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: YHLBLULIFEONEX2

Report Type:	**Product Type:**
Original Report	Smartphone

Report Number:	RSZ160817007-00D
Report Date:	2016-10-28
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: *LIFE ONE X2 (FCC ID: YHLBLULIFEONEX2)* or the "EUT" in this report was a *Smartphone* , which was measured approximately: 14.8 cm (L) × 7.3 cm (W) × 0.9 cm (H), rated with input voltage: DC 3.85V rechargeable Li-ion battery or DC 5.0/9.0/12.0 V from adapter.

Adapter Information:
Model: US-BM-2002
Input: AC 100-240V, 50/60Hz, 0.5A
Output: DC 5 V, 3A; DC 9 V, 2A; DC 12V, 1.5A

**All measurement and test data in this report was gathered from production sample serial number: 1603001 (Assigned by BACL, Kunsahn).The EUT supplied by the applicant was received on 2016-08-17.*

Objective

This test 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: YHLBLULIFEONEX2.

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, ANSI C63.4-2014.

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.

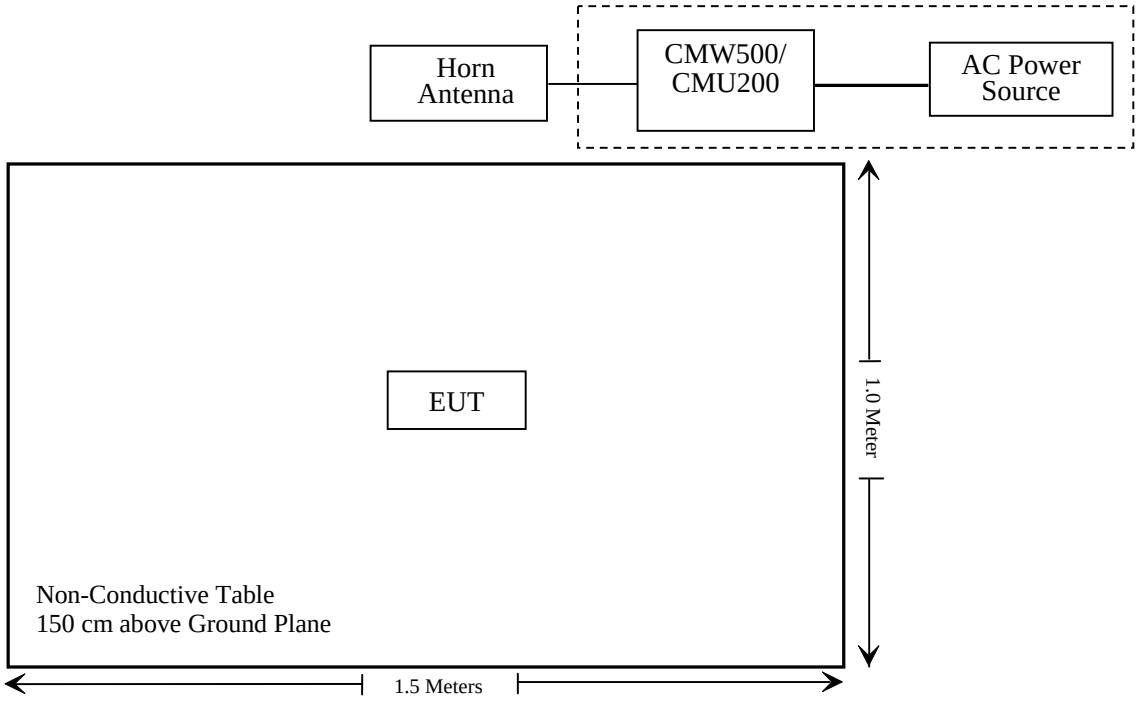
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.0002K50-116218-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: RSZ160817007-20.

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	2017-09-16
EMCO	Horn Antenna	3116	9510-2384	2015-11-07	2016-11-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	100048	2015-11-12	2016-11-11
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
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
HP	Signal Generator	E4421B	3426A01336	2015-11-04	2016-11-03
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	2016-09-08	2017-09-07
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: RSZ160817007-20.

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.

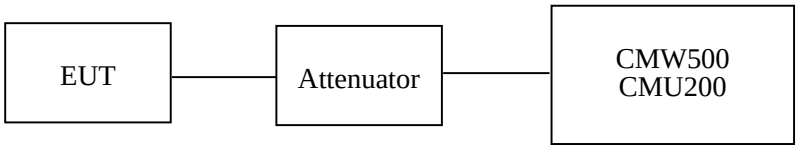
According to §27.50(h), the maximum EIRP must not exceed 2Watts (33dBm) for 2500-2570MHz.

According to §27.50(C), Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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:	24 ℃
Relative Humidity:	47 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-10-25.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.46	38.45
	190	836.6	31.99	38.45
	251	848.8	31.84	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.49	30.03	27.56	26.78	38.45
	190	836.6	32.08	31.82	27.43	26.12	38.45
	251	848.8	31.87	29.63	27.21	26.02	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.54	25.25	24.12	22.95	38.45
	190	836.6	26.38	25.11	23.98	22.81	38.45
	251	848.8	26.20	24.96	23.80	22.71	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC		21.98	21.75	21.83
		HSDPA	1	20.53	20.62	20.70
			2	20.45	20.50	20.66
			3	20.63	20.70	20.81
			4	20.41	20.54	20.59
		HSUPA	1	20.48	20.59	20.63
			2	20.37	20.51	20.55
			3	20.59	20.69	20.67
			4	20.41	20.51	20.56
			5	20.55	20.63	20.68

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.03	33
	661	1880.0	29.04	33
	810	1909.8	29.02	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.09	27.52	26.00	24.31	33
	661	1880.0	29.12	27.76	26.19	24.22	33
	810	1909.8	28.97	27.47	26.16	24.82	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.31	24.00	22.76	21.30	33
	661	1880.0	25.29	23.95	22.69	21.31	33
	810	1909.8	25.37	23.94	22.74	21.30	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC		21.99	22.10	22.13
		HSDPA	1	21.30	21.44	21.07
			2	21.21	21.37	20.95
			3	21.41	21.55	21.17
			4	21.21	21.40	21.03
		HSUPA	1	21.23	21.46	21.11
			2	21.13	21.38	21.00
			3	21.29	21.58	21.23
			4	21.13	21.43	21.00
			5	21.32	21.53	21.17

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band IV)	Normal	RMC12.2k		21.99	21.93	21.81
		Rel 6 HSDPA	1	20.53	20.55	20.13
			2	20.53	20.45	20.00
			3	20.59	20.61	20.25
			4	20.45	20.47	20.08
		Rel 6 HSUPA	1	20.35	20.45	20.09
			2	20.35	20.40	20.01
			3	20.43	20.58	20.16
			4	20.25	20.32	20.04
			5	20.48	20.57	20.19

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.12	13
	Middle	0.15	13
	High	0.18	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.21	13
	Middle	0.24	13
	High	0.25	13

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	3.48	13
	Middle	3.44	13
	High	3.47	13
HSDPA (16QAM)	Low	3.36	13
	Middle	3.37	13
	High	3.39	13
HSUPA (BPSK)	Low	3.40	13
	Middle	3.36	13
	High	3.41	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.16	13
	Middle	0.18	13
	High	0.18	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.22	13
	Middle	0.25	13
	High	0.27	13

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	3.23	13
	Middle	3.25	13
	High	3.42	13
HSDPA (16QAM)	Low	3.37	13
	Middle	3.30	13
	High	3.35	13
HSUPA (BPSK)	Low	3.40	13
	Middle	3.37	13
	High	3.43	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
WCDMA (BPSK)	Low	3.92	13
	Middle	3.89	13
	High	3.96	13
HSDPA (16QAM)	Low	3.87	13
	Middle	3.84	13
	High	3.74	13
HSUPA (BPSK)	Low	3.79	13
	Middle	3.76	13
	High	3.75	13

Radiated Power

ERP & EIRP

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 for Cellular Band (Part 22H), Middle Channel										
836.6	96.56	312	1.1	H	25.7	0.46	4.75	29.99	38.45	7.46
836.6	95.87	343	1.5	V	24.9	0.46	4.75	29.19	38.45	8.26
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	78.54	329	1.1	H	17.7	0.31	10.4	27.79	33	5.21
1880.00	79.27	89	1.8	V	15.0	0.31	10.4	25.09	33	7.91

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 for Cellular Band (Part 22H), Middle Channel										
836.6	91.67	83	1.5	H	20.3	0.46	4.75	24.59	38.45	13.86
836.6	89.85	79	2.4	V	18.5	0.46	4.75	22.79	38.45	15.66
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	74.44	144	2.4	H	13.6	0.31	10.4	23.69	33	9.31
1880.00	74.87	74	1.3	V	10.6	0.31	10.4	20.69	33	12.31

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 for WCDMA Band V (Part 22H), Middle Channel										
836.6	88.08	57	1.2	H	17.1	0.46	4.75	21.39	38.45	17.06
836.6	86.94	143	1.2	V	15.9	0.46	4.75	20.19	38.45	18.26
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880	72.74	58	2.4	H	11.9	0.31	10.4	21.99	33	11.01
1880	74.47	82	1.5	V	10.2	0.31	10.4	20.29	33	12.71
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.6	74.48	357	1.6	H	12.1	0.30	9.90	21.70	30	8.30
1732.6	74.44	331	1.8	V	9.6	0.30	9.90	19.20	30	10.80

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	23.29	23.40	23.10
		RB Size=1, RB Offset=2	23.20	23.32	22.98
		RB Size=1, RB Offset=5	23.26	23.38	23.02
		RB Size=3, RB Offset=0	23.26	23.25	23.08
		RB Size=3, RB Offset=1	23.20	23.24	22.97
		RB Size=3, RB Offset=2	23.19	23.31	22.96
		RB Size=6, RB Offset=0	22.32	22.35	22.35
	16QAM	RB Size=1, RB Offset=0	22.26	22.24	22.19
		RB Size=1, RB Offset=2	22.59	22.31	22.09
		RB Size=1, RB Offset=5	22.65	22.29	22.13
		RB Size=3, RB Offset=0	22.46	22.22	22.16
		RB Size=3, RB Offset=1	22.42	22.19	22.13
		RB Size=3, RB Offset=2	22.37	22.24	22.06
		RB Size=6, RB Offset=0	21.22	21.38	21.49
3.0	QPSK	RB Size=1, RB Offset=0	23.25	23.28	23.35
		RB Size=1, RB Offset=7	23.18	23.28	23.02
		RB Size=1, RB Offset=14	23.27	23.23	23.11
		RB Size=8, RB Offset=0	22.38	22.37	22.47
		RB Size=8, RB Offset=4	22.39	22.38	22.37
		RB Size=8, RB Offset=7	22.35	22.35	22.30
		RB Size=15, RB Offset=0	22.29	22.31	22.43
	16QAM	RB Size=1, RB Offset=0	22.11	22.06	22.64
		RB Size=1, RB Offset=7	22.15	22.09	22.46
		RB Size=1, RB Offset=14	22.10	22.04	22.55
		RB Size=8, RB Offset=0	21.46	21.37	21.49
		RB Size=8, RB Offset=4	21.46	21.36	21.44
		RB Size=8, RB Offset=7	21.44	21.33	21.39
		RB Size=15, RB Offset=0	21.30	21.24	21.42

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	23.22	23.41	23.40
		RB Size=1, RB Offset=12	22.76	22.85	22.83
		RB Size=1, RB Offset=24	23.33	22.97	22.99
		RB Size=12, RB Offset=0	21.96	22.10	22.29
		RB Size=12, RB Offset=6	21.94	21.98	22.08
		RB Size=12, RB Offset=11	21.96	21.96	21.95
		RB Size=25, RB Offset=0	21.03	21.22	21.07
	16QAM	RB Size=1, RB Offset=0	22.77	22.32	22.54
		RB Size=1, RB Offset=12	22.33	22.00	22.04
		RB Size=1, RB Offset=24	22.79	22.27	22.22
		RB Size=12, RB Offset=0	21.17	21.20	21.38
		RB Size=12, RB Offset=6	21.12	21.04	21.18
		RB Size=12, RB Offset=11	21.15	21.02	21.07
		RB Size=25, RB Offset=0	21.18	21.21	21.16
10.0	QPSK	RB Size=1, RB Offset=0	22.63	22.97	23.30
		RB Size=1, RB Offset=24	22.96	22.75	22.97
		RB Size=1, RB Offset=49	22.05	22.52	22.42
		RB Size=25, RB Offset=0	21.99	22.13	22.39
		RB Size=25, RB Offset=12	22.06	22.06	22.31
		RB Size=25, RB Offset=24	22.23	21.89	22.14
		RB Size=50, RB Offset=0	21.09	21.03	21.31
	16QAM	RB Size=1, RB Offset=0	22.08	21.97	22.25
		RB Size=1, RB Offset=24	22.33	21.73	22.09
		RB Size=1, RB Offset=49	22.34	21.50	21.56
		RB Size=25, RB Offset=0	21.08	21.19	21.40
		RB Size=25, RB Offset=12	21.17	21.09	21.43
		RB Size=25, RB Offset=24	21.33	20.91	21.27
		RB Size=50, RB Offset=0	20.18	20.06	20.39

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	22.93	23.18	23.42
		RB Size=1, RB Offset=37	22.55	22.68	23.16
		RB Size=1, RB Offset=74	22.33	22.68	22.66
		RB Size=36, RB Offset=0	22.03	22.12	22.50
		RB Size=36, RB Offset=18	22.16	21.96	22.54
		RB Size=36, RB Offset=37	22.35	21.80	22.32
		RB Size=75, RB Offset=0	21.19	20.04	21.39
	16QAM	RB Size=1, RB Offset=0	22.30	22.16	22.24
		RB Size=1, RB Offset=37	22.41	21.66	22.16
		RB Size=1, RB Offset=74	22.60	21.71	21.69
		RB Size=36, RB Offset=0	21.16	21.17	21.41
		RB Size=36, RB Offset=18	21.29	20.98	21.43
		RB Size=36, RB Offset=37	21.39	20.84	21.38
		RB Size=75, RB Offset=0	20.30	20.08	20.46
20.0	QPSK	RB Size=1, RB Offset=0	23.11	22.33	23.18
		RB Size=1, RB Offset=49	22.28	22.58	23.43
		RB Size=1, RB Offset=99	22.36	22.72	22.79
		RB Size=50, RB Offset=0	21.34	21.20	21.37
		RB Size=50, RB Offset=24	21.33	21.03	21.39
		RB Size=50, RB Offset=49	21.28	21.92	21.42
		RB Size=100, RB Offset=0	20.31	20.07	20.38
	16QAM	RB Size=1, RB Offset=0	22.56	22.79	22.62
		RB Size=1, RB Offset=49	22.68	22.13	22.64
		RB Size=1, RB Offset=99	22.64	22.30	22.26
		RB Size=50, RB Offset=0	21.36	21.26	21.31
		RB Size=50, RB Offset=24	21.35	21.05	21.33
		RB Size=50, RB Offset=49	21.29	21.00	21.32
		RB Size=100, RB Offset=0	20.30	20.13	20.34

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.33	13	Pass
QPSK (100%RB Size)	5.20	13	Pass
16QAM (1RB Size)	4.18	13	Pass
16QAM (100%RB Size)	6.46	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	73.64	222	2.4	H	12.8	0.31	10.4	22.89	33
1880.00	72.37	14	2.1	V	8.1	0.31	10.4	18.19	33
3 MHz Bandwidth									
1880.00	73.24	212	1.6	H	12.4	0.31	10.4	22.49	33
1880.00	72.27	6	1.4	V	8.0	0.31	10.4	18.09	33
5 MHz Bandwidth									
1880.00	72.34	136	2.0	H	11.5	0.31	10.4	21.59	33
1880.00	71.87	136	2.0	V	7.6	0.31	10.4	17.69	33
10MHz Bandwidth									
1880.00	72.14	152	1.3	H	11.3	0.31	10.4	21.39	33
1880.00	72.47	112	2.0	V	8.2	0.31	10.4	18.29	33
15 MHz Bandwidth									
1880.00	72.54	278	1.5	H	11.7	0.31	10.4	21.79	33
1880.00	72.47	25	1.2	V	8.2	0.31	10.4	18.29	33
20 MHz Bandwidth									
1880.00	71.94	332	1.6	H	11.1	0.31	10.4	21.19	33
1880.00	72.27	272	1.7	V	8.0	0.31	10.4	18.09	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	73.44	209	2.4	H	12.6	0.31	10.4	22.69	33
1880.00	73.27	240	2.3	V	9.0	0.31	10.4	19.09	33
3 MHz Bandwidth									
1880.00	73.34	202	1.8	H	12.5	0.31	10.4	22.59	33
1880.00	73.07	349	1.7	V	8.8	0.31	10.4	18.89	33
5 MHz Bandwidth									
1880.00	72.24	61	1.7	H	11.4	0.31	10.4	21.49	33
1880.00	72.67	79	2.5	V	8.4	0.31	10.4	18.49	33
10 MHz Bandwidth									
1880.00	71.04	98	1.6	H	10.2	0.31	10.4	20.29	33
1880.00	71.27	297	1.6	V	7.0	0.31	10.4	17.09	33
15 MHz Bandwidth									
1880.00	72.74	186	1.7	H	11.9	0.31	10.4	21.99	33
1880.00	72.67	255	1.1	V	8.4	0.31	10.4	18.49	33
20 MHz Bandwidth									
1880.00	72.74	3	1.5	H	11.9	0.31	10.4	21.99	33
1880.00	72.37	247	1.6	V	8.1	0.31	10.4	18.19	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	22.93	22.96	23.06
		RB Size=1, RB Offset=2	22.01	22.12	22.08
		RB Size=1, RB Offset=5	22.13	22.02	22.00
		RB Size=3, RB Offset=0	22.93	22.10	22.06
		RB Size=3, RB Offset=1	21.89	21.06	22.99
		RB Size=3, RB Offset=2	21.94	21.11	21.03
		RB Size=6, RB Offset=0	20.86	20.05	20.00
	16QAM	RB Size=1, RB Offset=0	22.25	22.04	22.10
		RB Size=1, RB Offset=2	22.28	22.11	22.16
		RB Size=1, RB Offset=5	22.23	22.08	22.08
		RB Size=3, RB Offset=0	21.08	21.25	21.07
		RB Size=3, RB Offset=1	21.00	21.23	21.02
		RB Size=3, RB Offset=2	21.05	21.26	21.06
		RB Size=6, RB Offset=0	20.74	20.20	20.11
3.0	QPSK	RB Size=1, RB Offset=0	22.97	23.01	23.07
		RB Size=1, RB Offset=7	22.01	22.04	22.13
		RB Size=1, RB Offset=14	22.65	22.04	22.07
		RB Size=8, RB Offset=0	21.05	21.07	21.18
		RB Size=8, RB Offset=4	21.04	21.12	21.19
		RB Size=8, RB Offset=7	21.07	21.08	21.15
		RB Size=15, RB Offset=0	20.01	20.07	20.13
	16QAM	RB Size=1, RB Offset=0	22.26	21.93	21.99
		RB Size=1, RB Offset=7	22.26	21.97	22.02
		RB Size=1, RB Offset=14	22.33	21.92	21.93
		RB Size=8, RB Offset=0	21.10	21.20	21.26
		RB Size=8, RB Offset=4	21.11	21.20	21.26
		RB Size=8, RB Offset=7	21.10	21.18	21.23
		RB Size=15, RB Offset=0	20.03	20.08	20.14

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	22.20	22.25
		RB Size=1, RB Offset=12	22.20	22.19	22.17
		RB Size=1, RB Offset=24	22.22	22.18	22.21
		RB Size=12, RB Offset=0	21.13	21.10	21.22
		RB Size=12, RB Offset=6	21.11	21.11	21.19
		RB Size=12, RB Offset=11	21.11	21.10	21.18
		RB Size=25, RB Offset=0	20.01	20.04	20.13
	16QAM	RB Size=1, RB Offset=0	22.28	22.27	22.70
		RB Size=1, RB Offset=12	22.27	22.25	22.68
		RB Size=1, RB Offset=24	22.28	22.27	22.64
		RB Size=12, RB Offset=0	21.19	21.17	21.34
		RB Size=12, RB Offset=6	21.18	21.17	21.31
		RB Size=12, RB Offset=11	21.17	21.17	21.30
		RB Size=25, RB Offset=0	20.08	20.09	20.19
10.0	QPSK	RB Size=1, RB Offset=0	23.01	23.05	23.11
		RB Size=1, RB Offset=24	23.18	23.08	23.09
		RB Size=1, RB Offset=49	23.24	22.76	22.75
		RB Size=25, RB Offset=0	22.11	22.04	22.11
		RB Size=25, RB Offset=12	22.13	22.09	22.19
		RB Size=25, RB Offset=24	22.14	22.10	22.09
		RB Size=50, RB Offset=0	21.12	21.08	21.07
	16QAM	RB Size=1, RB Offset=0	22.48	22.02	22.05
		RB Size=1, RB Offset=24	22.46	21.99	22.02
		RB Size=1, RB Offset=49	22.57	21.86	21.92
		RB Size=25, RB Offset=0	21.14	21.09	21.22
		RB Size=25, RB Offset=12	21.16	21.11	21.13
		RB Size=25, RB Offset=24	21.18	21.10	21.11
		RB Size=50, RB Offset=0	20.15	20.09	20.04

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	22.71	23.11	23.41
		RB Size=1, RB Offset=37	22.50	23.10	23.29
		RB Size=1, RB Offset=74	22.83	22.94	23.20
		RB Size=36, RB Offset=0	21.77	21.15	21.35
		RB Size=36, RB Offset=18	21.67	21.10	21.43
		RB Size=36, RB Offset=37	21.83	21.16	21.41
		RB Size=75, RB Offset=0	20.83	20.14	20.31
	16QAM	RB Size=1, RB Offset=0	21.80	22.02	22.72
		RB Size=1, RB Offset=37	21.57	22.00	22.61
		RB Size=1, RB Offset=74	21.93	22.00	22.48
		RB Size=36, RB Offset=0	20.73	21.12	21.39
		RB Size=36, RB Offset=18	20.75	21.11	21.40
		RB Size=36, RB Offset=37	20.91	21.16	21.43
		RB Size=75, RB Offset=0	19.88	20.11	20.15
20.0	QPSK	RB Size=1, RB Offset=0	22.79	23.16	23.15
		RB Size=1, RB Offset=49	22.62	23.12	22.71
		RB Size=1, RB Offset=99	23.08	22.82	22.45
		RB Size=50, RB Offset=0	21.81	21.04	21.56
		RB Size=50, RB Offset=24	21.82	21.06	21.92
		RB Size=50, RB Offset=49	22.03	21.07	21.81
		RB Size=100, RB Offset=0	20.91	20.08	20.51
	16QAM	RB Size=1, RB Offset=0	22.23	22.63	22.55
		RB Size=1, RB Offset=49	22.12	22.58	22.23
		RB Size=1, RB Offset=99	22.43	22.45	22.04
		RB Size=50, RB Offset=0	20.87	21.12	21.12
		RB Size=50, RB Offset=24	20.86	21.12	21.44
		RB Size=50, RB Offset=49	20.99	21.13	21.55
		RB Size=100, RB Offset=0	20.01	20.12	20.94

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.76	13	Pass
QPSK (100%RB Size)	5.32	13	Pass
16QAM (1RB Size)	4.23	13	Pass
16QAM (100%RB Size)	6.31	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									
1732.5	74.58	226	1	H	12.2	0.30	9.90	21.80	30
1732.5	76.04	232	1.9	V	11.2	0.30	9.90	20.80	30
3 MHz Bandwidth									
1732.50	74.08	142	2.3	H	11.7	0.30	9.90	21.30	30
1732.50	74.54	110	1.5	V	9.7	0.30	9.90	19.30	30
5 MHz Bandwidth									
1732.50	73.58	167	1.2	H	11.2	0.30	9.90	20.80	30
1732.50	74.14	182	2.3	V	9.3	0.30	9.90	18.90	30
10MHz Bandwidth									
1732.50	73.38	51	2.5	H	11.0	0.30	9.90	20.60	30
1732.50	73.64	287	2.2	V	8.8	0.30	9.90	17.40	30
15 MHz Bandwidth									
1732.50	73.98	20	1.3	H	11.6	0.30	9.90	21.20	30
1732.50	74.24	66	1.3	V	9.4	0.30	9.90	19.00	30
20 MHz Bandwidth									
1732.50	73.38	15	1.6	H	11.0	0.30	9.90	20.60	30
1732.50	74.04	287	2.3	V	9.2	0.30	9.90	18.80	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									
1732.5	74.78	226	1	H	12.4	0.30	9.90	22.00	30
1732.5	75.44	232	1.9	V	10.6	0.30	9.90	20.20	30
3 MHz Bandwidth									
1732.50	73.98	253	1.4	H	11.6	0.30	9.90	21.20	30
1732.50	74.54	272	1.8	V	9.7	0.30	9.90	19.30	30
5 MHz Bandwidth									
1732.50	73.68	35	2.2	H	11.3	0.30	9.90	20.90	30
1732.50	73.94	64	1.1	V	9.1	0.30	9.90	18.70	30
10 MHz Bandwidth									
1732.50	73.38	61	1.4	H	11.0	0.30	9.90	20.60	30
1732.50	73.84	157	1.7	V	9.0	0.30	9.90	18.60	30
15 MHz Bandwidth									
1732.50	74.88	360	1.1	H	12.5	0.30	9.90	22.10	30
1732.50	75.44	312	2.0	V	10.6	0.30	9.90	20.20	30
20 MHz Bandwidth									
1732.50	74.58	167	2.1	H	12.2	0.30	9.90	21.80	30
1732.50	75.04	120	1.7	V	10.2	0.30	9.90	19.80	30

LTE Band 7:

Maximum Output Power

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	22.71	22.81	22.13
		RB Size=1, RB Offset=12	22.42	22.38	22.61
		RB Size=1, RB Offset=24	22.63	22.87	22.63
		RB Size=12, RB Offset=0	21.53	21.52	22.10
		RB Size=12, RB Offset=6	21.54	21.43	21.88
		RB Size=12, RB Offset=11	21.53	21.58	21.88
		RB Size=25, RB Offset=0	20.49	20.52	20.91
	16QAM	RB Size=1, RB Offset=0	22.69	22.97	22.79
		RB Size=1, RB Offset=12	22.59	22.62	22.18
		RB Size=1, RB Offset=24	22.58	23.07	22.31
		RB Size=12, RB Offset=0	21.57	21.62	21.64
		RB Size=12, RB Offset=6	21.54	21.68	21.65
		RB Size=12, RB Offset=11	21.54	21.73	21.63
		RB Size=25, RB Offset=0	20.54	20.64	20.61
10.0	QPSK	RB Size=1, RB Offset=0	22.15	22.28	22.67
		RB Size=1, RB Offset=24	22.31	22.30	22.57
		RB Size=1, RB Offset=49	22.10	22.44	22.14
		RB Size=25, RB Offset=0	21.48	21.53	21.80
		RB Size=25, RB Offset=12	21.47	21.55	21.82
		RB Size=25, RB Offset=24	21.44	21.69	21.79
		RB Size=50, RB Offset=0	20.47	20.58	20.85
	16QAM	RB Size=1, RB Offset=0	22.55	22.30	21.75
		RB Size=1, RB Offset=24	22.70	22.37	21.69
		RB Size=1, RB Offset=49	22.59	22.41	21.28
		RB Size=25, RB Offset=0	21.47	21.63	20.97
		RB Size=25, RB Offset=12	21.44	21.64	20.94
		RB Size=25, RB Offset=24	21.42	21.77	20.90
		RB Size=50, RB Offset=0	20.43	20.63	19.92

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	22.23	22.29	22.90
		RB Size=1, RB Offset=37	22.16	22.24	22.62
		RB Size=1, RB Offset=74	22.10	22.59	22.39
		RB Size=36, RB Offset=0	21.44	21.45	21.80
		RB Size=36, RB Offset=18	21.41	21.50	21.79
		RB Size=36, RB Offset=37	21.29	21.72	21.79
		RB Size=75, RB Offset=0	20.36	20.61	20.80
	16QAM	RB Size=1, RB Offset=0	22.27	22.32	22.41
		RB Size=1, RB Offset=37	22.18	22.34	22.04
		RB Size=1, RB Offset=74	22.05	22.62	21.93
		RB Size=36, RB Offset=0	21.45	21.53	21.00
		RB Size=36, RB Offset=18	21.44	21.59	20.95
		RB Size=36, RB Offset=37	21.36	21.76	20.96
		RB Size=75, RB Offset=0	20.47	20.71	19.97
20.0	QPSK	RB Size=1, RB Offset=0	22.27	22.22	22.86
		RB Size=1, RB Offset=49	22.04	22.23	22.67
		RB Size=1, RB Offset=99	22.46	22.47	22.33
		RB Size=50, RB Offset=0	21.38	21.33	21.91
		RB Size=50, RB Offset=24	21.20	21.51	21.84
		RB Size=50, RB Offset=49	21.01	21.66	21.02
		RB Size=100, RB Offset=0	20.25	20.59	20.90
	16QAM	RB Size=1, RB Offset=0	22.73	22.89	22.53
		RB Size=1, RB Offset=49	22.46	22.88	22.13
		RB Size=1, RB Offset=99	22.07	22.16	21.98
		RB Size=50, RB Offset=0	21.44	21.47	21.00
		RB Size=50, RB Offset=24	21.33	21.59	20.98
		RB Size=50, RB Offset=49	21.15	21.78	21.09
		RB Size=100, RB Offset=0	20.42	20.71	20.02

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.63	13	Pass
QPSK (100%RB Size)	5.23	13	Pass
16QAM (1RB Size)	4.39	13	Pass
16QAM (100%RB Size)	6.09	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	69.62	199	1.4	H	12.2	0.43	10.60	22.37	33
2535.00	68.42	256	1.5	V	9.3	0.43	10.60	19.47	33
10MHz Bandwidth									
2535.00	69.12	209	1.8	H	11.7	0.43	10.60	21.87	33
2535.00	67.82	338	1.3	V	8.7	0.43	10.60	18.87	33
15 MHz Bandwidth									
2535.00	68.52	207	2.2	H	11.1	0.43	10.60	21.30	33
2535.00	67.32	261	1.2	V	8.2	0.43	10.60	18.40	33
20 MHz Bandwidth									
2535.00	68.72	147	1.7	H	11.3	0.43	10.60	21.50	33
2535.00	67.22	28	1.7	V	8.1	0.43	10.60	20.30	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	69.62	60	2.3	H	12.2	0.43	10.60	22.37	33
2535.00	68.12	4	1.4	V	9.0	0.43	10.60	19.17	33
10 MHz Bandwidth									
2535.00	69.12	149	1.8	H	11.7	0.43	10.60	21.87	33
2535.00	67.42	228	1.2	V	8.3	0.43	10.60	18.47	33
15 MHz Bandwidth									
2535.00	67.52	356	1.2	H	10.1	0.43	10.60	20.27	33
2535.00	65.22	172	2.4	V	6.1	0.43	10.60	16.27	33
20 MHz Bandwidth									
2535.00	69.12	181	2.4	H	11.7	0.43	10.60	21.87	33
2535.00	66.22	29	1.3	V	7.1	0.43	10.60	17.27	33

LTE Band 12

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	22.11	22.07	22.30
		RB Size=1, RB Offset=2	22.66	22.34	22.85
		RB Size=1, RB Offset=5	22.44	22.46	22.25
		RB Size=3, RB Offset=0	21.72	21.76	21.17
		RB Size=3, RB Offset=1	21.48	21.92	21.06
		RB Size=3, RB Offset=2	21.22	21.64	21.09
		RB Size=6, RB Offset=0	20.92	20.63	20.98
	16QAM	RB Size=1, RB Offset=0	22.88	22.54	22.07
		RB Size=1, RB Offset=2	22.71	22.81	22.49
		RB Size=1, RB Offset=5	22.93	22.80	22.61
		RB Size=3, RB Offset=0	21.46	21.98	21.78
		RB Size=3, RB Offset=1	21.29	21.05	21.66
		RB Size=3, RB Offset=2	21.82	21.14	21.61
		RB Size=6, RB Offset=0	20.88	20.80	20.63
3	QPSK	RB Size=1, RB Offset=0	22.95	22.91	22.06
		RB Size=1, RB Offset=7	22.04	22.63	22.34
		RB Size=1, RB Offset=14	22.18	22.75	22.81
		RB Size=8, RB Offset=0	21.11	21.90	21.62
		RB Size=8, RB Offset=4	21.37	21.75	21.83
		RB Size=8, RB Offset=7	21.07	21.57	21.07
		RB Size=15, RB Offset=0	20.78	20.25	20.85
	16QAM	RB Size=1, RB Offset=0	22.89	22.21	22.81
		RB Size=1, RB Offset=7	21.96	22.69	22.58
		RB Size=1, RB Offset=14	22.03	22.14	22.95
		RB Size=8, RB Offset=0	21.45	21.02	21.32
		RB Size=8, RB Offset=4	21.64	22.22	21.54
		RB Size=8, RB Offset=7	21.26	21.52	21.45
		RB Size=15, RB Offset=0	20.19	20.88	20.86

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.92	22.65	22.12
		RB Size=1, RB Offset=12	22.98	22.62	22.53
		RB Size=1, RB Offset=24	22.78	22.51	22.76
		RB Size=12, RB Offset=0	21.98	21.36	21.55
		RB Size=12, RB Offset=6	21.61	21.53	21.28
		RB Size=12, RB Offset=11	21.25	21.23	21.40
		RB Size=25, RB Offset=0	20.34	20.85	20.71
	16QAM	RB Size=1, RB Offset=0	22.50	22.74	22.74
		RB Size=1, RB Offset=12	22.32	22.53	22.32
		RB Size=1, RB Offset=24	22.63	22.26	22.59
		RB Size=12, RB Offset=0	21.53	21.24	21.29
		RB Size=12, RB Offset=6	21.81	21.44	21.48
		RB Size=12, RB Offset=11	21.39	21.89	21.31
		RB Size=25, RB Offset=0	20.65	20.81	20.55
10	QPSK	RB Size=1, RB Offset=0	22.02	22.44	22.17
		RB Size=1, RB Offset=24	22.87	22.90	22.21
		RB Size=1, RB Offset=49	22.41	22.31	22.47
		RB Size=25, RB Offset=0	21.33	21.07	21.83
		RB Size=25, RB Offset=12	21.74	21.53	21.90
		RB Size=25, RB Offset=24	21.40	21.16	21.81
		RB Size=50, RB Offset=0	20.20	20.49	20.76
	16QAM	RB Size=1, RB Offset=0	22.03	22.94	22.35
		RB Size=1, RB Offset=24	22.01	22.42	22.51
		RB Size=1, RB Offset=49	22.26	22.53	21.95
		RB Size=25, RB Offset=0	21.30	21.49	21.73
		RB Size=25, RB Offset=12	21.50	21.37	21.13
		RB Size=25, RB Offset=24	21.28	21.52	21.89
		RB Size=50, RB Offset=0	20.00	20.22	20.31

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.35	13	Pass
QPSK (100%RB Size)	6.32	13	Pass
16QAM (1RB Size)	4.15	13	Pass
16QAM (100%RB Size)	6.47	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									
1.4 MHz Bandwidth									
707.50	87.64	279	2.4	H	16.9	0.28	4.25	20.87	34.77
707.50	84.31	358	2.2	V	13.3	0.28	4.25	17.27	34.77
3MHz Bandwidth									
707.50	87.01	112	1.5	H	16.2	0.28	4.25	20.17	34.77
707.50	84.12	281	2.5	V	13.2	0.28	4.25	17.17	34.77
5 MHz Bandwidth									
707.50	86.82	302	1.9	H	15.7	0.28	4.25	19.67	34.77
707.50	83.13	133	1.2	V	12.8	0.28	4.25	16.77	34.77
10 MHz Bandwidth									
707.50	87.49	139	2.1	H	16.4	0.28	4.25	20.37	34.77
707.50	84.72	42	1.4	V	13.8	0.28	4.25	17.77	34.77

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									
707.50	87.53	289	1.6	H	16.5	0.28	4.25	20.47	34.77
707.50	84.27	203	1.7	V	13.2	0.28	4.25	17.17	34.77
3 MHz Bandwidth									
707.50	86.49	139	2.4	H	15.7	0.28	4.25	19.67	34.77
707.50	84.11	99	2.0	V	13.1	0.28	4.25	17.07	34.77
5 MHz Bandwidth									
707.50	86.32	274	1.5	H	15.3	0.28	4.25	19.27	34.77
707.50	83.71	176	1.7	V	12.8	0.28	4.25	16.77	34.77
10 MHz Bandwidth									
707.50	87.45	264	1.6	H	16.7	0.28	4.25	20.67	34.77
707.50	85.28	111	1.9	V	14.3	0.28	4.25	18.27	34.77

LTE Band 17:

Maximum Output Power

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	22.61	22.50
		RB Size=1, RB Offset=12	22.64	22.60	22.25
		RB Size=1, RB Offset=24	22.58	22.52	22.35
		RB Size=12, RB Offset=0	21.64	21.55	21.52
		RB Size=12, RB Offset=6	21.60	21.51	21.38
		RB Size=12, RB Offset=11	21.58	21.51	21.43
		RB Size=25, RB Offset=0	20.58	20.49	20.46
	16QAM	RB Size=1, RB Offset=0	22.80	22.70	22.98
		RB Size=1, RB Offset=12	22.72	22.64	22.86
		RB Size=1, RB Offset=24	22.64	22.58	22.86
		RB Size=12, RB Offset=0	21.76	21.63	21.66
		RB Size=12, RB Offset=6	21.69	21.59	21.66
		RB Size=12, RB Offset=11	21.68	21.59	21.67
		RB Size=25, RB Offset=0	20.62	20.51	20.54
10.0	QPSK	RB Size=1, RB Offset=0	22.58	22.56	22.57
		RB Size=1, RB Offset=24	22.51	22.45	22.31
		RB Size=1, RB Offset=49	22.21	22.24	22.39
		RB Size=25, RB Offset=0	21.55	21.52	21.53
		RB Size=25, RB Offset=12	21.54	21.49	21.51
		RB Size=25, RB Offset=24	21.53	21.43	21.44
		RB Size=50, RB Offset=0	20.55	20.52	20.53
	16QAM	RB Size=1, RB Offset=0	22.58	22.54	22.58
		RB Size=1, RB Offset=24	22.39	22.37	22.43
		RB Size=1, RB Offset=49	22.22	22.26	22.45
		RB Size=25, RB Offset=0	21.59	21.56	21.63
		RB Size=25, RB Offset=12	21.57	21.51	21.60
		RB Size=25, RB Offset=24	21.55	21.53	21.62
		RB Size=50, RB Offset=0	20.58	20.56	20.59

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.15	13	Pass
QPSK (100%RB Size)	6.03	13	Pass
16QAM (1RB Size)	4.91	13	Pass
16QAM (100%RB Size)	7.02	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									
5 MHz Bandwidth									
710.00	86.51	291	1.7	H	15.6	0.28	4.25	19.57	34.77
710.00	83.67	51	1.6	V	12.6	0.28	4.25	16.57	34.77
10MHz Bandwidth									
710.00	86.35	316	1.7	H	12.4	0.28	4.25	19.37	34.77
710.00	83.79	62	1.1	V	12.8	0.28	4.25	16.77	34.77

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)		
5 MHz Bandwidth									
710.00	87.01	47	1.5	H	16.0	0.28	4.25	19.97	34.77
710.00	83.19	61	1.5	V	12.2	0.28	4.25	16.17	34.77
10 MHz Bandwidth									
710.00	86.59	187	2.1	H	15.7	0.28	4.25	19.67	34.77
710.00	84.42	130	1.6	V	13.9	0.28	4.25	17.87	34.77

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

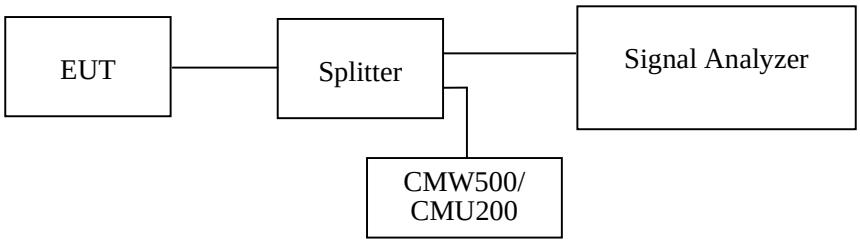
Applicable Standards

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:	54~57 %
ATM Pressure:	101.0~101.5 kPa

The testing was performed by Chris Wang from 2016-10-24 to2016-10-26.

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	244.5	314.6
EGPRS(8PSK)	836.6	258.5	338.7

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.23	4.85
HSUPA (BPSK)	836.6	4.23	4.85
HSDPA (16QAM)	836.6	4.21	4.91

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	246.5	318.6
EGPRS(8PSK)	1880.0	244.5	308.6

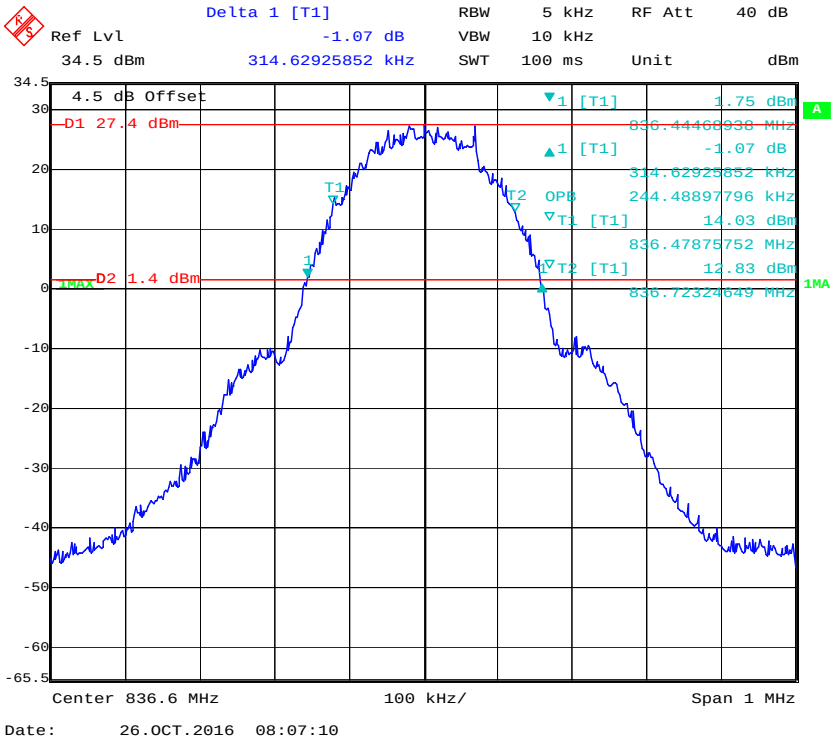
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.21	4.93
HSUPA (BPSK)	1880.0	4.21	4.89
HSDPA (16QAM)	1880.0	4.21	4.91

AWS Band (Part 27)

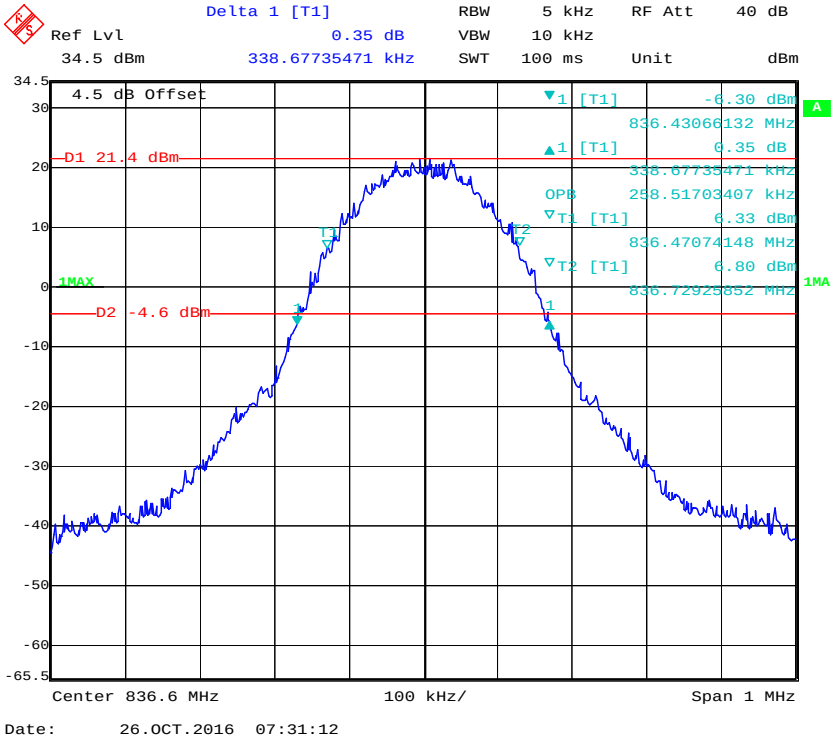
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.4	4.21	4.91
HSUPA (BPSK)	1732.4	4.23	4.89
HSDPA (16QAM)	1732.4	4.21	4.93

Cellular Band (Part 22H)

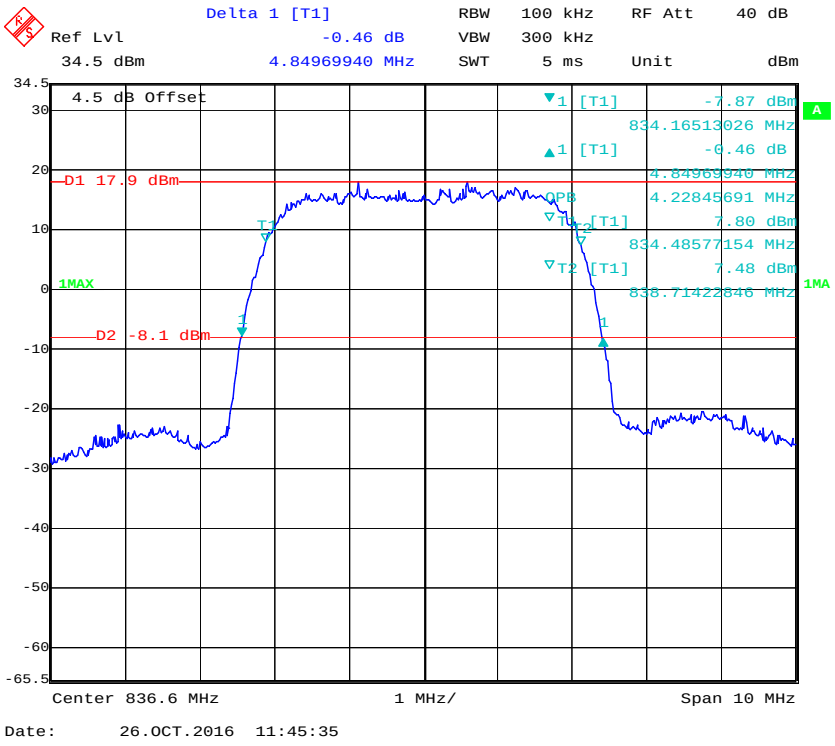
99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



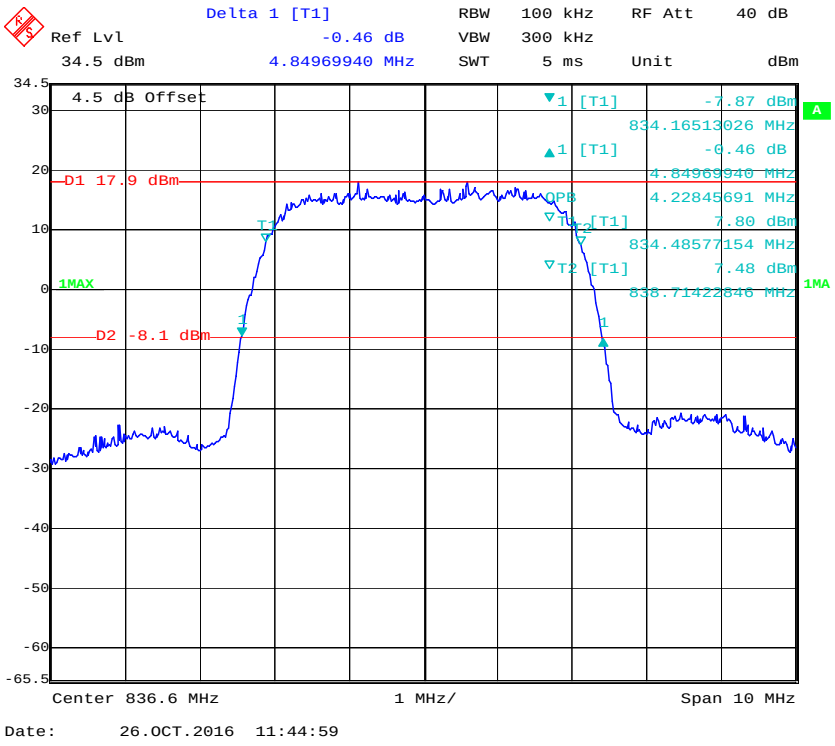
99% Occupied & 26 dB Emissions Bandwidth for EDGE Mode



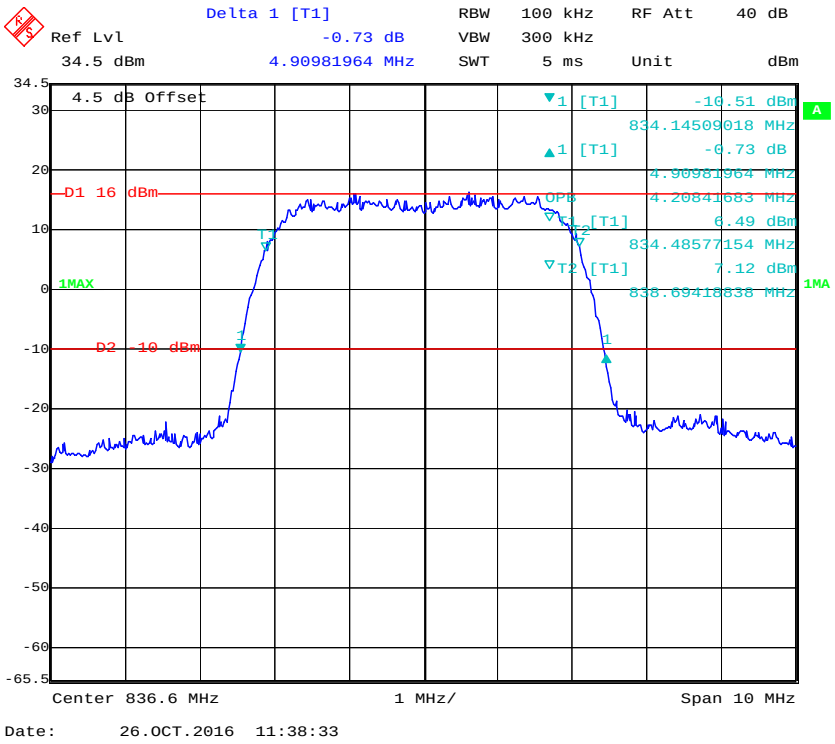
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode



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

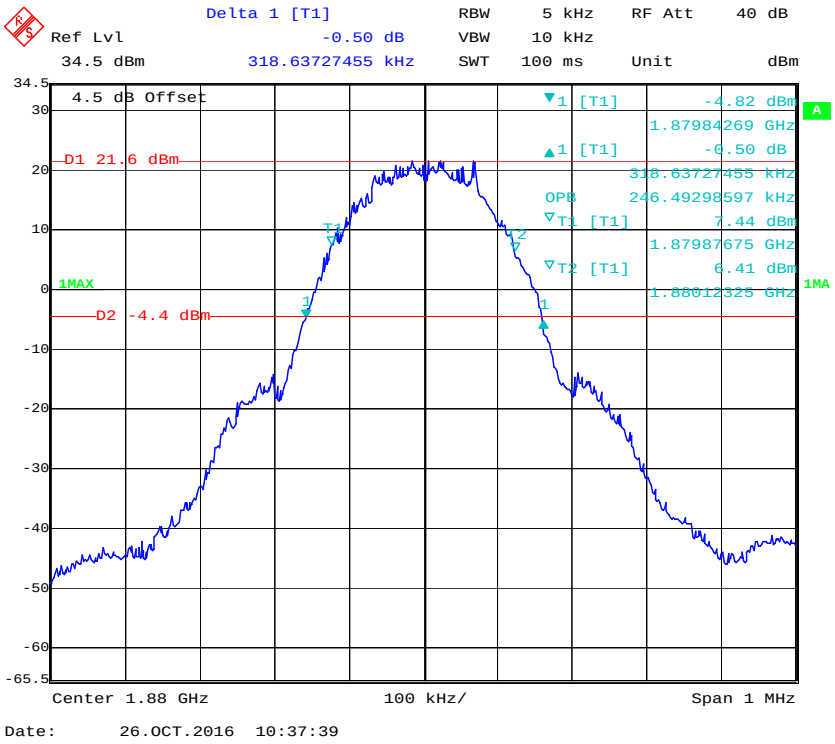


99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode

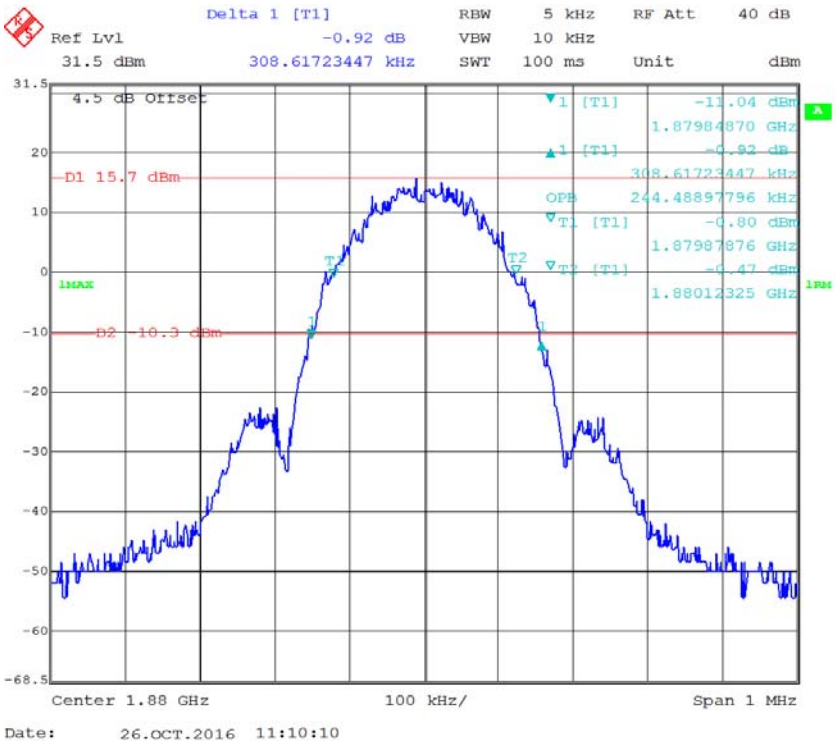


PCS Band (Part 24E)

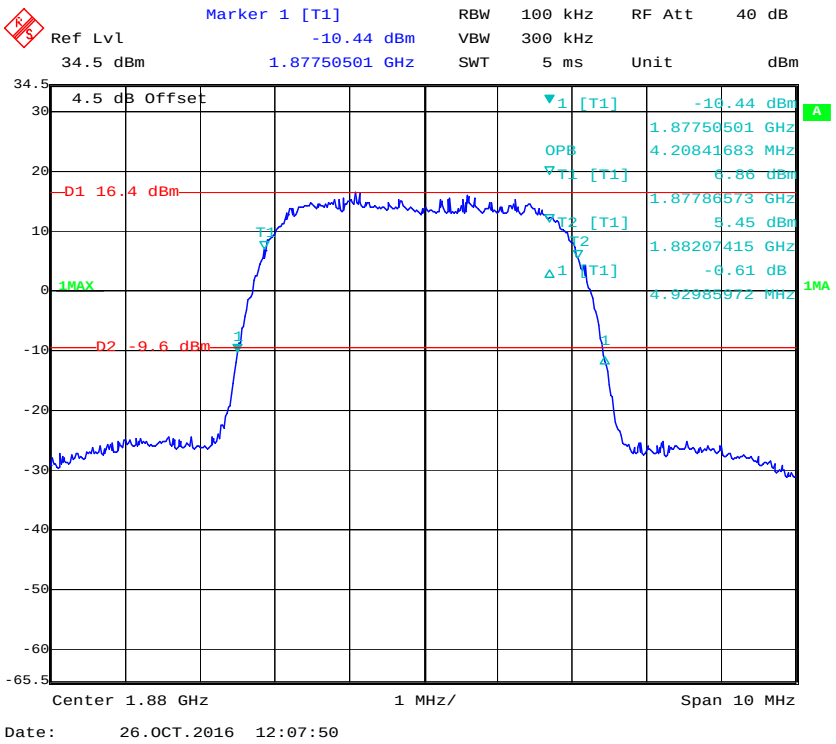
99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



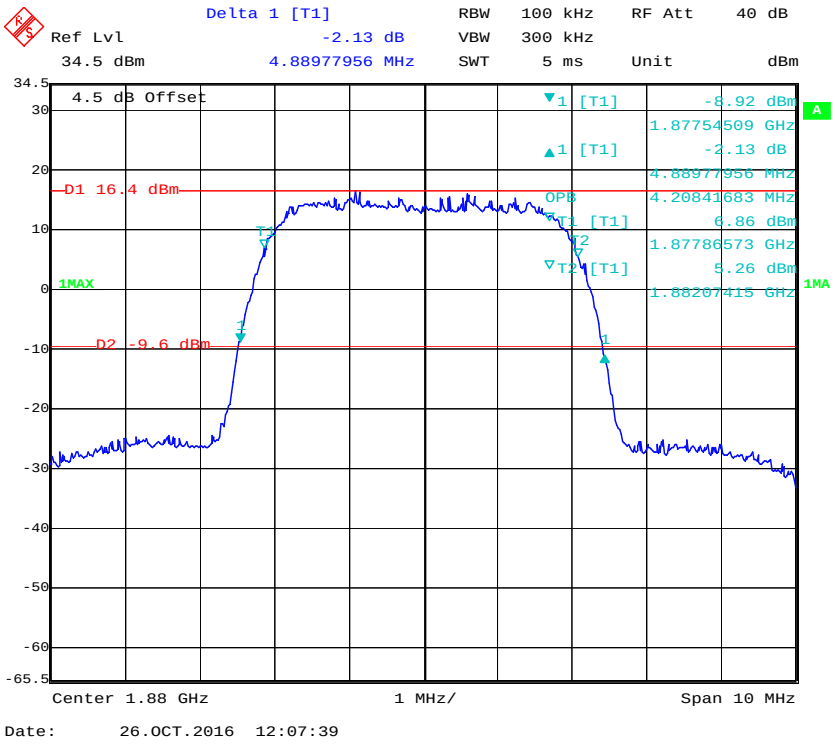
99% Occupied & 26 dB Emissions Bandwidth for EGPRS (8PSK) Mode



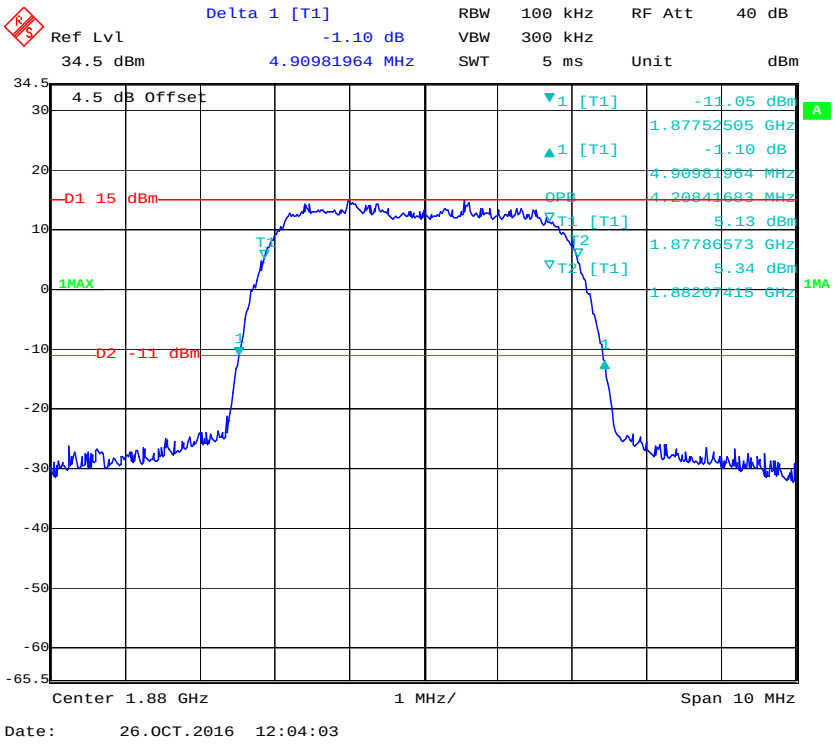
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode



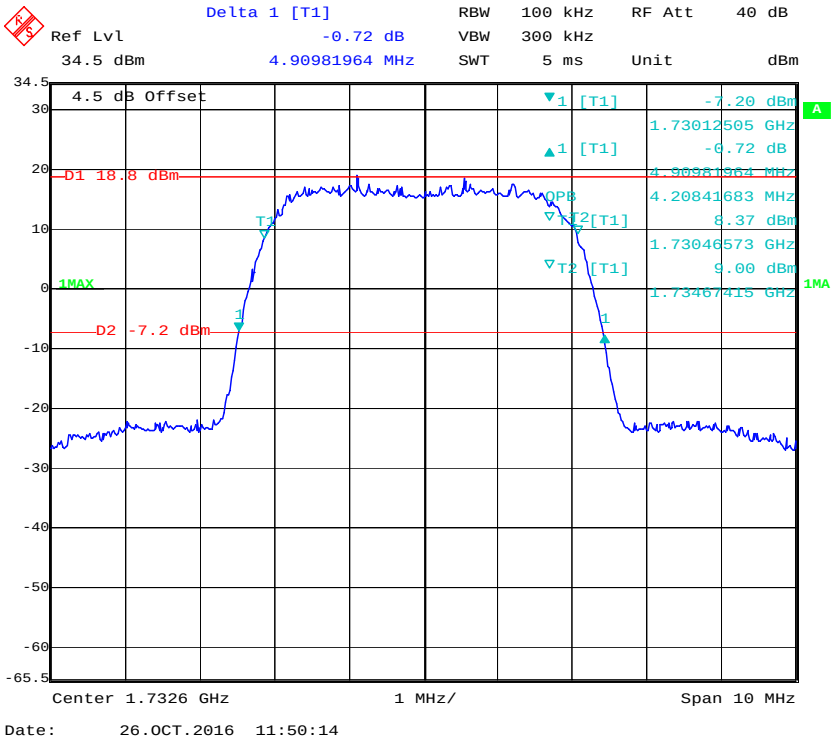
99% Occupied & 26 dB Emissions Bandwidth for HSUPA (BPSK) Mode



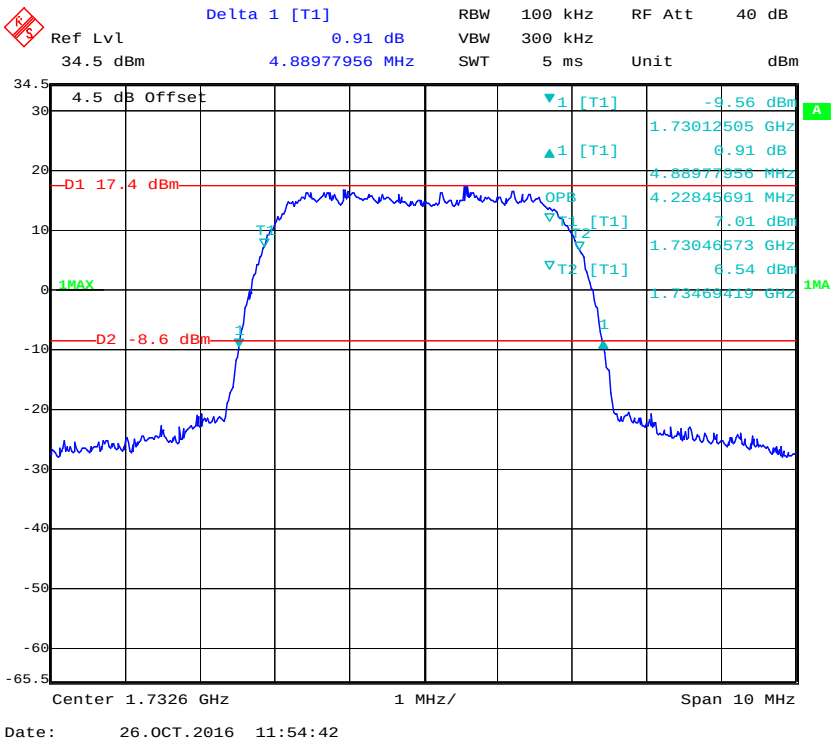
99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode



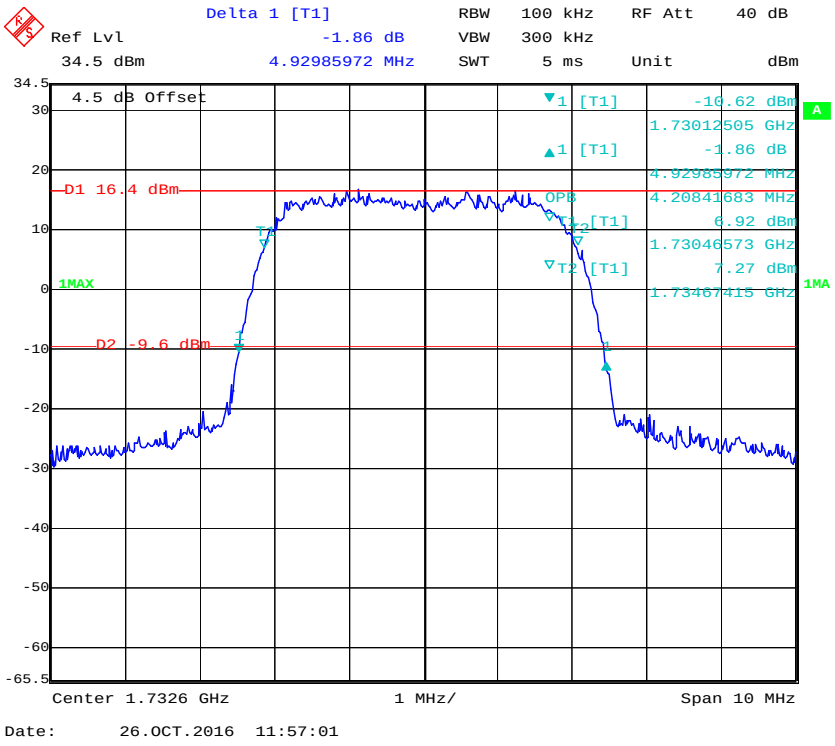
AWS Band (Part 27)
99% Occupied & 26 dB Emissions Bandwidth for WCDMA (BPSK) Mode



