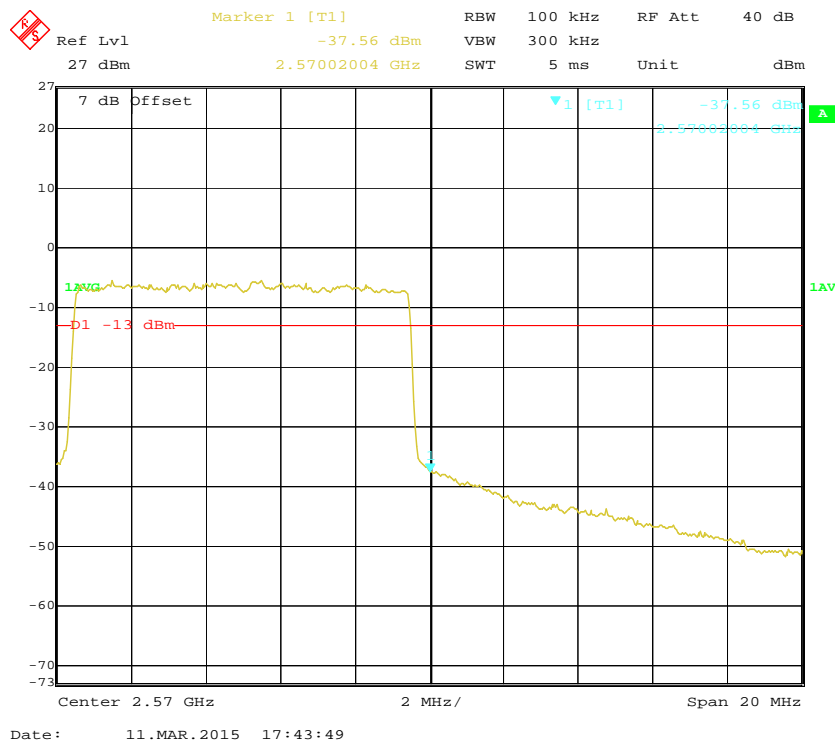
### QPSK (10.0 MHz, 1RB) - Left Band Edge



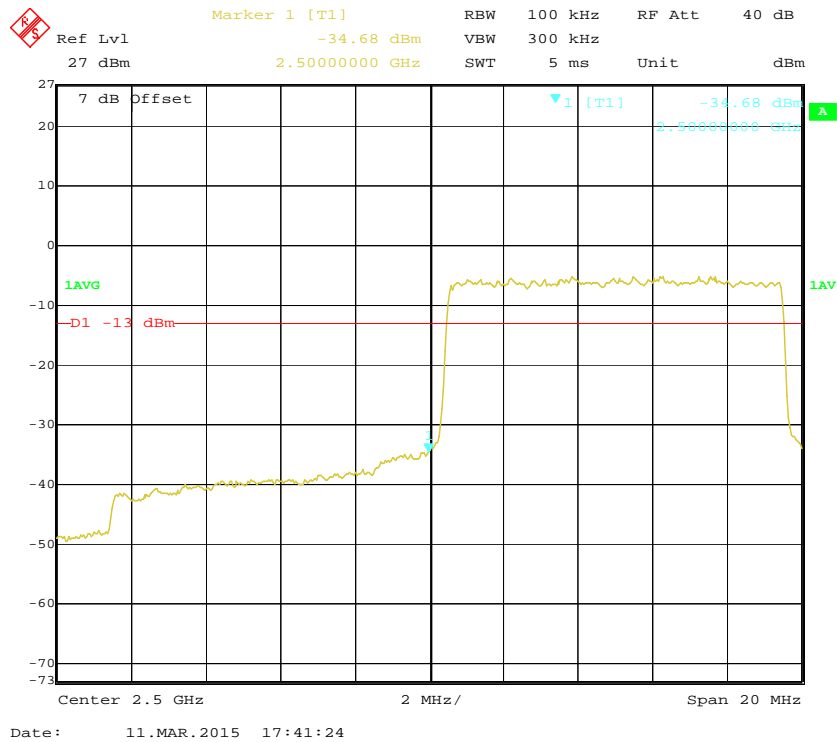
### QPSK (10.0 MHz, 1RB) - Right Band Edge



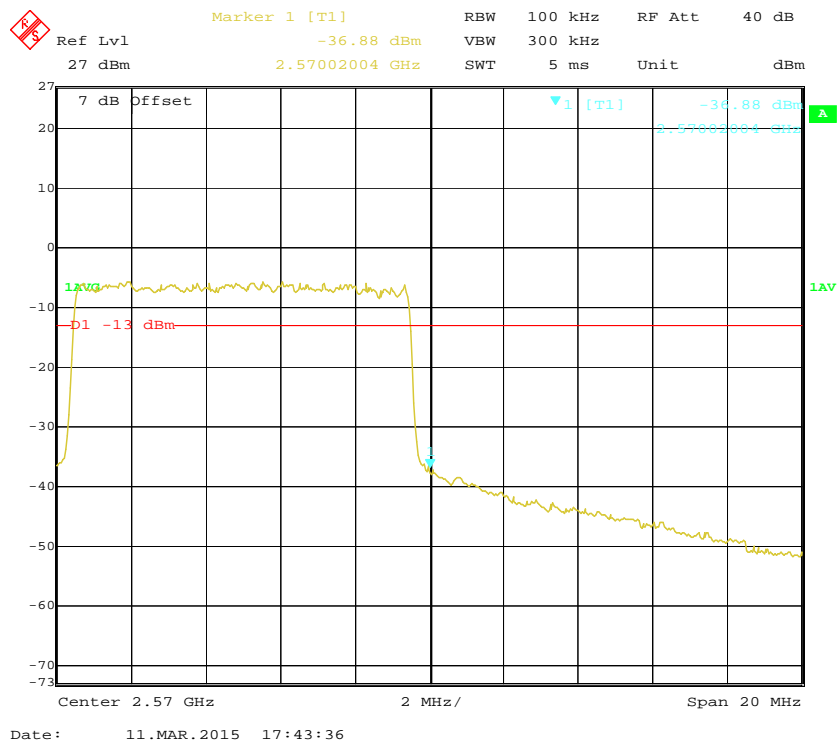
**16-QAM (10.0 MHz, 1RB) - Left Band Edge****16-QAM (10.0 MHz, 1RB) - Right Band Edge**

