FCC PART 27

FCC PART 22H, PART 24E

MEASUREMENT AND TEST REPORT

For

BLU Products, Inc.

10814 NW 33rd St # 100 Doral, FL 33172, United States

FCC ID: YHLBLUSTJ5

Report Type:	**Product Type:**
Original Report	Mobile phone

Report Number:	RSZ160829008-00D
Report Date:	2016-10-21
Reviewed By:	Oscar Ye Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Kunshan) Chenghu Road,Kunshan Development Zone No.248,Kunshan, Jiangsu, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *BLU Products, Inc.*'s product, model number: *STUDIO J5 (FCC ID: YHLBLUSTJ5)* or the "EUT" in this report was a *Mobile phone*, which was measured approximately: 142 mm (L) × 72 mm (W) × 8 mm (H), rated with input voltage: DC 3.8 V battery or DC 5V from adapter.

Adapter Information:
Model: US-BB-1000
Input: AC 100-240V, 50/60Hz, 0.2A
Output: DC 5V, 1A

**All measurement and test data in this report was gathered from production sample serial number: 1603122 (Assigned by BACL, Kunshan).The EUT supplied by the applicant was received on 2016-08-29.*

Objective

This type approval report is prepared on behalf of *BLU Products, Inc.* in accordance with Part 2, Part 22-Subpart H, Part 24-Subpart E and Part 27 of the Federal Communication Commission's 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, Part 15.247 DSS & DTS submissions with FCC ID: YHLBLUSTJ5.

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 22 Subpart H - Public Mobile Services
Part 24 Subpart E - Personal Communication Services
Part 27 – Miscellaneous wireless communications services

Applicable Standards: TIA/EIA 603-D.

All emissions measurement was performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Measurement Uncertainty

Item		Uncertainty
AC Power Lines Conducted Emissions		±3.26 dB
RF conducted test with spectrum		±0.9dB
RF Output Power with Power meter		±0.5dB
Radiated emission	30MHz~1GHz	±5.91dB
	Above 1G	±4.92dB
Occupied Bandwidth		±0.5kHz
Temperature		±1.0℃
Humidity		±6%

Test Facility

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the Chenghu Lake Road, Kunshan Development Zone No.248,Kunshan, Jiangsu, China

Test site at Bay Area Compliance Laboratories Corp. (Kunshan) 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 November 06, 2014. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 815570. 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.

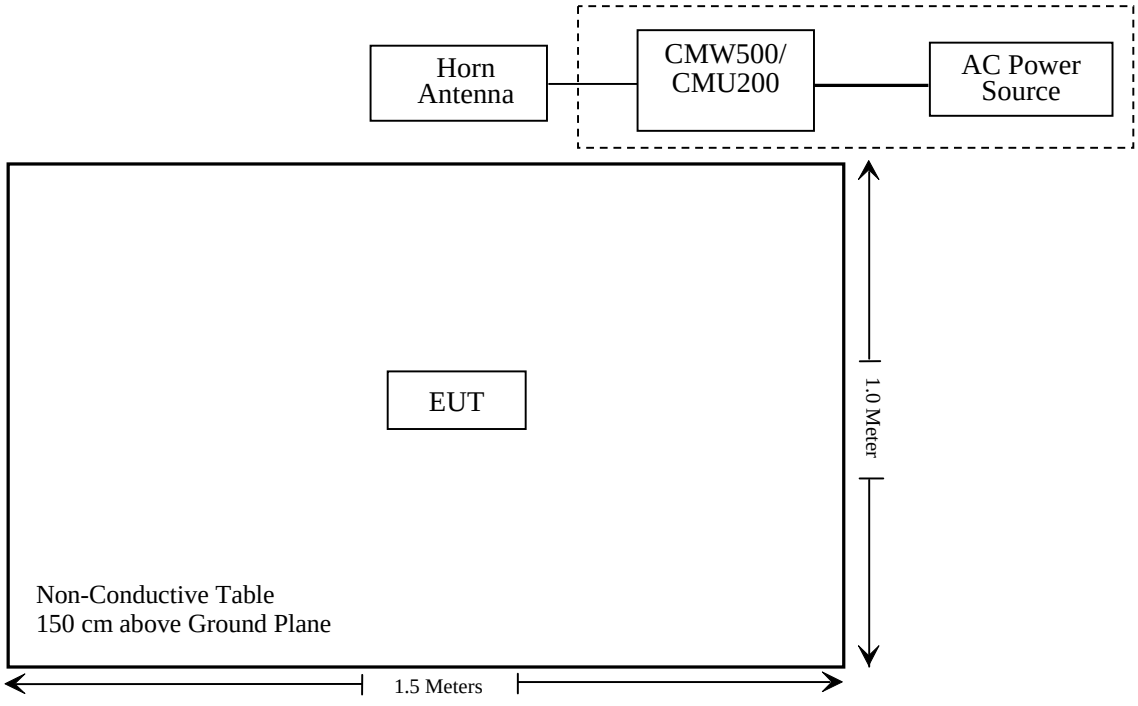
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-116218-UY
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1307 (b)(1), §2.1093	RF Exposure Information	Compliance*
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (d) (h)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Compliance*: Please refer to SAR report released by BACL, report number: RSZ160829008-20.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sonoma Instrunent	Amplifier	330	171377	2016-09-16	2017-09-16
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2015-11-12	2016-11-11
Sunol Sciences	Broadband Antenna	JB3	A090314-2	2015-11-07	2016-11-06
Sunol Sciences	Broadband Antenna	JB3	A090314-1	2015-11-07	2016-11-06
Mini	Pre-amplifier	ZVA-183-S+	857001418	2016-09-16	2017-09-15
DUCOMMUN	Pre-amplifier	ALN-22093530-01	990147	2016-09-16	2017-09-15
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Signal Analyzer	FSV40	101116	2016-07-04	2017-07-03
ETS	Horn Antenna	3115	6229	2015-11-07	2016-11-06
ETS	Horn Antenna	3115	9311-4159	2015-11-07	2016-11-06
R&S	Auto test Software	EMC32	V 09.10.0	NCR	NCR
HP	Signal Generator	E4421B	3426A01336	2015-11-04	2016-11-03
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
BACL	RF cable	KS-LAB-010	KS-LAB-010	2015-12-16	2016-12-15
RF Conducted test					
BACL	TS 8997 Cable-01	T-KS-EMC086	T-KS-EMC086	2015-12-10	2016-12-09
BACL	RF cable	KS-LAB-012	KS-LAB-012	2015-12-16	2016-12-15
WEINSCHEL	3dB Attenuator	5326	N/A	2016-06-18	2017-06-18
Rohde & Schwarz	OSP120 BASE UNIT	OSP120	101247	2016-07-04	2017-07-03
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131	2016-09-21	2017-09-21
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	110605	2015-11-11	2016-11-11
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-116218-UY	2016-04-14	2017-04-14
HONOVA	Power Splitter	ZFRSC-14-S+	019411452	2016-06-12	2017-06-12
WEINSCHEL	10dB Attenuator	5328	N/A	2016-06-18	2017-06-18

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

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

Applicable Standard

FCC§1.1307, §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ160829008-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d) , Part 22H & 24E, Part 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (d) (h) - RF OUTPUT POWER

Applicable Standards

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications..

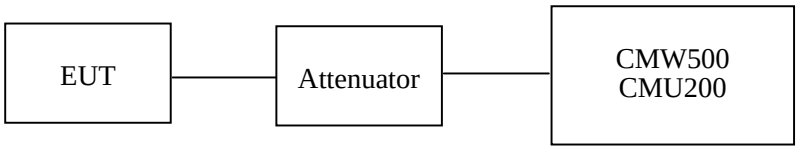
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.
The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

Test Procedure

Conducted method:

The RF output of the transmitter was connected to the CMW500/CMU200 through sufficient attenuation.



Radiated method:

TIA603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-10-20.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	31.25	38.45
	190	836.6	31.28	38.45
	251	848.8	31.32	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	31.25	29.32	28.26	26.24	38.45
	190	836.6	31.30	29.33	28.23	26.17	38.45
	251	848.8	31.31	29.32	28.15	26.07	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.07	24.21	23.28	22.26	38.45
	190	836.6	26.02	24.13	23.09	22.20	38.45
	251	848.8	25.95	24.05	23.09	22.10	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band 5)	Normal	RMC		21.81	21.69	21.81
		HSDPA	1	20.63	20.53	20.79
			2	20.53	20.41	20.75
			3	20.69	20.57	20.83
			4	20.59	20.48	20.68
		HSUPA	1	20.67	20.57	20.73
			2	20.54	20.46	20.65
			3	20.80	20.68	20.77
			4	20.62	20.52	20.61
			5	20.72	20.68	20.79
		HSPA+	1	20.58	20.49	20.76

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.52	33
	661	1880.0	28.36	33
	810	1909.8	28.32	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.64	26.73	25.56	24.60	33
	661	1880.0	28.53	26.68	25.52	24.61	33
	810	1909.8	28.49	26.72	25.62	24.68	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	26.19	23.49	22.46	21.48	33
	661	1880.0	26.08	23.40	22.42	21.43	33
	810	1909.8	26.03	23.40	22.34	21.31	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band 2)	**Normal**	RMC		21.96	21.86	21.56
		HSDPA	1	20.93	20.81	20.43
			2	20.81	20.75	20.31
			3	21.02	20.91	20.49
			4	20.87	20.73	20.40
		HSUPA	1	20.70	20.88	20.49
			2	20.66	20.79	20.38
			3	20.73	20.94	20.60
			4	20.57	20.82	20.41
			5	20.74	20.94	20.55
		HSPA+	1	20.70	20.86	20.50

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band 4)	**Normal**	RMC		21.52	21.65	21.74
		HSDPA	1	20.50	20.63	20.66
			2	20.44	20.55	20.54
			3	20.56	20.74	20.72
			4	20.43	20.51	20.53
		HSUPA	1	20.46	20.62	20.65
			2	20.39	20.55	20.55
			3	20.51	20.72	20.78
			4	20.42	20.57	20.58
			5	20.49	20.68	20.78
		HSPA+	1	20.50	20.59	20.64

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.29	13
	Middle	0.24	13
	High	0.27	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.59	13
	Middle	0.62	13
	High	0.54	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.17	13
	Middle	3.12	13
	High	3.14	13
HSDPA (16QAM)	Low	3.15	13
	Middle	3.02	13
	High	3.14	13
HSUPA (BPSK)	Low	3.17	13
	Middle	3.02	13
	High	3.12	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.27	13
	Middle	0.21	13
	High	0.26	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.34	13
	Middle	0.32	13
	High	0.37	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.18	13
	Middle	3.04	13
	High	3.19	13
HSDPA (16QAM)	Low	3.14	13
	Middle	3.01	13
	High	3.16	13
HSUPA (BPSK)	Low	3.18	13
	Middle	3.03	13
	High	3.15	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.89	13
	Middle	3.11	13
	High	3.23	13
HSDPA (16QAM)	Low	2.56	13
	Middle	2.67	13
	High	2.98	13
HSUPA (BPSK)	Low	3.51	13
	Middle	3.26	13
	High	3.34	13

Radiated Power

GSM Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), High Channel										
848.80	97.33	102	1.8	H	26.3	0.46	4.75	30.59	38.45	7.86
848.80	92.14	158	1.5	V	21.1	0.46	4.75	25.39	38.45	13.06
EIRP, PCS Band (Part 24E), Low Channel										
1850.20	79.24	66	1.3	H	18.4	0.31	10.4	28.49	33	4.51
1850.20	76.57	124	1.5	V	12.3	0.31	10.4	22.39	33	10.61

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, Cellular Band (Part 22H), Low Channel										
824.20	92.43	123	1.9	H	21.4	0.46	4.75	25.69	38.45	12.76
824.20	87.25	175	1.5	V	16.2	0.46	4.75	20.49	38.45	17.96
EIRP, PCS Band (Part 24E), Low Channel										
1850.20	76.54	9	1.8	H	15.7	0.31	10.4	25.79	33	7.21
1850.20	74.27	250	1.6	V	10.0	0.31	10.4	20.09	33	12.91

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	S.G. Level (dBm)	Cable loss (dB)	Antenna Gain (dB)			
ERP, WCDMA Band V (Part 22H), High Channel										
846.60	88.33	175	1.9	H	17.4	0.46	4.75	21.69	38.45	16.76
846.60	85.07	102	1.6	V	14.0	0.46	4.75	18.29	38.45	20.16
EIRP, WCDMA Band II (Part 24E), Low Channel										
1852.40	71.94	266	1.2	H	11.1	0.31	10.4	21.19	33	11.81
1852.40	72.07	110	1.3	V	7.8	0.31	10.4	17.89	33	15.11
EIRP, WCDMA Band IV(Part 27), Middle Channel										
1752.60	74.08	10	1.9	H	11.7	0.30	9.90	21.30	30	8.70
1752.60	75.74	326	1.4	V	10.9	0.30	9.90	20.50	30	9.50

Note:
All above data were tested with no amplifier.
Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

LTE Band 2:

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	22.35	22.82	22.41
		RB Size=1, RB Offset=2	22.30	22.70	22.31
		RB Size=1, RB Offset=5	22.39	22.90	22.46
		RB Size=3, RB Offset=0	21.75	21.05	21.69
		RB Size=3, RB Offset=1	21.68	21.34	21.59
		RB Size=3, RB Offset=2	21.82	21.13	21.78
		RB Size=6, RB Offset=0	20.26	20.75	20.34
	16QAM	RB Size=1, RB Offset=0	22.38	22.81	22.45
		RB Size=1, RB Offset=2	22.25	22.71	22.42
		RB Size=1, RB Offset=5	22.45	22.94	22.53
		RB Size=3, RB Offset=0	21.71	21.02	21.63
		RB Size=3, RB Offset=1	21.65	21.39	21.51
		RB Size=3, RB Offset=2	21.76	21.11	21.72
		RB Size=6, RB Offset=0	20.32	20.80	20.37
3.0	QPSK	RB Size=1, RB Offset=0	22.42	22.74	22.34
		RB Size=1, RB Offset=7	22.32	22.62	22.29
		RB Size=1, RB Offset=14	22.51	22.86	22.44
		RB Size=8, RB Offset=0	21.86	21.12	21.45
		RB Size=8, RB Offset=4	21.75	21.01	21.25
		RB Size=8, RB Offset=7	21.90	21.22	21.08
		RB Size=15, RB Offset=0	20.36	20.89	20.52
	16QAM	RB Size=1, RB Offset=0	22.52	22.84	22.42
		RB Size=1, RB Offset=7	22.48	22.74	22.36
		RB Size=1, RB Offset=14	22.58	22.95	22.53
		RB Size=8, RB Offset=0	21.89	21.18	21.84
		RB Size=8, RB Offset=4	21.85	21.12	21.80
		RB Size=8, RB Offset=7	21.96	21.21	21.87
		RB Size=15, RB Offset=0	20.39	20.91	20.54

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	22.55	22.84	22.46
		RB Size=1, RB Offset=12	22.51	22.80	22.37
		RB Size=1, RB Offset=24	22.64	22.91	22.53
		RB Size=12, RB Offset=0	21.75	21.12	21.86
		RB Size=12, RB Offset=6	21.70	21.01	21.73
		RB Size=12, RB Offset=11	21.82	21.16	21.91
		RB Size=25, RB Offset=0	20.42	20.93	20.58
	16QAM	RB Size=1, RB Offset=0	22.58	22.92	22.53
		RB Size=1, RB Offset=12	22.50	22.81	22.44
		RB Size=1, RB Offset=24	22.62	22.96	22.58
		RB Size=12, RB Offset=0	21.21	22.45	21.18
		RB Size=12, RB Offset=6	21.17	21.37	21.14
		RB Size=12, RB Offset=11	21.33	21.52	21.30
		RB Size=25, RB Offset=0	20.45	21.90	20.52
10.0	QPSK	RB Size=1, RB Offset=0	22.54	22.95	22.62
		RB Size=1, RB Offset=24	22.45	22.86	22.58
		RB Size=1, RB Offset=49	22.59	23.02	22.66
		RB Size=25, RB Offset=0	21.26	21.52	21.27
		RB Size=25, RB Offset=12	21.17	21.42	21.21
		RB Size=25, RB Offset=24	21.30	21.63	21.34
		RB Size=50, RB Offset=0	20.49	20.97	20.58
	16QAM	RB Size=1, RB Offset=0	22.42	22.86	22.52
		RB Size=1, RB Offset=24	22.30	22.78	22.49
		RB Size=1, RB Offset=49	22.53	22.97	22.62
		RB Size=25, RB Offset=0	21.22	21.49	21.23
		RB Size=25, RB Offset=12	21.17	21.39	21.18
		RB Size=25, RB Offset=24	21.28	21.60	21.27
		RB Size=50, RB Offset=0	20.42	20.97	20.51

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	22.32	22.76	22.42
		RB Size=1, RB Offset=37	22.22	22.71	22.36
		RB Size=1, RB Offset=74	22.36	22.85	22.52
		RB Size=36, RB Offset=0	21.24	22.45	21.28
		RB Size=36, RB Offset=18	21.14	21.39	21.18
		RB Size=36, RB Offset=37	21.36	21.51	21.33
		RB Size=75, RB Offset=0	20.05	20.27	20.03
	16QAM	RB Size=1, RB Offset=0	22.65	23.00	22.62
		RB Size=1, RB Offset=37	22.60	22.95	22.52
		RB Size=1, RB Offset=74	22.74	23.09	22.69
		RB Size=36, RB Offset=0	21.32	21.62	21.38
		RB Size=36, RB Offset=18	21.28	21.52	21.32
		RB Size=36, RB Offset=37	21.38	21.67	21.45
		RB Size=75, RB Offset=0	20.09	20.28	20.08
20.0	QPSK	RB Size=1, RB Offset=0	22.32	22.77	22.25
		RB Size=1, RB Offset=49	22.26	22.73	22.14
		RB Size=1, RB Offset=99	22.41	22.83	22.33
		RB Size=50, RB Offset=0	21.04	21.32	21.08
		RB Size=50, RB Offset=24	21.29	21.22	21.37
		RB Size=50, RB Offset=49	21.15	21.38	22.16
		RB Size=100, RB Offset=0	20.41	20.95	20.52
	16QAM	RB Size=1, RB Offset=0	22.24	22.55	22.17
		RB Size=1, RB Offset=49	22.15	22.52	22.09
		RB Size=1, RB Offset=99	22.33	22.62	22.22
		RB Size=50, RB Offset=0	21.01	21.28	21.04
		RB Size=50, RB Offset=24	21.28	21.16	21.04
		RB Size=50, RB Offset=49	22.12	21.39	22.11
		RB Size=100, RB Offset=0	20.86	20.10	20.78

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.25	13	Pass
QPSK (100%RB Size)	5.57	13	Pass
16QAM (1RB Size)	4.13	13	Pass
16QAM (100%RB Size)	5.64	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	73.41	278	1.2	H	12.6	0.31	10.4	22.69	33
1880.00	75.58	169	2.1	V	11.3	0.31	10.4	21.39	33
3 MHz Bandwidth									
1880.00	73.17	128	1.6	H	12.3	0.31	10.4	22.39	33
1880.00	74.47	241	1.4	V	10.2	0.31	10.4	20.29	33
5 MHz Bandwidth									
1880.00	72.65	101	1.2	H	11.8	0.31	10.4	21.89	33
1880.00	73.56	48	2.3	V	9.3	0.31	10.4	19.39	33
10MHz Bandwidth									
1880.00	72.33	64	2.4	H	11.5	0.31	10.4	21.59	33
1880.00	73.66	94	2.2	V	9.4	0.31	10.4	19.49	33
15 MHz Bandwidth									
1880.00	71.73	57	1.3	H	10.9	0.31	10.4	20.99	33
1880.00	73.05	273	1.3	V	8.8	0.31	10.4	18.89	33
20 MHz Bandwidth									
1880.00	71.22	180	2.1	H	10.4	0.31	10.4	20.49	33
1880.00	72.87	139	1.6	V	8.6	0.31	10.4	18.69	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	73.25	58	1.9	H	12.4	0.31	10.4	22.49	33
1880.00	74.47	316	2.3	V	10.2	0.31	10.4	20.29	33
3 MHz Bandwidth									
1880.00	72.97	17	2.0	H	12.1	0.31	10.4	22.19	33
1880.00	73.94	12	2.0	V	9.7	0.31	10.4	19.79	33
5 MHz Bandwidth									
1880.00	72.45	15	1.4	H	11.6	0.31	10.4	21.69	33
1880.00	73.65	262	1.5	V	9.4	0.31	10.4	19.49	33
10 MHz Bandwidth									
1880.00	72.14	115	1.8	H	11.3	0.31	10.4	21.39	33
1880.00	73.64	110	1.3	V	9.4	0.31	10.4	19.49	33
15 MHz Bandwidth									
1880.00	71.41	36	2.1	H	10.6	0.31	10.4	20.69	33
1880.00	73.03	185	1.9	V	8.8	0.31	10.4	18.89	33
20 MHz Bandwidth									
1880.00	71.23	92	2.0	H	10.4	0.31	10.4	20.49	33
1880.00	72.87	69	1.2	V	8.6	0.31	10.4	18.69	33

LTE 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	22.56	22.83	23.08
		RB Size=1, RB Offset=2	22.49	22.71	22.96
		RB Size=1, RB Offset=5	22.65	22.88	23.15
		RB Size=3, RB Offset=0	21.76	21.15	21.35
		RB Size=3, RB Offset=1	21.67	21.03	21.27
		RB Size=3, RB Offset=2	21.88	21.19	21.42
		RB Size=6, RB Offset=0	20.56	20.79	20.02
	16QAM	RB Size=1, RB Offset=0	22.51	22.80	23.04
		RB Size=1, RB Offset=2	22.40	22.73	22.95
		RB Size=1, RB Offset=5	22.61	22.88	23.11
		RB Size=3, RB Offset=0	21.74	21.08	21.28
		RB Size=3, RB Offset=1	21.68	21.99	21.19
		RB Size=3, RB Offset=2	21.81	21.20	21.40
		RB Size=6, RB Offset=0	20.68	20.80	20.08
3.0	QPSK	RB Size=1, RB Offset=0	22.46	22.81	23.08
		RB Size=1, RB Offset=7	22.37	22.71	23.03
		RB Size=1, RB Offset=14	22.56	22.88	23.17
		RB Size=8, RB Offset=0	21.86	21.12	21.34
		RB Size=8, RB Offset=4	21.75	21.08	21.31
		RB Size=8, RB Offset=7	21.93	21.19	21.40
		RB Size=15, RB Offset=0	20.61	20.86	20.03
	16QAM	RB Size=1, RB Offset=0	22.41	22.75	23.04
		RB Size=1, RB Offset=7	22.32	22.71	22.95
		RB Size=1, RB Offset=14	22.48	22.84	23.16
		RB Size=8, RB Offset=0	21.95	21.28	21.45
		RB Size=8, RB Offset=4	21.89	21.21	21.36
		RB Size=8, RB Offset=7	21.07	21.40	21.50
		RB Size=15, RB Offset=0	20.59	20.87	20.09

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	22.67	22.95	23.24
		RB Size=1, RB Offset=12	22.61	22.85	23.16
		RB Size=1, RB Offset=24	22.80	23.01	23.34
		RB Size=12, RB Offset=0	21.18	21.42	21.68
		RB Size=12, RB Offset=6	21.05	21.36	21.58
		RB Size=12, RB Offset=11	21.22	21.49	21.71
		RB Size=25, RB Offset=0	20.63	20.90	20.15
	16QAM	RB Size=1, RB Offset=0	22.64	22.88	23.17
		RB Size=1, RB Offset=12	22.59	22.81	23.13
		RB Size=1, RB Offset=24	22.73	22.98	23.30
		RB Size=12, RB Offset=0	21.11	21.35	21.64
		RB Size=12, RB Offset=6	21.02	21.27	21.57
		RB Size=12, RB Offset=11	21.22	21.44	21.74
		RB Size=25, RB Offset=0	20.52	20.87	20.08
10.0	QPSK	RB Size=1, RB Offset=0	22.84	23.12	23.42
		RB Size=1, RB Offset=24	22.80	23.04	23.32
		RB Size=1, RB Offset=49	22.94	23.19	23.48
		RB Size=25, RB Offset=0	21.76	21.04	21.28
		RB Size=25, RB Offset=12	21.72	21.00	21.17
		RB Size=25, RB Offset=24	21.85	21.07	21.32
		RB Size=50, RB Offset=0	20.45	20.93	20.27
	16QAM	RB Size=1, RB Offset=0	22.42	22.89	23.12
		RB Size=1, RB Offset=24	22.36	22.84	23.04
		RB Size=1, RB Offset=49	22.51	22.99	23.21
		RB Size=25, RB Offset=0	21.15	21.42	21.78
		RB Size=25, RB Offset=12	21.03	21.34	21.67
		RB Size=25, RB Offset=24	21.24	21.53	21.89
		RB Size=50, RB Offset=0	20.76	20.00	20.34

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	22.41	22.78	23.04
		RB Size=1, RB Offset=37	22.38	22.73	22.95
		RB Size=1, RB Offset=74	22.52	22.88	23.08
		RB Size=36, RB Offset=0	21.04	21.35	21.65
		RB Size=36, RB Offset=18	21.99	21.31	21.54
		RB Size=36, RB Offset=37	21.12	21.40	21.69
		RB Size=75, RB Offset=0	20.45	20.87	20.15
	16QAM	RB Size=1, RB Offset=0	22.75	22.96	23.24
		RB Size=1, RB Offset=37	22.63	22.87	23.15
		RB Size=1, RB Offset=74	22.81	22.99	23.34
		RB Size=36, RB Offset=0	21.21	21.54	21.78
		RB Size=36, RB Offset=18	21.16	21.44	21.68
		RB Size=36, RB Offset=37	21.33	21.60	21.91
		RB Size=75, RB Offset=0	20.87	20.17	20.42
20.0	QPSK	RB Size=1, RB Offset=0	22.63	22.97	23.21
		RB Size=1, RB Offset=49	22.59	22.94	23.15
		RB Size=1, RB Offset=99	22.70	23.10	23.32
		RB Size=50, RB Offset=0	21.26	21.57	21.84
		RB Size=50, RB Offset=24	21.20	21.45	21.80
		RB Size=50, RB Offset=49	21.32	21.67	21.96
		RB Size=100, RB Offset=0	20.42	20.89	20.24
	16QAM	RB Size=1, RB Offset=0	22.42	22.72	23.05
		RB Size=1, RB Offset=49	22.33	22.68	22.93
		RB Size=1, RB Offset=99	22.54	22.84	23.11
		RB Size=50, RB Offset=0	21.22	21.51	21.89
		RB Size=50, RB Offset=24	21.19	21.45	21.79
		RB Size=50, RB Offset=49	21.34	21.63	21.99
		RB Size=100, RB Offset=0	20.12	20.38	20.65

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.76	13	Pass
QPSK (100%RB Size)	5.52	13	Pass
16QAM (1RB Size)	4.95	13	Pass
16QAM (100%RB Size)	5.64	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	75.48	217	2.3	H	13.1	0.30	9.90	22.70	30
1732.50	75.74	317	1.9	V	10.9	0.30	9.90	20.50	30
3 MHz Bandwidth									
1732.50	74.88	296	1.7	H	12.5	0.30	9.90	22.10	30
1732.50	75.64	113	1.5	V	10.8	0.30	9.90	20.40	30
5 MHz Bandwidth									
1732.50	73.98	177	1.7	H	11.6	0.30	9.90	21.20	30
1732.50	74.54	300	2.0	V	9.7	0.30	9.90	19.30	30
10MHz Bandwidth									
1732.50	73.78	118	1.5	H	11.4	0.30	9.90	21.00	30
1732.50	74.74	106	1.8	V	9.9	0.30	9.90	19.50	30
15 MHz Bandwidth									
1732.50	73.58	158	2.2	H	11.2	0.30	9.90	20.80	30
1732.50	74.04	355	1.8	V	9.2	0.30	9.90	18.80	30
20 MHz Bandwidth									
1732.50	72.88	275	2.2	H	10.5	0.30	9.90	20.10	30
1732.50	73.14	246	1.5	V	8.3	0.30	9.90	17.90	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	75.18	206	1.2	H	12.8	0.30	9.90	22.40	30
1732.50	75.74	137	1.3	V	10.9	0.30	9.90	20.50	30
3 MHz Bandwidth									
1732.50	75.08	258	1.0	H	12.7	0.30	9.90	22.30	30
1732.50	75.04	281	1.8	V	10.2	0.30	9.90	19.80	30
5 MHz Bandwidth									
1732.50	74.48	233	1.2	H	12.1	0.30	9.90	21.70	30
1732.50	74.54	253	2.4	V	9.7	0.30	9.90	19.30	30
10 MHz Bandwidth									
1732.50	74.08	353	1.2	H	11.7	0.30	9.90	21.30	30
1732.50	73.74	19	1.7	V	8.9	0.30	9.90	18.50	30
15 MHz Bandwidth									
1732.50	73.68	273	1.9	H	11.3	0.30	9.90	20.90	30
1732.50	73.14	128	2.0	V	8.3	0.30	9.90	17.90	30
20 MHz Bandwidth									
1732.50	73.28	36	1.3	H	10.9	0.30	9.90	20.50	30
1732.50	72.94	311	2.1	V	8.1	0.30	9.90	17.70	30

LTE Band 7

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.85	22.16	22.75
		RB Size=1, RB Offset=12	22.78	22.06	22.69
		RB Size=1, RB Offset=24	22.92	22.19	22.80
		RB Size=12, RB Offset=0	21.26	21.56	21.32
		RB Size=12, RB Offset=6	21.14	21.49	21.21
		RB Size=12, RB Offset=11	21.37	21.67	21.42
		RB Size=25, RB Offset=0	20.02	20.26	20.95
	16QAM	RB Size=1, RB Offset=0	22.04	22.33	22.08
		RB Size=1, RB Offset=12	21.96	22.28	21.99
		RB Size=1, RB Offset=24	22.14	22.38	22.15
		RB Size=12, RB Offset=0	21.34	21.74	21.38
		RB Size=12, RB Offset=6	21.25	21.67	21.31
		RB Size=12, RB Offset=11	21.46	21.81	21.44
		RB Size=25, RB Offset=0	20.07	20.31	20.04
10	QPSK	RB Size=1, RB Offset=0	22.25	22.64	22.32
		RB Size=1, RB Offset=24	22.18	22.58	22.27
		RB Size=1, RB Offset=49	22.31	22.73	22.36
		RB Size=25, RB Offset=0	21.24	21.42	21.17
		RB Size=25, RB Offset=12	21.15	21.35	21.08
		RB Size=25, RB Offset=24	21.33	21.46	21.21
		RB Size=50, RB Offset=0	20.01	20.21	20.03
	16QAM	RB Size=1, RB Offset=0	22.29	22.70	22.36
		RB Size=1, RB Offset=24	22.16	22.65	22.26
		RB Size=1, RB Offset=49	22.38	22.77	22.40
		RB Size=25, RB Offset=0	21.26	21.51	21.27
		RB Size=25, RB Offset=12	21.23	21.38	21.19
		RB Size=25, RB Offset=24	21.33	21.56	21.33
		RB Size=50, RB Offset=0	20.12	20.30	20.17

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.22	22.60	22.32
		RB Size=1, RB Offset=37	22.16	22.52	22.25
		RB Size=1, RB Offset=74	22.35	22.67	22.37
		RB Size=36, RB Offset=0	21.22	21.42	21.22
		RB Size=36, RB Offset=18	21.11	21.37	21.14
		RB Size=36, RB Offset=37	21.27	21.51	21.28
		RB Size=75, RB Offset=0	20.15	20.31	20.19
	16QAM	RB Size=1, RB Offset=0	22.27	22.68	22.35
		RB Size=1, RB Offset=37	22.22	22.63	22.27
		RB Size=1, RB Offset=74	22.35	22.71	22.39
		RB Size=36, RB Offset=0	21.15	21.64	21.28
		RB Size=36, RB Offset=18	21.31	21.79	21.42
		RB Size=36, RB Offset=37	21.30	21.68	21.32
		RB Size=75, RB Offset=0	20.31	20.67	20.34
20	QPSK	RB Size=1, RB Offset=0	22.35	22.74	22.39
		RB Size=1, RB Offset=49	22.25	22.67	22.34
		RB Size=1, RB Offset=99	22.47	22.86	22.49
		RB Size=50, RB Offset=0	21.26	21.48	21.24
		RB Size=50, RB Offset=24	21.14	21.39	21.13
		RB Size=50, RB Offset=49	21.29	21.52	21.32
		RB Size=100, RB Offset=0	20.12	20.35	20.05
	16QAM	RB Size=1, RB Offset=0	22.31	22.74	22.27
		RB Size=1, RB Offset=49	22.27	22.67	22.17
		RB Size=1, RB Offset=99	22.44	22.84	22.38
		RB Size=50, RB Offset=0	21.19	21.62	21.16
		RB Size=50, RB Offset=24	21.35	21.79	21.38
		RB Size=50, RB Offset=49	21.40	21.79	21.20
		RB Size=100, RB Offset=0	20.42	20.73	20.35

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.76	13	Pass
QPSK (100%RB Size)	5.64	13	Pass
16QAM (1RB Size)	4.42	13	Pass
16QAM (100%RB Size)	5.45	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	69.65	109	1.8	H	12.2	0.43	10.60	22.37	33
2535.00	68.91	137	2.2	V	9.8	0.43	10.60	19.97	33
10MHz Bandwidth									
2535.00	69.01	13	1.6	H	11.6	0.43	10.60	21.77	33
2535.00	68.72	174	1.4	V	9.6	0.43	10.60	19.77	33
15 MHz Bandwidth									
2535.00	68.07	207	1.5	H	10.6	0.43	10.60	20.77	33
2535.00	68.25	153	2.1	V	9.1	0.43	10.60	19.27	33
20 MHz Bandwidth									
2535.00	67.63	211	1.7	H	10.2	0.43	10.60	20.37	33
2535.00	67.26	120	1.2	V	8.1	0.43	10.60	18.27	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
2535.00	69.72	145	2.0	H	12.3	0.43	10.60	22.47	33
2535.00	69.84	169	2.0	V	10.7	0.43	10.60	20.87	33
10 MHz Bandwidth									
2535.00	69.25	163	1.3	H	11.8	0.43	10.60	21.97	33
2535.00	69.51	331	1.4	V	10.4	0.43	10.60	20.57	33
15 MHz Bandwidth									
2535.00	69.07	303	1.2	H	12.6	0.43	10.60	21.77	33
2535.00	68.23	45	1.1	V	9.1	0.43	10.60	19.27	33
20 MHz Bandwidth									
2535.00	68.16	166	1.7	H	10.7	0.43	10.60	20.87	33
2535.00	67.25	332	1.9	V	8.1	0.43	10.60	18.27	33

LTE Band 12:

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	22.13	22.46	22.25
		RB Size=1, RB Offset=2	22.03	22.34	22.18
		RB Size=1, RB Offset=5	22.23	22.53	22.37
		RB Size=3, RB Offset=0	21.53	21.93	21.63
		RB Size=3, RB Offset=1	21.41	21.86	21.58
		RB Size=3, RB Offset=2	21.59	21.98	21.72
		RB Size=6, RB Offset=0	20.15	20.44	20.21
	16QAM	RB Size=1, RB Offset=0	22.16	22.44	22.22
		RB Size=1, RB Offset=2	22.05	22.39	22.14
		RB Size=1, RB Offset=5	22.27	22.48	22.30
		RB Size=3, RB Offset=0	21.58	21.97	21.69
		RB Size=3, RB Offset=1	21.52	21.88	21.61
		RB Size=3, RB Offset=2	21.64	21.09	21.81
		RB Size=6, RB Offset=0	20.19	20.44	20.26
3.0	QPSK	RB Size=1, RB Offset=0	22.11	22.33	22.16
		RB Size=1, RB Offset=7	22.04	22.28	22.10
		RB Size=1, RB Offset=14	22.17	22.38	22.23
		RB Size=8, RB Offset=0	21.52	21.96	21.51
		RB Size=8, RB Offset=4	21.40	21.88	21.42
		RB Size=8, RB Offset=7	21.57	21.08	21.62
		RB Size=15, RB Offset=0	20.12	20.55	20.26
	16QAM	RB Size=1, RB Offset=0	22.14	22.31	22.12
		RB Size=1, RB Offset=7	22.06	22.27	22.02
		RB Size=1, RB Offset=14	22.21	22.41	22.15
		RB Size=8, RB Offset=0	21.56	21.89	21.54
		RB Size=8, RB Offset=4	21.49	21.78	21.44
		RB Size=8, RB Offset=7	21.64	21.96	21.64
		RB Size=15, RB Offset=0	20.12	20.55	20.26

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	22.05	22.32	22.18
		RB Size=1, RB Offset=12	22.01	22.23	22.06
		RB Size=1, RB Offset=24	22.09	22.44	22.29
		RB Size=12, RB Offset=0	21.52	21.83	21.56
		RB Size=12, RB Offset=6	21.44	21.78	21.46
		RB Size=12, RB Offset=11	21.56	21.86	21.62
		RB Size=25, RB Offset=0	20.16	20.54	20.23
	16QAM	RB Size=1, RB Offset=0	22.08	22.31	22.13
		RB Size=1, RB Offset=12	21.98	22.19	22.01
		RB Size=1, RB Offset=24	22.19	22.36	22.18
		RB Size=12, RB Offset=0	21.56	21.86	21.51
		RB Size=12, RB Offset=6	21.44	21.73	21.40
		RB Size=12, RB Offset=11	21.67	21.90	21.59
		RB Size=25, RB Offset=0	20.12	20.65	20.29
10.0	QPSK	RB Size=1, RB Offset=0	22.02	22.24	22.03
		RB Size=1, RB Offset=24	21.97	22.14	21.98
		RB Size=1, RB Offset=49	22.11	22.28	22.10
		RB Size=25, RB Offset=0	21.51	21.81	21.46
		RB Size=25, RB Offset=12	21.39	21.72	21.38
		RB Size=25, RB Offset=24	21.55	21.94	21.50
		RB Size=50, RB Offset=0	20.18	20.54	20.23
	16QAM	RB Size=1, RB Offset=0	21.95	22.24	21.86
		RB Size=1, RB Offset=24	21.89	22.16	21.82
		RB Size=1, RB Offset=49	21.99	22.34	21.98
		RB Size=25, RB Offset=0	21.56	21.89	21.42
		RB Size=25, RB Offset=12	21.46	21.79	21.38
		RB Size=25, RB Offset=24	21.67	21.98	21.47
		RB Size=50, RB Offset=0	20.27	20.61	20.25

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.63	13	Pass
QPSK (100%RB Size)	6.05	13	Pass
16QAM (1RB Size)	5.24	13	Pass
16QAM (100%RB Size)	6.15	13	Pass

ERP:

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
707.00	89.42	102	2.0	H	18.4	0.36	4.25	22.29	30
707.00	87.36	85	1.8	V	16.4	0.36	4.25	20.29	30
3.0MHz Bandwidth									
707.00	88.59	109	1.5	H	17.6	0.36	4.25	21.49	30
707.00	87.31	256	2.1	V	16.3	0.36	4.25	20.19	30
5 MHz Bandwidth									
707.00	87.45	134	1.9	H	16.5	0.36	4.25	20.39	30
707.00	86.21	121	2.1	V	15.2	0.36	4.25	19.09	30
10 MHz Bandwidth									
707.00	87.12	156	2.3	H	16.1	0.36	4.25	19.99	30
707.00	86.08	125	1.8	V	15.1	0.36	4.25	18.99	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
707.00	89.45	134	1.8	H	18.5	0.36	4.25	22.39	30
707.00	87.58	215	1.8	V	16.6	0.36	4.25	20.49	30
3.0 MHz Bandwidth									
707.00	88.57	201	1.7	H	17.6	0.36	4.25	21.49	30
707.00	86.43	56	1.7	V	15.4	0.36	4.25	19.29	30
5 MHz Bandwidth									
707.00	87.57	101	1.7	H	16.6	0.36	4.25	20.49	30
707.00	86.13	123	1.9	V	15.1	0.36	4.25	18.99	30
10 MHz Bandwidth									
707.00	87.37	115	1.4	H	16.4	0.36	4.25	20.29	30
707.00	84.18	203	1.5	V	13.2	0.36	4.25	17.09	30

LTE Band 17:

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	22.23	22.59	22.85
		RB Size=1, RB Offset=12	22.20	22.50	22.72
		RB Size=1, RB Offset=24	22.35	22.68	22.92
		RB Size=12, RB Offset=0	21.12	21.36	21.63
		RB Size=12, RB Offset=6	21.05	21.25	21.57
		RB Size=12, RB Offset=11	21.21	21.42	21.72
		RB Size=25, RB Offset=0	20.85	20.15	20.42
	16QAM	RB Size=1, RB Offset=0	22.25	22.59	22.87
		RB Size=1, RB Offset=12	22.12	22.55	22.82
		RB Size=1, RB Offset=24	22.28	22.65	22.94
		RB Size=12, RB Offset=0	21.21	21.46	21.76
		RB Size=12, RB Offset=6	21.33	21.66	21.96
		RB Size=12, RB Offset=11	21.22	21.66	21.87
		RB Size=25, RB Offset=0	20.12	20.43	20.75
10.0	QPSK	RB Size=1, RB Offset=0	22.21	22.5	22.89
		RB Size=1, RB Offset=24	22.14	22.39	22.85
		RB Size=1, RB Offset=49	22.33	22.60	22.95
		RB Size=25, RB Offset=0	21.15	21.39	21.75
		RB Size=25, RB Offset=12	21.07	21.27	21.71
		RB Size=25, RB Offset=24	21.25	21.47	21.83
		RB Size=50, RB Offset=0	20.86	20.21	20.56
	16QAM	RB Size=1, RB Offset=0	22.17	22.5	22.82
		RB Size=1, RB Offset=24	22.09	22.47	22.75
		RB Size=1, RB Offset=49	22.22	22.61	22.87
		RB Size=25, RB Offset=0	21.19	21.36	21.86
		RB Size=25, RB Offset=12	21.10	21.33	21.73
		RB Size=25, RB Offset=24	21.29	21.43	21.93
		RB Size=50, RB Offset=0	20.84	20.21	20.62

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.56	13	Pass
QPSK (100%RB Size)	6.71	13	Pass
16QAM (1RB Size)	4.83	13	Pass
16QAM (100%RB Size)	6.47	13	Pass

ERP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710.00	89.34	265	1.4	H	18.3	0.36	4.25	22.19	30
710.00	87.15	147	1.5	V	16.2	0.36	4.25	20.09	30
10 MHz Bandwidth									
710.00	88.56	189	1.7	H	17.6	0.36	4.25	21.49	30
710.00	86.23	302	1.8	V	15.2	0.36	4.25	19.09	30

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710.00	89.31	185	1.5	H	18.3	0.36	4.25	22.19	30
710.00	87.47	85	1.5	V	16.5	0.36	4.25	20.39	30
10 MHz Bandwidth									
710.00	88.43	48	1.9	H	17.4	0.36	4.25	21.29	30
710.00	87.02	213	1.5	V	16.0	0.36	4.25	19.89	30

Note:
All above data were tested with no amplifier
Absolute Level = SG Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level

FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 - OCCUPIED BANDWIDTH

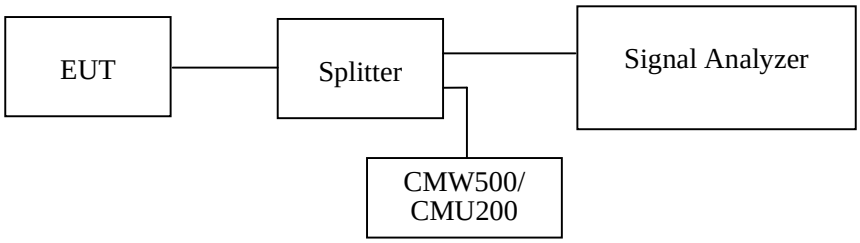
Applicable Standards

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 5 kHz (Cellular /PCS) & 100 kHz (WCDMA) and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	24~25℃
Relative Humidity:	53~55 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Chris Wang from 2016-10-16 to 2016-10-20.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables and plots.

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	248.5	316.6
EGPRS(8PSK)	836.6	252.5	316.6

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.208	4.890
HSUPA (BPSK)	836.6	4.208	4.890
HSDPA (16QAM)	836.6	4.228	4.890

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	248.5	316.6
EGPRS(8PSK)	1880.0	252.5	324.6

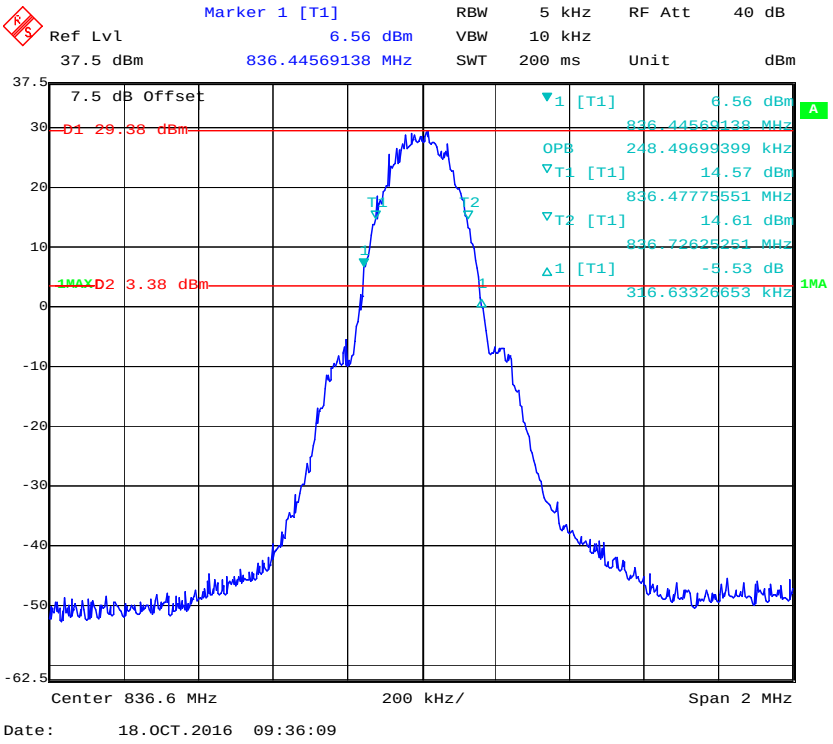
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.228	4.930
HSUPA (BPSK)	1880.0	4.248	4.910
HSDPA (16QAM)	1880.0	4.228	4.970

AWS Band

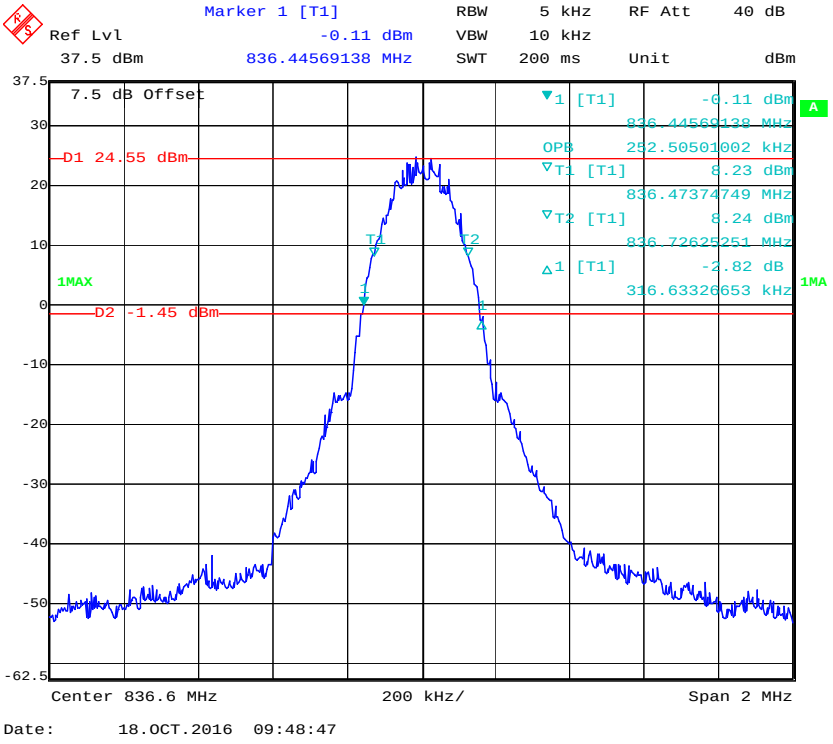
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
WCDMA (BPSK)	1732.6	4.228	4.890
HSUPA (BPSK)	1732.6	4.248	4.910
HSDPA (16QAM)	1732.6	4.228	4.890

Cellular Band (Part 22H)

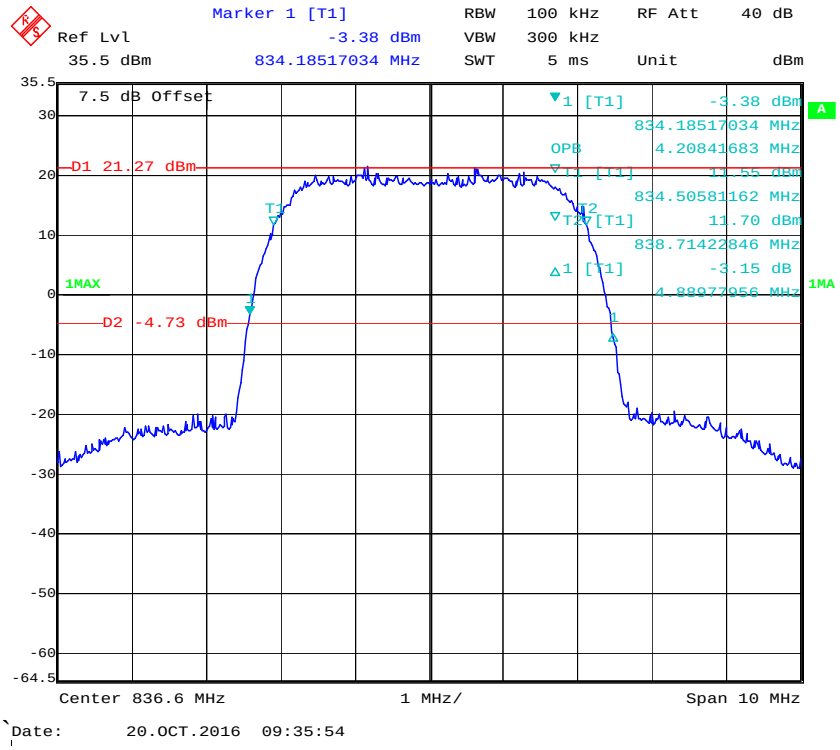
99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



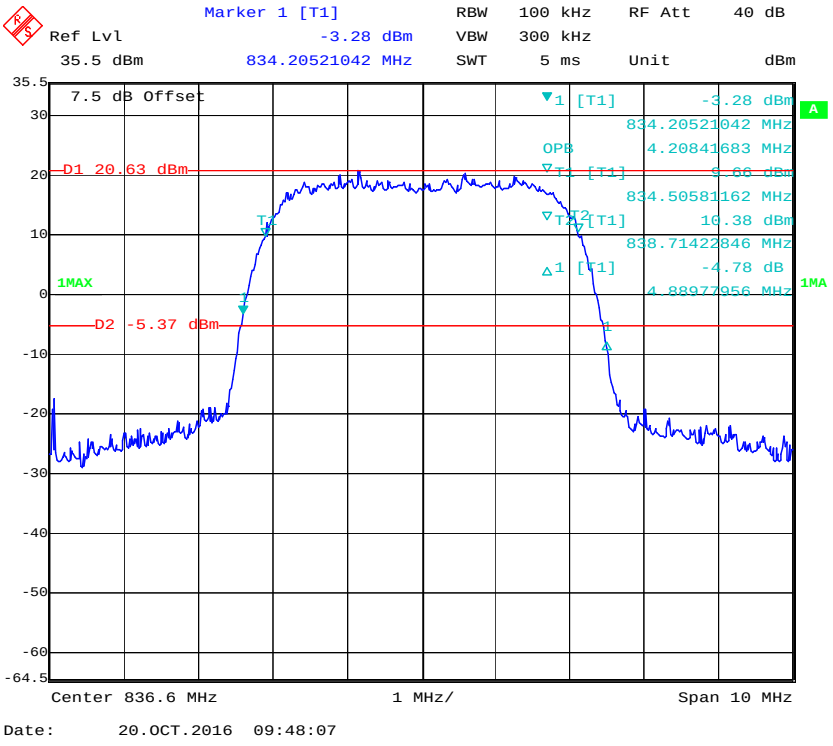
99% Occupied & 26 dB Emissions Bandwidth for EDGE Mode



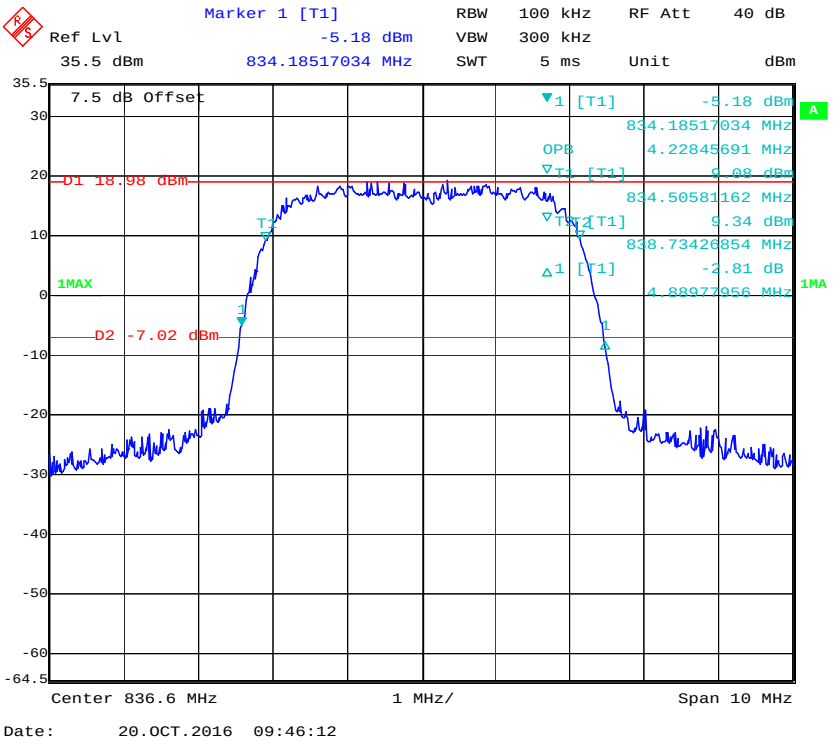
99% Occupied & 26 dB Emissions Bandwidth for RMC (BPSK) Mode



99% Occupied&26 dB Emissions Bandwidth for HSUPA (BPSK) Mode

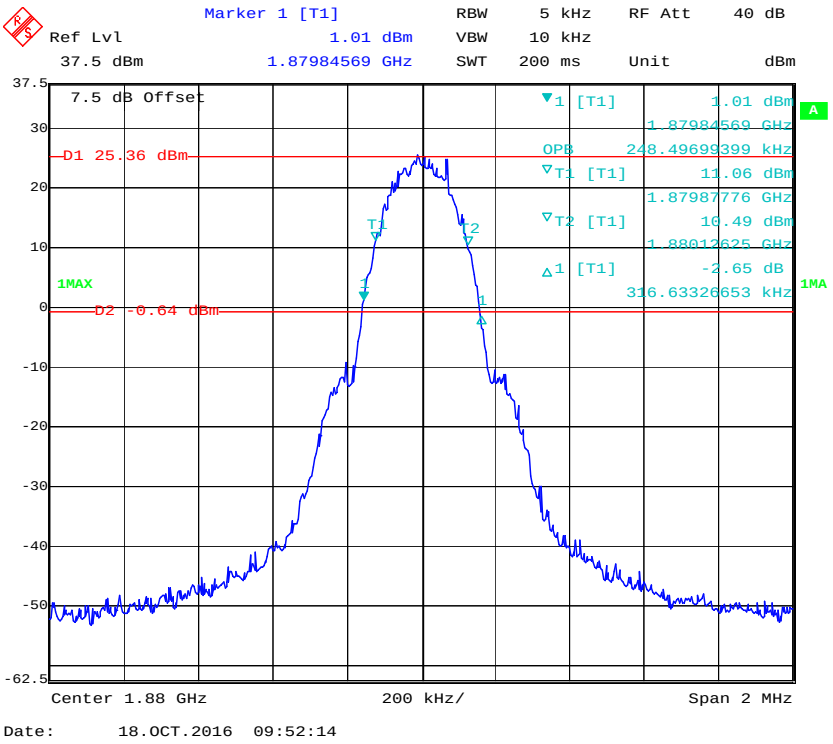


99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode

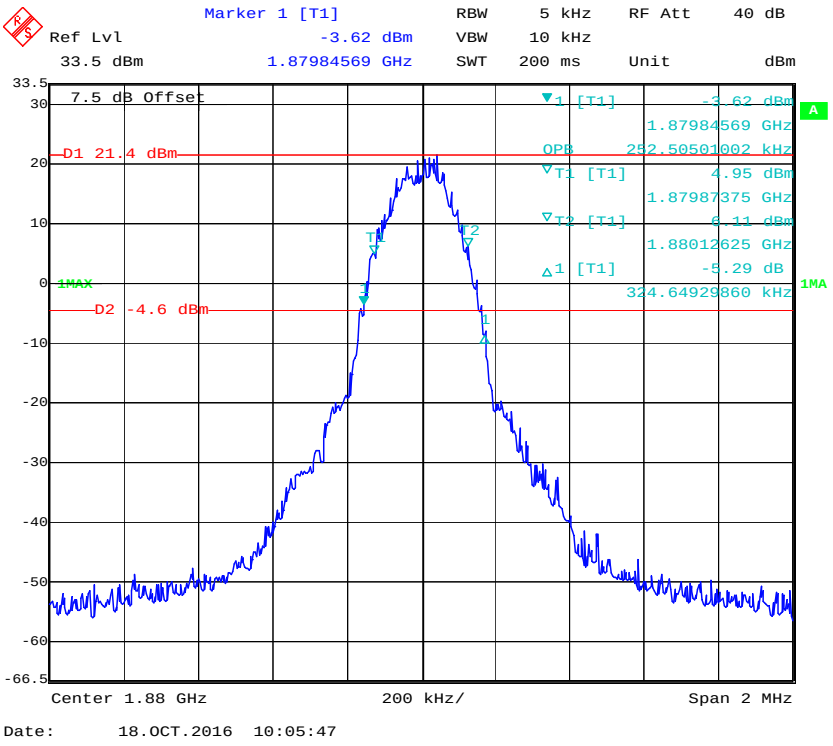


PCS Band (Part 24E)

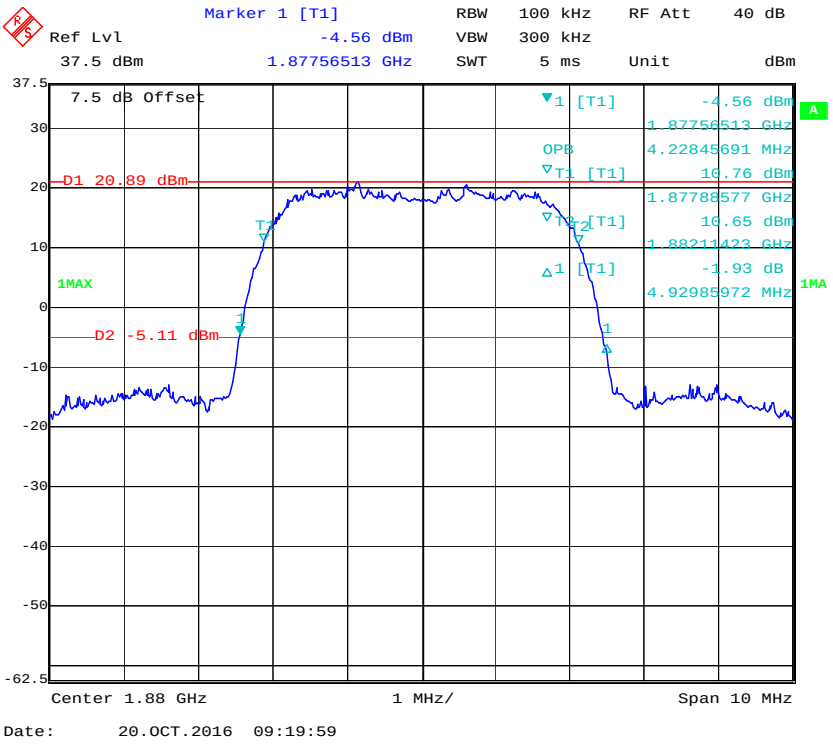
99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



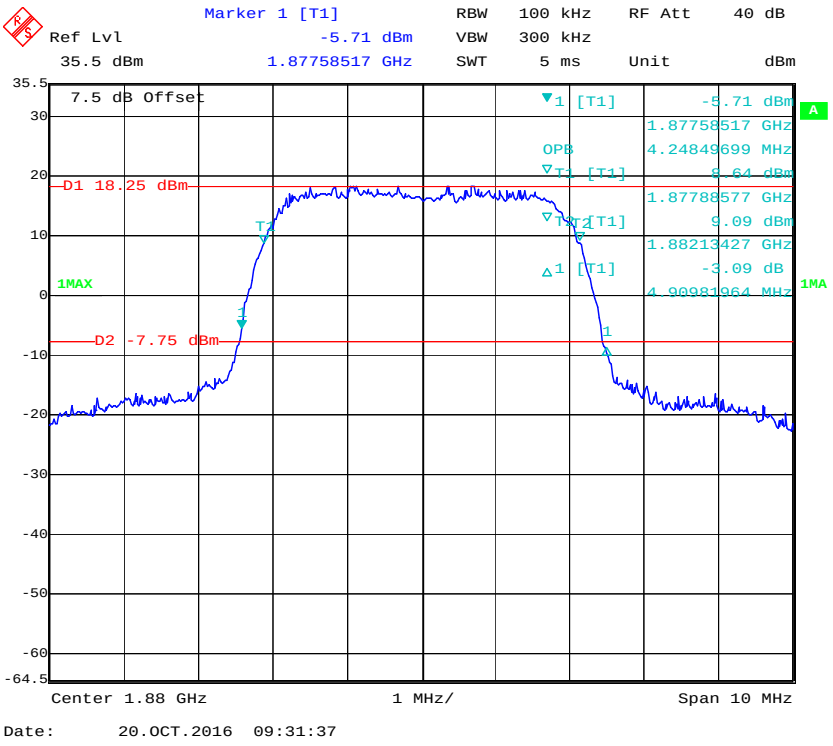
99% Occupied & 26 dB Emissions Bandwidth for EGPRS Mode



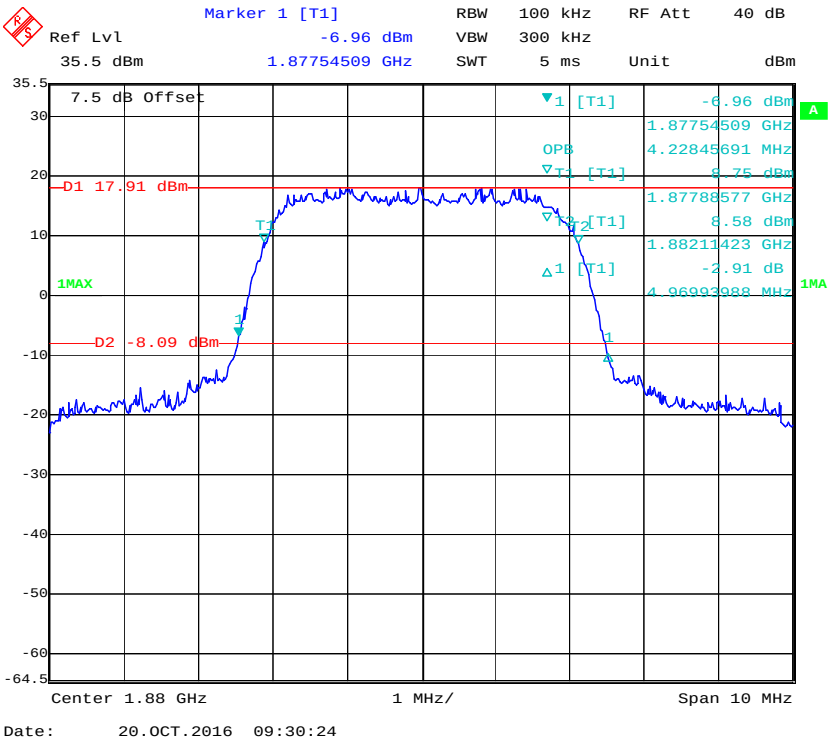
999% Occupied & 26 dB Emissions Bandwidth for RMC (BPSK) Mode



99% Occupied & 26 dB Emissions Bandwidth for HSUPA (BPSK) Mode

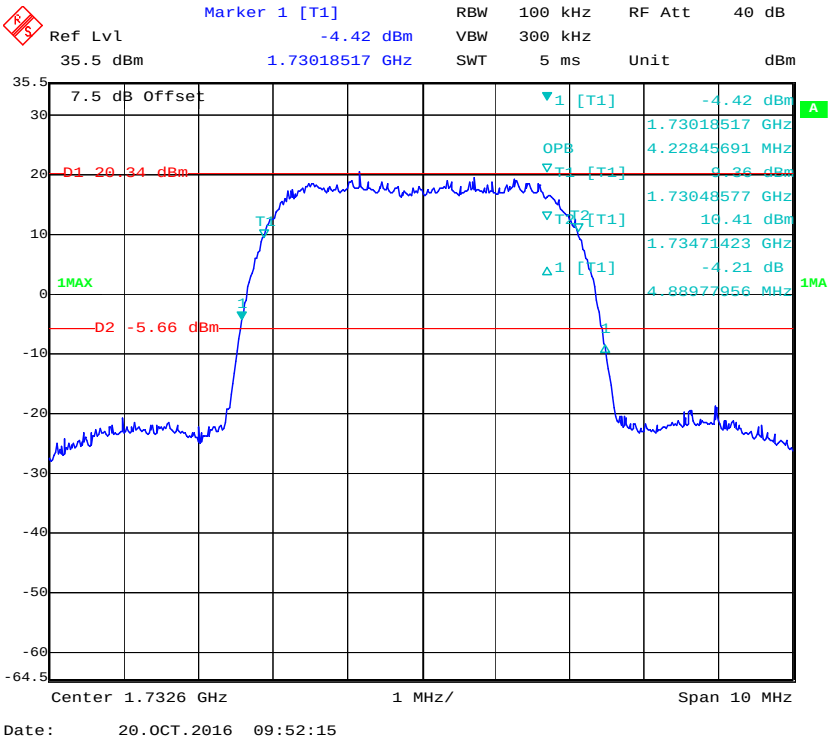


99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode

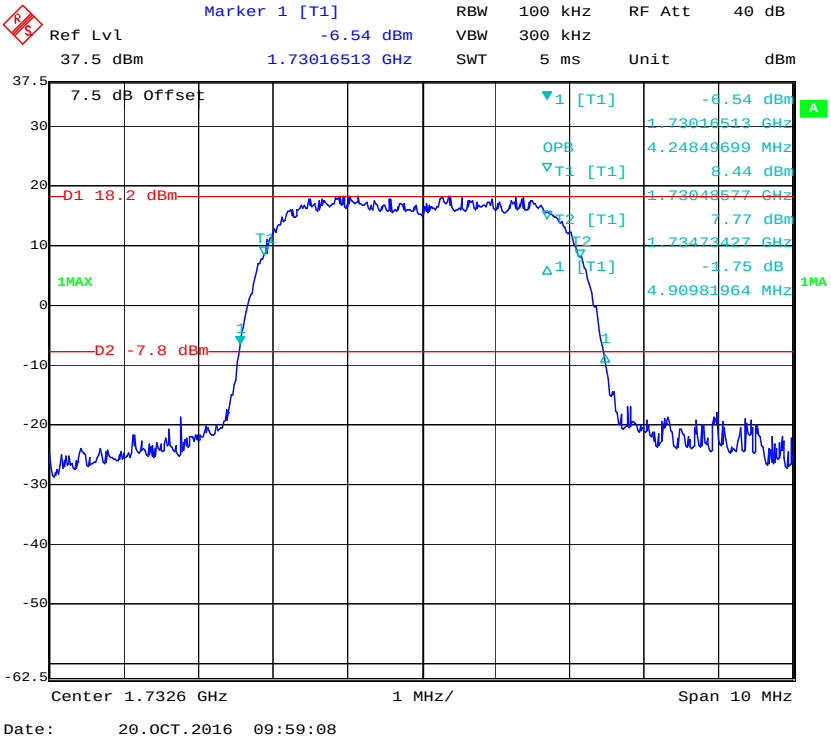


AWS Band

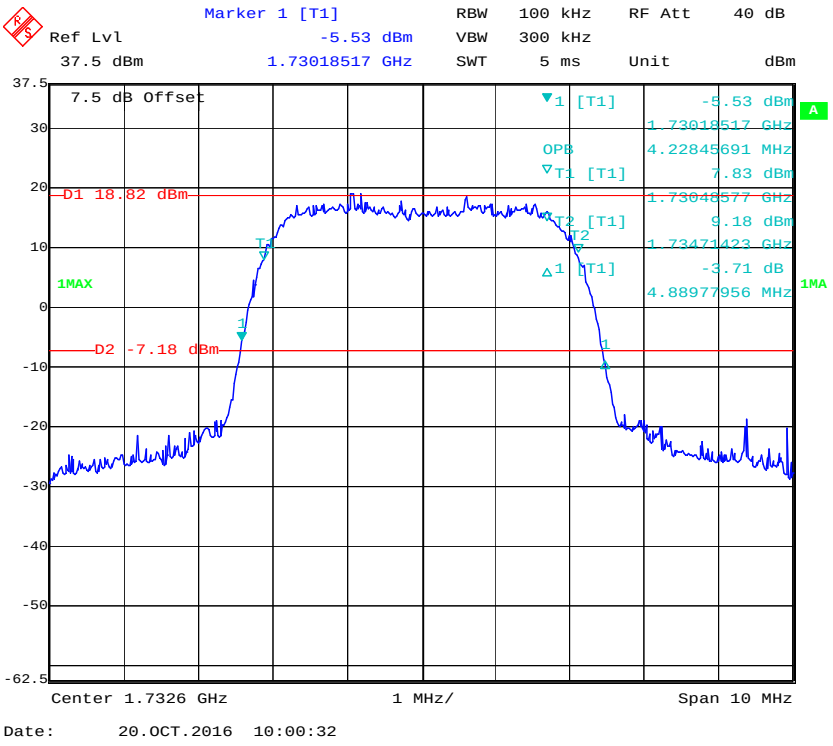
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode



99% Occupied & 26 dB Emissions Bandwidth for HSUPA (BPSK) Mode



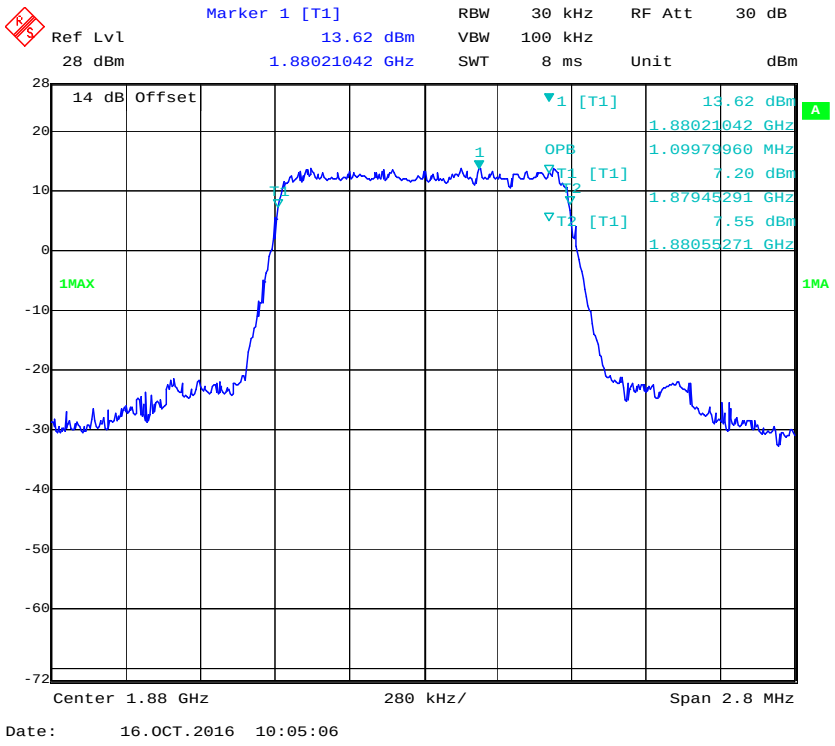
99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode



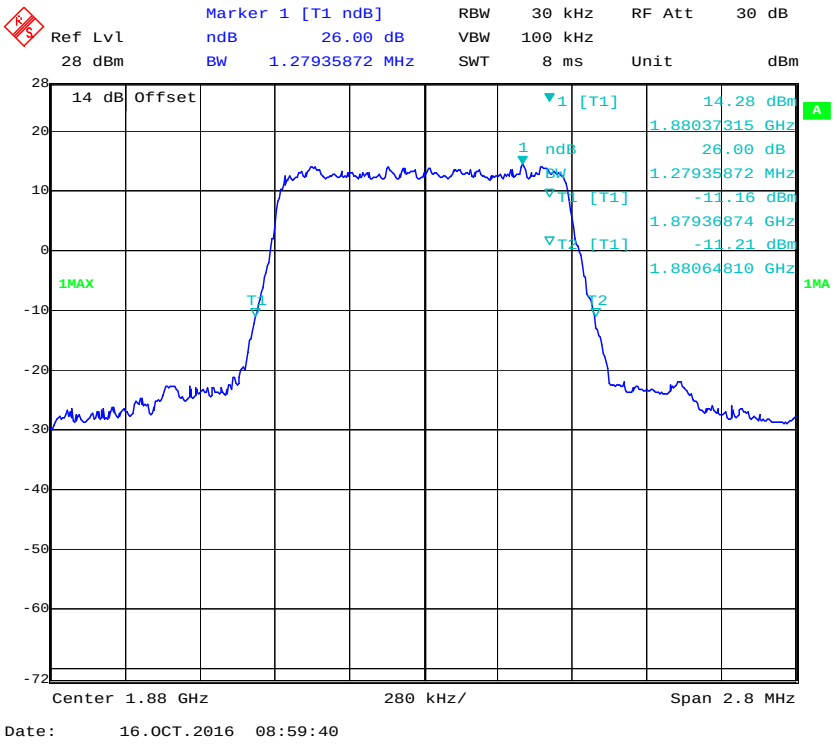
LTE Band 2: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.100	1.279
	16QAM	1.094	1.279
3.0	QPSK	2.693	2.910
	16QAM	2.693	2.946
5.0	QPSK	4.549	5.050
	16QAM	4.529	5.090
10.0	QPSK	8.978	9.739
	16QAM	8.978	9.739
15.0	QPSK	13.527	15.090
	16QAM	13.587	14.970
20.0	QPSK	17.956	19.319
	16QAM	17.956	19.399

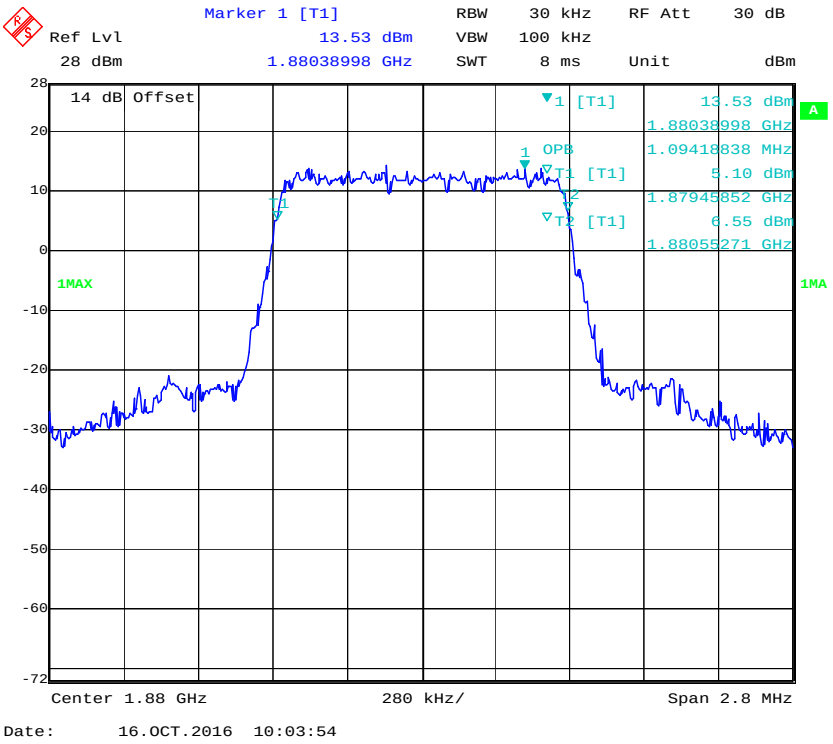
QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



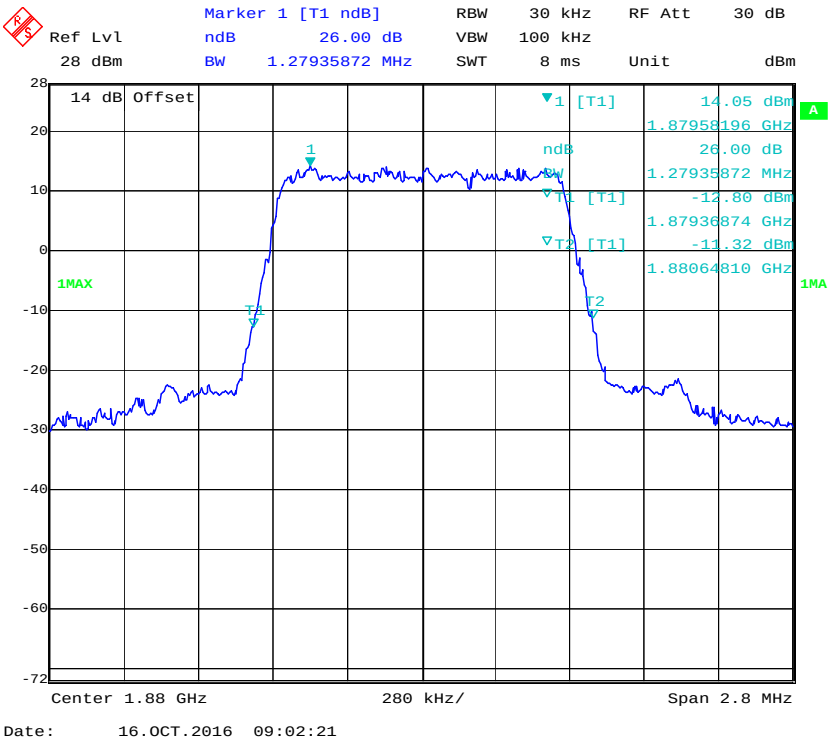
QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



