FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

TP-Link Technologies Co., Ltd.

Building 24 (floors 1,3,4,5) and 28 (floors1-4),Central Science and Technology Park,Nanshan,Shenzhen,China

FCC ID: TE7X20PROV1

Report Type:	**Product Type:**
Original Report	X20 Pro FDD-LTE Smartphone

Report Number:	RSZ190626009-00D
Report Date:	2019-07-17
Reviewed By:	Jacob Kong Engineer
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	X20 Pro FDD-LTE Smartphone
Tested Model	TP9131C
Multiple Model#	TP9131CXYZZ
Frequency Range	Cellular: 824-849 MHz PCS: 1850-1910 MHz WCDMA B2/LTE B2: 1850-1910 MHz WCDMA B5: 824-849 MHz WCDMA B4/LTE B4: 1710- 1755 MHz LTE B7: 2500-2570 MHz
Transmit Power (Conducted)	GSM850: 32.68 dBm, EGPRS850: 27.30 dBm PCS1900: 28.86 dBm，EGPRS1900: 25.46 dBm WCDMA Band 2: 21.96 dBm; WCDMA Band 4: 21.74 dBm WCDMA Band 5: 22.52 dBm LTE Band 2: 22.83 dBm; LTE Band 4: 23.71 dBm LTE Band 7: 22.16 dBm
Modulation Technique	2G: GMSK,8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification	2G/3G/4G:FPC Antennas
Voltage Range	DC 3.85V from battery or DC 5.0V from adapter
Date of Test	2019-06-28~2019-07-02
Sample serial number	DE9131C931200001
Received date	2019-06-26
Sample/EUT Status	Good condition
Adapter information	Model: A8A-050200U-US1 Input: AC 100-240V, 50/60Hz, 0.35A Output: DC 5V, 2A

Notes: This series products model: TP9131CXYZZ and TP9131C are identical schematics,Model TP9131C was selected for fully testing, the detailed information can be referred to the declaration which was stated and guaranteed by the applicant.

Objective

This test report is prepared on behalf of *TP-Link Technologies 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)

FCC Part 15.247 DSS, Part 15.247 DTS, Part 15.407 NII and Part 15B JBP submissions with FCC ID: TE7X20PROV1.

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℃
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.

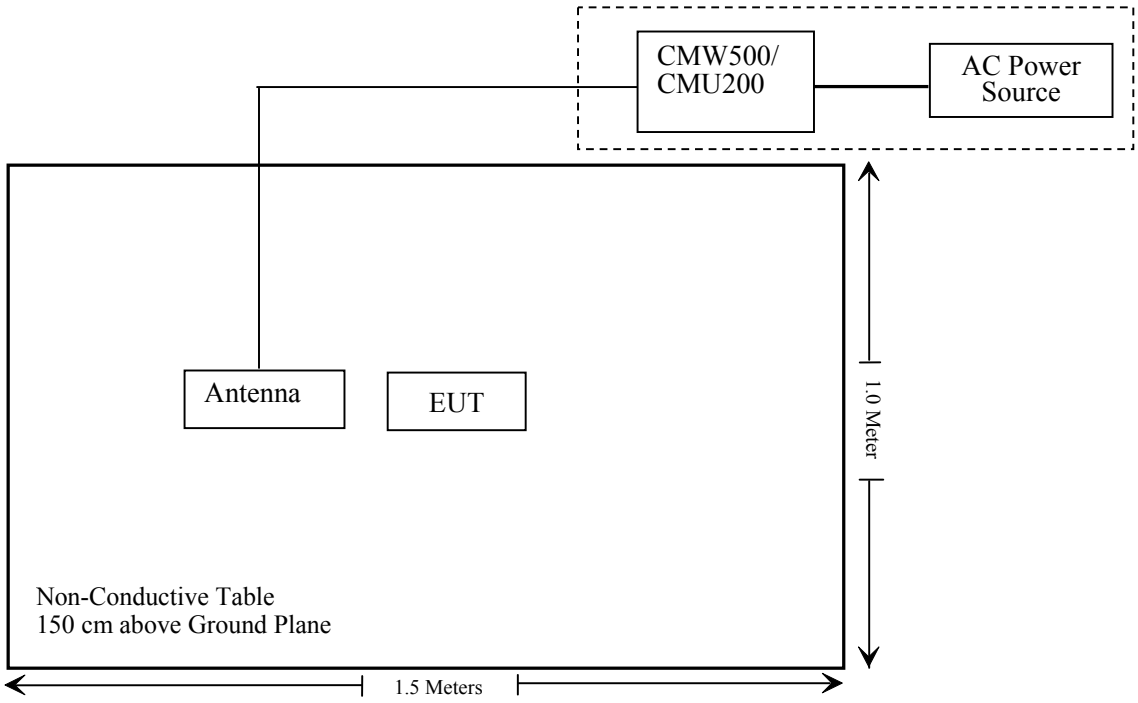
Equipment Modifications

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 (d) (h)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053; § 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53 (h)(m)	Band Edge	Compliance
§ 2.1055; § 22.355; § 24.235; §27.54;	Frequency stability	Compliance

Note: * Please refer to SAR report released by BACL, report number: RSZ190626009-20.

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 and Spectrum Analyzer	FSV40-N	102259	2019-06-22	2020-06-22
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
Agilent	Signal Generator	N5183A	MY51040755	2018-12-03	2019-12-03
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	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	RG-214	1	2019-05-21	2019-11-19
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	2019-03-02	2020-03-01
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019-01-05	2020-01-05
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2019-01-15	2020-01-15
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1316.3003K03-101746-zn	2018-08-19	2019-08-19
Wainwright	notch filter	WRCG1850/1910-1835/1925-40/8SS	22	NCR	NCR
Oulitong	notch filter	OBSF-2500-2570-S	OE01601523	NCR	NCR
Wainwright	notch filter	WRCG1709/1786-1689/1806-40/8SS	2	NCR	NCR
Ducommun Technologies	RF Cable	RG-214	3	Each Time	
WEINSCHEL	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: RSZ190626009-20.

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 (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.

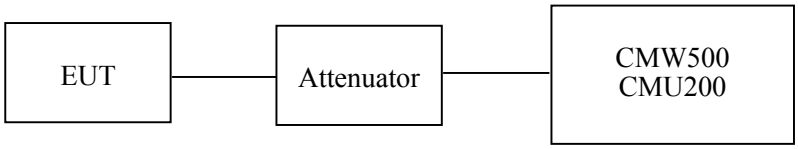
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	52~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Kieroy Luo from 2019-06-28 to 2019-07-02.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.46	38.45
	190	836.6	32.50	38.45
	251	848.8	32.58	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.57	28.67	28.16	27.31	38.45
	190	836.6	32.68	28.49	28.21	27.16	38.45
	251	848.8	32.49	28.57	28.13	27.31	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.30	24.12	22.86	20.19	38.45
	190	836.6	27.29	24.26	21.89	20.23	38.45
	251	848.8	27.26	24.10	21.96	20.17	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.45	22.52	22.49
		HSDPA	1	21.46	21.62	21.54
			2	21.37	21.52	21.53
			3	21.43	21.59	21.49
			4	21.48	21.67	21.62
		HSUPA	1	21.42	21.58	21.54
			2	21.42	21.24	21.41
			3	21.46	21.20	21.28
			4	21.53	21.23	21.11
			5	21.59	21.30	21.43
		HSPA+	/	21.65	21.37	21.52

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.86	33
	661	1880.0	28.65	33
	810	1909.8	28.74	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.71	27.91	25.78	24.76	33
	661	1880.0	28.76	27.86	25.74	24.72	33
	810	1909.8	28.85	27.73	25.66	24.63	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.45	22.46	20.15	18.62	33
	661	1880.0	25.46	22.65	20.34	18.52	33
	810	1909.8	25.34	22.51	20.21	18.49	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		21.84	21.96	21.75
		HSDPA	1	20.60	20.56	20.72
			2	20.53	20.75	20.41
			3	20.36	20.83	20.45
			4	20.63	20.85	20.52
		HSUPA	1	20.63	20.85	20.55
			2	20.17	20.10	20.18
			3	20.21	20.36	20.19
			4	20.24	20.41	20.22
			5	20.34	20.44	20.30
		HSPA+	/	20.37	20.50	20.34

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band IV)	Normal	RMC12.2k		21.62	21.74	21.67
		HSDPA	1	20.46	20.53	20.48
			2	20.52	20.61	20.46
			3	20.43	20.49	20.52
			4	20.48	20.62	20.39
		HSUPA	1	20.42	20.52	20.53
			2	20.16	20.13	20.25
			3	20.20	20.19	20.30
			4	20.15	20.22	20.24
			5	20.09	20.18	20.19
		HSPA+	/	20.15	20.34	20.28

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.25	13
	Middle	1.42	13
	High	1.25	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	0.98	13
	Middle	1.03	13
	High	1.10	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.21	13
	Middle	3.50	13
	High	3.42	13
HSDPA (16QAM)	Low	3.08	13
	Middle	3.04	13
	High	3.04	13
HSUPA (BPSK)	Low	2.94	13
	Middle	3.02	13
	High	2.98	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.43	13
	Middle	1.40	13
	High	1.44	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.15	13
	Middle	1.21	13
	High	1.08	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.57	13
	Middle	2.29	13
	High	2.37	13
HSDPA (16QAM)	Low	2.48	13
	Middle	2.68	13
	High	2.82	13
HSUPA (BPSK)	Low	2.76	13
	Middle	2.91	13
	High	2.86	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.46	13
	Middle	3.38	13
	High	3.19	13
HSDPA (16QAM)	Low	3.51	13
	Middle	3.36	13
	High	3.43	13
HSUPA (BPSK)	Low	3.22	13
	Middle	3.29	13
	High	3.45	13

Radiated Power
GSM Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	74.21	359	1.7	V	14.8	1.90	0.0	12.90	38.45	27.55
836.6	88.75	314	1.6	V	28.8	1.90	0.0	26.90	38.45	13.55
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	92.96	152	1.3	H	23.3	1.30	9.40	31.40	33	1.6
1880.00	88.95	221	1.5	V	19.1	1.30	9.40	27.20	33	5.8

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	70.08	359	1.2	V	10.7	1.90	0.0	8.80	38.45	31.65
836.6	85.83	314	1.0	V	25.8	1.90	0.0	23.90	38.45	16.55
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	89.03	86	1.1	H	19.4	1.30	9.40	27.50	33	5.10
1880.00	83.81	113	1.8	V	13.9	1.30	9.40	22.00	33	11.00

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 (dBi)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	69.33	359	2.3	V	10.0	1.9	0.0	8.10	38.5	33.20
836.6	81.86	314	2.0	V	21.9	1.9	0.0	20.00	38.5	20.40
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	86.11	44	1.5	H	16.4	1.30	9.40	24.50	33	8.50
1880.00	82.44	180	1.2	V	12.5	1.30	9.40	20.60	33	12.40
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	83.25	168	2.2	H	9.9	1.30	8.90	17.50	30	12.50
1732.60	84.06	92	1.6	V	11.3	1.30	8.90	18.90	30	11.10

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	22.44	22.58	22.64
		RB Size=1, RB Offset=2	22.38	22.51	22.57
		RB Size=1, RB Offset=5	22.33	22.40	22.19
		RB Size=3, RB Offset=0	22.00	22.38	22.21
		RB Size=3, RB Offset=1	22.27	22.56	22.26
		RB Size=3, RB Offset=2	22.30	22.24	21.90
		RB Size=6, RB Offset=0	22.19	22.48	22.37
	16QAM	RB Size=1, RB Offset=0	21.48	21.56	21.67
		RB Size=1, RB Offset=2	21.35	21.56	21.27
		RB Size=1, RB Offset=5	21.32	21.38	21.59
		RB Size=3, RB Offset=0	21.31	21.51	21.19
		RB Size=3, RB Offset=1	21.09	21.23	21.26
		RB Size=3, RB Offset=2	21.35	21.54	20.89
		RB Size=6, RB Offset=0	21.30	21.38	21.48
3.0	QPSK	RB Size=1, RB Offset=0	22.28	22.46	22.39
		RB Size=1, RB Offset=7	21.89	22.11	22.34
		RB Size=1, RB Offset=14	21.98	21.97	21.90
		RB Size=8, RB Offset=0	21.81	22.20	22.36
		RB Size=8, RB Offset=4	21.93	22.15	22.07
		RB Size=8, RB Offset=7	21.82	22.16	21.58
		RB Size=15, RB Offset=0	21.79	22.15	22.01
	16QAM	RB Size=1, RB Offset=0	21.36	21.55	21.45
		RB Size=1, RB Offset=7	21.06	21.25	21.03
		RB Size=1, RB Offset=14	21.02	21.46	20.98
		RB Size=8, RB Offset=0	21.22	21.26	21.37
		RB Size=8, RB Offset=4	21.02	21.54	20.96
		RB Size=8, RB Offset=7	21.26	21.53	20.50
		RB Size=15, RB Offset=0	20.94	21.30	21.04

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	22.68	22.77	22.83
		RB Size=1, RB Offset=12	22.41	22.47	22.78
		RB Size=1, RB Offset=24	22.53	22.37	22.74
		RB Size=12, RB Offset=0	22.20	22.46	22.44
		RB Size=12, RB Offset=6	22.58	22.75	22.79
		RB Size=12, RB Offset=11	22.56	22.47	22.61
		RB Size=25, RB Offset=0	22.49	22.68	22.77
	16QAM	RB Size=1, RB Offset=0	22.22	22.43	22.11
		RB Size=1, RB Offset=12	22.12	22.34	22.05
		RB Size=1, RB Offset=24	22.29	22.56	22.16
		RB Size=12, RB Offset=0	21.89	22.15	21.86
		RB Size=12, RB Offset=6	21.82	22.05	21.74
		RB Size=12, RB Offset=11	21.96	22.21	21.99
		RB Size=25, RB Offset=0	21.54	21.83	21.57
10.0	QPSK	RB Size=1, RB Offset=0	21.95	22.12	21.87
		RB Size=1, RB Offset=24	21.86	22.07	21.75
		RB Size=1, RB Offset=49	21.99	22.21	21.90
		RB Size=25, RB Offset=0	21.83	22.07	21.85
		RB Size=25, RB Offset=12	21.80	22.00	21.74
		RB Size=25, RB Offset=24	21.88	22.15	21.97
		RB Size=50, RB Offset=0	21.75	22.00	21.84
	16QAM	RB Size=1, RB Offset=0	21.25	21.38	21.46
		RB Size=1, RB Offset=24	21.09	21.37	21.29
		RB Size=1, RB Offset=49	20.95	21.01	21.37
		RB Size=25, RB Offset=0	21.16	21.29	21.40
		RB Size=25, RB Offset=12	20.87	21.00	21.22
		RB Size=25, RB Offset=24	20.91	20.99	21.09
		RB Size=50, RB Offset=0	21.04	21.14	21.18

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	22.38	22.56	22.41
		RB Size=1, RB Offset=37	21.89	22.22	22.31
		RB Size=1, RB Offset=74	22.36	22.17	21.94
		RB Size=36, RB Offset=0	22.15	22.43	22.38
		RB Size=36, RB Offset=18	22.26	22.44	21.94
		RB Size=36, RB Offset=37	22.03	22.07	21.87
		RB Size=75, RB Offset=0	22.23	22.27	22.15
	16QAM	RB Size=1, RB Offset=0	21.45	21.70	21.32
		RB Size=1, RB Offset=37	21.40	21.58	21.26
		RB Size=1, RB Offset=74	21.51	21.83	21.42
		RB Size=36, RB Offset=0	21.34	21.51	21.37
		RB Size=36, RB Offset=18	21.24	21.42	21.34
		RB Size=36, RB Offset=37	21.45	21.63	21.42
		RB Size=75, RB Offset=0	21.15	21.37	21.18
20.0	QPSK	RB Size=1, RB Offset=0	22.46	22.63	22.59
		RB Size=1, RB Offset=49	22.23	22.48	22.38
		RB Size=1, RB Offset=99	22.26	22.50	22.12
		RB Size=50, RB Offset=0	21.96	22.32	22.26
		RB Size=50, RB Offset=24	22.15	22.40	22.51
		RB Size=50, RB Offset=49	22.22	22.54	22.17
		RB Size=100, RB Offset=0	22.10	22.58	22.36
	16QAM	RB Size=1, RB Offset=0	21.44	21.57	21.53
		RB Size=1, RB Offset=49	21.20	21.53	21.06
		RB Size=1, RB Offset=99	21.17	21.25	21.35
		RB Size=50, RB Offset=0	21.33	21.31	21.26
		RB Size=50, RB Offset=24	21.05	21.16	21.03
		RB Size=50, RB Offset=49	21.26	21.33	20.91
		RB Size=100, RB Offset=0	21.38	21.33	21.48

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.95	13	Pass
QPSK (100RB Size)	7.66	13	Pass
16QAM (1RB Size)	7.75	13	Pass
16QAM (100RB Size)	7.38	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	85.33	20	1.4	H	15.7	1.30	9.40	23.80	33
1880.00	84.76	213	1.7	V	14.9	1.30	9.40	23.00	33
3 MHz Bandwidth									
1880.00	85.29	324	1.1	H	15.6	1.30	9.40	23.70	33
1880.00	84.64	254	2.4	V	14.7	1.30	9.40	22.80	33
5 MHz Bandwidth									
1880.00	85.17	167	1.2	H	15.5	1.30	9.40	23.60	33
1880.00	84.52	152	2.5	V	14.6	1.30	9.40	22.70	33
10 MHz Bandwidth									
1880.00	85.09	16	2.2	H	15.4	1.30	9.40	23.50	33
1880.00	84.33	33	1.3	V	14.4	1.30	9.40	22.50	33
15 MHz Bandwidth									
1880.00	85.01	5	1.8	H	15.3	1.30	9.40	23.40	33
1880.00	84.12	59	1.8	V	14.2	1.30	9.40	22.30	33
20 MHz Bandwidth									
1880.00	84.92	83	1.8	H	15.2	1.30	9.40	23.30	33
1880.00	84.02	11	2.2	V	14.1	1.30	9.40	22.20	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	85.25	37	1.9	H	15.6	1.30	9.40	23.70	33
1880.00	84.96	108	1.1	V	15.1	1.30	9.40	23.20	33
3 MHz Bandwidth									
1880.00	85.11	9	2.1	H	15.4	1.30	9.40	23.50	33
1880.00	84.83	128	1.7	V	14.9	1.30	9.40	23.00	33
5 MHz Bandwidth									
1880.00	85.06	157	1.7	H	15.4	1.30	9.40	23.50	33
1880.00	84.79	168	2.1	V	14.9	1.30	9.40	23.00	33
10 MHz Bandwidth									
1880.00	84.99	226	1.4	H	15.3	1.30	9.40	23.40	33
1880.00	84.76	211	2.3	V	14.9	1.30	9.40	23.00	33
15 MHz Bandwidth									
1880.00	84.62	204	2.1	H	14.9	1.30	9.40	23.00	33
1880.00	84.71	304	2.0	V	14.8	1.30	9.40	22.90	33
20 MHz Bandwidth									
1880.00	84.08	7	1.7	H	14.4	1.30	9.40	22.50	33
1880.00	84.31	134	1.1	V	14.4	1.30	9.40	22.50	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	23.18	23.22	23.35
		RB Size=1, RB Offset=2	22.97	23.08	23.26
		RB Size=1, RB Offset=5	23.10	22.92	22.87
		RB Size=3, RB Offset=0	22.85	22.76	23.22
		RB Size=3, RB Offset=1	23.08	22.74	23.07
		RB Size=3, RB Offset=2	22.79	22.98	22.95
		RB Size=6, RB Offset=0	22.97	22.94	23.16
	16QAM	RB Size=1, RB Offset=0	22.22	22.14	22.02
		RB Size=1, RB Offset=2	22.12	22.03	21.93
		RB Size=1, RB Offset=5	21.72	21.62	21.54
		RB Size=3, RB Offset=0	22.34	22.21	22.08
		RB Size=3, RB Offset=1	22.49	22.36	22.29
		RB Size=3, RB Offset=2	21.77	21.67	21.59
		RB Size=6, RB Offset=0	22.26	22.21	22.10
3.0	QPSK	RB Size=1, RB Offset=0	23.25	23.38	23.51
		RB Size=1, RB Offset=7	22.69	23.12	23.38
		RB Size=1, RB Offset=14	22.87	23.21	23.04
		RB Size=8, RB Offset=0	23.20	23.27	23.41
		RB Size=8, RB Offset=4	23.25	23.17	23.03
		RB Size=8, RB Offset=7	23.18	23.02	22.76
		RB Size=15, RB Offset=0	22.78	22.92	23.07
	16QAM	RB Size=1, RB Offset=0	22.38	22.32	22.43
		RB Size=1, RB Offset=7	22.93	22.25	22.56
		RB Size=1, RB Offset=14	22.89	22.11	22.73
		RB Size=8, RB Offset=0	22.91	21.84	22.61
		RB Size=8, RB Offset=4	22.78	21.94	22.62
		RB Size=8, RB Offset=7	22.51	22.21	23.02
		RB Size=15, RB Offset=0	22.49	22.31	22.86

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	23.48	23.62	23.71
		RB Size=1, RB Offset=12	22.95	23.36	23.70
		RB Size=1, RB Offset=24	23.08	23.19	23.28
		RB Size=12, RB Offset=0	23.26	23.37	23.56
		RB Size=12, RB Offset=6	23.14	23.16	23.41
		RB Size=12, RB Offset=11	23.39	23.48	23.05
		RB Size=25, RB Offset=0	23.01	23.34	23.30
	16QAM	RB Size=1, RB Offset=0	22.25	22.18	22.33
		RB Size=1, RB Offset=12	22.55	21.95	22.68
		RB Size=1, RB Offset=24	22.79	21.72	22.33
		RB Size=12, RB Offset=0	22.45	22.17	22.46
		RB Size=12, RB Offset=6	22.28	21.95	22.69
		RB Size=12, RB Offset=11	22.36	22.05	22.72
		RB Size=25, RB Offset=0	22.77	21.72	22.50
10.0	QPSK	RB Size=1, RB Offset=0	23.29	23.36	23.53
		RB Size=1, RB Offset=24	22.78	22.95	23.28
		RB Size=1, RB Offset=49	22.99	22.89	23.47
		RB Size=25, RB Offset=0	23.26	23.16	23.39
		RB Size=25, RB Offset=12	22.99	22.94	23.07
		RB Size=25, RB Offset=24	22.83	23.26	23.04
		RB Size=50, RB Offset=0	23.22	23.35	23.16
	16QAM	RB Size=1, RB Offset=0	22.24	22.17	22.24
		RB Size=1, RB Offset=24	21.93	21.98	21.92
		RB Size=1, RB Offset=49	21.92	22.01	21.90
		RB Size=25, RB Offset=0	21.89	21.82	22.03
		RB Size=25, RB Offset=12	22.09	21.75	21.93
		RB Size=25, RB Offset=24	21.90	22.05	21.62
		RB Size=50, RB Offset=0	21.83	21.71	21.78

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	23.46	23.55	23.67
		RB Size=1, RB Offset=37	23.32	23.23	23.43
		RB Size=1, RB Offset=74	23.30	23.48	23.66
		RB Size=36, RB Offset=0	23.31	23.18	23.54
		RB Size=36, RB Offset=18	23.37	23.11	23.49
		RB Size=36, RB Offset=37	23.38	23.34	23.45
		RB Size=75, RB Offset=0	23.45	23.20	23.46
	16QAM	RB Size=1, RB Offset=0	21.89	22.05	22.13
		RB Size=1, RB Offset=37	21.41	21.71	21.68
		RB Size=1, RB Offset=74	21.50	21.57	21.92
		RB Size=36, RB Offset=0	21.73	22.00	22.09
		RB Size=36, RB Offset=18	21.73	21.57	21.71
		RB Size=36, RB Offset=37	21.60	21.62	21.23
		RB Size=75, RB Offset=0	21.71	21.82	21.78
20.0	QPSK	RB Size=1, RB Offset=0	23.21	23.45	23.39
		RB Size=1, RB Offset=49	22.86	23.09	23.01
		RB Size=1, RB Offset=99	23.00	23.41	23.11
		RB Size=50, RB Offset=0	22.82	23.21	23.12
		RB Size=50, RB Offset=24	22.85	22.99	23.12
		RB Size=50, RB Offset=49	23.06	23.06	23.07
		RB Size=100, RB Offset=0	23.03	23.02	22.98
	16QAM	RB Size=1, RB Offset=0	21.89	21.93	22.01
		RB Size=1, RB Offset=49	21.84	21.87	21.63
		RB Size=1, RB Offset=99	21.63	21.59	21.79
		RB Size=50, RB Offset=0	21.84	21.46	21.86
		RB Size=50, RB Offset=24	21.80	21.68	21.55
		RB Size=50, RB Offset=49	21.56	21.47	21.23
		RB Size=100, RB Offset=0	21.80	21.63	21.97

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.73	13	Pass
QPSK (100RB Size)	6.84	13	Pass
16QAM (1RB Size)	7.30	13	Pass
16QAM (100RB Size)	7.32	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	85.26	180	2.0	H	11.9	1.30	8.90	19.50	30
1732.50	83.91	96	1.8	V	11.2	1.30	8.90	18.80	30
3 MHz Bandwidth									
1732.50	85.08	354	2.1	H	11.8	1.30	8.90	19.40	30
1732.50	84.66	269	1.1	V	11.9	1.30	8.90	19.50	30
5 MHz Bandwidth									
1732.50	85.22	112	2.5	H	11.9	1.30	8.90	19.50	30
1732.50	85.01	218	2.1	V	12.3	1.30	8.90	19.90	30
10 MHz Bandwidth									
1732.50	85.14	110	1.4	H	11.8	1.30	8.90	19.40	30
1732.50	84.93	134	1.9	V	12.2	1.30	8.90	19.80	30
15 MHz Bandwidth									
1732.50	85.77	222	1.0	H	12.4	1.30	8.90	20.00	30
1732.50	84.62	342	1.8	V	11.9	1.30	8.90	19.50	30
20 MHz Bandwidth									
1732.50	86.91	95	1.1	H	13.6	1.30	8.90	21.20	30
1732.50	85.39	342	1.8	V	12.7	1.30	8.90	20.30	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	85.11	326	1.7	H	11.8	1.30	8.90	19.40	30
1732.50	85.16	264	1.6	V	12.4	1.30	8.90	20.00	30
3 MHz Bandwidth									
1732.50	85.43	300	1.2	H	12.1	1.30	8.90	19.70	30
1732.50	85.01	180	2.4	V	12.3	1.30	8.90	19.90	30
5 MHz Bandwidth									
1732.50	85.61	156	2.3	H	12.3	1.30	8.90	19.90	30
1732.50	84.92	116	2.0	V	12.2	1.30	8.90	19.80	30
10 MHz Bandwidth									
1732.50	85.83	88	2.3	H	12.5	1.30	8.90	20.10	30
1732.50	85.16	300	1.2	V	12.4	1.30	8.90	20.00	30
15 MHz Bandwidth									
1732.50	86.42	276	1.6	H	13.1	1.30	8.90	20.70	30
1732.50	85.93	137	1.5	V	13.2	1.30	8.90	20.80	30
20 MHz Bandwidth									
1732.50	87.49	25	1.1	H	14.2	1.30	8.90	21.80	30
1732.50	85.80	137	1.5	V	13.1	1.30	8.90	20.70	30

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	21.89	21.76	21.64
		RB Size=1, RB Offset=12	21.76	21.68	21.51
		RB Size=1, RB Offset=24	21.80	21.61	21.22
		RB Size=12, RB Offset=0	21.88	21.45	21.26
		RB Size=12, RB Offset=6	21.59	21.67	21.49
		RB Size=12, RB Offset=11	21.52	21.28	21.00
		RB Size=25, RB Offset=0	21.52	21.60	21.47
	16QAM	RB Size=1, RB Offset=0	20.68	20.57	20.49
		RB Size=1, RB Offset=12	20.58	20.25	20.37
		RB Size=1, RB Offset=24	20.60	20.17	20.36
		RB Size=12, RB Offset=0	20.25	20.37	20.24
		RB Size=12, RB Offset=6	20.27	20.53	20.36
		RB Size=12, RB Offset=11	20.24	20.39	20.17
		RB Size=25, RB Offset=0	20.40	20.29	20.12
10	QPSK	RB Size=1, RB Offset=0	21.55	21.46	21.43
		RB Size=1, RB Offset=24	21.16	21.18	21.15
		RB Size=1, RB Offset=49	21.24	21.34	21.36
		RB Size=25, RB Offset=0	21.30	21.19	21.19
		RB Size=25, RB Offset=12	21.27	21.22	21.24
		RB Size=25, RB Offset=24	21.23	21.16	20.96
		RB Size=50, RB Offset=0	21.14	21.25	20.97
	16QAM	RB Size=1, RB Offset=0	20.72	20.63	20.57
		RB Size=1, RB Offset=24	20.48	20.38	20.37
		RB Size=1, RB Offset=49	20.47	20.40	20.10
		RB Size=25, RB Offset=0	20.64	20.40	20.25
		RB Size=25, RB Offset=12	20.62	20.15	20.24
		RB Size=25, RB Offset=24	20.22	20.52	19.78
		RB Size=50, RB Offset=0	20.48	20.22	20.32

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	21.76	21.74	21.61
		RB Size=1, RB Offset=37	21.41	21.38	21.32
		RB Size=1, RB Offset=74	21.26	21.27	21.20
		RB Size=36, RB Offset=0	22.02	21.98	21.92
		RB Size=36, RB Offset=18	22.16	22.10	22.02
		RB Size=36, RB Offset=37	21.61	21.57	21.54
		RB Size=75, RB Offset=0	22.14	22.13	22.05
	16QAM	RB Size=1, RB Offset=0	20.68	20.54	20.47
		RB Size=1, RB Offset=37	20.28	20.25	20.18
		RB Size=1, RB Offset=74	20.41	20.16	20.10
		RB Size=36, RB Offset=0	20.61	20.41	20.15
		RB Size=36, RB Offset=18	20.36	20.08	20.11
		RB Size=36, RB Offset=37	20.33	20.20	20.00
		RB Size=75, RB Offset=0	20.32	20.14	20.32
20	QPSK	RB Size=1, RB Offset=0	21.53	21.58	21.46
		RB Size=1, RB Offset=49	21.29	21.37	21.40
		RB Size=1, RB Offset=99	21.45	21.24	21.34
		RB Size=50, RB Offset=0	21.05	21.37	21.37
		RB Size=50, RB Offset=24	21.19	21.39	21.18
		RB Size=50, RB Offset=49	21.12	21.43	20.97
		RB Size=100, RB Offset=0	21.34	21.28	21.42
	16QAM	RB Size=1, RB Offset=0	20.46	20.57	20.51
		RB Size=1, RB Offset=49	20.31	20.09	20.27
		RB Size=1, RB Offset=99	20.23	20.46	20.08
		RB Size=50, RB Offset=0	20.43	20.46	20.42
		RB Size=50, RB Offset=24	20.03	20.16	20.45
		RB Size=50, RB Offset=49	20.21	20.13	20.35
		RB Size=100, RB Offset=0	20.17	20.20	20.42

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.76	13	Pass
QPSK (100RB Size)	6.17	13	Pass
16QAM (1RB Size)	7.15	13	Pass
16QAM (100RB Size)	7.89	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	86.86	60	1.9	H	16.7	2.60	10.20	24.30	30
2535.00	86.01	358	2.0	V	16.5	2.60	10.20	24.10	30
10 MHz Bandwidth									
2535.00	86.76	21	2.2	H	16.6	2.60	10.20	24.20	30
2535.00	85.91	85	2.4	V	16.4	2.60	10.20	24.00	30
15 MHz Bandwidth									
2535.00	86.54	86	1.3	H	16.4	2.60	10.20	24.00	30
2535.00	85.77	81	1.6	V	16.2	2.60	10.20	23.80	30
20 MHz Bandwidth									
2535.00	87.12	204	2.2	H	17.0	2.60	10.20	24.60	30
2535.00	86.21	2	1.9	V	16.7	2.60	10.20	24.30	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									
5 MHz Bandwidth									
2535.00	87.27	4	1.7	H	17.1	2.60	10.20	24.70	30
2535.00	85.73	259	2.4	V	16.2	2.60	10.20	23.80	30
10 MHz Bandwidth									
2535.00	87.10	320	1.8	H	16.9	2.60	10.20	24.50	30
2535.00	85.62	232	1.7	V	16.1	2.60	10.20	23.70	30
15 MHz Bandwidth									
2535.00	87.04	19	1.8	H	16.9	2.60	10.20	24.50	30
2535.00	85.46	326	1.2	V	15.9	2.60	10.20	23.50	30
20 MHz Bandwidth									
2535.00	87.28	131	2.0	H	17.1	2.60	10.20	24.70	30
2535.00	86.74	157	1.3	V	17.2	2.60	10.20	24.80	30

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

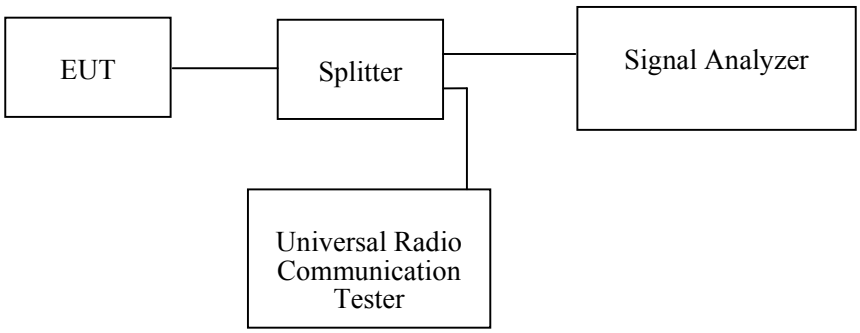
Applicable Standard

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 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Kieroy Luo from 2019-06-28 to 2019-07-01.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	245.19	314.42
EGPRS(8PSK)	836.6	246.79	316.03

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.18	4.70
HSUPA (BPSK)	836.6	4.20	4.70
HSDPA (16QAM)	836.6	4.20	4.77

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	245.19	317.63
EGPRS(8PSK)	1880.0	248.40	317.63

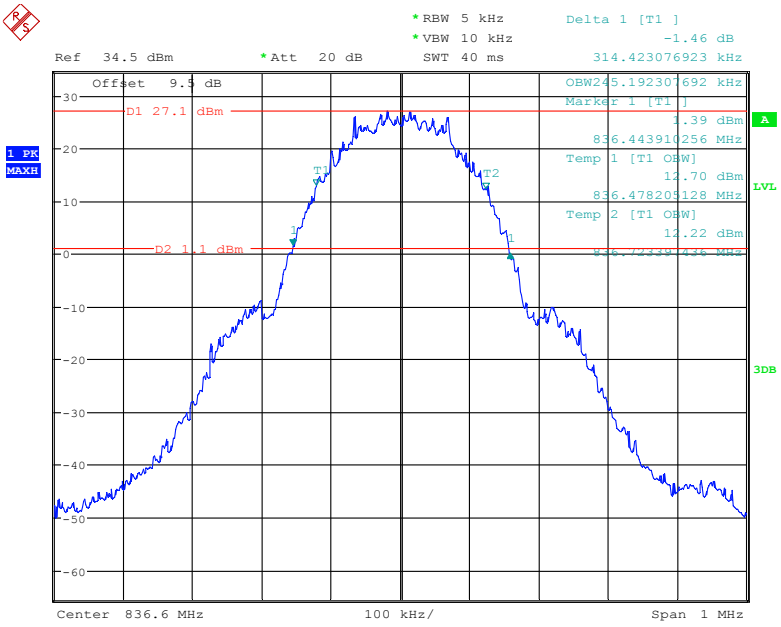
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.17	4.71
HSUPA (BPSK)	1880.0	4.20	4.73
HSDPA (16QAM)	1880.0	4.20	4.73

AWS Band (Part 27)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.6	4.17	4.71
HSUPA (BPSK)	1732.6	4.20	4.73
HSDPA (16QAM)	1732.6	4.18	4.71

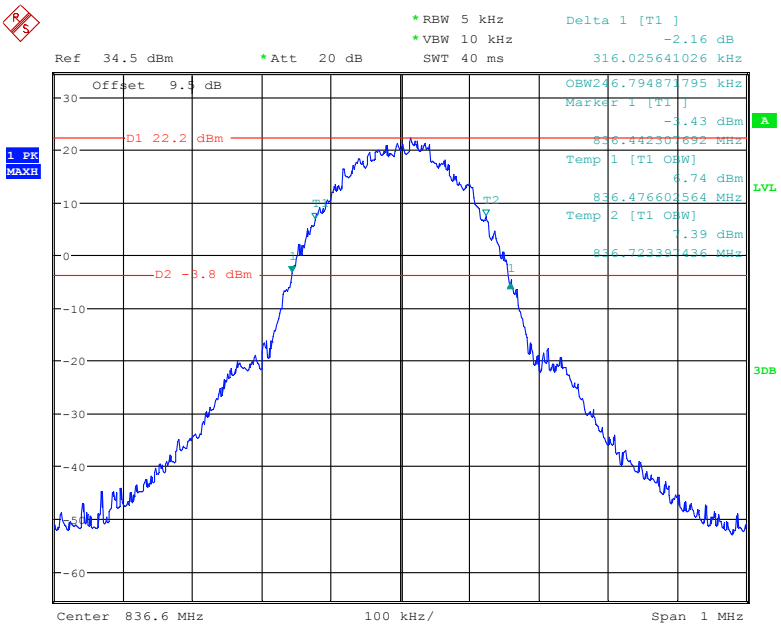
Cellular Band (Part 22H)

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



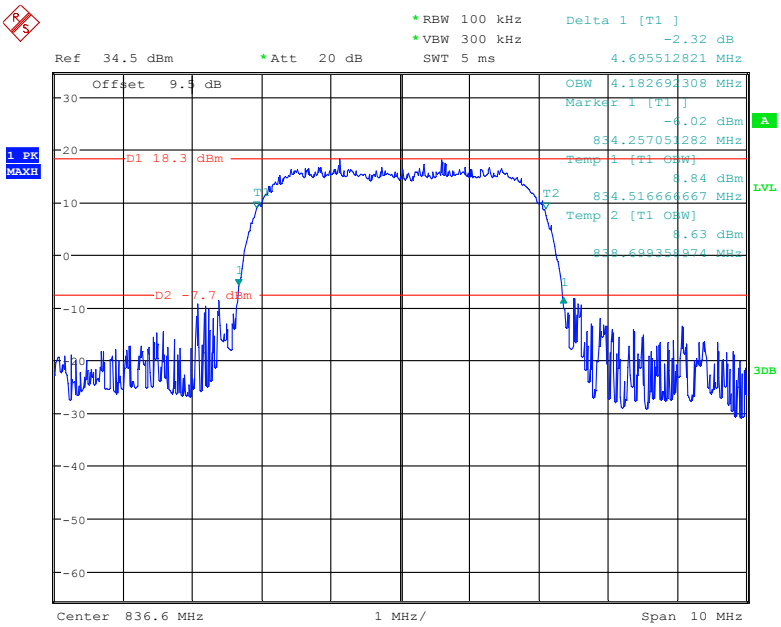
Date: 1.JUL.2019 21:31:07

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



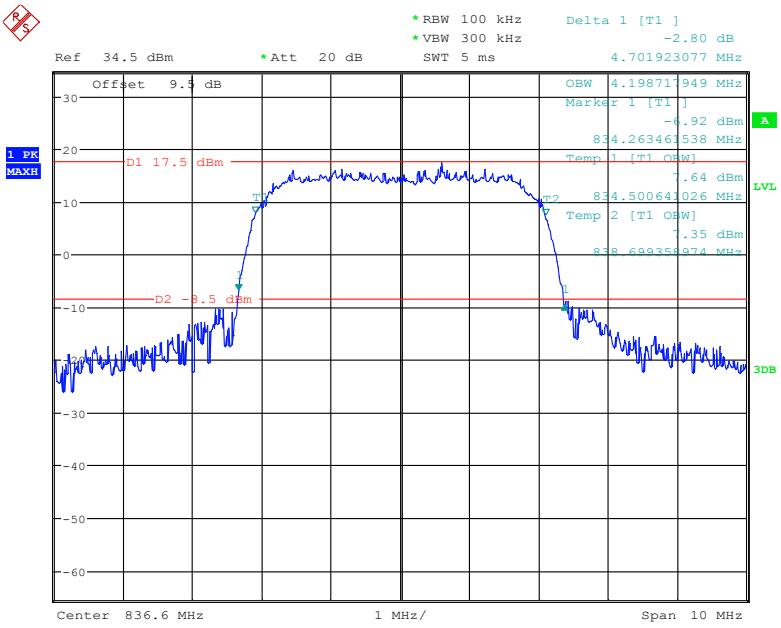
Date: 1.JUL.2019 22:17:11

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



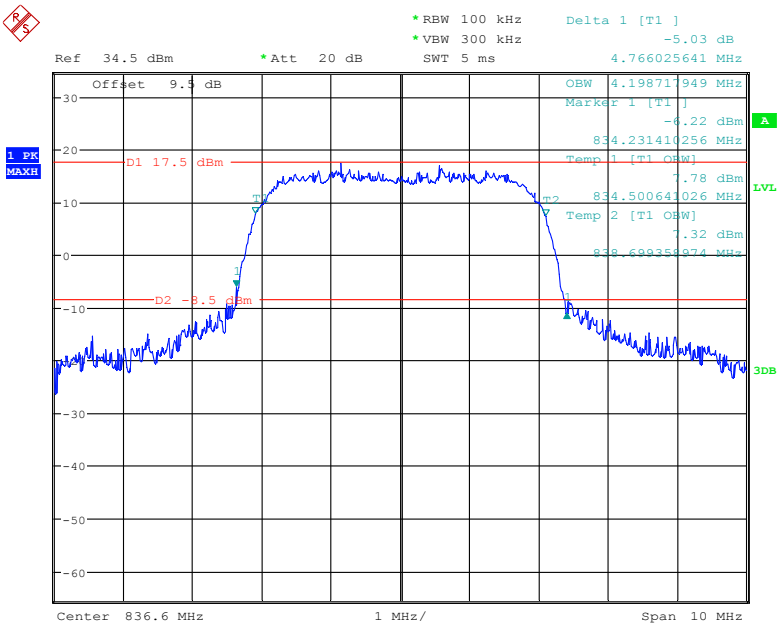
Date: 1.JUL.2019 23:33:44

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



Date: 1.JUL.2019 23:52:51

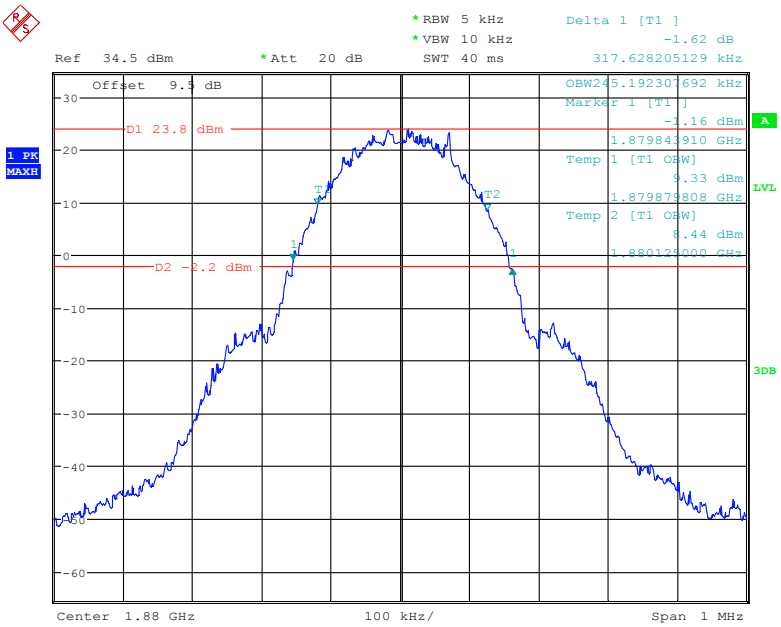
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 1.JUL.2019 23:51:11