**QPSK (10.0 MHz, FULL RB) - Left Band Edge****QPSK (10.0 MHz, FULL RB) - Right Band Edge**

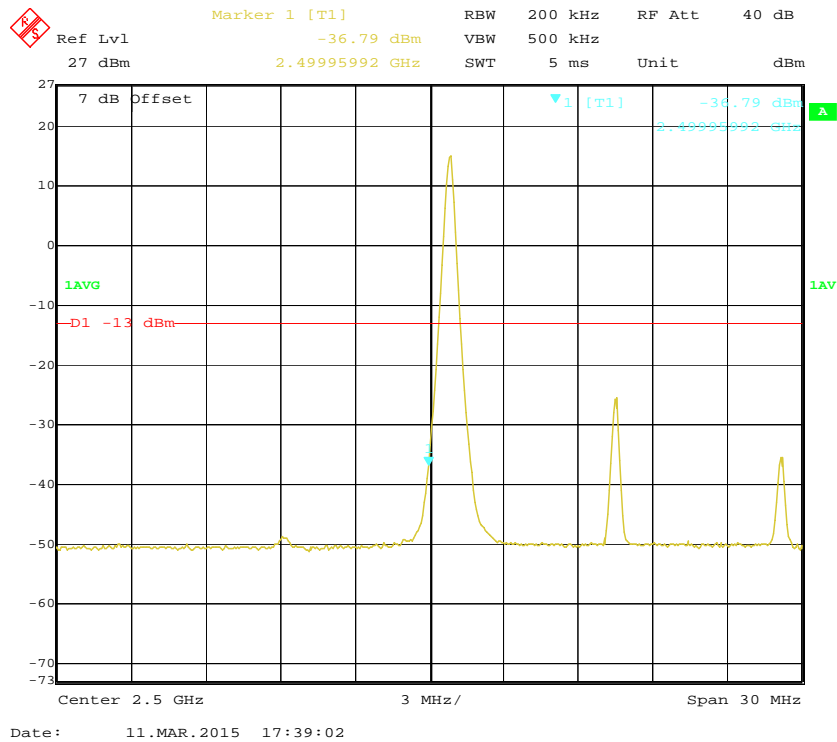
### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge



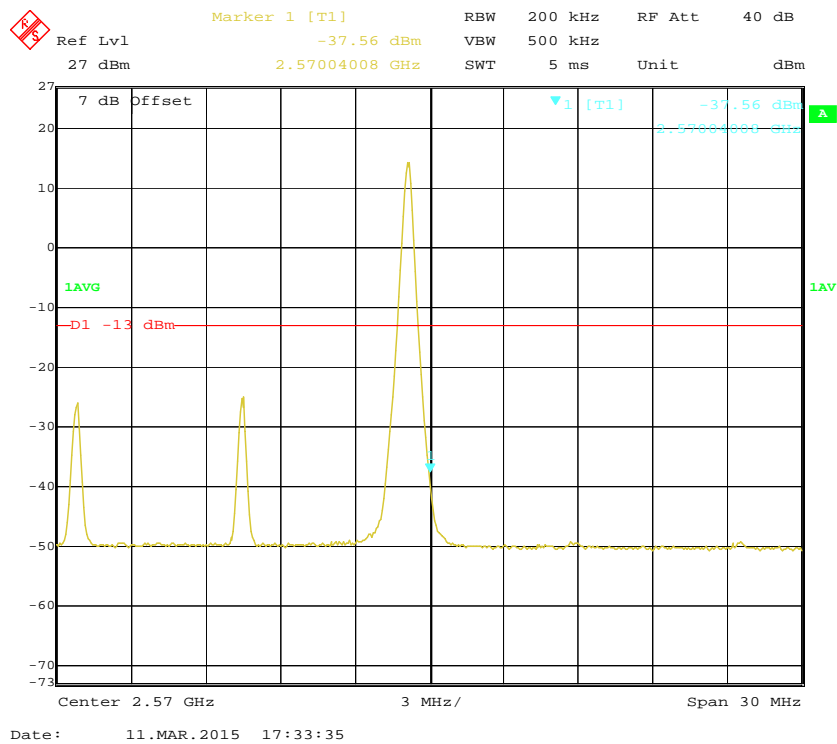
### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge