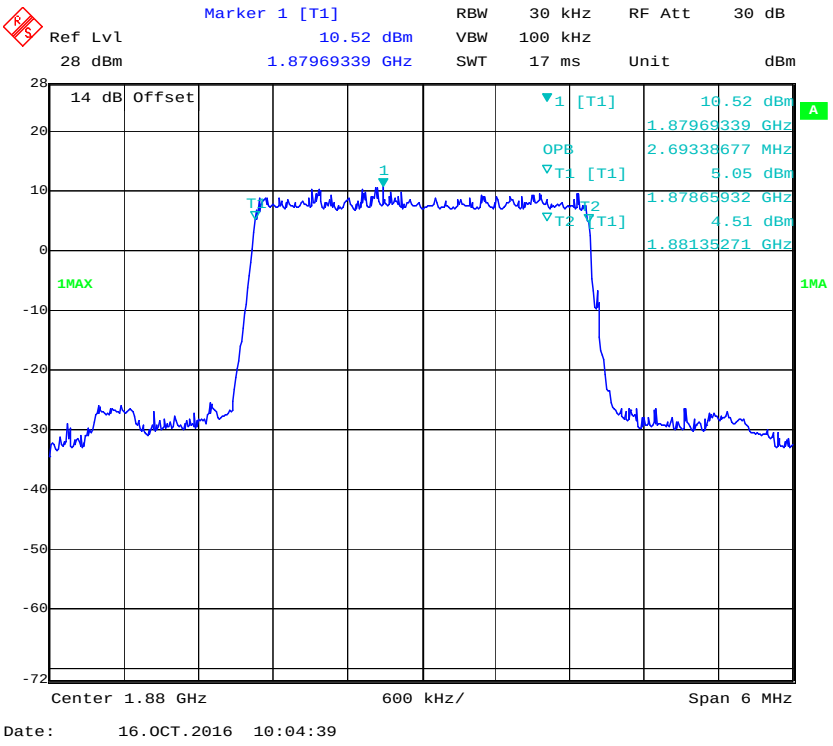
16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



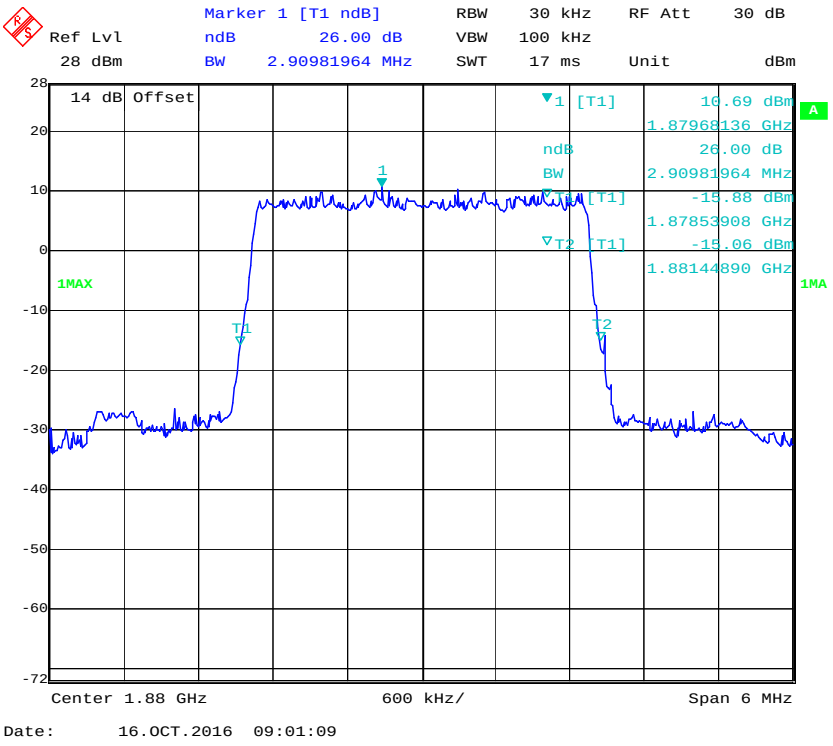
16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



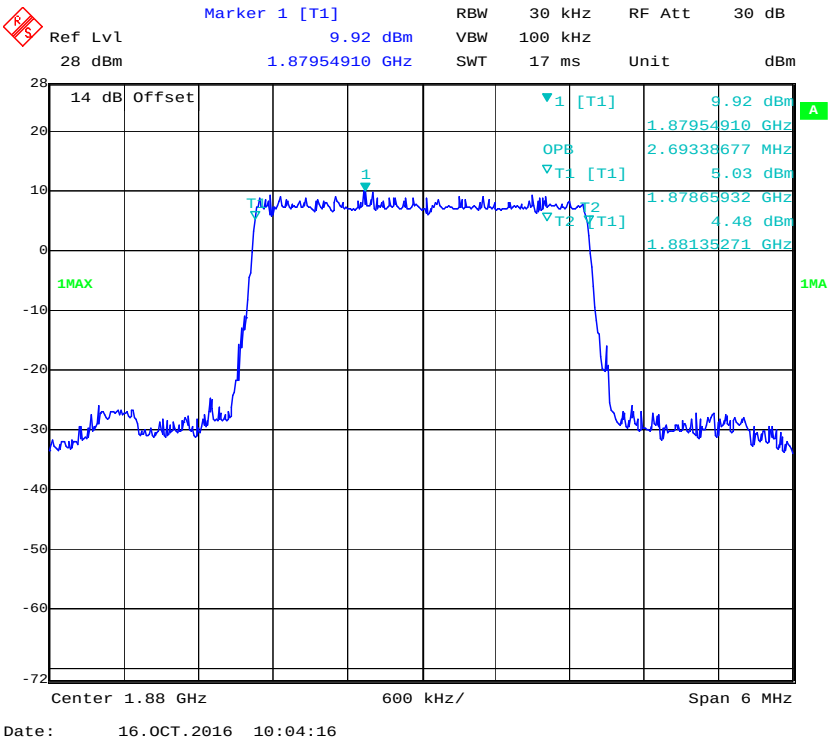
QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



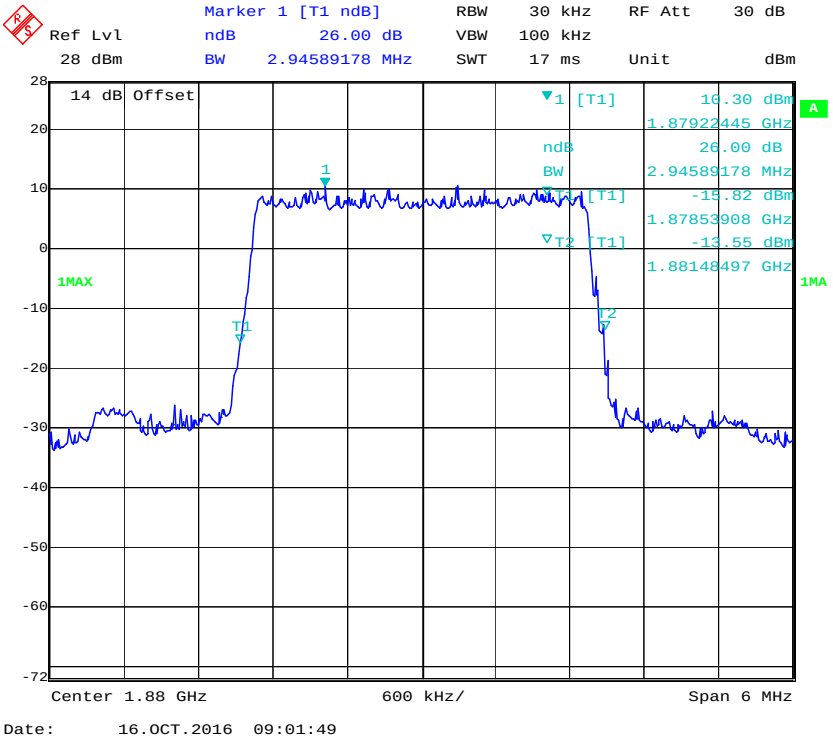
QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



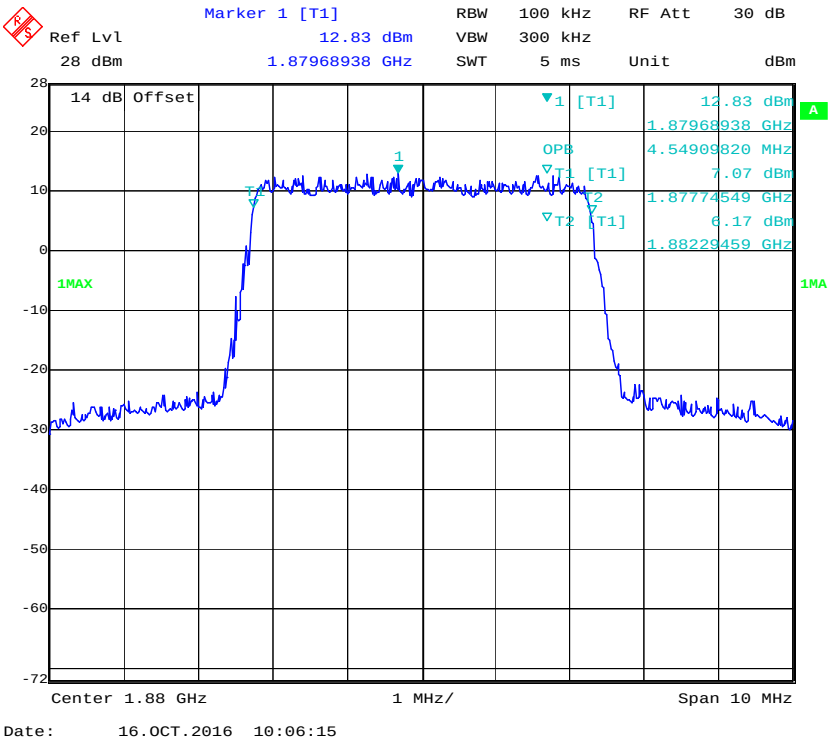
16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



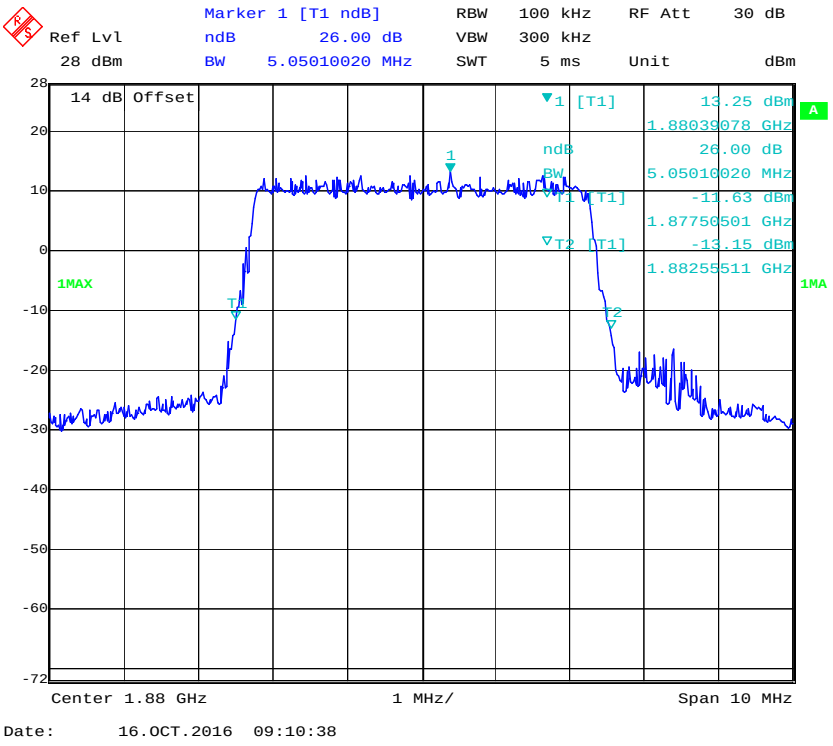
16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



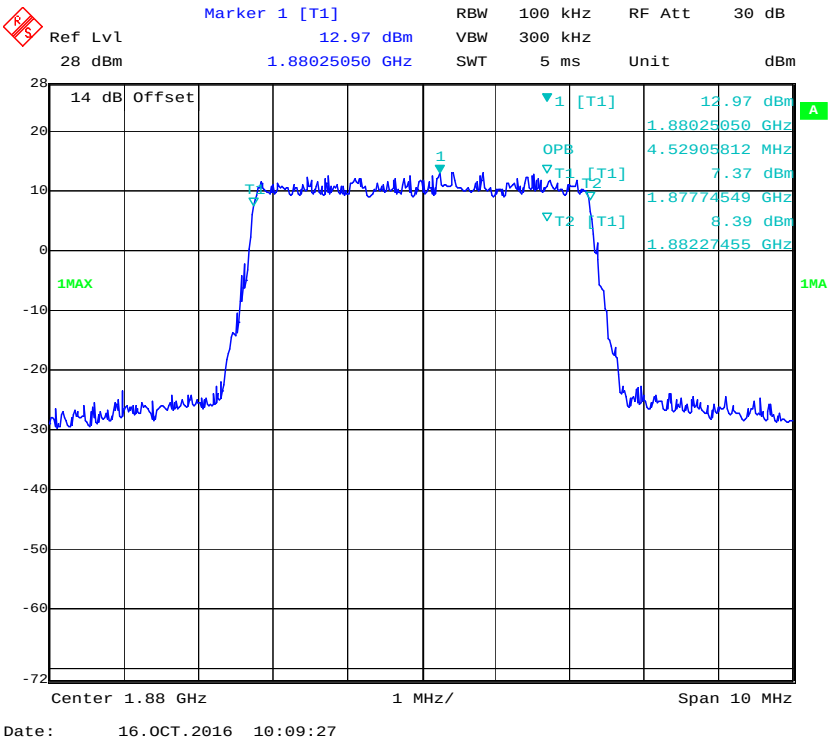
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



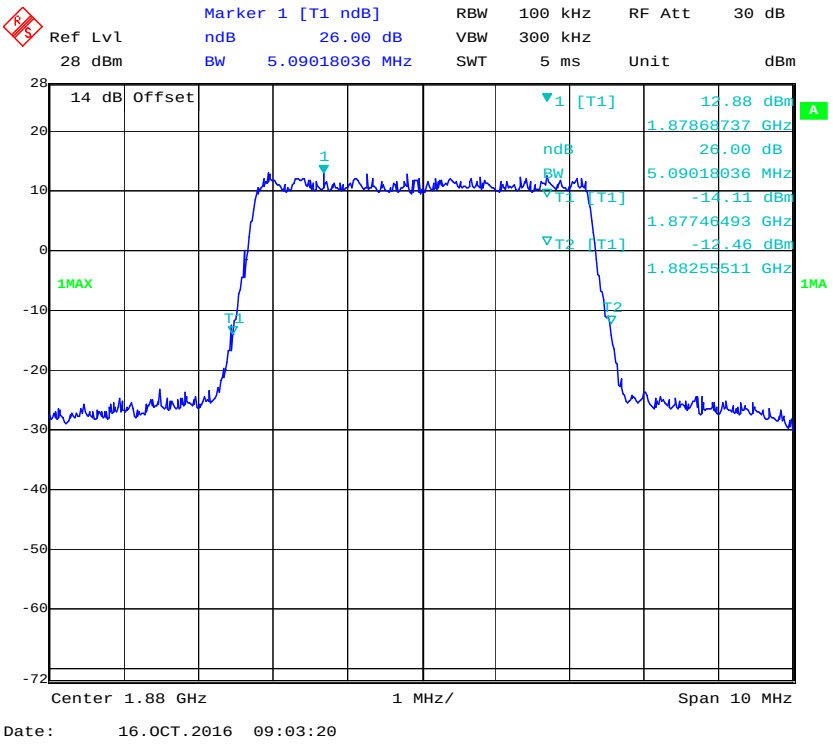
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



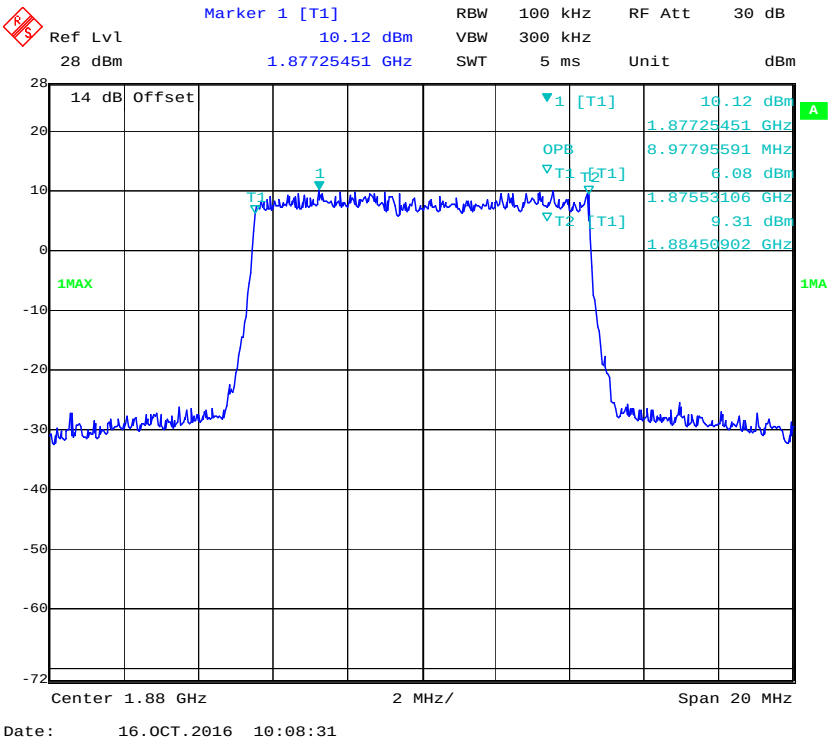
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



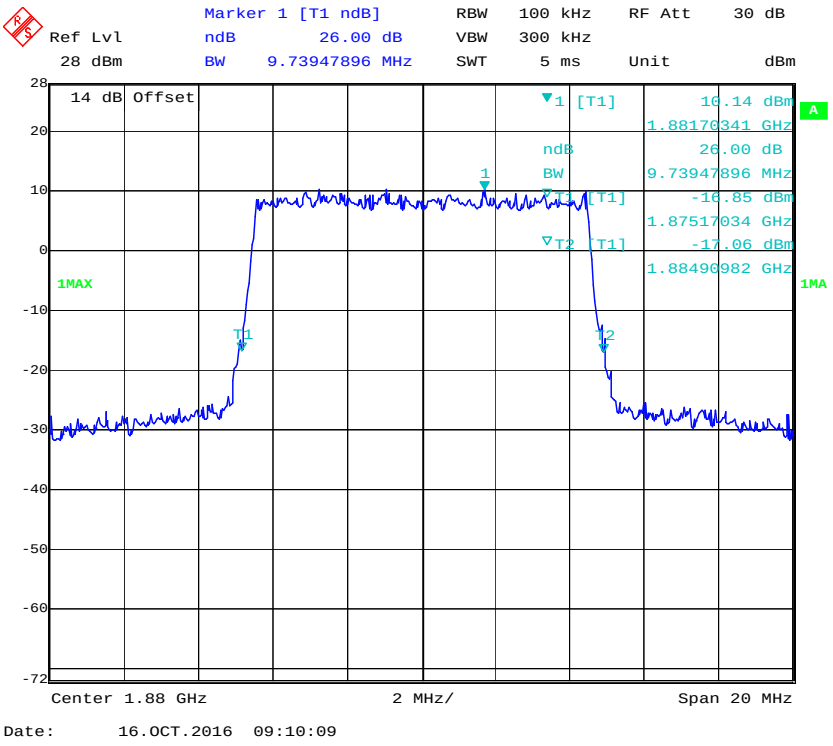
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



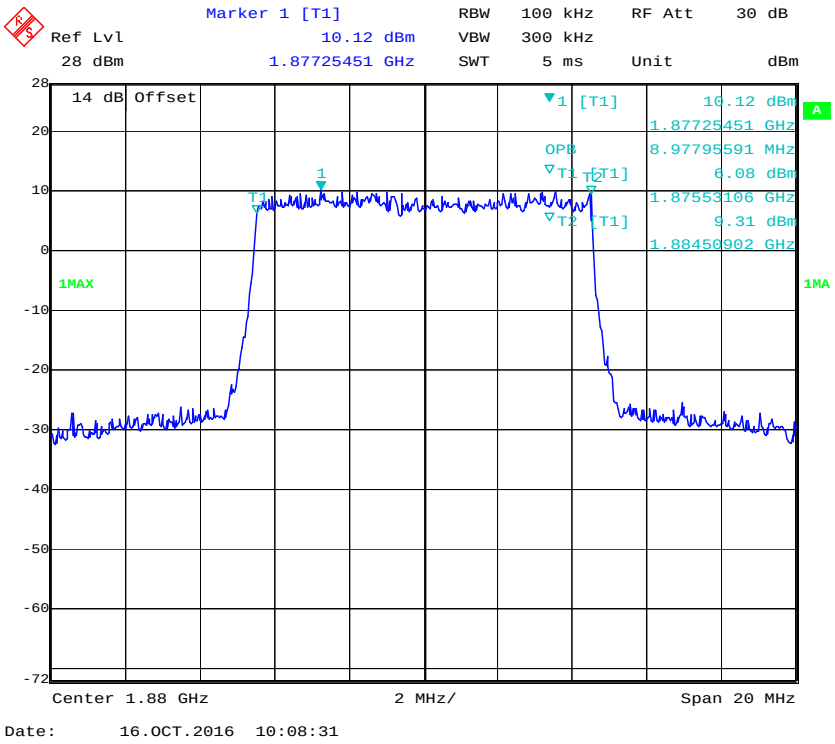
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



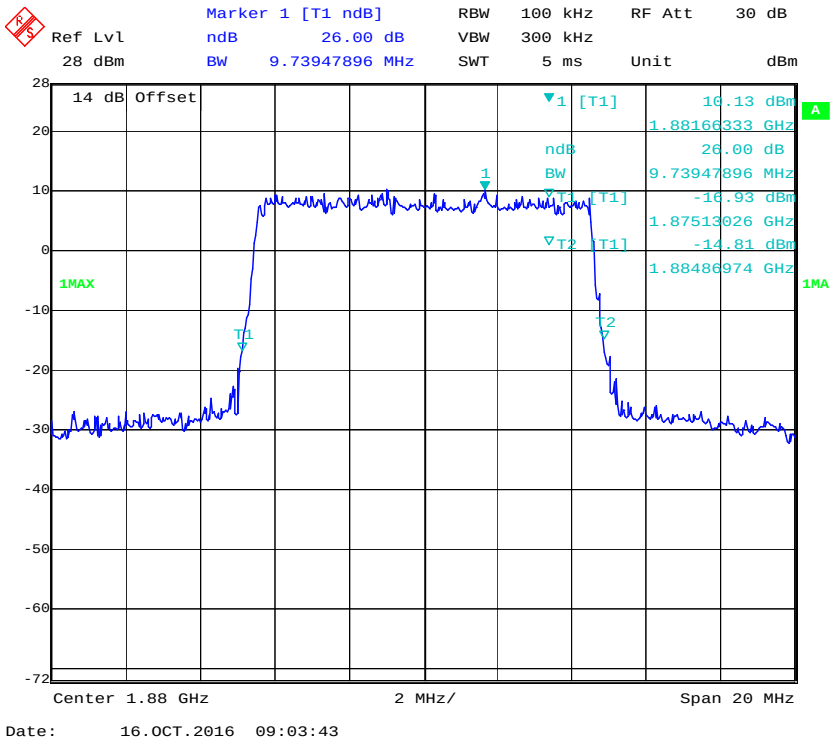
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



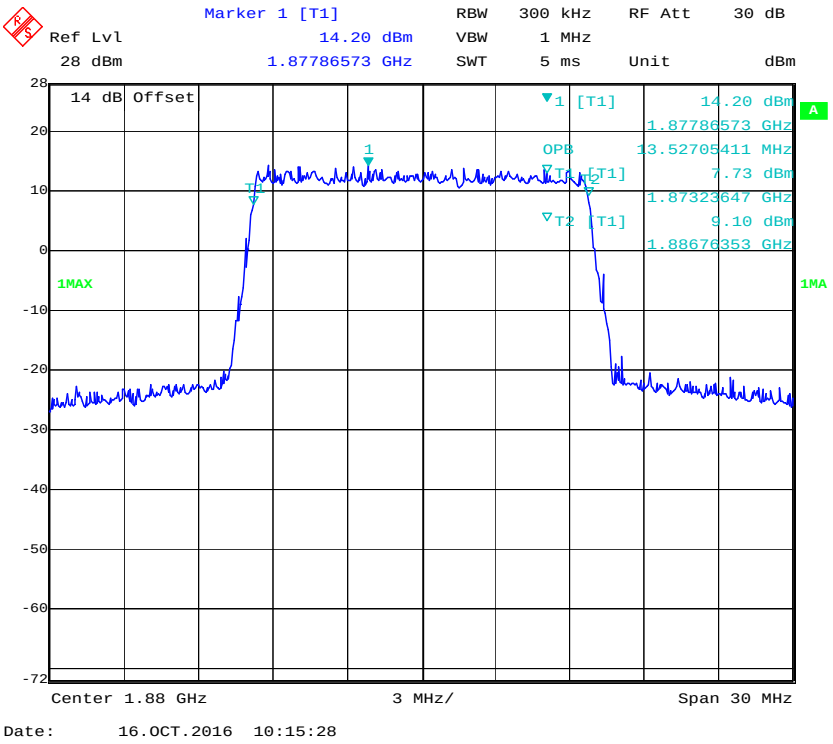
16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



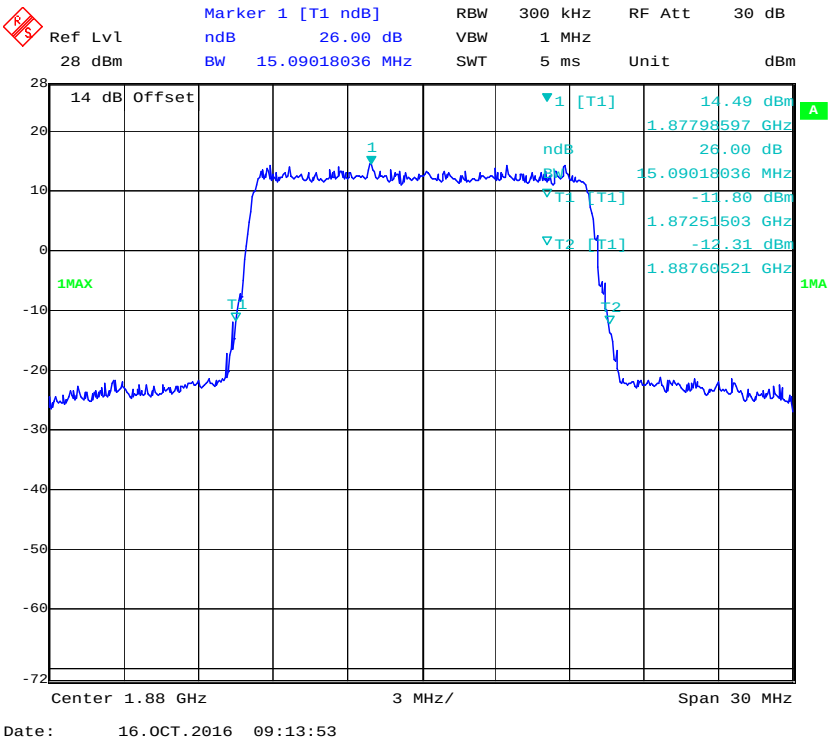
16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



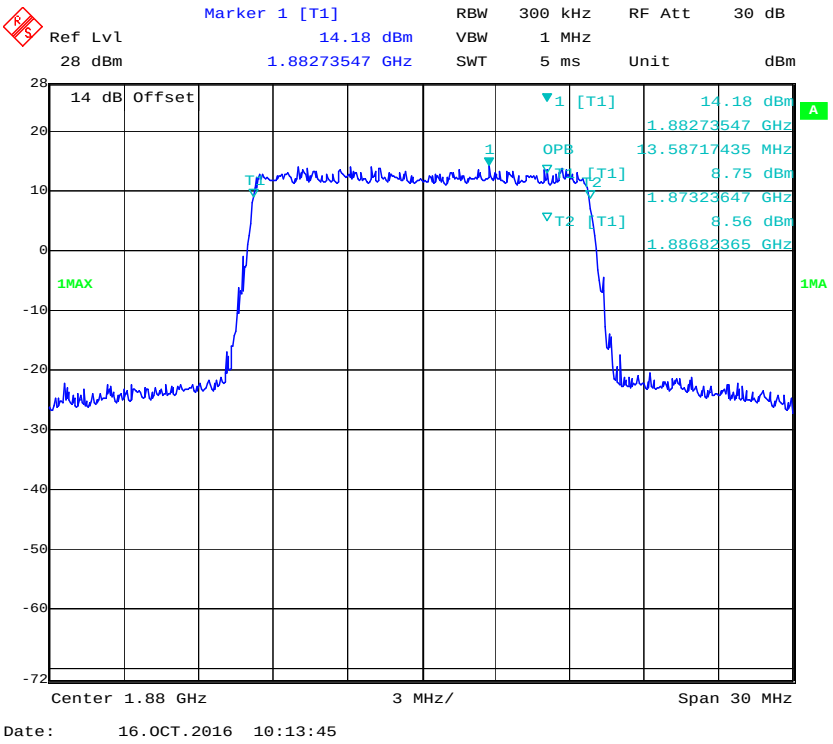
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



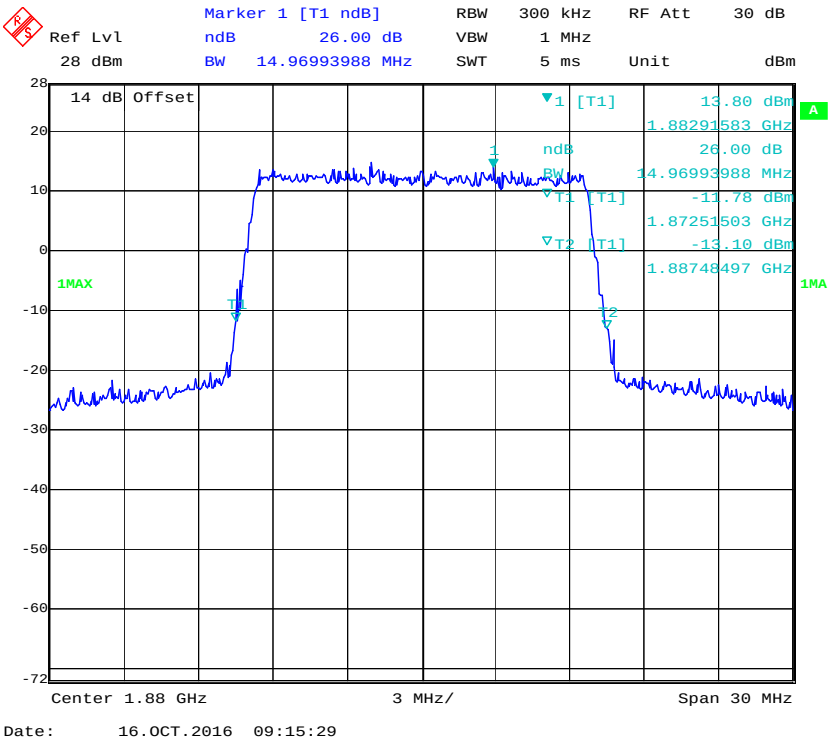
QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



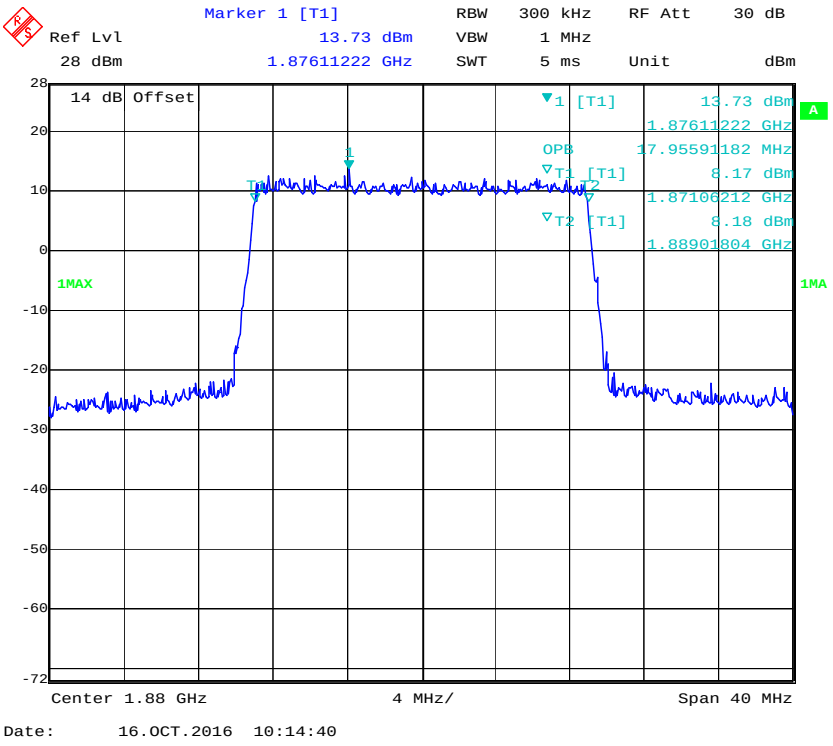
16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



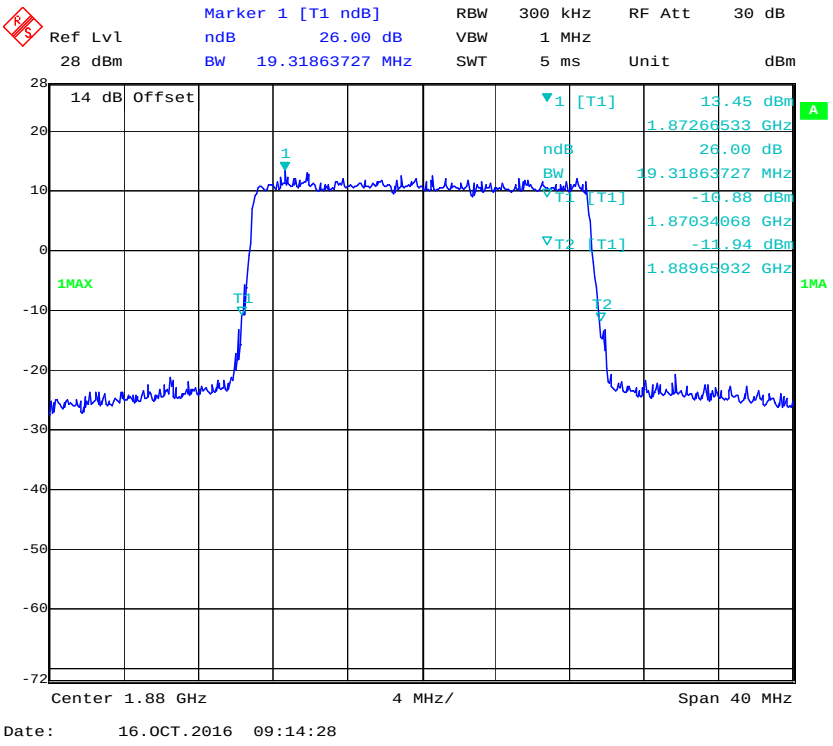
16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



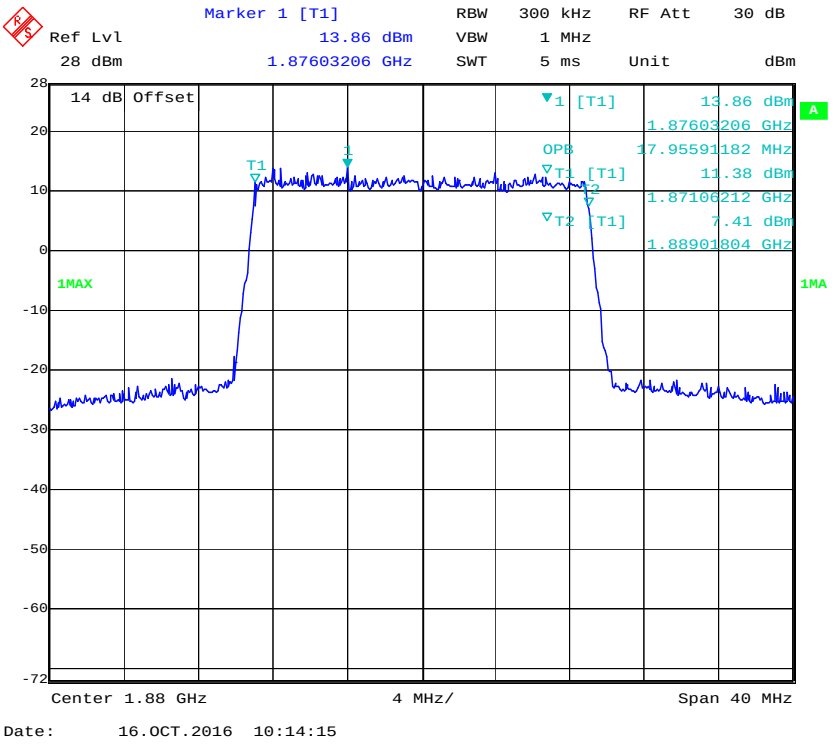
QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



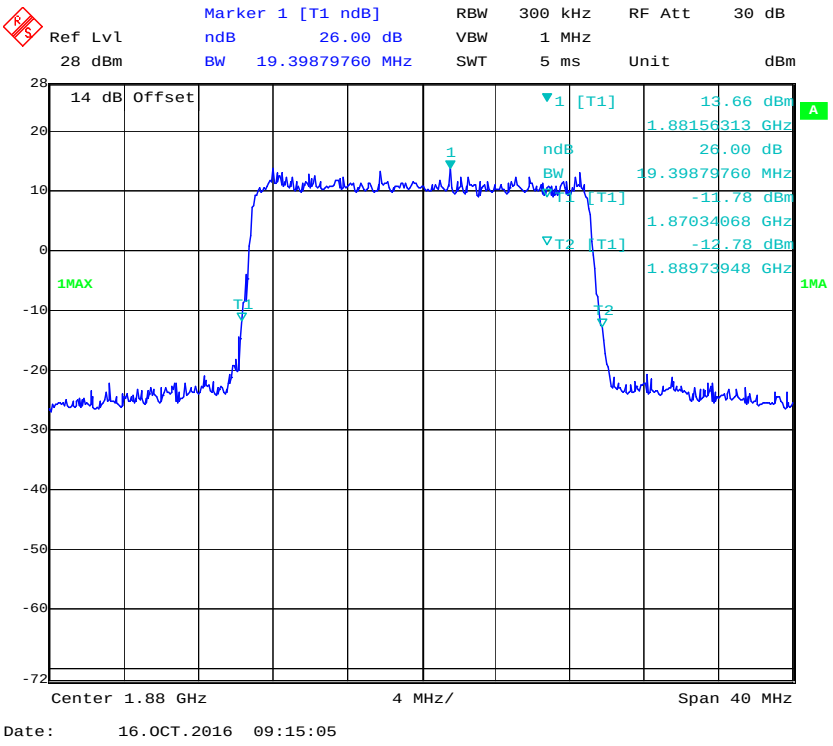
QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel



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



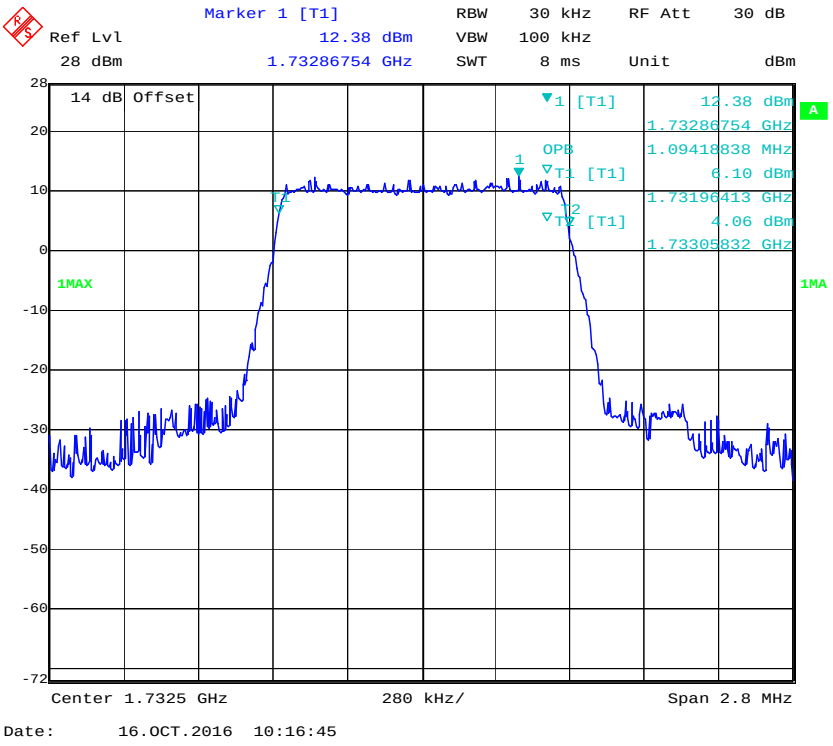
16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



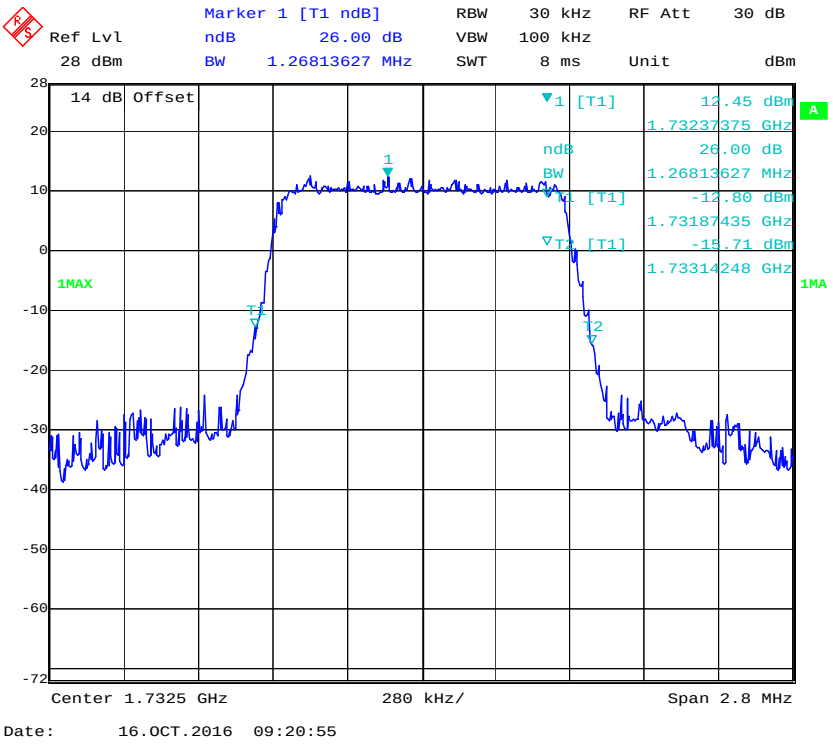
LTE Band 4: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.094	1.268
	16QAM	1.100	1.274
3.0	QPSK	2.693	2.946
	16QAM	2.681	2.934
5.0	QPSK	4.529	5.050
	16QAM	4.549	5.030
10.0	QPSK	8.978	9.739
	16QAM	8.978	9.659
15.0	QPSK	13.587	14.970
	16QAM	13.587	14.790
20.0	QPSK	17.956	19.399
	16QAM	17.956	19.399

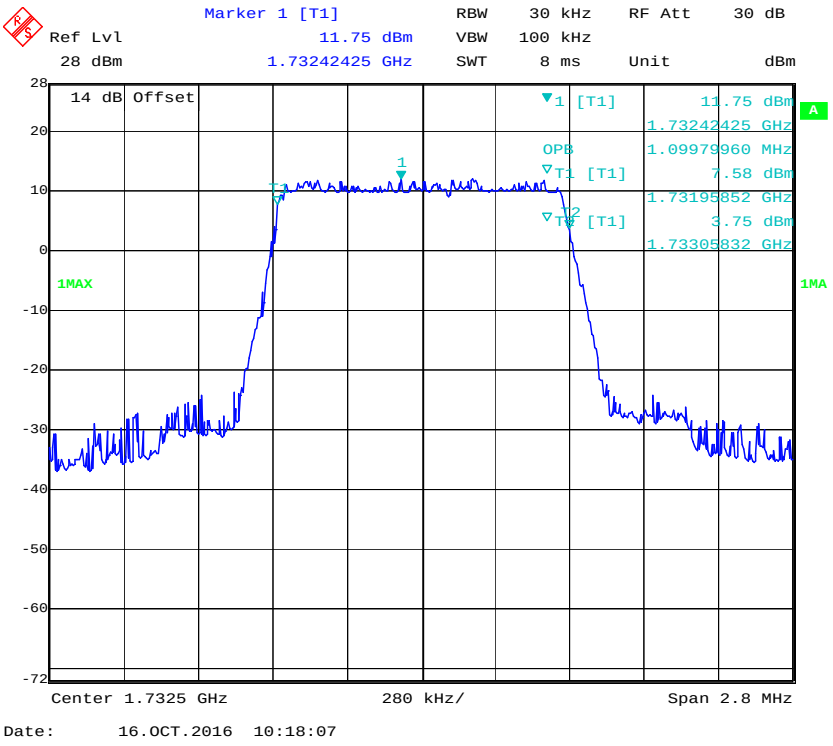
QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



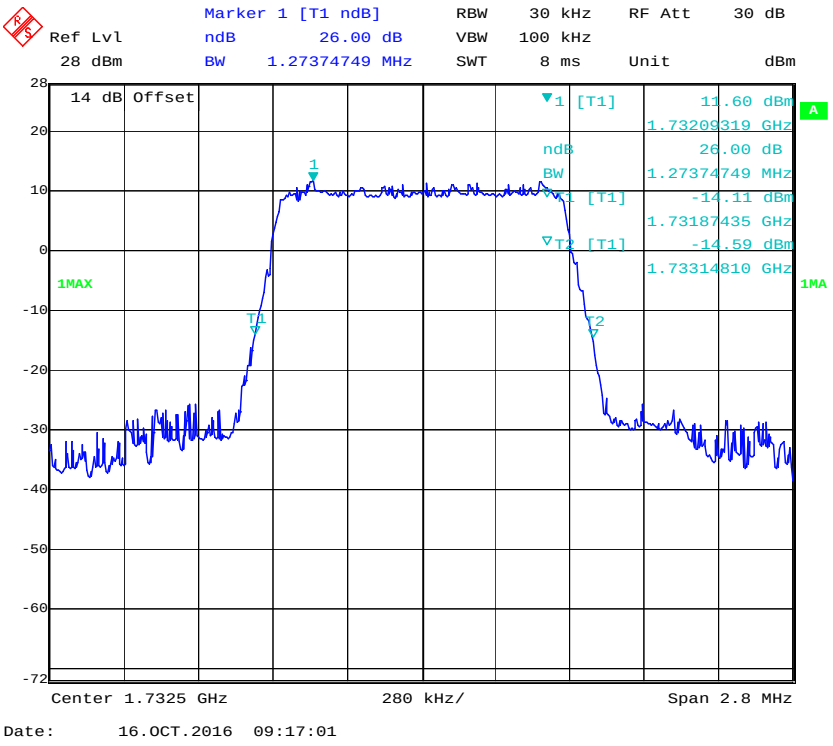
QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



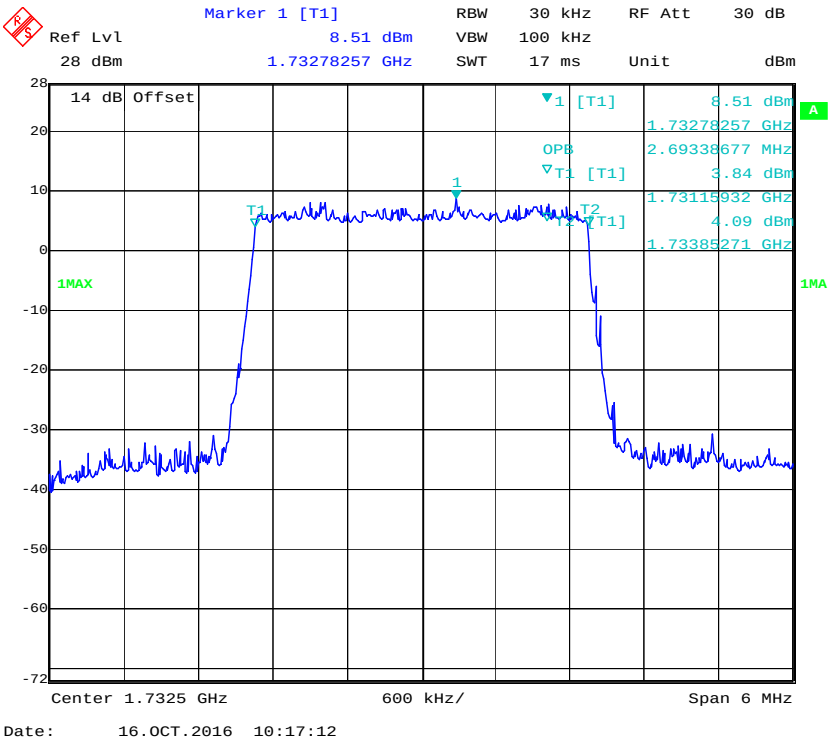
16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



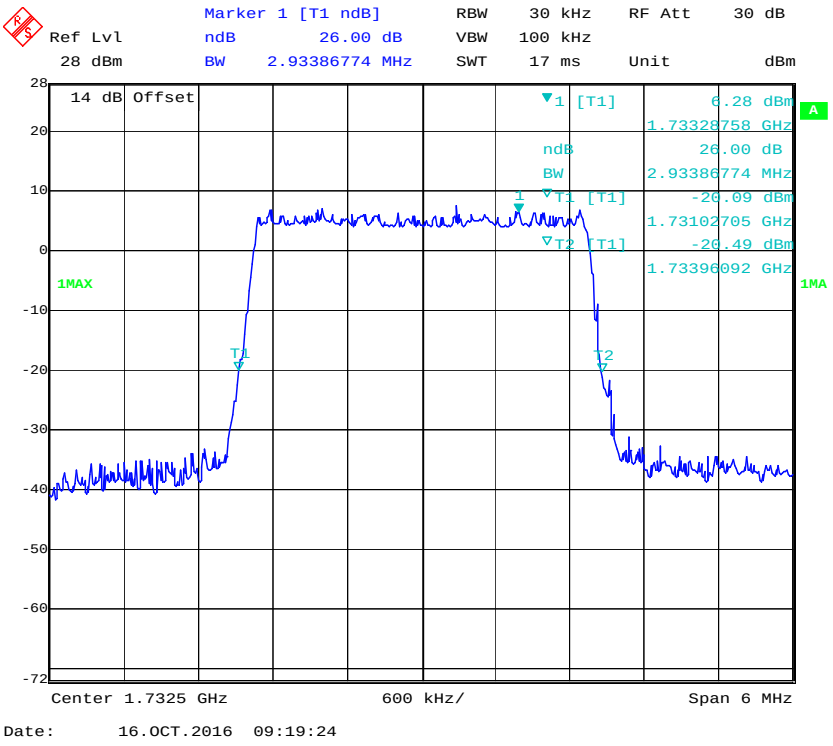
16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



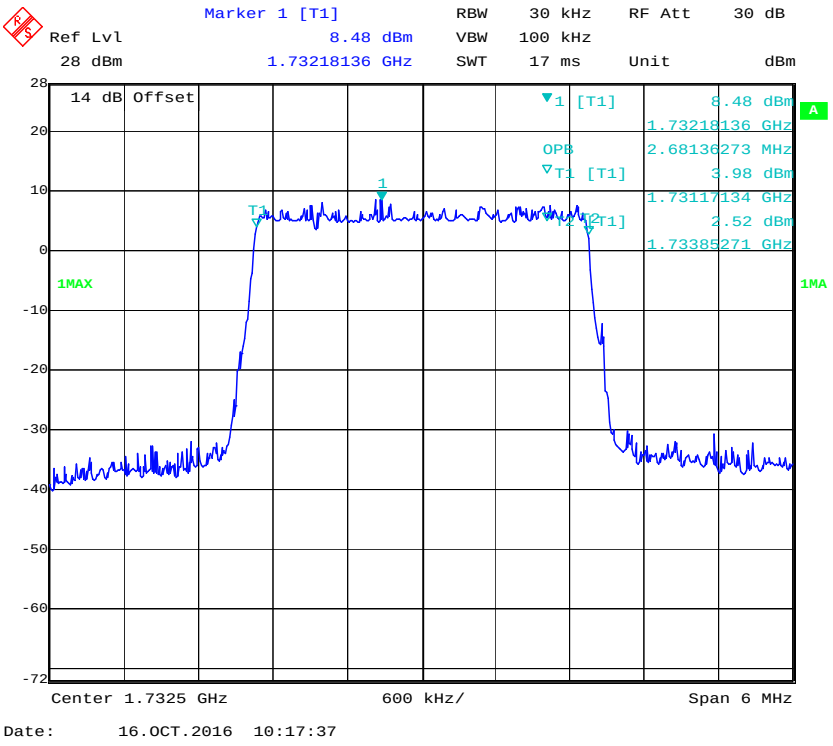
QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



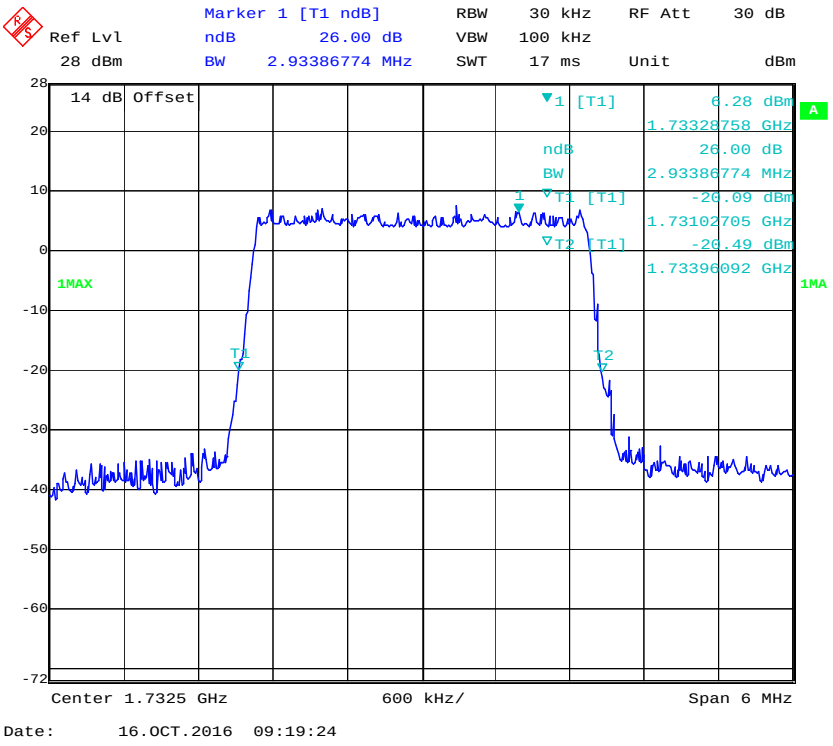
QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



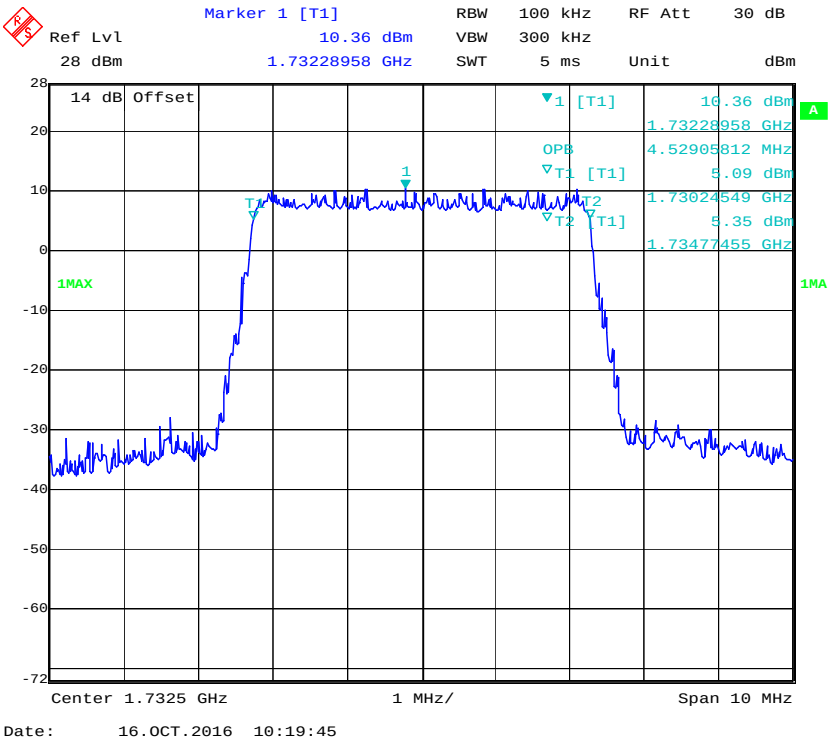
16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



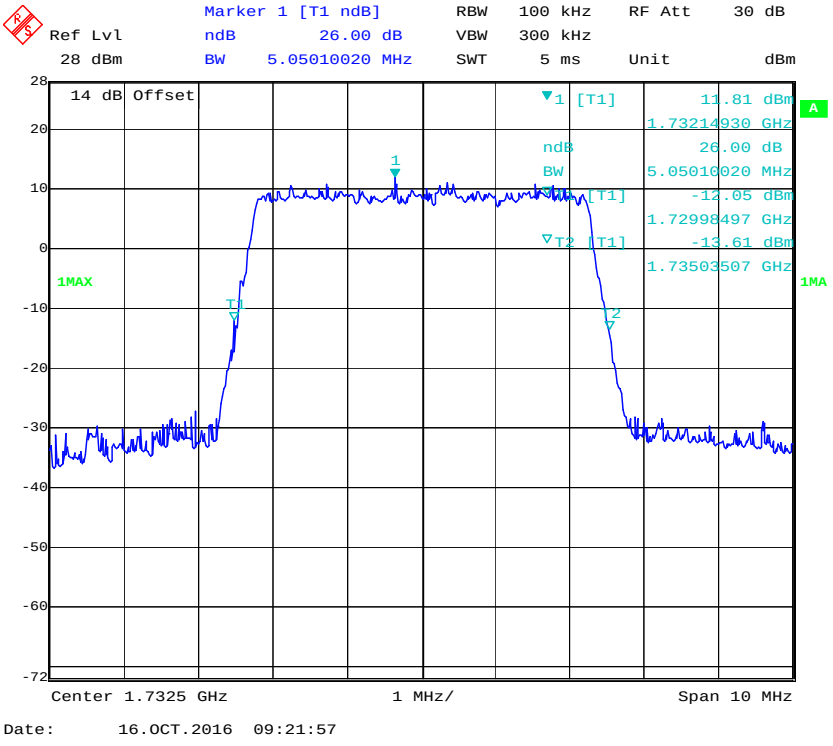
16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



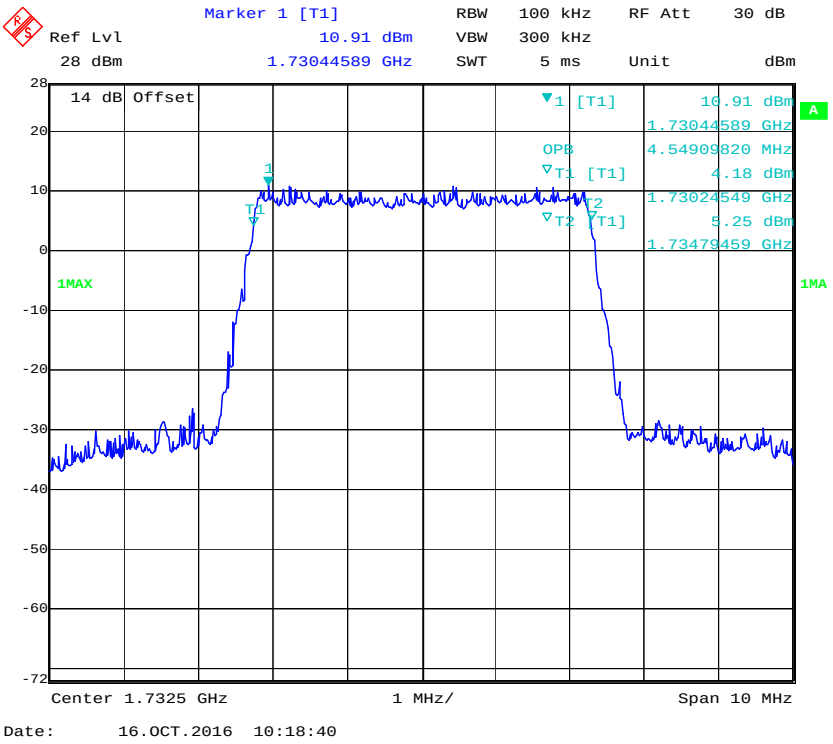
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



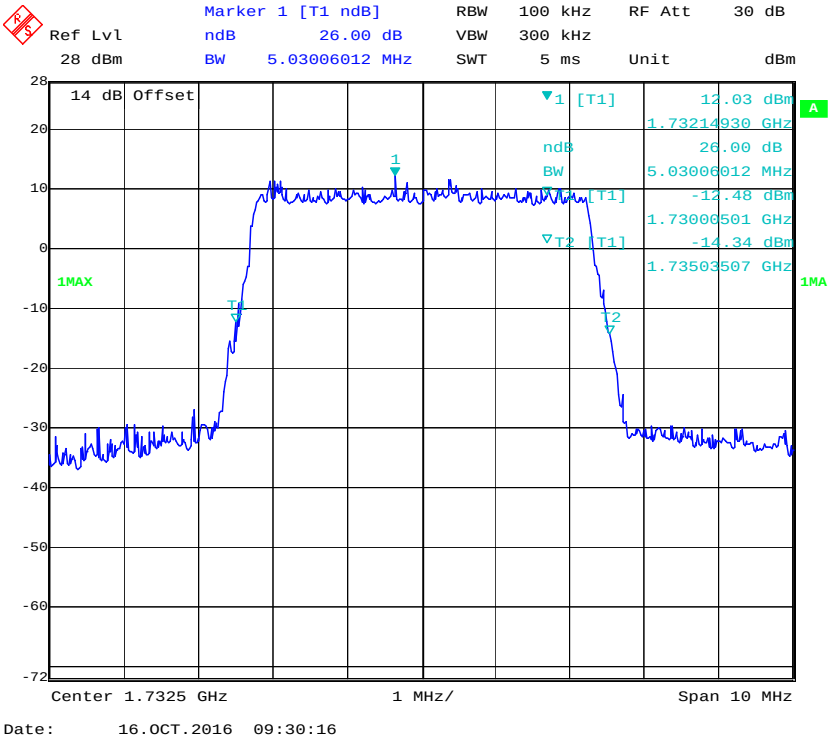
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



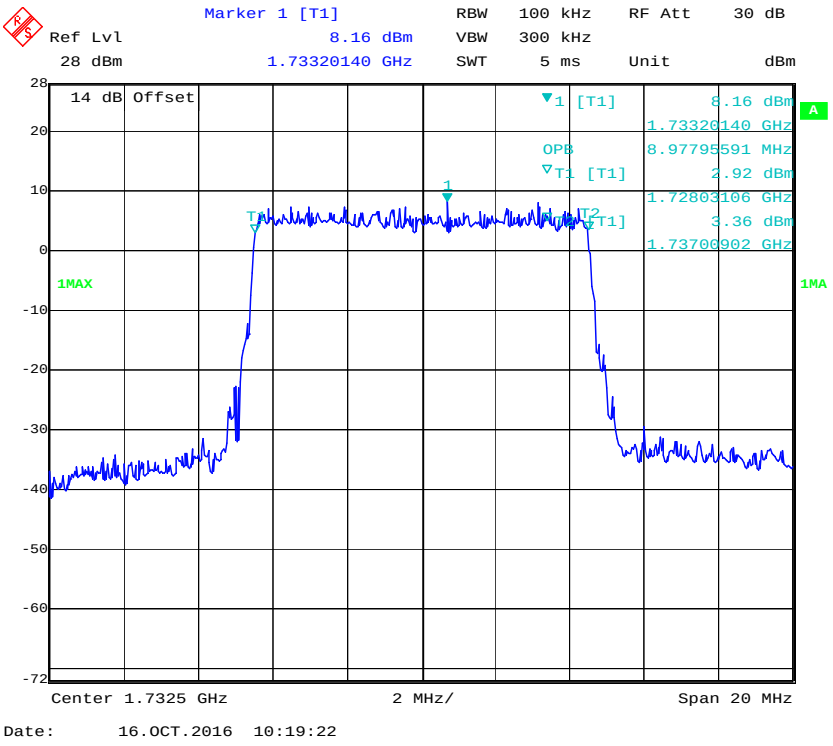
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



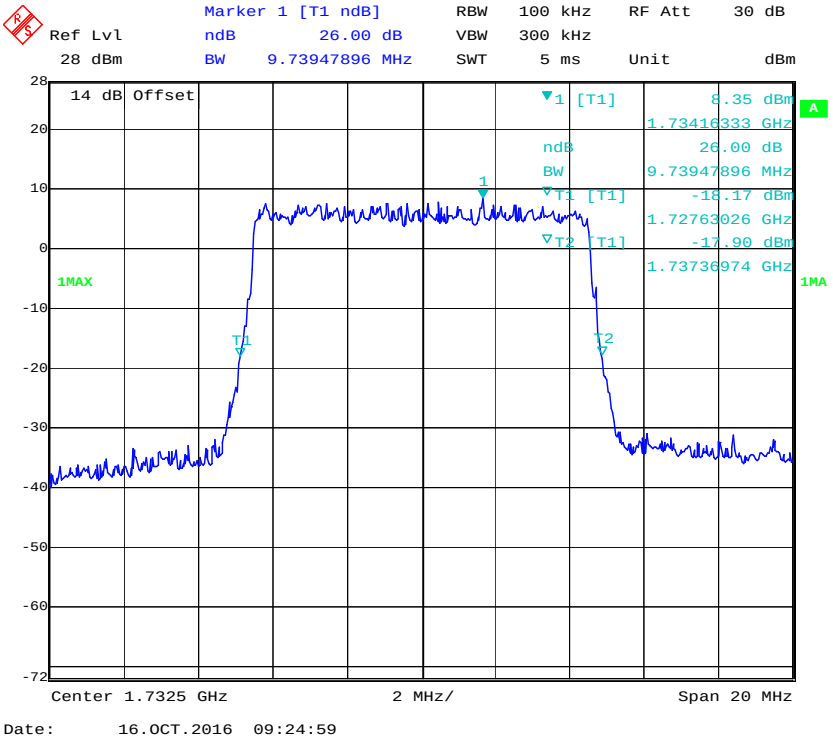
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



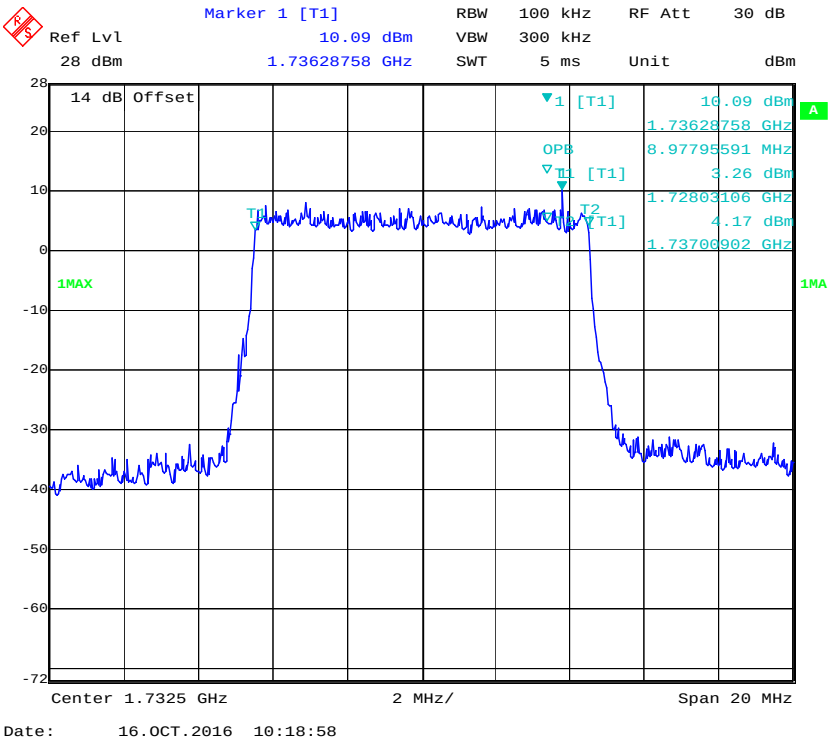
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



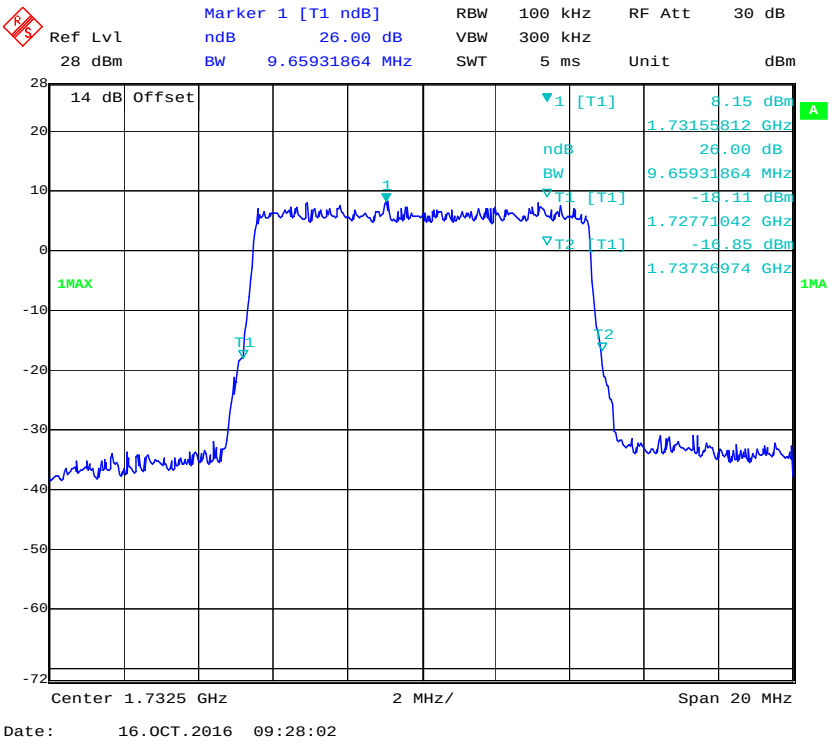
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



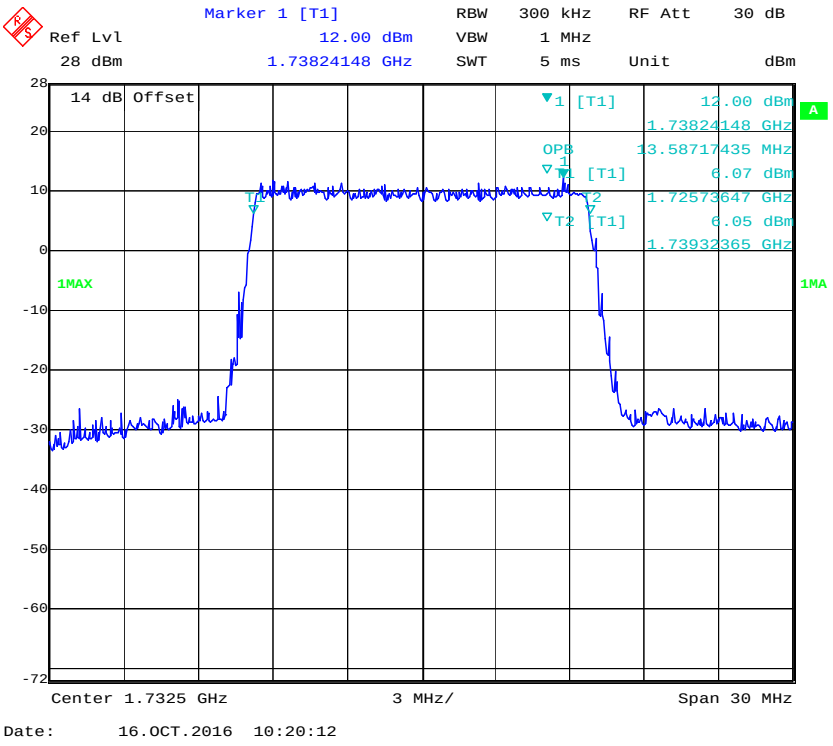
16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



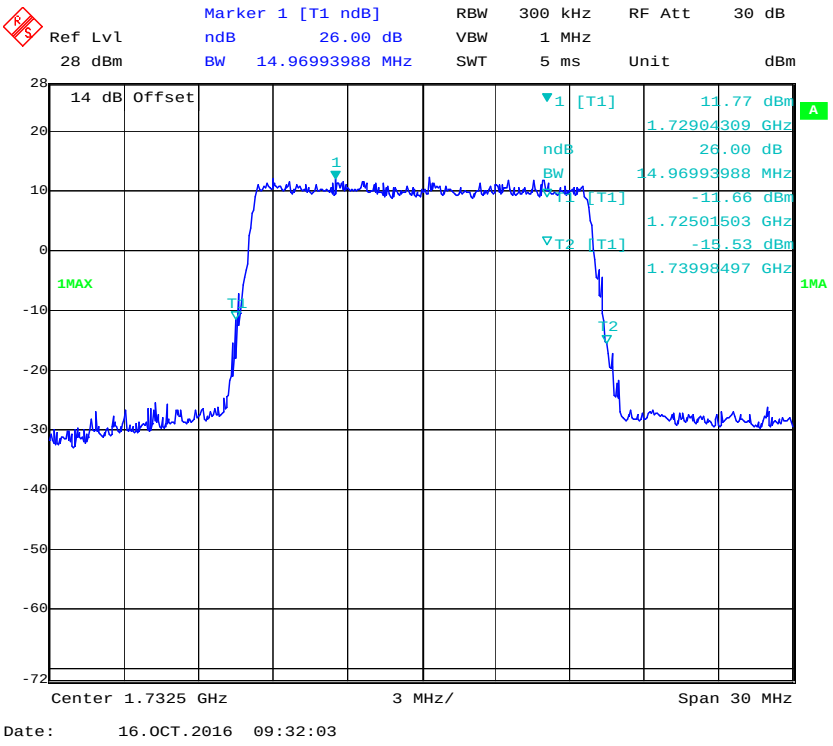
16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



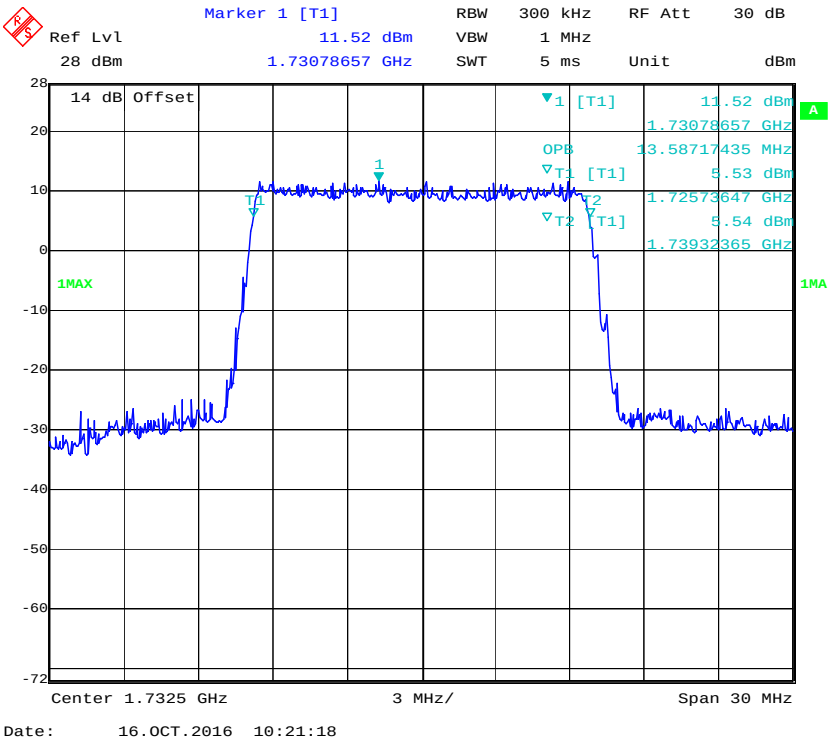
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



