



FCC PART 27
FCC PART 22H, PART 24E
TEST REPORT

For

Vanstone Electronic (Beijing) Co.,Ltd.

Room 4-18, No.25, Landianchang South Road, Haidian, Beijing, 100097, China

FCC ID: OWLA90

Report Type: Original Report	Product Type: Smart POS Terminal
Report Number: RGMA181217002-00D	
Report Date: 2019-04-02	
Reviewed By: RF Engineer	Rocky Kang <i>Rocky Kang</i>
Prepared By: Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F., West Wing, Third Phase of Wanli Industrial Building, Shihua Road, Futian Free Trade Zone, Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008 www.baclcorp.com.cn	

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Smart POS Terminal
Model	A90
Frequency Range	WCDMA B5: 824-849 MHz, 869-894 MHz WCDMA B2: 1850-1910 MHz, 1930-1990MHz WCDMA B4: 1710- 1755MHz, 2110-2155MHz LTE B2: 1850-1910 MHz, 1930-1990MHz LTE B5: 824-849 MHz, 869-894 MHz LTE B4: 1710-1755 MHz, 2110-2155MHz LTE B7: 2500-2570 MHz, 2620-2690 MHz LTE B12: 699-716 MHz, 729-746 MHz LTE B13: 777-787 MHz, 746-756 MHz LTE B17: 704-716 MHz, 734-746 MHz
Transmit Power	Conducted target power: WCDMA B5:22.6dBm,WCDMA B2: 22.5dBm,WCDMA B4: 22.4dBm LTE B2: 23.2dBm,LTE B5: 23.1dBm,LTE B4: 23dBm,LTE B7: 24.0dBm LTE B12: 23.5dBm,LTE B13: 23.3dBm, LTE B17: 23.3dBm
Modulation Technique	3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification	3G/4G:FPC Antennas
Voltage Range	DC 3.8 V from rechargeable Li-pol battery or DC 5V from adapter
Date of Test	2019-01-10 to 2019-04-02
Sample serial number	00021000001
Received date	2018-12-17
Sample/EUT Status	Good condition
Adapter information	Model:TPA-46050200UU Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5.0V, 2000mA

Objective

This test report is prepared on behalf of *Vanstone Electronic (Beijing) Co.,Ltd.* 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)

Part 15.247 DSS & DTS and Part 15.225 DXX submissions with FCC ID: OWLA90.

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-D.

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°C
Humidity		±6%
Supply voltages		±0.4%

Note: 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-D.
The final qualification test was performed with the EUT operating at normal mode.

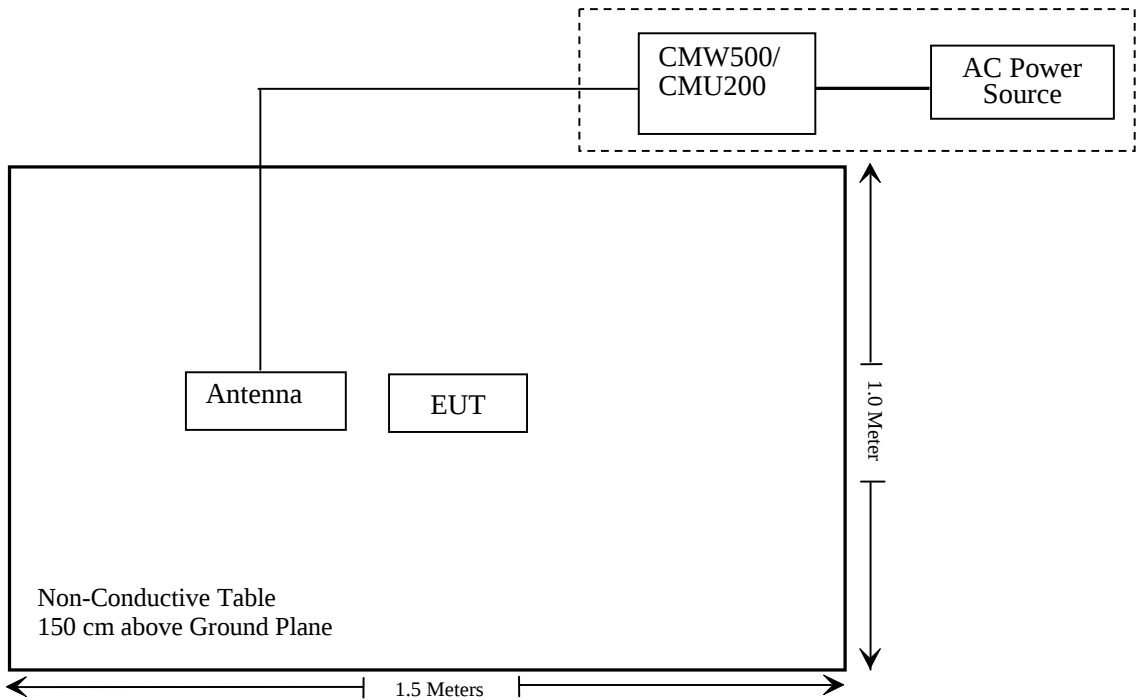
Equipment Modifications

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 (c) (f) (g) (h)(m)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (c) (f) (g) (h)(m)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (c) (f) (g) (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: GMA181217002-SA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	Signal Analyzer	FSV40	101473	2019-01-09	2020-01-08
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Anritsu	Signal Generator	68369B	004114	2018-12-24	2019-12-24
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2018-07-11	2019-07-11
COM-POWER	Dipole Antenna	AD-100	41000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-07-11	2021-07-10
Ducommun Technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	RG-214	1	2018-11-19	2019-05-21
Ducommun Technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-03	2017-12-29	2020-12-28
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-11-12	2019-11-12

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2018-12-24	2019-12-24
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2018-12-21	2019-12-21
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2018-12-14	2019-12-14
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2018-06-23	2019-06-23
Ducommun Technologies	RF Cable	RG-214	3	Each Time	
WEINSCHTEL	10dB Attenuator	5324	AU 3842	Each Time	
WEINSCHTEL	3dB Attenuator	6231	666	Each Time	
Unknown	Power Splitter	1620	129	Each Time	

* 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: RGMA181217002-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.

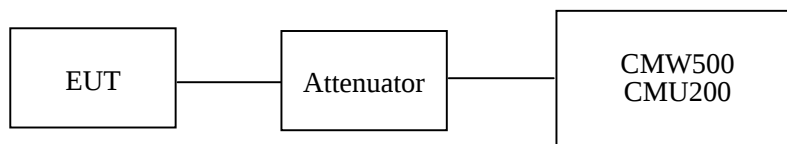
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2019-03-08.

Conducted Power**Cellular Band (Part 22H)**

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.55	22.30	21.95
		HSDPA	1	21.56	21.23	21.05
			2	21.73	21.93	21.34
			3	21.82	22.08	21.43
			4	21.74	21.96	21.35
		HSUPA	1	21.50	21.25	21.03
			2	21.72	21.92	21.26
			3	21.86	22.08	21.43
			4	21.66	21.92	21.27
			5	21.84	22.08	21.42

PCS Band (Part 24E)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		22.20	22.45	22.18
		HSDPA	1	21.20	21.43	21.34
			2	20.38	20.33	20.37
			3	20.48	20.38	20.56
			4	20.36	20.35	20.34
		HSUPA	1	21.24	21.45	21.32
			2	20.34	20.39	20.34
			3	20.54	20.31	20.44
			4	20.31	20.36	20.34
			5	20.46	20.42	20.47

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		22.10	22.35	22.17
		HSDPA	1	20.53	20.63	20.54
			2	20.41	20.33	20.33
			3	20.40	20.38	20.52
			4	20.33	20.35	20.37
		HSUPA	1	20.40	20.45	20.37
			2	20.34	20.33	20.34
			3	20.54	20.32	20.47
			4	20.31	20.39	20.32
			5	20.46	20.42	20.43

Peak-to-average ratio (PAR)**Cellular Band**

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.59	13
	Middle	3.65	13
	High	3.85	13
HSDPA (16QAM)	Low	3.87	13
	Middle	3.66	13
	High	3.86	13
HSUPA (BPSK)	Low	3.68	13
	Middle	3.64	13
	High	3.64	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.63	13
	Middle	3.63	13
	High	3.87	13
HSDPA (16QAM)	Low	3.84	13
	Middle	3.66	13
	High	3.65	13
HSUPA (BPSK)	Low	3.89	13
	Middle	3.61	13
	High	3.82	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.18	13
	Middle	3.18	13
	High	3.17	13
HSDPA (16QAM)	Low	3.18	13
	Middle	3.19	13
	High	3.19	13
HSUPA (BPSK)	Low	3.19	13
	Middle	3.20	13
	High	3.21	13

Radiated Power**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	81.21	320	2.4	H	19.2	1.88	0.0	17.32	38.45	21.13
836.6	77.19	272	1.6	V	11.8	1.88	0.0	14.92	38.45	23.53
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	80.92	42	1.0	H	10.9	1.30	9.40	19.00	33	14.0
1880.00	79.36	256	1.7	V	9.1	1.30	9.40	17.20	33	15.80
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	84.01	145	1.5	H	10.8	1.30	8.90	18.40	30	11.60
1732.60	81.59	266	1.8	V	9.0	1.30	8.90	16.60	30	13.40

Note:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

LTE Band 2:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.74	22.76	22.68
		RB Size=1, RB Offset=2	22.53	22.62	22.64
		RB Size=1, RB Offset=5	22.38	22.70	22.64
		RB Size=3, RB Offset=0	22.43	22.38	22.29
		RB Size=3, RB Offset=1	22.29	22.36	22.17
		RB Size=3, RB Offset=2	22.30	22.17	22.20
		RB Size=6, RB Offset=0	22.31	22.06	22.07
	16QAM	RB Size=1, RB Offset=0	22.19	22.14	22.24
		RB Size=1, RB Offset=2	22.11	21.98	22.02
		RB Size=1, RB Offset=5	22.10	22.02	23.10
		RB Size=3, RB Offset=0	21.84	21.67	22.92
		RB Size=3, RB Offset=1	21.74	21.82	21.74
		RB Size=3, RB Offset=2	21.82	21.97	21.81
		RB Size=6, RB Offset=0	21.86	21.70	21.68
3.0	QPSK	RB Size=1, RB Offset=0	22.86	22.84	22.89
		RB Size=1, RB Offset=7	22.72	22.64	22.74
		RB Size=1, RB Offset=14	22.67	22.64	22.83
		RB Size=8, RB Offset=0	21.96	21.84	22.04
		RB Size=8, RB Offset=4	21.78	21.65	21.77
		RB Size=8, RB Offset=7	21.57	21.59	21.79
		RB Size=15, RB Offset=0	21.71	21.82	21.86
	16QAM	RB Size=1, RB Offset=0	22.04	22.14	22.01
		RB Size=1, RB Offset=7	22.13	22.11	22.05
		RB Size=1, RB Offset=14	22.24	21.85	21.98
		RB Size=8, RB Offset=0	20.85	20.79	20.95
		RB Size=8, RB Offset=4	20.72	20.81	20.93
		RB Size=8, RB Offset=7	20.46	20.70	20.95
		RB Size=15, RB Offset=0	20.76	20.81	20.82

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	22.90	22.85	22.93
		RB Size=1, RB Offset=12	22.80	22.76	22.62
		RB Size=1, RB Offset=24	22.59	22.76	22.35
		RB Size=12, RB Offset=0	21.93	21.80	21.89
		RB Size=12, RB Offset=6	21.78	21.83	21.67
		RB Size=12, RB Offset=11	21.77	21.50	21.64
		RB Size=25, RB Offset=0	21.80	21.72	21.70
	16QAM	RB Size=1, RB Offset=0	22.01	21.66	21.66
		RB Size=1, RB Offset=12	21.92	21.39	21.64
		RB Size=1, RB Offset=24	21.83	21.34	21.62
		RB Size=12, RB Offset=0	20.71	20.75	20.75
		RB Size=12, RB Offset=6	20.93	20.74	20.58
		RB Size=12, RB Offset=11	20.66	20.45	20.53
		RB Size=25, RB Offset=0	20.86	20.78	20.79
10.0	QPSK	RB Size=1, RB Offset=0	22.82	22.82	22.66
		RB Size=1, RB Offset=24	22.73	22.80	22.69
		RB Size=1, RB Offset=49	22.54	22.72	22.68
		RB Size=25, RB Offset=0	21.81	21.67	21.80
		RB Size=25, RB Offset=12	21.70	21.67	21.73
		RB Size=25, RB Offset=24	21.85	21.64	21.68
		RB Size=50, RB Offset=0	21.57	21.52	21.52
	16QAM	RB Size=1, RB Offset=0	21.75	21.73	21.68
		RB Size=1, RB Offset=24	21.59	21.51	21.70
		RB Size=1, RB Offset=49	21.46	21.46	21.84
		RB Size=25, RB Offset=0	22.72	20.71	20.66
		RB Size=25, RB Offset=12	22.41	20.65	20.58
		RB Size=25, RB Offset=24	22.60	20.30	20.25
		RB Size=50, RB Offset=0	20.42	20.51	20.48

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	22.15	22.13	22.37
		RB Size=1, RB Offset=37	21.97	21.91	22.22
		RB Size=1, RB Offset=74	22.15	22.06	22.18
		RB Size=36, RB Offset=0	22.03	22.02	22.13
		RB Size=36, RB Offset=18	22.02	21.92	21.99
		RB Size=36, RB Offset=37	22.28	21.72	21.67
		RB Size=75, RB Offset=0	21.97	21.89	22.06
	16QAM	RB Size=1, RB Offset=0	21.90	21.87	21.70
		RB Size=1, RB Offset=37	21.88	21.92	21.53
		RB Size=1, RB Offset=74	21.75	21.82	21.52
		RB Size=36, RB Offset=0	21.85	21.78	22.11
		RB Size=36, RB Offset=18	21.83	21.80	22.02
		RB Size=36, RB Offset=37	21.60	21.70	21.91
		RB Size=75, RB Offset=0	21.20	21.14	20.89
20.0	QPSK	RB Size=1, RB Offset=0	22.87	22.98	23.05
		RB Size=1, RB Offset=49	22.95	22.79	22.96
		RB Size=1, RB Offset=99	22.95	22.90	22.80
		RB Size=50, RB Offset=0	21.81	21.88	21.95
		RB Size=50, RB Offset=24	21.80	21.80	21.98
		RB Size=50, RB Offset=49	21.68	21.74	21.62
		RB Size=100, RB Offset=0	21.82	21.77	21.80
	16QAM	RB Size=1, RB Offset=0	22.04	21.92	22.20
		RB Size=1, RB Offset=49	22.07	21.81	21.96
		RB Size=1, RB Offset=99	21.96	21.79	21.99
		RB Size=50, RB Offset=0	20.91	20.97	21.12
		RB Size=50, RB Offset=24	20.75	20.91	21.01
		RB Size=50, RB Offset=49	20.50	20.75	20.90
		RB Size=100, RB Offset=0	20.90	20.78	20.94

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.83	13	Pass
QPSK (100RB Size)	5.87	13	Pass
16QAM (1RB Size)	6.85	13	Pass
16QAM (100RB Size)	6.92	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	79.30	336	1.9	H	9.3	1.30	9.40	17.40	33
1880.00	77.47	235	2.1	V	7.2	1.30	9.40	15.30	33
3 MHz Bandwidth									
1880.00	79.62	56	1.3	H	9.6	1.30	9.40	17.70	33
1880.00	77.98	189	1.5	V	7.7	1.30	9.40	15.80	33
5 MHz Bandwidth									
1880.00	79.28	284	1.2	H	9.2	1.30	9.40	17.30	33
1880.00	77.39	79	1.8	V	7.1	1.30	9.40	15.20	33
10 MHz Bandwidth									
1880.00	79.60	133	2.4	H	9.6	1.30	9.40	17.70	33
1880.00	77.09	344	2.4	V	6.8	1.30	9.40	14.90	33
15 MHz Bandwidth									
1880.00	79.03	197	2.2	H	9.0	1.30	9.40	17.10	33
1880.00	77.22	24	1.0	V	7.0	1.30	9.40	15.10	33
20 MHz Bandwidth									
1880.00	79.16	248	2.0	H	9.1	1.30	9.40	17.20	33
1880.00	76.95	227	1.2	V	6.7	1.30	9.40	14.80	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	79.76	55	1.4	H	9.7	1.30	9.40	17.80	33
1880.00	78.10	96	1.7	V	7.8	1.30	9.40	15.90	33
3 MHz Bandwidth									
1880.00	79.46	191	1.1	H	9.4	1.30	9.40	17.50	33
1880.00	78.26	23	2.3	V	8.0	1.30	9.40	16.10	33
5 MHz Bandwidth									
1880.00	78.70	177	1.8	H	8.7	1.30	9.40	16.80	33
1880.00	76.69	244	2.1	V	6.4	1.30	9.40	14.50	33
10 MHz Bandwidth									
1880.00	78.97	341	1.5	H	8.9	1.30	9.40	17.00	33
1880.00	76.25	322	1.3	V	6.0	1.30	9.40	14.10	33
15 MHz Bandwidth									
1880.00	79.27	87	2.5	H	9.2	1.30	9.40	17.30	33
1880.00	77.30	74	2.3	V	7.0	1.30	9.40	15.10	33
20 MHz Bandwidth									
1880.00	79.01	272	2.2	H	9.0	1.30	9.40	17.10	33
1880.00	77.12	36	1.0	V	6.9	1.30	9.40	15.00	33

LTE Band 4:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.45	22.48	22.55
		RB Size=1, RB Offset=2	22.56	22.31	22.43
		RB Size=1, RB Offset=5	22.41	22.04	22.57
		RB Size=3, RB Offset=0	22.67	22.76	22.64
		RB Size=3, RB Offset=1	22.48	22.67	22.81
		RB Size=3, RB Offset=2	22.55	22.63	22.52
		RB Size=6, RB Offset=0	21.55	21.51	21.41
	16QAM	RB Size=1, RB Offset=0	21.86	21.88	22.04
		RB Size=1, RB Offset=2	21.81	21.80	21.71
		RB Size=1, RB Offset=5	21.70	21.84	21.95
		RB Size=3, RB Offset=0	22.85	21.78	21.83
		RB Size=3, RB Offset=1	22.85	21.78	21.72
		RB Size=3, RB Offset=2	22.71	21.75	21.72
		RB Size=6, RB Offset=0	20.61	20.69	20.75
3.0	QPSK	RB Size=1, RB Offset=0	22.62	22.52	22.51
		RB Size=1, RB Offset=7	22.30	22.41	22.22
		RB Size=1, RB Offset=14	22.41	22.22	22.29
		RB Size=8, RB Offset=0	21.55	21.53	21.60
		RB Size=8, RB Offset=4	21.50	21.46	21.63
		RB Size=8, RB Offset=7	21.36	21.40	21.67
		RB Size=15, RB Offset=0	21.61	21.73	21.70
	16QAM	RB Size=1, RB Offset=0	21.61	21.63	21.60
		RB Size=1, RB Offset=7	21.72	21.71	21.45
		RB Size=1, RB Offset=14	21.64	21.55	21.28
		RB Size=8, RB Offset=0	20.80	20.75	20.79
		RB Size=8, RB Offset=4	20.61	20.55	20.79
		RB Size=8, RB Offset=7	20.70	20.80	20.66
		RB Size=15, RB Offset=0	20.63	20.85	20.84

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.71	22.60	22.70
		RB Size=1, RB Offset=12	22.60	22.61	22.66
		RB Size=1, RB Offset=24	22.55	22.43	22.59
		RB Size=12, RB Offset=0	21.71	21.63	21.76
		RB Size=12, RB Offset=6	21.76	21.73	21.59
		RB Size=12, RB Offset=11	21.43	21.78	21.58
		RB Size=25, RB Offset=0	21.71	21.75	21.62
	16QAM	RB Size=1, RB Offset=0	22.04	21.83	21.91
		RB Size=1, RB Offset=12	21.73	21.82	21.78
		RB Size=1, RB Offset=24	21.71	21.79	21.62
		RB Size=12, RB Offset=0	20.91	20.90	21.11
		RB Size=12, RB Offset=6	20.92	20.99	20.86
		RB Size=12, RB Offset=11	20.81	20.74	20.90
		RB Size=25, RB Offset=0	20.93	20.61	20.61
10.0	QPSK	RB Size=1, RB Offset=0	22.78	22.75	22.67
		RB Size=1, RB Offset=24	22.64	22.51	22.69
		RB Size=1, RB Offset=49	22.56	22.77	22.74
		RB Size=25, RB Offset=0	21.81	21.87	21.66
		RB Size=25, RB Offset=12	21.56	21.82	21.82
		RB Size=25, RB Offset=24	21.66	21.48	21.71
		RB Size=50, RB Offset=0	21.86	21.86	21.70
	16QAM	RB Size=1, RB Offset=0	22.14	22.26	22.22
		RB Size=1, RB Offset=24	22.00	22.15	22.28
		RB Size=1, RB Offset=49	22.09	22.15	22.15
		RB Size=25, RB Offset=0	20.85	20.83	20.91
		RB Size=25, RB Offset=12	20.73	20.56	20.95
		RB Size=25, RB Offset=24	20.69	20.74	20.73
		RB Size=50, RB Offset=0	20.99	20.92	20.87

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	22.60	22.48	22.54
		RB Size=1, RB Offset=37	22.71	22.45	22.44
		RB Size=1, RB Offset=74	22.56	22.48	22.51
		RB Size=36, RB Offset=0	22.02	21.86	21.98
		RB Size=36, RB Offset=18	21.84	21.79	21.82
		RB Size=36, RB Offset=37	22.10	21.63	21.75
		RB Size=75, RB Offset=0	21.69	21.56	21.54
	16QAM	RB Size=1, RB Offset=0	21.69	21.50	21.60
		RB Size=1, RB Offset=37	21.74	21.56	21.68
		RB Size=1, RB Offset=74	21.54	21.50	21.43
		RB Size=36, RB Offset=0	20.78	20.65	20.69
		RB Size=36, RB Offset=18	20.84	20.58	20.64
		RB Size=36, RB Offset=37	20.57	20.53	20.53
		RB Size=75, RB Offset=0	20.74	20.74	20.91
20.0	QPSK	RB Size=1, RB Offset=0	22.83	22.43	22.59
		RB Size=1, RB Offset=49	22.66	22.25	22.41
		RB Size=1, RB Offset=99	22.68	22.37	22.20
		RB Size=50, RB Offset=0	21.92	21.88	21.99
		RB Size=50, RB Offset=24	21.85	21.96	21.91
		RB Size=50, RB Offset=49	21.74	21.93	21.84
		RB Size=100, RB Offset=0	21.69	21.45	21.54
	16QAM	RB Size=1, RB Offset=0	22.23	22.24	22.33
		RB Size=1, RB Offset=49	22.20	22.26	22.35
		RB Size=1, RB Offset=99	22.13	22.09	22.37
		RB Size=50, RB Offset=0	21.11	21.08	20.95
		RB Size=50, RB Offset=24	21.05	21.03	21.10
		RB Size=50, RB Offset=49	20.77	21.11	20.88
		RB Size=100, RB Offset=0	20.79	20.75	20.80

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.35	13	Pass
QPSK (100RB Size)	6.37	13	Pass
16QAM (1RB Size)	7.03	13	Pass
16QAM (100RB Size)	7.09	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	83.36	29	2.3	H	10.2	1.30	8.90	17.80	30
1732.50	79.50	287	1.4	V	6.9	1.30	8.90	14.50	30
3 MHz Bandwidth									
1732.50	82.79	111	1.0	H	9.6	1.30	8.90	17.20	30
1732.50	79.49	196	2.1	V	6.9	1.30	8.90	14.50	30
5 MHz Bandwidth									
1732.50	83.39	303	2.1	H	10.2	1.30	8.90	17.80	30
1732.50	79.10	118	1.1	V	6.5	1.30	8.90	14.10	30
10 MHz Bandwidth									
1732.50	83.55	331	1.1	H	10.4	1.30	8.90	18.00	30
1732.50	79.90	212	1.1	V	7.3	1.30	8.90	14.90	30
15 MHz Bandwidth									
1732.50	83.05	172	1.3	H	9.9	1.30	8.90	17.50	30
1732.50	79.35	250	1.7	V	6.8	1.30	8.90	14.40	30
20 MHz Bandwidth									
1732.50	82.90	98	1.8	H	9.7	1.30	8.90	17.30	30
1732.50	79.07	115	1.0	V	6.5	1.30	8.90	14.10	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	83.25	340	1.3	H	10.1	1.30	8.90	17.70	30
1732.50	80.36	337	1.8	V	7.8	1.30	8.90	15.40	30
3 MHz Bandwidth									
1732.50	83.49	81	1.8	H	10.3	1.30	8.90	17.90	30
1732.50	80.10	169	2.3	V	7.5	1.30	8.90	15.10	30
5 MHz Bandwidth									
1732.50	83.79	106	2.2	H	10.6	1.30	8.90	18.20	30
1732.50	80.11	272	1.3	V	7.5	1.30	8.90	15.10	30
10 MHz Bandwidth									
1732.50	82.94	61	1.6	H	9.8	1.30	8.90	17.40	30
1732.50	79.36	190	1.2	V	6.8	1.30	8.90	14.40	30
15 MHz Bandwidth									
1732.50	83.25	165	1.5	H	10.1	1.30	8.90	17.70	30
1732.50	79.02	314	2.4	V	6.5	1.30	8.90	14.10	30
20 MHz Bandwidth									
1732.50	83.44	172	2.2	H	10.3	1.30	8.90	17.90	30
1732.50	79.39	216	1.7	V	6.8	1.30	8.90	14.40	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	22.68	22.66	22.64
		RB Size=1, RB Offset=2	22.66	22.71	22.60
		RB Size=1, RB Offset=5	22.30	22.56	22.58
		RB Size=3, RB Offset=0	22.42	22.40	22.33
		RB Size=3, RB Offset=1	22.25	22.36	22.32
		RB Size=3, RB Offset=2	22.29	22.32	22.26
		RB Size=6, RB Offset=0	22.16	22.16	22.25
	16QAM	RB Size=1, RB Offset=0	22.11	22.13	22.11
		RB Size=1, RB Offset=2	22.09	22.09	21.89
		RB Size=1, RB Offset=5	22.07	22.07	22.90
		RB Size=3, RB Offset=0	21.88	21.76	22.84
		RB Size=3, RB Offset=1	21.82	21.88	21.85
		RB Size=3, RB Offset=2	21.93	21.73	21.82
		RB Size=6, RB Offset=0	21.66	21.67	21.82
3.0	QPSK	RB Size=1, RB Offset=0	22.85	22.70	22.96
		RB Size=1, RB Offset=7	22.78	22.80	22.83
		RB Size=1, RB Offset=14	22.66	22.72	22.92
		RB Size=8, RB Offset=0	21.99	21.97	21.84
		RB Size=8, RB Offset=4	21.75	21.62	21.81
		RB Size=8, RB Offset=7	21.57	21.60	21.80
		RB Size=15, RB Offset=0	21.83	21.73	21.88
	16QAM	RB Size=1, RB Offset=0	22.10	22.21	22.00
		RB Size=1, RB Offset=7	22.17	21.97	22.10
		RB Size=1, RB Offset=14	22.34	21.84	22.02
		RB Size=8, RB Offset=0	20.86	20.81	20.93
		RB Size=8, RB Offset=4	20.61	20.79	20.89
		RB Size=8, RB Offset=7	20.51	20.53	20.78
		RB Size=15, RB Offset=0	20.87	20.70	20.70

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	22.85	22.82	23.01
		RB Size=1, RB Offset=12	22.88	22.69	22.63
		RB Size=1, RB Offset=24	22.61	22.96	22.53
		RB Size=12, RB Offset=0	21.89	21.83	21.99
		RB Size=12, RB Offset=6	21.96	21.81	21.81
		RB Size=12, RB Offset=11	21.92	21.53	21.66
		RB Size=25, RB Offset=0	21.81	21.75	21.92
	16QAM	RB Size=1, RB Offset=0	22.06	21.59	21.67
		RB Size=1, RB Offset=12	21.92	21.54	21.78
		RB Size=1, RB Offset=24	21.83	21.39	21.50
		RB Size=12, RB Offset=0	20.73	20.83	20.76
		RB Size=12, RB Offset=6	20.79	20.74	20.57
		RB Size=12, RB Offset=11	20.49	20.54	20.59
		RB Size=25, RB Offset=0	20.80	20.67	20.84
10.0	QPSK	RB Size=1, RB Offset=0	22.89	22.75	22.73
		RB Size=1, RB Offset=24	22.74	22.80	22.78
		RB Size=1, RB Offset=49	22.61	22.69	22.74
		RB Size=25, RB Offset=0	21.88	21.68	21.63
		RB Size=25, RB Offset=12	21.84	21.80	21.73
		RB Size=25, RB Offset=24	21.86	21.46	21.46
		RB Size=50, RB Offset=0	21.58	21.60	21.54
	16QAM	RB Size=1, RB Offset=0	21.78	21.69	21.67
		RB Size=1, RB Offset=24	21.71	21.52	21.55
		RB Size=1, RB Offset=49	21.39	21.42	21.78
		RB Size=25, RB Offset=0	22.60	20.80	20.79
		RB Size=25, RB Offset=12	22.46	20.58	20.66
		RB Size=25, RB Offset=24	22.64	20.30	20.33
		RB Size=50, RB Offset=0	20.61	20.38	20.50

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.13	13	Pass
QPSK (50RB Size)	6.18	13	Pass
16QAM (1RB Size)	6.88	13	Pass
16QAM (50RB Size)	6.93	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 (dBd)		
Middle Channel									
1.4 MHz Bandwidth									
836.50	81.49	194	2.4	H	17.9	1.88	0	16.02	38.45
836.50	77.58	252	1.6	V	15.8	1.88	0	13.92	38.45
3 MHz Bandwidth									
836.50	81.28	354	1.8	H	17.7	1.88	0	15.82	38.45
836.50	78.62	156	1.5	V	16.8	1.88	0	14.92	38.45
5 MHz Bandwidth									
836.50	81.75	166	1.3	H	18.2	1.88	0	16.32	38.45
836.50	78.80	245	2.0	V	17.0	1.88	0	15.12	38.45
10 MHz Bandwidth									
836.50	81.51	87	1.9	H	17.9	1.88	0	16.02	38.45
836.50	78.72	306	1.6	V	16.9	1.88	0	15.02	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 (dBd)		
Middle Channel									
1.4 MHz Bandwidth									
836.50	82.05	321	2.2	H	18.5	1.88	0	16.62	38.45
836.50	77.87	24	1.1	V	16.1	1.88	0	14.22	38.45
3 MHz Bandwidth									
836.50	81.22	308	1.7	H	17.6	1.88	0	15.72	38.45
836.50	78.48	19	1.7	V	16.7	1.88	0	14.82	38.45
5 MHz Bandwidth									
836.50	81.79	354	1.3	H	18.2	1.88	0	16.32	38.45
836.50	78.50	269	1.3	V	16.7	1.88	0	14.82	38.45
10 MHz Bandwidth									
836.50	81.23	249	1.4	H	17.7	1.88	0	15.82	38.45
836.50	78.76	167	1.8	V	17.0	1.88	0	15.12	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	23.24	22.90	22.66
		RB Size=1, RB Offset=12	22.72	22.49	22.23
		RB Size=1, RB Offset=24	23.41	22.93	22.88
		RB Size=12, RB Offset=0	22.06	21.58	21.23
		RB Size=12, RB Offset=6	21.98	21.62	21.49
		RB Size=12, RB Offset=11	22.15	21.64	21.38
		RB Size=25, RB Offset=0	22.05	21.60	22.24
	16QAM	RB Size=1, RB Offset=0	22.47	21.95	22.10
		RB Size=1, RB Offset=12	22.51	21.87	22.03
		RB Size=1, RB Offset=24	22.57	21.97	22.29
		RB Size=12, RB Offset=0	21.78	21.04	21.40
		RB Size=12, RB Offset=6	21.68	21.15	21.30
		RB Size=12, RB Offset=11	21.62	21.03	21.49
		RB Size=25, RB Offset=0	21.11	20.76	20.49
10	QPSK	RB Size=1, RB Offset=0	22.73	22.38	22.79
		RB Size=1, RB Offset=24	22.62	22.42	22.75
		RB Size=1, RB Offset=49	22.58	22.14	22.87
		RB Size=25, RB Offset=0	21.90	21.65	21.96
		RB Size=25, RB Offset=12	21.98	21.86	22.05
		RB Size=25, RB Offset=24	21.85	21.81	22.12
		RB Size=50, RB Offset=0	22.00	21.42	21.67
	16QAM	RB Size=1, RB Offset=0	21.80	22.04	21.84
		RB Size=1, RB Offset=24	21.59	22.14	21.85
		RB Size=1, RB Offset=49	21.77	22.37	22.04
		RB Size=25, RB Offset=0	21.02	21.20	21.16
		RB Size=25, RB Offset=12	21.27	21.19	21.16
		RB Size=25, RB Offset=24	20.98	21.39	21.23
		RB Size=50, RB Offset=0	21.07	20.56	20.69

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.79	22.70	23.93
		RB Size=1, RB Offset=37	22.56	22.67	23.57
		RB Size=1, RB Offset=74	22.69	22.64	23.87
		RB Size=36, RB Offset=0	21.99	21.97	22.97
		RB Size=36, RB Offset=18	21.89	21.73	23.20
		RB Size=36, RB Offset=37	22.01	21.94	23.01
		RB Size=75, RB Offset=0	22.04	21.39	22.16
	16QAM	RB Size=1, RB Offset=0	22.13	21.83	22.60
		RB Size=1, RB Offset=37	21.98	21.43	22.68
		RB Size=1, RB Offset=74	22.09	21.77	22.74
		RB Size=36, RB Offset=0	21.24	21.02	22.01
		RB Size=36, RB Offset=18	21.21	21.06	21.69
		RB Size=36, RB Offset=37	21.13	21.12	21.91
		RB Size=75, RB Offset=0	20.79	20.53	21.43
20	QPSK	RB Size=1, RB Offset=0	22.84	23.00	23.61
		RB Size=1, RB Offset=49	22.62	22.93	23.31
		RB Size=1, RB Offset=99	23.02	23.04	23.72
		RB Size=50, RB Offset=0	22.01	22.23	22.81
		RB Size=50, RB Offset=24	22.11	22.12	22.78
		RB Size=50, RB Offset=49	21.93	22.04	22.76
		RB Size=100, RB Offset=0	22.33	21.63	22.46
	16QAM	RB Size=1, RB Offset=0	22.05	22.39	22.81
		RB Size=1, RB Offset=49	21.95	22.34	22.70
		RB Size=1, RB Offset=99	22.08	22.20	23.03
		RB Size=50, RB Offset=0	21.35	21.41	21.99
		RB Size=50, RB Offset=24	21.41	21.50	22.20
		RB Size=50, RB Offset=49	21.27	21.52	22.02
		RB Size=100, RB Offset=0	21.36	20.88	21.55

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.86	13	Pass
QPSK (100RB Size)	4.93	13	Pass
16QAM (1RB Size)	5.63	13	Pass
16QAM (100RB Size)	5.71	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	79.20	135	1.7	H	9.7	2.60	10.20	17.30	33
2535.00	77.13	308	1.2	V	8.3	2.60	10.20	15.90	33
10 MHz Bandwidth									
2535.00	79.47	224	1.1	H	10.0	2.60	10.20	17.60	33
2535.00	76.60	58	1.3	V	7.7	2.60	10.20	15.30	33
15 MHz Bandwidth									
2535.00	79.22	334	1.4	H	9.7	2.60	10.20	17.30	33
2535.00	76.48	359	1.1	V	7.6	2.60	10.20	15.20	33
20 MHz Bandwidth									
2535.00	79.02	332	1.5	H	9.5	2.60	10.20	17.10	33
2535.00	76.29	72	2.0	V	7.4	2.60	10.20	15.00	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	78.95	226	2.3	H	9.5	2.60	10.20	17.10	33
2535.00	76.25	27	1.5	V	7.4	2.60	10.20	15.00	33
10M Bandwidth									
2535.00	79.67	326	1.6	H	10.2	2.60	10.20	17.80	33
2535.00	76.10	184	1.3	V	7.2	2.60	10.20	14.80	33
15 MHz Bandwidth									
2535.00	79.40	338	1.2	H	9.9	2.60	10.20	17.50	33
2535.00	75.60	286	2.0	V	6.7	2.60	10.20	14.30	33
20M Bandwidth									
2535.00	79.16	314	1.4	H	9.7	2.60	10.20	17.30	33
2535.00	75.25	23	2.4	V	6.4	2.60	10.20	14.00	33

LTE Band 12**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.97	23.01	22.95
		RB Size=1, RB Offset=2	22.98	23.03	23.08
		RB Size=1, RB Offset=5	22.90	22.91	22.84
		RB Size=3, RB Offset=0	22.93	23.00	23.01
		RB Size=3, RB Offset=1	22.92	23.16	23.14
		RB Size=3, RB Offset=2	22.73	22.88	23.05
		RB Size=6, RB Offset=0	22.08	21.94	21.91
	16QAM	RB Size=1, RB Offset=0	22.00	21.91	22.10
		RB Size=1, RB Offset=2	21.90	21.84	21.89
		RB Size=1, RB Offset=5	21.95	21.70	21.76
		RB Size=3, RB Offset=0	22.10	22.24	22.35
		RB Size=3, RB Offset=1	22.15	22.16	22.20
		RB Size=3, RB Offset=2	21.95	22.15	22.07
		RB Size=6, RB Offset=0	20.90	21.11	20.92
3.0	QPSK	RB Size=1, RB Offset=0	22.90	23.00	23.01
		RB Size=1, RB Offset=7	22.79	23.00	23.00
		RB Size=1, RB Offset=14	22.56	22.81	22.75
		RB Size=8, RB Offset=0	22.07	21.97	22.00
		RB Size=8, RB Offset=4	21.96	22.03	22.05
		RB Size=8, RB Offset=7	22.13	21.82	21.75
		RB Size=15, RB Offset=0	22.04	22.03	22.07
	16QAM	RB Size=1, RB Offset=0	22.49	22.43	22.48
		RB Size=1, RB Offset=7	22.41	22.42	22.50
		RB Size=1, RB Offset=14	22.21	22.09	22.38
		RB Size=8, RB Offset=0	21.10	21.18	21.28
		RB Size=8, RB Offset=4	21.13	21.05	21.15
		RB Size=8, RB Offset=7	21.08	21.06	21.23
		RB Size=15, RB Offset=0	21.09	20.97	21.14

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.01	21.94	22.16
		RB Size=1, RB Offset=12	21.91	21.93	21.78
		RB Size=1, RB Offset=24	21.93	21.91	21.70
		RB Size=12, RB Offset=0	21.19	21.21	21.23
		RB Size=12, RB Offset=6	20.88	21.27	21.07
		RB Size=12, RB Offset=11	20.83	21.17	21.05
		RB Size=25, RB Offset=0	21.95	22.10	21.99
	16QAM	RB Size=1, RB Offset=0	21.96	22.04	22.08
		RB Size=1, RB Offset=12	21.82	21.79	21.88
		RB Size=1, RB Offset=24	21.99	21.65	21.88
		RB Size=12, RB Offset=0	21.34	21.12	21.14
		RB Size=12, RB Offset=6	21.07	21.09	21.20
		RB Size=12, RB Offset=11	20.90	21.04	21.06
		RB Size=25, RB Offset=0	21.09	21.01	21.10
10.0	QPSK	RB Size=1, RB Offset=0	22.99	23.07	23.00
		RB Size=1, RB Offset=24	23.18	22.89	22.92
		RB Size=1, RB Offset=49	22.91	23.09	22.90
		RB Size=25, RB Offset=0	22.03	22.08	22.12
		RB Size=25, RB Offset=12	22.08	22.13	22.20
		RB Size=25, RB Offset=24	21.70	21.92	21.88
		RB Size=50, RB Offset=0	22.17	22.13	22.05
	16QAM	RB Size=1, RB Offset=0	22.53	22.64	22.62
		RB Size=1, RB Offset=24	22.65	22.29	22.45
		RB Size=1, RB Offset=49	22.48	22.17	22.26
		RB Size=25, RB Offset=0	21.13	21.09	21.21
		RB Size=25, RB Offset=12	21.01	21.32	21.08
		RB Size=25, RB Offset=24	20.95	21.16	21.02
		RB Size=50, RB Offset=0	21.15	20.99	21.15

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.33	13	Pass
QPSK (50RB Size)	6.36	13	Pass
16QAM (1RB Size)	7.25	13	Pass
16QAM (50RB Size)	7.29	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 (dBd)		
Middle Channel									
1.4 MHz Bandwidth									
707.50	81.36	358	1.1	H	17.8	1.56	0	16.24	34.77
707.50	78.28	175	1.6	V	16.5	1.56	0	14.94	34.77
3 MHz Bandwidth									
707.50	81.81	216	2.3	H	18.2	1.56	0	16.64	34.77
707.50	77.77	87	2.1	V	16.0	1.56	0	14.44	34.77
5 MHz Bandwidth									
707.50	81.46	208	1.2	H	17.9	1.56	0	16.34	34.77
707.50	78.25	352	1.0	V	16.5	1.56	0	14.94	34.77
10 MHz Bandwidth									
707.50	81.39	256	1.9	H	17.8	1.56	0	16.24	34.77
707.50	77.60	331	2.3	V	15.8	1.56	0	14.24	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 (dBd)		
Middle Channel									
1.4 MHz Bandwidth									
707.50	81.42	84	1.3	H	17.8	1.56	0	16.24	34.77
707.50	79.37	68	1.3	V	17.6	1.56	0	16.04	34.77
3 MHz Bandwidth									
707.50	81.47	157	2.3	H	17.9	1.56	0	16.34	34.77
707.50	77.96	333	1.8	V	16.2	1.56	0	14.64	34.77
5 MHz Bandwidth									
707.50	81.50	352	1.2	H	17.9	1.56	0	16.34	34.77
707.50	78.17	331	1.5	V	16.4	1.56	0	14.84	34.77
10 MHz Bandwidth									
707.50	81.07	158	1.2	H	17.5	1.56	0	15.94	34.77
707.50	78.20	15	1.4	V	16.4	1.56	0	14.84	34.77

LTE Band 13:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.10	22.12	22.04
		RB Size=1, RB Offset=12	21.96	22.00	21.81
		RB Size=1, RB Offset=24	21.94	21.85	21.78
		RB Size=12, RB Offset=0	21.22	21.14	21.15
		RB Size=12, RB Offset=6	20.95	21.18	21.05
		RB Size=12, RB Offset=11	20.71	21.15	21.05
		RB Size=25, RB Offset=0	22.07	22.01	22.07
	16QAM	RB Size=1, RB Offset=0	22.02	22.01	21.96
		RB Size=1, RB Offset=12	21.84	21.76	21.91
		RB Size=1, RB Offset=24	21.95	21.61	22.05
		RB Size=12, RB Offset=0	21.26	21.13	21.21
		RB Size=12, RB Offset=6	21.03	21.19	21.12
		RB Size=12, RB Offset=11	20.91	20.93	21.07
		RB Size=25, RB Offset=0	21.14	21.07	21.07
10.0	QPSK	RB Size=1, RB Offset=0	/	23.16	/
		RB Size=1, RB Offset=24	/	23.01	/
		RB Size=1, RB Offset=49	/	23.17	/
		RB Size=25, RB Offset=0	/	21.91	/
		RB Size=25, RB Offset=12	/	21.97	/
		RB Size=25, RB Offset=24	/	21.88	/
		RB Size=50, RB Offset=0	/	22.05	/
	16QAM	RB Size=1, RB Offset=0	/	22.68	/
		RB Size=1, RB Offset=24	/	22.45	/
		RB Size=1, RB Offset=49	/	22.20	/
		RB Size=25, RB Offset=0	/	21.16	/
		RB Size=25, RB Offset=12	/	21.16	/
		RB Size=25, RB Offset=24	/	21.37	/
		RB Size=50, RB Offset=0	/	21.10	/

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.05	13	Pass
QPSK (50RB Size)	6.06	13	Pass
16QAM (1RB Size)	6.68	13	Pass
16QAM (50RB Size)	6.74	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 (dBd)		
Middle Channel									
5 MHz Bandwidth									
782.00	82.53	57	2.1	H	18.9	1.68	0	17.22	34.77
782.00	79.24	267	1.5	V	17.4	1.68	0	15.72	34.77
10 MHz Bandwidth									
782.00	81.99	279	2.4	H	18.4	1.68	0	16.72	34.77
782.00	78.63	87	2.4	V	16.8	1.68	0	15.12	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 (dBd)		
Middle Channel									
5 MHz Bandwidth									
782.00	82.03	112	2.1	H	18.5	1.68	0	16.82	34.77
782.00	77.59	194	1.5	V	15.8	1.68	0	14.12	34.77
10 MHz Bandwidth									
782.00	82.53	216	1.6	H	18.9	1.68	0	17.22	34.77
782.00	77.95	150	1.9	V	16.2	1.68	0	14.52	34.77

LTE Band 17:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.05	22.05	22.00
		RB Size=1, RB Offset=12	21.96	21.89	21.81
		RB Size=1, RB Offset=24	21.82	21.77	21.71
		RB Size=12, RB Offset=0	21.29	21.24	21.21
		RB Size=12, RB Offset=6	21.00	21.09	21.11
		RB Size=12, RB Offset=11	20.80	21.23	20.88
		RB Size=25, RB Offset=0	22.01	21.91	21.97
	16QAM	RB Size=1, RB Offset=0	22.02	21.93	22.11
		RB Size=1, RB Offset=12	21.89	21.74	22.04
		RB Size=1, RB Offset=24	22.06	21.73	21.97
		RB Size=12, RB Offset=0	21.28	21.28	21.25
		RB Size=12, RB Offset=6	21.13	21.01	21.23
		RB Size=12, RB Offset=11	20.99	20.96	21.00
		RB Size=25, RB Offset=0	21.11	21.08	21.12
10.0	QPSK	RB Size=1, RB Offset=0	23.13	23.00	23.13
		RB Size=1, RB Offset=24	23.15	22.94	22.80
		RB Size=1, RB Offset=49	23.08	23.09	22.89
		RB Size=25, RB Offset=0	22.09	22.05	21.98
		RB Size=25, RB Offset=12	22.01	21.92	22.03
		RB Size=25, RB Offset=24	21.69	21.98	21.93
		RB Size=50, RB Offset=0	22.18	22.19	22.10
	16QAM	RB Size=1, RB Offset=0	22.64	22.73	22.64
		RB Size=1, RB Offset=24	22.62	22.48	22.50
		RB Size=1, RB Offset=49	22.46	22.15	22.34
		RB Size=25, RB Offset=0	21.25	21.12	21.17
		RB Size=25, RB Offset=12	21.05	21.18	20.98
		RB Size=25, RB Offset=24	21.11	21.29	21.03
		RB Size=50, RB Offset=0	21.21	21.20	21.05

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.05	13	Pass
QPSK (50RB Size)	6.10	13	Pass
16QAM (1RB Size)	7.21	13	Pass
16QAM (50RB Size)	7.26	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 (dBd)		
5 MHz Bandwidth									
710.00	81.47	225	1.6	H	17.9	1.56	0	16.34	34.77
710.00	78.08	106	1.7	V	16.3	1.56	0	14.74	34.77
10 MHz Bandwidth									
710.00	81.40	99	2.0	H	17.8	1.56	0	16.24	34.77
710.00	76.69	323	1.8	V	14.9	1.56	0	13.34	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 (dBd)		
5 MHz Bandwidth									
710.00	81.56	189	1.1	H	18.0	1.56	0	16.44	34.77
710.00	77.27	329	1.3	V	15.5	1.56	0	13.94	34.77
10 MHz Bandwidth									
710.00	81.38	184	1.2	H	17.8	1.56	0	16.24	34.77
710.00	77.91	301	1.9	V	16.1	1.56	0	14.54	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

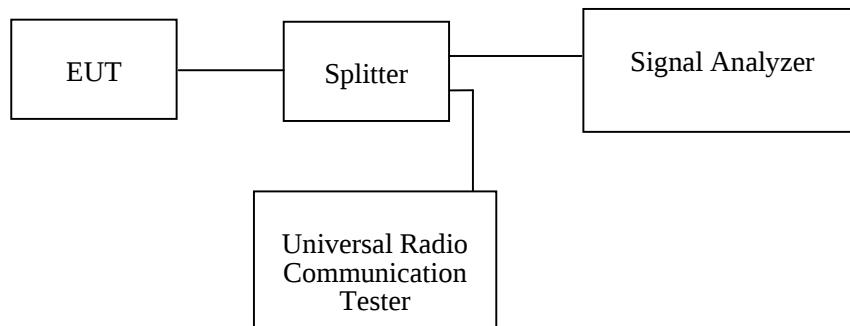
Applicable Standard

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:	24~25 °C
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Shawn Xiao on 2019-01-10 to 2019-04-02.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.151	4.728
HSUPA (BPSK)	836.6	4.167	4.744
HSDPA (16QAM)	836.6	4.167	4.744

PCS Band (Part 24E)

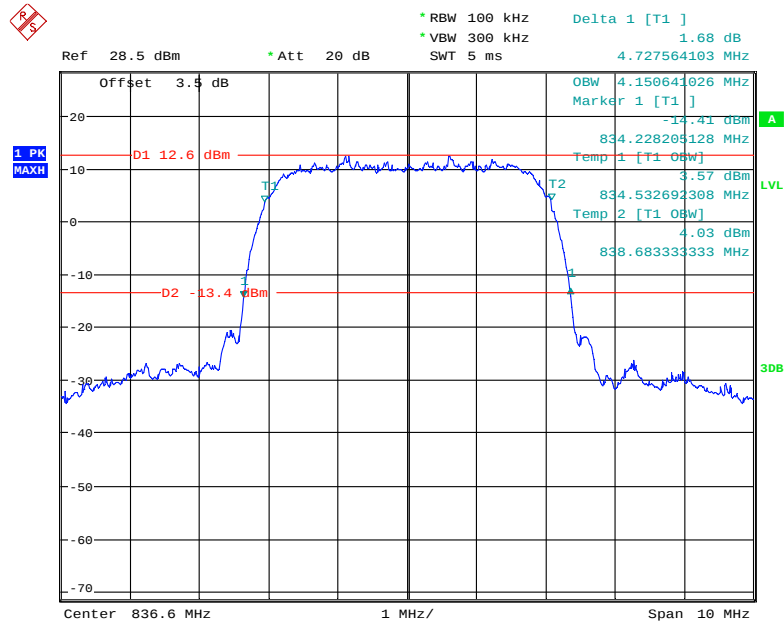
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.167	4.728
HSUPA (BPSK)	1880.0	4.167	4.728
HSDPA (16QAM)	1880.0	4.167	4.728

AWS Band (Part 27)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.6	4.167	4.744
HSUPA (BPSK)	1732.6	4.199	4.792
HSDPA (16QAM)	1732.6	4.199	4.760

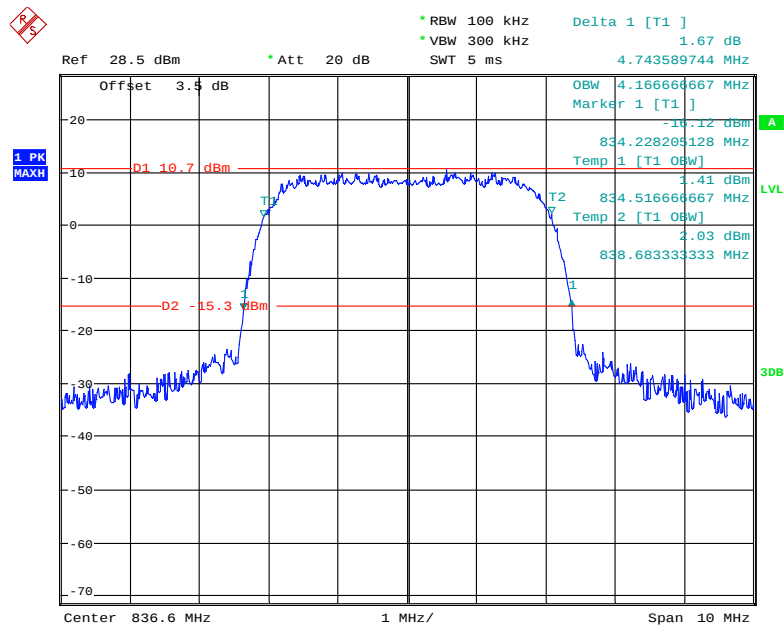
Cellular Band (Part 22H)

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



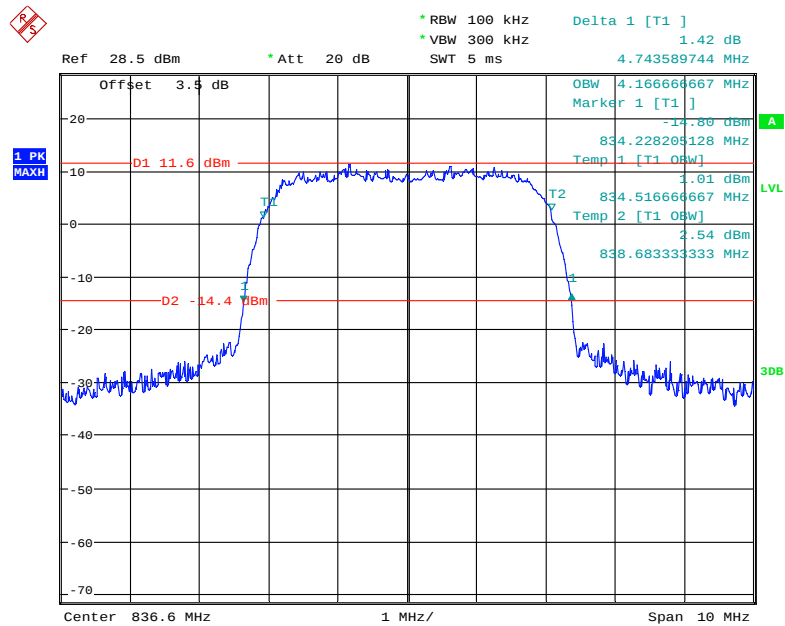
Date: 18.JAN.2019 08:55:59

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



Date: 18.JAN.2019 09:18:43

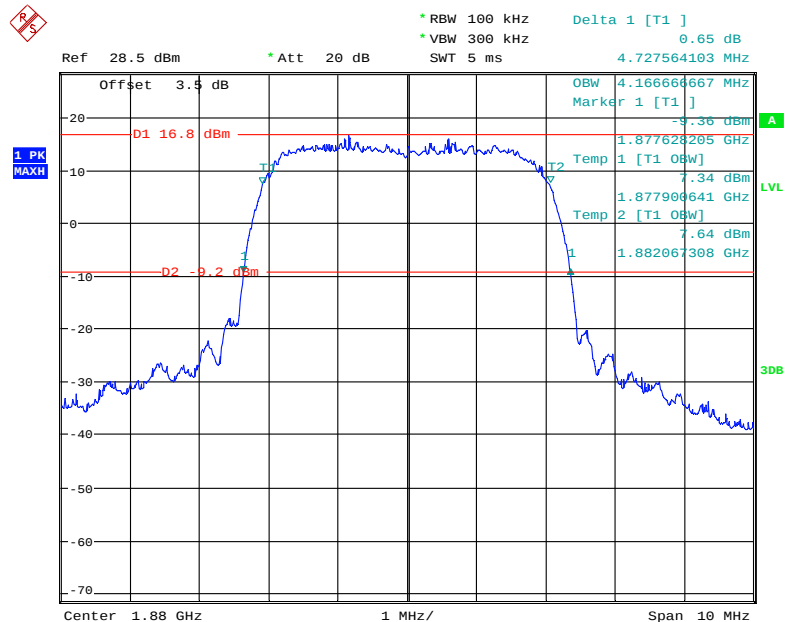
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 18.JAN.2019 09:16:53

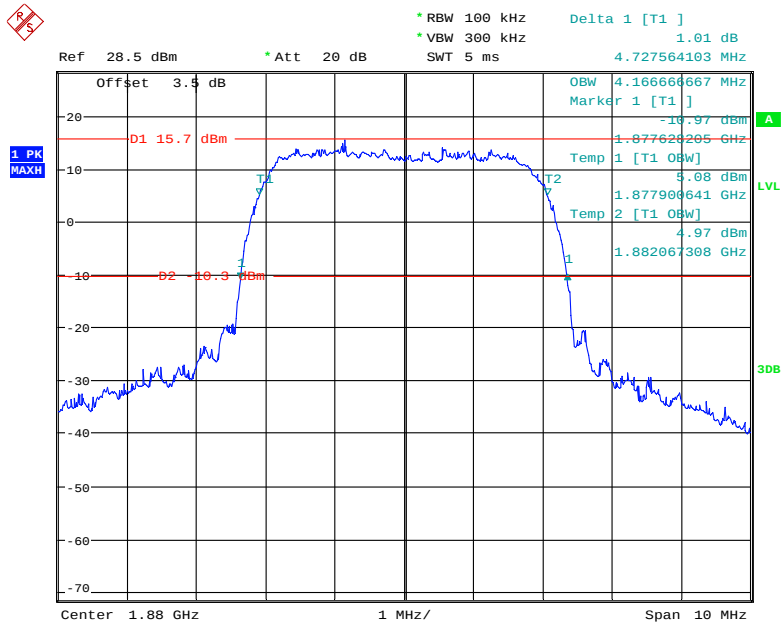
PCS Band (Part 24E)

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



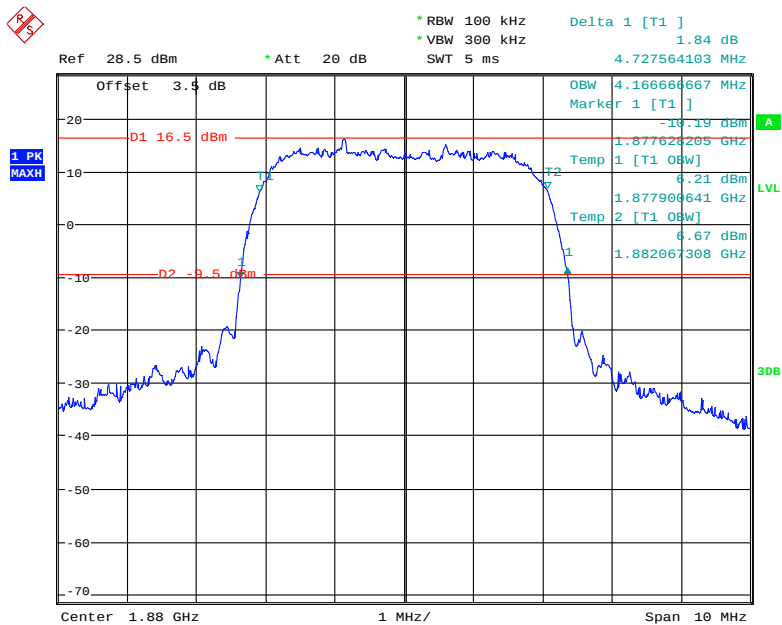
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26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode



Date: 18.JAN.2019 08:28:15

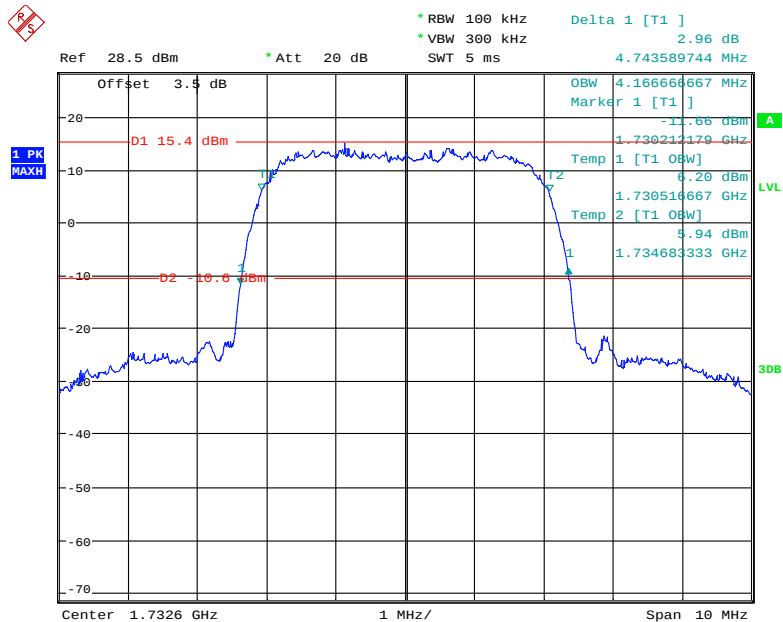
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 18.JAN.2019 08:24:44

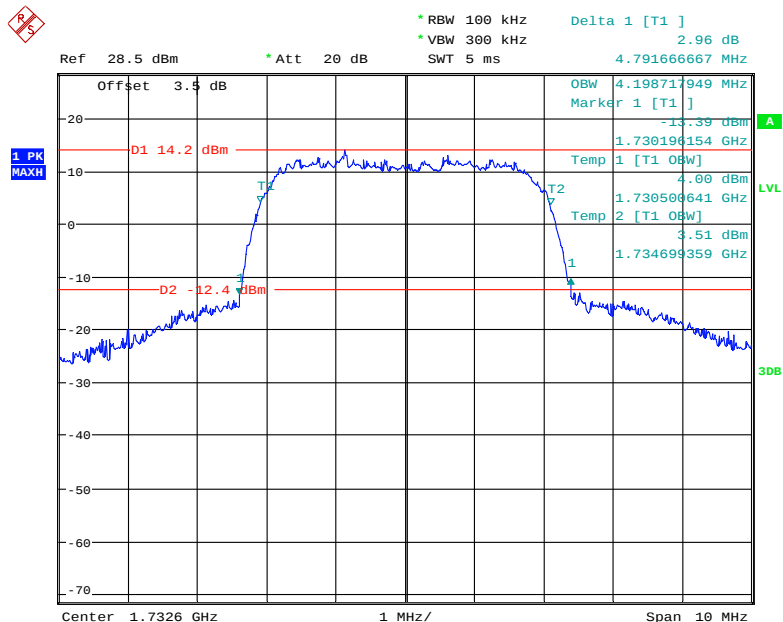
AWS Band (Part 27)

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



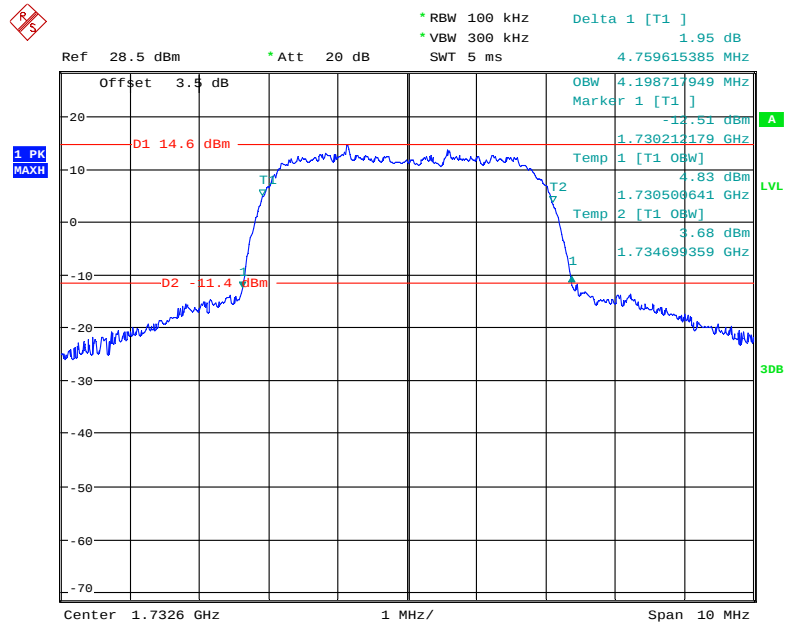
Date: 18.JAN.2019 08:32:14

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



Date: 18.JAN.2019 08:38:10

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

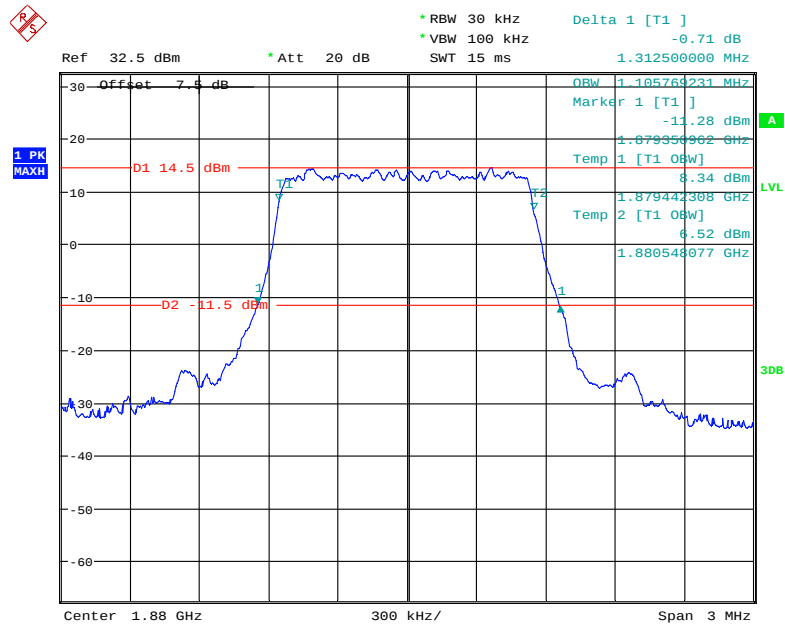


Date: 18.JAN.2019 08:42:59

LTE Band 2: (Middle Channel)