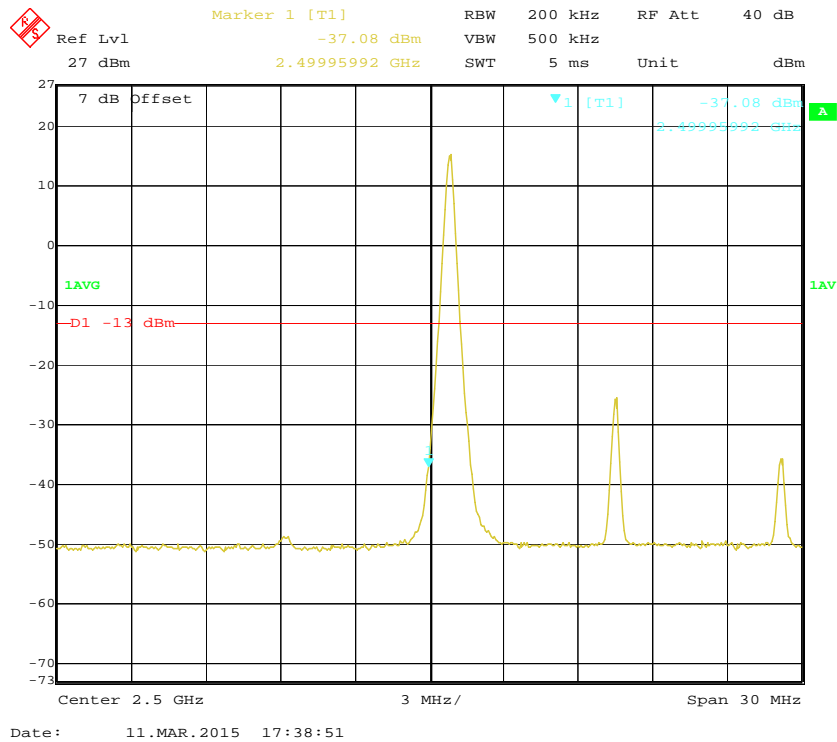
### QPSK (15.0 MHz, 1RB) - Left Band Edge



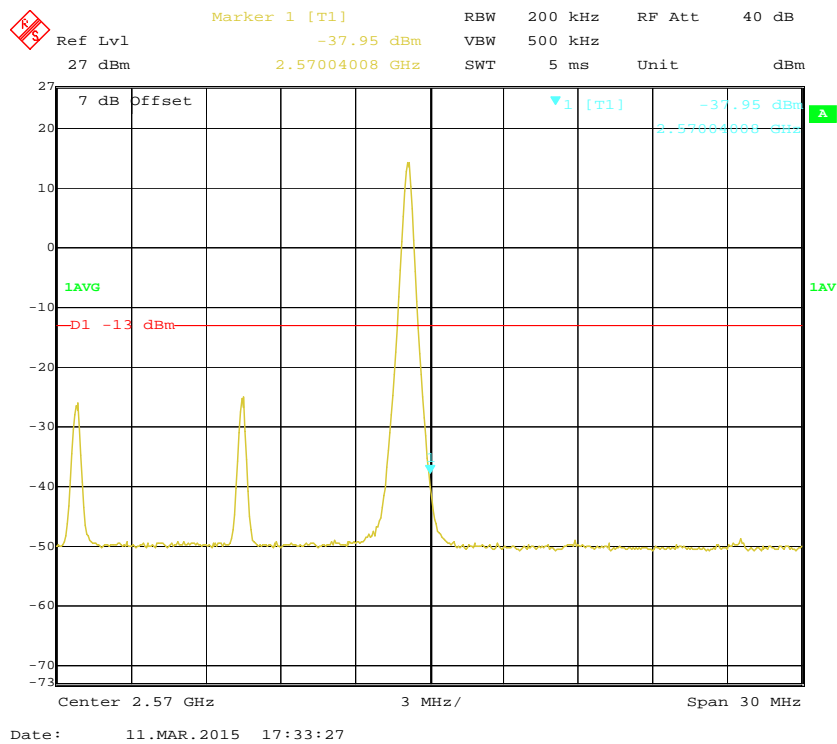
### QPSK (15.0 MHz, 1RB) - Right Band Edge



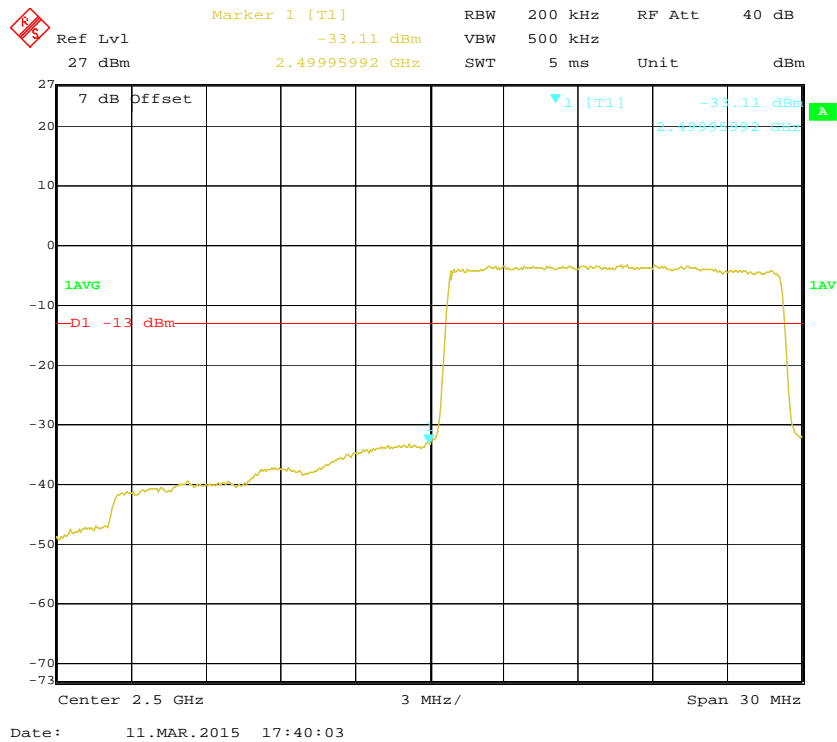
### 16-QAM (15.0 MHz, 1RB) - Left Band Edge