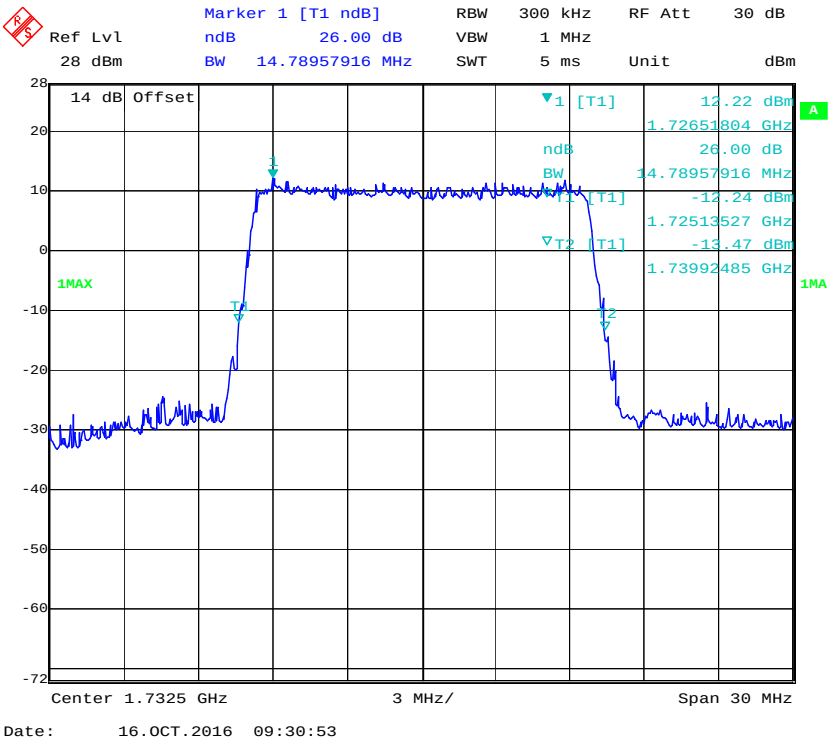
QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



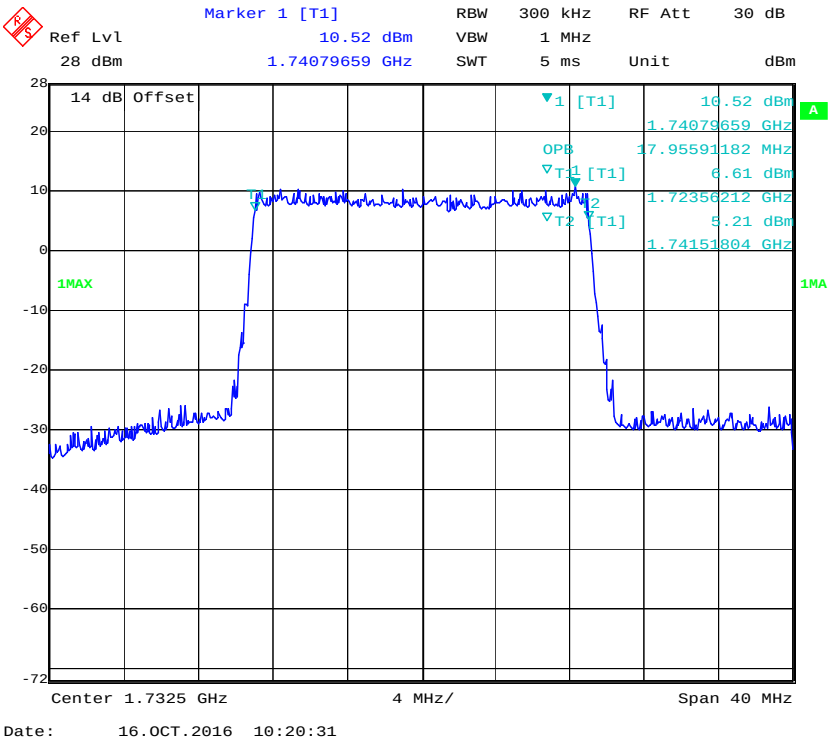
16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



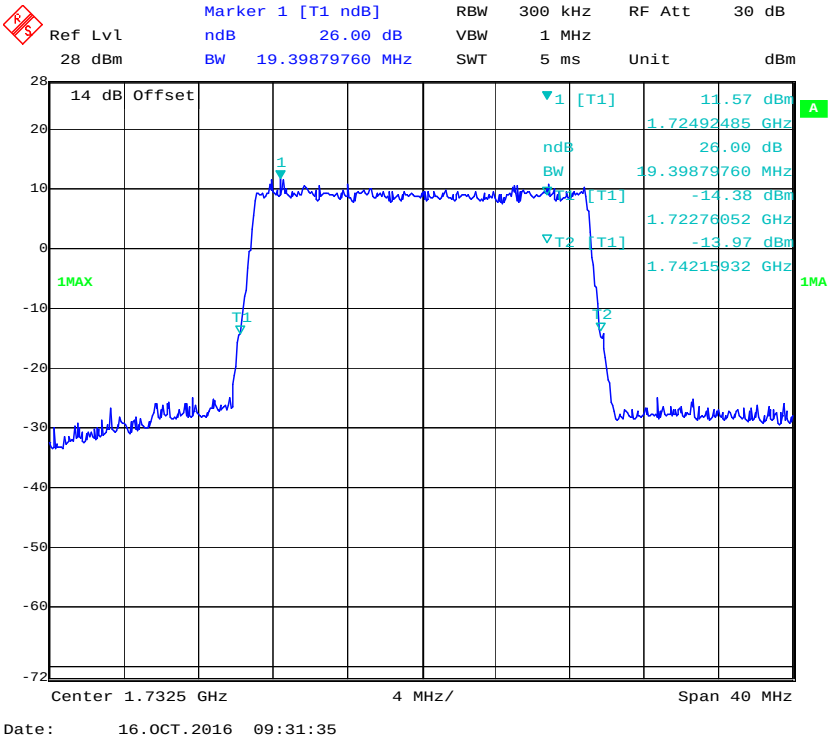
16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



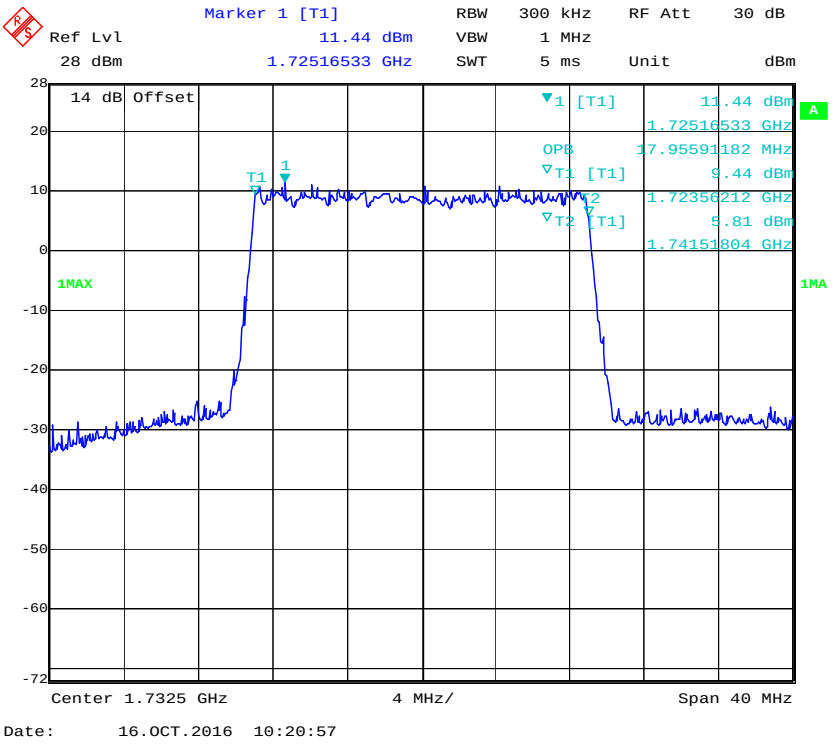
QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



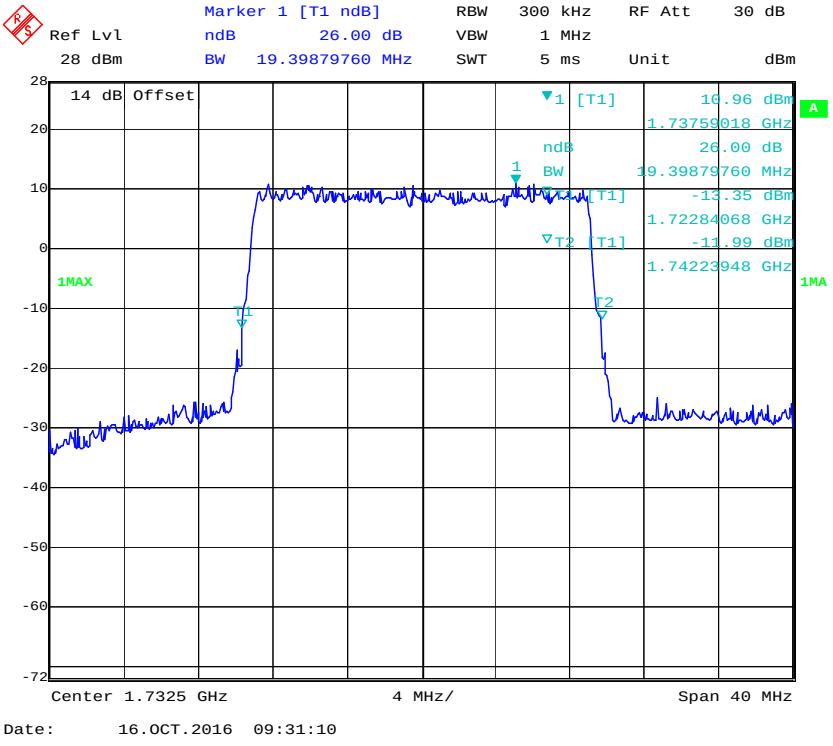
QPSK (20.0 MHz) - 26 dB Bandwidth, Middle channel



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



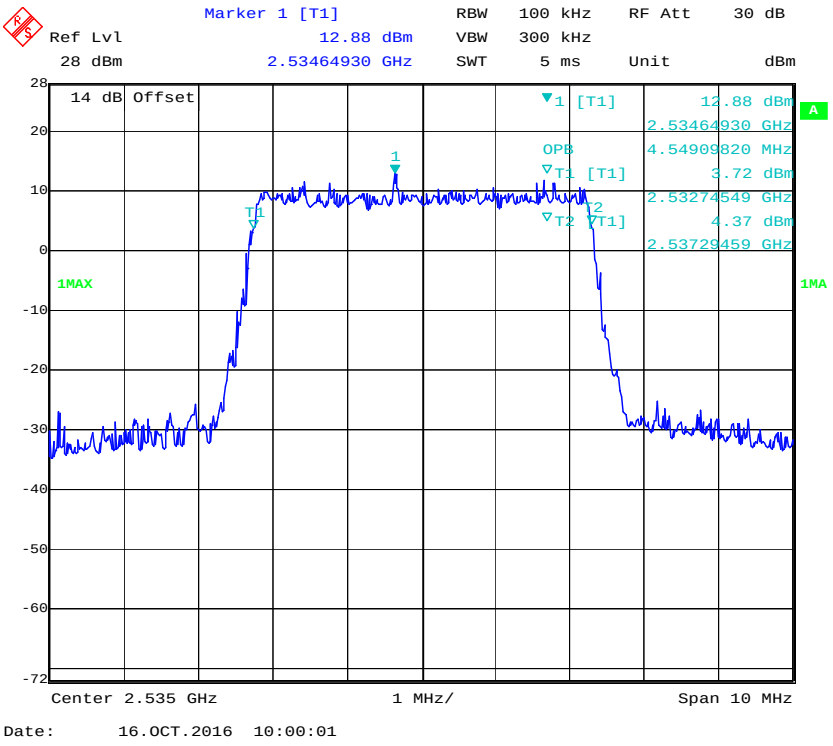
16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



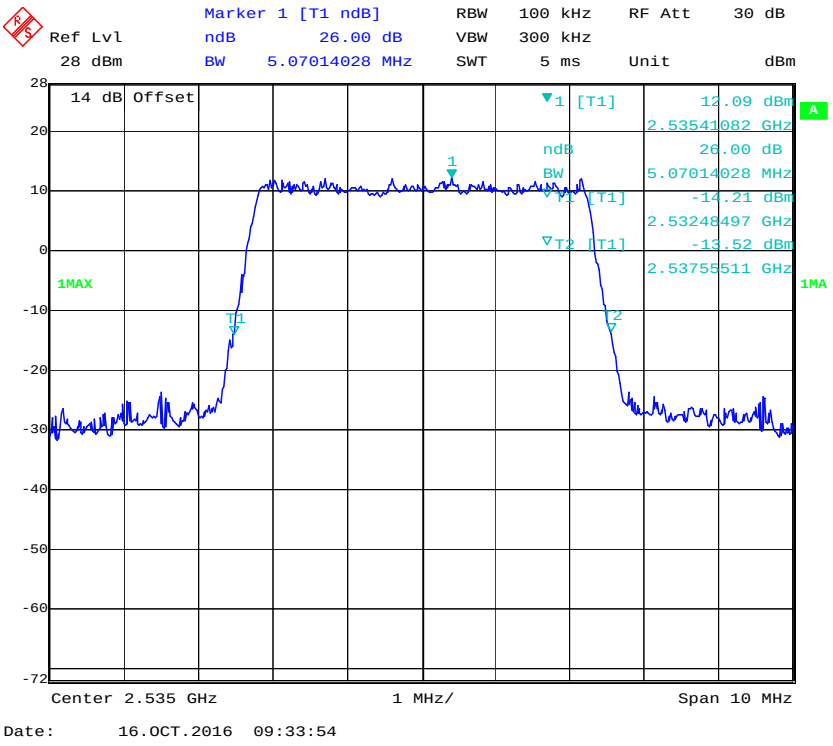
LTE Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5	QPSK	4.549	5.070
	16QAM	4.549	5.050
10	QPSK	8.978	9.619
	16QAM	8.978	9.739
15	QPSK	13.527	14.910
	16QAM	13.587	14.970
20	QPSK	18.036	19.399
	16QAM	17.956	19.559

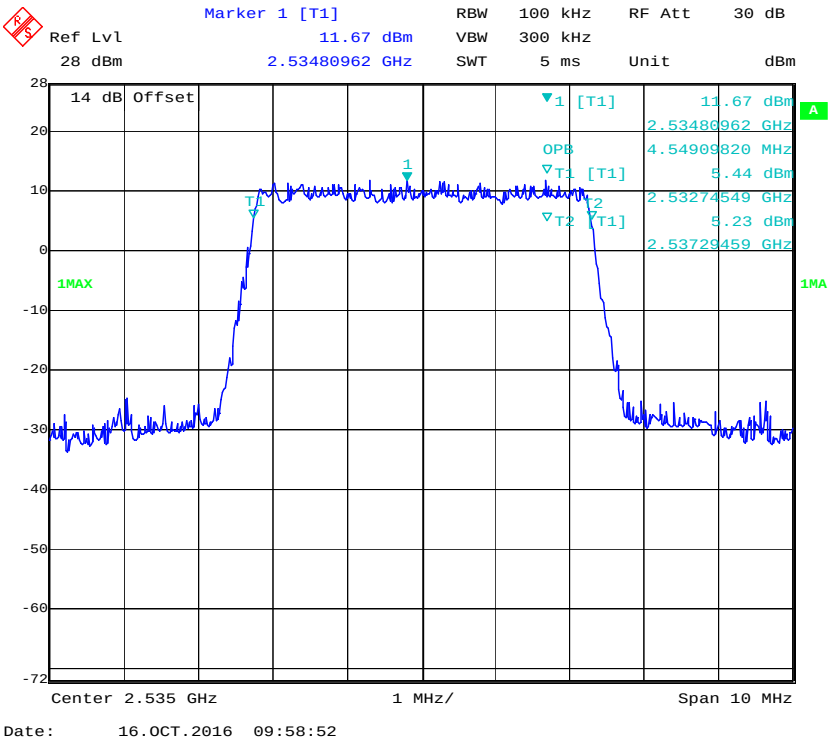
QPSK (5 MHz) - 99% Occupied Bandwidth, Middle channel



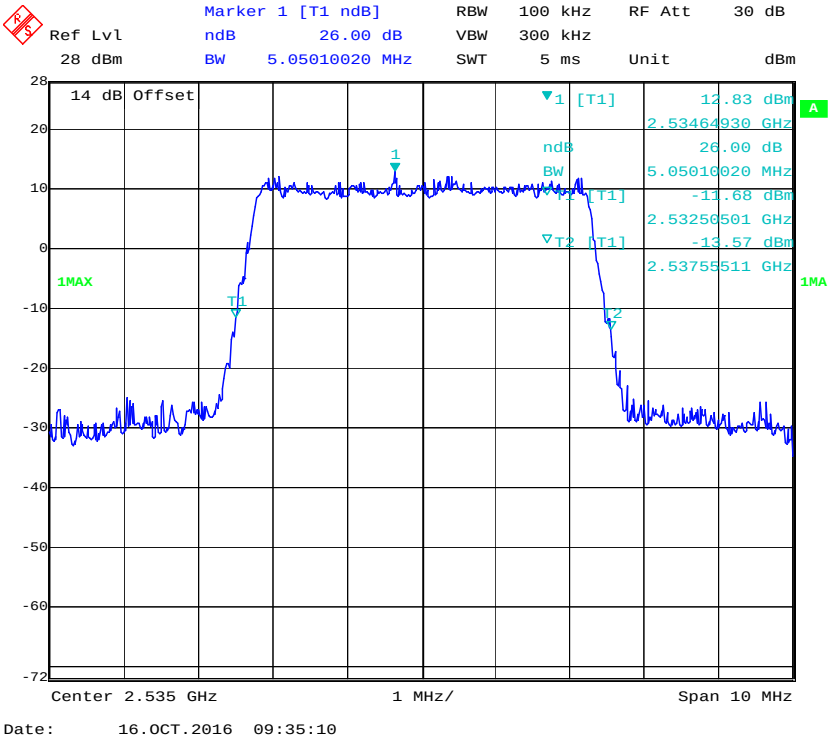
QPSK (5 MHz) - 26 dB Bandwidth, Middle channel



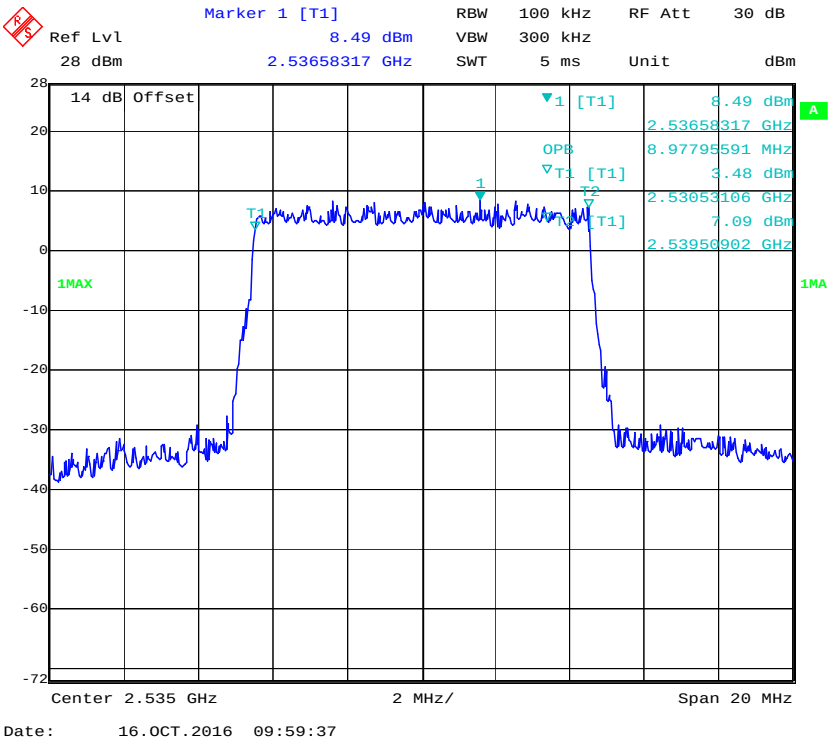
16-QAM (5 MHz) - 99% Occupied Bandwidth, Middle channel



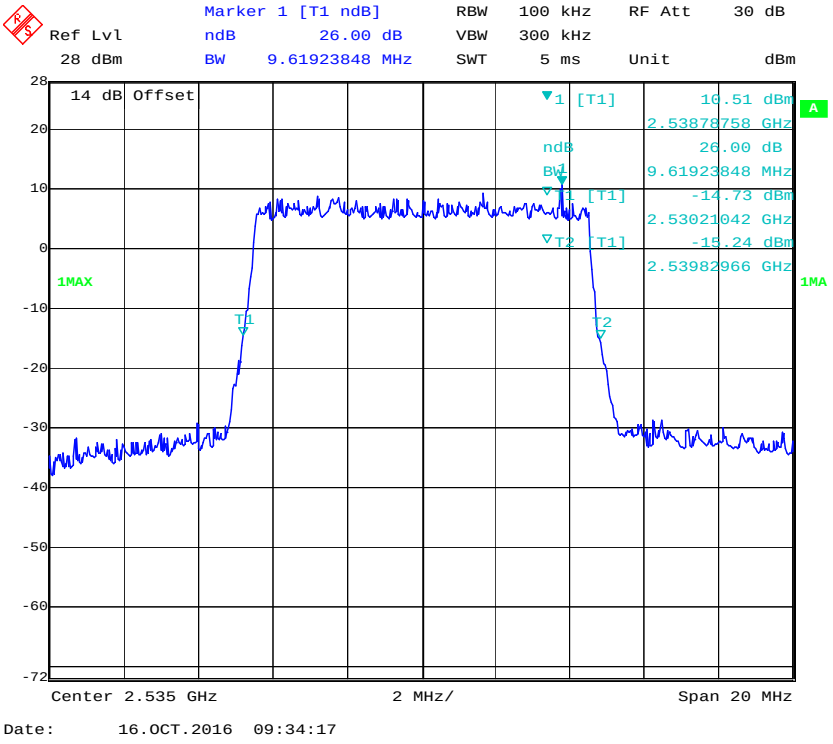
16-QAM (5MHz) - 26 dB Bandwidth, Middle channel



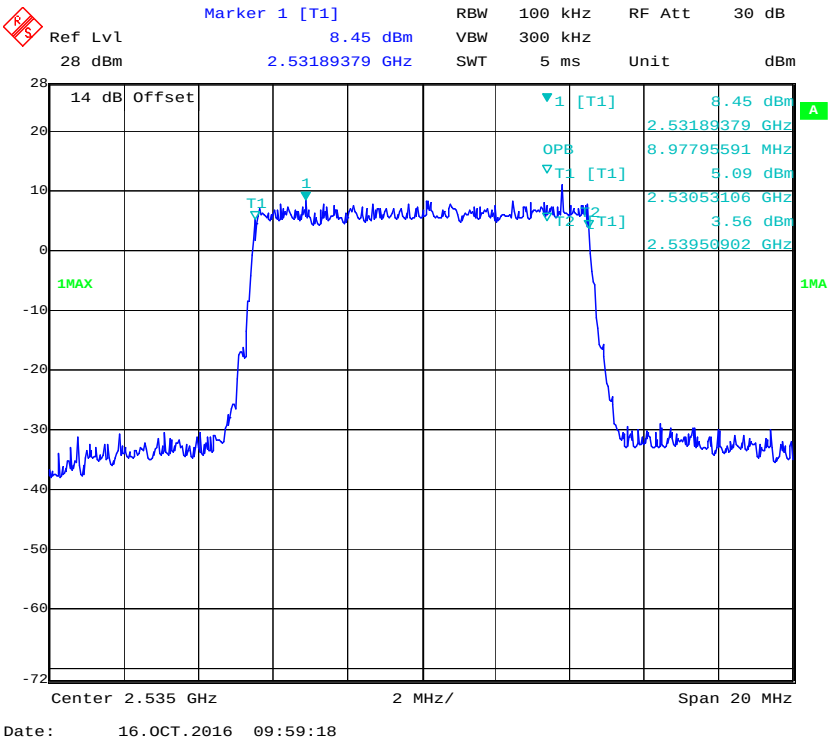
QPSK (10 MHz) - 99% Occupied Bandwidth, Middle channel



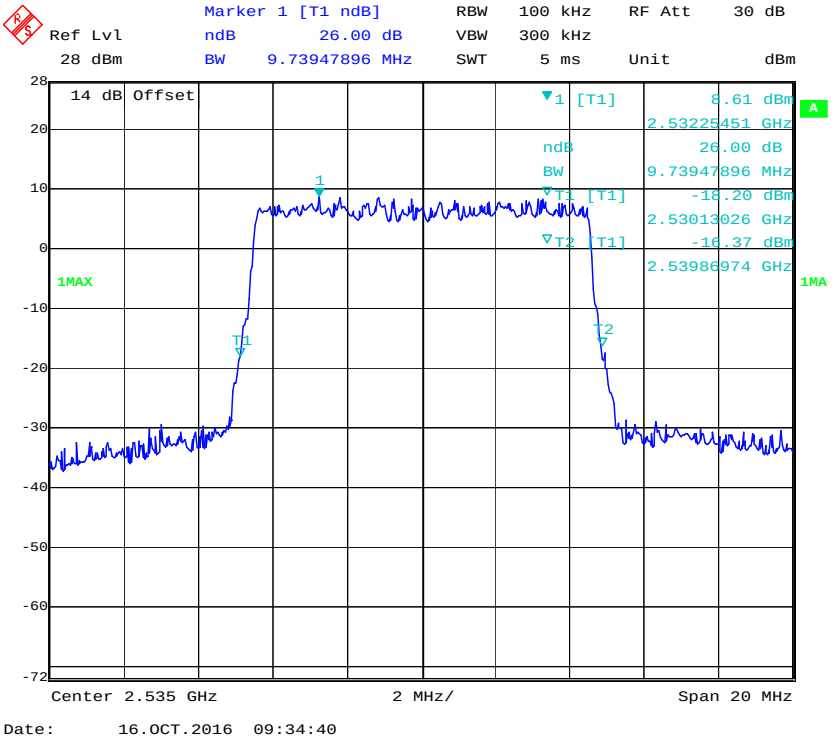
QPSK (10 MHz) - 26 dB Bandwidth, Middle channel



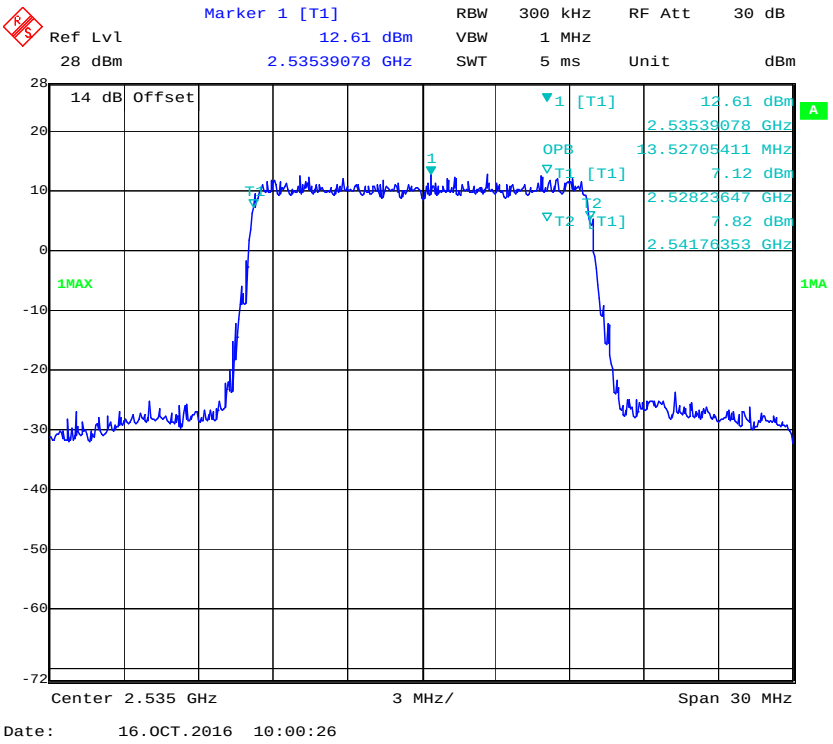
16-QAM (10MHz) - 99% Occupied Bandwidth, Middle channel



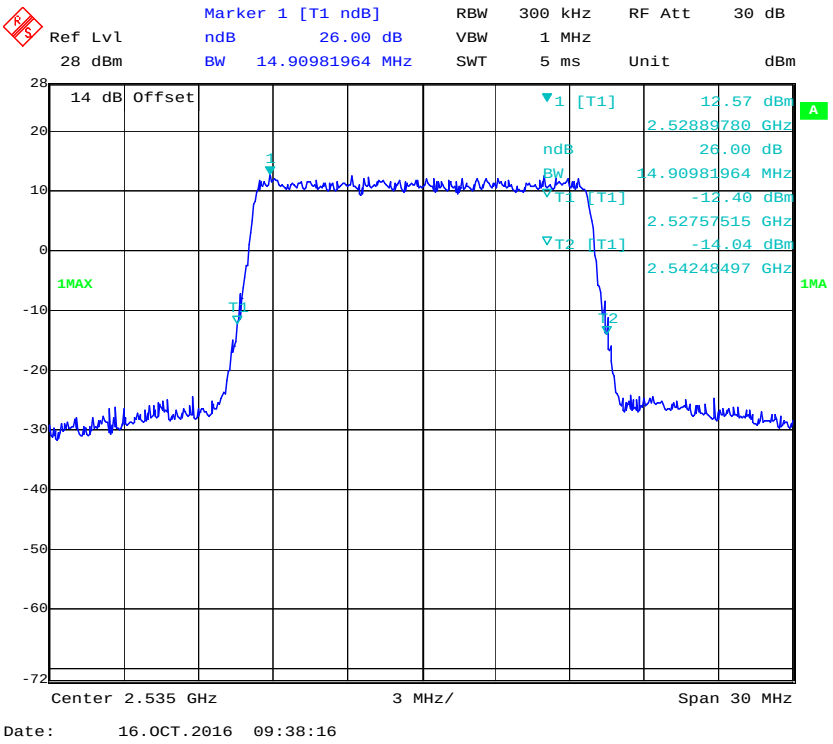
16-QAM (10MHz) - 26 dB Bandwidth, Middle channel



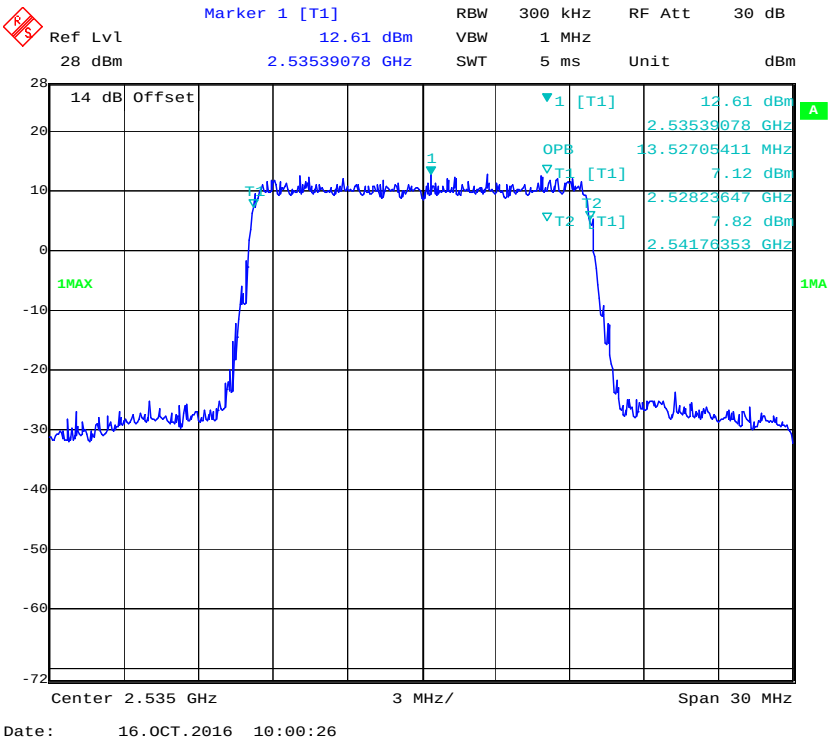
QPSK (15 MHz) - 99% Occupied Bandwidth, Middle channel



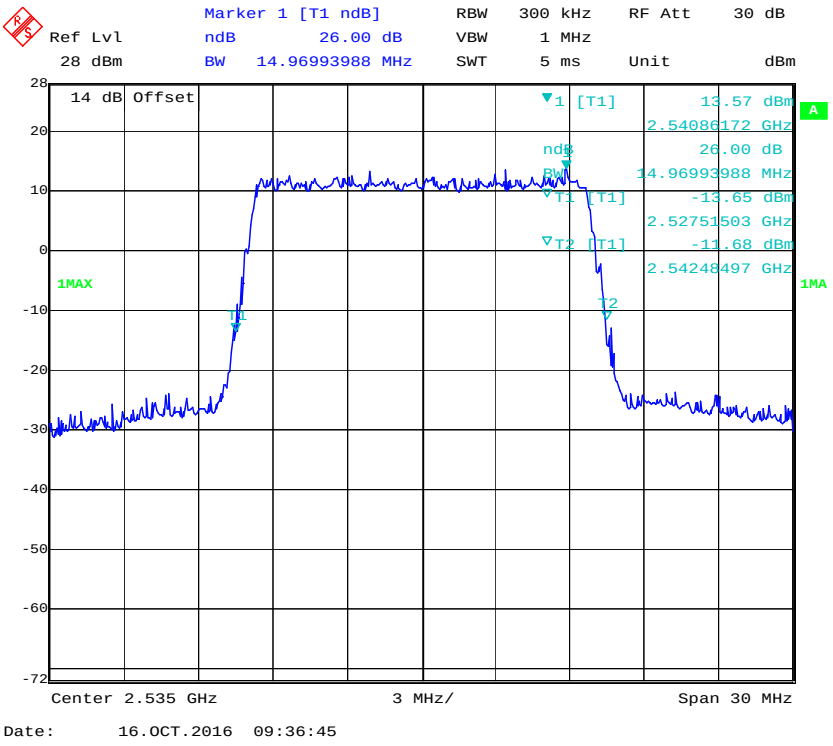
QPSK (15 MHz) -26 dB Bandwidth, Middle channel



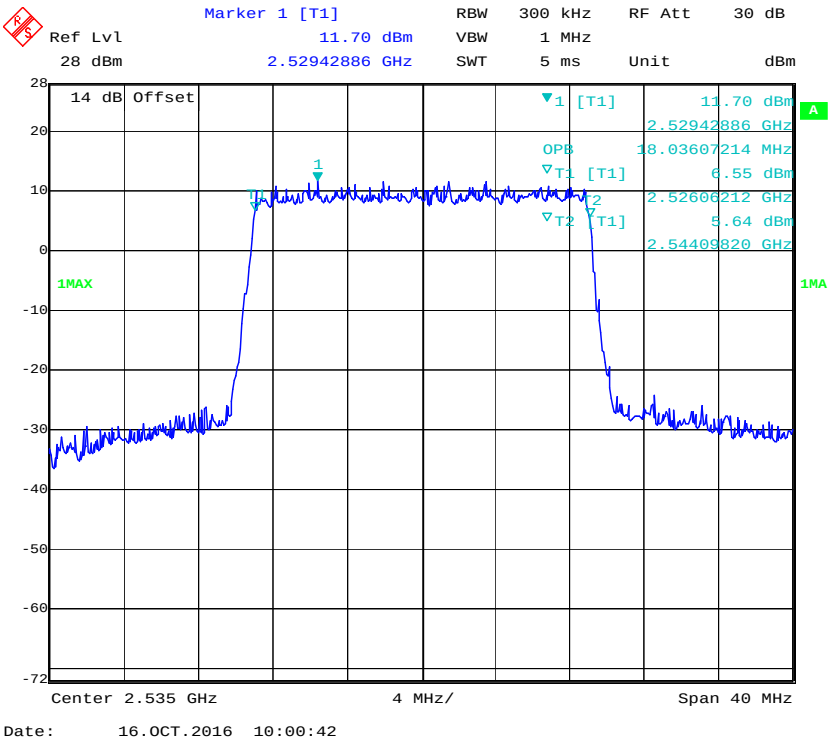
16-QAM (15 MHz) - 99% Occupied Bandwidth, Middle channel



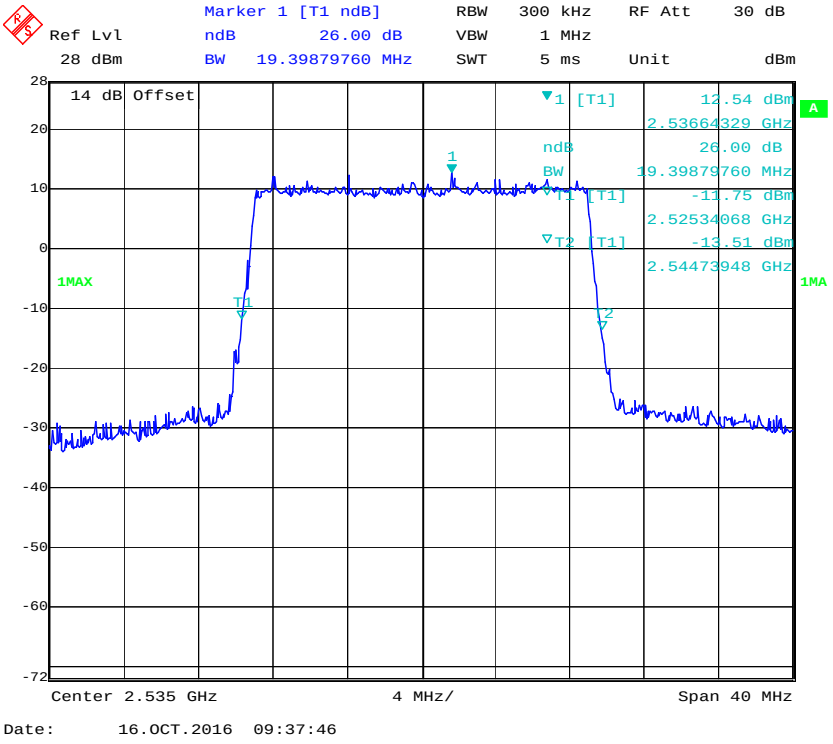
16-QAM (15 MHz) - 26 dB Bandwidth, Middle channel



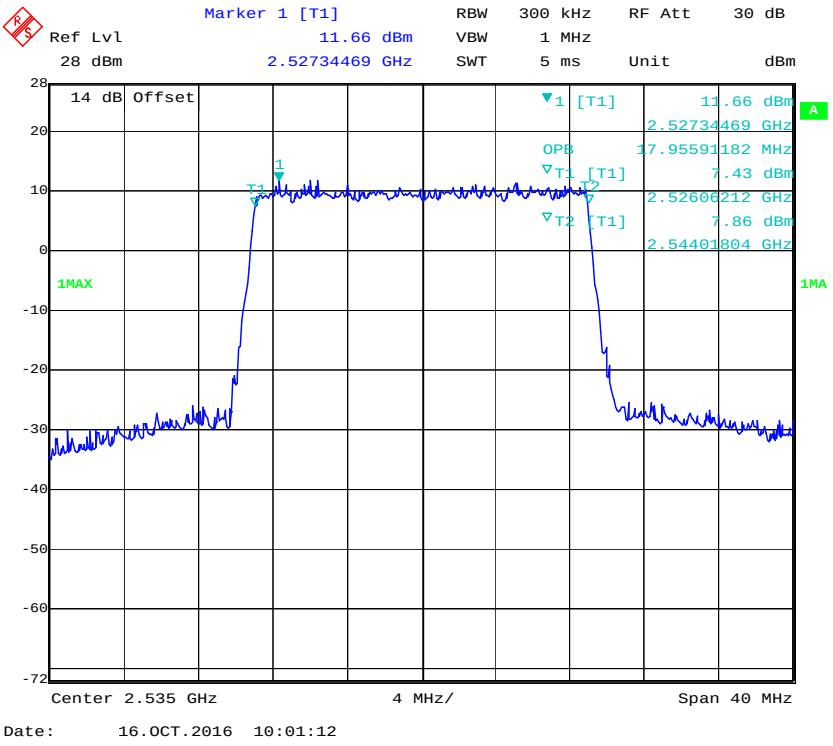
QPSK (20 MHz) - 99% Occupied Bandwidth, Middle channel



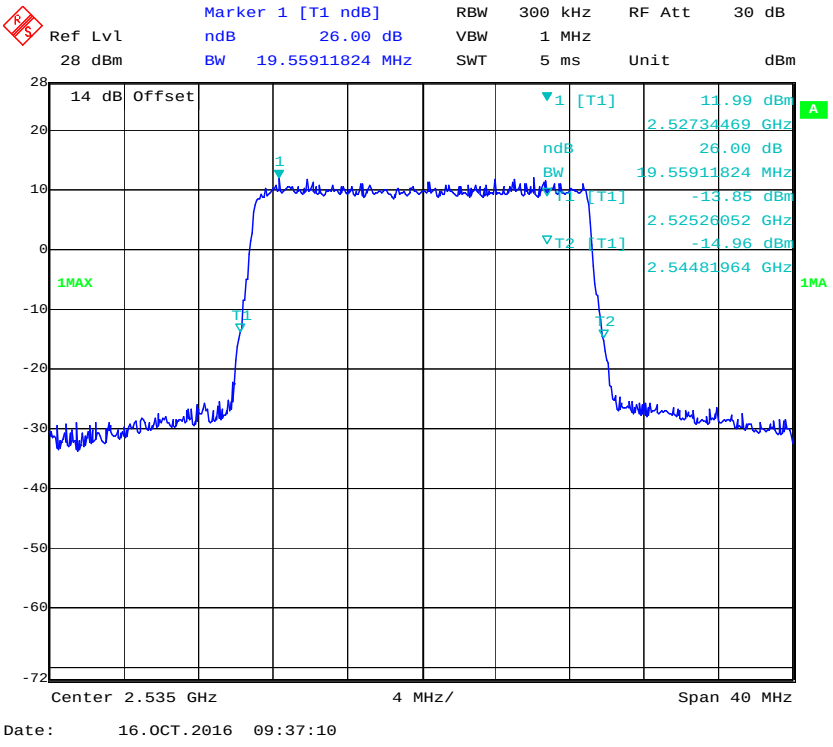
QPSK (20 MHz) - 26 dB Bandwidth, Middle channel



16-QAM (20 MHz) - 99% Occupied Bandwidth, Middle channel



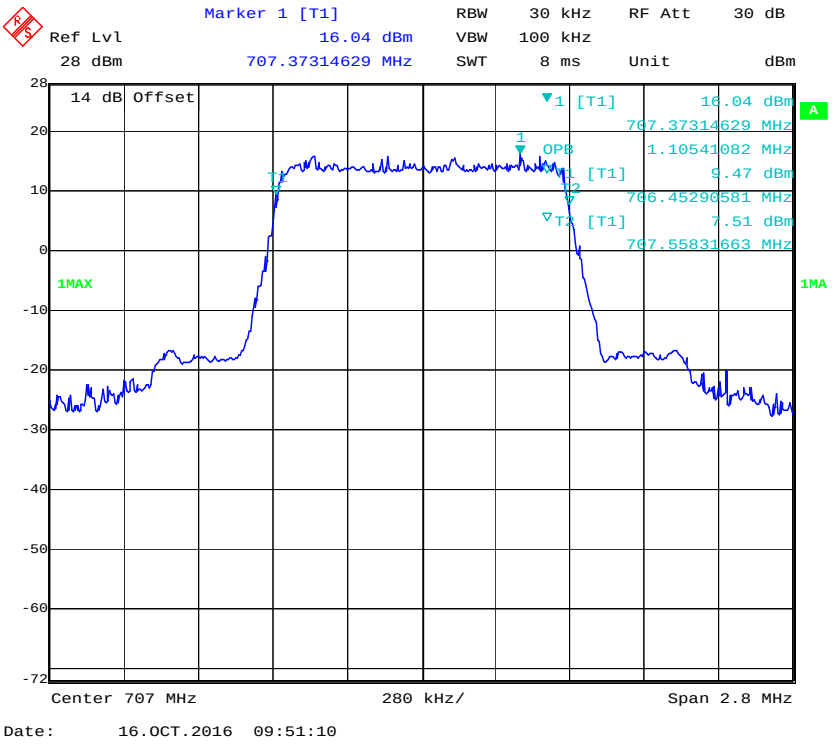
16-QAM (20 MHz) - 26 dB Bandwidth, Middle channel



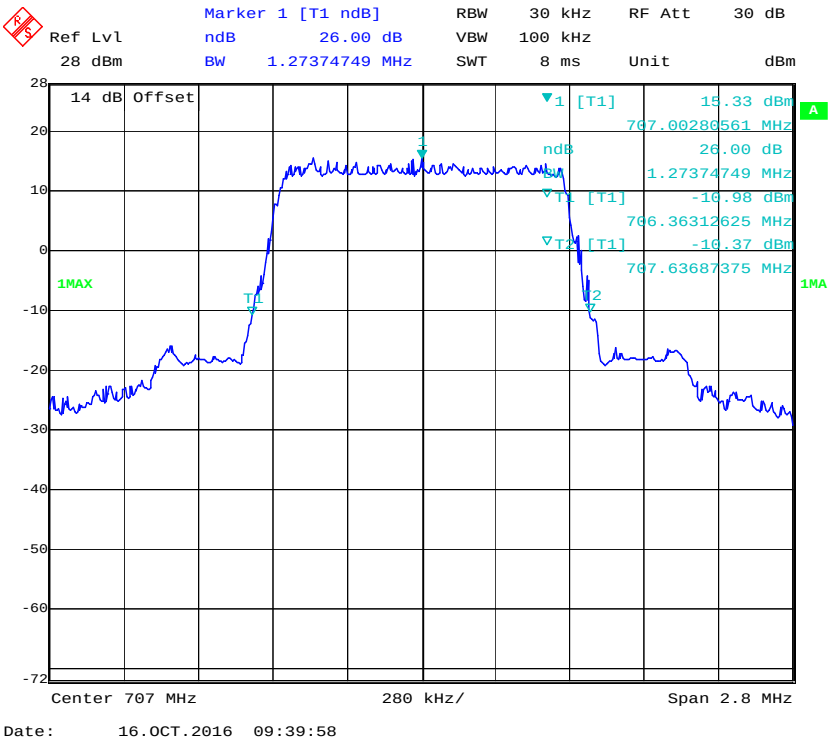
LTE Band 12: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.274
	16QAM	1.094	1.263
3.0	QPSK	2.681	2.922
	16QAM	2.693	2.922
5.0	QPSK	4.529	5.090
	16QAM	4.569	5.030
10.0	QPSK	8.978	9.780
	16QAM	8.978	9.820

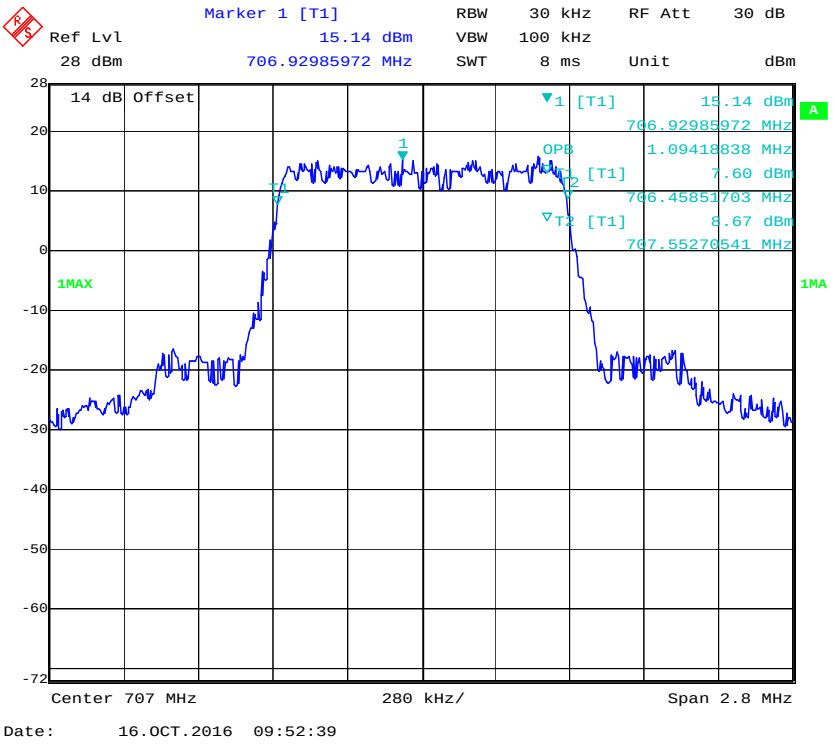
QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



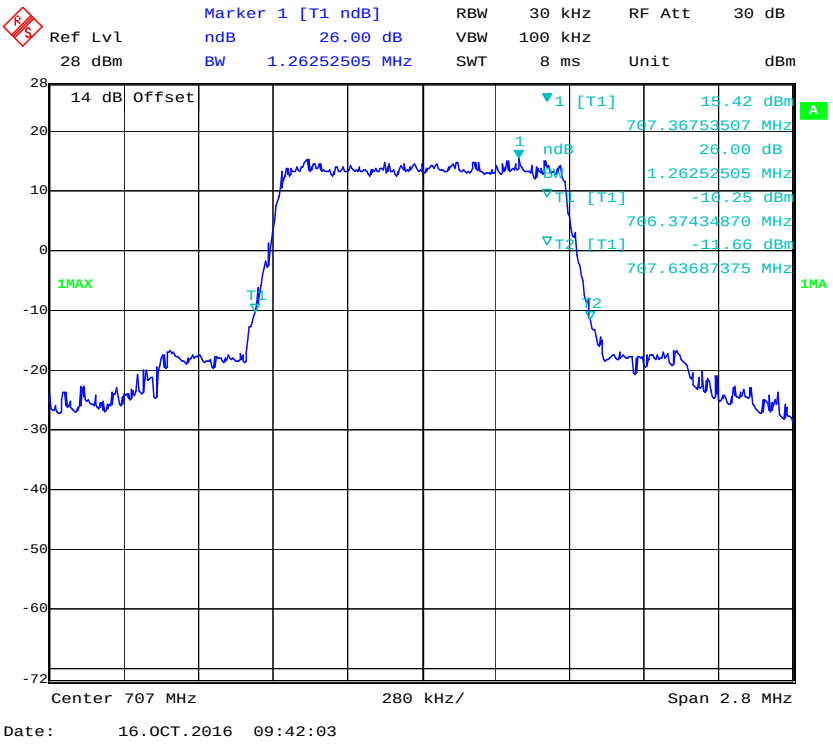
QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



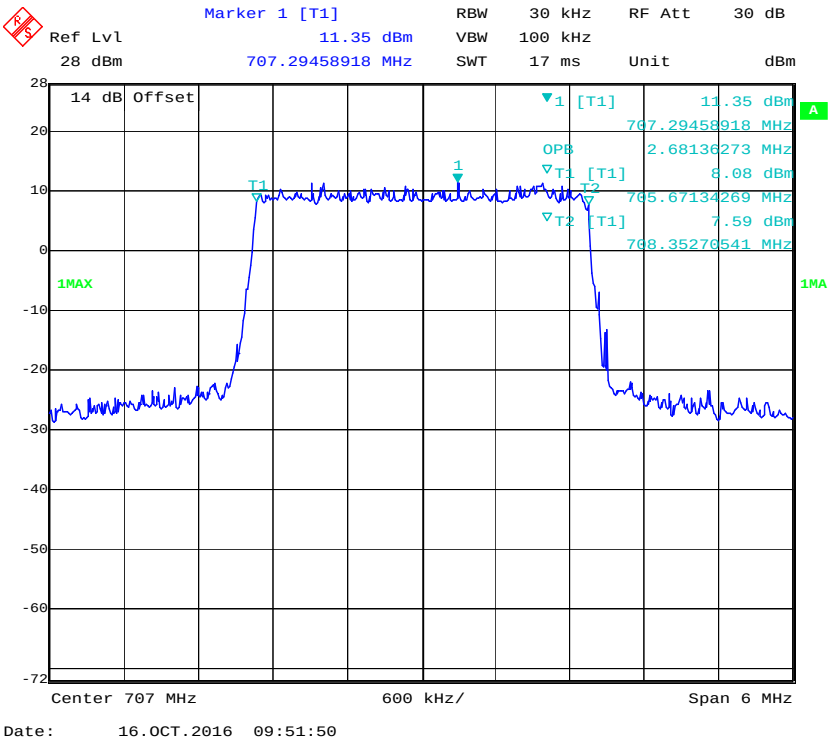
16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



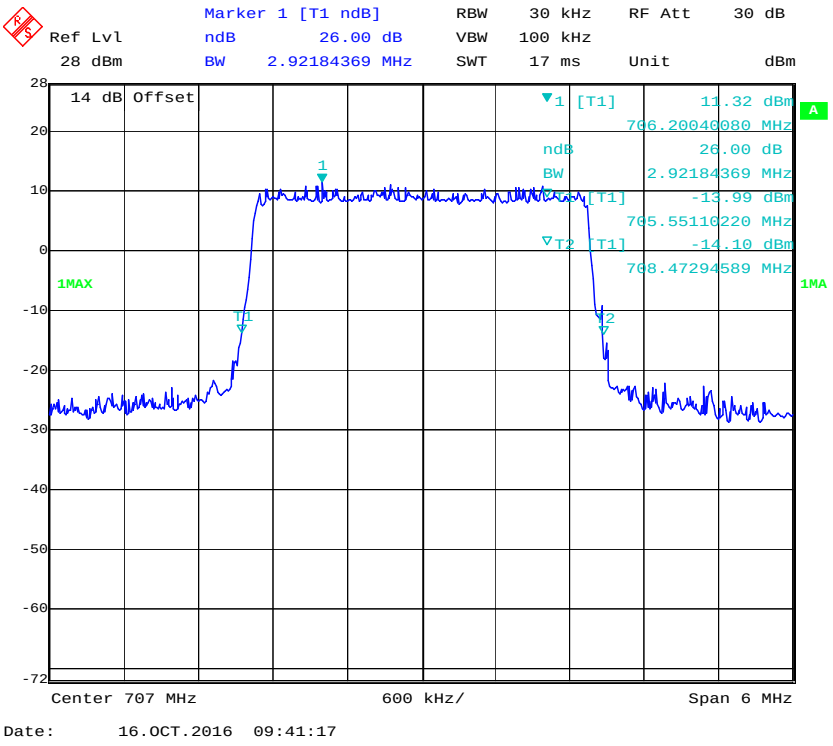
16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



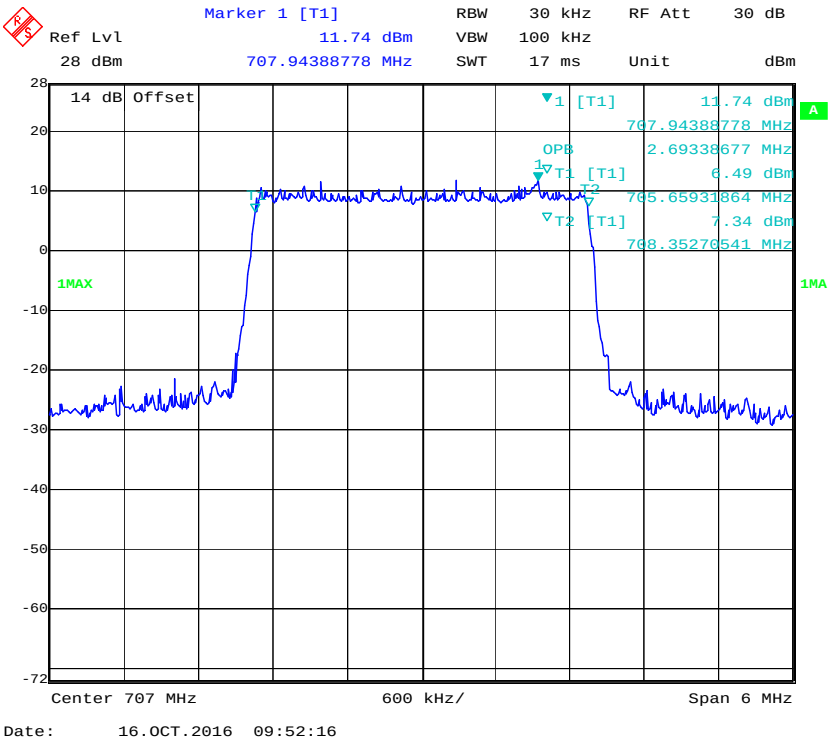
QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



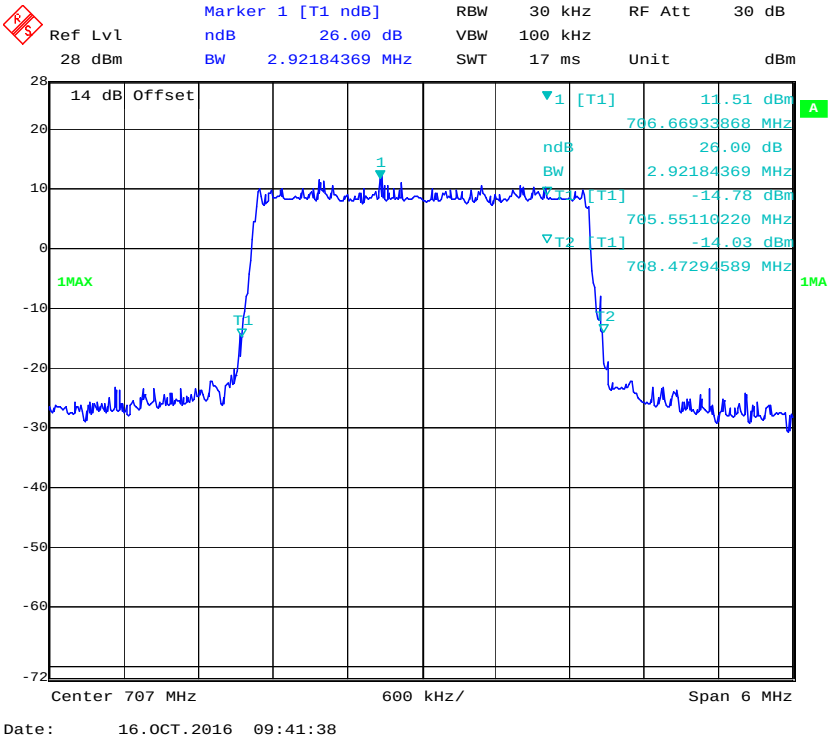
QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



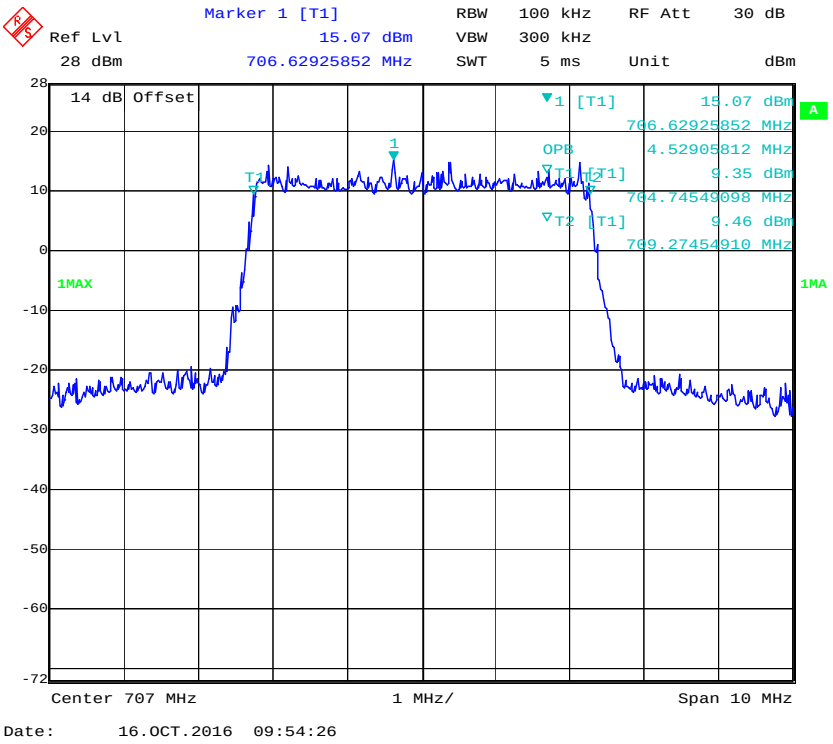
16-QAM (3.0MHz) - 99% Occupied Bandwidth, Middle channel



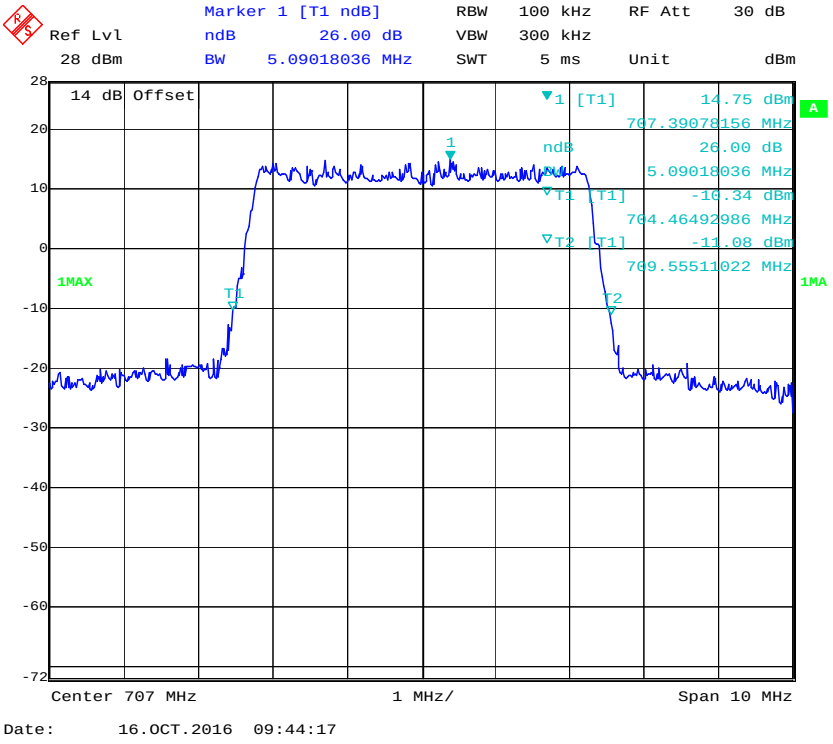
16-QAM (3.0MHz) - 26 dB Bandwidth, Middle channel



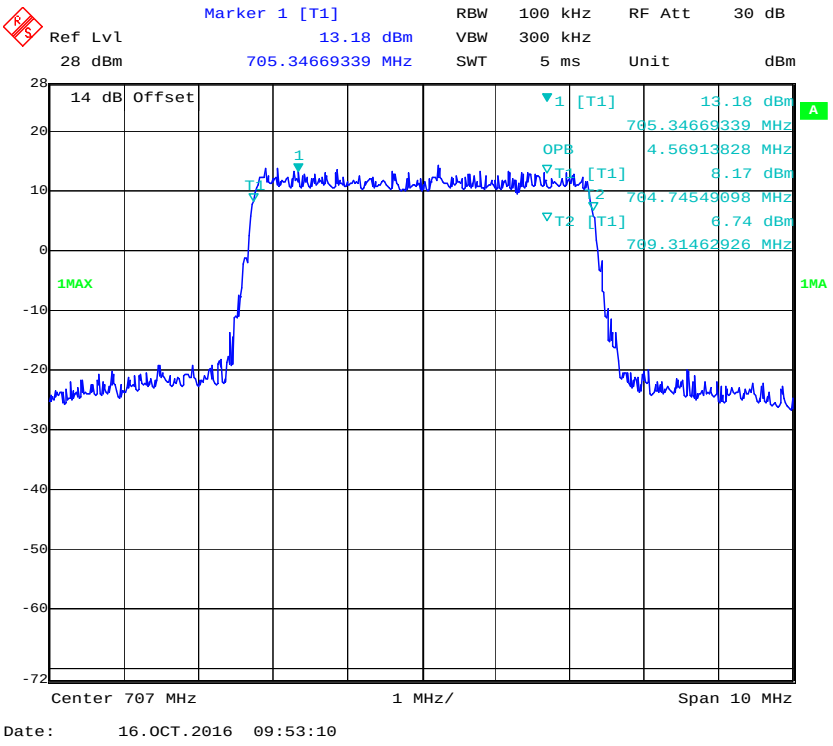
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



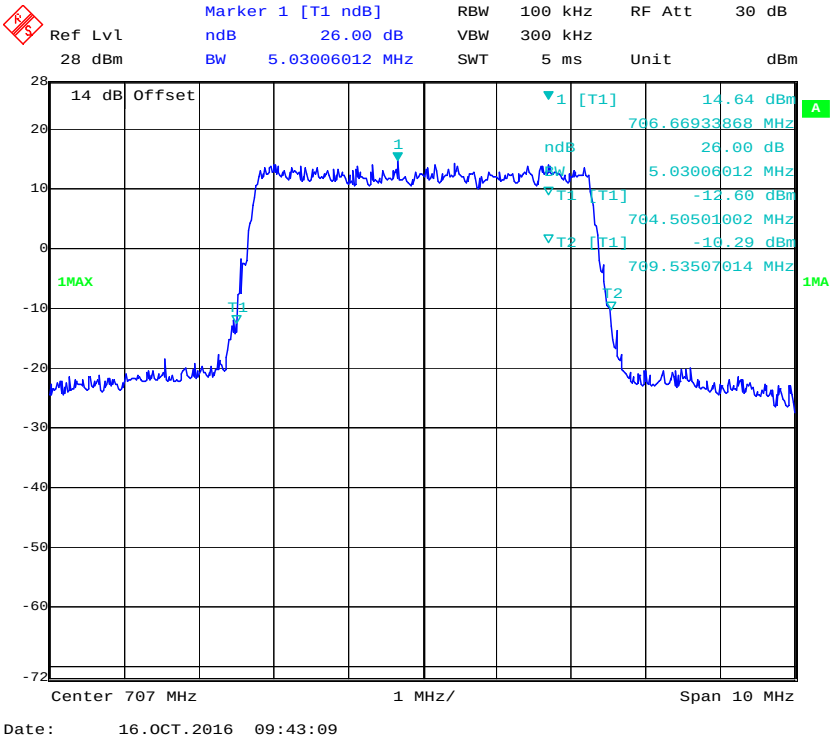
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



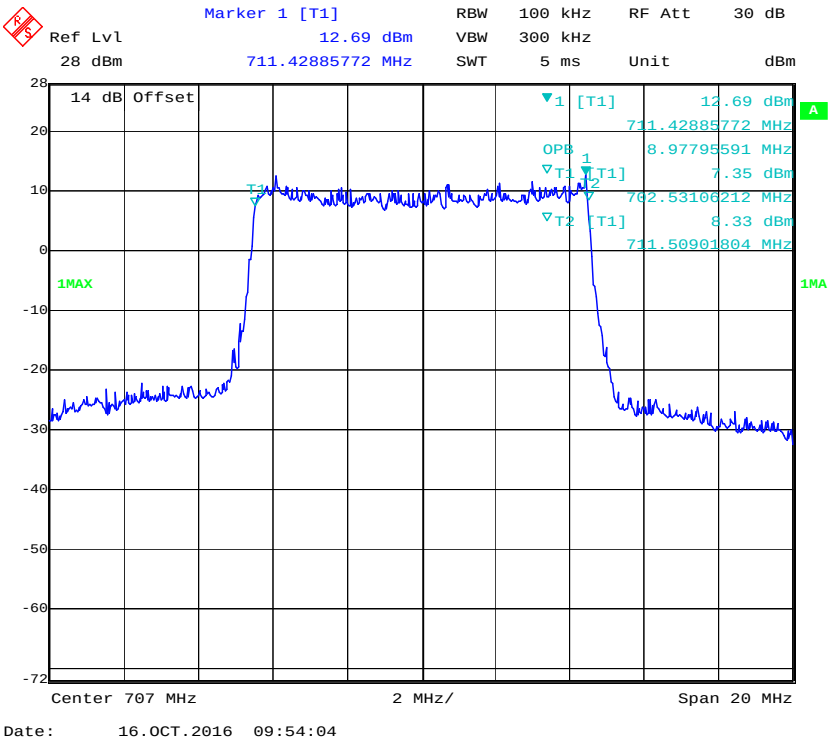
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



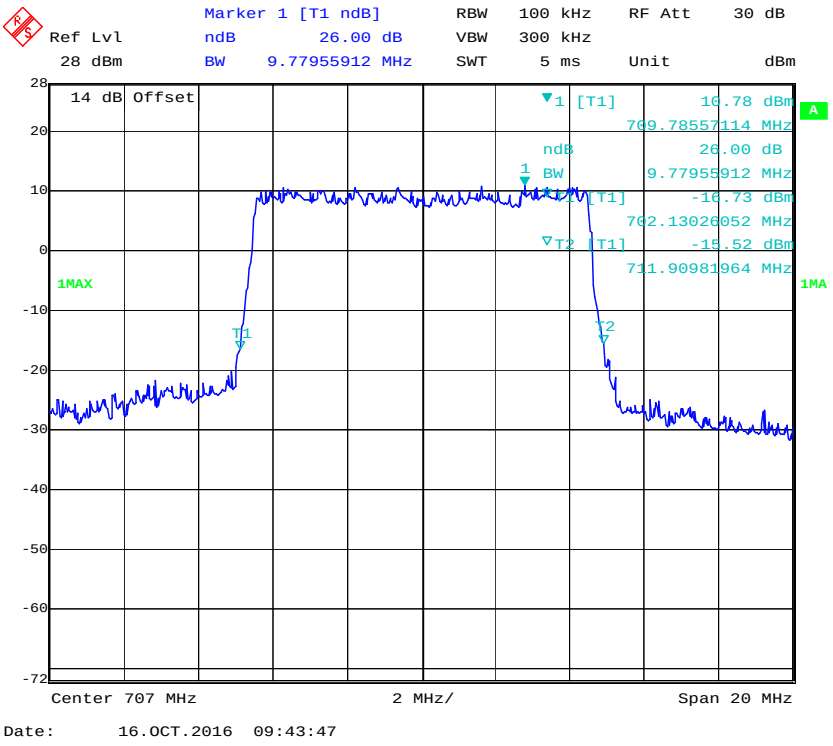
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



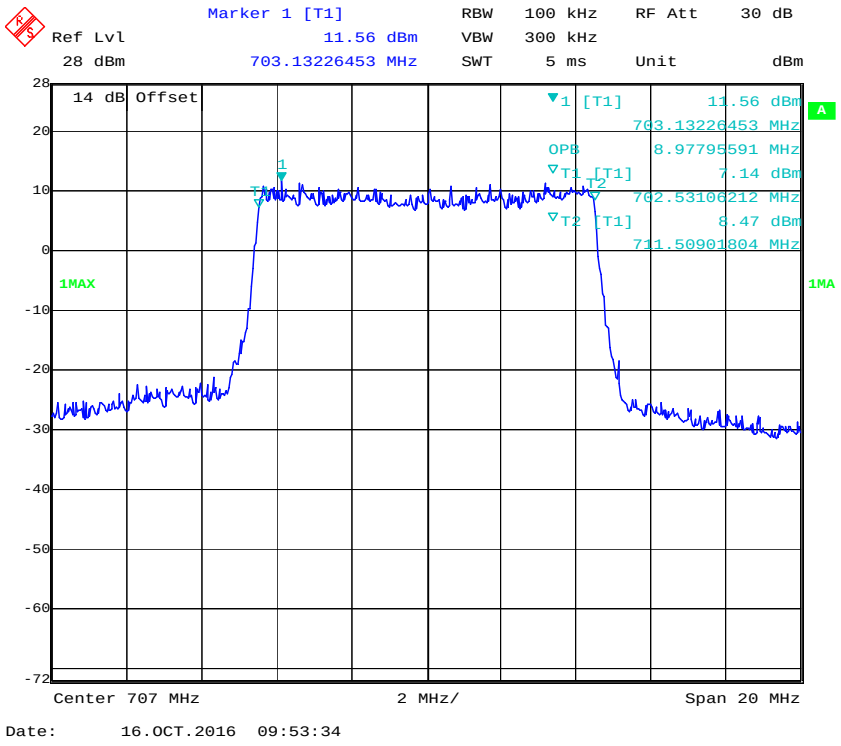
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



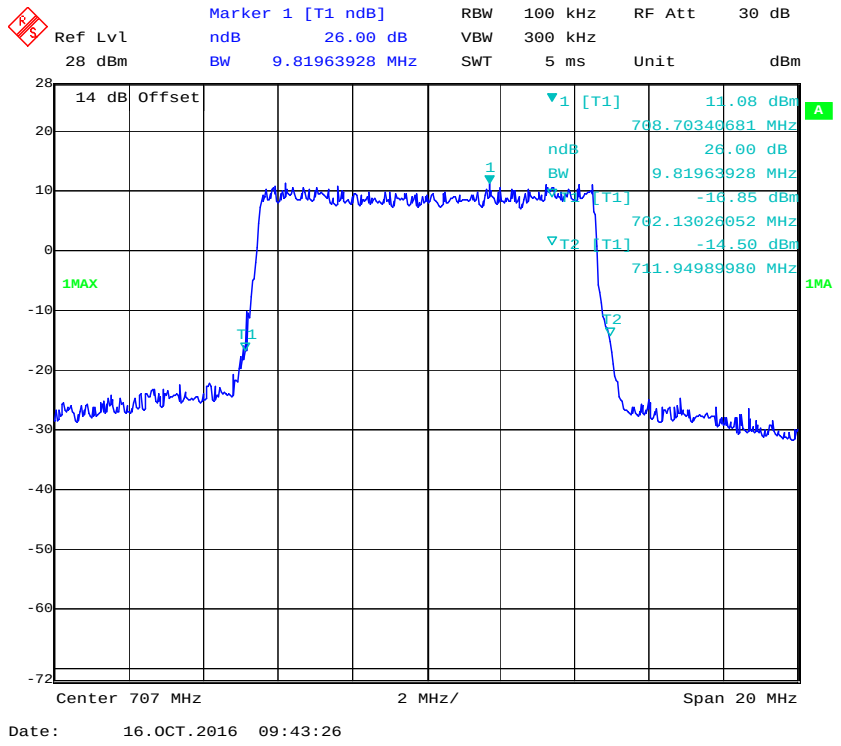
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



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



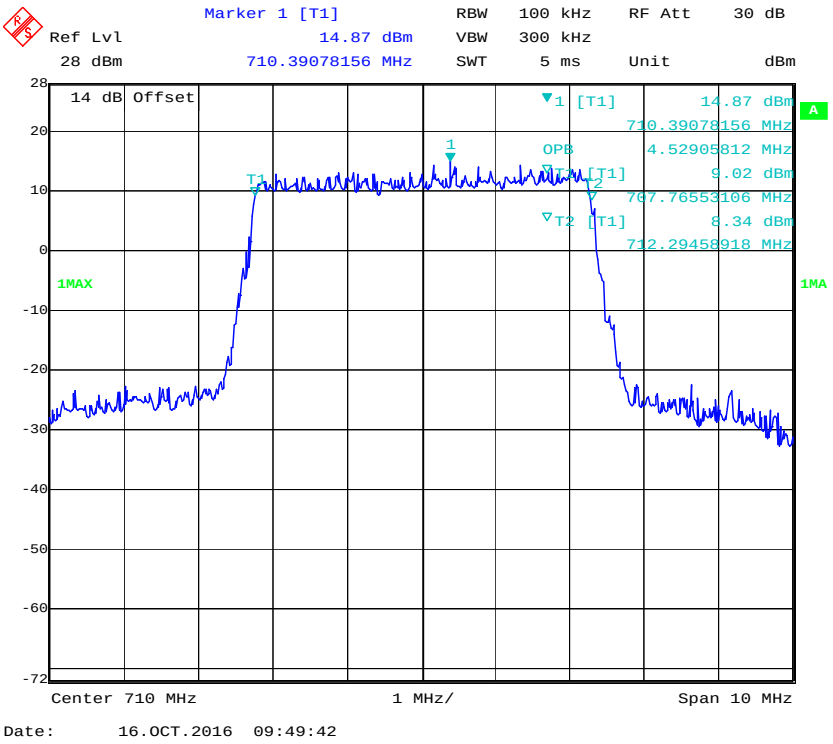
16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



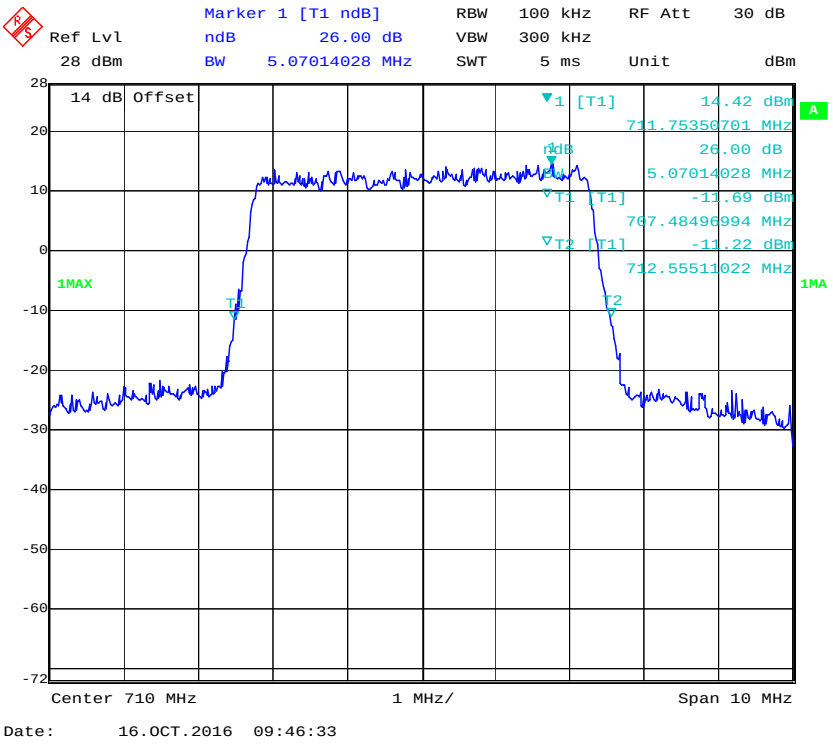
LTE Band 17: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.529	5.070
	16QAM	4.529	5.050
10.0	QPSK	8.938	9.659
	16QAM	8.978	9.780