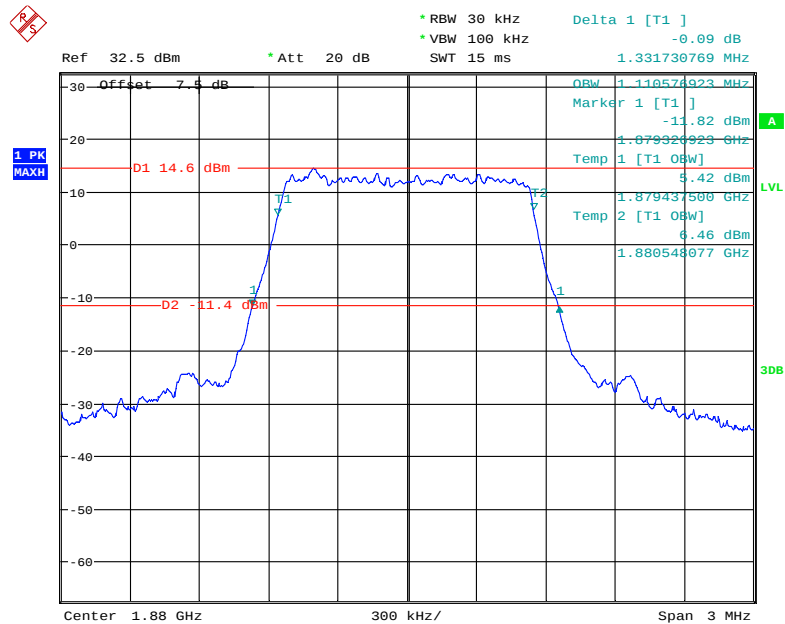
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.106	1.313
	16QAM	1.111	1.332
3.0	QPSK	2.692	2.952
	16QAM	2.692	2.981
5.0	QPSK	4.551	5.080
	16QAM	4.519	5.032
10.0	QPSK	8.974	9.776
	16QAM	8.974	9.712
15.0	QPSK	13.510	14.663
	16QAM	13.462	14.663
20.0	QPSK	17.885	19.167
	16QAM	17.949	19.167

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



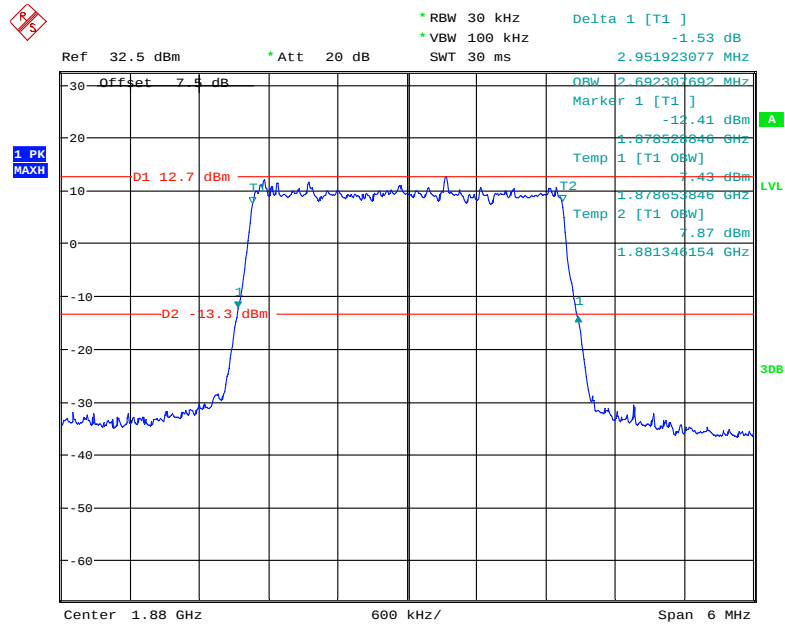
Date: 10.JAN.2019 20:56:48

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



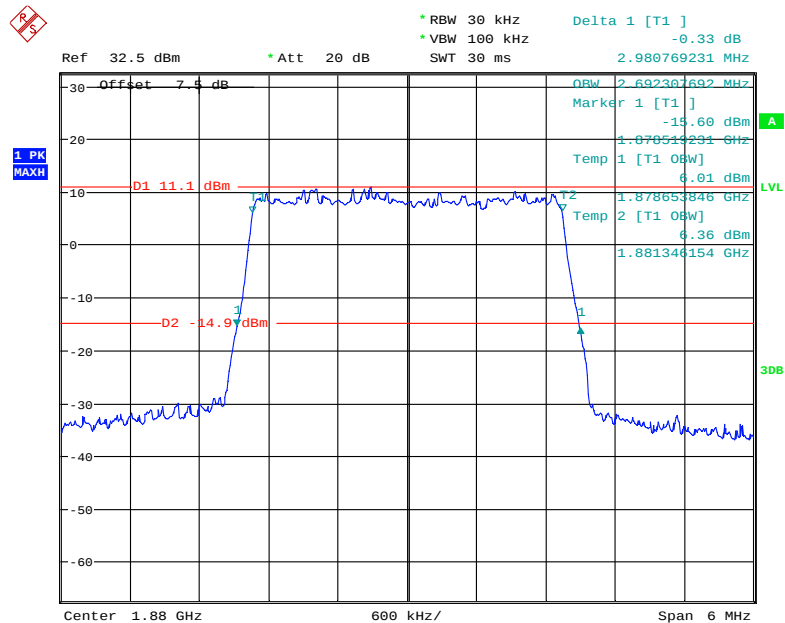
Date: 10.JAN.2019 20:59:21

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



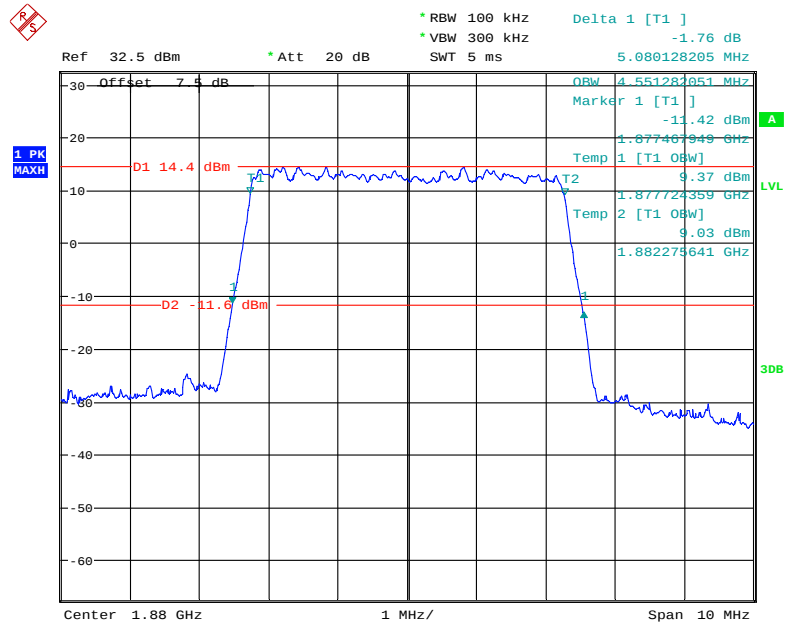
Date: 10.JAN.2019 21:01:43

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



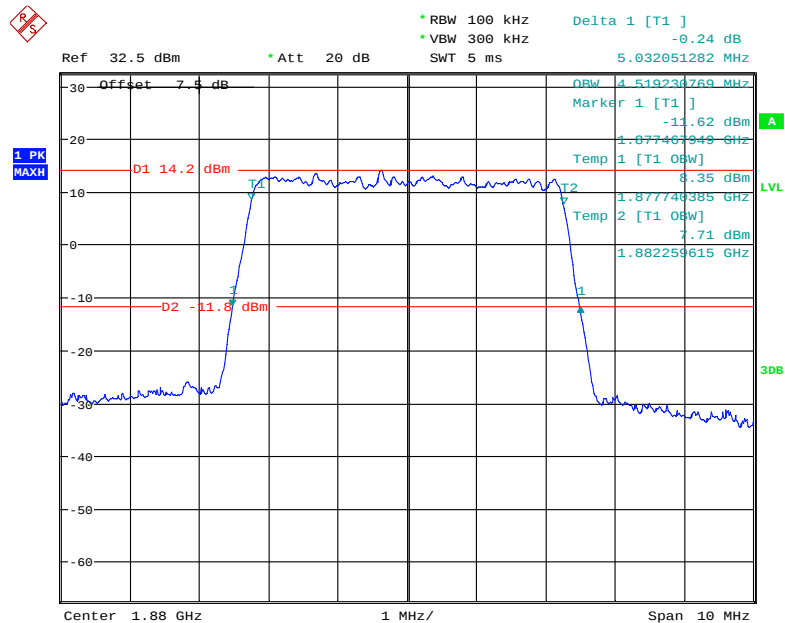
Date: 10.JAN.2019 21:07:48

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

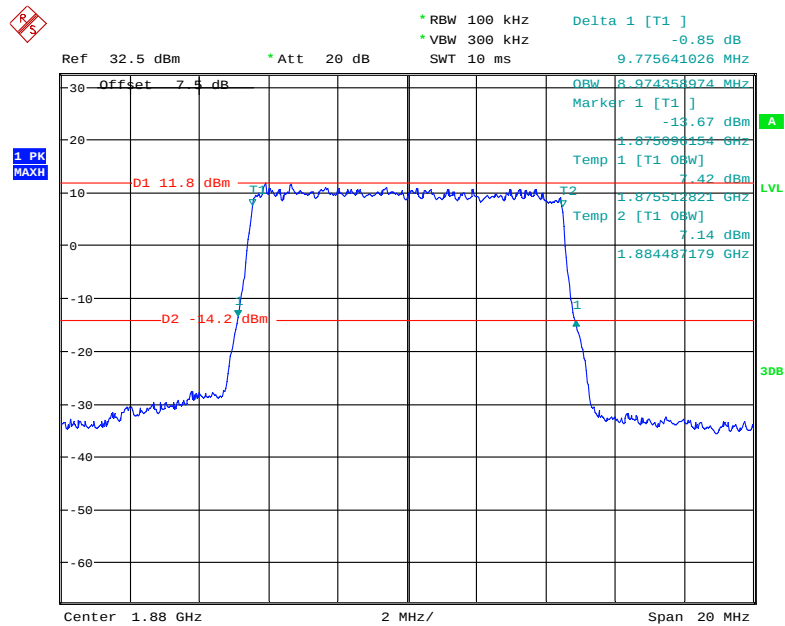


Date: 10.JAN.2019 21:09:48

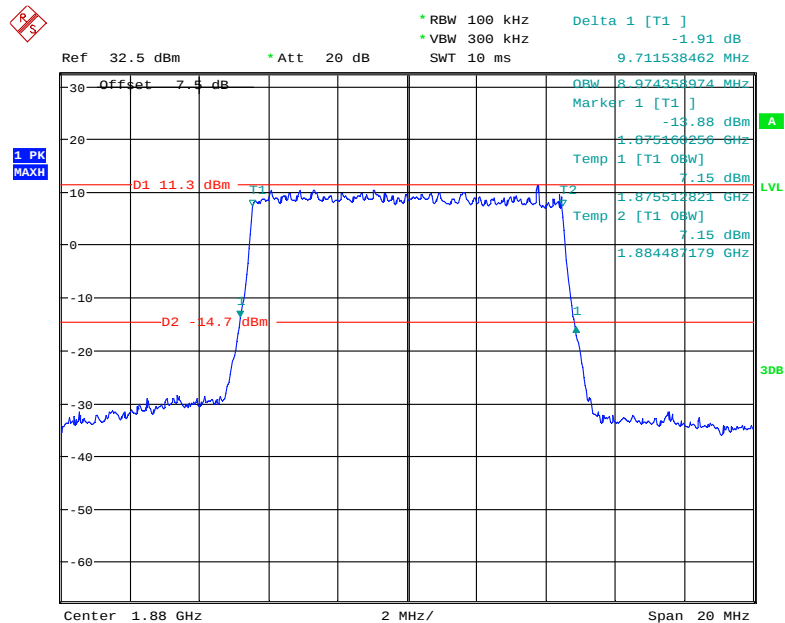
16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



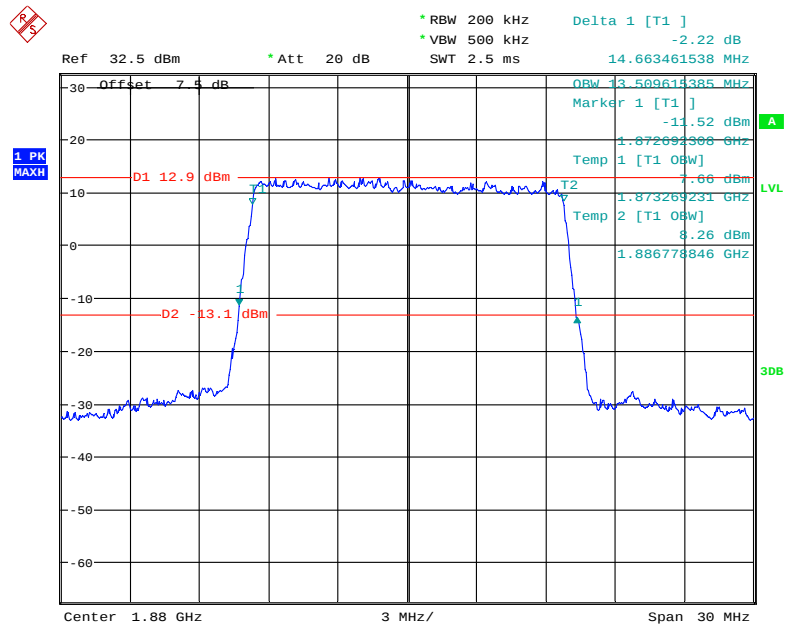
Date: 10.JAN.2019 21:12:36

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

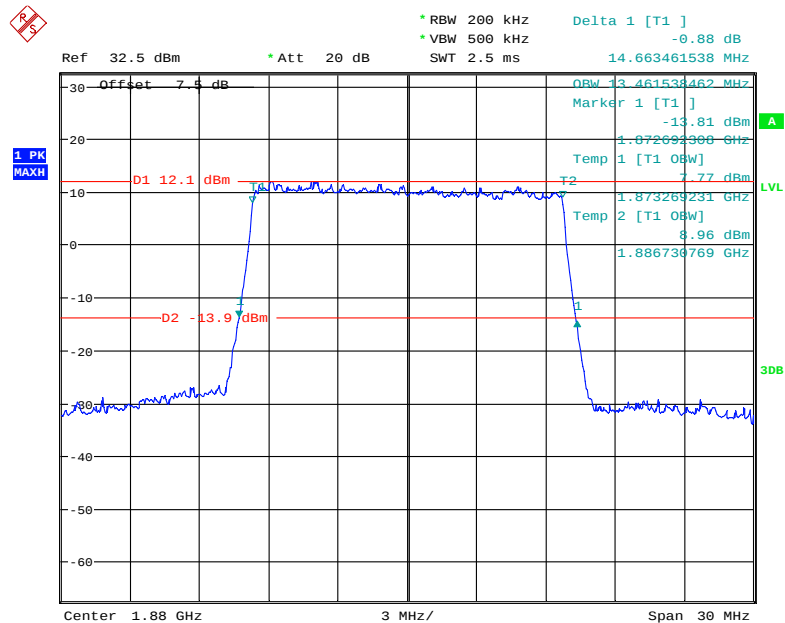
Date: 10.JAN.2019 21:14:37

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

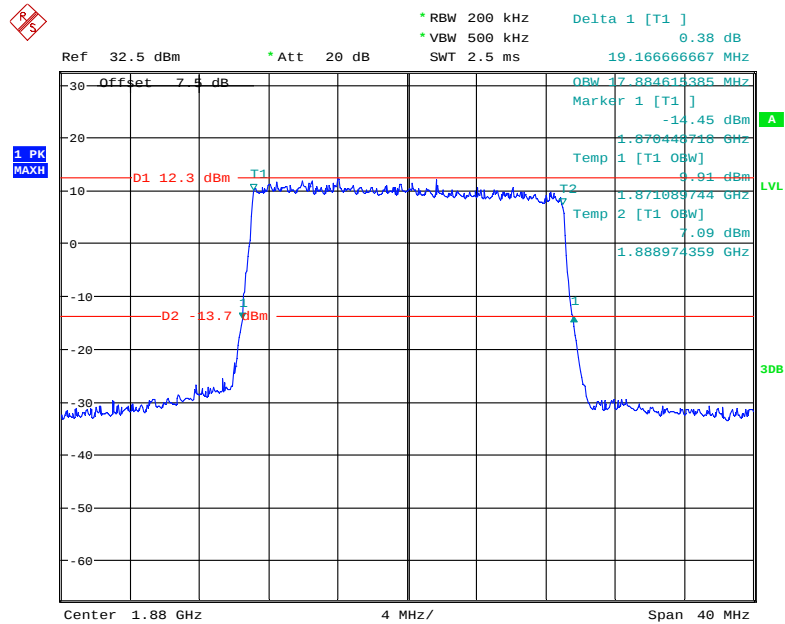
Date: 10.JAN.2019 21:15:49

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

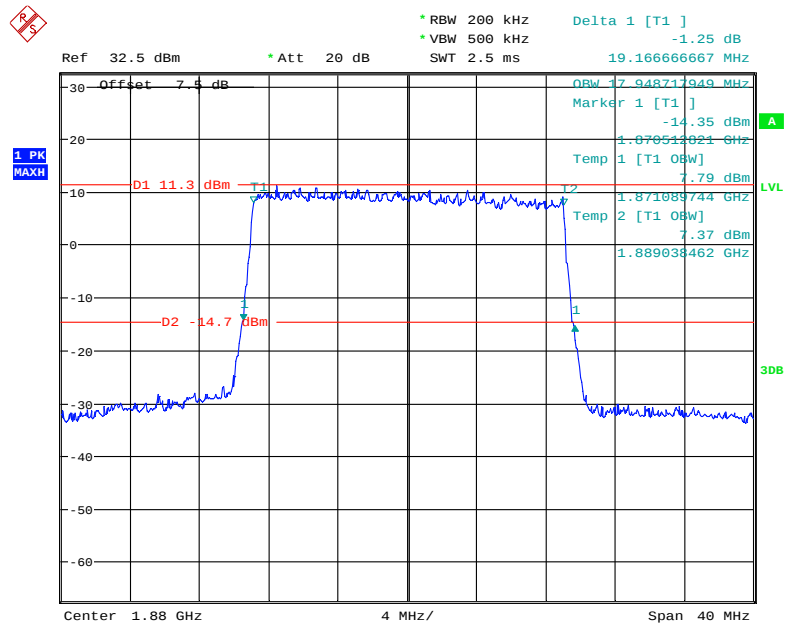
Date: 10.JAN.2019 21:17:21

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

Date: 10.JAN.2019 21:18:39

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

Date: 10.JAN.2019 21:21:16

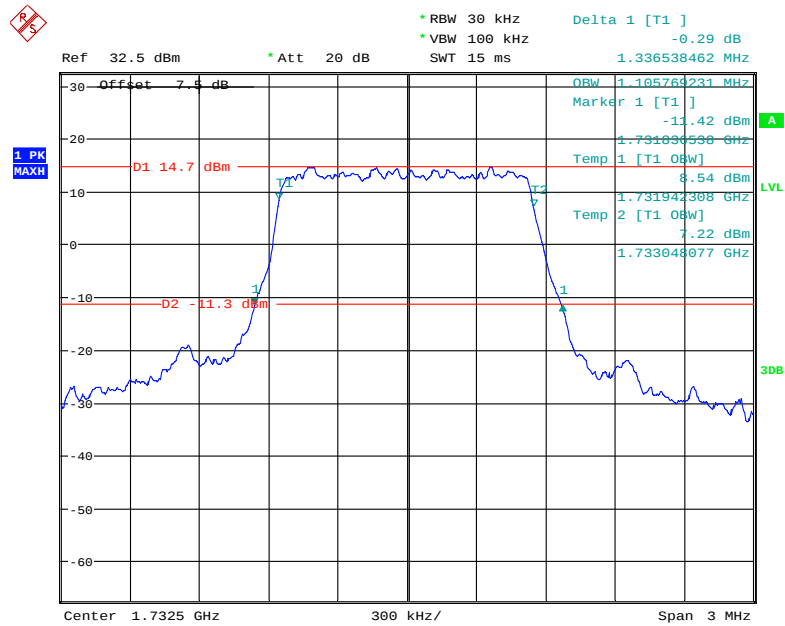
16-QAM (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 10.JAN.2019 21:22:49

LTE Band 4: (Middle Channel)

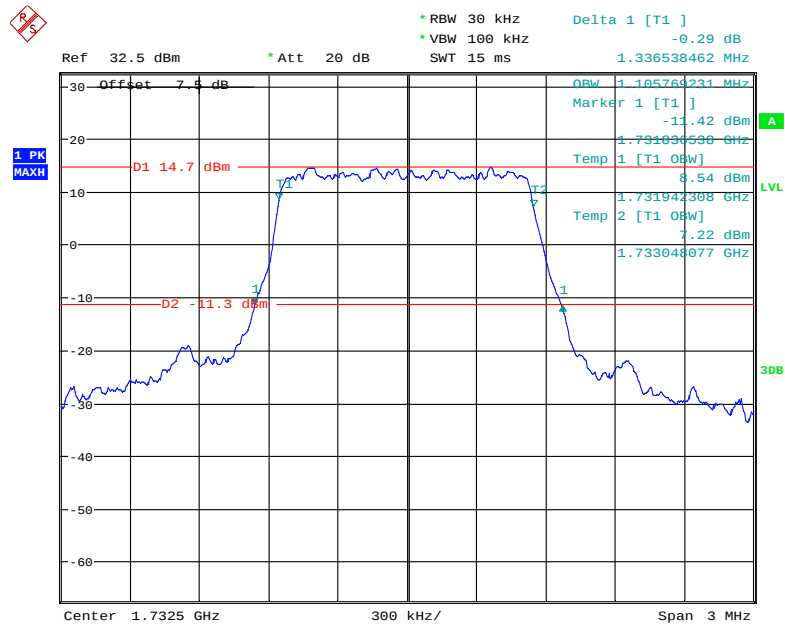
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.106	1.337
	16QAM	1.112	1.337
3.0	QPSK	2.692	2.952
	16QAM	2.692	2.981
5.0	QPSK	4.551	5.080
	16QAM	4.535	5.048
10.0	QPSK	9.006	9.840
	16QAM	8.974	9.744
15.0	QPSK	13.510	14.760
	16QAM	13.510	14.712
20.0	QPSK	17.949	19.231
	16QAM	17.949	19.231

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

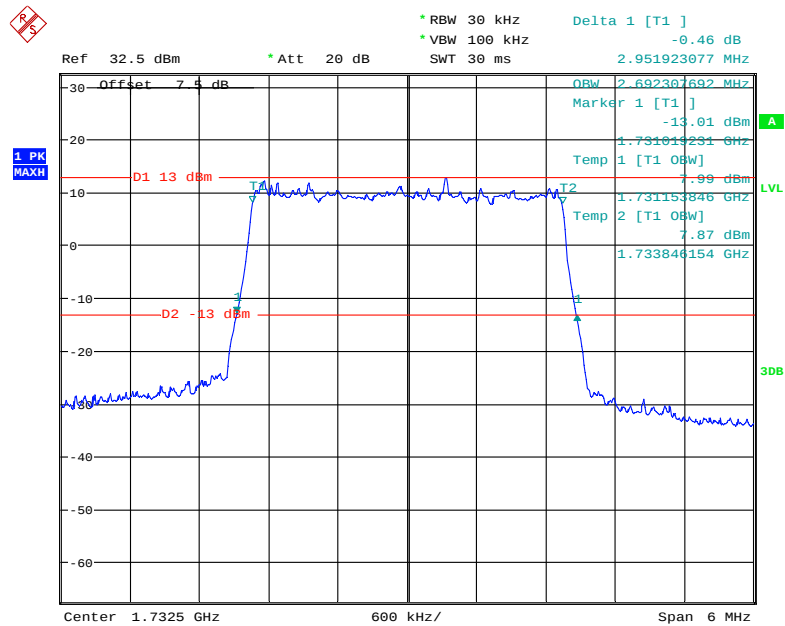


Date: 10.JAN.2019 21:27:15

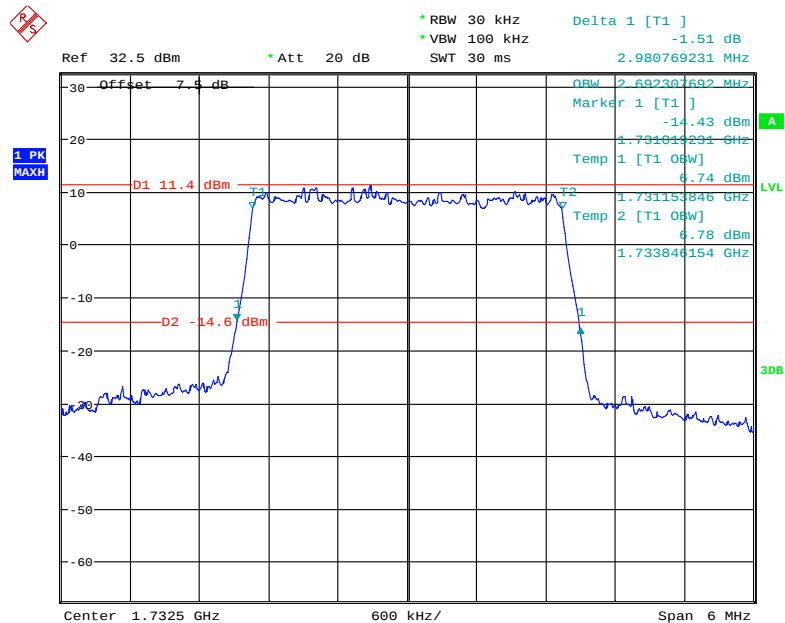
16-QAM (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



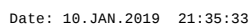
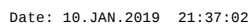
Date: 10.JAN.2019 21:27:15

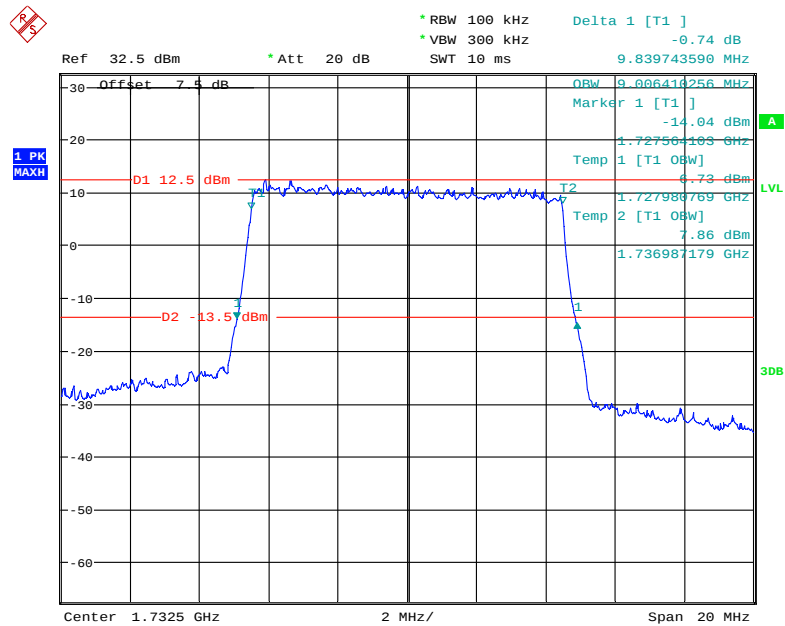
QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 10.JAN.2019 21:31:14

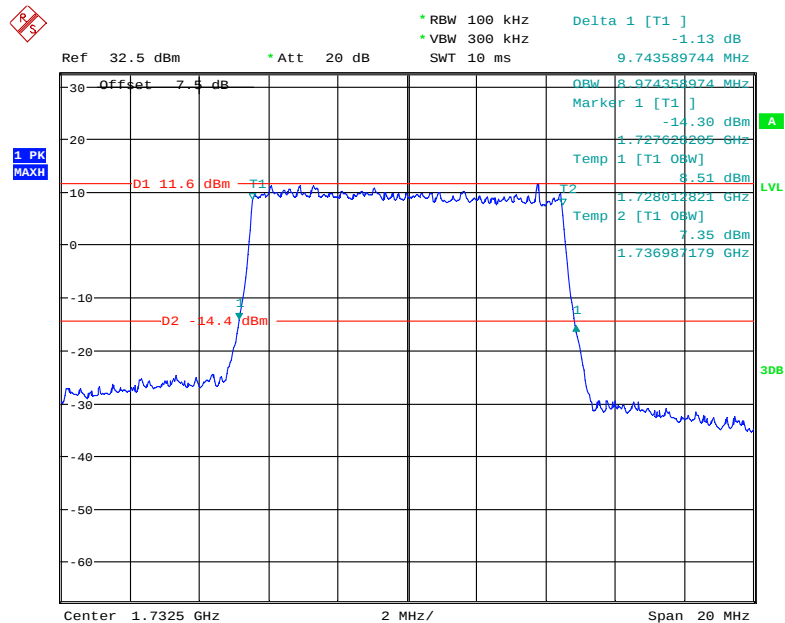
16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 10.JAN.2019 21:29:20

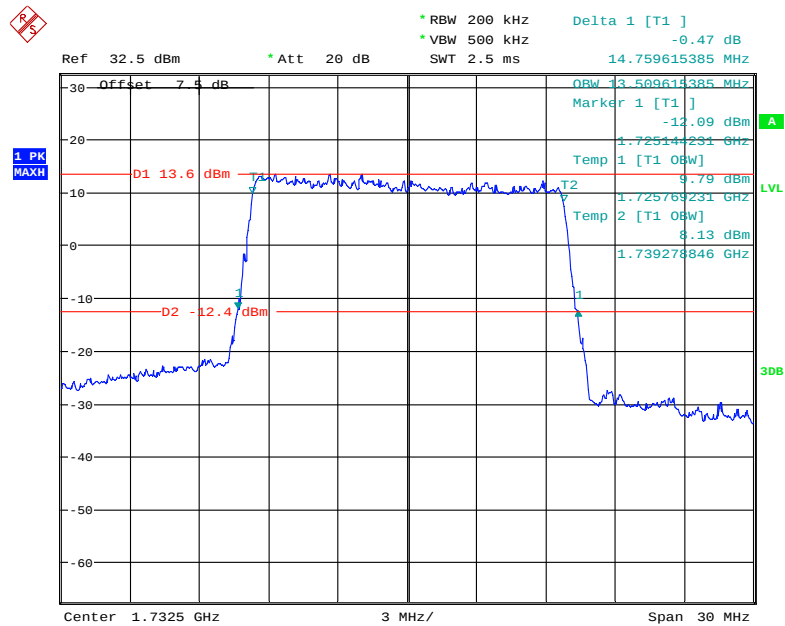


QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

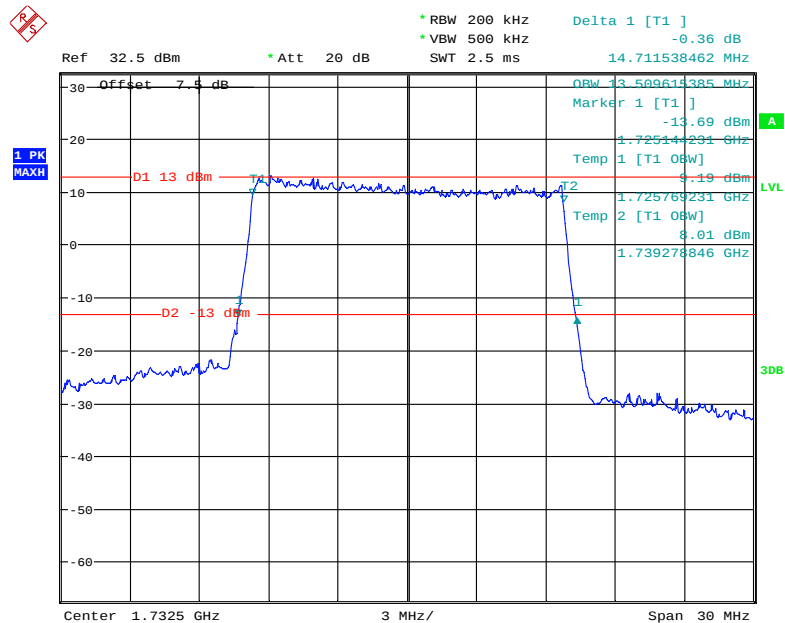
Date: 10.JAN.2019 21:40:25

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

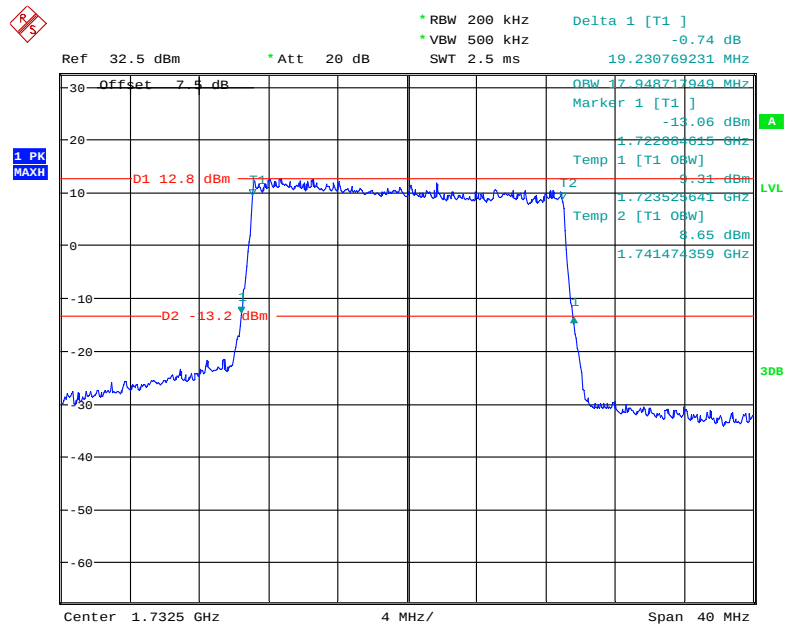
Date: 10.JAN.2019 21:39:18

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

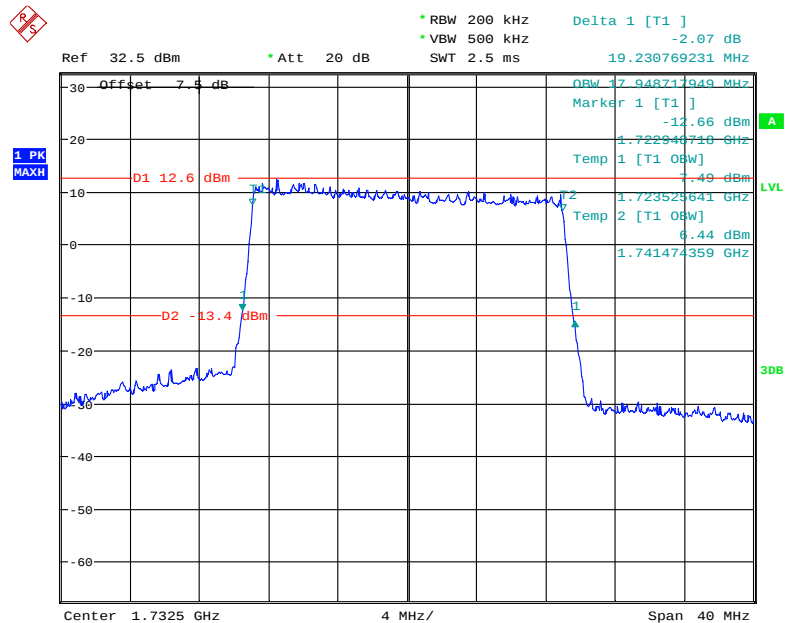
Date: 10.JAN.2019 21:43:55

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

Date: 10.JAN.2019 21:42:16

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

Date: 10.JAN.2019 21:46:52

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

Date: 10.JAN.2019 21:45:25

LTE Band 5: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.111	1.322
	16QAM	1.106	1.317
3.0	QPSK	2.702	2.952
	16QAM	2.702	2.981
5.0	QPSK	4.535	5.080
	16QAM	4.519	5.048
10.0	QPSK	8.974	9.872
	16QAM	8.974	9.679

Ref 32.5 dBm * Att 20 dB * RBW 30 kHz Delta 1 [T1] -0.77 dB
 * VBW 100 kHz 1.322115385 MHz
 SWT 15 ms

Offset 7.5 dB
 OBW 1.110578923 MHz
 Marker 1 [T1] -9.24 dBm
 835.050961530 MHz
 Temp 1 [T1 OBW] 8.97 dBm
 835.942301692 MHz
 Temp 2 [T1 OBW] 7.91 dBm
 837.052884615 MHz

1 PK MAXH
 D1 16.5 dBm
 D2 -9.5 dBm

Center 836.5 MHz 300 kHz/
 Span 3 MHz

Date: 10.JAN.2019 21:49:07

1 PK
MAXH

Ref 32.5 dBm Att 20 dB RBW 30 kHz VBW 100 kHz SWT 15 ms Delta 1 [T1] -1.04 dB 1.317307692 MHz

Offset 7.4 dB

D1 16.3 dBm

D2 -9.7 dBm

OBW 1 165764231 MHz

Marker 1 [T1] -8.90 dBm

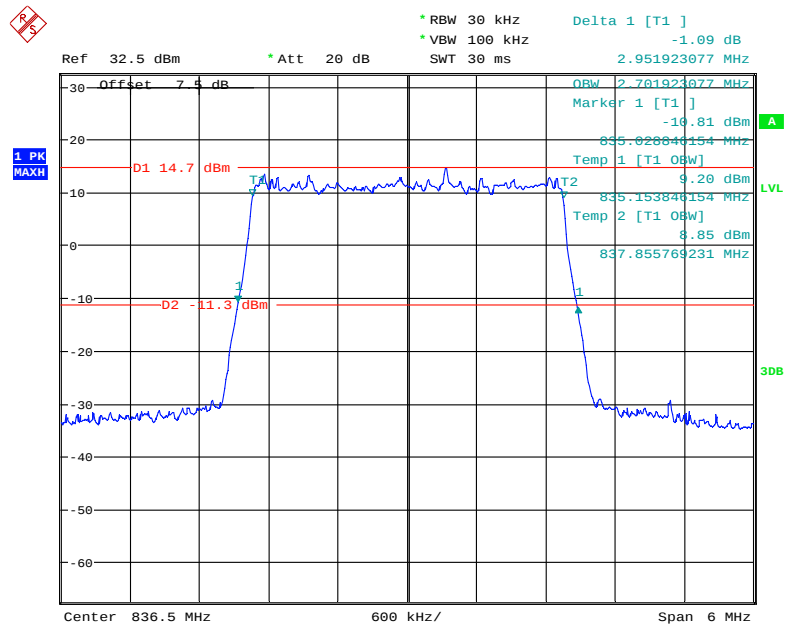
Temp 1 [T1 OBW] 8.03 dBm

Temp 2 [T1 OBW] 8.61 dBm

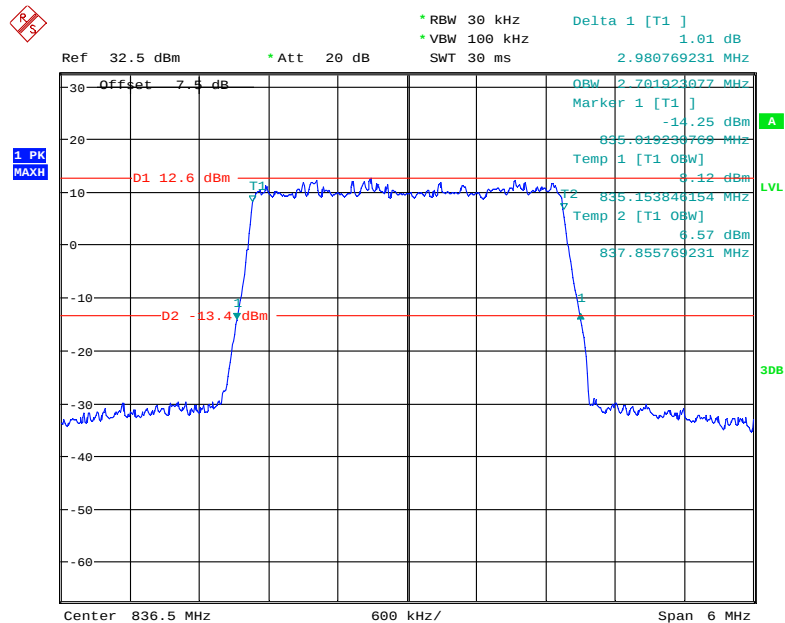
837.048076923 MHz

Center 836.5 MHz 300 kHz/ Span 3 MHz

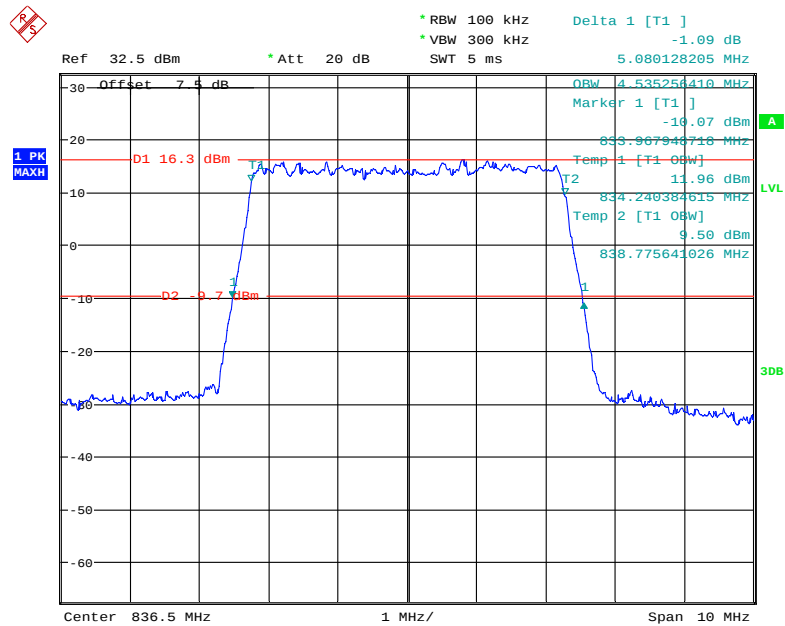
Date: 10.JAN.2019 21:51:11

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

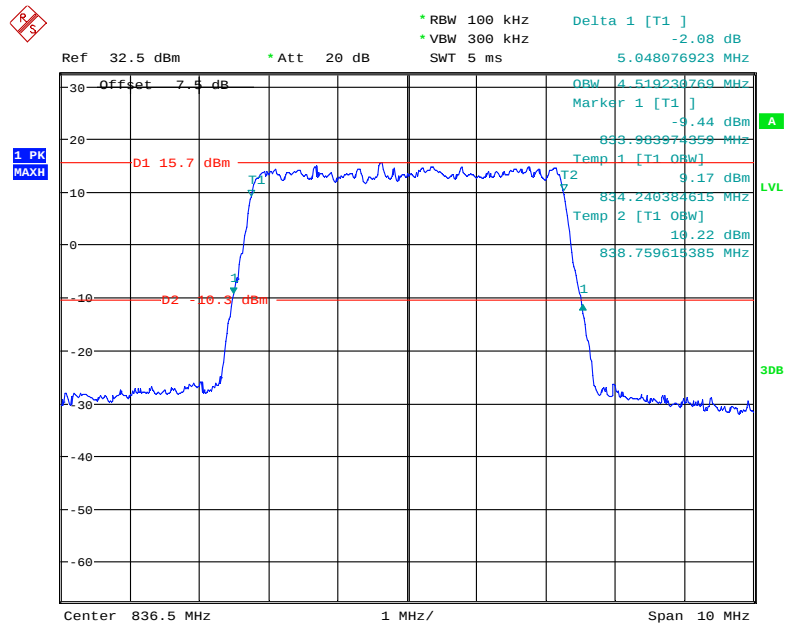
Date: 10.JAN.2019 21:53:16

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

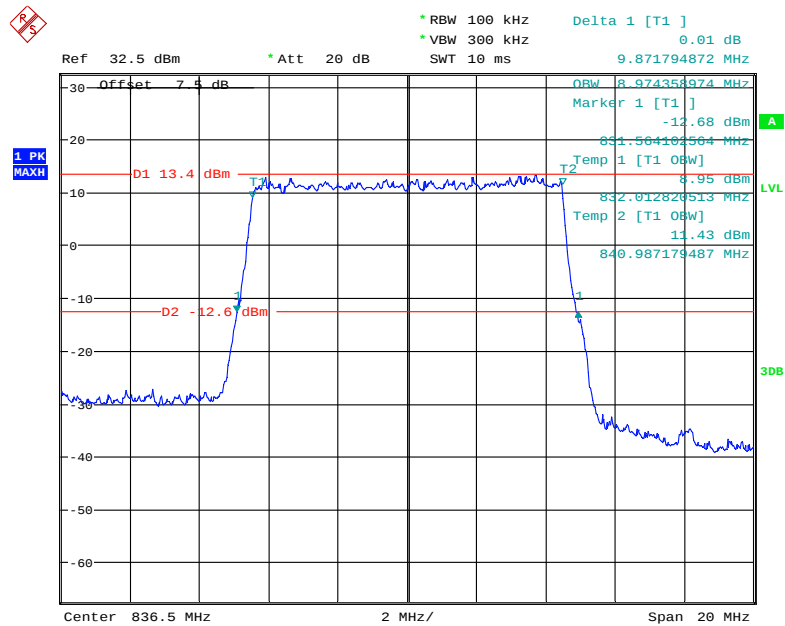
Date: 10.JAN.2019 21:54:44

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

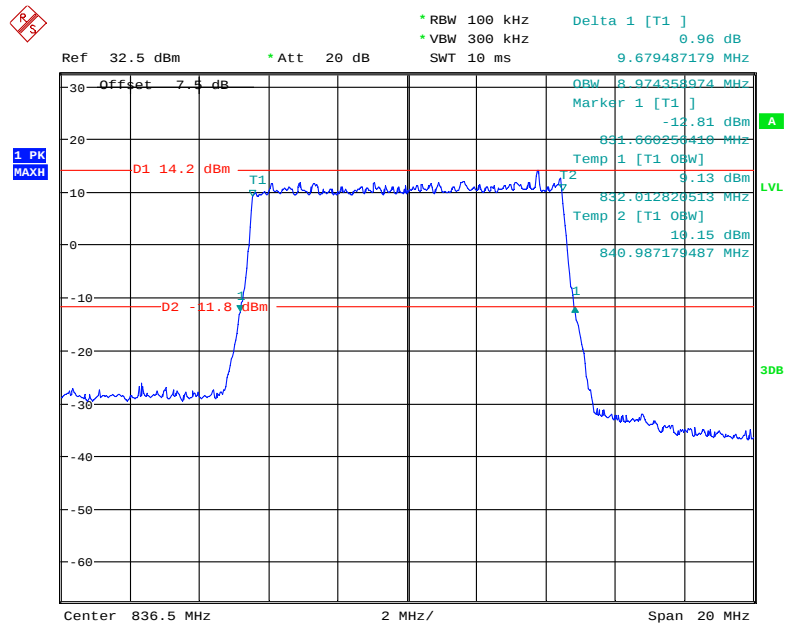
Date: 10.JAN.2019 21:56:48

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

Date: 10.JAN.2019 21:59:00

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

Date: 10.JAN.2019 22:01:14

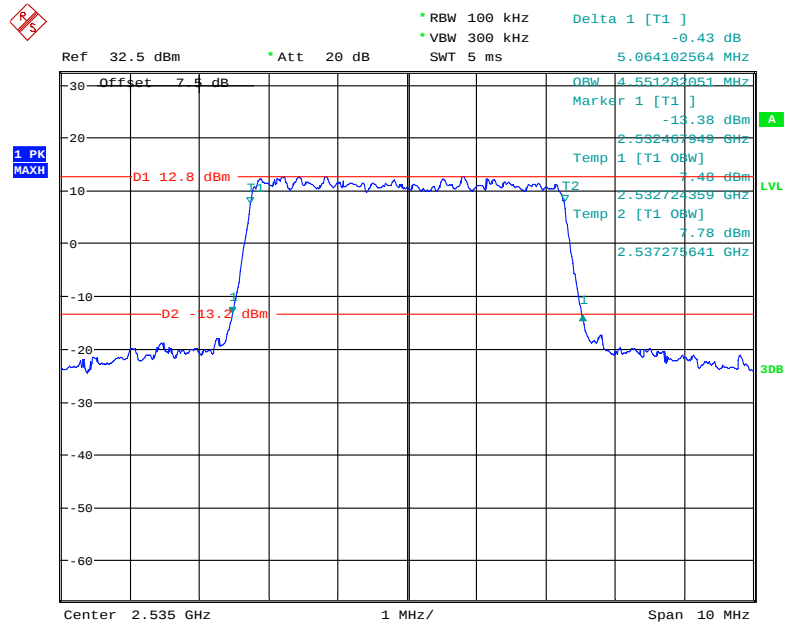
16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 10.JAN.2019 22:04:09

LTE Band 7: (Middle Channel)

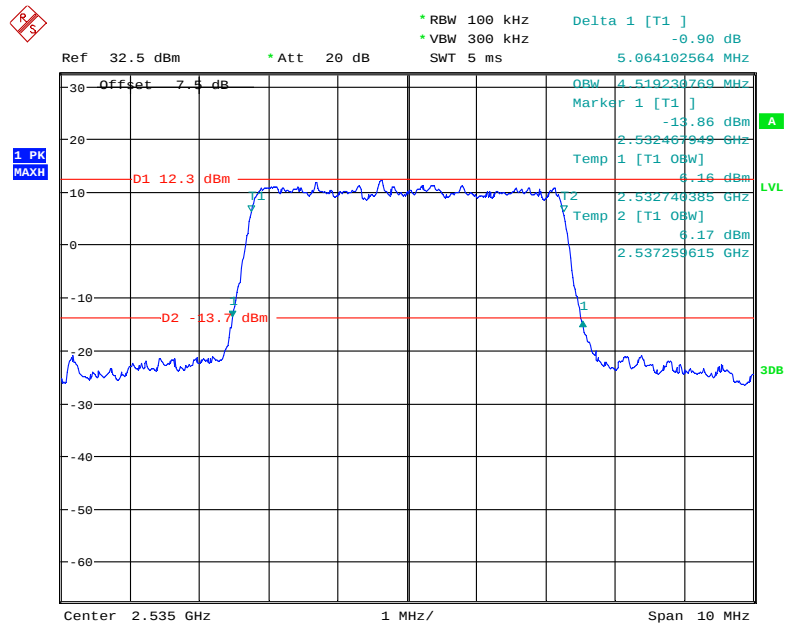
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.551	5.064
	16QAM	4.519	5.064
10.0	QPSK	8.974	9.904
	16QAM	8.974	9.712
15.0	QPSK	13.510	14.760
	16QAM	13.510	14.663
20.0	QPSK	17.885	19.231
	16QAM	17.949	19.231

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

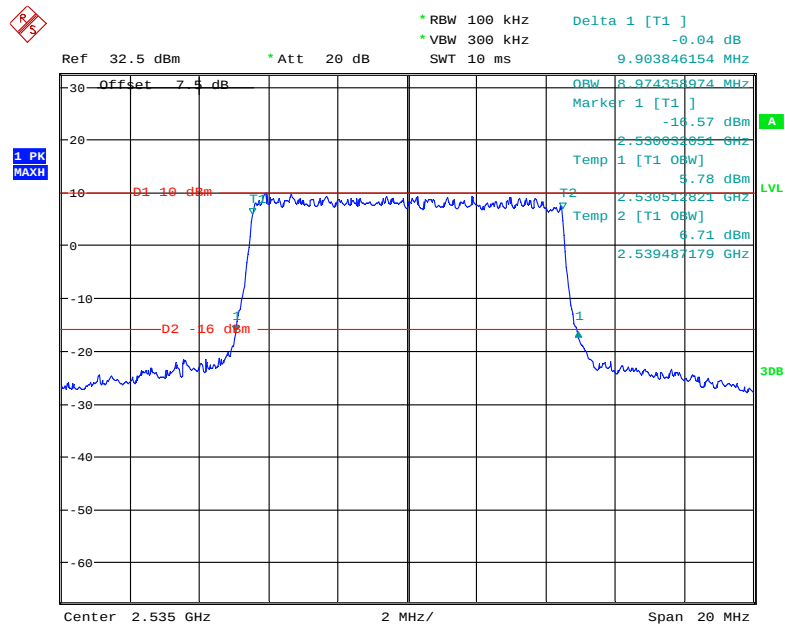


Date: 10.JAN.2019 22:17:27

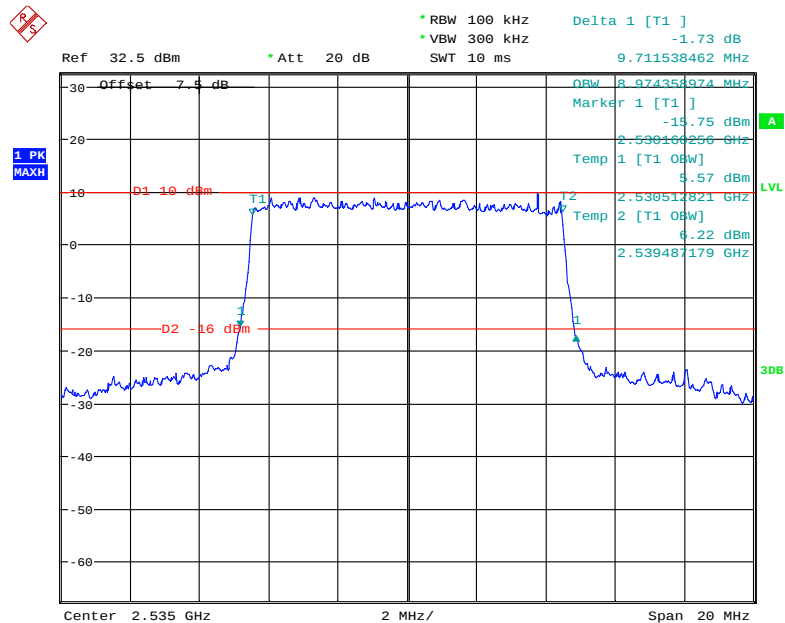
16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 10.JAN.2019 22:15:23

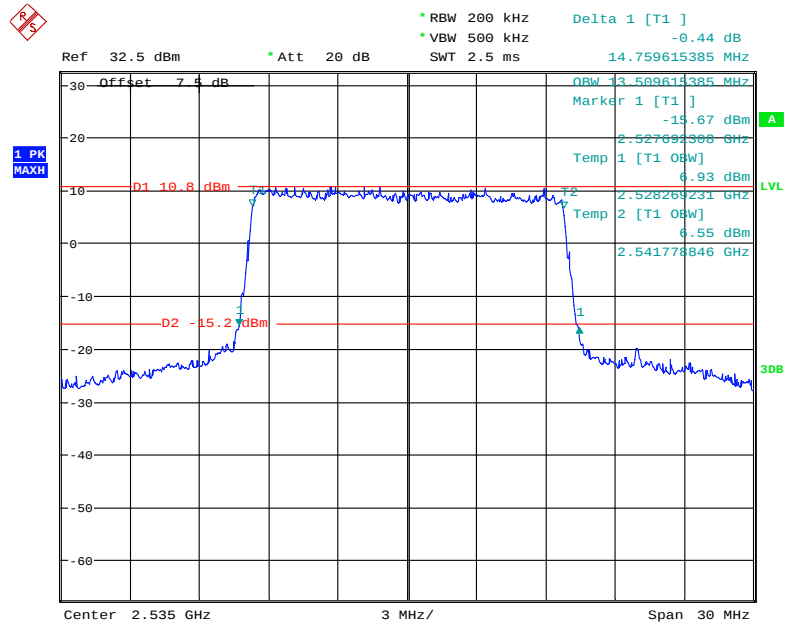
QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 10.JAN.2019 22:20:28

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

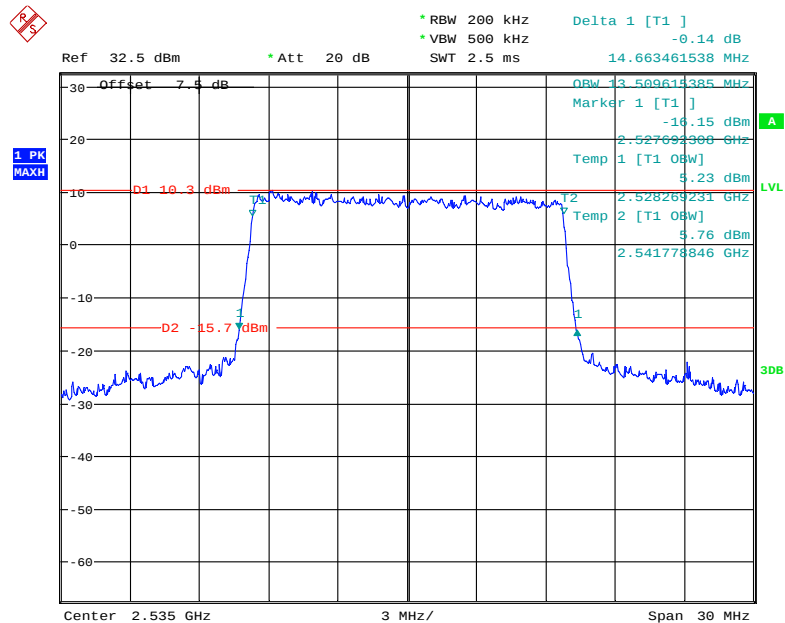
Date: 10.JAN.2019 22:19:10

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



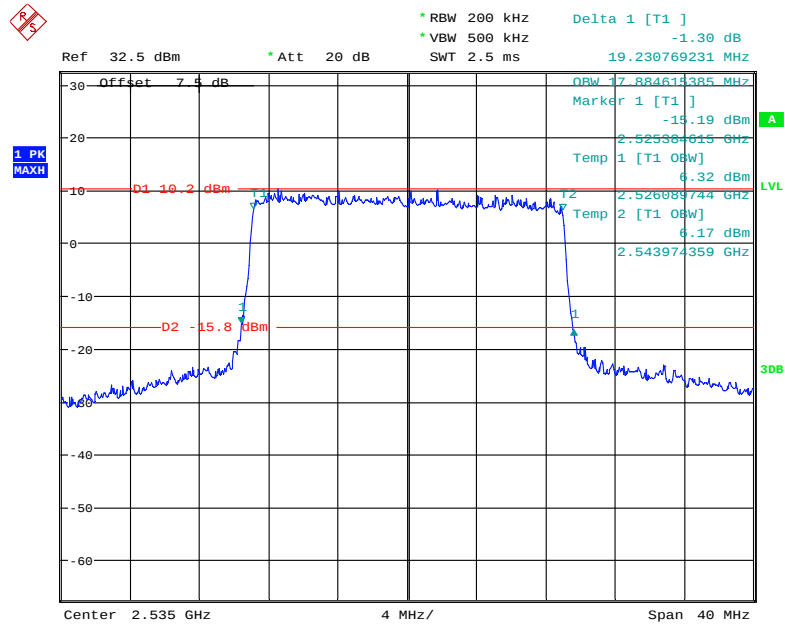
Date: 10.JAN.2019 22:21:52

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



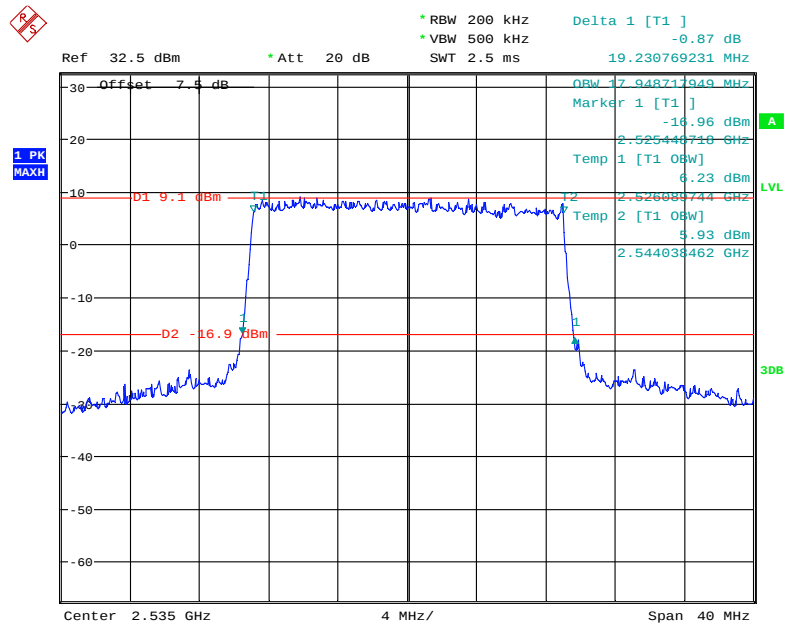
Date: 10.JAN.2019 22:23:46

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



Date: 10.JAN.2019 22:25:51

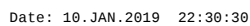
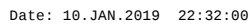
16-QAM (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

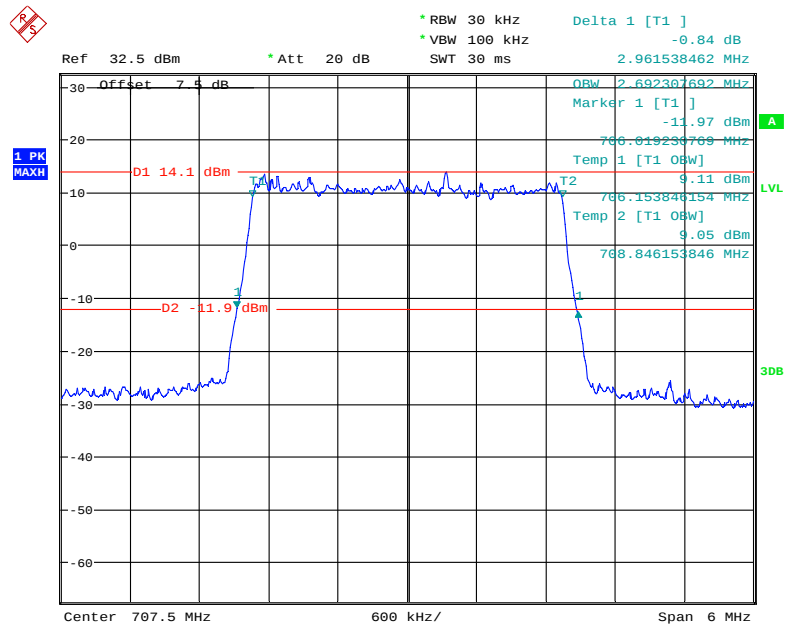


Date: 10.JAN.2019 22:28:02

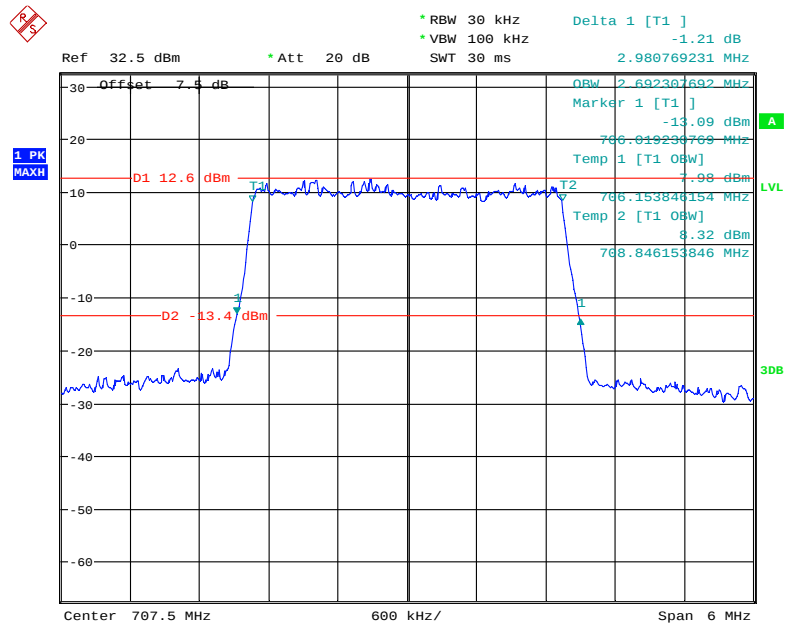
LTE Band 12(Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.106	1.308
	16QAM	1.111	1.322
3.0	QPSK	2.692	2.962
	16QAM	2.692	2.981
5.0	QPSK	4.551	5.080
	16QAM	4.535	5.064
10.0	QPSK	9.006	9.840
	16QAM	8.974	9.744

