



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

For

Bolt Modus Corp

Oficina N.33 Edificio Ofidepositos Central, Calidonia – Distrito Federal, Panama

FCC ID: 2APW4MAX1P

Report Type: Original Report	Product Type: Smart phone
Report Number: RSZ190718008-00D	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Smart phone
Model	MAX 1 Plus
Frequency Range	Cellular: 824-849 MHz PCS: 1850-1910 MHz WCDMA B2/LTE B2: 1850-1910 MHz WCDMA B5: 824-849 MHz LTE B4: 1710- 1755 MHz LTE B7: 2500-2570 MHz LTE B12: 699-716 MHz LTE B17: 704-716 MHz
Transmit Conducted Power	GSM850: 33.52dBm(GMSK), 27.87dBm(8PSK) PCS1900: 29.74dBm(GMSK), 25.62dBm(8PSK) WCDMA Band 2: 22.14dBm WCDMA Band 5: 21.52dBm LTE Band 2: 23.12dBm LTE Band 4: 23.08dBm LTE Band 7: 22.16dBm LTE Band 12: 22.91dBm LTE Band 17: 22.81dBm
Modulation Technique	2G: GMSK,8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification	2G/3G/4G: FPC Antennas
Voltage Range	DC 3.8V from battery or DC 5.0V from Adapter
Date of Test	2019/07/23~2019/08/22
Sample serial number	190718008
Received date	2019/07/18
Sample/EUT Status	Good condition
Adapter information	Model: CMAX1P Input: AC 100-240V, 50/60Hz Output: DC 5.0V, 1.0A

Objective

This test report is prepared on behalf of *Bolt Modus Corp* 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: 2APW4MAX1P.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

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

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

The EUT was configured for testing according to TIA/EIA-603-D.
The final qualification test was performed with the EUT operating at normal mode.

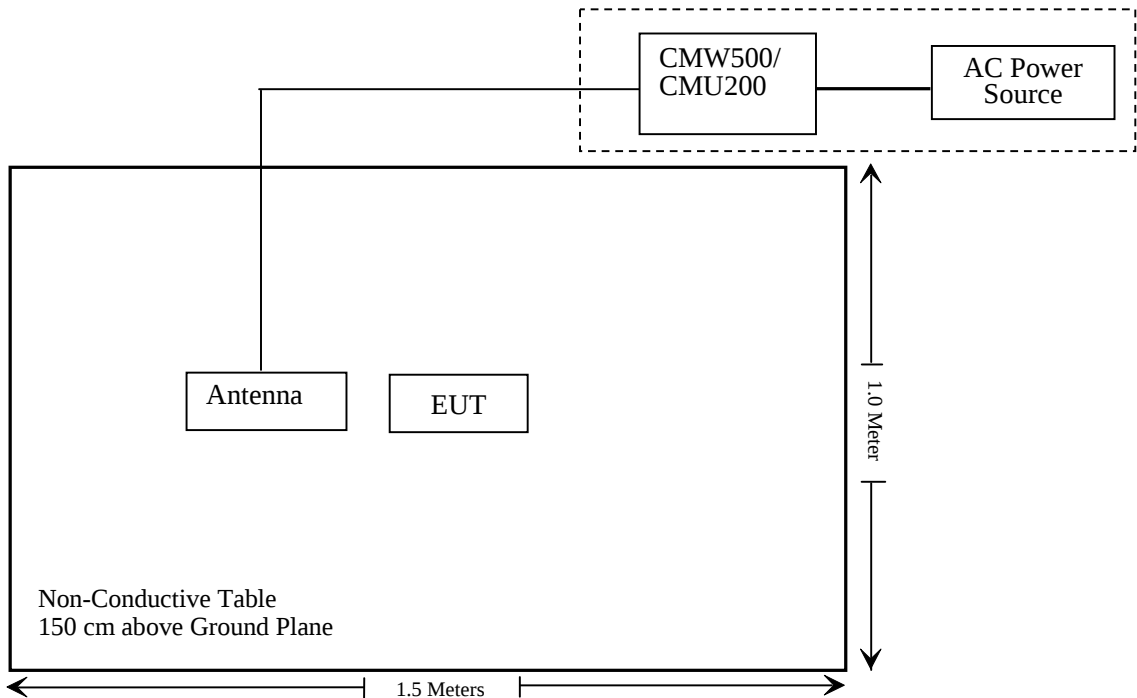
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

Note: * Please refer to SAR report released by BACL, report number: RSZ190718007-20A.

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
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
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	2020-07-09
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
Unknown	High Pass filter	1.3GHz	Unknown	2019-04-20	2020-04-20
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
WEINSCHTEL	3dB Attenuator	6231	666	Each Time	
Unknown	Power Splitter	1620	129	Each Time	

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

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ190718007-20A.

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 (c) (d) (h) - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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

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

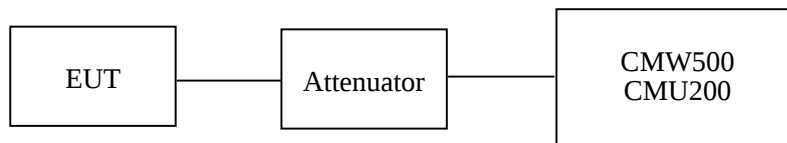
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Kieron Luo on 2019-08-22.

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

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.34	38.45
	190	836.6	32.42	38.45
	251	848.8	32.52	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.50	30.67	28.16	26.31	38.45
	190	836.6	32.42	30.49	28.21	26.16	38.45
	251	848.8	32.49	30.57	28.13	26.31	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.49	25.62	23.57	21.43	38.45
	190	836.6	27.35	25.52	23.68	21.51	38.45
	251	848.8	27.87	25.32	23.37	21.32	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		21.45	21.52	21.49
		HSDPA	1	20.46	20.62	20.54
			2	20.37	20.52	20.53
			3	20.43	20.59	20.49
			4	20.48	20.67	20.62
			5	20.42	20.58	20.54
		HSUPA	1	20.42	20.44	20.41
			2	20.46	20.32	20.44
			3	20.53	20.35	20.42
			4	20.59	20.36	20.43
			5	20.65	20.37	20.52

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.58	33
	661	1880.0	29.67	33
	810	1909.8	29.74	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.52	27.43	25.87	24.59	33
	661	1880.0	29.64	27.58	25.91	24.62	33
	810	1909.8	29.46	27.47	25.96	24.79	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	25.34	23.46	21.57	19.72	33
	661	1880.0	25.62	23.49	21.34	19.52	33
	810	1909.8	25.42	23.71	21.31	19.49	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		22.13	22.05	22.14
		HSDPA	1	21.43	21.56	21.75
			2	21.34	21.49	21.76
			3	21.35	21.57	21.49
			4	21.53	21.67	21.64
			5	21.48	21.58	21.74
		HSUPA	1	21.42	21.35	21.67
			2	21.34	21.38	21.76
			3	21.42	21.47	21.56
			4	21.38	21.49	21.64
			5	21.46	21.54	21.67

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.29	13
	Middle	1.34	13
	High	1.31	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.33	13
	Middle	1.29	13
	High	1.51	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.64	13
	Middle	3.58	13
	High	3.42	13
HSDPA (16QAM)	Low	3.16	13
	Middle	3.27	13
	High	3.51	13
HSUPA (BPSK)	Low	3.24	13
	Middle	3.37	13
	High	3.61	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.41	13
	Middle	1.34	13
	High	1.52	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.22	13
	Middle	1.26	13
	High	1.18	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.69	13
	Middle	2.29	13
	High	2.34	13
HSDPA (16QAM)	Low	2.44	13
	Middle	2.68	13
	High	2.82	13
HSUPA (BPSK)	Low	2.76	13
	Middle	2.34	13
	High	2.75	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	90.66	189	1.7	H	31.3	1.90	0.0	29.40	38.45	9.05
836.6	88.63	36	1.3	V	28.6	1.90	0.0	26.70	38.45	11.75
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	90.11	261	1.9	H	20.4	1.30	9.40	28.50	33	4.50
1880.00	89.68	40	2.2	V	19.8	1.30	9.40	27.90	33	5.10

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	87.03	214	2.3	H	27.7	1.90	0.0	25.80	38.45	12.65
836.6	85.24	55	2.2	V	25.2	1.90	0.0	23.30	38.45	15.15
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	86.02	209	1.7	H	16.3	1.30	9.40	24.40	33	8.60
1880.00	85.13	206	1.8	V	15.2	1.30	9.40	23.30	33	9.70

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	80.92	244	1.1	H	21.5	1.90	0.0	19.60	38.45	18.85
836.6	78.52	334	2.5	V	18.5	1.90	0.0	16.60	38.45	21.85
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	83.62	193	1.2	H	13.9	1.30	9.40	22.00	33	11.00
1880.00	82.72	280	1.9	V	12.8	1.30	9.40	20.90	33	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	22.42	22.34	22.58
		RB Size=1, RB Offset=2	22.26	22.22	22.12
		RB Size=1, RB Offset=5	22.37	22.37	22.34
		RB Size=3, RB Offset=0	22.90	22.92	22.85
		RB Size=3, RB Offset=1	22.86	22.80	22.68
		RB Size=3, RB Offset=2	21.85	21.84	21.71
		RB Size=6, RB Offset=0	22.42	22.34	22.58
	16QAM	RB Size=1, RB Offset=0	22.49	22.44	22.32
		RB Size=1, RB Offset=2	22.05	21.99	21.94
		RB Size=1, RB Offset=5	22.30	22.25	22.18
		RB Size=3, RB Offset=0	22.78	22.72	22.63
		RB Size=3, RB Offset=1	22.57	22.47	22.38
		RB Size=3, RB Offset=2	21.62	21.58	21.50
		RB Size=6, RB Offset=0	22.49	22.44	22.32
3.0	QPSK	RB Size=1, RB Offset=0	22.54	22.54	22.43
		RB Size=1, RB Offset=7	22.31	22.30	22.22
		RB Size=1, RB Offset=14	22.35	22.34	22.29
		RB Size=8, RB Offset=0	22.59	22.61	22.57
		RB Size=8, RB Offset=4	22.45	22.40	22.31
		RB Size=8, RB Offset=7	22.54	22.52	22.39
		RB Size=15, RB Offset=0	22.09	22.05	21.97
	16QAM	RB Size=1, RB Offset=0	22.54	22.49	22.44
		RB Size=1, RB Offset=7	22.34	22.25	22.14
		RB Size=1, RB Offset=14	22.88	22.82	22.78
		RB Size=8, RB Offset=0	22.47	22.40	22.29
		RB Size=8, RB Offset=4	22.25	22.16	22.07
		RB Size=8, RB Offset=7	22.46	22.43	22.33
		RB Size=15, RB Offset=0	21.94	21.83	21.77

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	22.26	22.4	22.15
		RB Size=1, RB Offset=12	22.21	22.35	22.05
		RB Size=1, RB Offset=24	22.37	22.47	22.24
		RB Size=12, RB Offset=0	21.87	22.06	21.82
		RB Size=12, RB Offset=6	21.80	22.02	21.69
		RB Size=12, RB Offset=11	21.98	22.19	21.92
		RB Size=25, RB Offset=0	21.45	21.79	21.54
	16QAM	RB Size=1, RB Offset=0	22.22	22.43	22.11
		RB Size=1, RB Offset=12	22.12	22.34	22.05
		RB Size=1, RB Offset=24	22.29	22.56	22.16
		RB Size=12, RB Offset=0	21.89	22.15	21.86
		RB Size=12, RB Offset=6	21.82	22.05	21.74
		RB Size=12, RB Offset=11	21.96	22.21	21.99
		RB Size=25, RB Offset=0	21.54	21.83	21.57
10.0	QPSK	RB Size=1, RB Offset=0	21.95	22.12	21.87
		RB Size=1, RB Offset=24	21.86	22.07	21.75
		RB Size=1, RB Offset=49	21.99	22.21	21.90
		RB Size=25, RB Offset=0	21.83	22.07	21.85
		RB Size=25, RB Offset=12	21.80	22.00	21.74
		RB Size=25, RB Offset=24	21.88	22.15	21.97
		RB Size=50, RB Offset=0	21.75	22.00	21.84
	16QAM	RB Size=1, RB Offset=0	21.92	22.08	21.84
		RB Size=1, RB Offset=24	21.83	22.03	21.71
		RB Size=1, RB Offset=49	21.97	22.19	21.89
		RB Size=25, RB Offset=0	21.72	21.95	21.71
		RB Size=25, RB Offset=12	21.64	21.84	21.65
		RB Size=25, RB Offset=24	21.85	22.06	21.78
		RB Size=50, RB Offset=0	21.45	21.86	21.57

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	21.43	21.73	21.37
		RB Size=1, RB Offset=37	21.35	21.65	21.26
		RB Size=1, RB Offset=74	21.55	21.78	21.47
		RB Size=36, RB Offset=0	21.42	21.68	21.48
		RB Size=36, RB Offset=18	21.34	21.60	21.41
		RB Size=36, RB Offset=37	21.51	21.80	21.54
		RB Size=75, RB Offset=0	21.42	21.65	21.34
	16QAM	RB Size=1, RB Offset=0	21.45	21.70	21.32
		RB Size=1, RB Offset=37	21.40	21.58	21.26
		RB Size=1, RB Offset=74	21.51	21.83	21.42
		RB Size=36, RB Offset=0	21.34	21.51	21.37
		RB Size=36, RB Offset=18	21.24	21.42	21.34
		RB Size=36, RB Offset=37	21.45	21.63	21.42
		RB Size=75, RB Offset=0	21.15	21.37	21.18
20.0	QPSK	RB Size=1, RB Offset=0	22.75	23.03	22.81
		RB Size=1, RB Offset=49	22.63	22.99	22.76
		RB Size=1, RB Offset=99	22.79	23.11	22.93
		RB Size=50, RB Offset=0	21.57	21.84	21.59
		RB Size=50, RB Offset=24	21.52	21.72	21.52
		RB Size=50, RB Offset=49	21.64	21.89	21.69
		RB Size=100, RB Offset=0	21.34	21.59	21.24
	16QAM	RB Size=1, RB Offset=0	22.74	23.02	22.72
		RB Size=1, RB Offset=49	22.71	22.94	22.63
		RB Size=1, RB Offset=99	22.86	23.12	22.76
		RB Size=50, RB Offset=0	22.26	22.51	22.17
		RB Size=50, RB Offset=24	22.22	22.39	22.14
		RB Size=50, RB Offset=49	22.29	22.63	22.26
		RB Size=100, RB Offset=0	21.54	21.83	21.45

