FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

TECNO MOBILE LIMITED

ROOM 604 6/F SOUTH TOWER WORLD FINANCE CTR HARBOUR CITY 17 CANTON ROAD TST KL

FCC ID: 2ADYY-BB4

Report Type:	Product Type:
Original Report	Mobile phone

Report Number:	RGMA190906001-00D
Report Date:	2019-09-18
Reviewed By:	Nancy Wang RF 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	Mobile phone
Tested Model	BB4
Frequency Range	Cellular: 824-849 MHz PCS: 1850-1910 MHz WCDMA B2/LTE B2: 1850-1910 MHz WCDMA B5/LTE B5: 824-849 MHz WCDMA B4/LTE B4: 1710- 1755 MHz LTE B7: 2500-2570 MHz
Conducted Average Power	GSM850: 32.86dBm(GMSK), 25.41dBm(8PSK) PCS1900: 28.97dBm(GMSK), 25.15dBm(8PSK) WCDMA Band 2: 21.76dBm WCDMA Band 4: 21.57dBm WCDMA Band 5: 22.58dBm LTE Band 2: 23.00dBm LTE Band 4: 22.87dBm LTE Band 5: 23.19dBm LTE Band 7: 23.82dBm
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	2019-09-06~2019-09-17
Sample serial number	190906001(Assigned by BACL, Shenzhen)
Received date	2019-09-06
Sample/EUT Status	Good condition
Adapter information	Model: A8-501000 Input: AC 100-240V, 50/60Hz, 200mA Output: DC 5.0V, 1.0A

Objective

This test report is prepared on behalf of *TECNO MOBILE LIMITED* 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 and Part 15.247 DTS submissions with FCC ID: 2ADYY-BB4.

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.

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

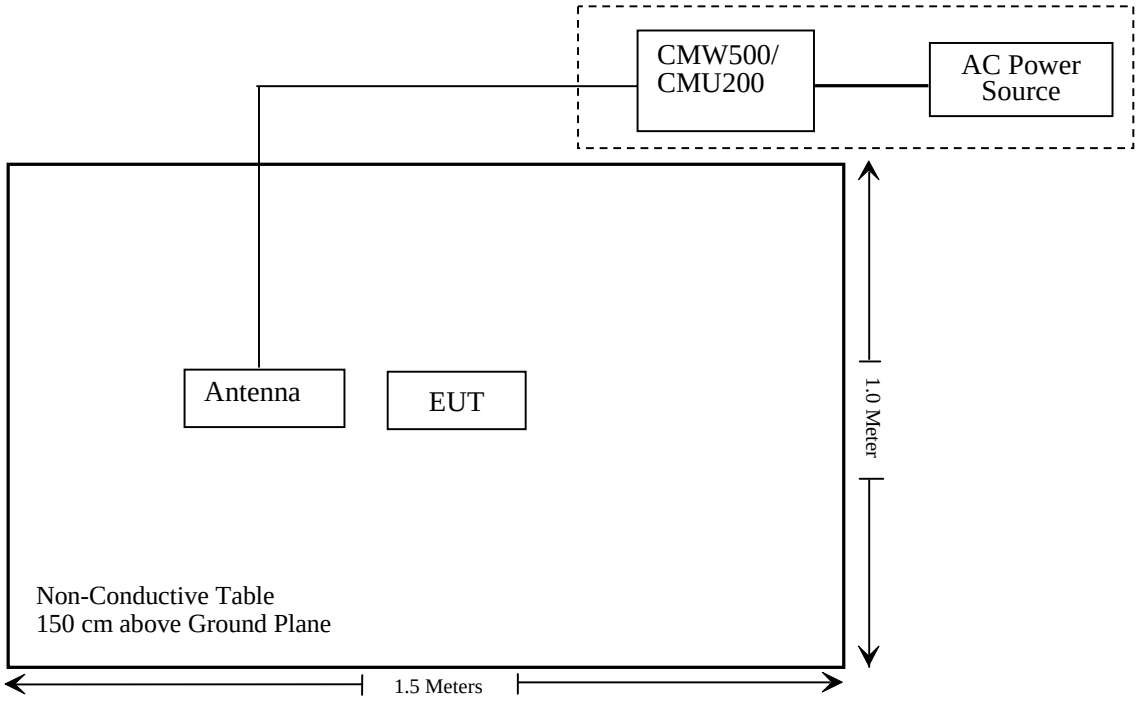
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

Note: * Please refer to SAR report released by BACL, report number: RGMA190906001-20.

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	Spectrum Analyzer	FSV40-N	102259	2019-07-22	2020-07-21
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	ESR3	102455	2019-07-09	2020-07-08
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-2823-02	1007726-03	2016-11-18	2019-11-18
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-11-12	2019-11-12
Unknown	High Pass filter	2.8GHz	Unknown	2019-04-20	2020-04-20
Unknown	High Pass filter	1.3GHz	Unknown	2019-04-20	2020-04-20

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
Fluke	Digital Multimeter	287	19000011	2019-04-12	2020-04-12
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2019-01-15	2020-01-15
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2019-07-09	2020-07-08
Wainwright Germany	Band Reject Filter	WRCG1850/1910-1835/1925-40/8SS	22	2019-03-02	2020-03-01
Wainwright Germany	Band Reject Filter	WRCG1786-1689/1806	2	2019-03-02	2020-03-01
Chengdu Oulitong	Band Reject Filter	OBSF-2500-2570-S	OE01601523	2019-03-02	2020-03-01
Wainwright Germany	Band Reject Filter	WRCG823/850-813/860-40/8SS	7	2019-03-02	2020-03-01
Ducommun Technologies	RF Cable	RG-214	3	Each Time	
Ducommun technologies	RF Cable	UFA210A-1-4724-30050U	MFR64369 223410-001	2018-11-12	2019-11-12
WEINSCHEL	10dB Attenuator	5324	AU 3842	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: RGMA190906001-20.

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.

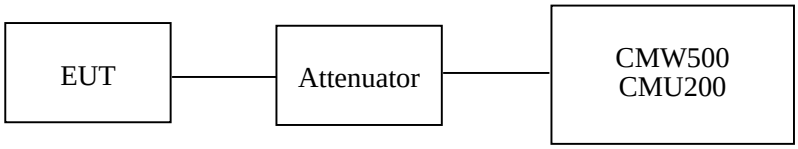
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Geroge Zhong from 2019-09-09 to 2019-09-11.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.51	38.45
	190	836.6	32.23	38.45
	251	848.8	32.86	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.08	30.99	28.84	27.61	38.45
	190	836.6	32.11	31.13	28.96	27.69	38.45
	251	848.8	32.28	31.07	28.94	27.72	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	25.26	24.01	22.92	21.53	38.45
	190	836.6	25.24	24.11	23.05	21.67	38.45
	251	848.8	25.41	24.13	23.11	21.75	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		22.58	22.41	22.34
		HSDPA	1	21.46	21.19	21.05
			2	21.53	21.45	21.35
			3	21.65	21.66	21.50
			4	21.48	21.50	21.34
		HSUPA	1	20.85	20.96	20.83
			2	20.74	20.56	20.69
			3	20.69	20.71	20.63
			4	20.63	20.53	20.48
			5	20.82	20.73	20.63

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.45	33
	661	1880.0	28.69	33
	810	1909.8	28.97	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.36	27.18	25.47	23.31	33
	661	1880.0	28.49	27.34	25.52	23.45	33
	810	1909.8	28.73	27.49	25.77	23.52	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.02	23.10	21.10	20.32	33
	661	1880.0	25.12	23.16	21.15	20.35	33
	810	1909.8	25.15	23.20	21.17	20.33	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		21.76	21.61	21.70
		HSDPA	1	21.12	21.53	21.16
			2	21.63	21.54	21.58
			3	21.71	21.73	21.63
			4	21.69	21.66	21.73
		HSUPA	1	20.65	20.76	20.86
			2	20.77	20.68	20.76
			3	20.82	20.73	20.69
			4	20.69	20.66	20.52
			5	20.82	20.47	20.46

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		21.57	21.34	21.28
		HSDPA	1	21.18	21.01	21.18
			2	21.45	21.35	21.58
			3	21.66	21.5	21.63
			4	21.5	21.34	21.73
		HSUPA	1	20.62	20.55	20.78
			2	20.46	20.38	20.76
			3	20.68	20.55	20.69
			4	20.44	20.43	20.52
			5	20.68	20.58	20.46

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.28	13
	Middle	1.23	13
	High	1.28	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.22	13
	Middle	1.43	13
	High	1.52	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.58	13
	Middle	2.45	13
	High	2.67	13
HSDPA (16QAM)	Low	2.82	13
	Middle	2.66	13
	High	2.86	13
HSUPA (BPSK)	Low	2.88	13
	Middle	2.64	13
	High	2.74	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.43	13
	Middle	1.48	13
	High	1.48	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.33	13
	Middle	1.52	13
	High	1.13	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.68	13
	Middle	3.61	13
	High	3.87	13
HSDPA (16QAM)	Low	3.84	13
	Middle	3.68	13
	High	3.85	13
HSUPA (BPSK)	Low	3.89	13
	Middle	3.63	13
	High	3.85	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.65	13
	Middle	3.68	13
	High	3.67	13
HSDPA (16QAM)	Low	3.84	13
	Middle	3.58	13
	High	3.75	13
HSUPA (BPSK)	Low	3.89	13
	Middle	3.65	13
	High	3.88	13

Radiated Power
GSM Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	92.78	87	1.5	H	30.8	0.28	0.0	30.52	38.45	7.93
836.6	85.62	130	1.0	V	25.6	0.28	0.0	25.32	38.45	13.13
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	90.25	261	2.1	H	20.6	1.30	9.40	28.70	33	4.30
1880.00	85.65	306	1.1	V	15.8	1.30	9.40	23.90	33	9.10

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 (dBd/dBi)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	87.45	340	2.2	H	25.5	0.28	0.0	25.22	38.45	13.23
836.6	82.34	5	1.2	V	22.3	0.28	0.0	22.02	38.45	16.43
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	85.62	114	1.6	H	15.9	1.30	9.40	24.00	33	9.00
1880.00	80.34	318	1.8	V	10.4	1.30	9.40	18.50	33	14.50

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.5	83.46	101	1.7	H	21.5	0.28	0.0	21.22	38.45	17.23
836.5	80.26	144	1.9	V	20.3	0.28	0.0	20.02	38.45	18.43
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	81.97	6	1.6	H	12.3	1.30	9.40	20.40	33	12.60
1880.00	80.13	315	2.0	V	10.2	1.30	9.40	18.30	33	14.70
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	85.12	278	2.2	H	11.8	1.30	8.90	19.40	30	10.60
1732.60	83.02	272	2.5	V	10.3	1.30	8.90	17.90	30	12.10

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

LTE Band 2:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.84	22.73	22.71
		RB Size=1, RB Offset=2	22.64	22.53	22.62
		RB Size=1, RB Offset=5	22.28	22.64	22.55
		RB Size=3, RB Offset=0	22.47	22.40	22.43
		RB Size=3, RB Offset=1	22.24	22.27	22.12
		RB Size=3, RB Offset=2	22.35	22.11	22.25
		RB Size=6, RB Offset=0	22.17	22.14	22.11
	16QAM	RB Size=1, RB Offset=0	22.18	22.26	22.06
		RB Size=1, RB Offset=2	22.01	22.16	22.04
		RB Size=1, RB Offset=5	21.94	21.90	23.11
		RB Size=3, RB Offset=0	21.77	21.72	22.83
		RB Size=3, RB Offset=1	21.69	21.96	21.82
		RB Size=3, RB Offset=2	21.85	21.91	21.90
		RB Size=6, RB Offset=0	21.69	21.71	21.79
3.0	QPSK	RB Size=1, RB Offset=0	22.77	22.86	22.92
		RB Size=1, RB Offset=7	22.79	22.80	22.84
		RB Size=1, RB Offset=14	22.57	22.64	22.80
		RB Size=8, RB Offset=0	21.95	21.99	22.03
		RB Size=8, RB Offset=4	21.73	21.69	21.72
		RB Size=8, RB Offset=7	21.65	21.67	21.77
		RB Size=15, RB Offset=0	21.86	21.85	21.75
	16QAM	RB Size=1, RB Offset=0	22.13	22.17	21.96
		RB Size=1, RB Offset=7	22.03	21.99	22.09
		RB Size=1, RB Offset=14	22.35	21.89	21.89
		RB Size=8, RB Offset=0	20.80	20.93	21.00
		RB Size=8, RB Offset=4	20.65	20.84	21.00
		RB Size=8, RB Offset=7	20.41	20.58	20.78
		RB Size=15, RB Offset=0	20.82	20.68	20.83

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	22.78	22.77	22.77
		RB Size=1, RB Offset=12	22.87	22.70	22.80
		RB Size=1, RB Offset=24	22.46	22.83	22.48
		RB Size=12, RB Offset=0	21.87	21.77	21.83
		RB Size=12, RB Offset=6	21.91	21.86	21.72
		RB Size=12, RB Offset=11	21.92	21.53	21.67
		RB Size=25, RB Offset=0	21.73	21.81	21.85
	16QAM	RB Size=1, RB Offset=0	22.08	21.50	21.69
		RB Size=1, RB Offset=12	21.86	21.53	21.72
		RB Size=1, RB Offset=24	21.93	21.42	21.63
		RB Size=12, RB Offset=0	20.89	20.77	20.82
		RB Size=12, RB Offset=6	20.82	20.72	20.68
		RB Size=12, RB Offset=11	20.54	20.61	20.65
		RB Size=25, RB Offset=0	20.75	20.74	20.79
10.0	QPSK	RB Size=1, RB Offset=0	22.88	22.86	22.77
		RB Size=1, RB Offset=24	22.87	22.82	22.71
		RB Size=1, RB Offset=49	22.65	22.73	22.69
		RB Size=25, RB Offset=0	21.71	21.63	21.75
		RB Size=25, RB Offset=12	21.83	21.82	21.59
		RB Size=25, RB Offset=24	21.96	21.49	21.60
		RB Size=50, RB Offset=0	21.58	21.53	21.64
	16QAM	RB Size=1, RB Offset=0	21.72	21.56	21.74
		RB Size=1, RB Offset=24	21.55	21.44	21.63
		RB Size=1, RB Offset=49	21.44	21.51	21.72
		RB Size=25, RB Offset=0	22.73	20.77	20.88
		RB Size=25, RB Offset=12	22.62	20.55	20.55
		RB Size=25, RB Offset=24	22.62	20.25	20.43
		RB Size=50, RB Offset=0	20.52	20.47	20.54

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	22.21	22.17	22.48
		RB Size=1, RB Offset=37	22.02	21.96	22.19
		RB Size=1, RB Offset=74	22.18	21.91	22.27
		RB Size=36, RB Offset=0	22.00	22.10	22.03
		RB Size=36, RB Offset=18	22.02	22.10	21.92
		RB Size=36, RB Offset=37	22.04	21.76	21.70
		RB Size=75, RB Offset=0	21.99	21.90	22.00
	16QAM	RB Size=1, RB Offset=0	21.95	21.98	21.65
		RB Size=1, RB Offset=37	21.78	21.94	21.62
		RB Size=1, RB Offset=74	21.95	21.88	21.40
		RB Size=36, RB Offset=0	21.82	21.71	22.20
		RB Size=36, RB Offset=18	21.91	21.74	21.98
		RB Size=36, RB Offset=37	21.49	21.55	21.88
		RB Size=75, RB Offset=0	21.28	21.17	20.95
20.0	QPSK	RB Size=1, RB Offset=0	23.00	22.96	22.96
		RB Size=1, RB Offset=49	22.89	22.86	22.83
		RB Size=1, RB Offset=99	22.74	22.75	22.86
		RB Size=50, RB Offset=0	21.99	21.81	22.09
		RB Size=50, RB Offset=24	21.93	21.94	21.86
		RB Size=50, RB Offset=49	21.69	21.63	21.66
		RB Size=100, RB Offset=0	21.75	21.76	21.85
	16QAM	RB Size=1, RB Offset=0	22.12	22.09	22.04
		RB Size=1, RB Offset=49	22.09	21.83	21.92
		RB Size=1, RB Offset=99	21.96	21.75	21.93
		RB Size=50, RB Offset=0	20.93	20.93	20.93
		RB Size=50, RB Offset=24	20.72	20.90	21.04
		RB Size=50, RB Offset=49	20.53	20.83	20.88
		RB Size=100, RB Offset=0	20.76	20.80	20.98

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.48	13	Pass
QPSK (100RB Size)	6.49	13	Pass
16QAM (1RB Size)	7.56	13	Pass
16QAM (100RB Size)	7.41	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	85.37	20	1.1	H	15.7	1.30	9.40	23.80	33
1880.00	83.10	173	2.0	V	13.2	1.30	9.40	21.30	33
3 MHz Bandwidth									
1880.00	85.26	352	2.2	H	15.6	1.30	9.40	23.70	33
1880.00	83.48	65	1.7	V	13.6	1.30	9.40	21.70	33
5 MHz Bandwidth									
1880.00	85.02	116	1.6	H	15.3	1.30	9.40	23.40	33
1880.00	83.18	224	1.4	V	13.3	1.30	9.40	21.40	33
10 MHz Bandwidth									
1880.00	85.53	294	2.5	H	15.9	1.30	9.40	24.00	33
1880.00	83.45	202	1.3	V	13.6	1.30	9.40	21.70	33
15 MHz Bandwidth									
1880.00	86.05	279	1.7	H	16.4	1.30	9.40	24.50	33
1880.00	84.12	188	2.2	V	14.2	1.30	9.40	22.30	33
20 MHz Bandwidth									
1880.00	85.68	118	1.6	H	16.0	1.30	9.40	24.10	33
1880.00	84.03	109	1.7	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	85.81	196	1.7	H	16.1	1.30	9.40	24.20	33
1880.00	83.62	222	2.4	V	13.7	1.30	9.40	21.80	33
3 MHz Bandwidth									
1880.00	85.69	56	1.9	H	16.0	1.30	9.40	24.10	33
1880.00	83.48	209	2.1	V	13.6	1.30	9.40	21.70	33
5 MHz Bandwidth									
1880.00	86.08	343	1.9	H	16.4	1.30	9.40	24.50	33
1880.00	83.72	274	1.9	V	13.8	1.30	9.40	21.90	33
10 MHz Bandwidth									
1880.00	85.91	307	2.1	H	16.2	1.30	9.40	24.30	33
1880.00	83.67	62	1.7	V	13.8	1.30	9.40	21.90	33
15 MHz Bandwidth									
1880.00	85.87	115	1.5	H	16.2	1.30	9.40	24.30	33
1880.00	83.65	353	1.9	V	13.8	1.30	9.40	21.90	33
20 MHz Bandwidth									
1880.00	85.49	310	2.5	H	15.8	1.30	9.40	23.90	33
1880.00	83.50	112	2.5	V	13.6	1.30	9.40	21.70	33

LTE Band 4:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.33	22.49	22.48
		RB Size=1, RB Offset=2	22.57	22.24	22.49
		RB Size=1, RB Offset=5	22.46	22.07	22.68
		RB Size=3, RB Offset=0	22.69	22.62	22.76
		RB Size=3, RB Offset=1	22.58	22.69	22.69
		RB Size=3, RB Offset=2	22.40	22.54	22.48
		RB Size=6, RB Offset=0	21.42	21.33	21.50
	16QAM	RB Size=1, RB Offset=0	21.98	22.01	21.93
		RB Size=1, RB Offset=2	21.78	21.88	21.79
		RB Size=1, RB Offset=5	21.75	21.79	21.95
		RB Size=3, RB Offset=0	22.83	21.87	21.70
		RB Size=3, RB Offset=1	22.75	21.60	21.72
		RB Size=3, RB Offset=2	22.51	21.67	21.64
		RB Size=6, RB Offset=0	20.77	20.69	20.71
3.0	QPSK	RB Size=1, RB Offset=0	22.40	22.52	22.42
		RB Size=1, RB Offset=7	22.42	22.42	22.35
		RB Size=1, RB Offset=14	22.41	22.18	22.20
		RB Size=8, RB Offset=0	21.59	21.52	21.72
		RB Size=8, RB Offset=4	21.45	21.37	21.72
		RB Size=8, RB Offset=7	21.38	21.41	21.55
		RB Size=15, RB Offset=0	21.53	21.52	21.66
	16QAM	RB Size=1, RB Offset=0	21.83	21.53	21.59
		RB Size=1, RB Offset=7	21.71	21.65	21.42
		RB Size=1, RB Offset=14	21.65	21.57	21.38
		RB Size=8, RB Offset=0	20.66	20.62	20.80
		RB Size=8, RB Offset=4	20.53	20.73	20.75
		RB Size=8, RB Offset=7	20.51	20.78	20.71
		RB Size=15, RB Offset=0	20.86	20.69	20.77

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.67	22.66	22.69
		RB Size=1, RB Offset=12	22.52	22.62	22.57
		RB Size=1, RB Offset=24	22.49	22.61	22.75
		RB Size=12, RB Offset=0	21.74	21.64	21.75
		RB Size=12, RB Offset=6	21.84	21.62	21.71
		RB Size=12, RB Offset=11	21.49	21.73	21.56
		RB Size=25, RB Offset=0	21.78	21.77	21.70
	16QAM	RB Size=1, RB Offset=0	21.95	21.89	21.88
		RB Size=1, RB Offset=12	21.74	21.74	21.70
		RB Size=1, RB Offset=24	21.72	21.83	21.71
		RB Size=12, RB Offset=0	20.87	20.95	21.12
		RB Size=12, RB Offset=6	20.85	20.87	20.93
		RB Size=12, RB Offset=11	20.72	20.79	20.75
		RB Size=25, RB Offset=0	20.89	20.67	20.63
10.0	QPSK	RB Size=1, RB Offset=0	22.69	22.71	22.87
		RB Size=1, RB Offset=24	22.76	22.56	22.86
		RB Size=1, RB Offset=49	22.58	22.64	22.70
		RB Size=25, RB Offset=0	21.75	21.79	21.76
		RB Size=25, RB Offset=12	21.73	21.72	21.66
		RB Size=25, RB Offset=24	21.52	21.56	21.59
		RB Size=50, RB Offset=0	21.96	21.82	21.81
	16QAM	RB Size=1, RB Offset=0	22.18	22.11	22.32
		RB Size=1, RB Offset=24	22.17	22.02	22.26
		RB Size=1, RB Offset=49	22.18	22.03	22.10
		RB Size=25, RB Offset=0	20.80	20.74	20.92
		RB Size=25, RB Offset=12	20.72	20.69	20.98
		RB Size=25, RB Offset=24	20.63	20.66	20.63
		RB Size=50, RB Offset=0	20.98	20.86	20.93

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	22.73	22.67	22.58
		RB Size=1, RB Offset=37	22.74	22.45	22.55
		RB Size=1, RB Offset=74	22.57	22.47	22.43
		RB Size=36, RB Offset=0	21.94	21.95	21.82
		RB Size=36, RB Offset=18	21.84	21.80	21.85
		RB Size=36, RB Offset=37	22.05	21.72	21.82
		RB Size=75, RB Offset=0	21.78	21.68	21.56
	16QAM	RB Size=1, RB Offset=0	21.65	21.60	21.57
		RB Size=1, RB Offset=37	21.61	21.46	21.73
		RB Size=1, RB Offset=74	21.48	21.41	21.59
		RB Size=36, RB Offset=0	20.88	20.60	20.82
		RB Size=36, RB Offset=18	20.85	20.67	20.48
		RB Size=36, RB Offset=37	20.56	20.53	20.42
		RB Size=75, RB Offset=0	20.81	20.71	20.80
20.0	QPSK	RB Size=1, RB Offset=0	22.83	22.47	22.56
		RB Size=1, RB Offset=49	22.65	22.32	22.53
		RB Size=1, RB Offset=99	22.73	22.36	22.29
		RB Size=50, RB Offset=0	21.83	21.81	21.93
		RB Size=50, RB Offset=24	21.67	21.79	21.92
		RB Size=50, RB Offset=49	21.68	21.82	21.70
		RB Size=100, RB Offset=0	21.86	21.52	21.48
	16QAM	RB Size=1, RB Offset=0	22.40	22.18	22.32
		RB Size=1, RB Offset=49	22.16	22.28	22.28
		RB Size=1, RB Offset=99	21.99	22.07	22.31
		RB Size=50, RB Offset=0	21.14	21.01	21.19
		RB Size=50, RB Offset=24	20.94	20.95	20.97
		RB Size=50, RB Offset=49	20.77	21.09	20.96
		RB Size=100, RB Offset=0	20.96	20.83	20.82

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.88	13	Pass
QPSK (100RB Size)	6.68	13	Pass
16QAM (1RB Size)	7.97	13	Pass
16QAM (100RB Size)	7.87	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	85.76	228	2.3	H	12.4	1.30	8.90	20.00	30
1732.50	80.26	312	1.6	V	7.5	1.30	8.90	15.10	30
3 MHz Bandwidth									
1732.50	85.38	32	1.7	H	12.1	1.30	8.90	19.70	30
1732.50	80.32	72	1.1	V	7.6	1.30	8.90	15.20	30
5 MHz Bandwidth									
1732.50	85.61	90	1.7	H	12.3	1.30	8.90	19.90	30
1732.50	80.52	78	1.5	V	7.8	1.30	8.90	15.40	30
10 MHz Bandwidth									
1732.50	85.46	174	2.0	H	12.1	1.30	8.90	19.70	30
1732.50	80.29	187	2.2	V	7.6	1.30	8.90	15.20	30
15 MHz Bandwidth									
1732.50	86.16	163	2.3	H	12.8	1.30	8.90	20.40	30
1732.50	80.65	289	2.2	V	7.9	1.30	8.90	15.50	30
20 MHz Bandwidth									
1732.50	85.83	45	1.2	H	12.5	1.30	8.90	20.10	30
1732.50	80.55	234	2.3	V	7.8	1.30	8.90	15.40	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	85.39	255	2.0	H	12.1	1.30	8.90	19.70	30
1732.50	80.57	96	2.0	V	7.8	1.30	8.90	15.40	30
3 MHz Bandwidth									
1732.50	85.63	280	1.1	H	12.3	1.30	8.90	19.90	30
1732.50	80.59	334	2.3	V	7.9	1.30	8.90	15.50	30
5 MHz Bandwidth									
1732.50	85.65	248	1.6	H	12.3	1.30	8.90	19.90	30
1732.50	80.61	324	1.6	V	7.9	1.30	8.90	15.50	30
10 MHz Bandwidth									
1732.50	85.34	194	1.4	H	12.0	1.30	8.90	19.60	30
1732.50	80.41	298	1.2	V	7.7	1.30	8.90	15.30	30
15 MHz Bandwidth									
1732.50	85.74	224	1.9	H	12.4	1.30	8.90	20.00	30
1732.50	80.62	140	1.8	V	7.9	1.30	8.90	15.50	30
20 MHz Bandwidth									
1732.50	85.86	98	1.5	H	12.5	1.30	8.90	20.10	30
1732.50	80.67	41	1.1	V	7.9	1.30	8.90	15.50	30

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	23.03	23.01	22.98
		RB Size=1, RB Offset=2	23.11	23.07	23.07
		RB Size=1, RB Offset=5	22.95	22.91	22.91
		RB Size=3, RB Offset=0	23.16	23.01	23.17
		RB Size=3, RB Offset=1	22.98	23.10	23.01
		RB Size=3, RB Offset=2	22.72	22.90	23.03
		RB Size=6, RB Offset=0	22.02	21.91	21.90
	16QAM	RB Size=1, RB Offset=0	22.07	21.89	22.08
		RB Size=1, RB Offset=2	21.91	21.81	21.95
		RB Size=1, RB Offset=5	21.97	21.67	21.72
		RB Size=3, RB Offset=0	22.27	22.13	22.18
		RB Size=3, RB Offset=1	22.10	22.28	22.06
		RB Size=3, RB Offset=2	21.89	22.08	22.11
		RB Size=6, RB Offset=0	20.98	20.87	21.10
3.0	QPSK	RB Size=1, RB Offset=0	22.99	22.94	22.93
		RB Size=1, RB Offset=7	22.74	23.05	22.93
		RB Size=1, RB Offset=14	22.61	22.75	22.81
		RB Size=8, RB Offset=0	22.09	22.02	22.13
		RB Size=8, RB Offset=4	22.14	22.01	22.06
		RB Size=8, RB Offset=7	22.15	21.77	21.86
		RB Size=15, RB Offset=0	22.05	22.17	22.11
	16QAM	RB Size=1, RB Offset=0	22.55	22.36	22.53
		RB Size=1, RB Offset=7	22.34	22.40	22.64
		RB Size=1, RB Offset=14	22.23	22.18	22.32
		RB Size=8, RB Offset=0	21.17	21.07	21.23
		RB Size=8, RB Offset=4	21.17	21.15	21.26
		RB Size=8, RB Offset=7	21.08	21.02	21.32
		RB Size=15, RB Offset=0	21.13	21.06	21.17

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	22.12	21.93	22.07
		RB Size=1, RB Offset=12	22.07	21.97	21.78
		RB Size=1, RB Offset=24	21.87	22.00	21.88
		RB Size=12, RB Offset=0	21.30	21.19	21.27
		RB Size=12, RB Offset=6	20.92	21.08	21.13
		RB Size=12, RB Offset=11	20.88	21.12	21.10
		RB Size=25, RB Offset=0	22.11	22.01	21.91
	16QAM	RB Size=1, RB Offset=0	21.88	21.87	22.10
		RB Size=1, RB Offset=12	21.87	21.79	22.08
		RB Size=1, RB Offset=24	22.04	21.52	21.91
		RB Size=12, RB Offset=0	21.11	21.17	21.26
		RB Size=12, RB Offset=6	21.04	20.96	21.08
		RB Size=12, RB Offset=11	20.92	20.94	20.87
		RB Size=25, RB Offset=0	21.05	21.07	21.10
10.0	QPSK	RB Size=1, RB Offset=0	23.14	23.19	23.13
		RB Size=1, RB Offset=24	23.16	23.11	22.93
		RB Size=1, RB Offset=49	23.11	23.06	22.81
		RB Size=25, RB Offset=0	22.19	21.97	22.02
		RB Size=25, RB Offset=12	22.02	21.99	22.07
		RB Size=25, RB Offset=24	21.83	22.02	21.97
		RB Size=50, RB Offset=0	22.04	22.12	22.19
	16QAM	RB Size=1, RB Offset=0	22.59	22.50	22.63
		RB Size=1, RB Offset=24	22.58	22.40	22.50
		RB Size=1, RB Offset=49	22.44	22.35	22.30
		RB Size=25, RB Offset=0	21.11	21.16	21.21
		RB Size=25, RB Offset=12	21.00	21.18	20.99
		RB Size=25, RB Offset=24	20.97	21.19	20.93
		RB Size=50, RB Offset=0	21.13	21.11	21.16

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.47	13	Pass
QPSK (50RB Size)	6.51	13	Pass
16QAM (1RB Size)	7.62	13	Pass
16QAM (50RB Size)	7.52	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	84.79	131	1.6	H	22.8	0.28	0.0	22.52	38.45
836.5	81.92	7	2.3	V	21.9	0.28	0.0	21.62	38.45
3 MHz Bandwidth									
836.5	84.34	110	2.5	H	22.3	0.28	0.0	22.02	38.45
836.5	81.52	140	1.5	V	21.5	0.28	0.0	21.22	38.45
5 MHz Bandwidth									
836.5	84.04	269	2.0	H	22.0	0.28	0.0	21.72	38.45
836.5	81.16	150	2.1	V	21.2	0.28	0.0	20.92	38.45
10 MHz Bandwidth									
836.5	83.64	178	1.8	H	21.6	0.28	0.0	21.32	38.45
836.5	80.58	173	1.4	V	20.6	0.28	0.0	20.32	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	84.43	101	2.3	H	22.4	0.28	0.0	22.12	38.45
836.5	81.82	89	1.7	V	21.8	0.28	0.0	21.52	38.45
3 MHz Bandwidth									
836.5	84.15	23	1.1	H	22.2	0.28	0.0	21.92	38.45
836.5	81.43	43	1.3	V	21.4	0.28	0.0	21.12	38.45
5 MHz Bandwidth									
836.5	83.75	283	2.1	H	21.8	0.28	0.0	21.52	38.45
836.5	81.16	337	1.9	V	21.2	0.28	0.0	20.92	38.45
10 MHz Bandwidth									
836.5	83.34	13	1.3	H	21.3	0.28	0.0	21.02	38.45
836.5	80.67	213	2.2	V	20.7	0.28	0.0	20.42	38.45

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	23.15	23.08	22.44
		RB Size=1, RB Offset=12	22.74	22.52	22.44
		RB Size=1, RB Offset=24	23.31	22.89	22.81
		RB Size=12, RB Offset=0	21.90	21.65	21.34
		RB Size=12, RB Offset=6	22.01	21.48	21.37
		RB Size=12, RB Offset=11	22.03	21.48	21.54
		RB Size=25, RB Offset=0	22.03	21.63	22.41
	16QAM	RB Size=1, RB Offset=0	22.63	22.05	22.02
		RB Size=1, RB Offset=12	22.53	21.90	22.09
		RB Size=1, RB Offset=24	22.53	21.98	22.23
		RB Size=12, RB Offset=0	21.83	21.10	21.27
		RB Size=12, RB Offset=6	21.70	21.04	21.29
		RB Size=12, RB Offset=11	21.56	20.87	21.45
		RB Size=25, RB Offset=0	21.05	20.83	20.64
10	QPSK	RB Size=1, RB Offset=0	22.62	22.55	22.86
		RB Size=1, RB Offset=24	22.71	22.29	22.67
		RB Size=1, RB Offset=49	22.56	22.24	22.75
		RB Size=25, RB Offset=0	21.77	21.74	22.17
		RB Size=25, RB Offset=12	21.95	21.74	22.02
		RB Size=25, RB Offset=24	21.88	21.83	22.13
		RB Size=50, RB Offset=0	21.90	21.55	21.48
	16QAM	RB Size=1, RB Offset=0	21.89	22.11	22.04
		RB Size=1, RB Offset=24	21.80	22.23	21.89
		RB Size=1, RB Offset=49	21.86	22.24	21.93
		RB Size=25, RB Offset=0	20.96	21.26	21.21
		RB Size=25, RB Offset=12	21.06	21.13	20.97
		RB Size=25, RB Offset=24	21.13	21.34	21.22
		RB Size=50, RB Offset=0	21.15	20.63	20.61

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.81	22.69	23.82
		RB Size=1, RB Offset=37	22.60	22.77	23.52
		RB Size=1, RB Offset=74	22.78	22.58	23.92
		RB Size=36, RB Offset=0	22.11	21.99	22.90
		RB Size=36, RB Offset=18	22.04	21.68	23.07
		RB Size=36, RB Offset=37	21.98	21.87	23.05
		RB Size=75, RB Offset=0	22.14	21.44	22.17
	16QAM	RB Size=1, RB Offset=0	22.04	21.65	22.53
		RB Size=1, RB Offset=37	21.97	21.51	22.77
		RB Size=1, RB Offset=74	22.09	21.82	22.72
		RB Size=36, RB Offset=0	21.14	20.94	21.86
		RB Size=36, RB Offset=18	21.41	20.94	21.83
		RB Size=36, RB Offset=37	21.02	20.99	21.80
		RB Size=75, RB Offset=0	20.58	20.53	21.36
20	QPSK	RB Size=1, RB Offset=0	22.70	22.87	23.63
		RB Size=1, RB Offset=49	22.80	22.88	23.32
		RB Size=1, RB Offset=99	22.97	23.07	23.71
		RB Size=50, RB Offset=0	22.09	22.22	22.78
		RB Size=50, RB Offset=24	22.05	22.15	22.87
		RB Size=50, RB Offset=49	21.91	22.08	22.70
		RB Size=100, RB Offset=0	22.19	21.74	22.45
	16QAM	RB Size=1, RB Offset=0	22.15	22.36	22.84
		RB Size=1, RB Offset=49	21.98	22.28	22.58
		RB Size=1, RB Offset=99	22.17	22.29	22.87
		RB Size=50, RB Offset=0	21.22	21.45	22.01
		RB Size=50, RB Offset=24	21.30	21.60	22.10
		RB Size=50, RB Offset=49	21.12	21.49	22.03
		RB Size=100, RB Offset=0	21.21	20.83	21.59

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.24	13	Pass
QPSK (50RB Size)	6.28	13	Pass
16QAM (1RB Size)	7.31	13	Pass
16QAM (50RB Size)	7.29	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	83.60	140	2.1	H	13.4	2.60	10.20	21.00	33
2535.00	80.53	82	1.1	V	11.0	2.60	10.20	18.60	33
10 MHz Bandwidth									
2535.00	83.66	102	1.6	H	13.5	2.60	10.20	21.10	33
2535.00	80.45	272	1.1	V	10.9	2.60	10.20	18.50	33
15 MHz Bandwidth									
2535.00	83.75	353	1.2	H	13.6	2.60	10.20	21.20	33
2535.00	80.48	342	2.2	V	10.9	2.60	10.20	18.50	33
20 MHz Bandwidth									
2535.00	83.38	280	2.2	H	13.2	2.60	10.20	20.80	33
2535.00	80.29	18	1.5	V	10.7	2.60	10.20	18.30	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	83.77	343	1.6	H	13.6	2.60	10.20	21.20	33
2535.00	80.43	329	1.2	V	10.9	2.60	10.20	18.50	33
10 MHz Bandwidth									
2535.00	83.82	329	2.3	H	13.7	2.60	10.20	21.30	33
2535.00	80.48	245	2.0	V	10.9	2.60	10.20	18.50	33
15 MHz Bandwidth									
2535.00	84.03	259	1.3	H	13.9	2.60	10.20	21.50	33
2535.00	80.51	110	1.3	V	11.0	2.60	10.20	18.60	33
20 MHz Bandwidth									
2535.00	83.42	60	2.4	H	13.3	2.60	10.20	20.90	33
2535.00	80.28	251	1.0	V	10.7	2.60	10.20	18.30	33

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

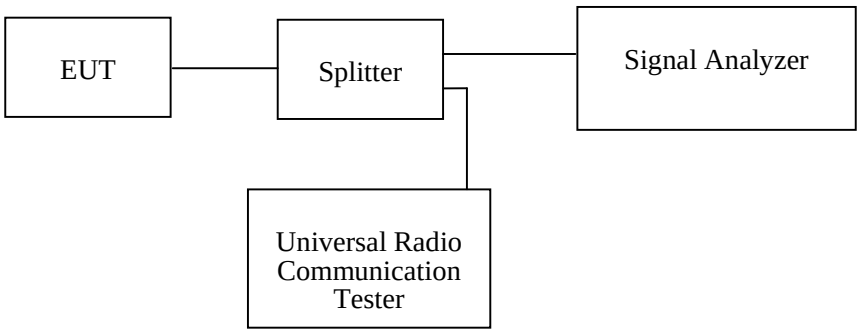
Applicable Standard

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:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Geroge Zhong on 2019-09-06 and 2019-09-07.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	248.0	316.0
EGPRS(8PSK)	836.6	248.0	314.1

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.180	4.728
HSUPA (BPSK)	836.6	4.220	5.721
HSDPA (16QAM)	836.6	4.220	5.179

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	244.0	312.5
EGPRS(8PSK)	1880.0	248.0	326.6

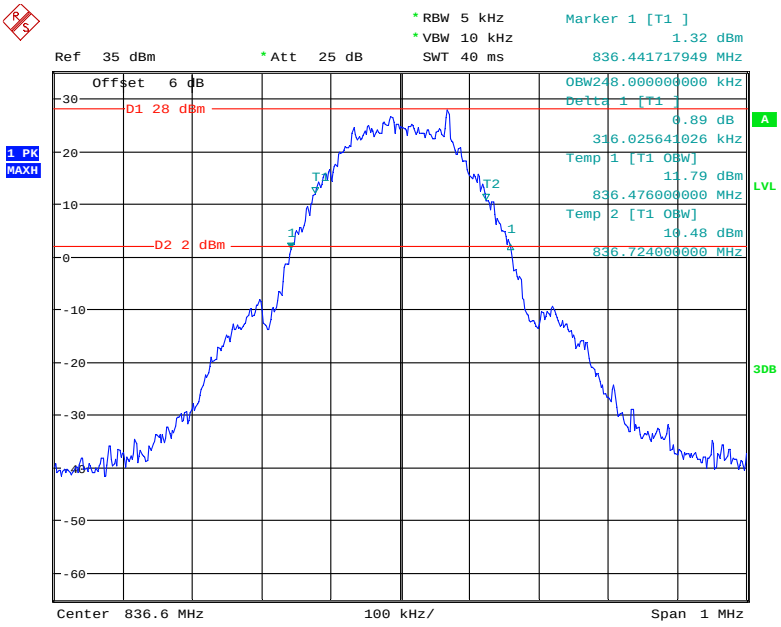
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.180	4.742
HSUPA (BPSK)	1880.0	4.200	4.779
HSDPA (16QAM)	1880.0	4.180	4.697

AWS Band (Part 27)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.6	4.160	4.733
HSUPA (BPSK)	1732.6	4.200	4.735
HSDPA (16QAM)	1732.6	4.200	4.733

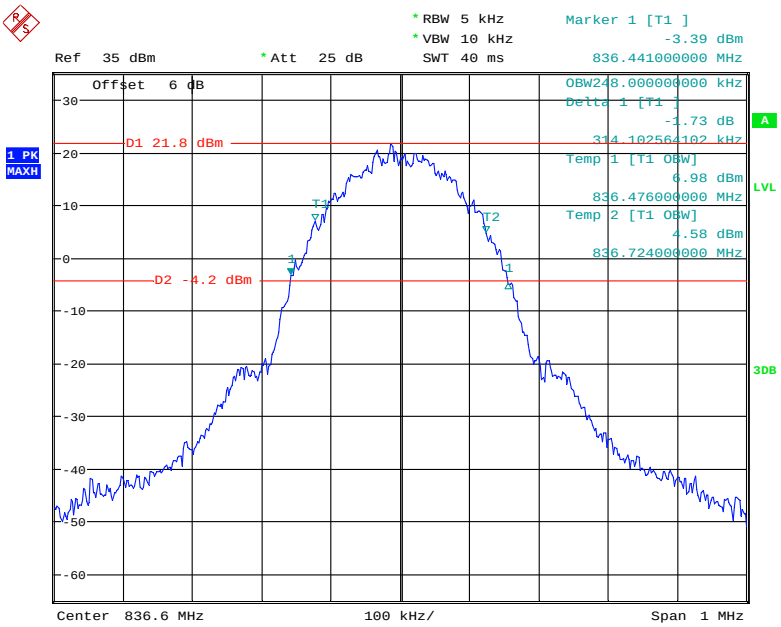
Cellular Band (Part 22H)

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



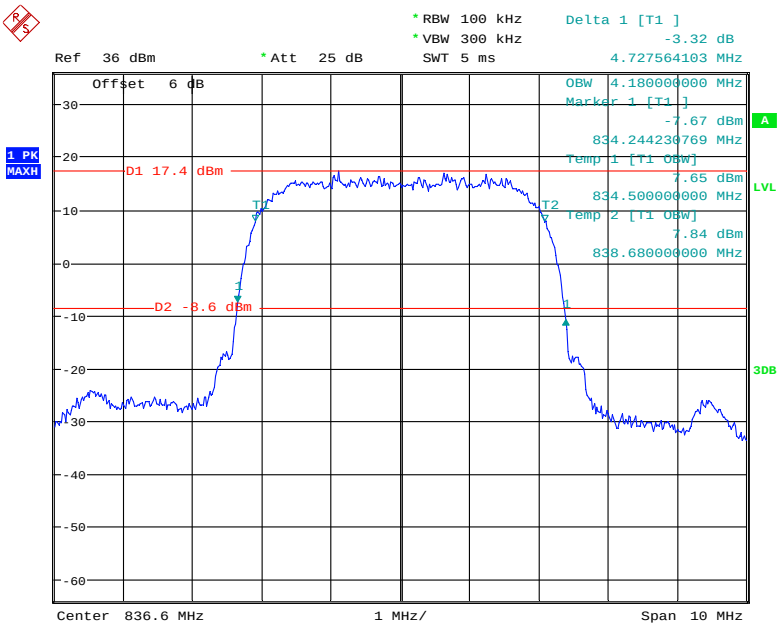
Date: 7.SEP.2019 15:31:07

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



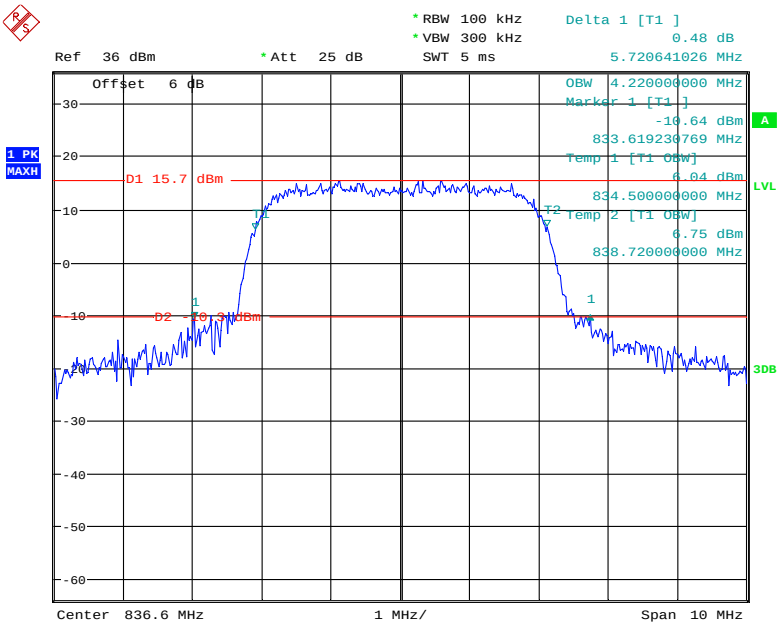
Date: 7.SEP.2019 16:00:30

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



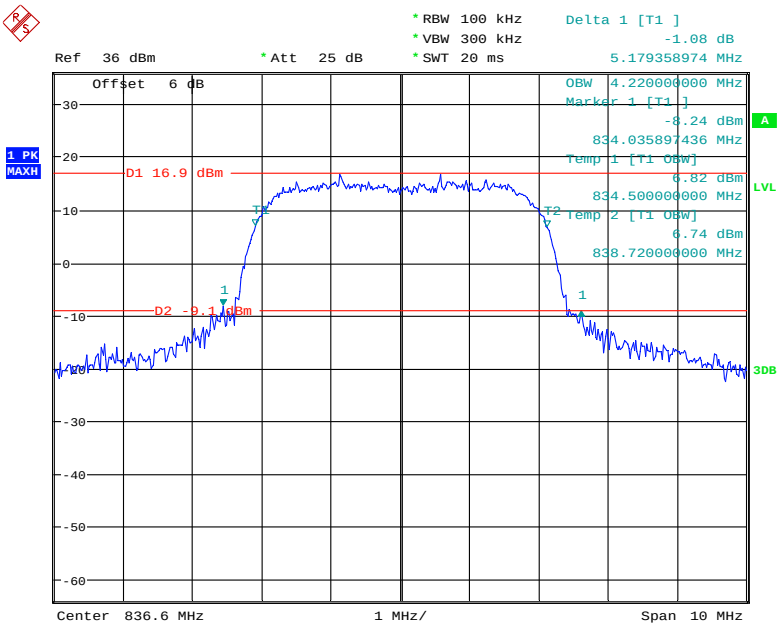
Date: 7.SEP.2019 17:13:56

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



Date: 7.SEP.2019 17:40:30

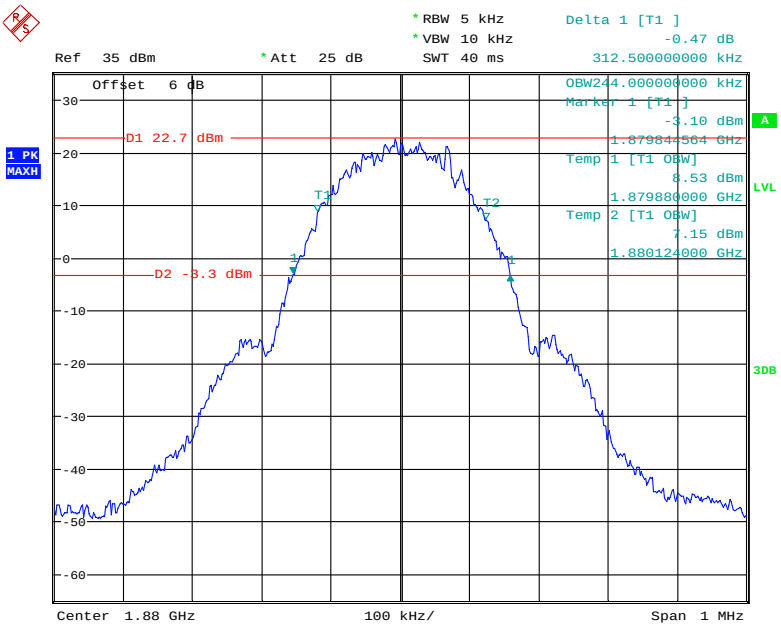
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 7.SEP.2019 17:56:23