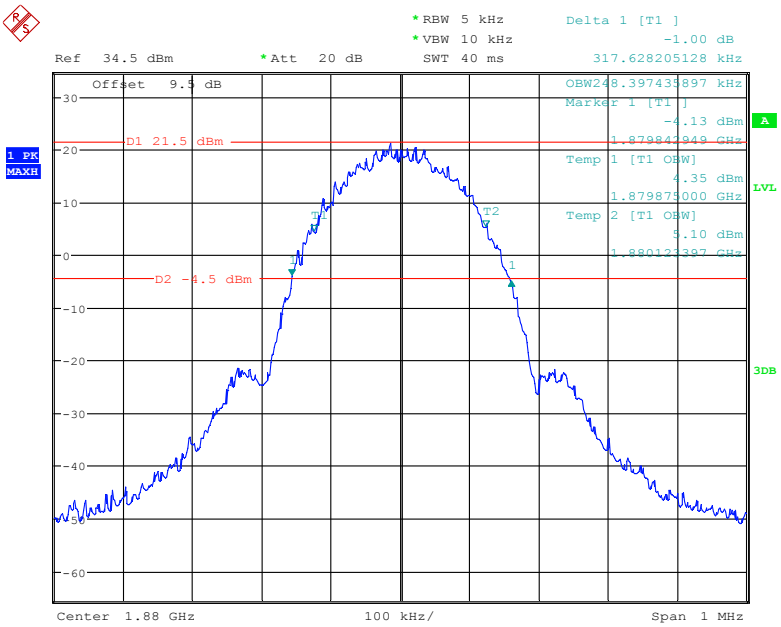
PCS Band (Part 24E)

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



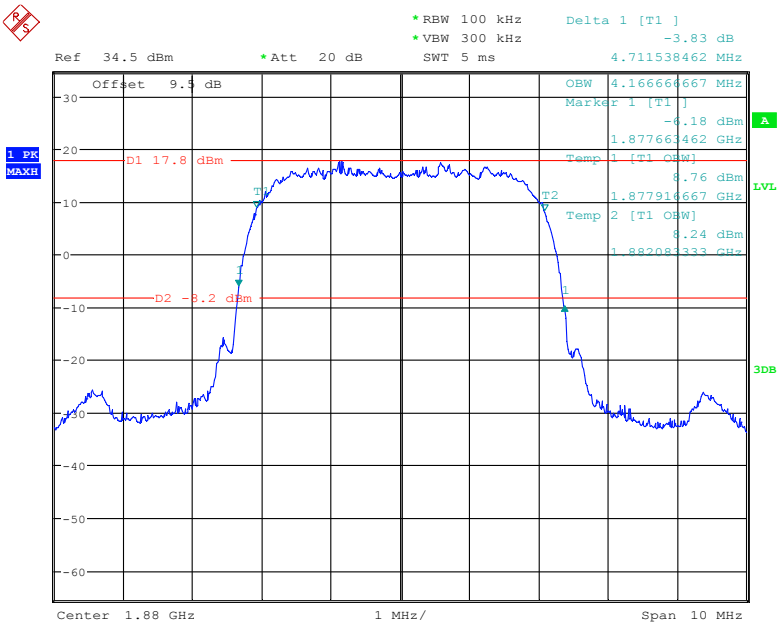
Date: 1.JUL.2019 21:42:03

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



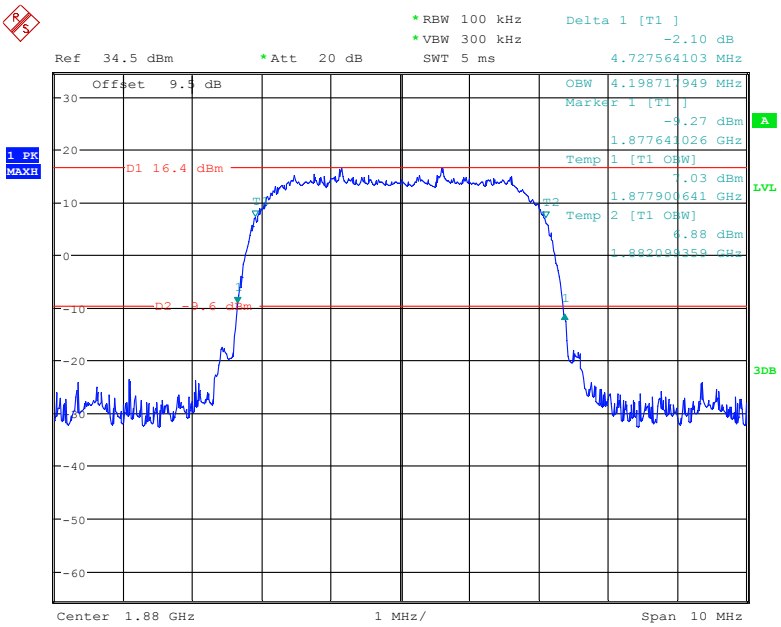
Date: 1.JUL.2019 22:14:05

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



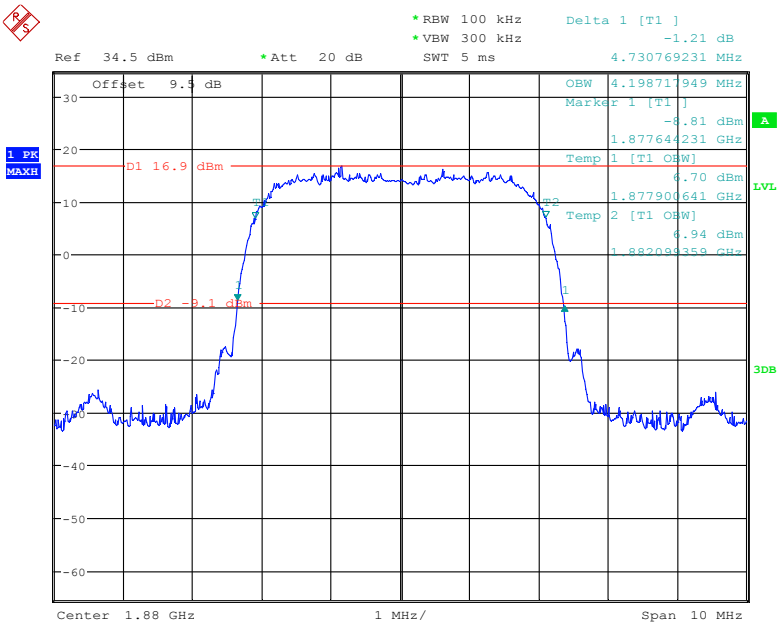
Date: 1.JUL.2019 22:46:50

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



Date: 1.JUL.2019 22:36:57

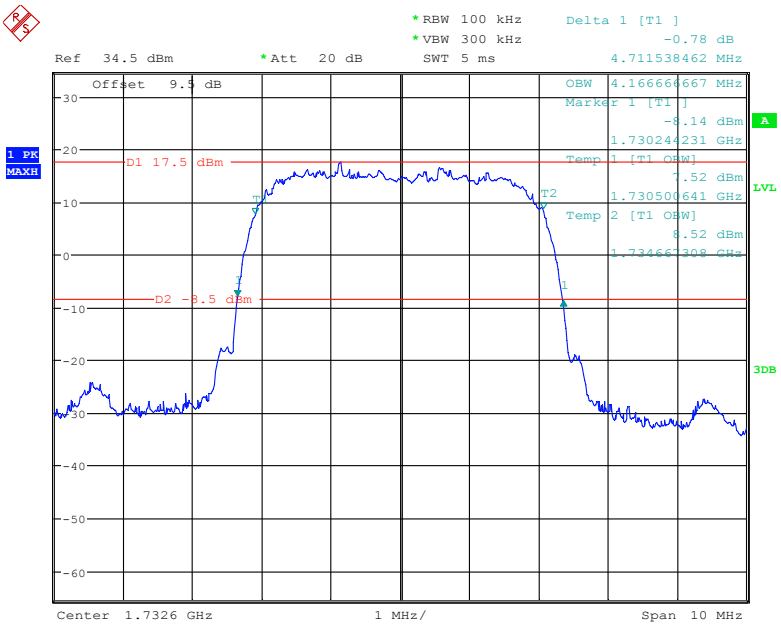
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 1.JUL.2019 22:32:55

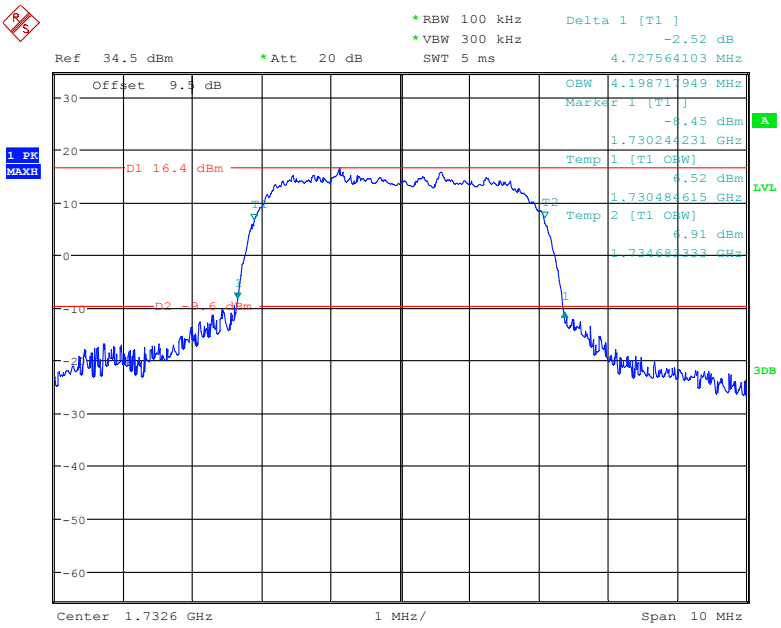
AWS Band (Part 27)

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



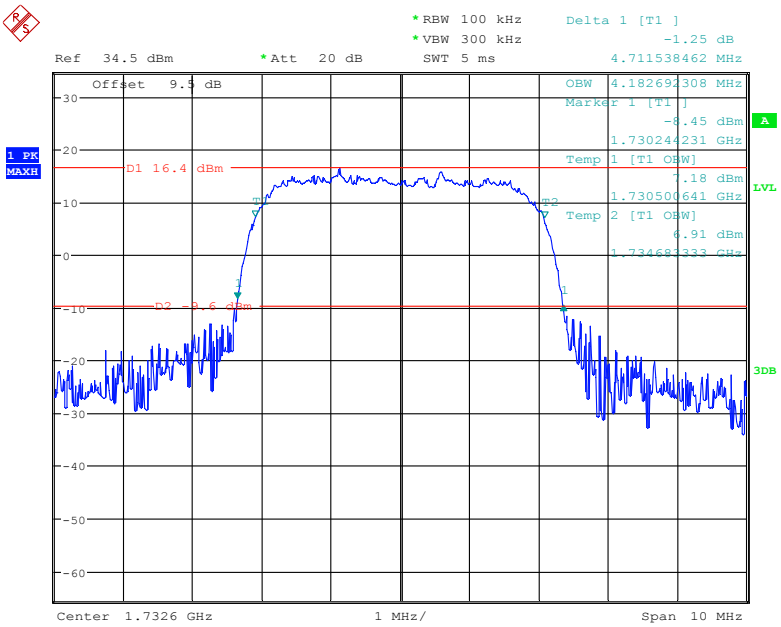
Date: 2.JUL.2019 00:02:59

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



Date: 2.JUL.2019 00:01:19

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

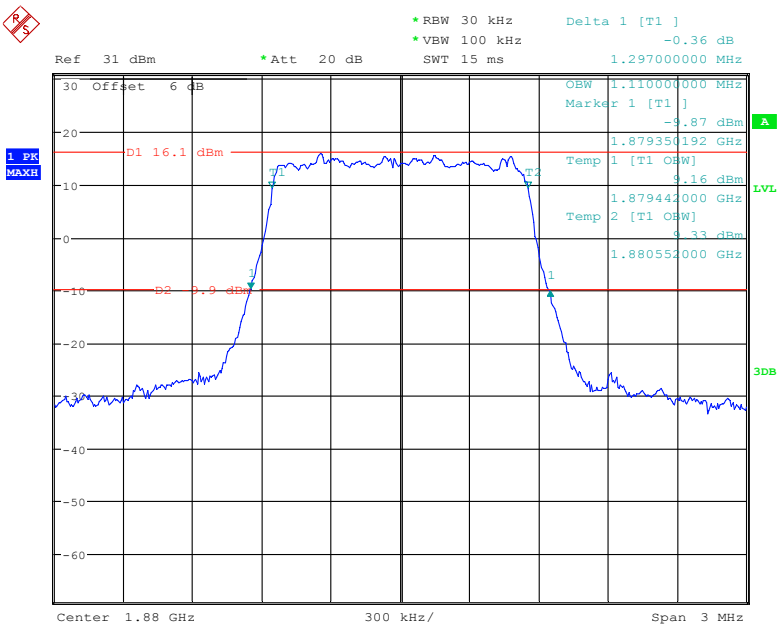


Date: 1.JUL.2019 23:58:48

LTE Band 2: (Middle Channel)

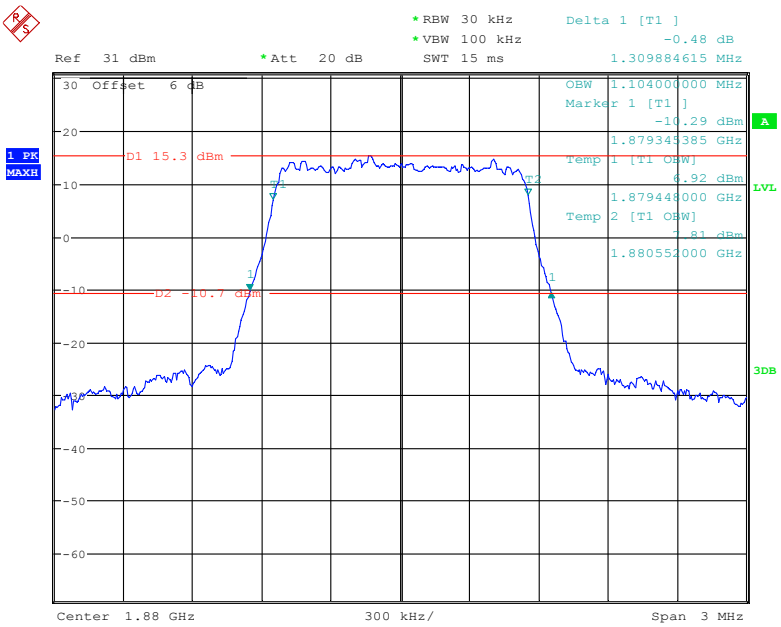
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.11	1.30
	16QAM	1.10	1.31
3.0	QPSK	2.69	2.89
	16QAM	2.69	2.91
5.0	QPSK	4.52	4.96
	16QAM	4.48	4.88
10.0	QPSK	8.96	9.63
	16QAM	8.96	9.50
15.0	QPSK	13.50	14.58
	16QAM	13.50	14.55
20.0	QPSK	17.92	19.04
	16QAM	17.92	18.97

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



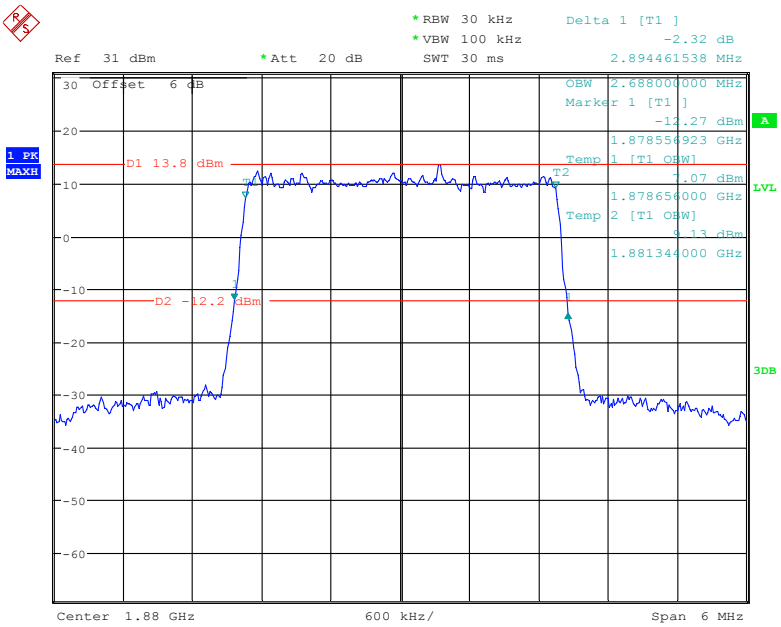
Date: 28.JUN.2019 14:19:02

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



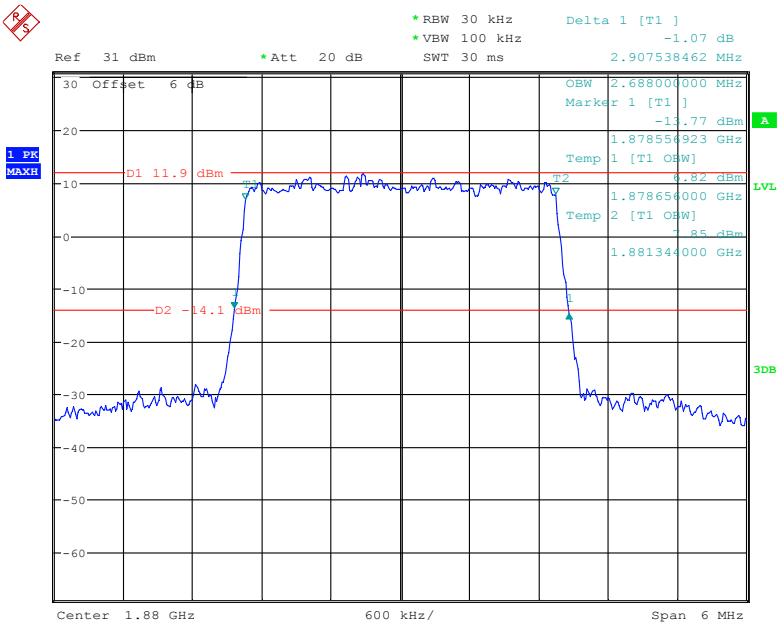
Date: 28.JUN.2019 14:21:04

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



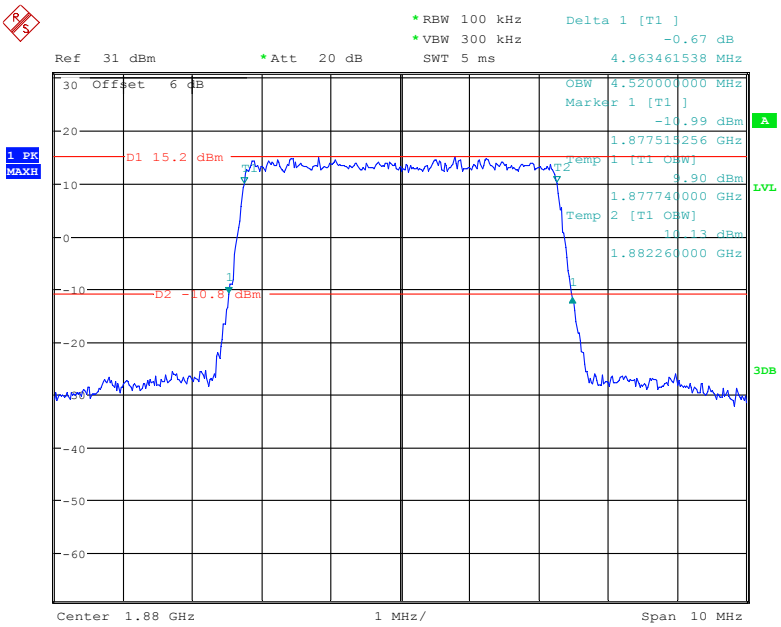
Date: 28.JUN.2019 14:22:28

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



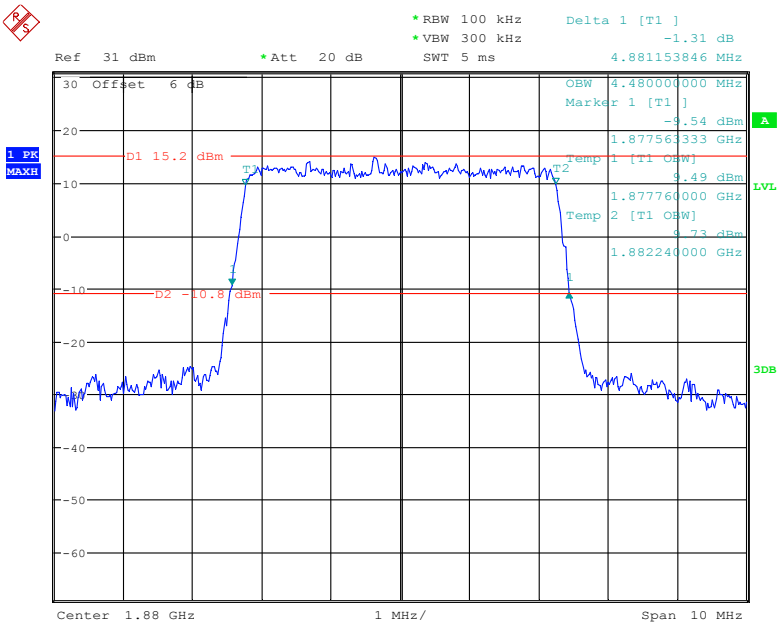
Date: 28.JUN.2019 14:23:36

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



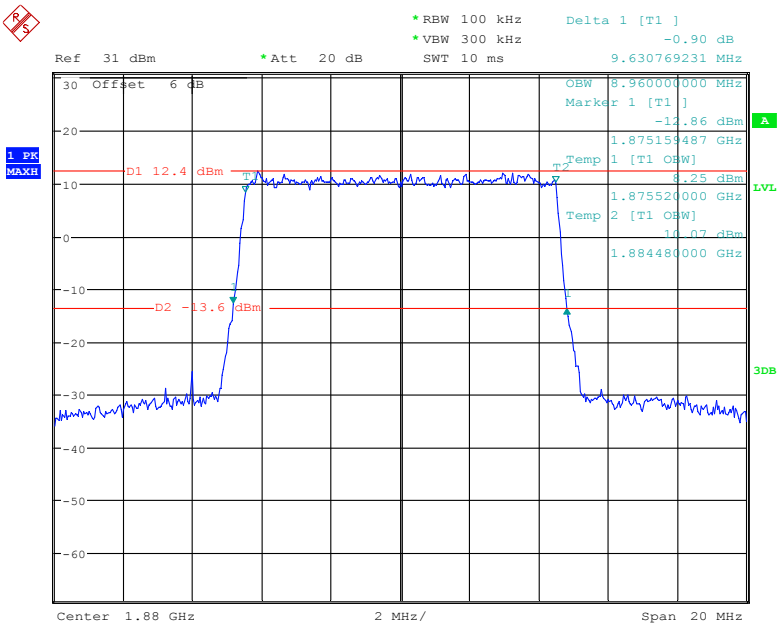
Date: 28.JUN.2019 14:24:43

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



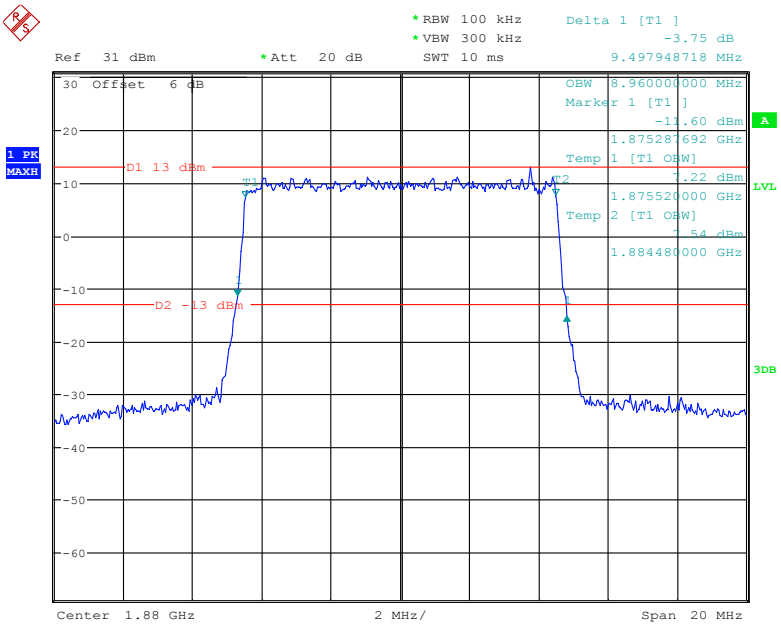
Date: 28.JUN.2019 14:25:33

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



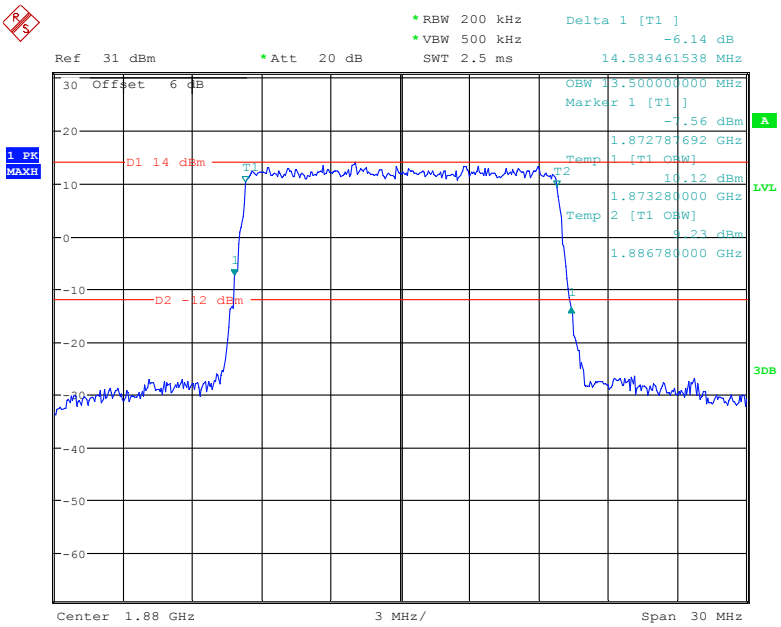
Date: 28.JUN.2019 14:26:35

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



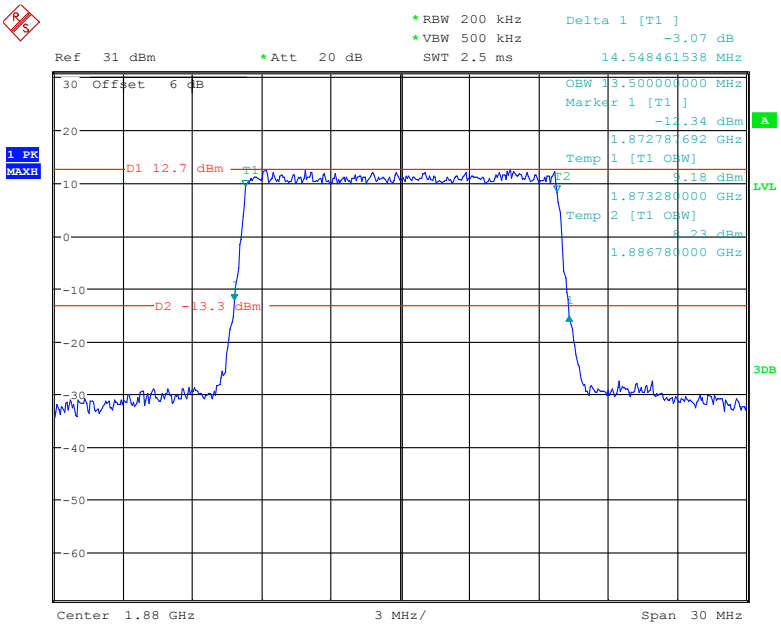
Date: 28.JUN.2019 14:27:19

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



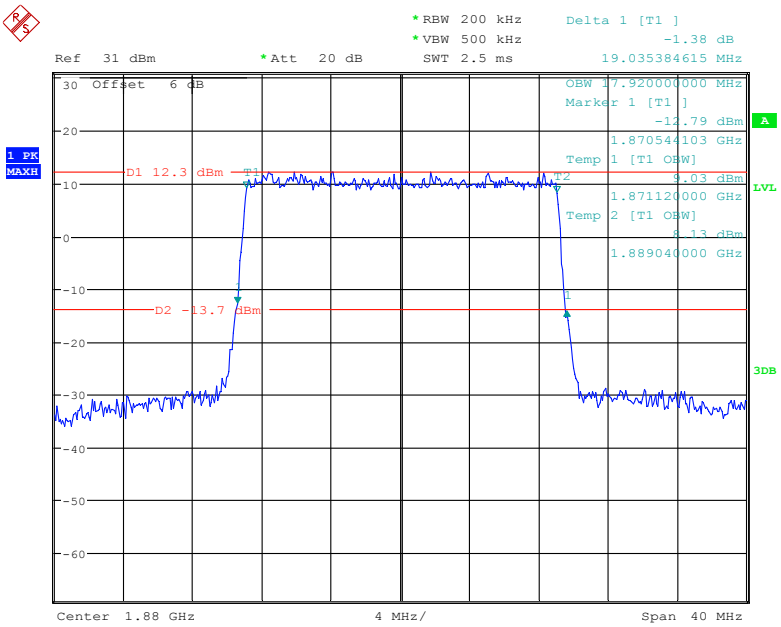
Date: 28.JUN.2019 14:29:34

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



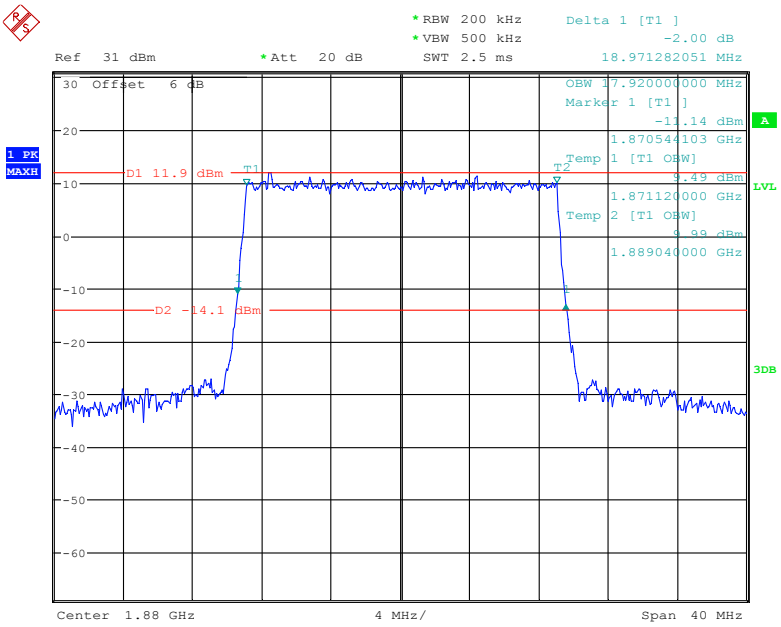
Date: 28.JUN.2019 14:30:29

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



Date: 28.JUN.2019 14:31:18

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

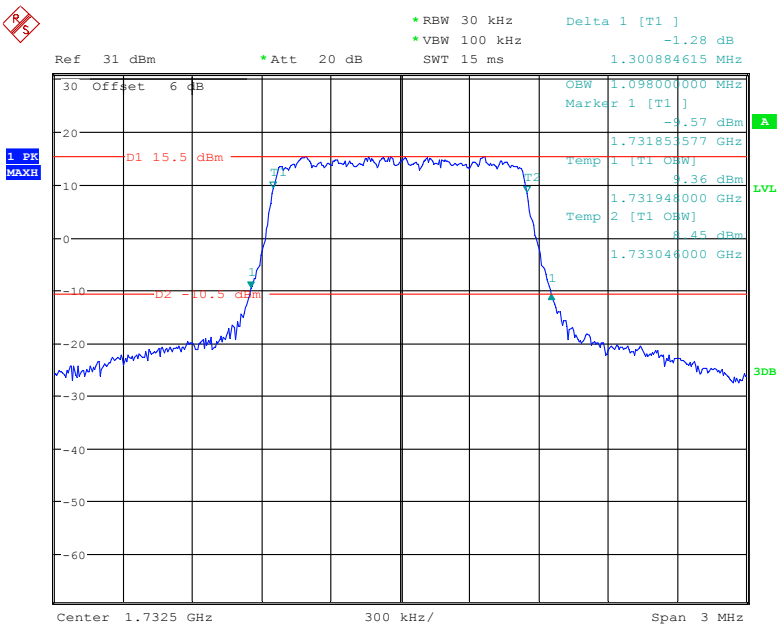


Date: 28.JUN.2019 14:35:12

LTE Band 4: (Middle Channel)

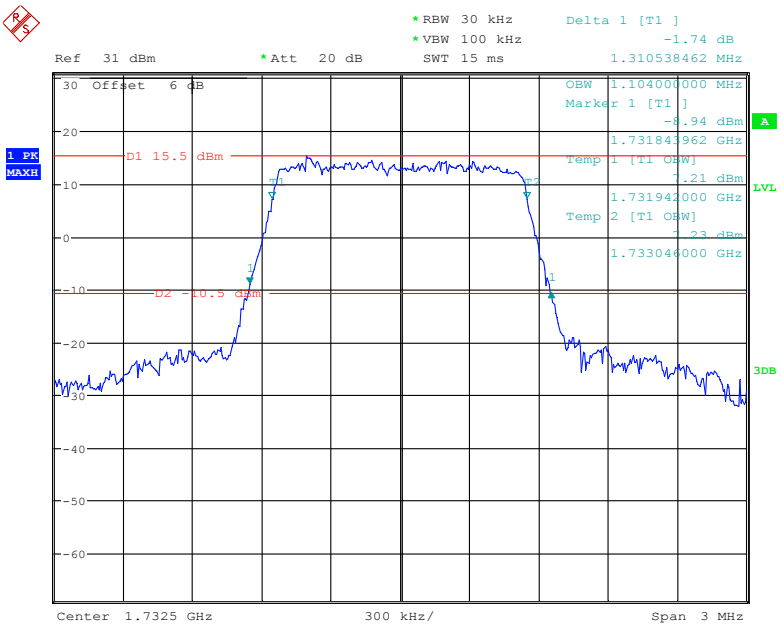
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.30
	16QAM	1.10	1.31
3.0	QPSK	2.69	2.89
	16QAM	2.69	2.91
5.0	QPSK	4.52	4.97
	16QAM	4.50	4.95
10.0	QPSK	8.96	9.65
	16QAM	8.96	9.61
15.0	QPSK	13.50	14.45
	16QAM	13.44	14.54
20.0	QPSK	17.92	19.02
	16QAM	17.92	19.17