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.95	13	Pass
QPSK (100RB Size)	4.66	13	Pass
16QAM (1RB Size)	4.75	13	Pass
16QAM (100RB Size)	4.38	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	82.52	187	2.3	H	12.8	1.30	9.40	20.90	33
1880.00	80.18	266	1.1	V	10.3	1.30	9.40	18.40	33
3 MHz Bandwidth									
1880.00	82.34	53	1.9	H	12.7	1.30	9.40	20.80	33
1880.00	80.53	3	2.5	V	10.6	1.30	9.40	18.70	33
5 MHz Bandwidth									
1880.00	81.93	303	1.9	H	12.3	1.30	9.40	20.40	33
1880.00	80.44	340	2.2	V	10.5	1.30	9.40	18.60	33
10 MHz Bandwidth									
1880.00	81.74	345	1.7	H	12.1	1.30	9.40	20.20	33
1880.00	80.01	219	1.4	V	10.1	1.30	9.40	18.20	33
15 MHz Bandwidth									
1880.00	81.51	337	2.4	H	11.8	1.30	9.40	19.90	33
1880.00	80.38	196	1.5	V	10.5	1.30	9.40	18.60	33
20 MHz Bandwidth									
1880.00	81.84	333	1.5	H	12.2	1.30	9.40	20.30	33
1880.00	80.73	310	1.1	V	10.8	1.30	9.40	18.90	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	82.57	137	1.6	H	12.9	1.30	9.40	21.00	33
1880.00	80.41	277	1.2	V	10.5	1.30	9.40	18.60	33
3 MHz Bandwidth									
1880.00	82.31	90	2.2	H	12.6	1.30	9.40	20.70	33
1880.00	80.34	70	1.2	V	10.4	1.30	9.40	18.50	33
5 MHz Bandwidth									
1880.00	82.02	356	1.5	H	12.3	1.30	9.40	20.40	33
1880.00	80.18	276	1.7	V	10.3	1.30	9.40	18.40	33
10 MHz Bandwidth									
1880.00	82.35	306	2.4	H	12.7	1.30	9.40	20.80	33
1880.00	80.52	193	1.8	V	10.6	1.30	9.40	18.70	33
15 MHz Bandwidth									
1880.00	81.88	168	1.3	H	12.2	1.30	9.40	20.30	33
1880.00	80.28	151	1.5	V	10.4	1.30	9.40	18.50	33
20 MHz Bandwidth									
1880.00	82.01	207	1.4	H	12.3	1.30	9.40	20.40	33
1880.00	81.63	79	1.8	V	11.7	1.30	9.40	19.80	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	22.18	22.36	22.55
		RB Size=1, RB Offset=2	21.29	21.22	21.11
		RB Size=1, RB Offset=5	21.65	21.66	21.55
		RB Size=3, RB Offset=0	22.65	22.60	22.48
		RB Size=3, RB Offset=1	22.55	22.48	22.40
		RB Size=3, RB Offset=2	21.48	21.50	21.42
		RB Size=6, RB Offset=0	22.18	22.36	22.55
	16QAM	RB Size=1, RB Offset=0	22.51	22.45	22.38
		RB Size=1, RB Offset=2	21.02	20.90	20.82
		RB Size=1, RB Offset=5	21.50	21.38	21.28
		RB Size=3, RB Offset=0	22.36	22.23	22.19
		RB Size=3, RB Offset=1	22.29	22.21	22.08
		RB Size=3, RB Offset=2	21.39	21.30	21.26
		RB Size=6, RB Offset=0	22.51	22.45	22.38
3.0	QPSK	RB Size=1, RB Offset=0	22.30	22.31	22.23
		RB Size=1, RB Offset=7	22.09	22.10	22.00
		RB Size=1, RB Offset=14	22.72	22.72	22.60
		RB Size=8, RB Offset=0	22.32	22.25	22.17
		RB Size=8, RB Offset=4	21.84	21.85	21.74
		RB Size=8, RB Offset=7	21.52	21.53	21.46
		RB Size=15, RB Offset=0	21.62	21.57	21.51
	16QAM	RB Size=1, RB Offset=0	22.38	22.32	22.43
		RB Size=1, RB Offset=7	22.93	22.25	22.56
		RB Size=1, RB Offset=14	22.89	22.11	22.73
		RB Size=8, RB Offset=0	22.91	21.84	22.61
		RB Size=8, RB Offset=4	22.78	21.94	22.62
		RB Size=8, RB Offset=7	22.51	22.21	23.02
		RB Size=15, RB Offset=0	22.49	22.31	22.86

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.21	22.32	22.36
		RB Size=1, RB Offset=12	22.30	21.99	22.49
		RB Size=1, RB Offset=24	22.56	22.26	22.46
		RB Size=12, RB Offset=0	22.77	21.84	22.62
		RB Size=12, RB Offset=6	22.49	21.97	22.75
		RB Size=12, RB Offset=11	22.67	21.91	23.08
		RB Size=25, RB Offset=0	22.60	21.86	22.80
	16QAM	RB Size=1, RB Offset=0	22.25	22.18	22.33
		RB Size=1, RB Offset=12	22.55	21.95	22.68
		RB Size=1, RB Offset=24	22.79	21.72	22.33
		RB Size=12, RB Offset=0	22.45	22.17	22.46
		RB Size=12, RB Offset=6	22.28	21.95	22.69
		RB Size=12, RB Offset=11	22.36	22.05	22.72
		RB Size=25, RB Offset=0	22.77	21.72	22.50
10.0	QPSK	RB Size=1, RB Offset=0	22.15	22.13	22.28
		RB Size=1, RB Offset=24	22.52	21.87	22.76
		RB Size=1, RB Offset=49	22.38	21.86	22.49
		RB Size=25, RB Offset=0	22.31	21.94	22.58
		RB Size=25, RB Offset=12	22.23	21.83	22.46
		RB Size=25, RB Offset=24	22.63	22.10	22.87
		RB Size=50, RB Offset=0	22.38	21.78	22.77
	16QAM	RB Size=1, RB Offset=0	22.24	22.17	22.24
		RB Size=1, RB Offset=24	21.93	21.98	21.92
		RB Size=1, RB Offset=49	21.92	22.01	21.90
		RB Size=25, RB Offset=0	21.89	21.82	22.03
		RB Size=25, RB Offset=12	22.09	21.75	21.93
		RB Size=25, RB Offset=24	21.90	22.05	21.62
		RB Size=50, RB Offset=0	21.83	21.71	21.78

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.11	22.13	22.21
		RB Size=1, RB Offset=37	21.78	21.84	22.13
		RB Size=1, RB Offset=74	21.86	21.77	21.89
		RB Size=36, RB Offset=0	21.84	21.76	22.17
		RB Size=36, RB Offset=18	21.71	21.82	21.94
		RB Size=36, RB Offset=37	21.78	21.69	21.85
		RB Size=75, RB Offset=0	22.06	21.82	22.07
	16QAM	RB Size=1, RB Offset=0	22.18	22.36	22.55
		RB Size=1, RB Offset=37	21.29	21.22	21.11
		RB Size=1, RB Offset=74	21.65	21.66	21.55
		RB Size=36, RB Offset=0	22.65	22.60	22.48
		RB Size=36, RB Offset=18	22.55	22.48	22.40
		RB Size=36, RB Offset=37	21.48	21.50	21.42
		RB Size=75, RB Offset=0	22.18	22.36	22.55
20.0	QPSK	RB Size=1, RB Offset=0	22.50	22.38	22.28
		RB Size=1, RB Offset=49	22.38	22.30	22.23
		RB Size=1, RB Offset=99	22.30	22.17	22.13
		RB Size=50, RB Offset=0	22.48	22.41	22.33
		RB Size=50, RB Offset=24	21.94	21.84	21.80
		RB Size=50, RB Offset=49	21.96	21.91	21.88
		RB Size=100, RB Offset=0	21.92	21.86	21.75
	16QAM	RB Size=1, RB Offset=0	22.65	22.67	22.57
		RB Size=1, RB Offset=49	22.55	22.52	22.44
		RB Size=1, RB Offset=99	22.42	22.44	22.33
		RB Size=50, RB Offset=0	22.75	22.69	22.58
		RB Size=50, RB Offset=24	22.10	22.07	22.01
		RB Size=50, RB Offset=49	22.13	22.13	22.04
		RB Size=100, RB Offset=0	22.08	22.05	22.01

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.73	13	Pass
QPSK (100RB Size)	4.84	13	Pass
16QAM (1RB Size)	4.30	13	Pass
16QAM (100RB Size)	4.32	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.67	171	1.5	H	13.3	1.30	8.90	20.90	30
1732.50	83.22	341	1.6	V	10.5	1.30	8.90	18.10	30
3 MHz Bandwidth									
1732.50	86.38	174	2.2	H	13.1	1.30	8.90	20.70	30
1732.50	83.28	232	2.1	V	10.6	1.30	8.90	18.20	30
5 MHz Bandwidth									
1732.50	86.17	357	2.1	H	12.8	1.30	8.90	20.40	30
1732.50	83.69	138	1.9	V	11.0	1.30	8.90	18.60	30
10 MHz Bandwidth									
1732.50	84.38	258	2.0	H	11.1	1.30	8.90	18.70	30
1732.50	83.12	36	1.1	V	10.4	1.30	8.90	18.00	30
15 MHz Bandwidth									
1732.50	85.84	258	2.2	H	12.5	1.30	8.90	20.10	30
1732.50	83.29	169	1.3	V	10.6	1.30	8.90	18.20	30
20 MHz Bandwidth									
1732.50	85.37	340	2.0	H	12.0	1.30	8.90	19.60	30
1732.50	82.58	341	1.6	V	9.9	1.30	8.90	17.50	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.35	329	2.1	H	13.0	1.30	8.90	20.60	30
1732.50	84.27	73	1.3	V	11.5	1.30	8.90	19.10	30
3 MHz Bandwidth									
1732.50	86.08	339	1.6	H	12.8	1.30	8.90	20.40	30
1732.50	84.33	141	2.4	V	11.6	1.30	8.90	19.20	30
5 MHz Bandwidth									
1732.50	85.87	73	1.4	H	12.5	1.30	8.90	20.10	30
1732.50	83.94	16	2.1	V	11.2	1.30	8.90	18.80	30
10 MHz Bandwidth									
1732.50	85.54	352	2.1	H	12.2	1.30	8.90	19.80	30
1732.50	83.69	157	1.5	V	11.0	1.30	8.90	18.60	30
15 MHz Bandwidth									
1732.50	85.21	303	1.7	H	11.9	1.30	8.90	19.50	30
1732.50	83.28	55	1.5	V	10.6	1.30	8.90	18.20	30
20 MHz Bandwidth									
1732.50	84.72	239	1.7	H	11.4	1.30	8.90	19.00	30
1732.50	83.76	103	1.6	V	11.0	1.30	8.90	18.60	30

LTE Band 7:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	21.33	21.56	21.48
		RB Size=1, RB Offset=12	20.34	20.27	20.15
		RB Size=1, RB Offset=24	20.78	20.73	20.60
		RB Size=12, RB Offset=0	21.71	21.65	21.61
		RB Size=12, RB Offset=6	21.92	21.91	21.87
		RB Size=12, RB Offset=11	21.10	21.13	21.10
		RB Size=25, RB Offset=0	21.33	21.56	21.48
	16QAM	RB Size=1, RB Offset=0	21.38	21.32	21.22
		RB Size=1, RB Offset=12	20.35	20.33	20.34
		RB Size=1, RB Offset=24	20.52	20.48	20.43
		RB Size=12, RB Offset=0	21.48	21.42	21.31
		RB Size=12, RB Offset=6	21.77	21.64	21.55
		RB Size=12, RB Offset=11	20.99	20.86	20.78
		RB Size=25, RB Offset=0	21.38	21.32	21.22
10.0	QPSK	RB Size=1, RB Offset=0	21.48	21.42	21.32
		RB Size=1, RB Offset=24	21.28	21.28	21.25
		RB Size=1, RB Offset=49	21.24	21.24	21.19
		RB Size=25, RB Offset=0	21.70	21.63	21.59
		RB Size=25, RB Offset=12	20.91	20.88	20.83
		RB Size=25, RB Offset=24	21.33	21.36	21.24
		RB Size=50, RB Offset=0	20.59	20.57	20.51
	16QAM	RB Size=1, RB Offset=0	21.19	21.11	21.06
		RB Size=1, RB Offset=24	21.14	21.03	20.97
		RB Size=1, RB Offset=49	21.15	21.10	21.04
		RB Size=25, RB Offset=0	21.53	21.41	21.37
		RB Size=25, RB Offset=12	20.71	20.59	20.49
		RB Size=25, RB Offset=24	21.17	21.13	21.06
		RB Size=50, RB Offset=0	20.43	20.32	20.19

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	21.76	21.74	21.61
		RB Size=1, RB Offset=37	21.41	21.38	21.32
		RB Size=1, RB Offset=74	21.26	21.27	21.20
		RB Size=36, RB Offset=0	22.02	21.98	21.92
		RB Size=36, RB Offset=18	22.16	22.10	22.02
		RB Size=36, RB Offset=37	21.61	21.57	21.54
		RB Size=75, RB Offset=0	22.14	22.13	22.05
	16QAM	RB Size=1, RB Offset=0	21.52	21.45	21.33
		RB Size=1, RB Offset=37	21.27	21.18	21.10
		RB Size=1, RB Offset=74	21.11	21.05	21.00
		RB Size=36, RB Offset=0	21.87	21.81	21.77
		RB Size=36, RB Offset=18	21.92	21.86	21.82
		RB Size=36, RB Offset=37	21.49	21.42	21.31
		RB Size=75, RB Offset=0	21.94	21.90	21.86
20.0	QPSK	RB Size=1, RB Offset=0	21.39	21.30	21.25
		RB Size=1, RB Offset=49	20.92	20.83	20.74
		RB Size=1, RB Offset=99	20.30	20.20	20.12
		RB Size=50, RB Offset=0	21.35	21.24	21.20
		RB Size=50, RB Offset=24	21.29	21.18	21.11
		RB Size=50, RB Offset=49	21.09	21.06	20.94
		RB Size=100, RB Offset=0	21.39	21.30	21.25
	16QAM	RB Size=1, RB Offset=0	21.12	21.10	21.03
		RB Size=1, RB Offset=49	21.04	21.01	20.95
		RB Size=1, RB Offset=99	21.61	21.54	21.43
		RB Size=50, RB Offset=0	21.07	21.03	20.96
		RB Size=50, RB Offset=24	21.15	21.15	21.10
		RB Size=50, RB Offset=49	20.55	20.56	20.44
		RB Size=100, RB Offset=0	21.04	21.04	20.93

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.76	13	Pass
QPSK (50RB Size)	4.17	13	Pass
16QAM (1RB Size)	3.15	13	Pass
16QAM (50RB Size)	3.89	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	83.25	266	1.8	H	13.1	2.60	10.20	20.70	33
2535.00	80.39	120	1.4	V	10.8	2.60	10.20	18.40	33
10 MHz Bandwidth									
2535.00	83.38	18	2.3	H	13.2	2.60	10.20	20.80	33
2535.00	80.25	123	1.9	V	10.7	2.60	10.20	18.30	33
15 MHz Bandwidth									
2535.00	83.21	142	1.7	H	13.0	2.60	10.20	20.60	33
2535.00	80.44	242	2.4	V	10.9	2.60	10.20	18.50	33
20 MHz Bandwidth									
2535.00	83.53	296	1.2	H	13.4	2.60	10.20	21.00	33
2535.00	81.02	139	2.1	V	11.5	2.60	10.20	19.10	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	83.09	125	1.3	H	12.9	2.60	10.20	20.50	33
2535.00	80.56	86	1.3	V	11.0	2.60	10.20	18.60	33
10 MHz Bandwidth									
2535.00	82.84	134	1.5	H	12.7	2.60	10.20	20.30	33
2535.00	80.35	125	1.8	V	10.8	2.60	10.20	18.40	33
15 MHz Bandwidth									
2535.00	82.18	45	2.1	H	12.0	2.60	10.20	19.60	33
2535.00	80.34	82	2.0	V	10.8	2.60	10.20	18.40	33
20 MHz Bandwidth									
2535.00	81.69	290	1.1	H	11.5	2.60	10.20	19.10	33
2535.00	79.48	46	2.0	V	9.9	2.60	10.20	17.50	33