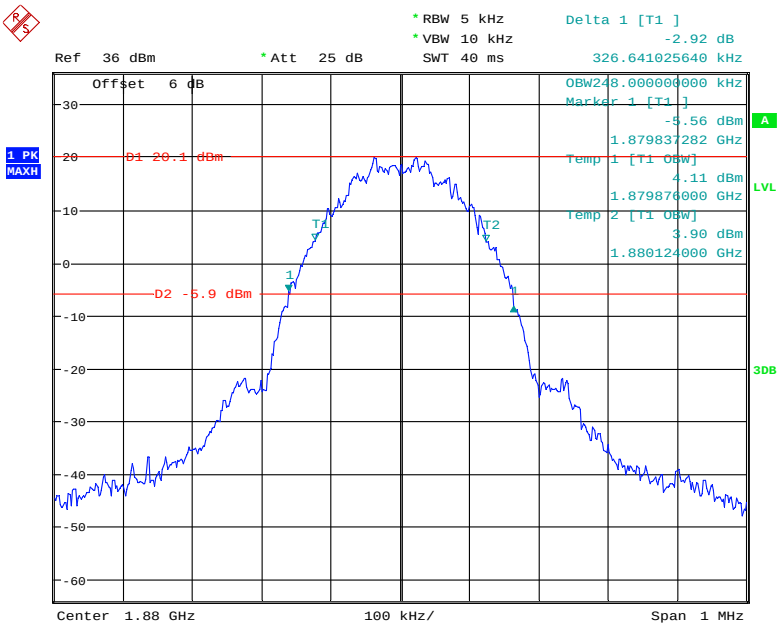
PCS Band (Part 24E)

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



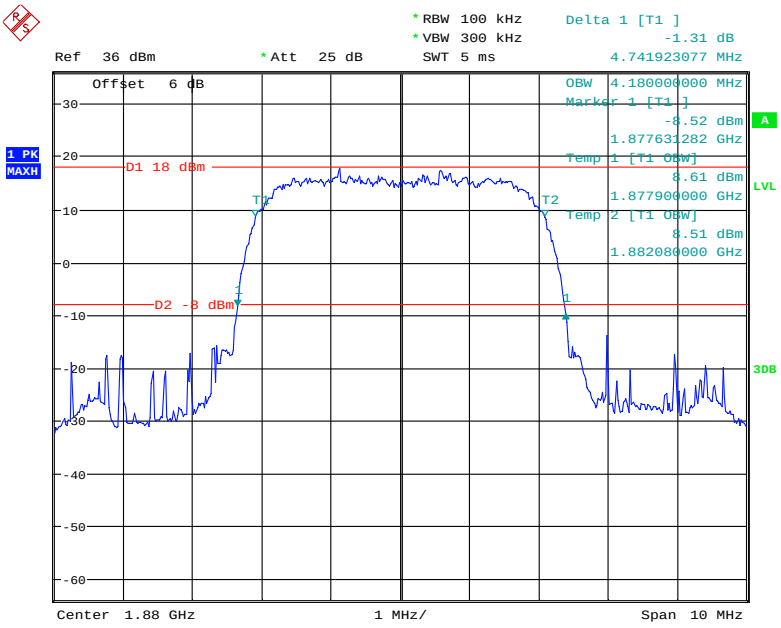
Date: 7.SEP.2019 16:19:22

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



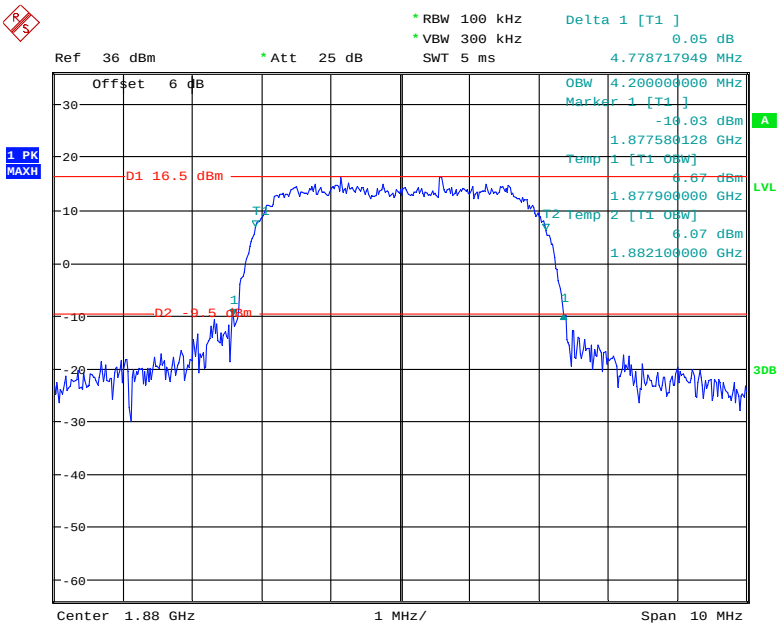
Date: 7.SEP.2019 16:37:04

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



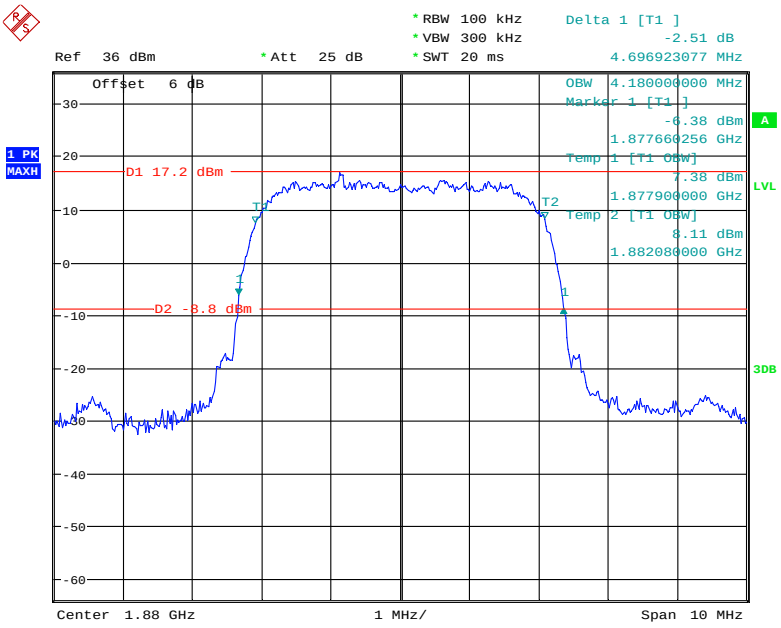
Date: 7.SEP.2019 17:11:19

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



Date: 7.SEP.2019 17:43:40

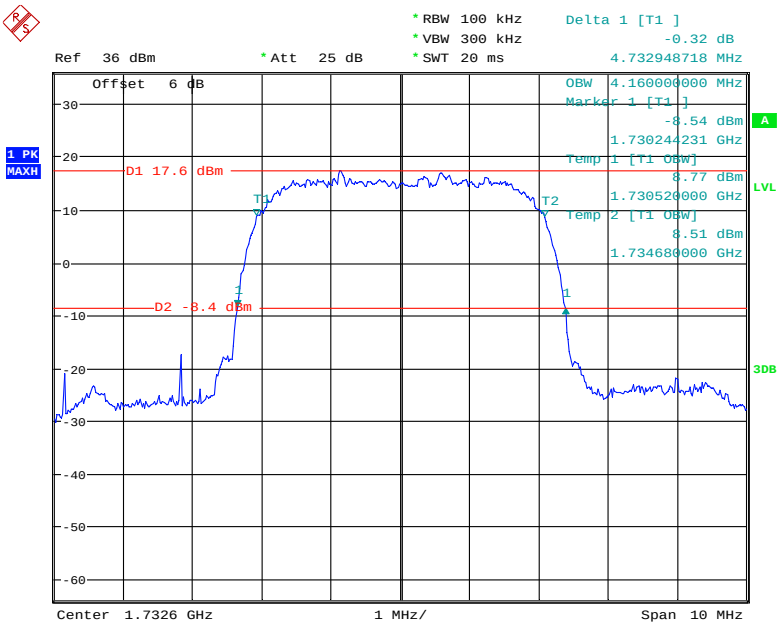
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 7.SEP.2019 17:57:37

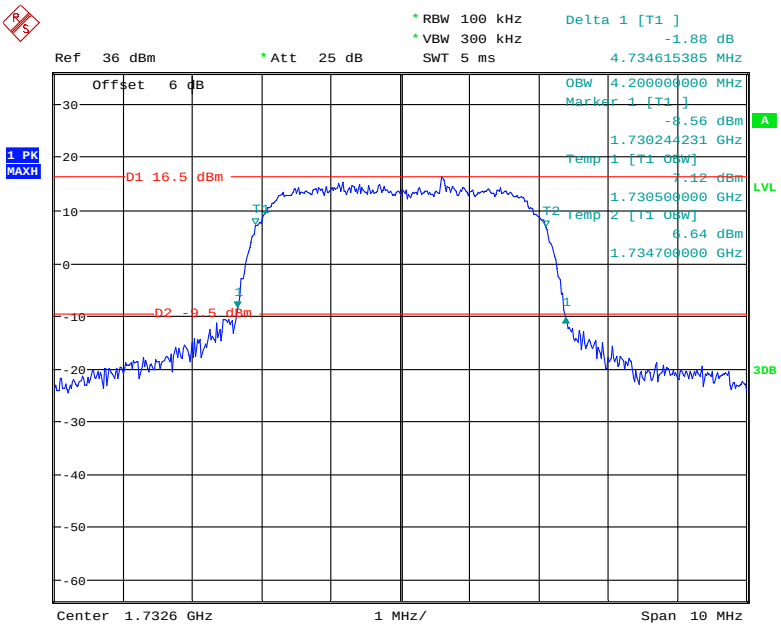
AWS Band (Part 27)

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



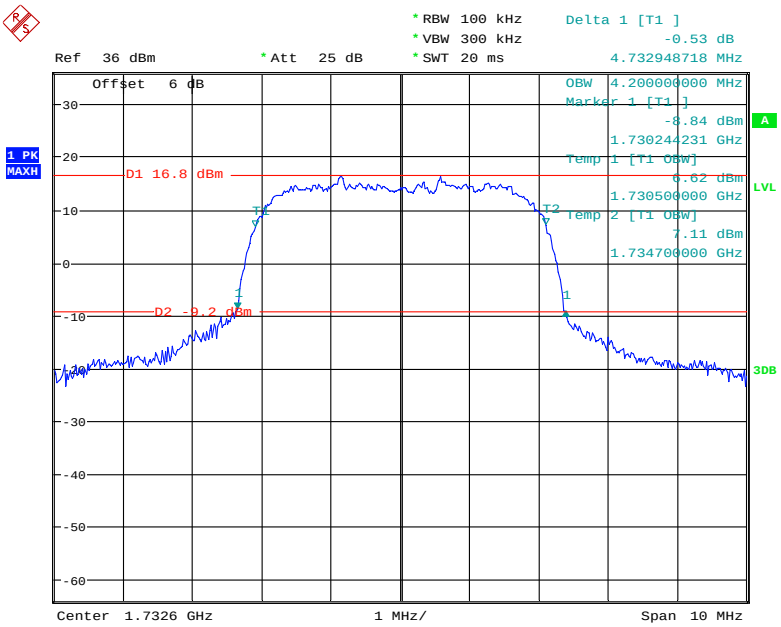
Date: 7.SEP.2019 18:00:59

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



Date: 7.SEP.2019 17:45:07

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

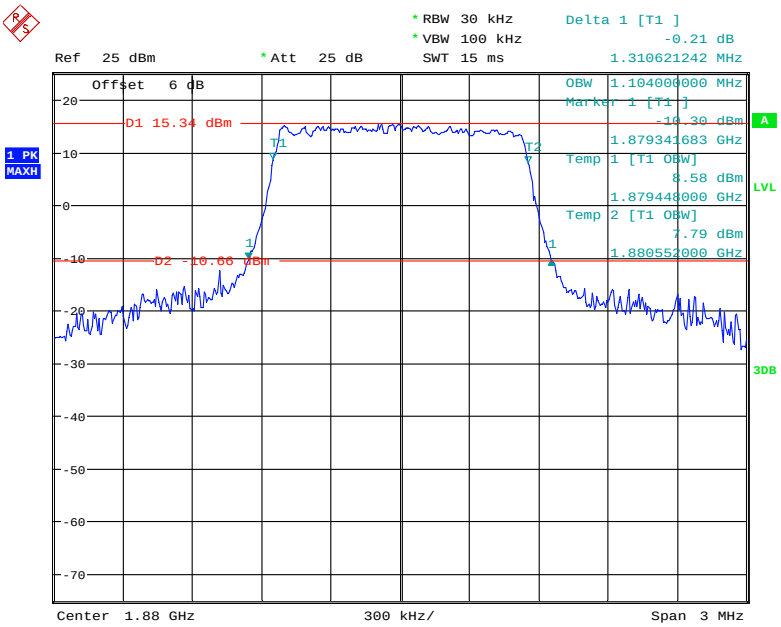


Date: 7.SEP.2019 17:59:12

LTE Band 2: (Middle Channel)

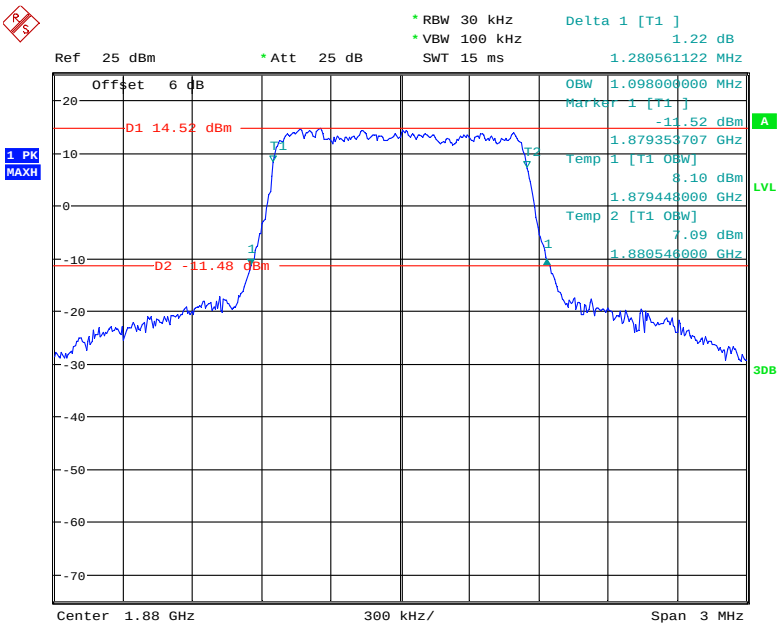
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.104	1.311
	16QAM	1.098	1.281
3.0	QPSK	2.688	2.862
	16QAM	2.688	2.874
5.0	QPSK	4.520	4.930
	16QAM	4.520	4.930
10.0	QPSK	8.960	9.619
	16QAM	8.960	9.579
15.0	QPSK	13.500	14.790
	16QAM	13.500	14.669
20.0	QPSK	18.000	19.158
	16QAM	18.000	19.319

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



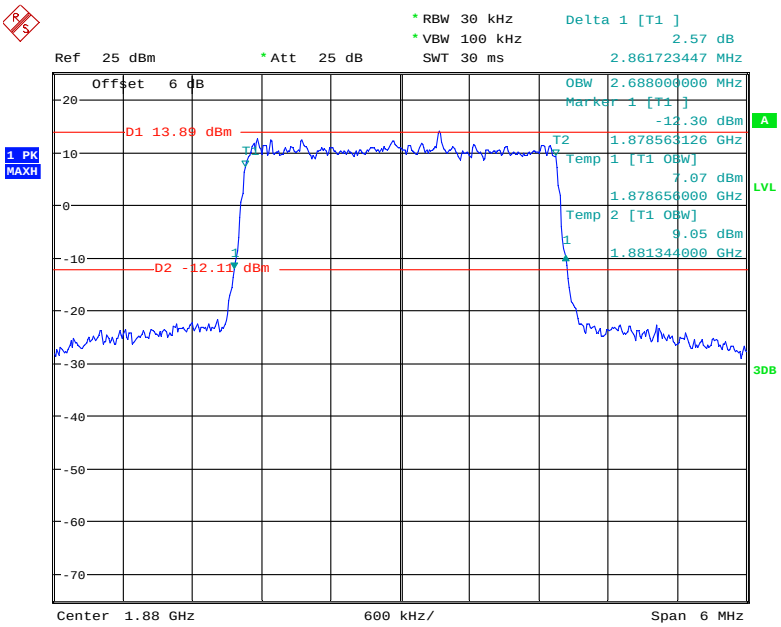
Date: 6.SEP.2019 21:16:58

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



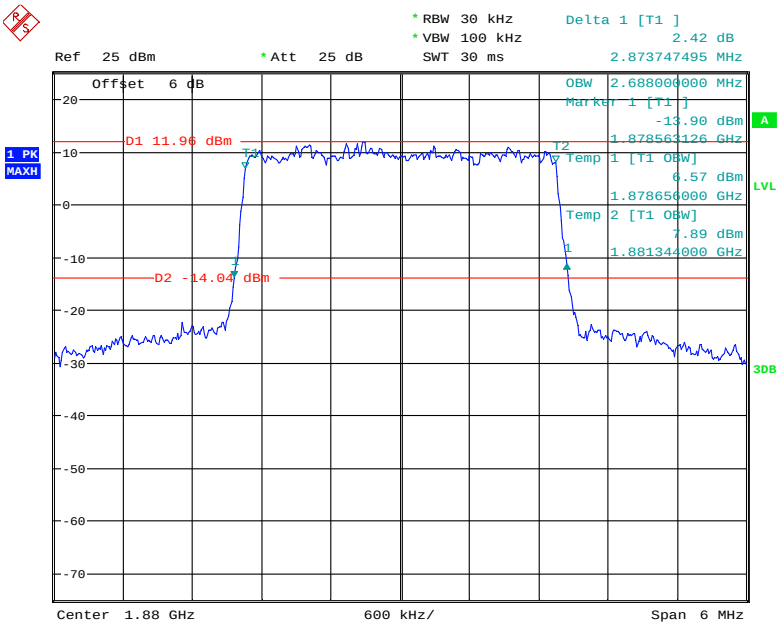
Date: 6.SEP.2019 21:17:26

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



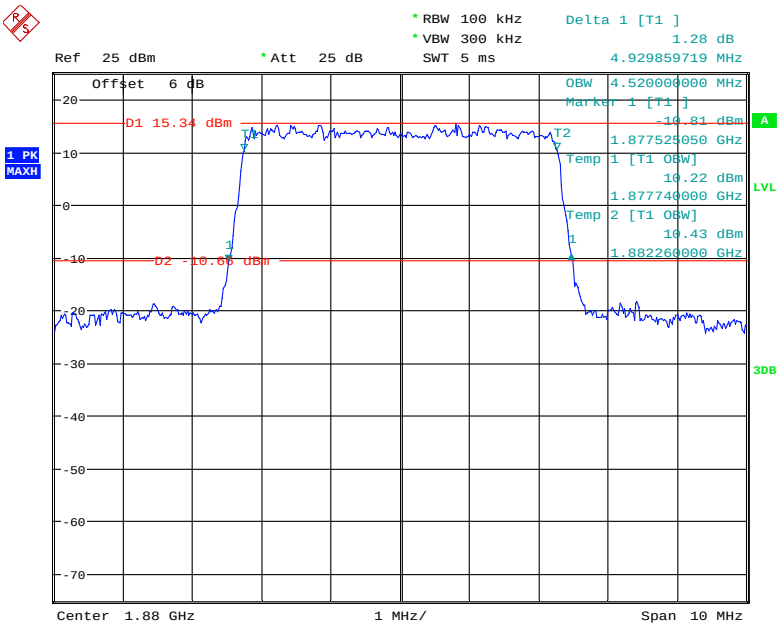
Date: 6.SEP.2019 21:17:51

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



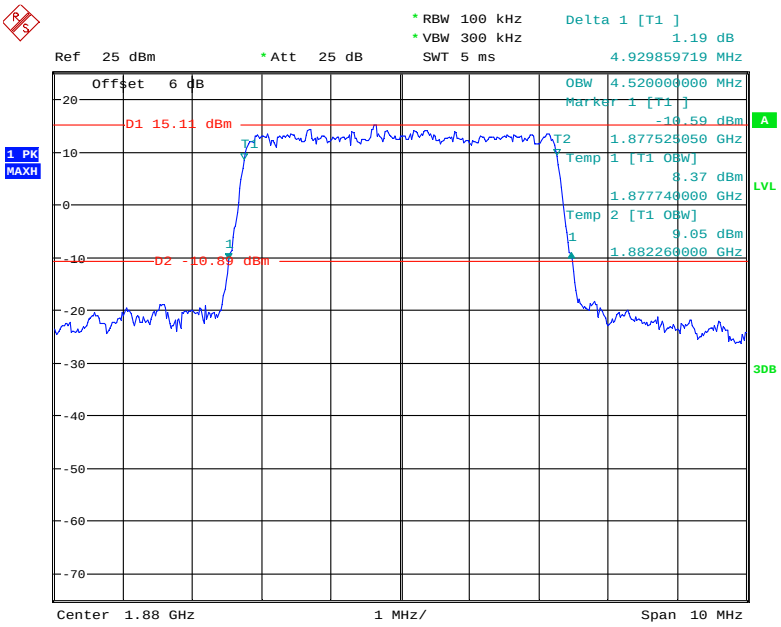
Date: 6.SEP.2019 21:18:15

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



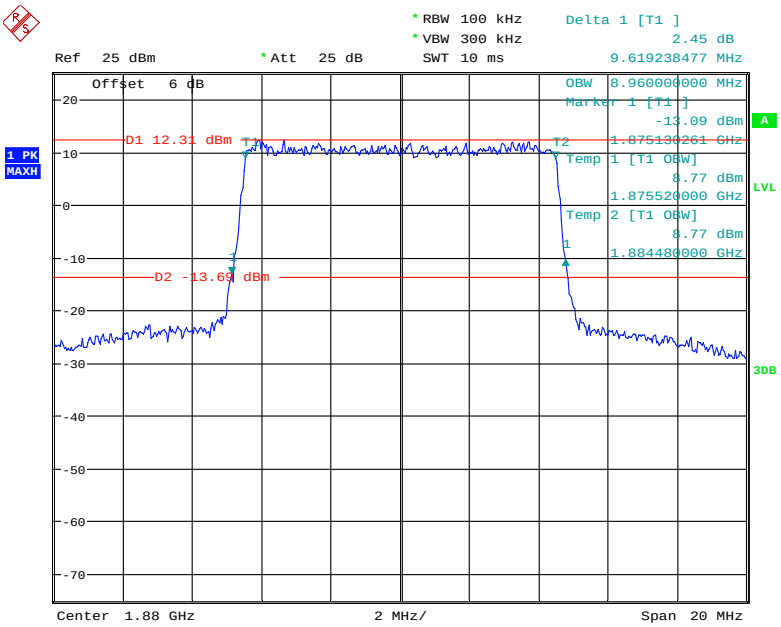
Date: 6.SEP.2019 21:18:50

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



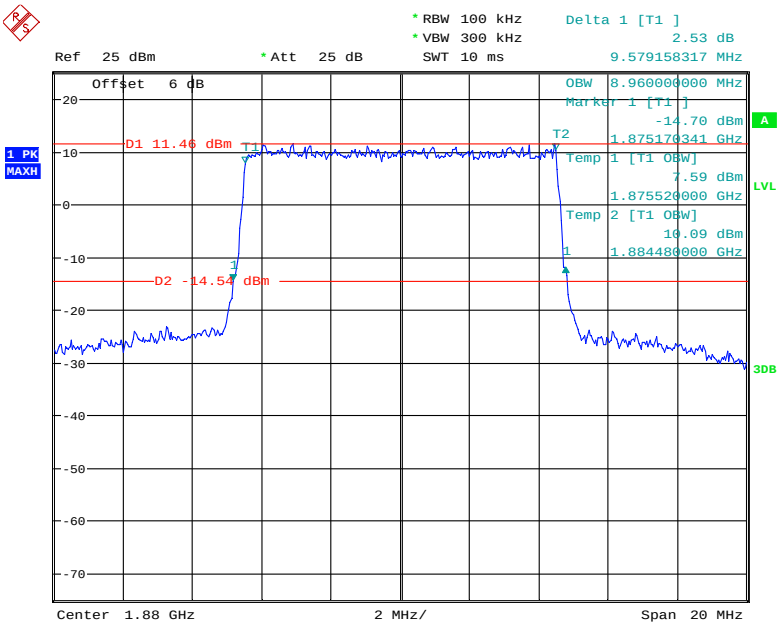
Date: 6.SEP.2019 21:19:26

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



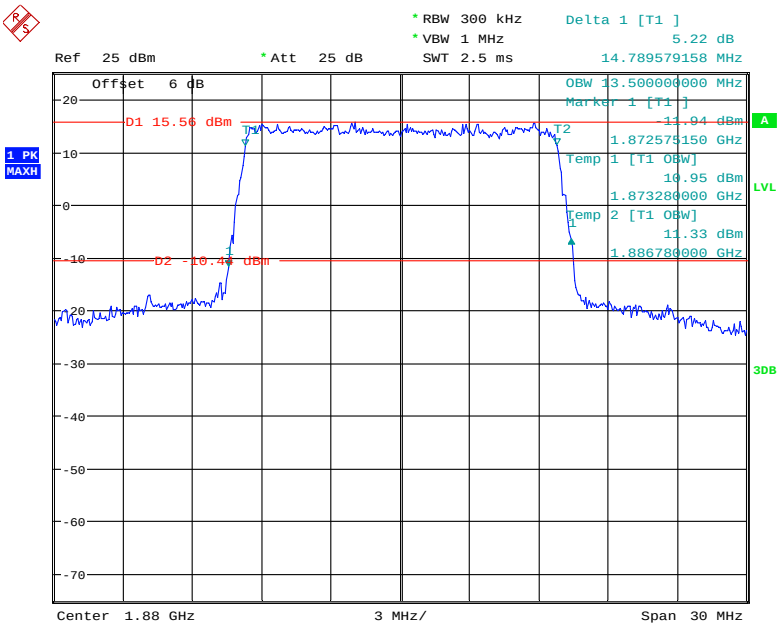
Date: 6.SEP.2019 21:19:53

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



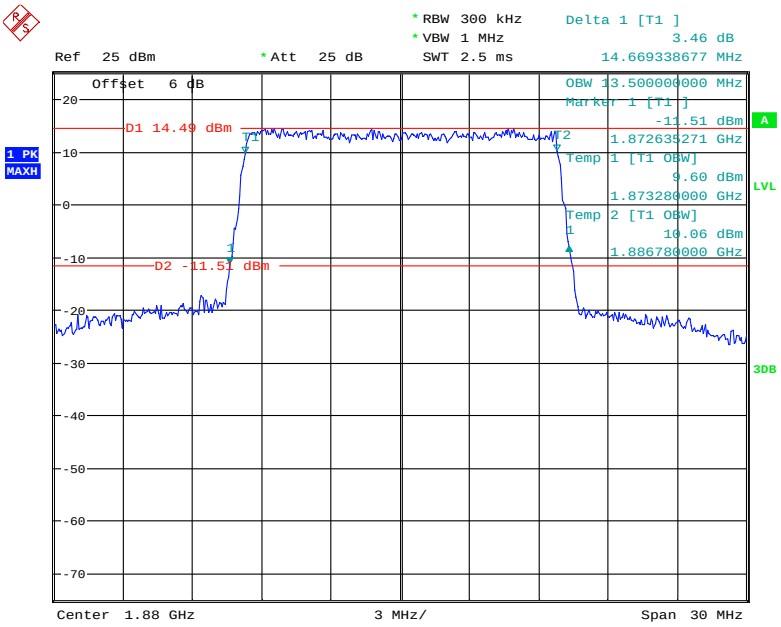
Date: 6.SEP.2019 21:20:24

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



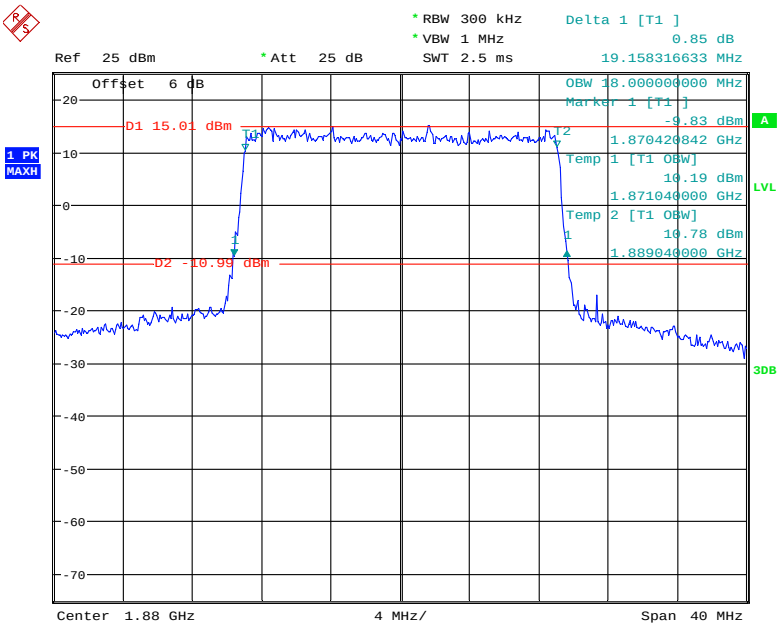
Date: 6.SEP.2019 21:21:03

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



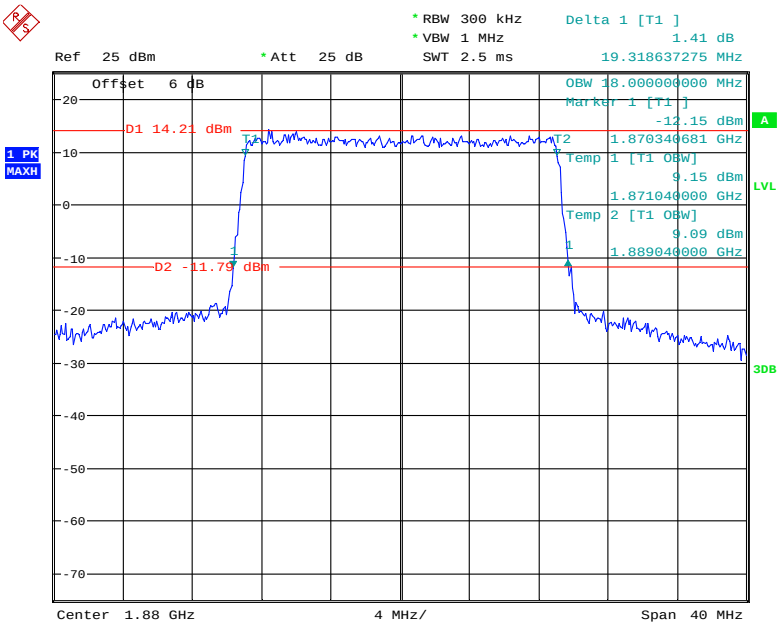
Date: 6.SEP.2019 21:21:36

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



Date: 6.SEP.2019 21:22:12

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

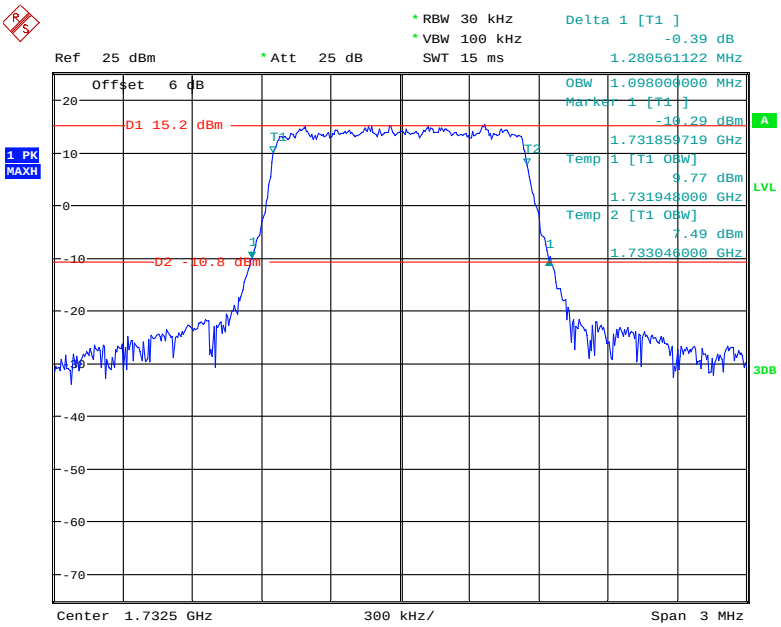


Date: 6.SEP.2019 21:22:48

LTE Band 4: (Middle Channel)

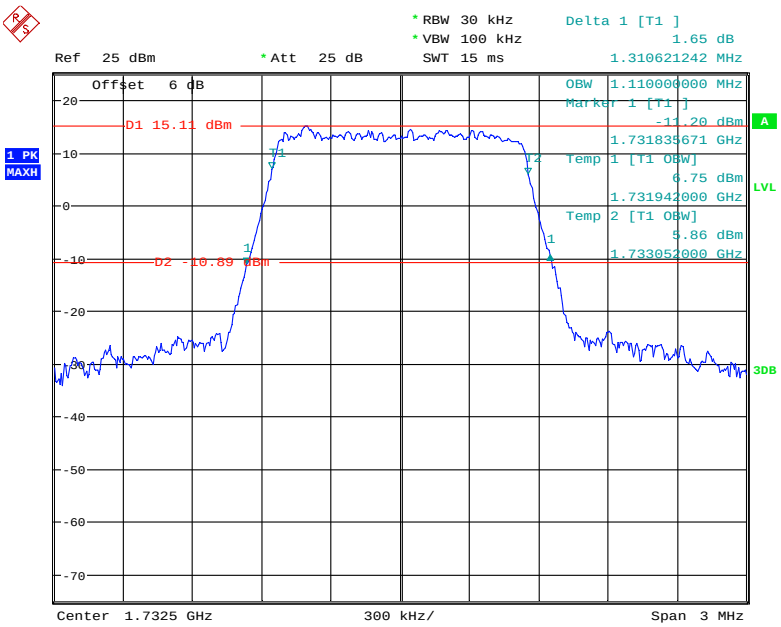
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.098	1.281
	16QAM	1.110	1.311
3.0	QPSK	2.688	2.850
	16QAM	2.688	2.862
5.0	QPSK	4.520	5.371
	16QAM	4.520	5.050
10.0	QPSK	8.960	9.579
	16QAM	8.960	9.419
15.0	QPSK	13.560	14.910
	16QAM	13.500	14.669
20.0	QPSK	18.000	19.158
	16QAM	18.000	19.238

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



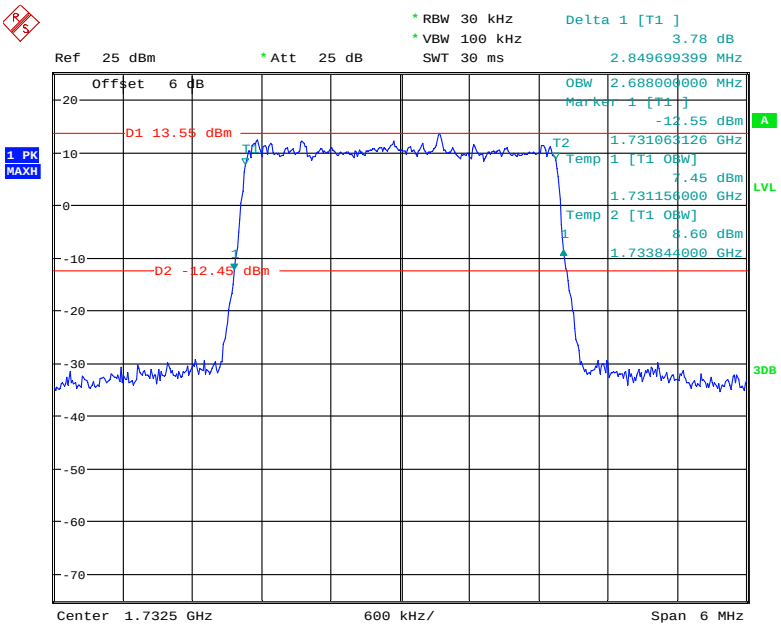
Date: 6.SEP.2019 21:23:14

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



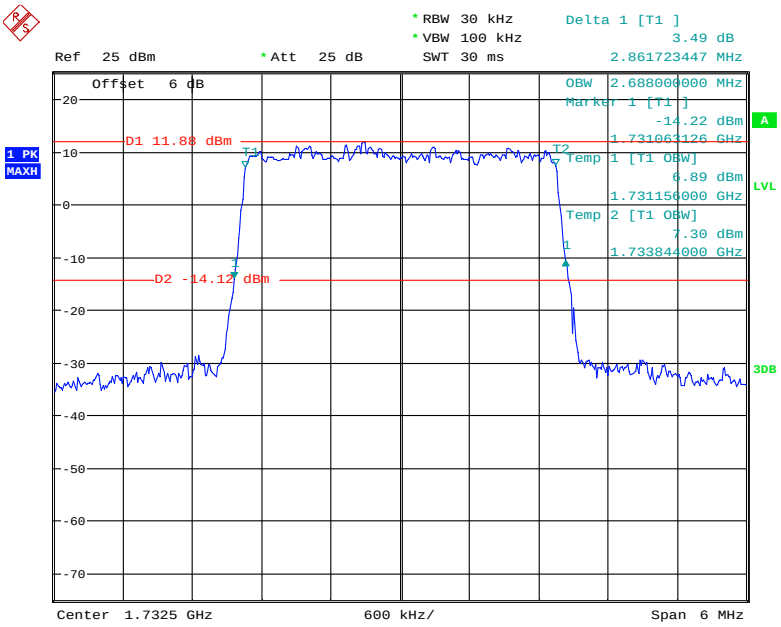
Date: 6.SEP.2019 21:23:50

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



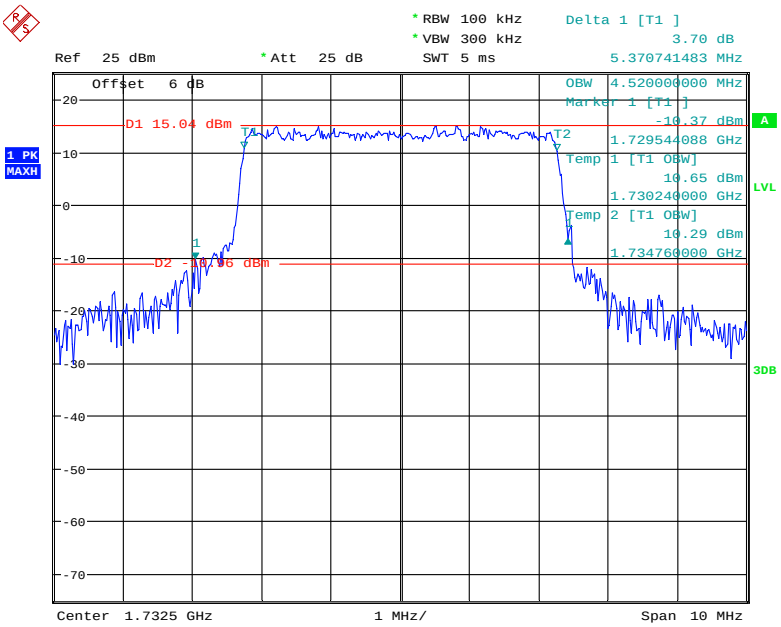
Date: 6.SEP.2019 21:24:19

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



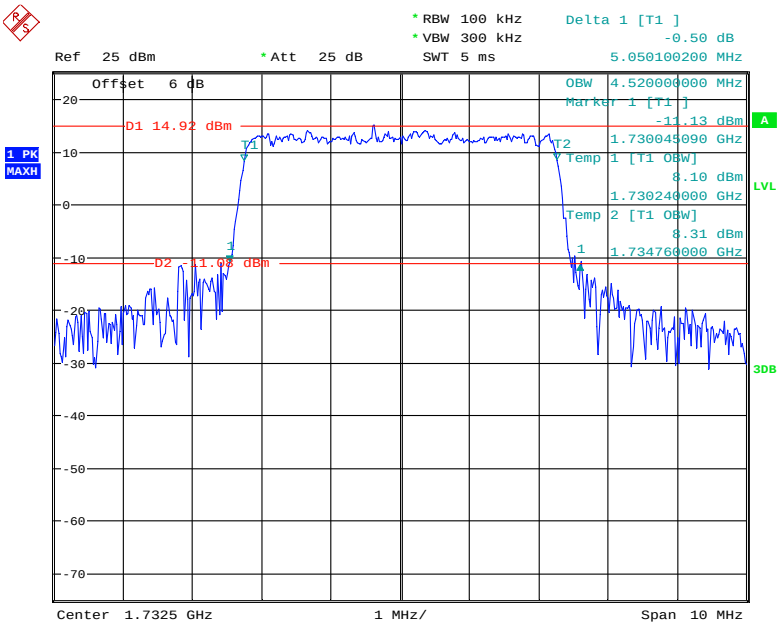
Date: 6.SEP.2019 21:24:55

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



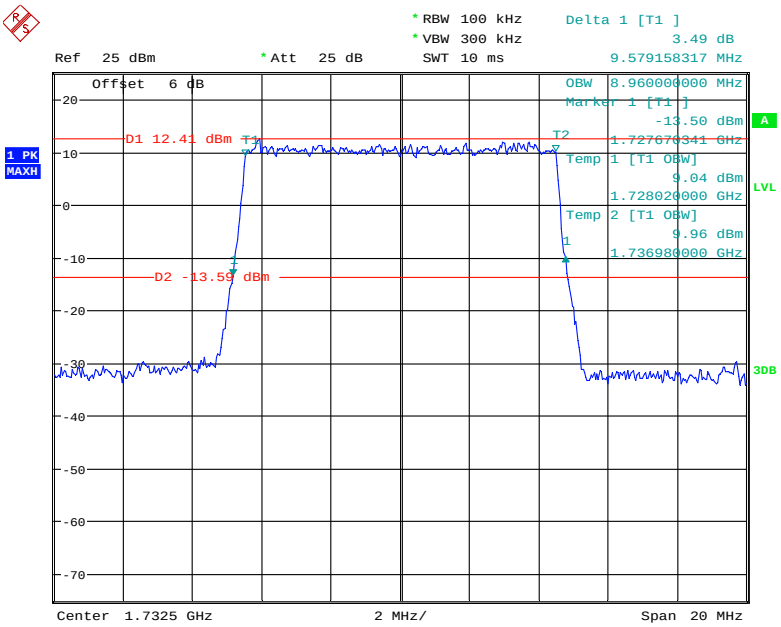
Date: 6.SEP.2019 21:25:30

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



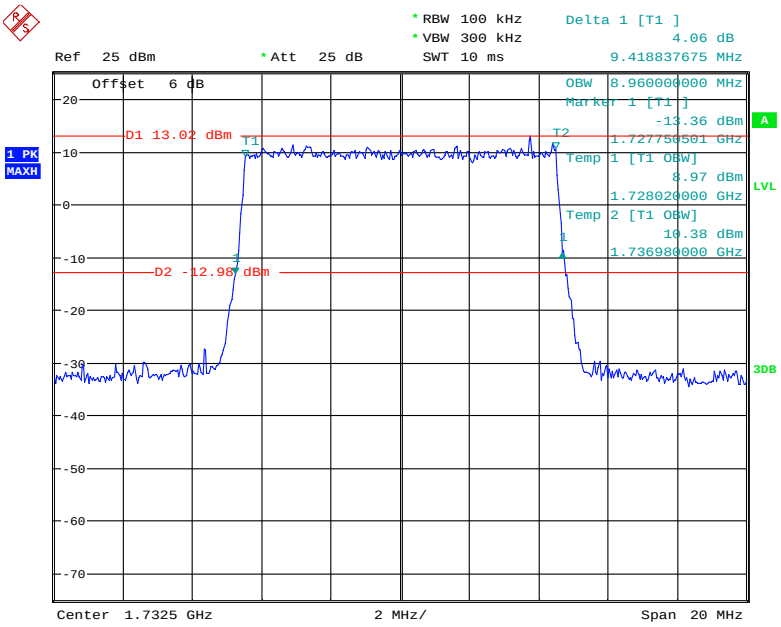
Date: 6.SEP.2019 21:26:06

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



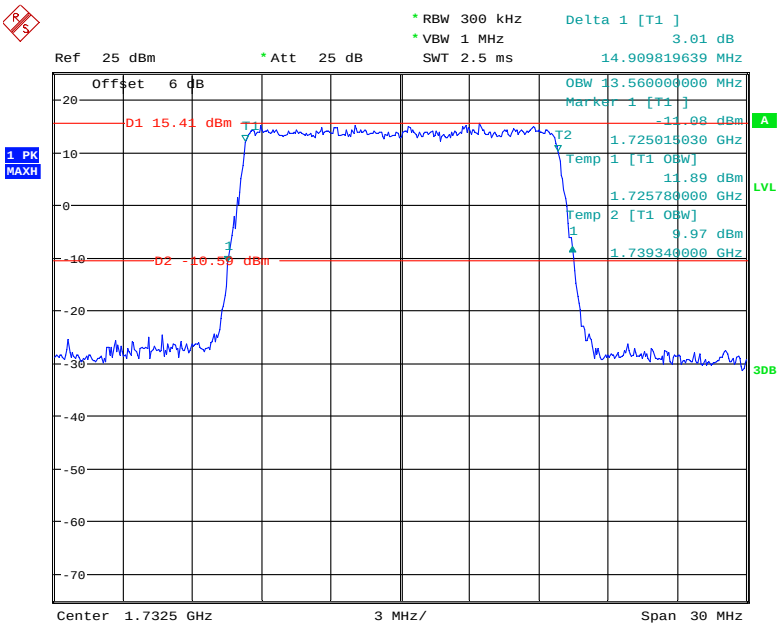
Date: 6.SEP.2019 21:26:40

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



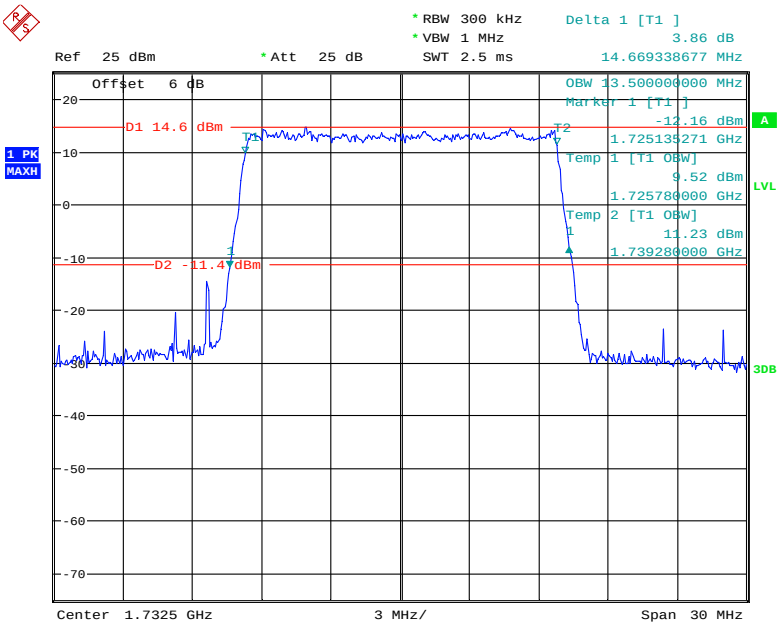
Date: 6.SEP.2019 21:27:11

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



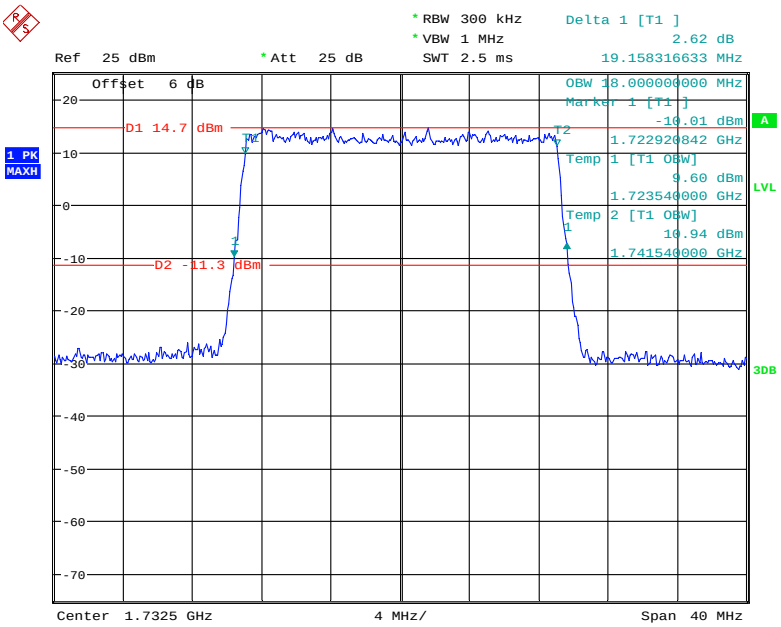
Date: 6.SEP.2019 21:27:49

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



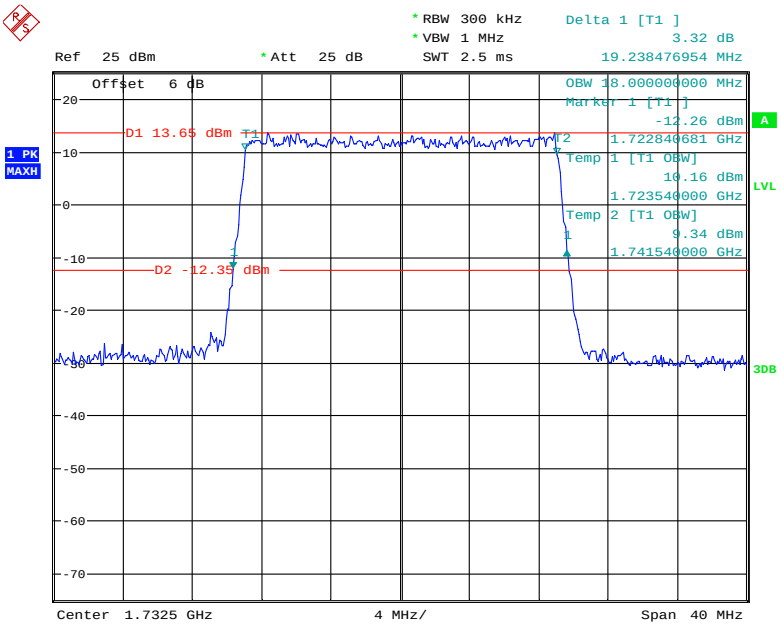
Date: 6.SEP.2019 21:28:23

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



Date: 6.SEP.2019 21:28:58

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

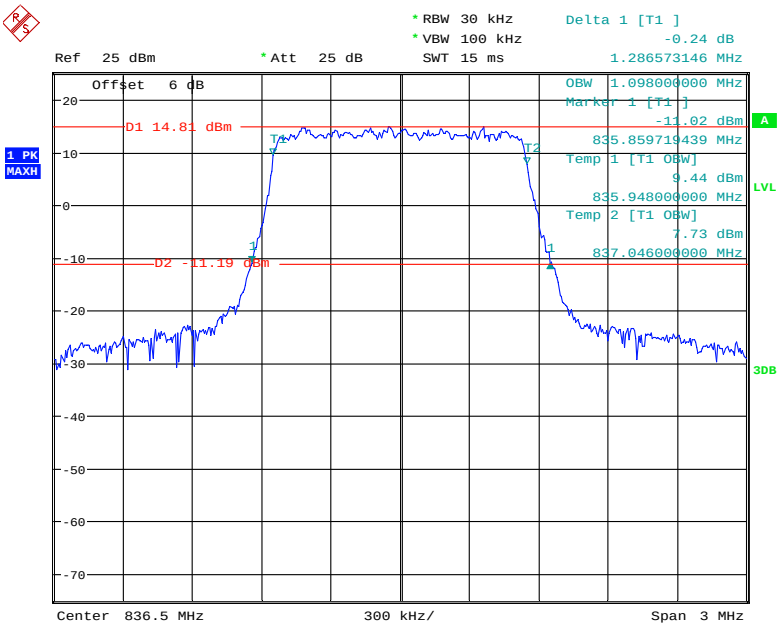


Date: 6.SEP.2019 21:29:37

LTE Band 5: (Middle Channel)

