FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

BLU Products, Inc.

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

FCC ID: YHLBLUC6L20

Report Type:	**Product Type:**
Original Report	Mobile Phone

Report Number:	RSZ200611012-00D
Report Date:	2020-07-20
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Mobile Phone
Tested Model	C6L 2020
Multiple Model	J7L
Model Differences	Refer to the DOS letter
Frequency Range	EGSM 850: 824-849 MHz(TX); 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 4: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) WCDMA Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) LTE Band 4: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) LTE Band 5: 824-849 MHz(TX) ; 869-894 MHz(RX) LTE Band 7: 2500-2570 MHz(TX); 2620-2690 MHz(RX) LTE Band 12: 699-716 MHz(TX) ; 729-746 MHz(RX) LTE Band 17: 704-716 MHz(TX); 734-746 MHz(RX)
Maximum Target Output Power	EGSM850: 33.5dBm(GMSK), PCS1900:30dBm(GMSK) WCDMA Band 2/4/5: 23dBm LTE Band 2: 23.2dBm LTE Band 4: 23dBm LTE Band 5: 24.5dBm LTE Band 7: 25dBm LTE Band 12: 24.5dBm LTE Band 17: 24dBm
Modulation Technique	2G: GMSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification	2G/3G/4G: FPC Antennas
Voltage Range	DC 3.8V from battery or DC 5V from adapter
Date of Test	2020-06-17 to 2020-06-18
Sample serial number	RSZ200611012-RF-S1 (Assigned by BACL, Shenzhen)
Received date	2020-06-04
Sample/EUT Status	Good condition
Adapter information	Model: US-WW-1006 Input: AC 100-240V, 50/60Hz, 0.15A Output: DC 5.0V, 1000mA

Objective

This test report is prepared on behalf of BLU Products, Inc. in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Subpart 27 of the Federal Communication Commissions rules.

The objective is to determine the compliance of the 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 15.247 DSS, Part 15.247 DTS and Part 15B JBP submissions with FCC ID: YHLBLUC6L20.

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2-Subpart 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-E.

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

Measurement Uncertainty

Parameter		Uncertainty
Occupied Channel Bandwidth		±5%
RF output power, conducted		±0.73dB
Unwanted Emission, conducted		±1.6dB
Emissions, Radiated	Below 1GHz	±4.75dB
	Above 1GHz	±4.88dB
Temperature		±1℃
Humidity		±6%
Supply voltages		±0.4%

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located on the 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No.: 342867, the FCC Designation No.: CN1221.

The test site has been registered with ISED Canada under ISED Canada Registration Number 3062B.

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

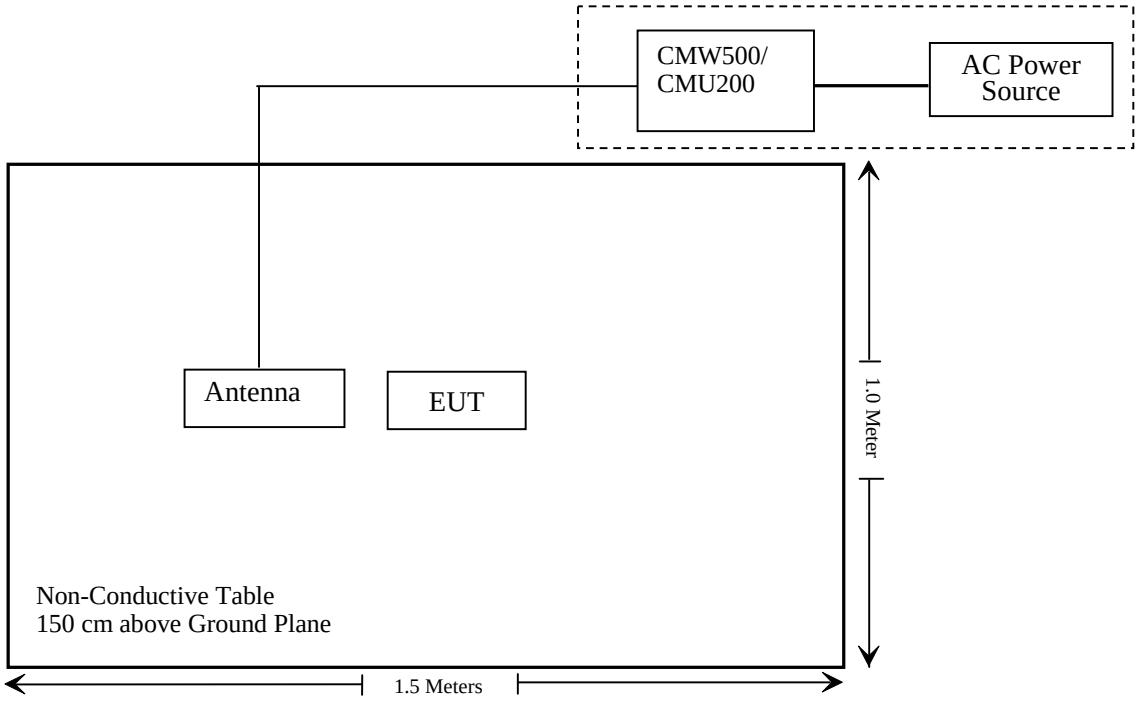
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

Note: * Please refer to SAR report released by BACL, report number: RSZ200611012-SA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sonoma instrument	Pre-amplifier	310 N	186238	2020/4/20	2021/4/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Unknow	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
Unknow	Cable	Chamber Cable 1	F-03-EM236	2019/11/29	2020/11/28
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2019/7/22	2020/7/21
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
A.H.System	Horn Antenna	SAS-200/571	135	2018/9/1	2021/8/31
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Unknow	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
MICRO-TRONICS	Passband filter	HPM50111	F-19-EM006	2020/4/20	2021/4/20
Unknown	High Pass filter	1.3GHz	101120	2020/4/20	2021/4/20
Ducommun Technolagies	Horn antenna	ARH-4223-02	1007726-02 1304	2017/12/6	2020/12/5
Ducommun Technolagies	Horn antenna	ARH-4223-02	1007726-01 1304	2017/12/6	2020/12/5
HP Agilent	RF Communication test set	8920B	3325U00859	2020/01/16	2021/01/16

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2020/3/2	2021/3/1
WEINSCHEL	3dB Attenuator	Unknow	F-03-EM121	2019/11/29	2020/11/28
Unknow	RF Cable	Unknow	2301 276	2019/11/29	2020/11/28
Unknow	RF Cable	Unknow	DLO J5/W6102	2019/11/29	2020/11/28
Weinschel	Power divider	1515	MY628	2019/11/29	2020/11/28
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	115500	2019/7/22	2020/7/21
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2019/7/9	2020/7/8
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2020/01/05	2021/01/05
Fluke	Digital Multimeter	287	19000011	2020/04/12	2021/04/12

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

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ200611012-SA.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E & 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 (b) (c) (d) (h) - RF OUTPUT POWER

Applicable Standard

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.

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

According to §27.50(b), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

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.

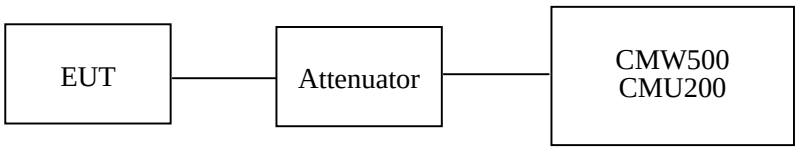
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo and Holland Yang and Leven Gan from 2020-06-17 to 2020-06-18.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	33.01	38.45
	190	836.6	33.02	38.45
	251	848.8	32.97	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	33.00	30.65	28.59	26.25	38.45
	190	836.6	33.02	30.75	28.68	26.33	38.45
	251	848.8	32.98	30.74	28.66	26.38	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		22.62	22.58	22.51
		HSDPA	1	21.81	21.86	21.58
			2	21.86	21.82	21.54
			3	21.78	21.83	21.51
			4	21.75	21.81	21.48
		HSUPA	1	21.81	22.08	21.82
			2	21.78	22.01	21.74
			3	21.81	22.07	21.82
			4	21.79	22.05	21.81
			5	21.77	22.03	21.80
		HSPA+	/	22.55	22.49	22.46

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.72	33
	661	1880.0	29.63	33
	810	1909.8	29.60	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.71	27.28	25.73	23.68	33
	661	1880.0	29.60	27.09	25.59	23.47	33
	810	1909.8	29.57	26.82	25.30	23.18	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		22.42	22.44	22.51
		HSDPA	1	21.53	21.43	21.77
			2	21.51	21.37	21.79
			3	21.46	21.37	21.70
			4	21.45	21.35	21.68
		HSUPA	1	21.61	21.46	21.98
			2	21.51	21.46	21.85
			3	21.68	21.43	21.94
			4	21.58	21.35	21.96
			5	21.56	21.39	21.92
		HSPA+	/	22.32	22.36	22.38

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band IV)	Normal	RMC12.2k		22.47	22.47	22.56
		HSDPA	1	22.19	21.80	21.54
			2	22.11	21.83	21.42
			3	22.15	21.75	21.43
			4	22.11	21.74	21.41
		HSUPA	1	22.44	22.27	22.06
			2	22.48	22.20	22.09
			3	22.47	22.28	22.05
			4	22.48	22.20	22.08
			5	22.44	22.21	22.07
		HSPA+	/	22.41	22.35	22.12

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	7.41	13
	Middle	7.35	13
	High	7.33	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.45	13
	Middle	3.56	13
	High	3.42	13
HSDPA (16QAM)	Low	3.12	13
	Middle	3.17	13
	High	3.16	13
HSUPA (BPSK)	Low	3.22	13
	Middle	3.32	13
	High	3.11	13
HSPA+	Low	3.09	13
	Middle	3.12	13
	High	3.14	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	7.44	13
	Middle	7.28	13
	High	7.19	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.41	13
	Middle	3.56	13
	High	3.66	13
HSDPA (16QAM)	Low	3.32	13
	Middle	3.14	13
	High	3.19	13
HSUPA (BPSK)	Low	3.28	13
	Middle	3.41	13
	High	3.46	13
HSPA+	Low	3.59	13
	Middle	3.46	13
	High	3.56	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.56	13
	Middle	3.47	13
	High	3.86	13
HSDPA (16QAM)	Low	3.41	13
	Middle	3.23	13
	High	3.33	13
HSUPA (BPSK)	Low	3.41	13
	Middle	3.47	13
	High	3.58	13
HSPA+	Low	3.63	13
	Middle	3.45	13
	High	3.74	13

Radiated Power
GSM Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	86.62	208	2.5	H	27.2	1.90	0.0	25.30	38.45	13.15
836.6	93.05	217	2.0	V	33.1	1.90	0.0	31.20	38.45	7.25
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	88.69	358	2.2	H	19.0	1.30	9.40	27.10	33	5.90
1880.00	86.69	88	1.0	V	16.8	1.30	9.40	24.90	33	8.10

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)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	81.97	47	1.7	H	22.6	1.35	0.0	21.25	38.45	17.20
836.6	81.54	56	1.4	V	21.5	1.35	0.0	20.15	38.45	18.30
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	82.25	161	2.4	H	12.6	1.30	9.40	20.70	33	12.30
1880.00	80.46	327	1.3	V	10.6	1.30	9.40	18.70	33	14.30
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	86.59	347	2.2	H	13.3	1.30	8.90	20.90	30	9.10
1732.60	84.36	113	2.1	V	11.6	1.30	8.90	19.20	30	10.80

Note:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level
dBd is for the ERP, dBi is for EIRP.

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	22.56	22.78	22.77
		RB Size=1, RB Offset=3	22.84	22.75	22.75
		RB Size=1, RB Offset=5	22.74	22.75	22.81
		RB Size=3, RB Offset=0	22.81	22.73	22.79
		RB Size=3, RB Offset=3	22.73	22.74	22.83
		RB Size=6, RB Offset=0	21.61	21.60	21.58
	16QAM	RB Size=1, RB Offset=0	21.89	22.27	22.38
		RB Size=1, RB Offset=3	21.83	22.23	22.42
		RB Size=1, RB Offset=5	21.85	22.29	22.49
		RB Size=3, RB Offset=0	21.65	21.78	21.94
		RB Size=3, RB Offset=3	21.50	21.80	21.91
		RB Size=6, RB Offset=0	20.79	21.01	21.05
3.0	QPSK	RB Size=1, RB Offset=0	22.58	22.66	22.92
		RB Size=1, RB Offset=8	22.76	22.70	22.88
		RB Size=1, RB Offset=14	22.65	22.75	22.91
		RB Size=6, RB Offset=0	21.63	21.67	21.97
		RB Size=6, RB Offset=9	21.55	21.76	21.88
		RB Size=15, RB Offset=0	21.72	21.58	21.90
	16QAM	RB Size=1, RB Offset=0	21.90	22.22	21.65
		RB Size=1, RB Offset=8	21.93	22.34	21.55
		RB Size=1, RB Offset=14	21.83	22.32	21.68
		RB Size=6, RB Offset=0	20.88	21.02	21.13
		RB Size=6, RB Offset=9	20.78	21.03	21.11
		RB Size=15, RB Offset=0	20.77	20.74	20.87

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	22.62	22.88	22.74
		RB Size=1, RB Offset=13	22.55	22.81	22.79
		RB Size=1, RB Offset=24	22.54	22.88	22.79
		RB Size=15, RB Offset=0	21.68	21.71	21.80
		RB Size=15, RB Offset=10	21.59	21.75	21.72
		RB Size=25, RB Offset=0	21.69	21.80	21.75
	16QAM	RB Size=1, RB Offset=0	20.94	21.84	21.53
		RB Size=1, RB Offset=13	20.80	21.86	21.48
		RB Size=1, RB Offset=24	20.90	21.94	21.54
		RB Size=15, RB Offset=0	20.72	20.52	20.94
		RB Size=15, RB Offset=10	20.81	20.66	20.94
		RB Size=25, RB Offset=0	20.65	20.55	20.86
10.0	QPSK	RB Size=1, RB Offset=0	22.55	22.74	22.88
		RB Size=1, RB Offset=25	22.40	22.71	22.85
		RB Size=1, RB Offset=49	22.53	22.77	22.86
		RB Size=25, RB Offset=0	21.63	20.83	21.74
		RB Size=25, RB Offset=25	21.53	20.61	21.82
		RB Size=50, RB Offset=0	21.56	20.74	21.76
	16QAM	RB Size=1, RB Offset=0	22.09	21.82	21.33
		RB Size=1, RB Offset=25	22.10	21.97	21.39
		RB Size=1, RB Offset=49	22.00	22.03	21.41
		RB Size=25, RB Offset=0	19.95	20.98	20.91
		RB Size=25, RB Offset=25	20.11	20.91	20.87
		RB Size=50, RB Offset=0	19.82	20.91	20.79

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	22.74	22.54	22.77
		RB Size=1, RB Offset=38	22.58	22.65	22.83
		RB Size=1, RB Offset=74	22.59	22.72	22.86
		RB Size=36, RB Offset=0	21.70	21.79	21.72
		RB Size=36, RB Offset=39	21.58	21.77	21.73
		RB Size=75, RB Offset=0	21.57	21.52	21.75
	16QAM	RB Size=1, RB Offset=0	22.10	21.99	22.20
		RB Size=1, RB Offset=38	22.05	22.06	22.17
		RB Size=1, RB Offset=74	22.09	22.20	22.18
		RB Size=36, RB Offset=0	20.74	20.94	20.75
		RB Size=36, RB Offset=39	20.70	20.88	20.87
		RB Size=75, RB Offset=0	20.83	20.75	20.81
20.0	QPSK	RB Size=1, RB Offset=0	22.71	22.71	22.82
		RB Size=1, RB Offset=50	22.86	22.70	22.63
		RB Size=1, RB Offset=99	22.75	22.92	22.89
		RB Size=50, RB Offset=0	21.51	21.61	21.69
		RB Size=50, RB Offset=50	21.61	21.73	21.80
		RB Size=100, RB Offset=0	21.56	21.78	21.78
	16QAM	RB Size=1, RB Offset=0	21.73	21.84	22.39
		RB Size=1, RB Offset=50	21.74	21.80	22.38
		RB Size=1, RB Offset=99	21.73	21.89	22.54
		RB Size=50, RB Offset=0	20.72	20.93	20.74
		RB Size=50, RB Offset=50	20.79	20.89	20.90
		RB Size=100, RB Offset=0	20.78	20.88	20.76

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	3.49	13	Pass
QPSK (100RB Size)	5.32	13	Pass
16QAM (1RB Size)	4.87	13	Pass
16QAM (100RB Size)	6.22	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	82.31	83	1.5	H	12.6	1.30	9.40	20.70	33
1880.00	80.36	311	2.4	V	10.5	1.30	9.40	18.60	33
3 MHz Bandwidth									
1880.00	82.08	75	1.8	H	12.4	1.30	9.40	20.50	33
1880.00	79.82	89	1.2	V	9.9	1.30	9.40	18.00	33
5 MHz Bandwidth									
1880.00	81.84	14	1.6	H	12.2	1.30	9.40	20.30	33
1880.00	79.63	333	2.1	V	9.7	1.30	9.40	17.80	33
10 MHz Bandwidth									
1880.00	81.56	179	1.3	H	11.9	1.30	9.40	20.00	33
1880.00	79.58	171	1.8	V	9.7	1.30	9.40	17.80	33
15 MHz Bandwidth									
1880.00	80.32	131	1.6	H	10.6	1.30	9.40	18.70	33
1880.00	78.98	210	2.0	V	9.1	1.30	9.40	17.20	33
20 MHz Bandwidth									
1880.00	81.82	348	1.3	H	12.1	1.30	9.40	20.20	33
1880.00	78.59	319	1.2	V	8.7	1.30	9.40	16.80	33

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	82.12	312	1.6	H	12.4	1.30	9.40	20.50	33
1880.00	80.17	119	1.3	V	10.3	1.30	9.40	18.40	33
3 MHz Bandwidth									
1880.00	81.96	214	1.2	H	12.3	1.30	9.40	20.40	33
1880.00	79.35	81	1.2	V	9.5	1.30	9.40	17.60	33
5 MHz Bandwidth									
1880.00	81.62	60	1.0	H	11.9	1.30	9.40	20.00	33
1880.00	79.58	159	2.4	V	9.7	1.30	9.40	17.80	33
10 MHz Bandwidth									
1880.00	81.47	200	2.2	H	11.8	1.30	9.40	19.90	33
1880.00	79.26	65	2.2	V	9.4	1.30	9.40	17.50	33
15 MHz Bandwidth									
1880.00	80.09	287	1.7	H	10.4	1.30	9.40	18.50	33
1880.00	79.13	146	1.5	V	9.2	1.30	9.40	17.30	33
20 MHz Bandwidth									
1880.00	80.68	32	1.1	H	11.0	1.30	9.40	19.10	33
1880.00	77.98	330	2.4	V	8.1	1.30	9.40	16.20	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	22.20	22.24	22.49
		RB Size=1, RB Offset=3	22.18	22.21	22.53
		RB Size=1, RB Offset=5	22.25	22.30	22.54
		RB Size=3, RB Offset=0	22.24	22.37	22.45
		RB Size=3, RB Offset=3	22.25	22.33	22.39
		RB Size=6, RB Offset=0	21.03	21.09	21.28
	16QAM	RB Size=1, RB Offset=0	21.85	21.97	22.24
		RB Size=1, RB Offset=3	21.85	21.80	22.19
		RB Size=1, RB Offset=5	21.93	21.93	22.30
		RB Size=3, RB Offset=0	21.24	21.26	21.50
		RB Size=3, RB Offset=3	21.40	21.46	21.53
		RB Size=6, RB Offset=0	20.33	20.49	20.51
3.0	QPSK	RB Size=1, RB Offset=0	22.03	22.14	22.59
		RB Size=1, RB Offset=8	22.15	21.65	22.62
		RB Size=1, RB Offset=14	22.21	21.47	22.61
		RB Size=6, RB Offset=0	21.25	21.19	21.34
		RB Size=6, RB Offset=9	21.27	20.25	21.33
		RB Size=15, RB Offset=0	21.18	20.19	21.26
	16QAM	RB Size=1, RB Offset=0	21.67	21.53	21.53
		RB Size=1, RB Offset=8	21.59	21.43	21.04
		RB Size=1, RB Offset=14	21.66	21.99	21.36
		RB Size=6, RB Offset=0	20.17	20.40	20.70
		RB Size=6, RB Offset=9	20.24	20.45	20.79
		RB Size=15, RB Offset=0	20.29	20.25	20.50

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	22.24	22.39	22.28
		RB Size=1, RB Offset=13	22.21	22.49	22.13
		RB Size=1, RB Offset=24	22.19	22.41	22.34
		RB Size=15, RB Offset=0	21.28	21.25	21.32
		RB Size=15, RB Offset=10	21.19	21.05	21.49
		RB Size=25, RB Offset=0	21.12	21.32	21.41
	16QAM	RB Size=1, RB Offset=0	20.59	21.53	21.08
		RB Size=1, RB Offset=13	20.58	21.52	21.06
		RB Size=1, RB Offset=24	20.50	21.40	21.10
		RB Size=15, RB Offset=0	20.31	19.87	20.48
		RB Size=15, RB Offset=10	20.33	20.32	20.52
		RB Size=25, RB Offset=0	20.30	20.37	20.23
10.0	QPSK	RB Size=1, RB Offset=0	21.28	22.38	22.41
		RB Size=1, RB Offset=25	21.13	22.36	22.47
		RB Size=1, RB Offset=49	22.27	22.28	22.56
		RB Size=25, RB Offset=0	21.23	21.19	21.32
		RB Size=25, RB Offset=25	21.30	20.43	21.41
		RB Size=50, RB Offset=0	21.25	20.44	21.46
	16QAM	RB Size=1, RB Offset=0	21.34	20.45	20.82
		RB Size=1, RB Offset=25	21.44	20.28	20.88
		RB Size=1, RB Offset=49	21.59	21.44	20.97
		RB Size=25, RB Offset=0	20.31	19.97	20.43
		RB Size=25, RB Offset=25	20.26	19.50	20.43
		RB Size=50, RB Offset=0	20.31	20.32	20.31

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	22.09	22.31	22.39
		RB Size=1, RB Offset=38	22.30	22.33	22.43
		RB Size=1, RB Offset=74	22.35	22.28	22.45
		RB Size=36, RB Offset=0	21.17	21.27	21.29
		RB Size=36, RB Offset=39	21.23	21.21	21.41
		RB Size=75, RB Offset=0	21.41	21.27	21.34
	16QAM	RB Size=1, RB Offset=0	21.53	21.50	21.69
		RB Size=1, RB Offset=38	21.50	21.58	21.83
		RB Size=1, RB Offset=74	21.60	21.44	21.82
		RB Size=36, RB Offset=0	20.33	20.57	20.39
		RB Size=36, RB Offset=39	20.36	20.45	20.45
		RB Size=75, RB Offset=0	20.39	20.41	20.45
20.0	QPSK	RB Size=1, RB Offset=0	22.36	22.24	22.37
		RB Size=1, RB Offset=50	22.43	22.33	22.38
		RB Size=1, RB Offset=99	22.65	22.33	22.57
		RB Size=50, RB Offset=0	21.16	21.25	21.42
		RB Size=50, RB Offset=50	21.12	21.30	21.19
		RB Size=100, RB Offset=0	21.16	21.40	21.20
	16QAM	RB Size=1, RB Offset=0	21.22	21.70	21.89
		RB Size=1, RB Offset=50	21.29	21.69	21.90
		RB Size=1, RB Offset=99	21.28	21.77	21.94
		RB Size=50, RB Offset=0	20.33	20.48	20.36
		RB Size=50, RB Offset=50	20.43	20.47	20.34
		RB Size=100, RB Offset=0	20.34	20.33	20.35

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.78	13	Pass
QPSK (100RB Size)	5.54	13	Pass
16QAM (1RB Size)	5.87	13	Pass
16QAM (100RB Size)	6.44	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.14	316	2.3	H	12.8	1.30	8.90	20.40	30
1732.50	83.51	350	2.0	V	10.8	1.30	8.90	18.40	30
3 MHz Bandwidth									
1732.50	86.01	82	2.1	H	12.7	1.30	8.90	20.30	30
1732.50	83.24	164	1.3	V	10.5	1.30	8.90	18.10	30
5 MHz Bandwidth									
1732.50	85.77	289	2.4	H	12.4	1.30	8.90	20.00	30
1732.50	83.64	117	2.1	V	10.9	1.30	8.90	18.50	30
10 MHz Bandwidth									
1732.50	85.62	270	1.1	H	12.3	1.30	8.90	19.90	30
1732.50	82.64	111	2.1	V	9.9	1.30	8.90	17.50	30
15 MHz Bandwidth									
1732.50	85.34	44	1.8	H	12.0	1.30	8.90	19.60	30
1732.50	82.17	44	1.1	V	9.4	1.30	8.90	17.00	30
20 MHz Bandwidth									
1732.50	86.31	152	2.4	H	13.0	1.30	8.90	20.60	30
1732.50	83.67	119	2.4	V	10.9	1.30	8.90	18.50	30

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.25	342	2.0	H	12.9	1.30	8.90	20.50	30
1732.50	83.11	307	1.6	V	10.4	1.30	8.90	18.00	30
3 MHz Bandwidth									
1732.50	85.88	243	1.1	H	12.6	1.30	8.90	20.20	30
1732.50	83.02	205	1.1	V	10.3	1.30	8.90	17.90	30
5 MHz Bandwidth									
1732.50	85.61	320	2.3	H	12.3	1.30	8.90	19.90	30
1732.50	83.27	238	2.2	V	10.5	1.30	8.90	18.10	30
10 MHz Bandwidth									
1732.50	85.48	280	1.2	H	12.2	1.30	8.90	19.80	30
1732.50	82.47	279	2.1	V	9.7	1.30	8.90	17.30	30
15 MHz Bandwidth									
1732.50	85.42	32	2.3	H	12.1	1.30	8.90	19.70	30
1732.50	82.57	28	1.6	V	9.8	1.30	8.90	17.40	30
20 MHz Bandwidth									
1732.50	86.17	73	1.1	H	12.8	1.30	8.90	20.40	30
1732.50	83.21	317	1.3	V	10.5	1.30	8.90	18.10	30

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	23.01	22.75	23.02
		RB Size=1, RB Offset=3	22.90	22.86	23.02
		RB Size=1, RB Offset=5	22.82	22.83	23.11
		RB Size=3, RB Offset=0	22.86	22.92	22.65
		RB Size=3, RB Offset=3	22.88	22.98	22.94
		RB Size=6, RB Offset=0	21.84	21.76	21.92
	16QAM	RB Size=1, RB Offset=0	22.28	22.33	20.86
		RB Size=1, RB Offset=3	22.23	22.22	22.14
		RB Size=1, RB Offset=5	22.32	22.23	22.02
		RB Size=3, RB Offset=0	22.01	21.88	21.80
		RB Size=3, RB Offset=3	21.92	22.04	21.82
		RB Size=6, RB Offset=0	20.87	21.19	20.97
3.0	QPSK	RB Size=1, RB Offset=0	22.94	22.83	21.77
		RB Size=1, RB Offset=8	21.64	22.92	21.78
		RB Size=1, RB Offset=14	21.40	22.82	21.75
		RB Size=6, RB Offset=0	22.10	21.83	20.48
		RB Size=6, RB Offset=9	20.42	20.65	20.53
		RB Size=15, RB Offset=0	20.51	20.68	20.42
	16QAM	RB Size=1, RB Offset=0	20.97	21.54	21.03
		RB Size=1, RB Offset=8	20.81	22.56	21.96
		RB Size=1, RB Offset=14	21.05	21.56	21.47
		RB Size=6, RB Offset=0	20.86	19.53	20.93
		RB Size=6, RB Offset=9	20.73	19.69	20.43
		RB Size=15, RB Offset=0	21.10	19.74	20.96

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	23.24	23.86	23.82
		RB Size=1, RB Offset=13	22.92	22.49	23.71
		RB Size=1, RB Offset=24	23.65	23.86	22.53
		RB Size=15, RB Offset=0	23.31	22.73	22.91
		RB Size=15, RB Offset=10	21.87	22.05	21.75
		RB Size=25, RB Offset=0	22.11	21.54	22.18
	16QAM	RB Size=1, RB Offset=0	22.61	22.83	21.72
		RB Size=1, RB Offset=13	21.15	23.34	21.39
		RB Size=1, RB Offset=24	21.13	22.79	22.17
		RB Size=15, RB Offset=0	21.14	21.36	21.38
		RB Size=15, RB Offset=10	22.04	20.96	20.99
		RB Size=25, RB Offset=0	22.15	20.72	20.88
10.0	QPSK	RB Size=1, RB Offset=0	24.11	23.62	23.85
		RB Size=1, RB Offset=25	23.03	24.03	23.58
		RB Size=1, RB Offset=49	23.88	23.42	23.59
		RB Size=25, RB Offset=0	22.70	21.52	22.59
		RB Size=25, RB Offset=25	23.06	21.58	21.25
		RB Size=50, RB Offset=0	21.78	21.94	21.36
	16QAM	RB Size=1, RB Offset=0	23.59	22.93	21.27
		RB Size=1, RB Offset=25	22.21	21.64	22.96
		RB Size=1, RB Offset=49	22.84	21.80	22.31
		RB Size=25, RB Offset=0	21.95	21.51	21.81
		RB Size=25, RB Offset=25	21.25	22.15	22.17
		RB Size=50, RB Offset=0	21.81	22.26	22.06

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.87	13	Pass
QPSK (50RB Size)	5.51	13	Pass
16QAM (1RB Size)	5.93	13	Pass
16QAM (50RB Size)	6.31	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	77.18	255	1.9	H	17.8	1.90	0.0	15.90	38.45
836.5	82.16	21	1.3	V	22.2	1.90	0.0	20.30	38.45
3 MHz Bandwidth									
836.5	76.82	145	1.3	H	17.4	1.90	0.0	15.50	38.45
836.5	81.94	57	2.4	V	21.9	1.90	0.0	20.00	38.45
5 MHz Bandwidth									
836.5	76.42	256	1.2	H	17.0	1.90	0.0	15.10	38.45
836.5	81.57	304	2.4	V	21.6	1.90	0.0	19.70	38.45
10 MHz Bandwidth									
836.5	77.21	196	1.6	H	17.8	1.90	0.0	15.90	38.45
836.5	82.31	104	1.7	V	22.3	1.90	0.0	20.40	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	76.93	327	1.7	H	17.6	1.90	0.0	15.70	38.45
836.5	82.01	10	1.3	V	22.0	1.90	0.0	20.10	38.45
3 MHz Bandwidth									
836.5	76.62	167	1.6	H	17.2	1.90	0.0	15.30	38.45
836.5	81.76	9	1.8	V	21.8	1.90	0.0	19.90	38.45
5 MHz Bandwidth									
836.5	76.51	208	1.1	H	17.1	1.90	0.0	15.20	38.45
836.5	81.47	83	2.1	V	21.5	1.90	0.0	19.60	38.45
10 MHz Bandwidth									
836.5	77.04	28	1.8	H	17.7	1.90	0.0	15.80	38.45
836.5	82.18	221	2.1	V	22.2	1.90	0.0	20.30	38.45

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	24.30	23.85	23.40
		RB Size=1, RB Offset=13	24.41	22.87	23.72
		RB Size=1, RB Offset=24	23.40	24.25	23.35
		RB Size=15, RB Offset=0	21.93	22.91	23.01
		RB Size=15, RB Offset=10	22.77	22.94	22.74
		RB Size=25, RB Offset=0	21.34	21.95	22.79
	16QAM	RB Size=1, RB Offset=0	22.31	22.93	23.11
		RB Size=1, RB Offset=13	22.70	21.73	21.48
		RB Size=1, RB Offset=24	22.57	23.33	22.43
		RB Size=15, RB Offset=0	21.28	21.68	22.02
		RB Size=15, RB Offset=10	21.82	21.62	21.98
		RB Size=25, RB Offset=0	22.10	22.08	21.21
10	QPSK	RB Size=1, RB Offset=0	22.31	23.18	22.55
		RB Size=1, RB Offset=25	22.91	22.90	23.51
		RB Size=1, RB Offset=49	22.23	22.58	22.06
		RB Size=25, RB Offset=0	22.01	21.63	21.03
		RB Size=25, RB Offset=25	21.39	21.03	22.41
		RB Size=50, RB Offset=0	22.27	21.48	21.37
	16QAM	RB Size=1, RB Offset=0	21.78	21.94	20.90
		RB Size=1, RB Offset=25	21.91	22.20	22.28
		RB Size=1, RB Offset=49	22.26	21.27	22.00
		RB Size=25, RB Offset=0	20.28	20.32	21.07
		RB Size=25, RB Offset=25	20.37	20.84	21.54
		RB Size=50, RB Offset=0	20.38	21.12	21.45

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.83	22.50	22.36
		RB Size=1, RB Offset=38	22.38	23.44	22.58
		RB Size=1, RB Offset=74	22.22	22.04	22.82
		RB Size=36, RB Offset=0	20.88	21.05	21.79
		RB Size=36, RB Offset=39	22.20	22.37	22.07
		RB Size=75, RB Offset=0	21.96	21.33	21.04
	16QAM	RB Size=1, RB Offset=0	22.42	21.79	21.08
		RB Size=1, RB Offset=38	21.86	21.08	22.20
		RB Size=1, RB Offset=74	21.98	21.58	21.94
		RB Size=36, RB Offset=0	20.85	21.42	21.35
		RB Size=36, RB Offset=39	20.62	20.49	20.49
		RB Size=75, RB Offset=0	20.75	20.86	21.49
20	QPSK	RB Size=1, RB Offset=0	21.99	23.16	22.80
		RB Size=1, RB Offset=50	22.35	22.20	22.89
		RB Size=1, RB Offset=99	21.94	22.46	23.02
		RB Size=50, RB Offset=0	21.86	22.03	22.47
		RB Size=50, RB Offset=50	22.27	21.01	21.53
		RB Size=100, RB Offset=0	21.66	21.24	21.56
	16QAM	RB Size=1, RB Offset=0	21.36	22.30	21.04
		RB Size=1, RB Offset=50	22.09	22.26	22.29
		RB Size=1, RB Offset=99	22.36	22.31	21.21
		RB Size=50, RB Offset=0	19.72	19.99	20.20
		RB Size=50, RB Offset=50	20.64	21.40	21.09
		RB Size=100, RB Offset=0	20.17	20.77	20.57

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.17	13	Pass
QPSK (100RB Size)	5.48	13	Pass
16QAM (1RB Size)	4.81	13	Pass
16QAM (100RB Size)	6.31	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)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	82.11	180	2.1	H	11.9	2.60	10.20	19.50	33
2535.00	78.30	297	1.9	V	8.7	2.60	10.20	16.30	33
10 MHz Bandwidth									
2535.00	81.90	45	1.0	H	11.7	2.60	10.20	19.30	33
2535.00	78.27	227	2.0	V	8.7	2.60	10.20	16.30	33
15 MHz Bandwidth									
2535.00	79.87	355	1.7	H	9.7	2.60	10.20	17.30	33
2535.00	77.72	109	2.3	V	8.2	2.60	10.20	15.80	33
20 MHz Bandwidth									
2535.00	77.84	237	2.3	H	7.7	2.60	10.20	15.30	33
2535.00	76.64	138	1.2	V	7.1	2.60	10.20	14.70	33

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	83.07	359	1.4	H	12.9	2.60	10.20	20.50	33
2535.00	78.89	336	1.5	V	9.3	2.60	10.20	16.90	33
10 MHz Bandwidth									
2535.00	76.38	72	1.7	H	6.7	1.30	9.40	14.80	33
2535.00	81.53	43	2.4	V	11.6	1.30	9.40	19.70	33
15 MHz Bandwidth									
2535.00	80.86	202	1.7	H	10.7	2.60	10.20	18.30	33
2535.00	78.14	148	1.3	V	8.6	2.60	10.20	16.20	33
20 MHz Bandwidth									
2535.00	78.68	21	1.9	H	8.5	2.60	10.20	16.10	33
2535.00	76.33	223	2.4	V	6.8	2.60	10.20	14.40	33

LTE Band 12:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	23.33	23.94	22.96
		RB Size=1, RB Offset=3	23.86	23.92	23.89
		RB Size=1, RB Offset=5	23.01	23.09	23.17
		RB Size=3, RB Offset=0	23.63	23.35	23.69
		RB Size=3, RB Offset=3	23.70	22.91	23.21
		RB Size=6, RB Offset=0	22.49	21.86	22.76
	16QAM	RB Size=1, RB Offset=0	22.15	21.99	22.85
		RB Size=1, RB Offset=3	22.15	22.58	23.10
		RB Size=1, RB Offset=5	22.22	22.89	22.53
		RB Size=3, RB Offset=0	22.82	22.47	22.01
		RB Size=3, RB Offset=3	22.17	22.94	22.86
		RB Size=6, RB Offset=0	20.97	22.51	21.04
3.0	QPSK	RB Size=1, RB Offset=0	22.88	23.67	23.31
		RB Size=1, RB Offset=8	23.77	23.62	23.68
		RB Size=1, RB Offset=14	22.95	23.44	23.63
		RB Size=6, RB Offset=0	22.78	23.27	23.16
		RB Size=6, RB Offset=9	23.58	23.16	23.75
		RB Size=15, RB Offset=0	22.45	21.84	22.37
	16QAM	RB Size=1, RB Offset=0	22.14	22.92	22.12
		RB Size=1, RB Offset=8	22.18	22.54	22.68
		RB Size=1, RB Offset=14	22.35	22.88	22.77
		RB Size=6, RB Offset=0	22.16	22.30	22.01
		RB Size=6, RB Offset=9	21.97	22.18	22.41
		RB Size=15, RB Offset=0	21.73	21.70	21.39

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	23.02	23.88	23.92
		RB Size=1, RB Offset=13	23.42	23.76	23.33
		RB Size=1, RB Offset=24	23.38	23.84	23.50
		RB Size=15, RB Offset=0	22.83	22.48	22.19
		RB Size=15, RB Offset=10	22.78	22.72	22.21
		RB Size=25, RB Offset=0	23.01	23.17	22.16
	16QAM	RB Size=1, RB Offset=0	21.92	23.46	22.63
		RB Size=1, RB Offset=13	22.14	23.34	21.89
		RB Size=1, RB Offset=24	22.36	22.65	22.75
		RB Size=15, RB Offset=0	21.41	21.89	21.90
		RB Size=15, RB Offset=10	21.46	21.99	21.97
		RB Size=25, RB Offset=0	22.03	22.01	21.11
10.0	QPSK	RB Size=1, RB Offset=0	22.69	23.36	21.93
		RB Size=1, RB Offset=25	23.21	23.02	23.82
		RB Size=1, RB Offset=49	23.15	23.66	23.22
		RB Size=25, RB Offset=0	22.38	23.05	22.87
		RB Size=25, RB Offset=25	22.50	22.48	22.66
		RB Size=50, RB Offset=0	22.41	22.89	22.30
	16QAM	RB Size=1, RB Offset=0	21.63	23.34	22.69
		RB Size=1, RB Offset=25	21.72	23.28	22.77
		RB Size=1, RB Offset=49	22.54	23.23	21.81
		RB Size=25, RB Offset=0	21.71	22.23	22.09
		RB Size=25, RB Offset=25	21.67	22.00	21.14
		RB Size=50, RB Offset=0	21.85	21.69	21.88

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.16	13	Pass
QPSK (50RB Size)	5.71	13	Pass
16QAM (1RB Size)	5.90	13	Pass
16QAM (50RB Size)	6.60	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	75.01	147	1.9	H	7.2	1.56	0.0	5.64	34.77
707.5	88.03	2	2.0	V	21.7	1.56	0.0	20.14	34.77
3 MHz Bandwidth									
707.5	75.24	266	1.9	H	7.4	1.56	0.0	5.84	34.77
707.5	87.92	260	2.1	V	21.6	1.56	0.0	20.04	34.77
5 MHz Bandwidth									
707.5	75.42	57	2.2	H	7.6	1.56	0.0	6.04	34.77
707.5	87.85	200	1.5	V	21.5	1.56	0.0	19.94	34.77
10 MHz Bandwidth									
707.5	75.12	340	2.1	H	7.3	1.56	0.0	5.74	34.77
707.5	87.73	343	1.8	V	21.4	1.56	0.0	19.84	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	75.53	68	1.6	H	7.7	1.56	0.0	6.14	34.77
707.5	87.67	283	1.2	V	21.3	1.56	0.0	19.74	34.77
3 MHz Bandwidth									
707.5	75.64	128	2.2	H	7.8	1.56	0.0	6.24	34.77
707.5	87.86	156	1.5	V	21.5	1.56	0.0	19.94	34.77
5 MHz Bandwidth									
707.5	75.73	202	2.5	H	7.9	1.56	0.0	6.34	34.77
707.5	88.32	329	1.3	V	22.0	1.56	0.0	20.44	34.77
10 MHz Bandwidth									
707.5	76.08	189	2.4	H	8.3	1.56	0.0	6.74	34.77
707.5	88.63	228	2.5	V	22.3	1.56	0.0	20.74	34.77

LTE Band 17:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	23.18	23.30	21.97
		RB Size=1, RB Offset=13	23.30	23.82	22.99
		RB Size=1, RB Offset=24	23.76	23.69	22.64
		RB Size=15, RB Offset=0	21.97	22.37	22.49
		RB Size=15, RB Offset=10	22.25	22.73	22.59
		RB Size=25, RB Offset=0	21.94	23.55	22.44
	16QAM	RB Size=1, RB Offset=0	21.65	23.26	21.83
		RB Size=1, RB Offset=13	22.84	23.20	21.83
		RB Size=1, RB Offset=24	22.14	23.31	21.64
		RB Size=15, RB Offset=0	21.73	21.56	21.43
		RB Size=15, RB Offset=10	21.90	21.47	21.27
		RB Size=25, RB Offset=0	22.35	21.37	21.54
10	QPSK	RB Size=1, RB Offset=0	22.91	23.48	22.34
		RB Size=1, RB Offset=25	22.36	22.73	22.83
		RB Size=1, RB Offset=49	23.32	23.55	23.36
		RB Size=25, RB Offset=0	22.80	22.63	22.11
		RB Size=25, RB Offset=25	22.46	22.49	22.86
		RB Size=50, RB Offset=0	22.22	22.71	22.20
	16QAM	RB Size=1, RB Offset=0	21.79	22.66	22.09
		RB Size=1, RB Offset=25	22.38	23.07	22.08
		RB Size=1, RB Offset=49	21.99	23.19	22.74
		RB Size=25, RB Offset=0	22.18	21.66	22.30
		RB Size=25, RB Offset=25	22.07	22.26	21.80
		RB Size=50, RB Offset=0	21.87	21.96	21.47

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.13	13	Pass
QPSK (50RB Size)	5.64	13	Pass
16QAM (1RB Size)	6.63	13	Pass
16QAM (50RB Size)	6.57	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
710	75.04	200	2.3	H	7.3	1.56	0.0	5.74	34.77
710	87.56	99	1.3	V	21.2	1.56	0.0	19.64	34.77
10 MHz Bandwidth									
710	74.88	137	1.0	H	7.1	1.56	0.0	5.54	34.77
710	88.22	226	1.6	V	21.9	1.56	0.0	20.34	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
710	74.59	167	1.2	H	6.8	1.56	0.0	5.24	34.77
710	87.13	94	1.5	V	20.8	1.56	0.0	19.24	34.77
10 MHz Bandwidth									
710	75.36	266	1.2	H	7.6	1.56	0.0	6.04	34.77
710	87.76	282	1.9	V	21.4	1.56	0.0	19.84	34.77

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

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

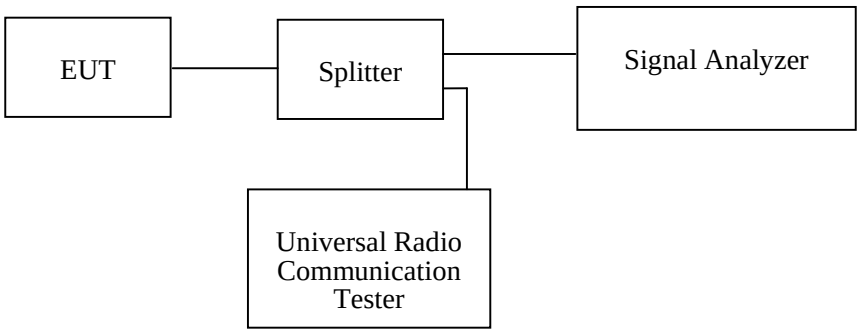
Applicable Standard

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 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-06-17.

EUT operation mode: Transmitting

Test Result: Pass

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	245.19	314.10

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.17	4.68
HSUPA (BPSK)	836.6	4.17	4.71
HSDPA (16QAM)	836.6	4.17	4.68

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	243.59	320.51

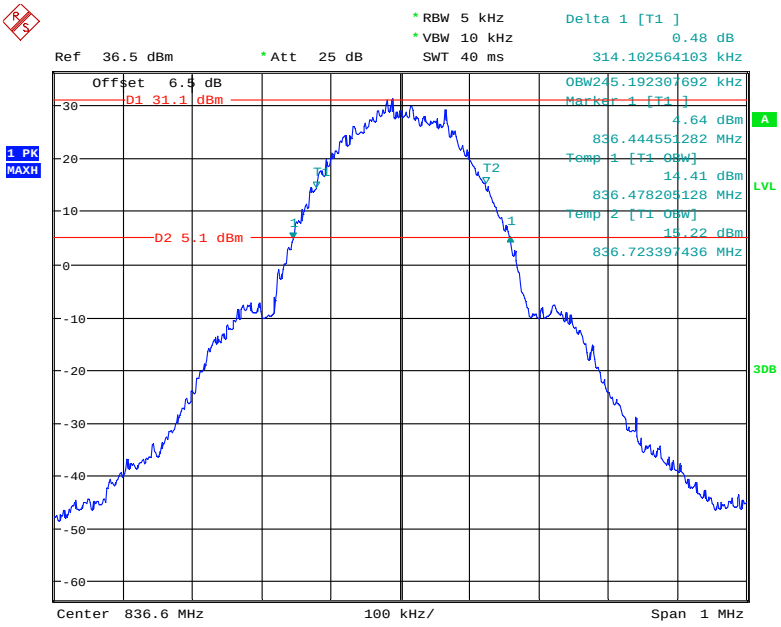
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.15	4.71
HSUPA (BPSK)	1880.0	4.15	4.68
HSDPA (16QAM)	1880.0	4.15	4.68

AWS Band (Part 27)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.6	4.15	4.68
HSUPA (BPSK)	1732.6	4.15	4.66
HSDPA (16QAM)	1732.6	4.15	4.66

Cellular Band (Part 22H)

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



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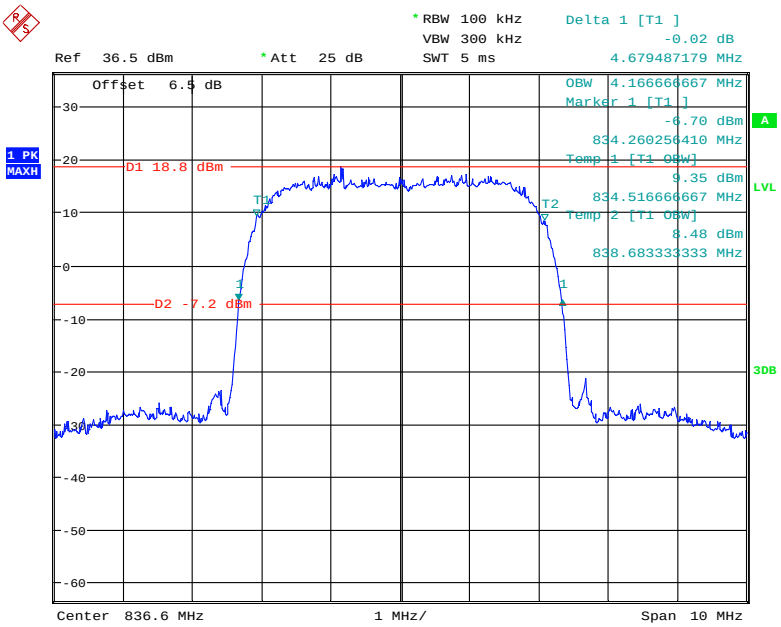
26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode



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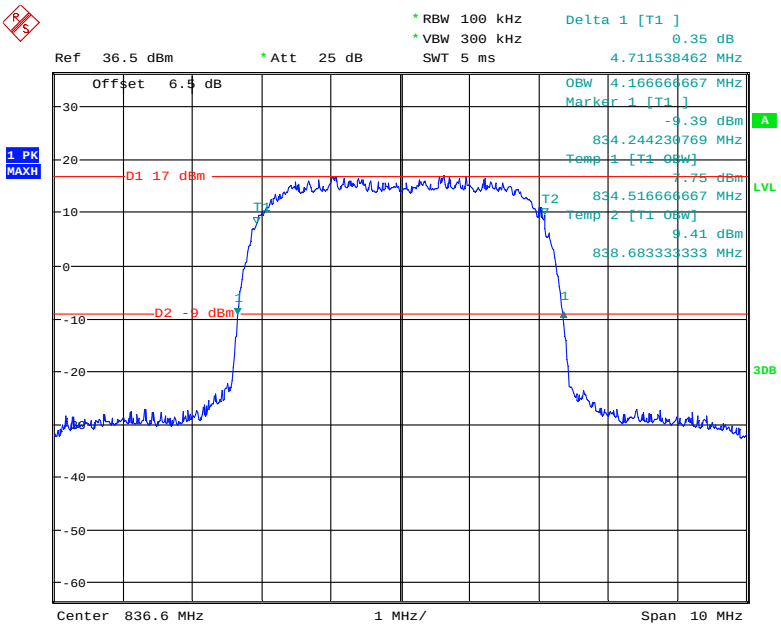
26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode



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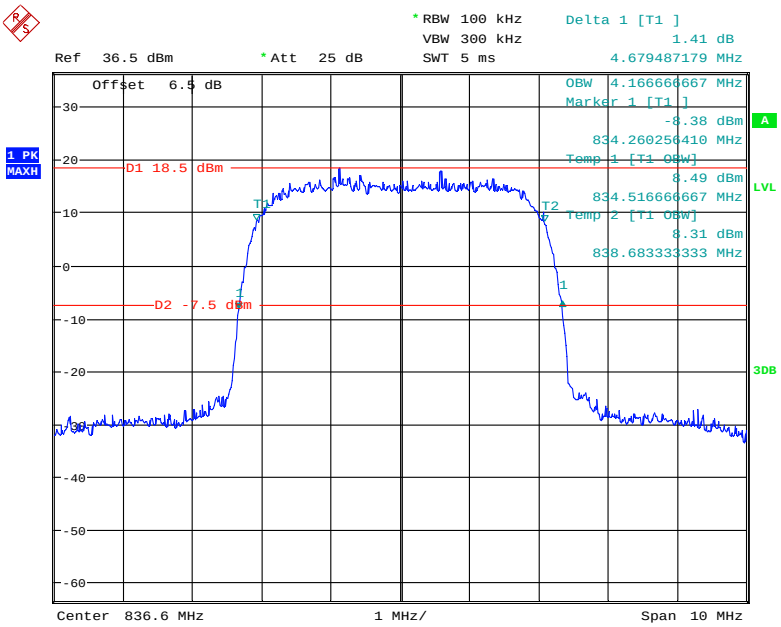
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



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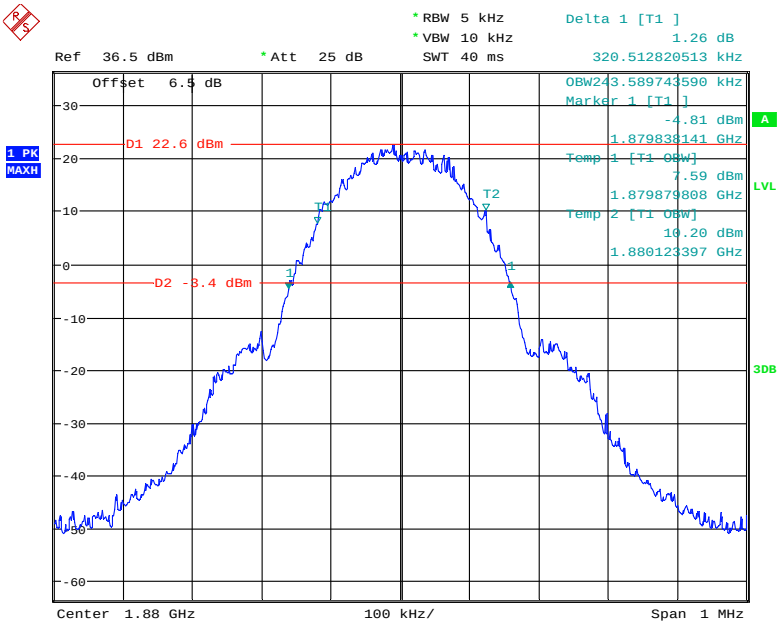
PCS Band (Part 24E)

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



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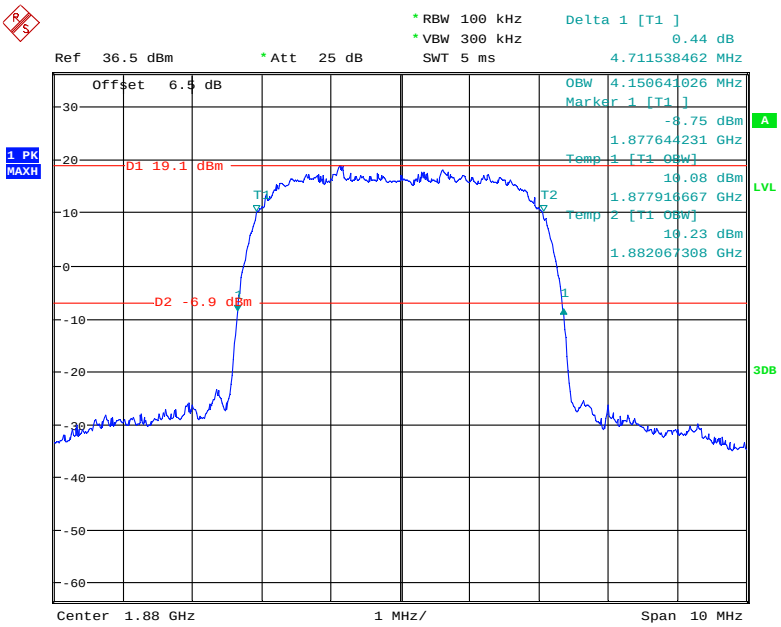
26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode



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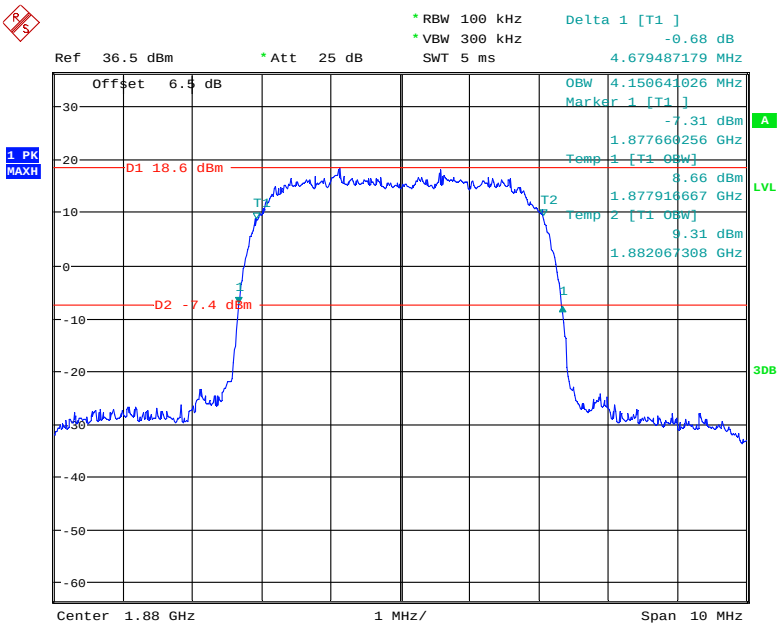
26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode



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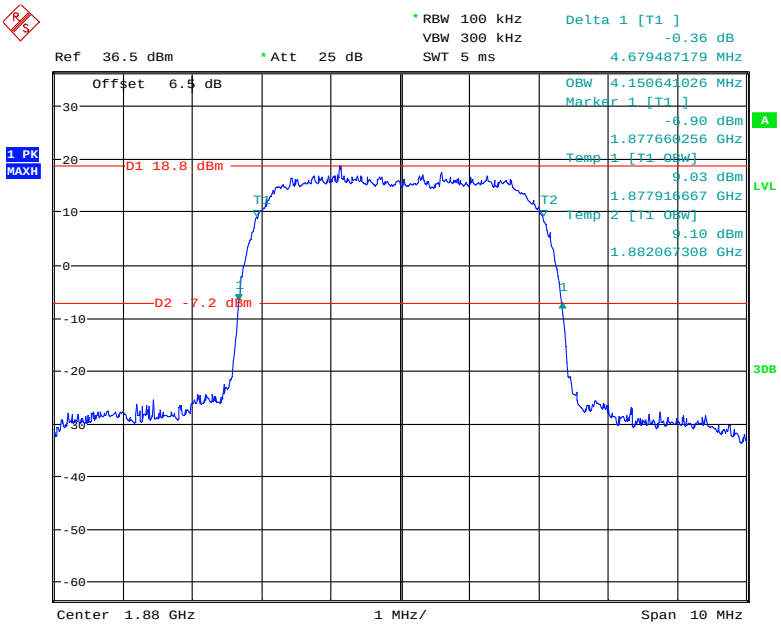
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



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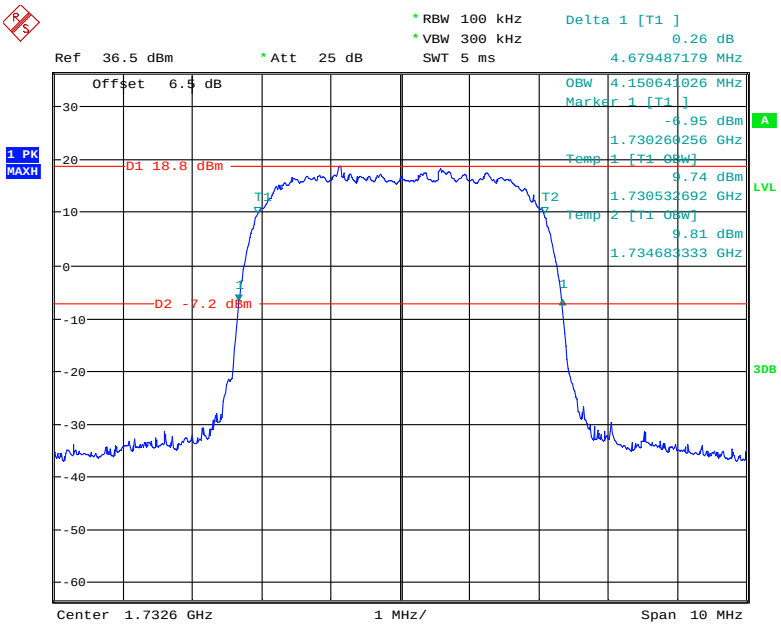
AWS Band (Part 27)