LTE Band 12:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.36	22.36	22.28
		RB Size=1, RB Offset=2	22.24	22.17	22.09
		RB Size=1, RB Offset=5	22.00	22.02	21.98
		RB Size=3, RB Offset=0	22.56	22.57	22.50
		RB Size=3, RB Offset=1	22.44	22.42	22.30
		RB Size=3, RB Offset=2	22.32	22.30	22.20
		RB Size=6, RB Offset=0	22.75	22.71	22.60
	16QAM	RB Size=1, RB Offset=0	22.25	22.20	22.14
		RB Size=1, RB Offset=2	21.99	21.95	21.88
		RB Size=1, RB Offset=5	21.91	21.87	21.80
		RB Size=3, RB Offset=0	22.38	22.34	22.24
		RB Size=3, RB Offset=1	22.26	22.20	22.16
		RB Size=3, RB Offset=2	22.13	22.02	21.94
		RB Size=6, RB Offset=0	22.53	22.41	22.30
3.0	QPSK	RB Size=1, RB Offset=0	22.75	22.78	22.73
		RB Size=1, RB Offset=7	22.12	22.11	22.08
		RB Size=1, RB Offset=14	22.91	22.88	22.79
		RB Size=8, RB Offset=0	22.44	22.42	22.35
		RB Size=8, RB Offset=4	22.41	22.41	22.30
		RB Size=8, RB Offset=7	21.89	21.86	21.73
		RB Size=15, RB Offset=0	21.94	21.93	21.87
	16QAM	RB Size=1, RB Offset=0	22.62	22.56	22.50
		RB Size=1, RB Offset=7	22.04	22.01	21.94
		RB Size=1, RB Offset=14	22.75	22.71	22.64
		RB Size=8, RB Offset=0	22.30	22.27	22.17
		RB Size=8, RB Offset=4	22.25	22.17	22.09
		RB Size=8, RB Offset=7	21.60	21.56	21.52
		RB Size=15, RB Offset=0	21.84	21.80	21.73

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	22.18	22.19	22.07
		RB Size=1, RB Offset=12	21.21	21.14	21.10
		RB Size=1, RB Offset=24	21.59	21.60	21.54
		RB Size=12, RB Offset=0	22.55	22.49	22.44
		RB Size=12, RB Offset=6	22.54	22.52	22.45
		RB Size=12, RB Offset=11	22.16	22.10	22.04
		RB Size=25, RB Offset=0	22.40	22.34	22.28
	16QAM	RB Size=1, RB Offset=0	21.97	21.86	21.76
		RB Size=1, RB Offset=12	20.97	20.94	20.91
		RB Size=1, RB Offset=24	21.44	21.34	21.26
		RB Size=12, RB Offset=0	22.40	22.34	22.28
		RB Size=12, RB Offset=6	22.37	22.29	22.21
		RB Size=12, RB Offset=11	21.96	21.84	21.72
		RB Size=25, RB Offset=0	20.75	20.73	20.79
10.0	QPSK	RB Size=1, RB Offset=0	22.42	22.38	22.32
		RB Size=1, RB Offset=24	22.26	22.29	22.18
		RB Size=1, RB Offset=49	21.92	21.87	21.75
		RB Size=25, RB Offset=0	22.62	22.60	22.50
		RB Size=25, RB Offset=12	22.52	22.53	22.42
		RB Size=25, RB Offset=24	22.09	22.08	21.96
		RB Size=50, RB Offset=0	22.68	22.68	22.56
	16QAM	RB Size=1, RB Offset=0	21.70	21.66	21.66
		RB Size=1, RB Offset=24	21.63	21.55	21.67
		RB Size=1, RB Offset=49	21.44	21.42	21.72
		RB Size=25, RB Offset=0	22.64	20.69	20.78
		RB Size=25, RB Offset=12	22.55	20.51	20.57
		RB Size=25, RB Offset=24	22.63	20.30	20.36
		RB Size=50, RB Offset=0	20.51	20.52	20.56

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.84	13	Pass
QPSK (50RB Size)	4.53	13	Pass
16QAM (1RB Size)	4.54	13	Pass
16QAM (50RB Size)	4.32	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	89.58	76	1.7	H	21.8	1.56	0.0	20.24	34.77
707.5	85.39	294	1.4	V	19.1	1.56	0.0	17.54	34.77
3 MHz Bandwidth									
707.5	89.44	24	1.2	H	21.7	1.56	0.0	20.14	34.77
707.5	85.13	164	1.1	V	18.8	1.56	0.0	17.24	34.77
5 MHz Bandwidth									
707.5	89.17	198	2.0	H	21.4	1.56	0.0	19.84	34.77
707.5	85.82	210	2.3	V	19.5	1.56	0.0	17.94	34.77
10 MHz Bandwidth									
707.5	89.72	197	1.3	H	21.9	1.56	0.0	20.34	34.77
707.5	85.11	236	1.2	V	18.8	1.56	0.0	17.24	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	89.86	50	1.3	H	22.1	1.56	0.0	20.54	34.77
707.5	86.01	135	1.2	V	19.7	1.56	0.0	18.14	34.77
3 MHz Bandwidth									
707.5	89.52	24	1.3	H	21.7	1.56	0.0	20.14	34.77
707.5	85.49	268	2.2	V	19.2	1.56	0.0	17.64	34.77
5 MHz Bandwidth									
707.5	89.31	99	1.6	H	21.5	1.56	0.0	19.94	34.77
707.5	85.17	233	2.3	V	18.8	1.56	0.0	17.24	34.77
10 MHz Bandwidth									
707.5	89.68	163	1.9	H	21.9	1.56	0.0	20.34	34.77
707.5	85.33	52	2.2	V	19.0	1.56	0.0	17.44	34.77

LTE Band 17:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.43	22.37	22.33
		RB Size=1, RB Offset=12	21.80	21.77	21.66
		RB Size=1, RB Offset=24	22.34	22.28	22.18
		RB Size=12, RB Offset=0	22.81	22.81	22.77
		RB Size=12, RB Offset=6	22.46	22.45	22.36
		RB Size=12, RB Offset=11	22.33	22.28	22.23
		RB Size=25, RB Offset=0	22.48	22.44	22.40
	16QAM	RB Size=1, RB Offset=0	22.22	22.12	22.09
		RB Size=1, RB Offset=12	21.57	21.48	21.43
		RB Size=1, RB Offset=24	22.05	21.96	21.90
		RB Size=12, RB Offset=0	22.67	22.59	22.51
		RB Size=12, RB Offset=6	22.33	22.27	22.16
		RB Size=12, RB Offset=11	22.17	22.07	21.97
		RB Size=25, RB Offset=0	22.30	22.20	22.07
10	QPSK	RB Size=1, RB Offset=0	22.29	22.24	22.14
		RB Size=1, RB Offset=24	22.29	22.23	22.11
		RB Size=1, RB Offset=49	22.51	22.52	22.49
		RB Size=25, RB Offset=0	22.35	22.35	22.25
		RB Size=25, RB Offset=12	21.84	21.83	21.72
		RB Size=25, RB Offset=24	21.93	21.88	21.84
		RB Size=50, RB Offset=0	22.02	22.04	21.92
	16QAM	RB Size=1, RB Offset=0	22.69	22.58	22.46
		RB Size=1, RB Offset=24	21.89	21.85	21.74
		RB Size=1, RB Offset=49	22.78	22.71	22.64
		RB Size=25, RB Offset=0	22.24	22.11	22.02
		RB Size=25, RB Offset=12	22.40	22.34	22.22
		RB Size=25, RB Offset=24	21.52	21.40	21.36
		RB Size=50, RB Offset=0	22.66	22.62	22.50

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.66	13	Pass
QPSK (50RB Size)	4.44	13	Pass
16QAM (1RB Size)	4.10	13	Pass
16QAM (50RB Size)	4.25	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 (dBd)		
Middle Channel									
5 MHz Bandwidth									
710	89.24	234	1.2	H	21.5	1.56	0.0	19.94	34.77
710	84.33	268	1.1	V	18.0	1.56	0.0	16.44	34.77
10 MHz Bandwidth									
710	89.68	277	2.4	H	21.9	1.56	0.0	20.34	34.77
710	84.68	317	2.4	V	18.3	1.56	0.0	16.74	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd)		
Middle Channel									
5 MHz Bandwidth									
710	89.62	79	1.5	H	21.8	1.56	0.0	20.24	34.77
710	84.28	305	2.0	V	17.9	1.56	0.0	16.34	34.77
10 MHz Bandwidth									
710	89.82	90	1.2	H	22.0	1.56	0.0	20.44	34.77
710	84.63	240	2.0	V	18.3	1.56	0.0	16.74	34.77

Note:

All above data were tested with no amplifier

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

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

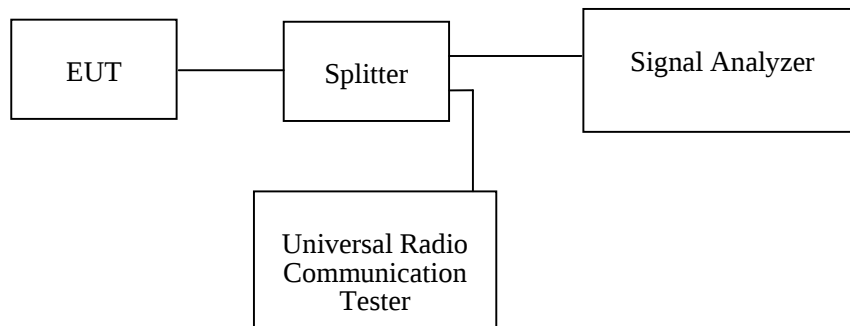
Applicable Standard

FCC 47 §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

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

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded.



Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by George Zhong and Kieron Luo from 2019-07-23 to 2019-07-24.

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	243.59	317.31
EGPRS(8PSK)	836.6	245.19	315.06

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.15	4.66
HSUPA (BPSK)	836.6	4.17	4.68
HSDPA (16QAM)	836.6	4.15	4.69

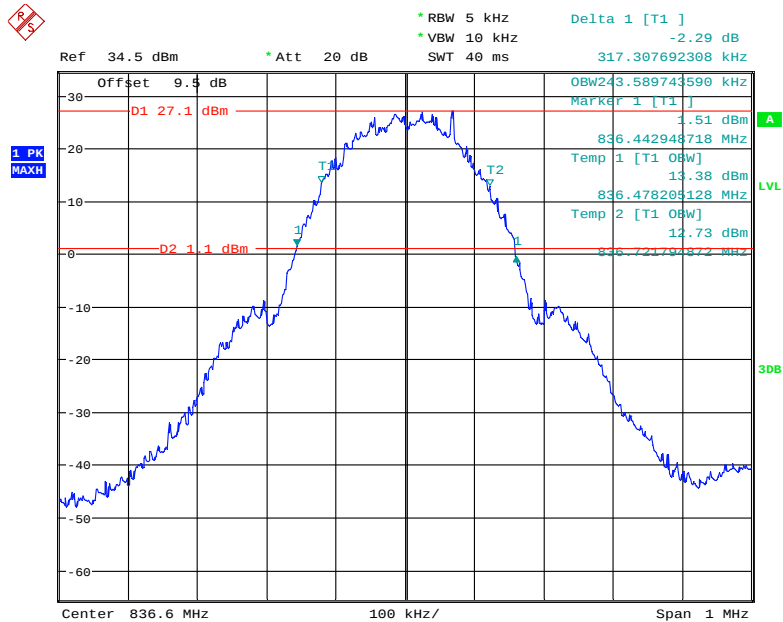
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	246.79	317.63
EGPRS(8PSK)	1880.0	248.40	317.31

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.17	4.71
HSUPA (BPSK)	1880.0	4.17	4.70
HSDPA (16QAM)	1880.0	4.18	4.72

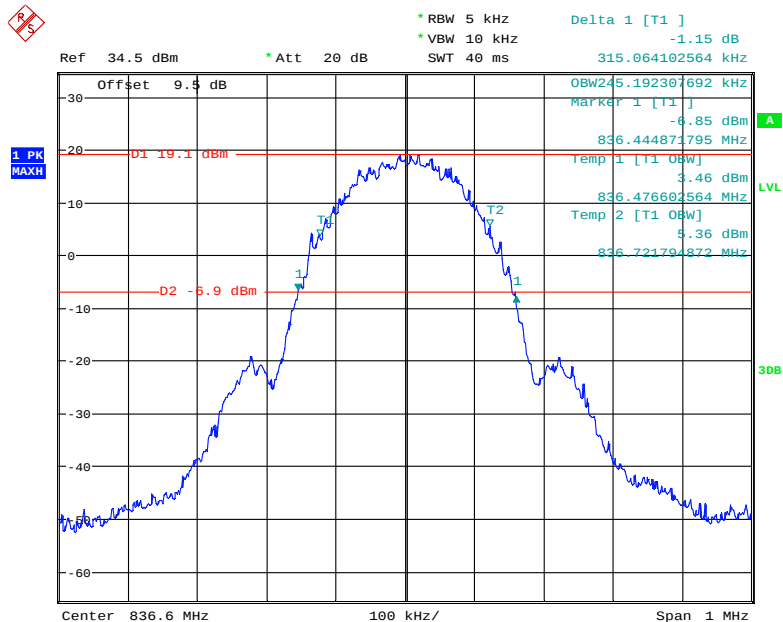
Cellular Band (Part 22H)