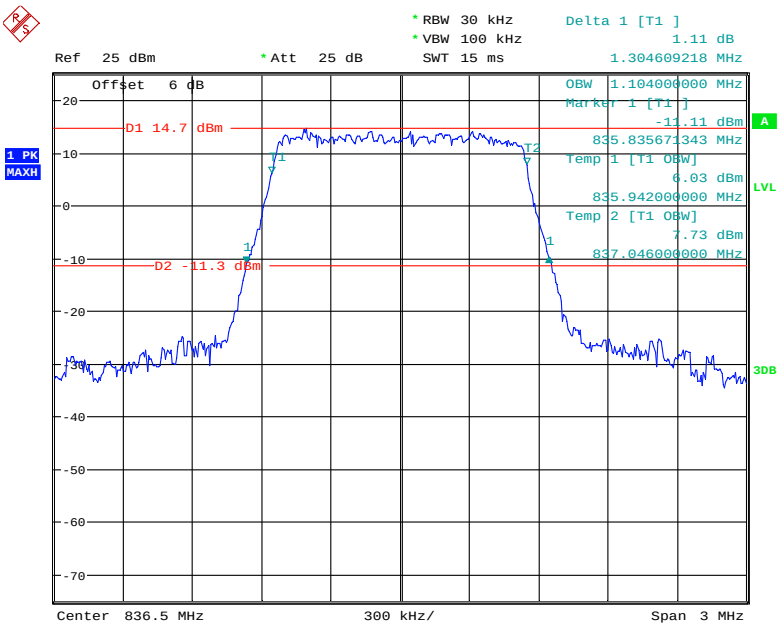
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.098	1.287
	16QAM	1.104	1.305
3.0	QPSK	2.688	2.850
	16QAM	2.688	2.862
5.0	QPSK	4.540	5.651
	16QAM	4.520	5.431
10.0	QPSK	8.960	9.579
	16QAM	8.960	9.619

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



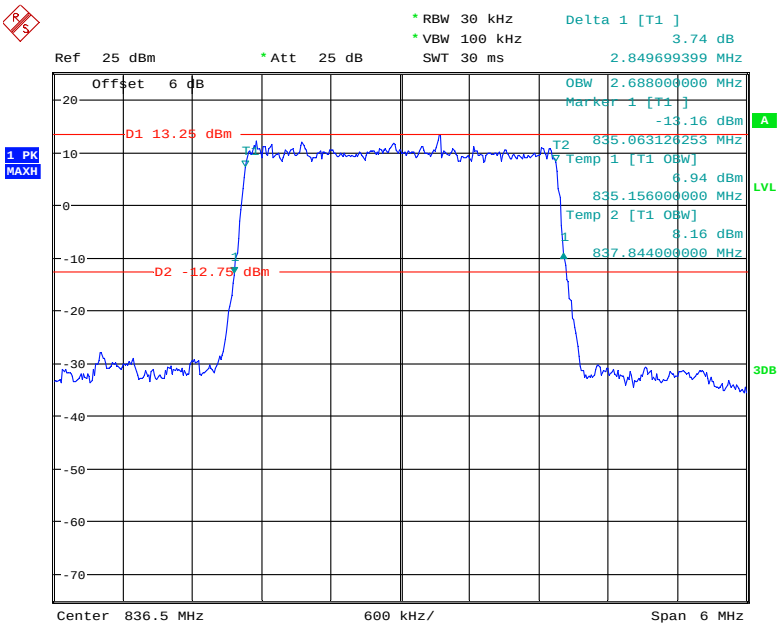
Date: 6.SEP.2019 21:30:16

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



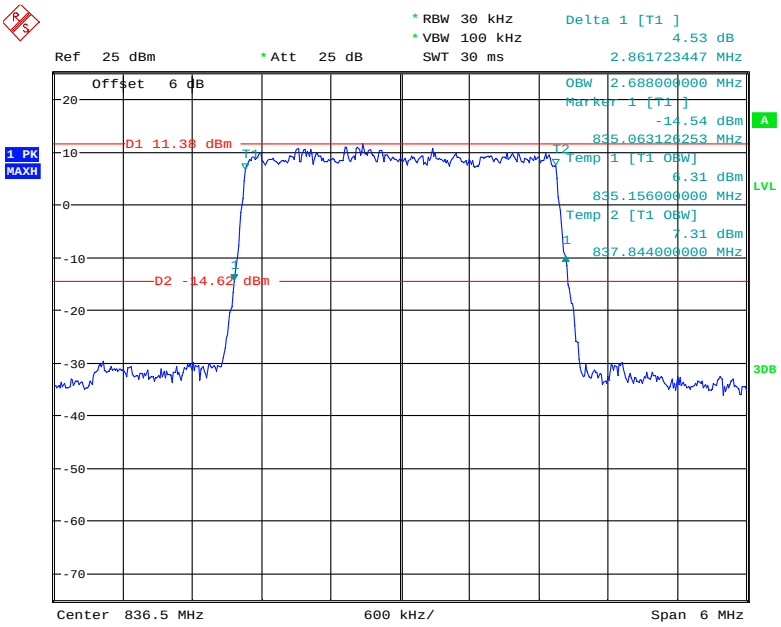
Date: 6.SEP.2019 21:30:49

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



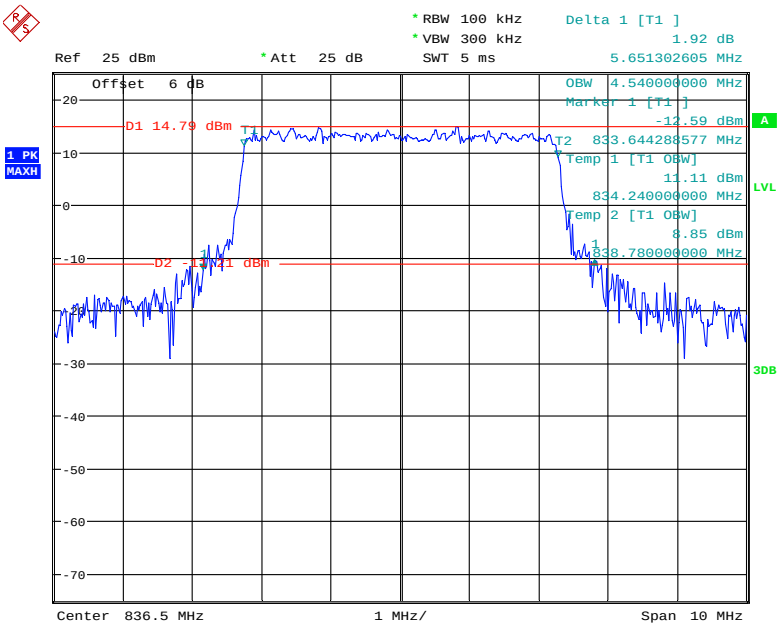
Date: 6.SEP.2019 21:31:23

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



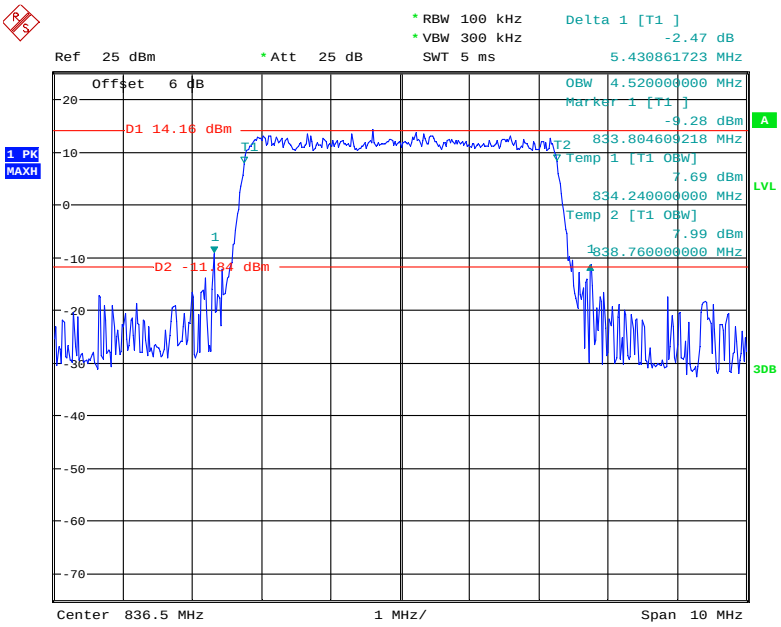
Date: 6.SEP.2019 21:31:56

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



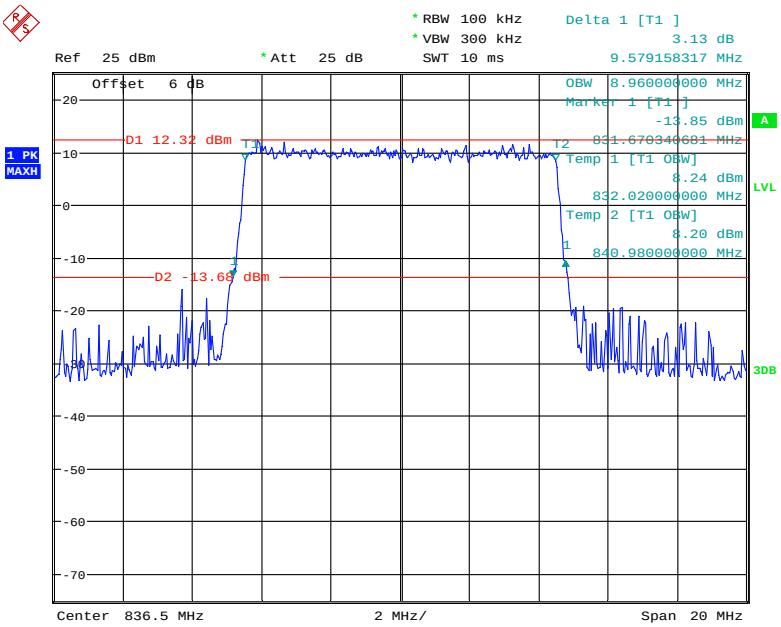
Date: 6.SEP.2019 21:33:17

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



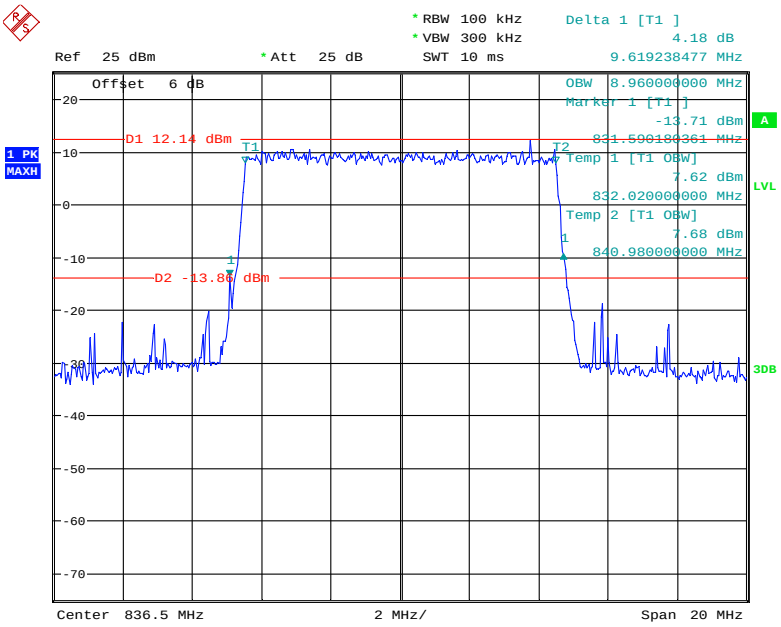
Date: 6.SEP.2019 21:33:53

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



Date: 6.SEP.2019 21:34:26

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

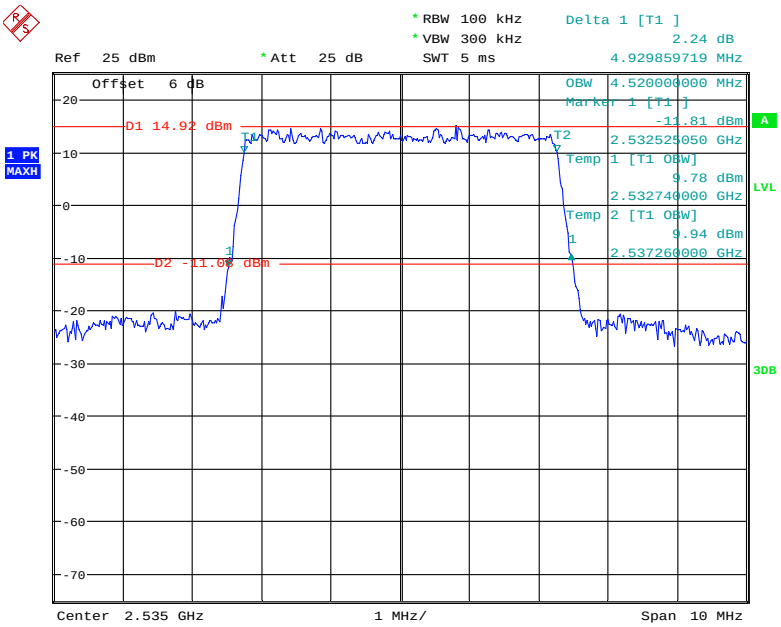


Date: 6.SEP.2019 21:35:00

LTE Band 7: (Middle Channel)

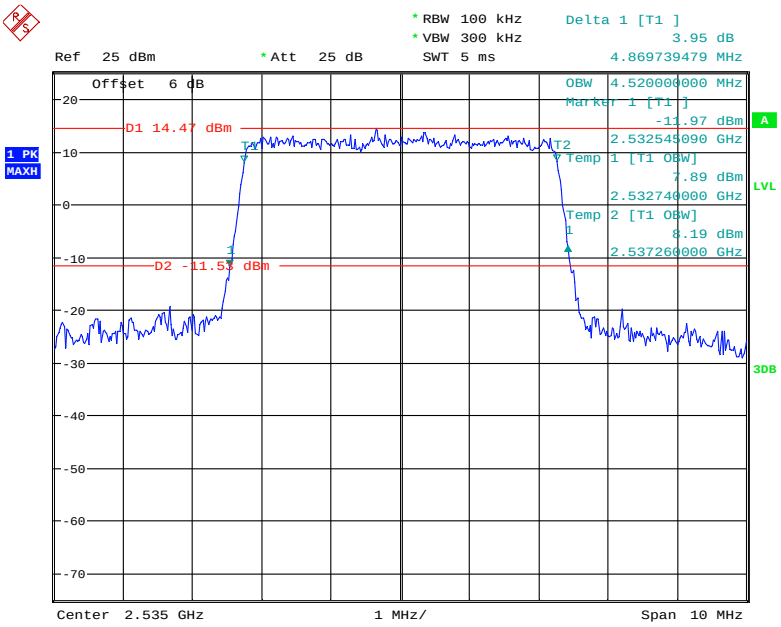
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.520	4.930
	16QAM	4.520	4.870
10.0	QPSK	9.000	9.579
	16QAM	8.960	9.499
15.0	QPSK	13.560	14.609
	16QAM	13.560	14.669
20.0	QPSK	18.000	19.158
	16QAM	18.000	19.238

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



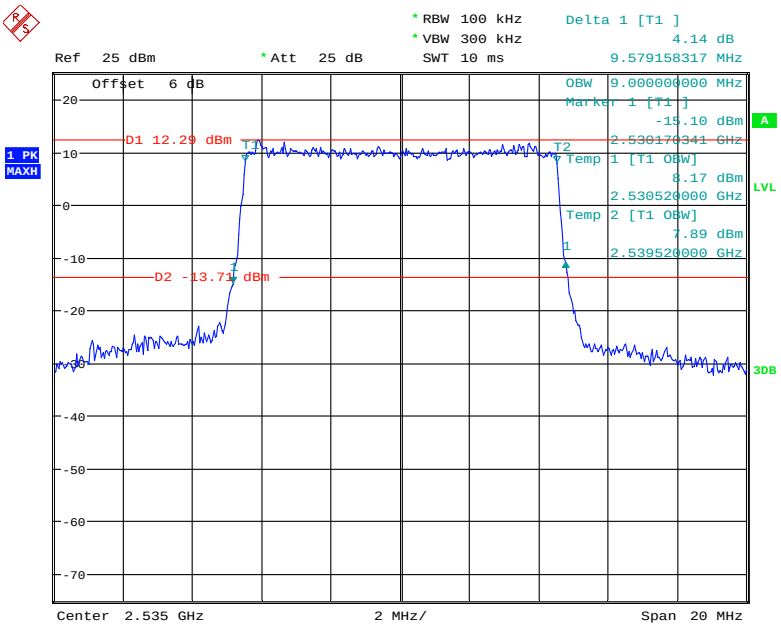
Date: 6.SEP.2019 21:35:38

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



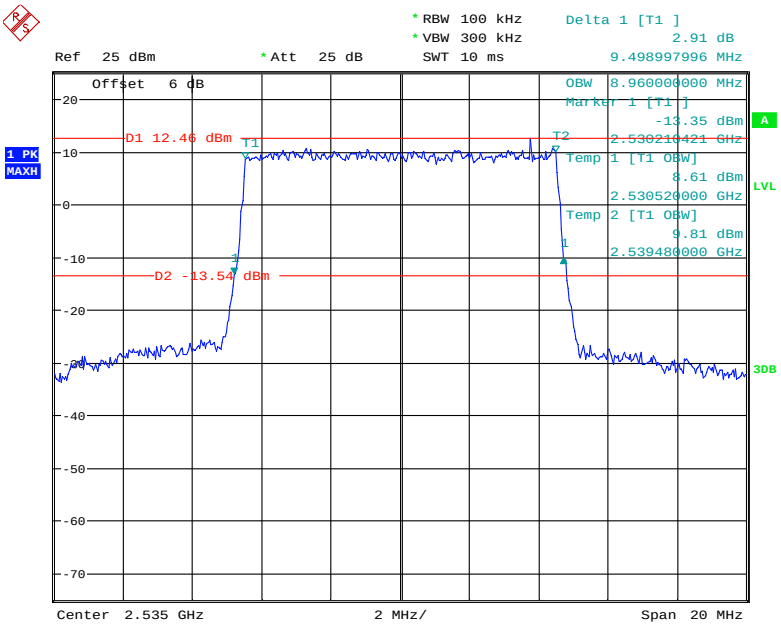
Date: 6.SEP.2019 21:36:05

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



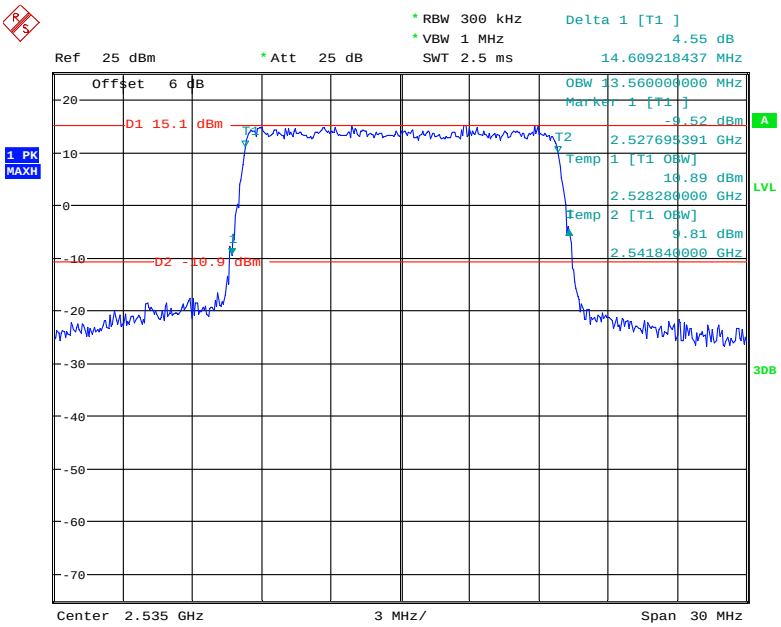
Date: 6.SEP.2019 21:36:35

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



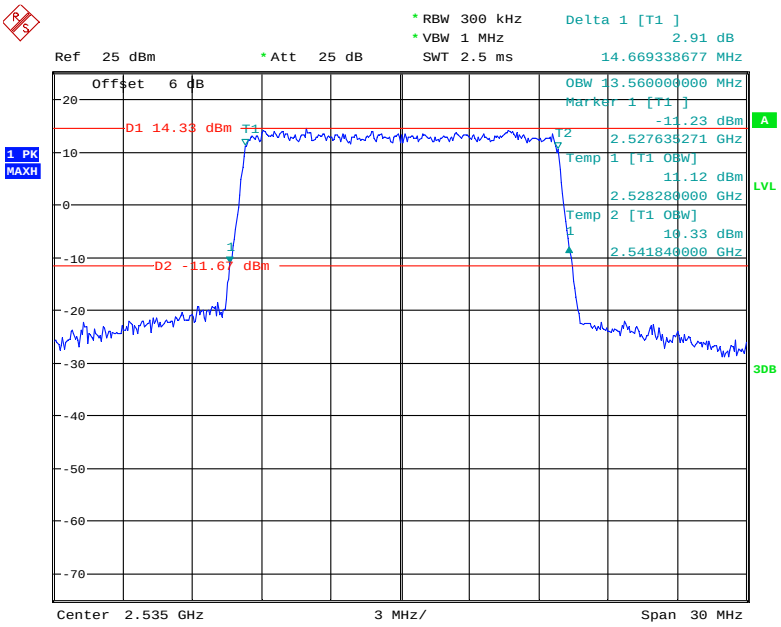
Date: 6.SEP.2019 21:37:12

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



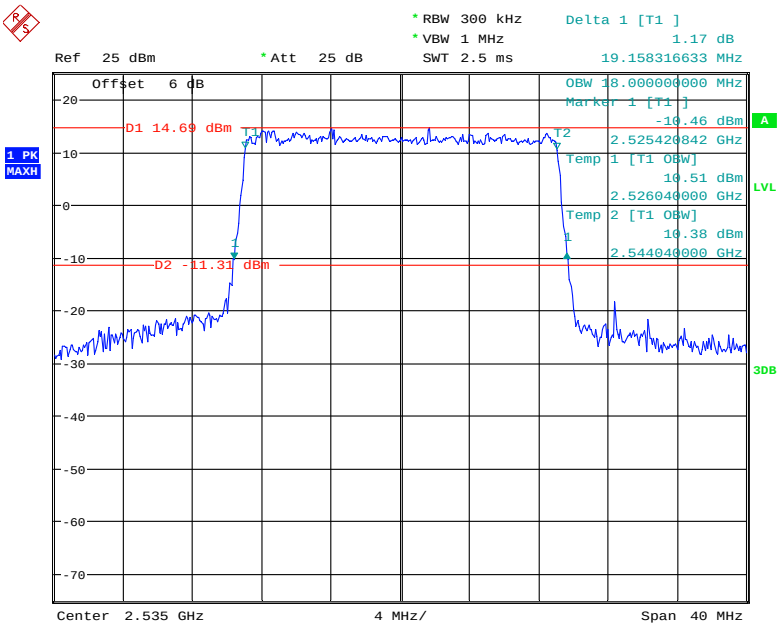
Date: 6.SEP.2019 21:37:48

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



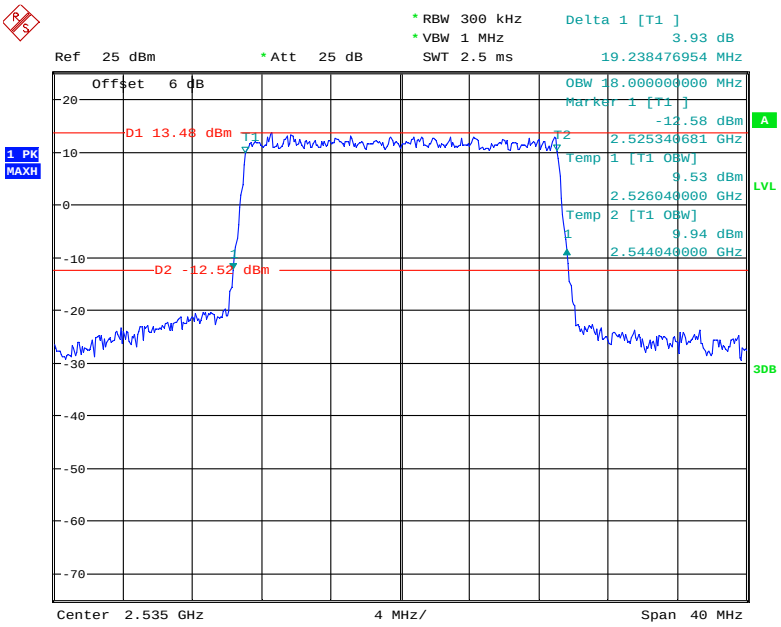
Date: 6.SEP.2019 21:38:30

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



Date: 6.SEP.2019 21:39:22

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



Date: 6.SEP.2019 21:40:04

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

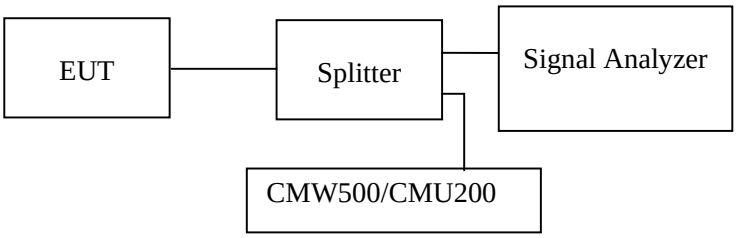
Applicable Standard

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

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

Test Procedure

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



Test Data

Environmental Conditions

Temperature:	24~25 ℃
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Geroge Zhong from 2019-09-06 to 2019-09-17.

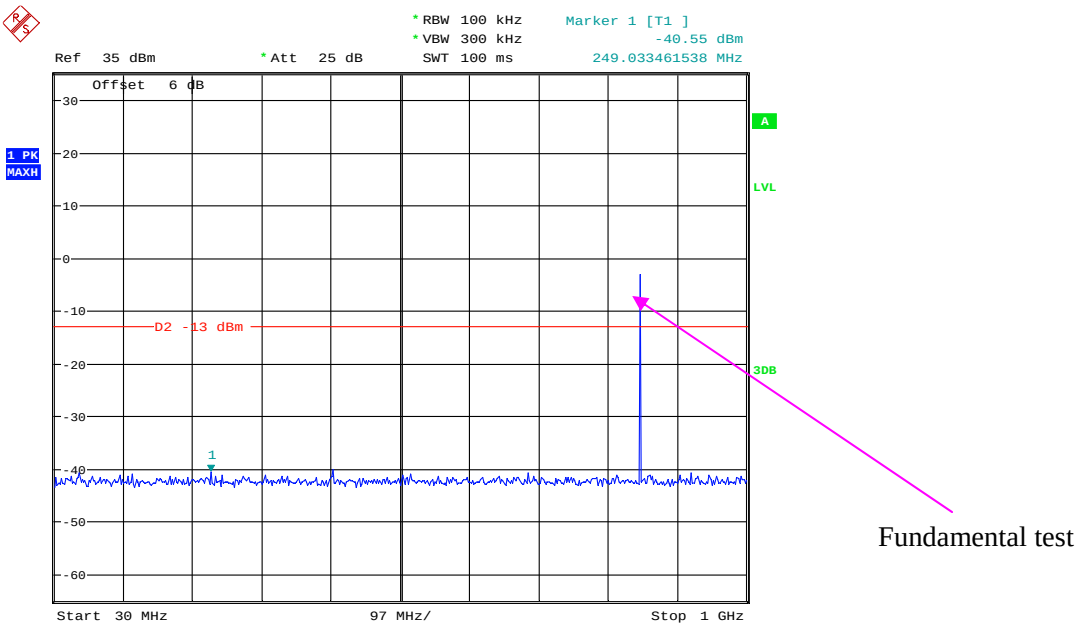
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

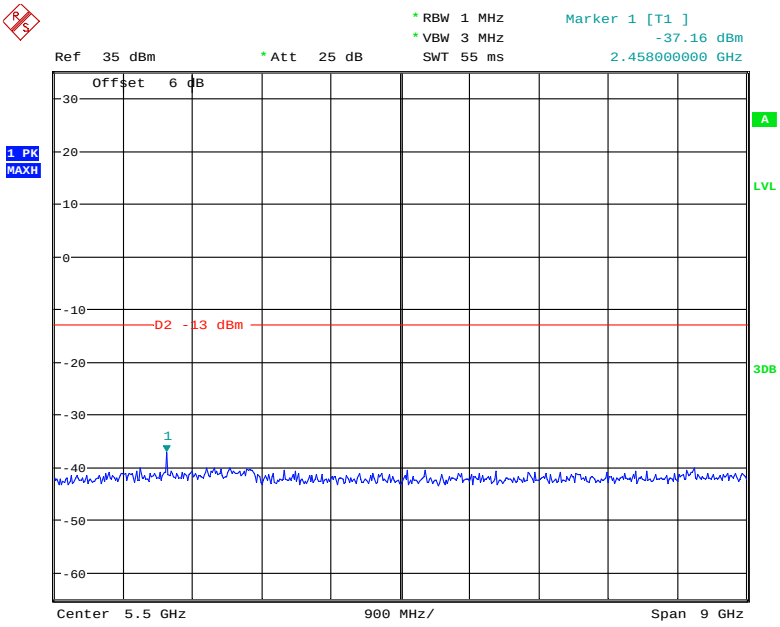
Cellular Band (Part 22H)

30 MHz – 1 GHz (GSM Mode)



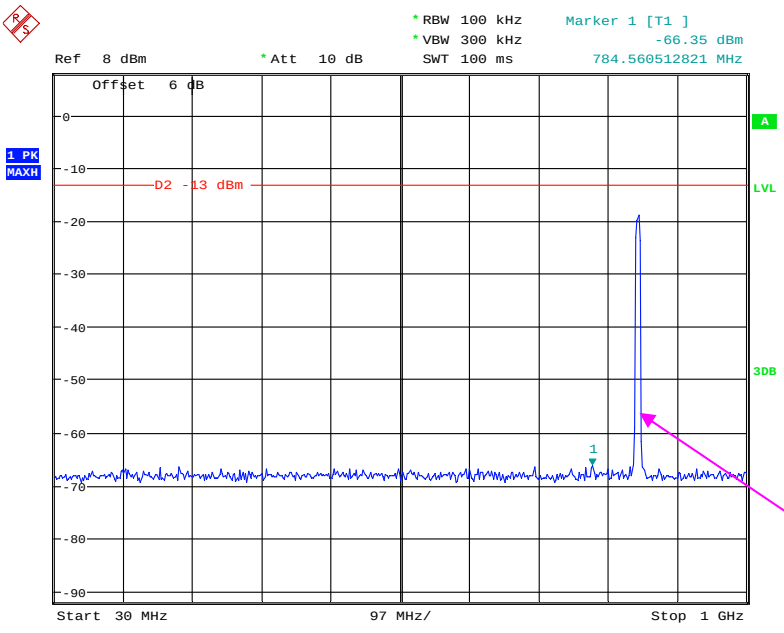
Date: 7.SEP.2019 15:39:09

1 GHz – 10 GHz (GSM Mode)



Date: 7.SEP.2019 15:39:51

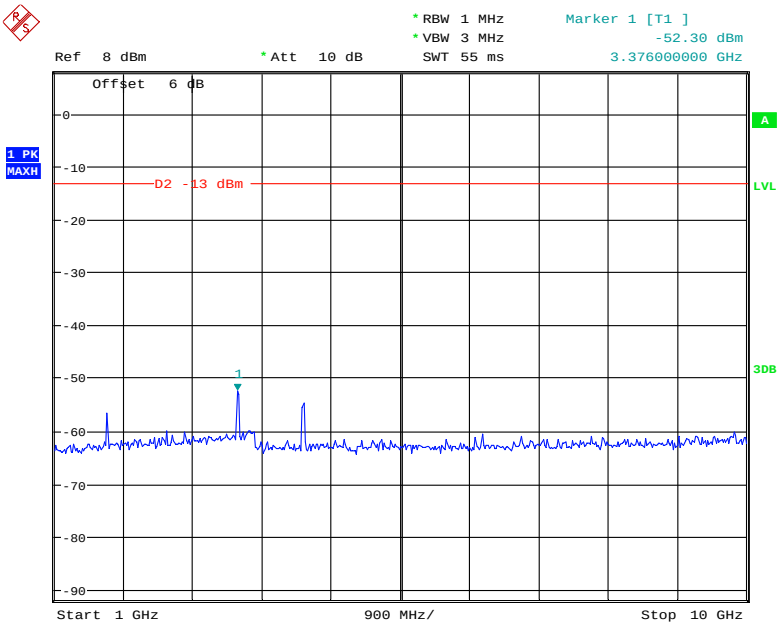
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 7.SEP.2019 17:35:20

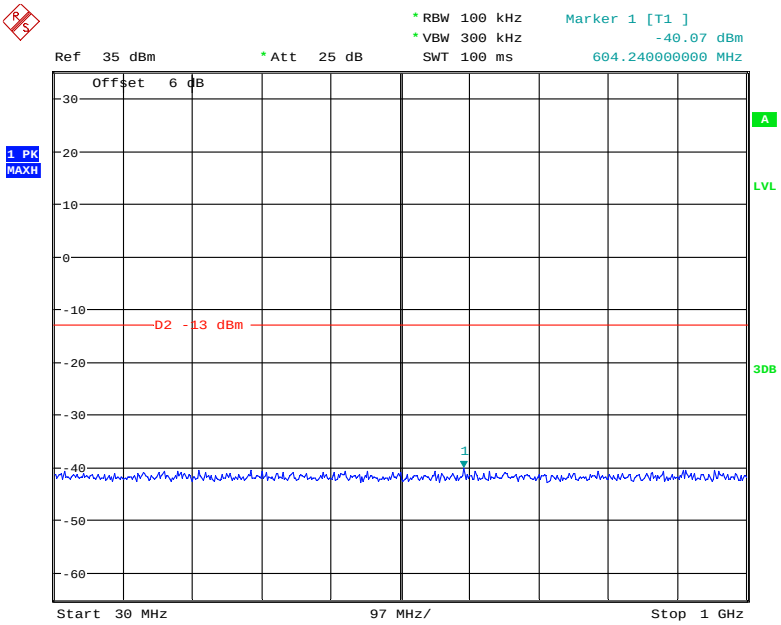
1 GHz – 10 GHz (WCDMA Mode)



Date: 7.SEP.2019 17:35:38

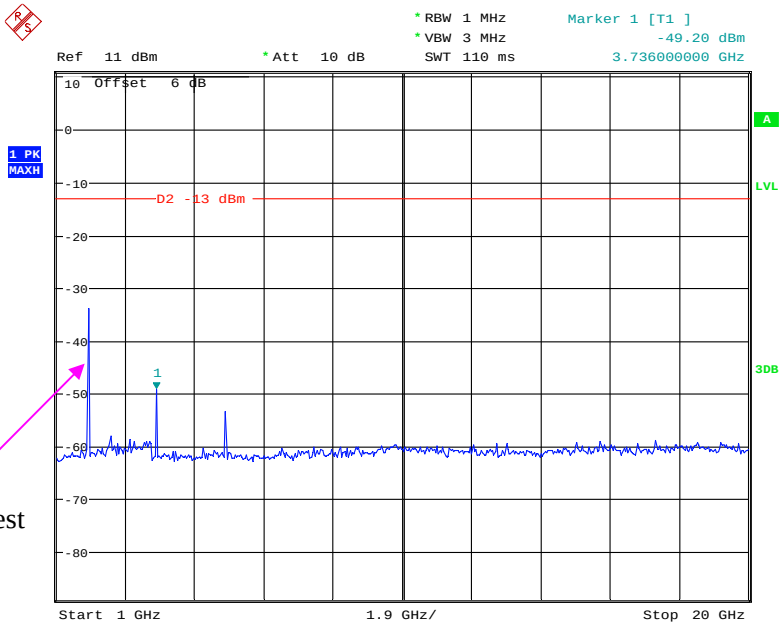
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 7.SEP.2019 16:27:47

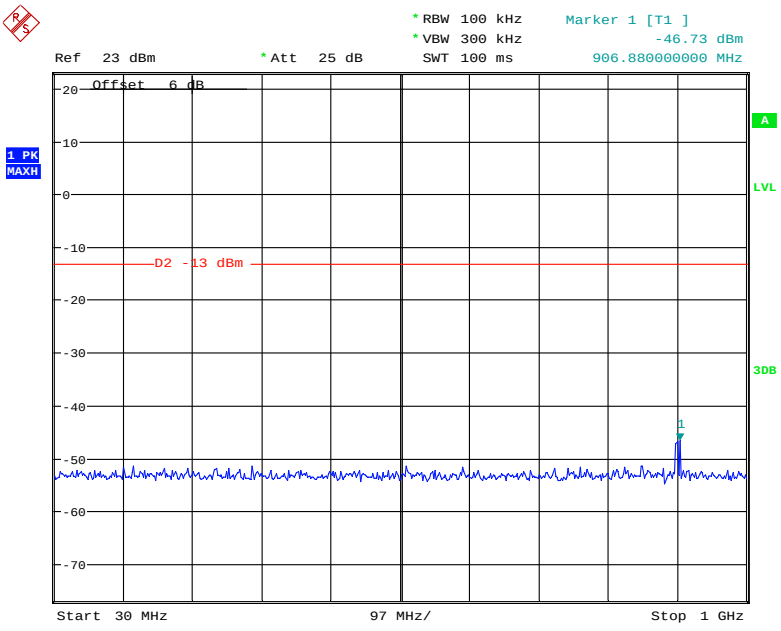
1 GHz – 20 GHz (GSM Mode)



Fundamental test

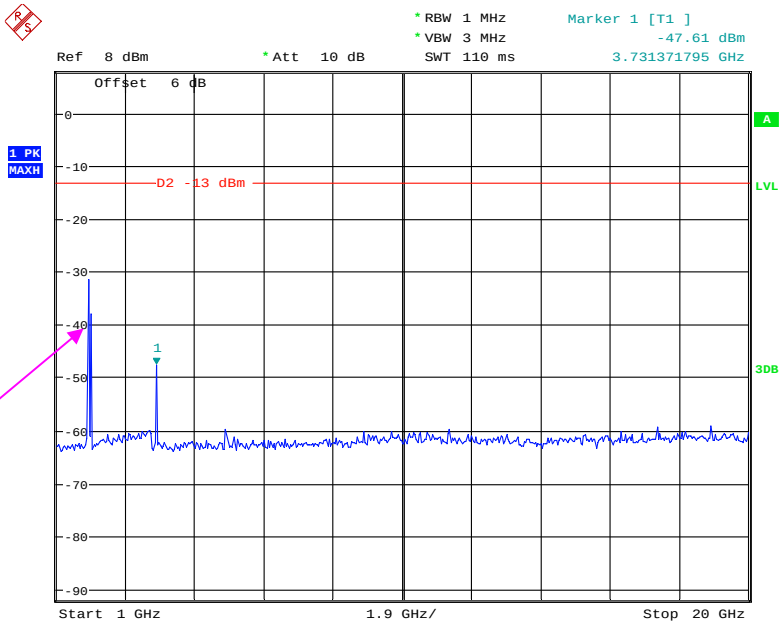
Date: 7.SEP.2019 16:30:41

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.SEP.2019 17:29:24

1 GHz – 20 GHz (WCDMA Mode)

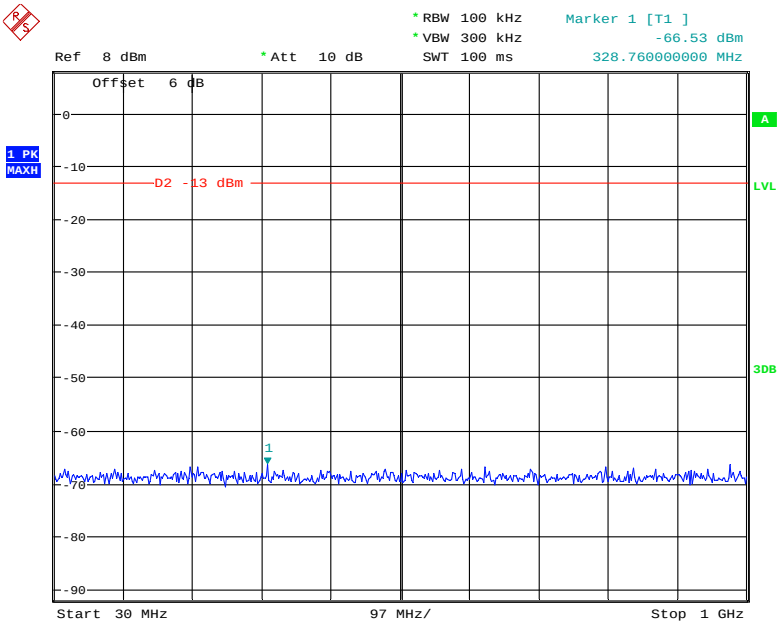


Fundamental test

Date: 7.SEP.2019 17:31:08

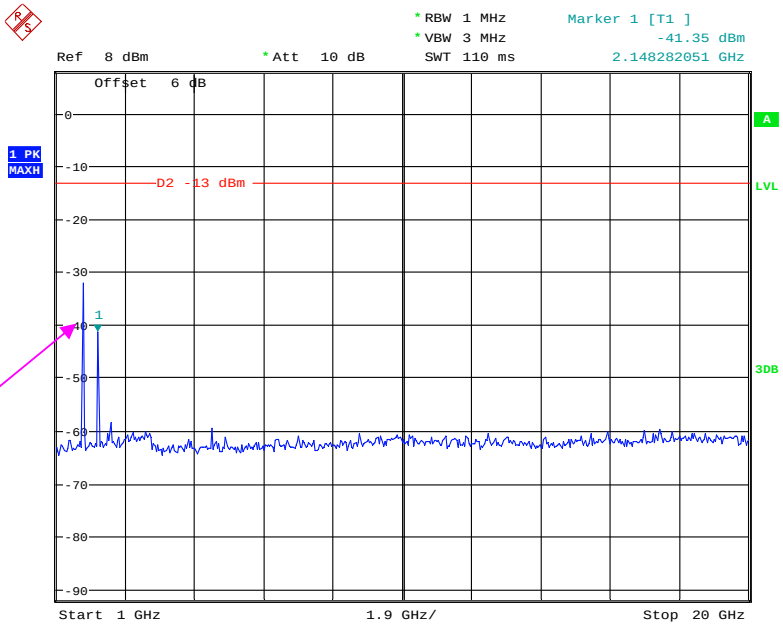
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



Date: 7.SEP.2019 17:33:31

1 GHz – 20 GHz (WCDMA Mode)

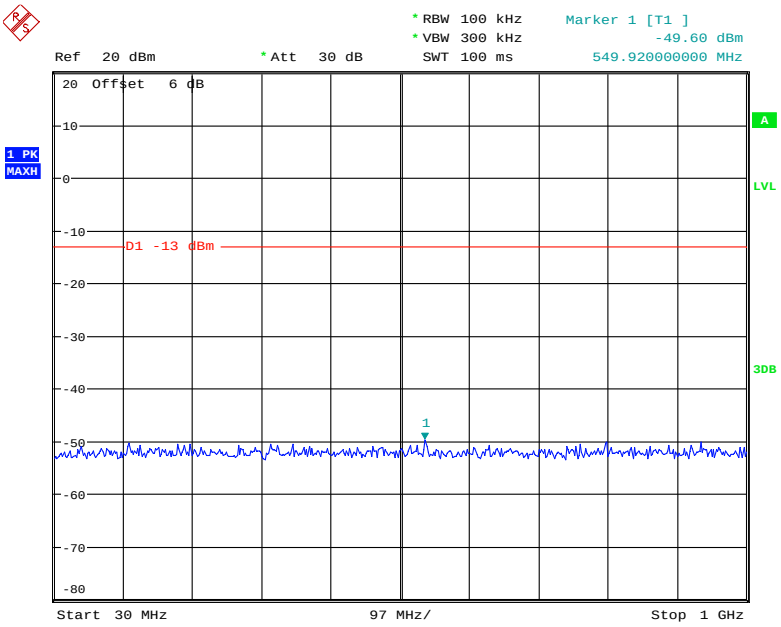


Fundamental test

Date: 7.SEP.2019 17:33:10

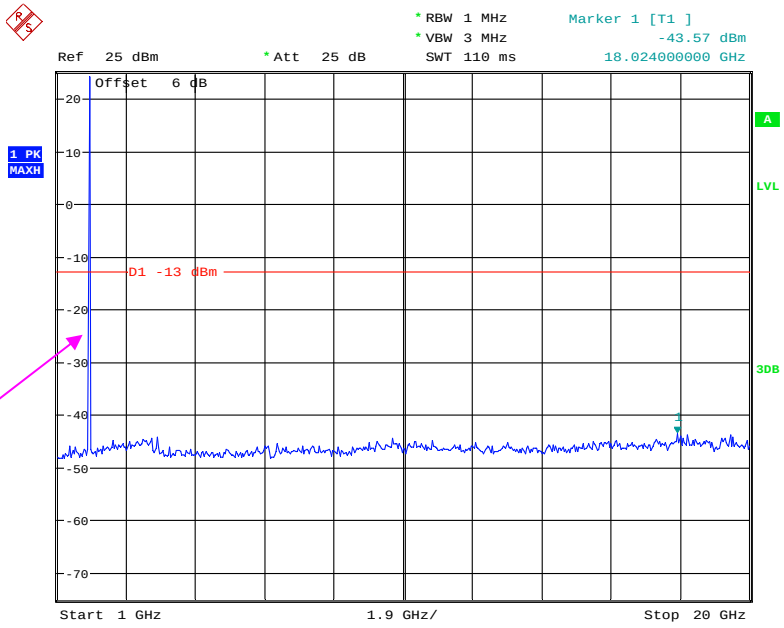
LTE Band 2:

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



Date: 6.SEP.2019 22:24:08

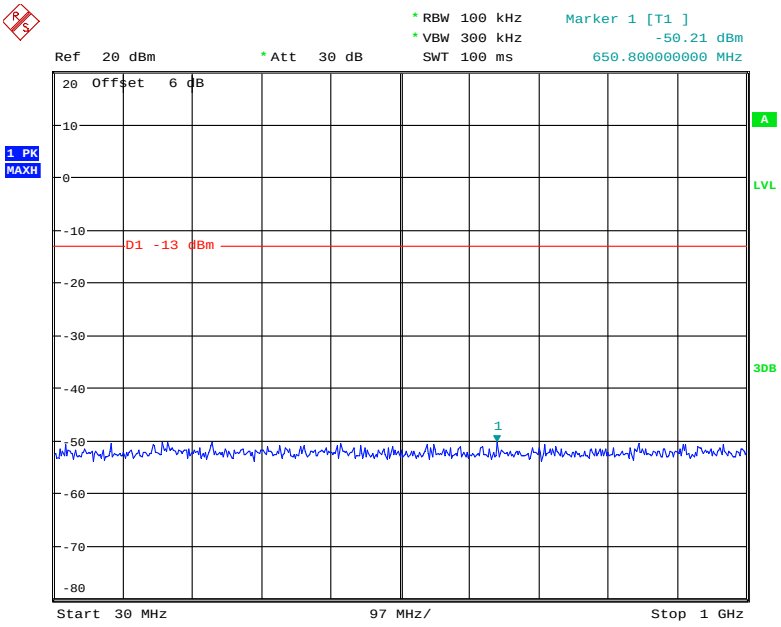
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test