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



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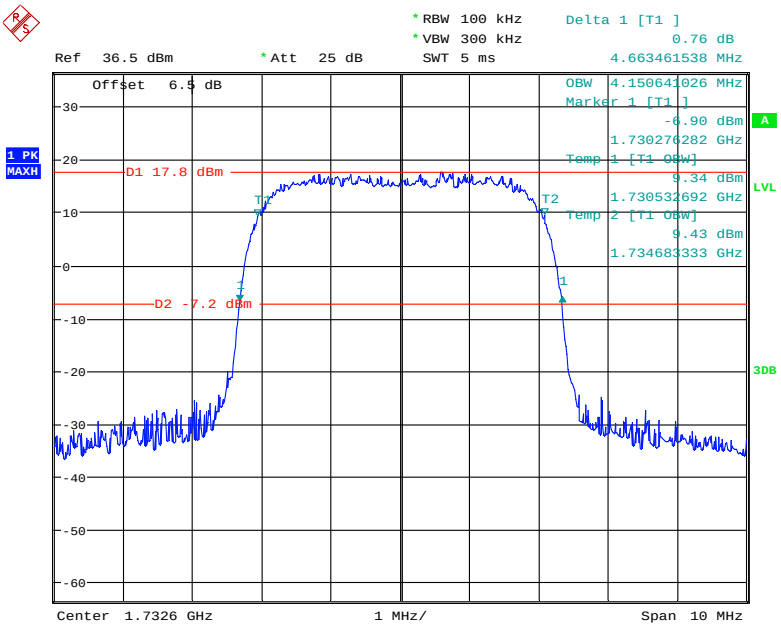
26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode



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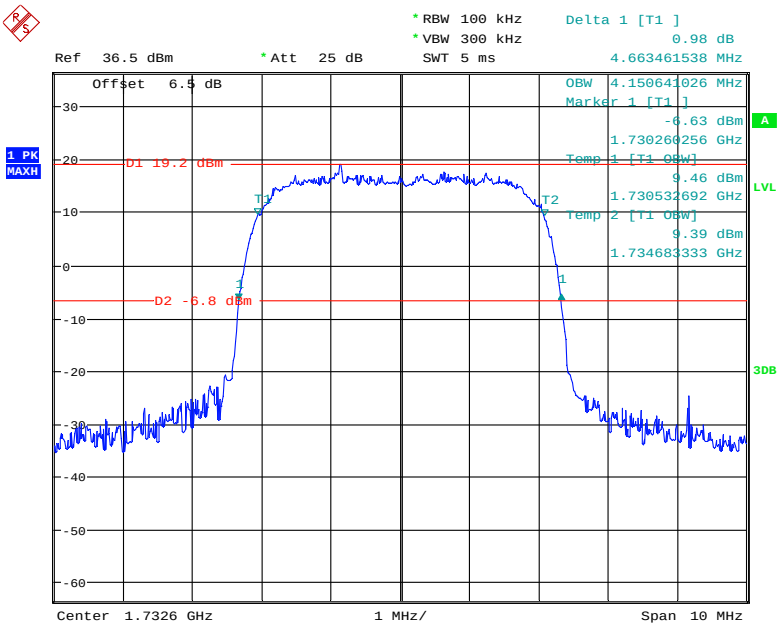
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



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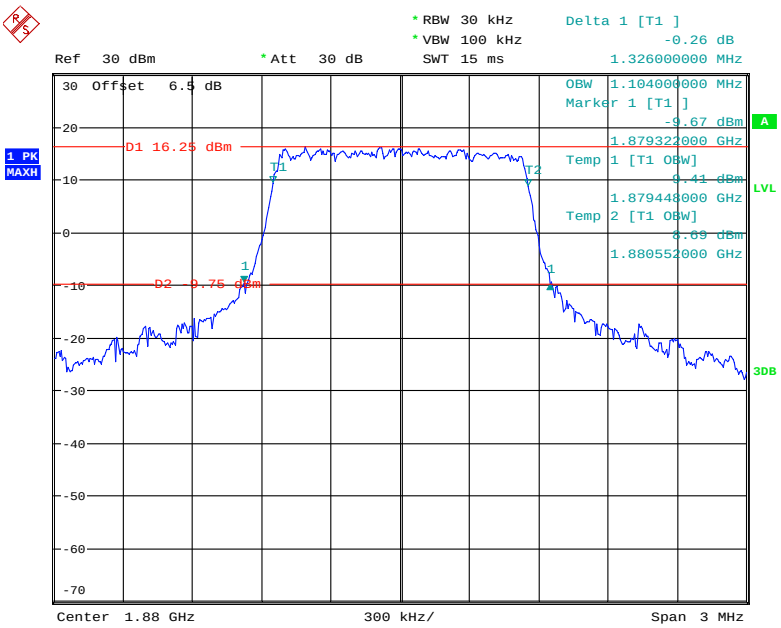
LTE Band 2: (Middle Channel)

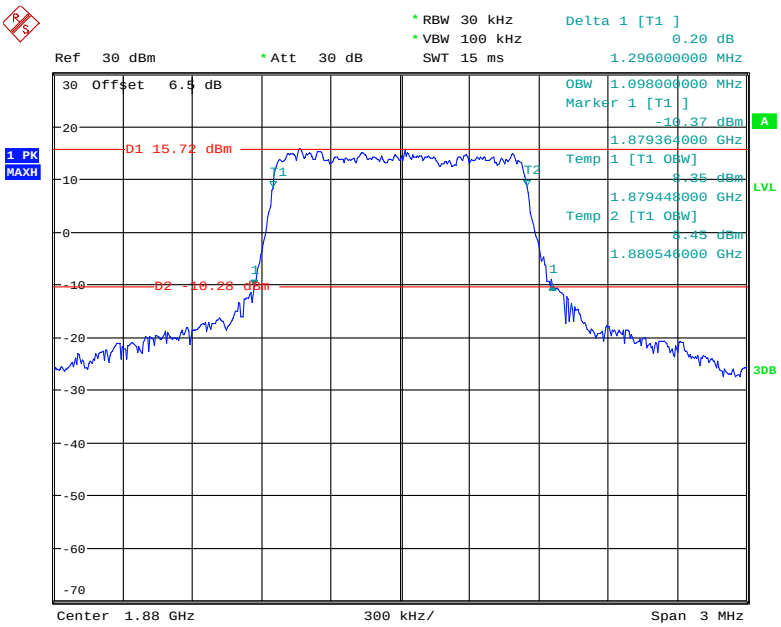
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.104	1.326
	16QAM	1.098	1.296
3.0	QPSK	2.700	3.000
	16QAM	2.688	3.036
5.0	QPSK	4.560	5.400
	16QAM	4.540	5.360
10.0	QPSK	9.000	9.800
	16QAM	8.960	9.840
15.0	QPSK	13.620	15.720
	16QAM	13.620	15.180
20.0	QPSK	18.080	20.160
	16QAM	18.160	20.000

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



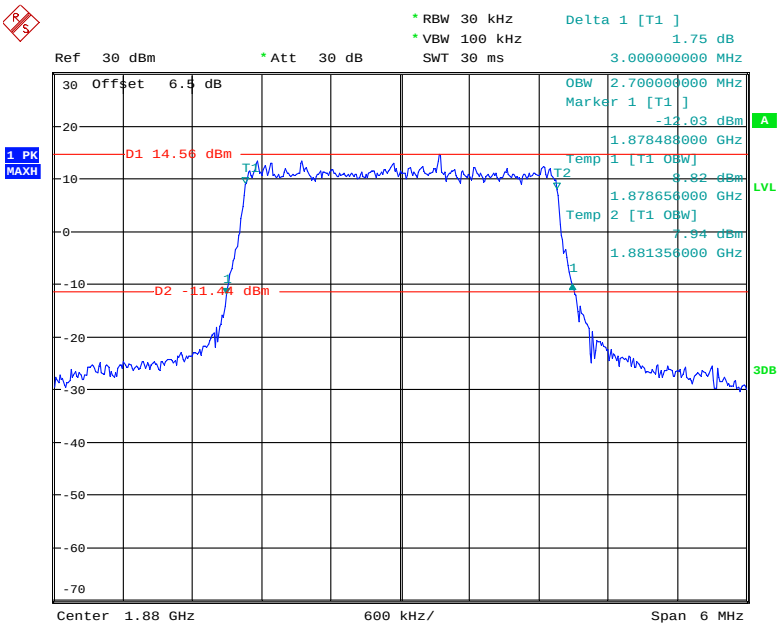
Date: 17.JUN.2020 09:51:19

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



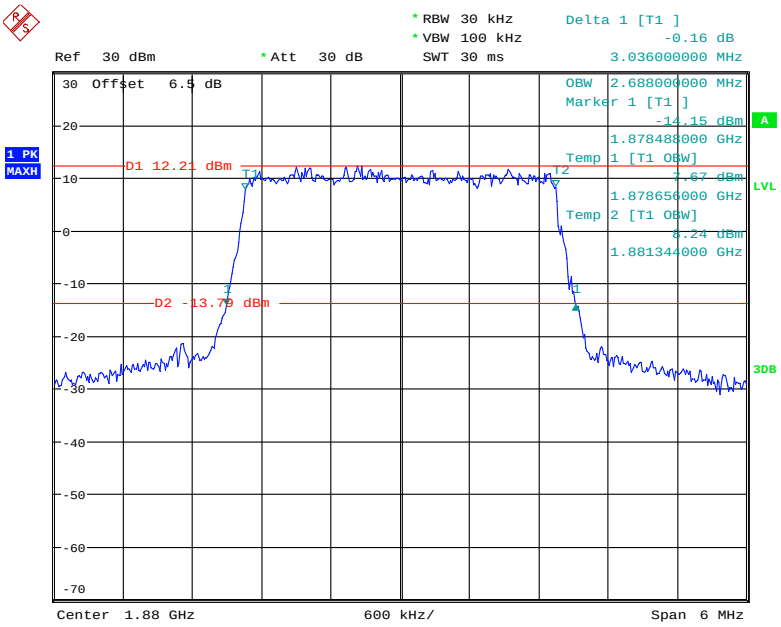
Date: 17.JUN.2020 09:51:41

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



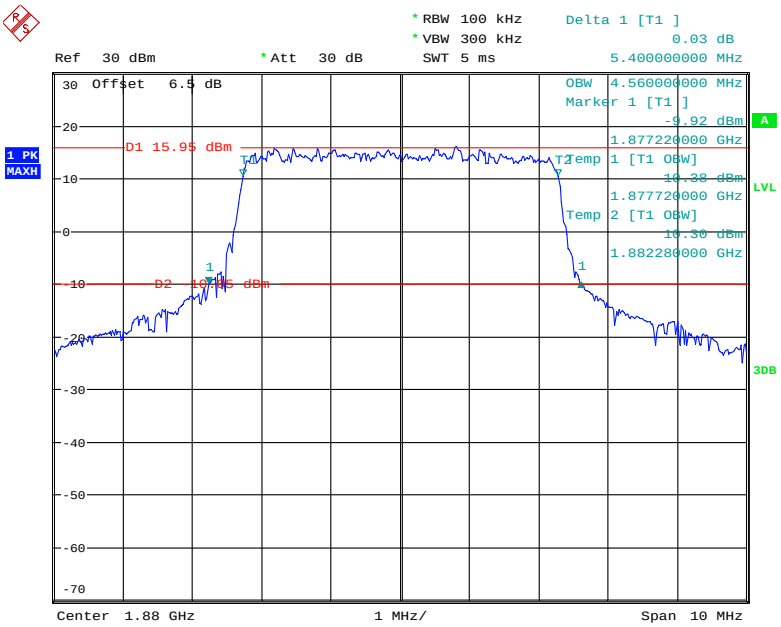
Date: 17.JUN.2020 09:52:00

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



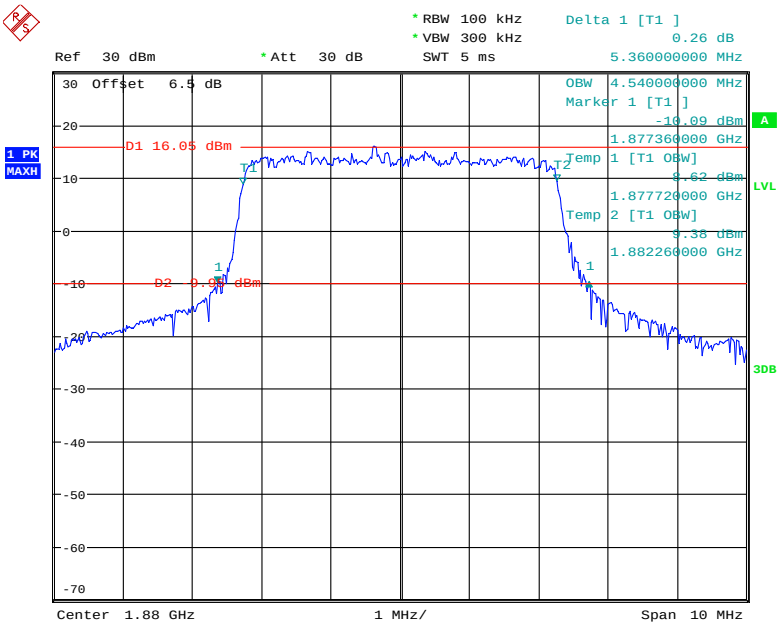
Date: 17.JUN.2020 09:52:16

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



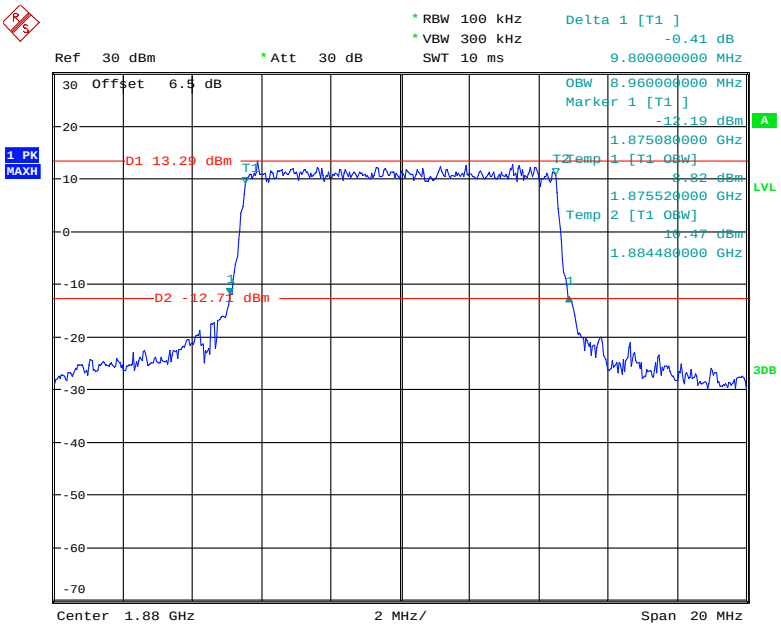
Date: 17.JUN.2020 09:52:45

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



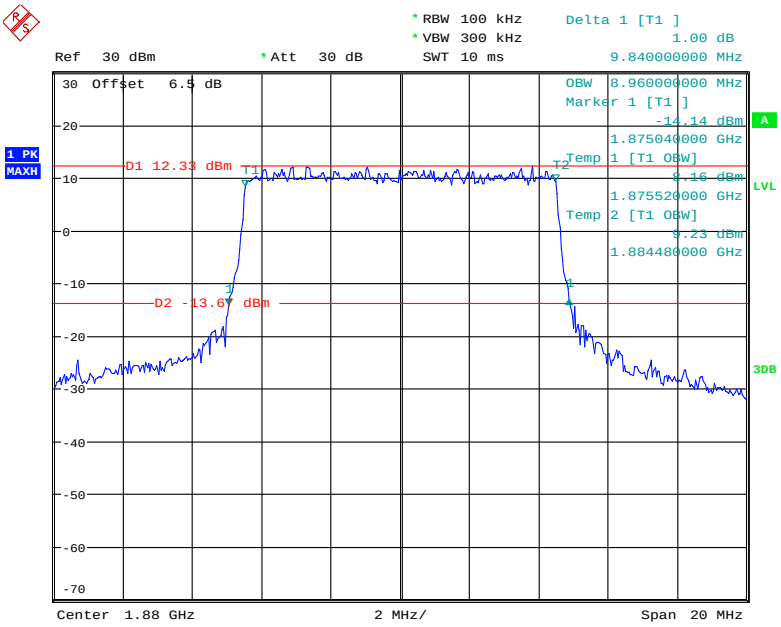
Date: 17.JUN.2020 09:53:07

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



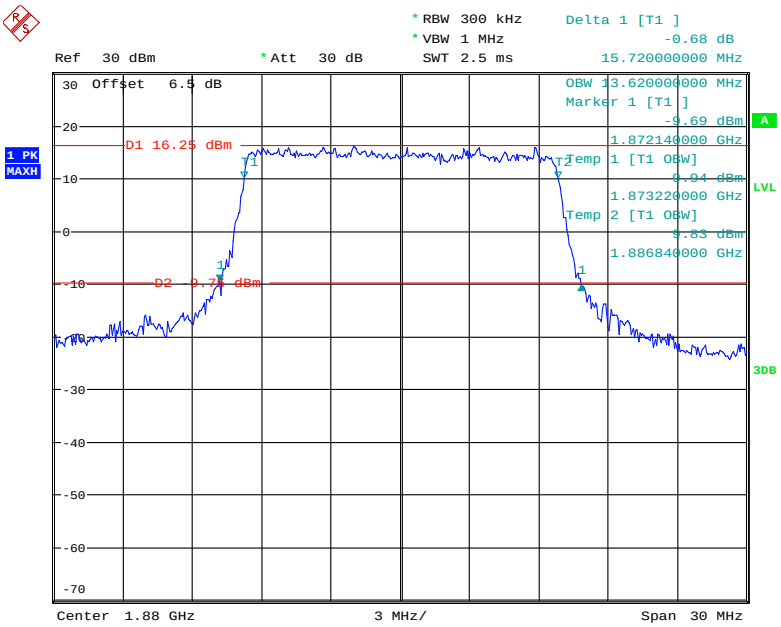
Date: 17.JUN.2020 09:53:27

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



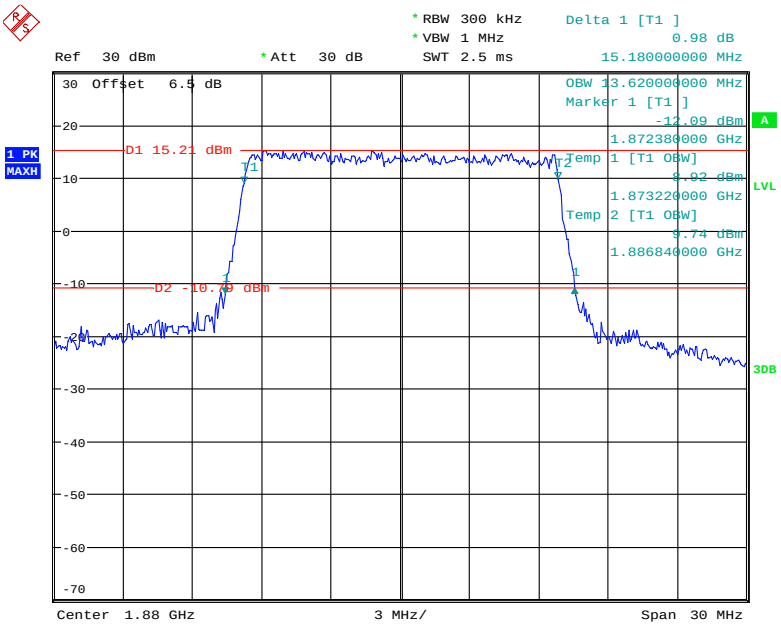
Date: 17.JUN.2020 09:53:48

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



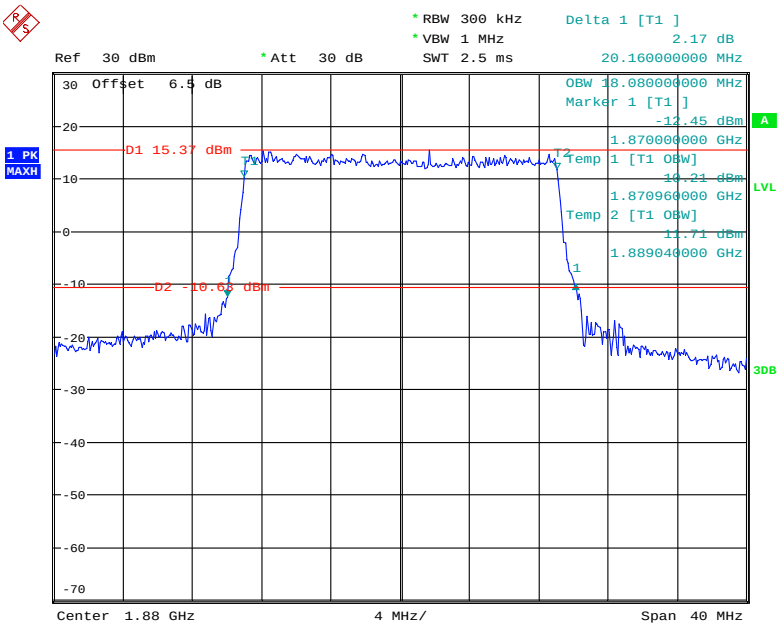
Date: 17.JUN.2020 09:54:20

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



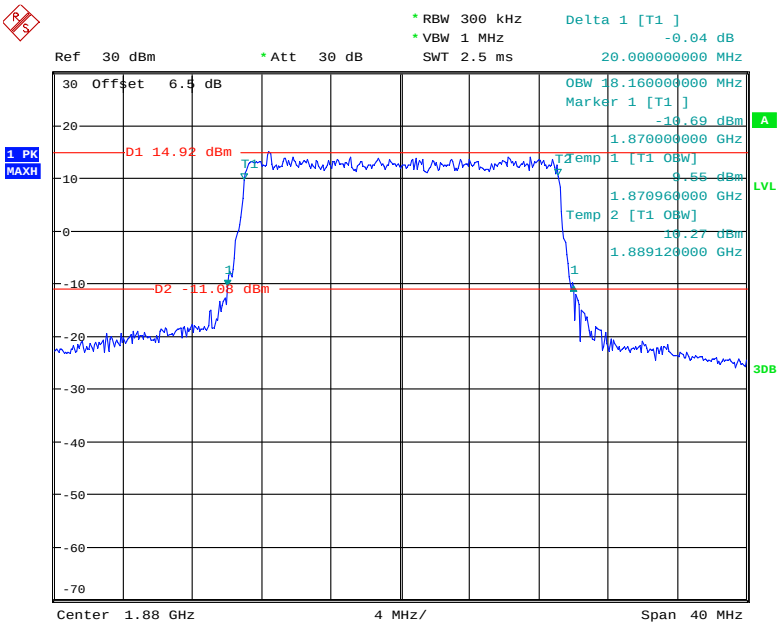
Date: 17.JUN.2020 09:54:43

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



Date: 17.JUN.2020 09:55:08

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

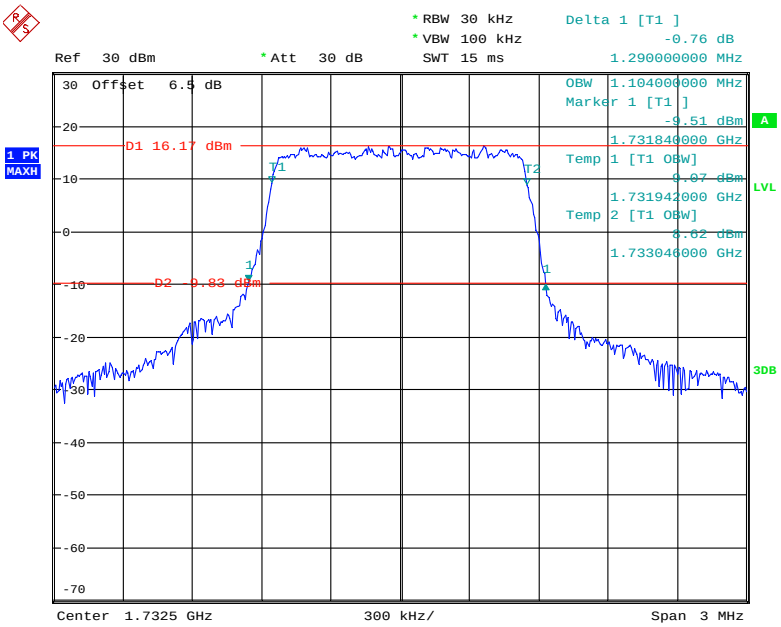


Date: 17.JUN.2020 09:55:34

LTE Band 4: (Middle Channel)

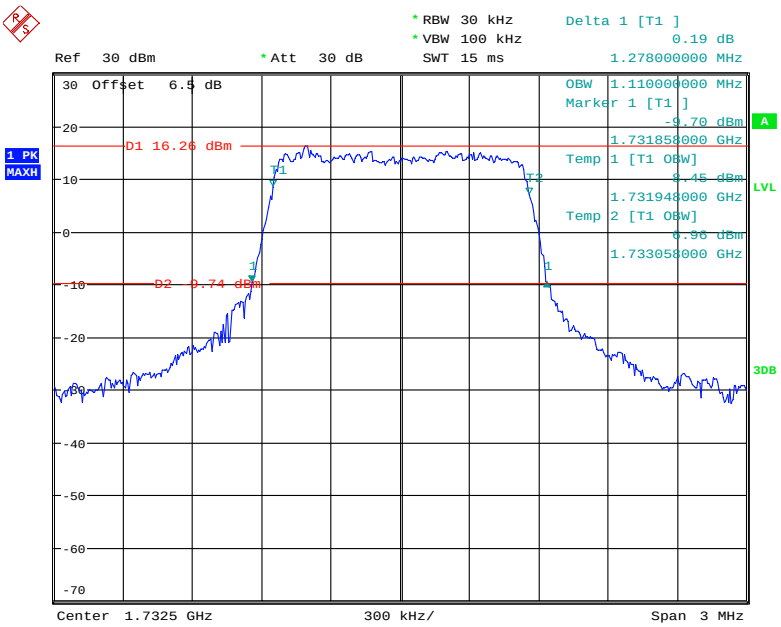
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.104	1.290
	16QAM	1.110	1.278
3.0	QPSK	2.712	3.024
	16QAM	2.700	3.012
5.0	QPSK	4.560	5.340
	16QAM	4.540	5.300
10.0	QPSK	9.000	9.840
	16QAM	8.960	9.760
15.0	QPSK	13.560	15.420
	16QAM	13.560	15.120
20.0	QPSK	18.000	19.840
	16QAM	18.000	20.160

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



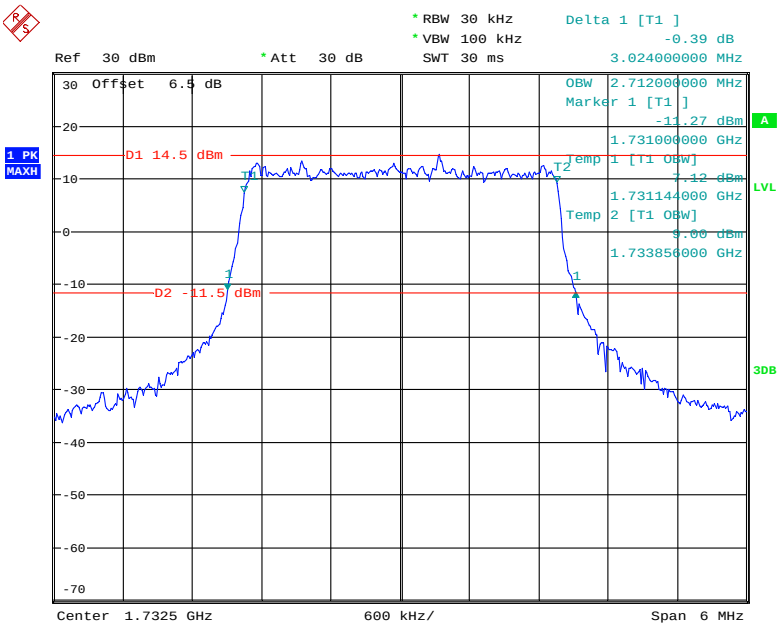
Date: 17.JUN.2020 09:55:56

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



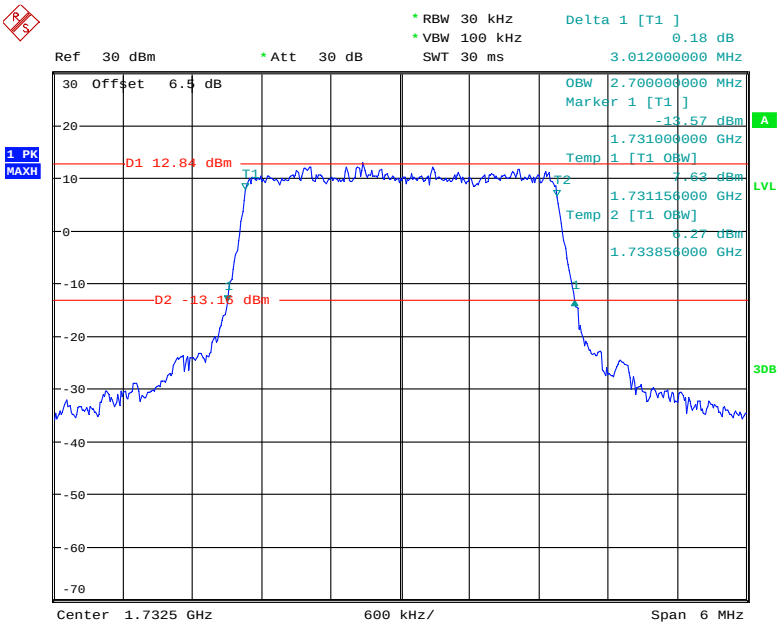
Date: 17.JUN.2020 09:56:16

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



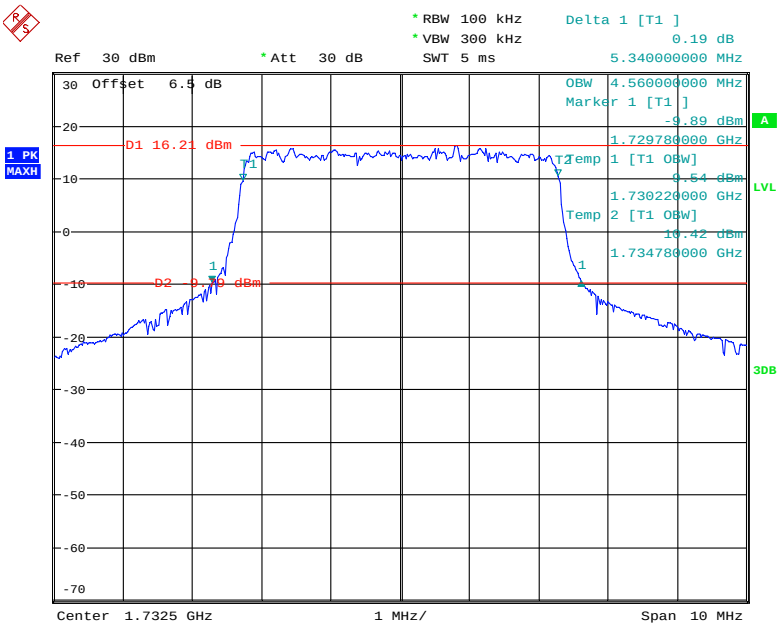
Date: 17.JUN.2020 09:56:38

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



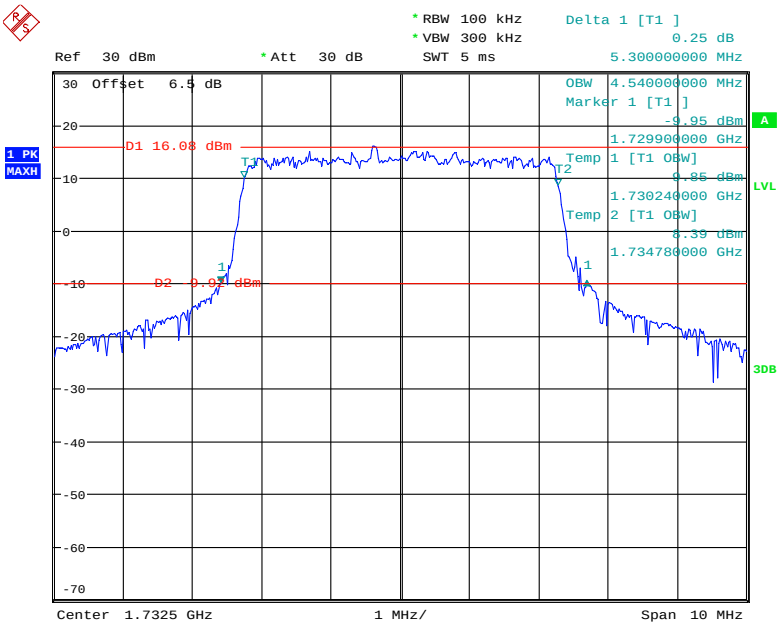
Date: 17.JUN.2020 09:56:57

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



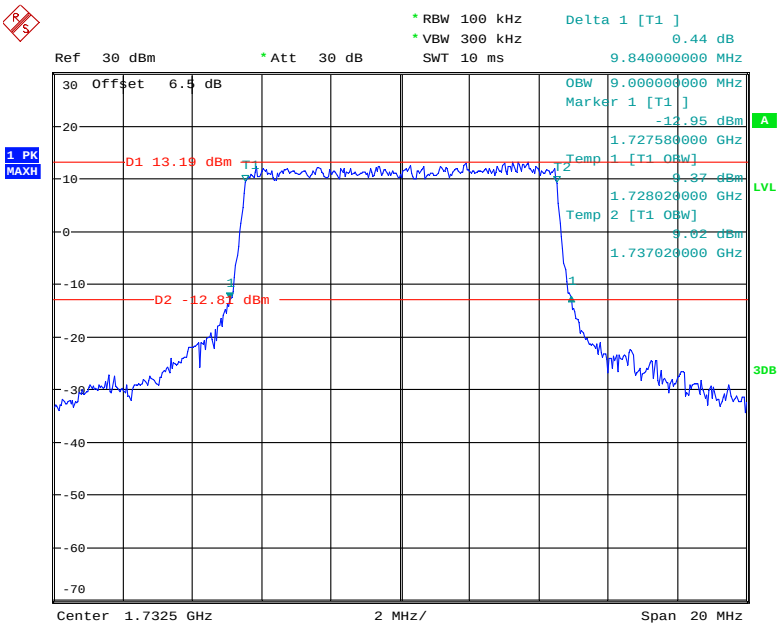
Date: 17.JUN.2020 09:57:29

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



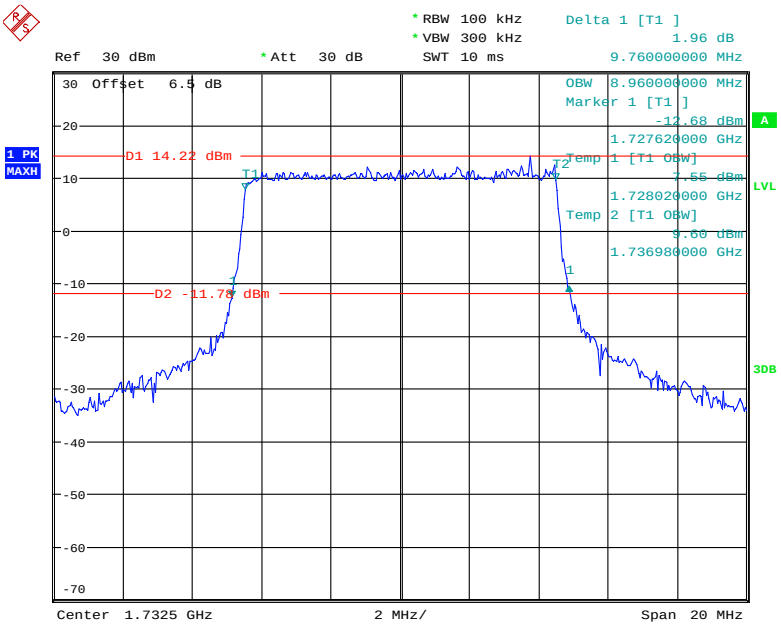
Date: 17.JUN.2020 09:57:51

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



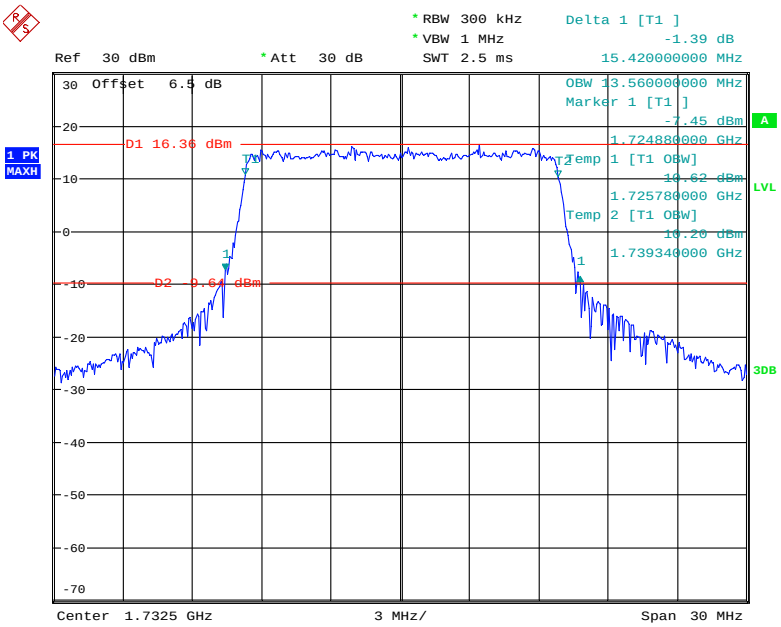
Date: 17.JUN.2020 09:58:15

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



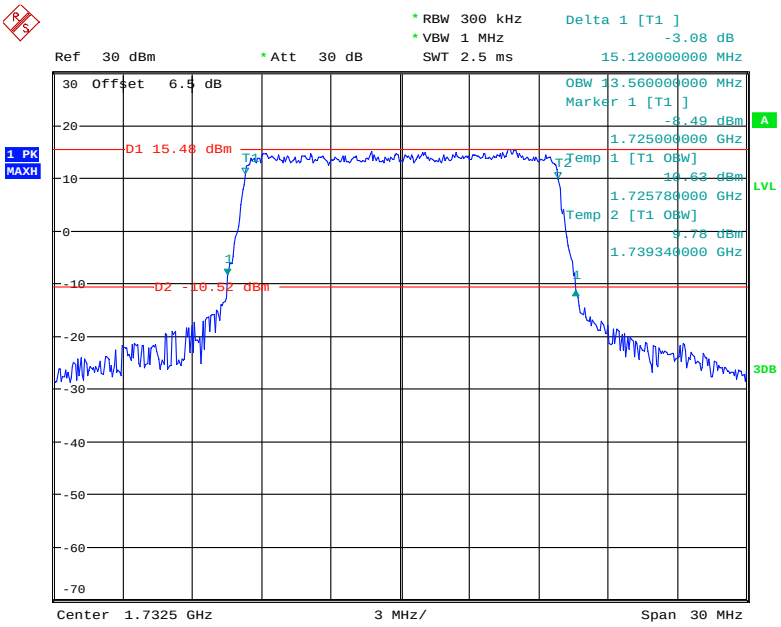
Date: 17.JUN.2020 09:58:35

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



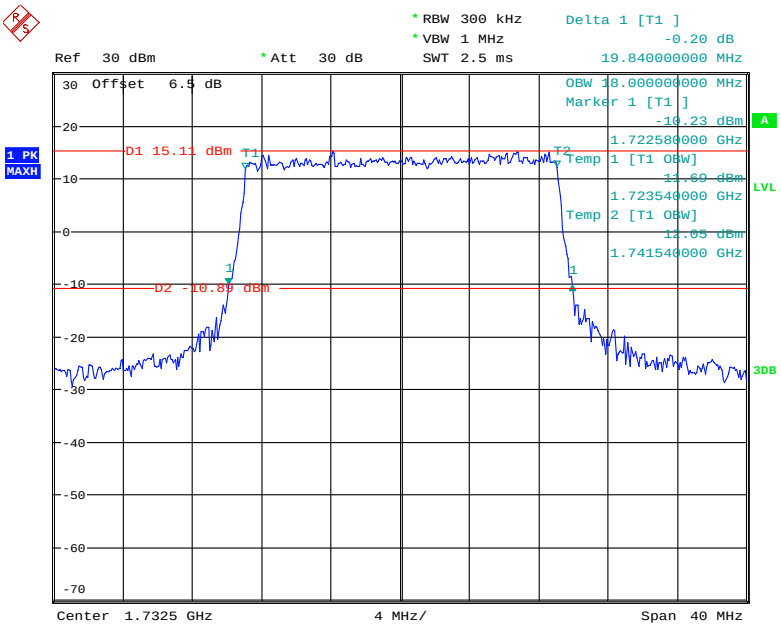
Date: 17.JUN.2020 09:59:04

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



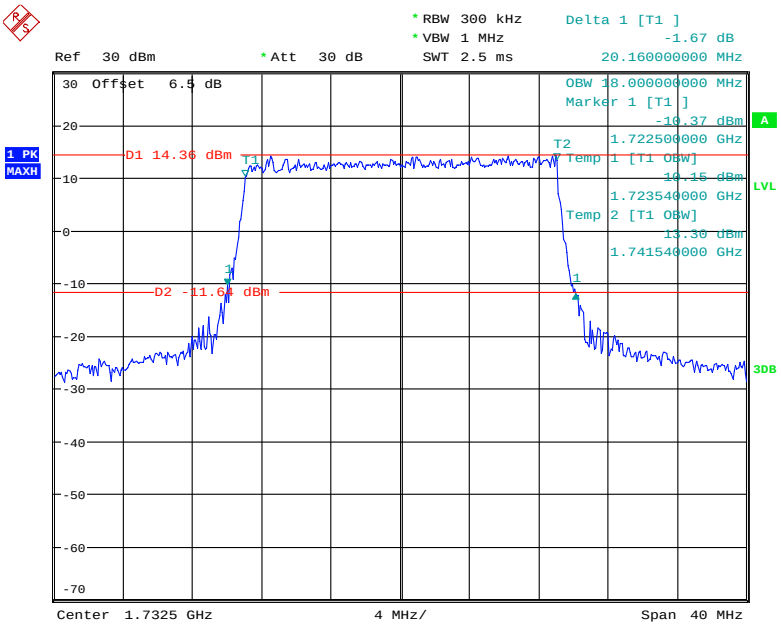
Date: 17.JUN.2020 09:59:30

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



Date: 17.JUN.2020 09:59:56

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

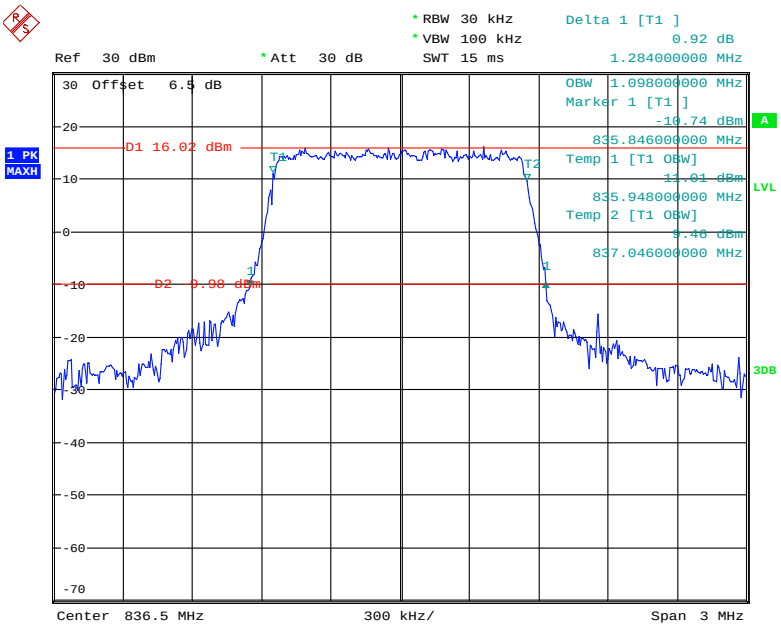


Date: 17.JUN.2020 10:00:22

LTE Band 5: (Middle Channel)

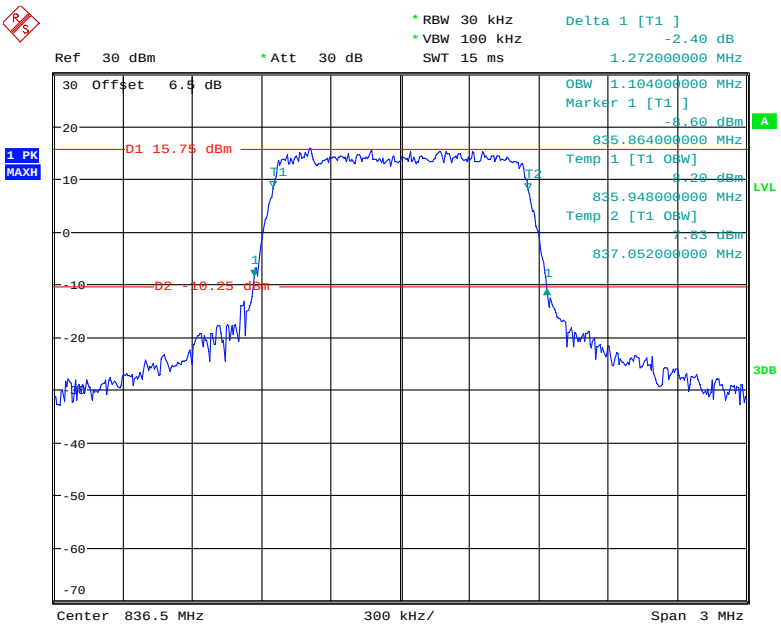
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.098	1.284
	16QAM	1.104	1.272
3.0	QPSK	2.700	3.012
	16QAM	2.700	3.012
5.0	QPSK	4.540	5.320
	16QAM	4.520	5.220
10.0	QPSK	8.960	9.760
	16QAM	8.960	9.840

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



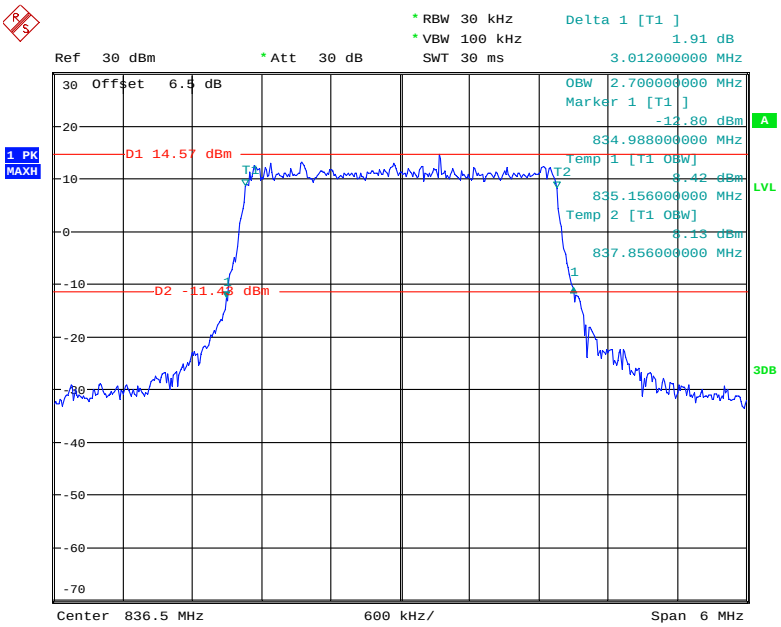
Date: 17.JUN.2020 10:00:44

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



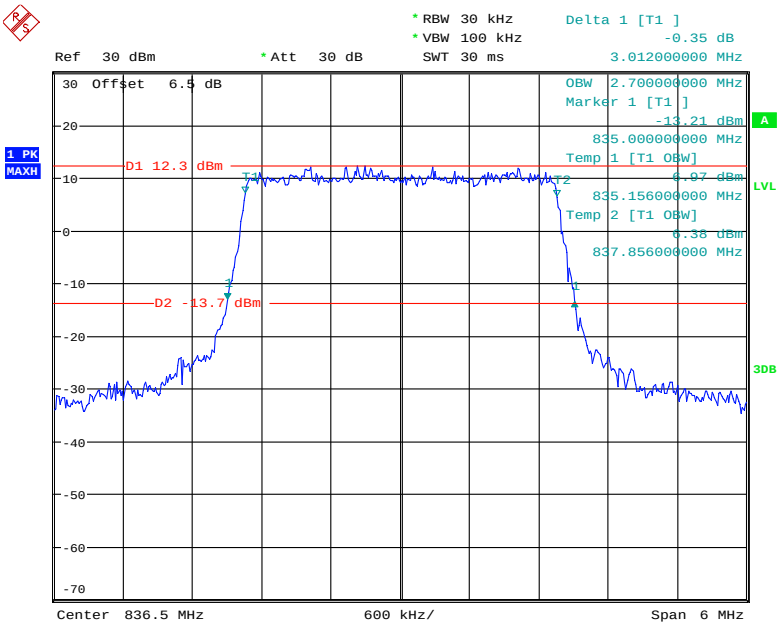
Date: 17.JUN.2020 10:01:04

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



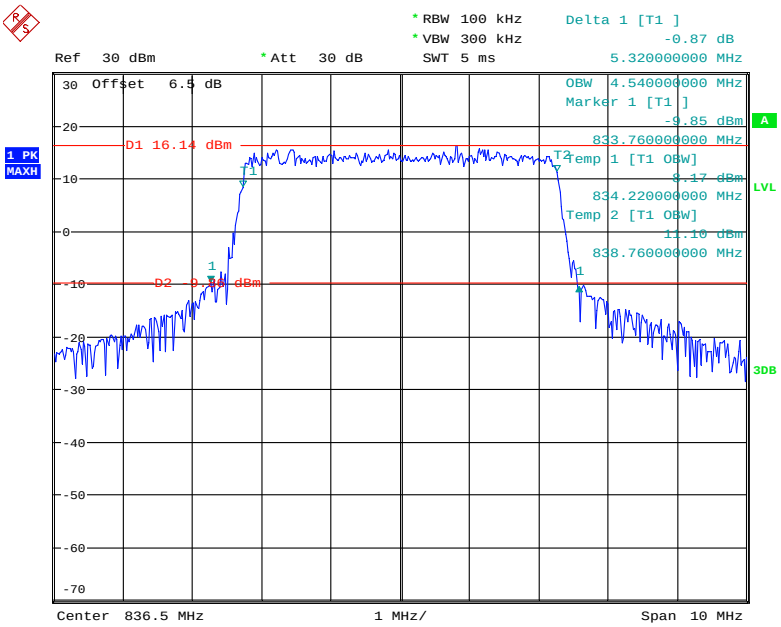
Date: 17.JUN.2020 10:01:26

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



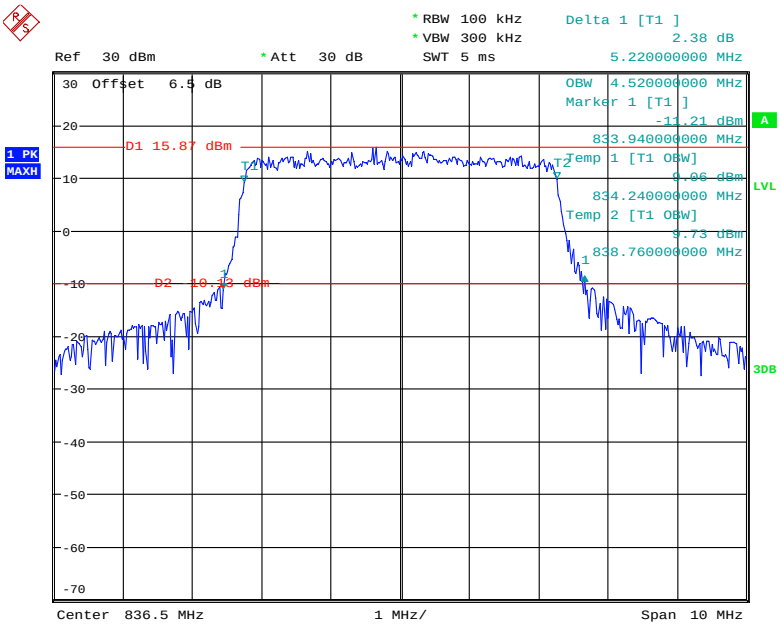
Date: 17.JUN.2020 10:01:45

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



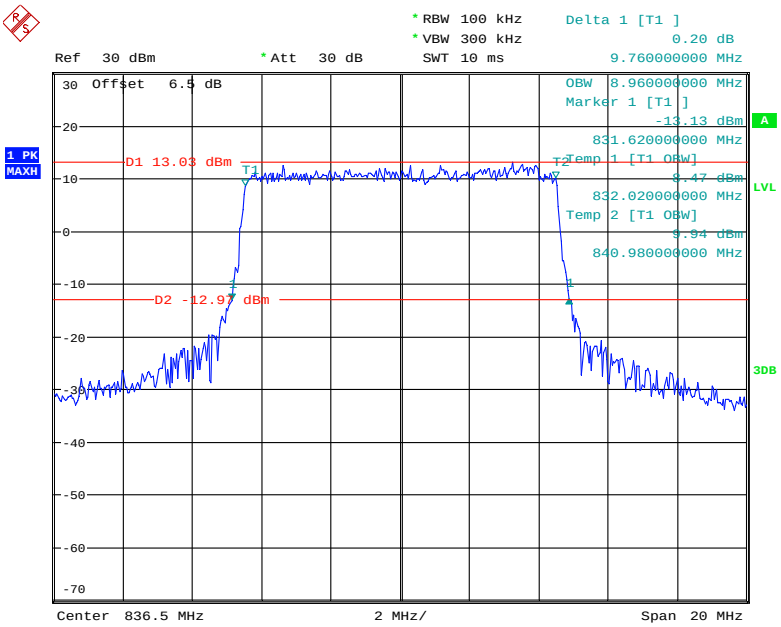
Date: 17.JUN.2020 10:02:20

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



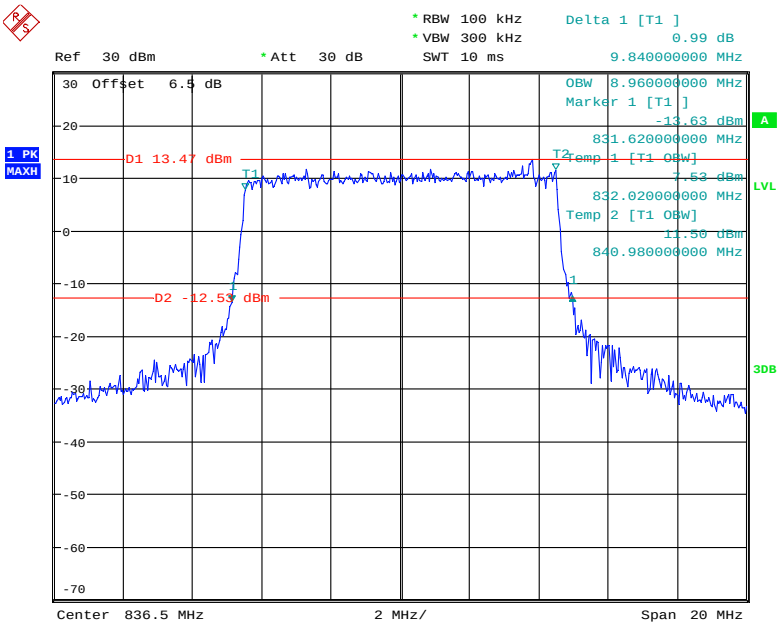
Date: 17.JUN.2020 10:02:52

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



Date: 17.JUN.2020 10:03:15

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

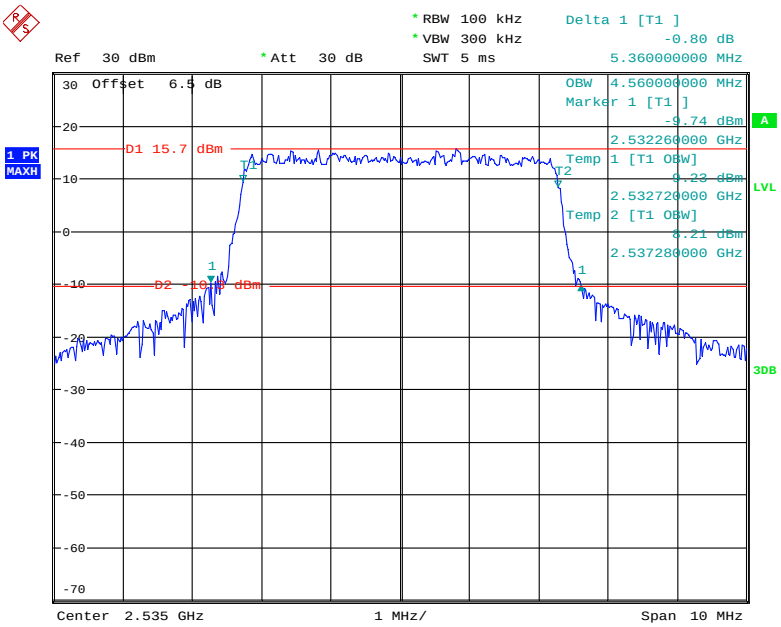


Date: 17.JUN.2020 10:03:39

LTE Band 7: (Middle Channel)

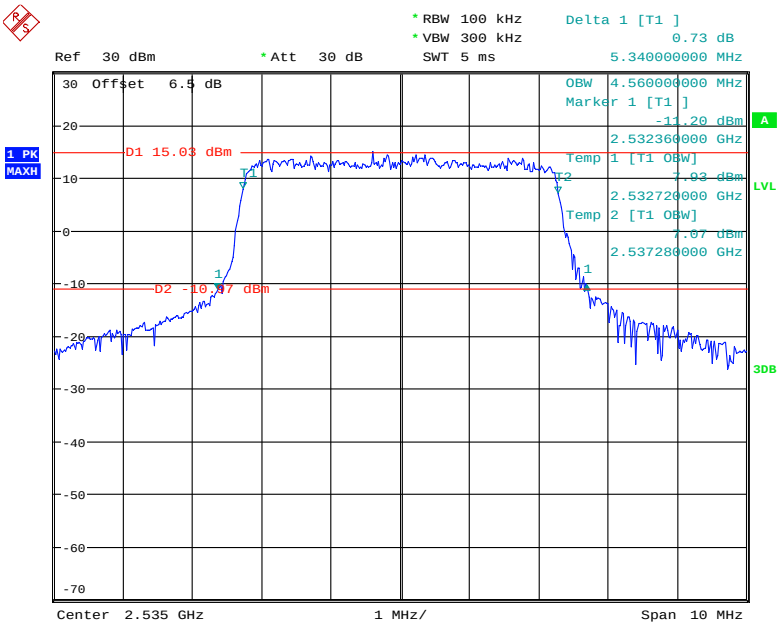
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.560	5.360
	16QAM	4.560	5.340
10.0	QPSK	8.960	9.840
	16QAM	8.960	9.920
15.0	QPSK	13.620	15.720
	16QAM	13.620	15.240
20.0	QPSK	18.000	19.840
	16QAM	18.000	20.160