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



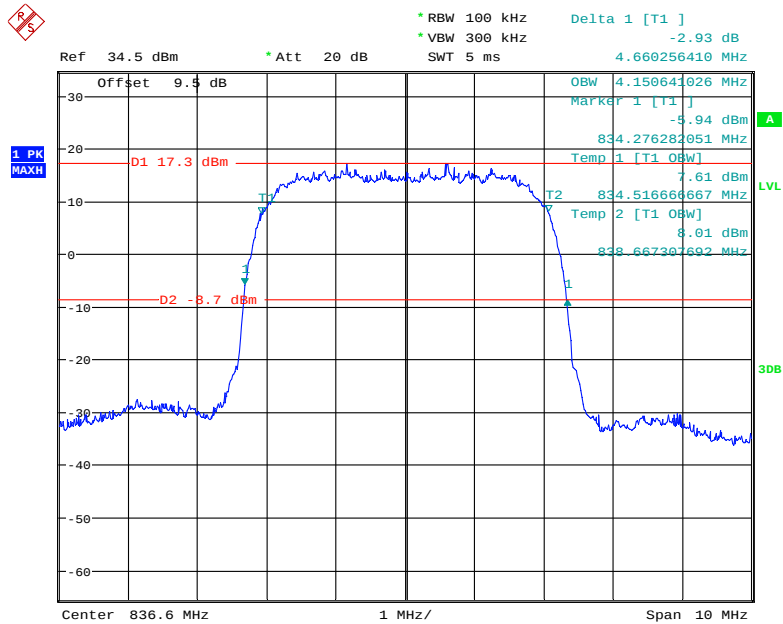
Date: 24.JUL.2019 00:50:43

26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



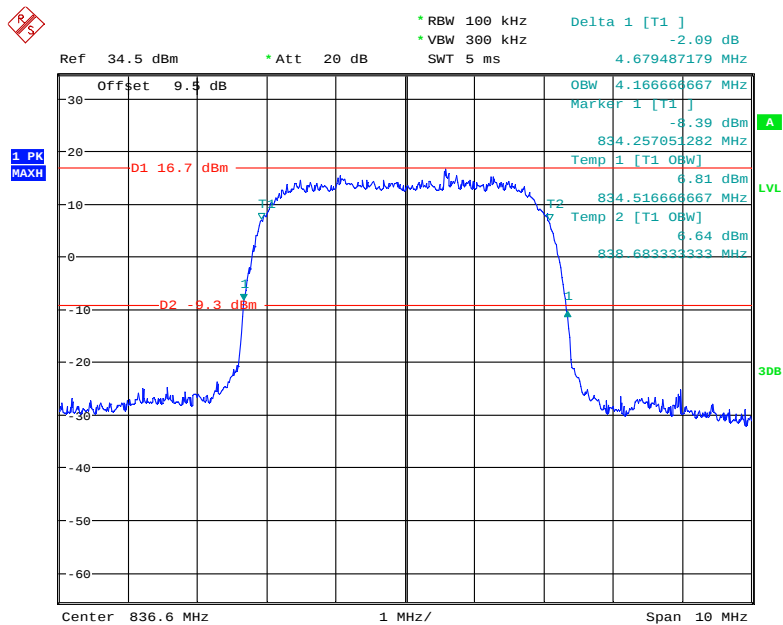
Date: 24.JUL.2019 00:46:46

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

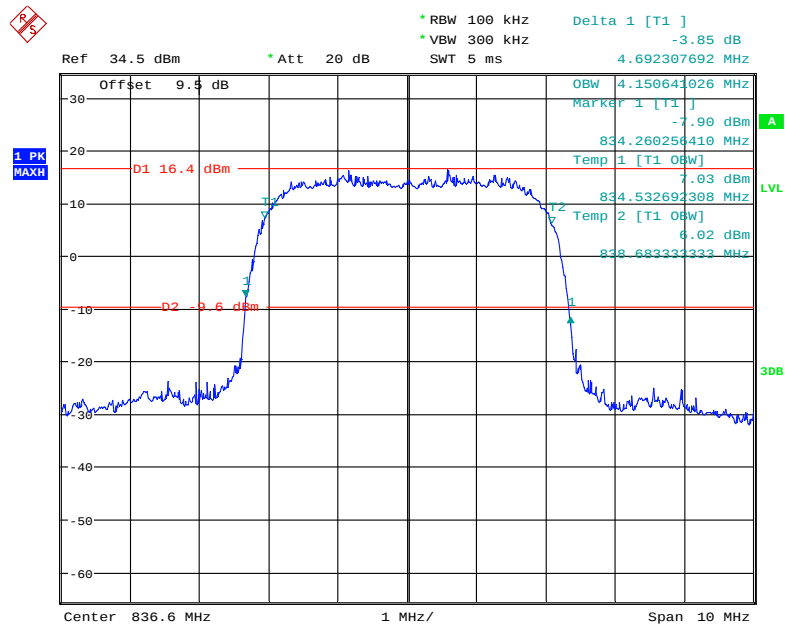


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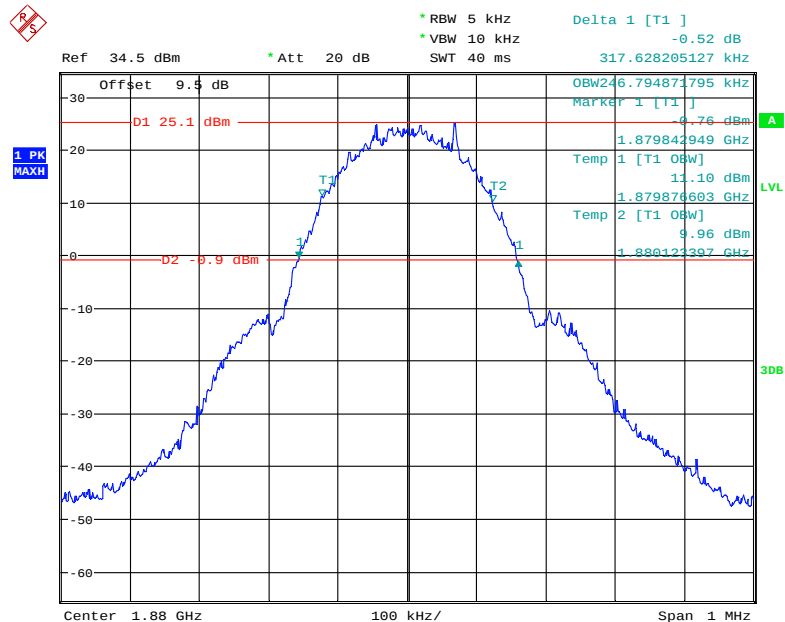
26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode



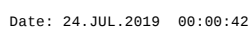
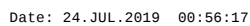
Date: 24.JUL.2019 00:24:13

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

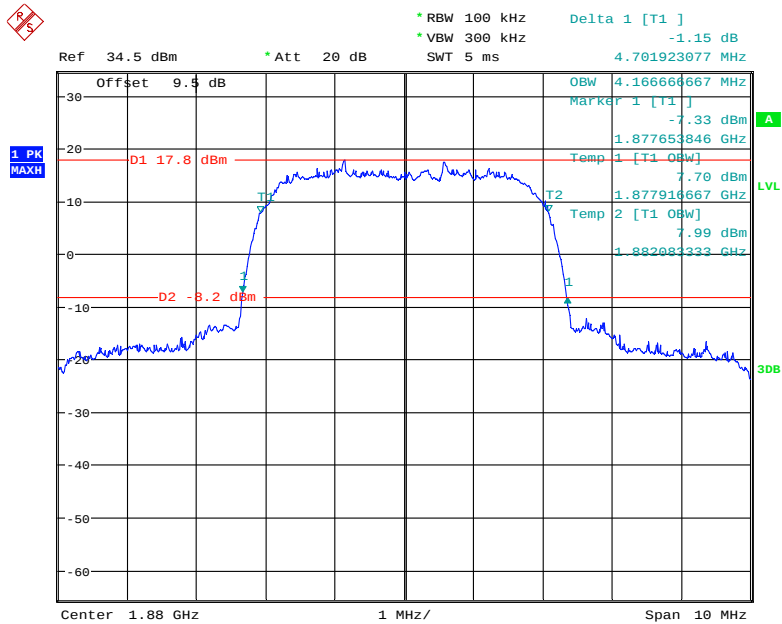
Date: 24.JUL.2019 00:22:36

PCS Band (Part 24E)**26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode**

Date: 23.JUL.2019 22:43:42

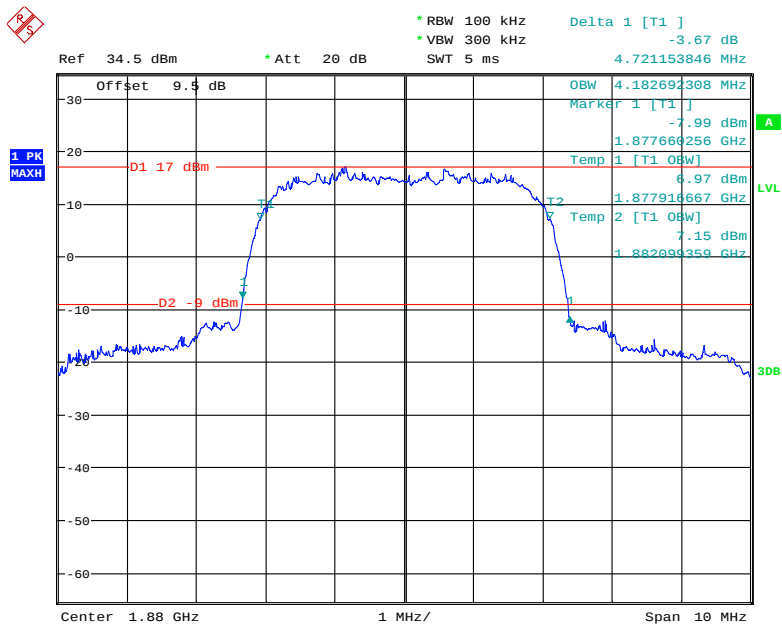


26 dB Emissions & 99% Occupied Bandwidth for HSUPA (BPSK) Mode



Date: 23.JUL.2019 23:53:43

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



Date: 23.JUL.2019 23:28:21

LTE Band 2: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.13	1.96
	16QAM	1.12	1.75
3.0	QPSK	2.70	3.02
	16QAM	2.70	3.09
5.0	QPSK	4.55	5.40
	16QAM	4.54	5.51
10.0	QPSK	8.97	9.89
	16QAM	8.97	9.92
15.0	QPSK	13.46	15.13
	16QAM	13.46	14.98
20.0	QPSK	17.95	19.50
	16QAM	17.95	19.76

1 PK
MAXH

Ref 25 dBm * Att 15 dB * RBW 30 kHz Delta 1 [T1] -1.46 dB
SWT 15 ms 1.956410256 MHz

Offset 6 dB

OBW 1.126282051 MHz
Marker 1 [T1] 0.81 dBm
1.879035256 GHz 0.71 dBm
1.879434615 GHz 0.29 dBm
Temp 2 [T1 OBW] 1.880560897 GHz

Center 1.88 GHz 280 kHz/ Span 2.8 MHz

Ref 25 dBm * Att 15 dB RBW 30 kHz VBW 100 kHz Delta 1 [T1] -2.95 dB
 SWT 15 ms 1.754487179 MHz

Offset 6 dB

1 PK MAXH

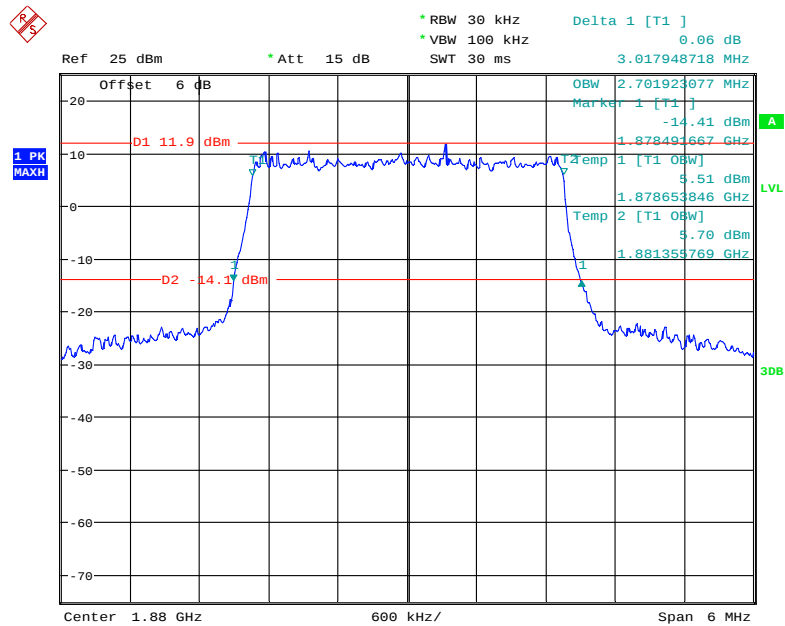
D1 15.4 dBm
 D2 -10.8 dBm

OBW 1.121794872 MHz
 Marker 1 [T1] -10.83 dBm
 1.879174359 GHz
 5.42 dBm
 1.879434615 GHz
 Temp 2 [T1 OBW] 6.46 dBm
 1.880556410 GHz

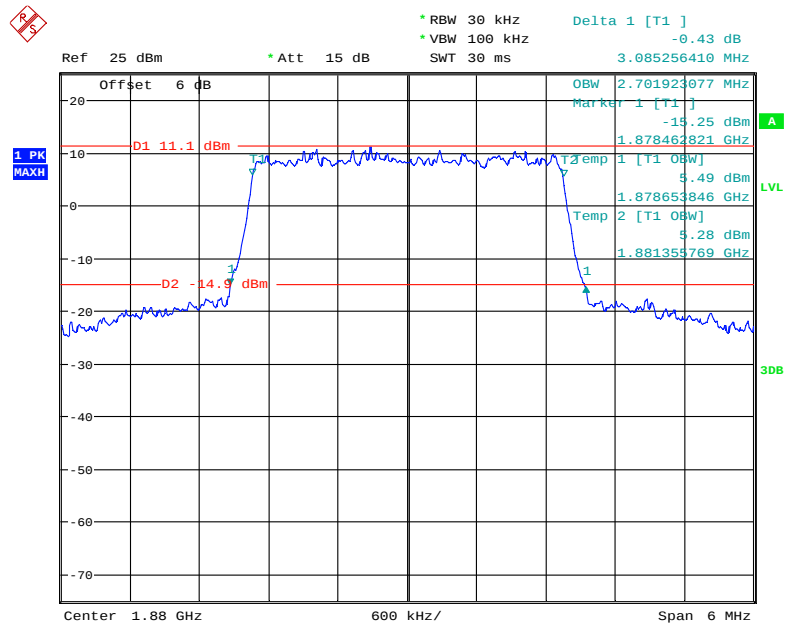
LVL
 3DB

Center 1.88 GHz 280 kHz/ Span 2.8 MHz

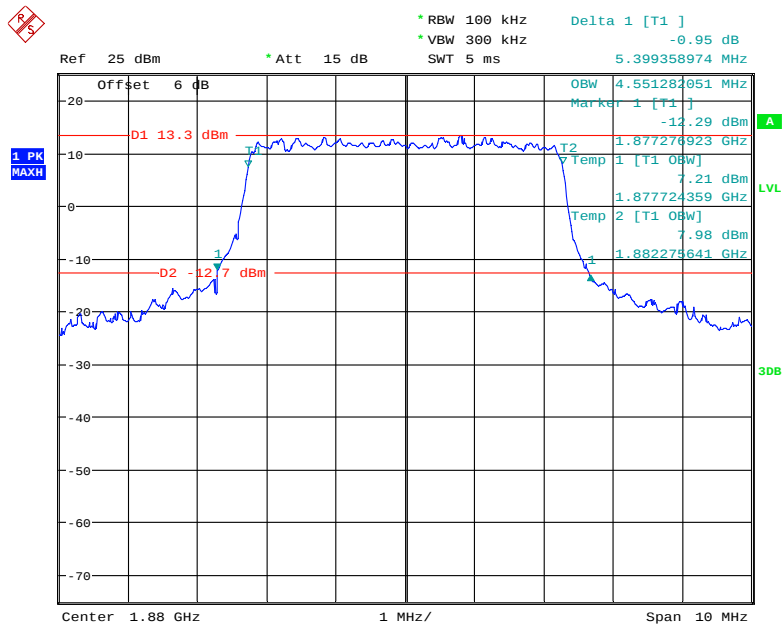
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QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