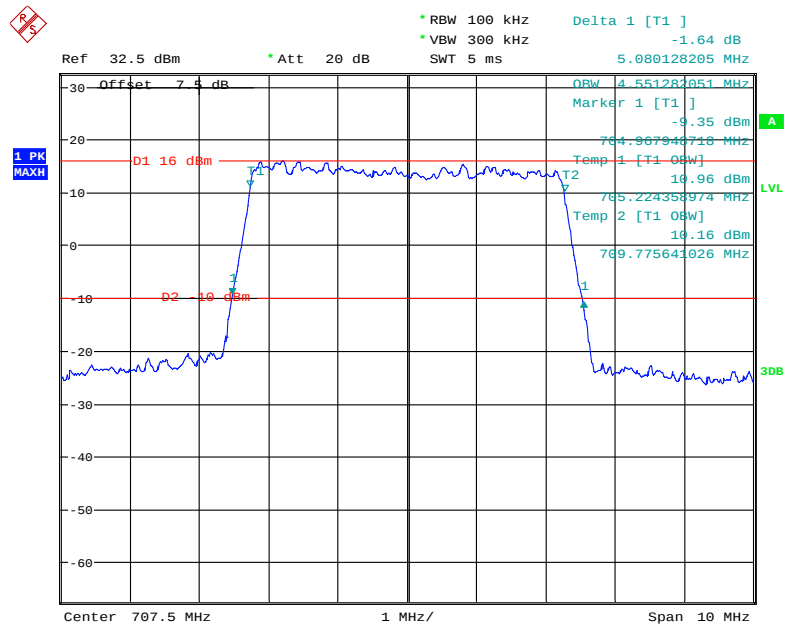


QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

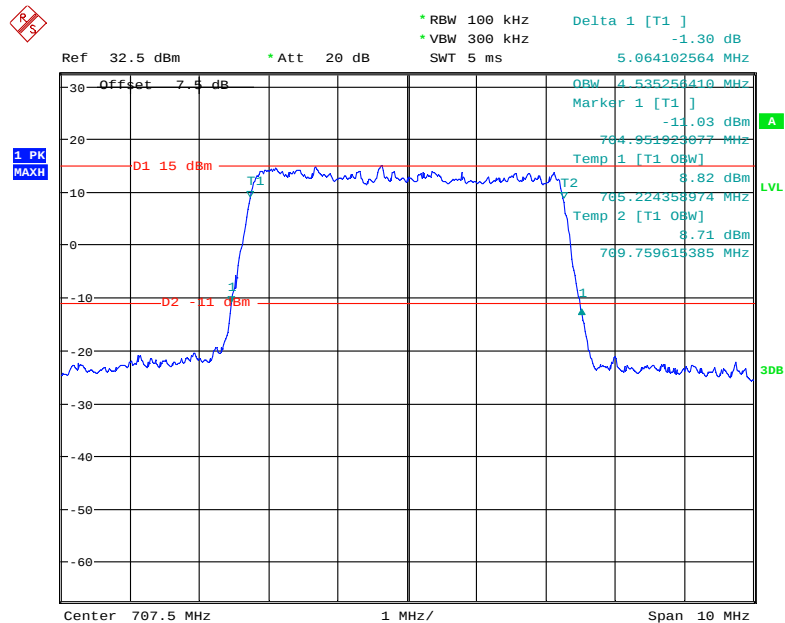
Date: 10.JAN.2019 22:35:02

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

Date: 10.JAN.2019 22:33:49

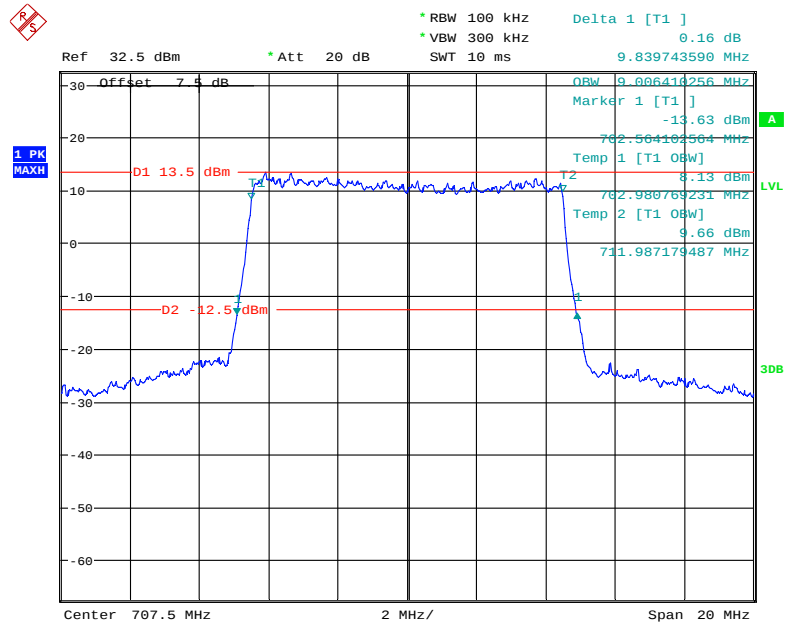
QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 10.JAN.2019 22:38:05

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

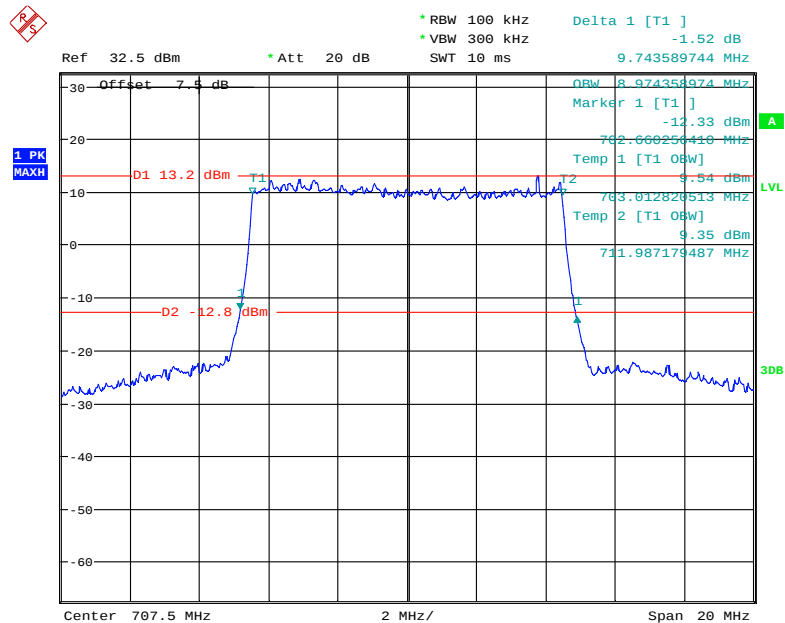
Date: 10.JAN.2019 22:39:53

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



Date: 10.JAN.2019 22:42:20

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



Date: 10.JAN.2019 22:45:13

LTE Band 13: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.535	5.064
	16QAM	4.519	5.032
10.0	QPSK	8.974	9.808
	16QAM	8.974	9.712

Ref 32.5 dBm * Att 20 dB * RBW 100 kHz Delta 1 [T1] -0.96 dB
 * VBW 300 kHz 5.064102564 MHz
 SWT 5 ms

Offset 7.5 dB

1 PK MAXH

D1 15.6 dBm

Marker 1 [T1] -10.46 dBm
 779.467946718 MHz
 Temp 1 [T1 DBW] 10.36 dBm
 779.724358974 MHz
 Temp 2 [T1 DBW] 10.00 dBm
 784.259615385 MHz

D2 -10.4 dBm

1

Center 782 MHz 1 MHz/ Span 10 MHz

Date: 10.JAN.2019 22:49:18

Ref 32.5 dBm * Att 20 dB * RBW 100 kHz * VBW 300 kHz SWT 5 ms Delta 1 [T1] -1.08 dB 5.032051282 MHz

Offset 7.5 dB

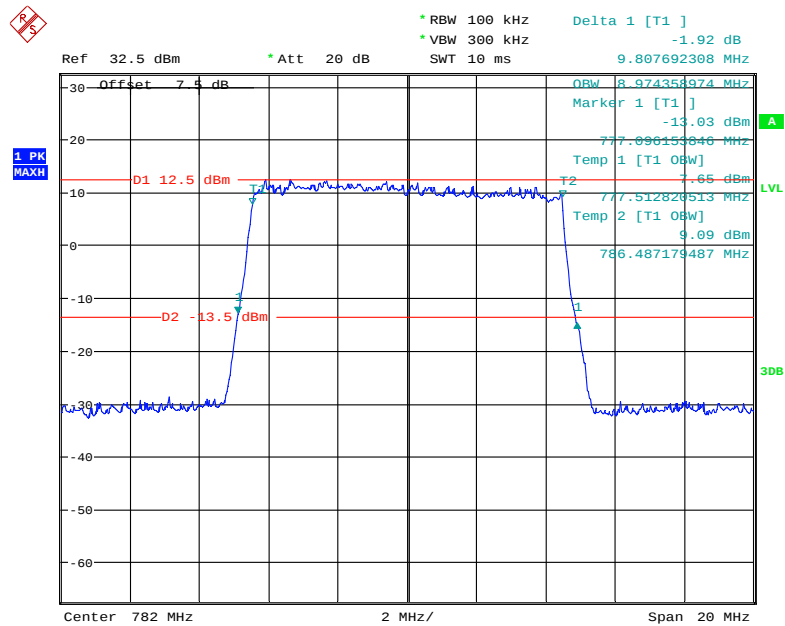
1 PK MAXH

D1 15.3 dBm D2 -10.7 dBm

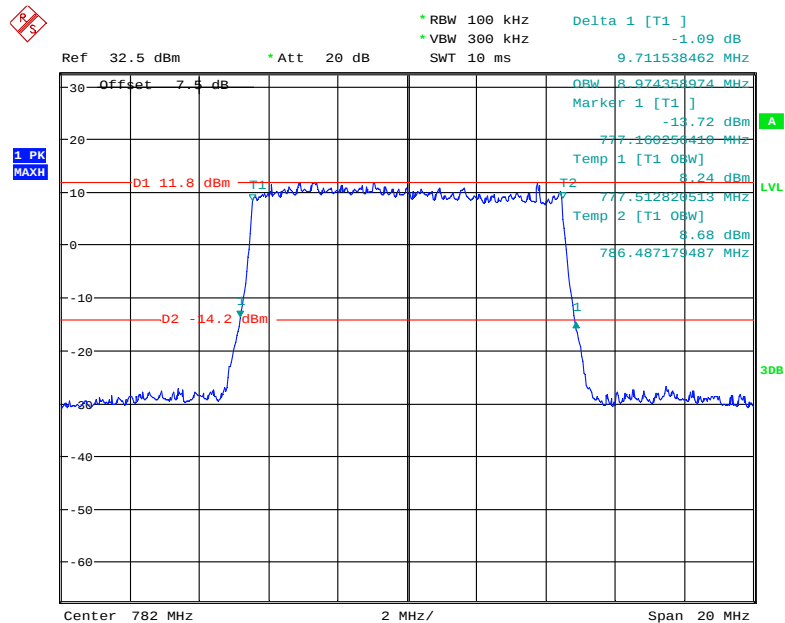
Marker 1 [T1] -10.70 dBm Temp 1 [T1 OBW] 8.71 dBm 779.467946710 MHz Temp 2 [T1 OBW] 9.09 dBm 784.243589744 MHz

Center 782 MHz 1 MHz/ Span 10 MHz

Date: 10.JAN.2019 22:47:36

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

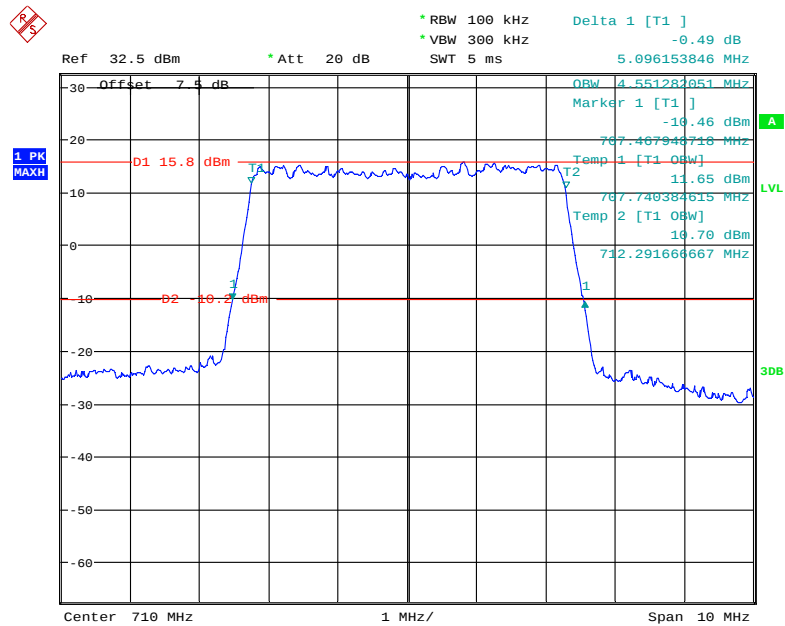
Date: 10.JAN.2019 22:52:08

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

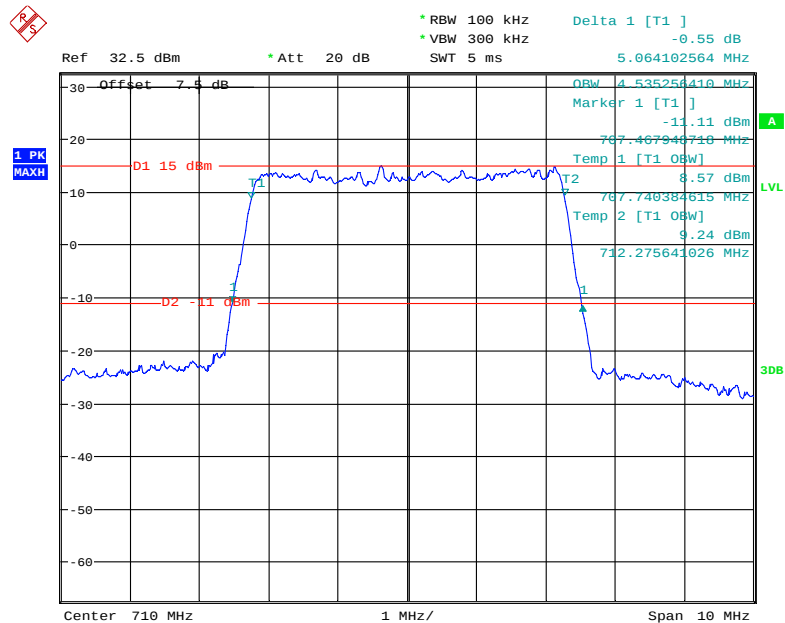
Date: 10.JAN.2019 22:50:53

LTE Band 17: (Middle Channel)

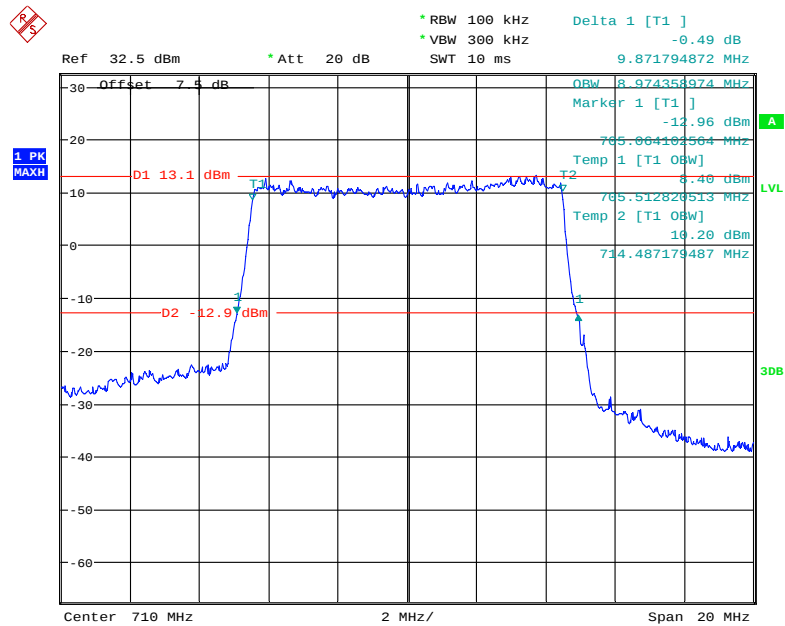
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.551	5.096
	16QAM	4.535	5.064
10.0	QPSK	8.974	9.872
	16QAM	8.974	9.647

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

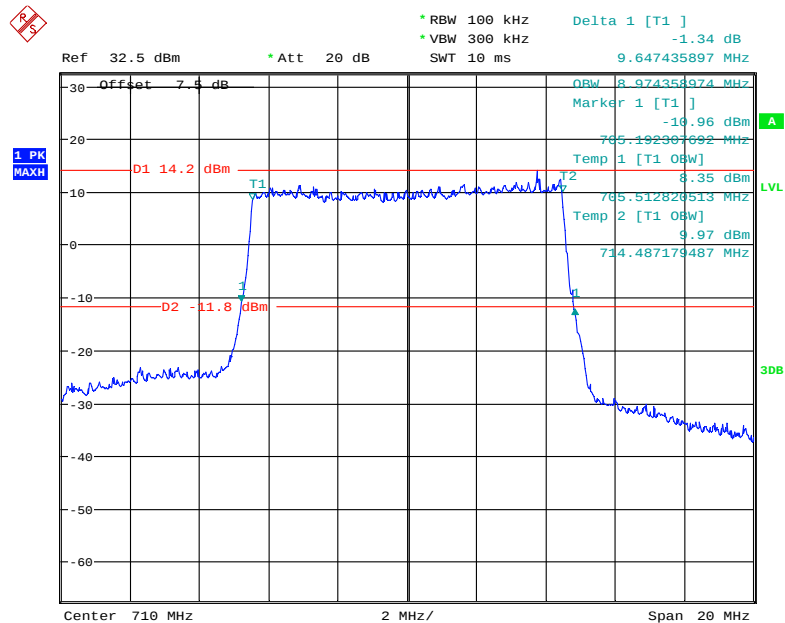
Date: 10.JAN.2019 22:56:32

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

Date: 10.JAN.2019 22:58:21

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

Date: 10.JAN.2019 22:59:52

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

Date: 10.JAN.2019 23:01:05

FCC §2.1051, §22.917(a) & §24.238(a); §27.53(c)(f)(g)(h)(m) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

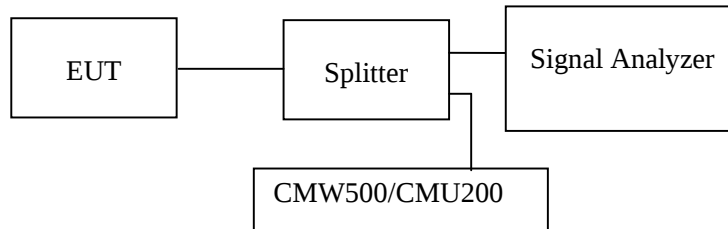
Applicable Standard

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

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

Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 1MHz. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao from 2019-01-11 to 2019-01-18.

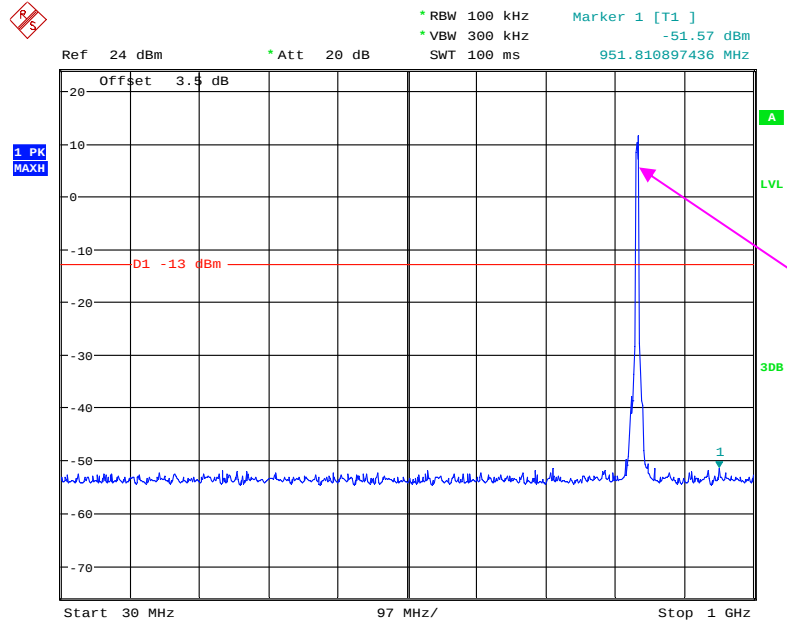
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

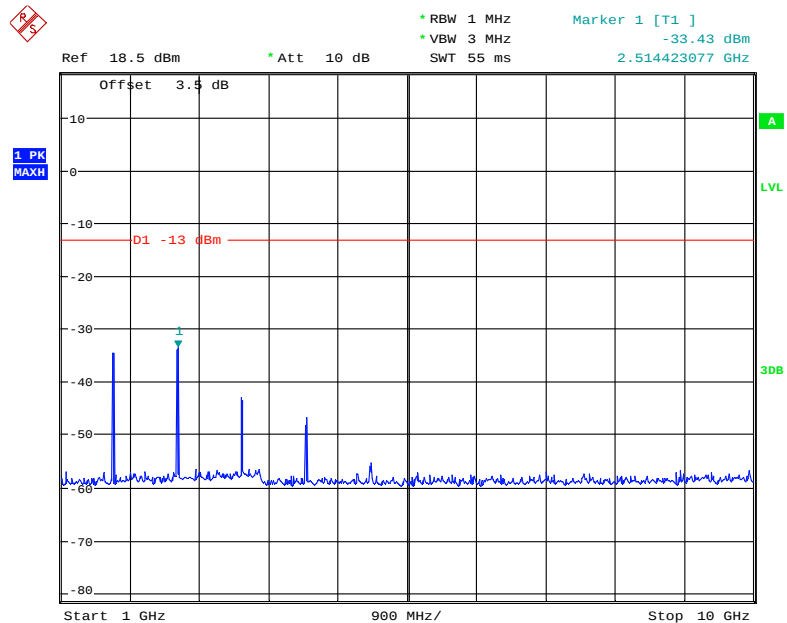
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 18.JAN.2019 08:52:04

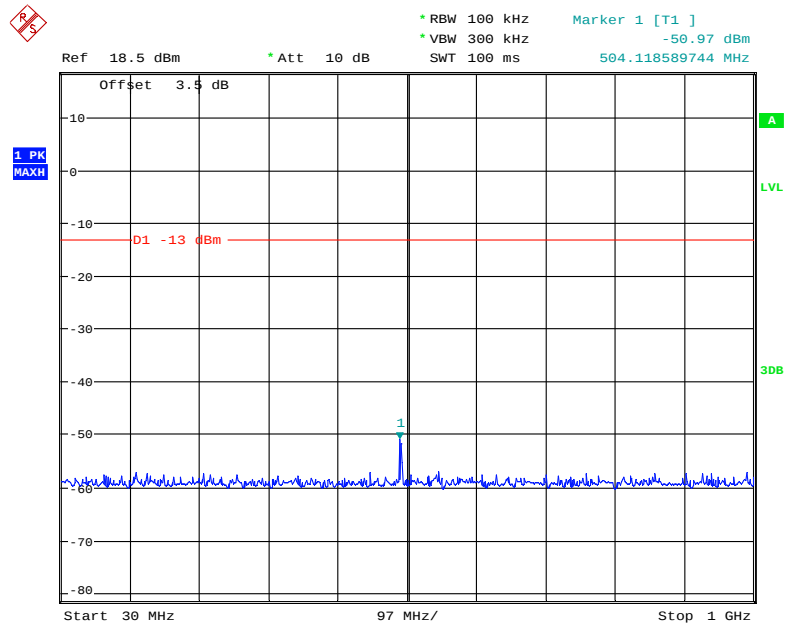
1 GHz – 10 GHz (WCDMA Mode)



Date: 18.JAN.2019 08:50:50

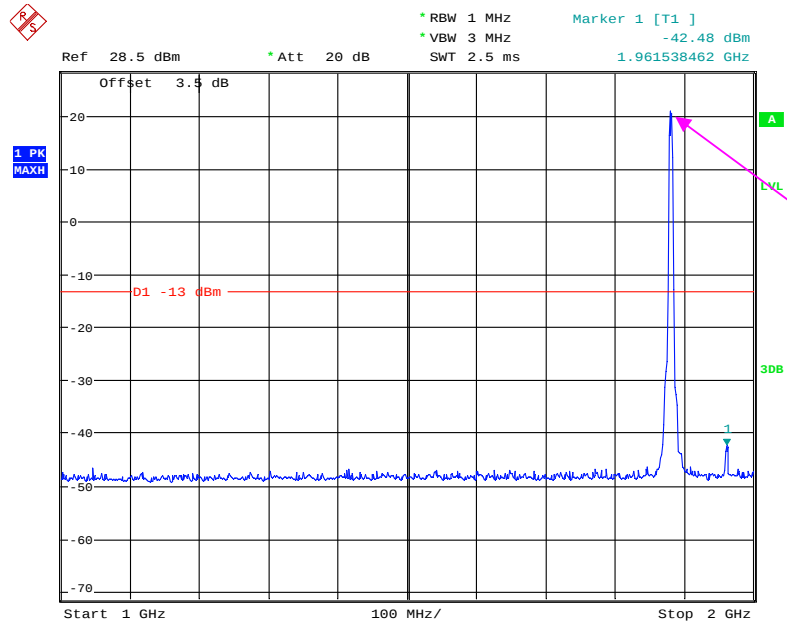
PCS Band (Part 24E)

30 MHz – 1 GHz (WCDMA Mode)



Date: 18.JAN.2019 08:20:38

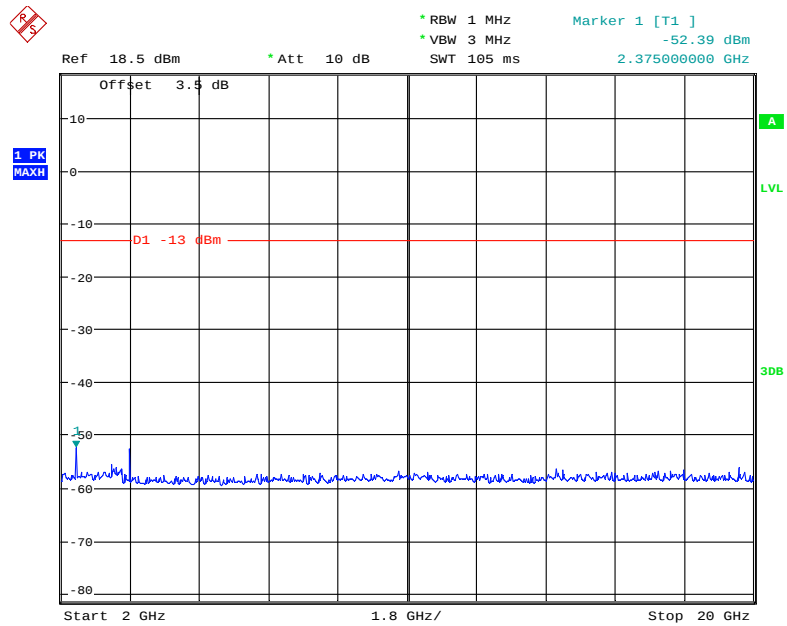
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 18.JAN.2019 08:08:30

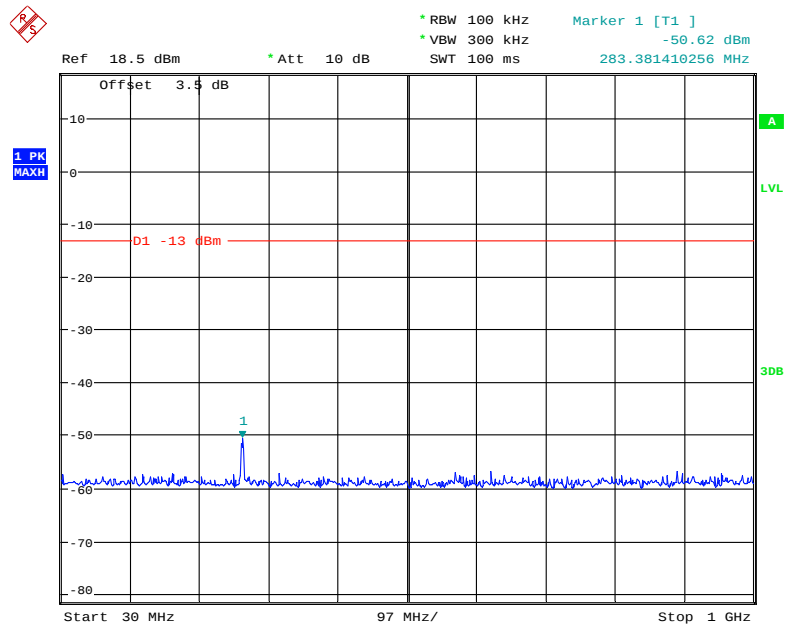
2 GHz – 20 GHz (WCDMA Mode)



Date: 18.JAN.2019 08:19:21

AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



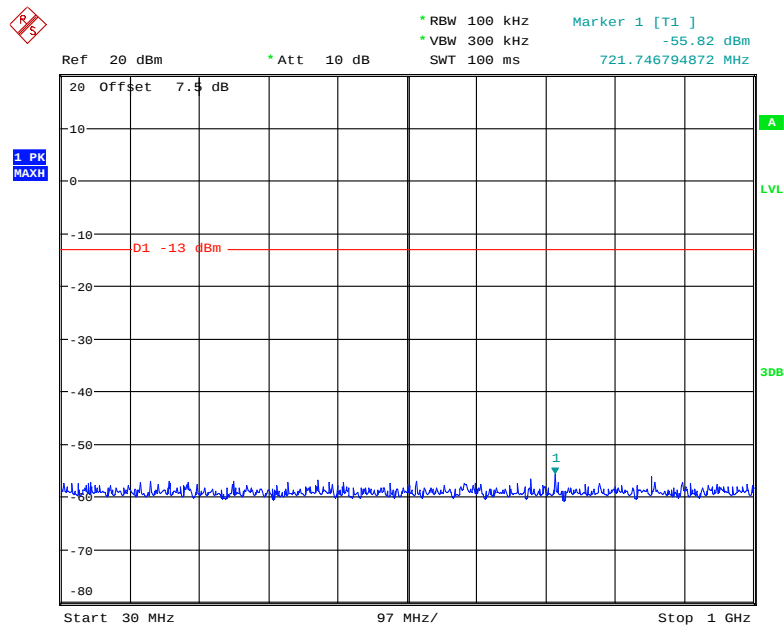
Date: 18.JAN.2019 08:45:08

Date: 18.JAN.2019 08:46:32

Date: 18.JAN.2019 08:47:39

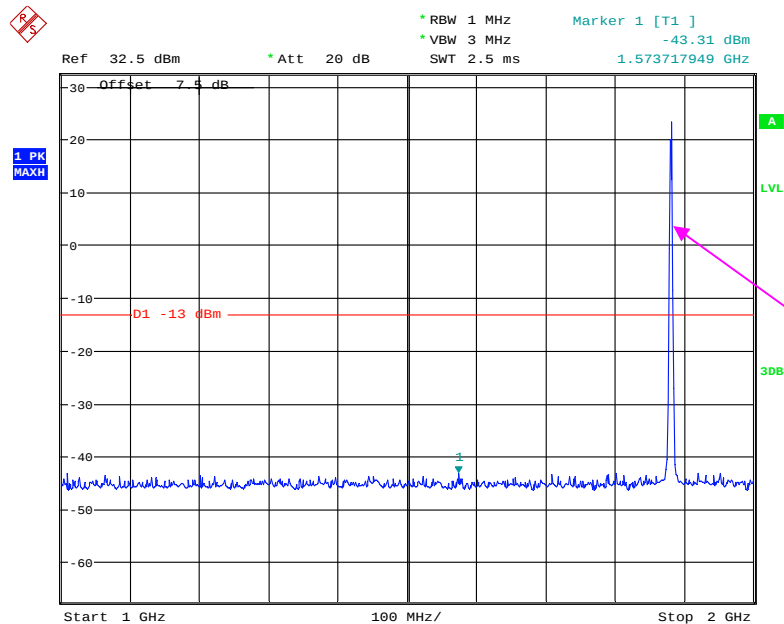
LTE Band 2:

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



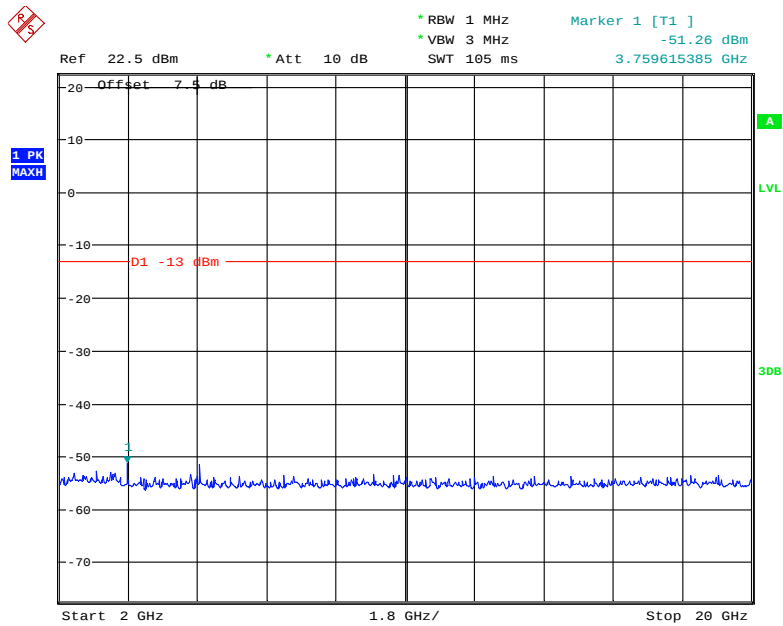
Date: 11.JAN.2019 21:14:44

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



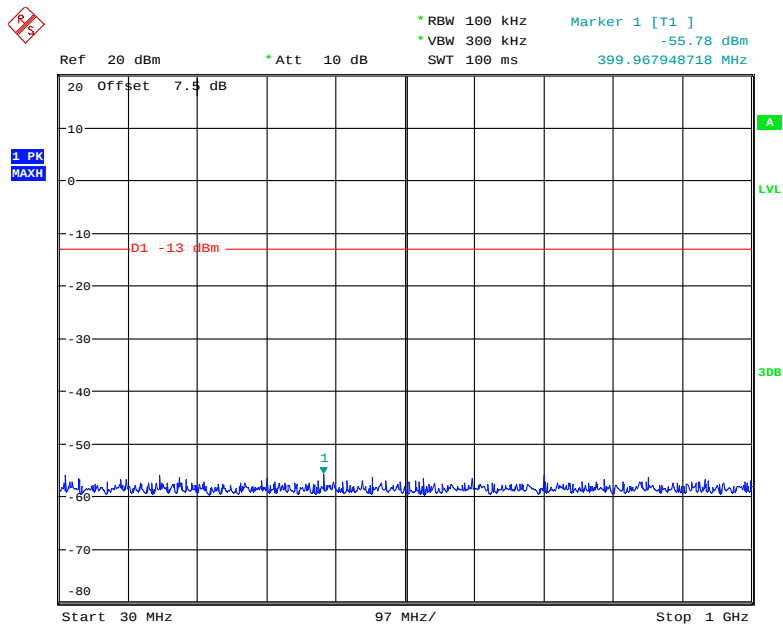
Date: 11.JAN.2019 21:23:33

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



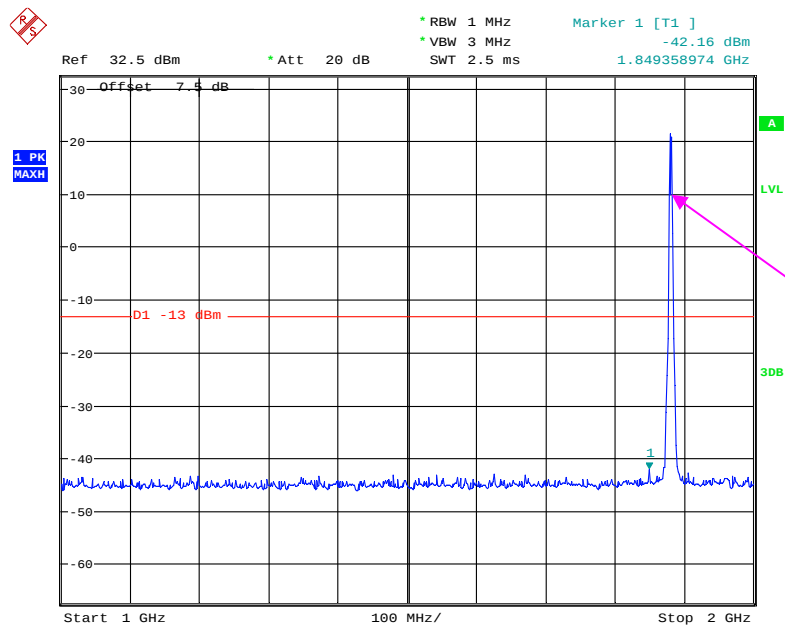
Date: 11.JAN.2019 21:27:38

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



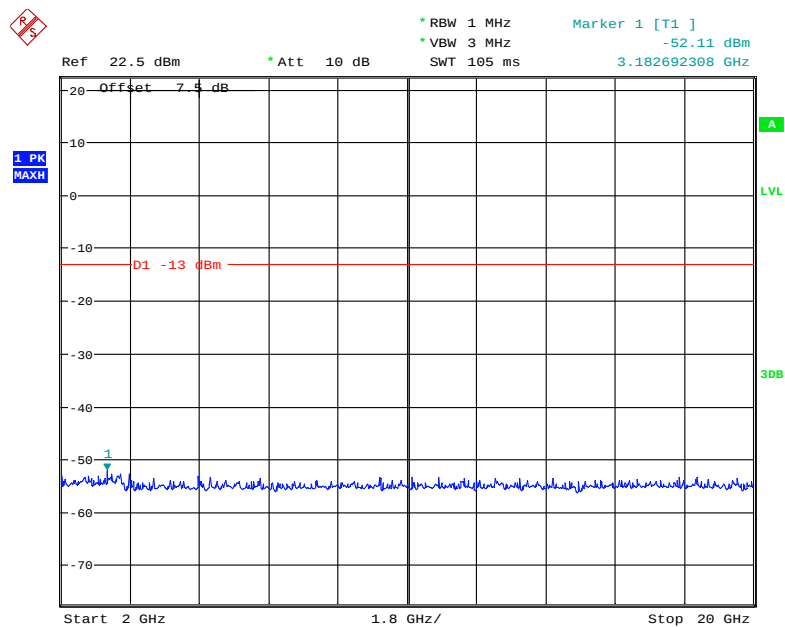
Date: 11.JAN.2019 21:15:13

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

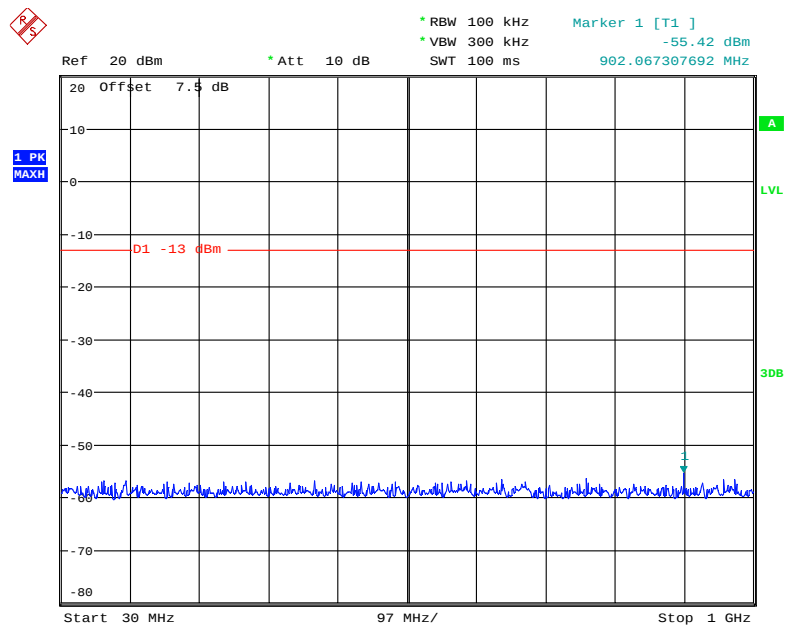


Date: 11.JAN.2019 21:22:56

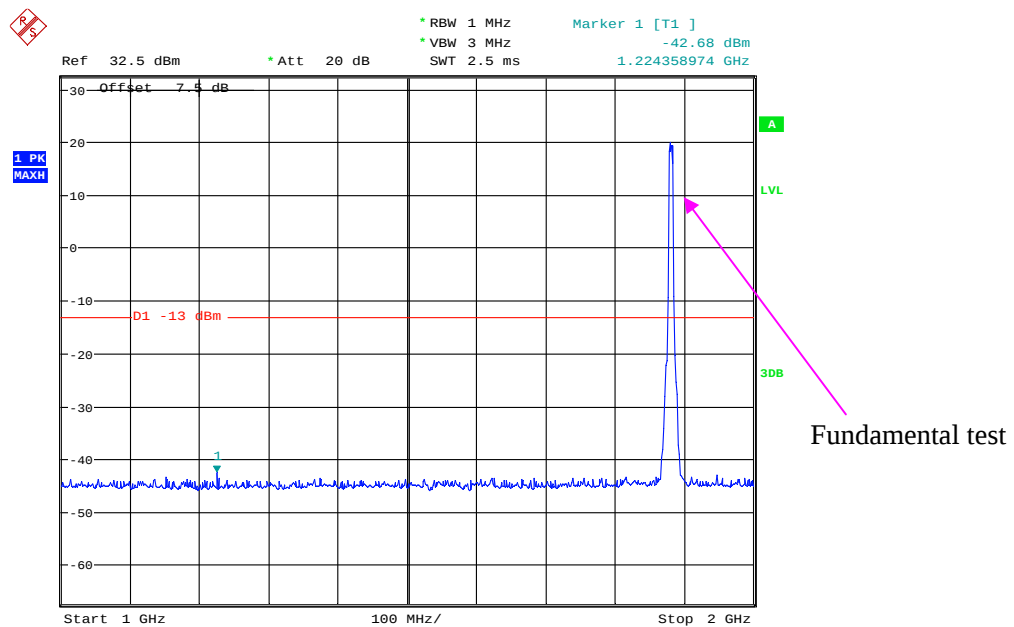
2 GHz – 20 GHz (3.0 MHz, Middle Channel)



Date: 11.JAN.2019 21:28:01

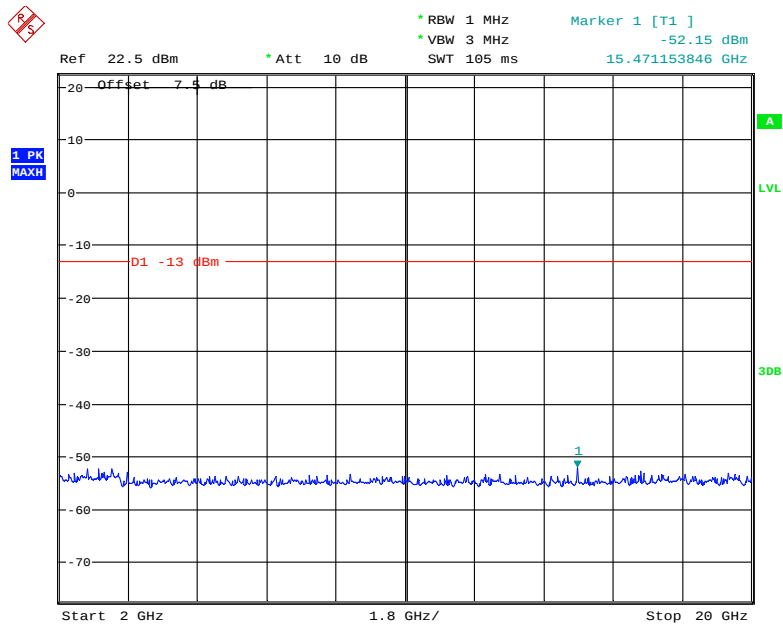
30 MHz - 1 GHz (5.0 MHz, Middle Channel)

Date: 11.JAN.2019 21:15:40

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

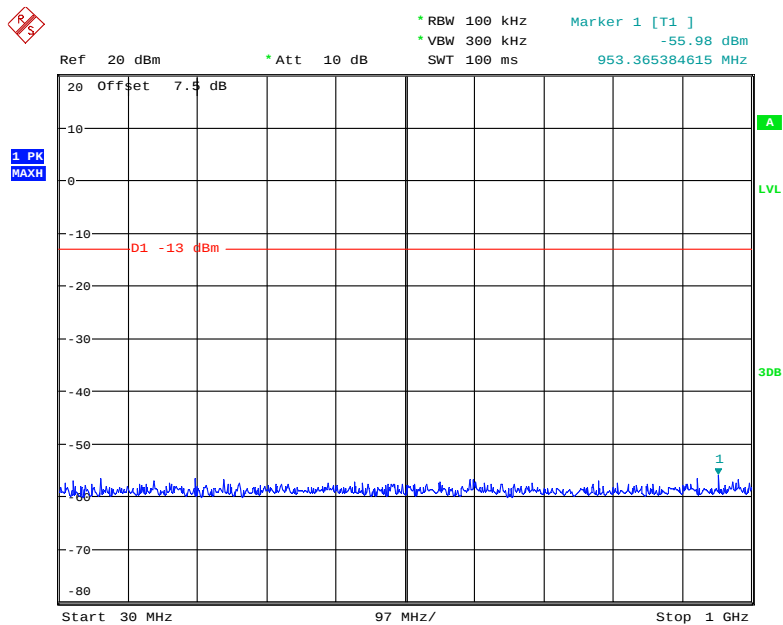
Date: 11.JAN.2019 21:22:24

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



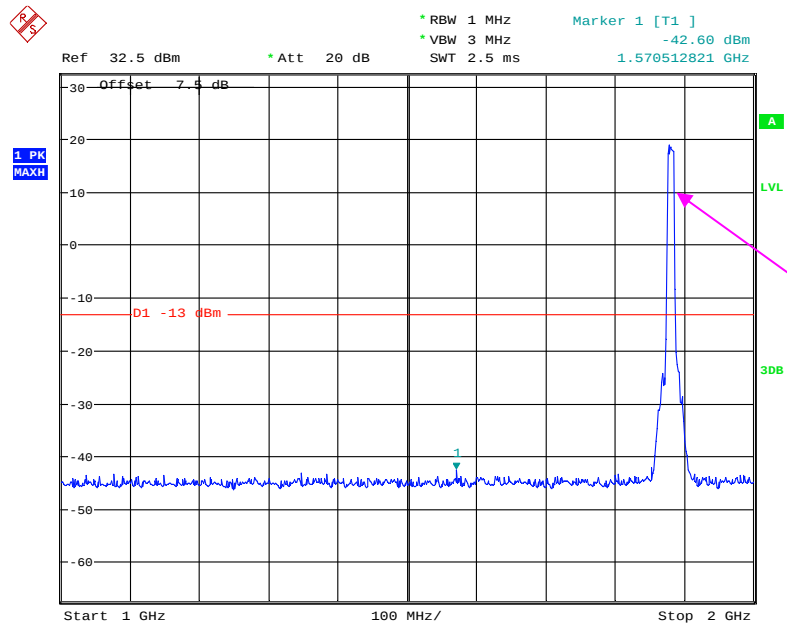
Date: 11.JAN.2019 21:28:30

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



Date: 11.JAN.2019 21:15:55

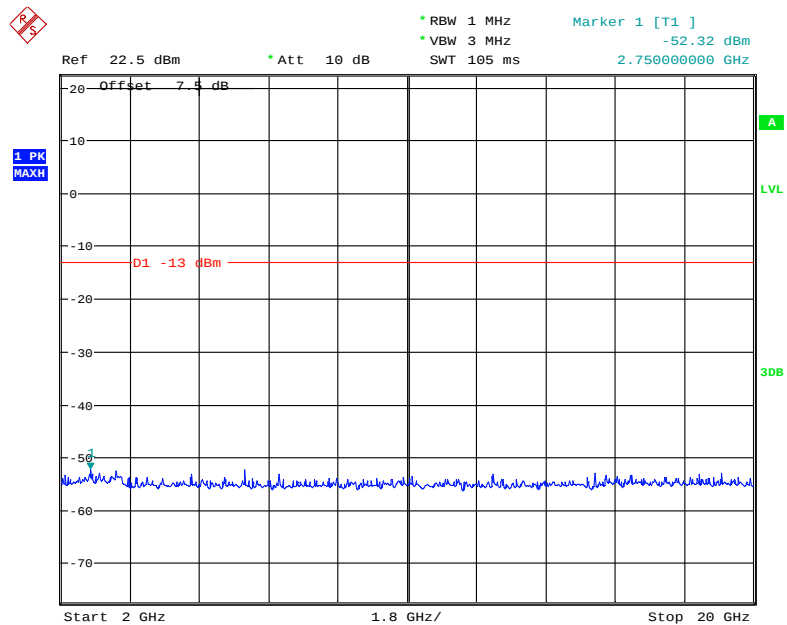
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



Fundamental test

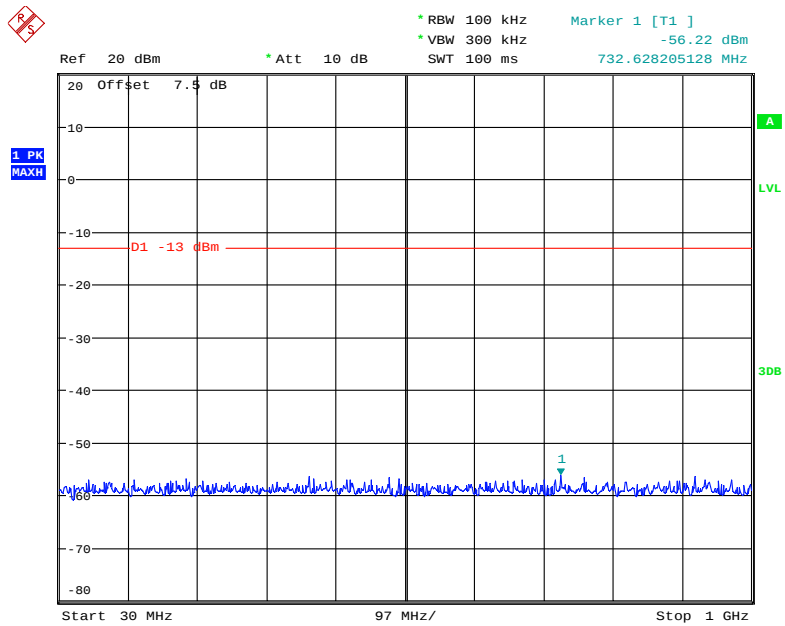
Date: 11.JAN.2019 21:21:46

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



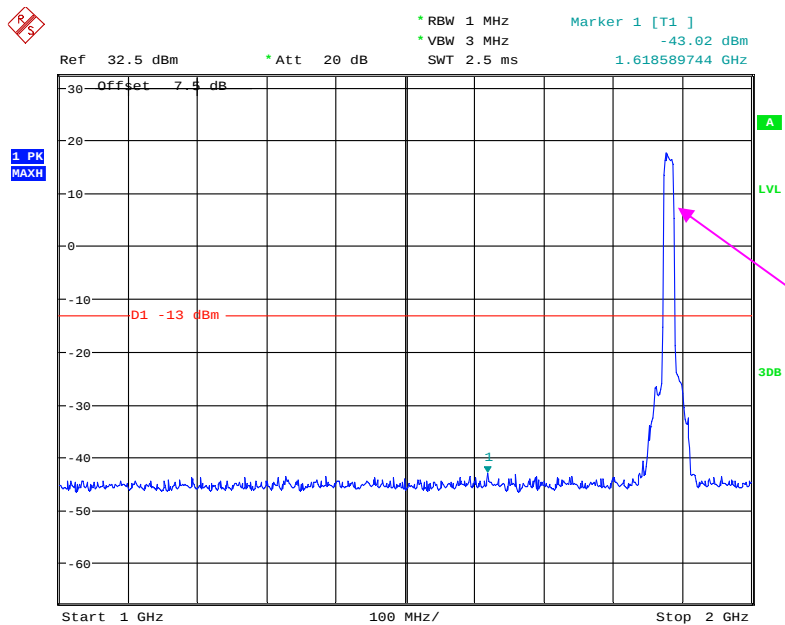
Date: 11.JAN.2019 21:28:55

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



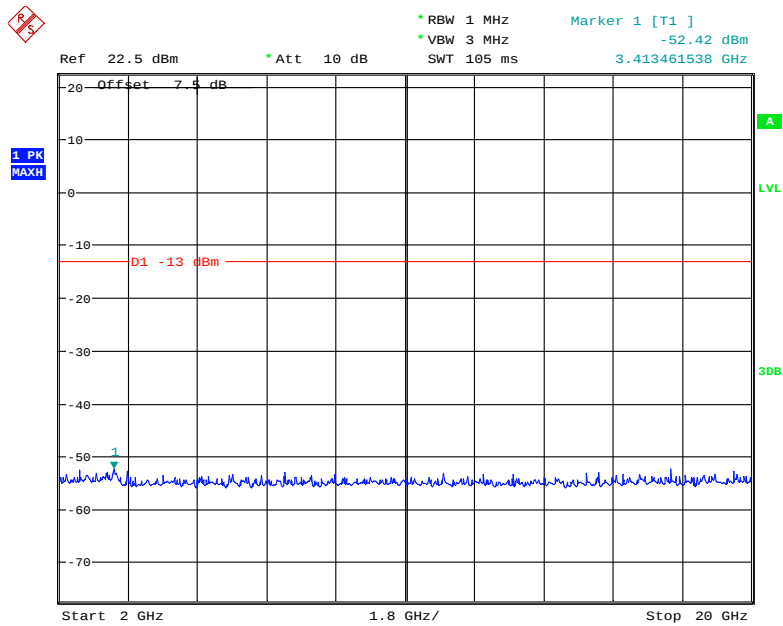
Date: 11.JAN.2019 21:16:10

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



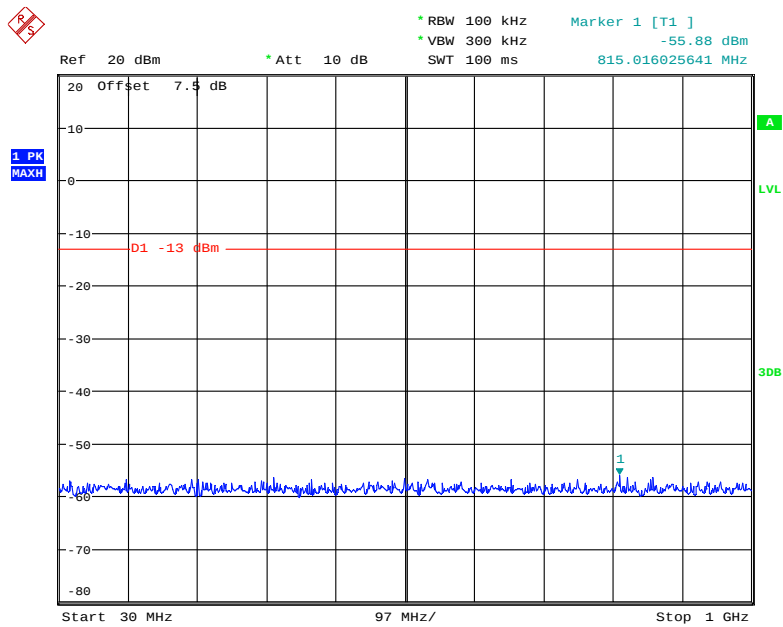
Fundamental test

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



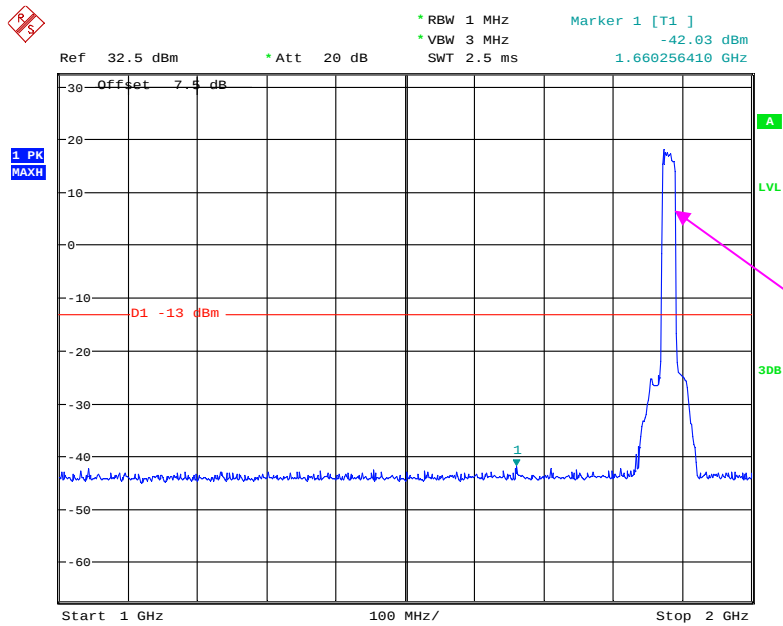
Date: 11.JAN.2019 21:29:12

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



Date: 11.JAN.2019 21:16:34

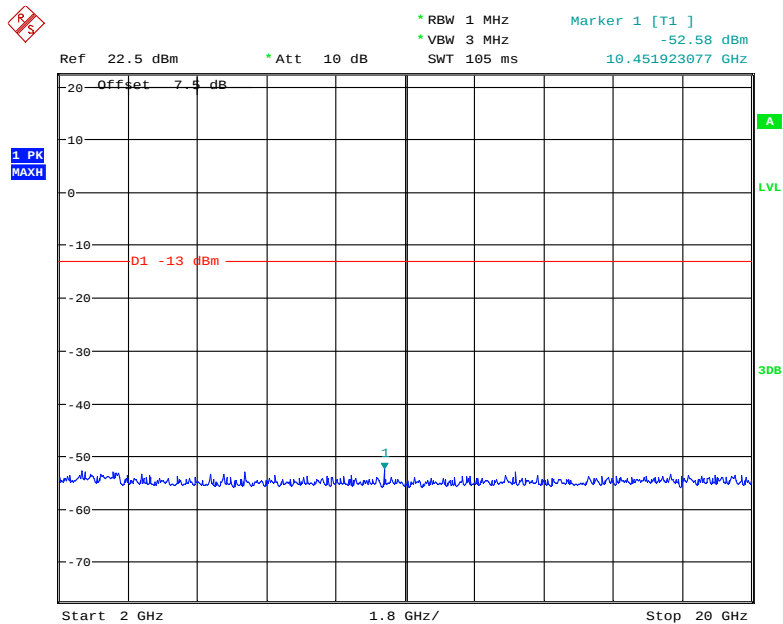
1 GHz – 2 GHz (20.0 MHz, Middle Channel)



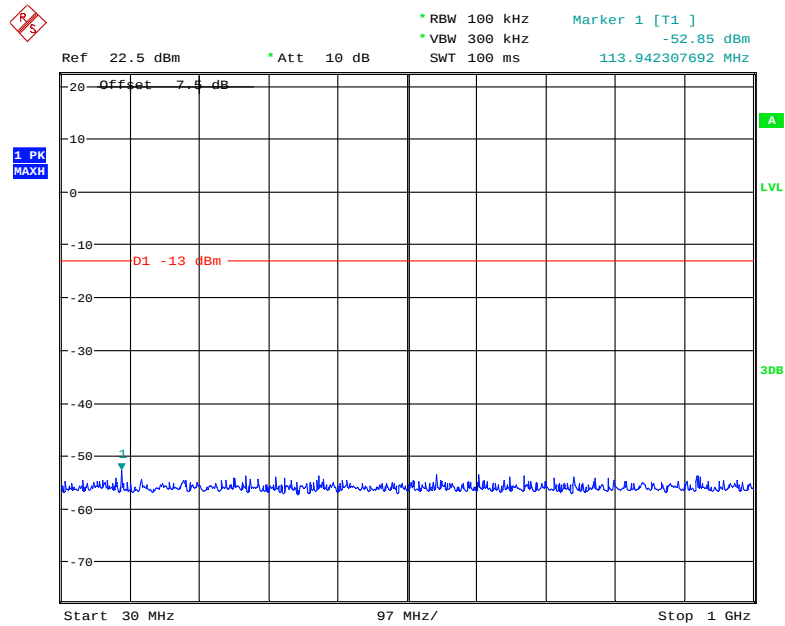
Fundamental test

Date: 11.JAN.2019 21:20:49

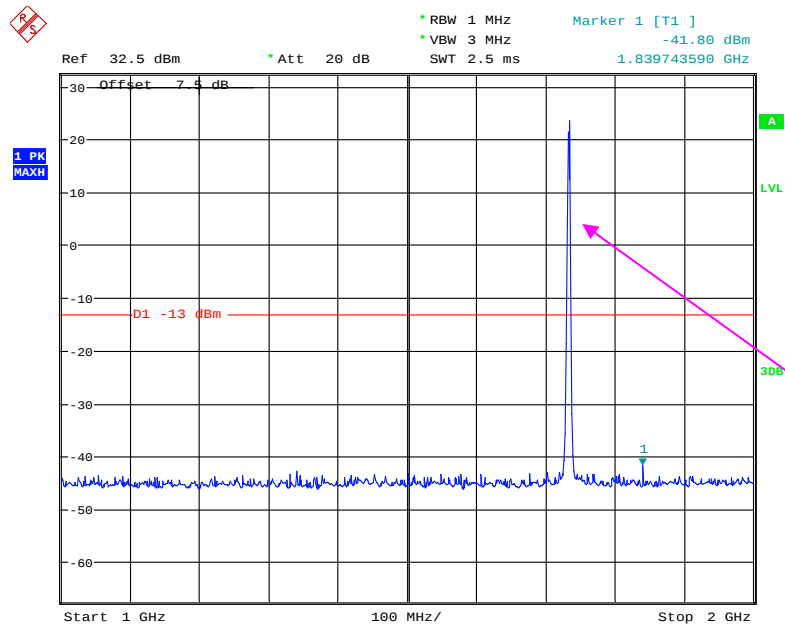
2GHz - 20GHz (20.0 MHz, Middle Channel)



Date: 11.JAN.2019 21:29:36

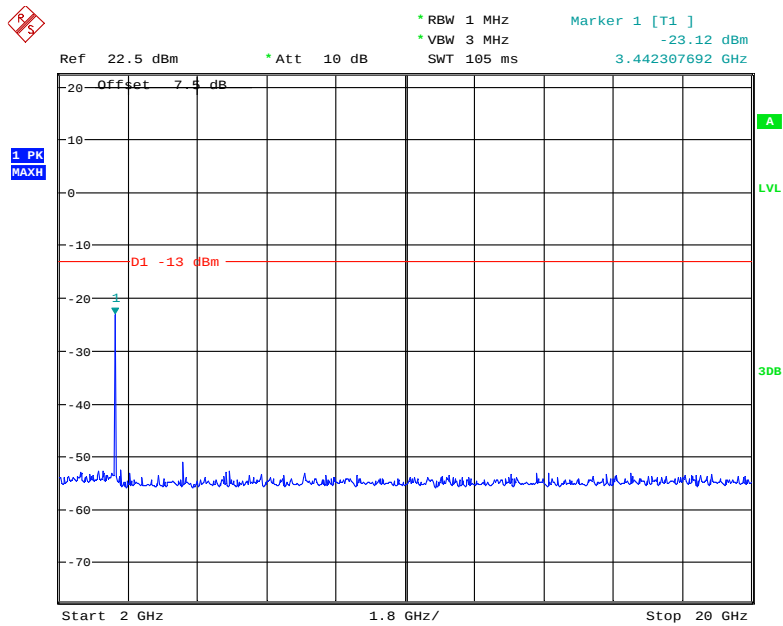
LTE Band 4:**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Date: 11.JAN.2019 21:32:15