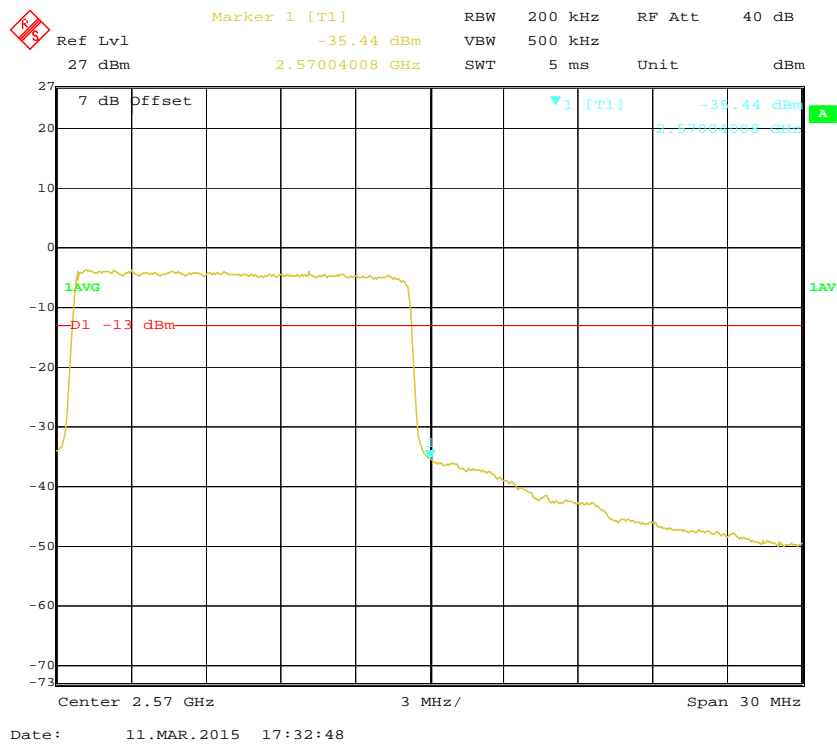
### 16-QAM (15.0 MHz, 1RB) - Right Band Edge