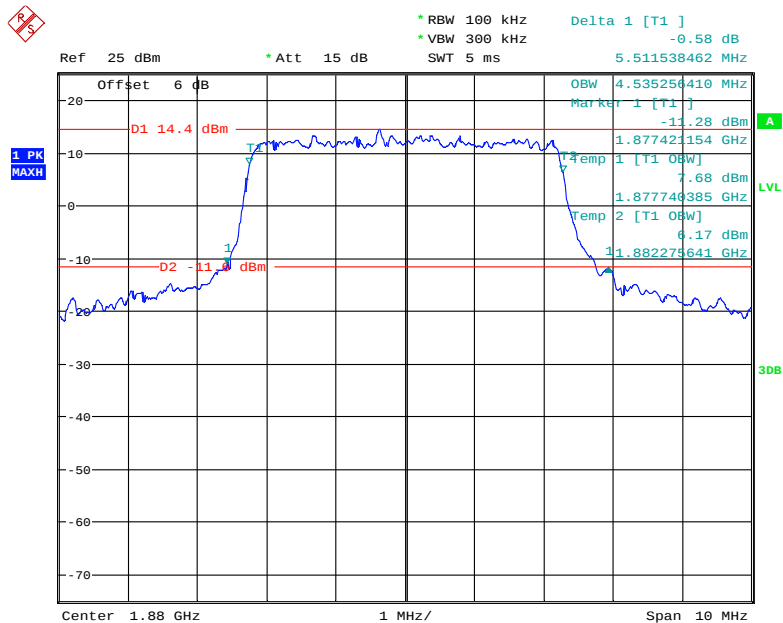
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16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

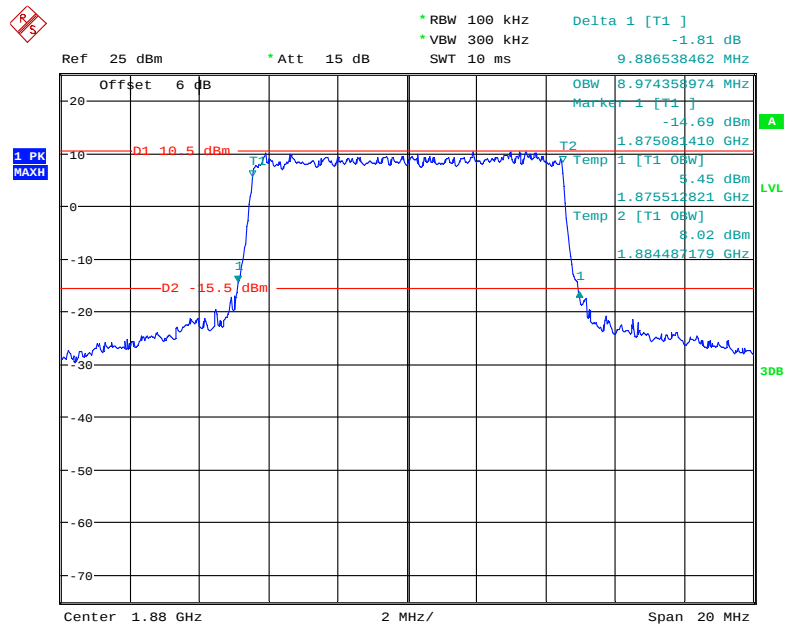
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QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

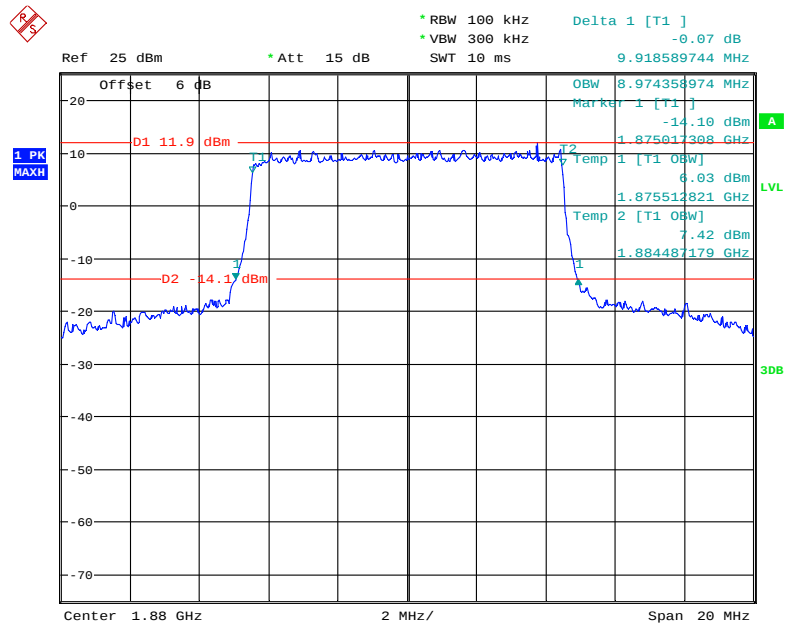
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16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

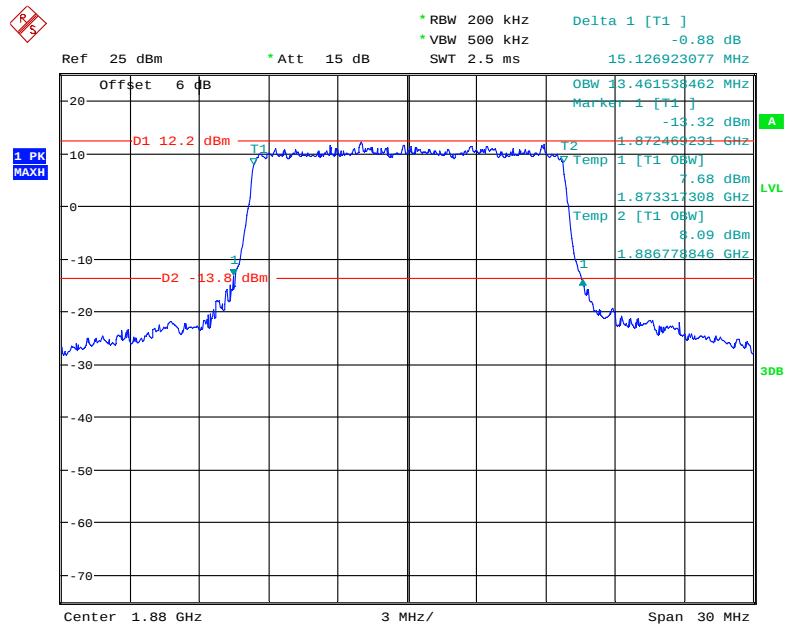
Date: 24.JUL.2019 15:43:46

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

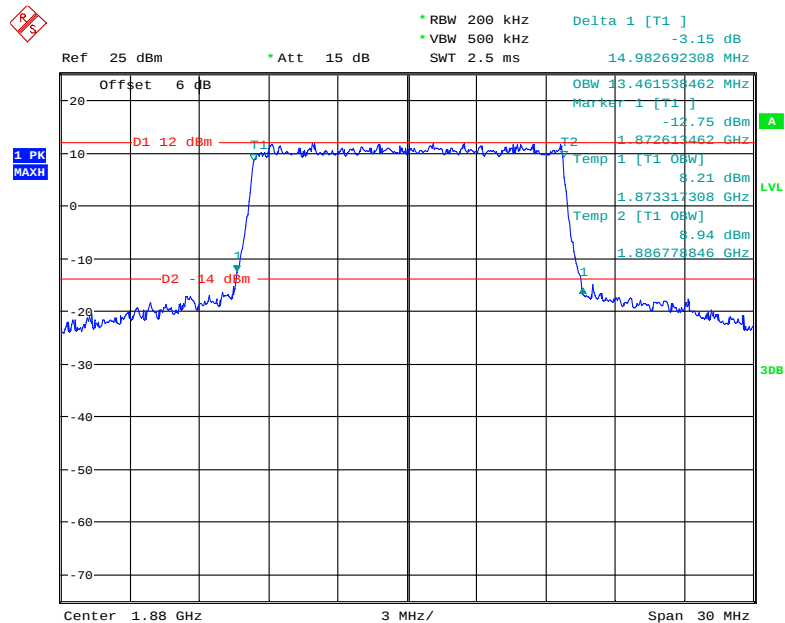
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16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

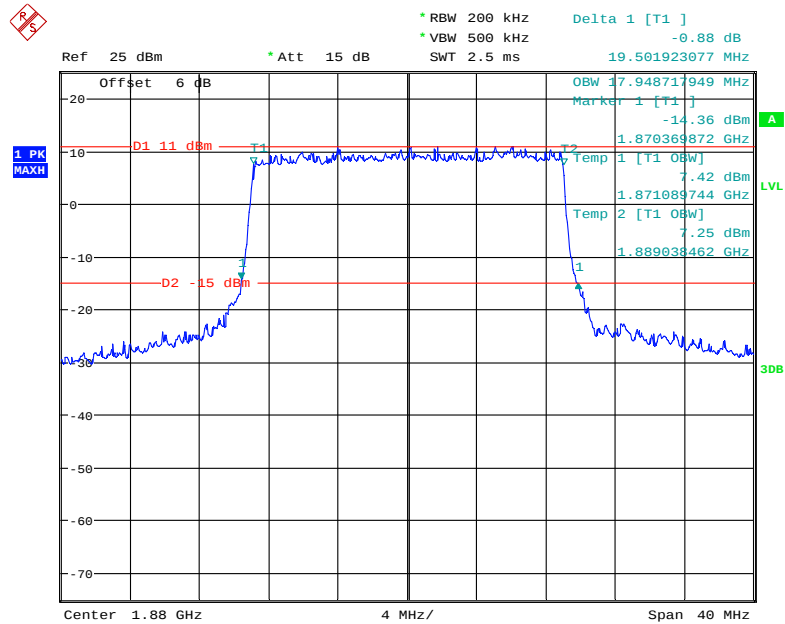
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QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

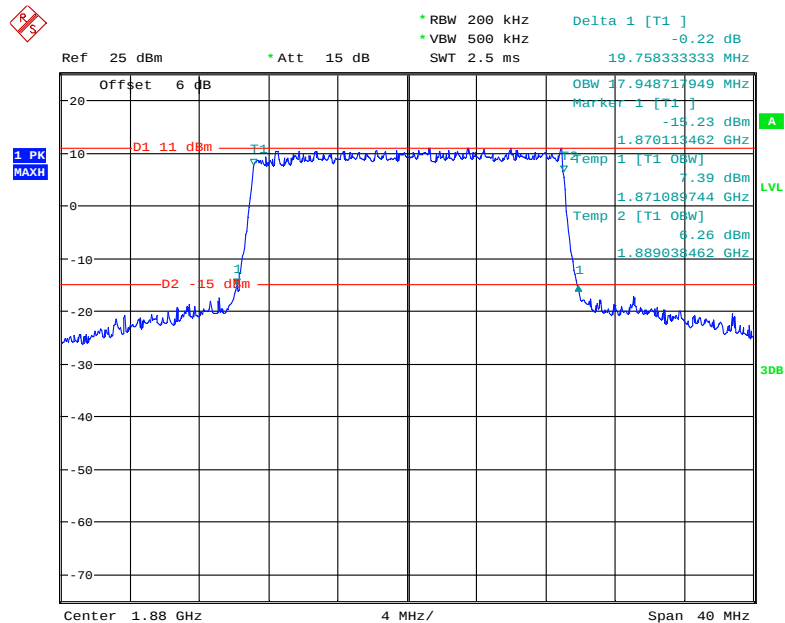
Date: 24.JUL.2019 15:49:48

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

Date: 24.JUL.2019 15:51:09

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

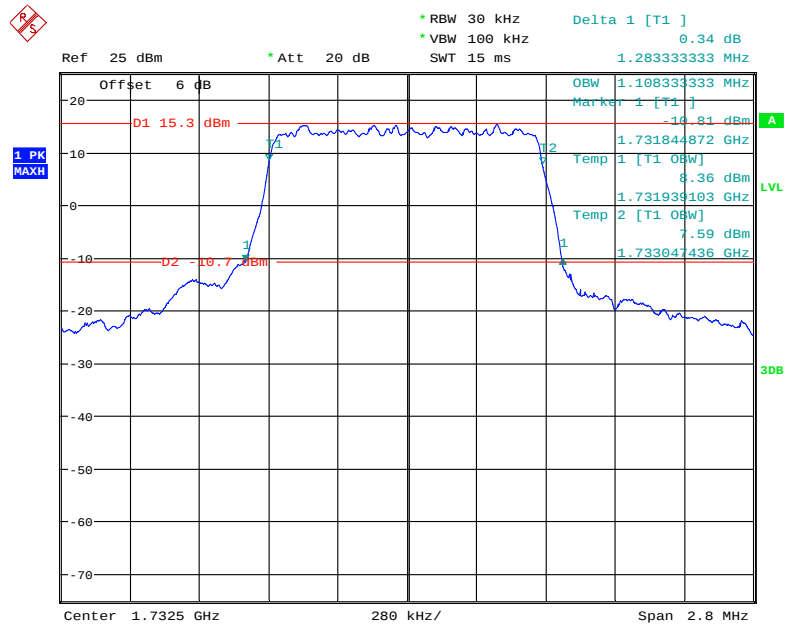
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16-QAM (20.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

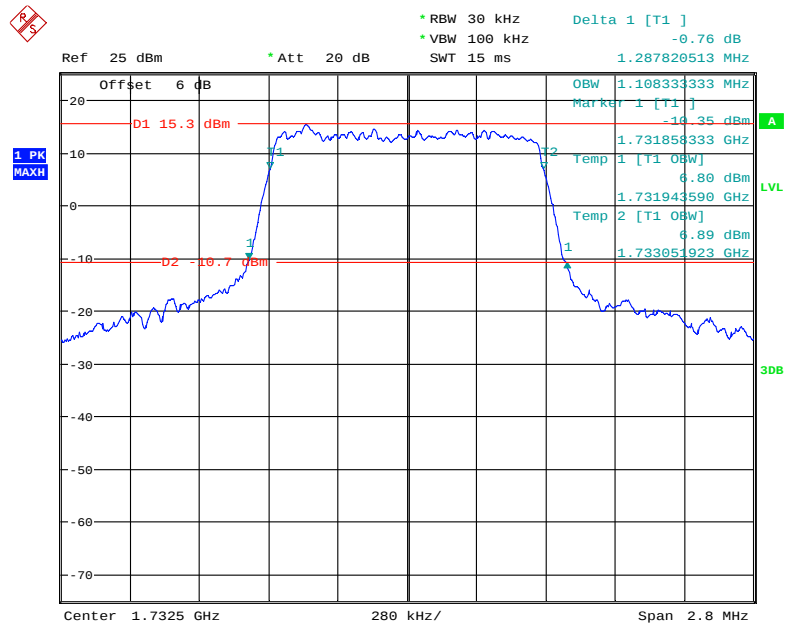
Date: 24.JUL.2019 15:55:27

LTE Band 4: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.11	1.28
	16QAM	1.11	1.29
3.0	QPSK	2.71	3.02
	16QAM	2.70	3.03
5.0	QPSK	4.57	5.45
	16QAM	4.55	5.27
10.0	QPSK	8.97	9.78
	16QAM	8.97	9.81
15.0	QPSK	13.46	15.02
	16QAM	13.41	14.82
20.0	QPSK	17.95	19.49
	16QAM	17.88	19.68