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

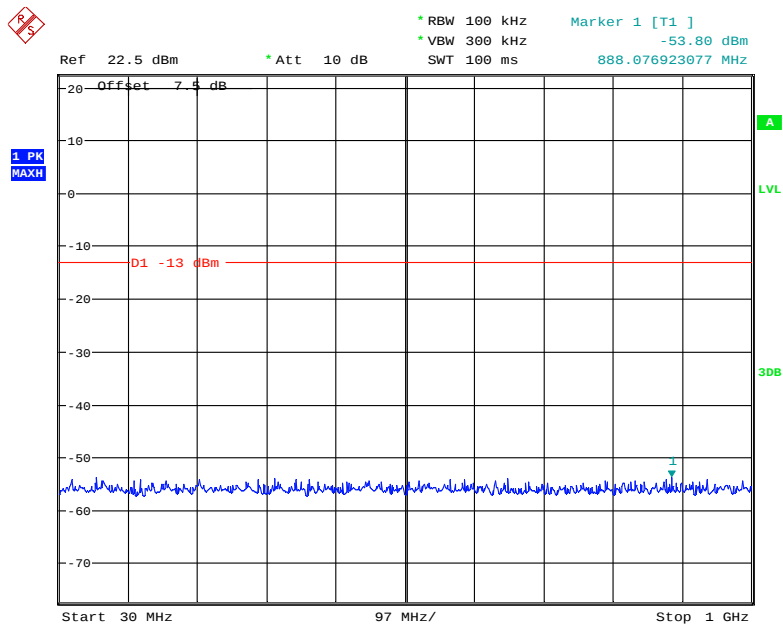
Date: 11.JAN.2019 21:38:09

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



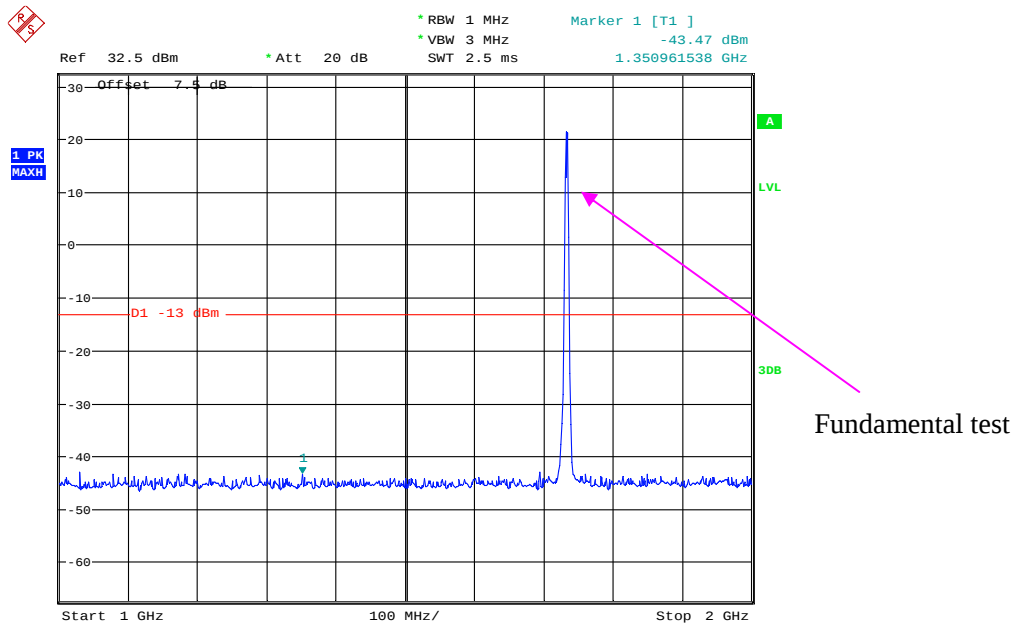
Date: 11.JAN.2019 21:38:55

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



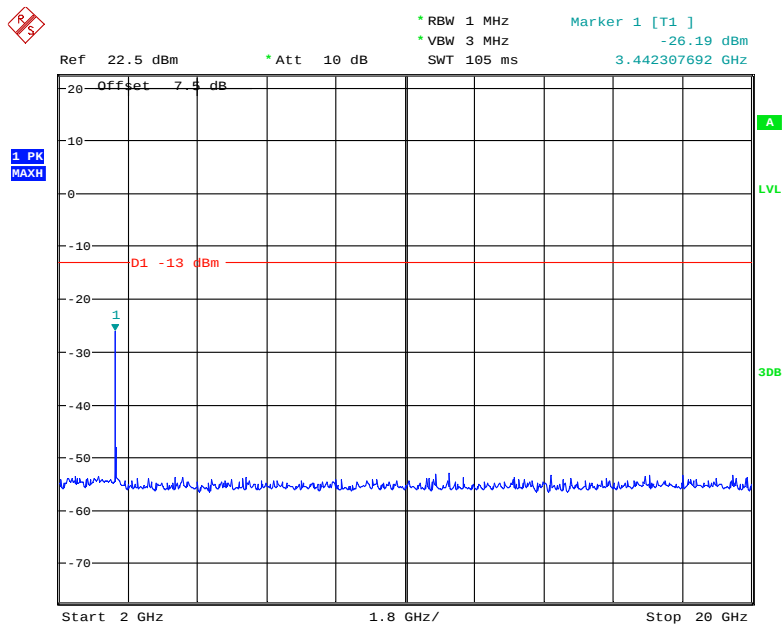
Date: 11.JAN.2019 21:32:45

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



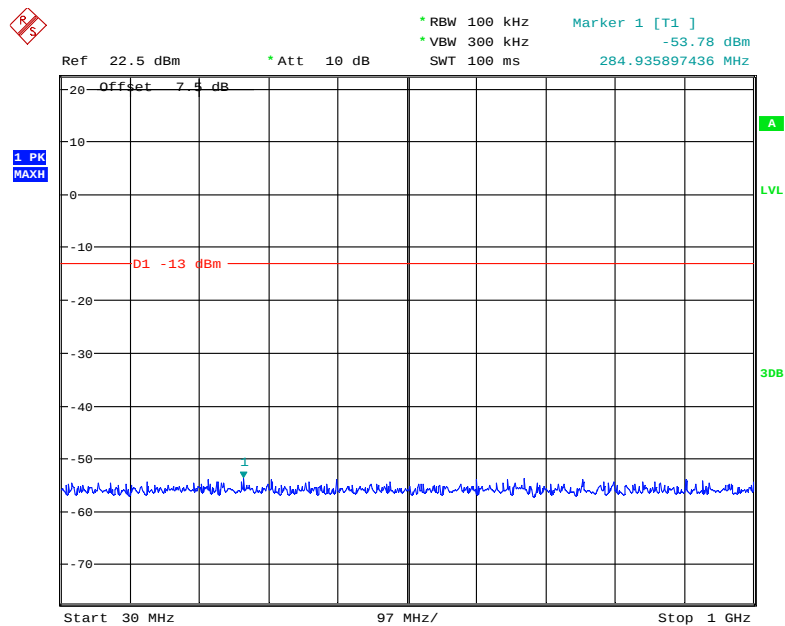
Date: 11.JAN.2019 21:37:39

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



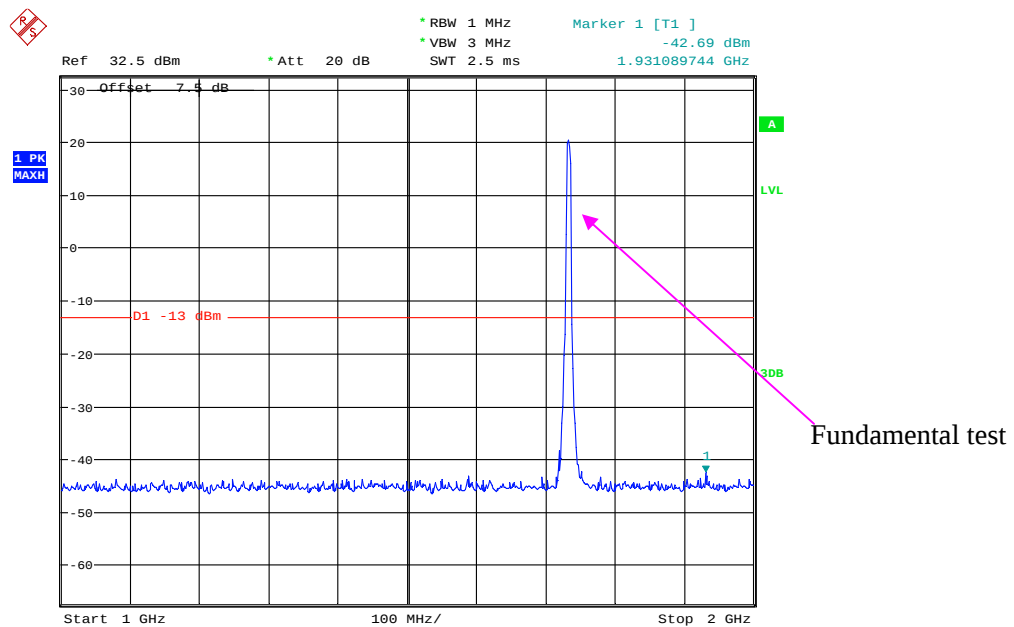
Date: 11.JAN.2019 21:39:18

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



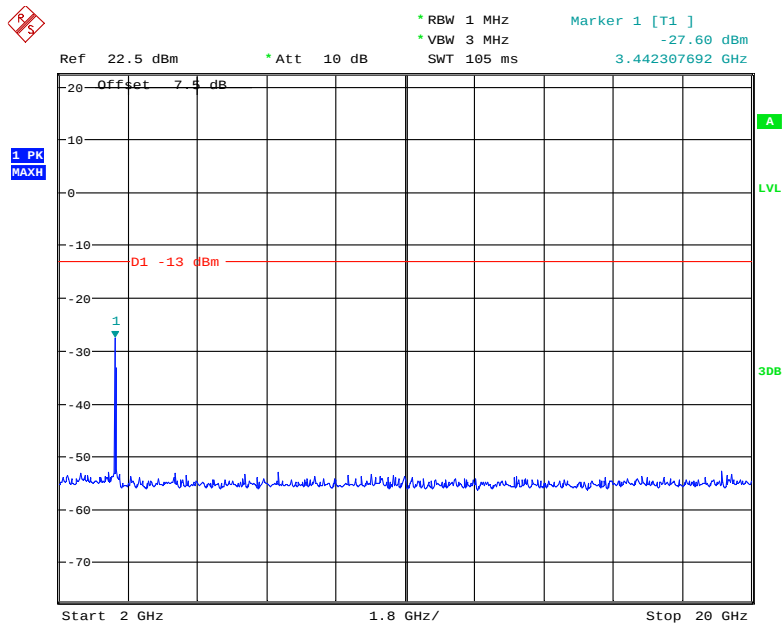
Date: 11.JAN.2019 21:33:03

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



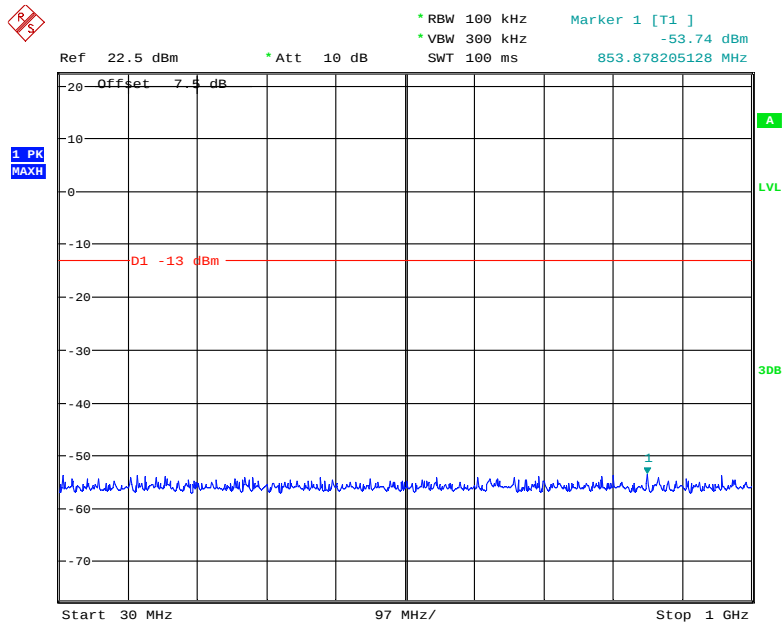
Date: 11.JAN.2019 21:37:16

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



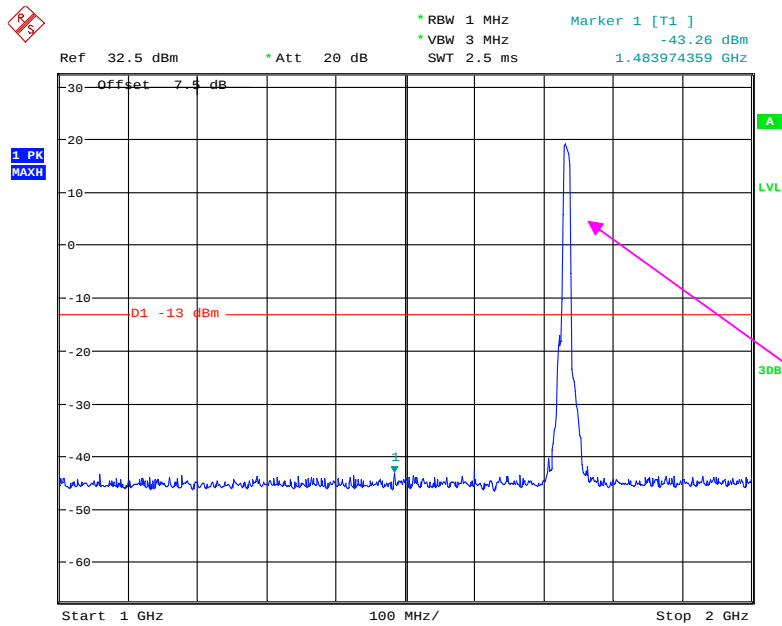
Date: 11.JAN.2019 21:39:32

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



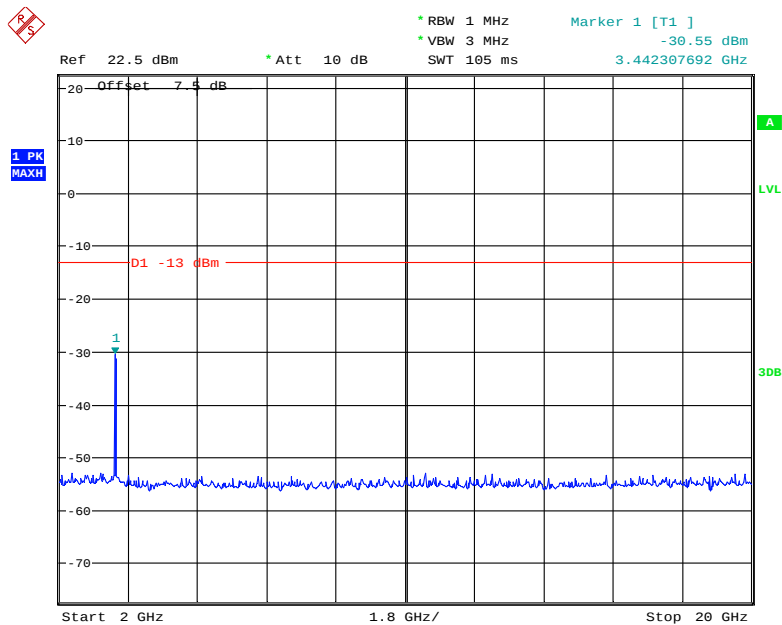
Date: 11.JAN.2019 21:33:26

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



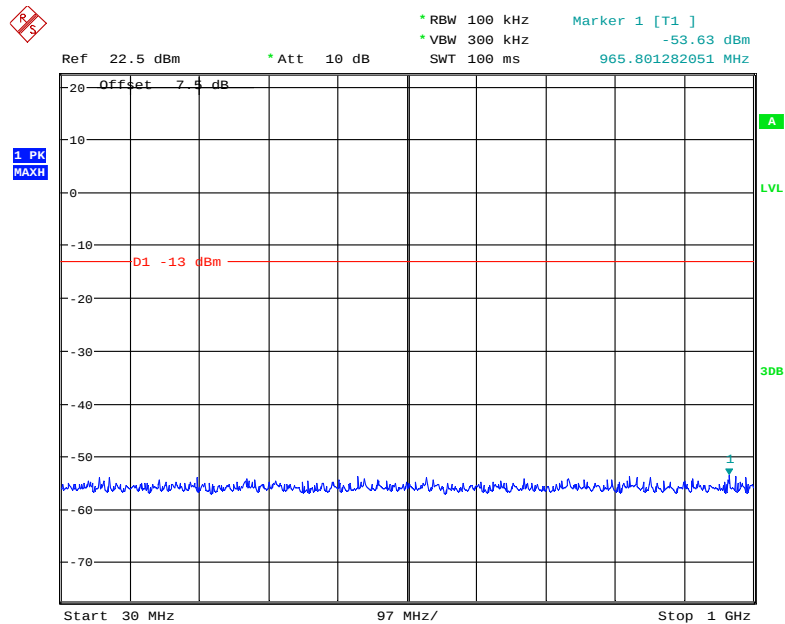
Date: 11.JAN.2019 21:36:55

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



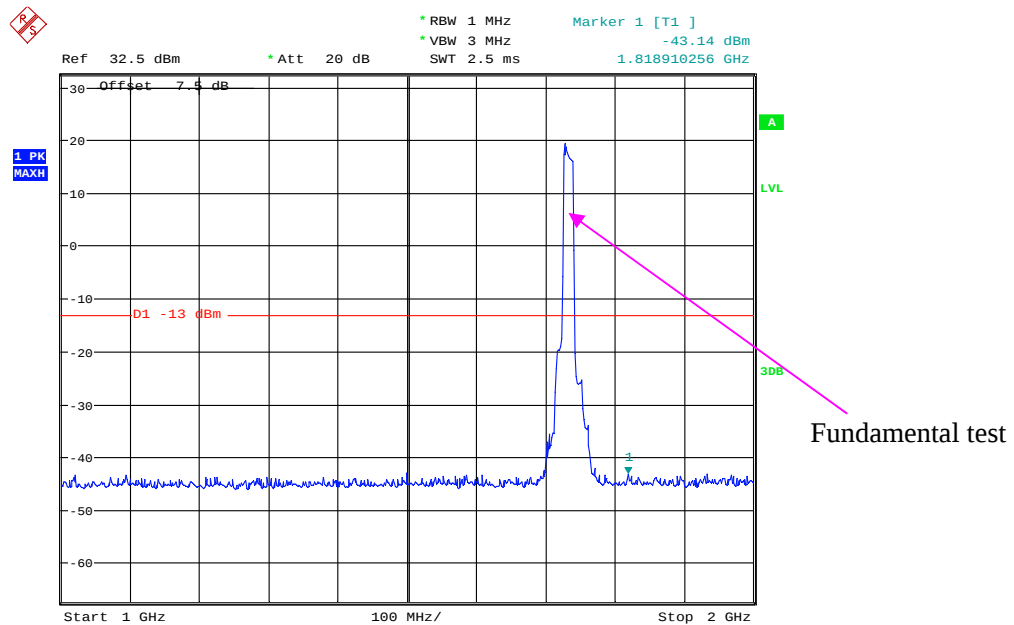
Date: 11.JAN.2019 21:39:46

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



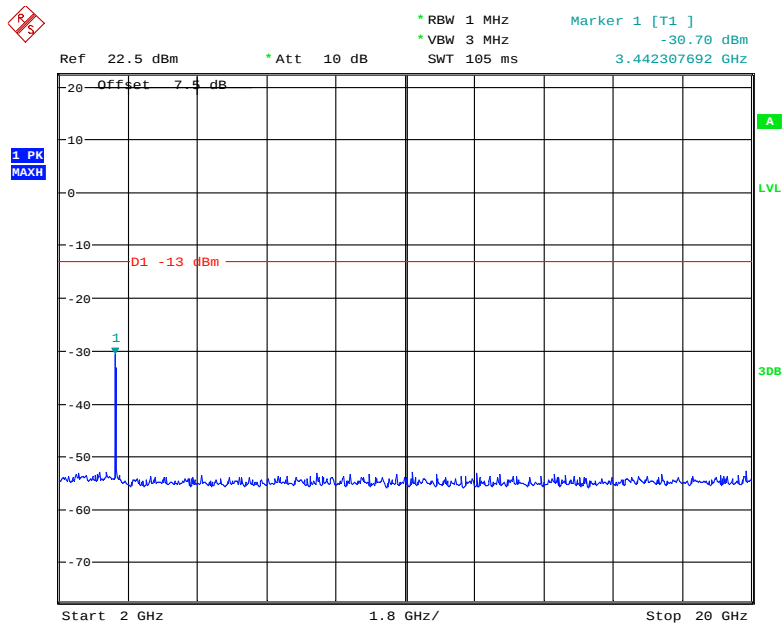
Date: 11.JAN.2019 21:34:08

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



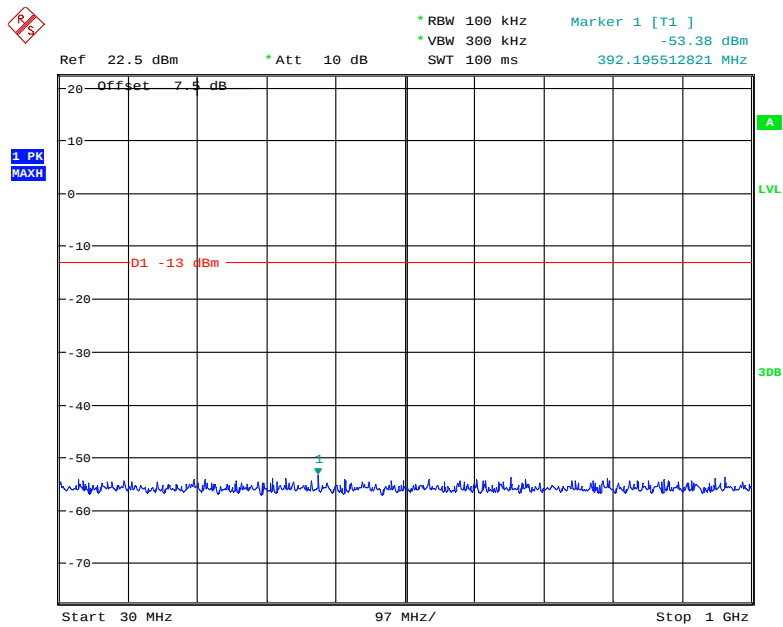
Date: 11.JAN.2019 21:36:29

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



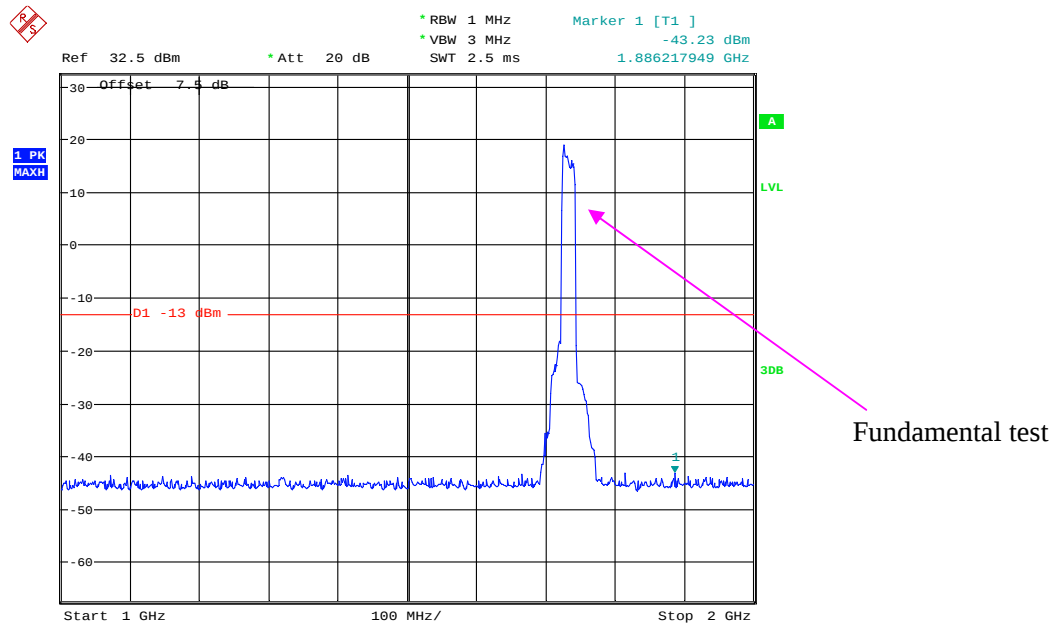
Date: 11.JAN.2019 21:40:02

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



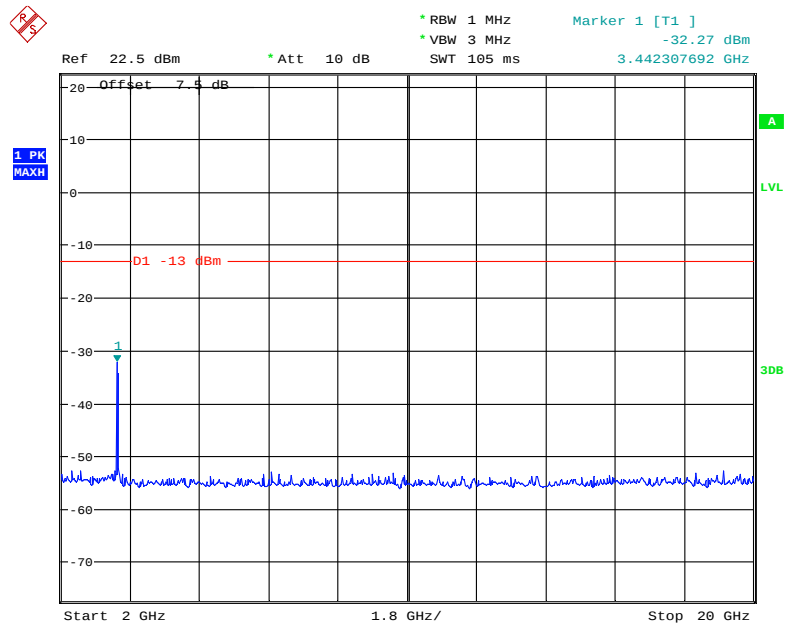
Date: 11.JAN.2019 21:34:32

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



Date: 11.JAN.2019 21:35:29

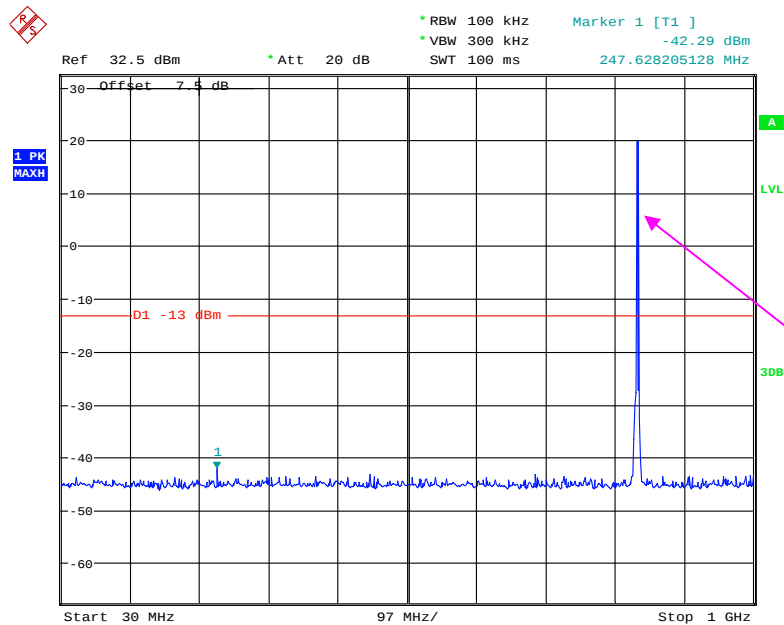
2GHz - 20GHz (20.0 MHz, Middle Channel)



Date: 11.JAN.2019 21:40:15

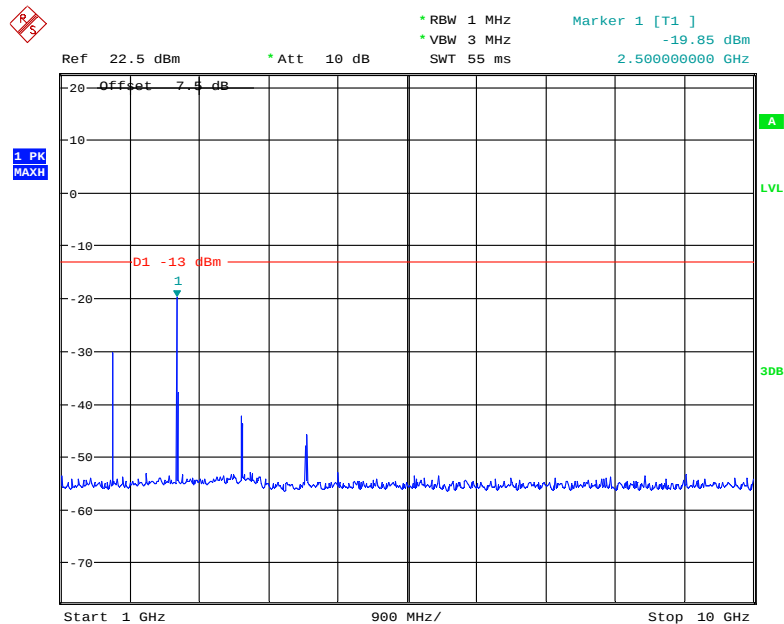
LTE Band 5:

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



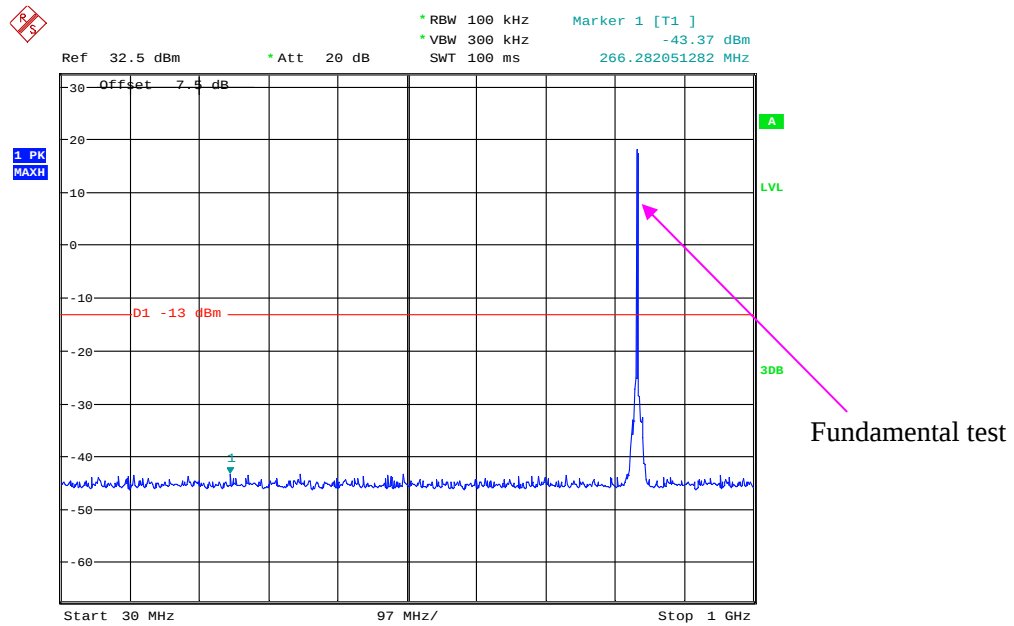
Date: 11.JAN.2019 21:52:29

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



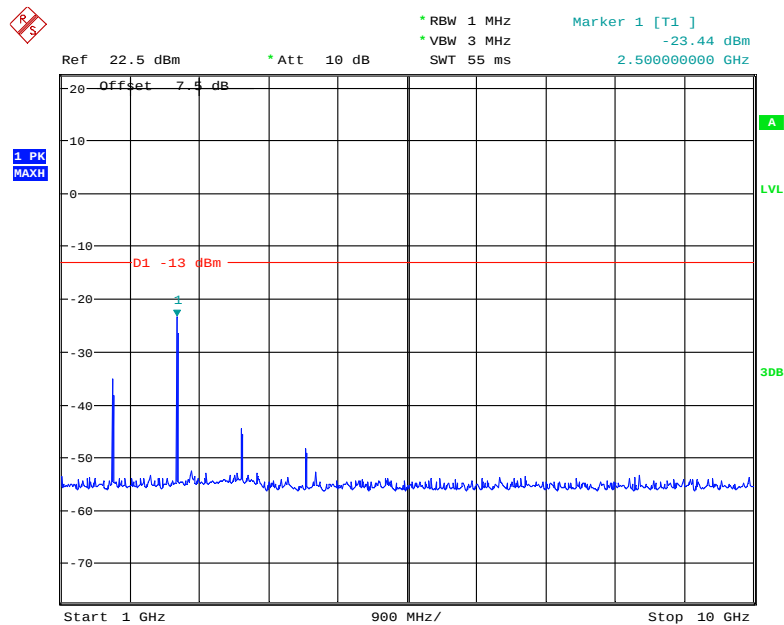
Date: 11.JAN.2019 21:55:47

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



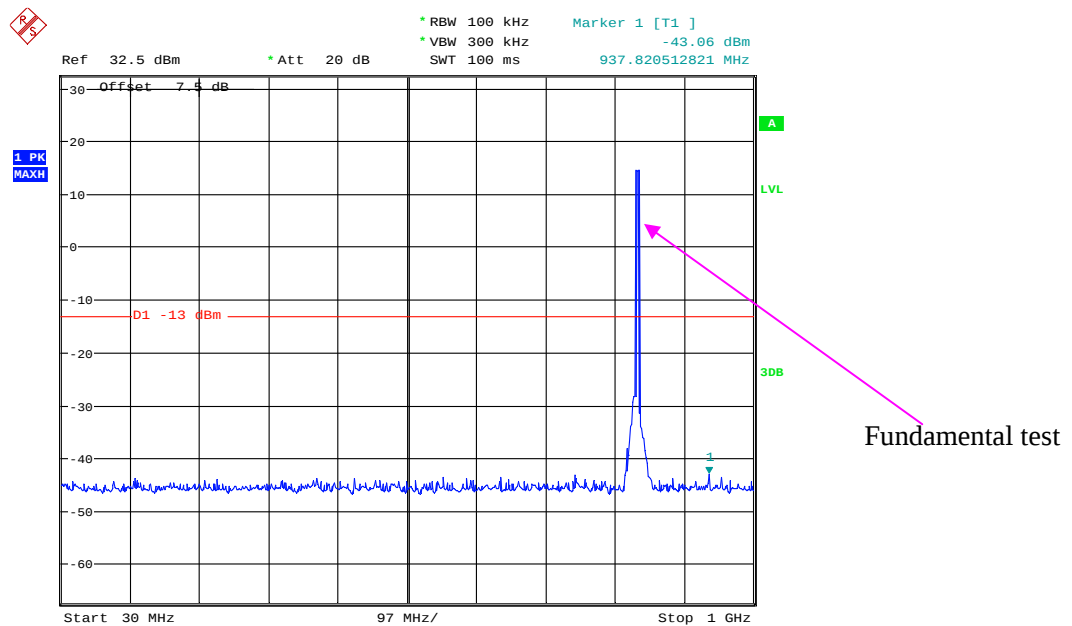
Date: 11.JAN.2019 21:53:15

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



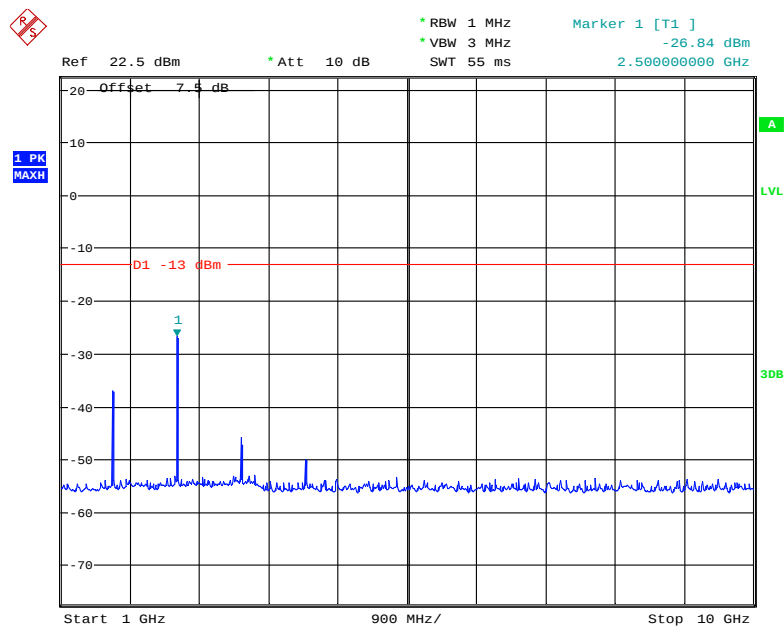
Date: 11.JAN.2019 21:55:34

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



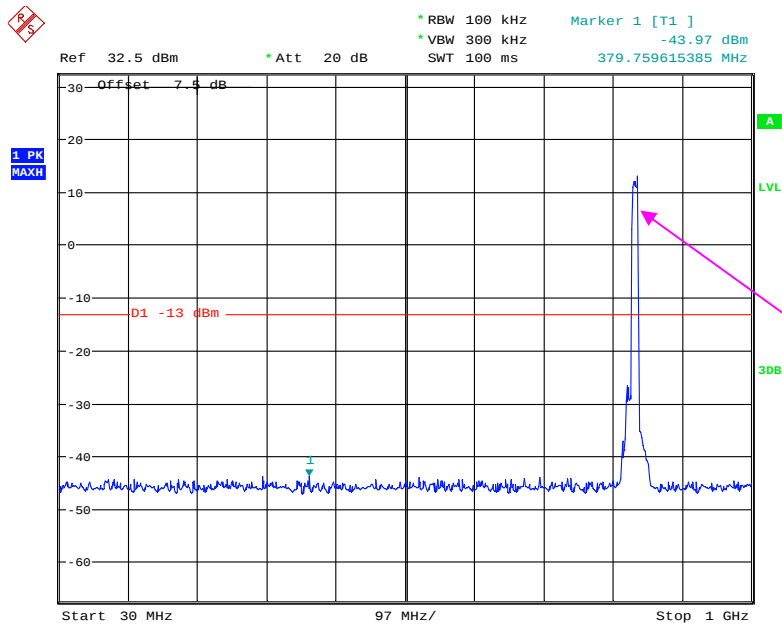
Date: 11.JAN.2019 21:54:10

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



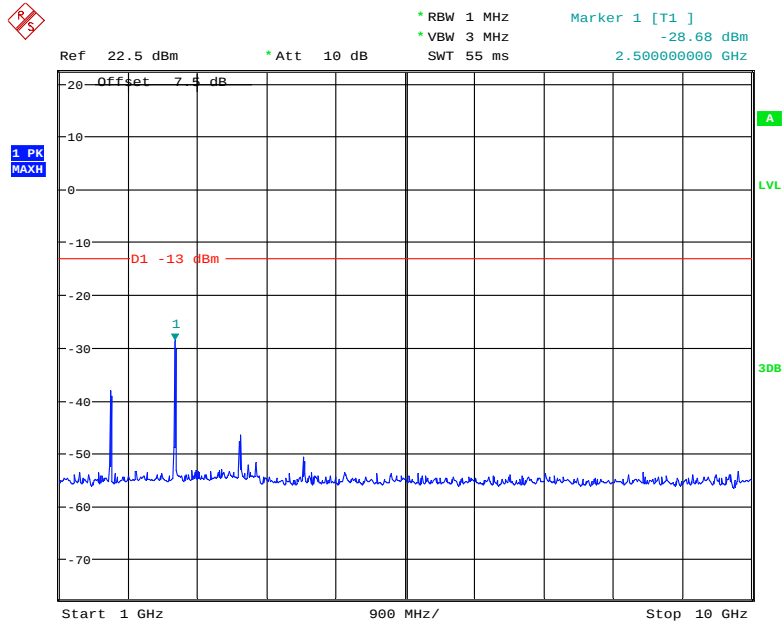
Date: 11.JAN.2019 21:55:23

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



Date: 11.JAN.2019 21:54:43

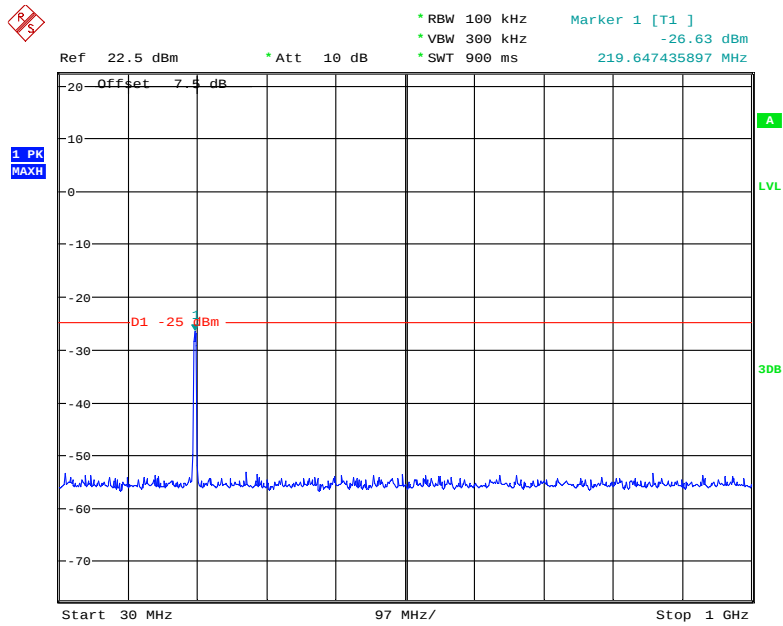
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 11.JAN.2019 21:55:08

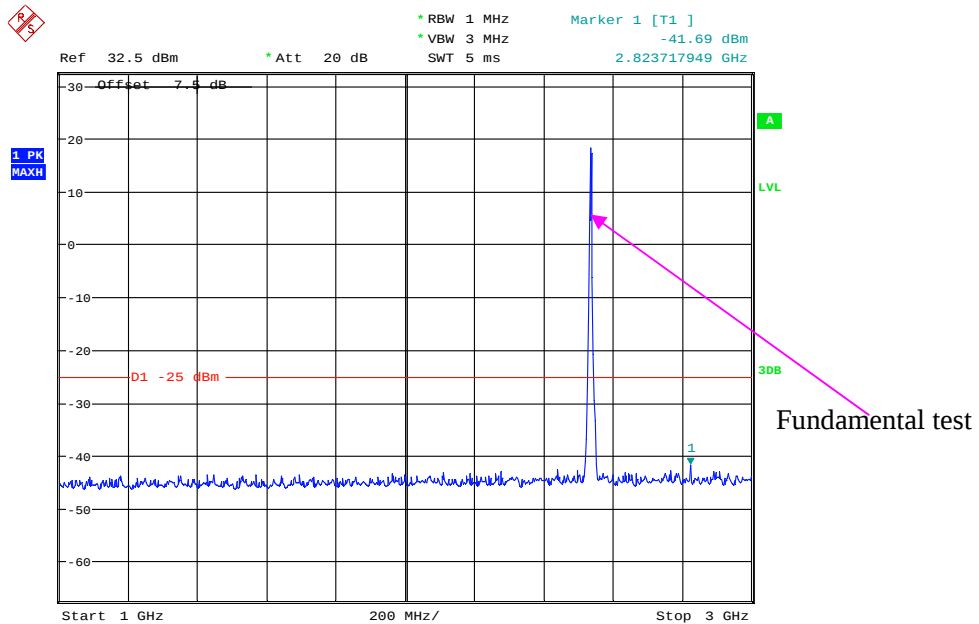
LTE Band 7:

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

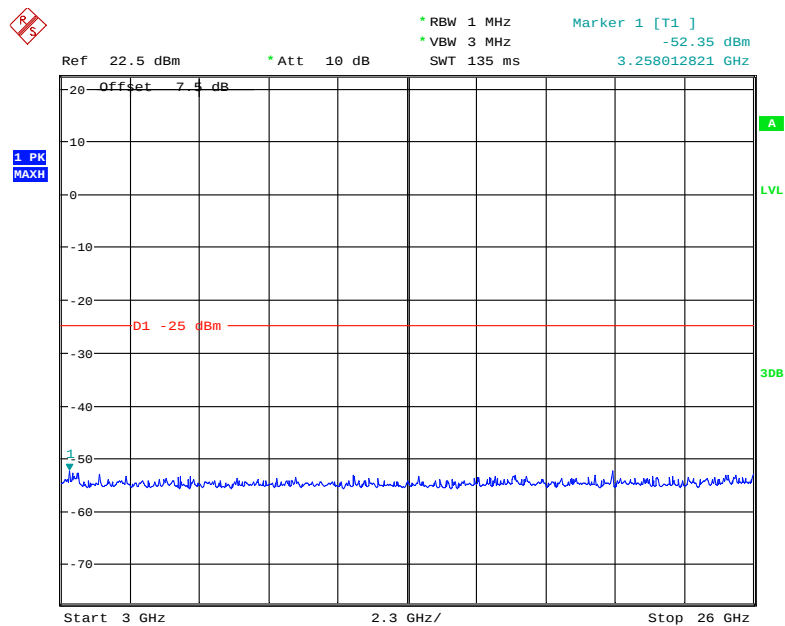


Date: 11.JAN.2019 21:58:54

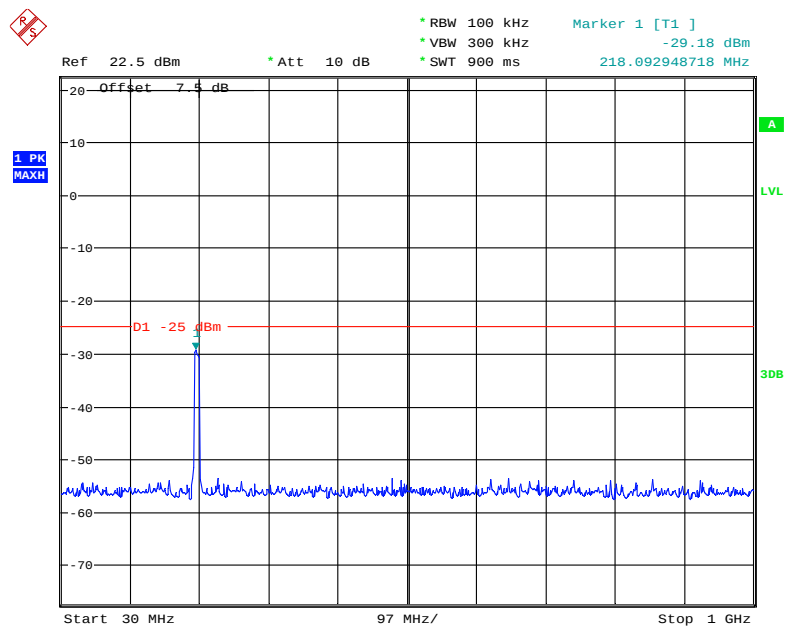
1 GHz – 3.0 GHz (5.0 MHz, Middle Channel)



Date: 11.JAN.2019 22:02:28

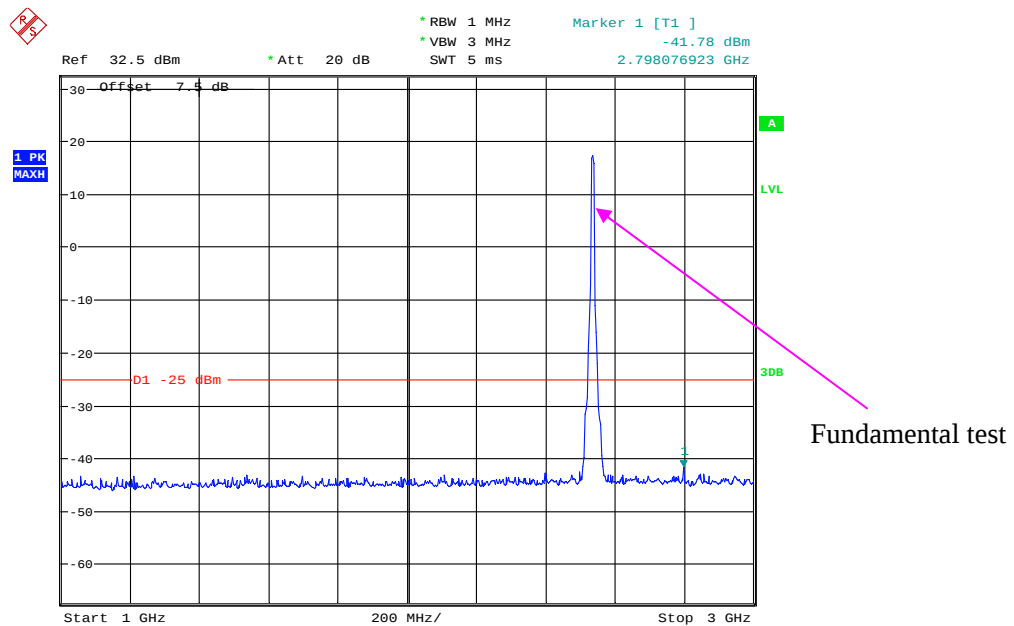
3.0 GHz – 26 GHz (5.0 MHz, Middle Channel)

Date: 11.JAN.2019 22:03:37

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

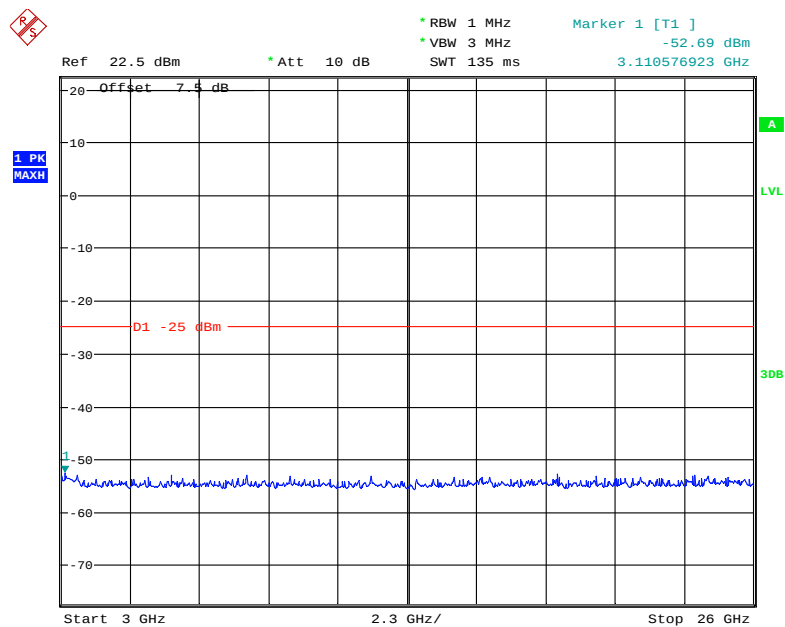
Date: 11.JAN.2019 21:59:19

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



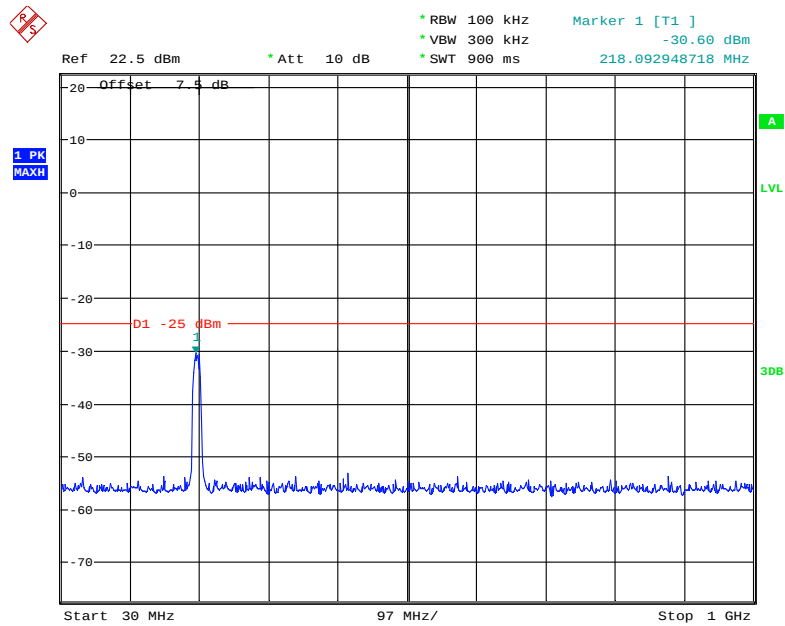
Date: 11.JAN.2019 22:01:35

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



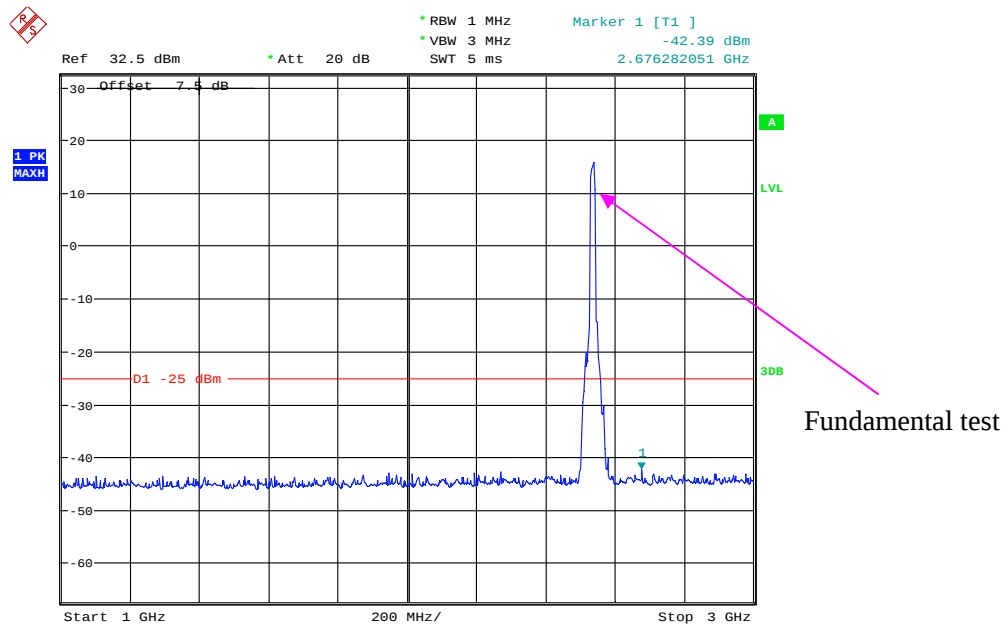
Date: 11.JAN.2019 22:03:57

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

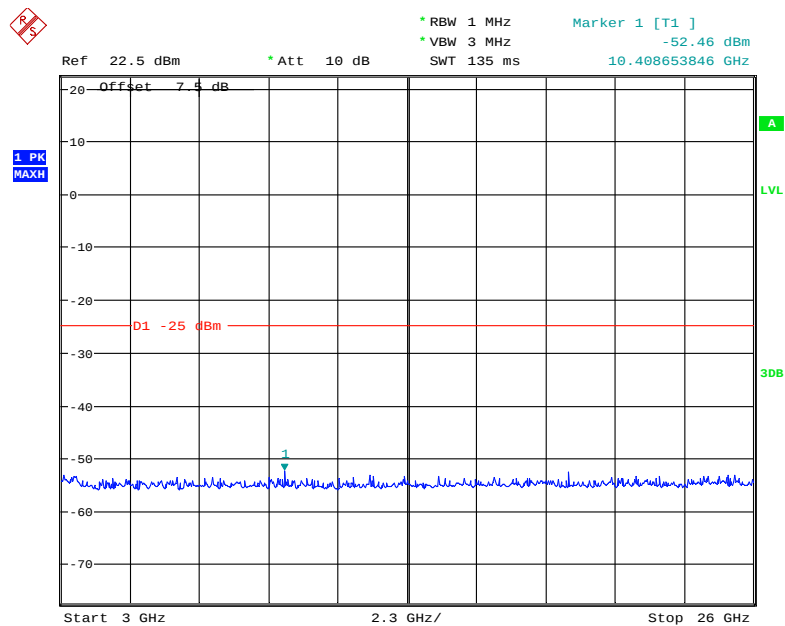


Date: 11.JAN.2019 21:59:35

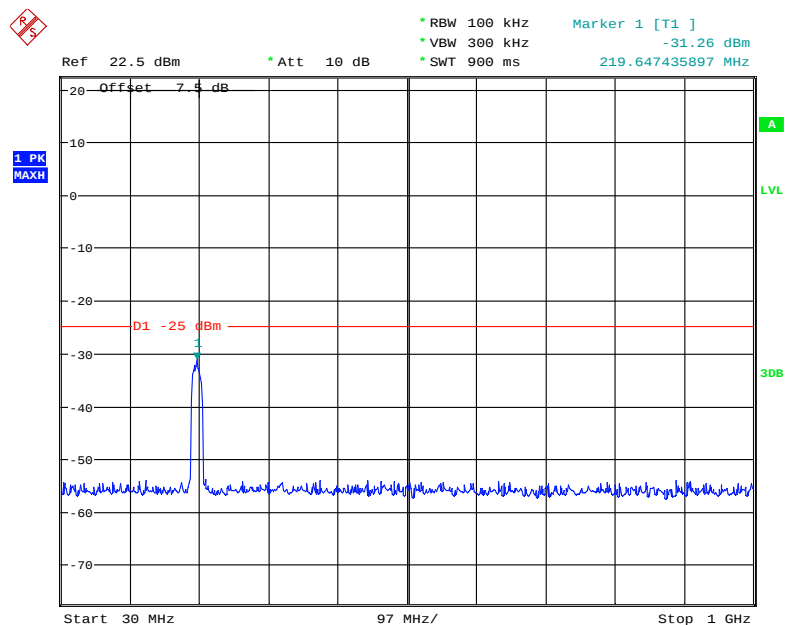
1 GHz – 3 GHz (15.0 MHz, Middle Channel)



Date: 15.JAN.2019 20:07:05

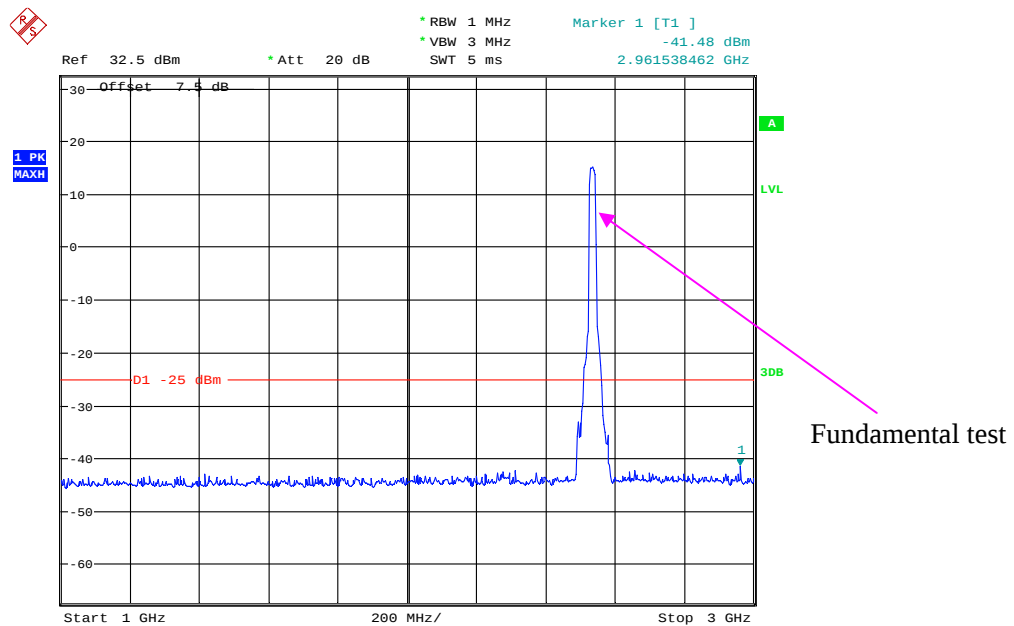
3 GHz – 26 GHz (15.0 MHz, Middle Channel)

Date: 11.JAN.2019 22:04:13

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

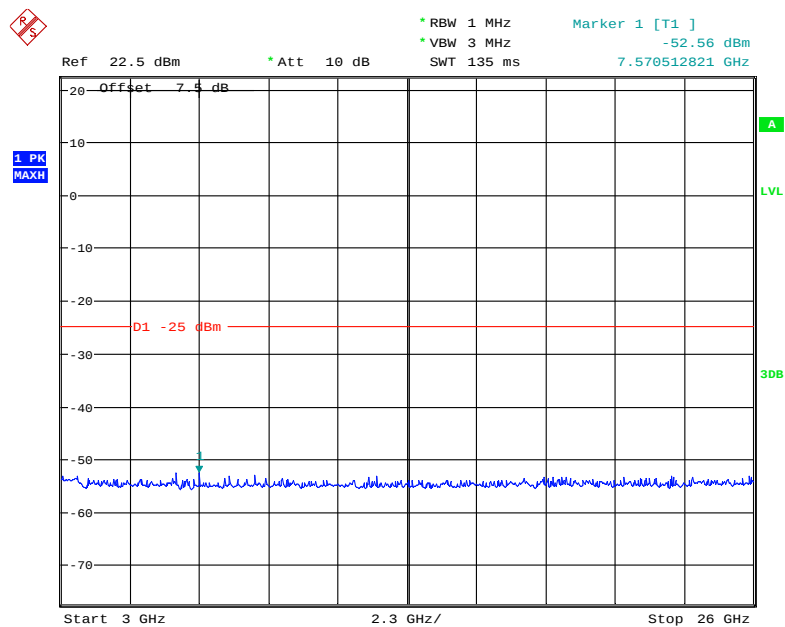
Date: 11.JAN.2019 21:59:50

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



Date: 11.JAN.2019 22:00:48

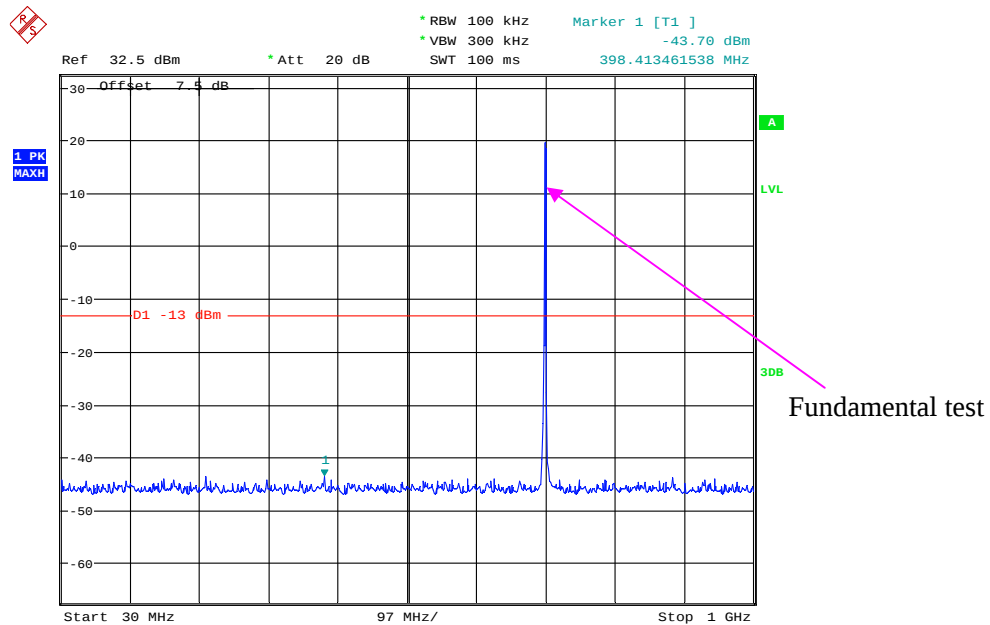
3 GHz – 26 GHz (20.0 MHz, Middle Channel)