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



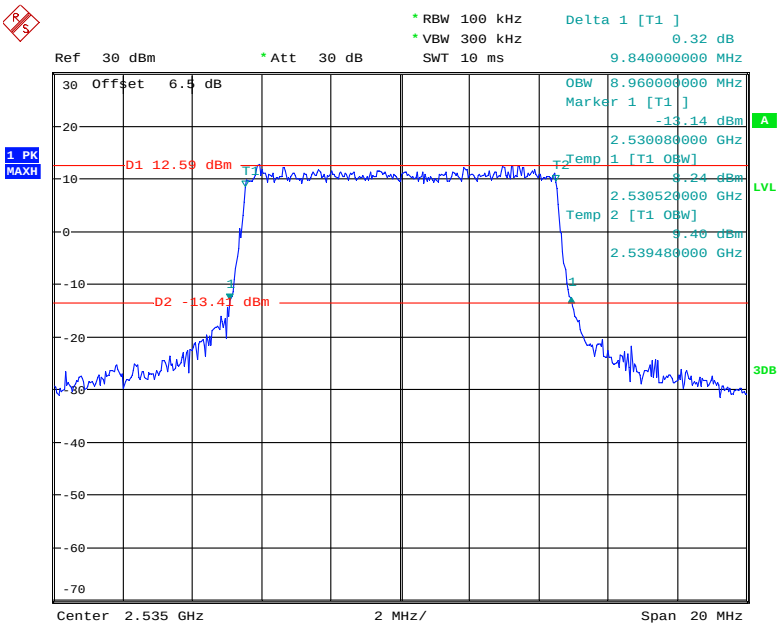
Date: 17.JUN.2020 10:04:11

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



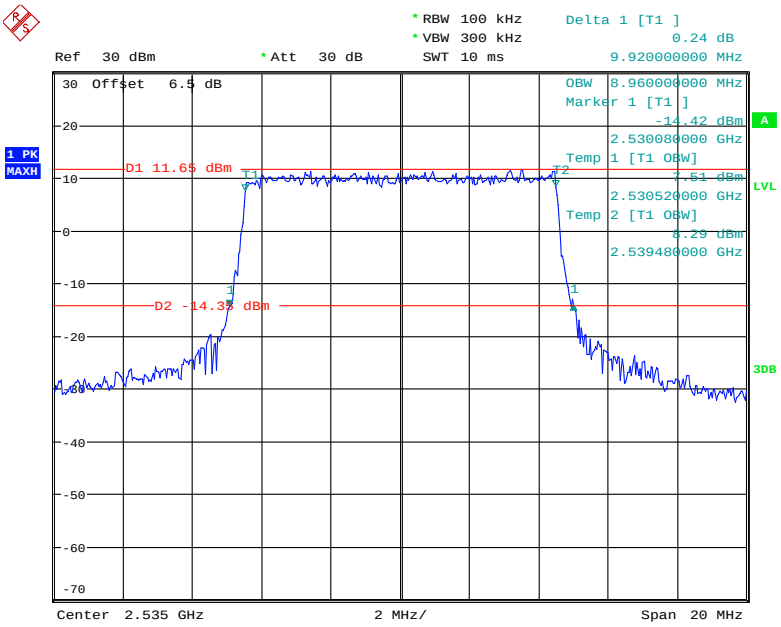
Date: 17.JUN.2020 10:04:39

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



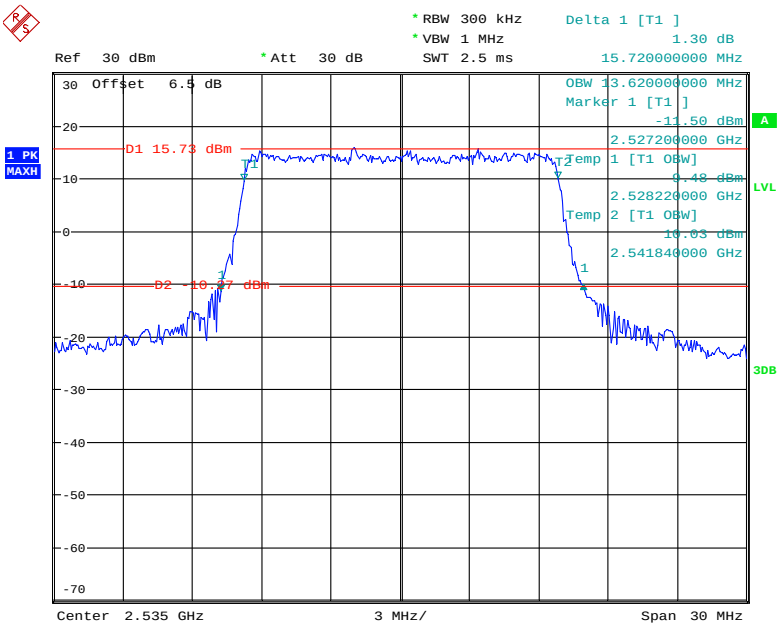
Date: 17.JUN.2020 10:05:05

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



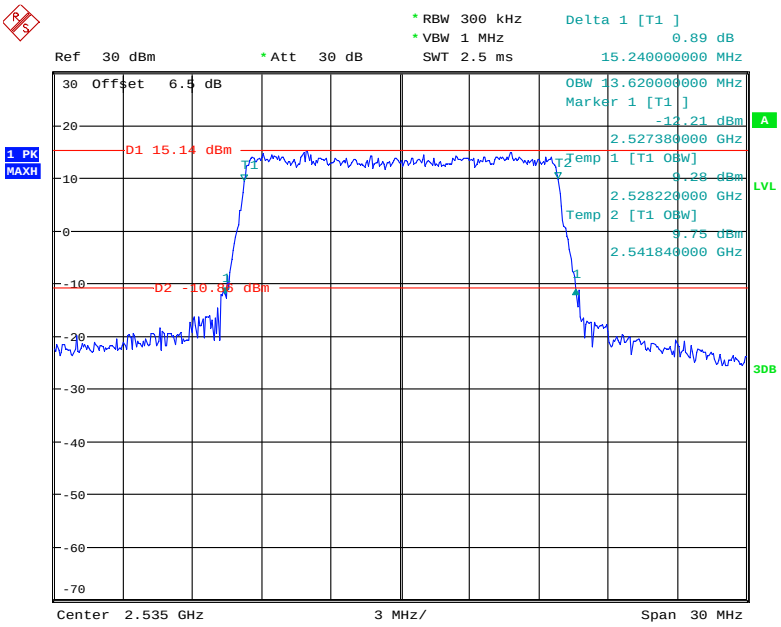
Date: 17.JUN.2020 10:05:29

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



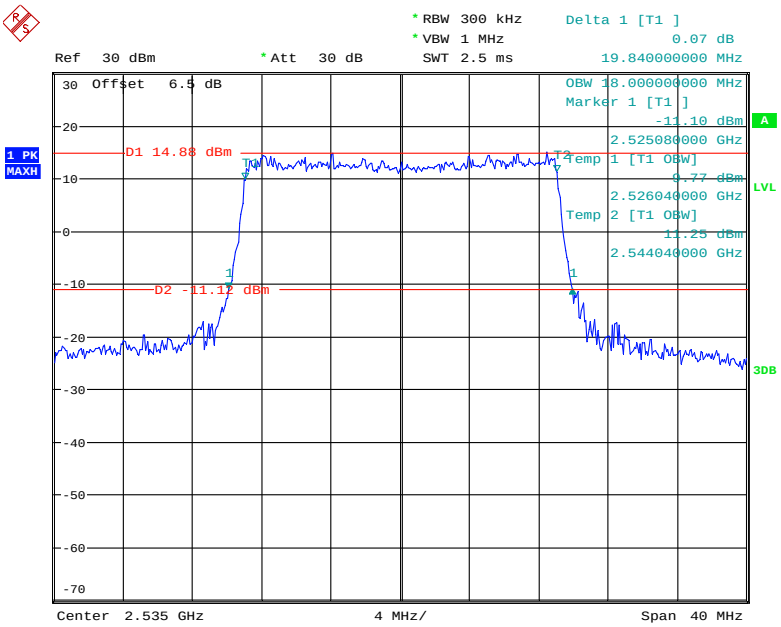
Date: 17.JUN.2020 10:05:57

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



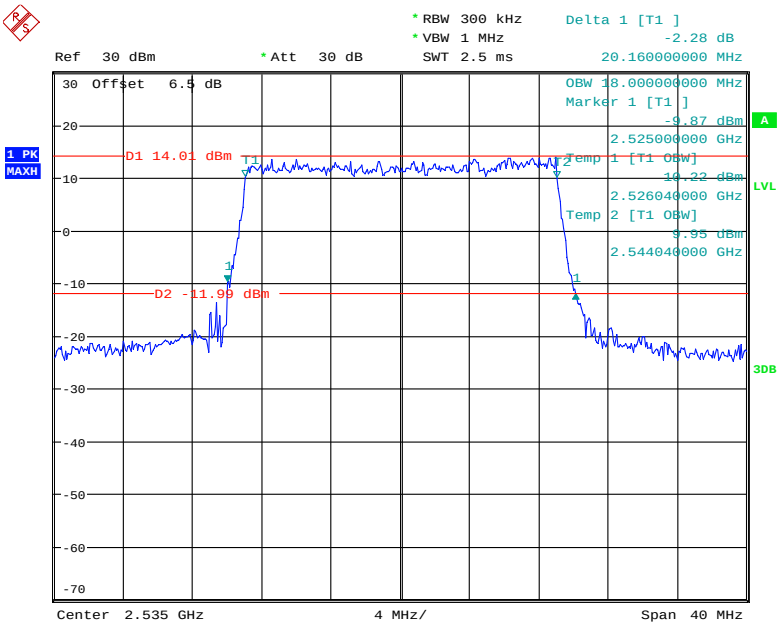
Date: 17.JUN.2020 10:06:20

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



Date: 17.JUN.2020 10:06:45

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

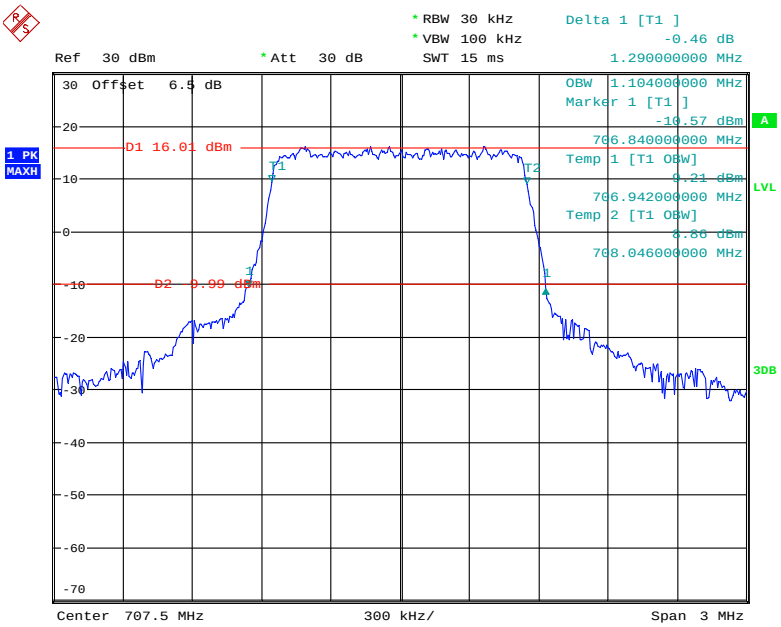


Date: 17.JUN.2020 10:07:08

LTE Band 12: (Middle Channel)

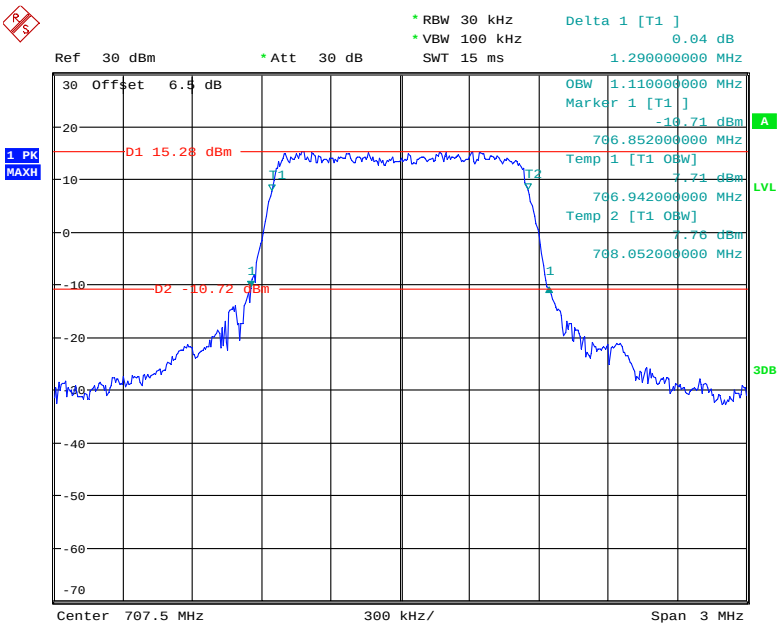
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.104	1.290
	16QAM	1.110	1.290
3.0	QPSK	2.688	3.012
	16QAM	2.700	3.000
5.0	QPSK	4.535	5.301
	16QAM	4.535	5.301
10.0	QPSK	8.960	9.840
	16QAM	8.974	10.151

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



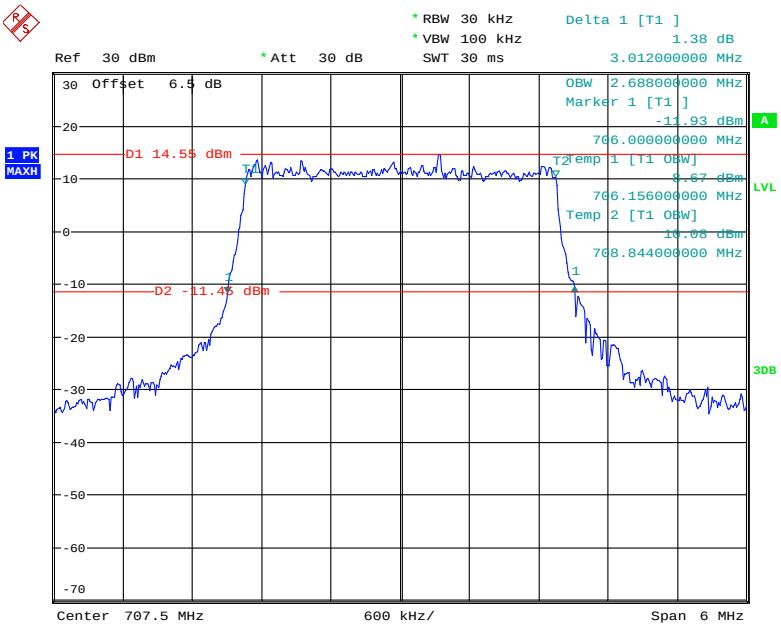
Date: 17.JUN.2020 10:07:30

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



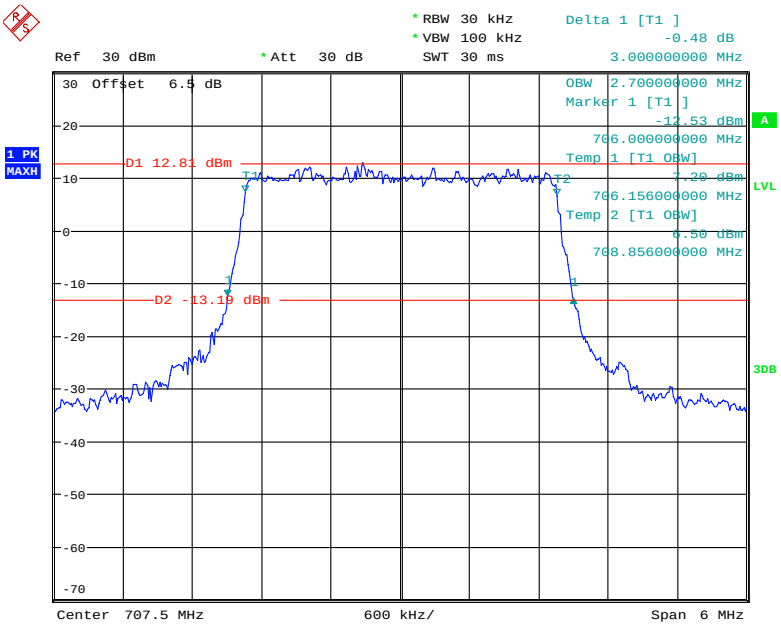
Date: 17.JUN.2020 10:07:50

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



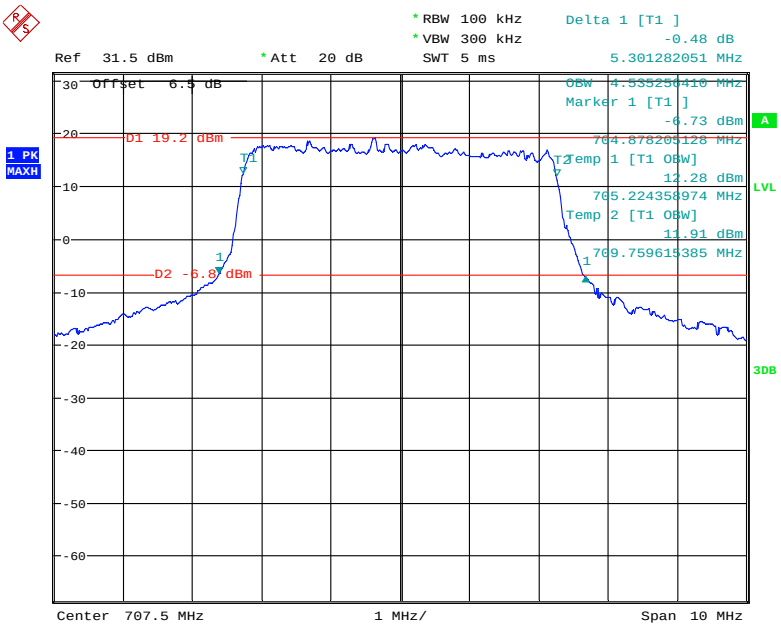
Date: 17.JUN.2020 10:08:11

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



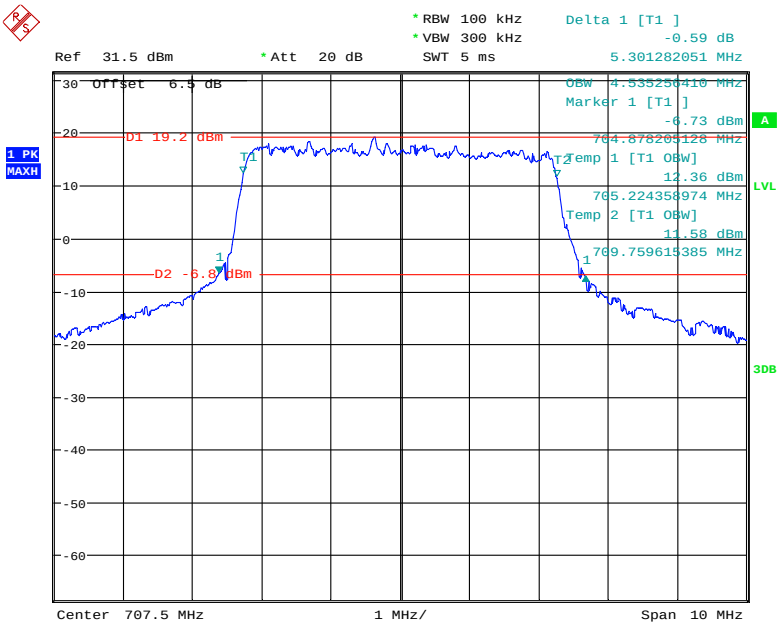
Date: 17.JUN.2020 10:08:30

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



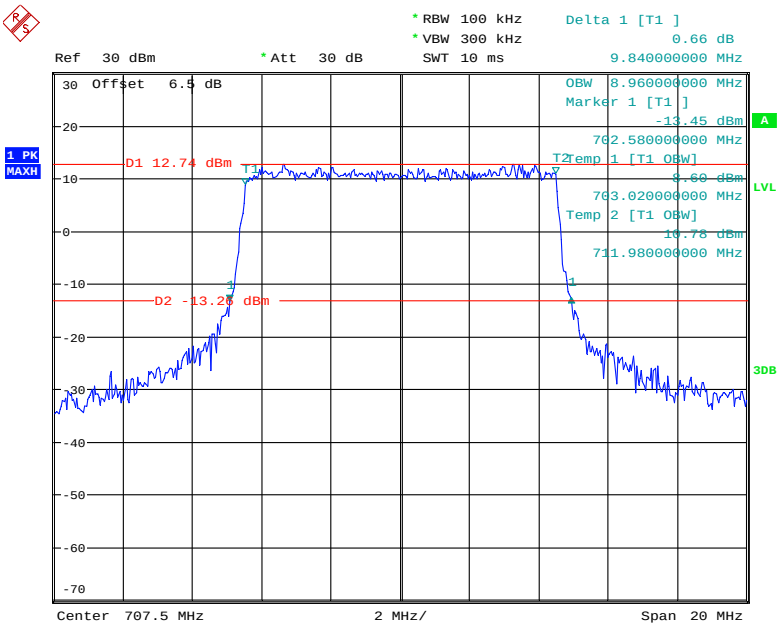
Date: 18.JUN.2020 16:12:32

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



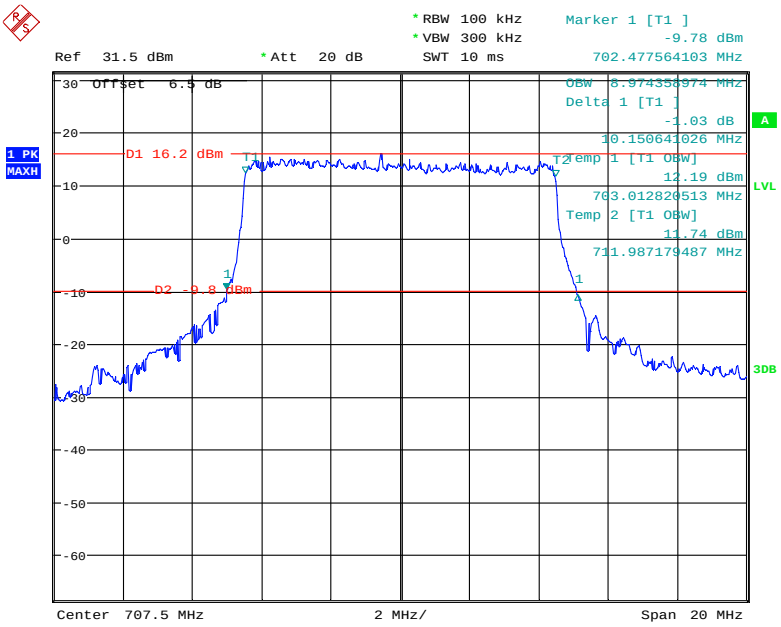
Date: 18.JUN.2020 16:09:42

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



Date: 17.JUN.2020 10:10:06

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

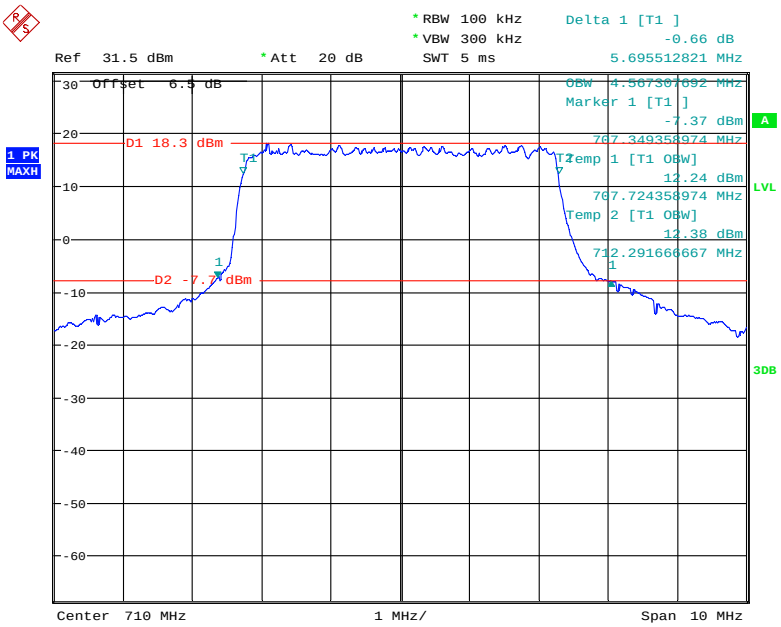


Date: 18.JUN.2020 16:07:18

LTE Band 17: (Middle Channel)

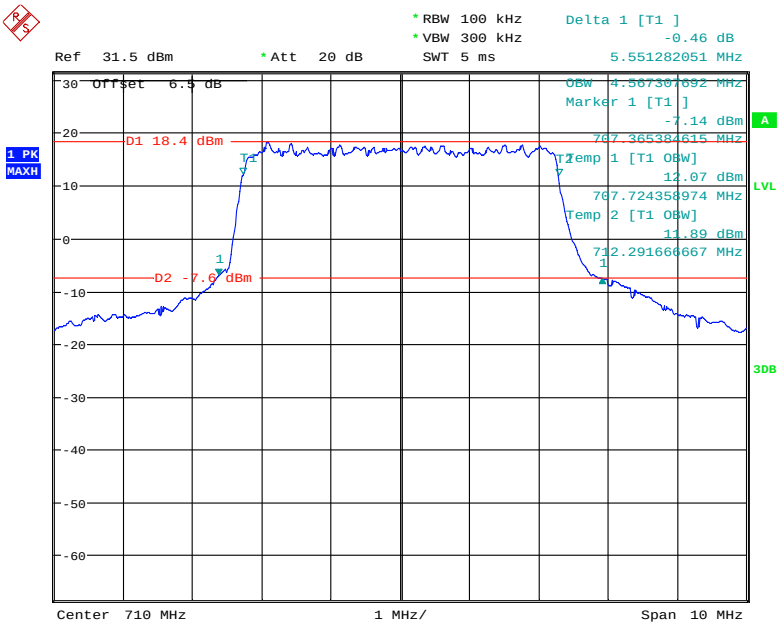
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.567	5.696
	16QAM	4.567	5.551
10.0	QPSK	8.960	9.880
	16QAM	8.960	9.920

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



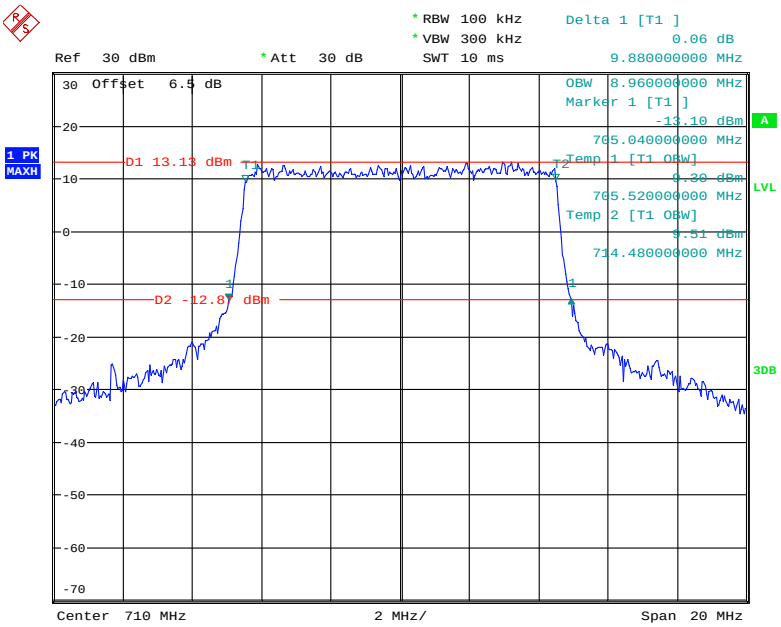
Date: 18.JUN.2020 16:02:35

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



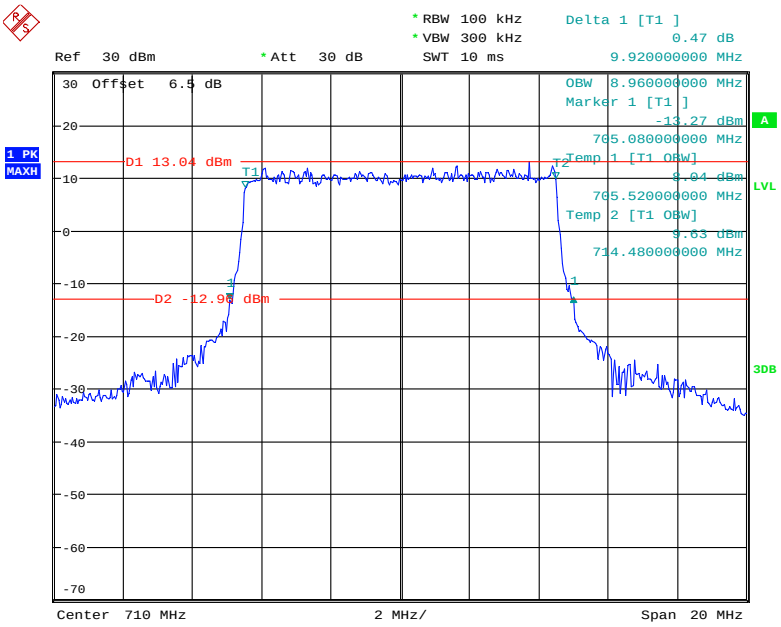
Date: 18.JUN.2020 16:00:25

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



Date: 17.JUN.2020 10:11:53

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



Date: 17.JUN.2020 10:12:16

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

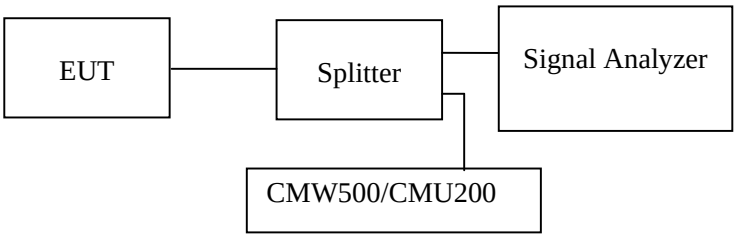
Applicable Standard

FCC §2.1051, §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 10^{th} harmonic.



Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-06-17

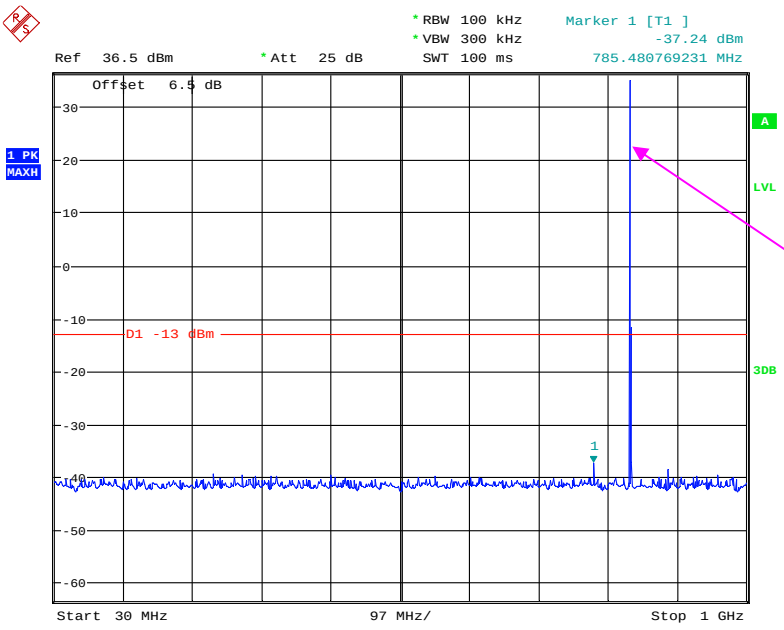
EUT operation mode: transmitting

Test result: Pass

Please refer to the following plots.

Cellular Band (Part 22H)

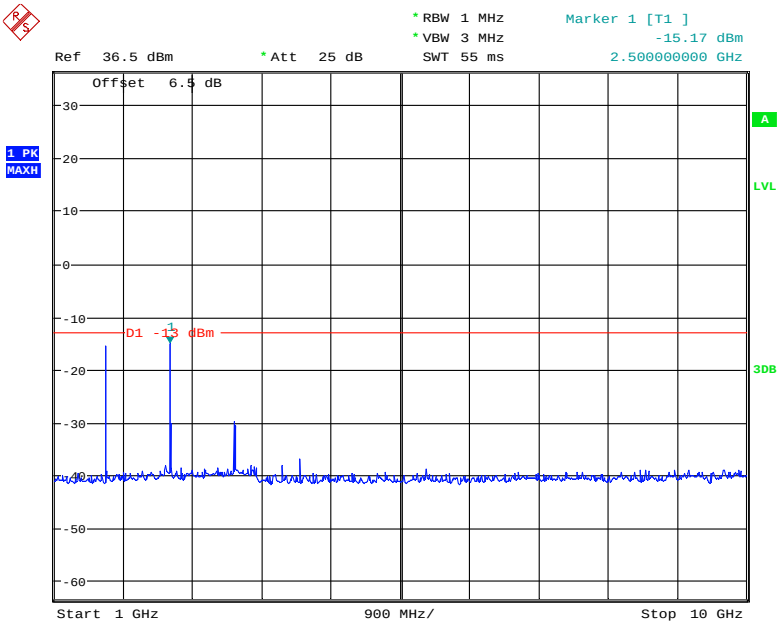
30 MHz – 1 GHz (GSM Mode)



Fundamental test

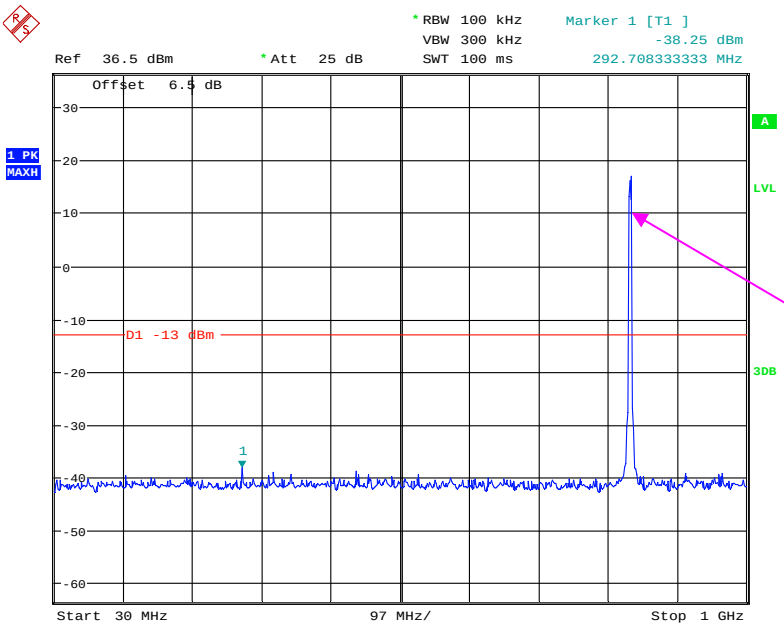
Date: 17.JUN.2020 20:50:13

1 GHz – 10 GHz (GSM Mode)



Date: 17.JUN.2020 20:51:01

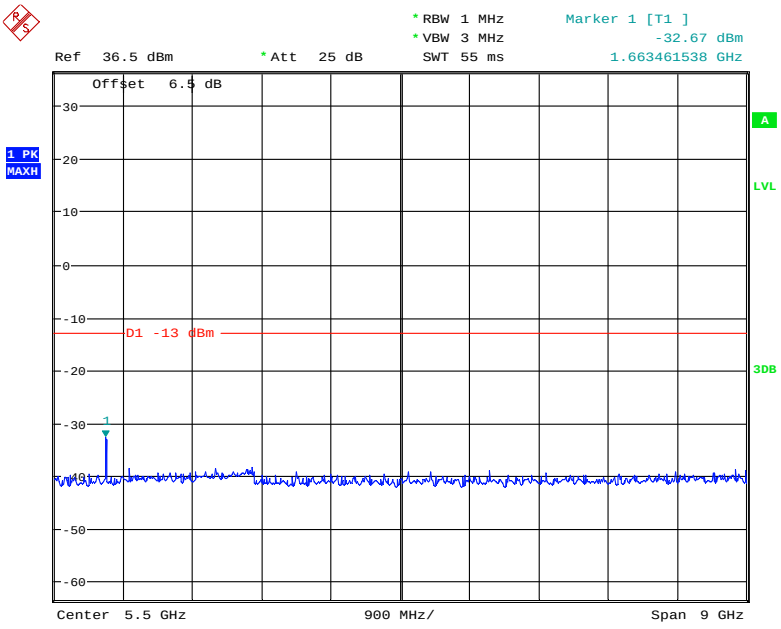
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 17.JUN.2020 22:29:39

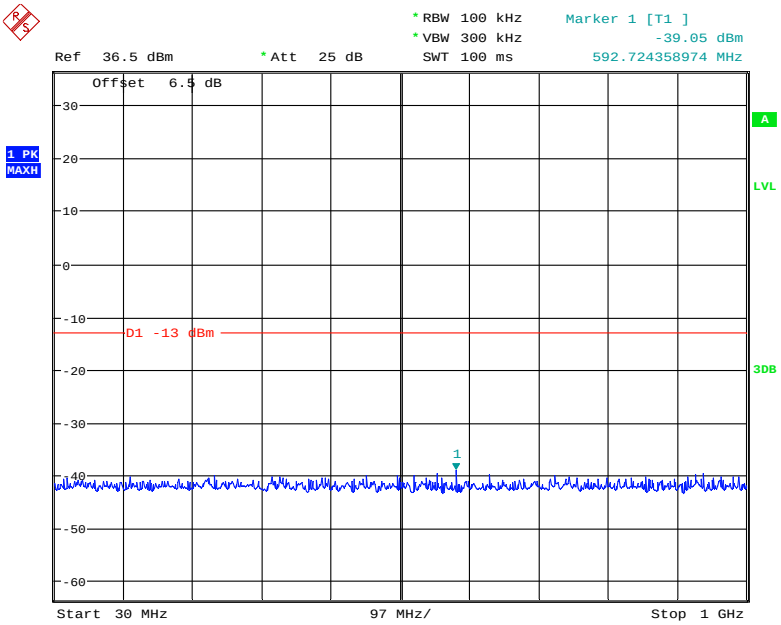
1 GHz – 10 GHz (WCDMA Mode)



Date: 17.JUN.2020 22:28:21

PCS Band (Part 24E)

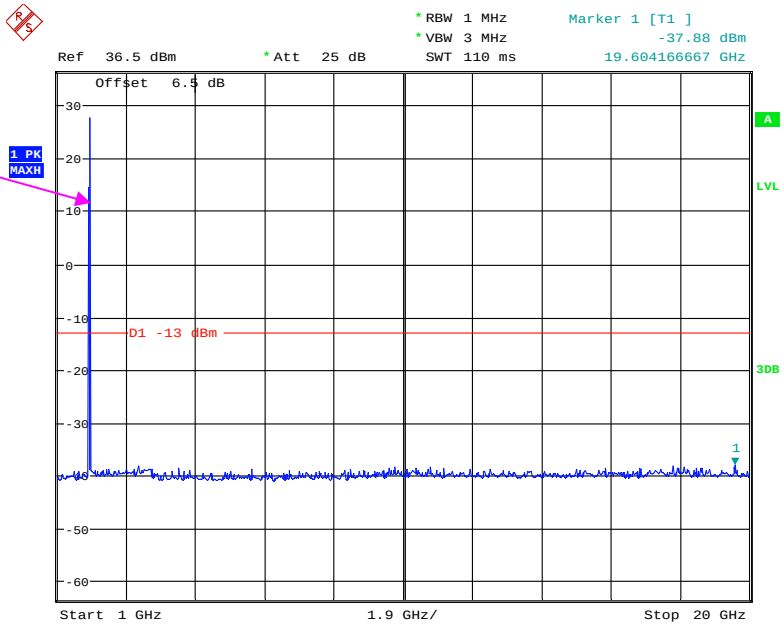
30 MHz – 1 GHz (GSM Mode)



Date: 17.JUN.2020 21:01:21

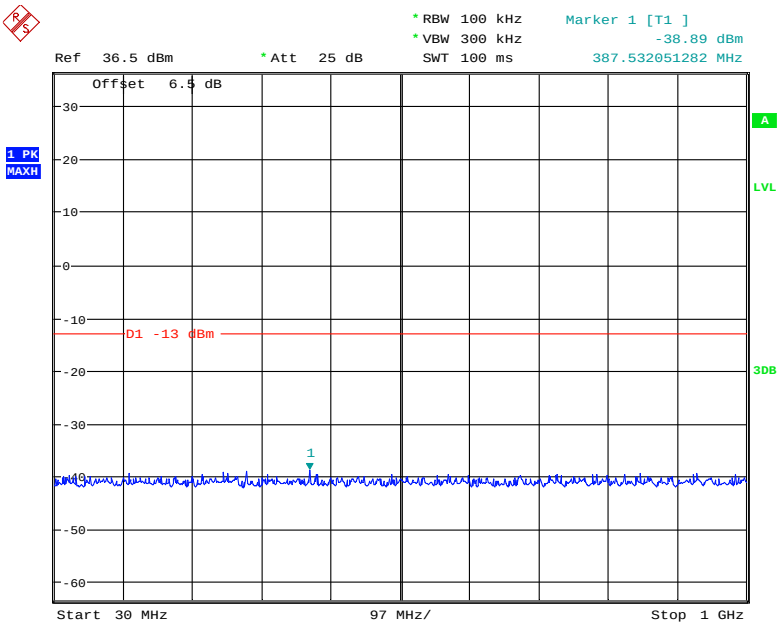
1 GHz – 20 GHz (GSM Mode)

Fundamental test



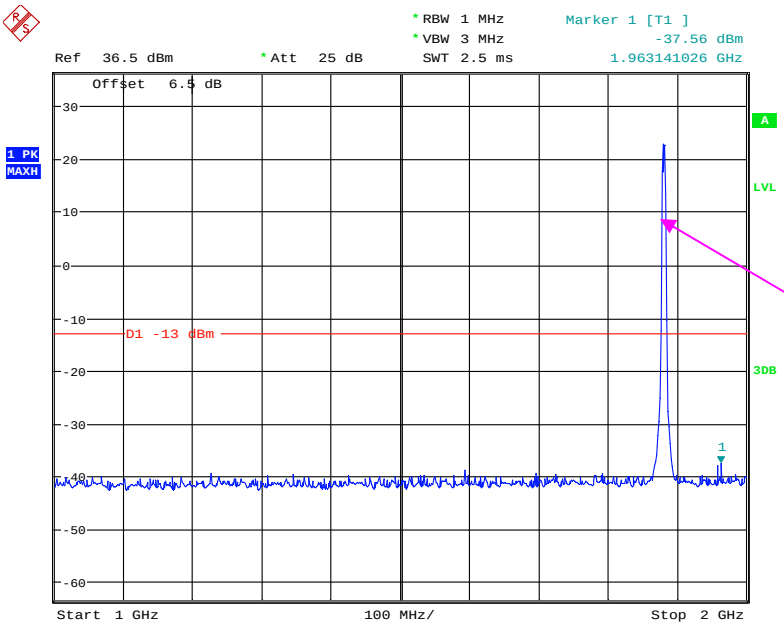
Date: 17.JUN.2020 21:01:00

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.JUN.2020 21:56:13

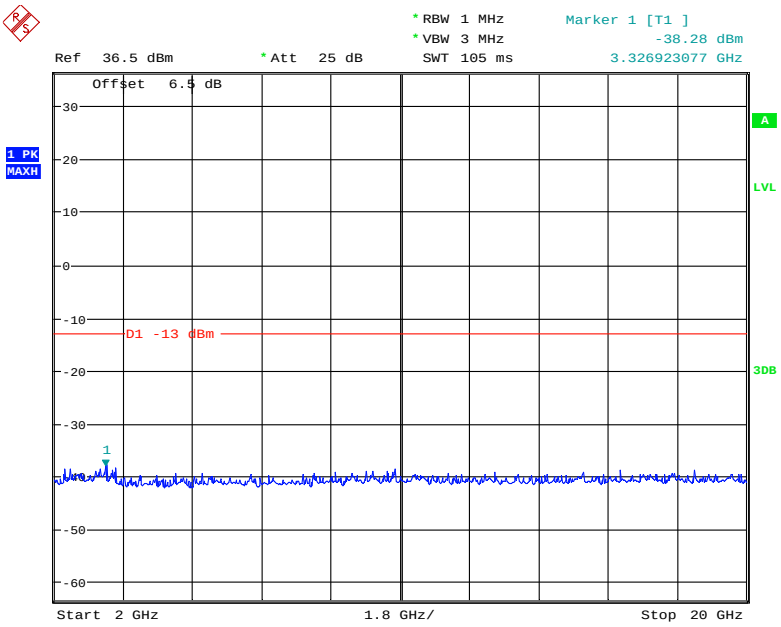
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 17.JUN.2020 21:57:20

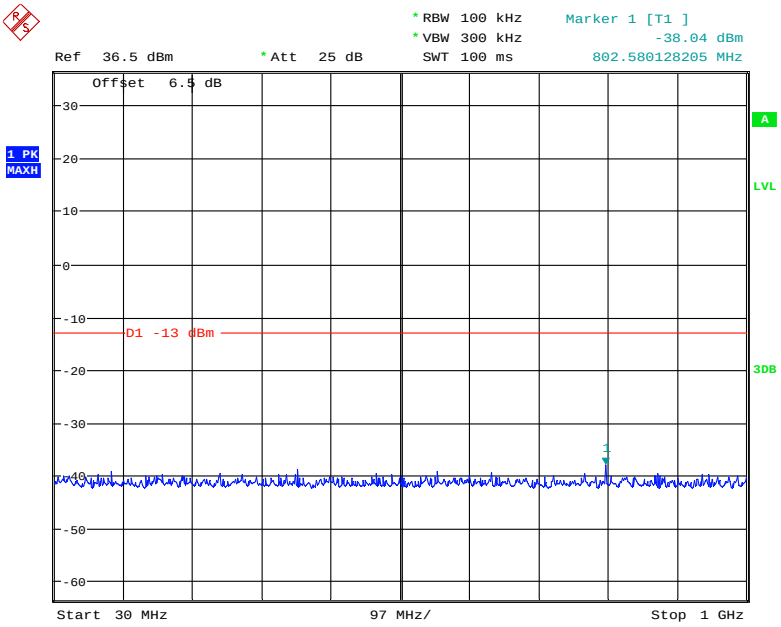
1 GHz – 20 GHz (WCDMA Mode)



Date: 17.JUN.2020 21:57:35

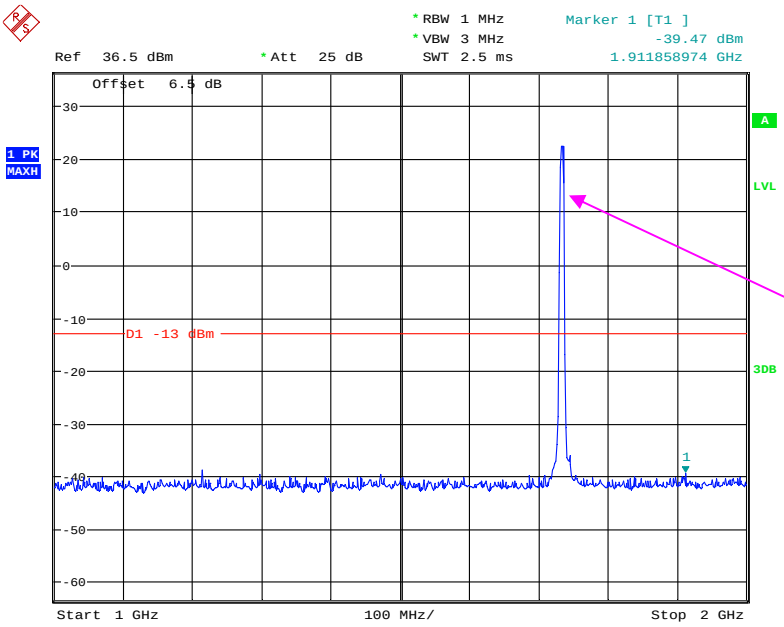
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



Date: 17.JUN.2020 22:21:15

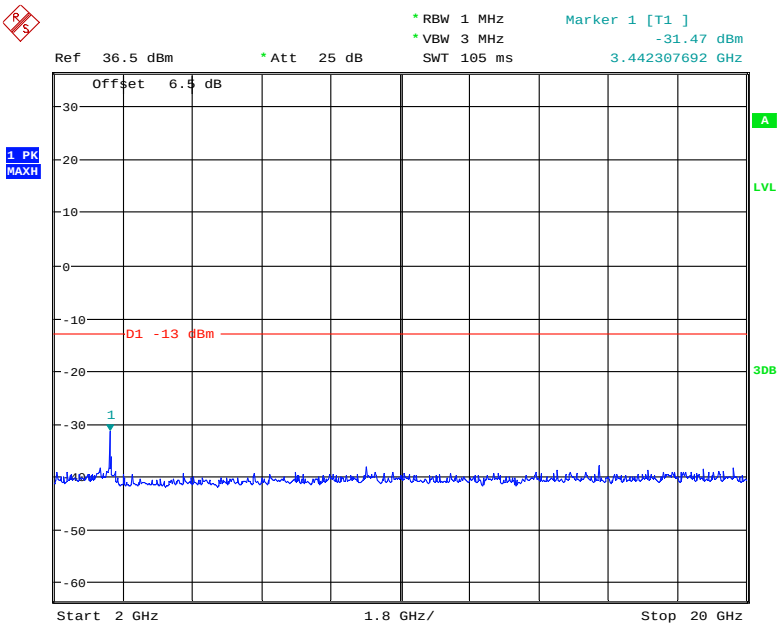
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 17.JUN.2020 22:21:45

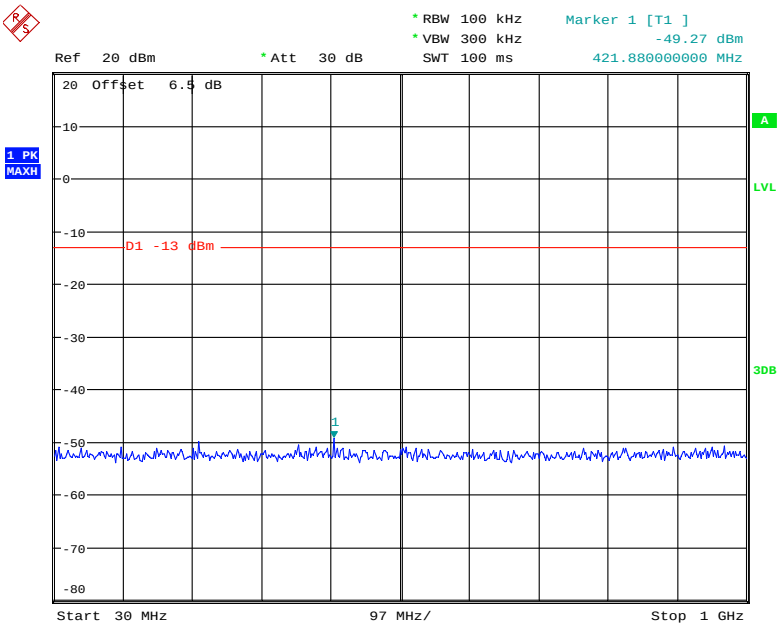
2 GHz – 20 GHz (WCDMA Mode)



Date: 17.JUN.2020 22:22:01

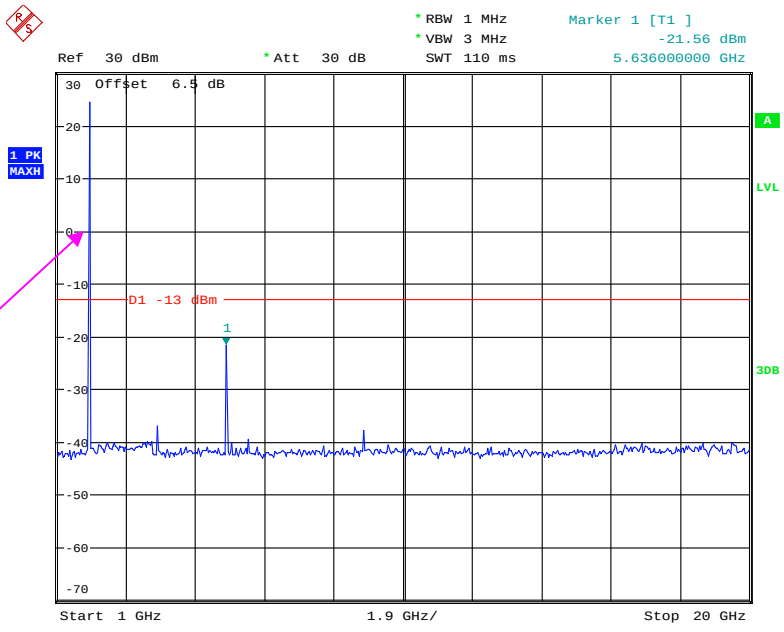
LTE Band 2:

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



Date: 17.JUN.2020 11:54:43

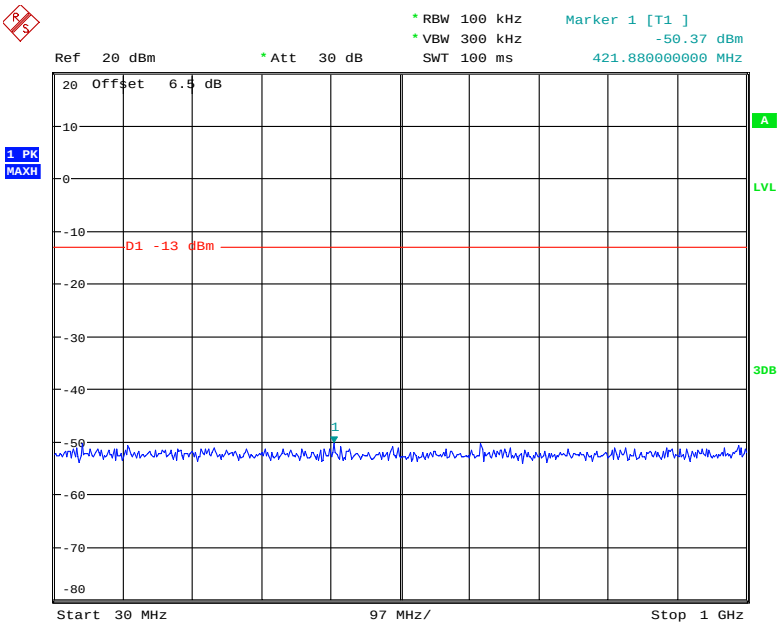
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test

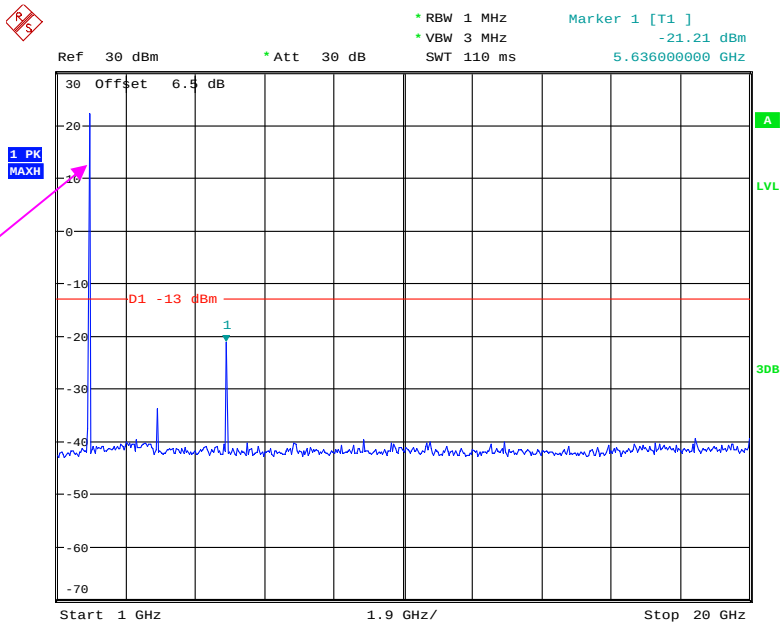
Date: 17.JUN.2020 11:54:54

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



Date: 17.JUN.2020 11:55:12

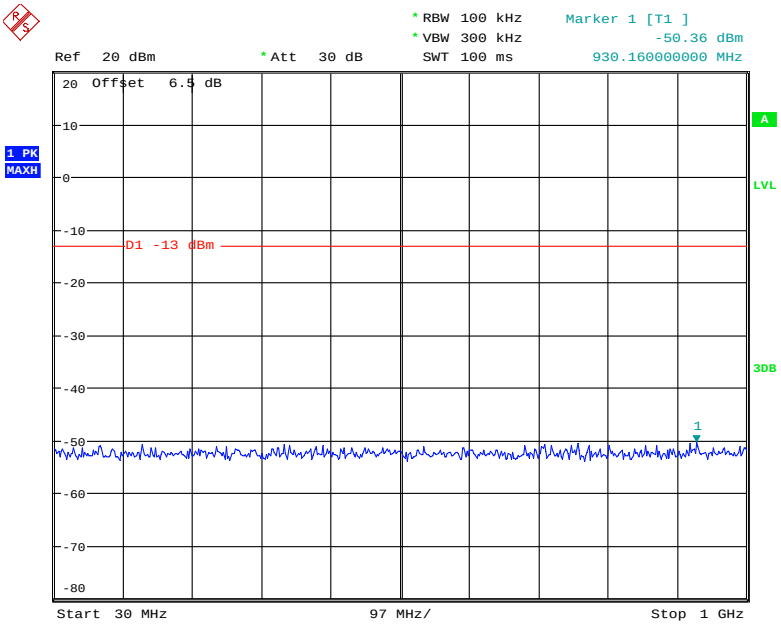
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test