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



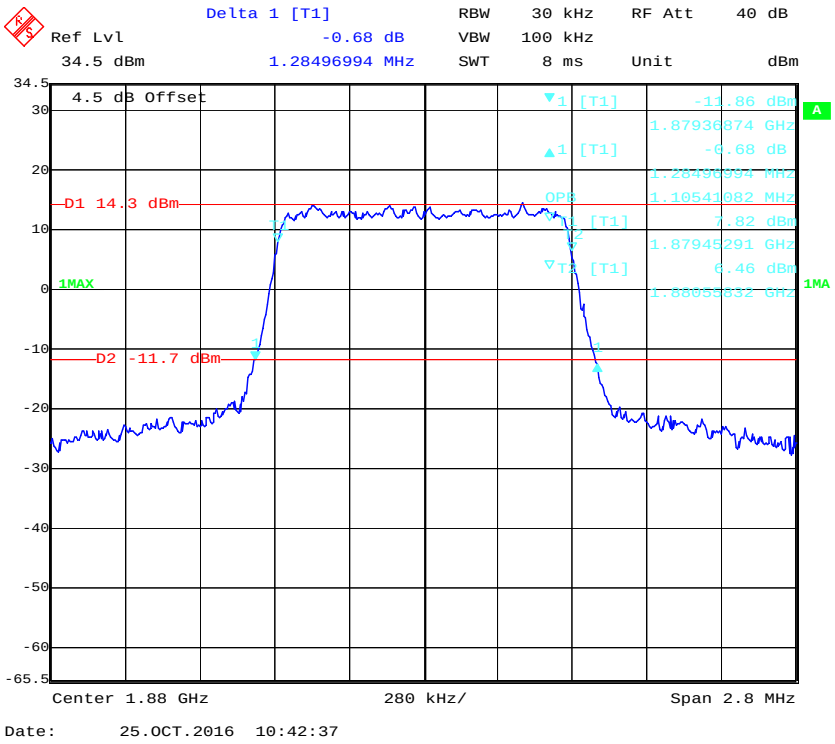
99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode



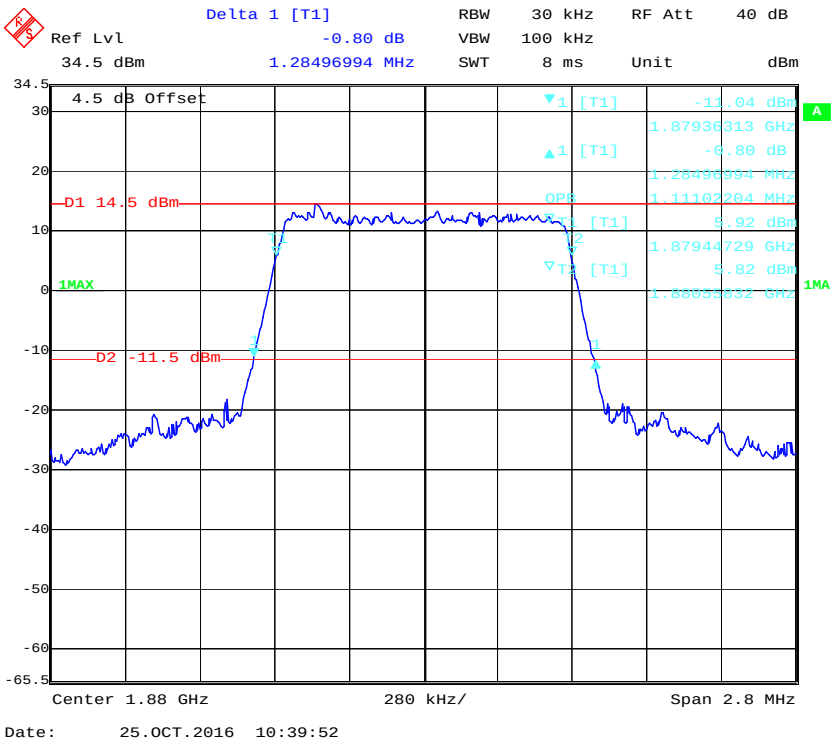
LTE Band 2: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.285
	16QAM	1.111	1.285
3.0	QPSK	2.705	2.934
	16QAM	2.705	2.970
5.0	QPSK	4.549	5.070
	16QAM	4.549	5.070
10.0	QPSK	8.978	9.739
	16QAM	8.938	9.780
15.0	QPSK	13.587	15.090
	16QAM	13.587	14.970
20.0	QPSK	18.036	19.559
	16QAM	18.036	19.639

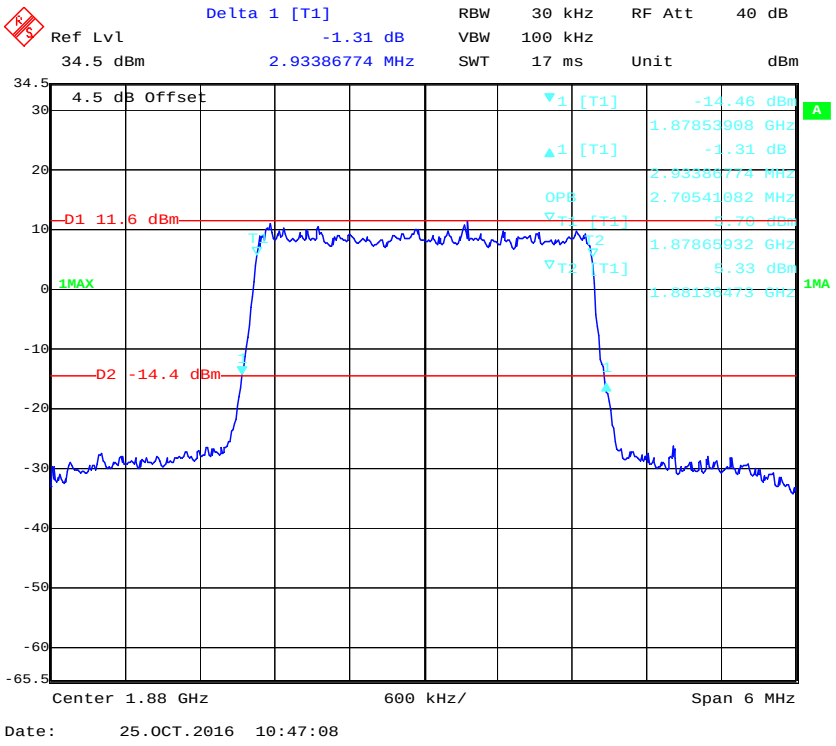
QPSK (1.4 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



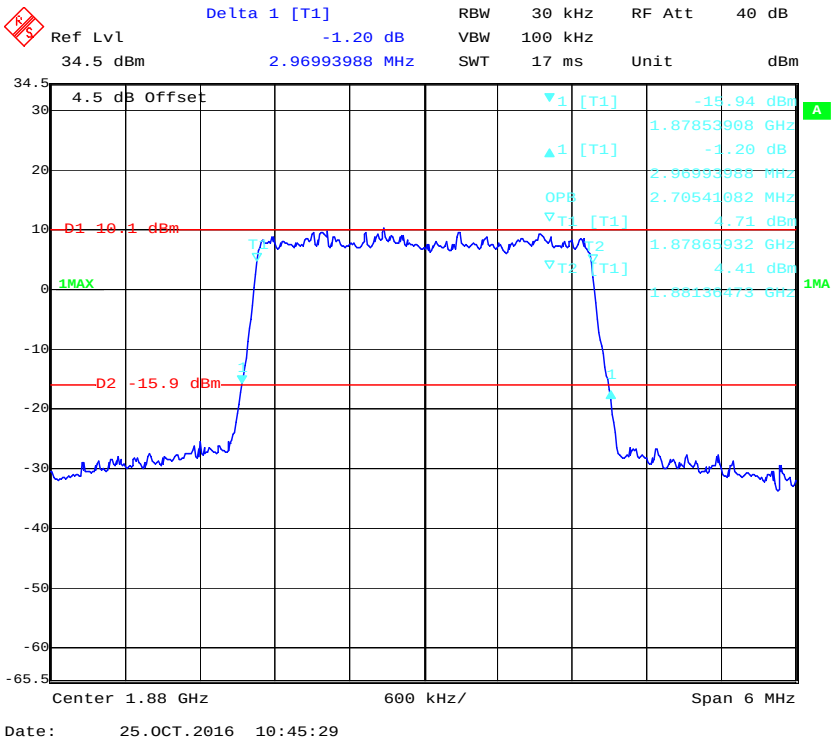
16-QAM (1.4 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



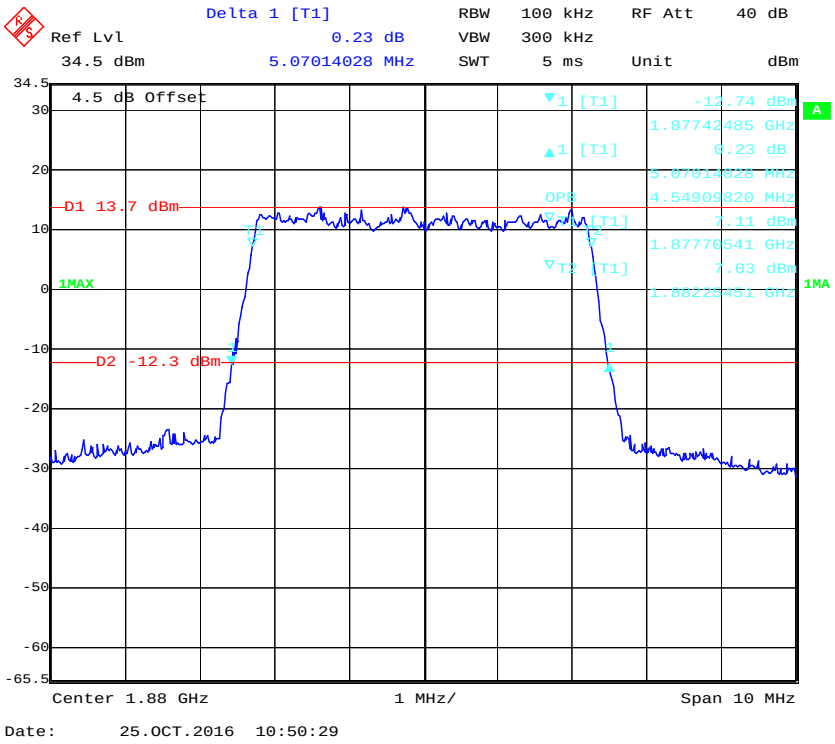
QPSK (3.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



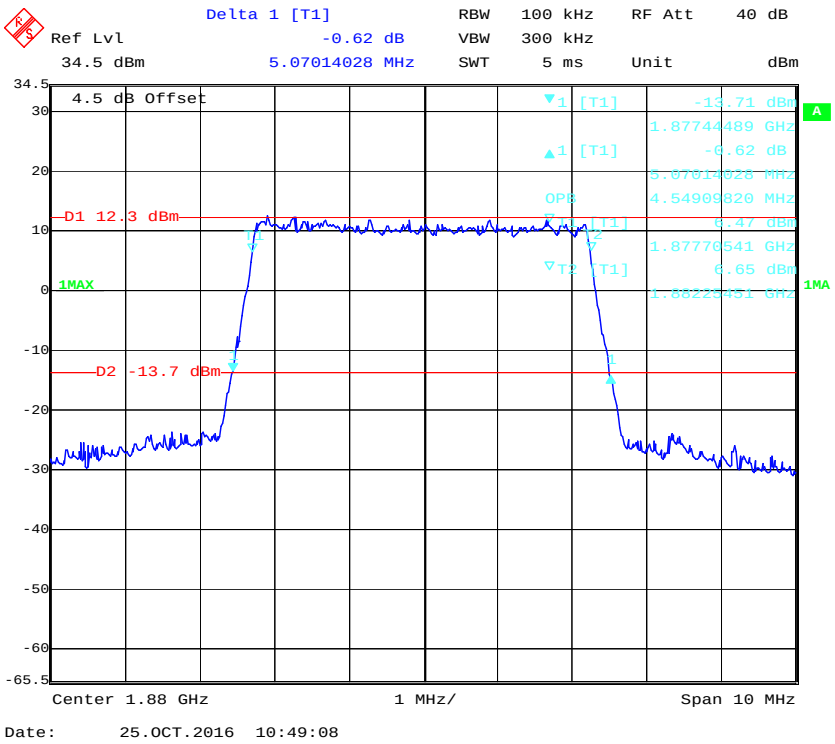
16-QAM (3.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



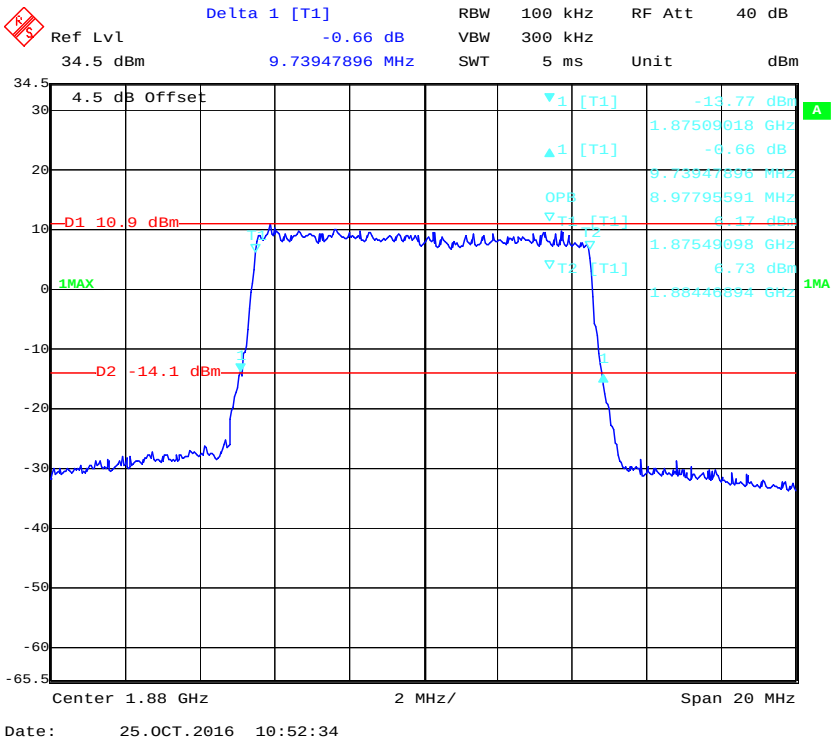
QPSK (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



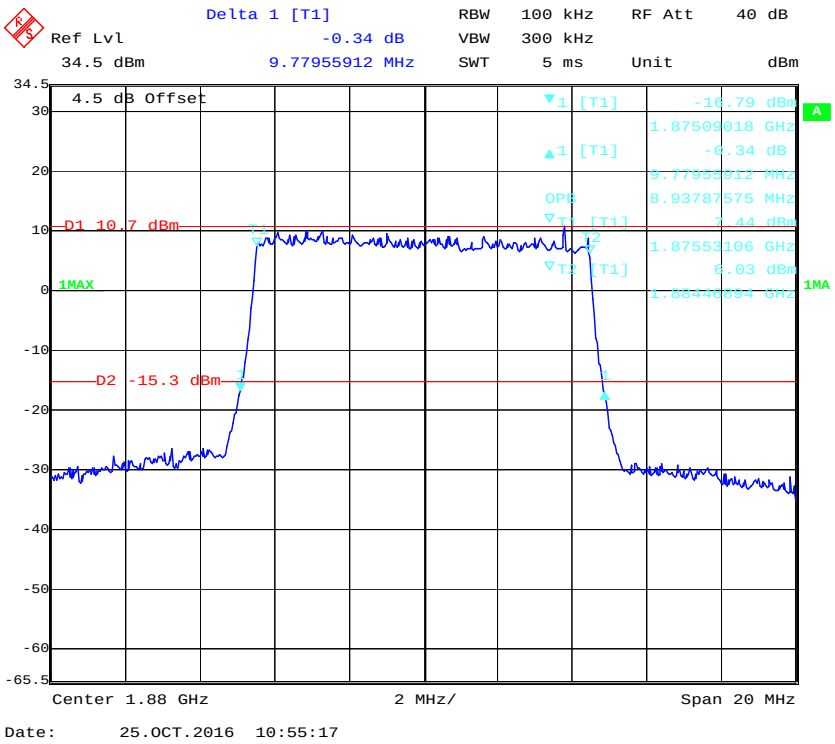
16-QAM (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



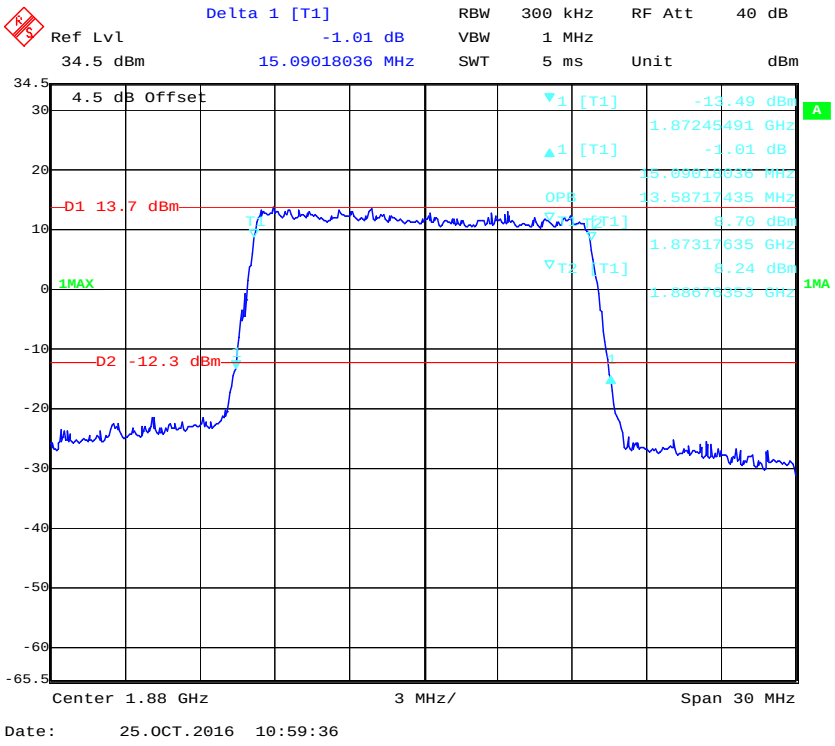
QPSK (10.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



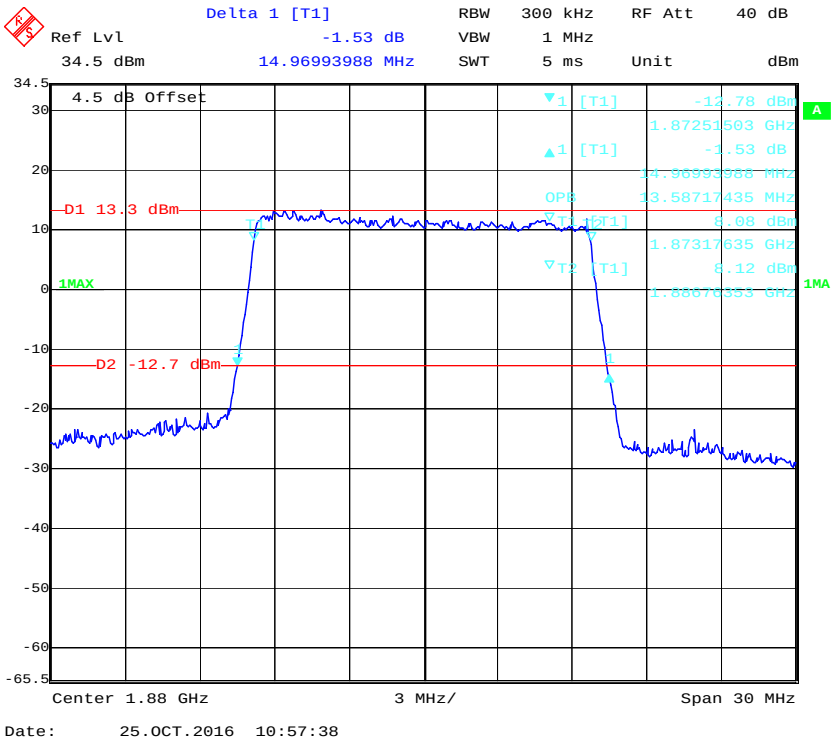
16-QAM (10.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



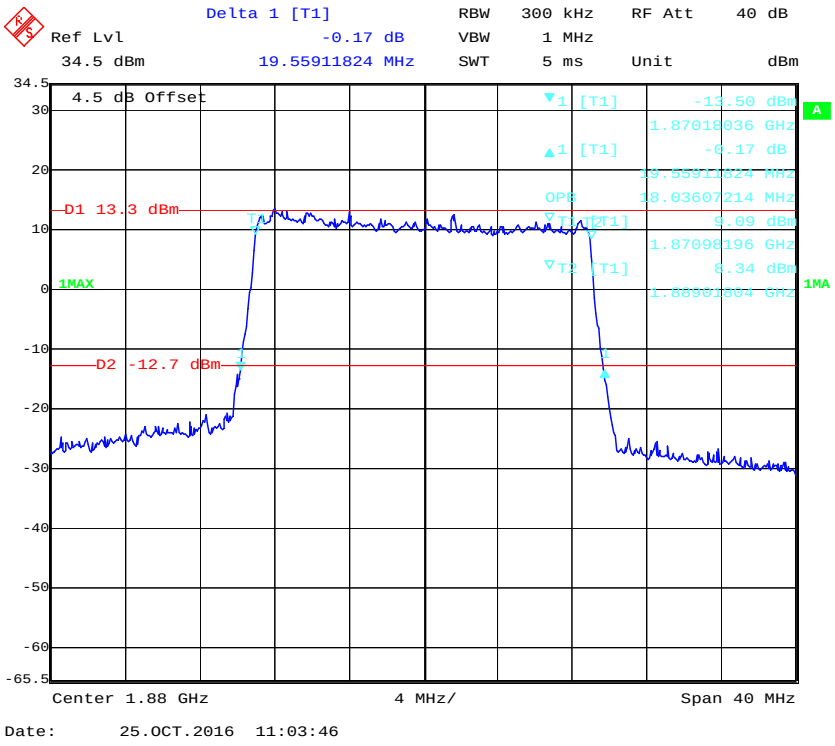
QPSK (15.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



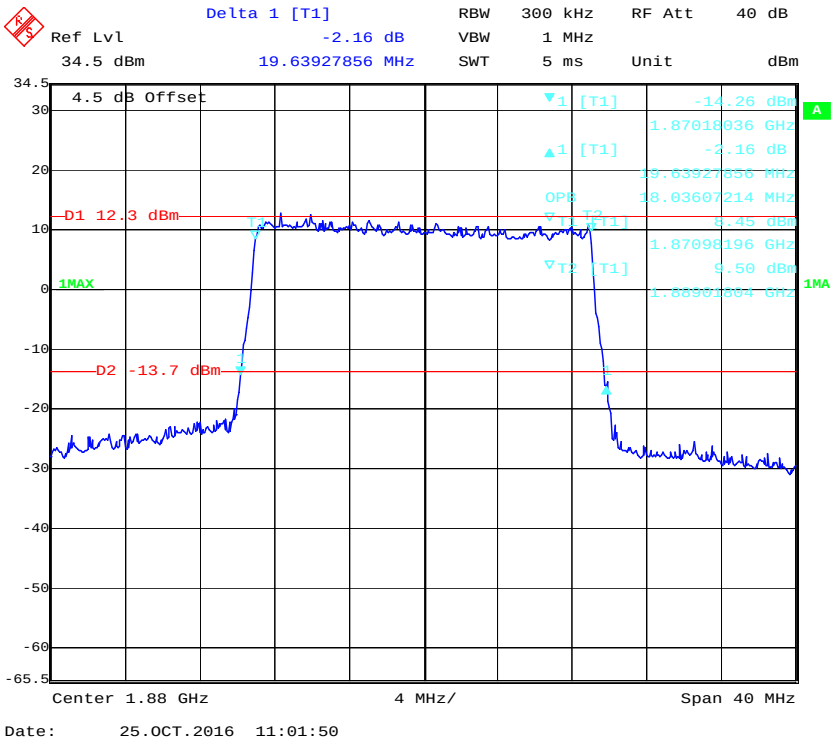
16-QAM (15.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



QPSK (20.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



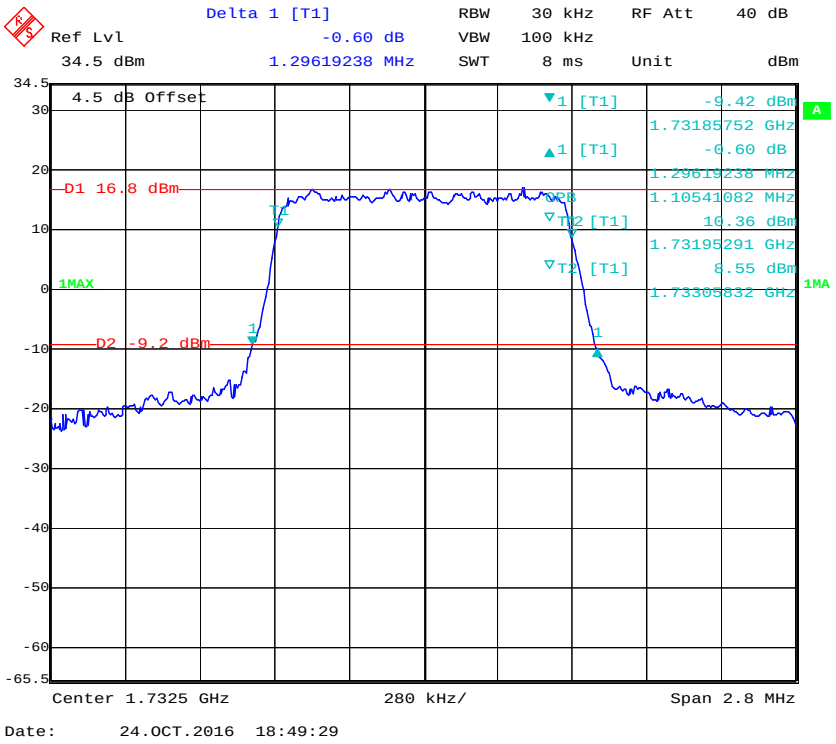
16-QAM (20.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



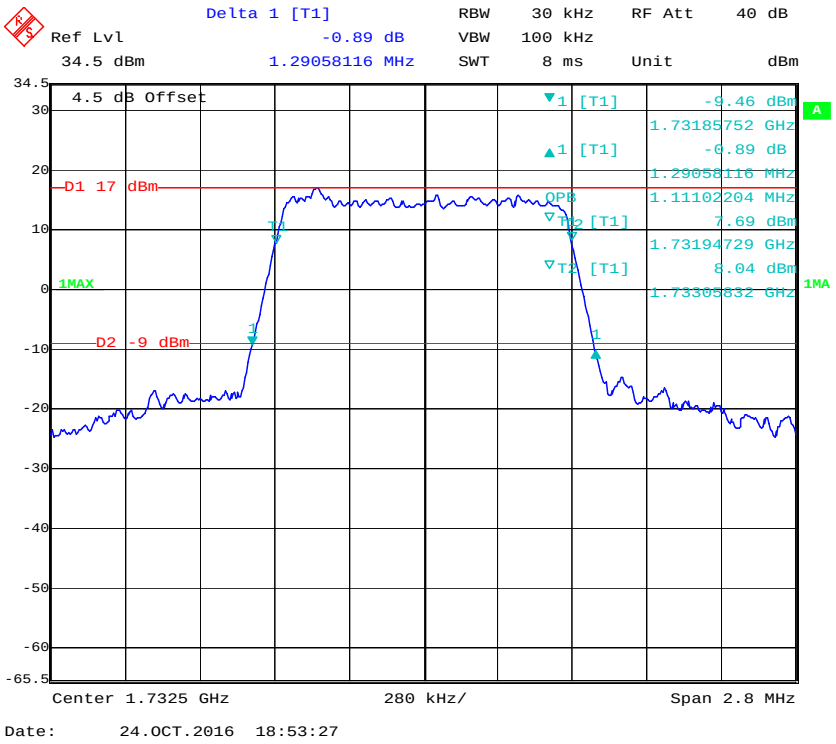
LTE Band 4: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.296
	16QAM	1.111	1.291
3.0	QPSK	2.693	2.934
	16QAM	2.693	2.958
5.0	QPSK	4.549	5.090
	16QAM	4.549	5.110
10.0	QPSK	8.978	9.940
	16QAM	8.978	9.900
15.0	QPSK	13.467	15.150
	16QAM	13.587	15.030
20.0	QPSK	18.036	19.599
	16QAM	18.036	19.800

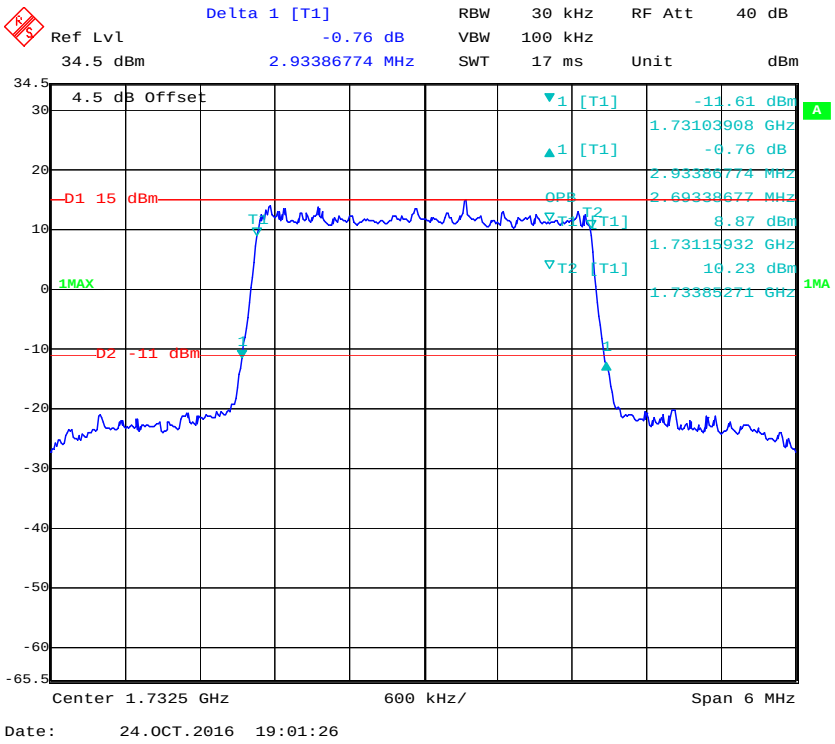
QPSK (1.4 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



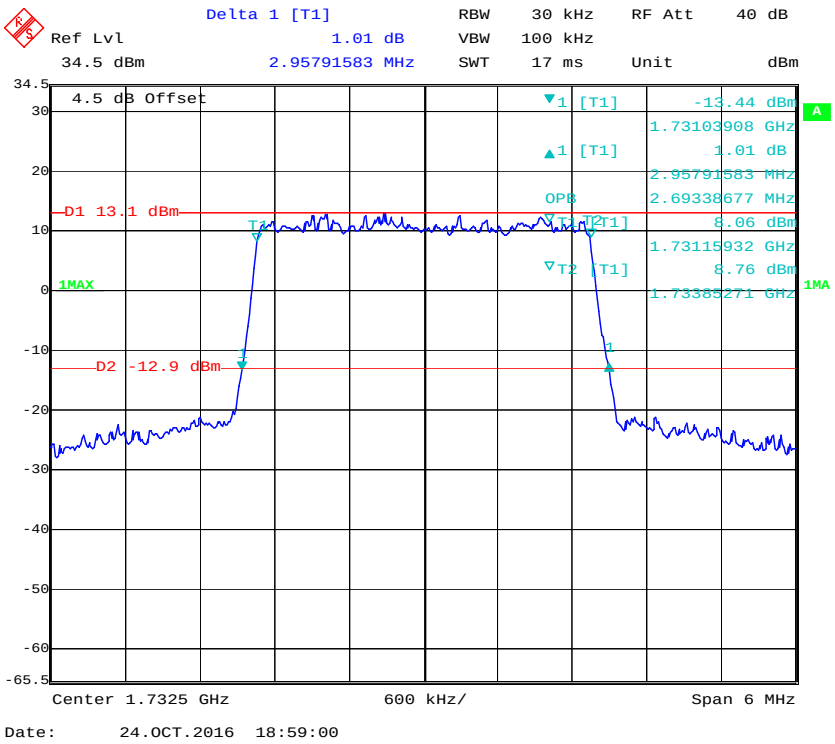
16-QAM (1.4 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



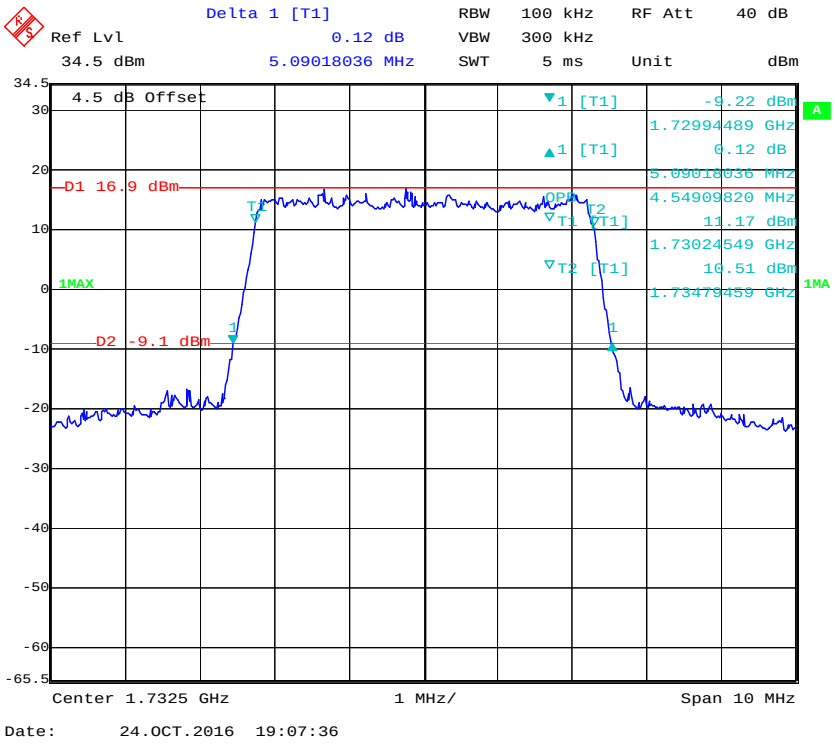
QPSK (3.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



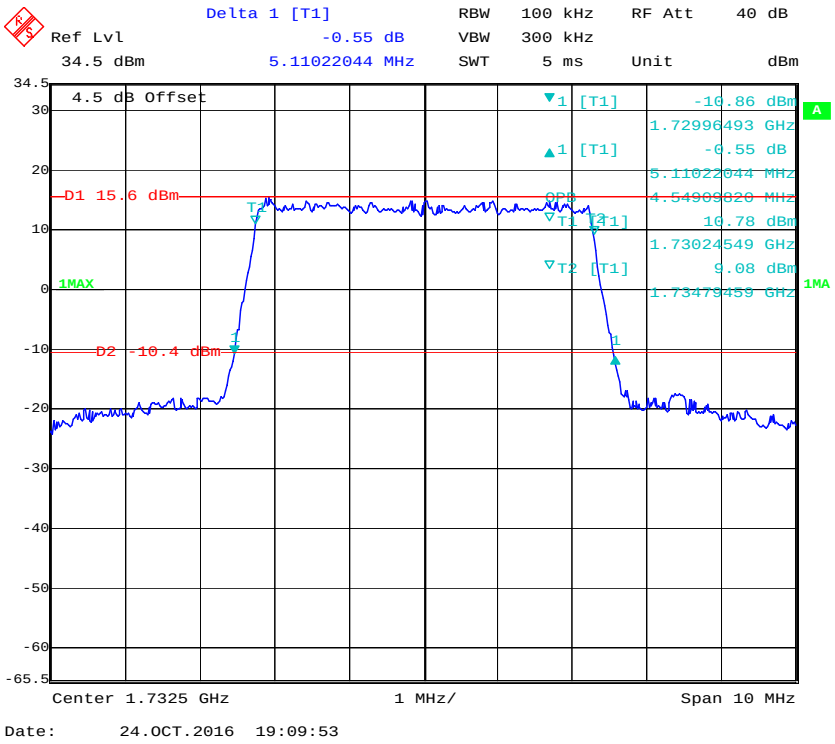
16-QAM (3.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



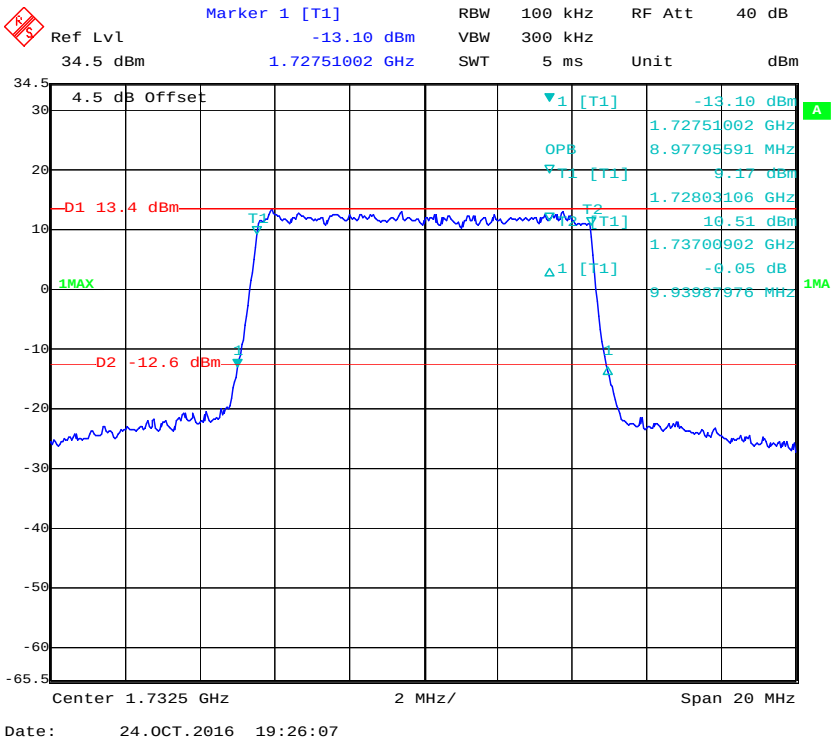
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



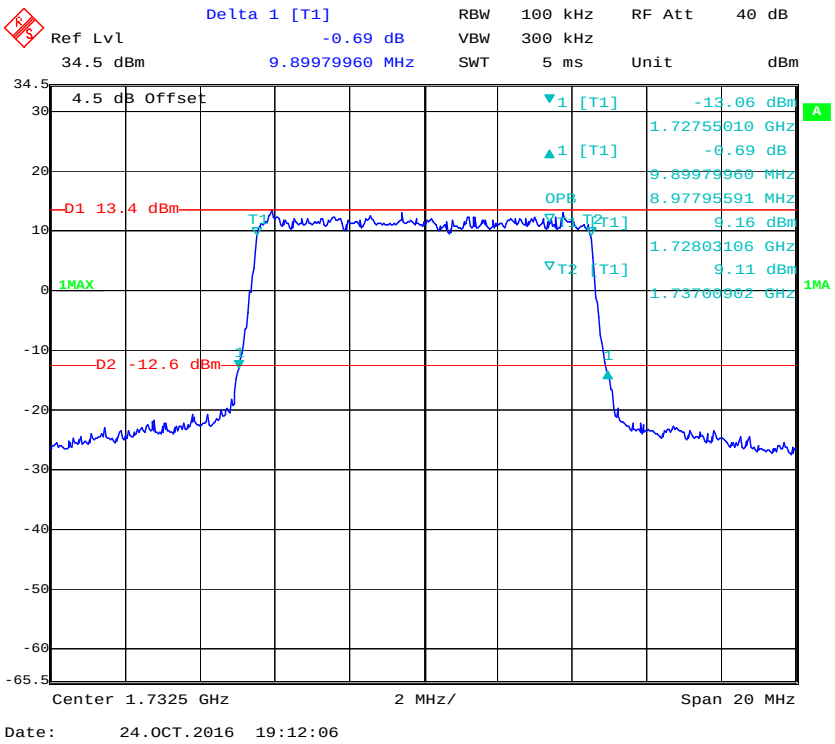
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



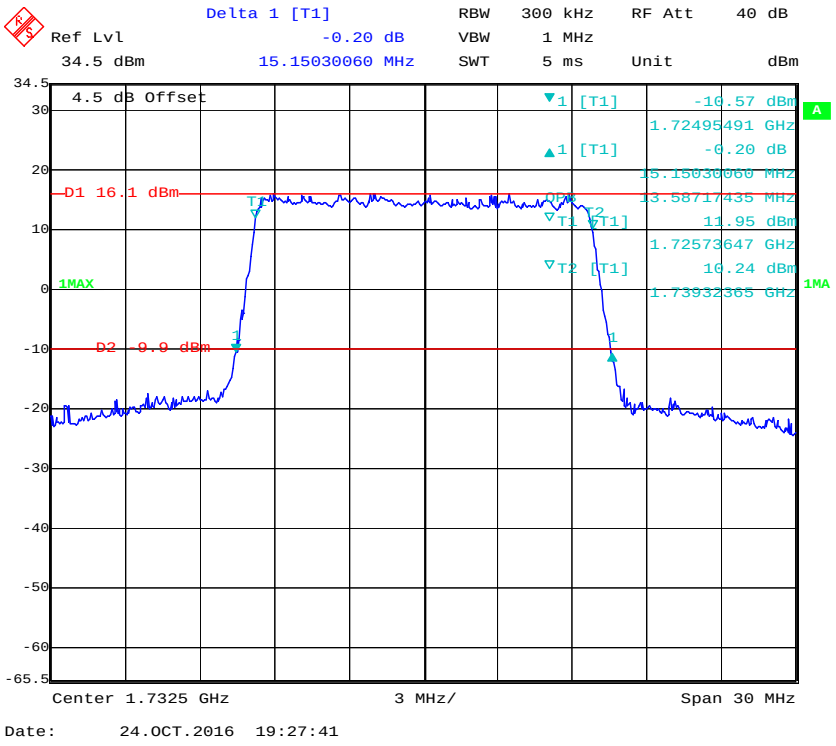
QPSK (10.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



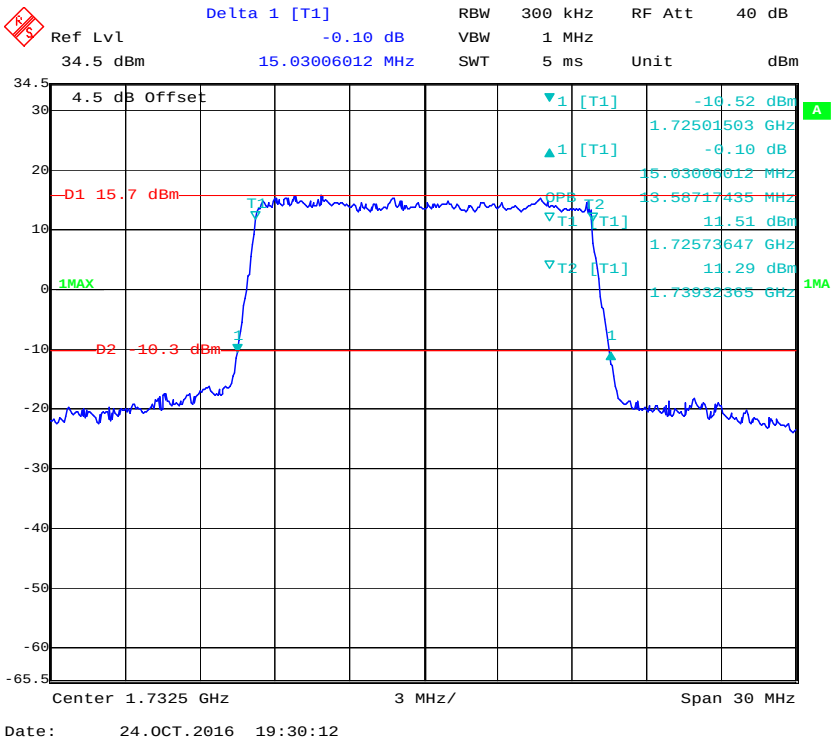
16-QAM (10.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



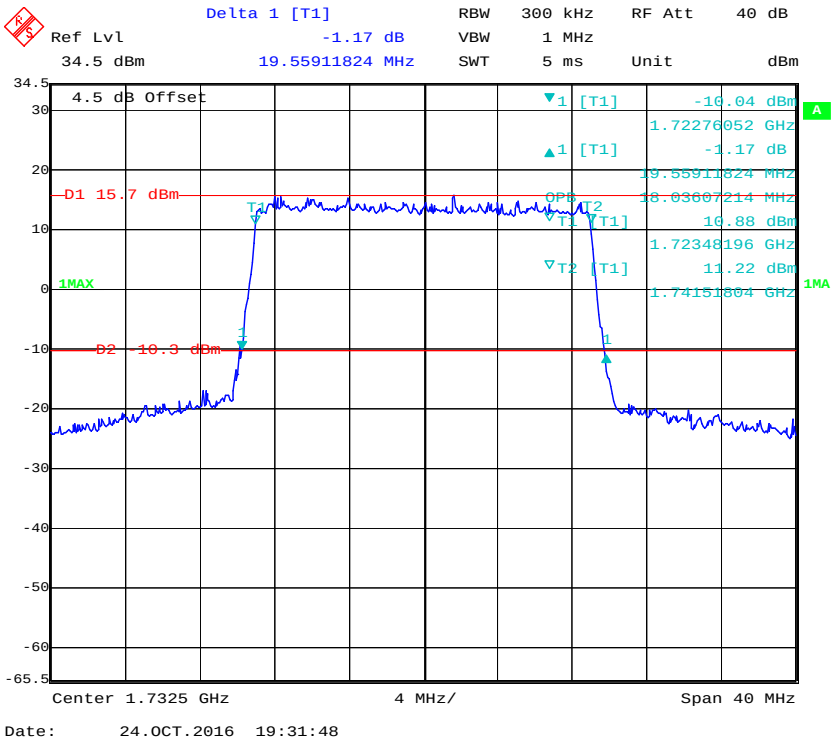
QPSK (15.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



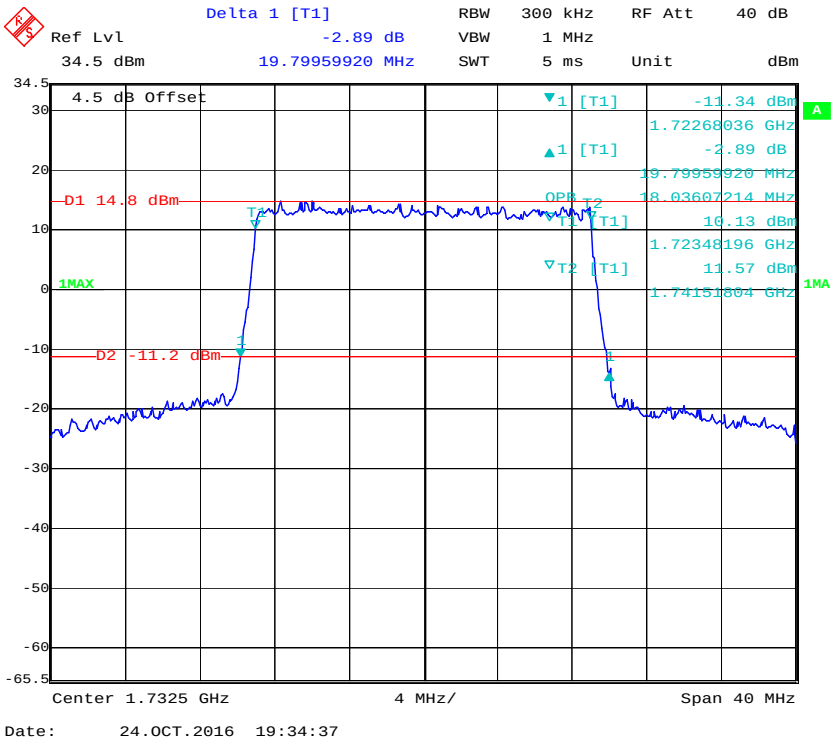
16-QAM (15.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



QPSK (20.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



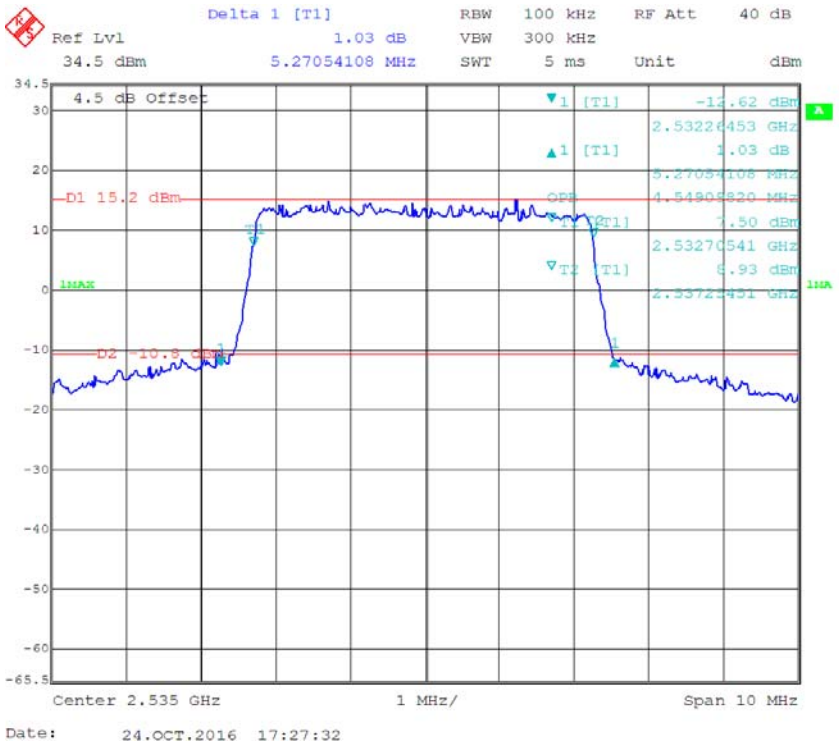
16-QAM (20.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



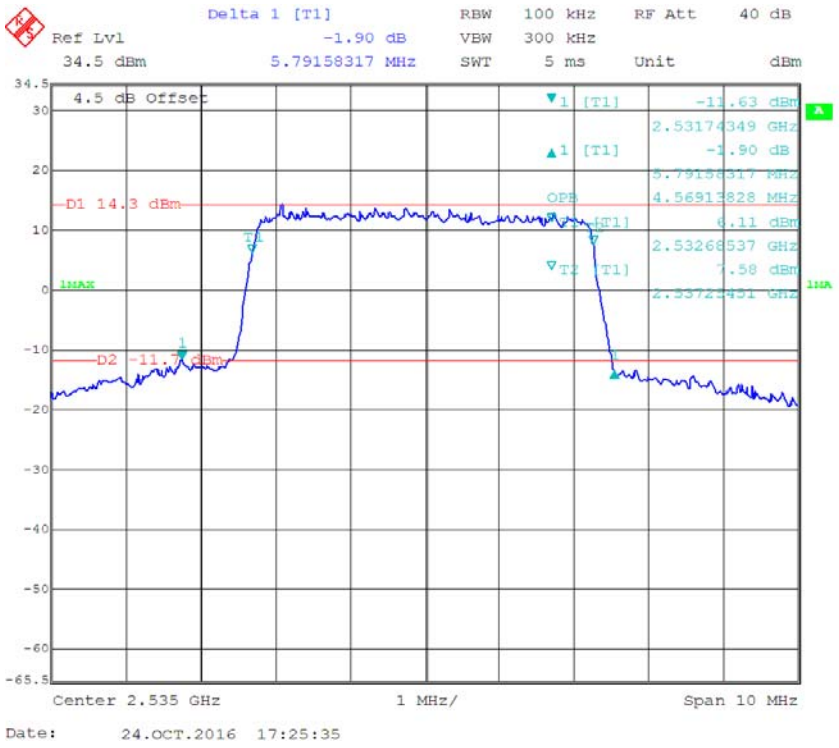
LTE Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.549	5.271
	16QAM	4.569	5.792
10.0	QPSK	7.936	13.467
	16QAM	7.896	13.587
15.0	QPSK	11.964	19.479
	16QAM	11.964	19.960
20.0	QPSK	11.964	19.479
	16QAM	15.792	22.946

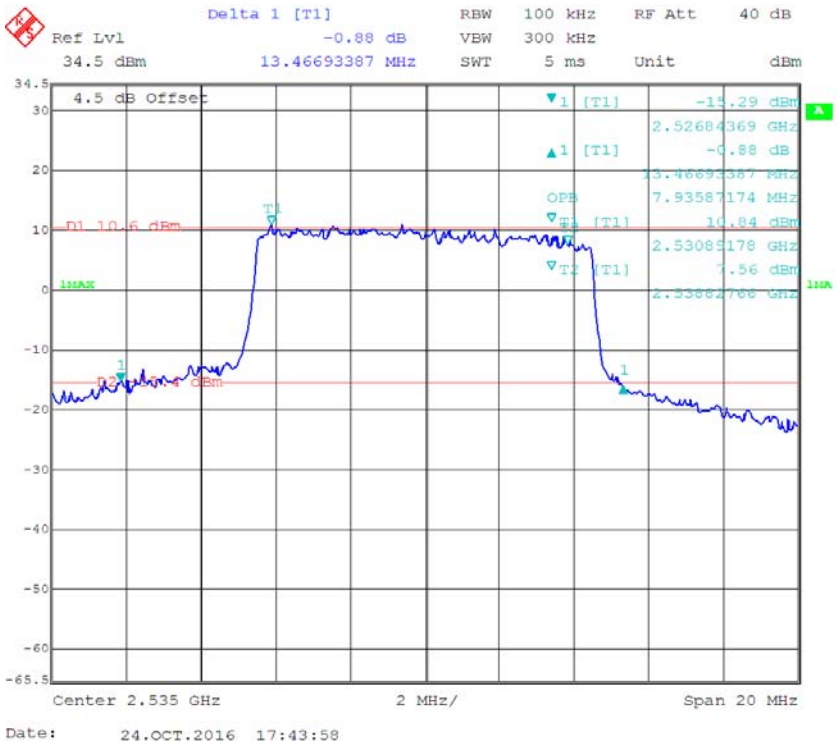
QPSK (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



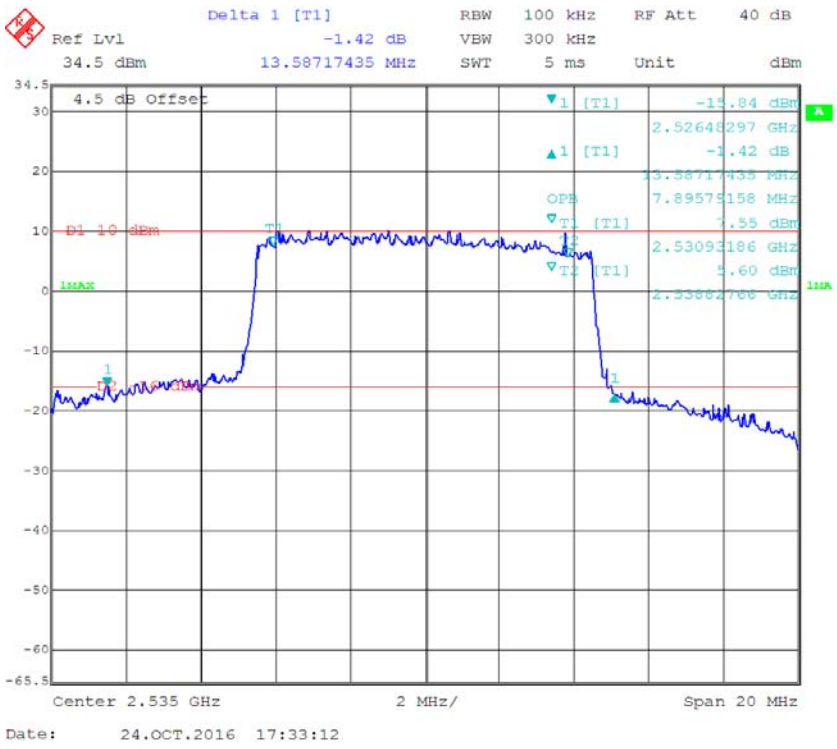
16-QAM (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



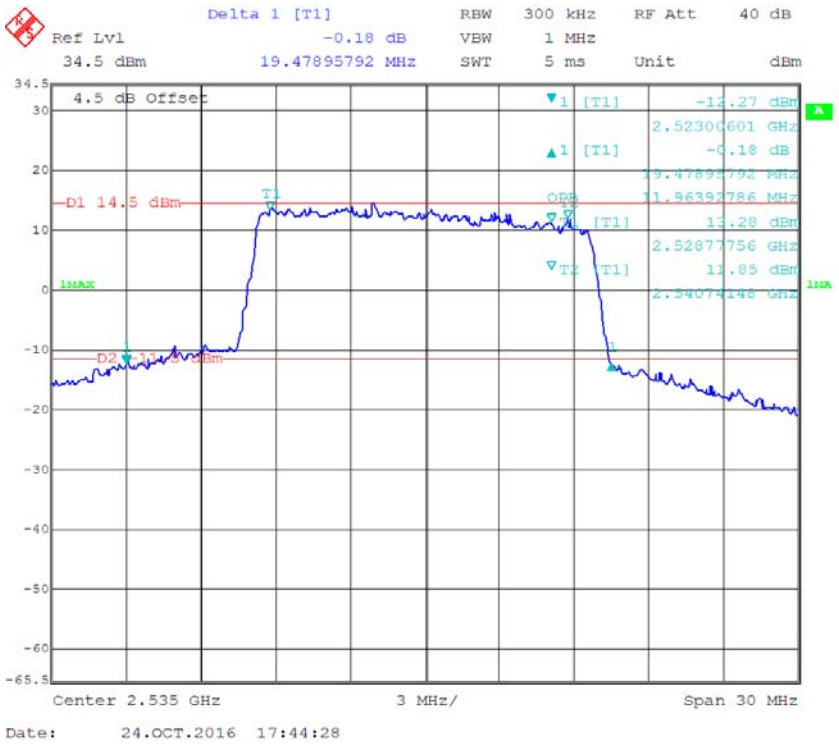
QPSK (10.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



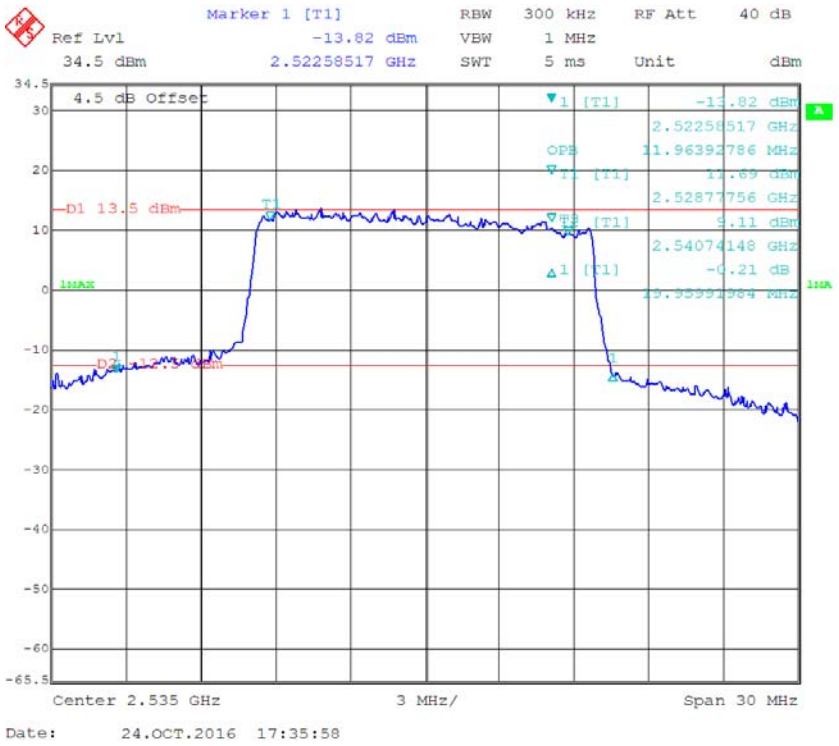
16-QAM (10.0MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



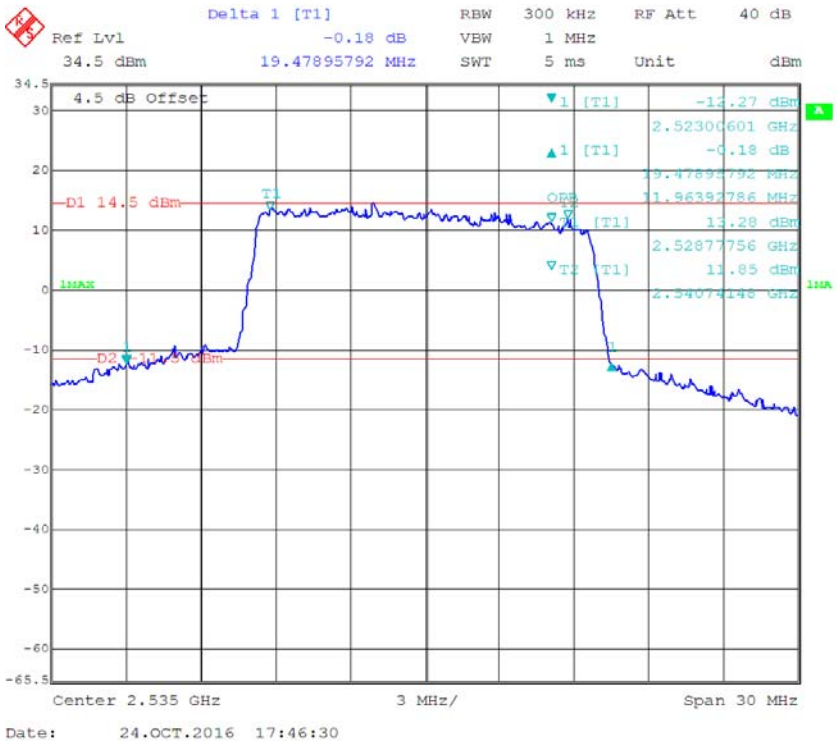
QPSK (15.0 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



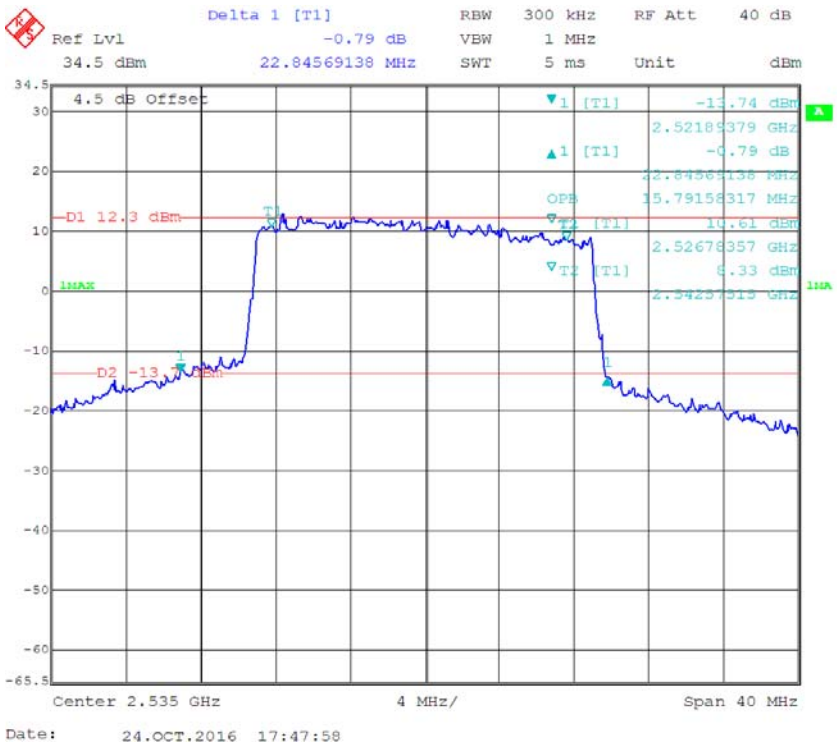
16-QAM (15.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



QPSK (20.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



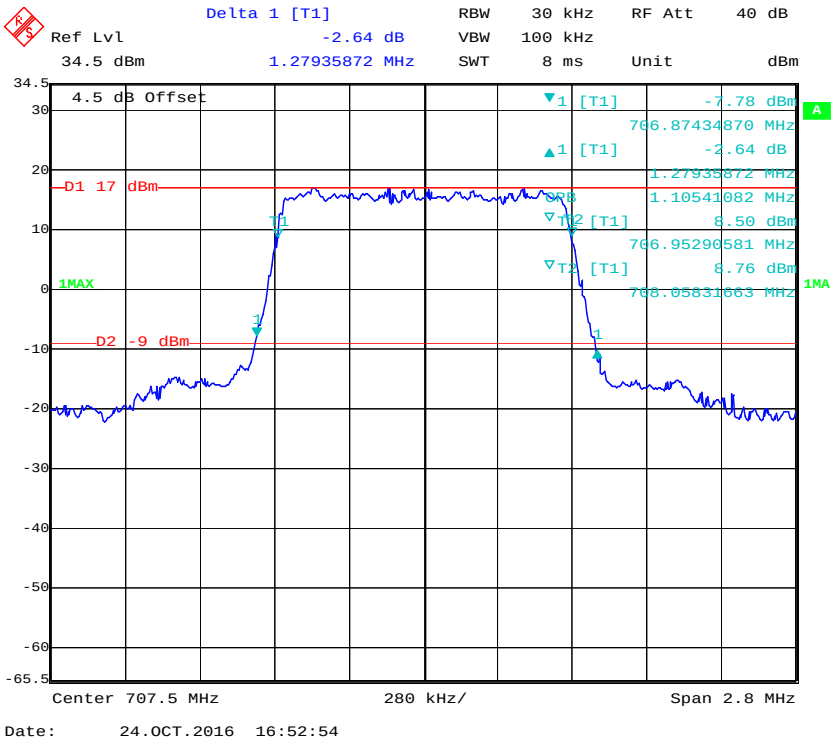
16-QAM (20.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