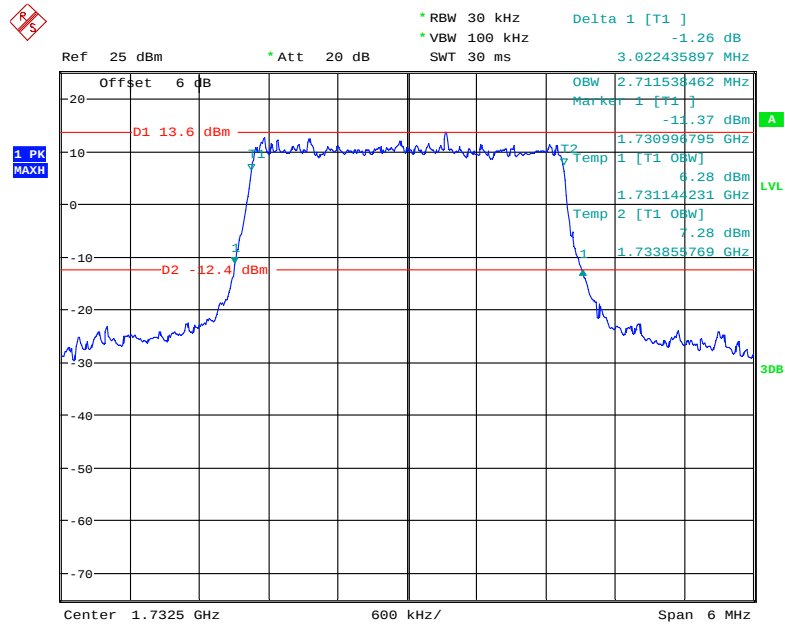
QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 24.JUL.2019 15:32:19

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

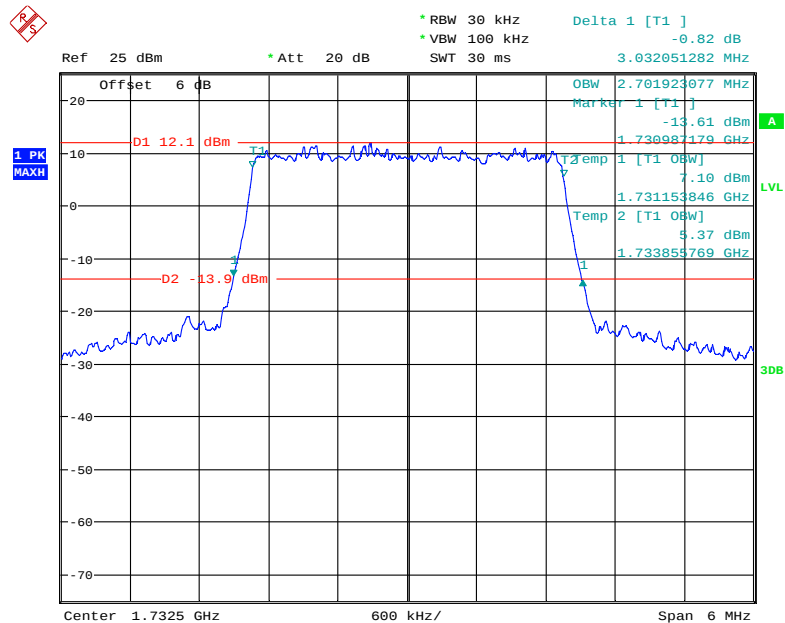
Date: 24.JUL.2019 15:30:47

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

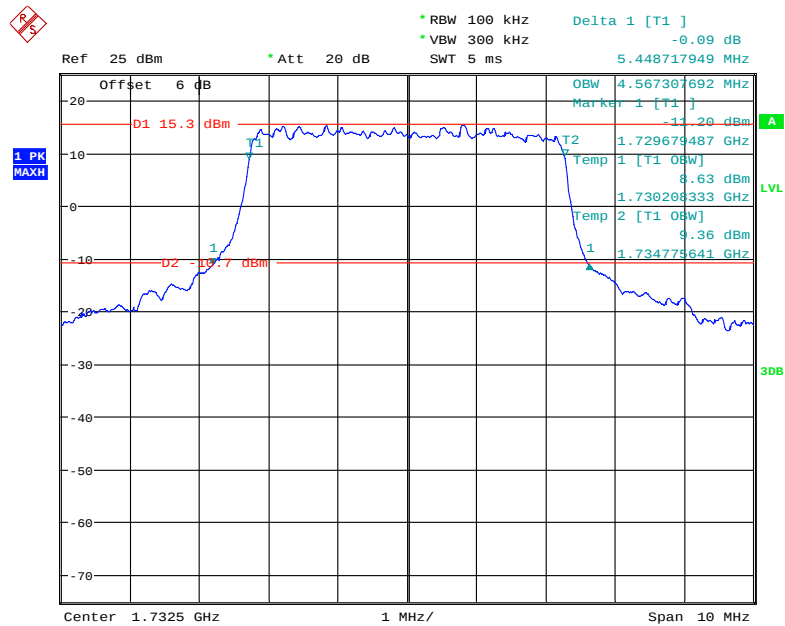


Date: 24.JUL.2019 15:29:07

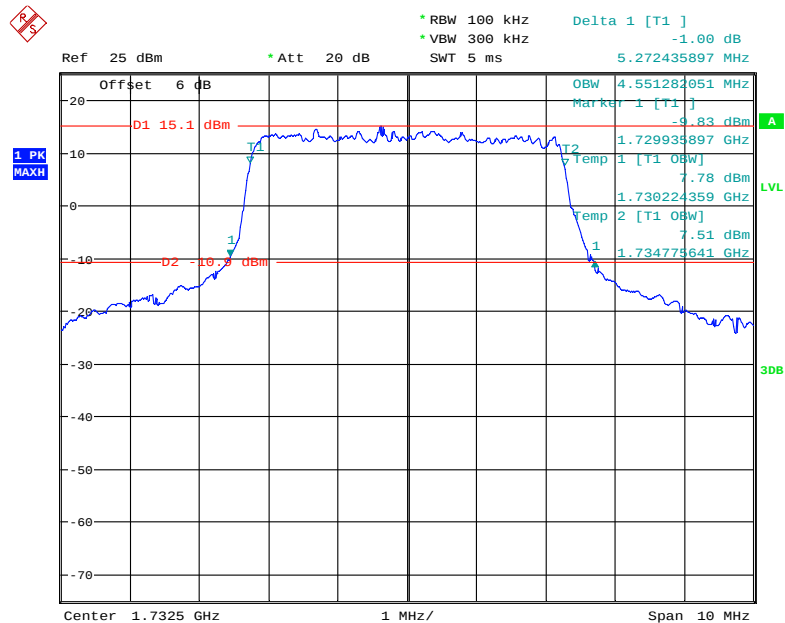
16-QAM (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



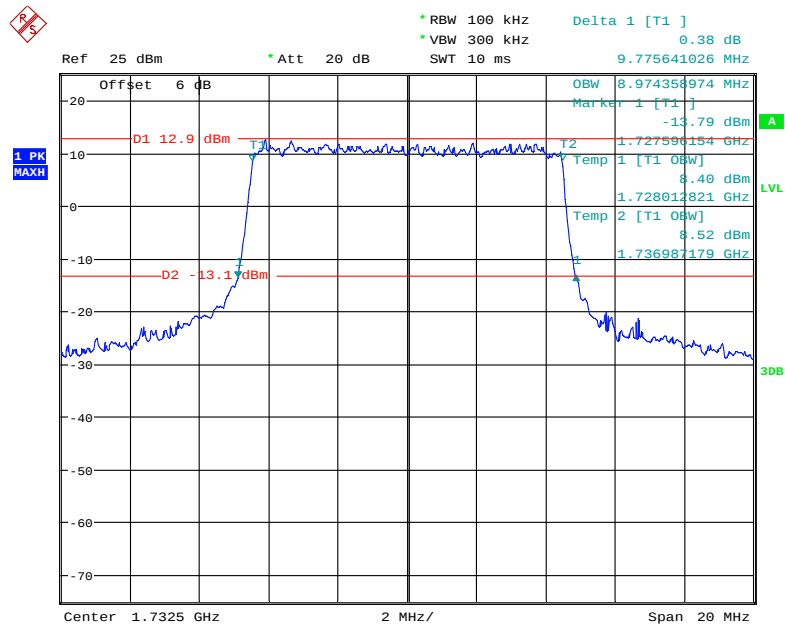
Date: 24.JUL.2019 15:28:20

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

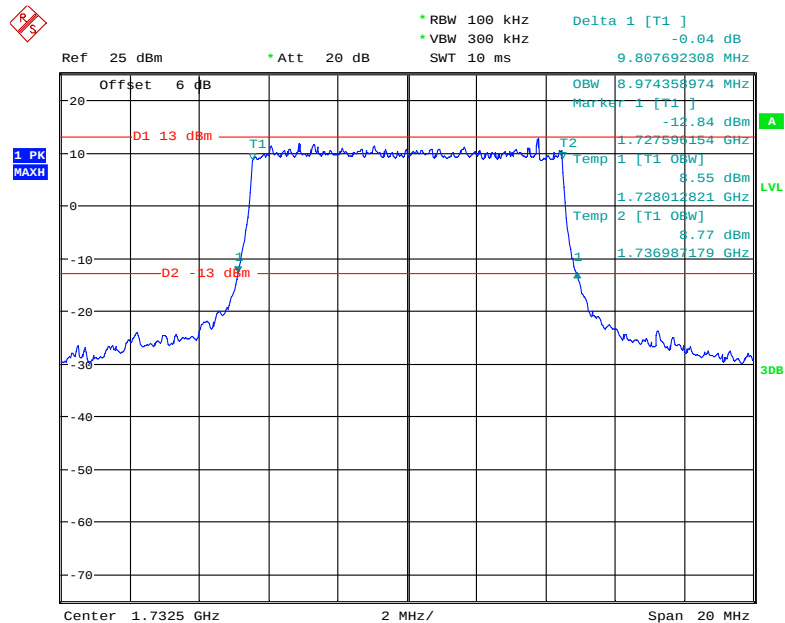
Date: 24.JUL.2019 15:26:12

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

Date: 24.JUL.2019 15:23:46

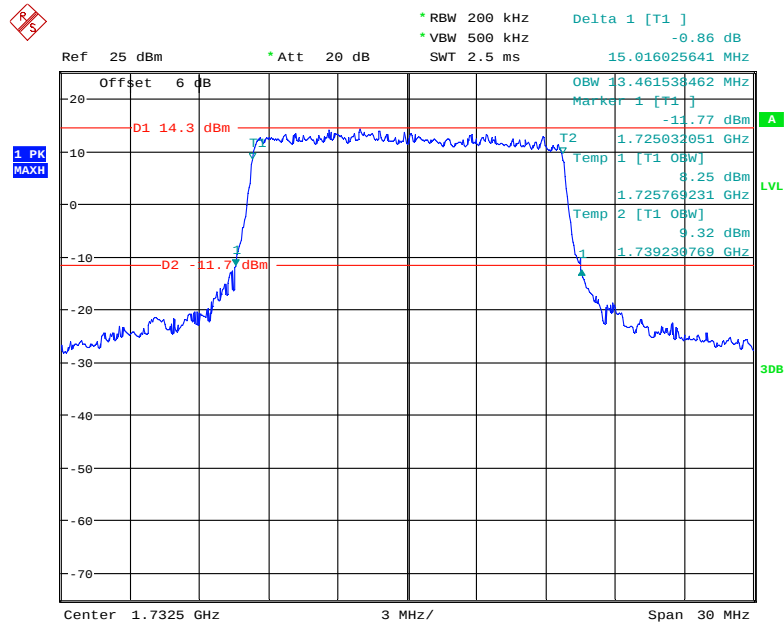
QPSK (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 24.JUL.2019 15:22:01

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

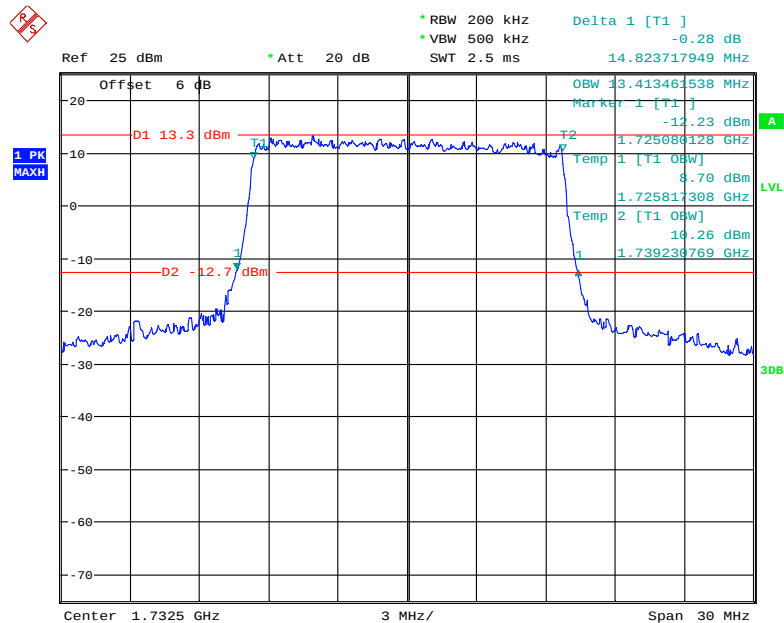
Date: 24.JUL.2019 15:20:35

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

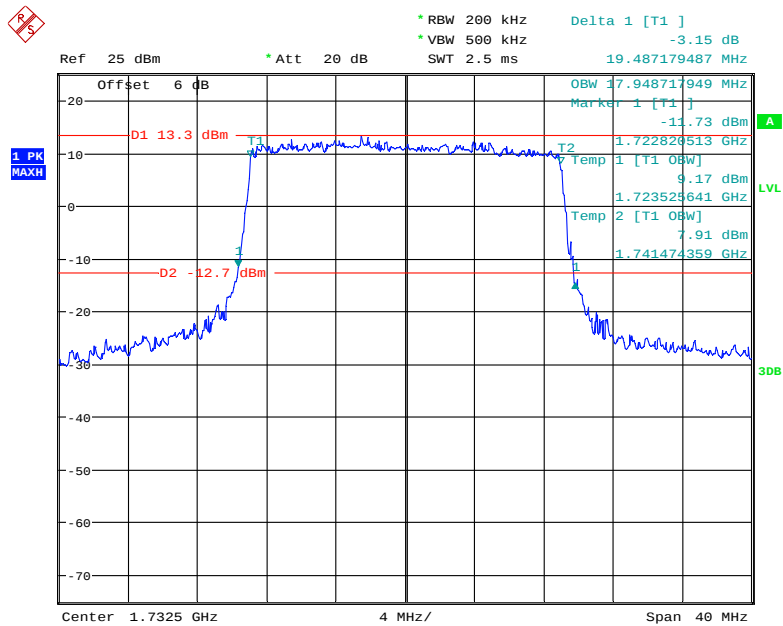


Date: 24.JUL.2019 15:18:52

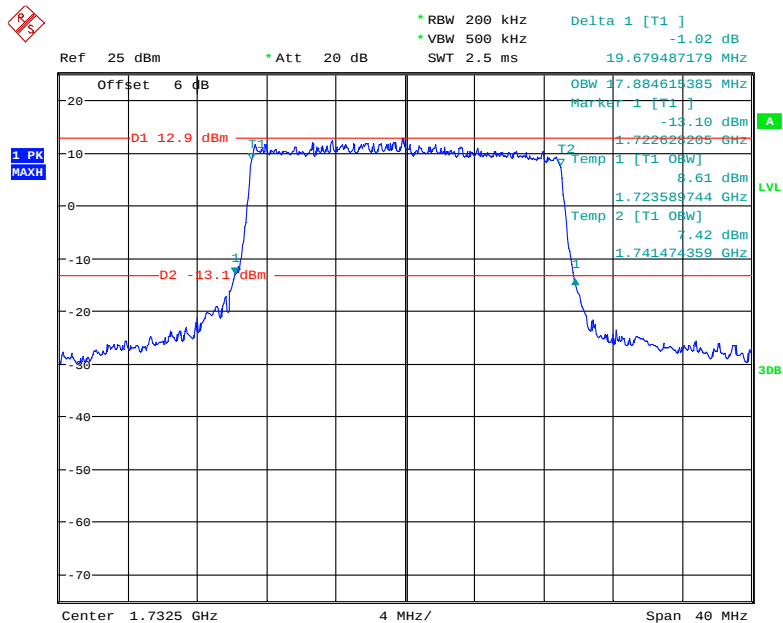
16-QAM (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 24.JUL.2019 15:17:04