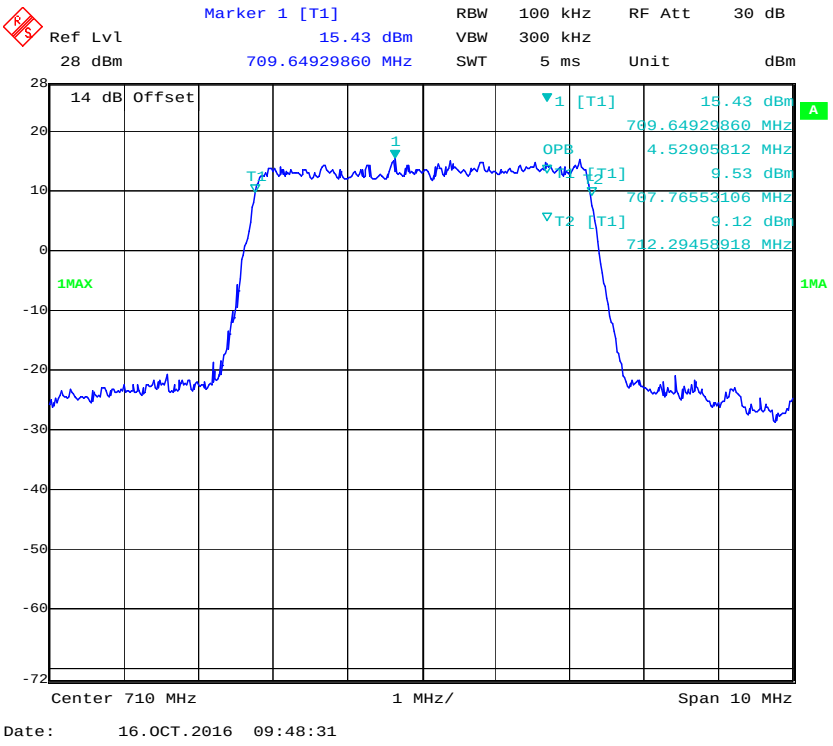
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



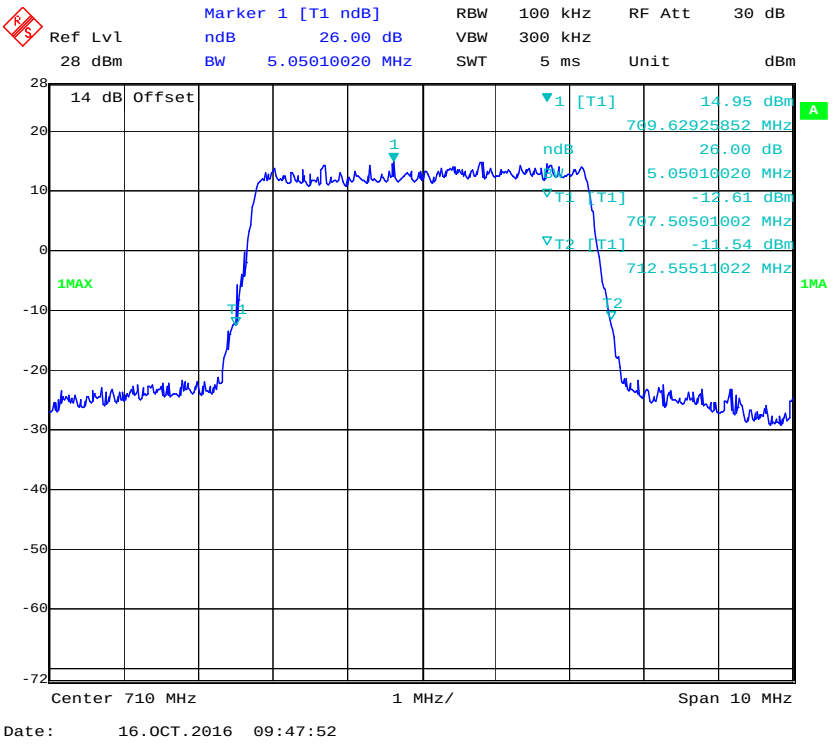
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



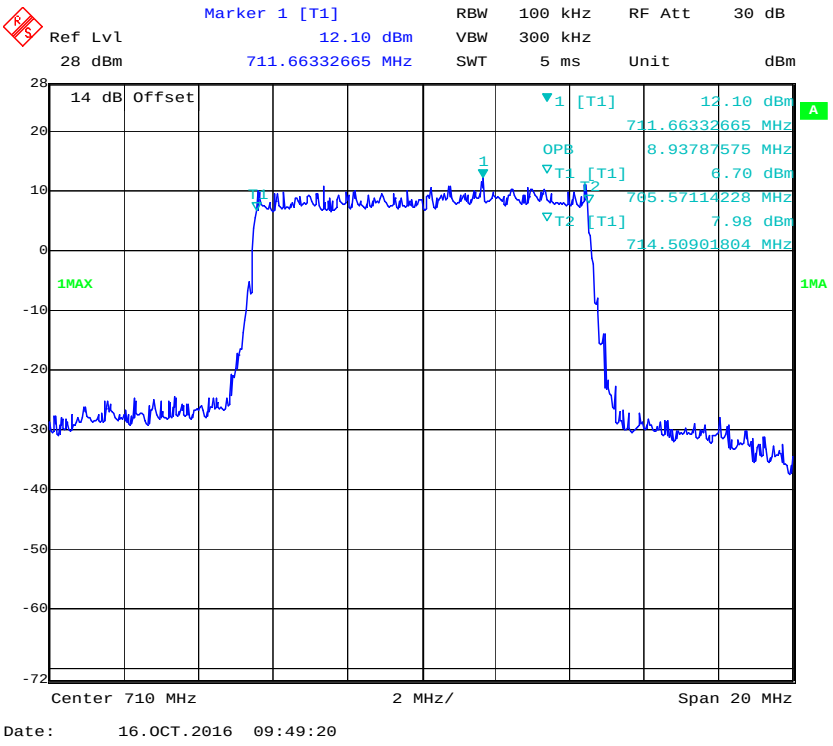
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



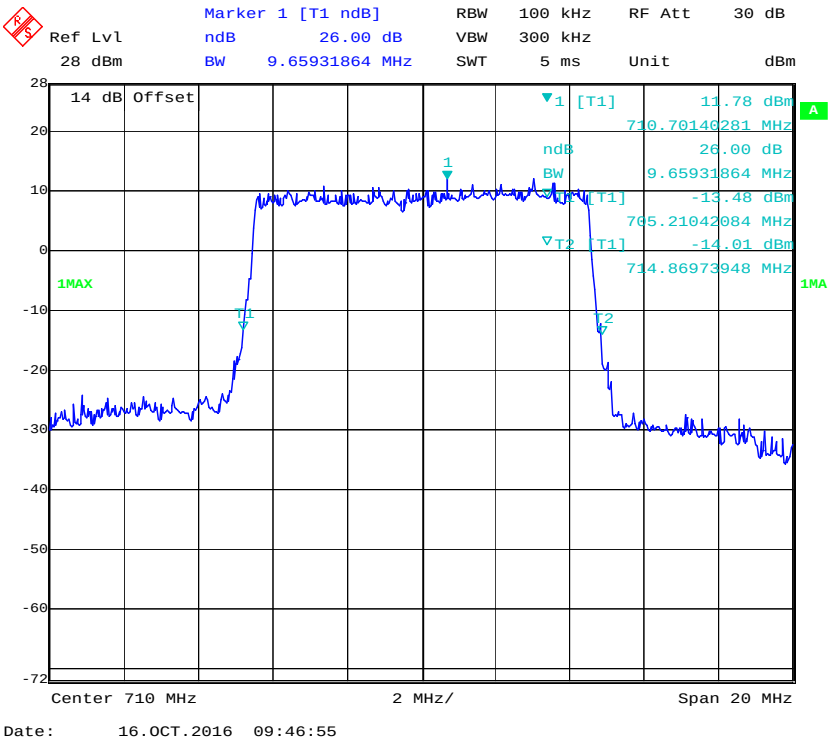
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



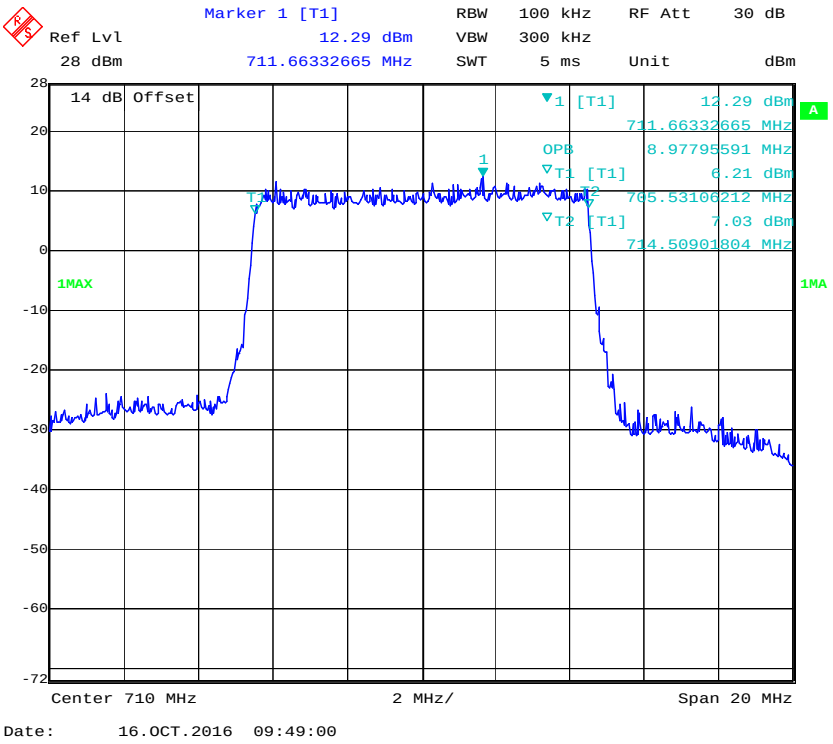
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



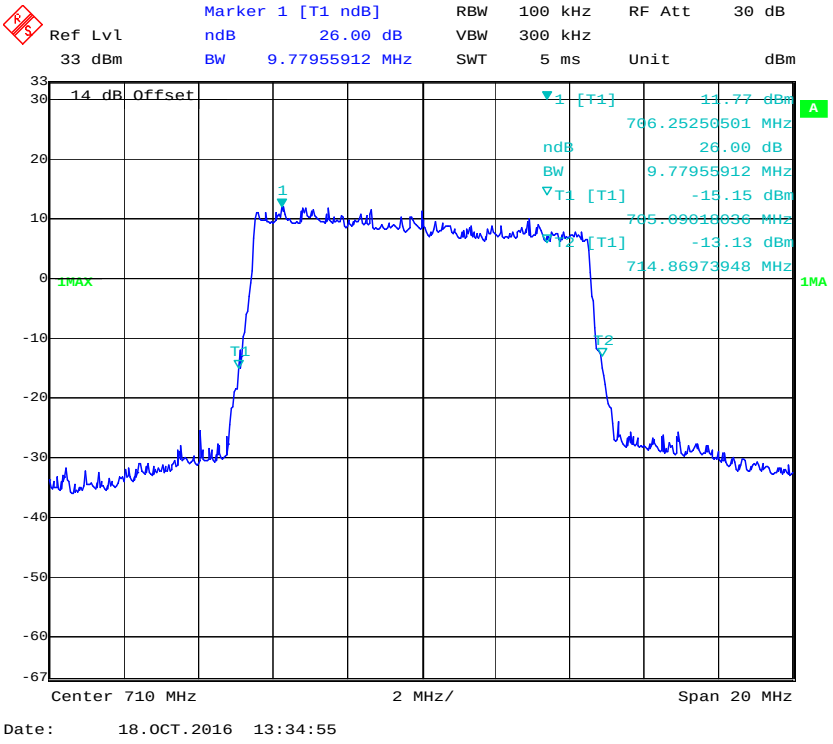
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



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



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



§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53 (h) (m)
SPURIOUS EMISSIONS AT ANTENNA TERMINALS

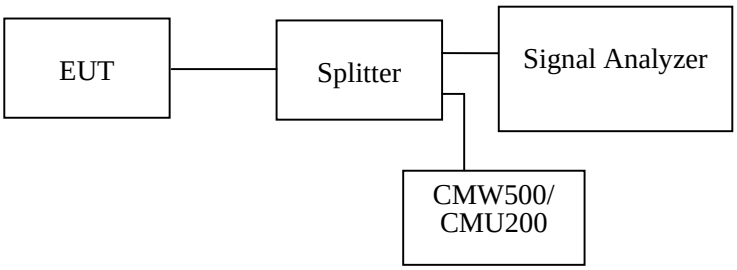
Applicable Standards

FCC §2.1051, §22.917(a) and §24.238(a) and §27.53(h) (m).

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 bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

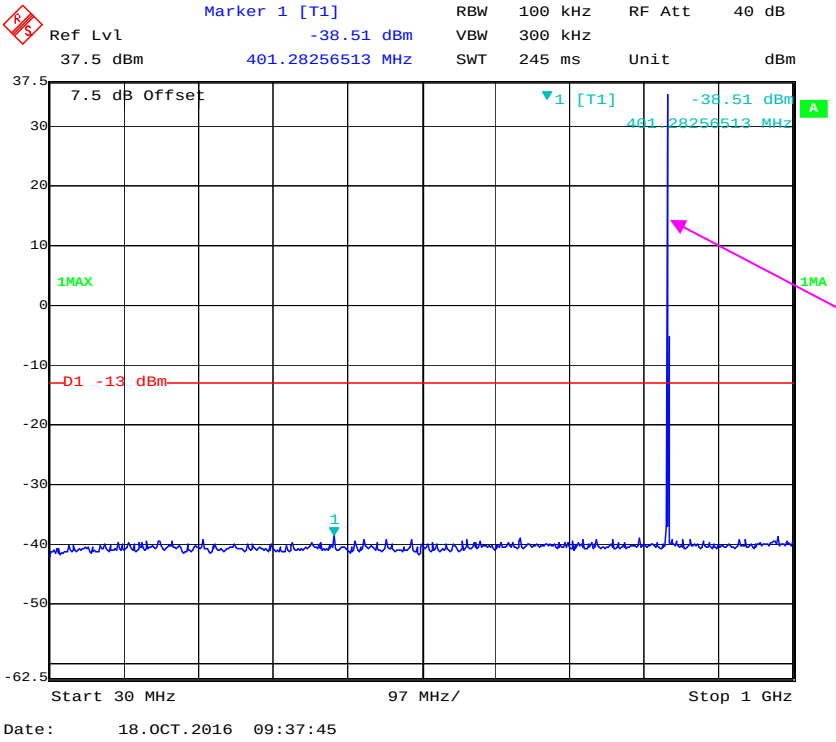
Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	53~55 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Chris Wang from 2016-10-16 to 2016-10-21.

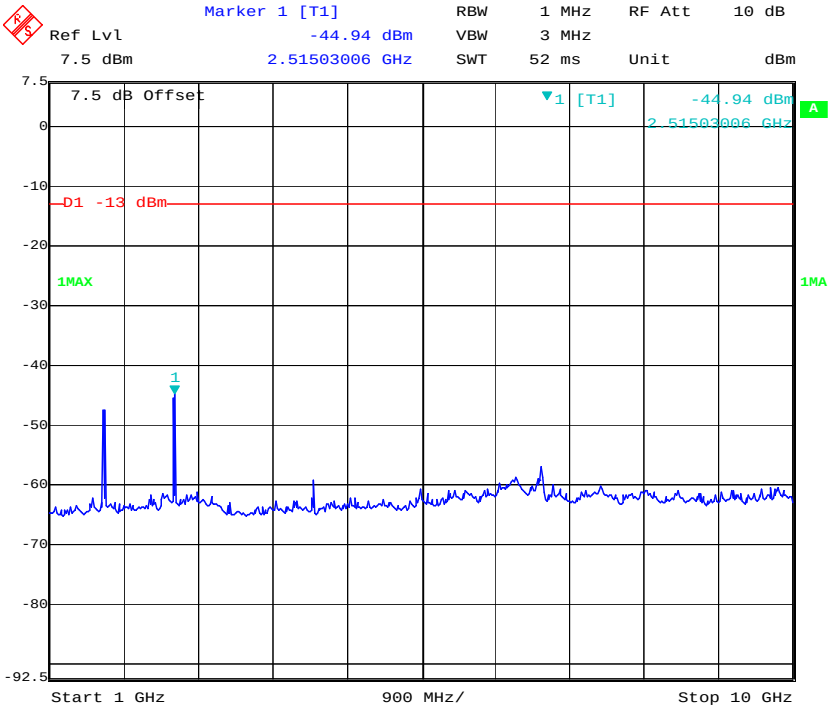
Cellular Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)

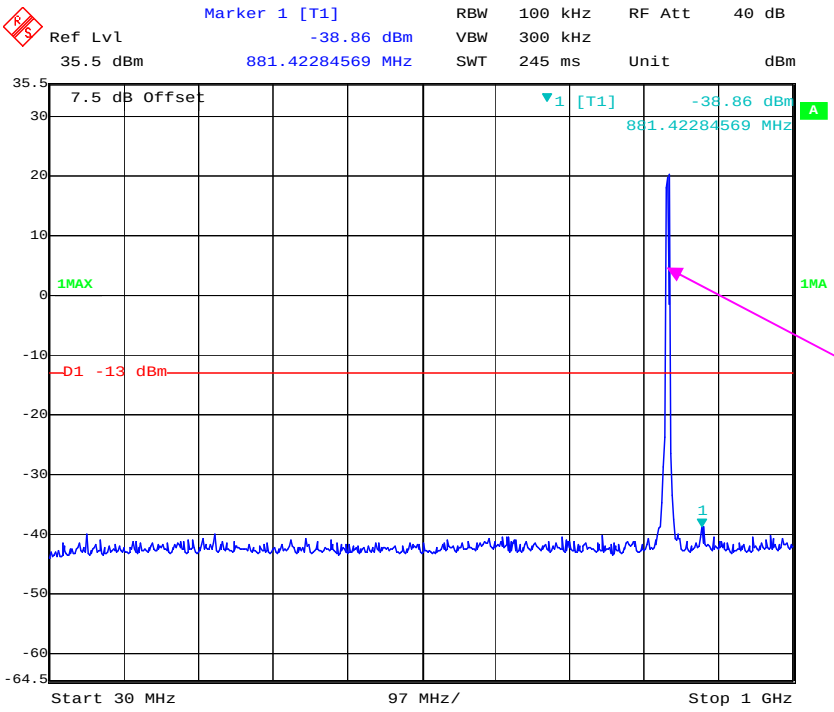


Fundamental test

1 GHz – 10 GHz (GSM Mode)

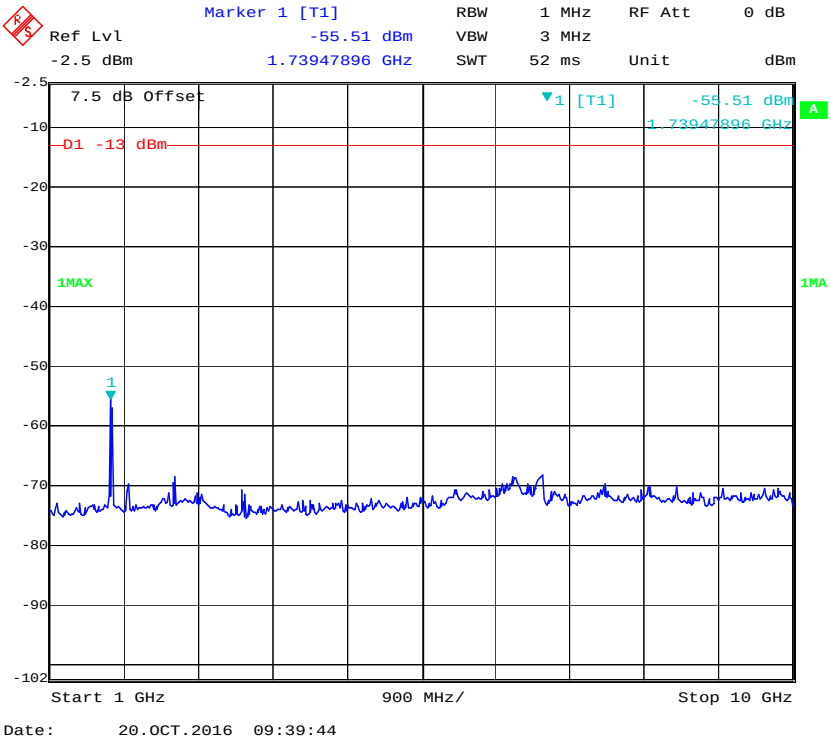


30 MHz – 1 GHz (WCDMA Mode)



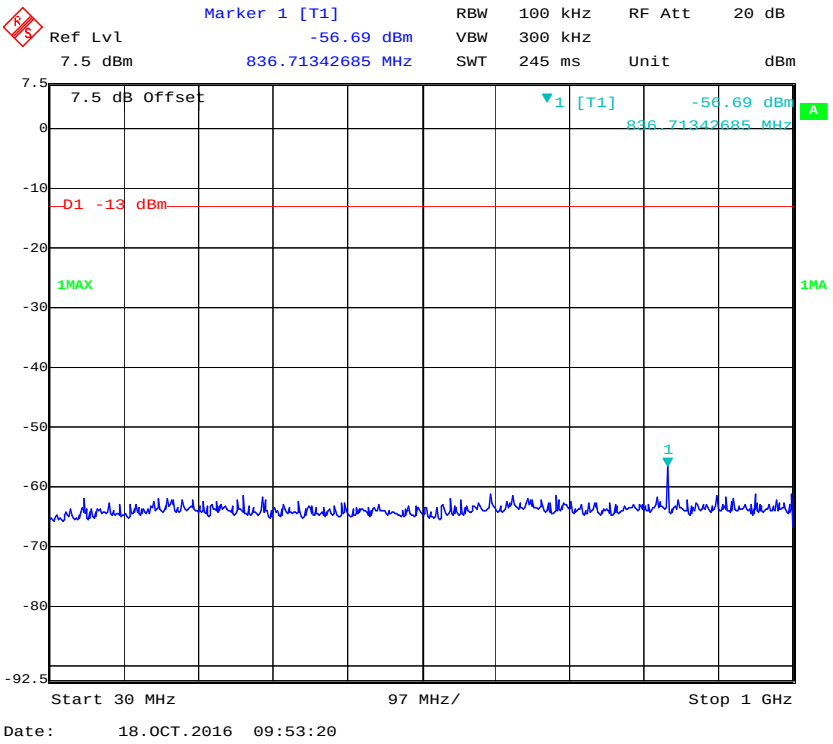
Fundamental test

1 GHz – 10 GHz (WCDMA Mode)

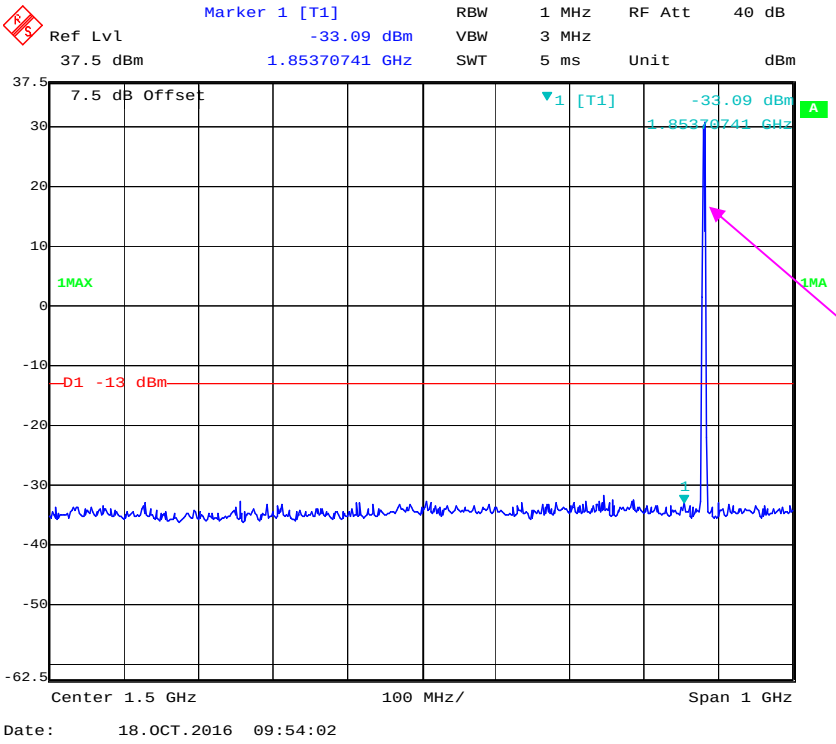


PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)

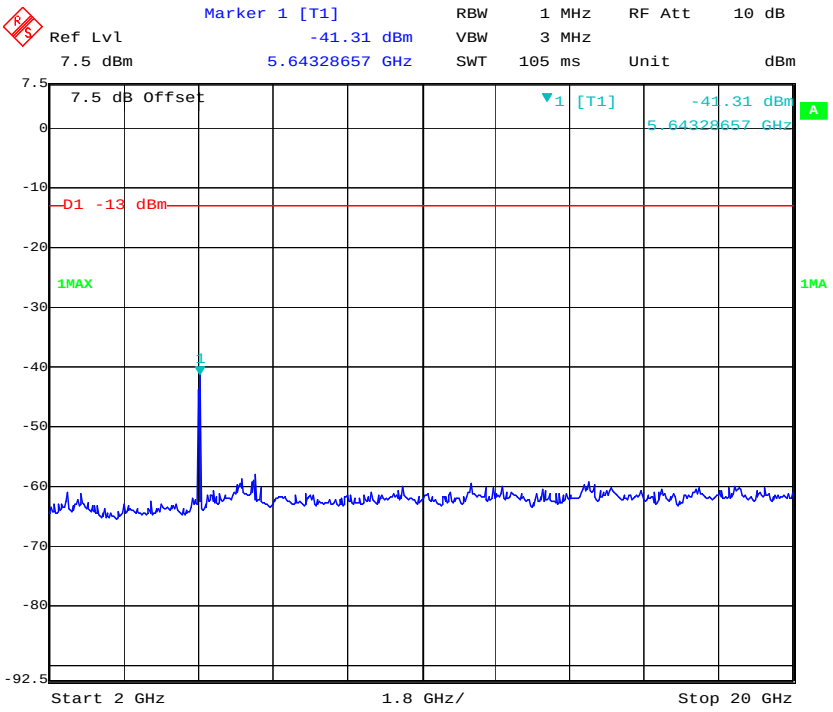


1 GHz – 2 GHz (GSM Mode)

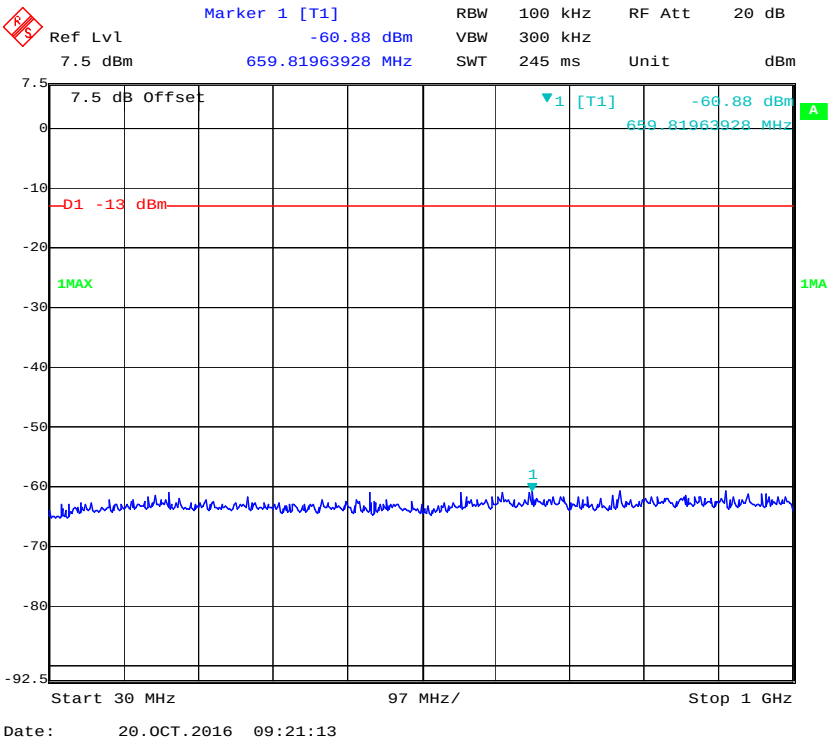


Fundamental test

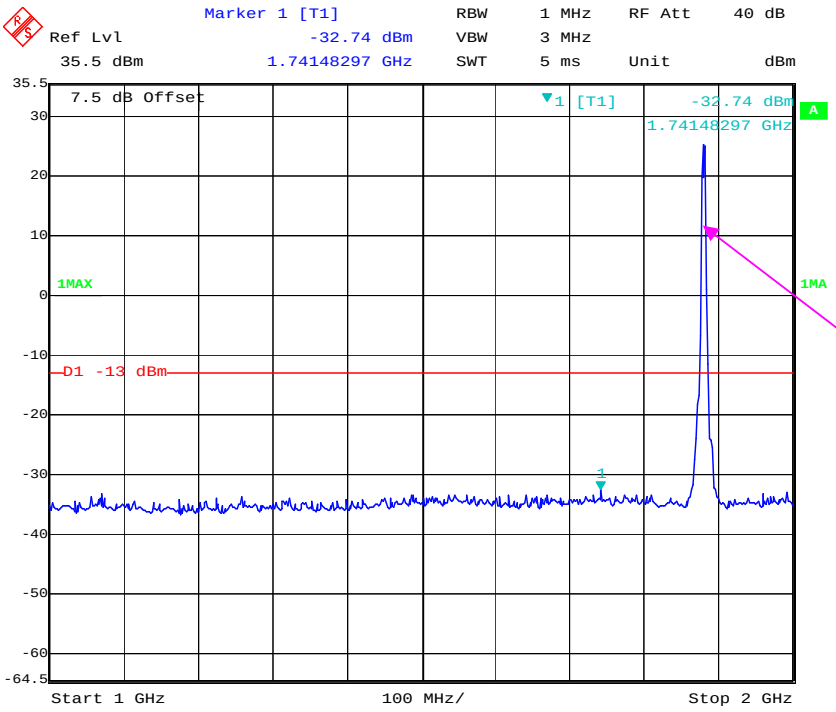
2 GHz – 20 GHz (GSM Mode)



30 MHz – 1 GHz (WCDMA Mode)

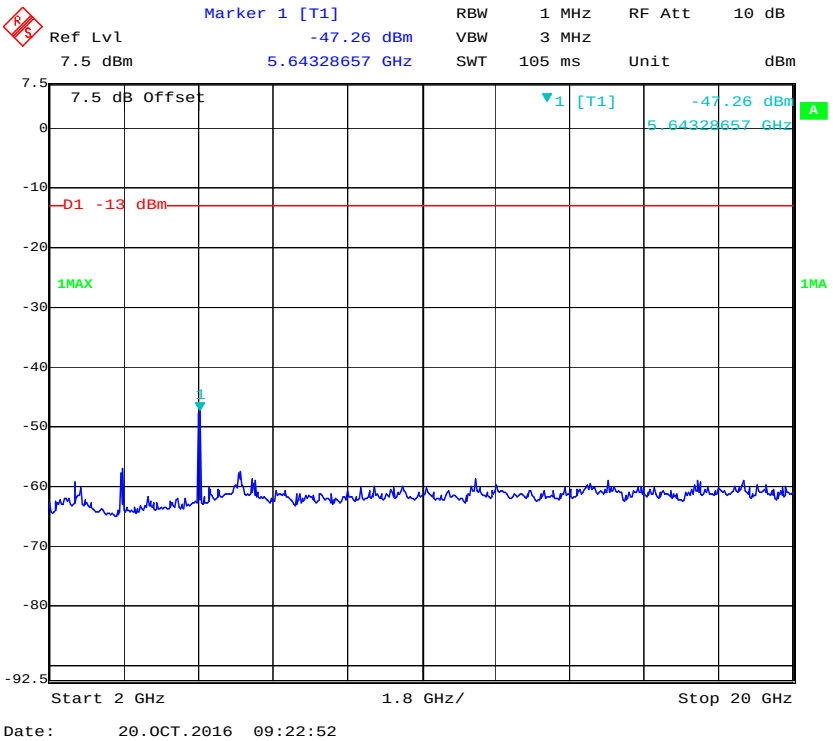


1 GHz – 2 GHz (WCDMA Mode)



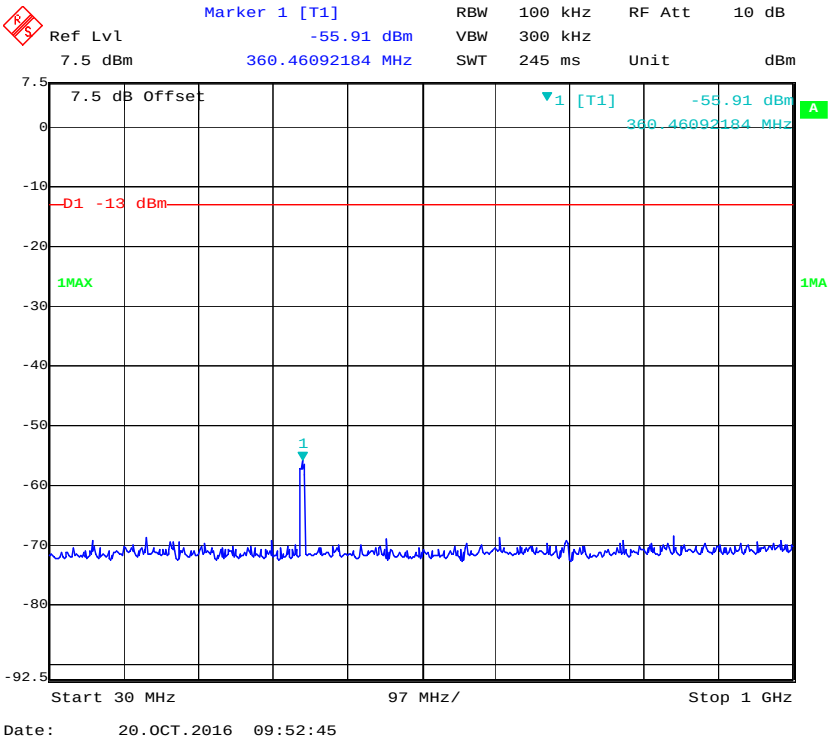
Fundamental test

2 GHz – 20 GHz (WCDMA Mode)

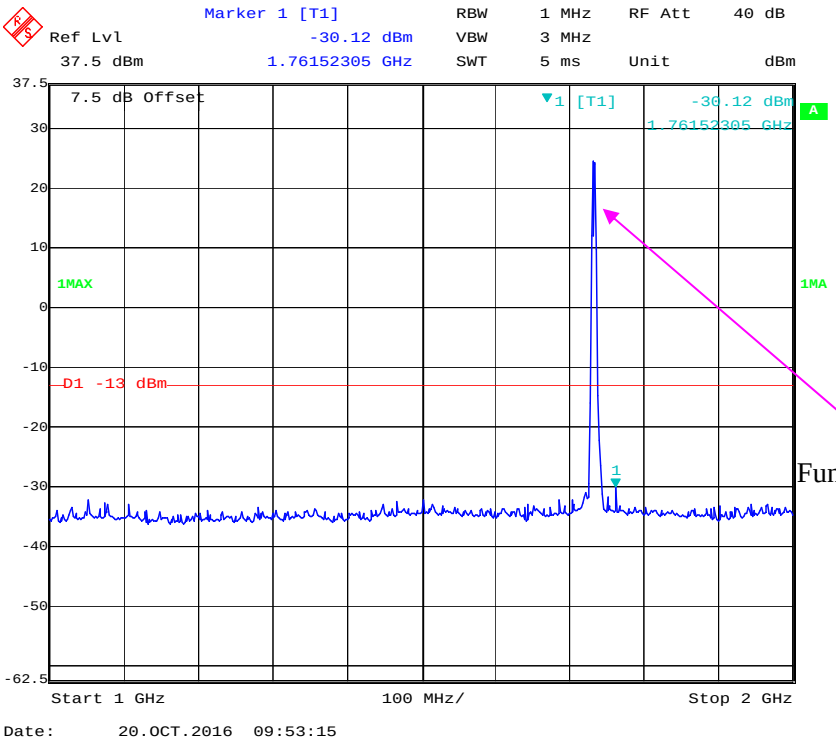


AWS Band:

30 MHz – 1 GHz (WCDMA Mode)

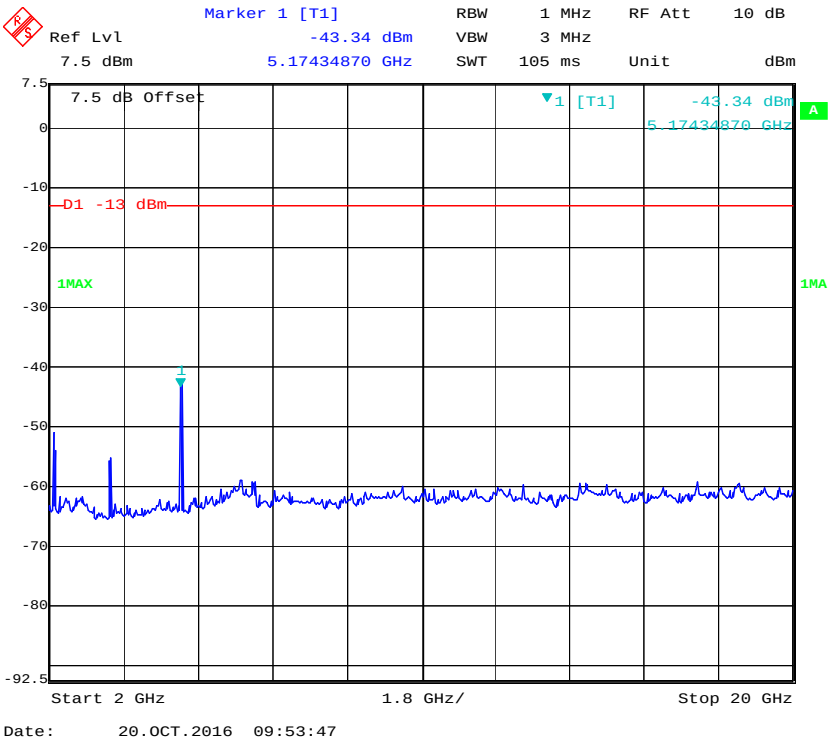


1 GHz – 2 GHz (WCDMA Mode)



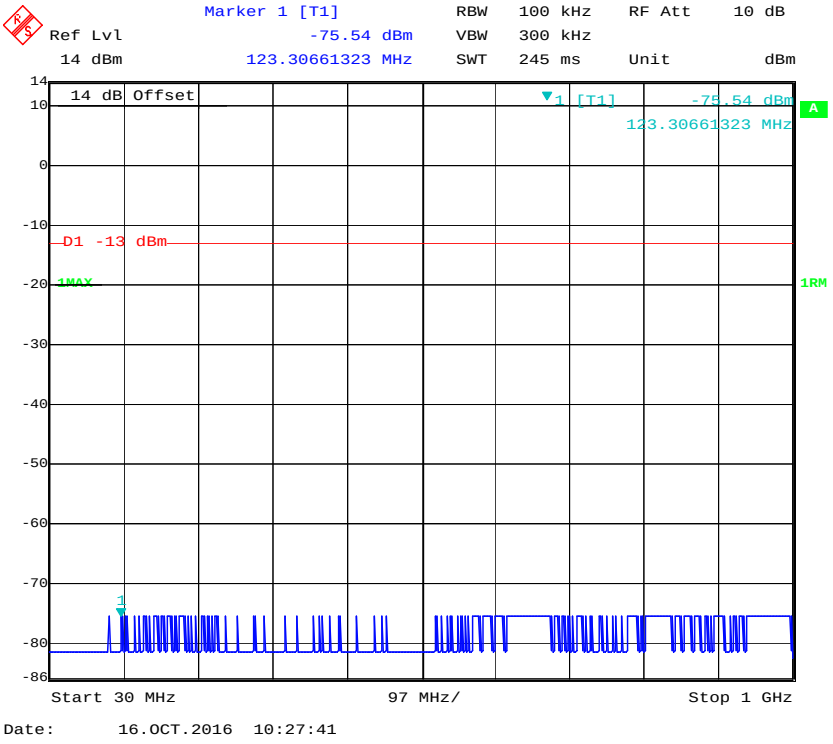
Fundamental test

2 GHz – 20 GHz (WCDMA Mode)

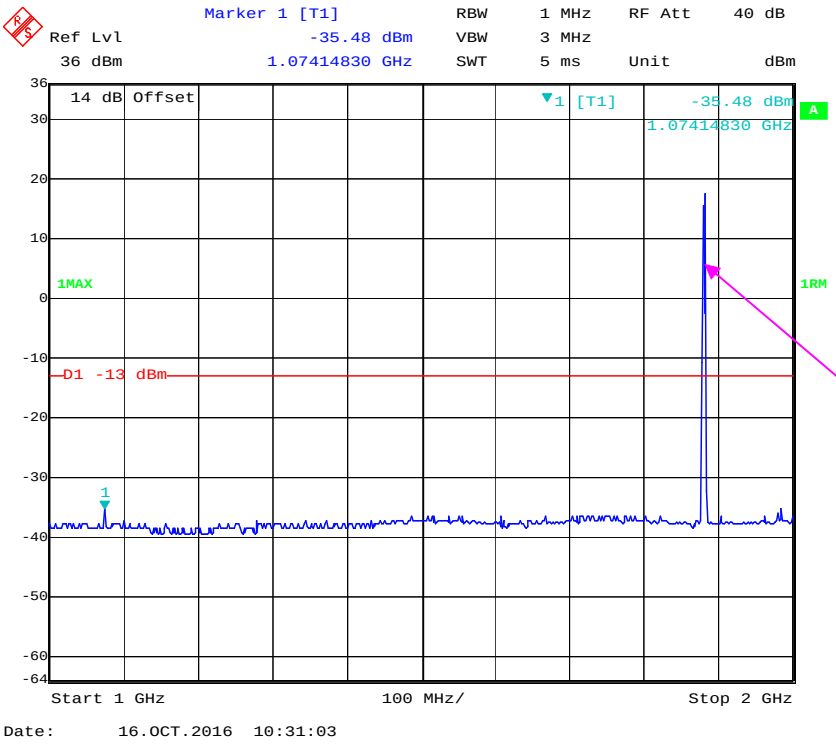


LTE Band 2:

30 MHz - 1 GHz (1.4 MHz, Middle Channel)

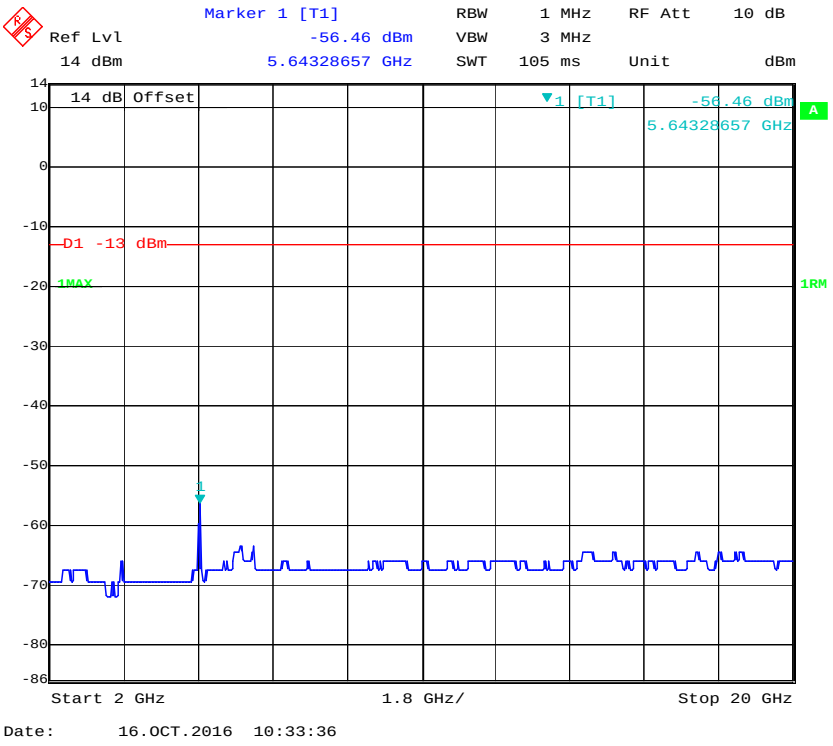


1 GHz – 2 GHz (1.4 MHz, Middle Channel)

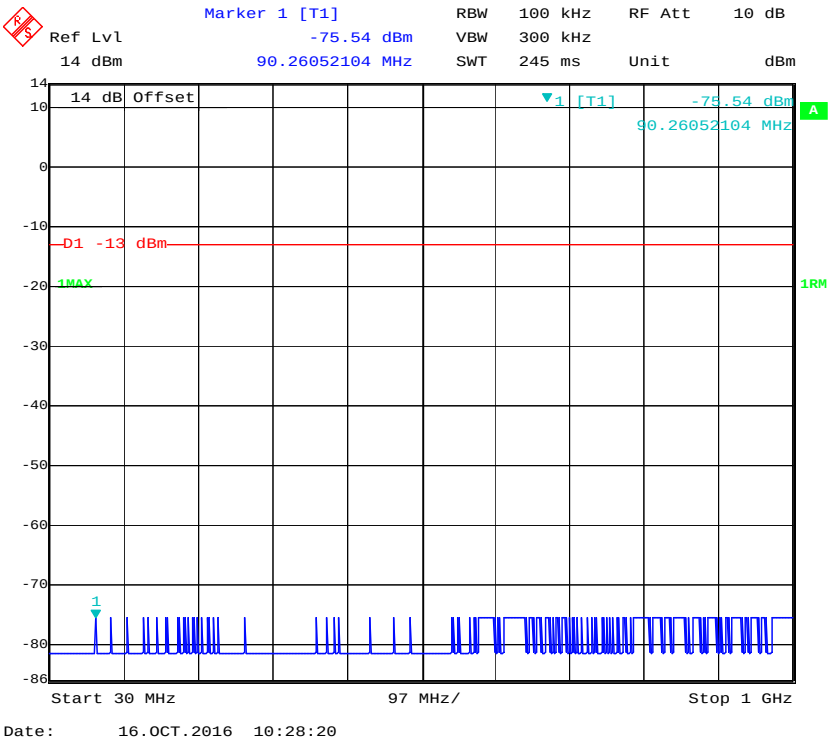


Fundamental test

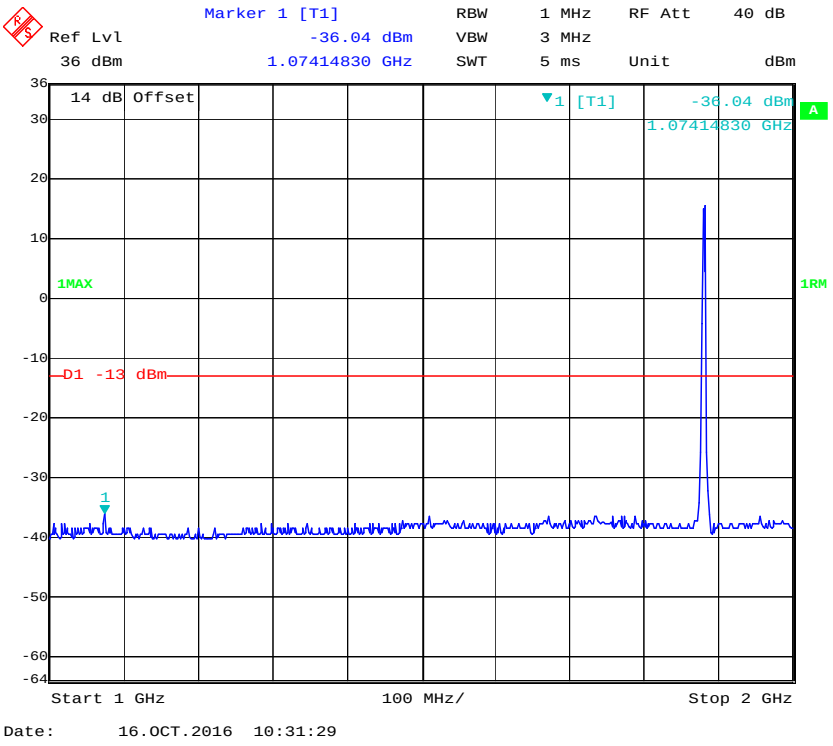
2 GHz – 20 GHz (1.4 MHz, Middle Channel)



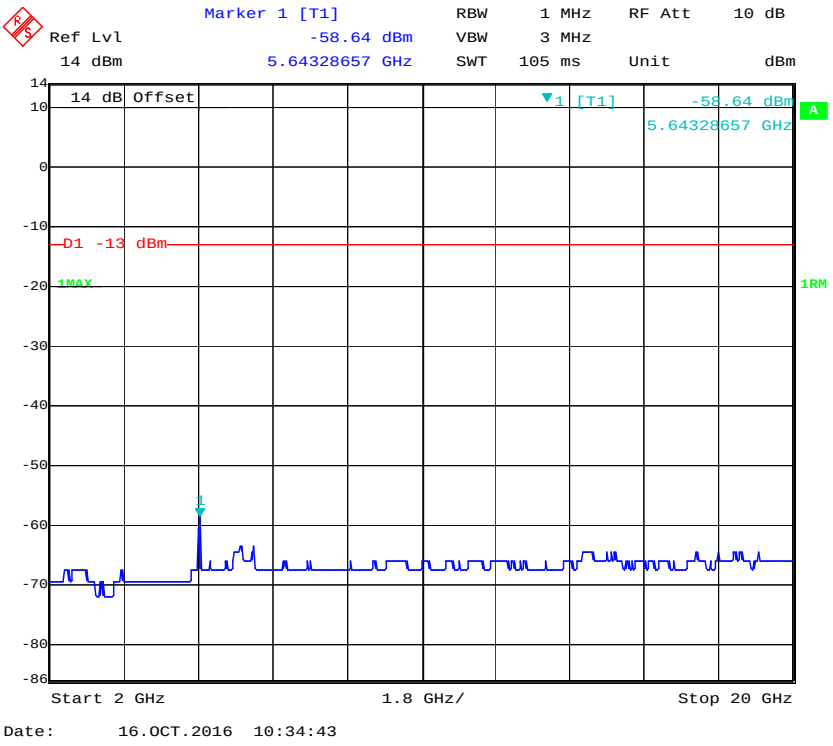
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



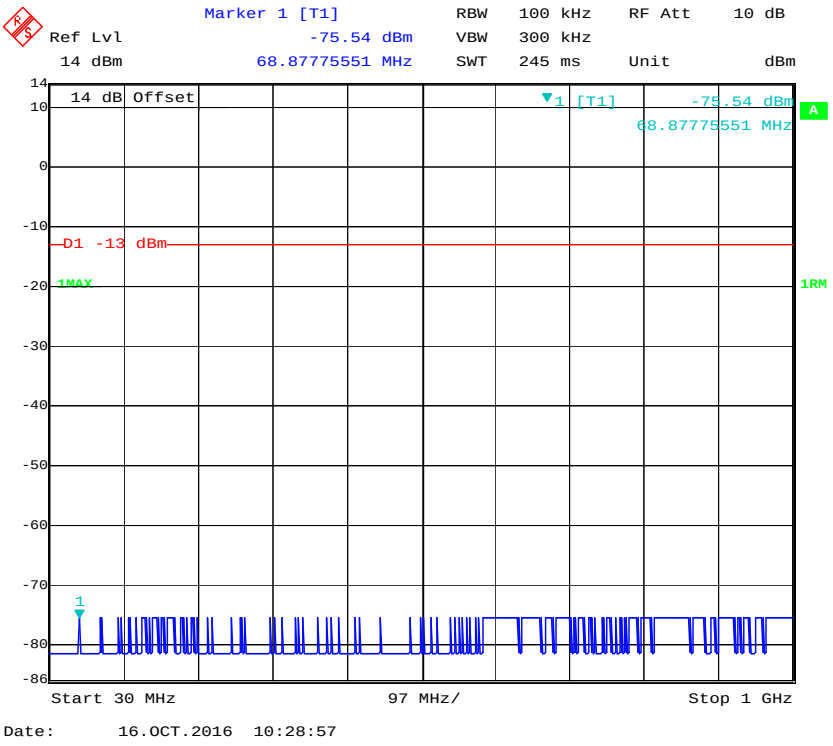
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



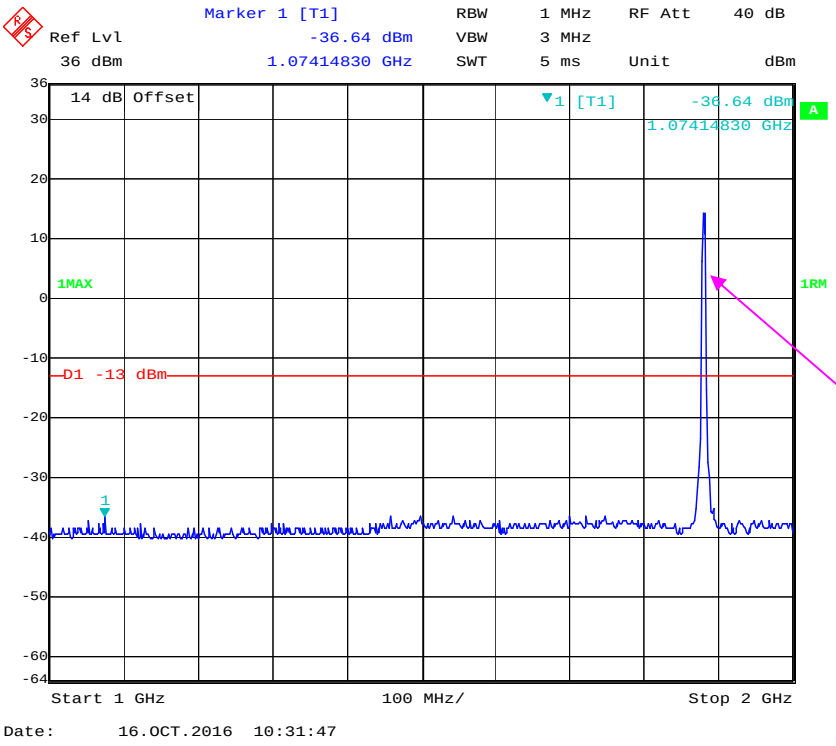
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



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

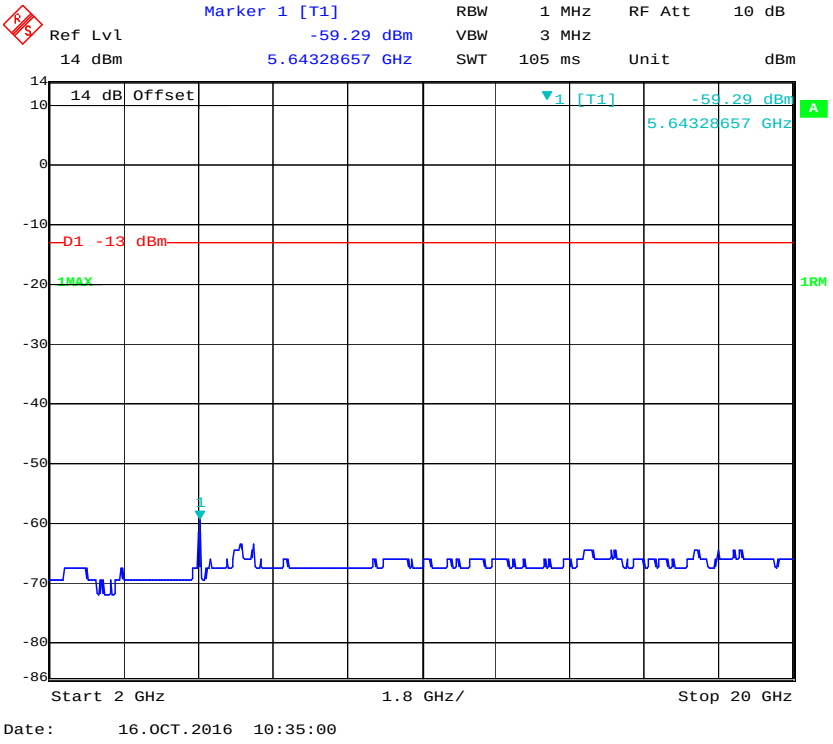


1 GHz – 2 GHz (5.0 MHz, Middle Channel)

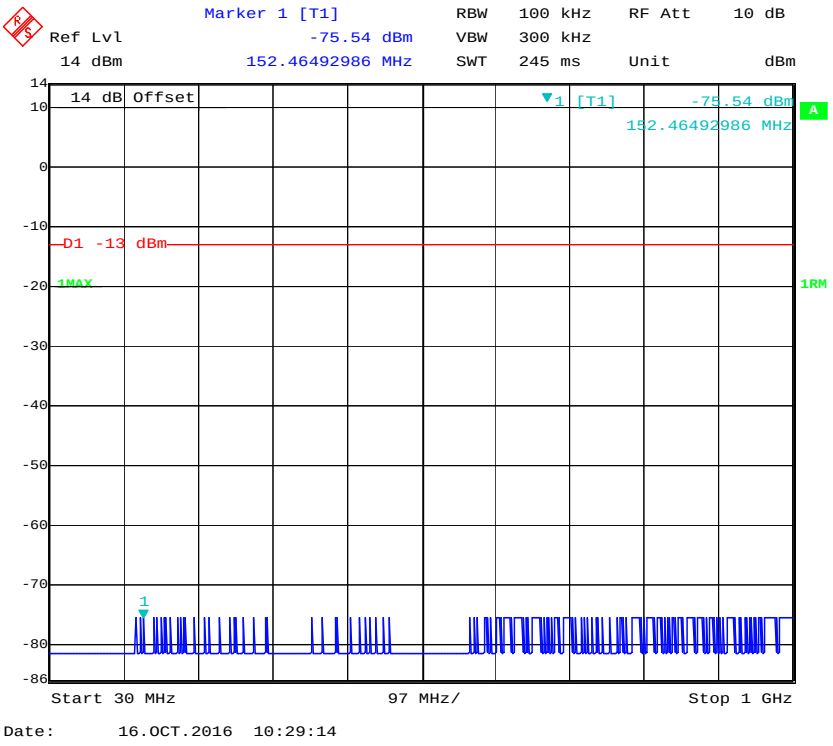


Fundamental test

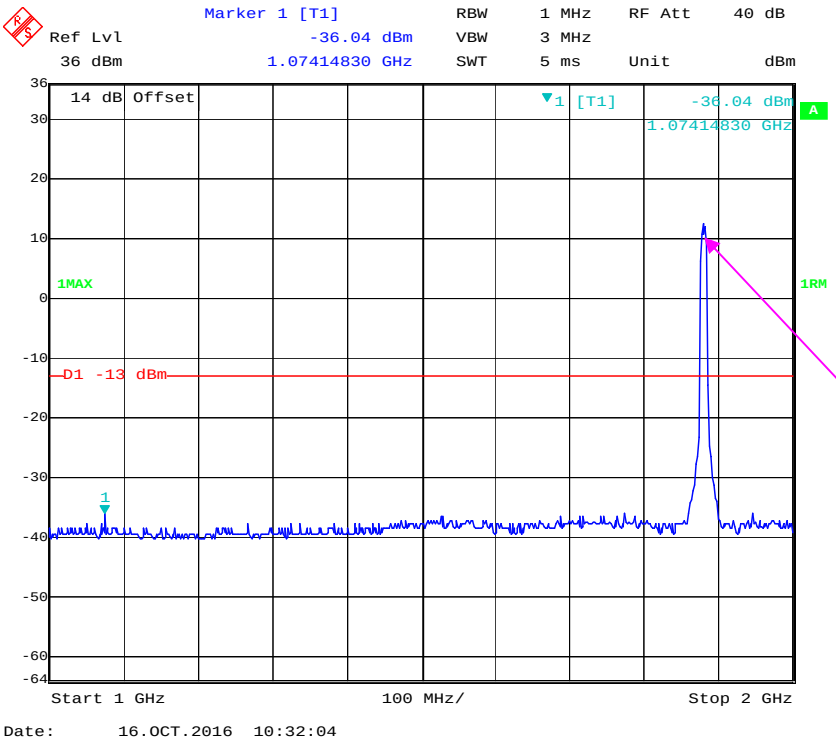
2 GHz – 20 GHz (5.0 MHz, Middle Channel)



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

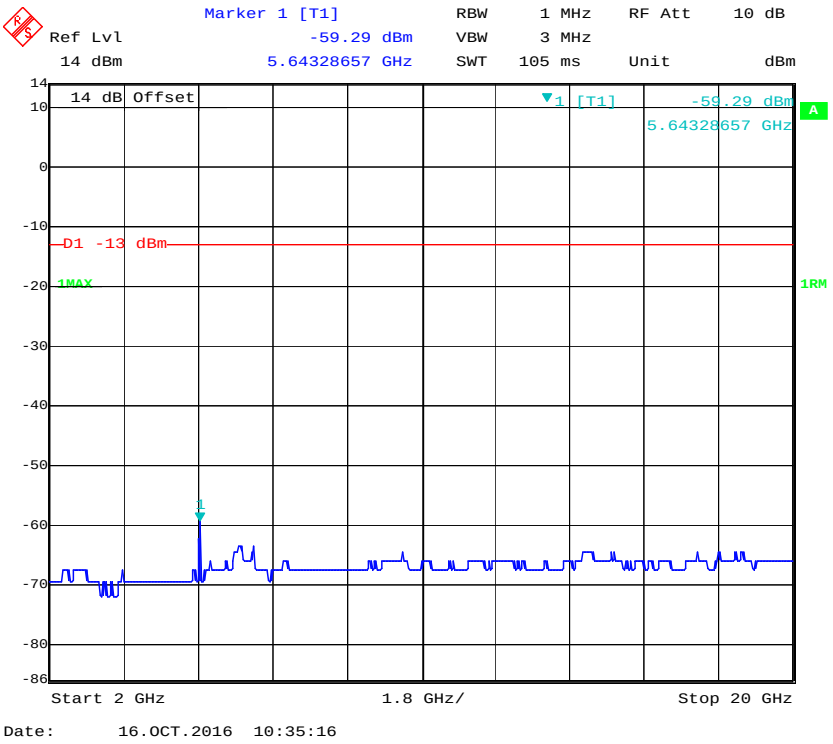


1 GHz – 2 GHz (10.0 MHz, Middle Channel)

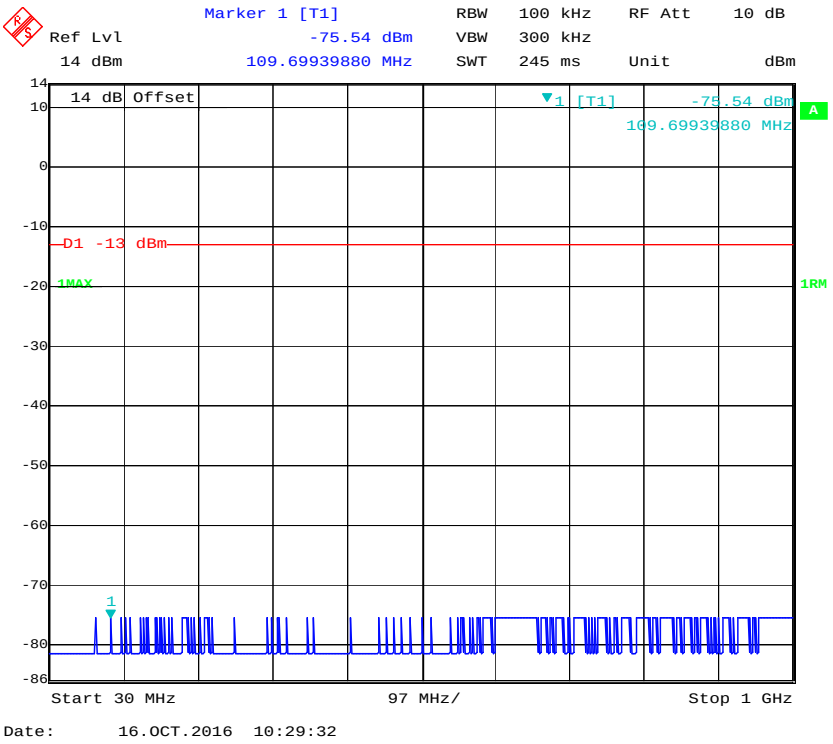


Fundamental test

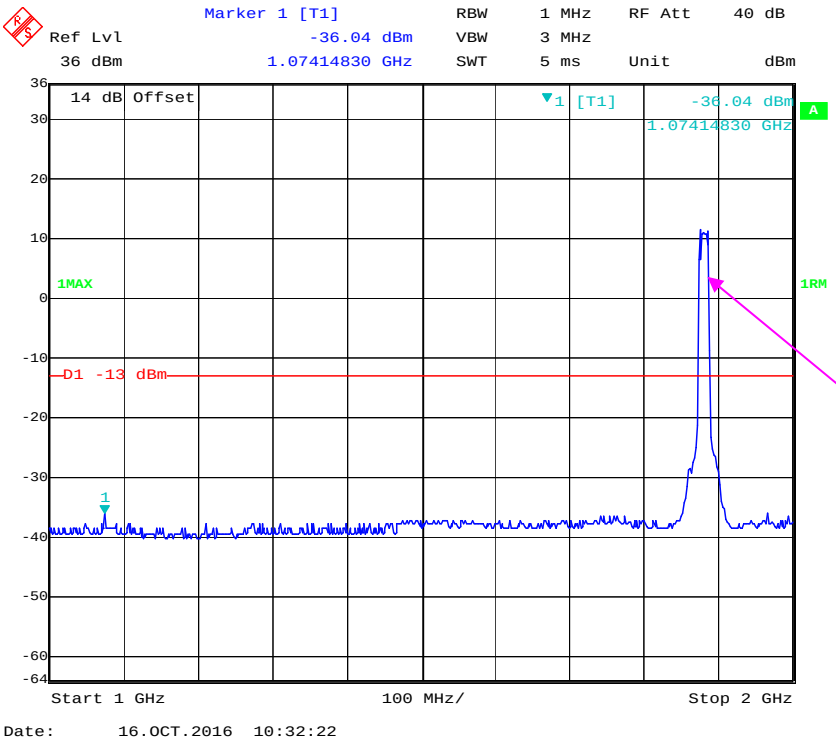
2 GHz – 20 GHz (10.0 MHz, Middle Channel)



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

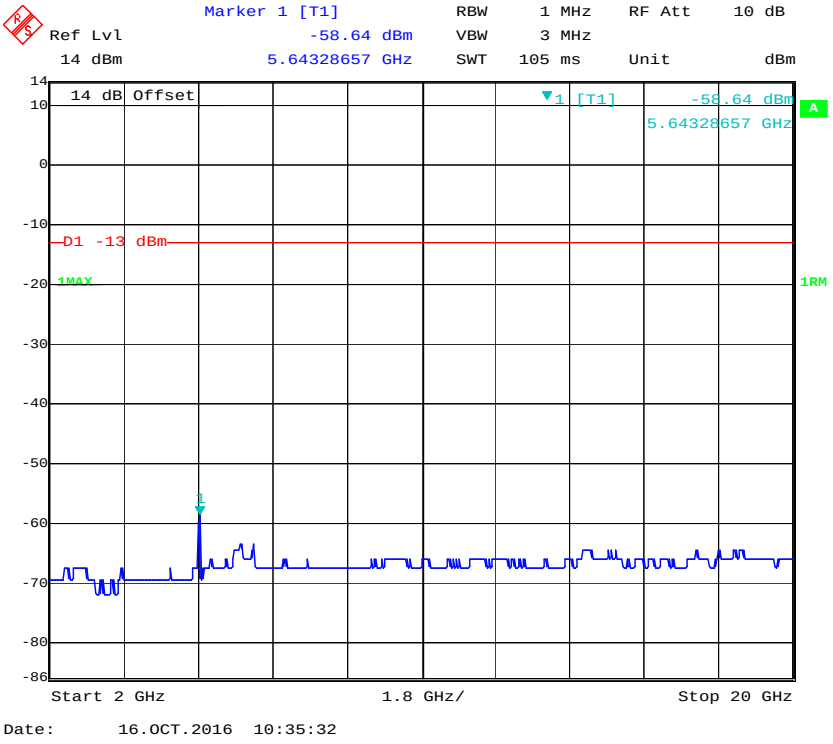


1 GHz –2 GHz (15.0 MHz, Middle Channel)

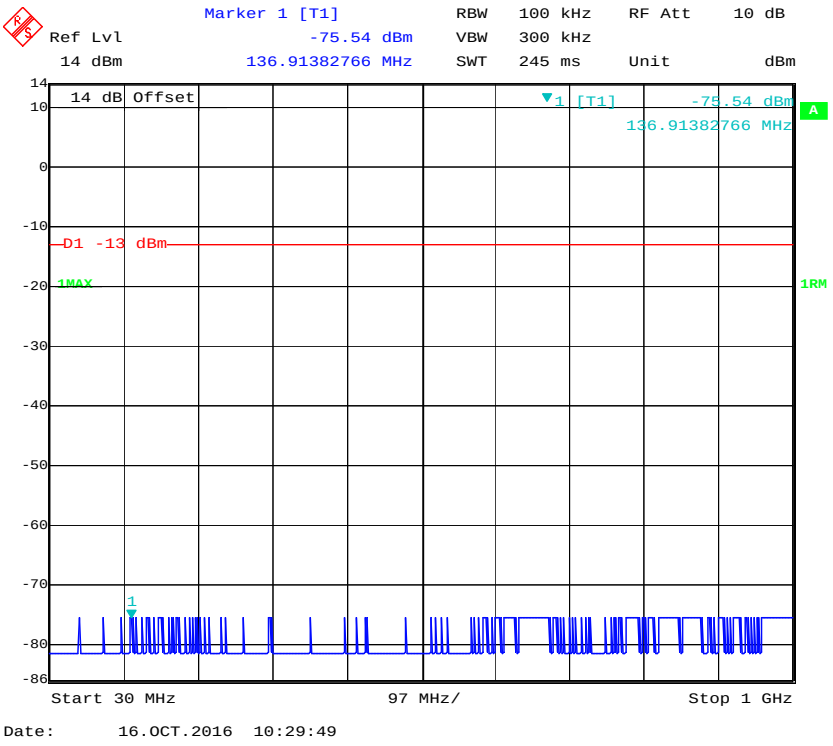


Fundamental test

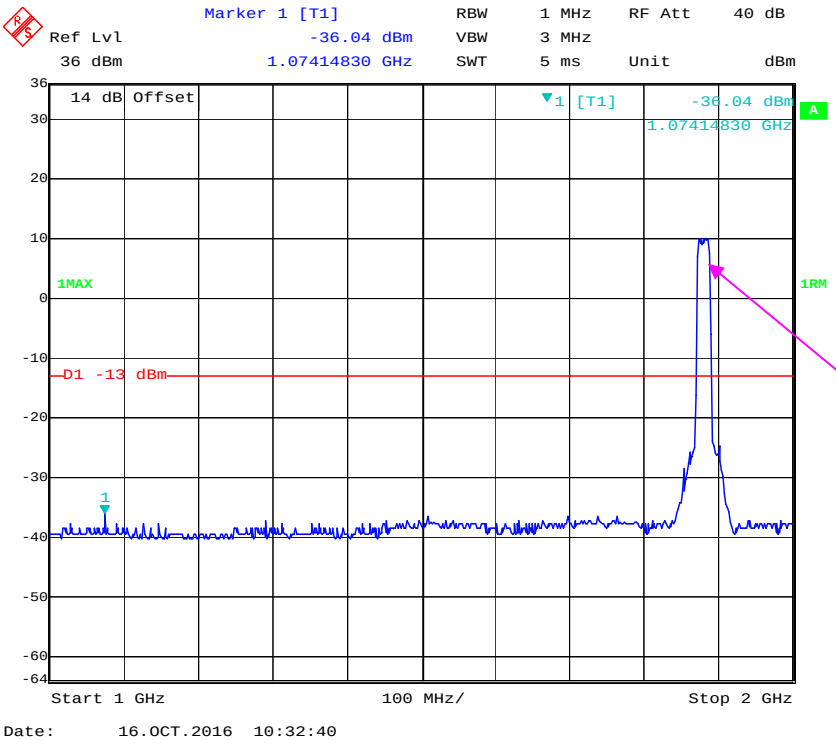
2 GHz –20 GHz (15.0 MHz, Middle Channel)



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

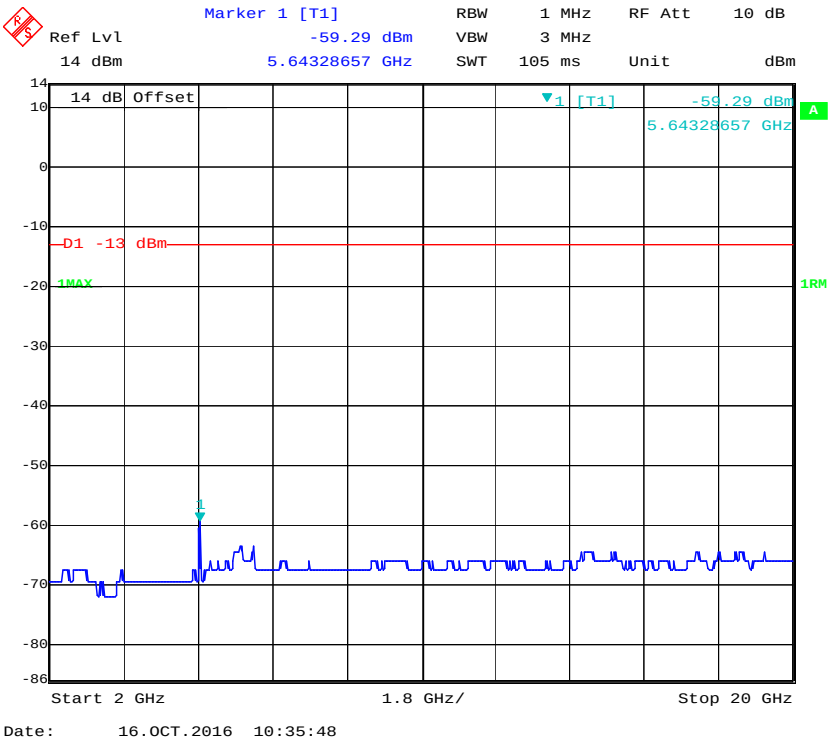


1 GHz –2 GHz (20.0 MHz, Middle Channel)



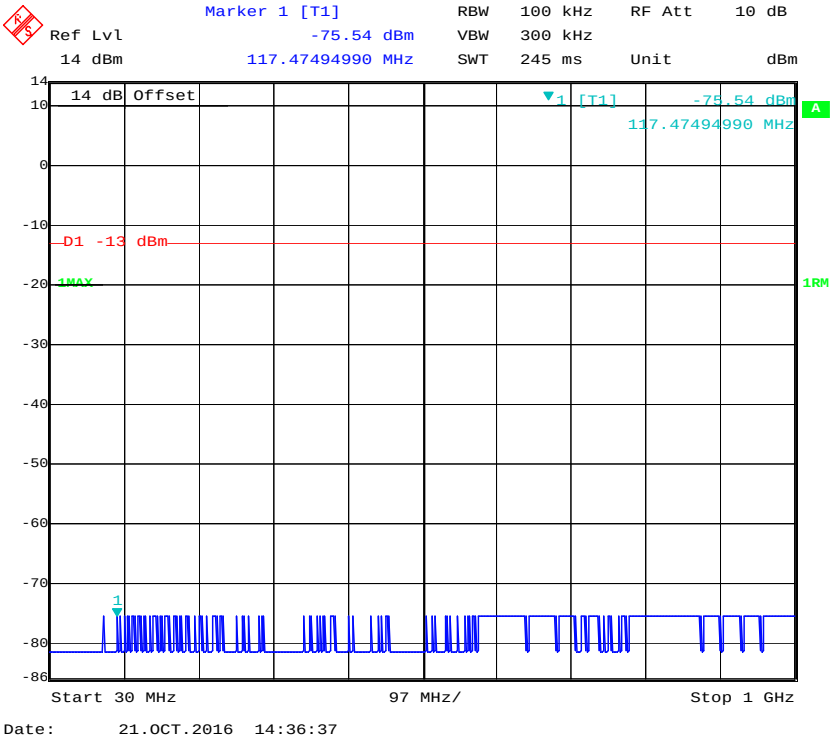
Fundamental test

2 GHz –20 GHz (20.0 MHz, Middle Channel)

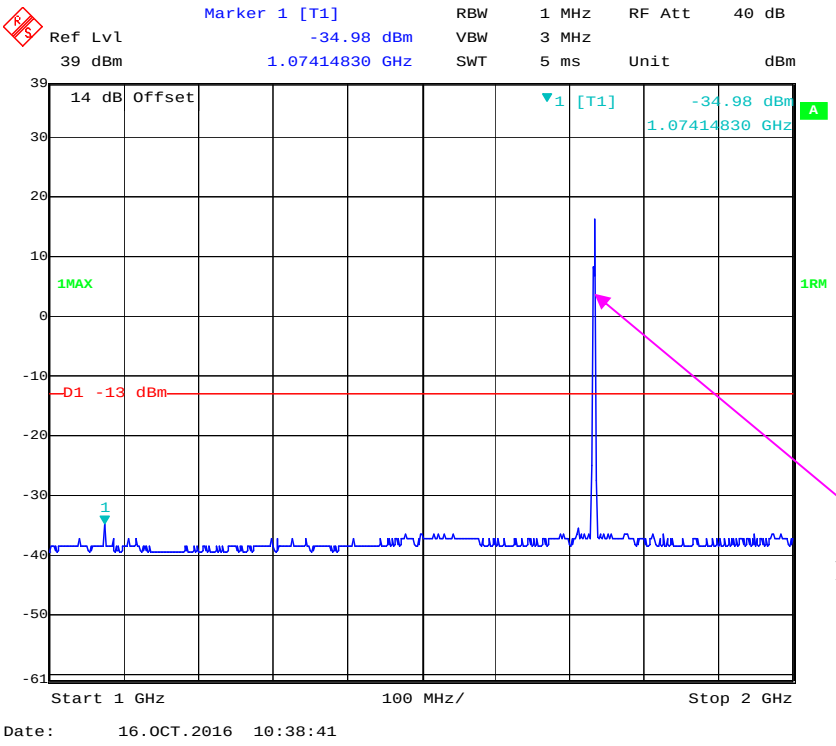


LTE Band 4:

30 MHz - 1 GHz (1.4 MHz, Middle Channel)

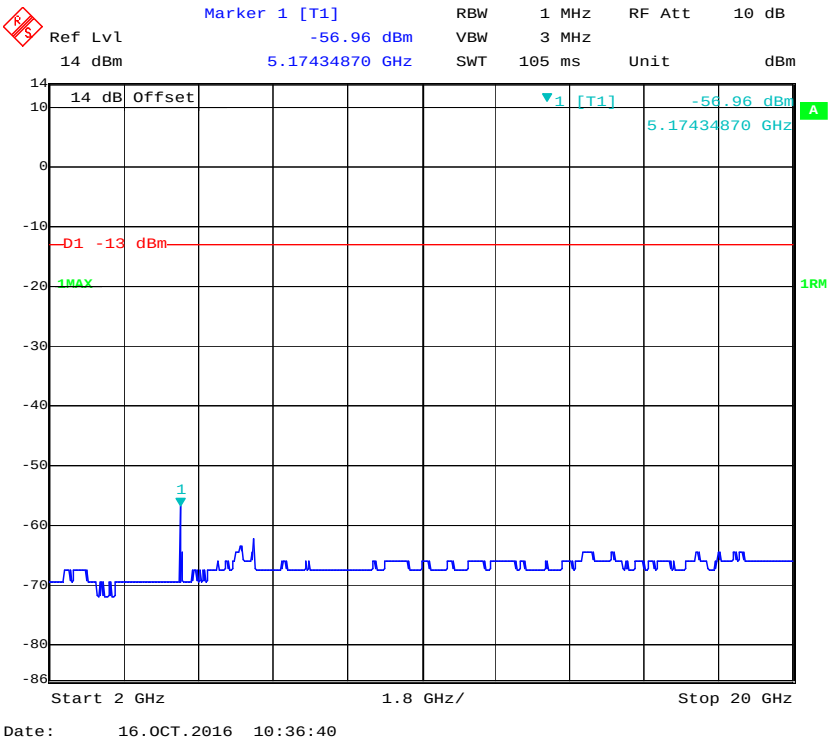


1 GHz – 2 GHz (1.4 MHz, Middle Channel)

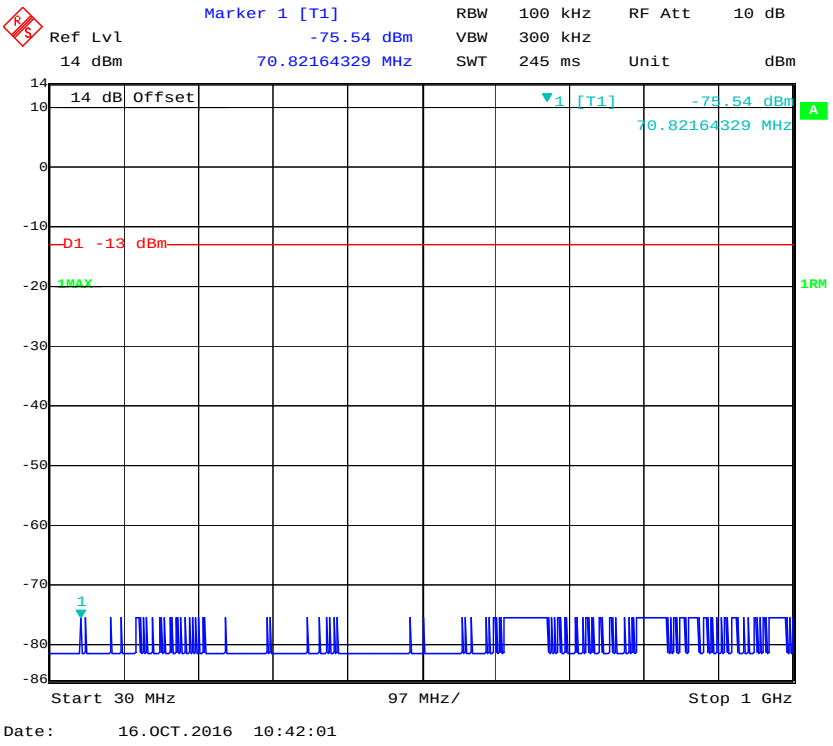


Fundamental test

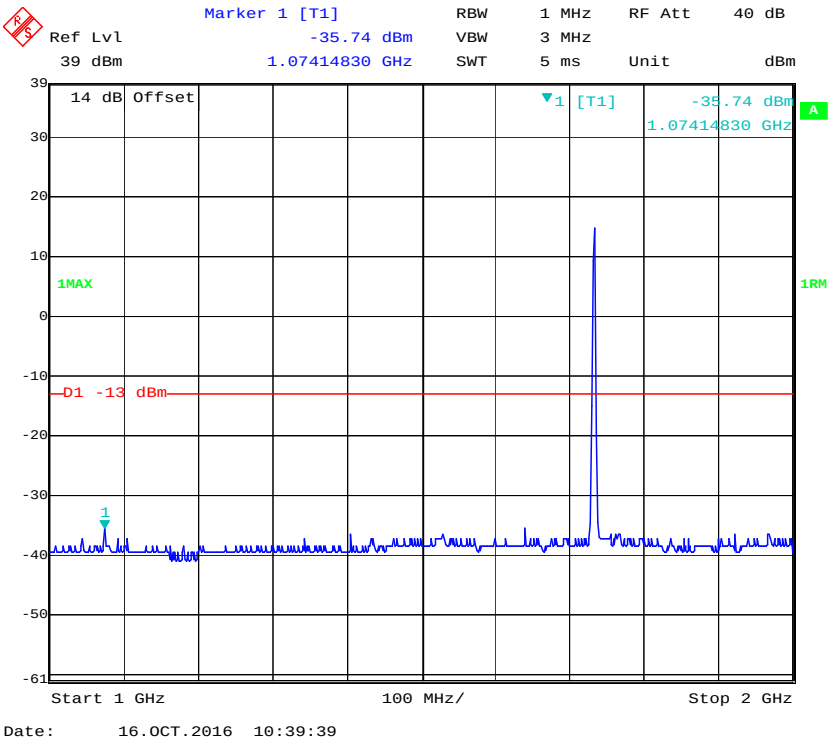
2 GHz – 20 GHz (1.4 MHz, Middle Channel)



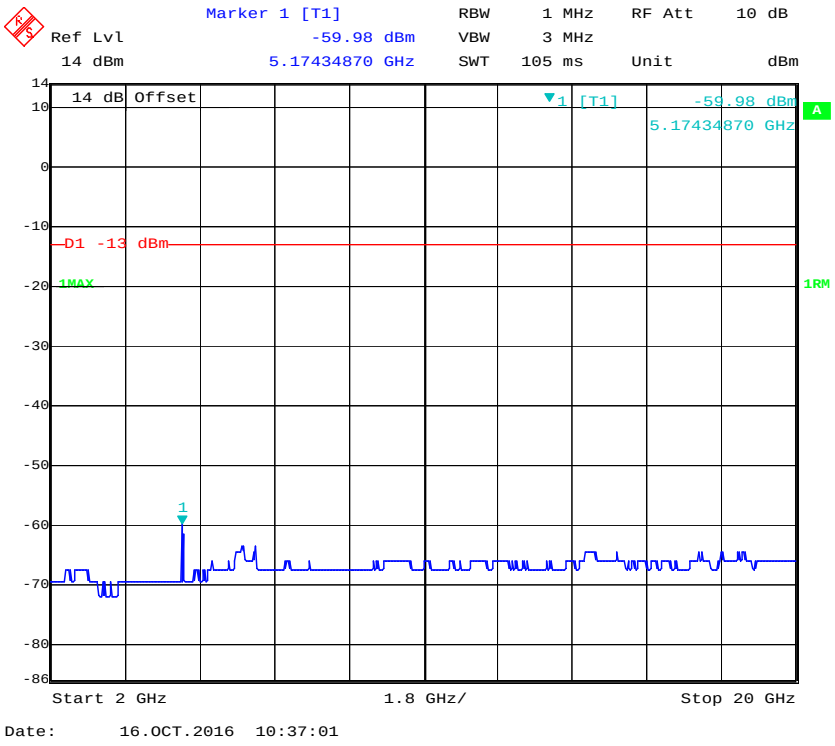
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



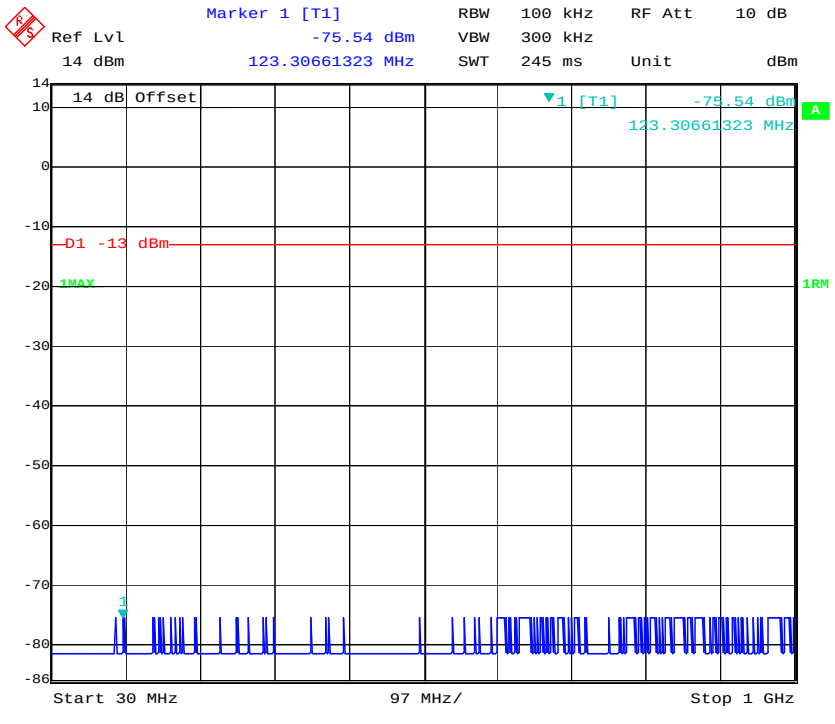
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



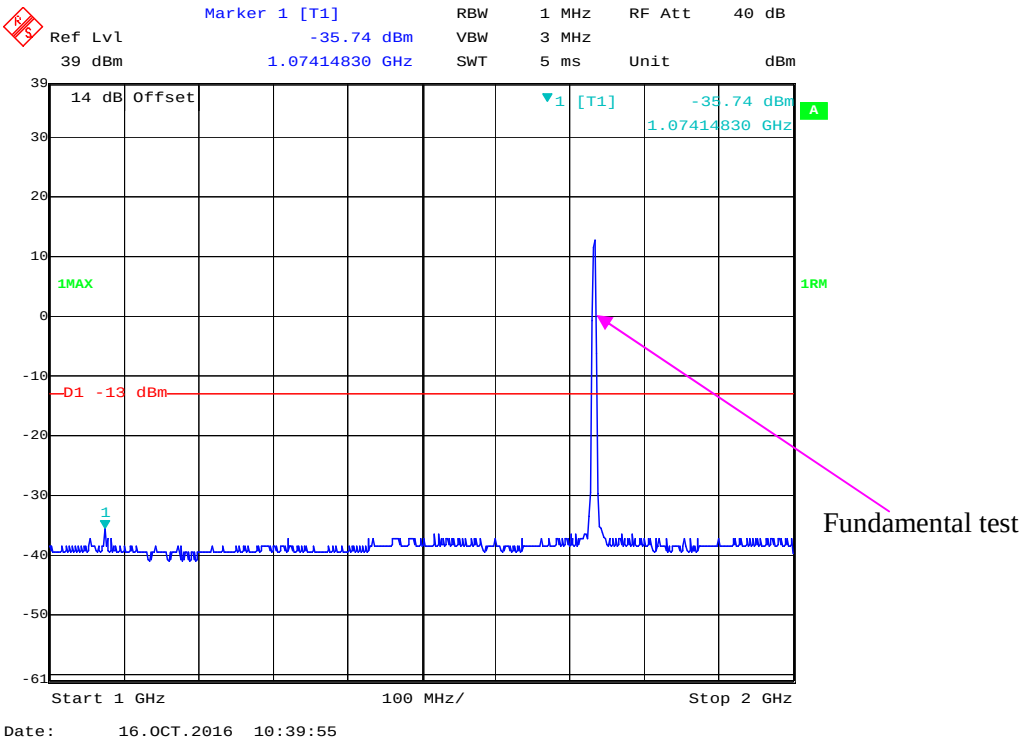
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



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



1 GHz – 2 GHz (5.0 MHz, Middle Channel)

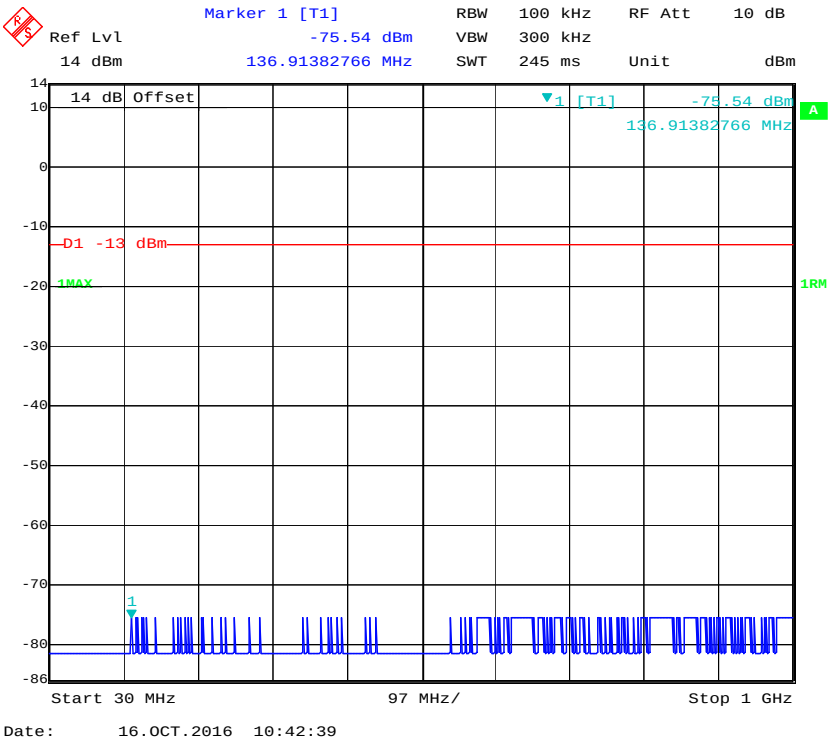


Date: 16.OCT.2016 10:39:55

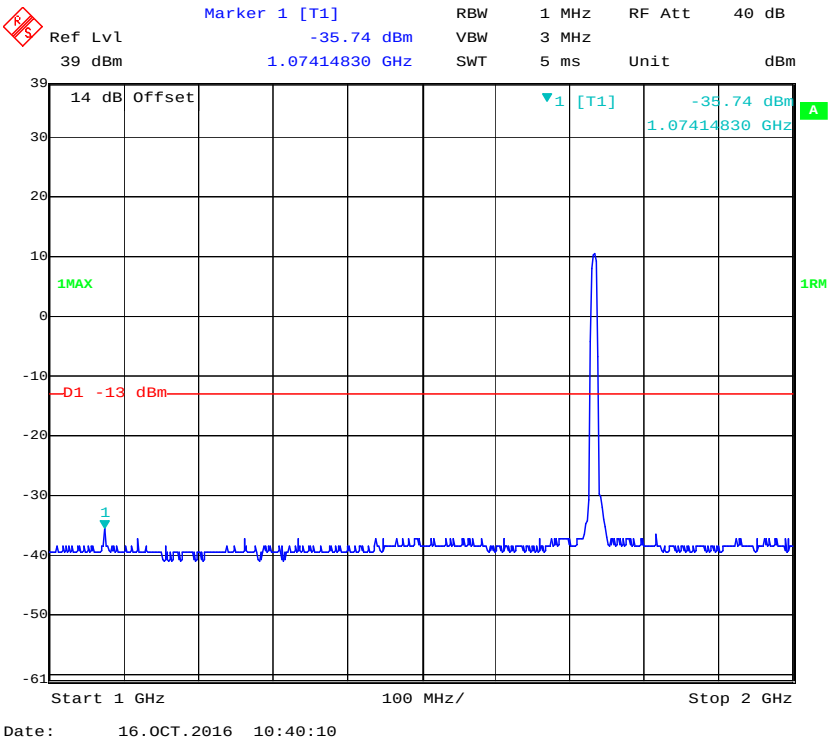
2 GHz – 20 GHz (5.0 MHz, Middle Channel)

Date: 16.OCT.2016 10:37:17

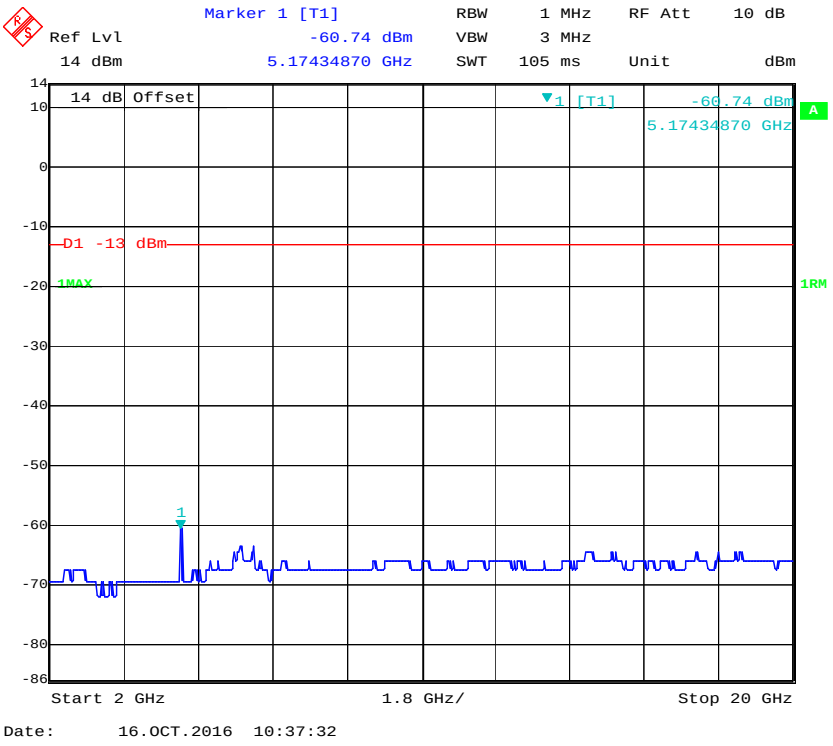
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



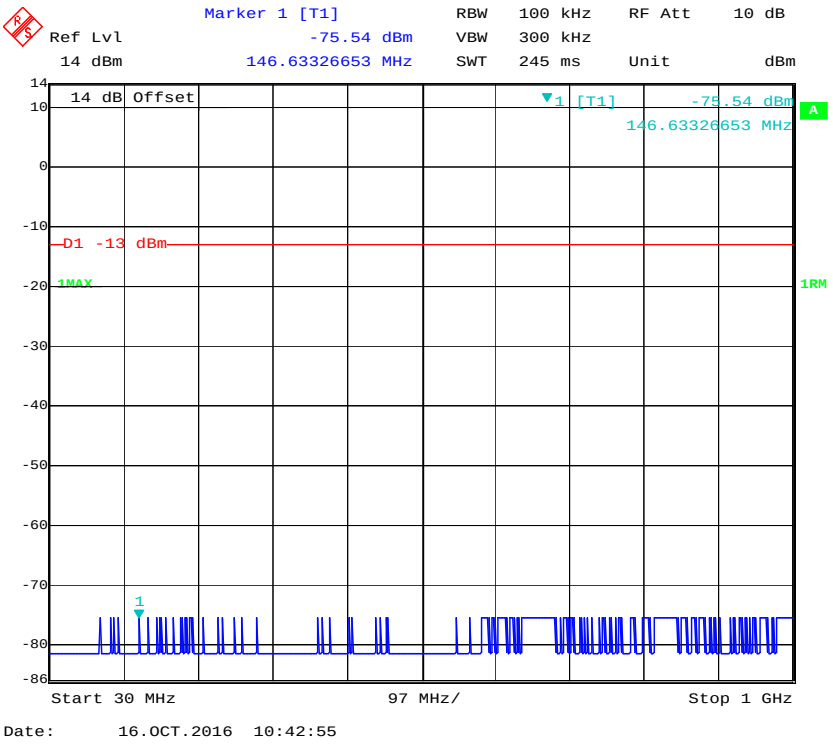
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



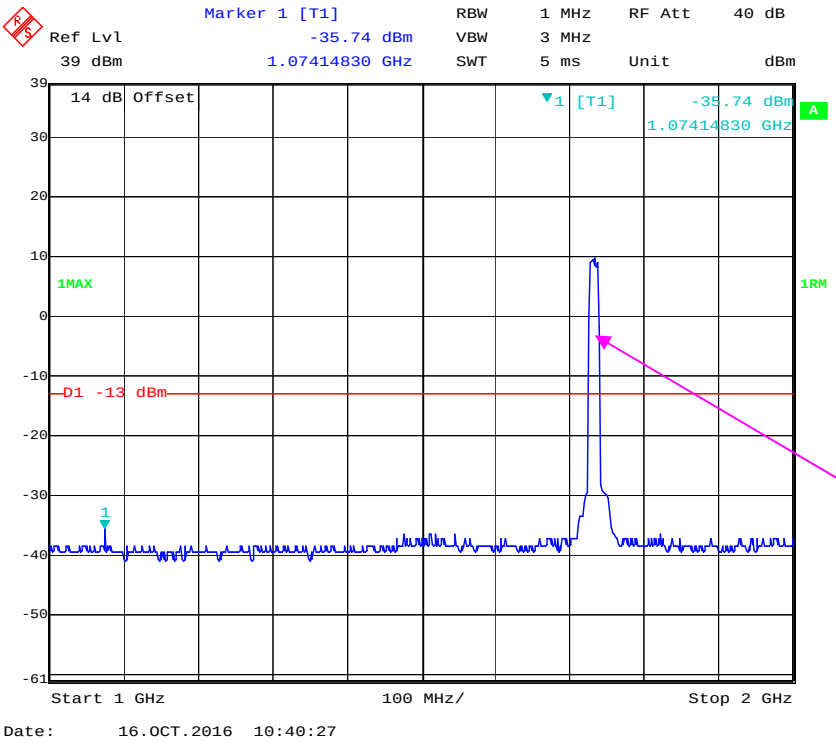
2 GHz – 20 GHz (10.0 MHz, Middle Channel)



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

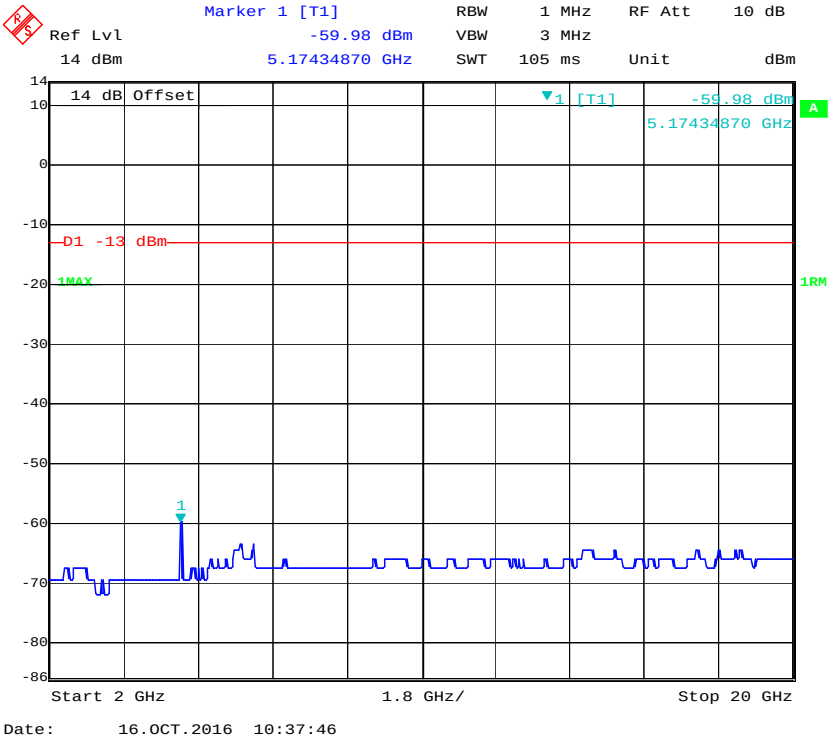


1 GHz –2 GHz (15.0 MHz, Middle Channel)

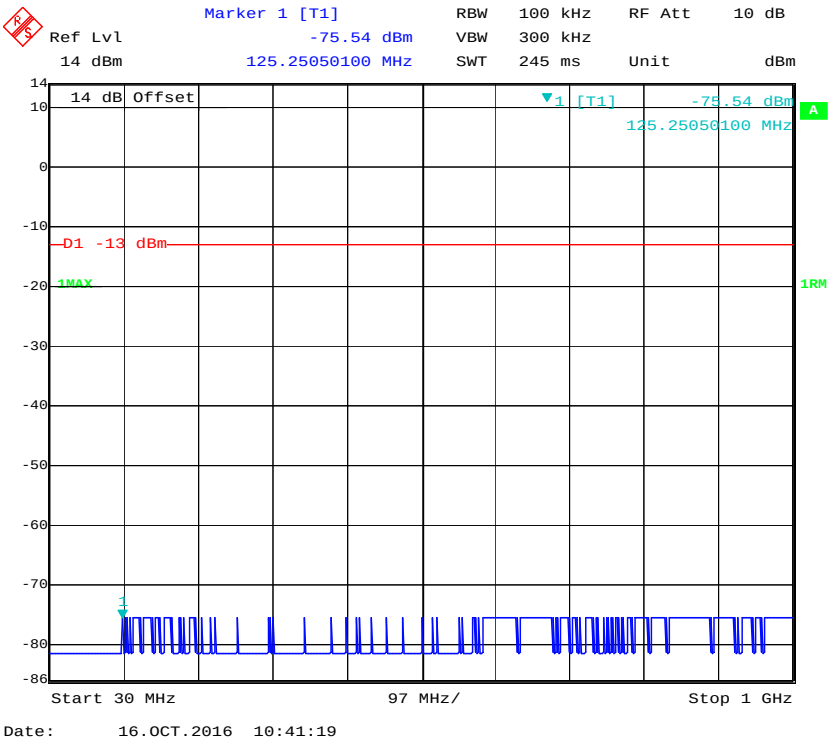


Fundamental test

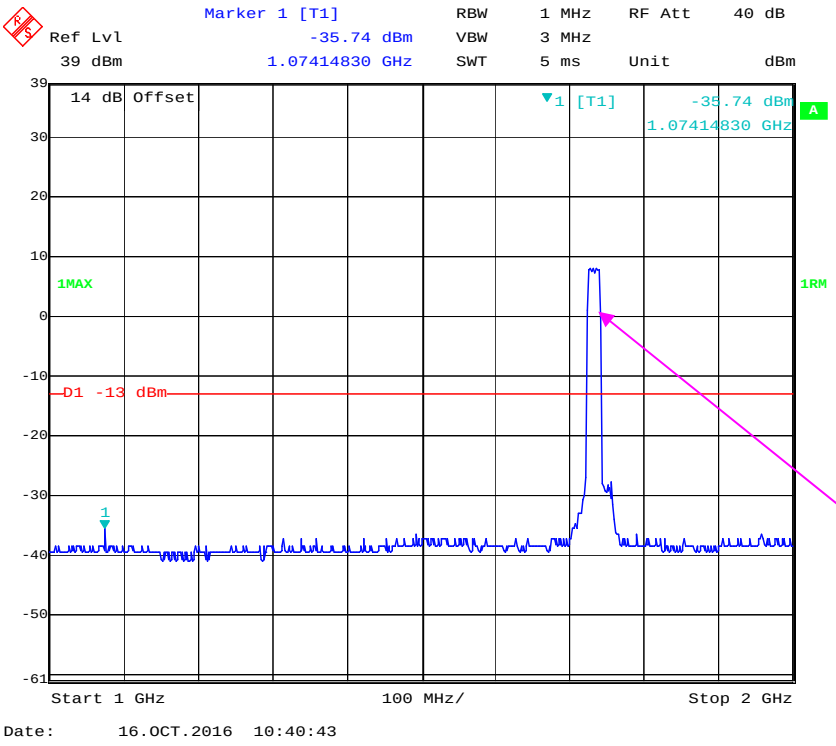
2 GHz –20 GHz (15.0 MHz, Middle Channel)



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

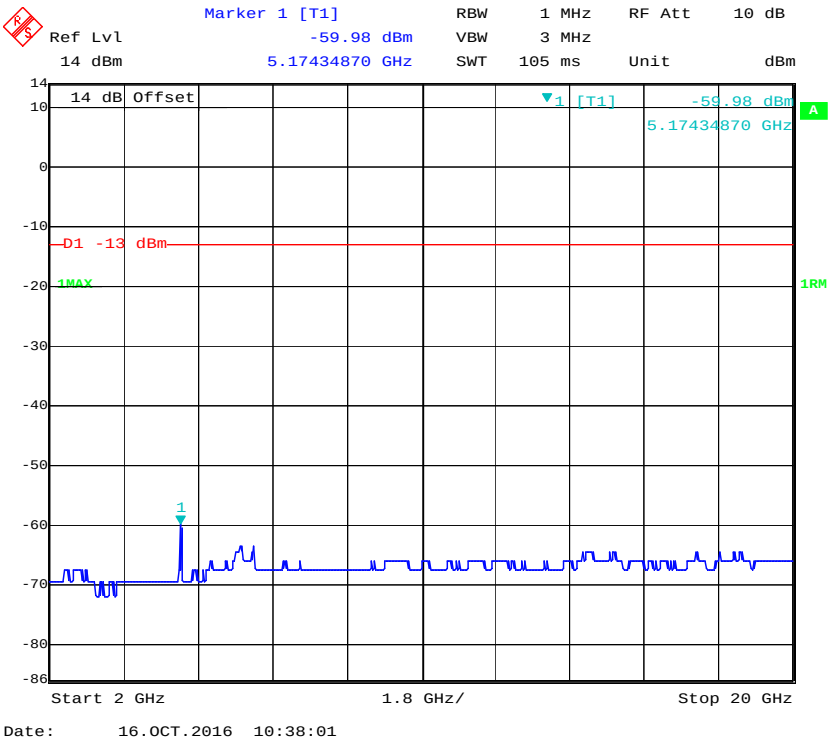


1 GHz –2 GHz (20.0 MHz, Middle Channel)



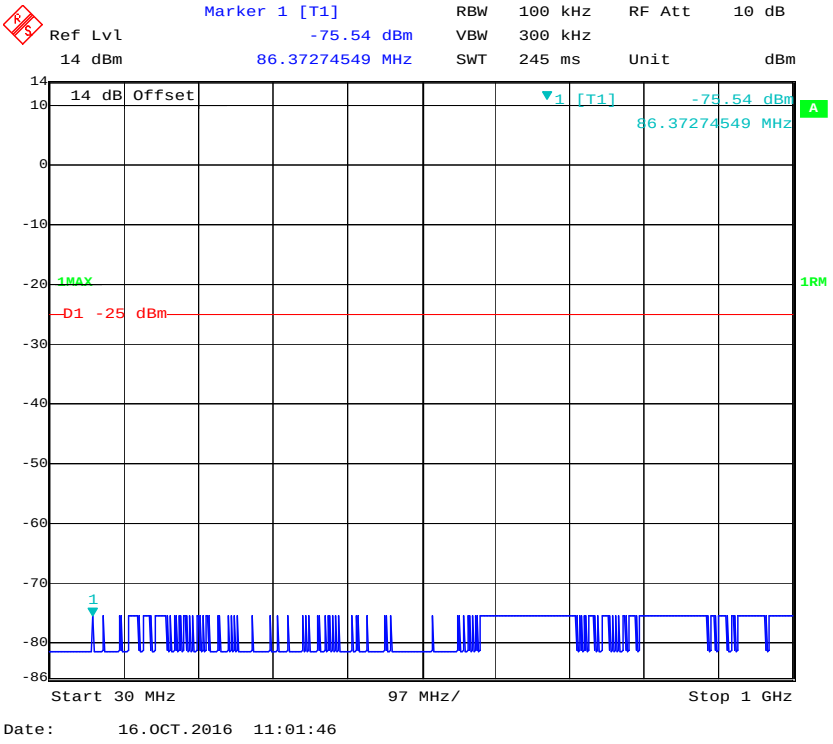
Fundamental test

2 GHz –20 GHz (20.0 MHz, Middle Channel)

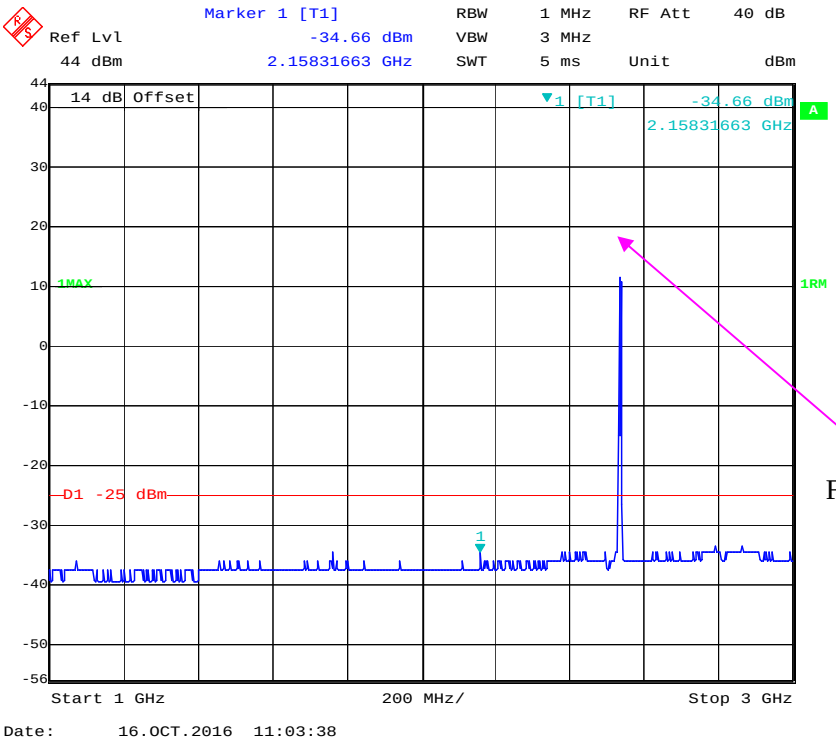


LTE Band 7:

30 MHz – 1 GHz (5.0 MHz, Middle Channel)

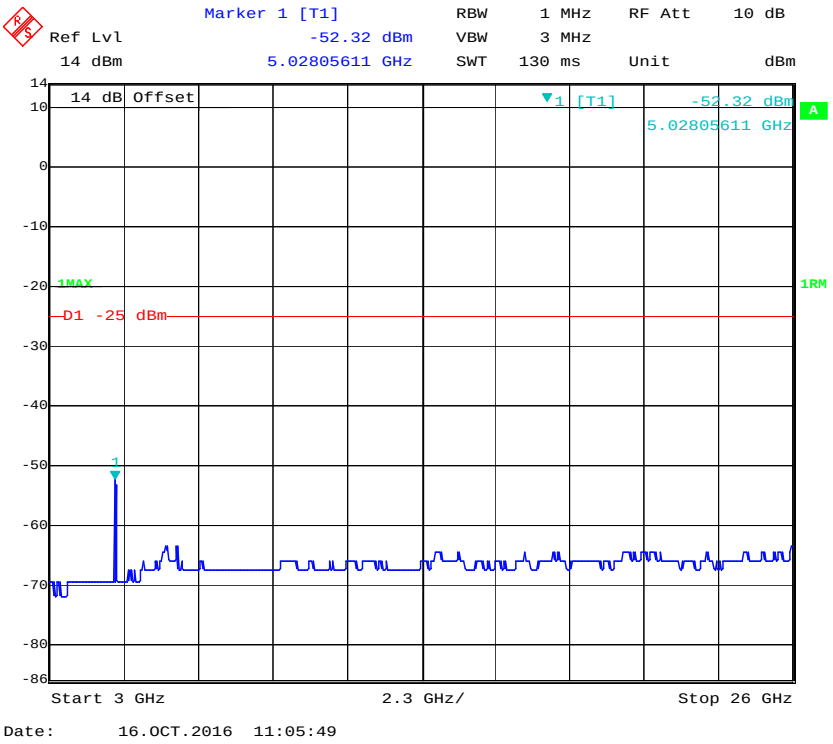


1 GHz – 3.0 GHz (5.0 MHz, Middle Channel)

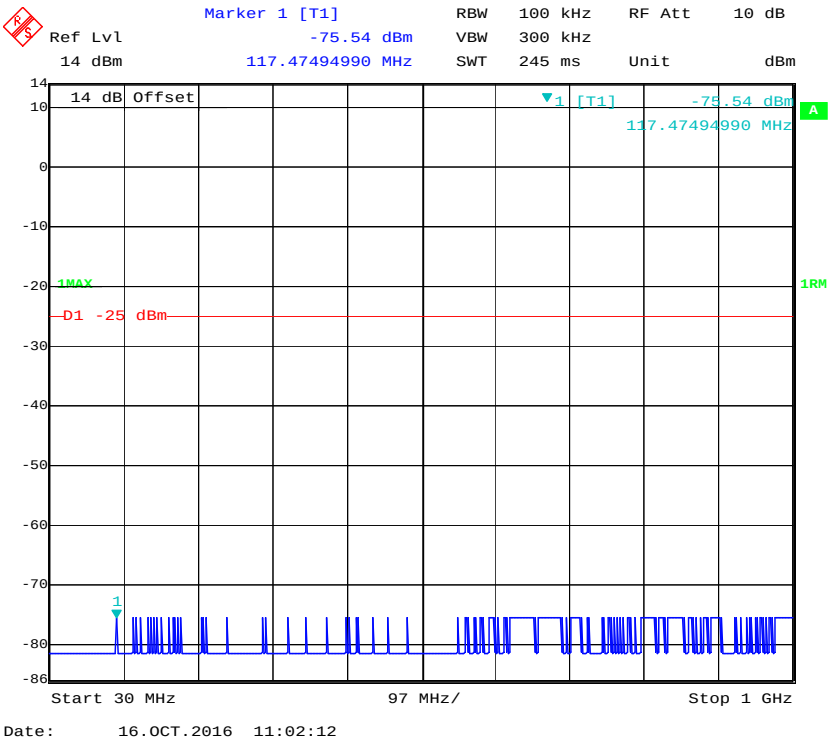


Fundamental test

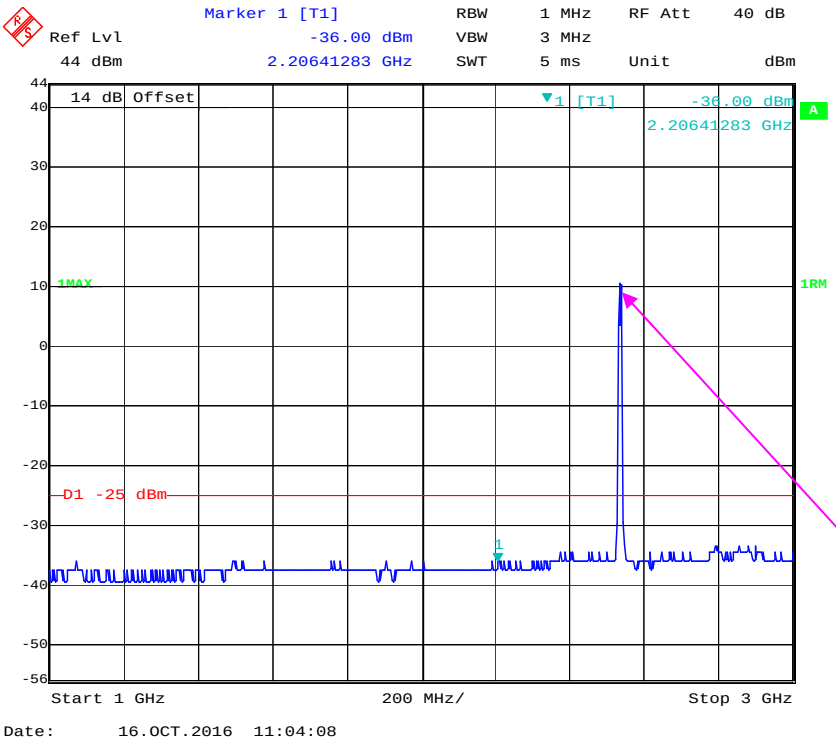
3.0 GHz – 26 GHz (5.0 MHz, Middle Channel)



30 MHz – 1.0 GHz (10.0 MHz, Middle Channel)

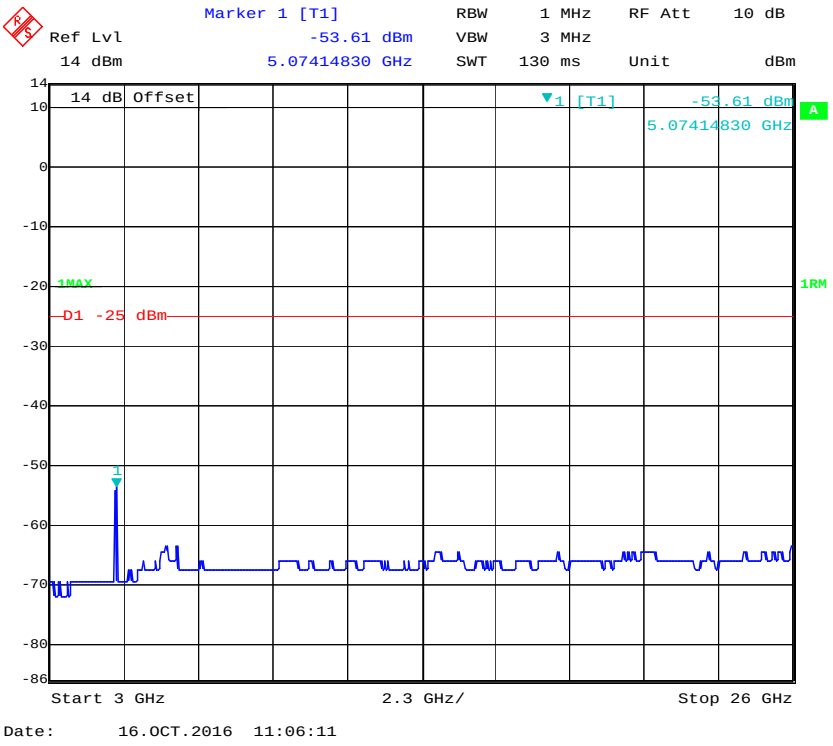


1 GHz – 3 GHz (10.0 MHz, Middle Channel)

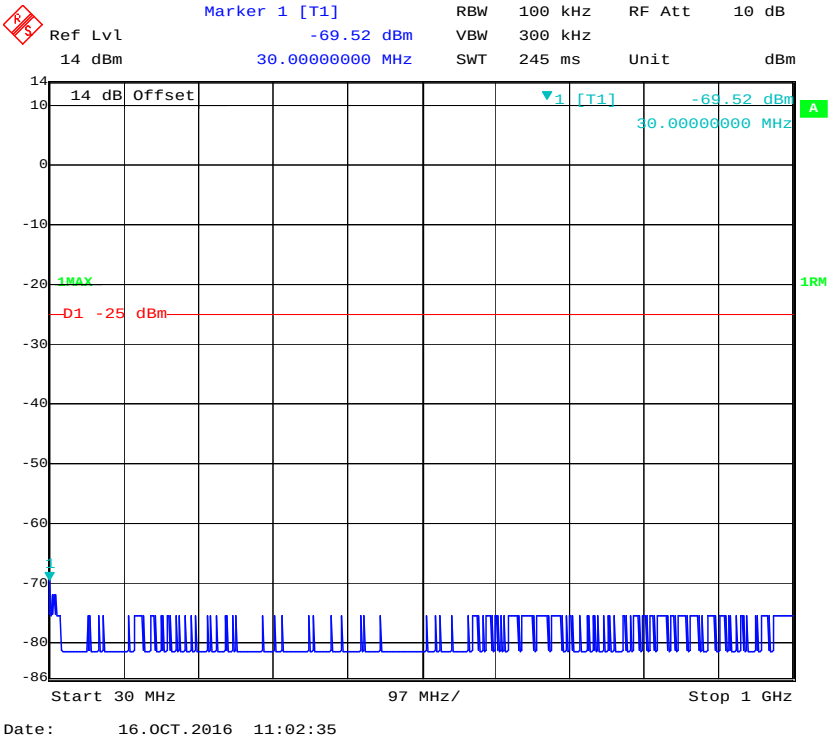


Fundamental test

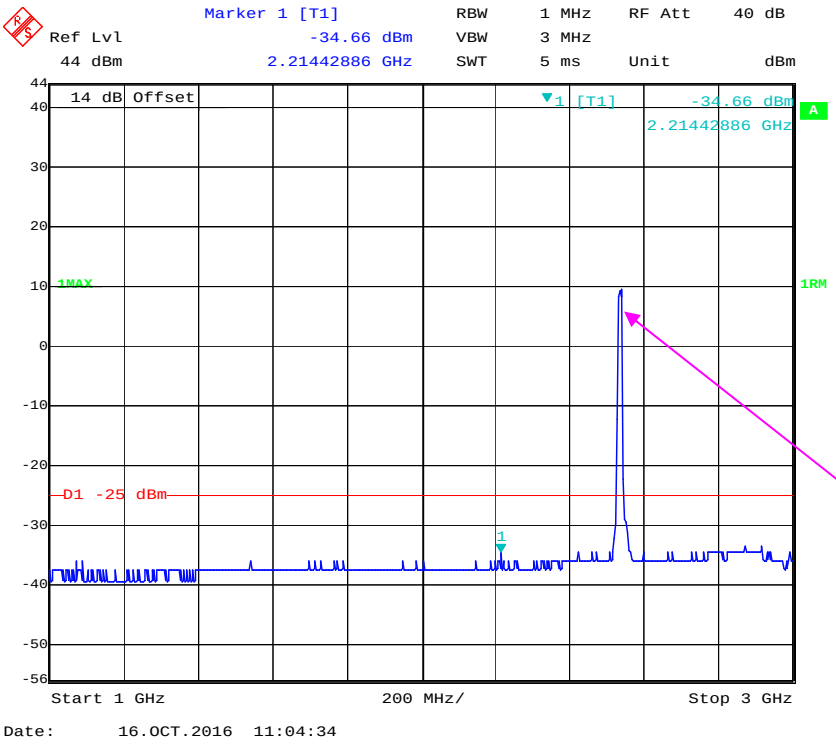
3 GHz – 26 GHz (10.0 MHz, Middle Channel)



30 MHz – 1 GHz (15.0 MHz, Middle Channel)

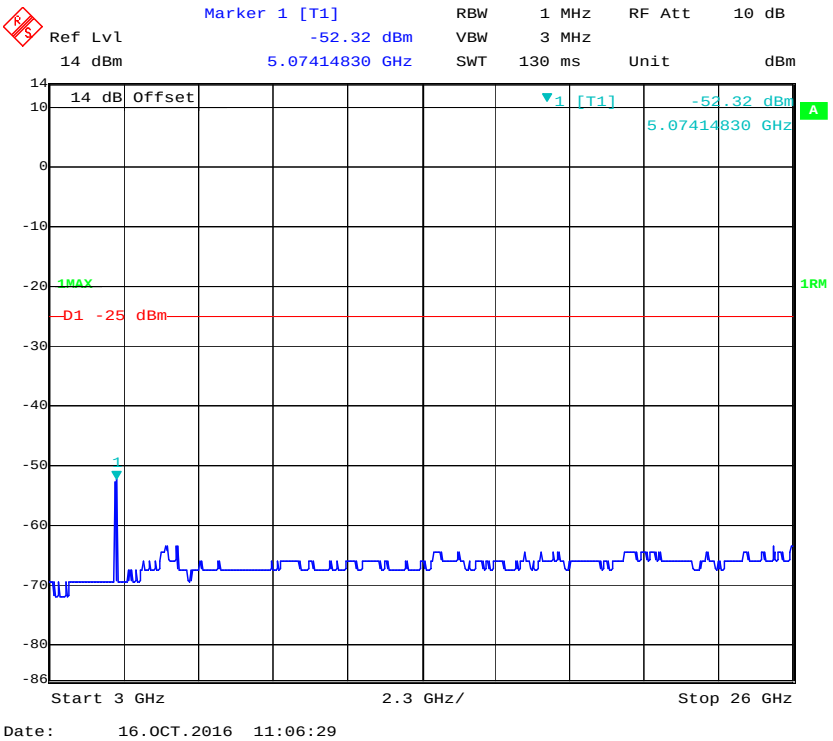


1 GHz – 3 GHz (15.0 MHz, Middle Channel)

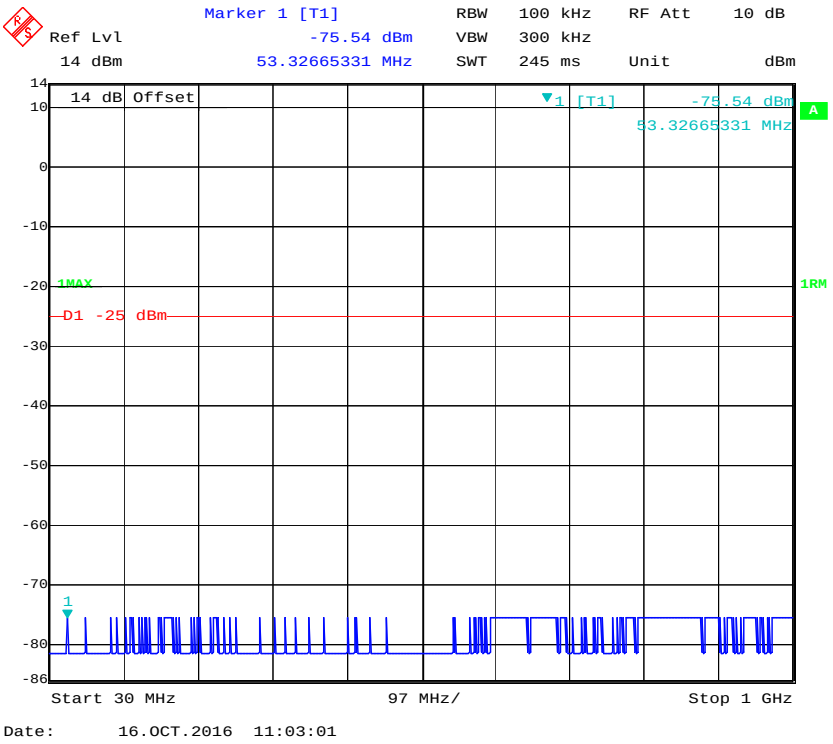


Fundamental test

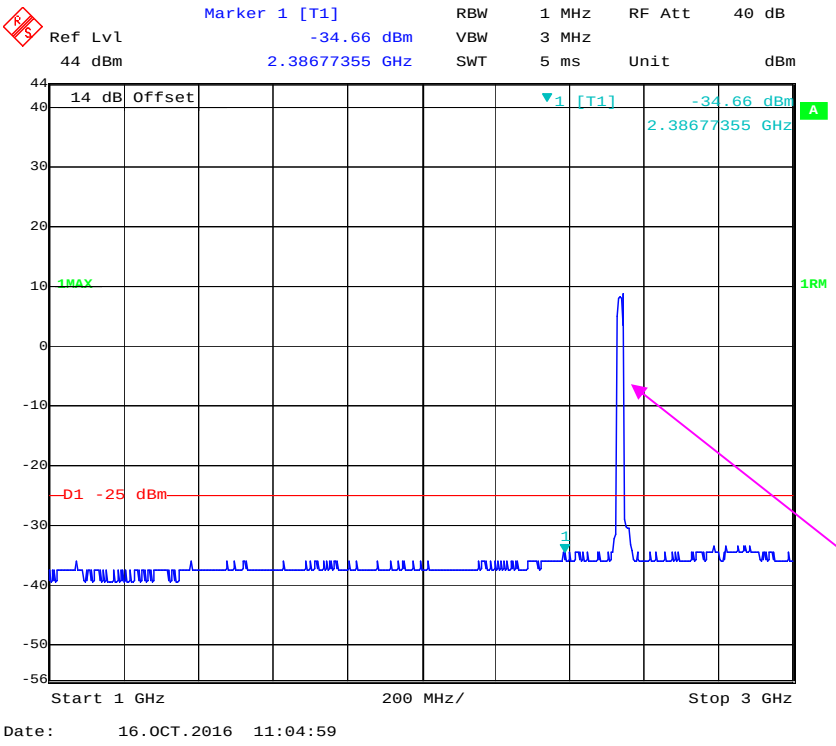
3 GHz – 26 GHz (15.0 MHz, Middle Channel)



30 MHz – 1 GHz (20.0 MHz, Middle Channel)

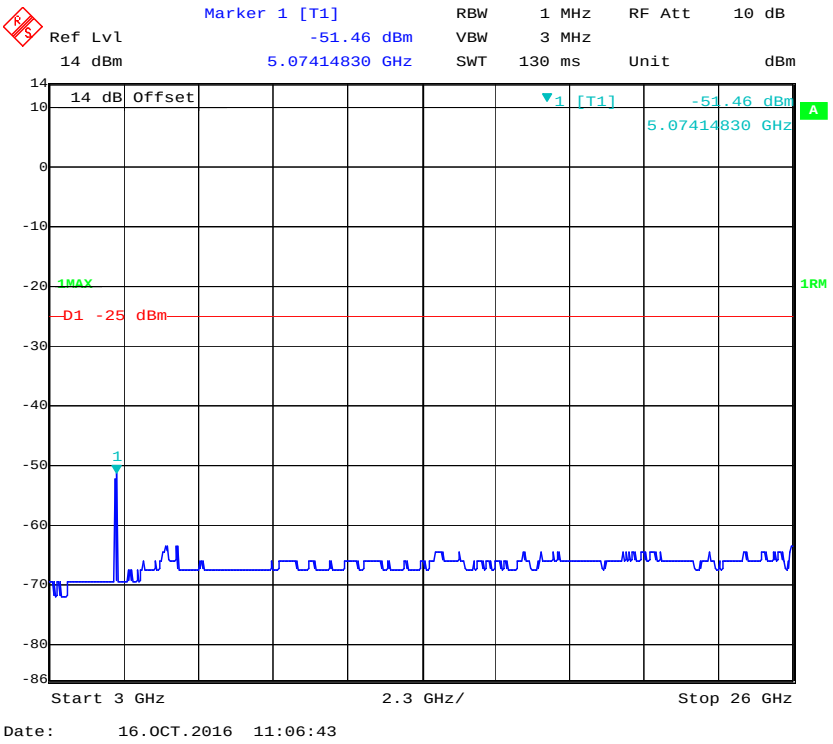


1 GHz – 3 GHz (15.0 MHz, Middle Channel)



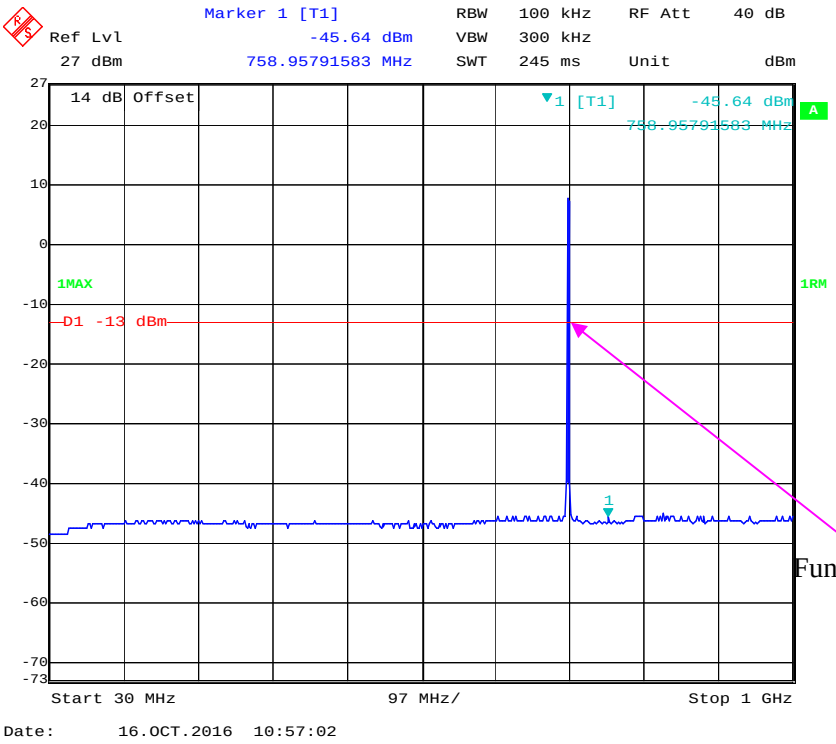
Fundamental test

3 GHz – 26 GHz (15.0 MHz, Middle Channel)



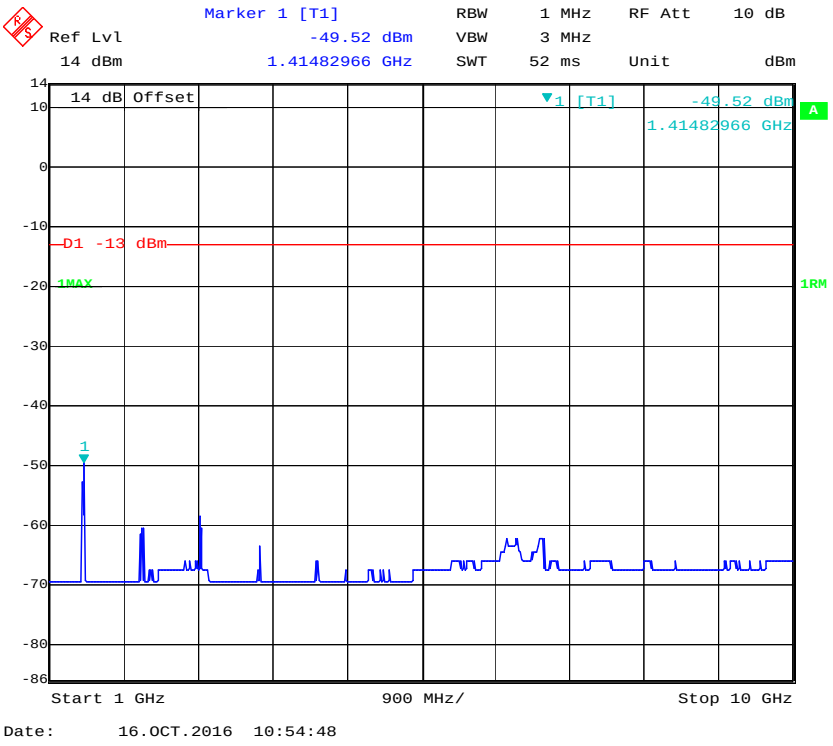
LTE Band 12:

30 MHz - 1 GHz (1.4 MHz, Middle Channel)

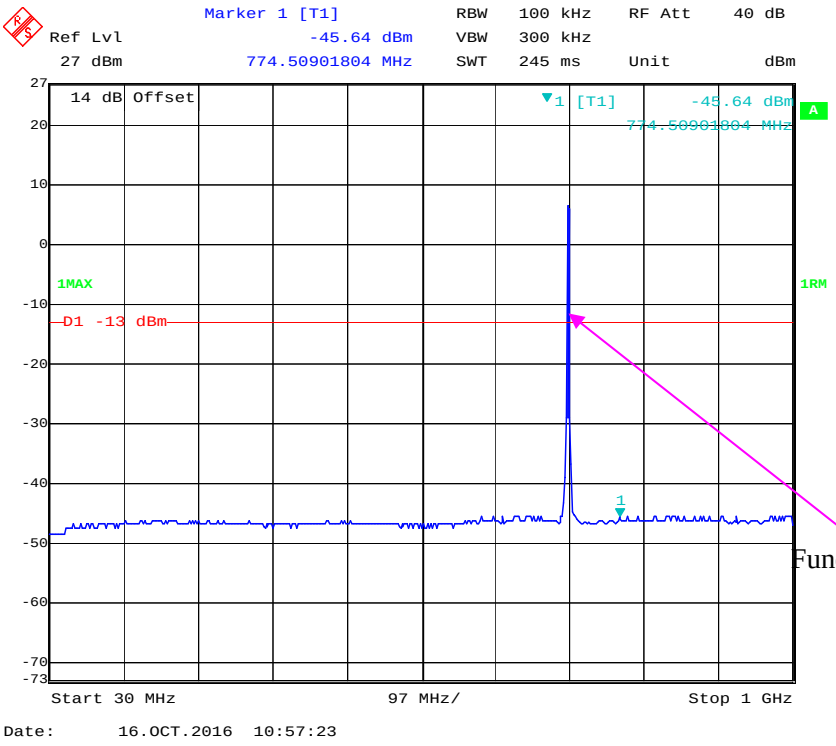


Fundamental test

1 GHz – 10 GHz (1.4 MHz, Middle Channel)



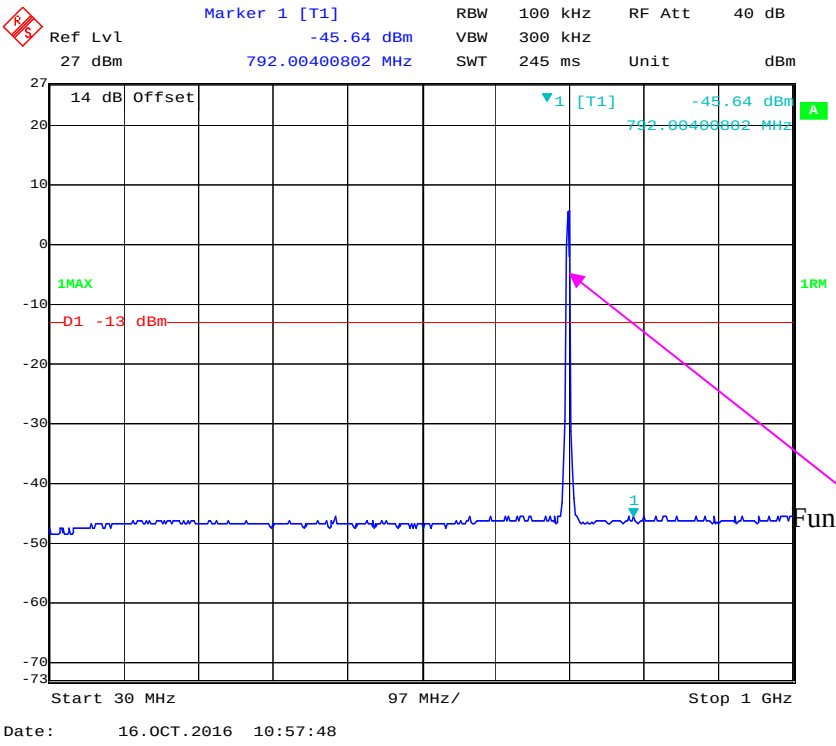
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



Fundamental test

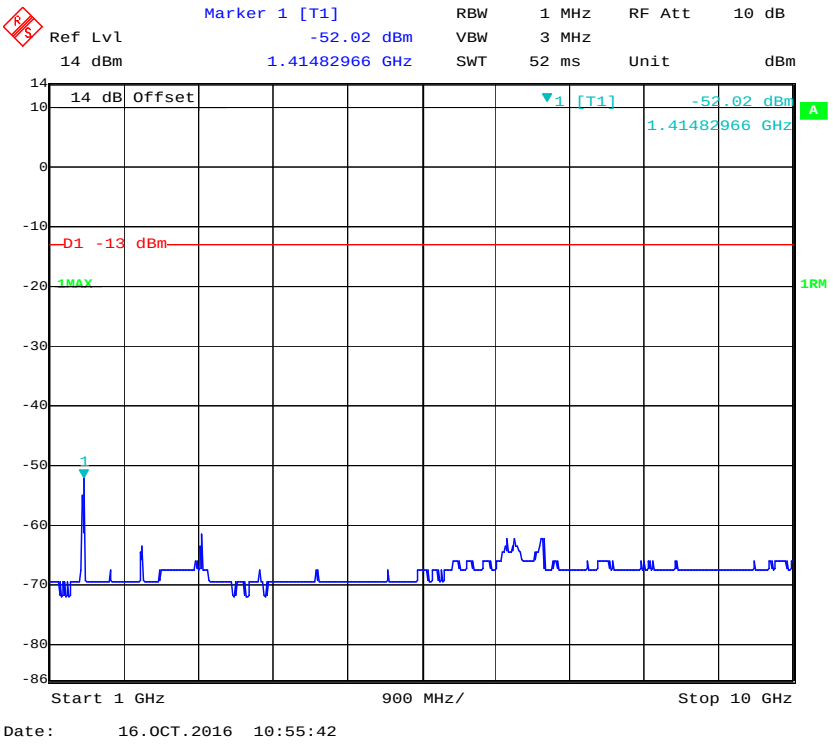
1 GHz – 10 GHz (3.0 MHz, Middle Channel)

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

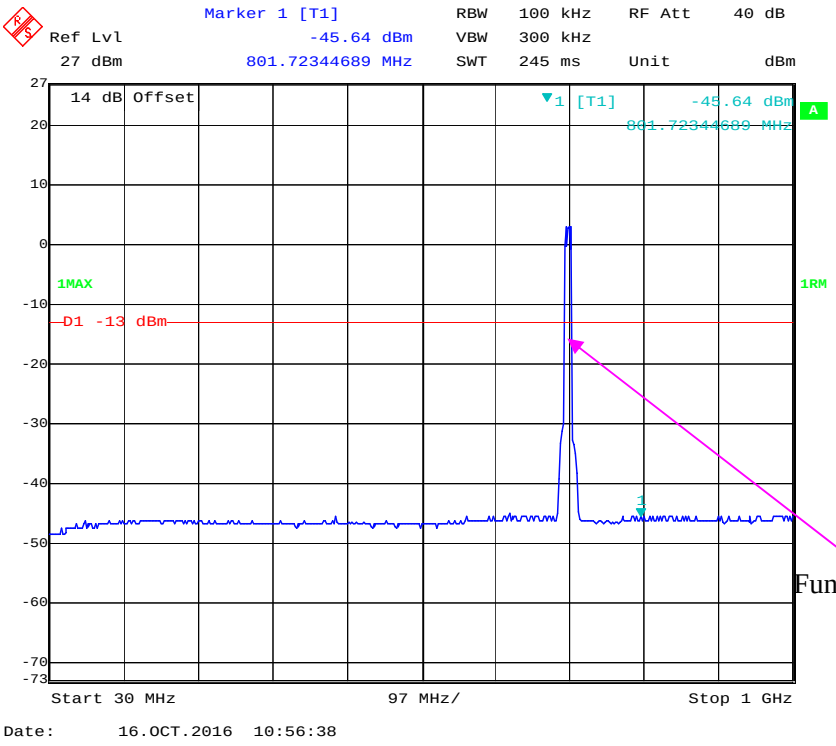


Fundamental test

1 GHz – 10 GHz (5.0 MHz, Middle Channel)

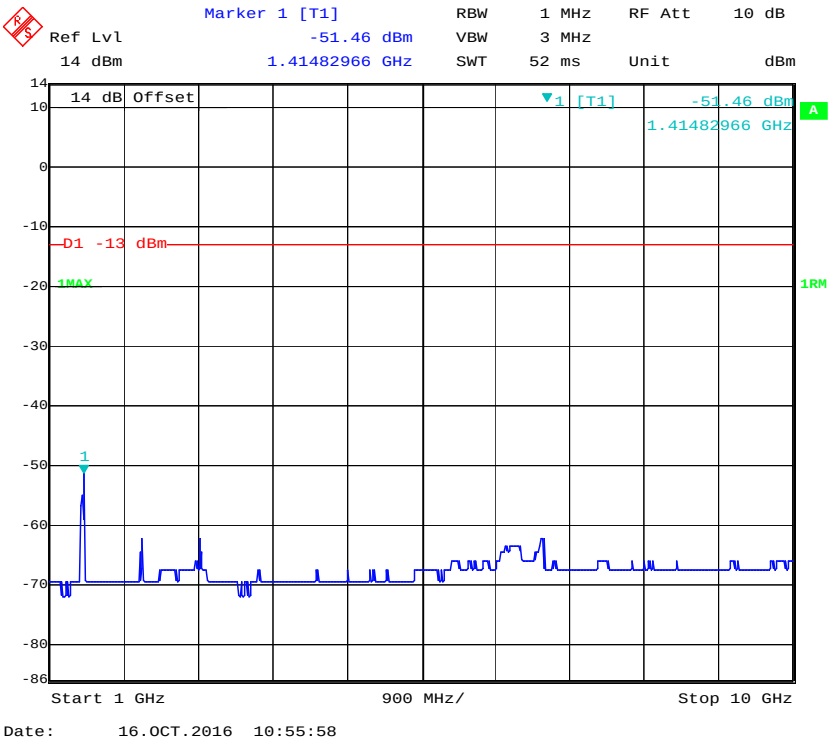


30 MHz - 1 GHz (10.0 MHz, Middle Channel)



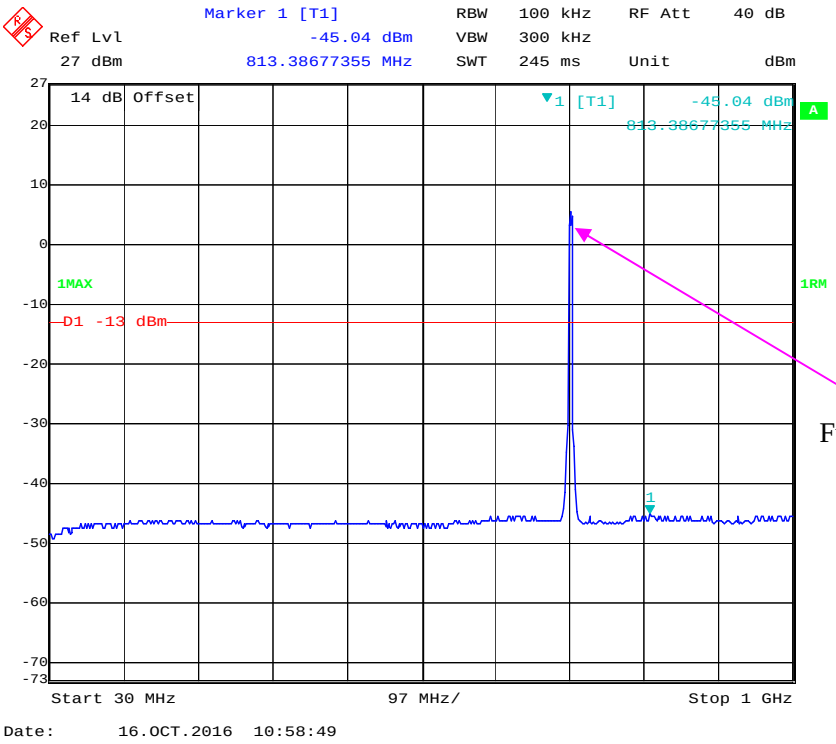
Fundamental test

1 GHz – 10 GHz (10.0 MHz, Middle Channel)



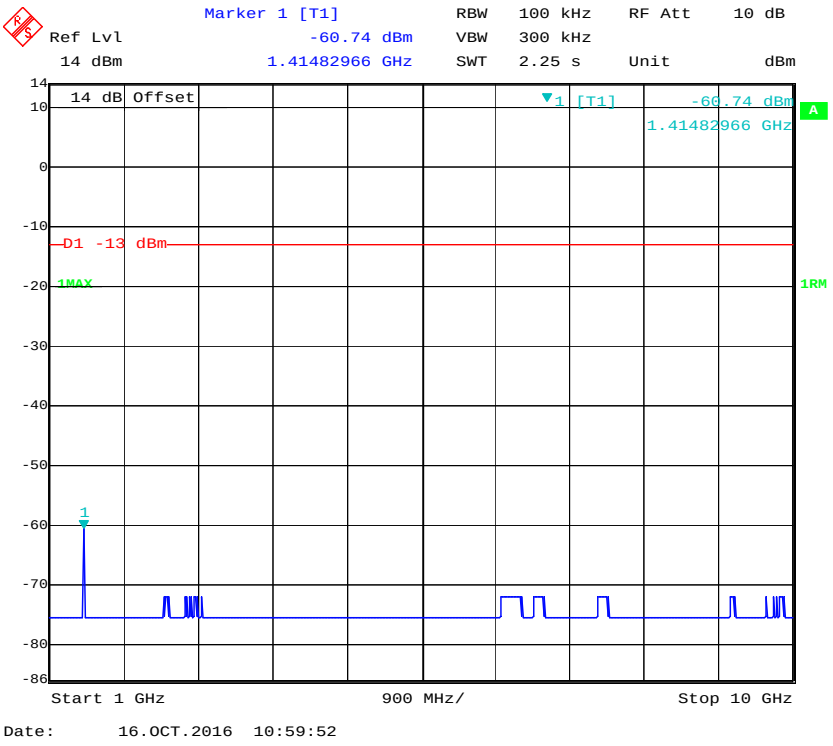
LTE Band 17:

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

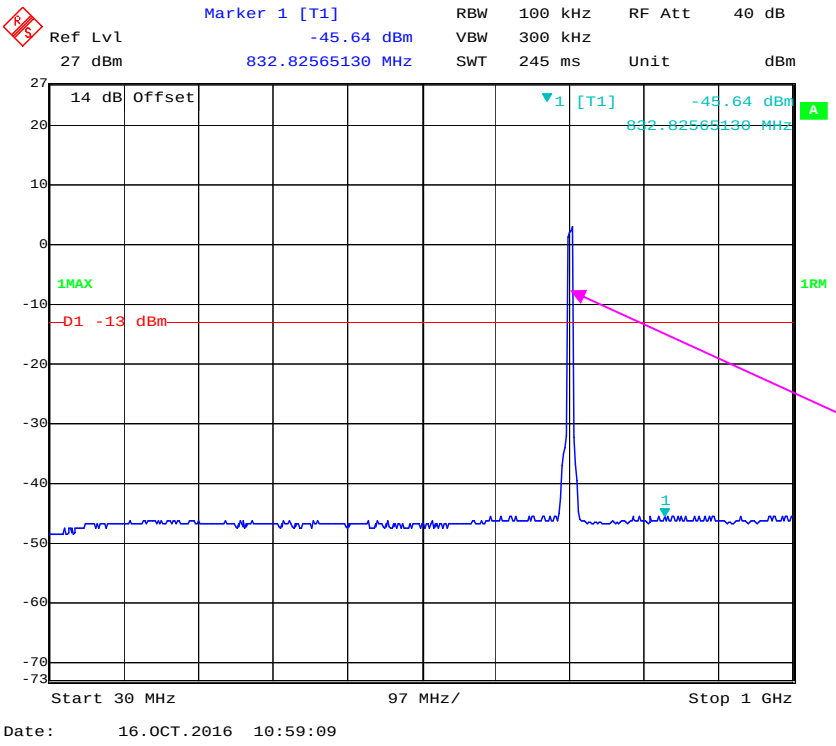


Fundamental test

1 GHz – 10 GHz (5.0 MHz, Middle Channel)

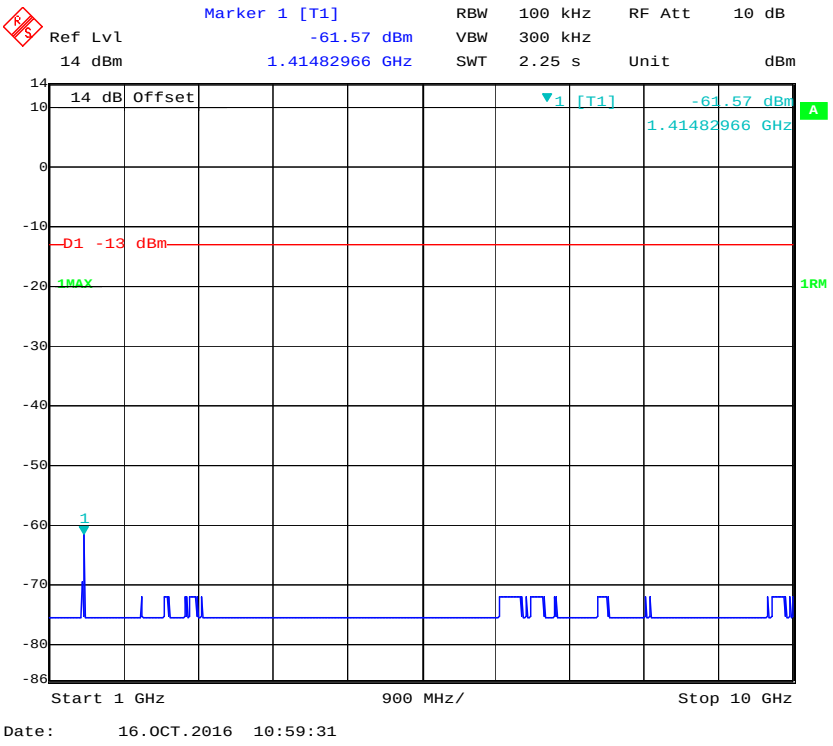


30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

1 GHz – 10 GHz (10.0 MHz, Middle Channel)



FCC § 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h) (m) SPURIOUS RADIATED EMISSIONS

Applicable Standards

FCC § 2.1053, §22.917(a) and § 24.238(a) and § 27.53(h)(m)

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 that 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 (TX pwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-10-20.

