FCC PART 27

FCC PART 22H, PART 24E

MEASUREMENT AND TEST REPORT

For

MP3 Car Soundvision Co., Ltd.

Autopista Cuenca-azogues y subida a Turi, Cuenca, Ecuador

FCC ID: 2AFJUM1

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

Test Engineer:	Haiguo Li
Report Number:	RSZ160324002-00D
Report Date:	2016-04-28
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *MP3 Car Soundvision Co., Ltd.*'s product, model number: *M1 (FCC ID: 2AFJUM1)* or the "EUT" in this report was a *LTE Mobile phone*, which was measured approximately: 143 mm (L) × 68 mm (W) × 8 mm (H), rated with input voltage: DC 3.8V rechargeable Li-ion battery or DC 5.0V from adapter.

Adapter Information:
Model: RKL-G94
Input: AC 100-240V, 50/60Hz, 0.3A
Output: DC 5.0V, 1000mA

**All measurement and test data in this report was gathered from production sample serial number: 1601754 (Assigned by BACL, Shenzhen).The EUT supplied by the applicant was received on 2016-03-24.*

Objective

This type approval report is prepared on behalf of *MP3 Car Soundvision Co., Ltd.* 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: 2AFJUM1.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D.

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

Measurement uncertainty with radiated emission is 5.81 dB for 30MHz-1GHz.and 4.88 dB for above 1GHz, 1.95dB for conducted measurement.

Test Facility

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

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on October 31, 2103. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

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

SYSTEM TEST CONFIGURATION

Justification

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

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

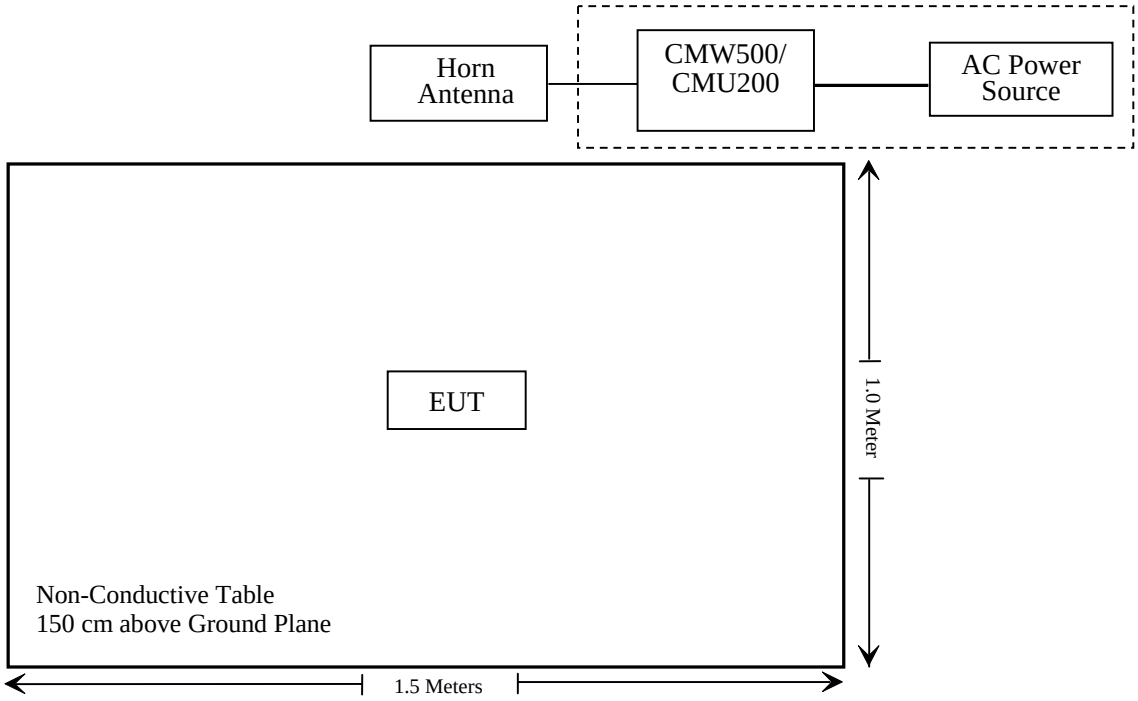
Equipment Modifications

No modifications were made to the EUT.

Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891

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) (i)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53 (c)	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53(c) (g)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (c) (g)	Spurious Radiated Emissions	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (c) (g);	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Note: * Please refer to SAR report released by BACL, report number: RSZ160324002-20.

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: RSZ160324002-20.

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.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50 - 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.

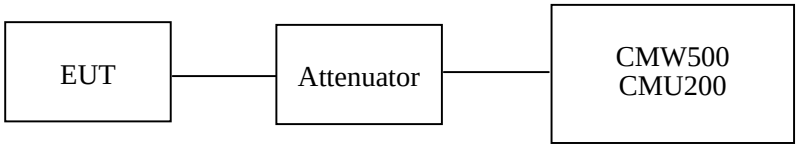
According to §27.50(c),Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-12-15	2016-12-14
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
HP	Synthesized Sweeper	HP 8341B	2624A00116	2015-07-02	2016-07-01
COM POWER	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	1	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	3	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18

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

Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0kPa

The testing was performed by Haiguo Li on 2016-02-25.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	33.14	38.45
	190	836.6	33.11	38.45
	251	848.8	33.16	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.15	32.25	30.23	29.03	38.45
	190	836.6	33.10	32.24	30.24	29.07	38.45
	251	848.8	33.18	32.29	30.35	29.20	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	26.55	25.22	24.12	22.83	38.45
	190	836.6	26.20	24.90	23.83	22.54	38.45
	251	848.8	25.80	24.53	23.46	22.17	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	**Normal**	RMC12.2k		22.39	22.46	22.29
		Rel 6 HSDPA	1	21.73	21.26	21.41
			2	21.67	21.20	21.38
			3	21.86	21.37	21.51
			4	21.69	21.15	21.30
		Rel 6 HSUPA	1	21.48	21.20	21.26
			2	21.42	21.08	21.14
			3	21.52	21.32	21.37
			4	21.40	21.10	21.14
			5	21.61	21.26	21.38
		HSPA+	1	21.68	21.25	21.32

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.07	33
	661	1880.0	28.96	33
	810	1909.8	29.10	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.08	28.19	26.27	25.20	33
	661	1880.0	28.95	28.06	26.11	25.07	33
	810	1909.8	29.09	28.16	26.21	25.13	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	26.34	25.46	23.32	22.08	33
	661	1880.0	26.21	25.32	23.24	21.90	33
	810	1909.8	25.96	25.04	22.79	21.47	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	**Normal**	RMC12.2k		22.04	21.96	21.99
		Rel 6 HSDPA	1	21.37	21.64	21.45
			2	21.26	21.61	21.36
			3	21.41	21.69	21.50
			4	21.33	21.58	21.35
		Rel 6 HSUPA	1	20.90	21.10	21.06
			2	20.80	21.03	20.97
			3	20.97	21.23	21.14
			4	20.78	21.02	20.95
			5	20.97	21.23	21.16
		HSPA+	1	21.02	21.12	21.08

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.27	13
	Middle	0.22	13
	High	0.24	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.31	13
	Middle	2.45	13
	High	2.54	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.42	13
	Middle	2.45	13
	High	2.41	13
HSDPA (16QAM)	Low	2.43	13
	Middle	2.48	13
	High	2.43	13
HSUPA (BPSK)	Low	2.40	13
	Middle	2.49	13
	High	2.43	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	0.28	13
	Middle	0.25	13
	High	0.26	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	2.28	13
	Middle	2.37	13
	High	2.31	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.93	13
	Middle	3.00	13
	High	2.94	13
HSDPA (16QAM)	Low	2.91	13
	Middle	3.07	13
	High	2.92	13
HSUPA (BPSK)	Low	2.97	13
	Middle	3.08	13
	High	2.98	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), High Channel										
848.80	102.62	256	1.7	H	32.1	0.69	0	31.31	38.45	7.14
848.80	100.21	103	1.5	V	29.7	0.69	0	29.01	38.45	9.44
EIRP for PCS Band (Part 24E), High Channel										
1909.80	90.35	39	2.0	H	21.7	1.40	7.30	27.60	33	5.4
1909.80	89.92	105	2.0	V	20.7	1.40	7.30	26.60	33	6.4

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), Low Channel										
824.20	96.37	253	1.6	H	25.9	0.69	0	25.21	38.45	13.24
824.20	96.17	179	1.5	V	25.7	0.69	0	25.01	38.45	13.44
EIRP for PCS Band (Part 24E), Low Channel										
1850.20	88.23	247	2.4	H	19.6	1.40	7.30	25.50	33	7.5
1850.20	87.29	244	1.3	V	18.1	1.40	7.30	24.00	33	9.0

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										
836.60	92.43	135	1.7	H	21.9	0.69	0	21.21	38.45	17.24
836.60	92.18	178	1.5	V	21.7	0.69	0	21.01	38.45	17.44
EIRP for WCDMA Band II (Part 24E), Low Channel										
1852.40	85.34	18	1.3	H	16.7	1.40	7.30	22.60	33	10.4
1852.40	85.16	189	1.9	V	15.9	1.40	7.30	21.80	33	11.2

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

LTE Band 2:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.08	22.68	22.08
		RB Size=1, RB Offset=2	22.23	22.85	22.21
		RB Size=1, RB Offset=5	22.07	22.71	22.04
		RB Size=3, RB Offset=0	22.17	22.88	22.20
		RB Size=3, RB Offset=1	22.14	22.81	22.13
		RB Size=3, RB Offset=2	22.35	22.97	22.30
		RB Size=6, RB Offset=0	22.19	22.77	22.07
	16QAM	RB Size=1, RB Offset=0	22.20	22.92	22.28
		RB Size=1, RB Offset=2	22.18	22.84	22.25
		RB Size=1, RB Offset=5	22.40	23.05	22.35
		RB Size=3, RB Offset=0	22.08	22.70	22.10
		RB Size=3, RB Offset=1	22.24	22.85	22.20
		RB Size=3, RB Offset=2	22.04	22.69	22.11
		RB Size=6, RB Offset=0	22.25	22.88	22.28
3.0	QPSK	RB Size=1, RB Offset=0	22.18	22.76	22.19
		RB Size=1, RB Offset=7	22.37	22.94	22.33
		RB Size=1, RB Offset=14	22.13	22.73	22.21
		RB Size=8, RB Offset=0	22.37	22.96	22.34
		RB Size=8, RB Offset=4	22.31	22.88	22.30
		RB Size=8, RB Offset=7	22.41	22.99	22.37
		RB Size=15, RB Offset=0	22.08	22.70	22.10
	16QAM	RB Size=1, RB Offset=0	22.24	22.85	22.20
		RB Size=1, RB Offset=7	22.04	22.69	22.11
		RB Size=1, RB Offset=14	22.25	22.88	22.28
		RB Size=8, RB Offset=0	22.18	22.76	22.19
		RB Size=8, RB Offset=4	22.37	22.94	22.33
		RB Size=8, RB Offset=7	22.13	22.73	22.21
		RB Size=15, RB Offset=0	22.37	22.96	22.34

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	22.07	22.69	22.05
		RB Size=1, RB Offset=12	22.18	22.84	22.22
		RB Size=1, RB Offset=24	22.06	22.64	22.05
		RB Size=12, RB Offset=0	22.19	22.81	22.18
		RB Size=12, RB Offset=6	22.16	22.79	22.13
		RB Size=12, RB Offset=11	22.24	22.90	22.31
		RB Size=25, RB Offset=0	22.17	22.77	22.08
	16QAM	RB Size=1, RB Offset=0	22.26	22.92	22.25
		RB Size=1, RB Offset=12	22.27	22.88	22.20
		RB Size=1, RB Offset=24	22.37	22.98	22.42
		RB Size=12, RB Offset=0	22.06	22.64	22.10
		RB Size=12, RB Offset=6	22.21	22.84	22.24
		RB Size=12, RB Offset=11	22.04	22.67	22.06
		RB Size=25, RB Offset=0	22.24	22.84	22.20
10.0	QPSK	RB Size=1, RB Offset=0	22.13	22.70	22.23
		RB Size=1, RB Offset=24	22.25	22.91	22.31
		RB Size=1, RB Offset=49	22.13	22.56	22.10
		RB Size=25, RB Offset=0	22.32	22.69	22.33
		RB Size=25, RB Offset=12	22.12	22.57	22.11
		RB Size=25, RB Offset=24	22.28	22.75	22.27
		RB Size=50, RB Offset=0	22.23	22.62	22.14
	16QAM	RB Size=1, RB Offset=0	22.40	22.79	22.44
		RB Size=1, RB Offset=24	22.24	22.66	22.22
		RB Size=1, RB Offset=49	22.39	22.80	22.36
		RB Size=25, RB Offset=0	22.29	22.67	22.25
		RB Size=25, RB Offset=12	22.43	22.82	22.52
		RB Size=25, RB Offset=24	22.16	22.60	22.11
		RB Size=50, RB Offset=0	22.25	22.68	22.34

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.12	22.55	22.13
		RB Size=1, RB Offset=37	22.25	22.74	22.30
		RB Size=1, RB Offset=74	22.20	22.65	22.24
		RB Size=36, RB Offset=0	22.36	22.80	22.41
		RB Size=36, RB Offset=18	22.22	22.68	22.19
		RB Size=36, RB Offset=37	22.31	22.81	22.39
		RB Size=75, RB Offset=0	22.29	22.73	22.30
	16QAM	RB Size=1, RB Offset=0	22.42	22.86	22.53
		RB Size=1, RB Offset=37	22.14	22.52	22.10
		RB Size=1, RB Offset=74	22.25	22.72	22.32
		RB Size=36, RB Offset=0	22.16	22.54	22.15
		RB Size=36, RB Offset=18	22.34	22.77	22.31
		RB Size=36, RB Offset=37	22.20	22.56	22.17
		RB Size=75, RB Offset=0	22.29	22.76	22.40
20.0	QPSK	RB Size=1, RB Offset=0	22.92	22.91	22.97
		RB Size=1, RB Offset=49	22.46	22.20	22.35
		RB Size=1, RB Offset=99	22.33	22.61	22.26
		RB Size=50, RB Offset=0	22.39	22.88	22.47
		RB Size=50, RB Offset=24	22.15	22.55	22.11
		RB Size=50, RB Offset=49	22.27	22.74	22.31
		RB Size=100, RB Offset=0	22.15	22.59	22.16
	16QAM	RB Size=1, RB Offset=0	22.27	22.77	22.33
		RB Size=1, RB Offset=49	22.20	22.66	22.16
		RB Size=1, RB Offset=99	22.31	22.82	22.43
		RB Size=50, RB Offset=0	22.27	22.67	22.26
		RB Size=50, RB Offset=24	22.35	22.87	22.37
		RB Size=50, RB Offset=49	22.33	22.78	22.27
		RB Size=100, RB Offset=0	22.43	22.90	22.47

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	4.18	13	Pass
QPSK (100%RB Size)	4.07	13	Pass
16QAM (1RB Size)	4.28	13	Pass
16QAM (100%RB Size)	4.19	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									
1880.00	84.38	143	2.0	H	15.7	1.40	7.30	21.60	33
1880.00	83.53	302	1.1	V	14.3	1.40	7.30	20.20	33
3 MHz Bandwidth									
1880.00	84.53	151	1.2	H	15.9	1.40	7.30	21.80	33
1880.00	83.73	54	1.3	V	14.5	1.40	7.30	20.40	33
5 MHz Bandwidth									
1880.00	84.32	232	1.4	H	15.6	1.40	7.30	21.50	33
1880.00	83.32	97	2.2	V	14.1	1.40	7.30	20.00	33
10 MHz Bandwidth									
1880.00	84.28	186	1.6	H	15.6	1.40	7.30	21.50	33
1880.00	83.37	263	1.4	V	14.1	1.40	7.30	20.00	33
15 MHz Bandwidth									
1880.00	84.24	351	1.2	H	15.6	1.40	7.30	21.50	33
1880.00	83.32	359	1.1	V	14.1	1.40	7.30	20.00	33
20 MHz Bandwidth									
1880.00	84.47	1	1.7	H	15.8	1.40	7.30	21.70	33
1880.00	83.23	172	2.3	V	14.0	1.40	7.30	19.90	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	84.63	170	1.7	H	16.0	1.40	7.30	21.90	33
1880.00	83.47	32	2.3	V	14.2	1.40	7.30	20.10	33
3 MHz Bandwidth									
1880.00	84.67	104	2.1	H	16.0	1.40	7.30	21.90	33
1880.00	83.35	356	2.5	V	14.1	1.40	7.30	20.00	33
5 MHz Bandwidth									
1880.00	84.57	318	2.3	H	15.9	1.40	7.30	21.80	33
1880.00	83.24	297	2.4	V	14.0	1.40	7.30	19.90	33
10 MHz Bandwidth									
1880.00	84.55	345	2.0	H	15.9	1.40	7.30	21.80	33
1880.00	83.46	202	1.1	V	14.2	1.40	7.30	20.10	33
15 MHz Bandwidth									
1880.00	84.67	236	1.8	H	16.0	1.40	7.30	21.90	33
1880.00	83.39	208	1.0	V	14.2	1.40	7.30	20.10	33
20 MHz Bandwidth									
1880.00	84.61	144	1.8	H	15.9	1.40	7.30	21.80	33
1880.00	83.34	197	1.2	V	14.1	1.40	7.30	20.00	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	22.28	22.64	22.28
		RB Size=1, RB Offset=2	22.46	22.79	22.37
		RB Size=1, RB Offset=5	22.32	22.58	22.23
		RB Size=3, RB Offset=0	22.38	22.81	22.44
		RB Size=3, RB Offset=1	22.38	22.67	22.32
		RB Size=3, RB Offset=2	22.53	22.89	22.48
		RB Size=6, RB Offset=0	22.40	22.70	22.29
	16QAM	RB Size=1, RB Offset=0	22.47	22.93	22.56
		RB Size=1, RB Offset=2	22.42	22.76	22.35
		RB Size=1, RB Offset=5	22.63	22.94	22.61
		RB Size=3, RB Offset=0	22.27	22.62	22.24
		RB Size=3, RB Offset=1	22.43	22.81	22.38
		RB Size=3, RB Offset=2	22.22	22.60	22.24
		RB Size=6, RB Offset=0	22.42	22.73	22.41
3.0	QPSK	RB Size=1, RB Offset=0	22.33	22.69	22.32
		RB Size=1, RB Offset=7	22.47	22.86	22.47
		RB Size=1, RB Offset=14	22.27	22.69	22.32
		RB Size=8, RB Offset=0	22.51	22.82	22.49
		RB Size=8, RB Offset=4	22.41	22.82	22.40
		RB Size=8, RB Offset=7	22.59	22.96	22.52
		RB Size=15, RB Offset=0	22.23	22.63	22.21
	16QAM	RB Size=1, RB Offset=0	22.39	22.77	22.37
		RB Size=1, RB Offset=7	22.25	22.64	22.22
		RB Size=1, RB Offset=14	22.39	22.76	22.39
		RB Size=8, RB Offset=0	22.34	22.74	22.26
		RB Size=8, RB Offset=4	22.51	22.85	22.48
		RB Size=8, RB Offset=7	22.30	22.69	22.30
		RB Size=15, RB Offset=0	22.43	22.87	22.49

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	22.42	22.80	22.35
		RB Size=1, RB Offset=12	22.58	22.94	22.56
		RB Size=1, RB Offset=24	22.27	22.62	22.26
		RB Size=12, RB Offset=0	22.47	22.77	22.37
		RB Size=12, RB Offset=6	22.27	22.60	22.22
		RB Size=12, RB Offset=11	22.45	22.80	22.41
		RB Size=25, RB Offset=0	22.31	22.73	22.39
	16QAM	RB Size=1, RB Offset=0	22.55	22.82	22.47
		RB Size=1, RB Offset=12	22.38	22.72	22.25
		RB Size=1, RB Offset=24	22.51	22.88	22.54
		RB Size=12, RB Offset=0	22.43	22.82	22.47
		RB Size=12, RB Offset=6	22.27	22.62	22.26
		RB Size=12, RB Offset=11	22.38	22.77	22.28
		RB Size=25, RB Offset=0	22.53	22.86	22.44
10.0	QPSK	RB Size=1, RB Offset=0	22.54	22.76	22.45
		RB Size=1, RB Offset=24	22.63	22.98	22.51
		RB Size=1, RB Offset=49	22.31	22.64	22.27
		RB Size=25, RB Offset=0	22.45	22.76	22.41
		RB Size=25, RB Offset=12	22.32	22.58	22.25
		RB Size=25, RB Offset=24	22.38	22.80	22.42
		RB Size=50, RB Offset=0	22.36	22.76	22.30
	16QAM	RB Size=1, RB Offset=0	22.51	22.82	22.47
		RB Size=1, RB Offset=24	22.43	22.65	22.31
		RB Size=1, RB Offset=49	22.49	22.87	22.52
		RB Size=25, RB Offset=0	22.40	22.81	22.35
		RB Size=25, RB Offset=12	22.56	22.86	22.56
		RB Size=25, RB Offset=24	22.24	22.55	22.27
		RB Size=50, RB Offset=0	22.39	22.72	22.40

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	22.26	22.59	22.27
		RB Size=1, RB Offset=37	22.45	22.78	22.42
		RB Size=1, RB Offset=74	22.32	22.59	22.32
		RB Size=36, RB Offset=0	22.52	22.78	22.51
		RB Size=36, RB Offset=18	22.30	22.64	22.32
		RB Size=36, RB Offset=37	22.51	22.85	22.52
		RB Size=75, RB Offset=0	22.42	22.66	22.35
	16QAM	RB Size=1, RB Offset=0	22.59	22.87	22.59
		RB Size=1, RB Offset=37	22.26	22.64	22.21
		RB Size=1, RB Offset=74	22.47	22.74	22.38
		RB Size=36, RB Offset=0	22.22	22.58	22.27
		RB Size=36, RB Offset=18	22.40	22.76	22.44
		RB Size=36, RB Offset=37	22.38	22.74	22.28
		RB Size=75, RB Offset=0	22.58	22.85	22.41
20.0	QPSK	RB Size=1, RB Offset=0	23.01	22.92	22.82
		RB Size=1, RB Offset=49	22.45	22.85	22.53
		RB Size=1, RB Offset=99	22.44	22.80	22.41
		RB Size=50, RB Offset=0	22.71	22.93	22.50
		RB Size=50, RB Offset=24	22.22	22.64	22.24
		RB Size=50, RB Offset=49	22.46	22.81	22.37
		RB Size=100, RB Offset=0	22.24	22.56	22.22
	16QAM	RB Size=1, RB Offset=0	22.43	22.74	22.38
		RB Size=1, RB Offset=49	22.33	22.69	22.32
		RB Size=1, RB Offset=99	22.58	22.92	22.42
		RB Size=50, RB Offset=0	22.29	22.65	22.26
		RB Size=50, RB Offset=24	22.46	22.85	22.47
		RB Size=50, RB Offset=49	22.39	22.73	22.36
		RB Size=100, RB Offset=0	22.67	23.00	22.46

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	3.65	13	Pass
QPSK (100%RB Size)	4.27	13	Pass
16QAM (1RB Size)	3.10	13	Pass
16QAM (100%RB Size)	4.31	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									
1732.50	84.53	302	1.7	H	15.7	1.60	6.90	21.00	30
1732.50	83.32	48	2.2	V	14.1	1.60	6.90	19.40	30
3 MHz Bandwidth									
1732.50	84.37	49	1.3	H	15.6	1.60	6.90	20.90	30
1732.50	83.52	277	1.5	V	14.3	1.60	6.90	19.60	30
5 MHz Bandwidth									
1732.50	84.57	141	2.0	H	15.8	1.60	6.90	21.10	30
1732.50	83.36	173	2.3	V	14.1	1.60	6.90	19.40	30
10MHz Bandwidth									
1732.50	84.43	223	2.3	H	15.6	1.60	6.90	20.90	30
1732.50	83.23	328	1.3	V	14.0	1.60	6.90	19.30	30
15 MHz Bandwidth									
1732.50	84.45	316	1.6	H	15.7	1.60	6.90	21.00	30
1732.50	83.16	72	1.1	V	13.9	1.60	6.90	19.20	30
20 MHz Bandwidth									
1732.50	84.42	59	2.0	H	15.6	1.60	6.90	20.90	30
1732.50	83.36	249	2.2	V	14.1	1.60	6.90	19.40	30

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	84.26	241	1.0	H	15.5	1.60	6.90	20.80	30
1732.50	83.28	334	1.2	V	14.1	1.60	6.90	19.40	30
3 MHz Bandwidth									
1732.50	84.37	49	1.3	H	15.6	1.60	6.90	20.90	30
1732.50	83.52	277	1.5	V	14.3	1.60	6.90	19.60	30
5 MHz Bandwidth									
1732.50	84.22	139	2.4	H	15.4	1.60	6.90	20.70	30
1732.50	83.18	132	1.5	V	14.0	1.60	6.90	19.30	30
10 MHz Bandwidth									
1732.50	84.27	166	2.2	H	15.5	1.60	6.90	20.80	30
1732.50	83.13	223	2.4	V	13.9	1.60	6.90	19.20	30
15 MHz Bandwidth									
1732.50	84.37	340	1.1	H	15.6	1.60	6.90	20.90	30
1732.50	83.26	288	1.4	V	14.0	1.60	6.90	19.30	30
20 MHz Bandwidth									
1732.50	84.34	315	2.5	H	15.6	1.60	6.90	20.90	30
1732.50	83.21	143	1.9	V	14.0	1.60	6.90	19.30	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	22.10	22.58	22.05
		RB Size=1, RB Offset=12	22.21	22.73	22.21
		RB Size=1, RB Offset=24	22.04	22.61	22.01
		RB Size=12, RB Offset=0	22.22	22.68	22.25
		RB Size=12, RB Offset=6	22.17	22.65	22.12
		RB Size=12, RB Offset=11	22.32	22.81	22.30
		RB Size=25, RB Offset=0	22.12	22.69	22.09
	16QAM	RB Size=1, RB Offset=0	22.30	22.78	22.37
		RB Size=1, RB Offset=12	22.21	22.68	22.18
		RB Size=1, RB Offset=24	22.38	22.85	22.37
		RB Size=12, RB Offset=0	22.11	22.60	22.00
		RB Size=12, RB Offset=6	22.23	22.77	22.16
		RB Size=12, RB Offset=11	22.08	22.58	22.08
		RB Size=25, RB Offset=0	22.19	22.71	22.19
10.0	QPSK	RB Size=1, RB Offset=0	22.23	22.69	22.12
		RB Size=1, RB Offset=24	22.35	22.85	22.25
		RB Size=1, RB Offset=49	22.14	22.68	22.17
		RB Size=25, RB Offset=0	22.25	22.79	22.24
		RB Size=25, RB Offset=12	22.35	22.81	22.25
		RB Size=25, RB Offset=24	22.46	22.91	22.33
		RB Size=50, RB Offset=0	22.03	22.55	22.01
	16QAM	RB Size=1, RB Offset=0	22.22	22.71	22.19
		RB Size=1, RB Offset=24	22.07	22.52	22.07
		RB Size=1, RB Offset=49	22.19	22.77	22.20
		RB Size=25, RB Offset=0	22.09	22.63	22.08
		RB Size=25, RB Offset=12	22.28	22.80	22.26
		RB Size=25, RB Offset=24	22.20	22.56	22.16
		RB Size=50, RB Offset=0	22.24	22.84	22.32

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	22.13	22.71	22.20
		RB Size=1, RB Offset=37	22.36	22.88	22.34
		RB Size=1, RB Offset=74	22.08	22.58	22.10
		RB Size=36, RB Offset=0	22.21	22.70	22.18
		RB Size=36, RB Offset=18	22.07	22.56	22.10
		RB Size=36, RB Offset=37	22.21	22.74	22.19
		RB Size=75, RB Offset=0	22.12	22.62	22.17
	16QAM	RB Size=1, RB Offset=0	22.28	22.80	22.30
		RB Size=1, RB Offset=37	22.17	22.68	22.19
		RB Size=1, RB Offset=74	22.33	22.79	22.28
		RB Size=36, RB Offset=0	22.19	22.66	22.24
		RB Size=36, RB Offset=18	22.31	22.85	22.37
		RB Size=36, RB Offset=37	22.04	22.55	22.01
		RB Size=75, RB Offset=0	22.25	22.70	22.25
20.0	QPSK	RB Size=1, RB Offset=0	22.93	22.81	22.93
		RB Size=1, RB Offset=49	22.21	22.69	22.22
		RB Size=1, RB Offset=99	22.11	22.64	22.05
		RB Size=50, RB Offset=0	22.29	22.81	22.35
		RB Size=50, RB Offset=24	22.16	22.57	22.10
		RB Size=50, RB Offset=49	22.07	22.58	22.06
		RB Size=100, RB Offset=0	22.28	22.72	22.25
	16QAM	RB Size=1, RB Offset=0	22.08	22.53	22.02
		RB Size=1, RB Offset=49	22.20	22.76	22.24
		RB Size=1, RB Offset=99	22.17	22.62	22.16
		RB Size=50, RB Offset=0	22.34	22.77	22.36
		RB Size=50, RB Offset=24	22.12	22.60	22.08
		RB Size=50, RB Offset=49	22.23	22.80	22.34
		RB Size=100, RB Offset=0	22.23	22.70	22.24

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	3.26	13	Pass
QPSK (100%RB Size)	4.75	13	Pass
16QAM (1RB Size)	3.34	13	Pass
16QAM (100%RB Size)	4.87	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	80.65	208	2.1	H	14.3	1.70	8.60	21.20	33
2535.00	80.23	95	1.4	V	13.5	1.70	8.60	20.40	33
10MHz Bandwidth									
2535.00	80.76	137	1.3	H	14.4	1.70	8.60	21.30	33
2535.00	80.46	81	2.0	V	13.8	1.70	8.60	20.70	33
15 MHz Bandwidth									
2535.00	80.71	283	1.3	H	14.3	1.70	8.60	21.20	33
2535.00	80.53	255	2.3	V	13.8	1.70	8.60	20.70	33
20 MHz Bandwidth									
2535.00	80.74	331	2.2	H	14.4	1.70	8.60	21.30	33
2535.00	80.67	13	1.1	V	14.0	1.70	8.60	20.90	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	80.64	126	2.4	H	14.3	1.70	8.60	21.20	33
2535.00	80.52	274	1.2	V	13.8	1.70	8.60	20.70	33
10 MHz Bandwidth									
2535.00	80.61	220	1.8	H	14.2	1.70	8.60	21.10	33
2535.00	80.58	310	2.0	V	13.9	1.70	8.60	20.80	33
15 MHz Bandwidth									
2535.00	80.56	181	1.9	H	14.2	1.70	8.60	21.10	33
2535.00	80.43	290	1.7	V	13.7	1.70	8.60	20.60	33
20 MHz Bandwidth									
2535.00	80.52	330	1.9	H	14.1	1.70	8.60	21.00	33
2535.00	80.34	294	1.0	V	13.6	1.70	8.60	20.50	33

LTE Band 17:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.26	22.69	22.30
		RB Size=1, RB Offset=12	22.40	22.82	22.43
		RB Size=1, RB Offset=24	22.25	22.68	22.22
		RB Size=12, RB Offset=0	22.38	22.80	22.42
		RB Size=12, RB Offset=6	22.36	22.81	22.37
		RB Size=12, RB Offset=11	22.49	22.94	22.55
		RB Size=25, RB Offset=0	22.36	22.75	22.32
	16QAM	RB Size=1, RB Offset=0	22.42	22.90	22.53
		RB Size=1, RB Offset=12	22.40	22.89	22.46
		RB Size=1, RB Offset=24	22.59	22.97	22.59
		RB Size=12, RB Offset=0	22.22	22.66	22.27
		RB Size=12, RB Offset=6	22.39	22.82	22.37
		RB Size=12, RB Offset=11	22.22	22.69	22.26
		RB Size=25, RB Offset=0	22.39	22.84	22.44
10	QPSK	RB Size=1, RB Offset=0	22.29	22.77	22.31
		RB Size=1, RB Offset=24	22.92	22.92	22.82
		RB Size=1, RB Offset=49	22.30	22.80	22.31
		RB Size=25, RB Offset=0	22.48	22.96	22.49
		RB Size=25, RB Offset=12	22.36	22.88	22.35
		RB Size=25, RB Offset=24	22.47	22.99	22.53
		RB Size=50, RB Offset=0	22.27	22.69	22.23
	16QAM	RB Size=1, RB Offset=0	22.46	22.85	22.44
		RB Size=1, RB Offset=24	22.31	22.66	22.28
		RB Size=1, RB Offset=49	22.48	22.89	22.45
		RB Size=25, RB Offset=0	22.32	22.80	22.28
		RB Size=25, RB Offset=12	22.55	22.91	22.54
		RB Size=25, RB Offset=24	22.36	22.73	22.38
		RB Size=50, RB Offset=0	22.54	22.93	22.58

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK(1RB Size)	3.38	13	Pass
QPSK (100%RB Size)	5.04	13	Pass
16QAM (1RB Size)	3.53	13	Pass
16QAM (100%RB Size)	5.35	13	Pass

ERP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710.00	91.35	136	1.5	H	20.9	0.62	0	20.28	34.8
710.00	89.43	102	1.7	V	18.4	0.62	0	18.78	34.8
10MHz Bandwidth									
710.00	91.15	189	1.5	H	20.7	0.62	0	20.08	34.8
710.00	89.76	85	1.7	V	19.3	0.62	0	18.68	34.8

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)		
Middle Channel									
5 MHz Bandwidth									
710.00	91.23	215	1.5	H	20.7	0.62	0	20.08	34.8
710.00	89.56	123	1.7	V	19.1	0.62	0	18.48	34.8
10 MHz Bandwidth									
710.00	91.04	56	1.7	H	20.5	0.62	0	19.88	34.8
710.00	89.42	96	1.7	V	18.9	0.62	0	18.28	34.8

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

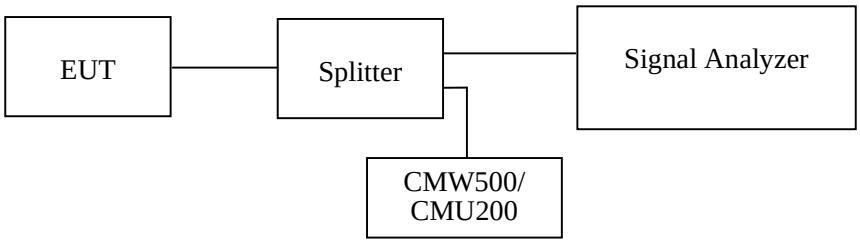
Applicable Standards

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
WEINSCHEL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18

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

Test Data

Environmental Conditions

Temperature:	22-24 ℃
Relative Humidity:	48-53 %
ATM Pressure:	100.5-101.0kPa

The testing was performed by Haiguo Li from 2016-04-13 to 2016-04-21.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	248.49	312.63
EGPRS(8PSK)	836.6	240.48	308.62

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.188	4.910
HSUPA (BPSK)	836.6	4.188	4.890
HSDPA (16QAM)	836.6	4.188	4.870

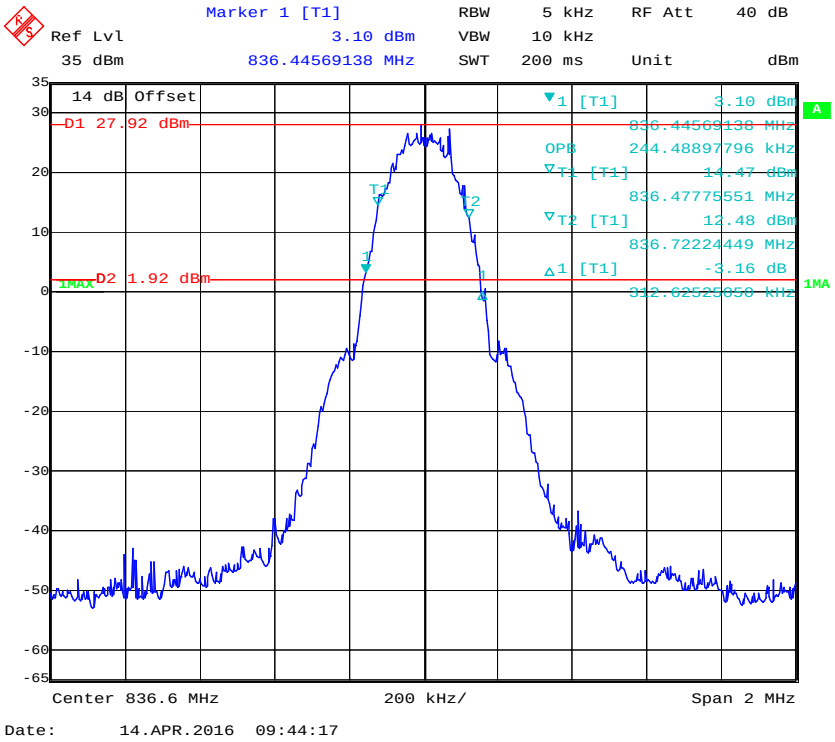
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	244.49	316.63
EGPRS(8PSK)	1880.0	256.51	324.65

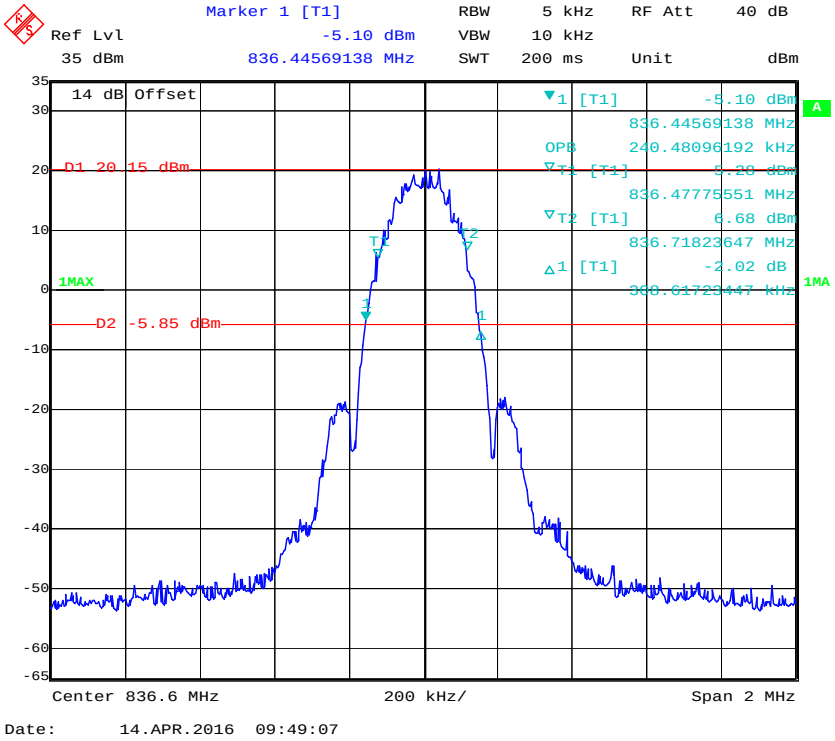
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.208	4.890
HSUPA (BPSK)	1880.0	4.208	4.890
HSDPA (16QAM)	1880.0	4.208	4.910

Cellular Band (Part 22H)

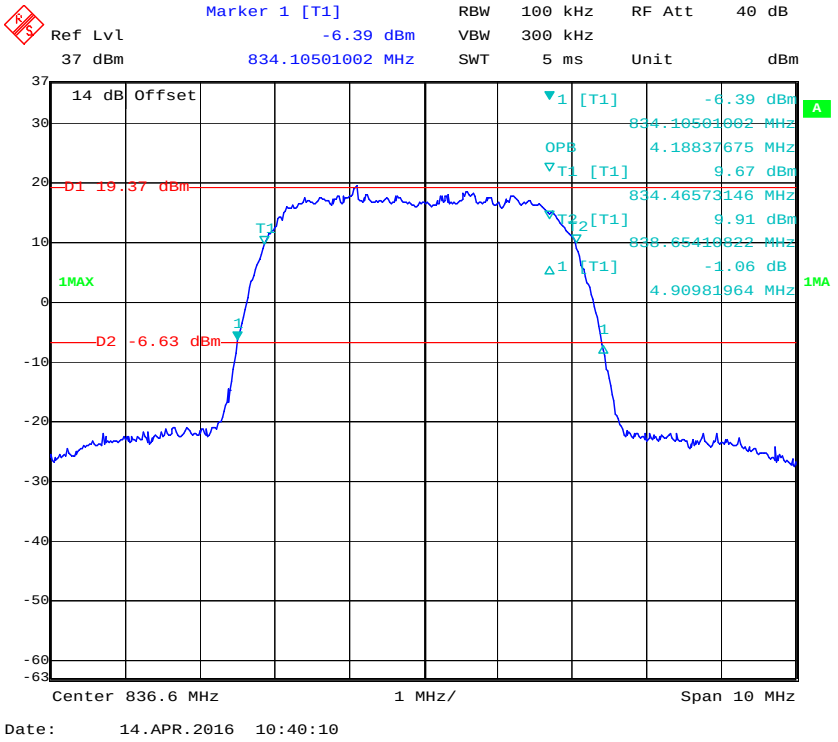
99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



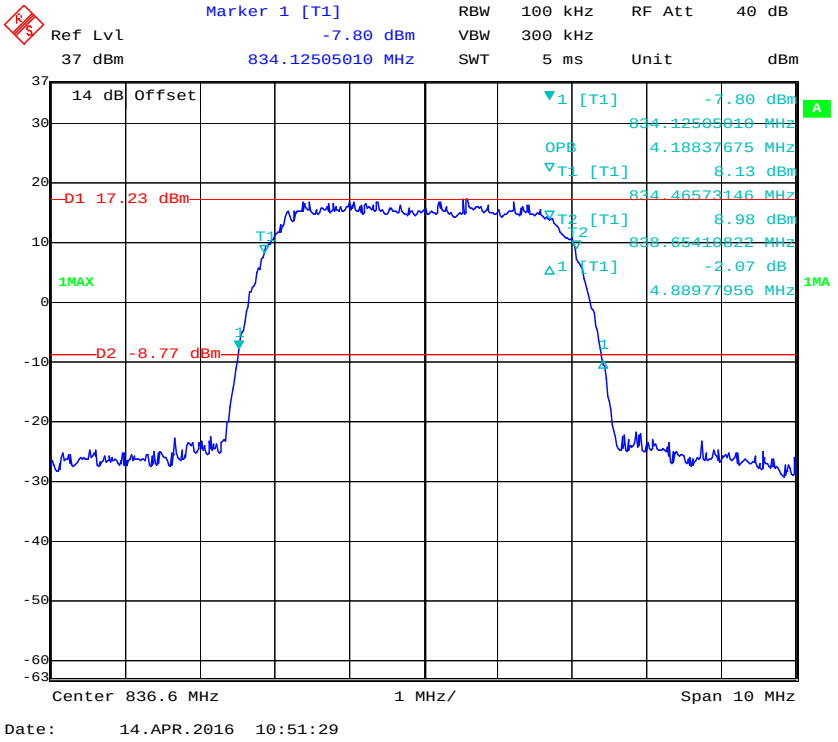
99% Occupied & 26 dB Emissions Bandwidth for EDGE Mode



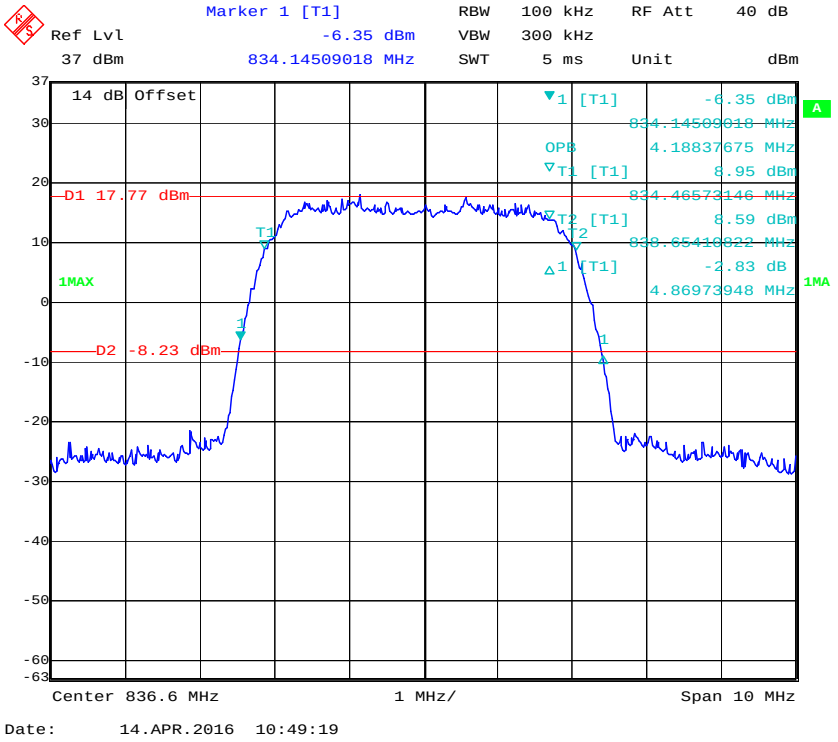
99% Occupied & 26 dB Emissions Bandwidth for RMC (BPSK) Mode



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

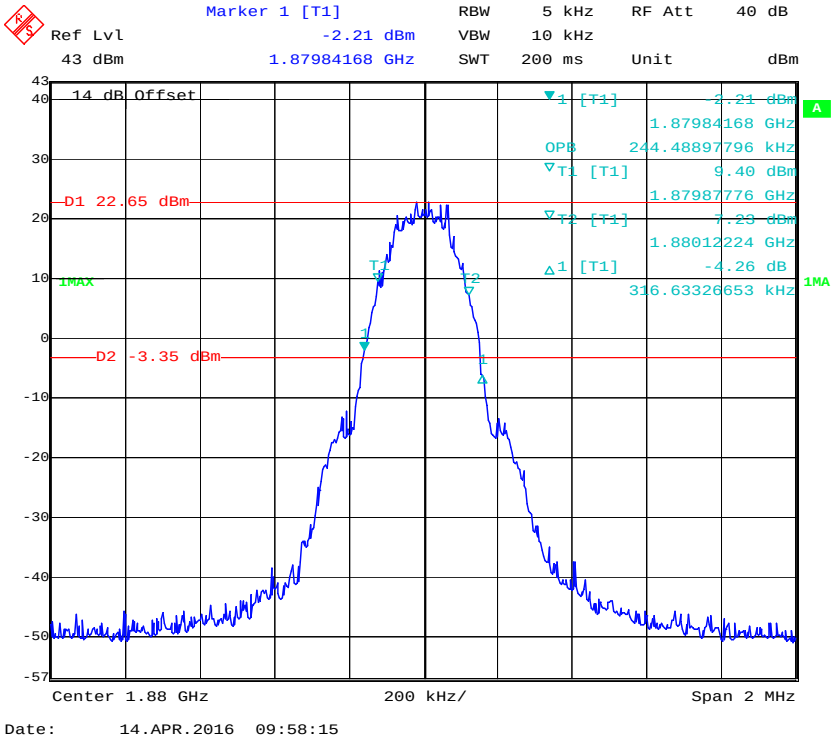


99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode

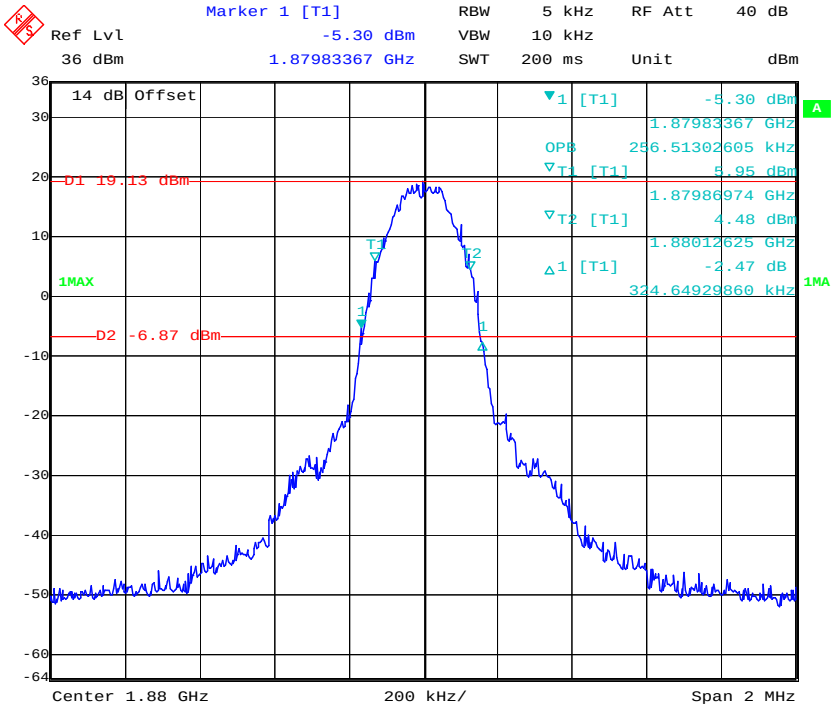


PCS Band (Part 24E)

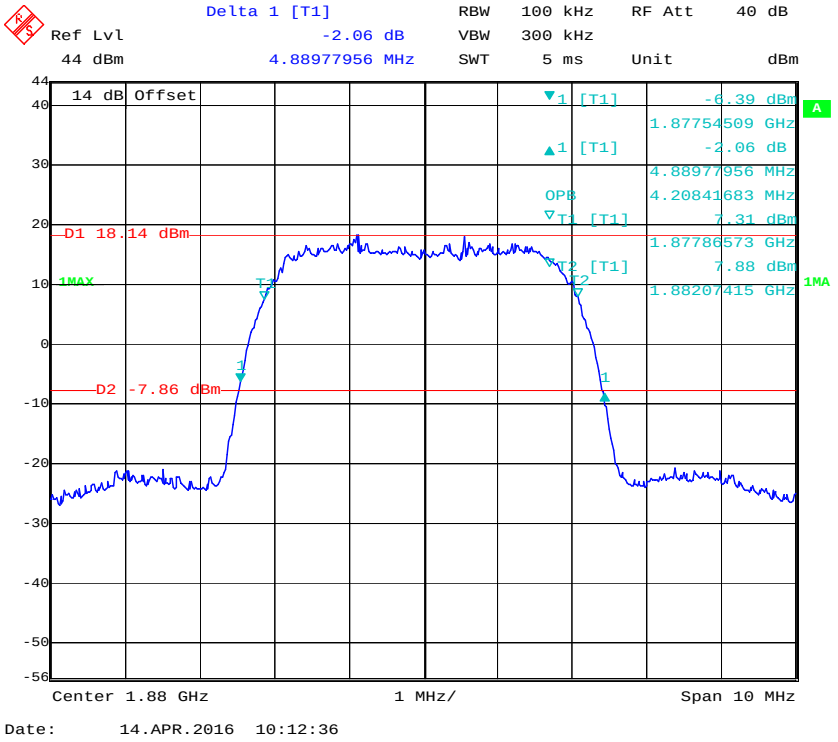
99% Occupied & 26 dB Emissions Bandwidth for GSM (GMSK) Mode



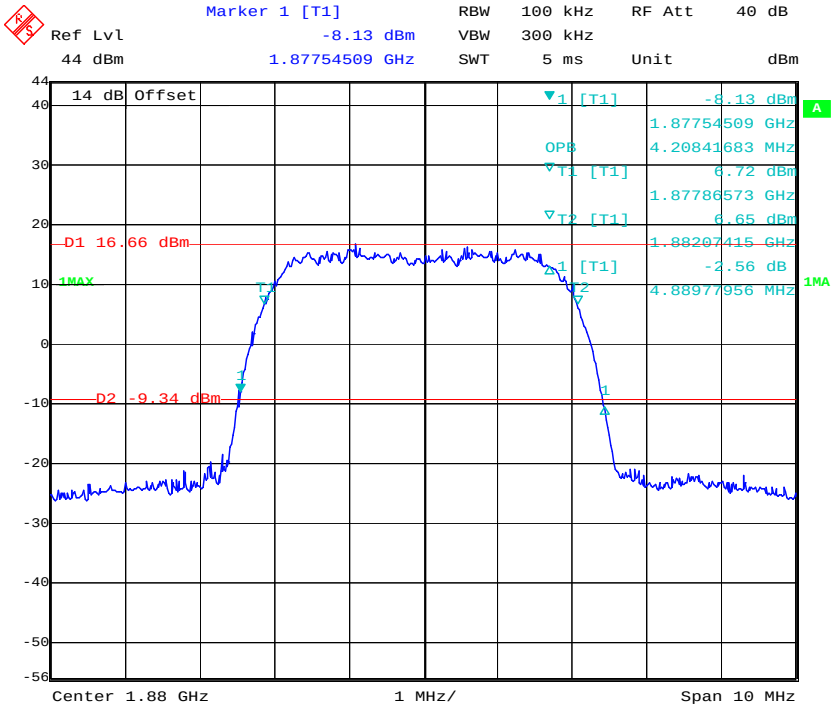
99% Occupied & 26 dB Emissions Bandwidth for EGPRS Mode



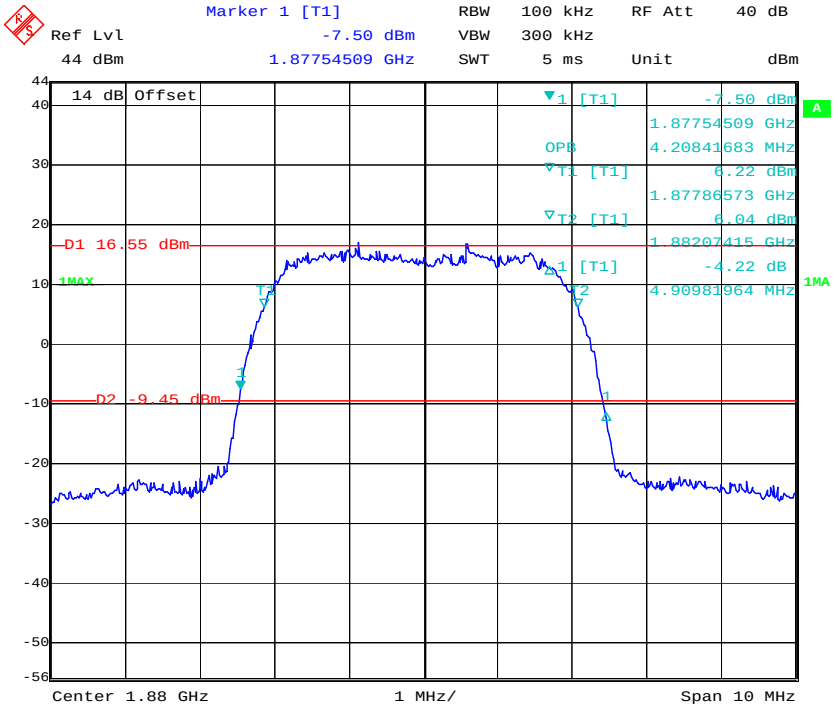
99% Occupied & 26 dB Emissions Bandwidth for RMC (BPSK) Mode



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



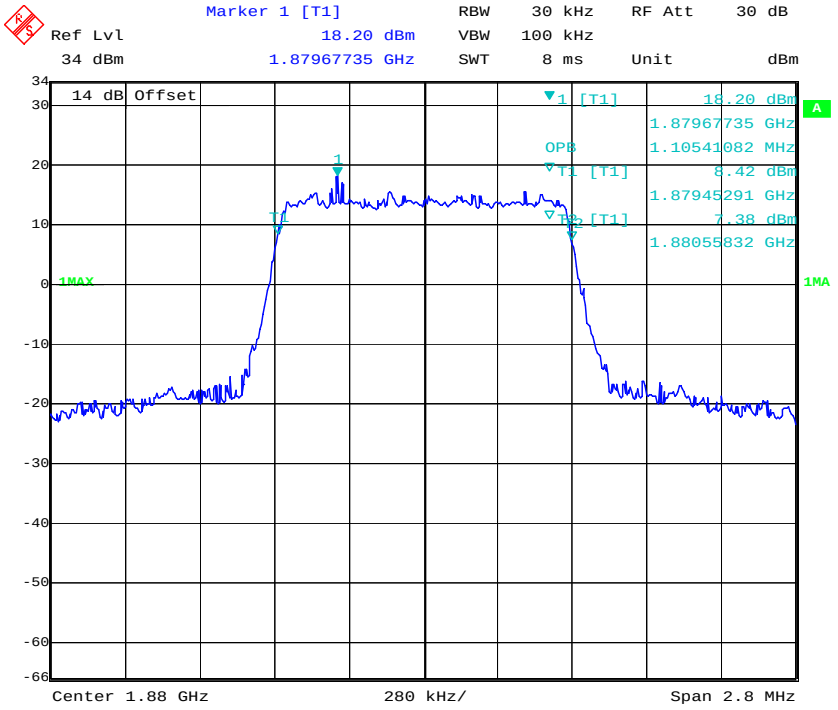
99% Occupied & 26 dB Emissions Bandwidth for HSDPA (16QAM) Mode



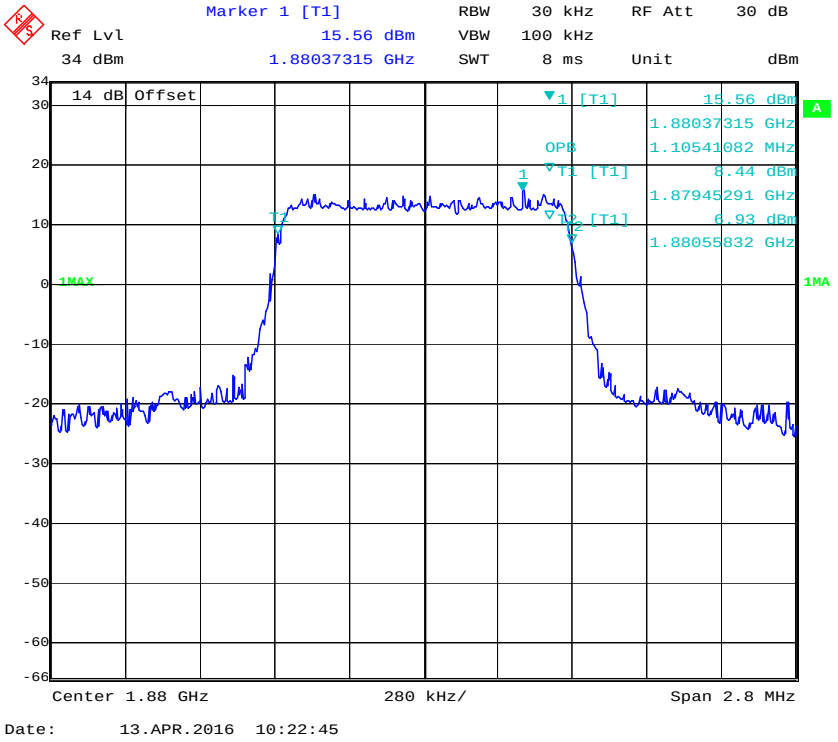
LTE Band 2: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.279
	16QAM	1.105	1.279
3.0	QPSK	2.693	2.934
	16QAM	2.693	2.946
5.0	QPSK	4.549	5.050
	16QAM	4.529	5.010
10.0	QPSK	8.978	9.619
	16QAM	8.938	9.699
15.0	QPSK	13.527	15.030
	16QAM	13.527	15.090
20.0	QPSK	17.956	19.559
	16QAM	18.036	19.479

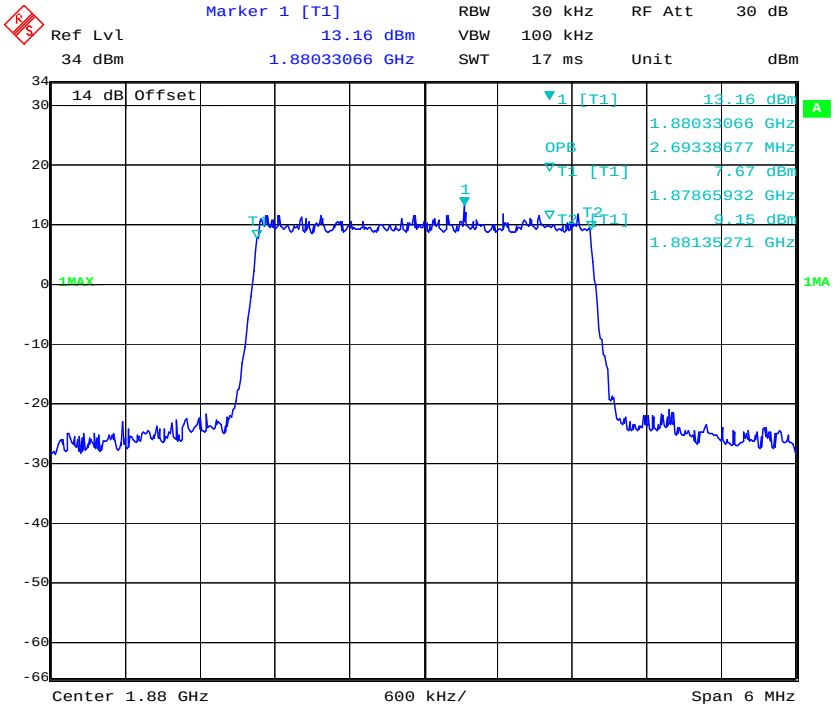
QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



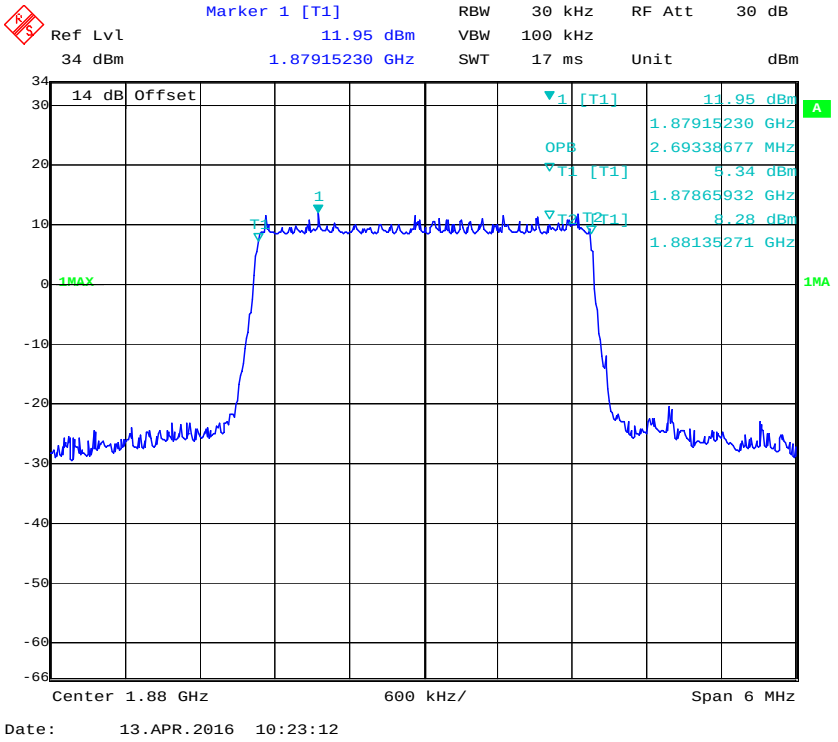
16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



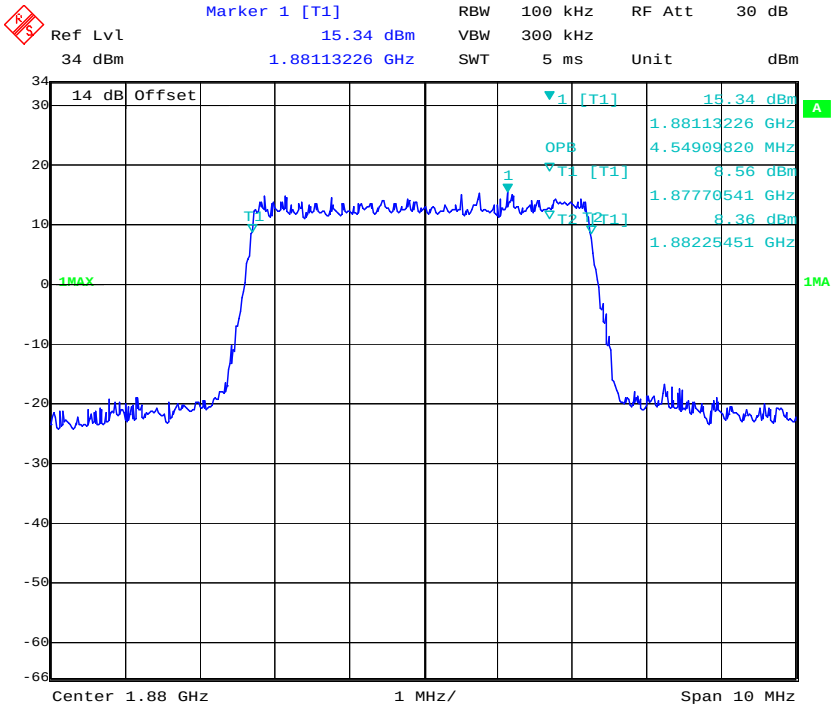
QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