Date: 11.JAN.2019 22:04:34

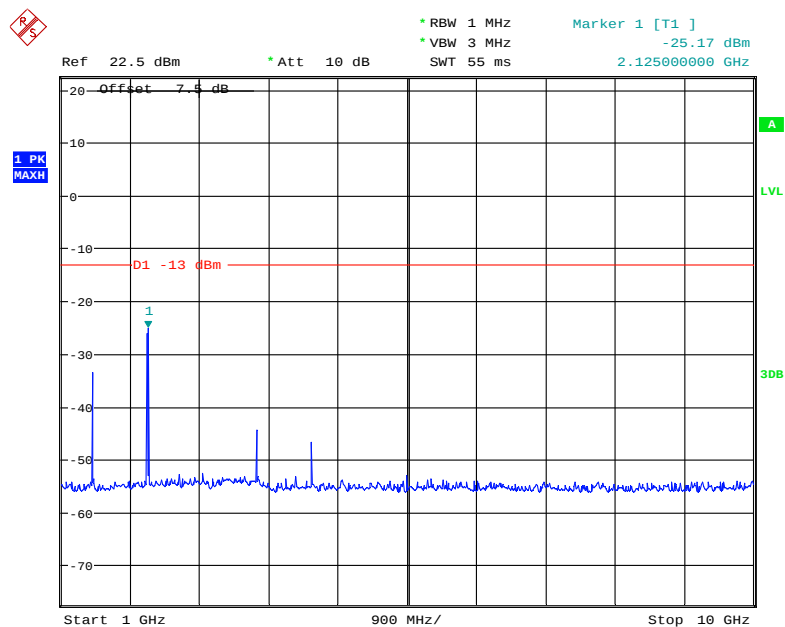
LTE Band 12

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



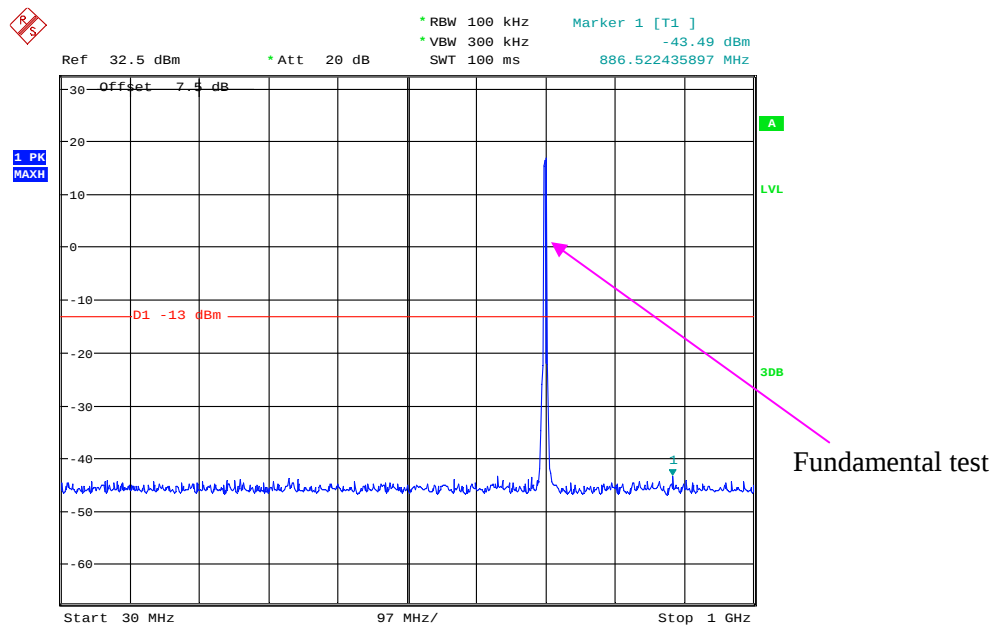
Date: 11.JAN.2019 22:06:05

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



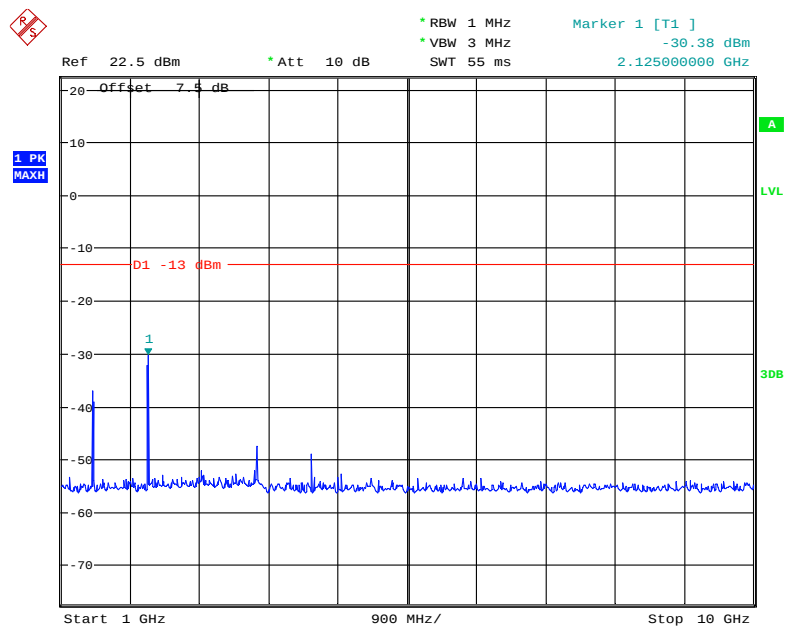
Date: 11.JAN.2019 22:09:14

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



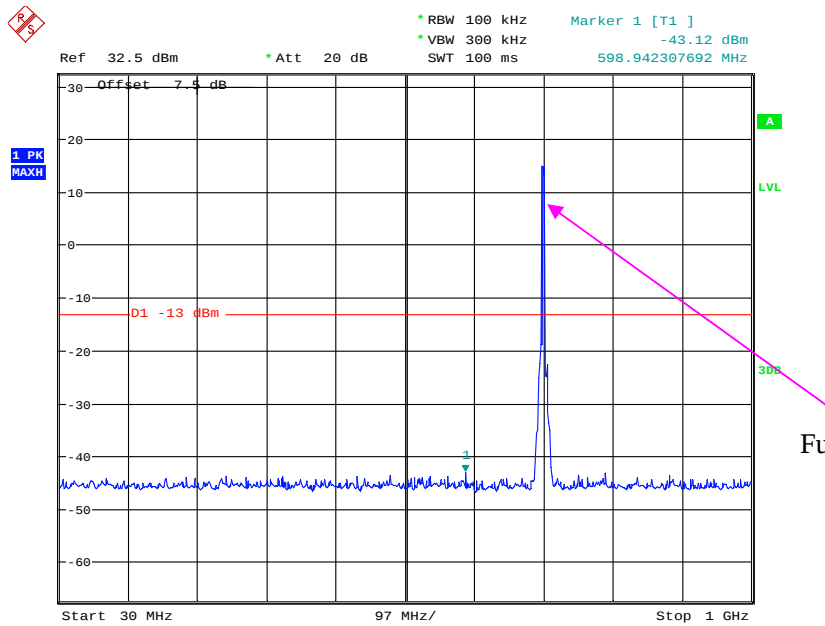
Date: 11.JAN.2019 22:06:43

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



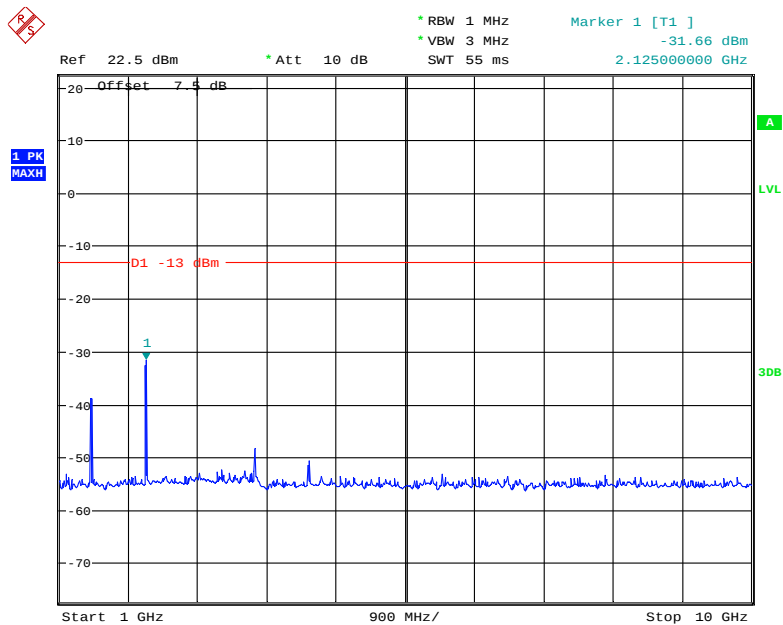
Date: 11.JAN.2019 22:08:55

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



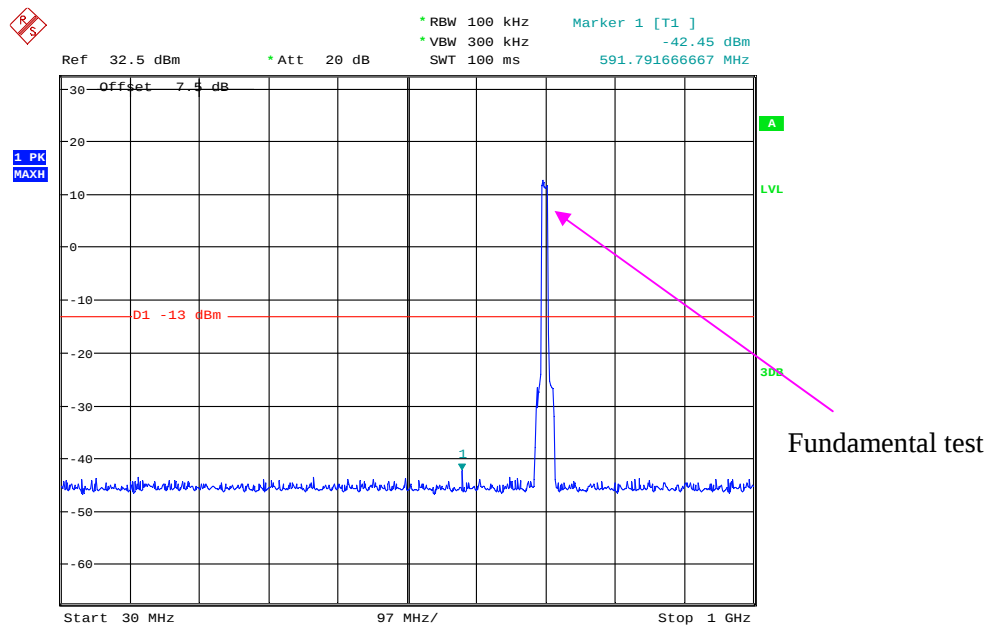
Date: 11.JAN.2019 22:07:12

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



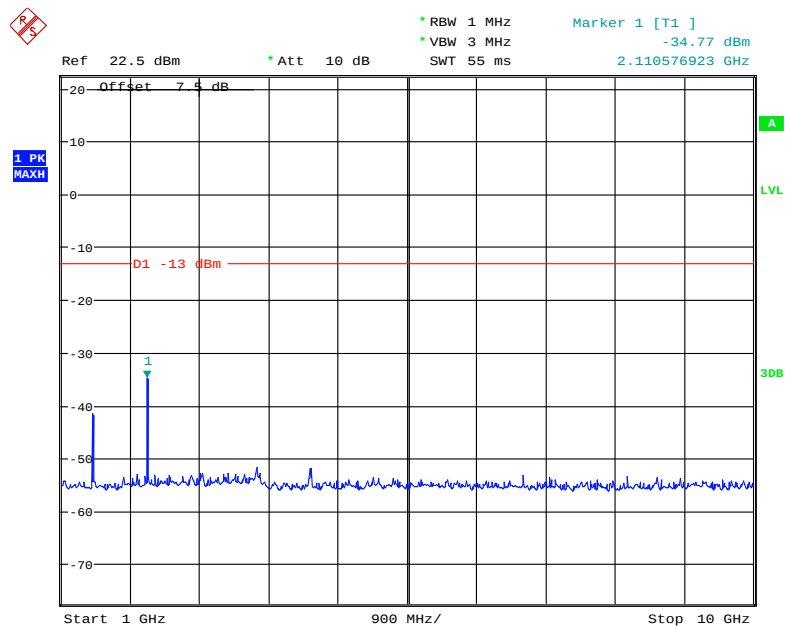
Date: 11.JAN.2019 22:08:42

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



Date: 11.JAN.2019 22:07:51

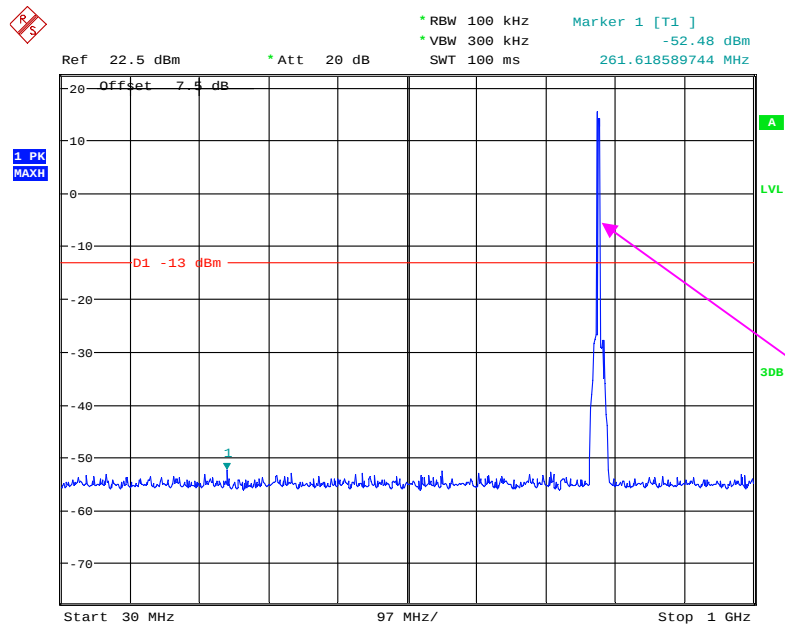
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 11.JAN.2019 22:08:25

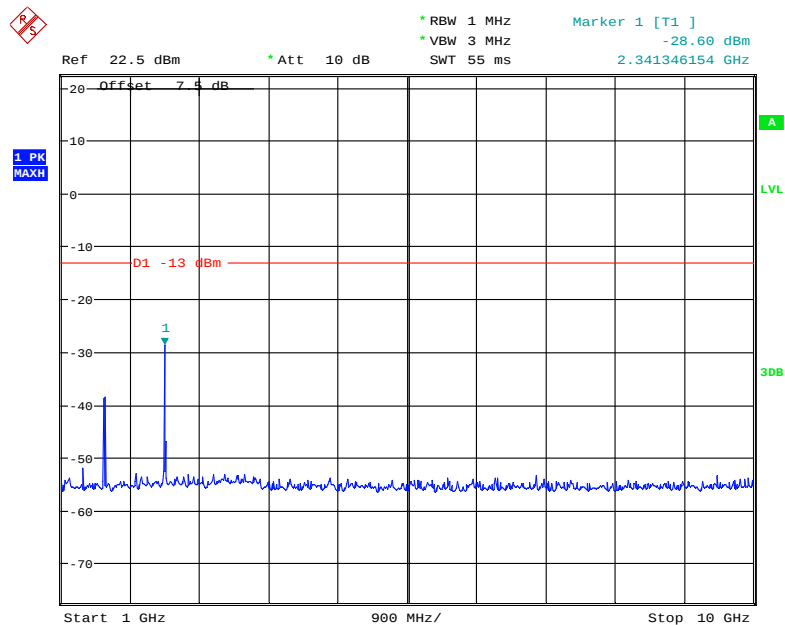
LTE Band 13

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



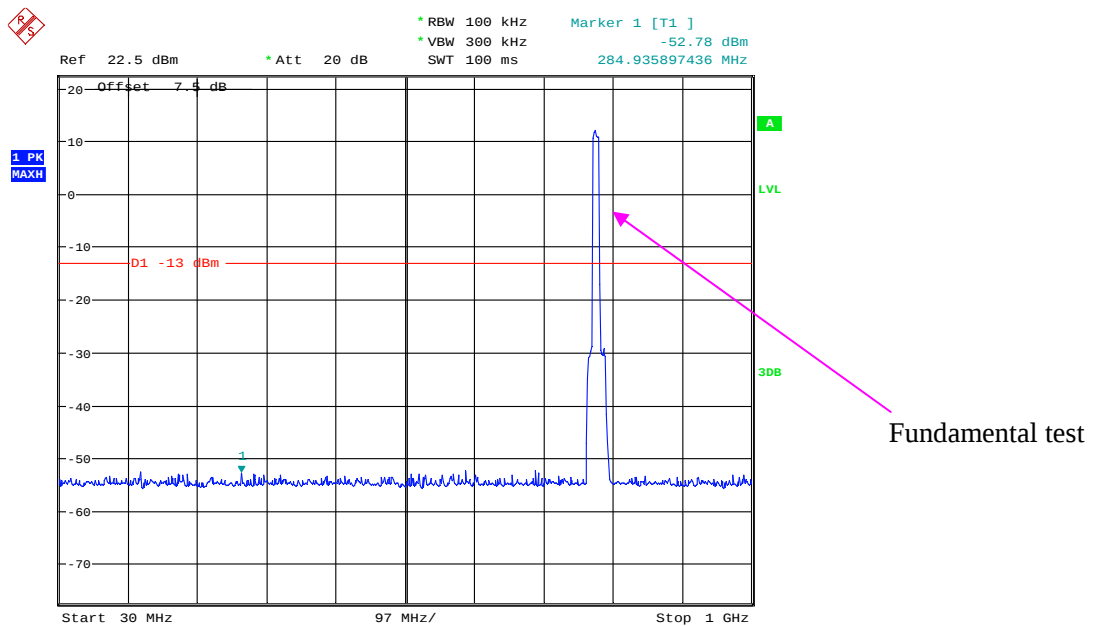
Date: 11.JAN.2019 22:11:20

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



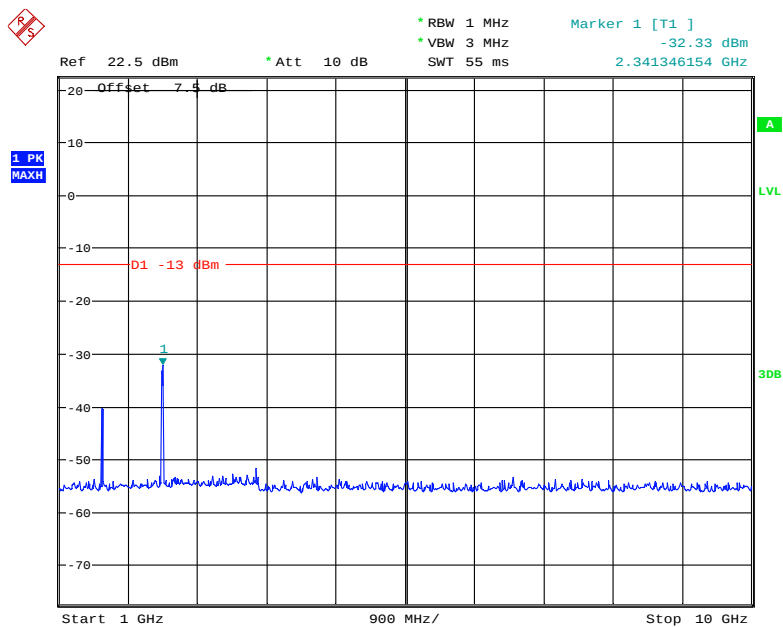
Date: 11.JAN.2019 22:13:05

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



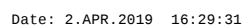
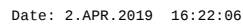
Date: 11.JAN.2019 22:12:21

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

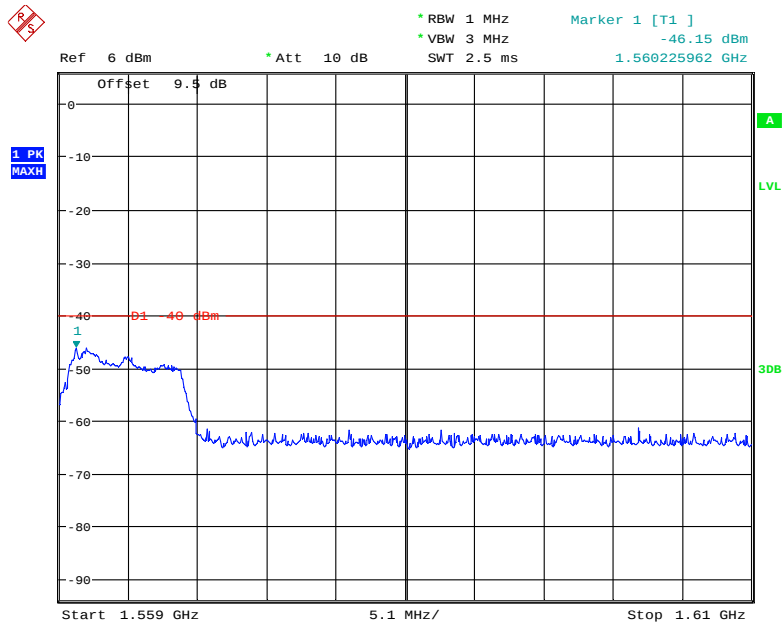


Date: 11.JAN.2019 22:12:48

763 MHz – 775MHz (5.0 MHz, Middle Channel)

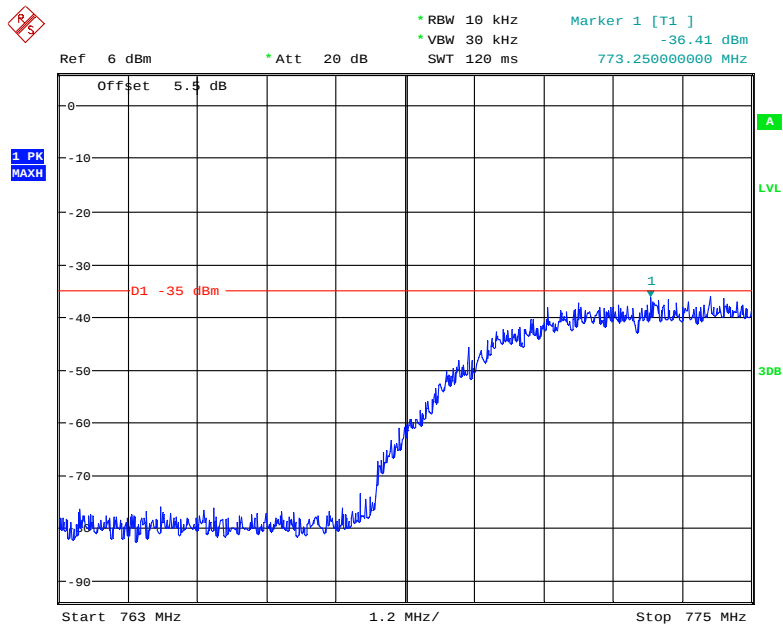


1.559 GHz – 1.610 GHz (5.0 MHz, Middle Channel)



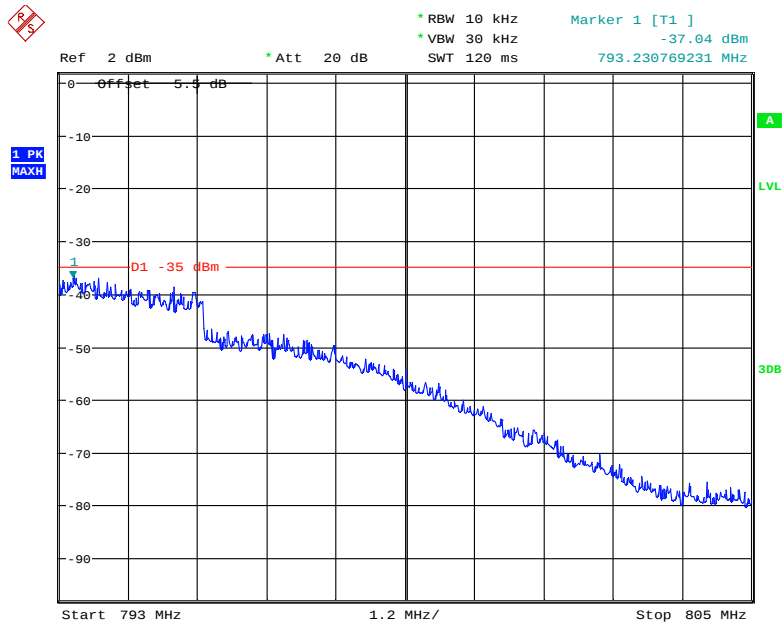
Date: 2.APR.2019 16:32:20

763 MHz – 775MHz (10.0 MHz, Middle Channel)



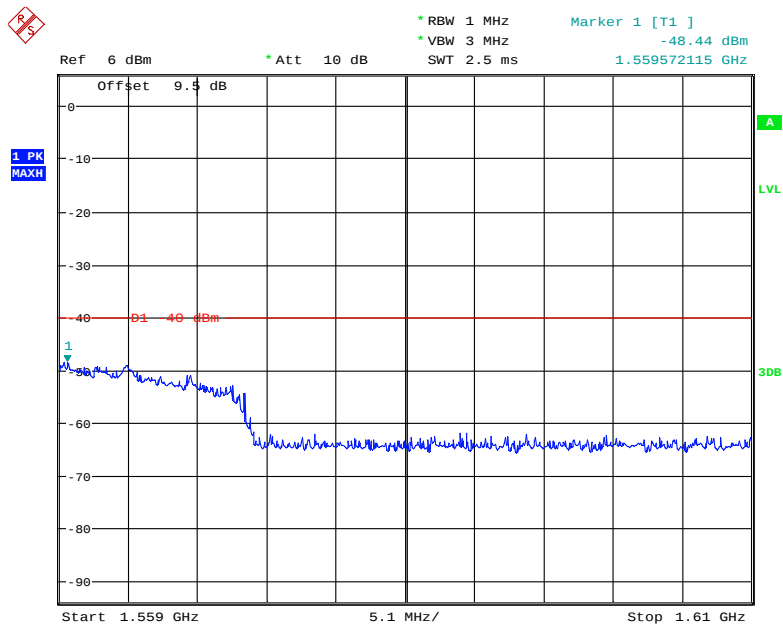
Date: 2.APR.2019 16:26:51

793MHz – 805MHz (10.0 MHz, Middle Channel)



Date: 2.APR.2019 16:28:40

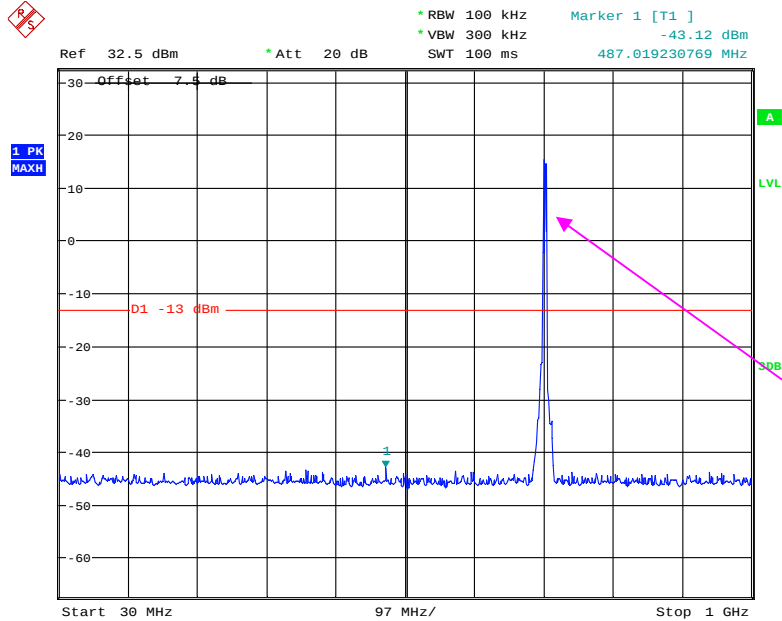
1.559 GHz – 1.610 GHz (10.0 MHz, Middle Channel)



Date: 2.APR.2019 16:32:45

LTE Band17:

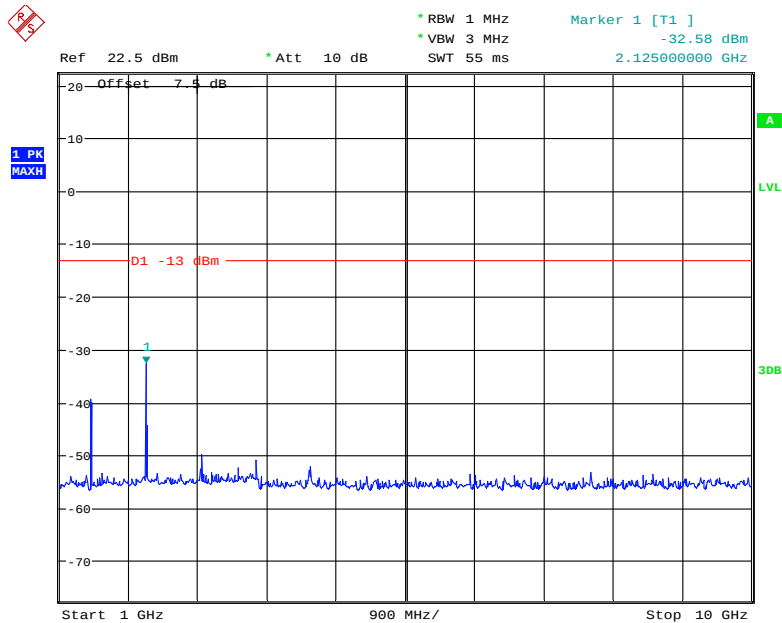
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

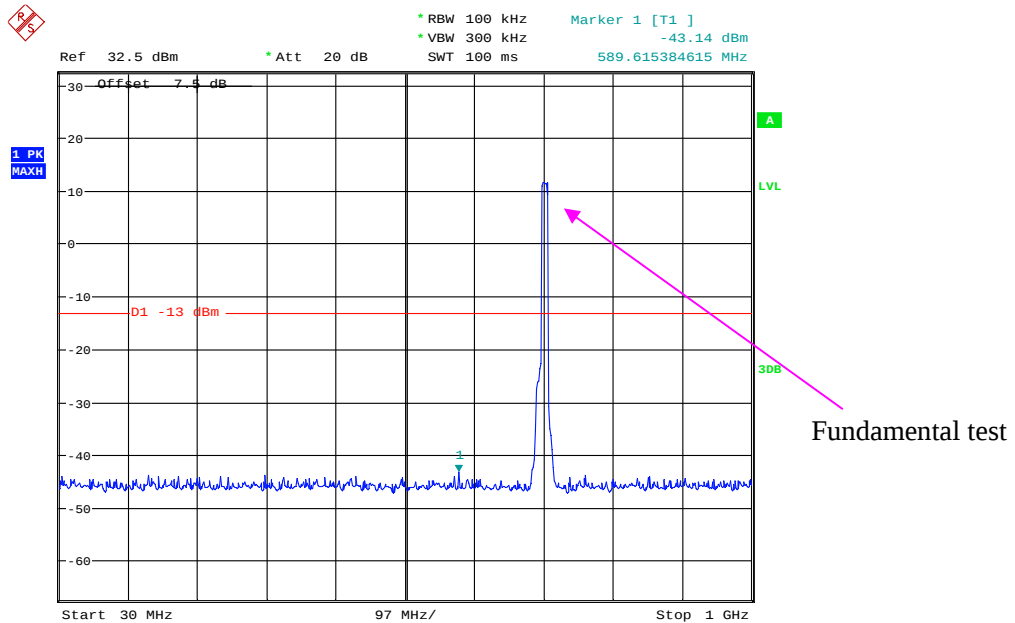
Date: 11.JAN.2019 22:14:47

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



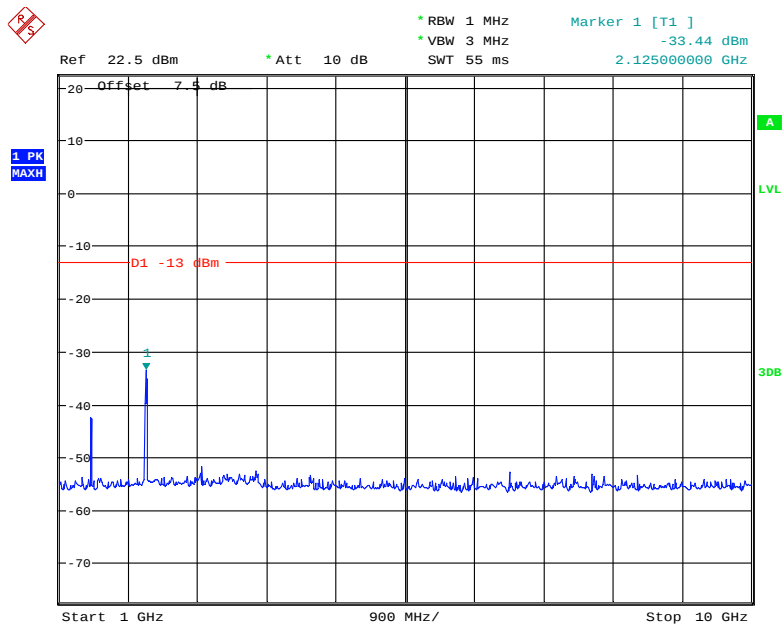
Date: 11.JAN.2019 22:16:14

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



Date: 11.JAN.2019 22:15:19

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



Date: 11.JAN.2019 22:16:02

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

Applicable Standard

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

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:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2019-01-05.

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)
WCDMA Mode, Middle channel										
237.68	41.05	175	2.3	H	-59.9	1.31	0	-61.21	-13	48.21
237.68	41.59	300	1.2	V	-58.2	1.31	0	-59.51	-13	46.51
1673.00	50.60	127	1.9	H	-56.5	1.30	8.90	-48.90	-13	35.90
1673.00	48.20	177	1.5	V	-58.3	1.30	8.90	-50.70	-13	37.70
2509.50	52.30	293	1.0	H	-51.2	2.60	10.20	-43.60	-13	30.60
2509.50	46.20	43	1.6	V	-56.7	2.60	10.20	-49.10	-13	36.10
3346.00	45.90	117	1.1	H	-54.4	1.50	11.70	-44.20	-13	31.20
3346.00	44.30	85	2.5	V	-56.1	1.50	11.70	-45.90	-13	32.90

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)
WCDMA Mode Band II, Middle channel										
237.68	41.00	234	1.1	H	-60.0	1.31	0	-61.31	-13	48.31
237.68	41.18	315	1.6	V	-58.7	1.31	0	-60.01	-13	47.01
3760.00	48.30	142	2.3	H	-52.9	1.50	11.80	-42.60	-13	29.60
3760.00	47.16	206	2.3	V	-53.6	1.50	11.80	-43.30	-13	30.30

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										
237.68	41.94	280	1.4	H	-59.0	1.31	0	-60.31	-13	47.31
237.68	41.47	103	2.4	V	-58.4	1.31	0	-59.71	-13	46.71
3465.20	53.10	120	2.0	H	-47.3	1.50	12.00	-36.80	-13	23.80
3465.20	49.70	21	1.3	V	-51.4	1.50	12.00	-40.90	-13	27.90

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										
Test frequency range:30 MHz ~ 20 GHz										
237.68	41.49	177	2.2	H	-59.5	1.31	0	-60.81	-13	47.81
237.68	40.28	233	1.5	V	-59.6	1.31	0	-60.91	-13	47.91
3760.00	43.70	189	1.9	H	-57.9	1.50	11.80	-47.60	-13	34.60
3760.00	44.26	190	2.0	V	-56.8	1.50	11.80	-46.50	-13	33.50
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
237.68	41.67	326	1.8	H	-59.3	1.31	0	-60.61	-13	47.61
237.68	41.04	267	1.6	V	-58.8	1.31	0	-60.11	-13	47.11
3465.00	52.60	228	1.3	H	-47.9	1.50	12.00	-37.40	-13	24.40
3465.00	48.15	355	2.0	V	-53.1	1.50	12.00	-42.60	-13	29.60
Band 5										
Test frequency range:30 MHz ~ 10 GHz										
237.68	41.30	177	2.0	H	-59.7	1.31	0	-61.01	-13	48.01
237.68	40.35	325	1.3	V	-59.5	1.31	0	-60.81	-13	47.81
1673.00	48.60	254	1.3	H	-58.5	1.30	8.90	-50.90	-13	37.90
1673.00	47.30	91	1.7	V	-59.2	1.30	8.90	-51.60	-13	38.60
2509.50	49.36	33	1.3	H	-54.2	2.60	10.20	-46.60	-13	33.60
2509.50	46.08	71	1.7	V	-56.8	2.60	10.20	-49.20	-13	36.20
Band 7										
Test frequency range: 30 MHz ~ 26GHz										
237.68	41.03	338	1.4	H	-60.0	1.31	0	-61.31	-25	36.31
237.68	41.73	18	2.1	V	-58.1	1.31	0	-59.41	-25	34.41
5070.00	48.30	214	2.5	H	-47.2	1.60	12.10	-36.70	-25	11.70
5070.00	45.69	122	1.4	V	-49.8	1.60	12.10	-39.30	-25	14.30
Band 12										
Test frequency range:30 MHz ~ 10 GHz										
237.68	40.34	118	1.5	H	-60.6	1.31	0	-61.91	-13	48.91
237.68	40.55	150	1.2	V	-59.3	1.31	0	-60.61	-13	47.61
1415.00	59.48	252	2.5	H	-48.4	1.60	7.90	-42.10	-13	29.10
1415.00	61.70	168	1.7	V	-46.4	1.60	7.90	-40.10	-13	27.10
2122.50	58.29	16	1.3	H	-43.8	1.30	9.70	-35.40	-13	22.40
2122.50	53.60	219	1.4	V	-49.3	1.30	9.70	-40.90	-13	27.90

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level	Limit	Margin
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)	(dBm)	(dBm)	(dB)
Band 13										
Test frequency range: 30 MHz ~ 10GHz										
237.68	41.18	326	1.2	H	-59.8	1.31	0	-61.11	-13	48.11
237.68	41.35	212	2.3	V	-58.5	1.31	0	-59.81	-13	46.81
1564.00	48.60	137	1.3	H	-59.4	1.40	8.70	-52.10	-40	12.10
1564.00	46.90	5	2.5	V	-60.9	1.40	8.70	-53.60	-40	13.60
2346.00	55.96	35	1.0	H	-48.6	1.30	10.00	-39.90	-13	26.90
2346.00	47.50	311	1.6	V	-56.9	1.30	10.00	-48.20	-13	35.20
Band 17										
Test frequency range:30 MHz ~ 10 GHz										
237.68	40.52	216	1.1	H	-60.5	1.31	0	-61.81	-13	48.81
237.68	41.49	258	1.9	V	-58.3	1.31	0	-59.61	-13	46.61
1420.00	58.70	66	2.2	H	-49.1	1.60	7.90	-42.80	-13	29.80
1420.00	57.20	253	1.6	V	-50.9	1.60	7.90	-44.60	-13	31.60
2130.00	51.90	270	1.3	H	-50.2	1.30	9.70	-41.80	-13	28.80
2130.00	48.20	134	1.8	V	-54.7	1.30	9.70	-46.30	-13	33.30

Note:

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

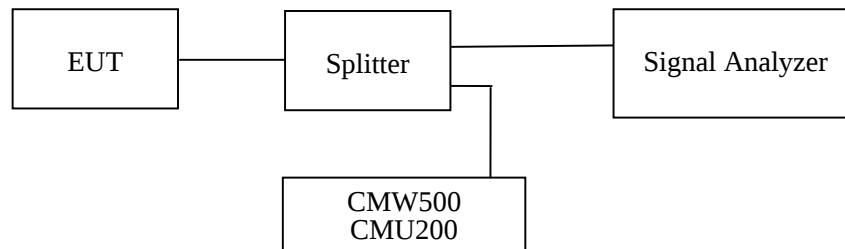
FCC § 22.917 (a);§ 24.238 (a); §27.53 (c) (f) (g) (h)(m) - BAND EDGES**Applicable Standard**

FCC§22.917(a) and § 24.238(a) and § 27.53(c) (f) (g) (h)(m)

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

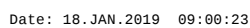
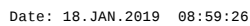
**Test Data****Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

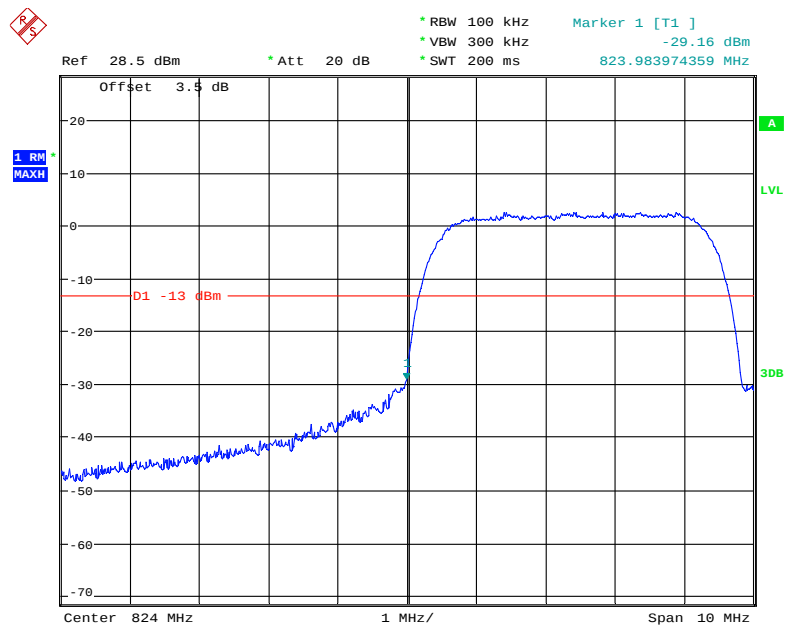
The testing was performed by Shawn Xiao from 2019-01-11 to 2019-01-18.

EUT operation mode: Transmitting

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

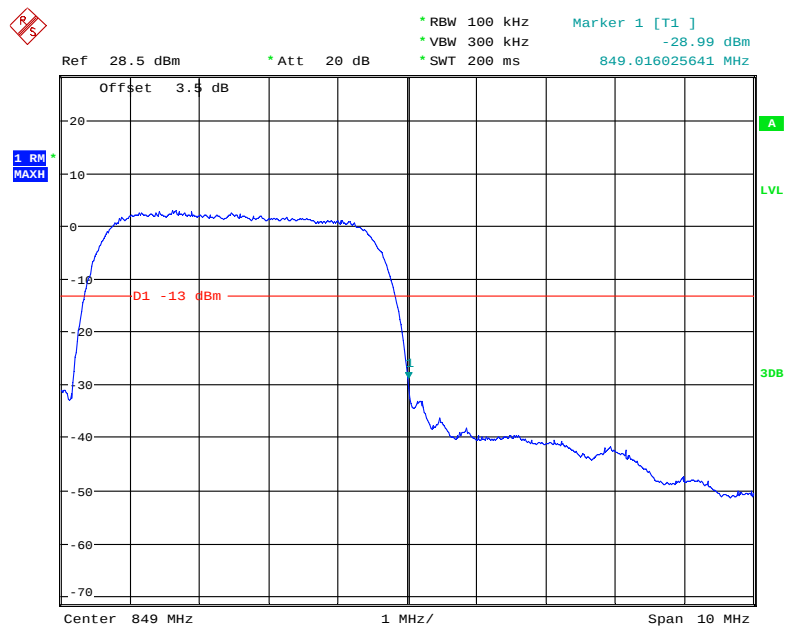


Cellular Band, Left Band Edge for HSDPA (16QAM) Mode



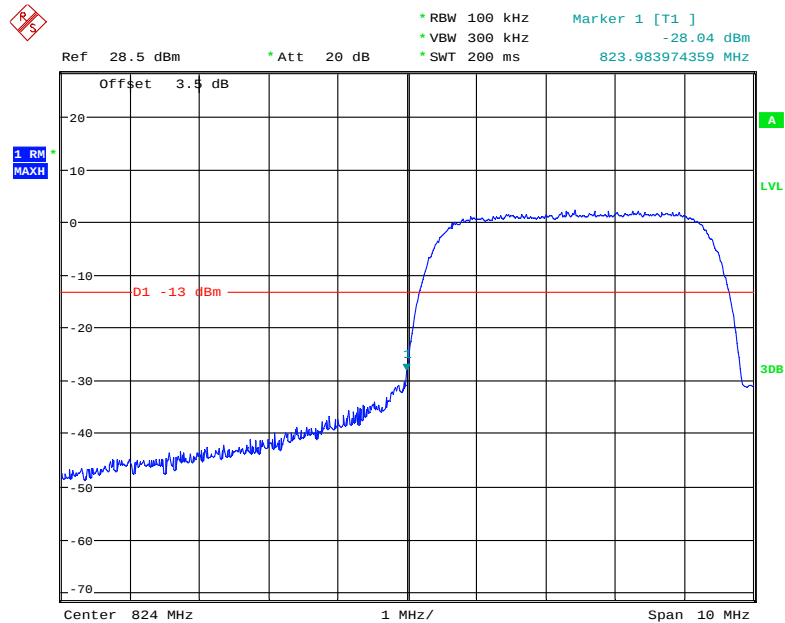
Date: 18.JAN.2019 09:06:38

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



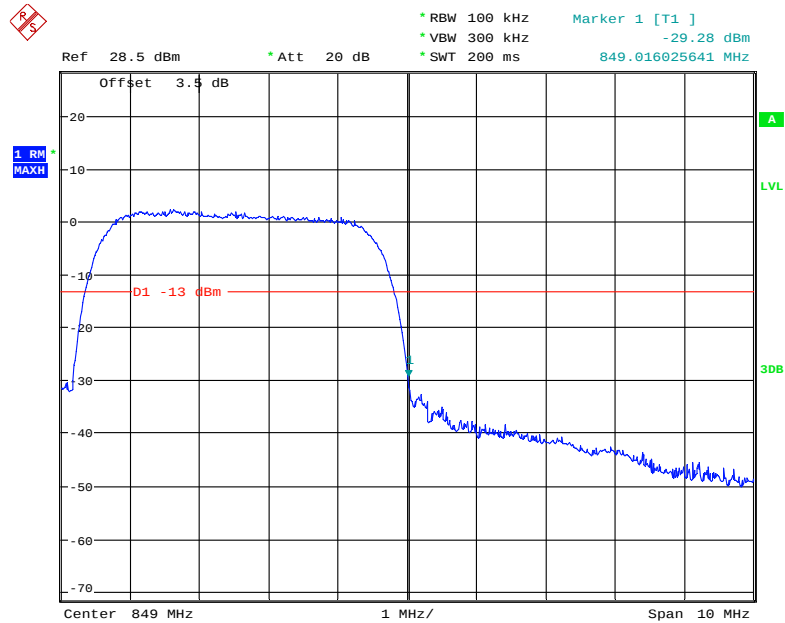
Date: 18.JAN.2019 09:05:11

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



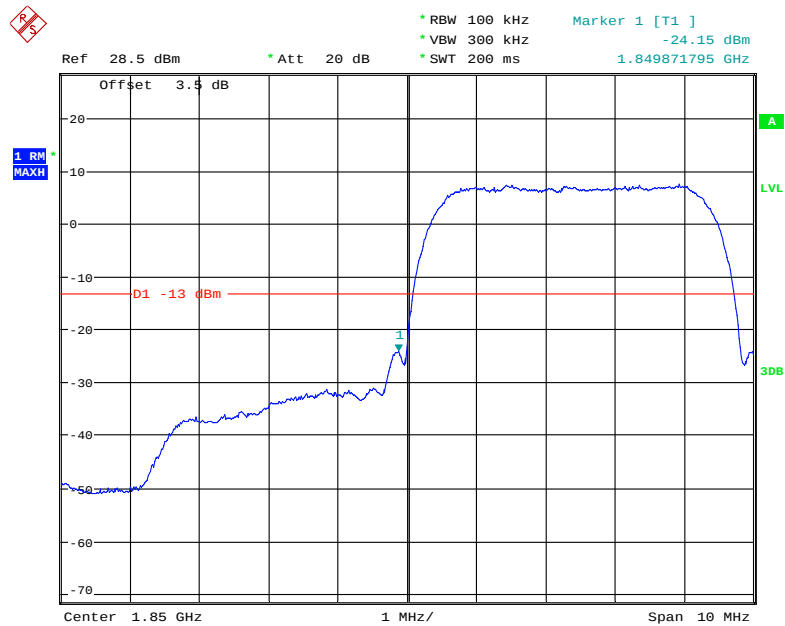
Date: 18.JAN.2019 09:07:54

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



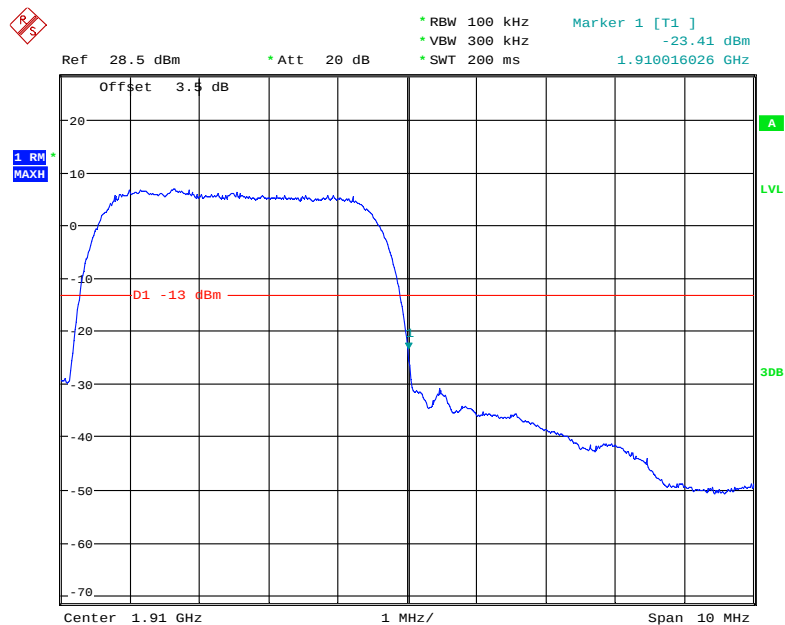
Date: 18.JAN.2019 09:09:02

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



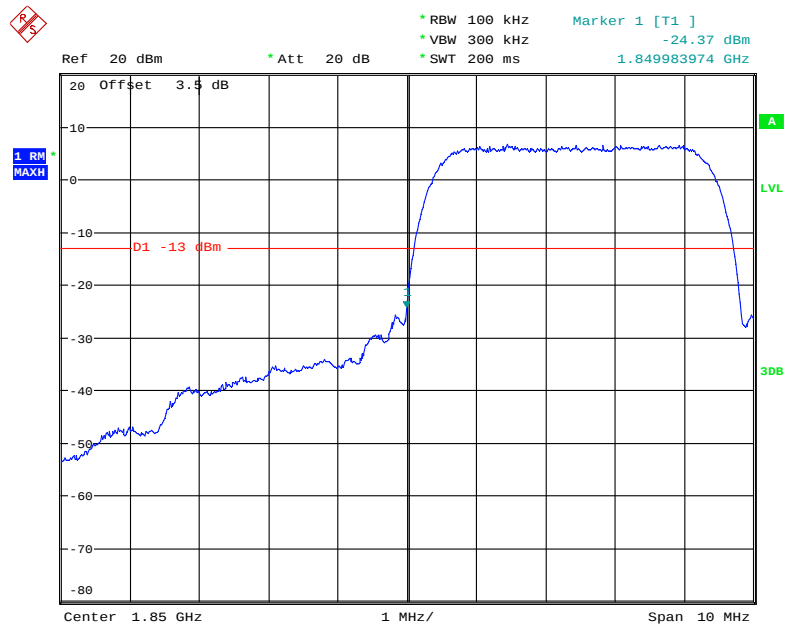
Date: 18.JAN.2019 07:54:36

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



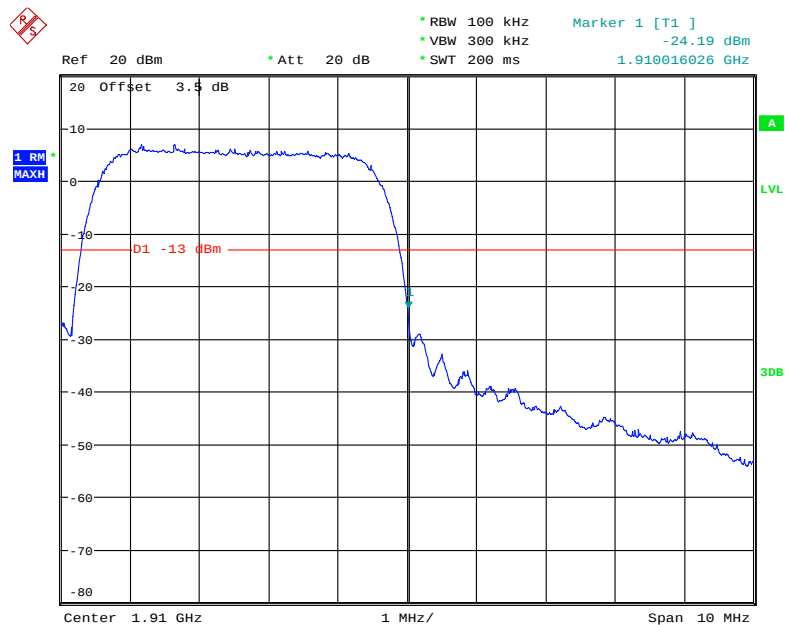
Date: 18.JAN.2019 07:55:35

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



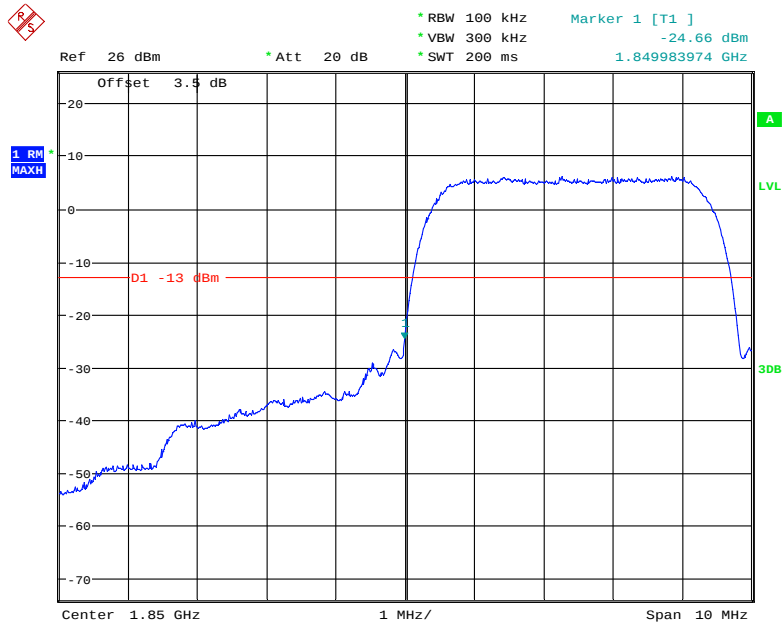
Date: 15.JAN.2019 14:50:28

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



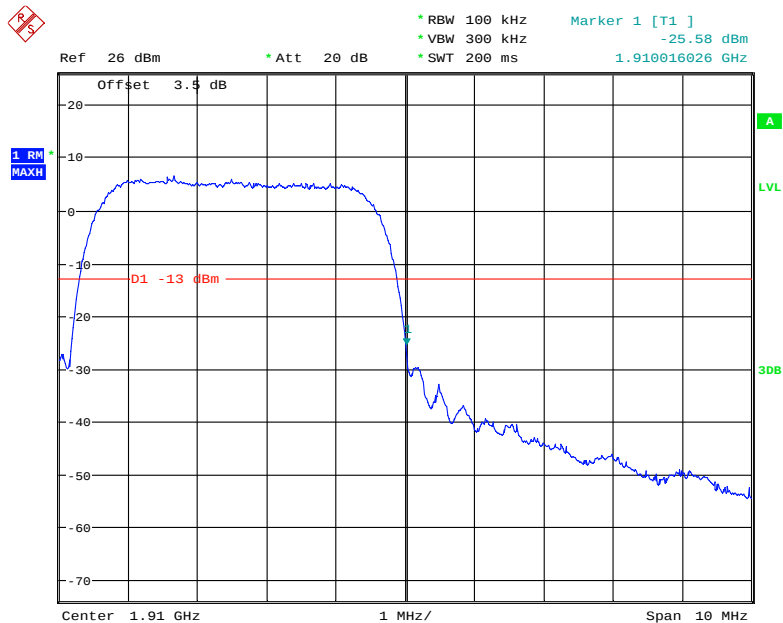
Date: 15.JAN.2019 14:51:47

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



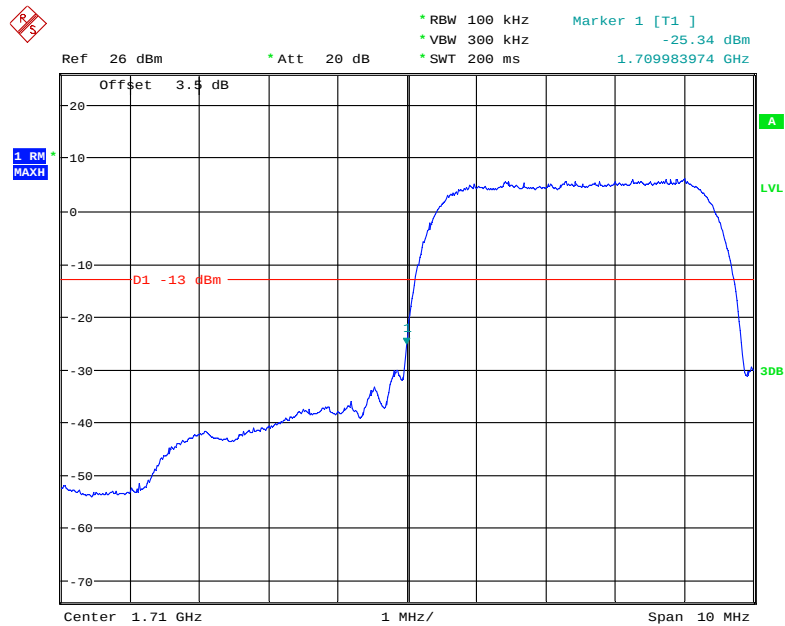
Date: 15.JAN.2019 15:03:27

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



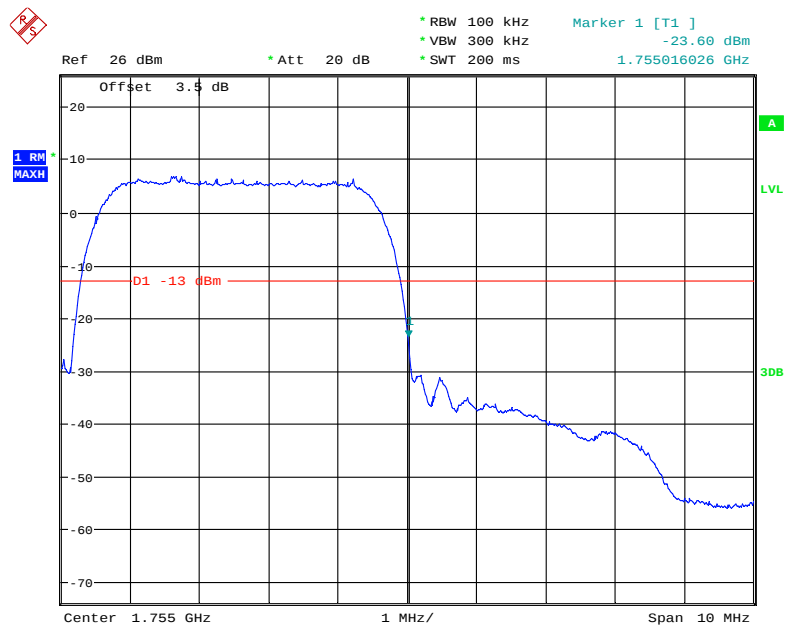
Date: 15.JAN.2019 15:04:11

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



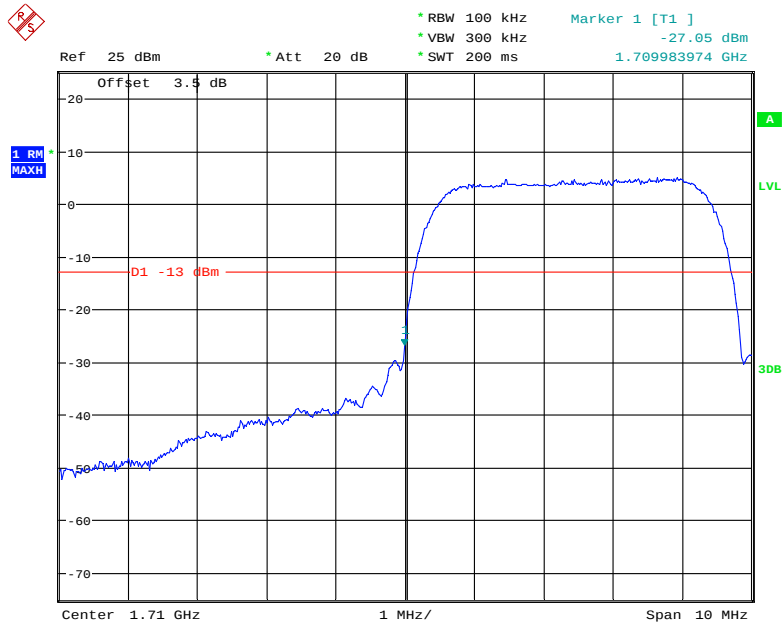
Date: 15.JAN.2019 15:07:05

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



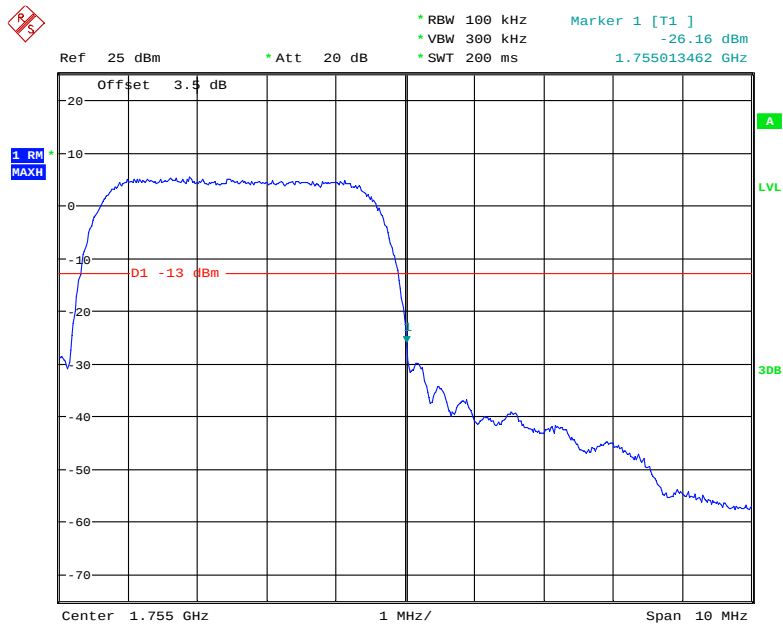
Date: 15.JAN.2019 15:08:04

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



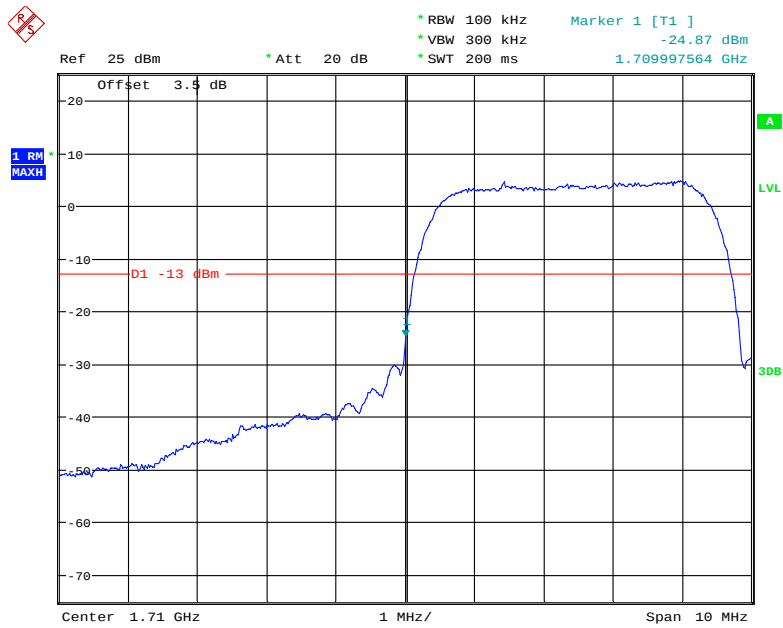
Date: 16.JAN.2019 08:19:18

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



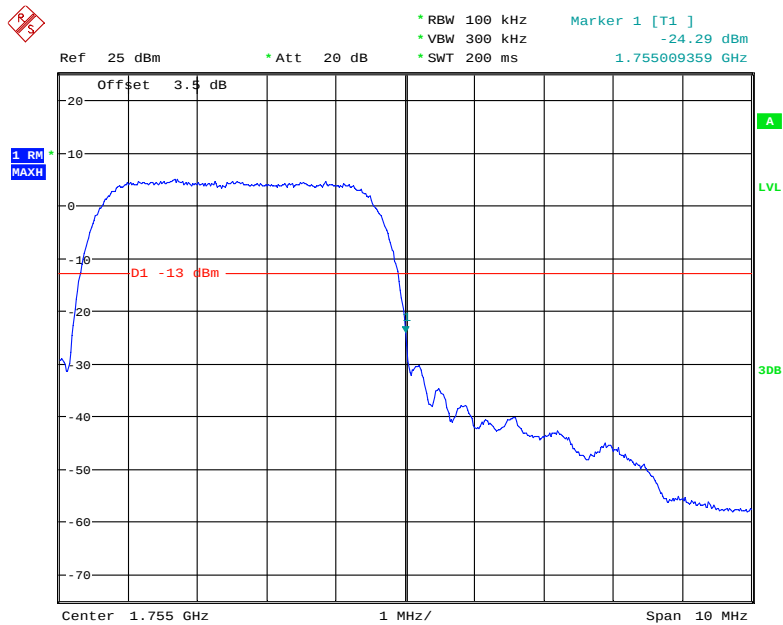
Date: 16.JAN.2019 08:18:14

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

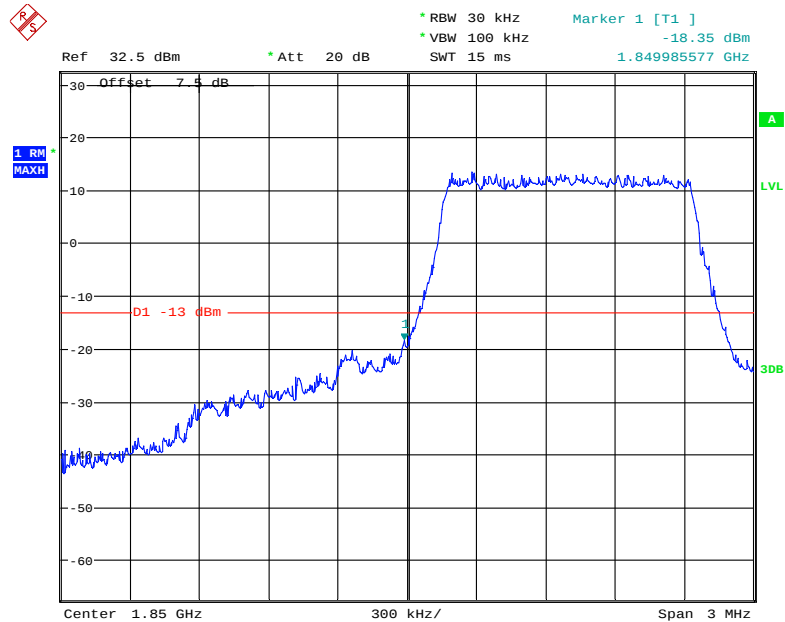


Date: 16.JAN.2019 08:14:58

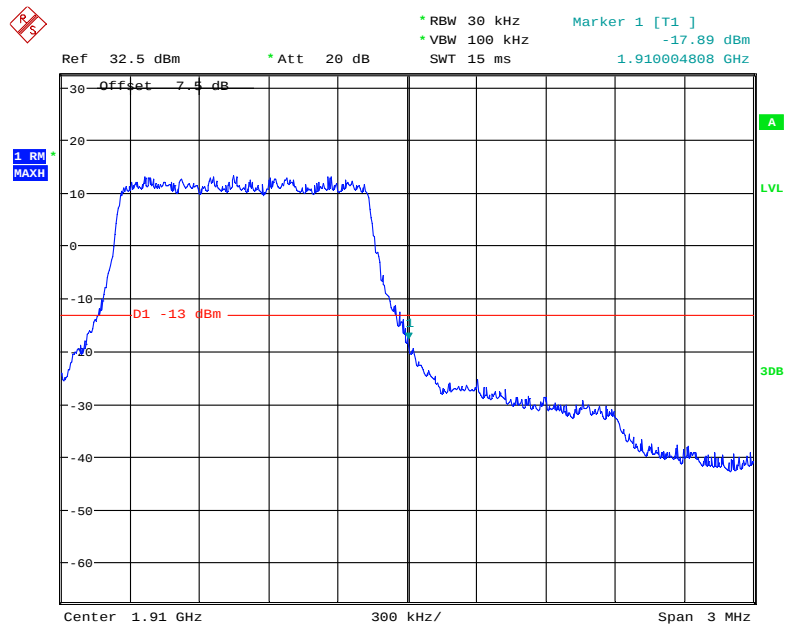
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 16.JAN.2019 08:17:06