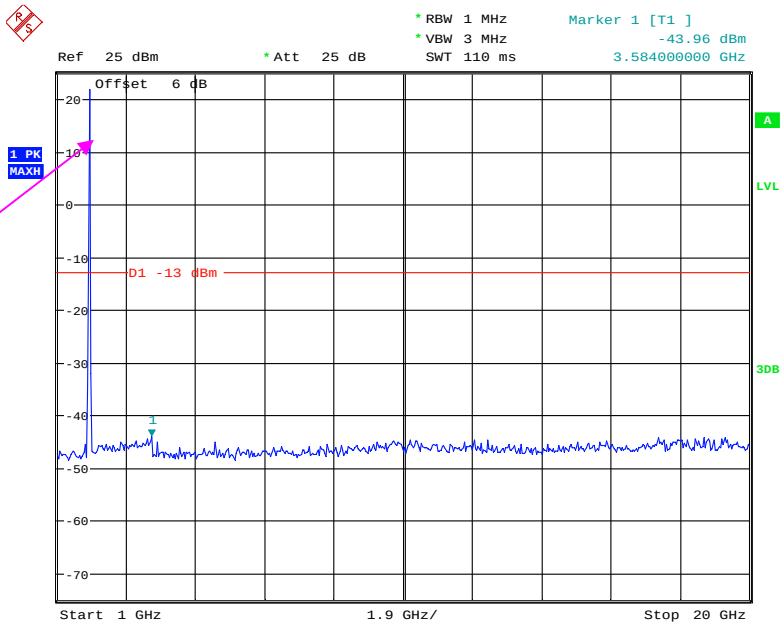
Date: 6.SEP.2019 22:24:17

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



Date: 6.SEP.2019 22:24:33

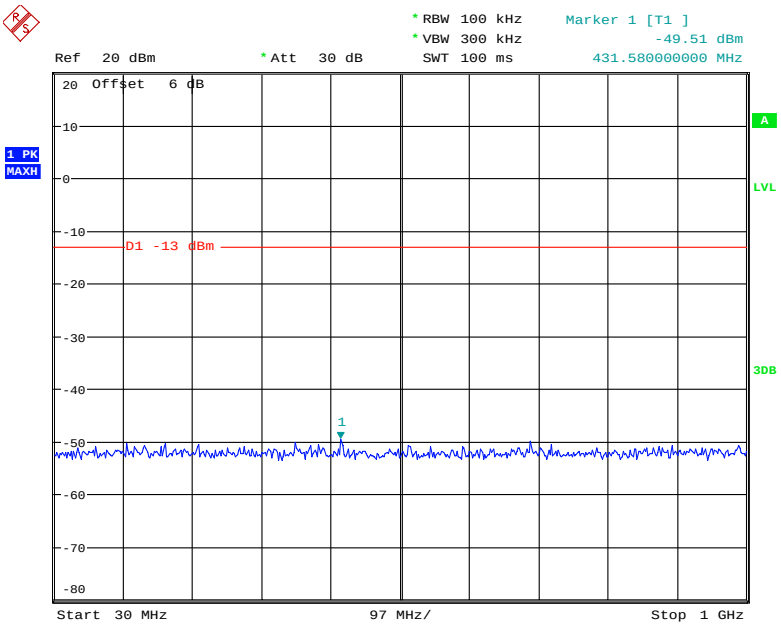
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test

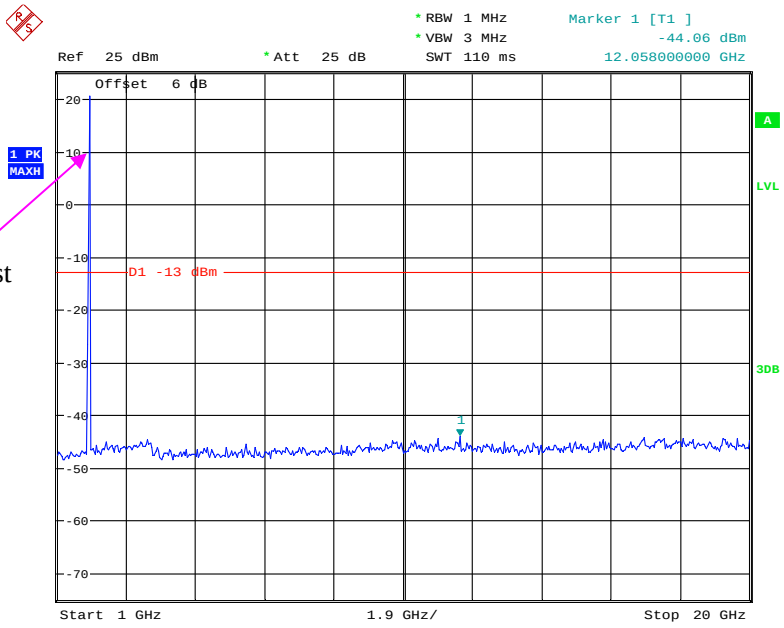
Date: 6.SEP.2019 22:24:42

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



Date: 6.SEP.2019 22:25:00

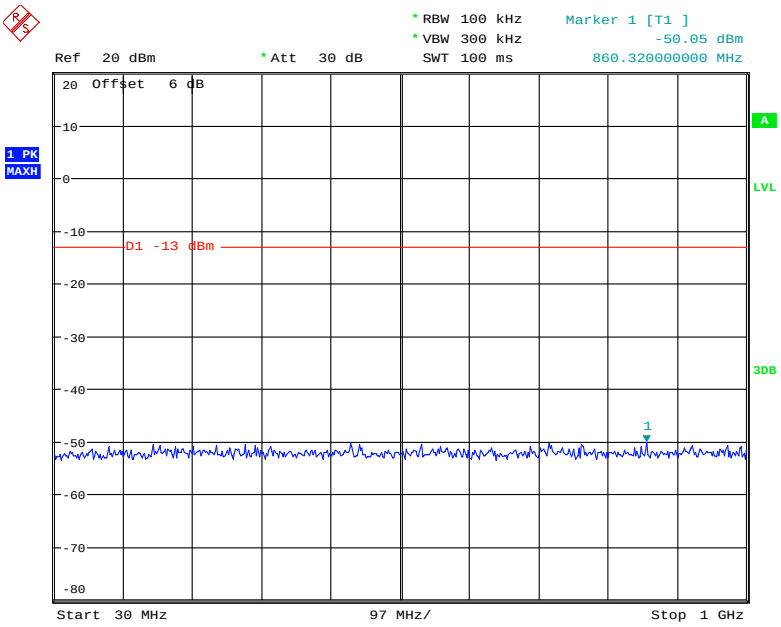
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test

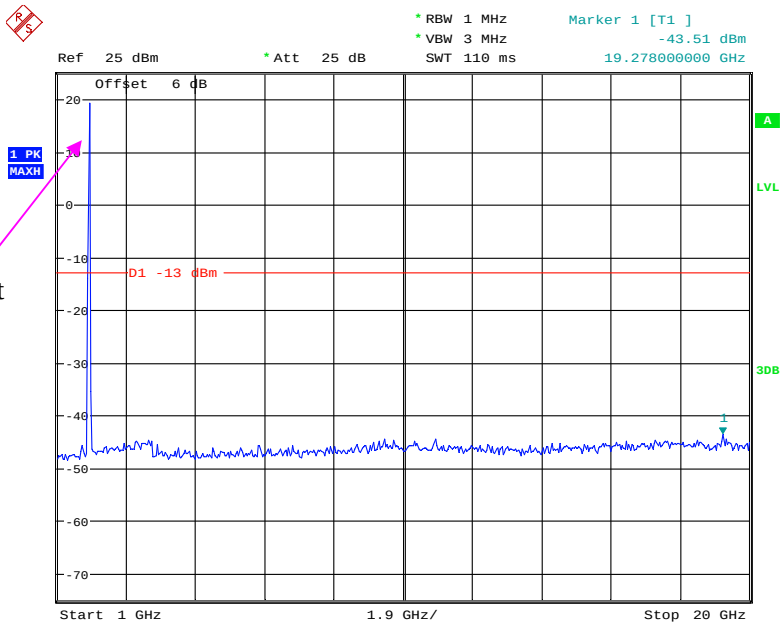
Date: 6.SEP.2019 22:25:09

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



Date: 6.SEP.2019 22:25:29

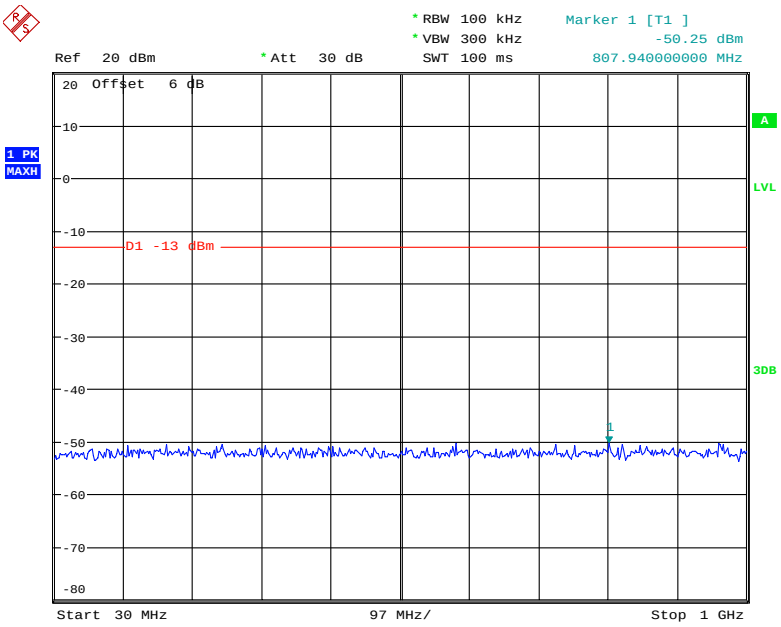
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test

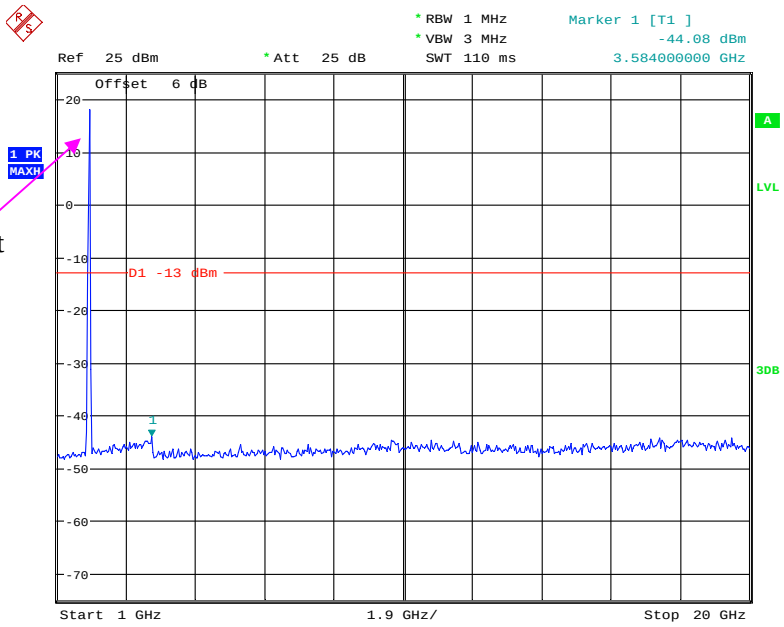
Date: 6.SEP.2019 22:25:38

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



Date: 6.SEP.2019 22:26:00

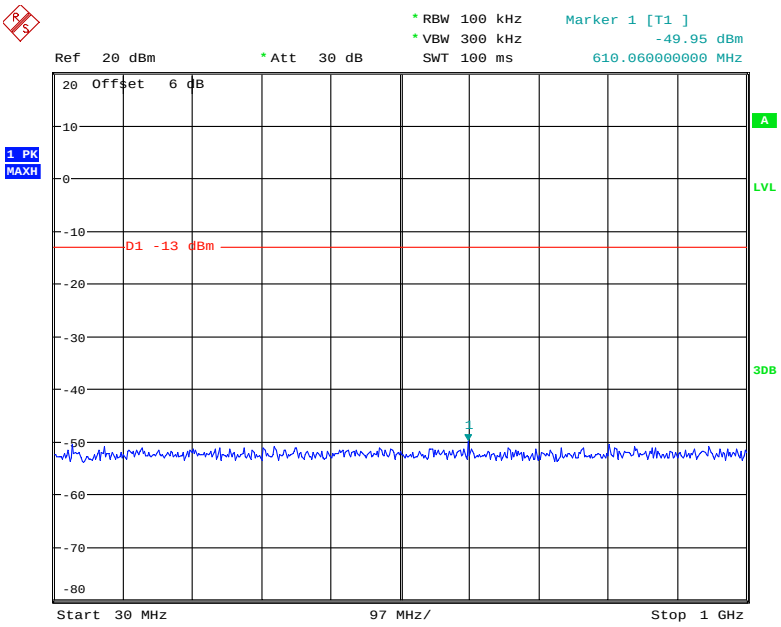
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test

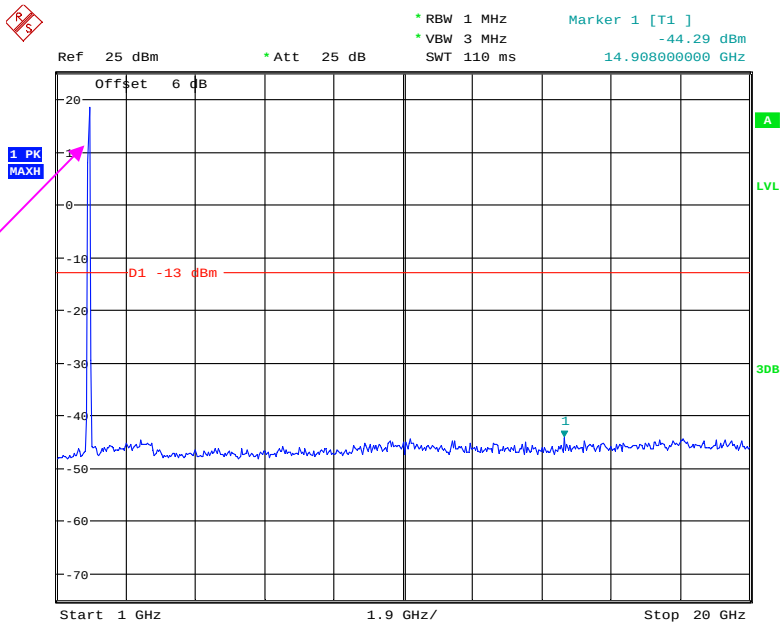
Date: 6.SEP.2019 22:26:09

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



Date: 6.SEP.2019 22:26:28

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

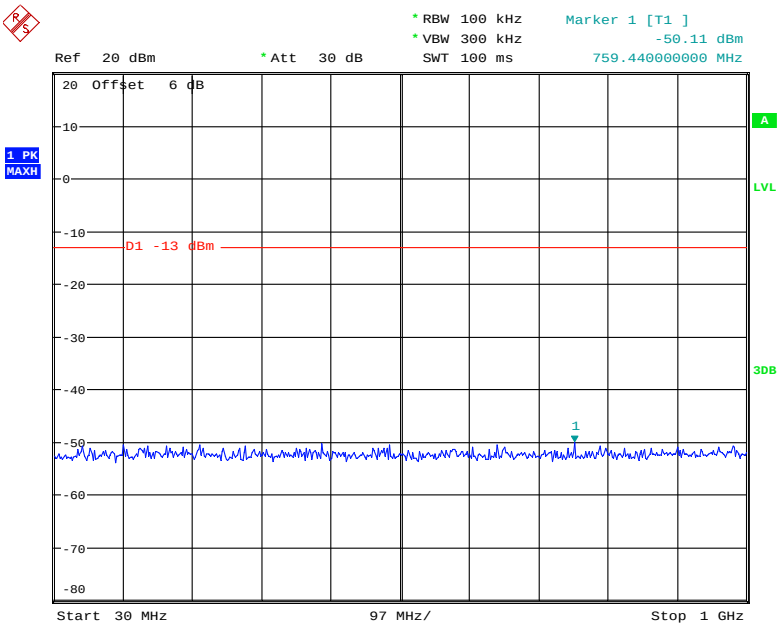


Fundamental test

Date: 6.SEP.2019 22:26:37

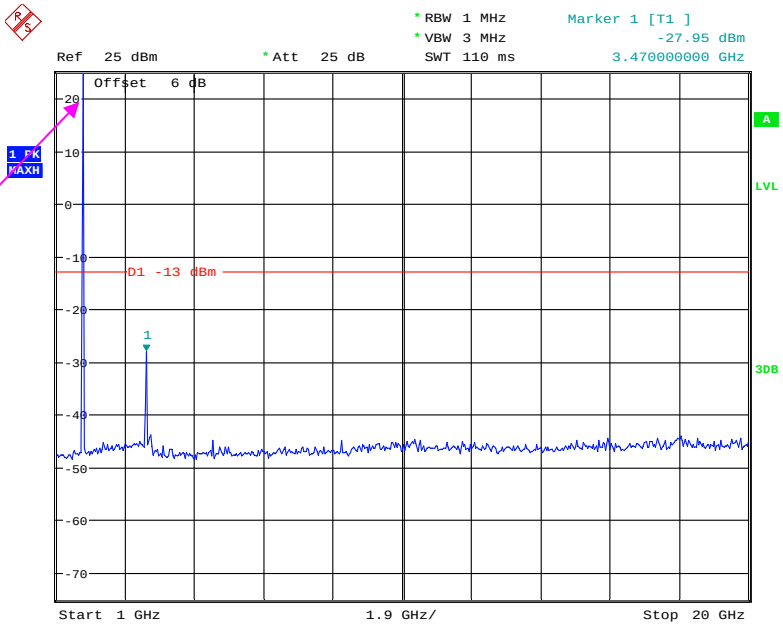
LTE Band 4:

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



Date: 6.SEP.2019 22:26:53

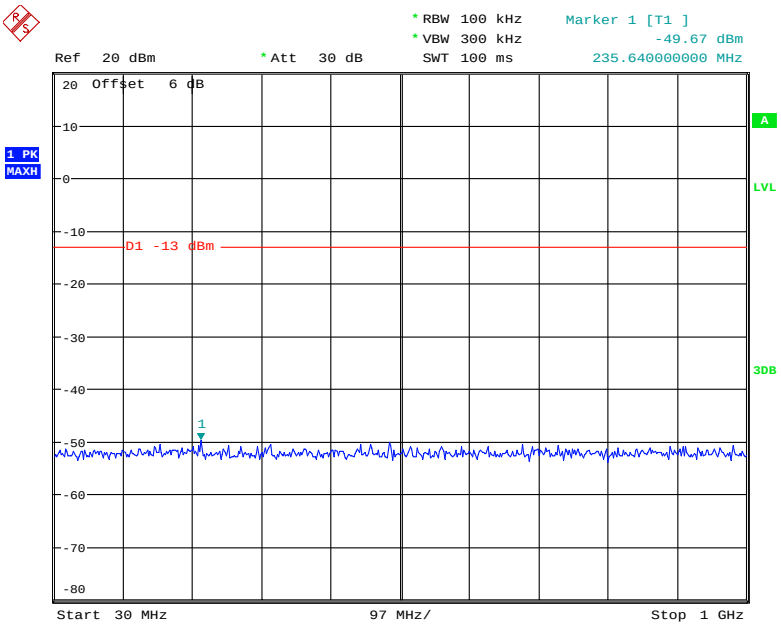
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test

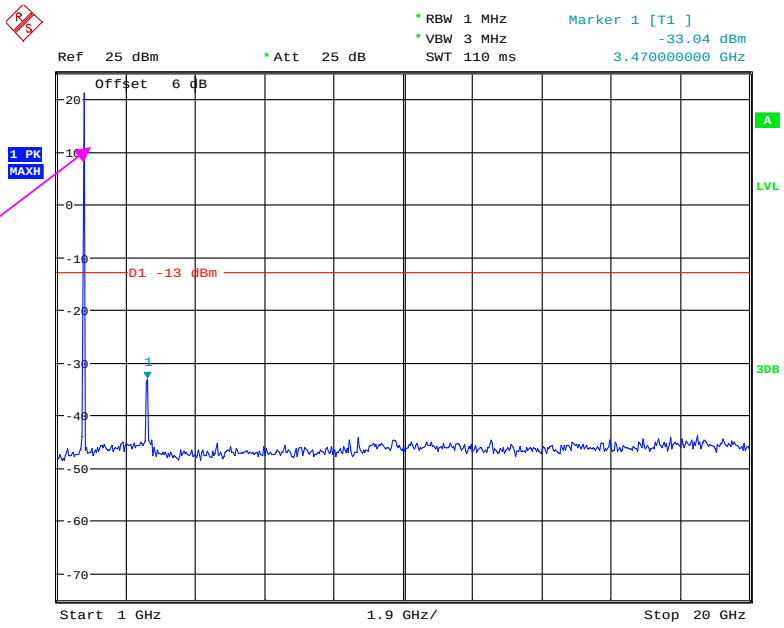
Date: 6.SEP.2019 22:27:02

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



Date: 6.SEP.2019 22:27:20

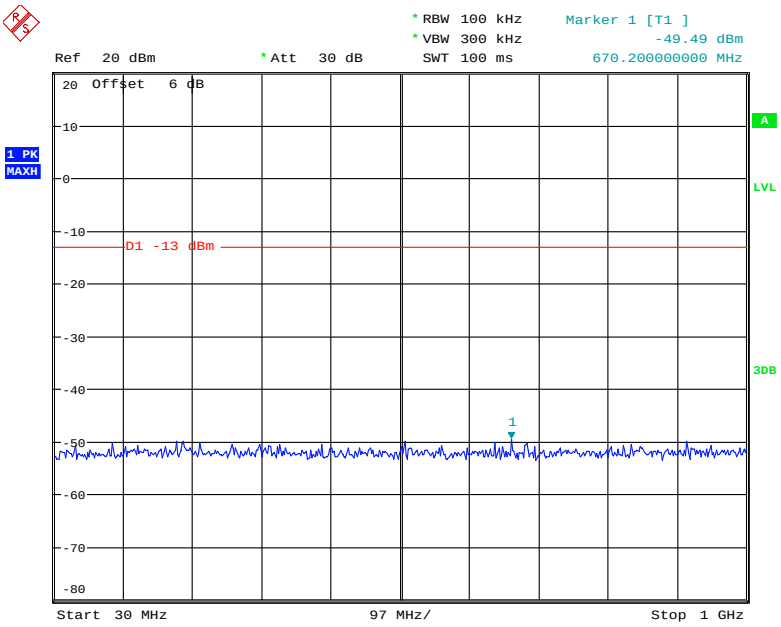
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test

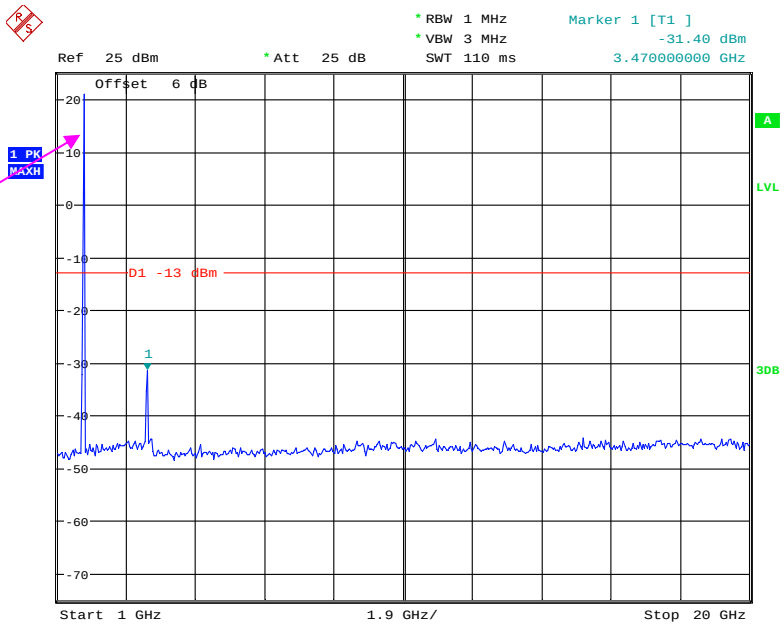
Date: 6.SEP.2019 22:27:29

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



Date: 6.SEP.2019 22:27:48

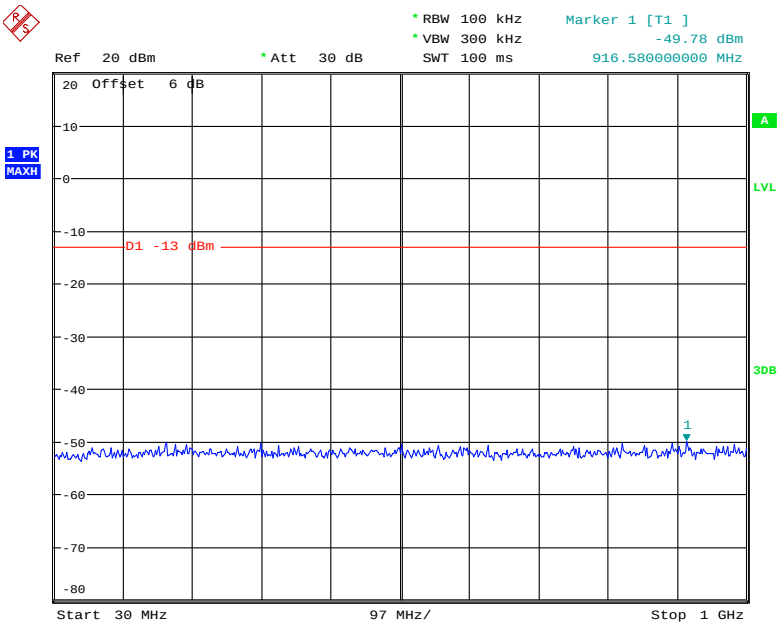
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test

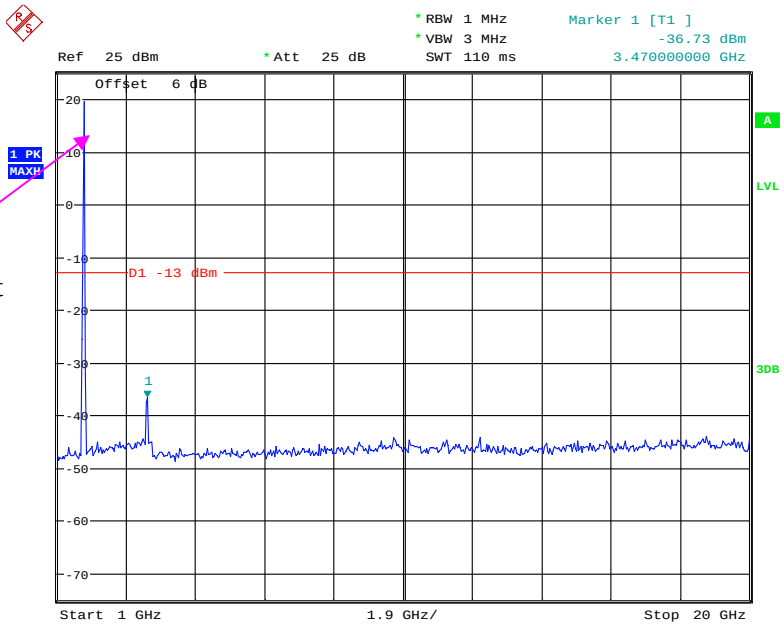
Date: 6.SEP.2019 22:28:00

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



Date: 6.SEP.2019 22:28:19

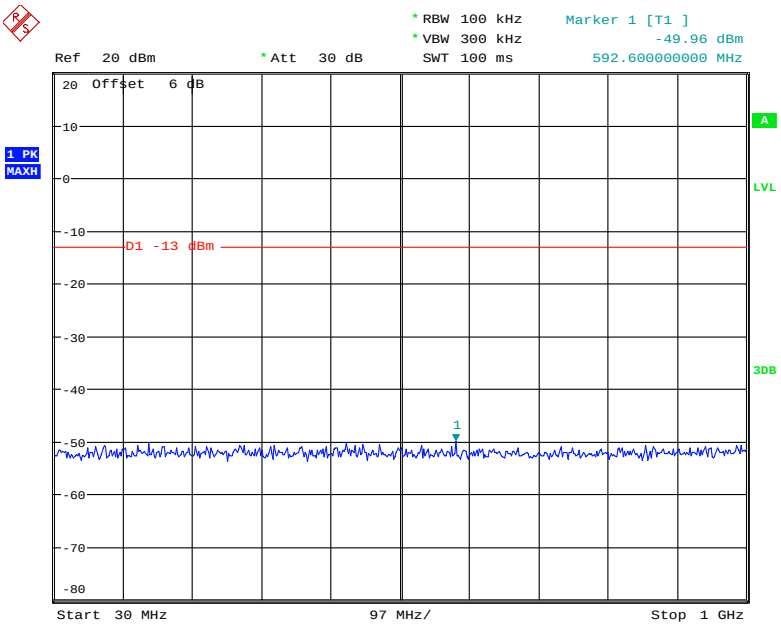
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test

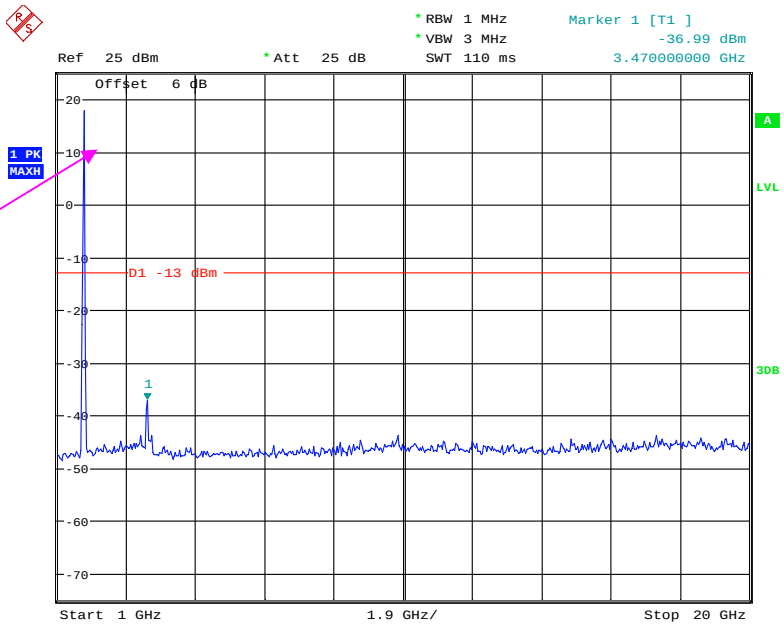
Date: 6.SEP.2019 22:28:28

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



Date: 6.SEP.2019 22:28:50

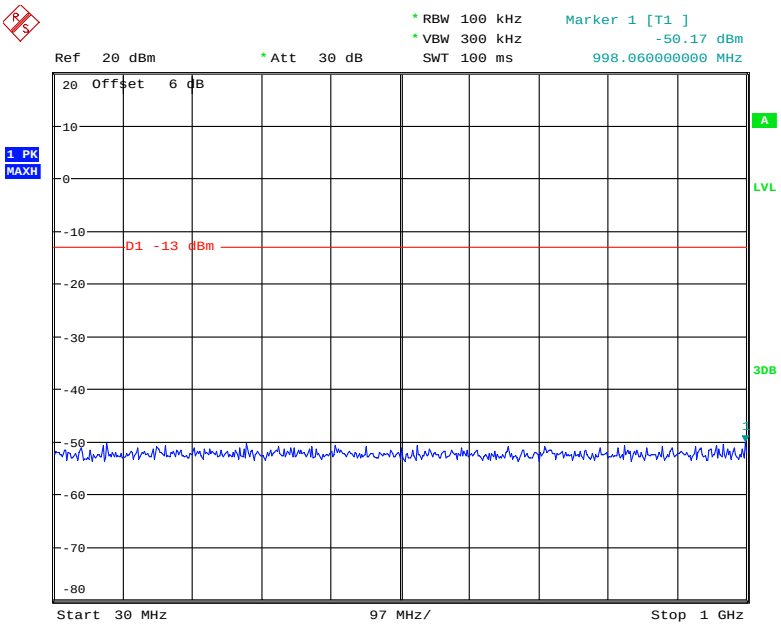
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test

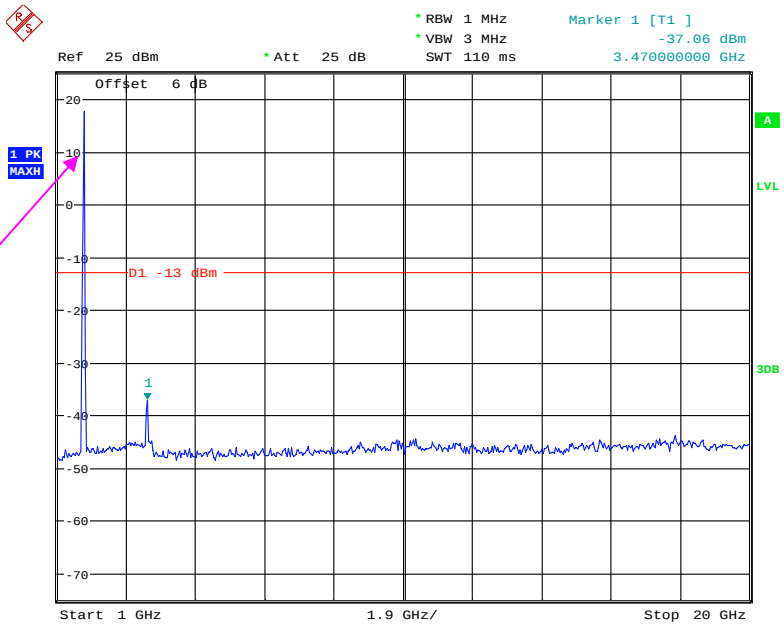
Date: 6.SEP.2019 22:28:59

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



Date: 6.SEP.2019 22:29:18

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

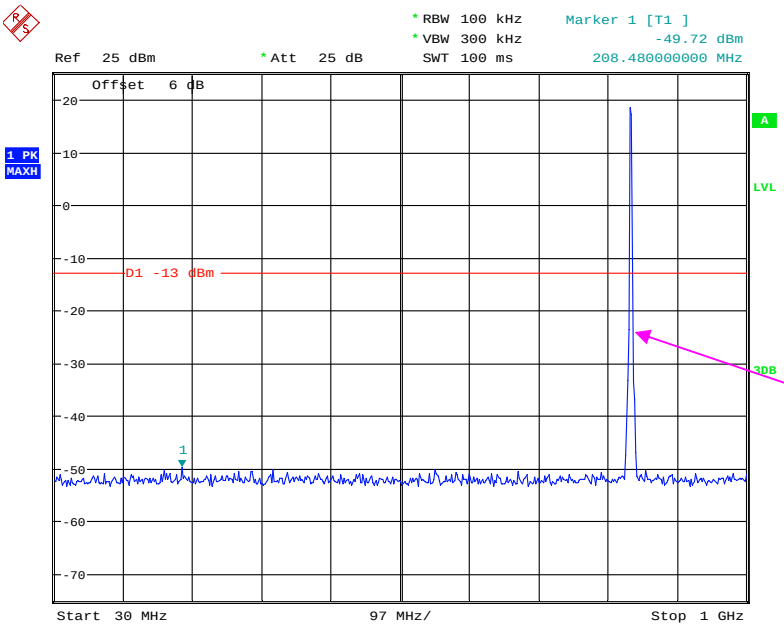


Fundamental test

Date: 6.SEP.2019 22:29:27

LTE Band 5:

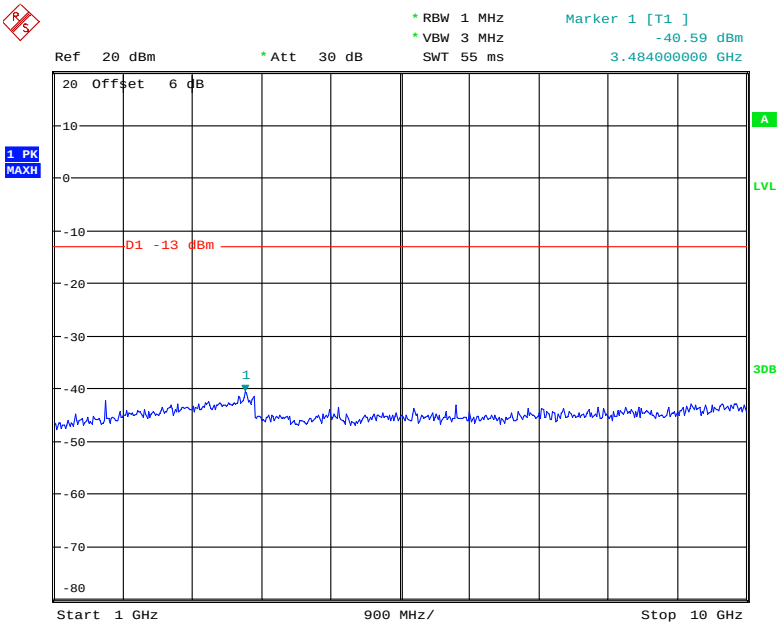
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



Fundamental test

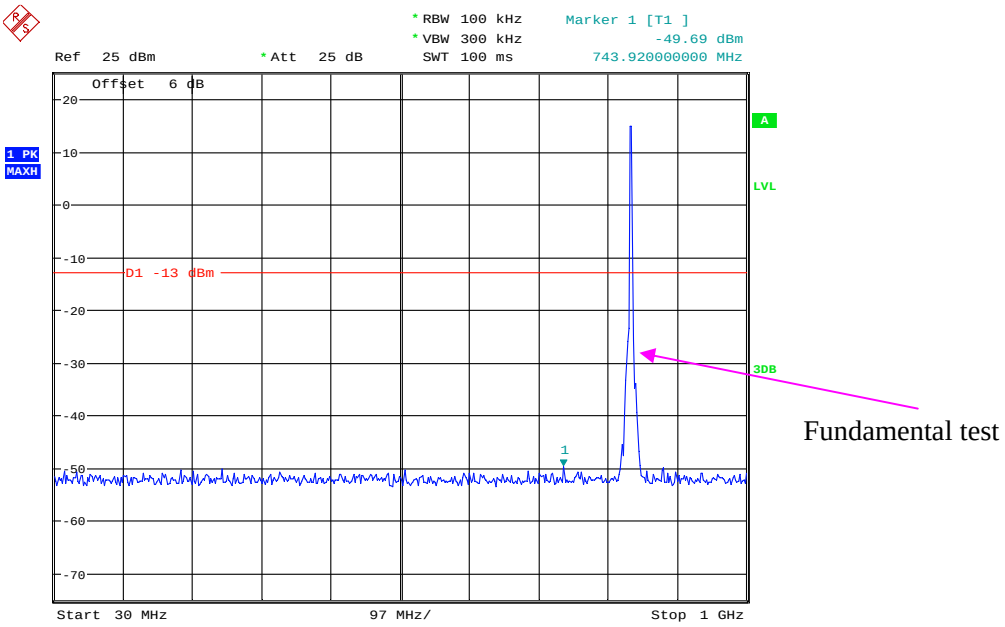
Date: 6.SEP.2019 22:29:42

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



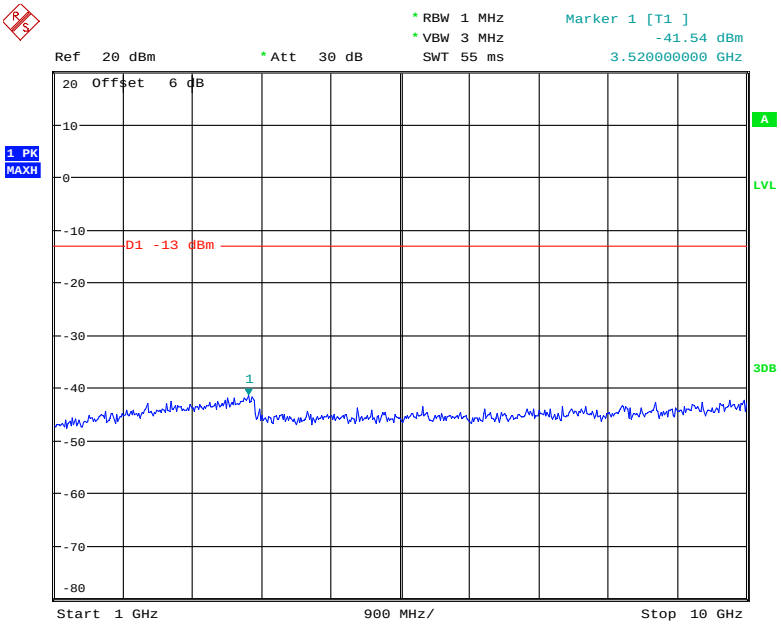
Date: 6.SEP.2019 22:29:51

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



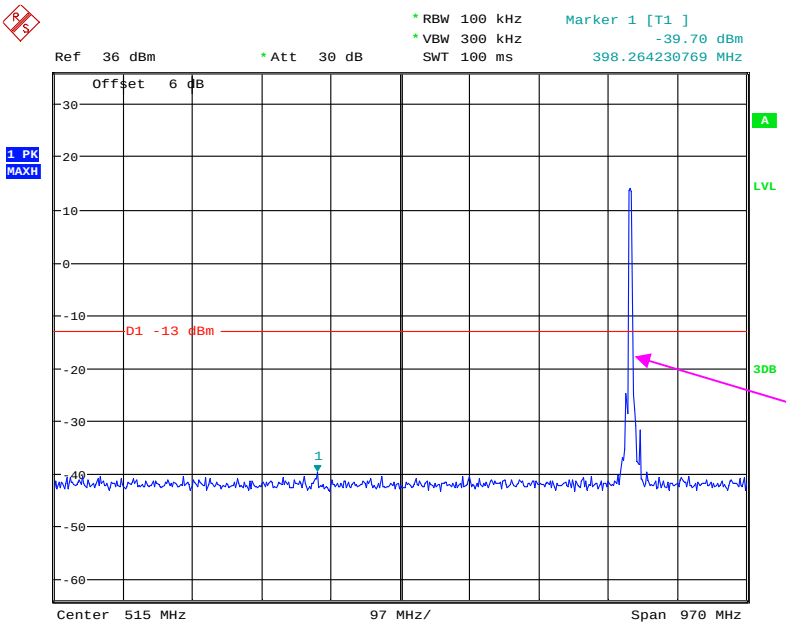
Date: 6.SEP.2019 22:30:07

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



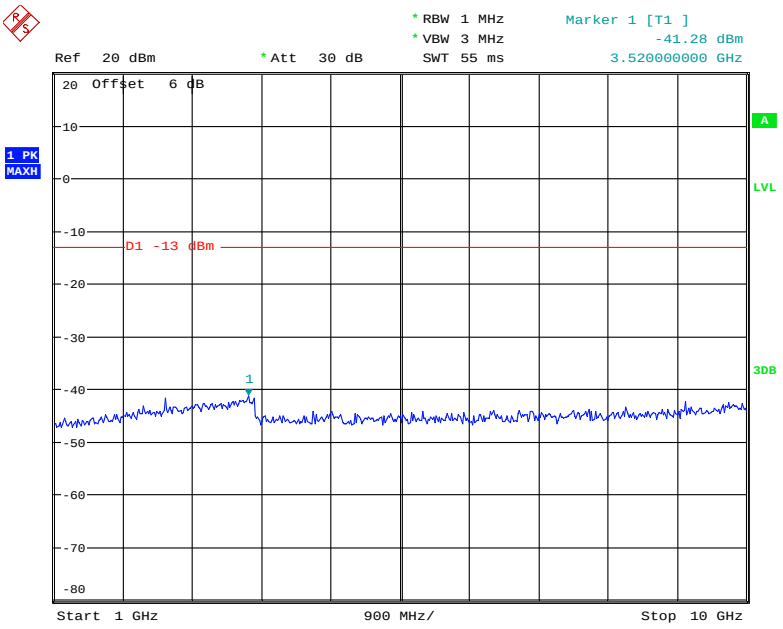
Date: 6.SEP.2019 22:30:16

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



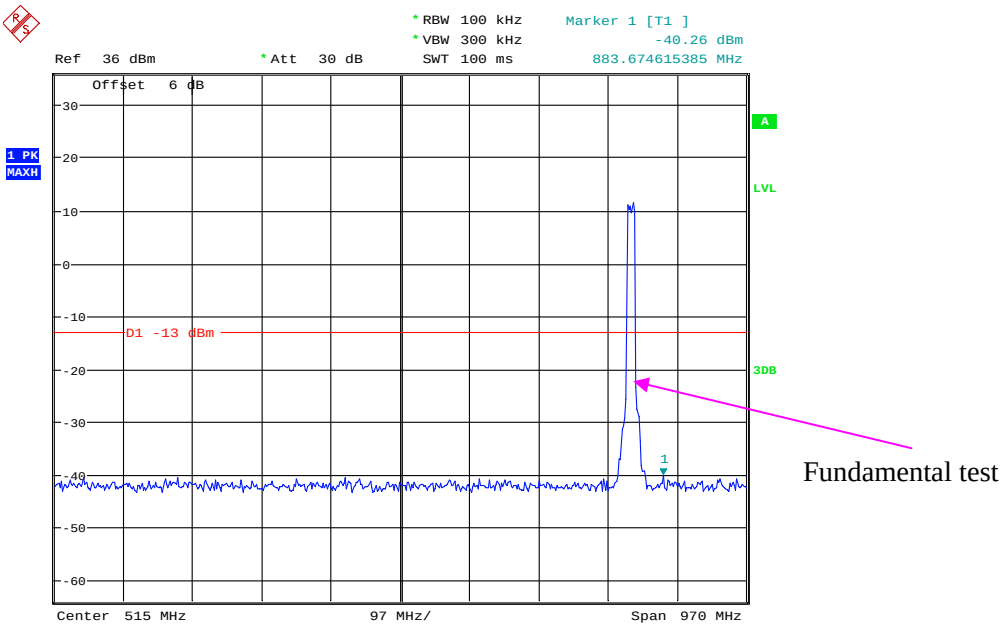
Date: 17.SEP.2019 00:07:25

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



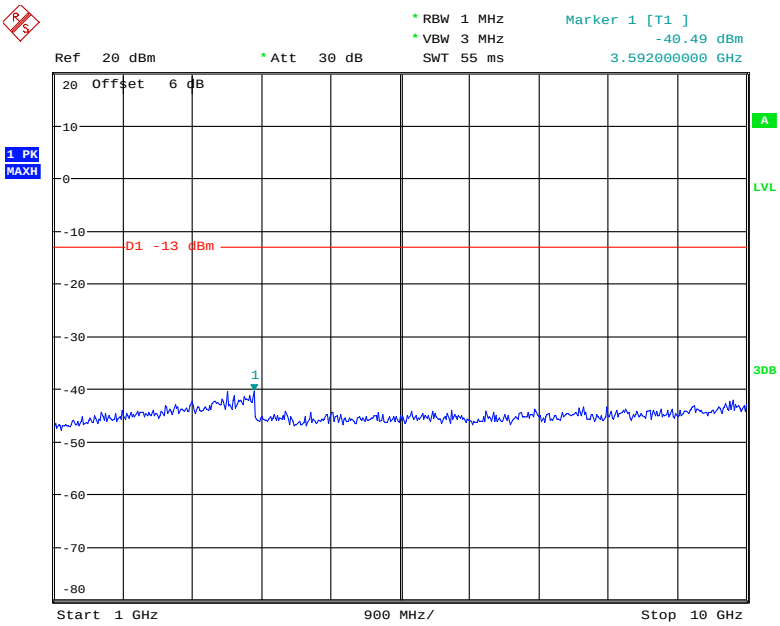
Date: 6.SEP.2019 22:30:40

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



Date: 17.SEP.2019 00:06:23

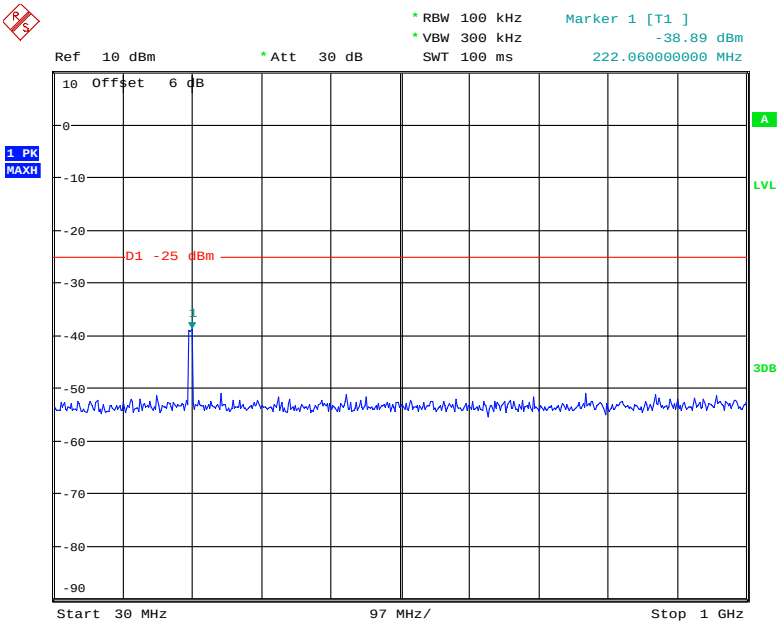
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 6.SEP.2019 22:31:09