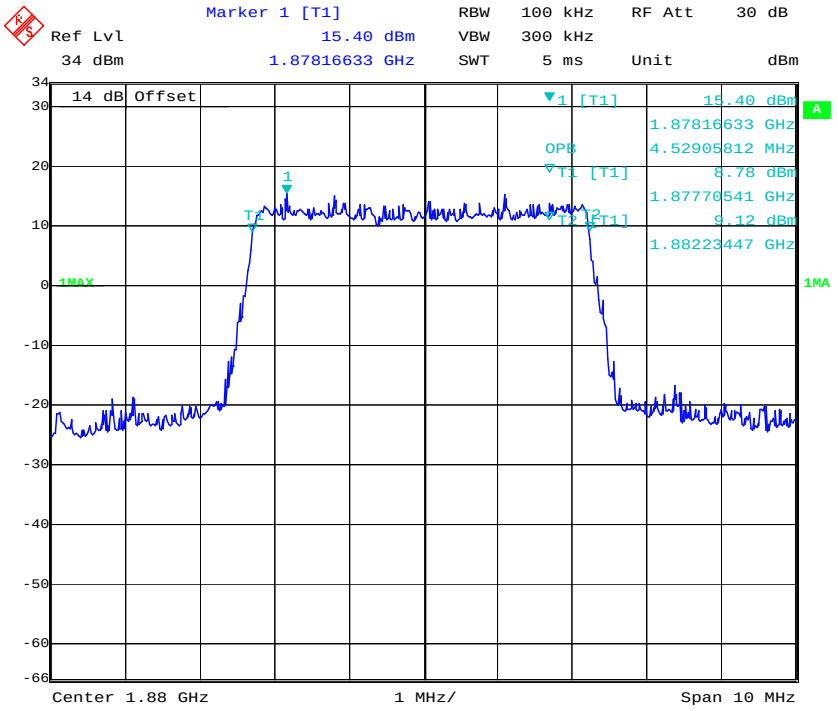
16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



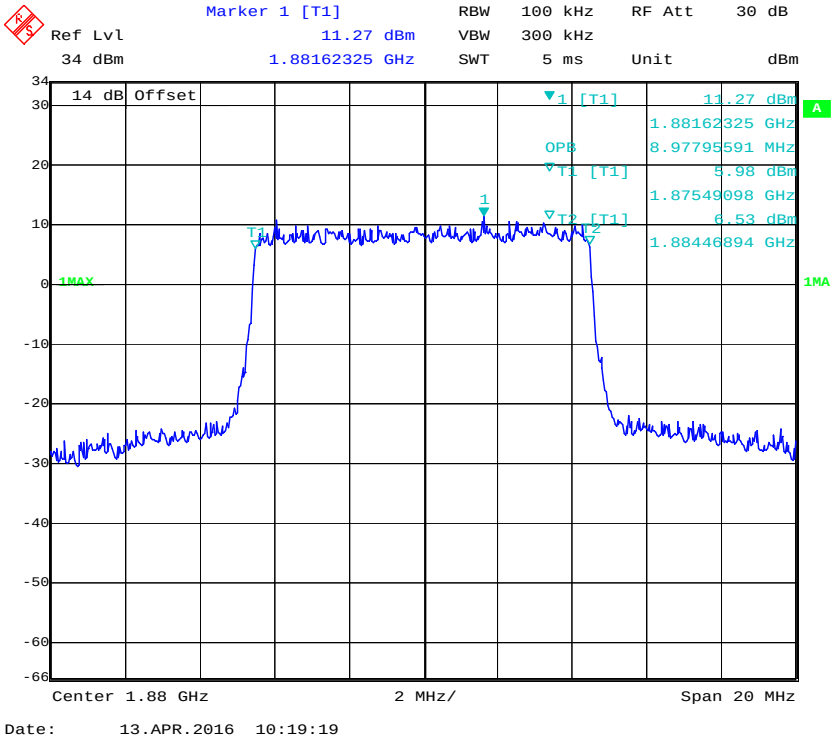
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



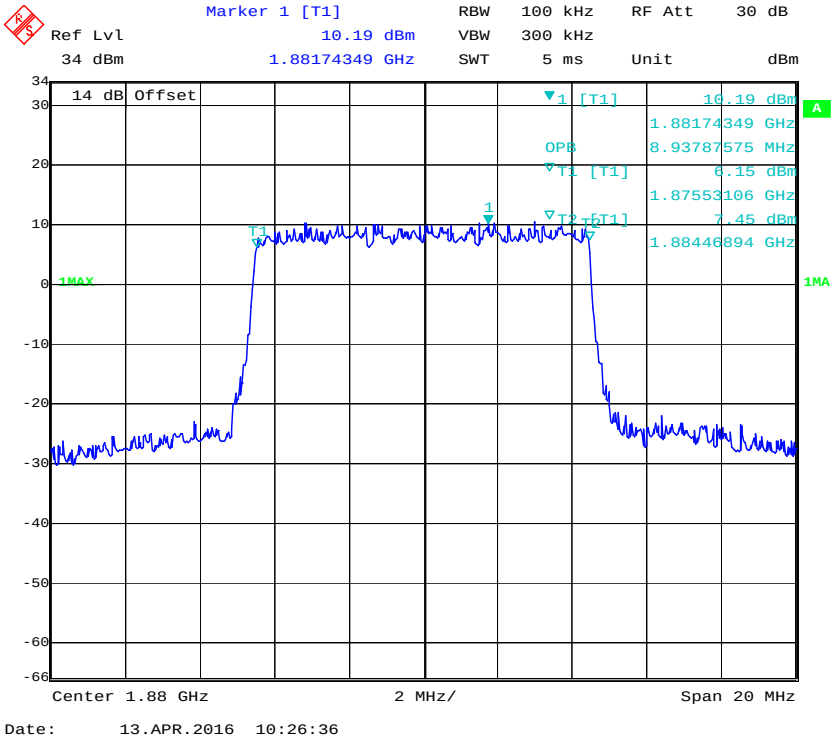
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



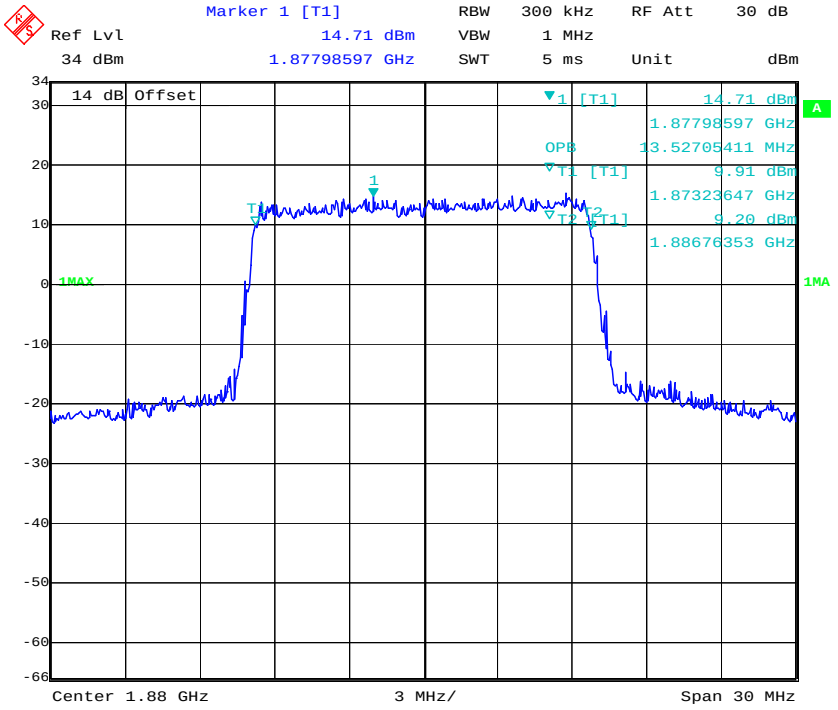
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



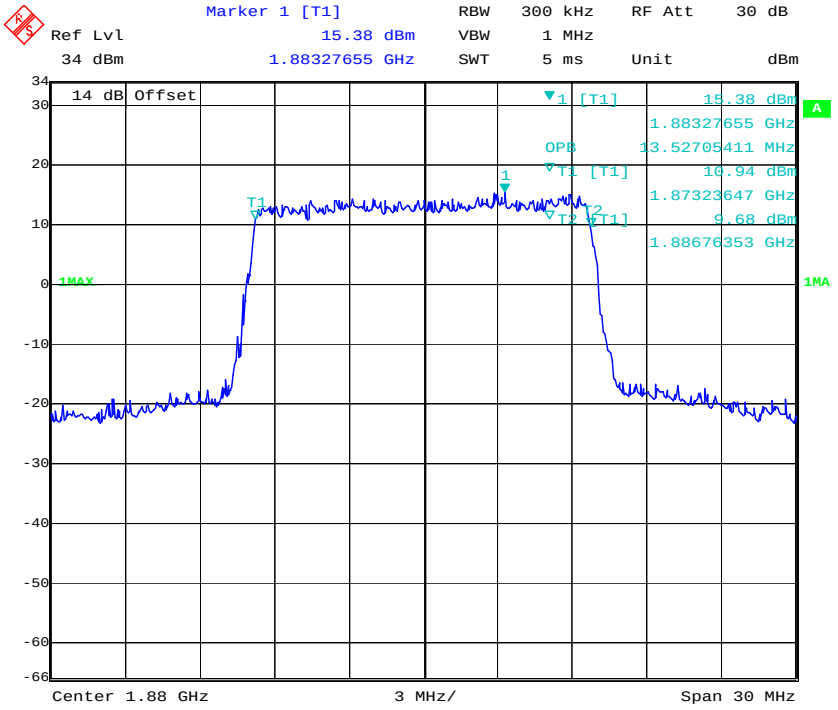
16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



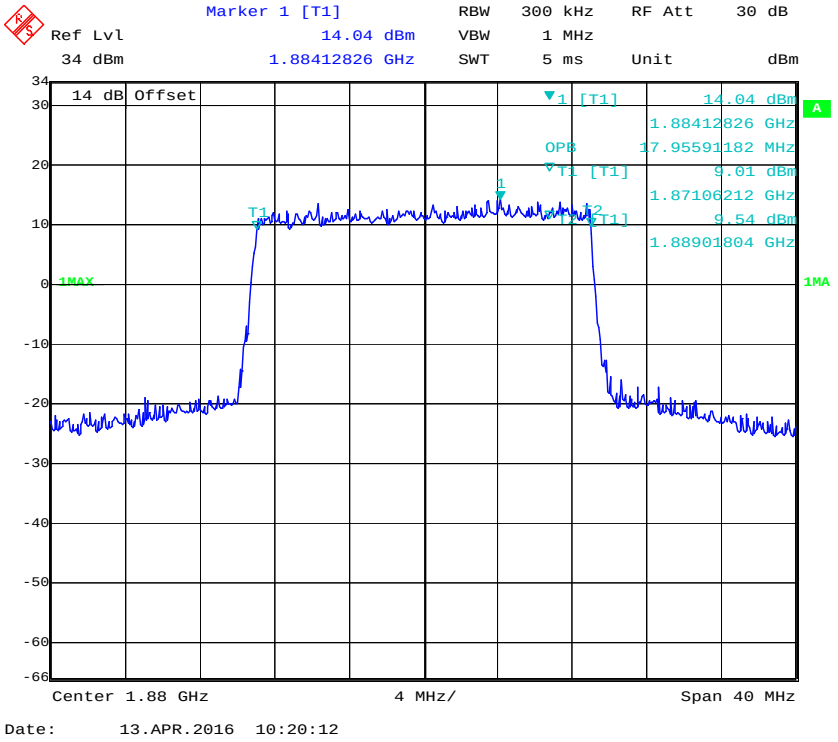
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



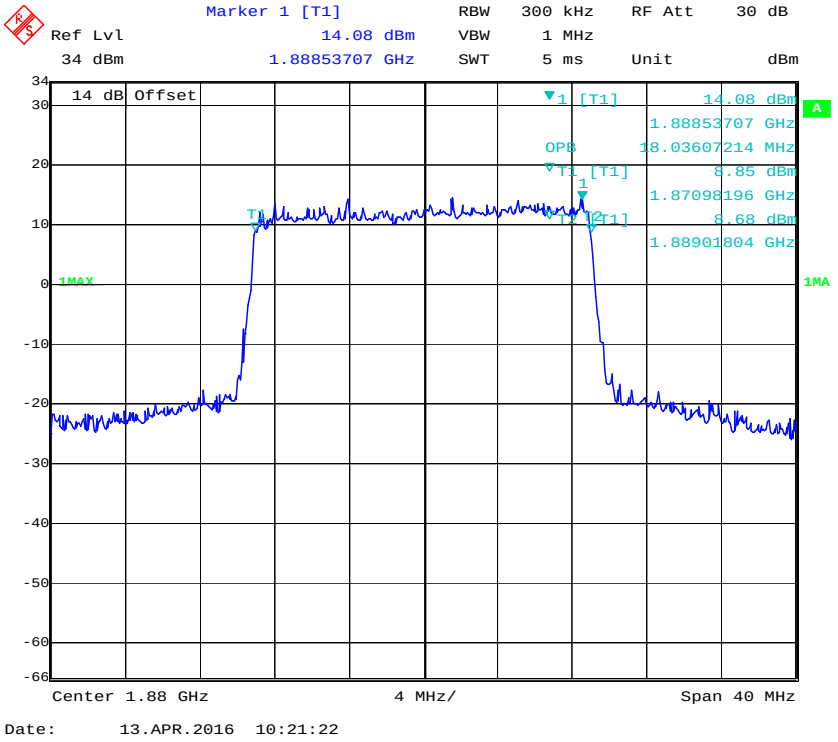
16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



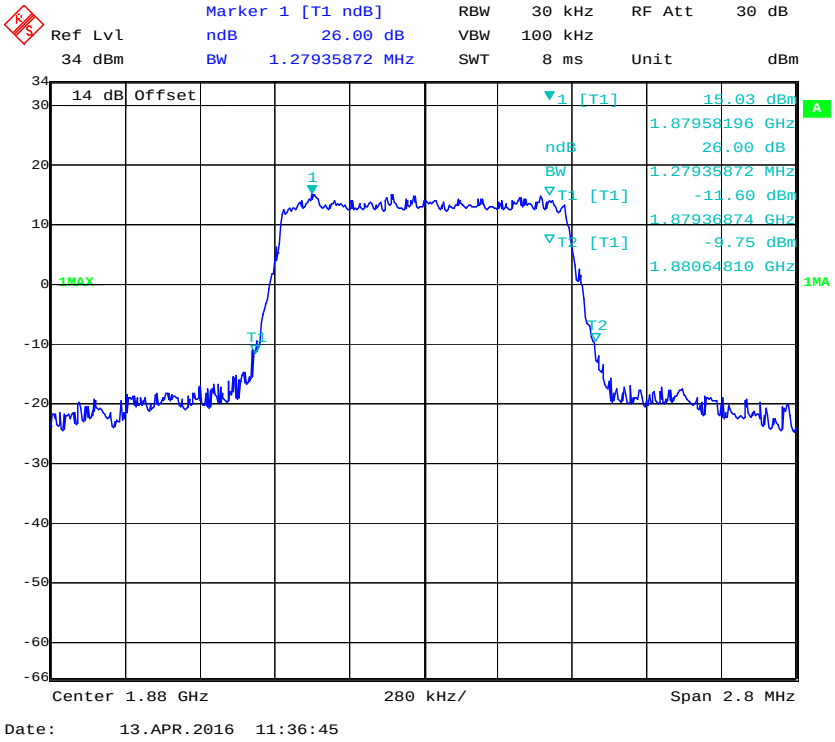
QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



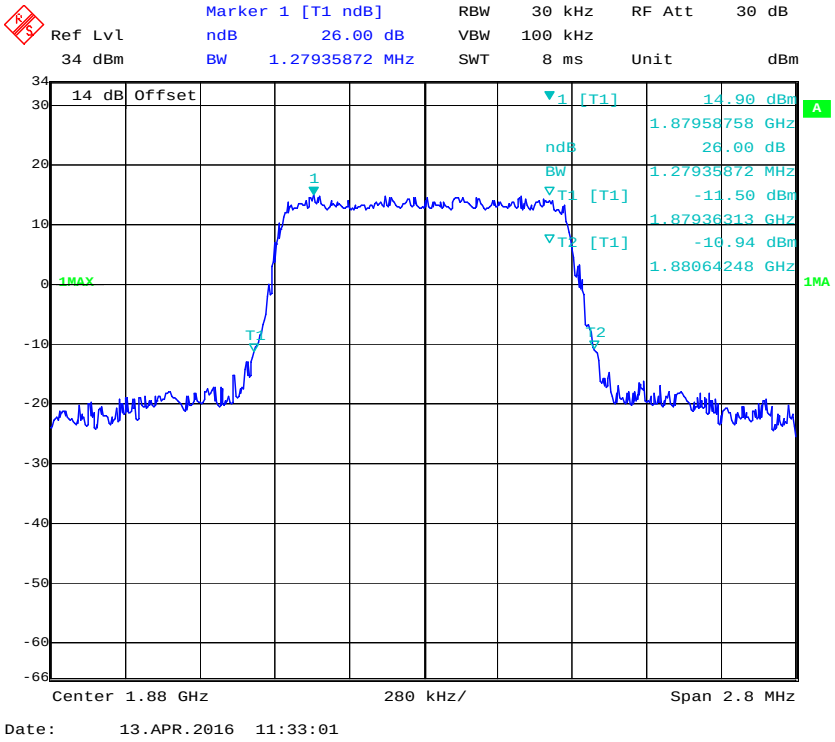
16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



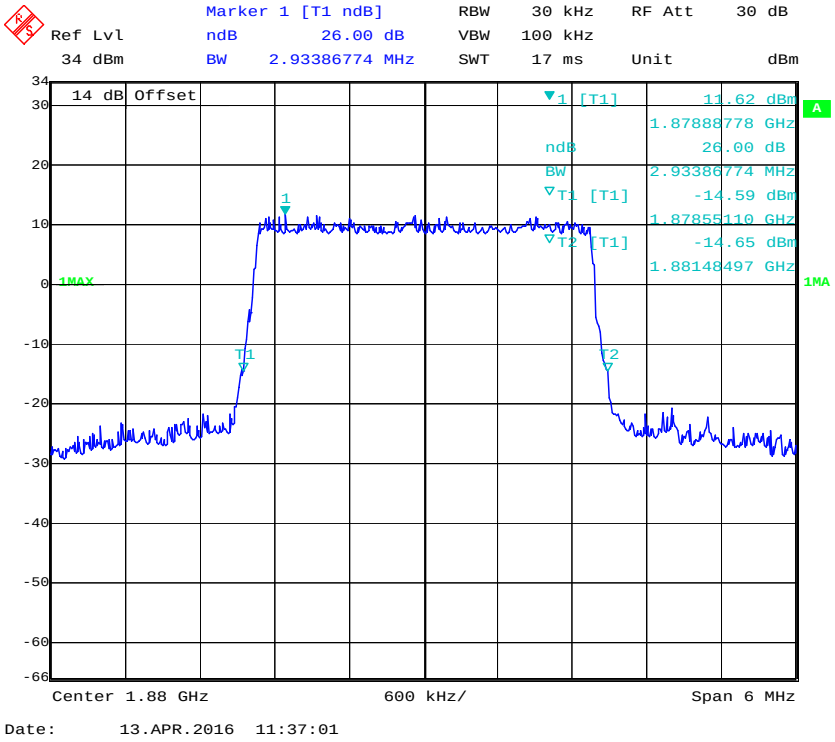
QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



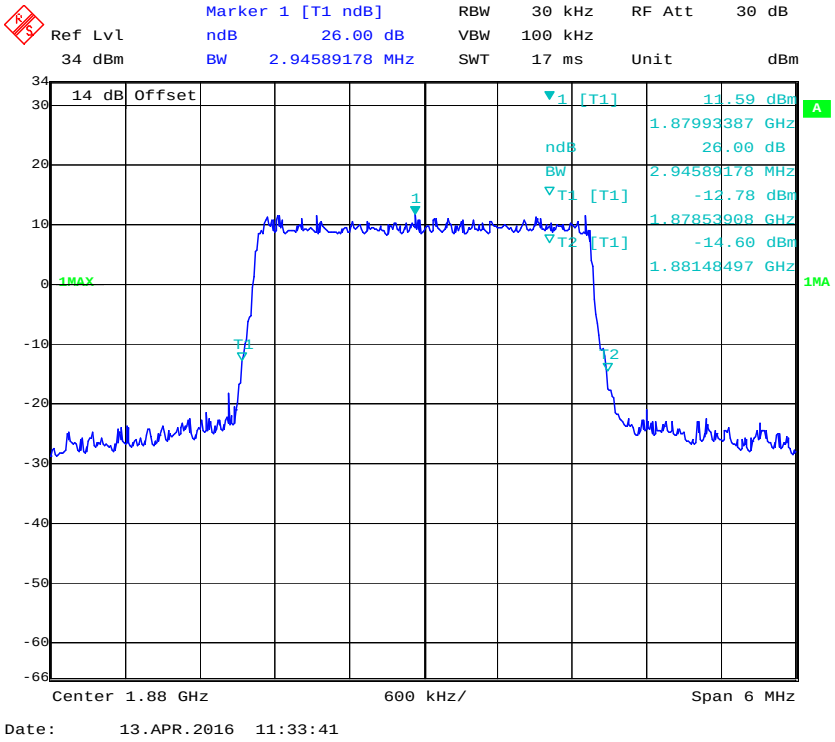
16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



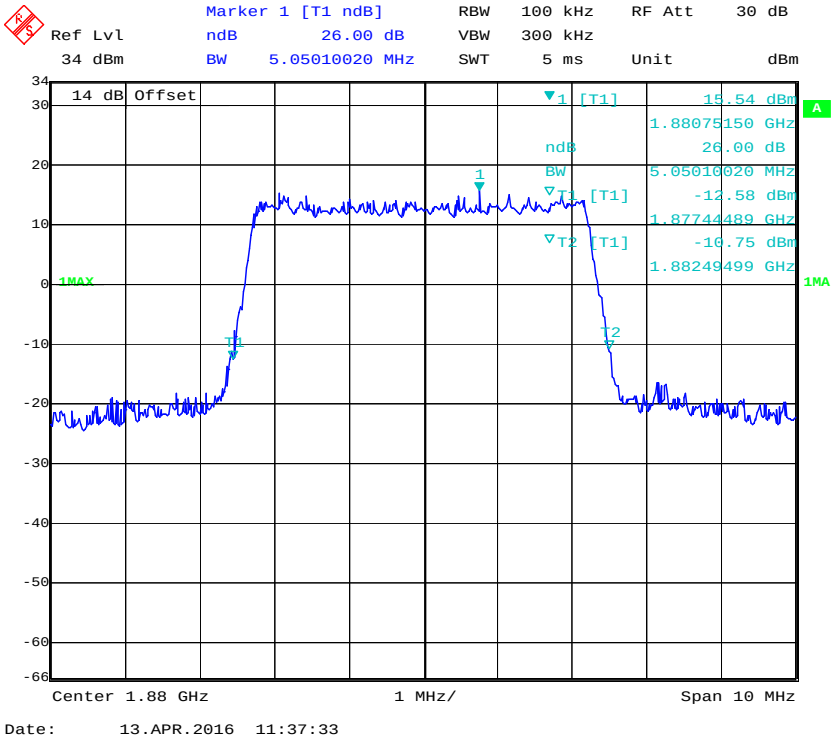
QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



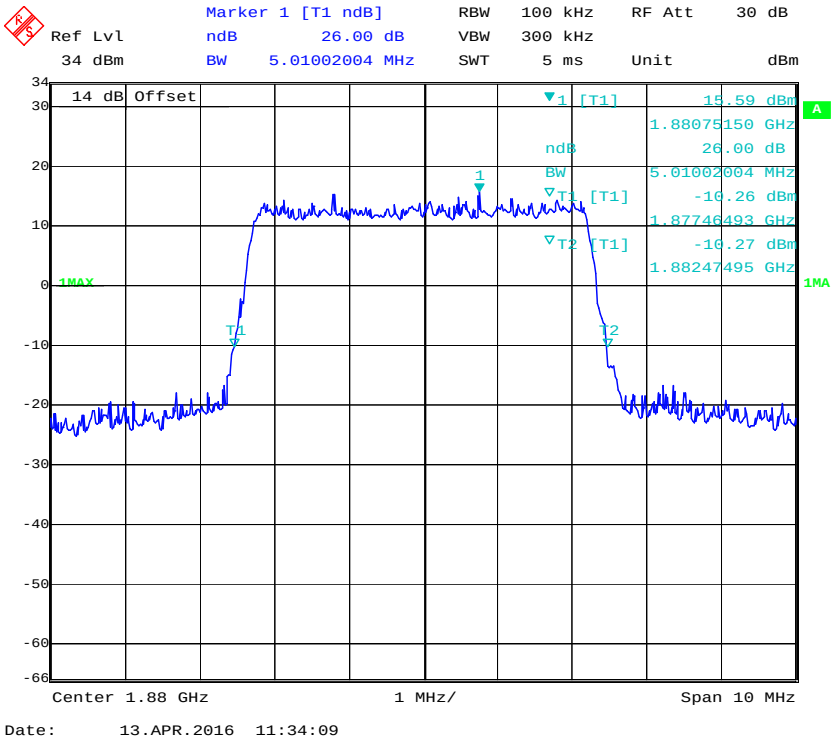
16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



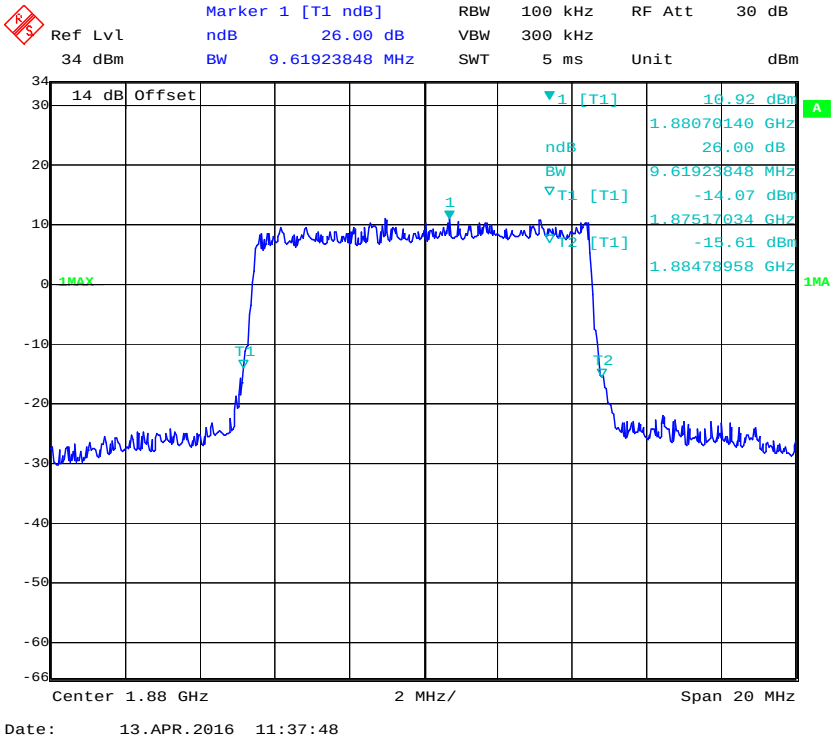
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



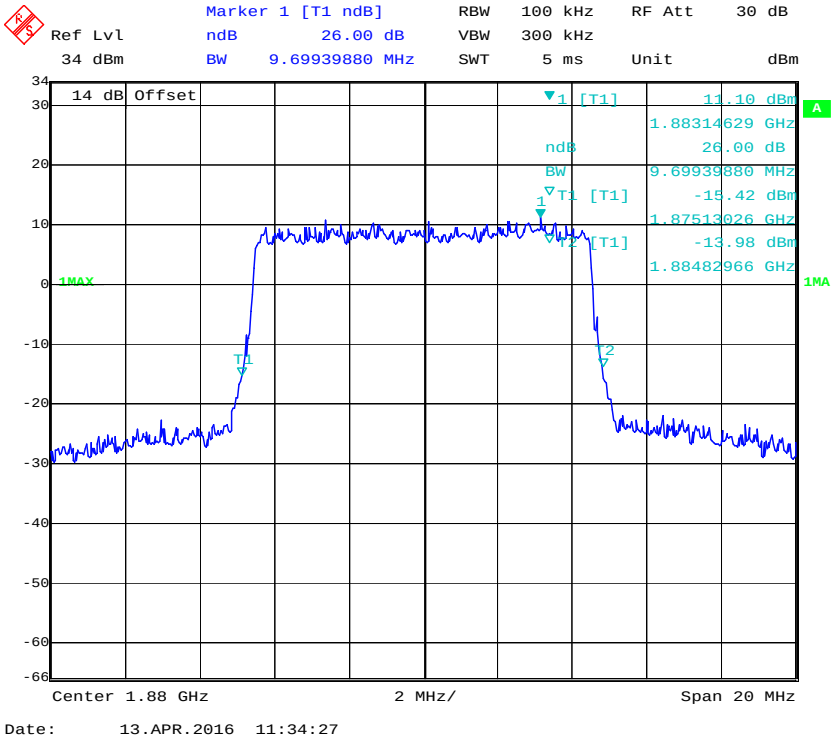
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



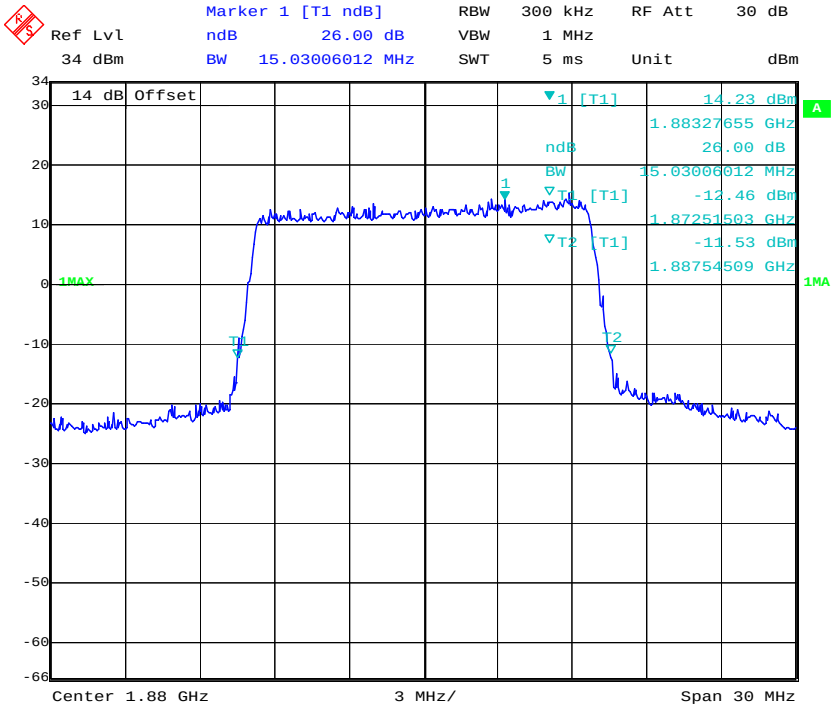
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



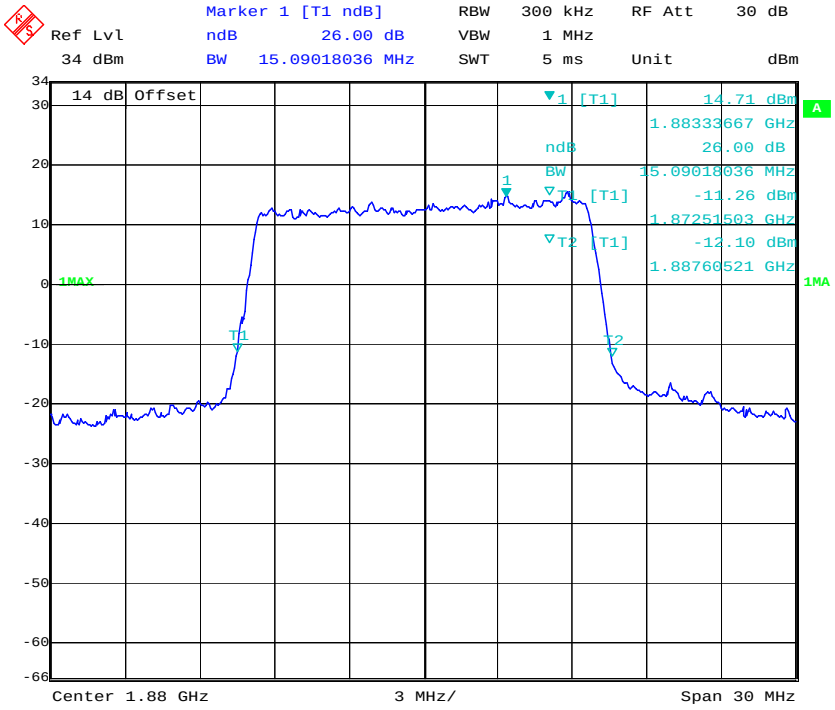
16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



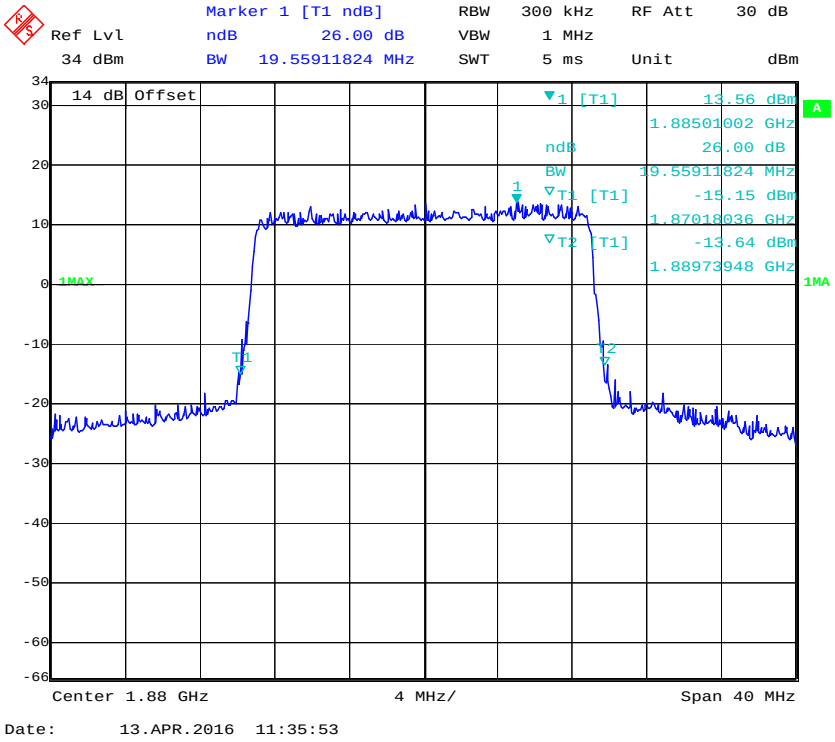
QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



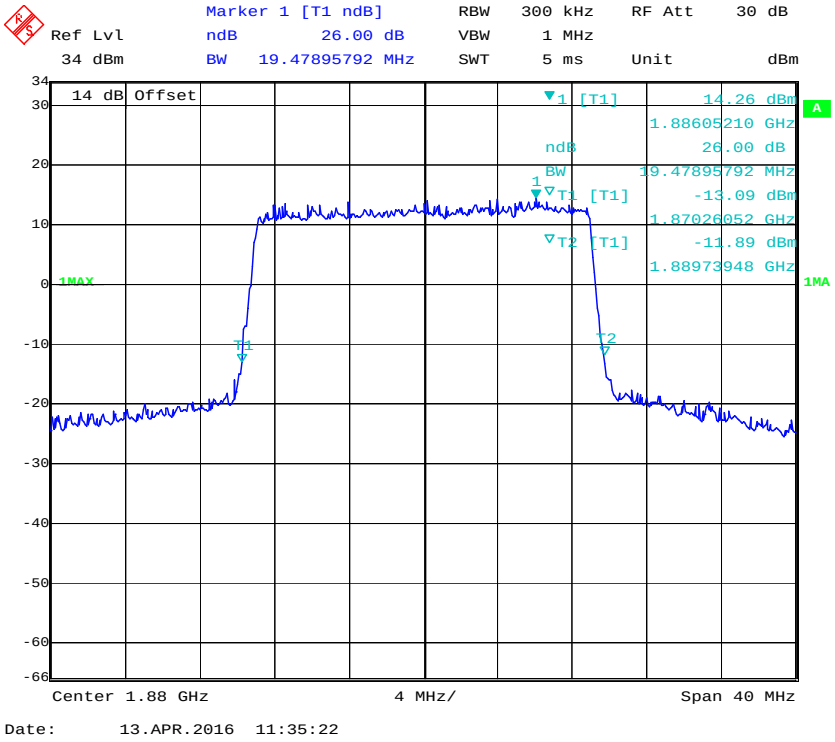
16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



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



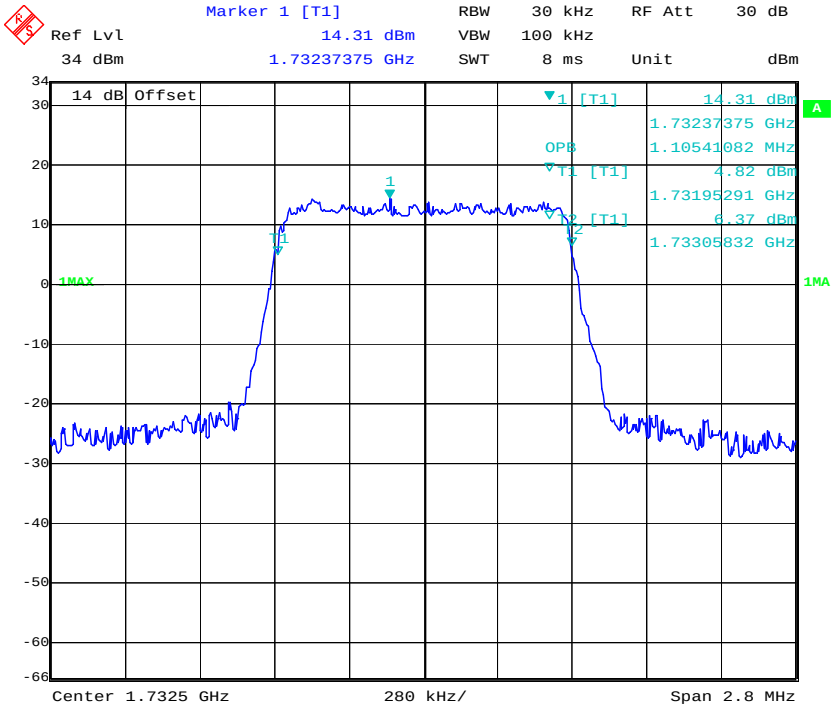
16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



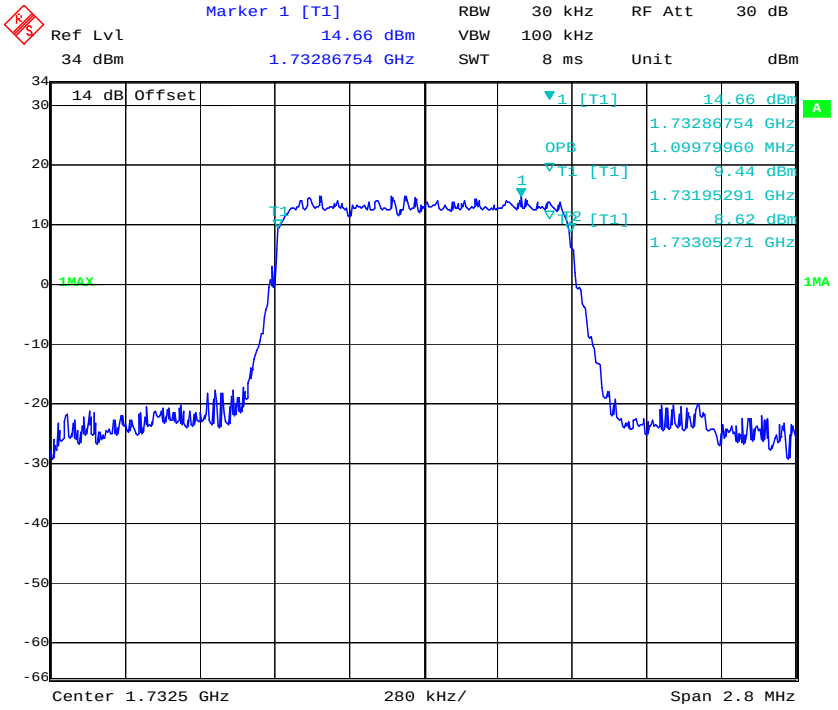
LTE Band 4: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.105	1.263
	16QAM	1.100	1.268
3.0	QPSK	2.681	2.922
	16QAM	2.693	2.898
5.0	QPSK	4.529	5.010
	16QAM	4.509	4.970
10.0	QPSK	8.938	9.699
	16QAM	8.978	9.699
15.0	QPSK	13.587	15.030
	16QAM	13.587	14.970
20.0	QPSK	17.956	19.399
	16QAM	17.956	19.559

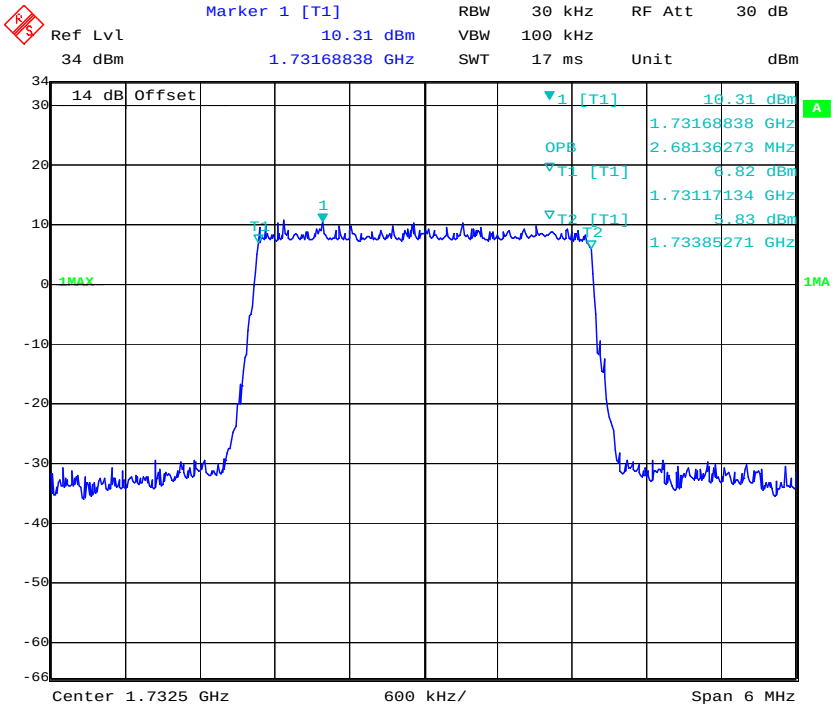
QPSK (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



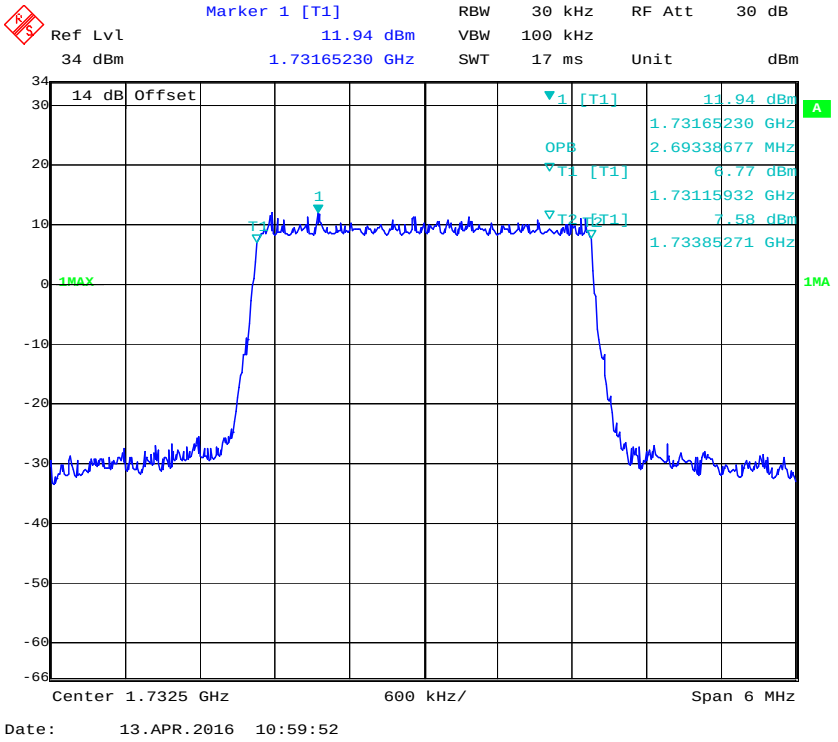
16-QAM (1.4 MHz) - 99% Occupied Bandwidth, Middle channel



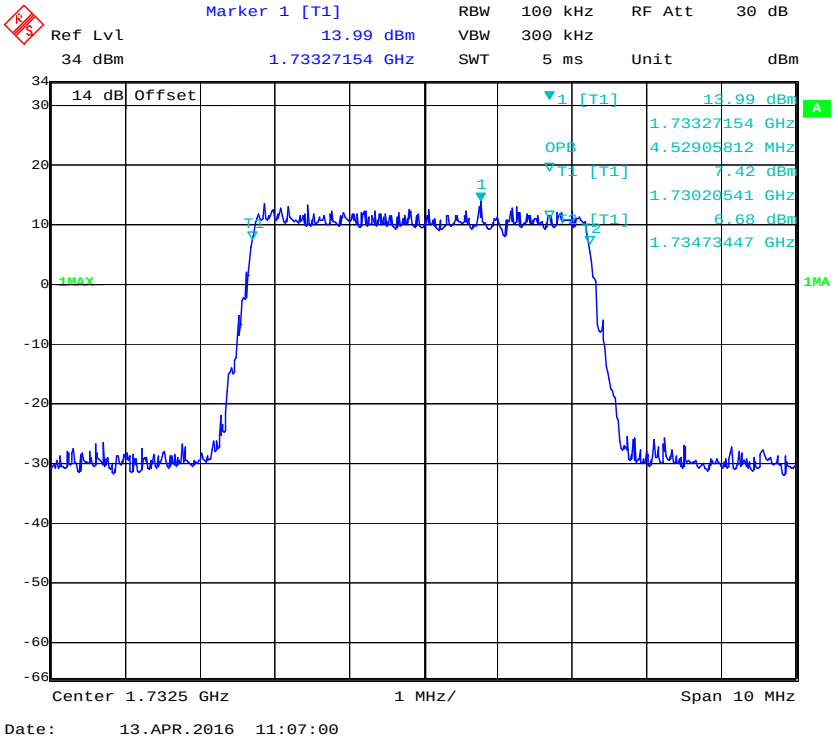
QPSK (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



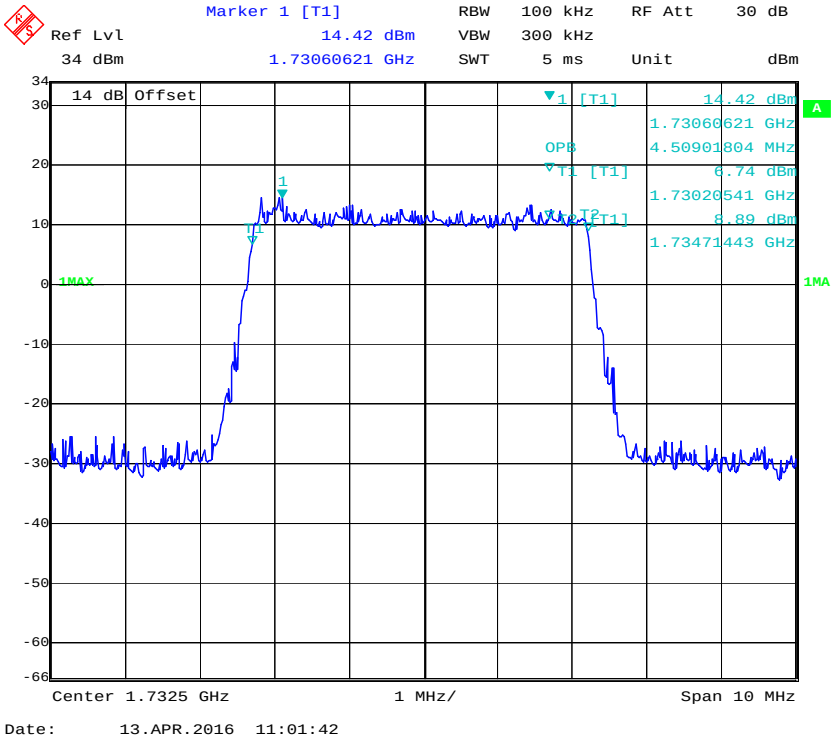
16-QAM (3.0 MHz) - 99% Occupied Bandwidth, Middle channel



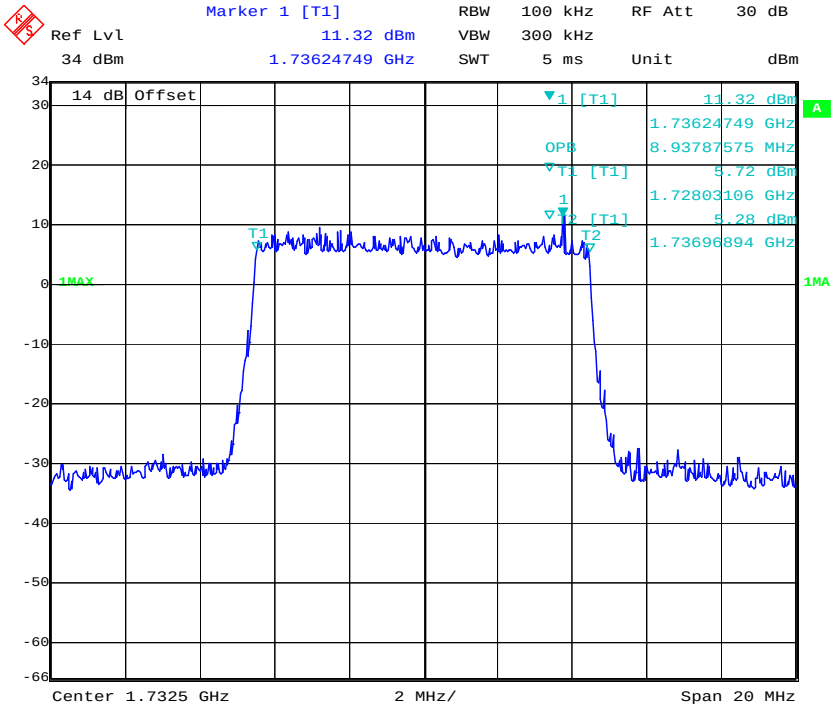
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



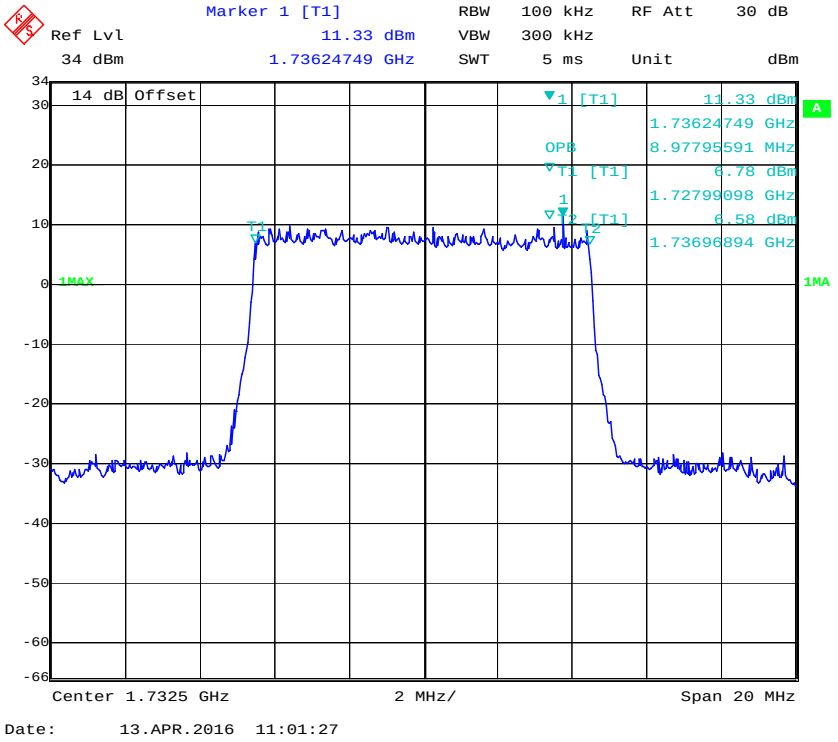
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



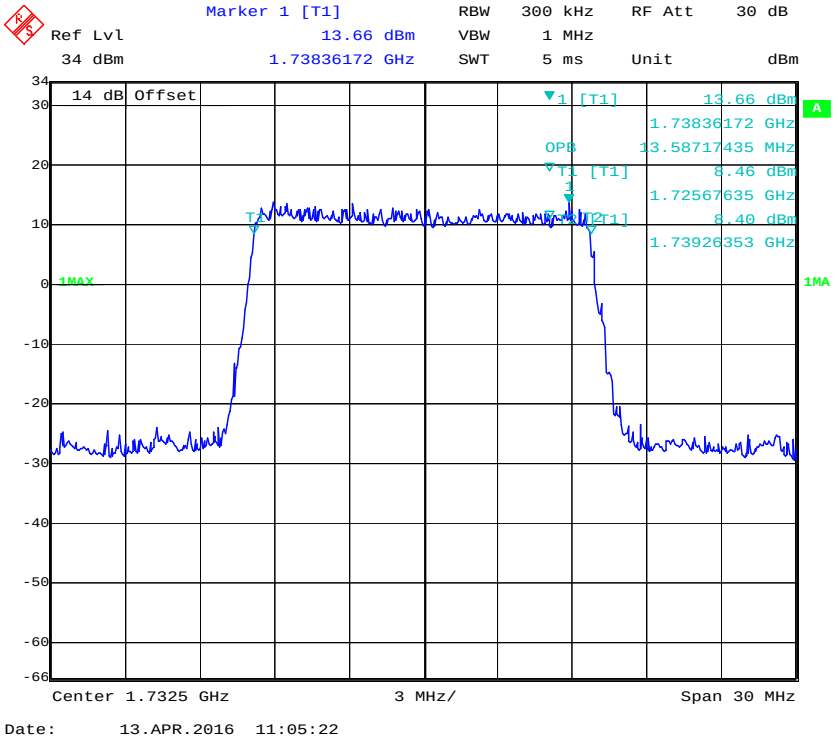
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



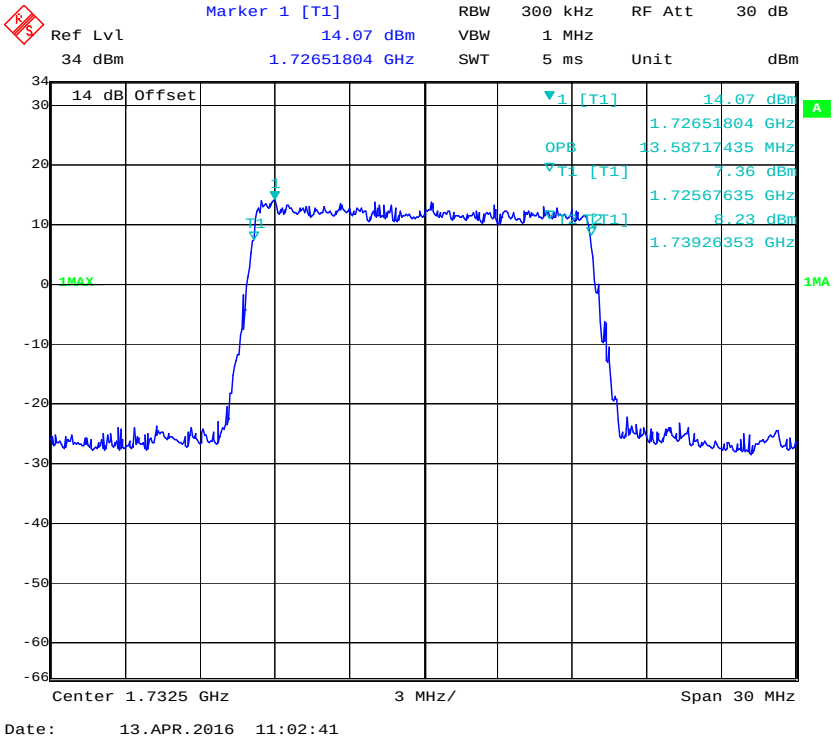
16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



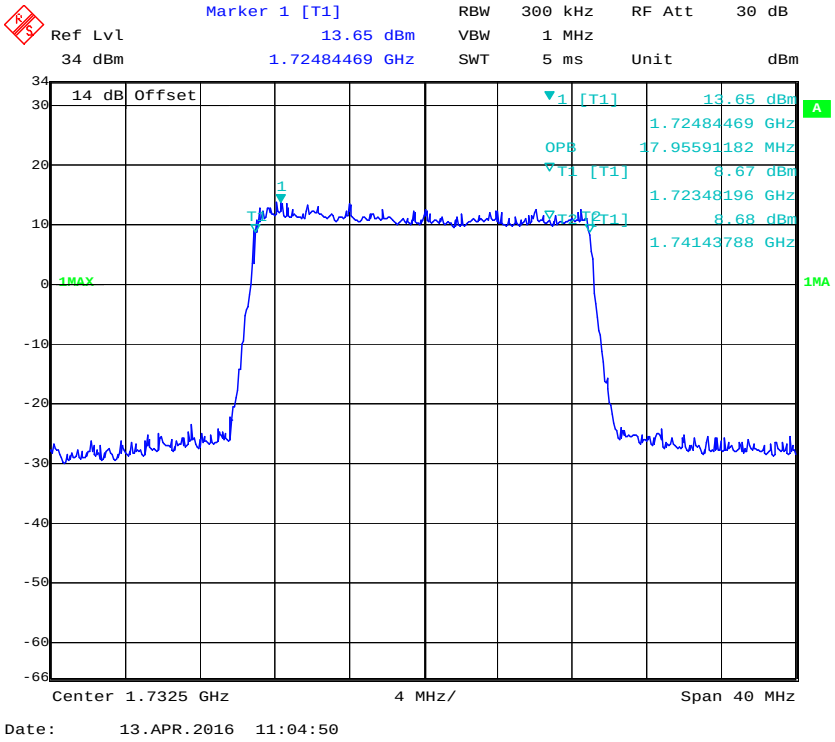
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



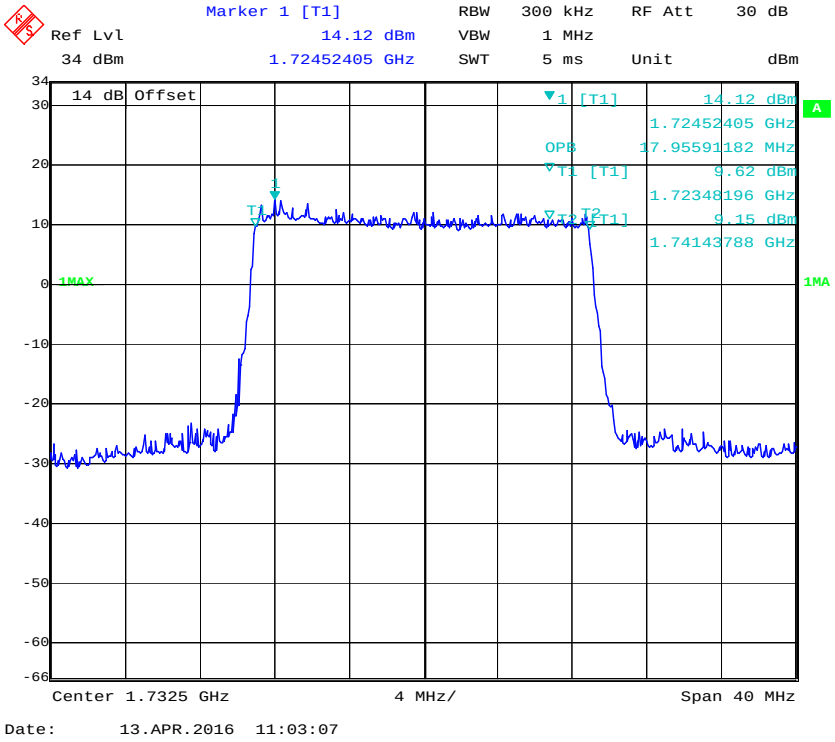
16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



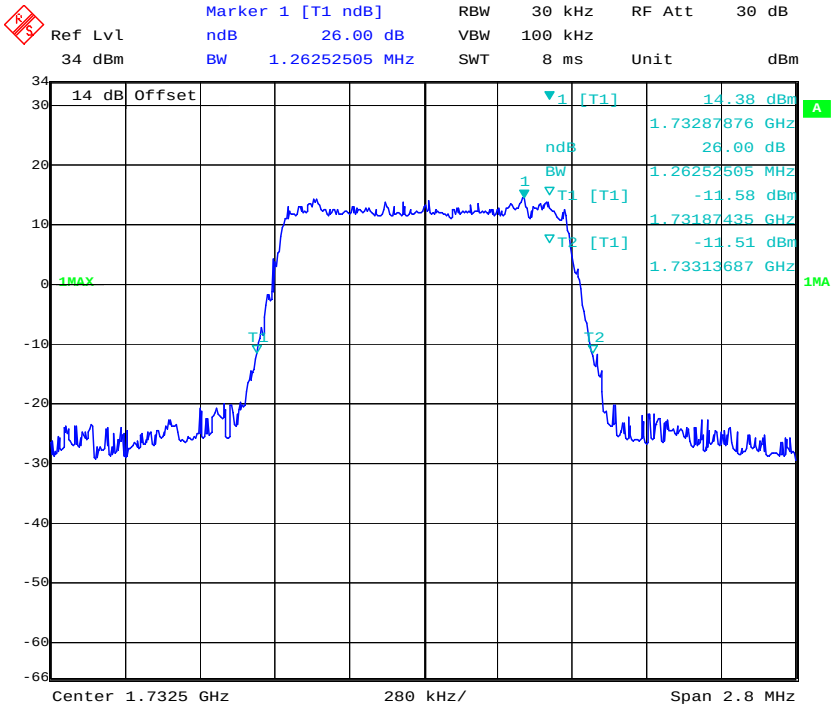
QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



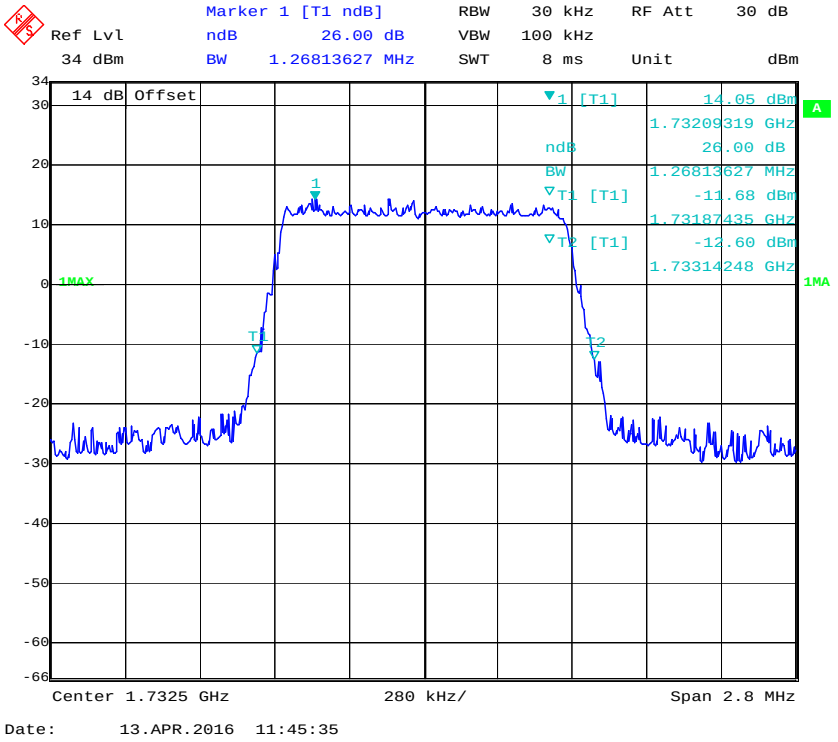
16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



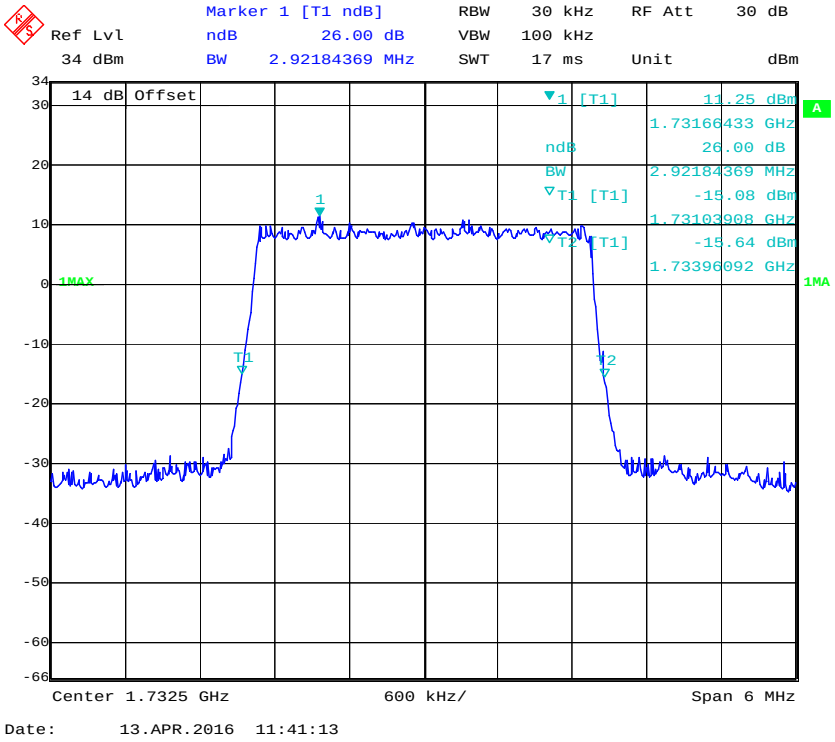
QPSK (1.4 MHz) - 26 dB Bandwidth, Middle channel