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



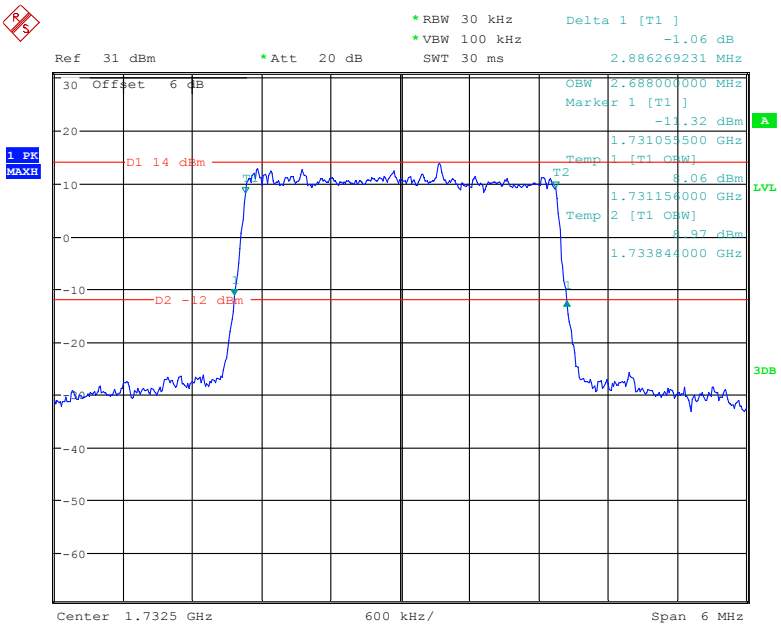
Date: 28.JUN.2019 14:37:07

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



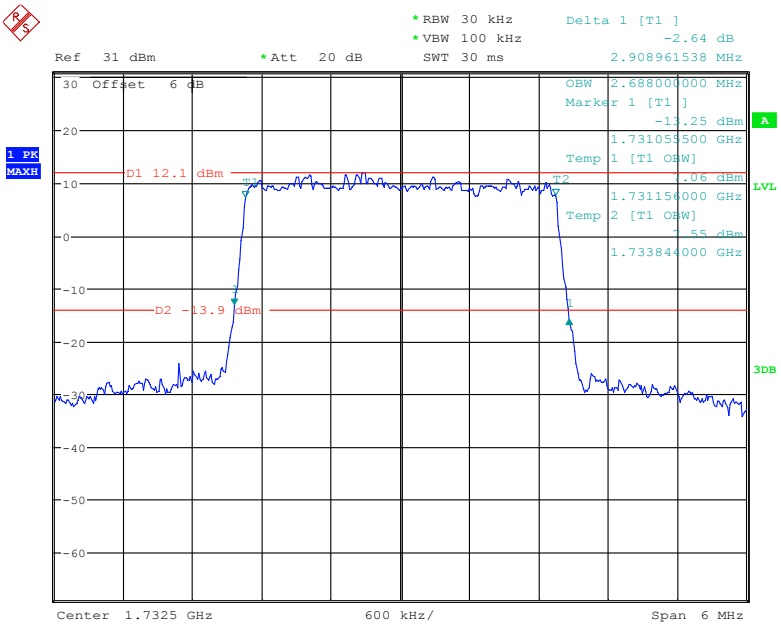
Date: 28.JUN.2019 14:37:49

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



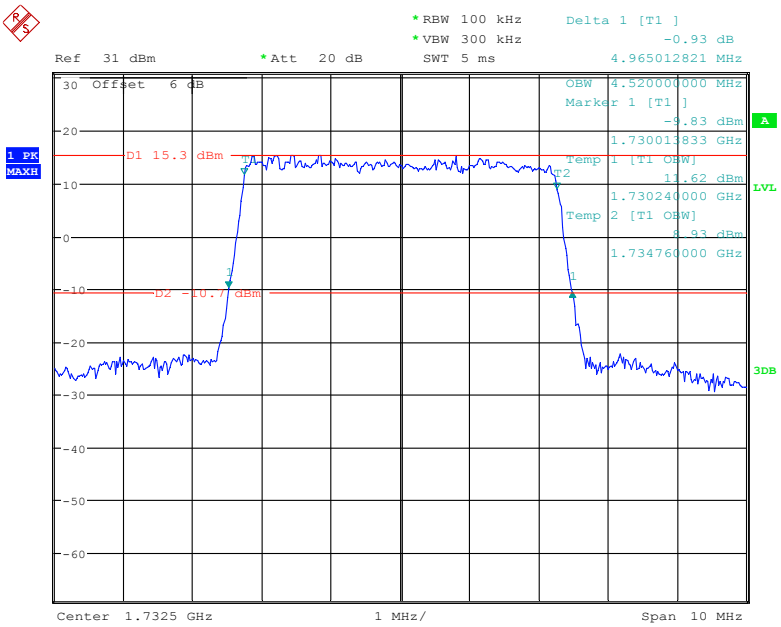
Date: 28.JUN.2019 14:39:41

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



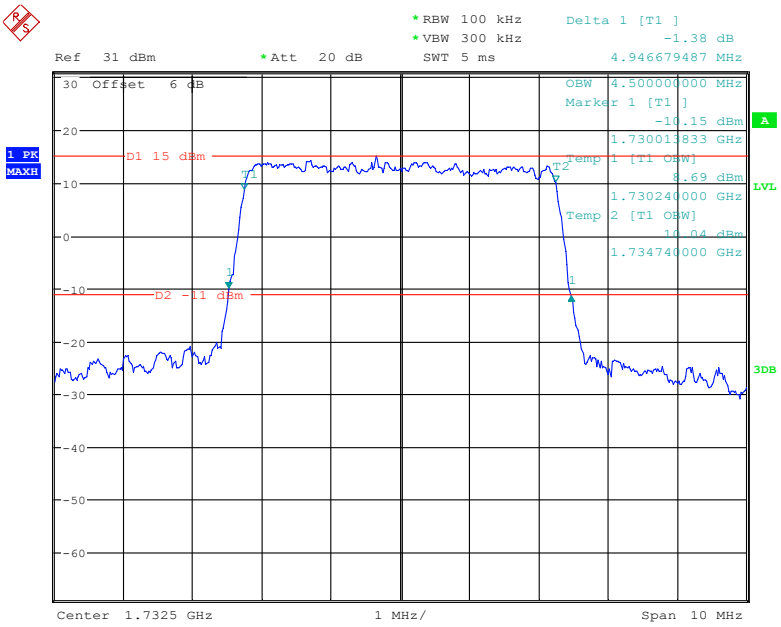
Date: 28.JUN.2019 14:38:48

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



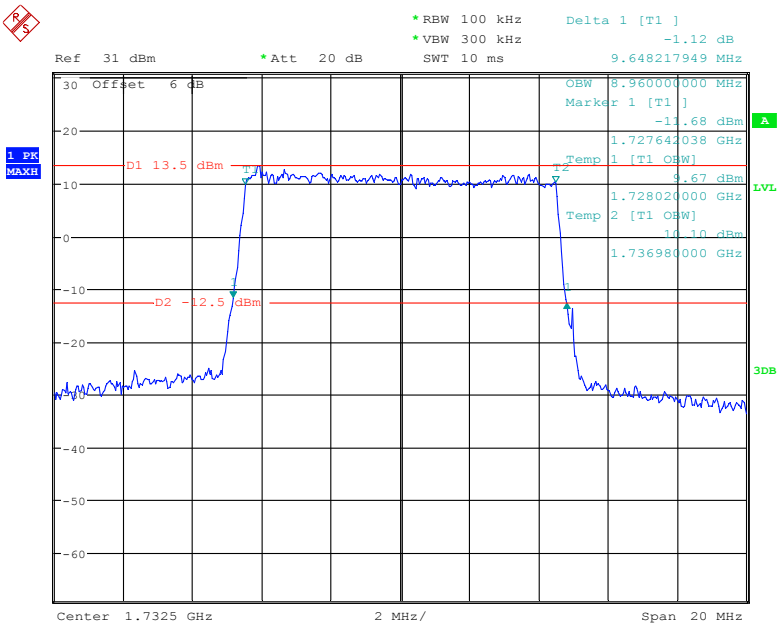
Date: 28.JUN.2019 14:42:05

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



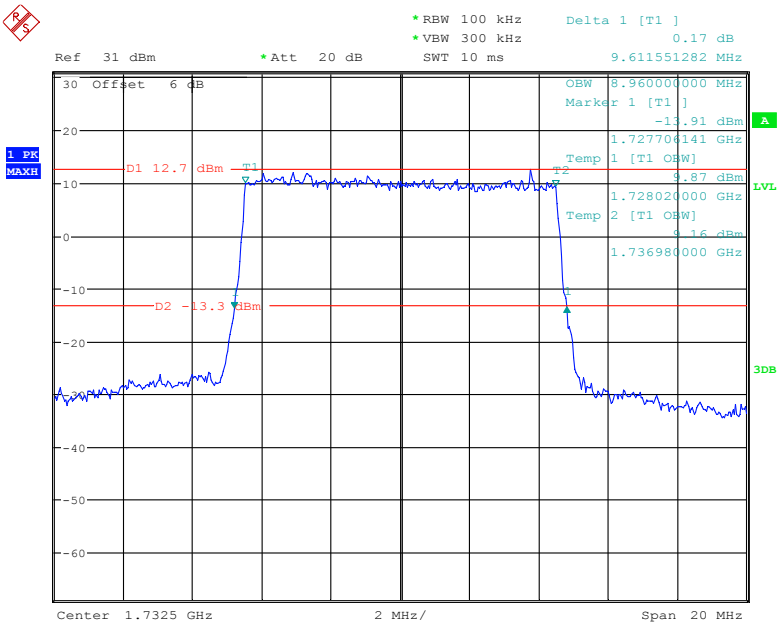
Date: 28.JUN.2019 14:41:05

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



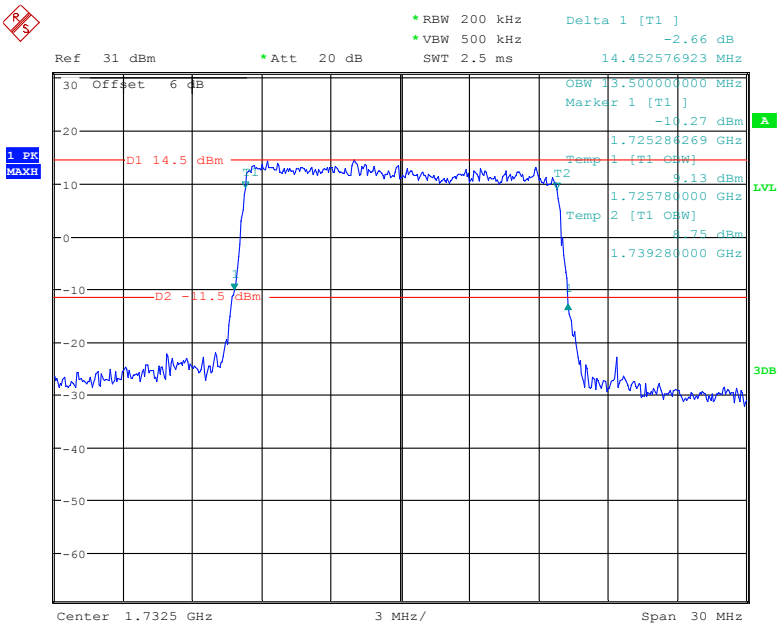
Date: 28.JUN.2019 14:44:15

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



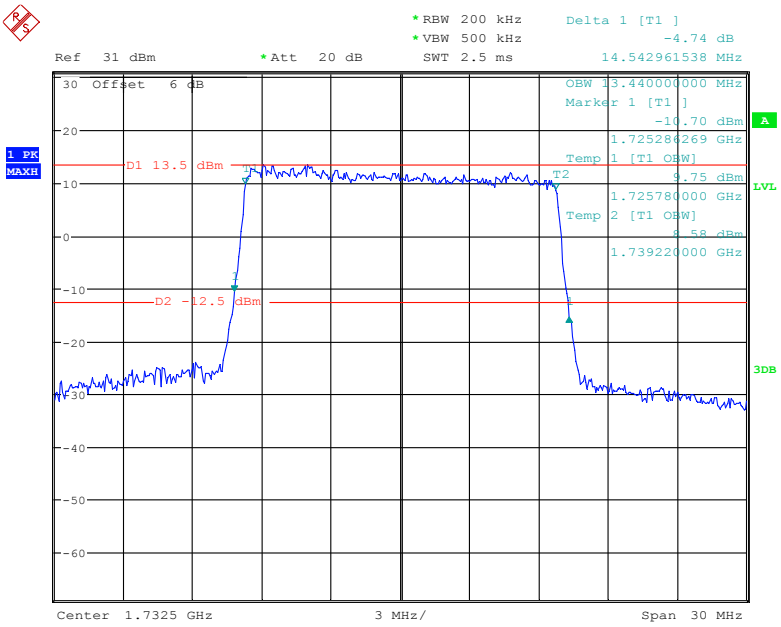
Date: 28.JUN.2019 14:43:09

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



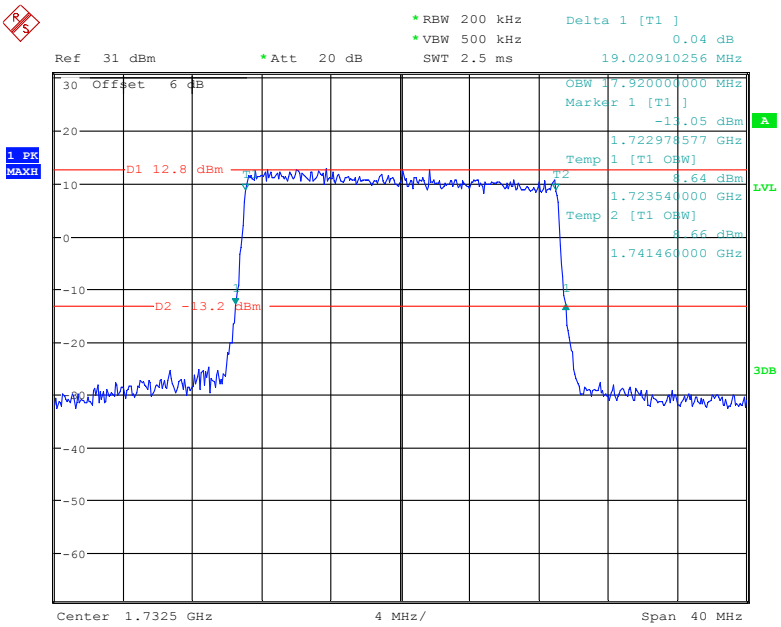
Date: 28.JUN.2019 14:46:34

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



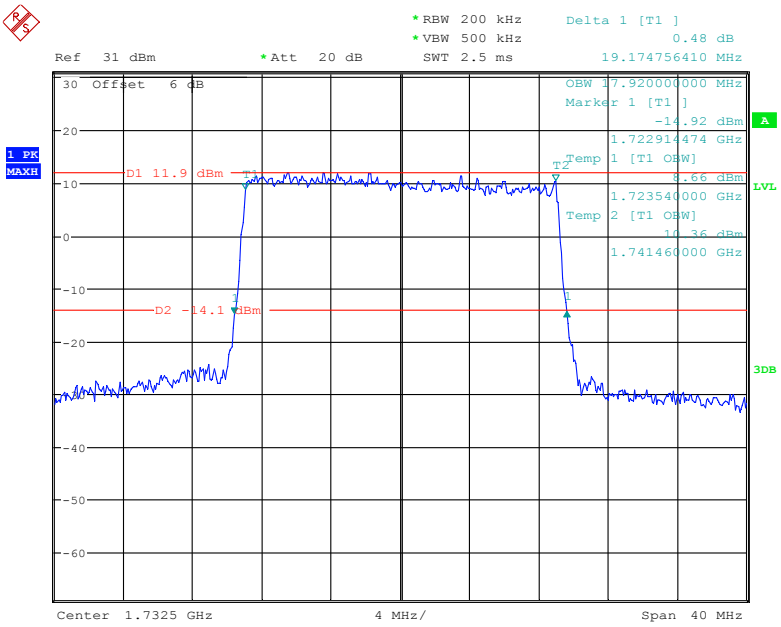
Date: 28.JUN.2019 14:45:35

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



Date: 28.JUN.2019 14:48:20

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

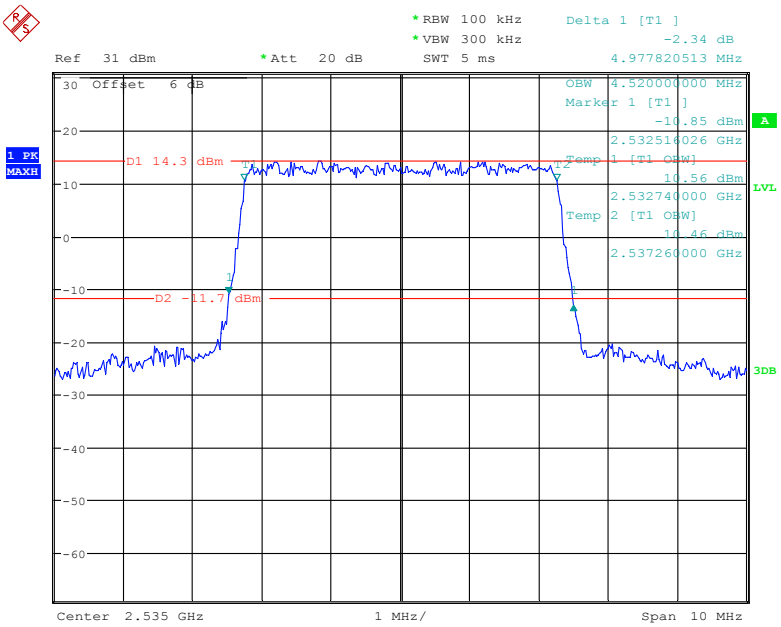


Date: 28.JUN.2019 14:47:31

LTE Band 7: (Middle Channel)

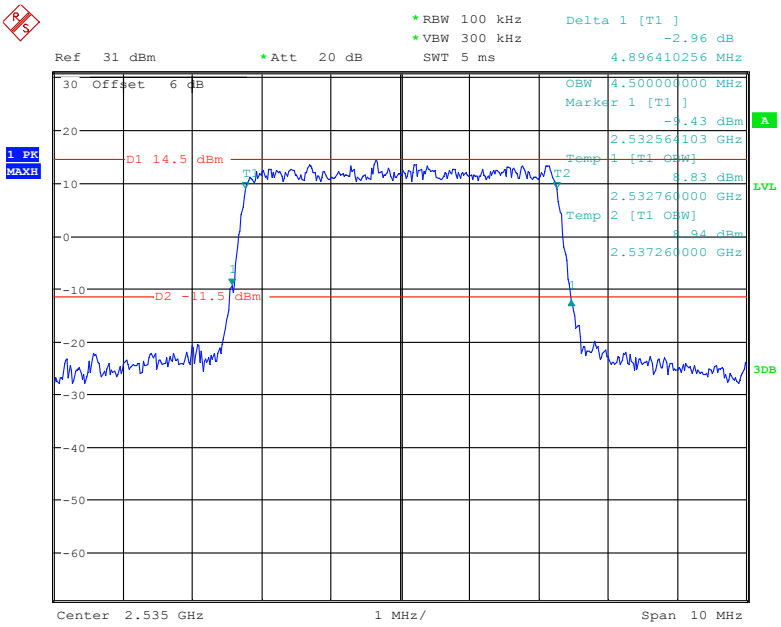
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.52	4.98
	16QAM	4.50	4.90
10.0	QPSK	9.00	9.60
	16QAM	8.96	9.62
15.0	QPSK	13.44	14.61
	16QAM	13.44	14.54
20.0	QPSK	17.92	19.32
	16QAM	17.92	19.15

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



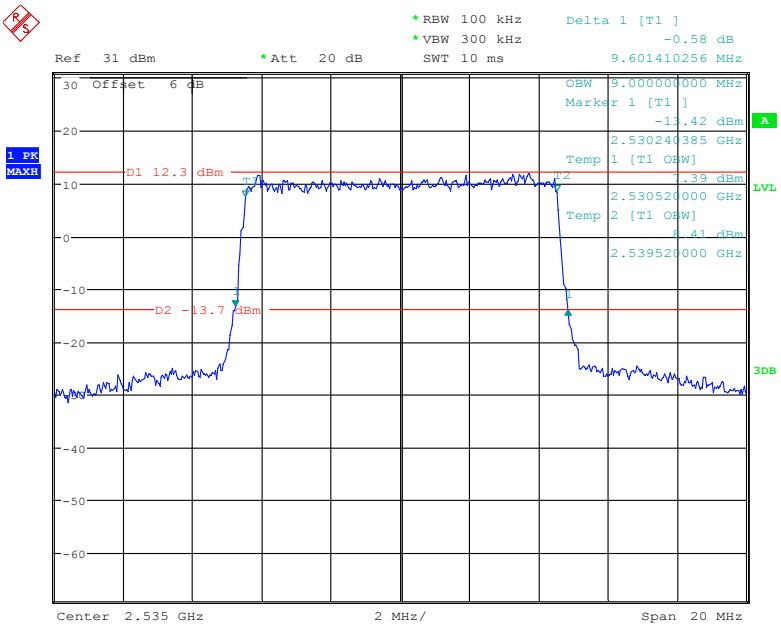
Date: 28.JUN.2019 14:58:17

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



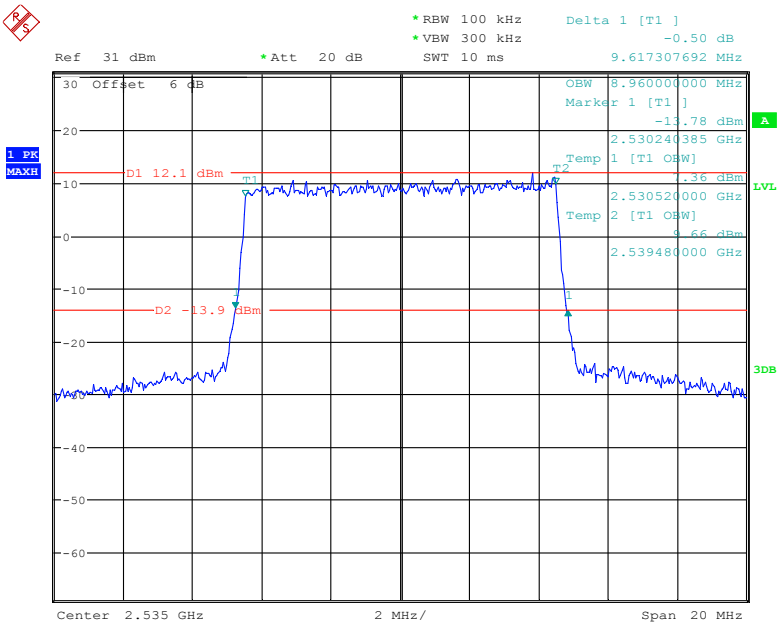
Date: 28.JUN.2019 14:58:59

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



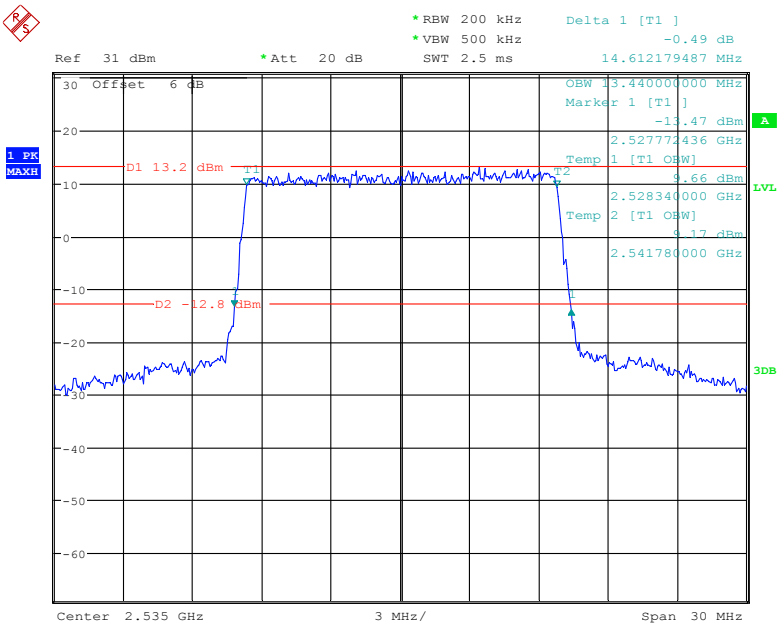
Date: 28.JUN.2019 14:55:56

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



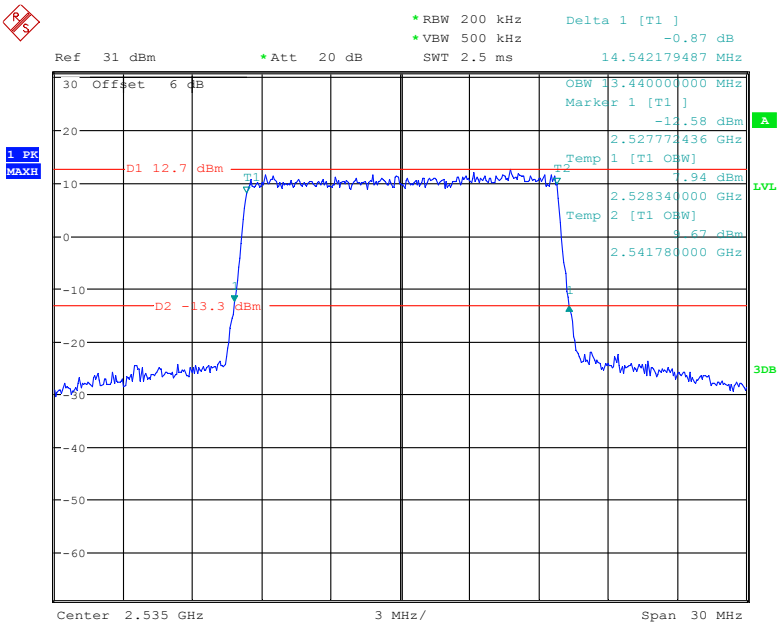
Date: 28.JUN.2019 14:57:04

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



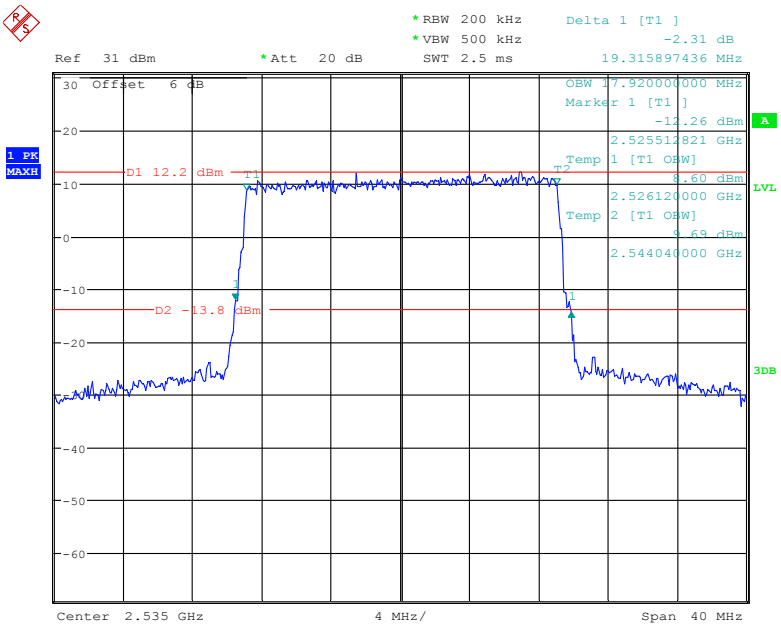
Date: 28.JUN.2019 14:53:23

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



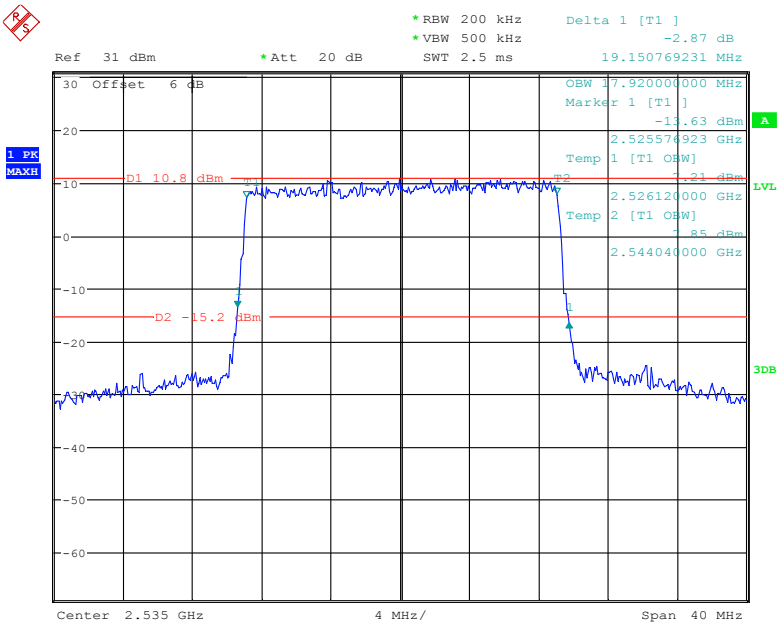
Date: 28.JUN.2019 14:54:53

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



Date: 28.JUN.2019 14:52:31

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



Date: 28.JUN.2019 14:51:22

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

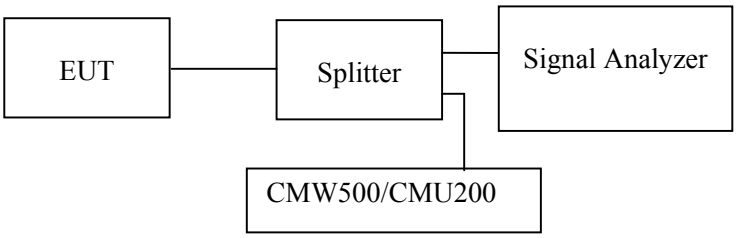
Applicable Standard

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

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

Test Procedure

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



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Kieroy Luo from 2019-06-28 to 2019-07-01.

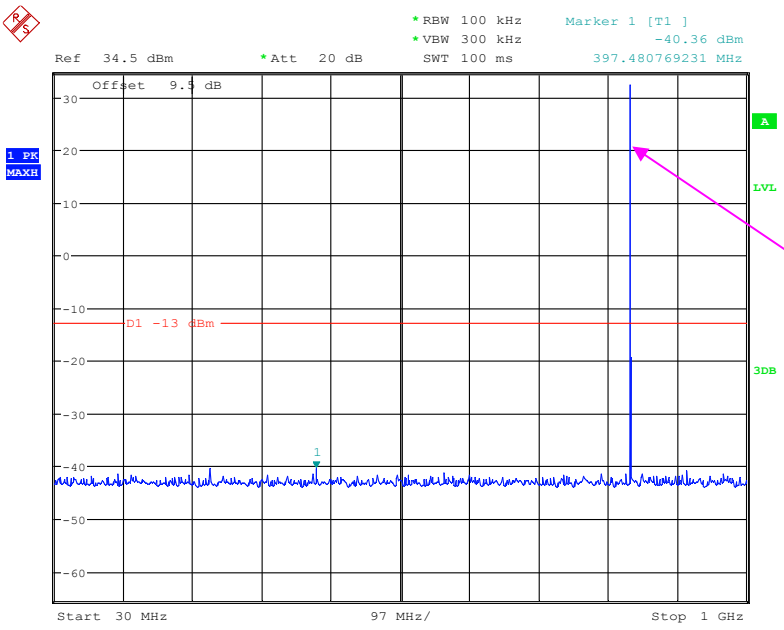
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

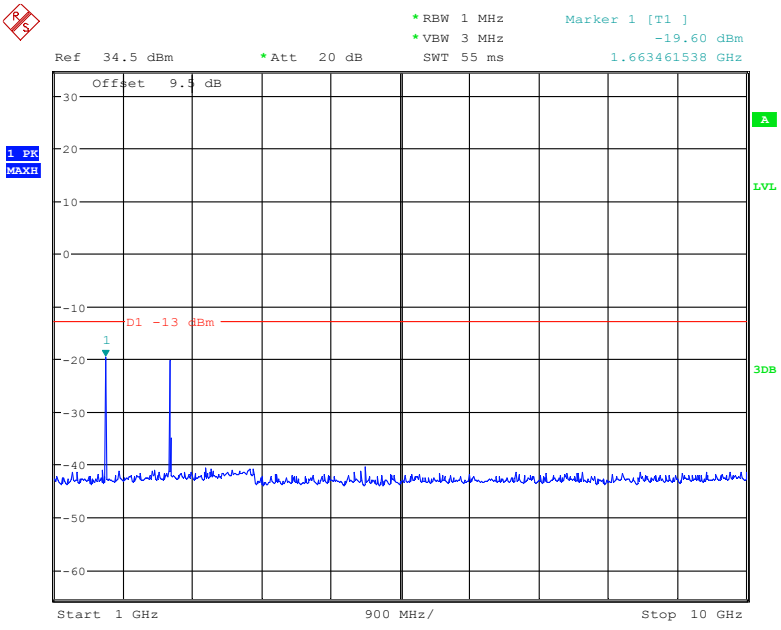
30 MHz – 1 GHz (GSM Mode)



Fundamental test

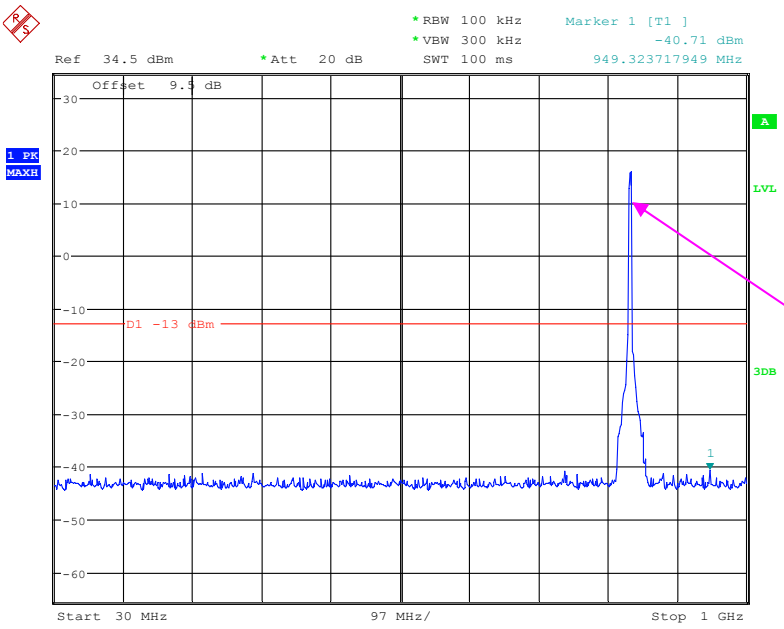
Date: 1.JUL.2019 21:33:48

1 GHz – 10 GHz (GSM Mode)



Date: 1.JUL.2019 21:34:27

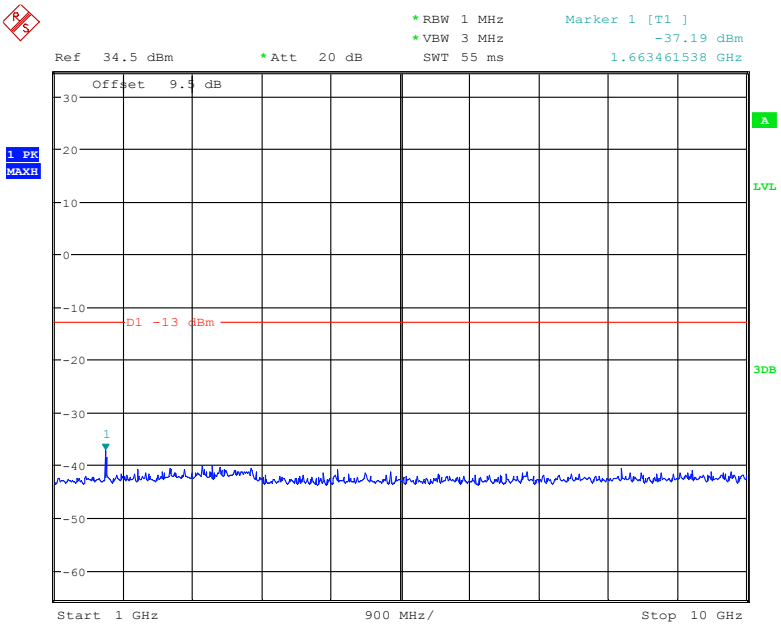
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 1.JUL.2019 23:18:18

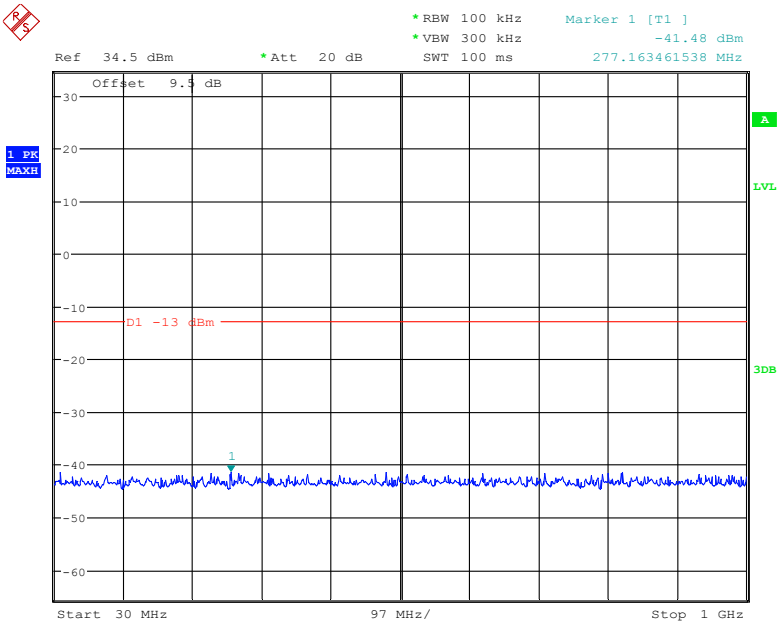
1 GHz – 10 GHz (WCDMA Mode)



Date: 1.JUL.2019 23:16:23

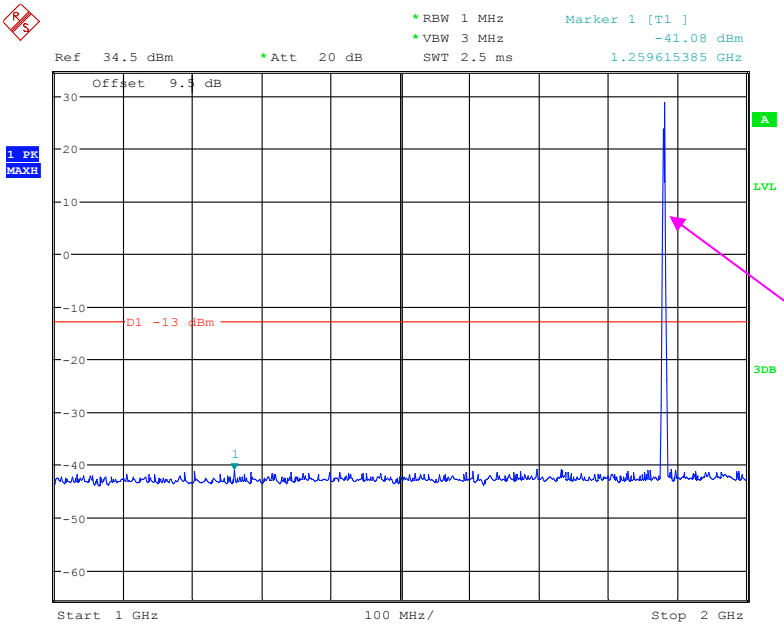
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 1.JUL.2019 21:39:33

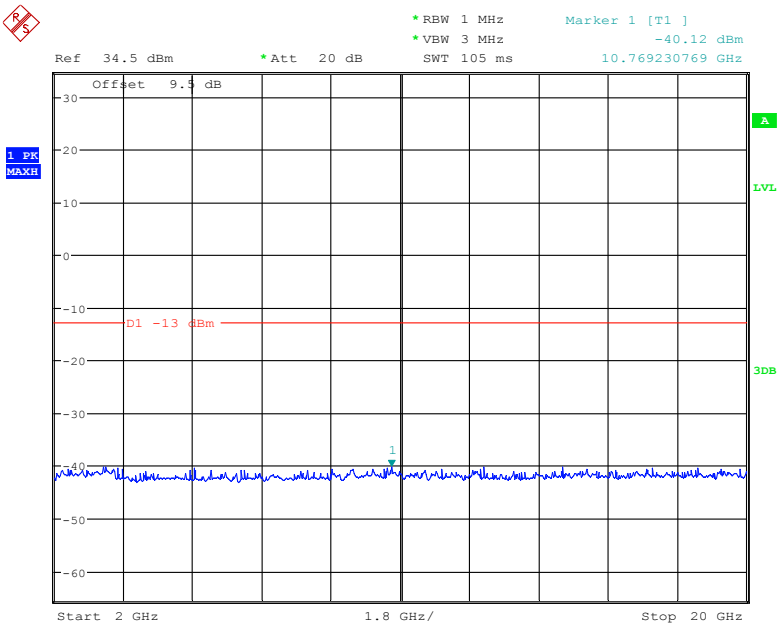
1 GHz – 2 GHz (GSM Mode)



Fundamental test

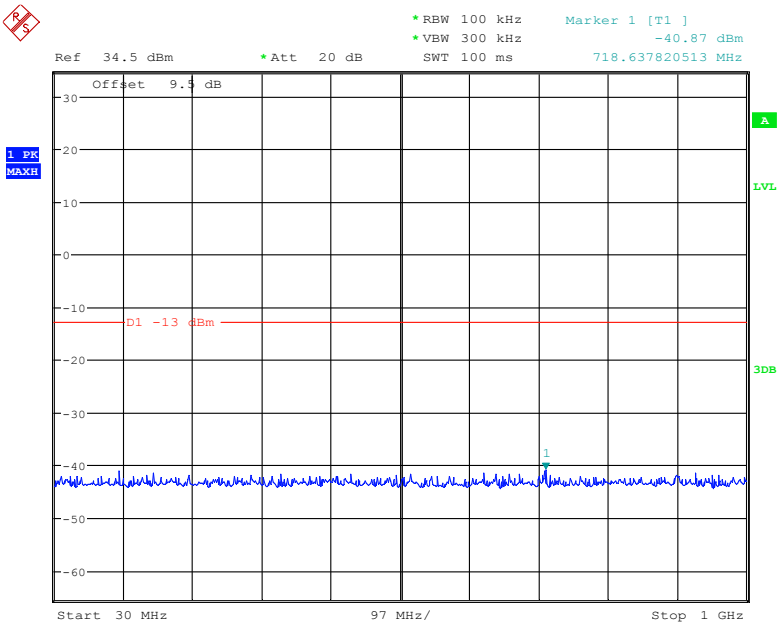
Date: 1.JUL.2019 21:38:10

2 GHz – 20 GHz (GSM Mode)



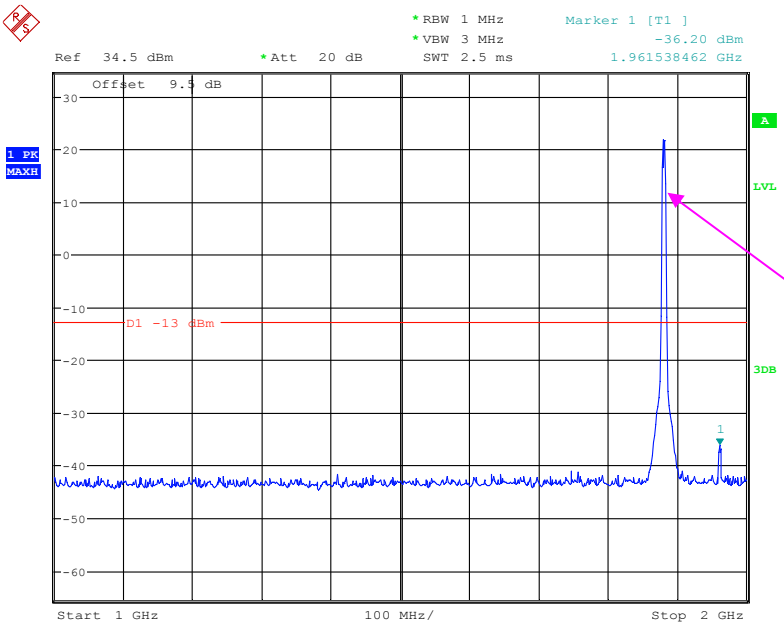
Date: 1.JUL.2019 21:38:55

30 MHz – 1 GHz (WCDMA Mode)



Date: 1.JUL.2019 23:10:52

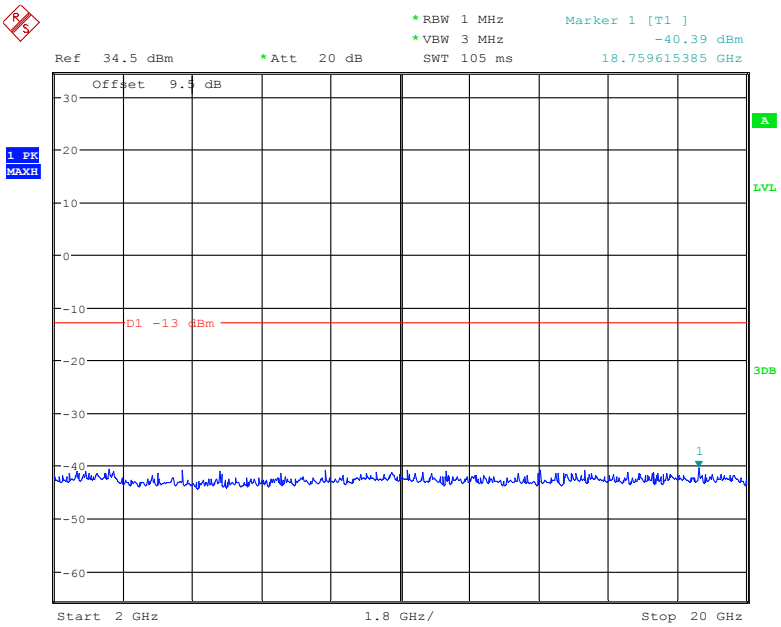
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 1.JUL.2019 23:11:32

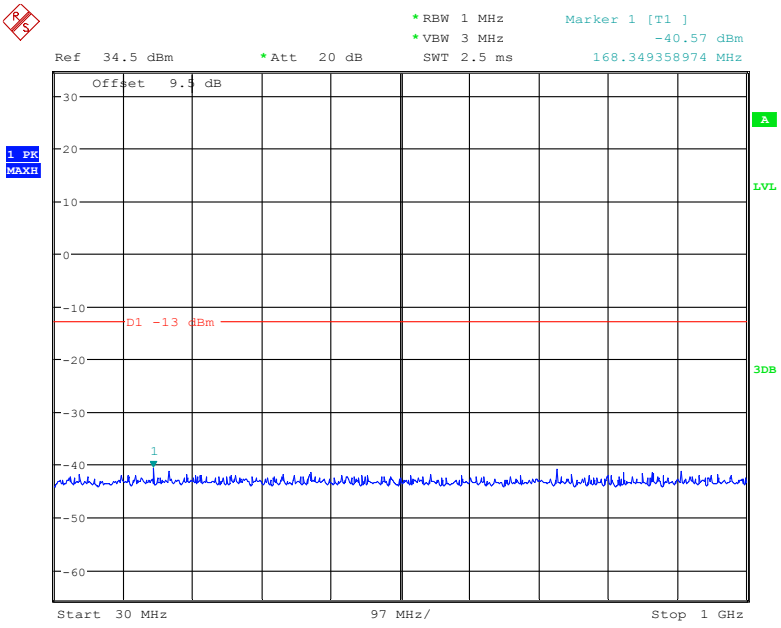
2 GHz – 20 GHz (WCDMA Mode)



Date: 1.JUL.2019 23:11:54

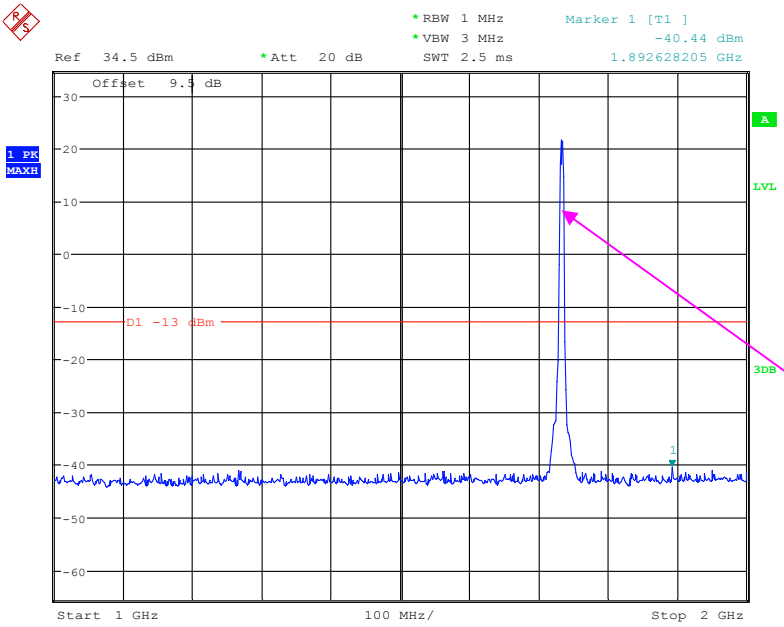
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