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

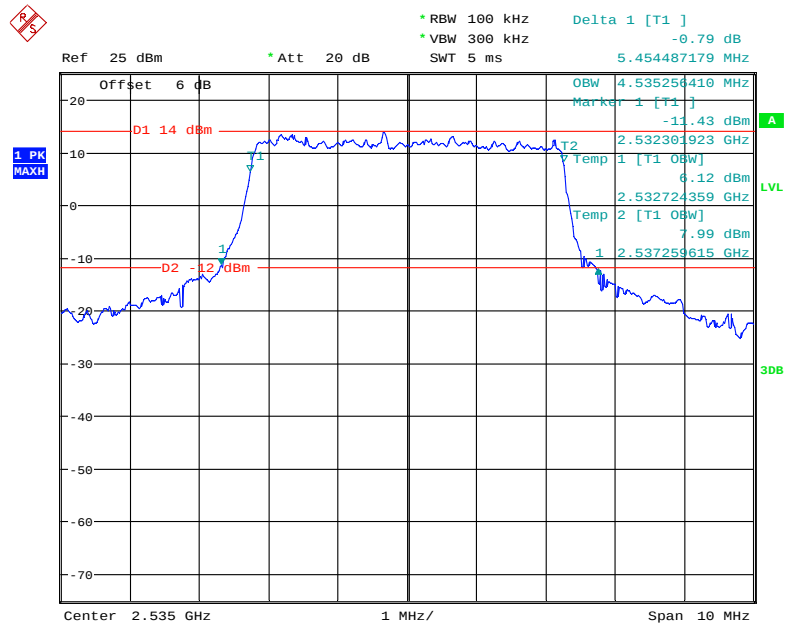
Date: 24.JUL.2019 15:15:20

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

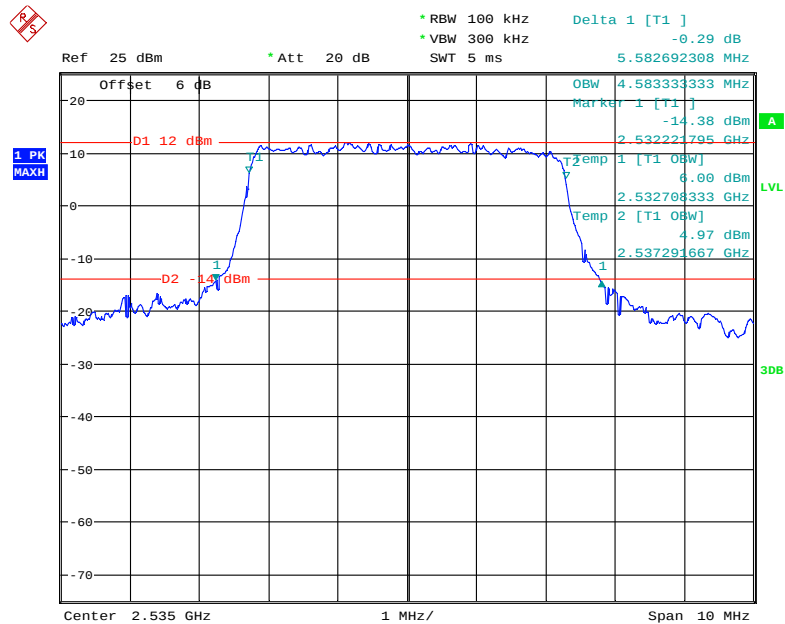
Date: 24.JUL.2019 15:13:19

LTE Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.54	5.45
	16QAM	4.58	5.58
10.0	QPSK	9.01	10.05
	16QAM	8.97	9.96
15.0	QPSK	13.56	15.25
	16QAM	13.51	14.91
20.0	QPSK	17.95	19.55
	16QAM	18.08	20.45

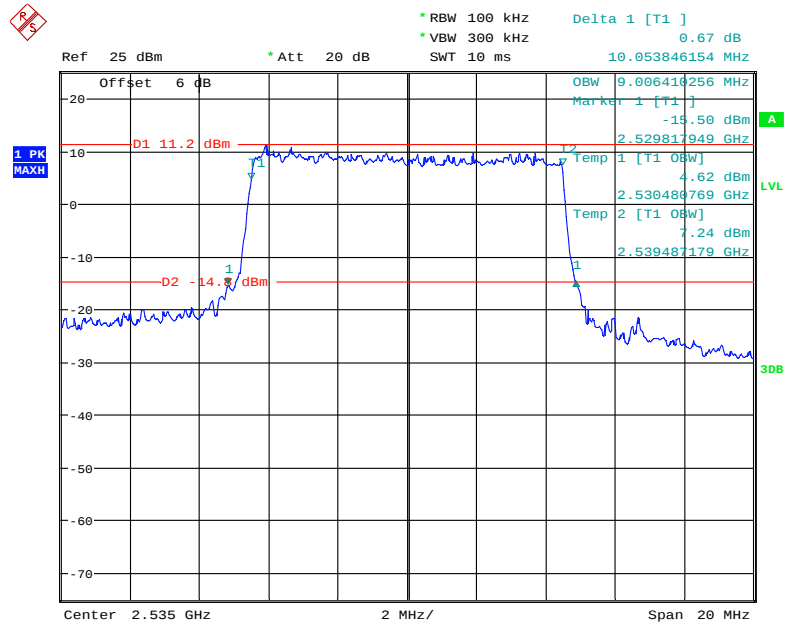
QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 24.JUL.2019 14:51:12

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

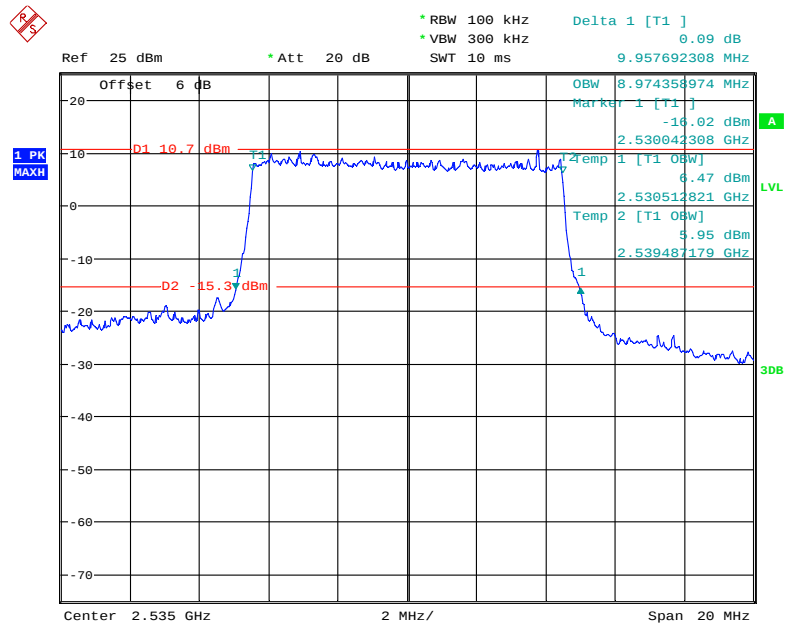
Date: 24.JUL.2019 14:53:48

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

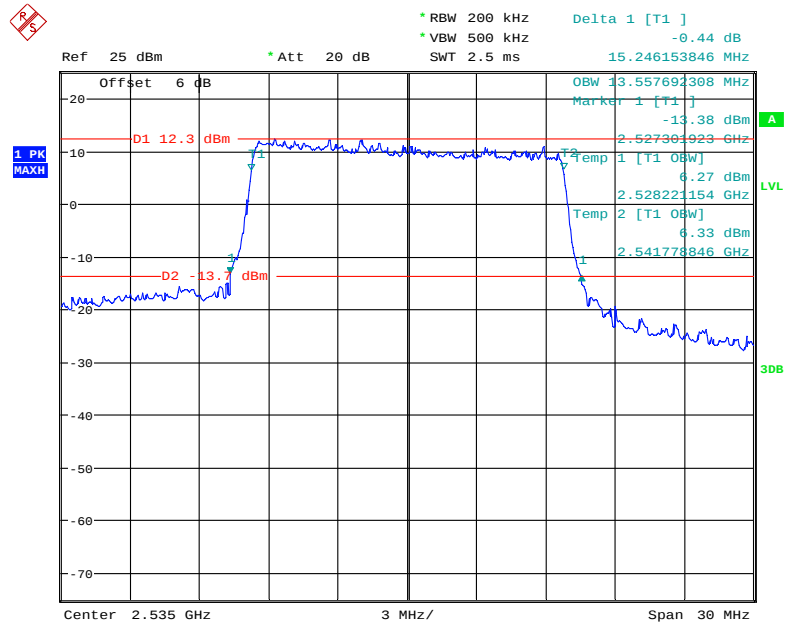


Date: 24.JUL.2019 14:55:48

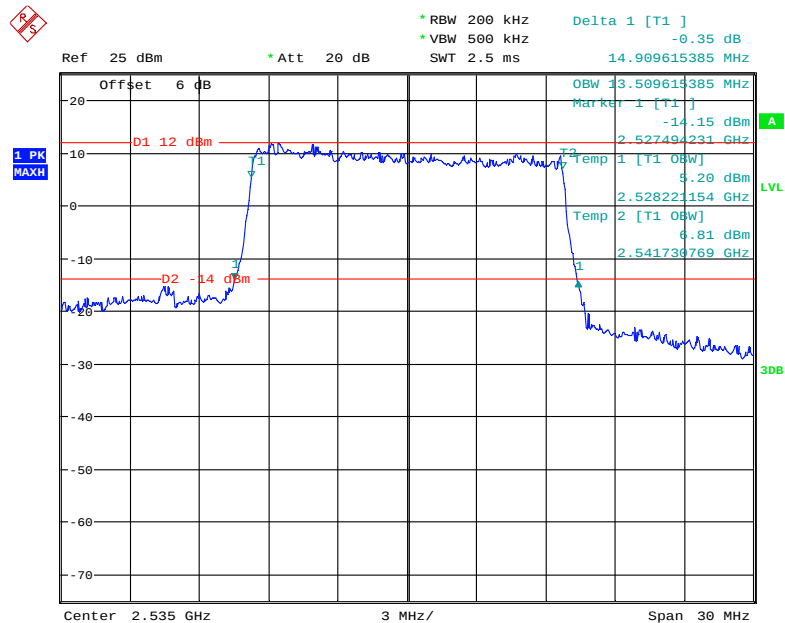
16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