Test mode: Transmitting

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worse case data as below)

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 850 Mode										
235.52	37.59	164	1.3	H	-59.4	0.27	3.75	-55.92	-13	42.92
235.52	36.85	143	1.0	V	-60.1	0.27	3.75	-56.62	-13	43.62
1673.20	53.25	233	2.0	H	-50.7	0.30	9.40	-41.60	-13	28.60
1673.20	53.41	88	1.2	V	-52.0	0.30	9.40	-42.90	-13	29.90
WCDMA 850 Mode										
239.36	37.52	339	1.2	H	-59.5	0.27	3.75	-56.02	-13	43.02
239.36	36.48	9	1.4	V	-60.5	0.27	3.75	-57.02	-13	44.02
1652.80	52.33	93	1.4	H	-51.6	0.30	9.40	-42.50	-13	29.50
1652.80	54.67	287	1.4	V	-50.8	0.30	9.40	-41.70	-13	28.70

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM 1900 Mode										
235.52	37.42	17	1.2	H	-59.6	0.27	3.75	-56.12	-13	43.12
235.52	36.35	358	1.6	V	-60.6	0.27	3.75	-57.12	-13	44.12
3700.40	45.13	233	2.1	H	-48.6	2.42	12.60	-38.42	-13	25.42
3700.40	43.63	115	1.8	V	-49.1	2.42	12.60	-38.92	-13	25.92
WCDMA 1900 Mode										
235.52	37.57	43	1.8	H	-59.4	0.27	3.75	-55.92	-13	42.92
235.52	36.42	289	1.5	V	-60.6	0.27	3.75	-57.12	-13	44.12
3815.20	38.43	55	2.3	H	-55.3	2.42	12.60	-45.12	-13	32.12
3815.20	37.13	51	2.0	V	-55.6	2.42	12.60	-45.42	-13	32.42

30 MHz ~ 18 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
WCDMA Mode										
235.52	37.57	43	1.8	H	-59.4	0.27	3.75	-55.92	-13	42.92
235.52	36.42	289	1.5	V	-60.6	0.27	3.75	-57.12	-13	44.12
3505.20	45.37	245	2.5	H	-49.2	2.34	12.40	-39.14	-13	26.14
3505.20	42.31	95	1.8	V	-50.2	2.34	12.40	-40.14	-13	27.14

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

LTE Band:

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
Band 2										
Test frequency range:30 MHz ~ 20 GHz										
278.86	36.58	212	1.4	H	-60.4	0.27	3.85	-56.82	-13	43.82
278.86	35.85	230	1.5	V	-61.1	0.27	3.85	-57.52	-13	44.52
3760.00	39.43	109	1.2	H	-54.3	2.42	12.60	-44.12	-13	31.12
3760.00	40.83	129	2.5	V	-51.9	2.42	12.60	-41.72	-13	28.72
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
278.86	36.42	334	1.0	H	-60.6	0.27	3.85	-57.02	-13	44.02
278.86	35.32	43	1.2	V	-61.7	0.27	3.85	-58.12	-13	45.12
3465.00	44.57	91	1.7	H	-50.0	2.34	12.40	-39.94	-13	26.94
3465.00	43.11	37	1.0	V	-49.4	2.34	12.40	-39.34	-13	26.34
Band 7										
Test frequency range: 30 MHz ~ 26 GHz										
278.86	36.72	319	1.2	H	-60.3	0.27	3.85	-56.72	-25	31.72
278.86	35.53	250	1.1	V	-61.5	0.27	3.85	-57.92	-25	32.92
5070.00	37.36	90	1.0	H	-51.3	2.57	12.70	-41.17	-25	16.17
5070.00	38.27	317	2.3	V	-51.2	2.57	12.70	-41.07	-25	16.07
Band 12										
Test frequency range: 30 MHz ~ 10 GHz										
278.86	36.78	211	2.1	H	-60.2	0.27	3.85	-56.62	-13	43.62
278.86	35.43	340	2.4	V	-61.6	0.27	3.85	-58.02	-13	45.02
1414.00	44.66	175	1.1	H	-58.1	0.28	8.00	-50.38	-13	37.38
1414.00	47.62	187	1.0	V	-59.2	0.28	8.00	-51.48	-13	38.48
Band 17										
Test frequency range: 30 MHz ~ 10 GHz										
278.86	36.72	107	2.2	H	-60.3	0.27	3.85	-56.72	-13	43.72
278.86	35.34	356	1.3	V	-61.7	0.27	3.85	-58.12	-13	45.12
1420.00	43.26	331	2.3	H	-59.5	0.28	8.00	-51.78	-13	38.78
1420.00	45.62	242	2.0	V	-61.2	0.28	8.00	-53.48	-13	40.48

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

FCC § 22.917 (a);§ 24.238 (a); §27.53 (h)(m) - BAND EDGES

Applicable Standards

According to § 22.917(a), the power of any emissions 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.

According to §24.238(a), the power of any emissions 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.

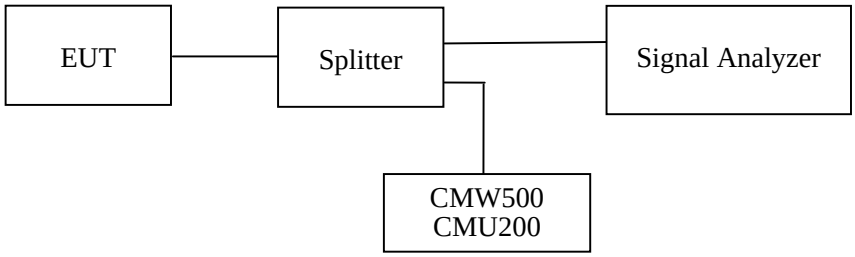
According to FCC §27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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 that 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



Test Data

Environmental Conditions

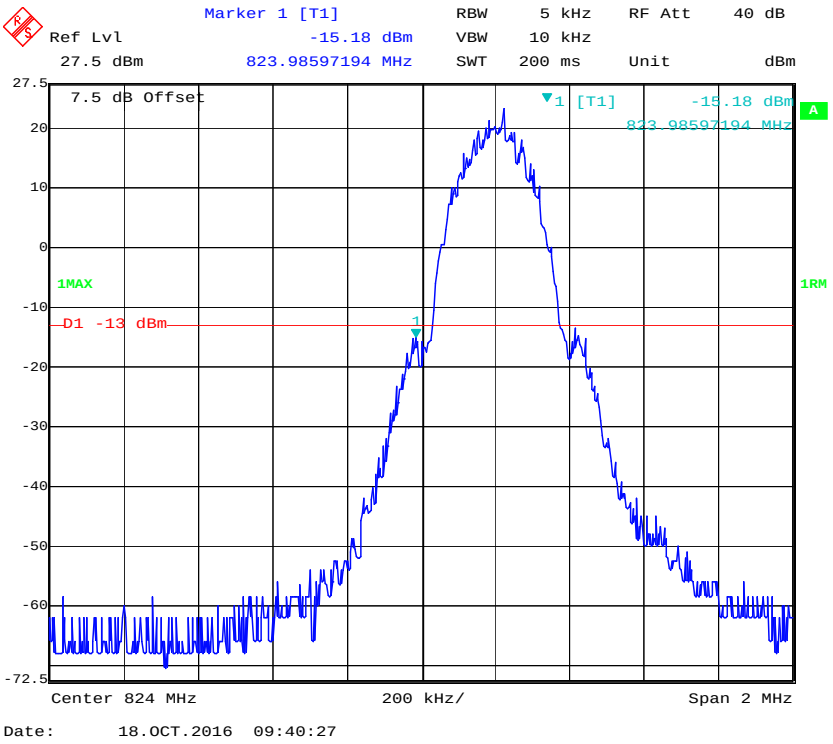
Temperature:	24~25 ℃
Relative Humidity:	53~55 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Chris Wang from 2016-10-16 to 2016-10-21.

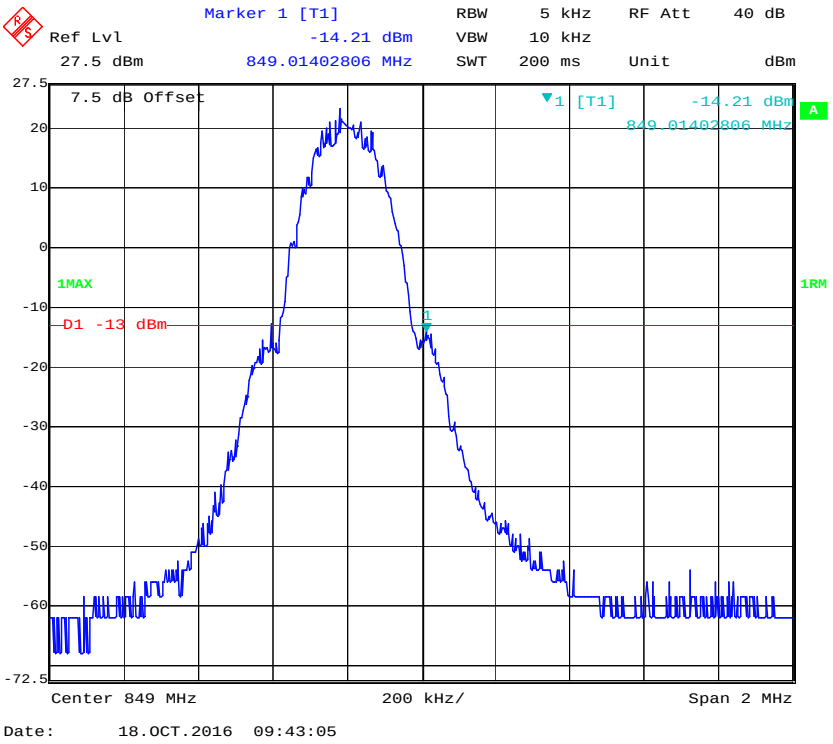
EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following plots.

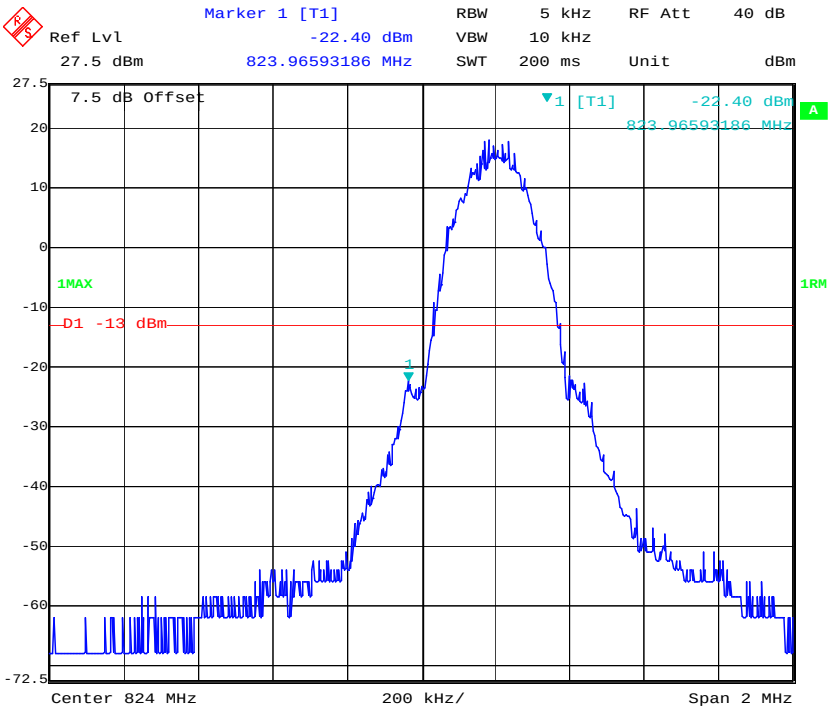
Cellular Band, Left Band Edge for GSM (GMSK) Mode



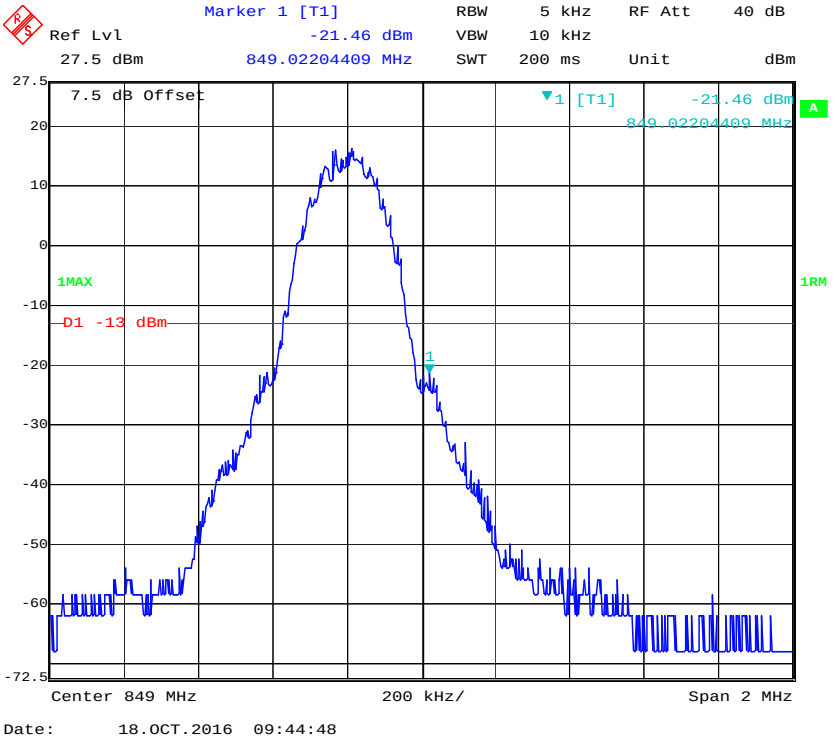
Cellular Band, Right Band Edge for GSM (GMSK) Mode



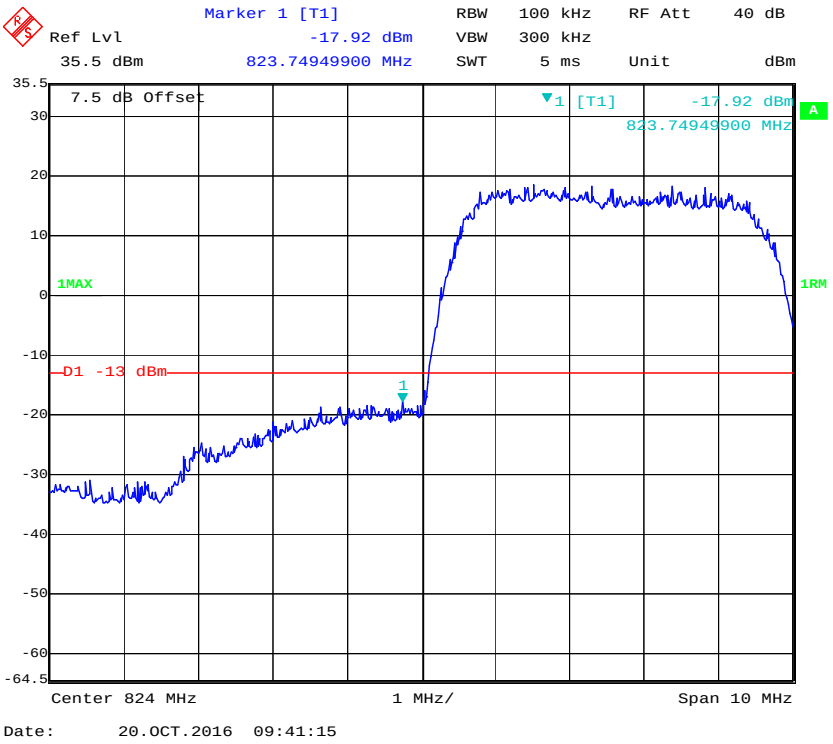
Cellular Band, Left Band Edge for EGPRS Mode



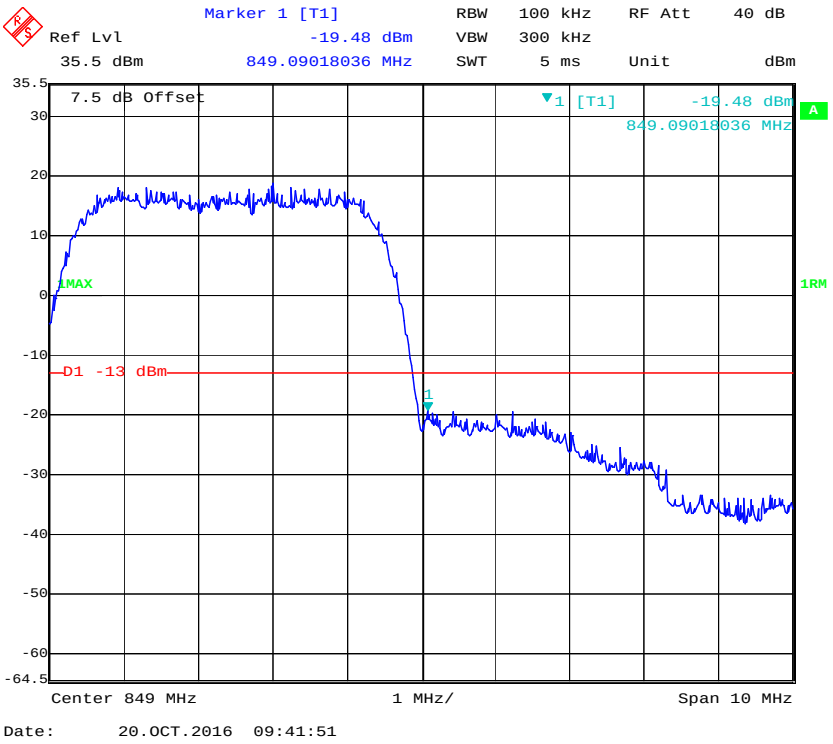
Cellular Band, Right Band Edge for EGPRS Mode



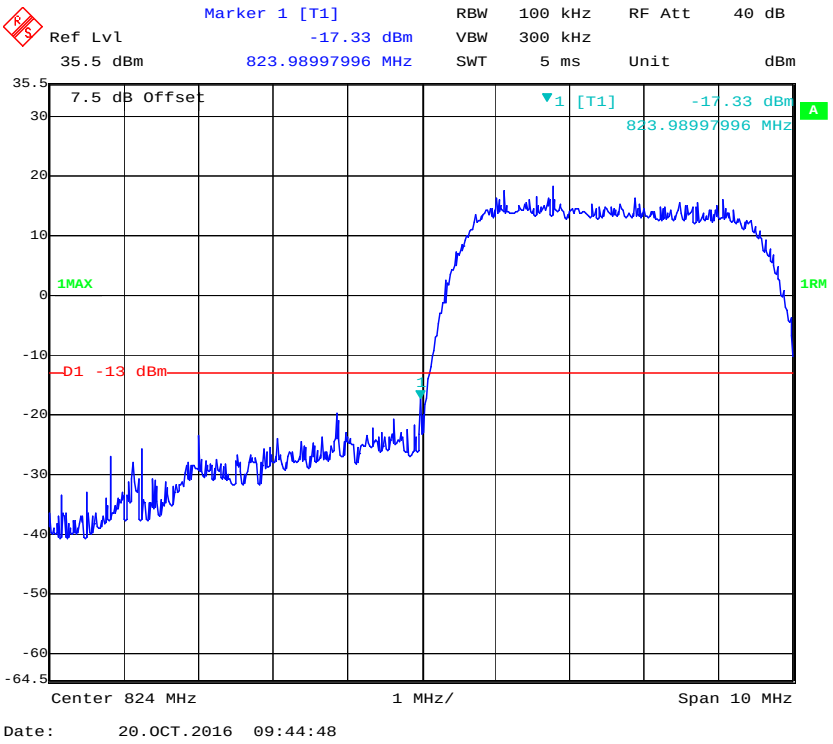
Cellular Band, Left Band Edge for RMC (BPSK) Mode



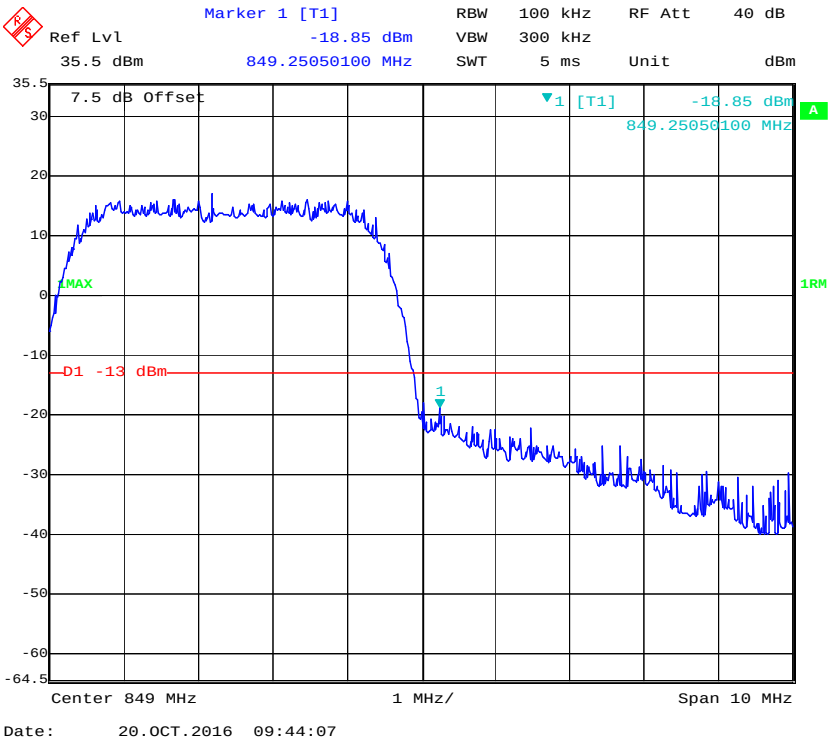
Cellular Band, Right Band Edge for RMC (BPSK) Mode



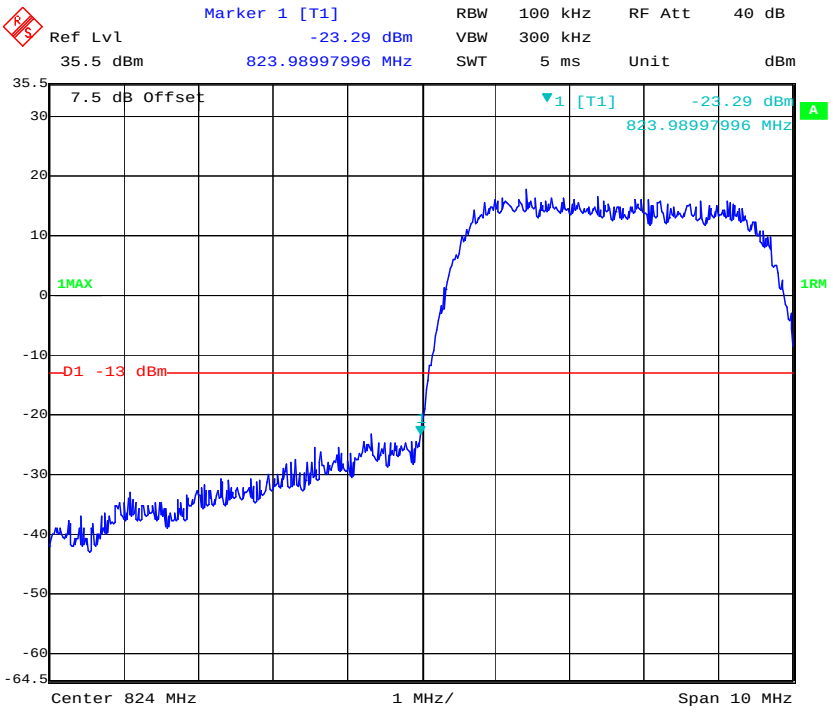
Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



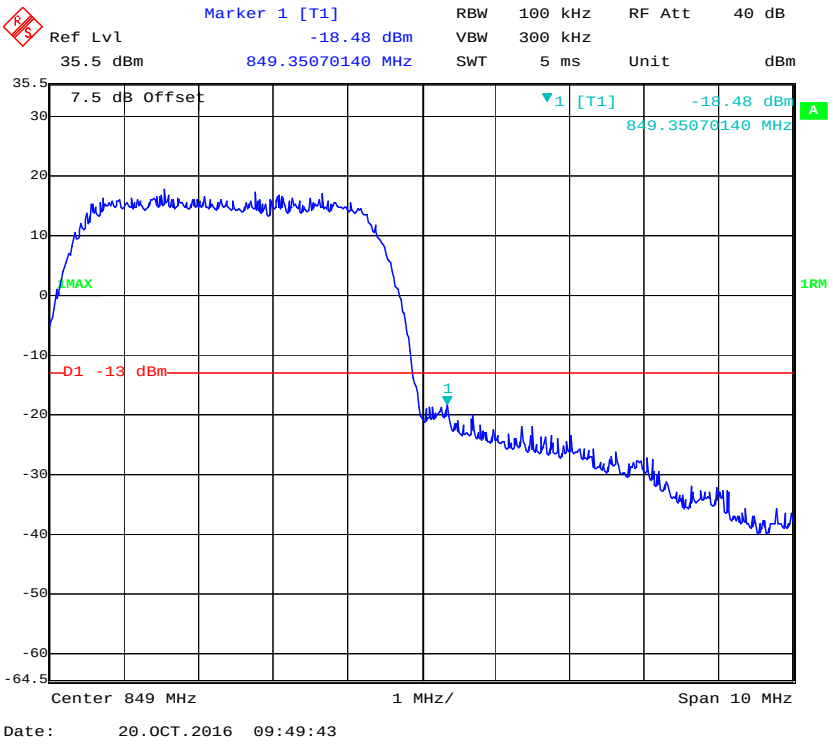
Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



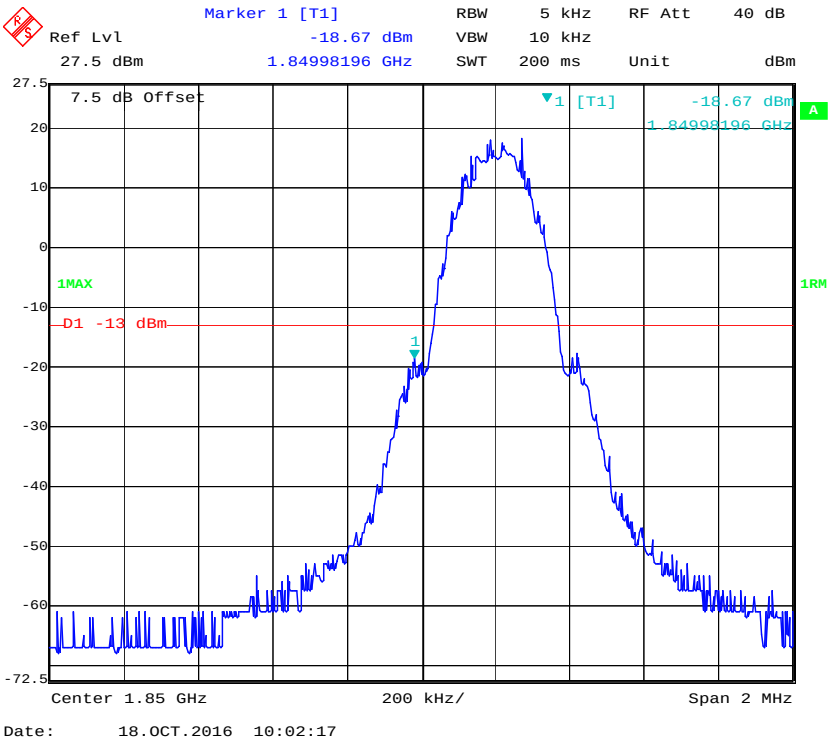
Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



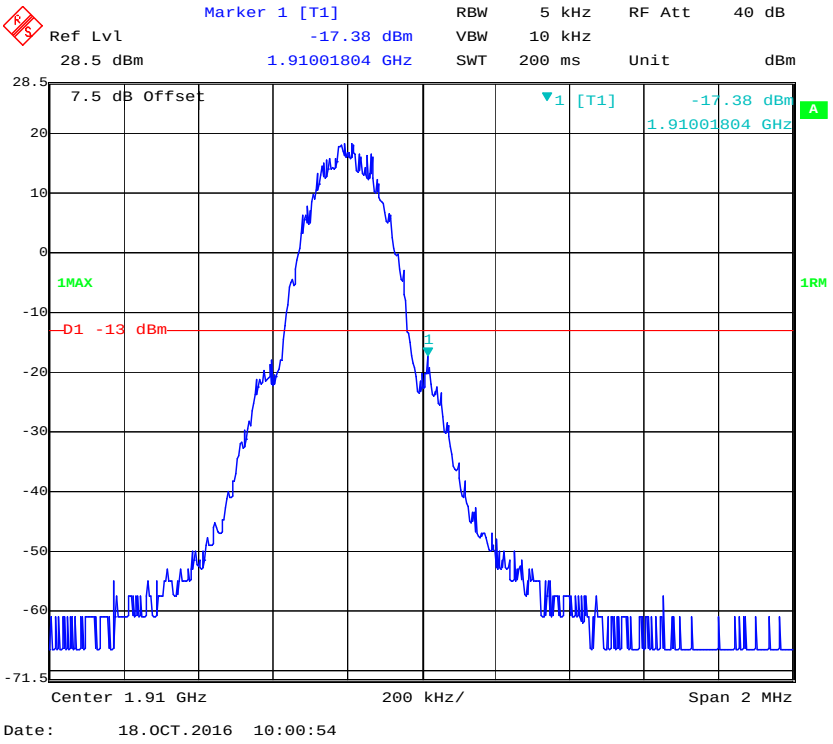
Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



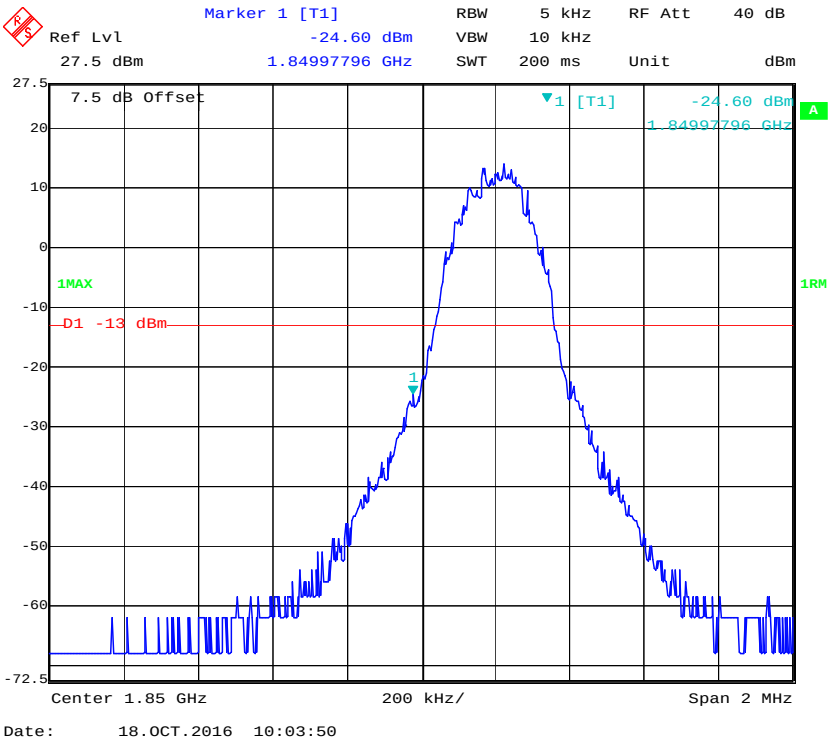
PCS Band, Left Band Edge for GSM (GMSK) Mode



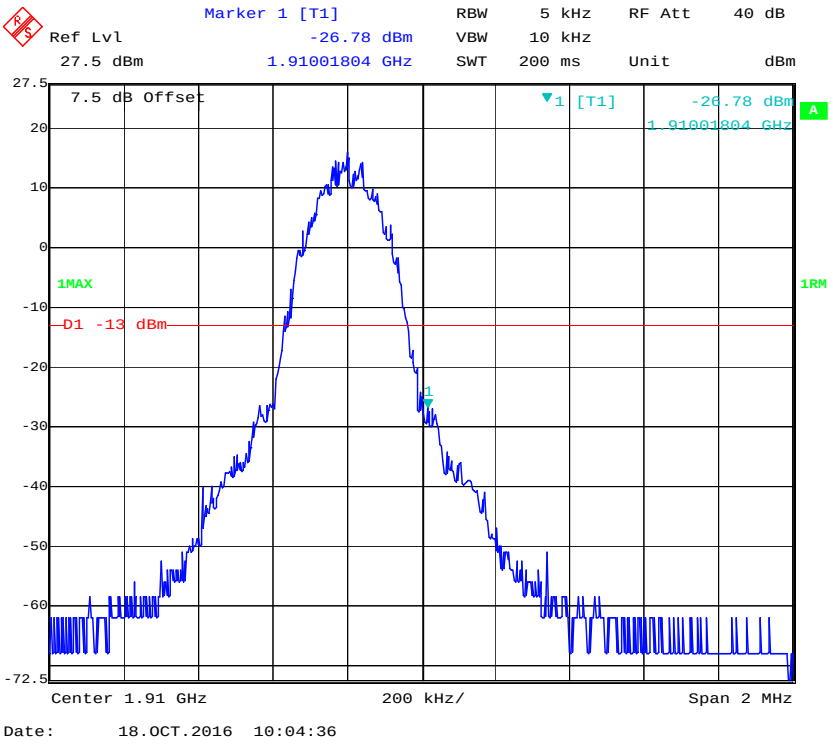
PCS Band, Right Band Edge for GSM (GMSK) Mode



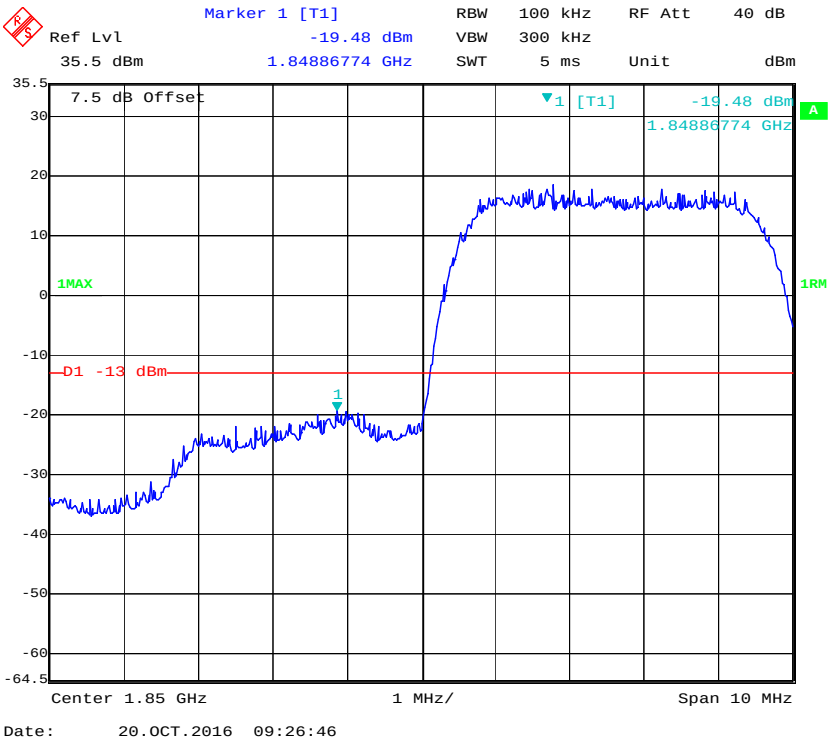
PCS Band, Left Band Edge for EGPRS Mode



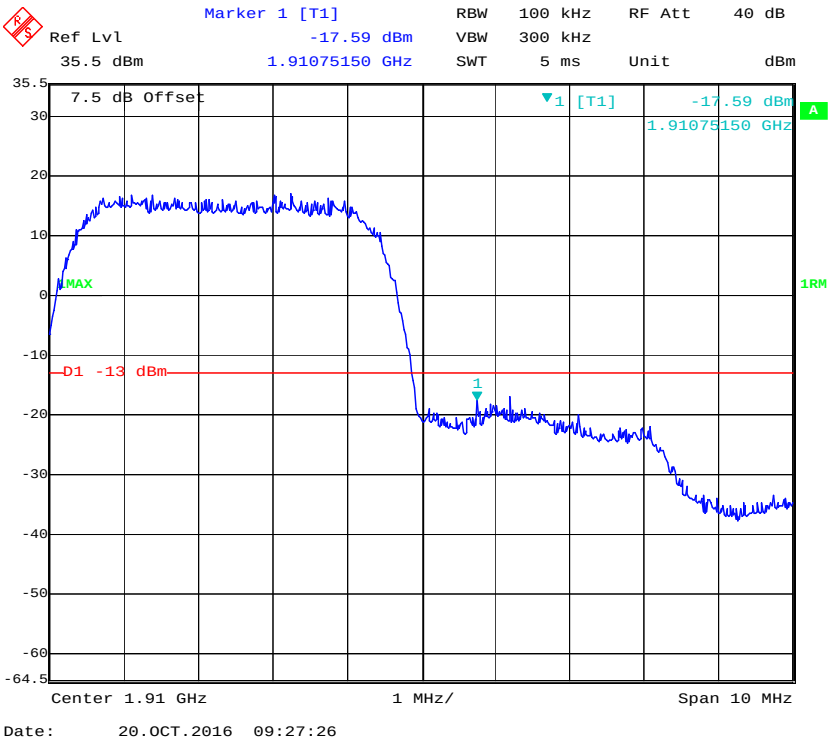
PCS Band, Right Band Edge for EGPRS Mode



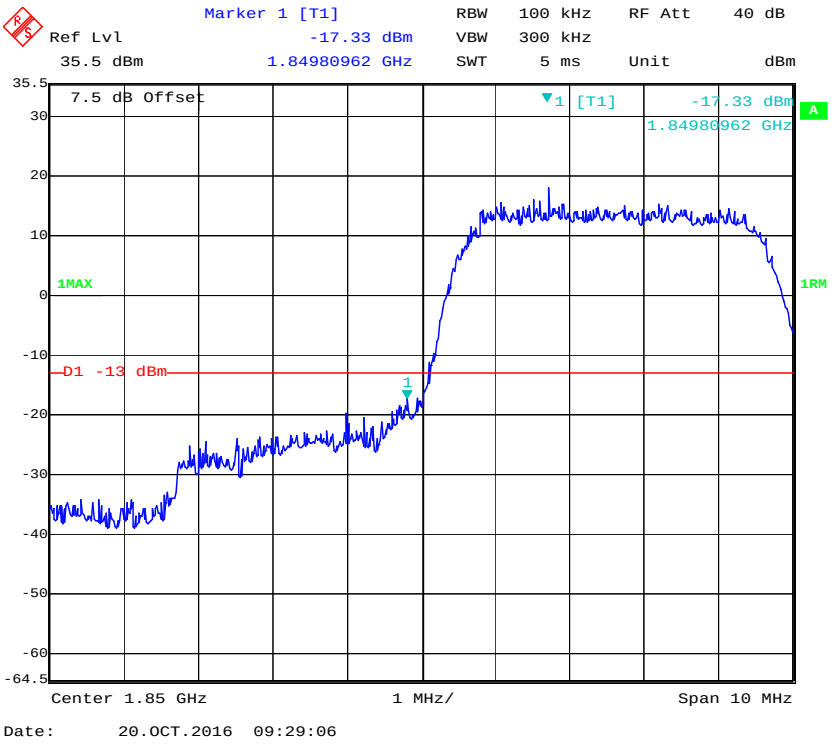
PCS Band, Left Band Edge for RMC (BPSK) Mode



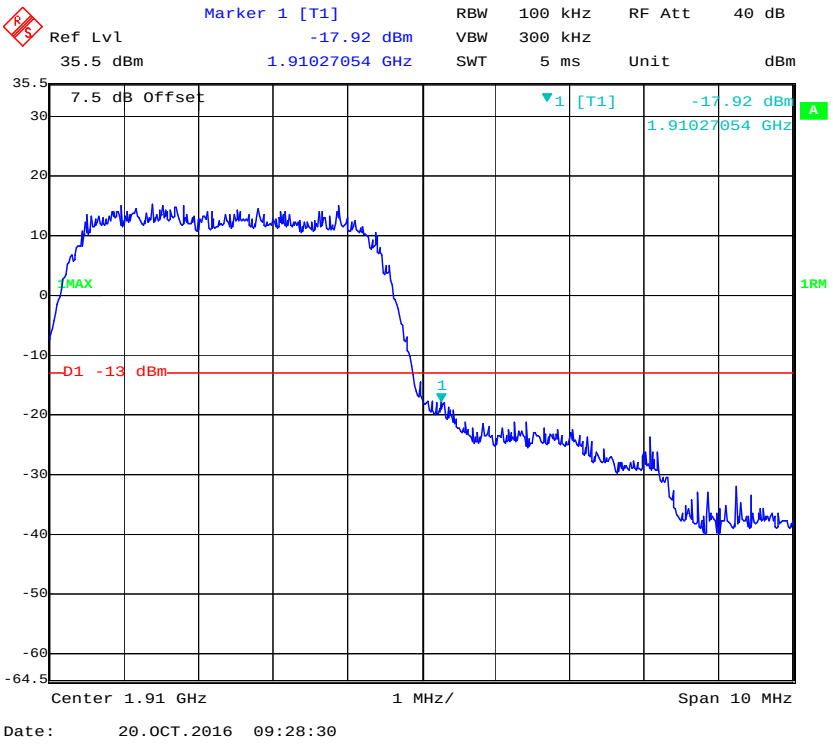
PCS Band, Right Band Edge for RMC (BPSK) Mode



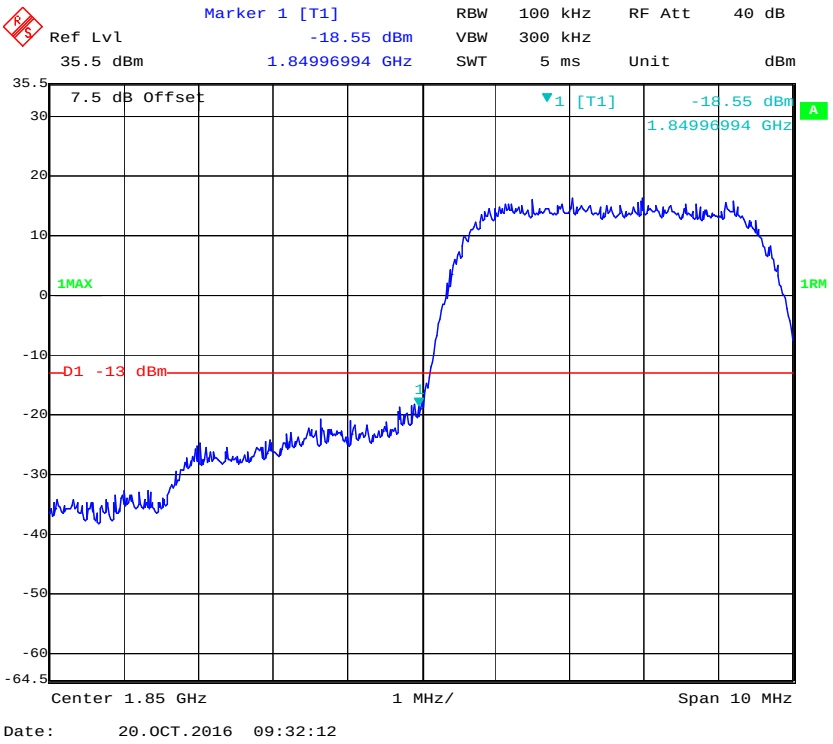
PCS Band, Left Band Edge for HSDPA (16QAM) Mode



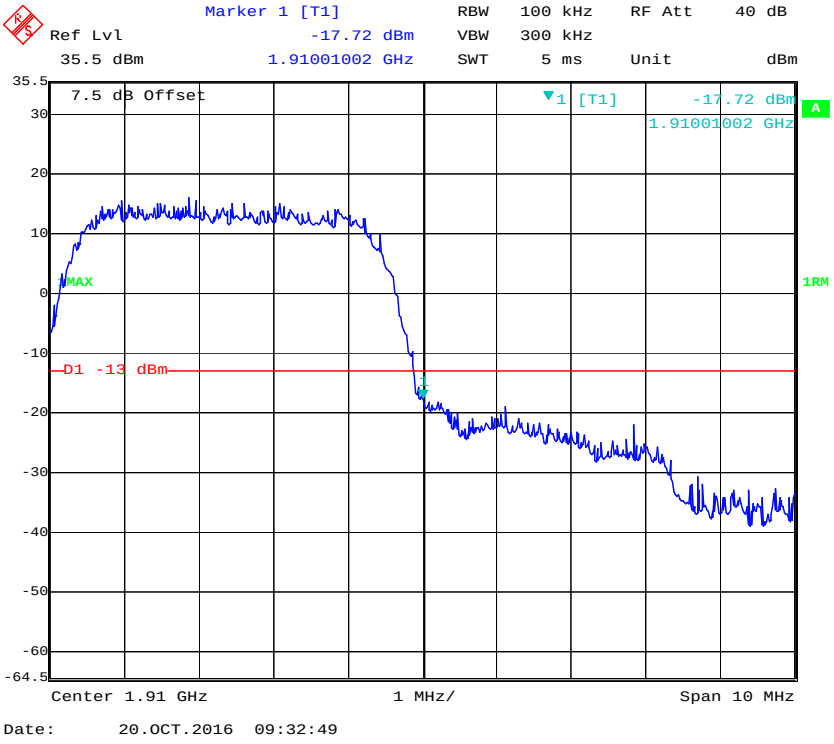
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



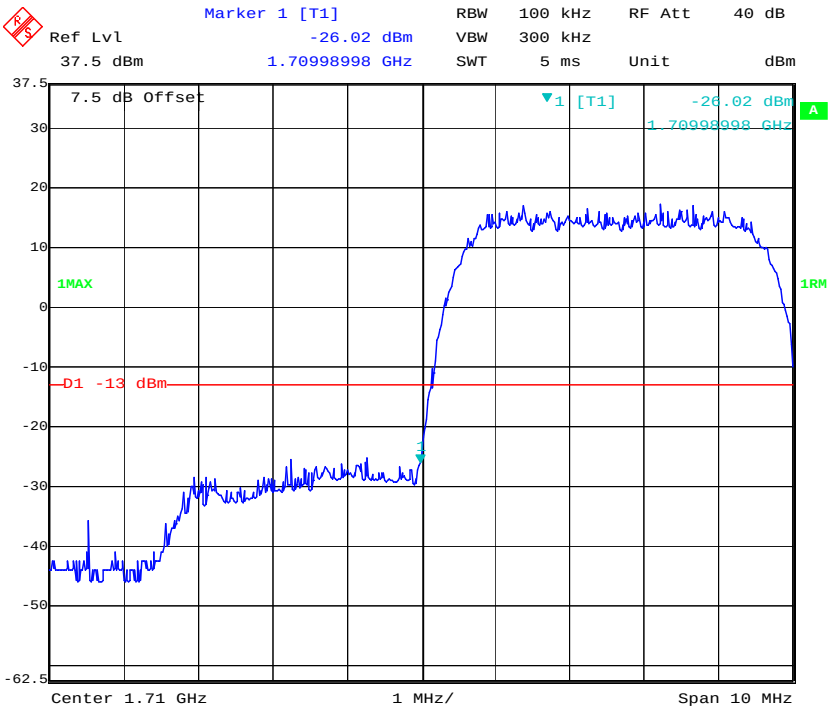
PCS Band, Left Band Edge for HSUPA (BPSK) Mode



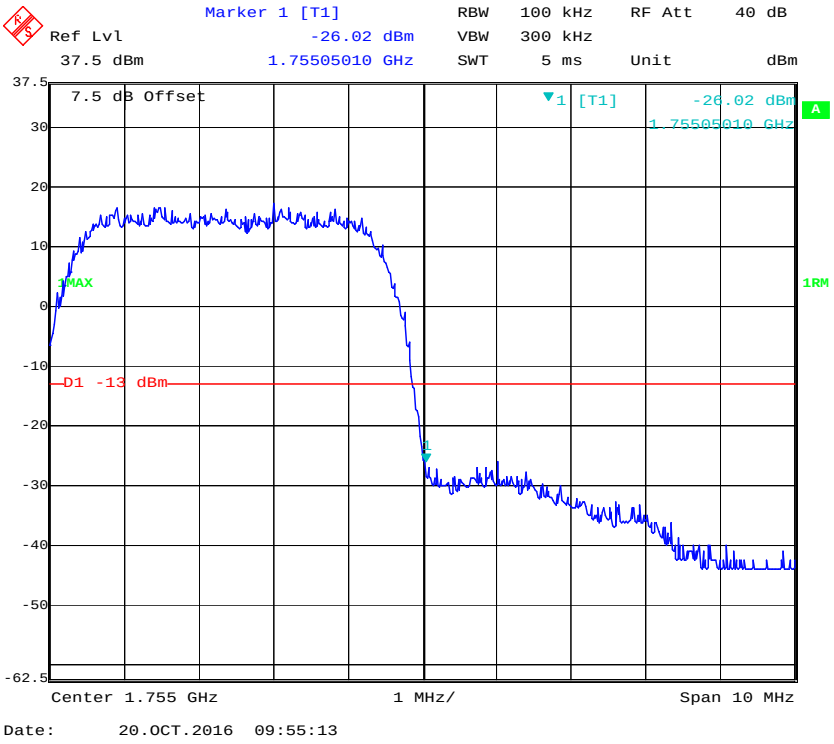
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



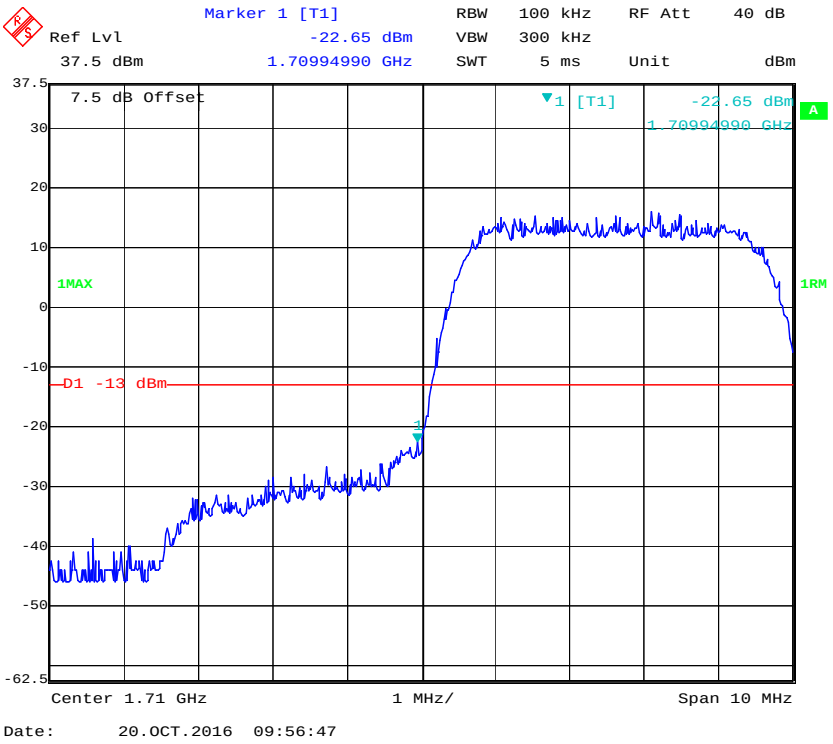
Band 4, Left Band Edge for WCDMA (BPSK) Mode



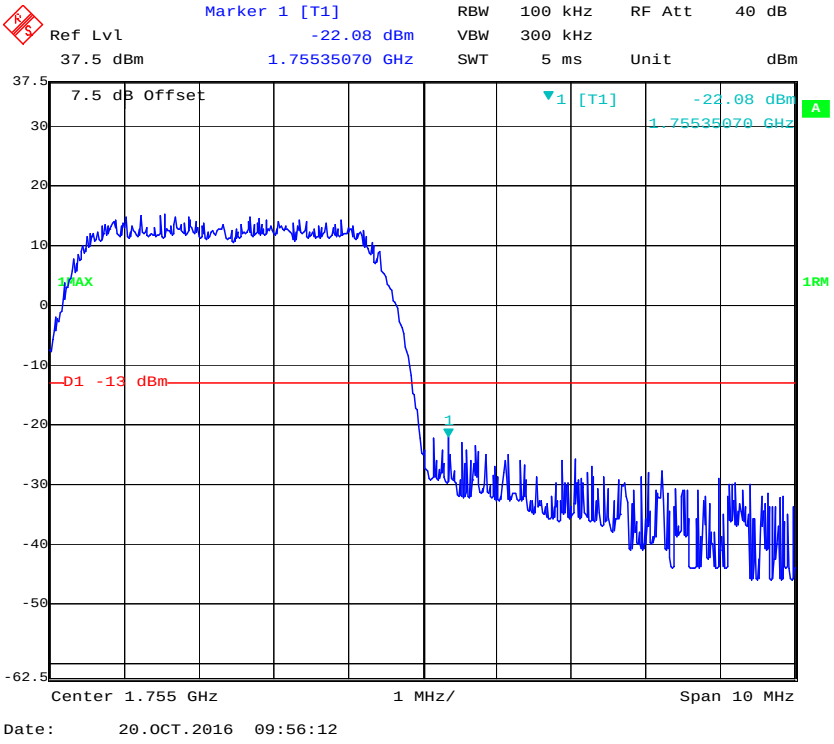
Band 4, Right Band Edge for WCDMA (BPSK) Mode



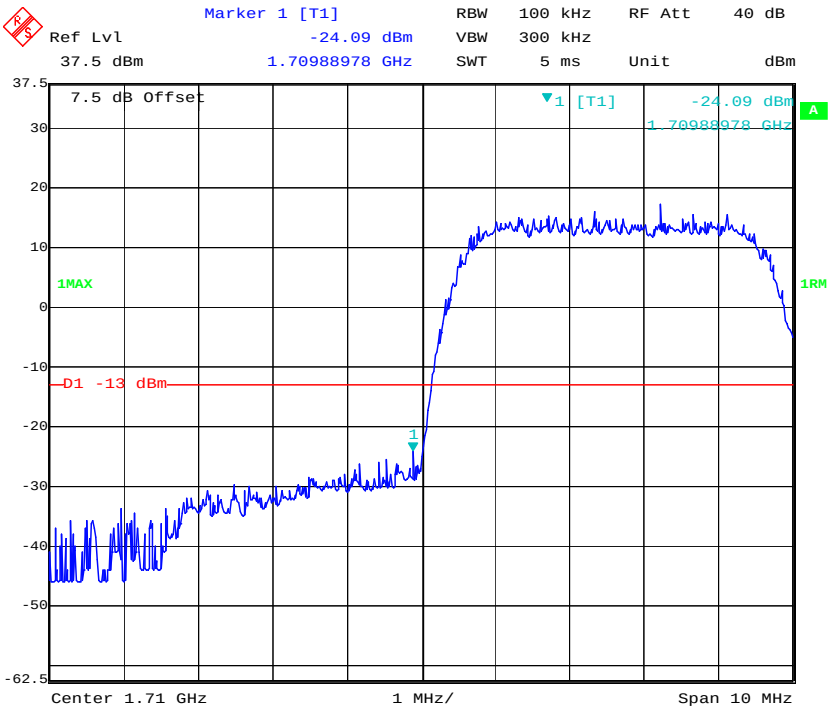
Band 4, Left Band Edge for HSDPA (16QAM) Mode



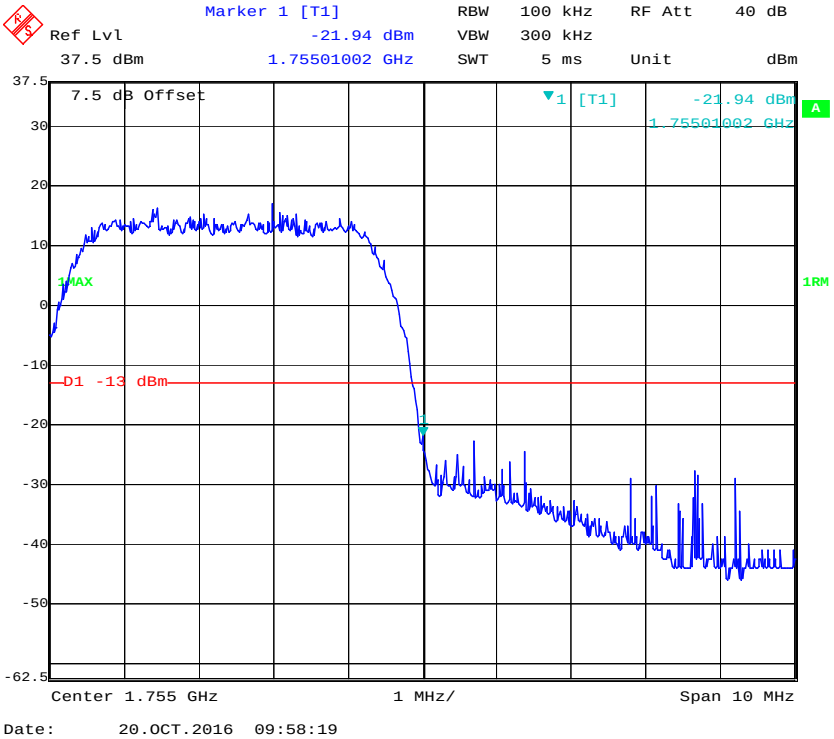
Band 4, Right Band Edge for HSDPA (16QAM) Mode



Band 4, Left Band Edge for HSUPA (BPSK) Mode

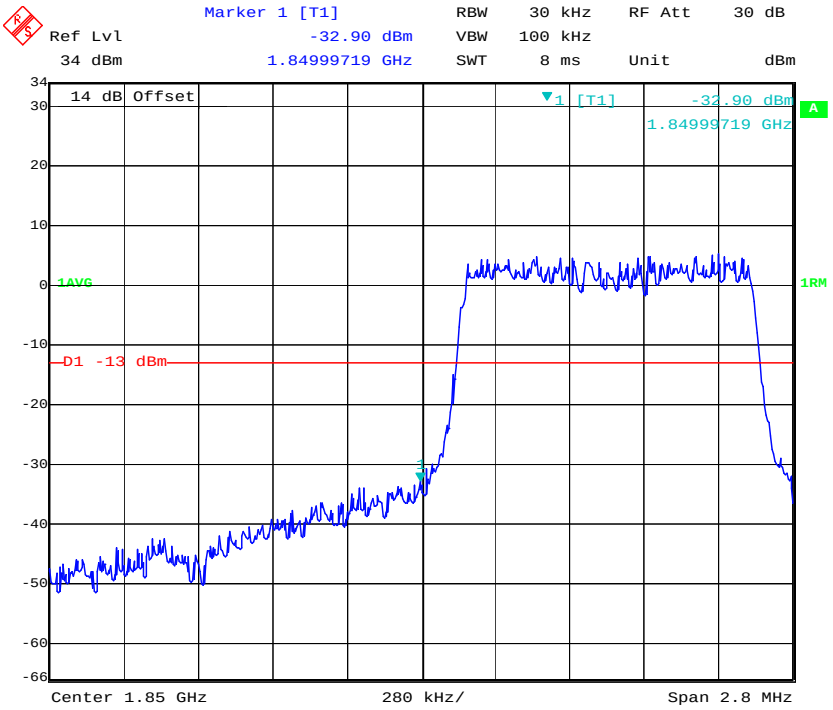


Band 4, Right Band Edge for HSUPA (BPSK) Mode

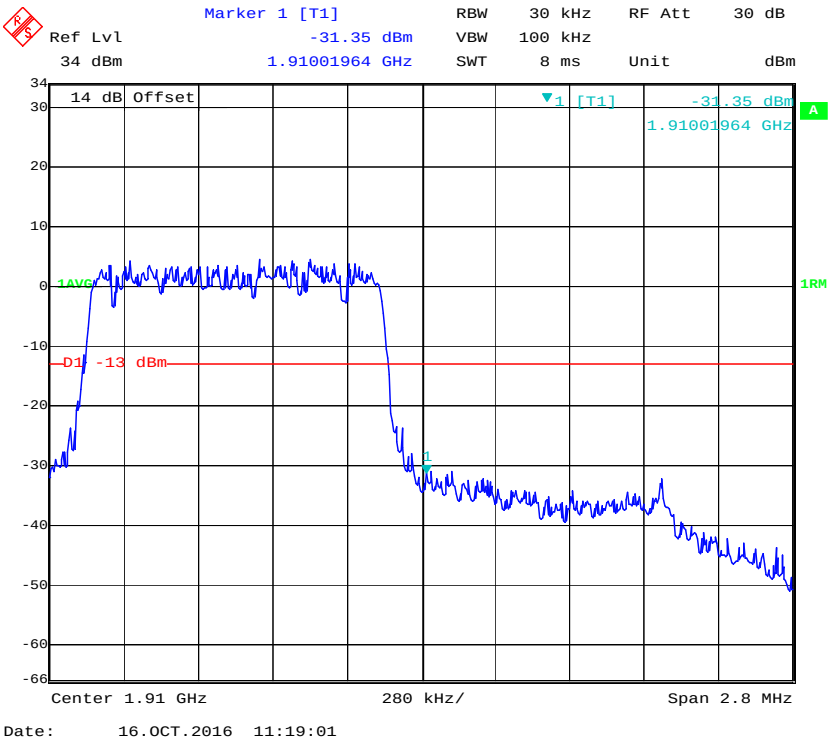


LTE Band 2:

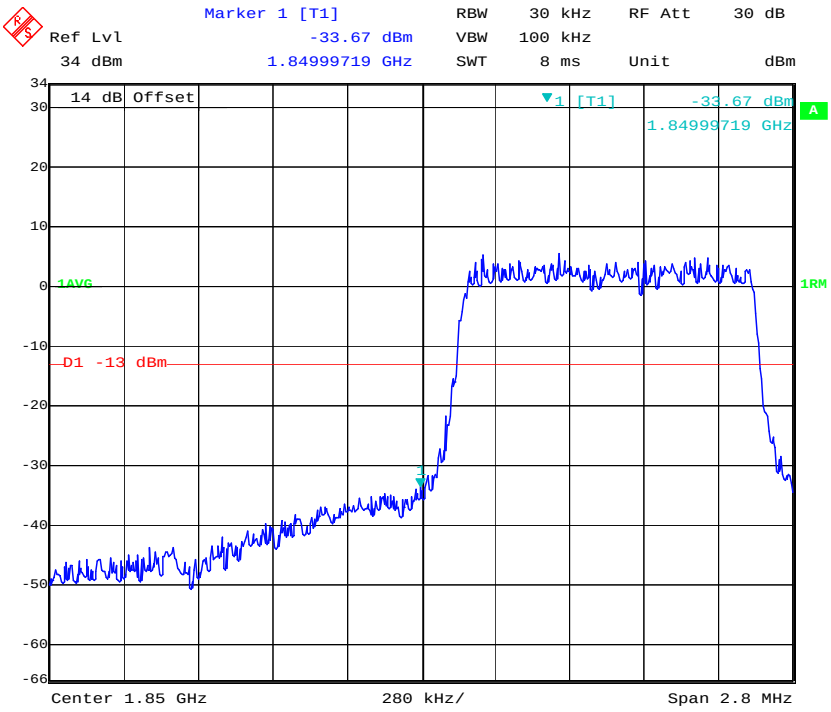
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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

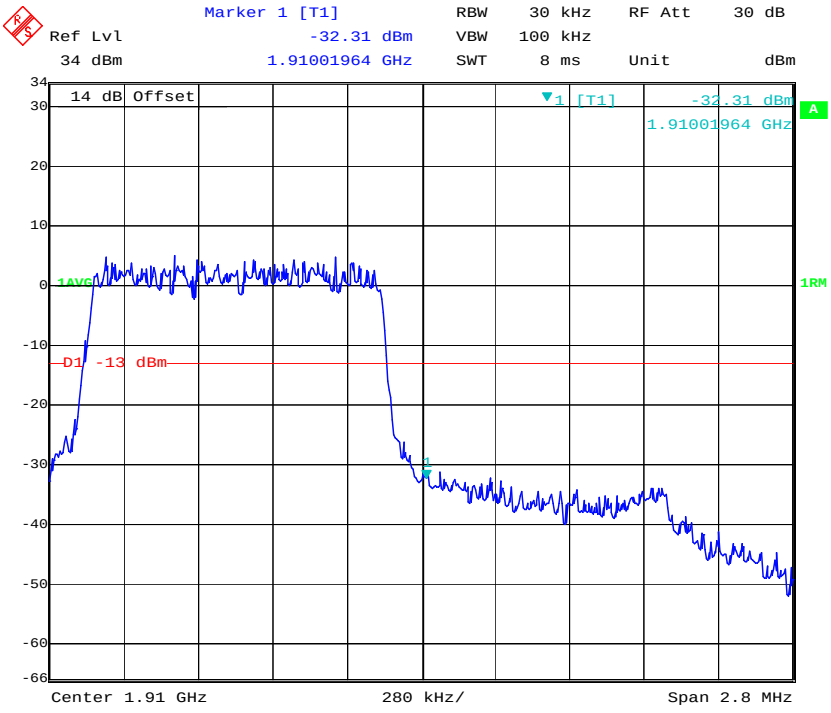


16-QAM (1.4 MHz, FULL RB) - Left Band Edge



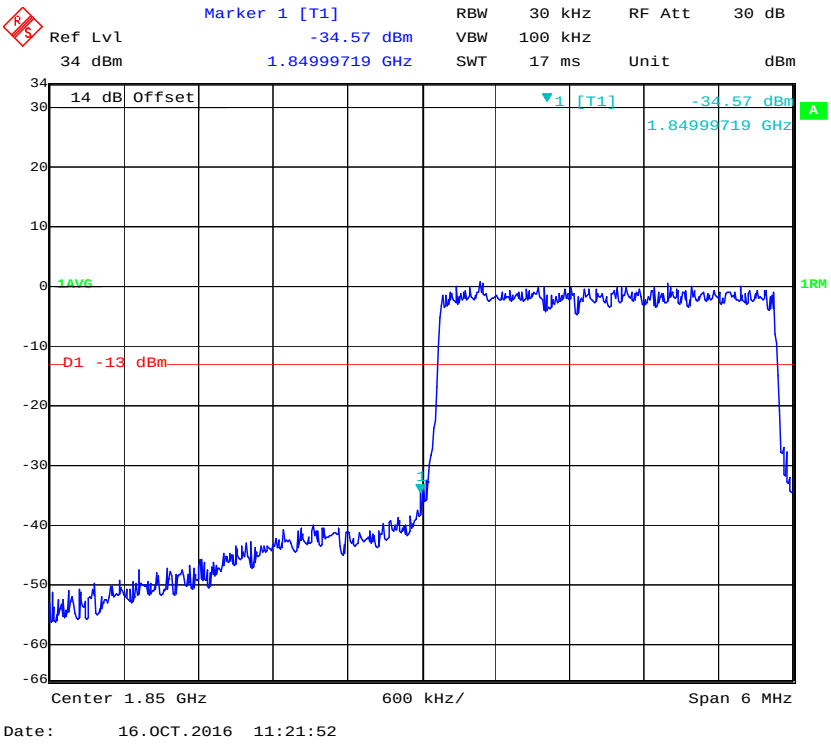
Date: 16.OCT.2016 11:16:32

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

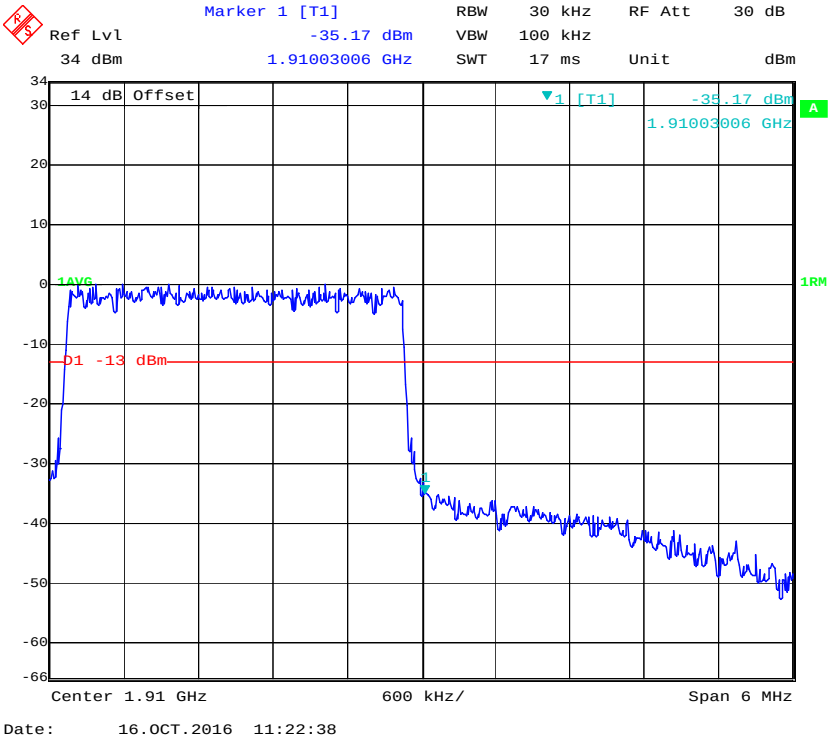


Date: 16.OCT.2016 11:18:36

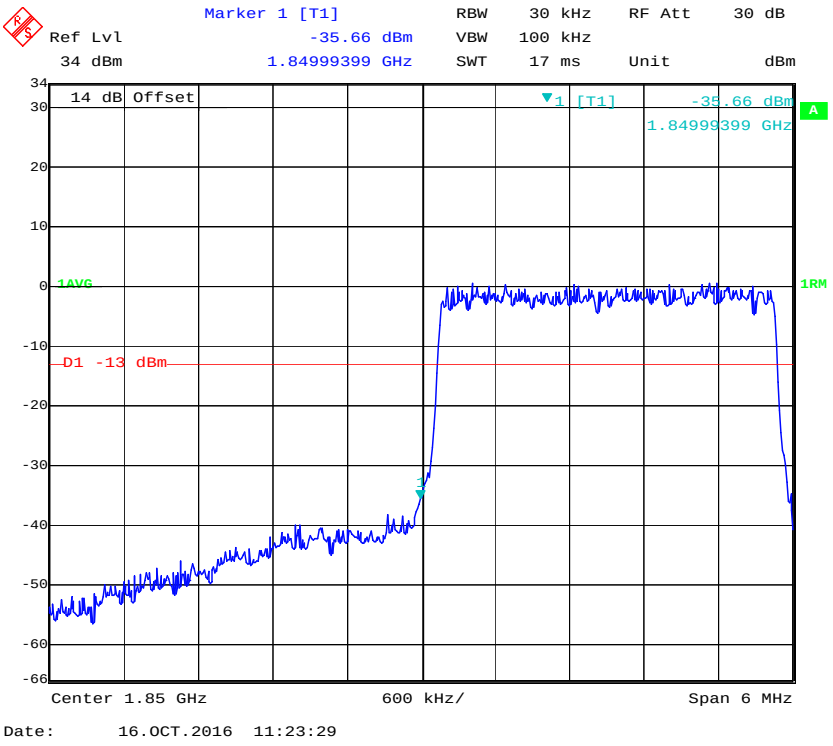
QPSK (3.0 MHz, FULL RB) - Left Band Edge



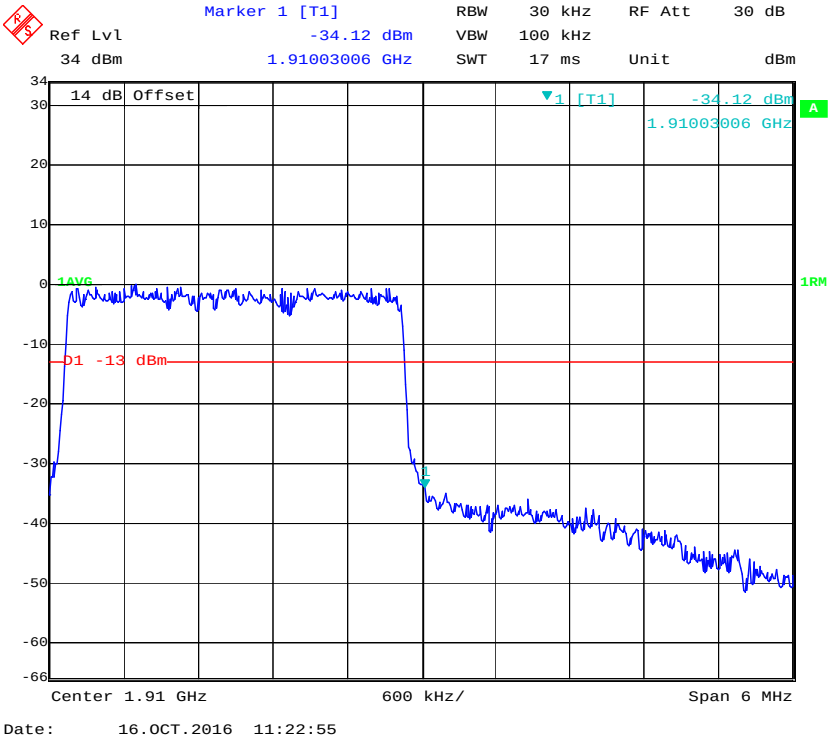
QPSK (3.0 MHz, FULL RB) - Right Band Edge



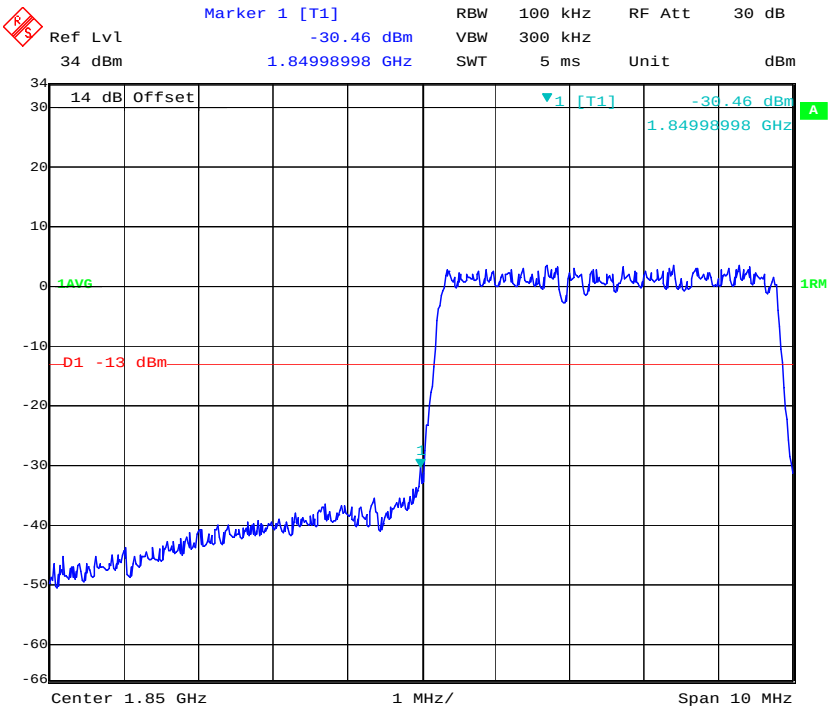
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



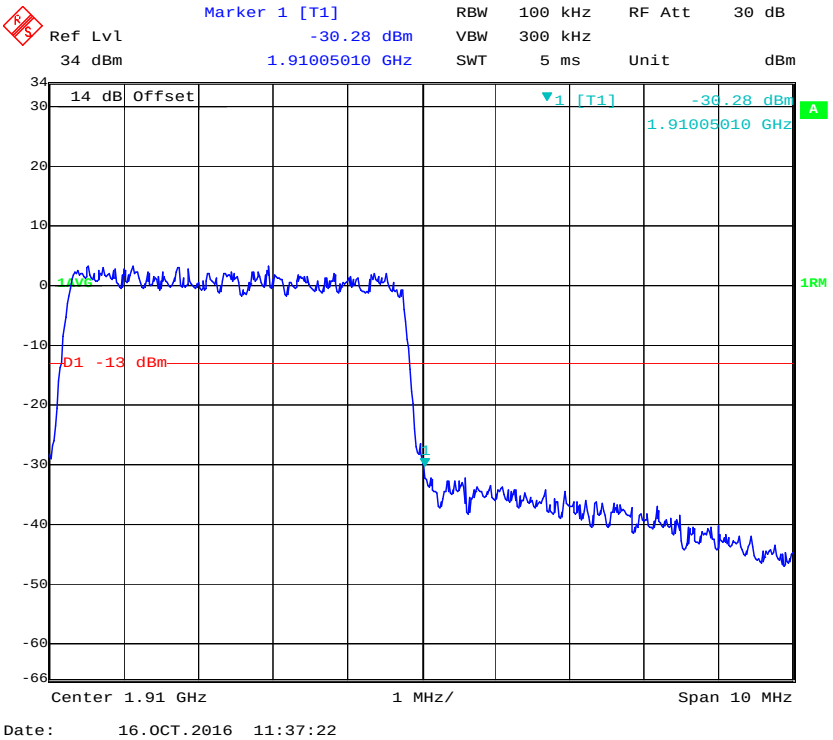
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



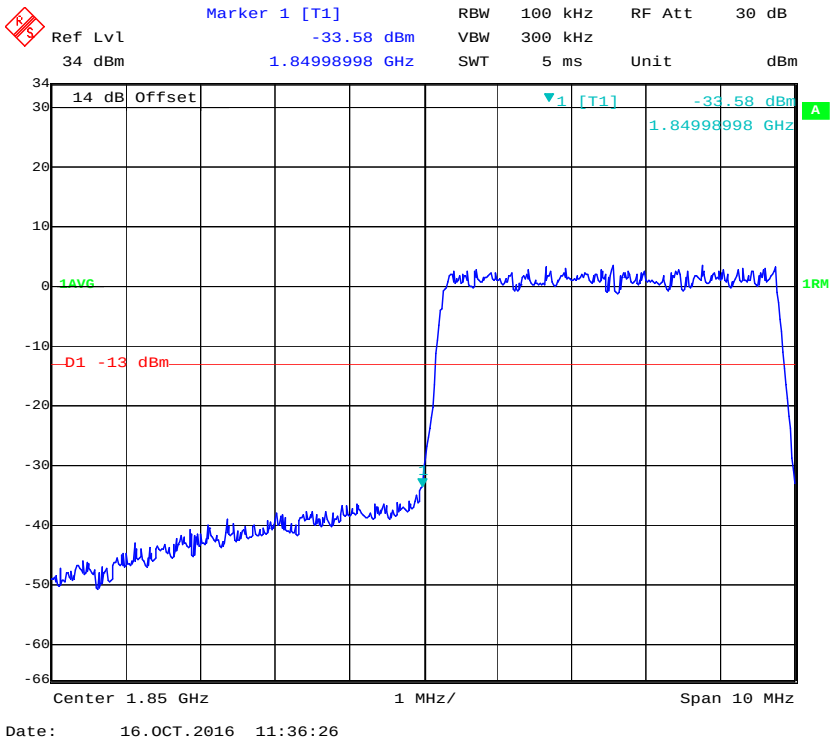
QPSK (5.0 MHz, FULL RB) - Left Band Edge