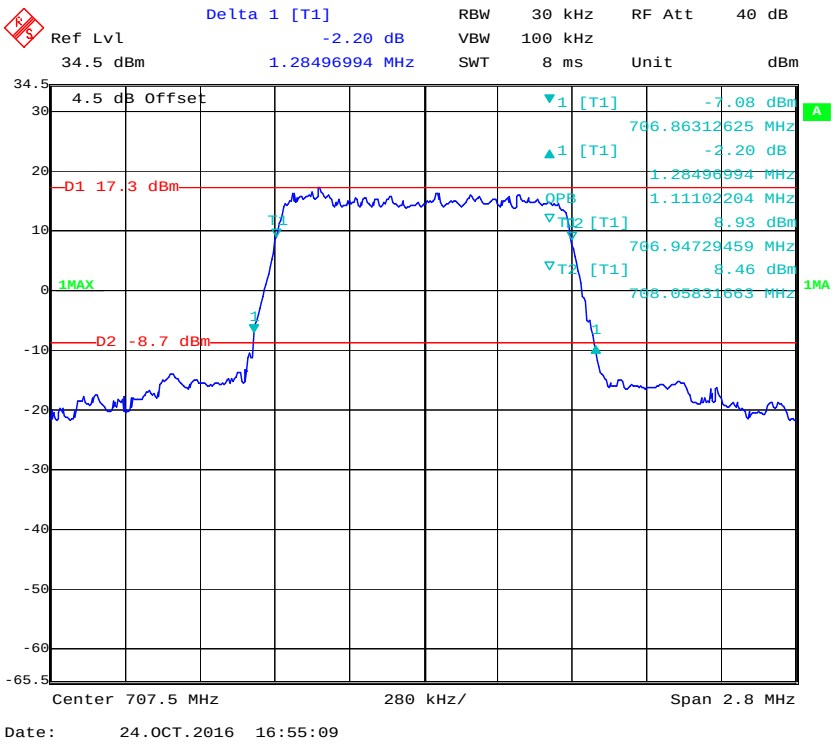
LTE Band 12: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.279
	16QAM	1.111	1.285
3.0	QPSK	2.693	2.922
	16QAM	2.693	2.970
5.0	QPSK	4.569	5.070
	16QAM	4.569	5.090
10.0	QPSK	9.018	9.860
	16QAM	8.978	9.739

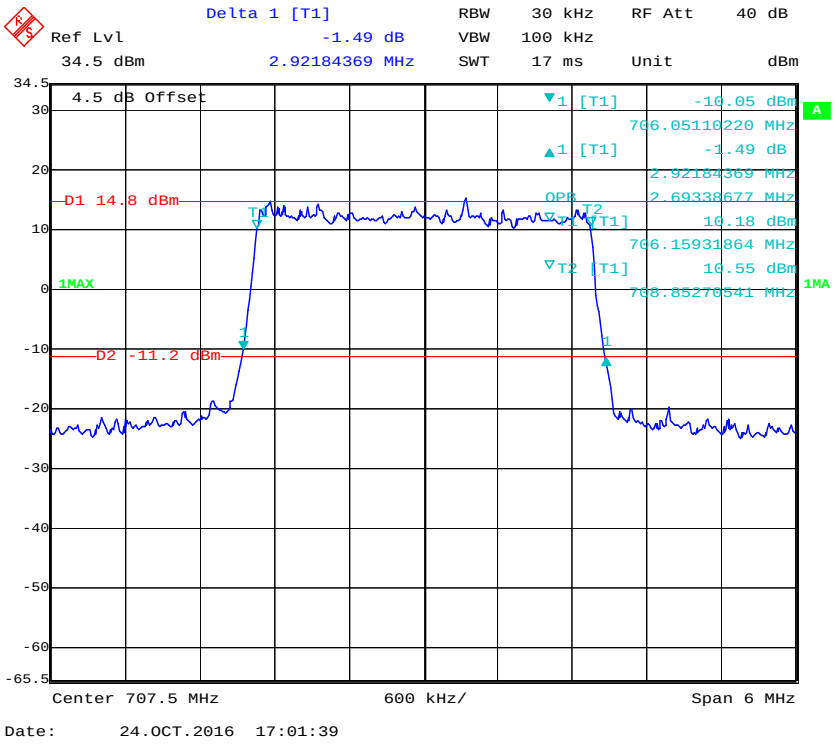
QPSK (1.4 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



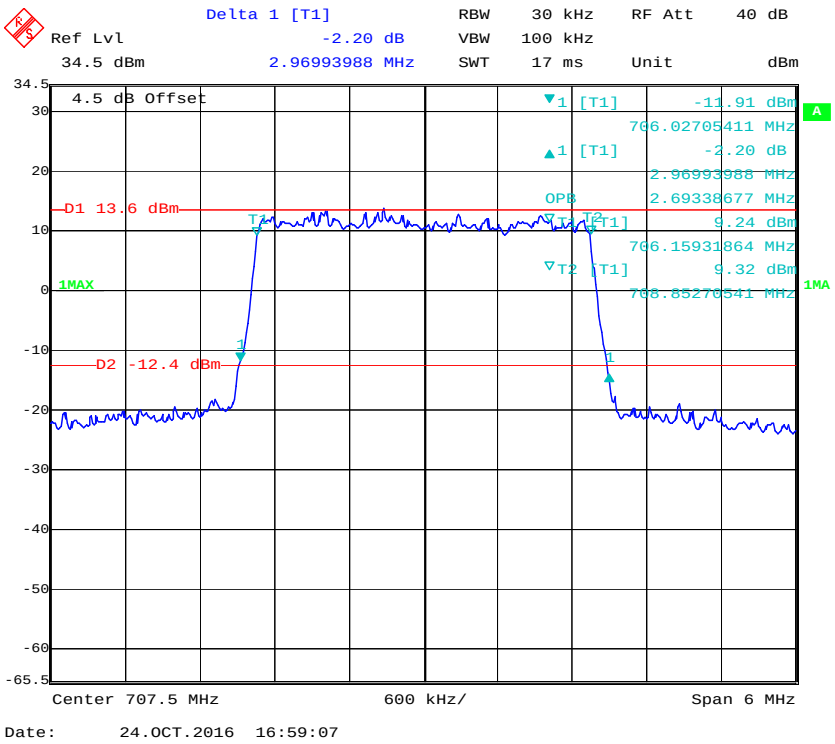
16-QAM (1.4 MHz) -99% Occupied &26 dB Bandwidth, Middle channel



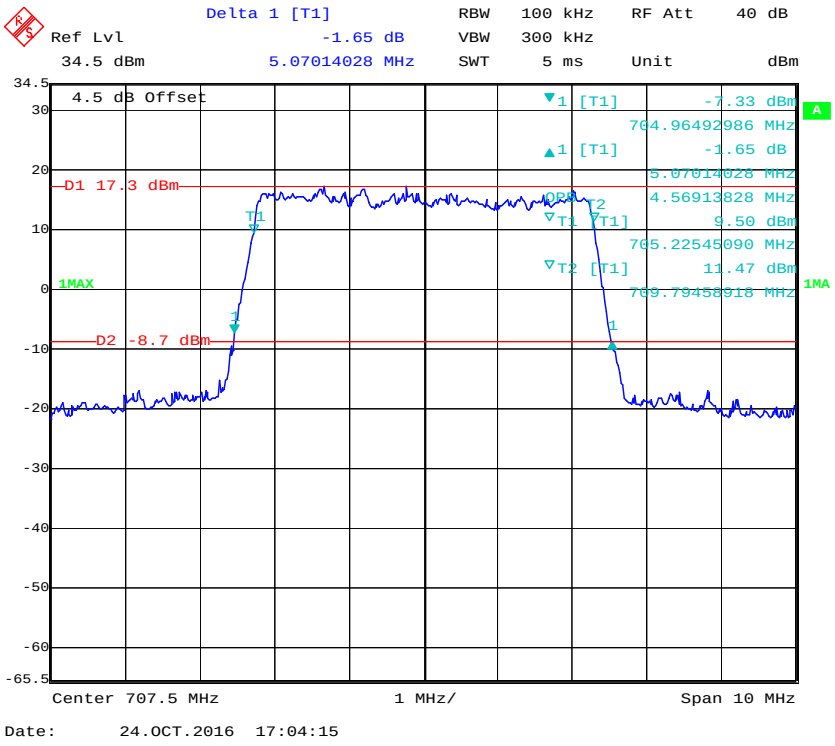
QPSK (3.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



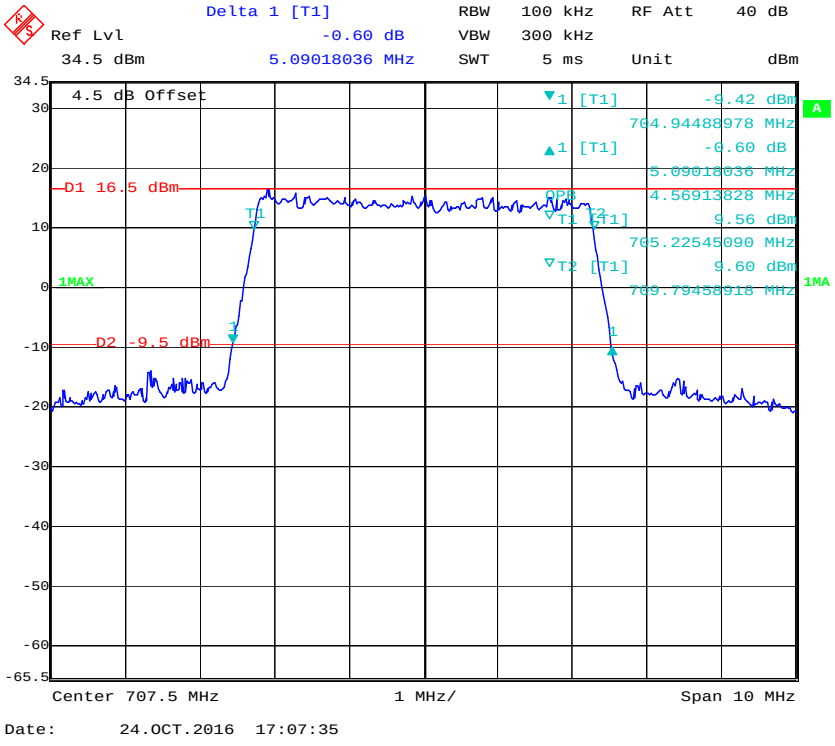
16-QAM (3.0MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



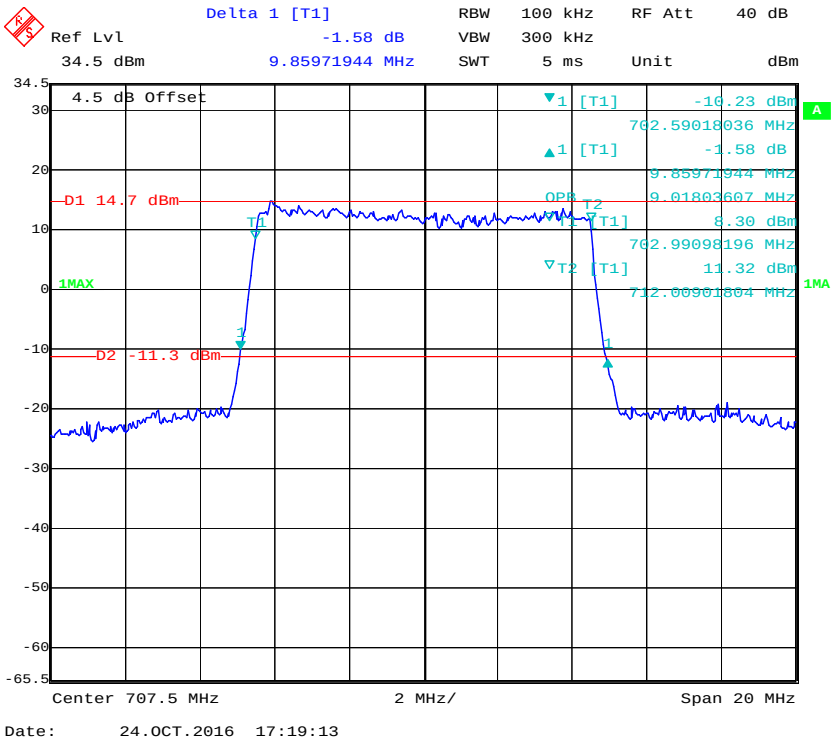
QPSK (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



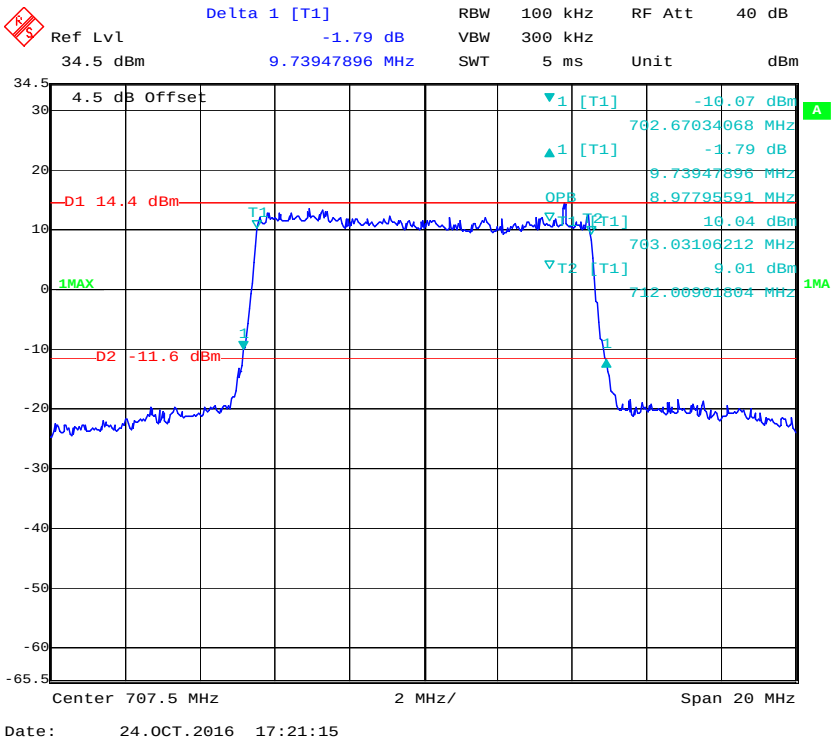
16-QAM (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



QPSK (10.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



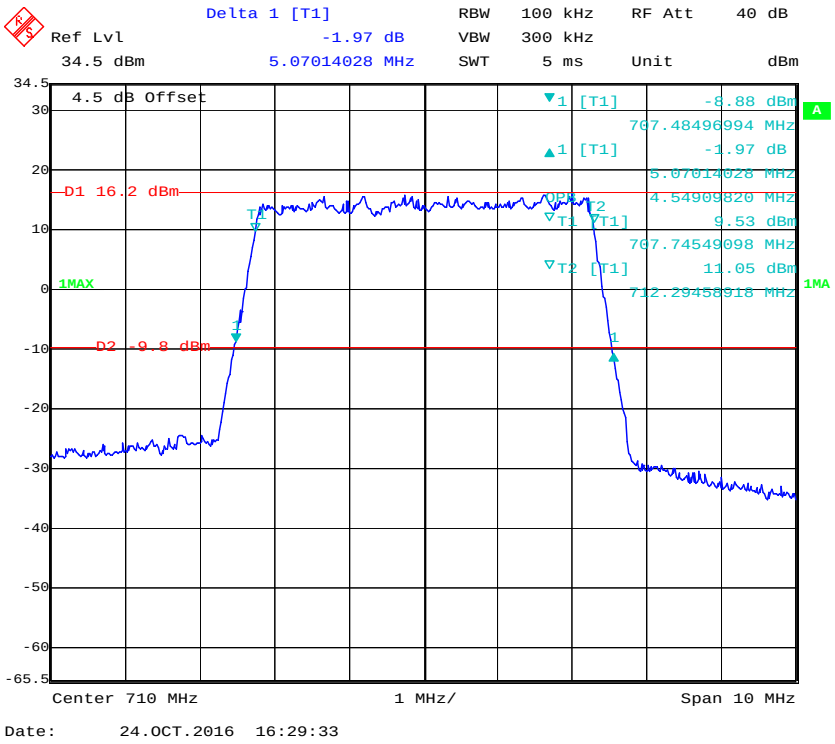
16-QAM (10.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



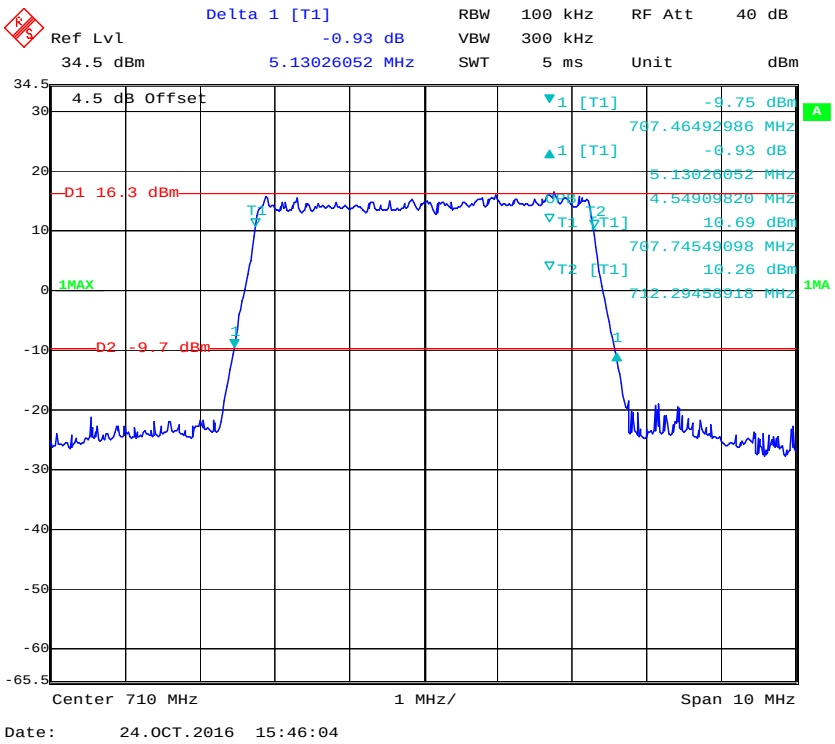
LTE Band 17: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.549	5.070
	16QAM	4.549	5.130
10.0	QPSK	8.978	9.860
	16QAM	8.978	9.659

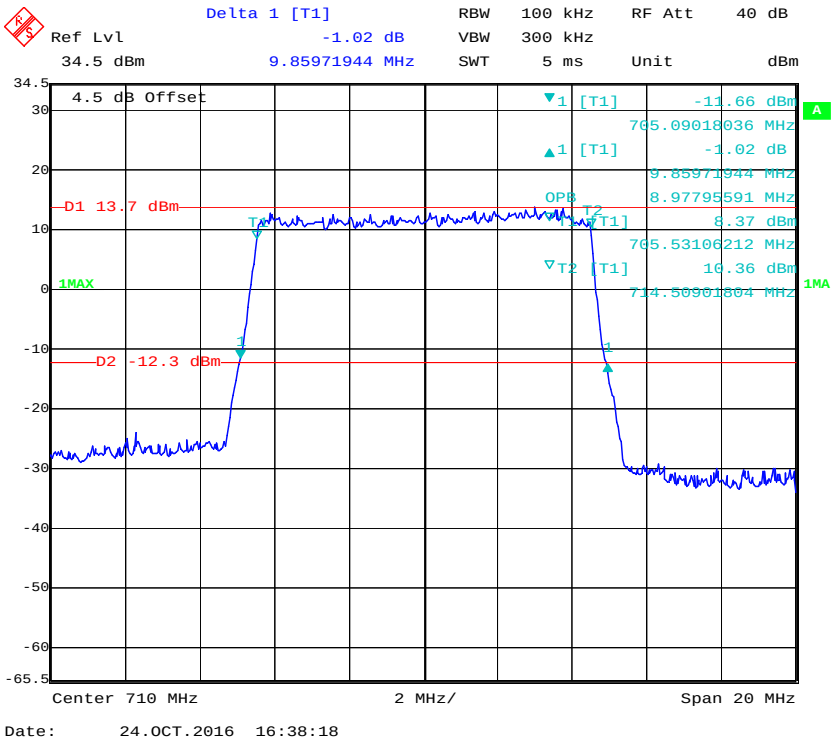
QPSK (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



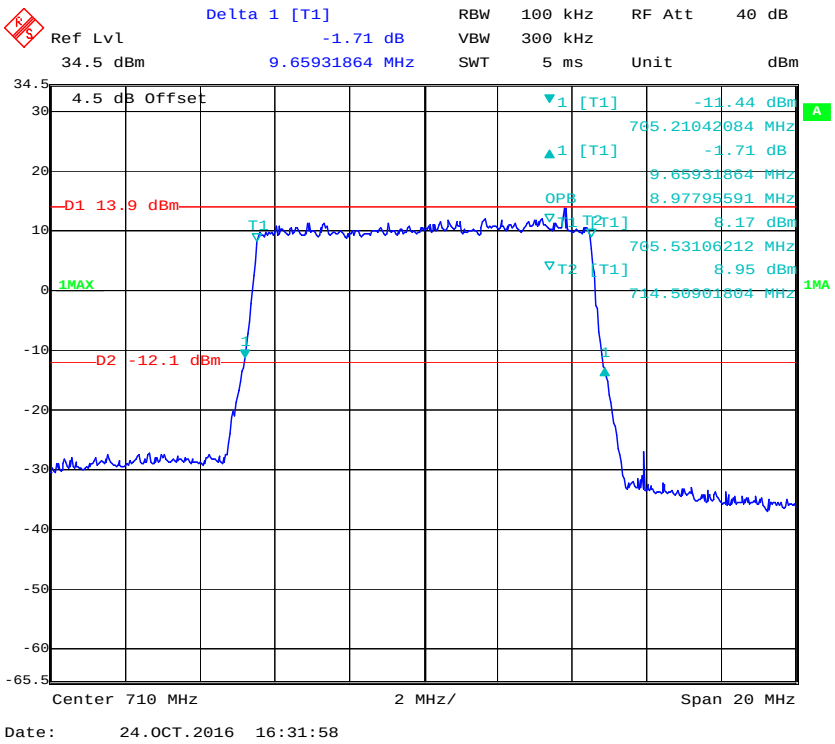
16-QAM (5.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



QPSK (10.0 MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



16-QAM (10.0MHz) - 99% Occupied &26 dB Bandwidth, Middle channel



FCC §2.1051, §22.917(a) & §24.238(a) & §27.53 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

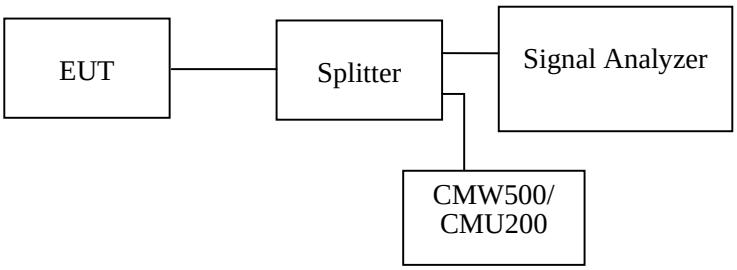
Applicable Standards

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

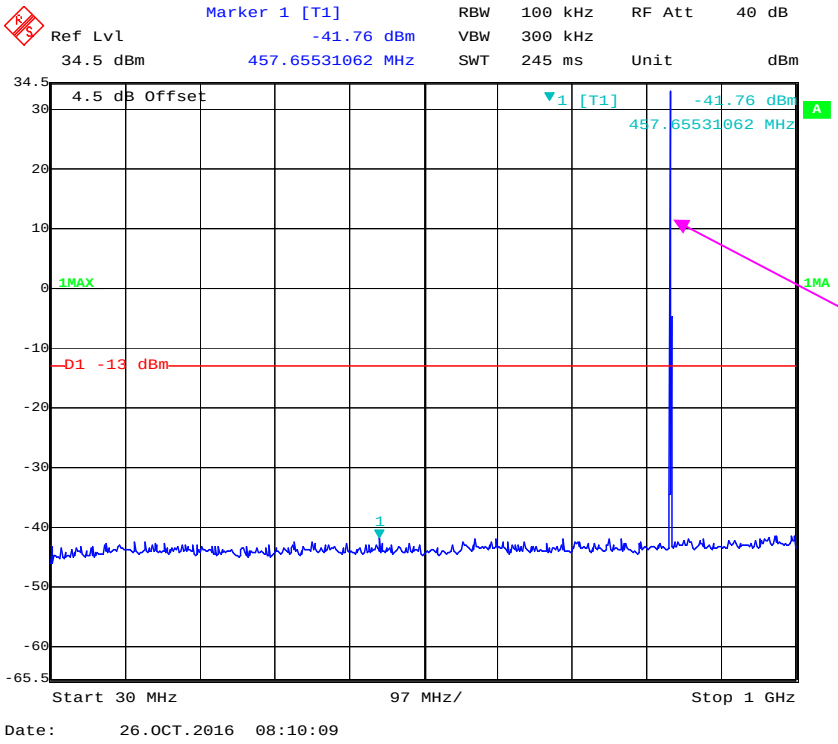
Temperature:	24~25 ℃
Relative Humidity:	54~57 %
ATM Pressure:	101.0~101.5 kPa

The testing was performed by Chris Wang from 2016-10-24 to2016-10-26

Please refer to the following plots.

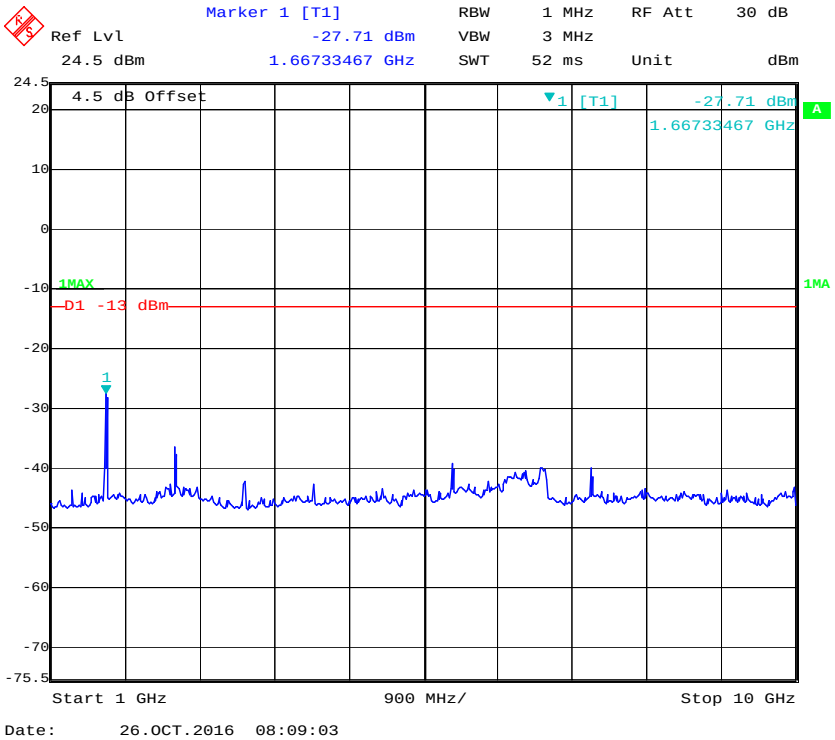
Cellular Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)

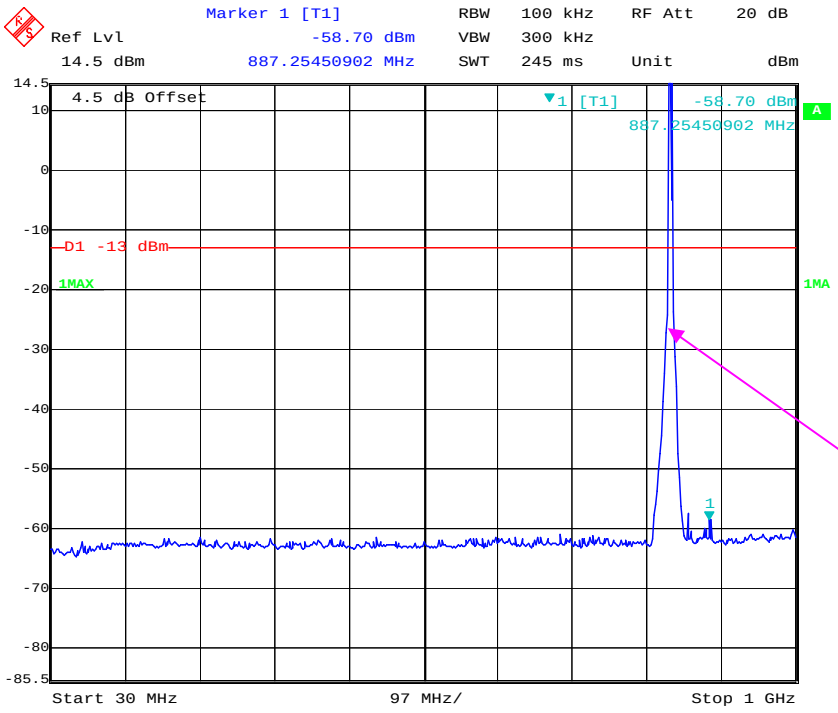


Fundamental test

1 GHz – 10 GHz (GSM Mode)

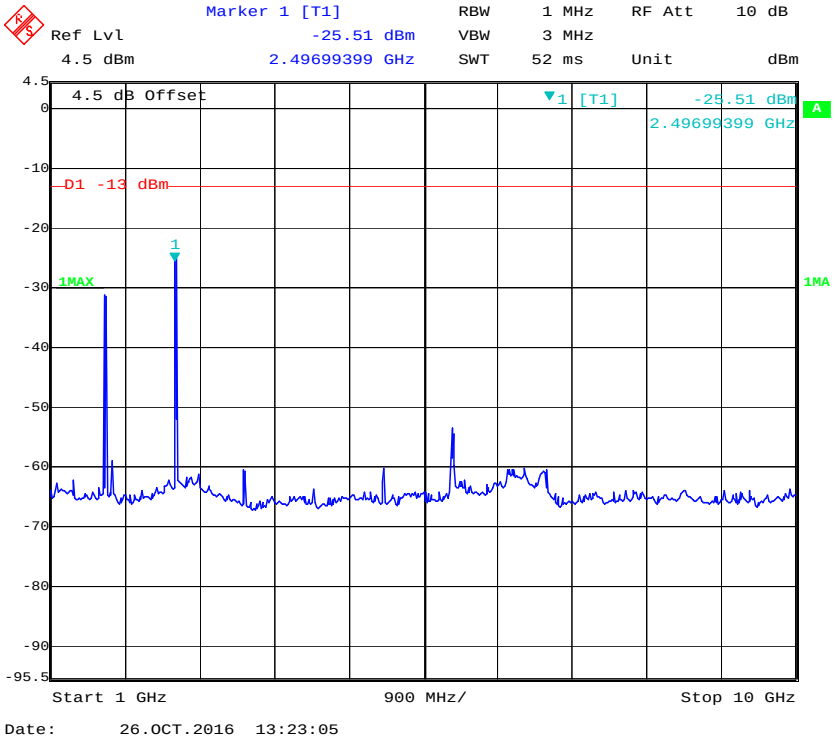


30 MHz – 1 GHz (WCDMA Mode)



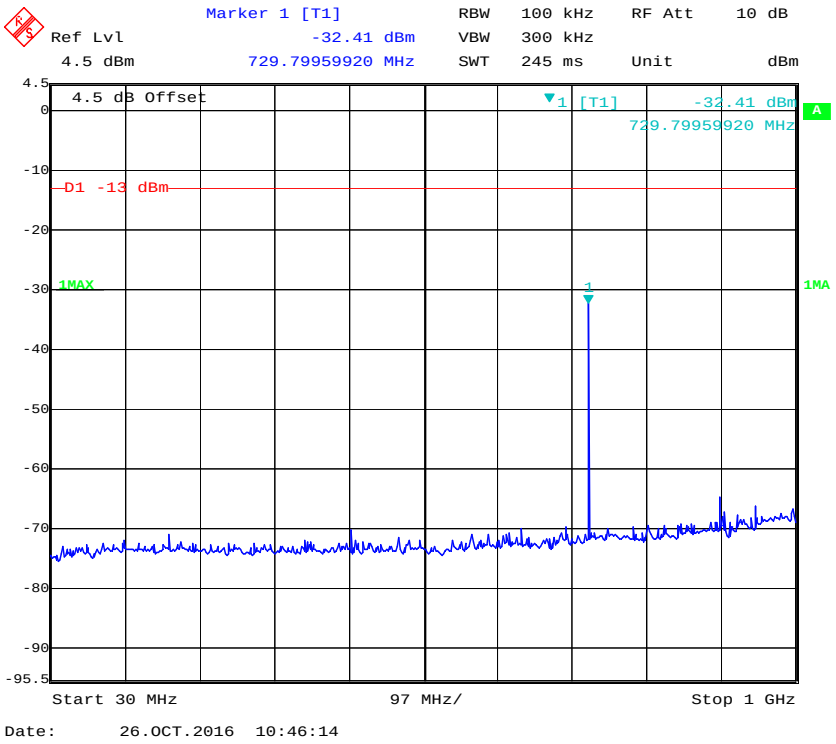
Fundamental test

1 GHz – 10 GHz (WCDMA Mode)

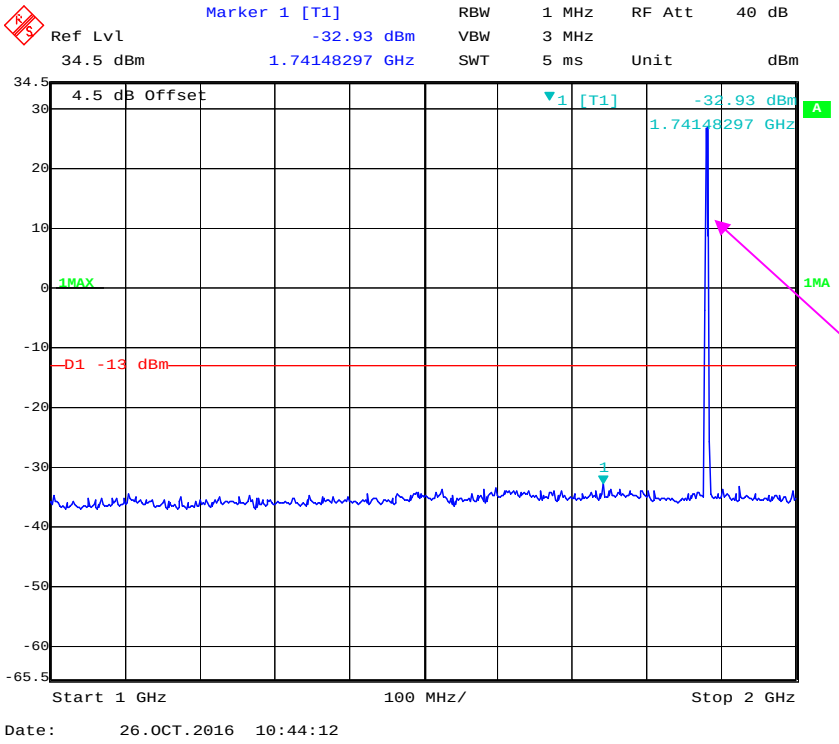


PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)

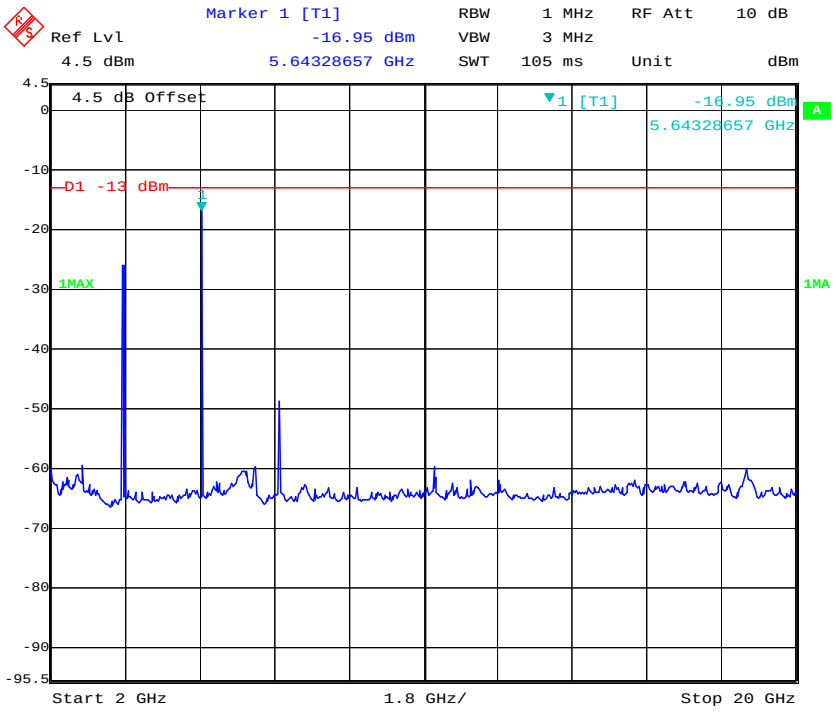


1 GHz – 2 GHz (GSM Mode)

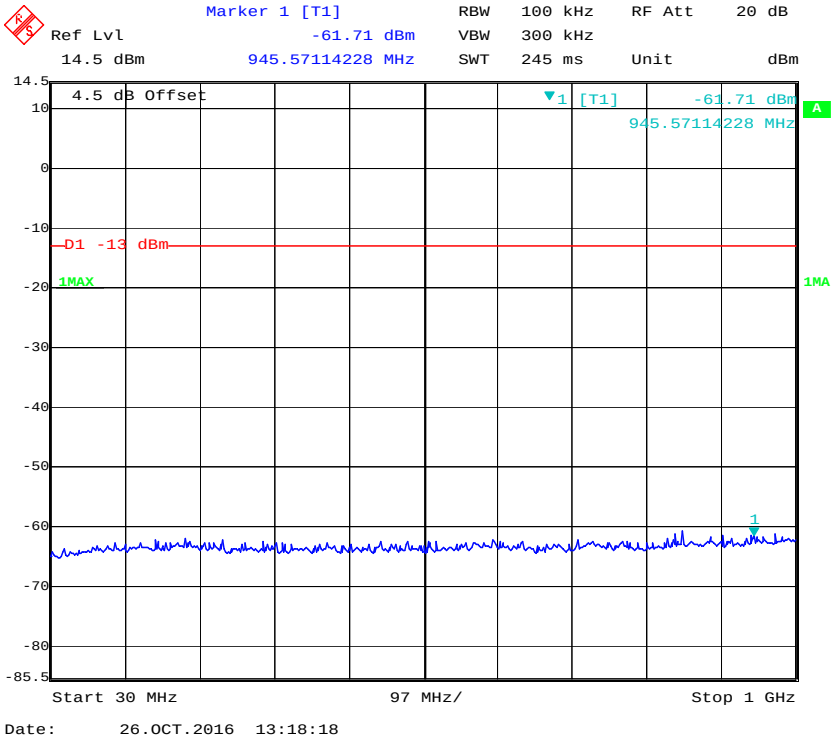


Fundamental test

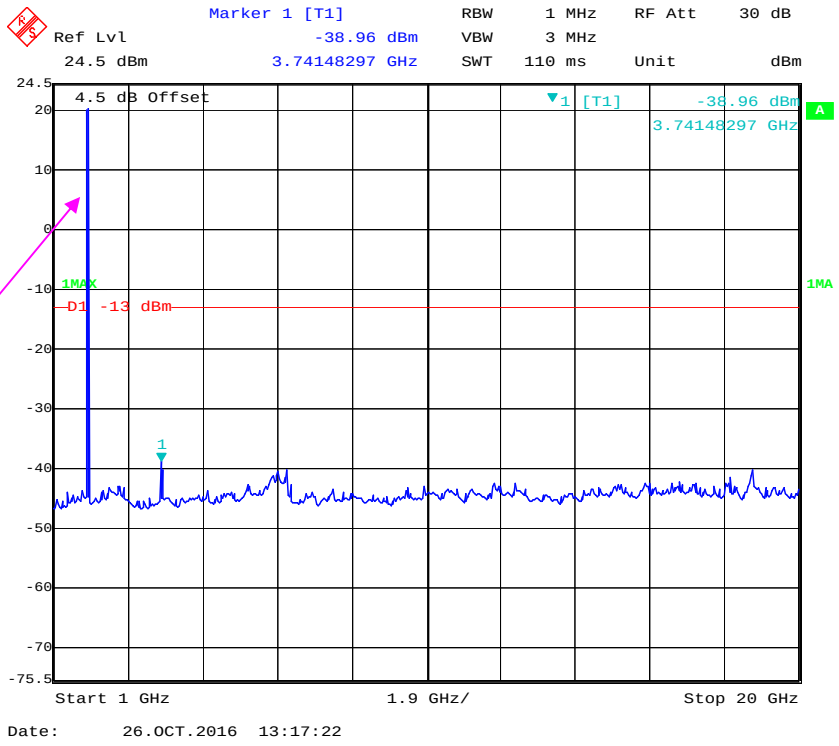
2 GHz – 20 GHz (GSM Mode)



30 MHz – 1 GHz (WCDMA Mode)



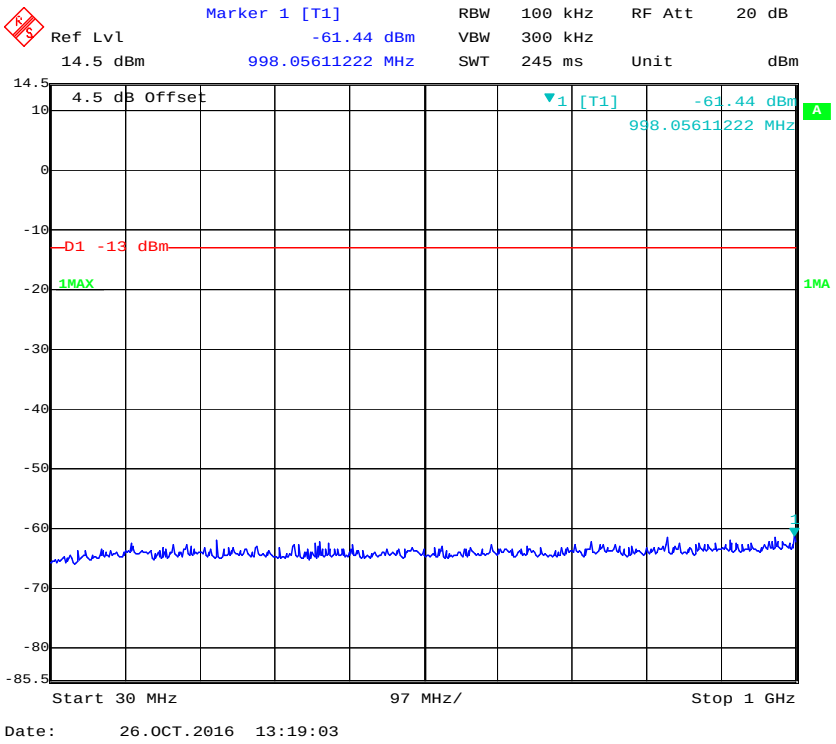
1 GHz – 20 GHz (WCDMA Mode)



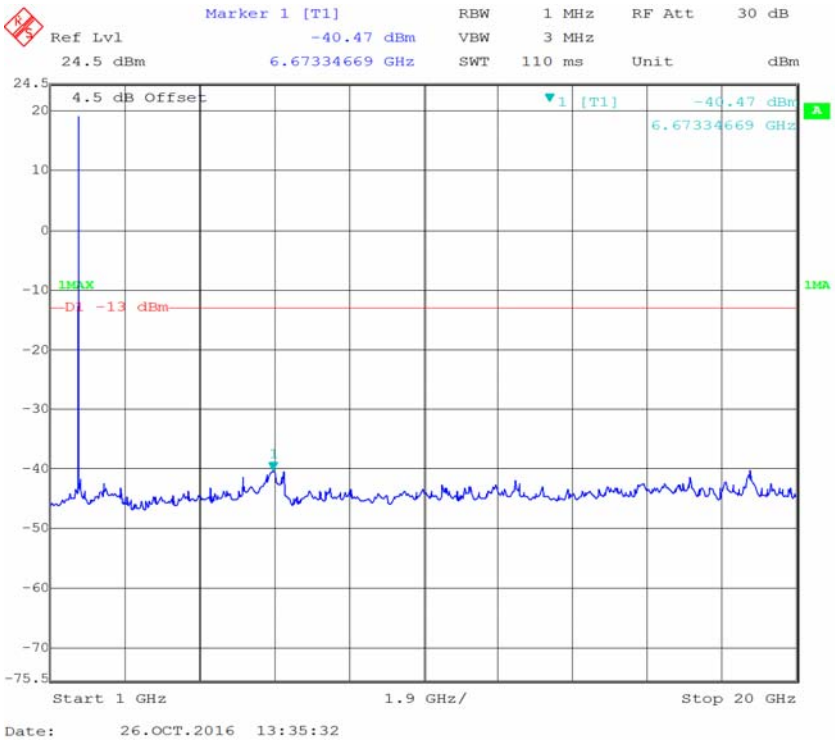
Fundamental test

AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)

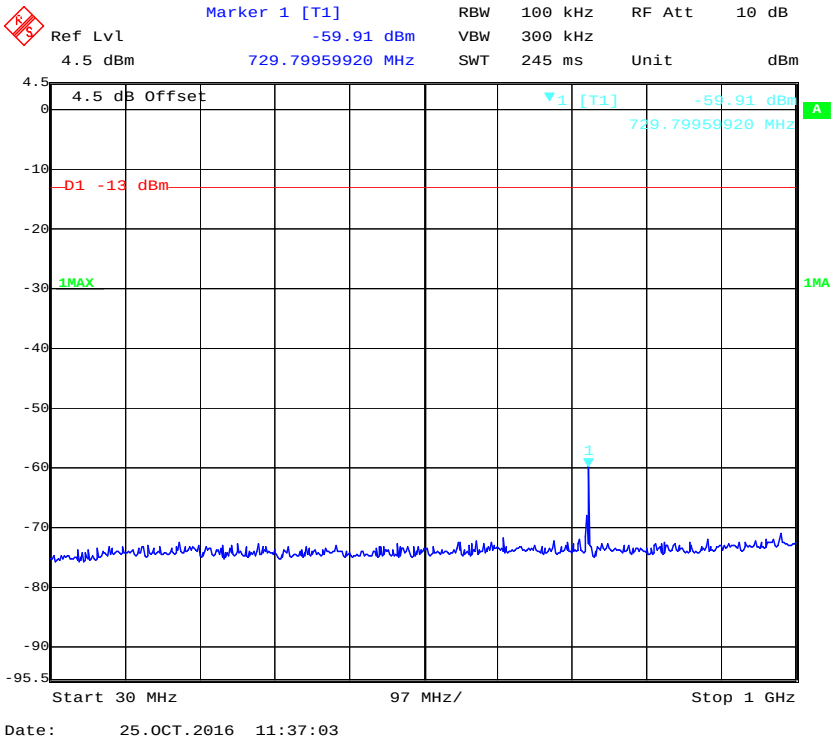


1 GHz – 20 GHz (WCDMA Mode)

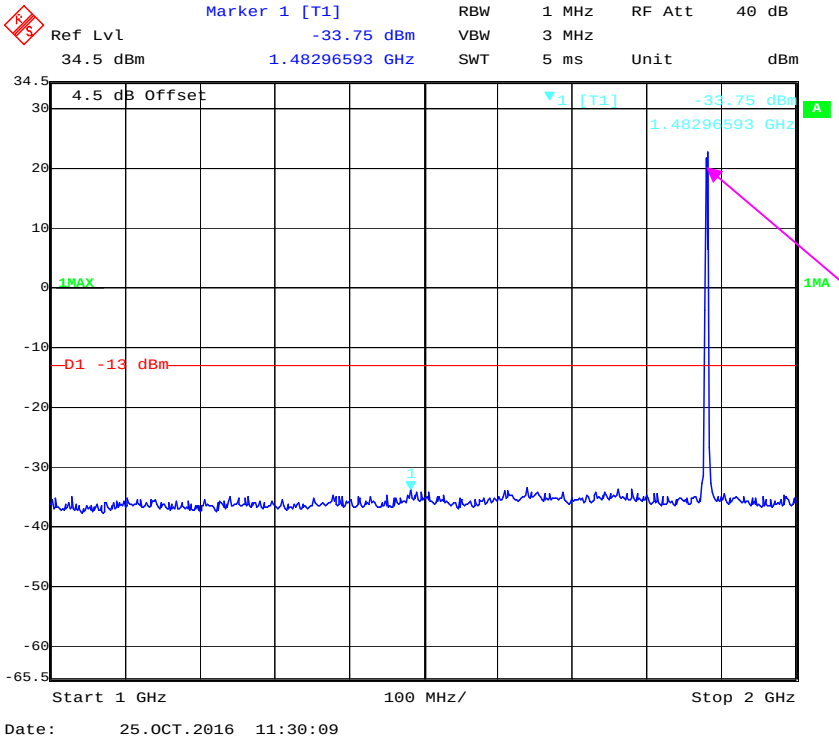


LTE Band 2:

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

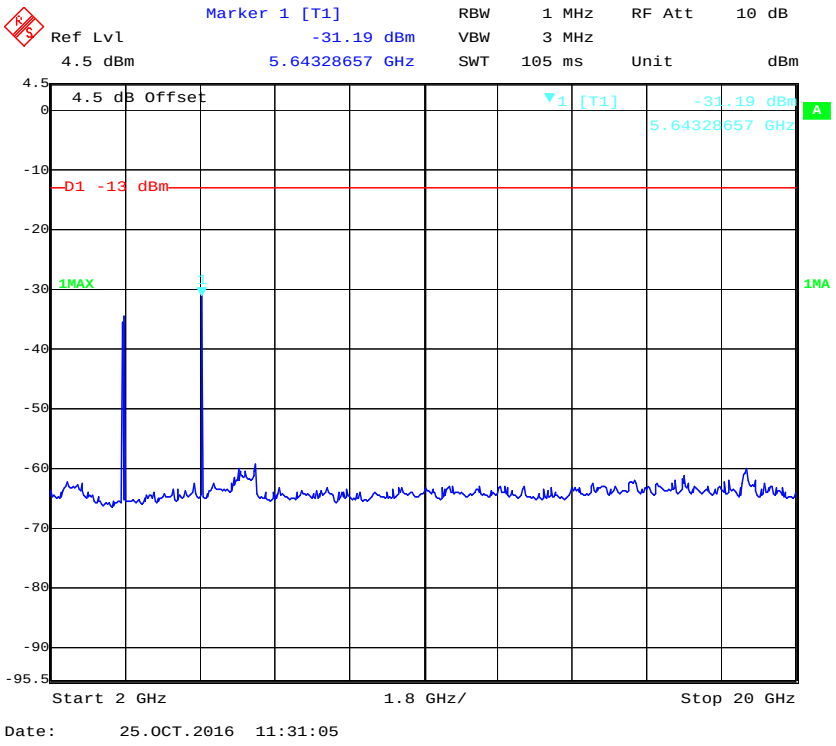


1 GHz – 2 GHz (1.4 MHz, Middle Channel)

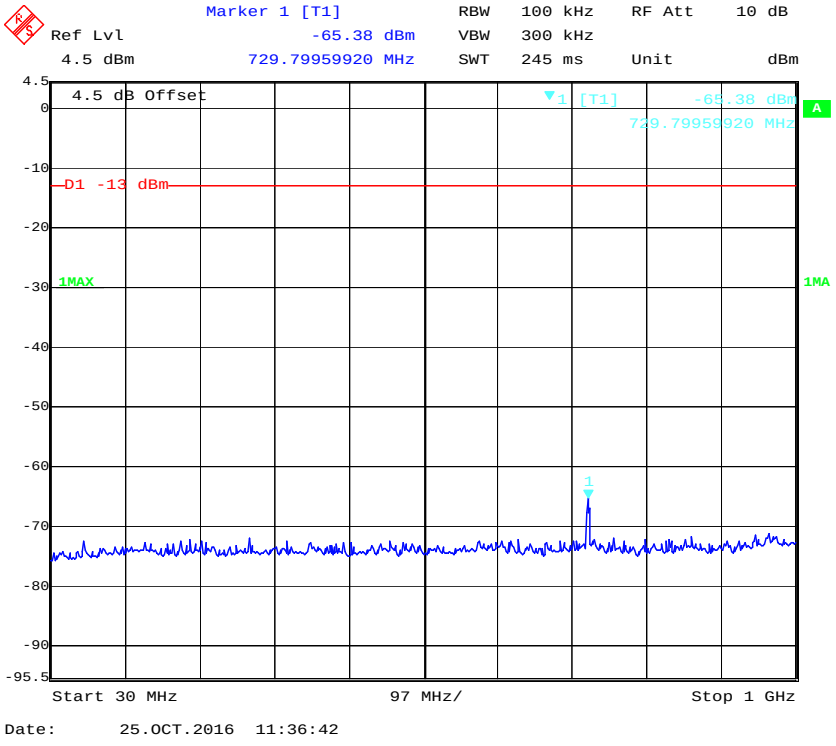


Fundamental test

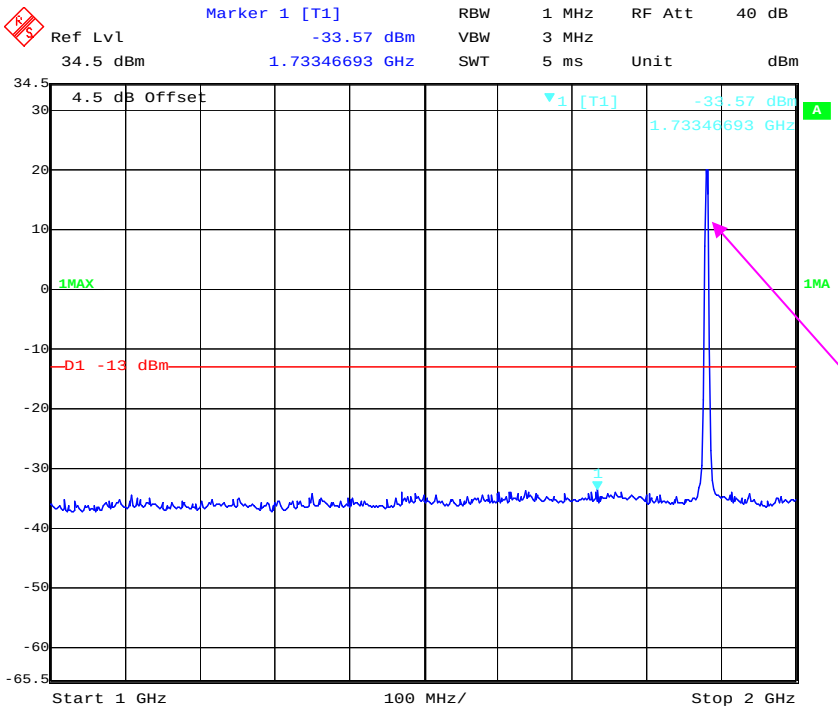
2 GHz – 20 GHz (1.4 MHz, Middle Channel)



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

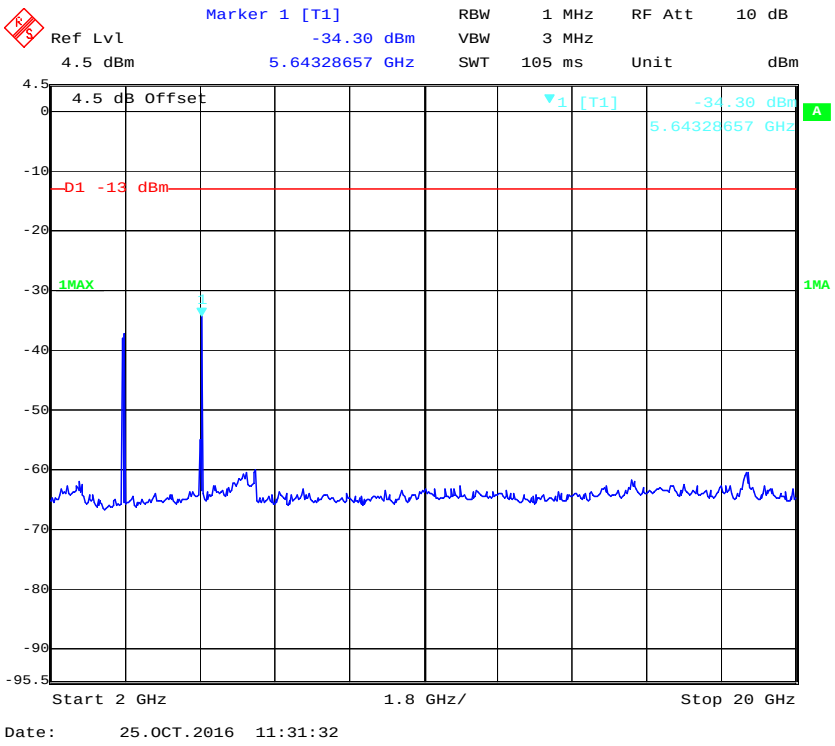


1 GHz – 2 GHz (3.0 MHz, Middle Channel)

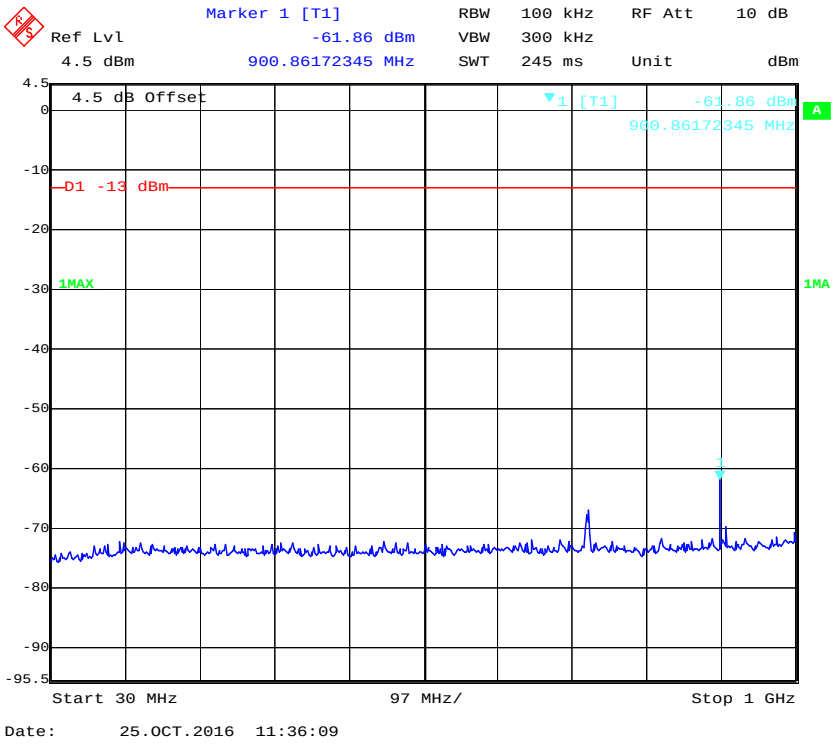


Fundamental test

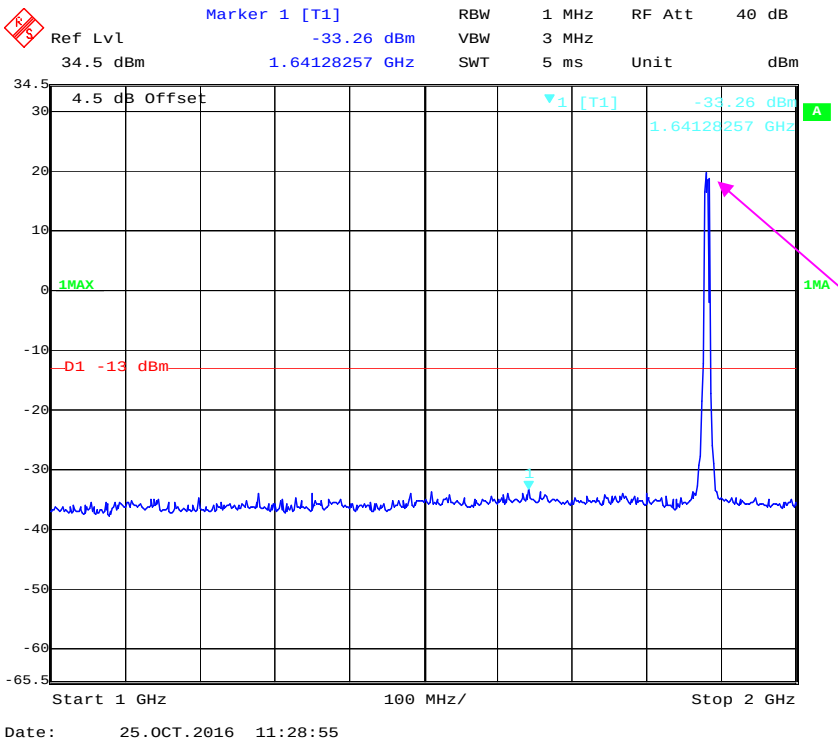
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



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

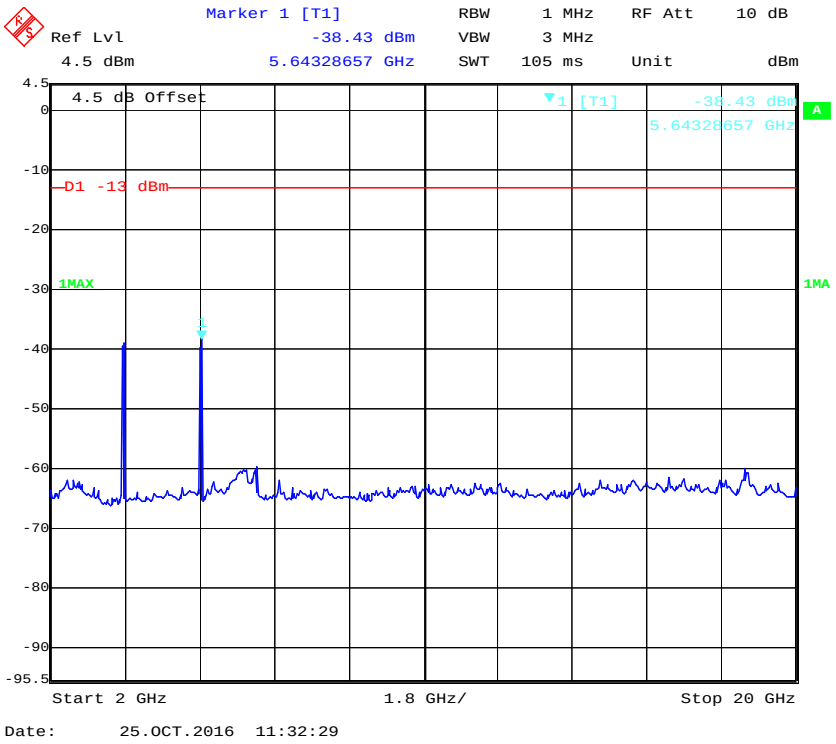


1 GHz – 2 GHz (5.0 MHz, Middle Channel)

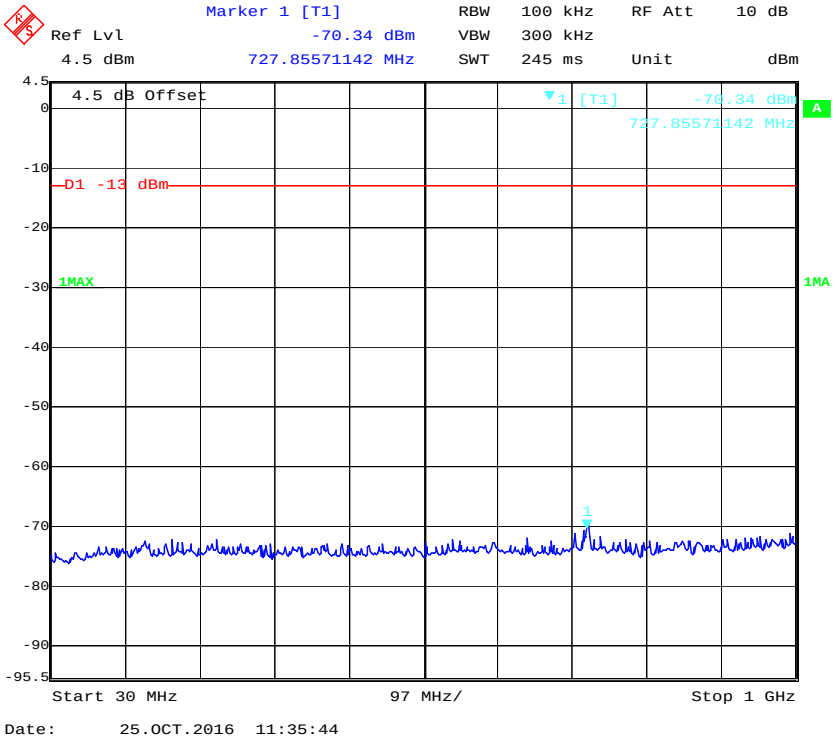


Fundamental test

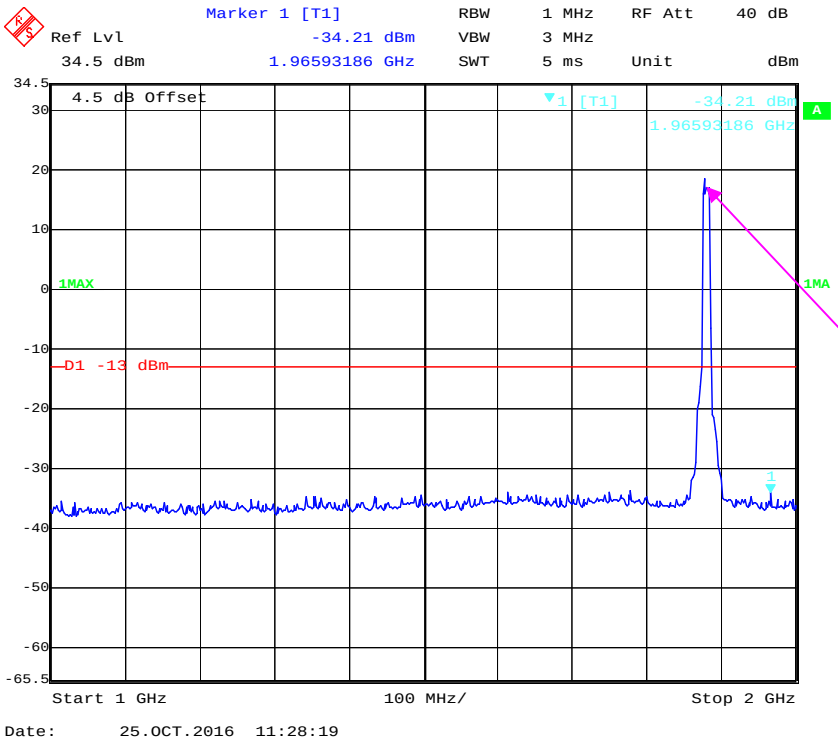
2 GHz – 20 GHz (5.0 MHz, Middle Channel)