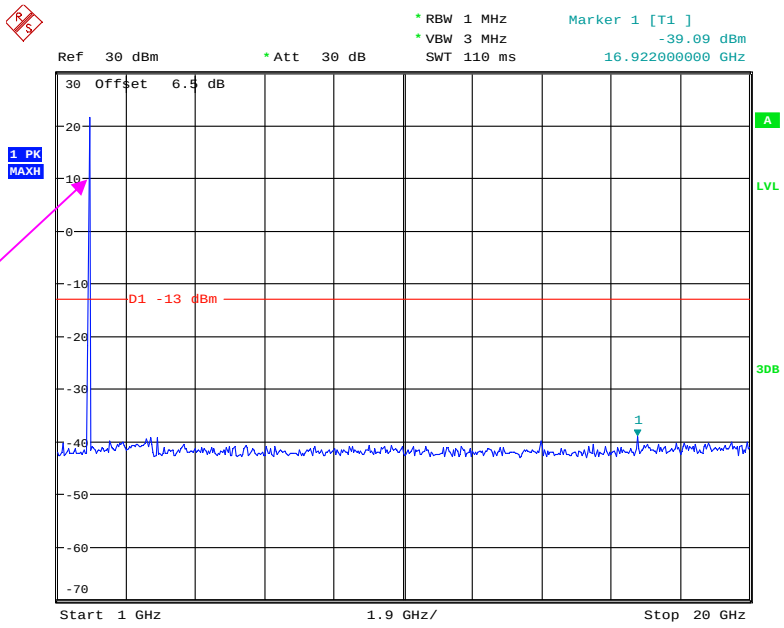
Date: 17.JUN.2020 11:55:22

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



Date: 17.JUN.2020 11:55:40

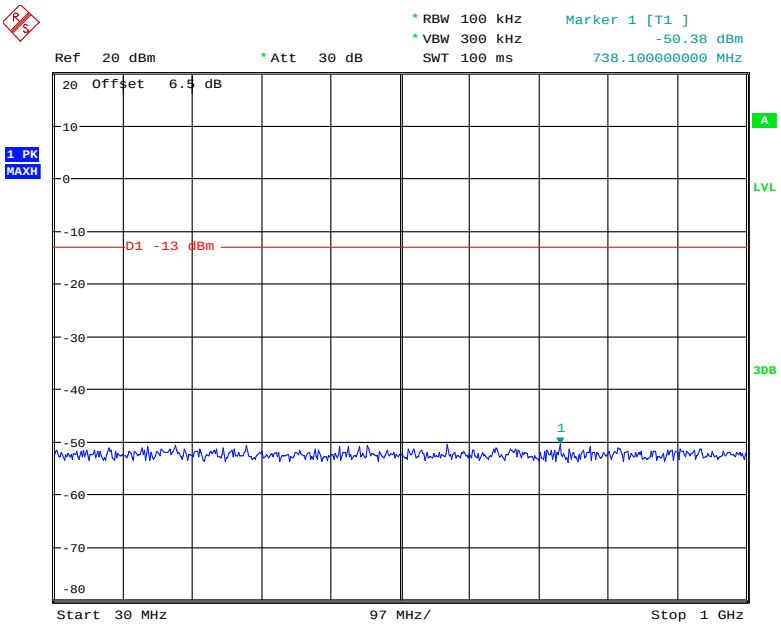
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test

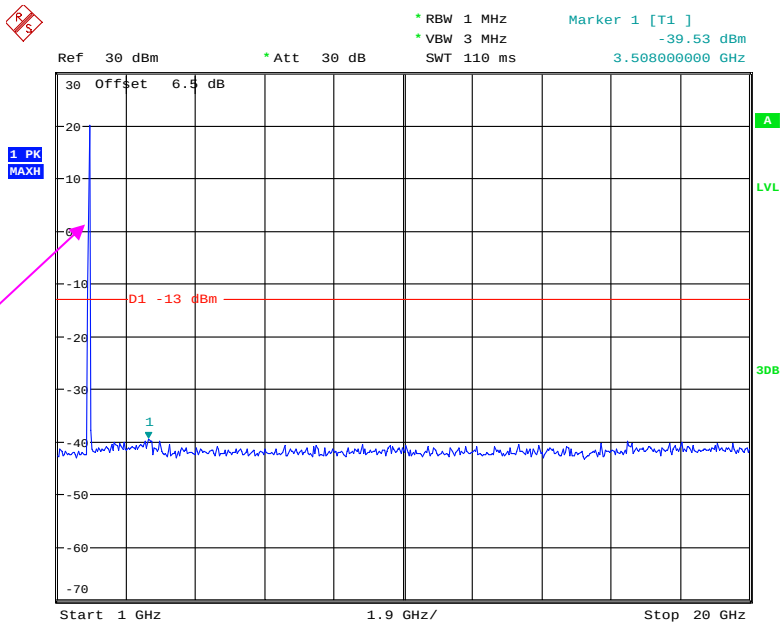
Date: 17.JUN.2020 11:55:50

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



Date: 17.JUN.2020 11:56:09

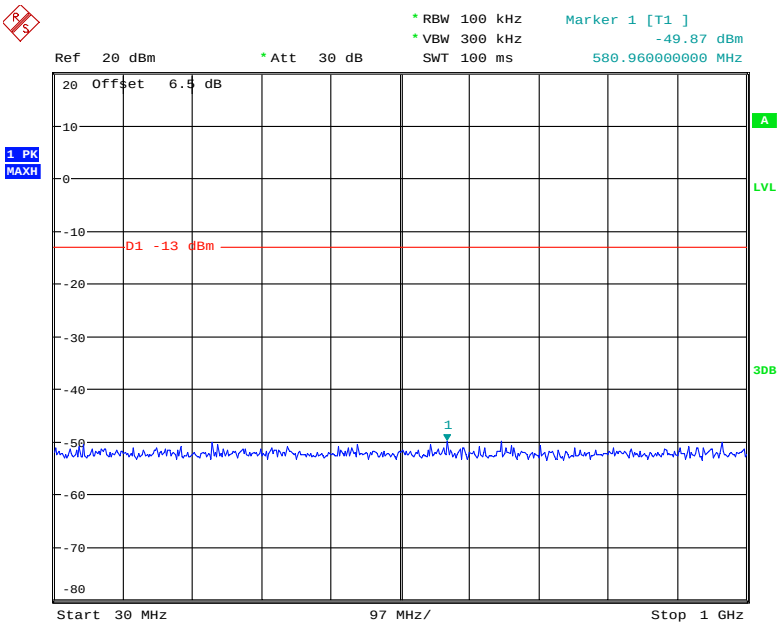
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test

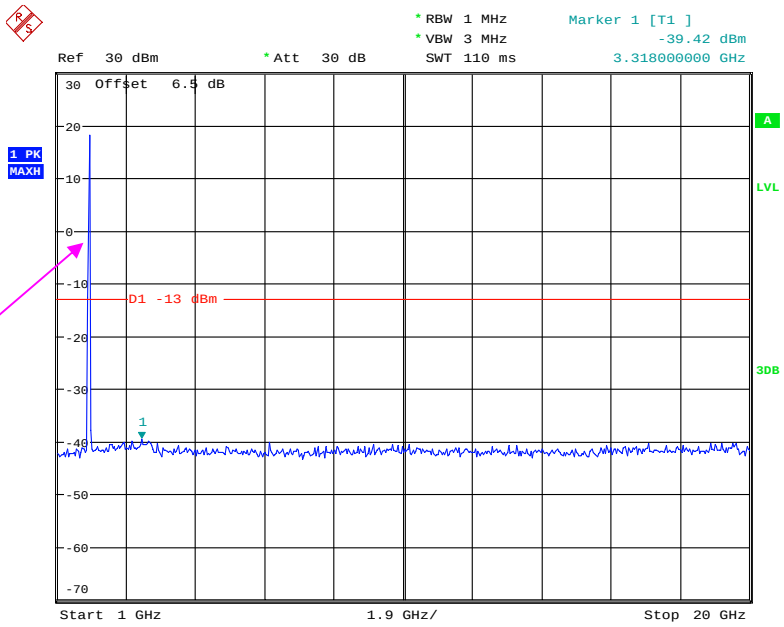
Date: 17.JUN.2020 11:56:19

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



Date: 17.JUN.2020 11:56:44

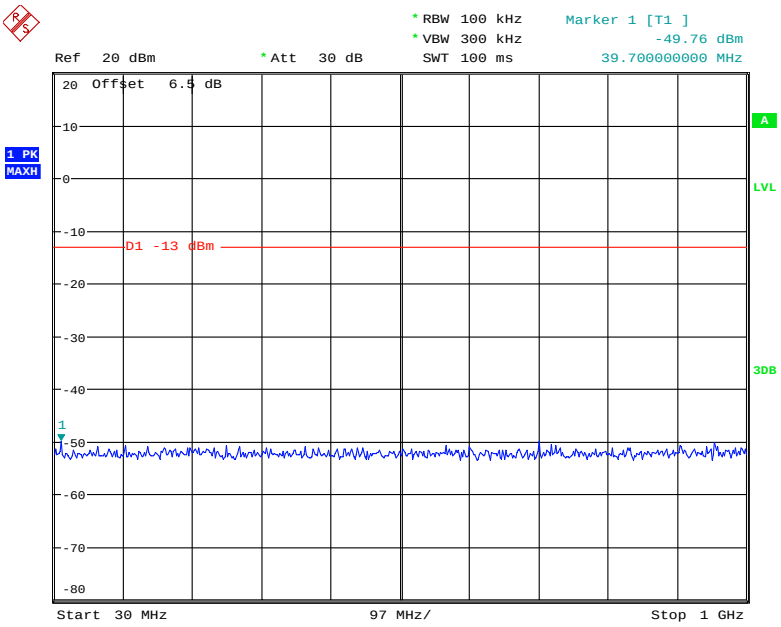
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test

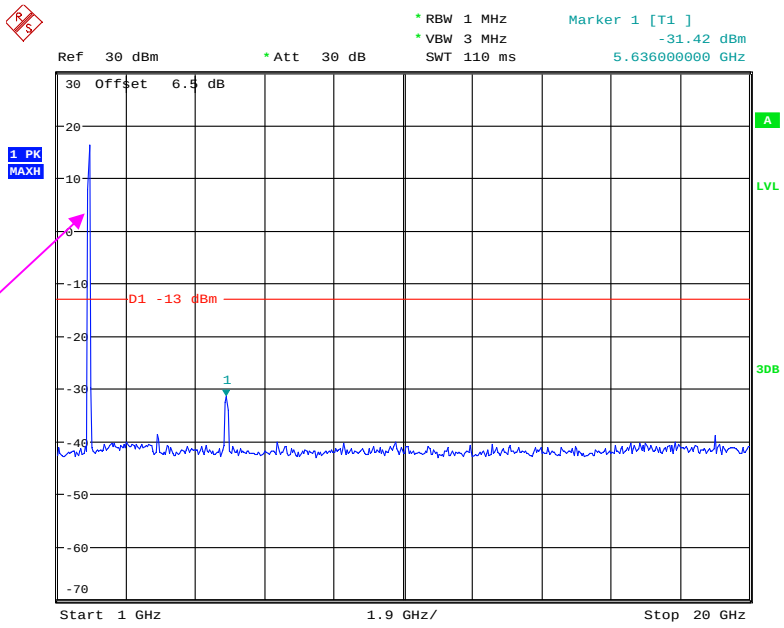
Date: 17.JUN.2020 11:56:54

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



Date: 17.JUN.2020 11:57:19

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

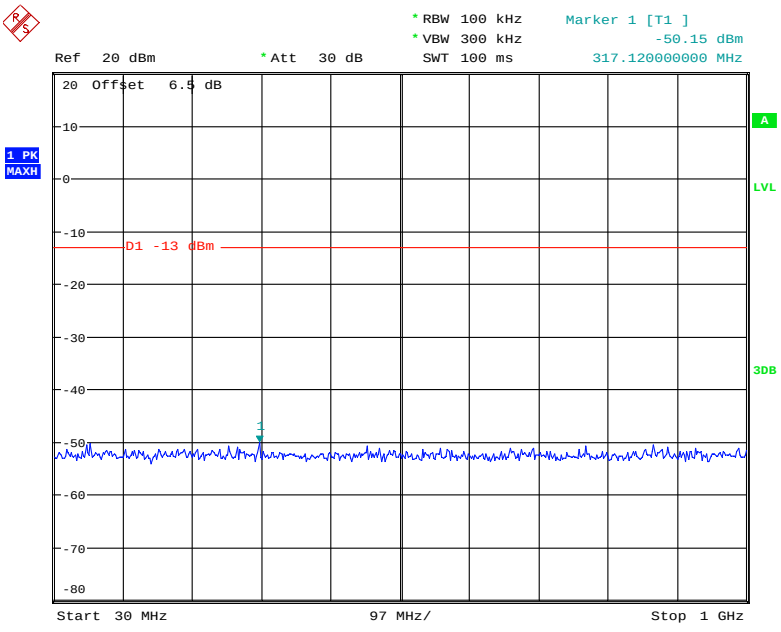


Fundamental test

Date: 17.JUN.2020 11:57:29

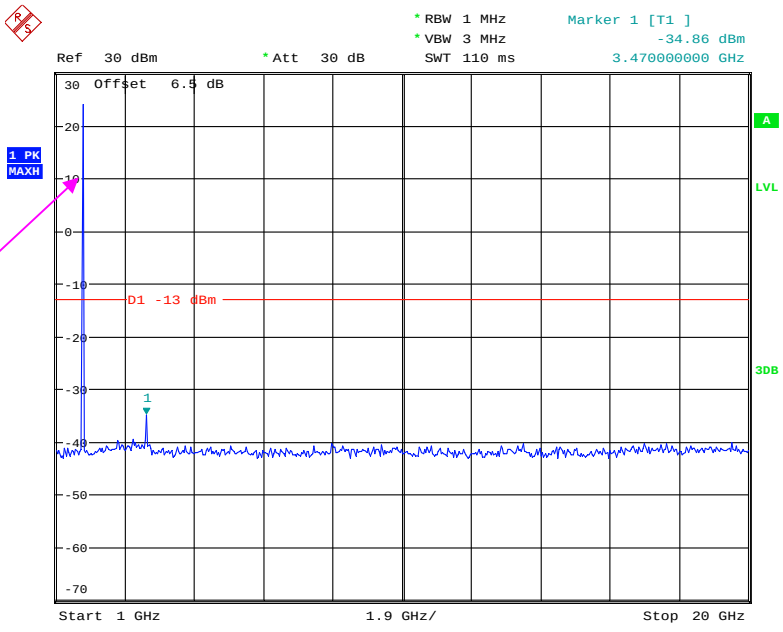
LTE Band 4:

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



Date: 17.JUN.2020 11:57:47

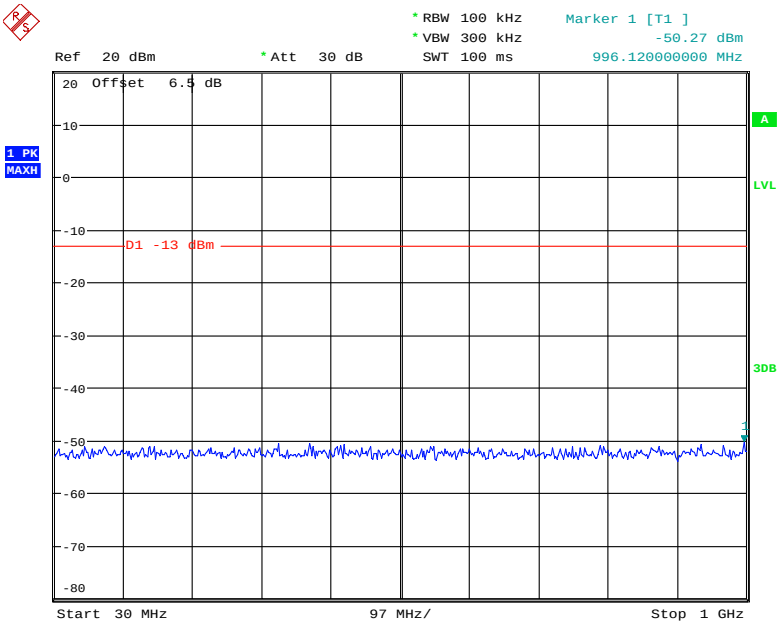
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test

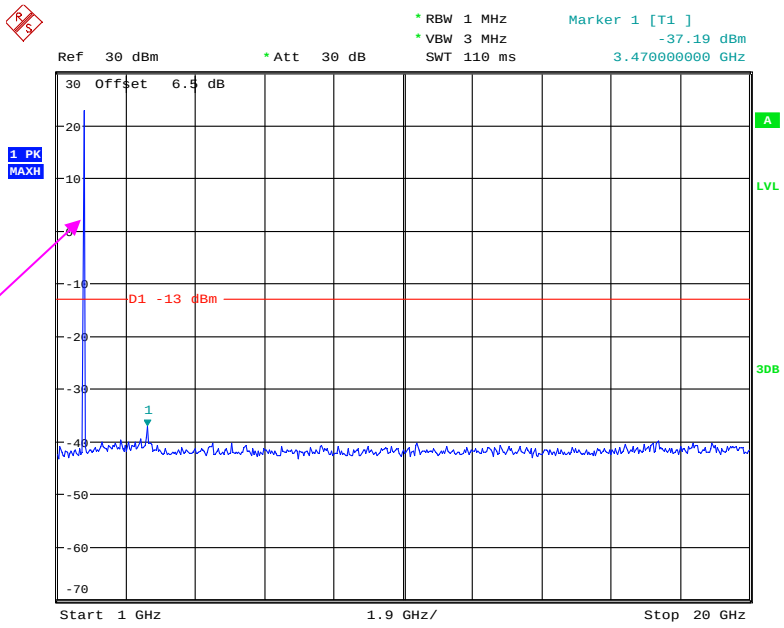
Date: 17.JUN.2020 11:57:58

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



Date: 17.JUN.2020 11:58:15

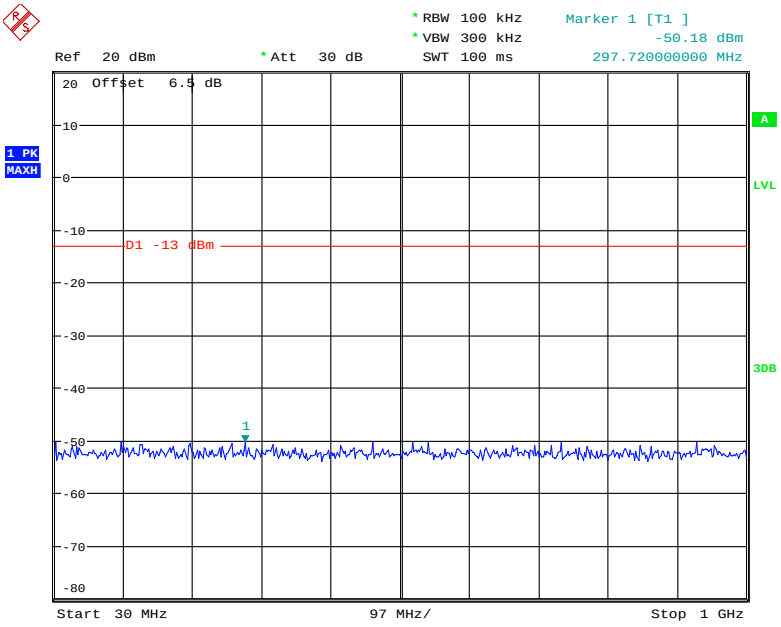
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test

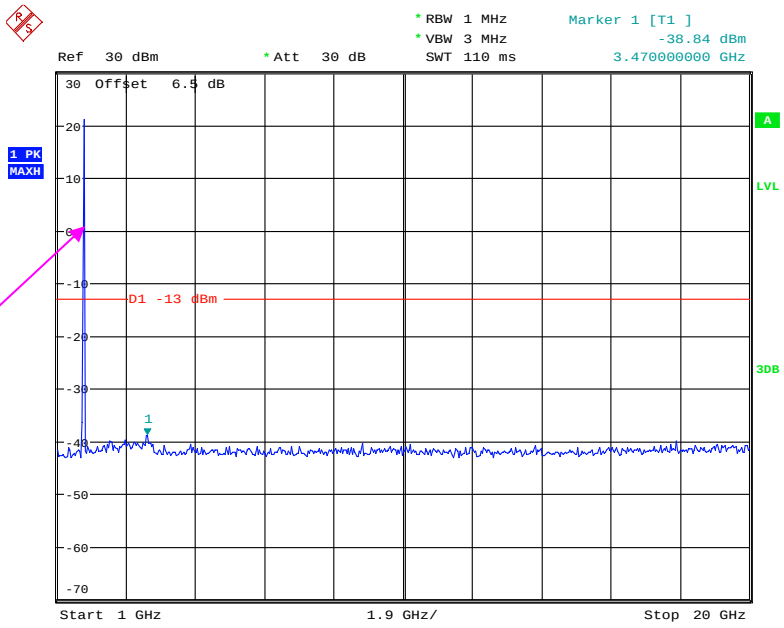
Date: 17.JUN.2020 11:58:26

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



Date: 17.JUN.2020 11:58:43

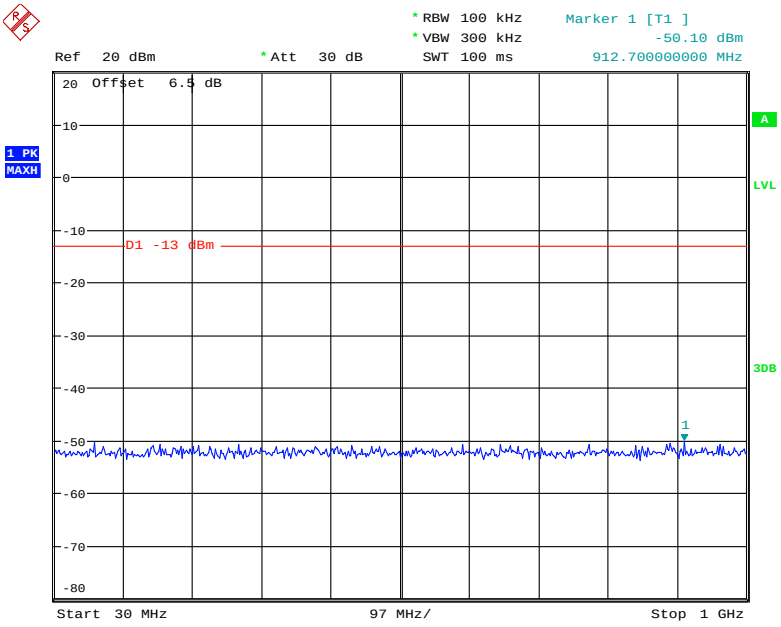
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test

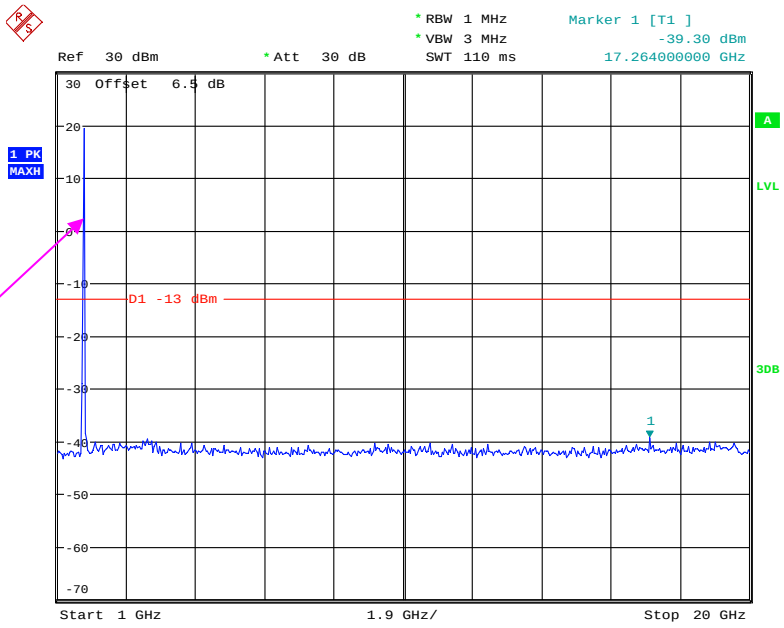
Date: 17.JUN.2020 11:58:54

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



Date: 17.JUN.2020 11:59:15

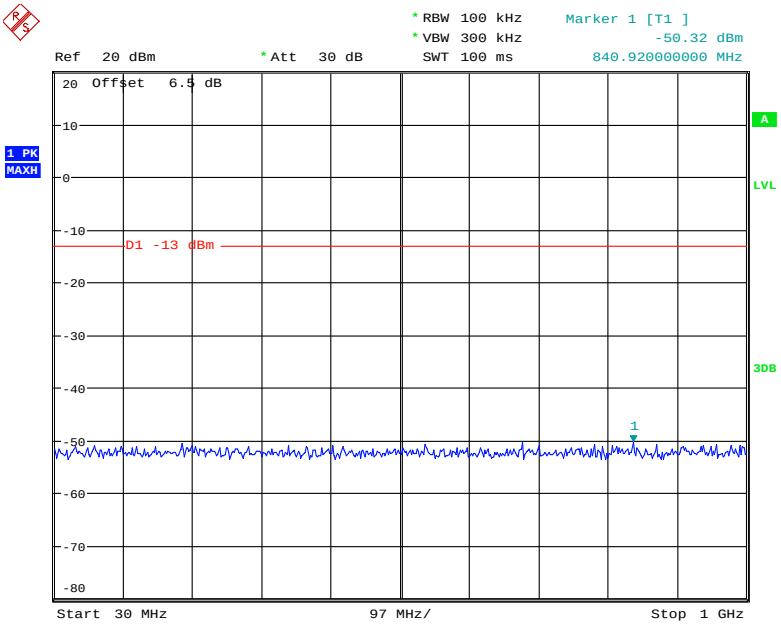
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test

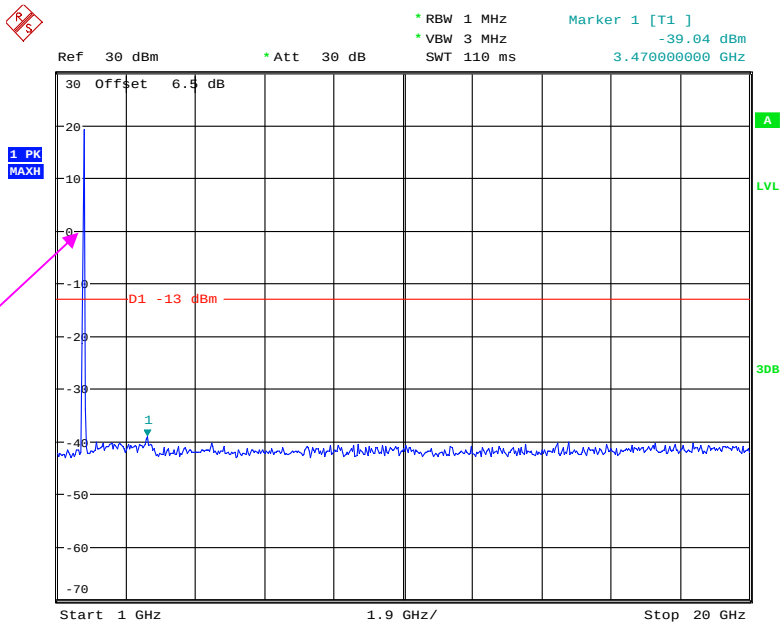
Date: 17.JUN.2020 11:59:26

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



Date: 17.JUN.2020 11:59:50

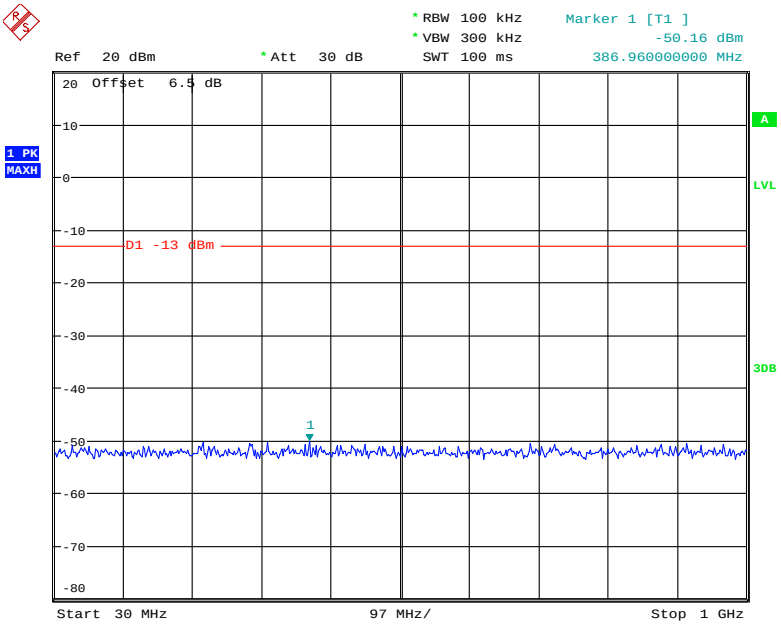
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test

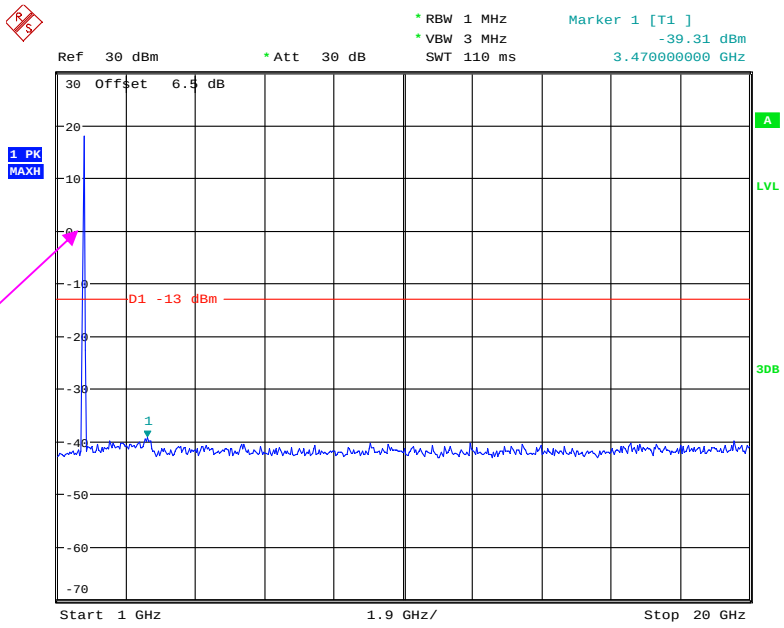
Date: 17.JUN.2020 12:00:00

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



Date: 17.JUN.2020 12:00:25

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

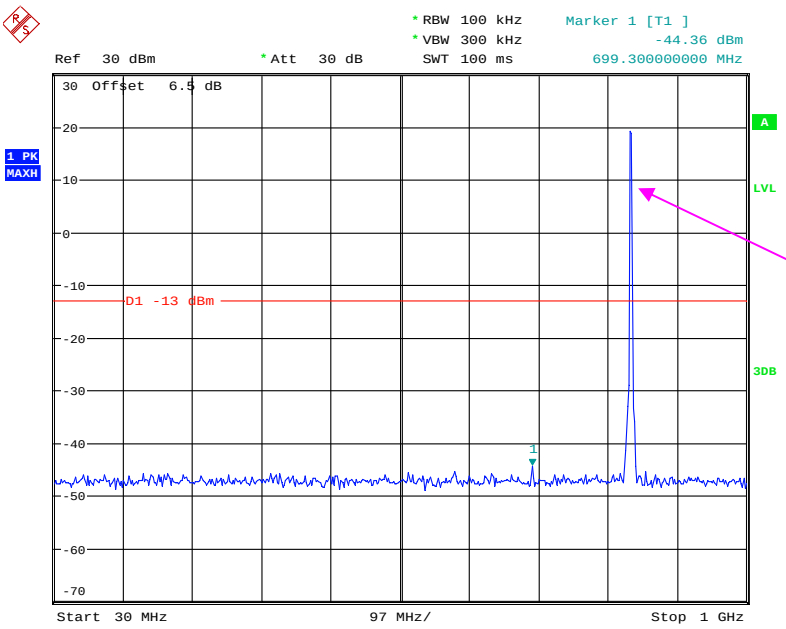


Fundamental test

Date: 17.JUN.2020 12:00:36

LTE Band 5:

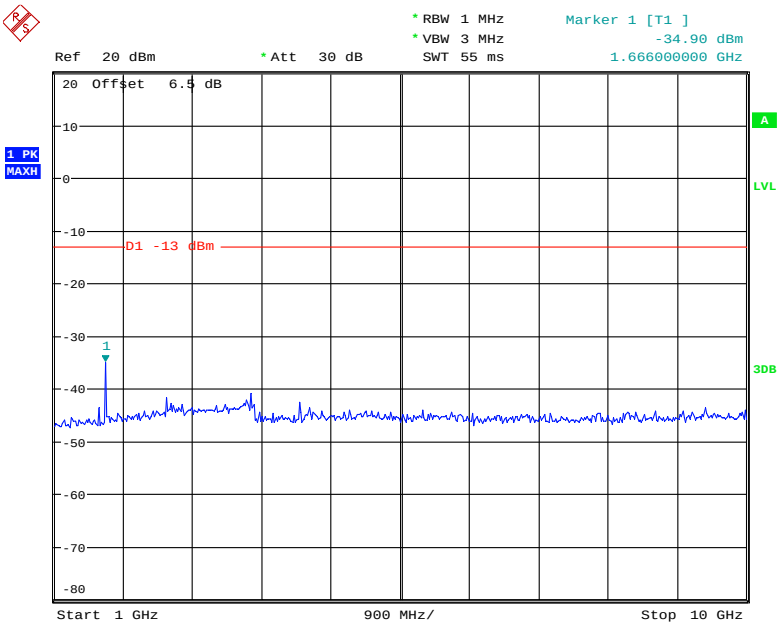
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



Fundamental test

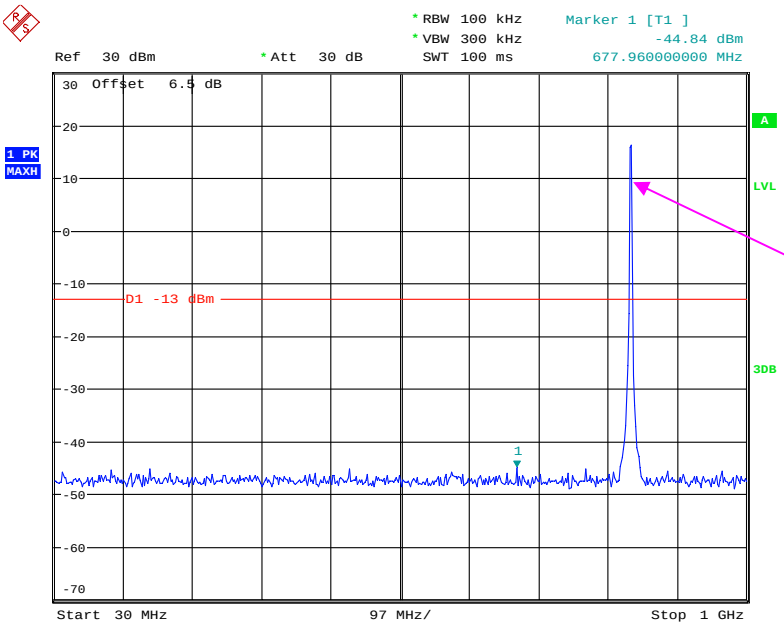
Date: 17.JUN.2020 12:00:56

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



Date: 17.JUN.2020 12:01:07

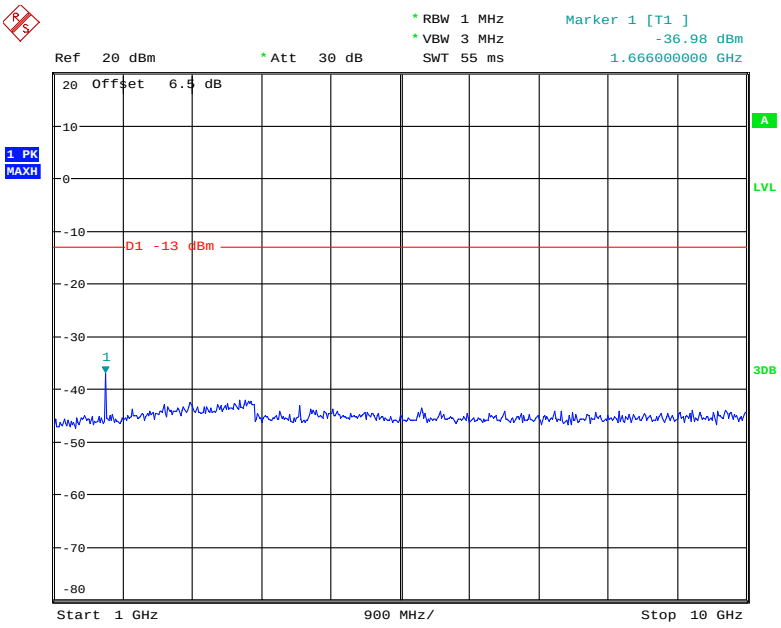
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



Fundamental test

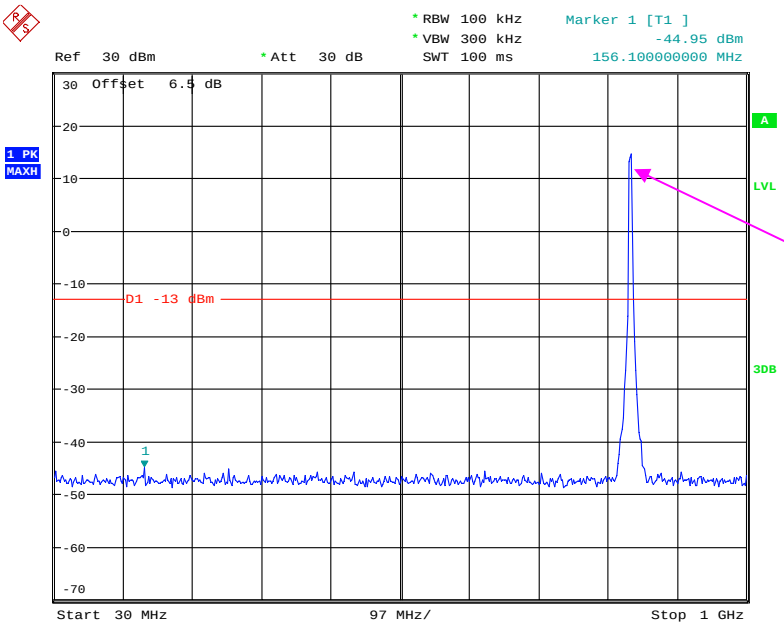
Date: 17.JUN.2020 12:01:25

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



Date: 17.JUN.2020 12:01:36

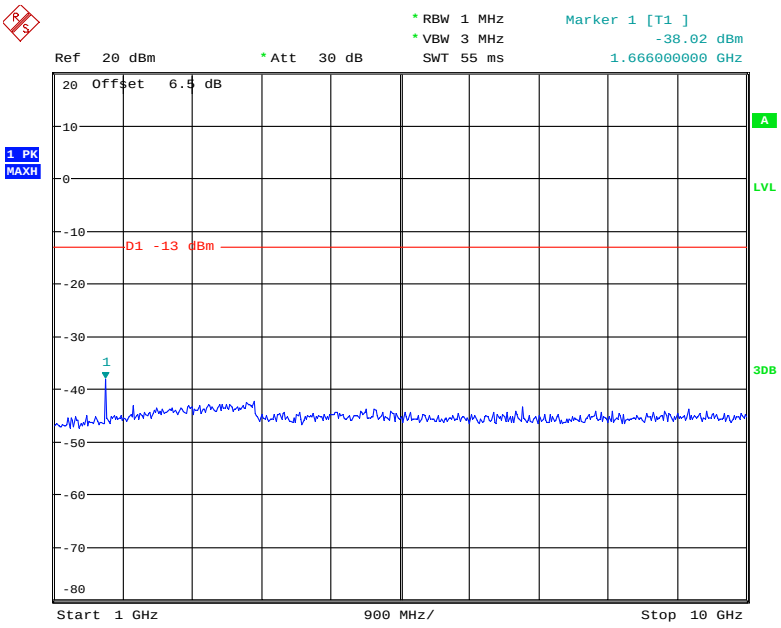
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

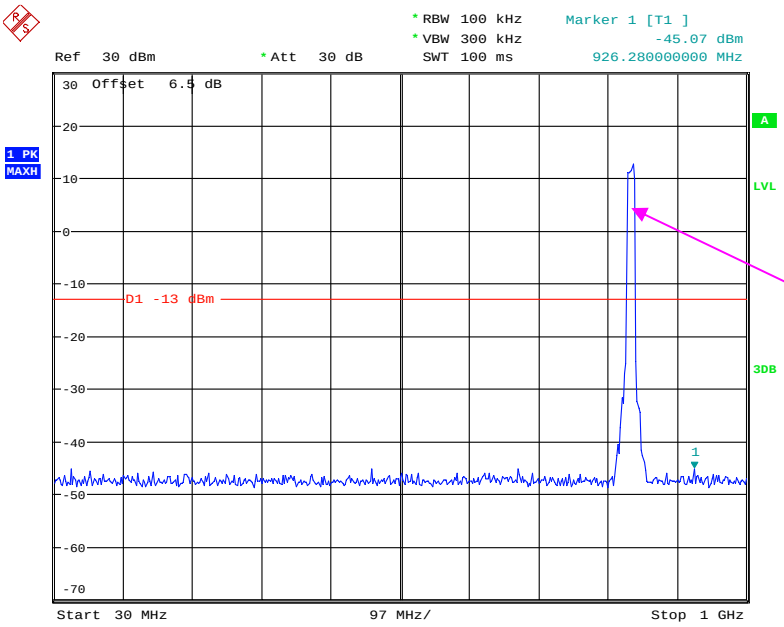
Date: 17.JUN.2020 12:01:53

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



Date: 17.JUN.2020 12:02:03

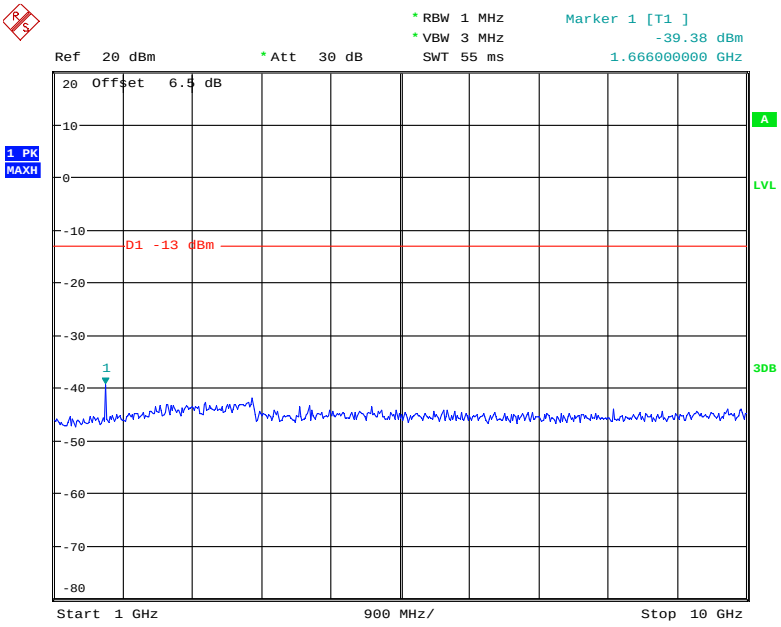
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 17.JUN.2020 12:02:22

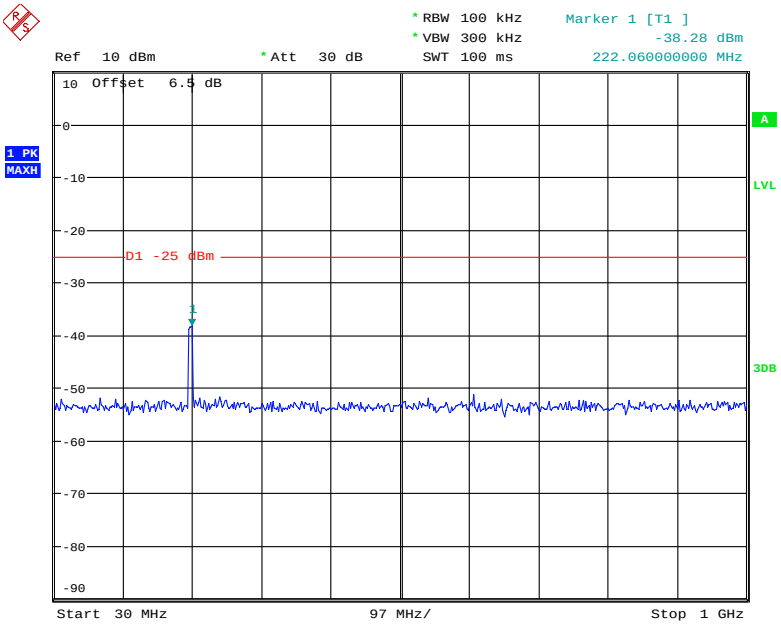
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 17.JUN.2020 12:02:33

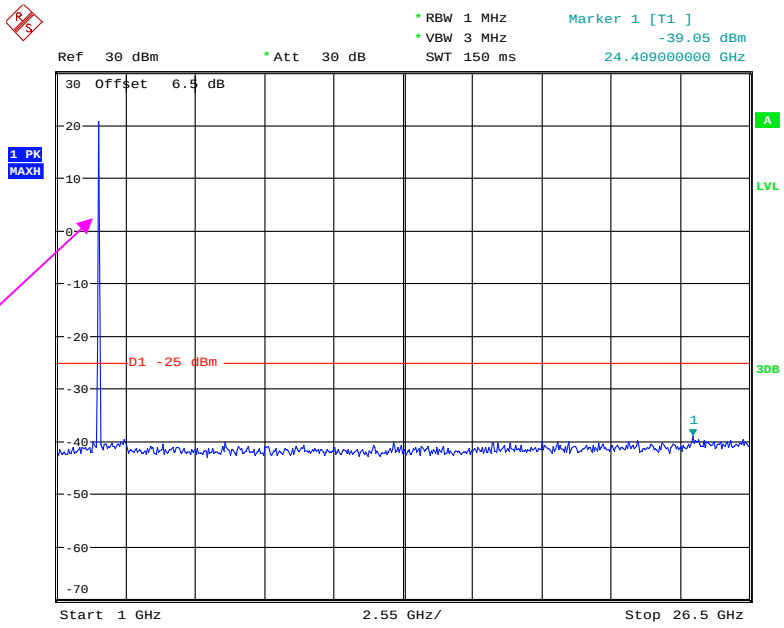
LTE Band 7:

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



Date: 17.JUN.2020 12:02:51

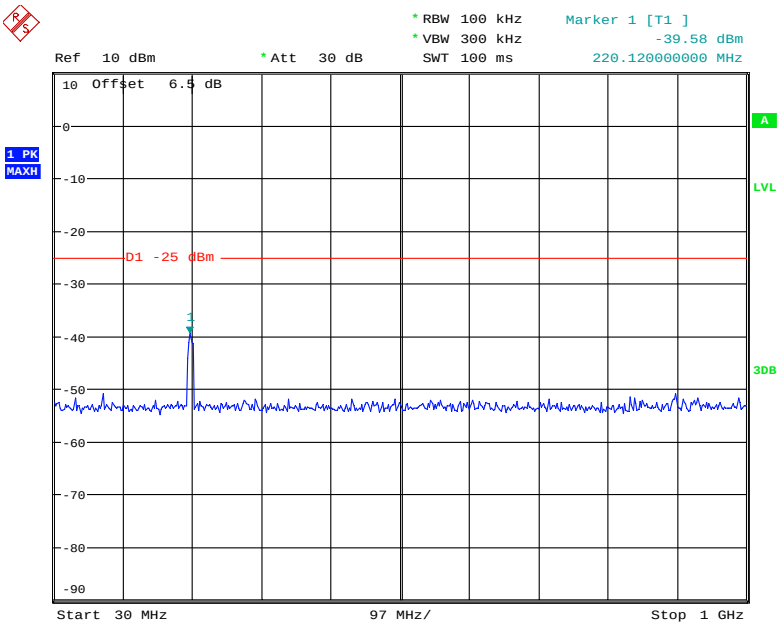
1 GHz – 26.5 GHz (5.0 MHz, Middle Channel)



Fundamental test

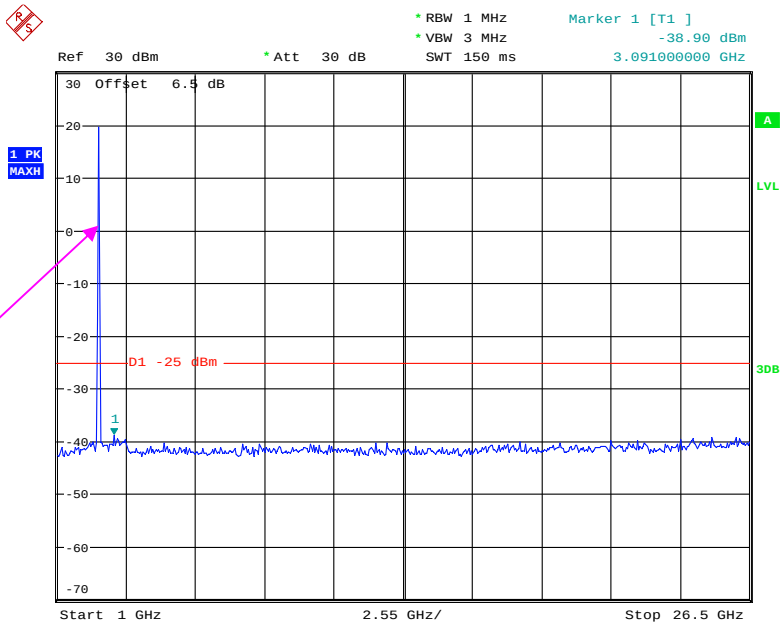
Date: 17.JUN.2020 12:03:01

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



Date: 17.JUN.2020 12:03:23

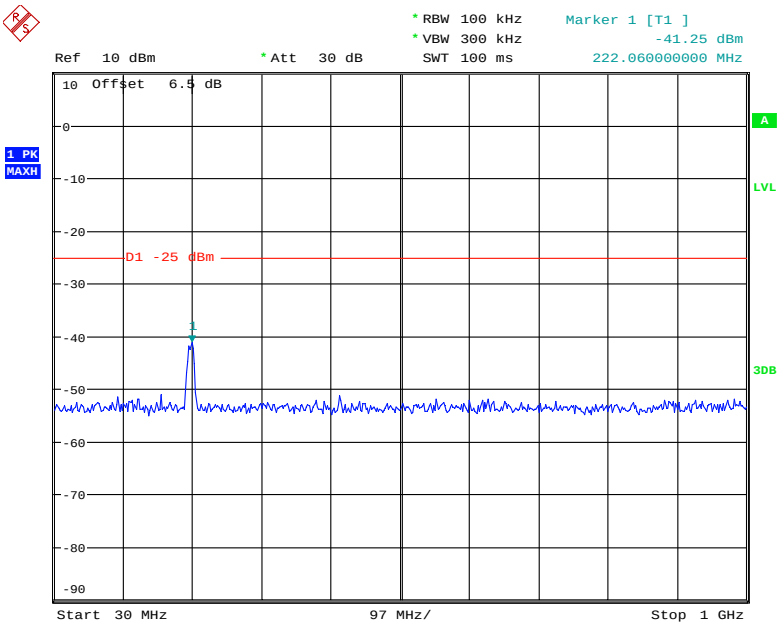
1 GHz – 26.5 GHz (10.0 MHz, Middle Channel)



Fundamental test

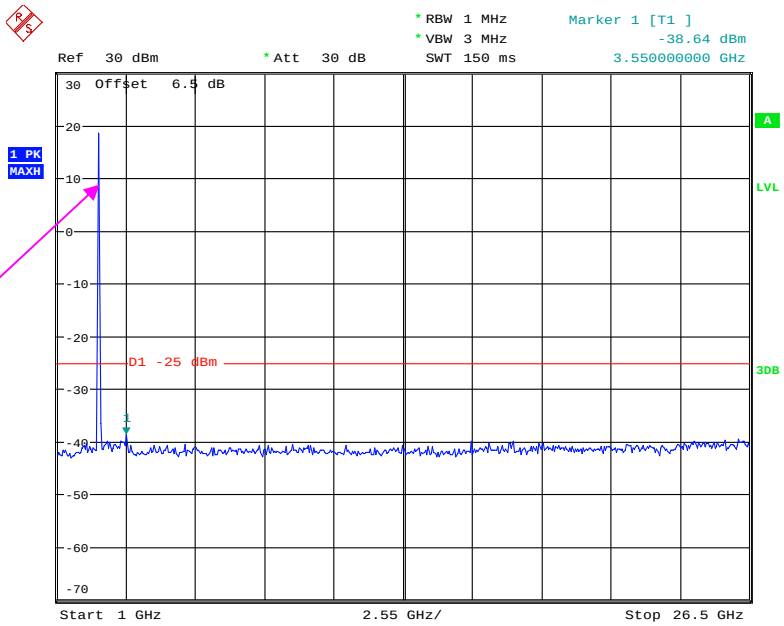
Date: 17.JUN.2020 12:03:34

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



Date: 17.JUN.2020 12:03:55

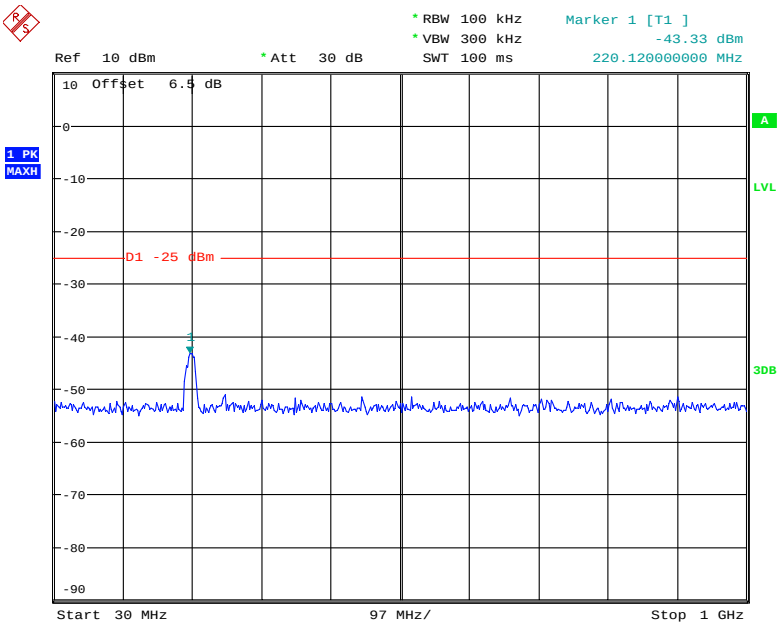
1 GHz – 26.5 GHz (15.0 MHz, Middle Channel)



Fundamental test

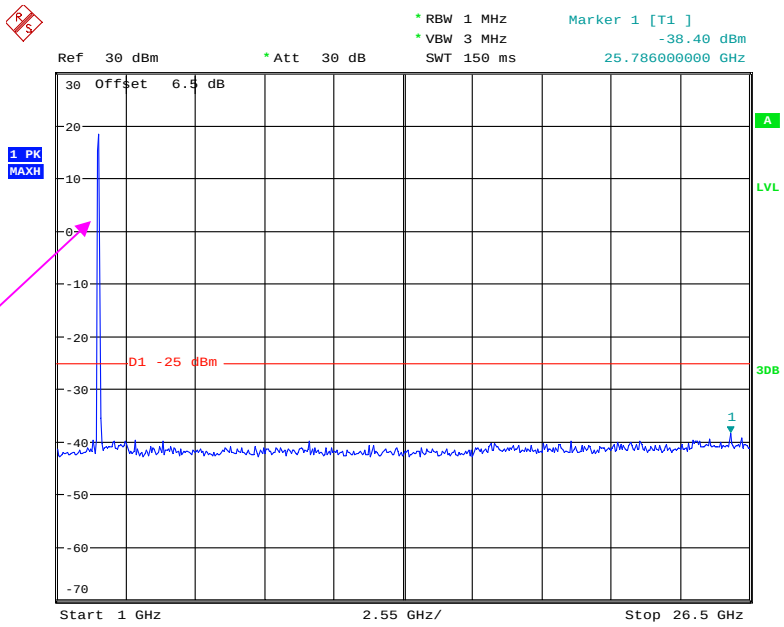
Date: 17.JUN.2020 12:04:05

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



Date: 17.JUN.2020 12:04:26

1 GHz – 26.5 GHz (20.0 MHz, Middle Channel)

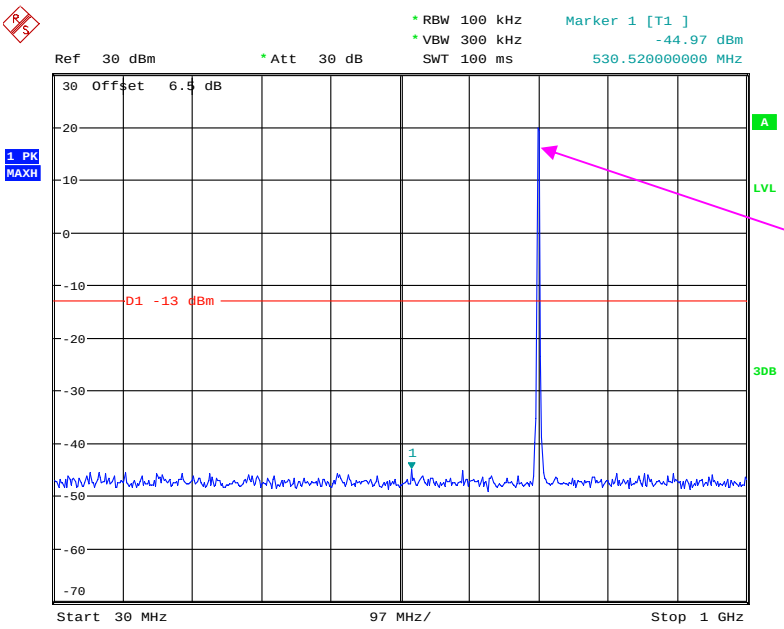


Fundamental test

Date: 17.JUN.2020 12:04:37

LTE Band 12:

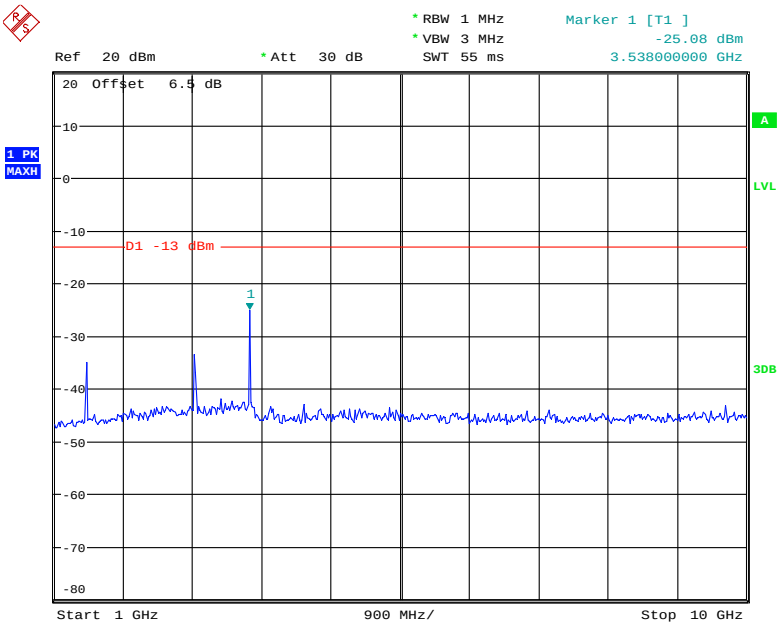
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