### QPSK (15.0 MHz, FULL RB) - Left Band Edge

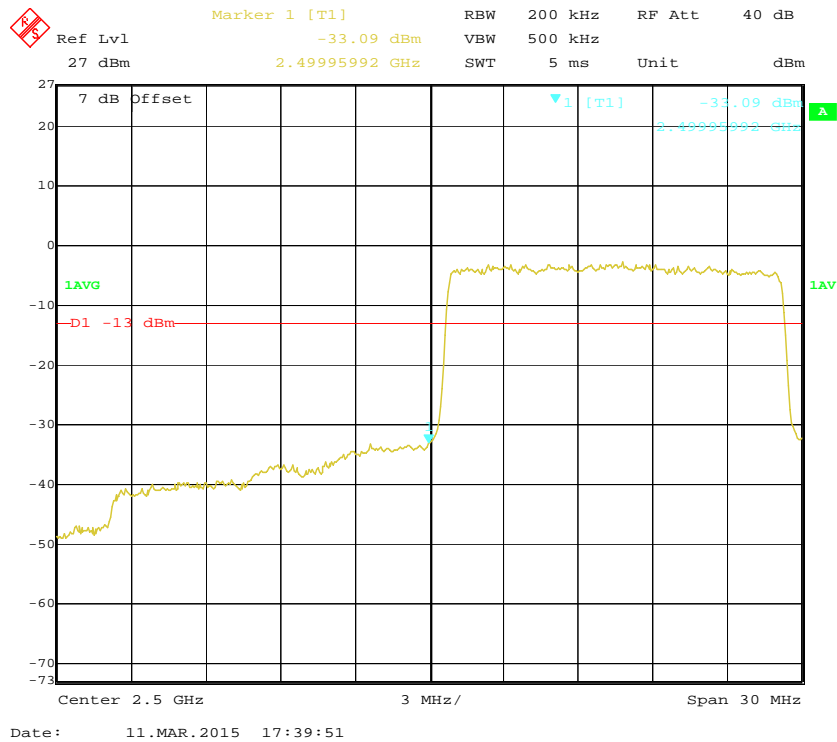


### QPSK (15.0 MHz, FULL RB) - Right Band Edge

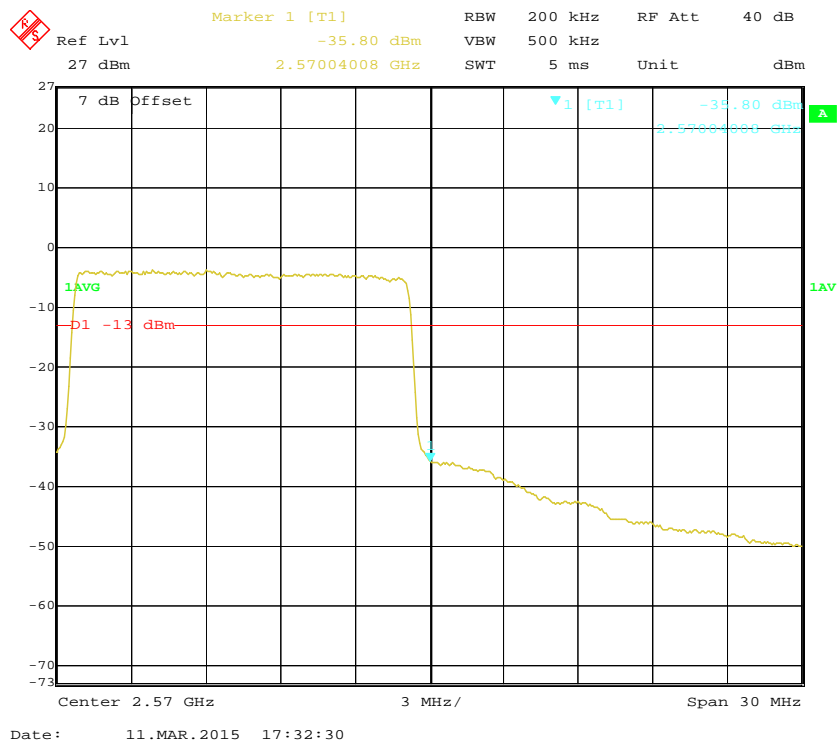




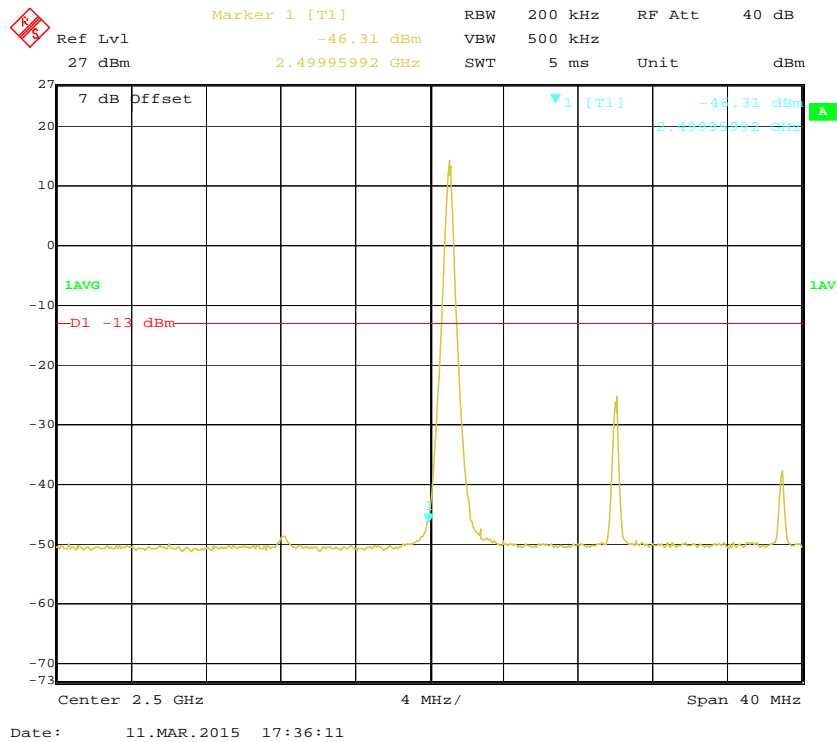
### 16-QAM (15.0 MHz, FULL RB) - Left Band Edge



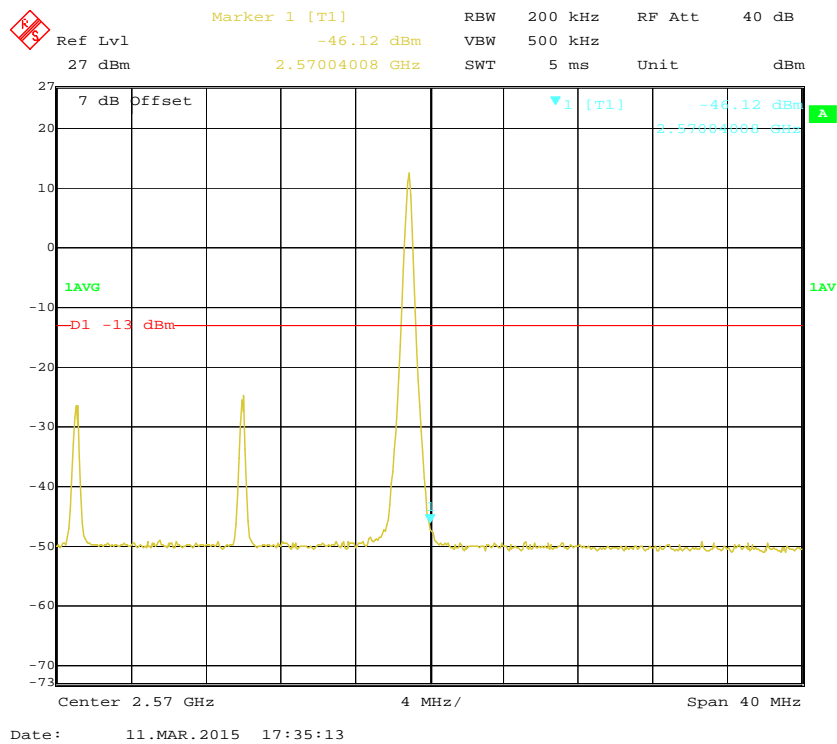
### 16-QAM (15.0 MHz, FULL RB) - Right Band Edge