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

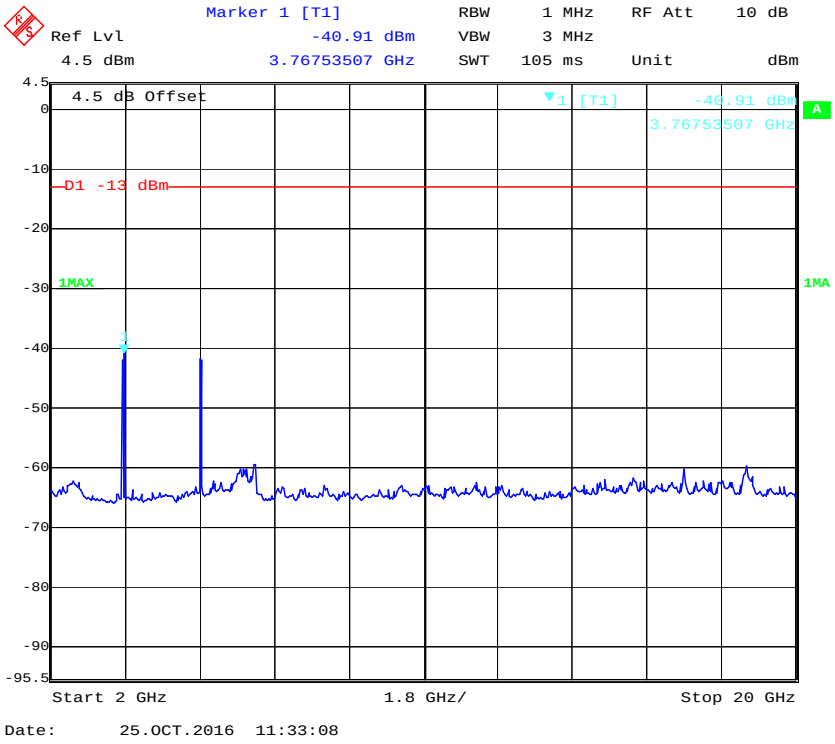


1 GHz – 2 GHz (10.0 MHz, Middle Channel)

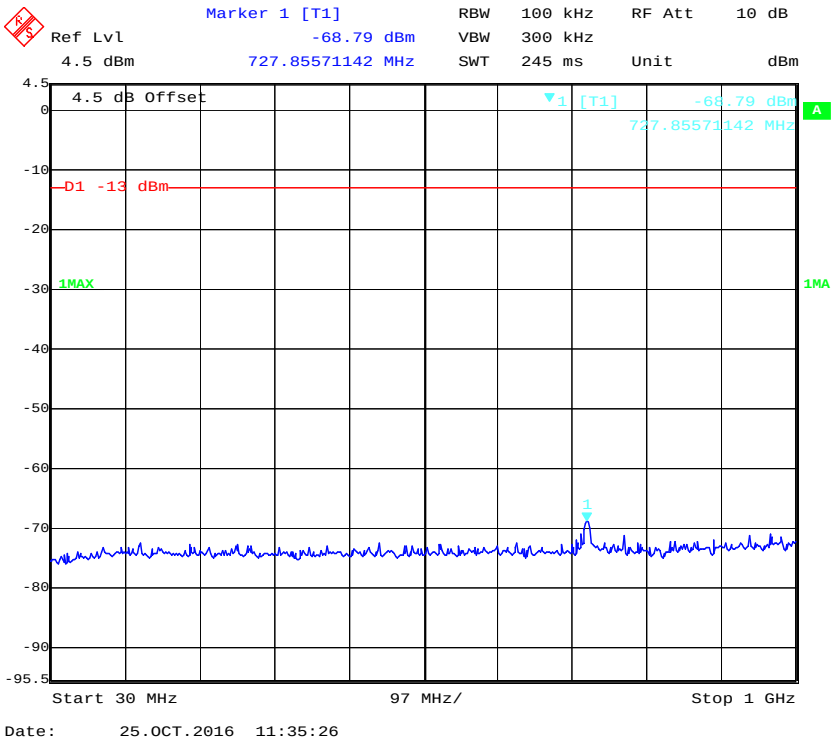


Fundamental test

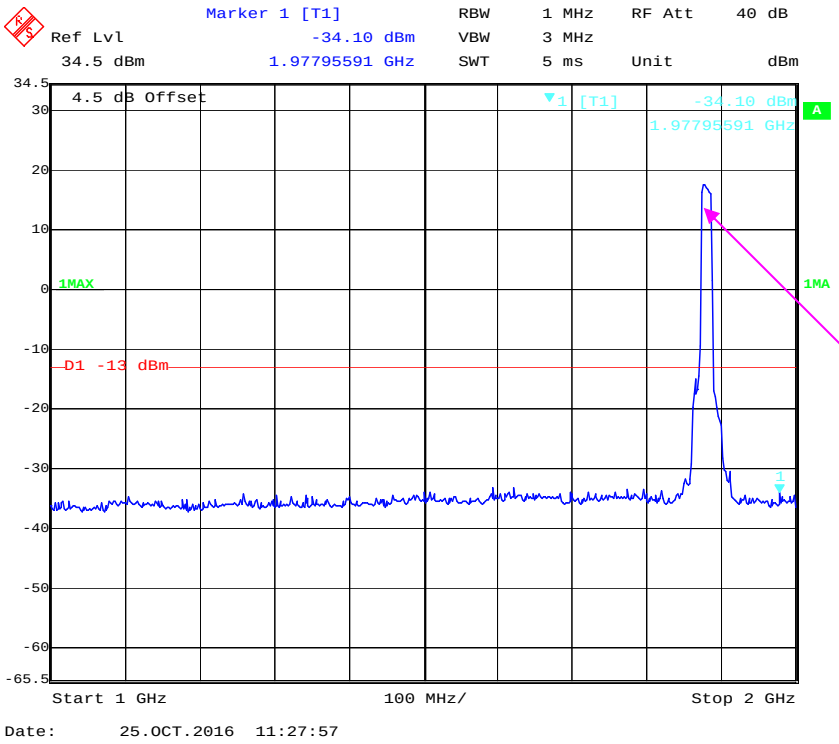
2 GHz – 20 GHz (10.0 MHz, Middle Channel)



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

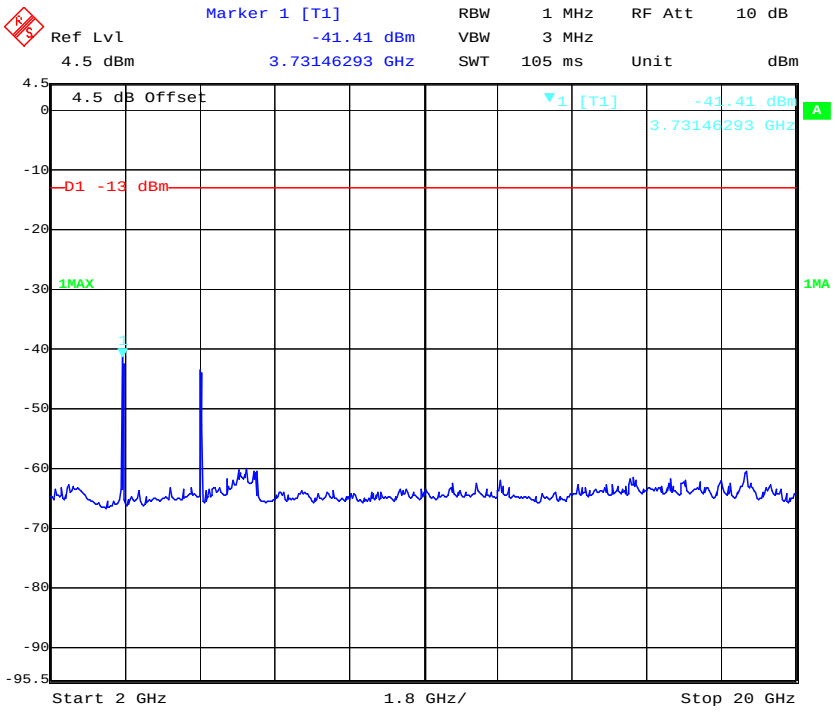


1 GHz –2 GHz (15.0 MHz, Middle Channel)

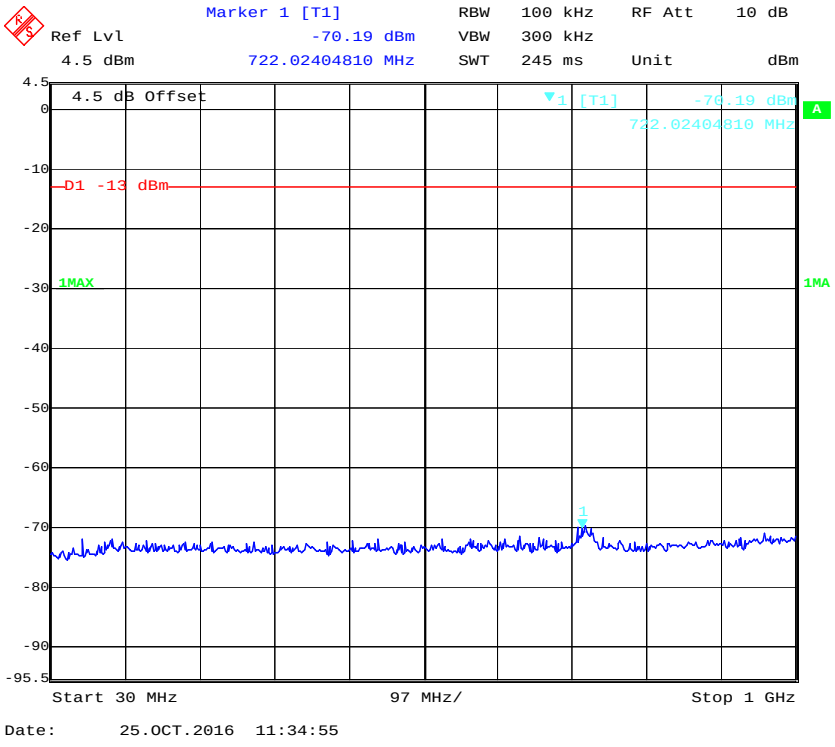


Fundamental test

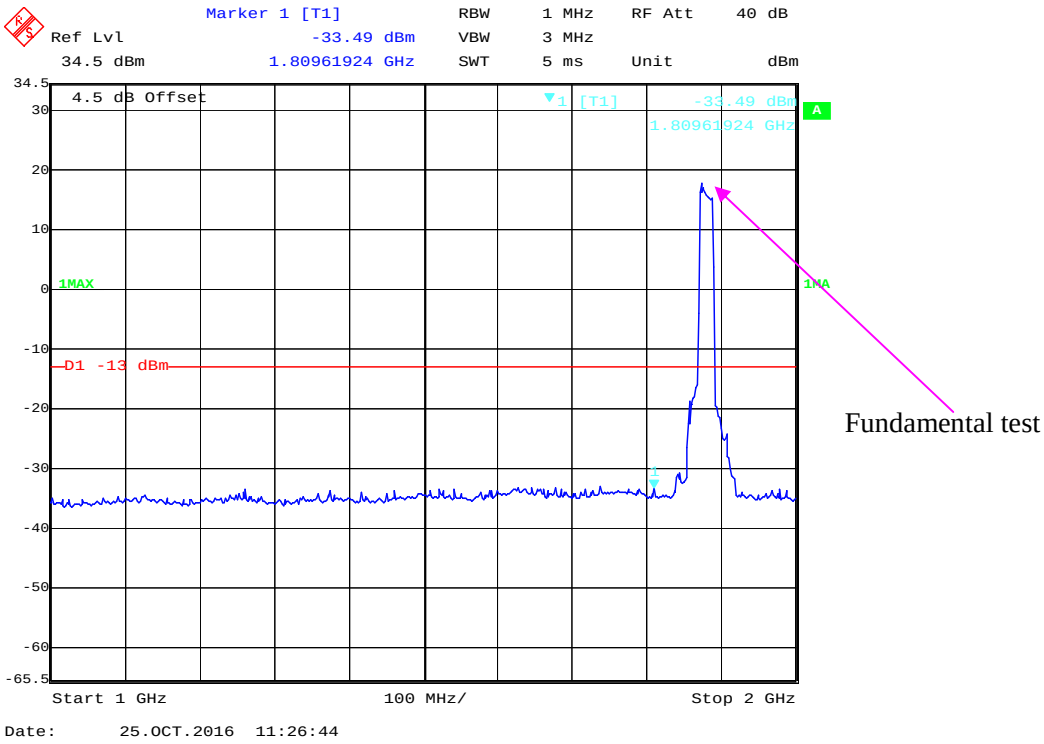
2 GHz –20 GHz (15.0 MHz, Middle Channel)



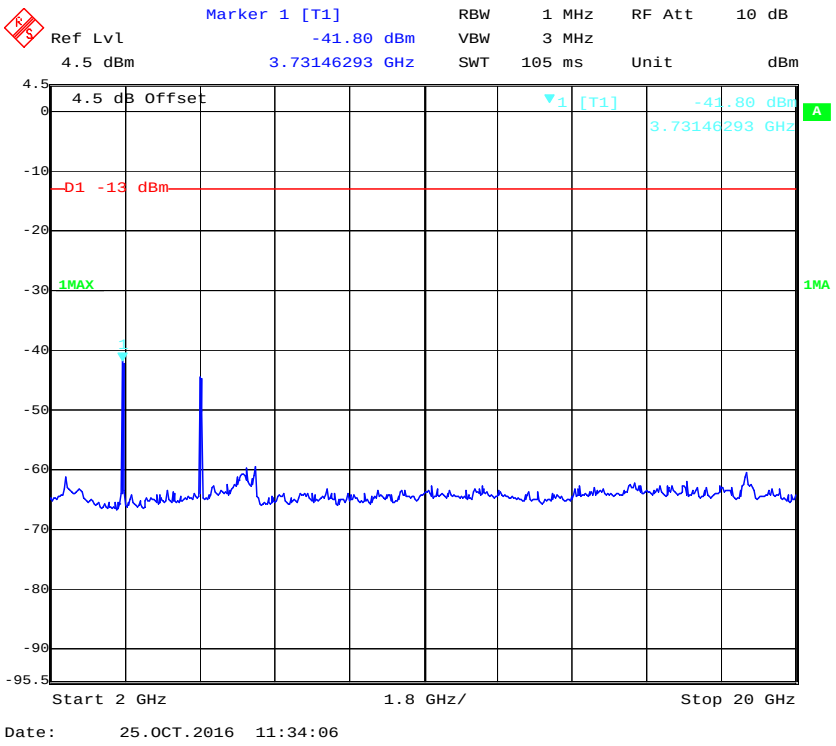
30 MHz - 1 GHz (20.0 MHz, Middle Channel)



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

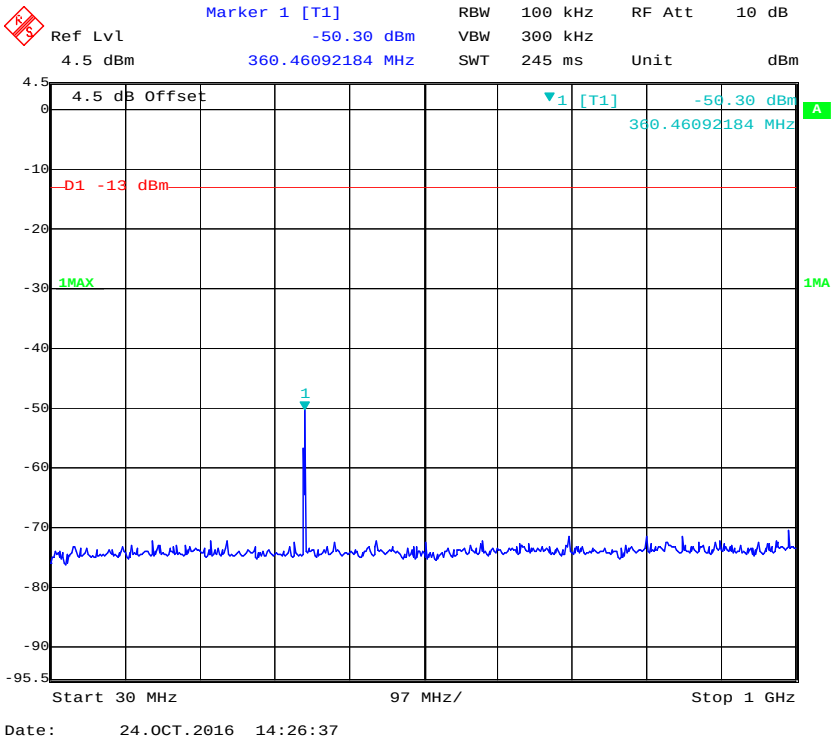


2 GHz –20 GHz (20.0 MHz, Middle Channel)

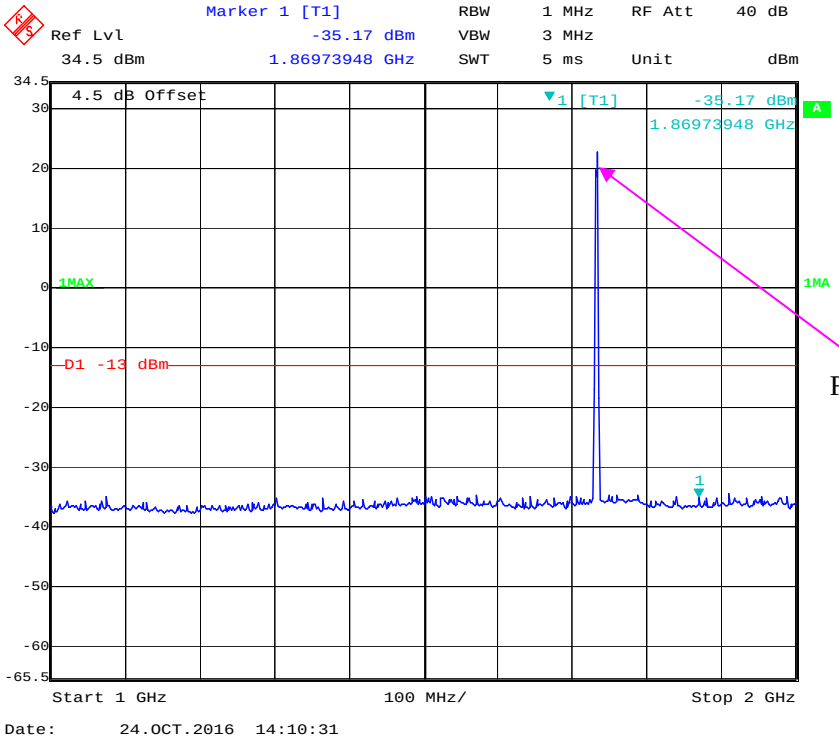


LTE Band 4:

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

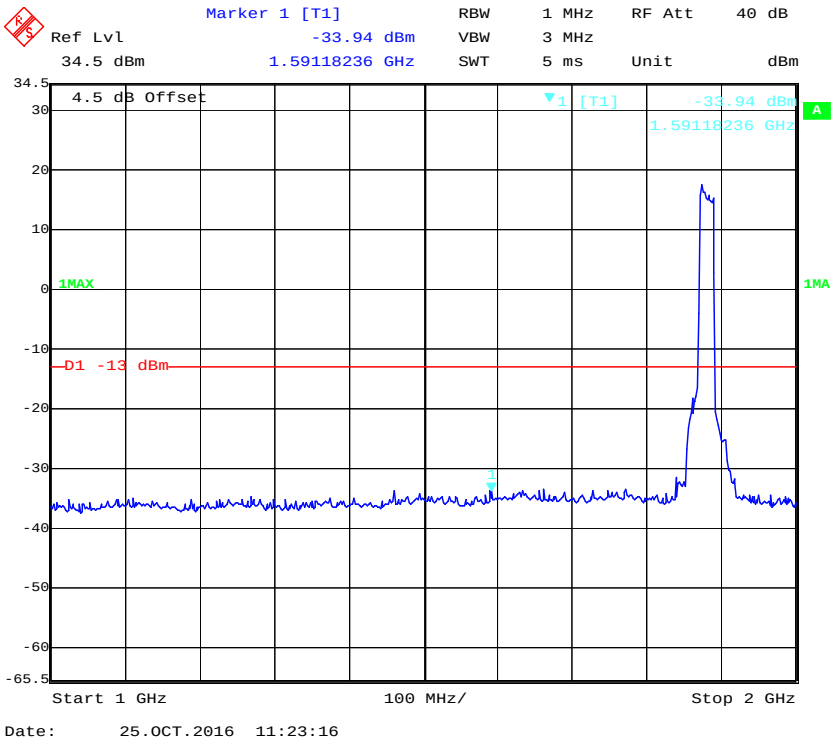


1 GHz – 2 GHz (1.4 MHz, Middle Channel)

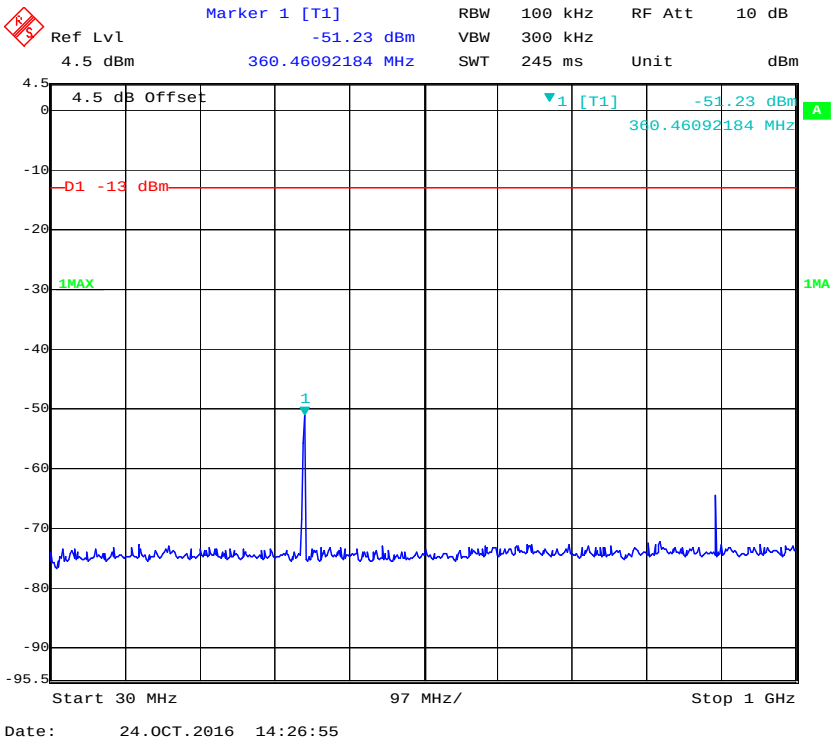


Fundamental test

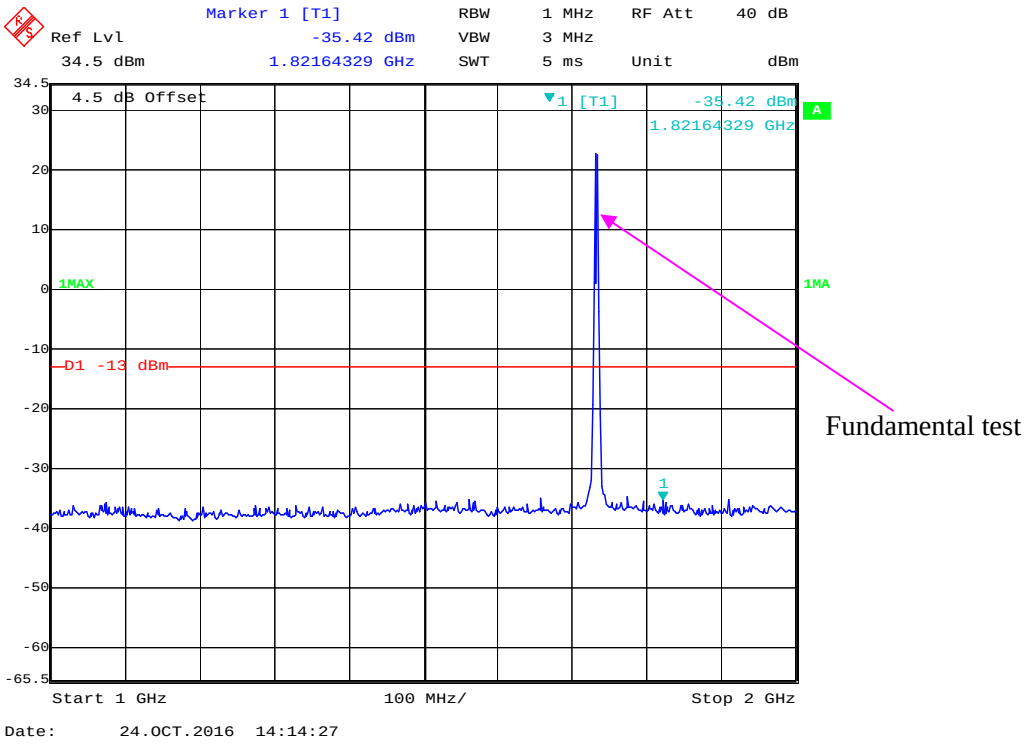
2 GHz – 20 GHz (1.4 MHz, Middle Channel)



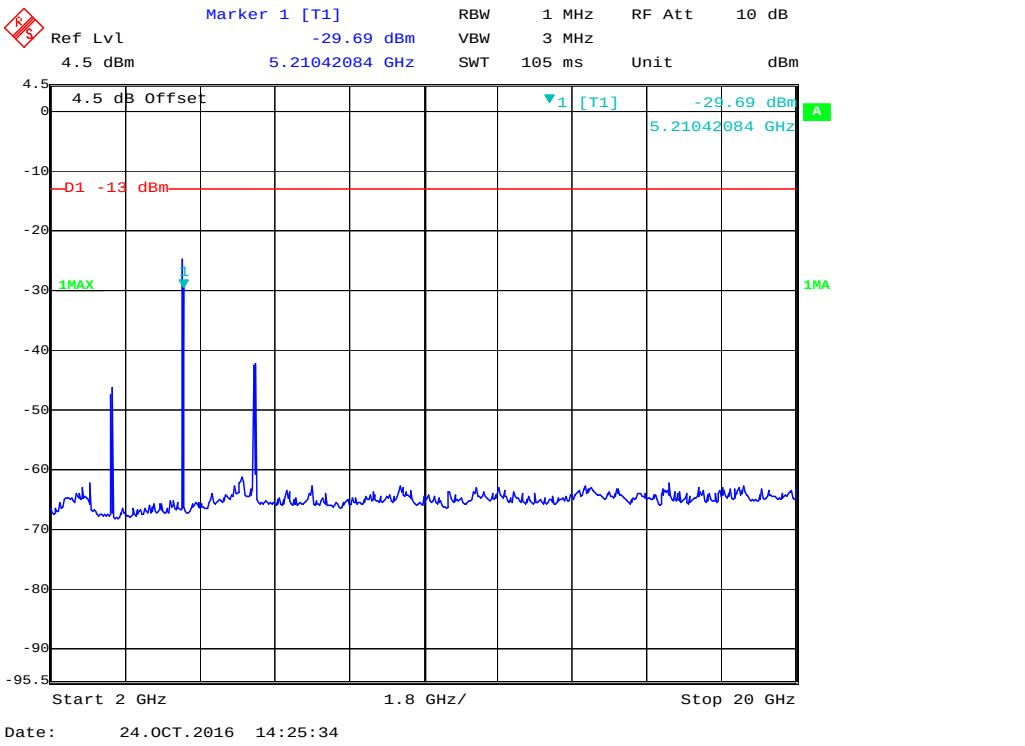
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



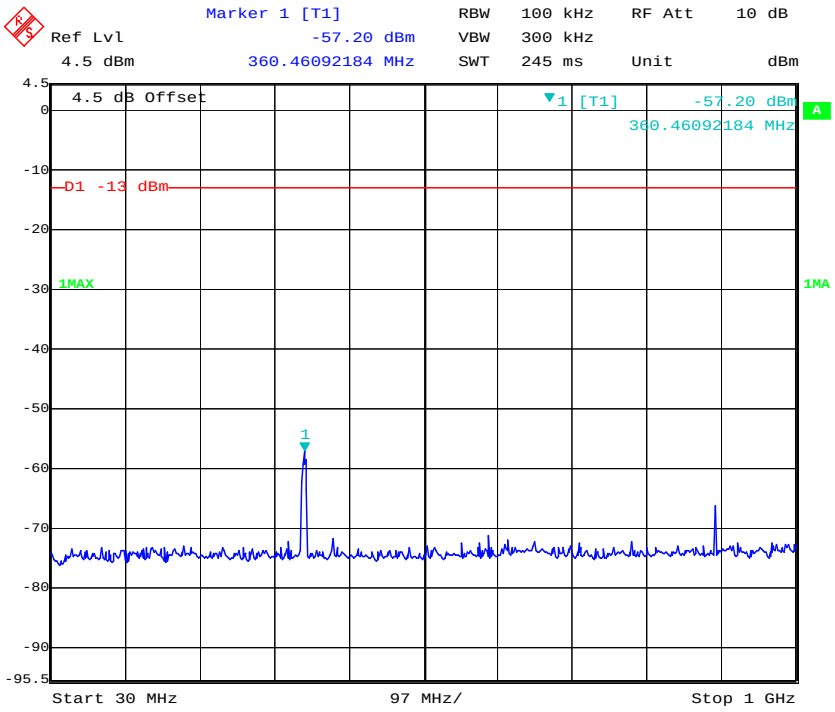
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



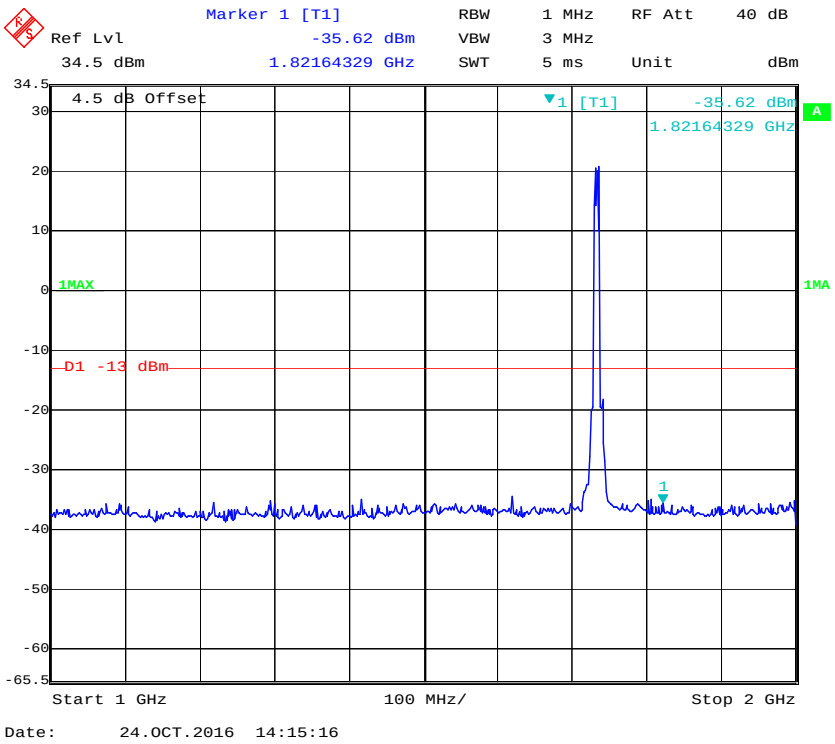
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



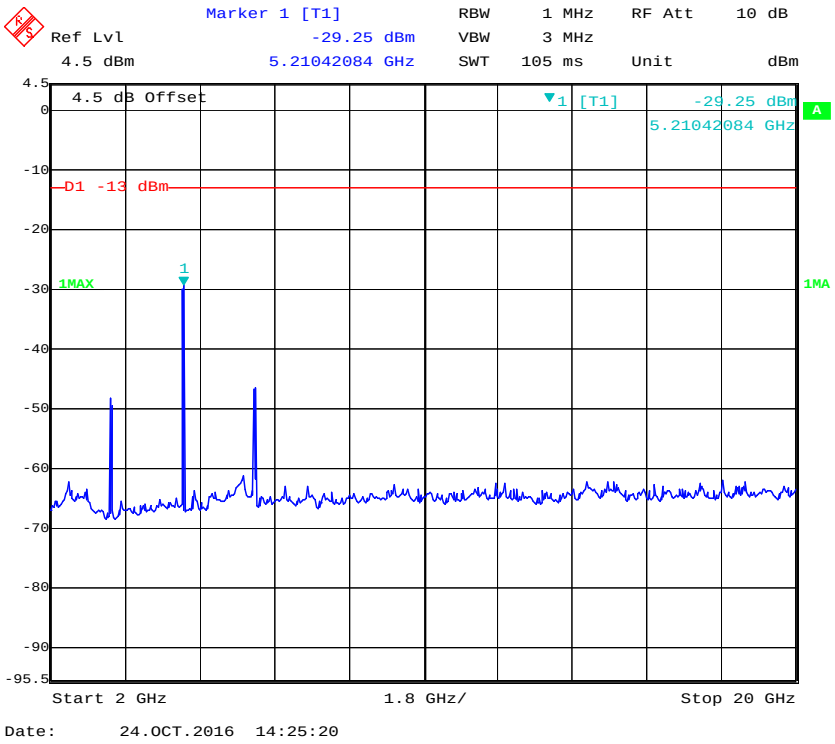
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



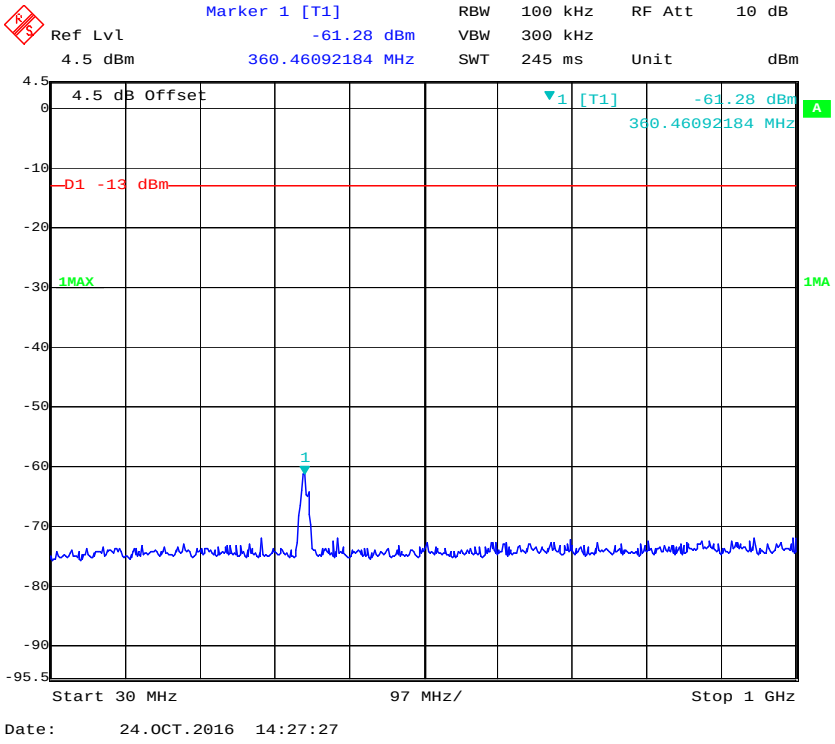
1 GHz – 2 GHz (5.0 MHz, Middle Channel)



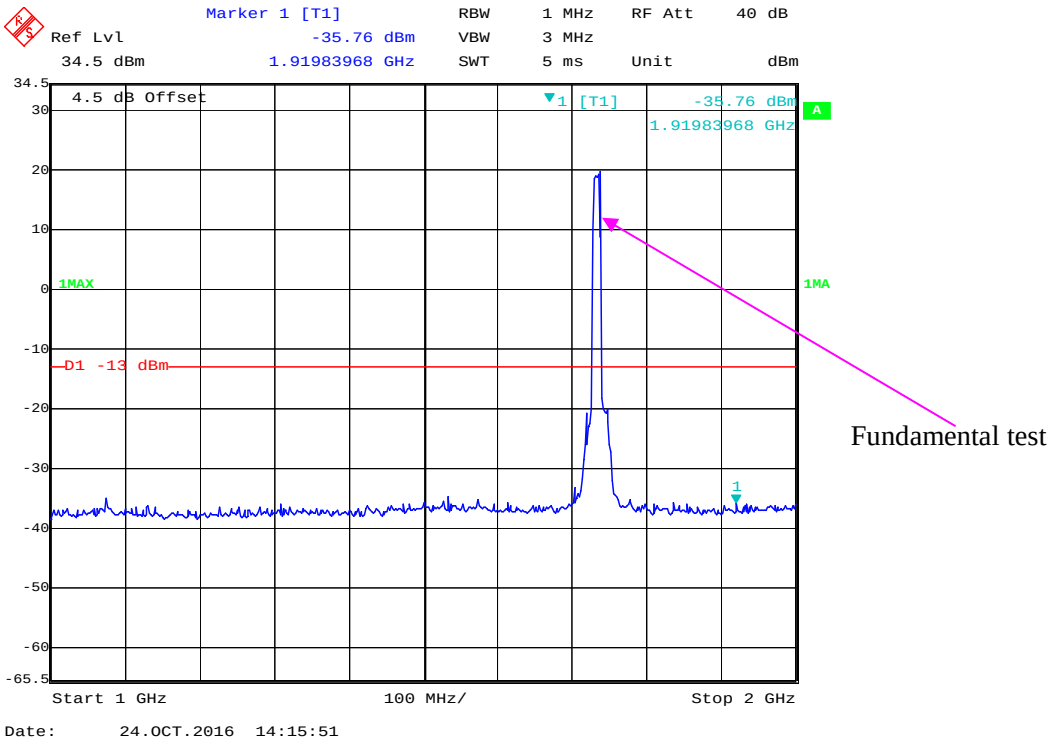
2 GHz – 20 GHz (5.0 MHz, Middle Channel)



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

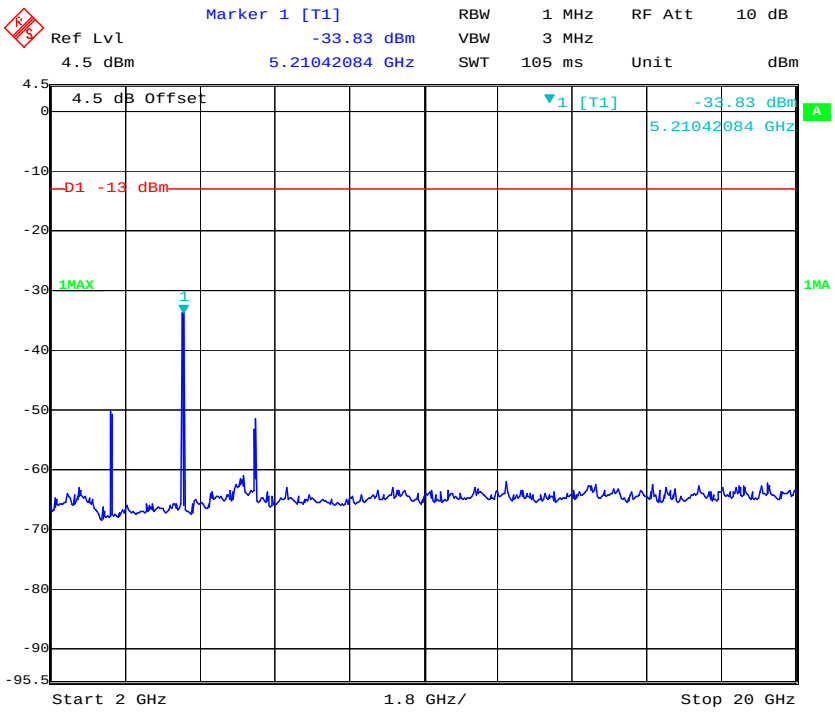


1 GHz – 2 GHz (10.0 MHz, Middle Channel)



Date: 24.OCT.2016 14:15:51

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



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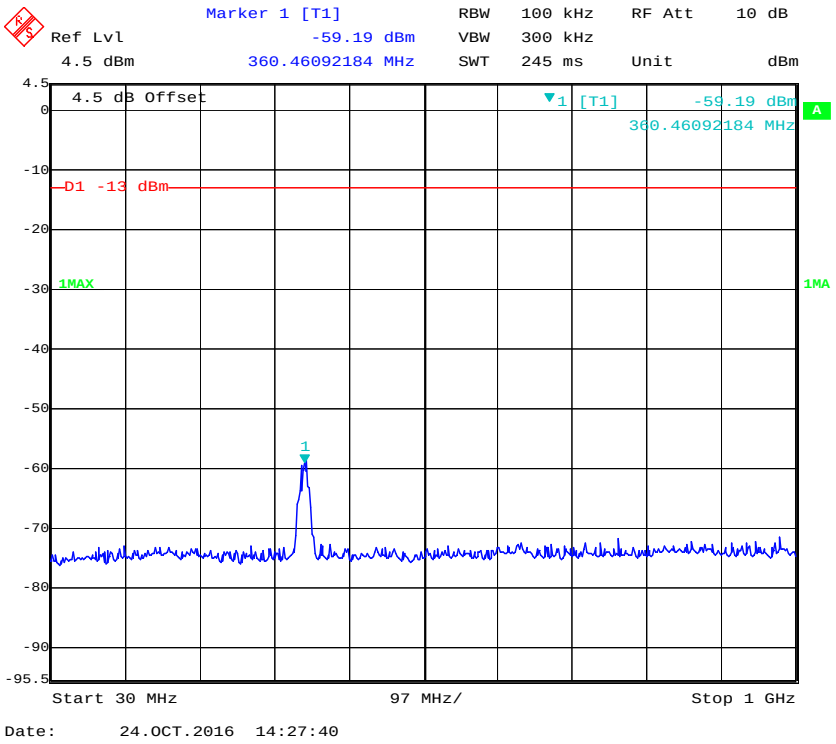
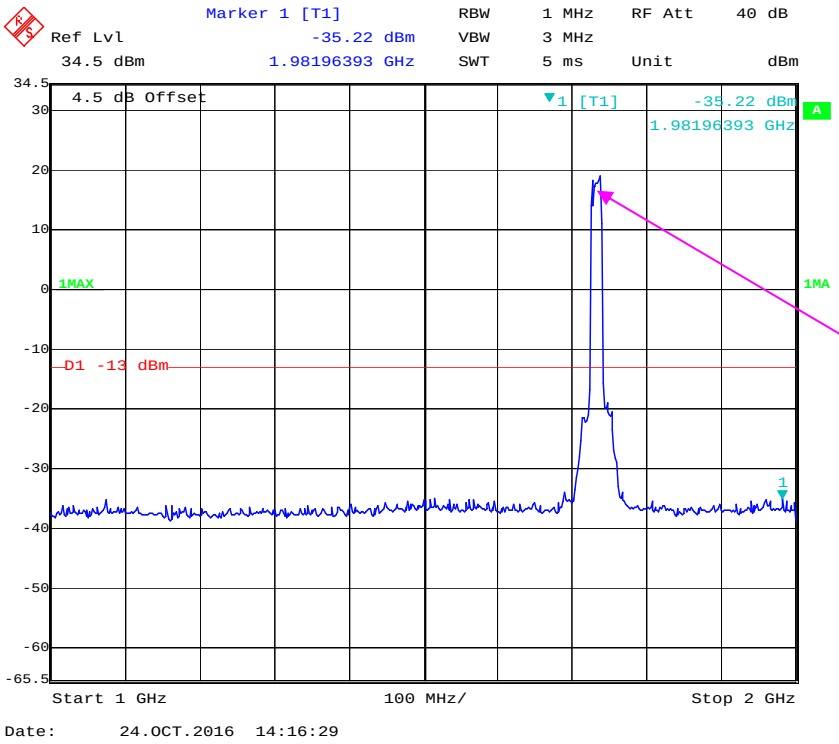
30 MHz - 1 GHz (15.0 MHz, Middle Channel)

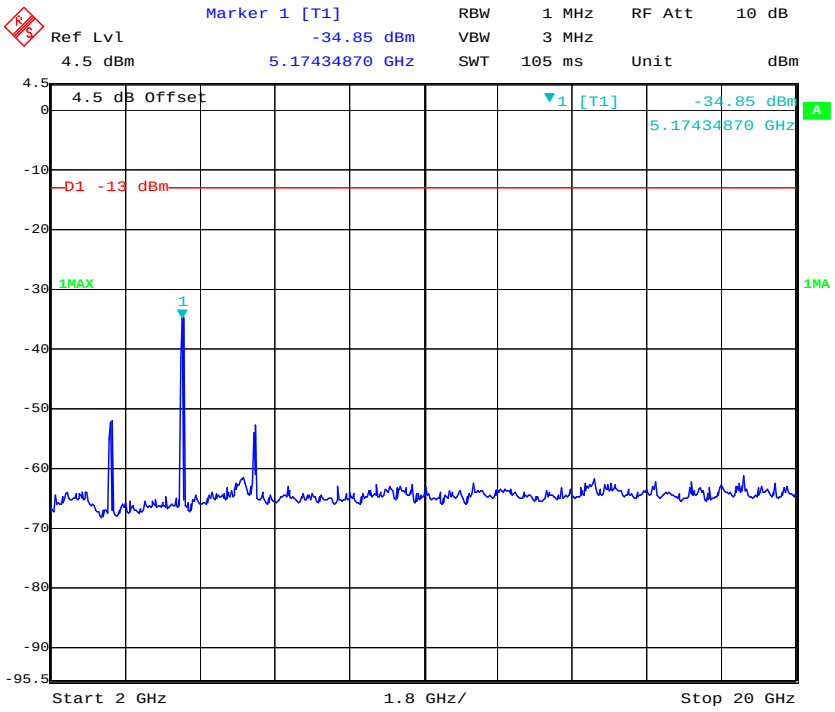


1 GHz –2 GHz (15.0 MHz, Middle Channel)

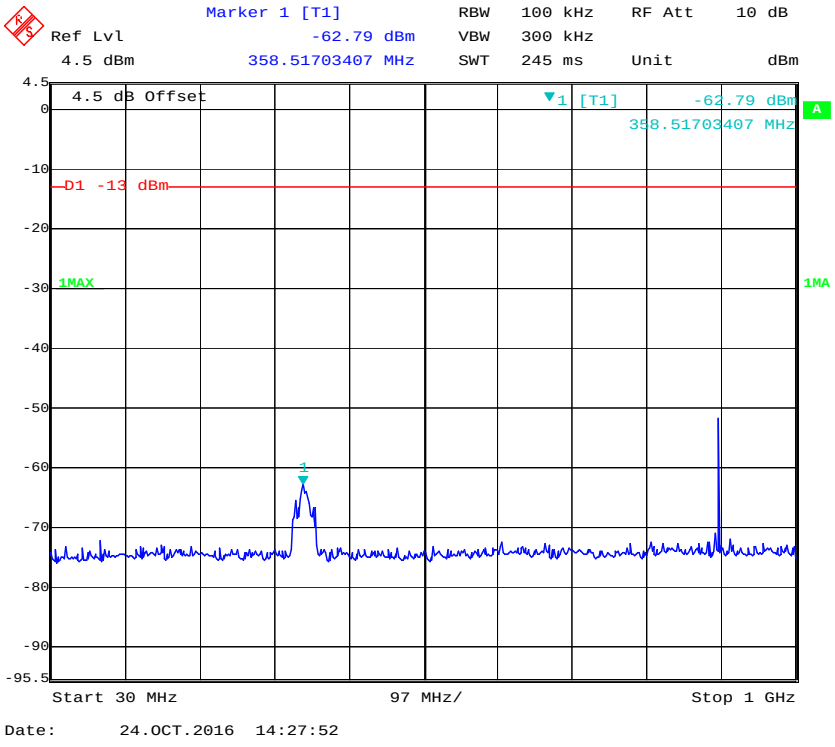


Fundamental test

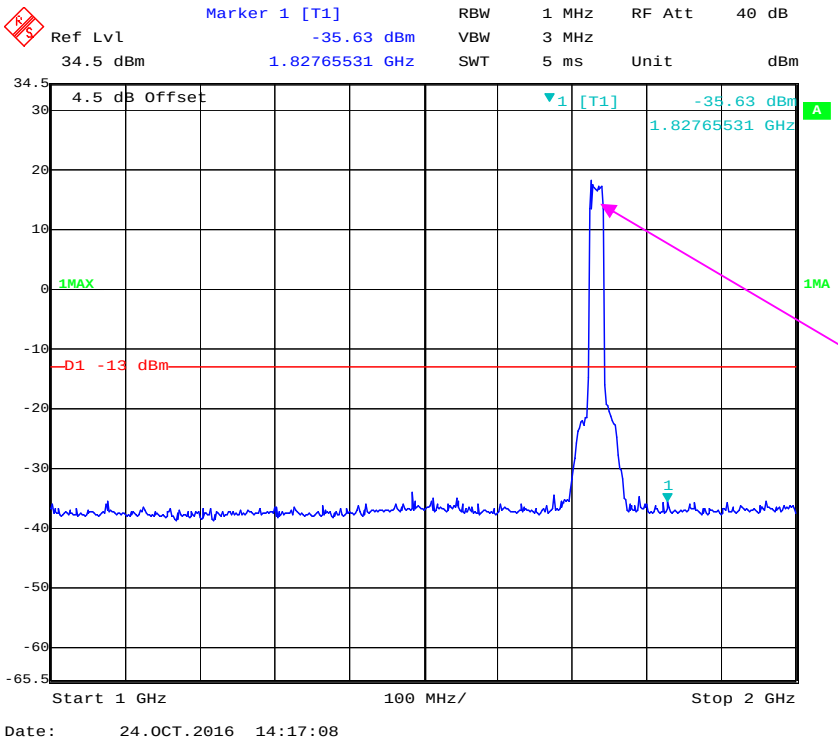
2 GHz –20 GHz (15.0 MHz, Middle Channel)



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

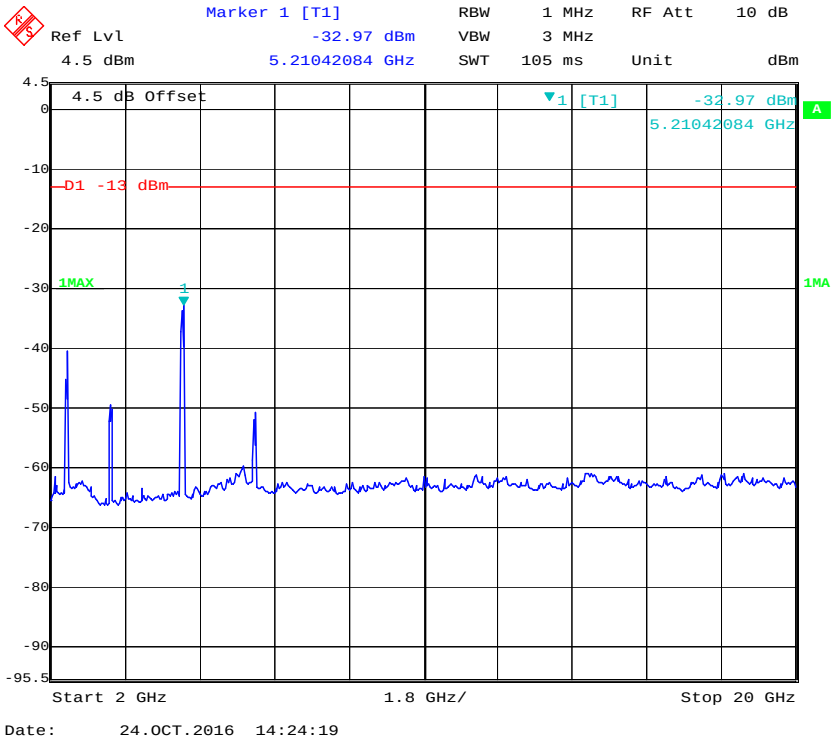


1 GHz –2 GHz (20.0 MHz, Middle Channel)



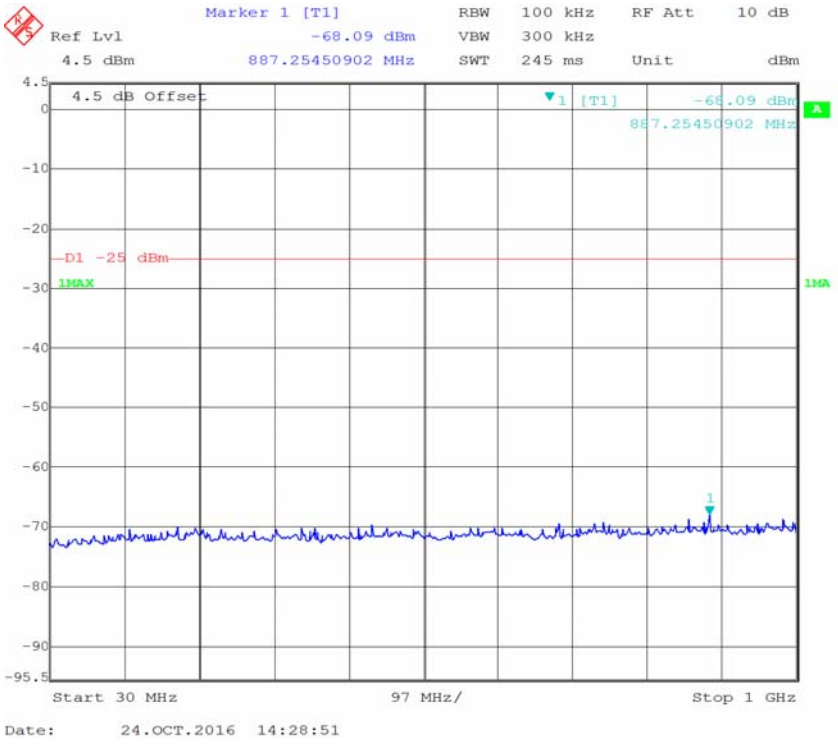
Fundamental test

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

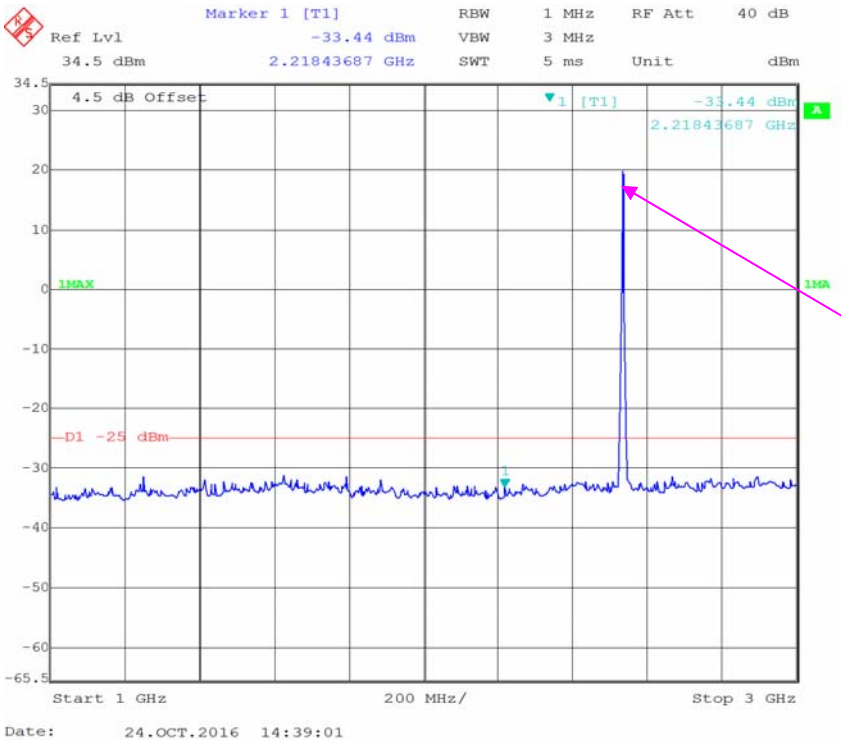


LTE Band 7:

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

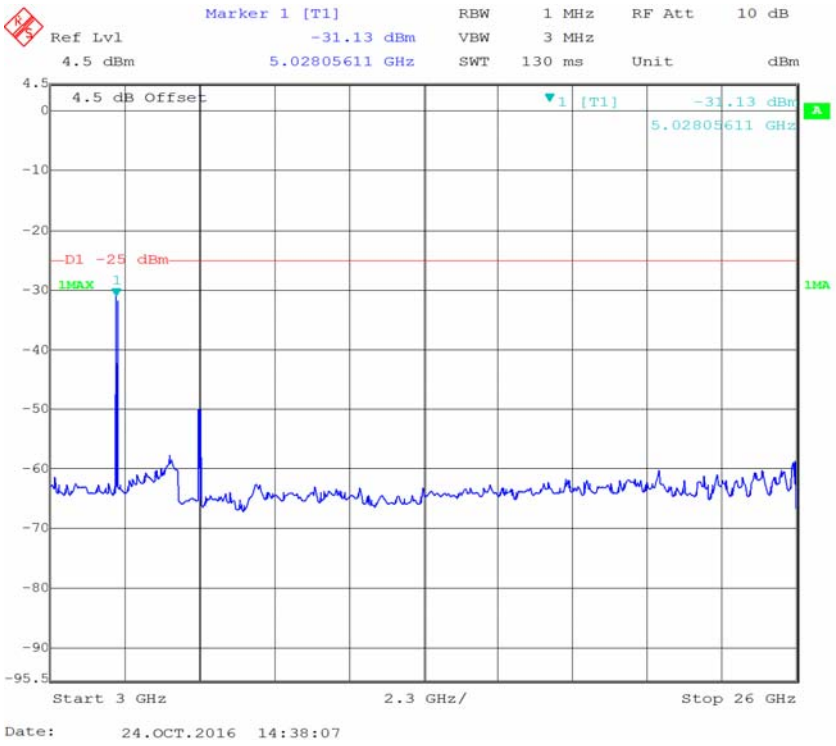


1 GHz – 3 GHz (5.0 MHz, Middle Channel)

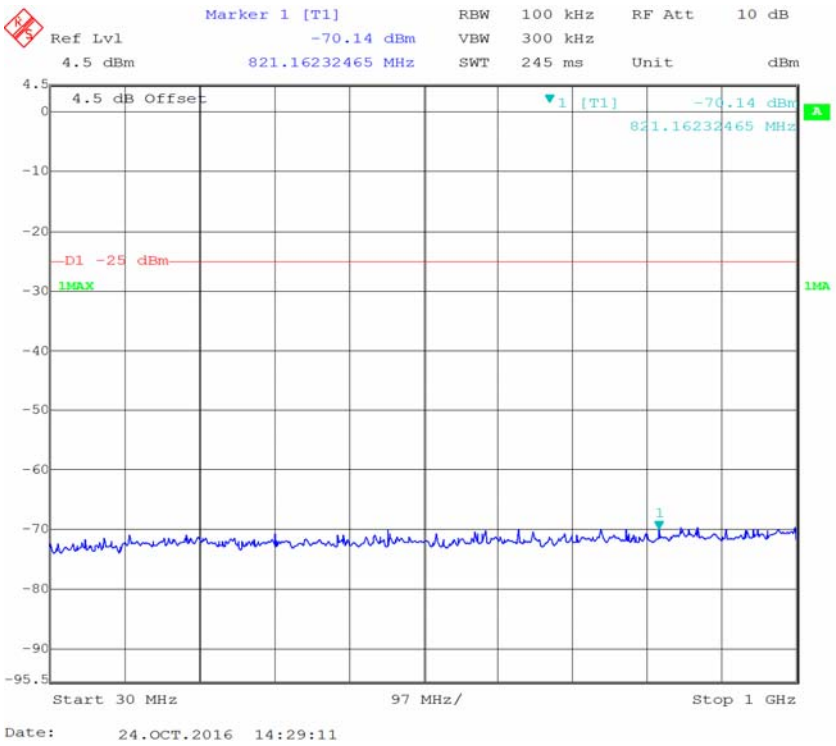


Fundamental test

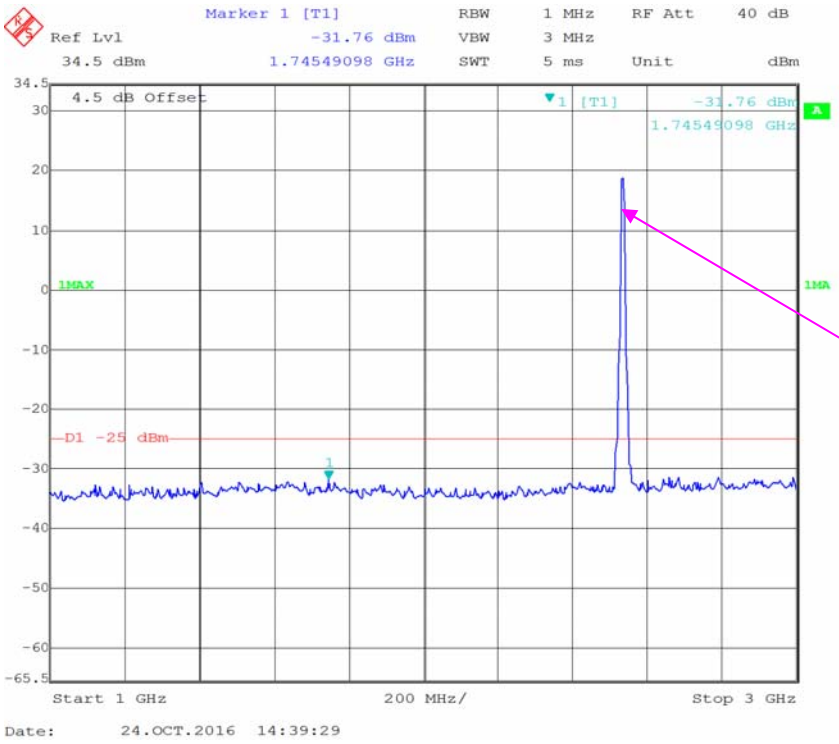
3 GHz – 26 GHz (5.0 MHz, Middle Channel)



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

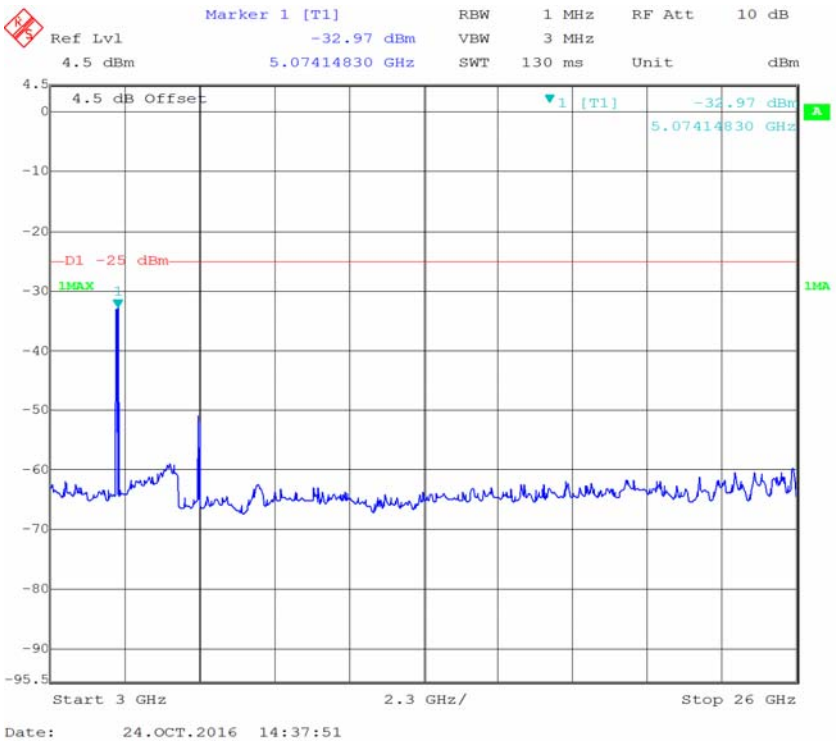


1 GHz – 3 GHz (10.0 MHz, Middle Channel)

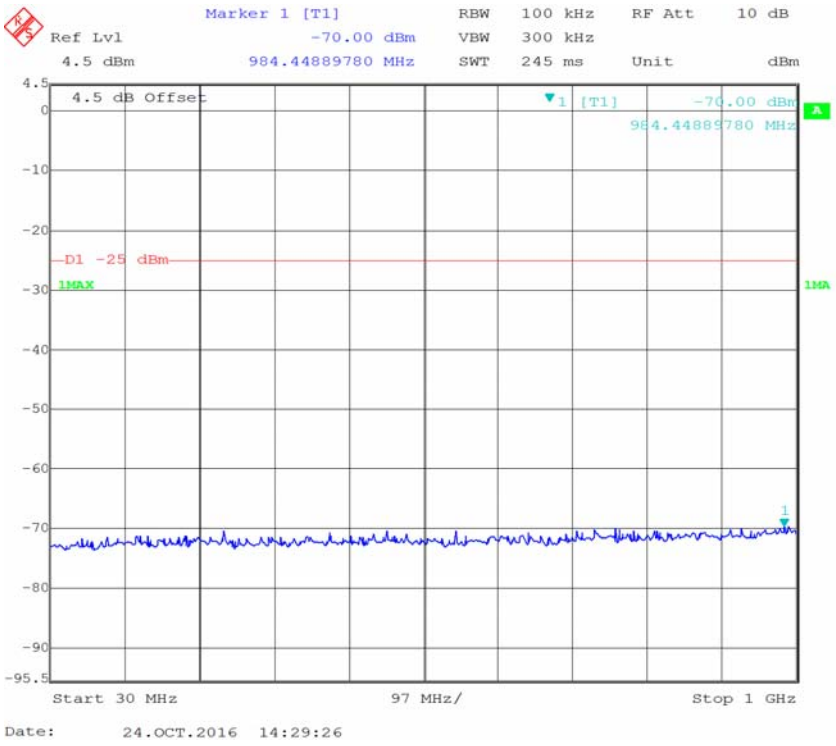


Fundamental test

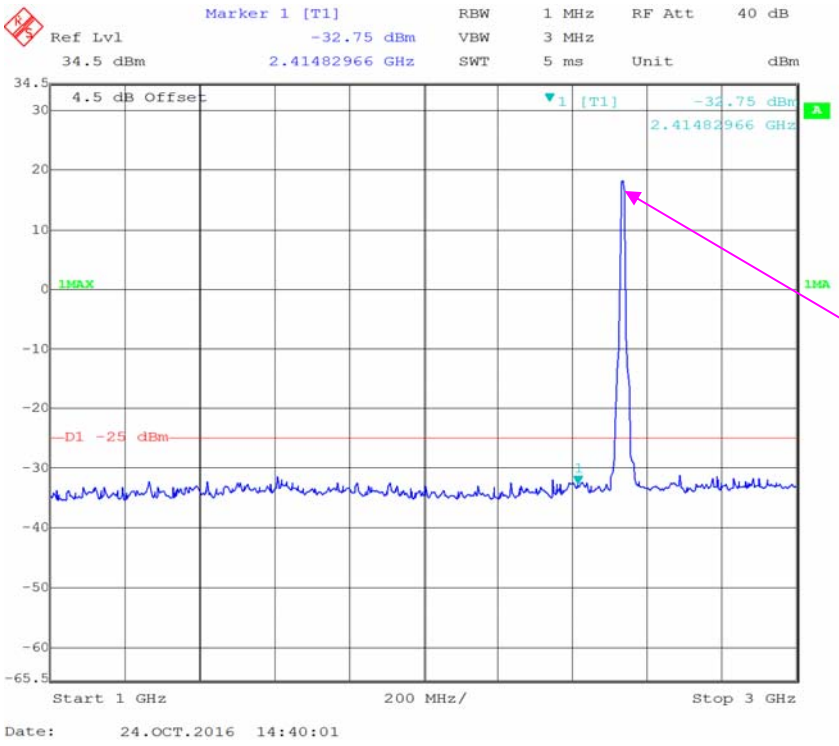
3 GHz – 26 GHz (10.0 MHz, Middle Channel)