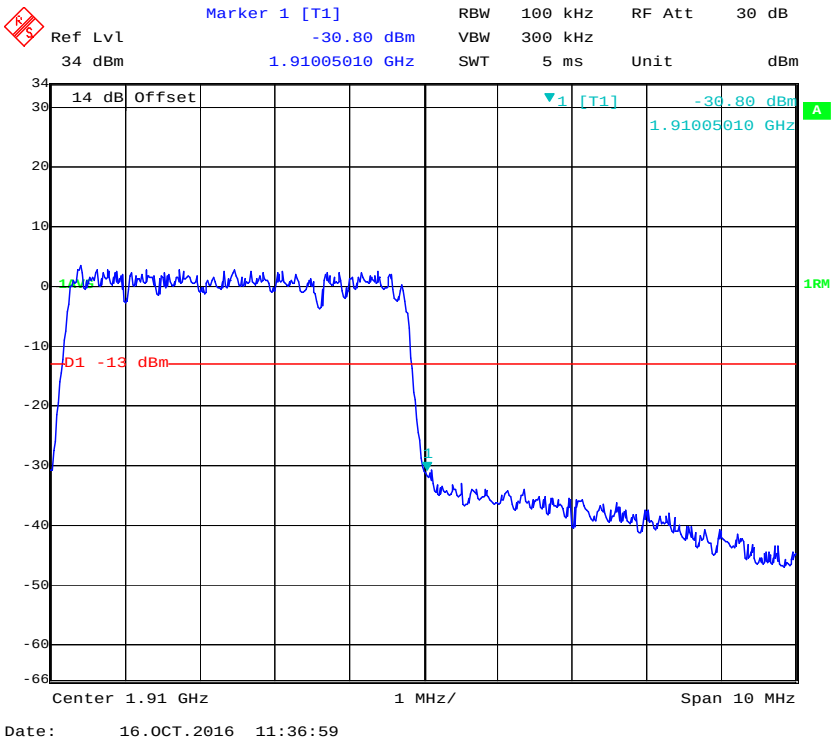
QPSK (5.0 MHz, FULL RB) - Right Band Edge



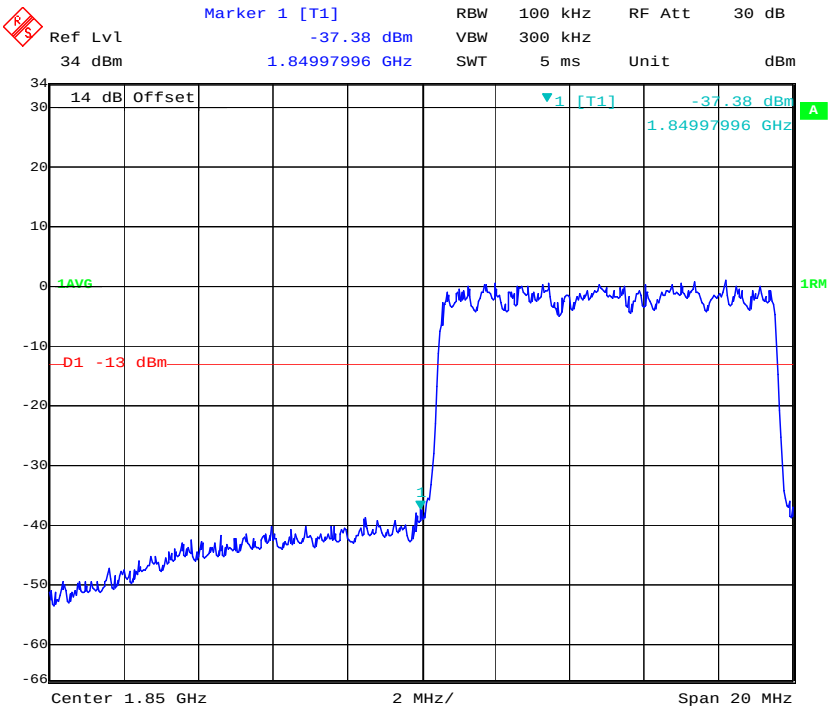
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



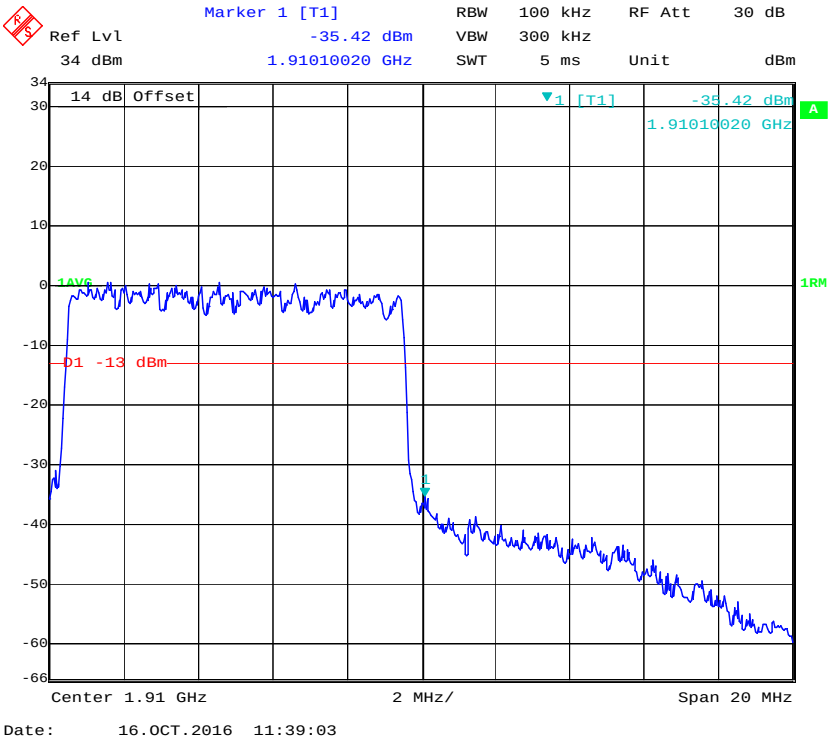
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



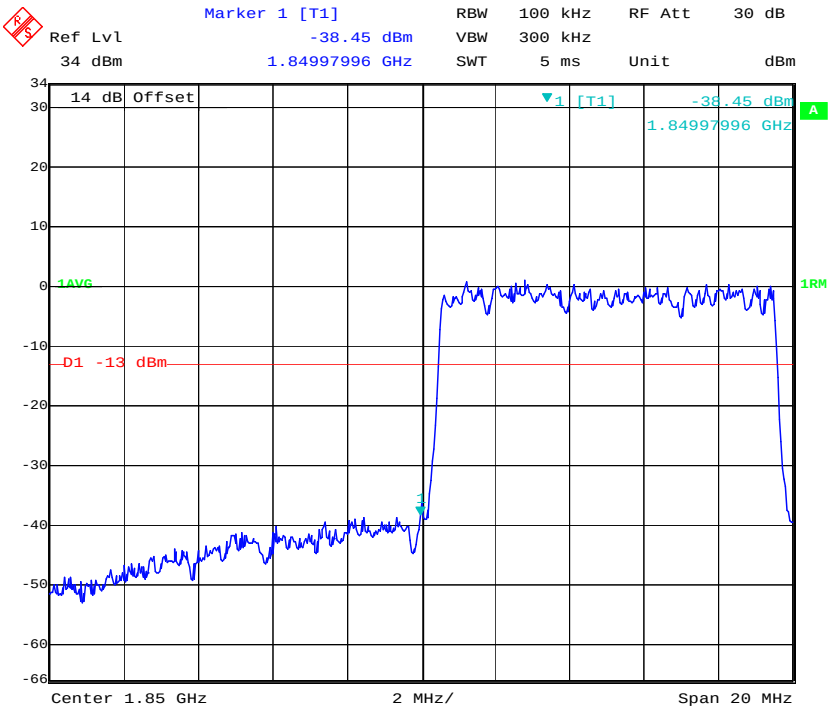
QPSK (10.0 MHz, FULL RB) - Left Band Edge



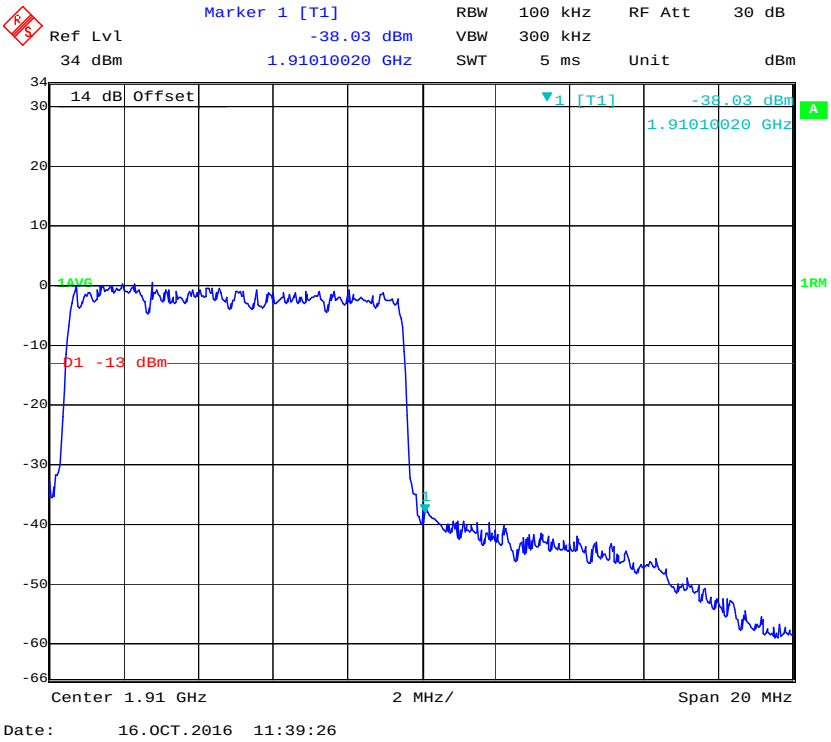
QPSK (10.0 MHz, FULL RB) - Right Band Edge



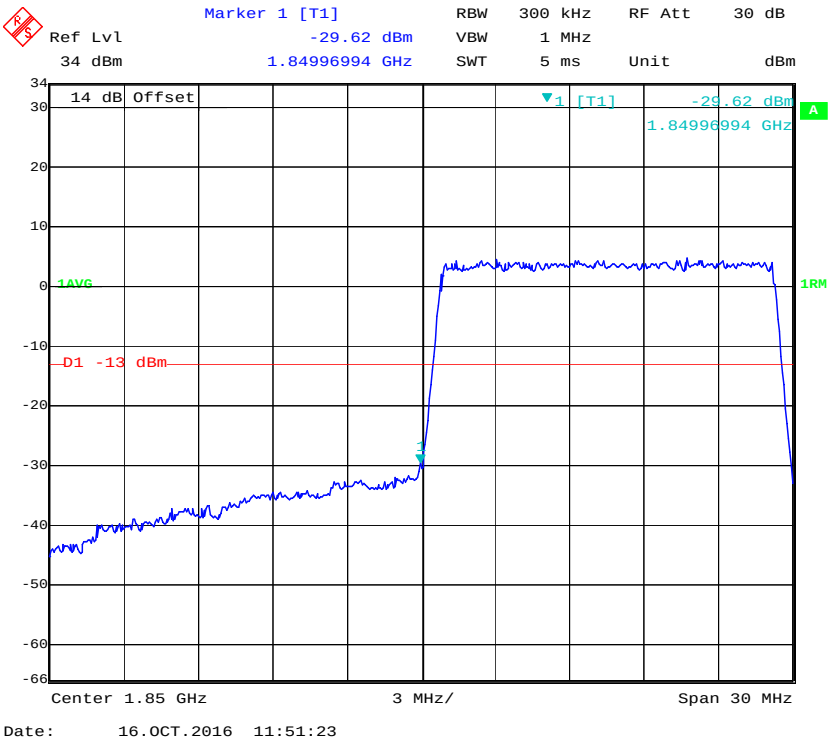
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



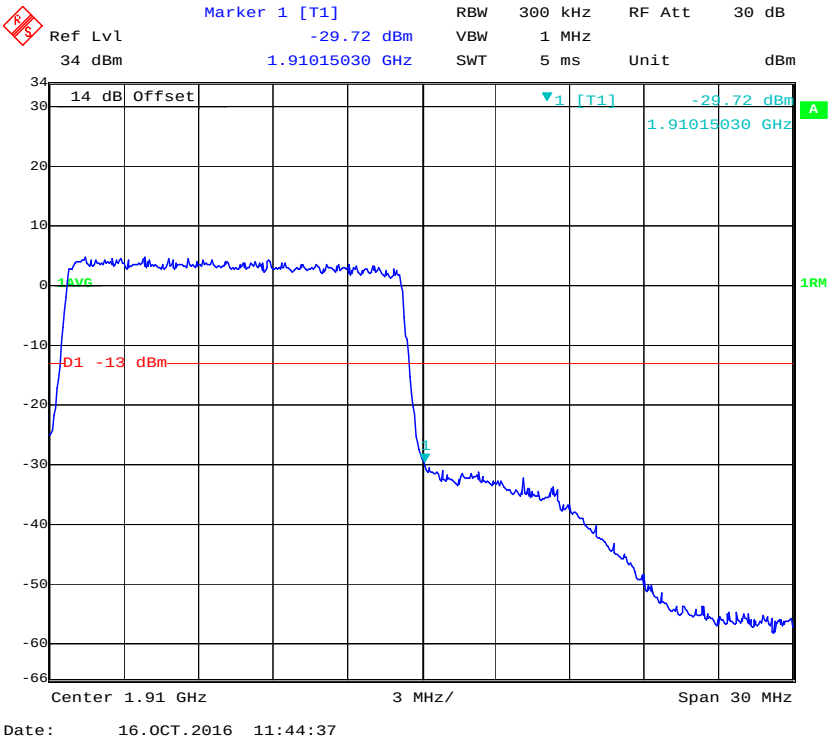
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



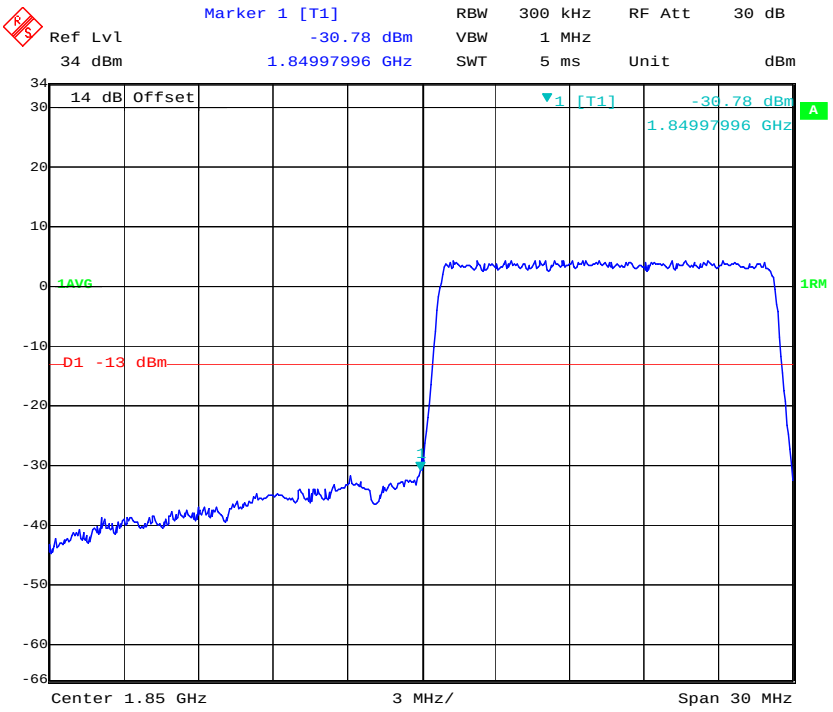
QPSK (15.0 MHz, FULL RB) - Left Band Edge



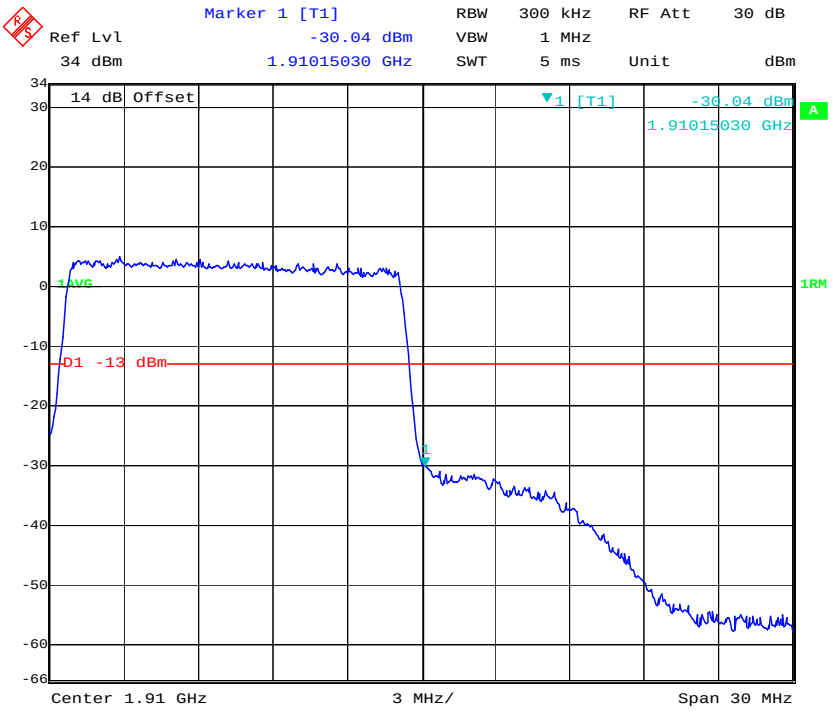
QPSK (15.0 MHz, FULL RB) - Right Band Edge



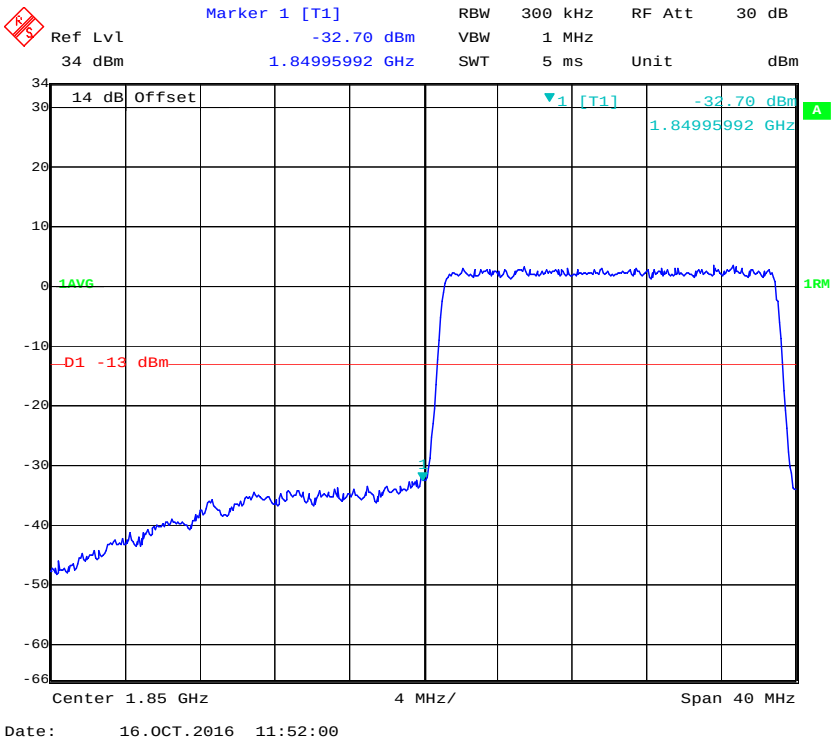
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



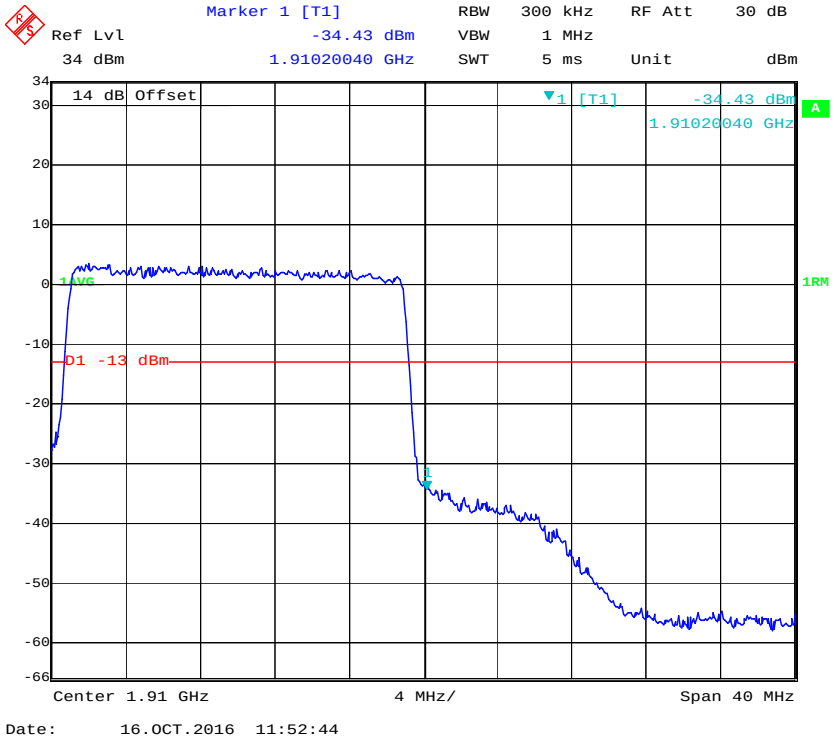
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



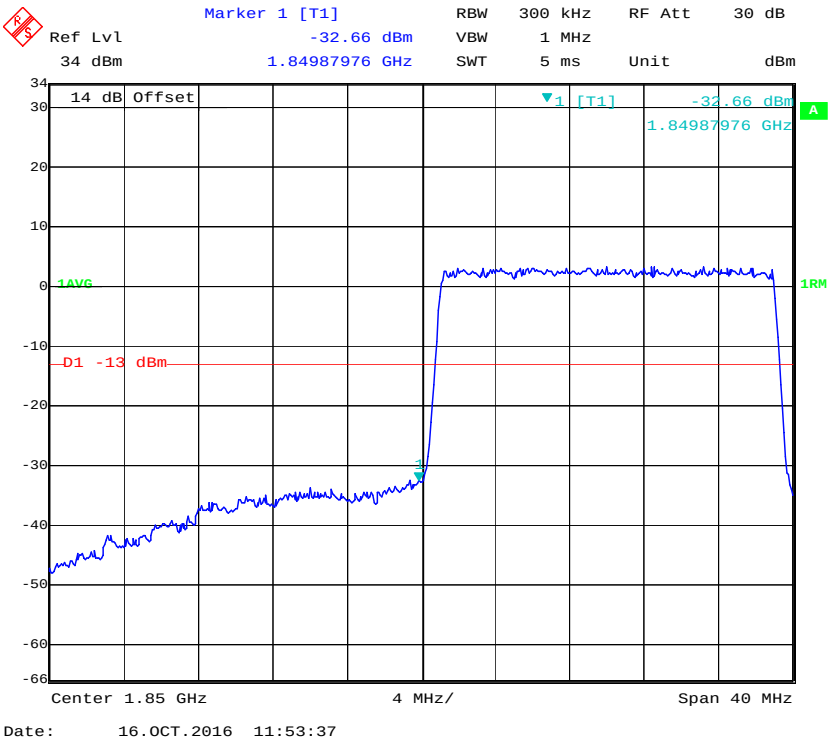
QPSK (20.0 MHz, FULL RB) - Left Band Edge



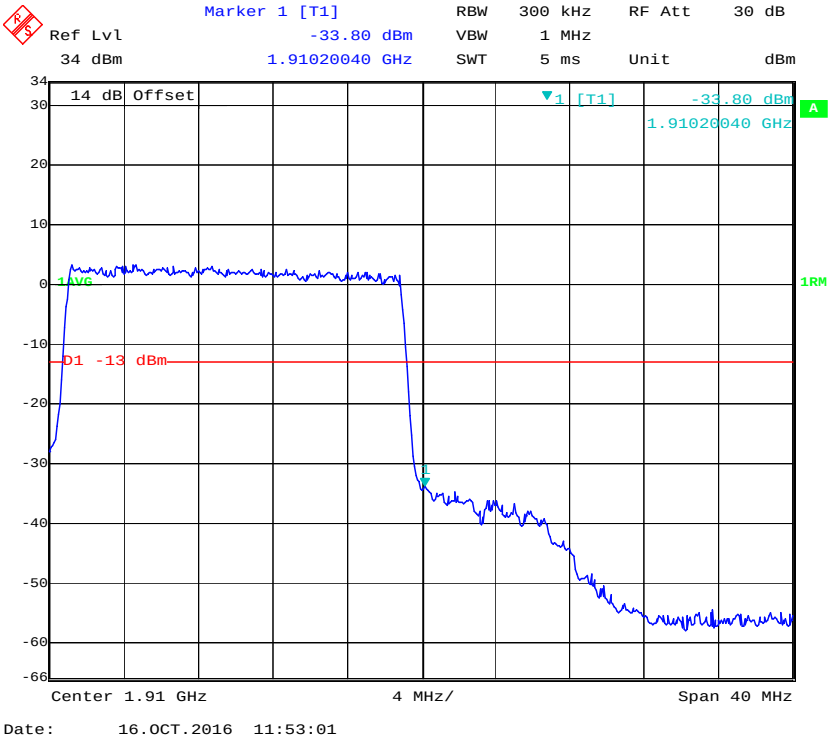
QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

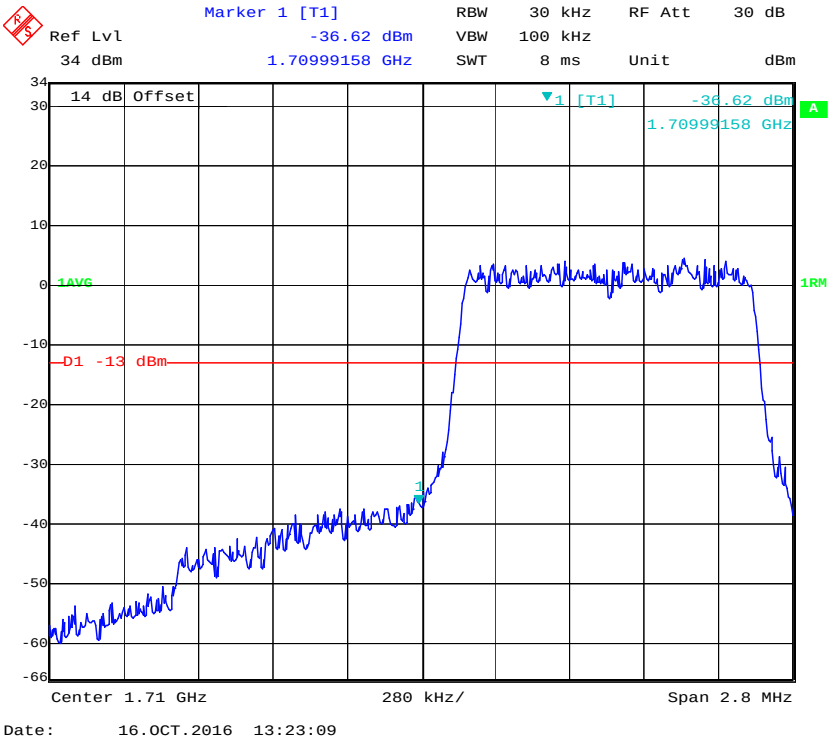


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

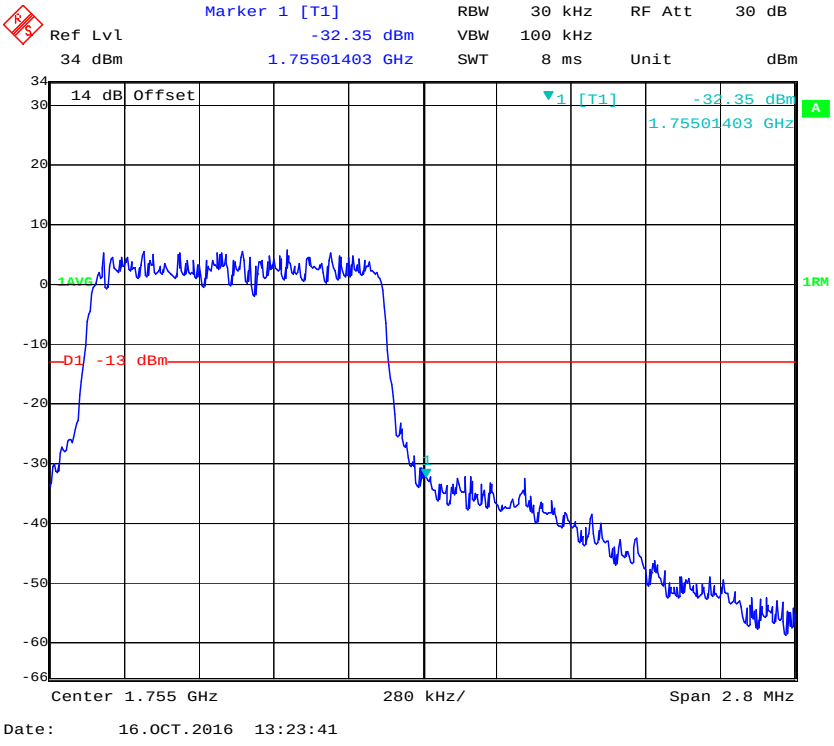


Band 4:

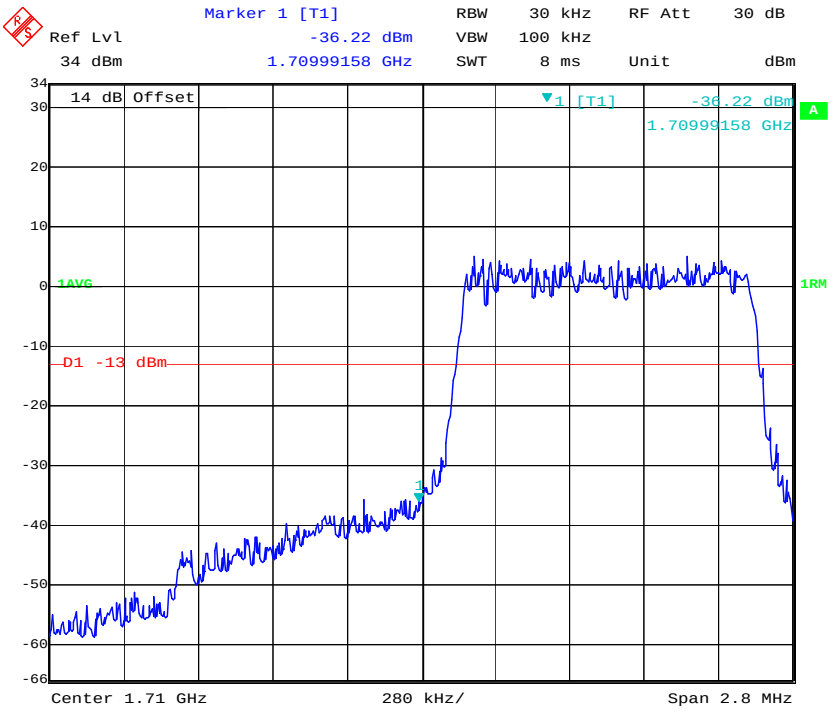
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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



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



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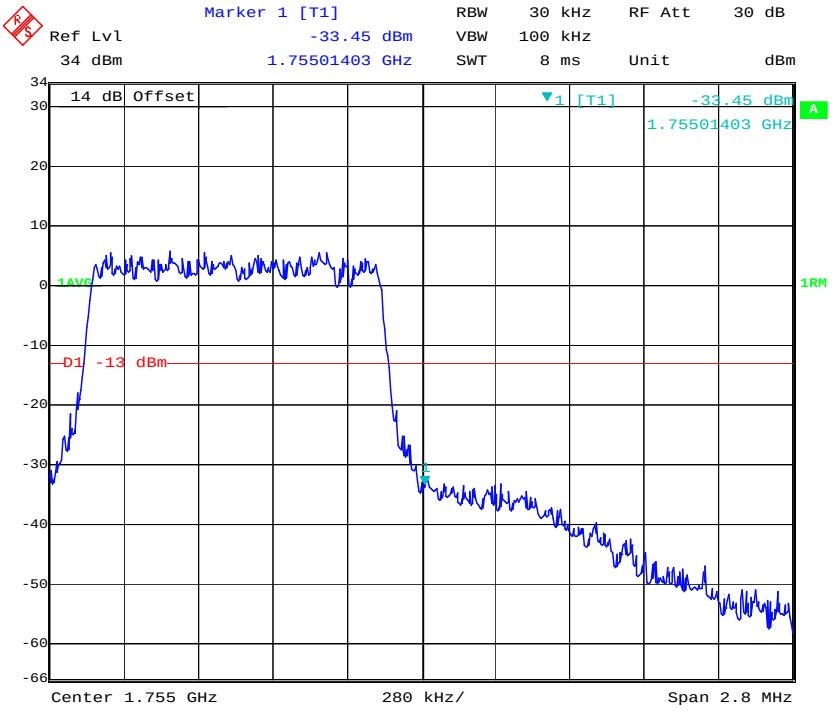
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



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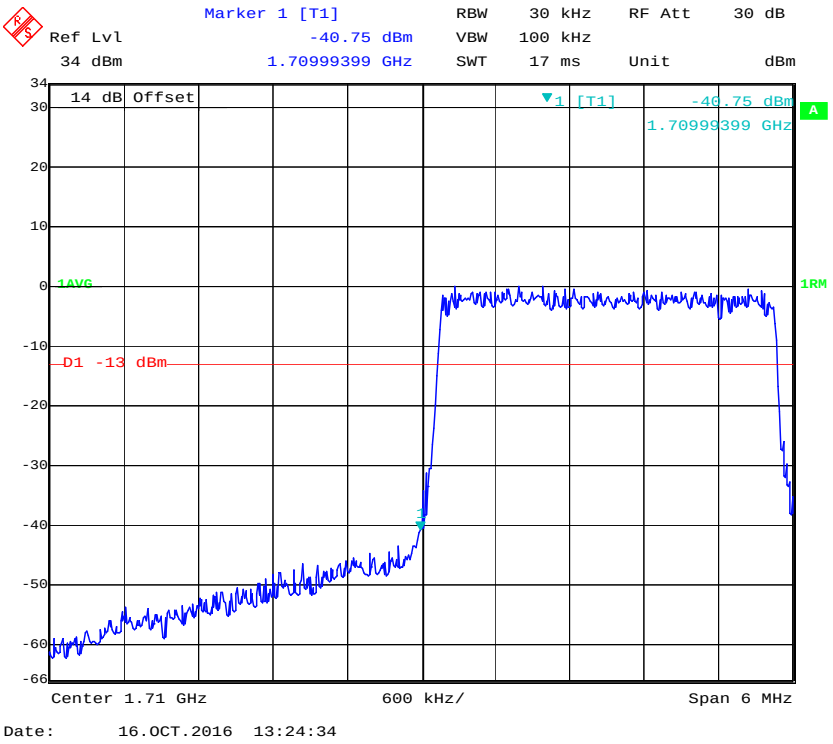
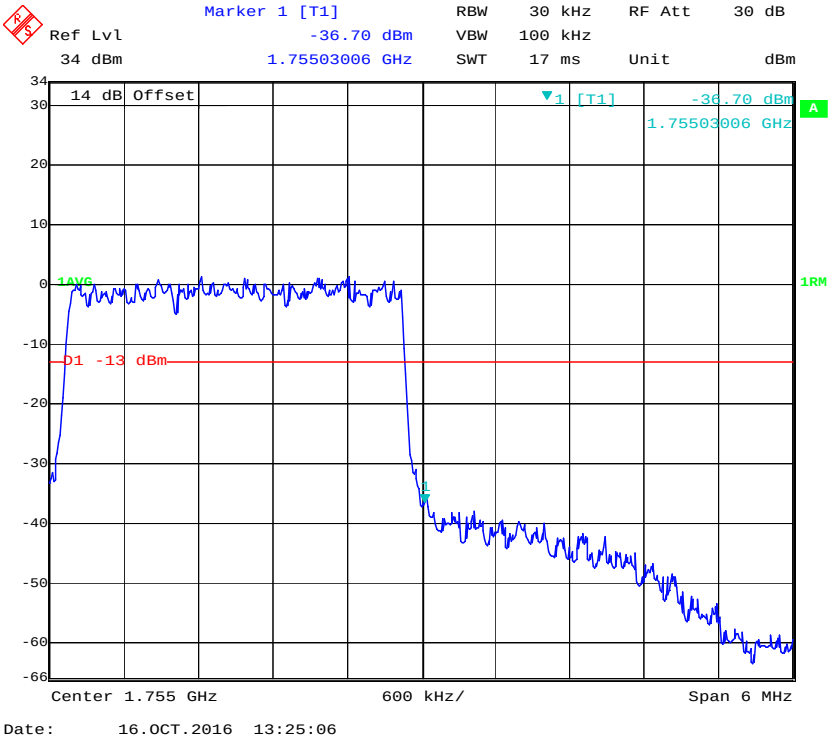
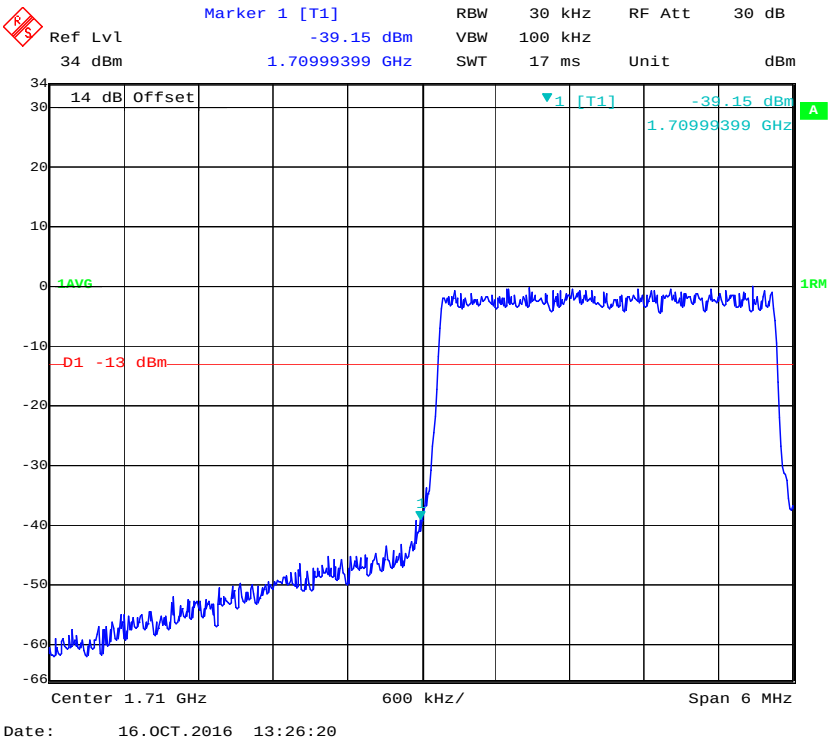
QPSK (3.0 MHz, FULL RB) - Left Band Edge



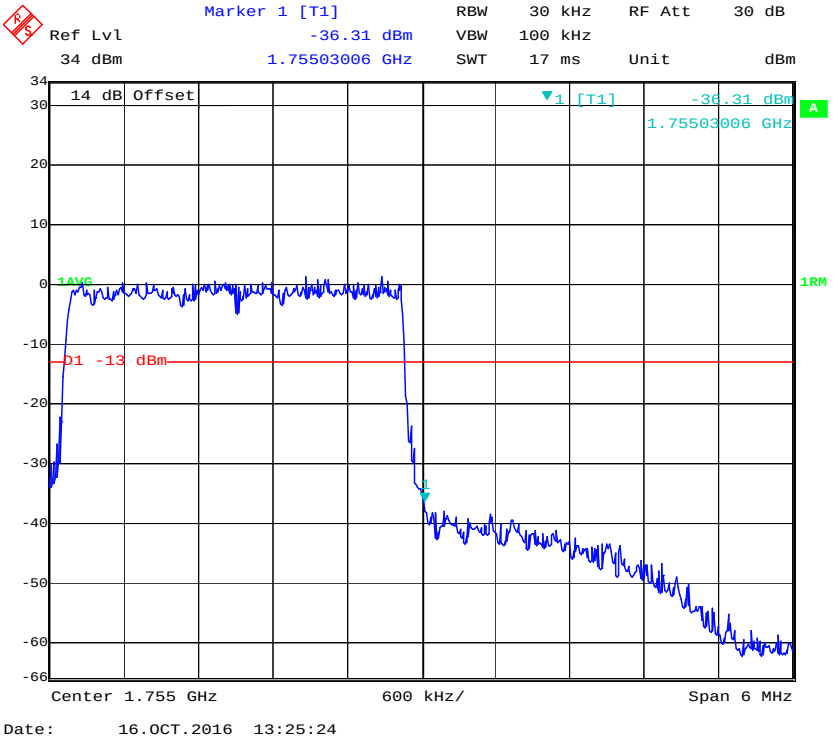
QPSK (3.0 MHz, FULL RB) - Right Band Edge



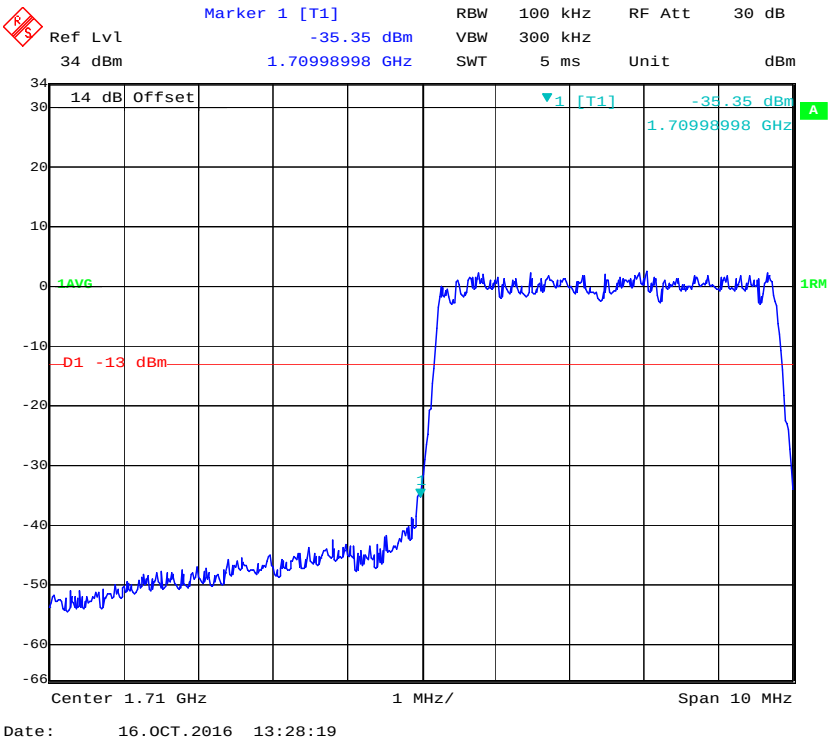
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



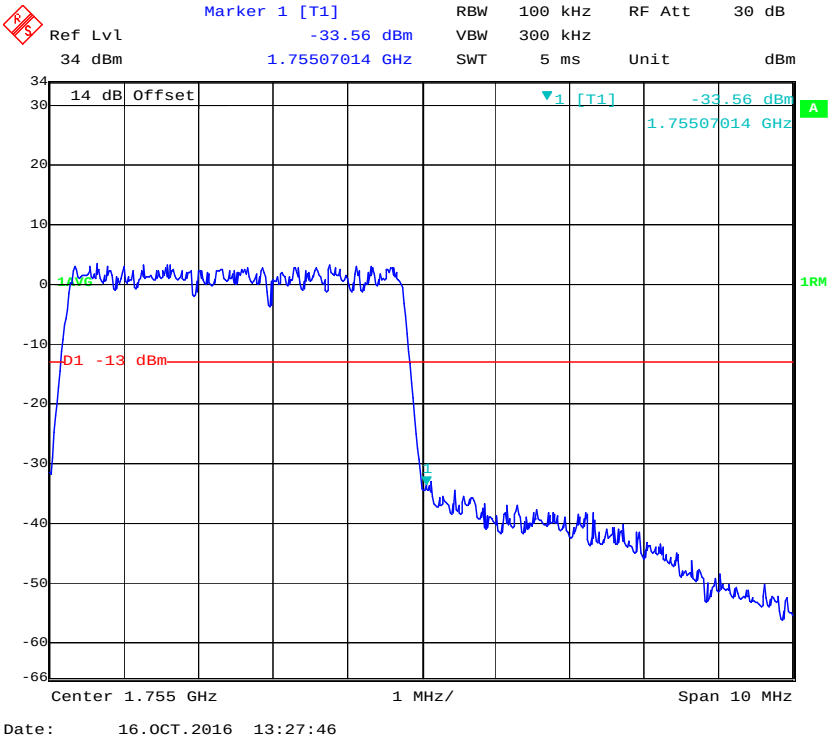
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



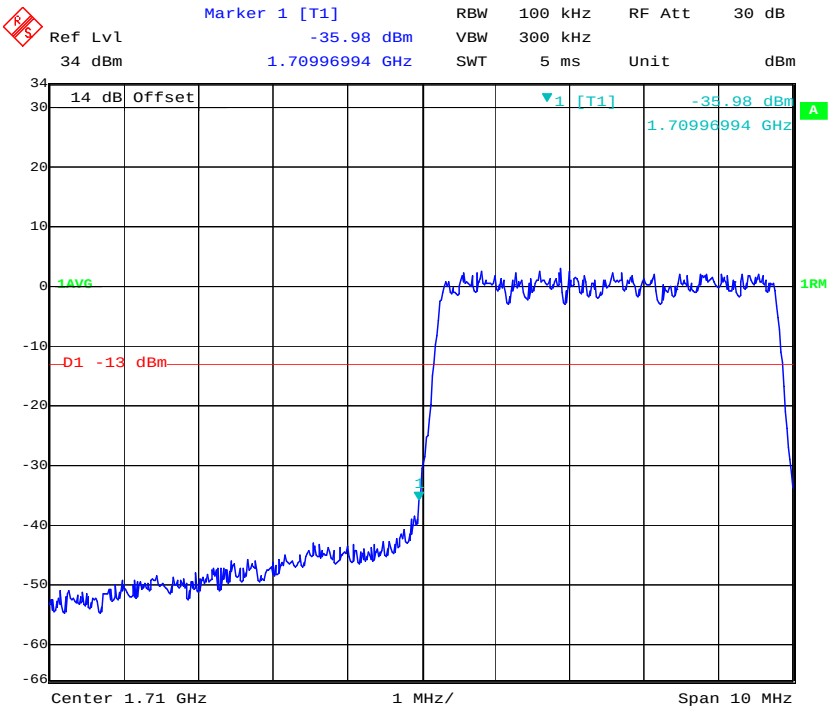
QPSK (5.0 MHz, FULL RB) - Left Band Edge



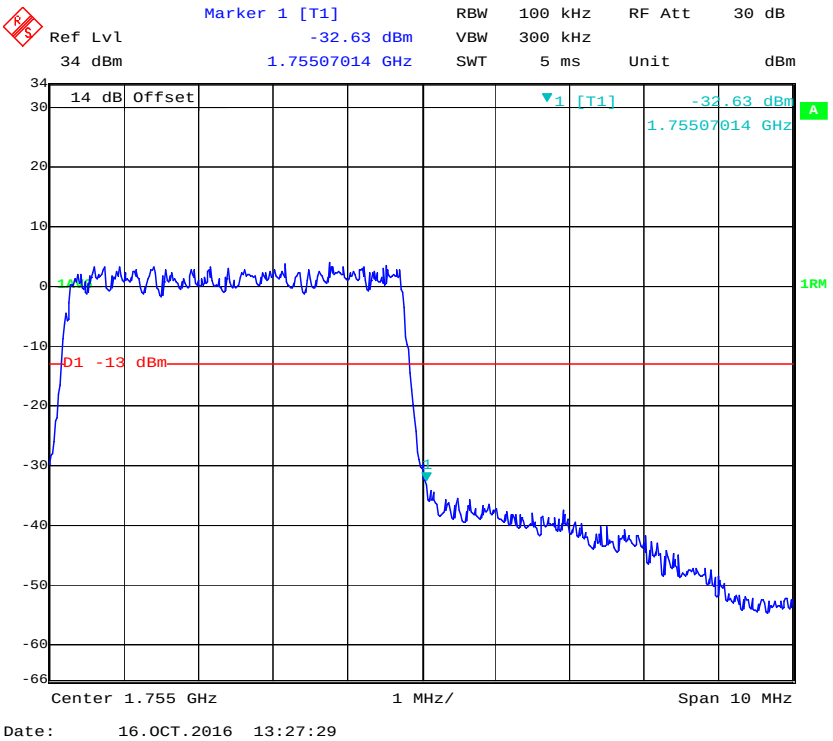
QPSK (5.0 MHz, FULL RB) - Right Band Edge



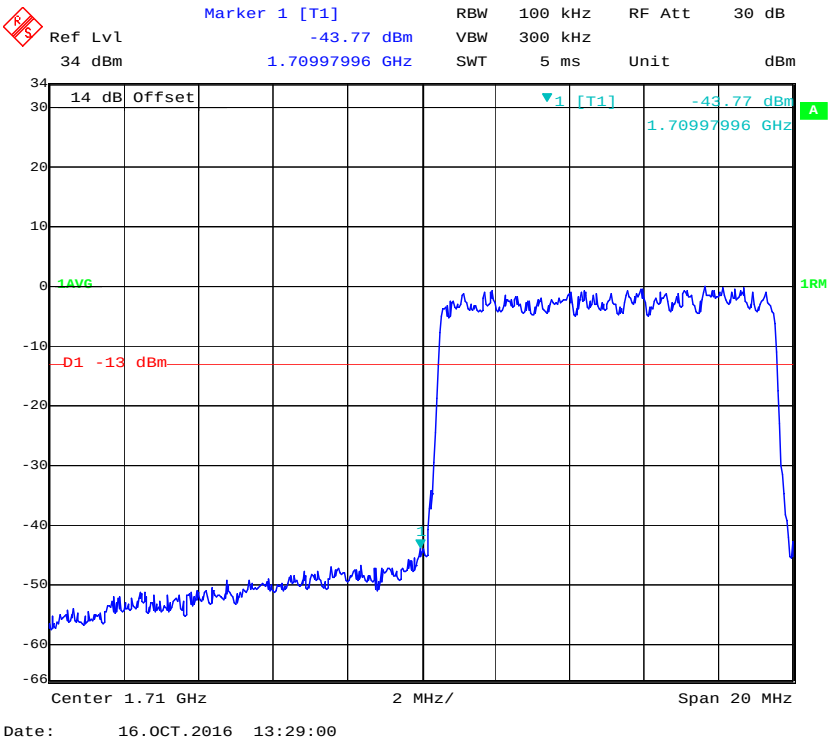
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



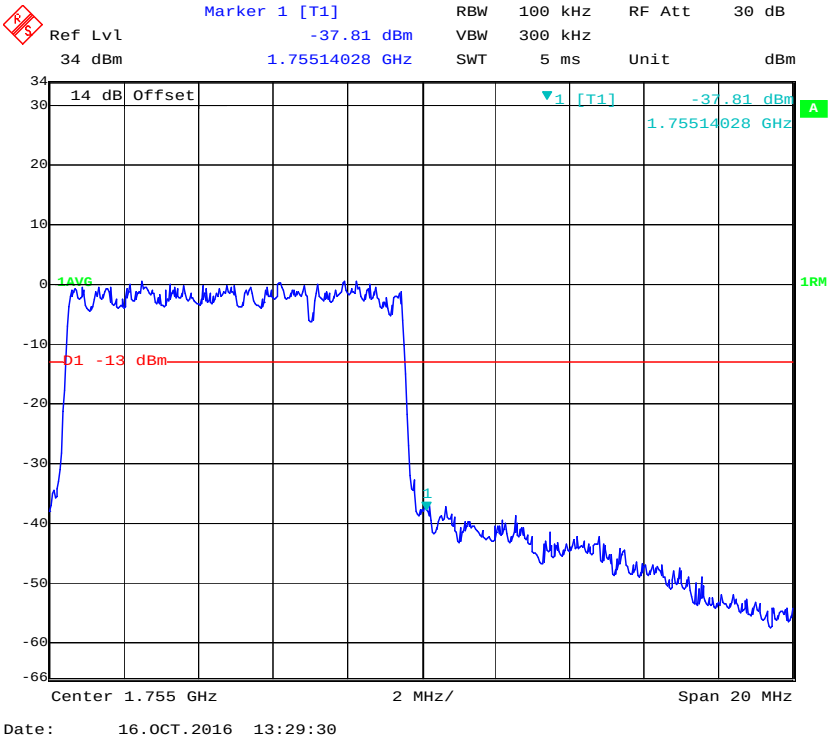
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



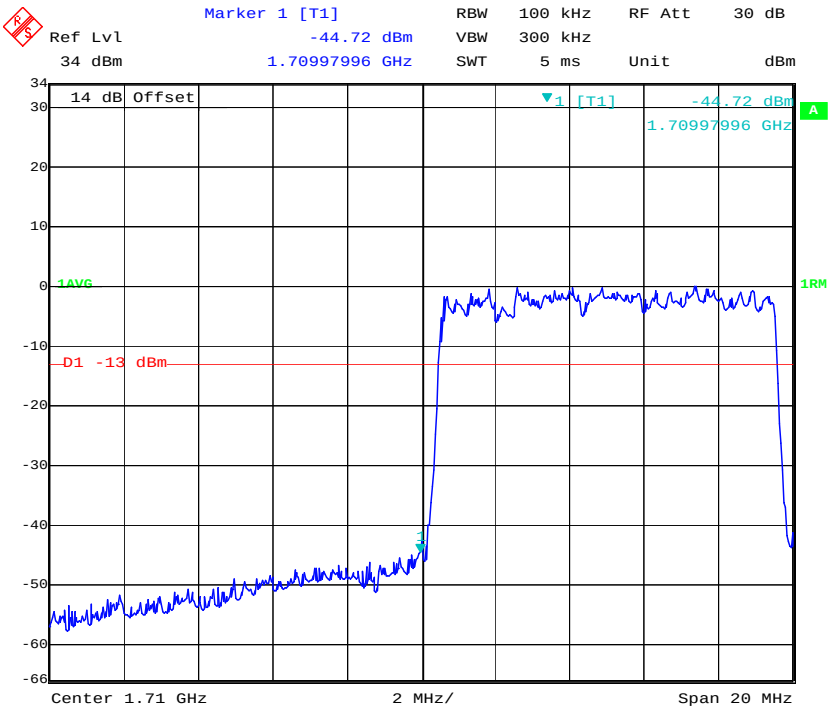
QPSK (10.0 MHz, FULL RB) - Left Band Edge



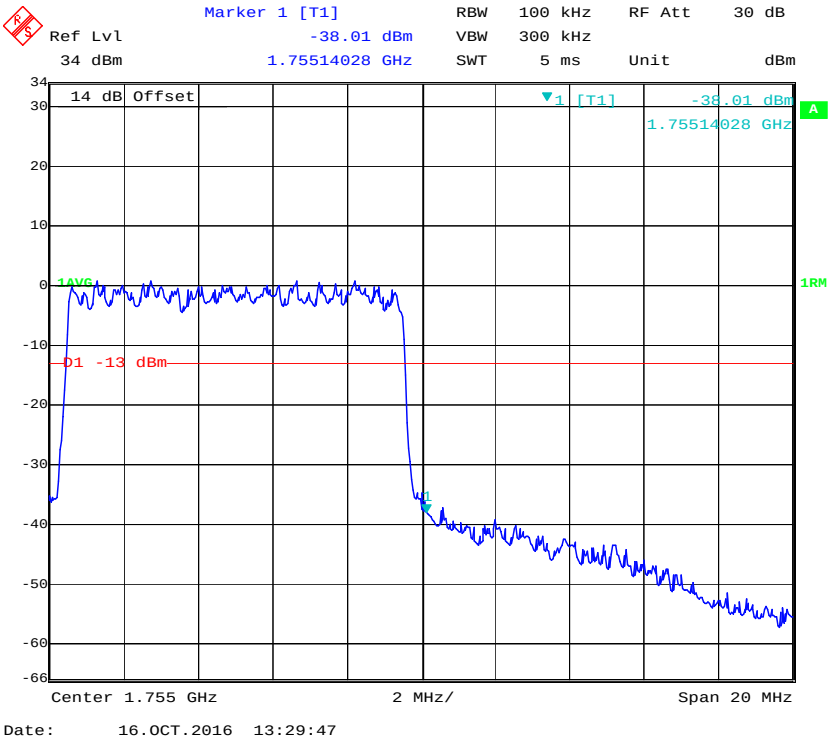
QPSK (10.0 MHz, FULL RB) - Right Band Edge



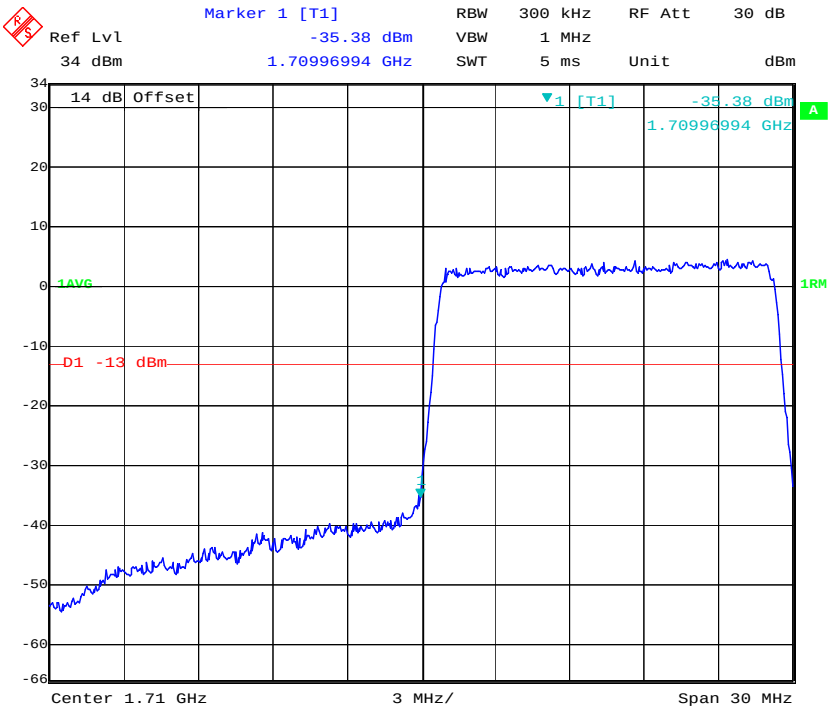
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



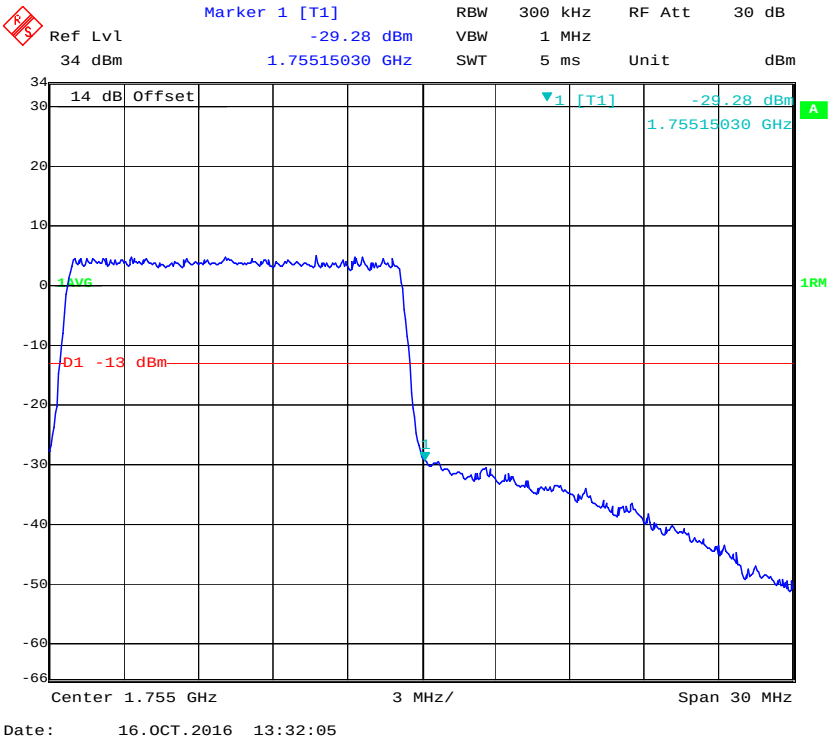
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



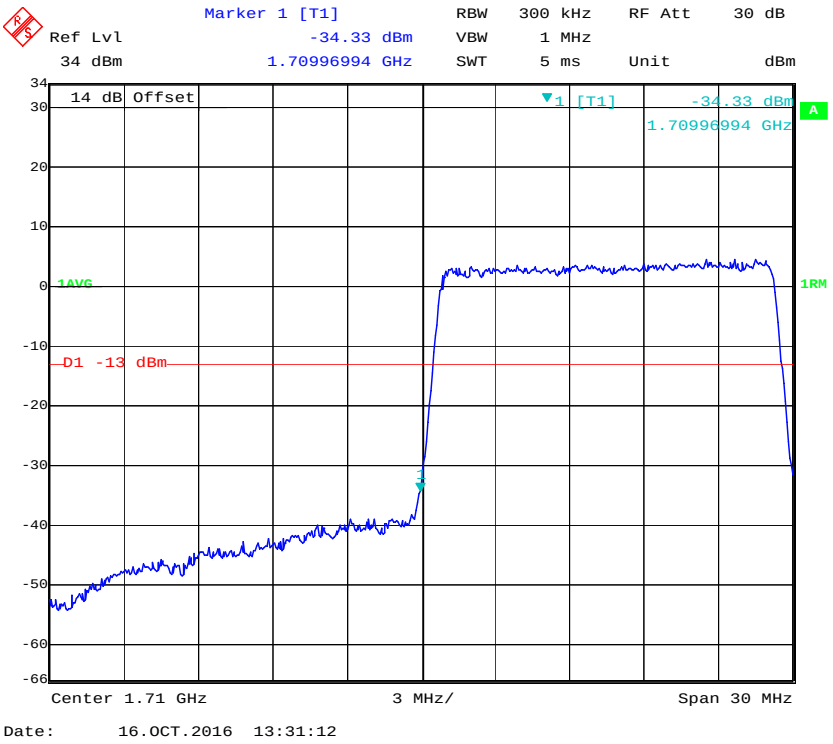
QPSK (15.0 MHz, FULL RB) - Left Band Edge



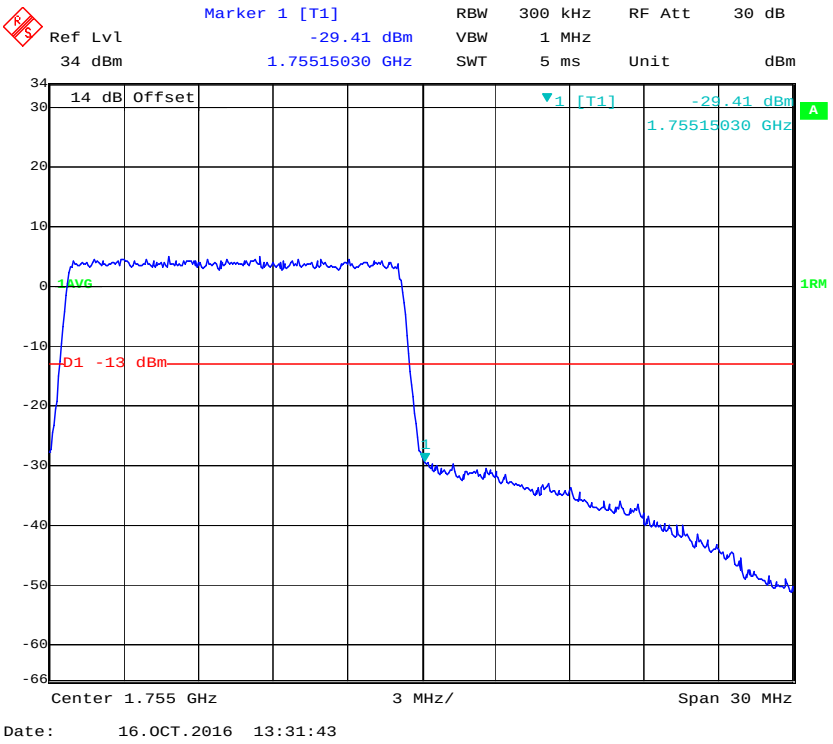
QPSK (15.0 MHz, FULL RB) - Right Band Edge



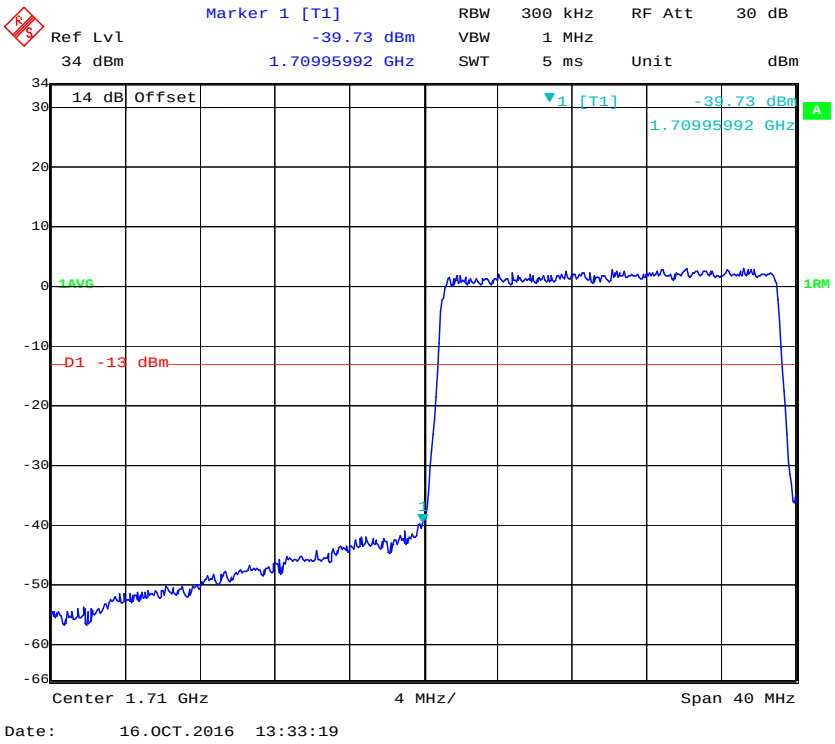
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



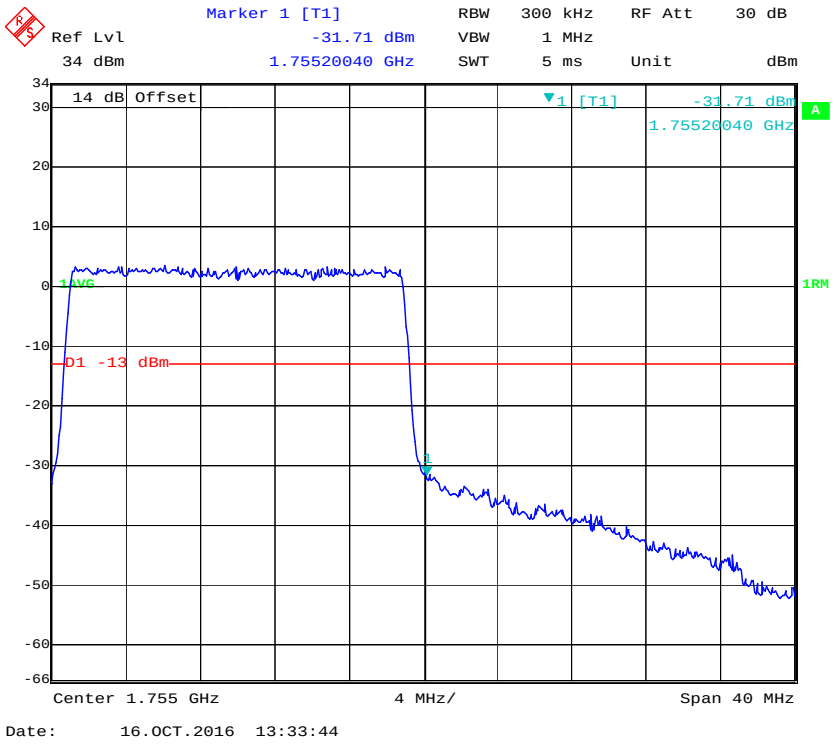
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



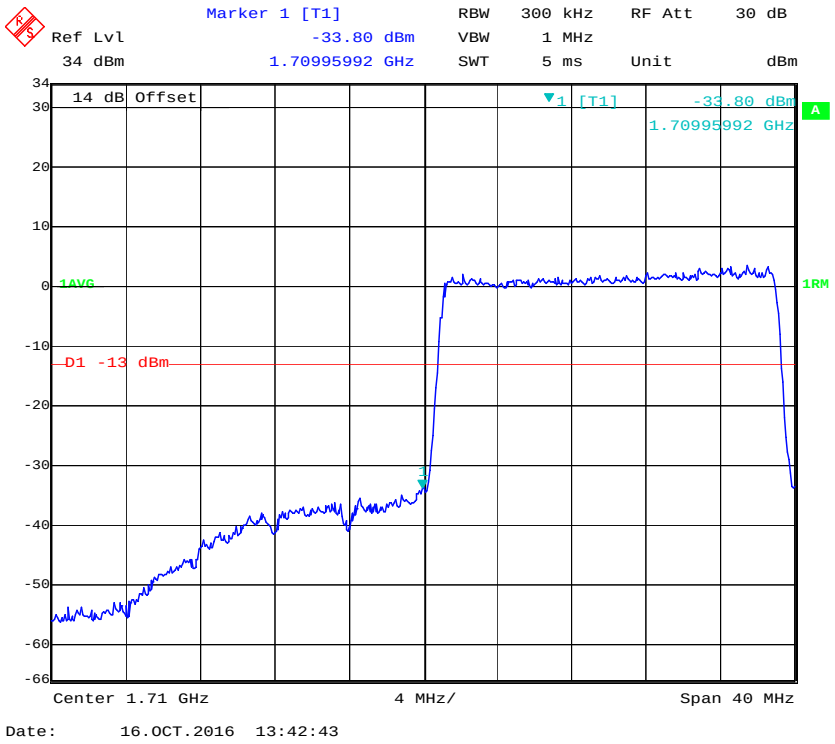
QPSK (20.0 MHz, FULL RB) - Left Band Edge



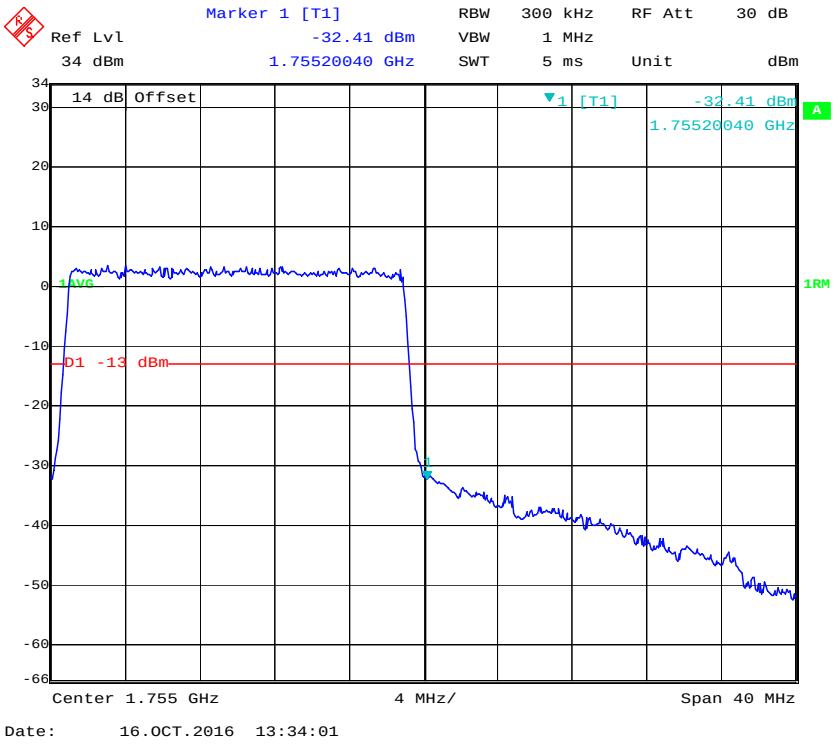
QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

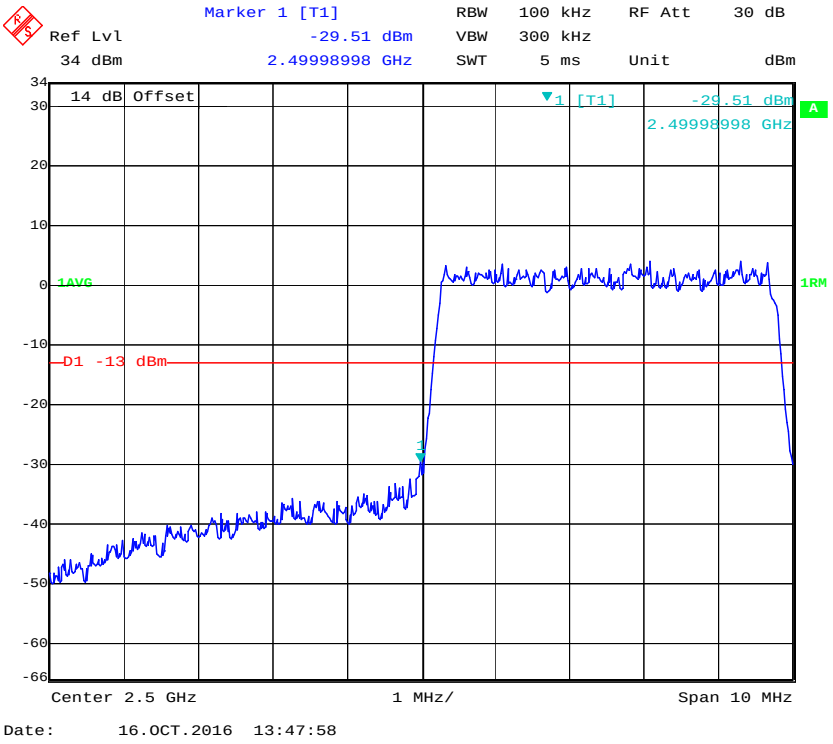


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

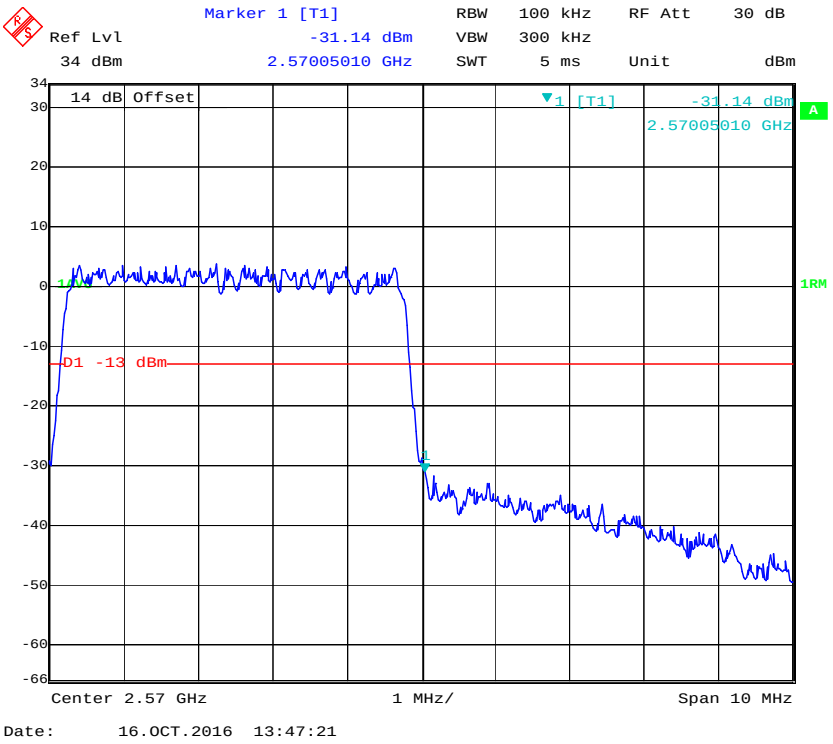


Band 7:

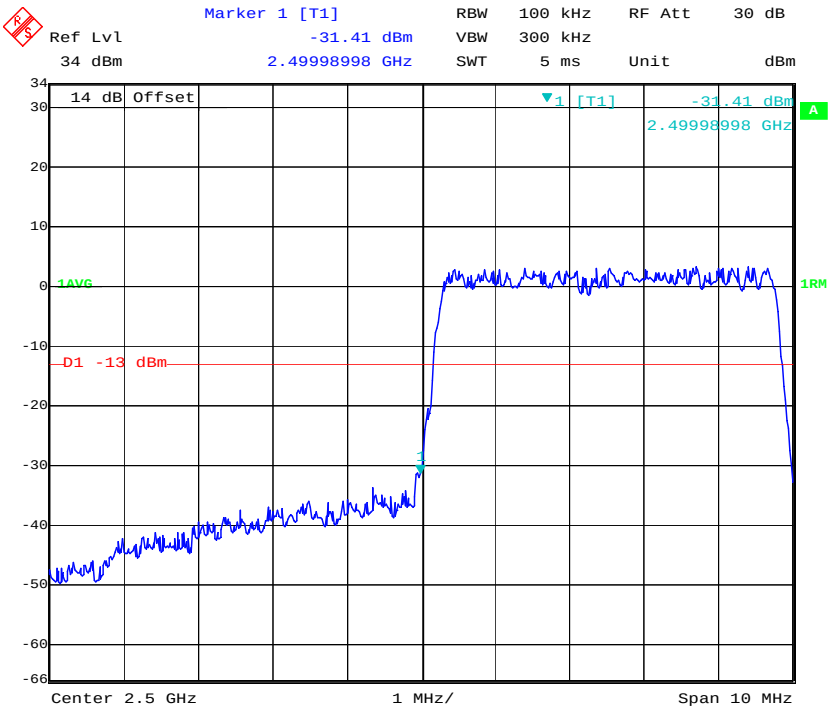
QPSK (5.0 MHz, FULL RB) - Left Band Edge