Date: 2.JUL.2019 00:15:00

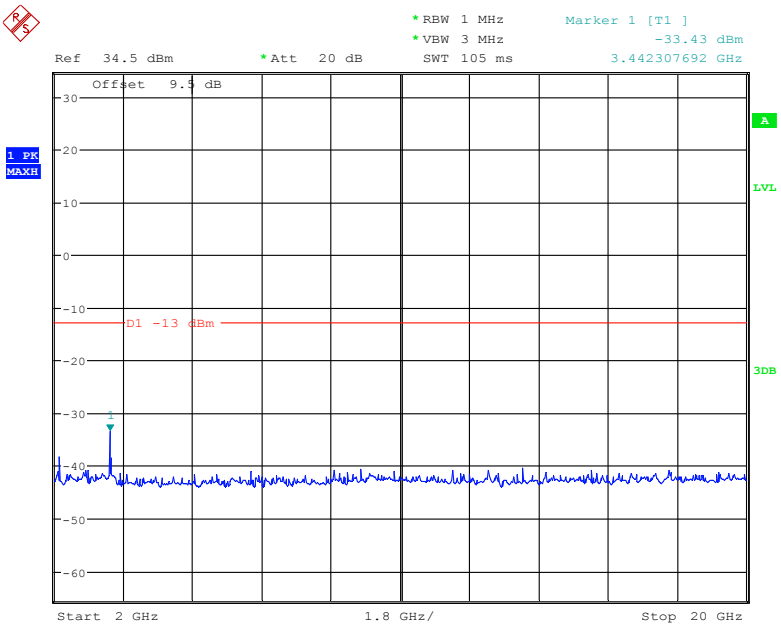
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 2.JUL.2019 00:14:36

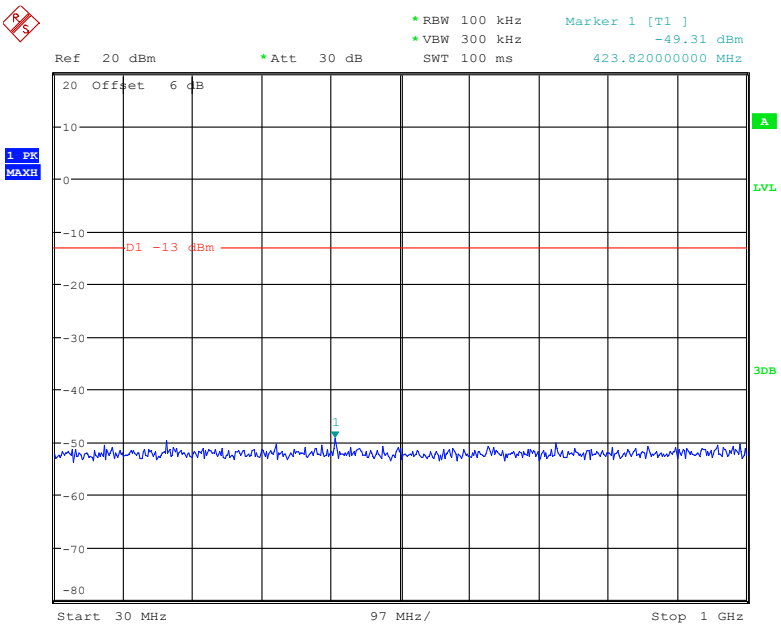
2 GHz – 20 GHz (WCDMA Mode)



Date: 2.JUL.2019 00:13:53

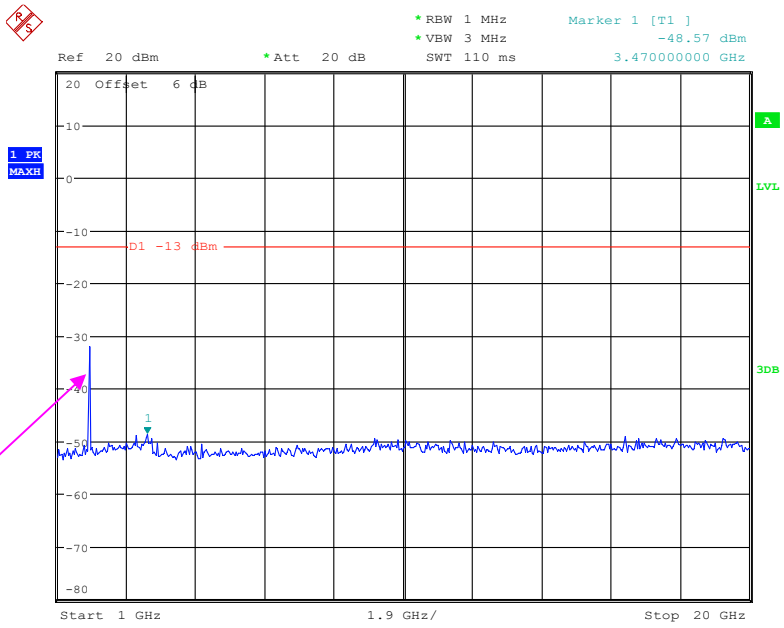
LTE Band 2:

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



Date: 28.JUN.2019 13:25:53

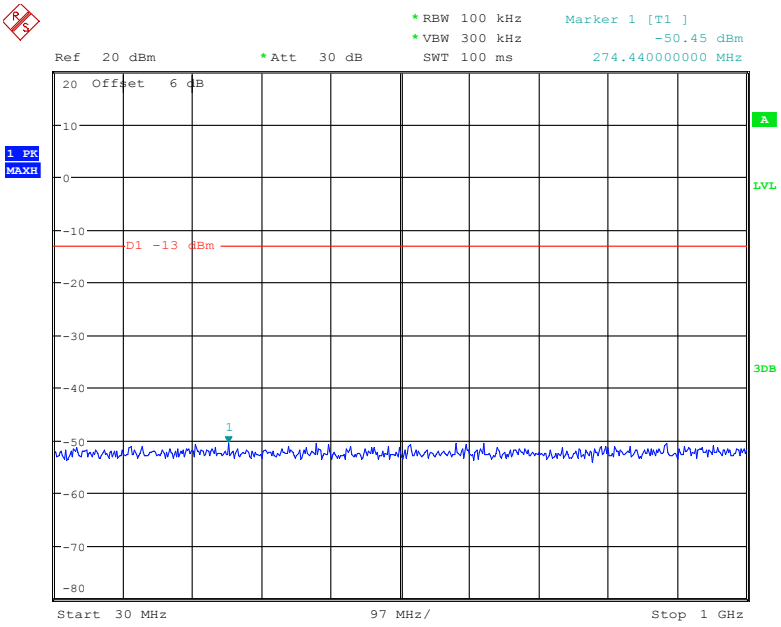
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test with notch filter

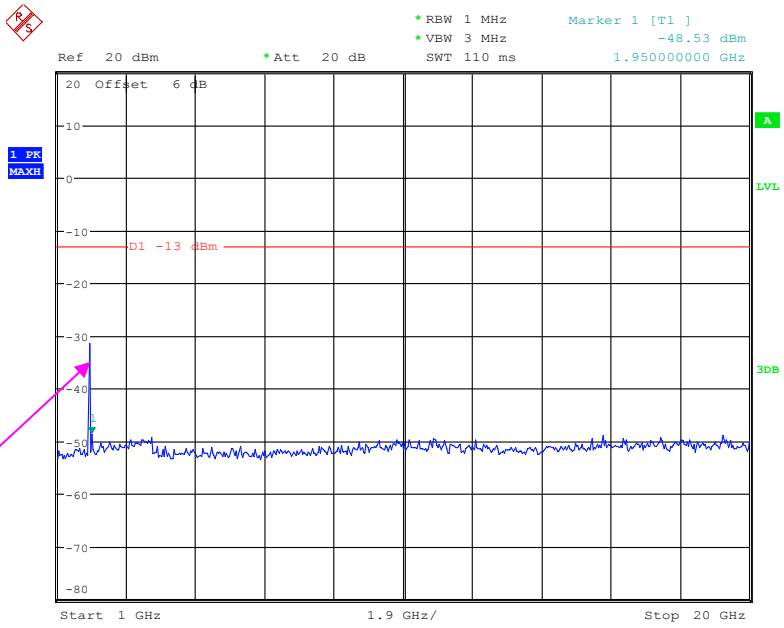
Date: 28.JUN.2019 13:26:03

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



Date: 28.JUN.2019 13:26:18

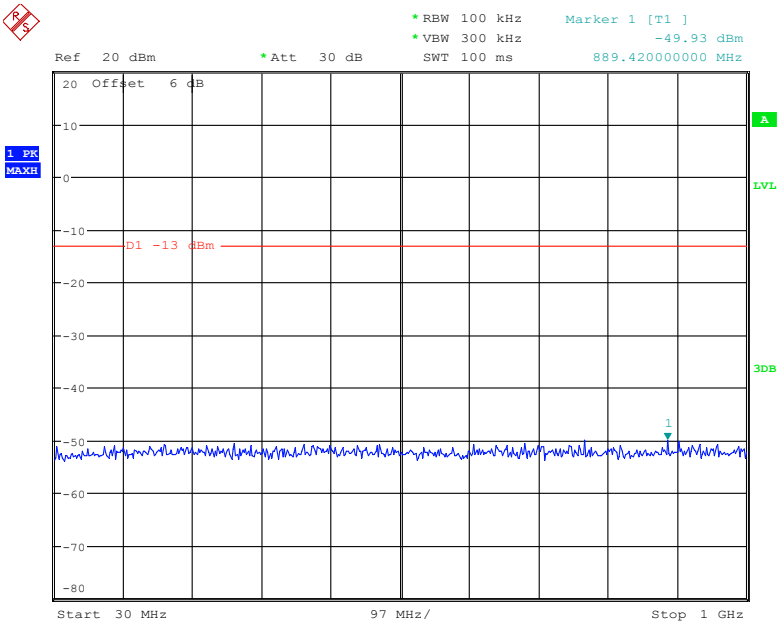
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test with notch filter

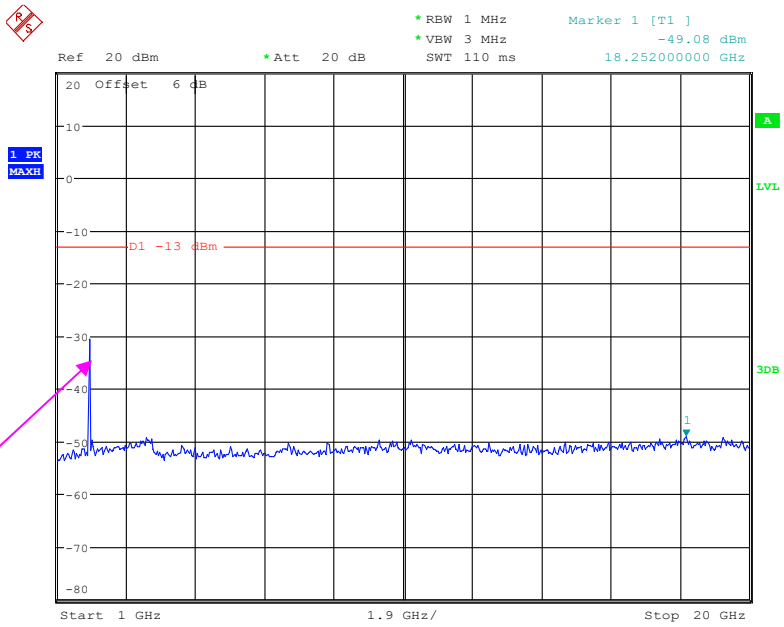
Date: 28.JUN.2019 13:26:27

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



Date: 28.JUN.2019 13:26:42

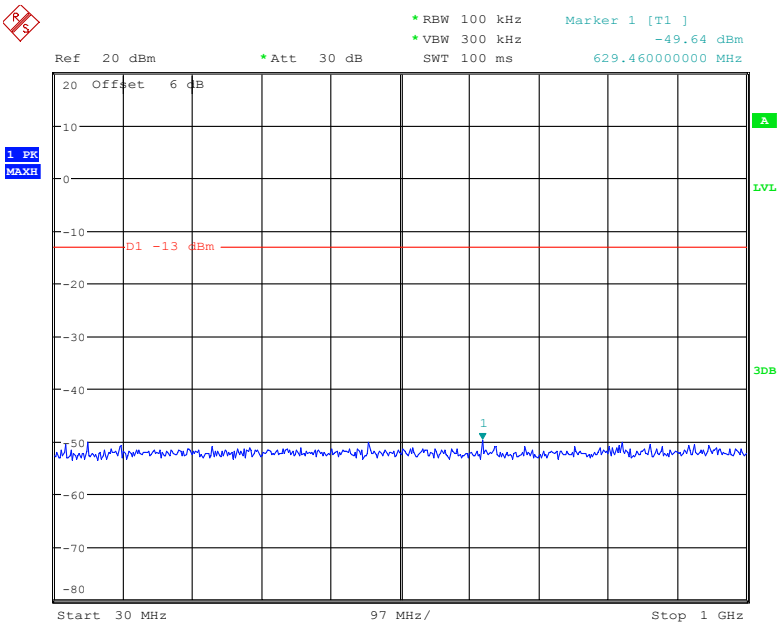
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test with notch filter

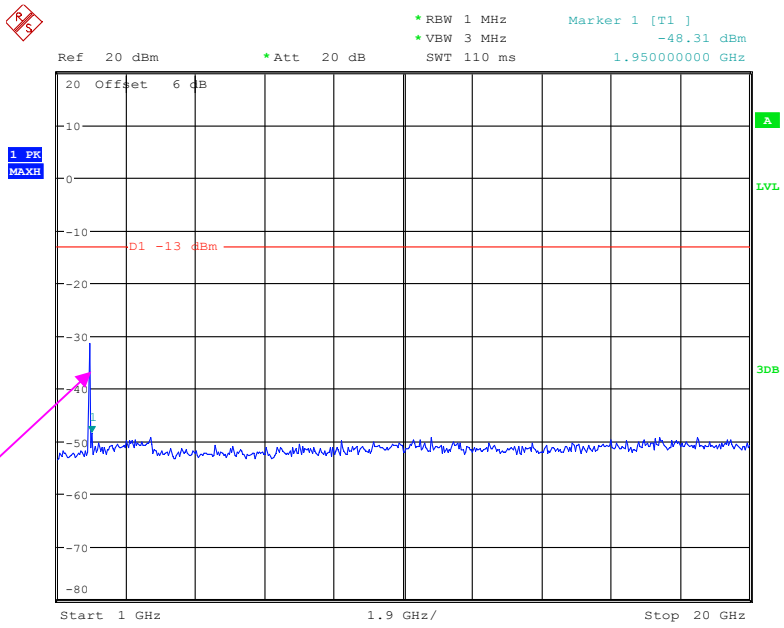
Date: 28.JUN.2019 13:26:51

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



Date: 28.JUN.2019 13:27:11

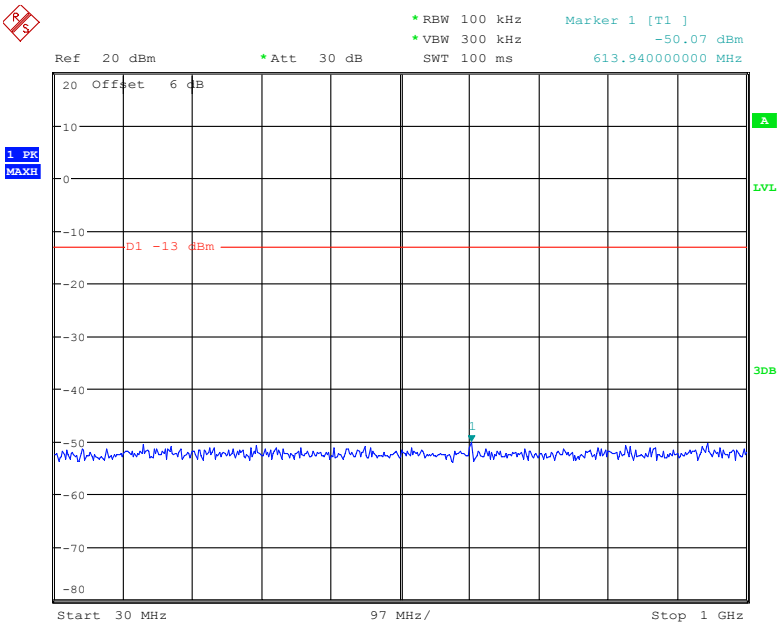
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test with notch filter

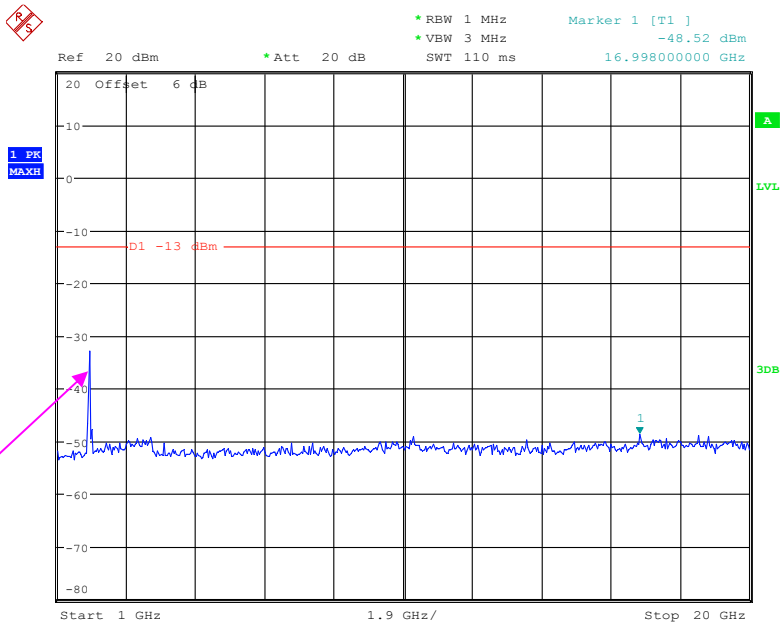
Date: 28.JUN.2019 13:27:20

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



Date: 28.JUN.2019 13:27:38

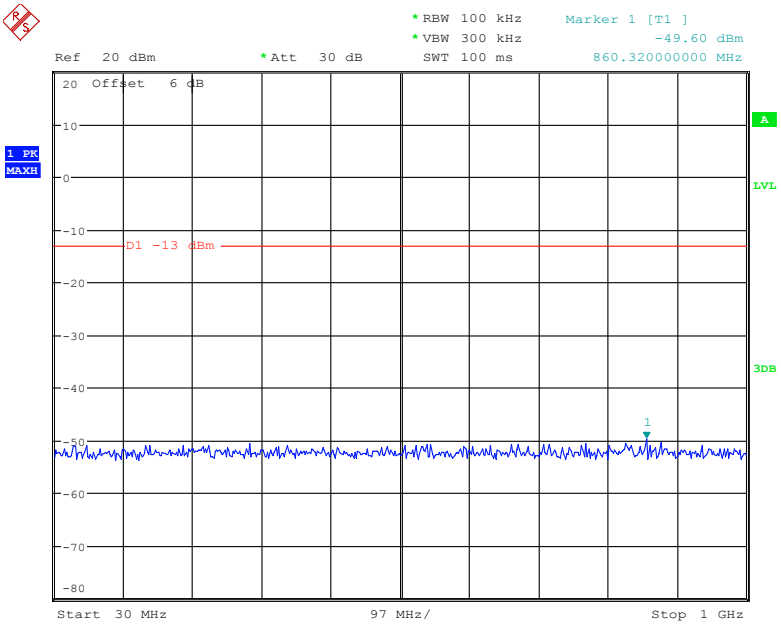
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test with notch filter

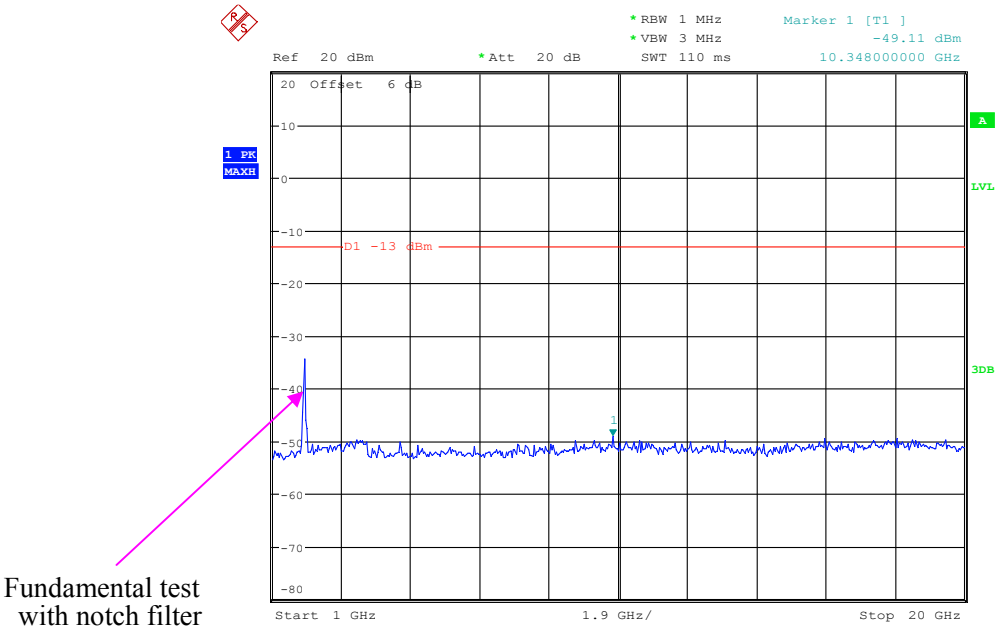
Date: 28.JUN.2019 13:27:48

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



Date: 28.JUN.2019 13:28:07

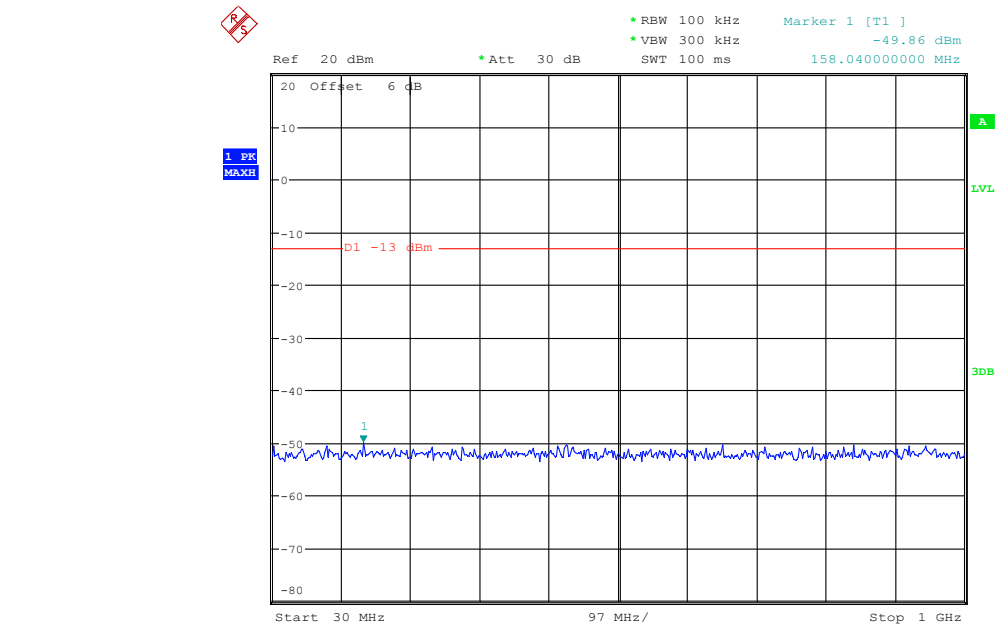
1 GHz - 20 GHz (20.0 MHz, Middle Channel)



Date: 28.JUN.2019 13:28:16

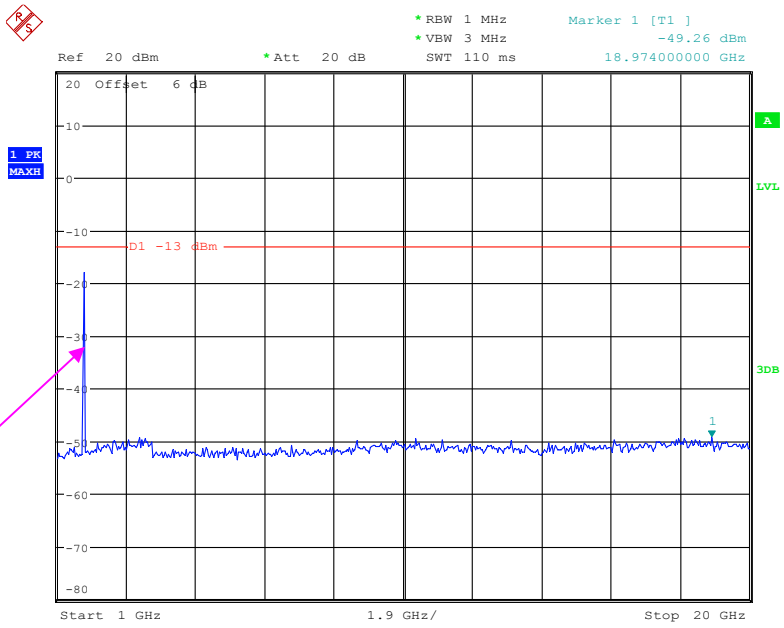
LTE Band 4:

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



Date: 28.JUN.2019 15:17:36

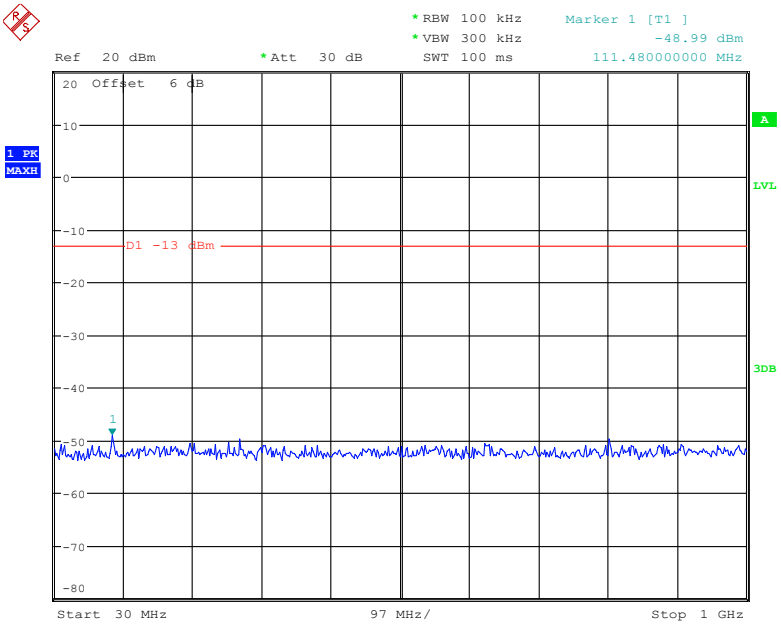
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test with notch filter

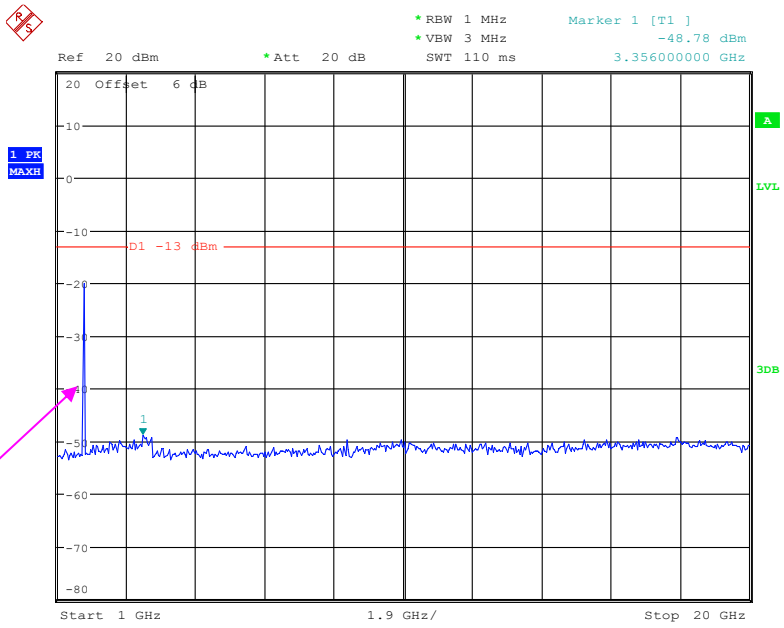
Date: 28.JUN.2019 15:17:45

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



Date: 28.JUN.2019 15:18:01

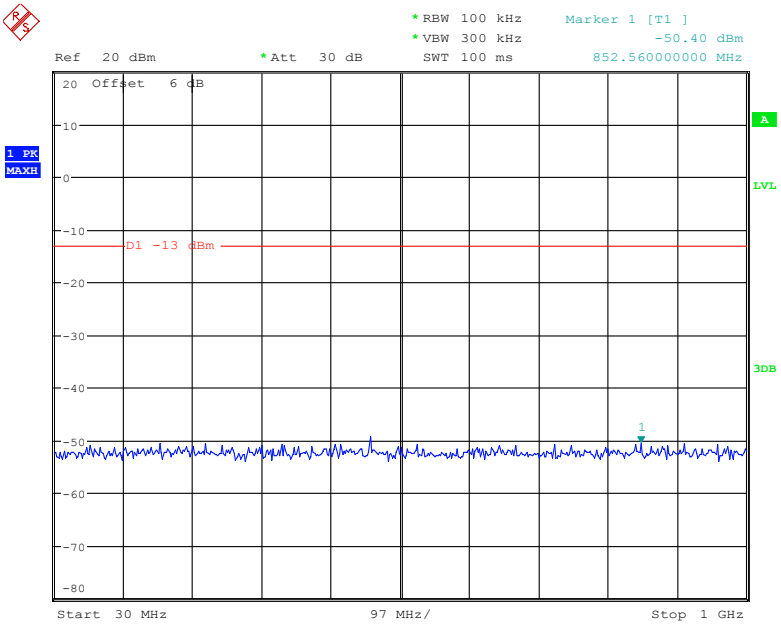
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test with notch filter

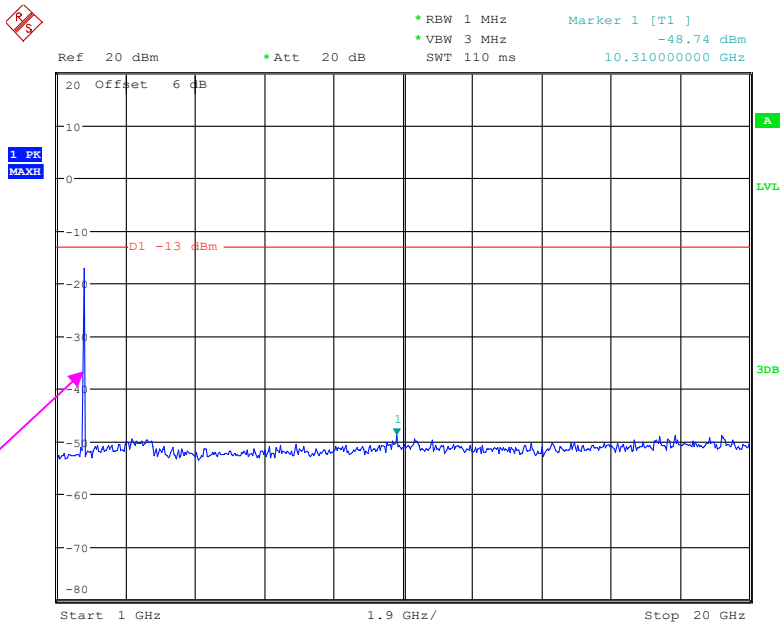
Date: 28.JUN.2019 15:18:11

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



Date: 28.JUN.2019 15:18:27

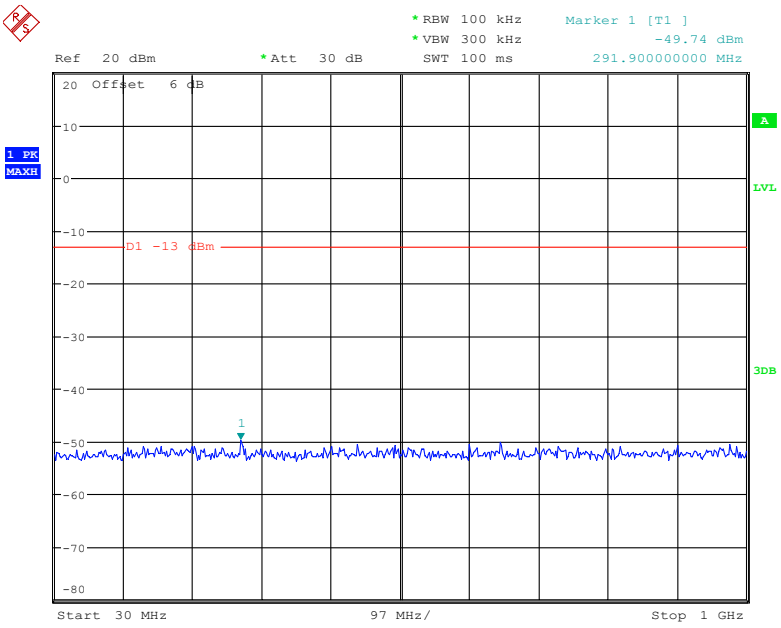
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test with notch filter

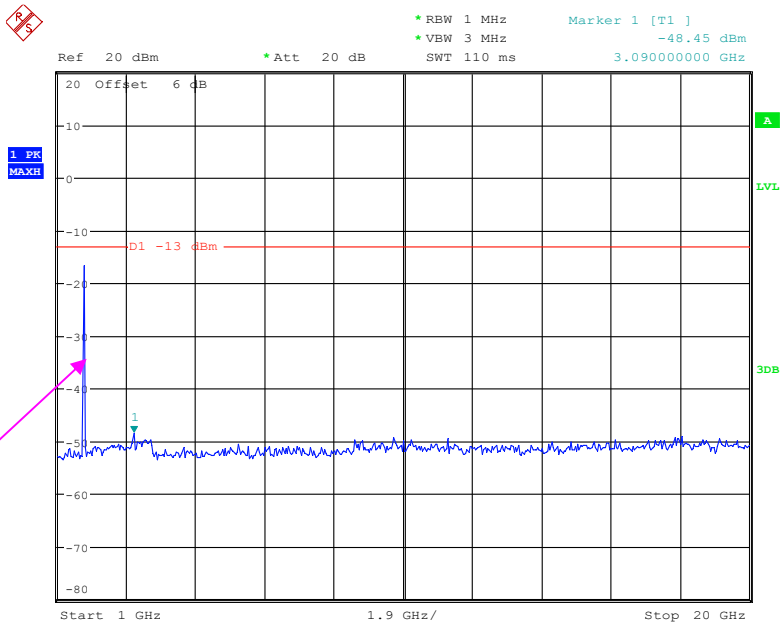
Date: 28.JUN.2019 15:18:36

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



Date: 28.JUN.2019 15:18:53

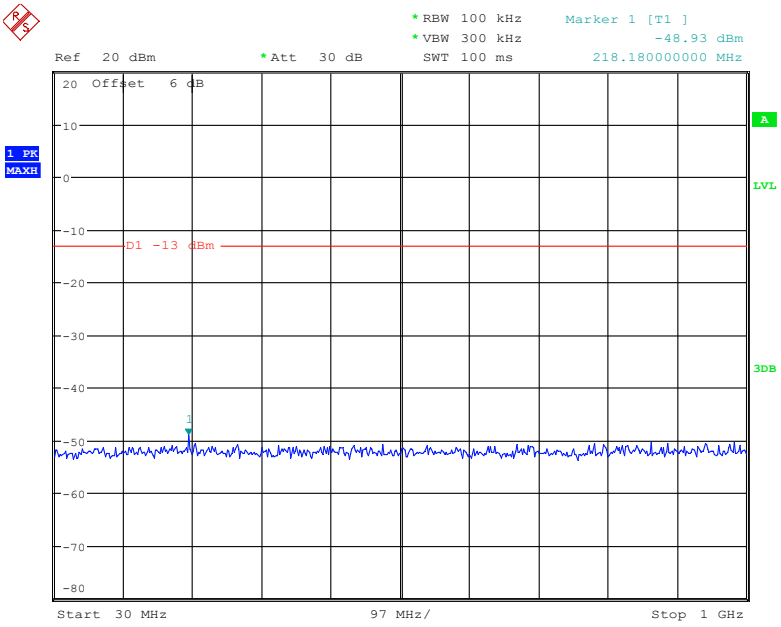
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test with notch filter

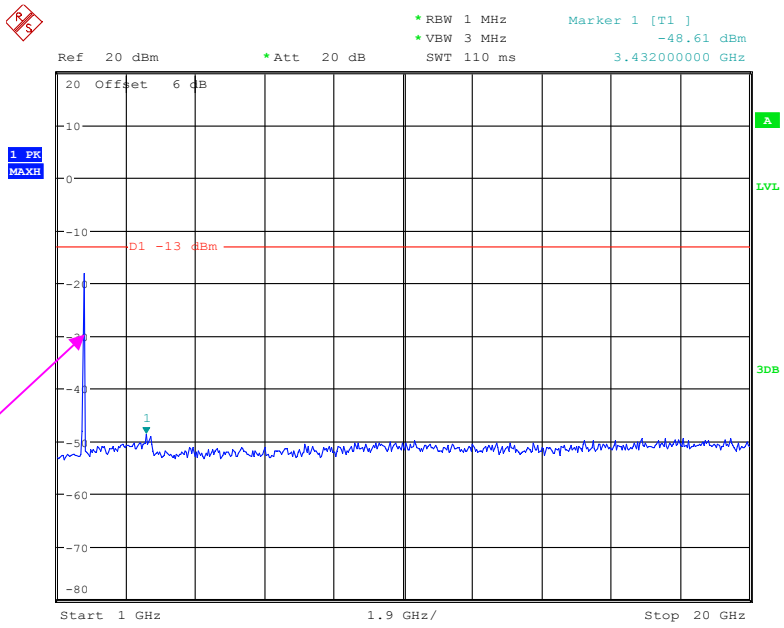
Date: 28.JUN.2019 15:19:03

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



Date: 28.JUN.2019 15:19:25

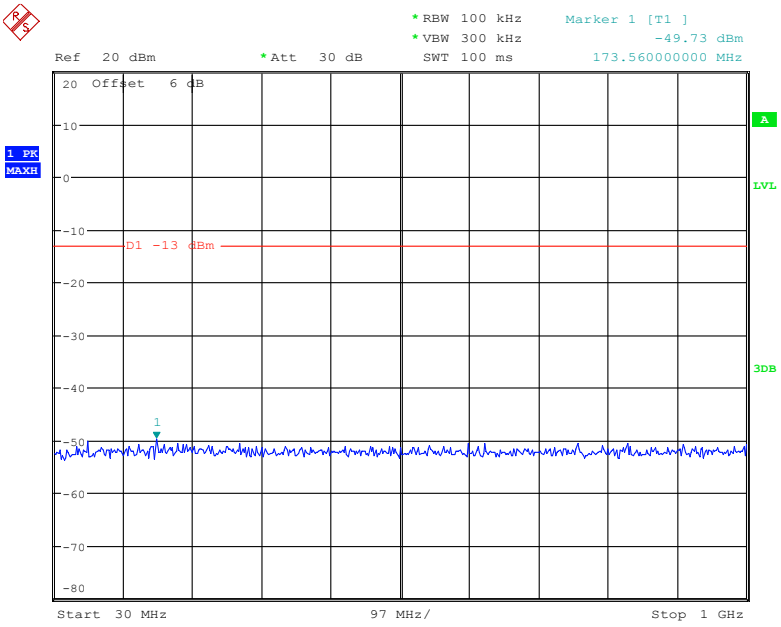
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test with notch filter