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

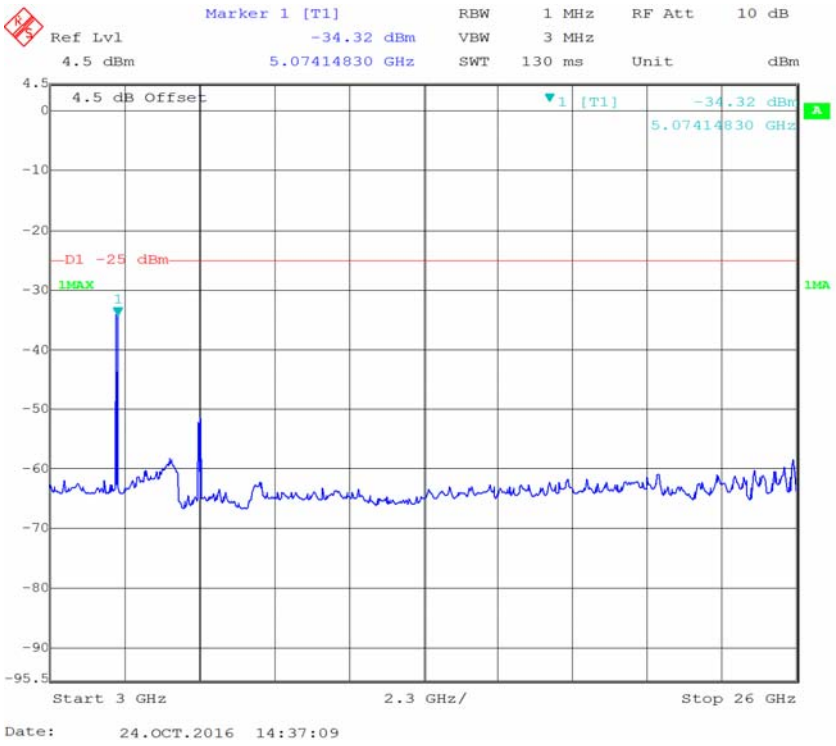


1 GHz – 3 GHz (15.0 MHz, Middle Channel)

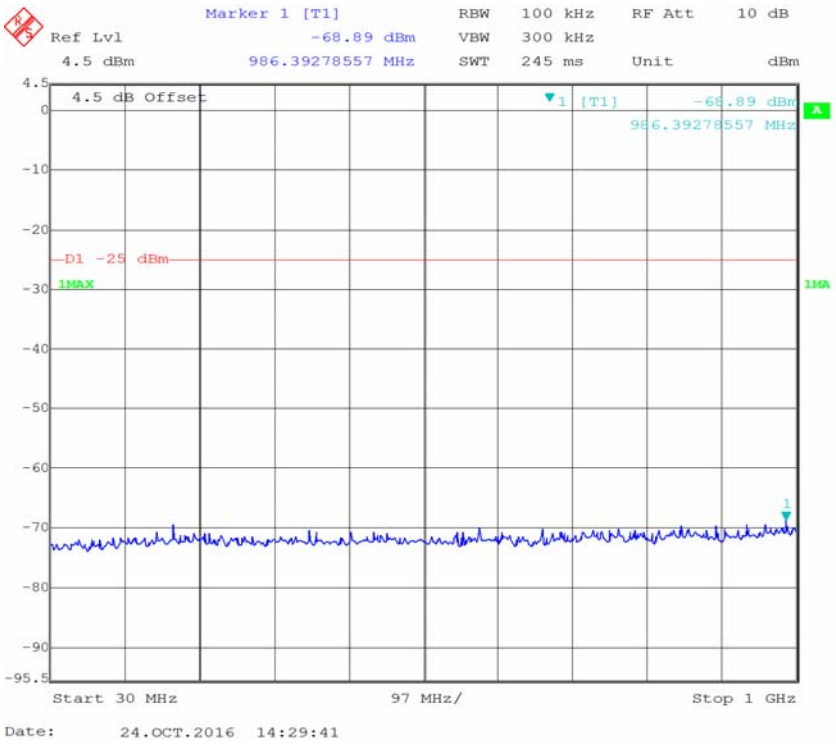


Fundamental test

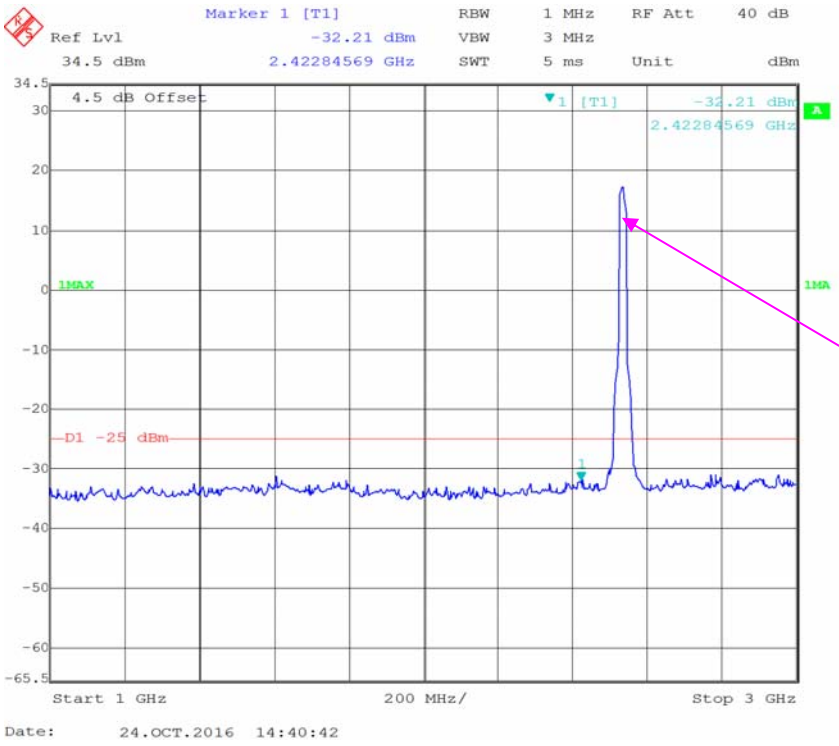
3 GHz –26 GHz (15.0 MHz, Middle Channel)



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

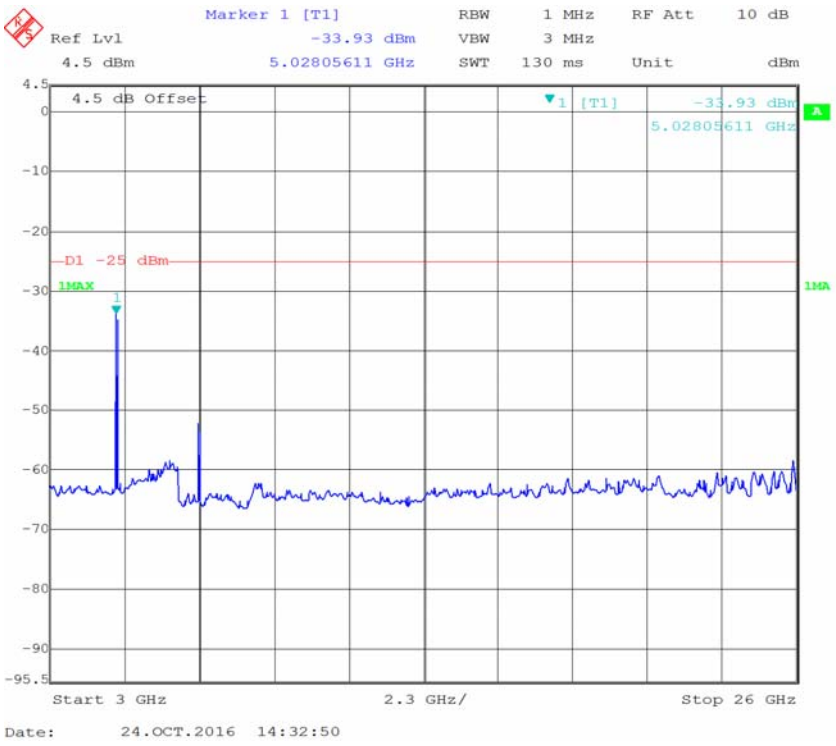


1 GHz –3 GHz (20.0 MHz, Middle Channel)



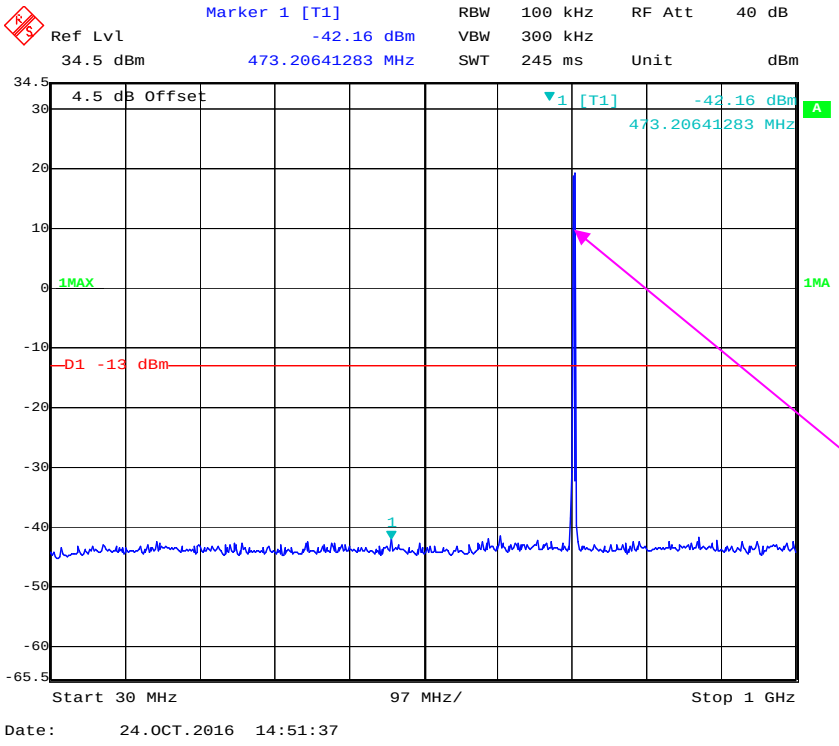
Fundamental test

3 GHz –26 GHz (20.0 MHz, Middle Channel)



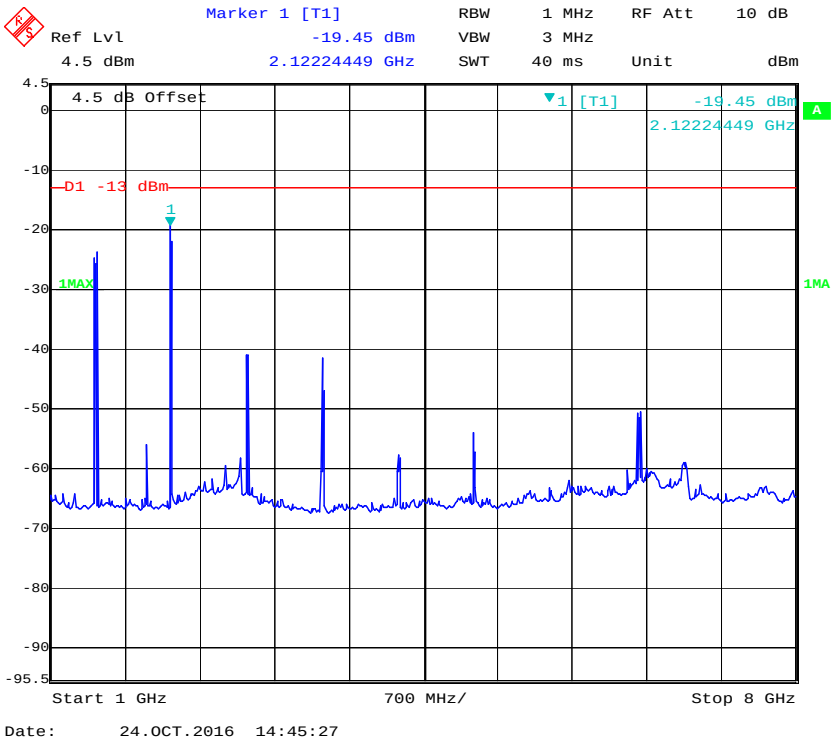
LTE Band 12:

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

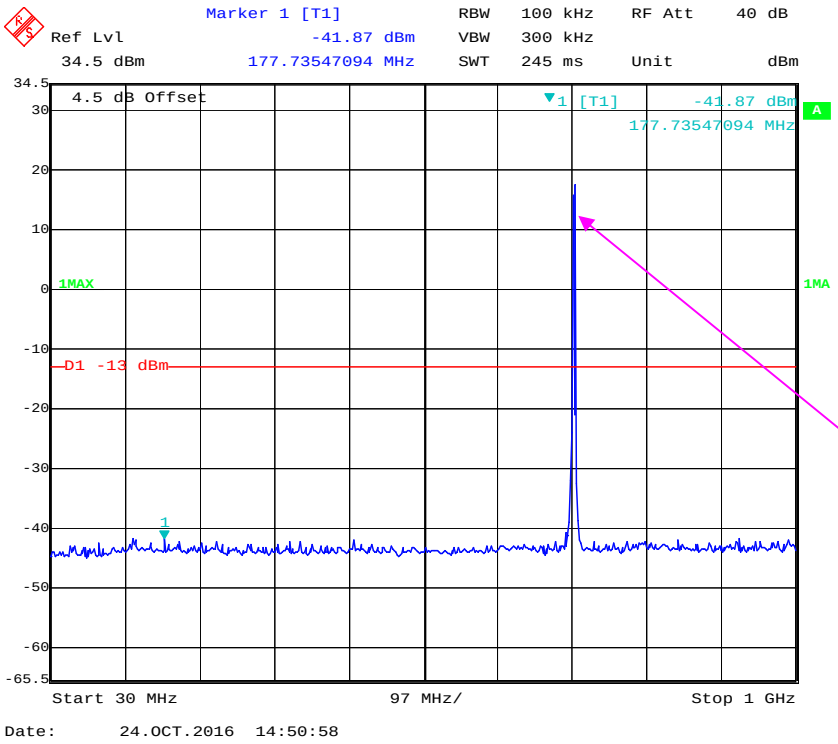


Fundamental test

1 GHz – 8 GHz (1.4 MHz, Middle Channel)

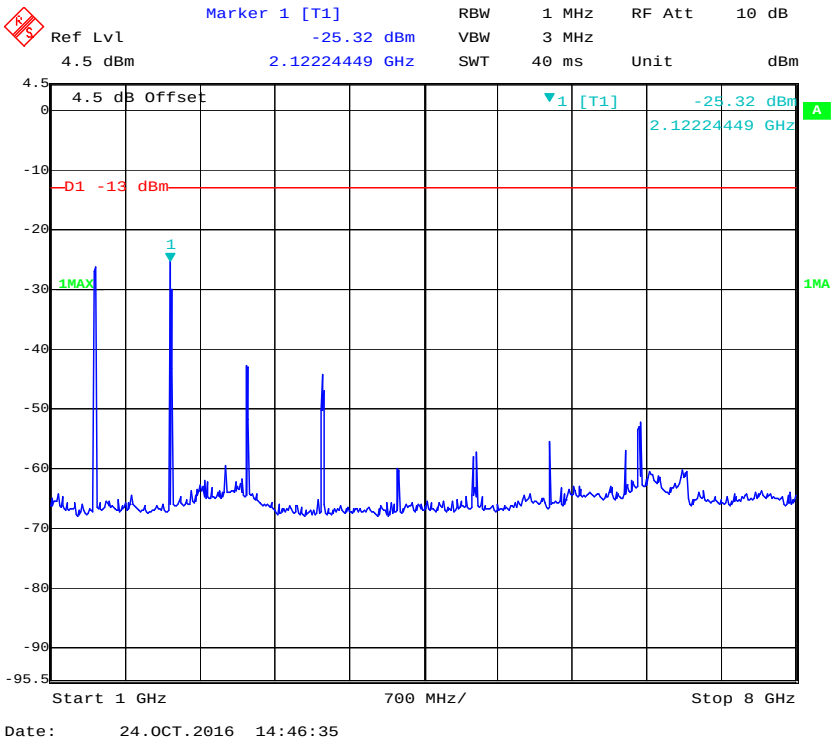


30 MHz – 1 GHz (3.0 MHz, Middle Channel)

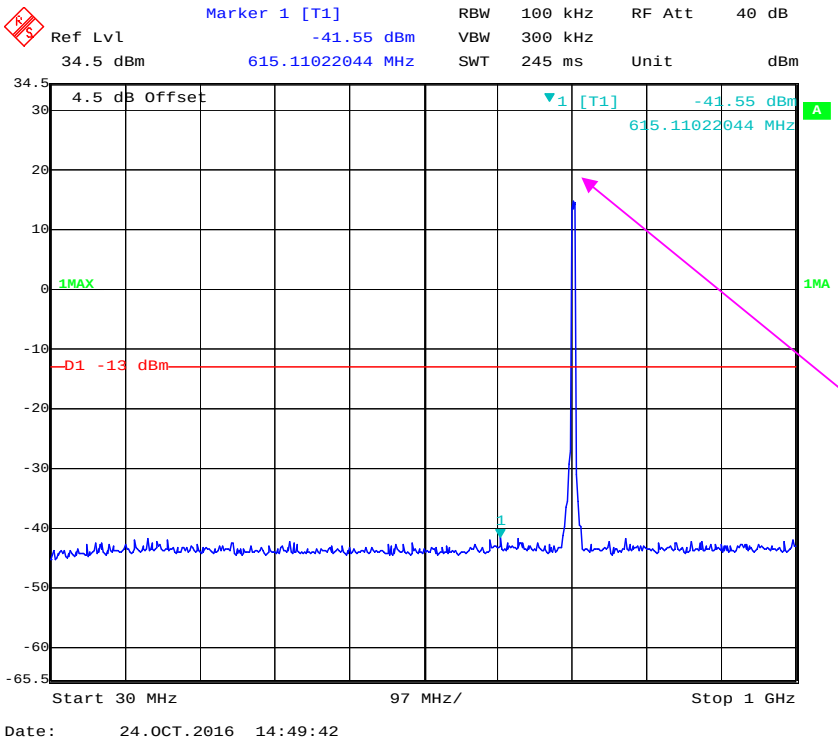


Fundamental test

1 GHz – 8GHz (3.0 MHz, Middle Channel)

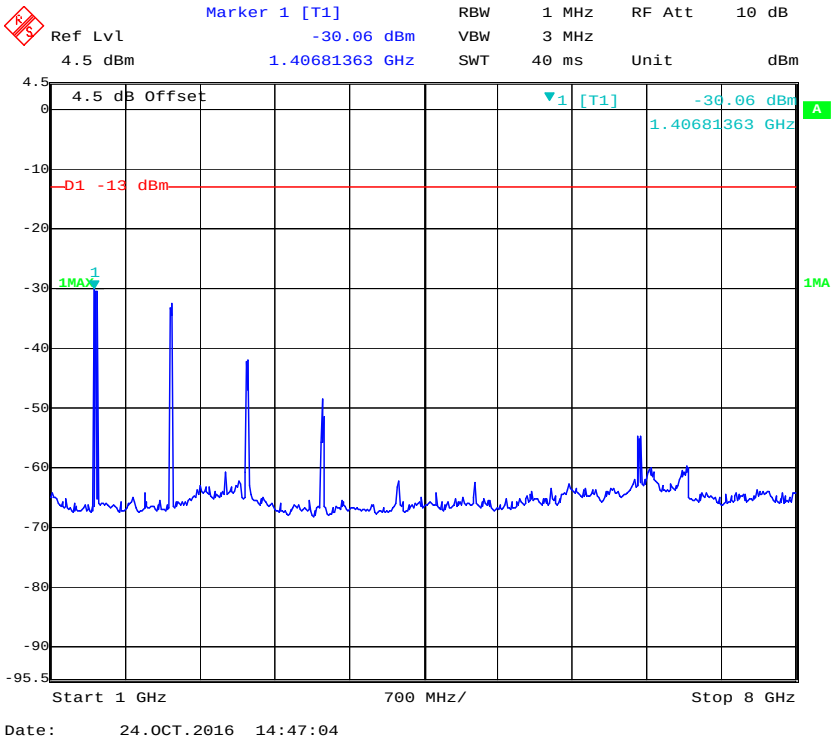


30 MHz – 1 GHz (5.0 MHz, Middle Channel)

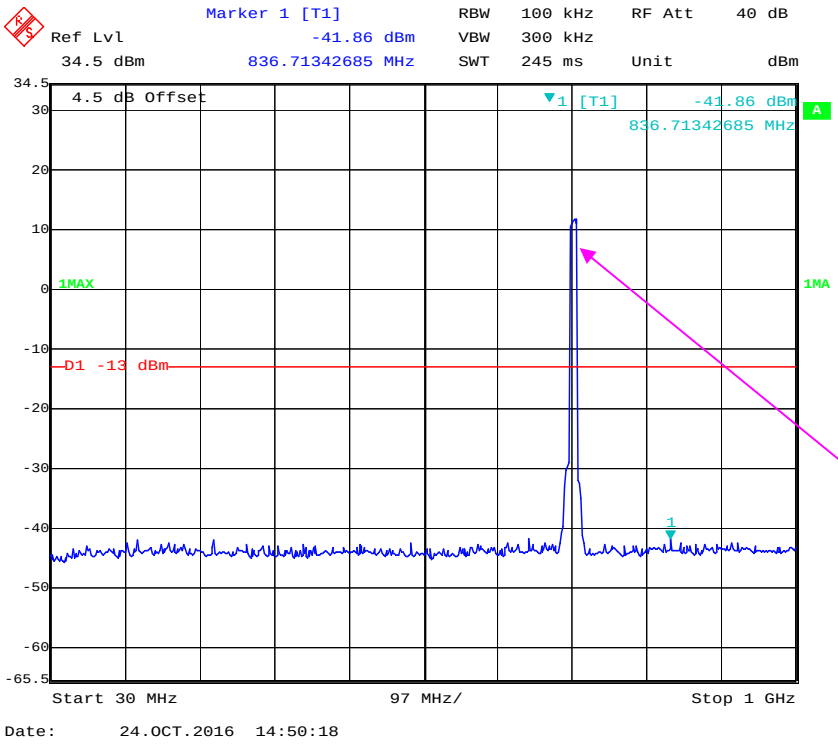


Fundamental test

1 GHz – 8 GHz (5.0 MHz, Middle Channel)

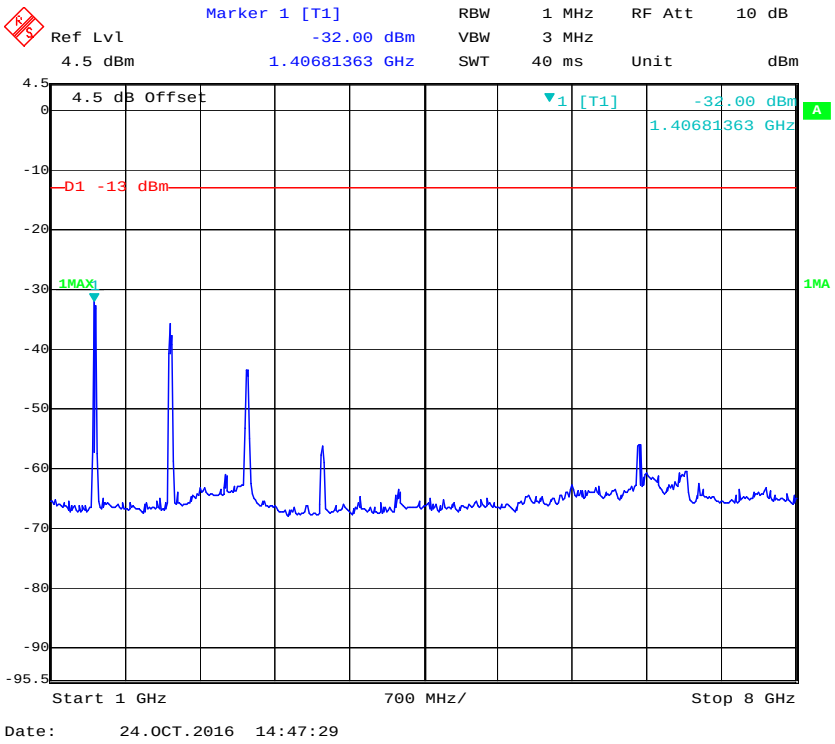


30 MHz – 1 GHz (10.0 MHz, Middle Channel)



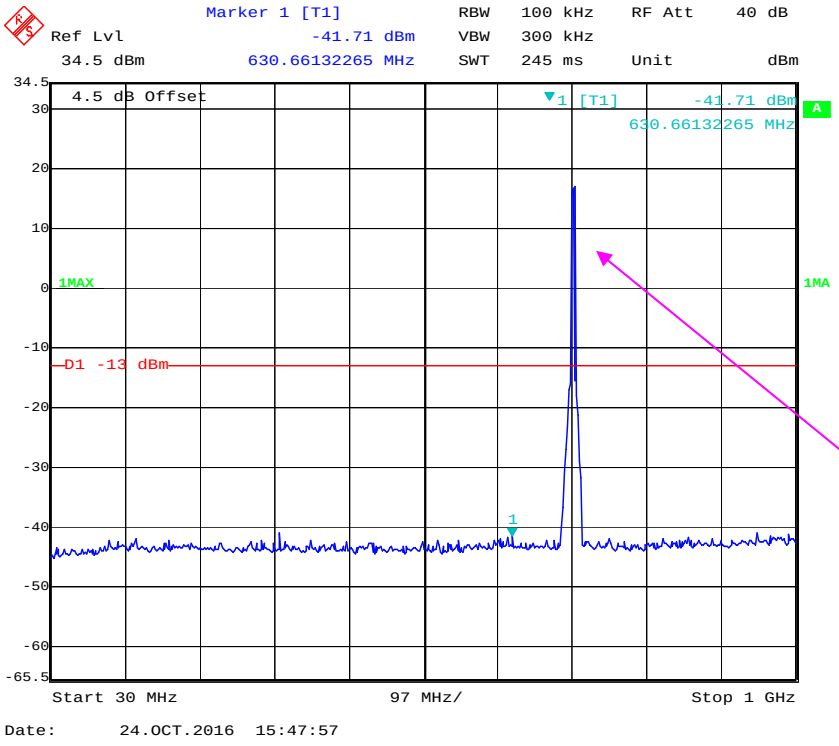
Fundamental test

1 GHz – 8GHz (10.0 MHz, Middle Channel)



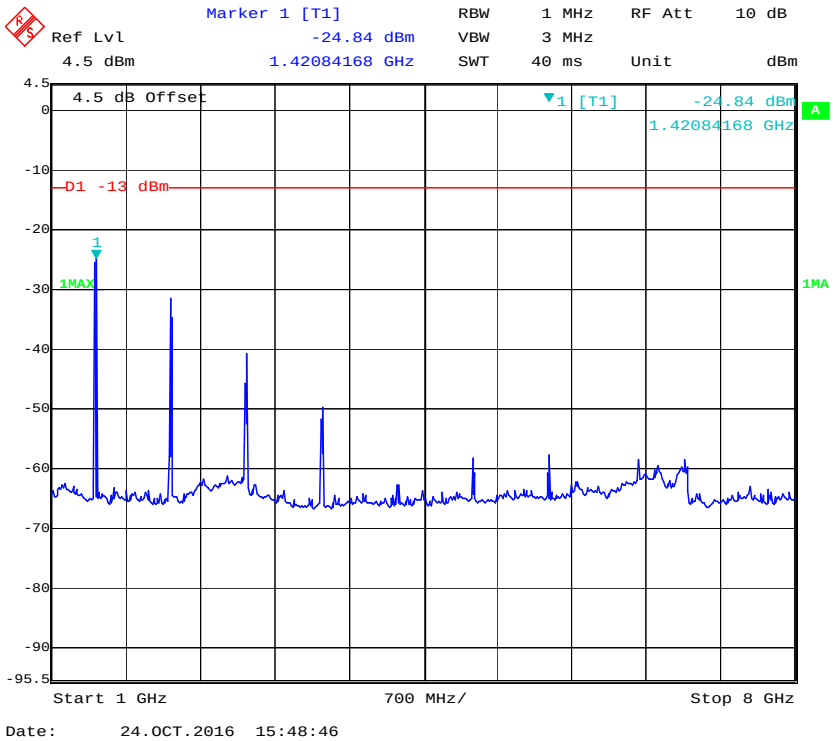
LTE Band 17:

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

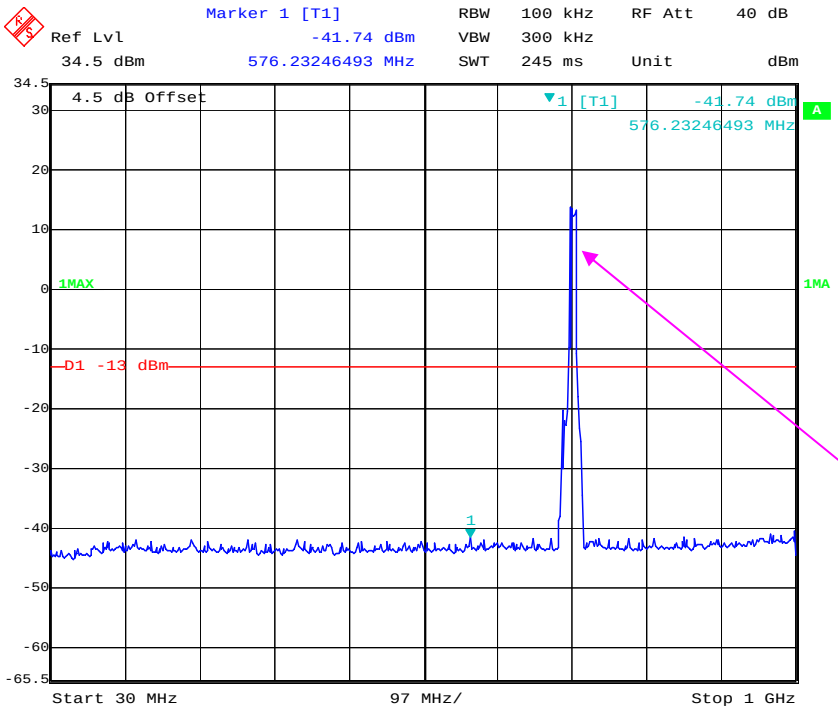


Fundamental test

1 GHz – 8 GHz (5.0 MHz, Middle Channel)

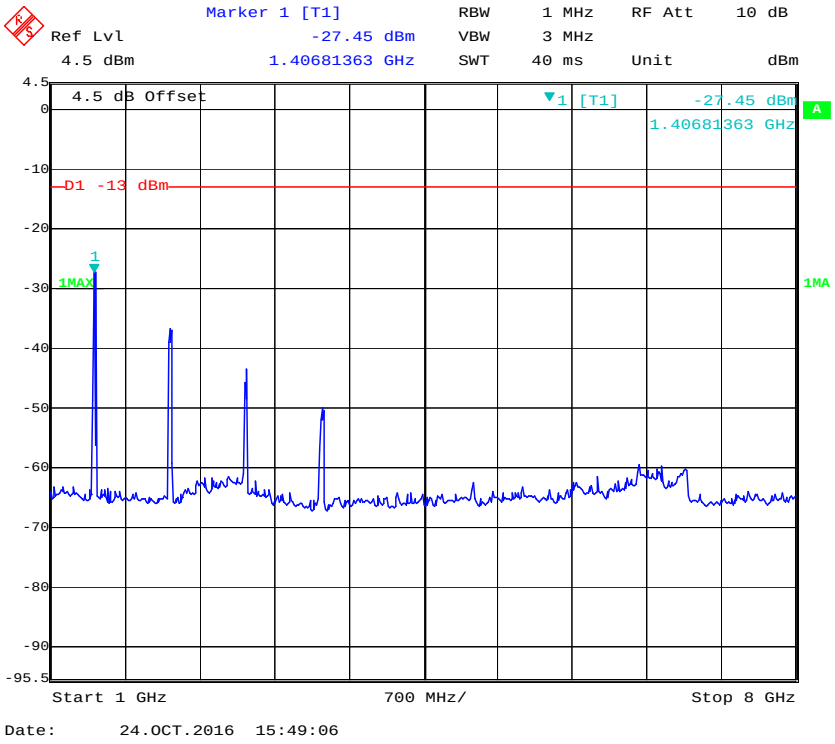


30 MHz – 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

1 GHz – 8 GHz (10.0 MHz, Middle Channel)



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

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:	24 ℃
Relative Humidity:	47 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-10-25.

Test mode: Transmitting (Pre-scan with Low, Middle, High channel, and the worst 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 Mode										
479.93	30.30	79	1.2	H	-66.7	0.27	4.05	-62.92	-13	49.92
479.93	31.90	242	1.7	V	-65.1	0.27	4.05	-61.32	-13	48.32
1673.20	56.13	292	2.2	H	-47.8	0.30	9.40	-38.70	-13	25.70
1673.20	57.22	356	1.9	V	-48.2	0.30	9.40	-39.10	-13	26.10
2509.80	53.92	336	2.4	H	-43.5	0.43	10.60	-33.33	-13	20.33
2509.80	55.42	288	2.0	V	-43.7	0.43	10.60	-33.53	-13	20.53
WCDMA Mode										
430.7	30.23	270	1.3	H	-66.8	0.27	4.05	-63.02	-13	50.02
430.7	30.85	107	2.3	V	-66.1	0.27	4.05	-62.32	-13	49.32
1673.20	53.83	319	1.3	H	-50.1	0.30	9.40	-41.00	-13	28.00
1673.20	55.72	256	1.0	V	-49.7	0.30	9.40	-40.60	-13	27.60
2509.80	69.72	242	1.6	H	-27.7	0.43	10.60	-17.53	-13	4.53
2509.80	71.52	318	1.1	V	-27.6	0.43	10.60	-17.43	-13	4.43

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 Mode										
479.93	31.58	39	1.6	H	-65.4	0.27	4.05	-61.62	-13	48.62
479.93	30.57	45	1.7	V	-66.4	0.27	4.05	-62.62	-13	49.62
3760.00	40.83	156	1.9	H	-52.9	2.42	12.60	-42.72	-13	29.72
3760.00	38.93	73	1.9	V	-53.8	2.42	12.60	-43.62	-13	30.62
WCDMA Mode										
430.7	30.45	256	1.7	H	-66.5	0.27	4.05	-62.72	-13	49.72
430.7	30.97	207	2.0	V	-66.0	0.27	4.05	-62.22	-13	49.22
3760.00	49.33	180	1.1	H	-44.4	2.42	12.60	-34.22	-13	21.22
3760.00	48.03	346	1.7	V	-44.7	2.42	12.60	-34.52	-13	21.52

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										
430.7	30.31	276	1.9	H	-66.7	0.27	4.05	-62.92	-13	49.92
430.7	30.19	62	1.7	V	-66.8	0.27	4.05	-63.02	-13	50.02
3465.20	52.37	31	1.1	H	-42.2	2.34	12.40	-32.14	-13	19.14
3465.20	50.61	341	1.7	V	-41.9	2.34	12.40	-31.84	-13	18.84

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										
479.93	31.07	9	2.4	H	-65.9	0.27	4.05	-62.12	-13	49.12
479.93	31.74	183	1.0	V	-65.3	0.27	4.05	-61.52	-13	48.52
3760.00	38.33	102	2.1	H	-55.4	2.42	12.60	-45.22	-13	32.22
3760.00	38.13	101	1.6	V	-54.6	2.42	12.60	-44.42	-13	31.42
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
479.93	31.78	26	1.7	H	-65.2	0.27	4.05	-61.42	-13	48.42
479.93	32.31	154	1.7	V	-64.7	0.27	4.05	-60.92	-13	47.92
3465.00	41.27	230	2.0	H	-53.3	2.34	12.40	-43.24	-13	30.24
3465.00	40.21	29	1.7	V	-52.3	2.34	12.40	-42.24	-13	29.24
Band 7										
Test frequency range:30 MHz ~ 26 GHz										
479.93	30.69	320	2.4	H	-66.3	0.27	4.05	-62.52	-25	37.52
479.93	31.47	284	1.4	V	-65.5	0.27	4.05	-61.72	-25	36.72
5070.00	34.26	40	1.4	H	-54.4	2.57	12.70	-44.27	-25	19.27
5070.00	37.07	92	1.7	V	-52.4	2.57	12.70	-42.27	-25	17.27
Band 12										
Test frequency range:30 MHz ~ 8 GHz										
479.93	30.67	23	2.2	H	-66.3	0.27	4.05	-62.52	-13	49.52
479.93	31.99	27	2.1	V	-65.0	0.27	4.05	-61.22	-13	48.22
1415.00	41.86	283	1.6	H	-60.9	0.28	8.00	-53.18	-13	40.18
1415.00	45.72	206	1.5	V	-61.1	0.28	8.00	-53.38	-13	40.38
Band 17										
Test frequency range:30 MHz ~ 8 GHz										
479.93	31.78	26	1.7	H	-65.2	0.27	4.05	-61.42	-13	48.42
479.93	32.31	154	1.7	V	-64.7	0.27	4.05	-60.92	-13	47.92
1420.00	41.06	111	1.9	H	-61.7	0.28	8.00	-53.98	-13	40.98
1420.00	45.82	288	1.8	V	-61.0	0.28	8.00	-53.28	-13	40.28

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.

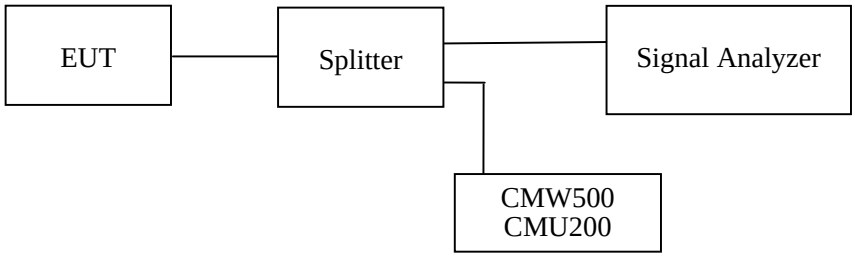
According to FCC §27.53 (h)(m), the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

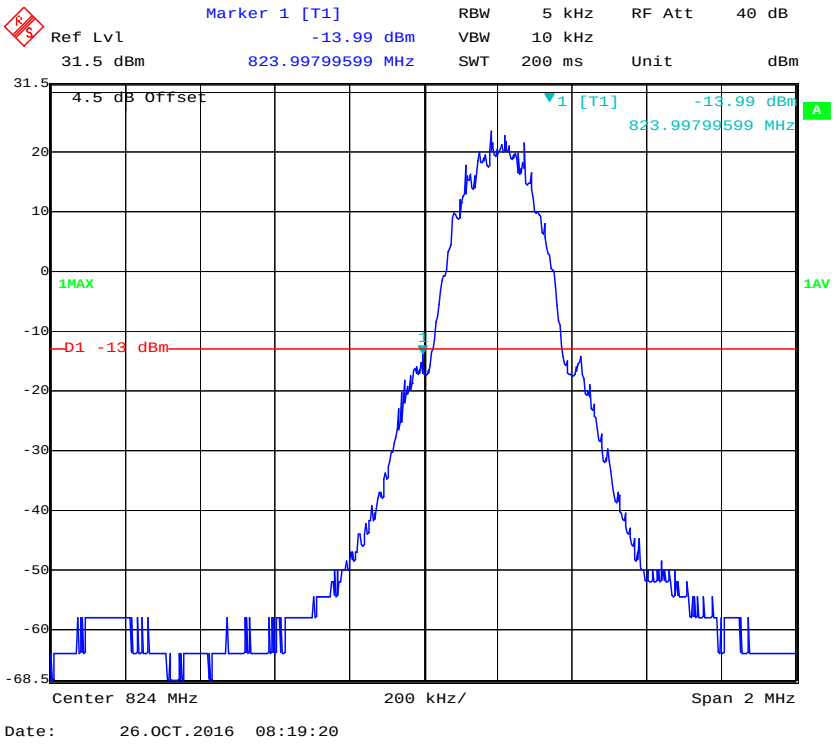
Temperature:	24~25 ℃
Relative Humidity:	54~57 %
ATM Pressure:	101.0~101.5 kPa

The testing was performed by Chris Wang from 2016-10-24 to2016-10-26

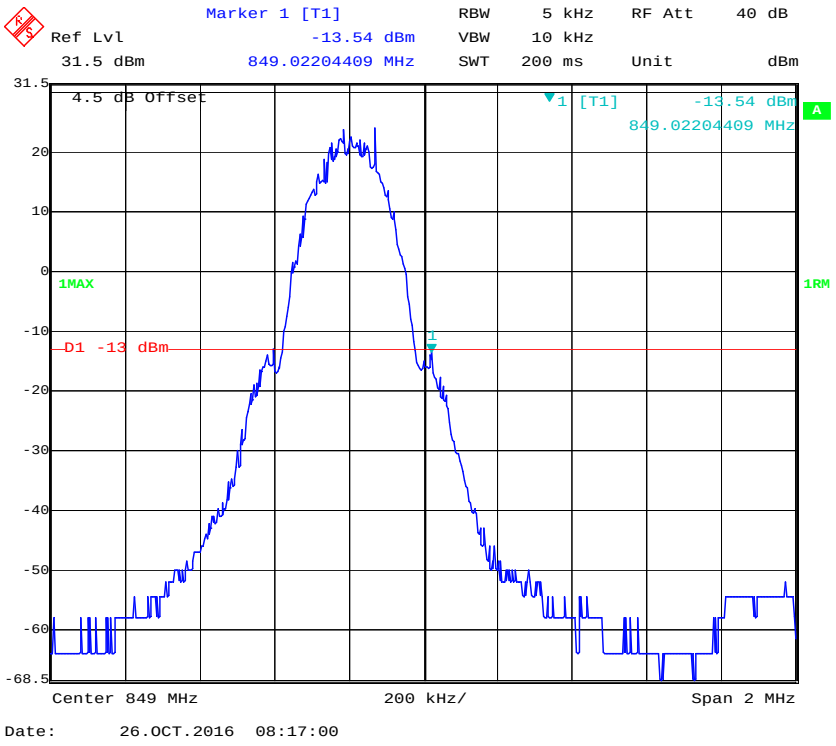
EUT operation mode: Transmitting

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

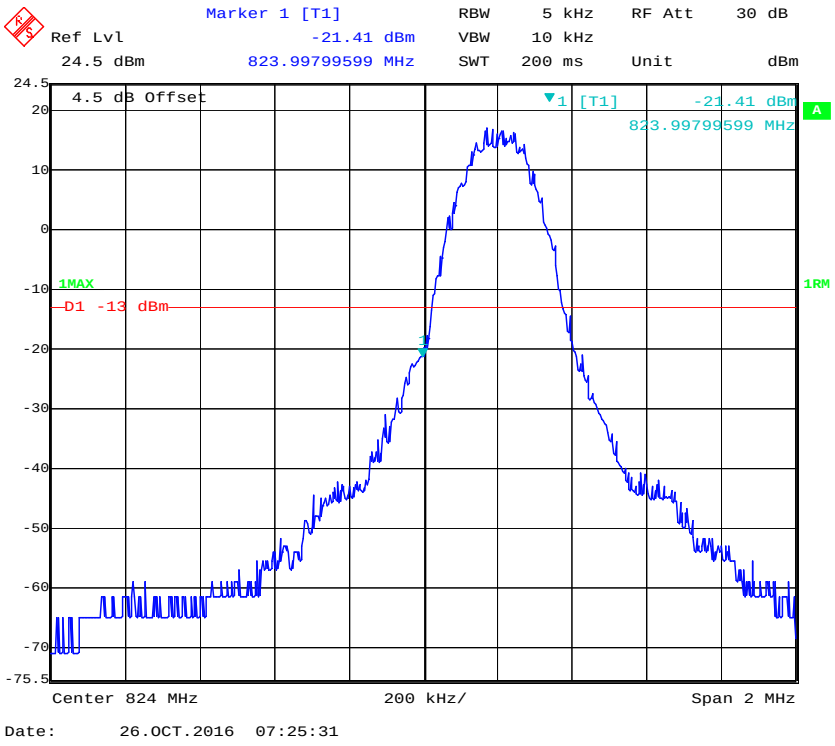
Cellular Band, Left Band Edge for GSM (GMSK) Mode



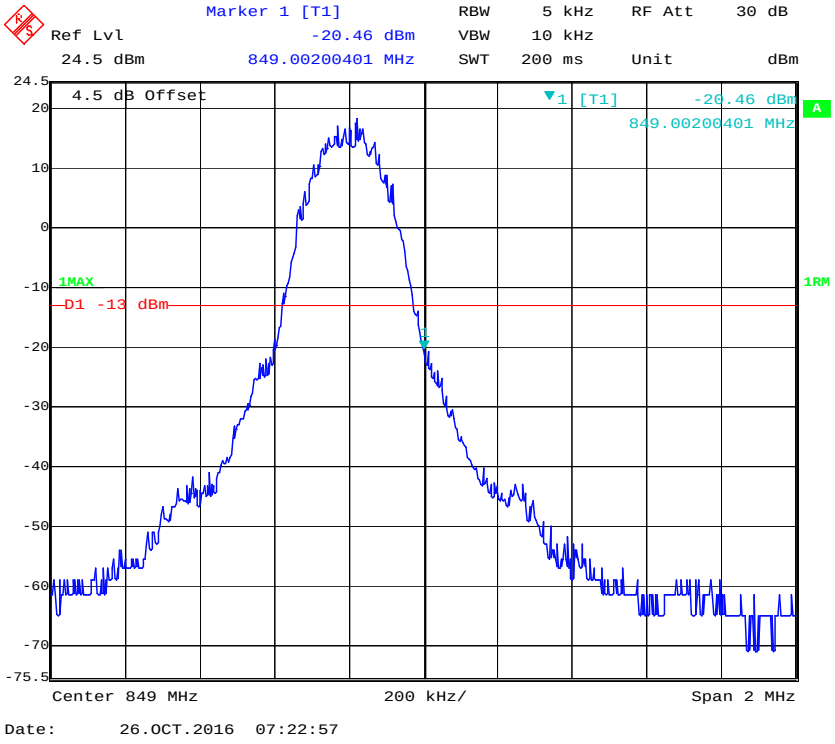
Cellular Band, Right Band Edge for GSM (GMSK) Mode



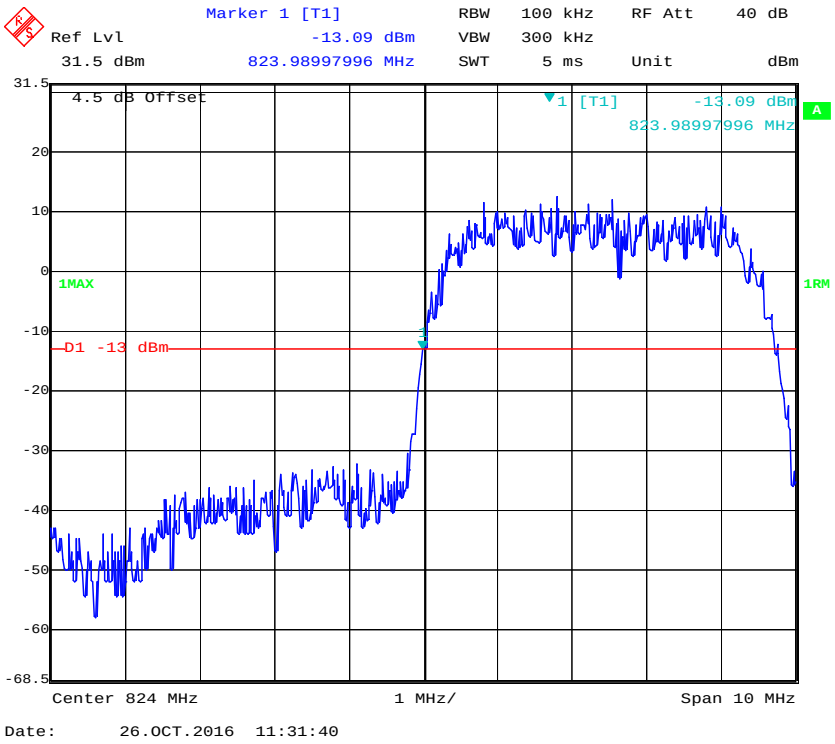
Cellular Band, Left Band Edge for EGPRS Mode



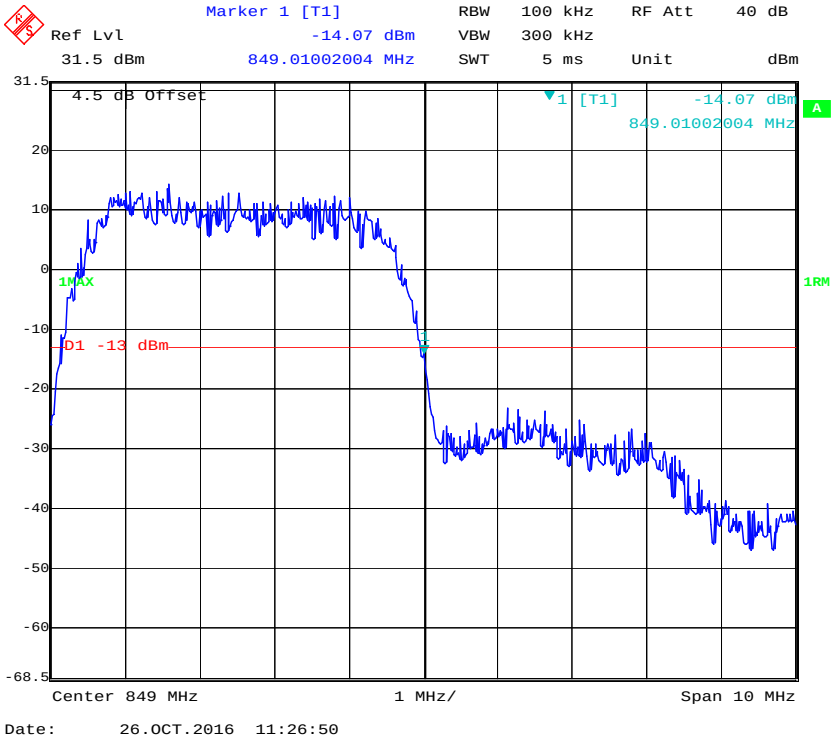
Cellular Band, Right Band Edge for EGPRS Mode



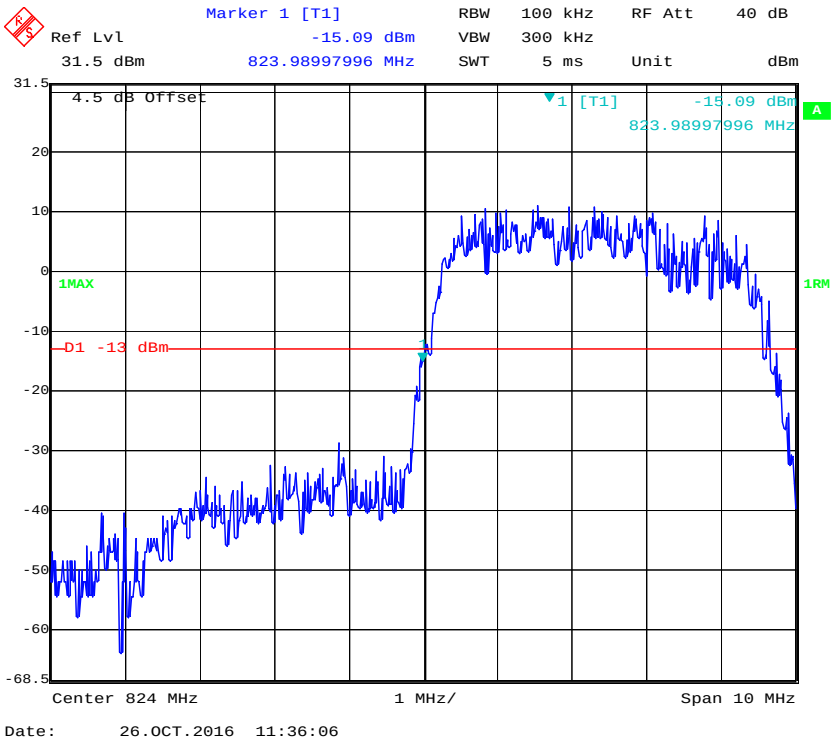
Cellular Band, Left Band Edge for WCDMA (BPSK) Mode



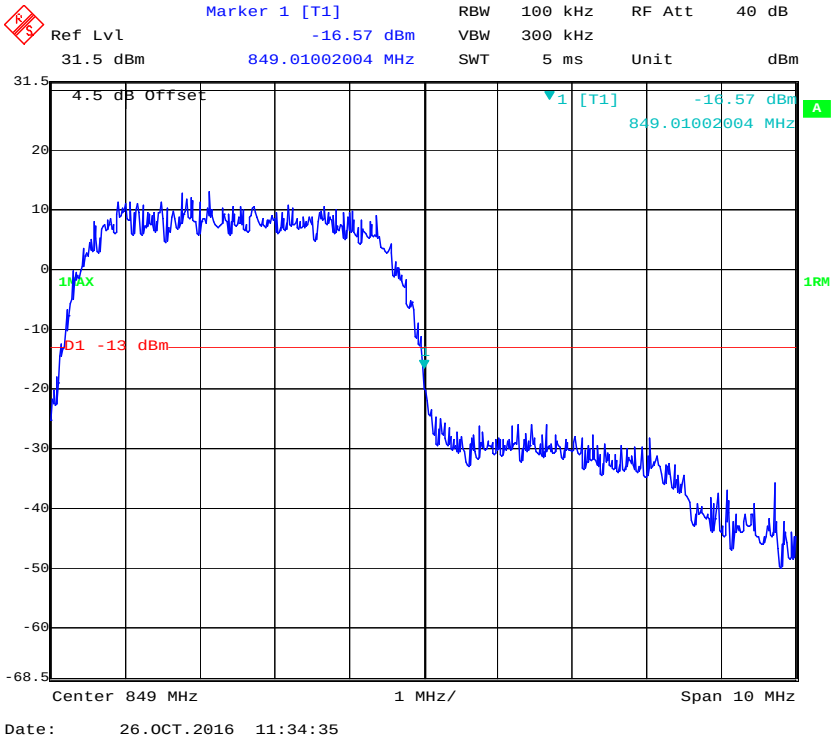
Cellular Band, Right Band Edge for WCDMA (BPSK) Mode



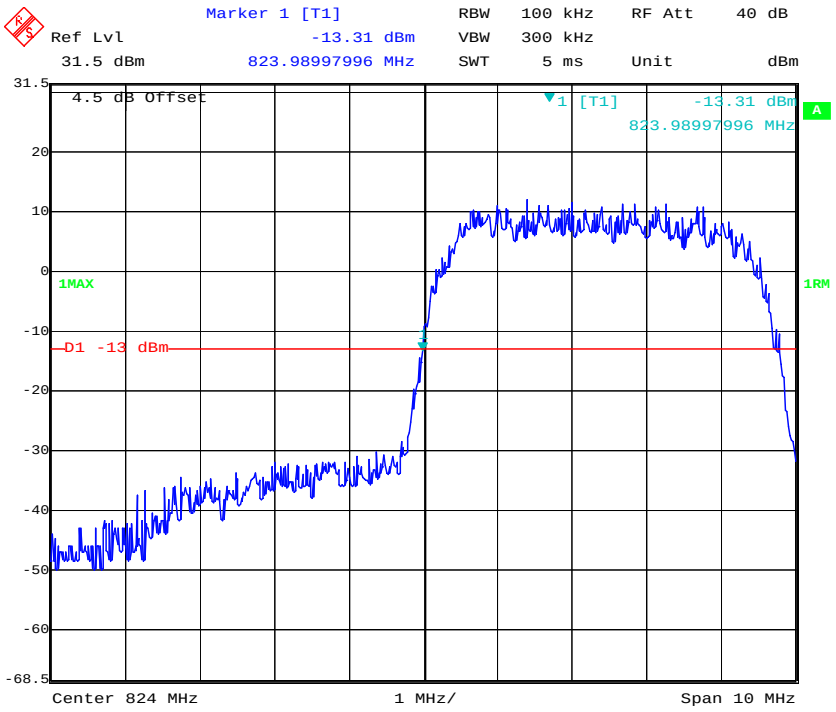
Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



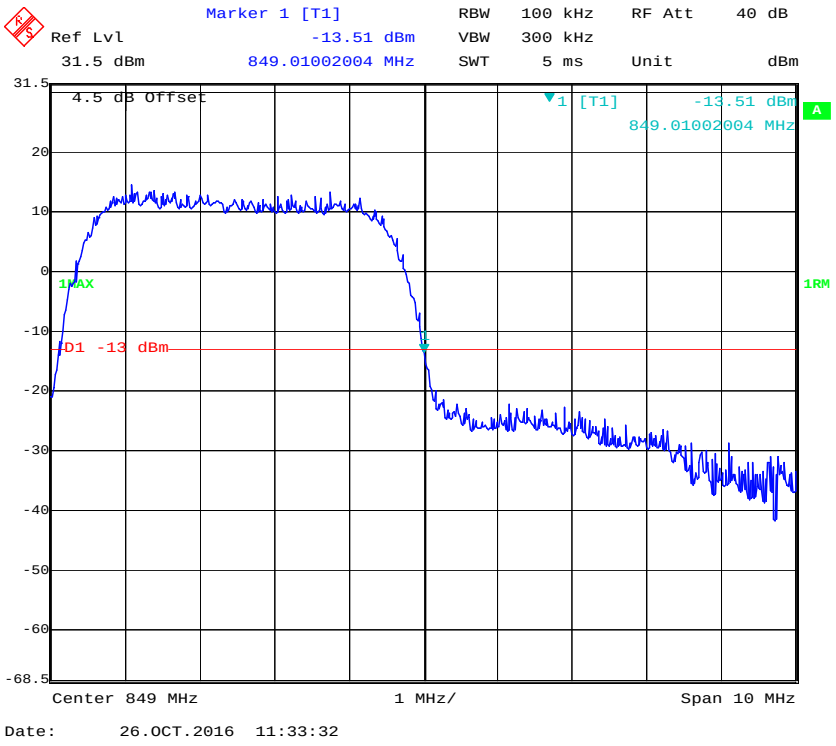
Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



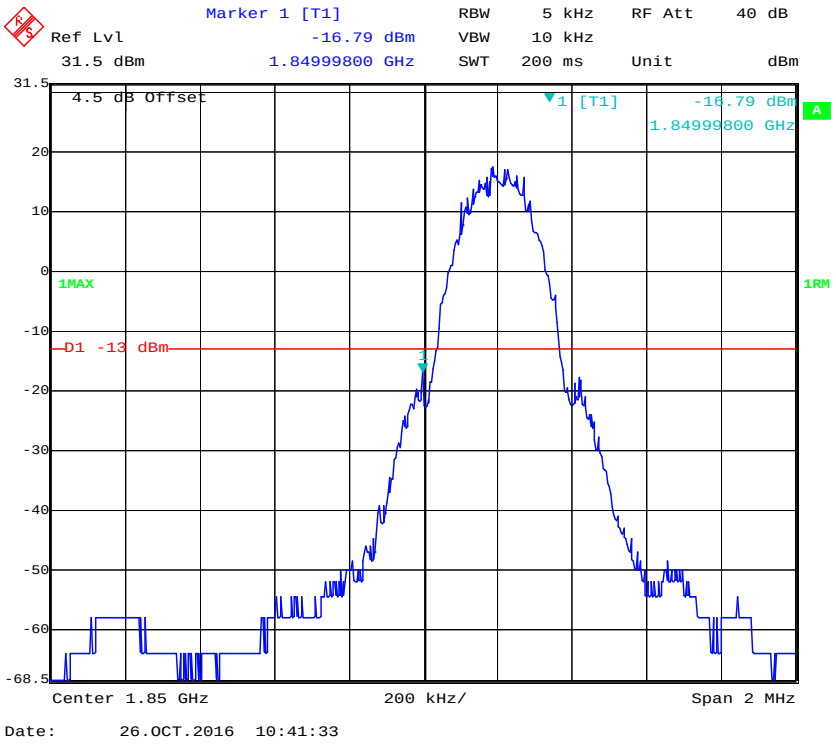
Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



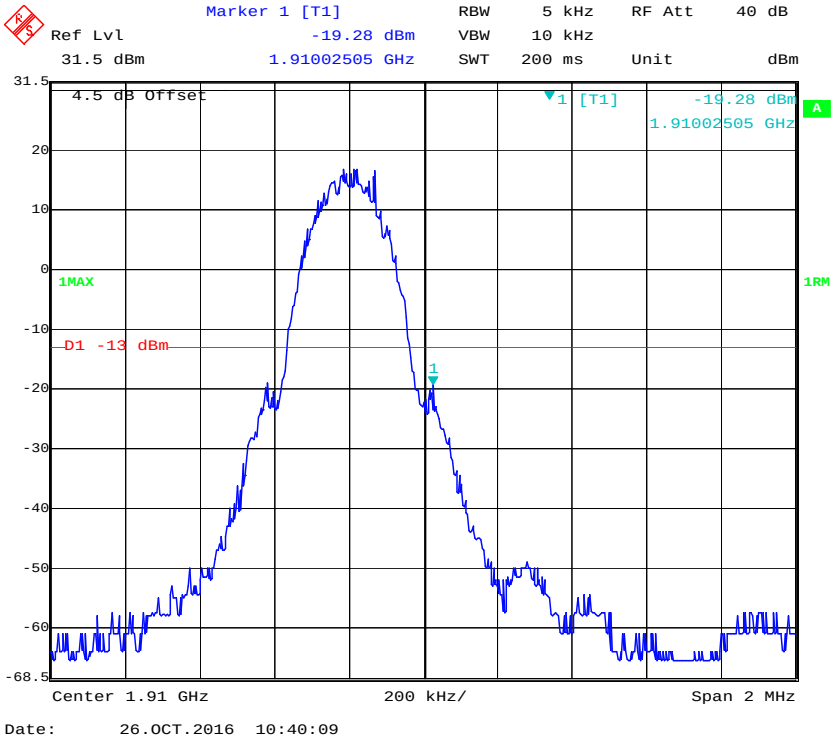
Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



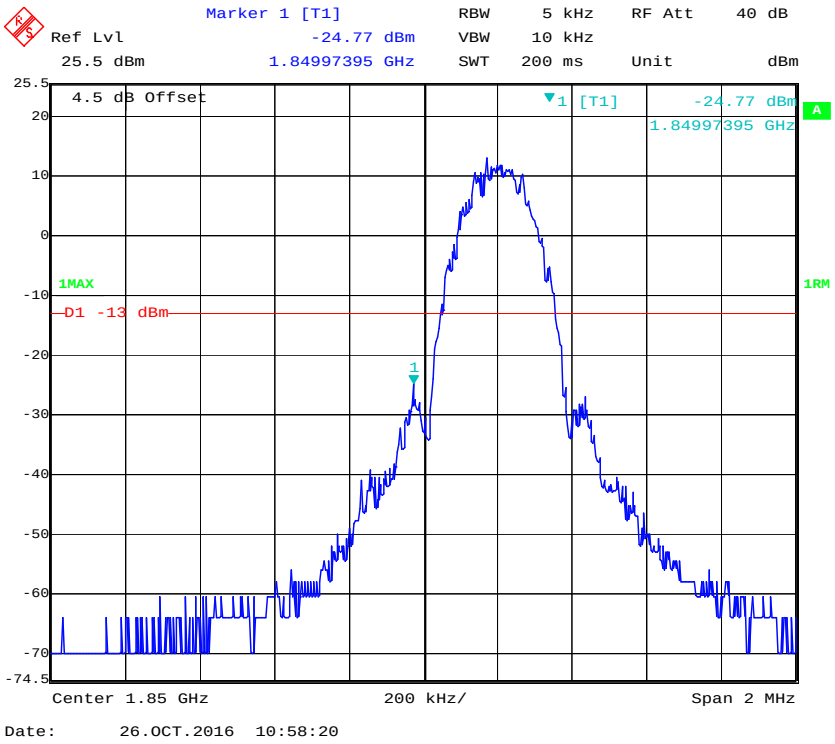
PCS Band, Left Band Edge for GSM (GMSK) Mode