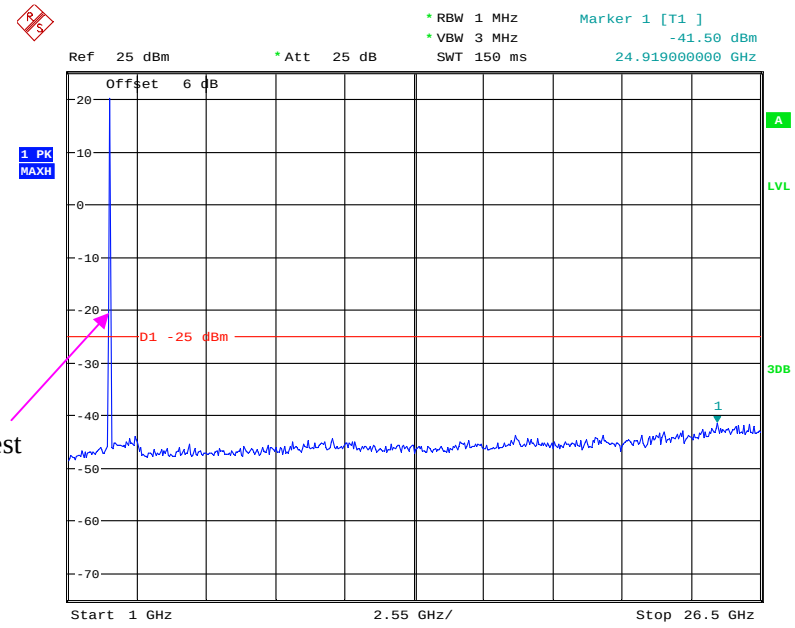
LTE Band 7:

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



Date: 6.SEP.2019 22:31:24

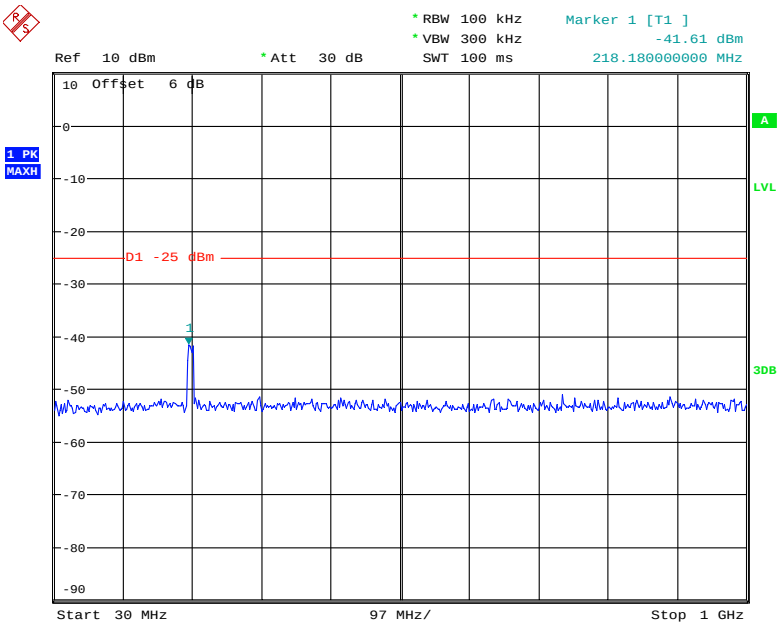
1 GHz – 26.5 GHz (5.0 MHz, Middle Channel)



Fundamental test

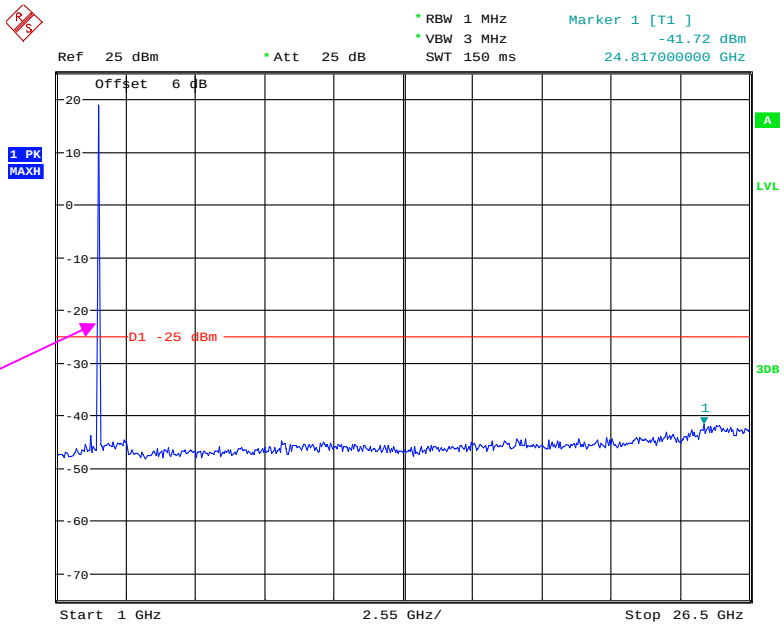
Date: 6.SEP.2019 22:31:33

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



Date: 6.SEP.2019 22:31:53

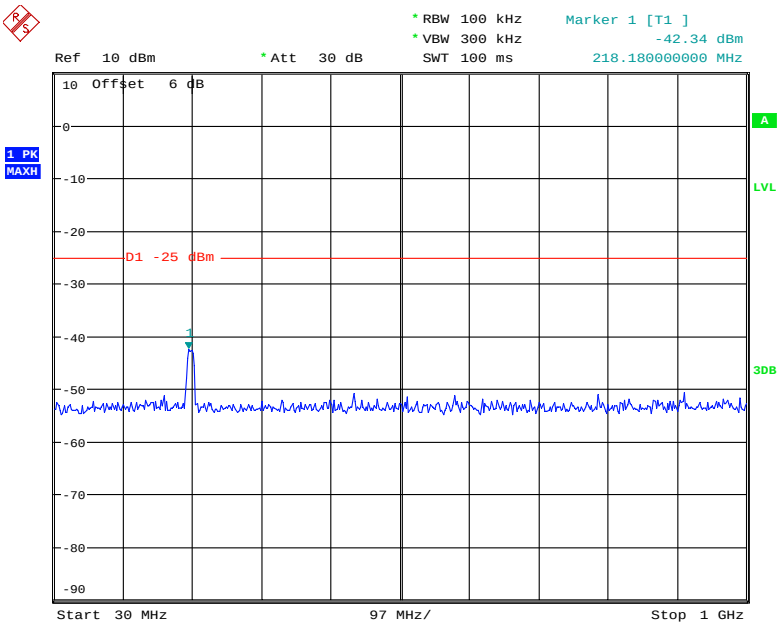
1 GHz – 26.5 GHz (10.0 MHz, Middle Channel)



Fundamental test

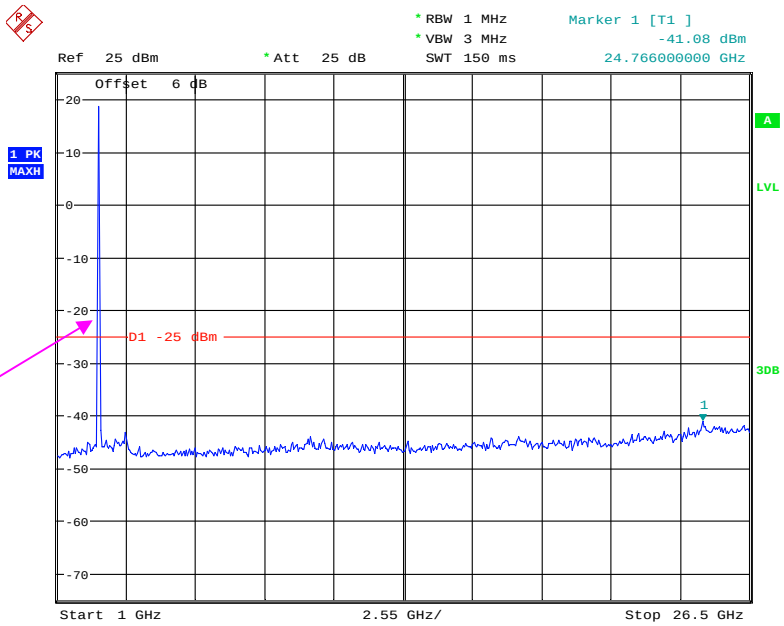
Date: 6.SEP.2019 22:32:02

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



Date: 6.SEP.2019 22:32:21

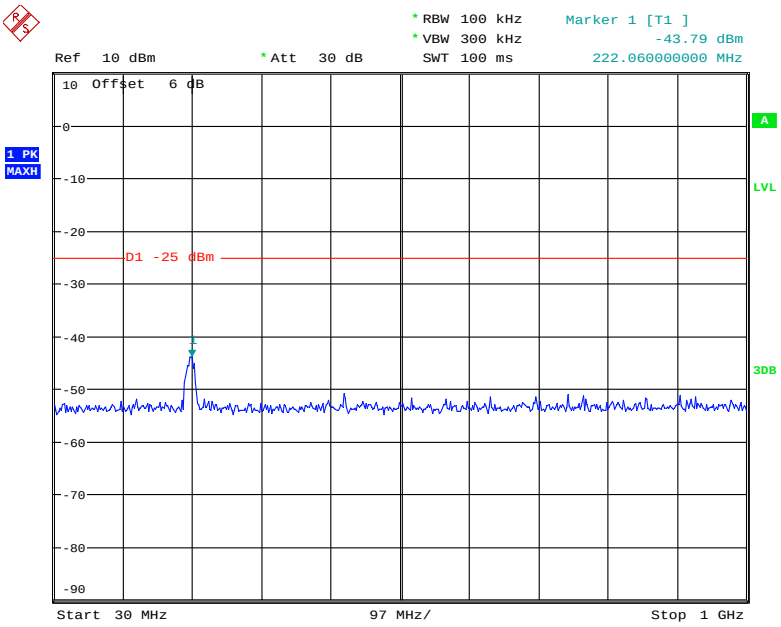
1 GHz – 26.5 GHz (15.0 MHz, Middle Channel)



Fundamental test

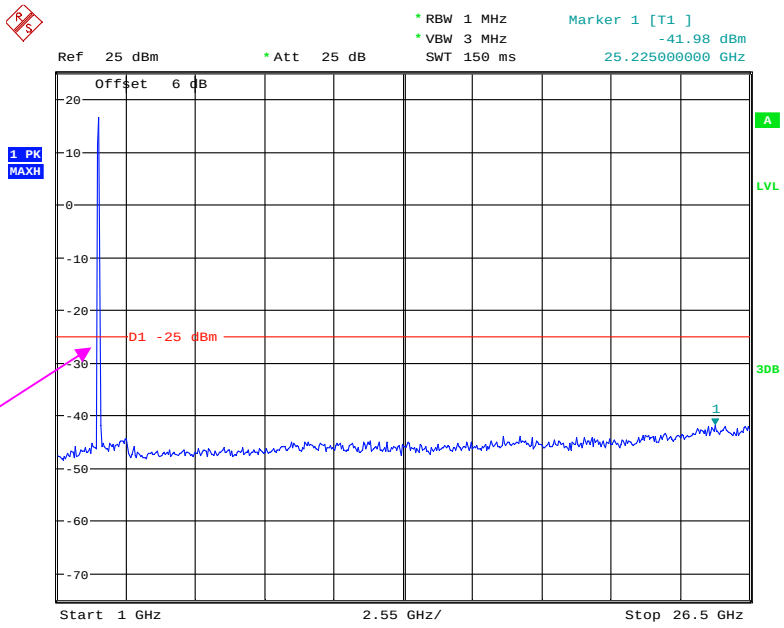
Date: 6.SEP.2019 22:32:33

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



Date: 6.SEP.2019 22:32:52

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



Fundamental test

Date: 6.SEP.2019 22:33:01

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

Applicable Standard

FCC § 2.1053, §22.917(a) and § 24.238(a) and § 27.53

Test Procedure

The transmitter was placed on a wooden turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the receiving antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Alan He on 2019-09-07.

EUT operation mode: Transmitting

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
967.58	36.57	92	1.2	H	-60.4	0.74	0	-61.14	-13	48.14
967.58	34.25	165	2.0	V	-62.8	0.74	0	-63.54	-13	50.54
1673.20	47.55	216	1.6	H	-58.8	1.30	8.90	-51.20	-13	38.20
1673.20	46.35	206	1.3	V	-59.4	1.30	8.90	-51.80	-13	38.80
2509.80	49.68	193	1.3	H	-53.7	2.60	10.20	-46.10	-13	33.10
2509.80	47.39	299	1.3	V	-55.4	2.60	10.20	-47.80	-13	34.80
WCDMA Mode, Middle channel										
967.58	36.57	22	1.9	H	-60.4	0.74	0	-61.14	-13	48.14
967.58	33.65	70	1.9	V	-63.4	0.74	0	-64.14	-13	51.14
2509.80	50.55	164	1.8	H	-52.8	2.60	10.20	-45.20	-13	32.20
2509.80	48.43	328	2.2	V	-54.3	2.60	10.20	-46.70	-13	33.70

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
967.58	36.17	81	1.9	H	-60.8	0.74	0	-61.54	-13	48.54
967.58	34.07	344	1.3	V	-62.9	0.74	0	-63.64	-13	50.64
3760.00	43.95	116	1.9	H	-58.1	1.50	11.80	-47.80	-13	34.80
3760.00	43.89	123	1.7	V	-57.7	1.50	11.80	-47.40	-13	34.40
WCDMA Mode Band II, Middle channel										
967.58	36.78	198	1.6	H	-60.2	0.74	0	-60.94	-13	47.94
967.58	33.26	66	1.7	V	-63.7	0.74	0	-64.44	-13	51.44
3760.00	44.11	53	1.2	H	-57.9	1.50	11.80	-47.60	-13	34.60
3760.00	43.93	218	1.2	V	-57.7	1.50	11.80	-47.40	-13	34.40

30 MHz ~ 20 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
967.58	36.72	4	1.8	H	-60.3	0.74	0	-61.04	-13	48.04
967.58	32.57	25	2.5	V	-64.4	0.74	0	-65.14	-13	52.14
3465.20	42.54	305	1.7	H	-58.2	1.50	12.00	-47.70	-13	34.70
3465.20	40.26	17	1.9	V	-61.2	1.50	12.00	-50.70	-13	37.70

LTE Band: *(Pre-scan with all the bandwidth, and worse case as below)*

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 2 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
967.58	36.32	279	1.2	H	-60.7	0.74	0	-61.44	-13	48.44
967.58	33.13	92	1.9	V	-63.9	0.74	0	-64.64	-13	51.64
3760.00	46.13	165	2.2	H	-55.9	1.50	11.80	-45.60	-13	32.60
3760.00	45.52	158	1.1	V	-56.1	1.50	11.80	-45.80	-13	32.80
5640.00	44.54	85	2.3	H	-55.1	1.70	12.40	-44.40	-13	31.40
5640.00	44.13	314	1.4	V	-55.2	1.70	12.40	-44.50	-13	31.50
Band 4 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
967.58	36.84	81	1.3	H	-60.2	0.74	0	-60.94	-13	47.94
967.58	33.06	257	1.1	V	-63.9	0.74	0	-64.64	-13	51.64
3465.00	45.30	246	1.5	H	-55.4	1.50	12.00	-44.90	-13	31.90
3465.00	44.82	145	2.4	V	-56.7	1.50	12.00	-46.20	-13	33.20
5197.50	46.32	260	2.0	H	-53.8	1.60	12.10	-43.30	-13	30.30
5197.50	45.25	104	1.2	V	-54.4	1.60	12.10	-43.90	-13	30.90
8662.50	45.10	307	1.1	H	-52.9	2.10	11.40	-43.60	-13	30.60
8662.50	44.15	274	1.9	V	-53.9	2.10	11.40	-44.60	-13	31.60
Band 5 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 10 GHz										
967.58	36.73	109	1.4	H	-60.3	0.74	0	-61.04	-13	48.04
967.58	32.57	75	2.3	V	-64.4	0.74	0	-65.14	-13	52.14
1673.00	45.17	181	1.6	H	-61.2	1.30	8.90	-53.60	-13	40.60
1673.00	44.26	352	1.1	V	-61.5	1.30	8.90	-53.90	-13	40.90
2509.50	46.06	184	2.3	H	-57.3	2.60	10.20	-49.70	-13	36.70
2509.50	45.12	2	2.2	V	-57.6	2.60	10.20	-50.00	-13	37.00
Band 7 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
967.58	36.32	16	2.3	H	-60.7	0.74	0	-61.44	-25	36.44
967.58	32.15	151	1.5	V	-64.9	0.74	0	-65.64	-25	40.64
5070.00	45.29	347	1.1	H	-54.7	1.60	12.10	-44.20	-25	19.20
5070.00	44.89	352	1.8	V	-55.1	1.60	12.10	-44.60	-25	19.60
7605.00	49.87	224	2.1	H	-47.6	2.10	10.50	-39.20	-25	14.20
7605.00	47.52	171	2.2	V	-49.8	2.10	10.50	-41.40	-25	16.40
10140.00	44.83	304	1.9	H	-51.6	2.40	10.80	-43.20	-25	18.20
10140.00	44.06	164	1.7	V	-52.6	2.40	10.80	-44.20	-25	19.20
12675.00	44.07	206	1.1	H	-53.2	2.70	12.60	-43.30	-25	18.30
12675.00	43.45	144	1.3	V	-54.5	2.70	12.60	-44.60	-25	19.60

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

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

Applicable Standard

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

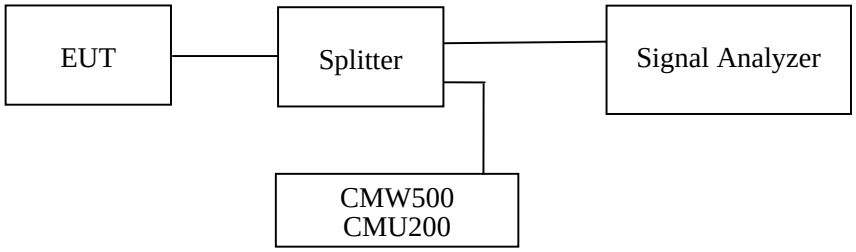
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

Test Procedure

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

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



Test Data

Environmental Conditions

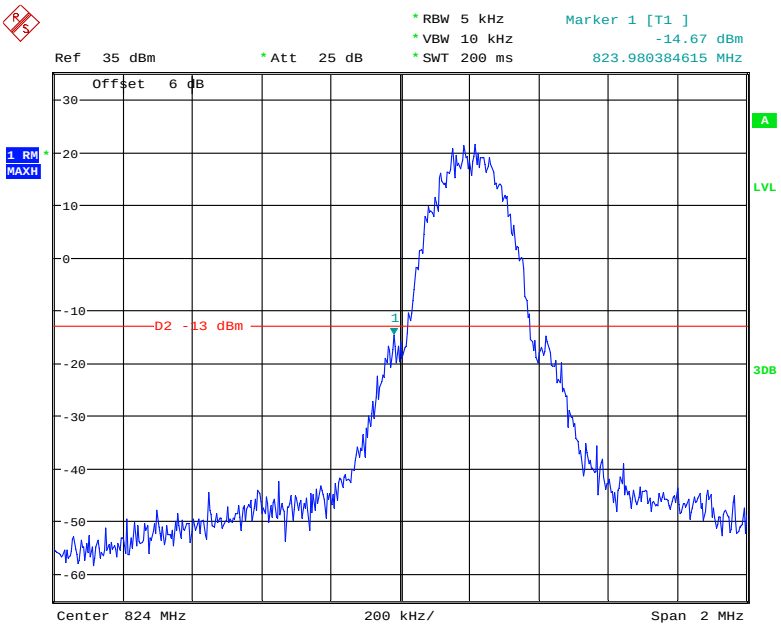
Temperature:	24~25 ℃
Relative Humidity:	50~52 %
ATM Pressure:	100.0~101.0 kPa

The testing was performed by Geroge Zhong from 2019-09-06 to 2019-09-07.

EUT operation mode: Transmitting

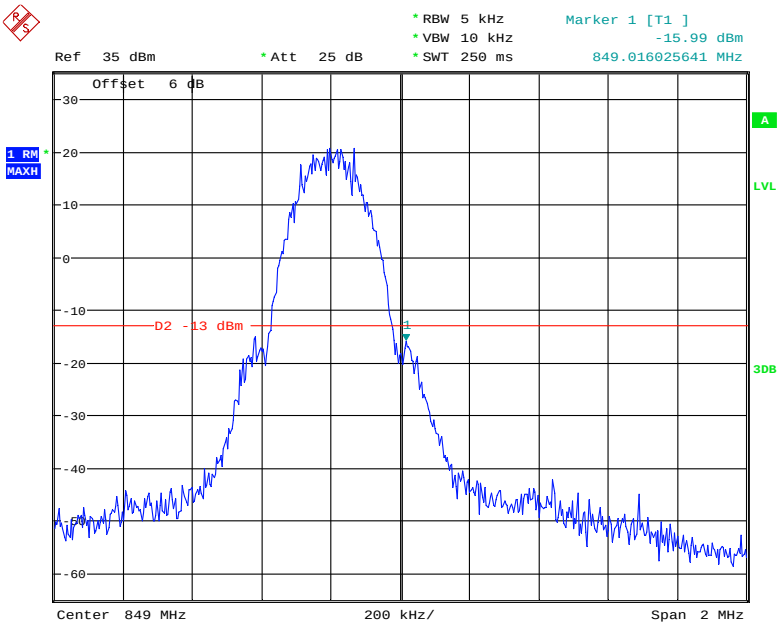
Test Result: Compliance. Please refer to the following plots.