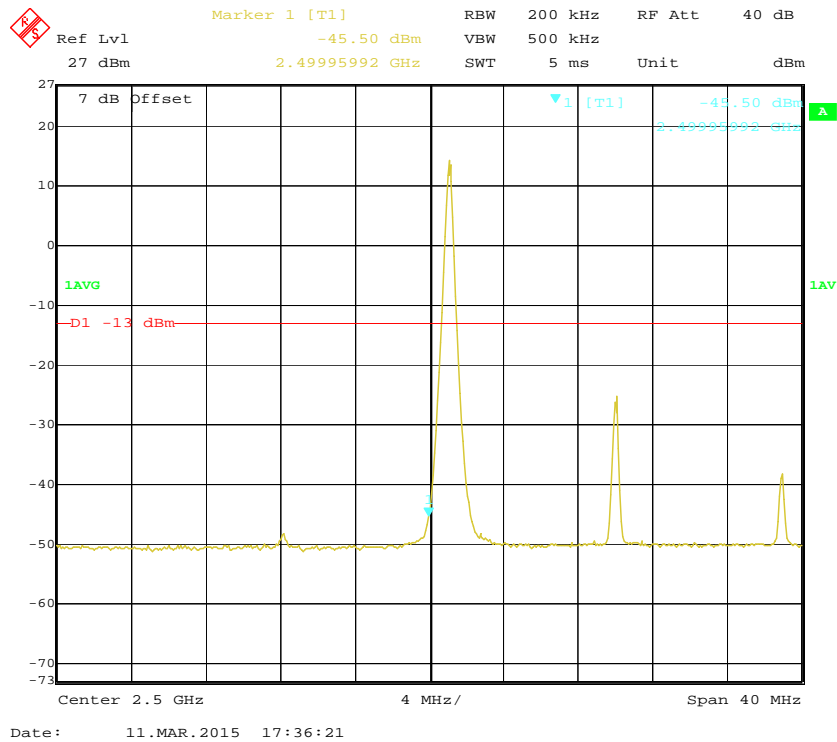
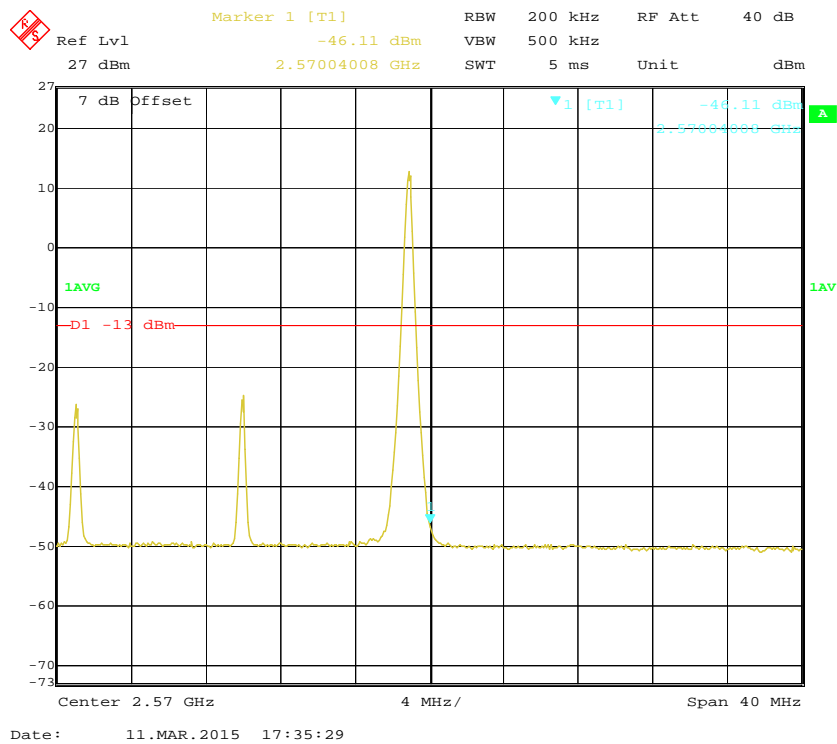