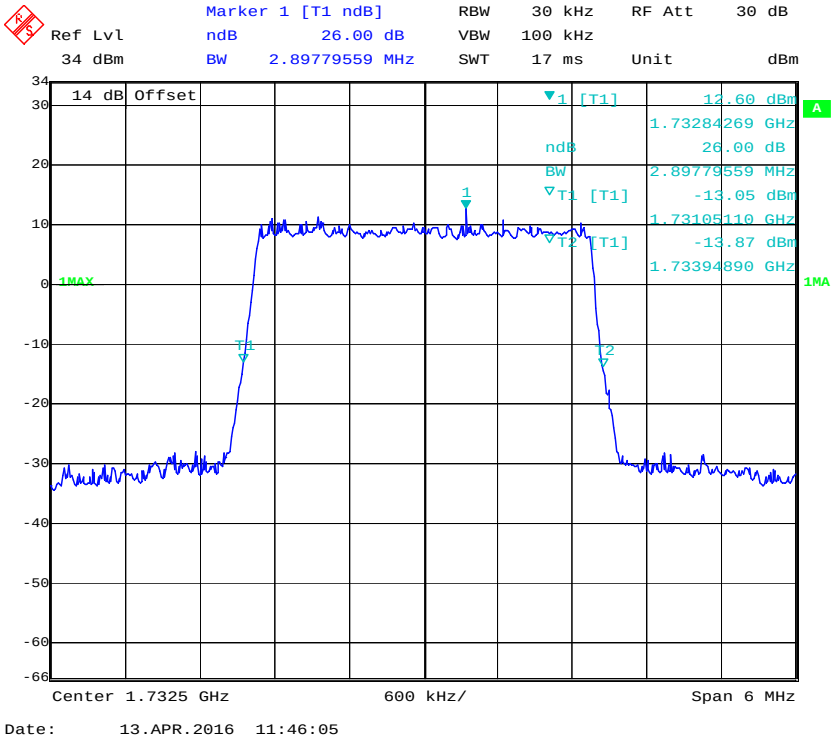
16-QAM (1.4 MHz) - 26 dB Bandwidth, Middle channel



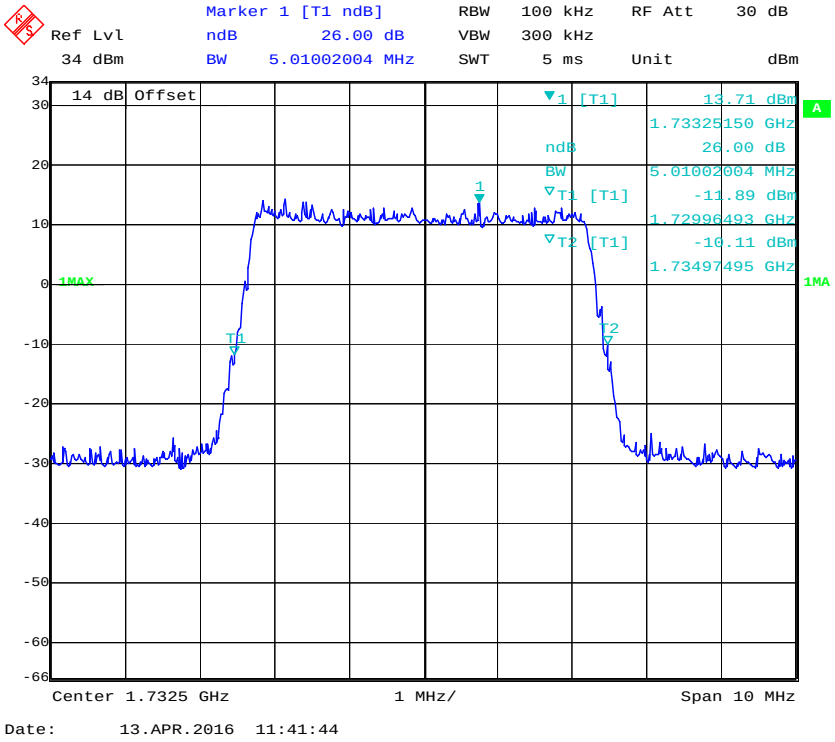
QPSK (3.0 MHz) - 26 dB Bandwidth, Middle channel



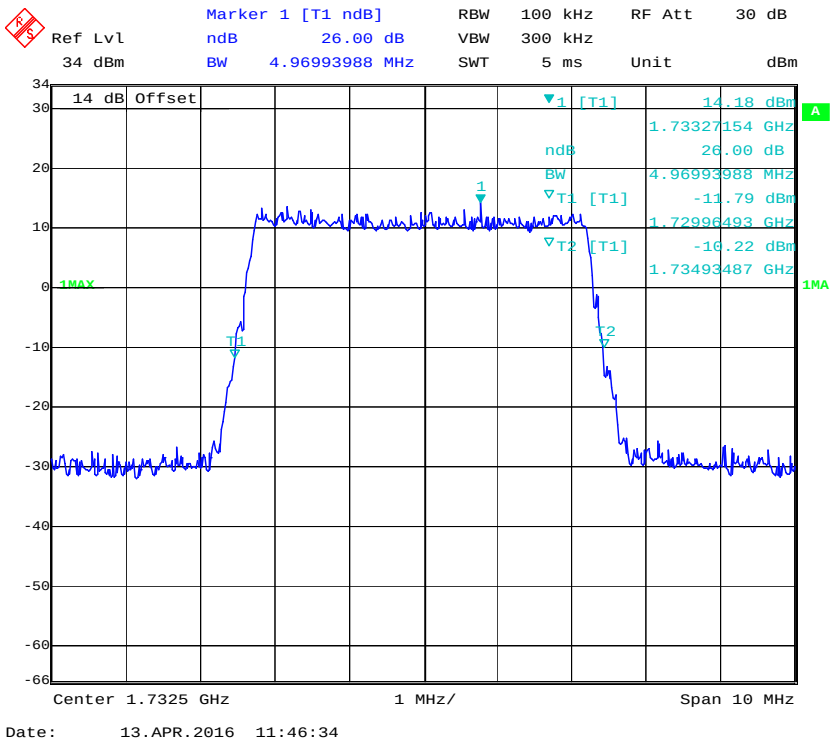
16-QAM (3.0 MHz) - 26 dB Bandwidth, Middle channel



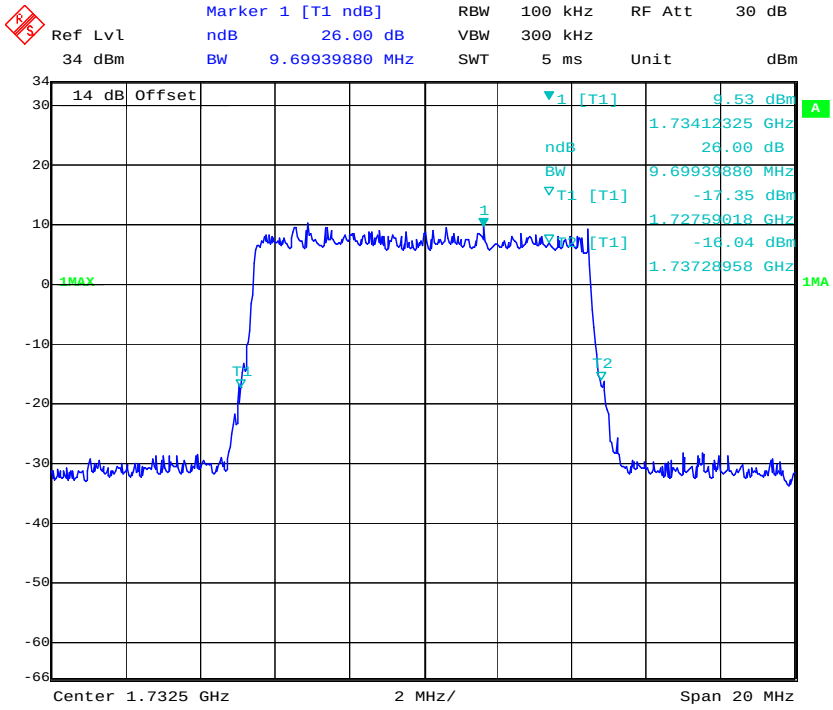
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



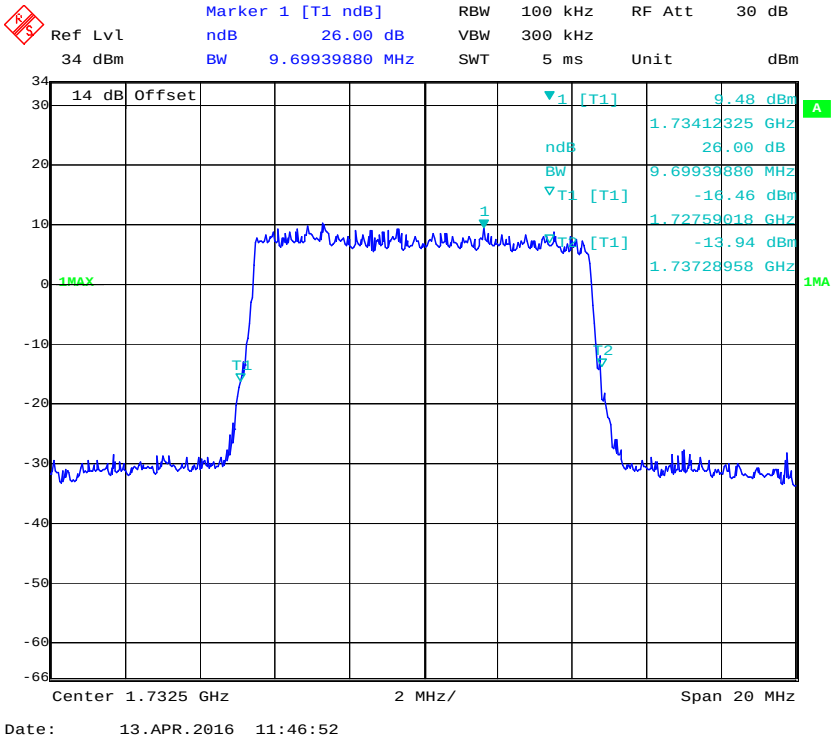
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



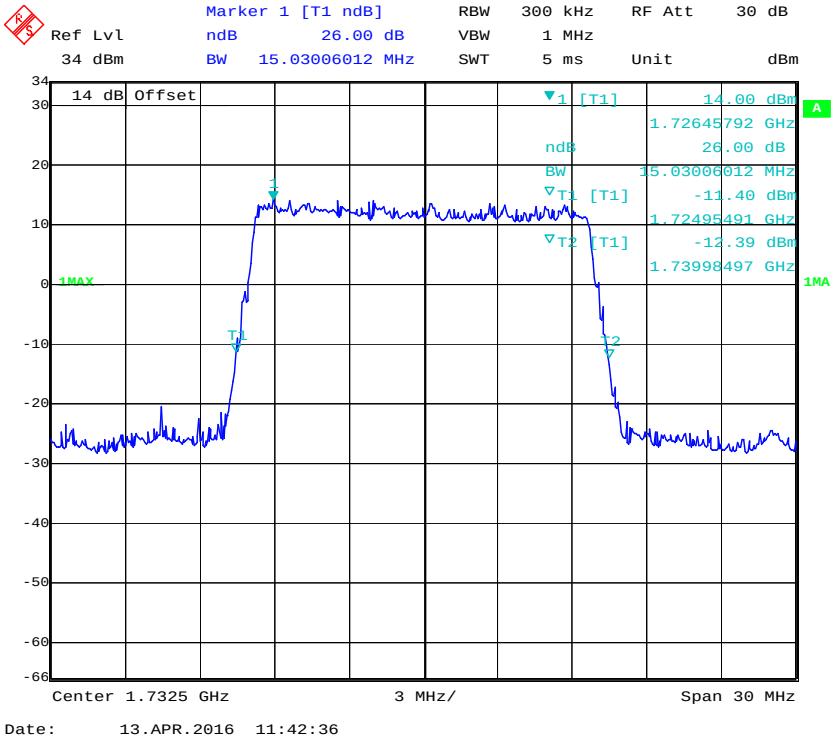
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



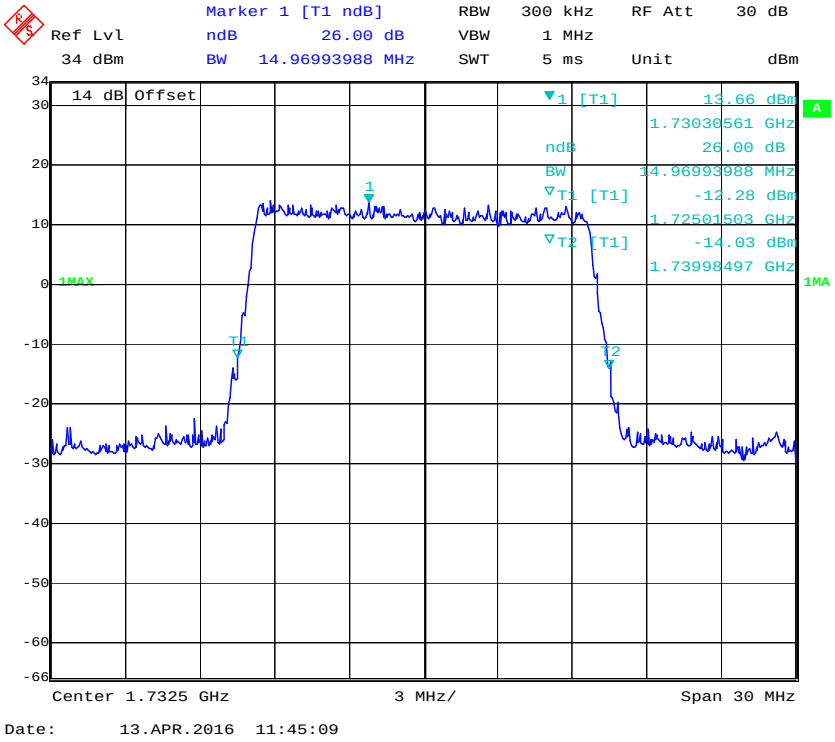
16-QAM (10.0 MHz) - 26 dB Bandwidth, Middle channel



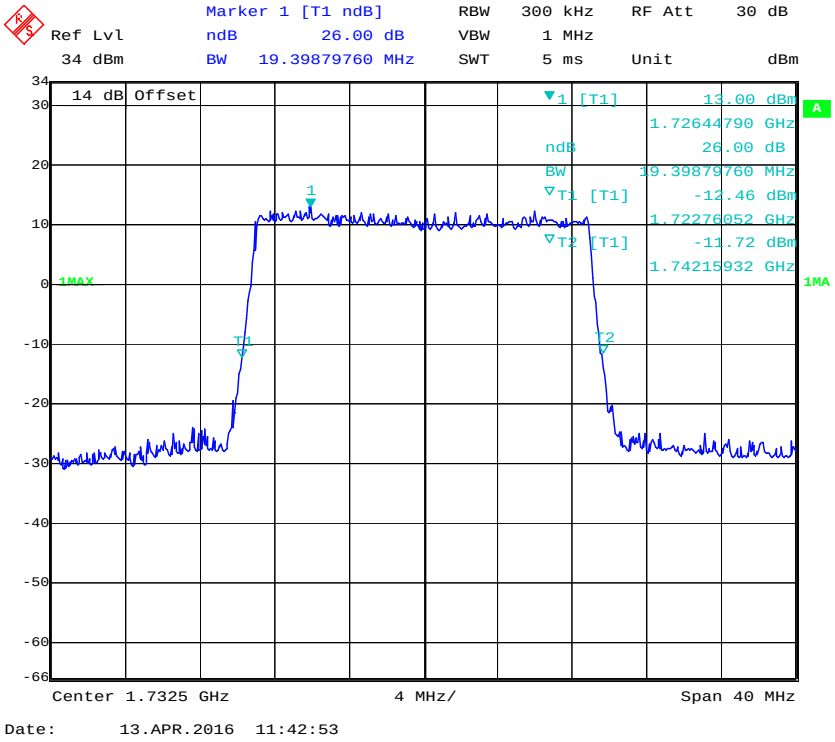
QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



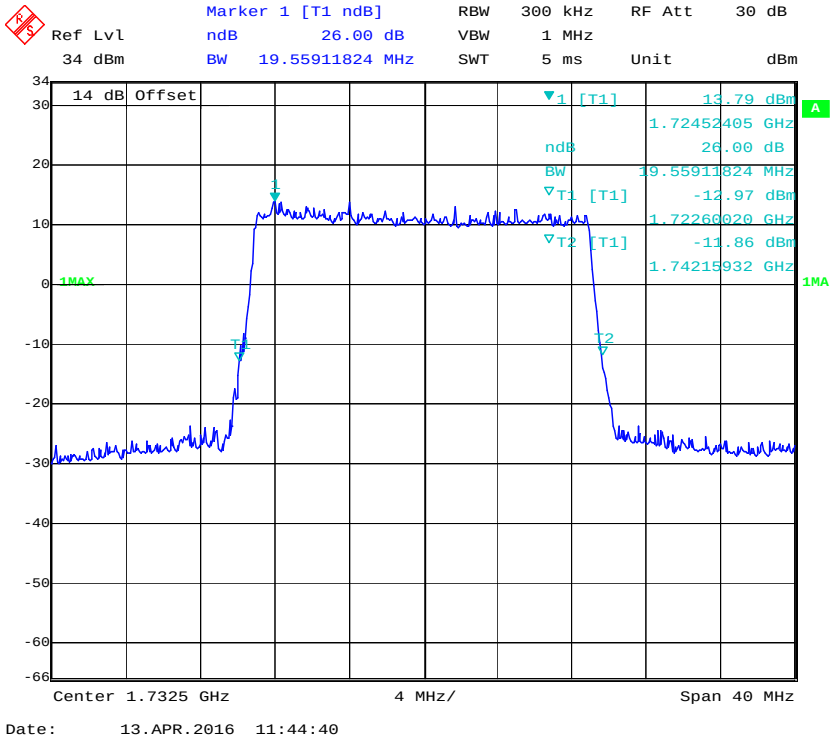
16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



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



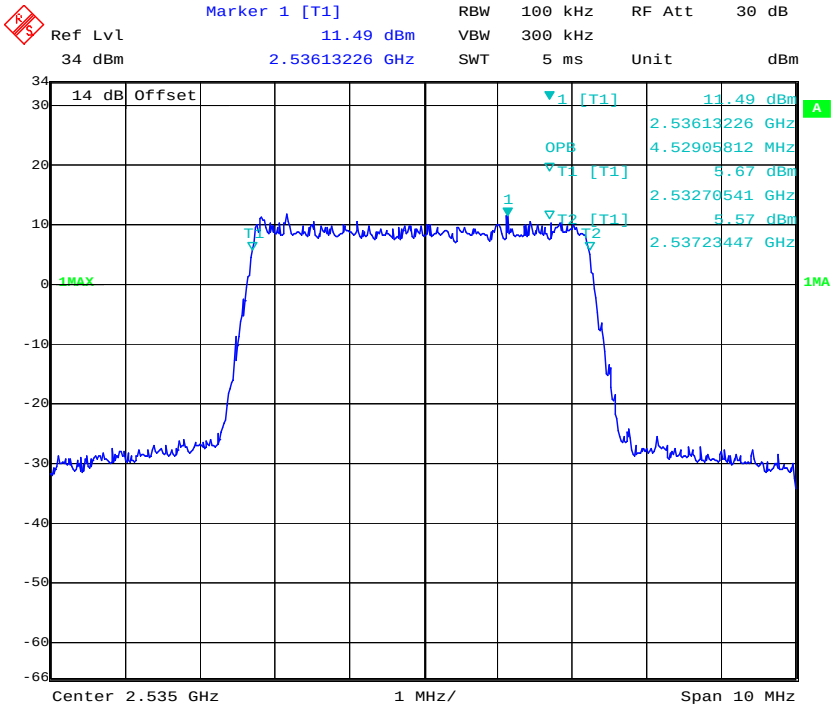
16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



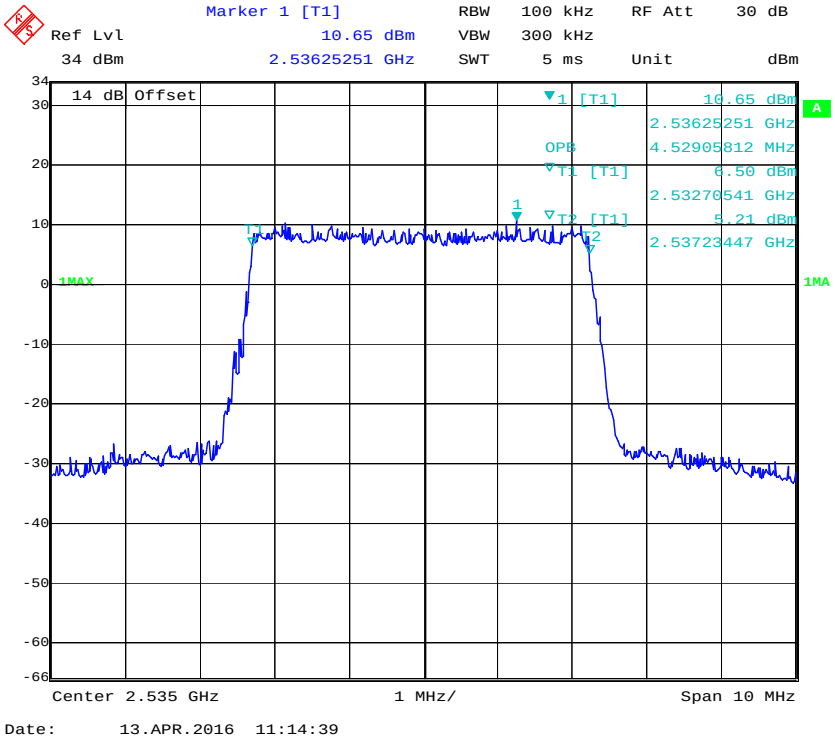
LTE Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.529	5.050
	16QAM	4.529	4.970
10.0	QPSK	8.978	9.699
	16QAM	8.938	9.699
15.0	QPSK	13.527	14.910
	16QAM	13.587	14.910
20.0	QPSK	17.956	19.479
	16QAM	18.036	19.559

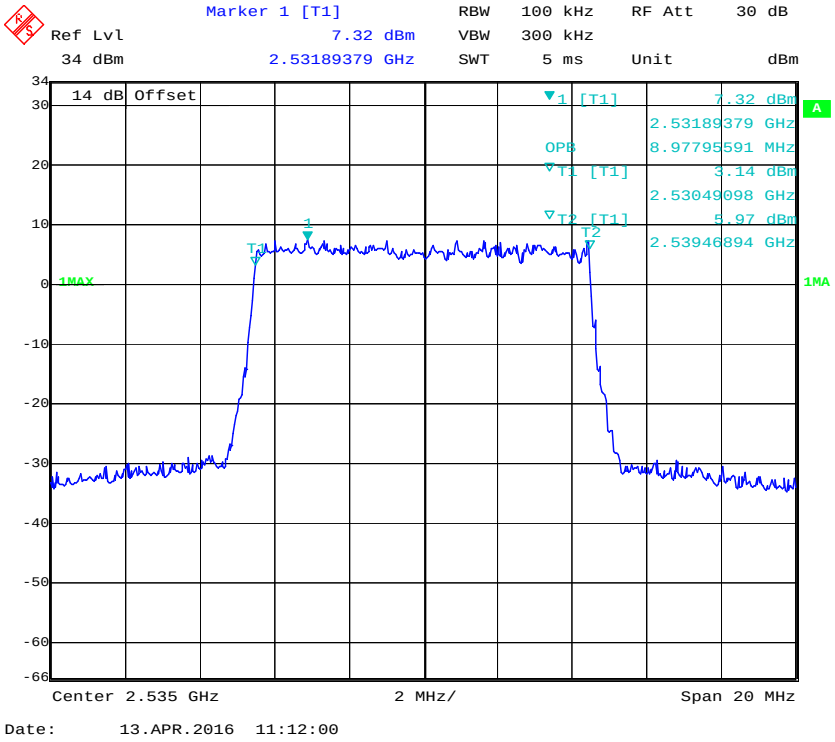
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



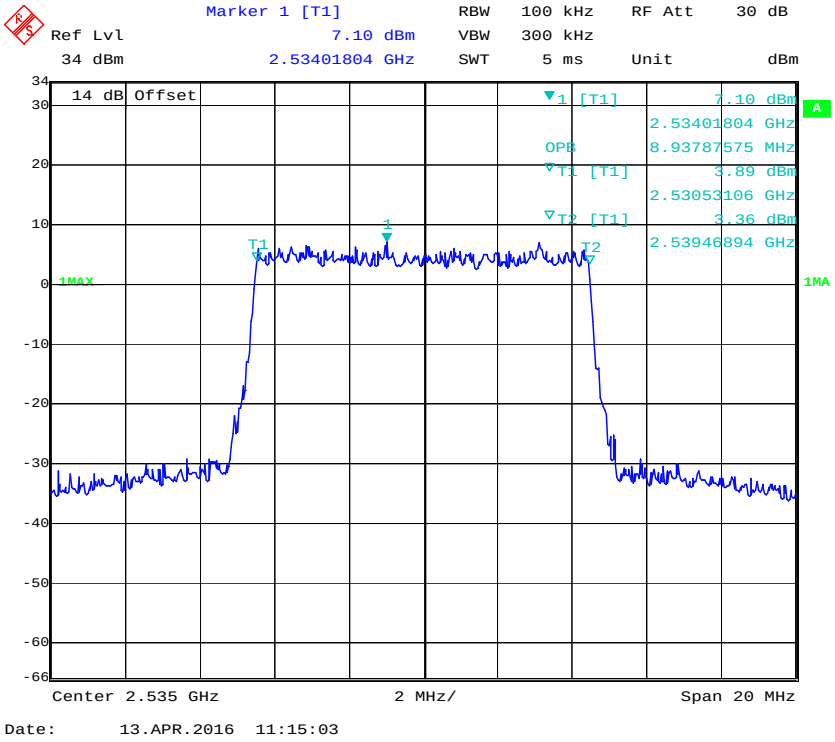
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



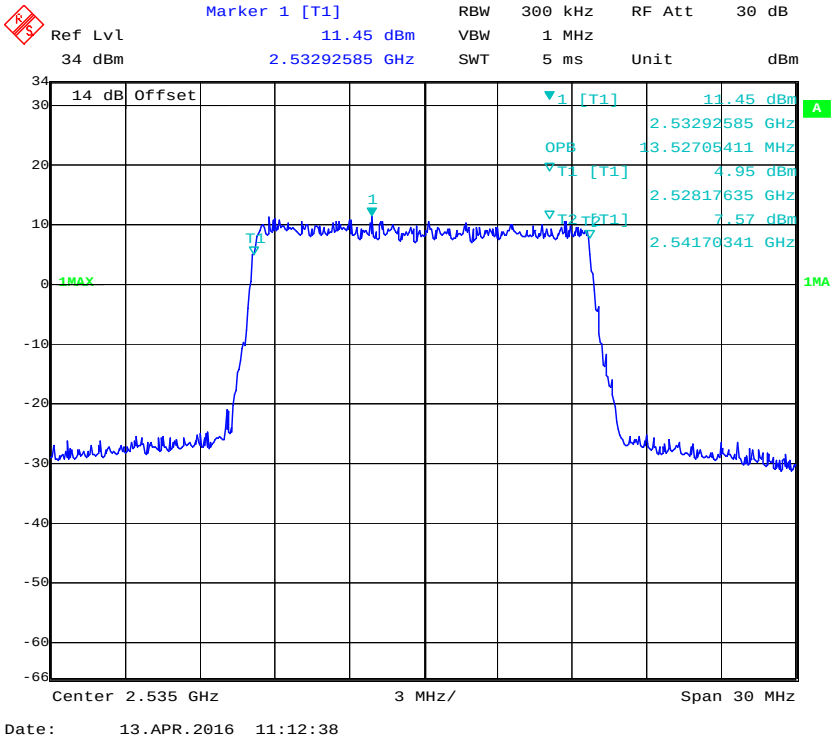
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



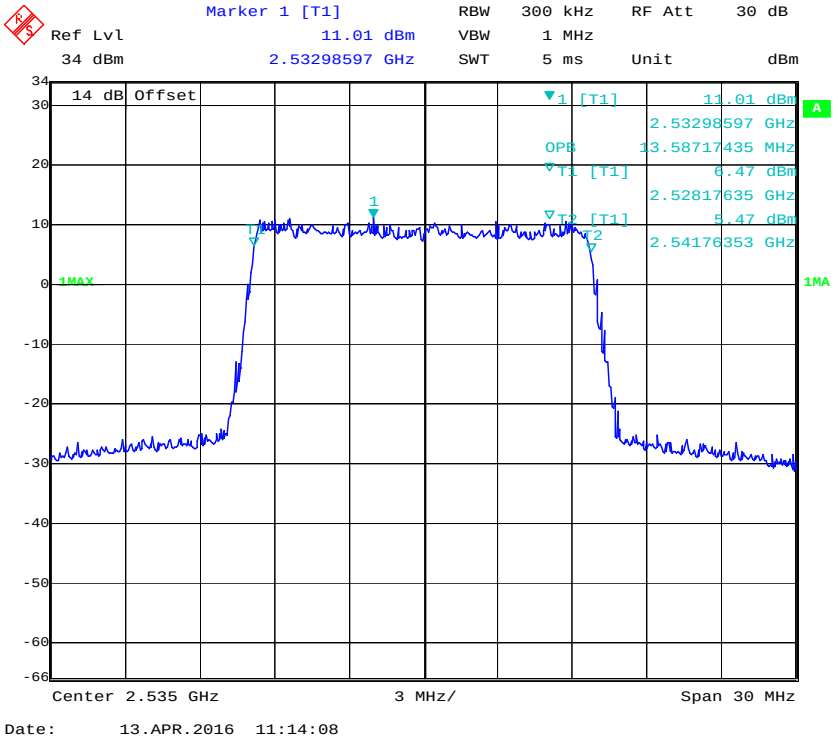
16-QAM (10.0MHz) - 99% Occupied Bandwidth, Middle channel



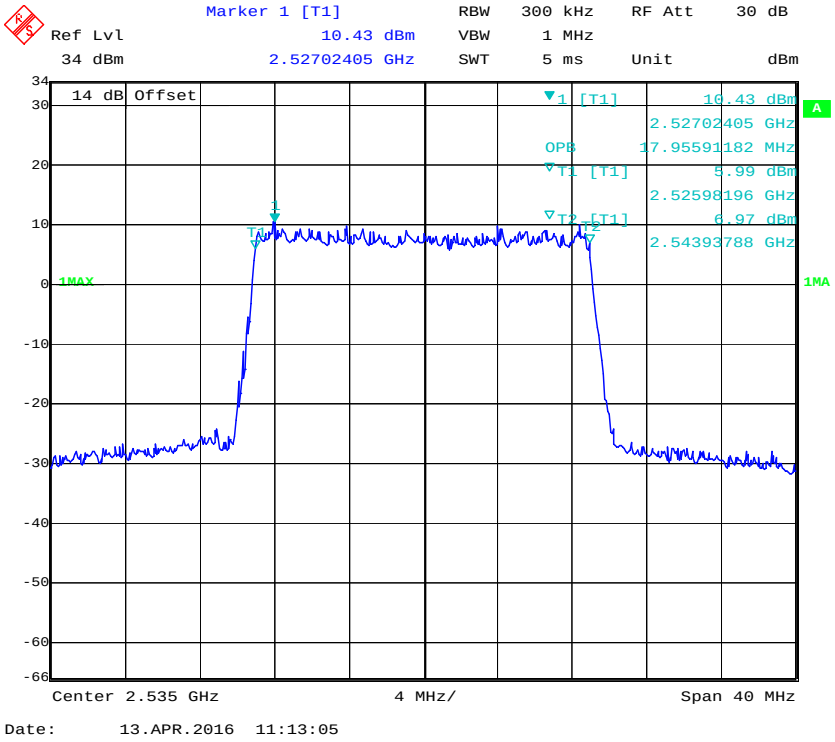
QPSK (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



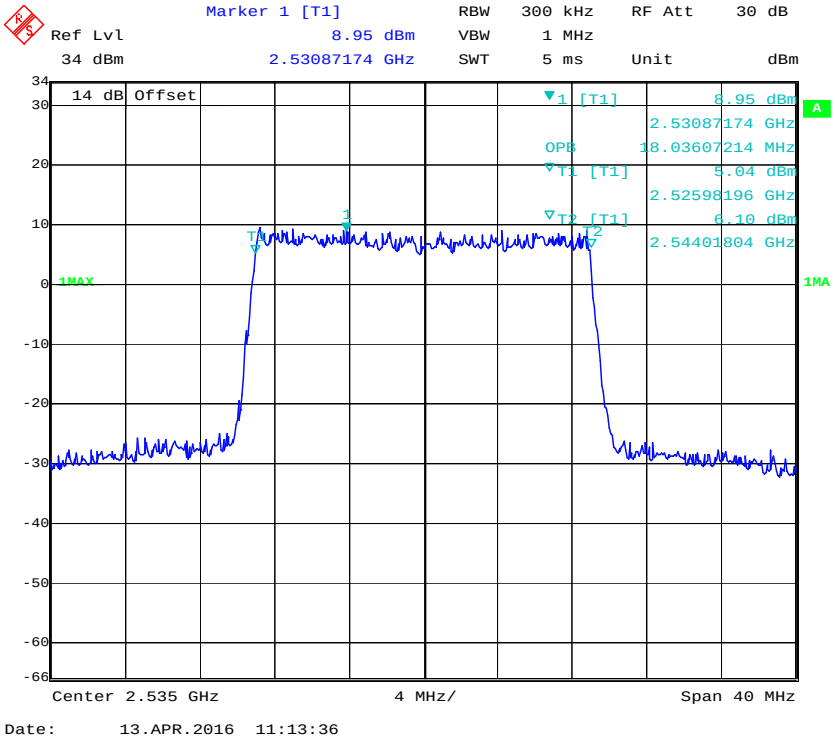
16-QAM (15.0 MHz) - 99% Occupied Bandwidth, Middle channel



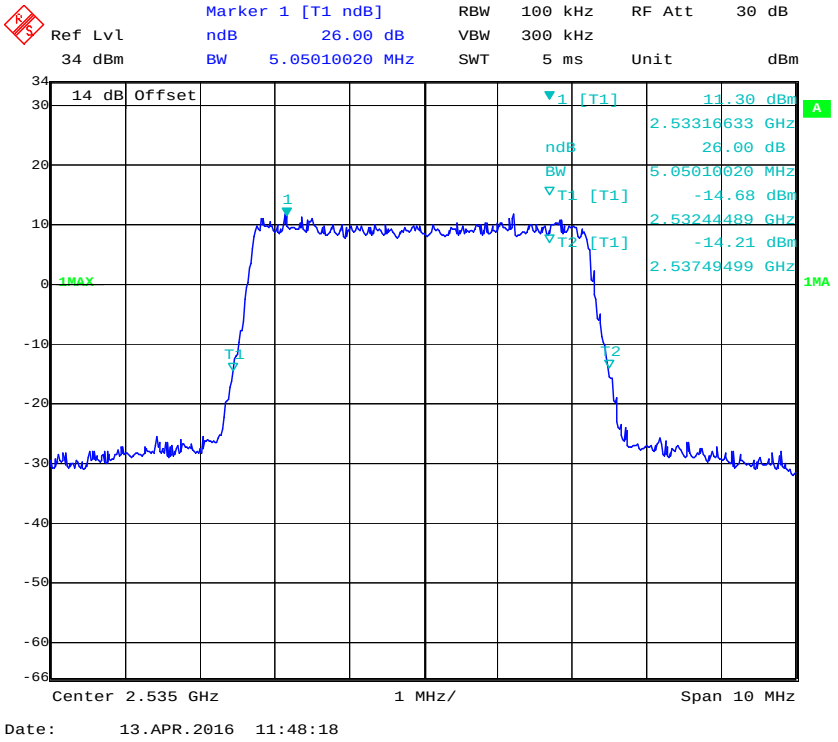
QPSK (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



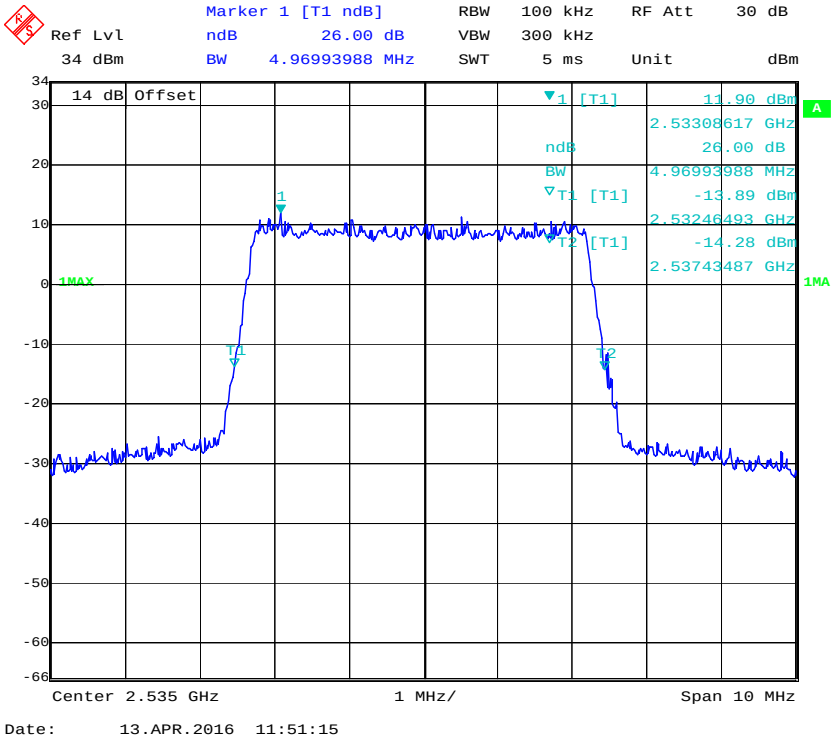
16-QAM (20.0 MHz) - 99% Occupied Bandwidth, Middle channel



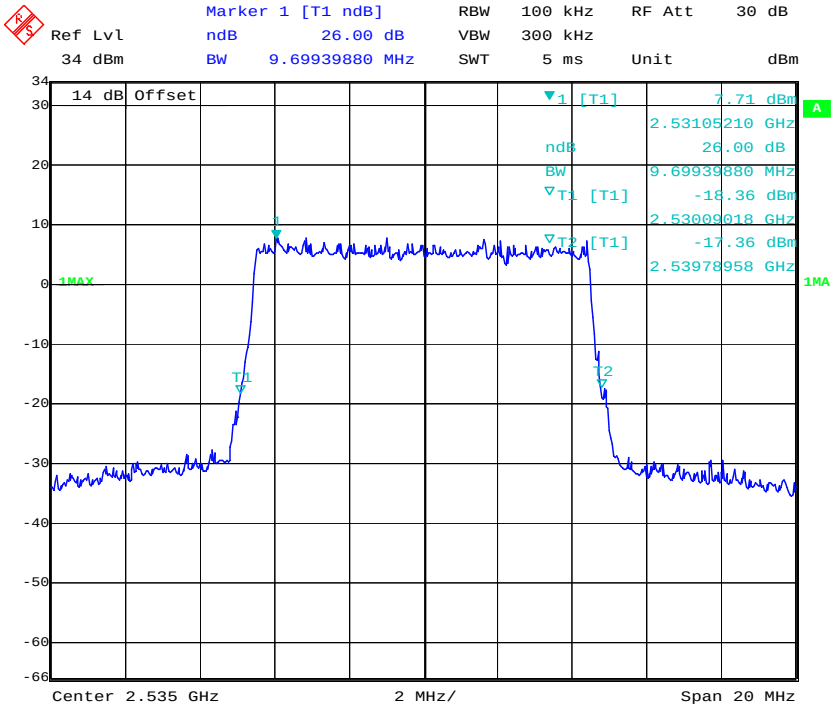
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



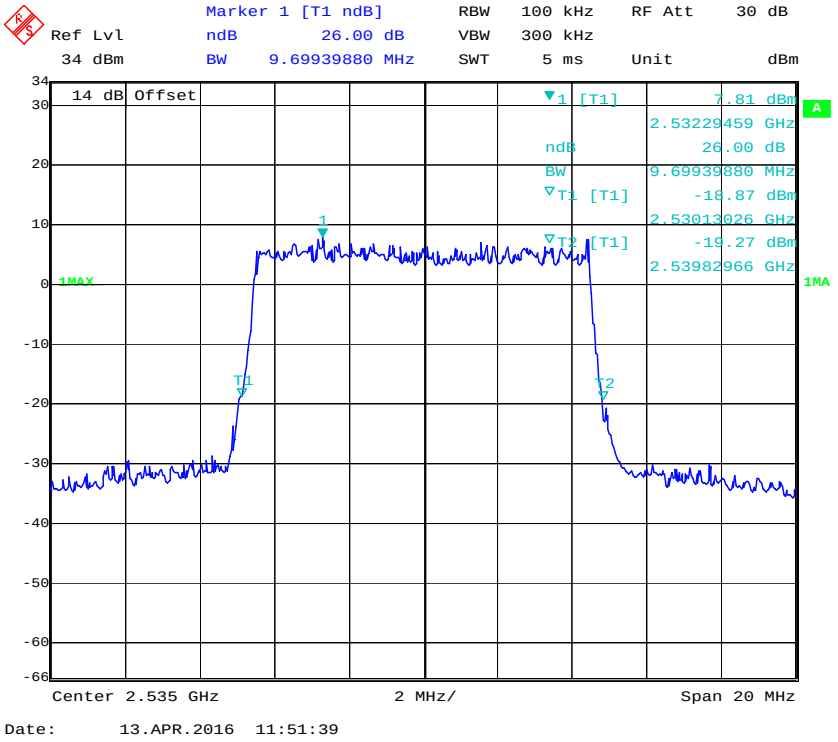
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



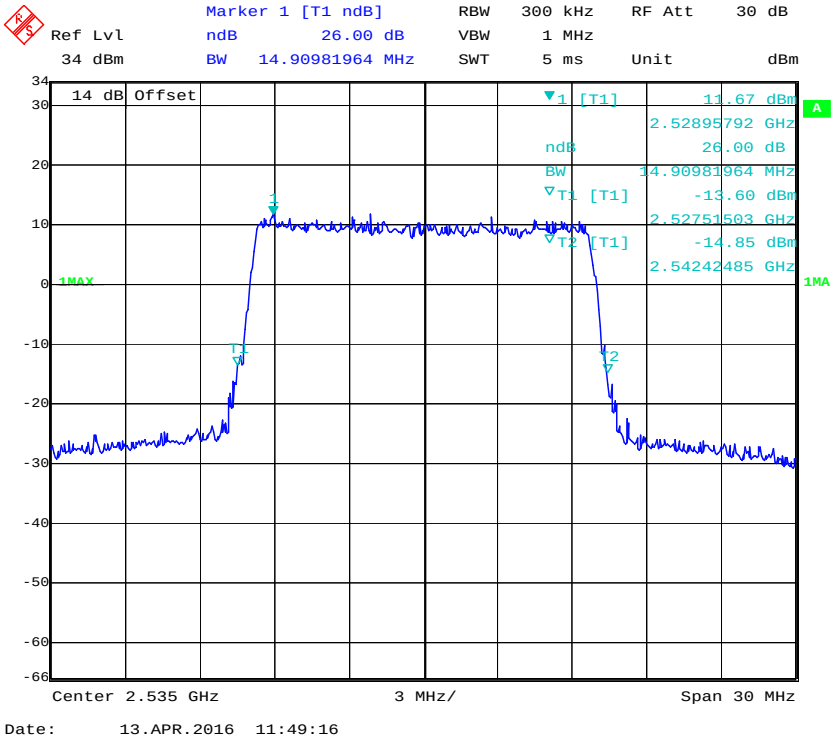
QPSK (10.0 MHz) - 26 dB Bandwidth, Middle channel



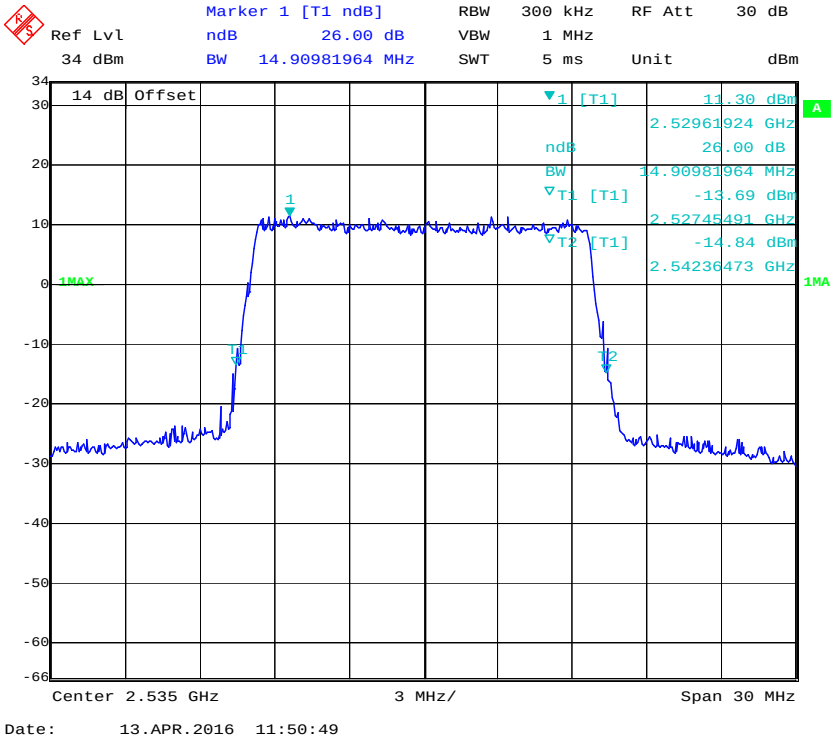
16-QAM (10.0MHz) - 26 dB Bandwidth, Middle channel



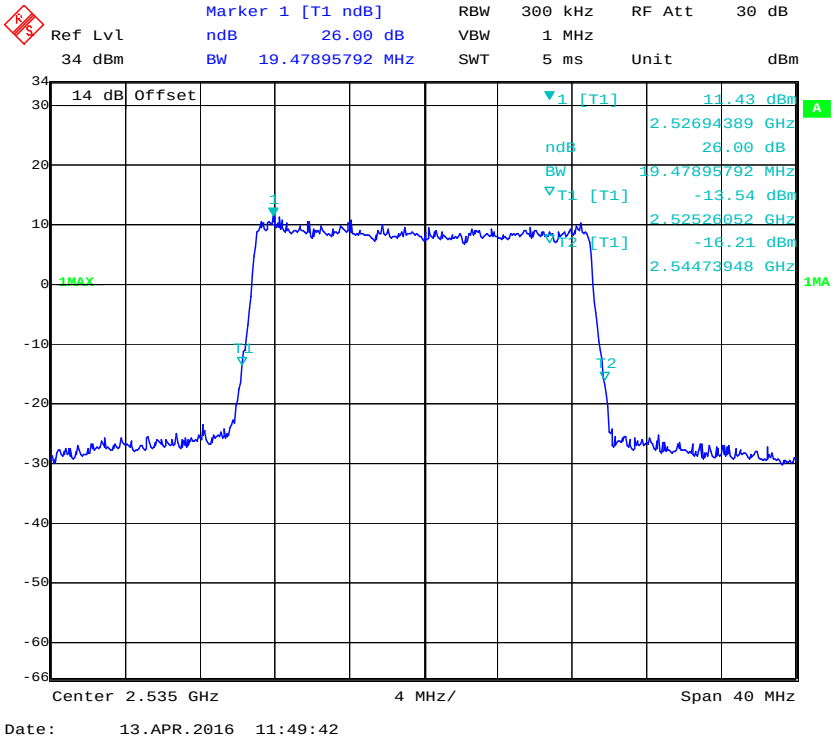
QPSK (15.0 MHz) - 26 dB Bandwidth, Middle channel



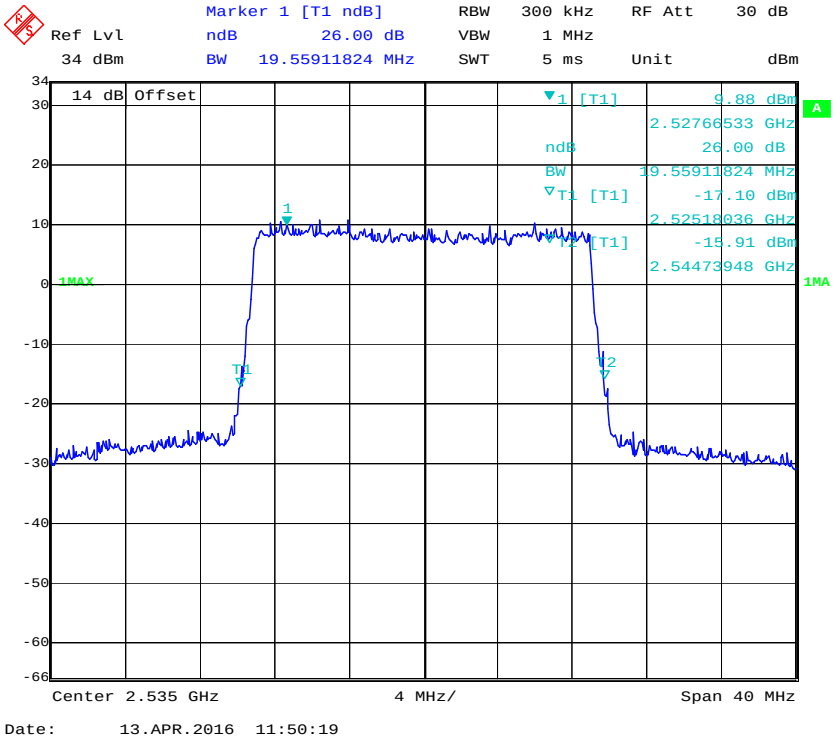
16-QAM (15.0 MHz) - 26 dB Bandwidth, Middle channel



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



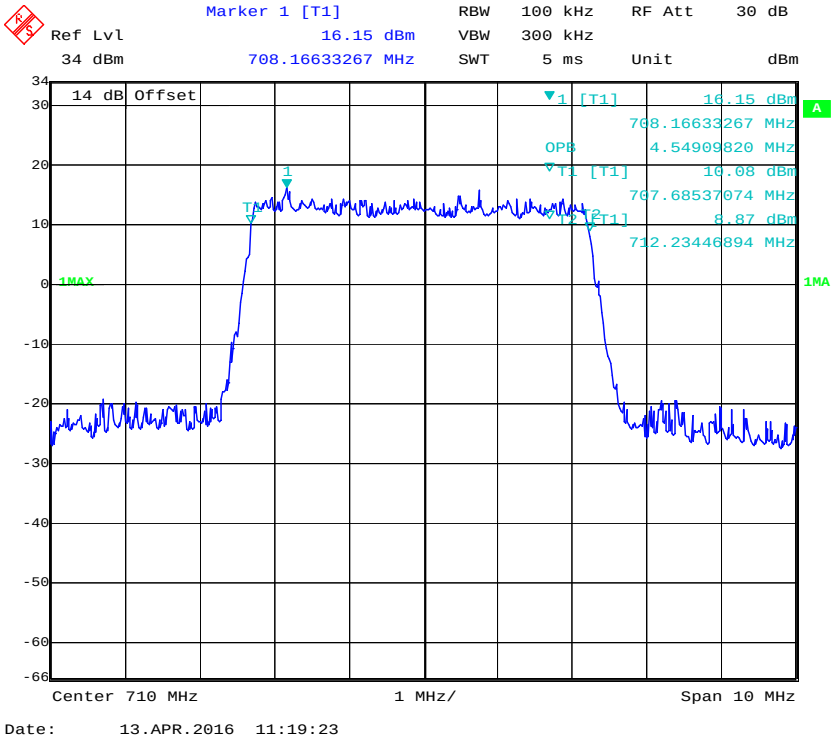
16-QAM (20.0 MHz) - 26 dB Bandwidth, Middle channel



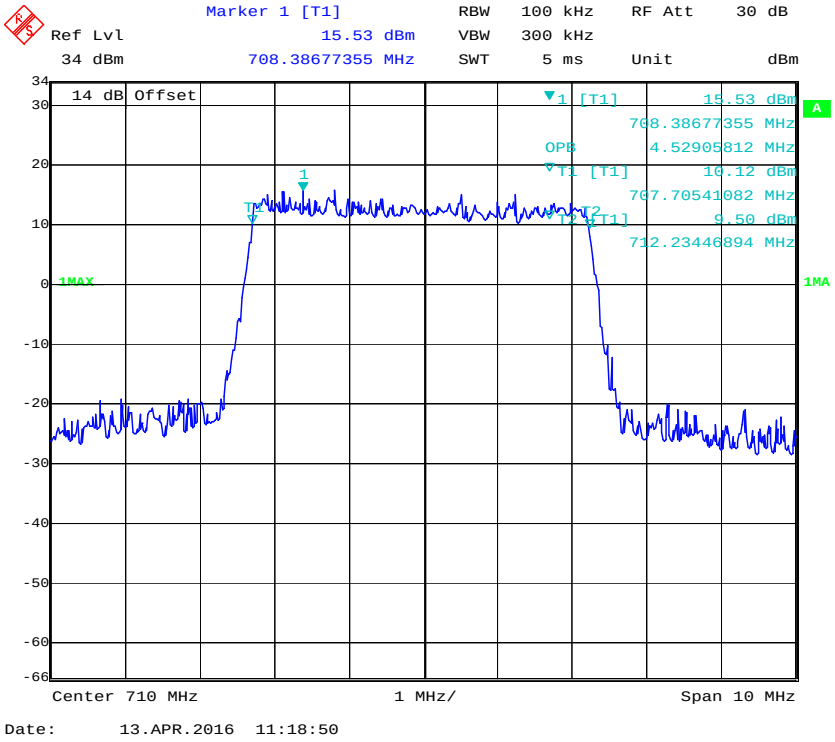
LTE Band 17: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.549	5.050
	16QAM	4.529	5.050
10.0	QPSK	8.978	9.659
	16QAM	8.978	9.659

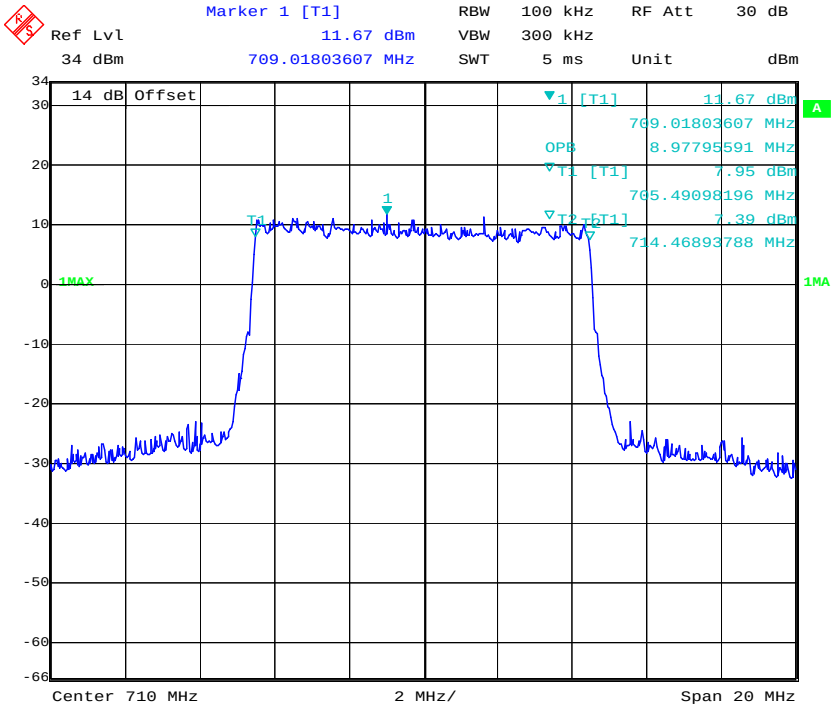
QPSK (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



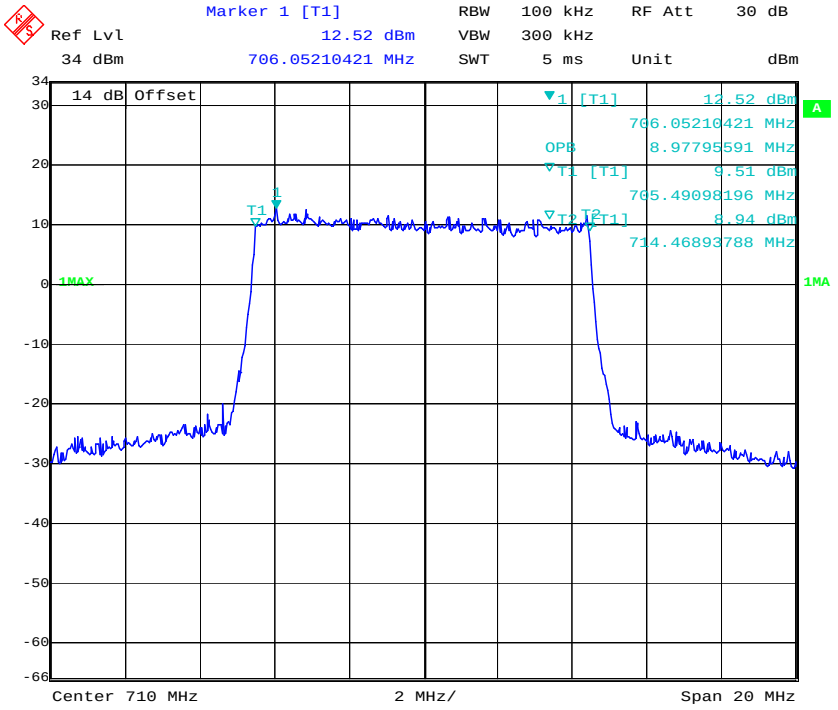
16-QAM (5.0 MHz) - 99% Occupied Bandwidth, Middle channel



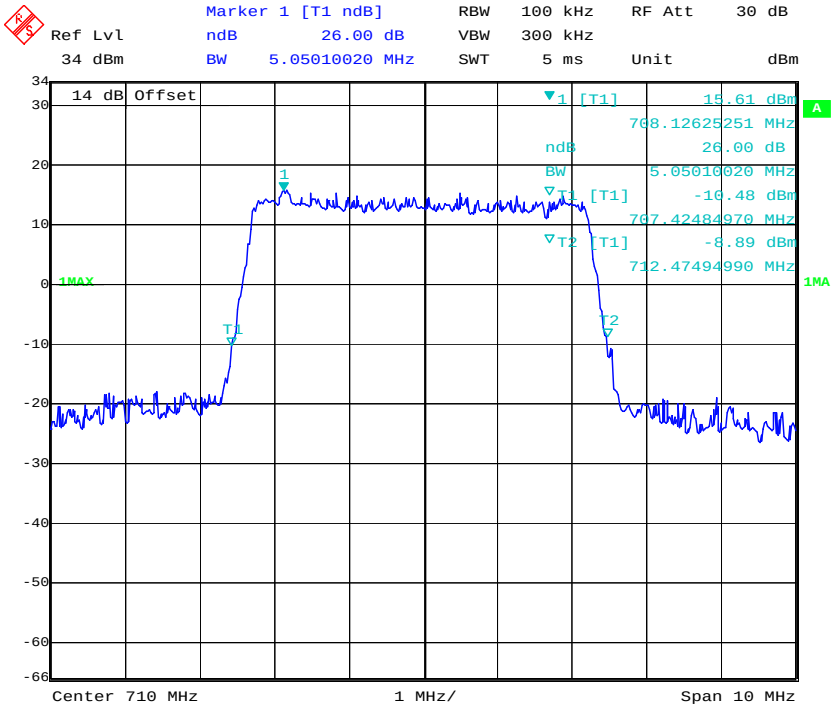
QPSK (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



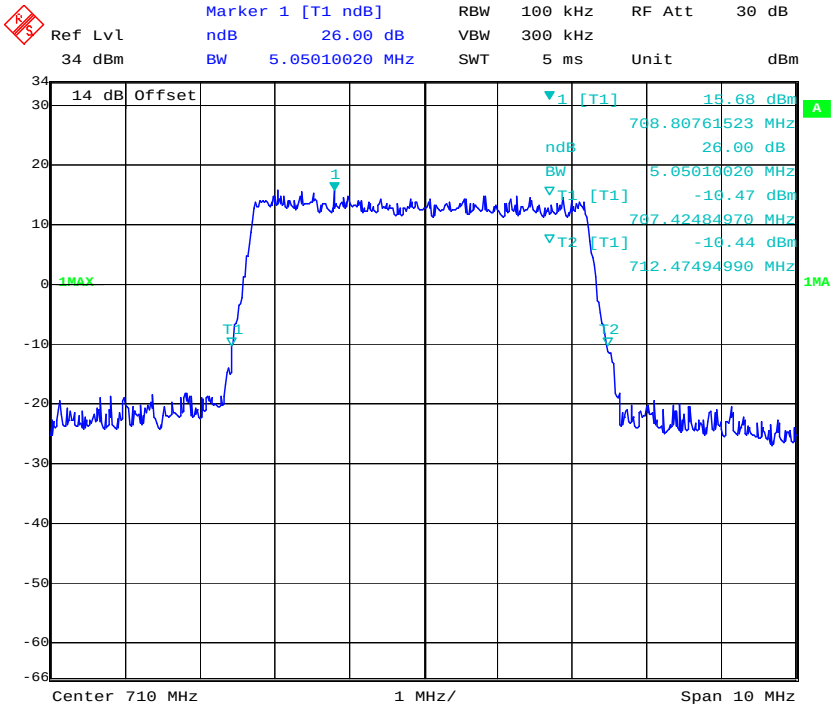
16-QAM (10.0 MHz) - 99% Occupied Bandwidth, Middle channel



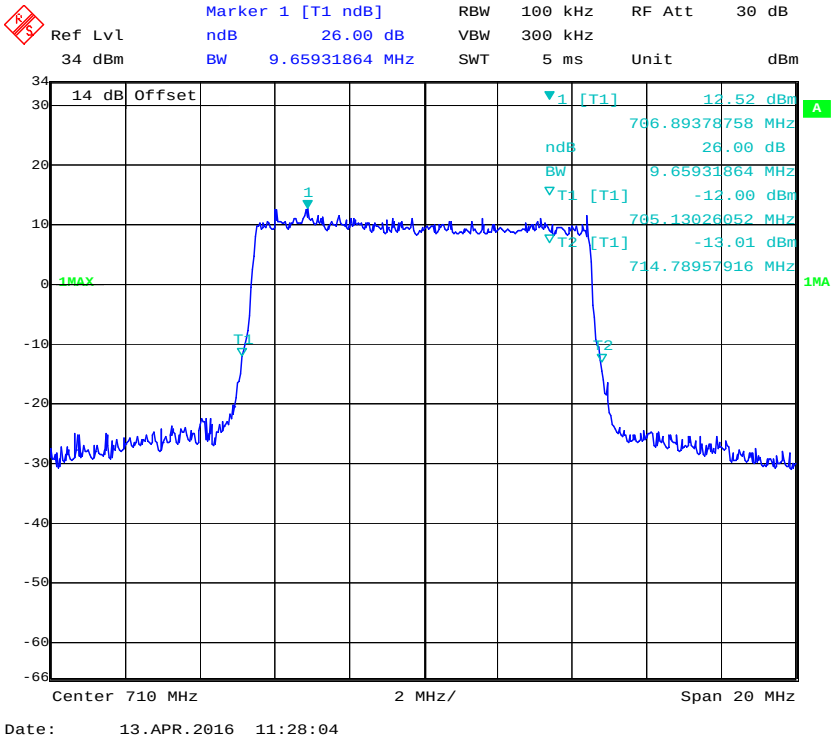
QPSK (5.0 MHz) - 26 dB Bandwidth, Middle channel



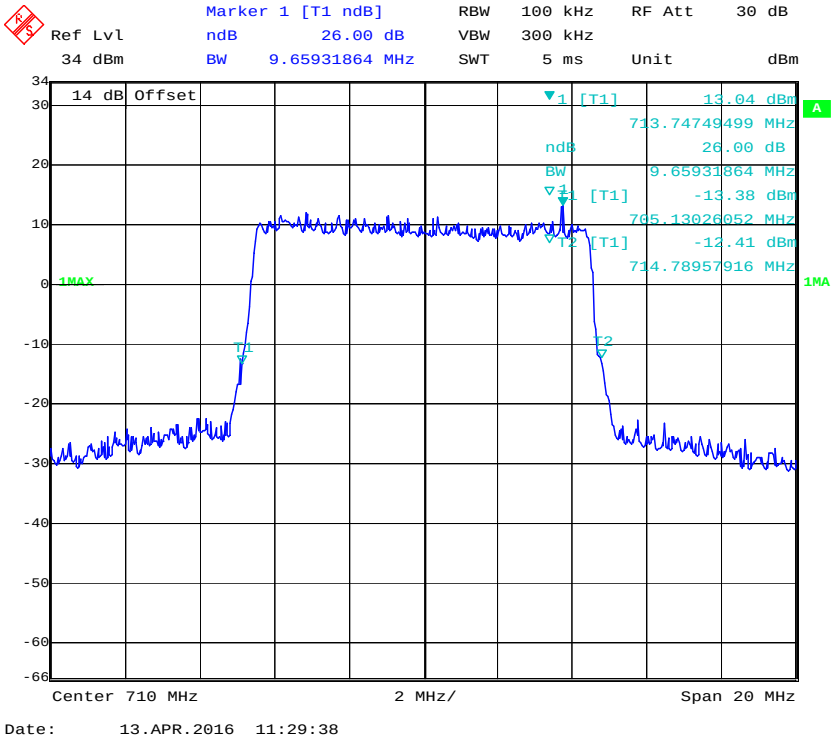
16-QAM (5.0 MHz) - 26 dB Bandwidth, Middle channel



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



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



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

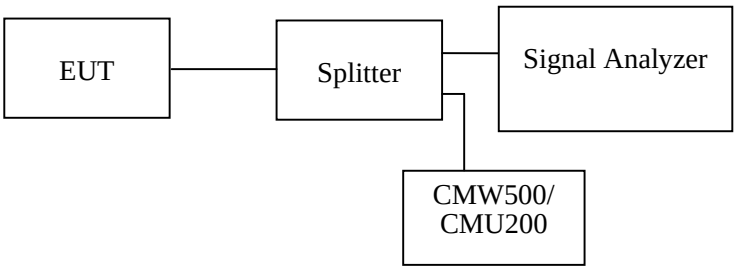
Applicable Standards

FCC §2.10511, §22.917(a) and §24.238(a) and §27.53.