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



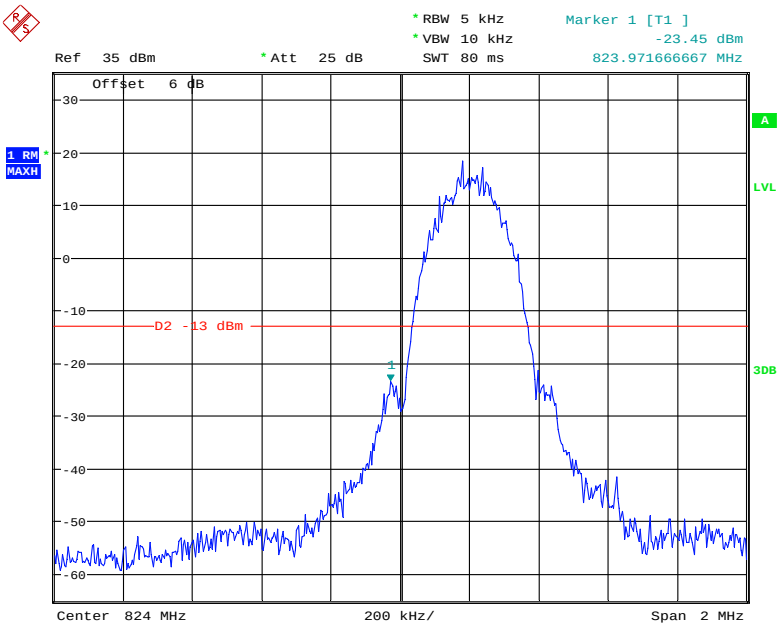
Date: 7.SEP.2019 15:33:12

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



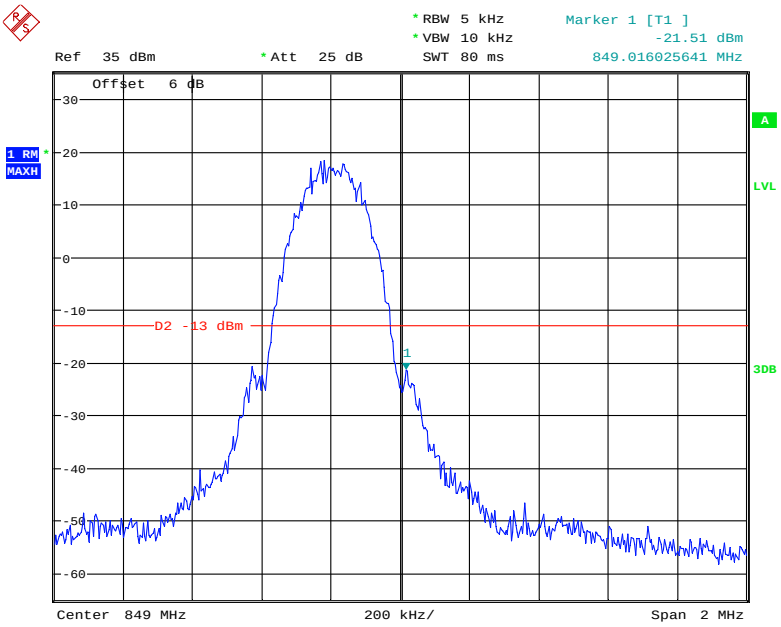
Date: 7.SEP.2019 15:34:46

Cellular Band, Left Band Edge for EDGE Mode



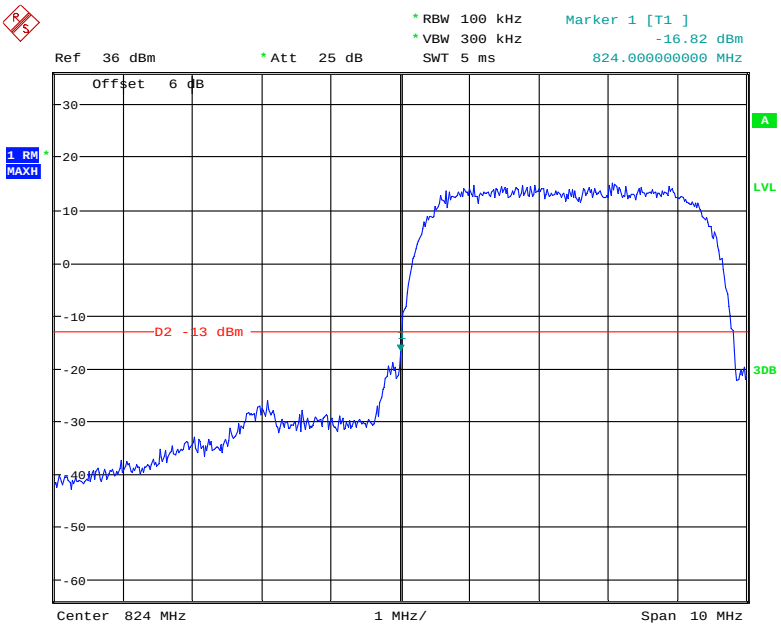
Date: 7.SEP.2019 16:01:53

Cellular Band, Right Band Edge for EDGE Mode



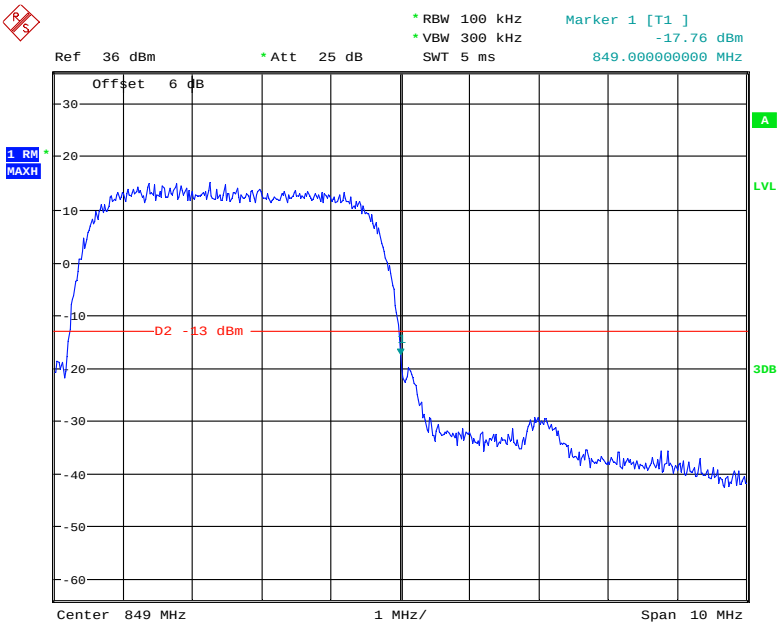
Date: 7.SEP.2019 16:03:14

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



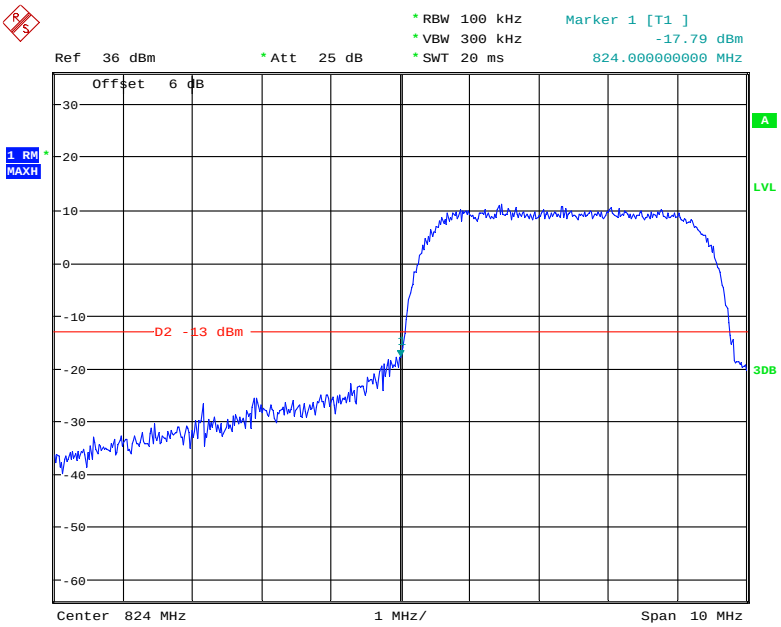
Date: 7.SEP.2019 17:20:07

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



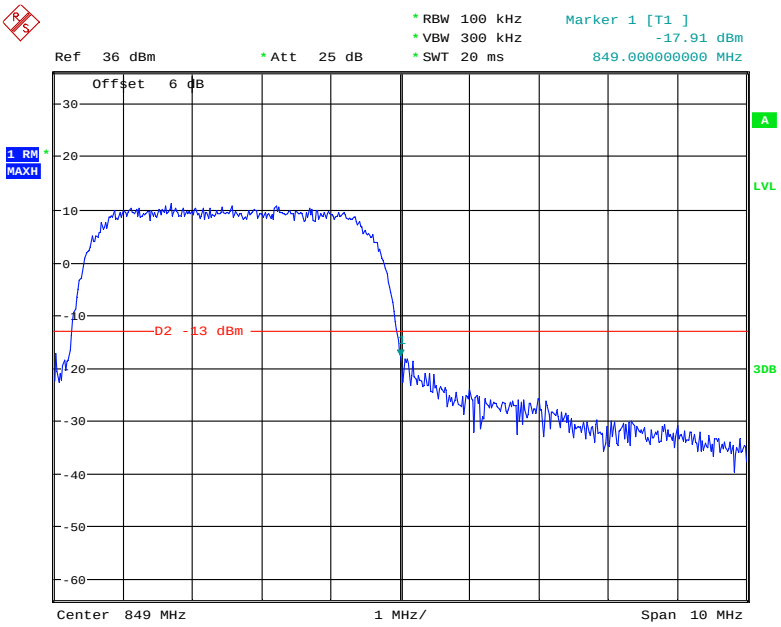
Date: 7.SEP.2019 17:20:57

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



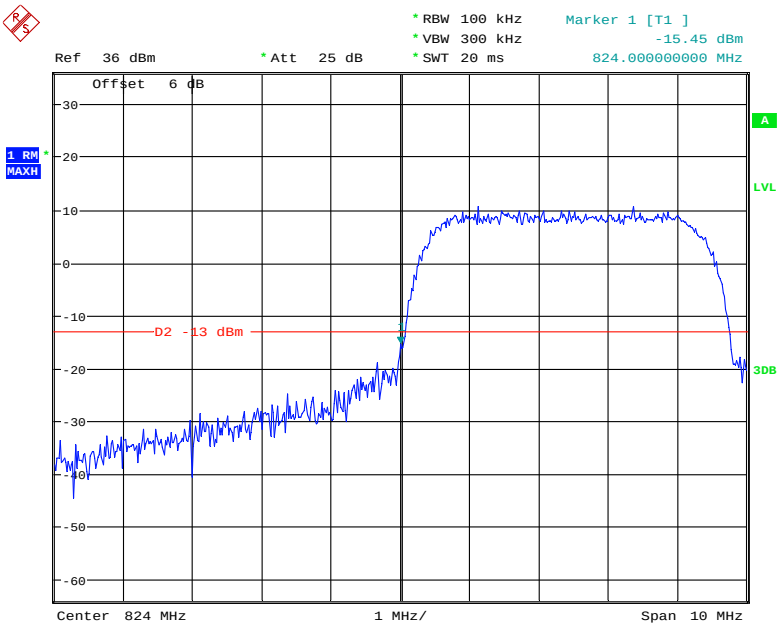
Date: 7.SEP.2019 17:54:58

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



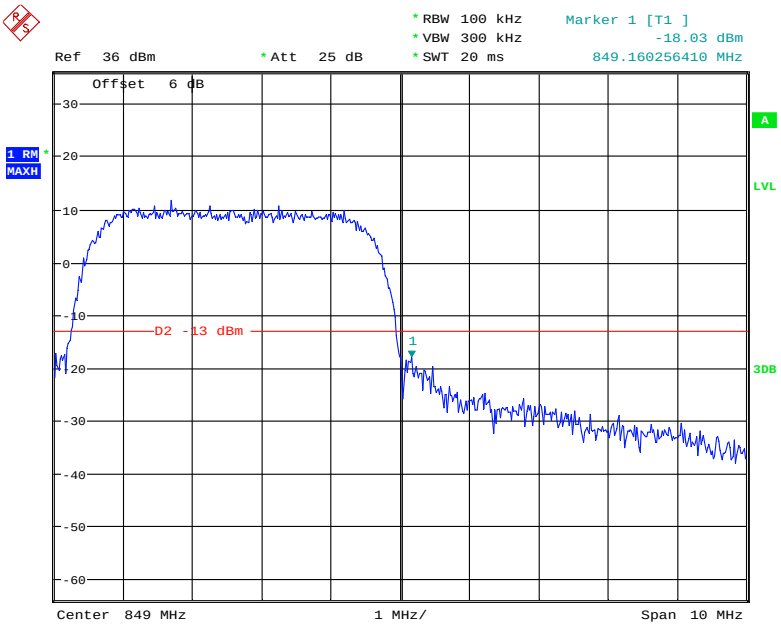
Date: 7.SEP.2019 17:54:15

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



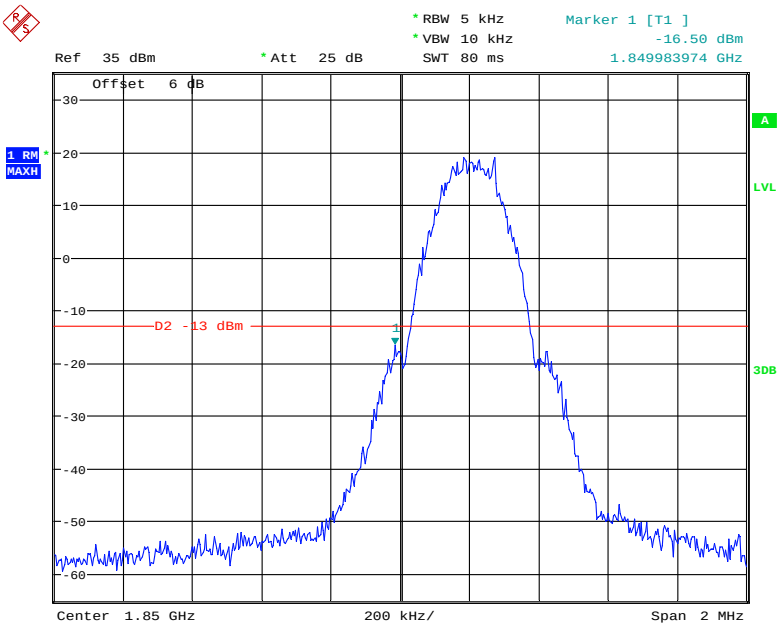
Date: 7.SEP.2019 17:47:55

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



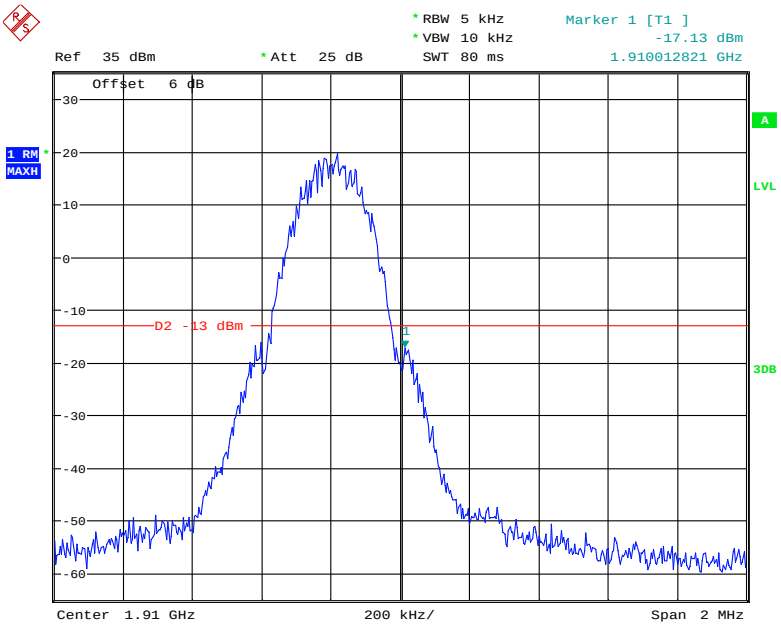
Date: 7.SEP.2019 17:48:39

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



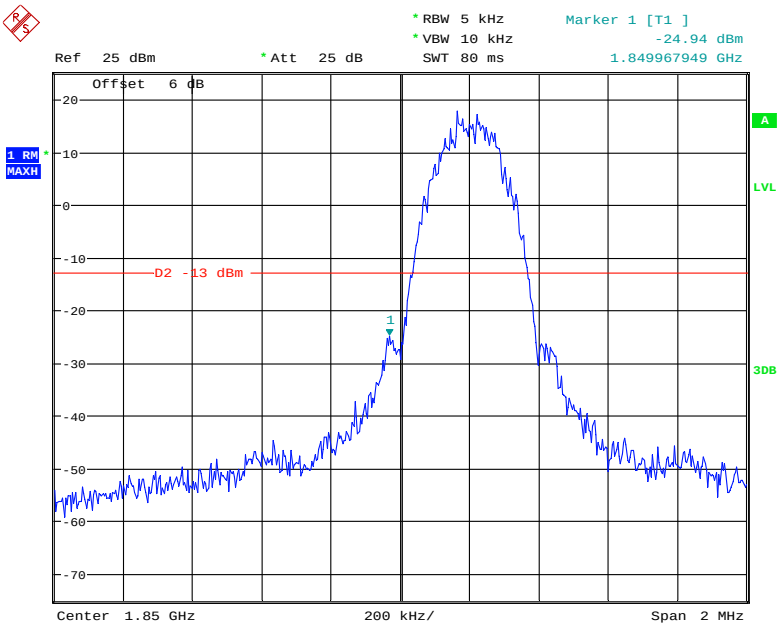
Date: 7.SEP.2019 16:16:39

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



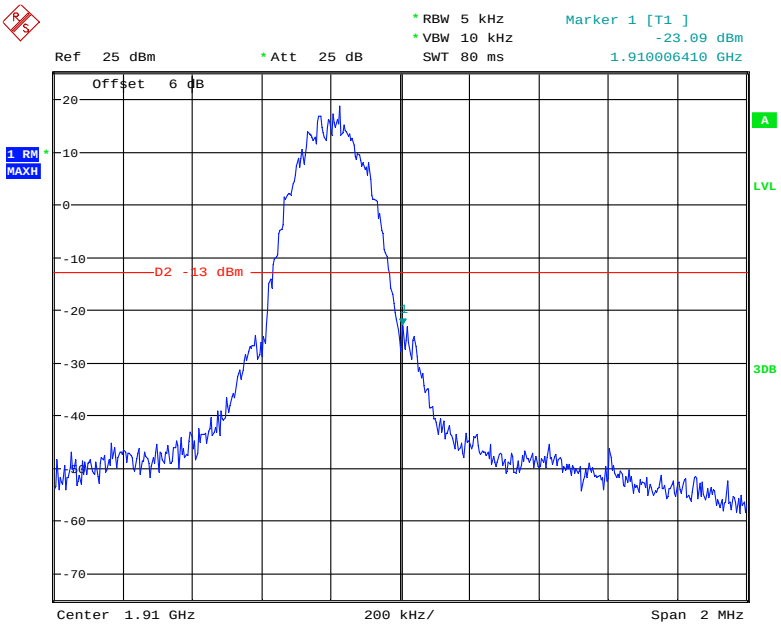
Date: 7.SEP.2019 16:17:32

PCS Band, Left Band Edge for EDGE Mode



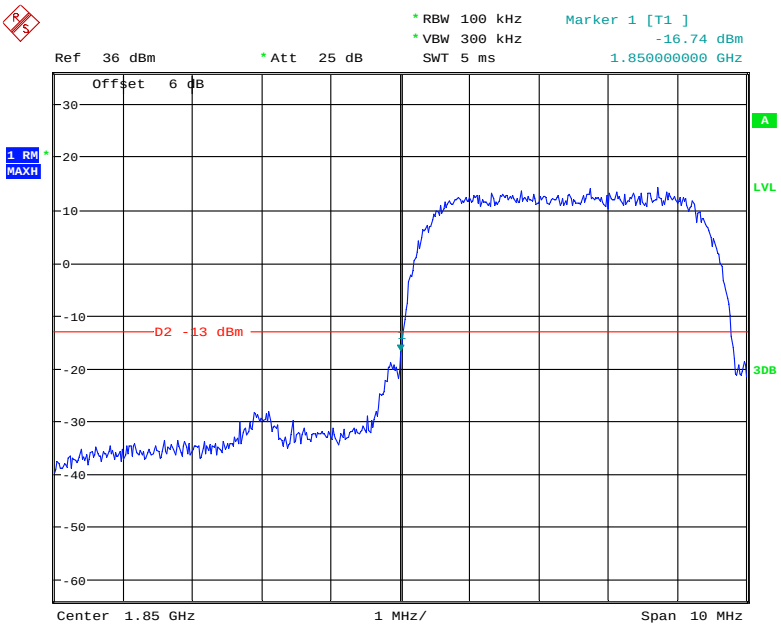
Date: 7.SEP.2019 16:39:15

PCS Band, Right Band Edge for EDGE Mode



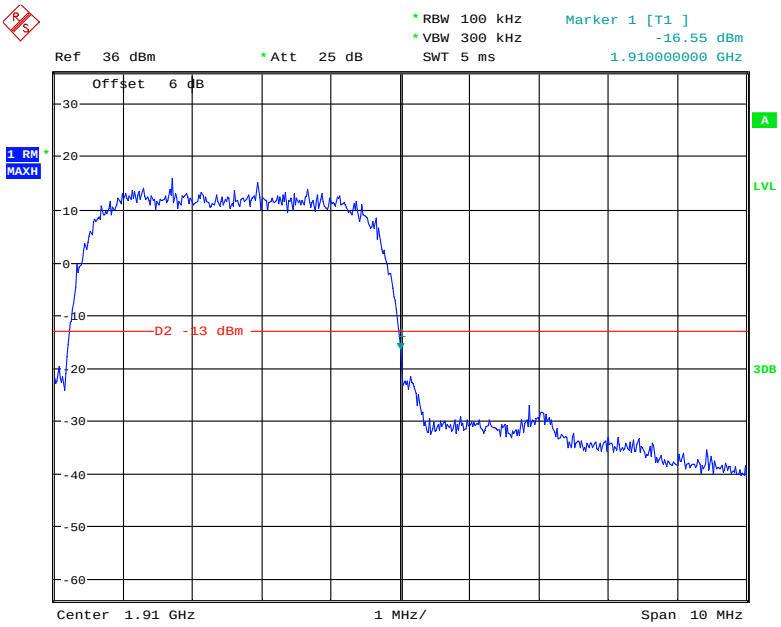
Date: 7.SEP.2019 16:40:07

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



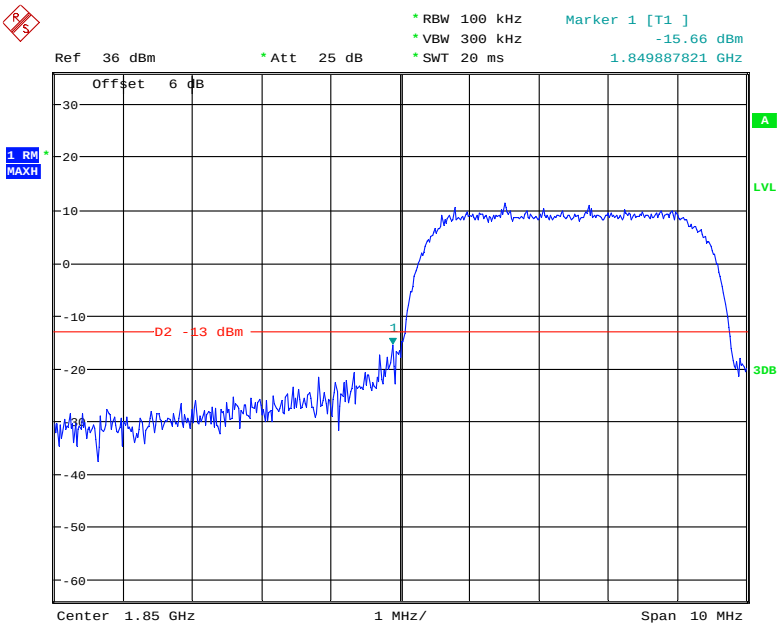
Date: 7.SEP.2019 17:23:10

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



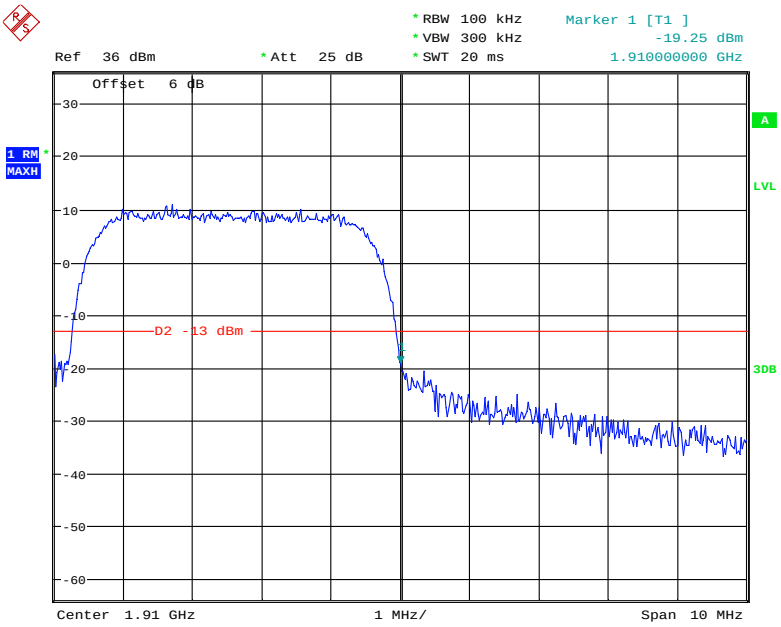
Date: 7.SEP.2019 17:23:44

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



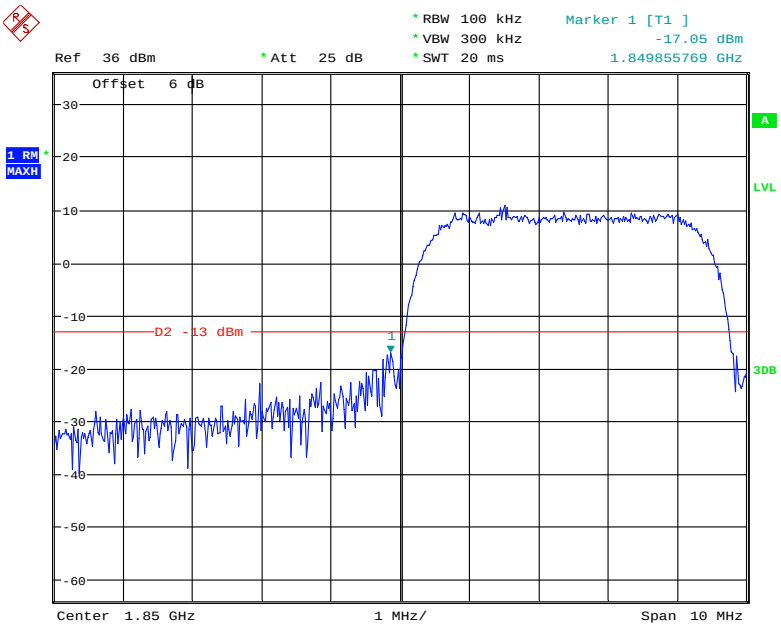
Date: 7.SEP.2019 17:52:30

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



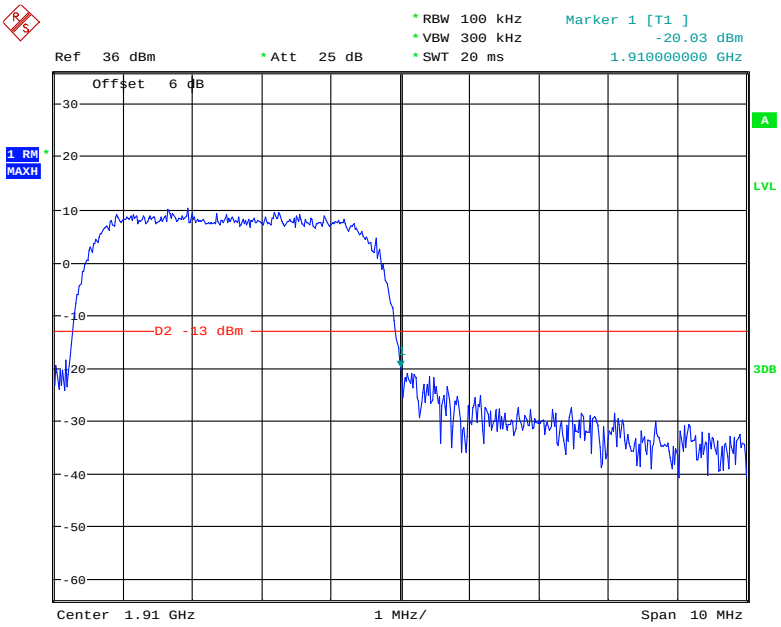
Date: 7.SEP.2019 17:51:41

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



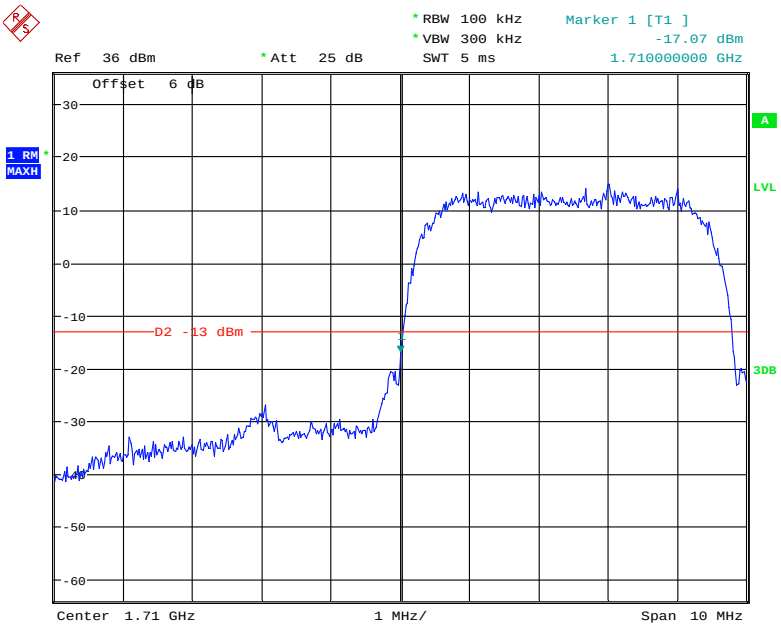
Date: 7.SEP.2019 17:49:27

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



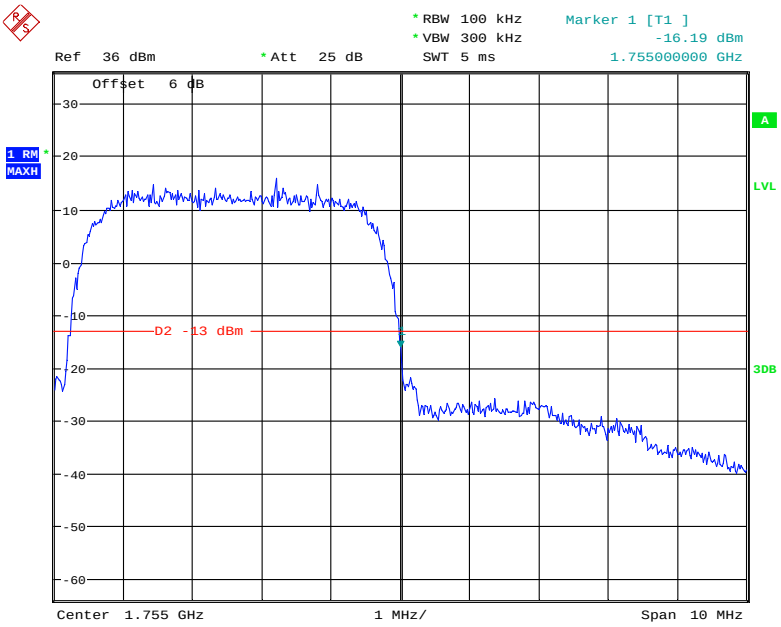
Date: 7.SEP.2019 17:49:59

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



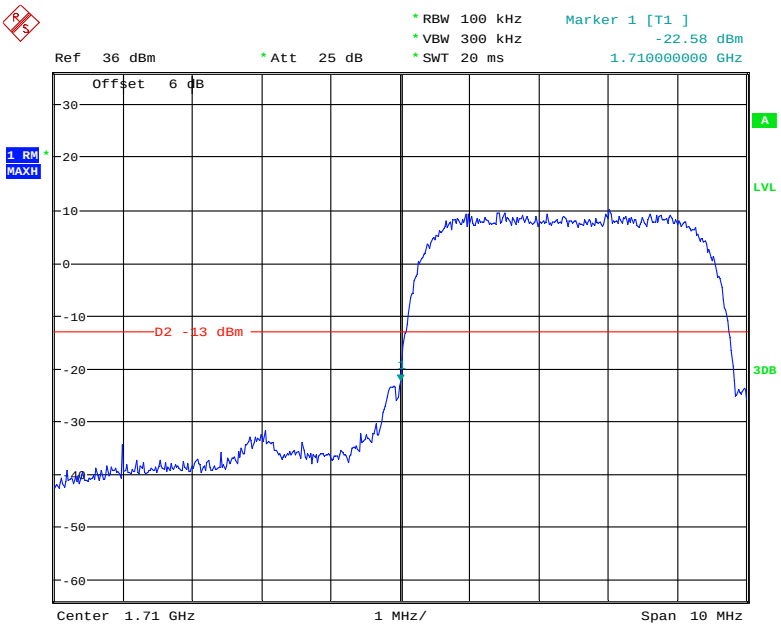
Date: 7.SEP.2019 17:21:52

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



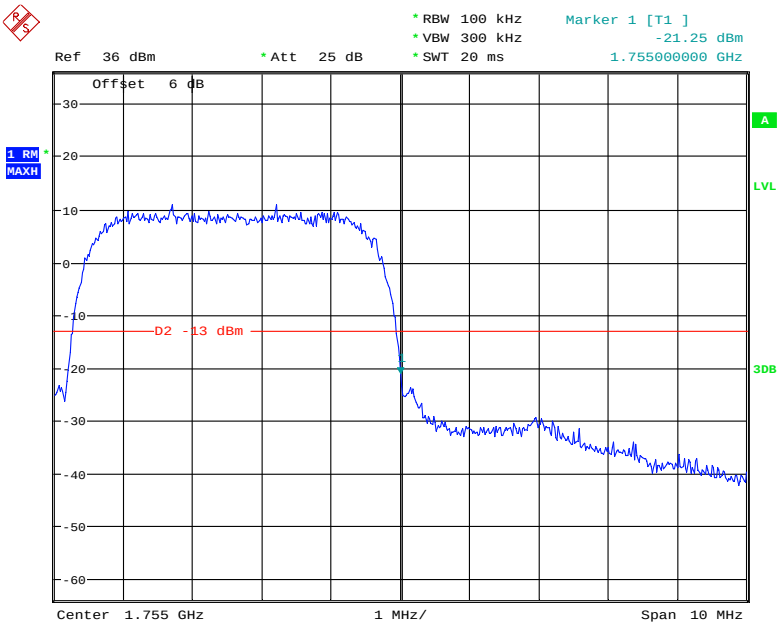
Date: 7.SEP.2019 17:22:26

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



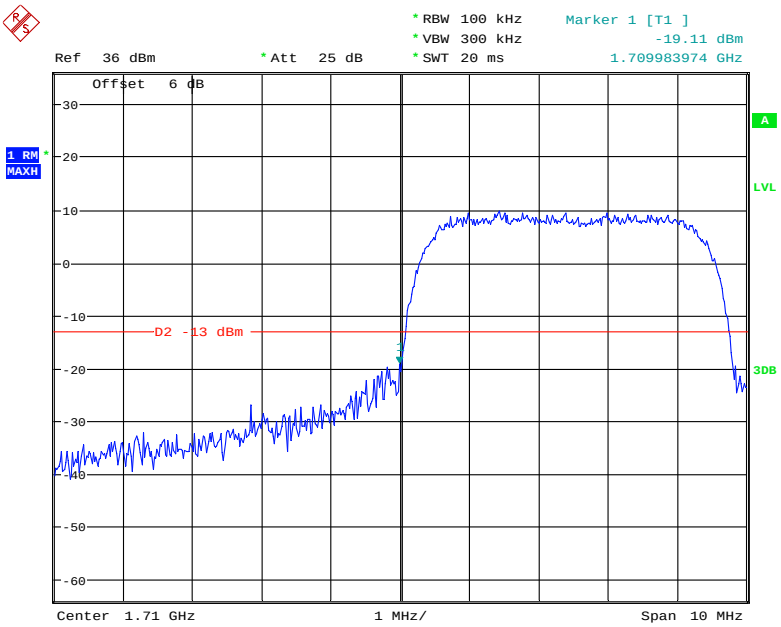
Date: 7.SEP.2019 17:53:33

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



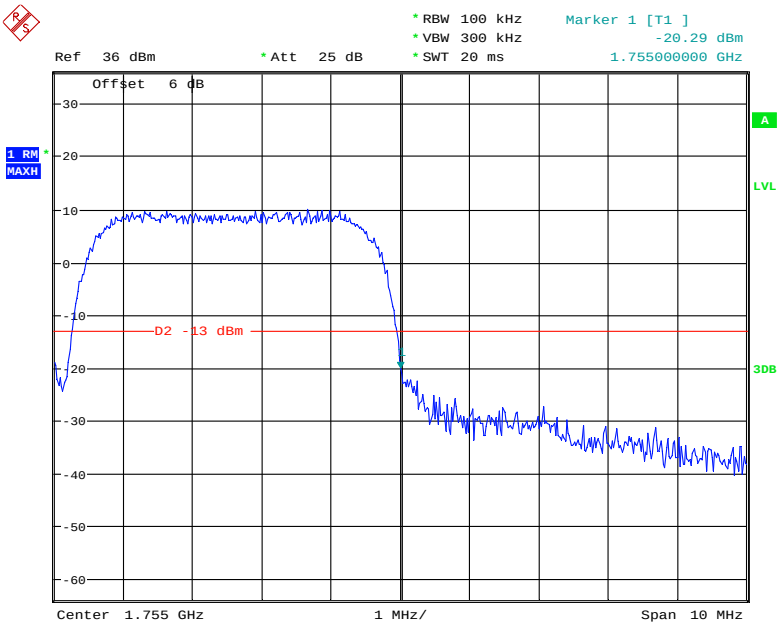
Date: 7.SEP.2019 17:53:00

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



Date: 7.SEP.2019 17:46:27

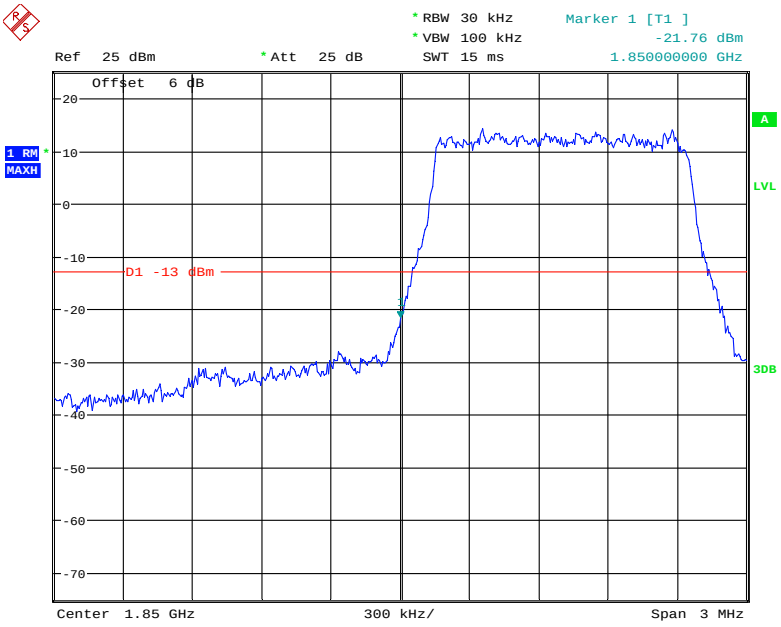
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 7.SEP.2019 17:47:13

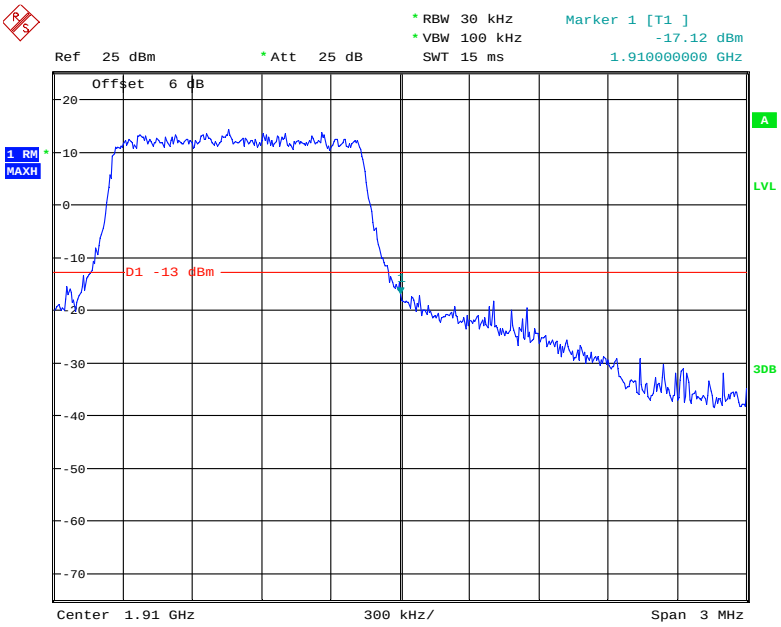
Band 2:

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



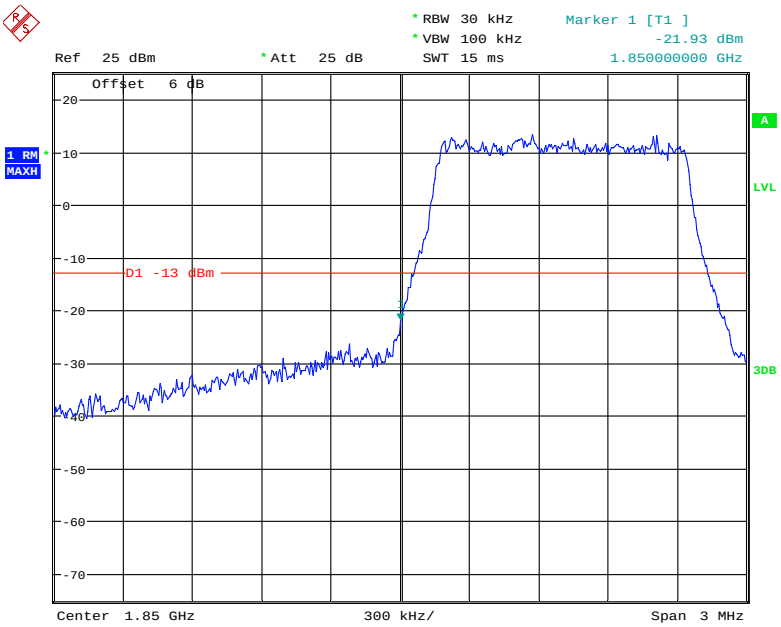
Date: 6.SEP.2019 21:40:59

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



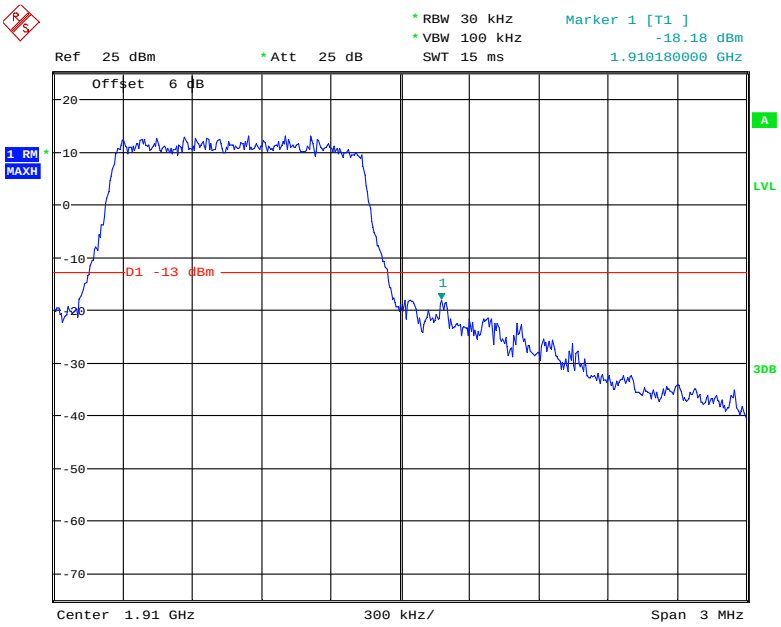
Date: 6.SEP.2019 21:42:00

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



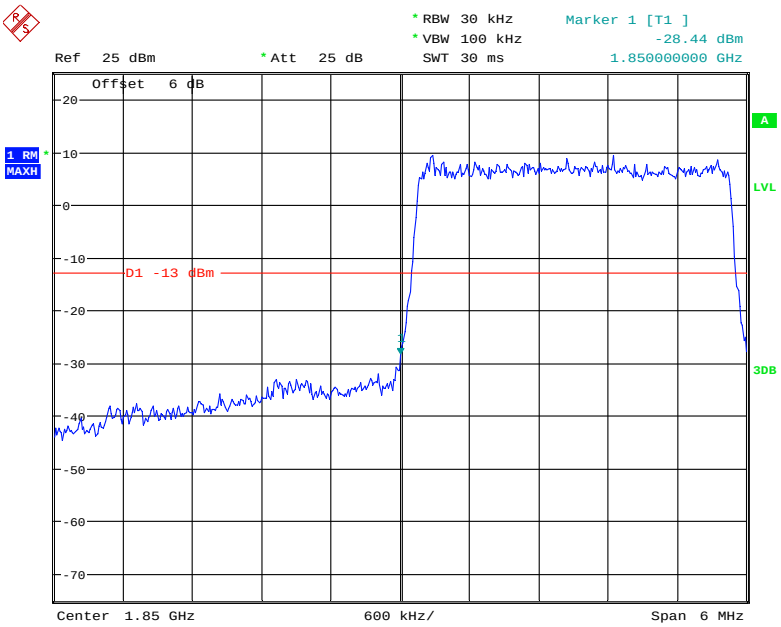
Date: 6.SEP.2019 21:41:27

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



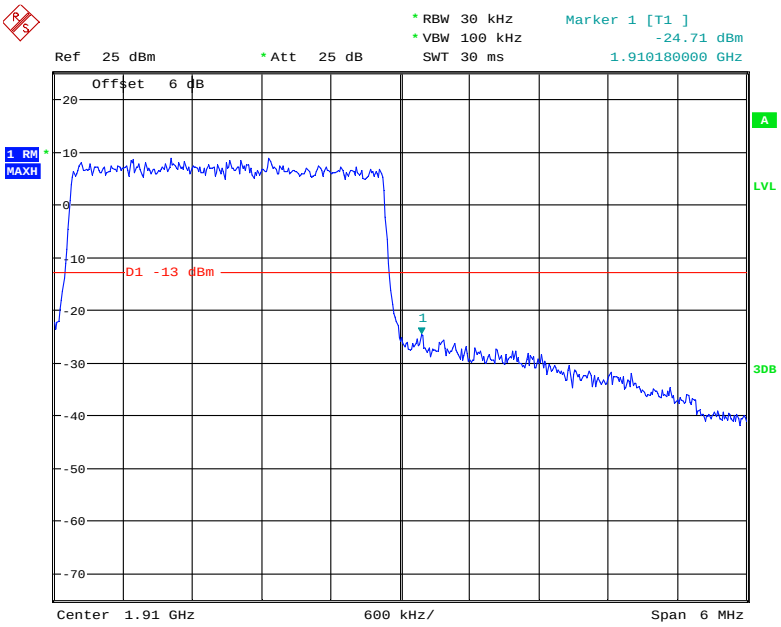
Date: 6.SEP.2019 21:42:29

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



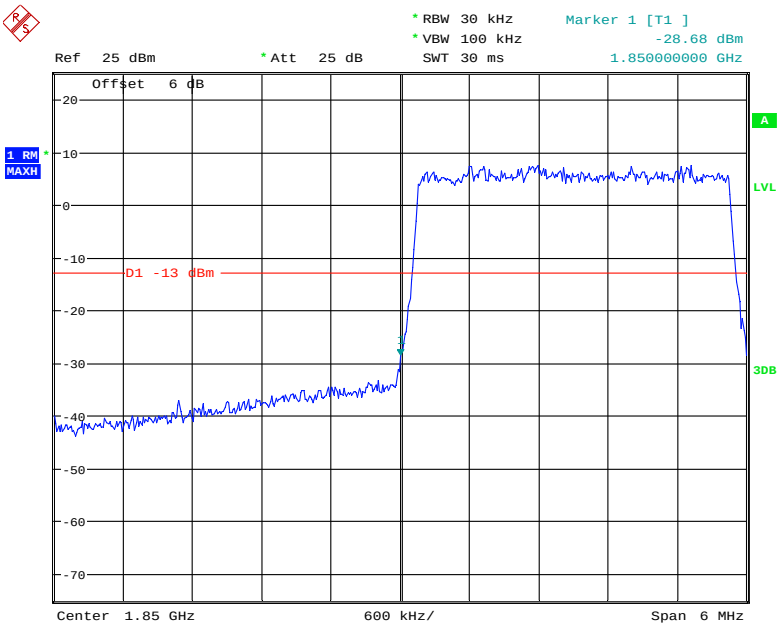
Date: 6.SEP.2019 21:42:57

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



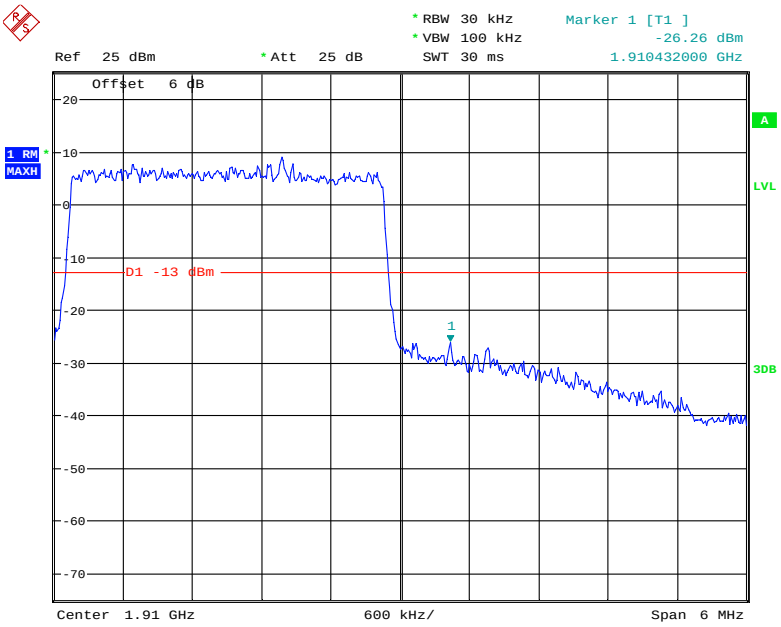
Date: 6.SEP.2019 21:43:55

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



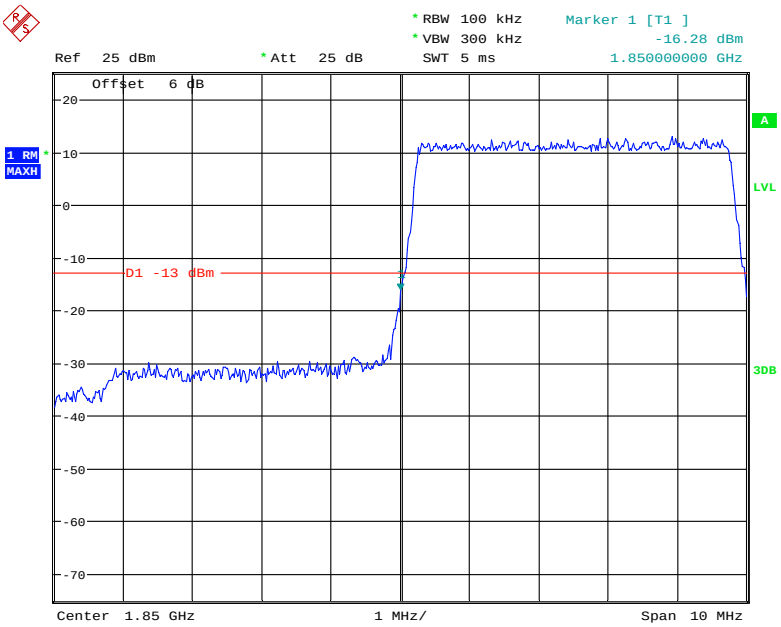
Date: 6.SEP.2019 21:43:26

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



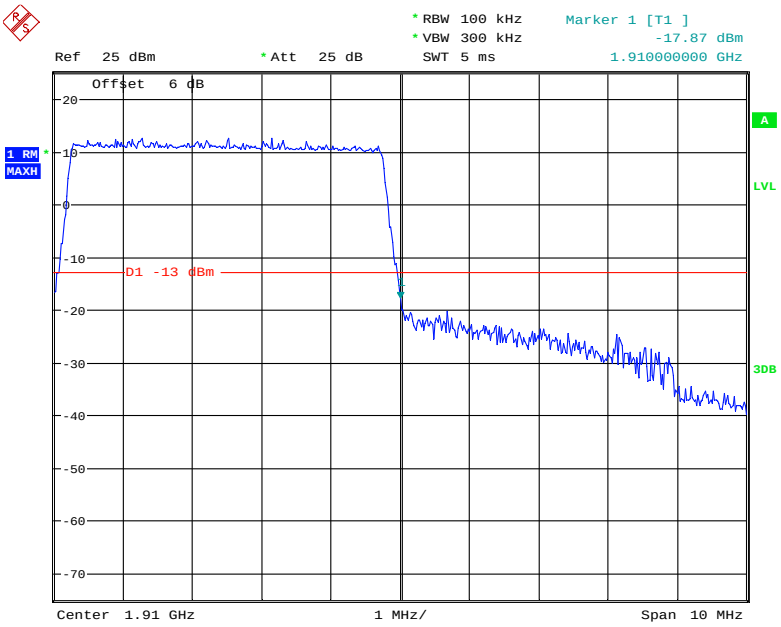
Date: 6.SEP.2019 21:44:24

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



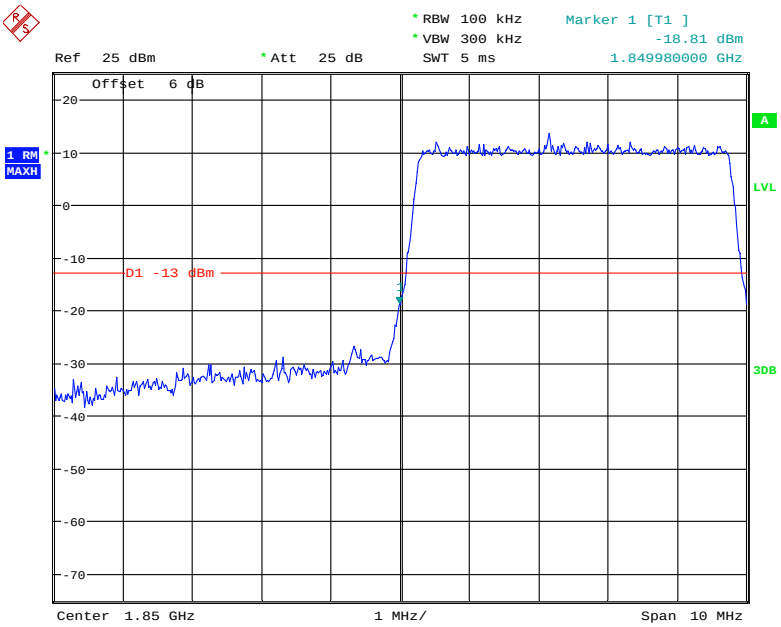
Date: 6.SEP.2019 21:44:56

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



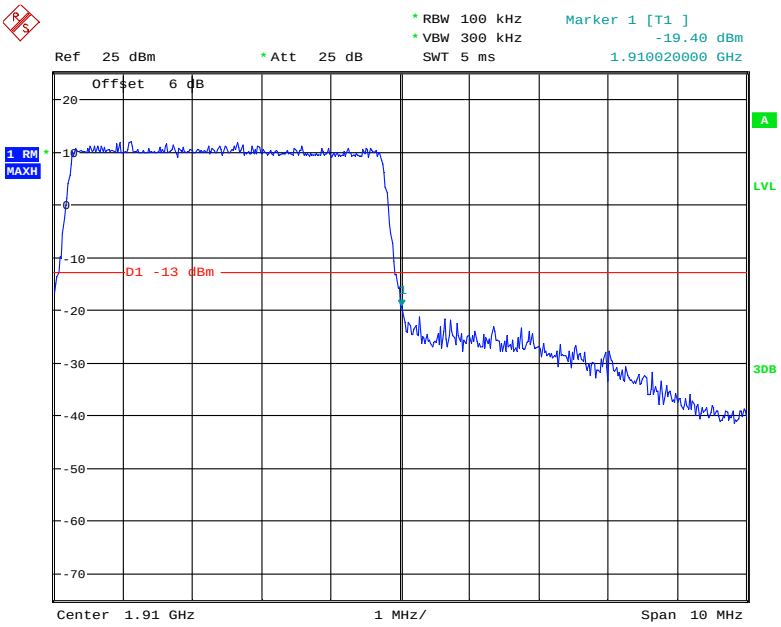
Date: 6.SEP.2019 21:46:01

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



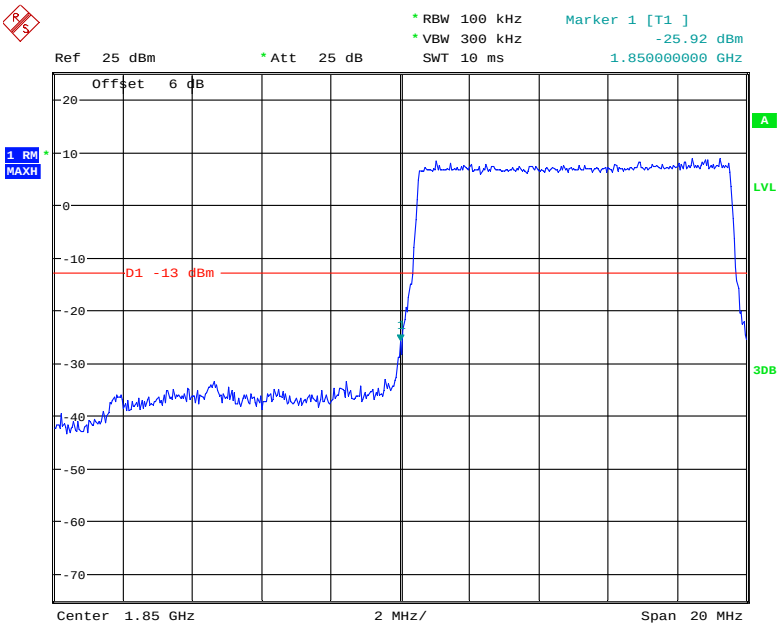
Date: 6.SEP.2019 21:45:28

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



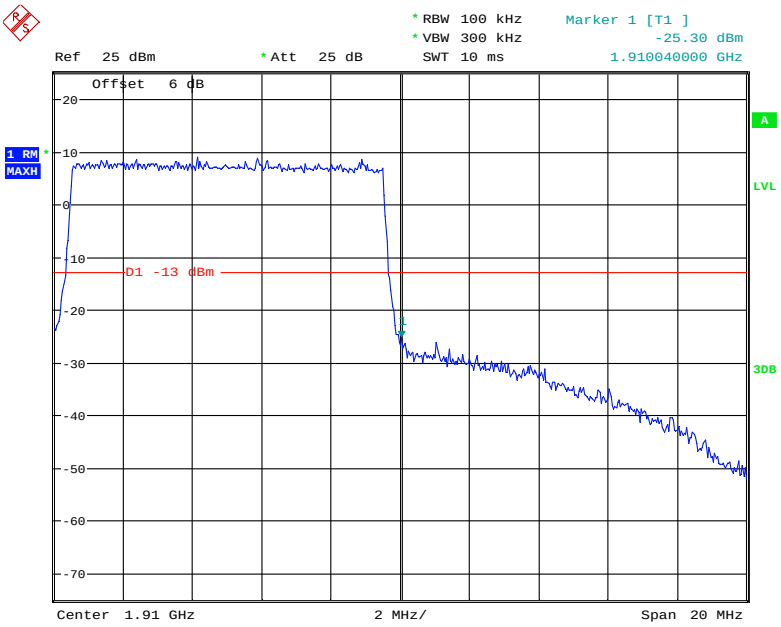
Date: 6.SEP.2019 21:46:26

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



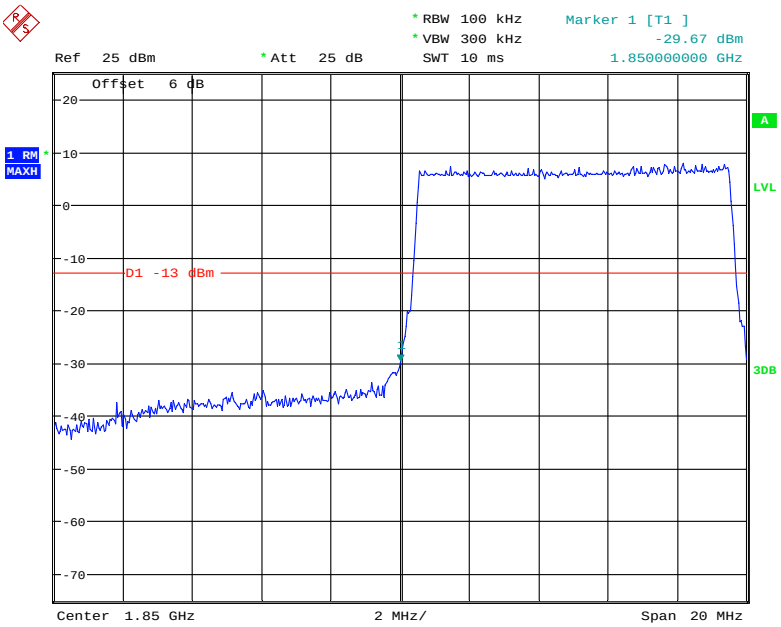
Date: 6.SEP.2019 21:46:59

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



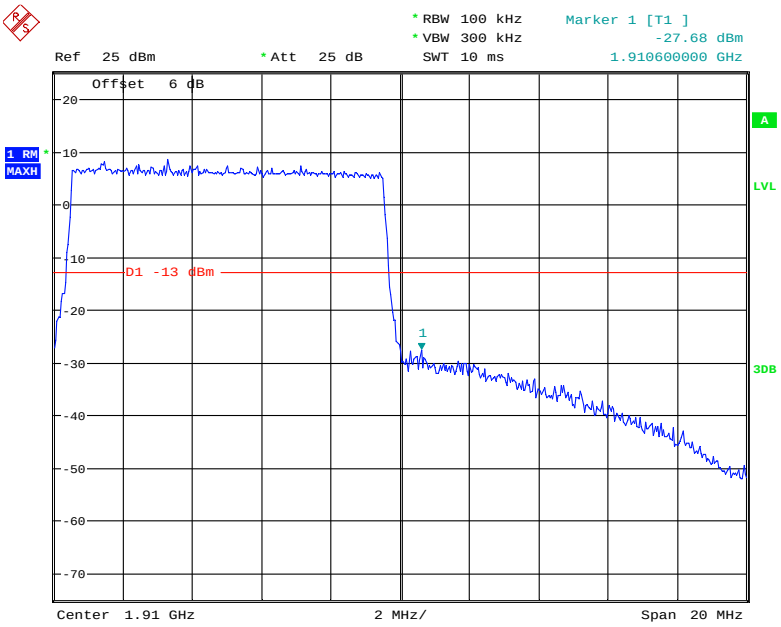
Date: 6.SEP.2019 21:48:06

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



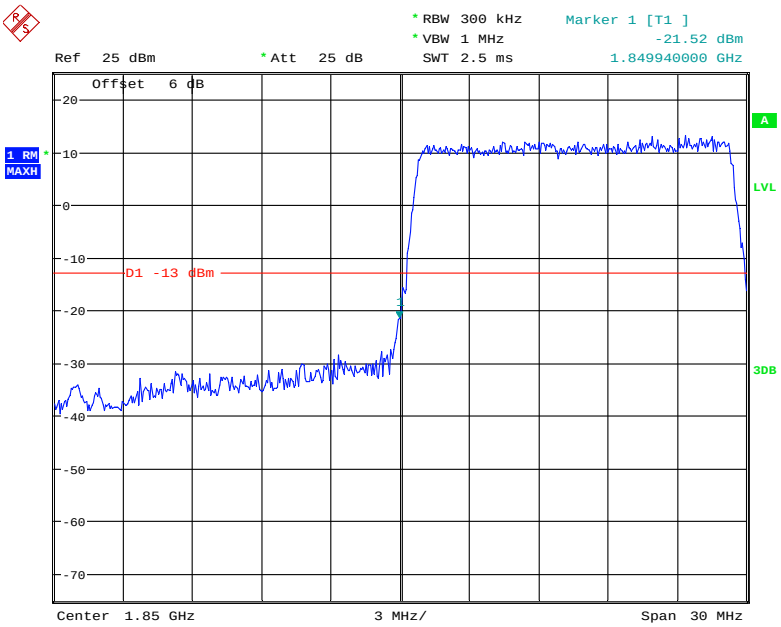
Date: 6.SEP.2019 21:47:29

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



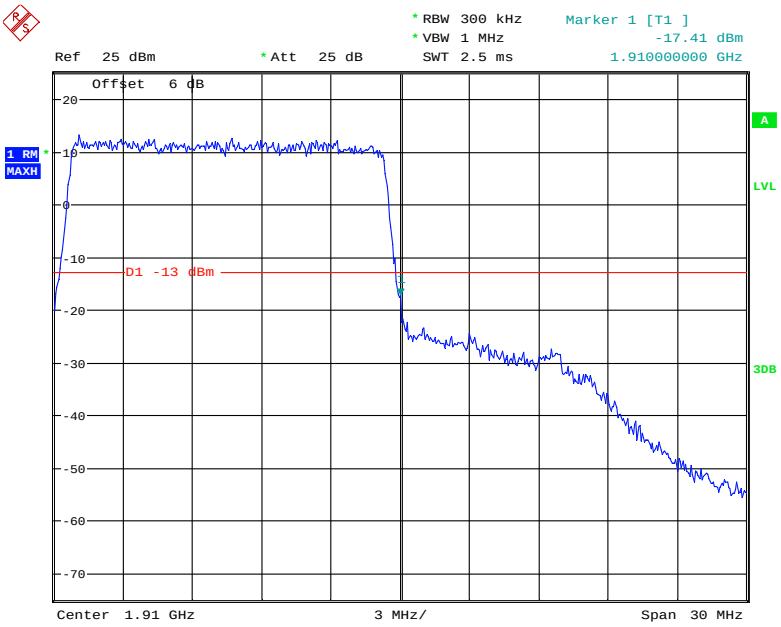
Date: 6.SEP.2019 21:48:42

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



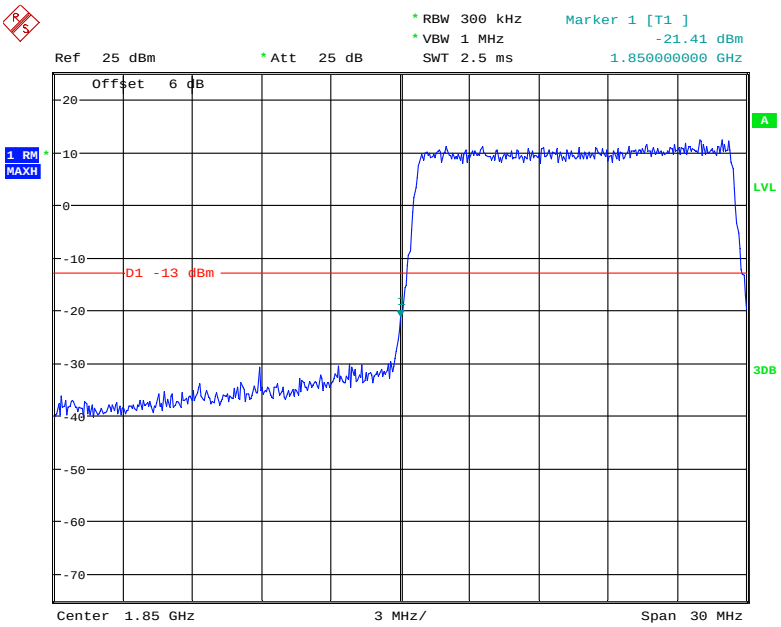
Date: 6.SEP.2019 21:49:26

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



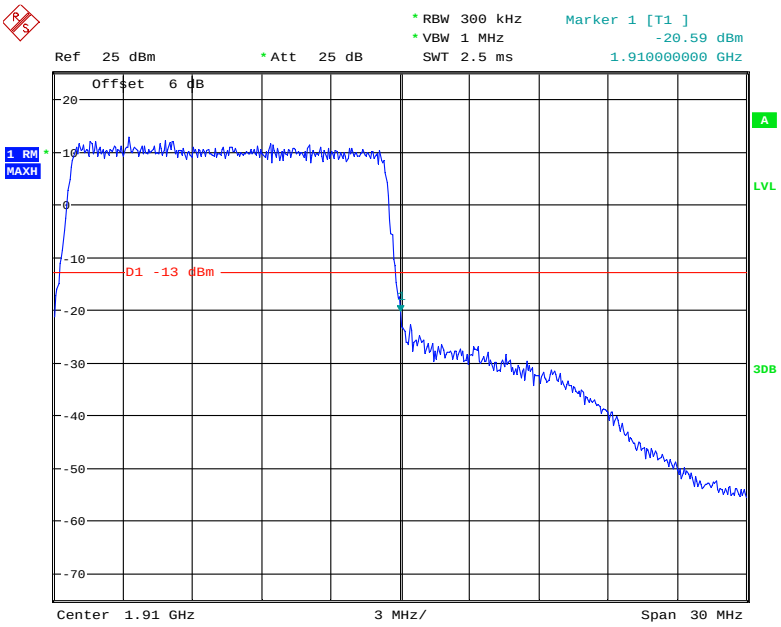
Date: 6.SEP.2019 21:50:43

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



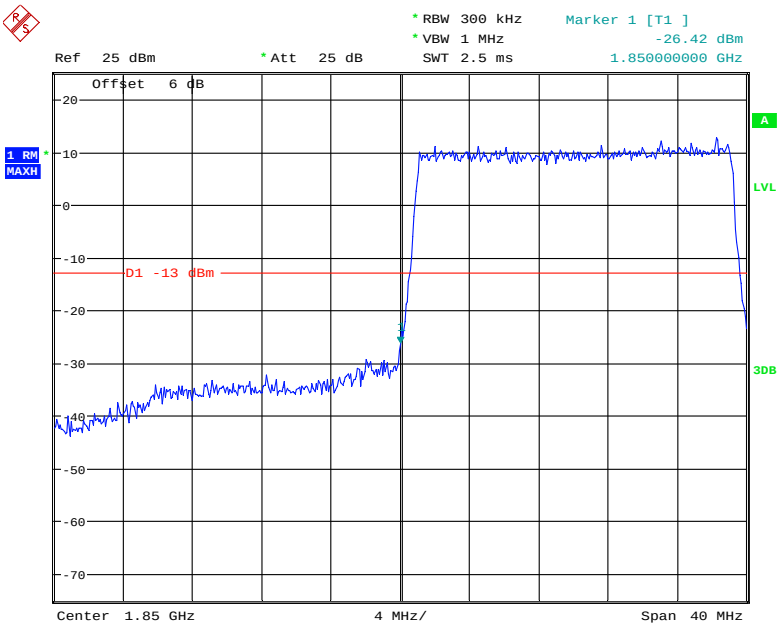
Date: 6.SEP.2019 21:50:07

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



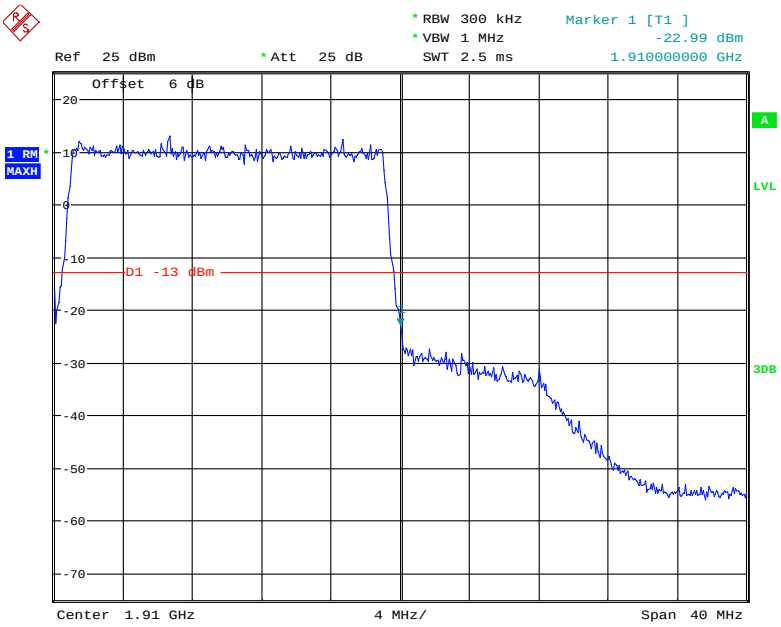
Date: 6.SEP.2019 21:51:18

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



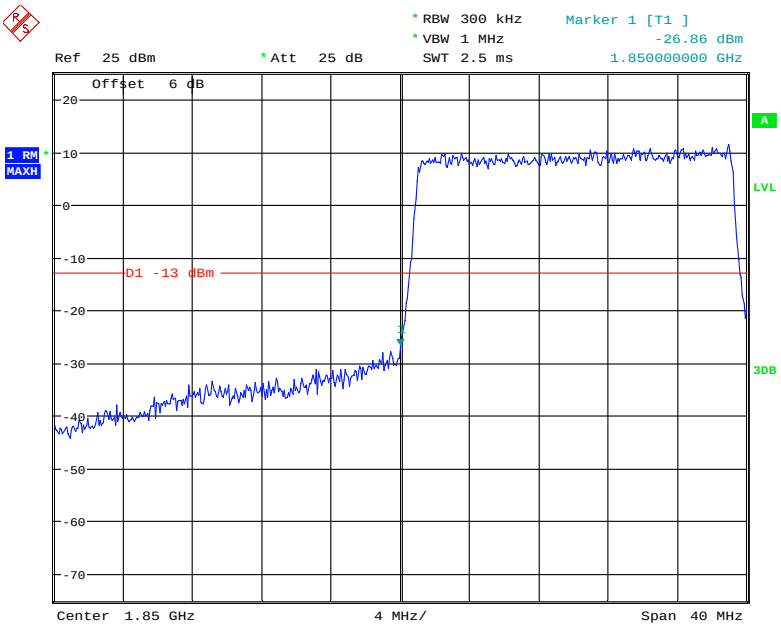
Date: 6.SEP.2019 21:51:59

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



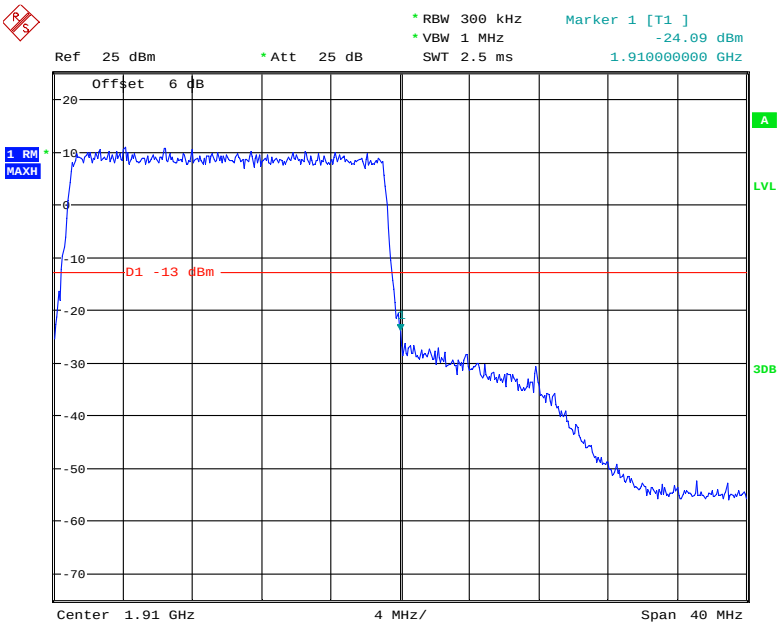
Date: 6.SEP.2019 21:53:23

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



Date: 6.SEP.2019 21:52:46

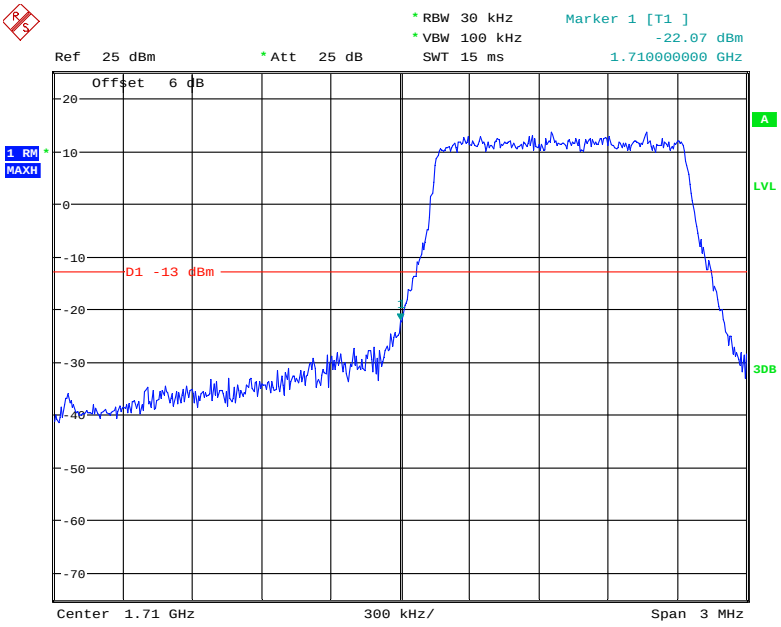
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 6.SEP.2019 21:53:58