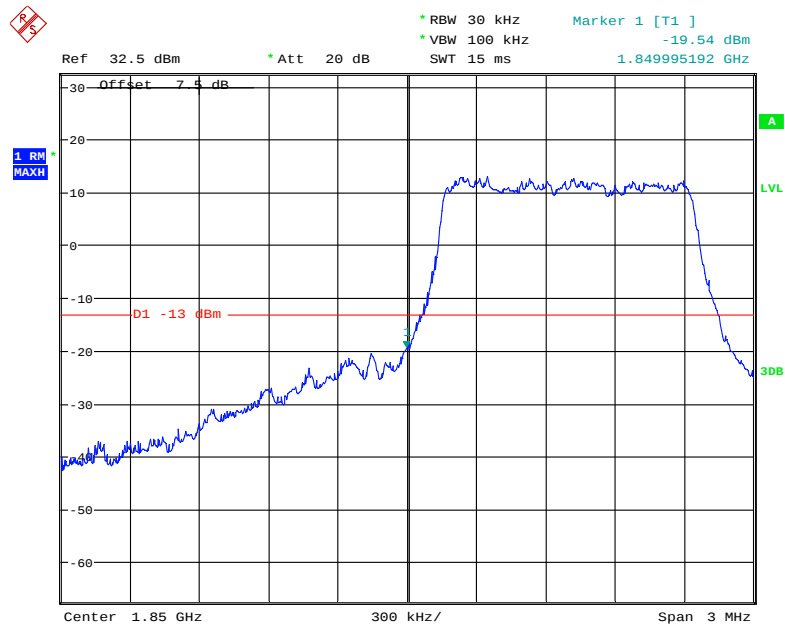
Band 2:**QPSK (1.4 MHz, FULL RB) - Left Band Edge**

Date: 11.JAN.2019 20:17:14

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

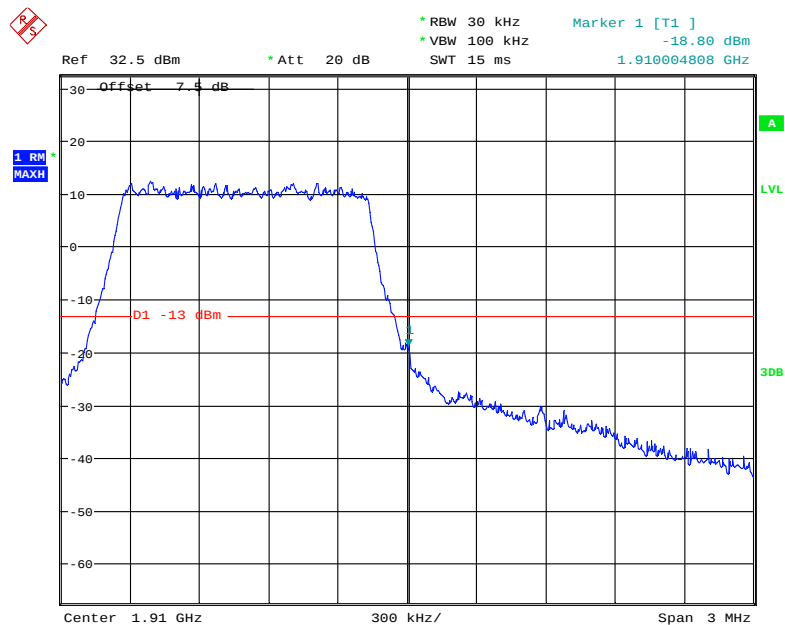
Date: 11.JAN.2019 20:22:02

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



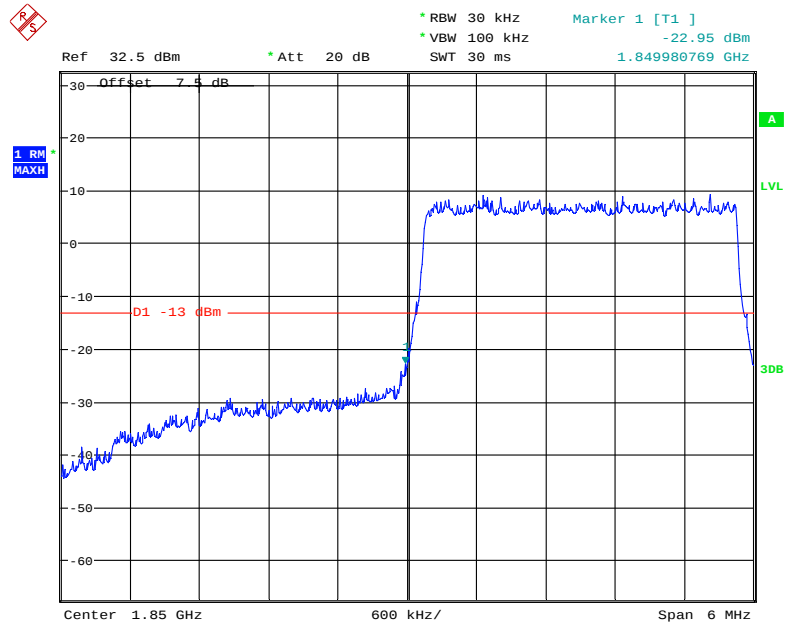
Date: 11.JAN.2019 20:19:12

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



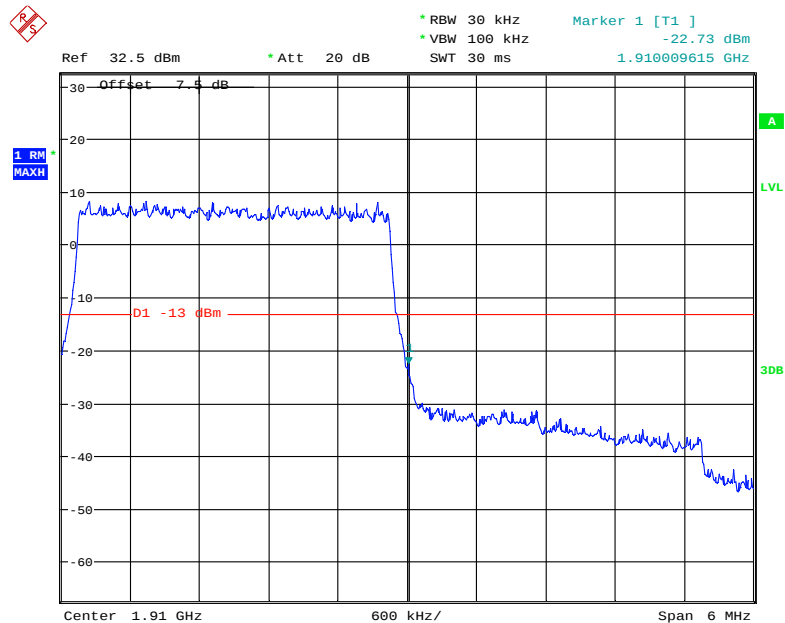
Date: 11.JAN.2019 20:21:28

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



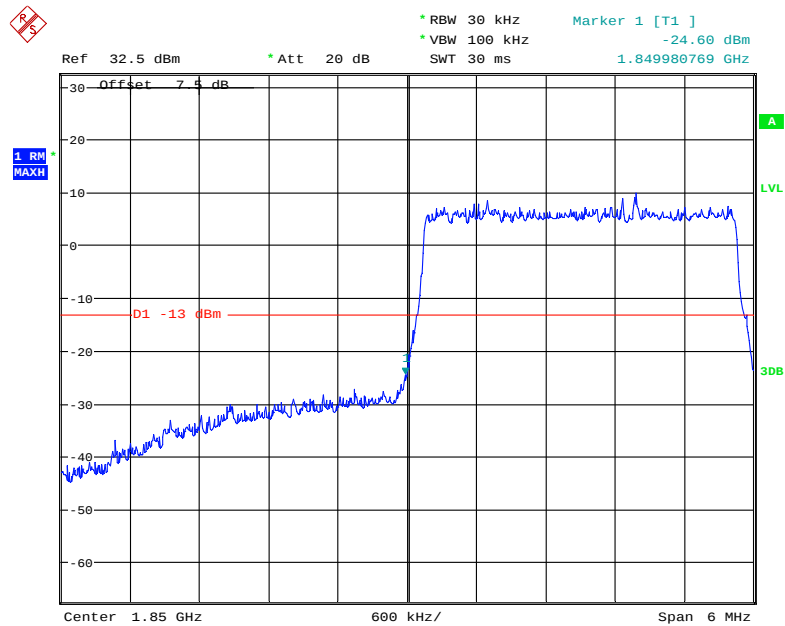
Date: 11.JAN.2019 20:25:54

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



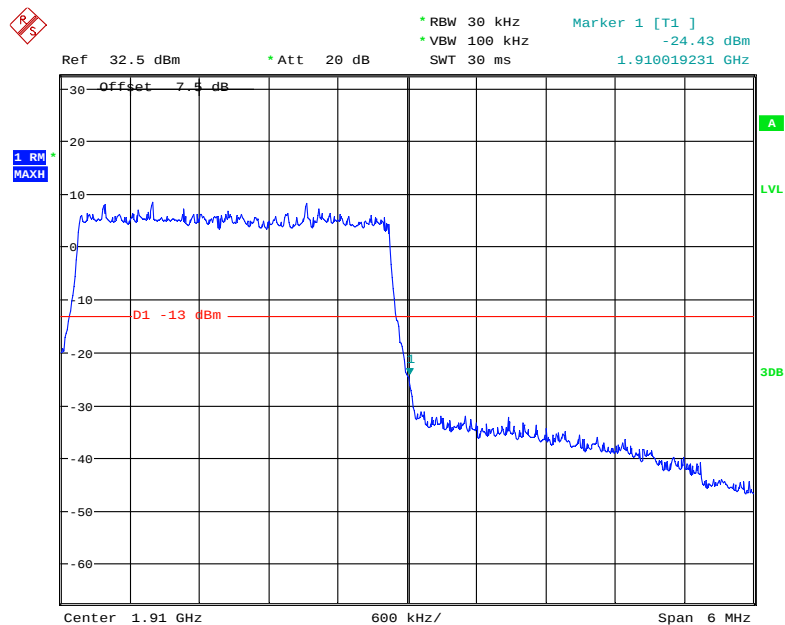
Date: 11.JAN.2019 20:32:04

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



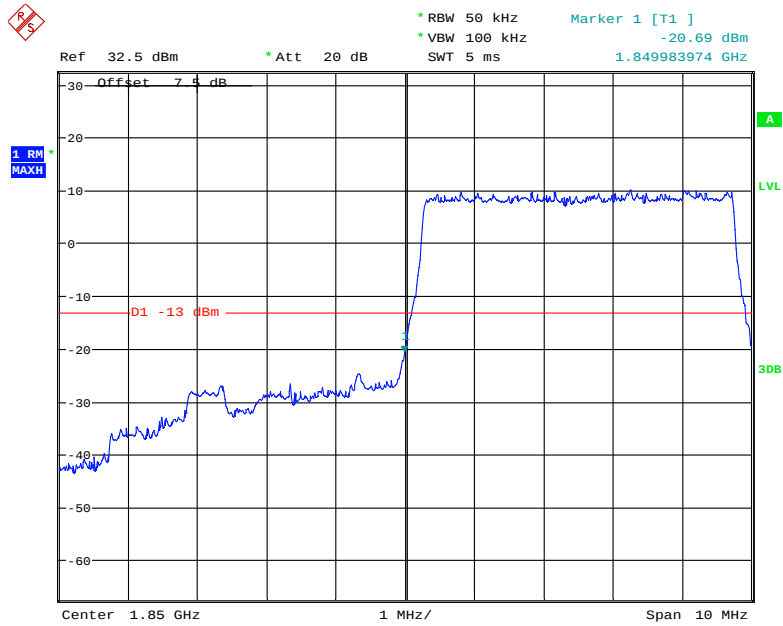
Date: 11.JAN.2019 20:28:58

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



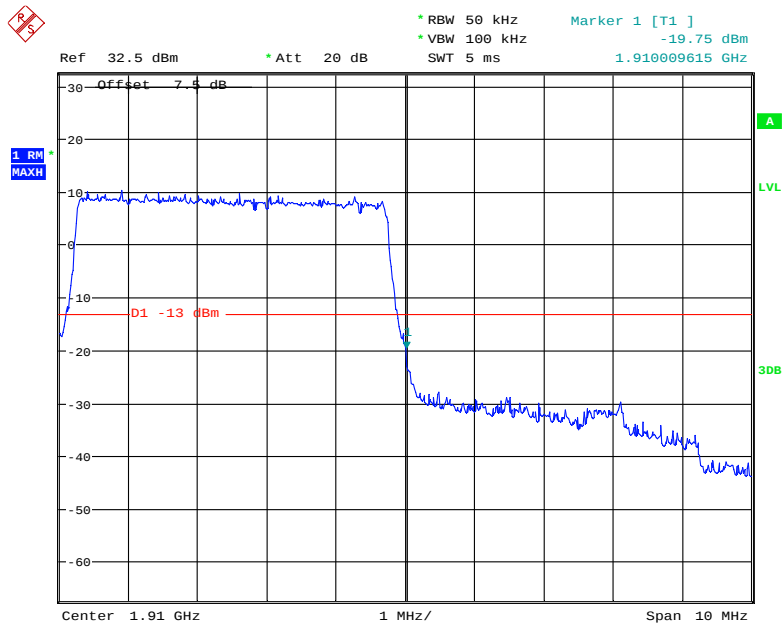
Date: 11.JAN.2019 20:30:05

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



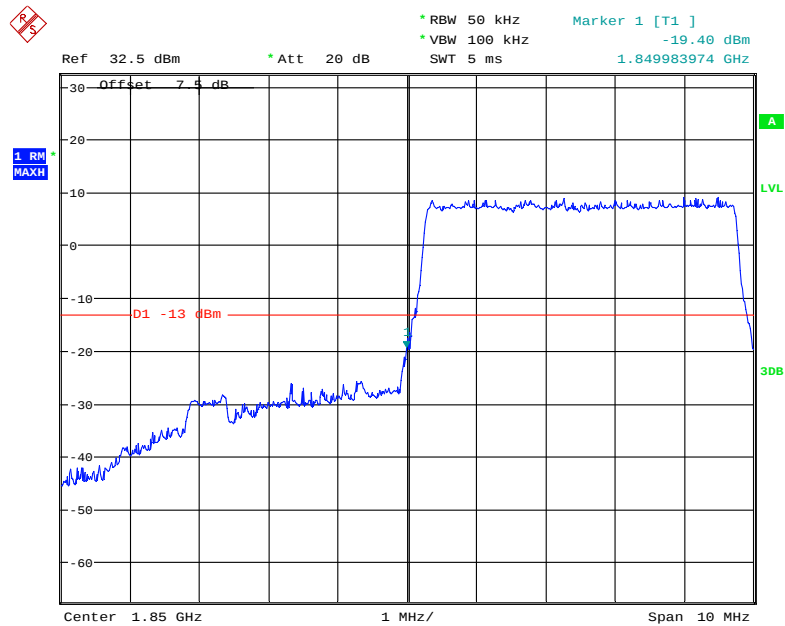
Date: 11.JAN.2019 20:35:08

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



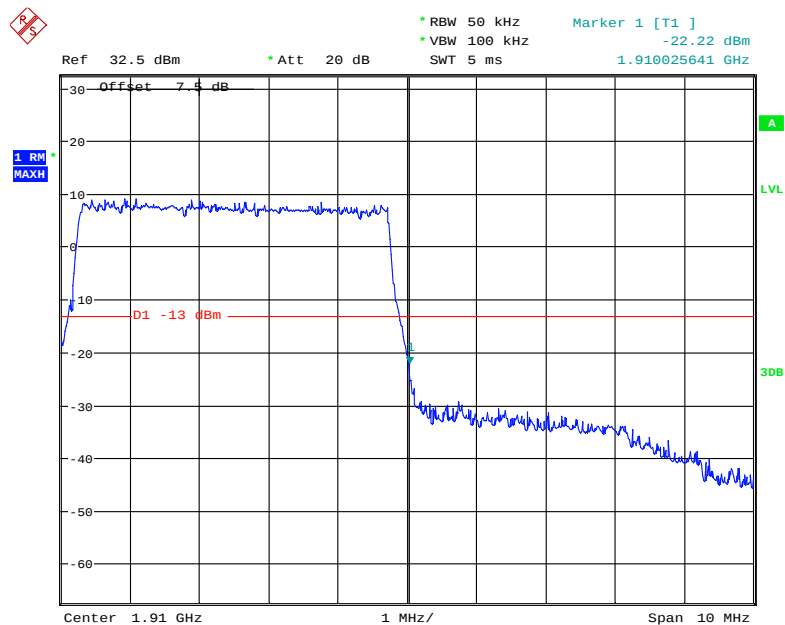
Date: 11.JAN.2019 20:33:02

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



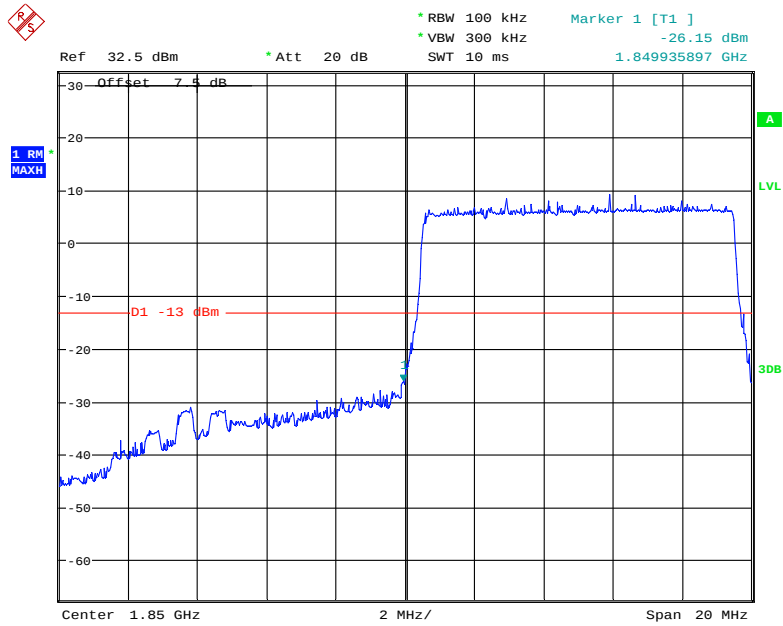
Date: 11.JAN.2019 20:34:15

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



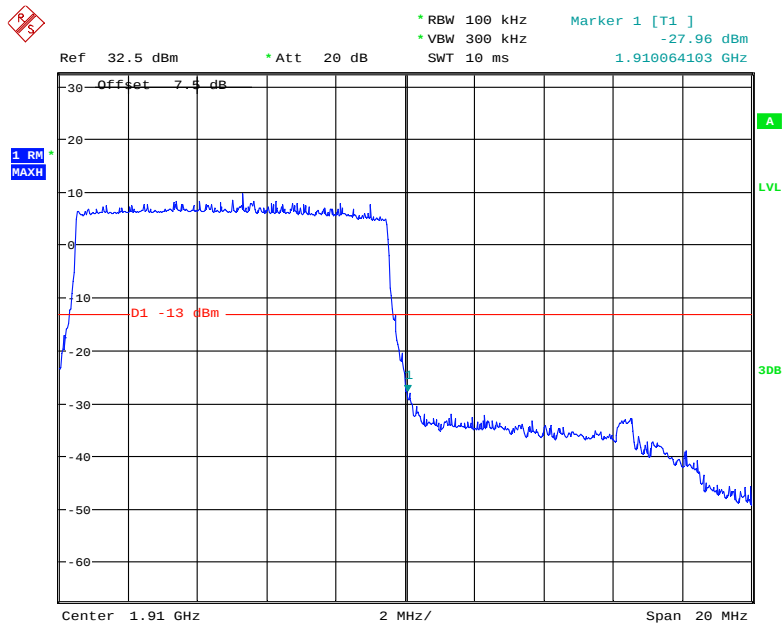
Date: 11.JAN.2019 20:33:31

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



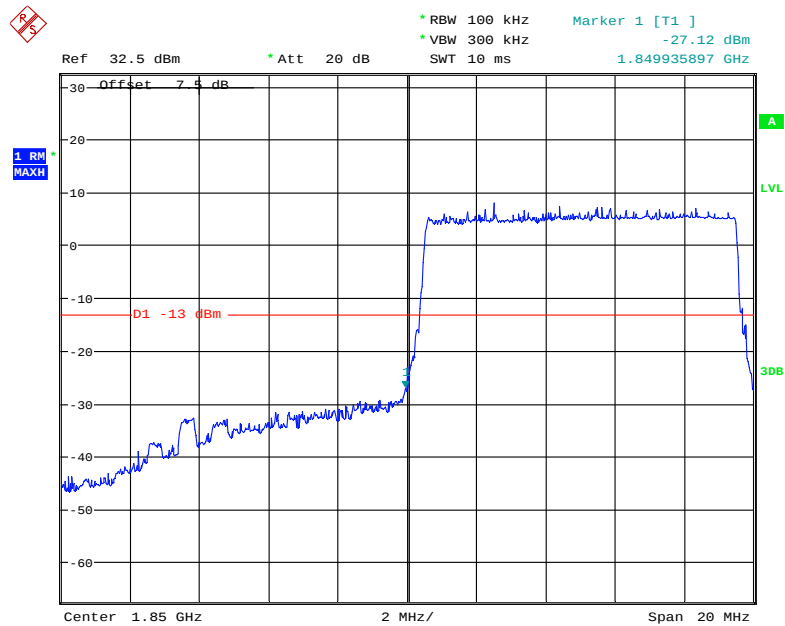
Date: 11.JAN.2019 20:36:08

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



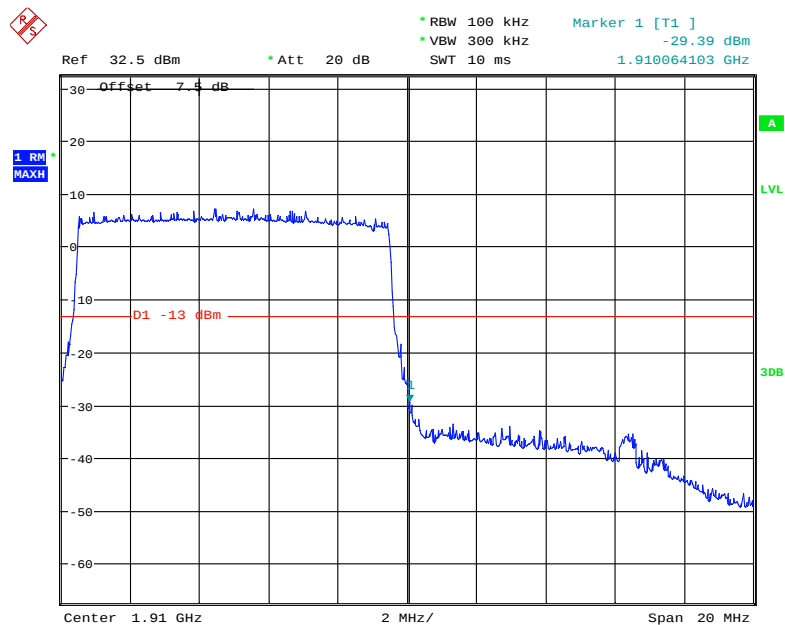
Date: 11.JAN.2019 20:38:39

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



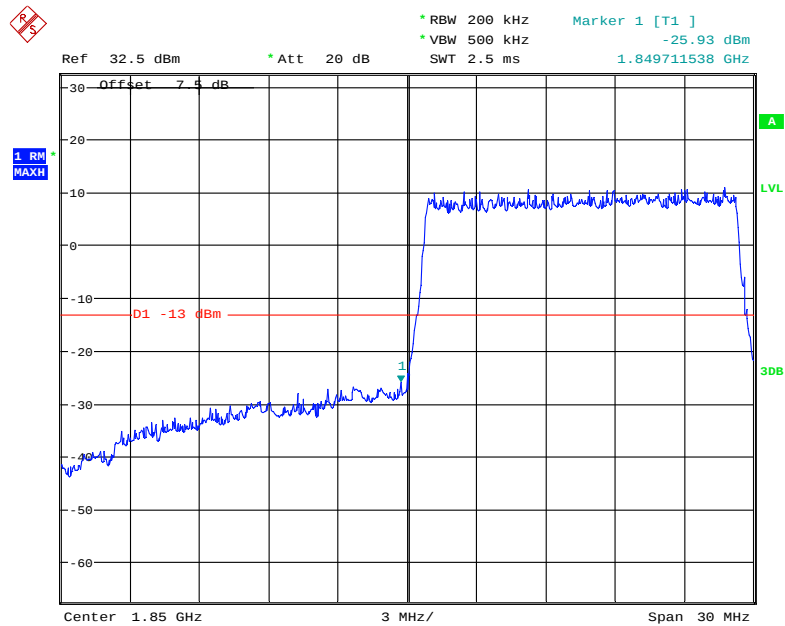
Date: 11.JAN.2019 20:36:51

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



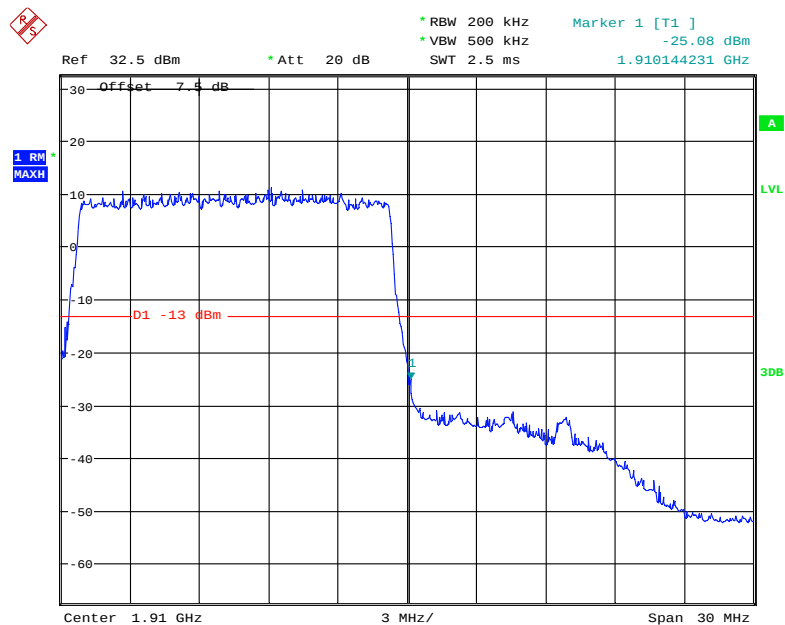
Date: 11.JAN.2019 20:37:33

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



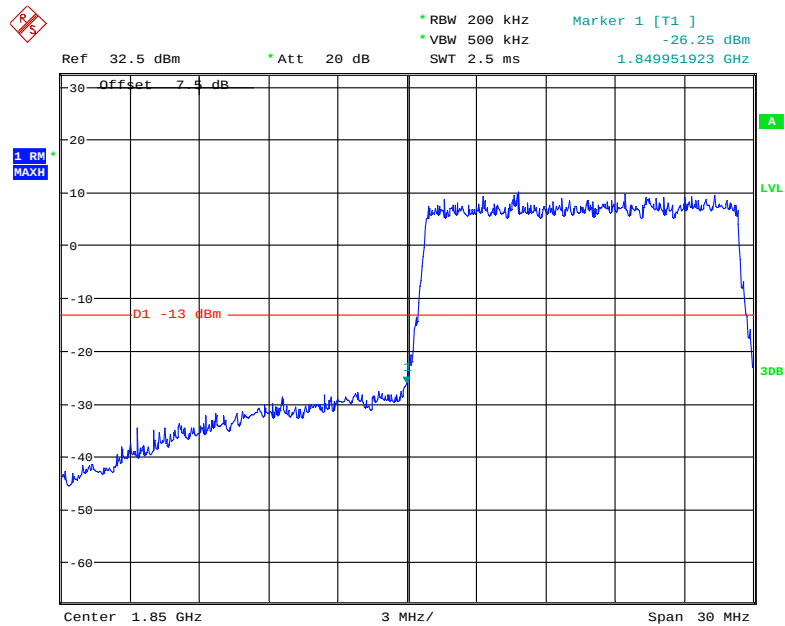
Date: 11.JAN.2019 20:40:21

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



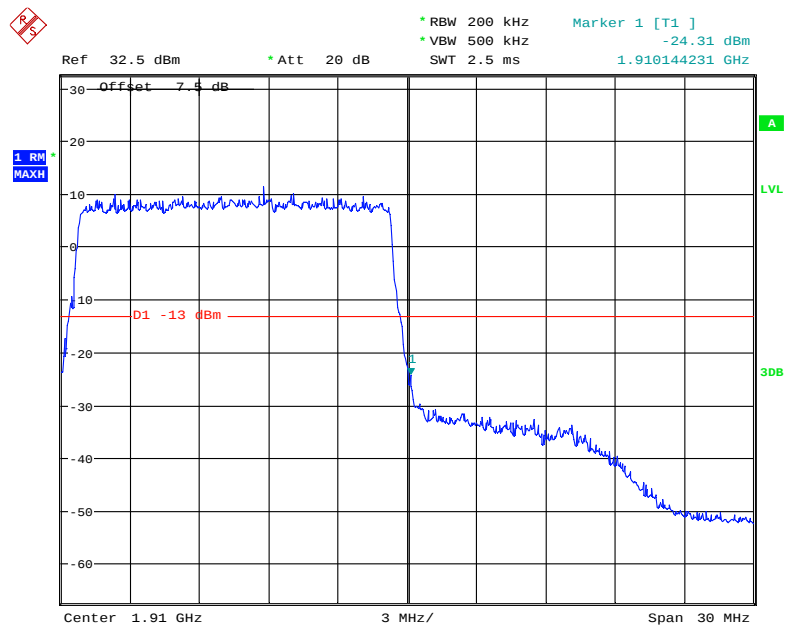
Date: 11.JAN.2019 20:43:48

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



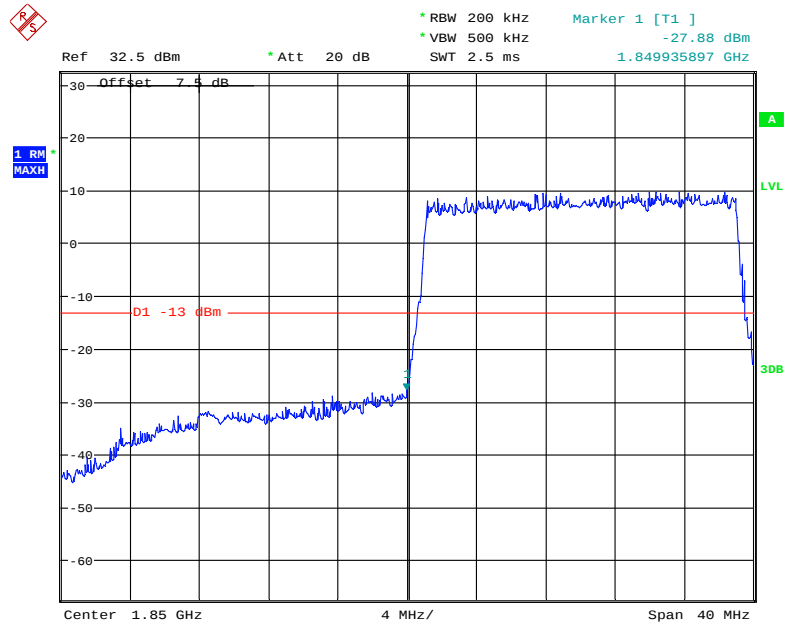
Date: 11.JAN.2019 20:40:57

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



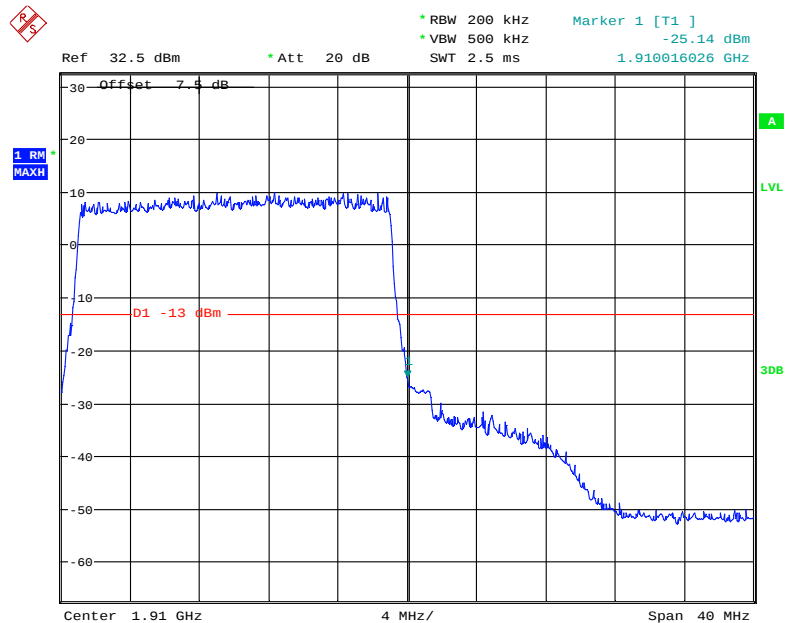
Date: 11.JAN.2019 20:42:32

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

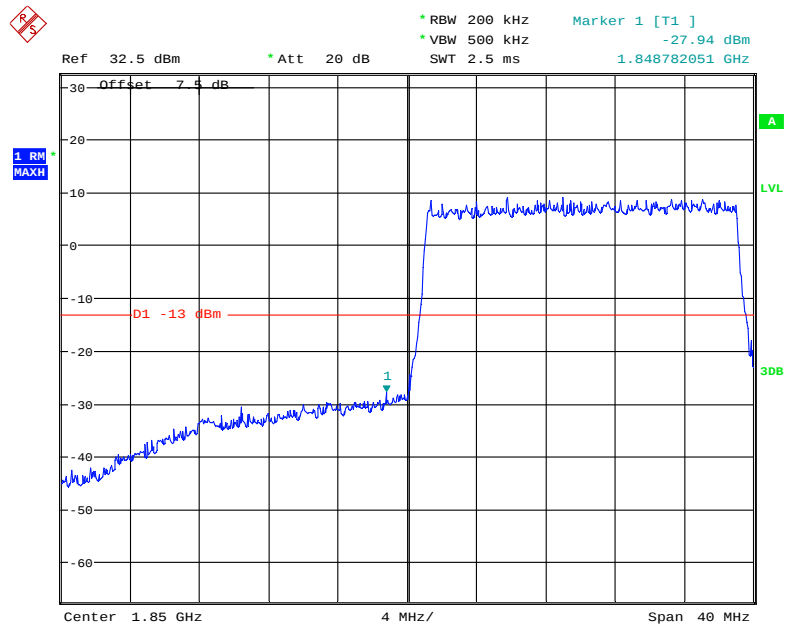


Date: 11.JAN.2019 20:49:32

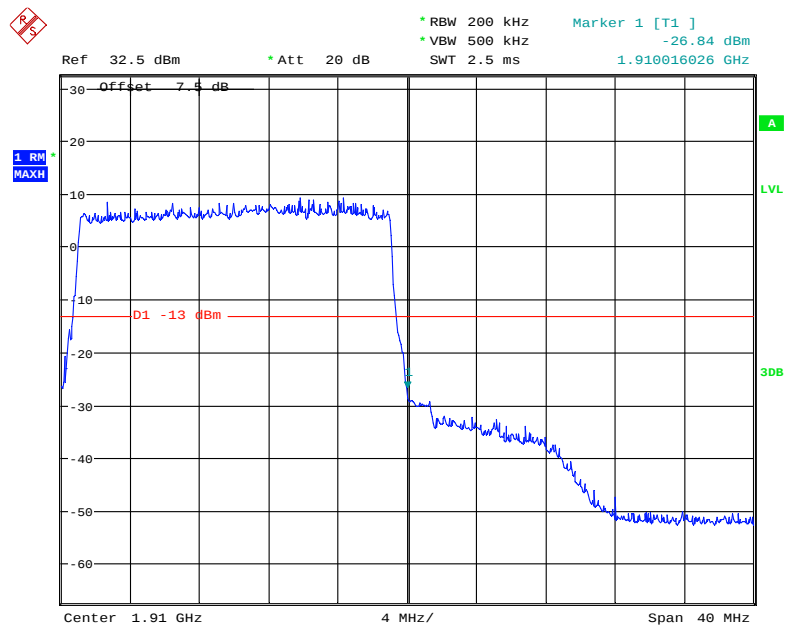
QPSK (20.0 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 20:45:30

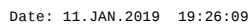
16-QAM (20.0 MHz, FULL RB) - Left Band Edge

Date: 11.JAN.2019 20:48:17

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

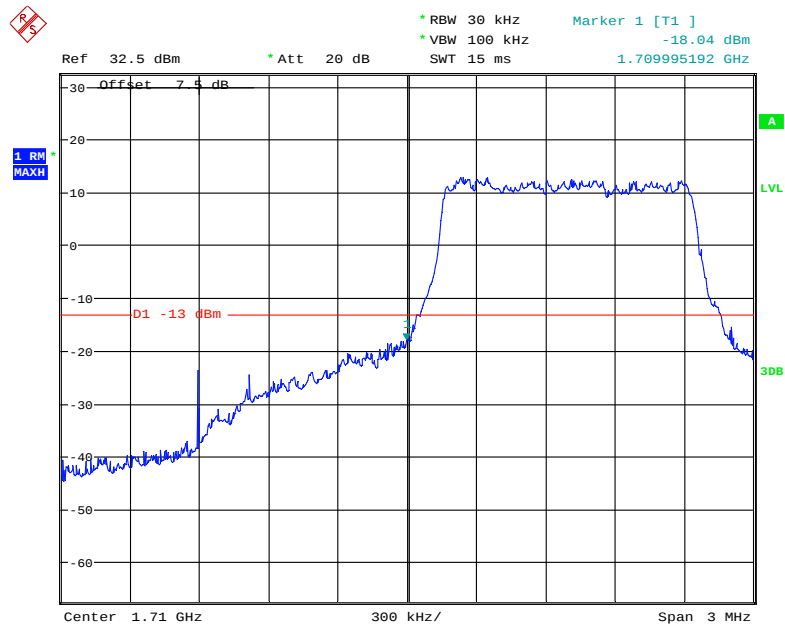
Date: 11.JAN.2019 20:46:34

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



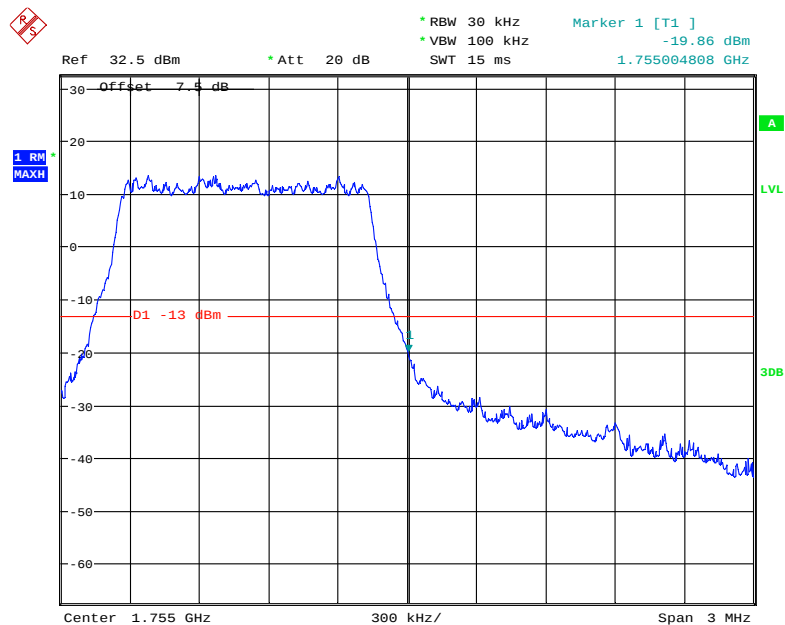
Date: 11.JAN.2019 19:30:24

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



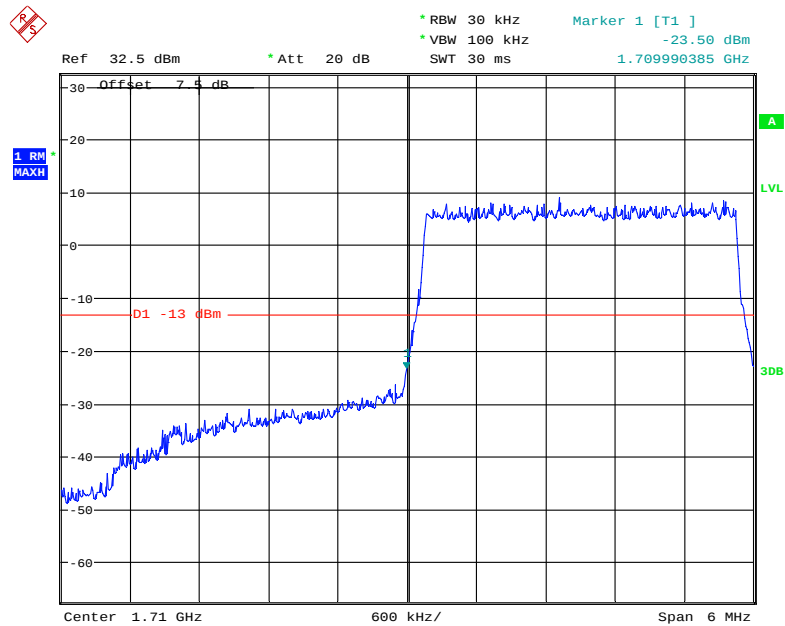
Date: 11.JAN.2019 19:27:22

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



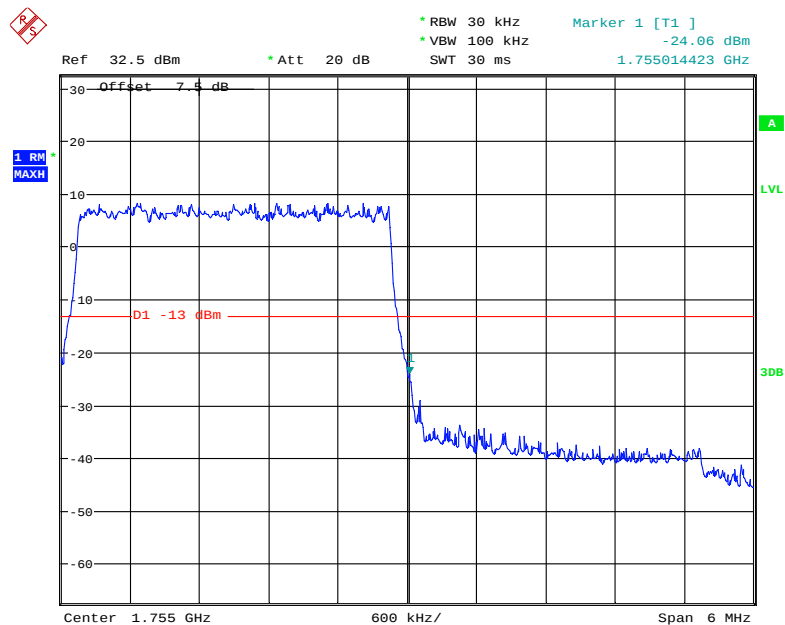
Date: 11.JAN.2019 19:28:56

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



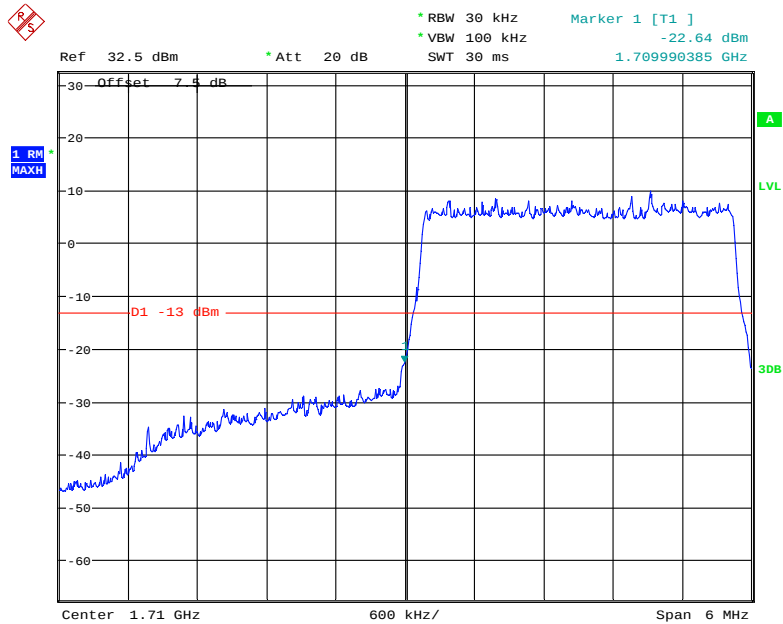
Date: 11.JAN.2019 19:36:48

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



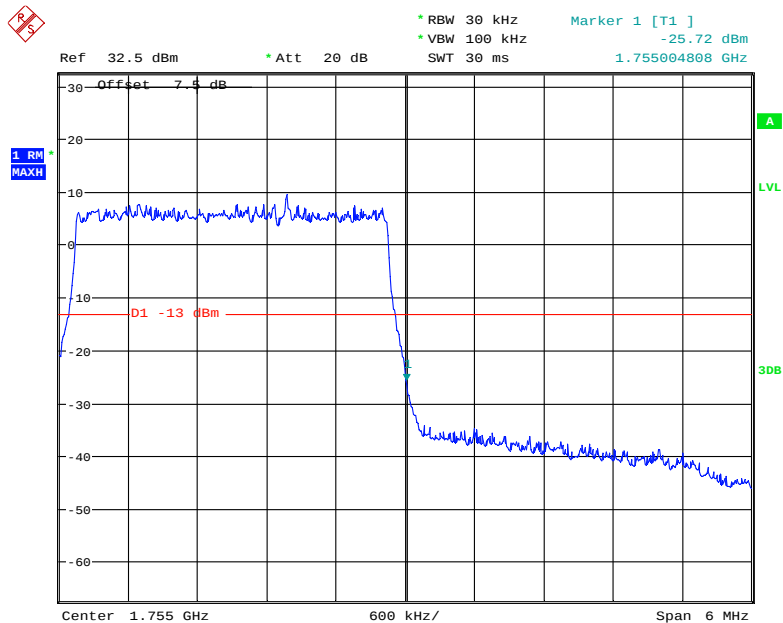
Date: 11.JAN.2019 19:32:10

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



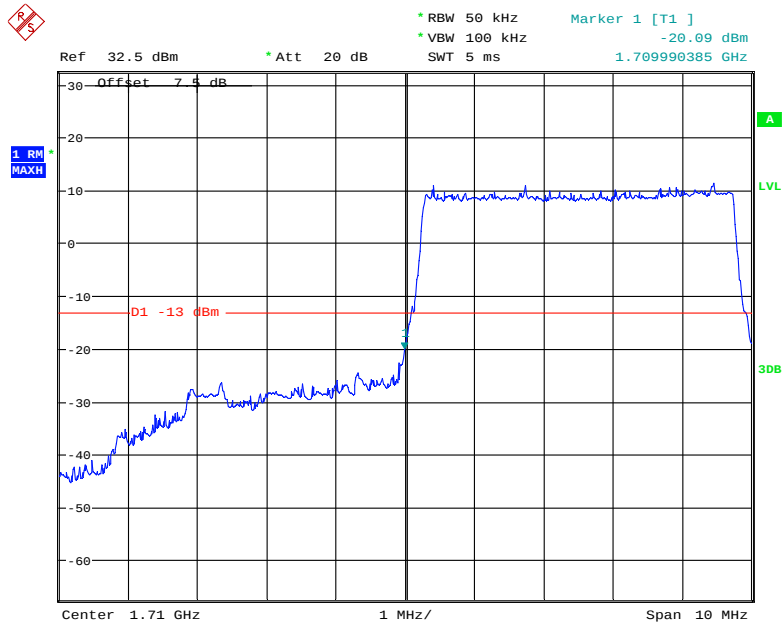
Date: 11.JAN.2019 19:36:22

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



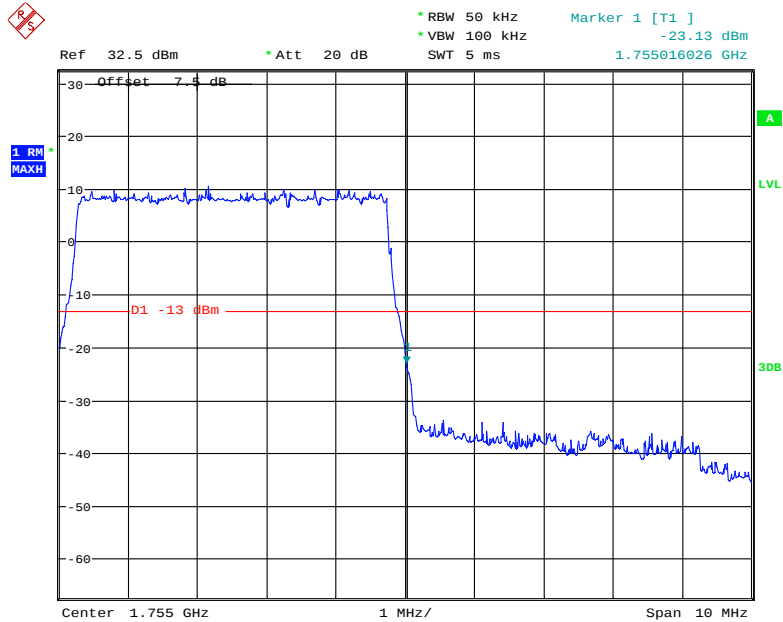
Date: 11.JAN.2019 19:33:15

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



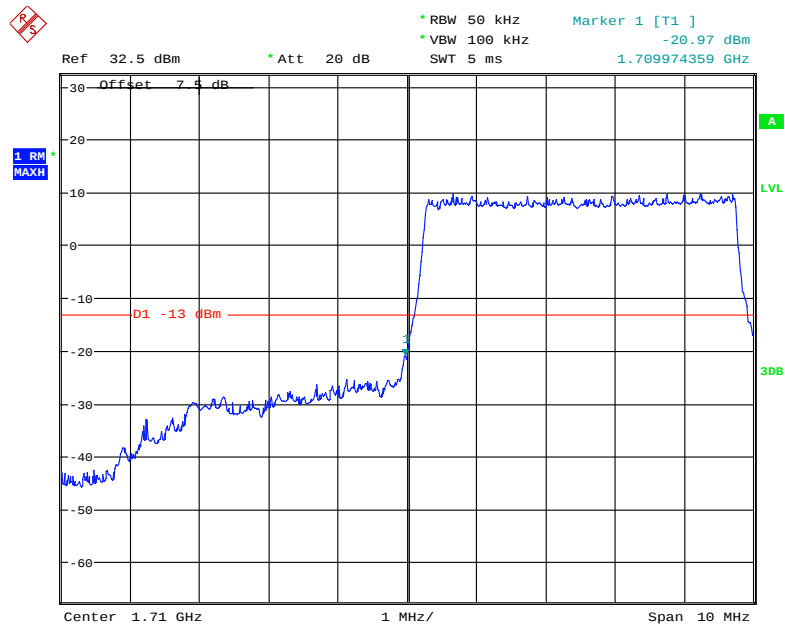
Date: 11.JAN.2019 19:38:00

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



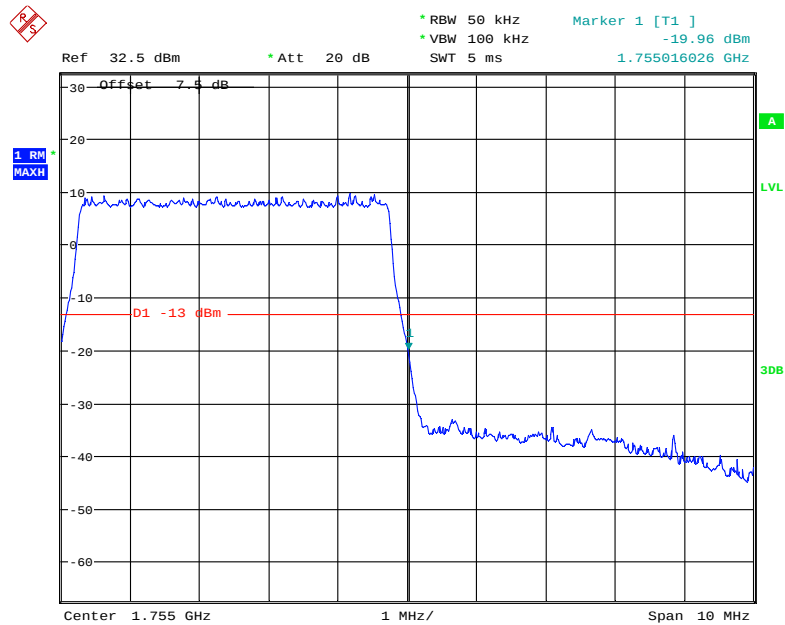
Date: 11.JAN.2019 19:49:33

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



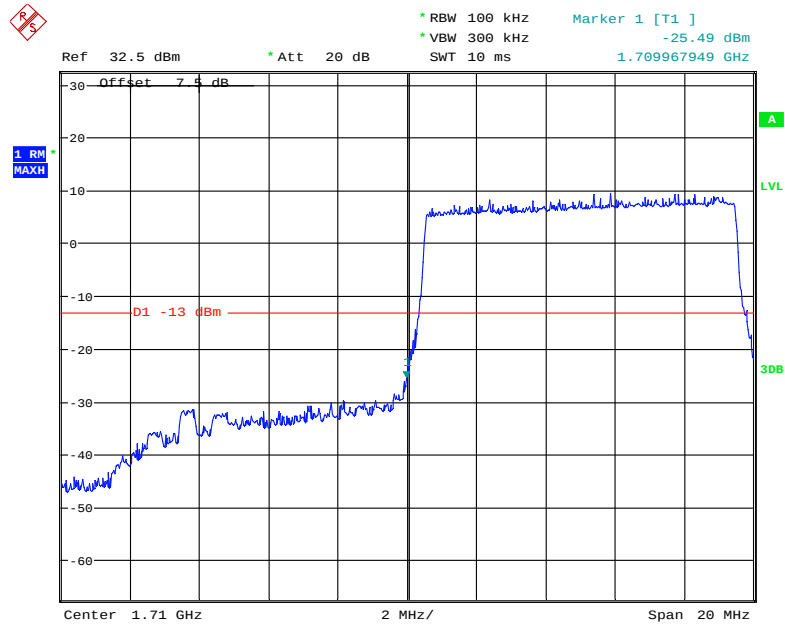
Date: 11.JAN.2019 19:39:12

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



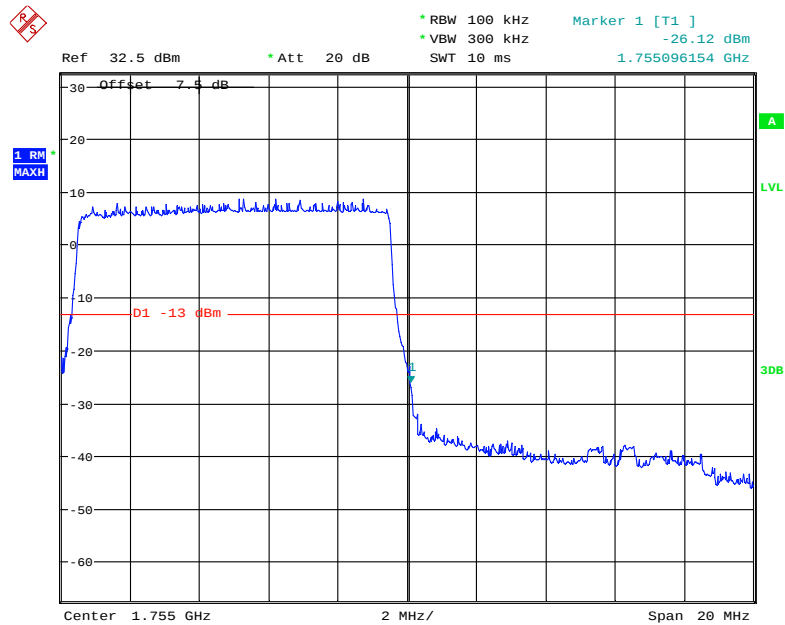
Date: 11.JAN.2019 19:49:09

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

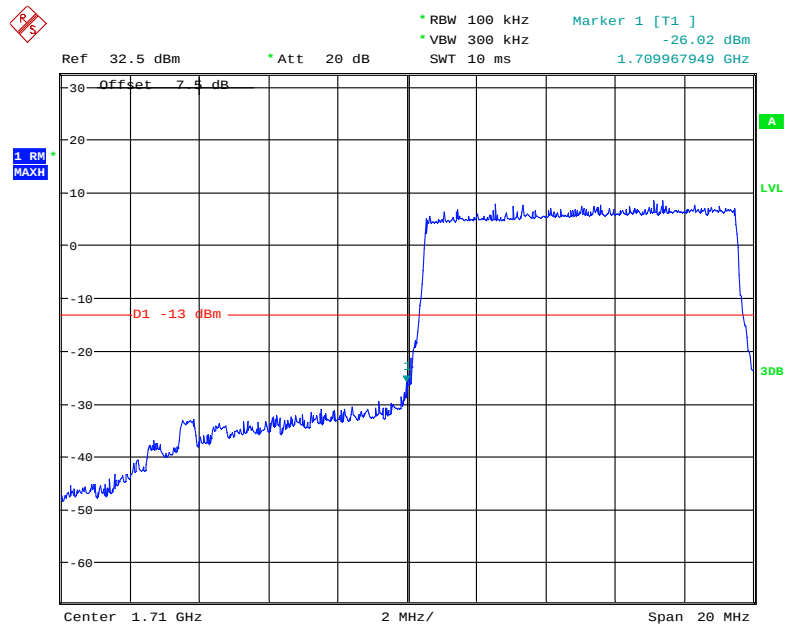


Date: 11.JAN.2019 19:50:55

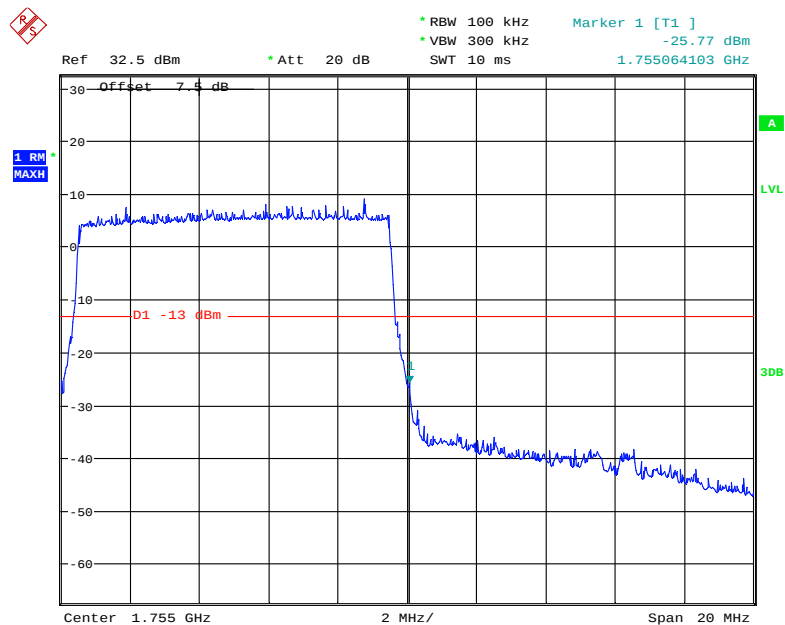
QPSK (10.0 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 19:56:18