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

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution 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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
WEINSCHEL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18

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

Test Data

Environmental Conditions

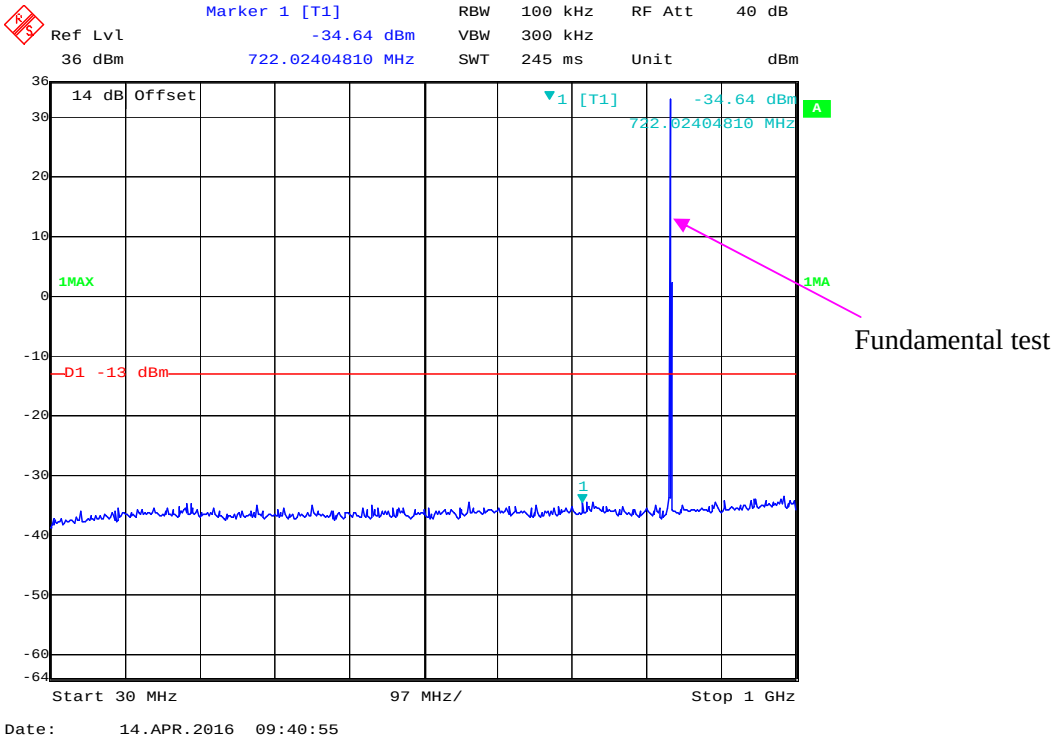
Temperature:	21-23 ℃
Relative Humidity:	48-55 %
ATM Pressure:	100.9-101.0kPa

The testing was performed by Haiguo Li from 2016-04-13 to 2016-04-14.

Please refer to the following plots.

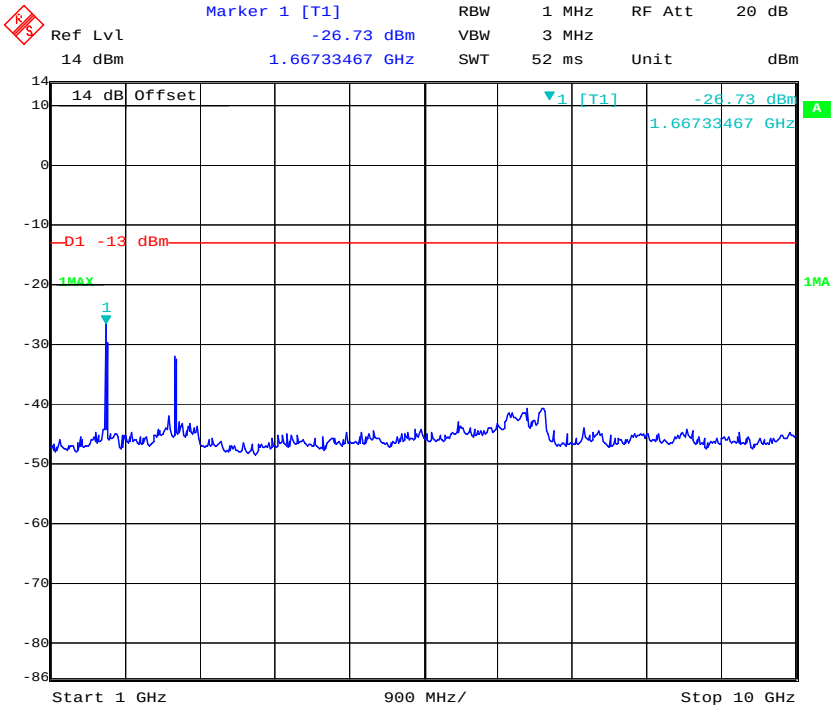
Cellular Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)



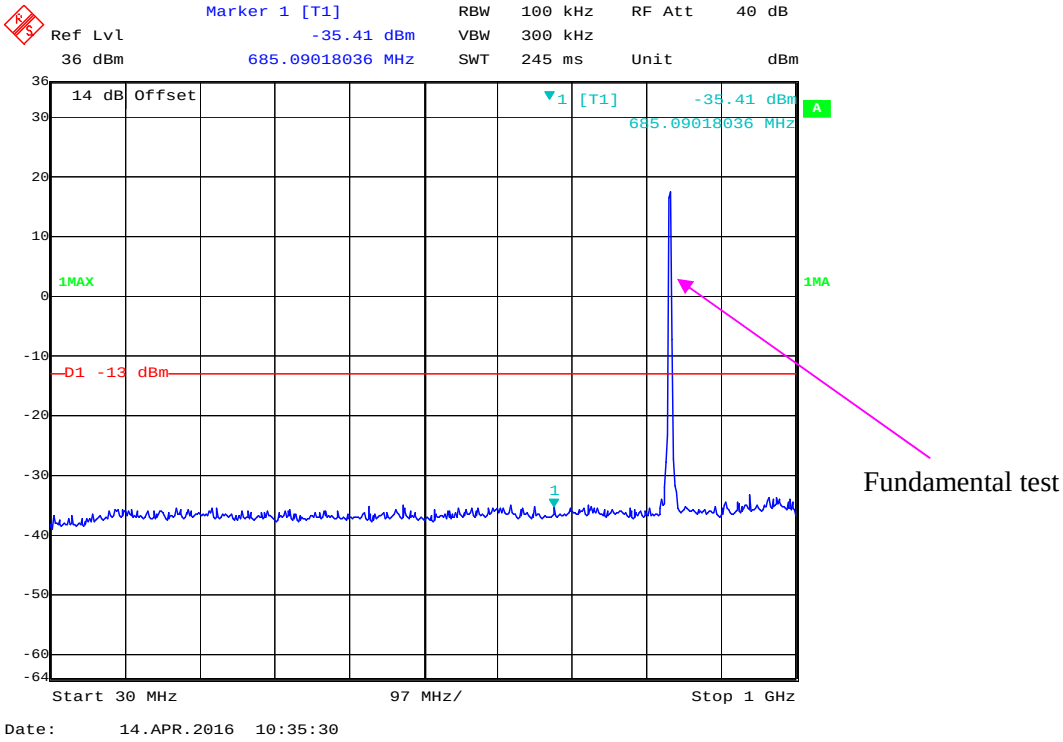
Date: 14.APR.2016 09:40:55

1 GHz – 10 GHz (GSM Mode)

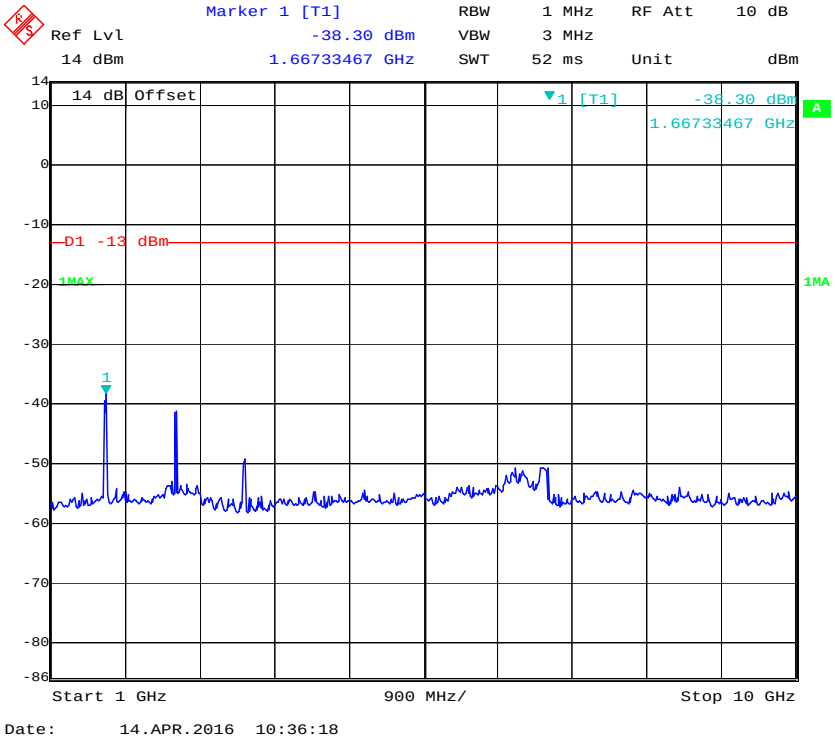


Date: 14.APR.2016 09:42:13

30 MHz – 1 GHz (RMC Mode)

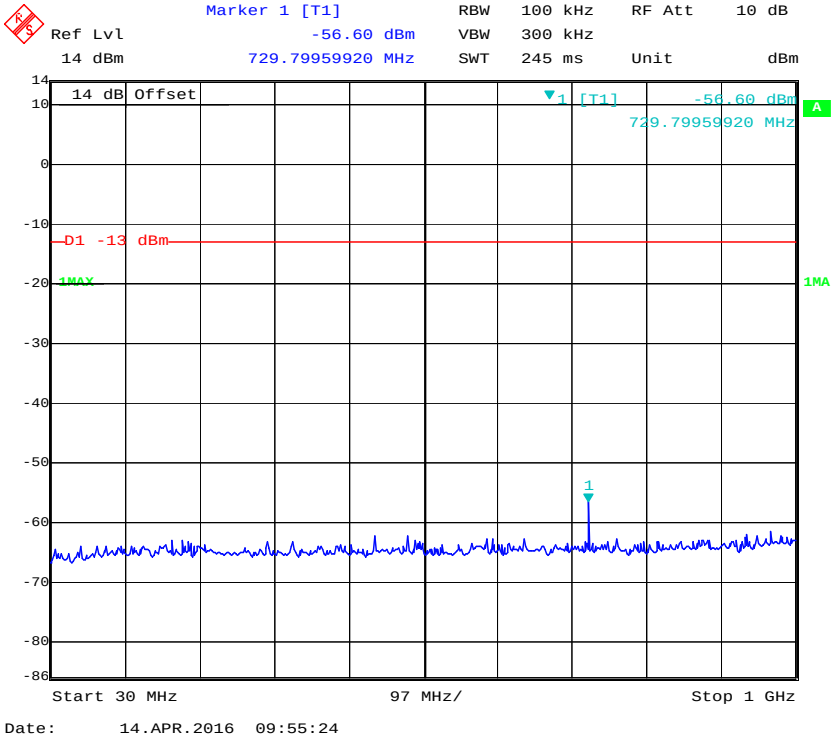


1 GHz – 10 GHz (RMC Mode)

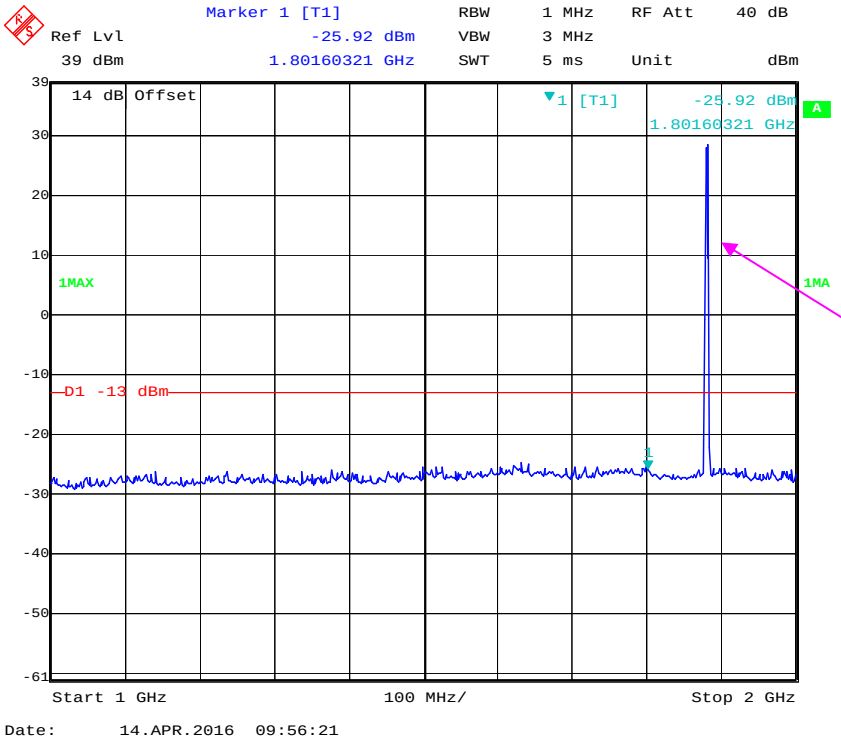


PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)

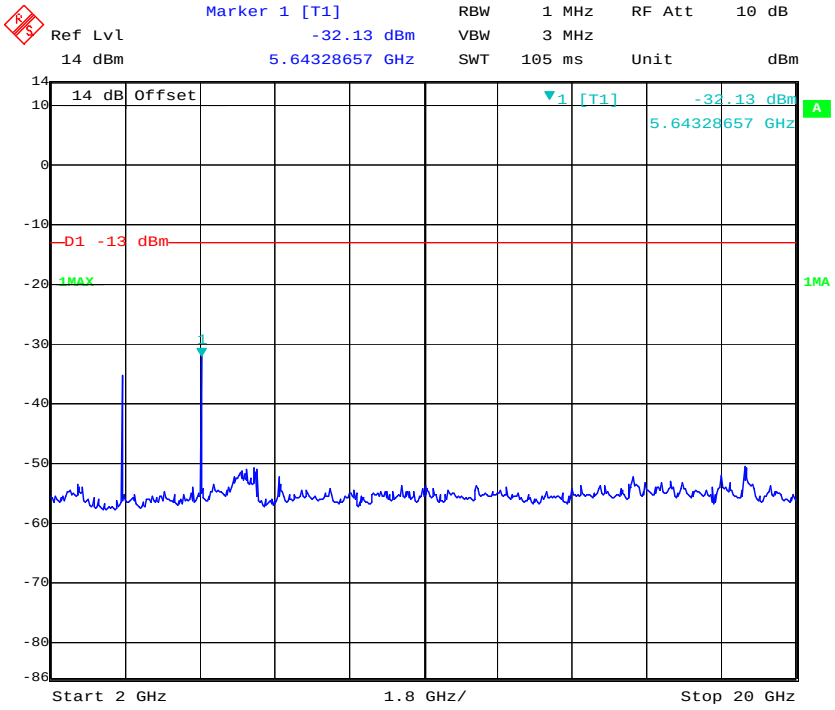


1 GHz – 2 GHz (GSM Mode)



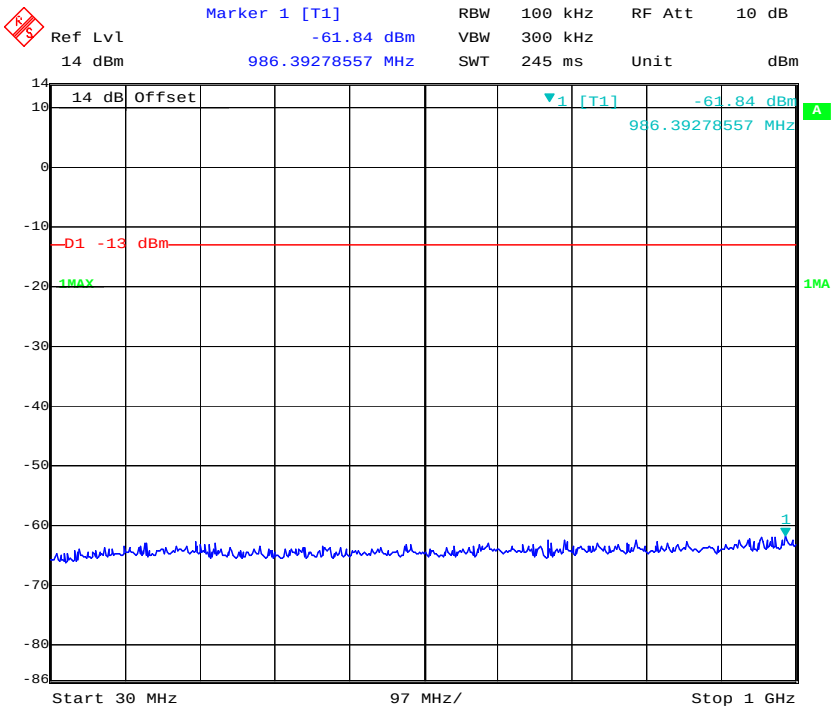
Fundamental test

2 GHz – 20 GHz (GSM Mode)



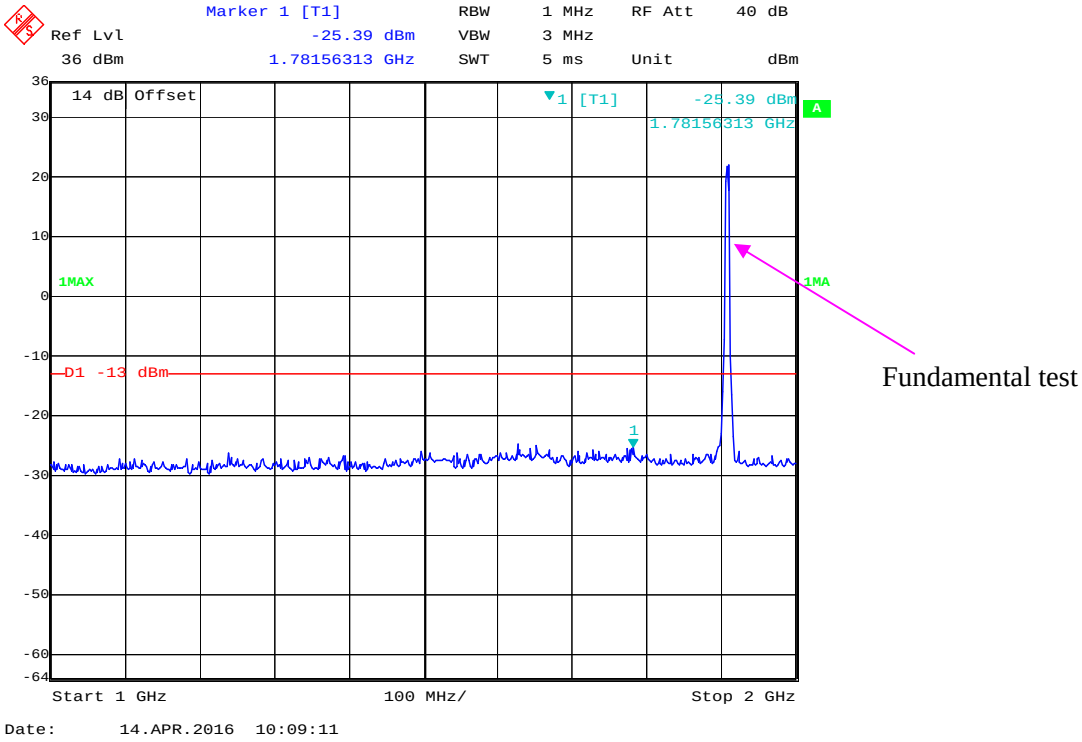
Date: 14.APR.2016 09:56:41

30 MHz – 1 GHz (RMC Mode)

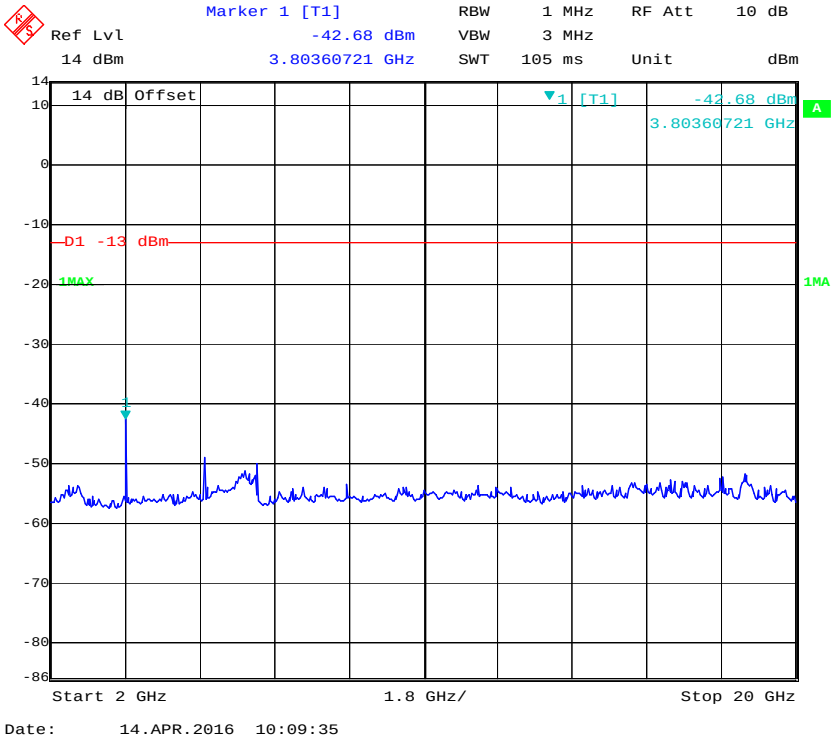


Date: 14.APR.2016 10:08:26

1 GHz – 2 GHz (RMC Mode)

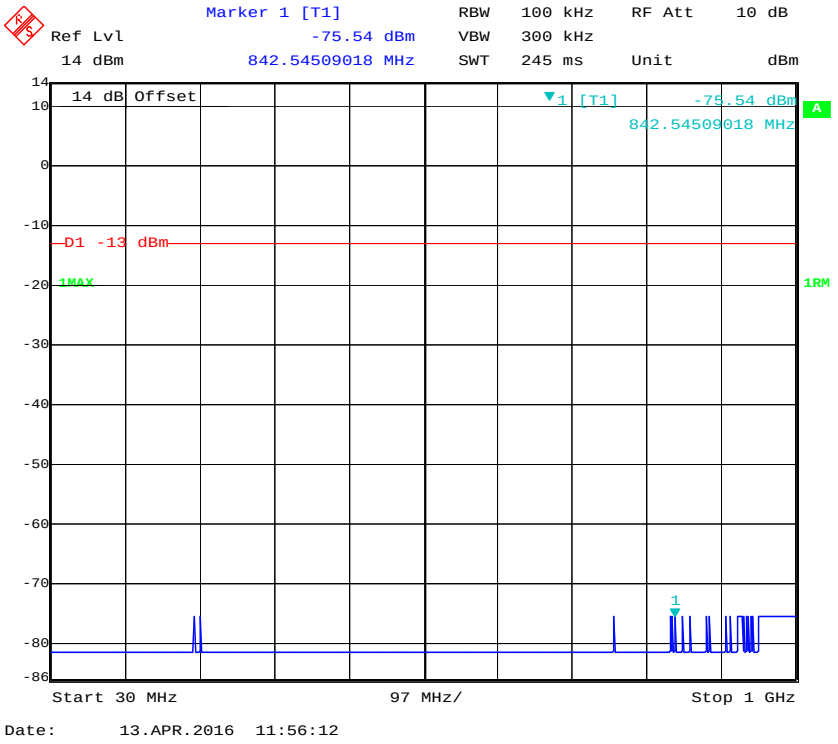


2 GHz – 20 GHz (RMC Mode)

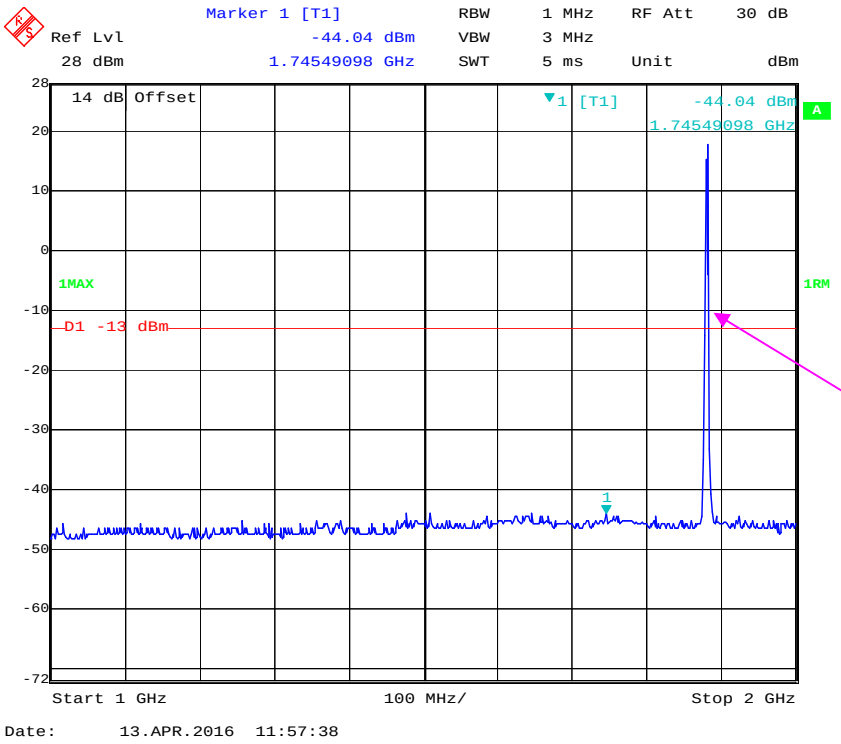


LTE Band 2:

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

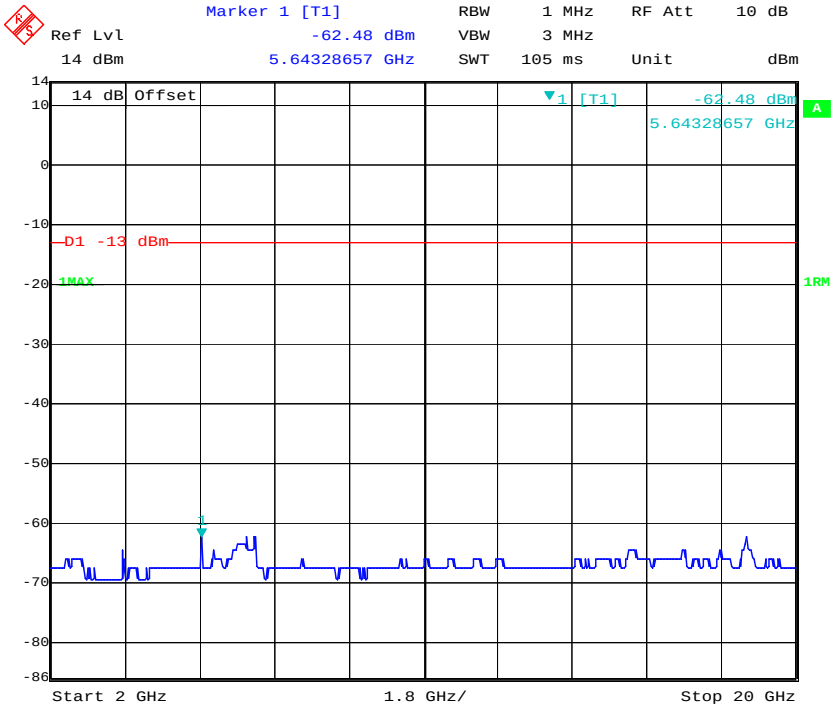


1 GHz – 2 GHz (1.4 MHz, Middle Channel)



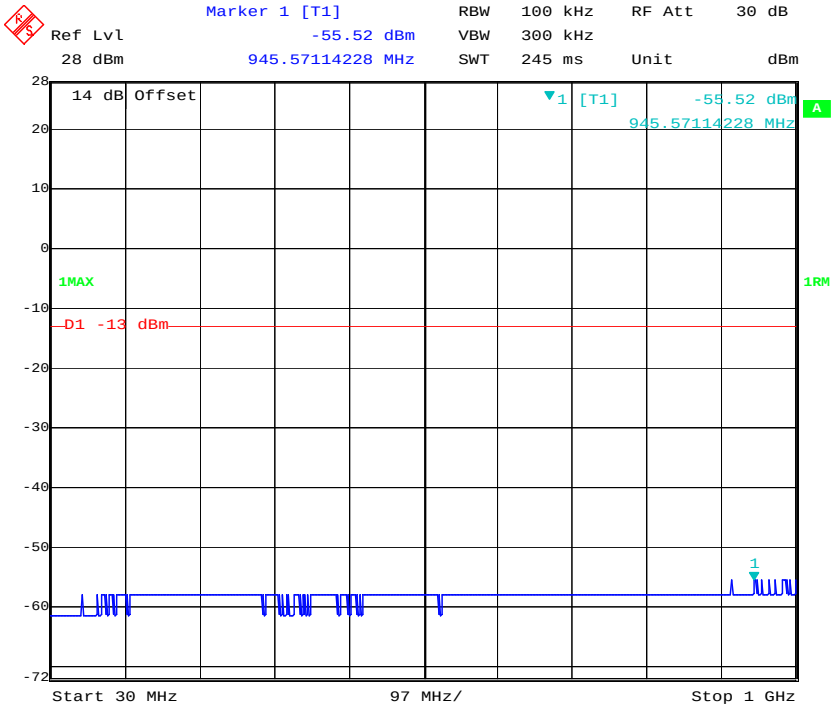
Fundamental test

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



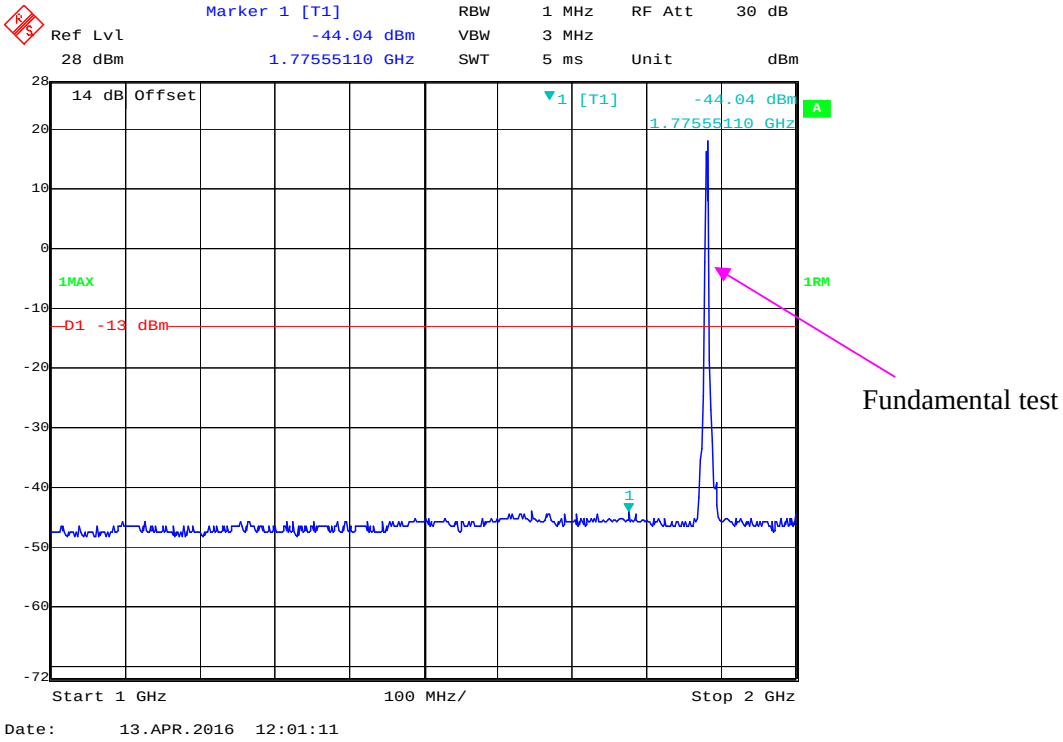
Date: 13.APR.2016 12:00:27

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

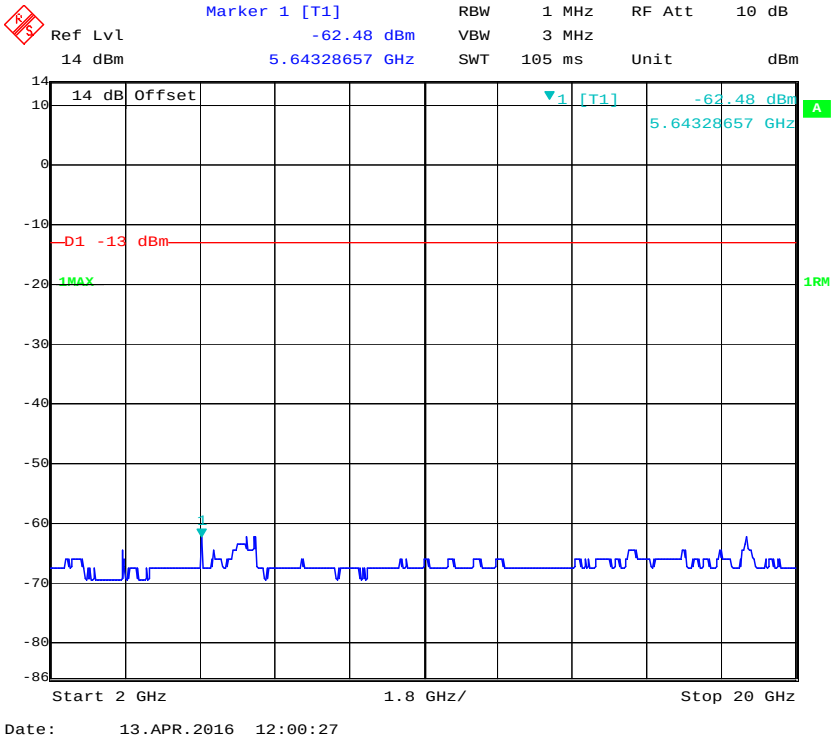


Date: 13.APR.2016 12:02:21

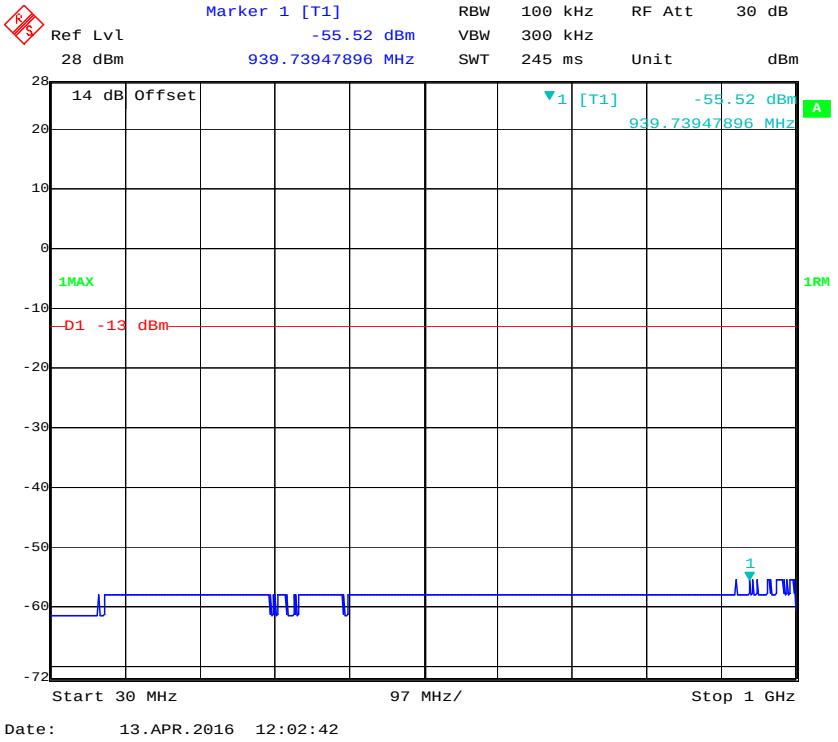
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



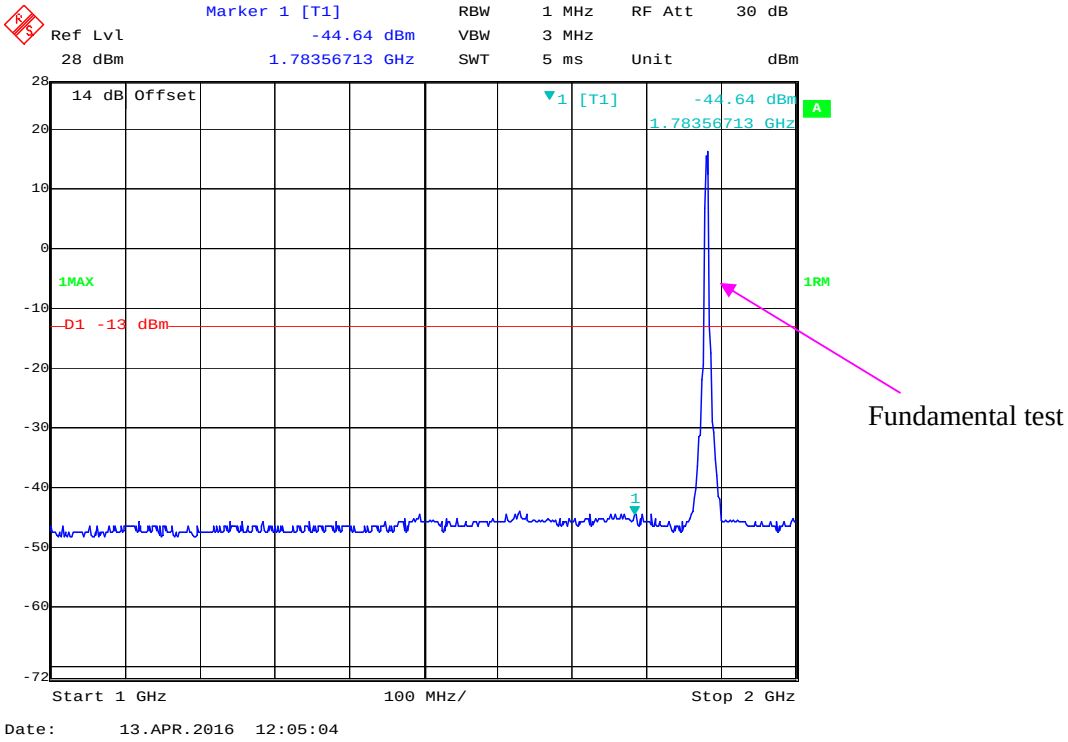
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



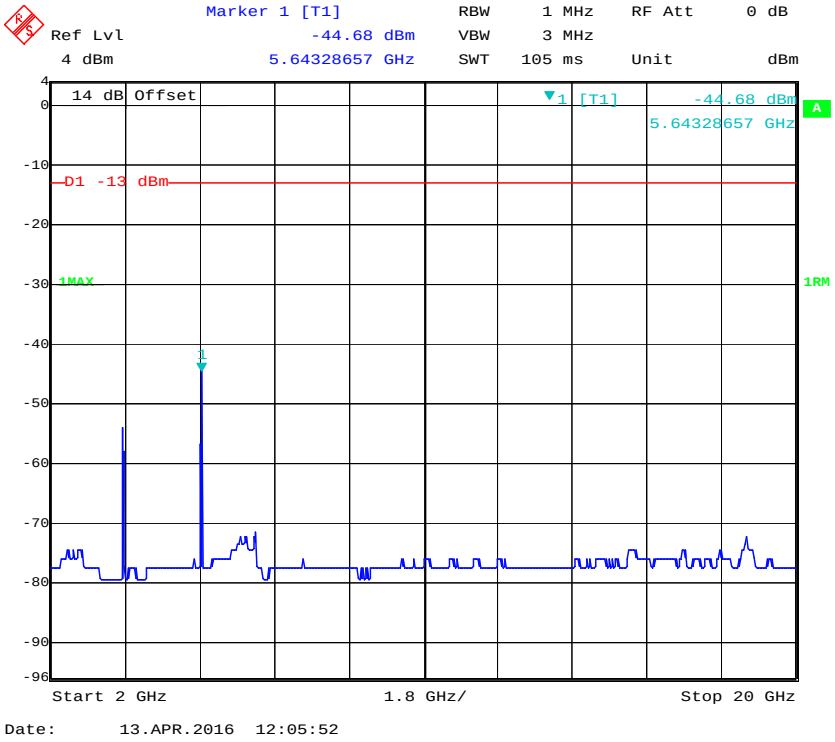
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



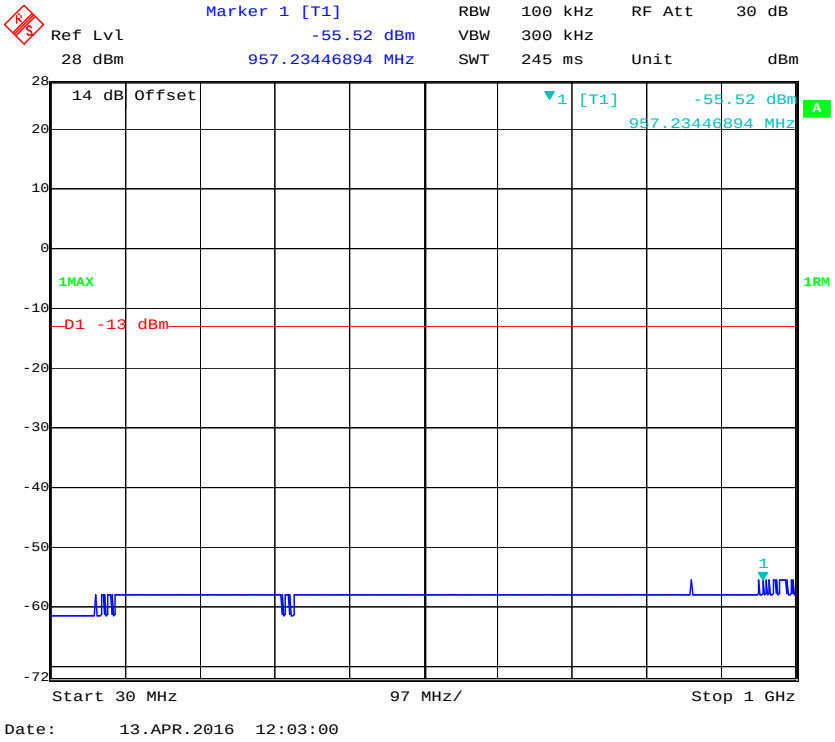
1 GHz – 2 GHz (5.0 MHz, Middle Channel)



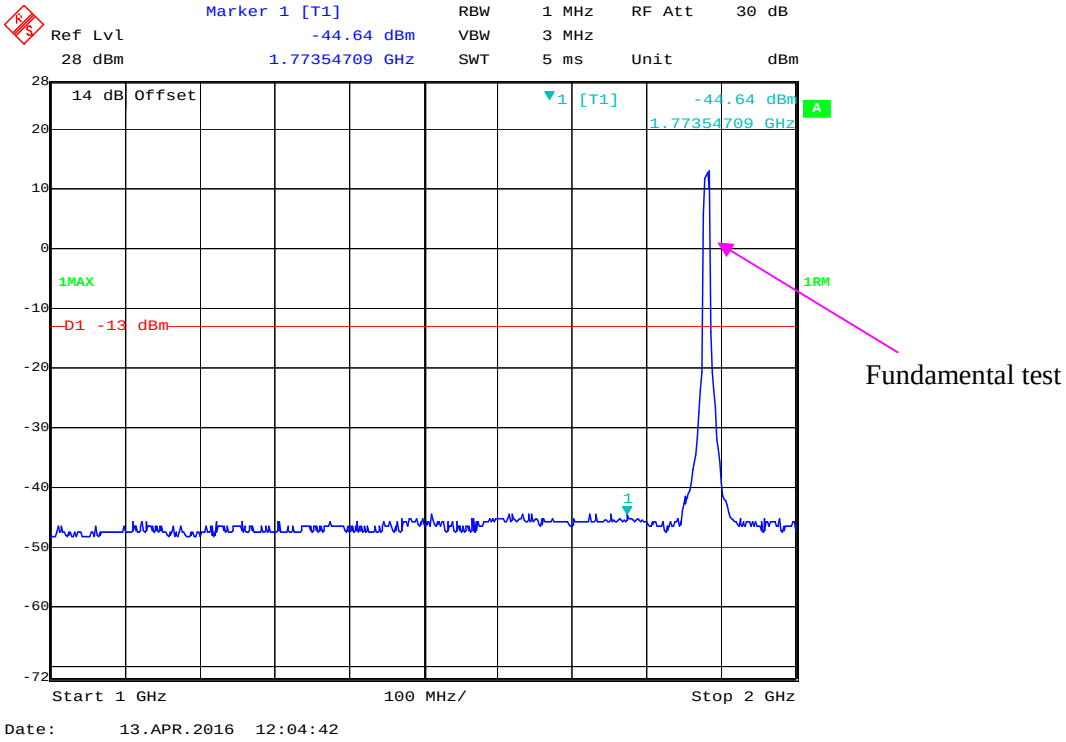
2 GHz – 20 GHz (5.0 MHz, Middle Channel)



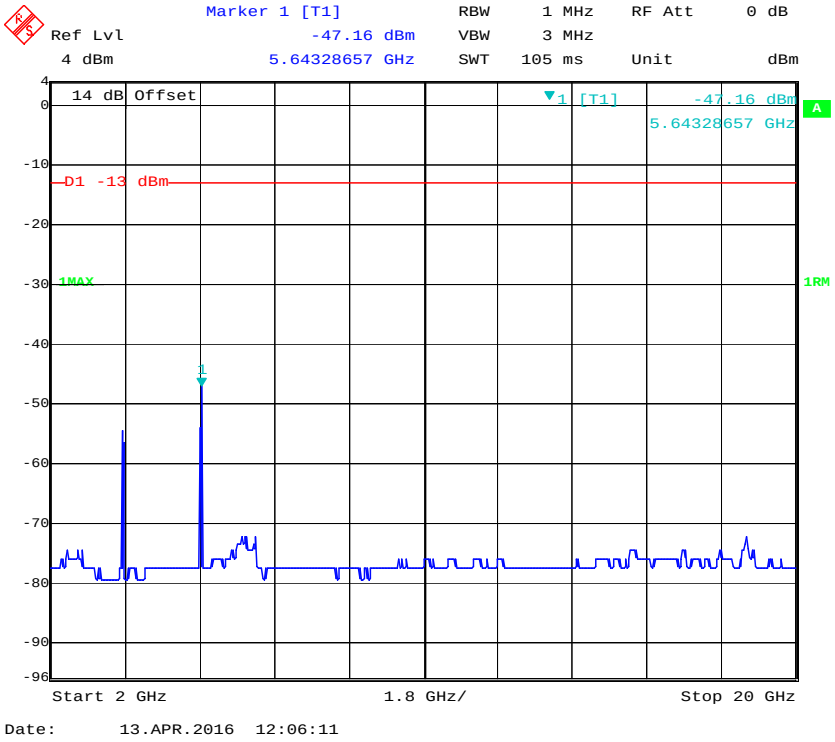
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



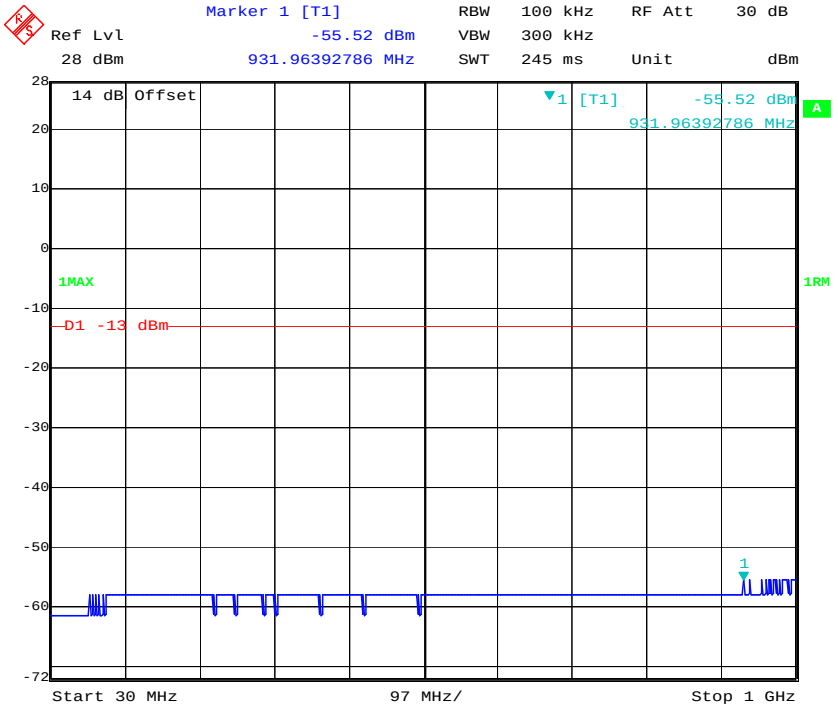
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



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

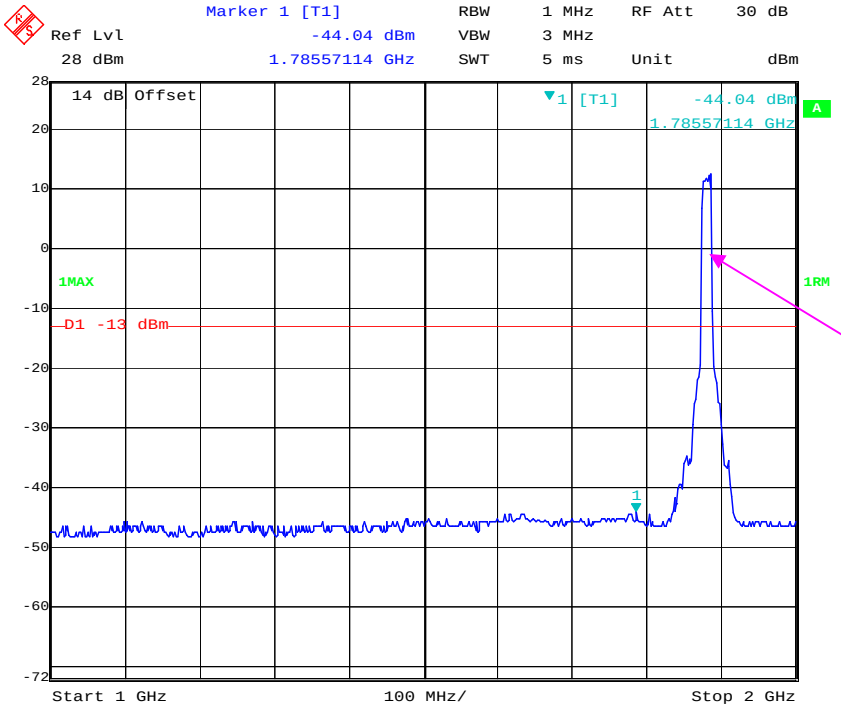


30 MHz - 1 GHz (15.0 MHz, Middle Channel)



Date: 13.APR.2016 12:03:15

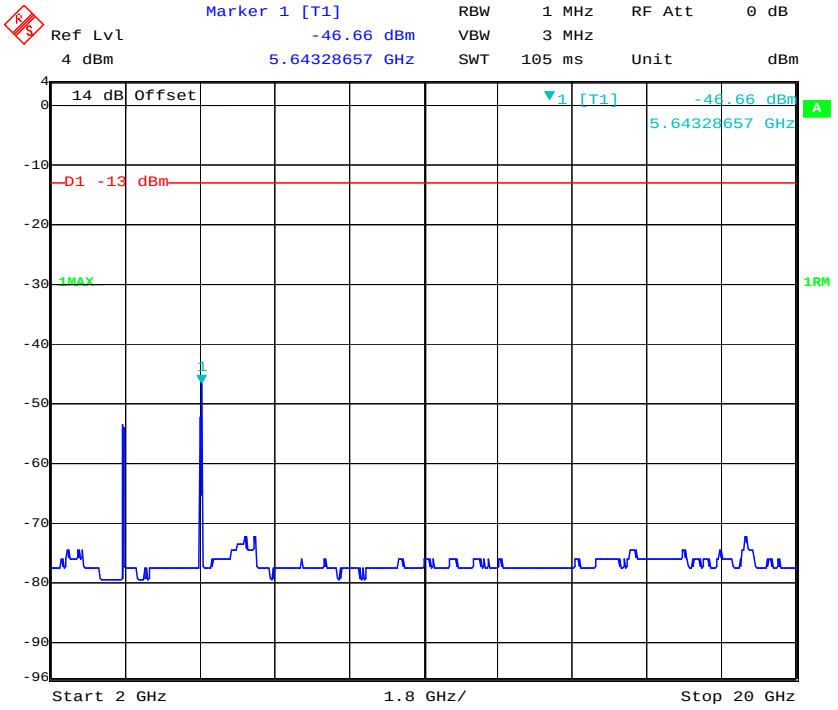
1 GHz –2 GHz (15.0 MHz, Middle Channel)



Fundamental test

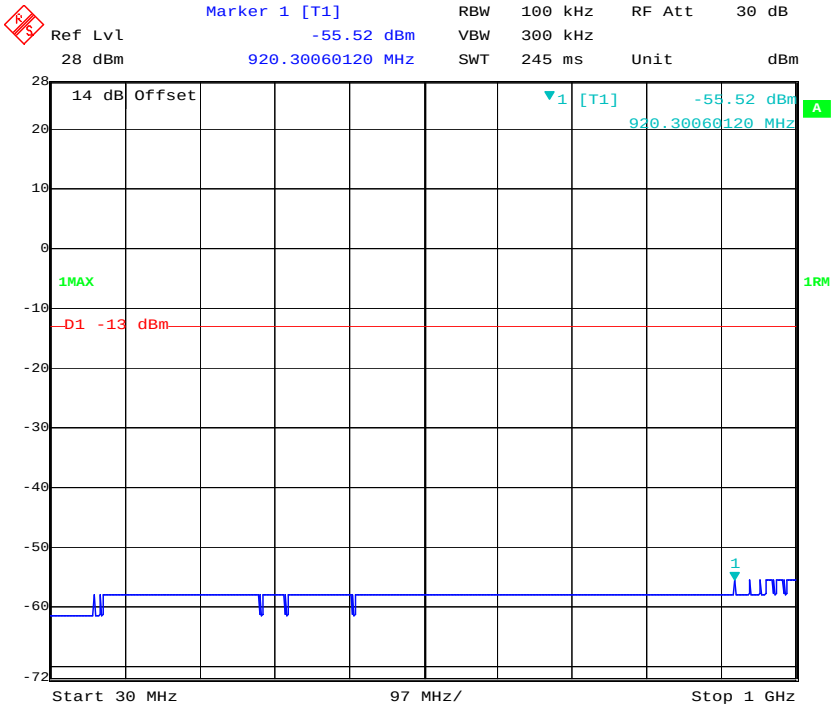
Date: 13.APR.2016 12:04:23

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



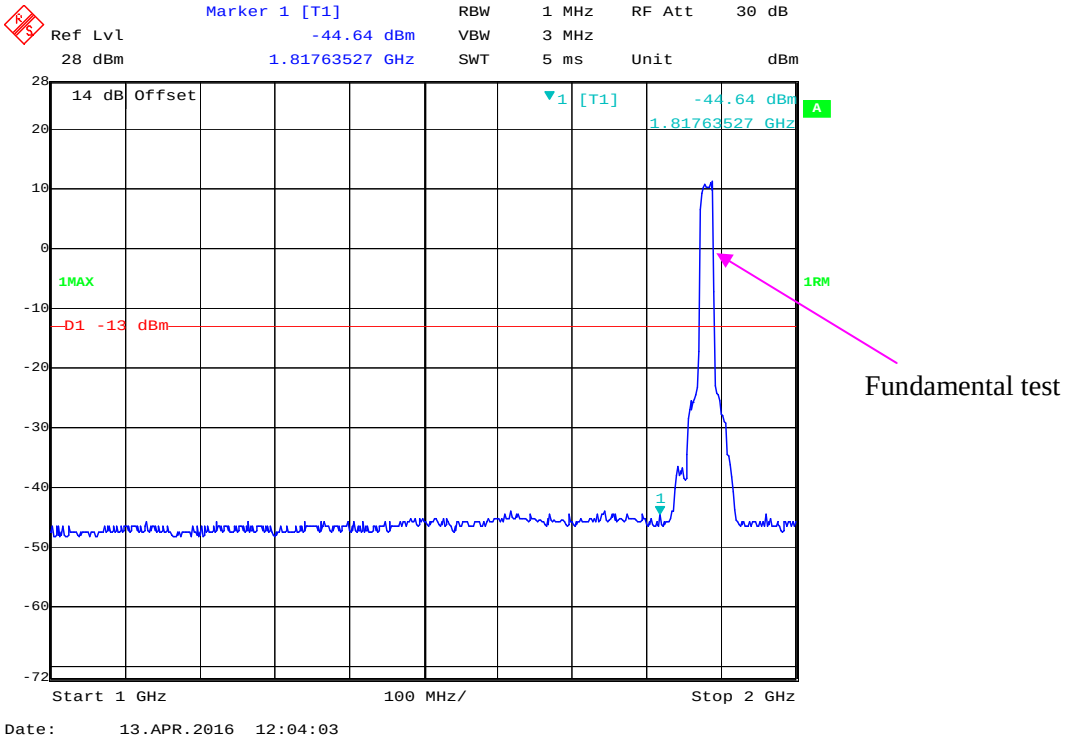
Date: 13.APR.2016 12:06:28

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

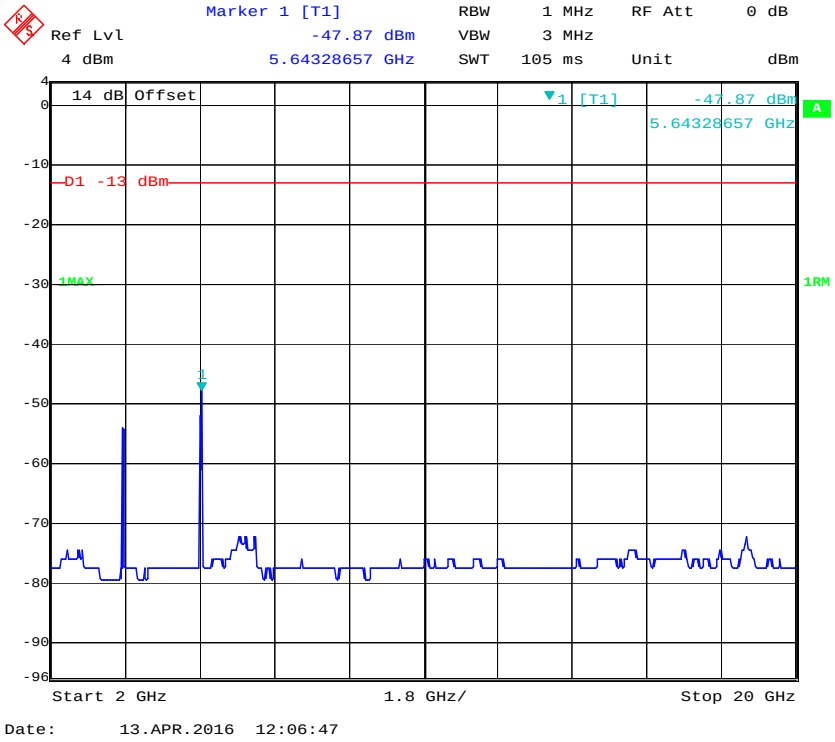


Date: 13.APR.2016 12:03:37

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

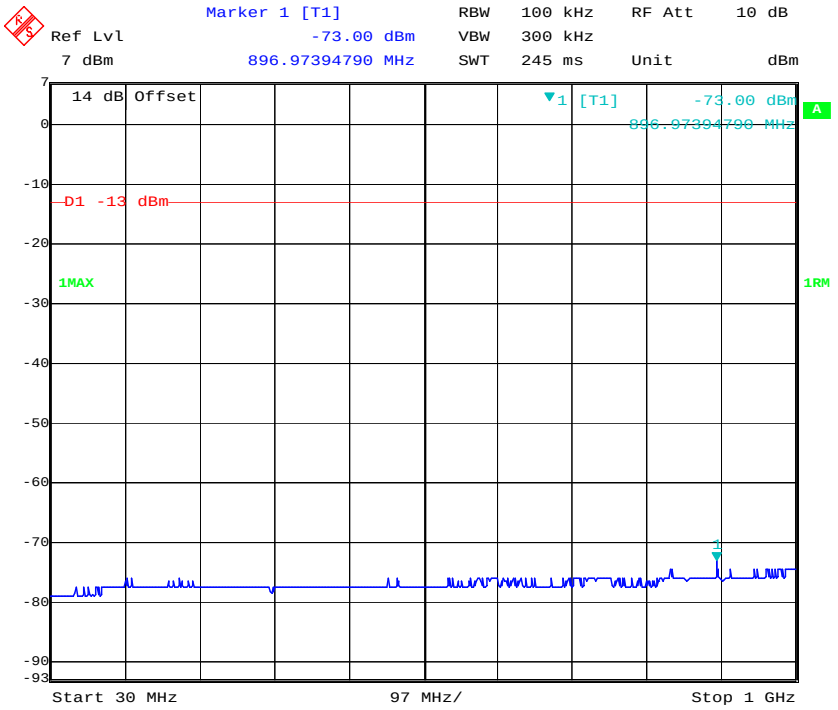


2 GHz –20 GHz (20.0 MHz, Middle Channel)



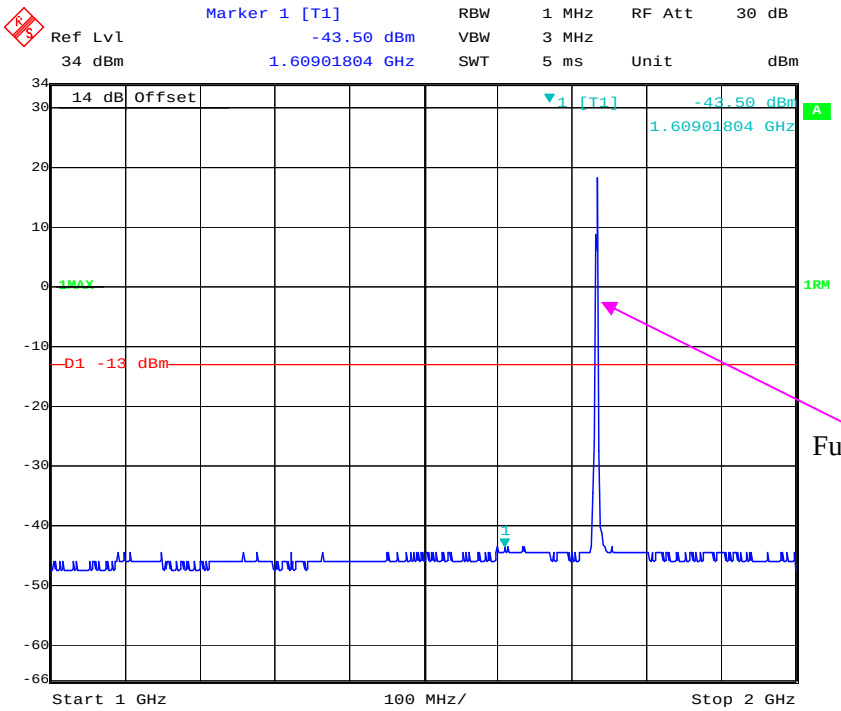
LTE Band 4:

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



Date: 13.APR.2016 12:11:49

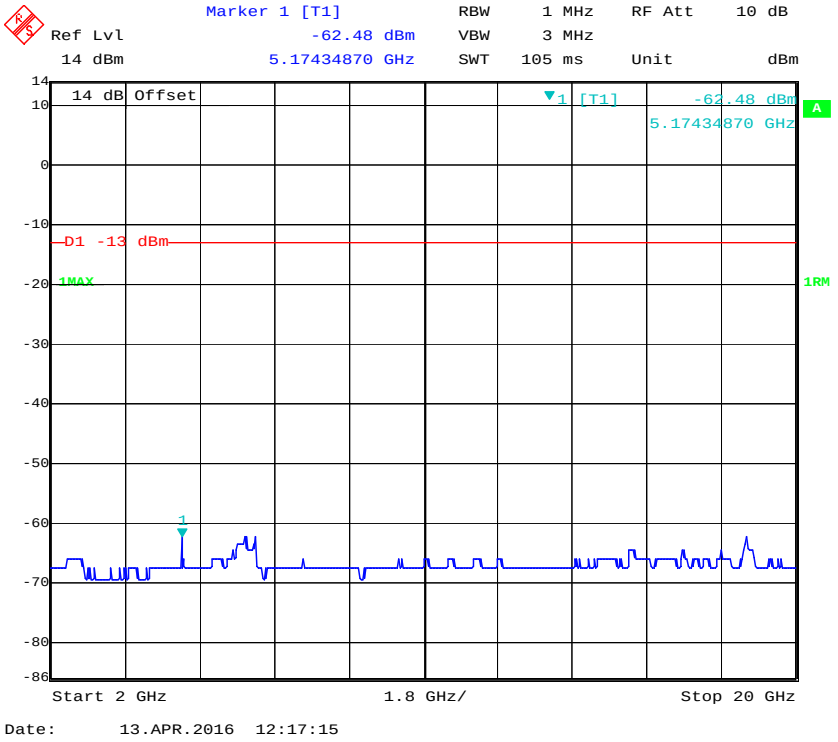
1 GHz – 2 GHz (1.4 MHz, Middle Channel)