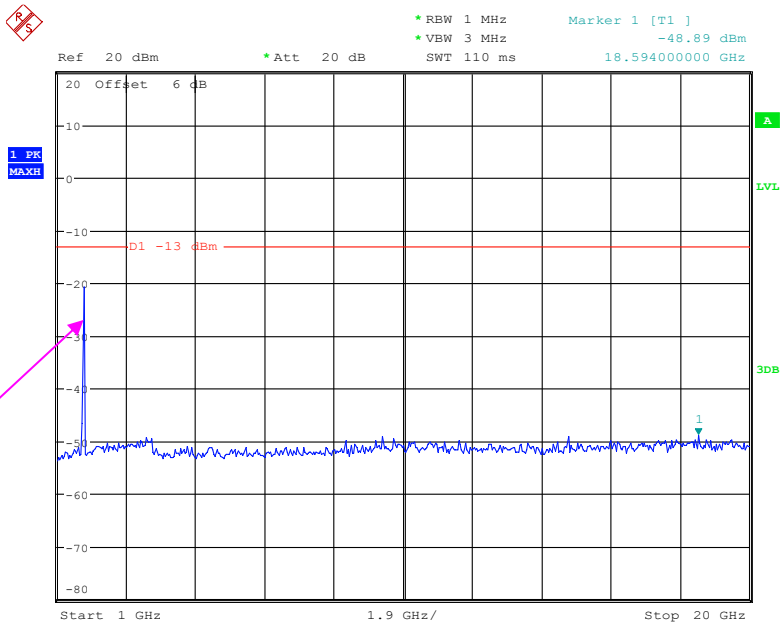
Date: 28.JUN.2019 15:19:34

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



Date: 28.JUN.2019 15:19:57

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

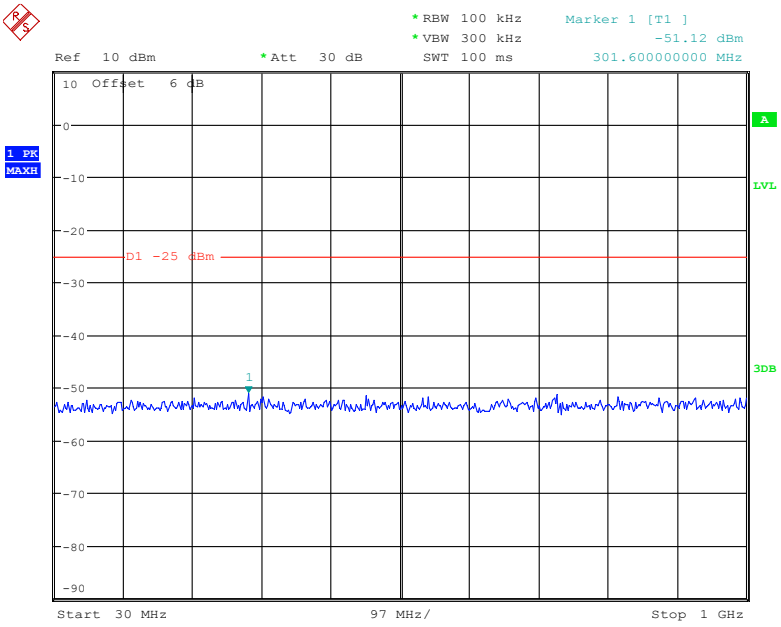


Fundamental test with notch filter

Date: 28.JUN.2019 15:20:06

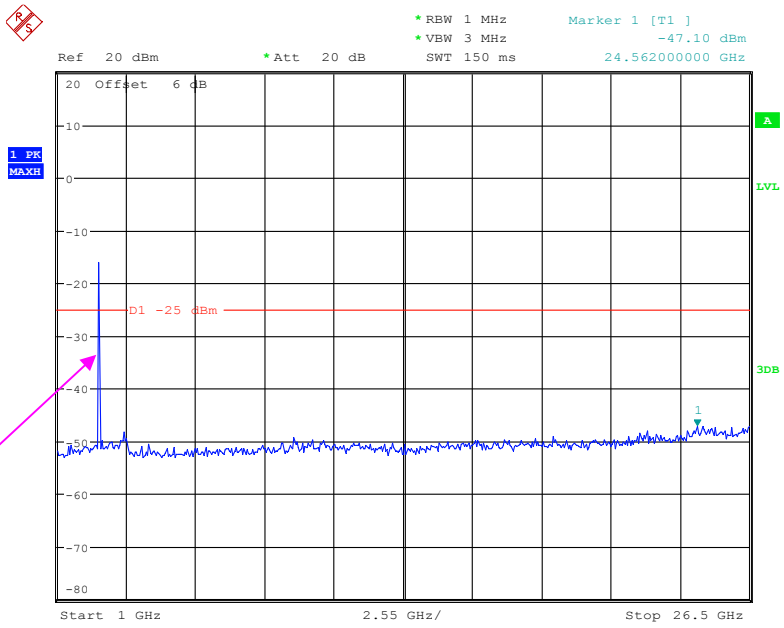
LTE Band 7:

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



Date: 28.JUN.2019 13:43:11

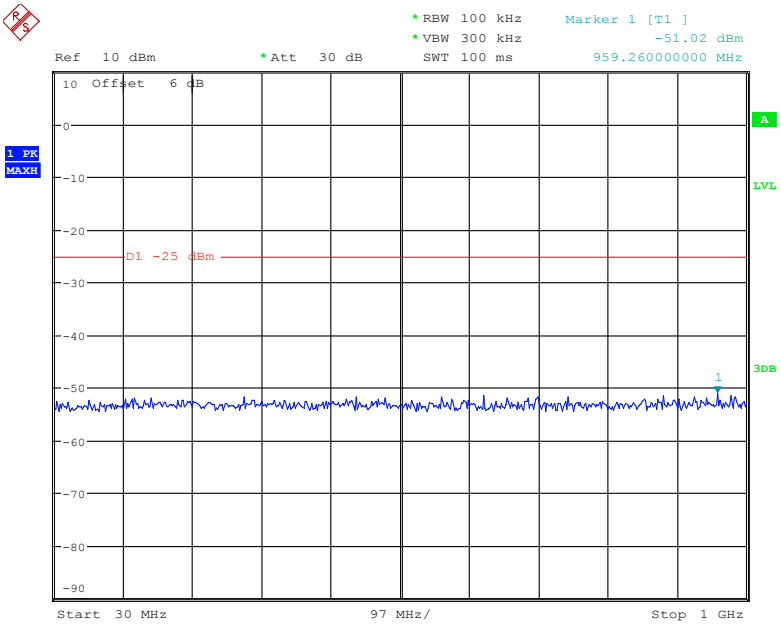
1.0 GHz – 26.5 GHz (5.0 MHz, Middle Channel)



Fundamental test with notch filter

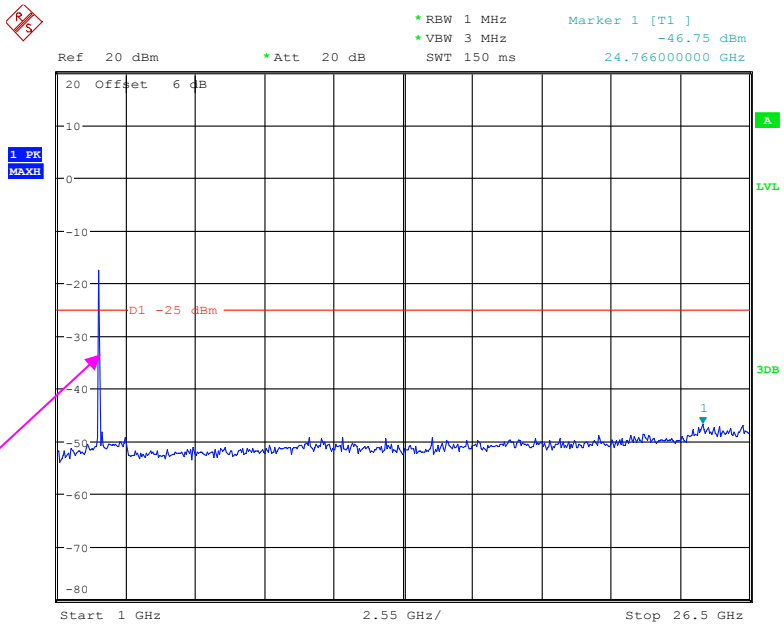
Date: 28.JUN.2019 13:43:20

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



Date: 28.JUN.2019 13:43:39

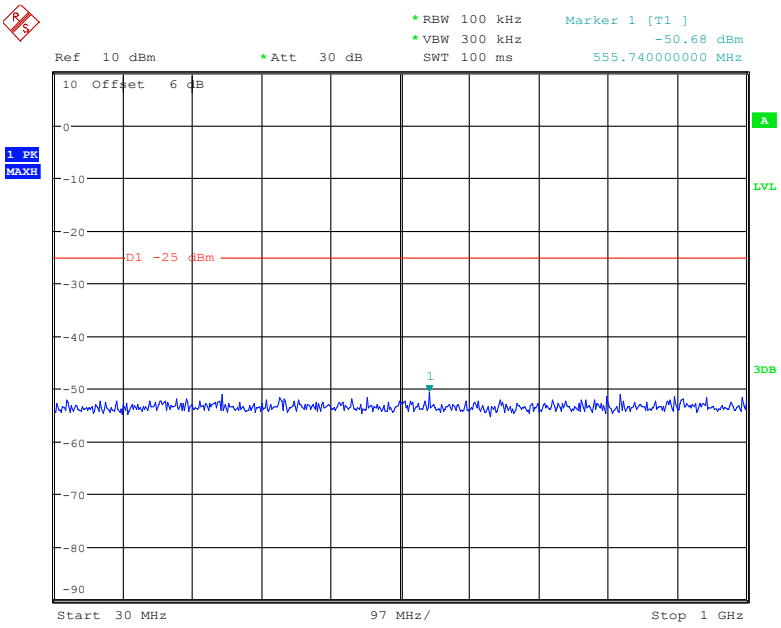
1 GHz – 26.5 GHz (10.0 MHz, Middle Channel)



Fundamental test with notch filter

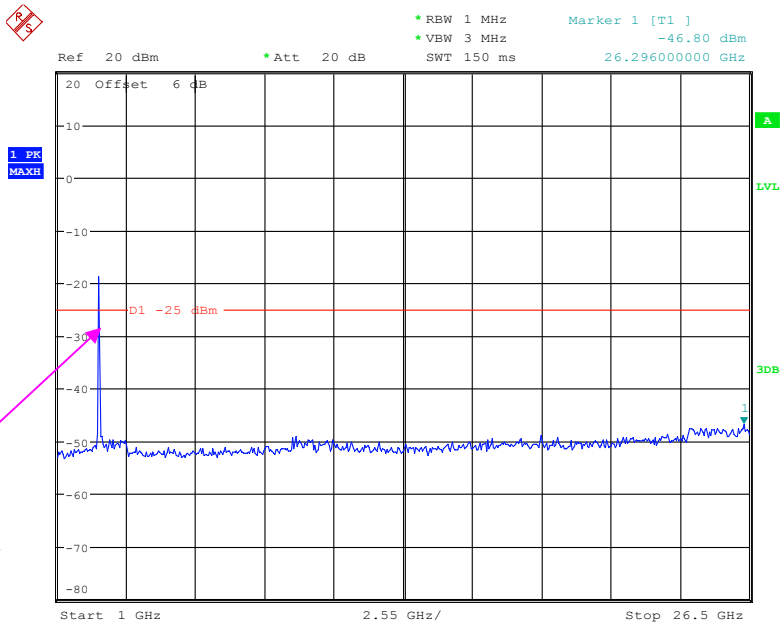
Date: 28.JUN.2019 13:43:48

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



Date: 28.JUN.2019 13:44:07

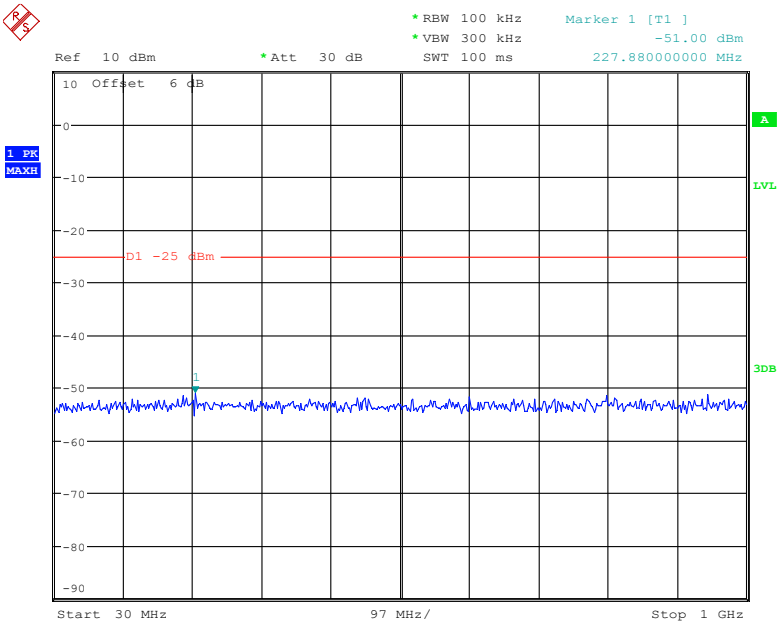
1 GHz – 26.5 GHz (15.0 MHz, Middle Channel)



Fundamental test with notch filter

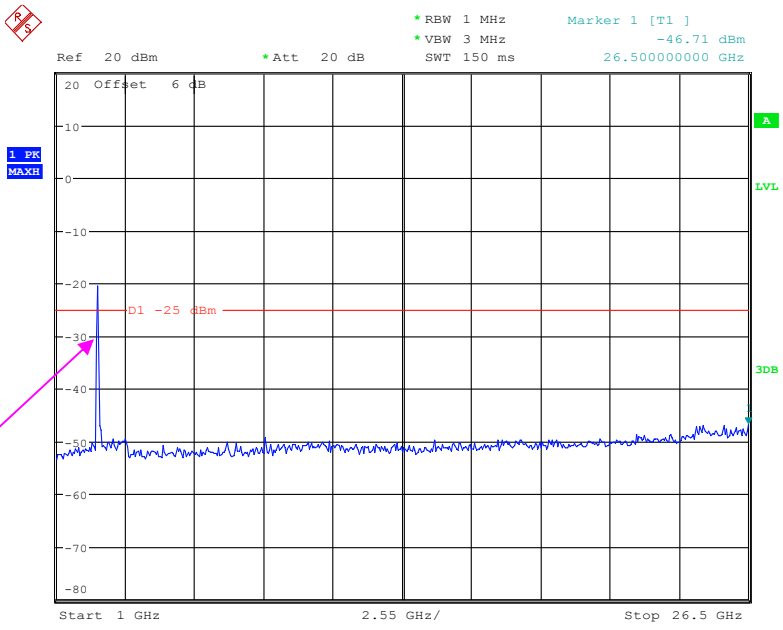
Date: 28.JUN.2019 13:44:17

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



Date: 28.JUN.2019 13:44:35

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



Fundamental test with notch filter

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

Applicable Standard

FCC § 2.1053, §22.917(a) and § 24.238(a) and § 27.53(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 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Curry Xiang on 2019-07-02.

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 (dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
938.36	36.18	274	1.3	H	-64.4	1.37	0.0	-65.77	-13	52.77
938.36	36.81	353	1.2	V	-62.5	1.37	0.0	-63.87	-13	50.87
1673.20	53.61	321	1.3	H	-52.7	1.30	8.90	-45.10	-13	32.10
1673.20	50.31	90	1.5	V	-55.4	1.30	8.90	-47.80	-13	34.80
2509.80	49.71	139	1.4	H	-53.6	2.60	10.20	-46.00	-13	33.00
2509.80	47.40	135	1.0	V	-55.3	2.60	10.20	-47.70	-13	34.70
3346.40	42.62	102	1.1	H	-58.3	1.50	11.70	-48.10	-13	35.10
3346.40	44.17	262	2.0	V	-56.8	1.50	11.70	-46.60	-13	33.60
WCDMA Mode, Middle channel										
941.36	36.62	341	2.1	H	-64.0	1.37	0.0	-65.37	-13	52.37
941.36	37.54	248	2.5	V	-61.8	1.37	0.0	-63.17	-13	50.17
1673.20	43.89	13	1.6	H	-62.4	1.30	8.90	-54.80	-13	41.80
1673.20	43.49	92	1.8	V	-62.2	1.30	8.90	-54.60	-13	41.60

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 (dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
938.36	35.97	0	1.9	H	-64.6	1.37	0.0	-65.97	-13	52.97
938.36	37.19	142	1.0	V	-62.2	1.37	0.0	-63.57	-13	50.57
3760.00	44.18	88	2.2	H	-57.9	1.50	11.80	-47.60	-13	34.60
3760.00	44.10	8	1.8	V	-57.5	1.50	11.80	-47.20	-13	34.20
WCDMA Mode Band II, Middle channel										
941.36	36.95	89	1.8	H	-63.6	1.37	0.0	-64.97	-13	51.97
941.36	36.83	164	1.8	V	-62.5	1.37	0.0	-63.87	-13	50.87
3760.00	44.19	238	1.6	H	-57.9	1.50	11.80	-47.60	-13	34.60
3760.00	43.57	198	2.1	V	-58.0	1.50	11.80	-47.70	-13	34.70

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 (dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
941.36	36.27	60	1.4	H	-64.3	1.37	0.0	-65.67	-13	52.67
941.36	37.07	131	2.1	V	-62.3	1.37	0.0	-63.67	-13	50.67
3465.20	43.69	287	1.9	H	-57.1	1.50	12.00	-46.60	-13	33.60
3465.20	44.15	47	1.1	V	-57.4	1.50	12.00	-46.90	-13	33.90

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 (dBi)			
Band 2										
Test frequency range:30 MHz ~ 20 GHz										
940.65	36.67	67	1.5	H	-63.9	1.37	0.0	-65.27	-13	52.27
940.65	36.99	275	2.0	V	-62.4	1.37	0.0	-63.77	-13	50.77
3760.00	44.73	80	1.5	H	-57.3	1.50	11.80	-47.00	-13	34.00
3760.00	43.95	307	2.4	V	-57.6	1.50	11.80	-47.30	-13	34.30
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
940.65	37.76	229	2.1	H	-62.8	1.37	0.0	-64.17	-13	51.17
940.65	36.37	87	1.6	V	-63.0	1.37	0.0	-64.37	-13	51.37
3465.00	44.17	141	1.6	H	-56.6	1.50	12.00	-46.10	-13	33.10
3465.00	43.52	20	1.1	V	-58.0	1.50	12.00	-47.50	-13	34.50
Band 7										
Test frequency range: 30 MHz ~ 26GHz										
940.65	36.62	86	2.3	H	-64.0	1.37	0.0	-65.37	-25	40.37
940.65	37.07	42	1.5	V	-62.3	1.37	0.0	-63.67	-25	38.67
5070.00	43.71	82	1.6	H	-56.3	1.60	12.10	-45.80	-25	20.8
5070.00	43.09	288	1.7	V	-56.9	1.60	12.10	-46.40	-25	21.4

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

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

Applicable Standard

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

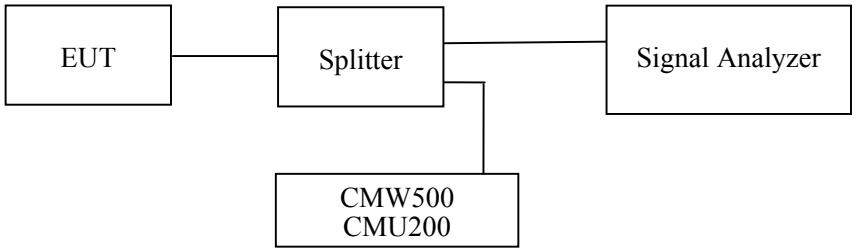
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

Test Procedure

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

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



Test Data

Environmental Conditions

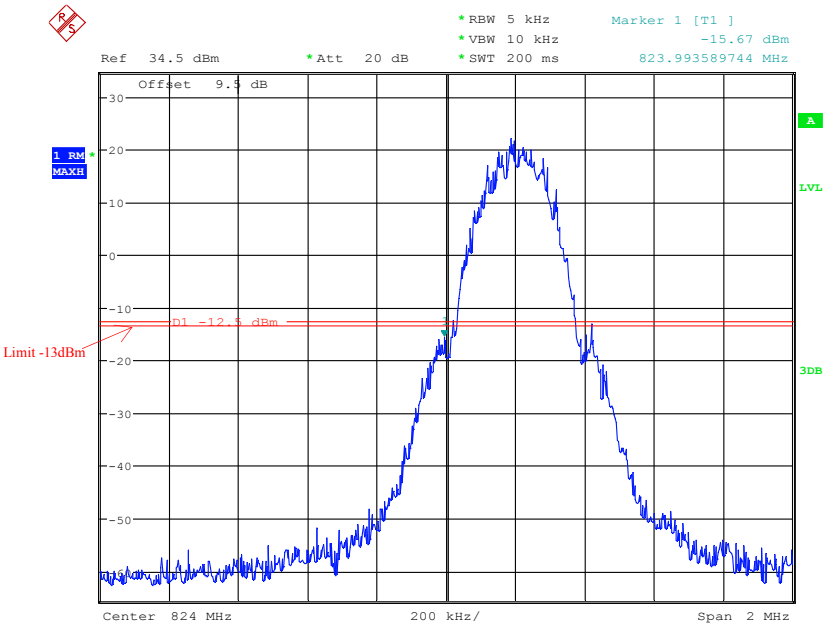
Temperature:	24~25 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Kieroy Luo from 2019-06-28 to 2019-07-01.

EUT operation mode: Transmitting

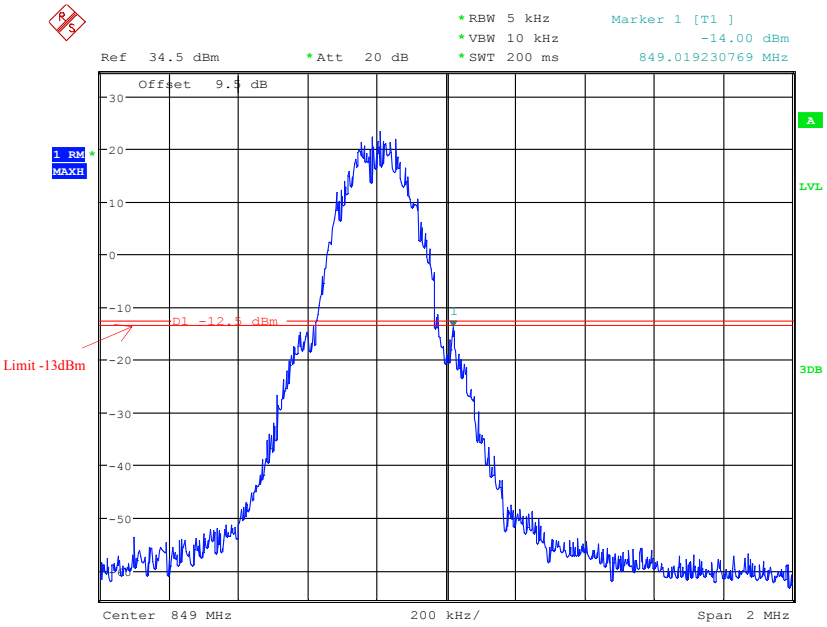
Test Result: Compliance. Please refer to the following plots.