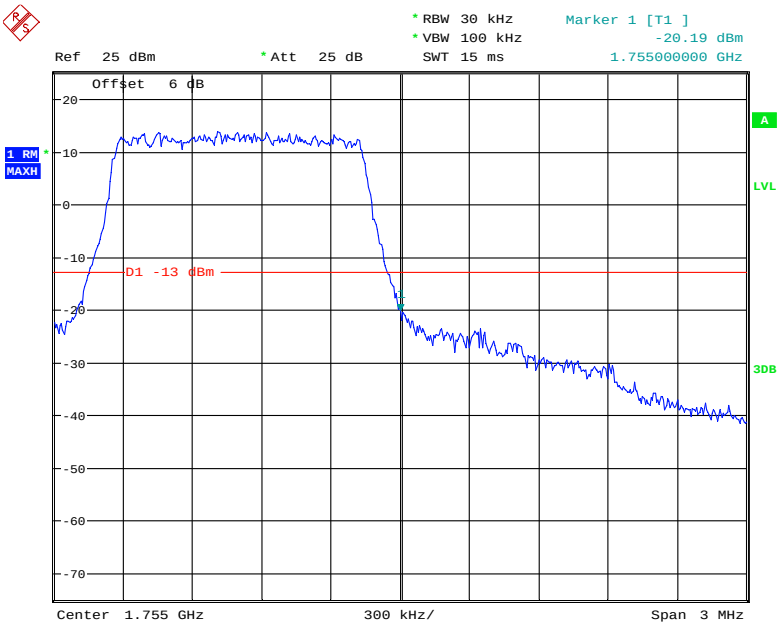
Band 4:

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



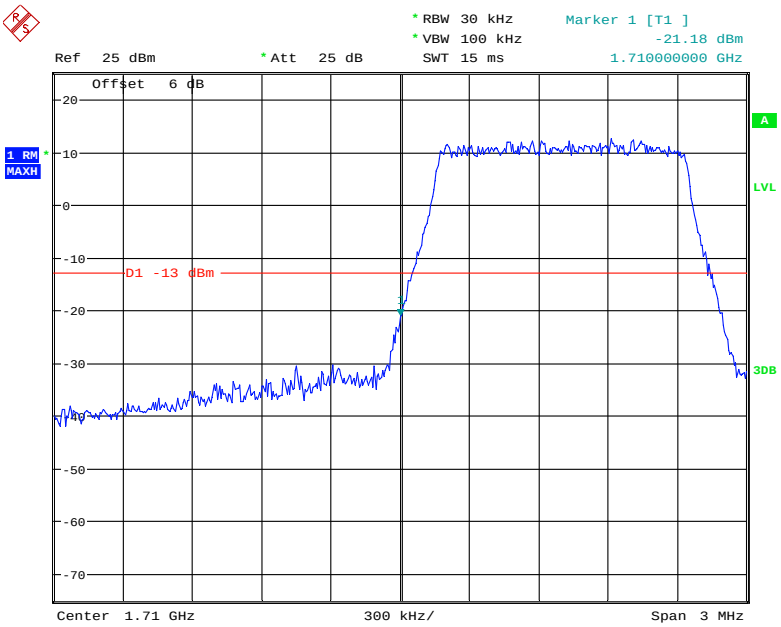
Date: 6.SEP.2019 21:54:27

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



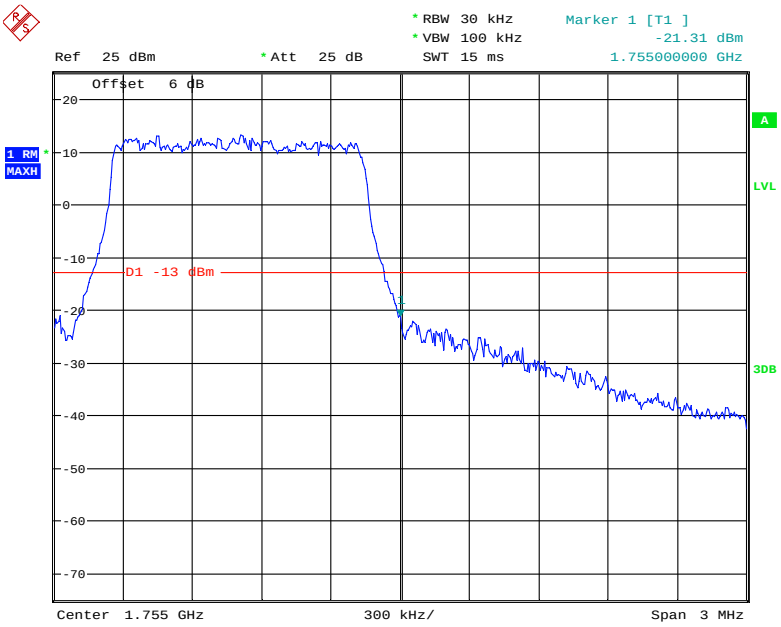
Date: 6.SEP.2019 21:55:34

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



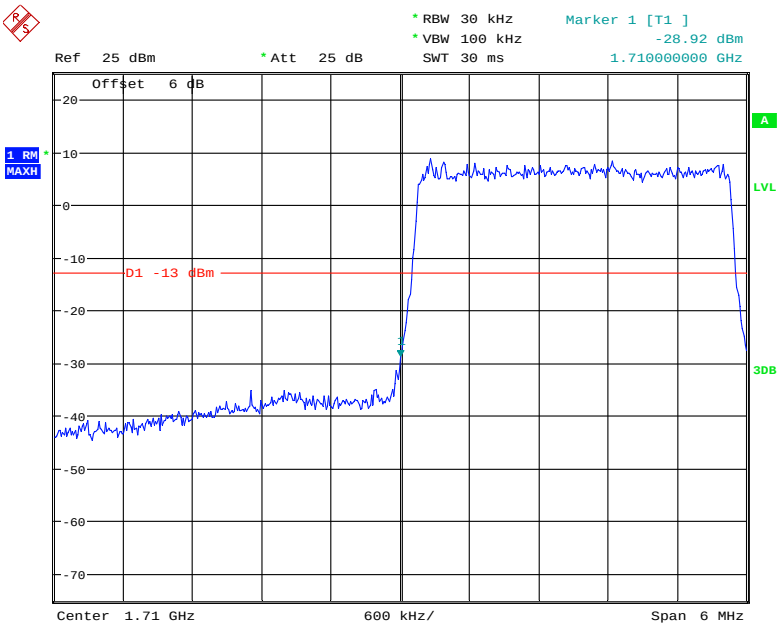
Date: 6.SEP.2019 21:54:55

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



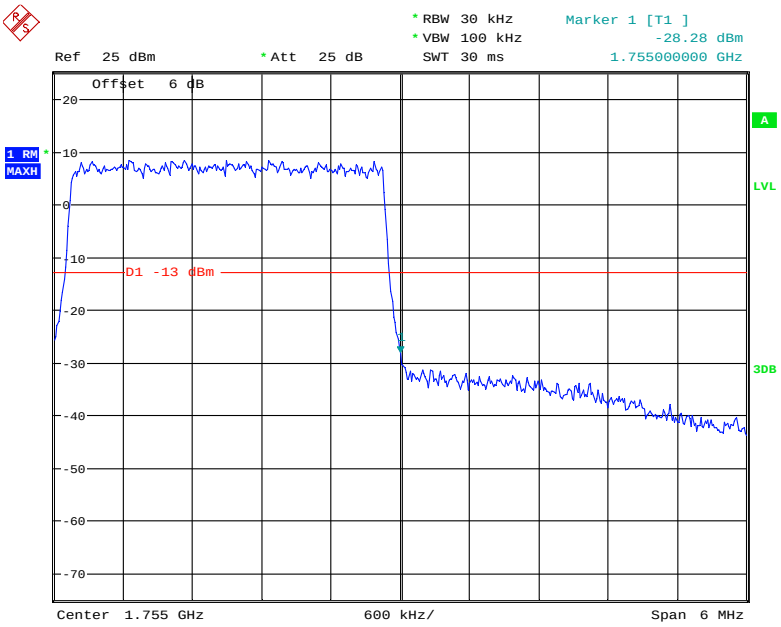
Date: 6.SEP.2019 21:56:06

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



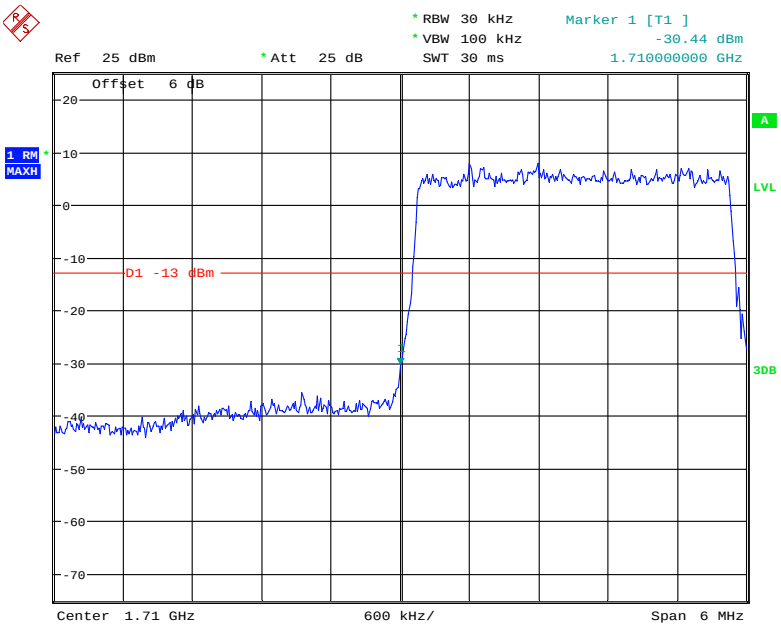
Date: 6.SEP.2019 21:56:40

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



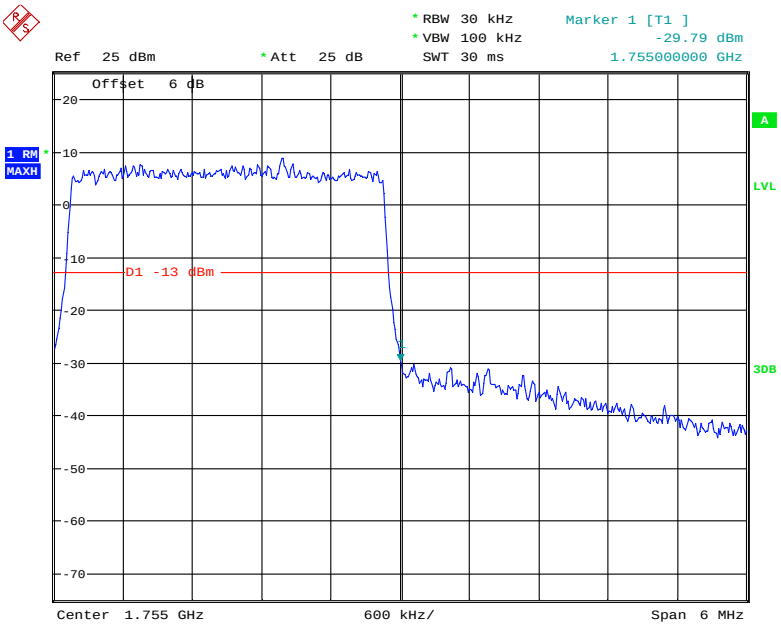
Date: 6.SEP.2019 21:57:33

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



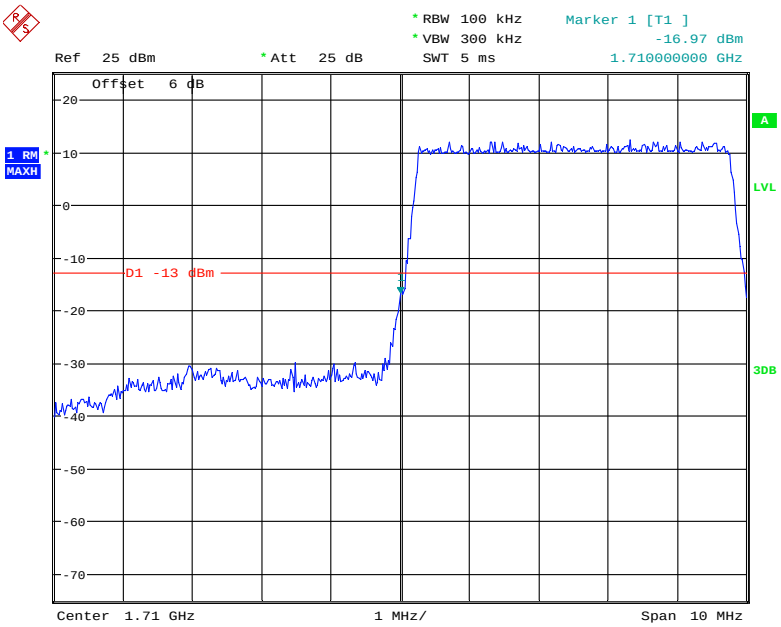
Date: 6.SEP.2019 21:57:09

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



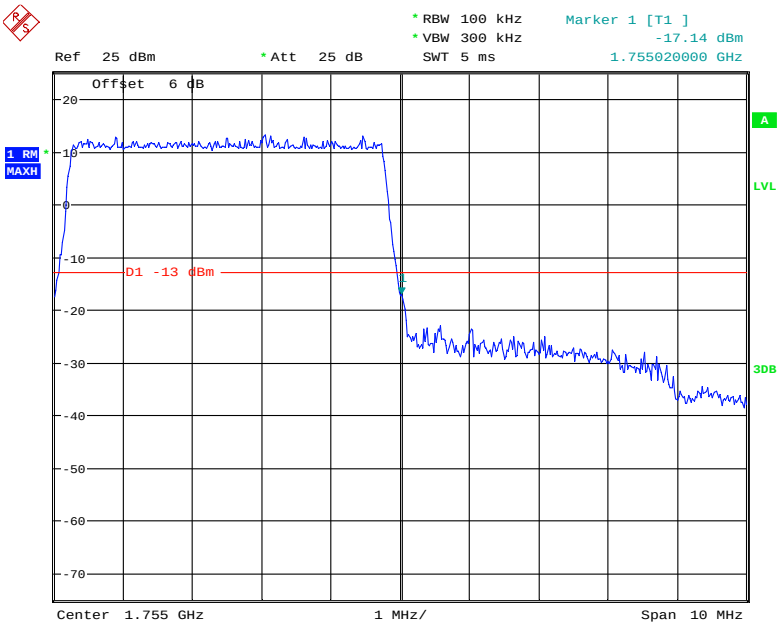
Date: 6.SEP.2019 21:57:55

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



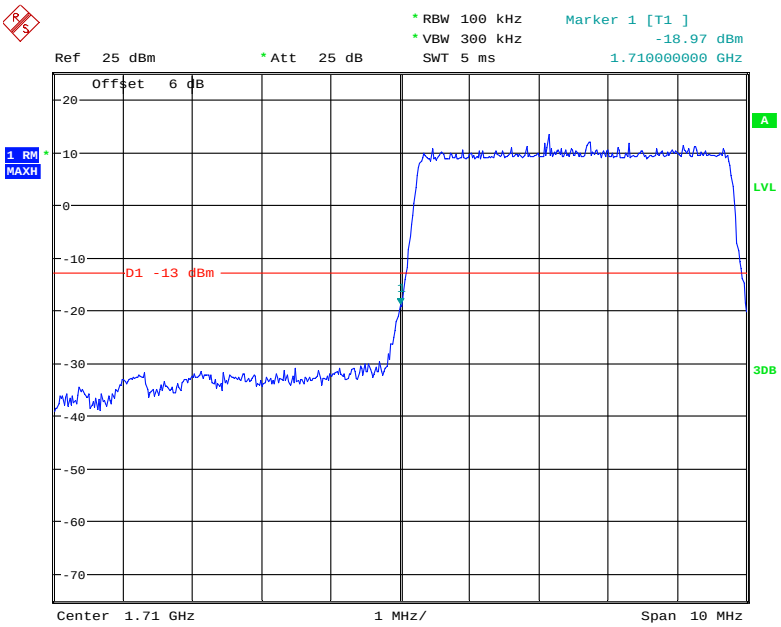
Date: 6.SEP.2019 21:58:27

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



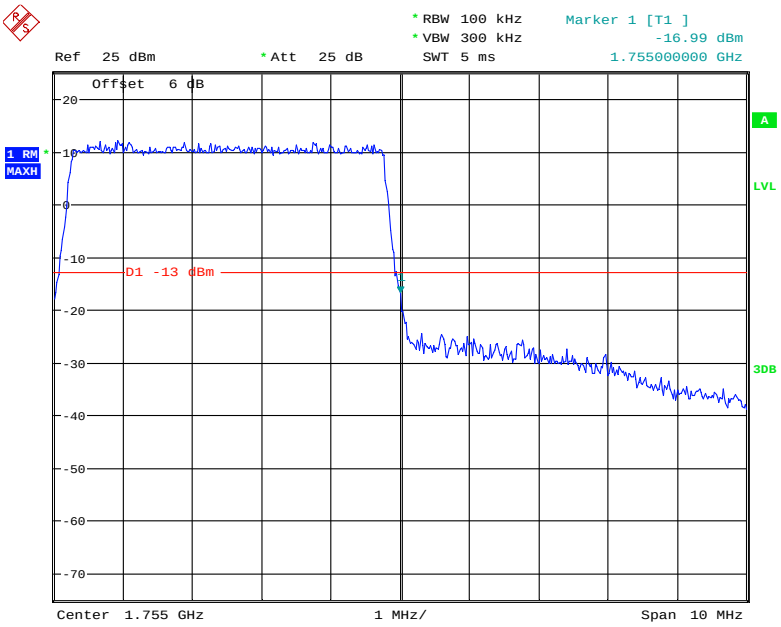
Date: 6.SEP.2019 21:59:25

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



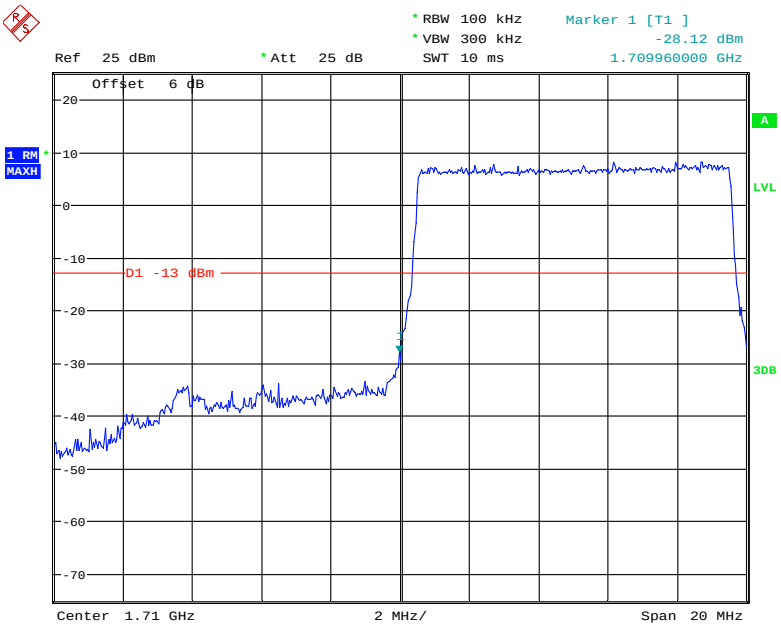
Date: 6.SEP.2019 21:58:55

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



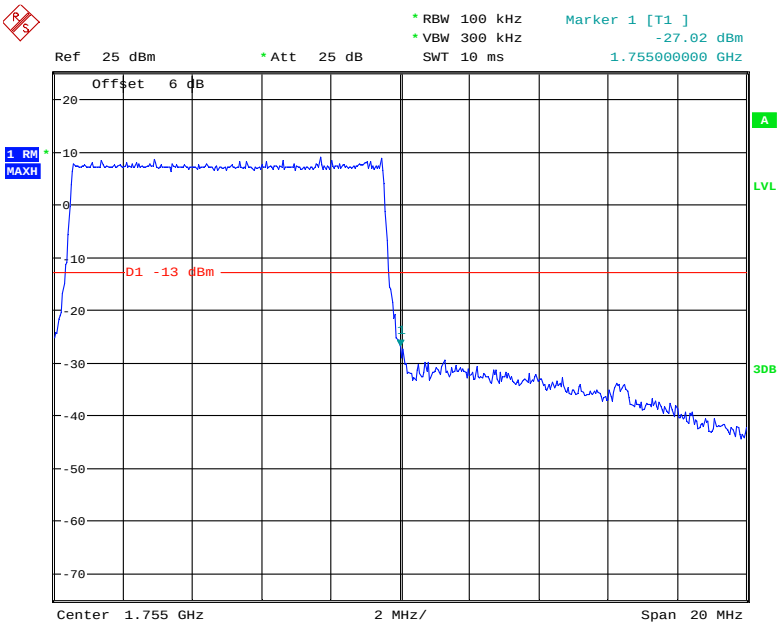
Date: 6.SEP.2019 21:59:57

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



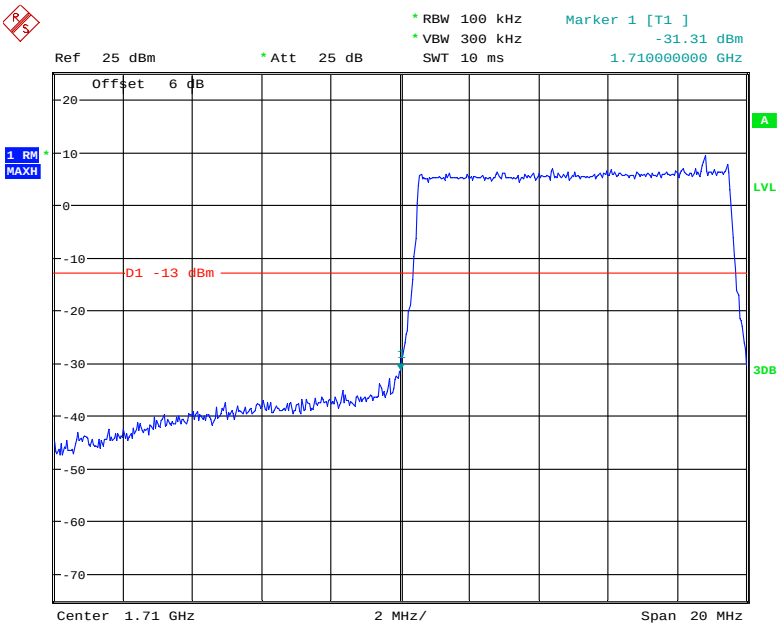
Date: 6.SEP.2019 22:00:29

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



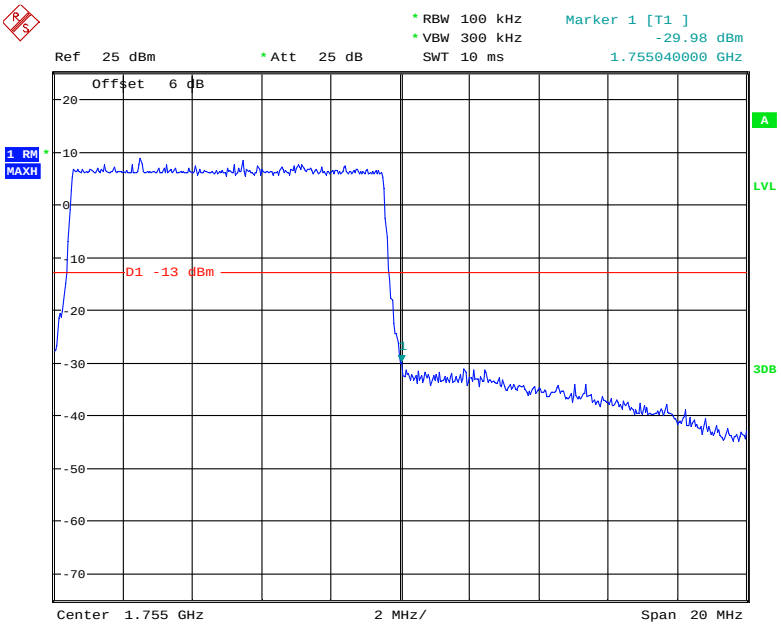
Date: 6.SEP.2019 22:01:23

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



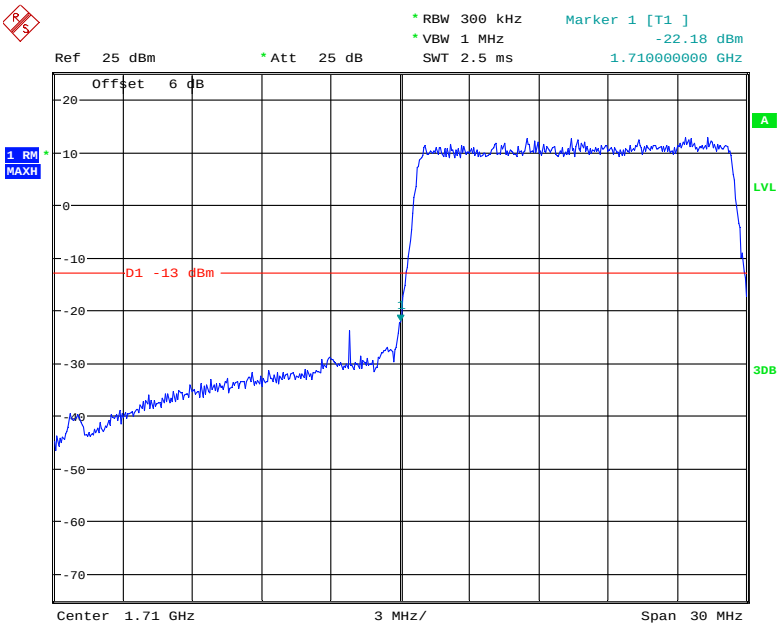
Date: 6.SEP.2019 22:00:56

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



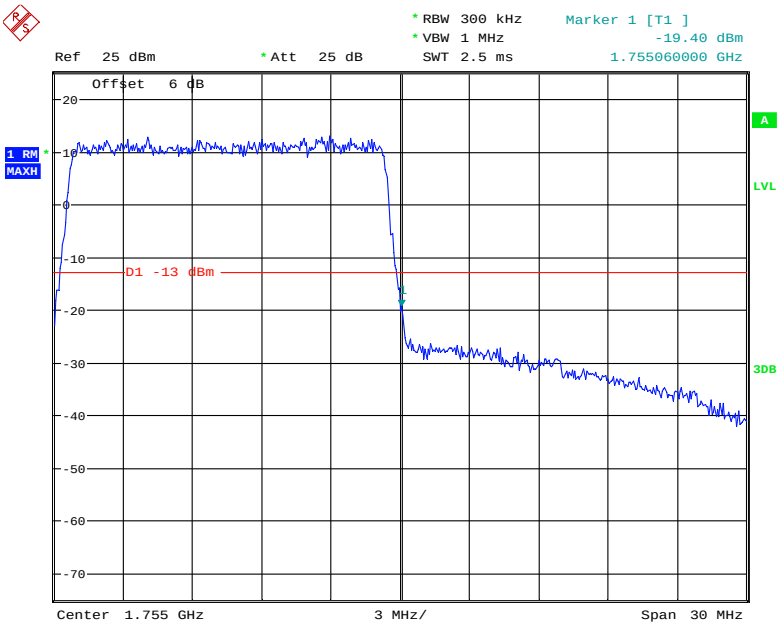
Date: 6.SEP.2019 22:01:53

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



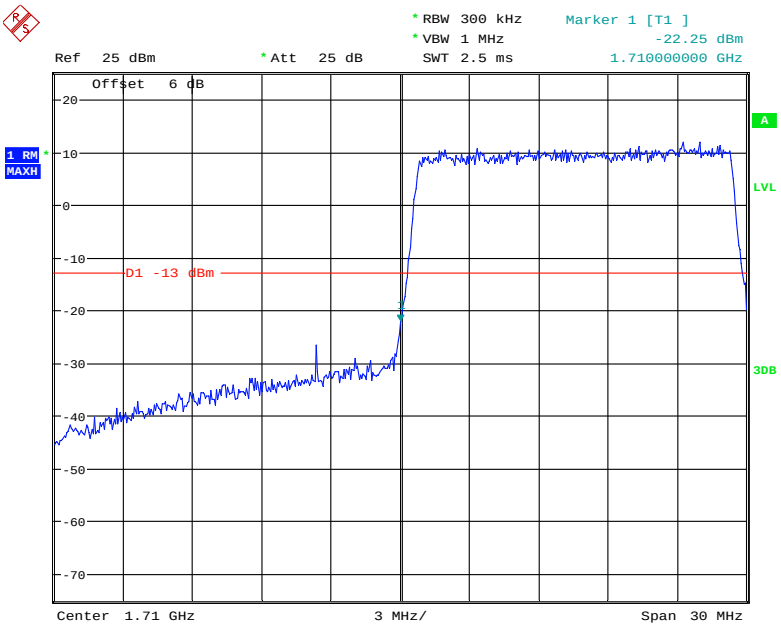
Date: 6.SEP.2019 22:02:34

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



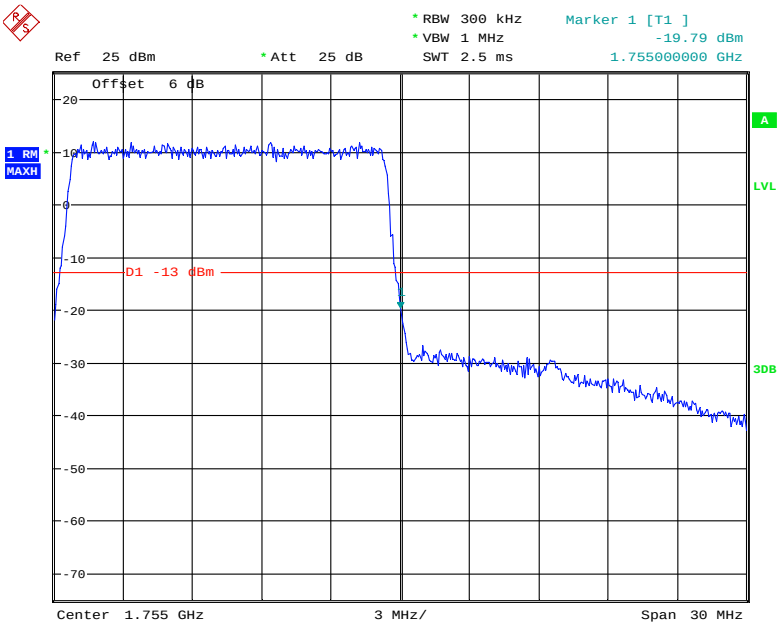
Date: 6.SEP.2019 22:03:33

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



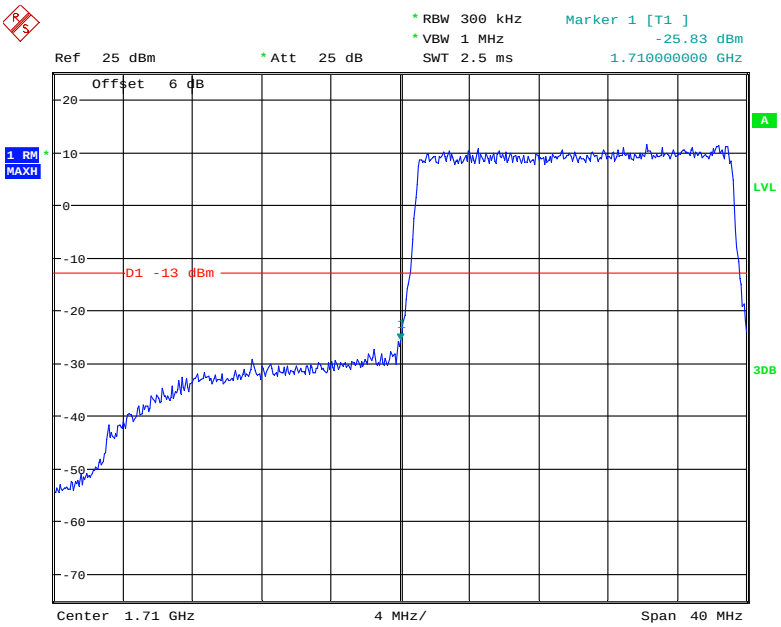
Date: 6.SEP.2019 22:03:06

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



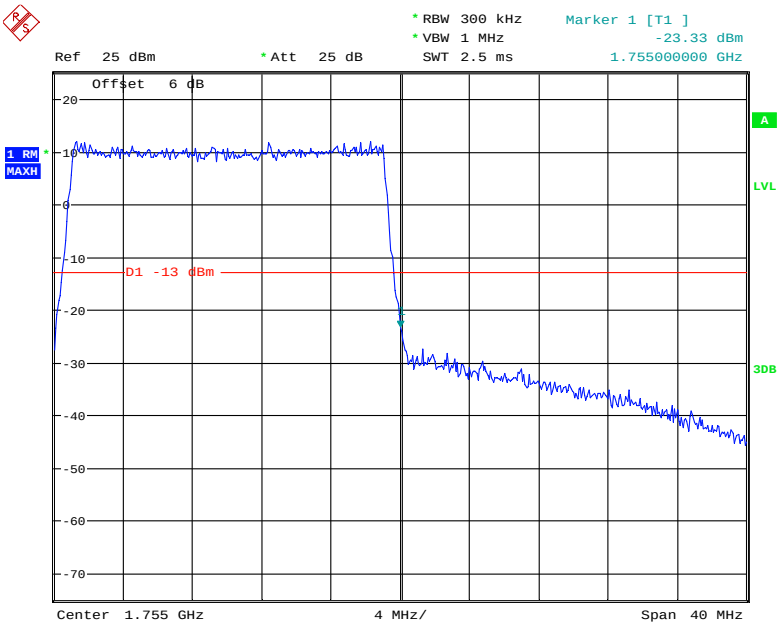
Date: 6.SEP.2019 22:04:05

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



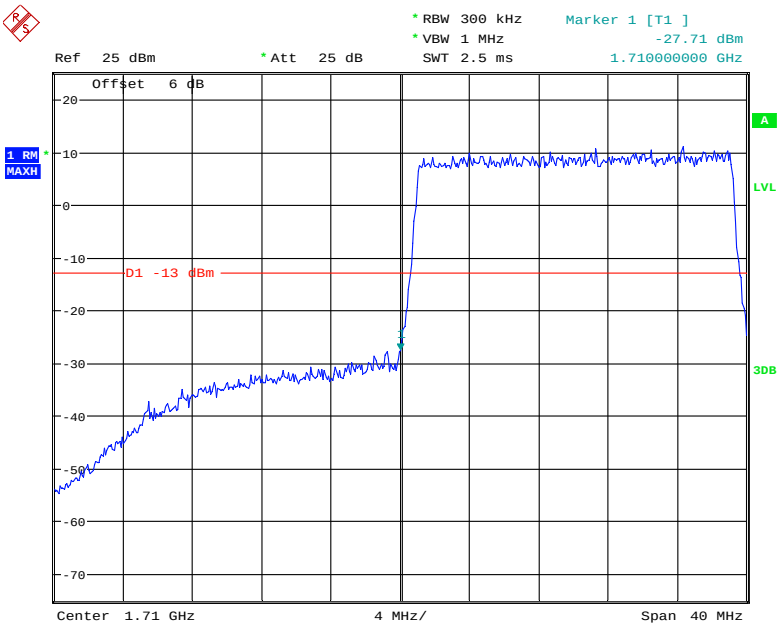
Date: 6.SEP.2019 22:04:46

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



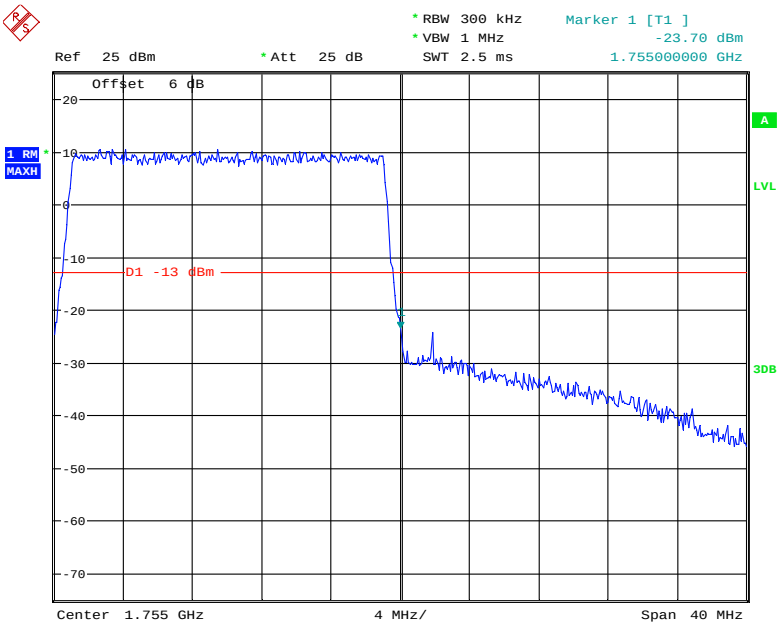
Date: 6.SEP.2019 22:06:04

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



Date: 6.SEP.2019 22:05:28

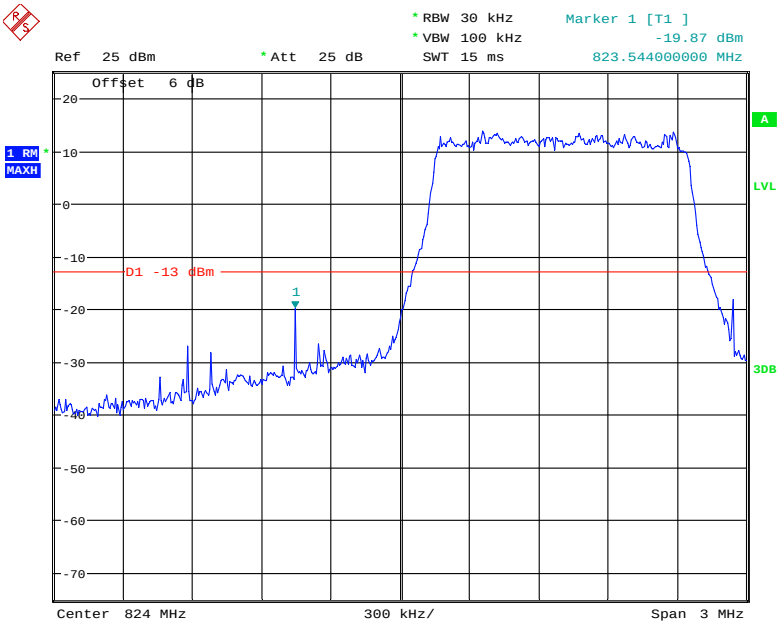
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 6.SEP.2019 22:06:42

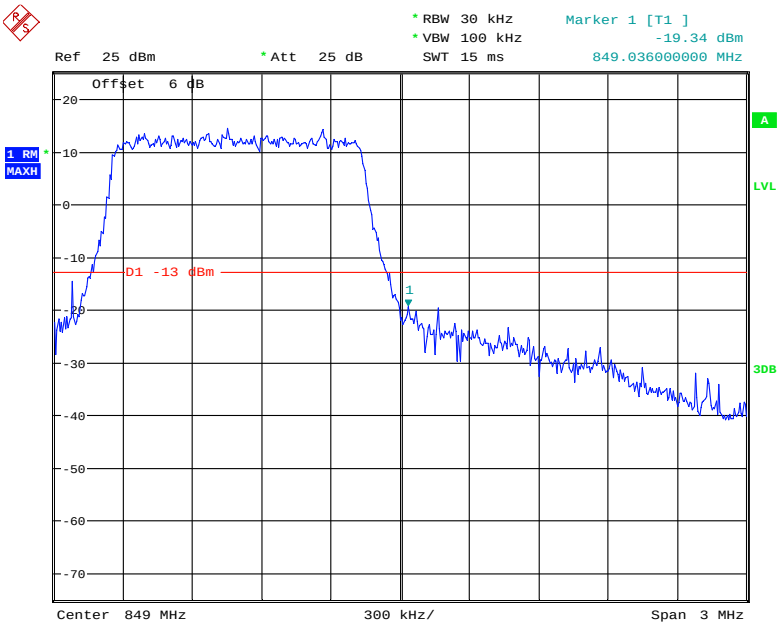
Band 5:

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



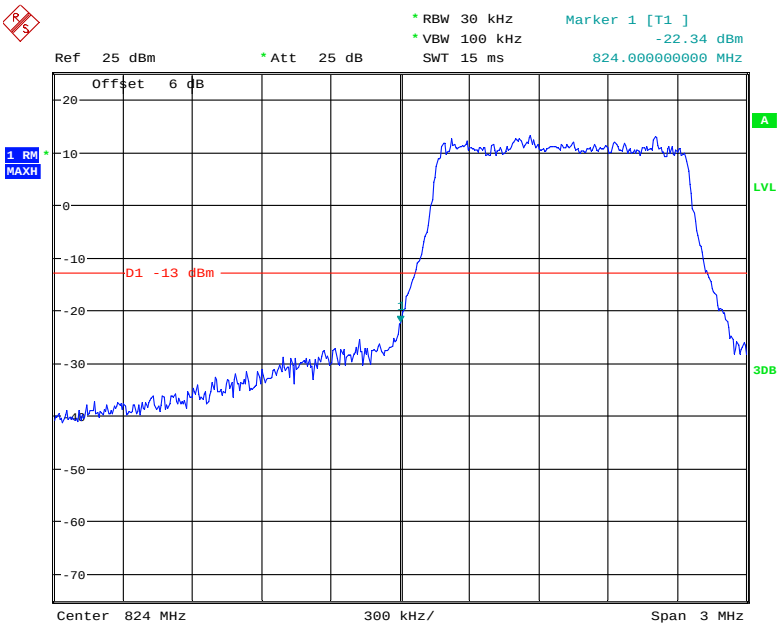
Date: 6.SEP.2019 22:07:19

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



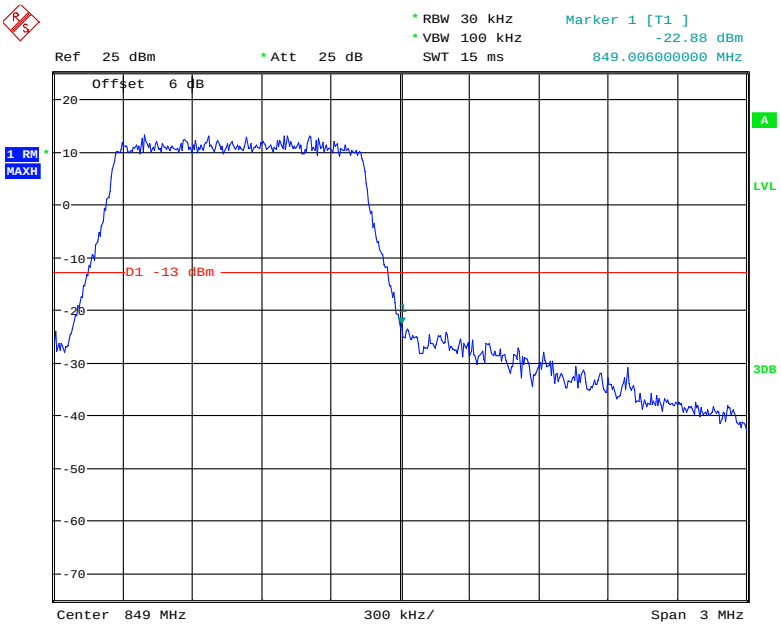
Date: 6.SEP.2019 22:08:21

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



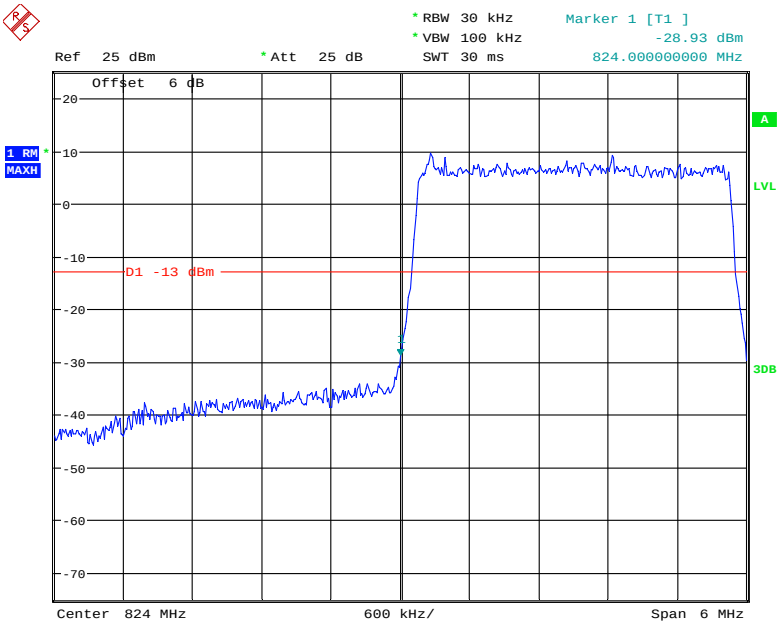
Date: 6.SEP.2019 22:07:51

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



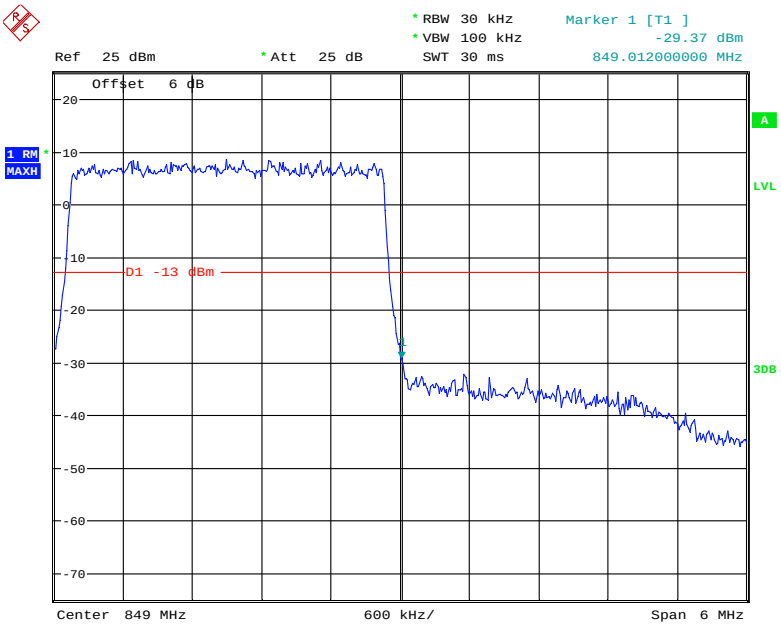
Date: 6.SEP.2019 22:08:50

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



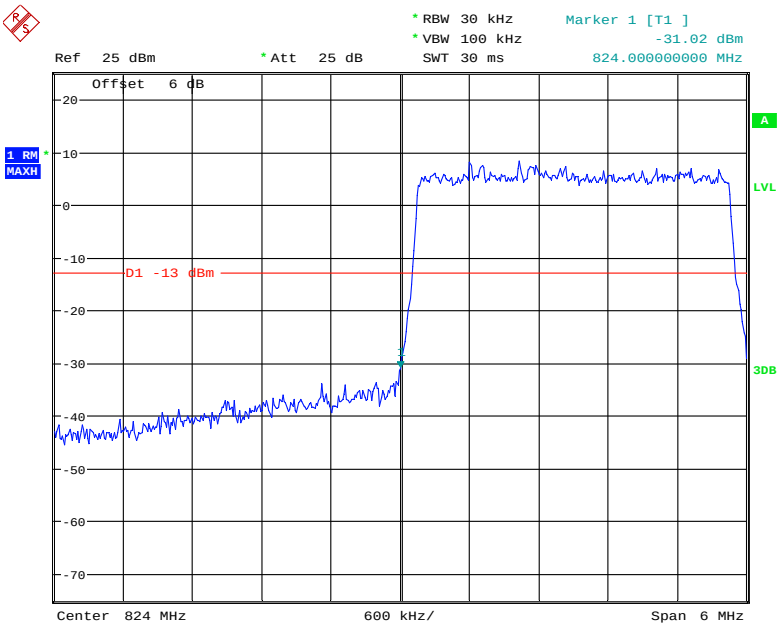
Date: 6.SEP.2019 22:09:18

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



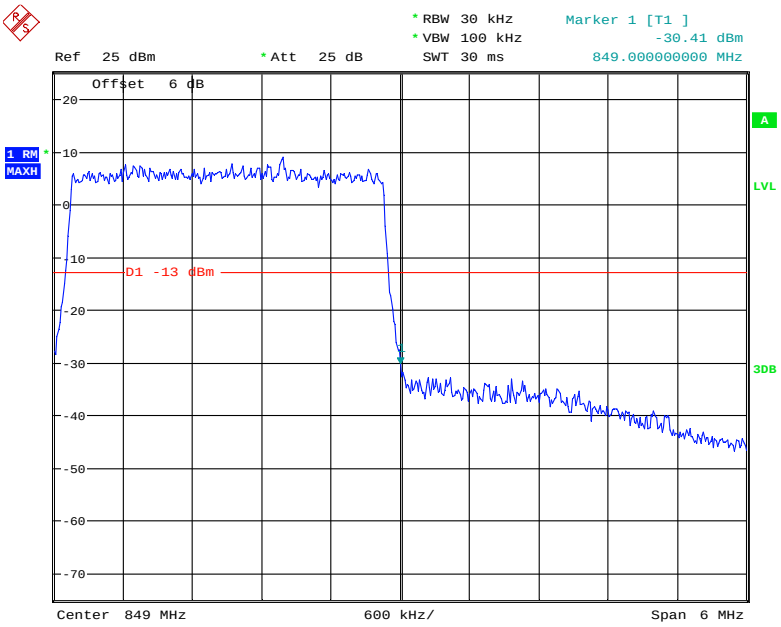
Date: 6.SEP.2019 22:10:16

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



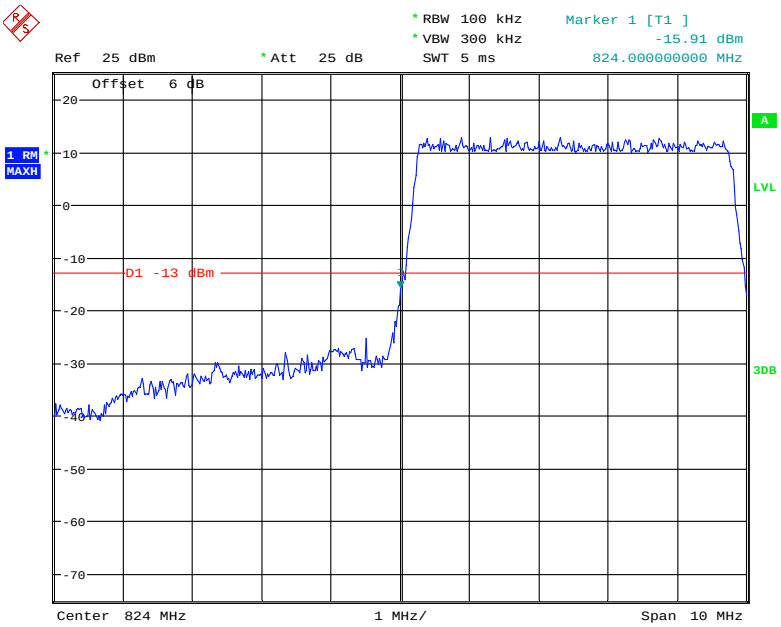
Date: 6.SEP.2019 22:09:47

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



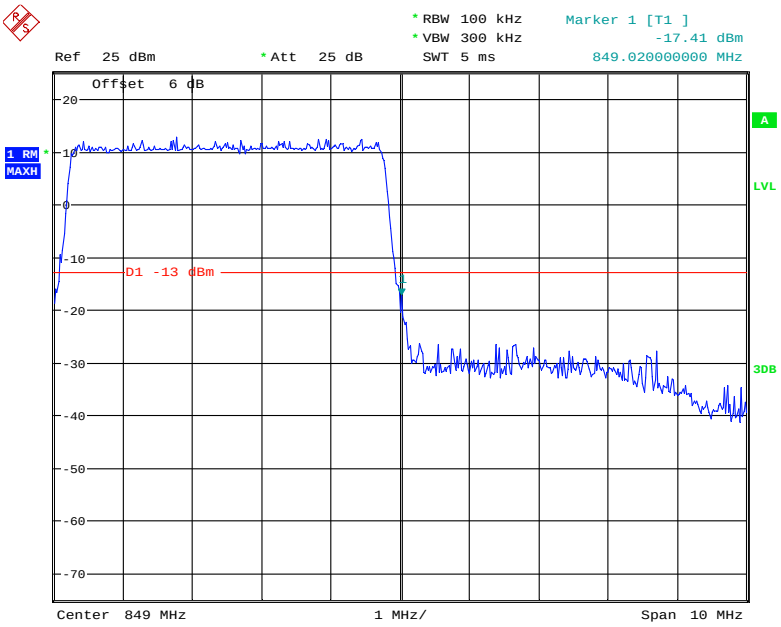
Date: 6.SEP.2019 22:10:48

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



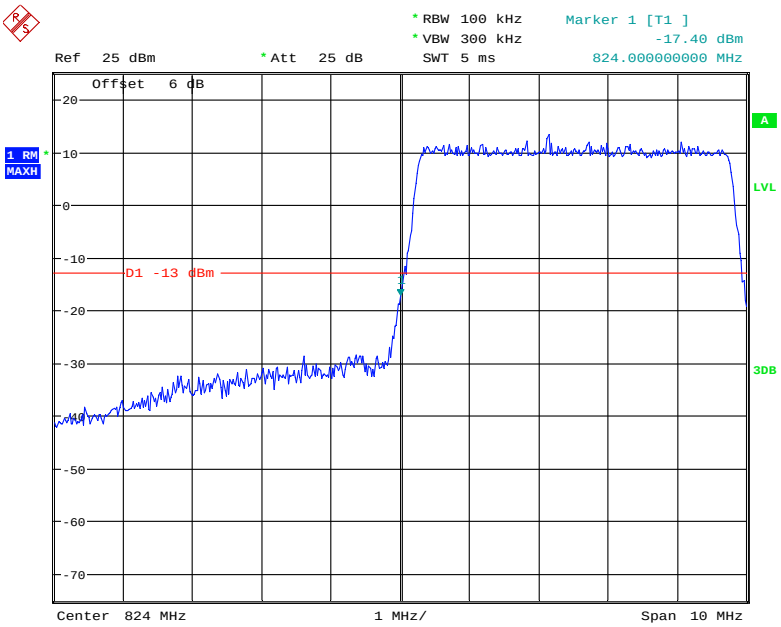
Date: 6.SEP.2019 22:11:26

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



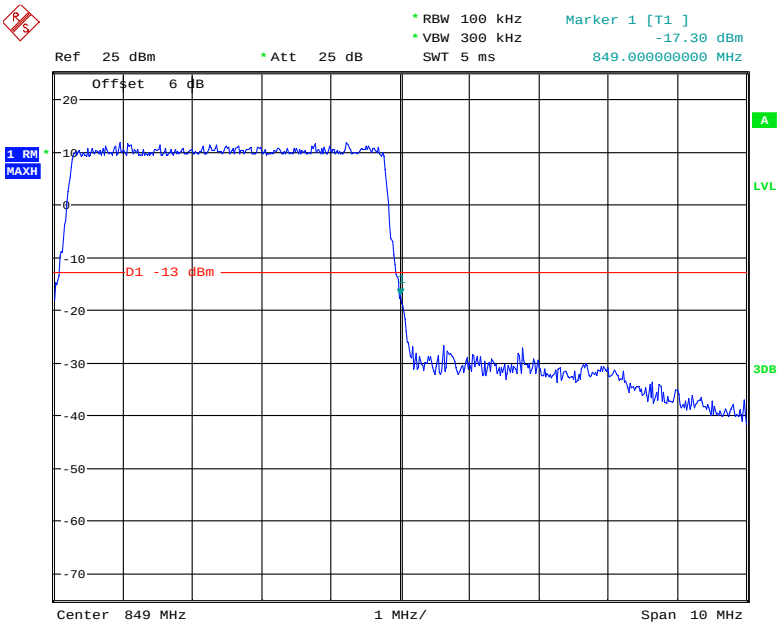
Date: 6.SEP.2019 22:12:21

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



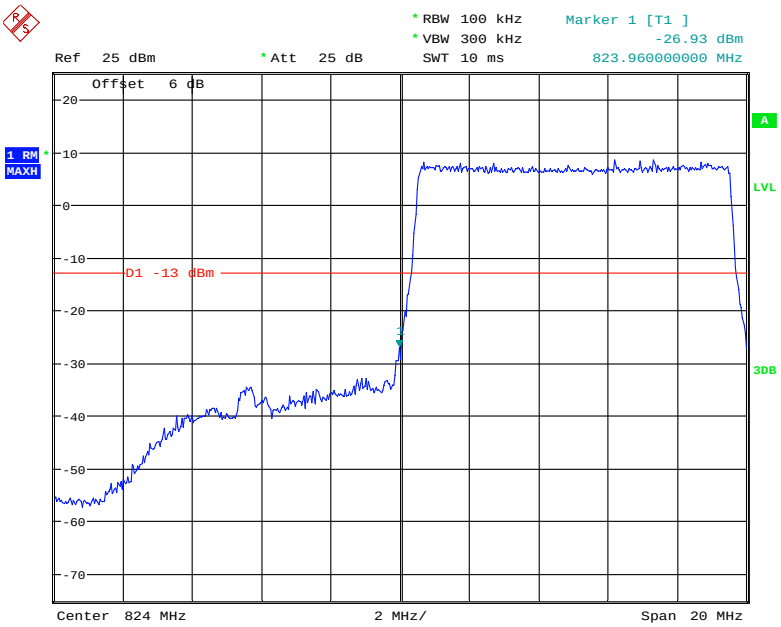
Date: 6.SEP.2019 22:12:00

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



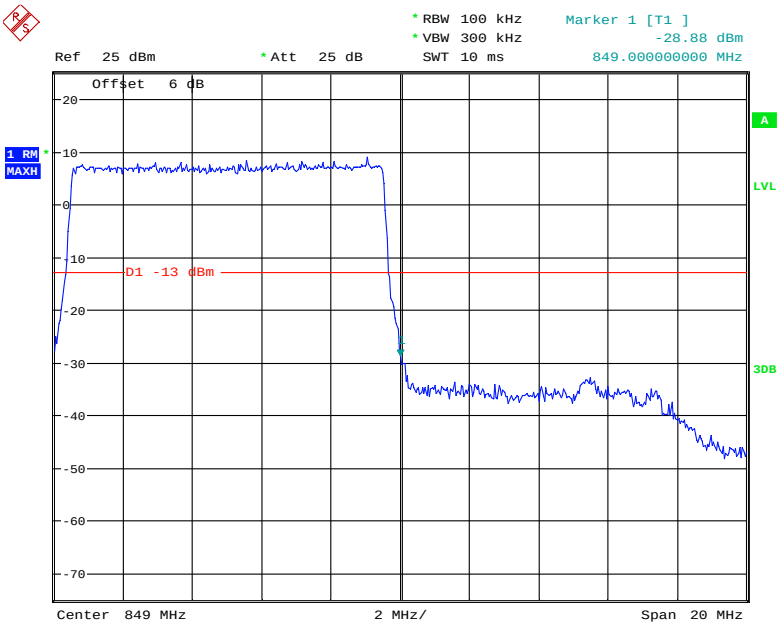
Date: 6.SEP.2019 22:12:56

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



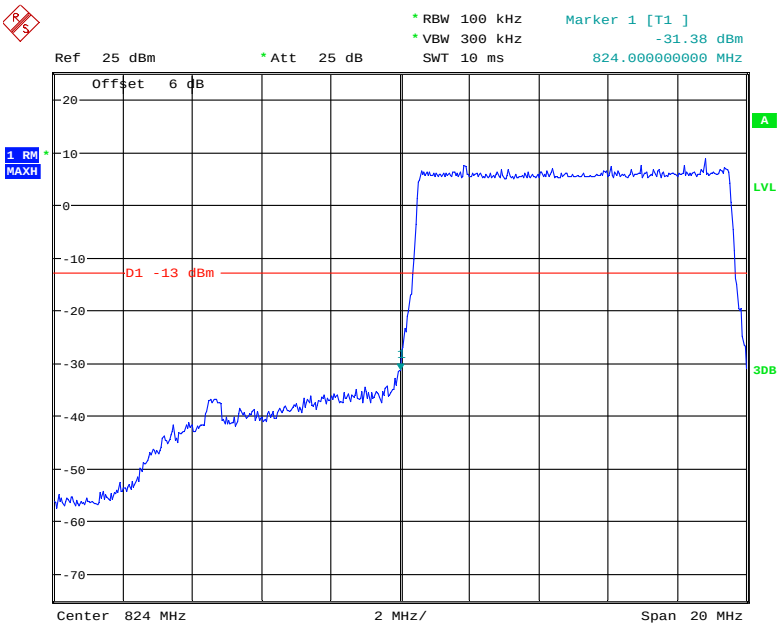
Date: 6.SEP.2019 22:13:28

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



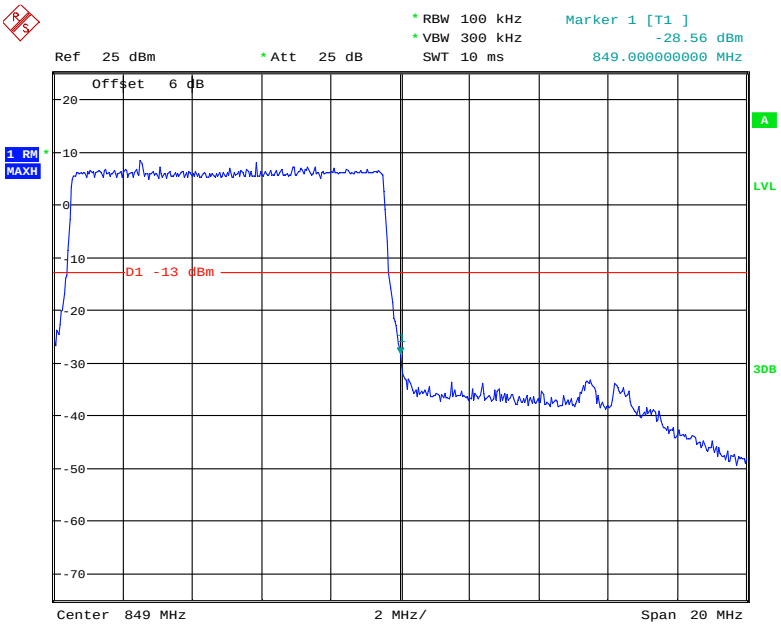
Date: 6.SEP.2019 22:14:20

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



Date: 6.SEP.2019 22:13:55

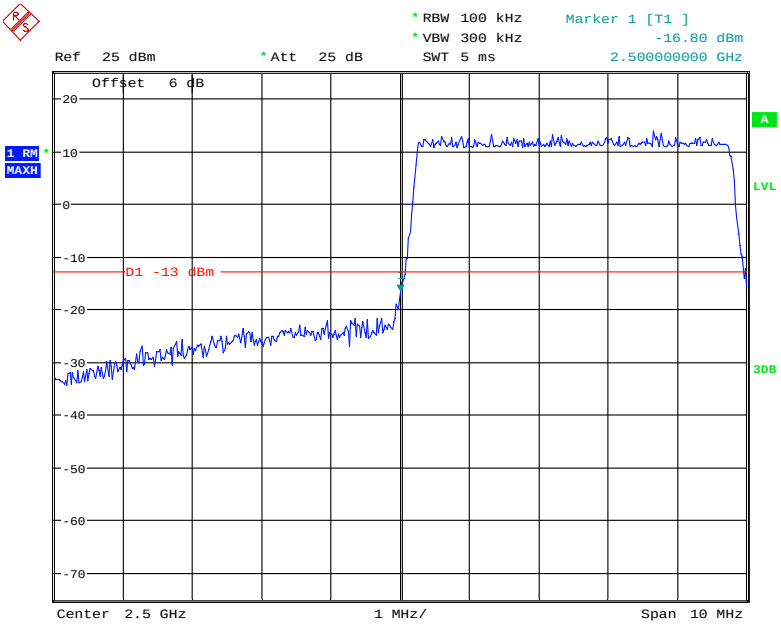
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 6.SEP.2019 22:14:52

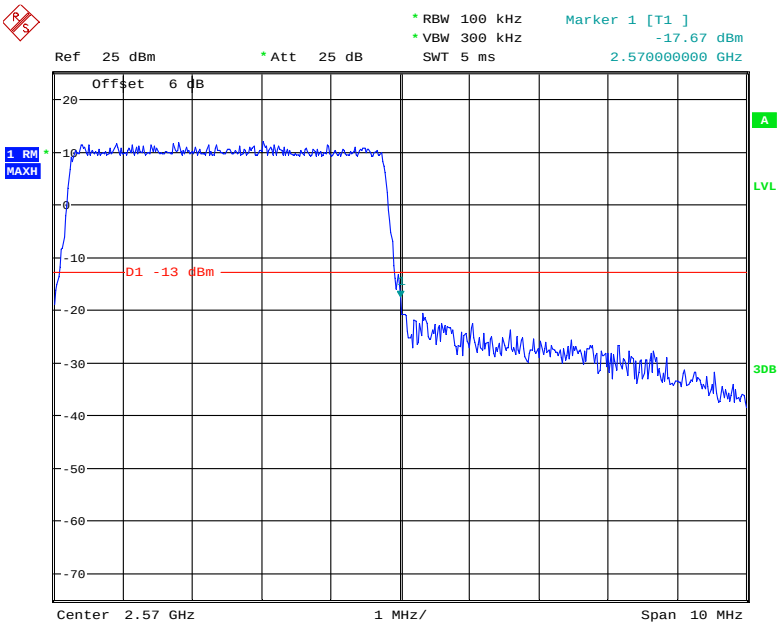
Band 7:

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



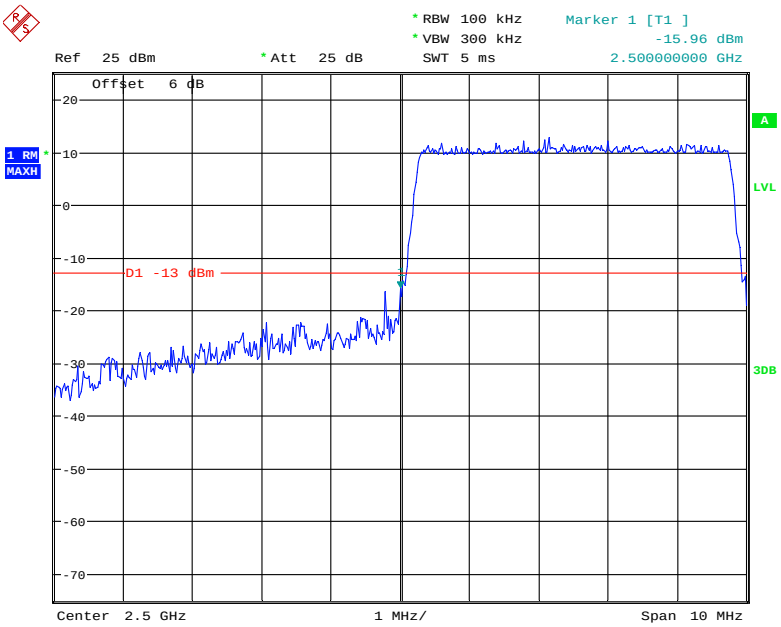
Date: 6.SEP.2019 22:15:27

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



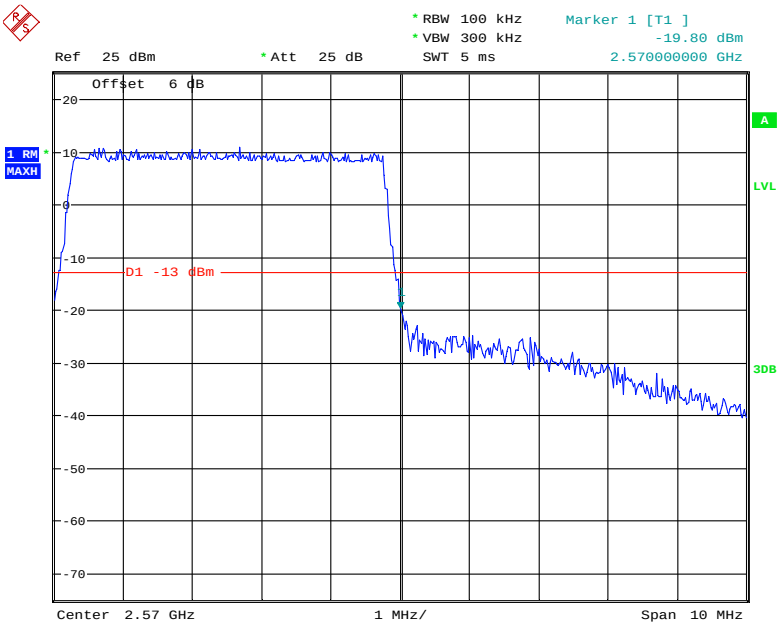
Date: 6.SEP.2019 22:16:31

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



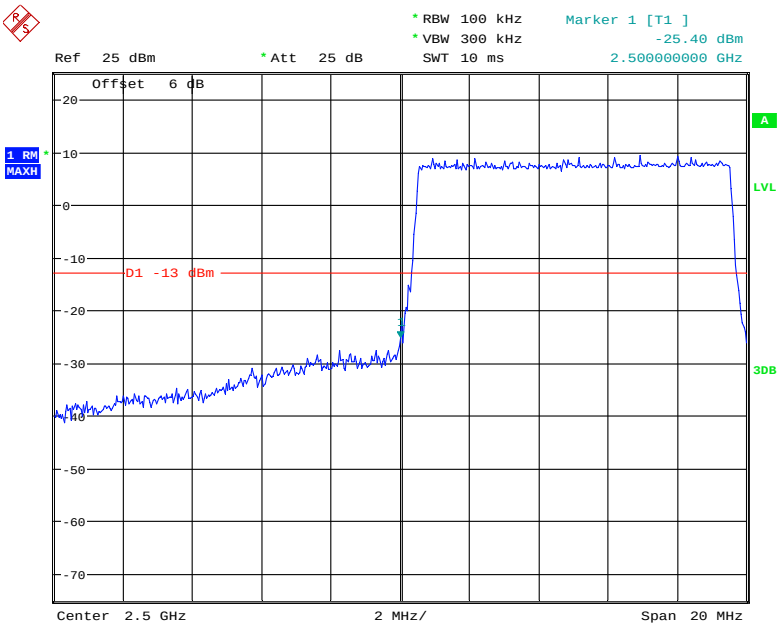
Date: 6.SEP.2019 22:15:53

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



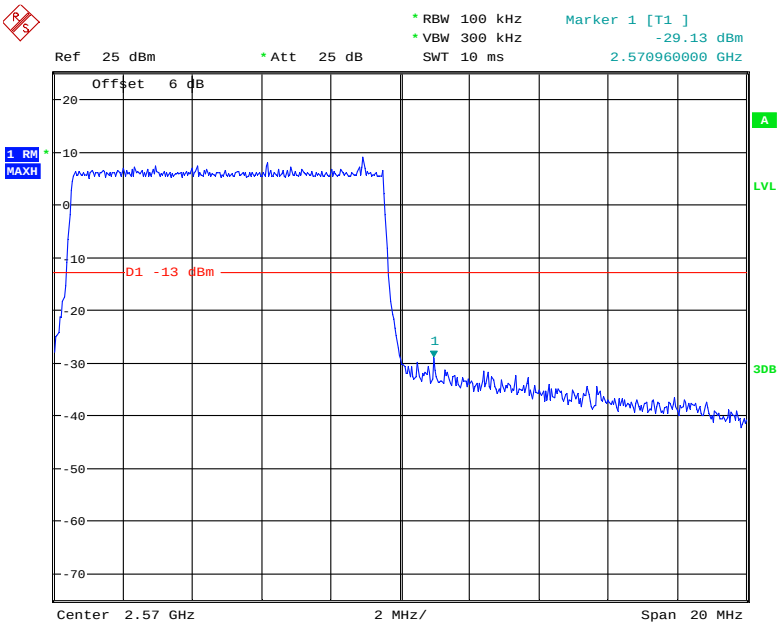
Date: 6.SEP.2019 22:17:03

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



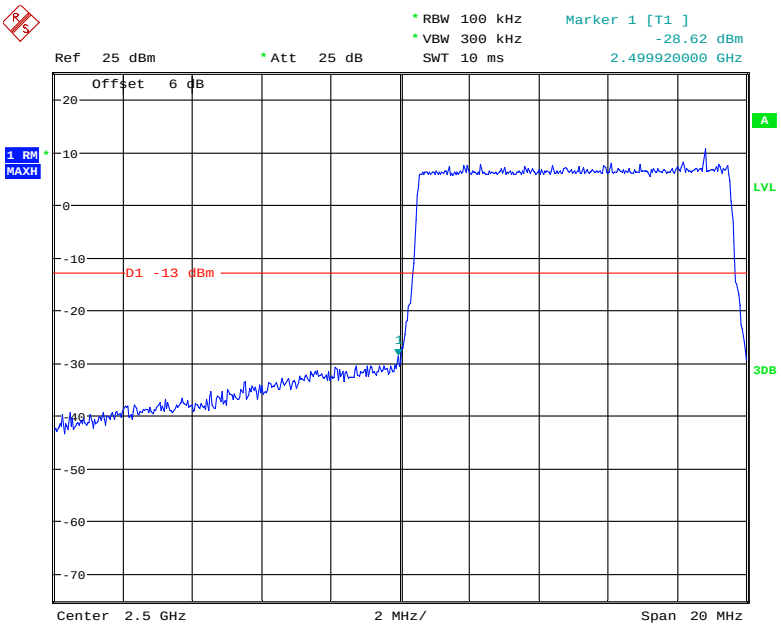
Date: 6.SEP.2019 22:17:39

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



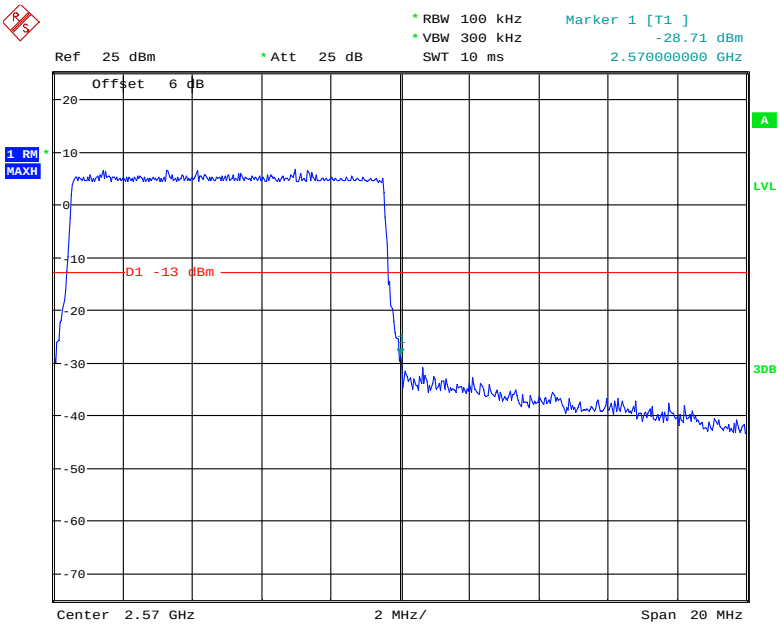
Date: 6.SEP.2019 22:18:33

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



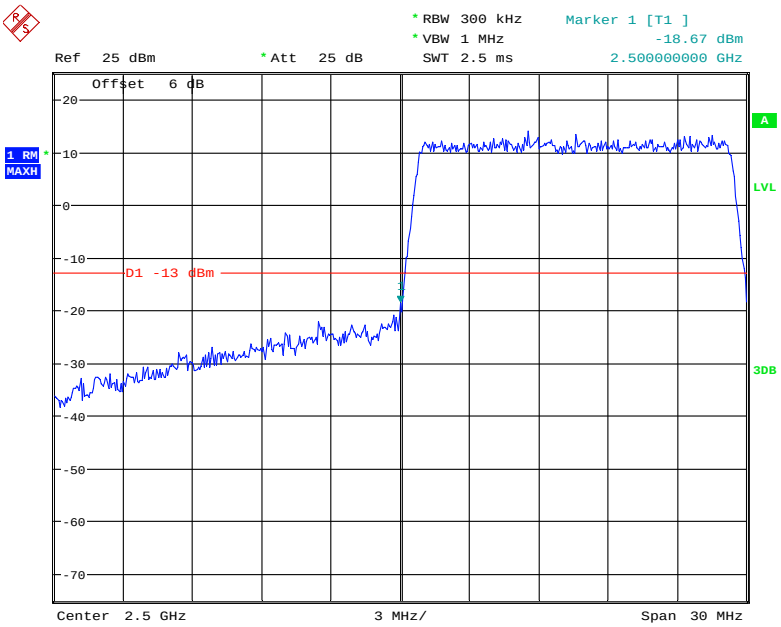
Date: 6.SEP.2019 22:18:03

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



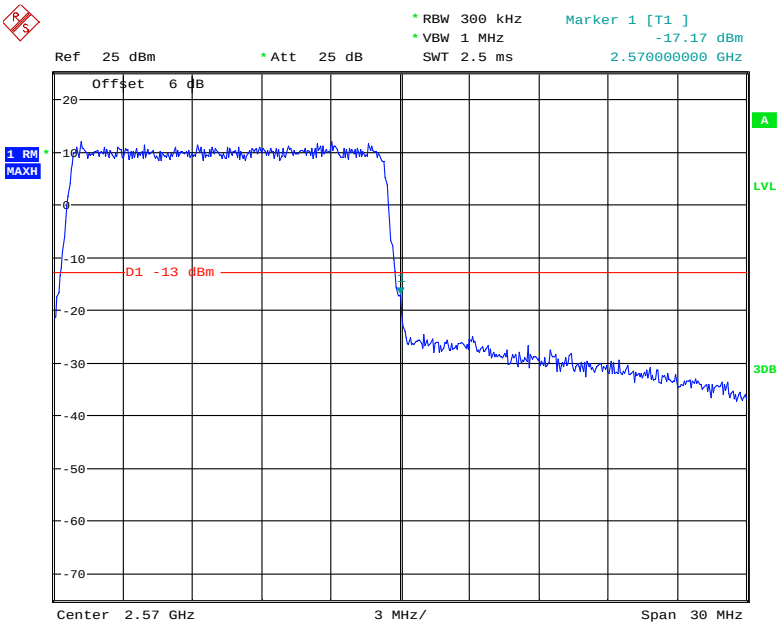
Date: 6.SEP.2019 22:19:06

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



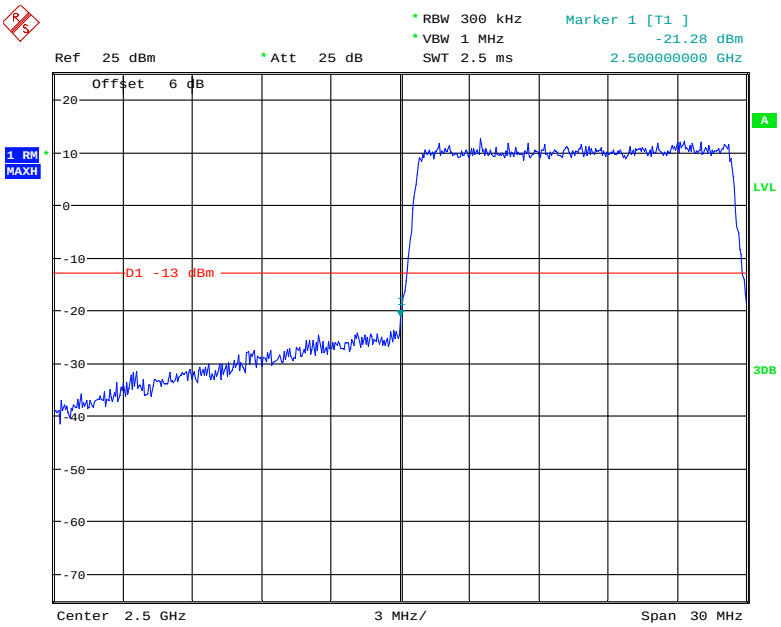
Date: 6.SEP.2019 22:19:41

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



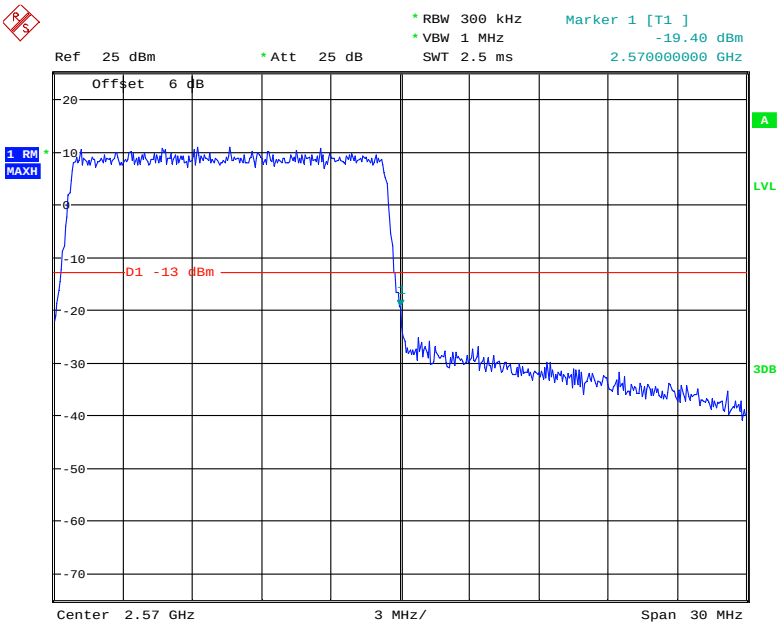
Date: 6.SEP.2019 22:20:55

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



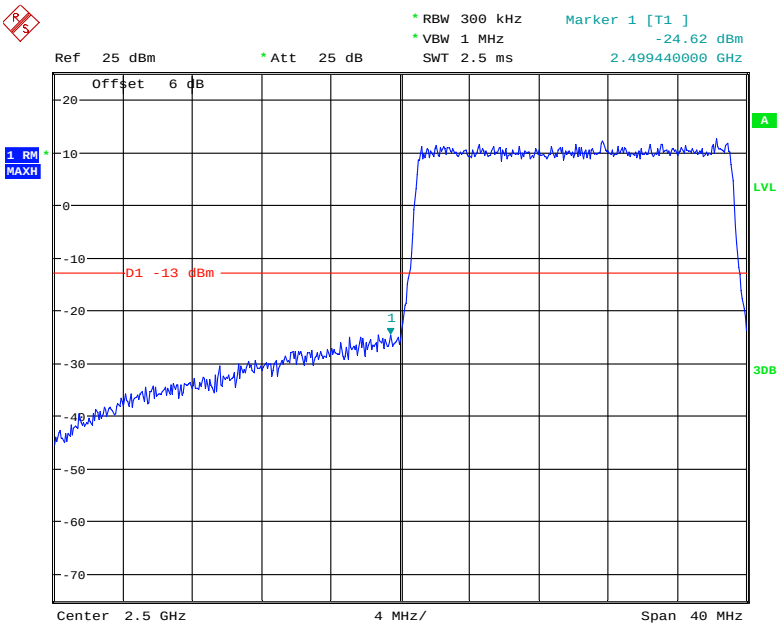
Date: 6.SEP.2019 22:20:16

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



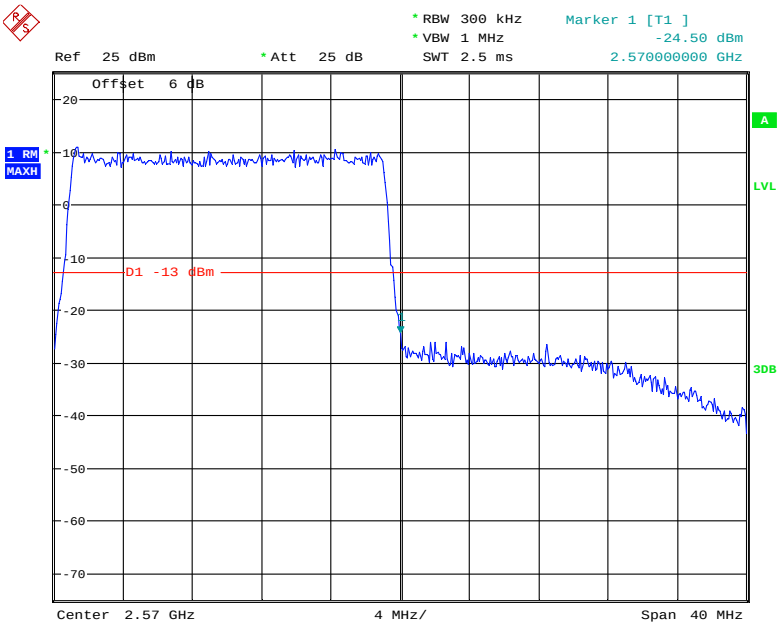
Date: 6.SEP.2019 22:21:24

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



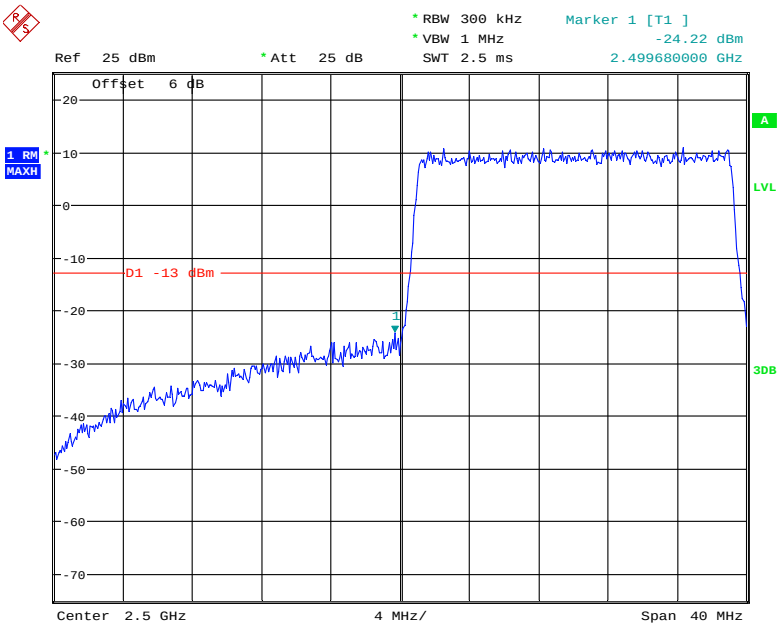
Date: 6.SEP.2019 22:22:14

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



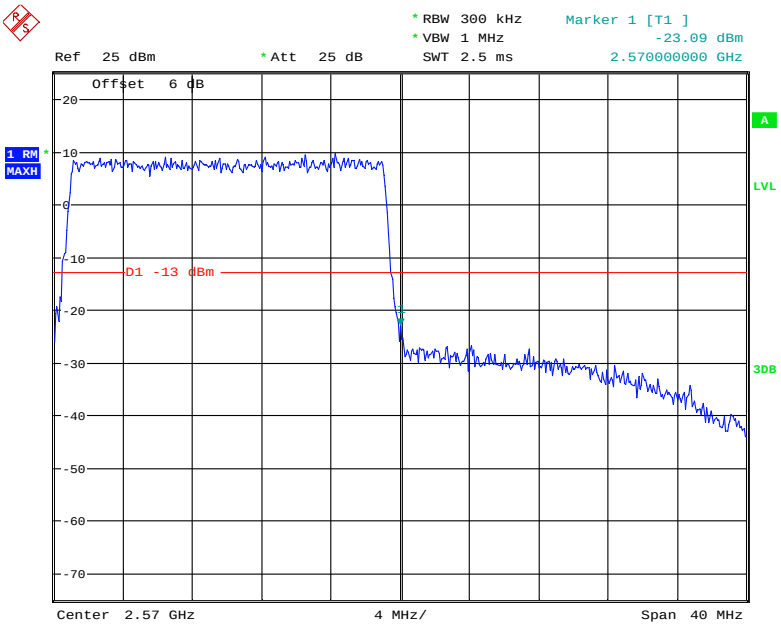
Date: 6.SEP.2019 22:23:13

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



Date: 6.SEP.2019 22:22:44

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



Date: 6.SEP.2019 22:23:46

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

Applicable Standard

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

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

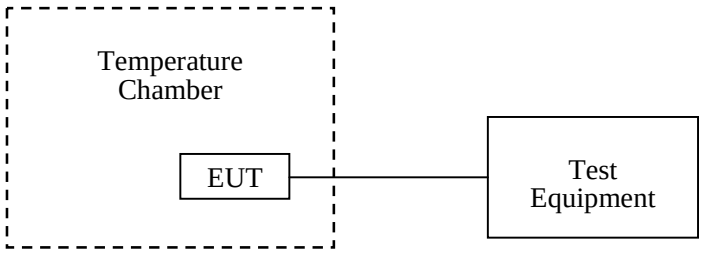
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

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

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

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



Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Geroge Zhong on 2019-09-09.

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	2	0.0024	2.5
-20		-1	-0.0012	2.5
-10		1	0.0012	2.5
0		-2	-0.0024	2.5
10		-3	-0.0036	2.5
20		2	0.0024	2.5
30		1	0.0012	2.5
40		2	0.0024	2.5
50		-2	-0.0024	2.5
20	V min.= 3.5	1	0.0012	2.5
	V max.= 4.4	2	0.0024	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	0.0060	2.5
-20		3	0.0036	2.5
-10		4	0.0048	2.5
0		5	0.0060	2.5
10		9	0.0108	2.5
20		6	0.0072	2.5
30		5	0.0060	2.5
40		4	0.0048	2.5
50		8	0.0096	2.5
20	V min.= 3.5	8	0.0096	2.5
	V max.= 4.4	6	0.0072	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	2	0.0024	2.5
-20		-1	-0.0012	2.5
-10		-3	-0.0036	2.5
0		1	0.0012	2.5
10		2	0.0024	2.5
20		-1	-0.0012	2.5
30		-2	-0.0024	2.5
40		3	0.0036	2.5
50		2	0.0024	2.5
20	V min.= 3.5	3	0.0036	2.5
	V max.= 4.4	4	0.0048	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	2	0.0011	pass
-20		4	0.0021	pass
-10		2	0.0011	pass
0		-4	-0.0021	pass
10		-3	-0.0016	pass
20		-3	-0.0016	pass
30		4	0.0021	pass
40		5	0.0027	pass
50		3	0.0016	pass
20	V min.= 3.5	2	0.0011	pass
	V max.= 4.4	-3	-0.0016	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	-0.0005	pass
-20		3	0.0016	pass
-10		6	0.0032	pass
0		4	0.0021	pass
10		6	0.0032	pass
20		-2	-0.0011	pass
30		5	0.0027	pass
40		6	0.0032	pass
50		4	0.0021	pass
20	V min.= 3.5	2	0.0011	pass
	V max.= 4.4	-1	-0.0005	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	2	0.0011	pass
-20		-3	-0.0016	pass
-10		2	0.0011	pass
0		-2	-0.0011	pass
10		-1	-0.0005	pass
20		1	0.0005	pass
30		-3	-0.0016	pass
40		2	0.0011	pass
50		6	0.0032	pass
20	V min.= 3.5	-6	-0.0032	pass
	V max.= 4.4	-5	-0.0027	pass

AWS Band /WCDMA

Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	1710.5278	1754.7543	1710	1755
-20		1710.5269	1754.7575	1710	1755
-10		1710.5248	1754.7527	1710	1755
0		1710.5287	1754.7545	1710	1755
10		1710.5276	1754.7541	1710	1755
20		1710.5238	1754.7586	1710	1755
30		1710.5258	1754.7557	1710	1755
40		1710.5244	1754.7577	1710	1755
50		1710.5273	1754.7522	1710	1755
20	V min.= 3.5	1710.5221	1754.7569	1710	1755
	V max.= 4.4	1710.5224	1754.7545	1710	1755

LTE:
QPSK:

Band 2:

10.0 MHz Middle Channel, f_o=1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.85	-9	-0.0048	pass
-20		-8	-0.0043	pass
-10		-7	-0.0037	pass
0		-24	-0.0128	pass
10		-21	-0.0112	pass
20		-21	-0.0112	pass
30		-10	-0.0053	pass
40		-9	-0.0048	pass
50		1	0.0005	pass
20	V min.= 3.5	4	0.0021	pass
	V max.= 4.4	5	0.0027	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	1710.5309	1754.7709	1710	1755
-20		1710.5235	1754.7575	1710	1755
-10		1710.5333	1754.7647	1710	1755
0		1710.5336	1754.7629	1710	1755
10		1710.5365	1754.7586	1710	1755
20		1710.5294	1754.7694	1710	1755
30		1710.5193	1754.7651	1710	1755
40		1710.5377	1754.7613	1710	1755
50		1710.5346	1754.7727	1710	1755
20	V min.= 3.5	1710.5410	1754.7612	1710	1755
	V max.= 4.4	1710.5236	1754.7558	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	-15	-0.0179	2.5
-20		-8	-0.0096	2.5
-10		-6	-0.0072	2.5
0		-11	-0.0132	2.5
10		-15	-0.0179	2.5
20		-17	-0.0203	2.5
30		-10	-0.0120	2.5
40		1	0.0012	2.5
50		-2	-0.0024	2.5
20	V min.= 3.5	6	0.0072	2.5
	V max.= 4.4	11	0.0131	2.5

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	2500.4529	2569.7019	2500	2570
-20		2500.4589	2569.7109	2500	2570
-10		2500.4523	2569.7129	2500	2570
0		2500.4611	2569.7112	2500	2570
10		2500.4565	2569.7129	2500	2570
20		2500.4500	2569.7144	2500	2570
30		2500.4614	2569.7028	2500	2570
40		2500.4621	2569.7057	2500	2570
50		2500.4560	2569.7008	2500	2570
20	V min.= 3.5	2500.4688	2569.7133	2500	2570
	V max.= 4.4	2500.4534	2569.7012	2500	2570

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	-16	-0.0085	pass
-20		-15	-0.0080	pass
-10		-13	-0.0069	pass
0		-11	-0.0059	pass
10		-8	-0.0043	pass
20		-5	-0.0027	pass
30		-3	-0.0016	pass
40		1	0.0005	pass
50		2	0.0011	pass
20	V min.= 3.5	5	0.0027	pass
	V max.= 4.4	7	0.0037	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	1710.4349	1754.7858	1710	1755
-20		1710.4426	1754.7863	1710	1755
-10		1710.4404	1754.7846	1710	1755
0		1710.4307	1754.7926	1710	1755
10		1710.4385	1754.7868	1710	1755
20		1710.4359	1754.7807	1710	1755
30		1710.4534	1754.7922	1710	1755
40		1710.4346	1754.7862	1710	1755
50		1710.4522	1754.7882	1710	1755
20	V min.= 3.5	1710.4451	1754.7941	1710	1755
	V max.= 4.4	1710.4548	1754.7941	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o=836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.85	-14	-0.0167	2.5
-20		-11	-0.0132	2.5
-10		-9	-0.0108	2.5
0		-8	-0.0096	2.5
10		-5	-0.0060	2.5
20		-4	-0.0048	2.5
30		-2	-0.0024	2.5
40		2	0.0024	2.5
50		4	0.0048	2.5
20	V min.= 3.5	5	0.0060	2.5
	V max.= 4.4	8	0.0096	2.5

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.85	2500.4581	2569.7152	2500	2570
-20		2500.4486	2569.7182	2500	2570
-10		2500.4674	2569.7046	2500	2570
0		2500.4628	2569.7060	2500	2570
10		2500.4541	2569.7121	2500	2570
20		2500.4649	2569.7013	2500	2570
30		2500.4605	2569.7057	2500	2570
40		2500.4549	2569.7026	2500	2570
50		2500.4524	2569.7059	2500	2570
20	V min.= 3.5	2500.4718	2569.7069	2500	2570
	V max.= 4.4	2500.4475	2569.7142	2500	2570

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