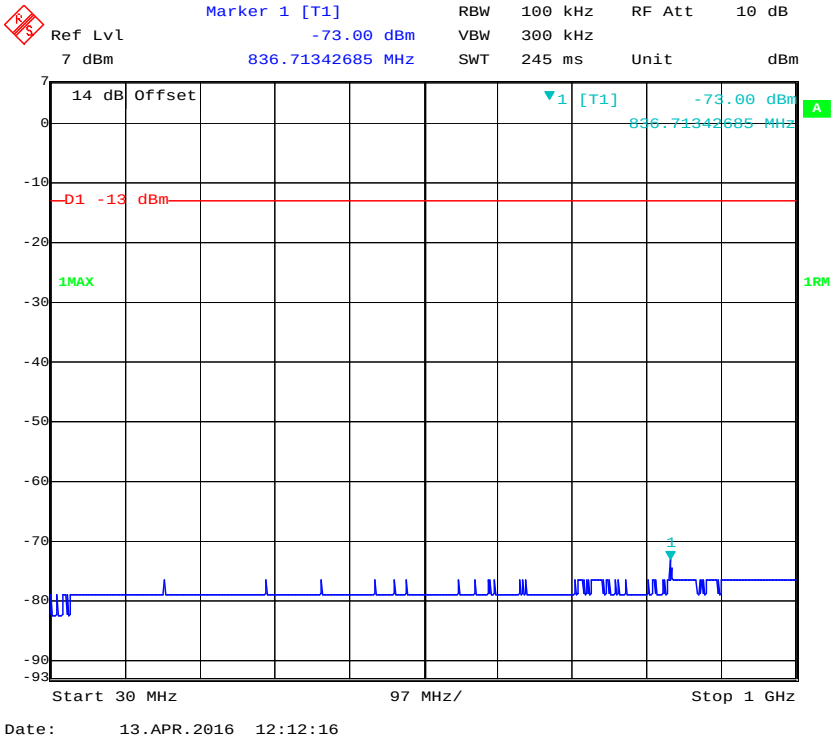
Fundamental test

Date: 13.APR.2016 12:15:48

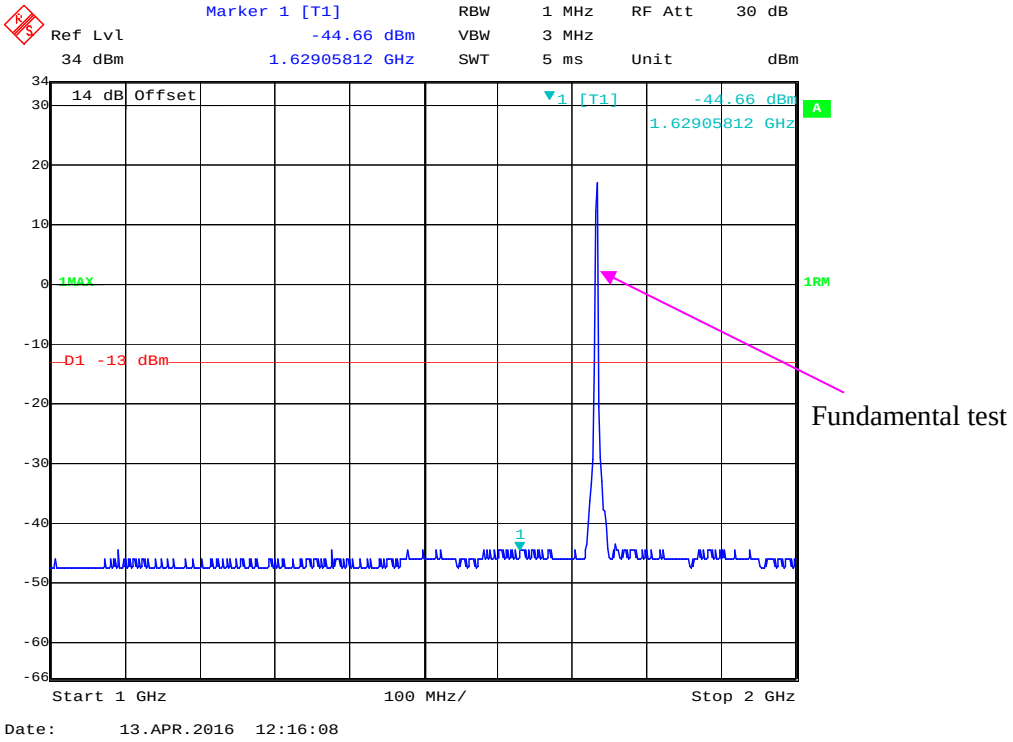
2 GHz – 20 GHz (1.4 MHz, Middle Channel)



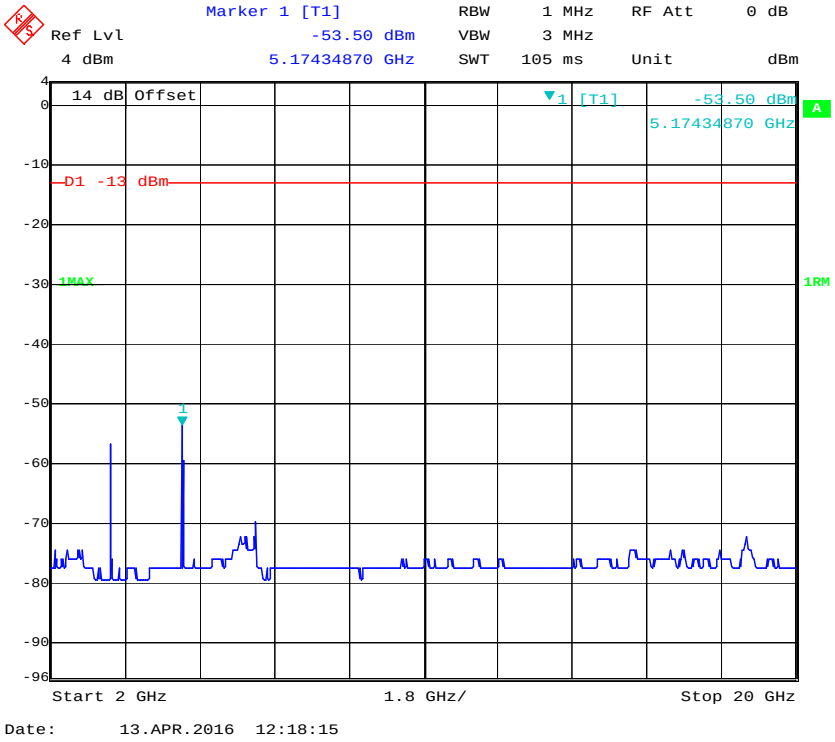
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



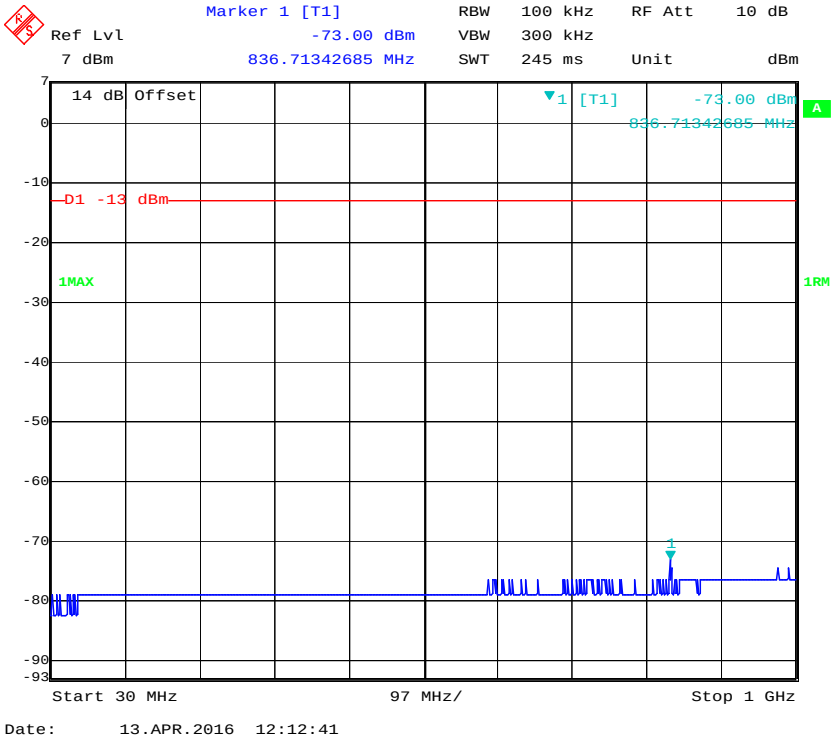
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



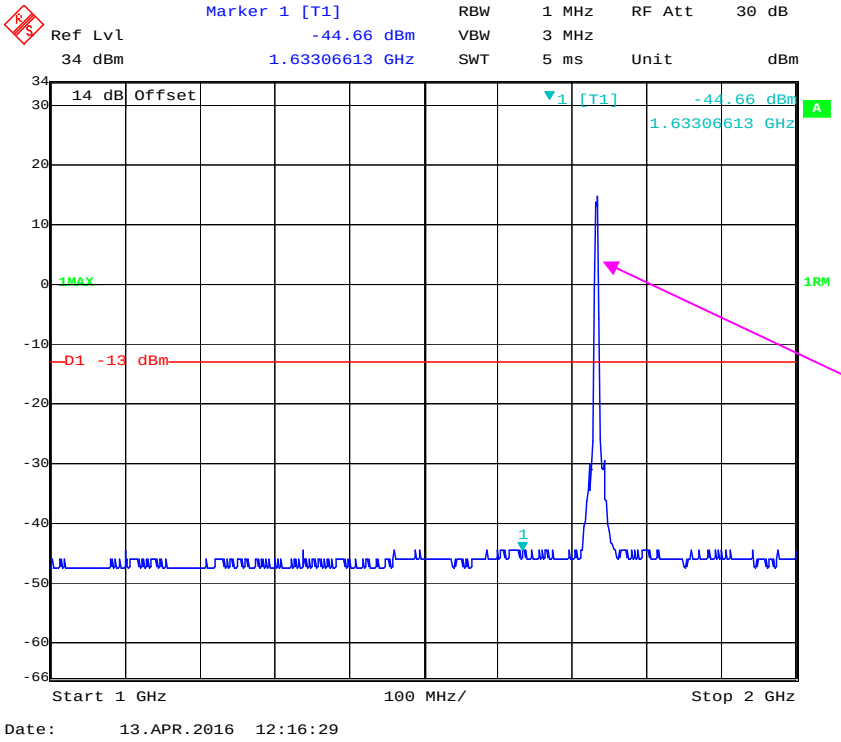
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



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

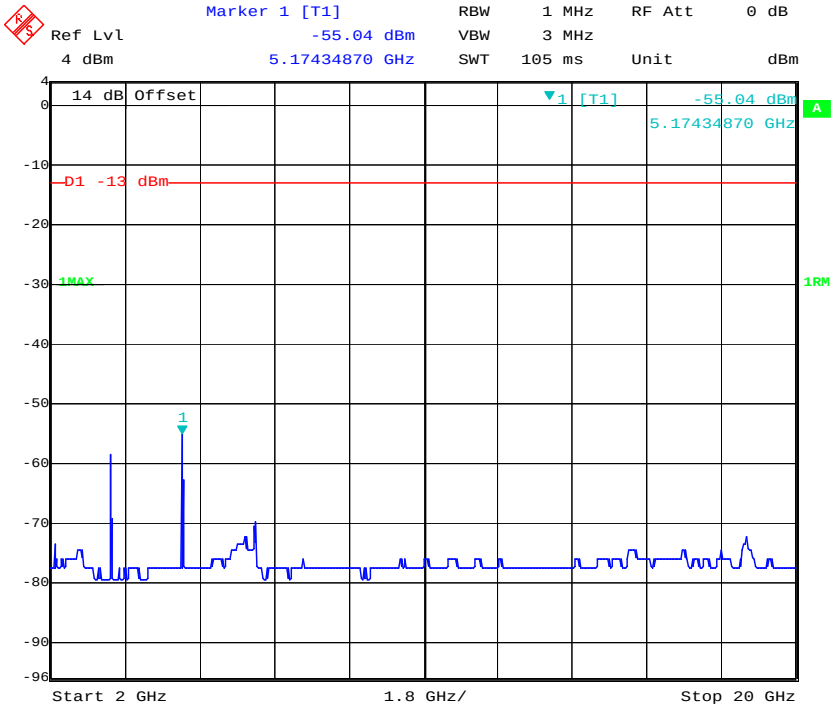


1 GHz – 2 GHz (5.0 MHz, Middle Channel)

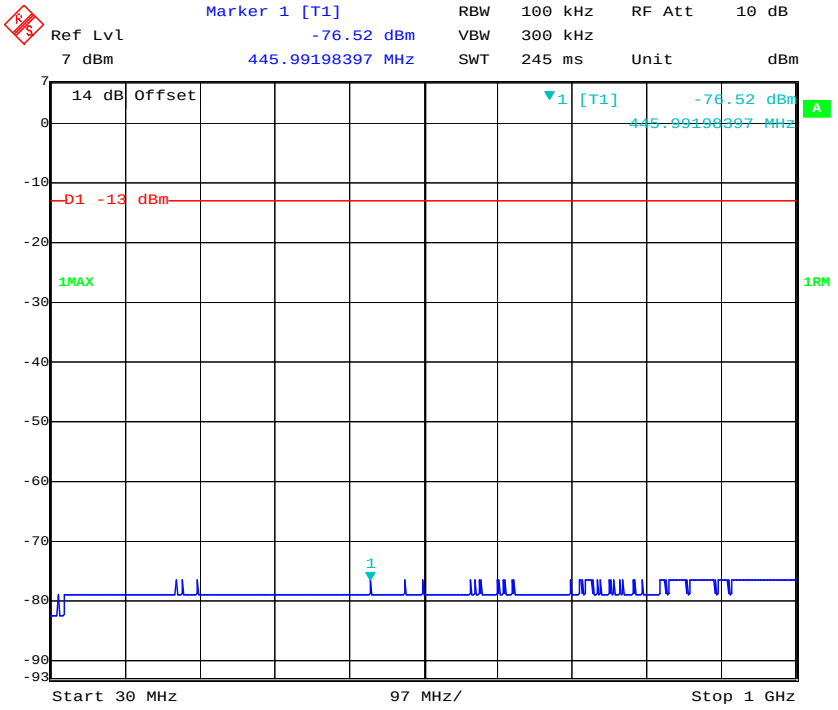


Fundamental test

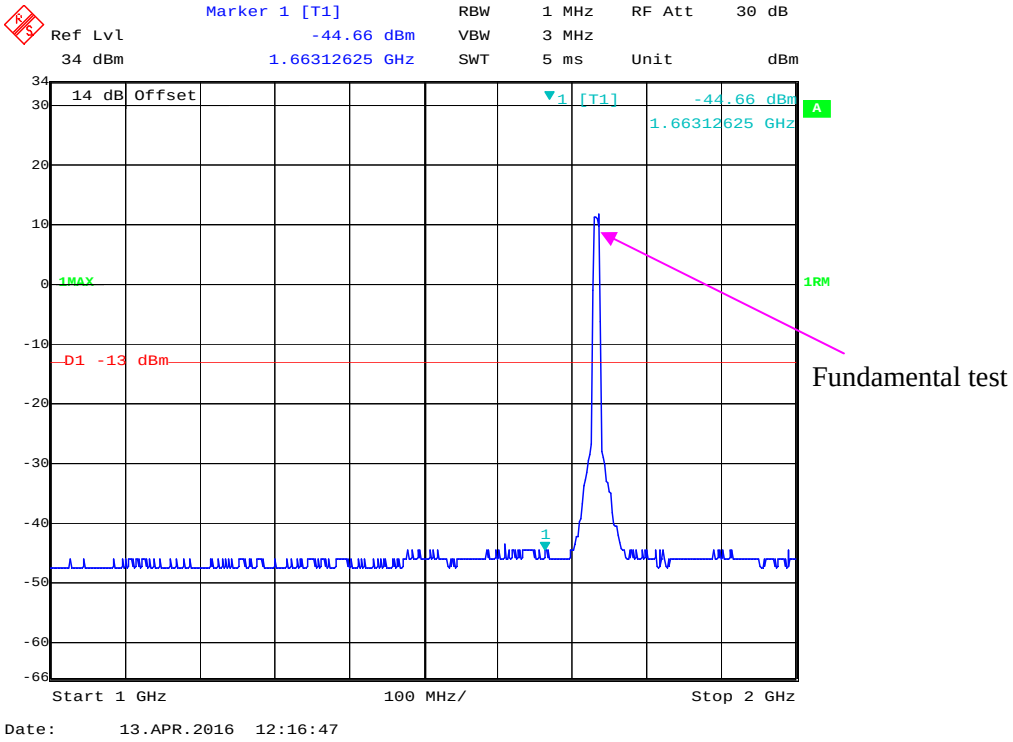
2 GHz – 20 GHz (5.0 MHz, Middle Channel)



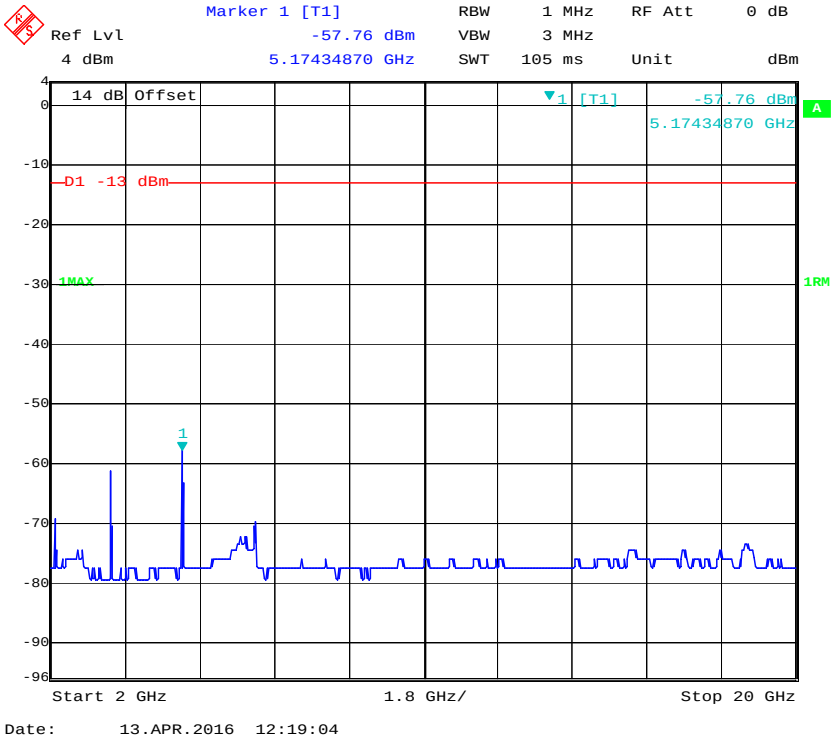
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



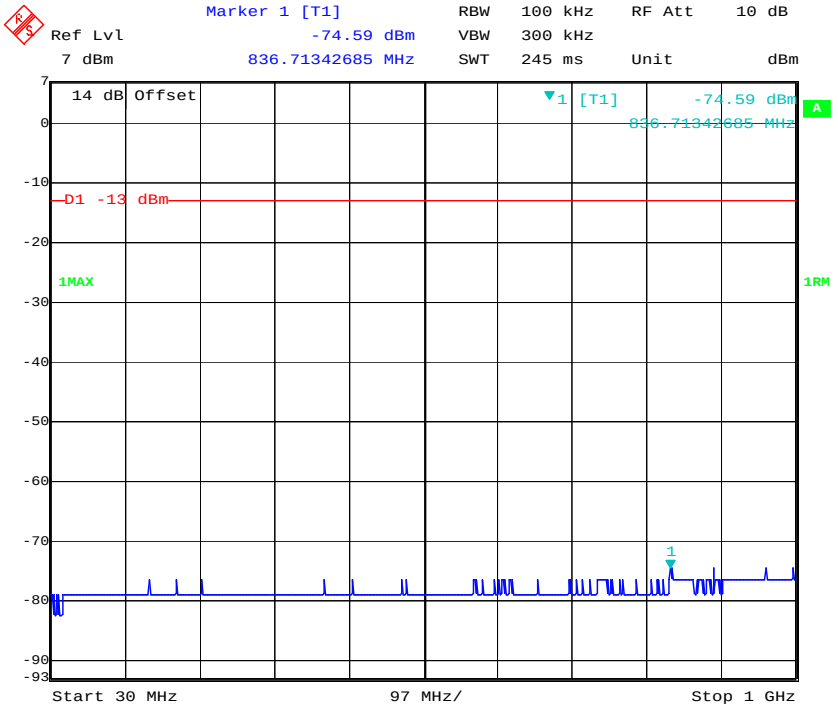
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



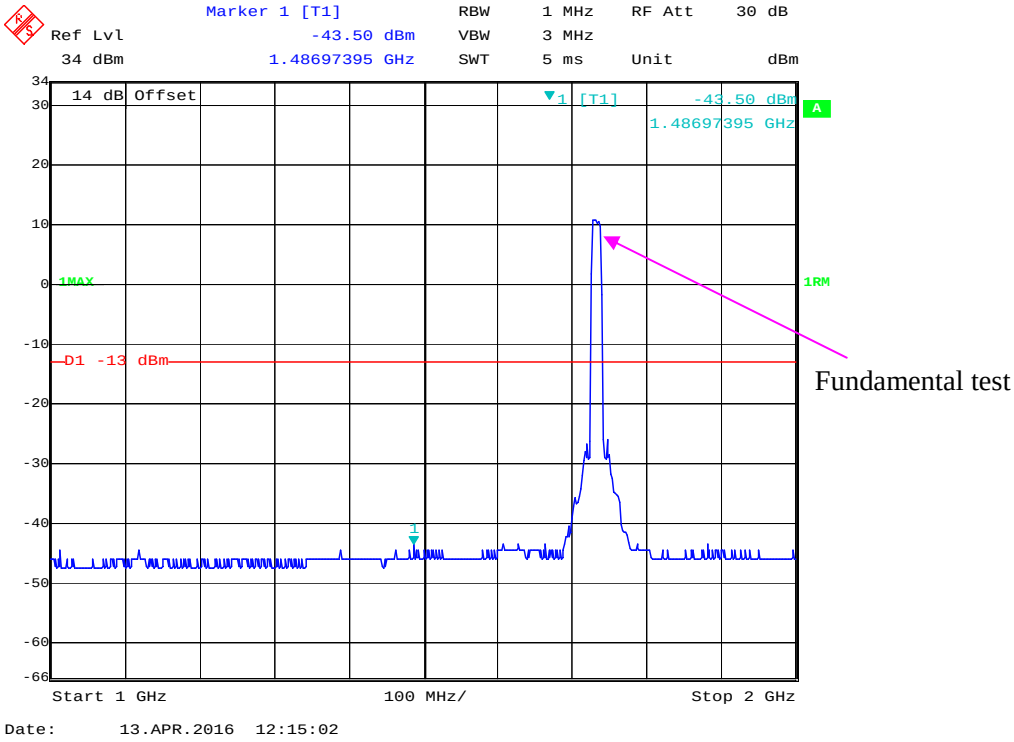
2 GHz – 20 GHz (10.0 MHz, Middle Channel)



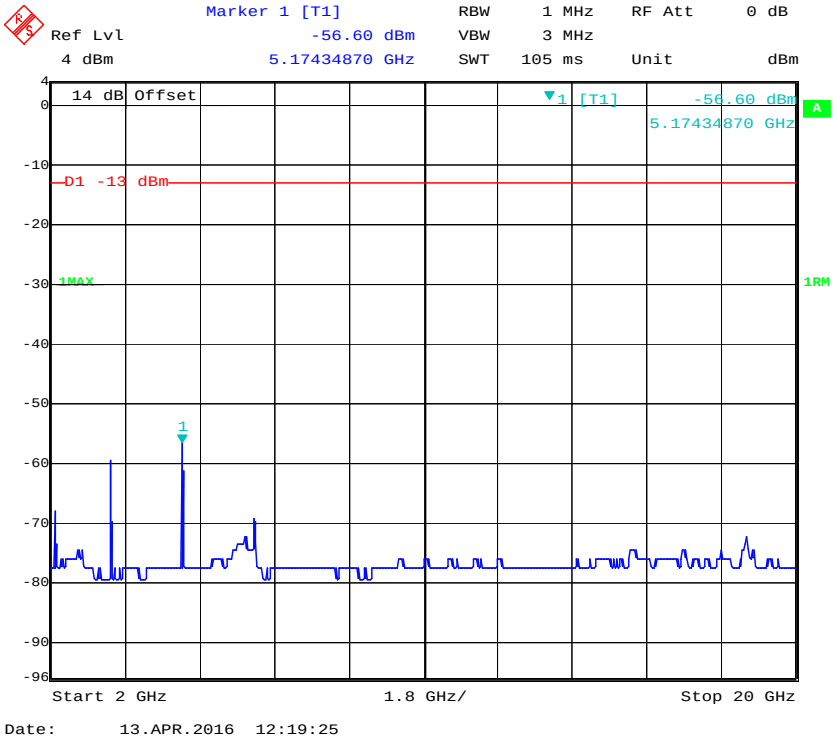
30 MHz - 1 GHz (15.0 MHz, Middle Channel)



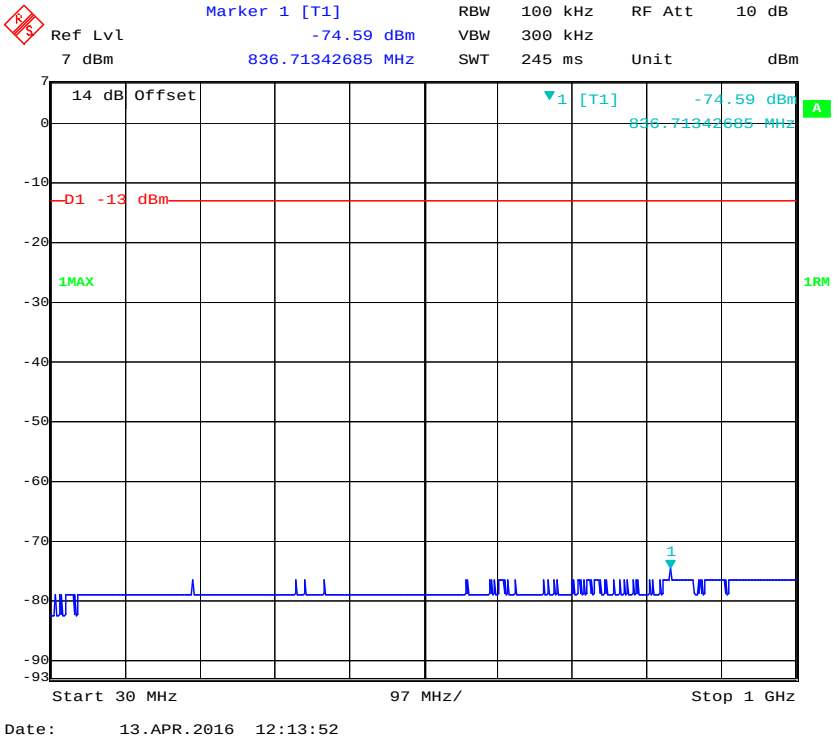
1 GHz –2 GHz (15.0 MHz, Middle Channel)



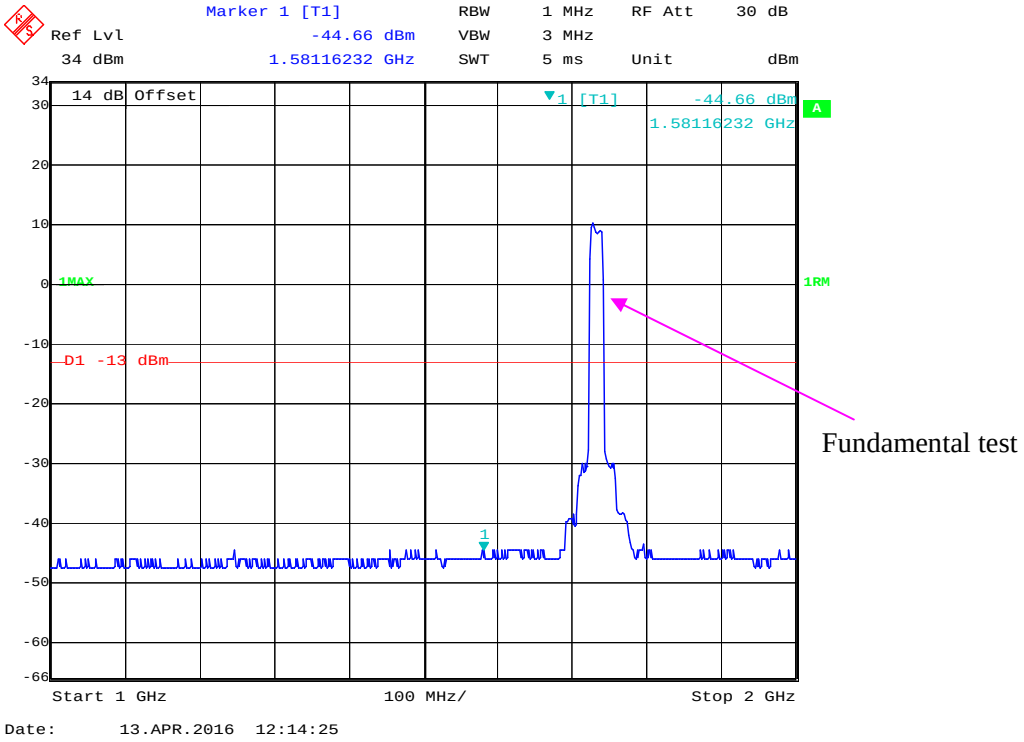
2 GHz –20GHz (15.0 MHz, Middle Channel)



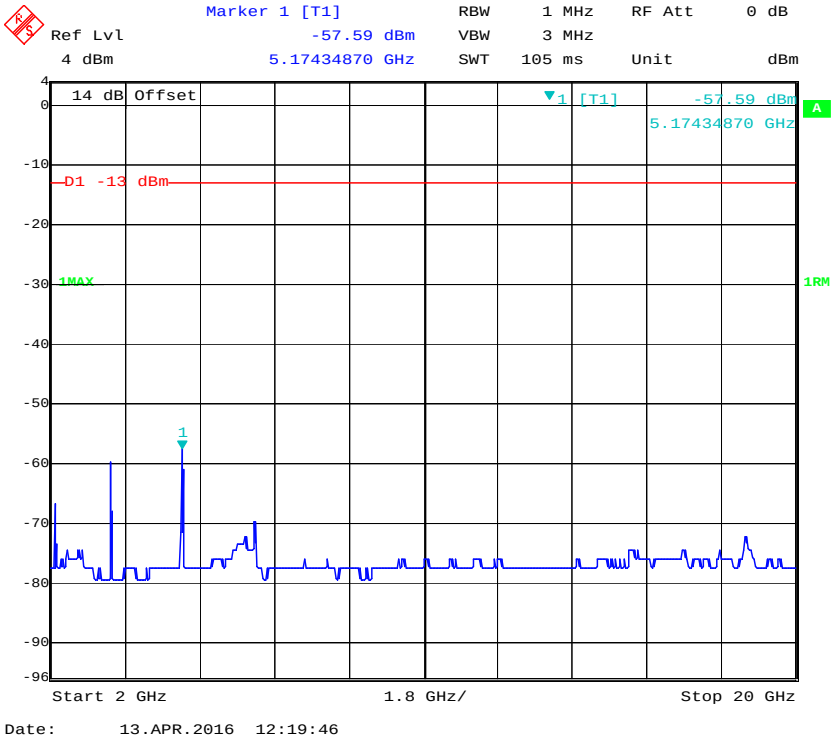
30 MHz - 1 GHz (20.0 MHz, Middle Channel)



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

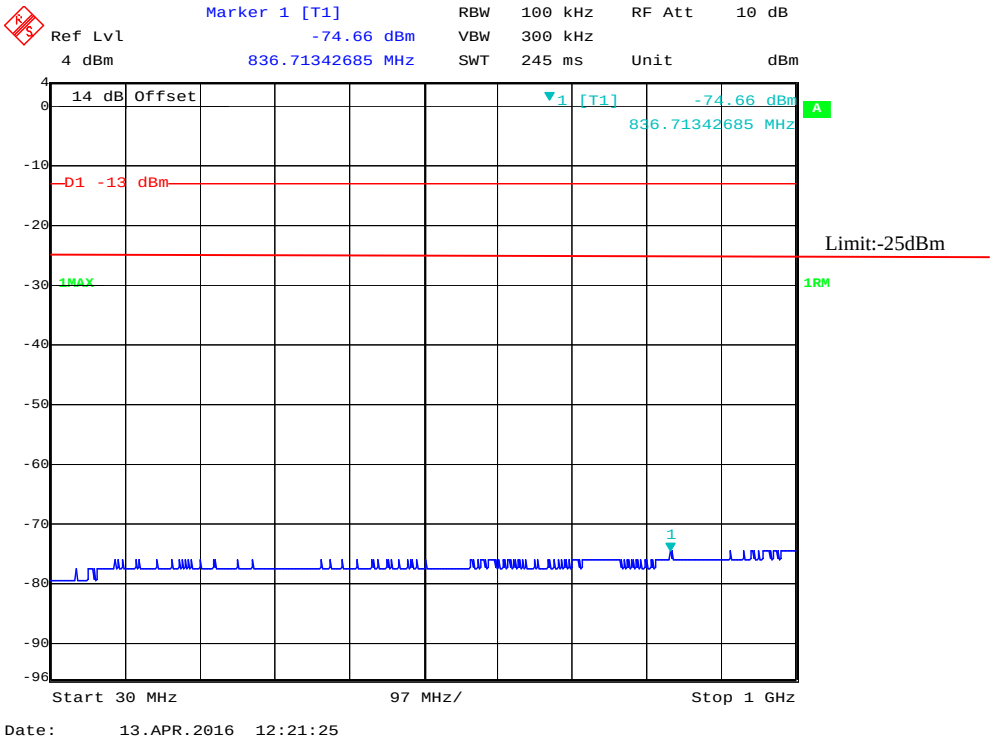


2 GHz –20 GHz (20.0 MHz, Middle Channel)

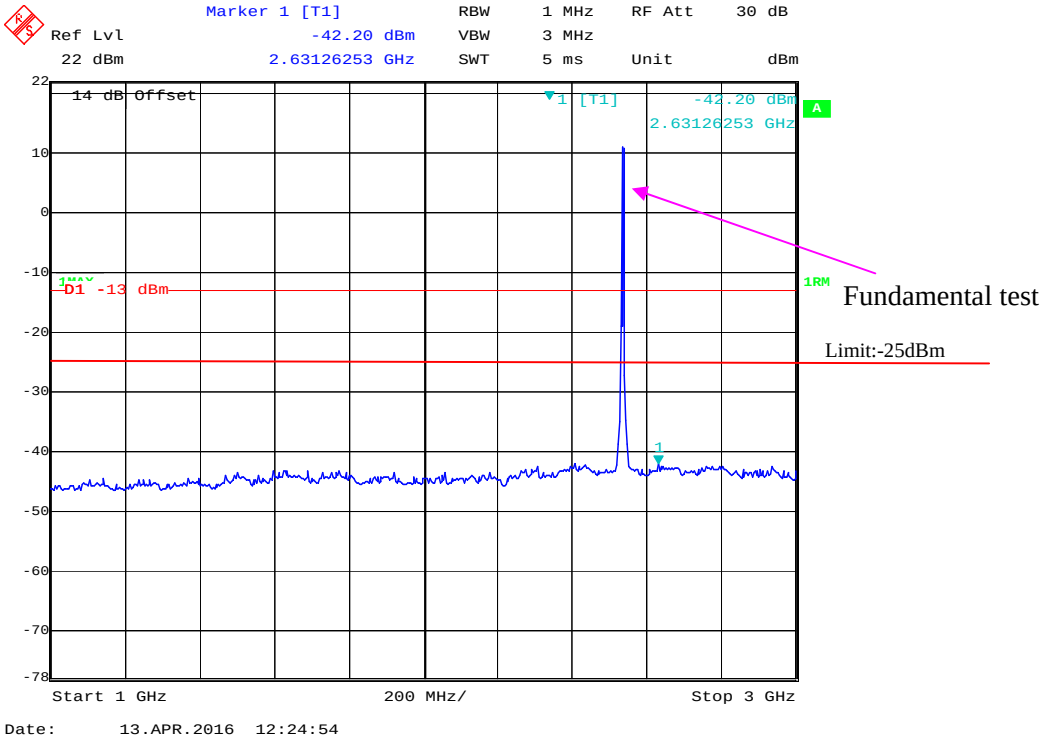


LTE Band 7:

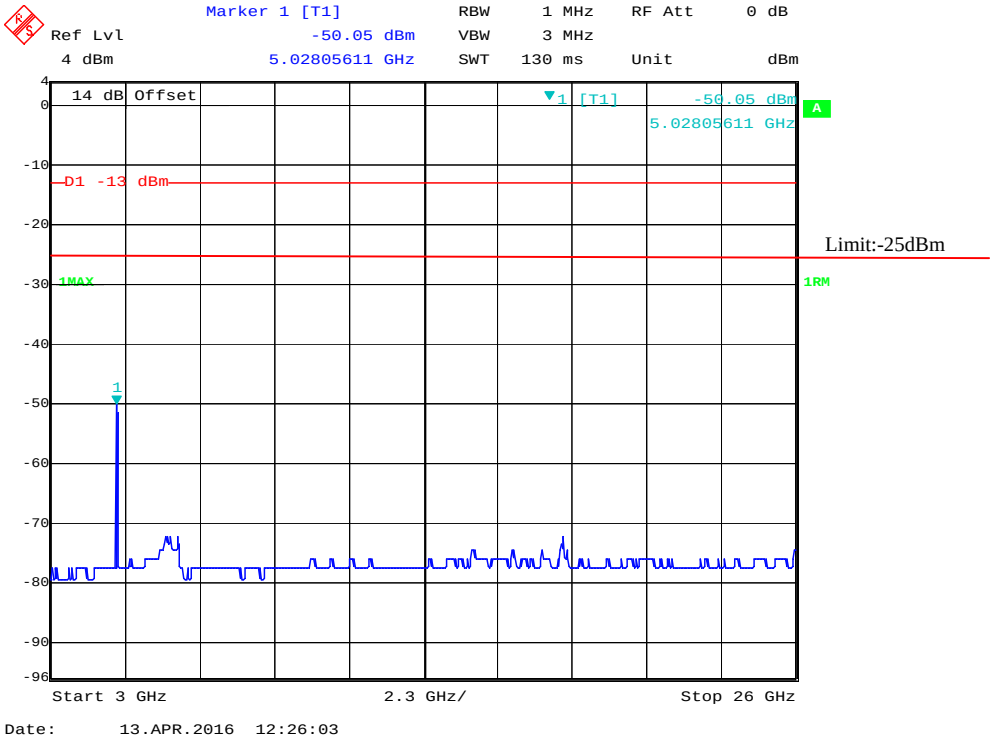
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



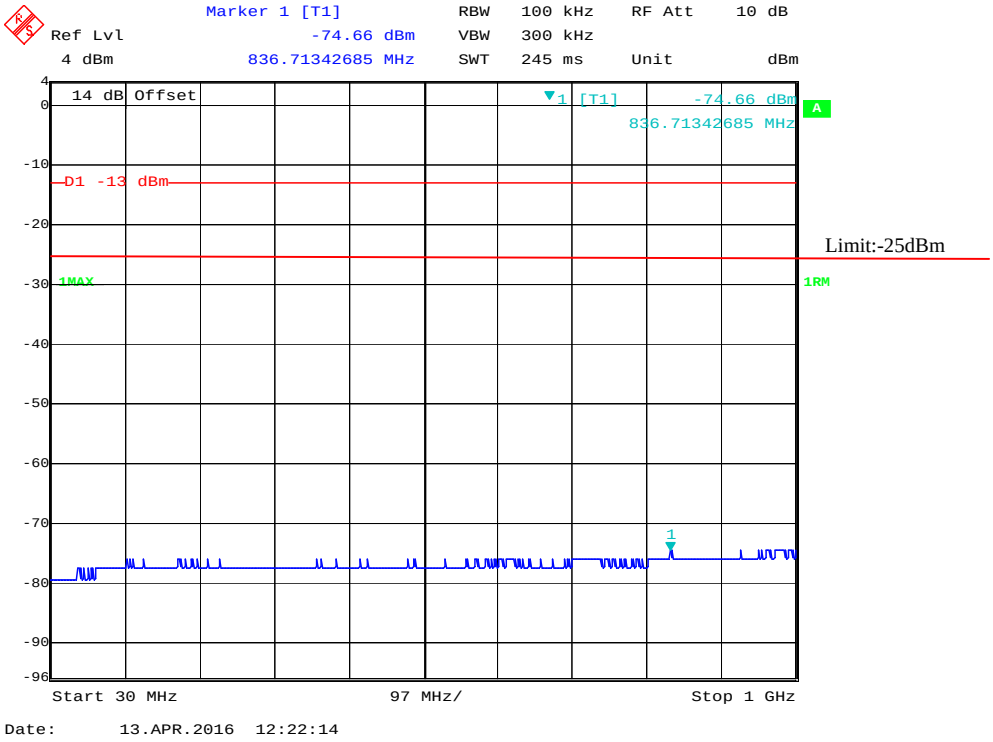
1 GHz – 3 GHz (5.0 MHz, Middle Channel)



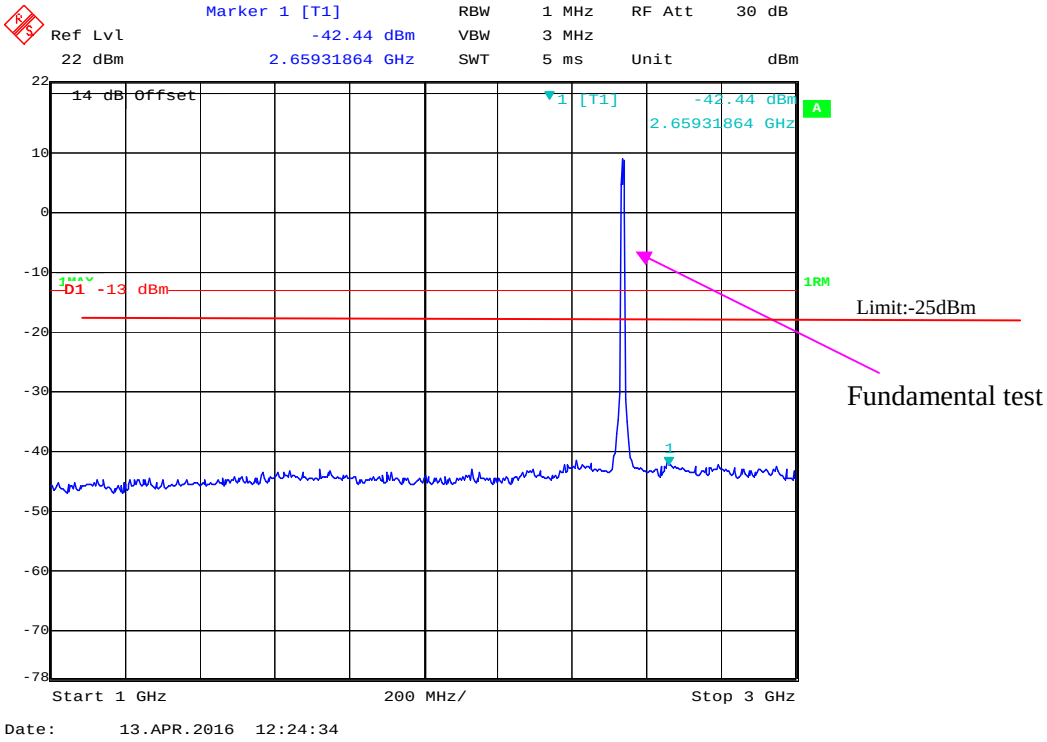
3 GHz – 26 GHz (5.0 MHz, Middle Channel)



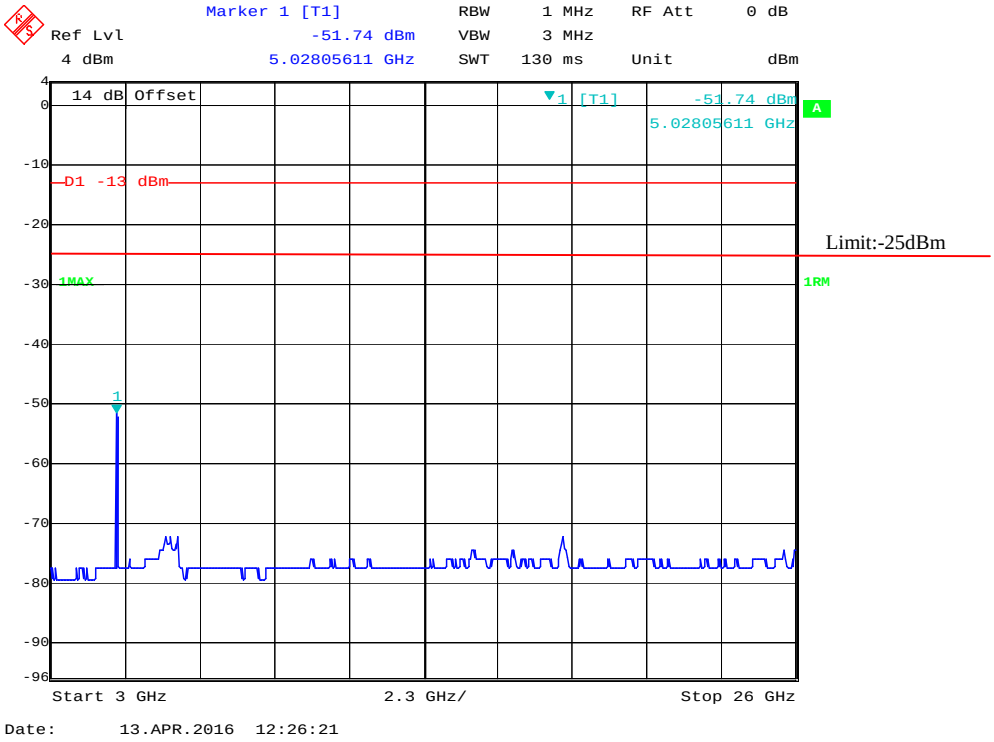
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



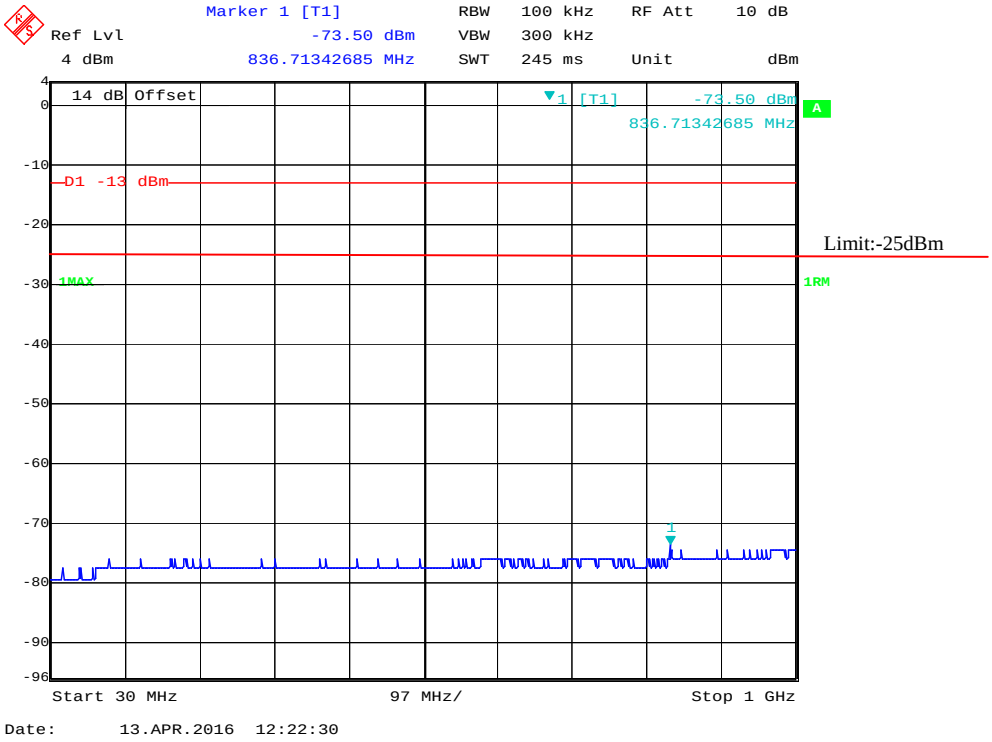
1 GHz – 3 GHz (10.0 MHz, Middle Channel)



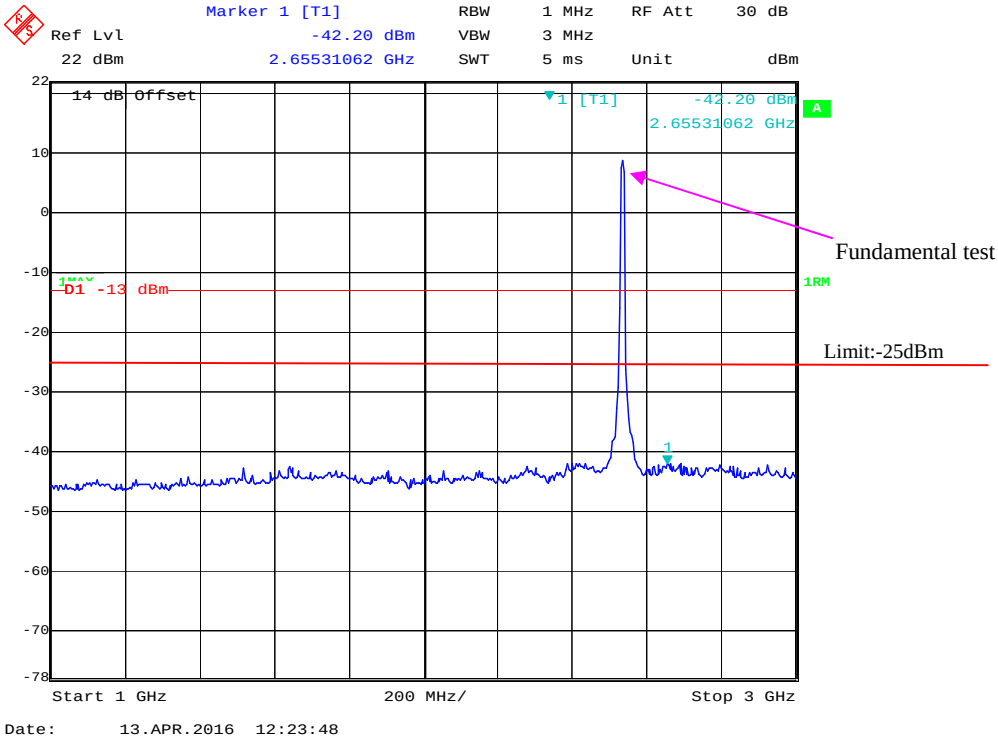
3 GHz – 26 GHz (10.0 MHz, Middle Channel)



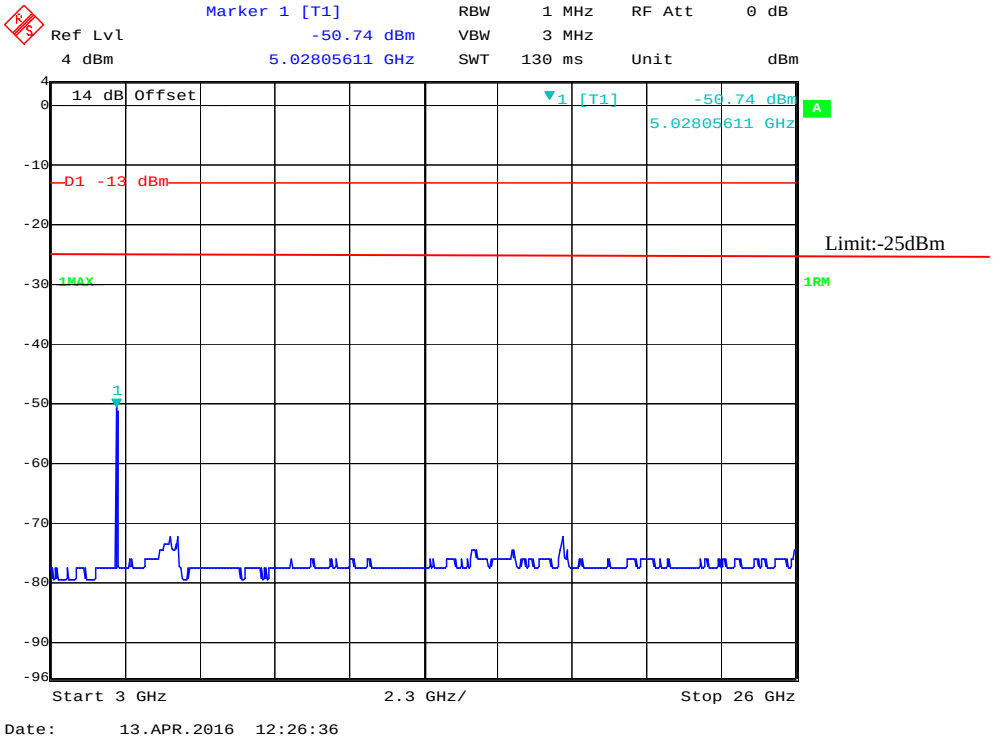
30 MHz - 1 GHz (15.0 MHz, Middle Channel)



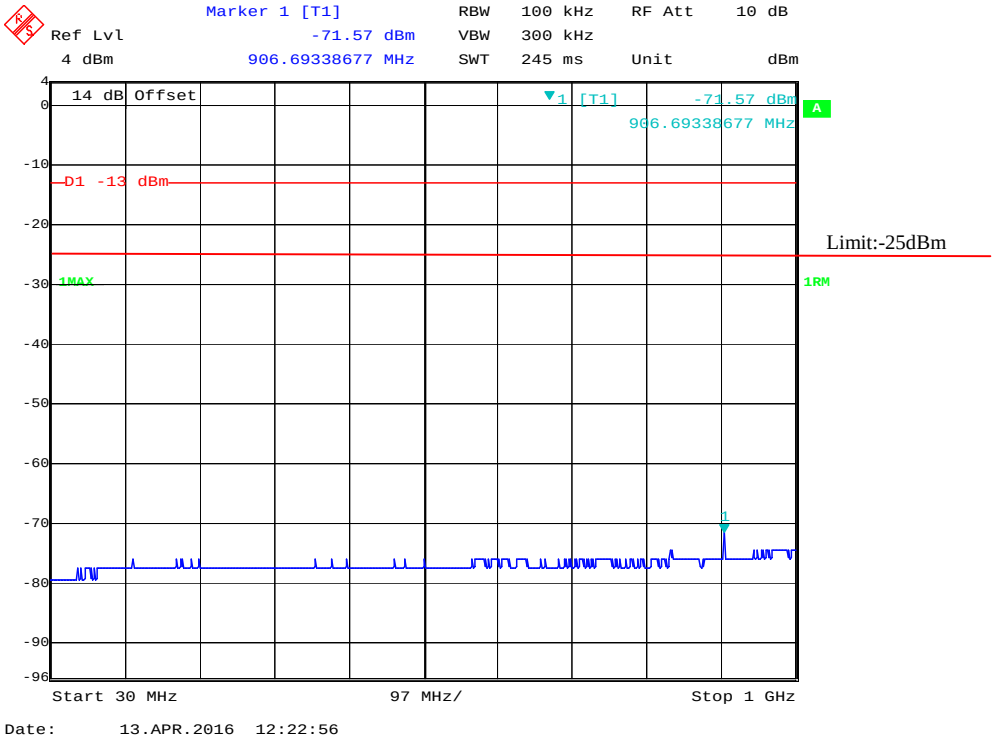
1 GHz –3 GHz (15.0 MHz, Middle Channel)



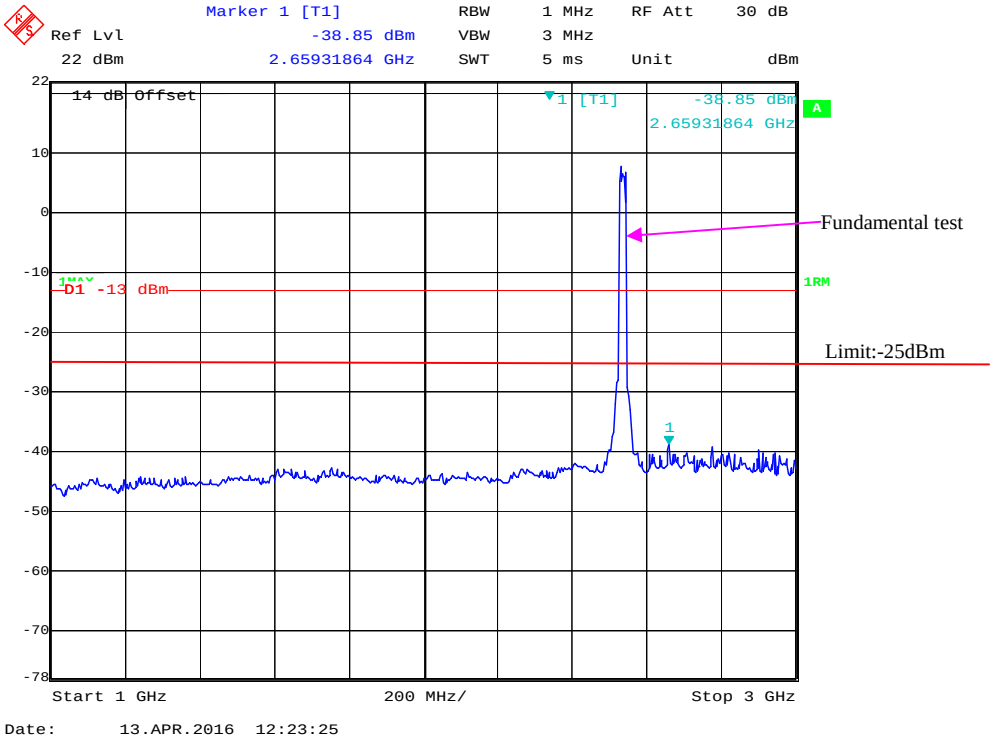
3 GHz –26GHz (15.0 MHz, Middle Channel)



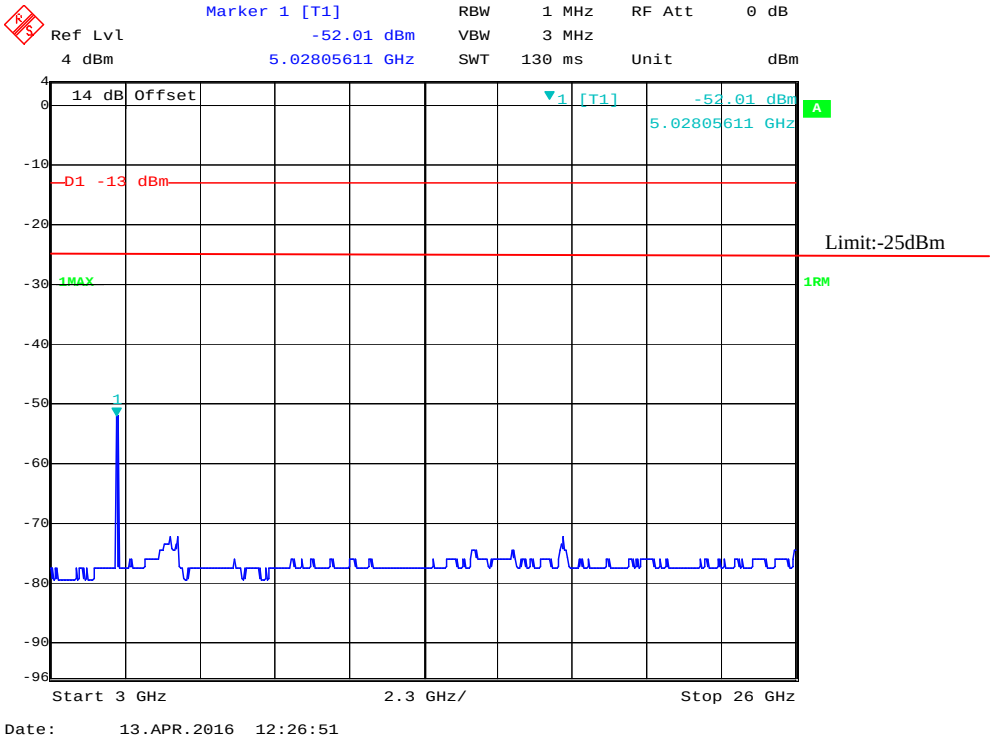
30 MHz - 1 GHz (20.0 MHz, Middle Channel)



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

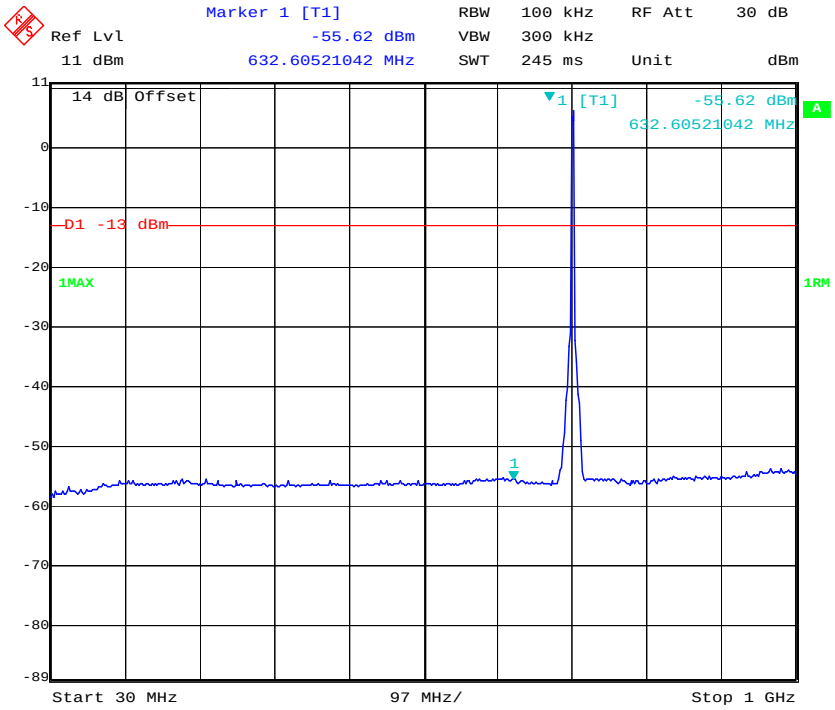


3 GHz –26 GHz (20.0 MHz, Middle Channel)



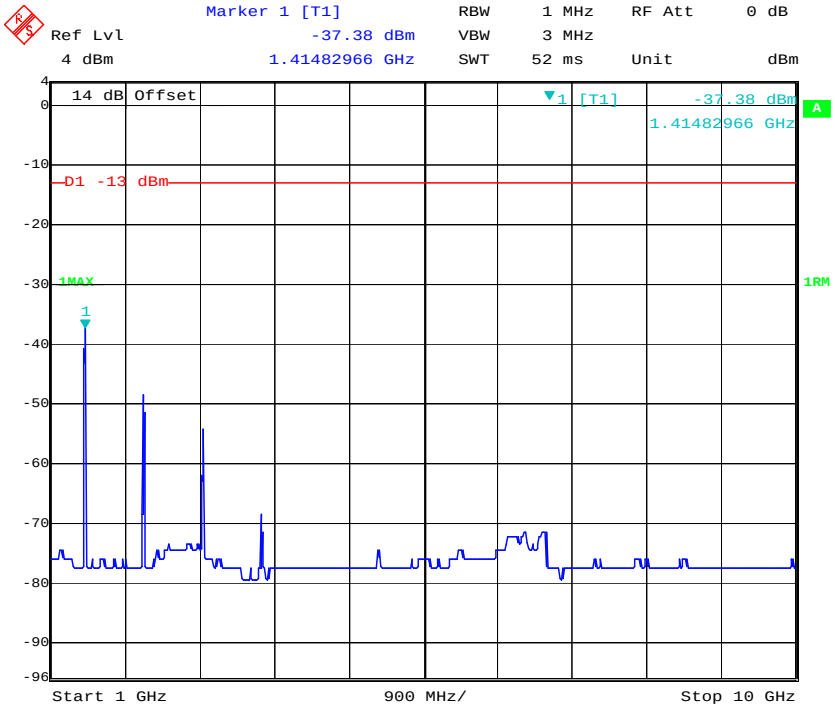
LTE Band 17:

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



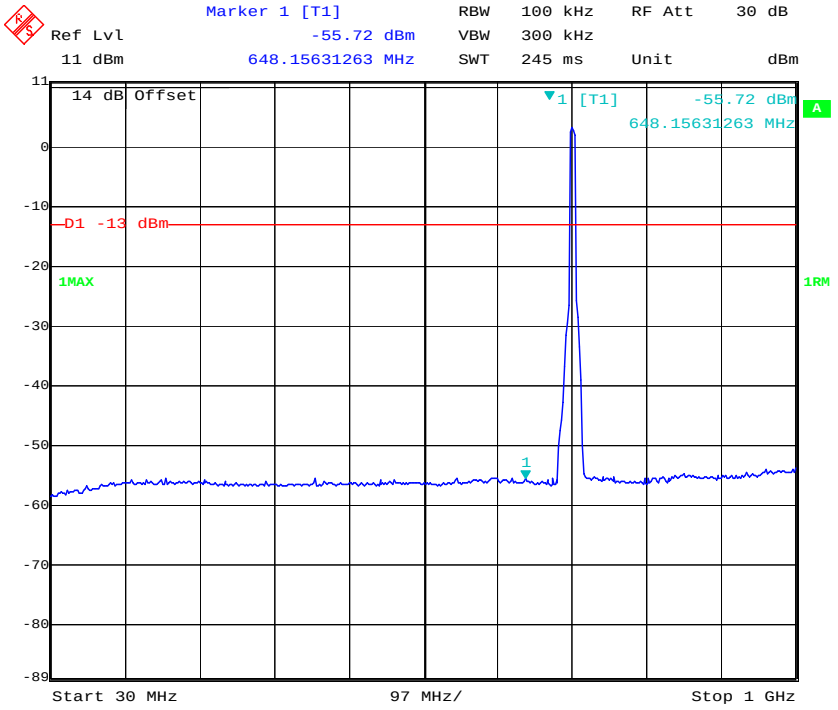
Date: 13.APR.2016 12:35:02

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



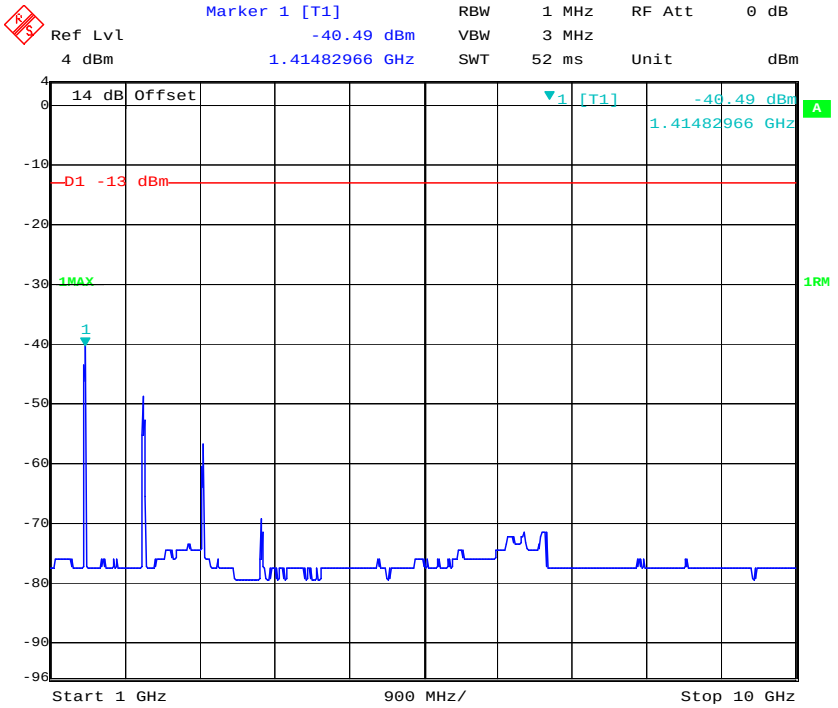
Date: 13.APR.2016 12:33:13

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



Date: 13.APR.2016 12:34:06

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



Date: 13.APR.2016 12:33:37

FCC §2.1053, §22.917 & §24.238 & §27.53 - SPURIOUS RADIATED EMISSIONS

Applicable Standards

FCC § 2.1053, §22.917 and § 24.238 and § 27.53.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Horn Antenna	DRH-118	A052604	2014-12-29	2017-12-28
Sunol Sciences	Bi-log Antenna	JB1	A040904-2	2014-12-07	2017-12-06
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Mini	Pre-amplifier	ZVA-183-S+	5969001149	2015-04-23	2016-04-23
HP	Amplifier	HP8447E	1937A01046	2015-05-06	2016-05-06
HP	Signal Generator	HP 8341B	2624A00116	2015-07-02	2016-07-01
COM POWER	Dipole Antenna	AD-100	041000	2015-08-18	2016-08-18
A.H. System	Horn Antenna	SAS-200/571	135	2015-08-18	2018-08-17
Rohde & Schwarz	EMI Test Receiver	ESCI	101120	2015-12-15	2016-12-14
the electro-Mechanics Co.	Horn Antenna	3116	9510-2270	2013-10-14	2016-10-13
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	104PEA	218124002	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	1	2015-06-15	2016-06-15
Ducommun technologies	RF Cable	RG-214	2	2015-06-15	2016-06-15

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

Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0kPa

The testing was performed by Haiguo Li on 2016-04-06.