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



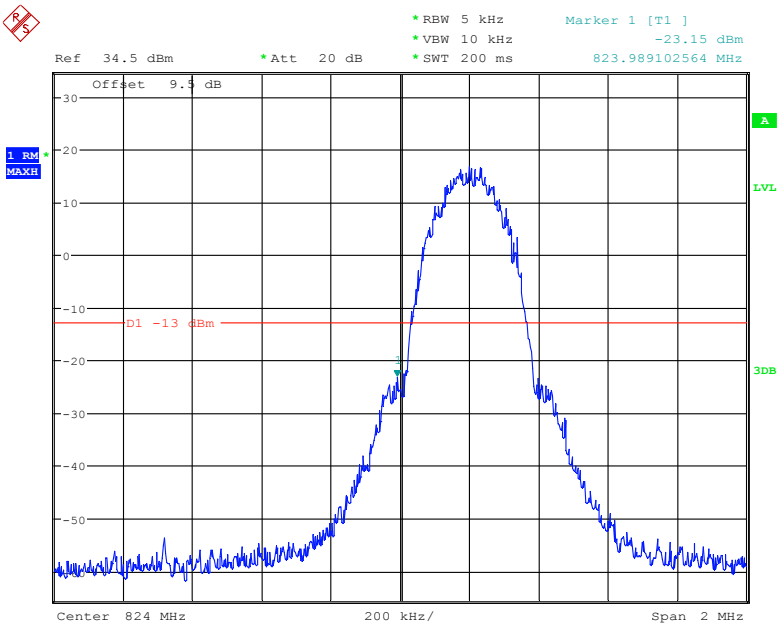
Date: 1.JUL.2019 21:27:57

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



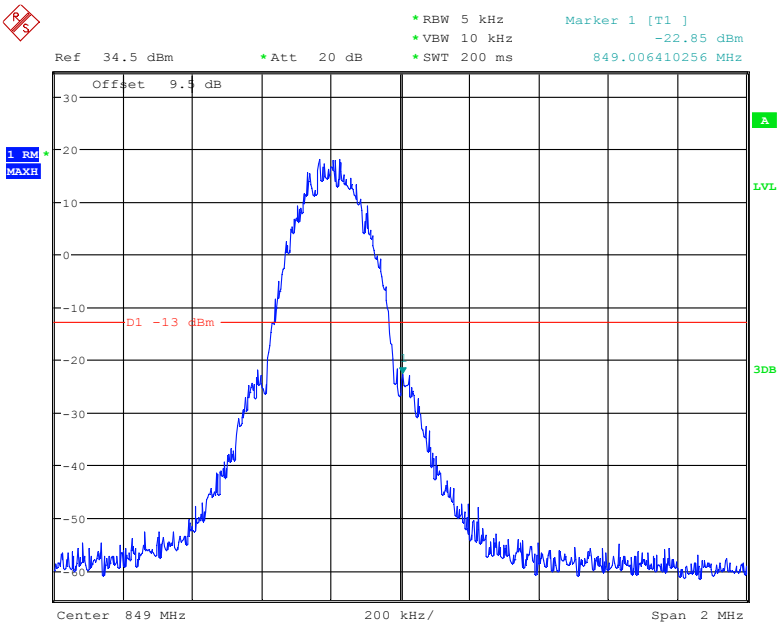
Date: 1.JUL.2019 21:28:37

Cellular Band, Left Band Edge for EDGE Mode



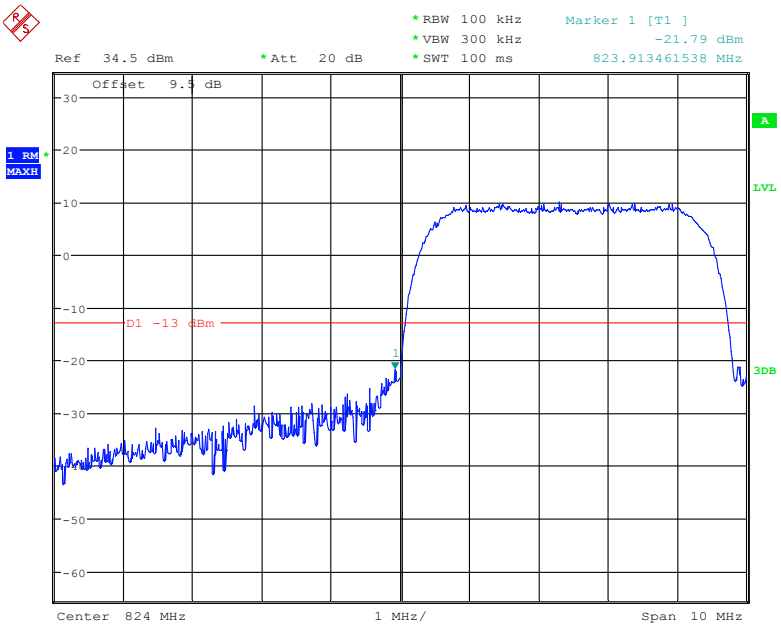
Date: 1.JUL.2019 22:04:13

Cellular Band, Right Band Edge for EDGE Mode



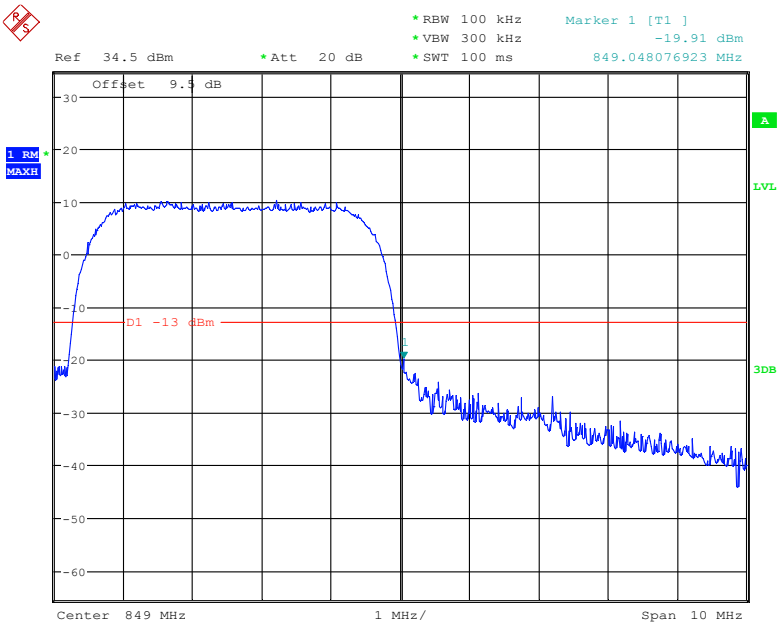
Date: 1.JUL.2019 22:04:55

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



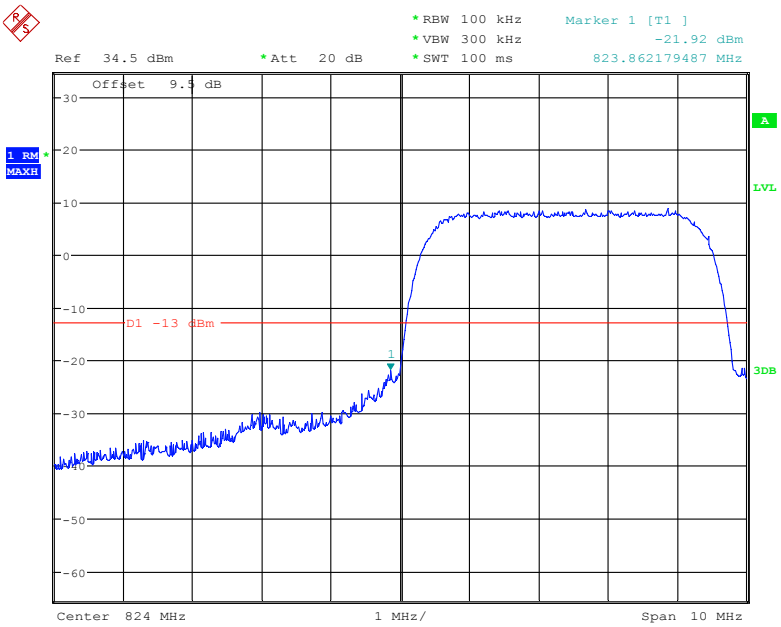
Date: 1.JUL.2019 23:27:17

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



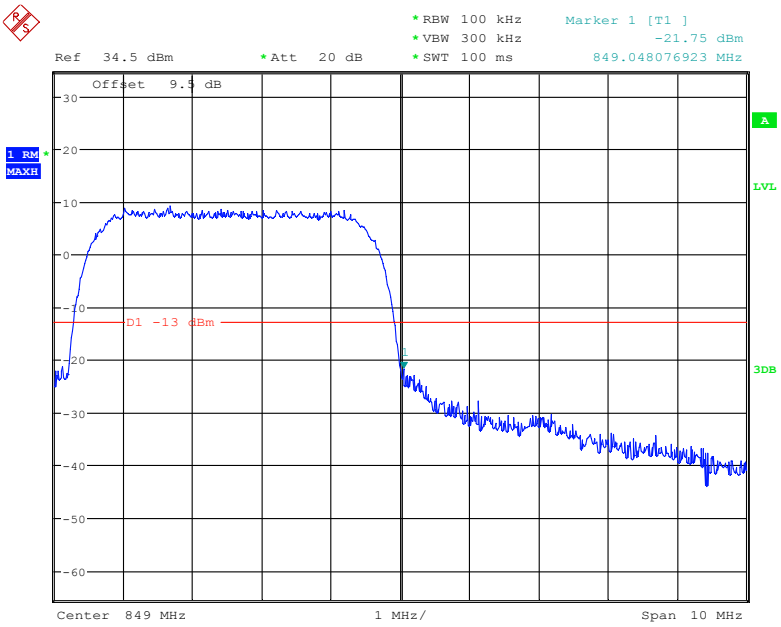
Date: 1.JUL.2019 23:27:50

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



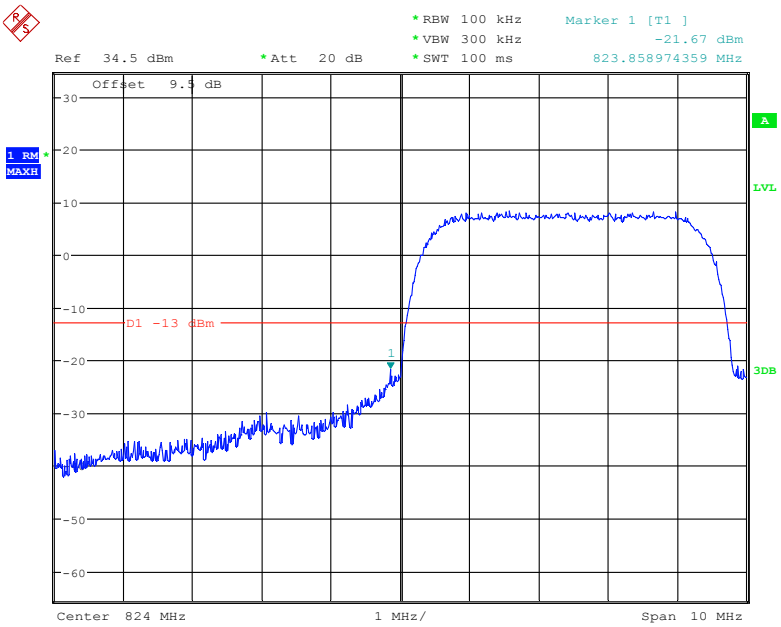
Date: 1.JUL.2019 23:47:54

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



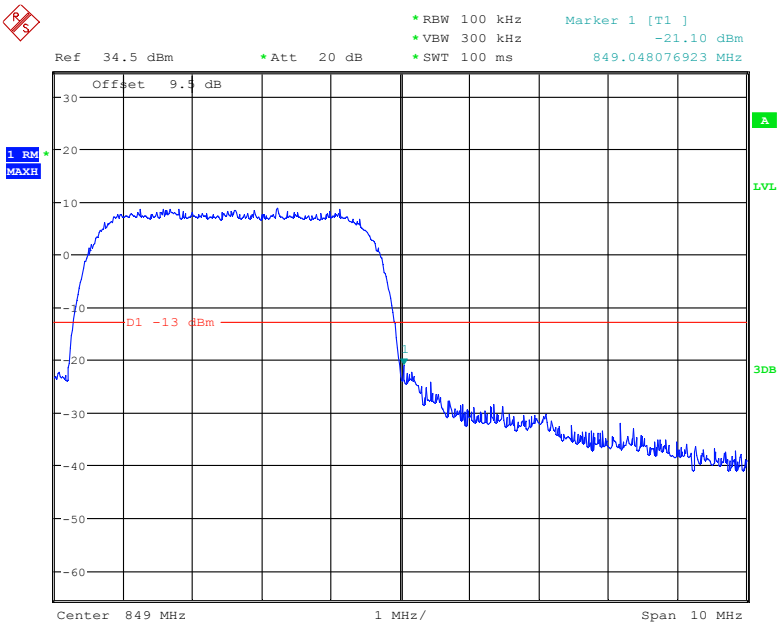
Date: 1.JUL.2019 23:47:05

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



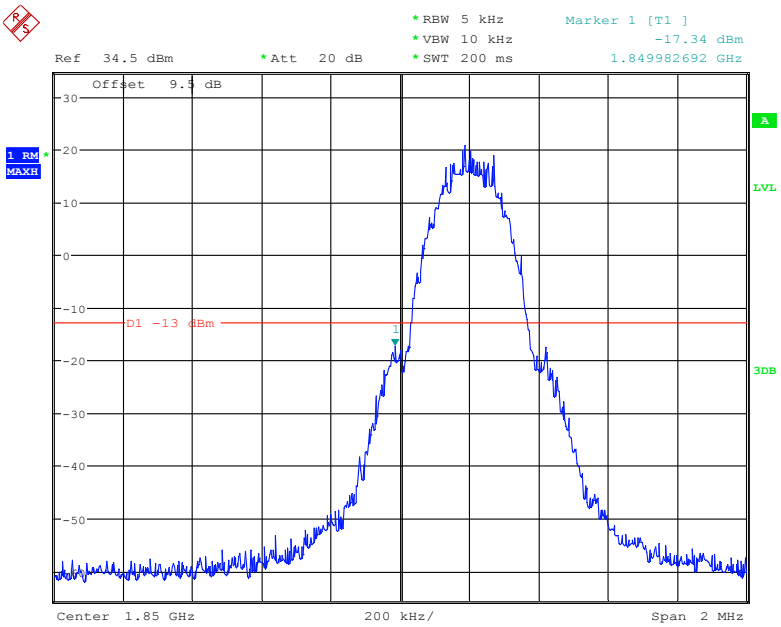
Date: 1.JUL.2019 23:44:52

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



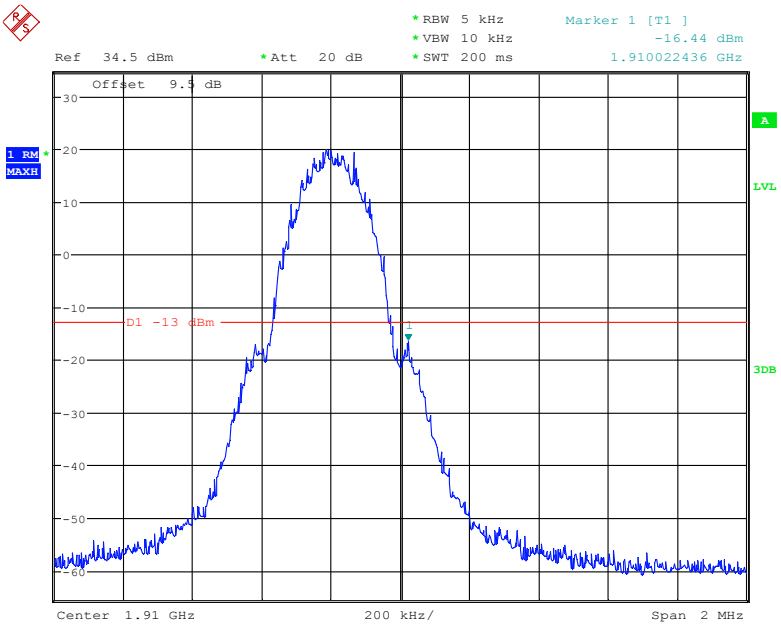
Date: 1.JUL.2019 23:45:37

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



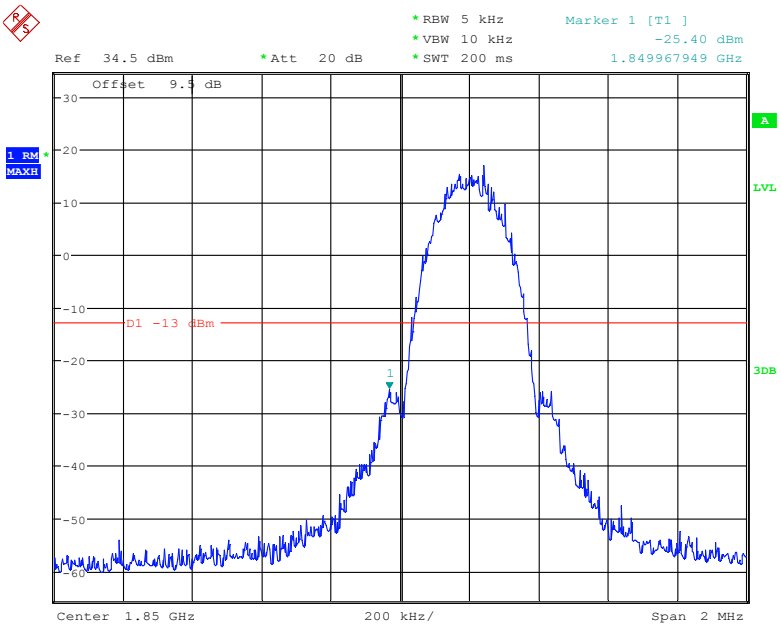
Date: 1.JUL.2019 21:44:16

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



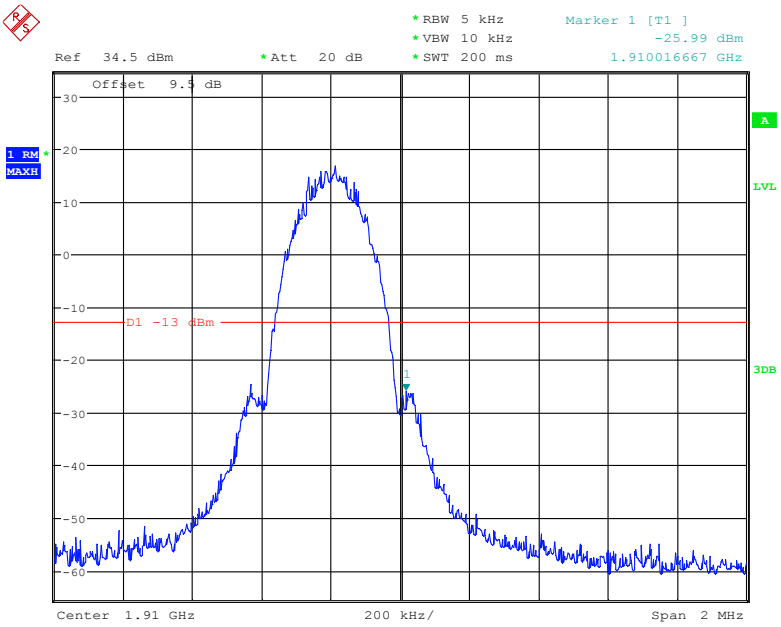
Date: 1.JUL.2019 21:45:53

PCS Band, Left Band Edge for EDGE Mode



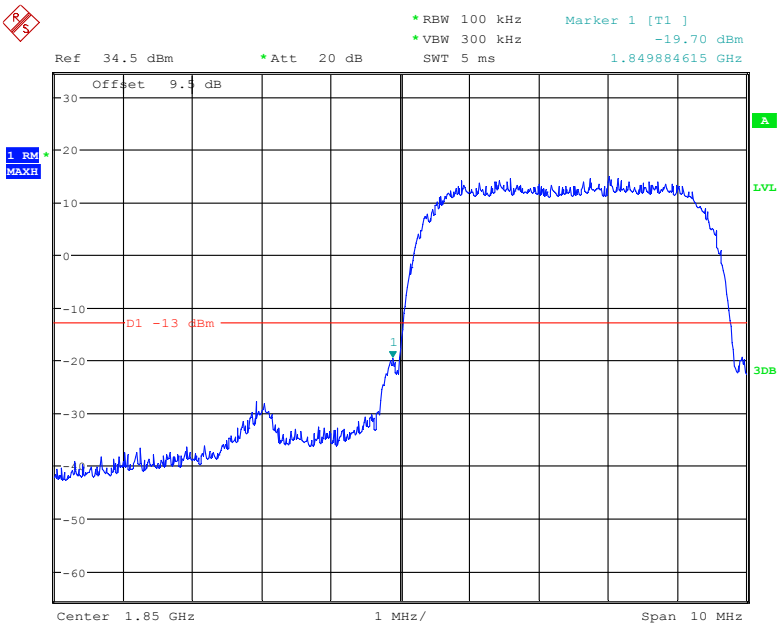
Date: 1.JUL.2019 22:09:53

PCS Band, Right Band Edge for EDGE Mode



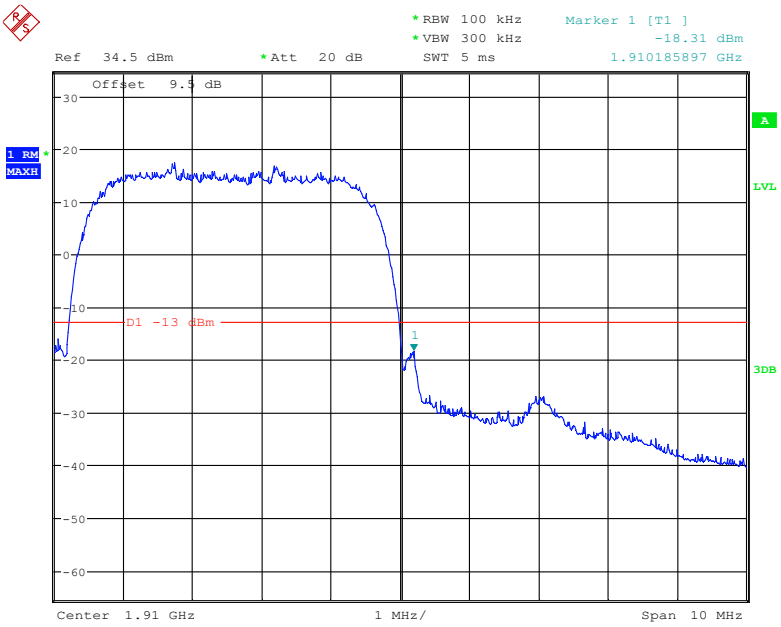
Date: 1.JUL.2019 22:10:57

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



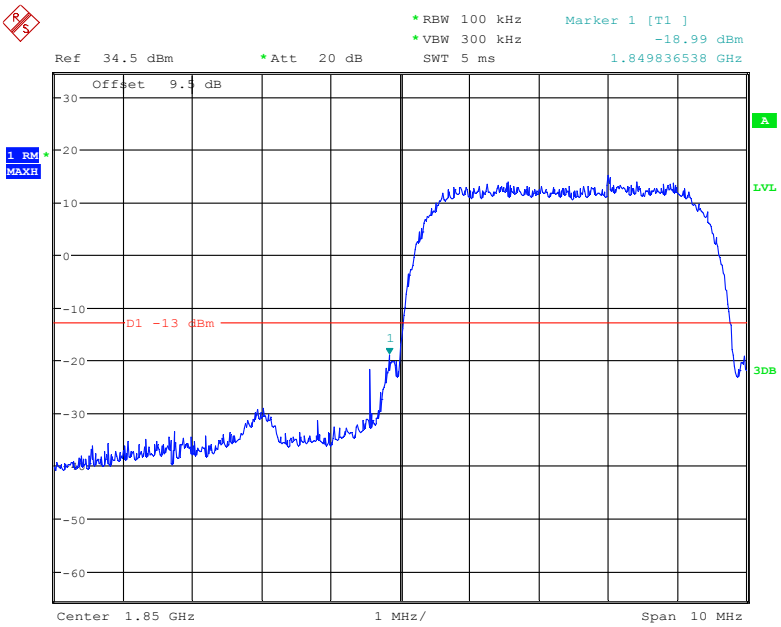
Date: 1.JUL.2019 22:41:58

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



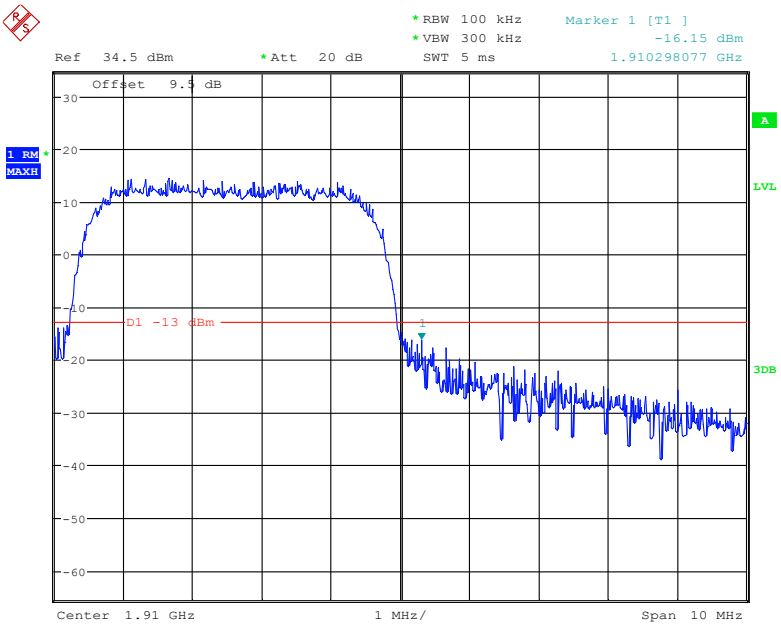
Date: 1.JUL.2019 23:06:22

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



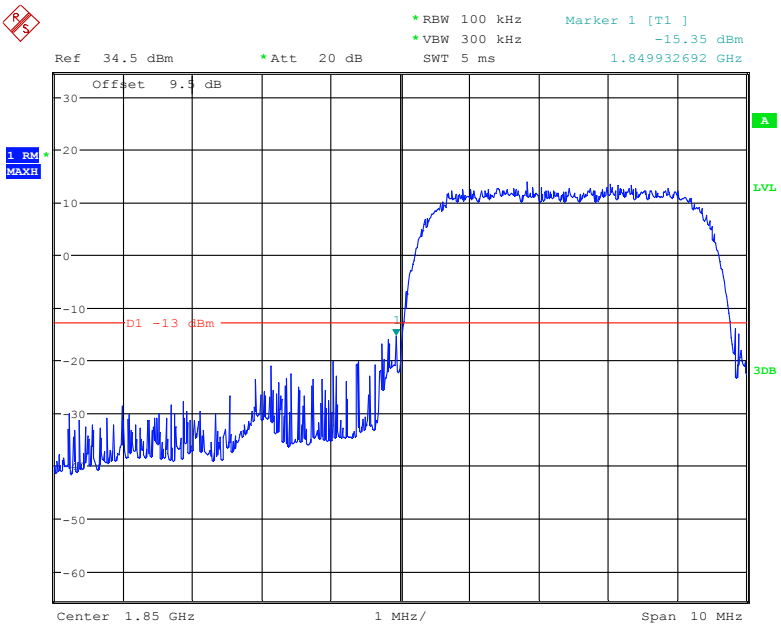
Date: 1.JUL.2019 22:28:48

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



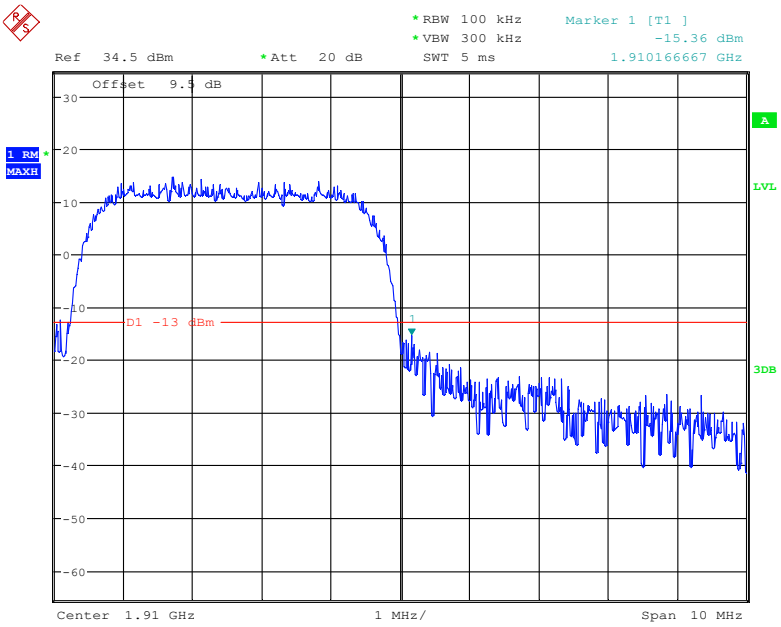
Date: 1.JUL.2019 22:29:35

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



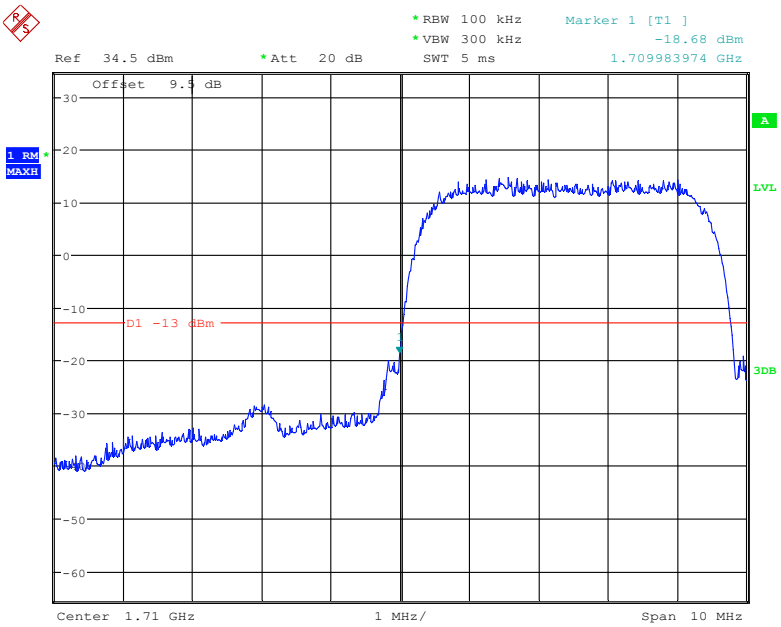
Date: 1.JUL.2019 22:39:10

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



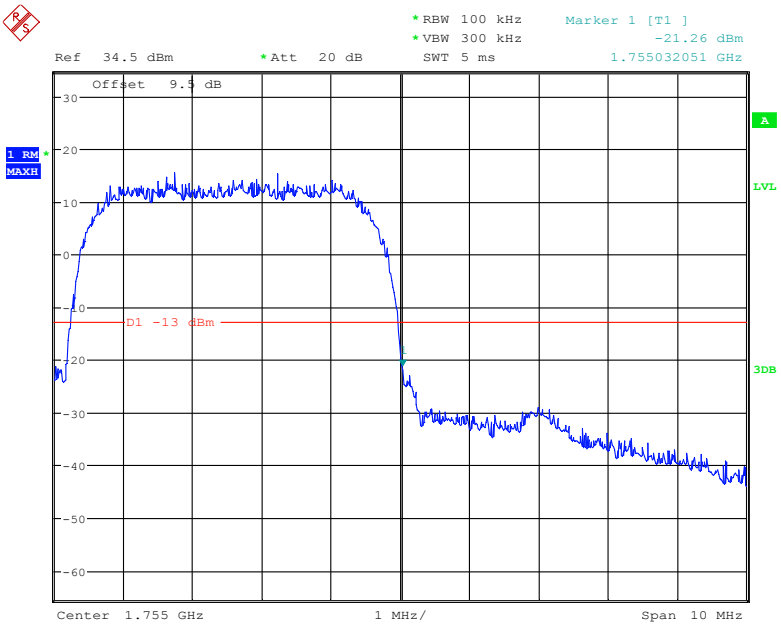
Date: 1.JUL.2019 22:40:13

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



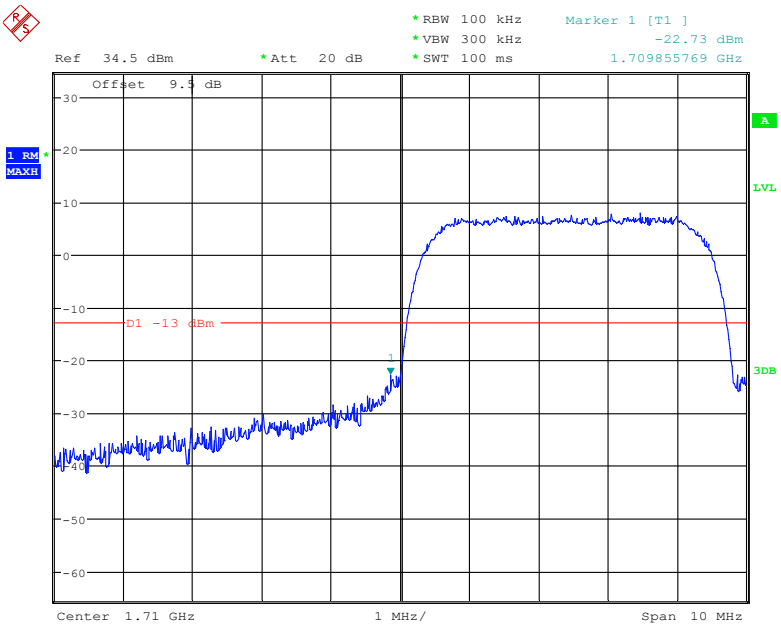
Date: 2.JUL.2019 00:05:12

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



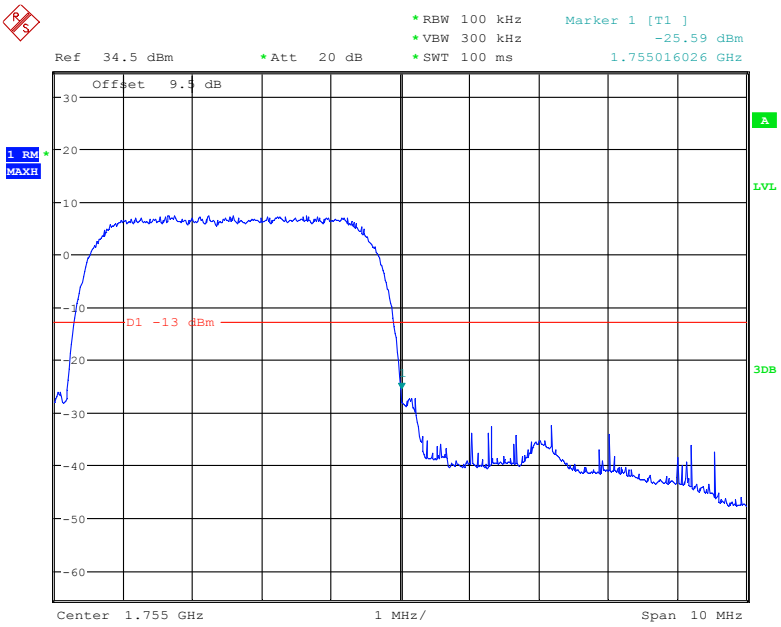
Date: 2.JUL.2019 00:05:59

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



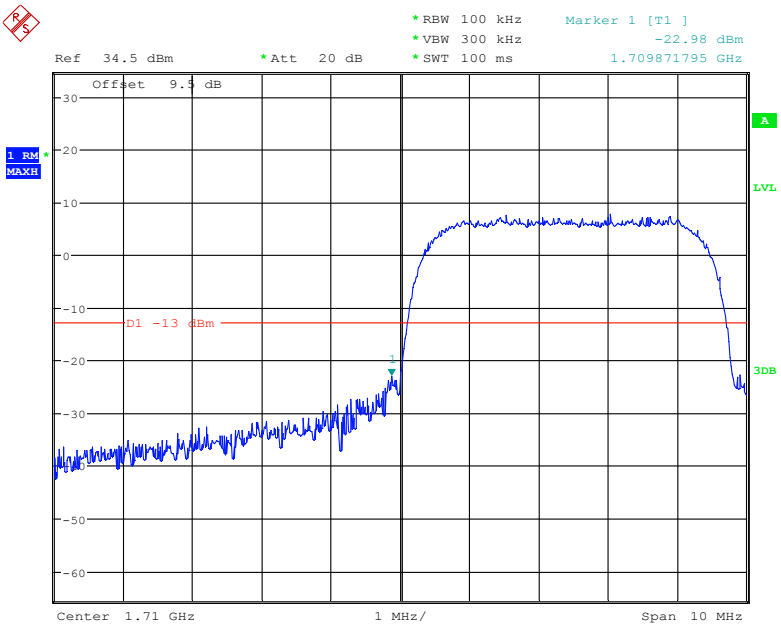
Date: 2.JUL.2019 00:09:07

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



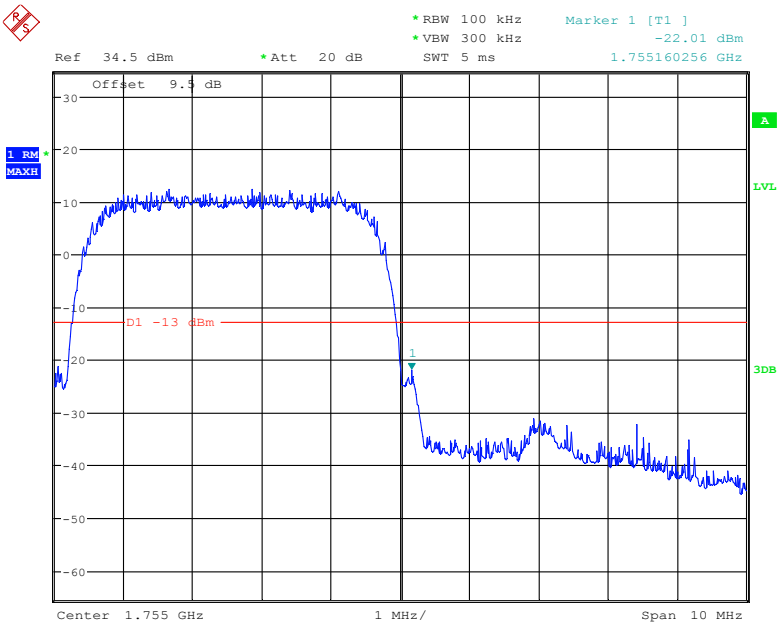
Date: 2.JUL.2019 00:09:42

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



Date: 2.JUL.2019 00:07:57

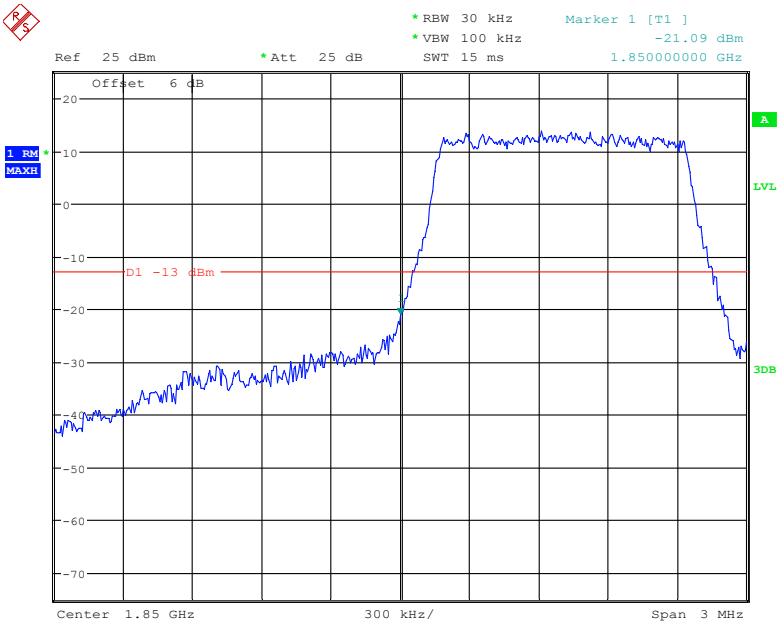
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 2.JUL.2019 00:06:39

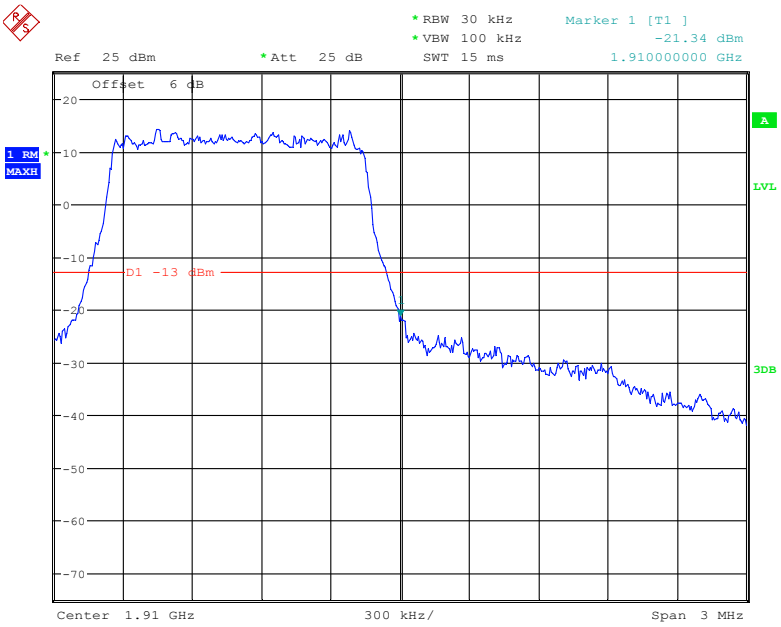
LTE Band 2:

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



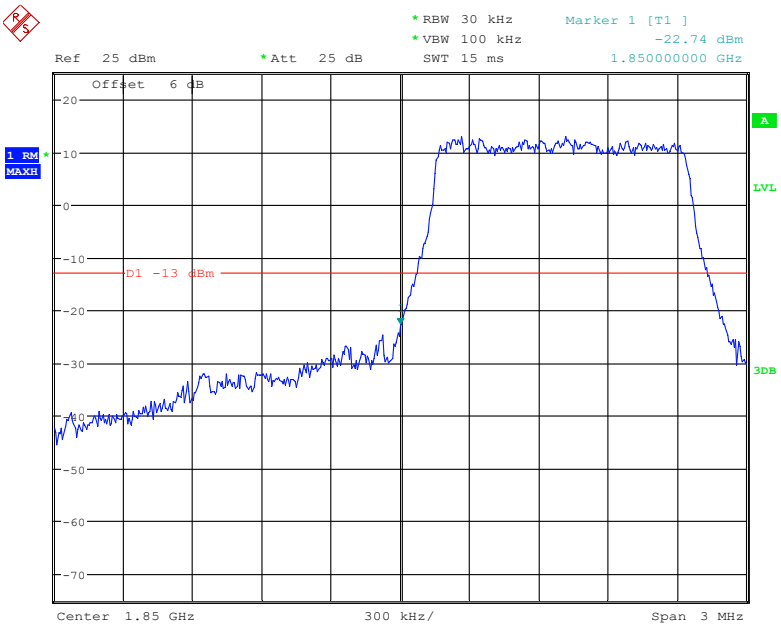
Date: 28.JUN.2019 10:42:27

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



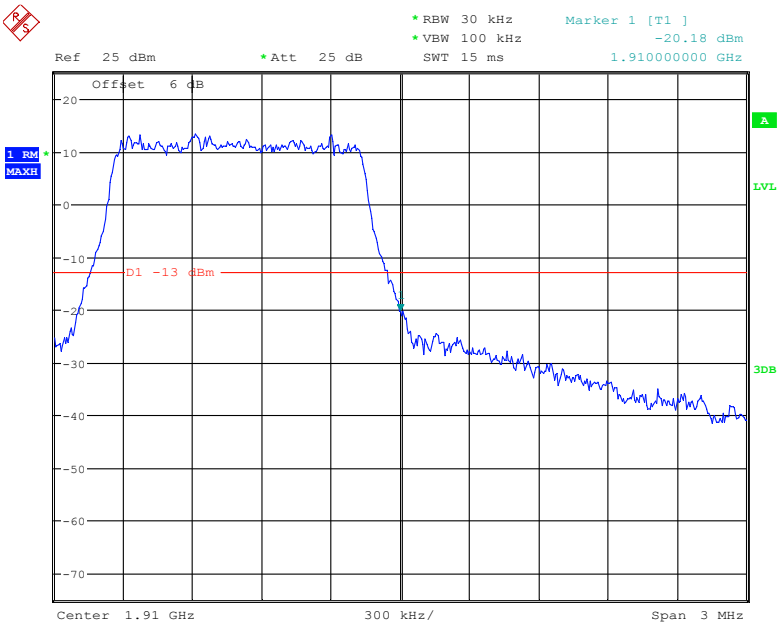
Date: 28.JUN.2019 10:43:38

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



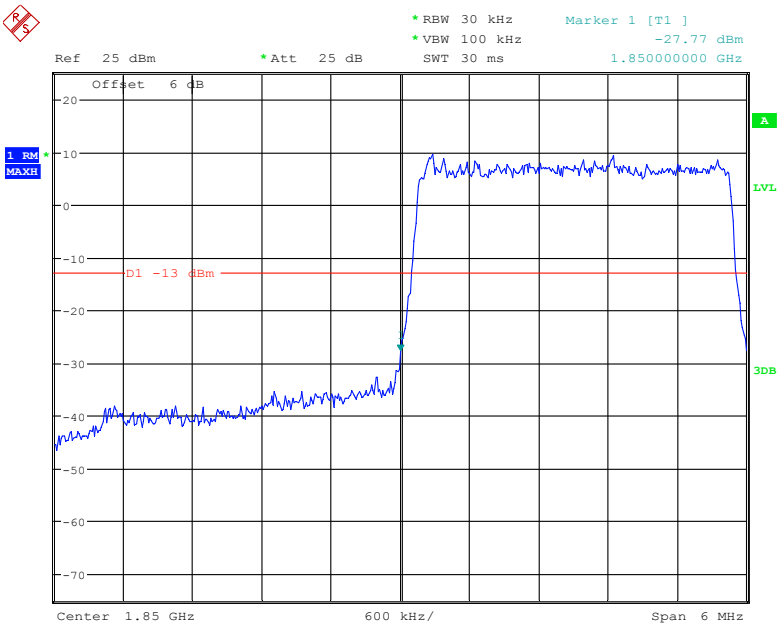
Date: 28.JUN.2019 10:42:59

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



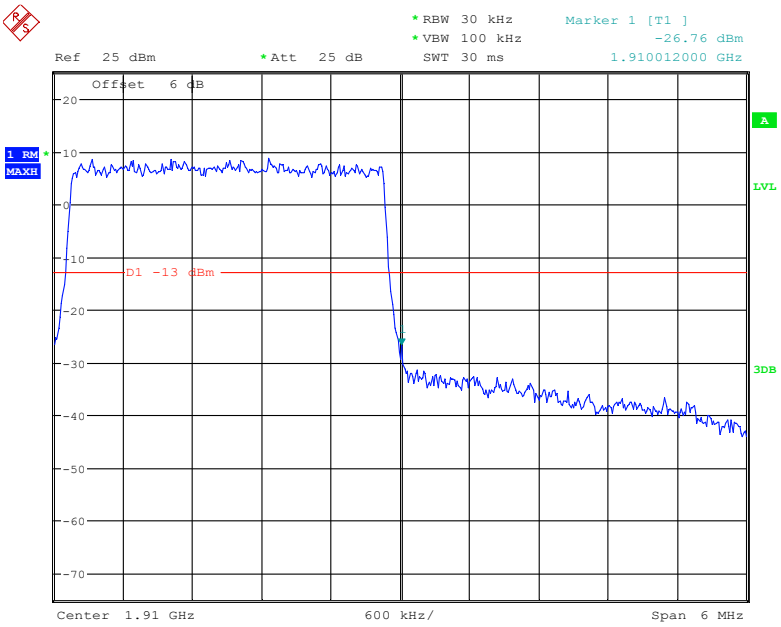
Date: 28.JUN.2019 10:44:16

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



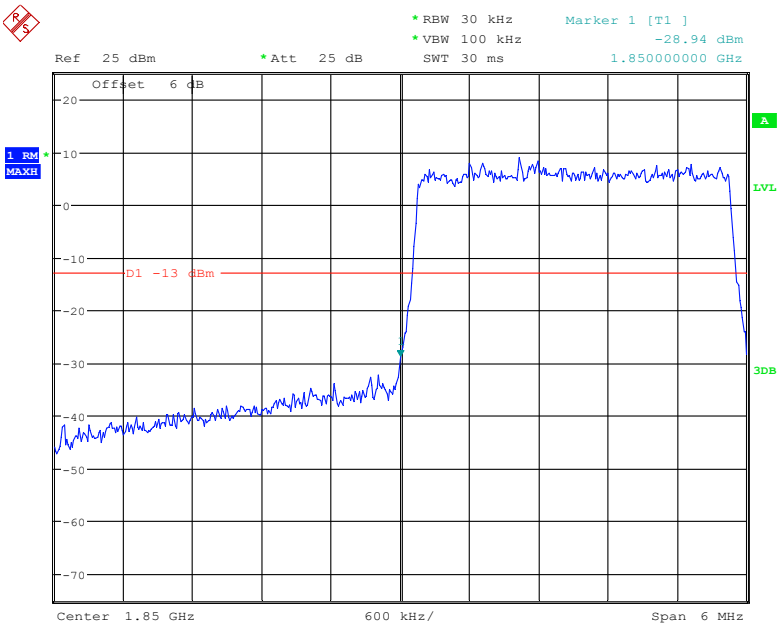
Date: 28.JUN.2019 10:44:44

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



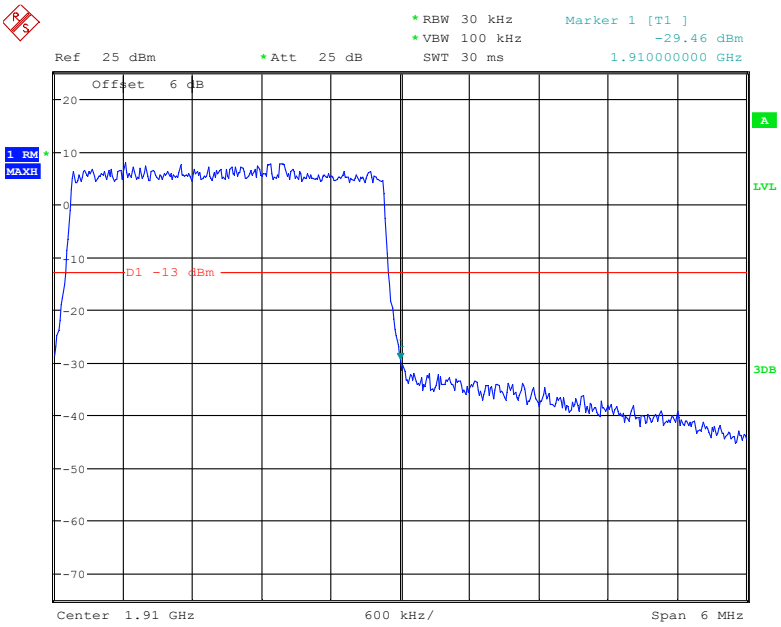
Date: 28.JUN.2019 10:45:45

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



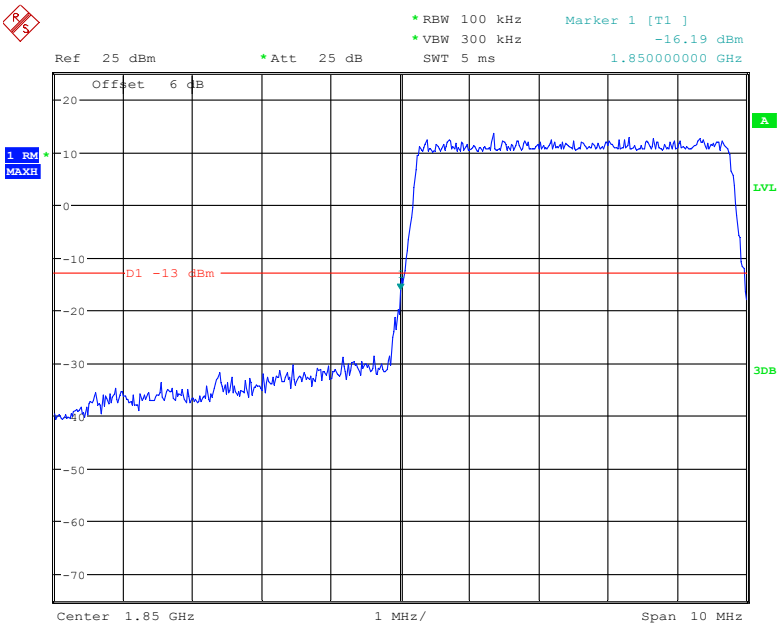
Date: 28.JUN.2019 10:45:13

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



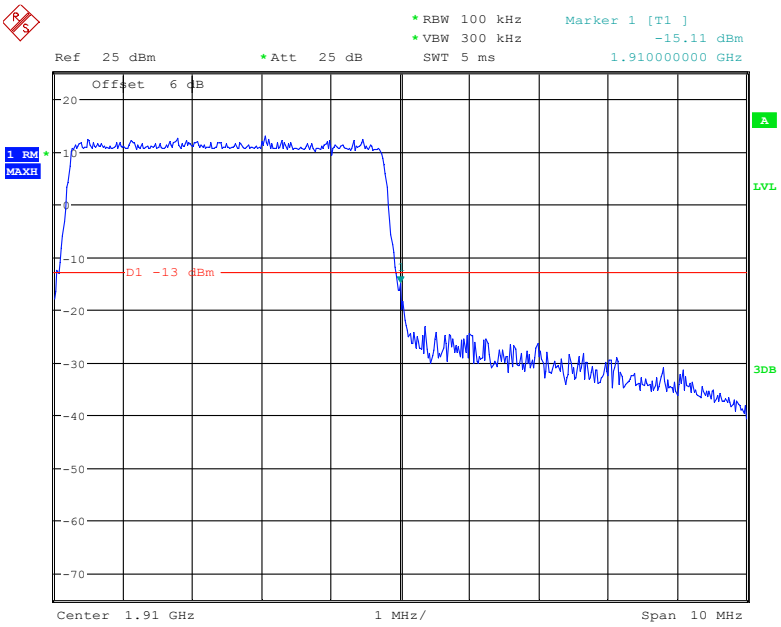
Date: 28.JUN.2019 10:46:17

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



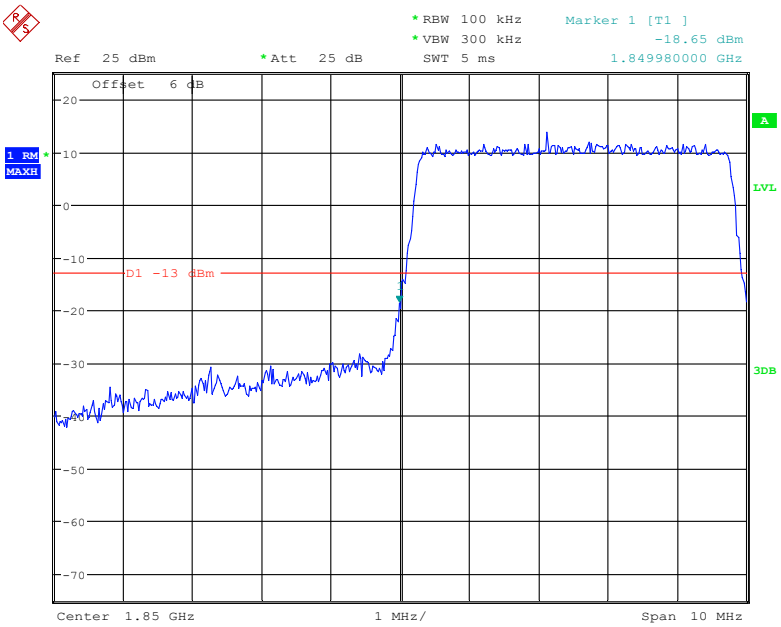
Date: 28.JUN.2019 10:46:49

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



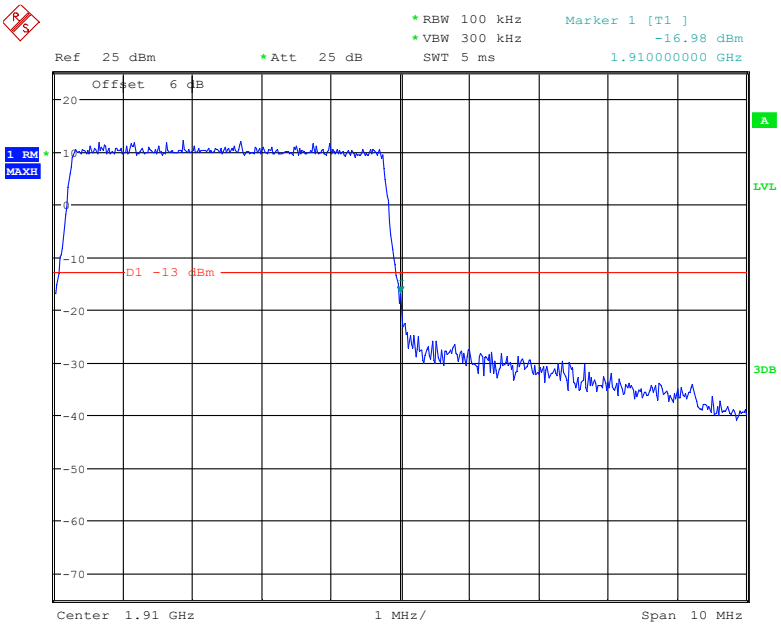
Date: 28.JUN.2019 10:47:59

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



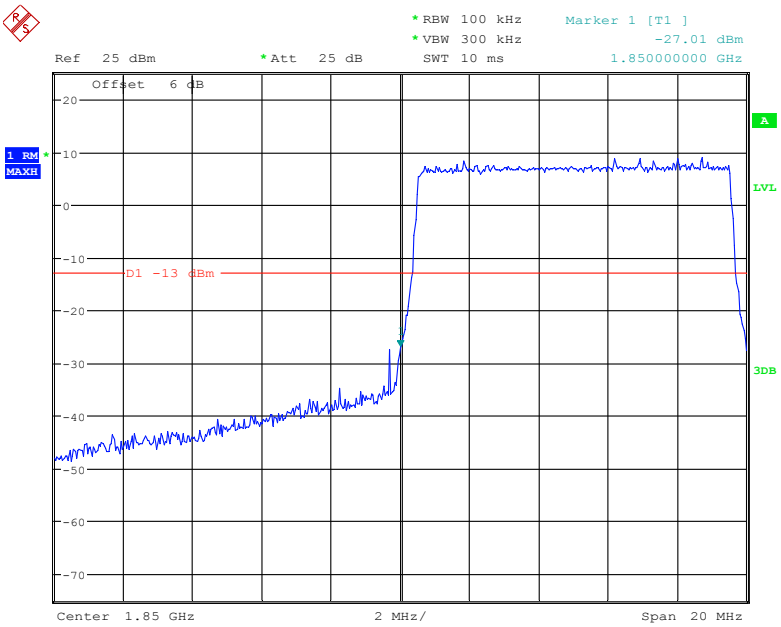
Date: 28.JUN.2019 10:47:20

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



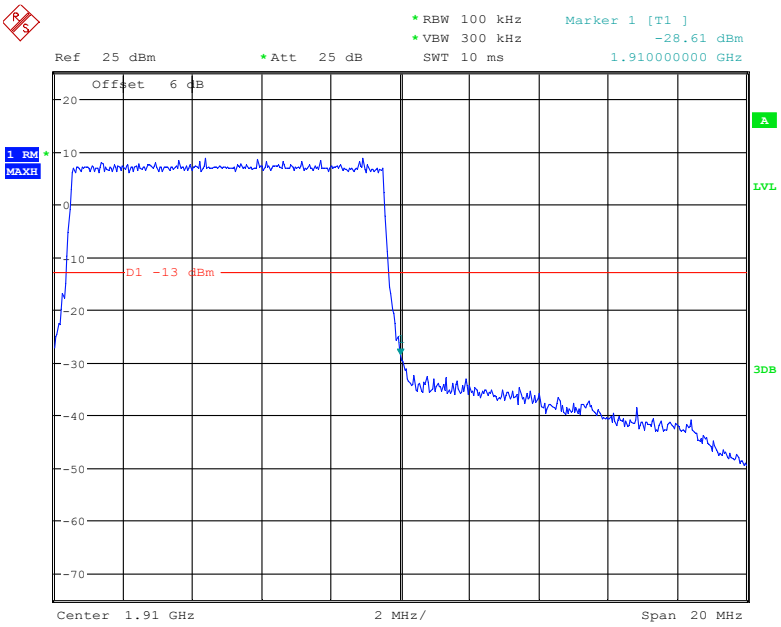
Date: 28.JUN.2019 10:48:31

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



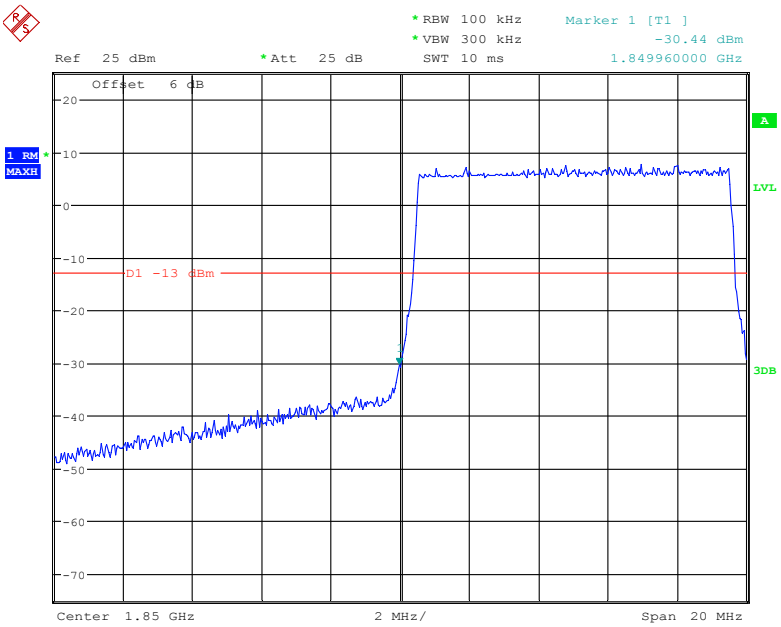
Date: 28.JUN.2019 10:49:03

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



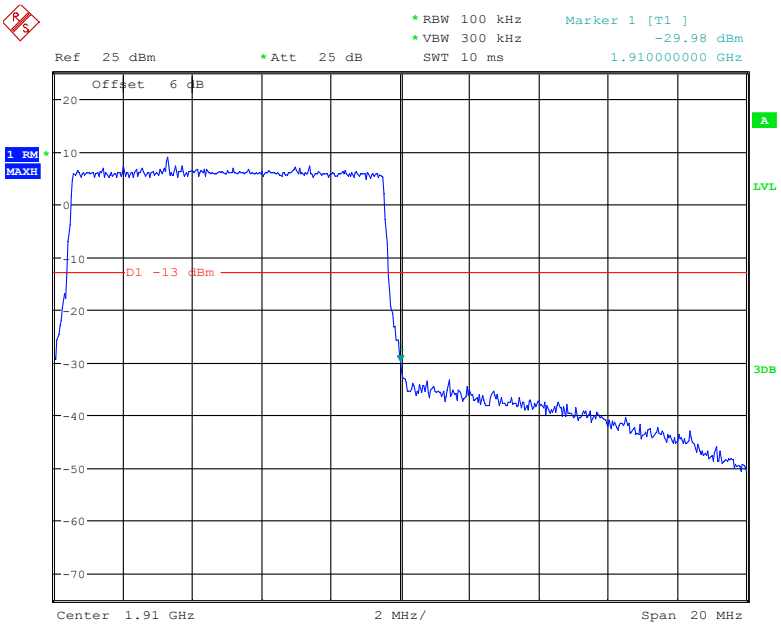
Date: 28.JUN.2019 10:50:07

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



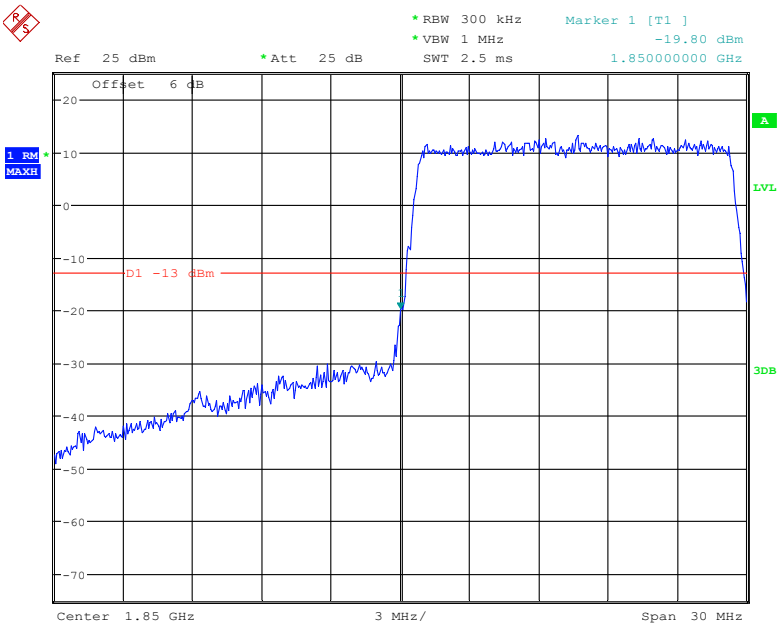
Date: 28.JUN.2019 10:49:33

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



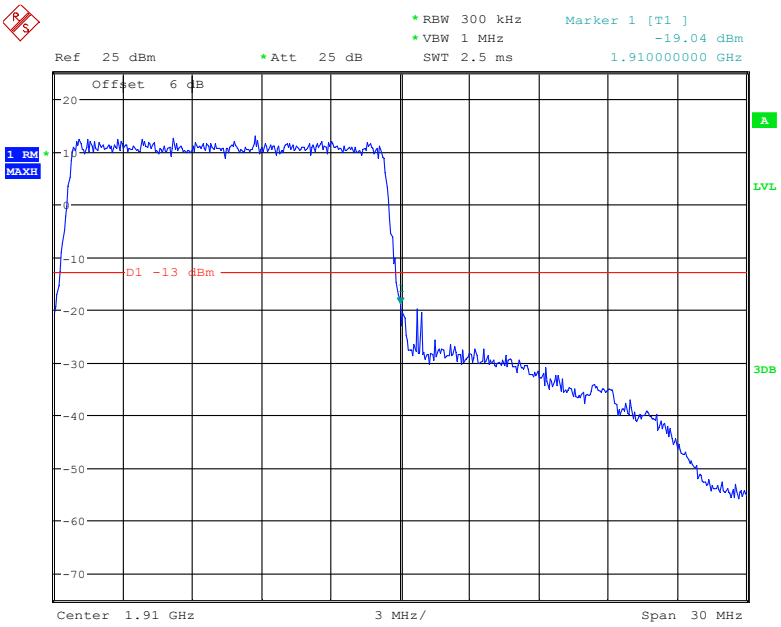
Date: 28.JUN.2019 10:50:34

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



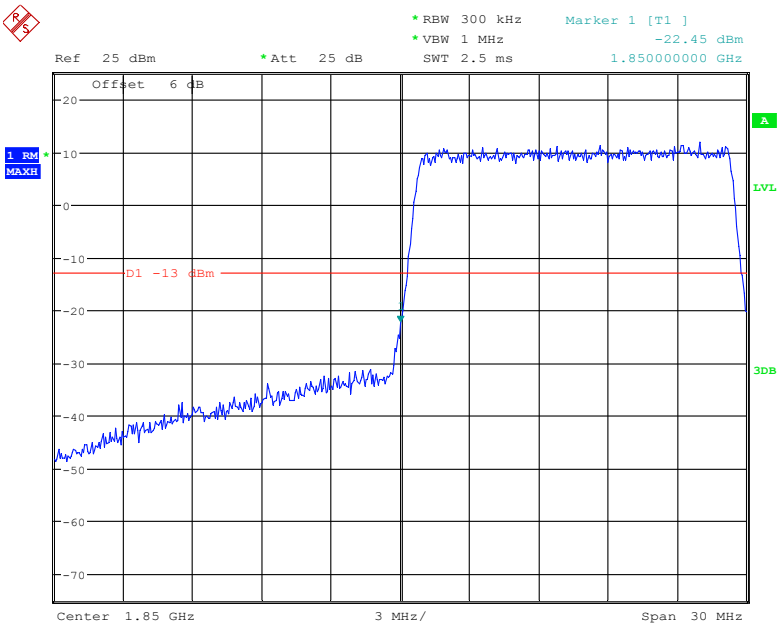
Date: 28.JUN.2019 10:51:15

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



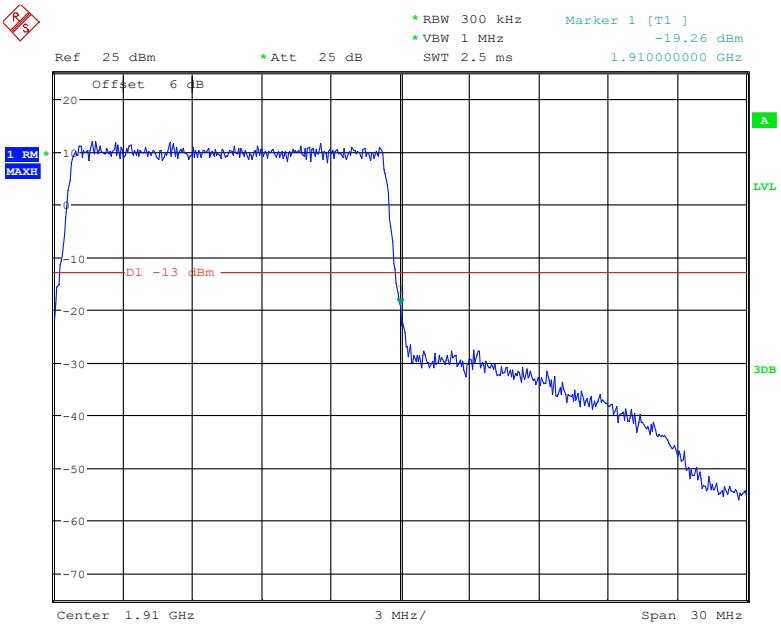
Date: 28.JUN.2019 10:52:23

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



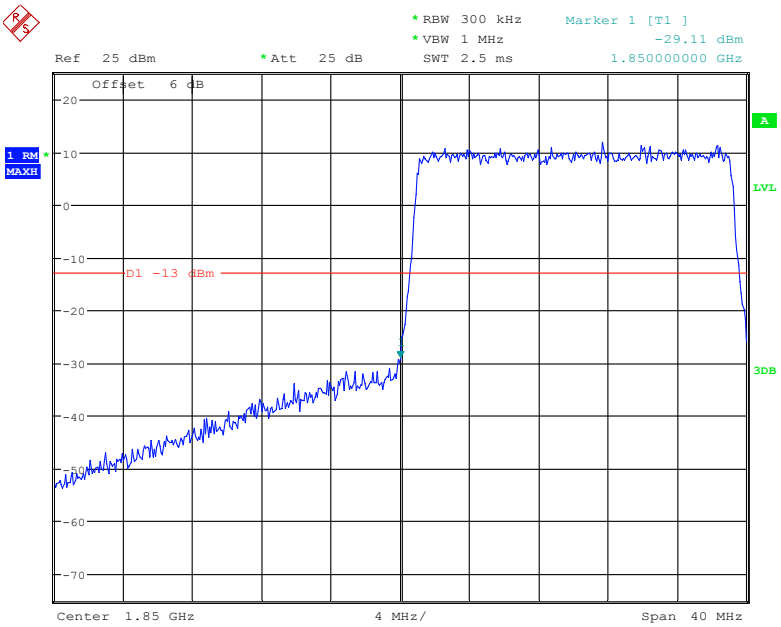
Date: 28.JUN.2019 10:51:47

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



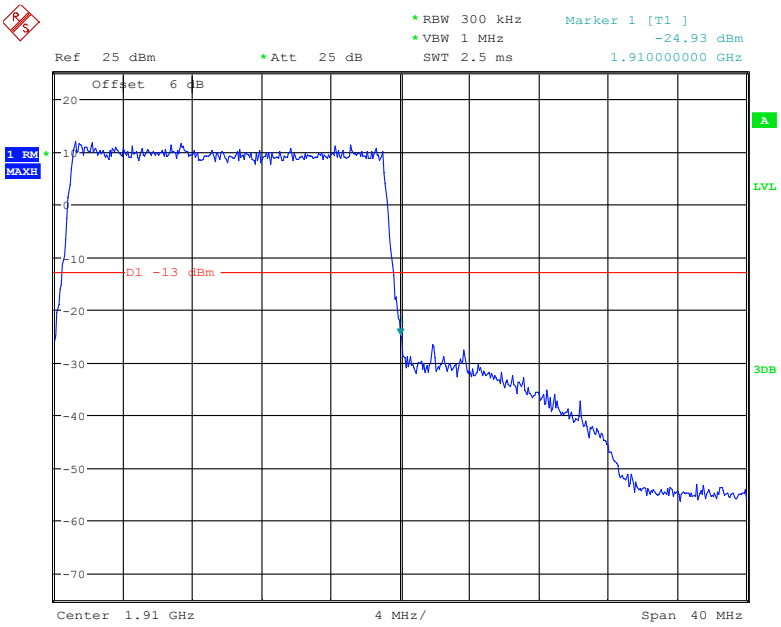
Date: 28.JUN.2019 10:53:02

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



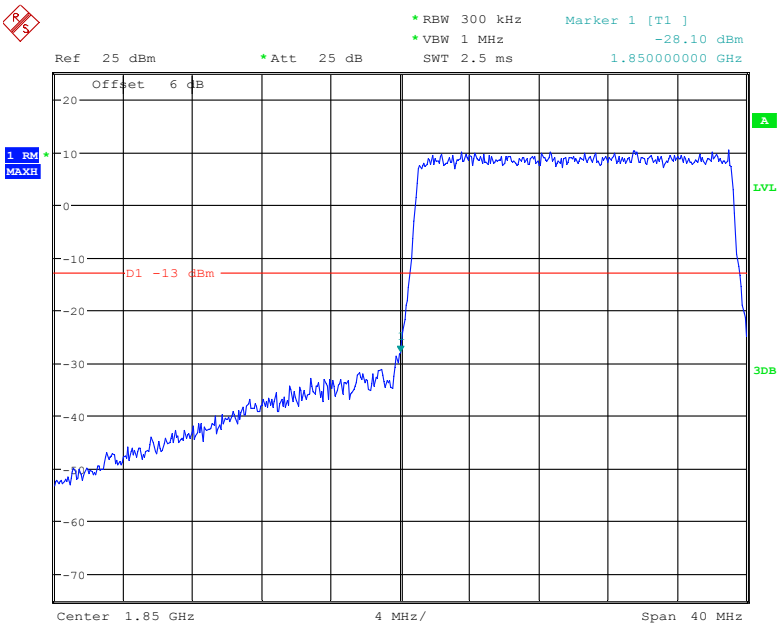
Date: 28.JUN.2019 10:53:37

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



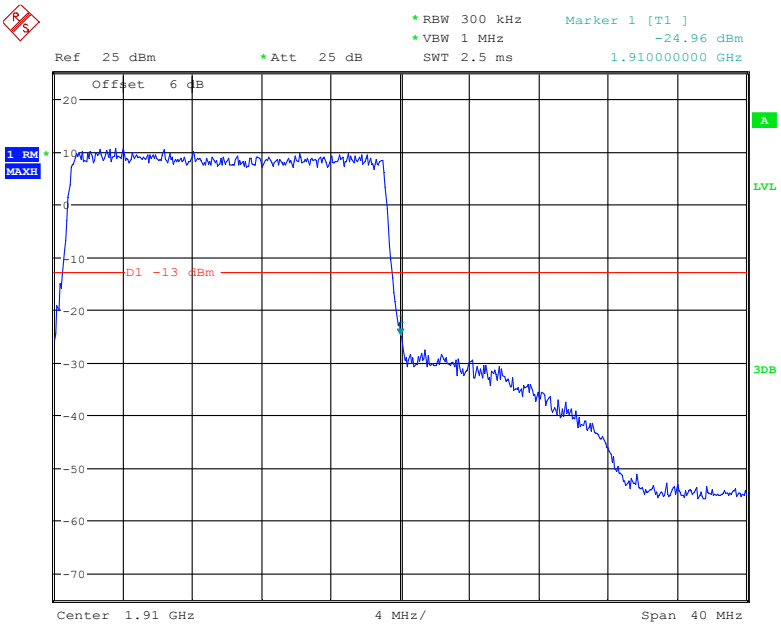
Date: 28.JUN.2019 10:54:54

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



Date: 28.JUN.2019 10:54:21

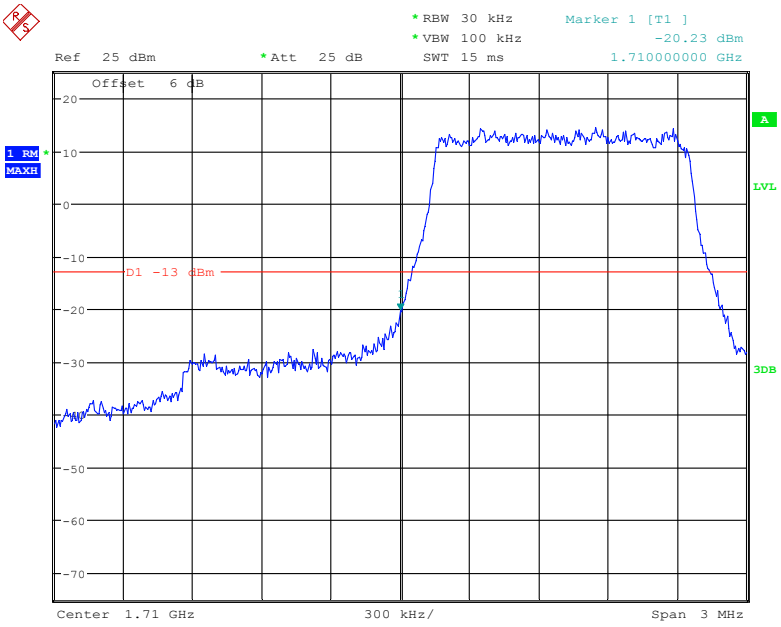
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 28.JUN.2019 10:55:29

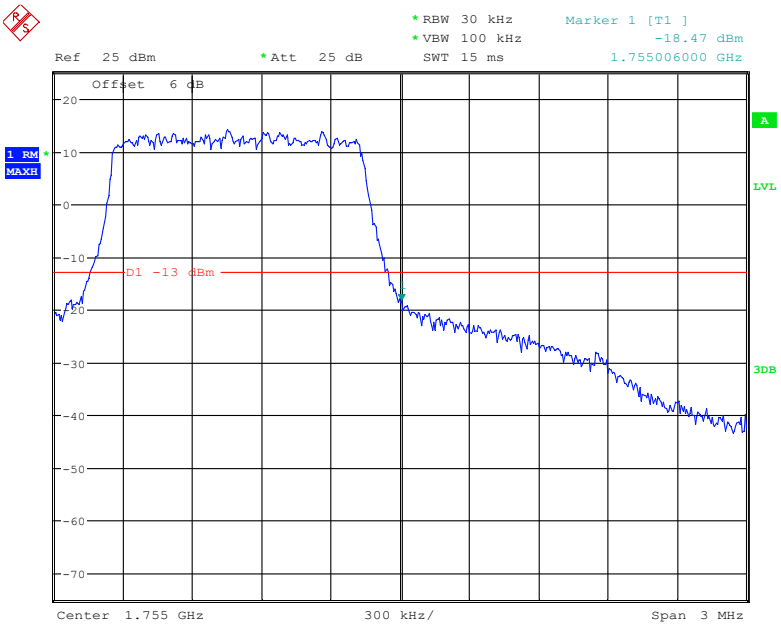
LTE Band 4:

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



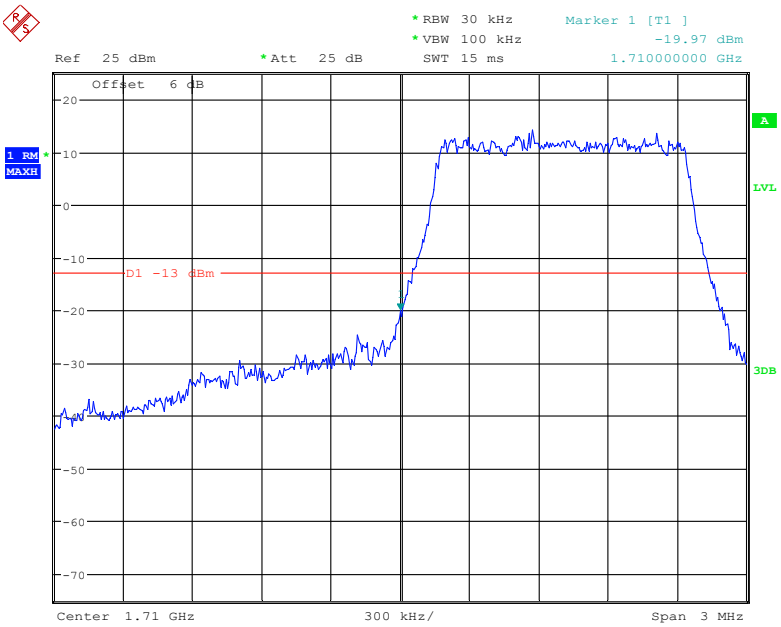
Date: 28.JUN.2019 11:10:23

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



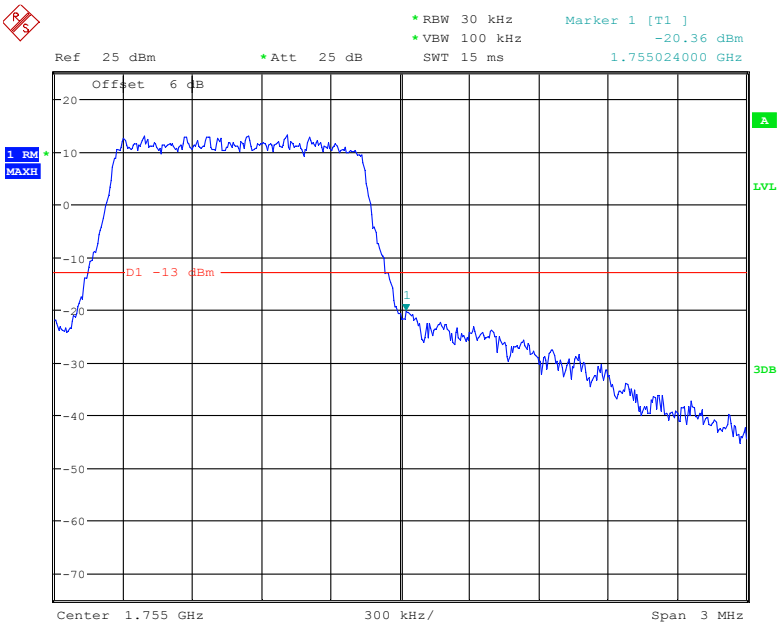
Date: 28.JUN.2019 11:11:27

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



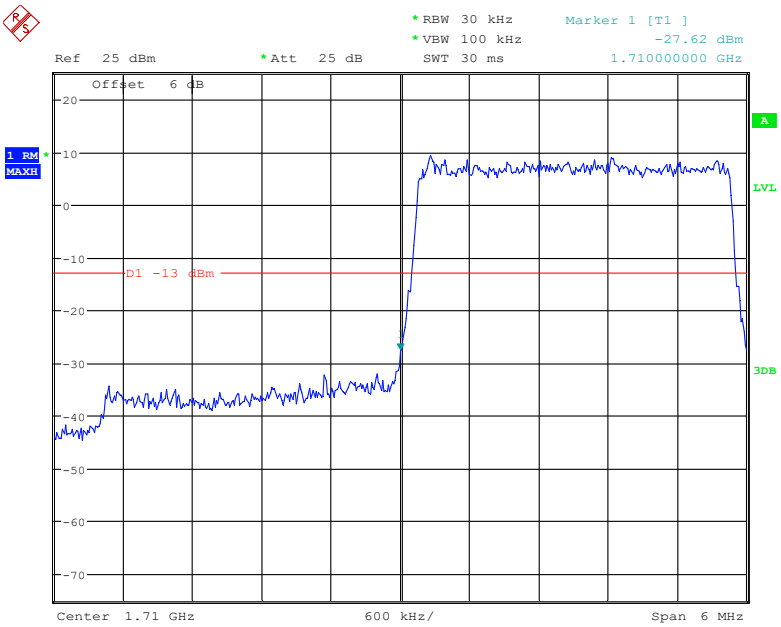
Date: 28.JUN.2019 11:10:52

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



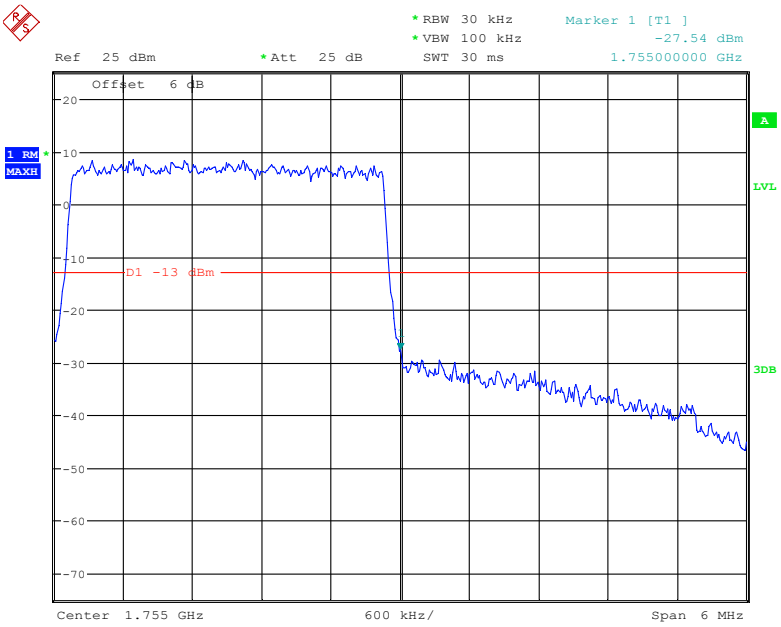
Date: 28.JUN.2019 11:11:59

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



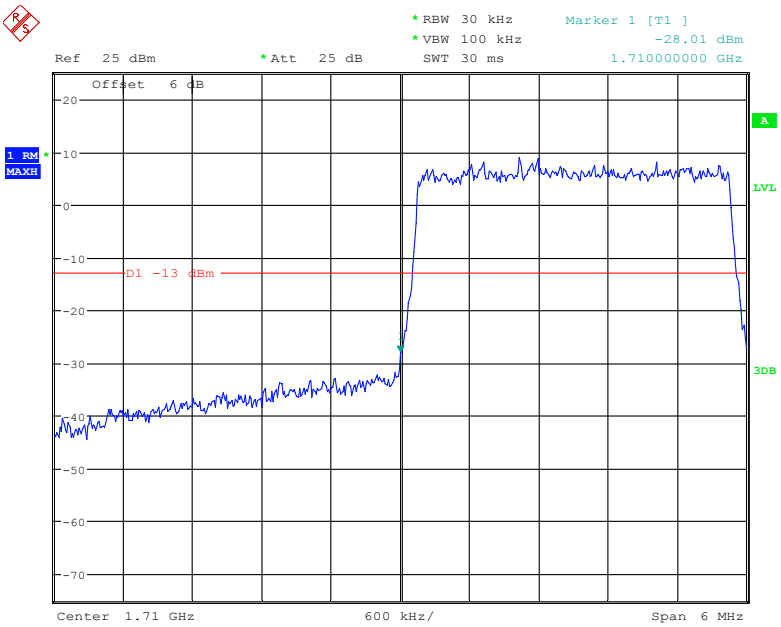
Date: 28.JUN.2019 11:12:28

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



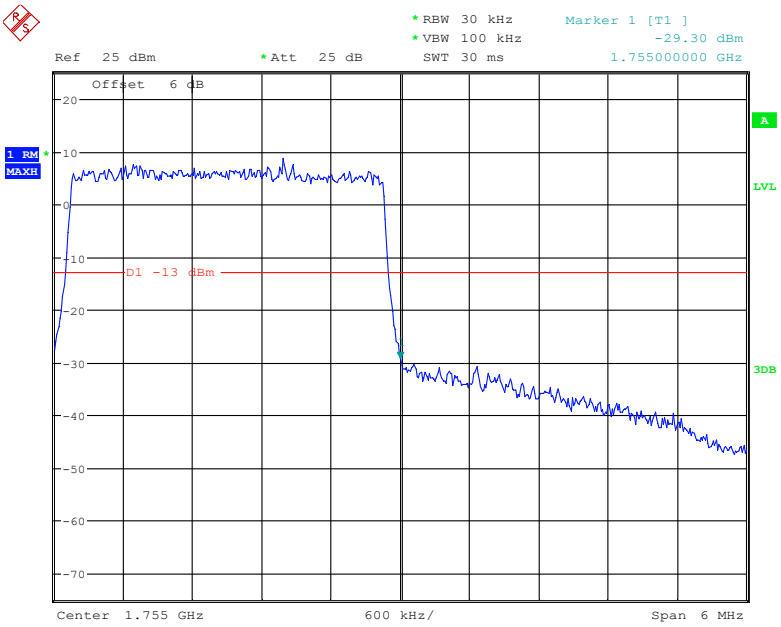
Date: 28.JUN.2019 11:13:23

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



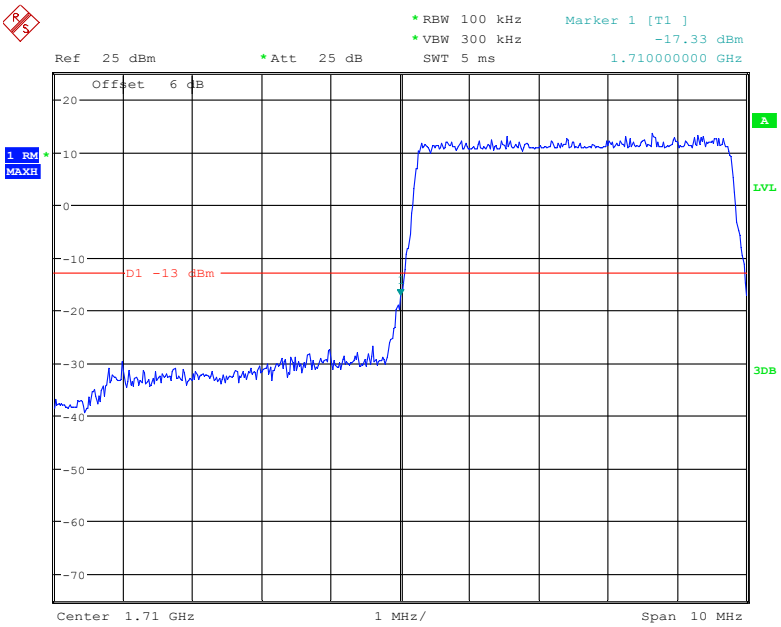
Date: 28.JUN.2019 11:13:00

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



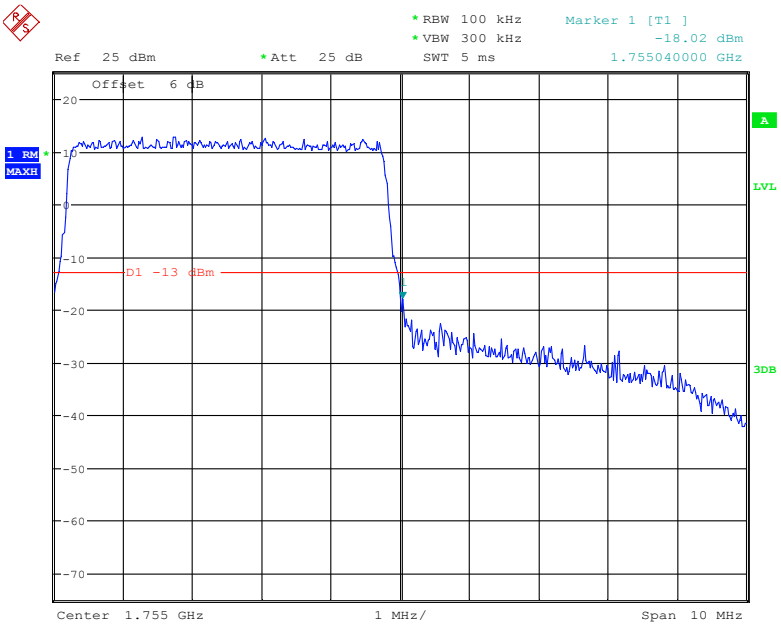
Date: 28.JUN.2019 11:13:49

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



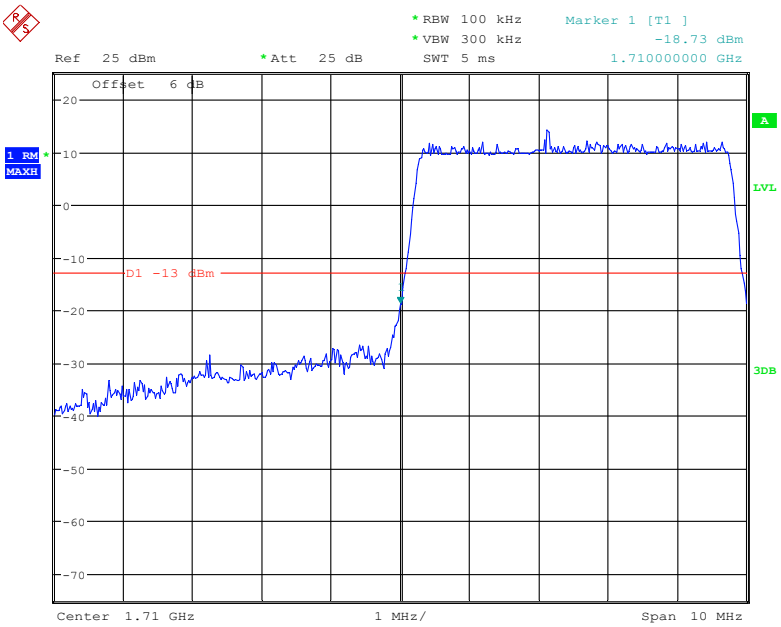
Date: 28.JUN.2019 11:14:20

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



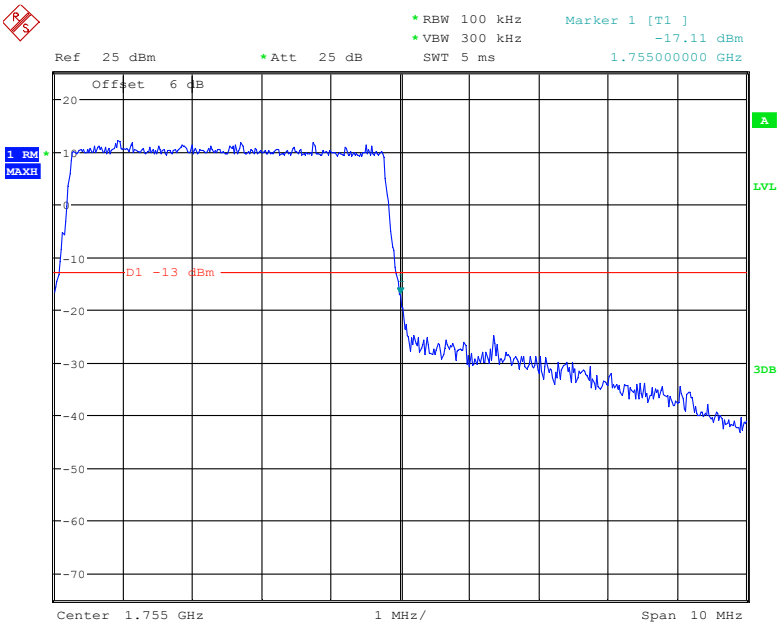
Date: 28.JUN.2019 11:15:31

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



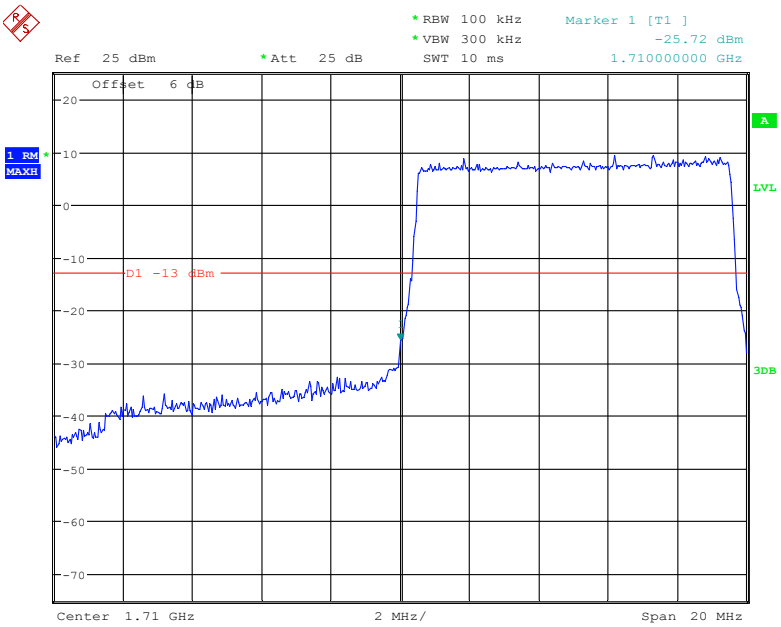
Date: 28.JUN.2019 11:14:49

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



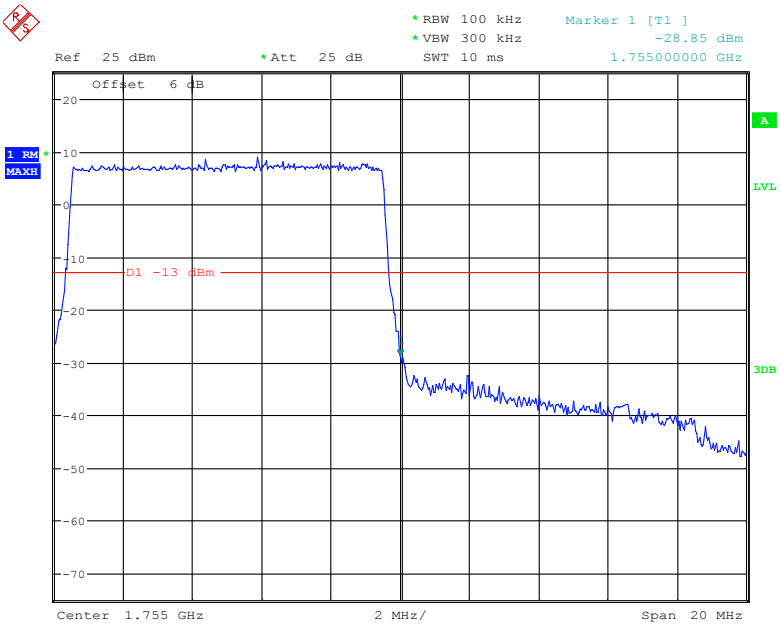
Date: 28.JUN.2019 11:16:06

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



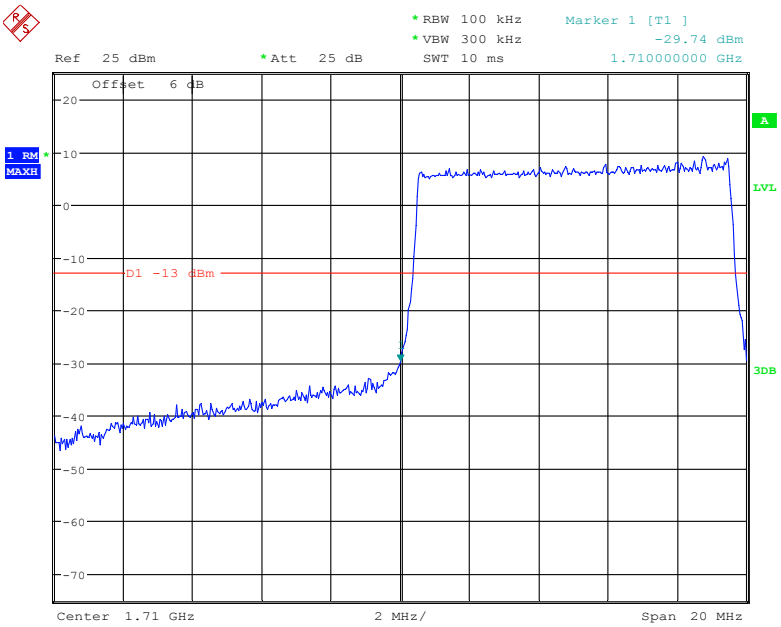
Date: 28.JUN.2019 11:16:41

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



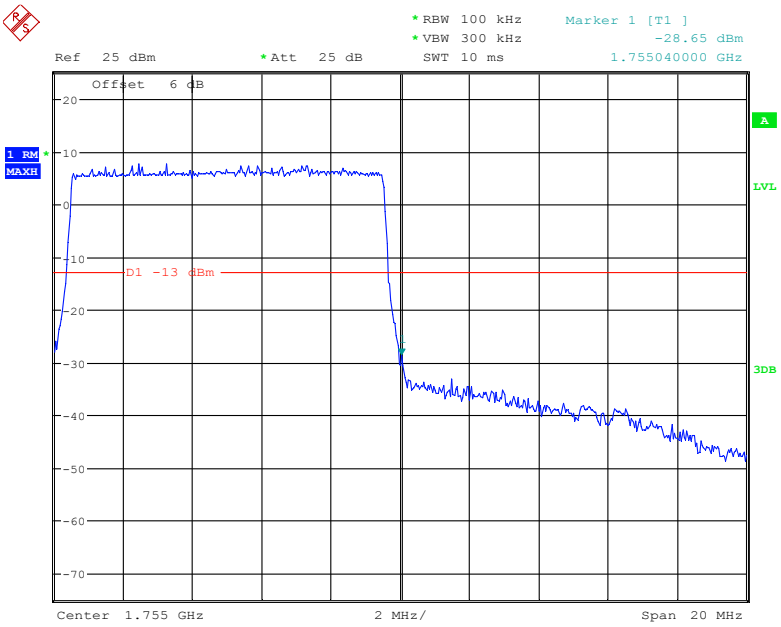
Date: 28.JUN.2019 11:17:33

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



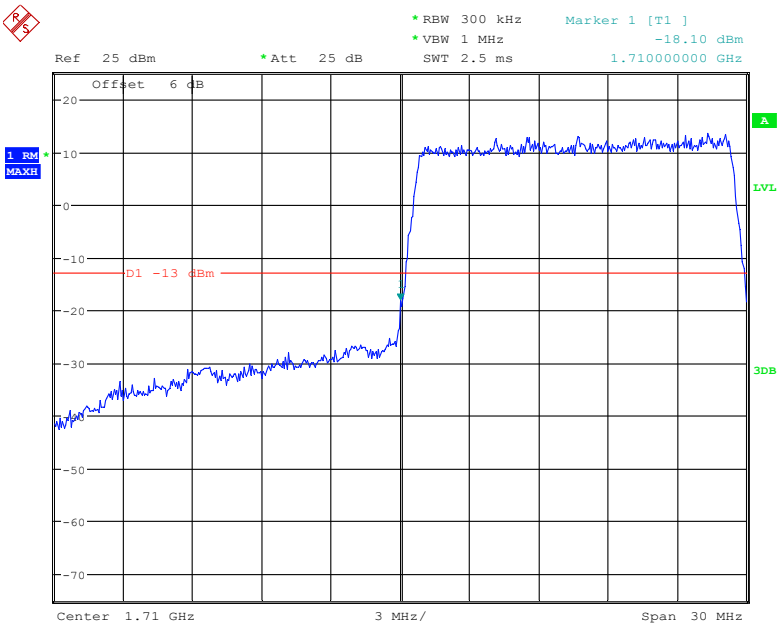
Date: 28.JUN.2019 11:17:08

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



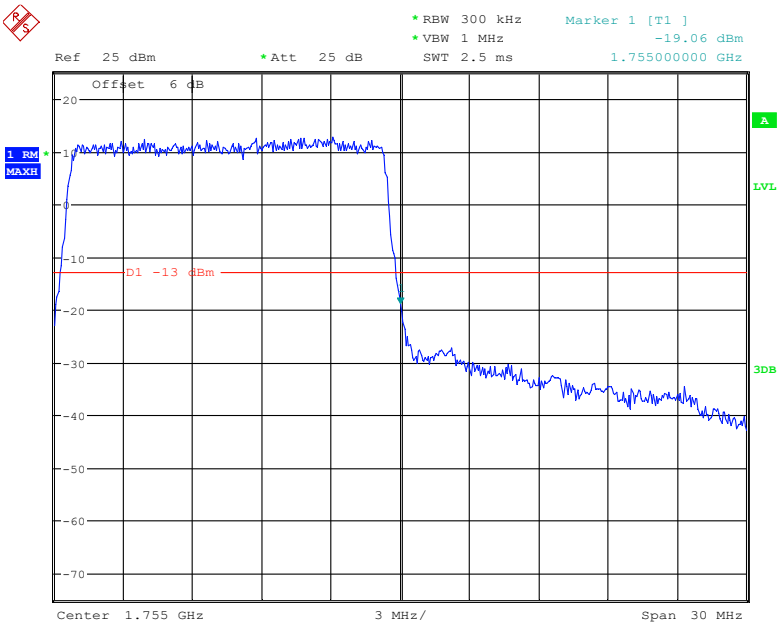
Date: 28.JUN.2019 11:17:56

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



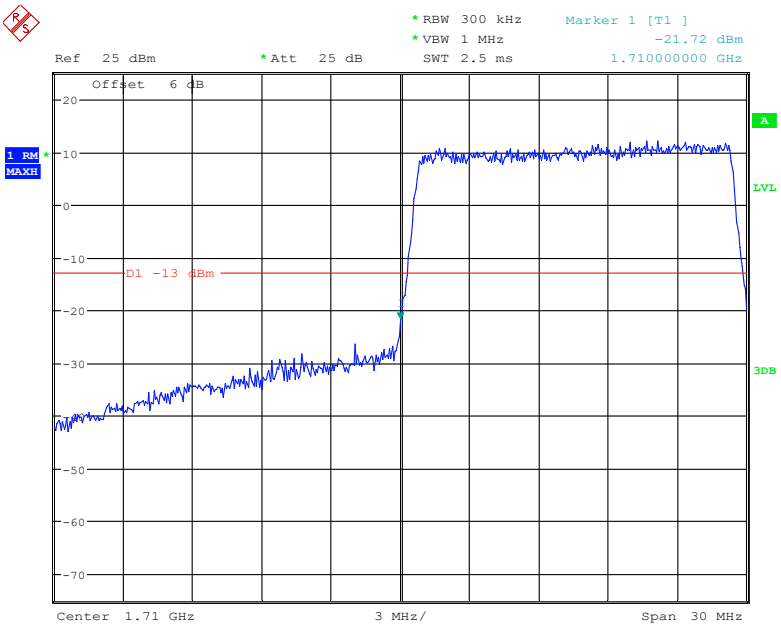
Date: 28.JUN.2019 11:18:31

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



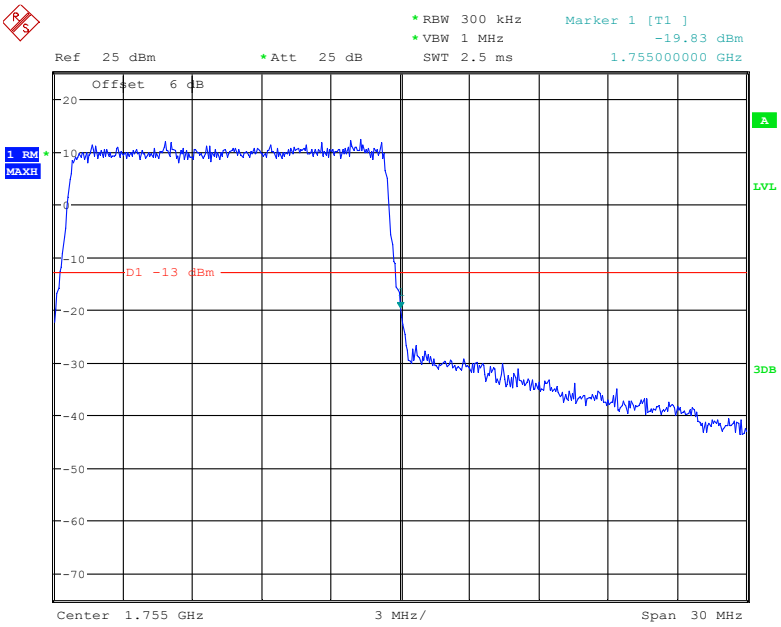
Date: 28.JUN.2019 11:19:42

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



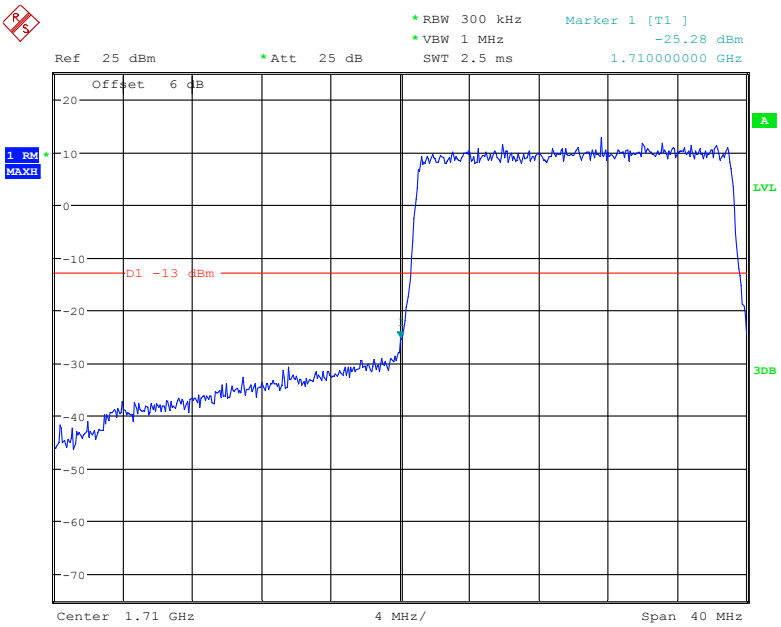
Date: 28.JUN.2019 11:19:03

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



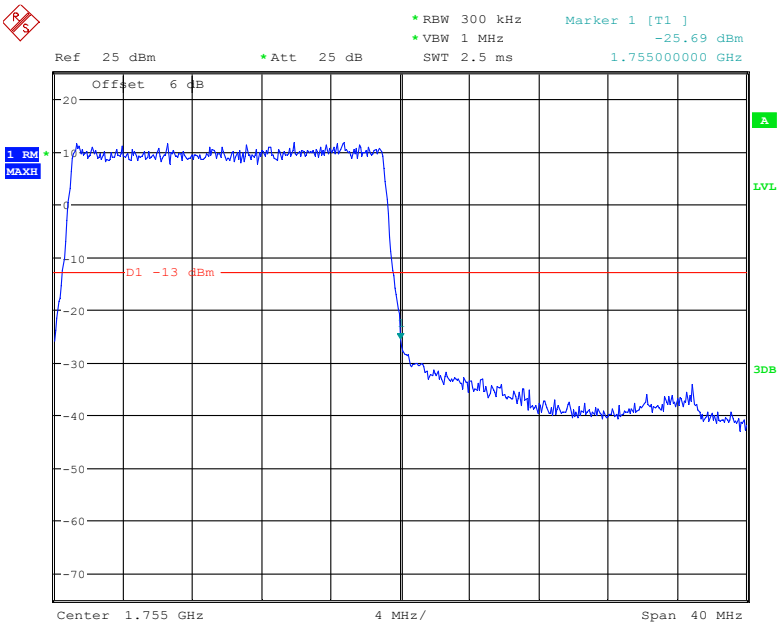
Date: 28.JUN.2019 11:20:21

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



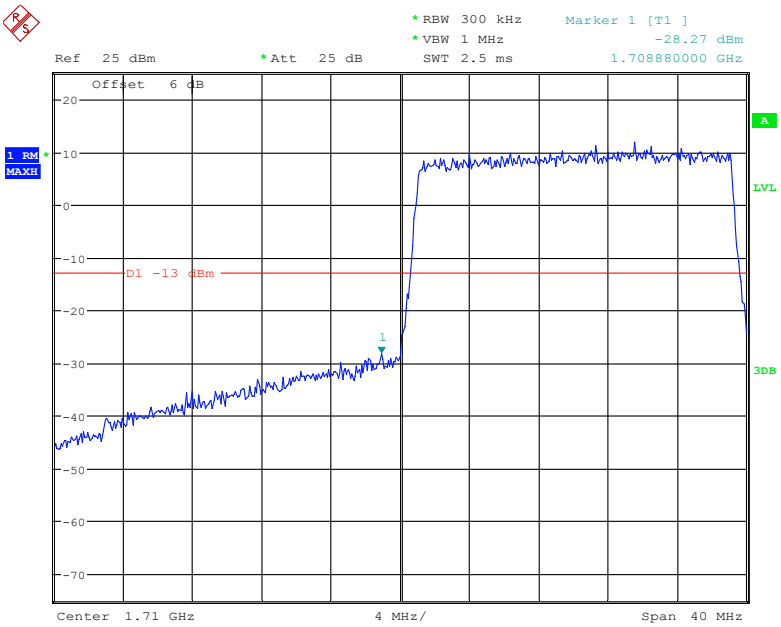
Date: 28.JUN.2019 11:20:56

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



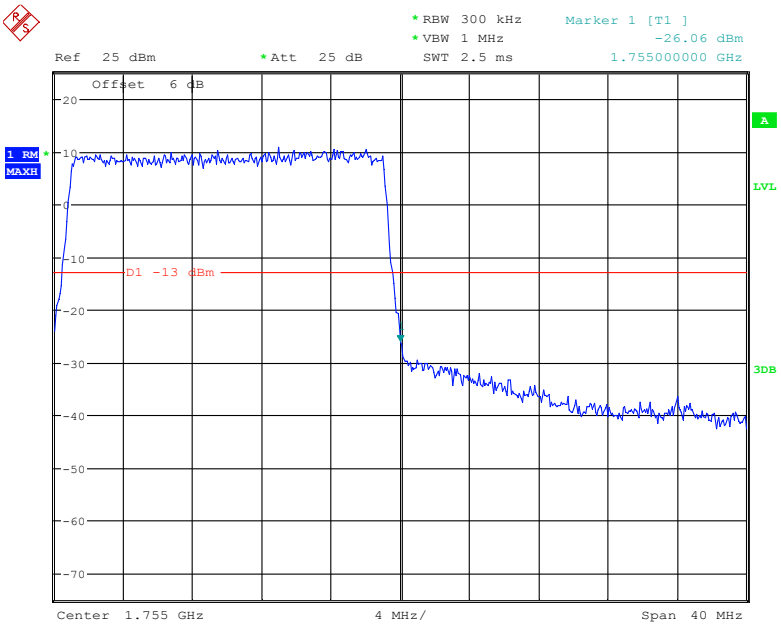
Date: 28.JUN.2019 11:22:07

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



Date: 28.JUN.2019 11:21:31

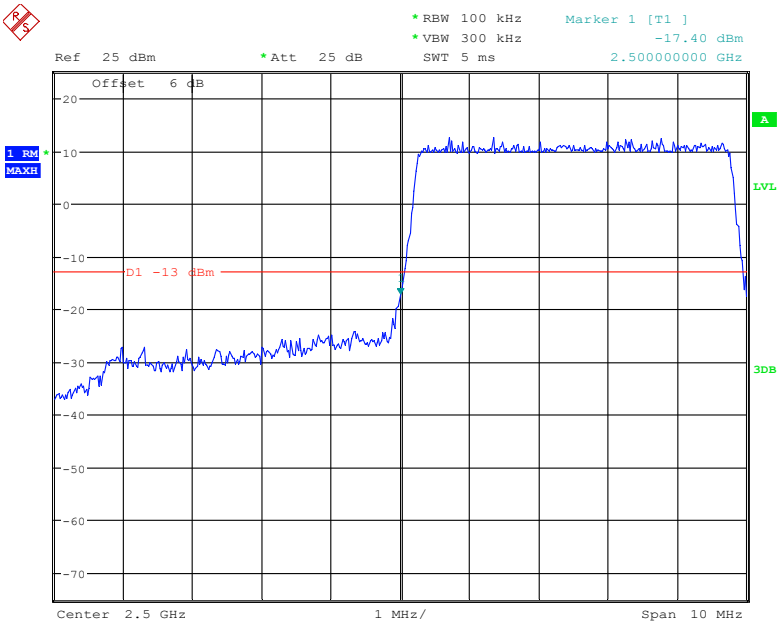
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 28.JUN.2019 11:22:48

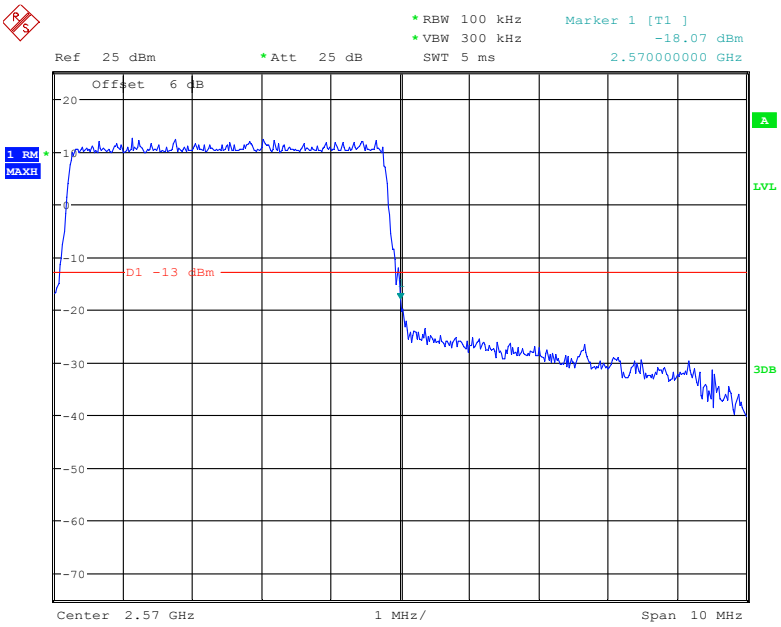
LTE Band 7:

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



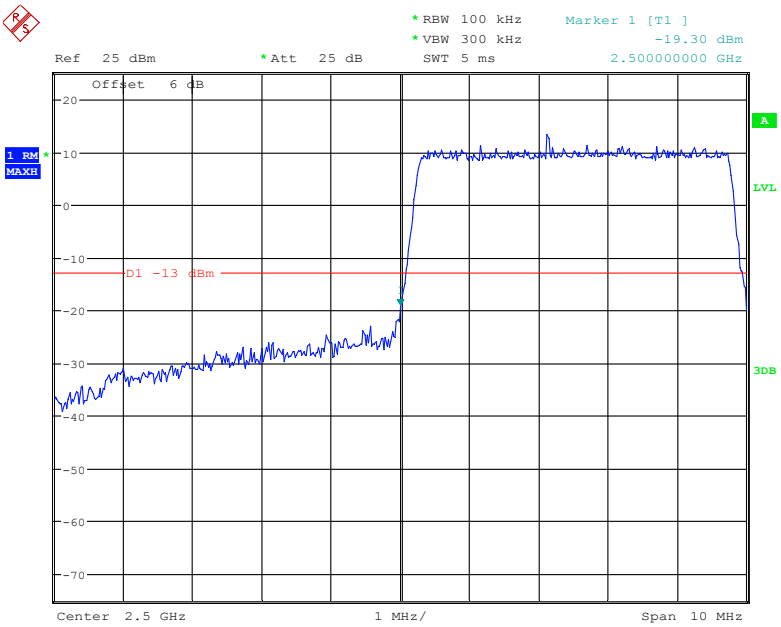
Date: 28.JUN.2019 11:23:23

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



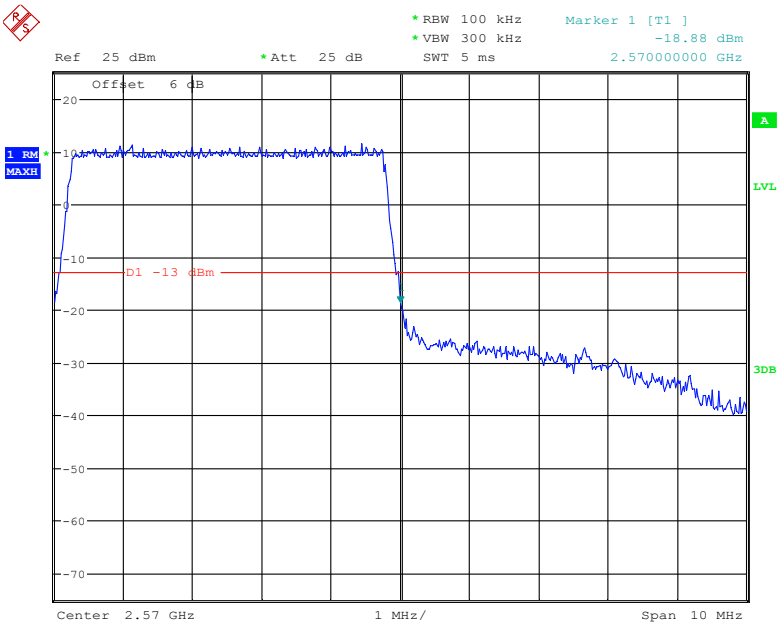
Date: 28.JUN.2019 11:24:24

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



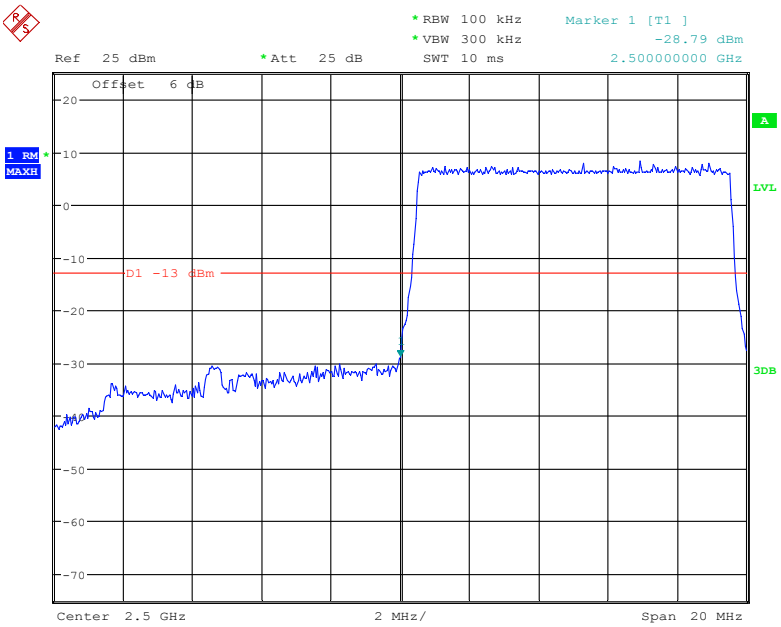
Date: 28.JUN.2019 11:23:55

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



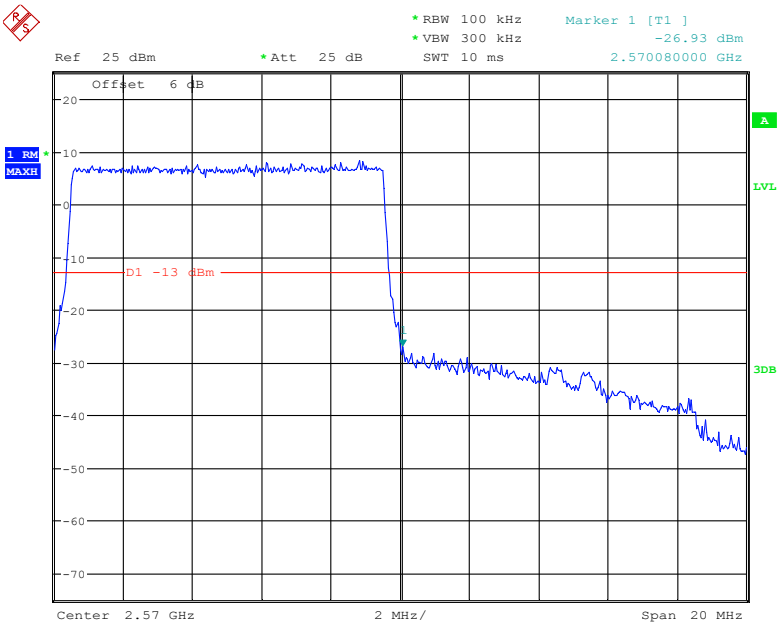
Date: 28.JUN.2019 11:24:50

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



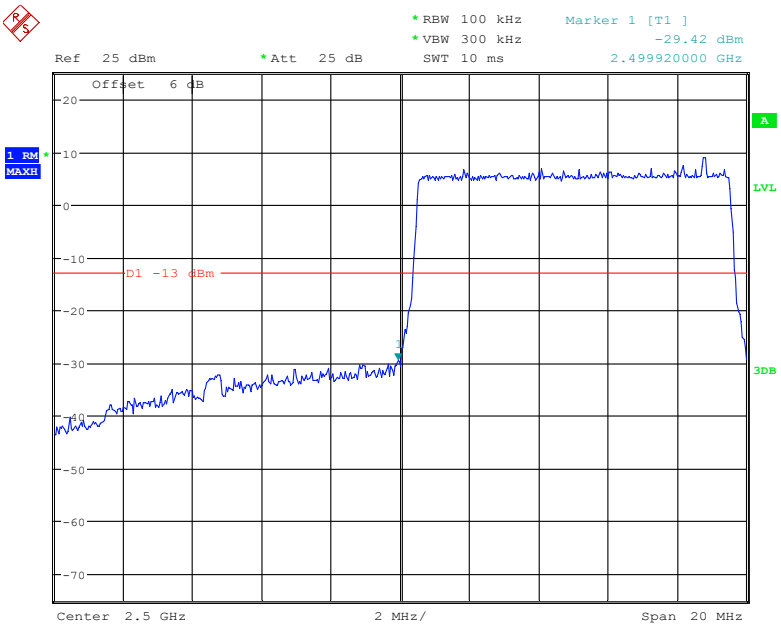
Date: 28.JUN.2019 11:25:22

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



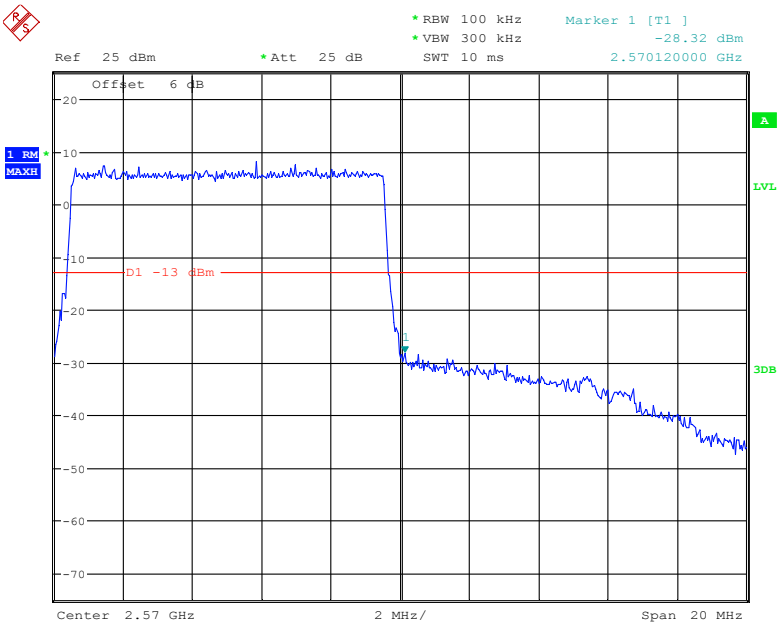
Date: 28.JUN.2019 11:26:20

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



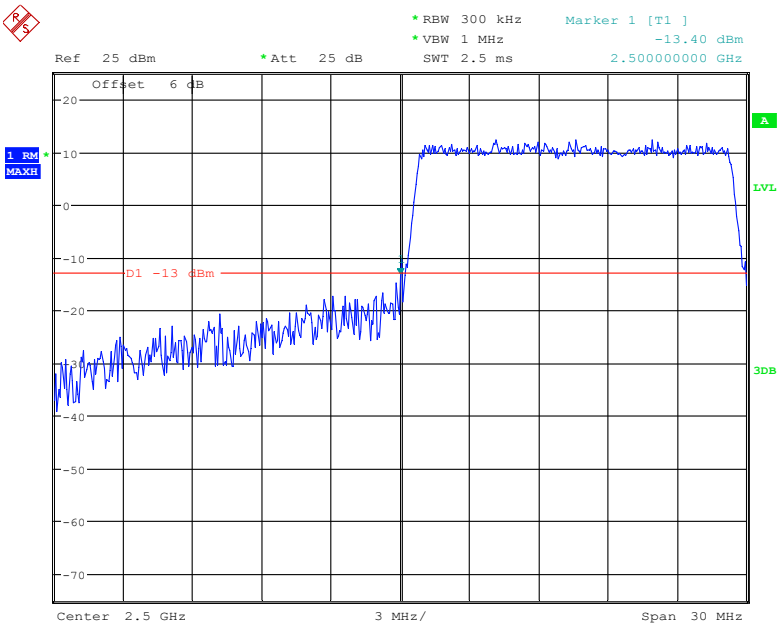
Date: 28.JUN.2019 11:25:52

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



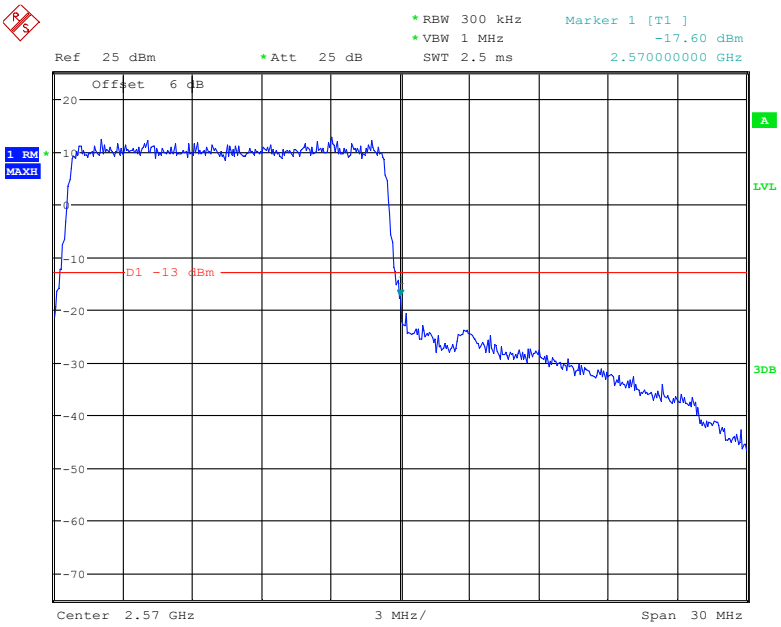
Date: 28.JUN.2019 11:26:50

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



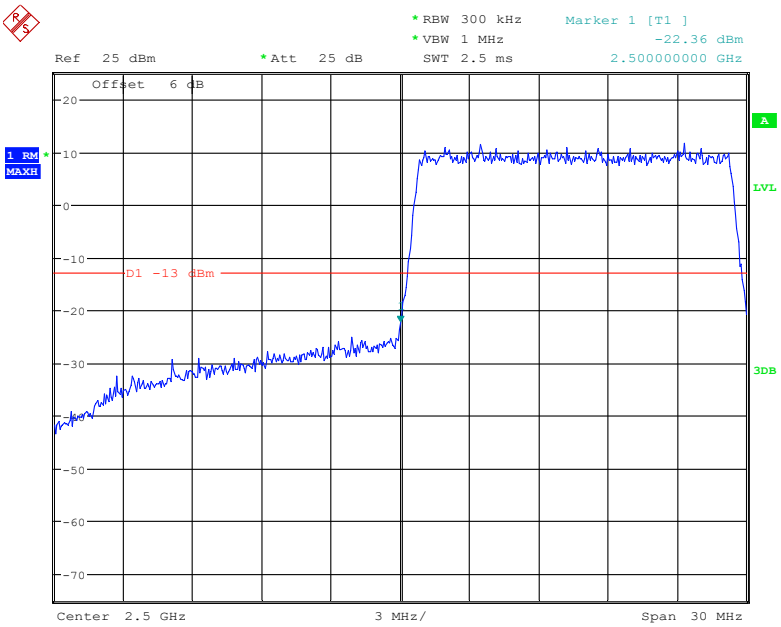
Date: 28.JUN.2019 11:27:37

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



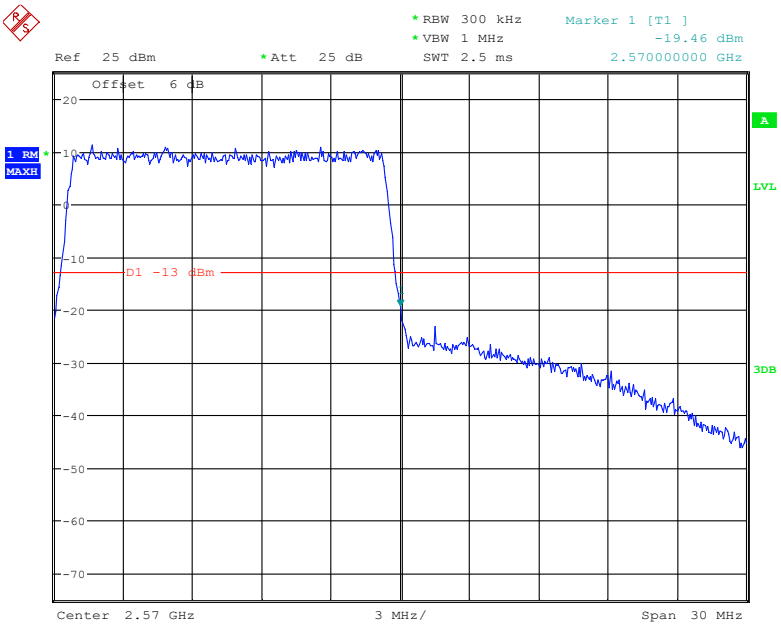
Date: 28.JUN.2019 11:28:33

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



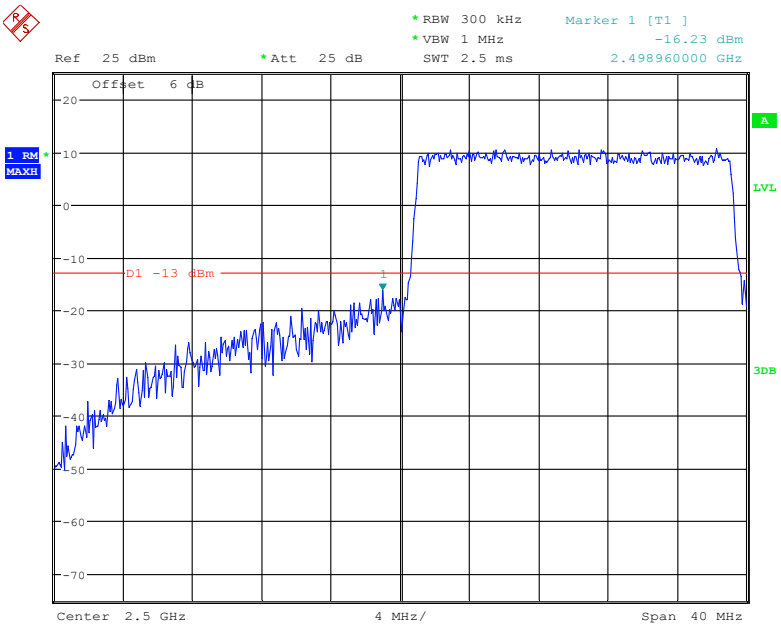
Date: 28.JUN.2019 11:28:03

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



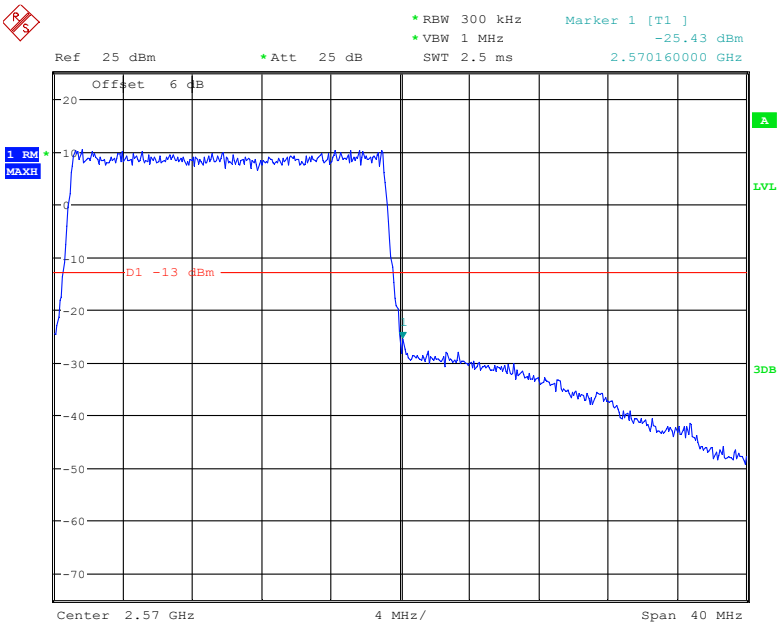
Date: 28.JUN.2019 11:29:05

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



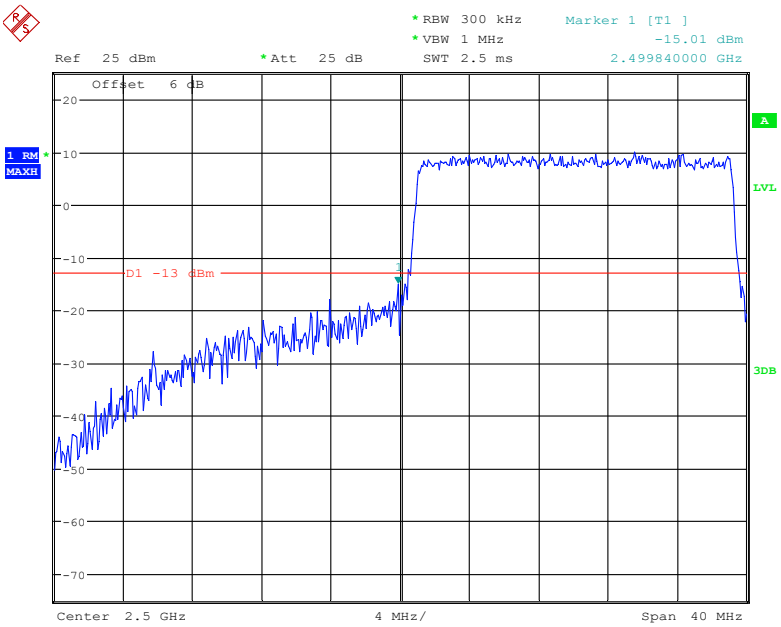
Date: 28.JUN.2019 11:30:02

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



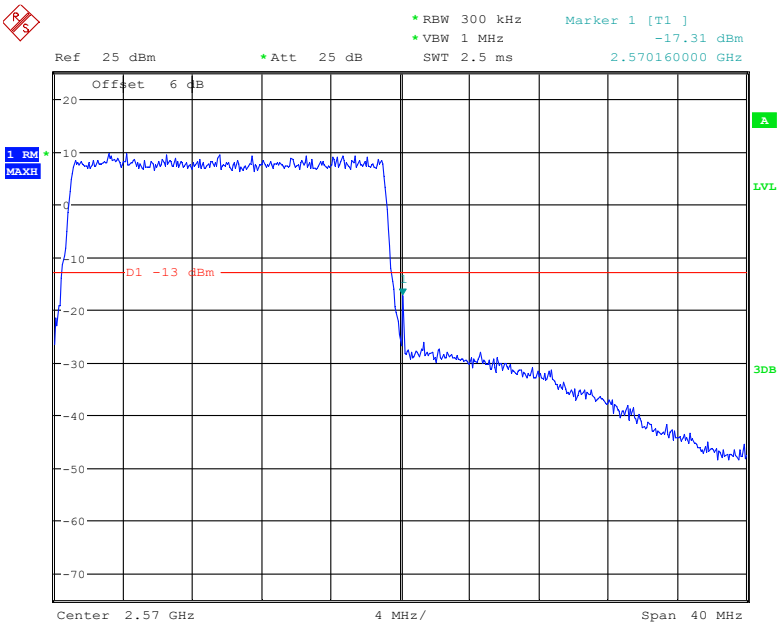
Date: 28.JUN.2019 11:31:28

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



Date: 28.JUN.2019 11:31:01

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



Date: 28.JUN.2019 11:32:03

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

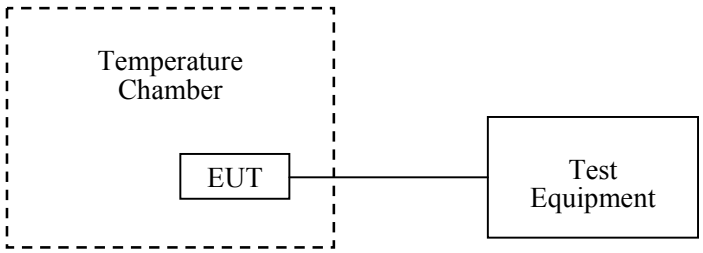
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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

The testing was performed by Kieroy Luo from 2019-06-28 to 2019-07-02.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	4	0.004781	2.5
-20		3	0.003586	2.5
-10		1	0.001195	2.5
0		5	0.005977	2.5
10		7	0.008367	2.5
20		8	0.009563	2.5
30		1	0.001195	2.5
40		-2	-0.002391	2.5
50		2	0.002391	2.5
20	V min.= 3.3	-2	-0.002391	2.5
	V max.= 4.4	5	0.005977	2.5

EDGE Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	5	0.005977	2.5
-20		3	0.003586	2.5
-10		4	0.004781	2.5
0		5	0.005877	2.5
10		9	0.010758	2.5
20		6	0.007172	2.5
30		5	0.005977	2.5
40		4	0.004781	2.5
50		8	0.009563	2.5
20	V min.= 3.3	8	0.009563	2.5
	V max.= 4.4	6	0.007172	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	4	0.004781	2.5
-20		3	0.003586	2.5
-10		1	0.001195	2.5
0		5	0.005977	2.5
10		-1	-0.001195	2.5
20		4	0.004781	2.5
30		1	0.001195	2.5
40		-2	-0.002391	2.5
50		2	0.002391	2.5
20	V min.= 3.3	-2	-0.002391	2.5
	V max.= 4.4	5	0.005977	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	5	0.002660	pass
-20		4	0.002128	pass
-10		2	0.001064	pass
0		7	0.003723	pass
10		-2	-0.001064	pass
20		4	0.002128	pass
30		8	0.004255	pass
40		-1	-0.000532	pass
50		3	0.001596	pass
20	V min.= 3.3	4	0.002128	pass
	V max.= 4.4	5	0.002660	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-1	-0.000532	pass
-20		3	0.001596	pass
-10		6	0.003191	pass
0		4	0.002128	pass
10		6	0.003191	pass
20		-2	-0.001064	pass
30		5	0.002660	pass
40		6	0.003191	pass
50		4	0.002128	pass
20	V min.= 3.3	2	0.001064	pass
	V max.= 4.4	-1	-0.000532	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	5	0.002660	pass
-20		-2	-0.001064	pass
-10		2	0.001064	pass
0		3	0.001596	pass
10		-2	-0.001064	pass
20		4	0.002128	pass
30		8	0.004255	pass
40		-1	-0.000532	pass
50		3	0.001596	pass
20	V min.= 3.3	1	0.000532	pass
	V max.= 4.4	5	0.002660	pass

AWS Band (Part 27)

Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	1710.0042	1754.9984	1710	1755
-20		1710.0032	1754.9977	1710	1755
-10		1710.0058	1754.9973	1710	1755
0		1710.0021	1754.9954	1710	1755
10		1710.0074	1754.9943	1710	1755
20		1710.0047	1754.9989	1710	1755
30		1710.0054	1754.9966	1710	1755
40		1710.0031	1754.9975	1710	1755
50		1710.0070	1754.9985	1710	1755
20	V min.= 3.3	1710.0045	1754.9960	1710	1755
	V max.= 4.4	1710.0015	1754.9981	1710	1755

LTE Mode:

QPSK:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-4	-0.002128	pass
-20		-2	-0.001064	pass
-10		-3	-0.001596	pass
0		-2	-0.001064	pass
10		-3	-0.001596	pass
20		-2	-0.001064	pass
30		-1	-0.000532	pass
40		-2	-0.001064	pass
50		-2	-0.001064	pass
20	V min.= 3.3	-3	-0.001596	pass
	V max.= 4.4	-1	-0.000532	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	1710.321765	1754.613407	1710.0000	1755.0000
-20		1710.320959	1754.615235	1710.0000	1755.0000
-10		1710.323743	1754.616127	1710.0000	1755.0000
0		1710.319869	1754.617482	1710.0000	1755.0000
10		1710.319869	1754.617482	1710.0000	1755.0000
20		1710.384615	1754.615385	1710.0000	1755.0000
30		1710.320202	1754.618929	1710.0000	1755.0000
40		1710.326010	1754.613172	1710.0000	1755.0000
50		1710.323124	1754.614920	1710.0000	1755.0000
20	V min.= 3.3	1710.383560	1754.618273	1710.0000	1755.0000
	V max.= 4.4	1710.387859	1754.619132	1710.0000	1755.0000

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	2500.356494	2569.619585	2500.0000	2570.0000
-20		2500.349730	2569.617465	2500.0000	2570.0000
-10		2500.354232	2569.620013	2500.0000	2570.0000
0		2500.356303	2569.616463	2500.0000	2570.0000
10		2500.355158	2569.613180	2500.0000	2570.0000
20		2500.352564	2569.615385	2500.0000	2570.0000
30		2500.357033	2569.618567	2500.0000	2570.0000
40		2500.357522	2569.615353	2500.0000	2570.0000
50		2500.355130	2569.618988	2500.0000	2570.0000
20	V min.= 3.3	2500.350452	2569.615712	2500.0000	2570.0000
	V max.= 4.4	2500.351877	2569.619988	2500.0000	2570.0000

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-5	-0.002660	pass
-20		-2	-0.001064	pass
-10		-3	-0.001596	pass
0		-6	-0.003191	pass
10		-3	-0.001596	pass
20		-2	-0.001064	pass
30		-2	-0.001064	pass
40		-2	-0.001064	pass
50		-1	-0.000532	pass
20	V min.= 3.3	3	0.001596	pass
	V max.= 4.4	7	0.003723	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	1710.381908	1754.616781	1710.0000	1755.0000
-20		1710.387778	1754.615446	1710.0000	1755.0000
-10		1710.387316	1754.616282	1710.0000	1755.0000
0		1710.386327	1754.618032	1710.0000	1755.0000
10		1710.381665	1754.616078	1710.0000	1755.0000
20		1710.384615	1754.615385	1710.0000	1755.0000
30		1710.382134	1754.618308	1710.0000	1755.0000
40		1710.383226	1754.618572	1710.0000	1755.0000
50		1710.387756	1754.618279	1710.0000	1755.0000
20	V min.= 3.3	1710.382736	1754.616938	1710.0000	1755.0000
	V max.= 4.4	1710.389154	1754.617689	1710.0000	1755.0000

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	2500.383045	2569.616701	2500.0000	2570.0000
-20		2500.382921	2569.613413	2500.0000	2570.0000
-10		2500.386012	2569.615403	2500.0000	2570.0000
0		2500.388553	2569.617556	2500.0000	2570.0000
10		2500.386565	2569.619261	2500.0000	2570.0000
20		2500.384615	2569.615385	2500.0000	2570.0000
30		2500.389172	2569.619540	2500.0000	2570.0000
40		2500.386749	2569.618736	2500.0000	2570.0000
50		2500.381933	2569.614308	2500.0000	2570.0000
20	V min.= 3.3	2500.384683	2569.618325	2500.0000	2570.0000
	V max.= 4.4	2500.387390	2569.613399	2500.0000	2570.0000

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