## QPSK (20.0 MHz, 1RB) - Left Band Edge

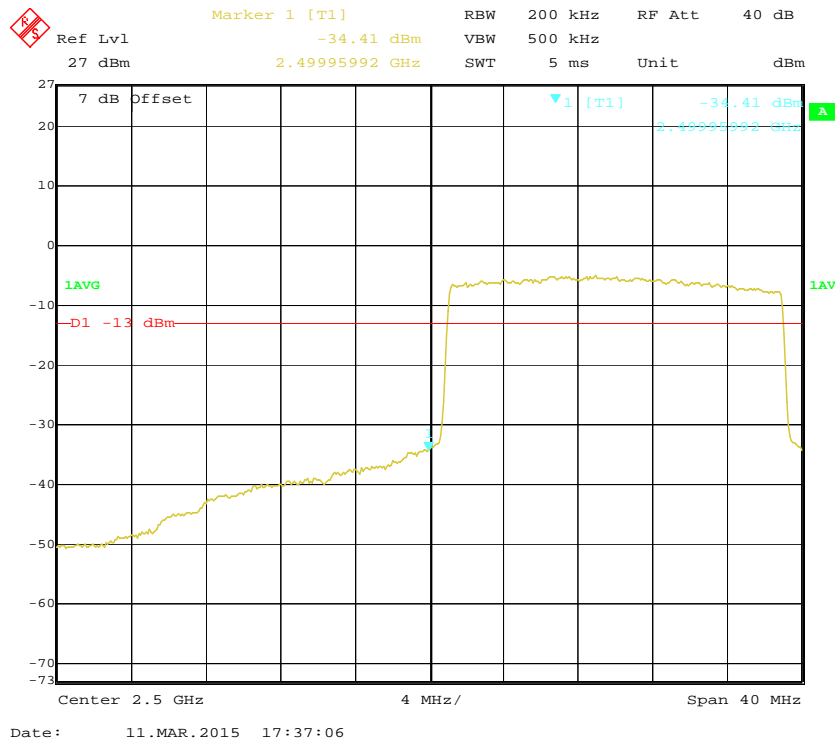


## QPSK (20.0 MHz, 1RB) - Right Band Edge

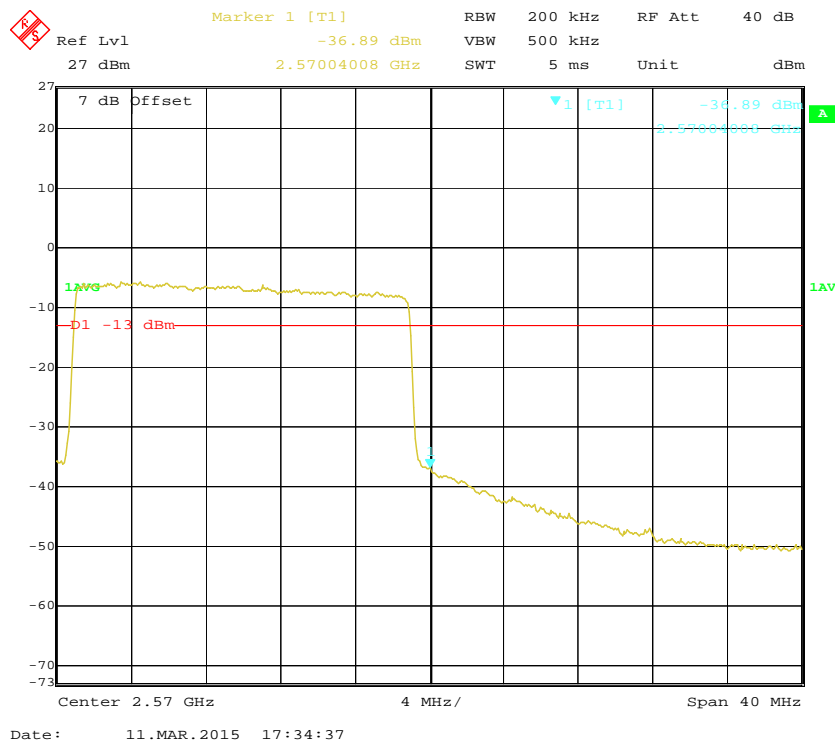


**16-QAM (20.0 MHz, 1RB) - Left Band Edge****16-QAM (20.0 MHz, 1RB) - Right Band Edge**

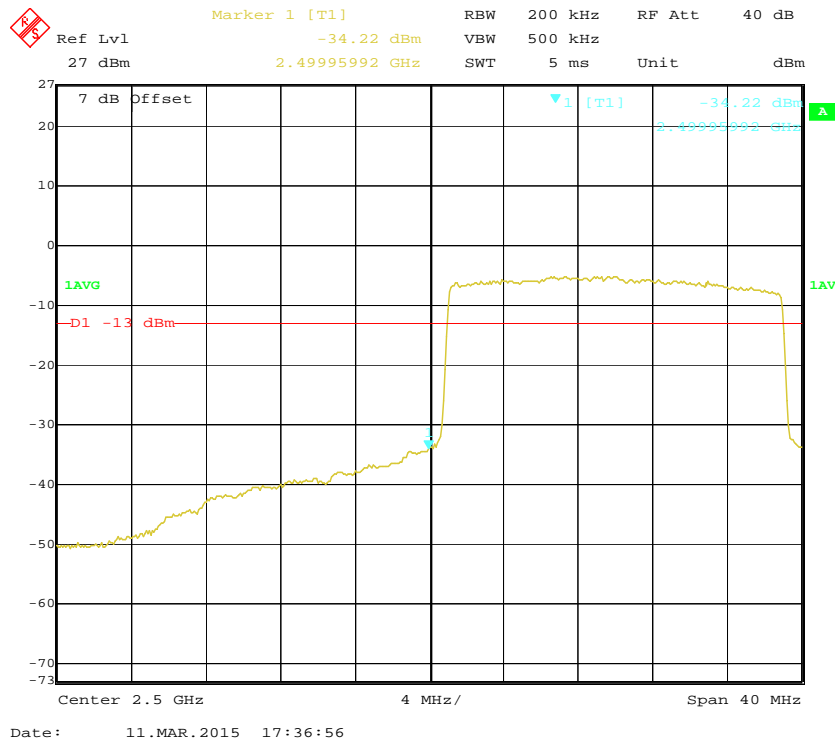
### QPSK (20.0 MHz, FULL RB) - Left Band Edge