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	SG Level (dBm)	Cable Loss (dB)	Antenna Gain (dB)			
GSM Mode, High channel										
227.65	38.42	242	1.8	H	-58.6	0.31	0	-58.91	-13	45.91
227.65	37.33	7	1.2	V	-59.7	0.31	0	-60.01	-13	47.01
1697.60	68.61	110	2.2	H	-38.8	1.60	6.90	-33.50	-13	20.50
1697.60	69.88	358	1.5	V	-38.0	1.60	6.90	-32.70	-13	19.70
2546.40	68.44	176	2.3	H	-36.1	1.70	8.60	-29.20	-13	16.20
2546.40	62.44	318	2.0	V	-42.5	1.70	8.60	-35.60	-13	22.60
WCDMA Mode, Middle channel										
235.58	38.47	24	1.7	H	-58.5	0.31	0	-58.81	-13	45.81
235.58	37.25	113	2.1	V	-59.7	0.31	0	-60.01	-13	47.01
1673.20	58.39	337	1.1	H	-49.0	1.60	6.90	-43.70	-13	30.70
1673.20	59.63	163	1.4	V	-48.2	1.60	6.90	-42.90	-13	29.90
2509.80	45.75	333	1.1	H	-58.8	1.70	8.60	-51.90	-13	38.90
2509.80	46.37	164	1.4	V	-58.5	1.70	8.60	-51.60	-13	38.60

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, High channel										
227.65	38.21	131	1.6	H	-58.8	0.31	0	-59.11	-13	46.11
227.65	37.17	302	1.1	V	-59.8	0.31	0	-60.11	-13	47.11
3819.60	57.31	100	1.9	H	-42.2	1.90	9.90	-34.20	-13	21.20
3819.60	58.11	336	2.3	V	-41.0	1.90	9.90	-33.00	-13	20.00
WCDMA Mode, Low channel										
235.58	38.42	193	1.3	H	-58.6	0.31	0	-58.91	-13	45.91
235.58	37.34	290	2.1	V	-59.7	0.31	0	-60.01	-13	47.01
3704.80	43.72	220	2.4	H	-51.1	1.80	10.00	-42.90	-13	29.90
3704.80	43.36	141	2.5	V	-51.8	1.80	10.00	-43.60	-13	30.60
5557.20	53.39	145	2.1	H	-43.1	2.10	10.30	-34.90	-13	21.90
5557.20	55.33	106	1.6	V	-40.5	2.10	10.30	-32.30	-13	19.30

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										
172.34	38.34	278	2.1	H	-58.7	0.28	0	-58.98	-13	45.98
172.34	37.27	333	1.1	V	-59.7	0.28	0	-59.98	-13	46.98
3760.00	55.53	278	1.4	H	-43.9	1.90	9.90	-35.90	-13	22.90
3760.00	54.36	268	1.4	V	-44.7	1.90	9.90	-36.70	-13	23.70
Band 4										
172.34	38.39	8	1.6	H	-58.6	0.28	0	-58.88	-13	45.88
172.34	37.32	3	1.2	V	-59.7	0.28	0	-59.98	-13	46.98
3465.00	54.36	270	1.6	H	-41.2	1.90	10.00	-33.10	-13	20.10
3465.00	53.38	235	1.4	V	-42.3	1.90	10.00	-34.20	-13	21.20
Band 7										
172.34	38.56	276	1.0	H	-58.4	0.28	0	-58.68	-25	33.68
172.34	37.43	270	2.1	V	-59.6	0.28	0	-59.88	-25	34.88
5070.00	56.68	245	1.9	H	-39.6	2.30	10.10	-31.80	-25	6.80
5070.00	54.63	295	1.4	V	-40.9	2.30	10.10	-33.10	-25	8.10
Band 17										
172.34	38.64	139	2.2	H	-58.4	0.28	0	-58.68	-13	45.68
172.34	37.37	243	2.0	V	-59.6	0.28	0	-59.88	-13	46.88
1420.00	58.12	107	1.9	H	-50.3	1.20	6.40	-45.10	-13	32.10
1420.00	55.36	208	1.8	V	-53.1	1.20	6.40	-47.90	-13	34.90

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

FCC §22.917(a) & §24.238(a) & §27.53 - 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.

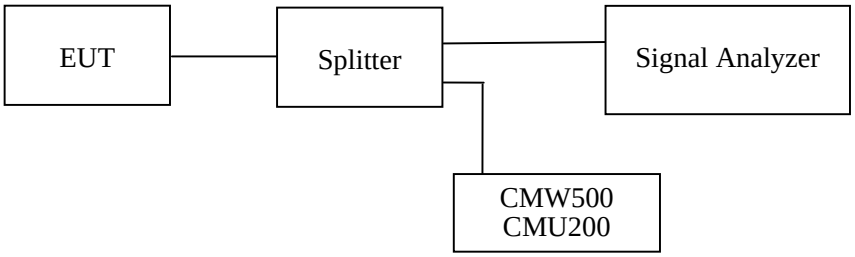
According to FCC §27.53, the power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	8386001028	2015-12-11	2016-12-11
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18
WEINSCHEL	3dB Attenuator	5321	AU0709	2015-06-18	2016-06-18

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

Test Data

Environmental Conditions

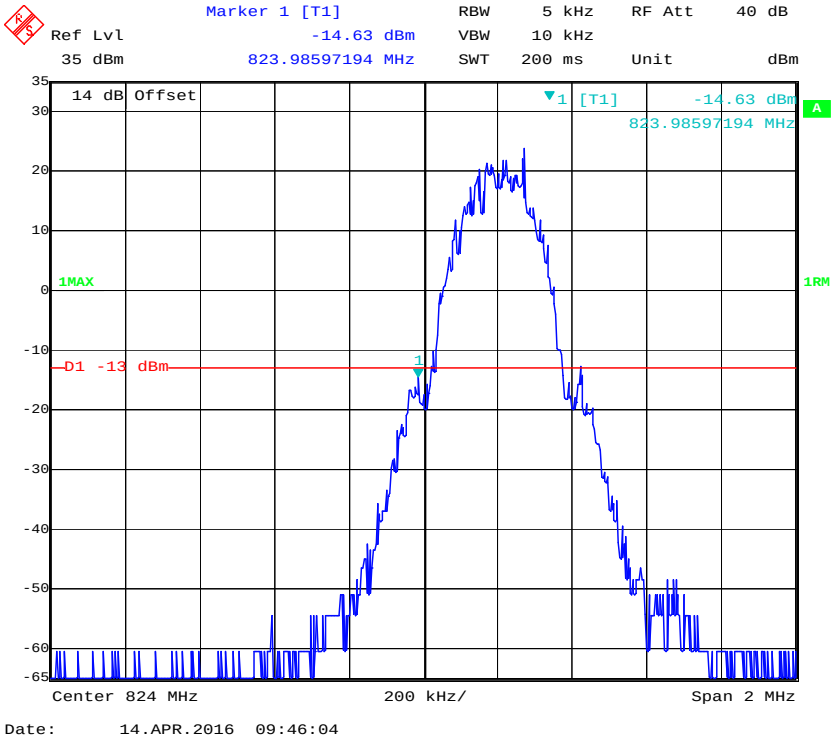
Temperature:	20-23 ℃
Relative Humidity:	48-55 %
ATM Pressure:	100.5-101.0kPa

The testing was performed by Haiguo Li from 2016-04-13 to 2016-04-14.

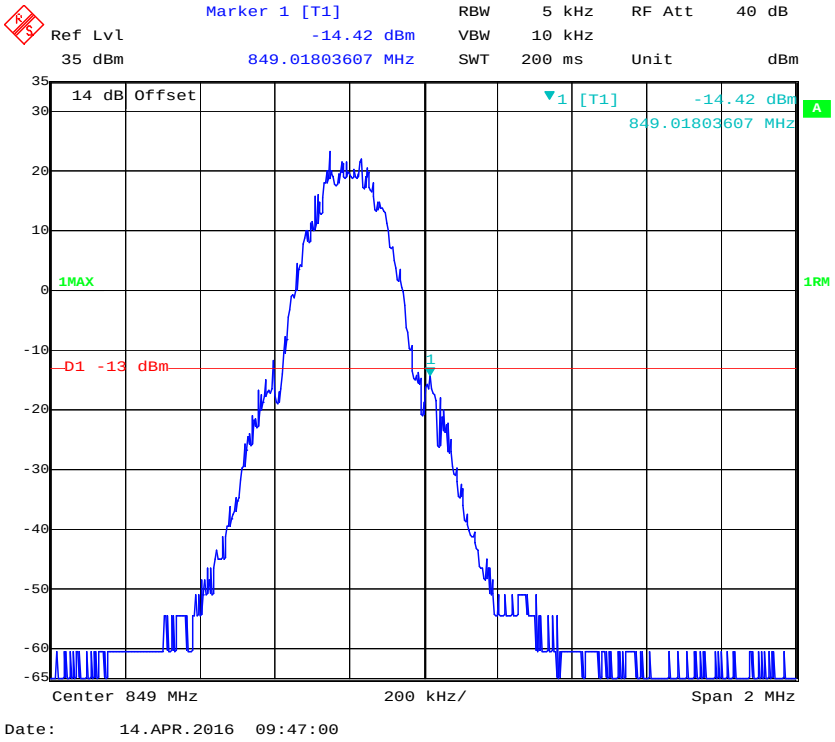
EUT operation mode: Transmitting

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

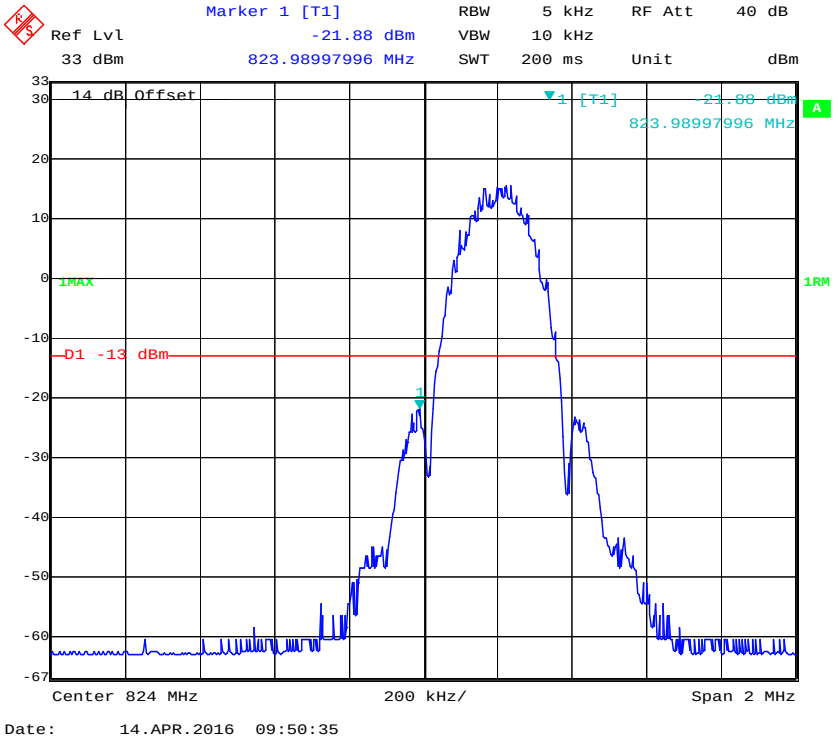
Cellular Band, Left Band Edge for GSM (GMSK) Mode



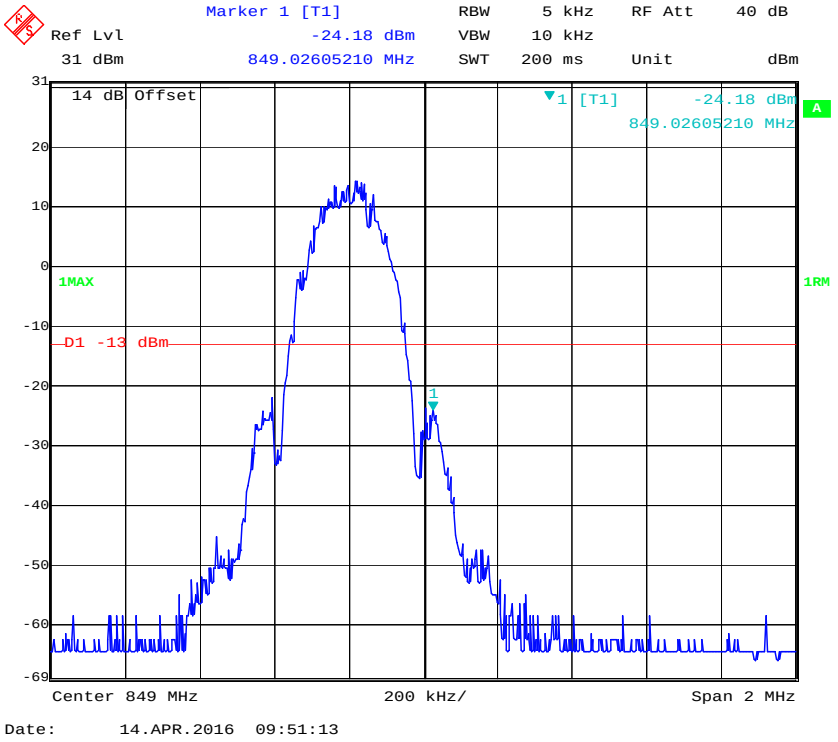
Cellular Band, Right Band Edge for GSM (GMSK) Mode



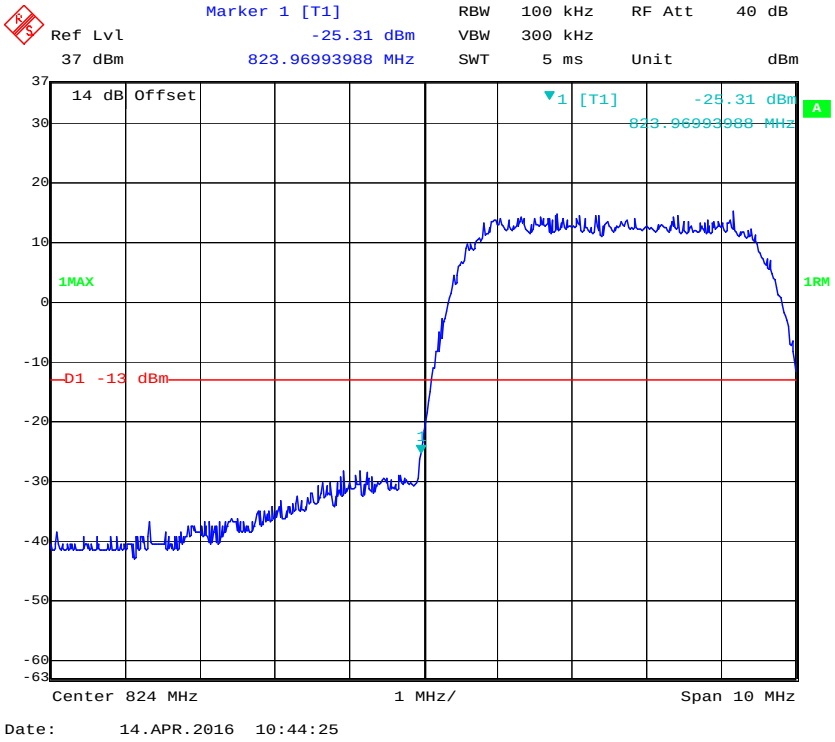
Cellular Band, Left Band Edge for EGPRS Mode



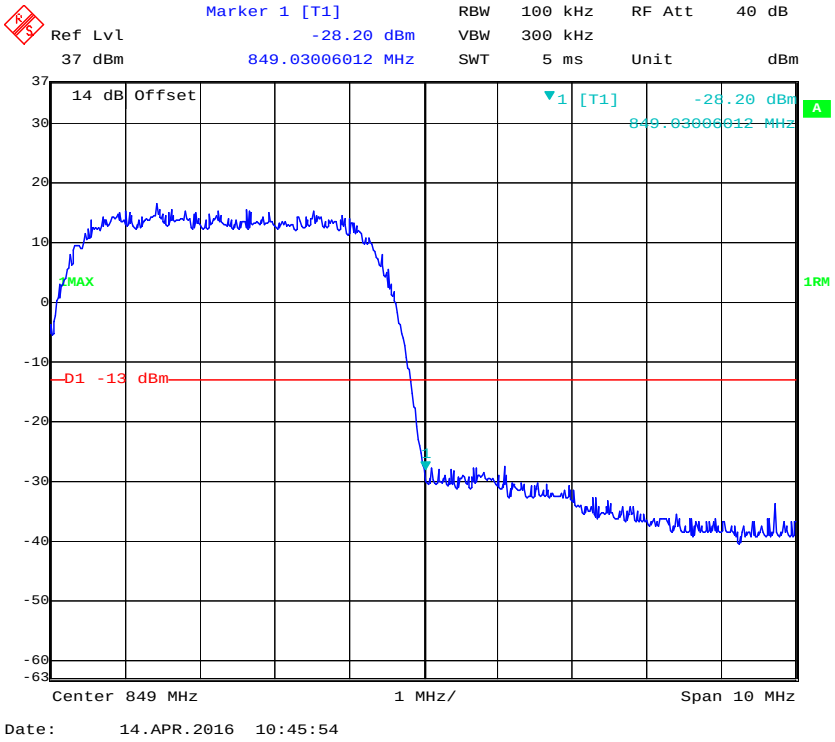
Cellular Band, Right Band Edge for EGPRS Mode



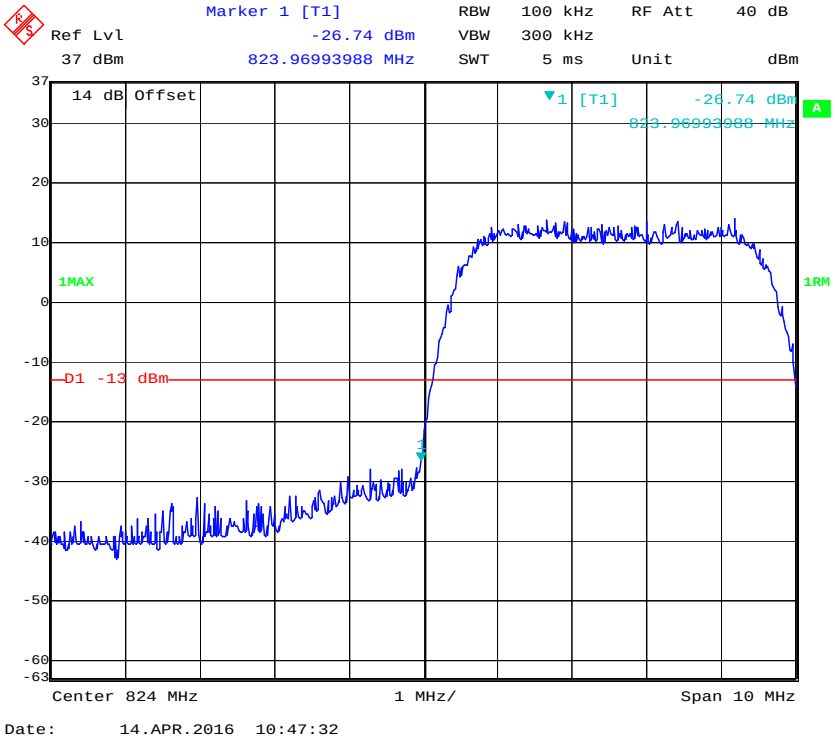
Cellular Band, Left Band Edge for RMC (BPSK) Mode



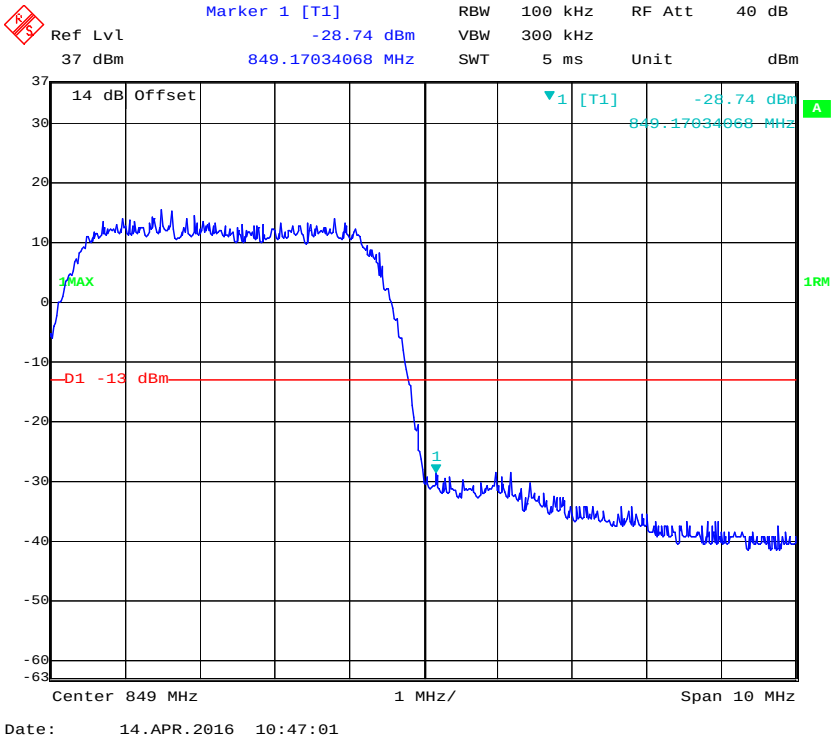
Cellular Band, Right Band Edge for RMC (BPSK) Mode



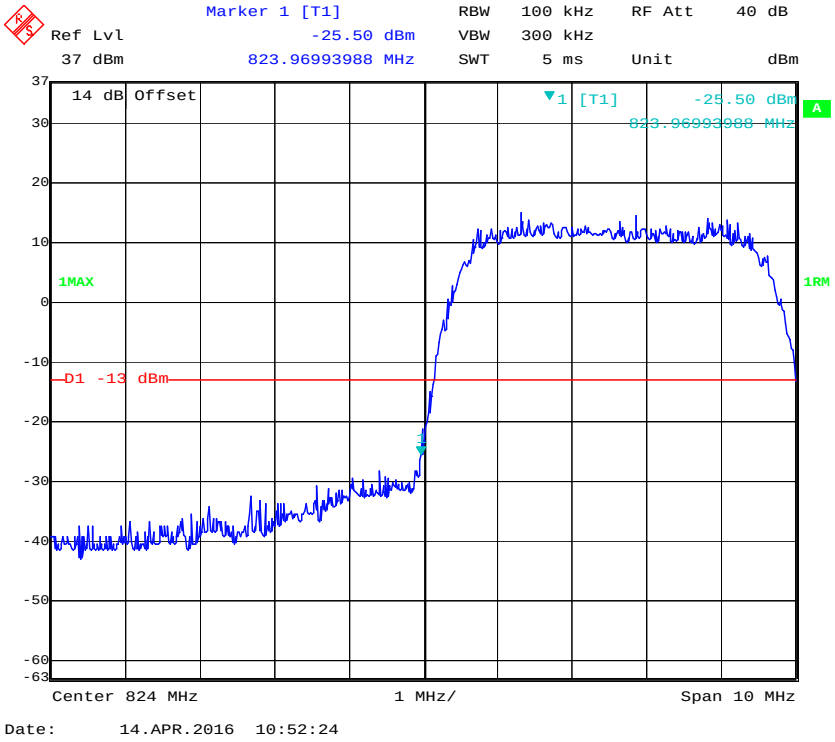
Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



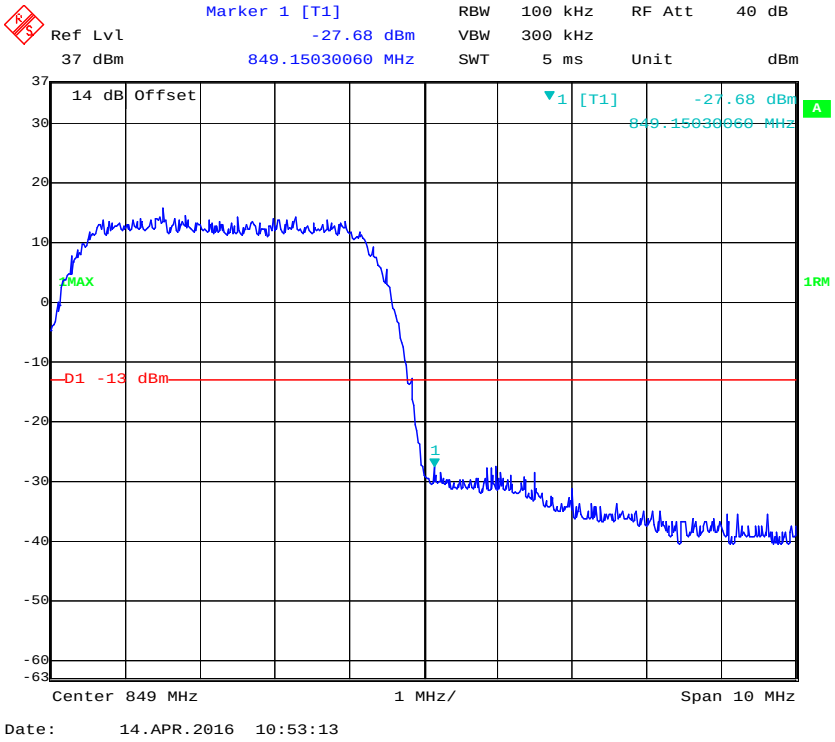
Cellular Band, Right Band Edge for HSDPA (16QAM) Mode



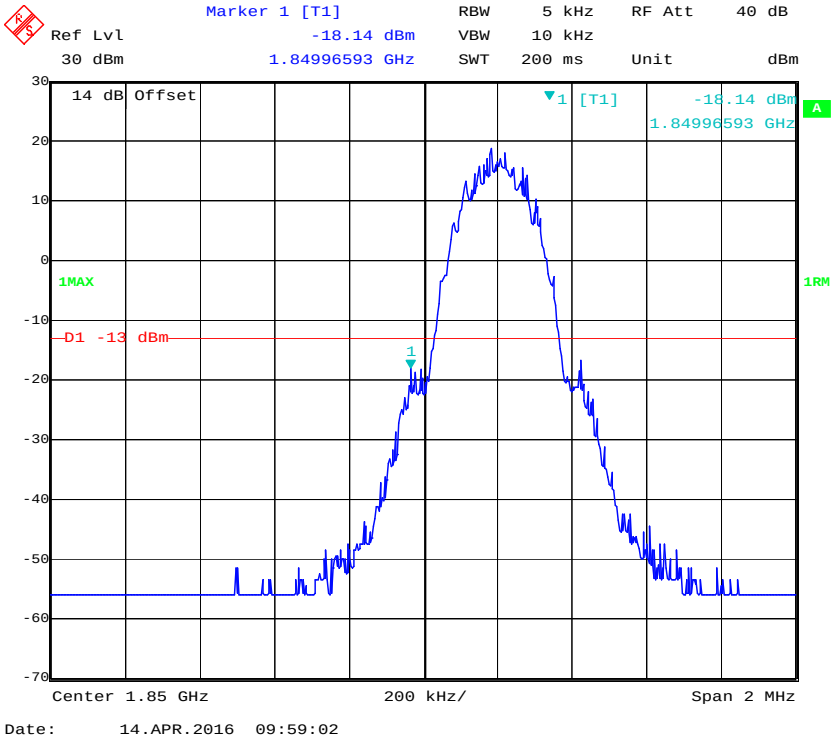
Cellular Band, Left Band Edge for HSUPA (BPSK) Mode



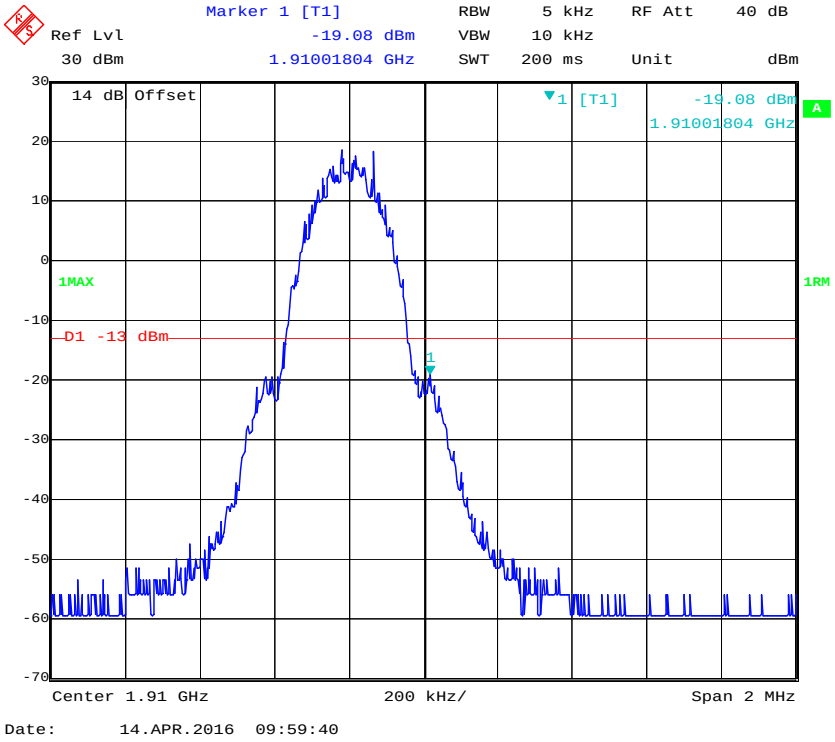
Cellular Band, Right Band Edge for HSUPA (BPSK) Mode



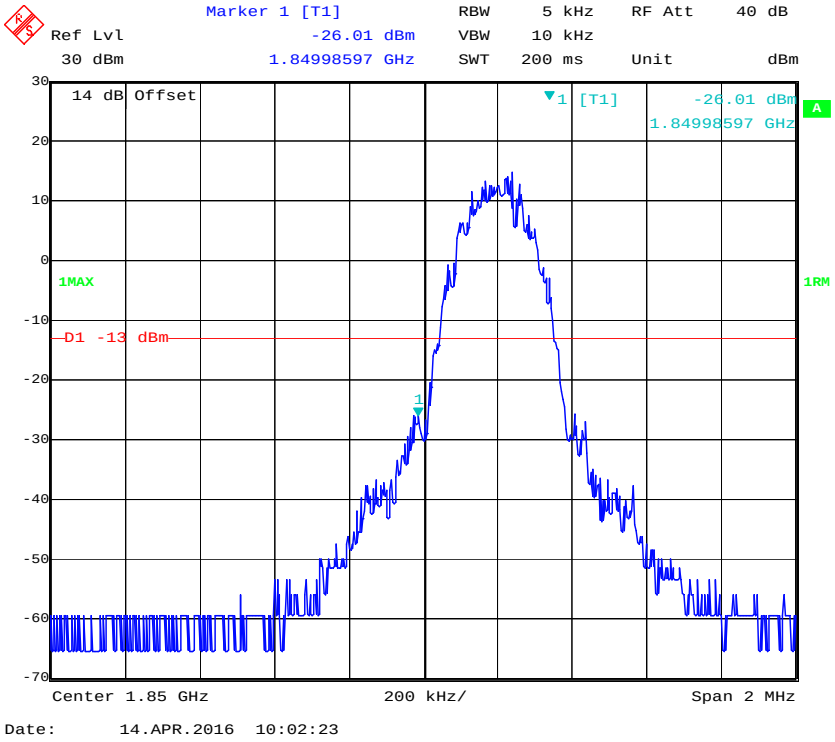
PCS Band, Left Band Edge for GSM (GMSK) Mode



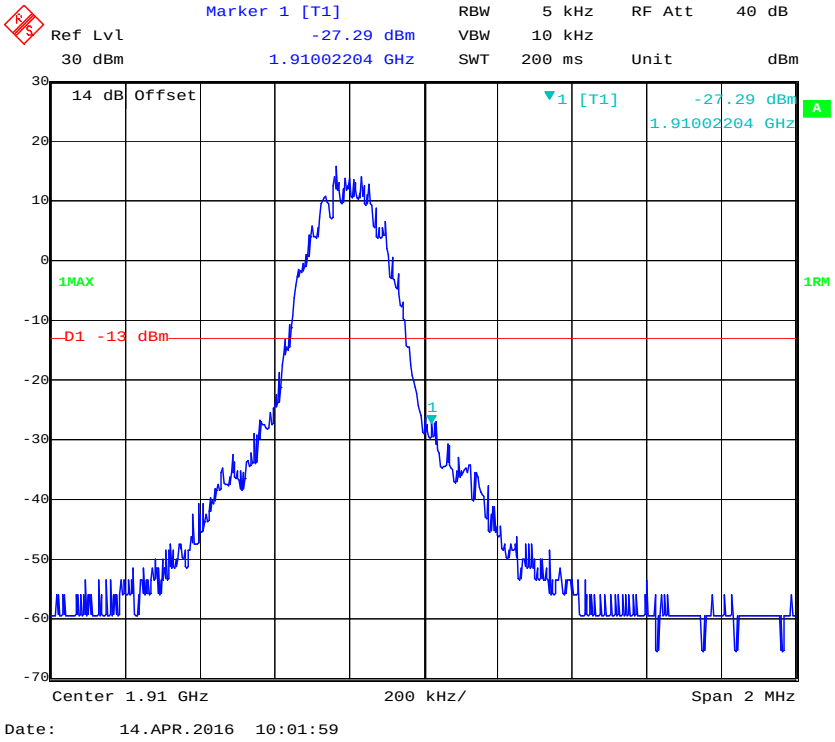
PCS Band, Right Band Edge for GSM (GMSK) Mode



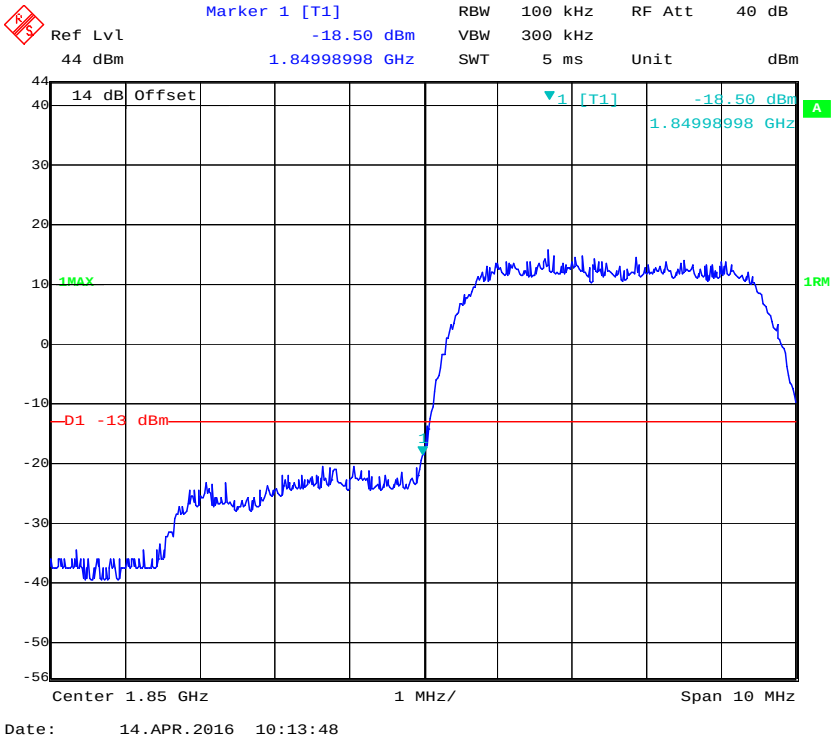
PCS Band, Left Band Edge for EGPRS Mode



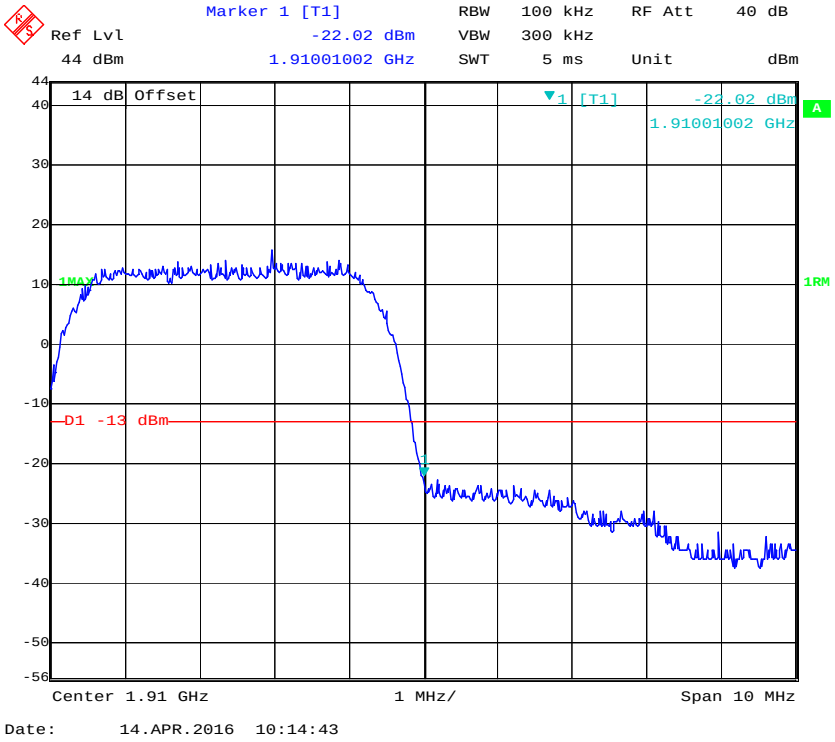
PCS Band, Right Band Edge for EGPRS Mode



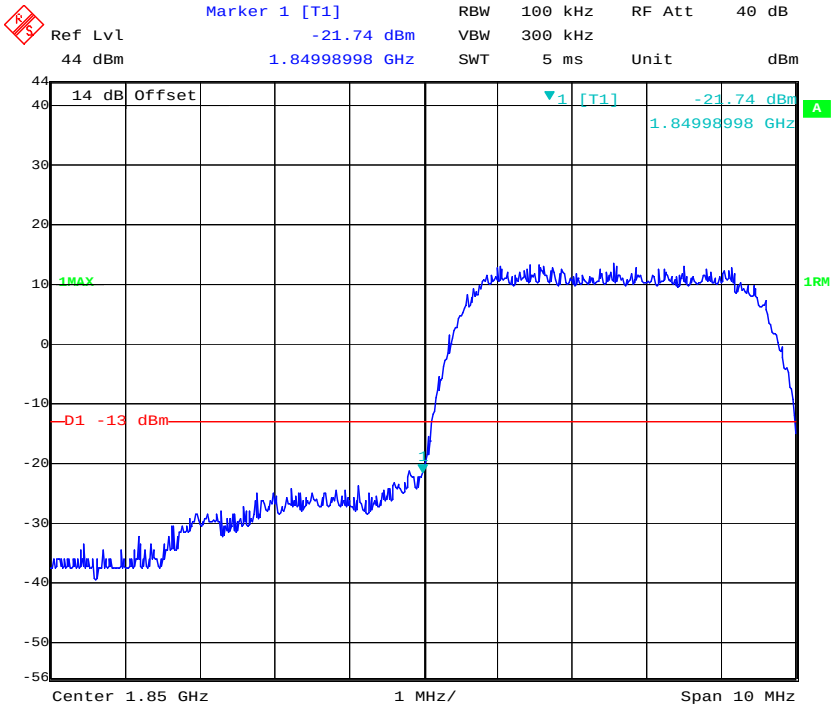
PCS Band, Left Band Edge for RMC (BPSK) Mode



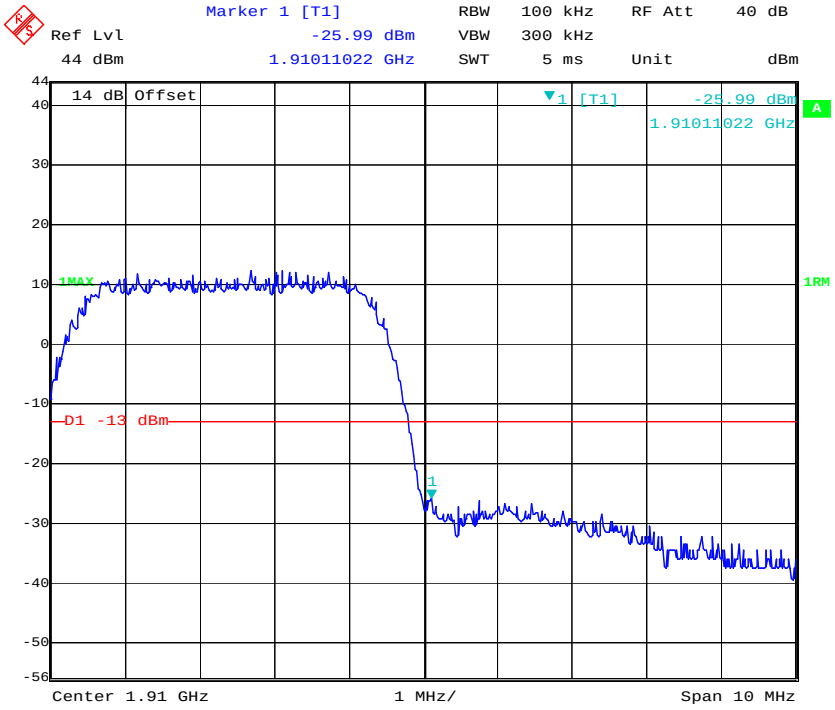
PCS Band, Right Band Edge for RMC (BPSK) Mode



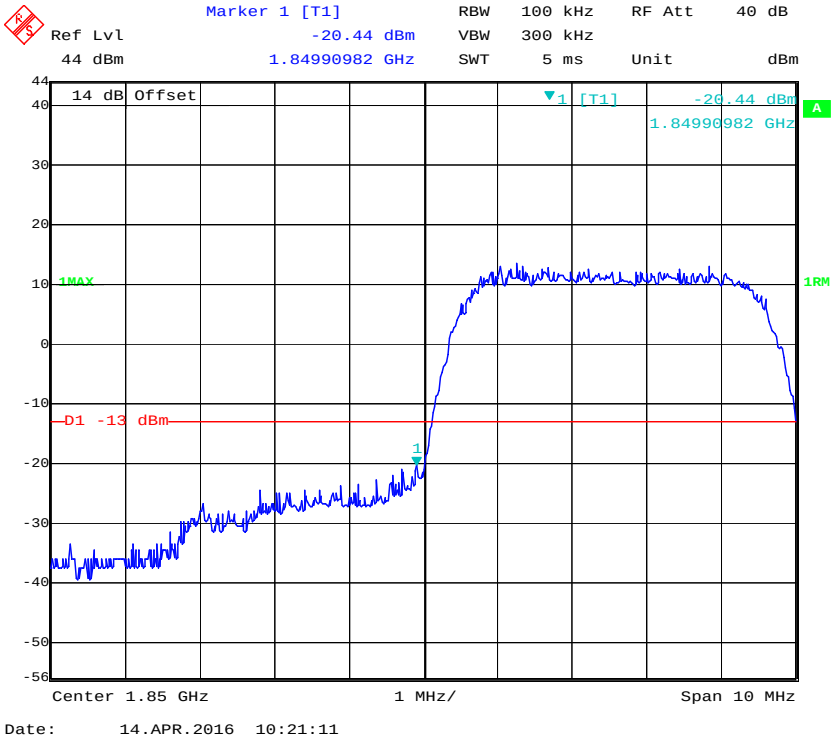
PCS Band, Left Band Edge for HSDPA (16QAM) Mode



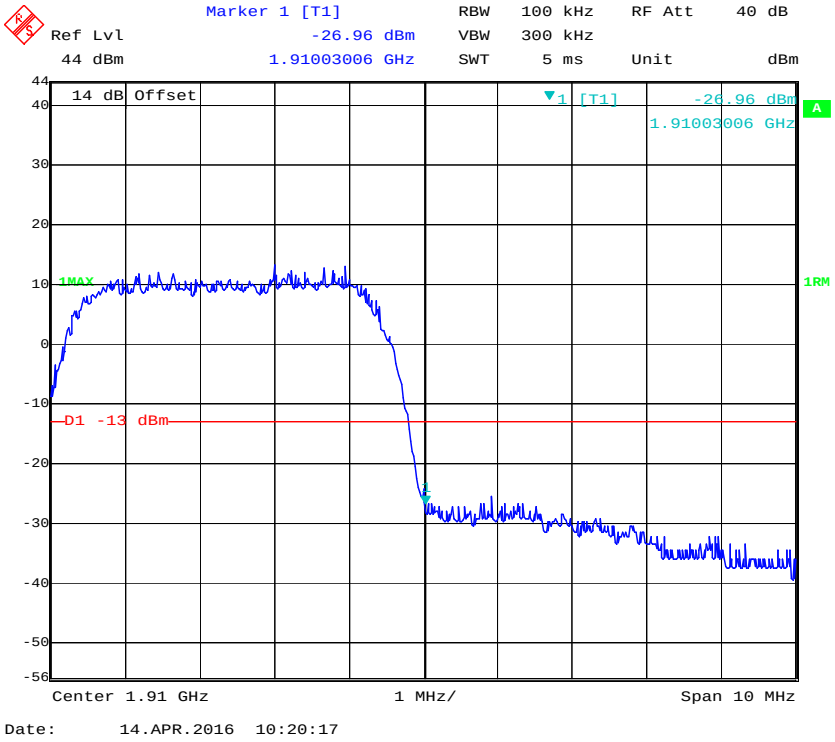
PCS Band, Right Band Edge for HSDPA (16QAM) Mode



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

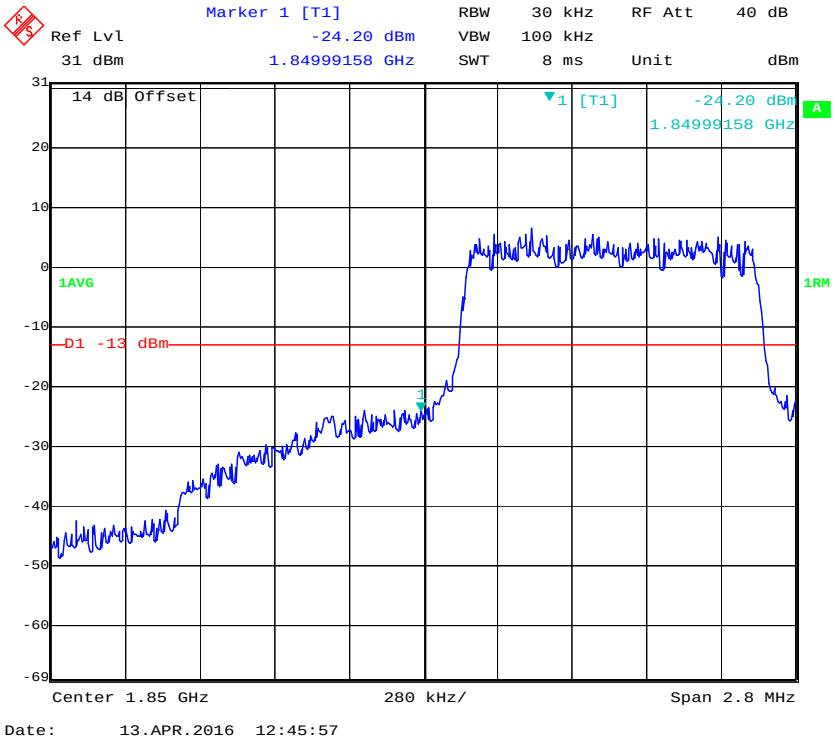


PCS Band, Right Band Edge for HSUPA (BPSK) Mode

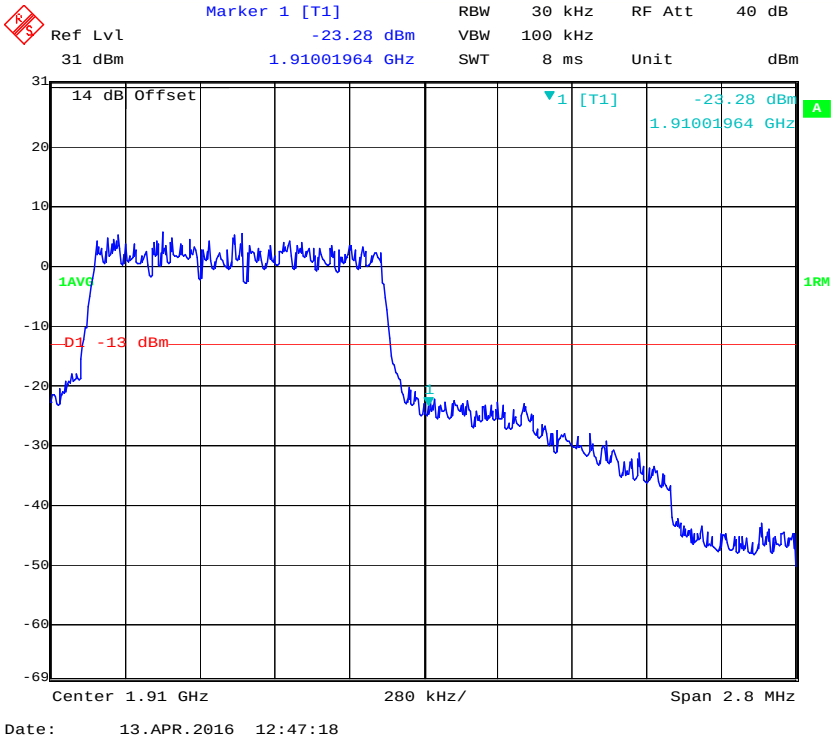


Band 2:

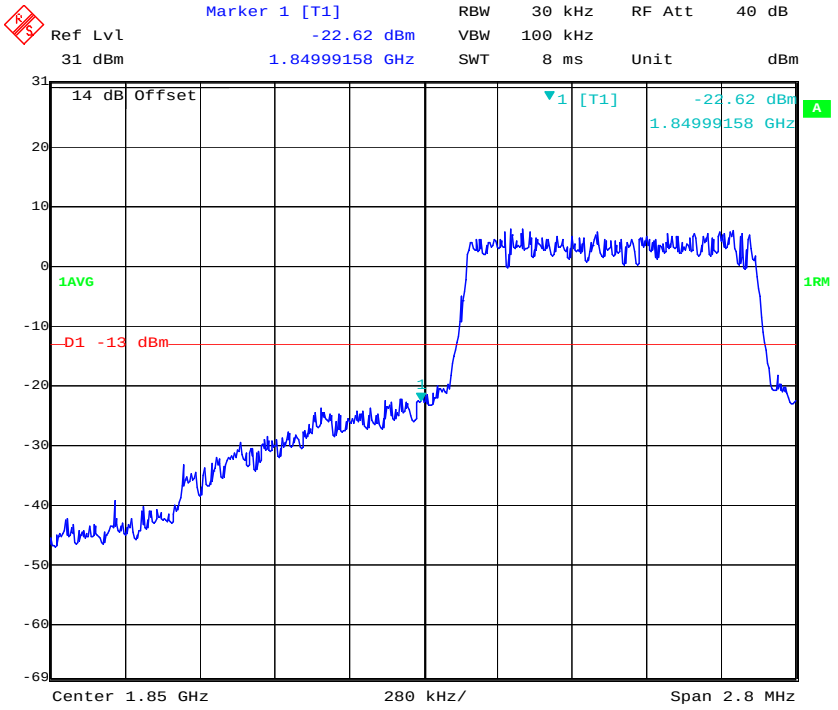
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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



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



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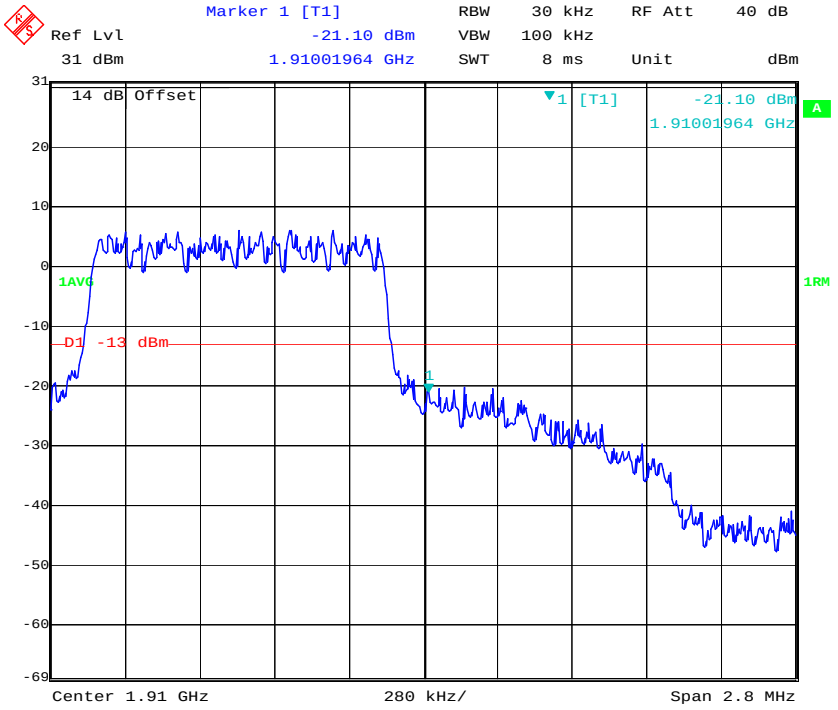
16-QAM (1.4 MHz, FULL RB) - Right Band Edge



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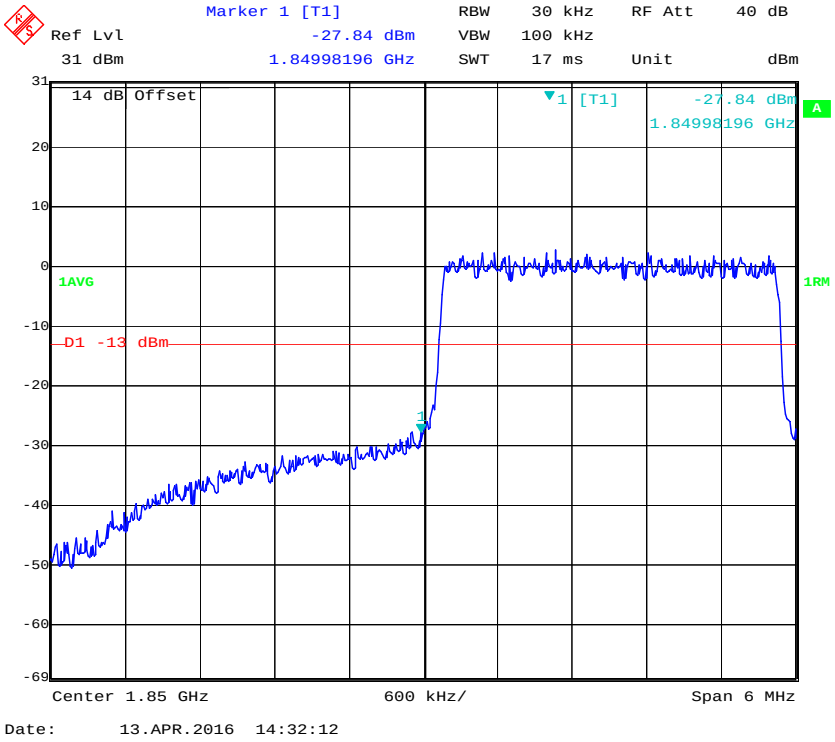
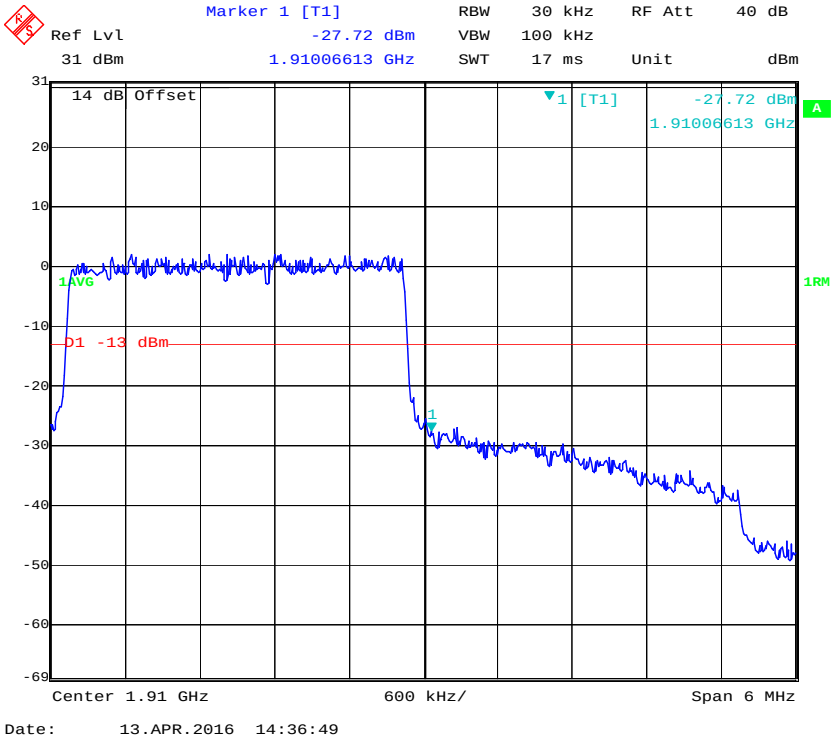
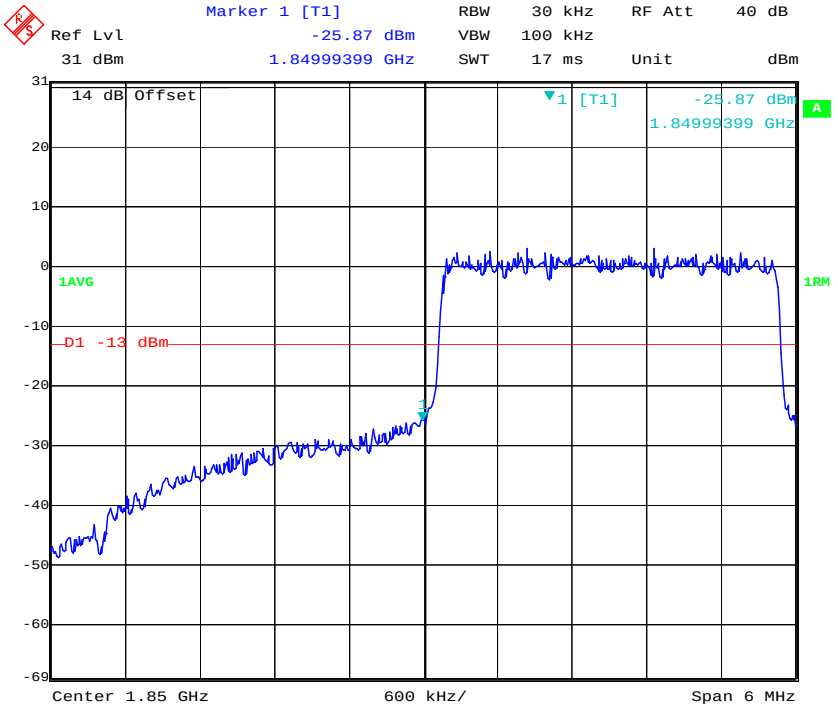
QPSK (3.0 MHz, FULL RB) - Left Band Edge



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



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



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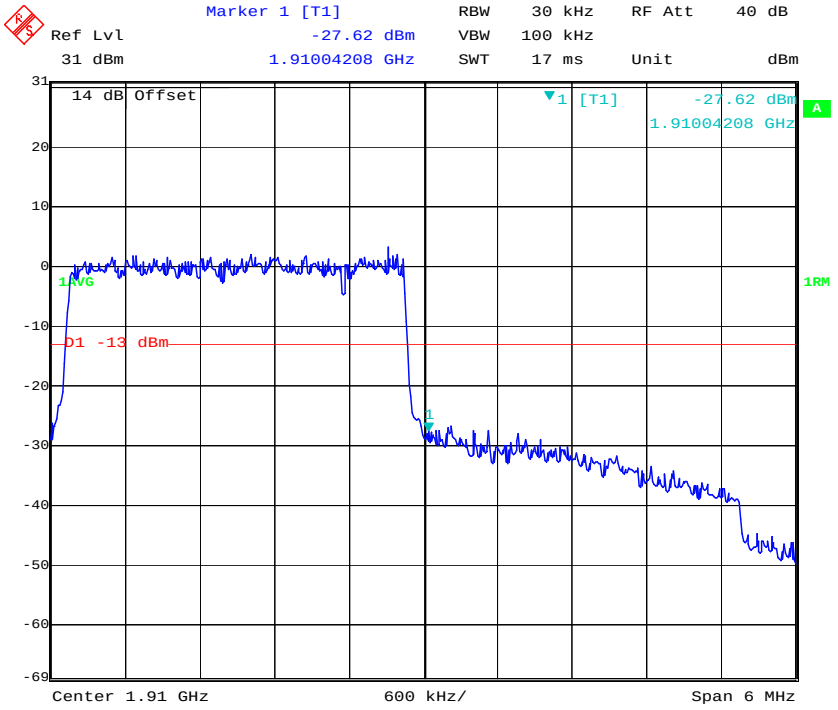
16-QAM (3.0 MHz, FULL RB) - Right Band Edge