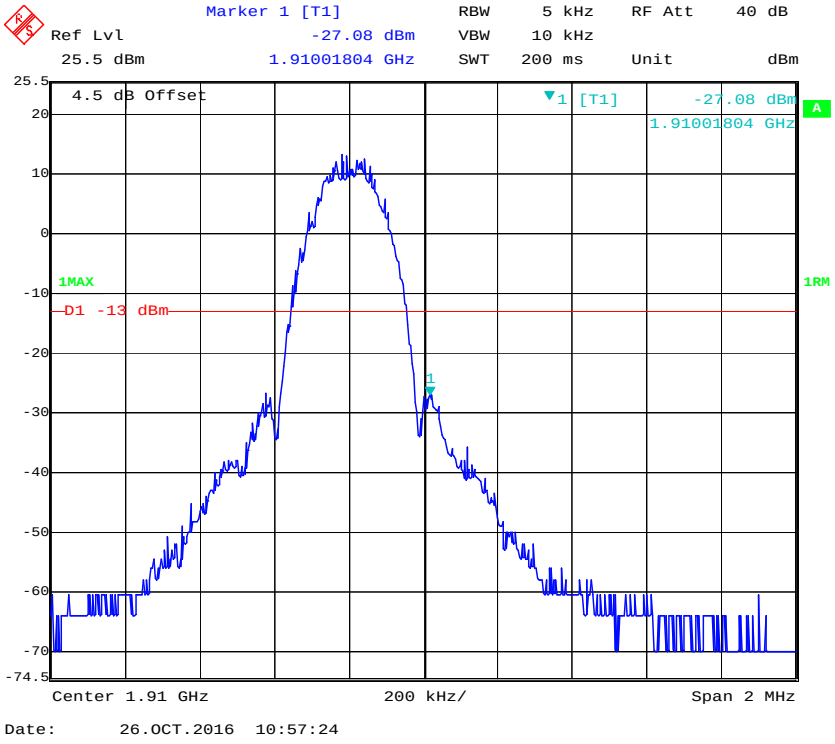
PCS Band, Right Band Edge for GSM (GMSK) Mode



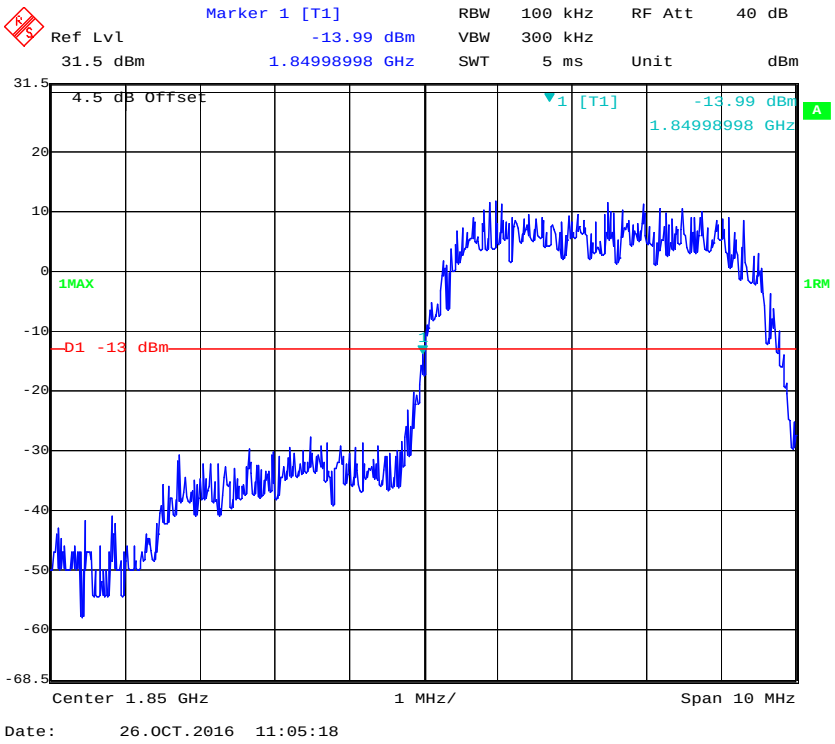
PCS Band, Left Band Edge for EGPRS Mode



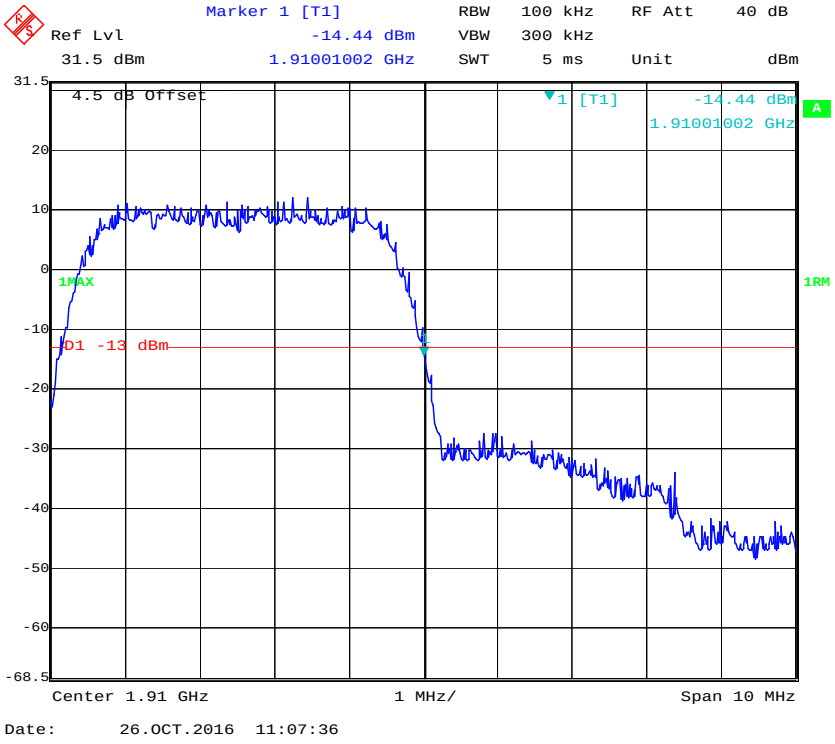
PCS Band, Right Band Edge for EGPRS Mode



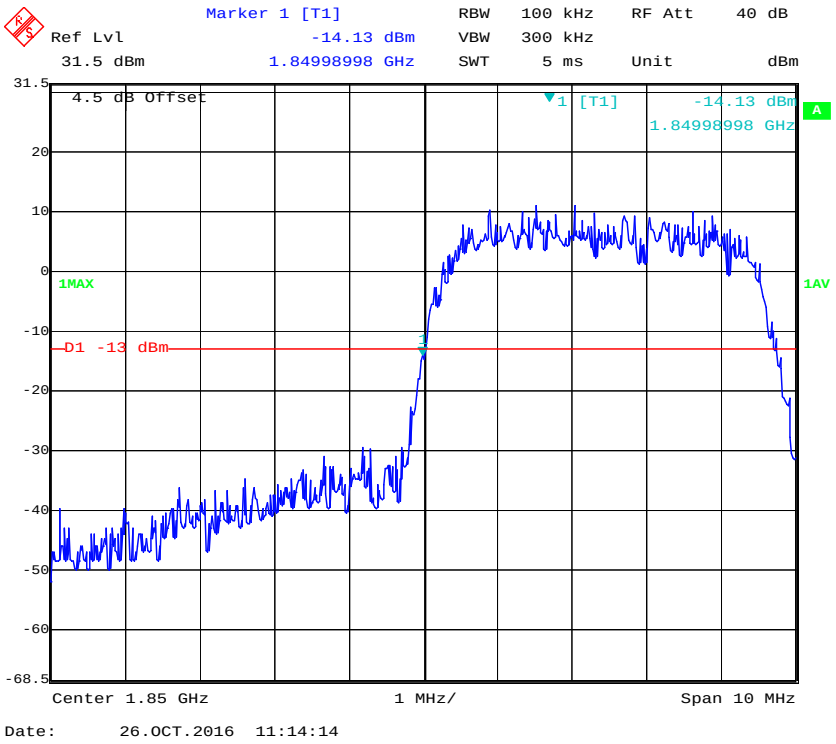
PCS Band, Left Band Edge for WCDMA (BPSK) Mode



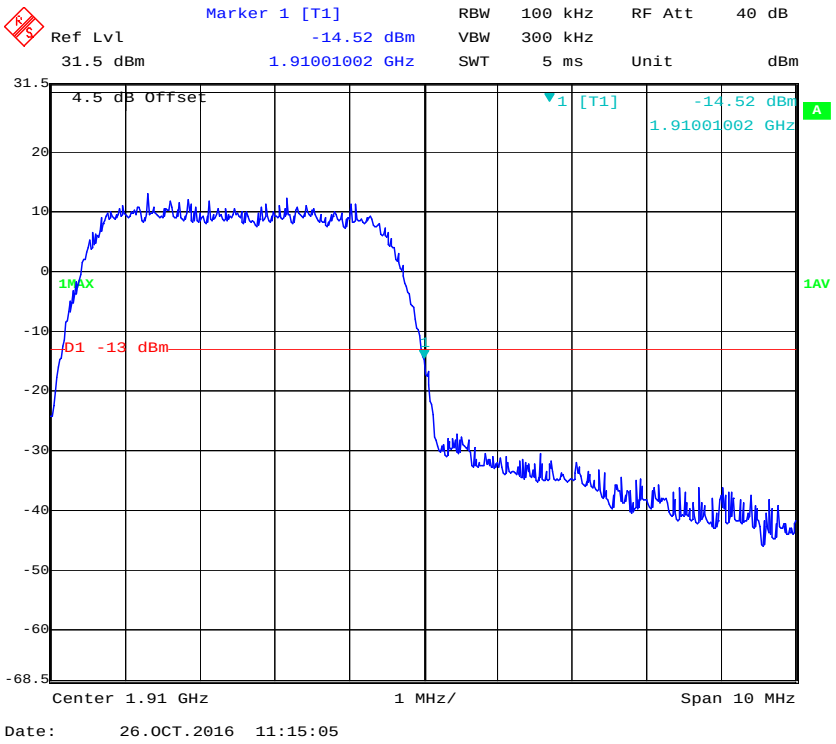
PCS Band, Right Band Edge for WCDMA (BPSK) Mode



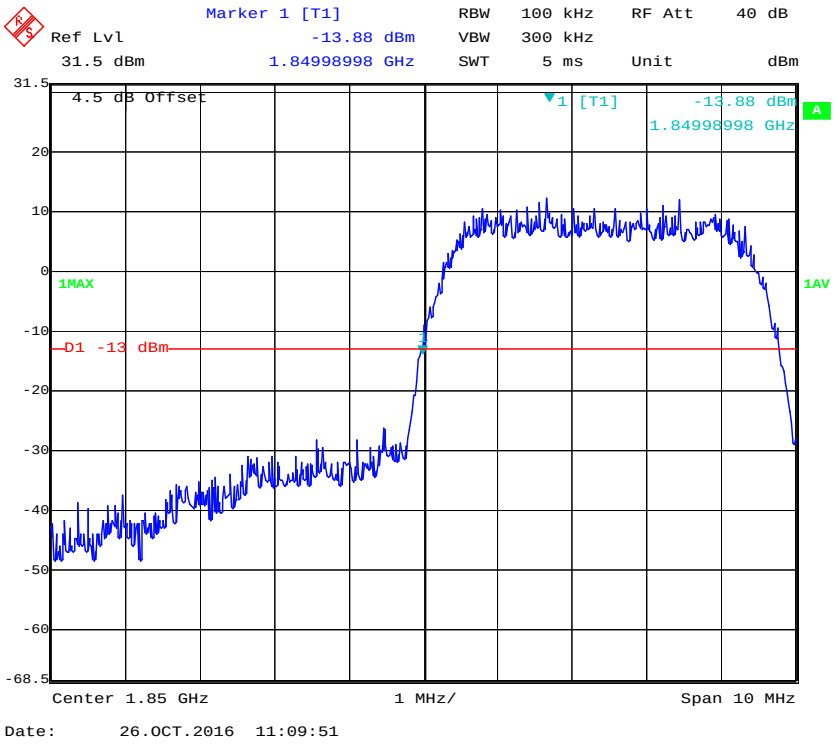
PCS Band, Left Band Edge for HSDPA (16QAM) Mode



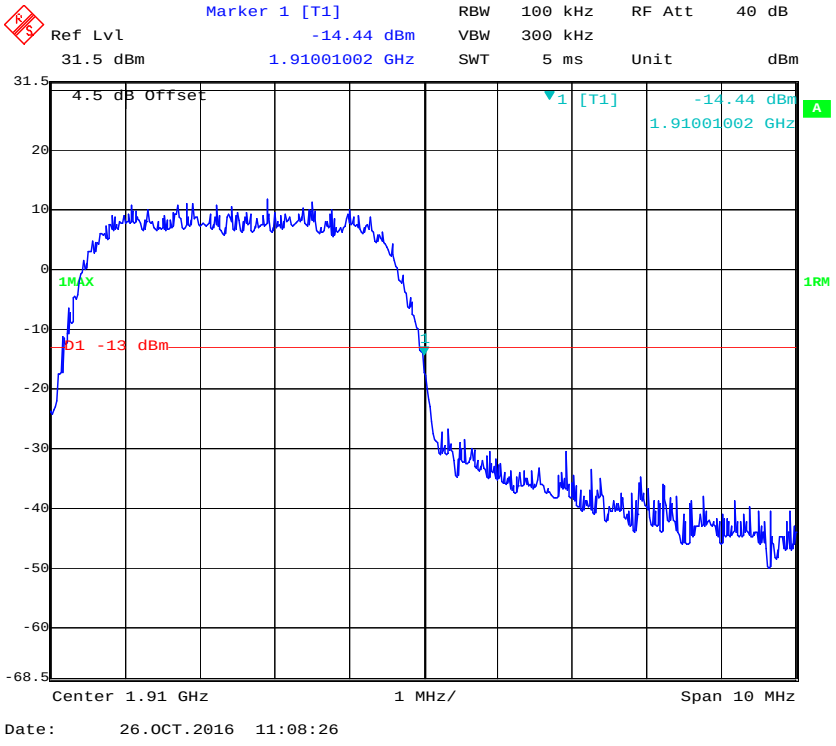
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



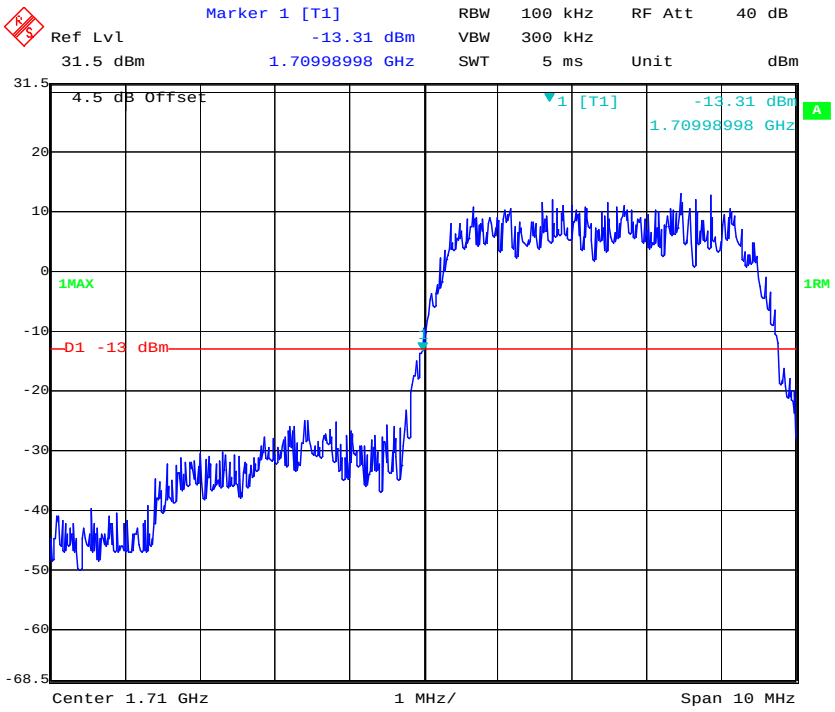
PCS Band, Left Band Edge for HSUPA (BPSK) Mode



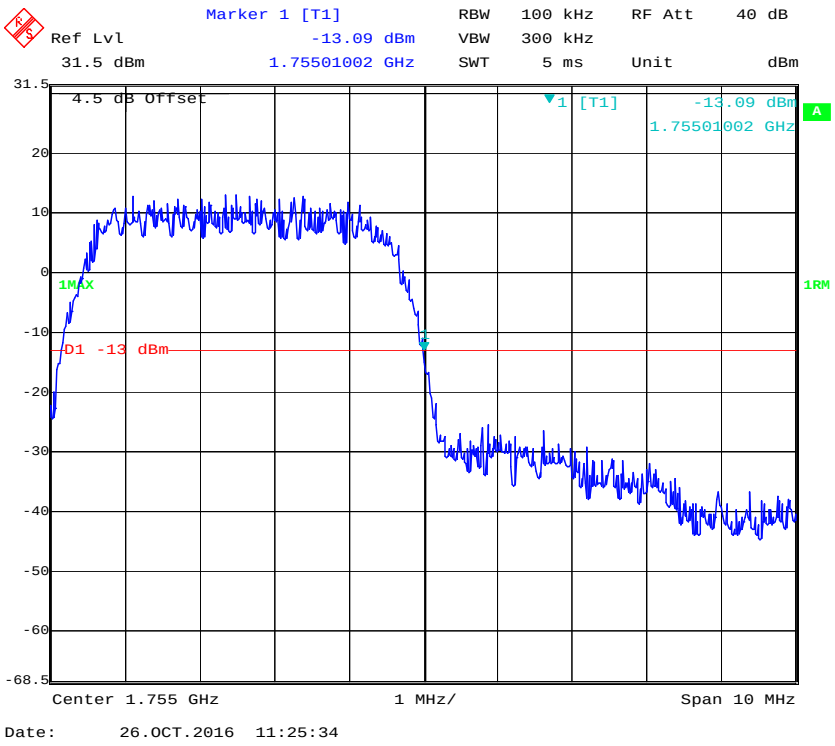
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



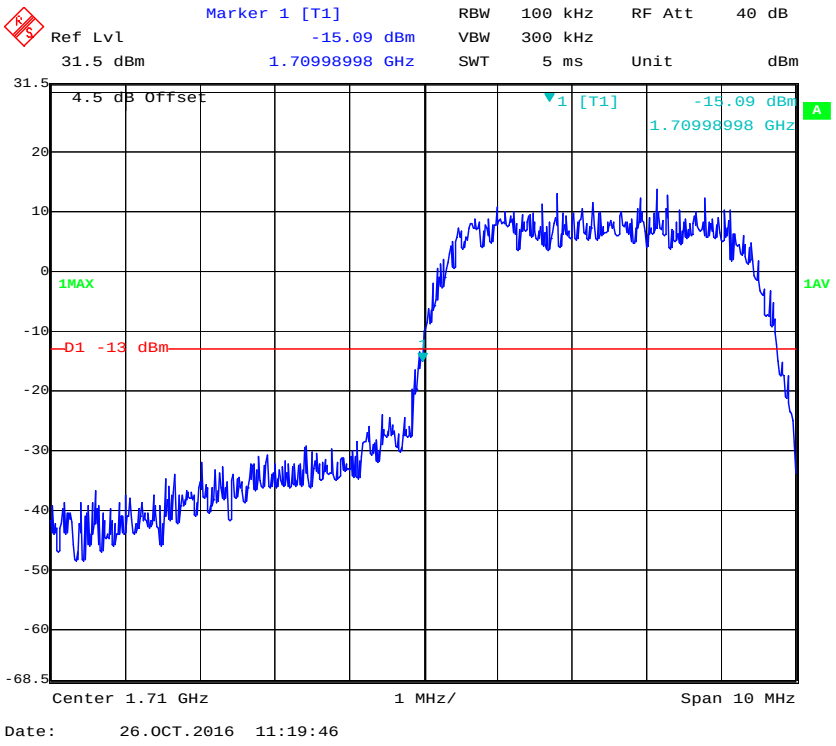
AWS Band, Left Band Edge for WCDMA (BPSK) Mode



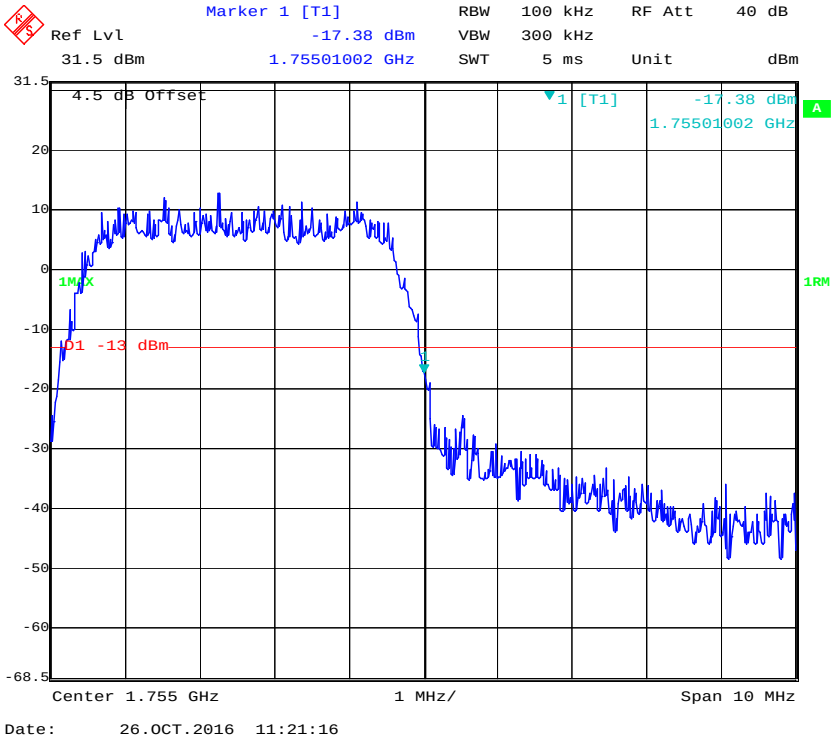
AWS Band, Right Band Edge for WCDMA (BPSK) Mode



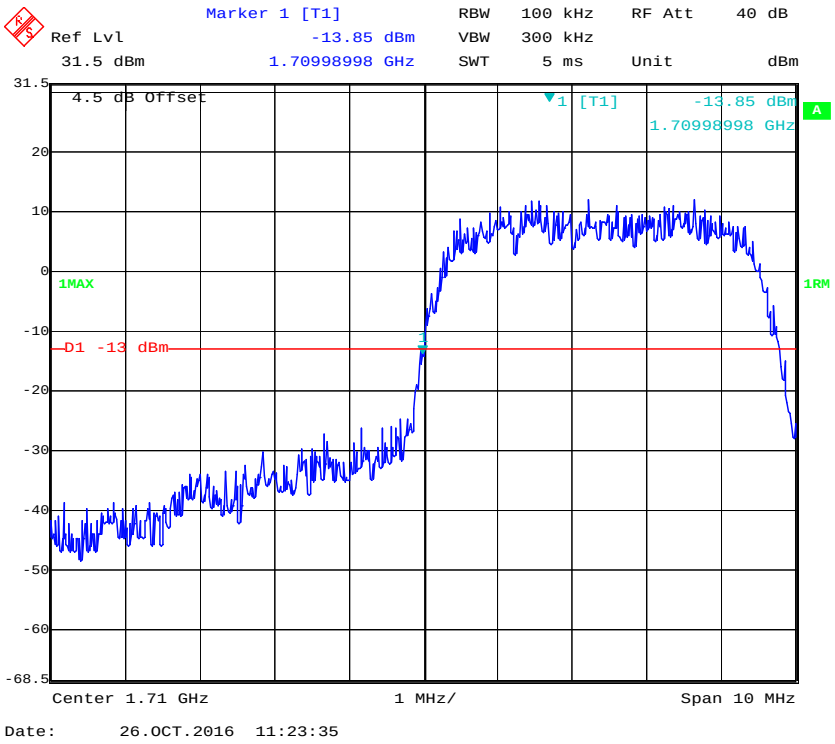
AWS Band, Left Band Edge for HSDPA (16QAM) Mode



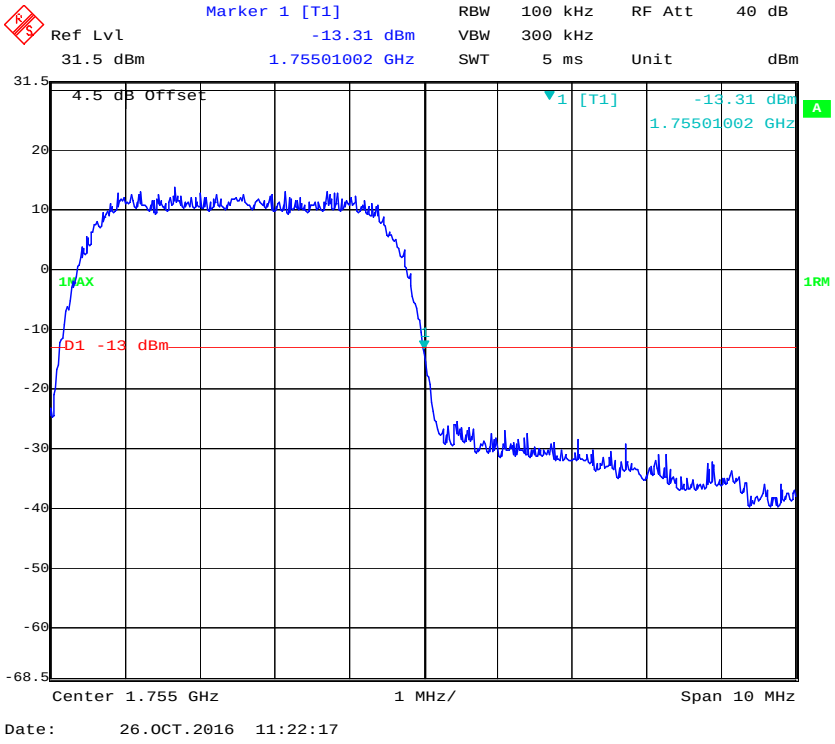
AWS Band, Right Band Edge for HSDPA (16QAM) Mode



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

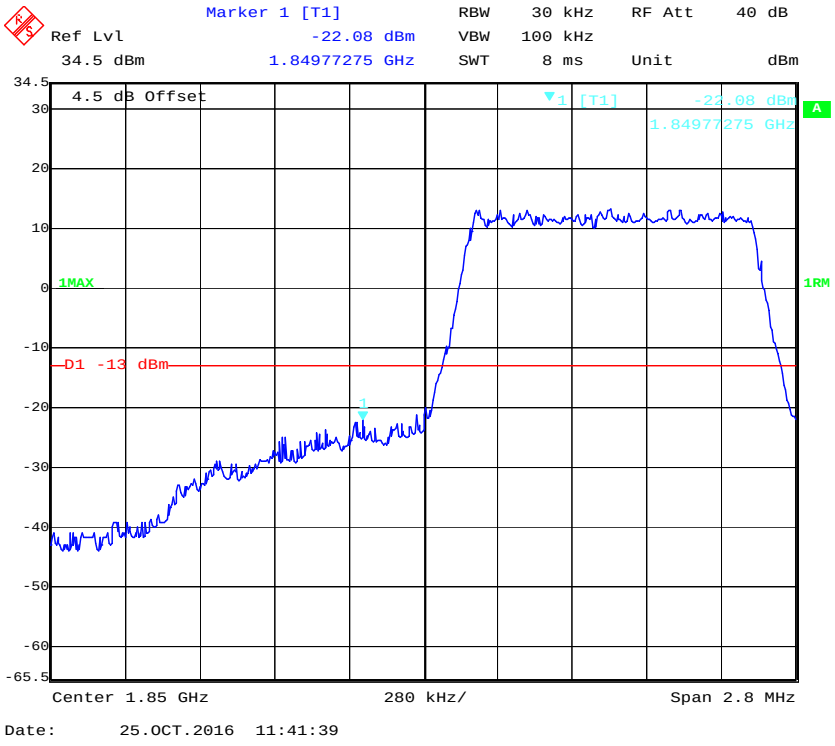


AWS Band, Right Band Edge for HSUPA (BPSK) Mode



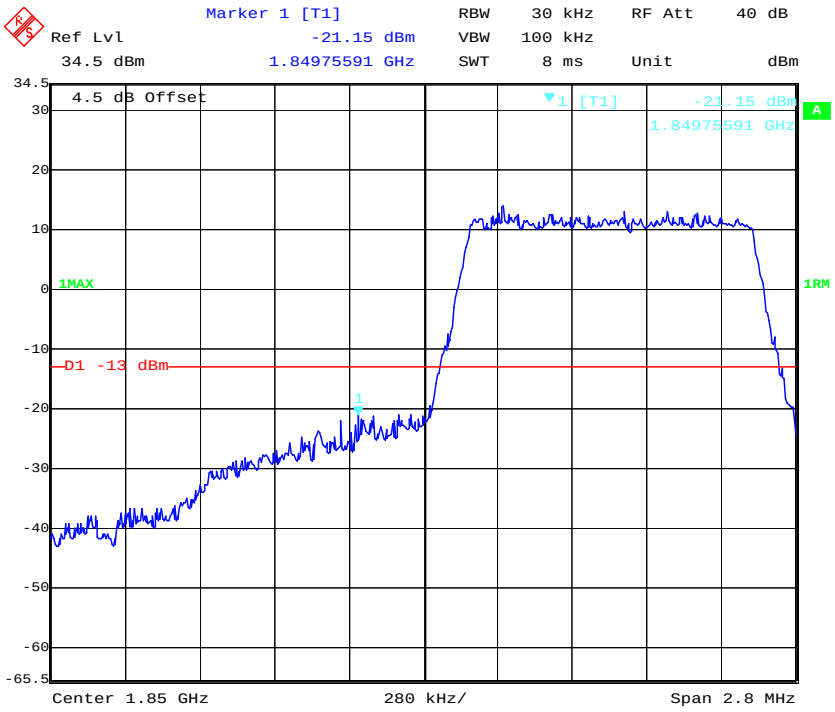
Band 2:

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

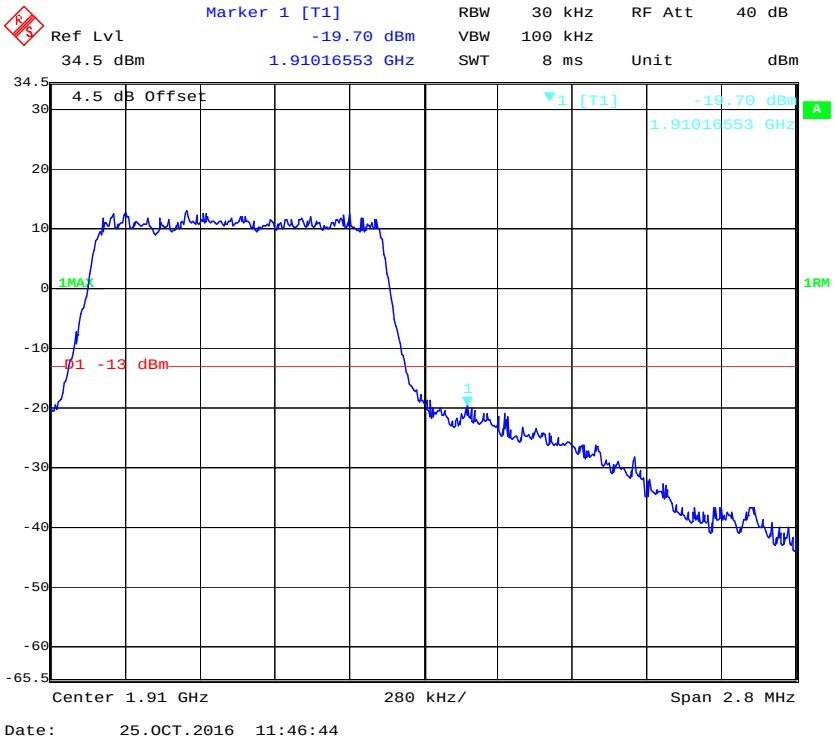


QPSK (1.4 MHz, FULL RB) - Right Band Edge

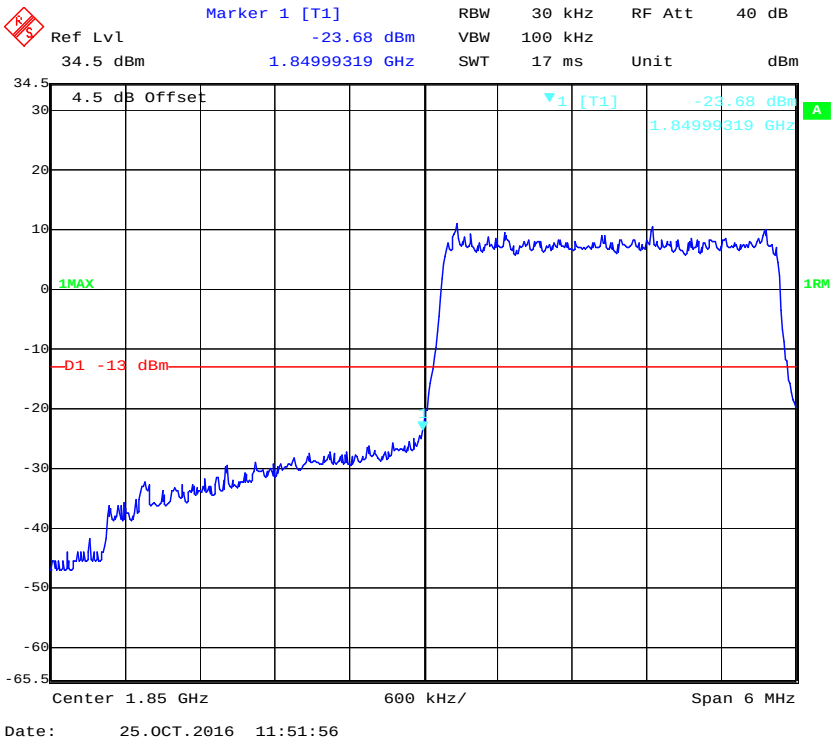
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



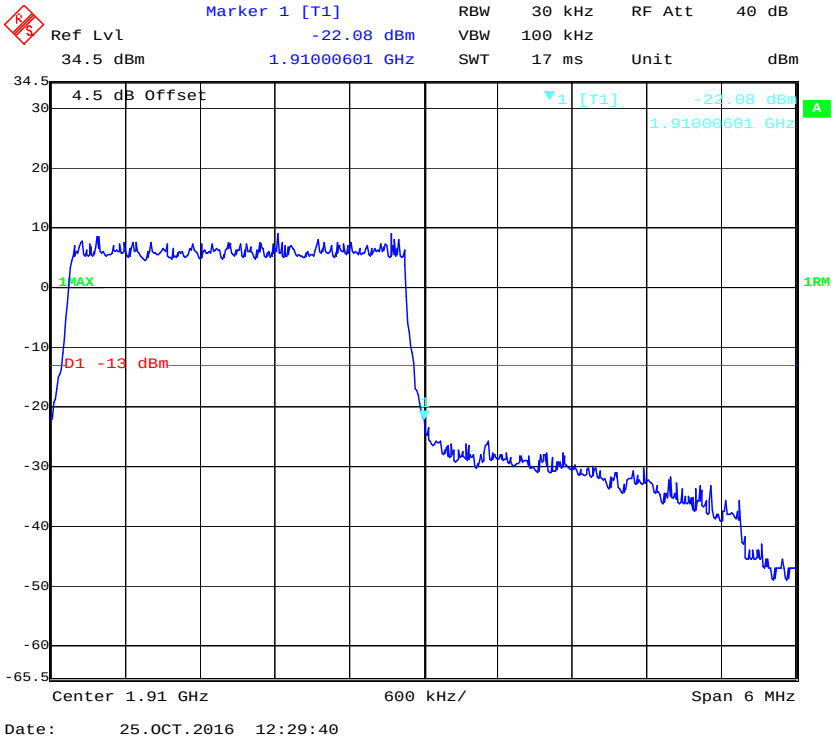
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



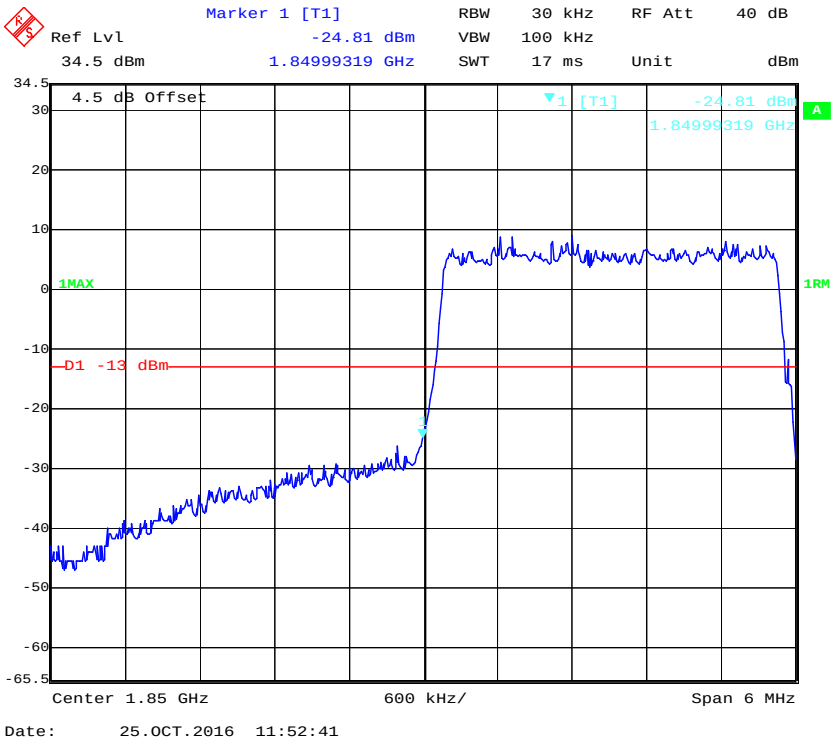
QPSK (3.0 MHz, FULL RB) - Left Band Edge



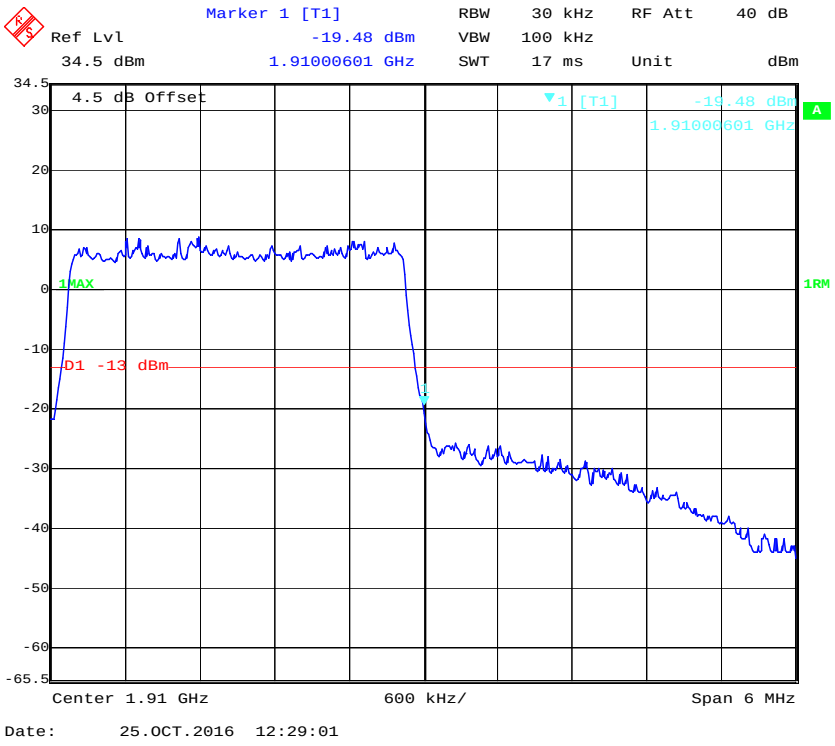
QPSK (3.0 MHz, FULL RB) - Right Band Edge



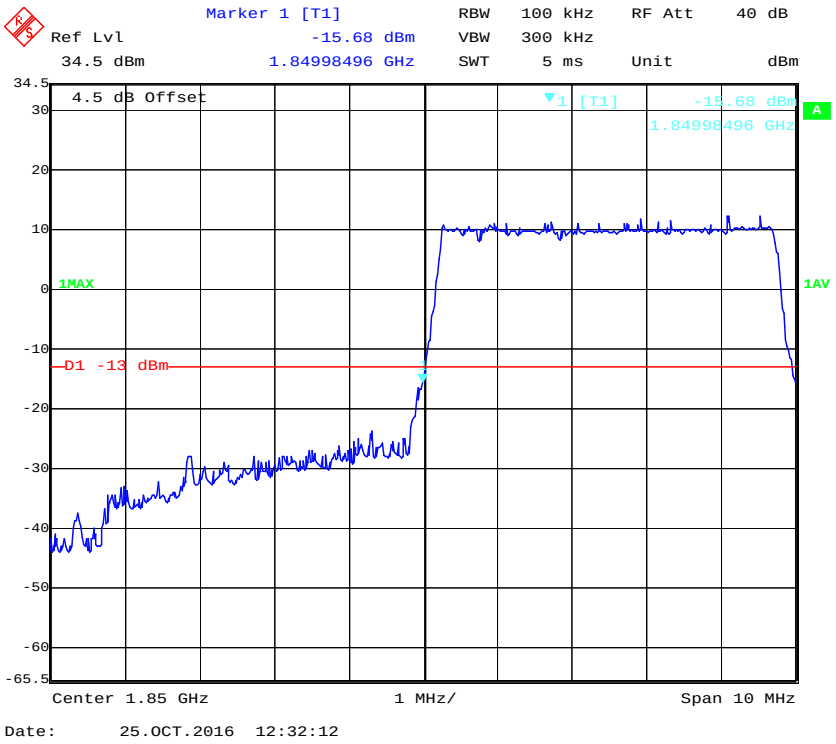
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



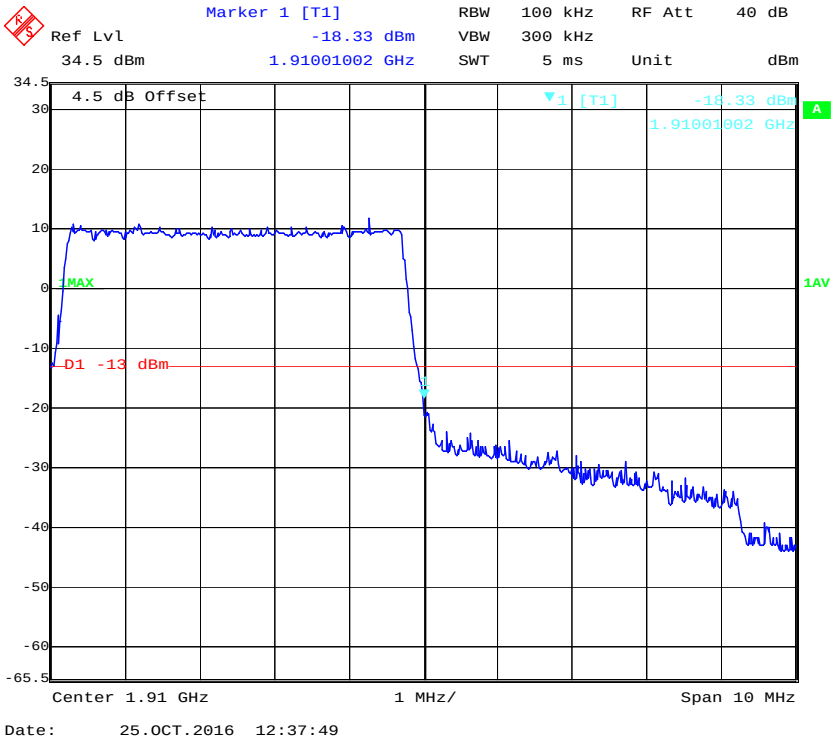
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



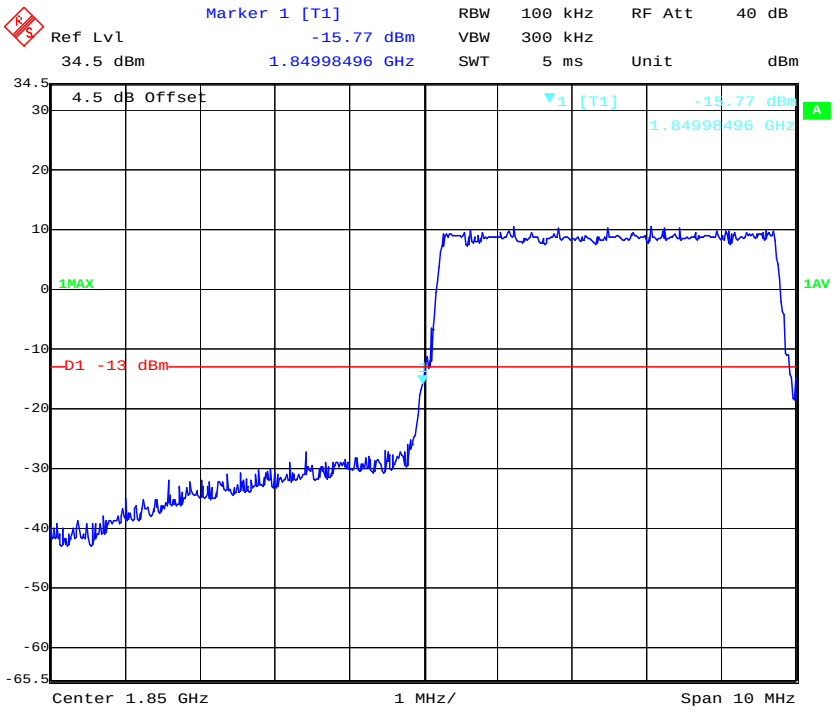
QPSK (5.0 MHz, FULL RB) - Left Band Edge



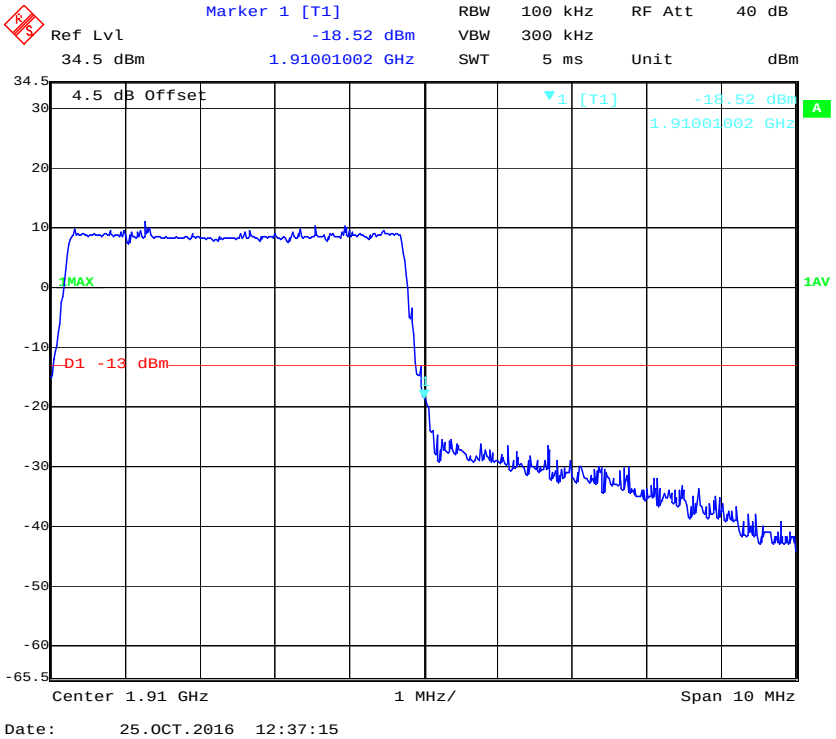
QPSK (5.0 MHz, FULL RB) - Right Band Edge



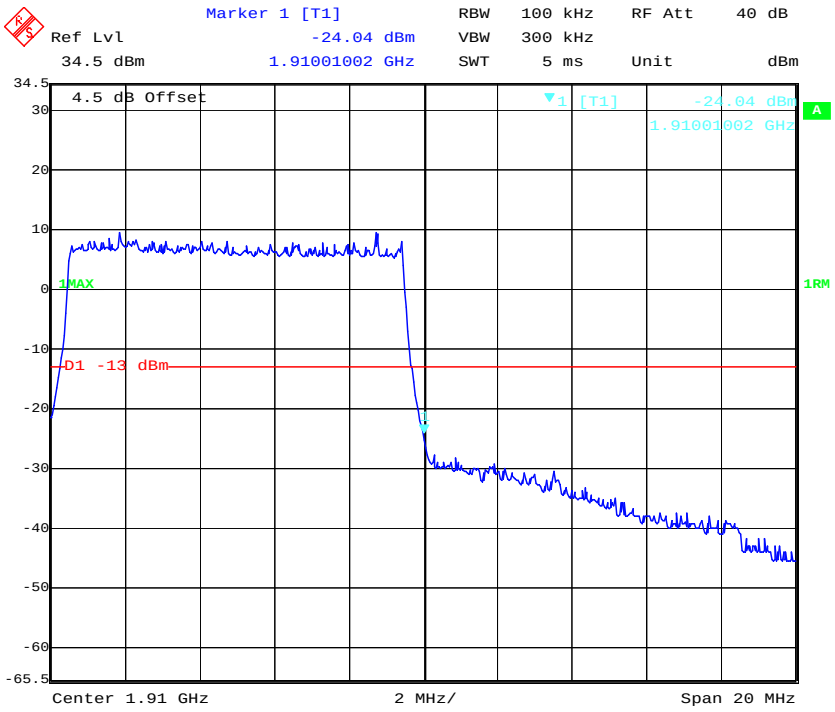
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



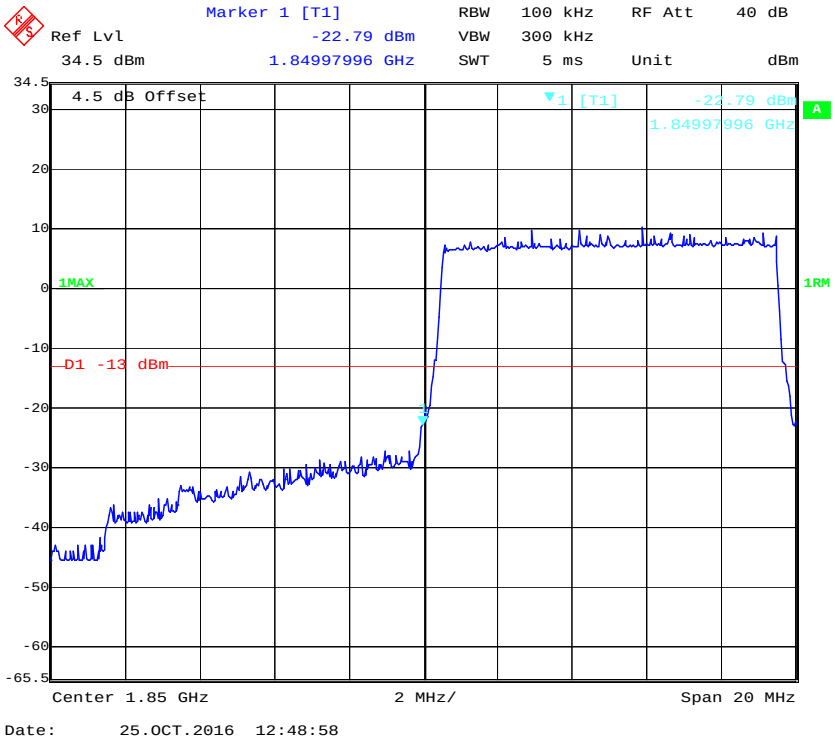
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



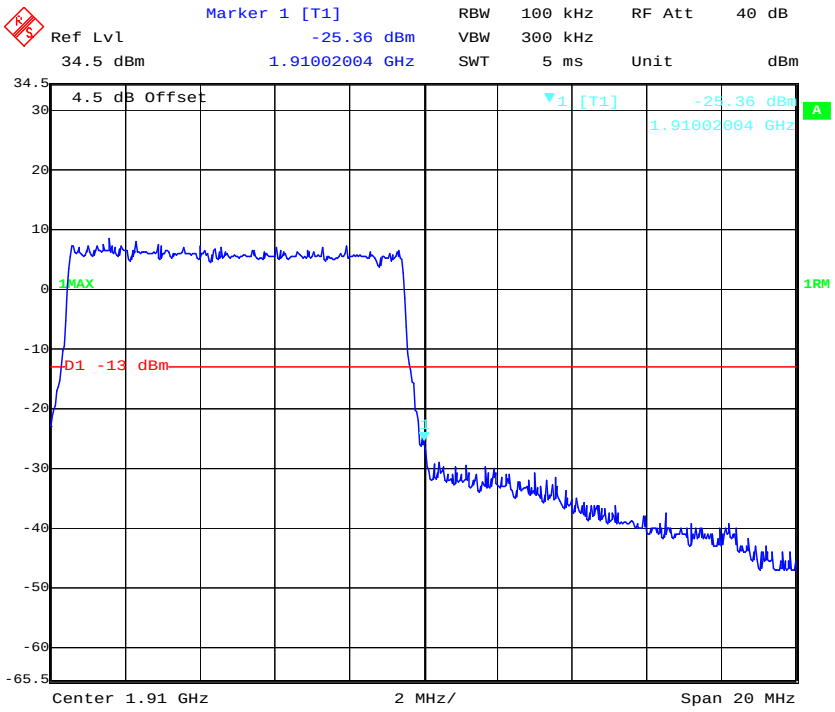
QPSK (10.0 MHz, FULL RB) - Left Band Edge



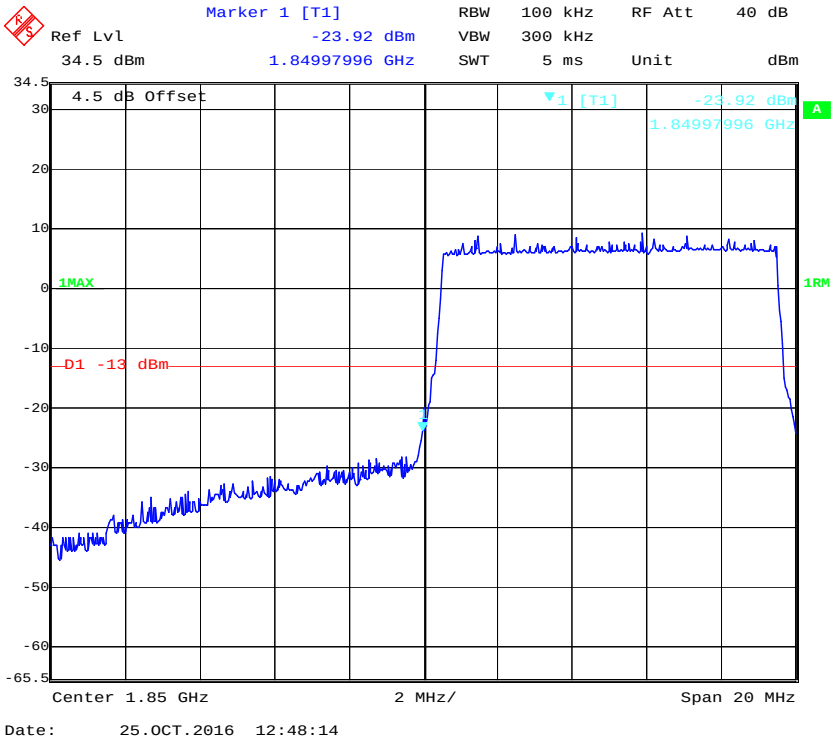
QPSK (10.0 MHz, FULL RB) - Right Band Edge



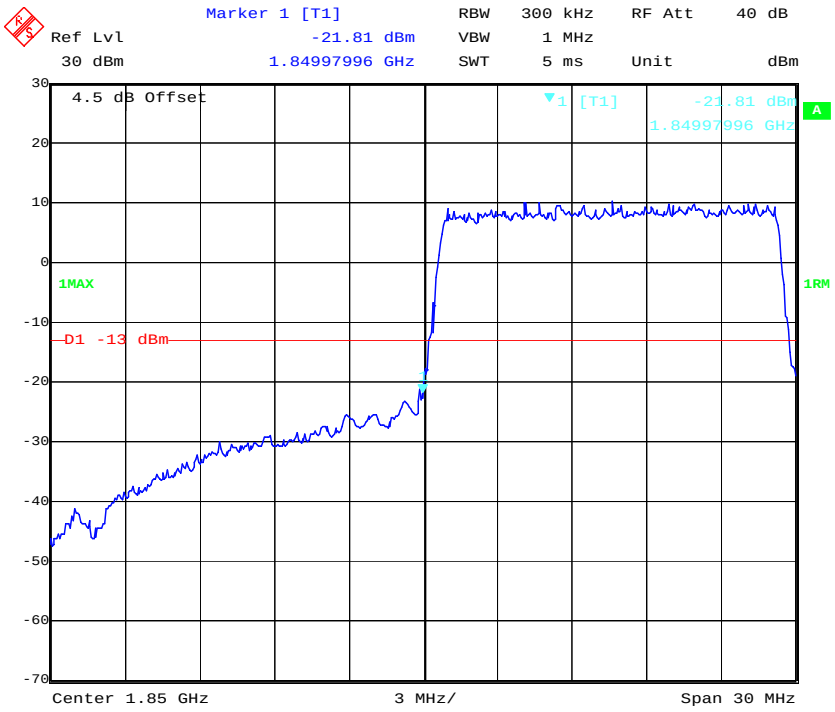
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



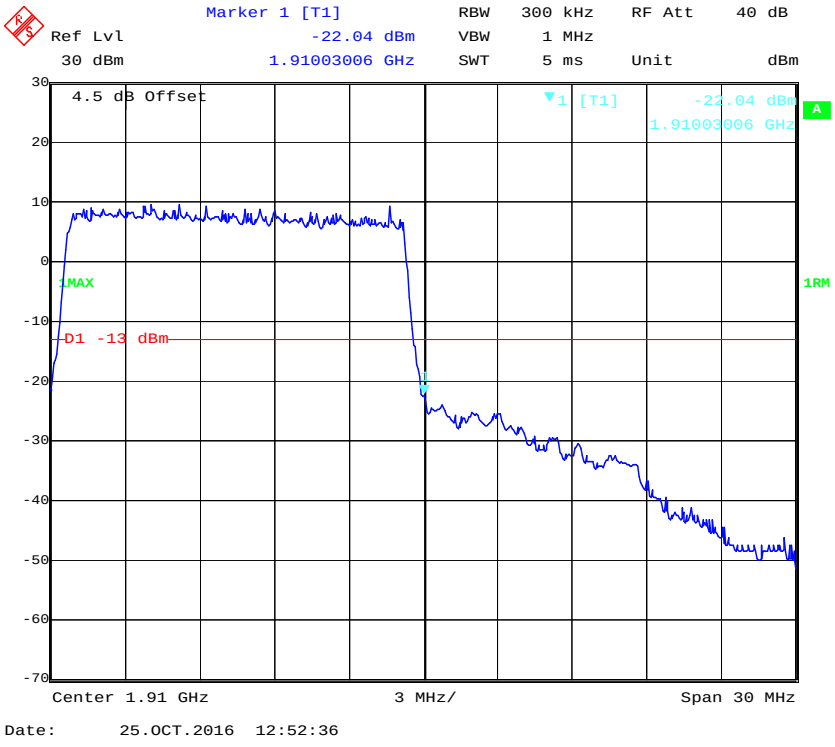
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



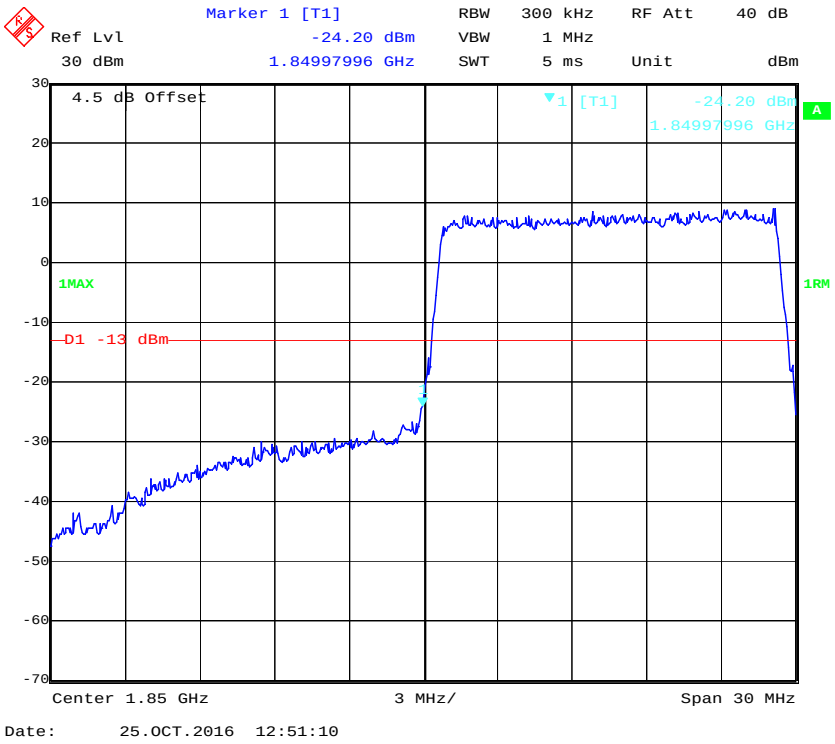
QPSK (15.0 MHz, FULL RB) - Left Band Edge



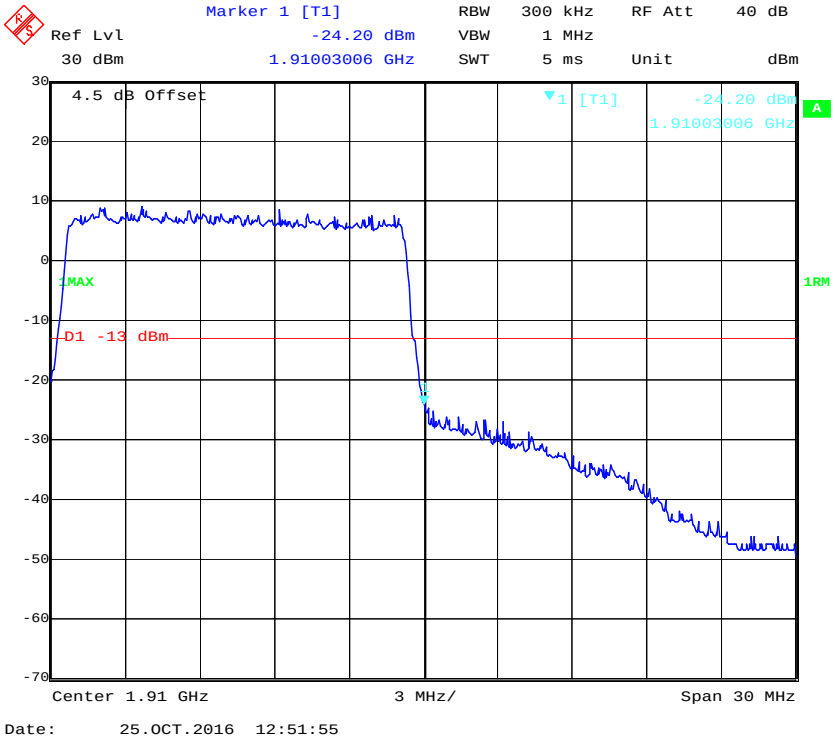
QPSK (15.0 MHz, FULL RB) - Right Band Edge



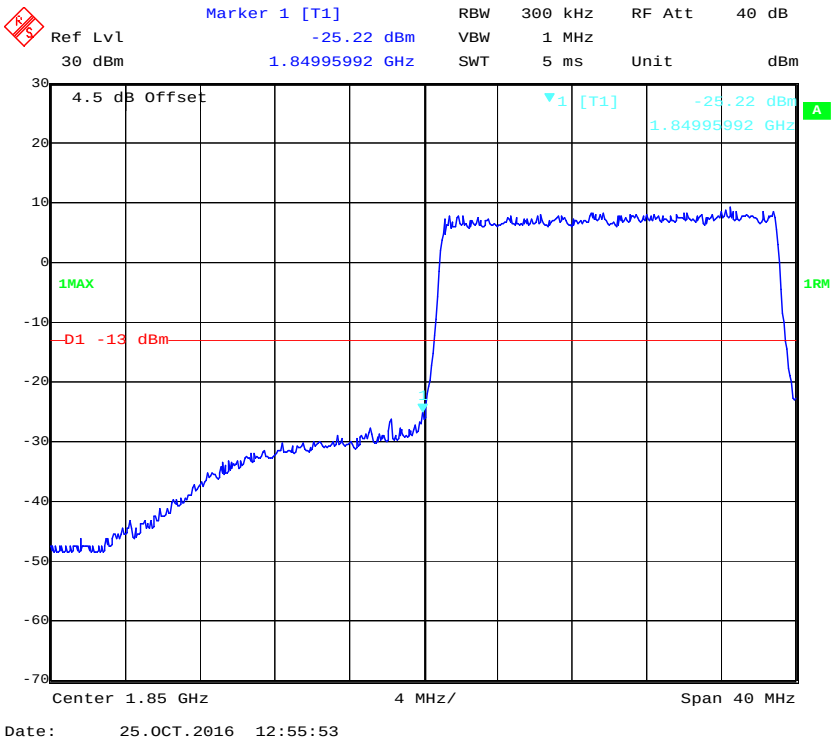
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



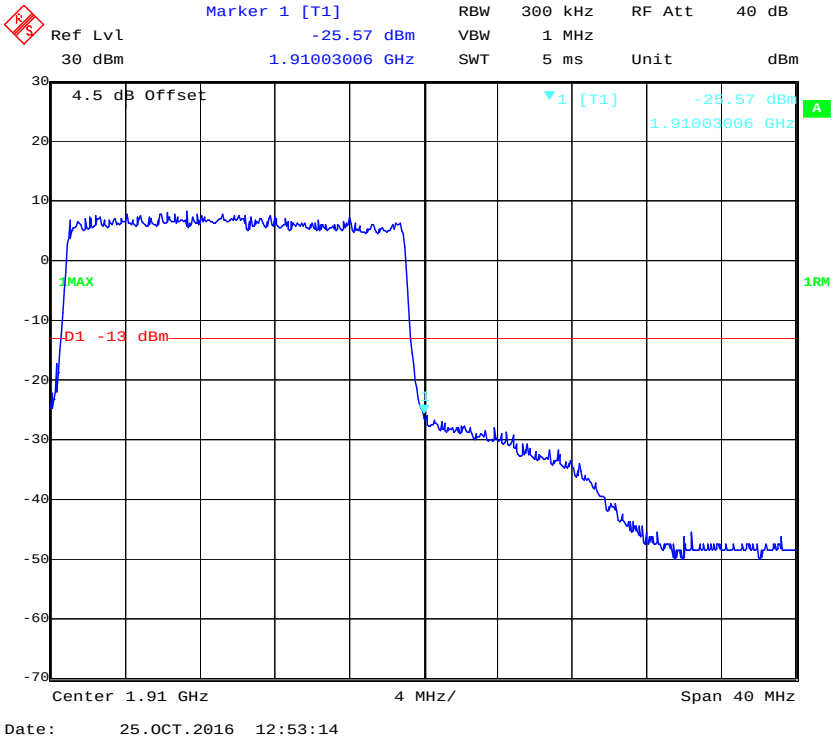
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