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



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



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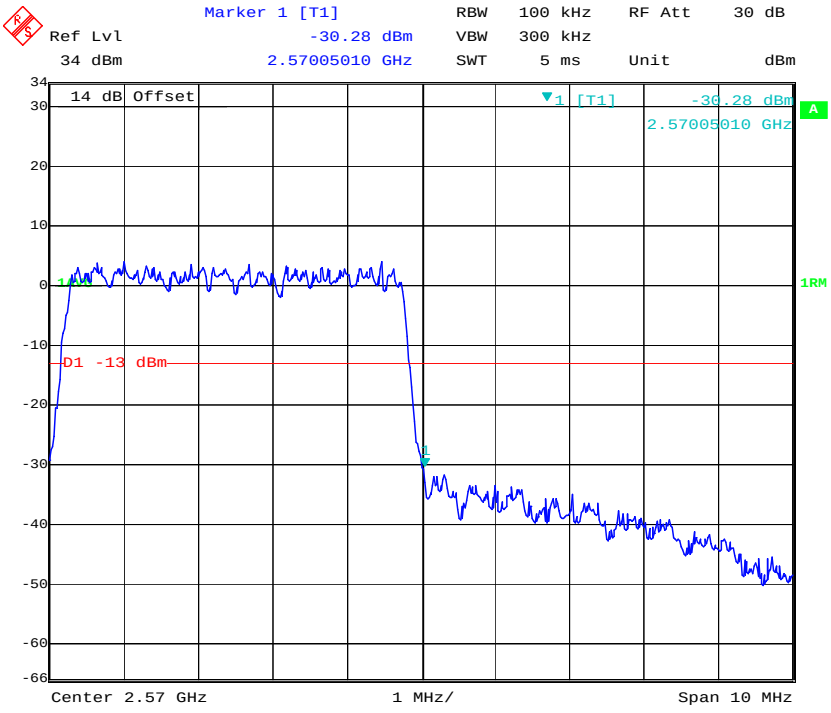
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



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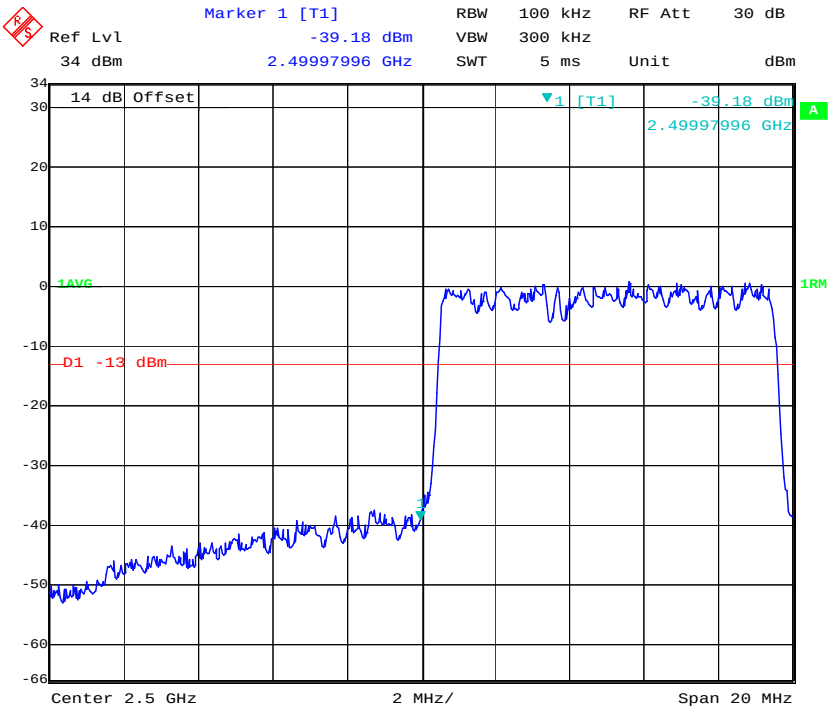
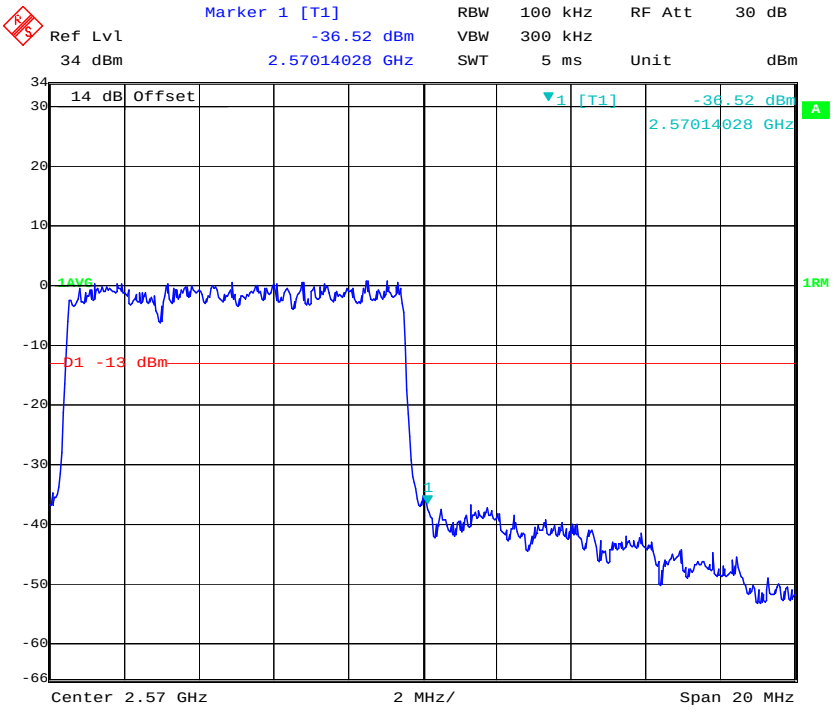
QPSK (10.0 MHz, FULL RB) - Left Band Edge



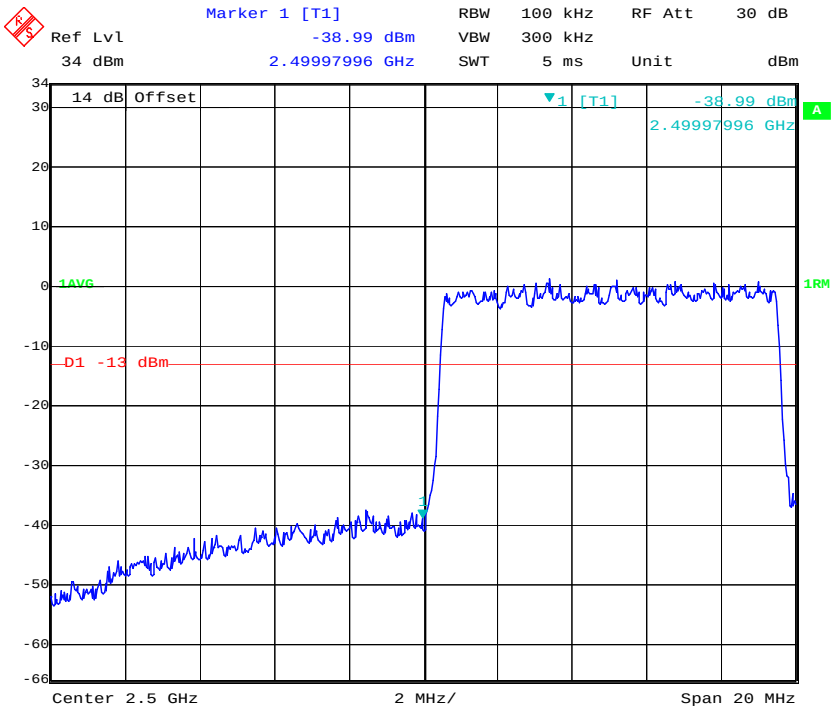
Date: 16.OCT.2016 13:48:30

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

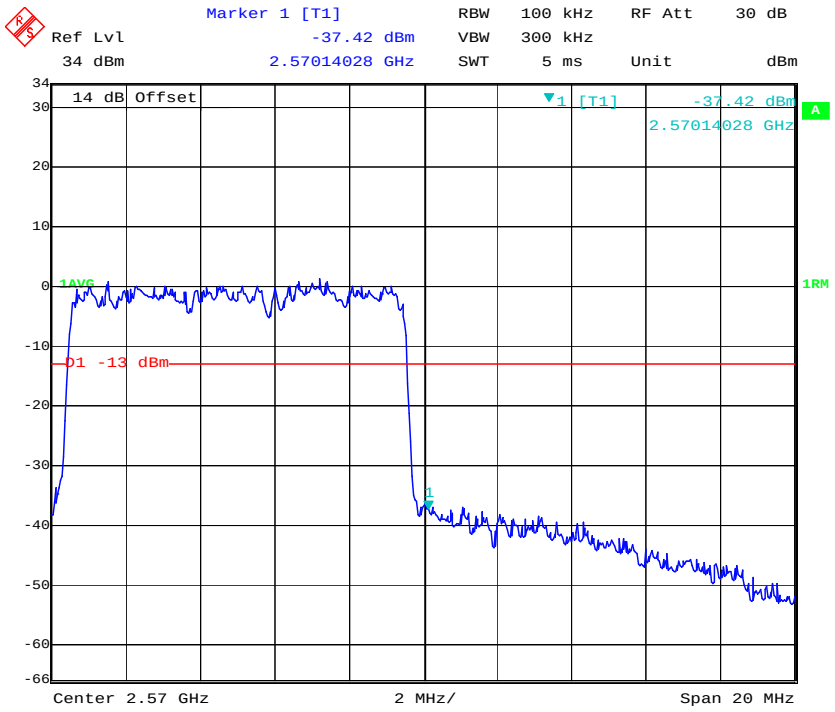


Date: 16.OCT.2016 13:49:01

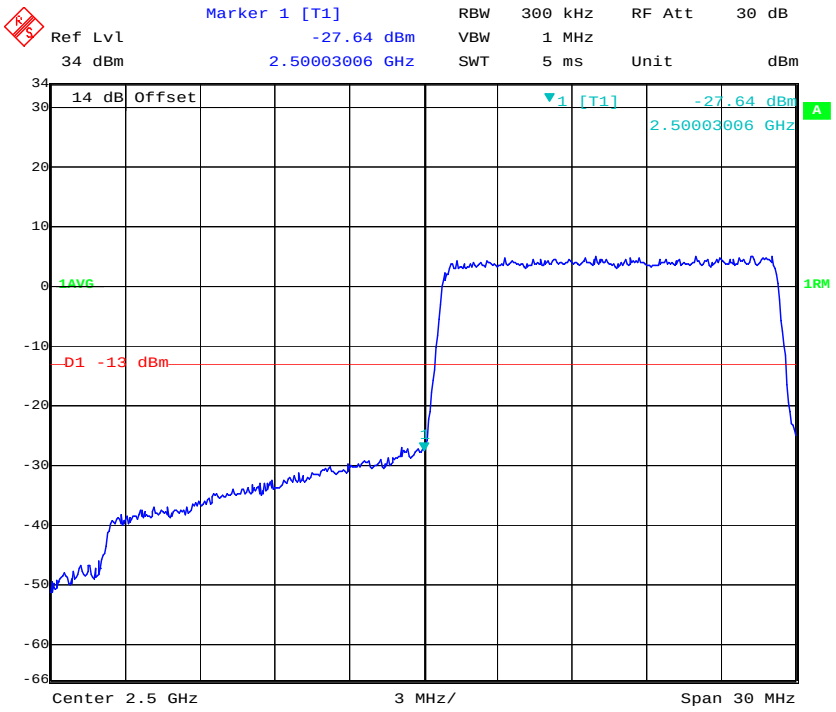
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



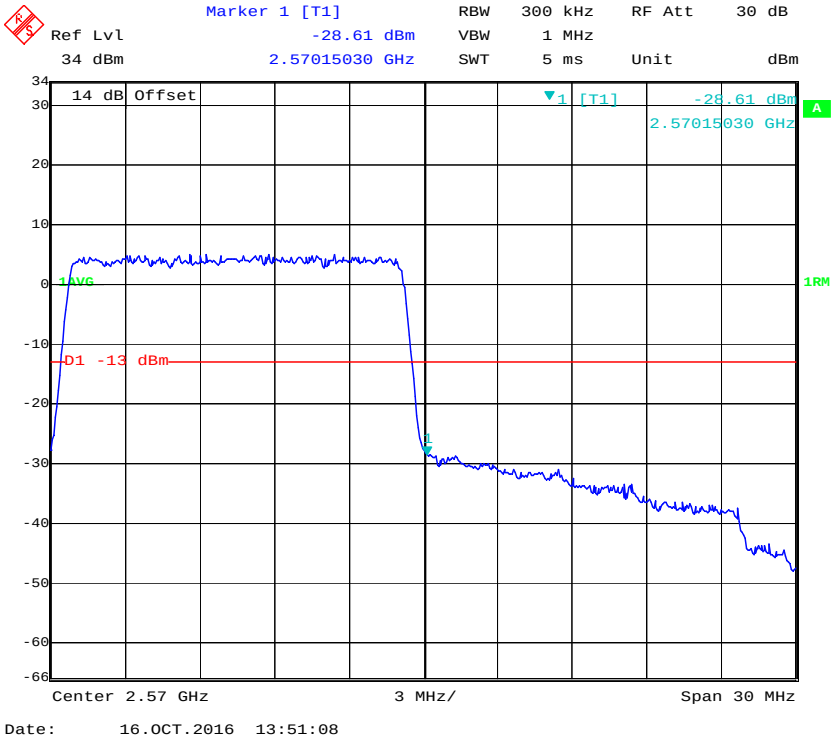
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



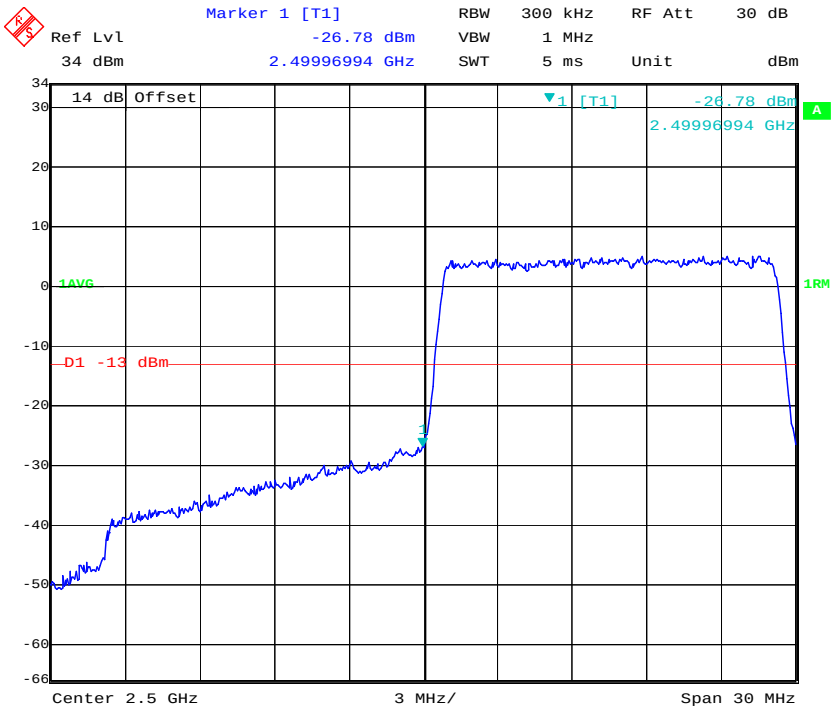
QPSK (15 MHz, FULL RB) - Left Band Edge



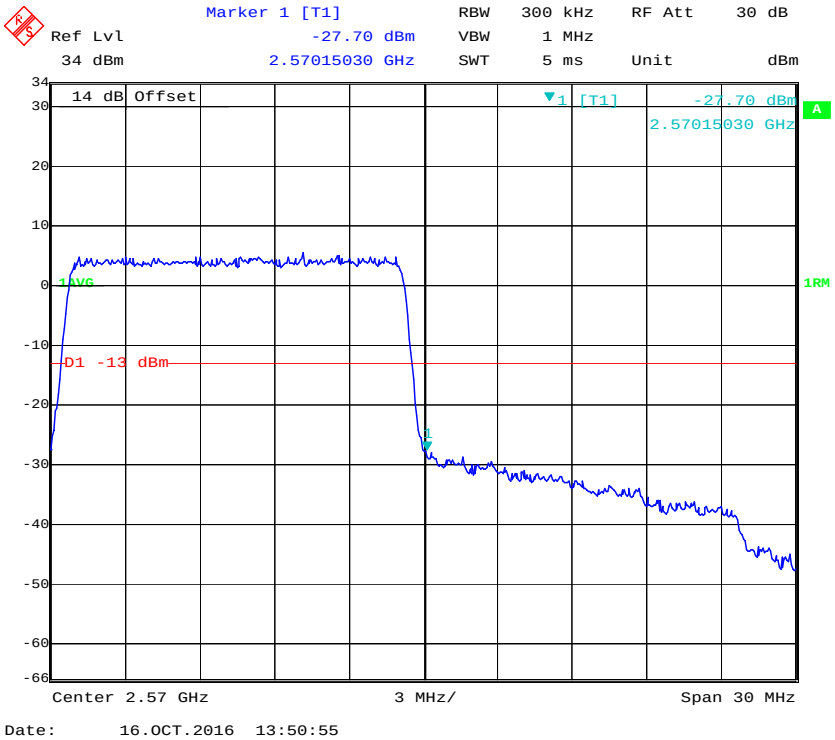
QPSK (15 MHz, FULL RB) - Right Band Edge



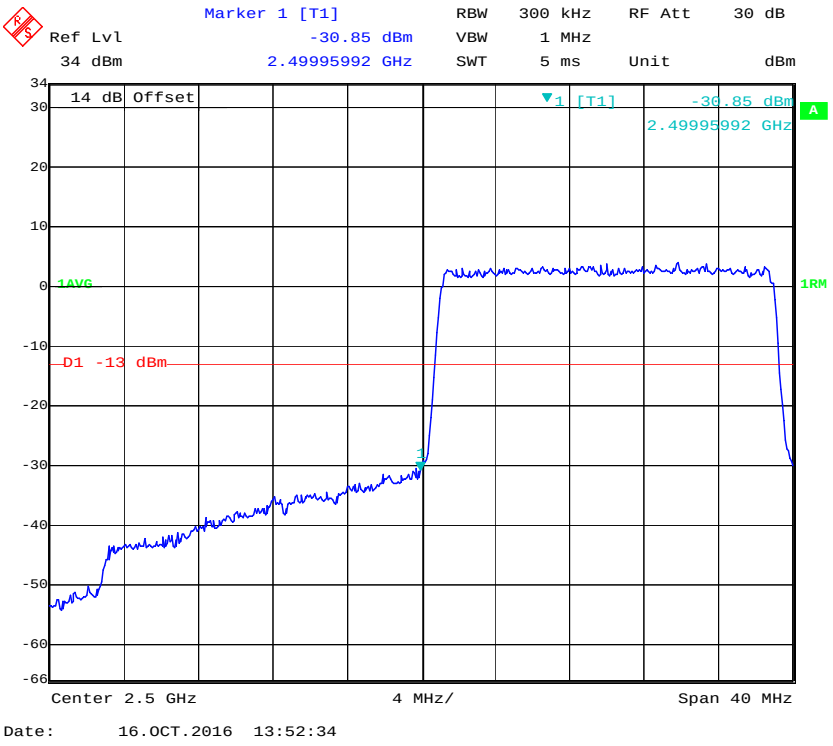
16-QAM (15 MHz, FULL RB) - Left Band Edge



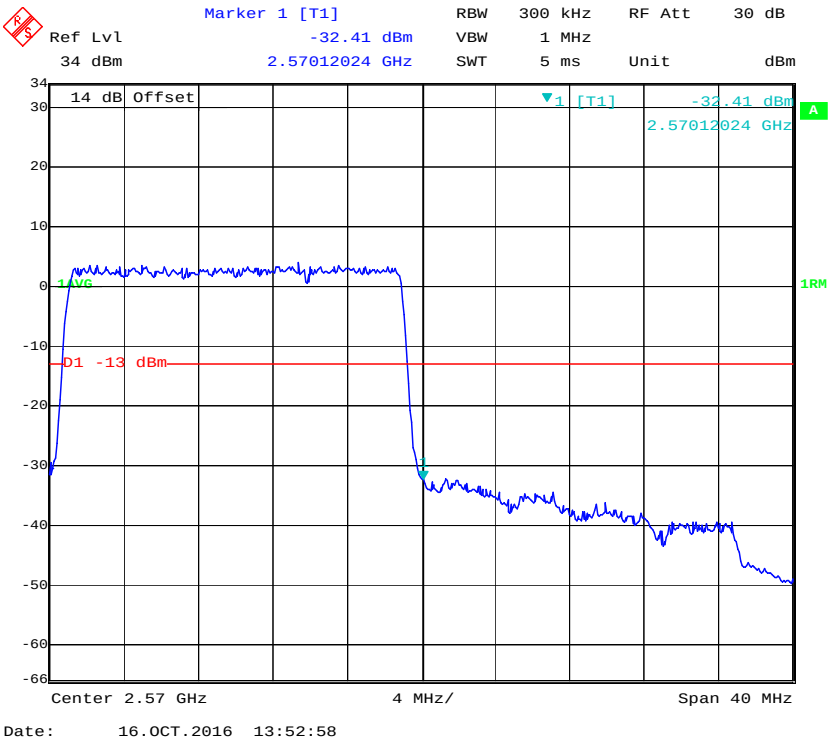
16-QAM (15 MHz, FULL RB) - Right Band Edge



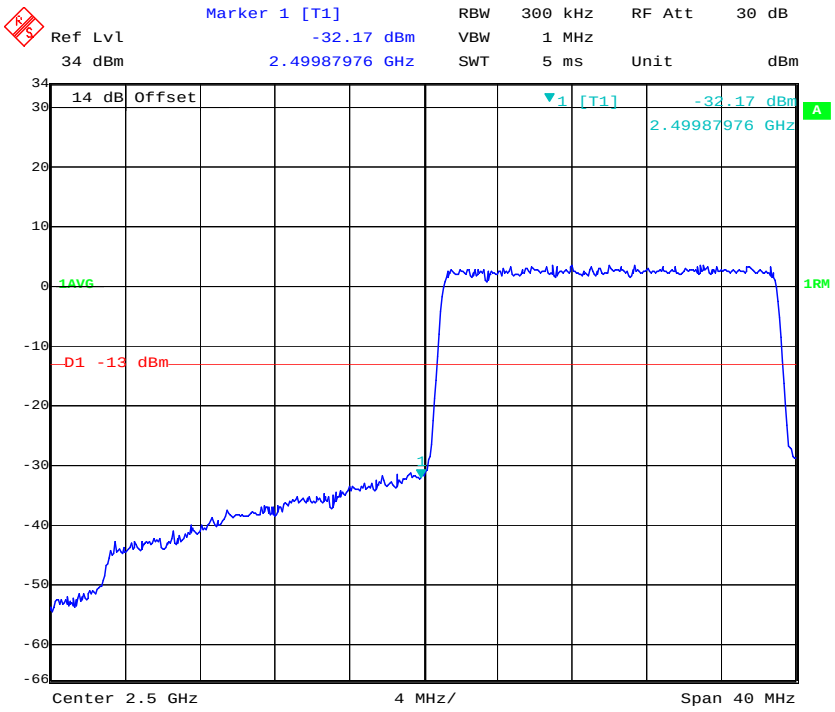
QPSK (20 MHz, FULL RB) - Left Band Edge



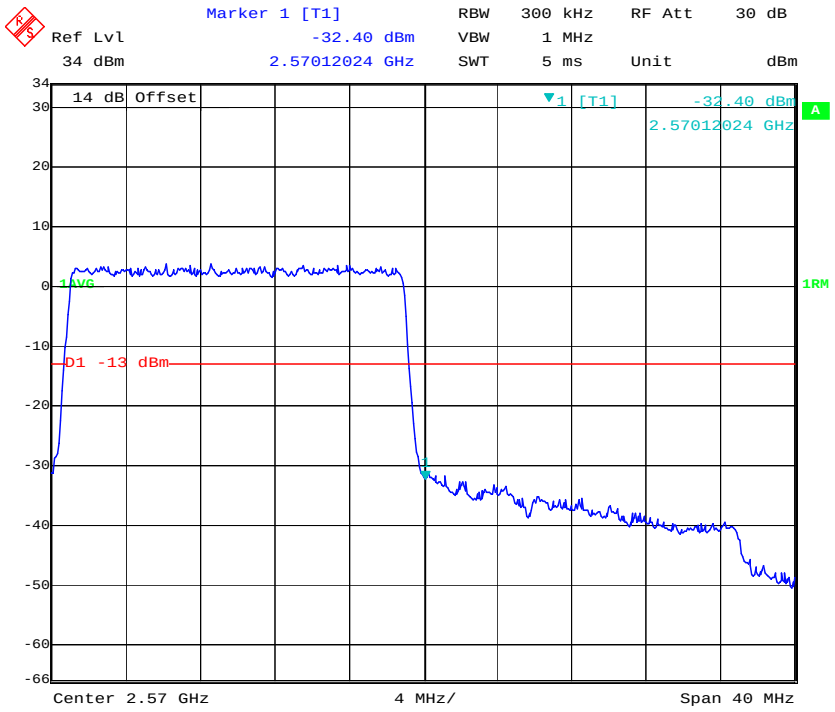
QPSK (20 MHz, FULL RB) - Right Band Edge



16-QAM (20 MHz, FULL RB) - Left Band Edge

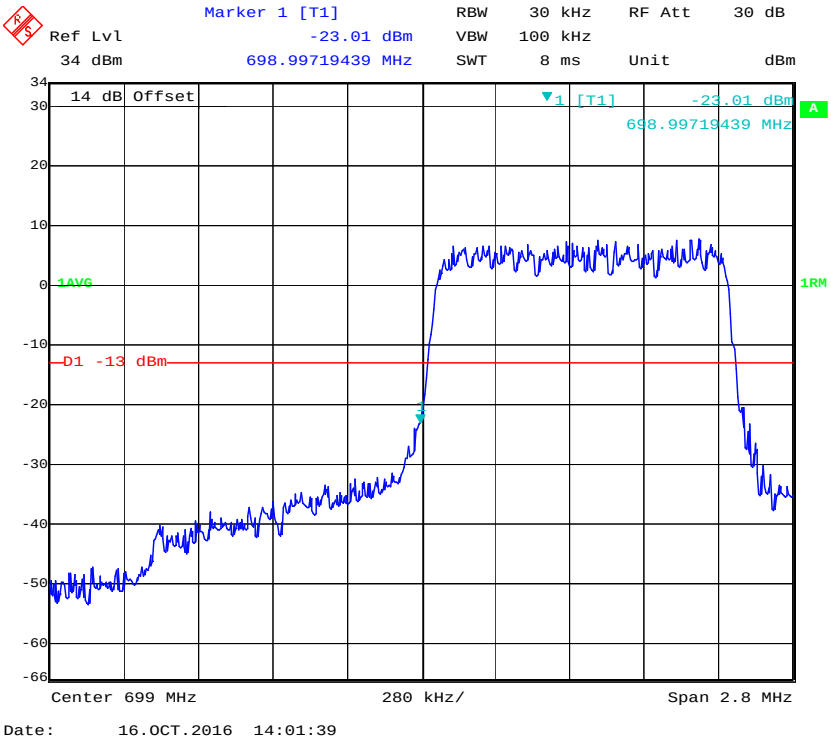


16-QAM (20 MHz, FULL RB) - Right Band Edge

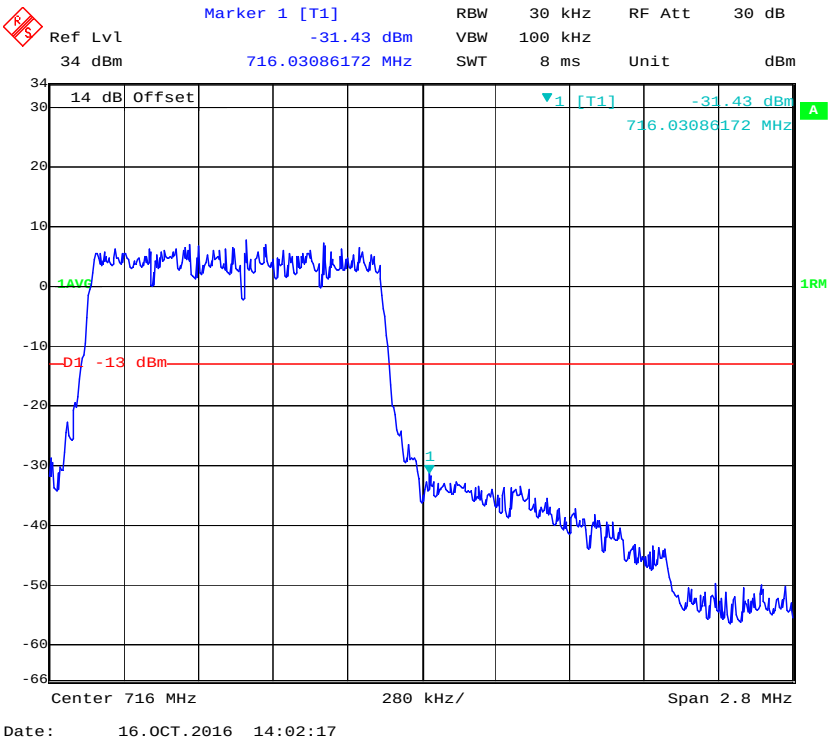


Band 12:

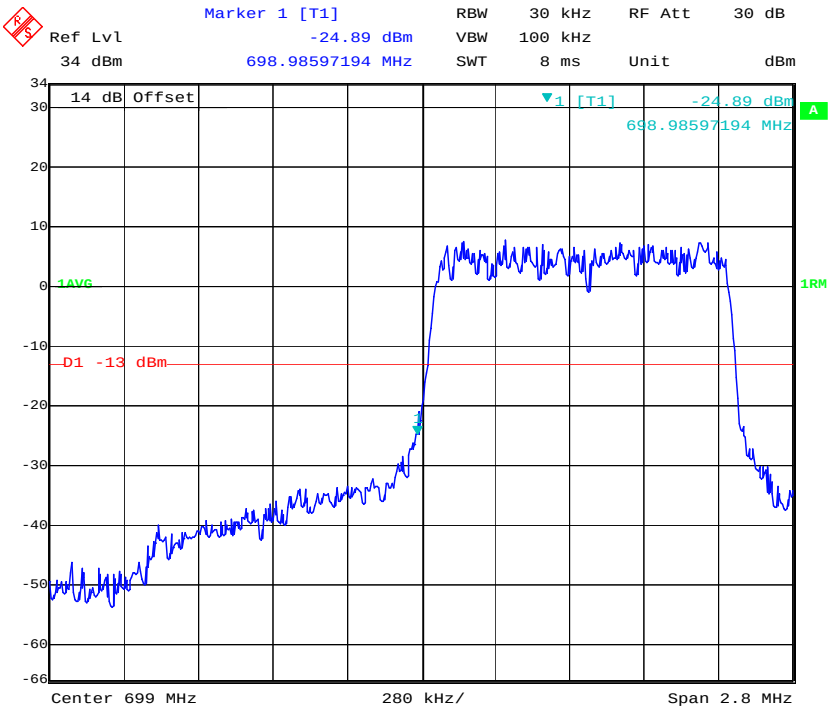
QPSK (1.4 MHz, FULL RB) - Left Band Edge



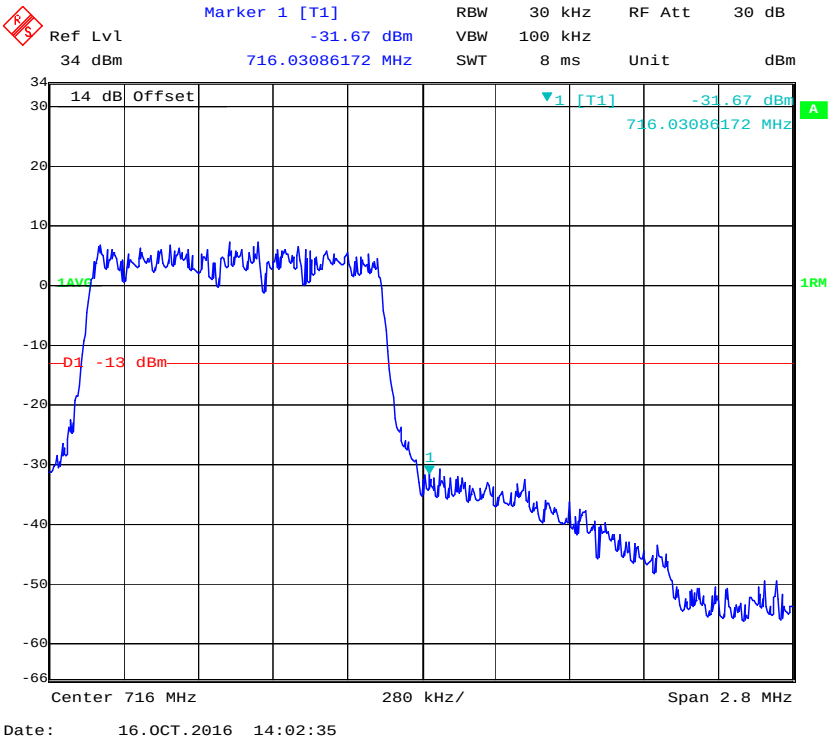
QPSK (1.4 MHz, FULL RB) - Right Band Edge



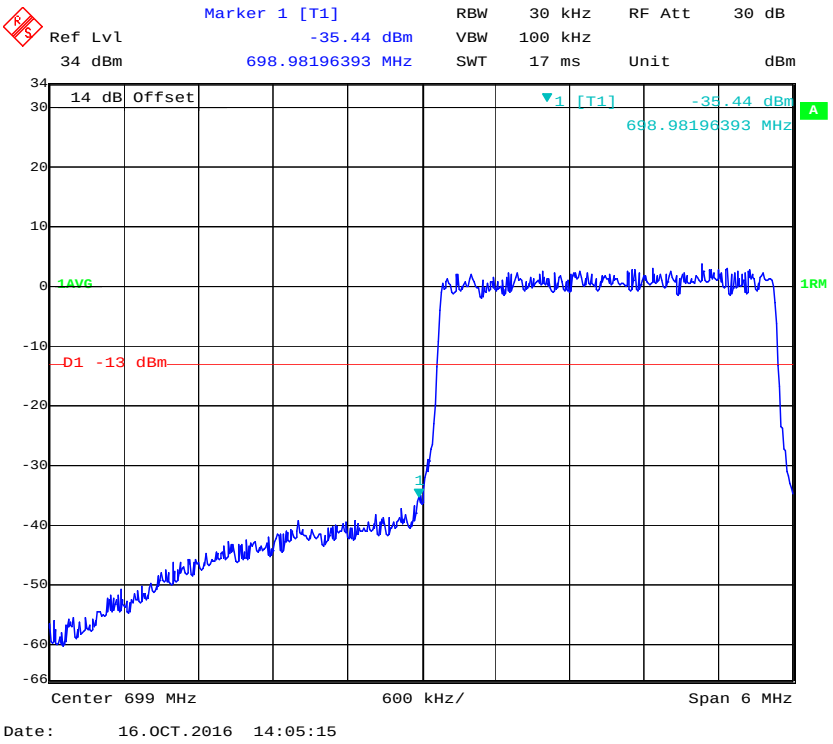
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



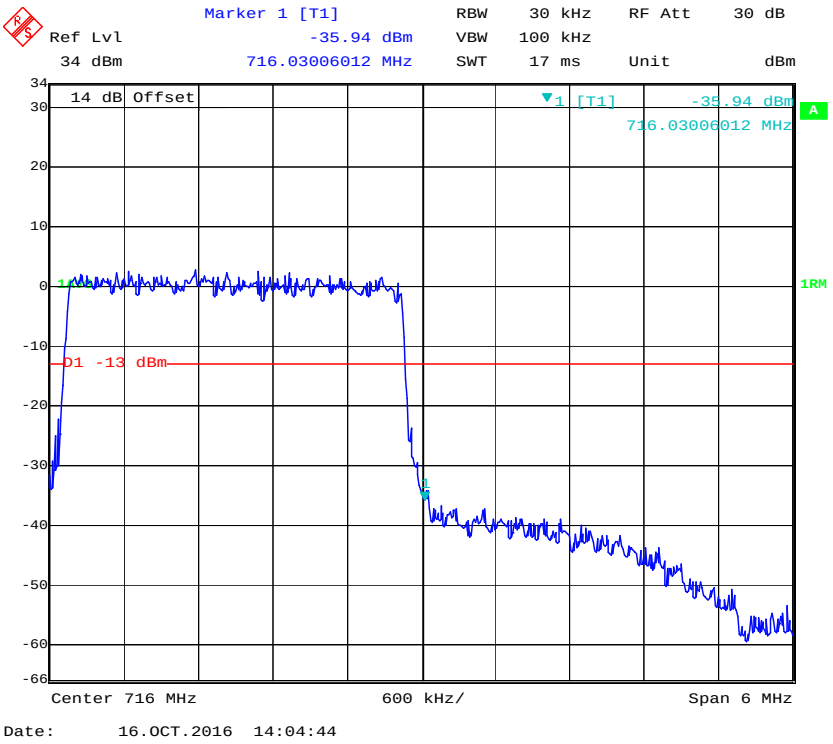
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



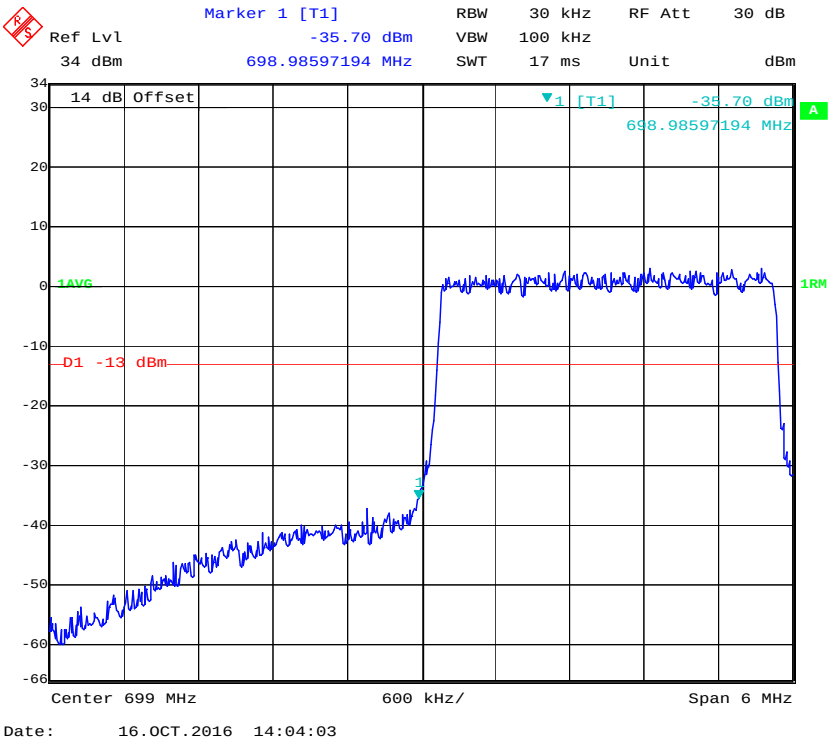
QPSK (3.0 MHz, FULL RB) - Left Band Edge



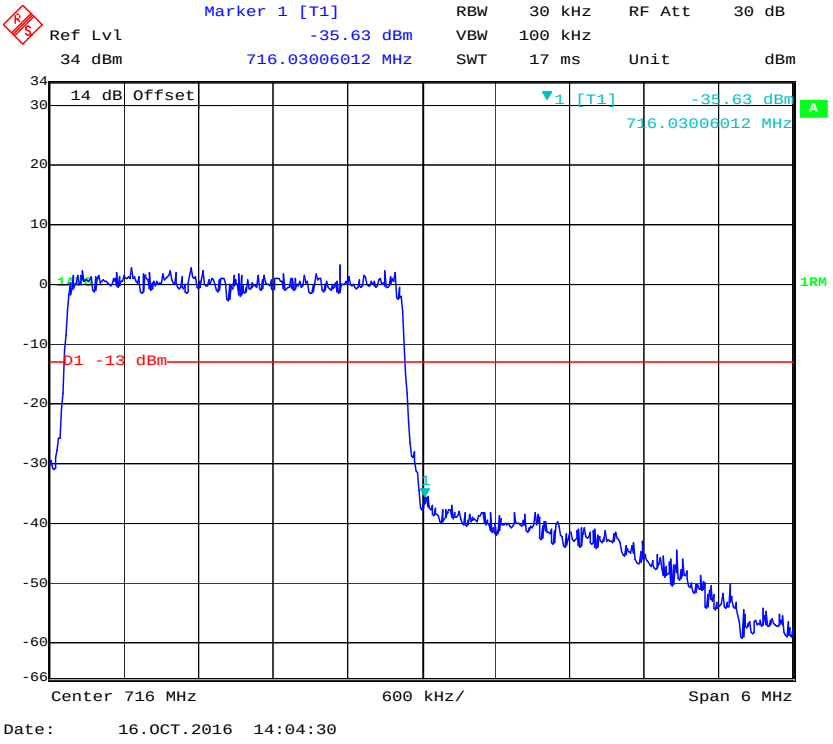
QPSK (3.0 MHz, FULL RB) - Right Band Edge



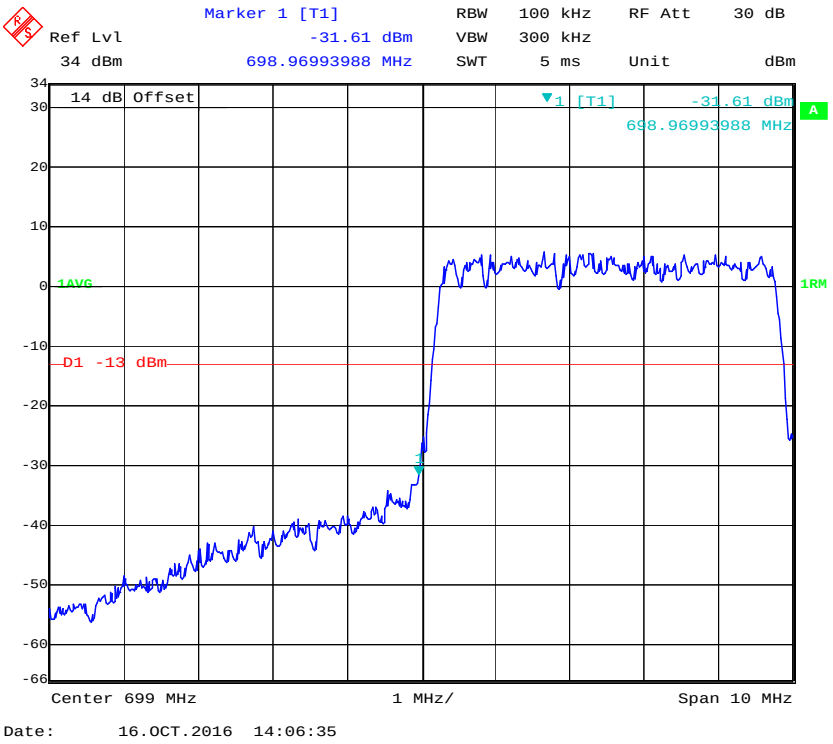
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



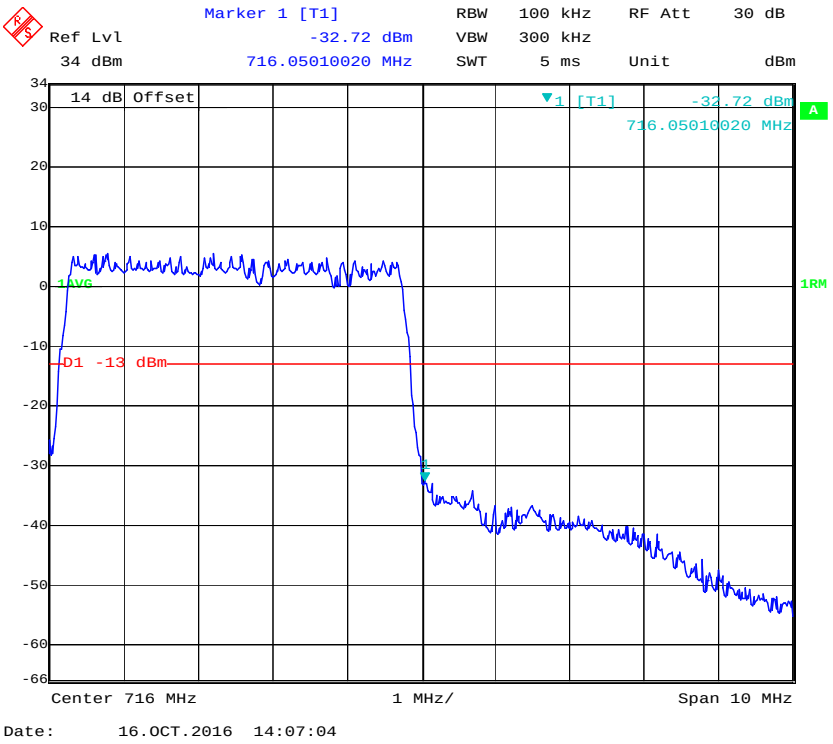
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



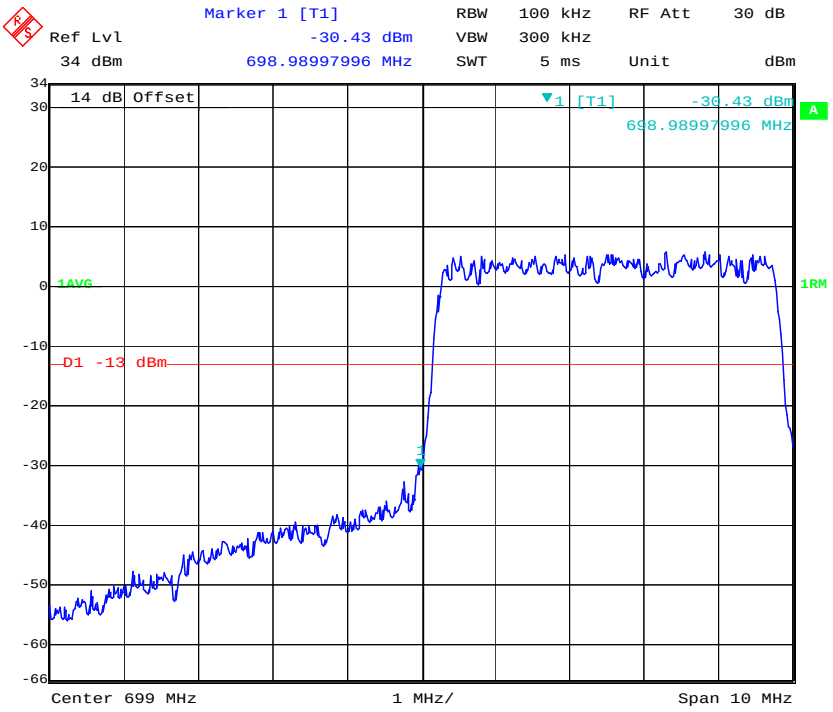
QPSK (5.0 MHz, FULL RB) - Left Band Edge



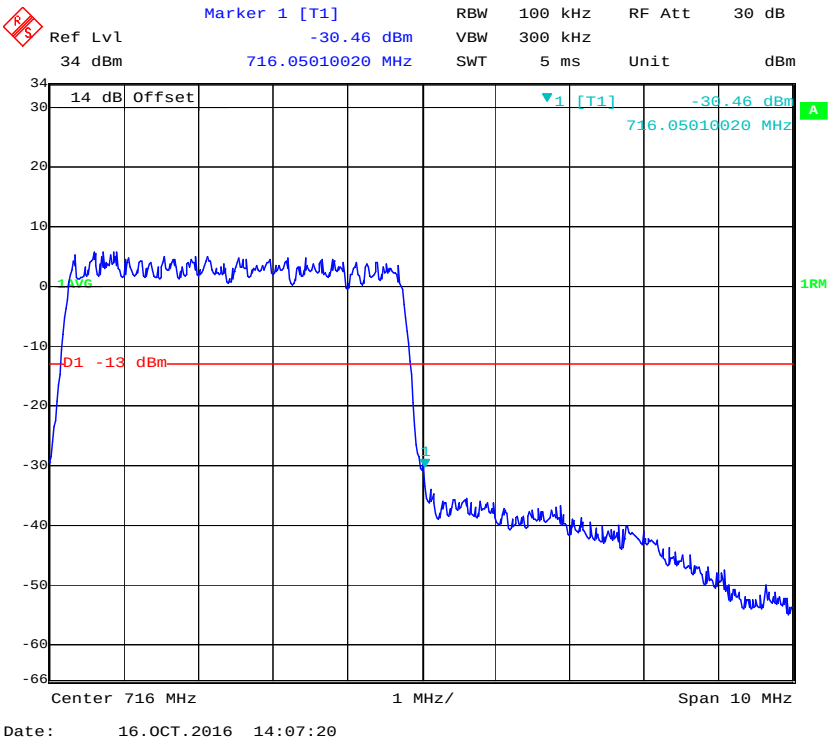
QPSK (5.0 MHz, FULL RB) - Right Band Edge



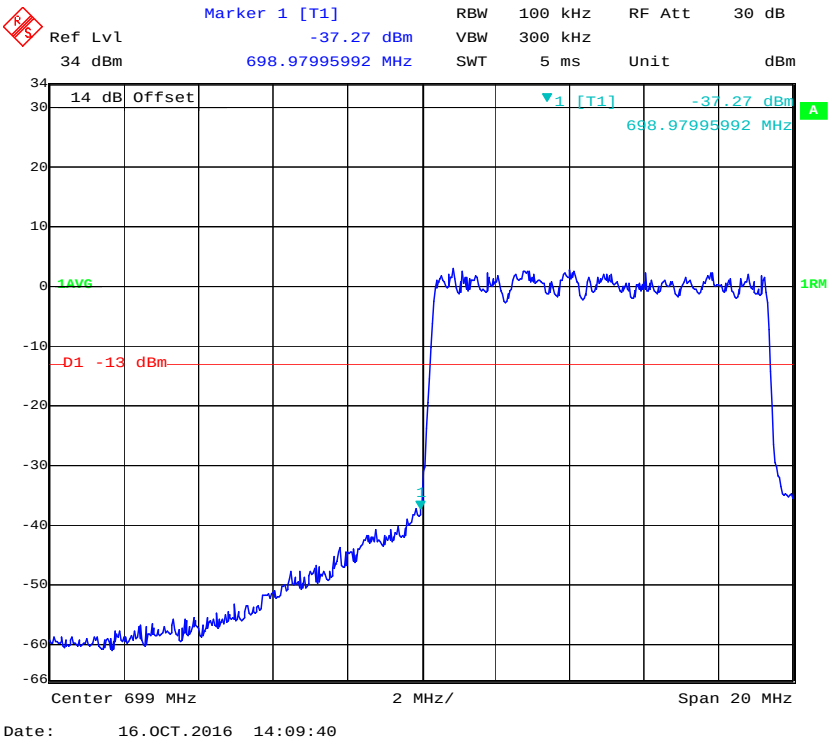
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



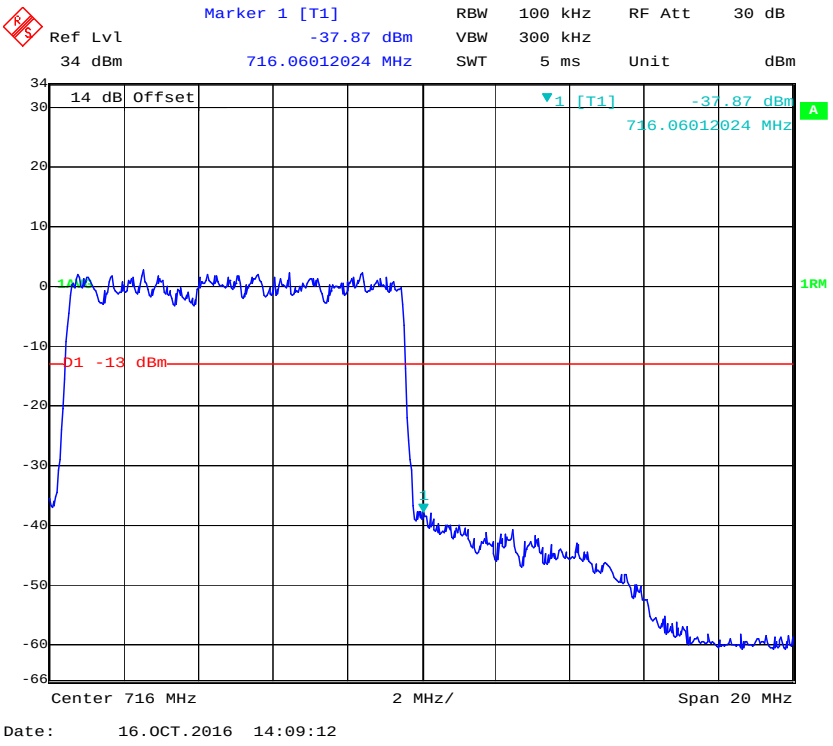
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



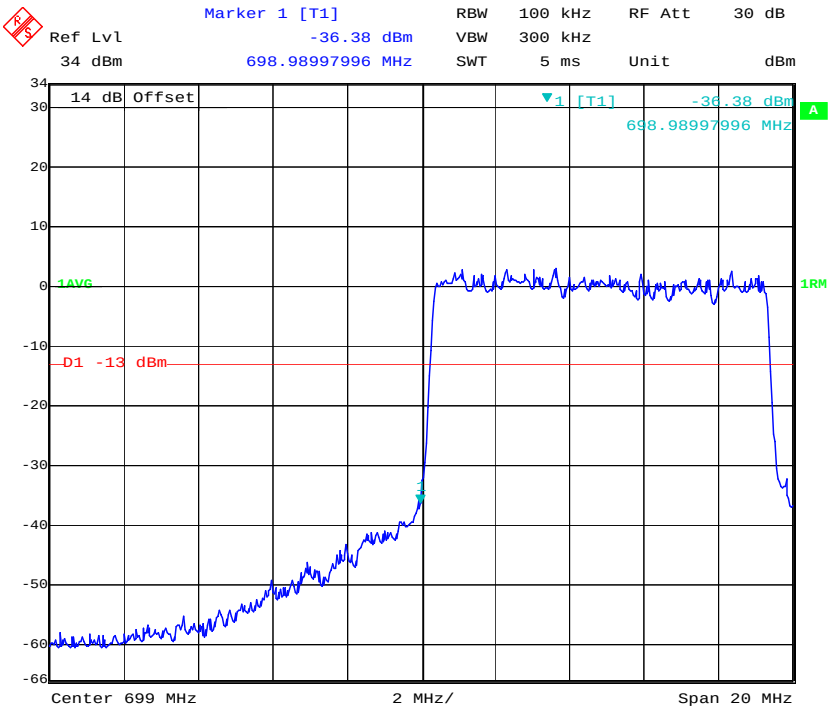
QPSK (10.0 MHz, FULL RB) - Left Band Edge



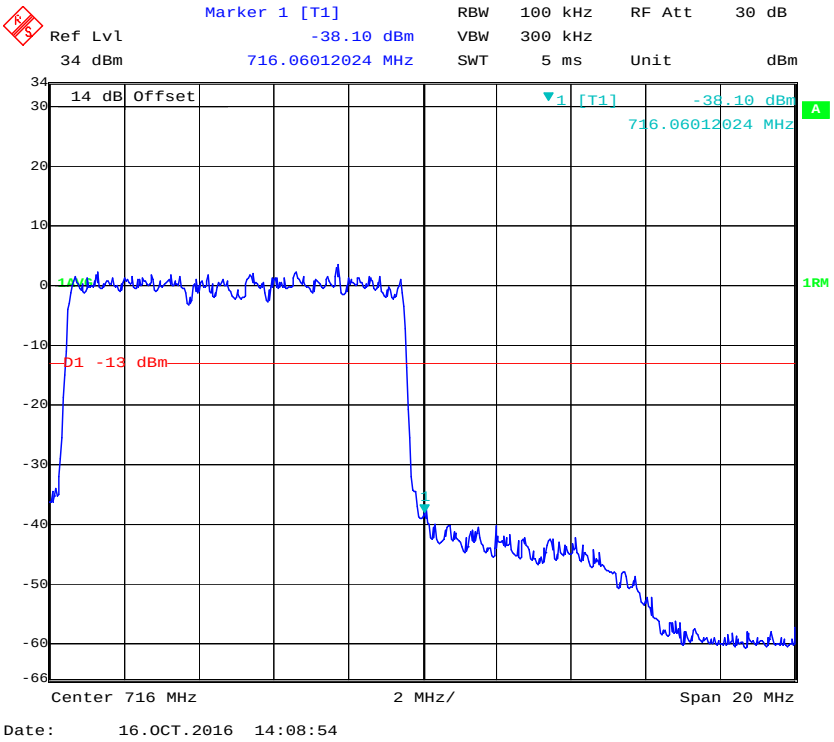
QPSK (10.0 MHz, FULL RB) - Right Band Edge



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

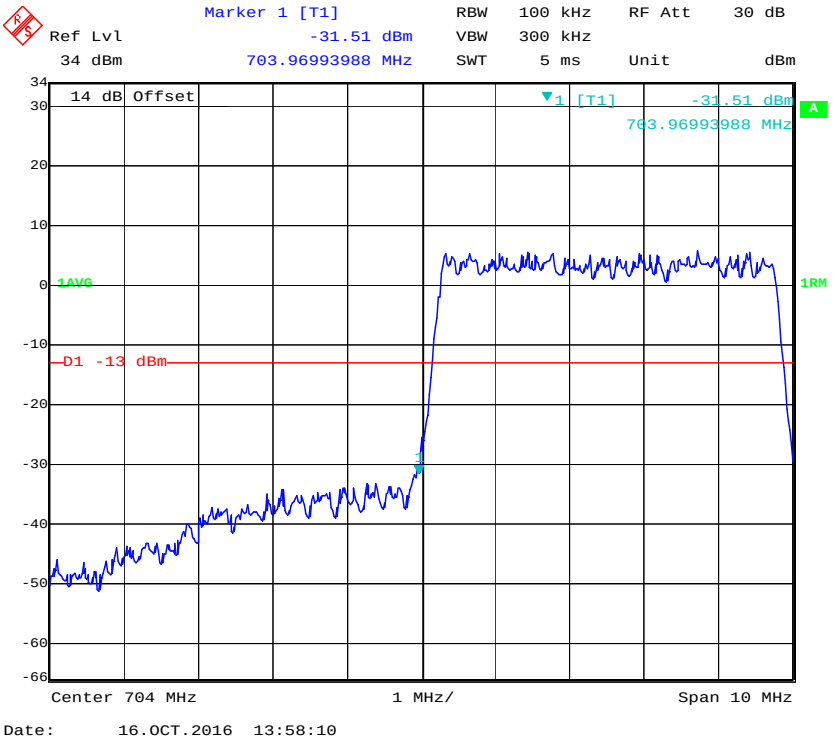


16-QAM (10.0 MHz, FULL RB) - Right Band Edge

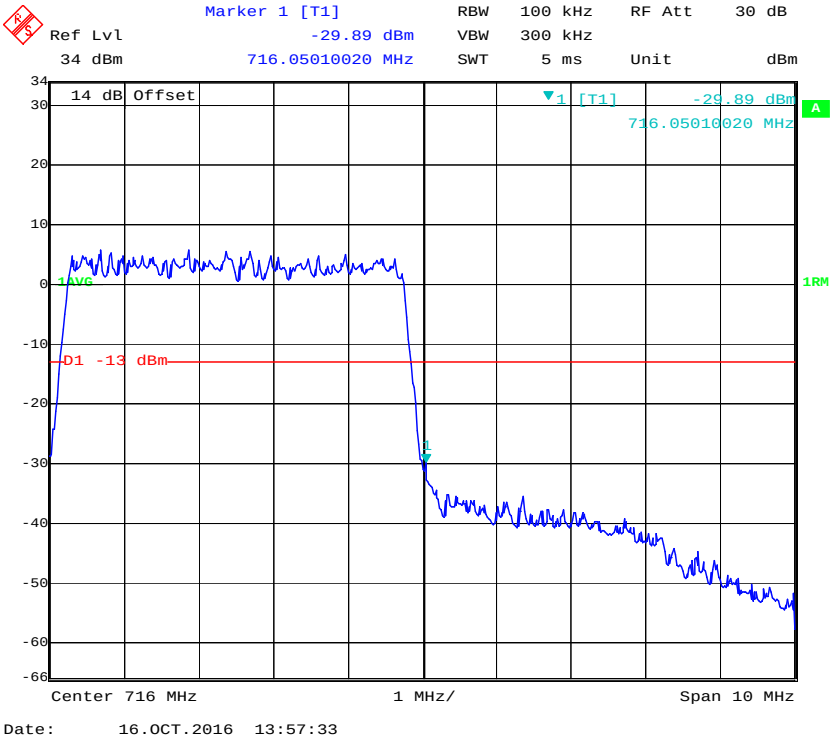


Band 17:

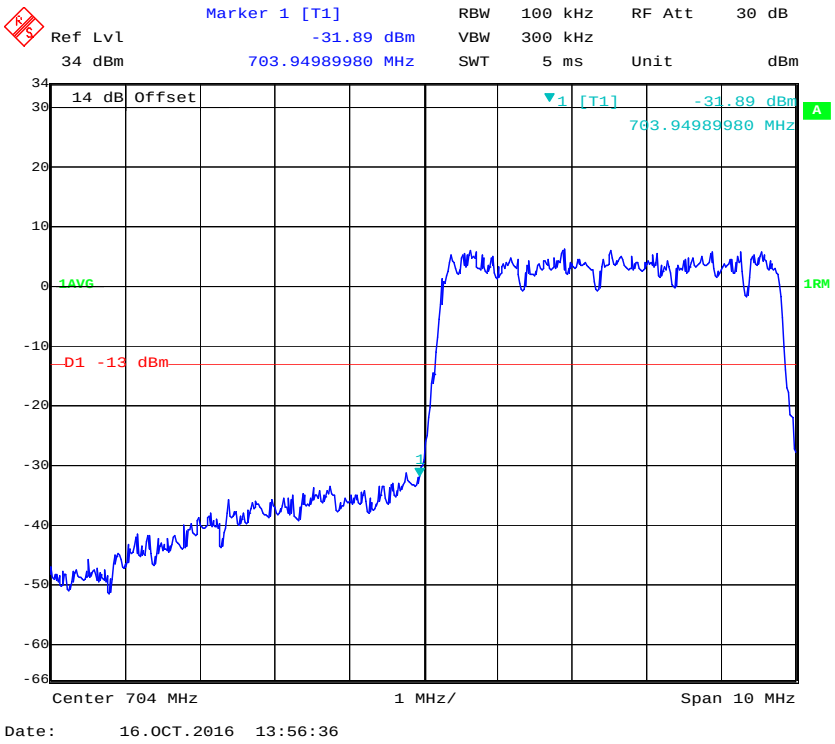
QPSK (5.0 MHz, FULL RB) - Left Band Edge



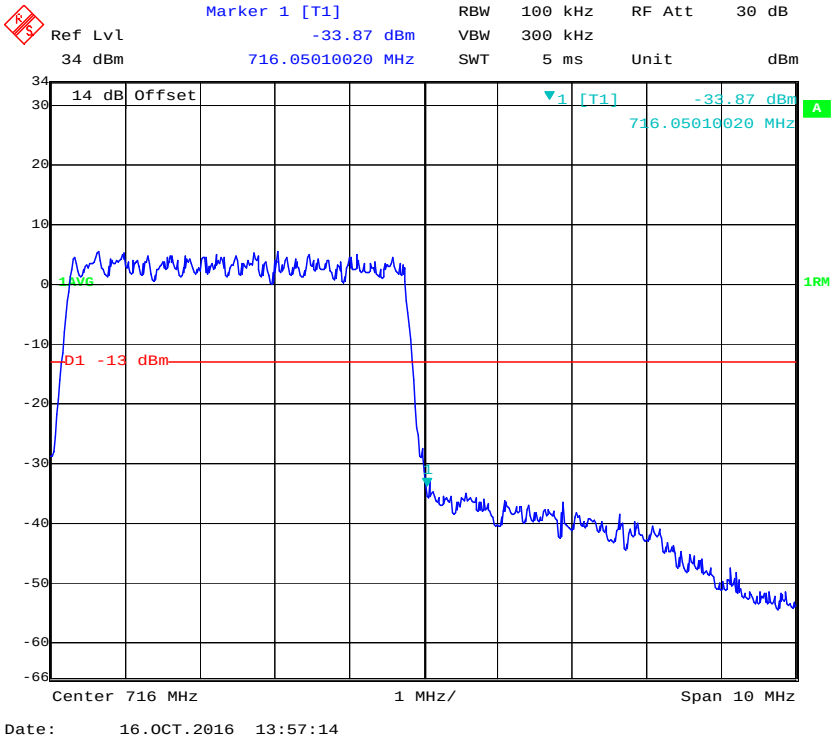
QPSK (5.0 MHz, FULL RB) - Right Band Edge



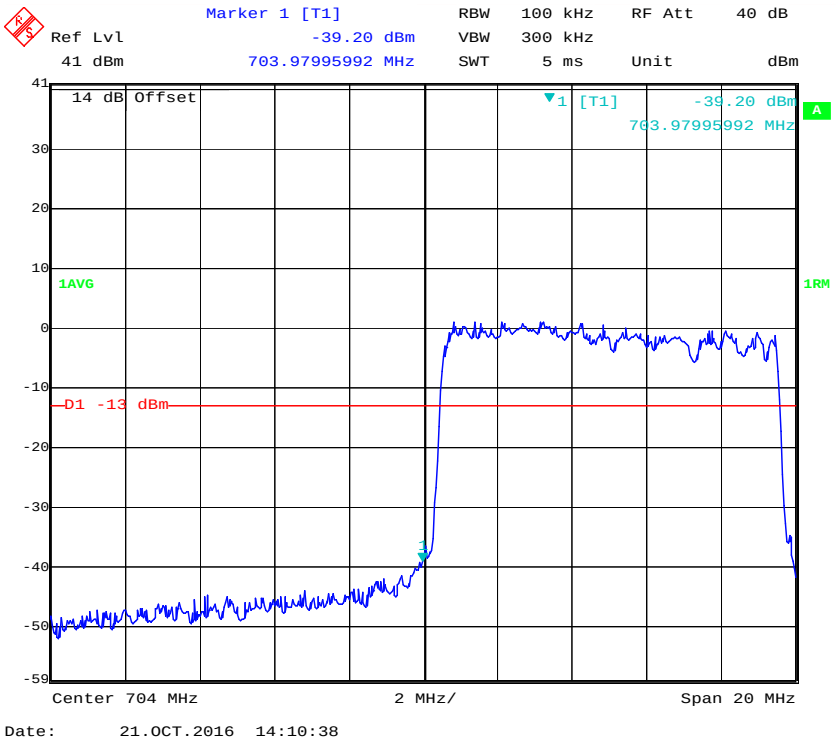
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



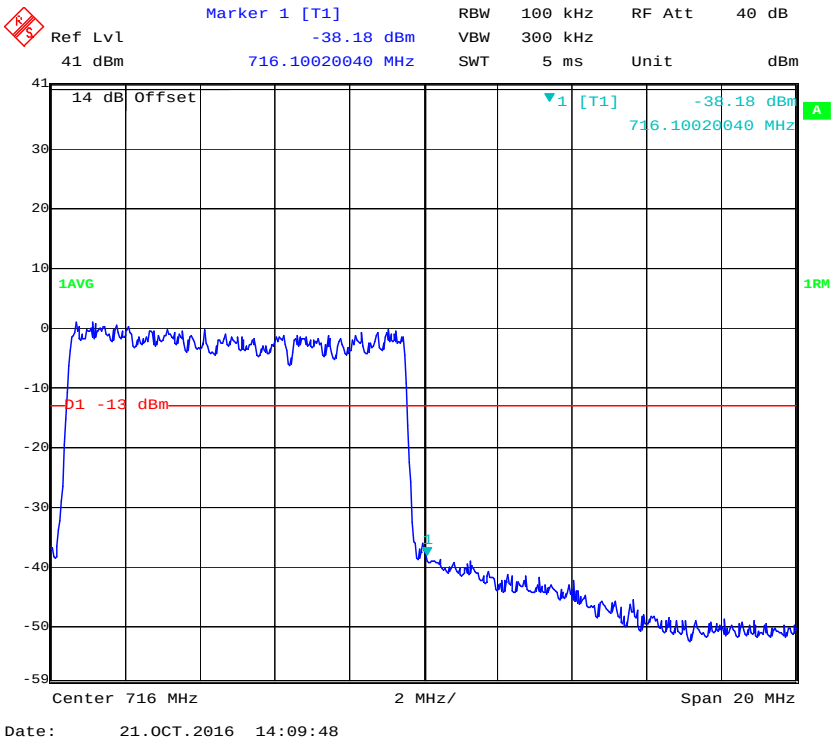
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



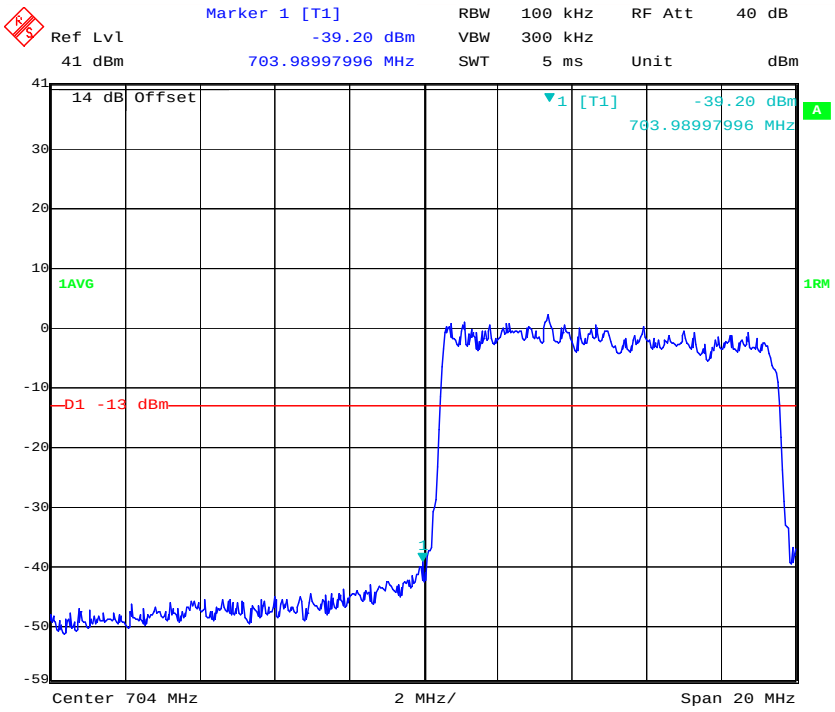
QPSK (10.0 MHz, FULL RB) - Left Band Edge



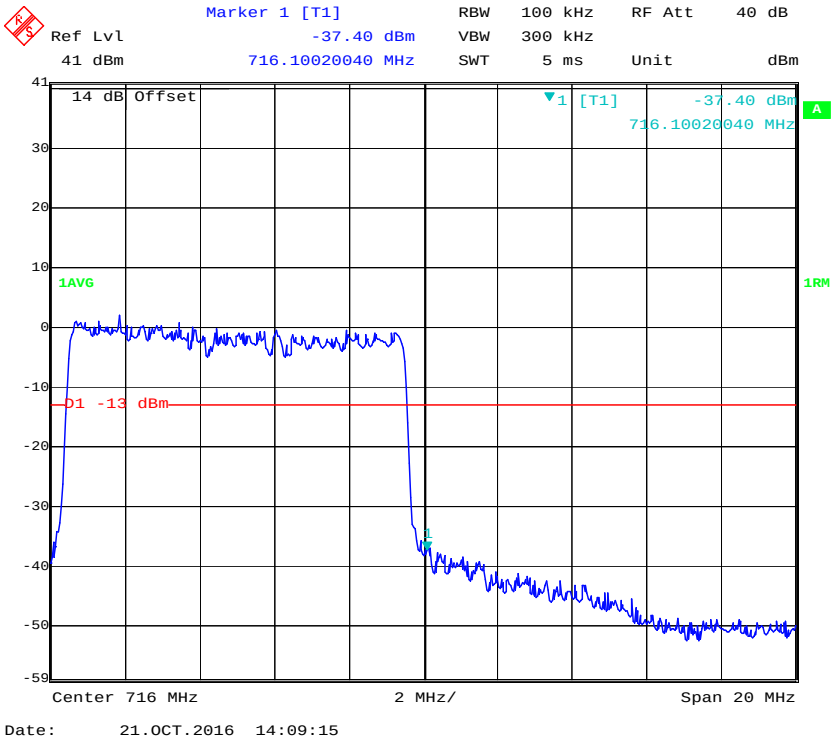
QPSK (10.0 MHz, FULL RB) - Right Band Edge



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



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



FCC § 2.1055; § 22.355; § 24.235; §27.54; - FREQUENCY STABILITY

Applicable Standards

FCC § 2.1055, §22.355, §24.235 and & §27.54.

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

According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

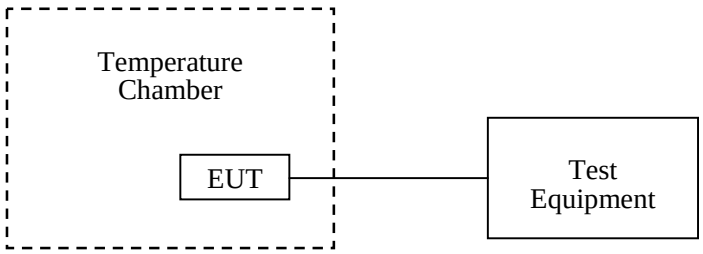
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-10-20.

EUT operation mode: Transmitting

Test Result: Compliance. Please refer to the following tables.

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	22	0.02630	2.5
-20		21	0.02510	2.5
-10		20	0.02391	2.5
0		19	0.02271	2.5
10		18	0.02152	2.5
20		17	0.02032	2.5
30		18	0.02152	2.5
40		19	0.02271	2.5
50		20	0.02391	2.5
20	V min.= 3.6	21	0.02510	2.5
	V max.= 4.2	25	0.02988	2.5

EDGE Mode

Middle Channel, f_o =836.6 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	25	0.02988	2.5
-20		21	0.02510	2.5
-10		8	0.00956	2.5
0		9	0.01076	2.5
10		15	0.01793	2.5
20		12	0.01434	2.5
30		18	0.02152	2.5
40		21	0.02510	2.5
50		27	0.03227	2.5
20	V min.= 3.6	23	0.02749	2.5
	V max.= 4.2	28	0.03347	2.5

WCDMA Mode

Middle Channel, f_o=836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	39	0.04662	2.5
-20		38	0.04542	2.5
-10		37	0.04423	2.5
0		36	0.04303	2.5
10		35	0.04184	2.5
20		34	0.04064	2.5
30		35	0.04184	2.5
40		36	0.04303	2.5
50		37	0.04423	2.5
20	V min.= 3.6	38	0.04542	2.5
	V max.= 4.2	40	0.04781	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o=1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	13	0.00691	pass
-20		15	0.00798	pass
-10		18	0.00957	pass
0		14	0.00745	pass
10		17	0.00904	pass
20		11	0.00585	pass
30		15	0.00798	pass
40		17	0.00904	pass
50		18	0.00957	pass
20	V min.= 3.6	15	0.00798	pass
	V max.= 4.2	16	0.00851	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	16	0.00851	pass
-20		12	0.00638	pass
-10		15	0.00798	pass
0		7	0.00372	pass
10		9	0.00479	pass
20		11	0.00585	pass
30		17	0.00904	pass
40		16	0.00851	pass
50		15	0.00798	pass
20	V min.= 3.6	22	0.01170	pass
	V max.= 4.2	14	0.00745	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	22	0.01170	pass
-20		21	0.01117	pass
-10		20	0.01064	pass
0		19	0.01011	pass
10		18	0.00957	pass
20		17	0.00904	pass
30		18	0.00957	pass
40		19	0.01011	pass
50		20	0.01064	pass
20	V min.= 3.6	21	0.01117	pass
	V max.= 4.2	25	0.01330	pass

WCDMA Mode Band 4

Middle Channel, f_o =1732.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	14	0.00808	pass
-20		13	0.00750	pass
-10		12	0.00693	pass
0		11	0.00635	pass
10		10	0.00577	pass
20		9	0.00519	pass
30		10	0.00577	pass
40		11	0.00635	pass
50		12	0.00693	pass
20	V min.= 3.6	13	0.00750	pass
	V max.= 4.2	15	0.00866	pass

Band 2:

20.0 MHz Middle Channel, f_o =1880MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	24	0.01277	pass
-20		23	0.01223	pass
-10		22	0.01170	pass
0		21	0.01117	pass
10		20	0.01064	pass
20		19	0.01011	pass
30		20	0.01064	pass
40		21	0.01117	pass
50		22	0.01170	pass
20	V min.= 3.6	25	0.01330	pass
	V max.= 4.2	32	0.01702	pass

Band 4:

20.0 MHz Middle Channel, f_o=1732.5 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	39	0.02251	pass
-20		38	0.02193	pass
-10		37	0.02136	pass
0		36	0.02078	pass
10		35	0.02020	pass
20		34	0.01962	pass
30		35	0.02020	pass
40		36	0.02078	pass
50		37	0.02136	pass
20	V min.= 3.6	39	0.02251	pass
	V max.= 4.2	45	0.02597	pass

Band 7:

20.0 MHz Middle Channel, f_o=2535 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	15	0.00592	pass
-20		14	0.00552	pass
-10		13	0.00513	pass
0		12	0.00473	pass
10		11	0.01262	pass
20		10	0.00394	pass
30		11	0.00434	pass
40		12	0.00473	pass
50		13	0.00513	pass
20	V min.= 3.6	15	0.00592	pass
	V max.= 4.2	20	0.00789	pass

Band 12:

10.0 MHz Middle Channel, f_o=707 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	24	0.03395	pass
-20		23	0.03253	pass
-10		22	0.03112	pass
0		21	0.02970	pass
10		20	0.02829	pass
20		19	0.02687	pass
30		20	0.02829	pass
40		21	0.02970	pass
50		22	0.03112	pass
20	V min.= 3.6	24	0.03395	pass
	V max.= 4.2	26	0.03678	pass

Band 17:

10.0 MHz Middle Channel, f_o=710 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	10	0.01408	pass
-20		9	0.01268	pass
-10		8	0.01127	pass
0		7	0.00986	pass
10		6	0.00845	pass
20		5	0.00704	pass
30		6	0.00845	pass
40		7	0.00986	pass
50		8	0.01127	pass
20	V min.= 3.6	10	0.01408	pass
	V max.= 4.2	15	0.02113	pass

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