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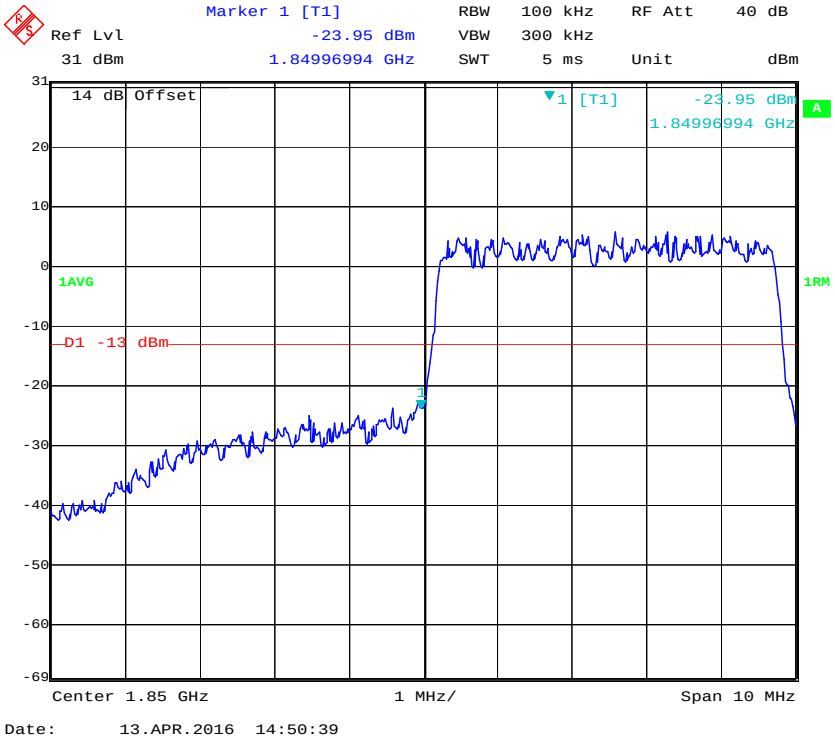
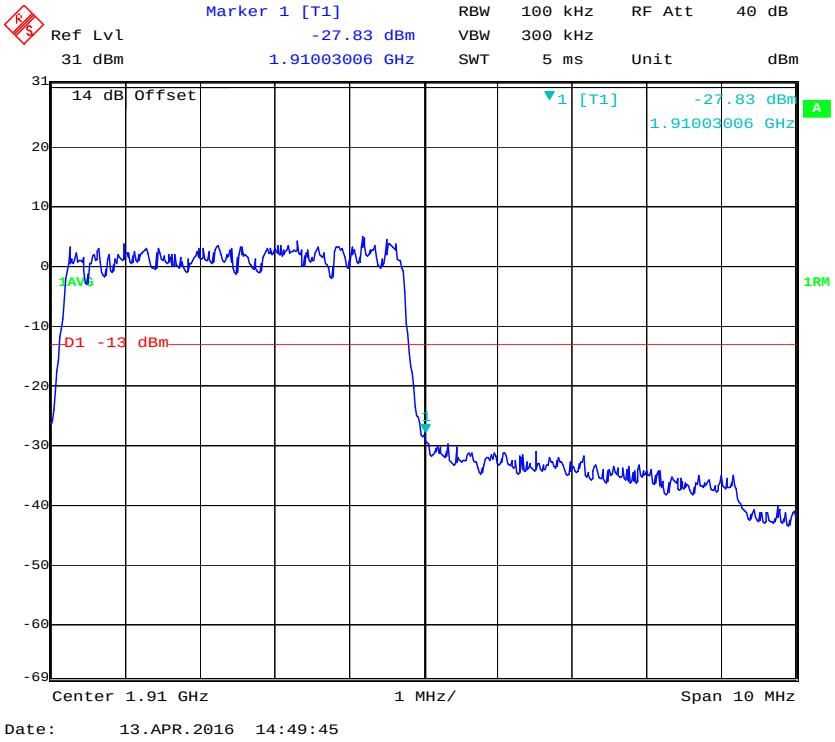
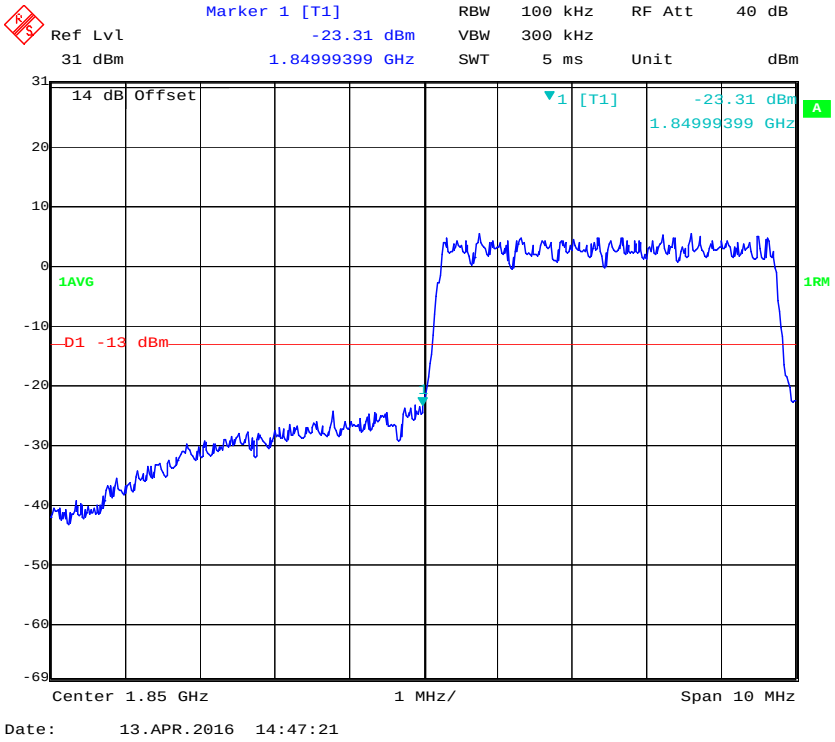
QPSK (5.0 MHz, FULL RB) - Left Band Edge



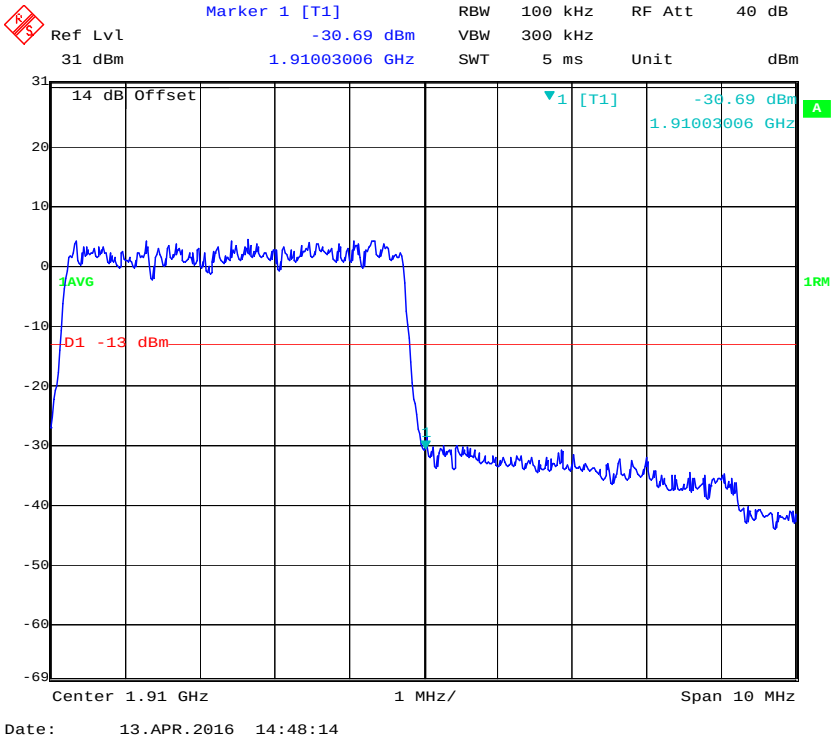
QPSK (5.0 MHz, FULL RB) - Right Band Edge



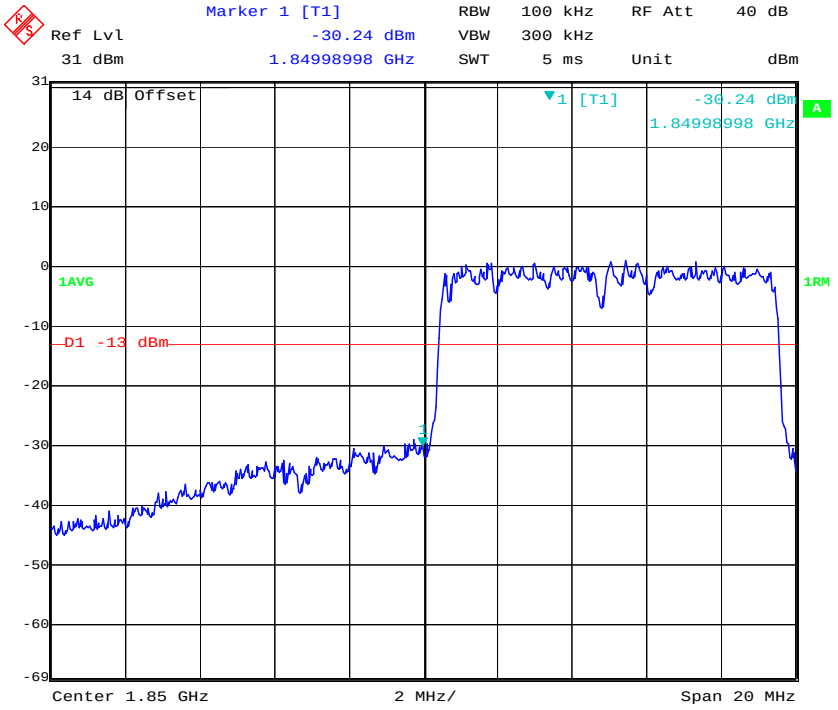
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



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

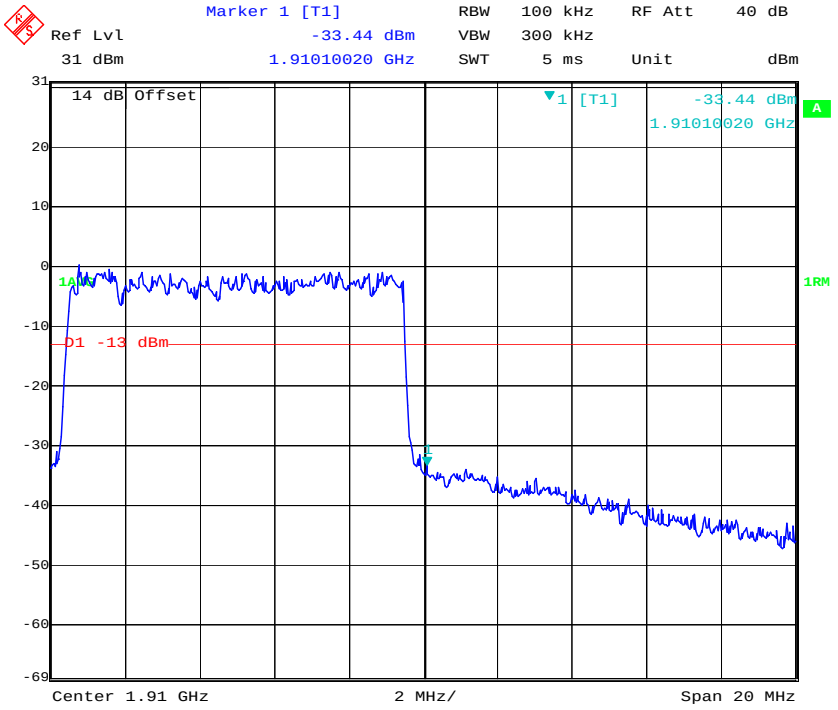


QPSK (10.0 MHz, FULL RB) - Left Band Edge



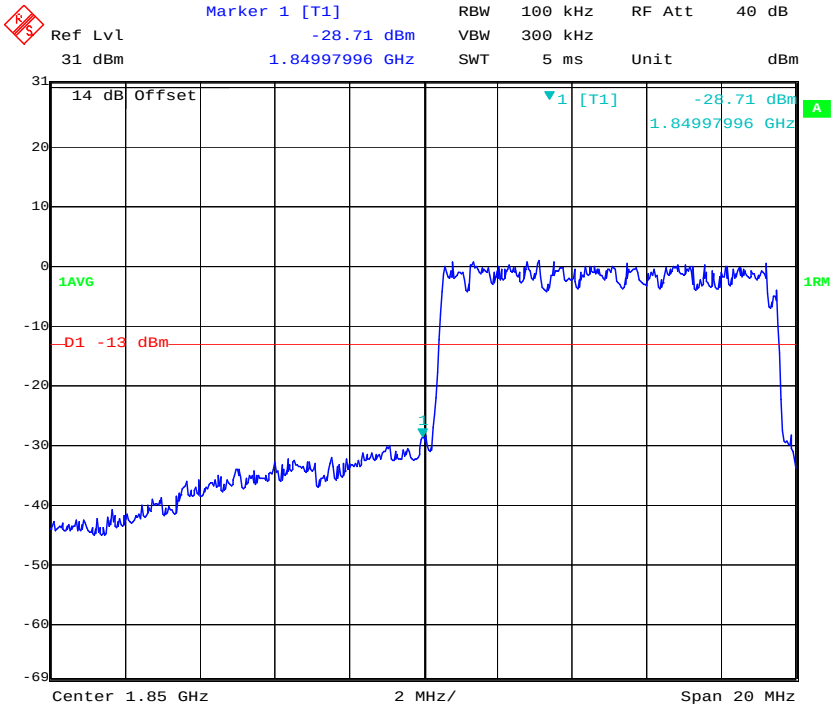
Date: 13.APR.2016 14:53:20

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



Date: 13.APR.2016 14:55:35

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



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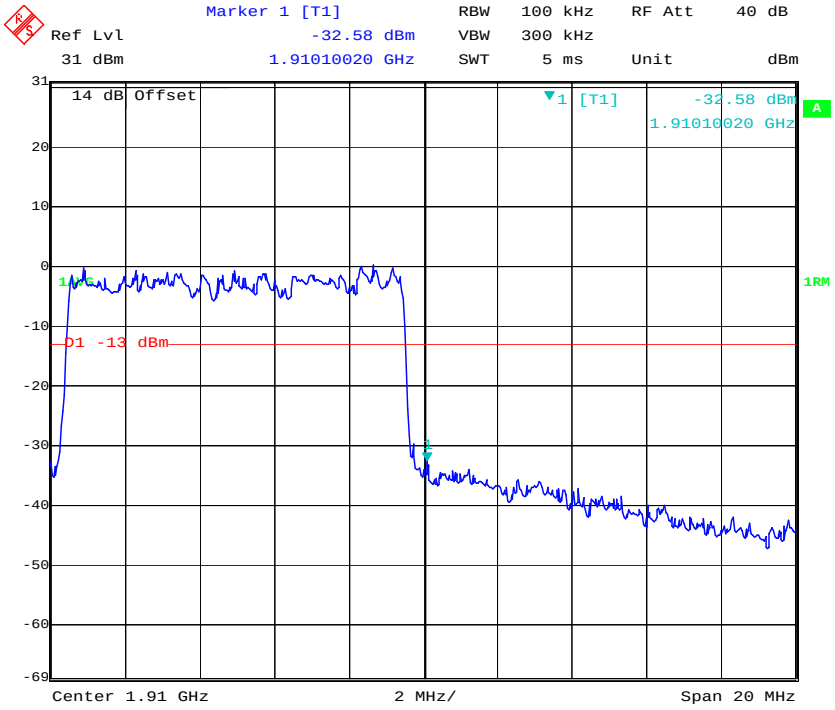
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



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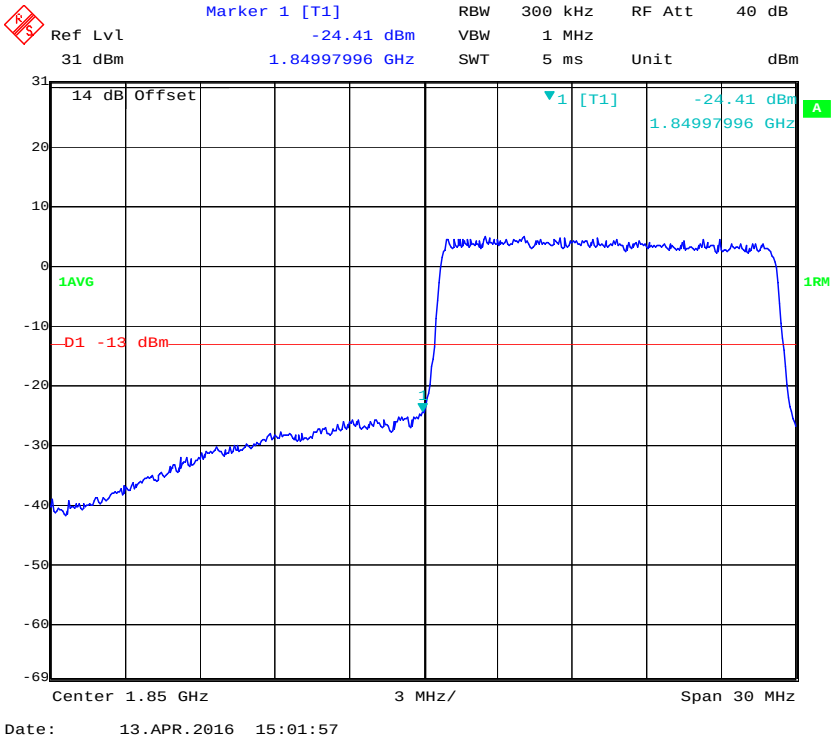
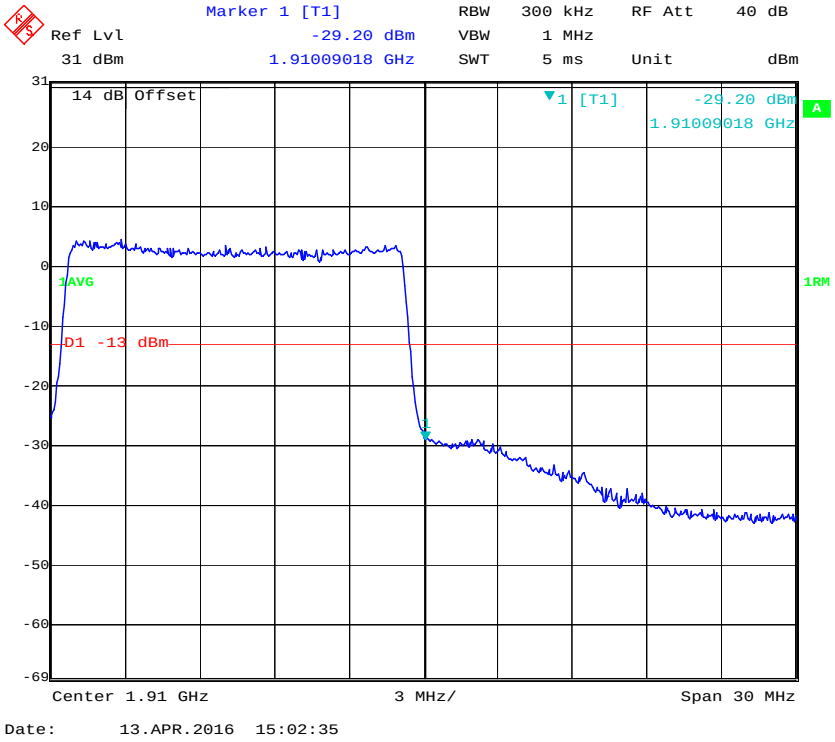
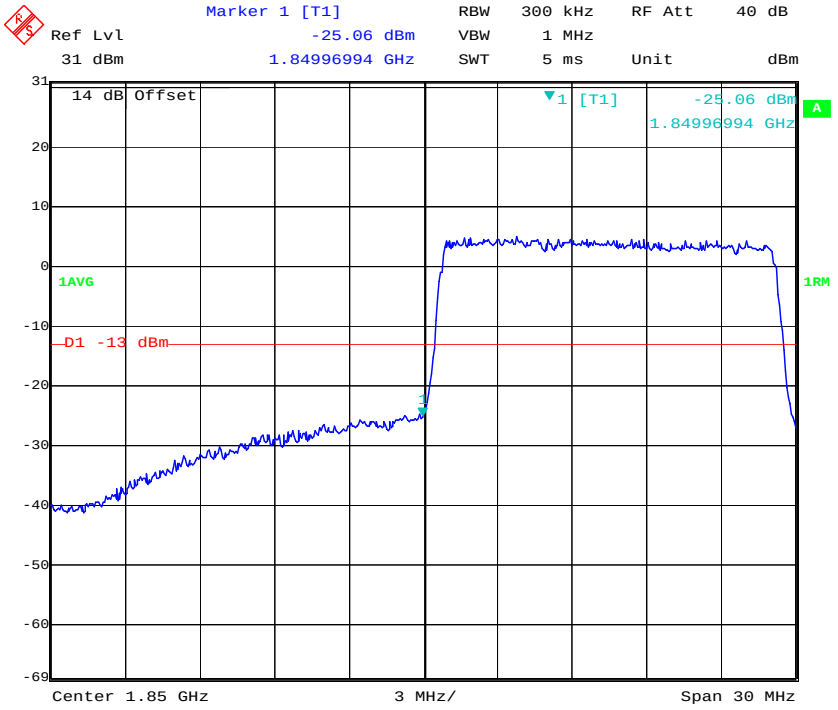
QPSK (15.0 MHz, FULL RB) - Left Band Edge



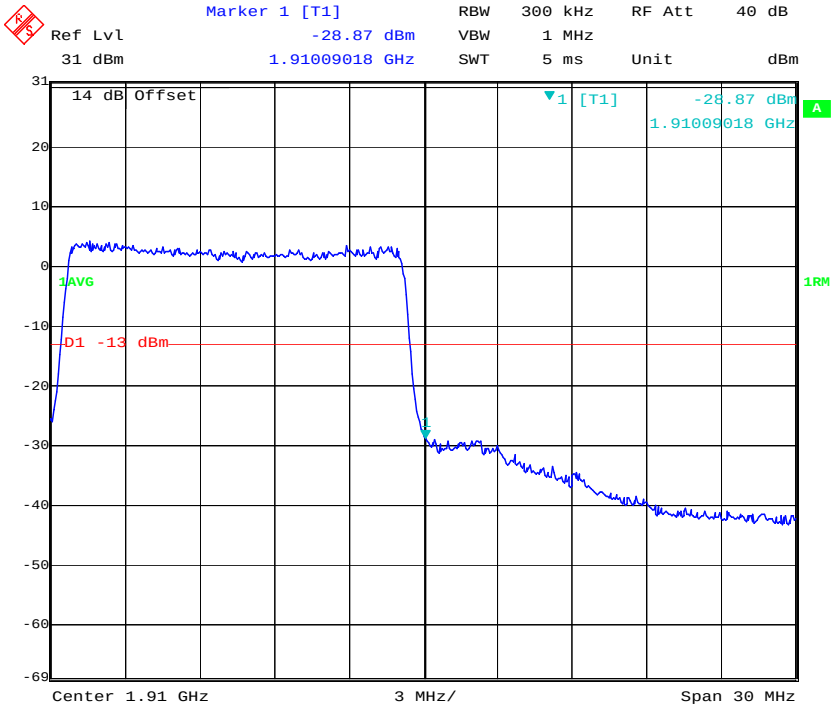
QPSK (15.0 MHz, FULL RB) - Right Band Edge



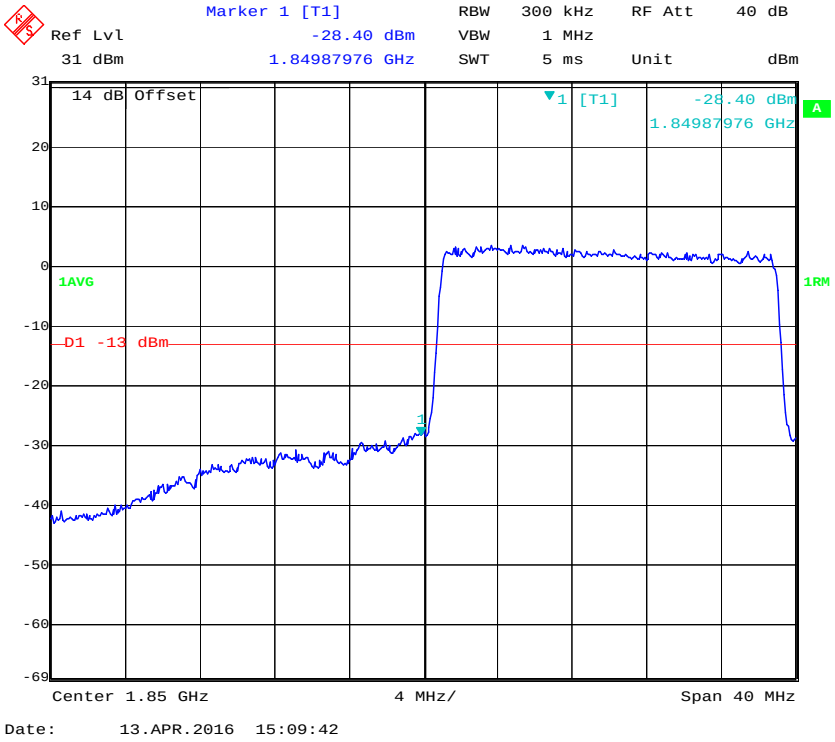
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



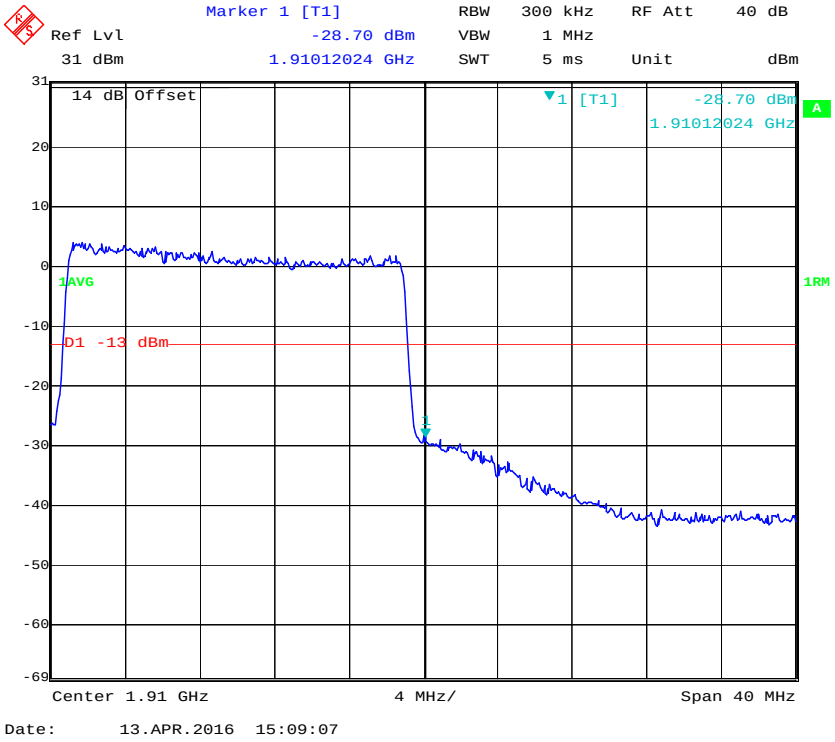
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



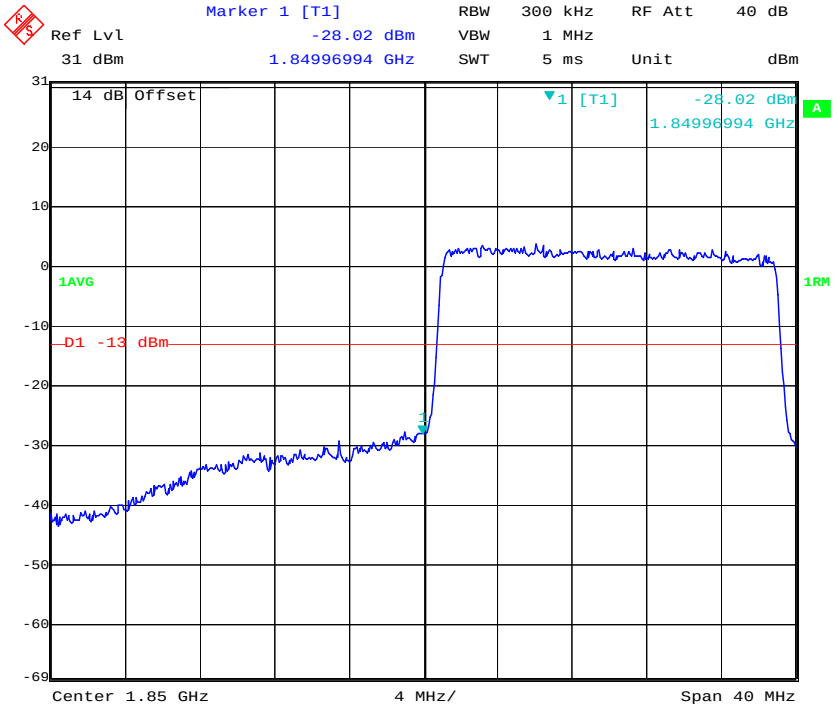
QPSK (20.0 MHz, FULL RB) - Left Band Edge



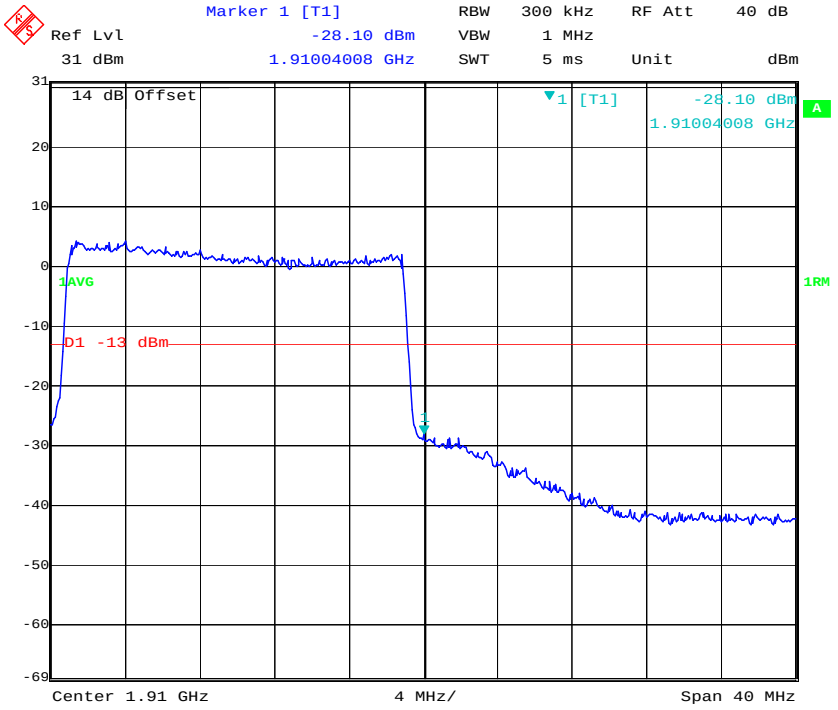
QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

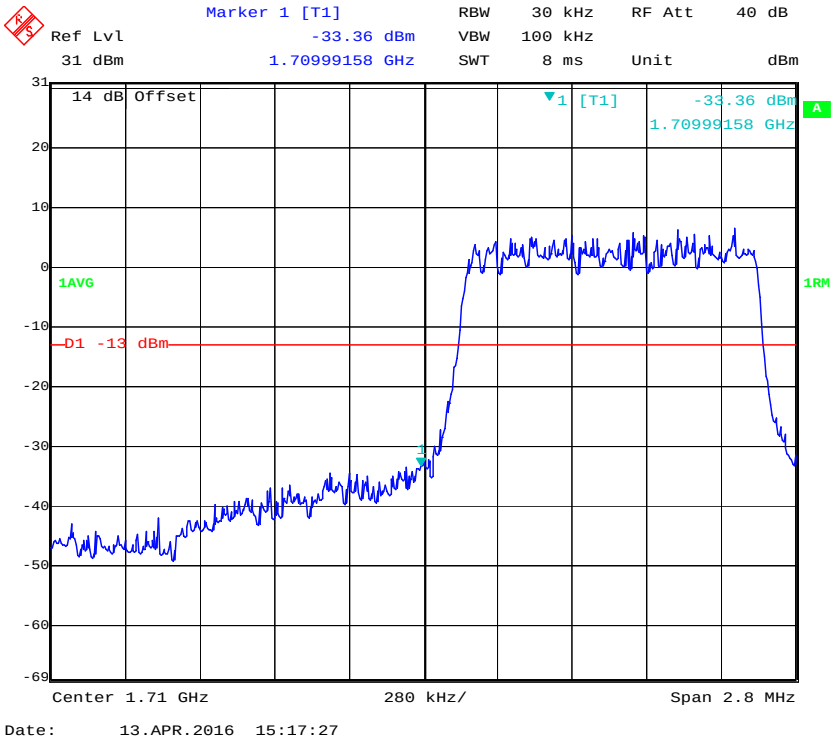


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

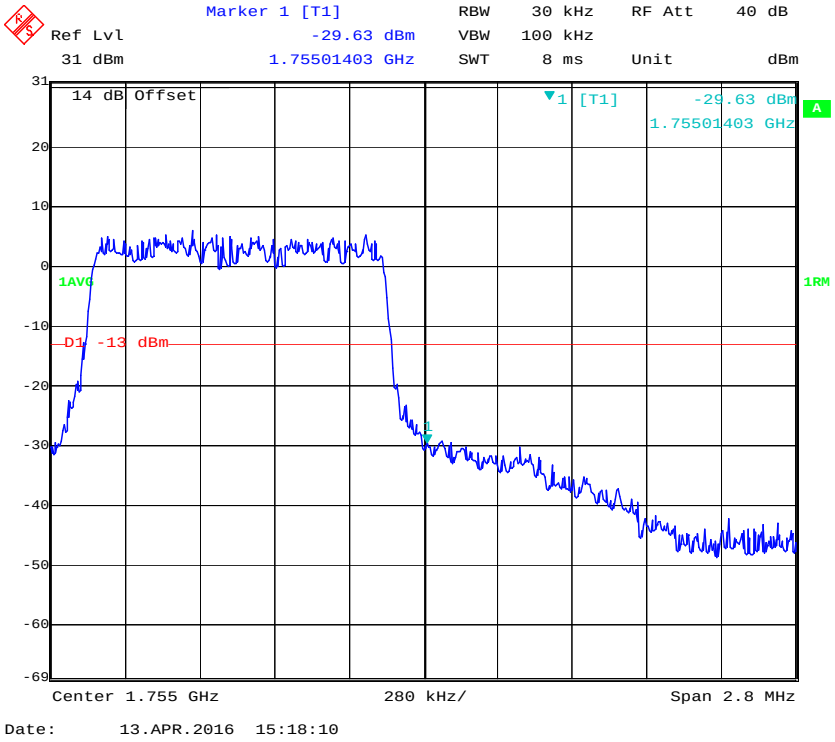


Band 4:

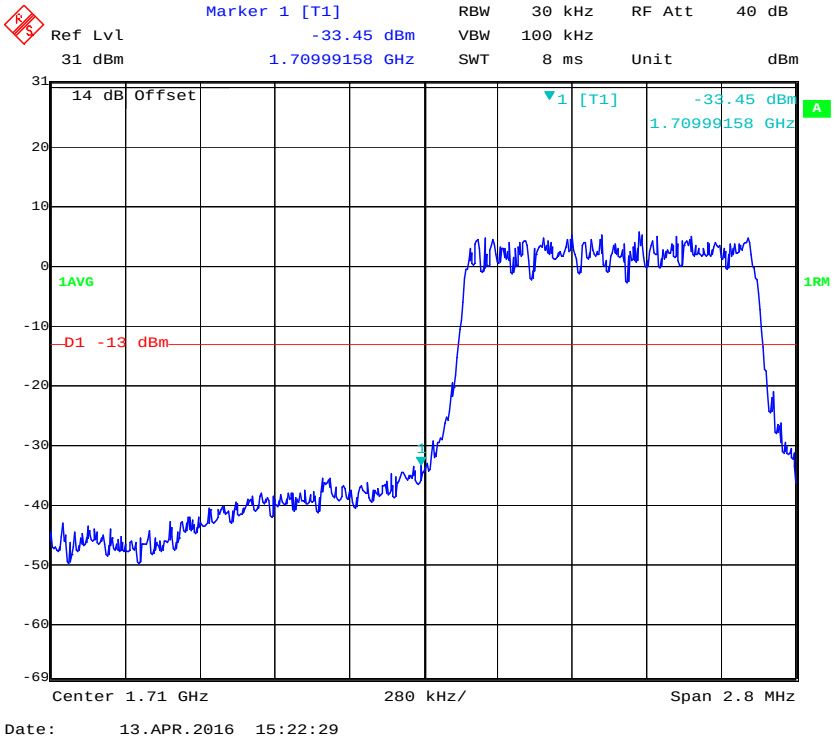
QPSK (1.4 MHz, FULL RB) - Left Band Edge



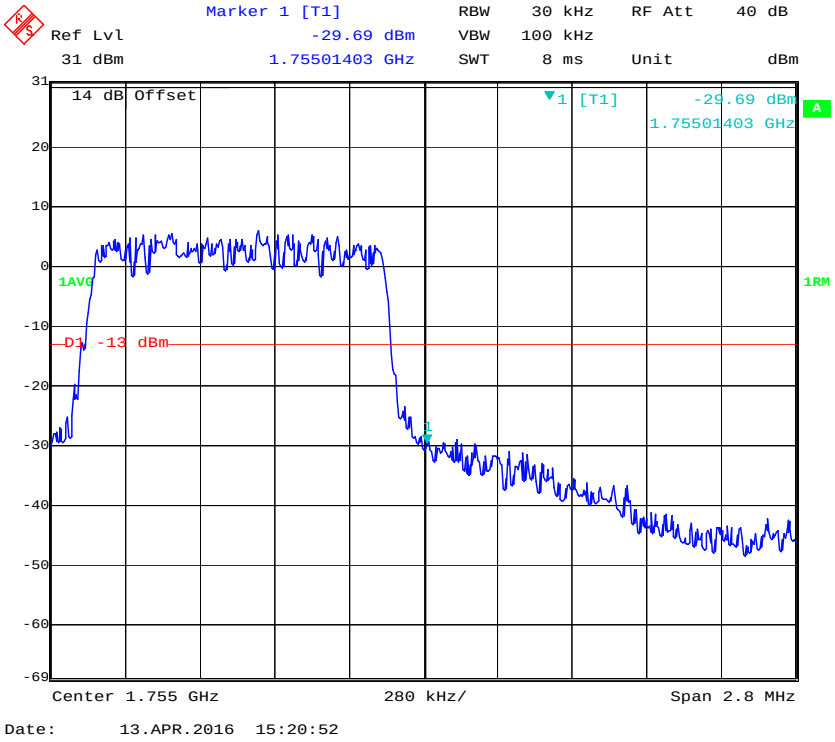
QPSK (1.4 MHz, FULL RB) - Right Band Edge



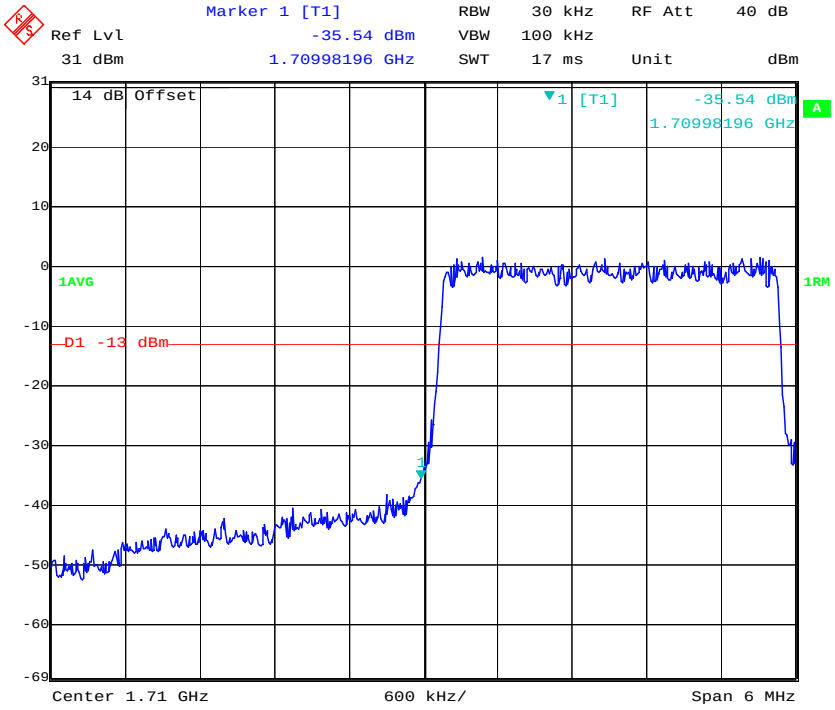
16-QAM (1.4 MHz, FULL RB) - Left Band Edge



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



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



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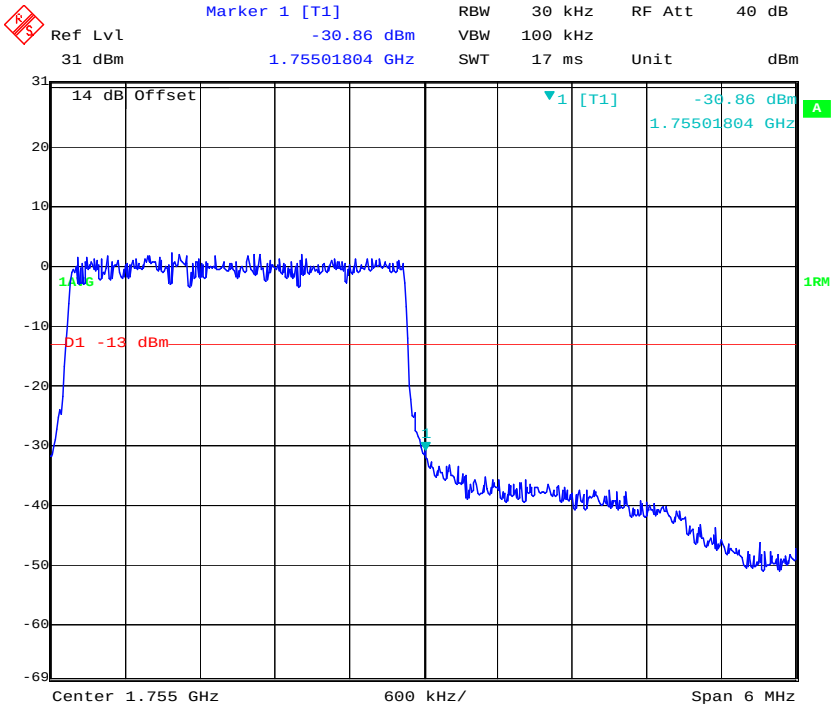
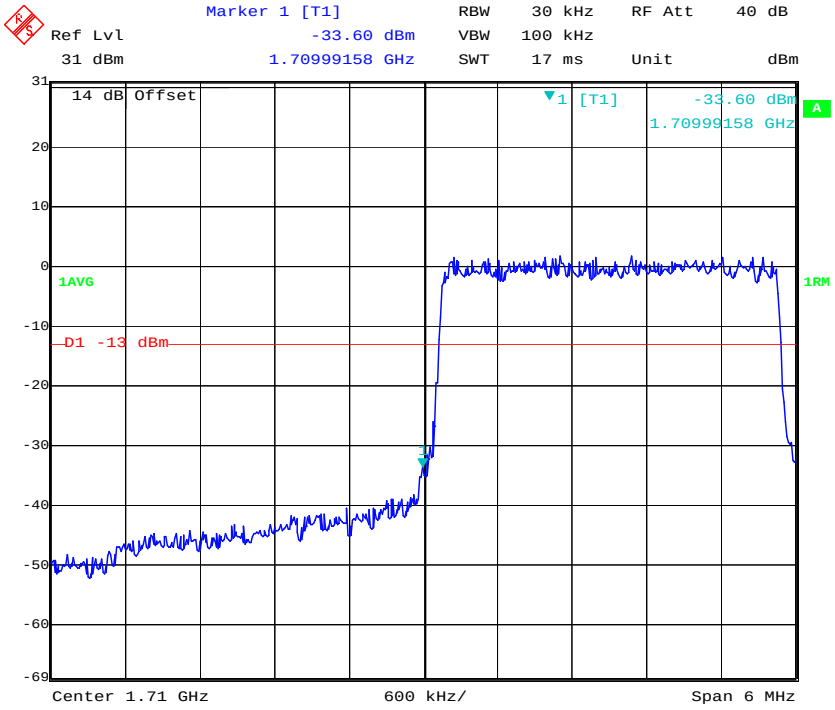
QPSK (3.0 MHz, FULL RB) - Right Band Edge



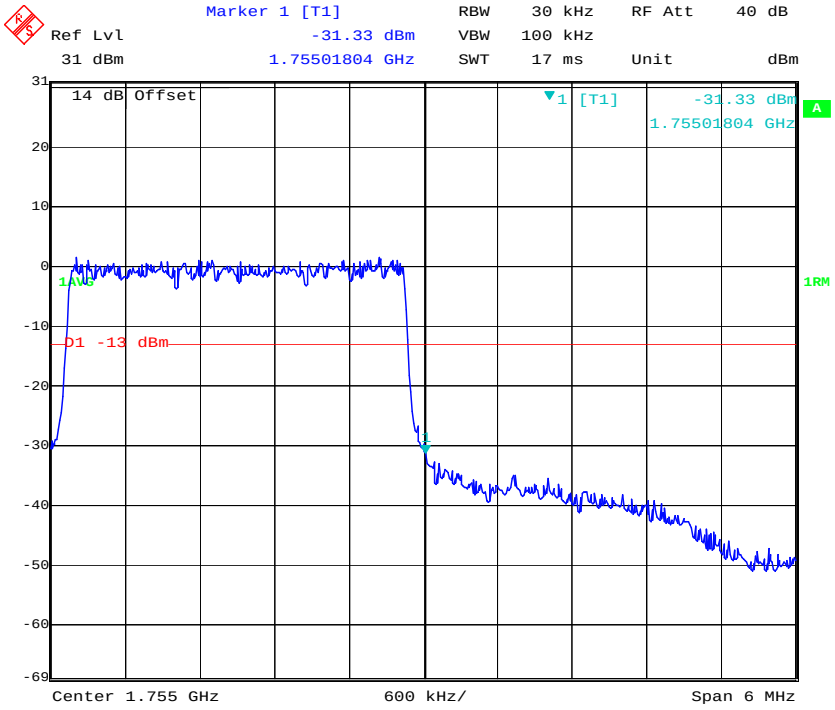
Date: 13.APR.2016 15:29:09

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



Date: 13.APR.2016 15:24:37

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



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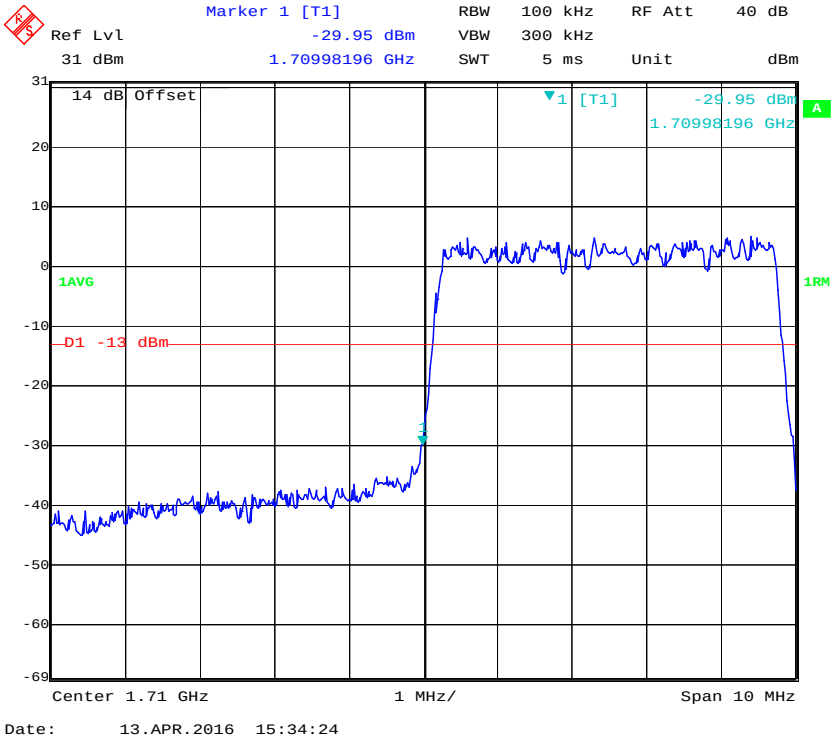
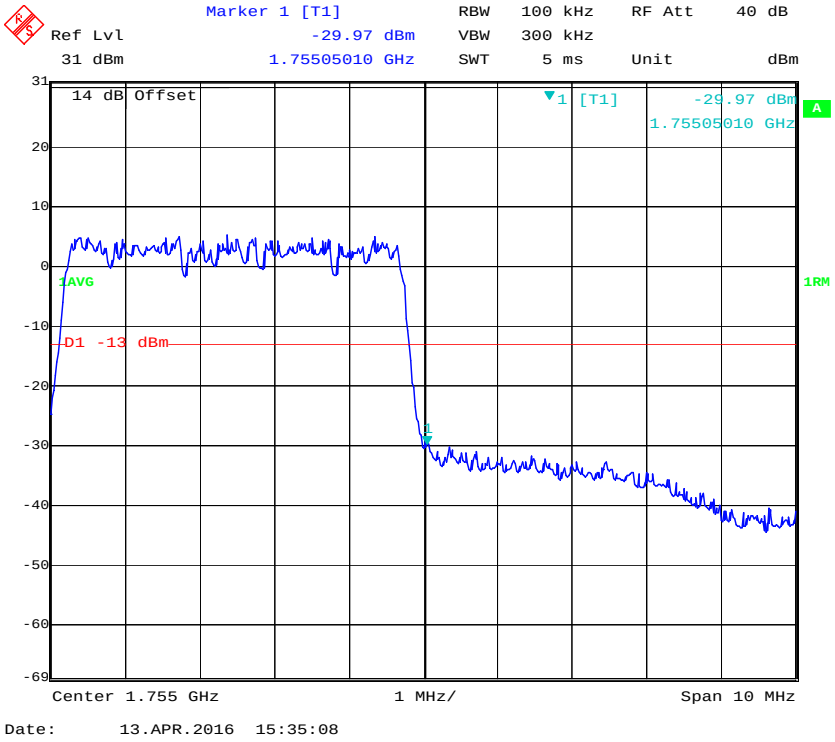
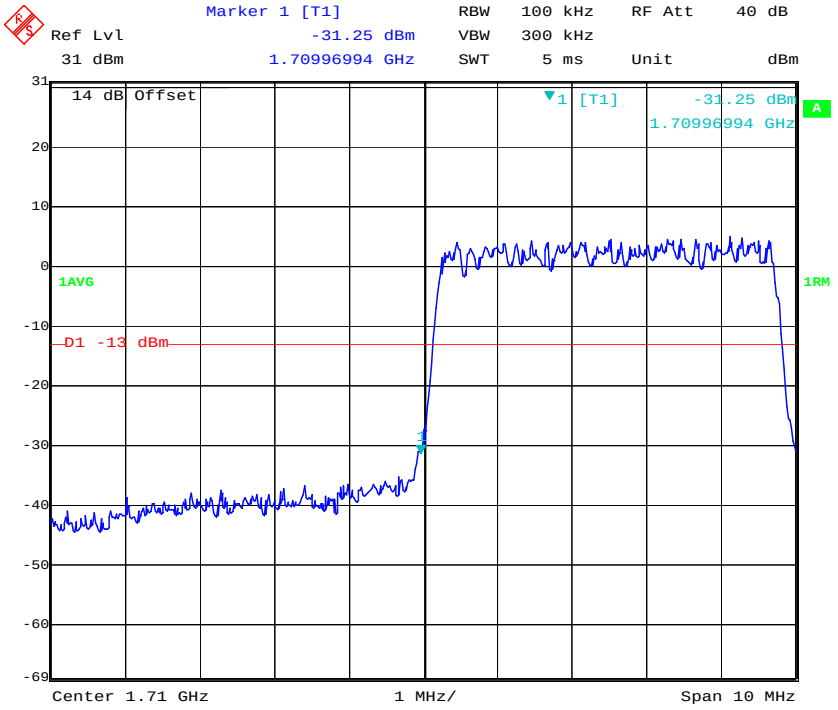
QPSK (5.0 MHz, FULL RB) - Left Band Edge



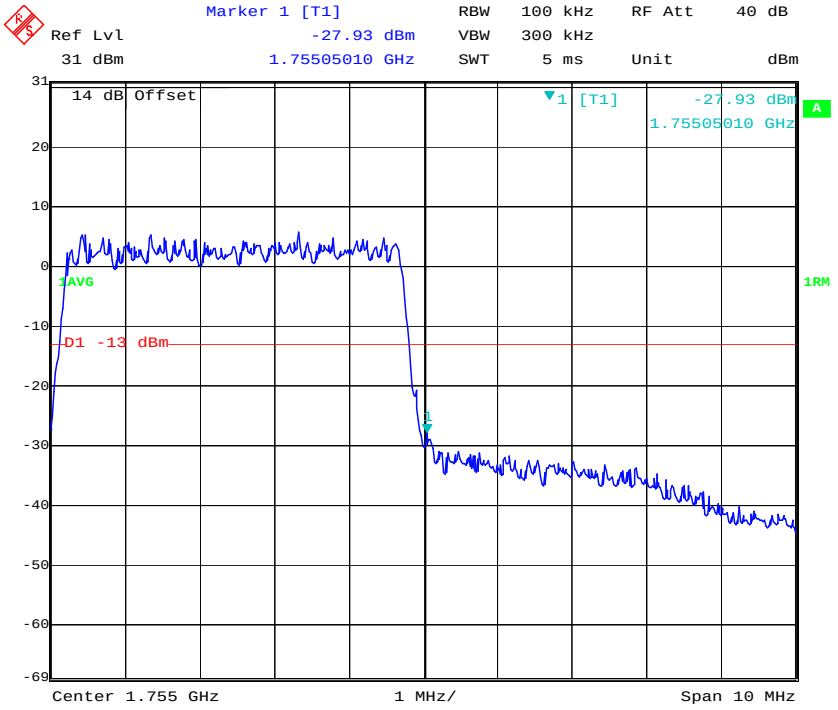
QPSK (5.0 MHz, FULL RB) - Right Band Edge



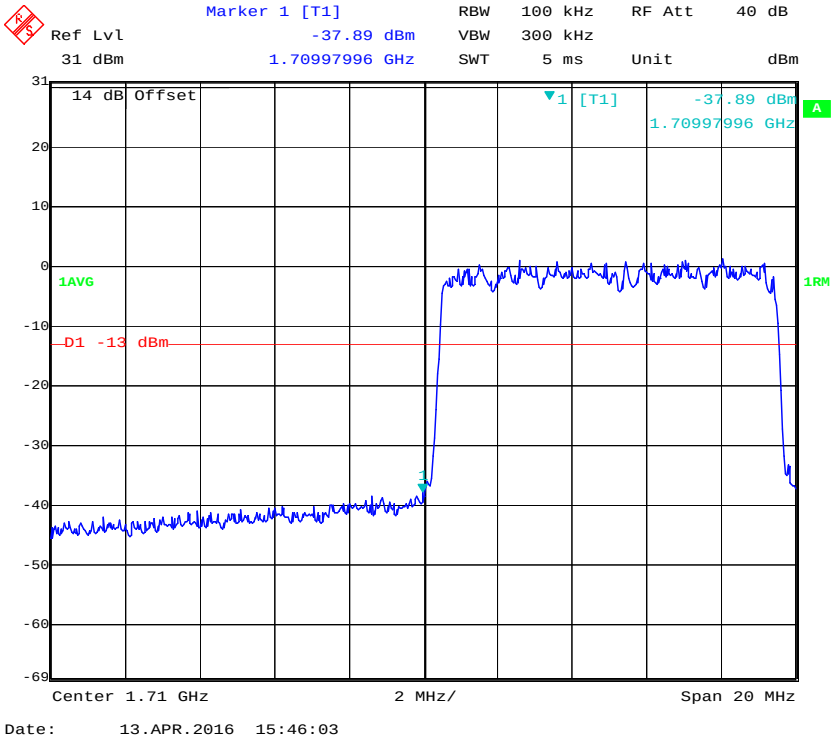
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



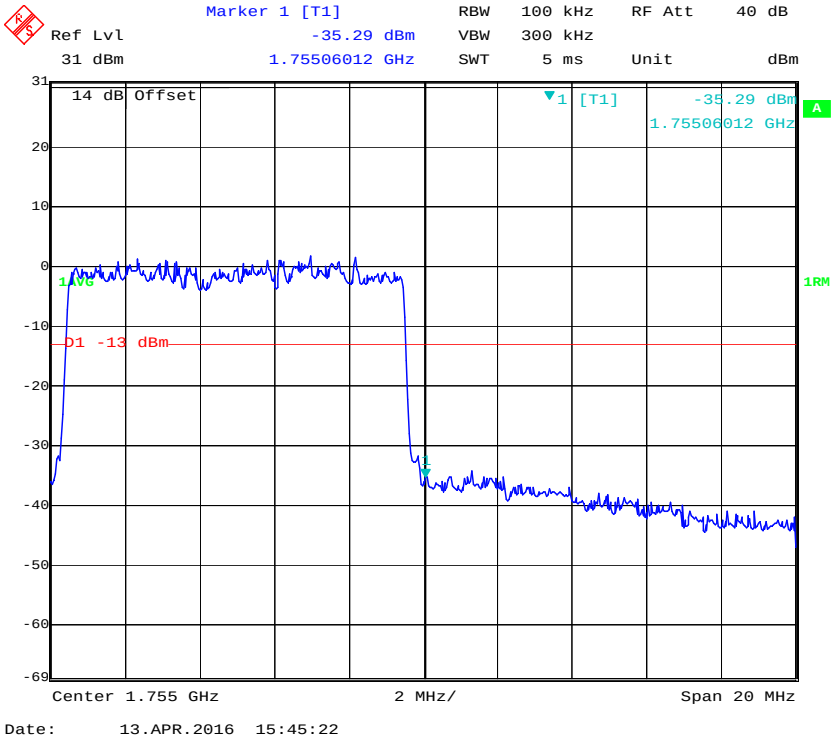
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



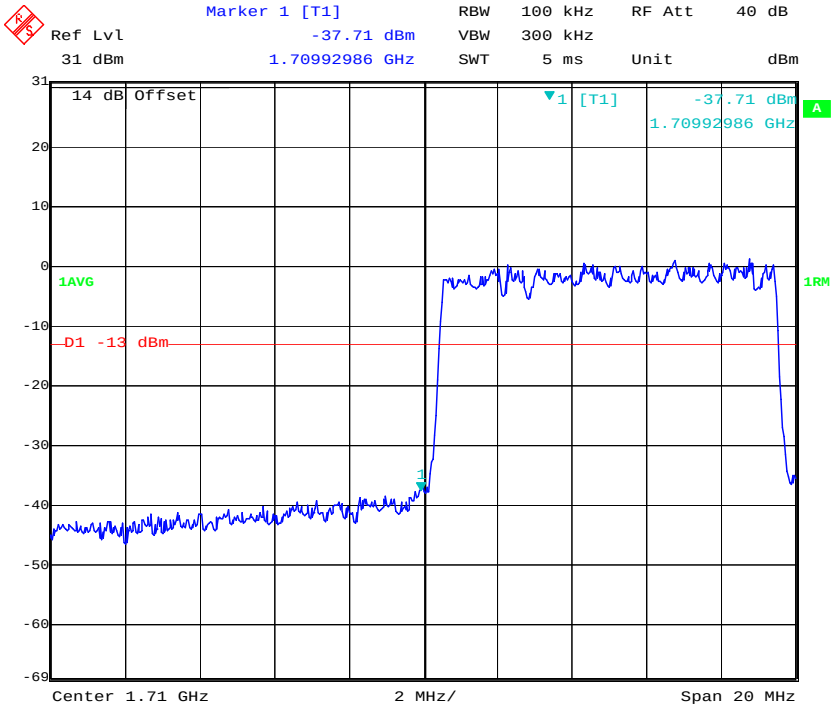
QPSK (10.0 MHz, FULL RB) - Left Band Edge



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

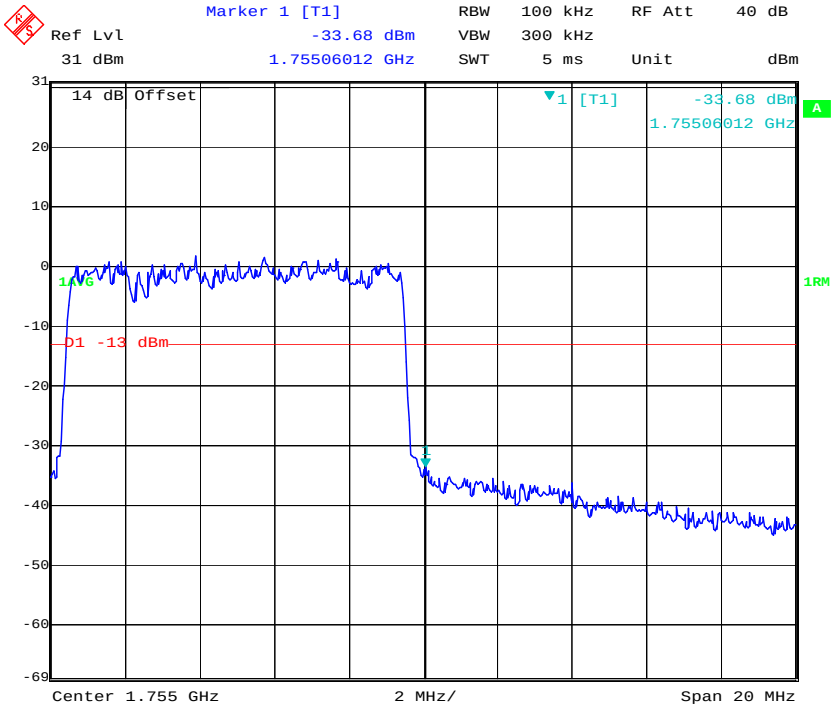


16-QAM (10.0 MHz, FULL RB) - Left Band Edge



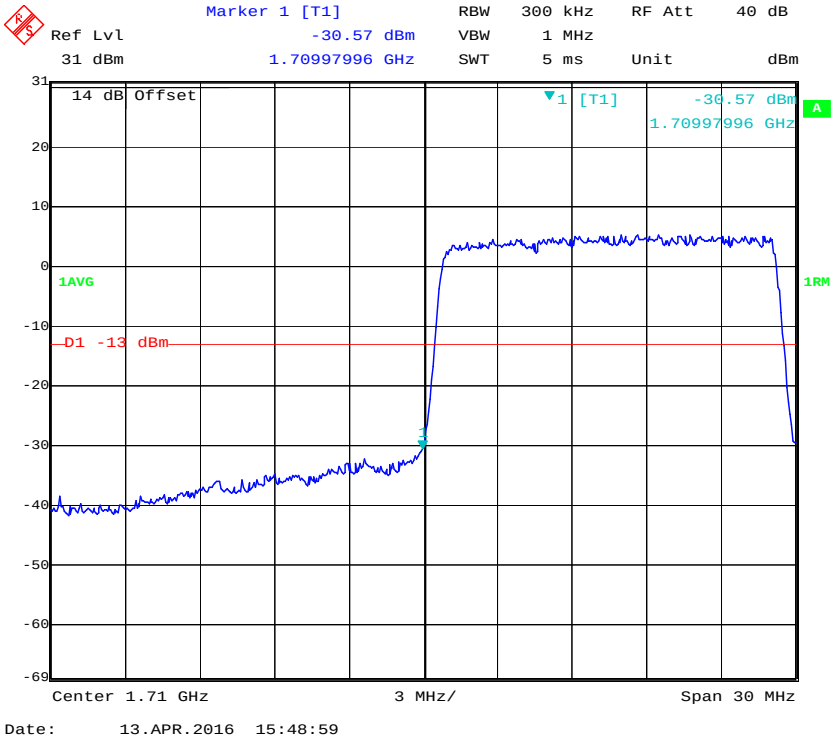
Date: 13.APR.2016 15:40:00

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

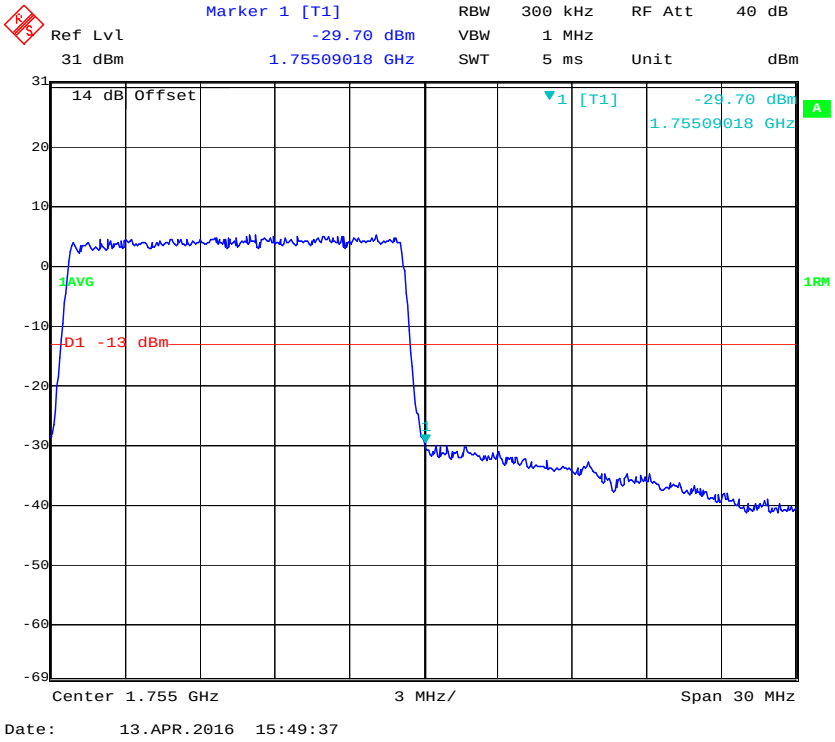


Date: 13.APR.2016 15:40:40

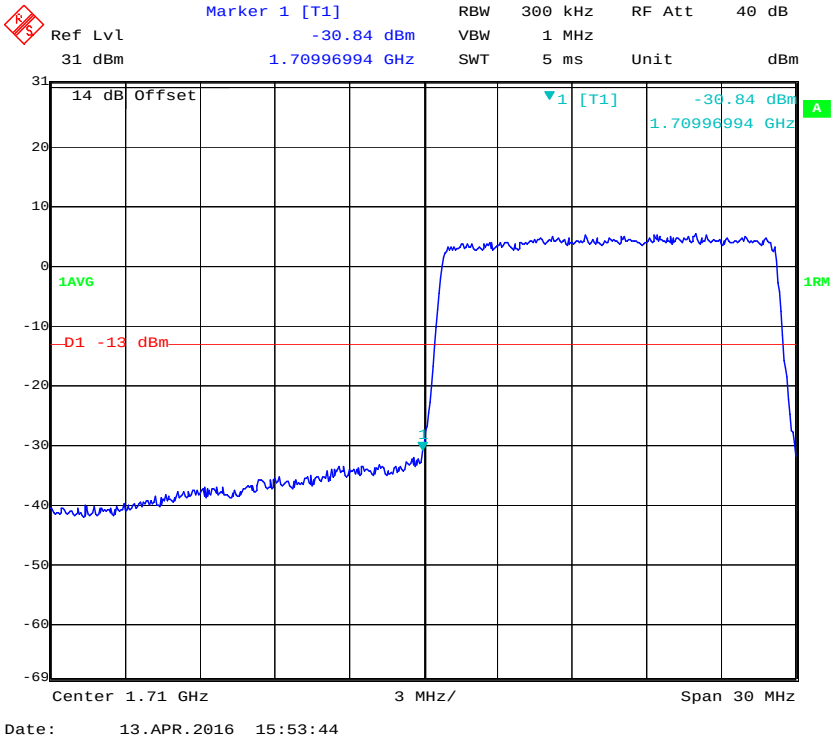
QPSK (15.0 MHz, FULL RB) - Left Band Edge