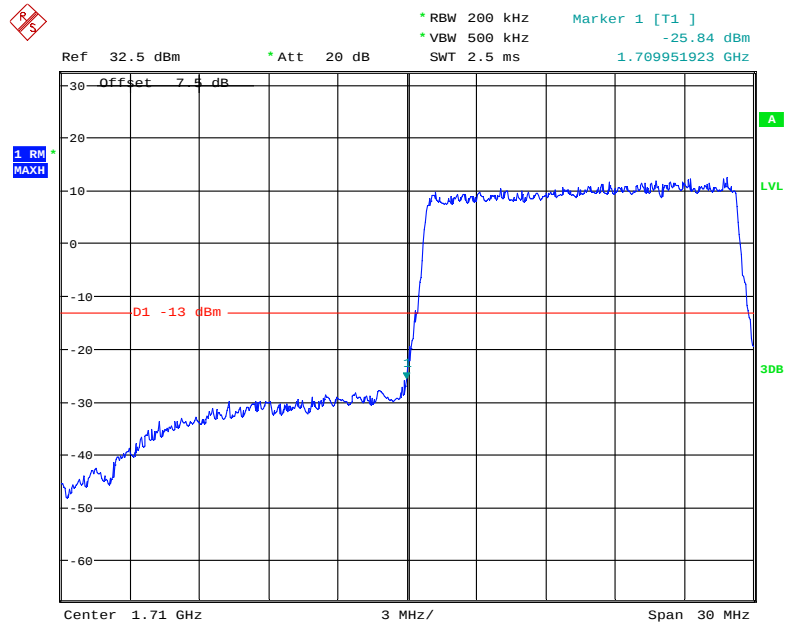
16-QAM (10.0 MHz, FULL RB) - Left Band Edge

Date: 11.JAN.2019 19:52:26

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

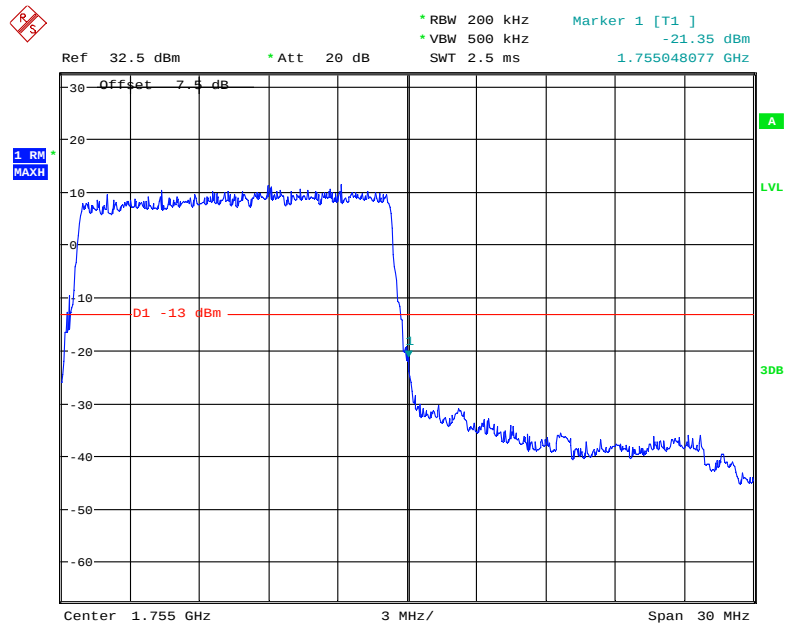
Date: 11.JAN.2019 19:55:16

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



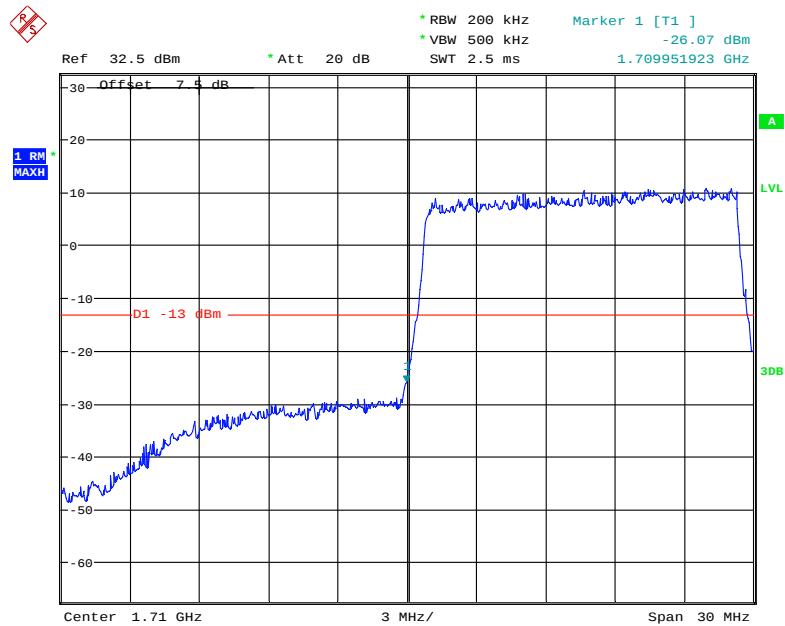
Date: 11.JAN.2019 19:59:30

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



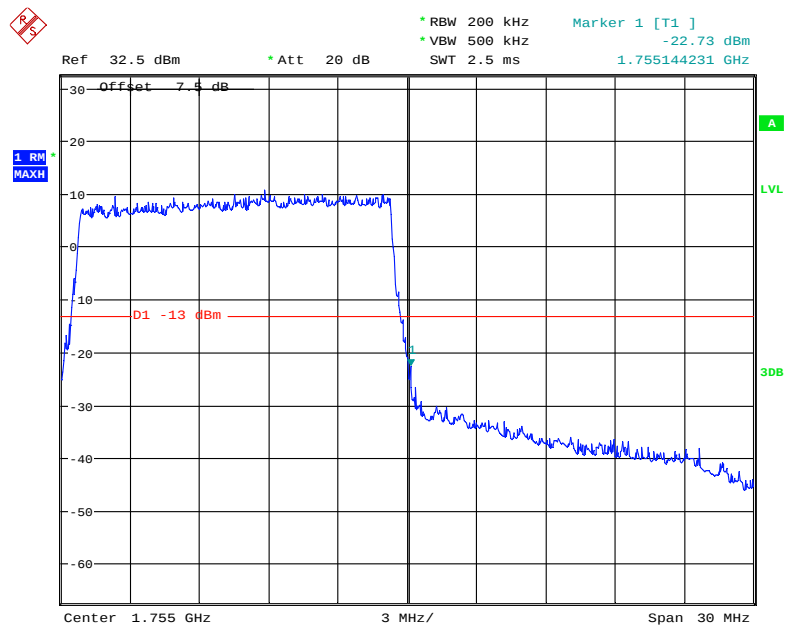
Date: 11.JAN.2019 20:03:57

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



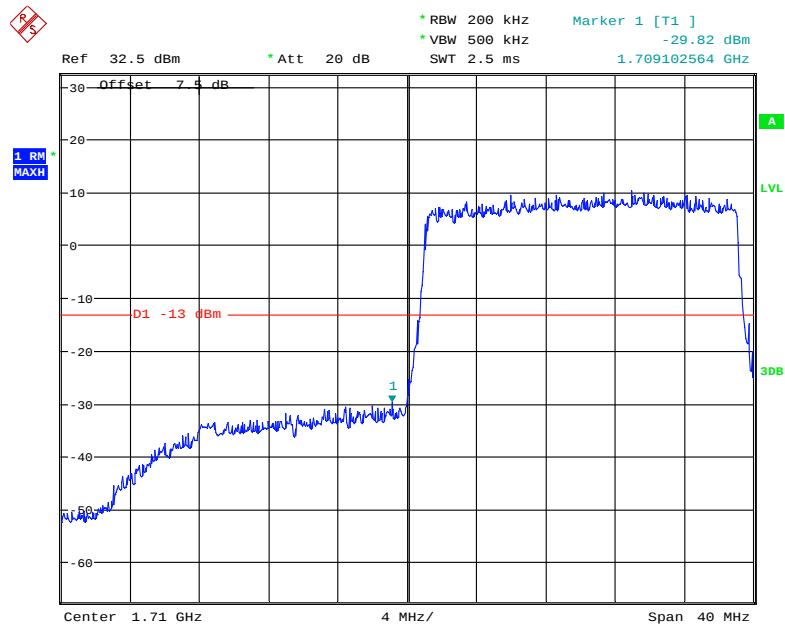
Date: 11.JAN.2019 20:01:43

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



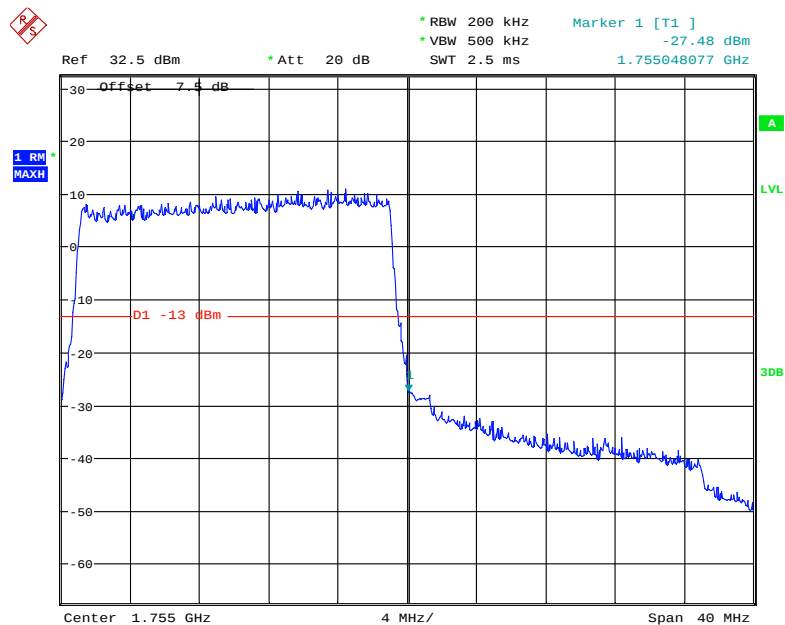
Date: 11.JAN.2019 20:02:41

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



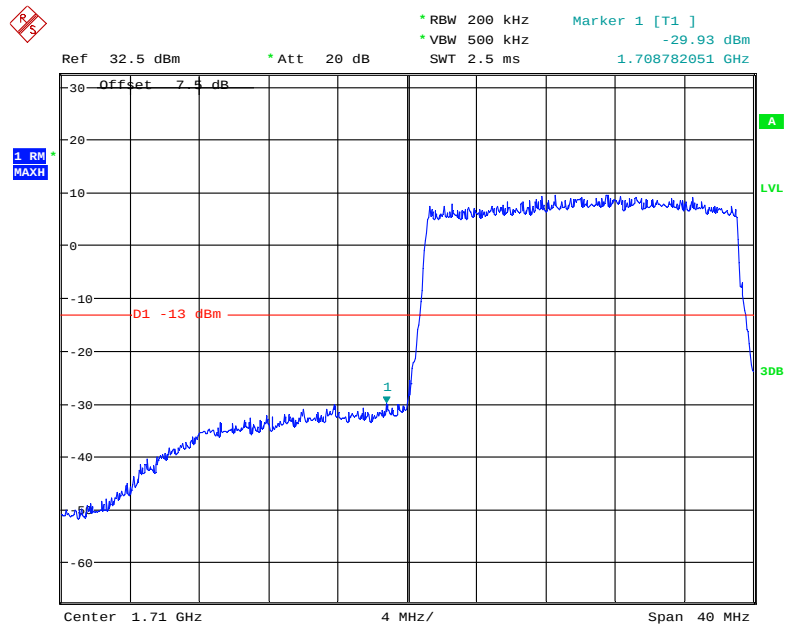
Date: 11.JAN.2019 20:08:26

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



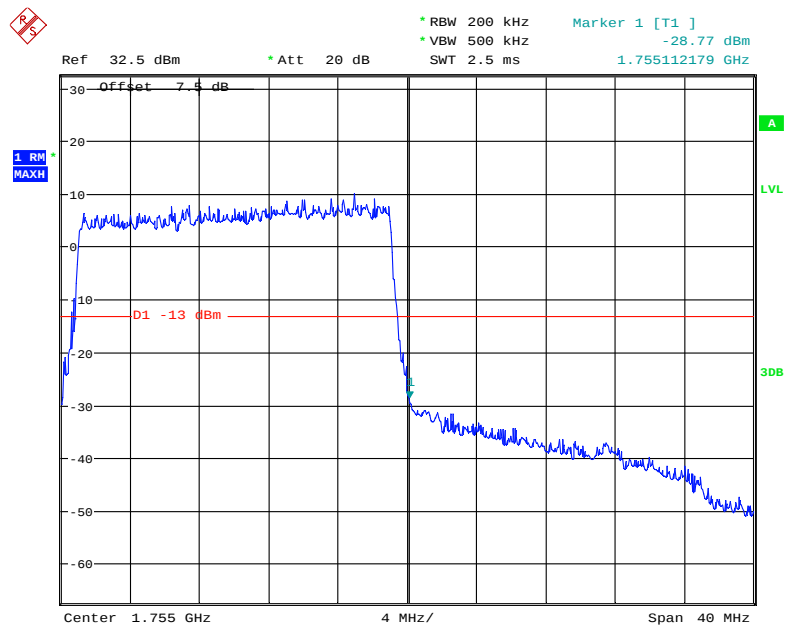
Date: 11.JAN.2019 20:05:48

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



Date: 11.JAN.2019 20:07:45

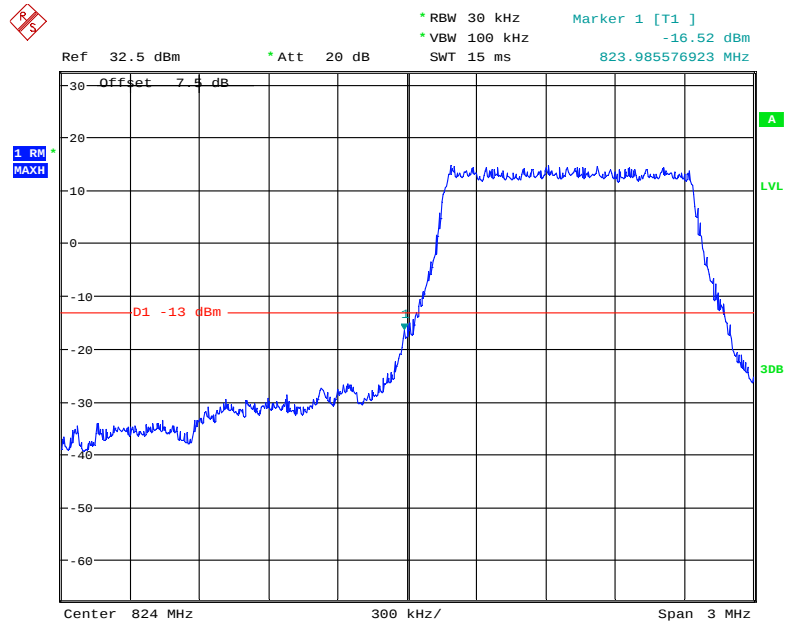
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 20:06:19

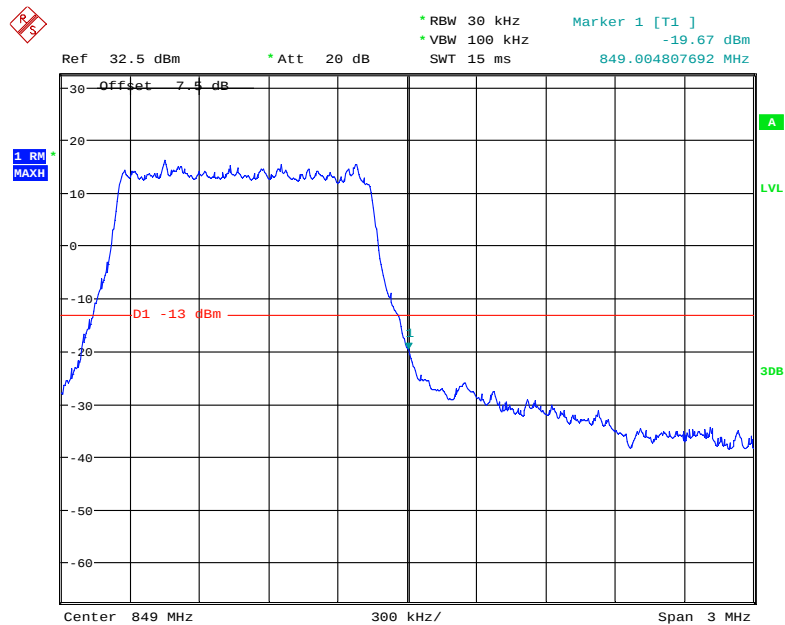
Band 5:

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

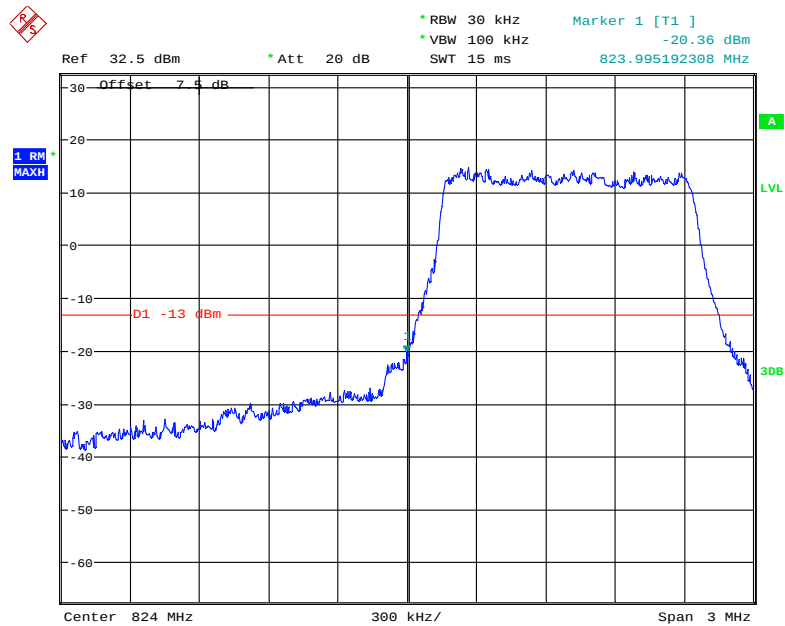


Date: 11.JAN.2019 18:58:10

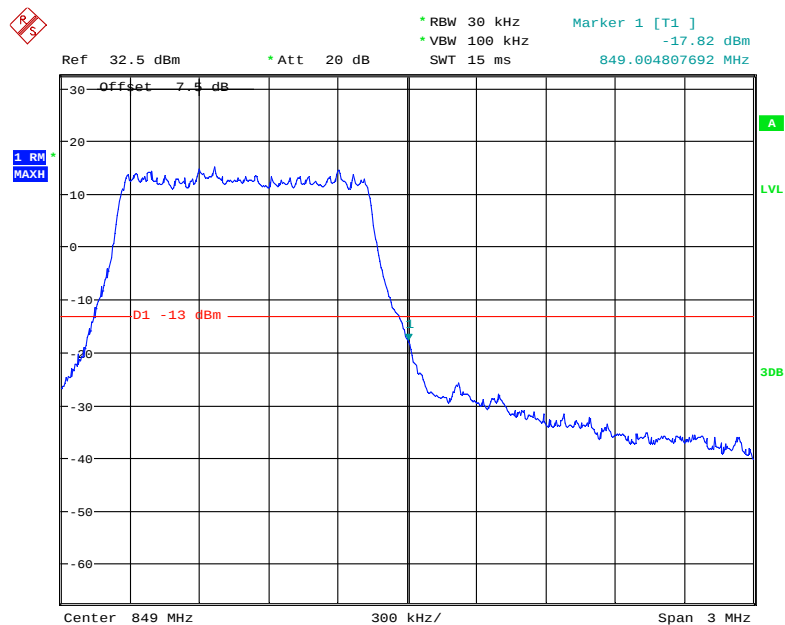
QPSK (1.4 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 19:03:53

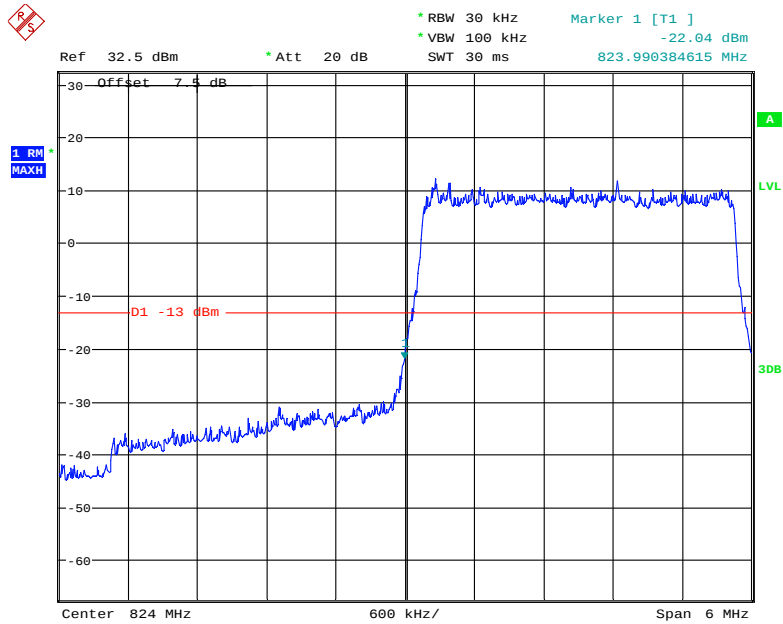
16-QAM 1.4 MHz, FULL RB) - Left Band Edge

Date: 11.JAN.2019 19:00:28

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

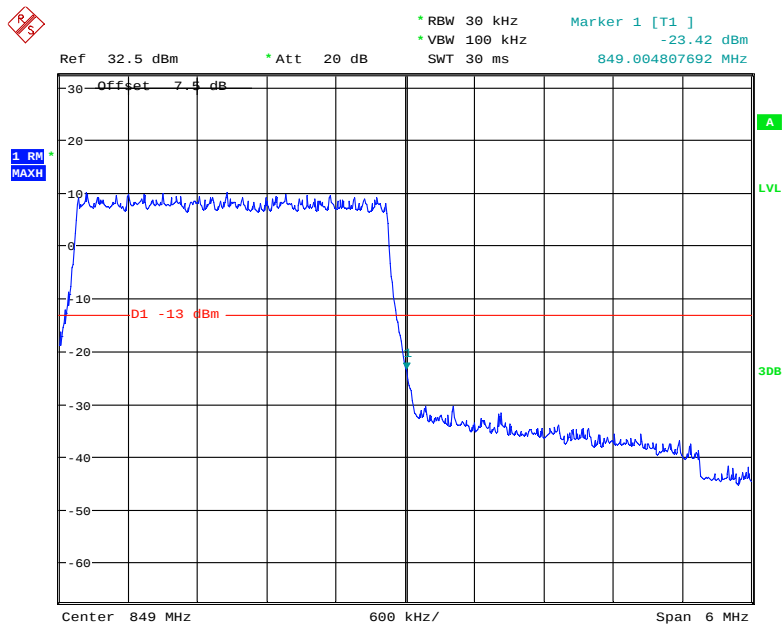
Date: 11.JAN.2019 19:02:05

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



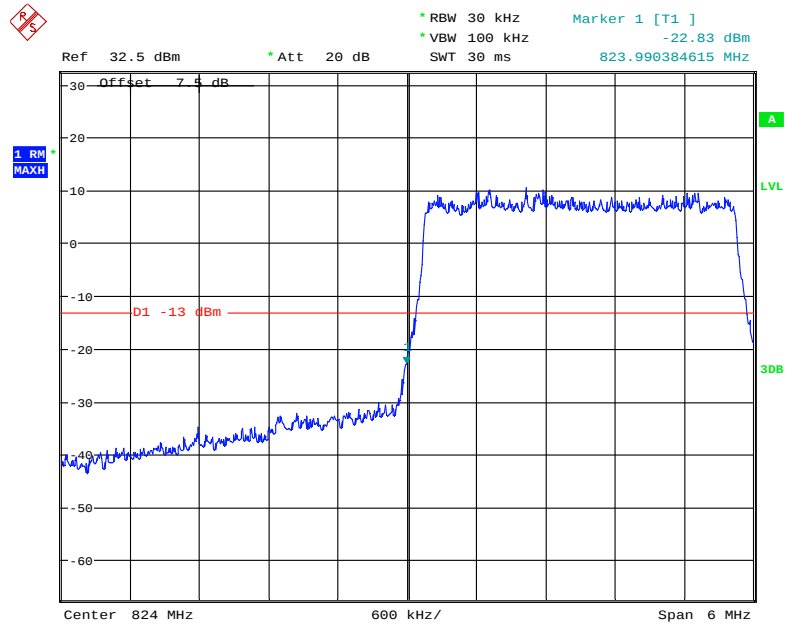
Date: 11.JAN.2019 19:10:31

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



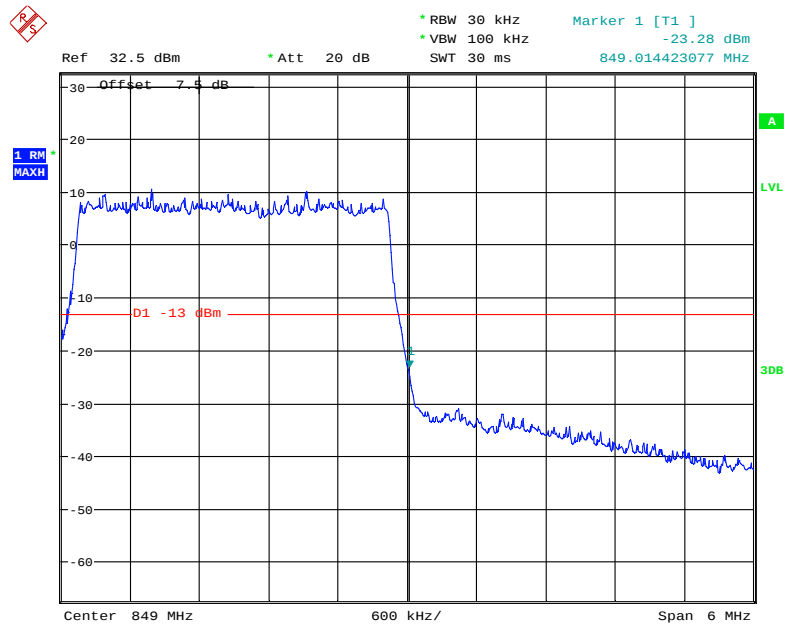
Date: 11.JAN.2019 19:05:04

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



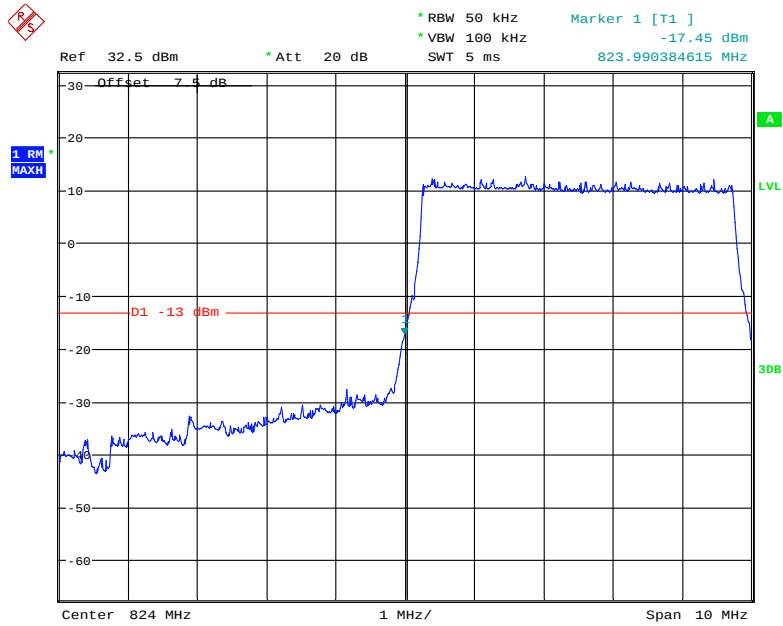
Date: 11.JAN.2019 19:09:15

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



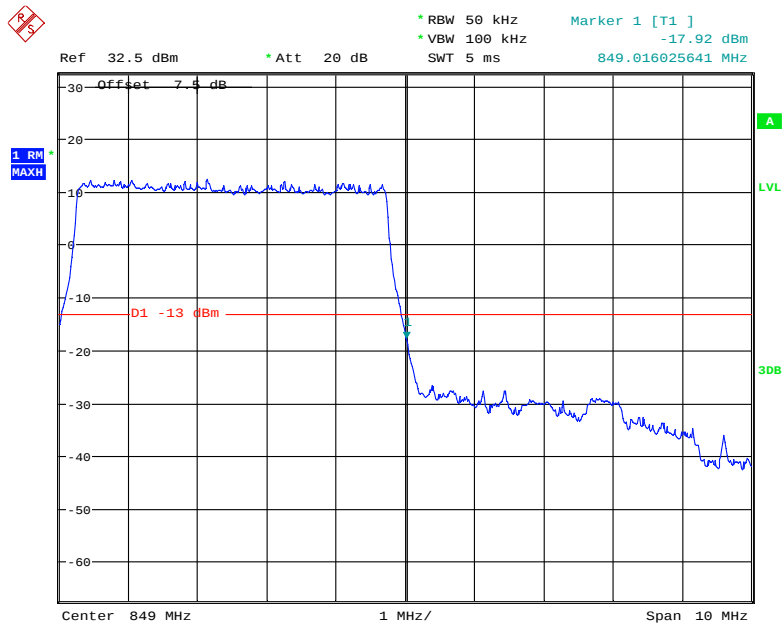
Date: 11.JAN.2019 19:07:32

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



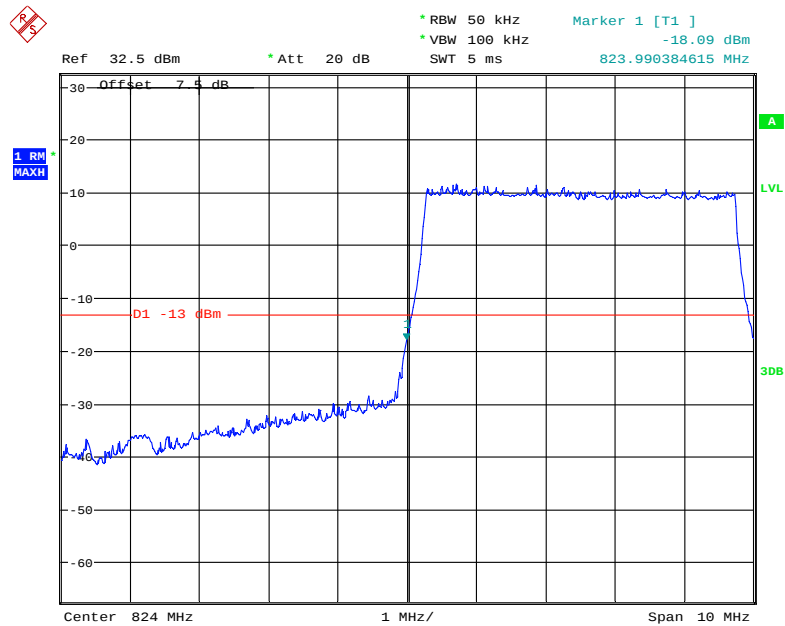
Date: 11.JAN.2019 19:11:42

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



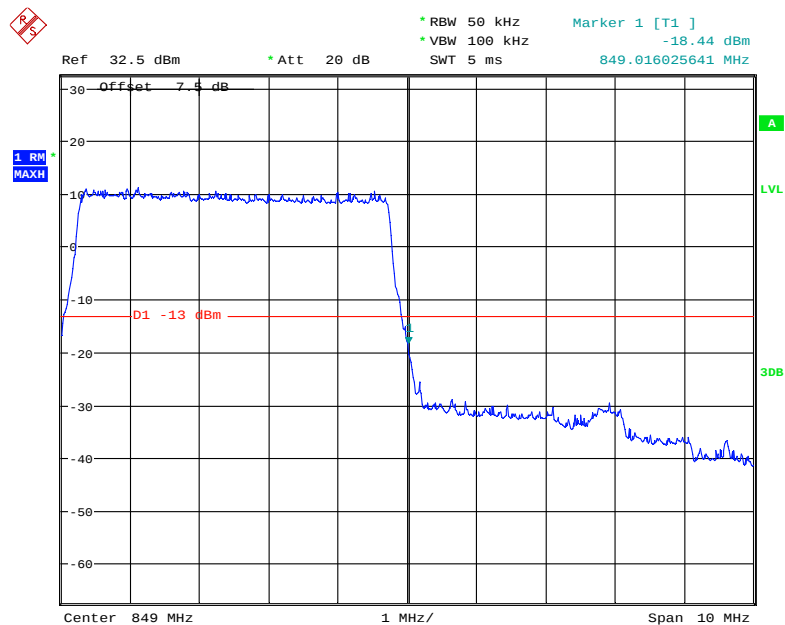
Date: 11.JAN.2019 19:18:11

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



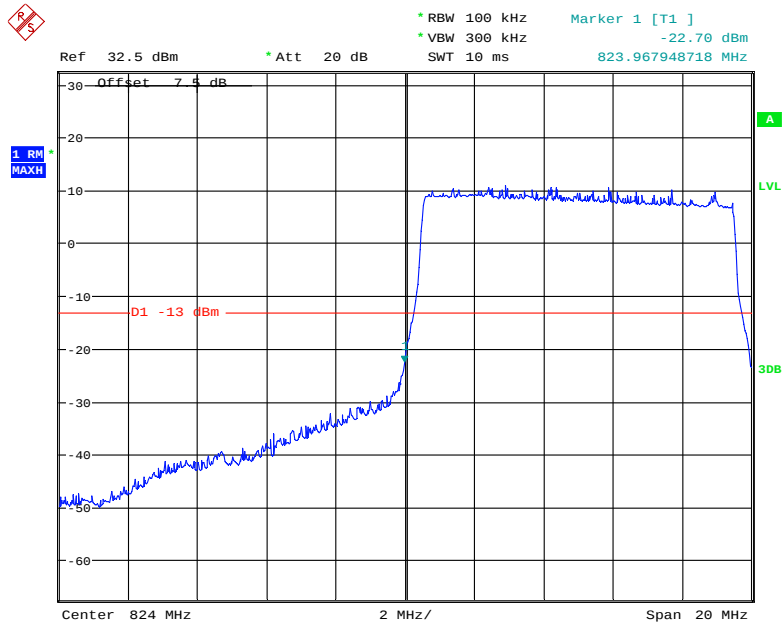
Date: 11.JAN.2019 19:12:48

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



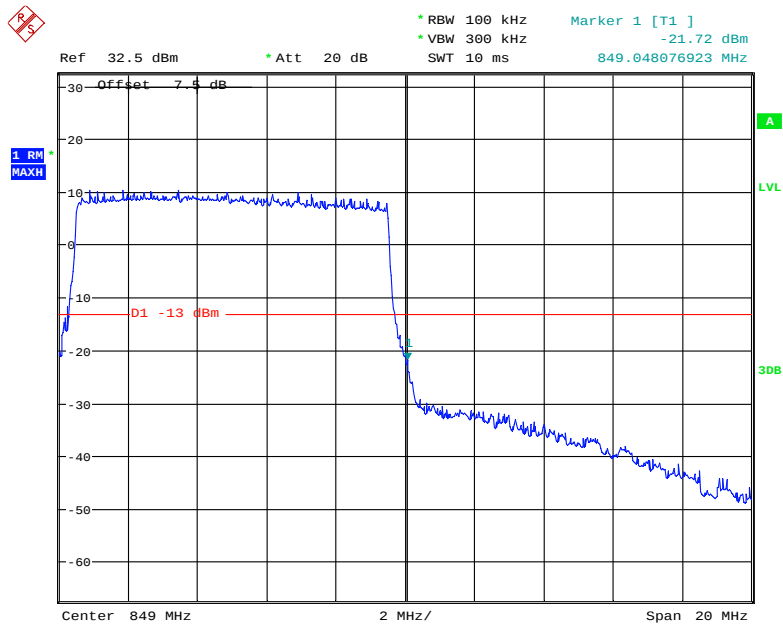
Date: 11.JAN.2019 19:14:02

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



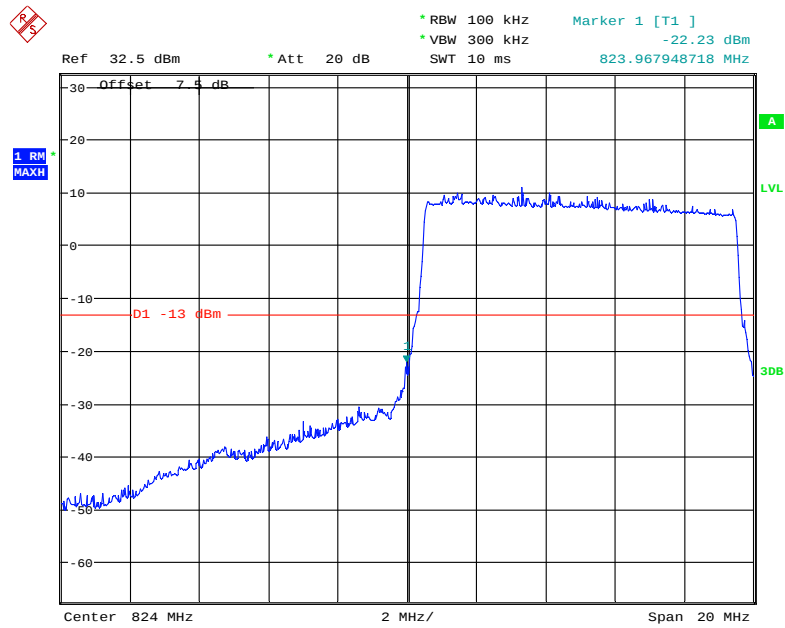
Date: 11.JAN.2019 19:23:12

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



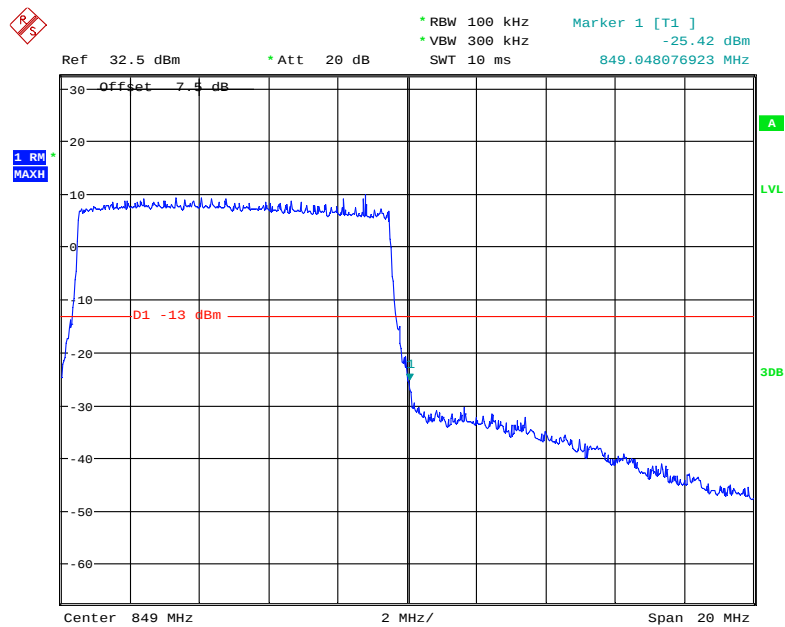
Date: 11.JAN.2019 19:19:58

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

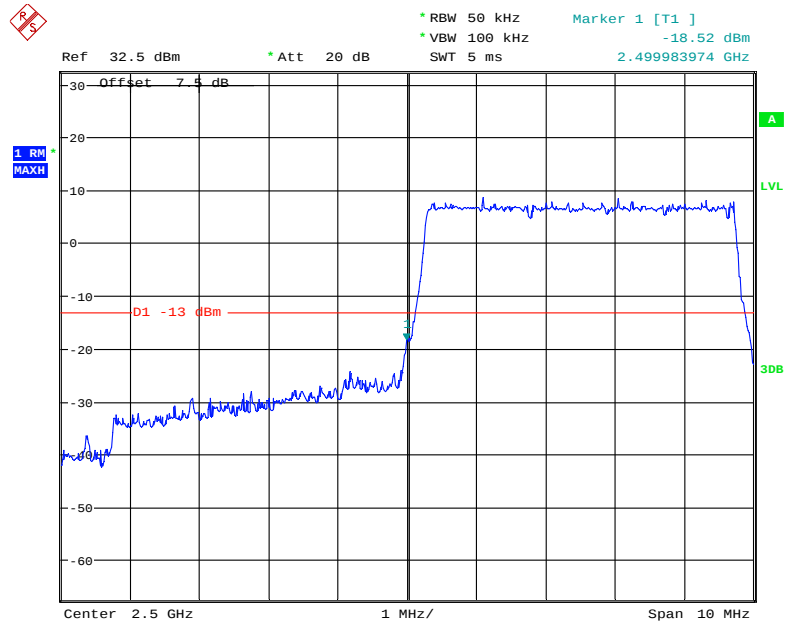


Date: 11.JAN.2019 19:22:06

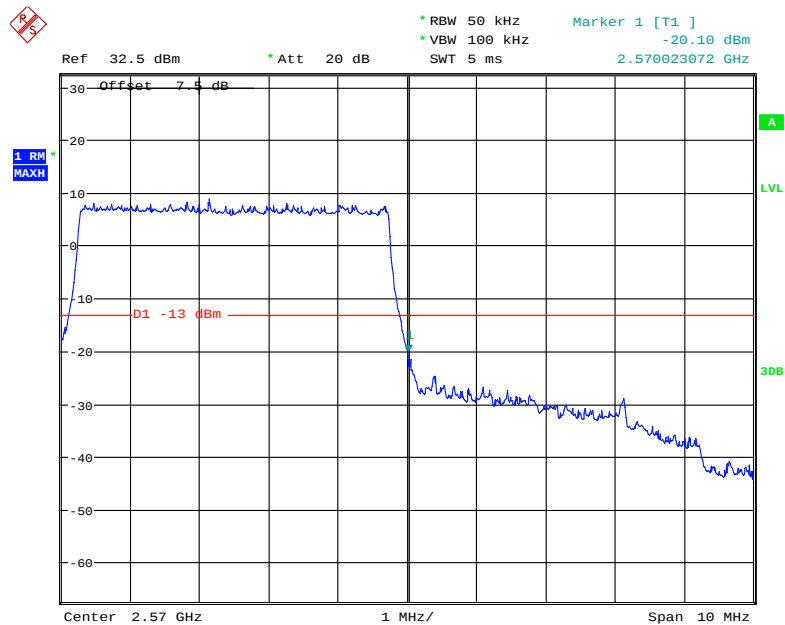
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 19:20:56

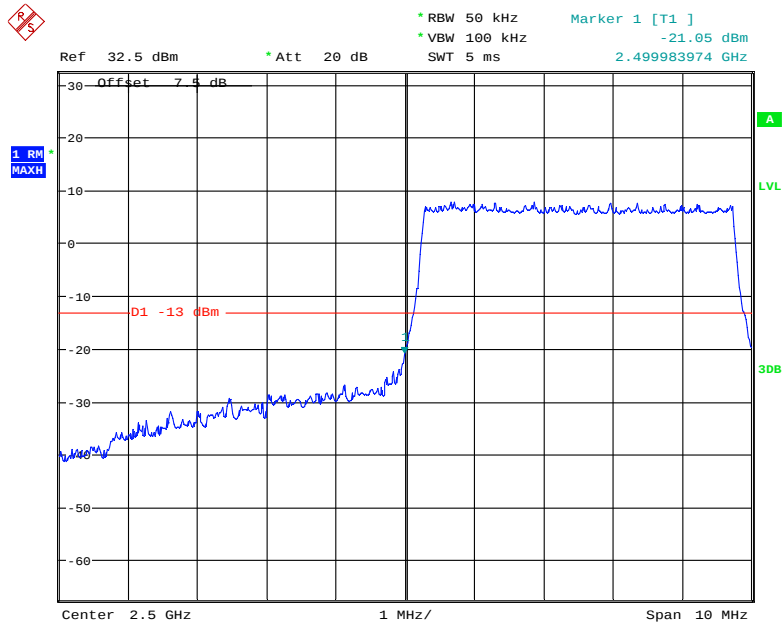
Band 7:**QPSK (5.0 MHz, FULL RB) - Left Band Edge**

Date: 11.JAN.2019 00:17:06

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

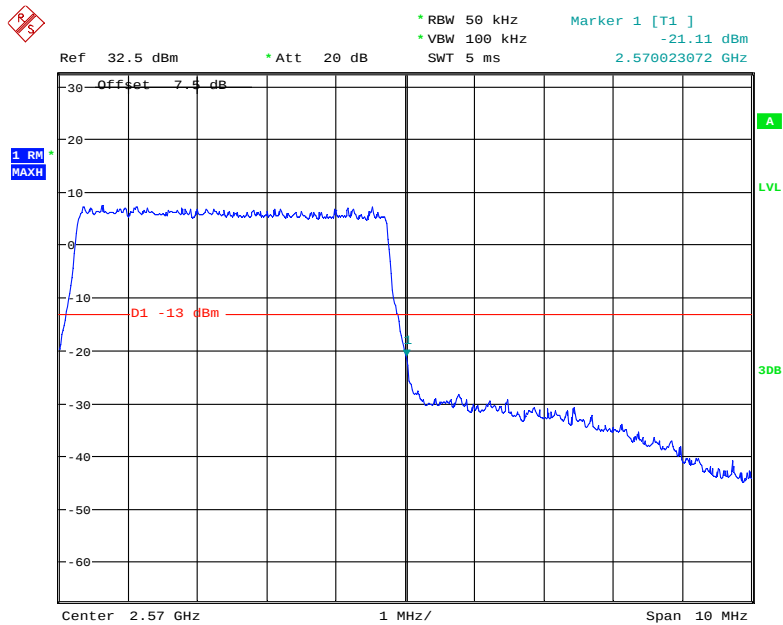
Date: 11.JAN.2019 00:19:25

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



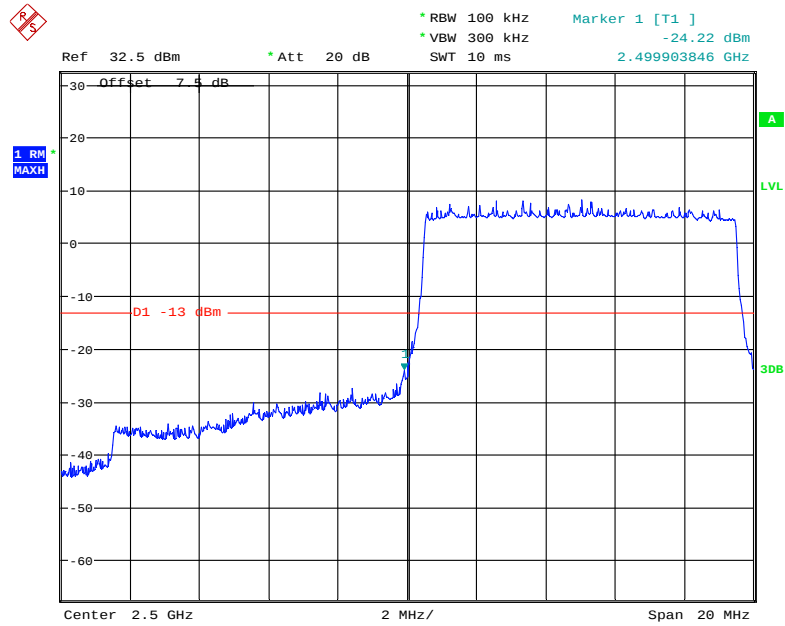
Date: 11.JAN.2019 00:14:47

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



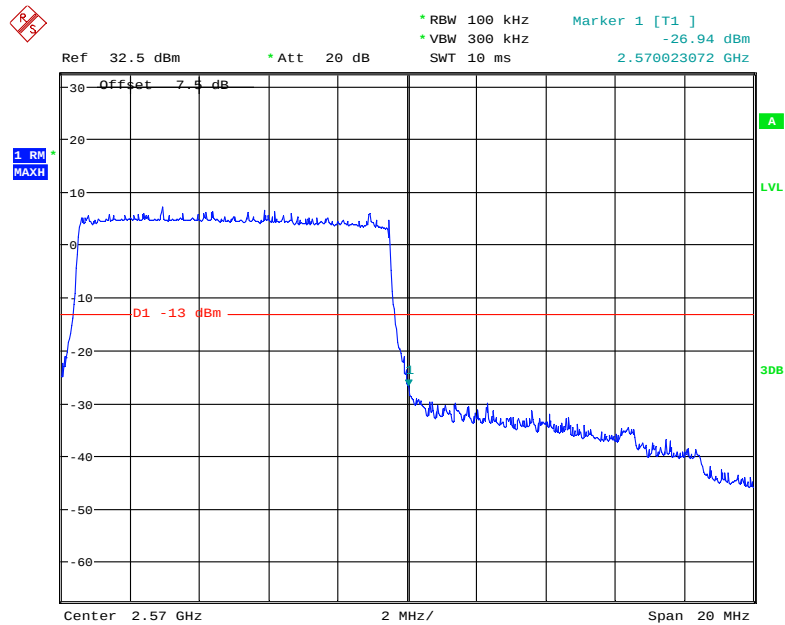
Date: 11.JAN.2019 00:23:05

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



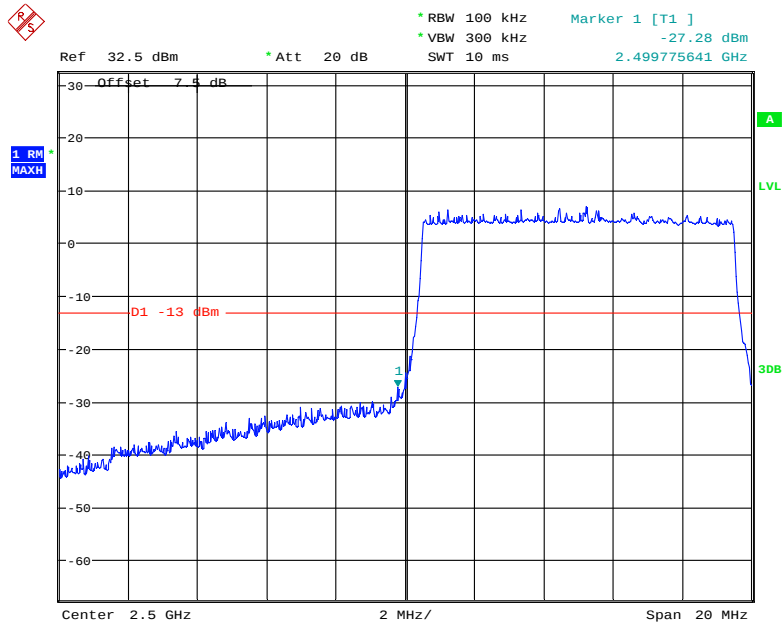
Date: 11.JAN.2019 00:28:03

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



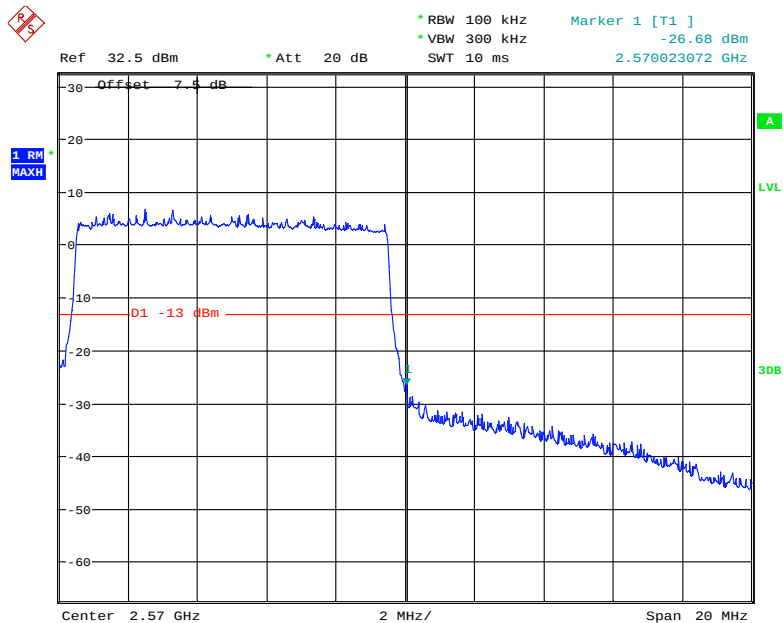
Date: 11.JAN.2019 00:25:58

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



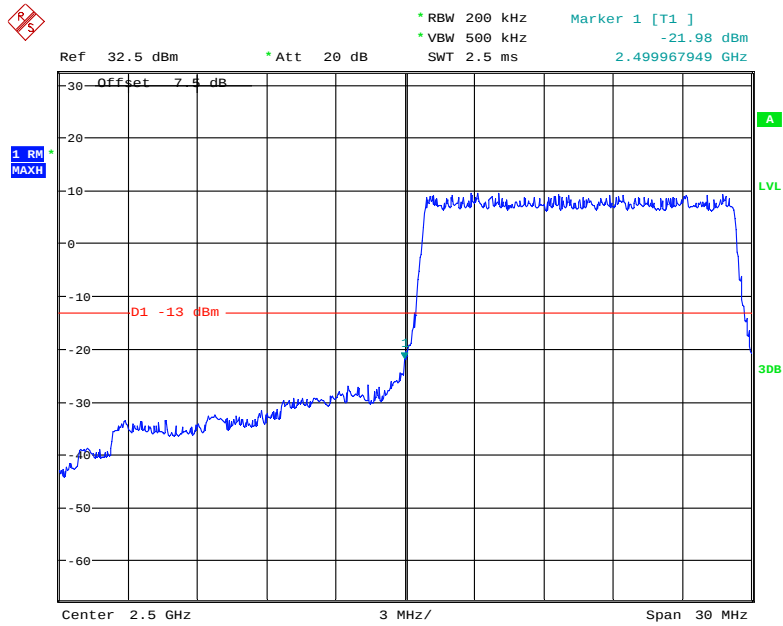
Date: 11.JAN.2019 00:29:59

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



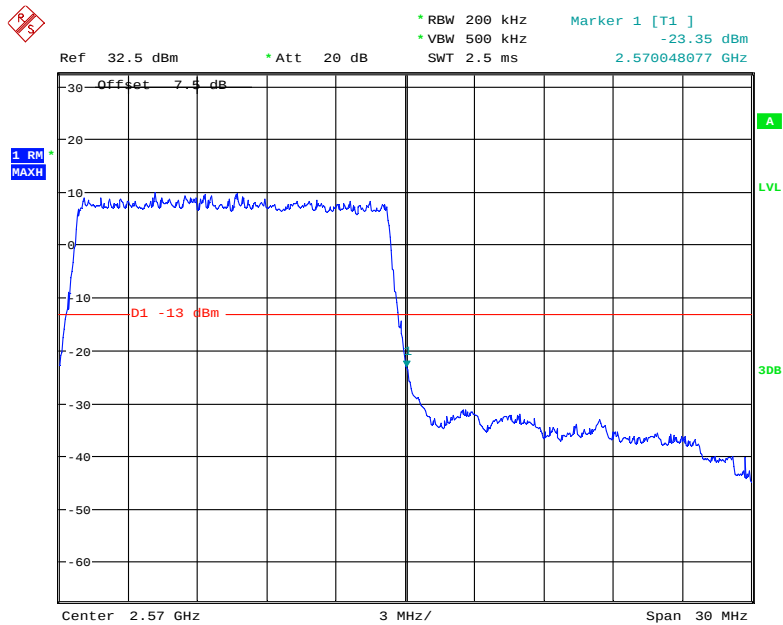
Date: 11.JAN.2019 00:24:55

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

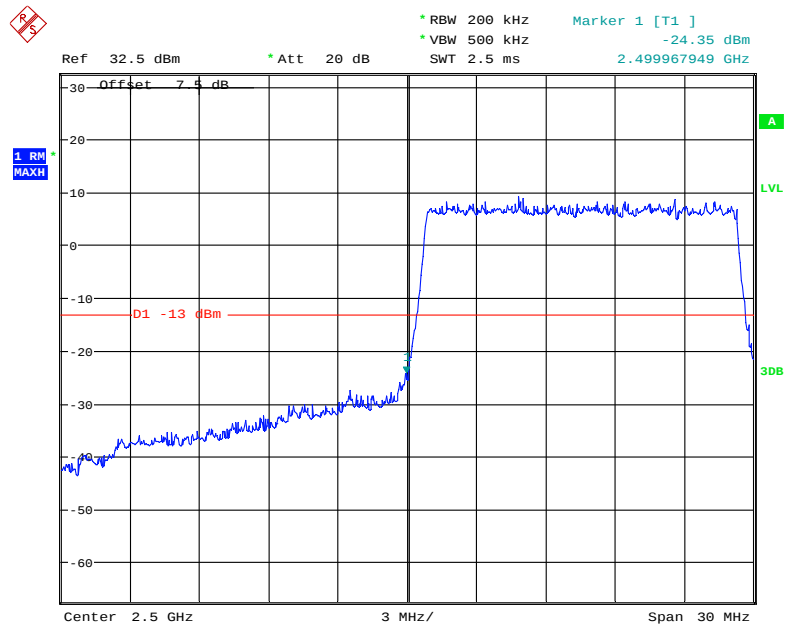


Date: 11.JAN.2019 00:32:17

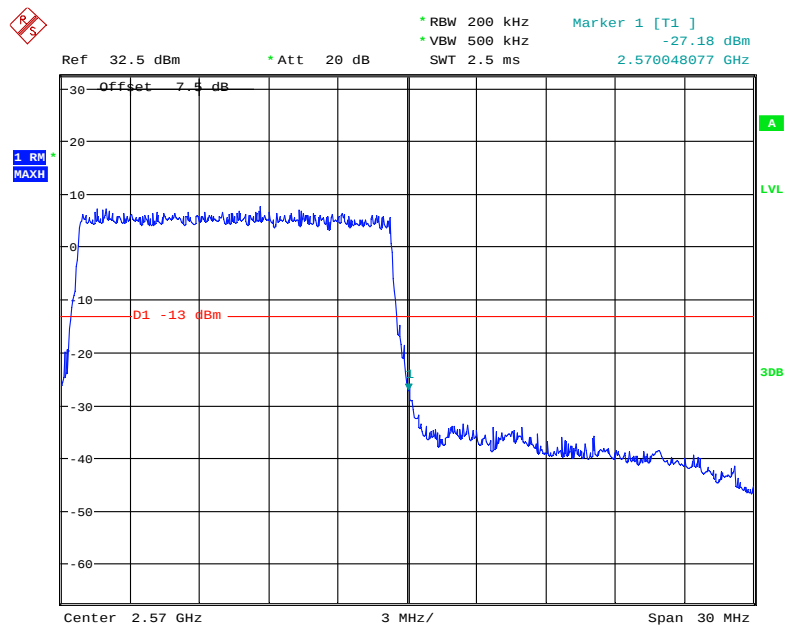
QPSK (15.0 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 00:36:49

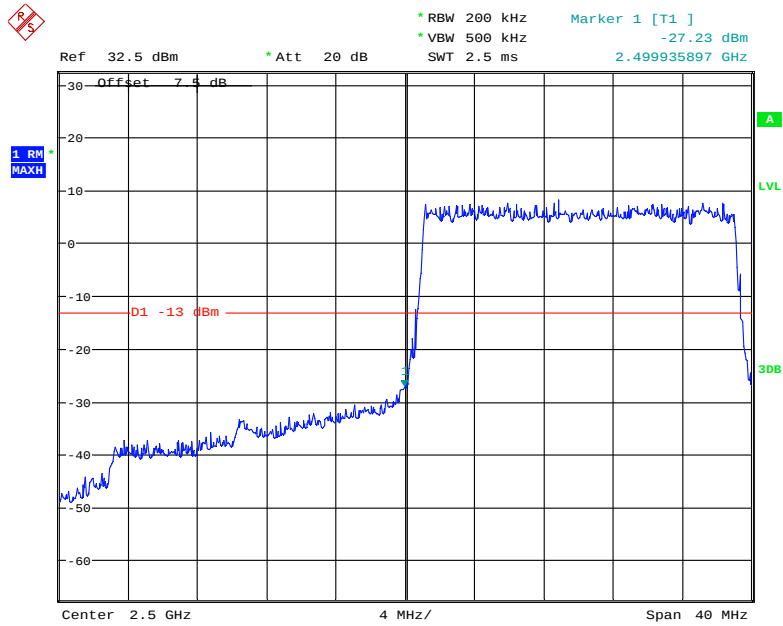
16-QAM (15.0 MHz, FULL RB) - Left Band Edge

Date: 11.JAN.2019 00:31:24

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

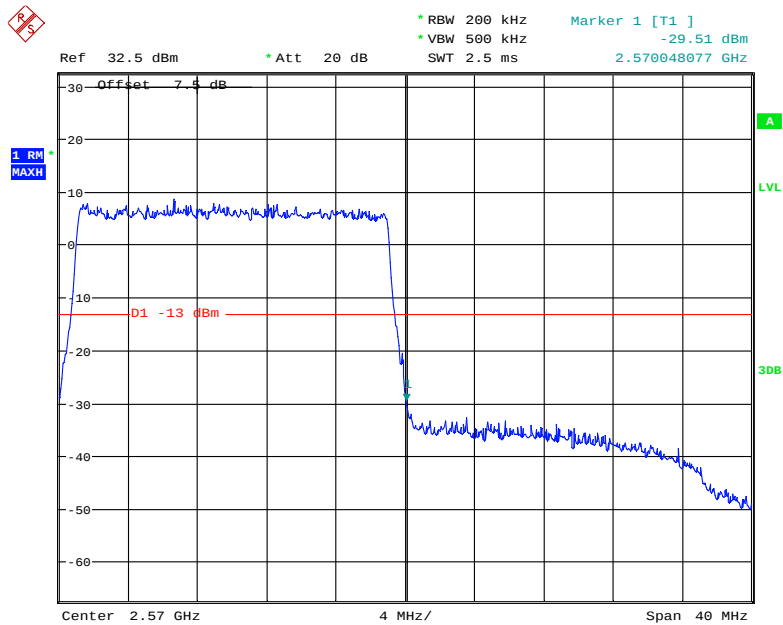
Date: 11.JAN.2019 00:39:28

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

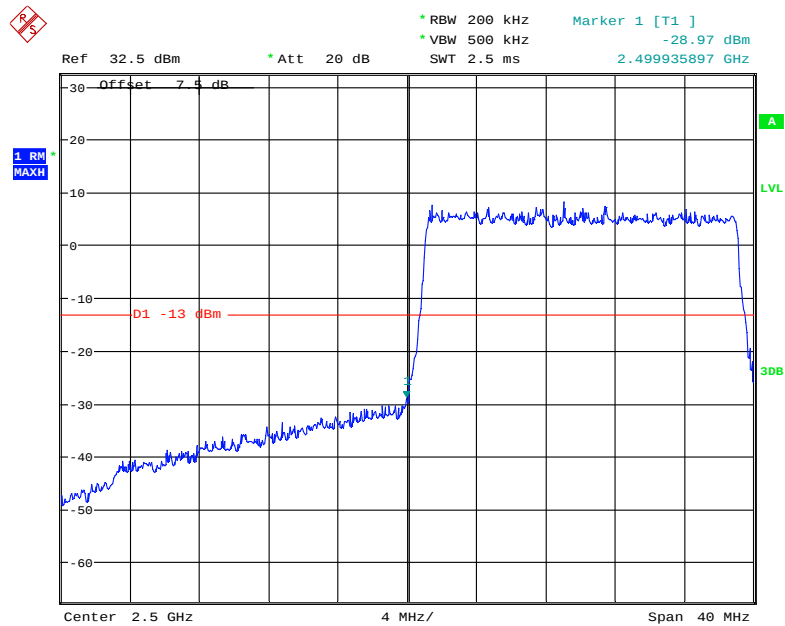


Date: 11.JAN.2019 00:45:23

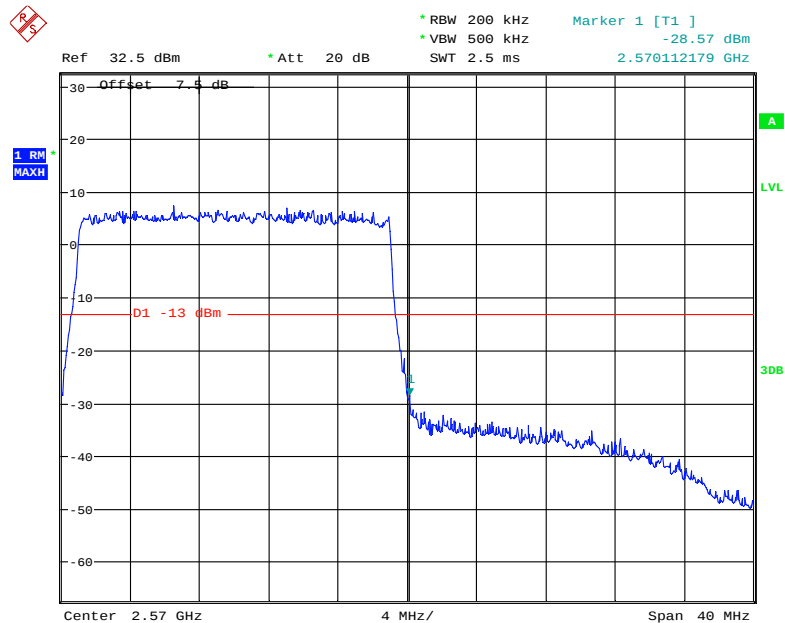
QPSK (20.0 MHz, FULL RB) - Right Band Edge