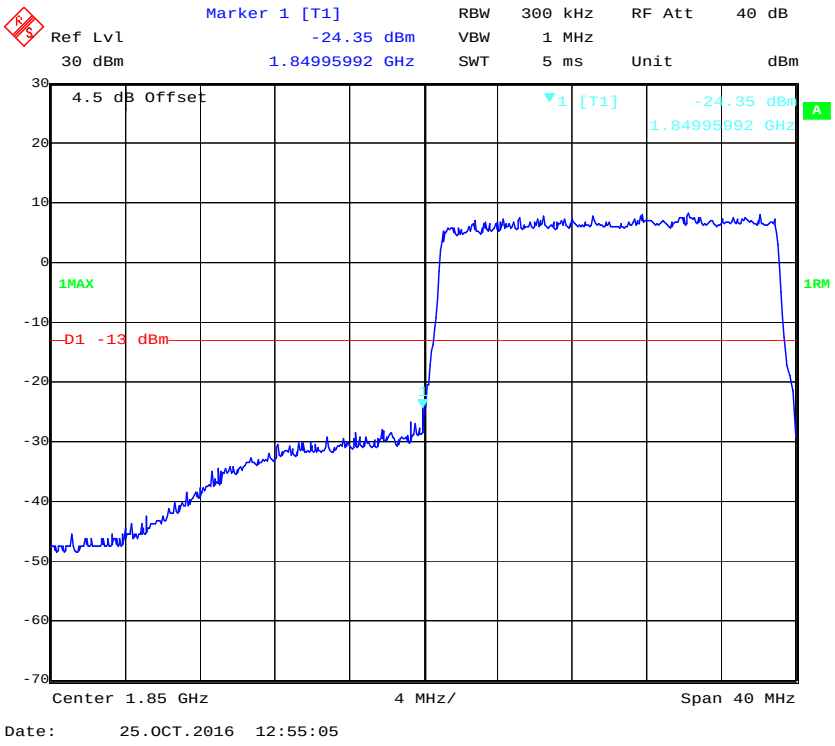
QPSK (20.0 MHz, FULL RB) - Left Band Edge



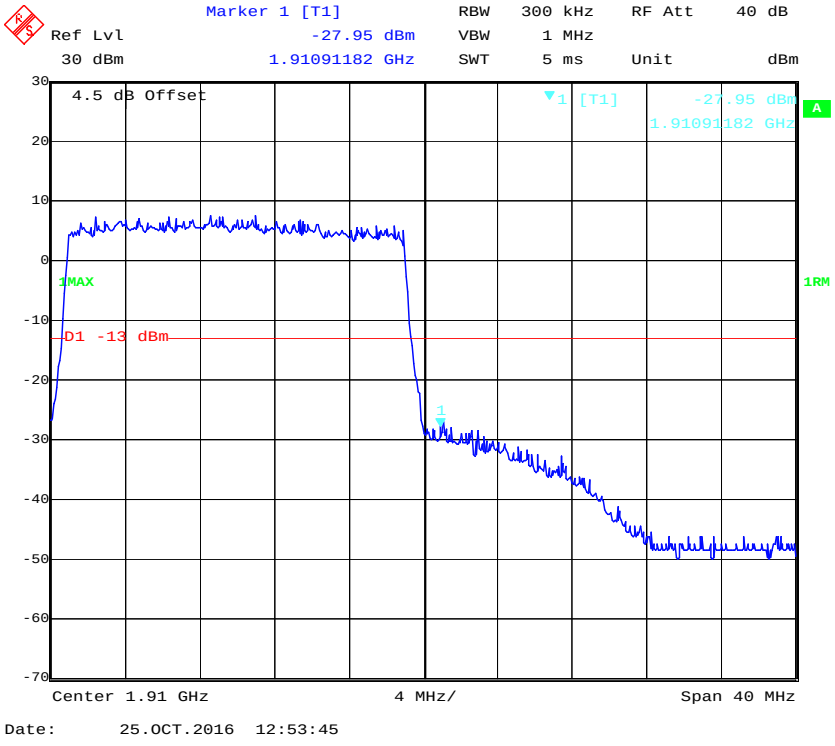
QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

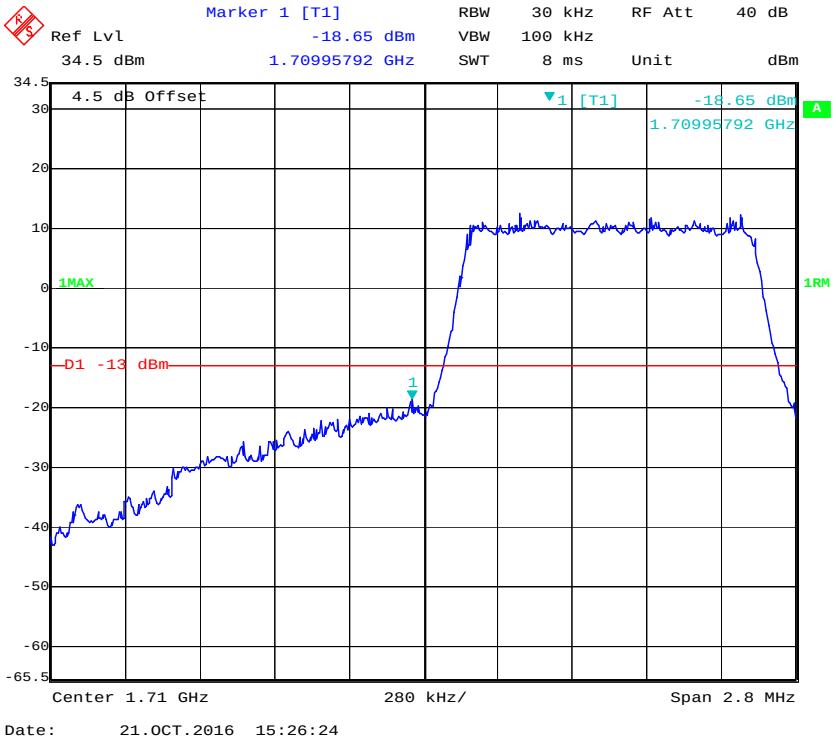


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

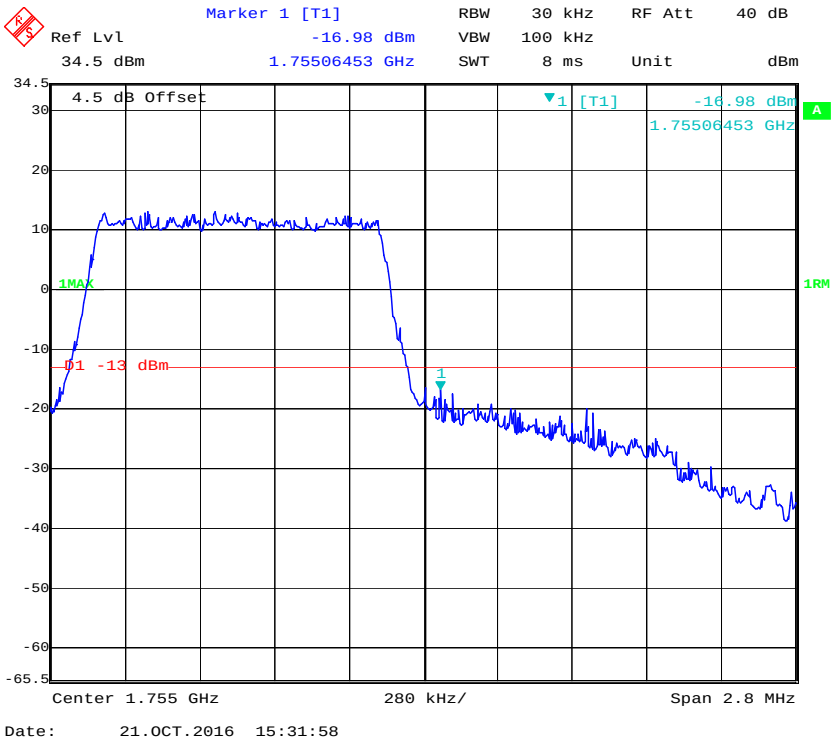


Band 4:

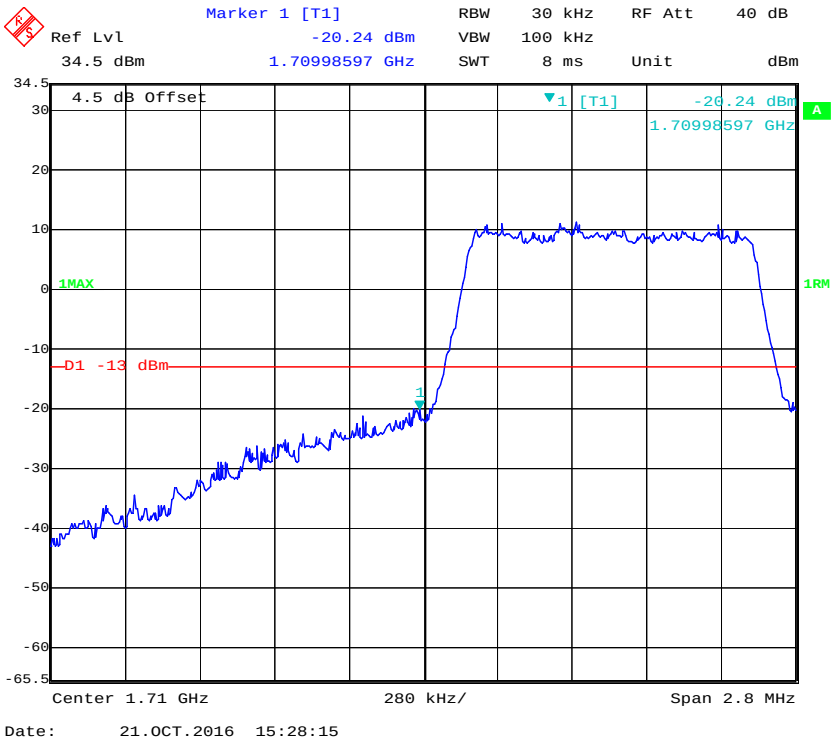
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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

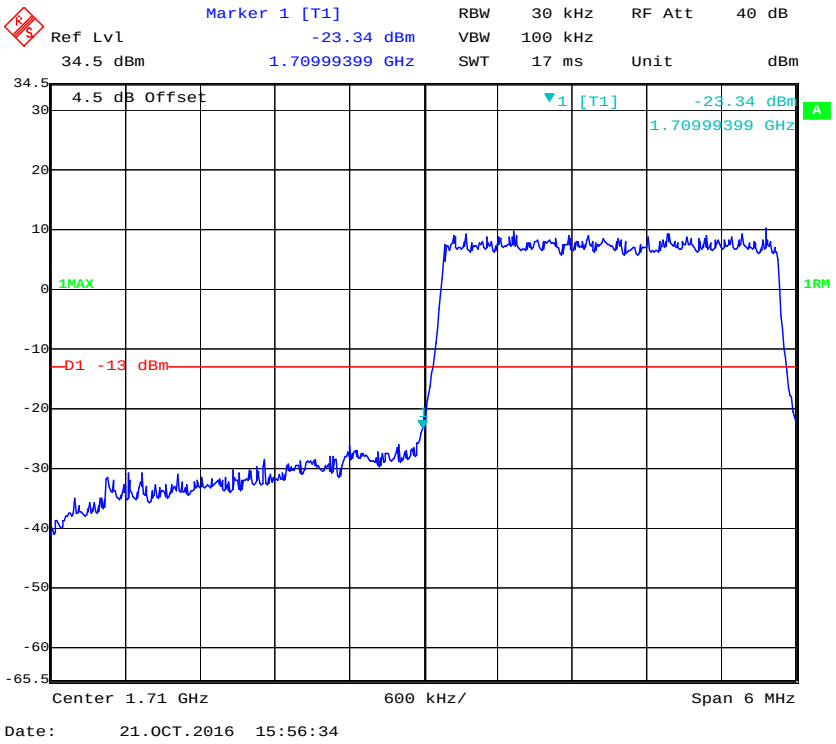


16-QAM (1.4 MHz, FULL RB) - Left Band Edge

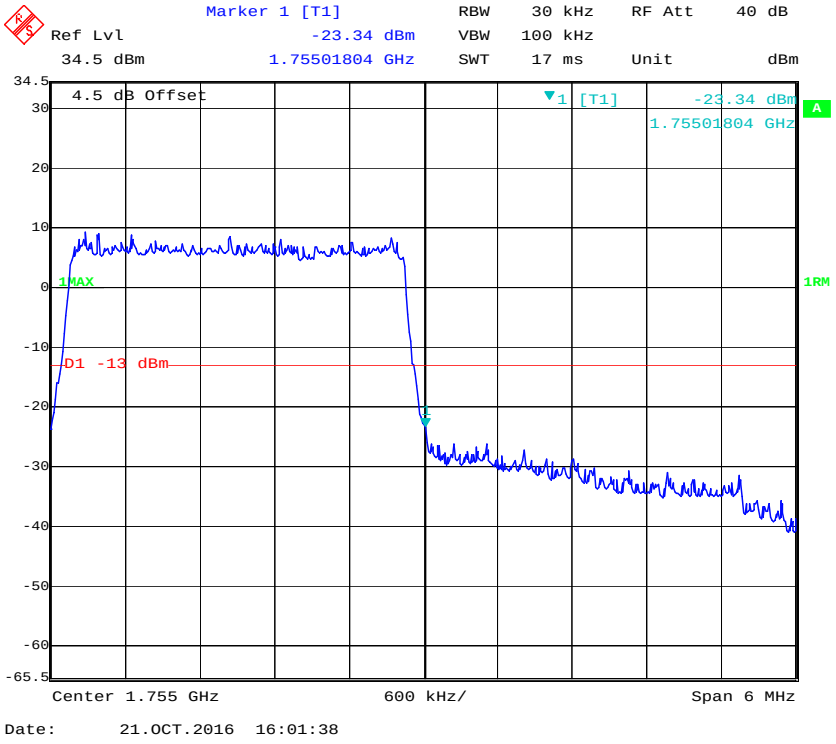


16-QAM (1.4 MHz, FULL RB) - Right Band Edge

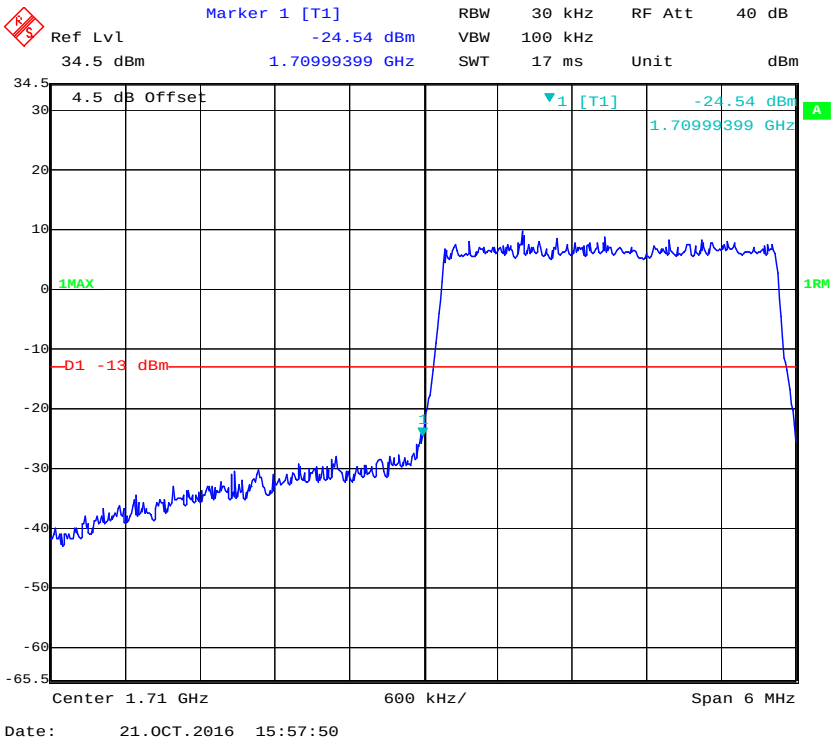
QPSK (3.0 MHz, FULL RB) - Left Band Edge



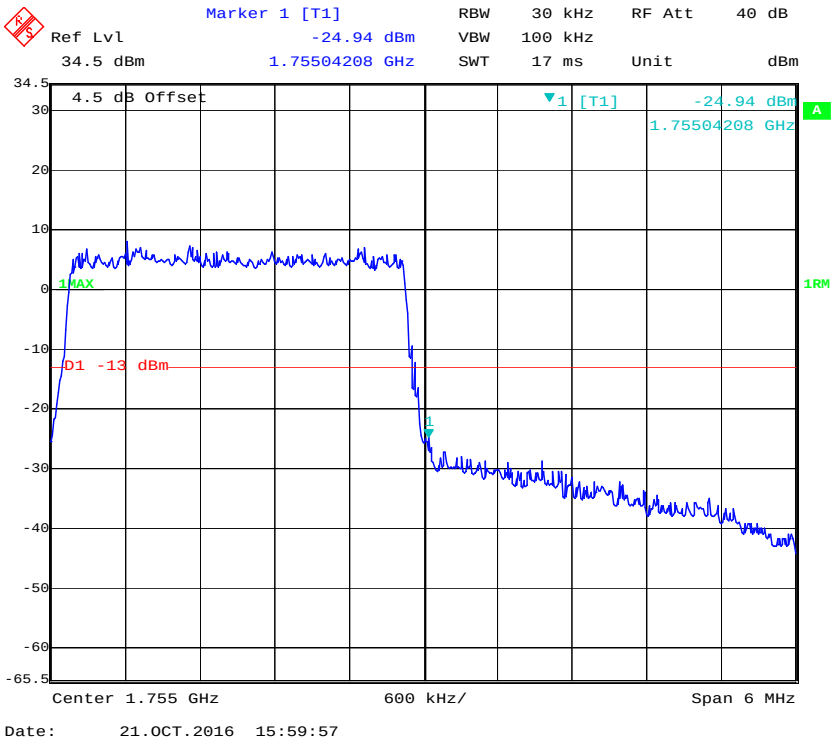
QPSK (3.0 MHz, FULL RB) - Right Band Edge



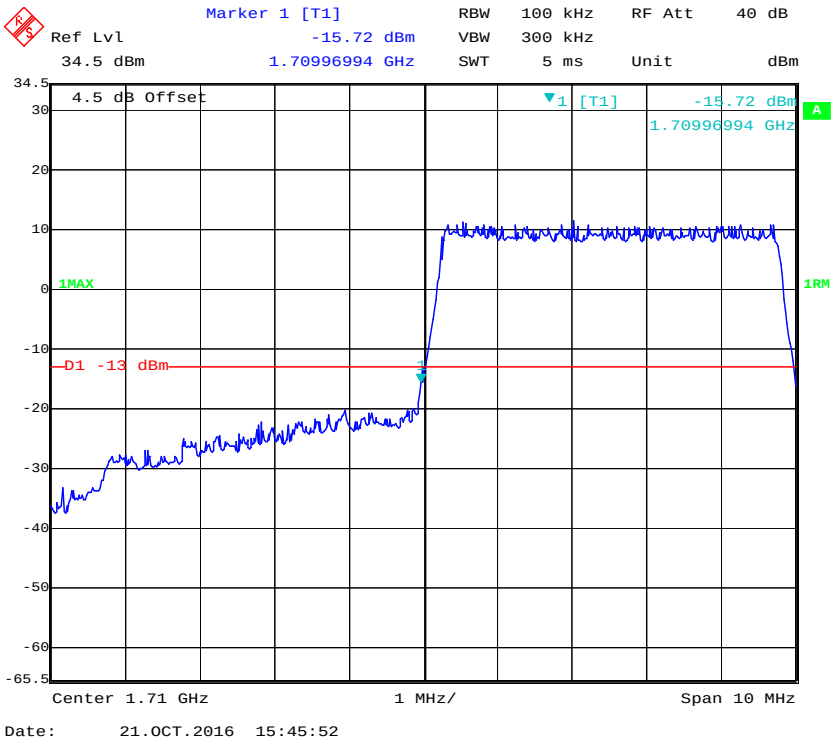
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



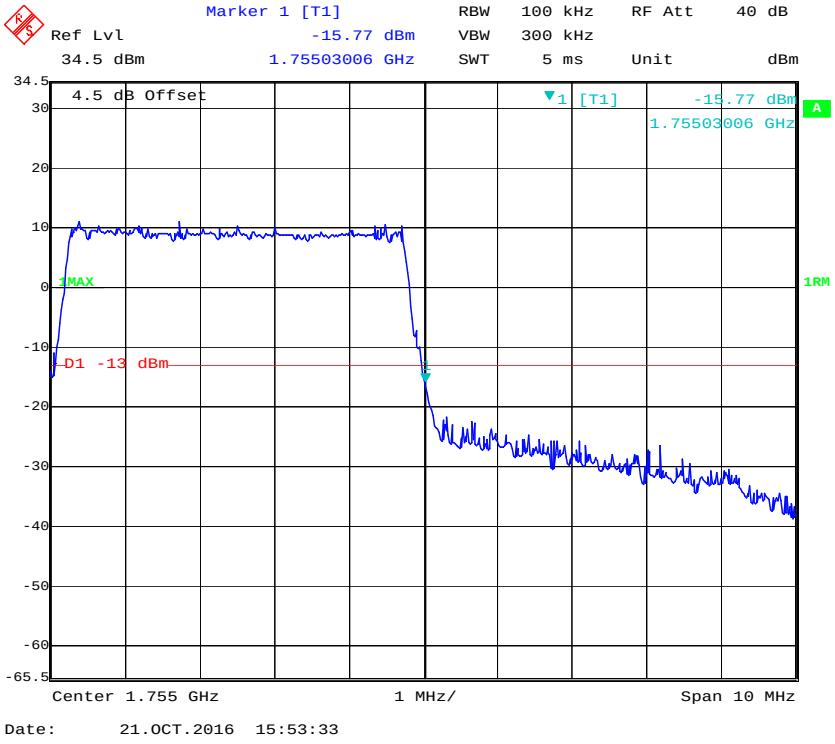
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



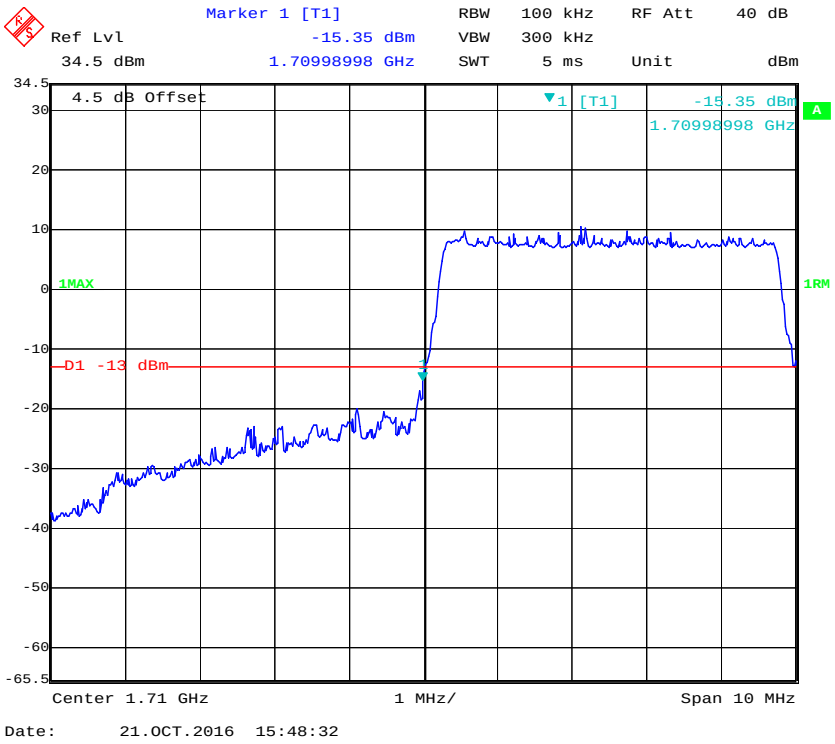
QPSK (5.0 MHz, FULL RB) - Left Band Edge



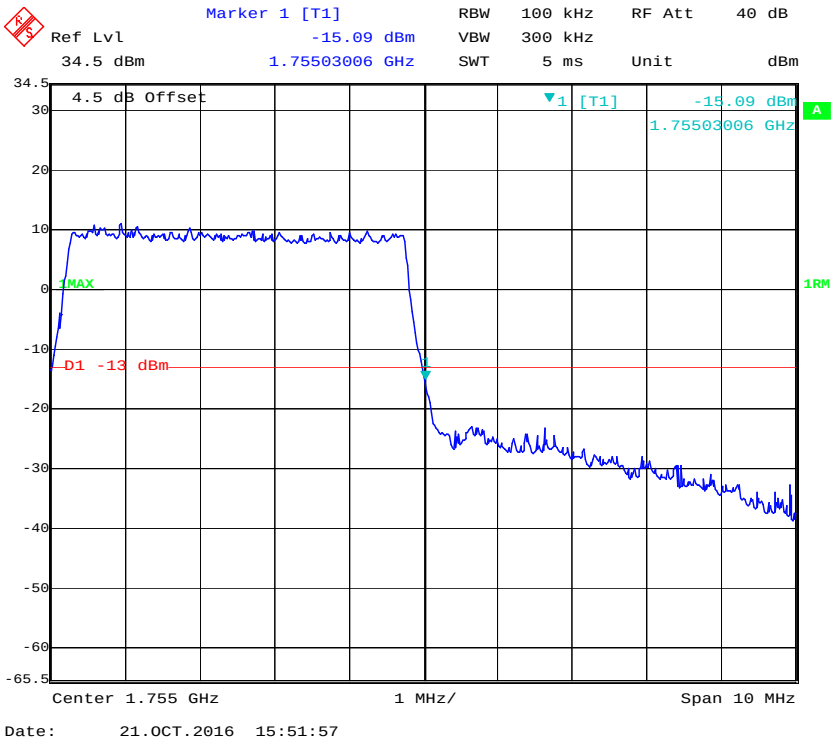
QPSK (5.0 MHz, FULL RB) - Right Band Edge



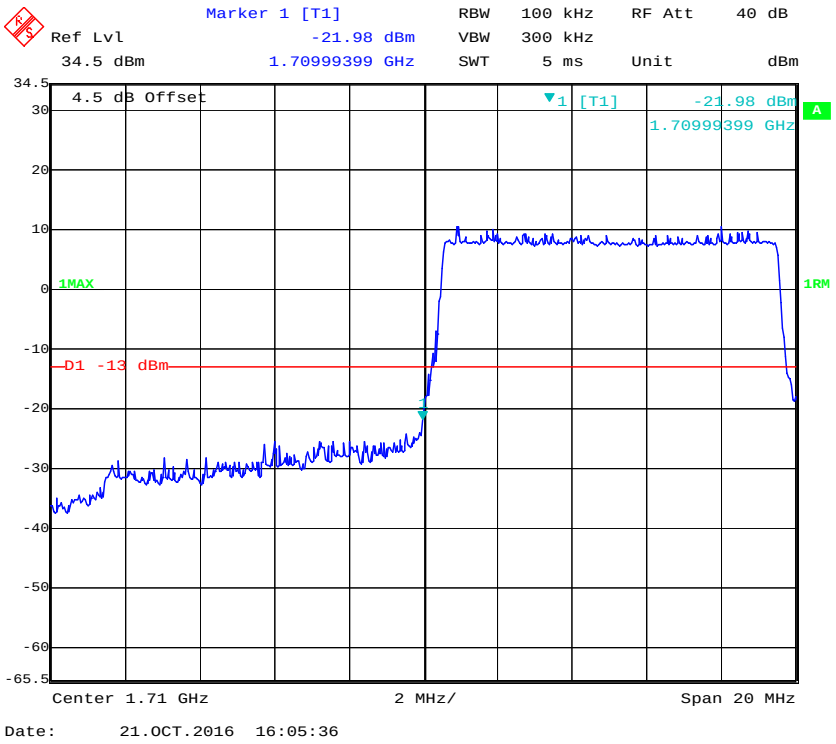
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



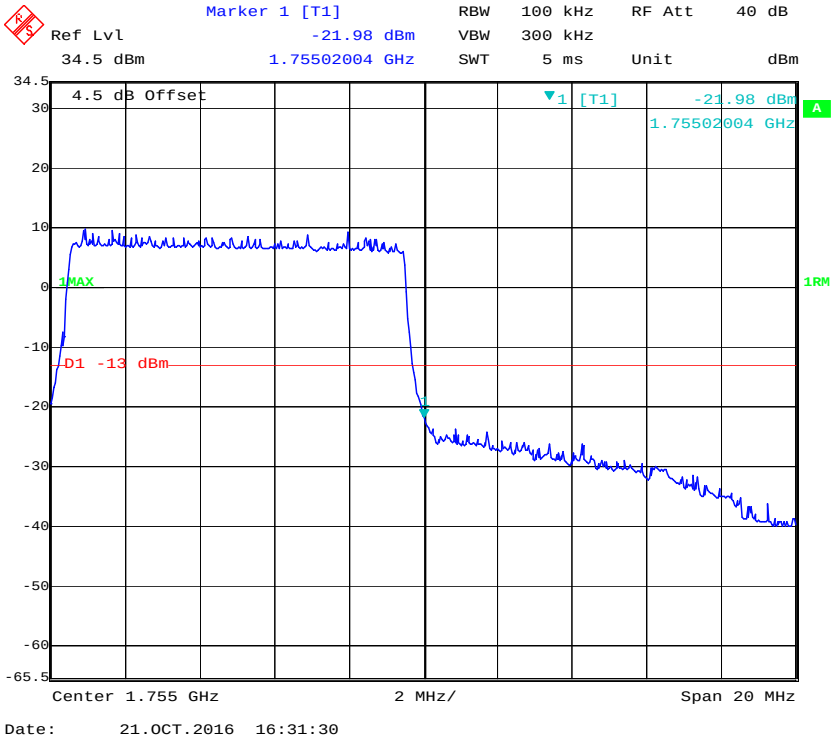
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



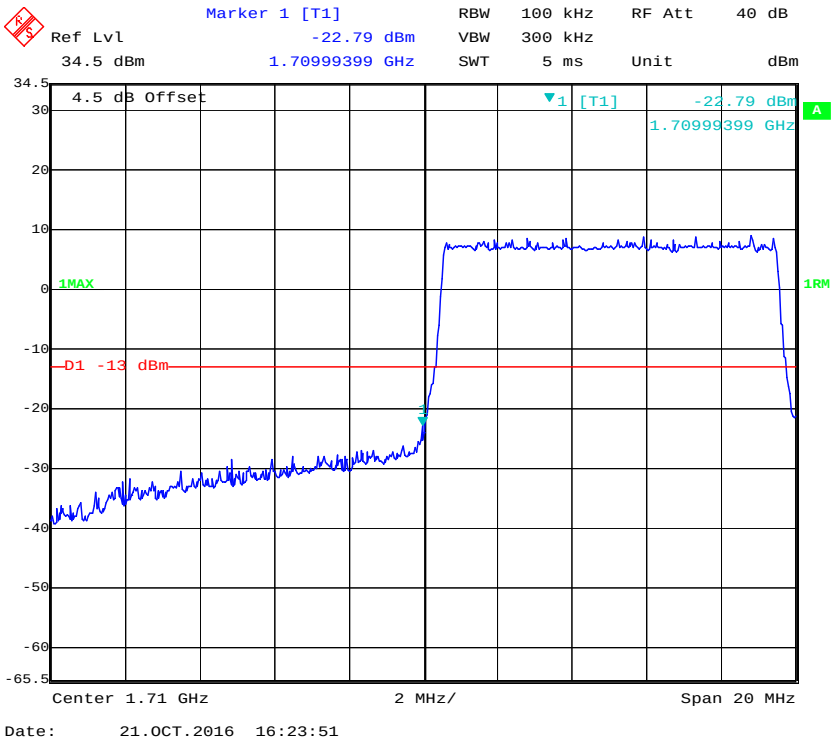
QPSK (10.0 MHz, FULL RB) - Left Band Edge



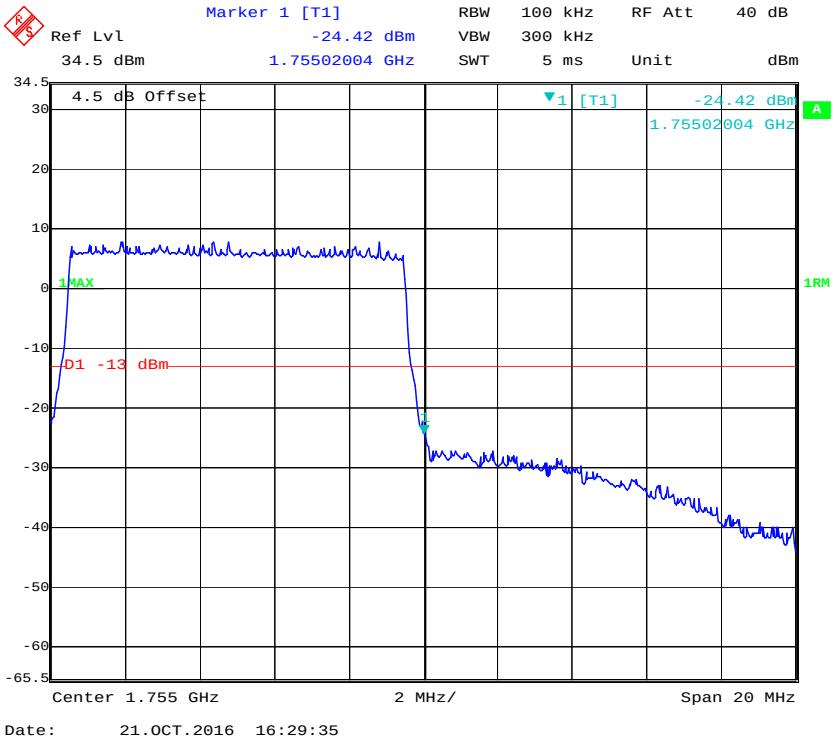
QPSK (10.0 MHz, FULL RB) - Right Band Edge



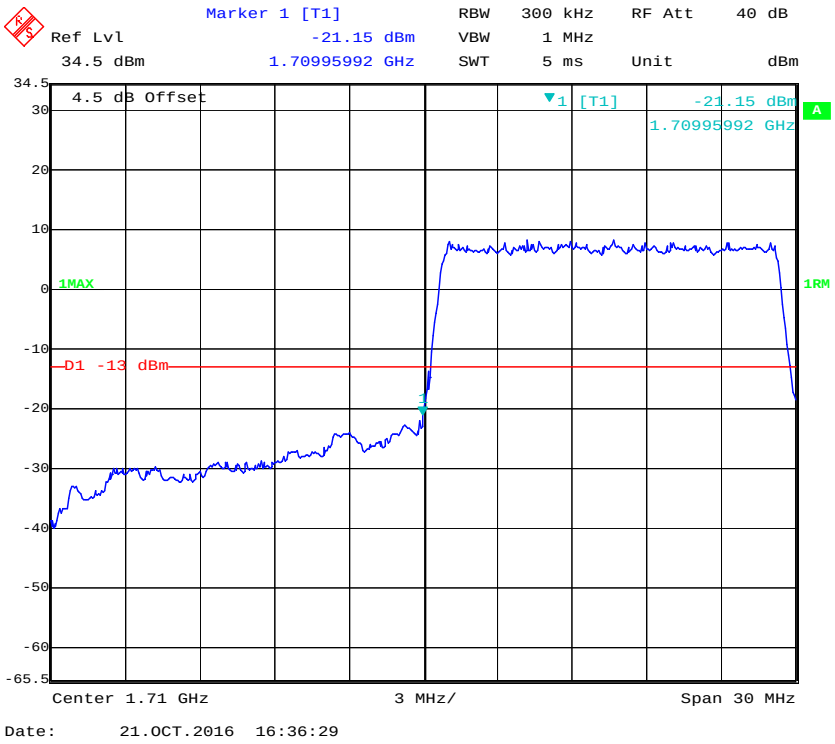
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



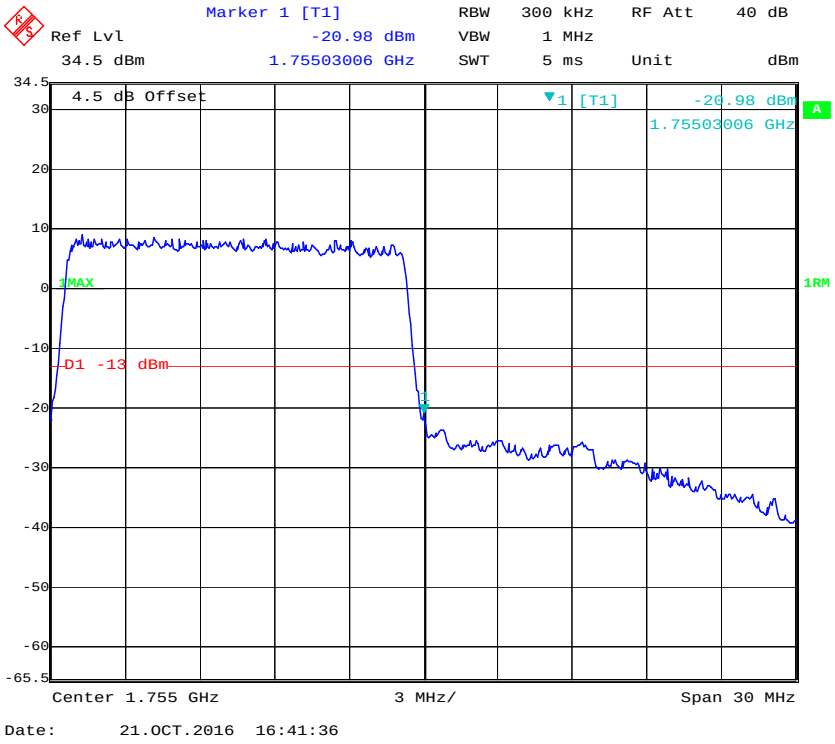
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



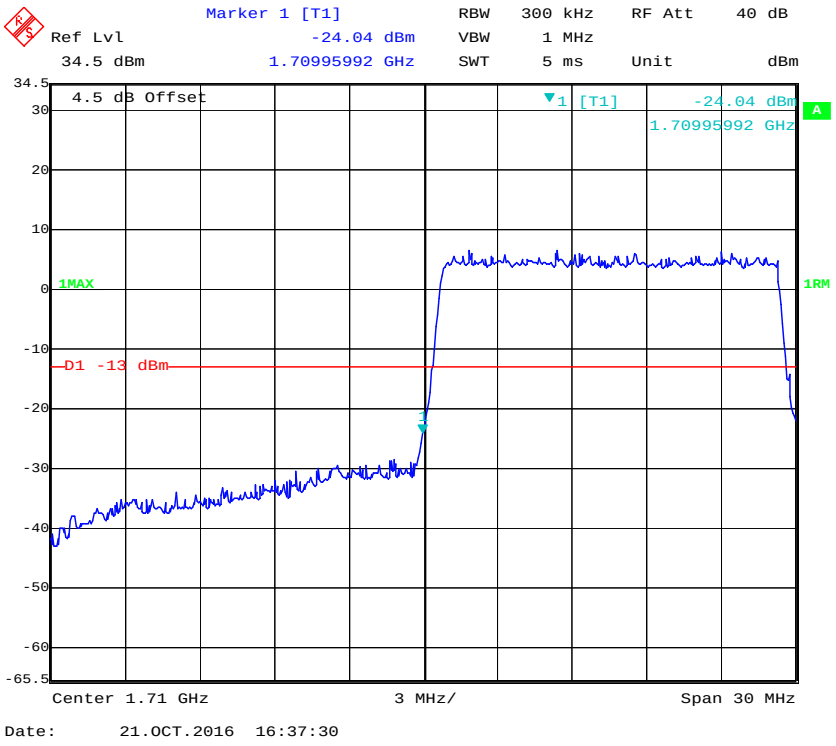
QPSK (15.0 MHz, FULL RB) - Left Band Edge



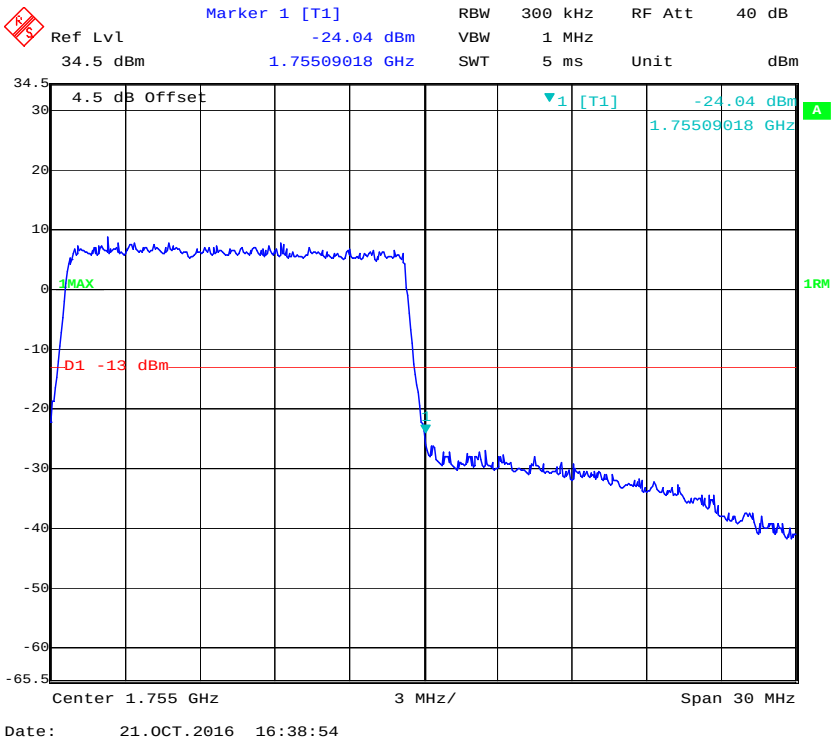
QPSK (15.0 MHz, FULL RB) - Right Band Edge



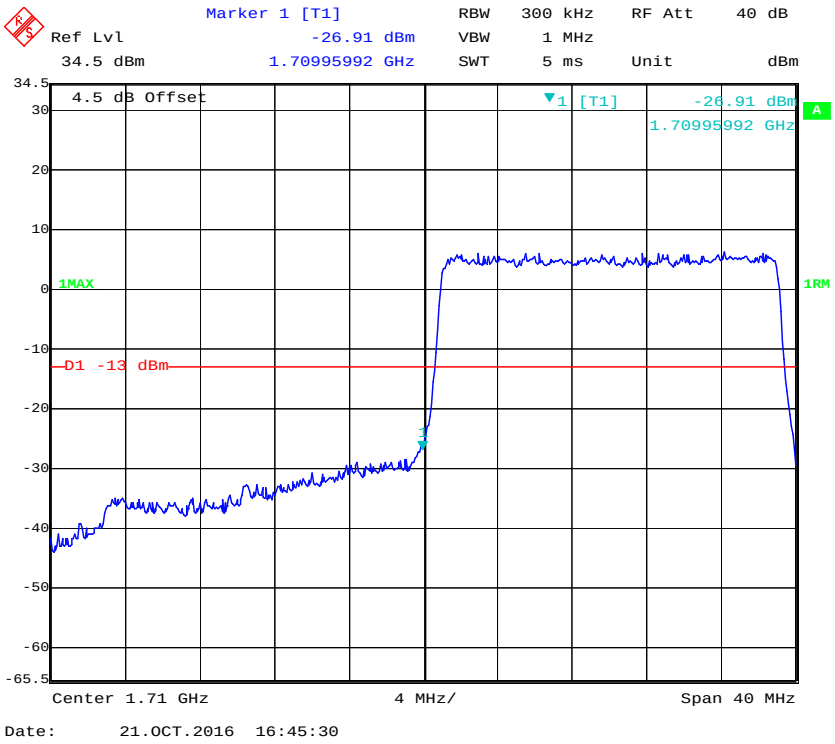
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



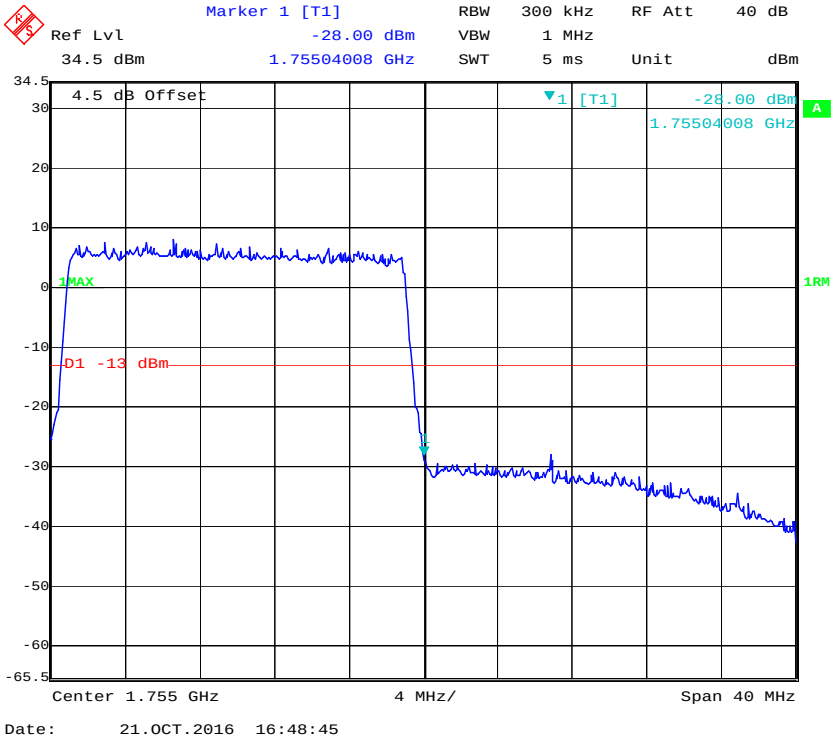
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



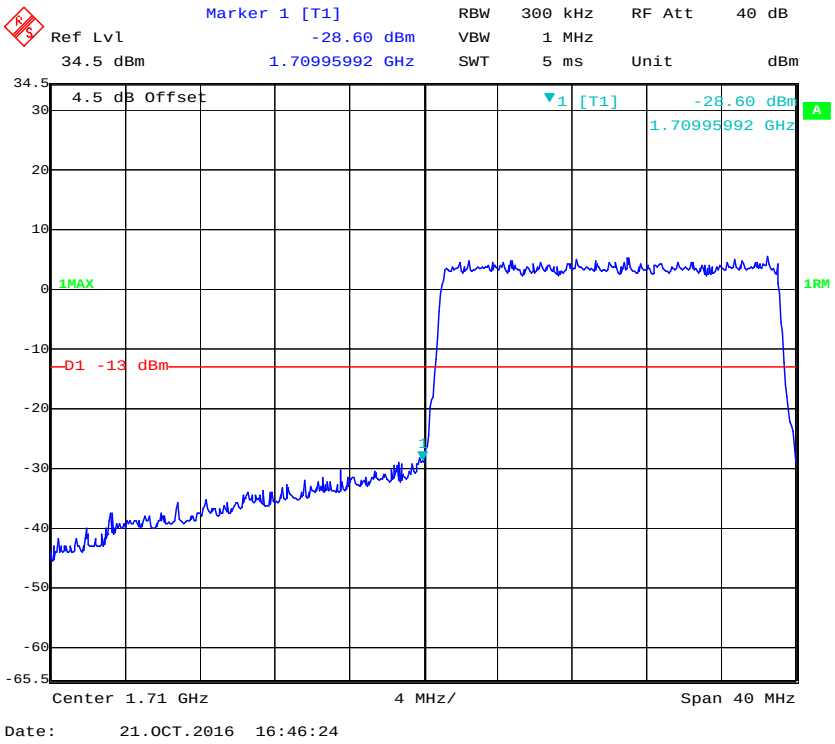
QPSK (20.0 MHz, FULL RB) - Left Band Edge



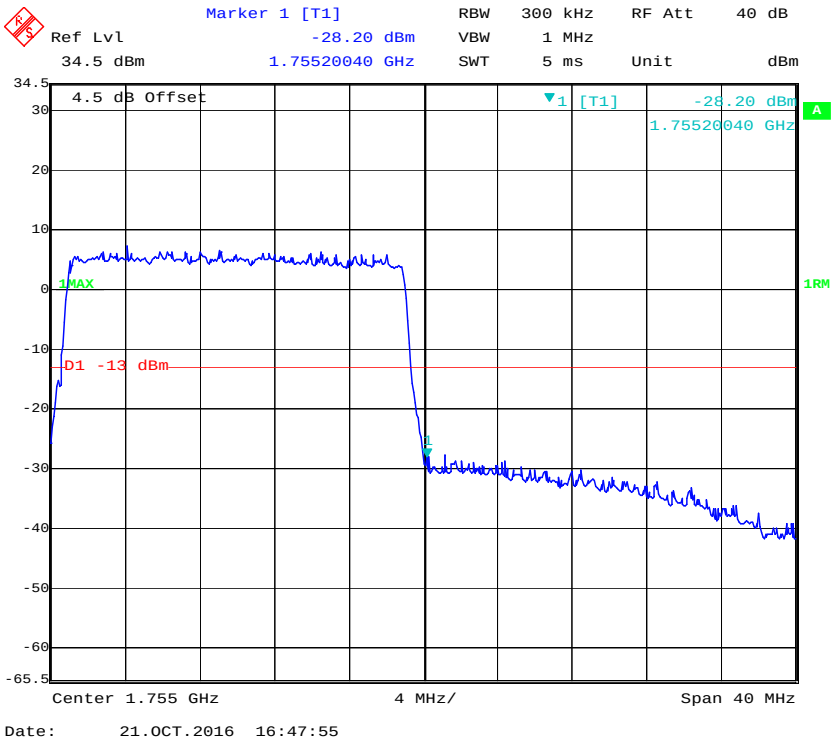
QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

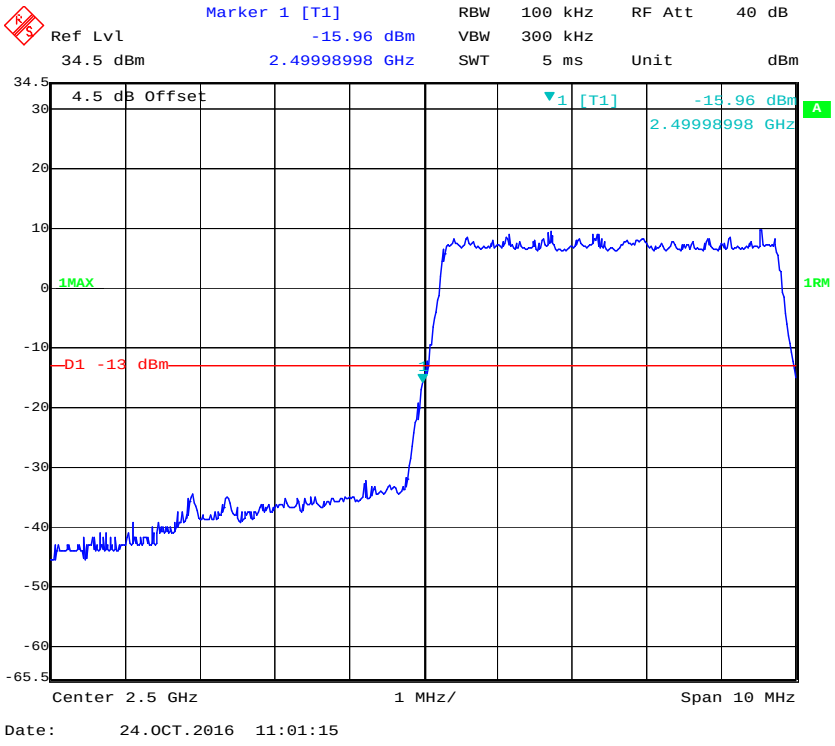


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

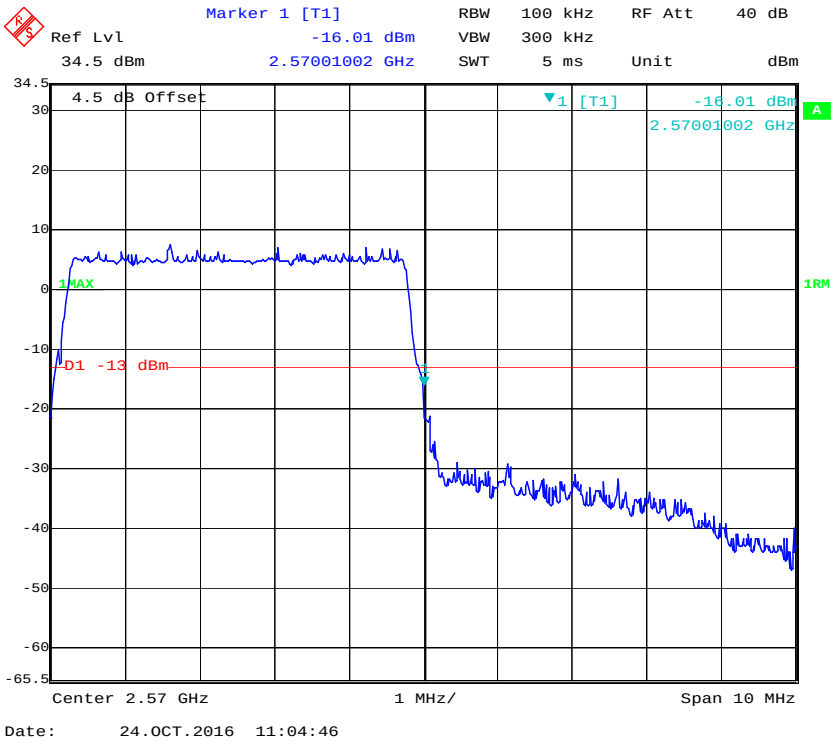


Band 7:

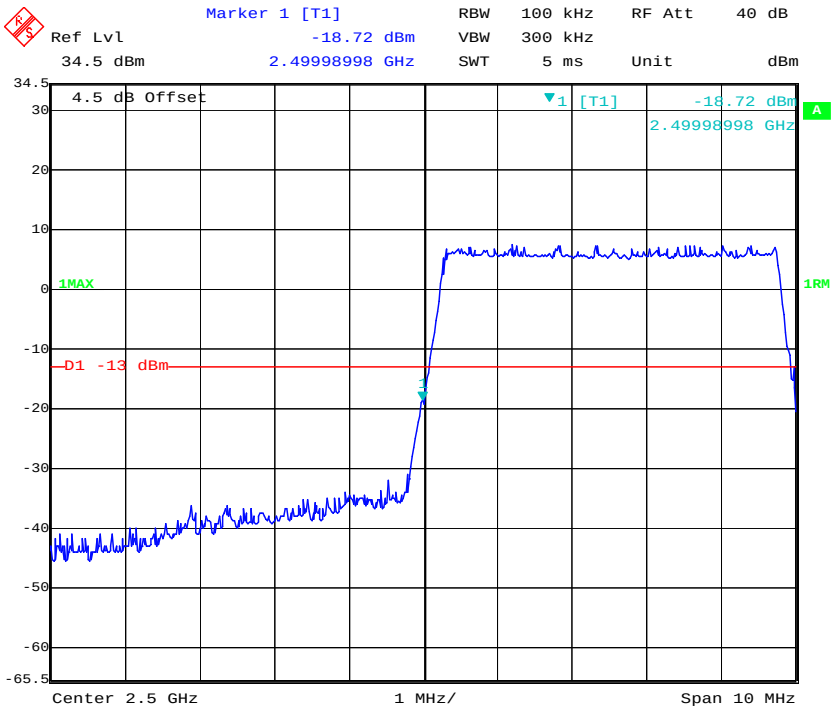
QPSK (5.0 MHz, FULL RB) - Left Band Edge



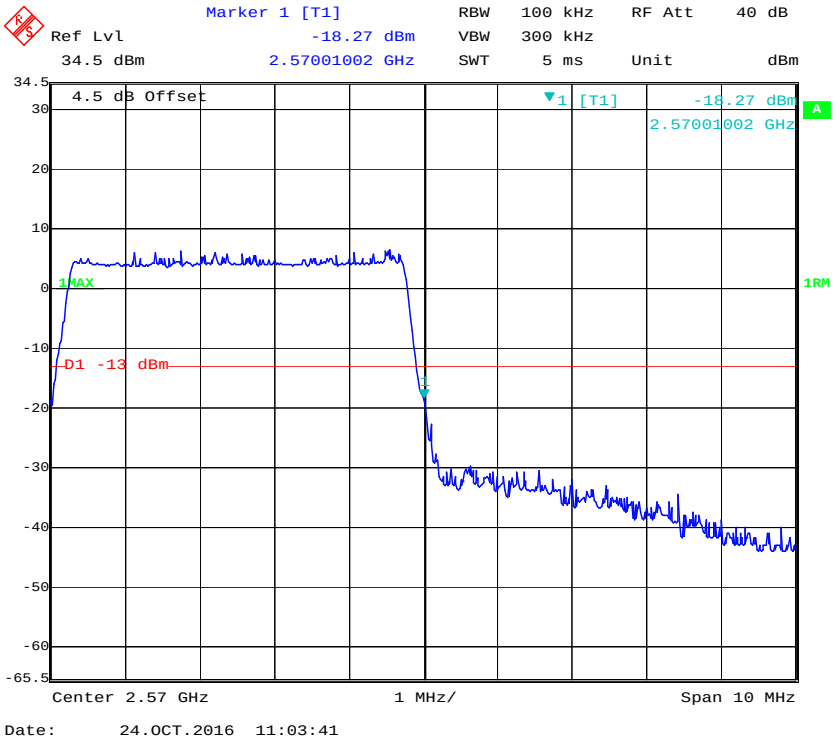
QPSK (5.0 MHz, FULL RB) - Right Band Edge



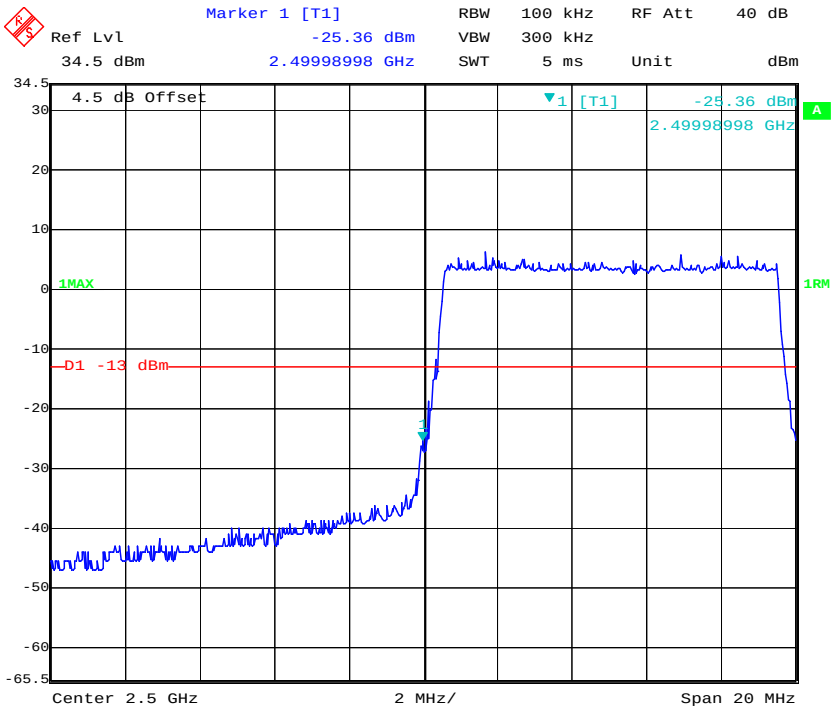
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



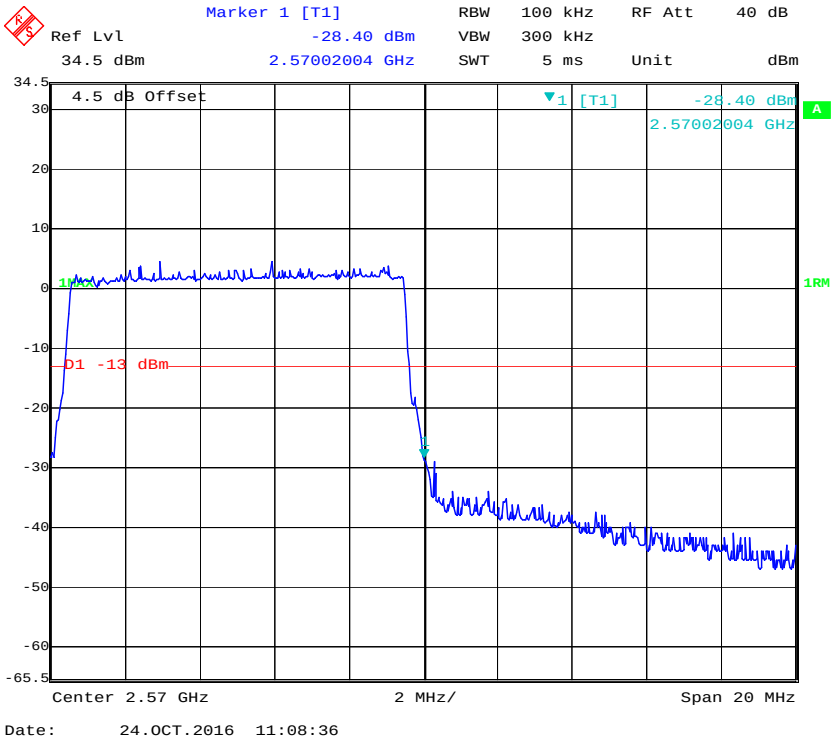
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



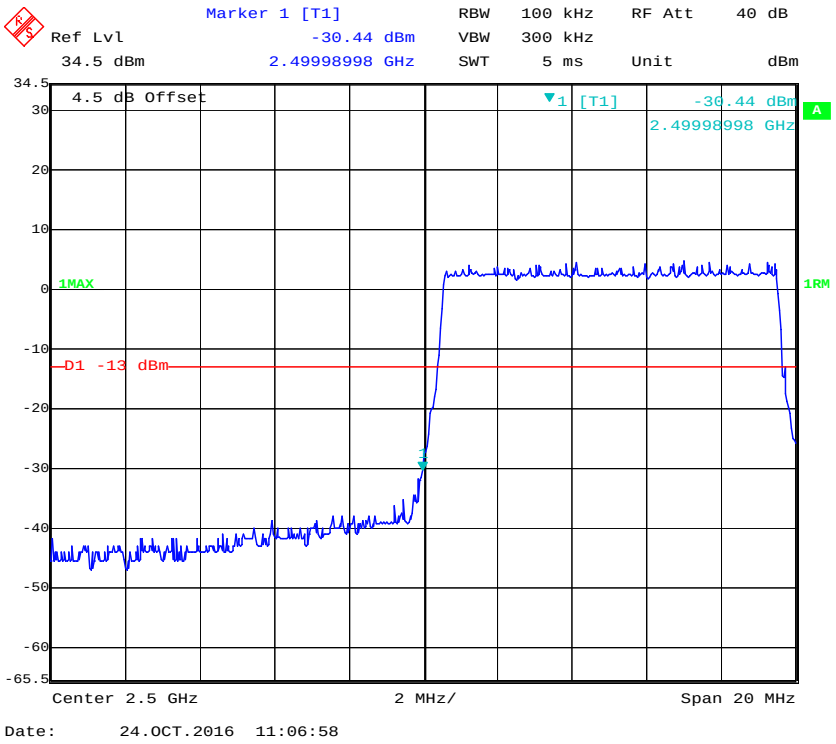
QPSK (10.0 MHz, FULL RB) - Left Band Edge



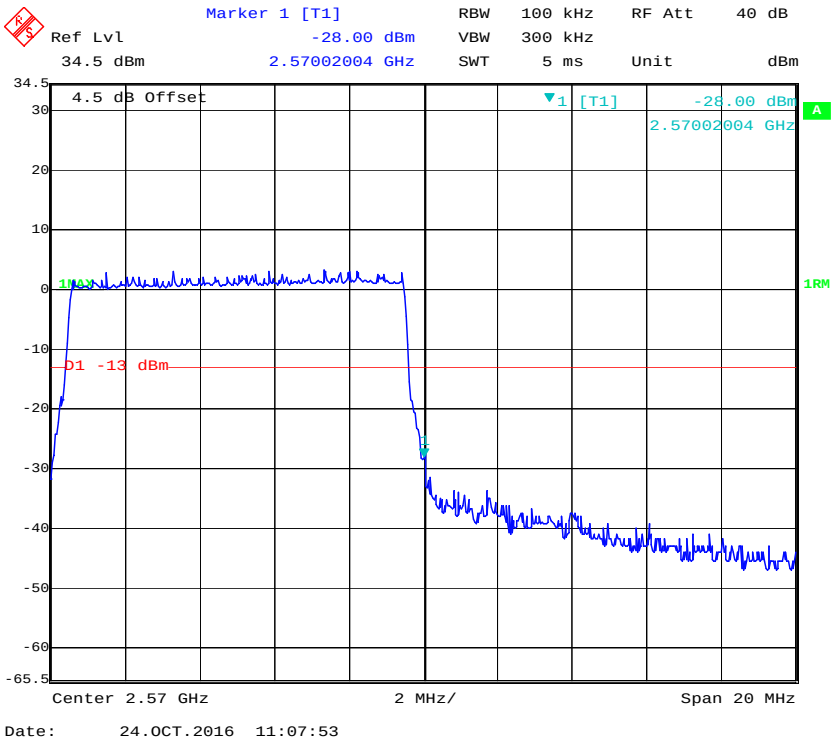
QPSK (10.0 MHz, FULL RB) - Right Band Edge