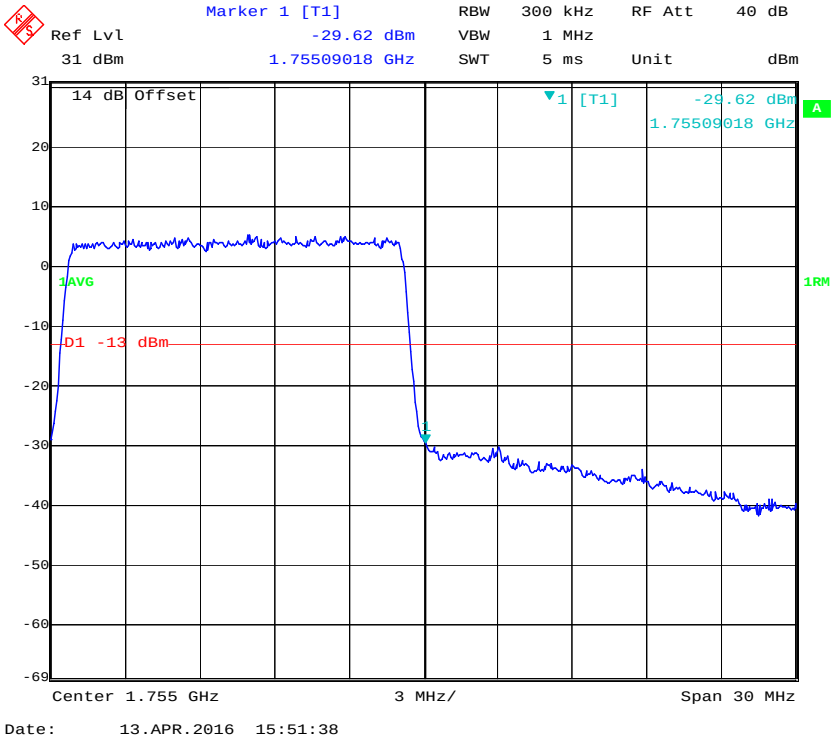
QPSK (15.0 MHz, FULL RB) - Right Band Edge



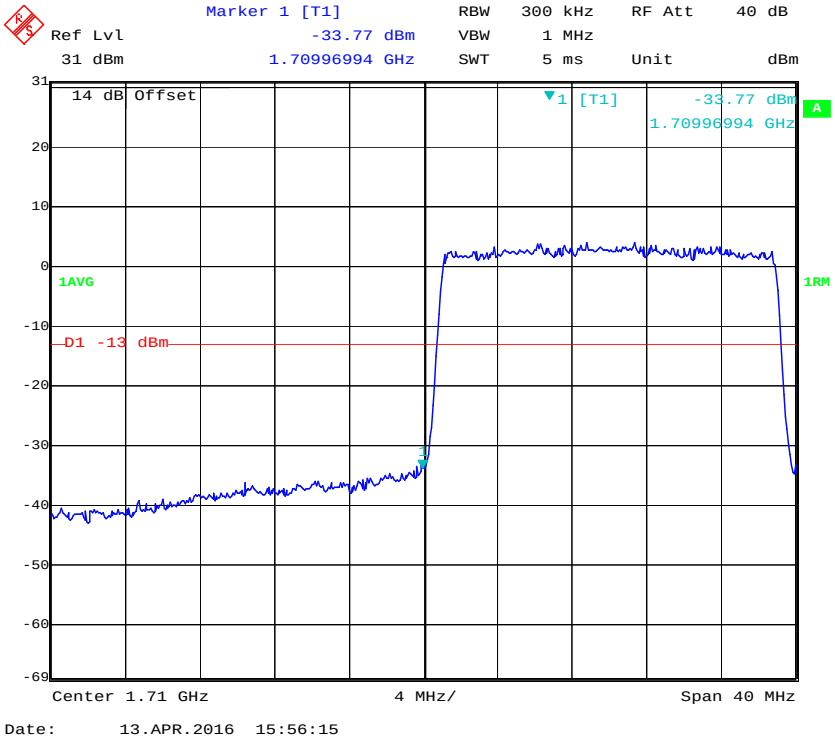
16-QAM (15.0 MHz, FULL RB) - Left Band Edge



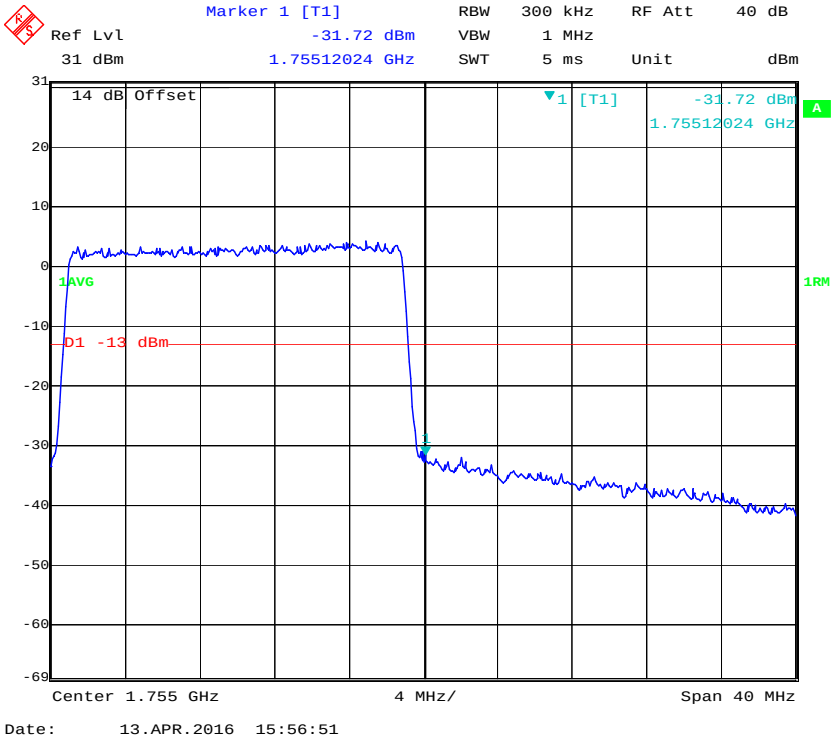
16-QAM (15.0 MHz, FULL RB) - Right Band Edge



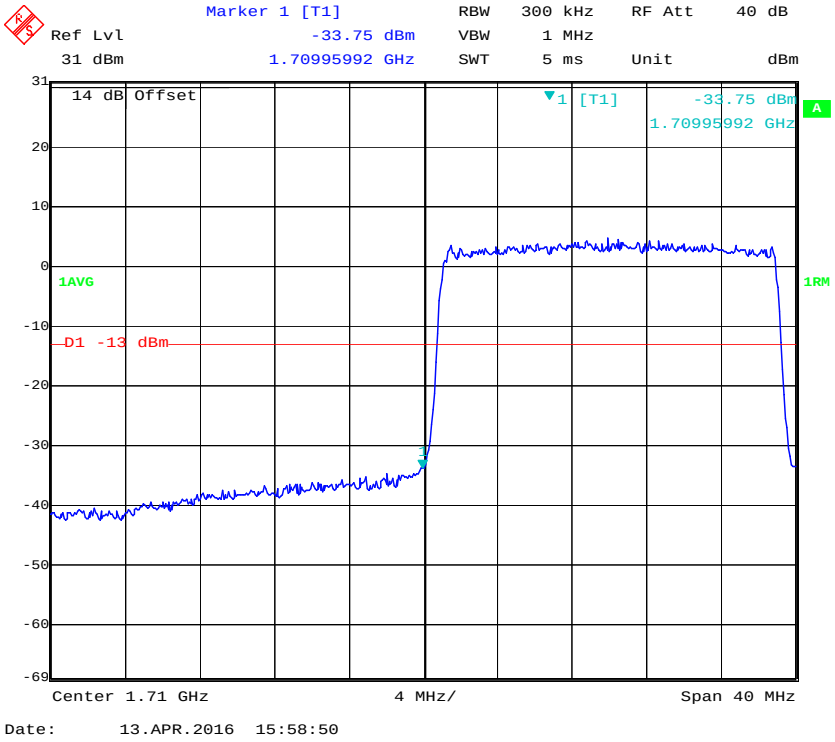
QPSK (20.0 MHz, FULL RB) - Left Band Edge



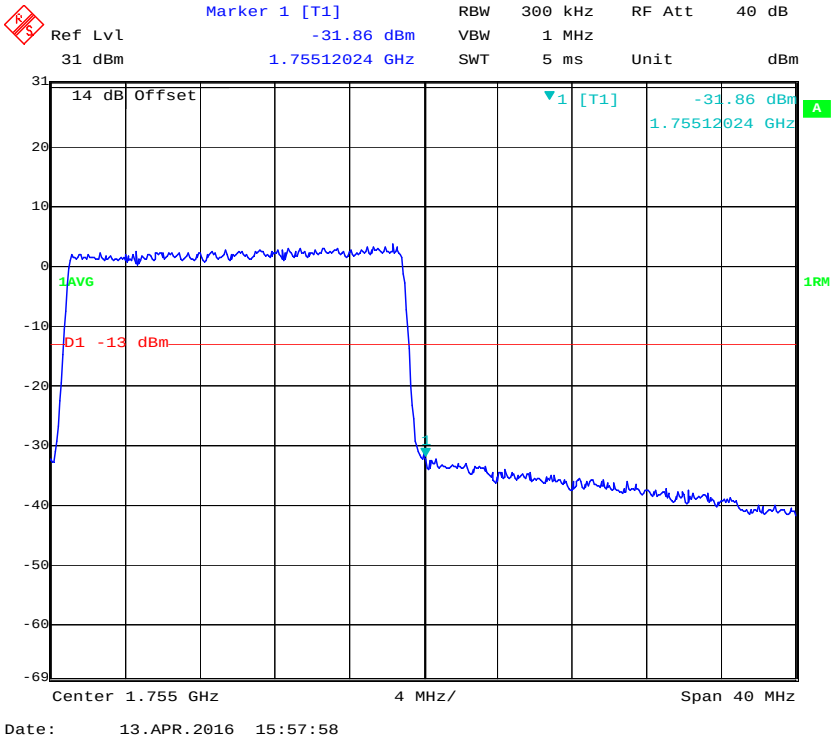
QPSK (20.0 MHz, FULL RB) - Right Band Edge



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

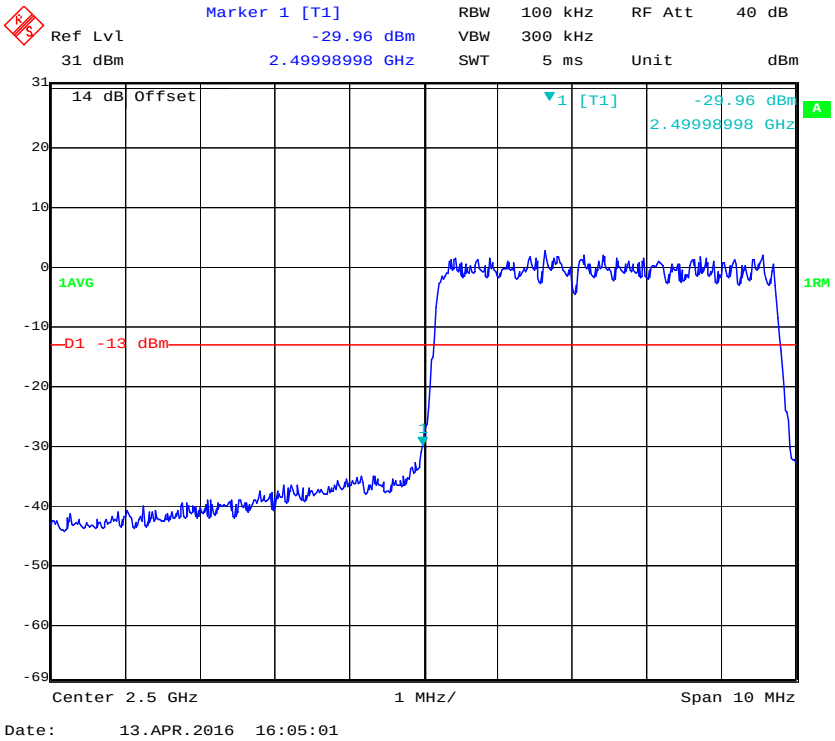


16-QAM (20.0 MHz, FULL RB) - Right Band Edge

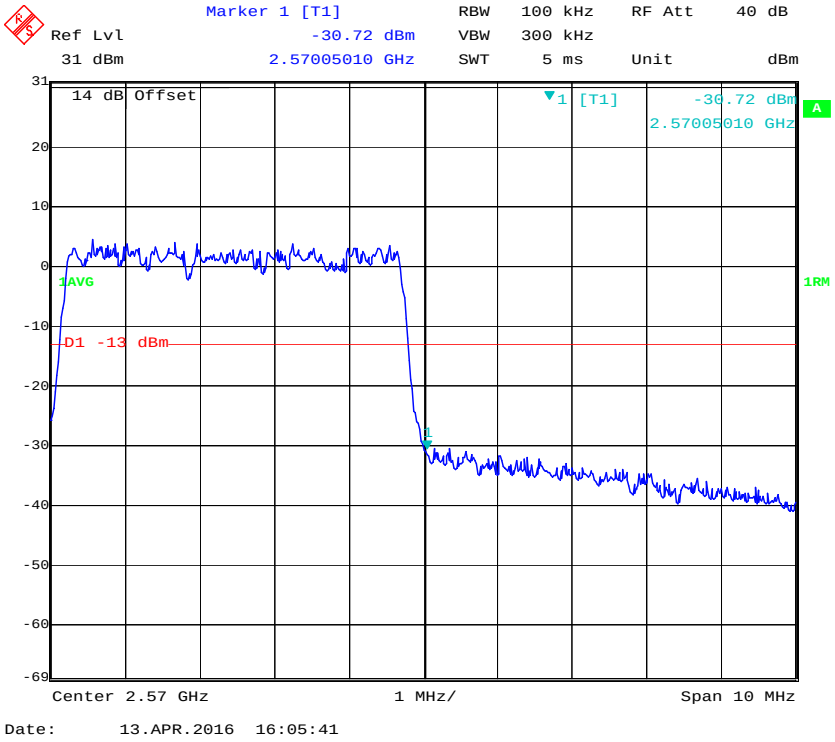


Band 7:

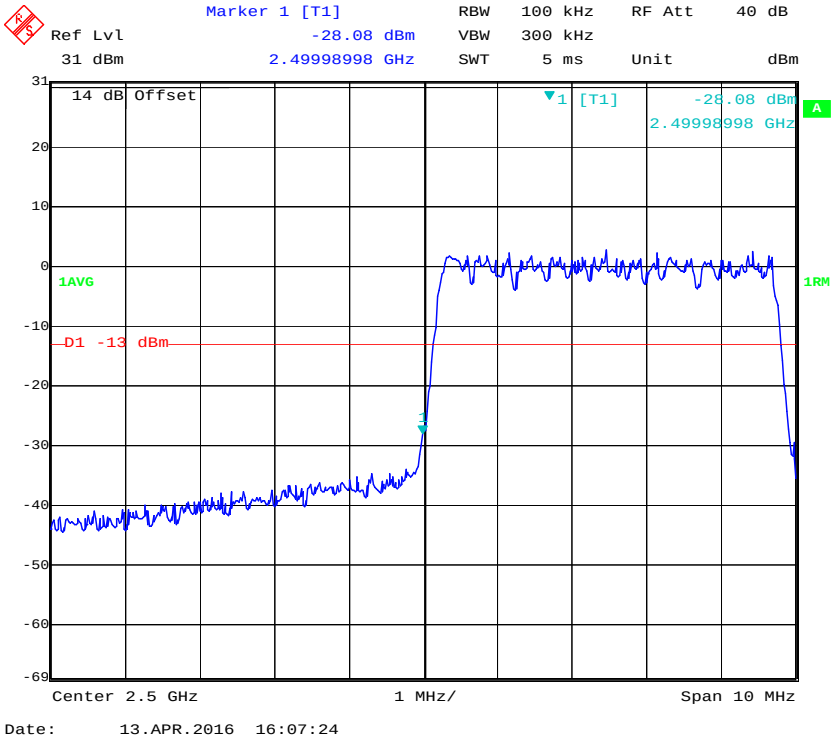
QPSK (5.0 MHz, FULL RB) - Left Band Edge



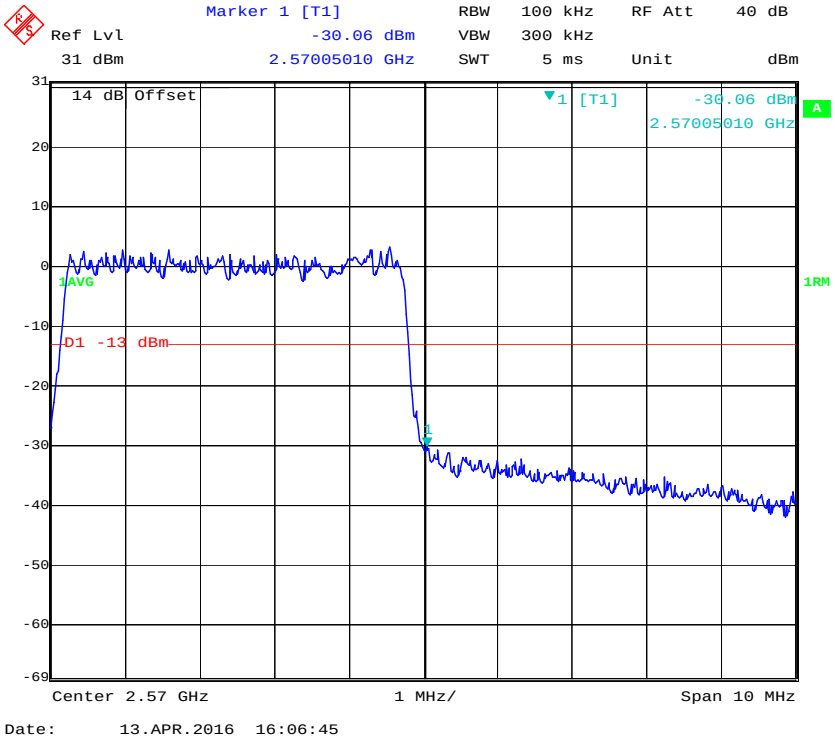
QPSK (5.0 MHz, FULL RB) - Right Band Edge



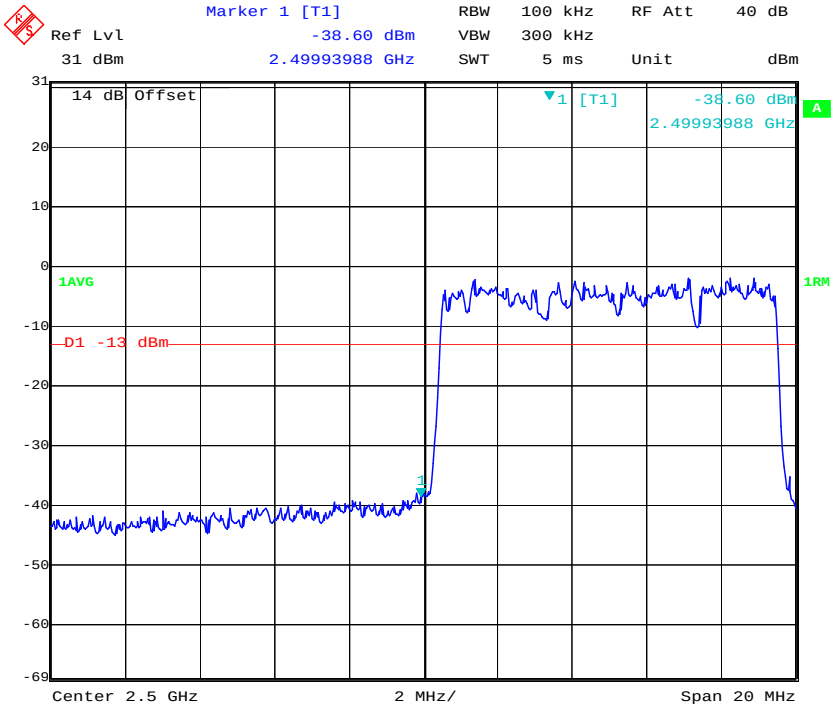
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



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

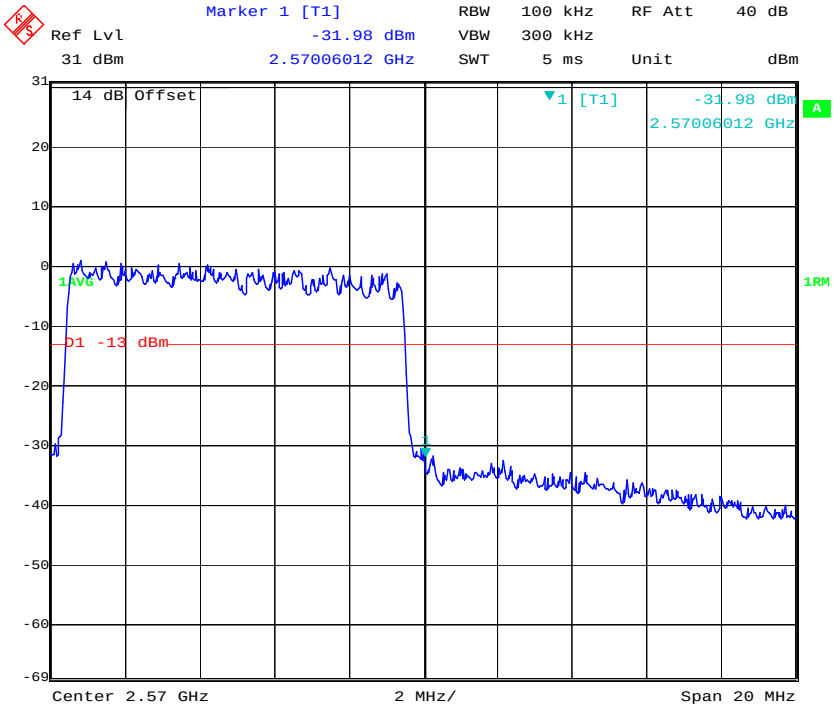


QPSK (10.0 MHz, FULL RB) - Left Band Edge



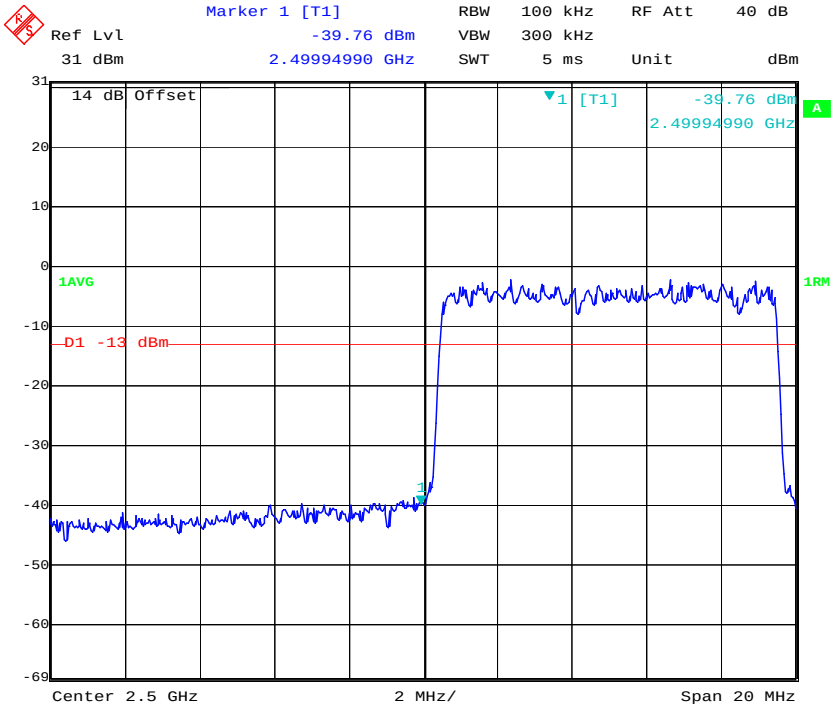
Date: 13.APR.2016 16:12:52

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



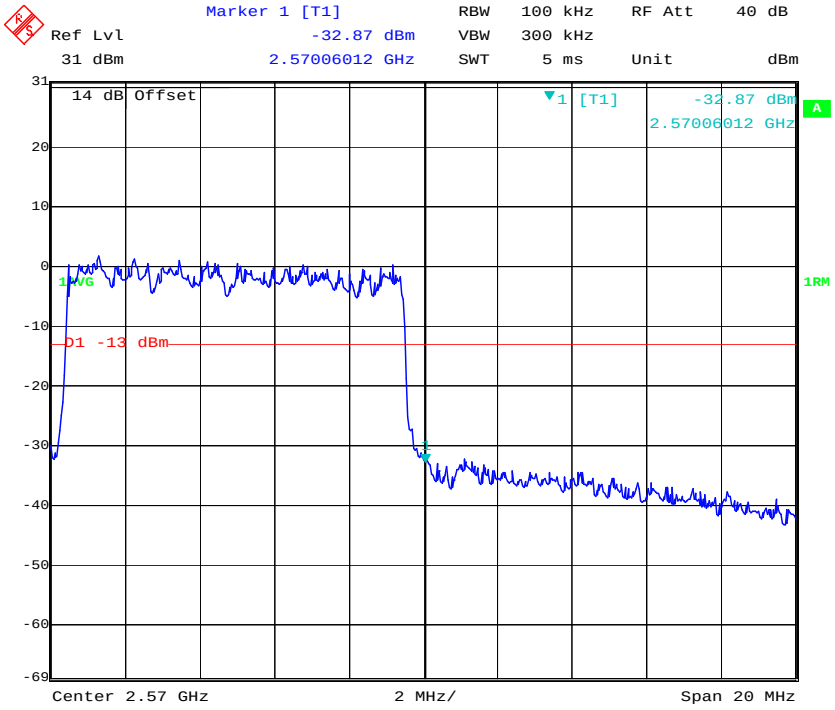
Date: 13.APR.2016 16:11:55

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



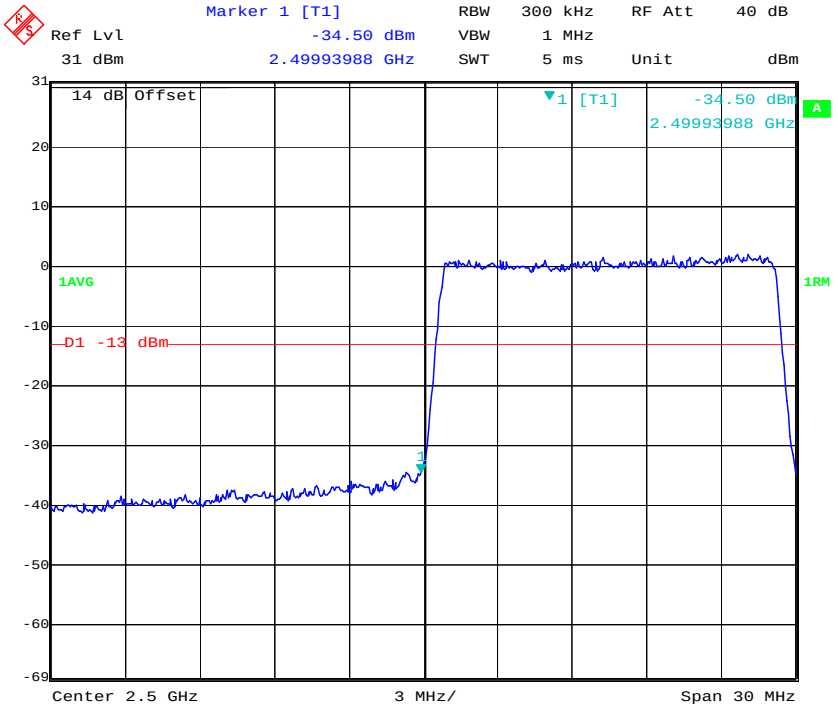
Date: 13.APR.2016 16:09:51

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

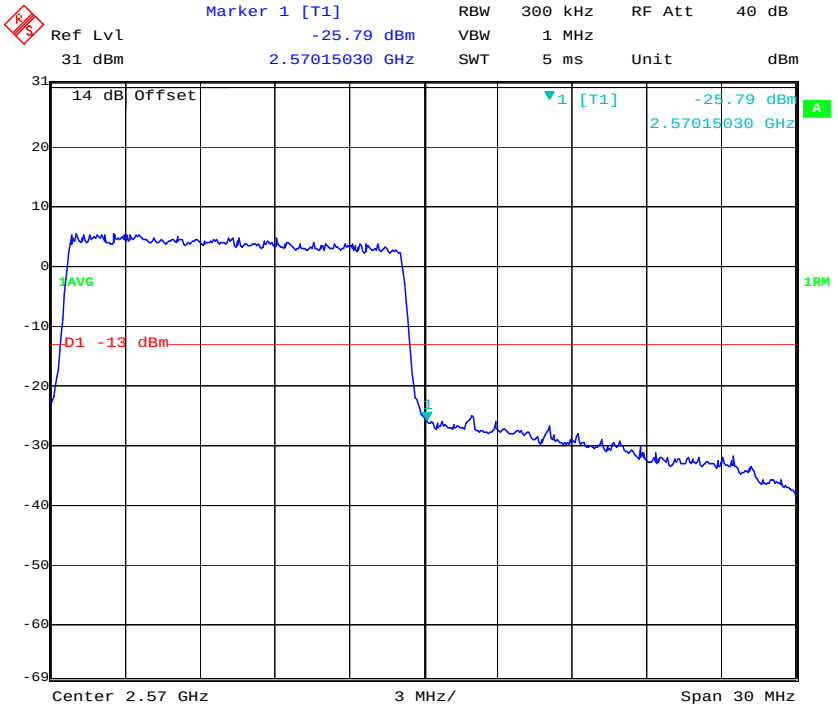


Date: 13.APR.2016 16:10:44

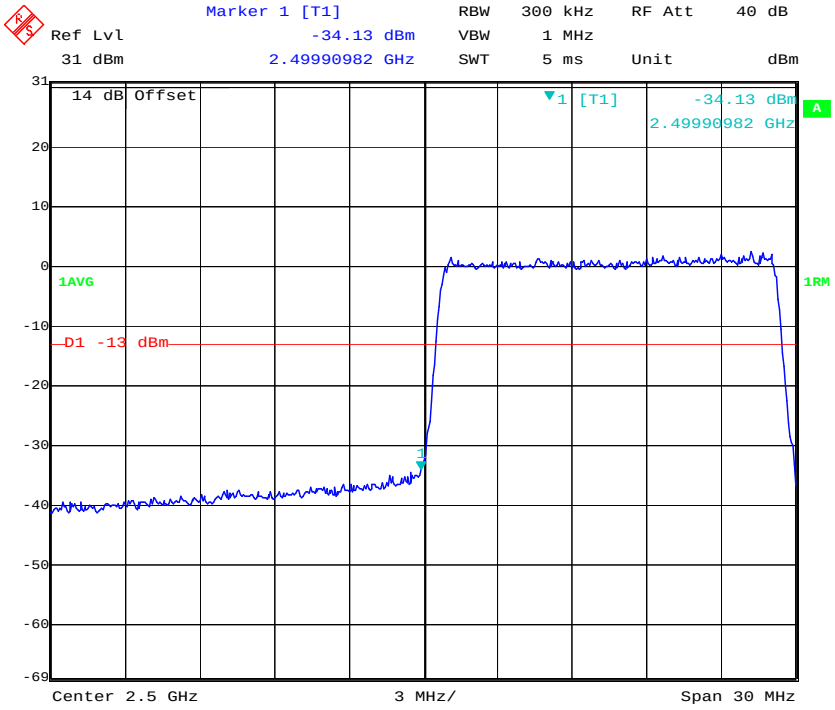
QPSK (15 MHz, FULL RB) - Left Band Edge



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

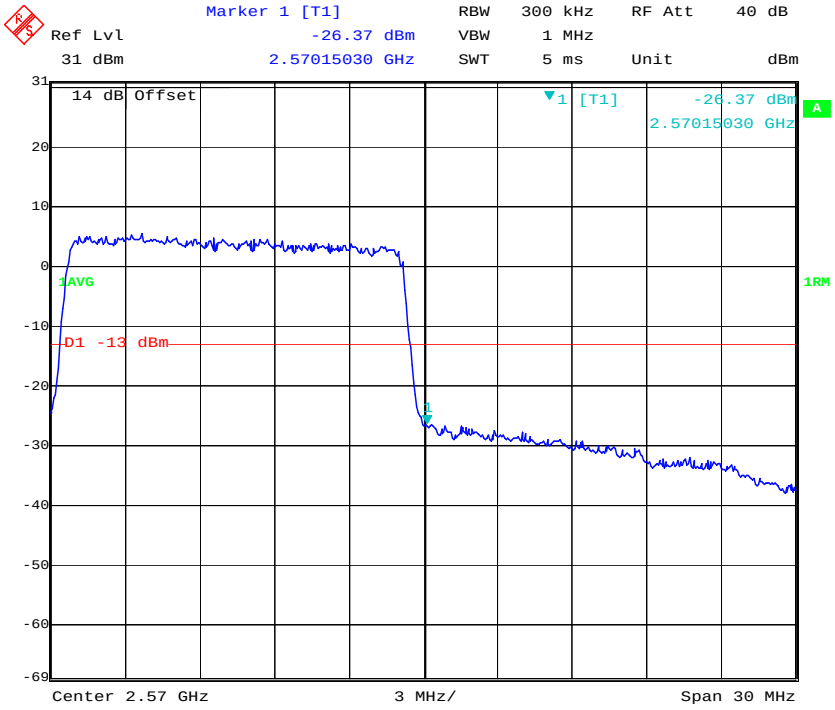


16-QAM (15 MHz, FULL RB) - Left Band Edge



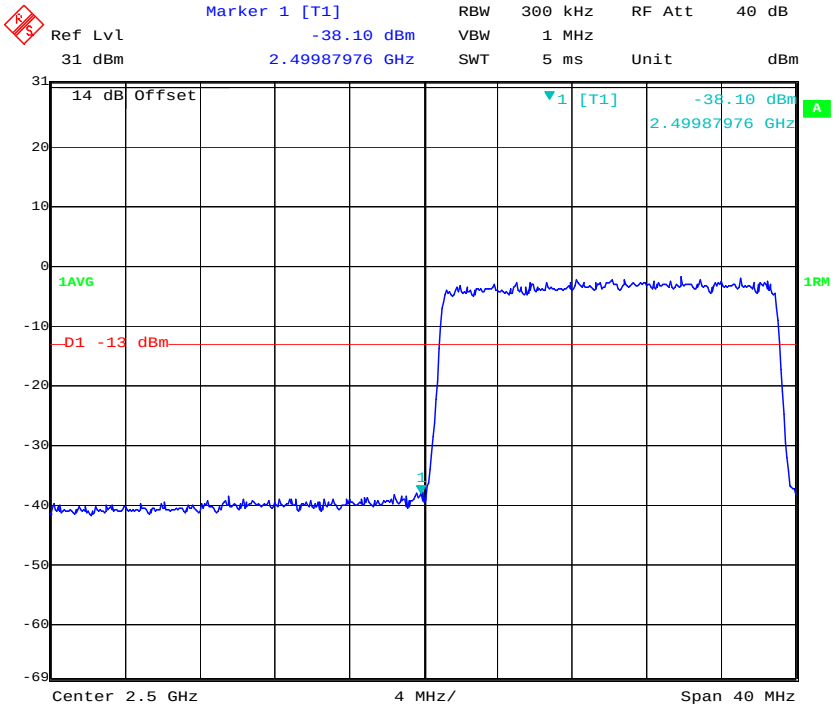
Date: 13.APR.2016 16:18:35

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

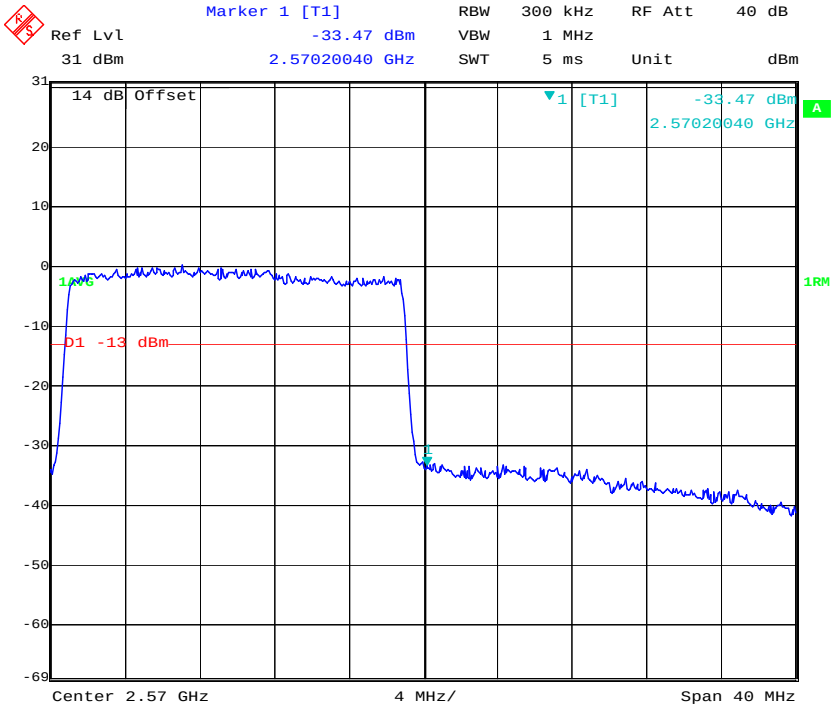


Date: 13.APR.2016 16:17:49

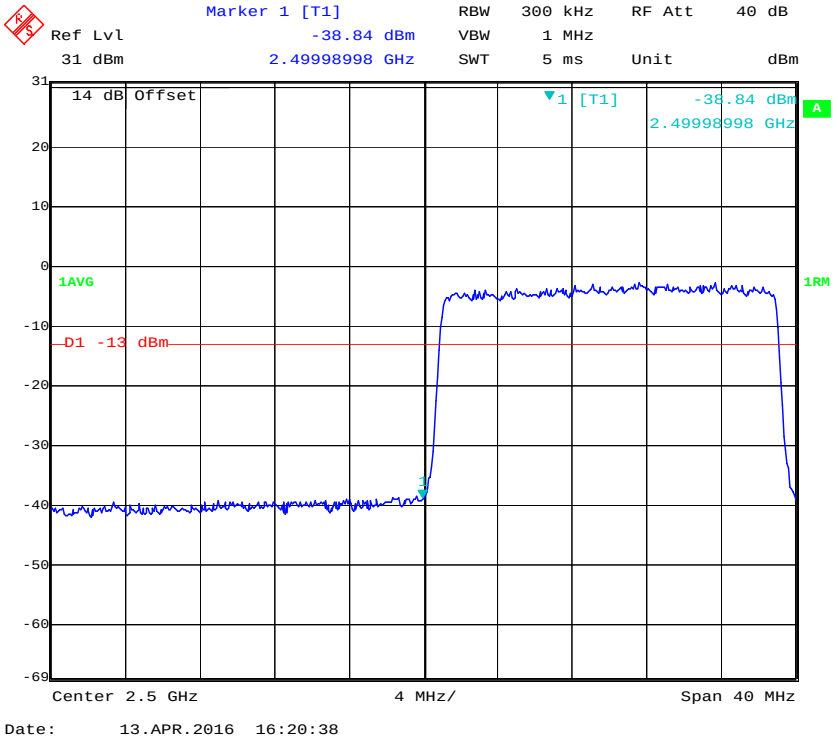
QPSK (20 MHz, FULL RB) - Left Band Edge



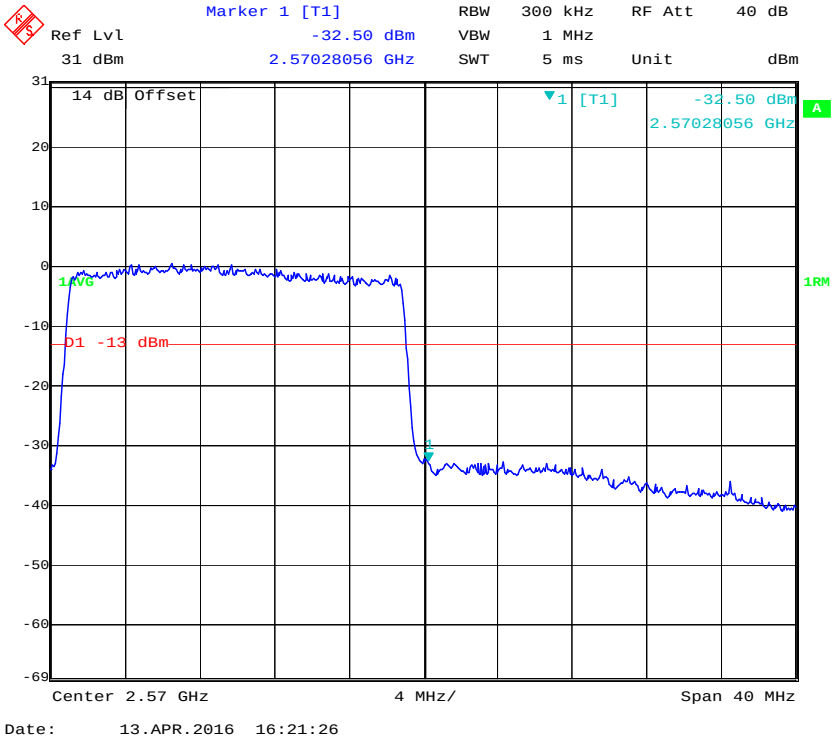
QPSK (20 MHz, FULL RB) - Right Band Edge



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

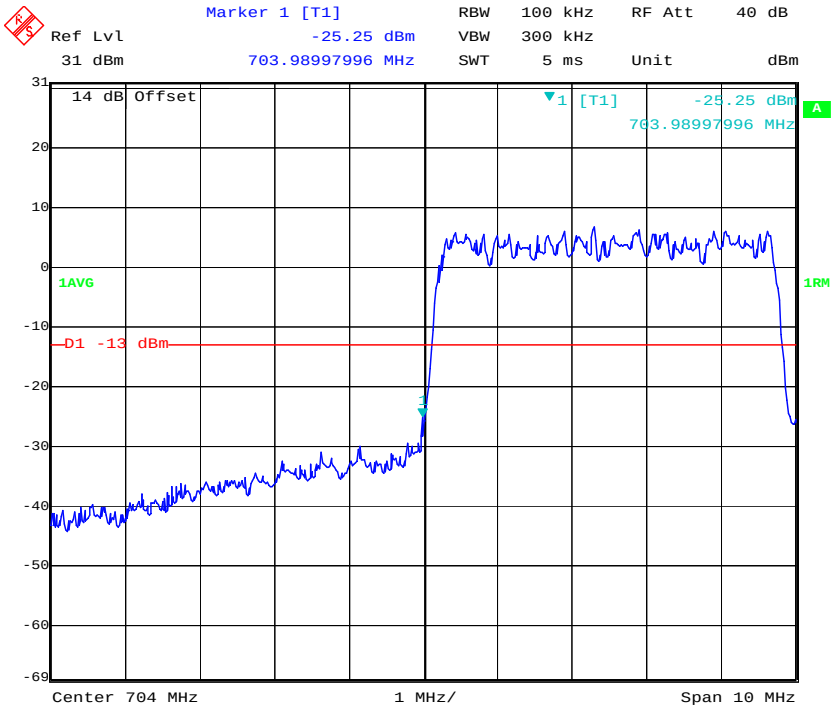


16-QAM (20 MHz, FULL RB) - Right Band Edge

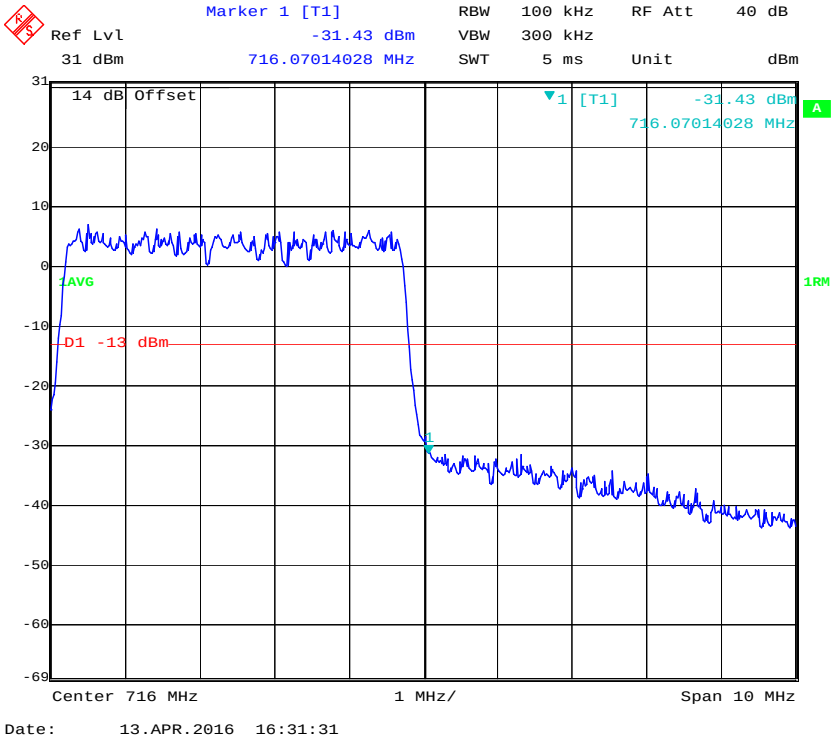


Band 17:

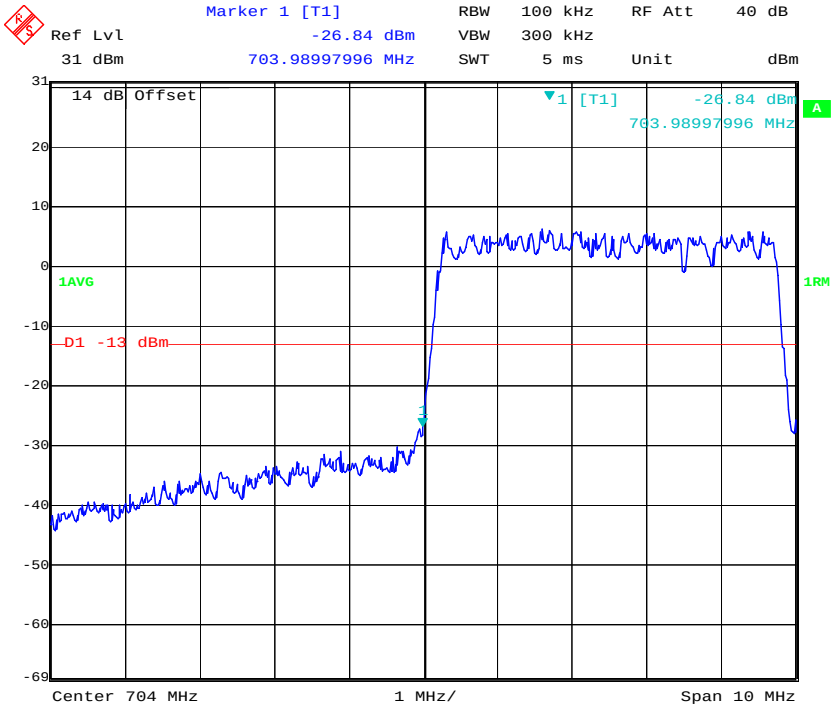
QPSK (5.0 MHz, FULL RB) - Left Band Edge



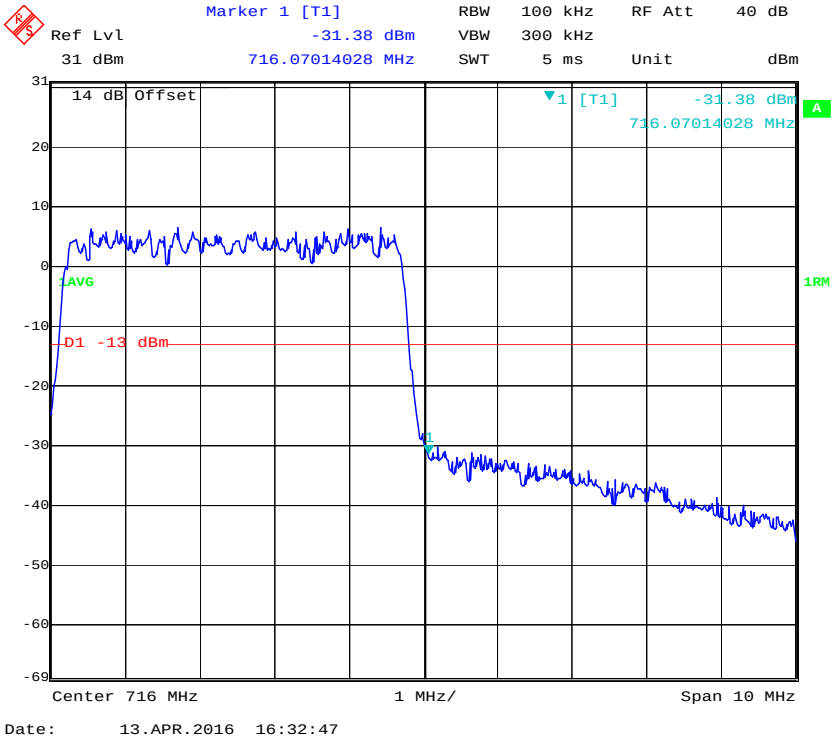
QPSK (5.0 MHz, FULL RB) - Right Band Edge



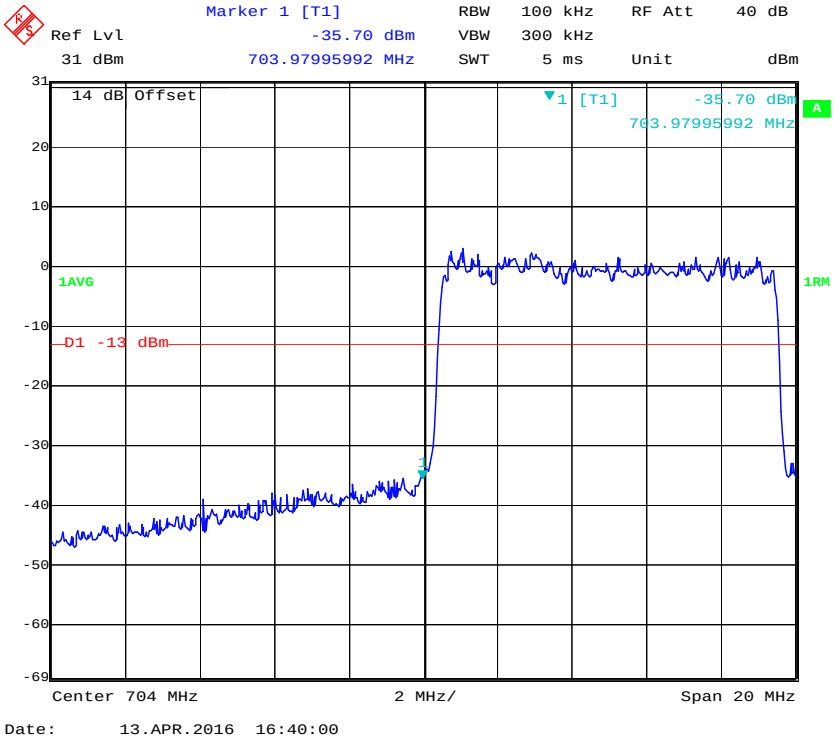
16-QAM (5.0 MHz, FULL RB) - Left Band Edge



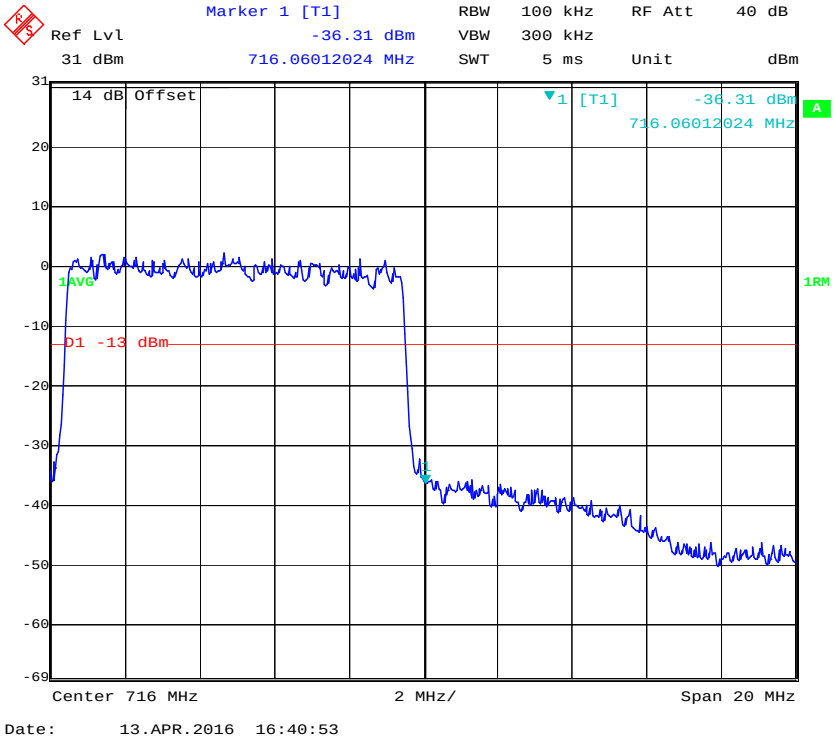
16-QAM (5.0 MHz, FULL RB) - Right Band Edge



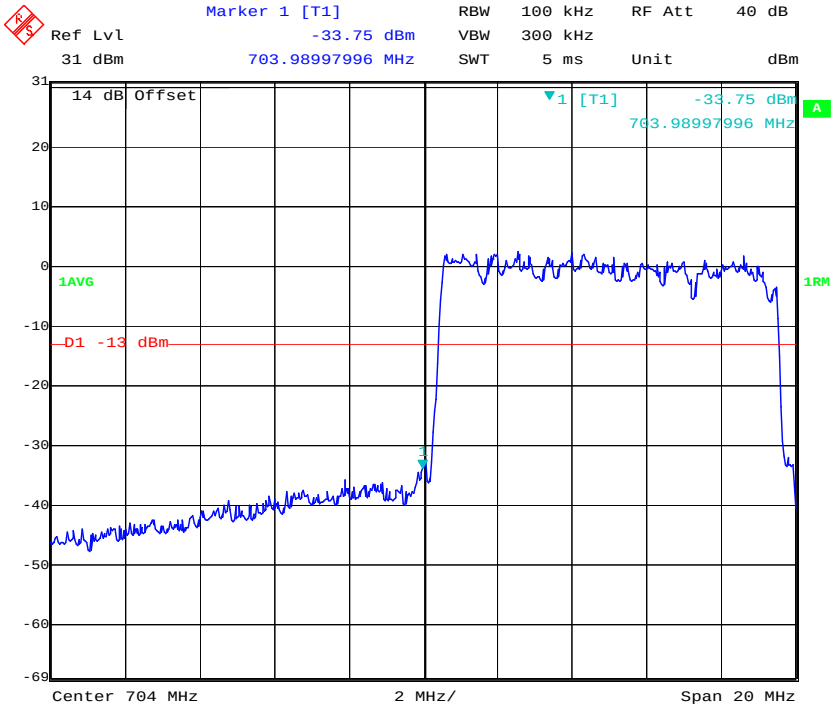
QPSK (10.0 MHz, FULL RB) - Left Band Edge



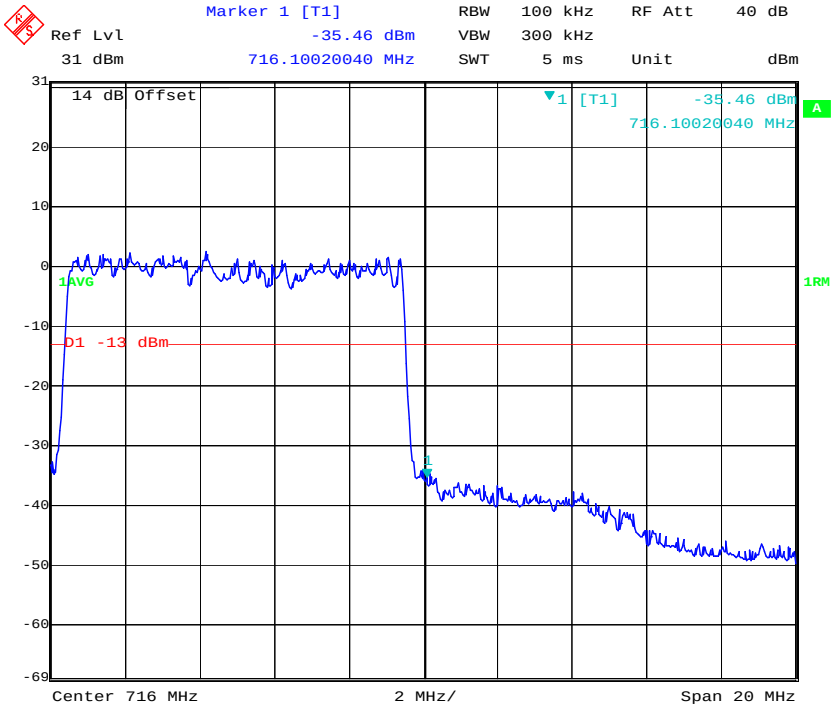
QPSK (10.0 MHz, FULL RB) - Right Band Edge



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

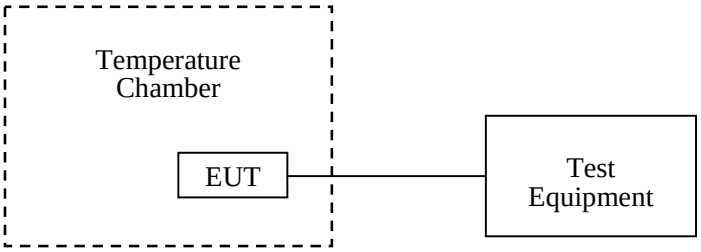
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
ESPEC	Temperature & Humidity Chamber	EL-10KA	09107726	2015-11-01	2016-10-31
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2015-11-23	2016-11-23
R&S	Wideband Radio Communication tester	CMW500	1201.002K50-146520-wh	2015-11-23	2016-11-23
Ducommun technologies	RF Cable	RG-214	4	2015-06-15	2016-06-15
WEINSCHEL	10dB Attenuator	5324	AU0709	2015-06-18	2016-06-18

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

Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0kPa

The testing was performed by Haiguo Li on 2016-04-20.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	20	0.02391	2.5
-20		20	0.02391	2.5
-10		18	0.02152	2.5
0		18	0.02152	2.5
10		15	0.01793	2.5
20		15	0.01793	2.5
30		18	0.02152	2.5
40		18	0.02152	2.5
50		20	0.02391	2.5
25	V min.= 3.6	20	0.02391	2.5
25	V max.= 4.35	20	0.02391	2.5

EDGE Mode

Middle Channel, f_o =836.6 MHz				
Temperature (℃)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	19	0.02271	2.5
-20		19	0.02271	2.5
-10		19	0.02271	2.5
0		14	0.01673	2.5
10		14	0.01673	2.5
20		14	0.01673	2.5
30		17	0.02032	2.5
40		17	0.02032	2.5
50		17	0.02032	2.5
25	V min.= 3.6	19	0.02271	2.5
25	V max.= 4.35	19	0.02271	2.5

WCDMA Mode

Middle Channel, f_o=836.6 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	18	0.02152	2.5
-20		18	0.02152	2.5
-10		18	0.02152	2.5
0		12	0.01434	2.5
10		12	0.01434	2.5
20		15	0.01793	2.5
30		15	0.01793	2.5
40		15	0.01793	2.5
50		15	0.01793	2.5
25	V min.= 3.6	18	0.02152	2.5
25	V max.= 4.35	18	0.02152	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o=1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	30	0.01596	pass
-20		30	0.01596	pass
-10		28	0.01489	pass
0		28	0.01489	pass
10		25	0.01330	pass
20		25	0.01330	pass
30		25	0.01330	pass
40		28	0.01489	pass
50		28	0.01489	pass
25	V min.= 3.6	30	0.01596	pass
25	V max.= 4.35	30	0.01596	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	30	0.01596	pass
-20		30	0.01596	pass
-10		28	0.01489	pass
0		22	0.01170	pass
10		22	0.01170	pass
20		22	0.01170	pass
30		29	0.01543	pass
40		29	0.01543	pass
50		29	0.01543	pass
25	V min.= 3.6	30	0.01596	pass
25	V max.= 4.35	30	0.01596	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Power Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	20	0.01064	pass
-20		20	0.01064	pass
-10		18	0.00957	pass
0		18	0.00957	pass
10		15	0.00798	pass
20		15	0.00798	pass
30		15	0. 00798	pass
40		18	0.00957	pass
50		18	0. 00957	pass
25	V min.= 3.6	18	0.00957	pass
25	V max.= 4.35	20	0.01064	pass

LTE Band 2:

Bandwidth	Temperature (°C)	Voltage (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
20.0 MHz	-30	3.8	30	0.01596	Pass
	-20		30	0.01596	Pass
	-10		25	0.01330	Pass
	0		25	0.01330	Pass
	10		28	0.01489	Pass
	20		28	0.01489	Pass
	30		29	0.01558	Pass
	40		29	0.01543	Pass
	50		29	0.01543	Pass
	25	3.6	25	0.01330	Pass
	25	3.8	30	0.01596	Pass
	25	4.35	30	0.01596	Pass

LTE Band 4:

Bandwidth	Temperature (°C)	Voltage (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
20.0 MHz	-30	3.8	28	0.01616	Pass
	-20		28	0.01616	Pass
	-10		25	0.01443	Pass
	0		25	0.01443	Pass
	10		25	0.01443	Pass
	20		22	0.01270	Pass
	30		22	0.01270	Pass
	40		20	0.01154	Pass
	50		20	0.01154	Pass
	25	3.6	22	0.01270	Pass
	25	3.8	28	0.01616	Pass
	25	4.35	28	0.01616	Pass

LTE Band 7:

Bandwidth	Temperature (°C)	Voltage (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
20.0 MHz	-30	3.8	35	0.01381	Pass
	-20		35	0.01381	Pass
	-10		32	0.01262	Pass
	0		32	0.01262	Pass
	10		22	0.00868	Pass
	20		22	0.00868	Pass
	30		32	0.01262	Pass
	40		32	0.01262	Pass
	50		32	0.01262	Pass
	25	3.6	20	0.00789	Pass
	25	3.8	35	0.01381	Pass
	25	4.35	35	0.01381	Pass

LTE Band 17:

	Temperature (°C)	Voltage (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
10.0 MHz	-30	3.8	20	0.02817	Pass
	-20		20	0.02817	Pass
	-10		20	0.02817	Pass
	0		15	0.02113	Pass
	10		15	0.02113	Pass
	20		15	0.02113	Pass
	30		19	0.02676	Pass
	40		19	0.02676	Pass
	50		19	0.02676	Pass
	25	3.6	15	0.02113	Pass
	25	3.8	20	0.02817	Pass
	25	4.35	20	0.02817	Pass

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