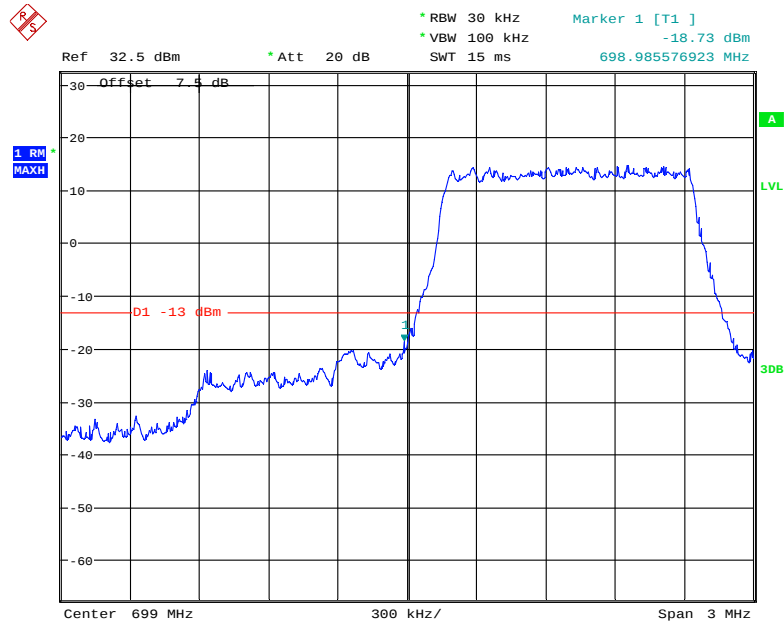
Date: 11.JAN.2019 00:44:44

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

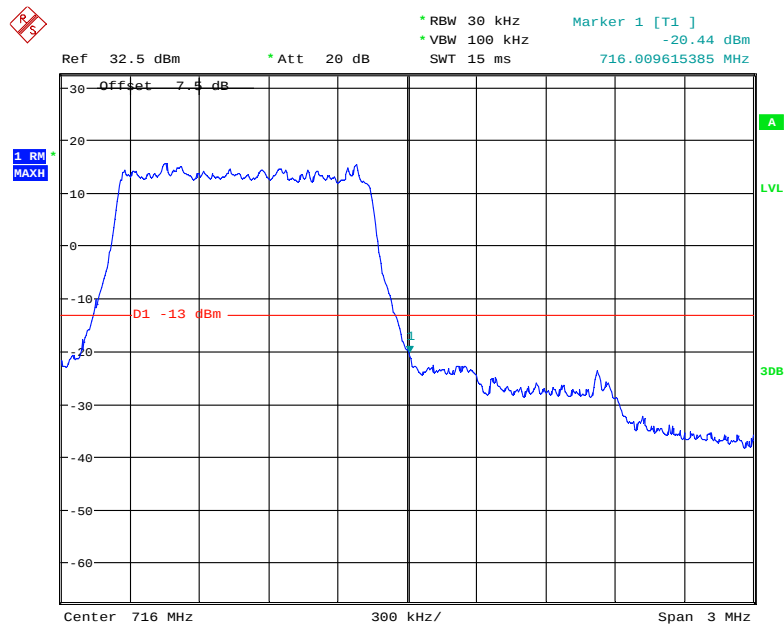
Date: 11.JAN.2019 00:46:32

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

Date: 11.JAN.2019 00:42:44

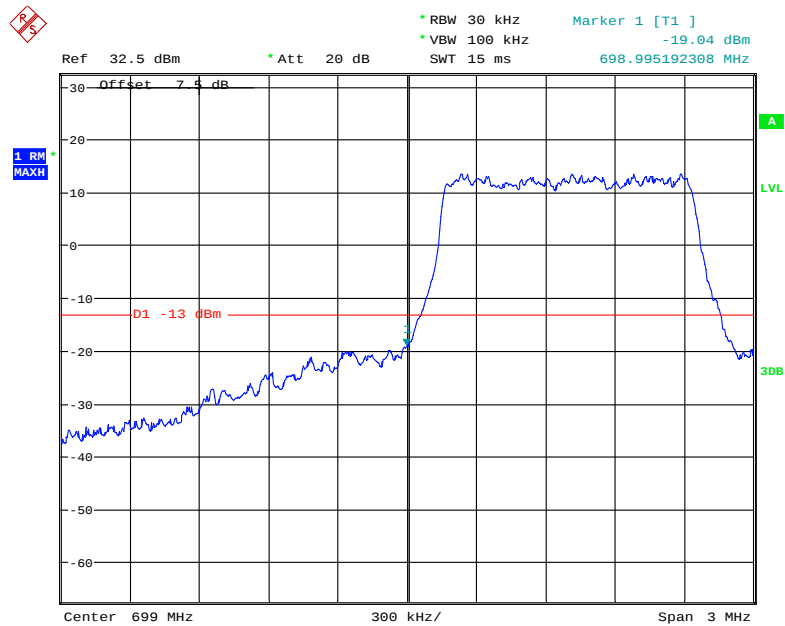
Band 12:**QPSK (1.4 MHz, FULL RB) - Left Band Edge**

Date: 10.JAN.2019 23:39:22

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

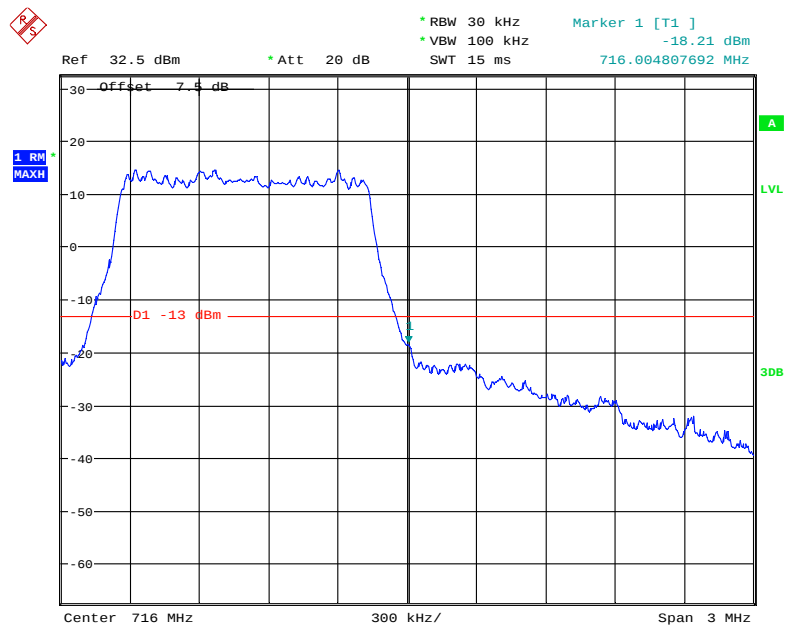
Date: 10.JAN.2019 23:47:17

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



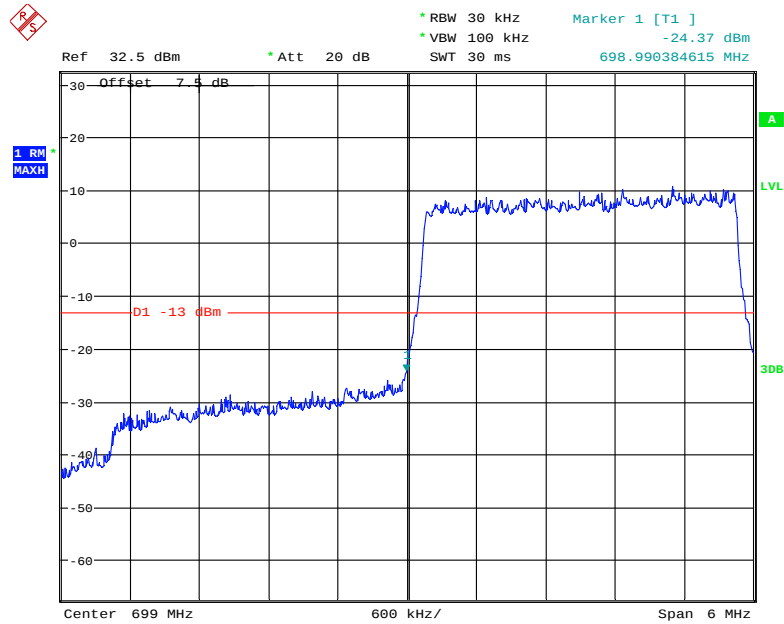
Date: 10.JAN.2019 23:42:10

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



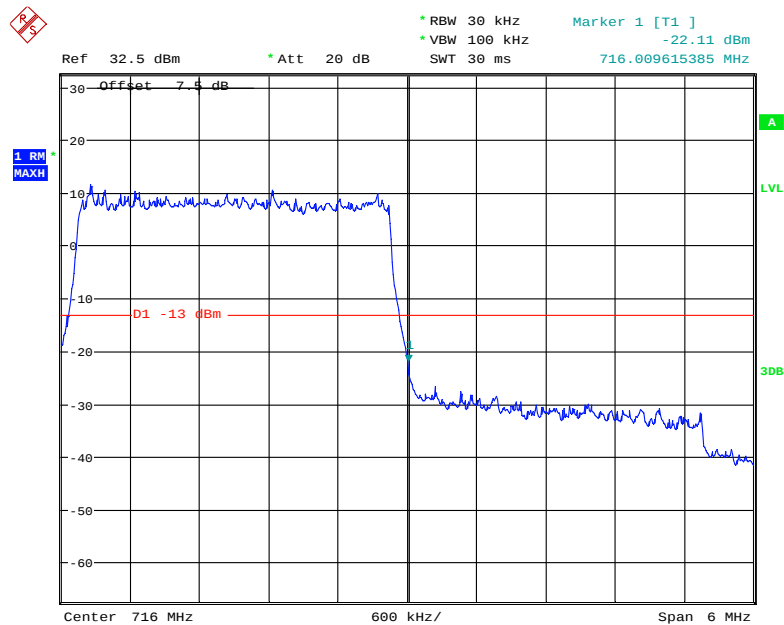
Date: 10.JAN.2019 23:44:07

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



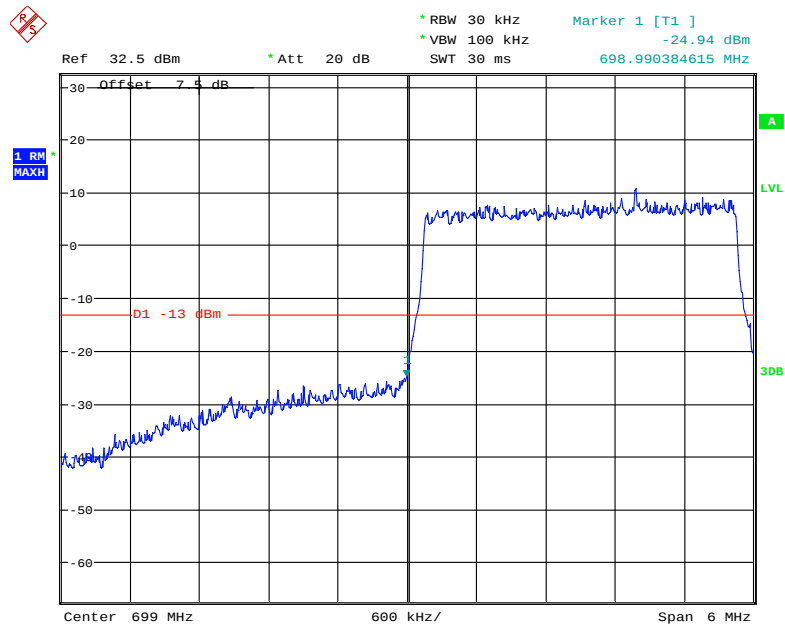
Date: 10.JAN.2019 23:56:17

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



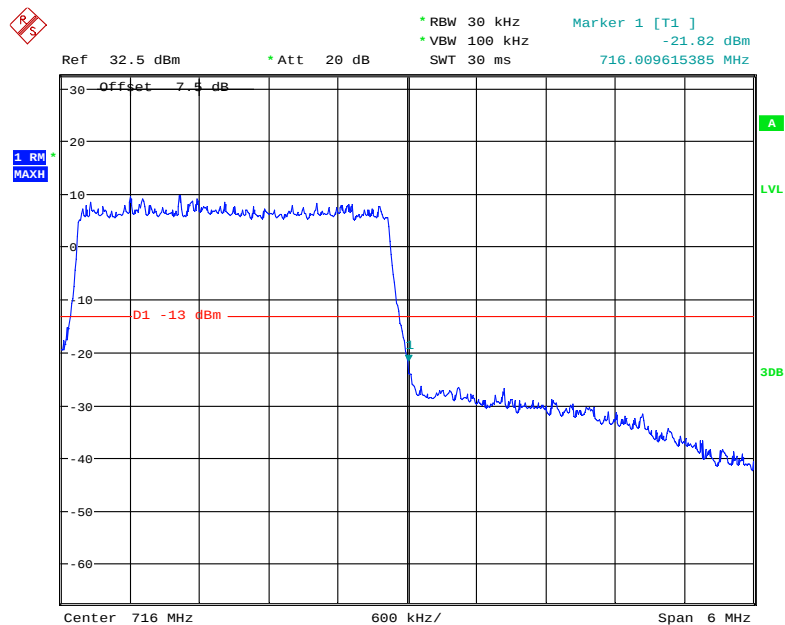
Date: 10.JAN.2019 23:48:32

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



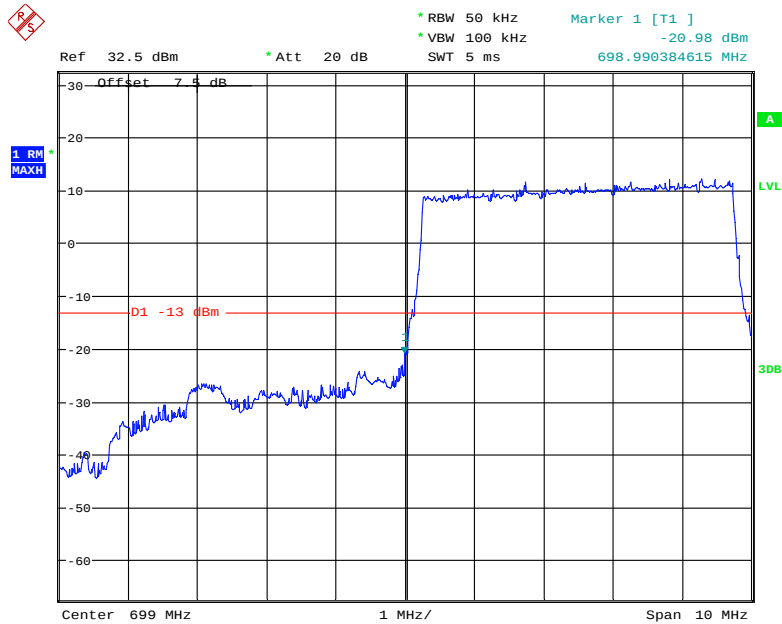
Date: 10.JAN.2019 23:52:38

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



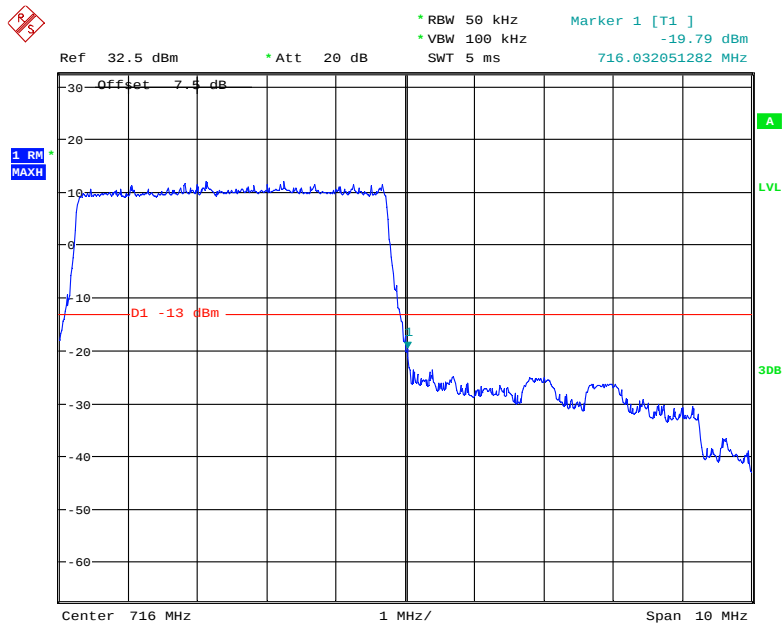
Date: 10.JAN.2019 23:51:52

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



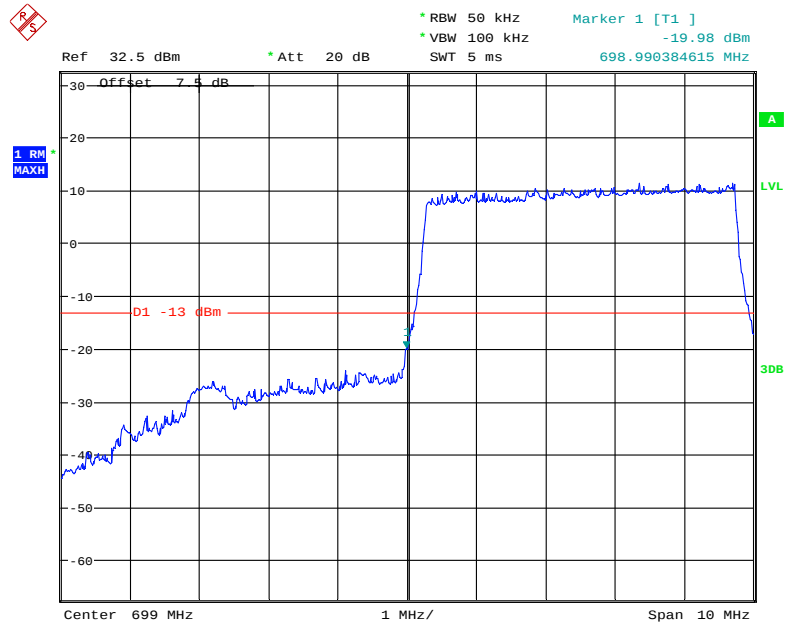
Date: 10.JAN.2019 23:59:30

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



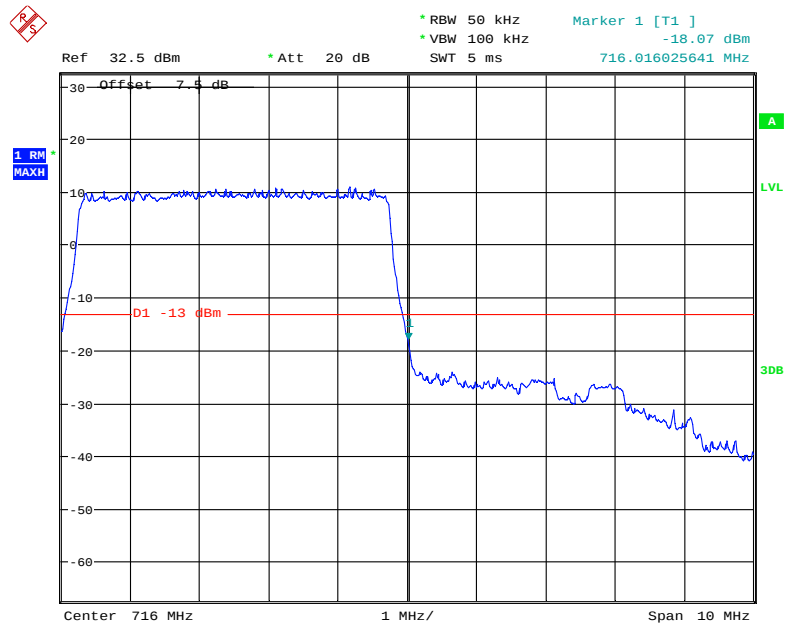
Date: 11.JAN.2019 00:00:12

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



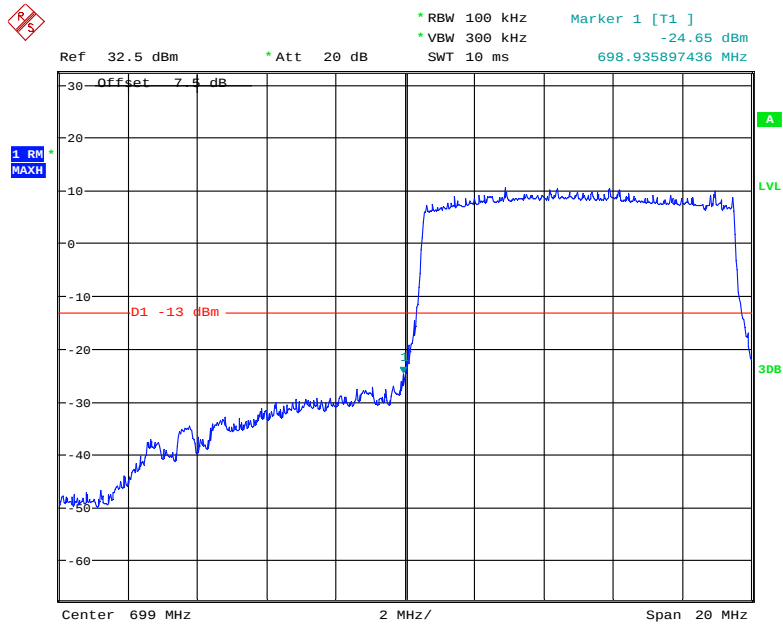
Date: 10.JAN.2019 23:58:04

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



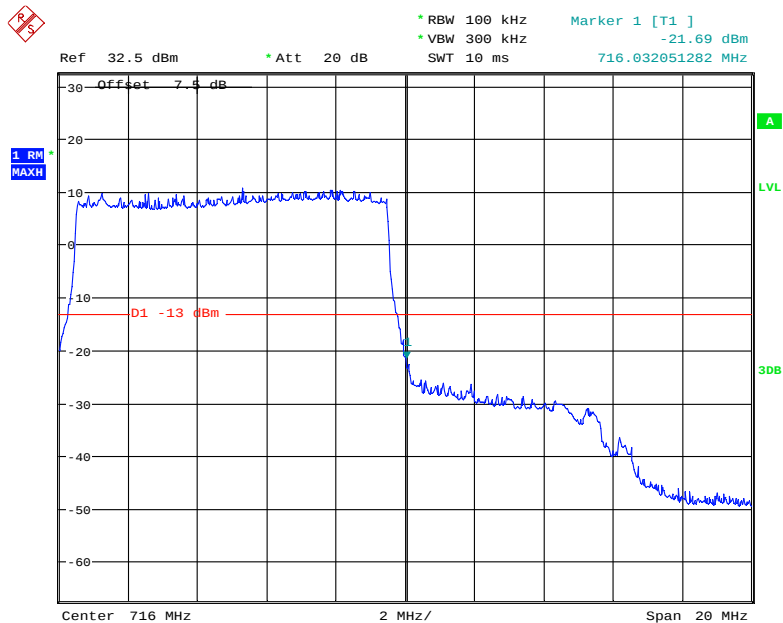
Date: 11.JAN.2019 00:02:01

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



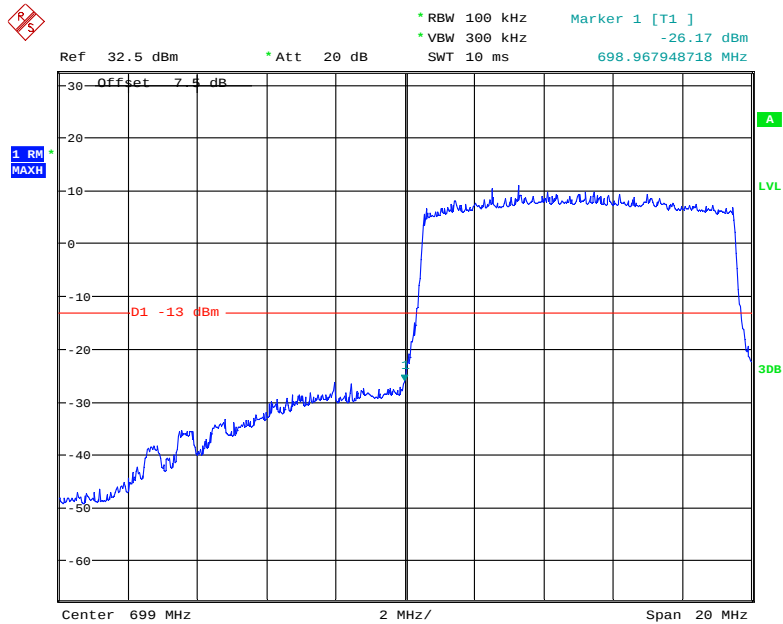
Date: 11.JAN.2019 00:08:36

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



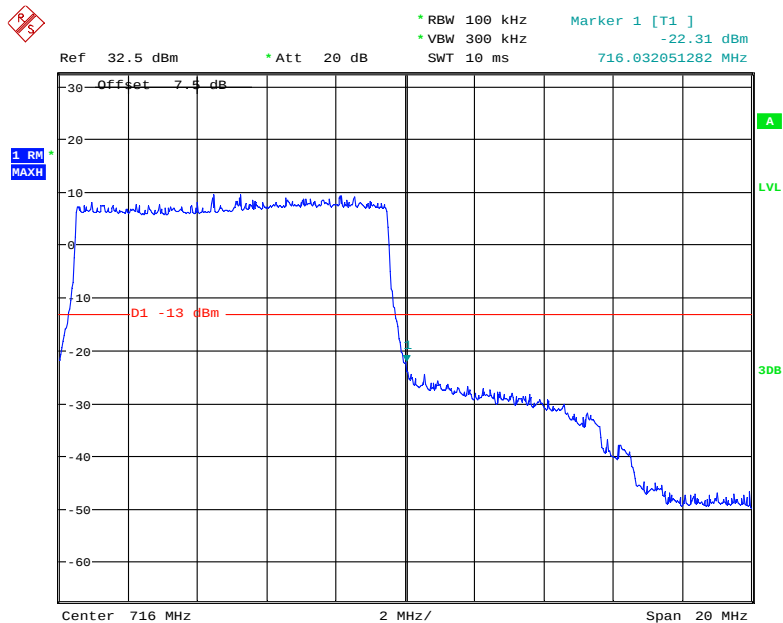
Date: 11.JAN.2019 00:10:32

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



Date: 11.JAN.2019 00:05:42

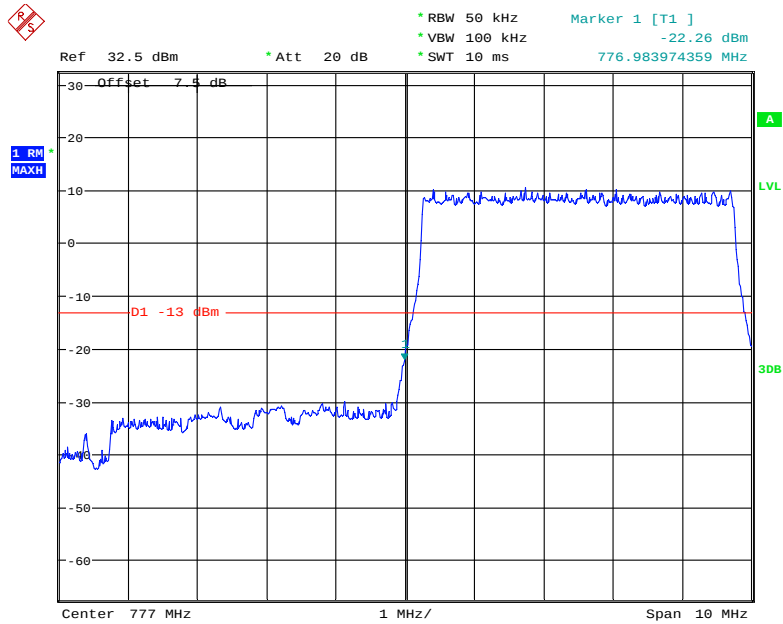
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 11.JAN.2019 00:11:50

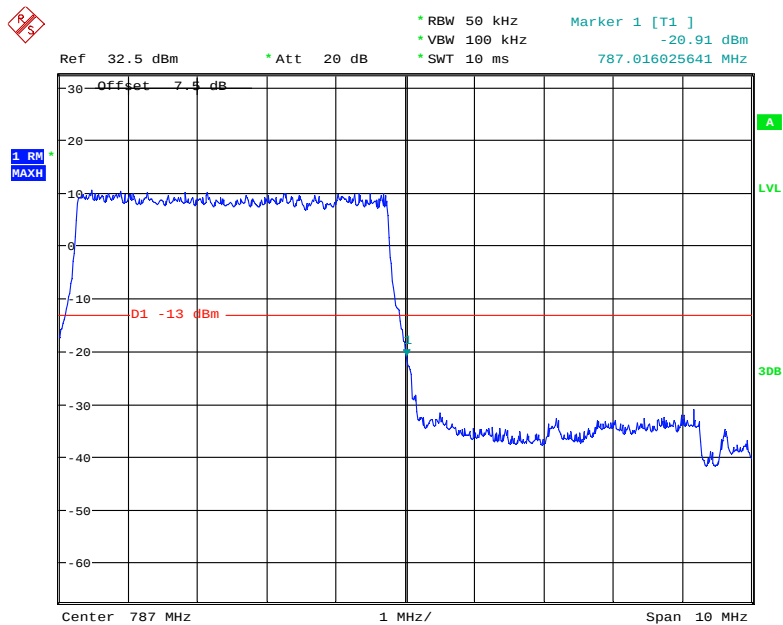
Band 13:

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



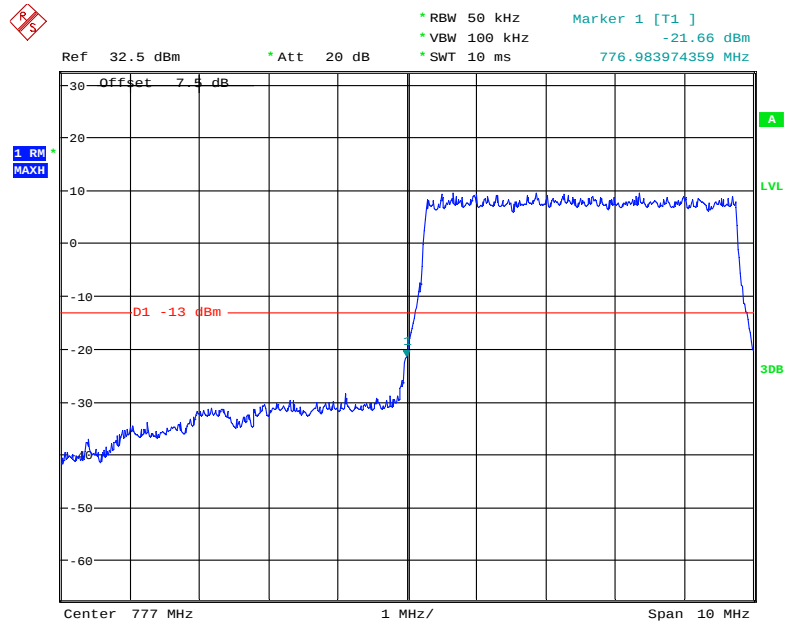
Date: 10.JAN.2019 23:29:08

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



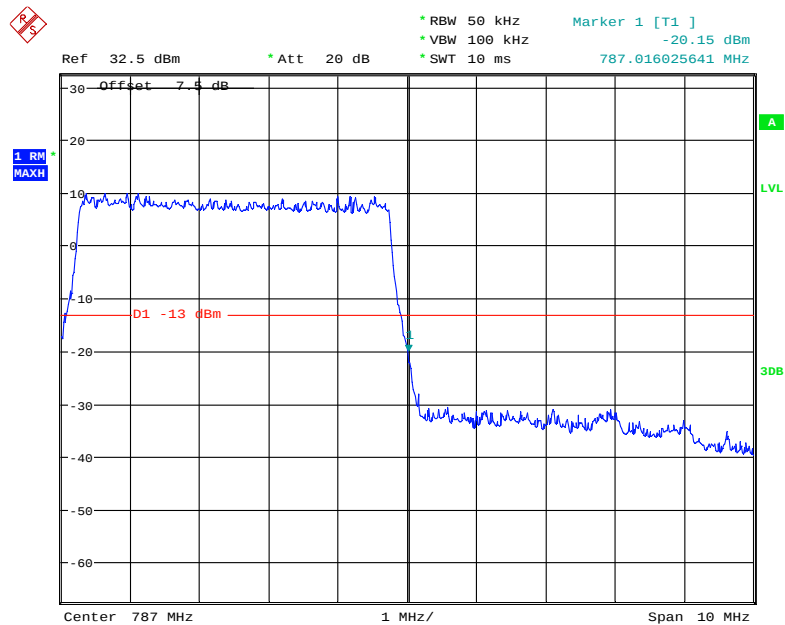
Date: 10.JAN.2019 23:30:17

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



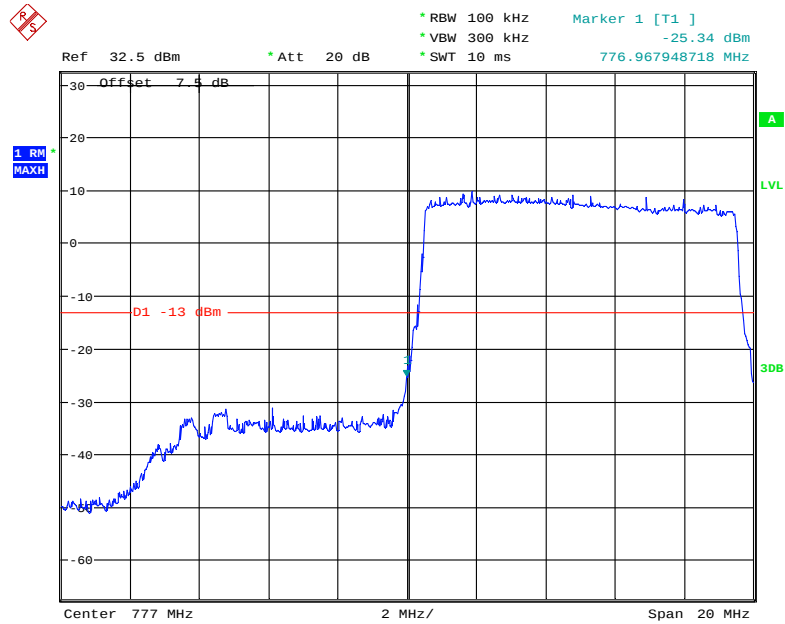
Date: 10.JAN.2019 23:28:22

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



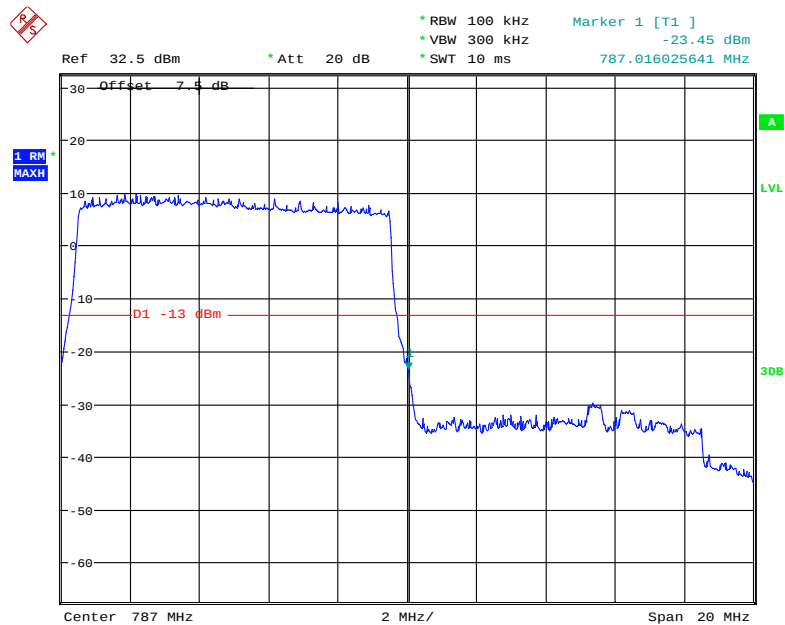
Date: 10.JAN.2019 23:32:22

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



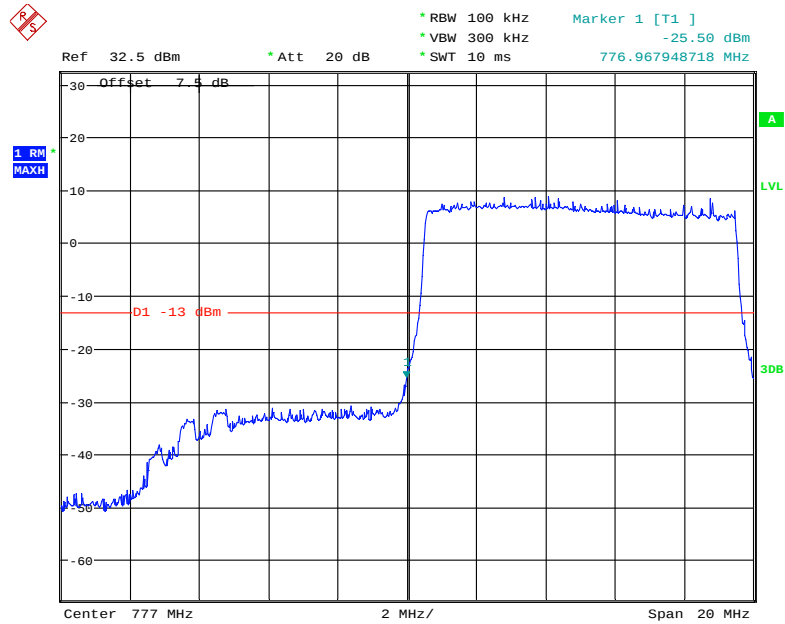
Date: 10.JAN.2019 23:36:58

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



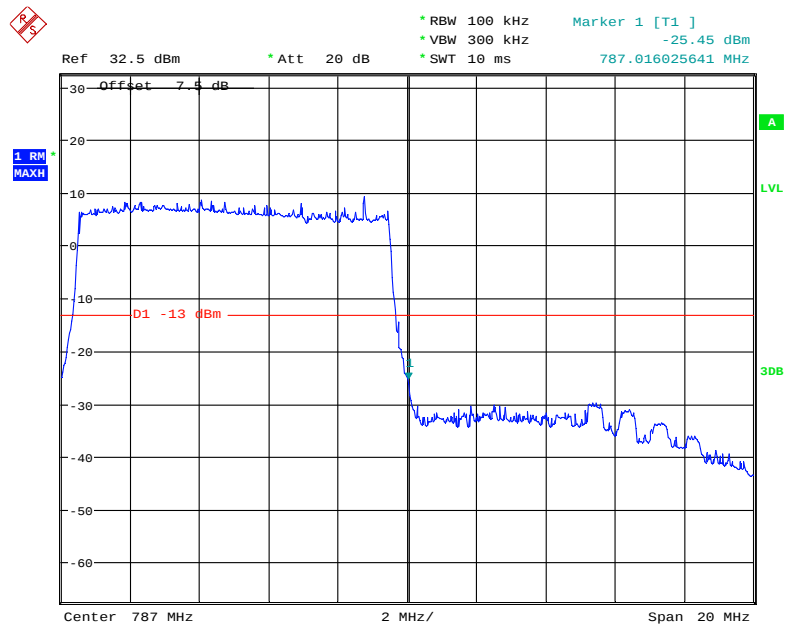
Date: 10.JAN.2019 23:35:32

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



Date: 10.JAN.2019 23:37:47

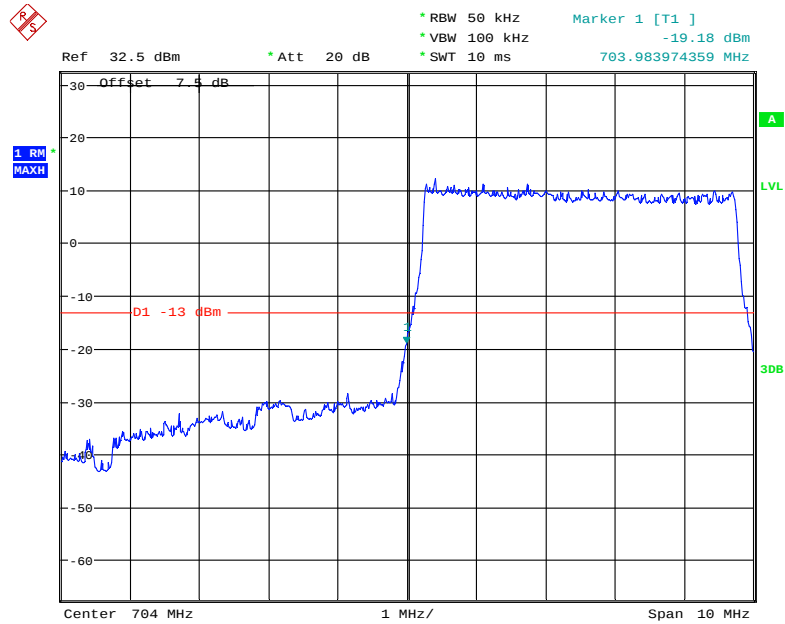
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 10.JAN.2019 23:33:38

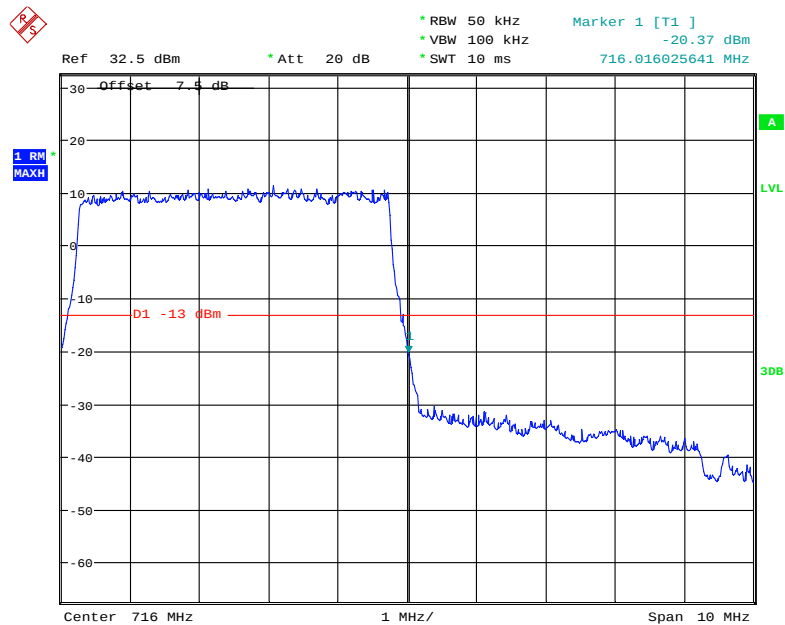
Band 17:

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



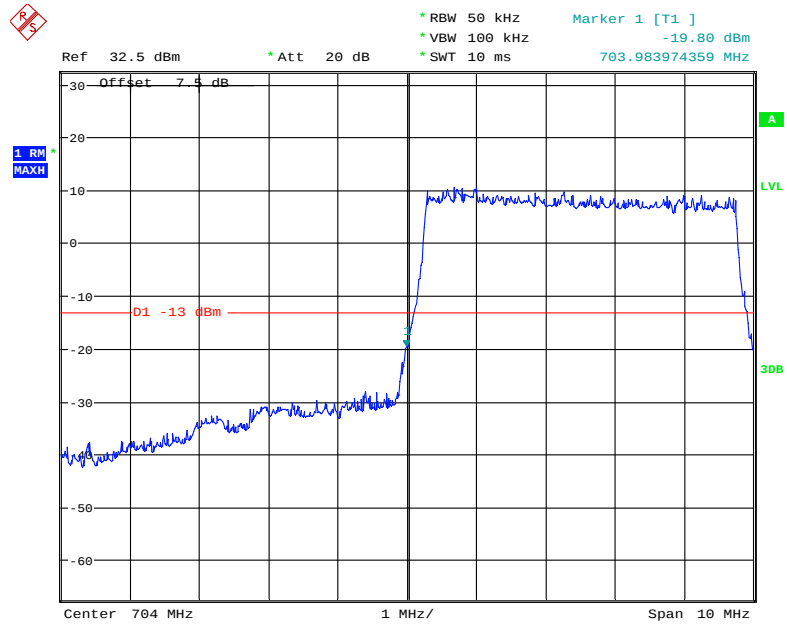
Date: 10.JAN.2019 23:23:40

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



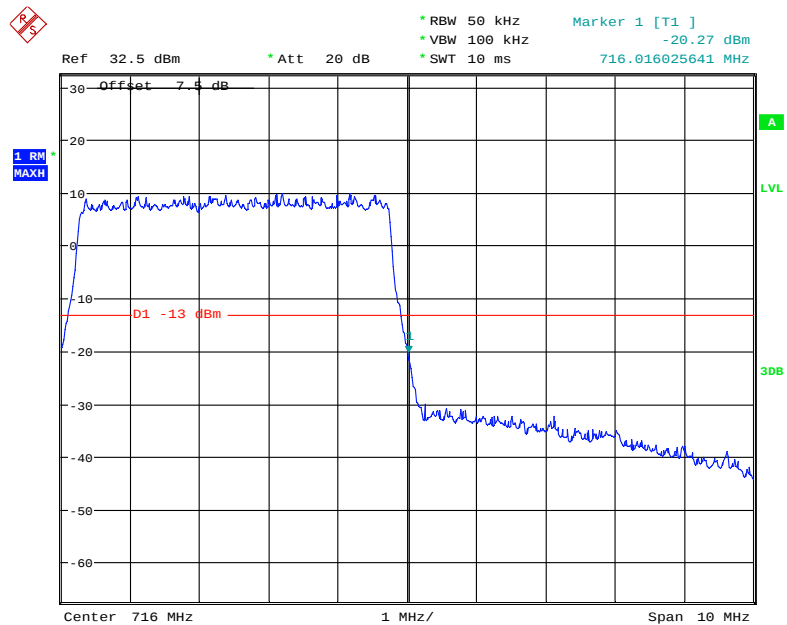
Date: 10.JAN.2019 23:24:47

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



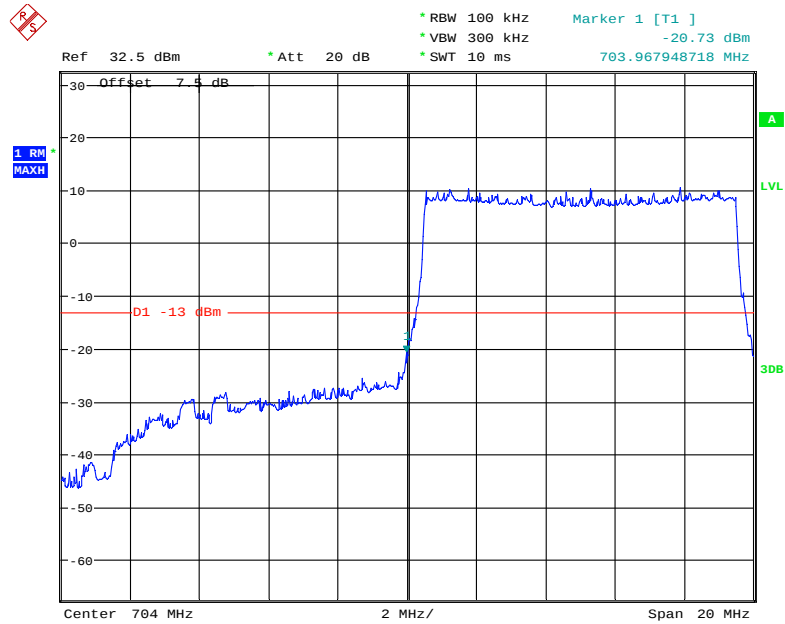
Date: 10.JAN.2019 23:22:06

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



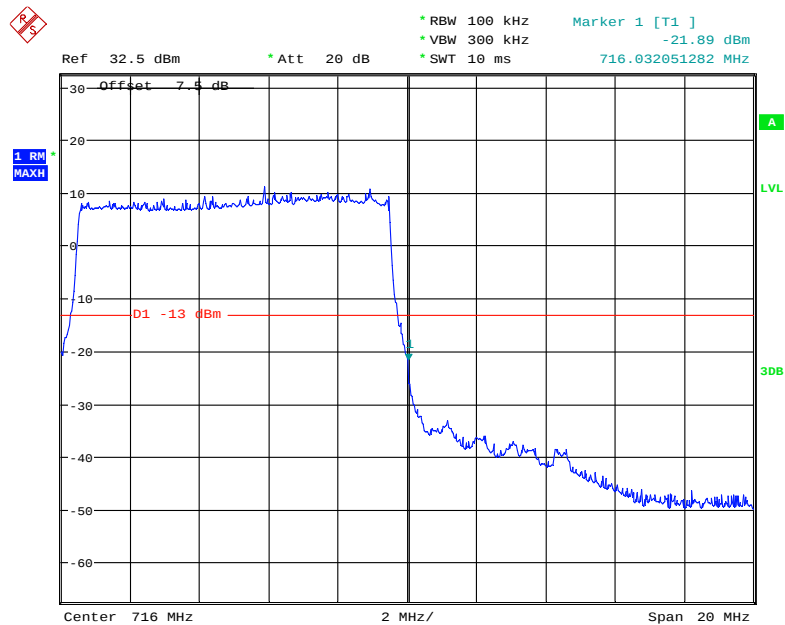
Date: 10.JAN.2019 23:25:35

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

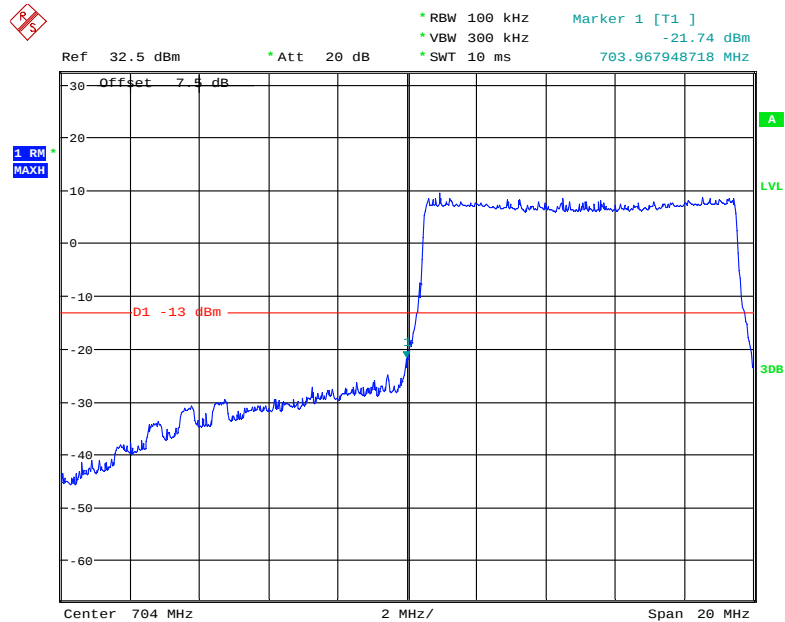


Date: 10.JAN.2019 23:19:49

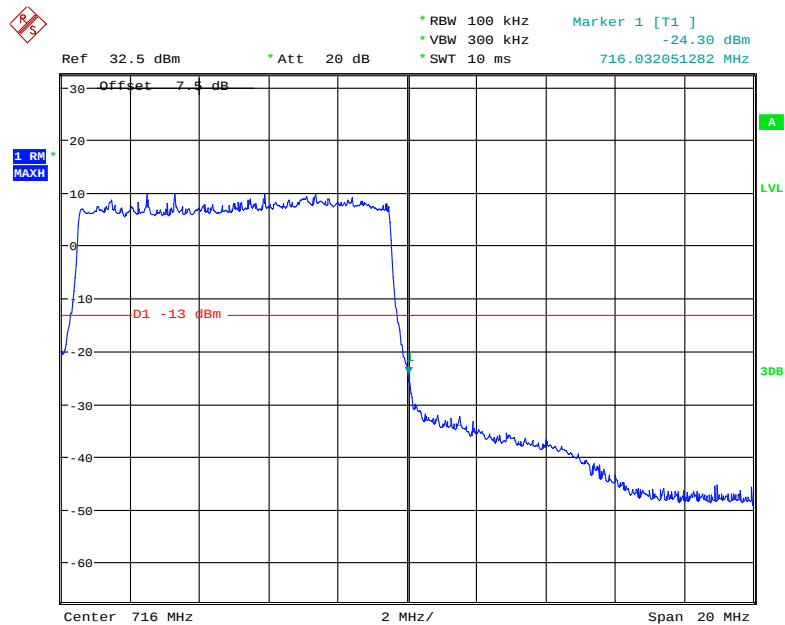
QPSK (10.0 MHz, FULL RB) - Right Band Edge



Date: 10.JAN.2019 23:18:02

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

Date: 10.JAN.2019 23:21:07

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

Date: 10.JAN.2019 23:16:38

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

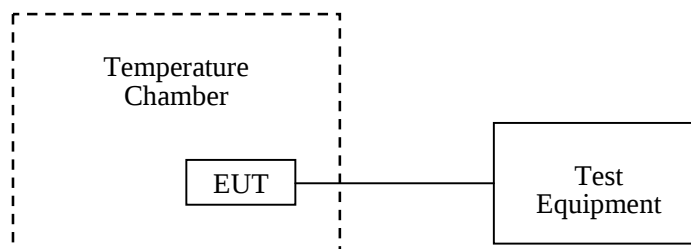
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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:	25 °C
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Shawn Xiao on 2019-01-18.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)**WCDMA Mode**

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-2	-0.0024	2.5
-20		-1	-0.0012	2.5
-10		0	0.0000	2.5
0		-1	-0.0012	2.5
10		-2	-0.0024	2.5
20		0	0.0000	2.5
30		-2	-0.0024	2.5
40		1	0.0012	2.5
50		1	0.0012	2.5
20	V min.= 3.5	-2	-0.0024	2.5
	V max.= 4.35	-2	-0.0024	2.5

PCS Band (Part 24E)**WCDMA Mode**

Middle Channel, $f_o = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-3	-0.0016	pass
-20		-1	-0.0005	pass
-10		-2	-0.0011	pass
0		-1	-0.0005	pass
10		2	0.0011	pass
20		0	0.0000	pass
30		1	0.0005	pass
40		-2	-0.0011	pass
50		-1	-0.0005	pass
20	V min.= 3.5	-3	-0.0016	pass
	V max.= 4.35	-2	-0.0011	pass

AWS Band (Part 27)

Temperature (°C)	Power Supplied (V_{DC})	F_L (MHz)	F_H (MHz)	F_L Limit (MHz)	F_H Limit (MHz)
-30	3.8	1710.4651	1754.4812	1710.0000	1755.0000
-20		1710.4562	1754.5051	1710.0000	1755.0000
-10		1710.4575	1754.4853	1710.0000	1755.0000
0		1710.4433	1754.4983	1710.0000	1755.0000
10		1710.4462	1754.4825	1710.0000	1755.0000
20		1710.4673	1754.4881	1710.0000	1755.0000
30		1710.4631	1754.4916	1710.0000	1755.0000
40		1710.4592	1754.5072	1710.0000	1755.0000
50		1710.4651	1754.4961	1710.0000	1755.0000
20	V min.= 3.5	1710.4533	1754.4852	1710.0000	1755.0000
	V max.= 4.35	1710.4632	1754.5026	1710.0000	1755.0000

LTE:
QPSK:

Band 2:

Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-8	-0.0043	pass
-20		-5	-0.0027	pass
-10		-4	-0.0021	pass
0		-1	-0.0005	pass
10		1	0.0005	pass
20		3	0.0016	pass
30		4	0.0021	pass
40		2	0.0011	pass
50		5	0.0027	pass
20	V min.= 3.5	6	0.0032	pass
	V max.= 4.35	8	0.0043	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.1964	1754.1338	1710	1755
-20		1710.1951	1754.1393	1710	1755
-10		1710.1966	1754.1306	1710	1755
0		1710.1933	1754.1397	1710	1755
10		1710.1997	1754.1340	1710	1755
20		1710.1978	1754.1361	1710	1755
30		1710.1977	1754.1373	1710	1755
40		1710.1935	1754.1378	1710	1755
50		1710.1903	1754.1323	1710	1755
20	V min.= 3.5	1710.1971	1754.1371	1710	1755
	V max.= 4.35	1710.1938	1754.1318	1710	1755

Band 5:

Middle Channel, $f_0=836.5\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-9	-0.0108	2.5
-20		-6	-0.0072	2.5
-10		-7	-0.0084	2.5
0		-4	-0.0048	2.5
10		-2	-0.0024	2.5
20		-1	-0.0012	2.5
30		1	0.0012	2.5
40		2	0.0024	2.5
50		-1	-0.0012	2.5
20	V min.= 3.5	4	0.0048	2.5
	V max.= 4.35	6	0.0072	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	2500.2644	2569.5090	2500	2570
-20		2500.2564	2569.5148	2500	2570
-10		2500.2546	2569.5265	2500	2570
0		2500.2547	2569.5165	2500	2570
10		2500.2548	2569.5163	2500	2570
20		2500.2512	2569.5138	2500	2570
30		2500.2568	2569.5228	2500	2570
40		2500.2663	2569.5101	2500	2570
50		2500.2587	2569.5126	2500	2570
20	V min.= 3.5	2500.2530	2569.5259	2500	2570
	V max.= 4.35	2500.2526	2569.5385	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	699.2119	715.3841	699	716
-20		699.2108	715.3853	699	716
-10		699.2249	715.3883	699	716
0		699.2113	715.3845	699	716
10		699.2187	715.3873	699	716
20		699.2187	715.3885	699	716
30		699.2234	715.3897	699	716
40		699.2112	715.3833	699	716
50		699.2144	715.3890	699	716
20	V min. = 3.5	699.2137	715.3852	699	716
	V max. = 4.35	699.2140	715.3862	699	716

Band 13:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	777.3435	786.2648	777	787
-20		777.3468	786.2507	777	787
-10		777.3400	786.2671	777	787
0		777.3499	786.2654	777	787
10		777.3474	786.2509	777	787
20		777.3434	786.2603	777	787
30		777.3401	786.2628	777	787
40		777.3630	786.2536	777	787
50		777.3405	786.2687	777	787
20	V min. = 3.5	777.3553	786.2853	777	787
	V max. = 4.35	777.3439	786.2469	777	787

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	704.4259	715.5360	704	716
-20		704.4216	715.5358	704	716
-10		704.4295	715.5370	704	716
0		704.4251	715.5383	704	716
10		704.4295	715.5316	704	716
20		704.4211	715.5369	704	716
30		704.4396	715.4904	704	716
40		704.4305	715.5236	704	716
50		704.4289	715.5431	704	716
20	V min.= 3.5	704.4173	715.5332	704	716
	V max.= 4.35	704.4588	715.5690	704	716

16QAM:**Band 2:**

Middle Channel, f ₀ =1880MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-7	-0.0037	pass
-20		-6	-0.0032	pass
-10		-4	-0.0021	pass
0		-3	-0.0016	pass
10		-1	-0.0005	pass
20		1	0.0005	pass
30		2	0.0011	pass
40		4	0.0021	pass
50		6	0.0032	pass
20	V min.= 3.5	9	0.0048	pass
	V max.= 4.35	12	0.0064	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.2831	1754.5576	1710	1755
-20		1710.2792	1754.5452	1710	1755
-10		1710.2738	1754.5644	1710	1755
0		1710.2598	1754.5347	1710	1755
10		1710.2664	1754.5444	1710	1755
20		1710.2775	1754.5433	1710	1755
30		1710.2332	1754.5124	1710	1755
40		1710.3001	1754.5449	1710	1755
50		1710.2779	1754.5330	1710	1755
20	V min.= 3.5	1710.2637	1754.5292	1710	1755
	V max.= 4.35	1710.3229	1754.5692	1710	1755

Band 5:

Middle Channel, f ₀ =836.5MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	-7	-0.0084	2.5
-20		-5	-0.0060	2.5
-10		-4	-0.0048	2.5
0		-2	-0.0024	2.5
10		-1	-0.0012	2.5
20		1	0.0012	2.5
30		1	0.0012	2.5
40		4	0.0048	2.5
50		7	0.0084	2.5
20	V min.= 3.5	9	0.0108	2.5
	V max.= 4.35	12	0.0143	2.5

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	2500.4628	2569.5092	2500	2570
-20		2500.4528	2569.4899	2500	2570
-10		2500.4655	2569.4853	2500	2570
0		2500.4479	2569.4856	2500	2570
10		2500.4514	2569.4974	2500	2570
20		2500.4601	2569.5085	2500	2570
30		2500.4582	2569.4901	2500	2570
40		2500.4654	2569.4899	2500	2570
50		2500.4574	2569.4931	2500	2570
20	V min.= 3.5	2500.4582	2569.4938	2500	2570
	V max.= 4.35	2500.4542	2569.5054	2500	2570

Band12

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	699.4616	715.4885	699	716
-20		699.4627	715.4878	699	716
-10		699.4563	715.4927	699	716
0		699.4591	715.4994	699	716
10		699.4599	715.4978	699	716
20		699.4598	715.4864	699	716
30		699.4648	715.4896	699	716
40		699.4499	715.4872	699	716
50		699.4466	715.5016	699	716
20	V min.= 3.5	699.4591	715.4850	699	716
	V max.= 4.35	699.4583	715.4937	699	716

Band13

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	777.4519	786.4919	777	787
-20		777.4531	786.4933	777	787
-10		777.4610	786.4836	777	787
0		777.4600	786.4849	777	787
10		777.4648	786.4894	777	787
20		777.4637	786.4990	777	787
30		777.4564	786.4894	777	787
40		777.4545	786.4963	777	787
50		777.4569	786.4832	777	787
20	V min.= 3.5	777.4616	786.5020	777	787
	V max.= 4.35	777.4602	786.4972	777	787

Band17

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	704.4626	715.4987	704	716
-20		704.4466	715.4921	704	716
-10		704.4556	715.4927	704	716
0		704.4574	715.5037	704	716
10		704.4674	715.4959	704	716
20		704.4499	715.4939	704	716
30		704.4546	715.4977	704	716
40		704.4716	715.4970	704	716
50		704.4669	715.5010	704	716
20	V min.= 3.5	704.4528	715.4884	704	716
	V max.= 4.35	704.4618	715.4973	704	716

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