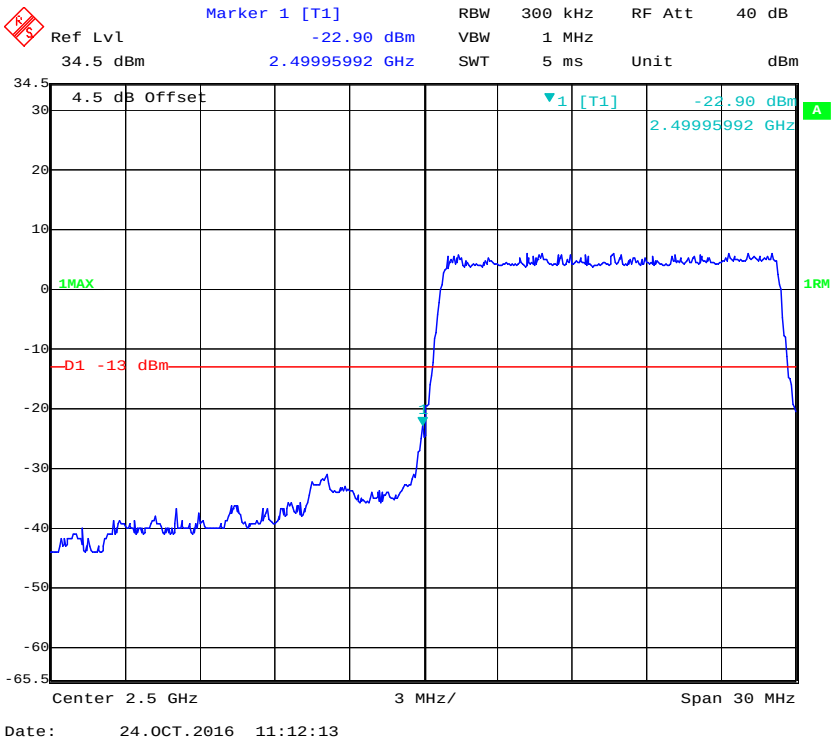
16-QAM (10.0 MHz, FULL RB) - Left Band Edge



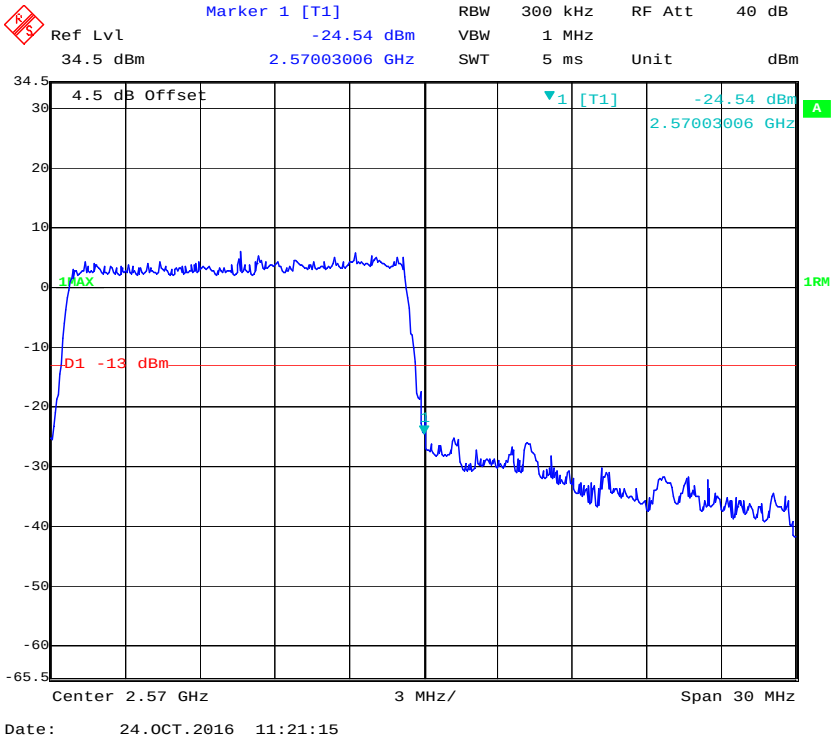
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



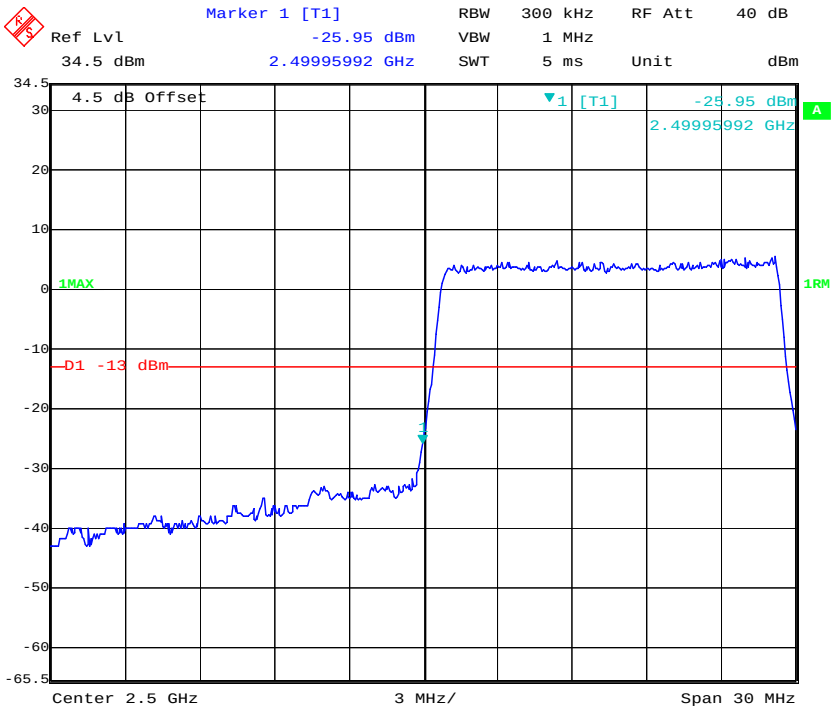
QPSK (15 MHz, FULL RB) - Left Band Edge



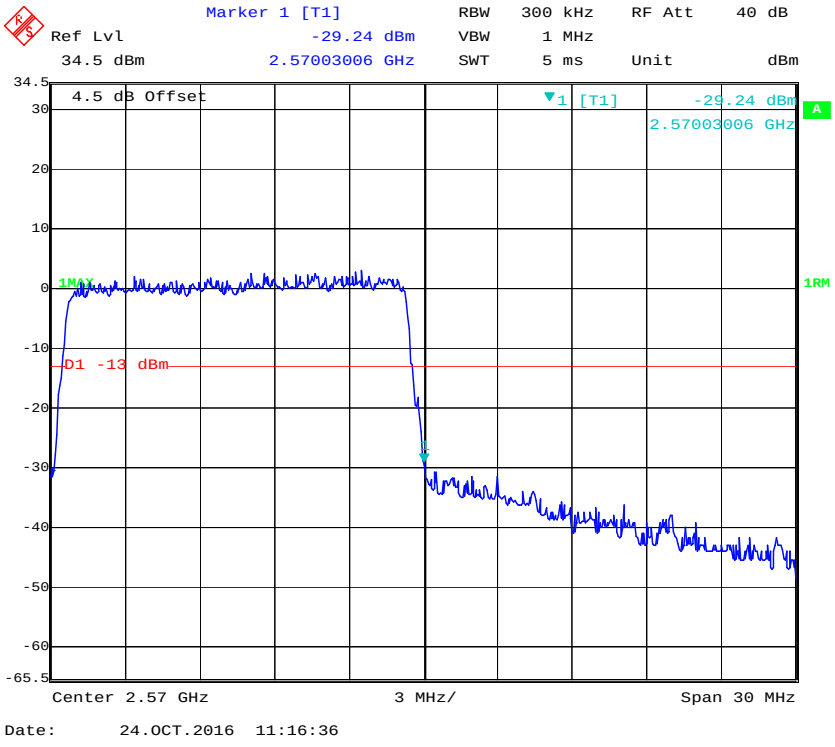
QPSK (15 MHz, FULL RB) - Right Band Edge



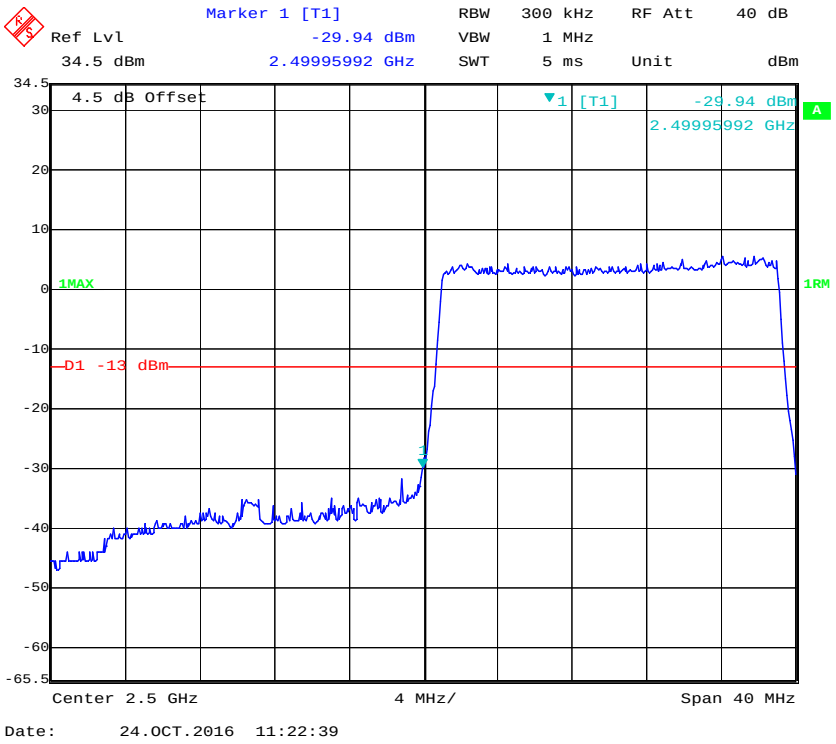
16-QAM (15 MHz, FULL RB) - Left Band Edge



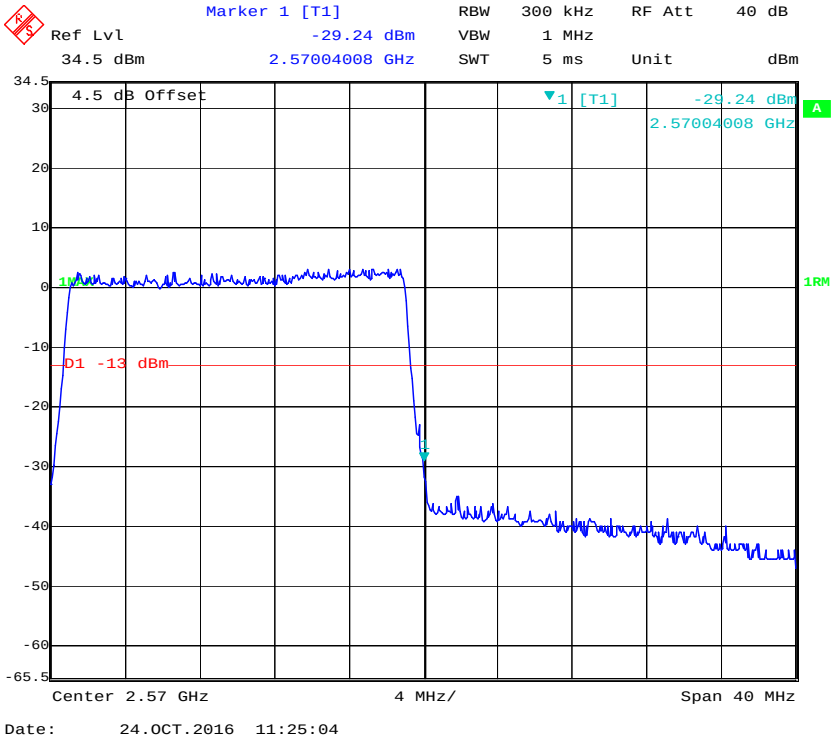
16-QAM (15 MHz, FULL RB) - Right Band Edge



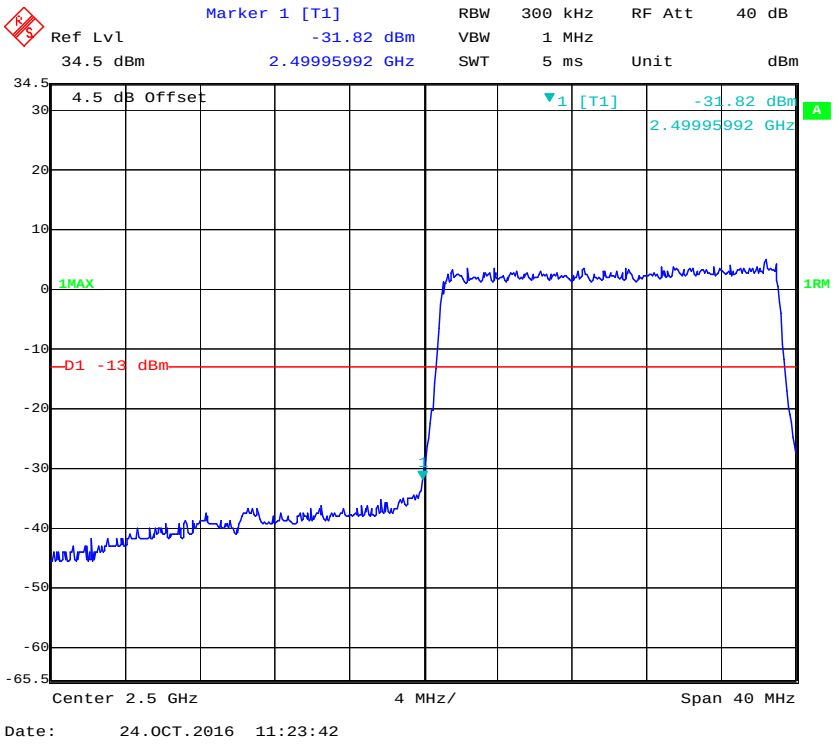
QPSK (20 MHz, FULL RB) - Left Band Edge



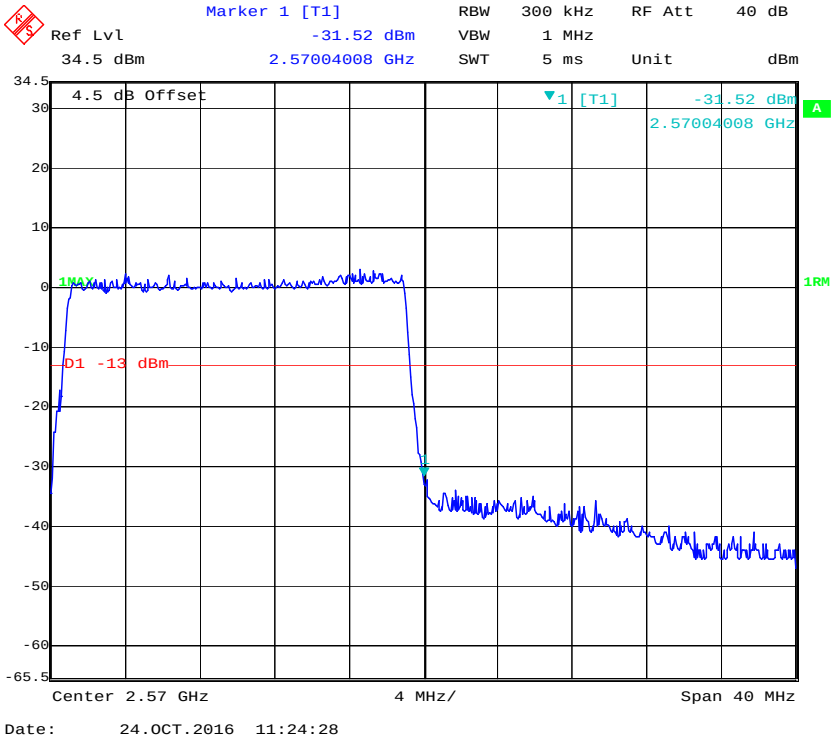
QPSK (20 MHz, FULL RB) - Right Band Edge



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

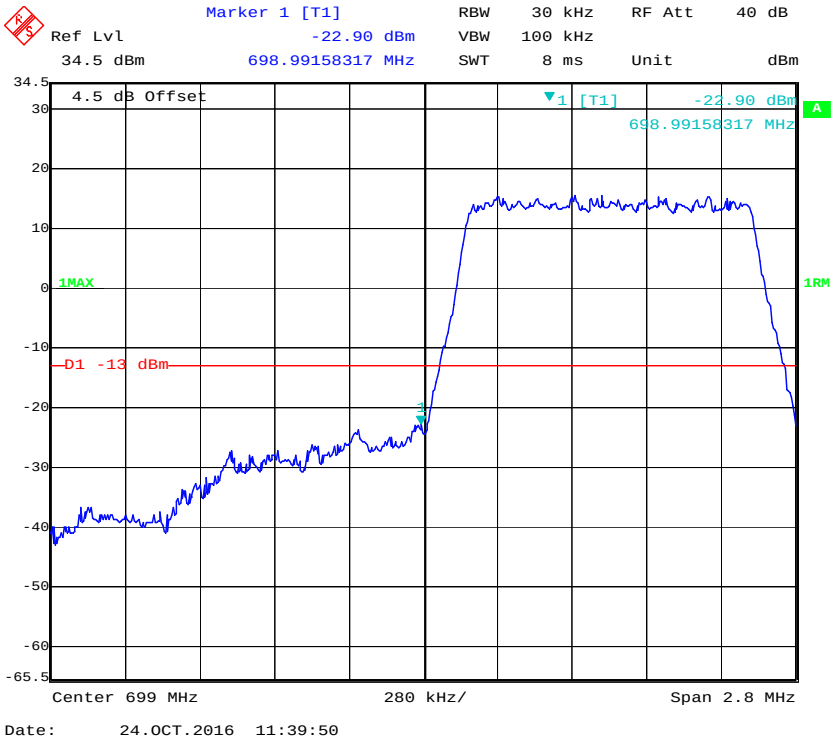


16-QAM (20 MHz, FULL RB) - Right Band Edge

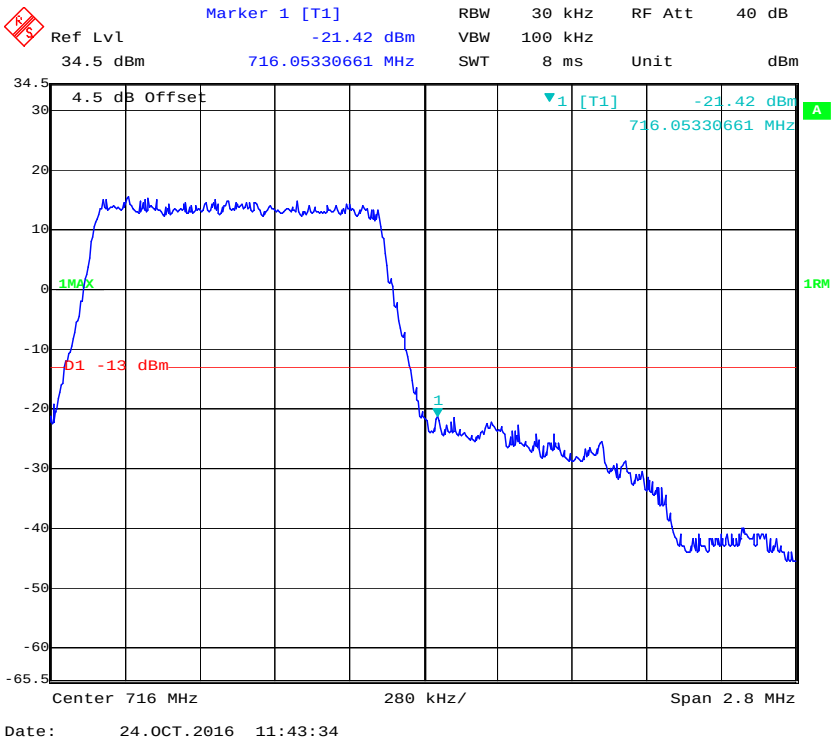


Band 12:

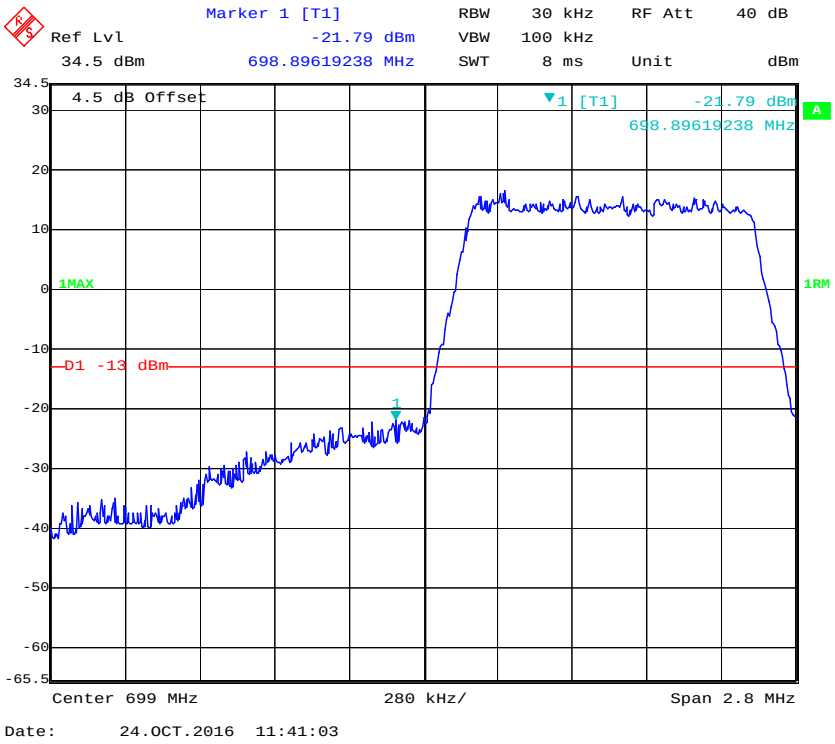
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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

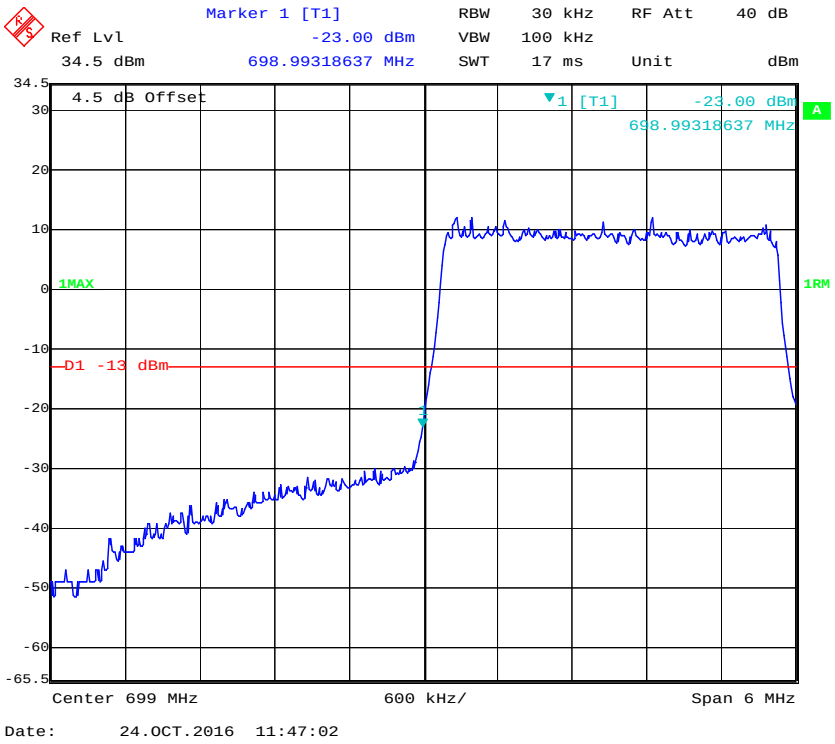


16-QAM (1.4 MHz, FULL RB) - Left Band Edge

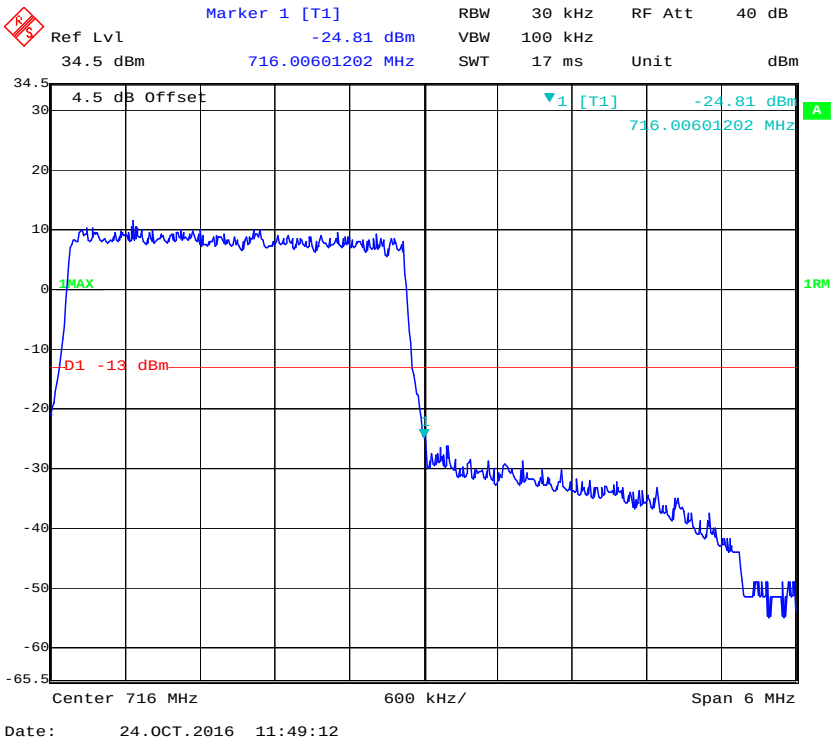


16-QAM (1.4 MHz, FULL RB) - Right Band Edge

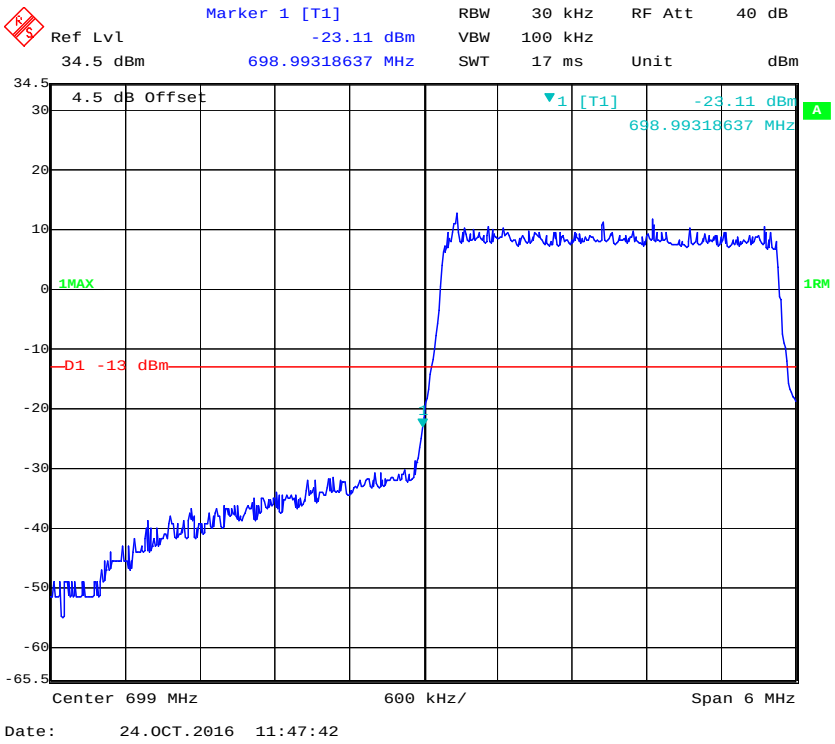
QPSK (3.0 MHz, FULL RB) - Left Band Edge



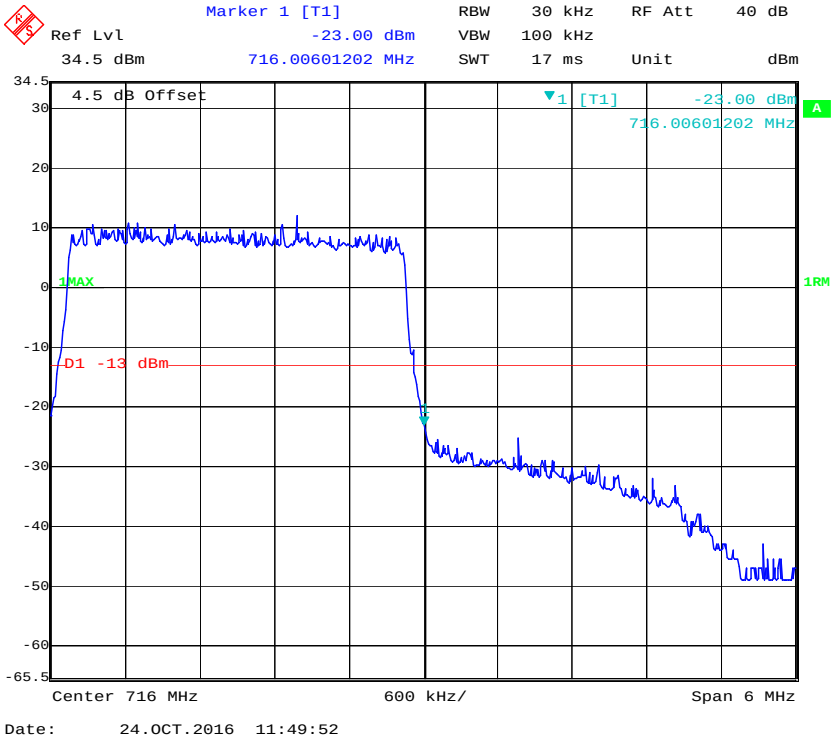
QPSK (3.0 MHz, FULL RB) - Right Band Edge



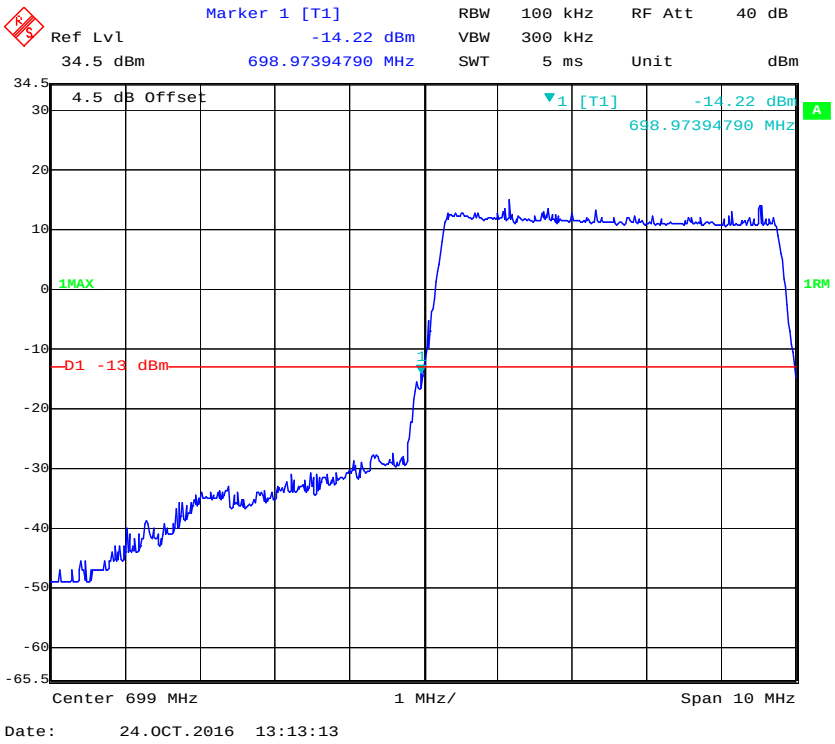
16-QAM (3.0 MHz, FULL RB) - Left Band Edge



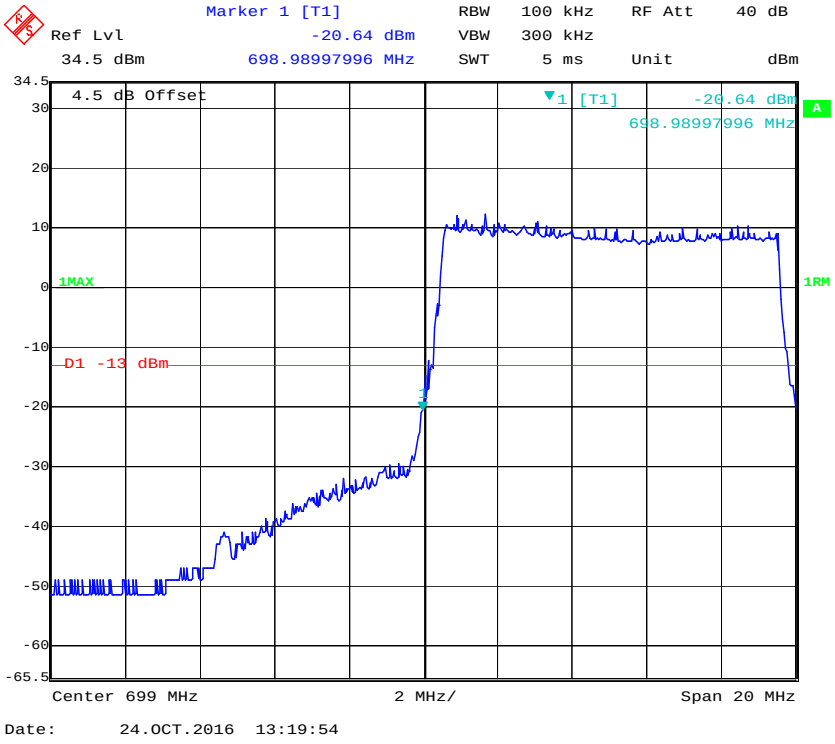
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



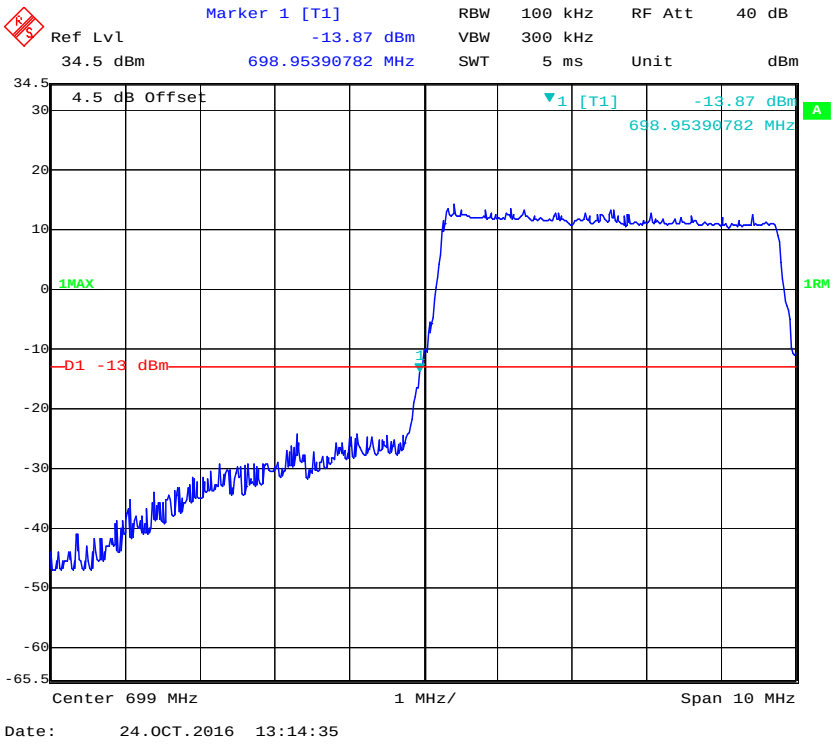
QPSK (5.0 MHz, FULL RB) - Left Band Edge



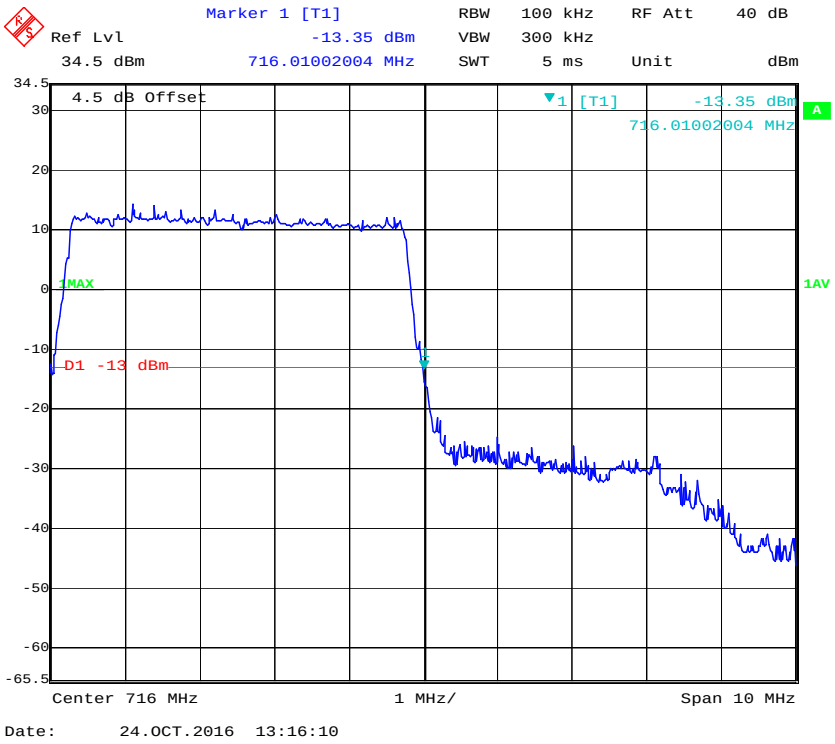
QPSK (5.0 MHz, FULL RB) - Right Band Edge



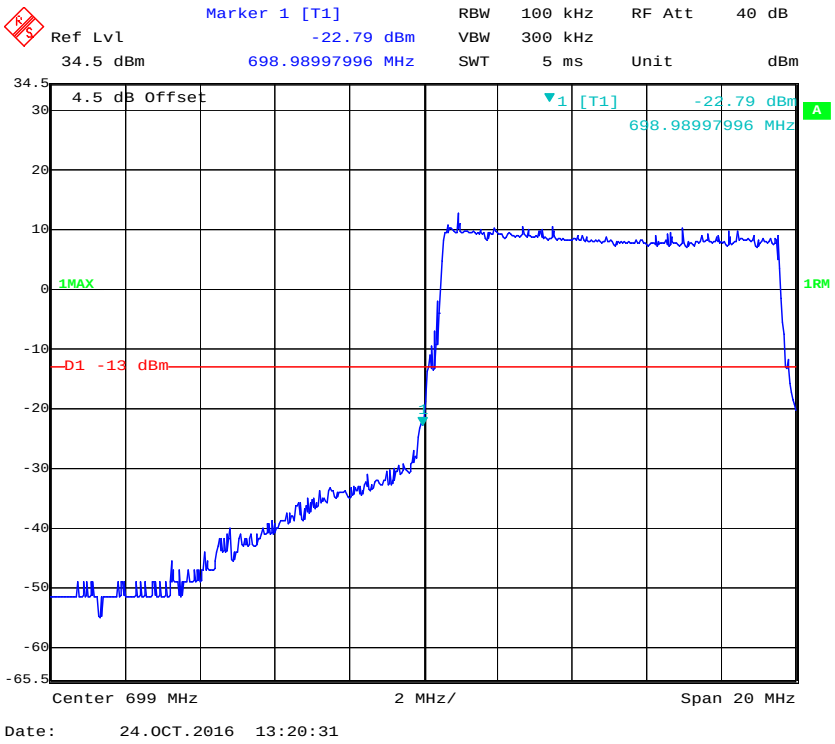
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



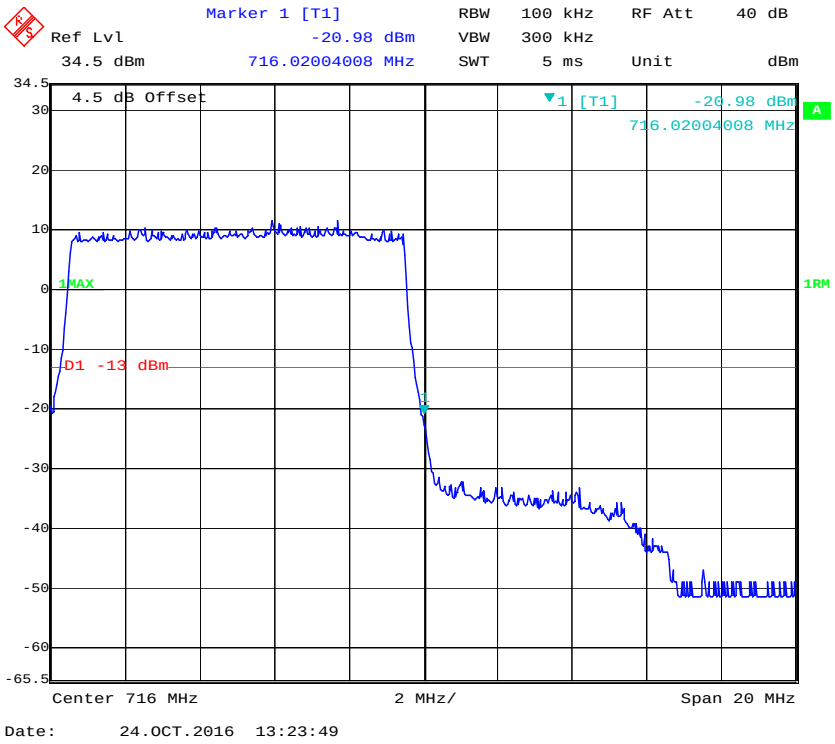
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



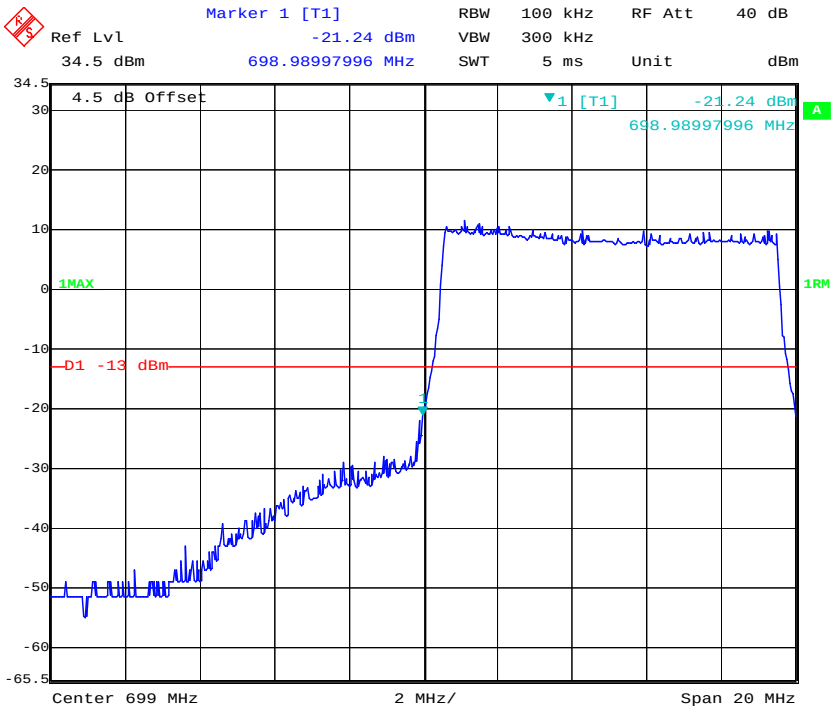
QPSK (10.0 MHz, FULL RB) - Left Band Edge



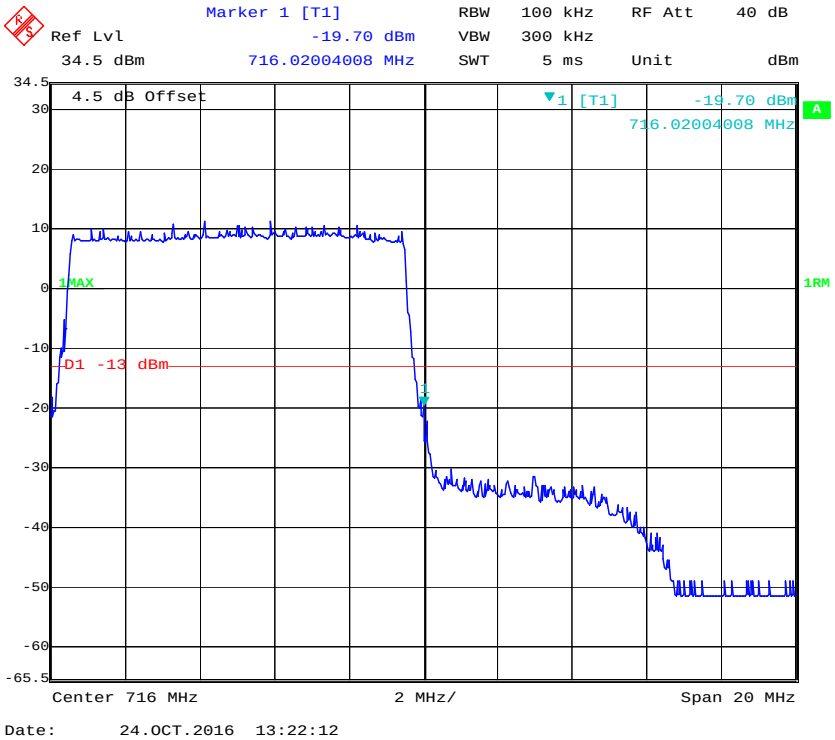
QPSK (10.0 MHz, FULL RB) - Right Band Edge



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

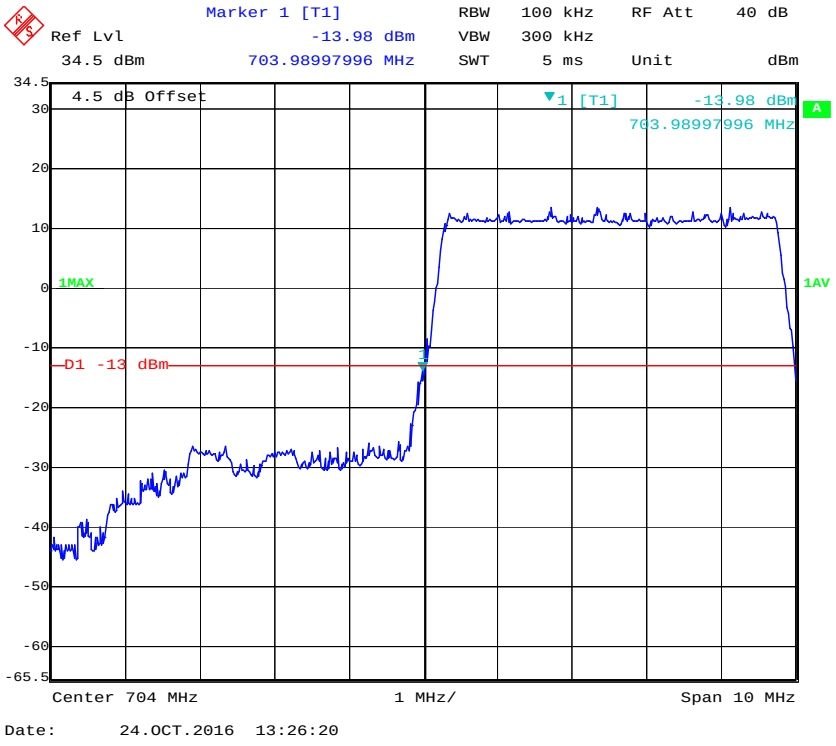


16-QAM (10.0 MHz, FULL RB) - Right Band Edge

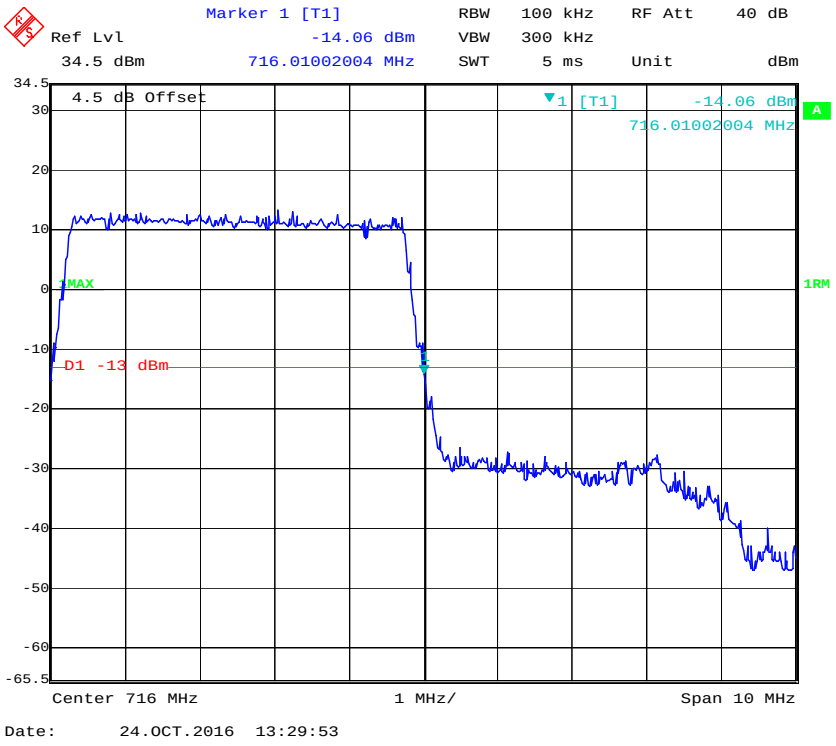


Band 17:

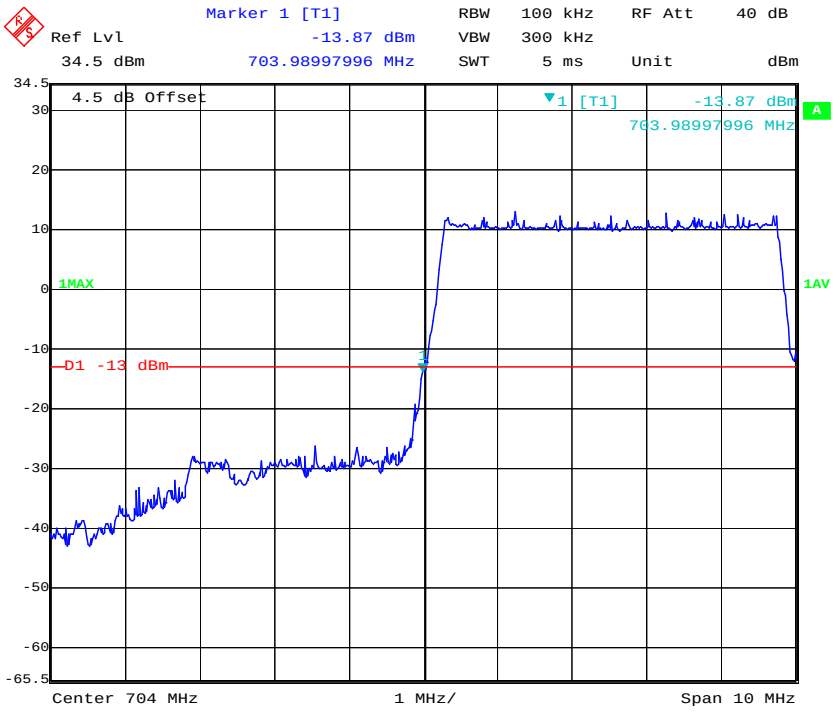
QPSK (5.0 MHz, FULL RB) - Left Band Edge



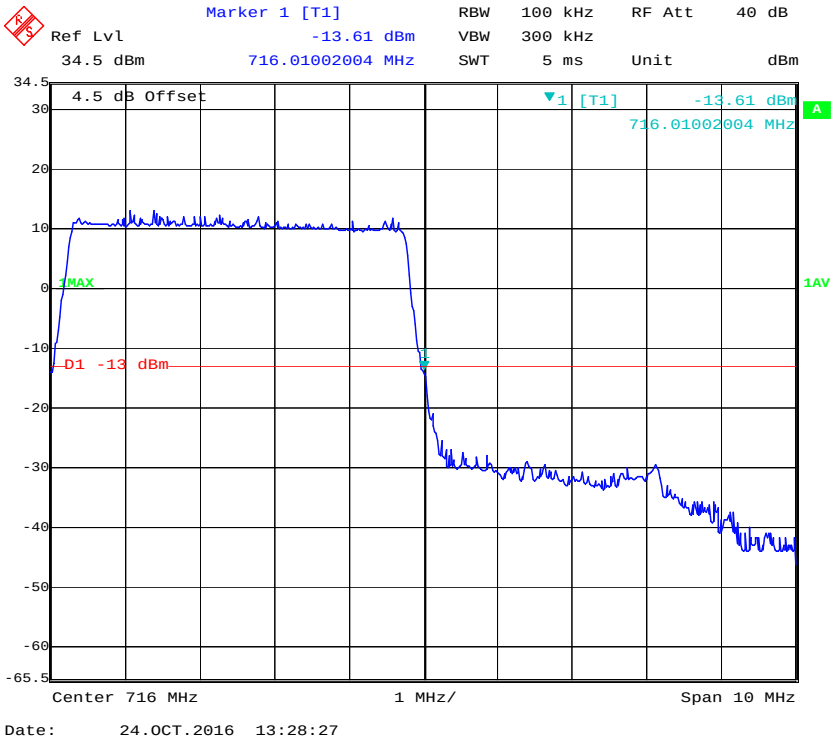
QPSK (5.0 MHz, FULL RB) - Right Band Edge



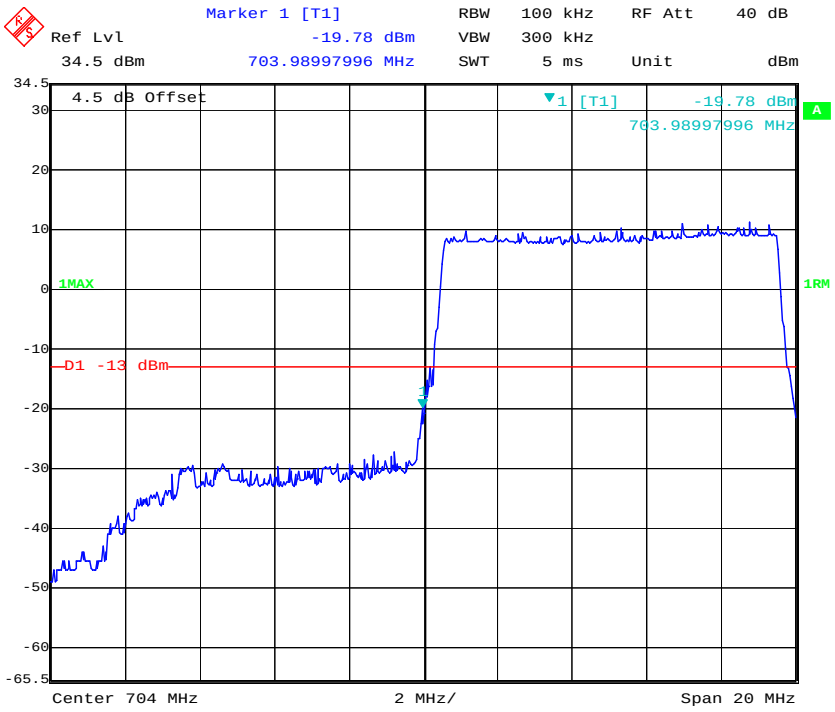
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



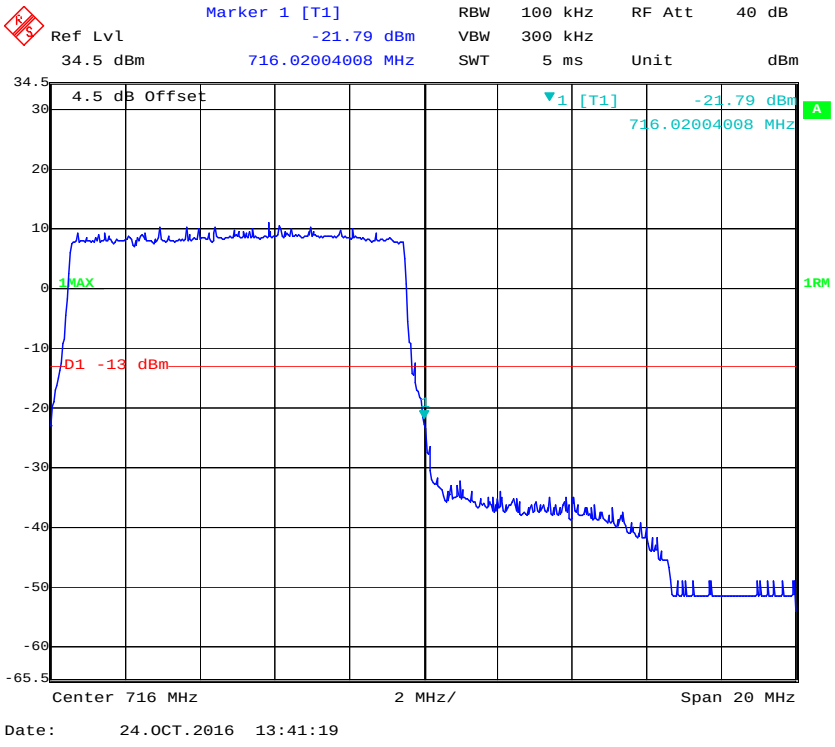
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



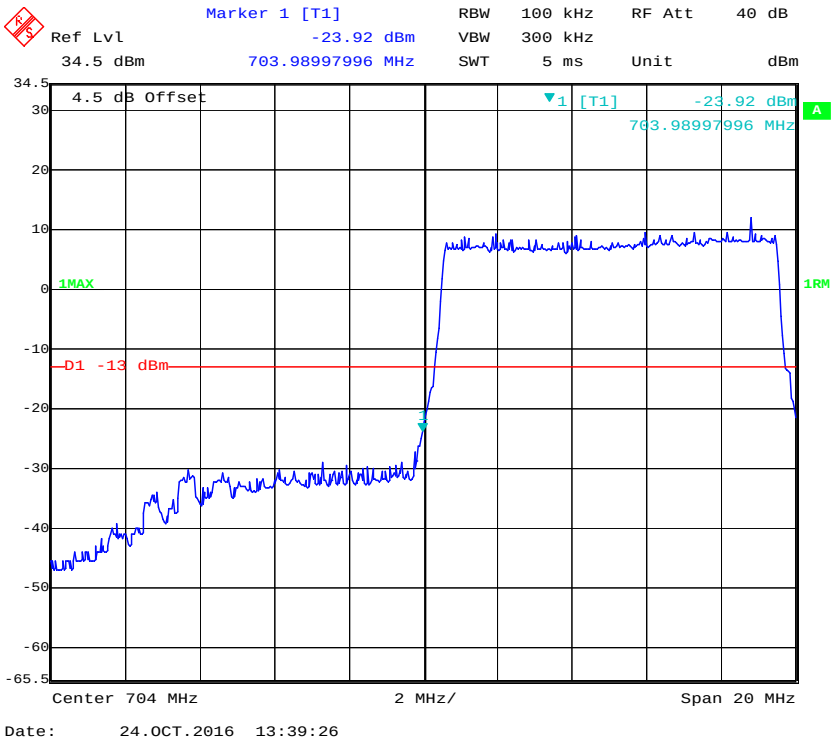
QPSK (10.0 MHz, FULL RB) - Left Band Edge



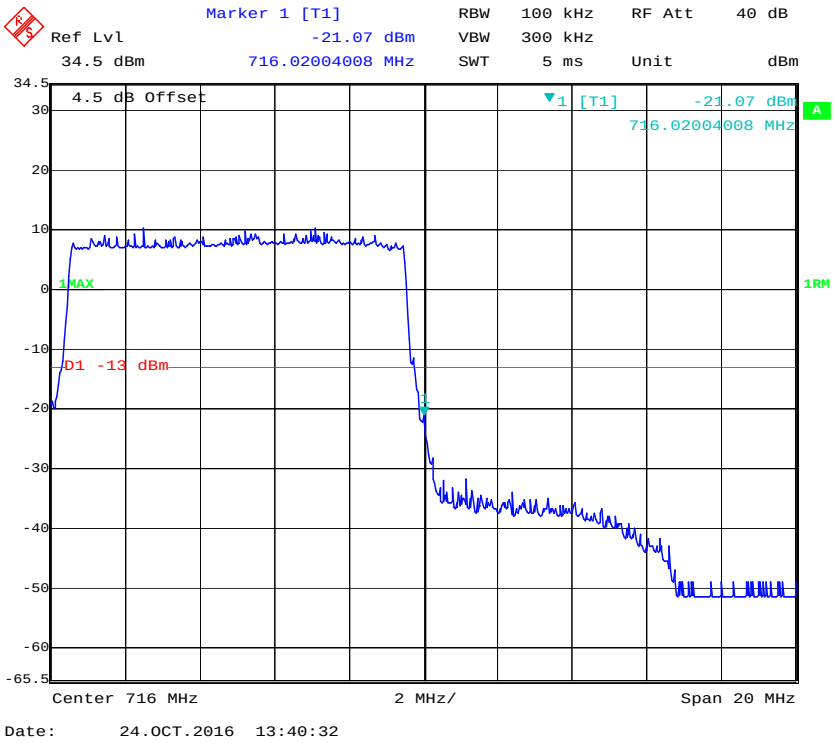
QPSK (10.0 MHz, FULL RB) - Right Band Edge



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

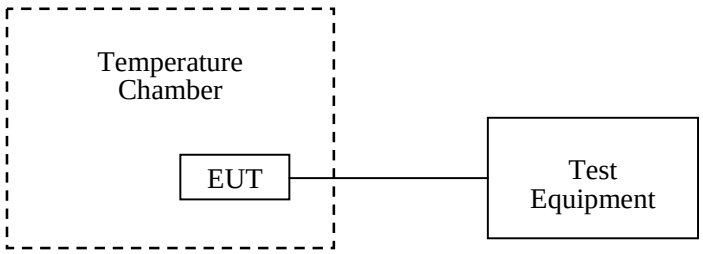
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	24 ℃
Relative Humidity:	47 %
ATM Pressure:	101.0 kPa

The testing was performed by Chris Wang on 2016-10-25.

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	3.85	2	0.0024	2.5
-20		2	0.0024	2.5
-10		4	0.0048	2.5
0		3	0.0036	2.5
10		3	0.0036	2.5
20		4	0.0048	2.5
30		5	0.0060	2.5
40		6	0.0072	2.5
50		4	0.0048	2.5
25	V min.= 3.6	5	0.0060	2.5
25	V max.= 4.2	6	0.0072	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	3.85	15	0.0179	2.5
-20		13	0.0155	2.5
-10		17	0.0203	2.5
0		10	0.0120	2.5
10		16	0.0191	2.5
20		17	0.0203	2.5
30		15	0.0179	2.5
40		15	0.0179	2.5
50		16	0.0191	2.5
25	V min.= 3.6	17	0.0203	2.5
25	V max.= 4.2	18	0.0215	2.5

WCDMA Mode

Middle Channel, f_o=836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-20	3.85	-4	-0.005	
-10		-3	-0.004	2.5
0		-9	-0.011	2.5
10		-5	-0.006	2.5
20		-1	-0.001	2.5
30		-2	-0.002	2.5
40		3	0.004	2.5
50		2	0.002	2.5
25	V min.= 3.6	4	0.005	2.5
25	V max.= 4.2	5	0.006	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	3.85	-2	-0.0011	pass
-20		2	0.0011	pass
-10		-5	-0.0027	pass
0		-2	-0.0011	pass
10		-2	-0.0011	pass
20		-1	-0.0005	pass
30		-2	-0.0011	pass
40		2	0.0011	pass
50		-2	-0.0011	pass
25	V min.= 3.6	-1	-0.0005	pass
25	V max.= 4.2	1	0.0005	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	5	0.0027	pass
-20		7	0.0037	pass
-10		5	0.0027	pass
0		4	0.0021	pass
10		5	0.0027	pass
20		4	0.0021	pass
30		3	0.0016	pass
40		5	0.0027	pass
50		6	0.0032	pass
25	V min.= 3.6	7	0.0037	pass
25	V max.= 4.2	8	0.0043	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-20	3.85	-2	-0.0011	
-10		2	0.0011	pass
0		-4	-0.0021	pass
10		-2	-0.0011	pass
20		-2	-0.0011	pass
30		-3	-0.0016	pass
40		-3	-0.0016	pass
50		-1	-0.0005	pass
25	V min.= 3.6	-2	-0.0011	pass
25	V max.= 4.2	-1	-0.0005	pass

AWS Band (Part 27)

WCDMA Mode

Middle Channel, f_o =1732.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-20	3.85	1	0.0006	pass
-10		-1	-0.0006	pass
0		-2	-0.0012	pass
10		-1	-0.0006	pass
20		-1	-0.0006	pass
30		1	0.0006	pass
40		-1	-0.0006	pass
50		2	0.0012	pass
25	V min.= 3.6	-2	-0.0012	pass
25	V max.= 4.2	1	0.0006	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	3.85	1	0.000532	pass
-20		-1	-0.000532	pass
-10		-2	-0.001064	pass
0		-3	-0.001596	pass
10		-1	-0.000532	pass
20		-2	-0.001064	pass
30		1	0.000532	pass
40		2	0.001064	pass
50		-1	-0.000532	pass
25	V min.= 3.6	-1	-0.000532	pass
25	V max.= 4.2	1	0.000532	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	3.85	1	0.000577	pass
-20		2	0.001154	pass
-10		-1	-0.000577	pass
0		-2	-0.001154	pass
10		-1	-0.000577	pass
20		2	0.001154	pass
30		-3	-0.001732	pass
40		-1	-0.000577	pass
50		1	0.000577	pass
25	V min.= 3.6	2	0.001154	pass
25	V max.= 4.2	1	0.000577	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	3.85	-1	-0.000394	pass
-20		1	0.000394	pass
-10		2	0.000789	pass
0		3	0.001183	pass
10		1	0.000394	pass
20		-1	-0.000394	pass
30		2	0.000789	pass
40		1	0.000394	pass
50		3	0.001183	pass
25	V min.= 3.6	-1	-0.000394	pass
25	V max.= 4.2	1	0.000394	pass

Band 12:

20.0 MHz Middle Channel, f_o=707.5 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-1	-0.001413	pass
-20		-1	-0.001413	pass
-10		-2	-0.002827	pass
0		-1	-0.001413	pass
10		-2	-0.002827	pass
20		-1	-0.001413	pass
30		-1	-0.001413	pass
40		2	0.002827	pass
50		-2	-0.002827	pass
25	V min.= 3.6	-2	-0.002827	pass
25	V max.= 4.2	1	0.001413	pass

Band 17:

20.0 MHz Middle Channel, f_o=710 MHz (QPSK)				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	2	0.002817	pass
-20		1	0.001408	pass
-10		-1	-0.001408	pass
0		1	0.001408	pass
10		-2	-0.002817	pass
20		3	0.004225	pass
30		-1	-0.001408	pass
40		3	0.004225	pass
50		1	0.001408	pass
25	V min.= 3.6	1	0.001408	pass
25	V max.= 4.2	2	0.002817	pass

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