Fundamental test

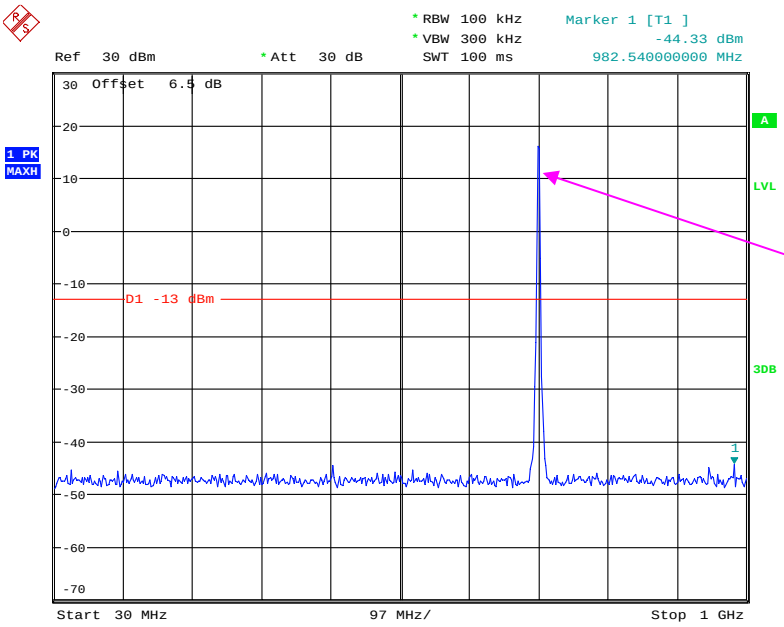
Date: 17.JUN.2020 12:04:54

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



Date: 17.JUN.2020 12:05:05

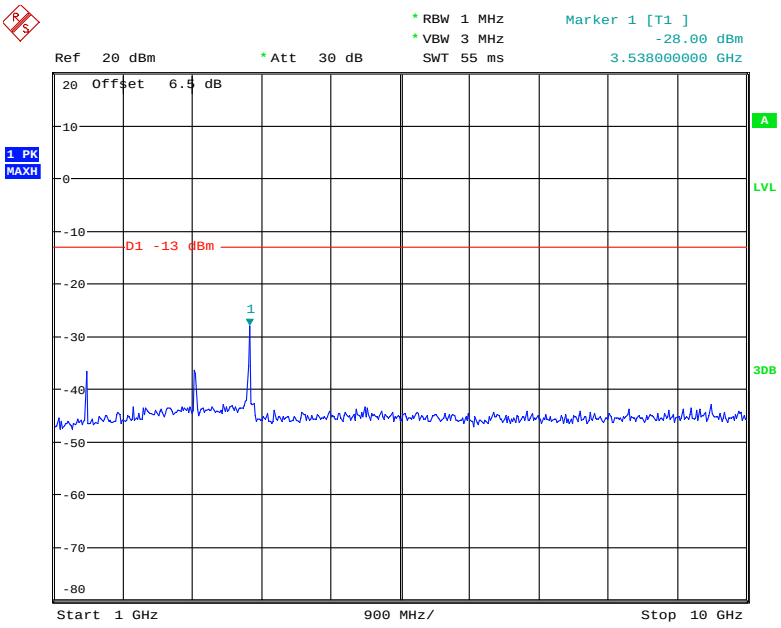
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



Fundamental test

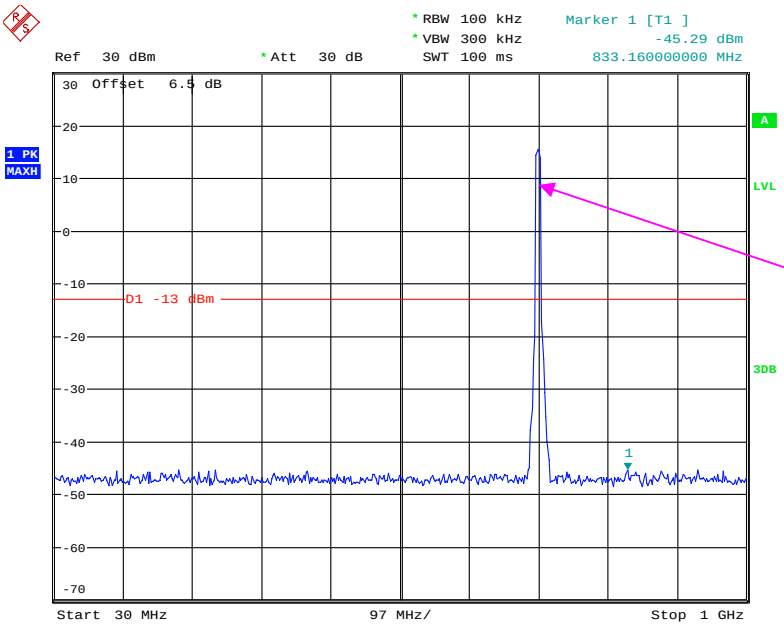
Date: 17.JUN.2020 12:05:23

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



Date: 17.JUN.2020 12:05:33

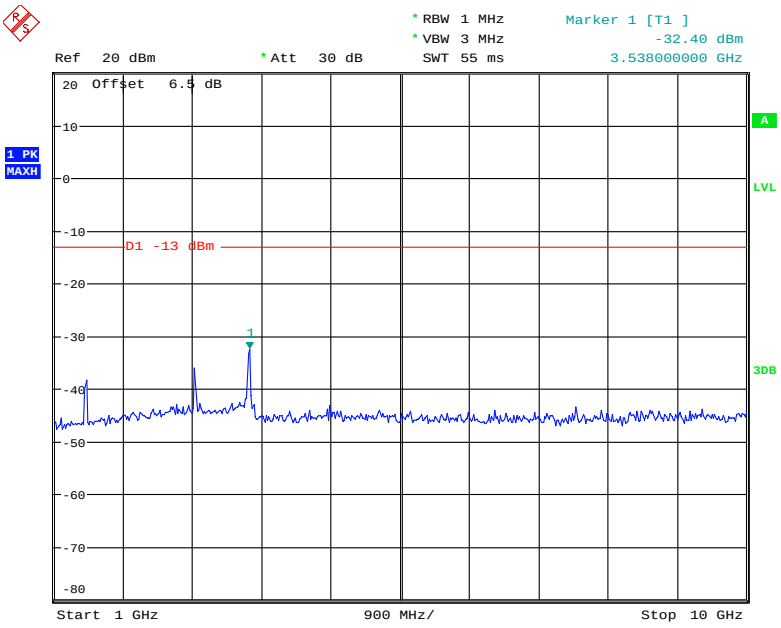
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

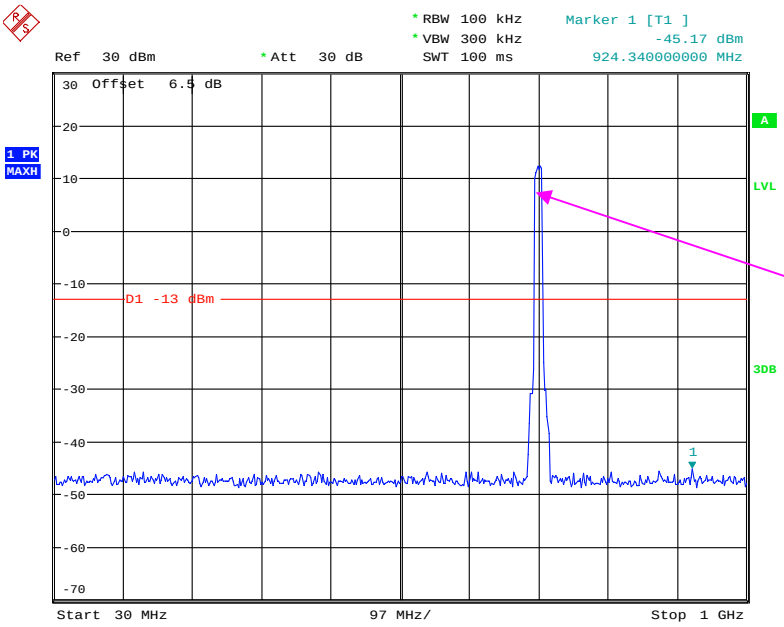
Date: 17.JUN.2020 12:05:54

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



Date: 17.JUN.2020 12:06:05

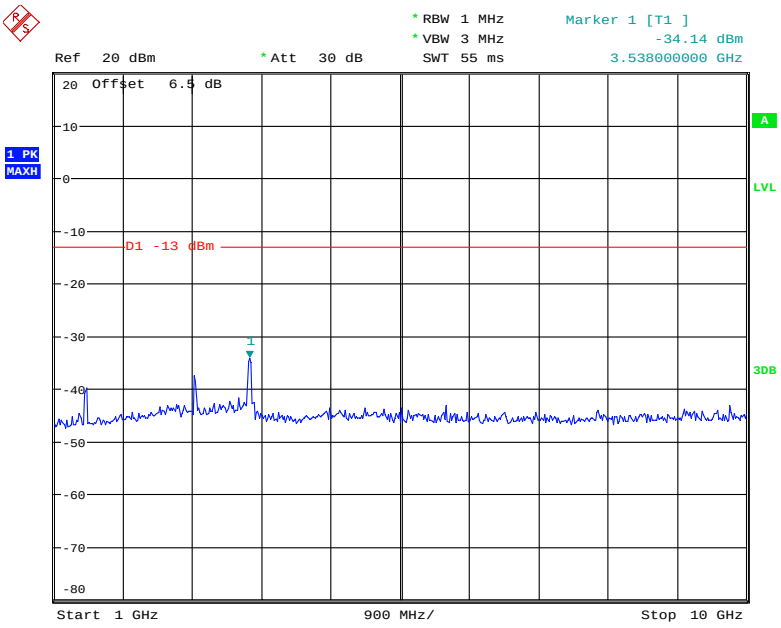
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 17.JUN.2020 12:06:24

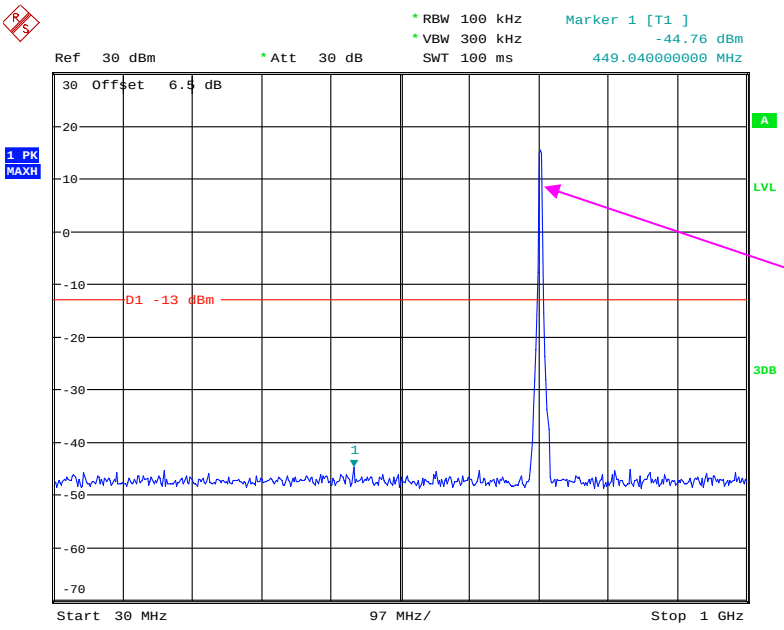
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 17.JUN.2020 12:06:35

LTE Band 17:

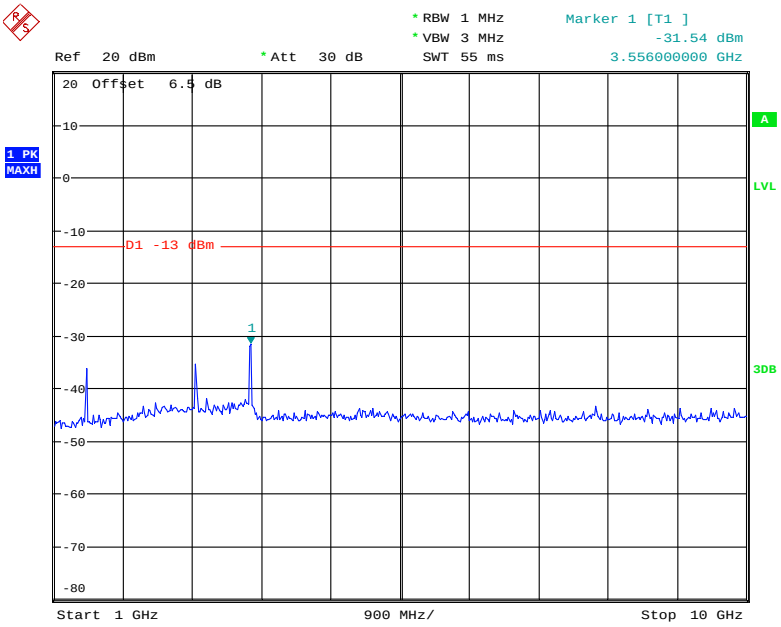
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

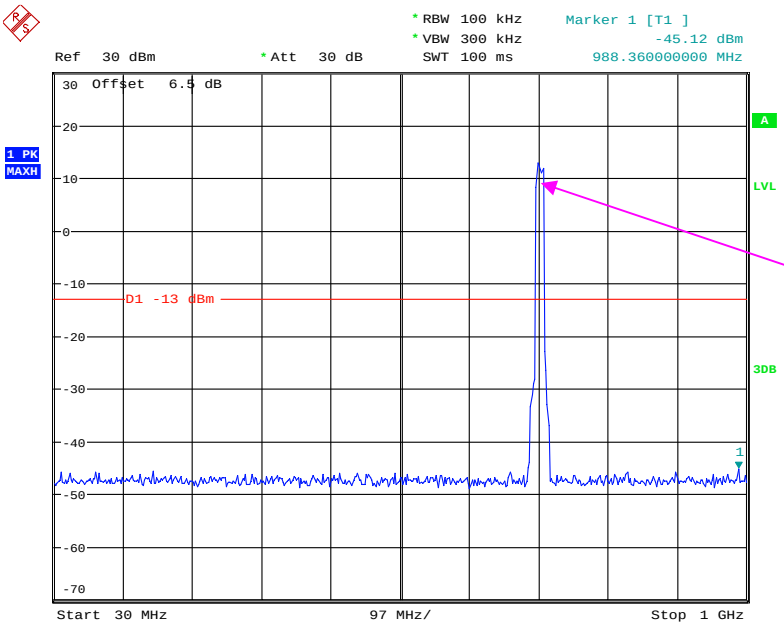
Date: 17.JUN.2020 12:06:53

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



Date: 17.JUN.2020 12:07:03

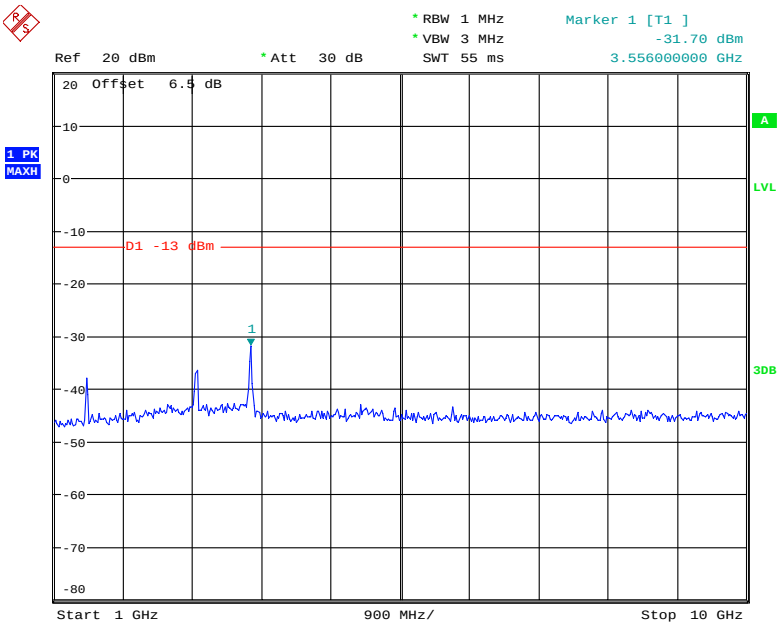
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 17.JUN.2020 12:07:22

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



Date: 17.JUN.2020 12:07:36

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

Applicable Standard

FCC § 2.1053, §22.917(a) and § 24.238(a) 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 receiving 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.

Test Data

Environmental Conditions

Temperature:	24 ℃
Relative Humidity:	54 %
ATM Pressure:	101.0 kPa

The testing was performed by Holland Yang and Leven Gan from 2020-06-17 to 2020-06-18.

EUT operation mode: Transmitting

Pre-scan with Low, Middle and High channel, the worst case as below:

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
959.6	37.57	99	1.1	H	-63.0	1.37	0.0	-64.37	-13	51.37
959.6	38.23	251	2.0	V	-61.1	1.37	0.0	-62.47	-13	49.47
1673.20	54.73	13	1.1	H	-51.6	1.30	8.90	-44.00	-13	31.00
1673.20	50.51	233	1.1	V	-55.2	1.30	8.90	-47.60	-13	34.60
2509.80	58.81	139	1.8	H	-44.5	2.60	10.20	-36.90	-13	23.90
2509.80	59.25	312	2.1	V	-43.5	2.60	10.20	-35.90	-13	22.90
3346.40	48.27	220	1.1	H	-52.6	1.50	11.70	-42.40	-13	29.40
3346.40	48.22	266	1.3	V	-52.7	1.50	11.70	-42.50	-13	29.50
4183.00	48.95	113	2.4	H	-53.0	1.50	11.80	-42.70	-13	29.70
4183.00	48.85	252	2.0	V	-52.3	1.50	11.80	-42.00	-13	29.00
WCDMA Mode, Middle channel										
959.80	36.12	29	1.3	H	-64.5	1.37	0.0	-65.87	-13	52.87
959.80	37.12	61	1.3	V	-62.2	1.37	0.0	-63.57	-13	50.57
1673.20	43.47	142	2.1	H	-62.9	1.30	8.90	-55.30	-13	42.30
1673.20	44.20	213	1.8	V	-61.5	1.30	8.90	-53.90	-13	40.90
2509.80	43.58	346	1.4	H	-59.8	2.60	10.20	-52.20	-13	39.20
2509.80	43.47	81	1.4	V	-59.3	2.60	10.20	-51.70	-13	38.70
3346.40	43.34	134	2.4	H	-57.6	1.50	11.70	-47.40	-13	34.40
3346.40	43.52	303	1.9	V	-57.4	1.50	11.70	-47.20	-13	34.20

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
961.2	37.91	202	1.3	H	-62.7	1.37	0.0	-64.07	-13	51.07
961.2	38.49	322	2.2	V	-60.9	1.37	0.0	-62.27	-13	49.27
3760.00	49.34	272	1.7	H	-52.7	1.50	11.80	-42.40	-13	29.40
3760.00	49.49	104	1.0	V	-52.1	1.50	11.80	-41.80	-13	28.80
5640.00	54.51	162	1.6	H	-45.2	1.70	12.40	-34.50	-13	21.50
5640.00	56.68	339	1.7	V	-42.7	1.70	12.40	-32.00	-13	19.00
7520.00	42.79	234	1.6	H	-53.1	1.90	10.70	-44.30	-13	31.30
7520.00	42.21	105	1.1	V	-53.3	1.90	10.70	-44.50	-13	31.50
9400.00	42.76	348	2.0	H	-54.1	2.20	11.50	-44.80	-13	31.80
9400.00	42.58	93	2.3	V	-54.5	2.20	11.50	-45.20	-13	32.20
WCDMA Mode Band II, Middle channel										
960.6	37.28	139	2.3	H	-63.3	1.37	0.0	-64.67	-13	51.67
960.6	38.84	162	1.8	V	-60.5	1.37	0.0	-61.87	-13	48.87
3760.00	41.67	294	1.8	H	-60.4	1.50	11.80	-50.10	-13	37.10
3760.00	41.34	83	2.2	V	-60.2	1.50	11.80	-49.90	-13	36.90

30 MHz ~ 20 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
958.4	37.08	337	1.7	H	-63.5	1.37	0.0	-64.87	-13	51.87
958.4	38.42	42	1.5	V	-60.9	1.37	0.0	-62.27	-13	49.27
3465.20	42.62	310	1.4	H	-58.1	1.50	12.00	-47.60	-13	34.60
3465.20	42.79	347	1.5	V	-58.7	1.50	12.00	-48.20	-13	35.20

LTE Band: *(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)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
958.7	37.54	243	1.3	H	-63.1	1.37	0.0	-64.47	-13	51.47
958.7	38.26	120	1.8	V	-61.1	1.37	0.0	-62.47	-13	49.47
3760.00	42.91	168	1.6	H	-59.1	1.50	11.80	-48.80	-13	35.80
3760.00	42.67	162	2.1	V	-58.9	1.50	11.80	-48.60	-13	35.60
Band 4 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
961.3	37.48	201	2.0	H	-63.1	1.37	0.0	-64.47	-13	51.47
961.3	38.15	223	1.5	V	-61.2	1.37	0.0	-62.57	-13	49.57
3465.00	42.14	65	1.8	H	-58.6	1.50	12.00	-48.10	-13	35.10
3465.00	42.56	191	2.5	V	-58.9	1.50	12.00	-48.40	-13	35.40
Band 5 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 10 GHz										
959.4	37.63	284	2.0	H	-63.0	1.37	0.0	-64.37	-13	51.37
959.4	38.52	38	2.3	V	-60.8	1.37	0.0	-62.17	-13	49.17
1673.00	43.10	33	2.3	H	-63.2	1.30	8.90	-55.60	-13	42.60
1673.00	42.81	139	2.3	V	-62.9	1.30	8.90	-55.30	-13	42.30
Band 7 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
962.5	37.34	154	1.2	H	-63.3	1.37	0.0	-64.67	-25	39.67
962.5	38.78	159	2.3	V	-60.6	1.37	0.0	-61.97	-25	36.97
5070.00	43.70	343	1.0	H	-57.2	1.60	12.10	-46.70	-25	21.70
5070.00	42.89	284	2.3	V	-58.0	1.60	12.10	-47.50	-25	22.50
Band 12 (1.4 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
961.7	37.39	173	1.8	H	-63.2	1.37	0.0	-64.57	-13	51.57
961.7	38.46	5	1.8	V	-60.9	1.37	0.0	-62.27	-13	49.27
1415.00	42.51	243	1.5	H	-65.7	1.60	7.90	-59.40	-13	46.40
1415.00	42.33	303	2.1	V	-66.1	1.60	7.90	-59.80	-13	46.80
Band 17 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
963.2	37.41	102	2.4	H	-63.2	1.37	0.0	-64.57	-13	51.57
963.2	38.27	255	2.5	V	-61.1	1.37	0.0	-62.47	-13	49.47
1420.00	43.22	163	1.1	H	-65.0	1.60	7.90	-58.70	-13	45.70
1420.00	43.46	260	2.4	V	-65.0	1.60	7.90	-58.70	-13	45.70

Note:
Absolute Level = Substituted Level - Cable loss + Antenna Gain
Margin = Limit- Absolute Level
dBd is for the ERP, dBi is for EIRP.

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

Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

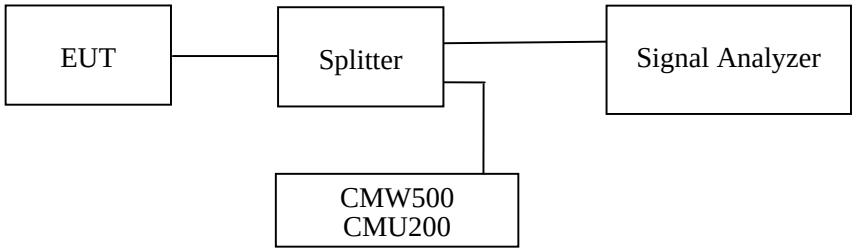
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

Test Procedure

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

The center of the spectrum analyzer was set to block edge frequency



Test Data

Environmental Conditions

Temperature:	23 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

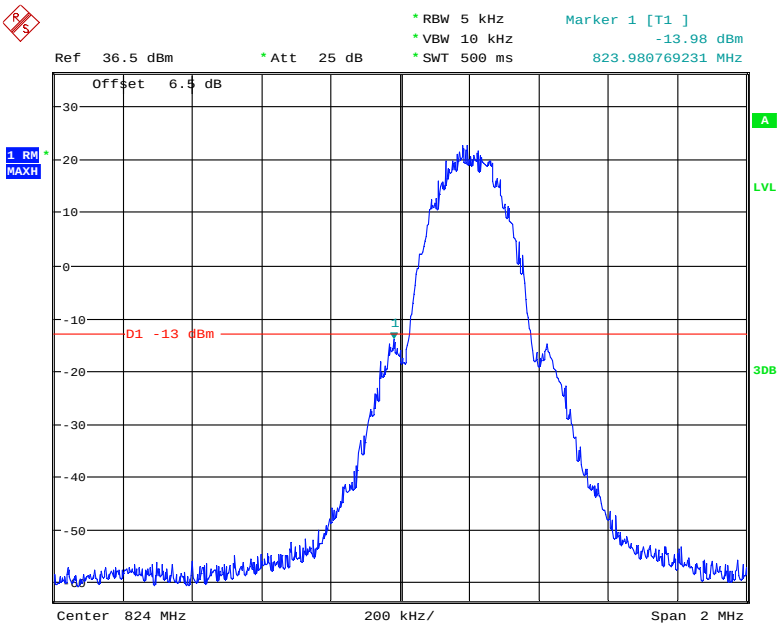
The testing was performed by Gavin Guo from 2020-06-17 to 2020-06-18.

EUT operation mode: Transmitting

Test Result: Pass

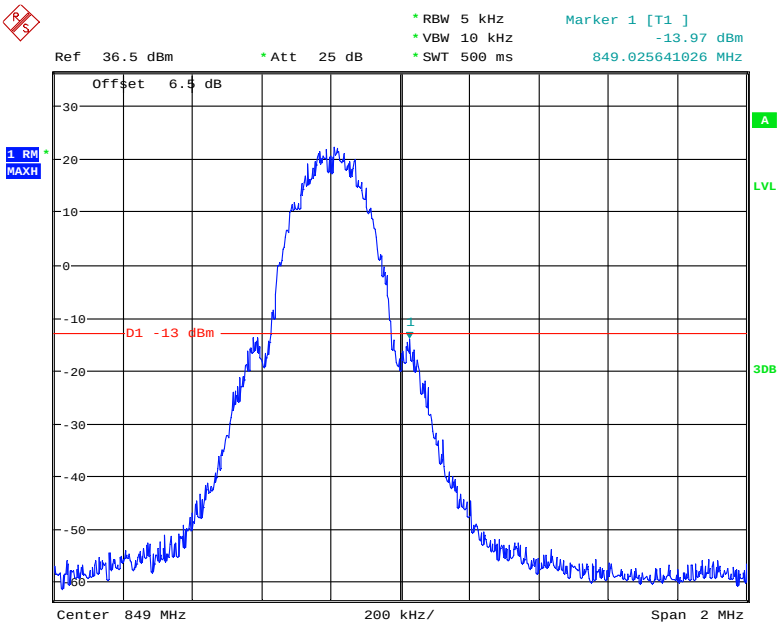
Please refer to the following plots.

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



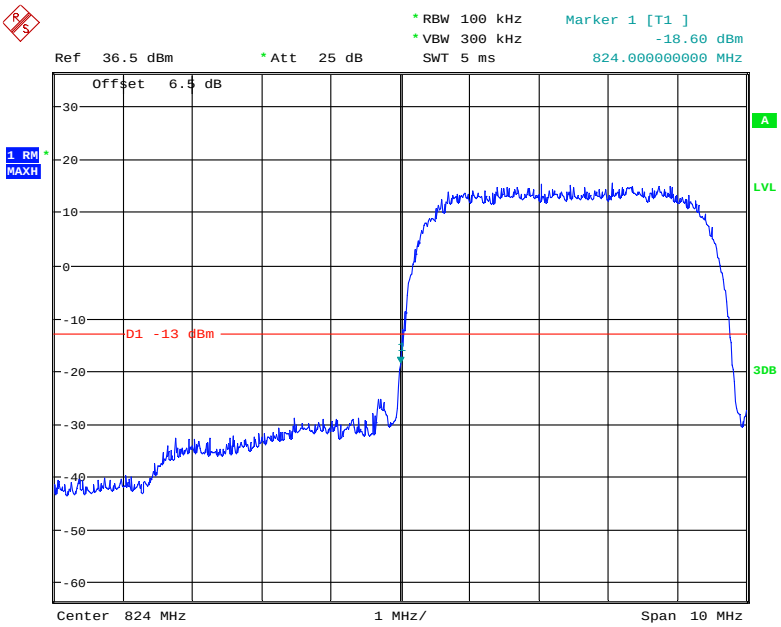
Date: 17.JUN.2020 20:48:28

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



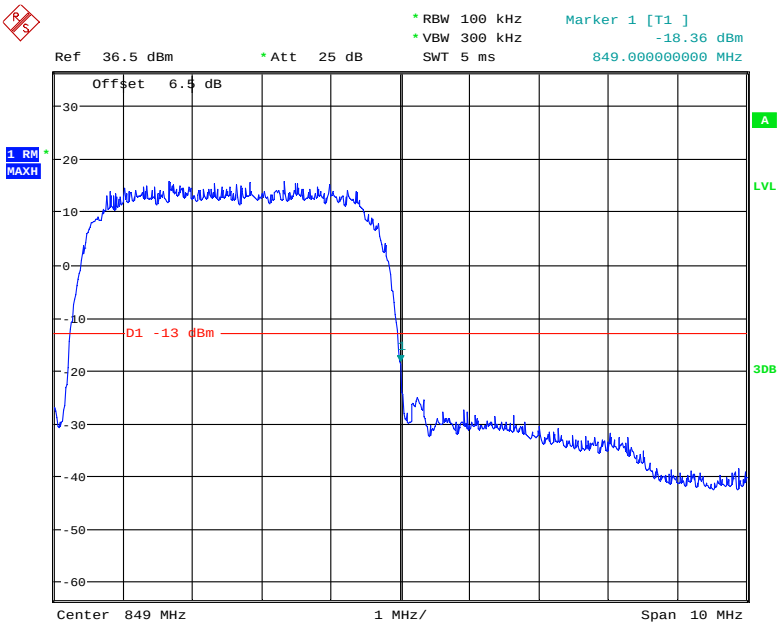
Date: 17.JUN.2020 20:49:14

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



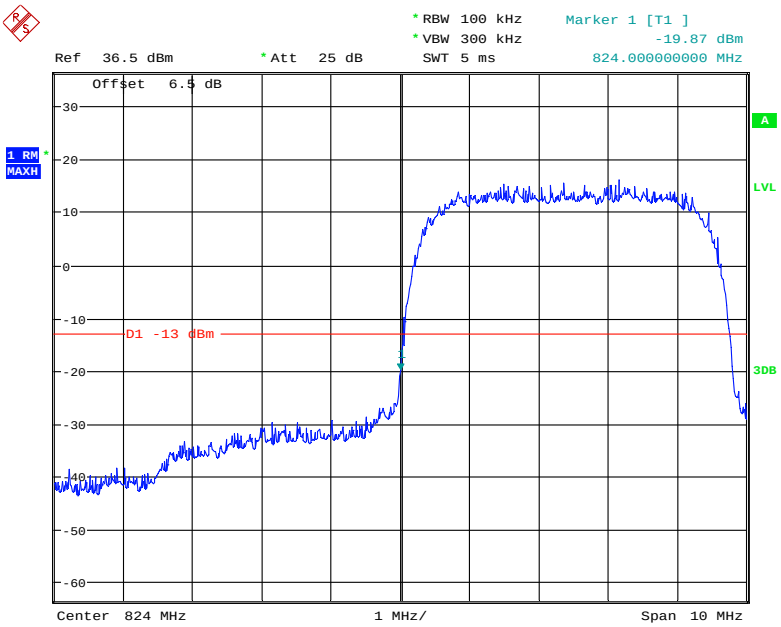
Date: 17.JUN.2020 22:26:12

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



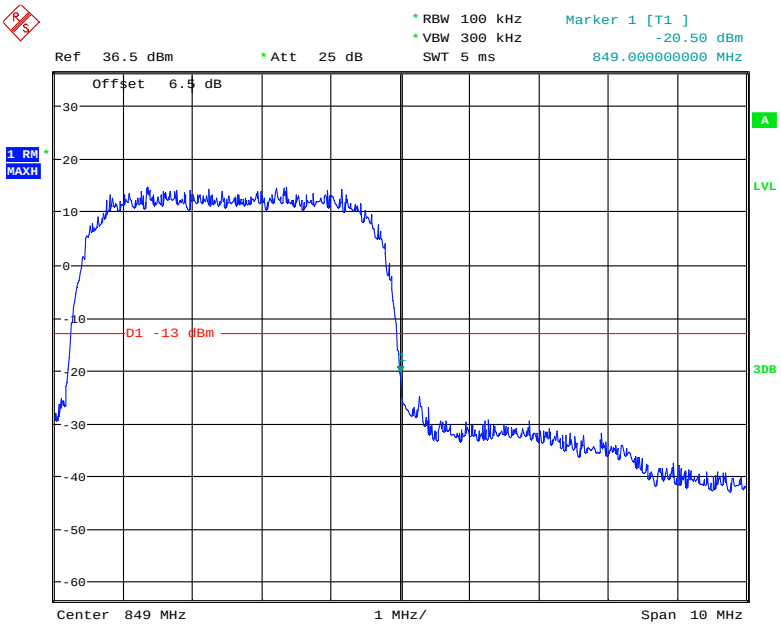
Date: 17.JUN.2020 22:26:42

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



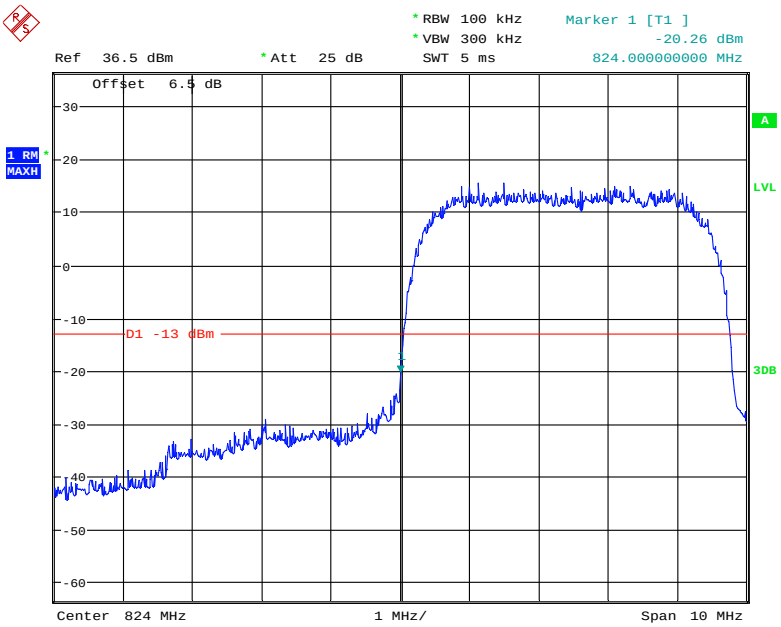
Date: 17.JUN.2020 22:36:37

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



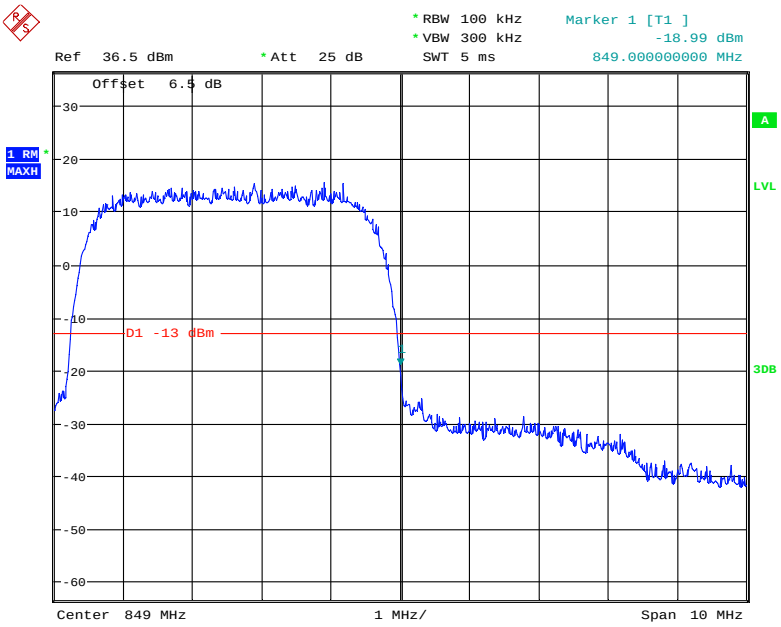
Date: 17.JUN.2020 22:37:04

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



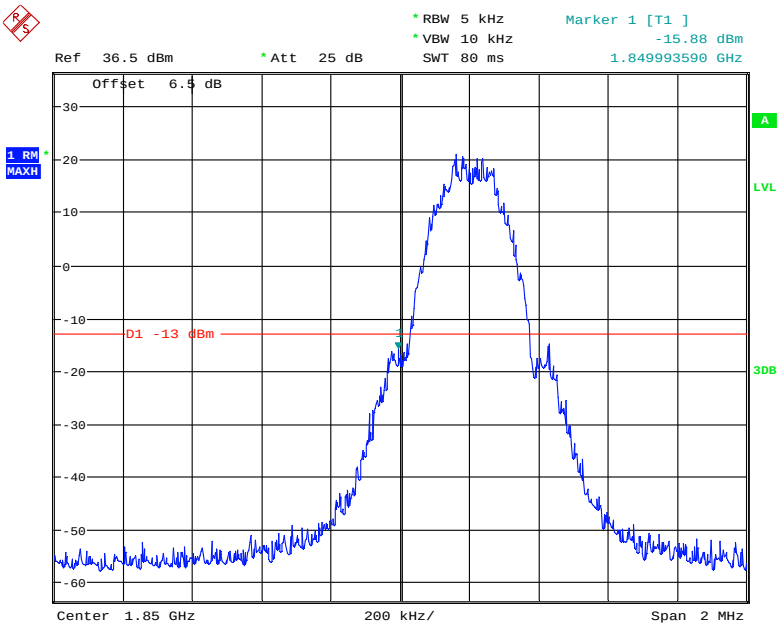
Date: 17.JUN.2020 22:38:18

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



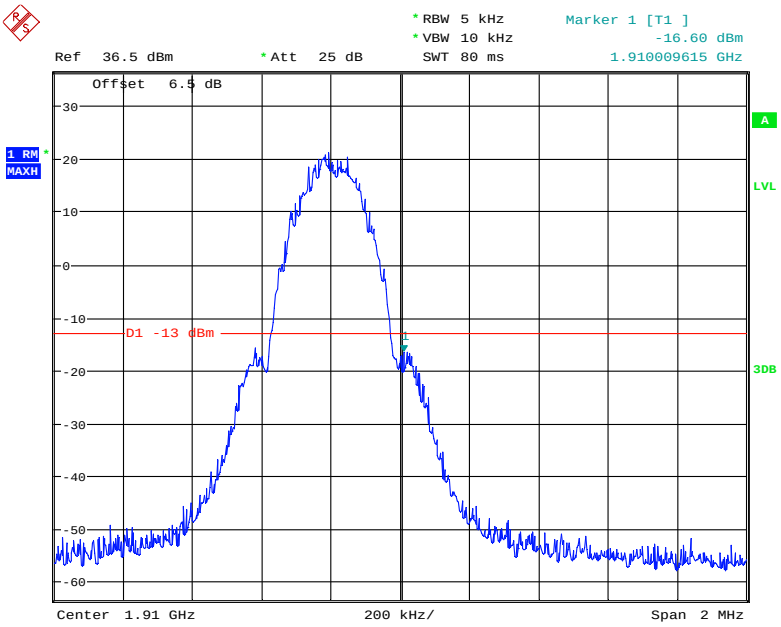
Date: 17.JUN.2020 22:37:56

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



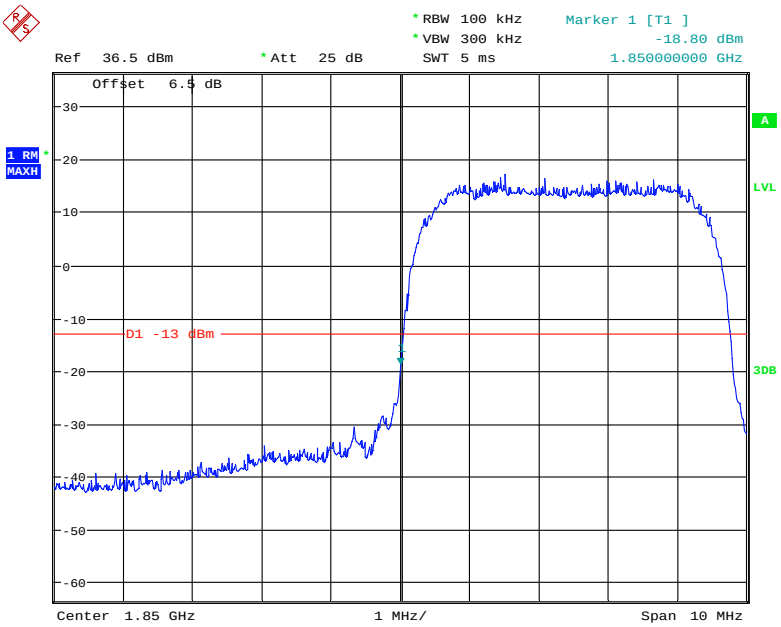
Date: 17.JUN.2020 21:04:35

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



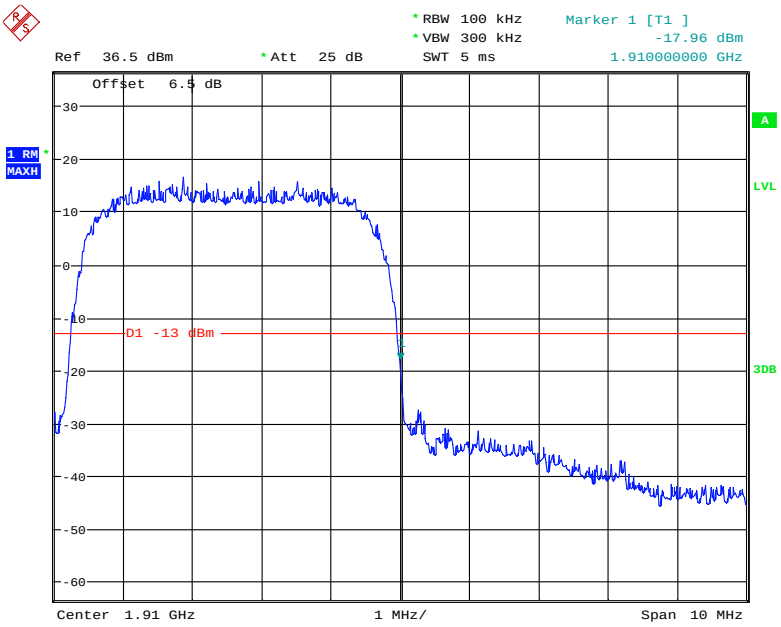
Date: 17.JUN.2020 21:05:21

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



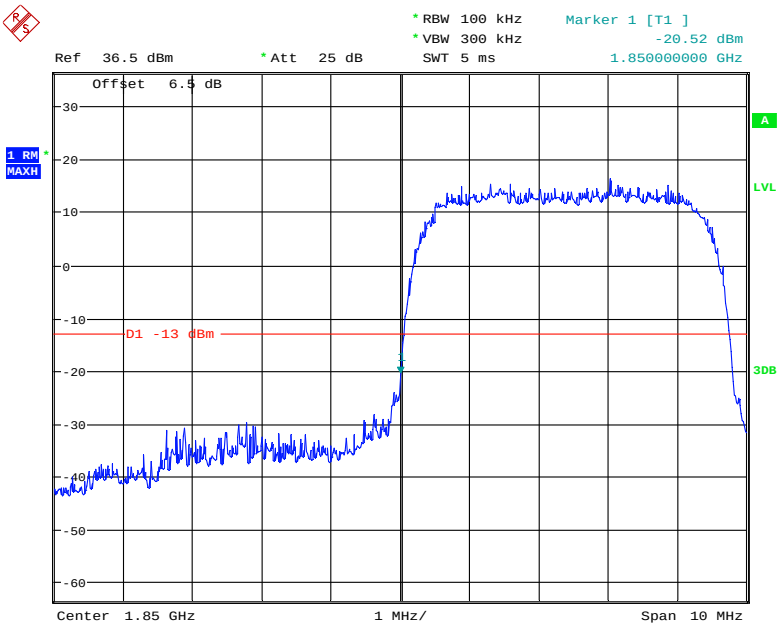
Date: 17.JUN.2020 21:53:05

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



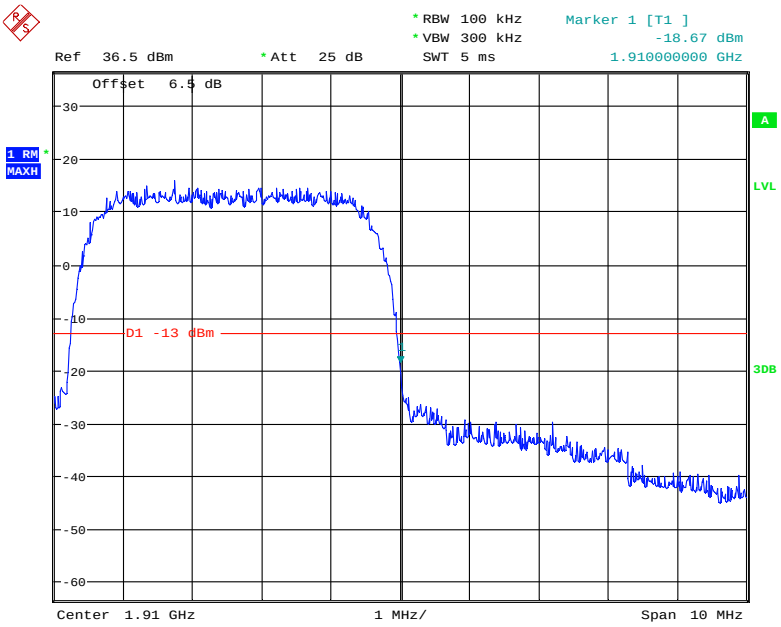
Date: 17.JUN.2020 21:53:36

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



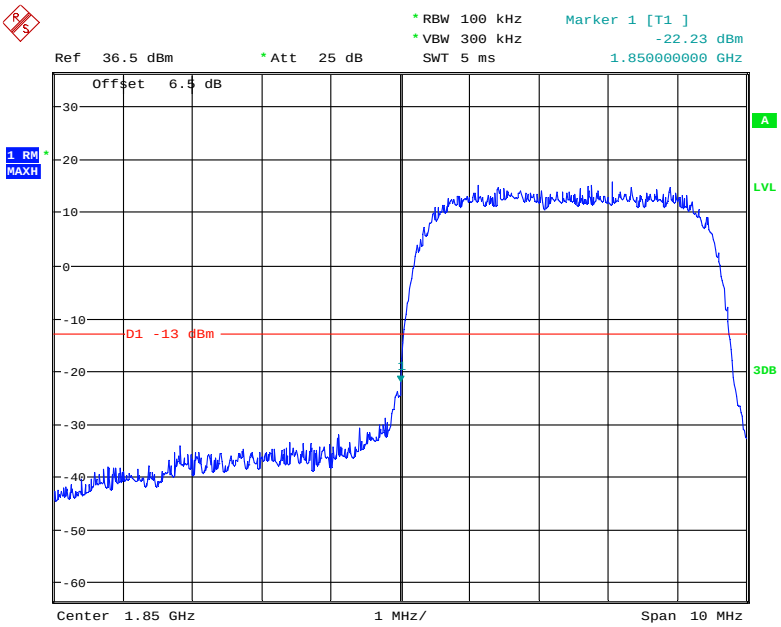
Date: 17.JUN.2020 22:05:11

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



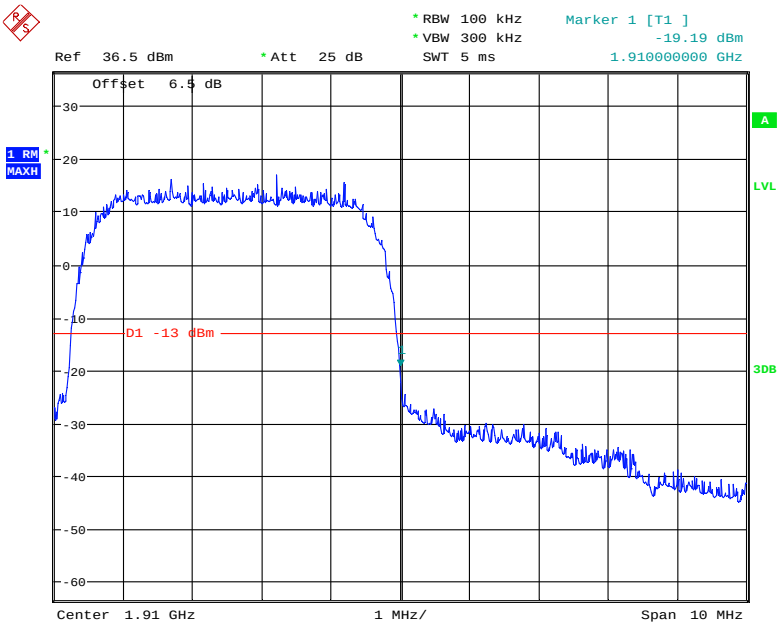
Date: 17.JUN.2020 22:05:35

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



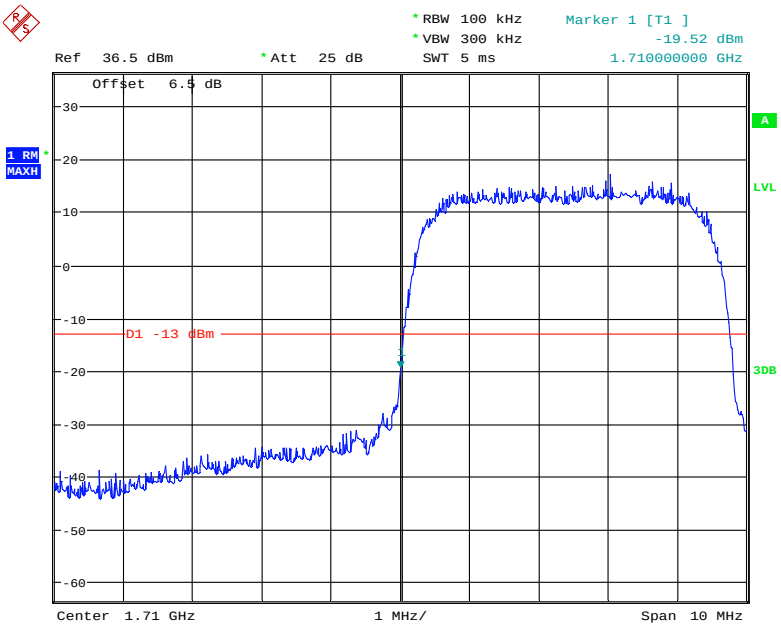
Date: 17.JUN.2020 22:06:46

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



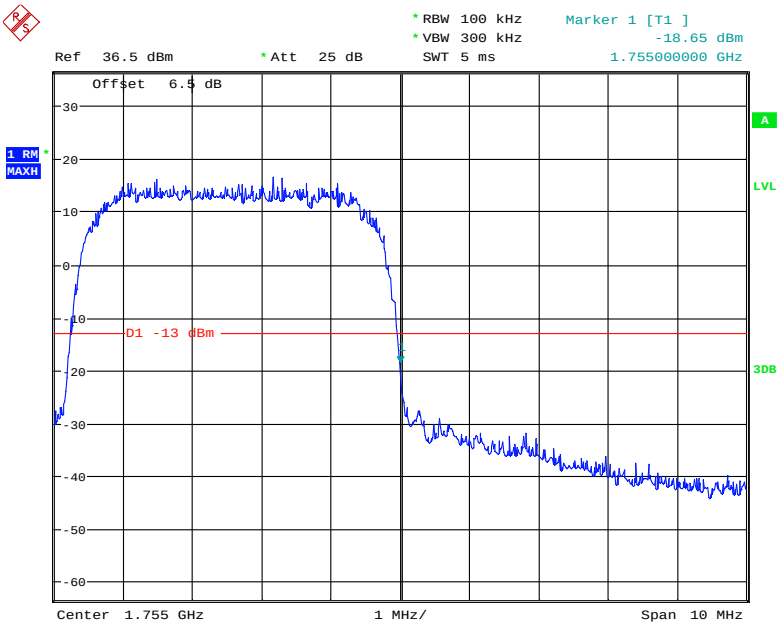
Date: 17.JUN.2020 22:06:28

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



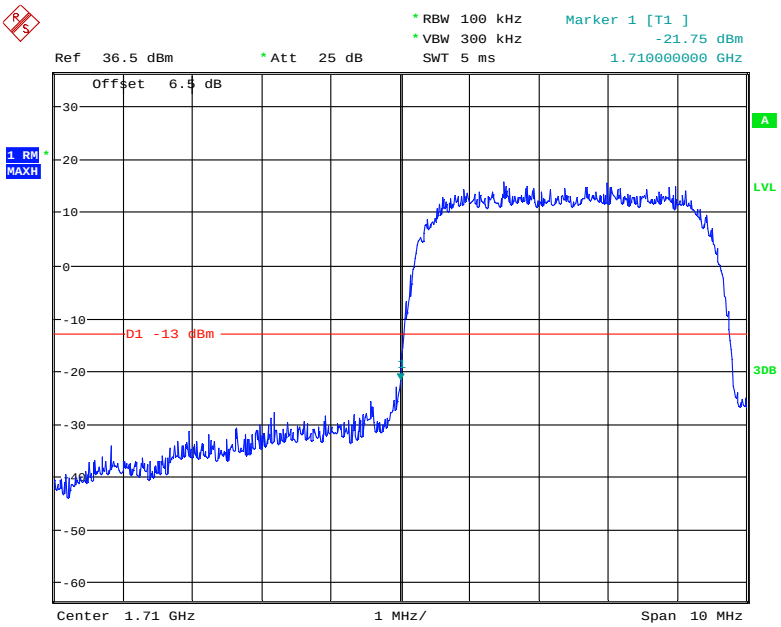
Date: 17.JUN.2020 22:22:37

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



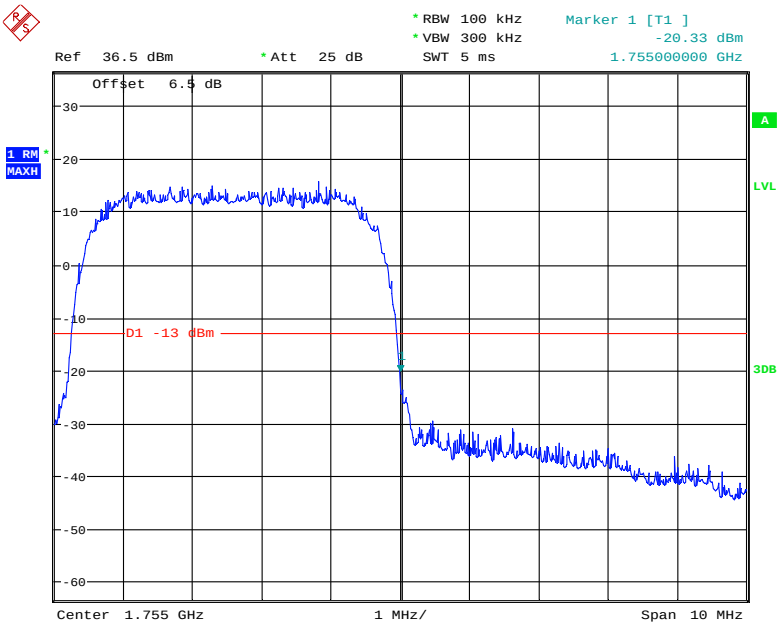
Date: 17.JUN.2020 22:23:08

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



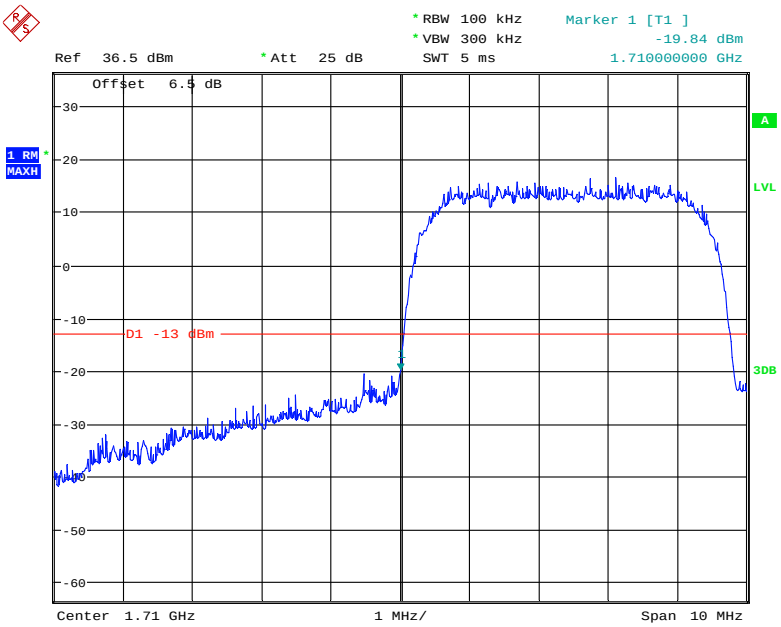
Date: 17.JUN.2020 22:14:46

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



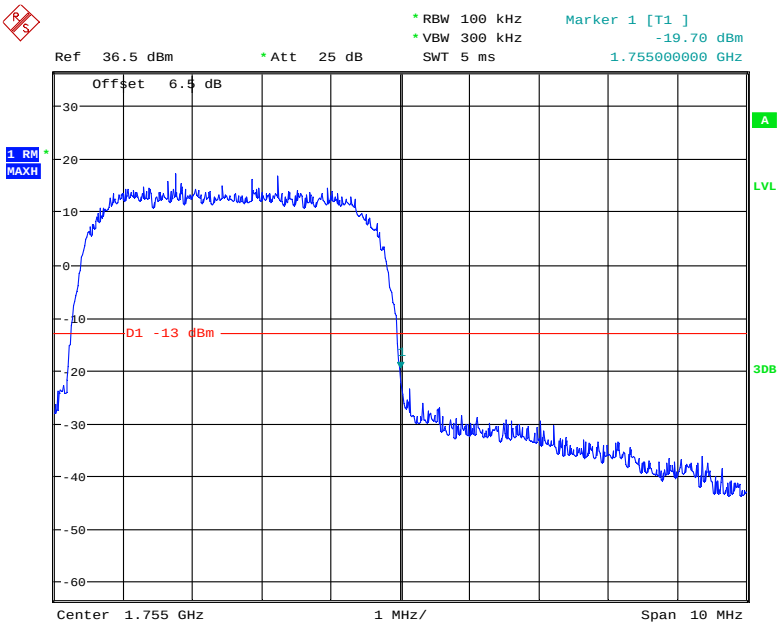
Date: 17.JUN.2020 22:14:24

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



Date: 17.JUN.2020 22:12:25

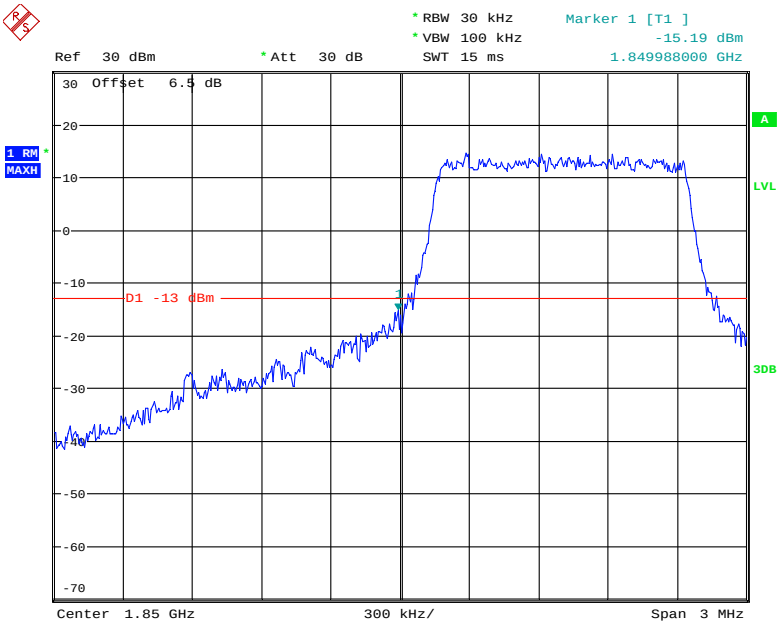
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 17.JUN.2020 22:12:56