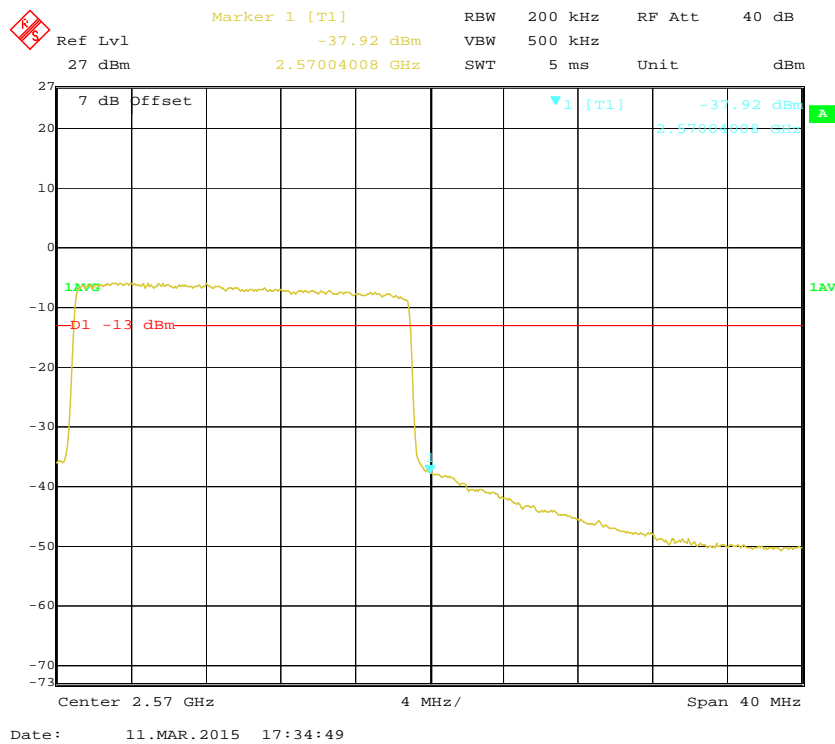
### QPSK (20.0 MHz, FULL RB) - Right Band Edge



### 16-QAM (20.0 MHz, FULL RB) - Left Band Edge



### 16-QAM (20.0 MHz, FULL RB) - Right Band Edge



## FCC §2.1055 & §27.54 - FREQUENCY STABILITY

### Applicable Standards

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

### Test Procedure

The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from - 30 °C to + 50 °C using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from battery end point to 115 % of the voltage normally at the input to the device or at the power supply terminals if cables are not normally supplied.

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2014-11-01	2015-11-01

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to requirements, traceable to National Primary Standards and International System of Units (SI).

### Test Data

#### Environmental Conditions

Temperature:	25 °C
Relative Humidity:	48 %
ATM Pressure:	101.0 kPa

*The testing was performed by Mike Hu on 2015-03-17.*

**Band 4:**

	Temperature (°C)	QPSK (Hz)	QPSK (ppm)	Result
<b>10.0 MHz, Middle Channel</b>	-30	-28	-0.016	Pass
	-20	-22	-0.013	Pass
	-10	-19	-0.011	Pass
	0	-16	-0.009	Pass
	10	-17	-0.010	Pass
	20	-24	-0.014	Pass
	30	-22	-0.013	Pass
	40	-18	-0.010	Pass
	50	-25	-0.014	Pass
	Voltage (V <sub>DC</sub> )	QPSK (Hz)	QPSK (ppm)	Result
	3.7	-22	-0.013	Pass
	3.5	-23	-0.013	Pass
	4.2	-27	-0.016	Pass

**Band 7:**

	Temperature (°C)	QPSK (Hz)	QPSK (ppm)	Result
<b>10.0 MHz, Middle Channel, FULL RB</b>	-30	-15	-0.006	Pass
	-20	-10	-0.004	Pass
	-10	-9	-0.004	Pass
	0	-10	-0.004	Pass
	10	-12	-0.005	Pass
	20	-13	-0.005	Pass
	30	-13	-0.005	Pass
	40	-12	-0.005	Pass
	50	-11	-0.004	Pass
	Voltage (V <sub>DC</sub> )	QPSK (Hz)	QPSK (ppm)	Result
	3.7	-15	-0.006	Pass
	3.5	-15	-0.006	Pass
	4.2	-16	-0.006	Pass

\*\*\*\*\* END OF REPORT \*\*\*\*\*