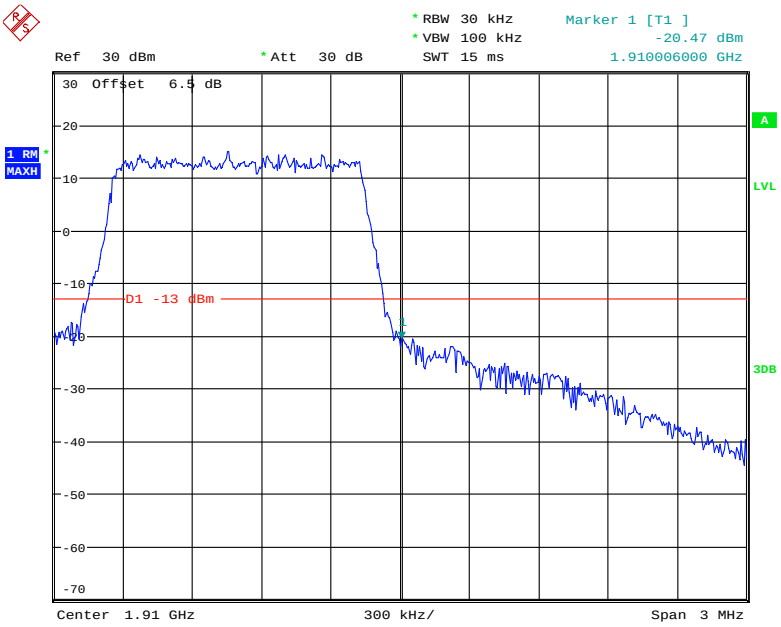
Band 2:

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



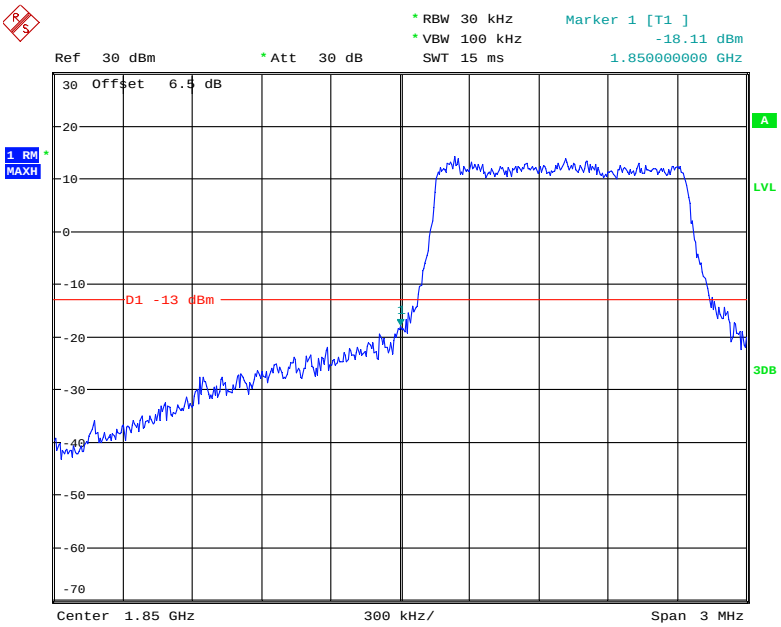
Date: 17.JUN.2020 11:02:14

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



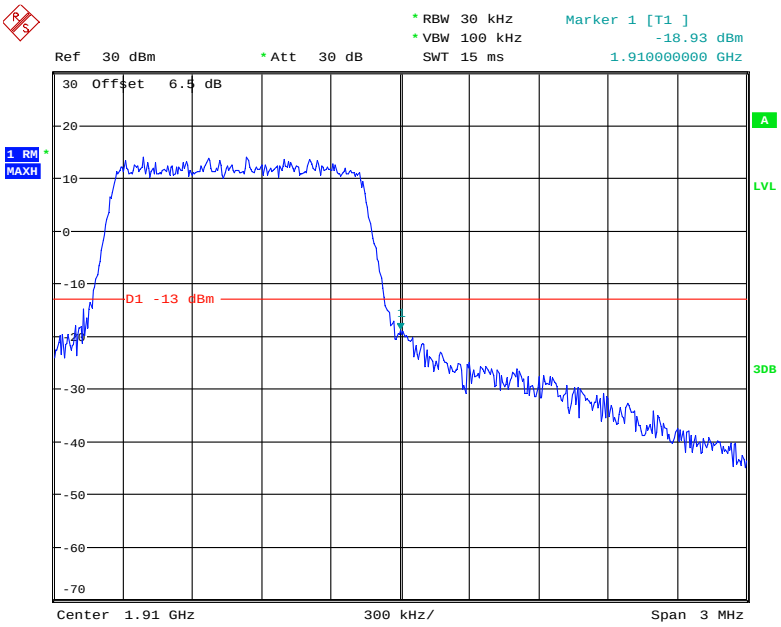
Date: 17.JUN.2020 11:03:09

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



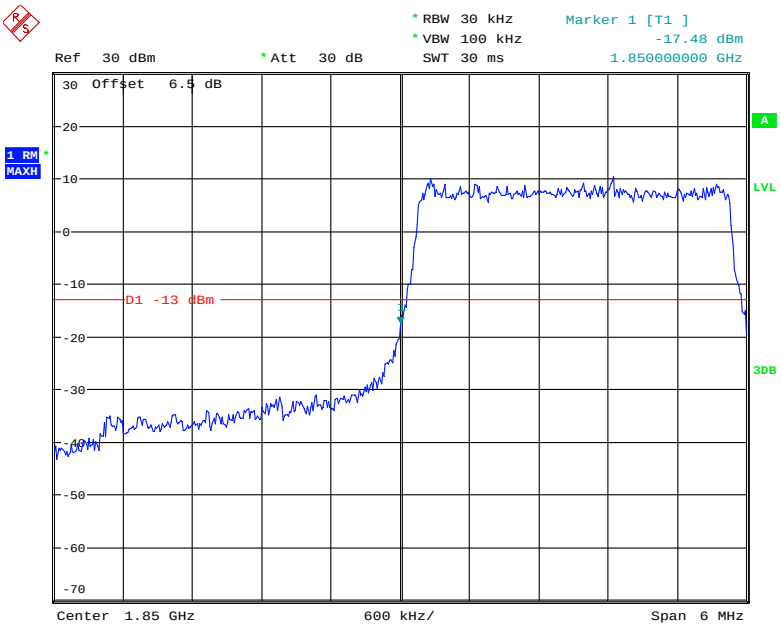
Date: 17.JUN.2020 11:02:33

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



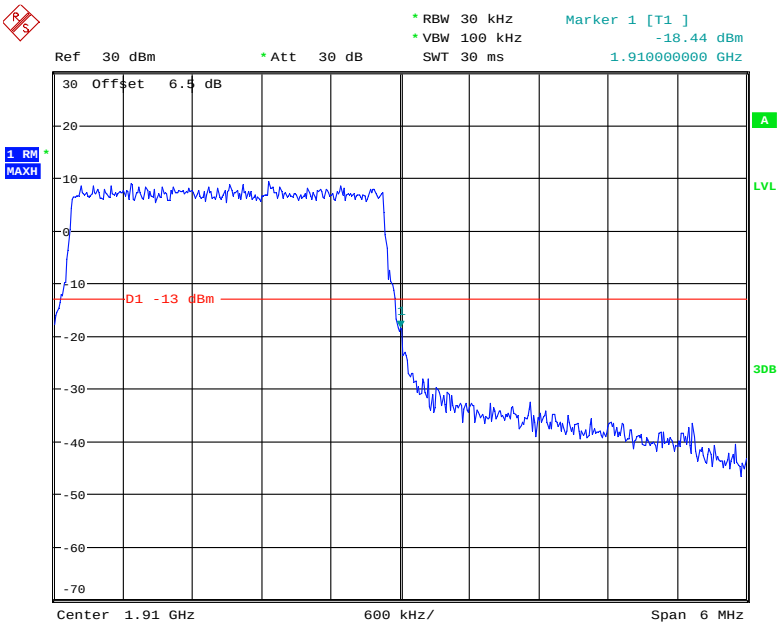
Date: 17.JUN.2020 11:03:31

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



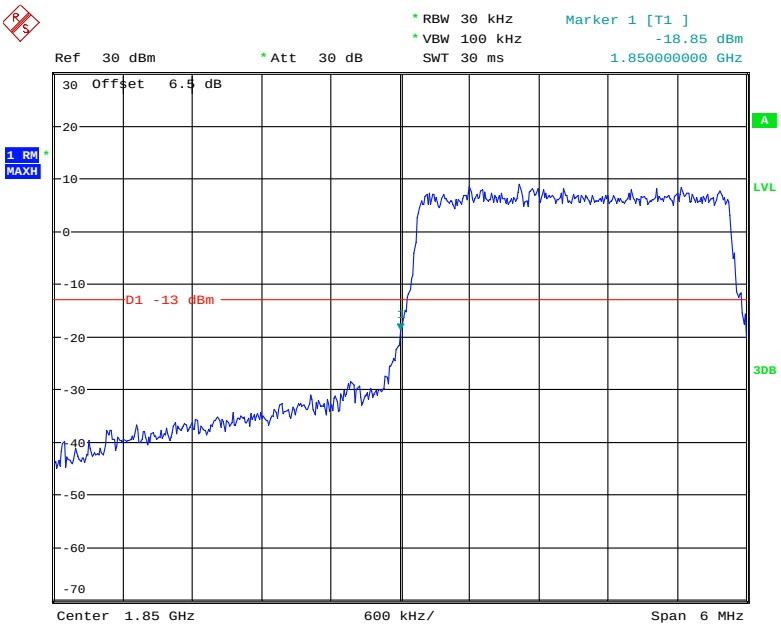
Date: 17.JUN.2020 11:03:52

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



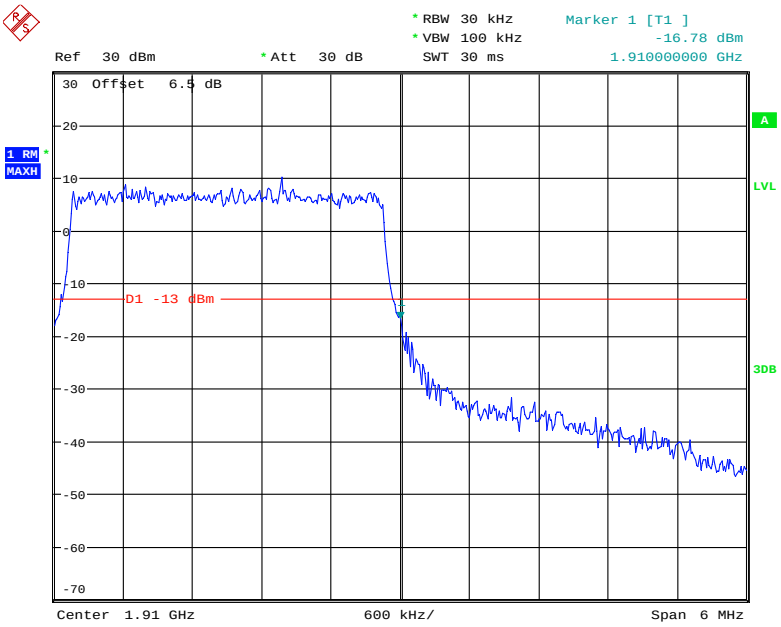
Date: 17.JUN.2020 11:04:27

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



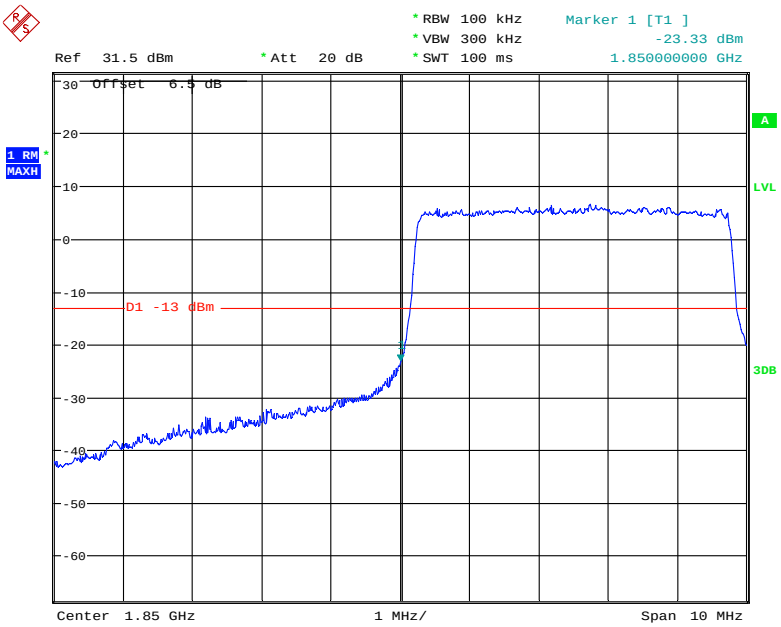
Date: 17.JUN.2020 11:04:11

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



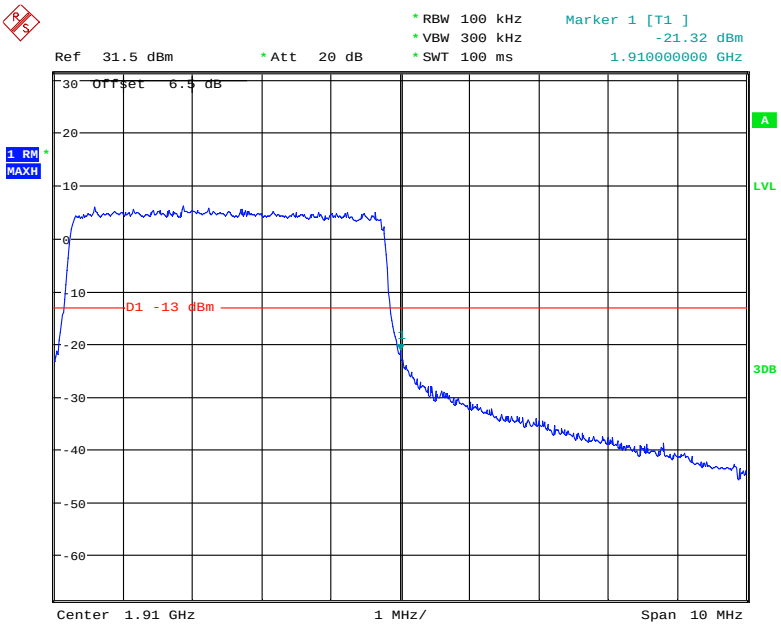
Date: 17.JUN.2020 11:04:46

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



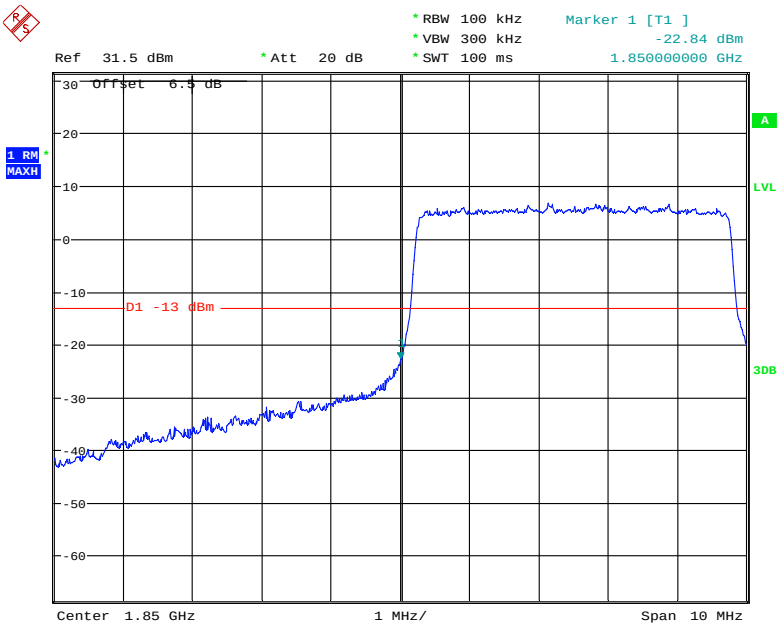
Date: 18.JUN.2020 15:18:44

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



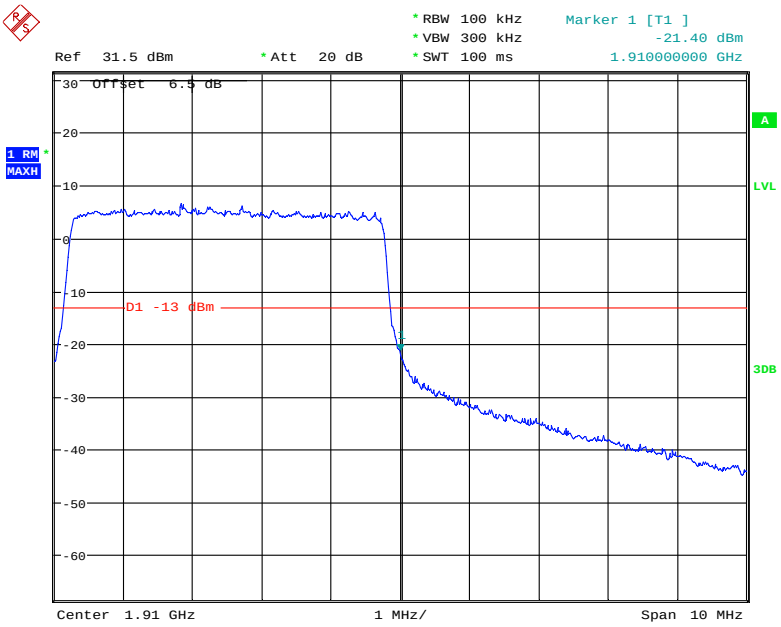
Date: 18.JUN.2020 15:21:16

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



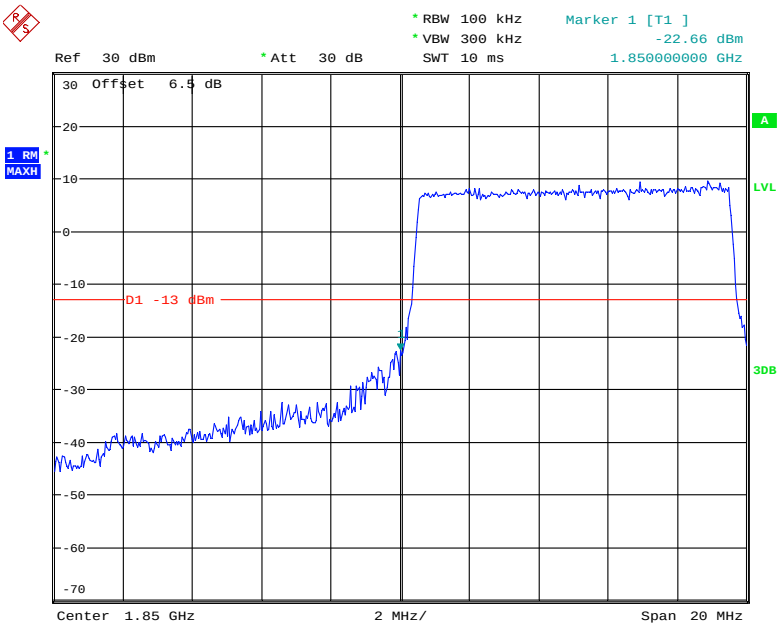
Date: 18.JUN.2020 15:19:52

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



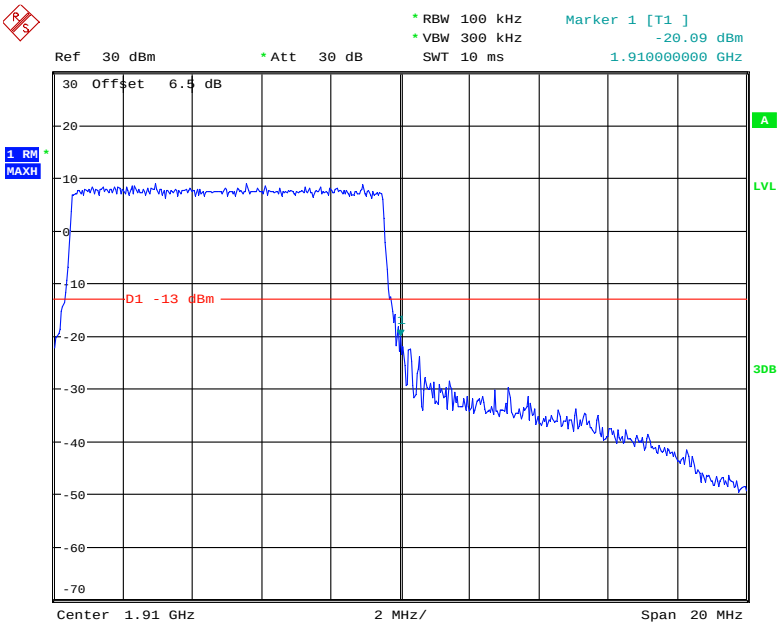
Date: 18.JUN.2020 15:20:45

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



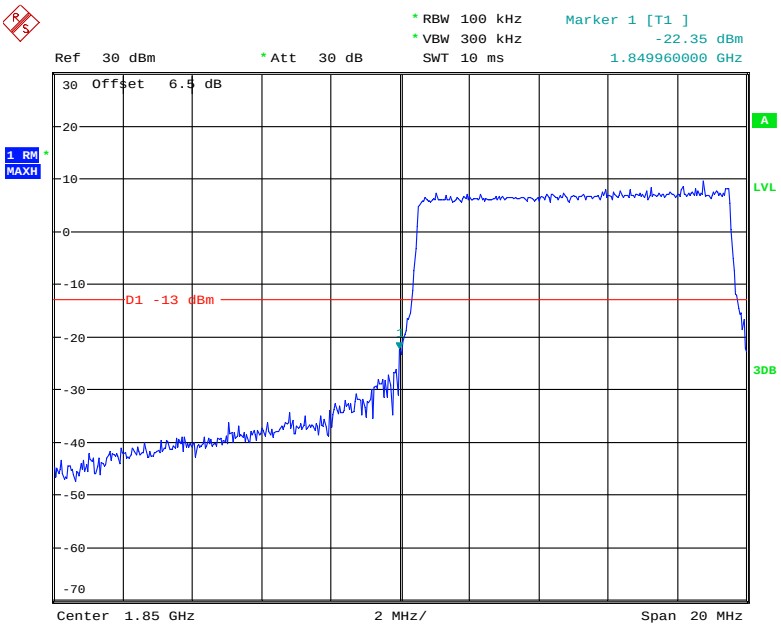
Date: 17.JUN.2020 11:06:34

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



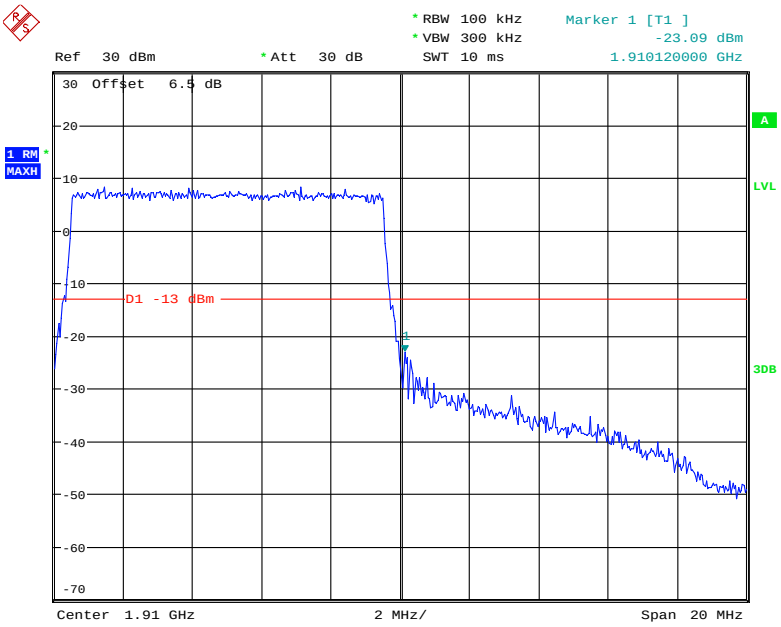
Date: 17.JUN.2020 11:07:11

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



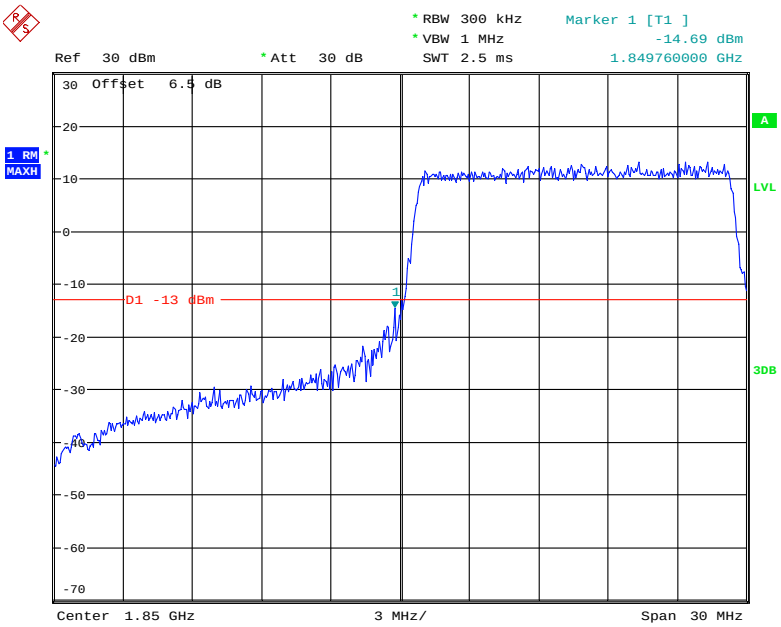
Date: 17.JUN.2020 11:06:53

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



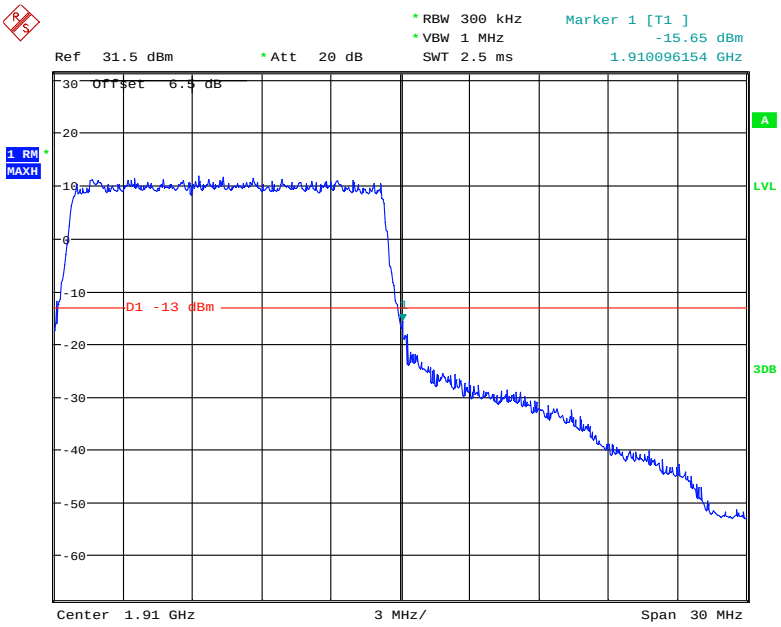
Date: 17.JUN.2020 11:07:28

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



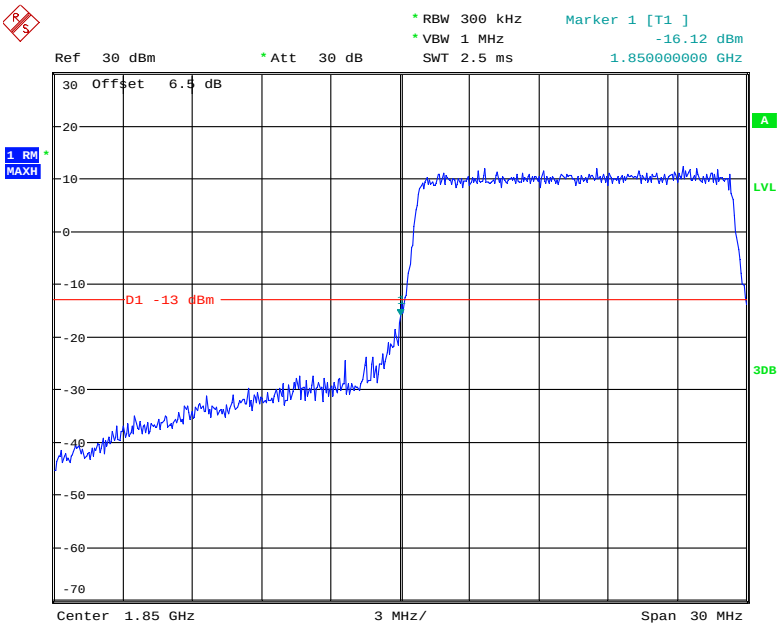
Date: 17.JUN.2020 11:07:53

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



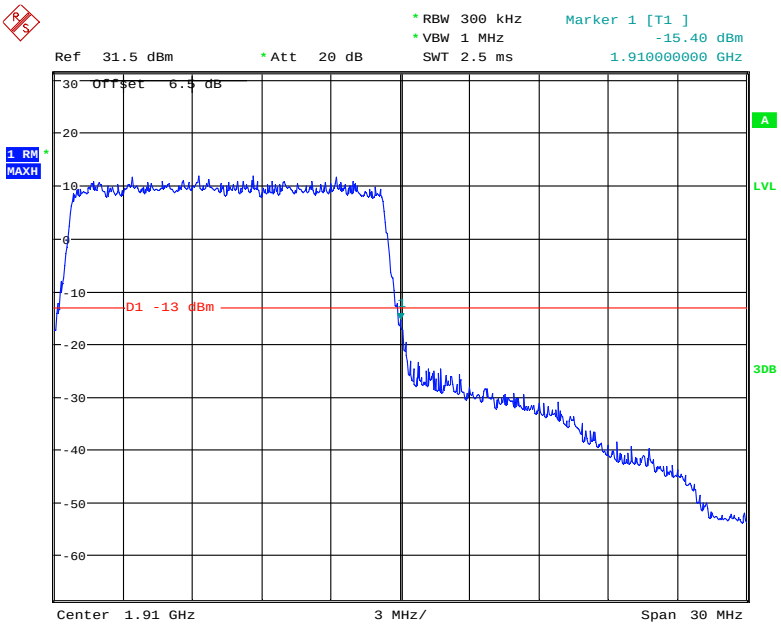
Date: 18.JUN.2020 15:23:36

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



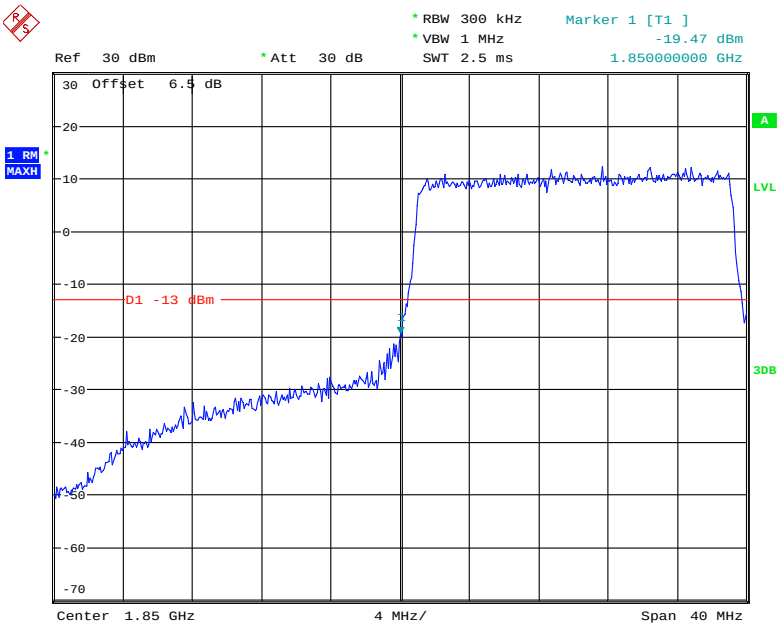
Date: 17.JUN.2020 11:08:12

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



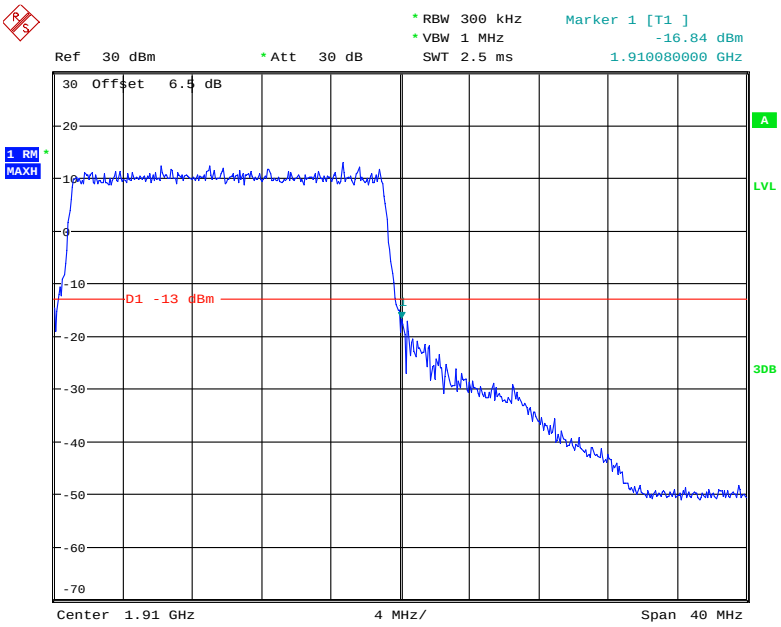
Date: 18.JUN.2020 15:24:17

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



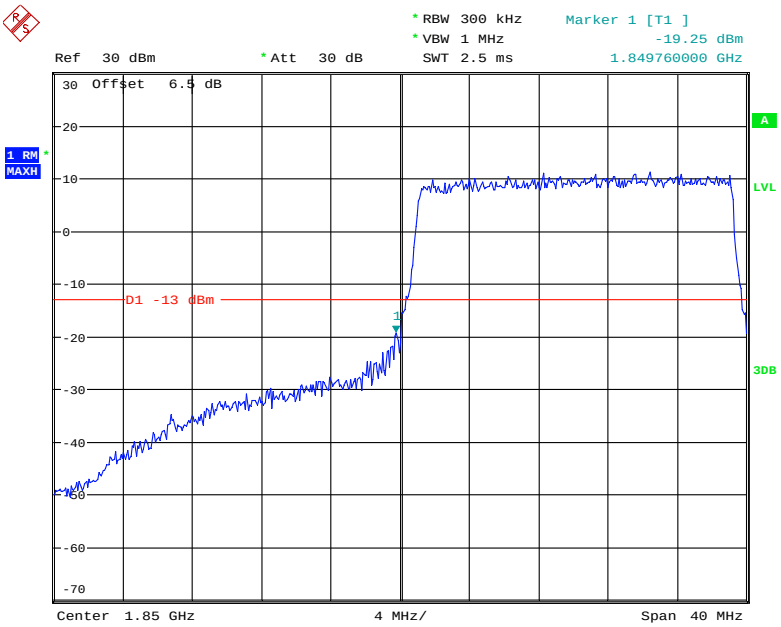
Date: 17.JUN.2020 11:09:12

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



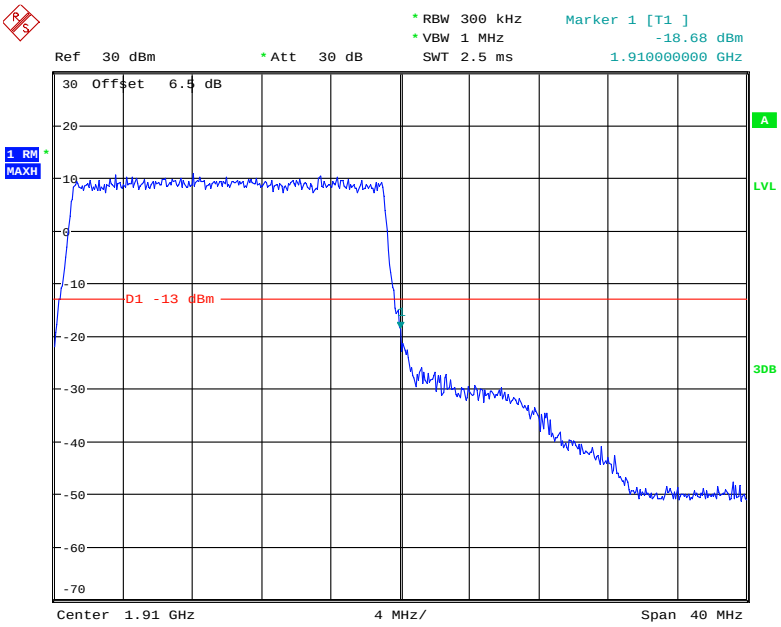
Date: 17.JUN.2020 11:10:00

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



Date: 17.JUN.2020 11:09:38

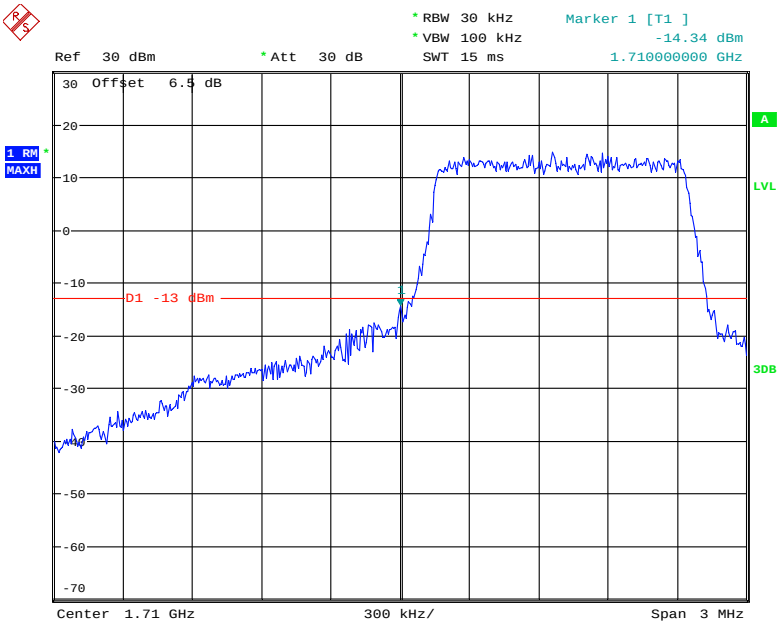
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 17.JUN.2020 11:10:19

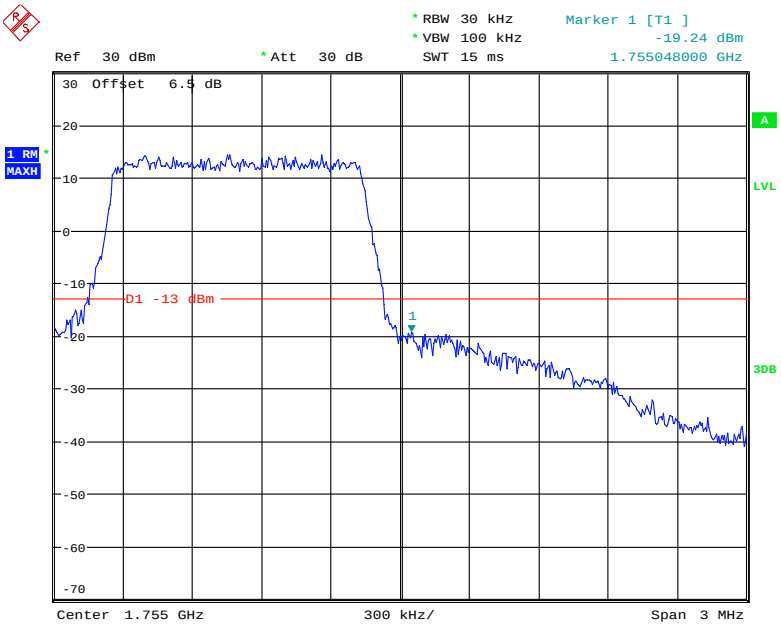
Band 4:

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



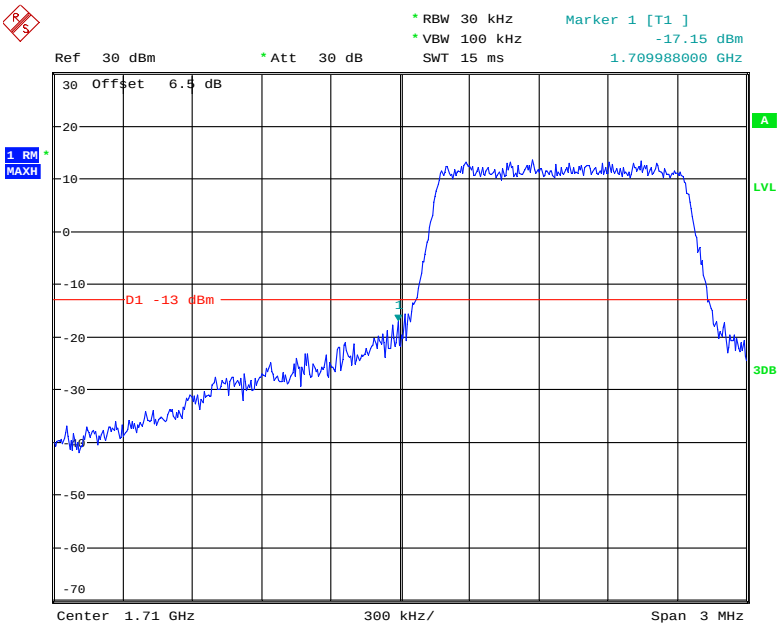
Date: 17.JUN.2020 11:10:44

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



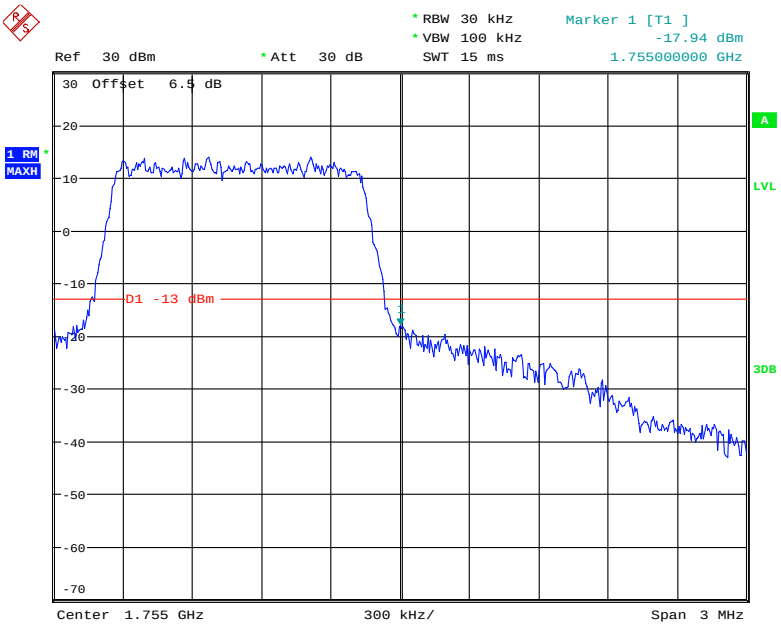
Date: 17.JUN.2020 11:11:38

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



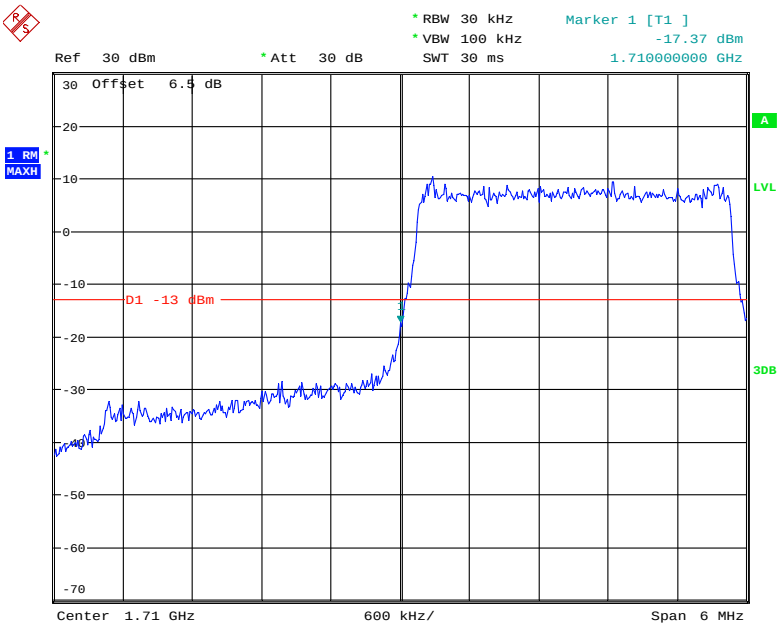
Date: 17.JUN.2020 11:11:06

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



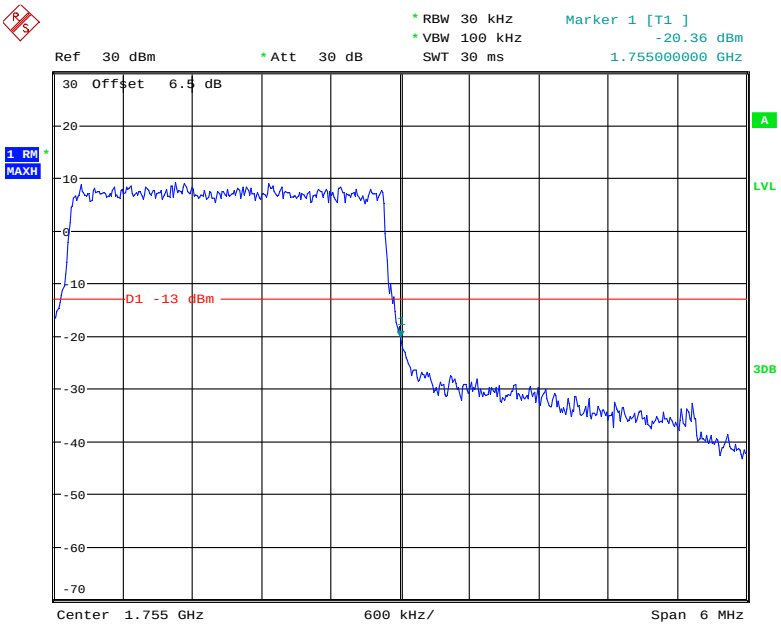
Date: 17.JUN.2020 11:11:57

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



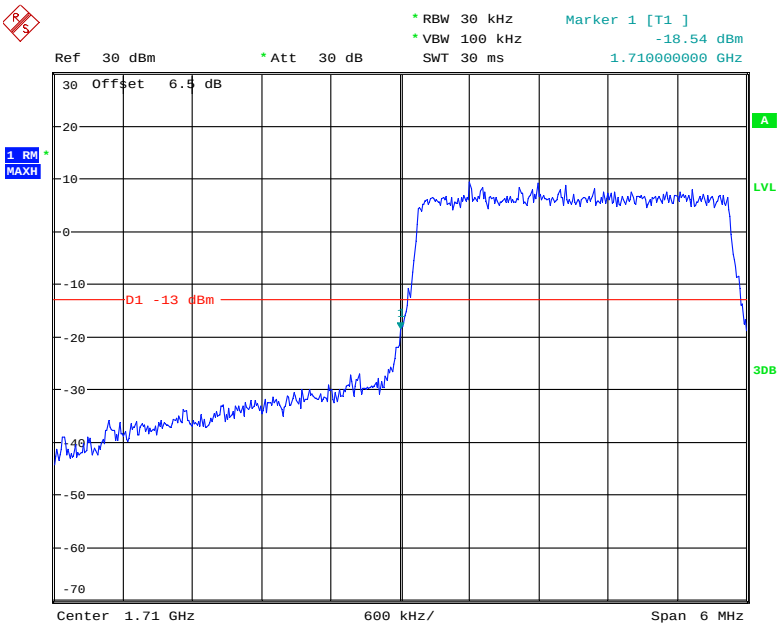
Date: 17.JUN.2020 11:12:15

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



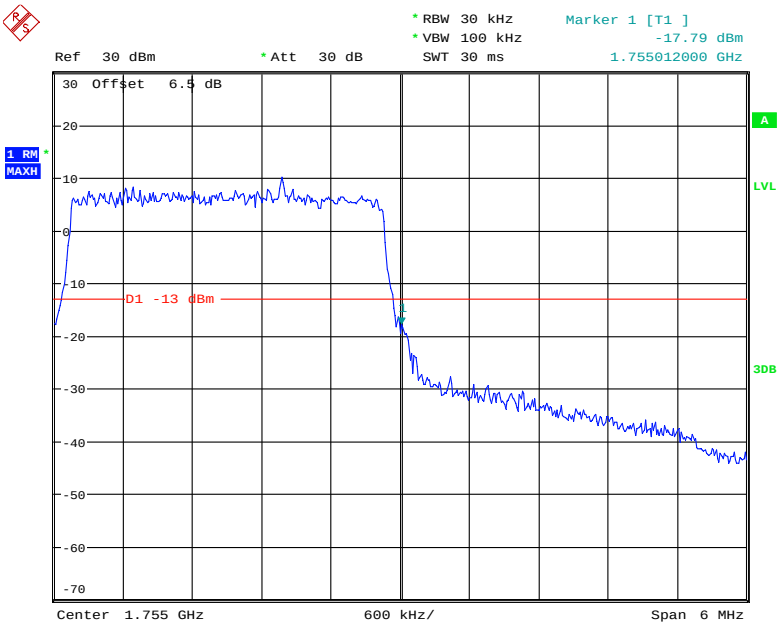
Date: 17.JUN.2020 11:12:47

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



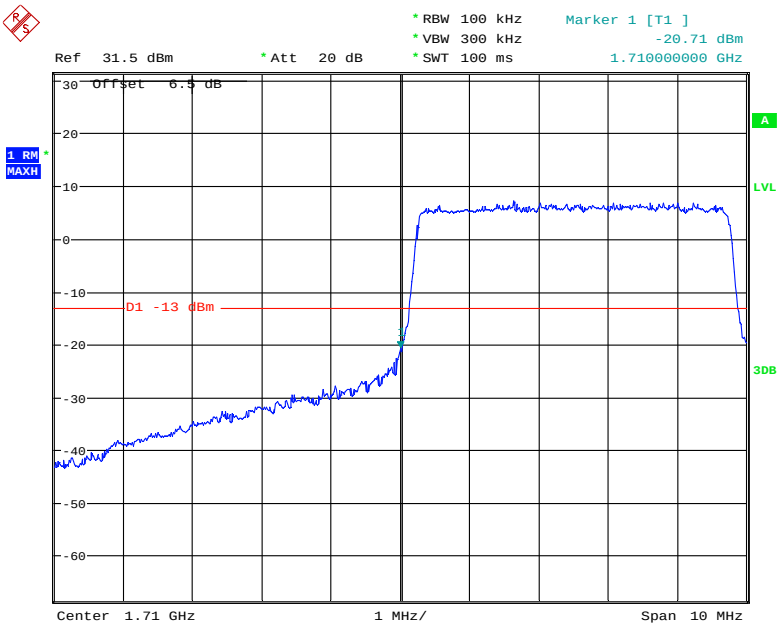
Date: 17.JUN.2020 11:12:31

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



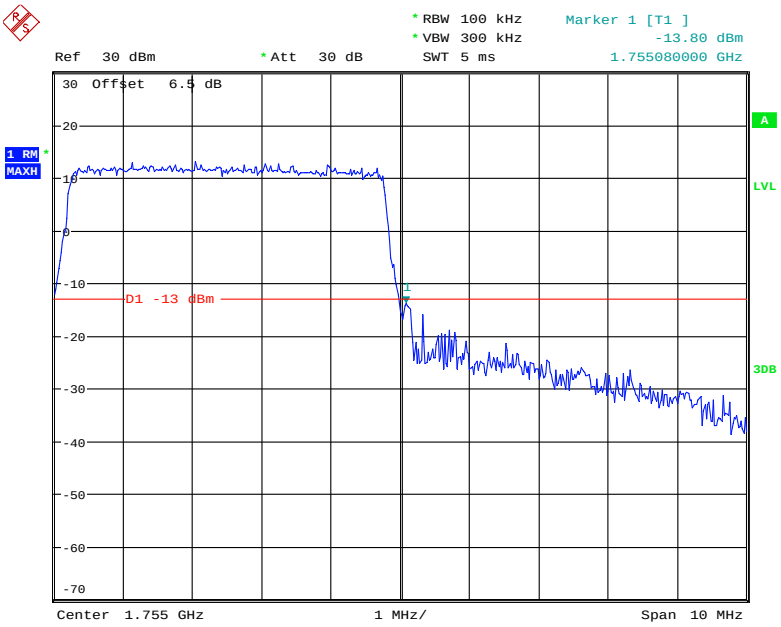
Date: 17.JUN.2020 11:13:03

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



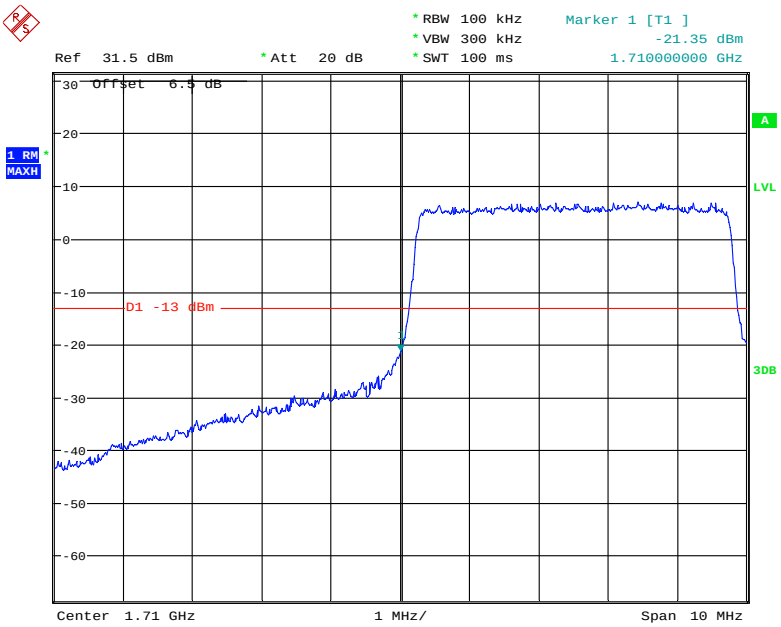
Date: 18.JUN.2020 15:27:10

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



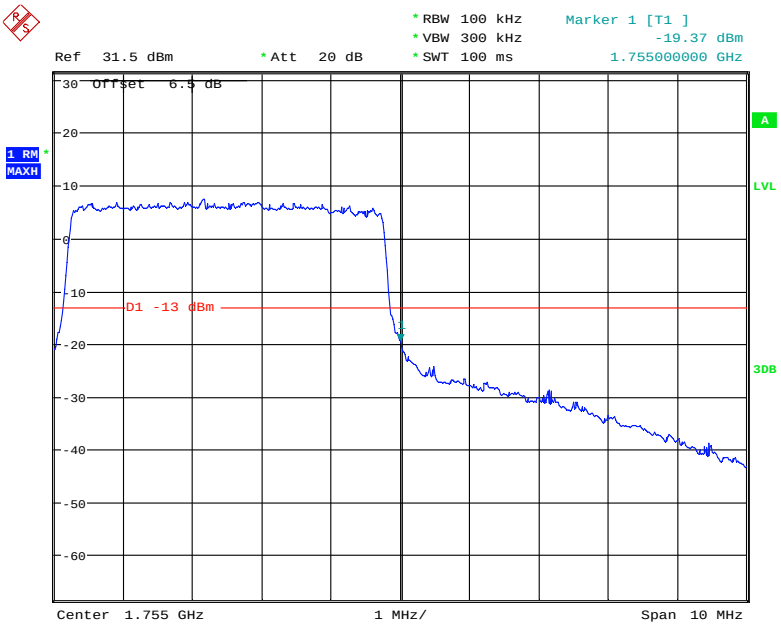
Date: 17.JUN.2020 11:14:00

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



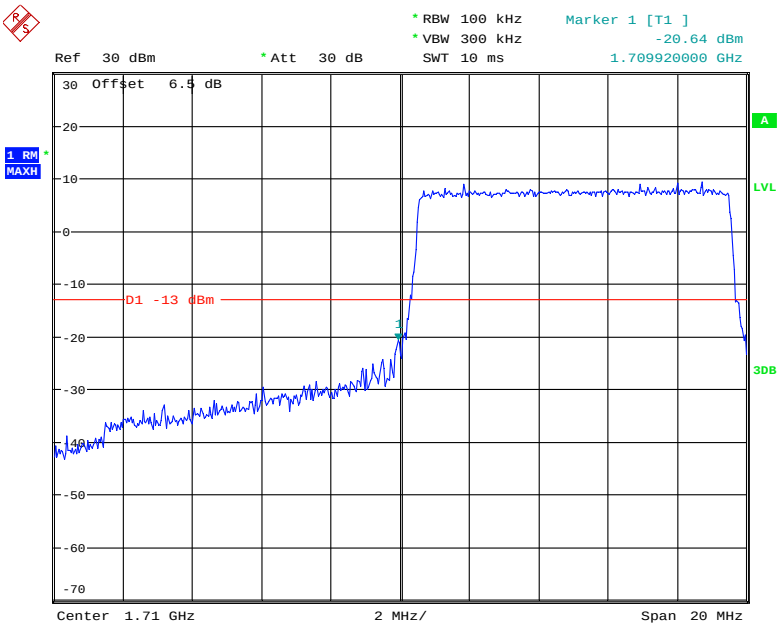
Date: 18.JUN.2020 15:26:32

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



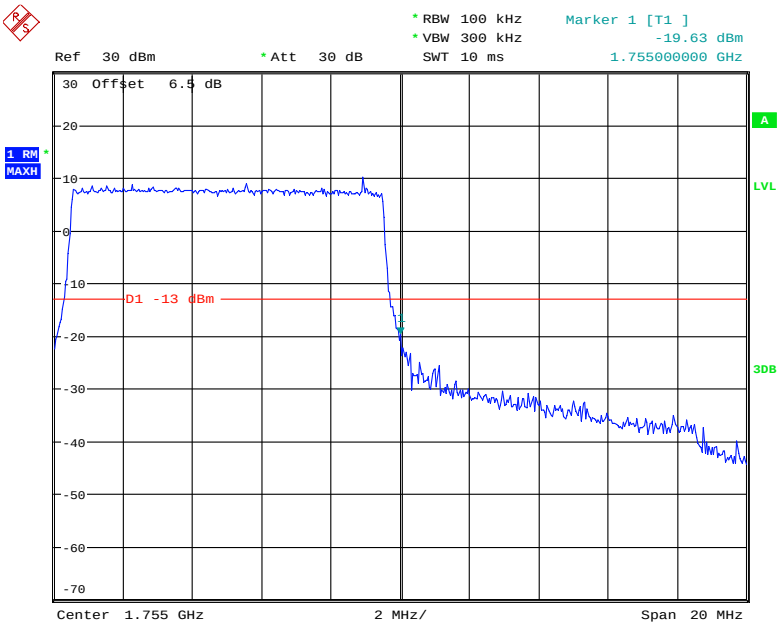
Date: 18.JUN.2020 15:28:36

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



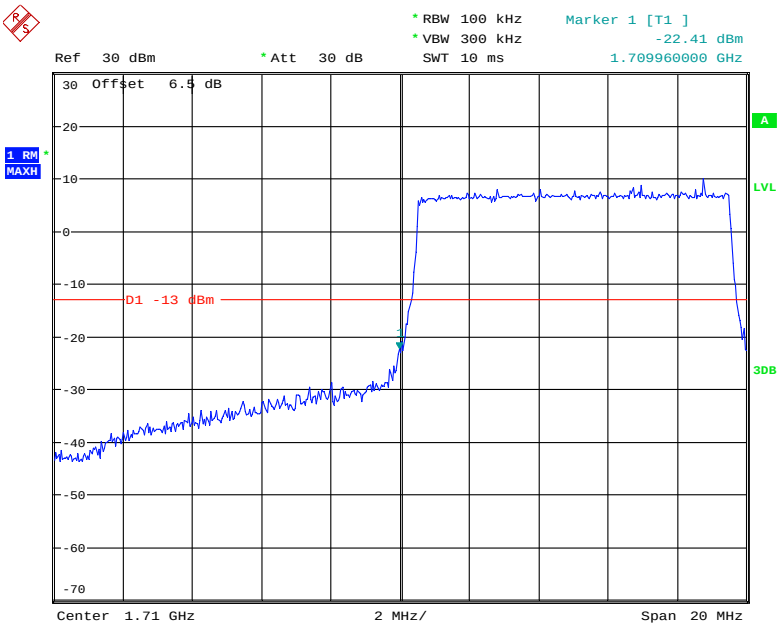
Date: 17.JUN.2020 11:14:41

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



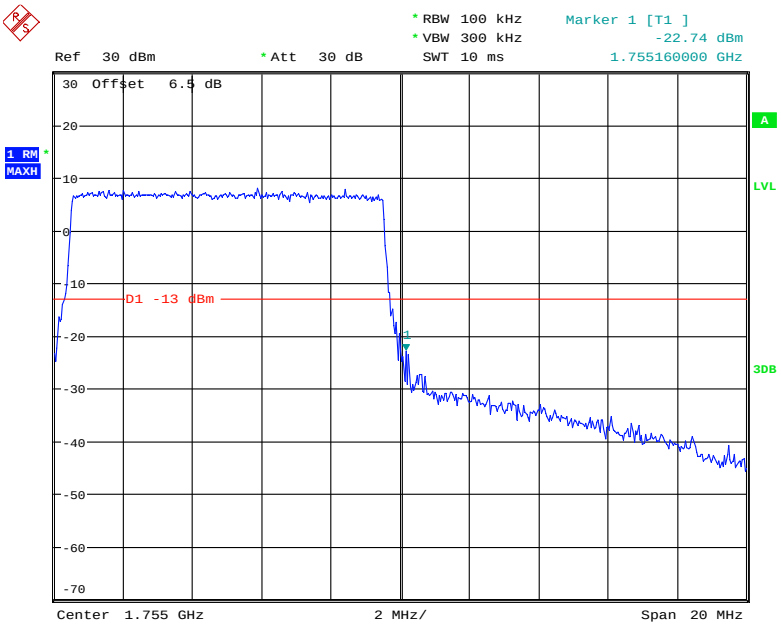
Date: 17.JUN.2020 11:15:22

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



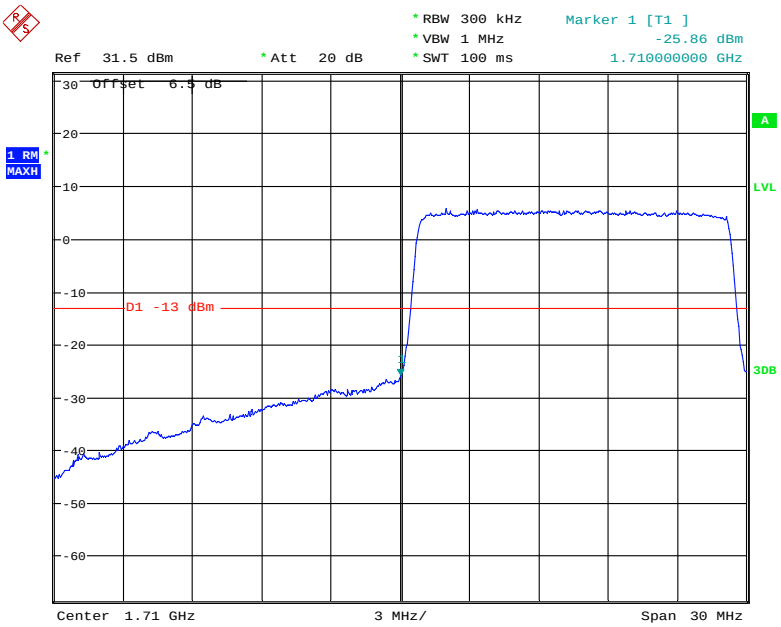
Date: 17.JUN.2020 11:15:01

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



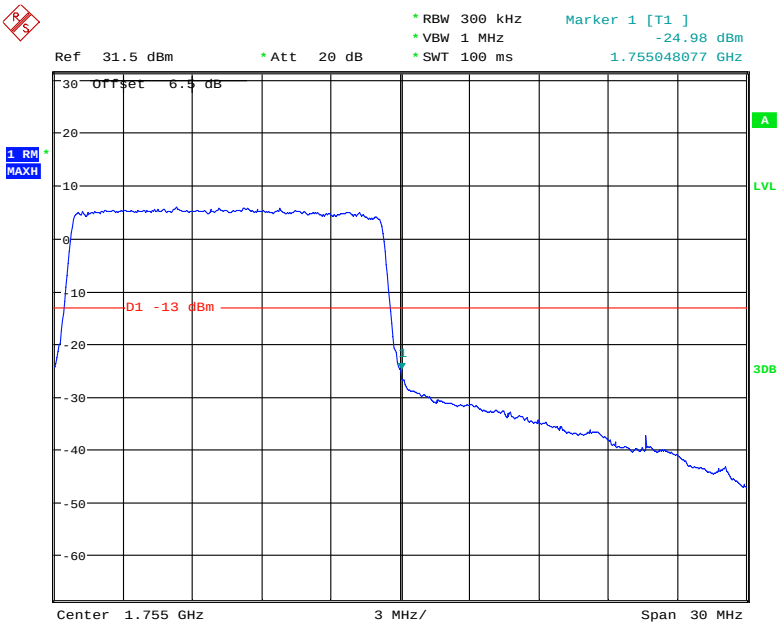
Date: 17.JUN.2020 11:15:38

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



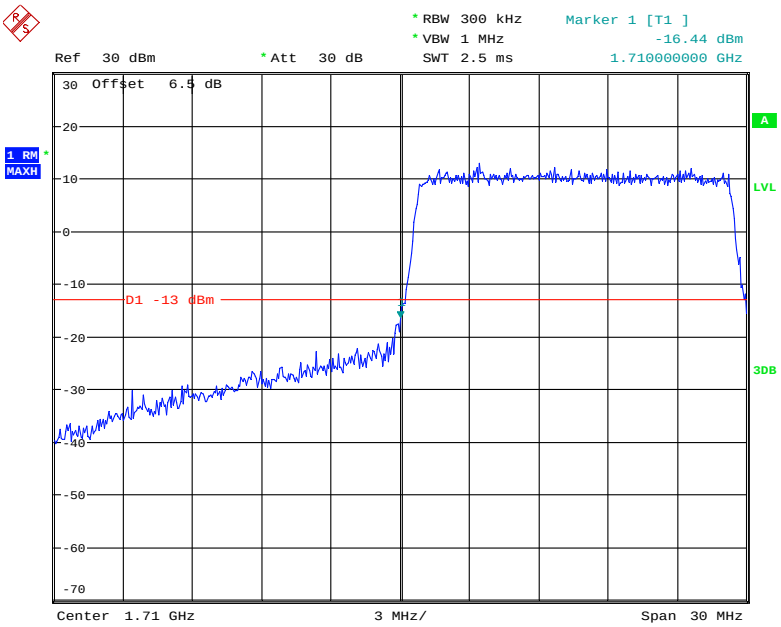
Date: 18.JUN.2020 15:30:19

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



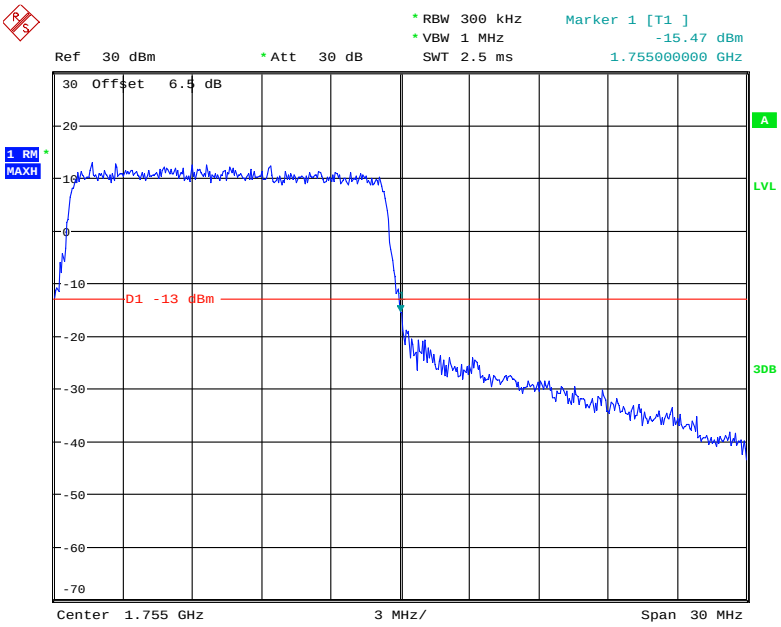
Date: 18.JUN.2020 15:31:42

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



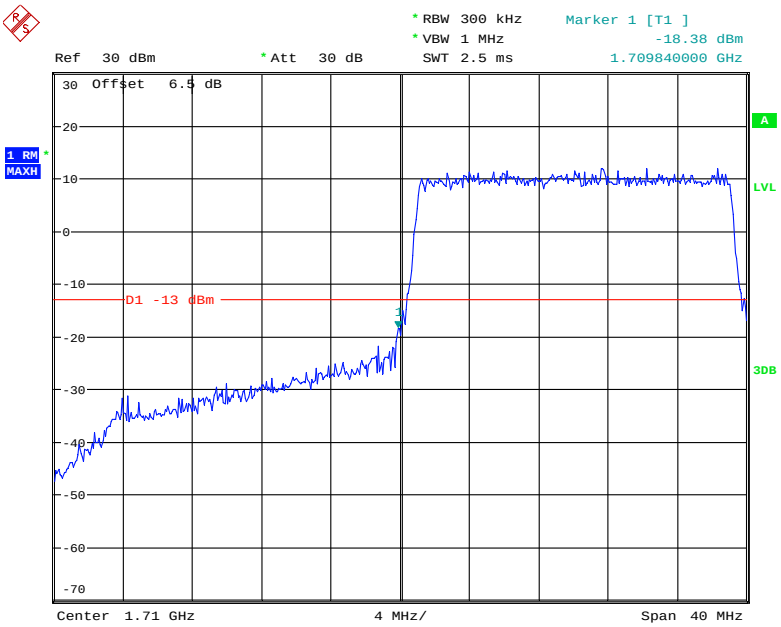
Date: 17.JUN.2020 11:16:19

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



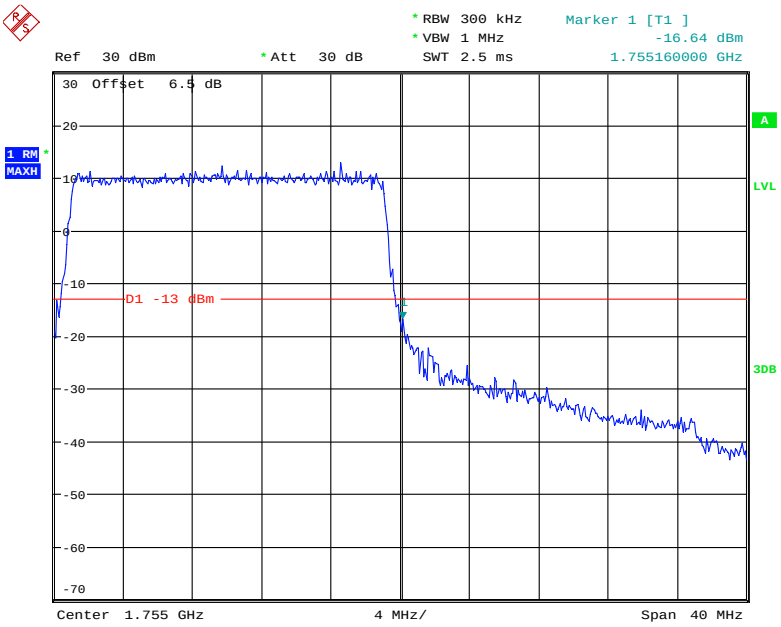
Date: 17.JUN.2020 11:17:01

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



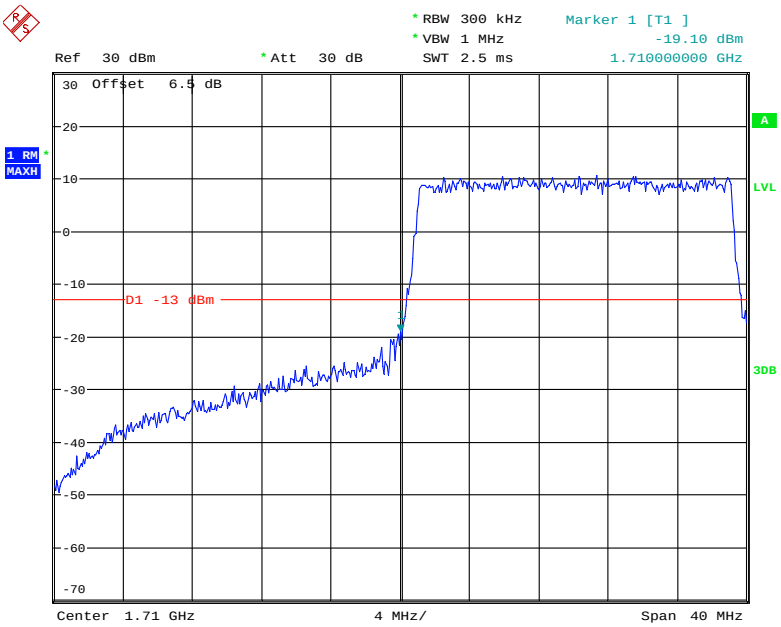
Date: 17.JUN.2020 11:17:23

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



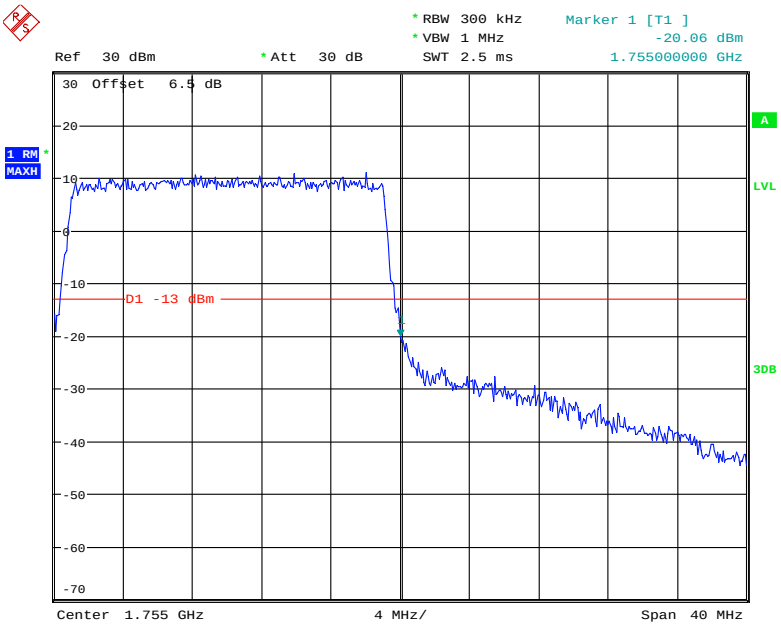
Date: 17.JUN.2020 11:18:02

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



Date: 17.JUN.2020 11:17:42

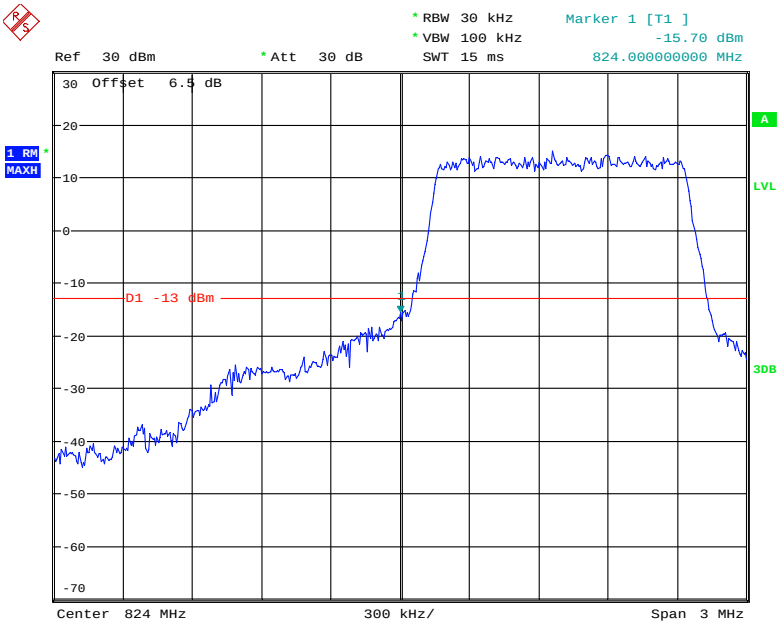
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 17.JUN.2020 11:18:24

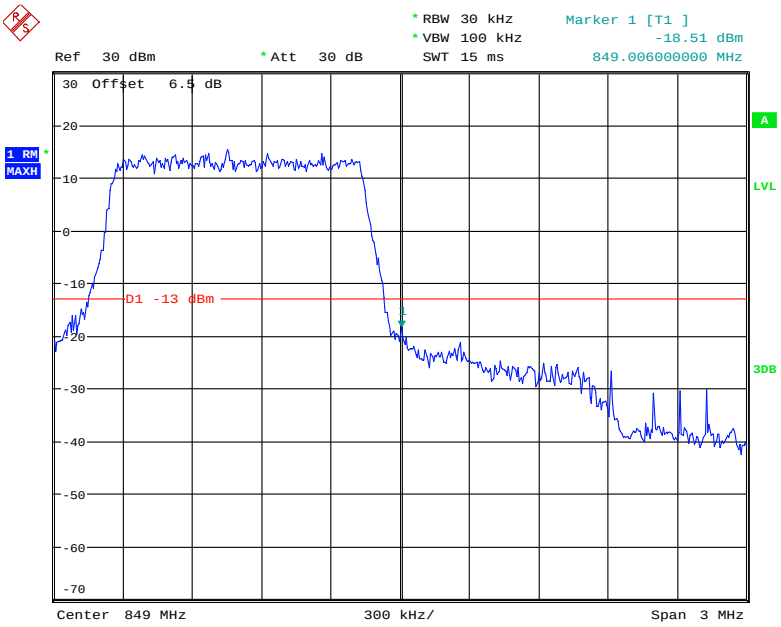
Band 5:

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



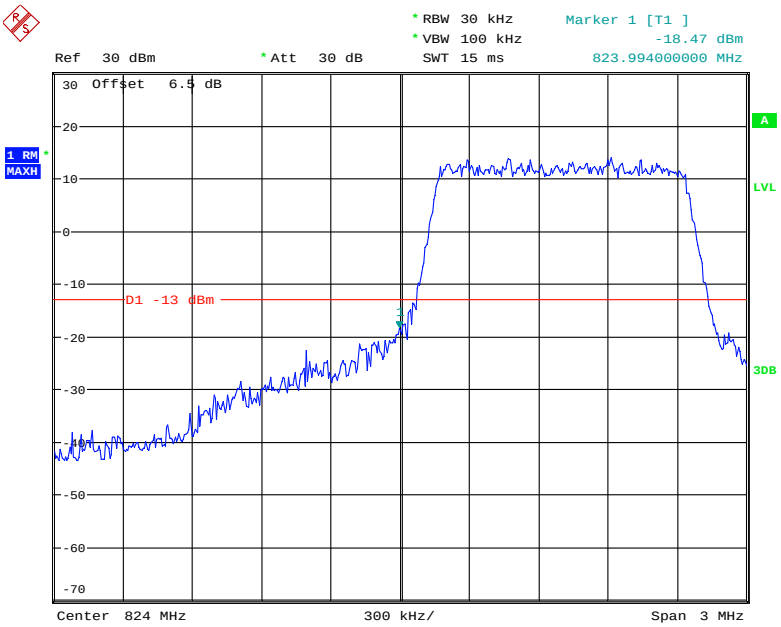
Date: 17.JUN.2020 11:18:49

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



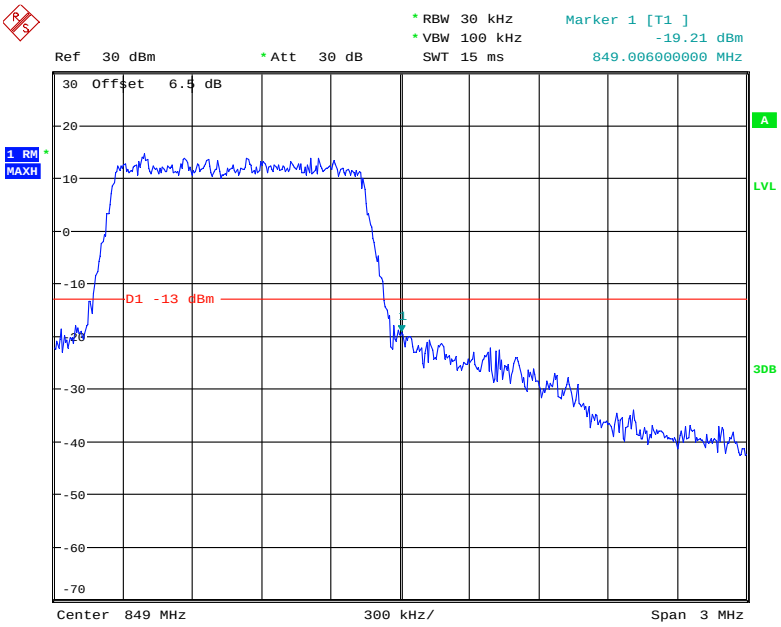
Date: 17.JUN.2020 11:19:45

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



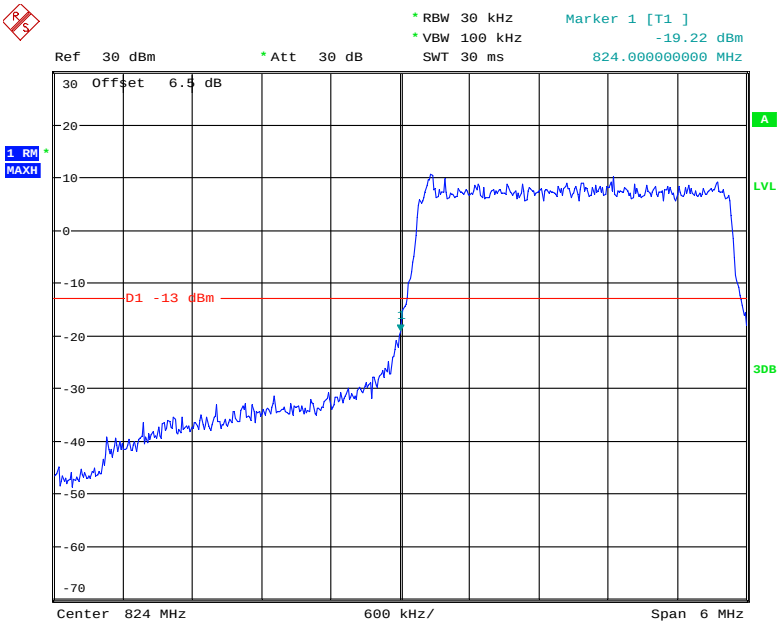
Date: 17.JUN.2020 11:19:05

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



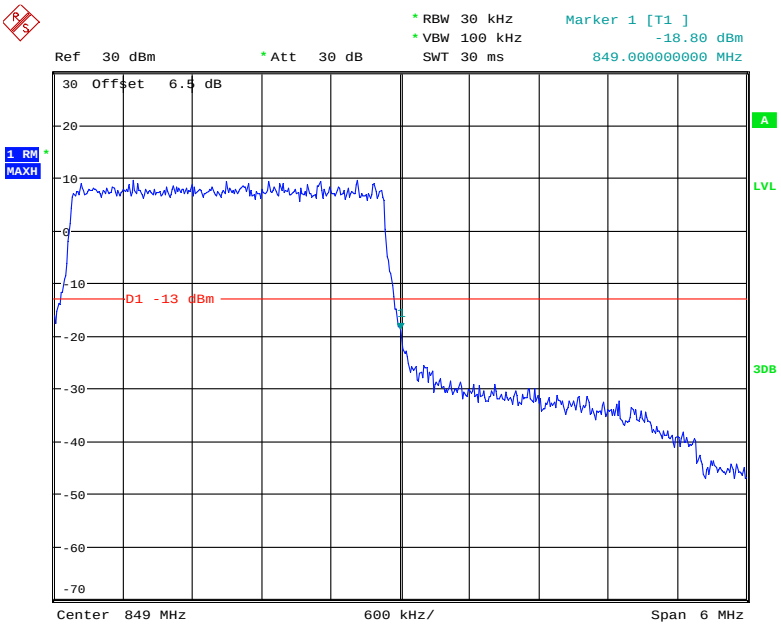
Date: 17.JUN.2020 11:20:01

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



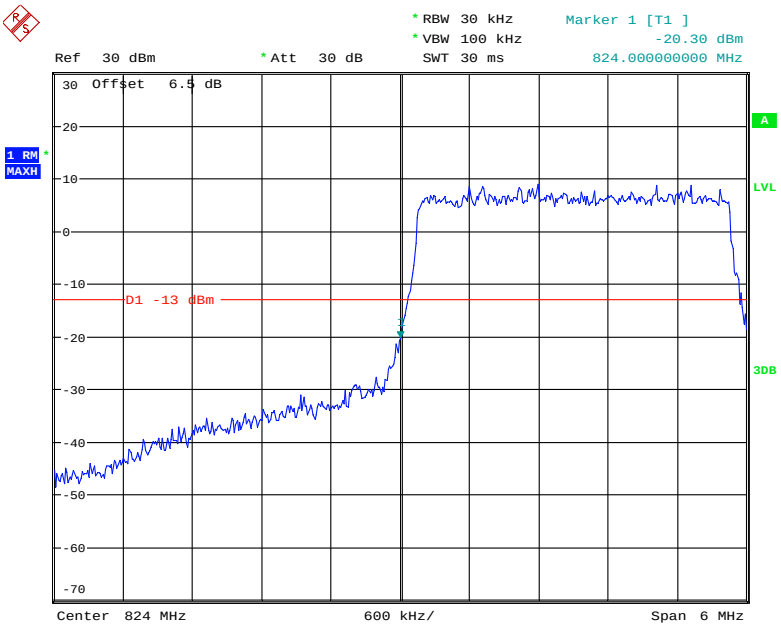
Date: 17.JUN.2020 11:20:19

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



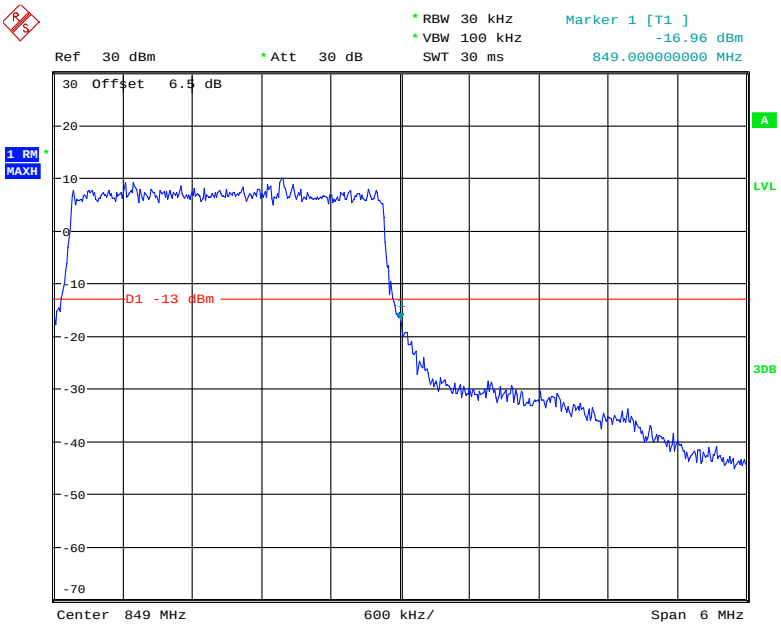
Date: 17.JUN.2020 11:20:54

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



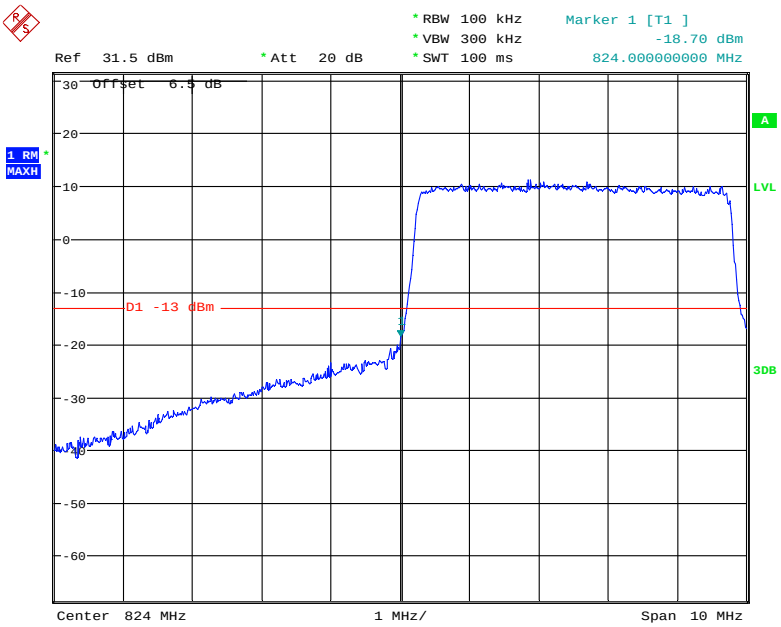
Date: 17.JUN.2020 11:20:35

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



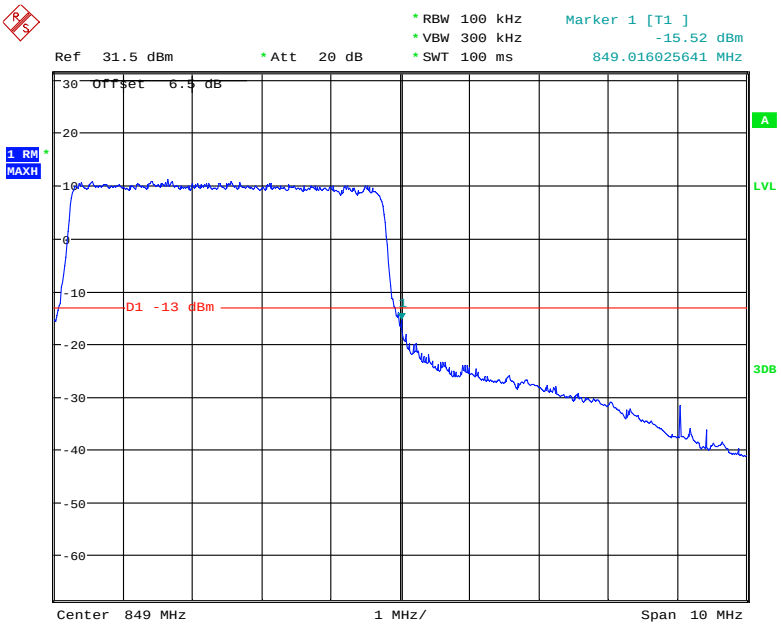
Date: 17.JUN.2020 11:21:16

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



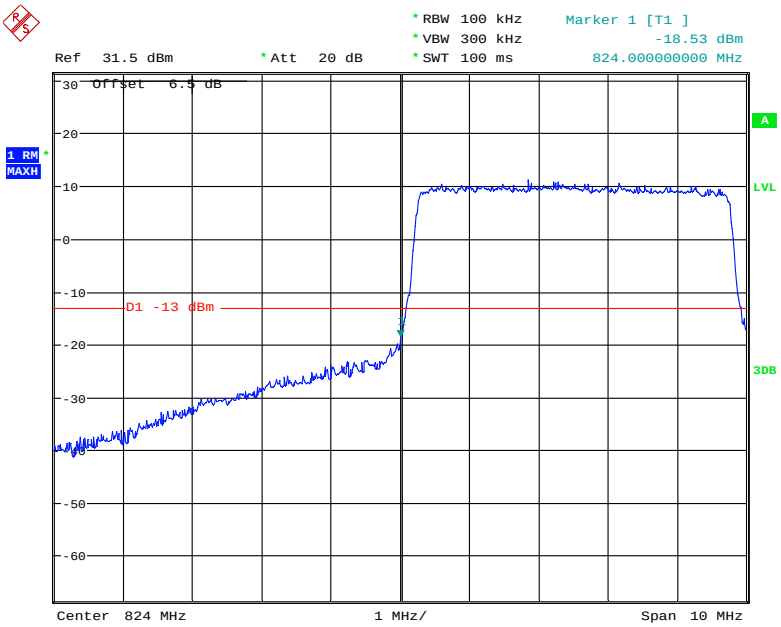
Date: 18.JUN.2020 15:32:46

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



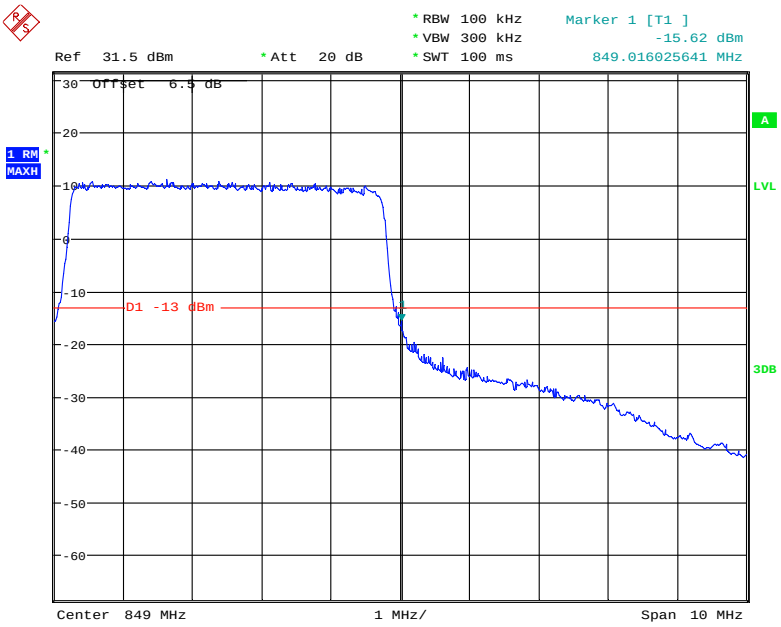
Date: 18.JUN.2020 15:35:26

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



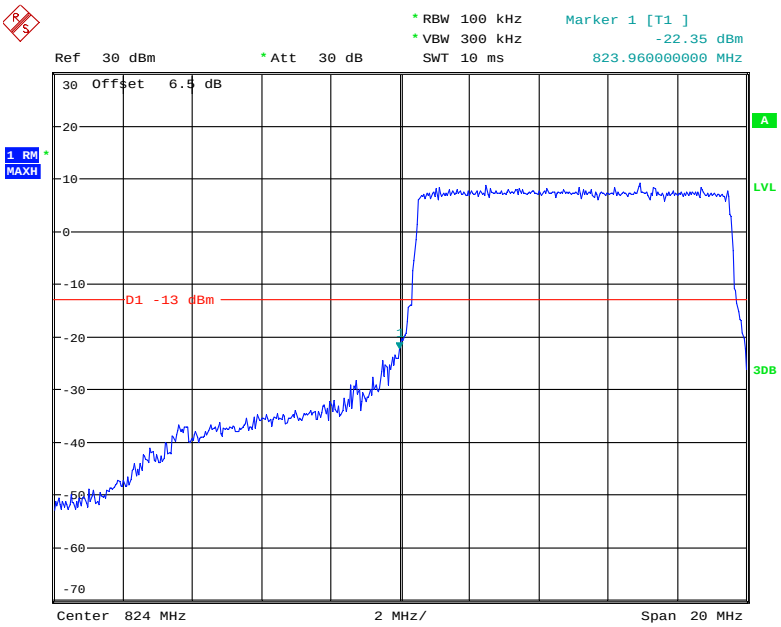
Date: 18.JUN.2020 15:33:14

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



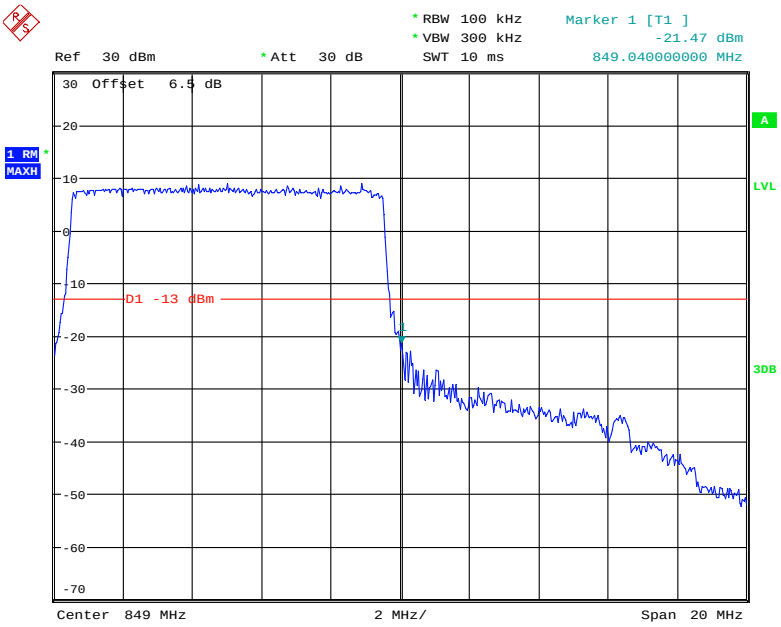
Date: 18.JUN.2020 15:34:22

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



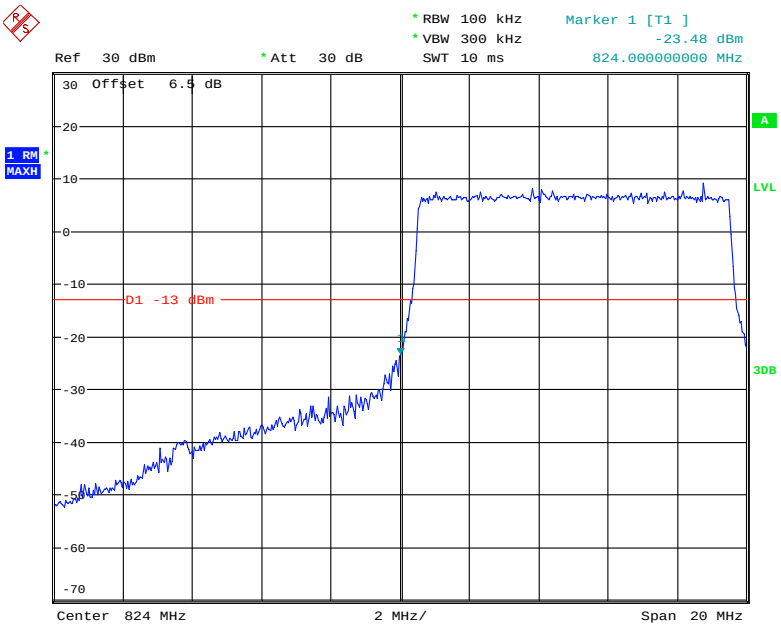
Date: 17.JUN.2020 11:23:04

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



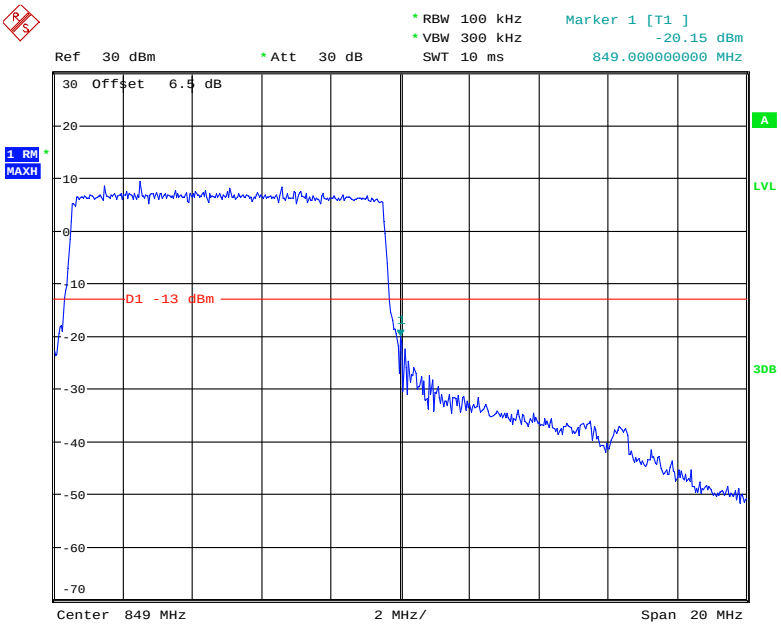
Date: 17.JUN.2020 11:23:45

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



Date: 17.JUN.2020 11:23:24

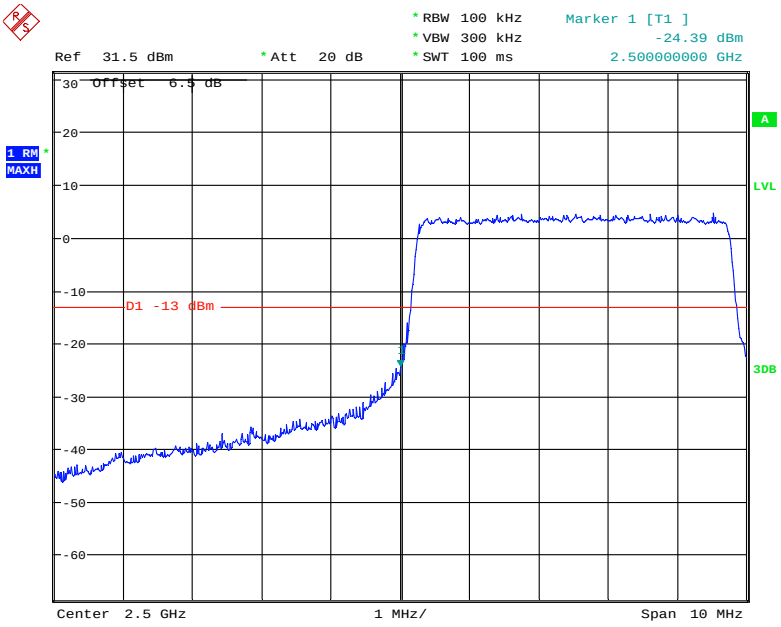
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 17.JUN.2020 11:24:01

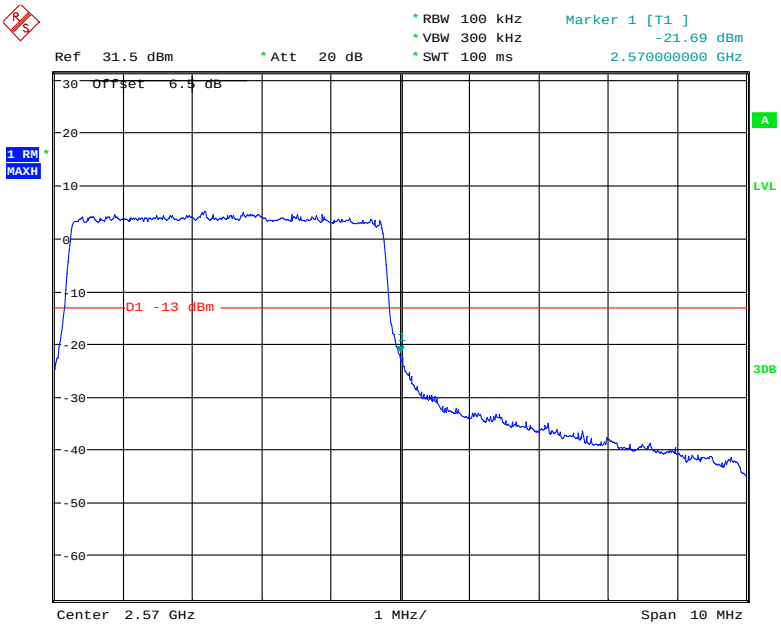
Band 7:

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



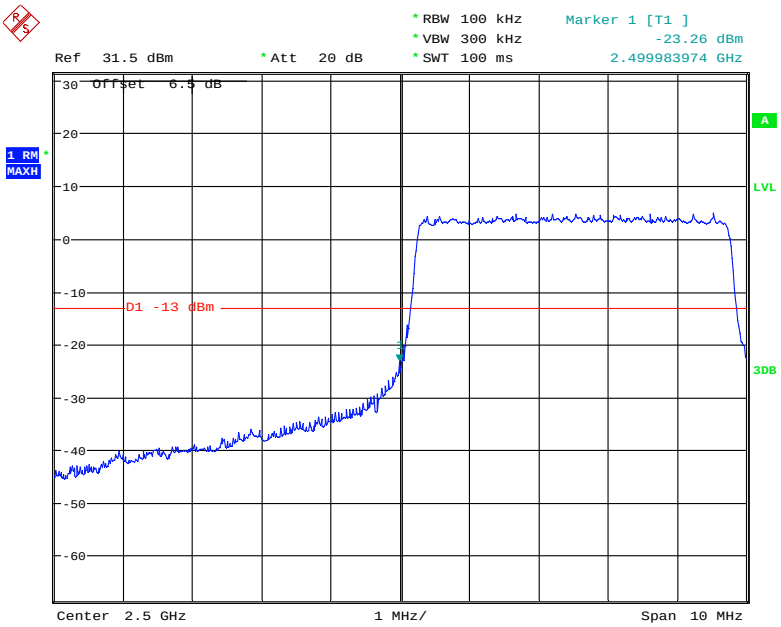
Date: 18.JUN.2020 15:37:21

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



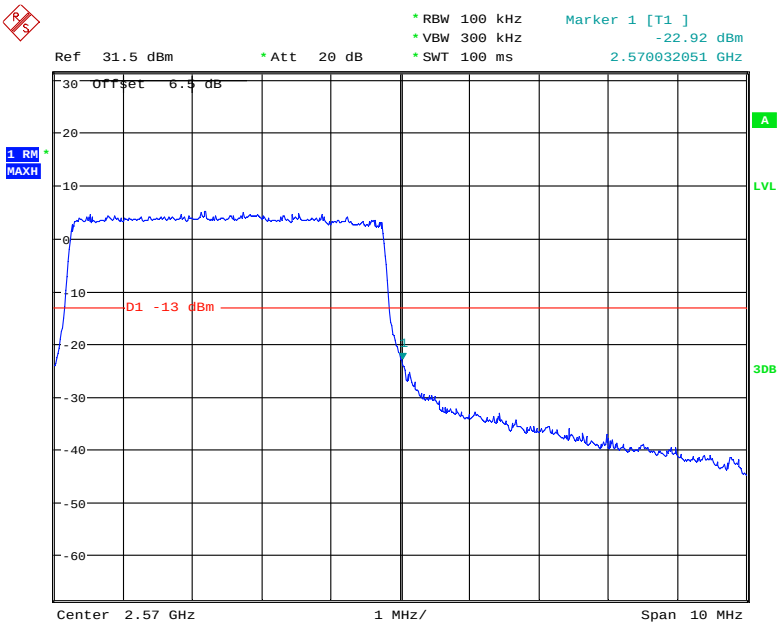
Date: 18.JUN.2020 15:40:11

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



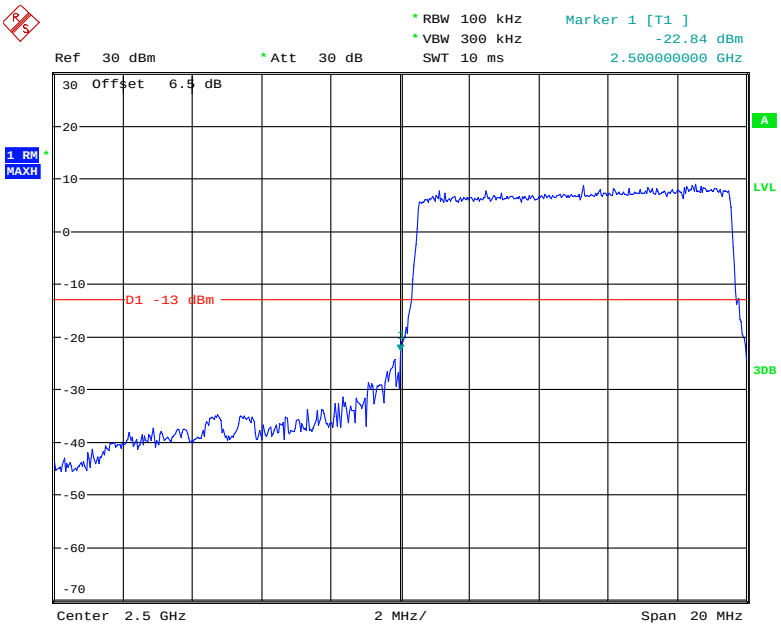
Date: 18.JUN.2020 15:38:11

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



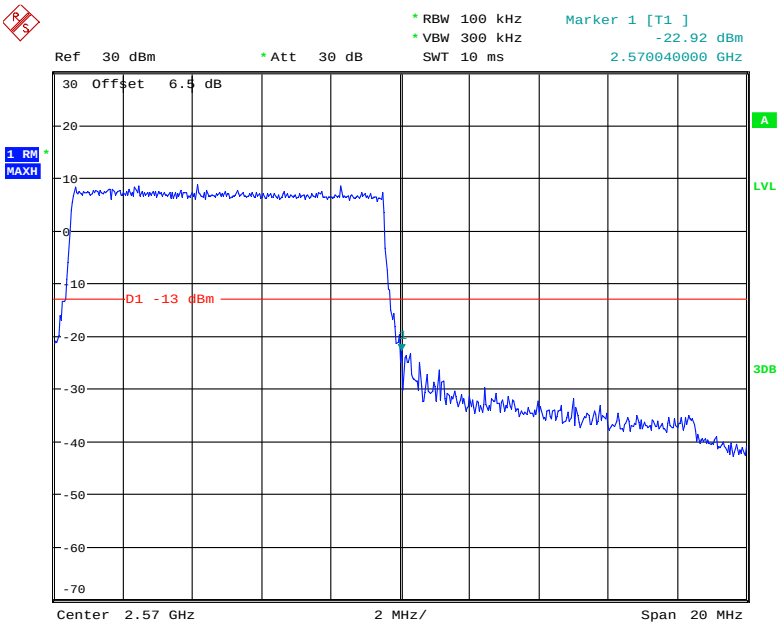
Date: 18.JUN.2020 15:39:15

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



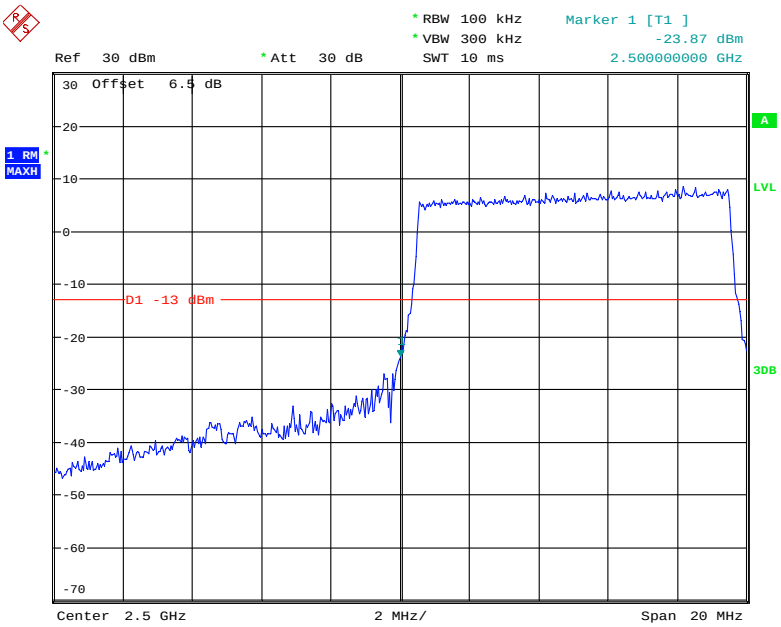
Date: 17.JUN.2020 11:25:55

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



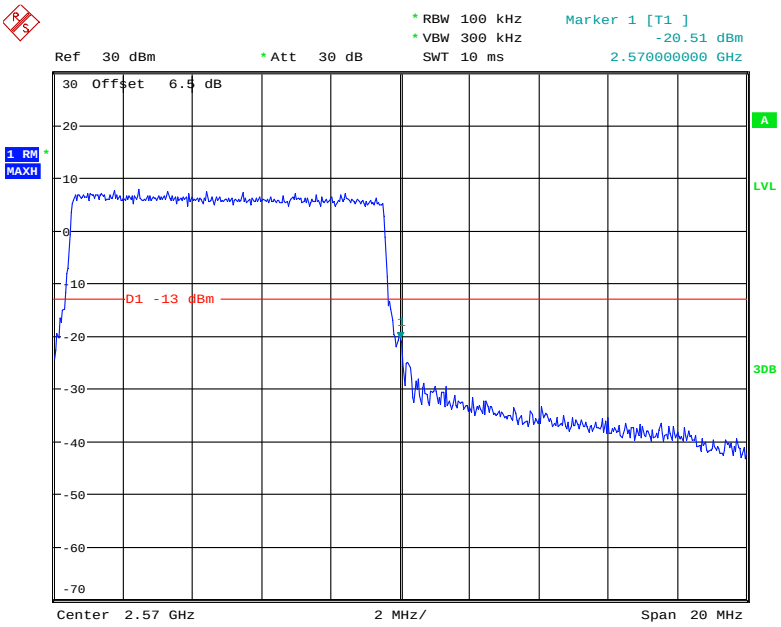
Date: 17.JUN.2020 11:26:29

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



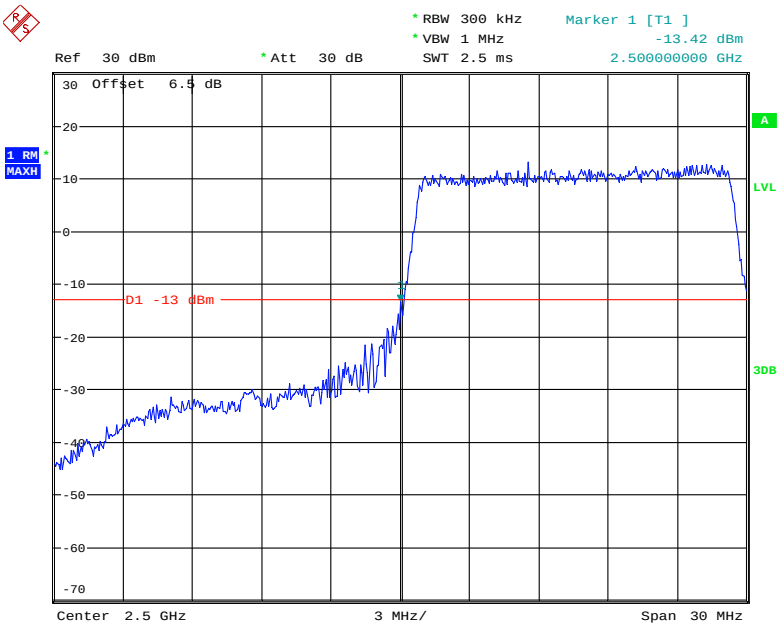
Date: 17.JUN.2020 11:26:12

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



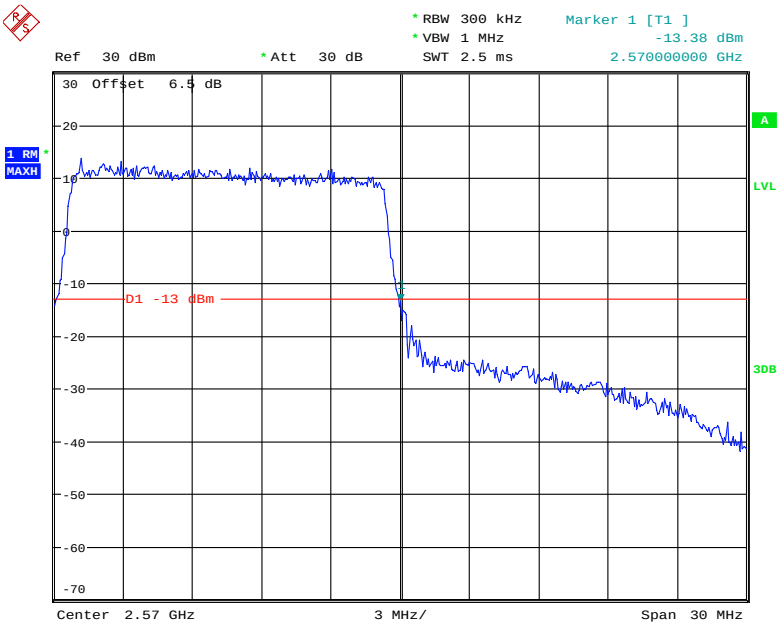
Date: 17.JUN.2020 11:26:46

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



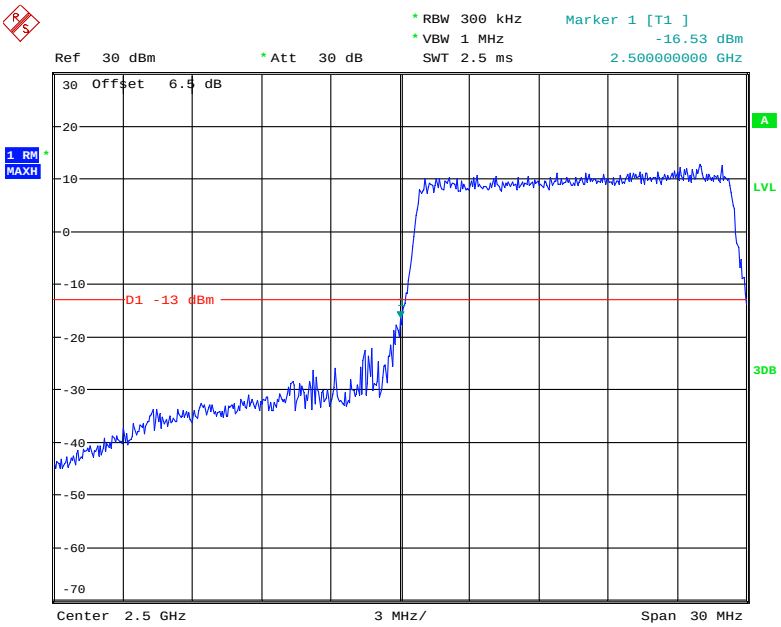
Date: 17.JUN.2020 11:27:12

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



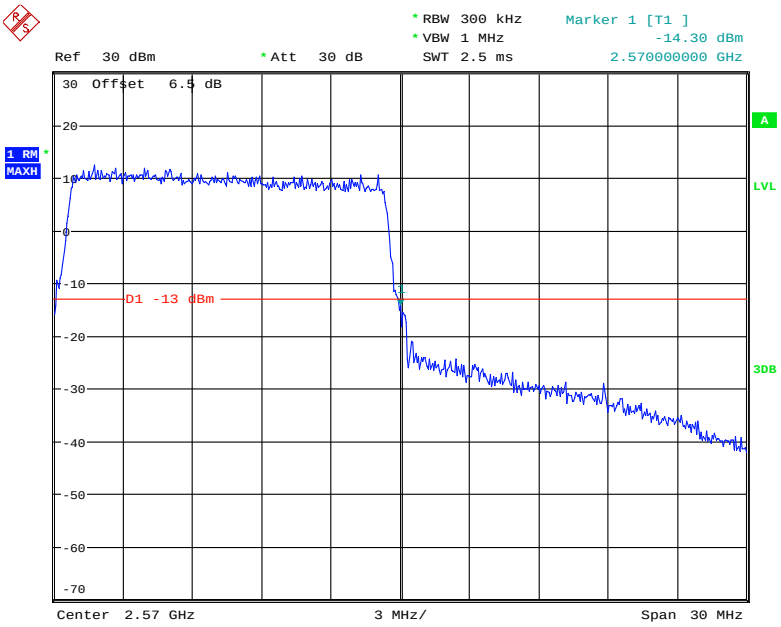
Date: 17.JUN.2020 11:27:53

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



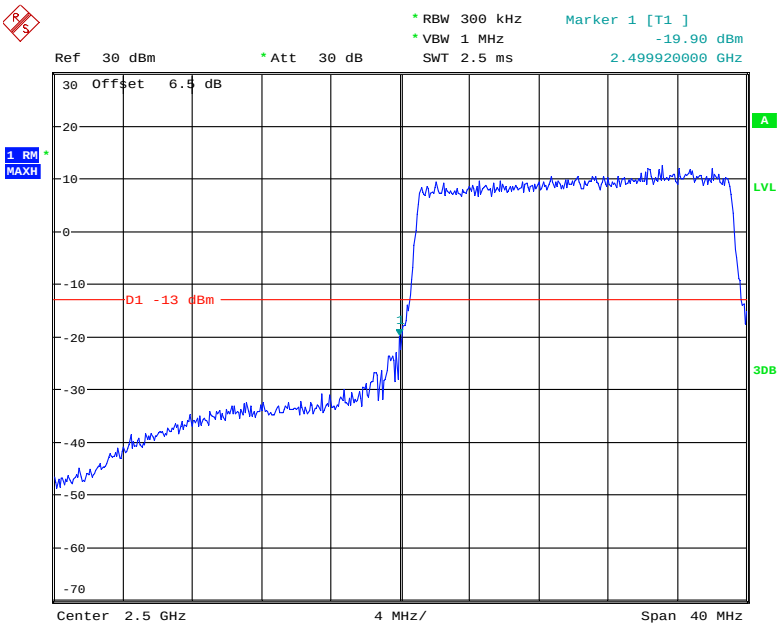
Date: 17.JUN.2020 11:27:34

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



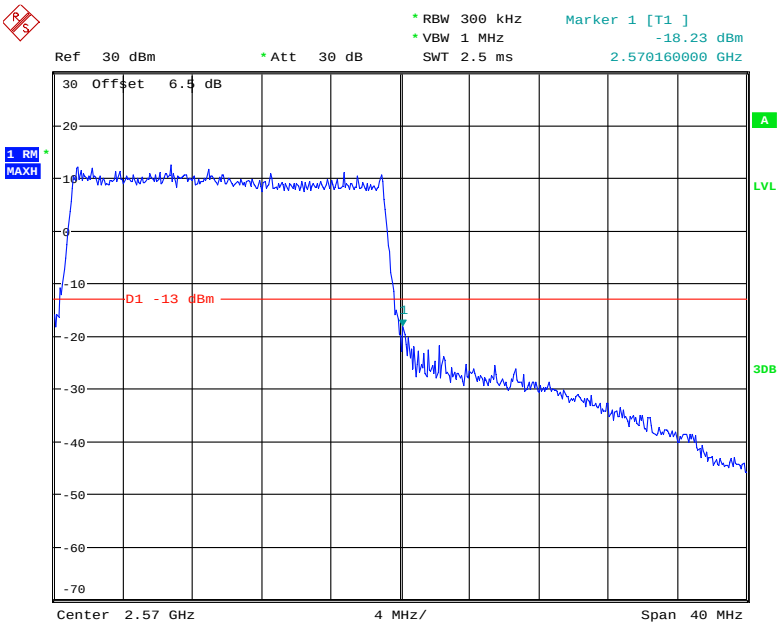
Date: 17.JUN.2020 11:28:12

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



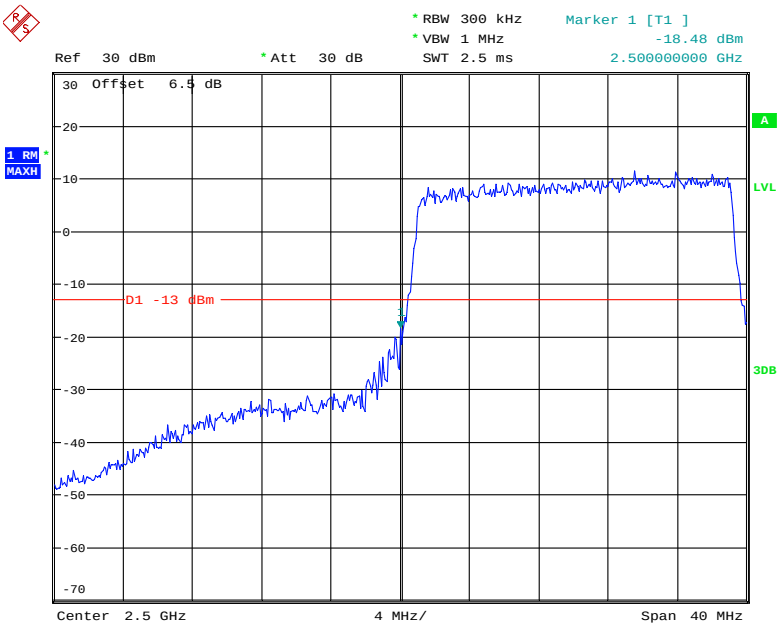
Date: 17.JUN.2020 11:28:35

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



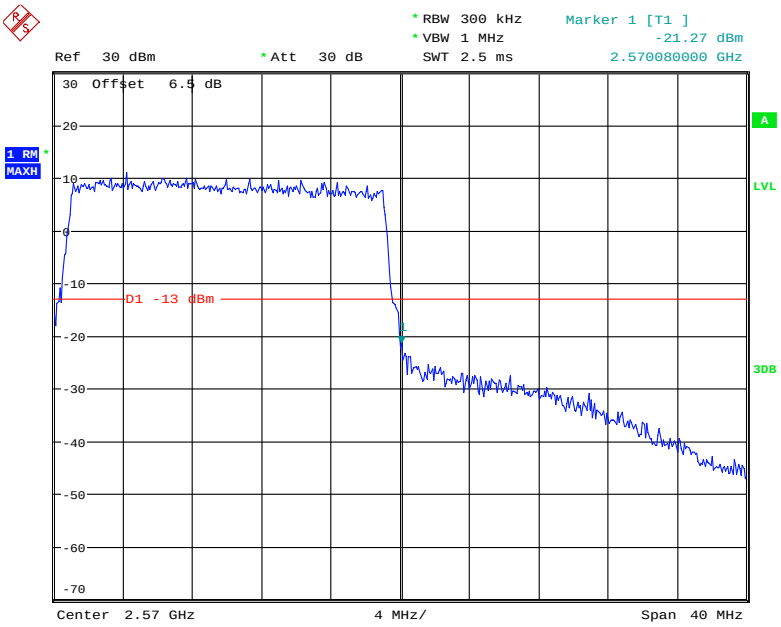
Date: 17.JUN.2020 11:29:17

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



Date: 17.JUN.2020 11:28:57

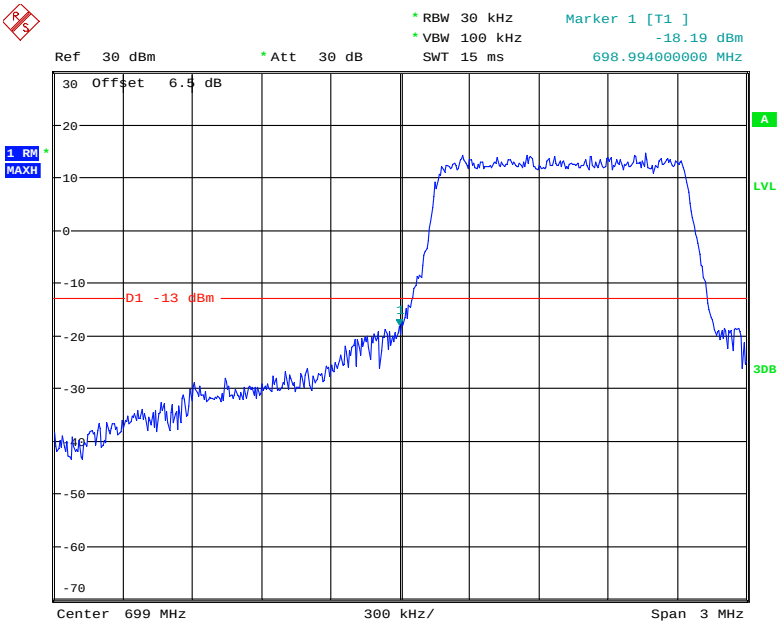
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 17.JUN.2020 11:29:36

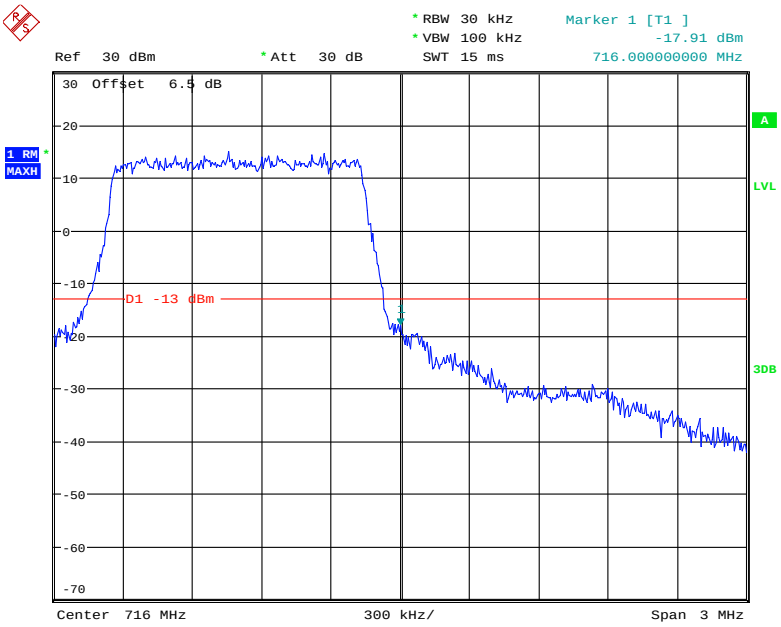
Band 12:

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



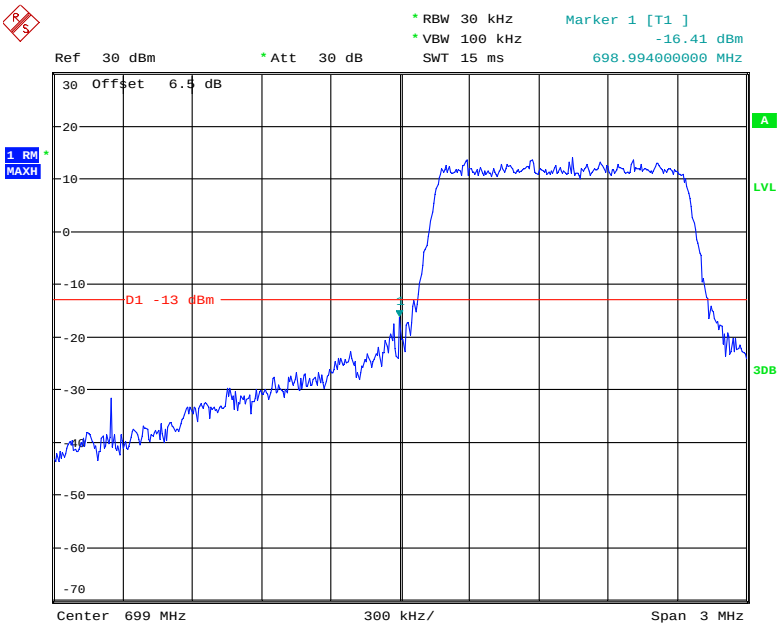
Date: 17.JUN.2020 11:29:57

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



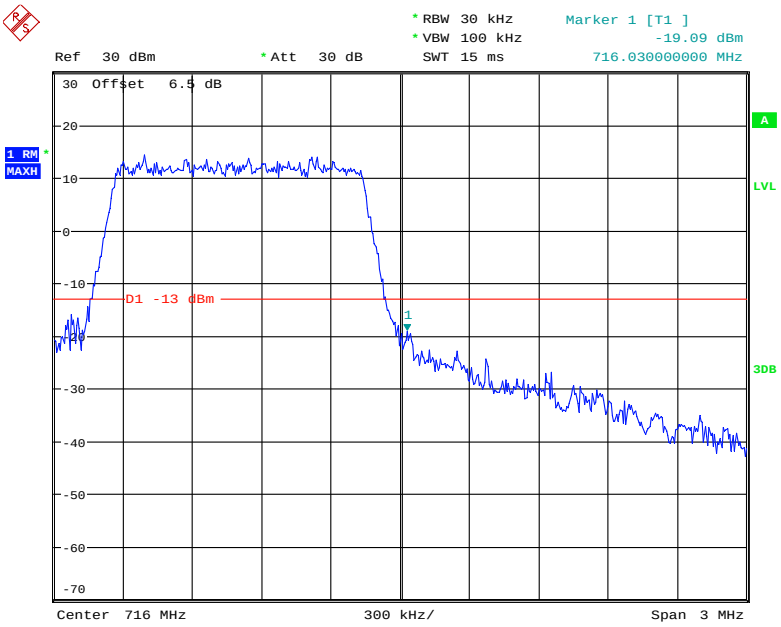
Date: 17.JUN.2020 11:30:50

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



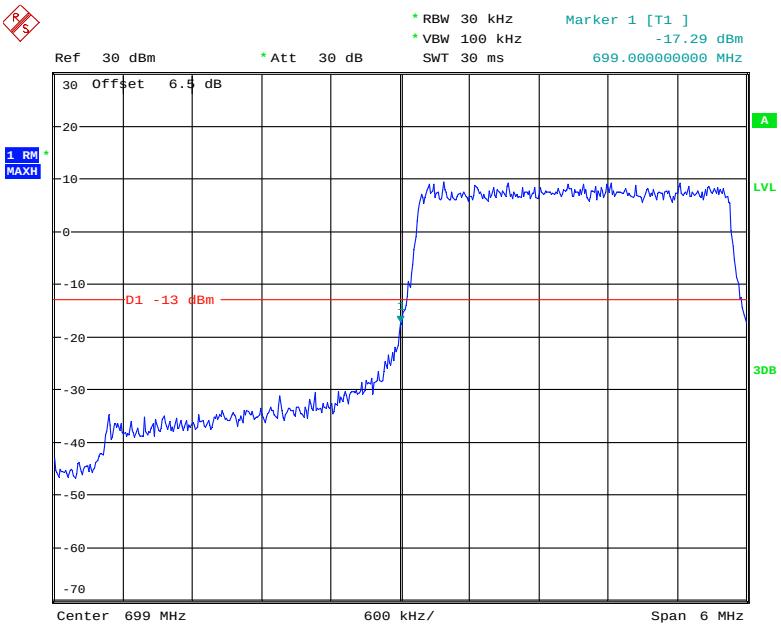
Date: 17.JUN.2020 11:30:19

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



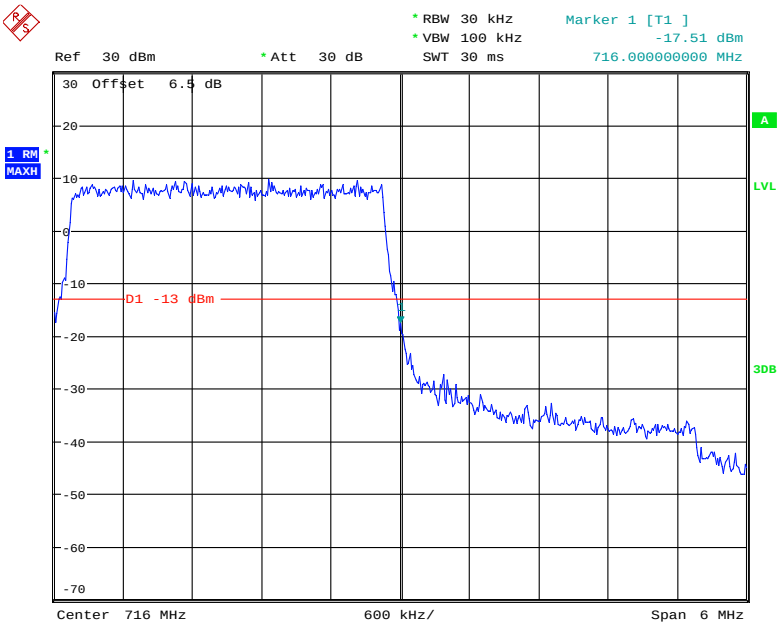
Date: 17.JUN.2020 11:31:09

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



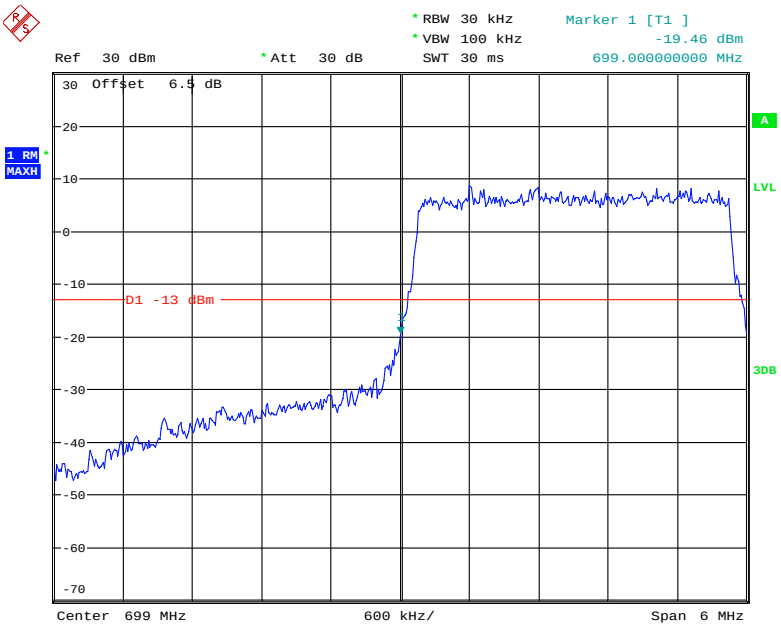
Date: 17.JUN.2020 11:31:31

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



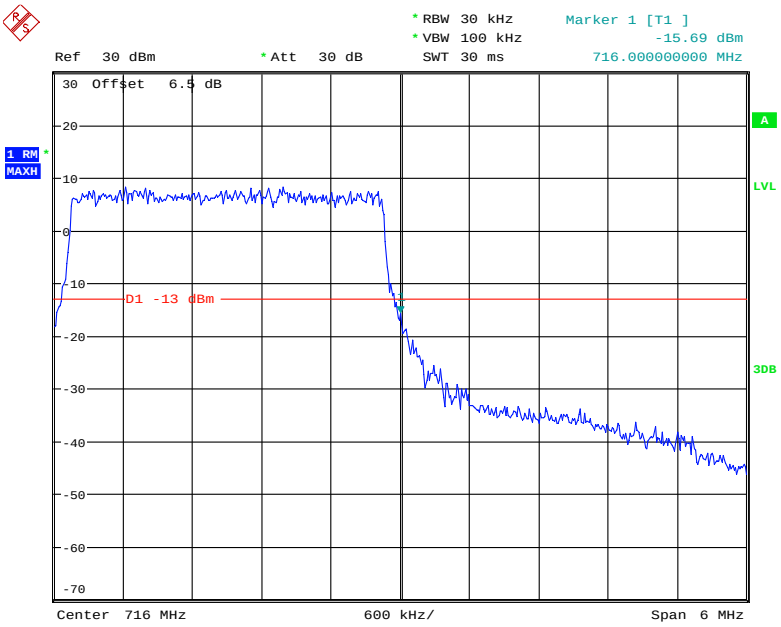
Date: 17.JUN.2020 11:32:09

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



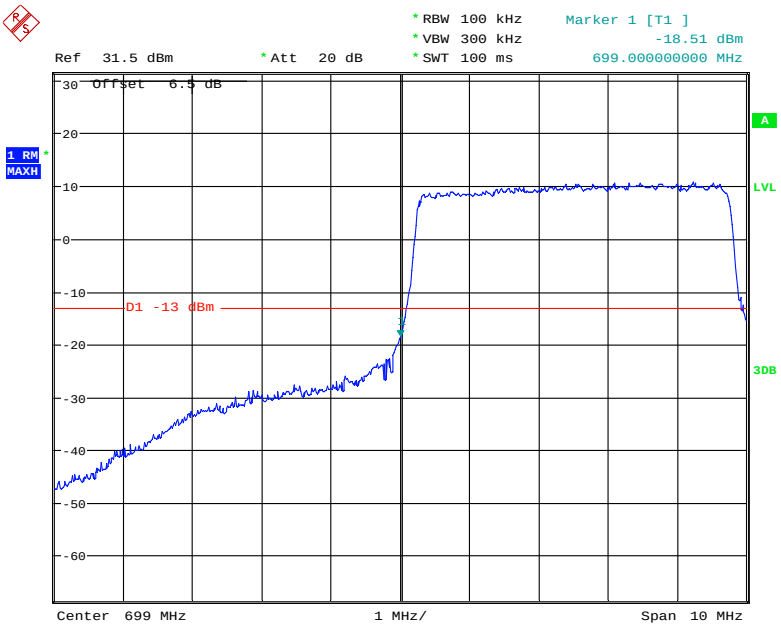
Date: 17.JUN.2020 11:31:49

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



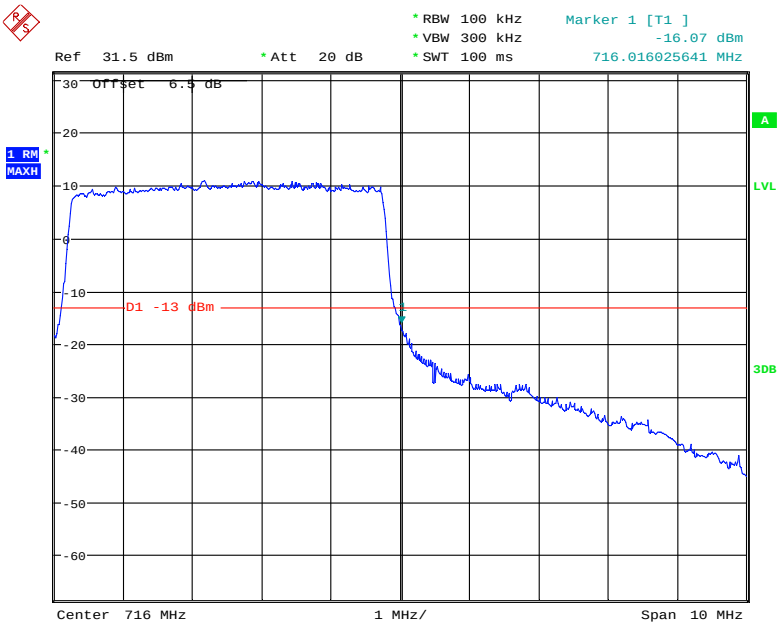
Date: 17.JUN.2020 11:32:27

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



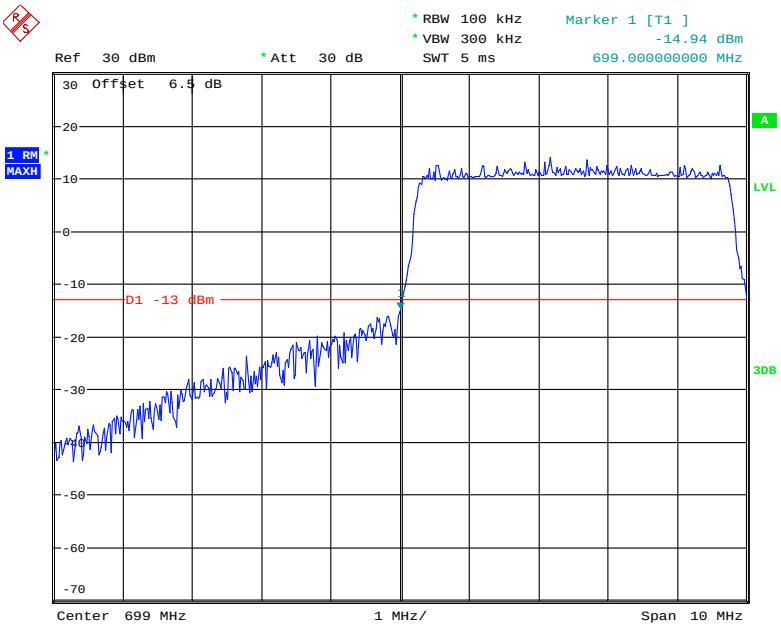
Date: 18.JUN.2020 15:41:33

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



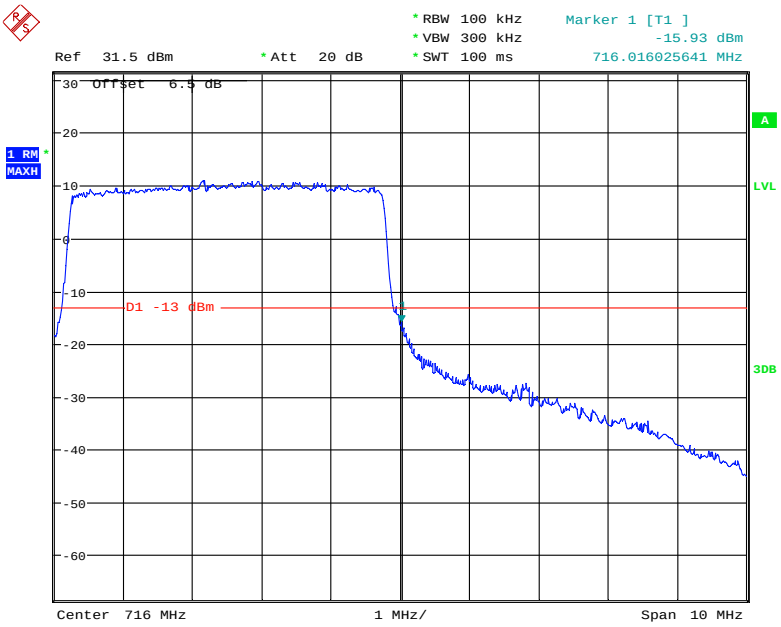
Date: 18.JUN.2020 15:42:41

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



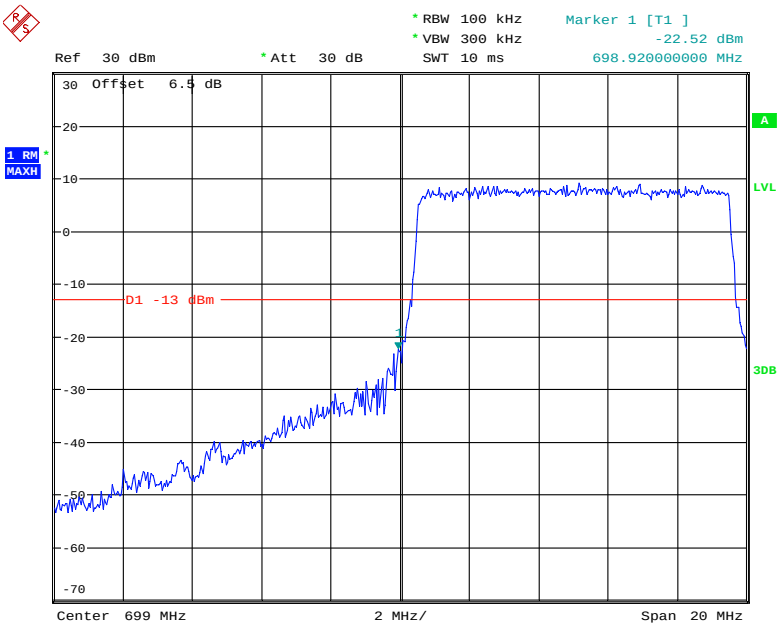
Date: 17.JUN.2020 11:33:17

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



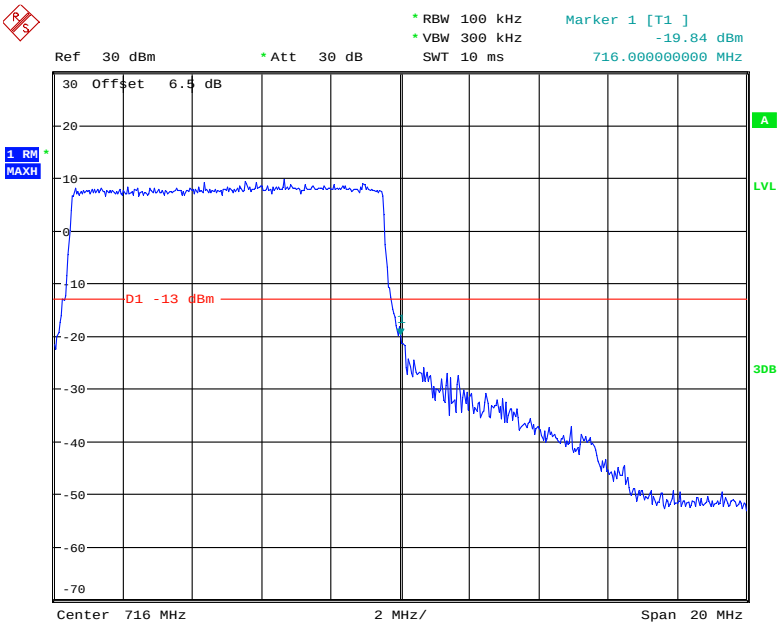
Date: 18.JUN.2020 15:43:18

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



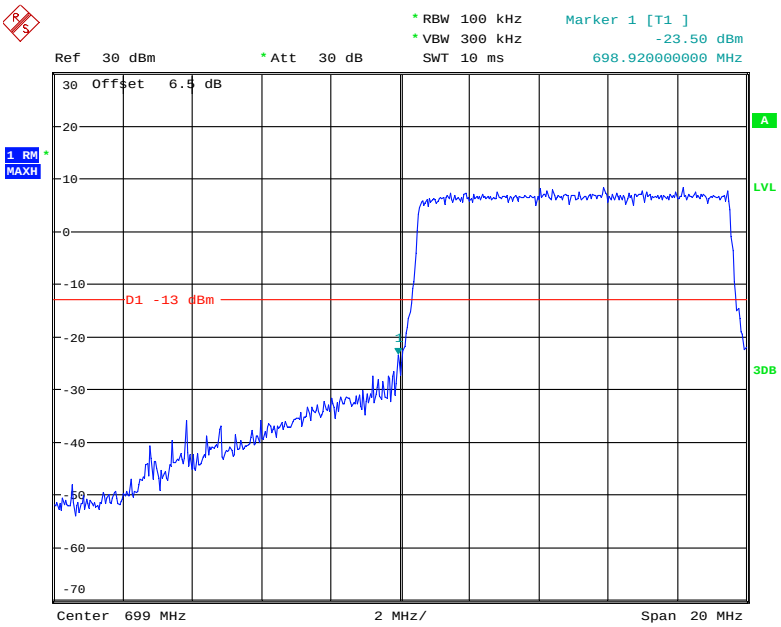
Date: 17.JUN.2020 11:34:21

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



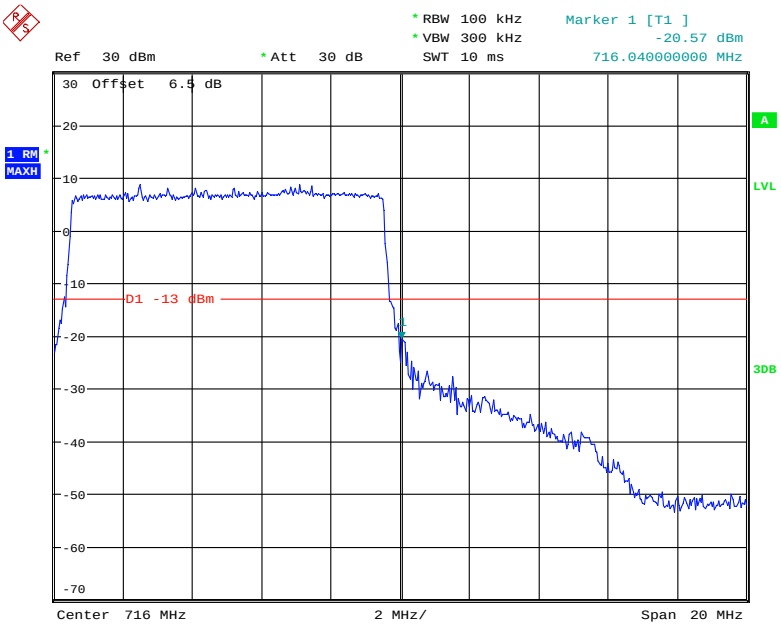
Date: 17.JUN.2020 11:34:55

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



Date: 17.JUN.2020 11:34:38

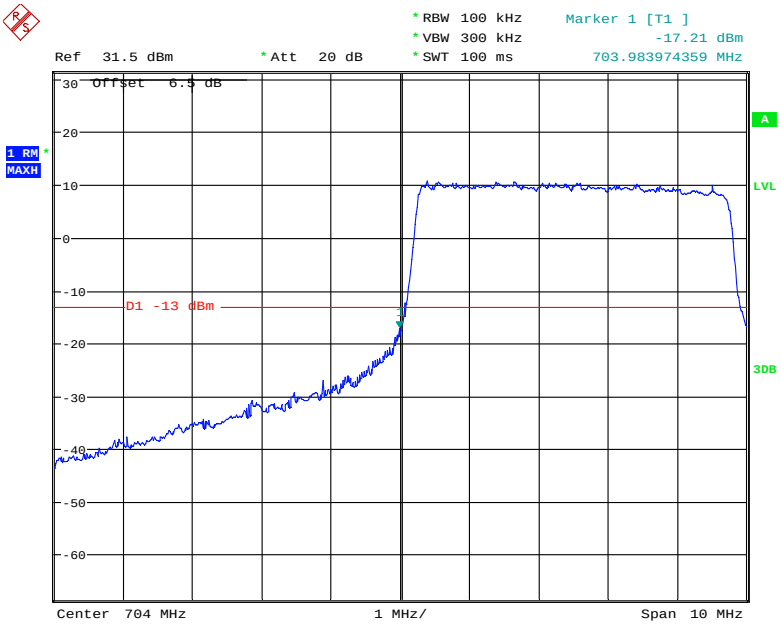
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 17.JUN.2020 11:35:12

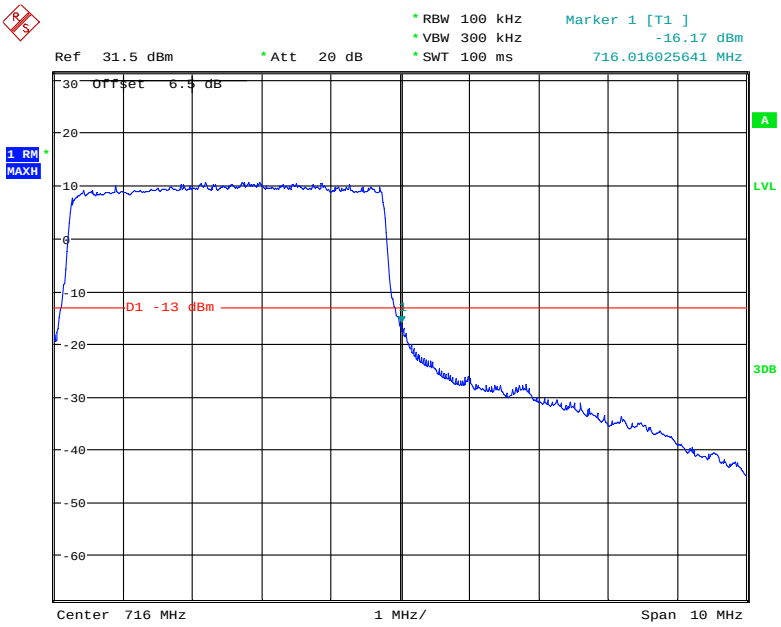
Band 17:

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



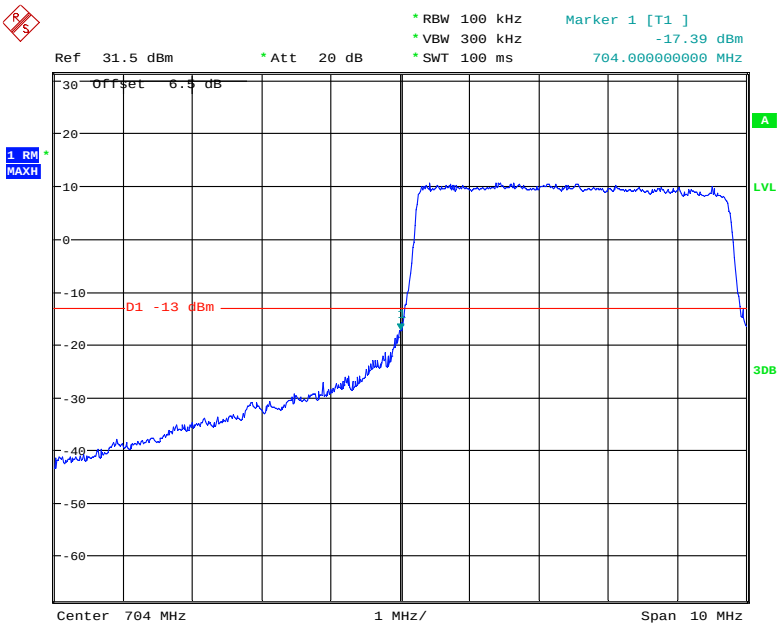
Date: 18.JUN.2020 15:45:12

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



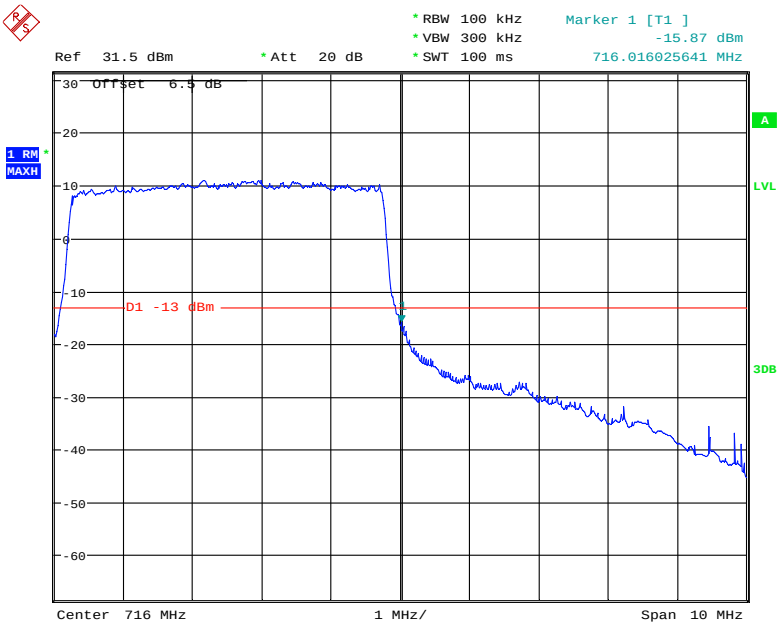
Date: 18.JUN.2020 15:47:19

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



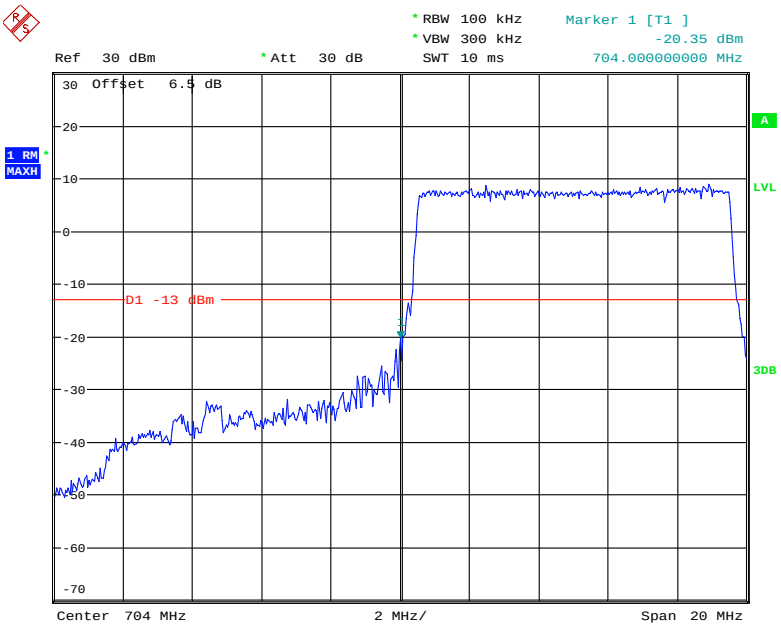
Date: 18.JUN.2020 15:44:31

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



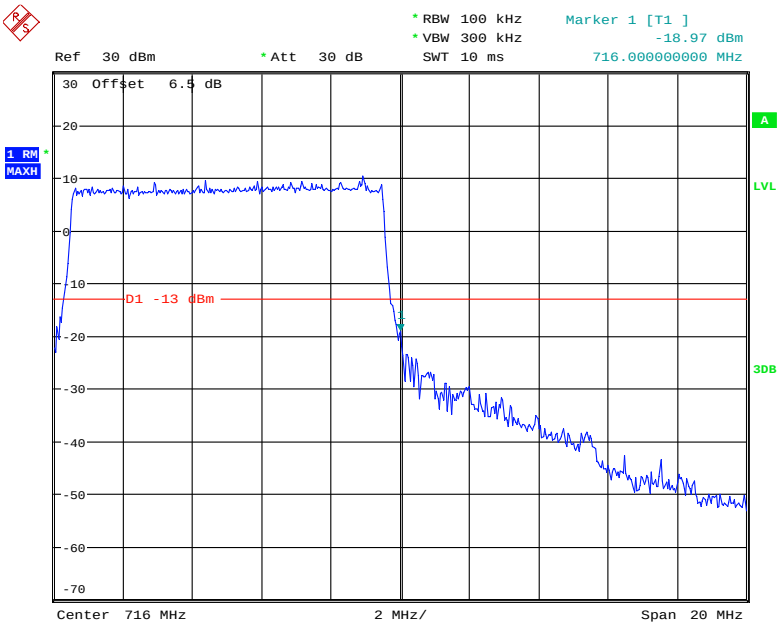
Date: 18.JUN.2020 15:53:54

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



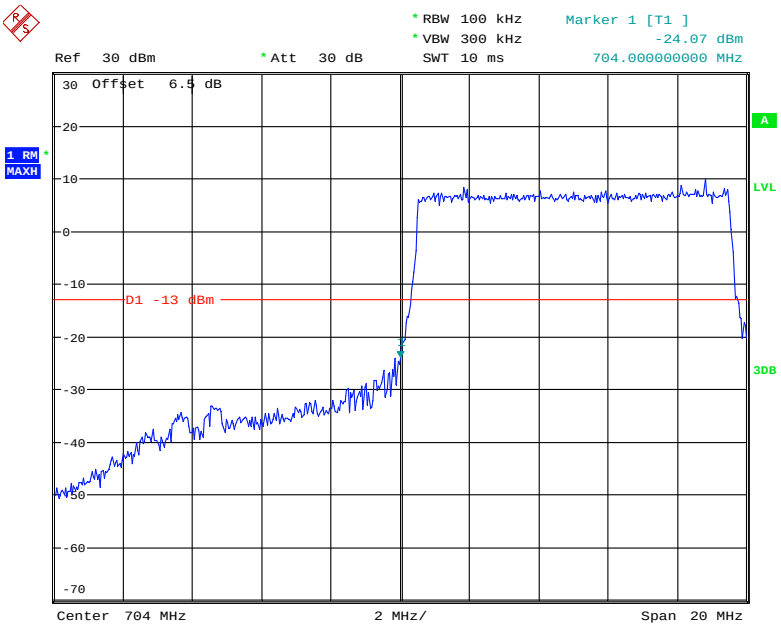
Date: 17.JUN.2020 11:37:13

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



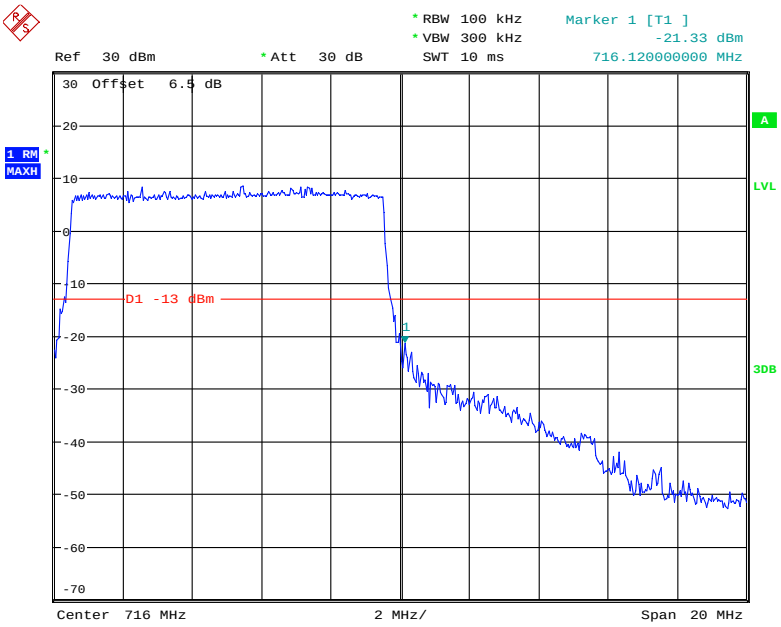
Date: 17.JUN.2020 11:37:47

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



Date: 17.JUN.2020 11:37:30

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



Date: 17.JUN.2020 11:38:07

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

Applicable Standard

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

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

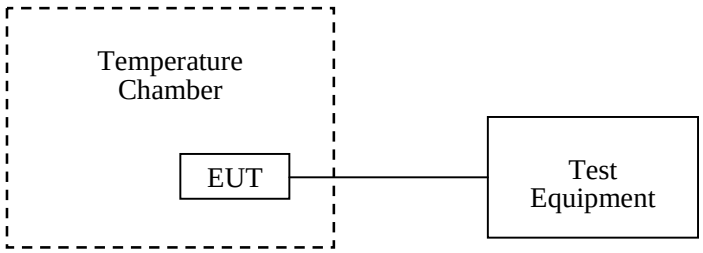
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

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

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

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



Test Data

Environmental Conditions

Temperature:	20 ℃
Relative Humidity:	55 %
ATM Pressure:	101.0 kPa

The testing was performed by Gavin Guo on 2020-06-17.

EUT operation mode: Transmitting

Test Result: Pass

Please refer to the following tables.

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	12	0.0143	2.5
-20		5	0.0060	2.5
-10		14	0.0167	2.5
0		11	0.0131	2.5
10		-9	-0.0108	2.5
20		-13	-0.0155	2.5
30		14	0.0167	2.5
40		13	0.0155	2.5
50		-4	-0.0048	2.5
20	V min.= 3.5	-9	-0.0108	2.5
	V max.= 4.2	8	0.0096	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-10	-0.0120	2.5
-20		9	0.0108	2.5
-10		8	0.0096	2.5
0		-5	-0.0060	2.5
10		-3	-0.0036	2.5
20		-2	-0.0024	2.5
30		4	0.0048	2.5
40		-5	-0.0060	2.5
50		-8	-0.0096	2.5
20	V min.= 3.5	5	0.0060	2.5
	V max.= 4.2	-6	-0.0072	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	11	0.0059	Pass
-20		12	0.0064	Pass
-10		-12	-0.0064	Pass
0		16	0.0085	Pass
10		9	0.0048	Pass
20		11	0.0059	Pass
30		18	0.0096	Pass
40		12	0.0064	Pass
50		-9	-0.0048	Pass
20	V min.= 3.5	-12	-0.0064	Pass
	V max.= 4.2	7	0.0037	Pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-1	-0.0005	Pass
-20		9	0.0048	Pass
-10		8	0.0043	Pass
0		-5	-0.0027	Pass
10		-3	-0.0016	Pass
20		-4	-0.0021	Pass
30		4	0.0021	Pass
40		-7	-0.0037	Pass
50		-10	-0.0053	Pass
20	V min.= 3.5	5	0.0027	Pass
	V max.= 4.2	-2	-0.0011	Pass

AWS Band (Part 27)

Temperature (℃)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	3.8	1710.0035	1754.9973	1710	1755
-20		1710.0062	1754.9972	1710	1755
-10		1710.0025	1754.9951	1710	1755
0		1710.0015	1754.9976	1710	1755
10		1710.0051	1754.9984	1710	1755
20		1710.0059	1754.9962	1710	1755
30		1710.0037	1754.9978	1710	1755
40		1710.0044	1754.9975	1710	1755
50		1710.0060	1754.9971	1710	1755
20	V min.= 3.5	1710.0031	1754.9951	1710	1755
	V max.= 4.2	1710.0018	1754.9970	1710	1755

LTE:
QPSK:

Band 2:

10.0 MHz Middle Channel, f_o=1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-16.81	-0.0089	pass
-20		-7.53	-0.004	pass
-10		-7.80	-0.0041	pass
0		8.82	0.0047	pass
10		-7.19	-0.0038	pass
20		6.69	0.0036	pass
30		-7.11	-0.0038	pass
40		-9.97	-0.0053	pass
50		-8.77	-0.0047	pass
20	V min.= 3.5	6.12	0.0033	pass
	V max.= 4.2	7.05	0.0038	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.0066	1754.9971	1710	1755
-20		1710.0042	1754.9968	1710	1755
-10		1710.0060	1754.9963	1710	1755
0		1710.0025	1754.9953	1710	1755
10		1710.0017	1754.9974	1710	1755
20		1710.0055	1754.9989	1710	1755
30		1710.0056	1754.9955	1710	1755
40		1710.0037	1754.9966	1710	1755
50		1710.0070	1754.9982	1710	1755
20	V min.= 3.5	1710.0040	1754.9961	1710	1755
	V max.= 4.2	1710.0011	1754.9975	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o =836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	8	0.0096	2.5
-20		7	0.0084	2.5
-10		4	0.0048	2.5
0		9	0.0108	2.5
10		7	0.0084	2.5
20		5	0.0060	2.5
30		3	0.0036	2.5
40		4	0.0048	2.5
50		7	0.0084	2.5
20	V min.= 3.5	4	0.0048	2.5
	V max.= 4.2	7	0.0084	2.5

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2500.4747	2569.6952	2500	2570
-20		2500.4760	2569.6981	2500	2570
-10		2500.4724	2569.6955	2500	2570
0		2500.4762	2569.6976	2500	2570
10		2500.4737	2569.6948	2500	2570
20		2500.4739	2569.6947	2500	2570
30		2500.4760	2569.6980	2500	2570
40		2500.4724	2569.6957	2500	2570
50		2500.4770	2569.6974	2500	2570
20	V min.= 3.5	2500.4744	2569.6948	2500	2570
	V max.= 4.2	2500.4746	2569.6940	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	699.5235	715.5860	699	716
-20		699.5232	715.5871	699	716
-10		699.5242	715.5871	699	716
0		699.5228	715.5867	699	716
10		699.5236	715.5866	699	716
20		699.5233	715.5866	699	716
30		699.5226	715.5847	699	716
40		699.5237	715.5847	699	716
50		699.5228	715.5867	699	716
20	V min.= 3.5	699.5252	715.5866	699	716
	V max.= 4.2	699.5227	715.5865	699	716

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	704.3888	715.7264	704	716
-20		704.3872	715.7256	704	716
-10		704.3887	715.7249	704	716
0		704.3878	715.7220	704	716
10		704.3882	715.7263	704	716
20		704.3866	715.7266	704	716
30		704.3886	715.7247	704	716
40		704.3876	715.7229	704	716
50		704.3876	715.7242	704	716
20	V min.= 3.5	704.3883	715.7259	704	716
	V max.= 4.2	704.3872	715.7261	704	716

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	16.42	0.0087	pass
-20		-5.79	-0.0031	pass
-10		-7.69	-0.0041	pass
0		-9.71	-0.0052	pass
10		-7.72	-0.0041	pass
20		5.04	0.0027	pass
30		-8.52	-0.0045	pass
40		-5.96	-0.0032	pass
50		-5.35	-0.0028	pass
20	V min.= 3.5	-6.80	-0.0036	pass
	V max.= 4.2	9.26	0.0049	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.0035	1754.9973	1710	1755
-20		1710.0062	1754.9972	1710	1755
-10		1710.0025	1754.9951	1710	1755
0		1710.0015	1754.9976	1710	1755
10		1710.0051	1754.9984	1710	1755
20		1710.0059	1754.9962	1710	1755
30		1710.0037	1754.9978	1710	1755
40		1710.0044	1754.9975	1710	1755
50		1710.0060	1754.9971	1710	1755
20	V min.= 3.5	1710.0031	1754.9951	1710	1755
	V max.= 4.2	1710.0018	1754.9970	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o =836.5MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	7	0.0084	2.5
-20		7	0.0084	2.5
-10		4	0.0048	2.5
0		5	0.0060	2.5
10		5	0.0060	2.5
20		3	0.0036	2.5
30		3	0.0036	2.5
40		2	0.0024	2.5
50		1	0.0012	2.5
20	V min.= 3.5	5	0.0060	2.5
	V max.= 4.2	2	0.0024	2.5

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2500.4746	2569.6947	2500	2570
-20		2500.4738	2569.6952	2500	2570
-10		2500.4760	2569.6982	2500	2570
0		2500.4735	2569.6957	2500	2570
10		2500.4760	2569.6978	2500	2570
20		2500.4738	2569.6950	2500	2570
30		2500.4742	2569.6947	2500	2570
40		2500.4741	2569.6958	2500	2570
50		2500.4726	2569.6947	2500	2570
20	V min.= 3.5	2500.4736	2569.6981	2500	2570
	V max.= 4.2	2500.4736	2569.6942	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	699.5233	715.5862	699	716
-20		699.5236	715.5848	699	716
-10		699.5230	715.5870	699	716
0		699.5248	715.5867	699	716
10		699.5226	715.5864	699	716
20		699.5239	715.5855	699	716
30		699.5236	715.5869	699	716
40		699.5225	715.5849	699	716
50		699.5248	715.5886	699	716
20	V min.= 3.5	699.5247	715.5861	699	716
	V max.= 4.2	699.5244	715.5884	699	716

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	704.3897	715.7245	704	716
-20		704.3894	715.7262	704	716
-10		704.3861	715.7244	704	716
0		704.3889	715.7255	704	716
10		704.3880	715.7240	704	716
20		704.3887	715.7265	704	716
30		704.3871	715.7276	704	716
40		704.3892	715.7241	704	716
50		704.3885	715.7269	704	716
20	V min.= 3.5	704.3866	715.7247	704	716
	V max.= 4.2	704.3890	715.7251	704	716

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