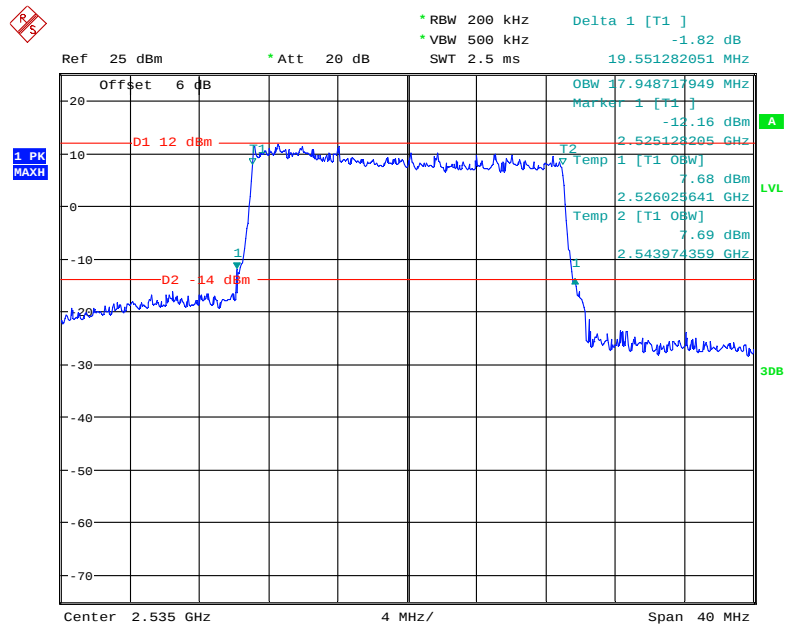
Date: 24.JUL.2019 14:57:48

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

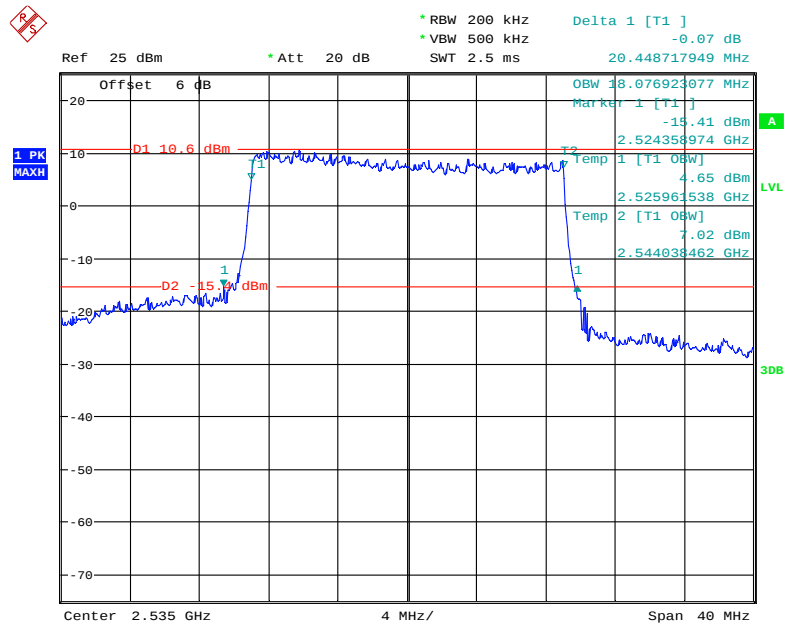
Date: 24.JUL.2019 15:02:14

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

Date: 24.JUL.2019 15:04:48

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

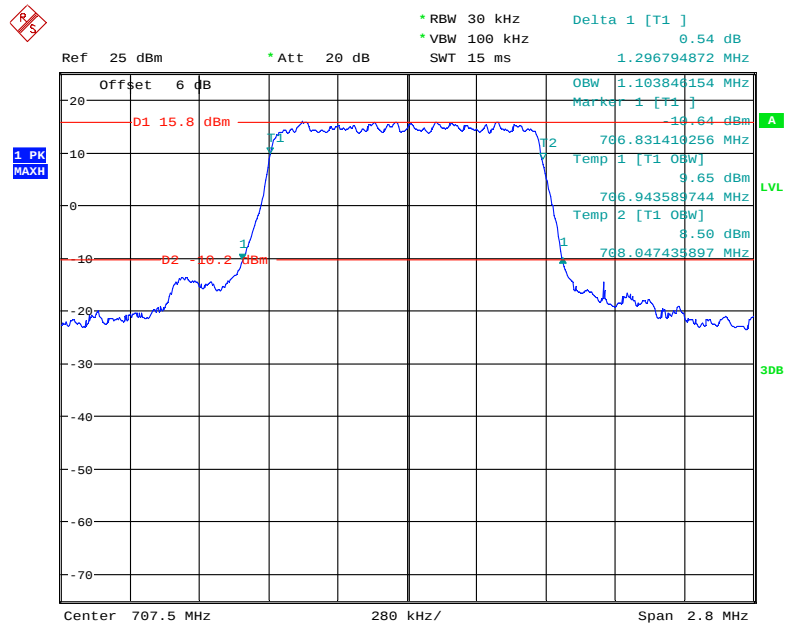
Date: 24.JUL.2019 15:06:54

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

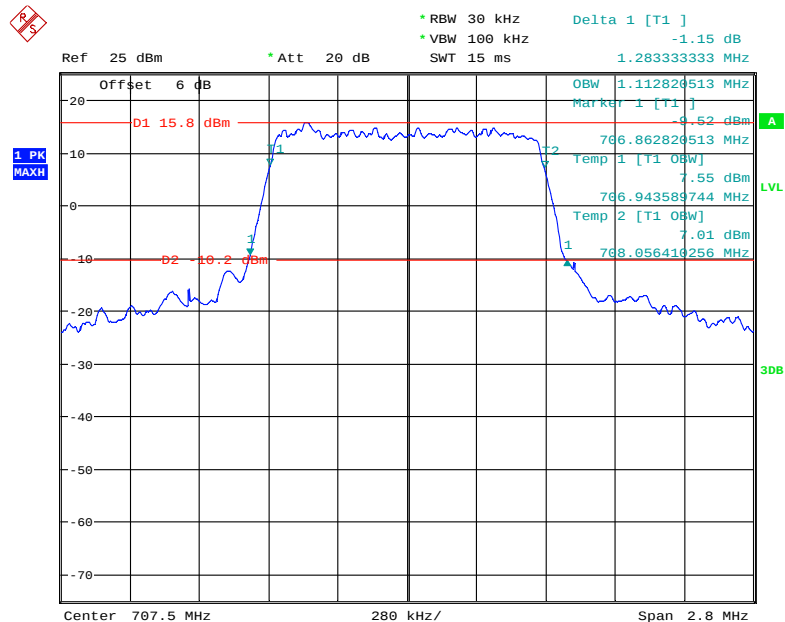
Date: 24.JUL.2019 15:10:04

LTE Band 12: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.30
	16QAM	1.11	1.28
3.0	QPSK	2.70	3.02
	16QAM	2.70	3.04
5.0	QPSK	4.55	5.37
	16QAM	4.55	5.30
10.0	QPSK	8.97	9.82
	16QAM	8.97	9.86

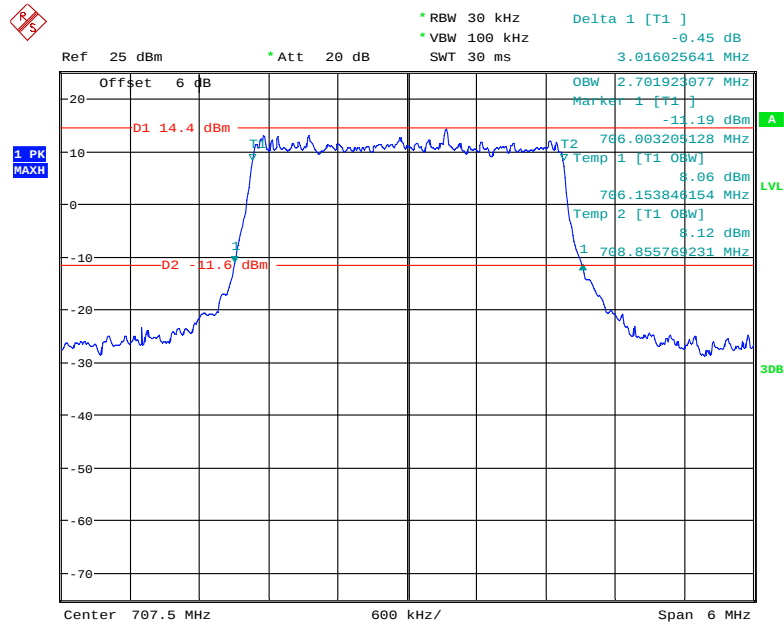
QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 24.JUL.2019 14:35:33

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

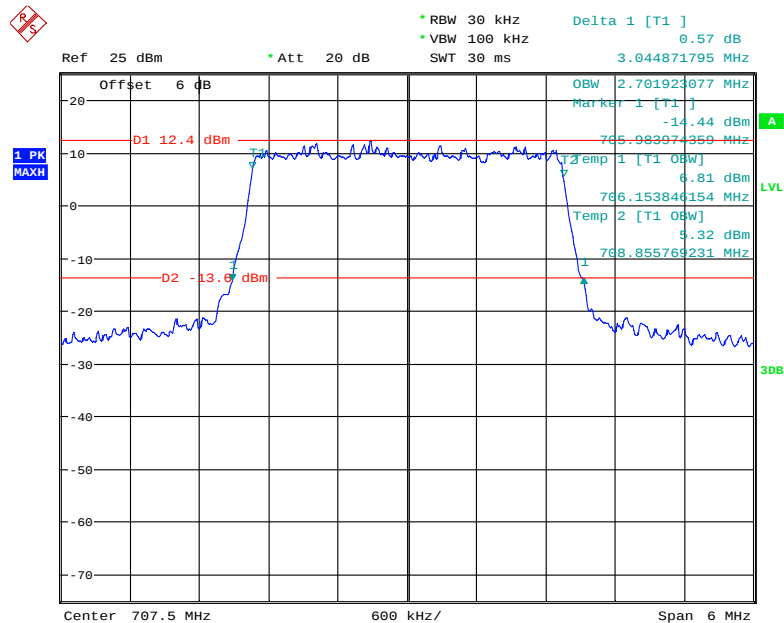
Date: 24.JUL.2019 14:44:15

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



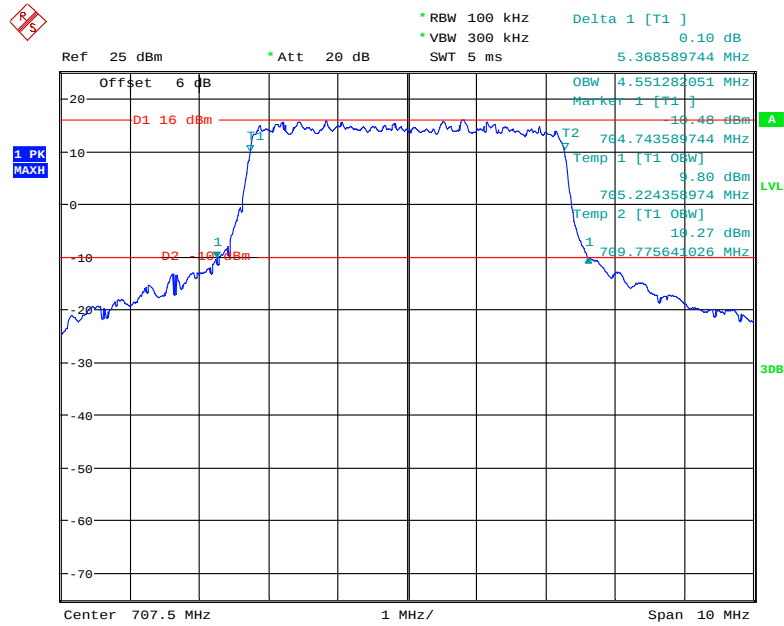
Date: 24.JUL.2019 14:31:37

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



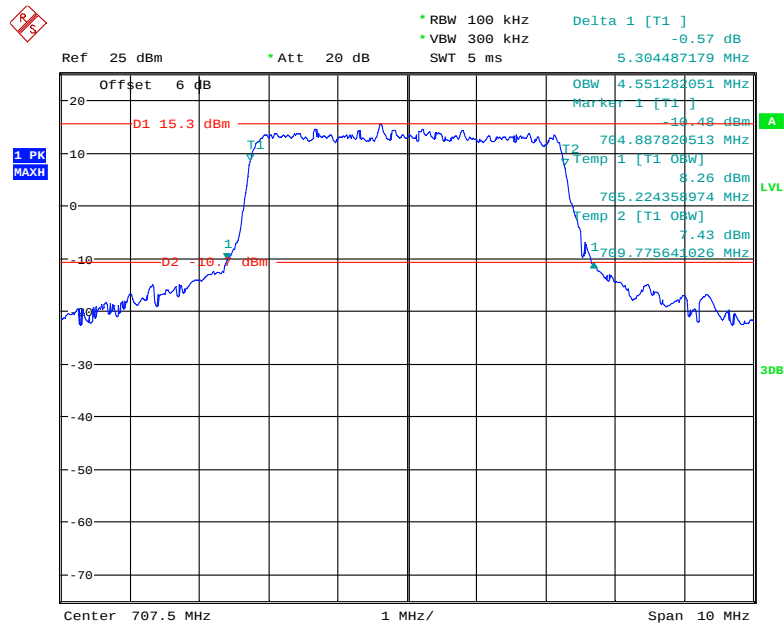
Date: 24.JUL.2019 14:33:35

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

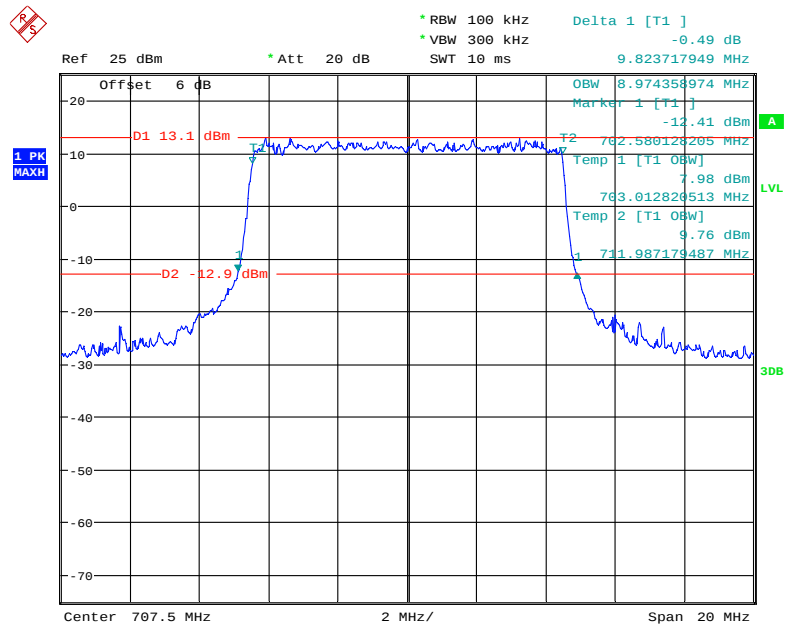


Date: 24.JUL.2019 14:29:50

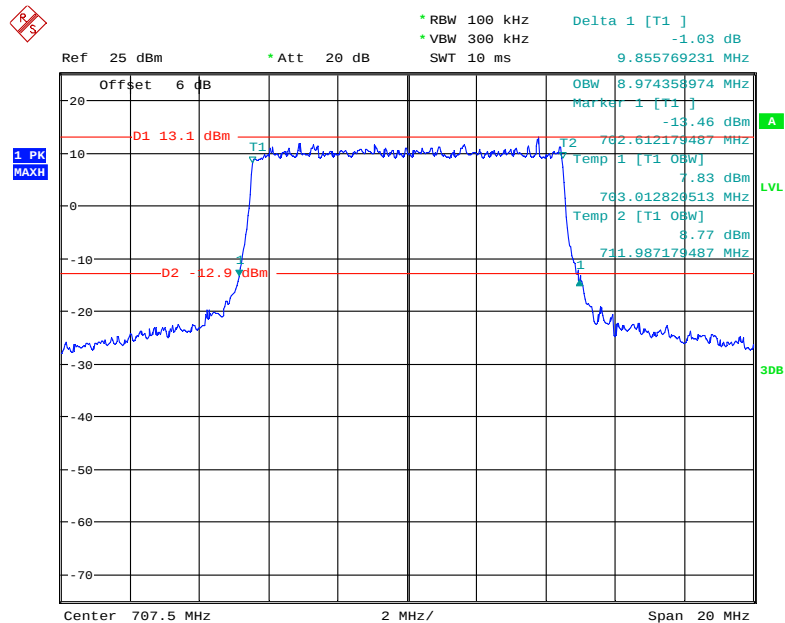
16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 24.JUL.2019 14:27:02

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

Date: 24.JUL.2019 14:25:02

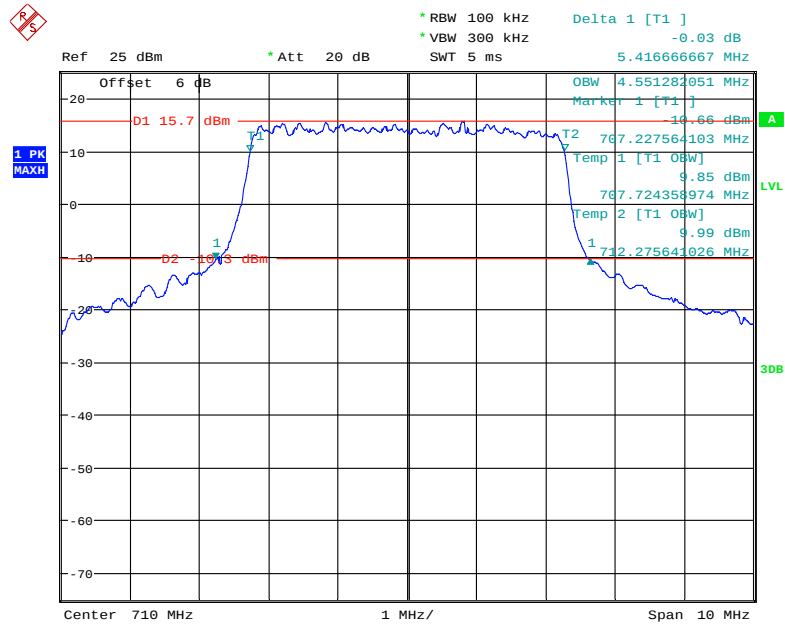
16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 24.JUL.2019 14:23:03

LTE Band 17: (Middle Channel)

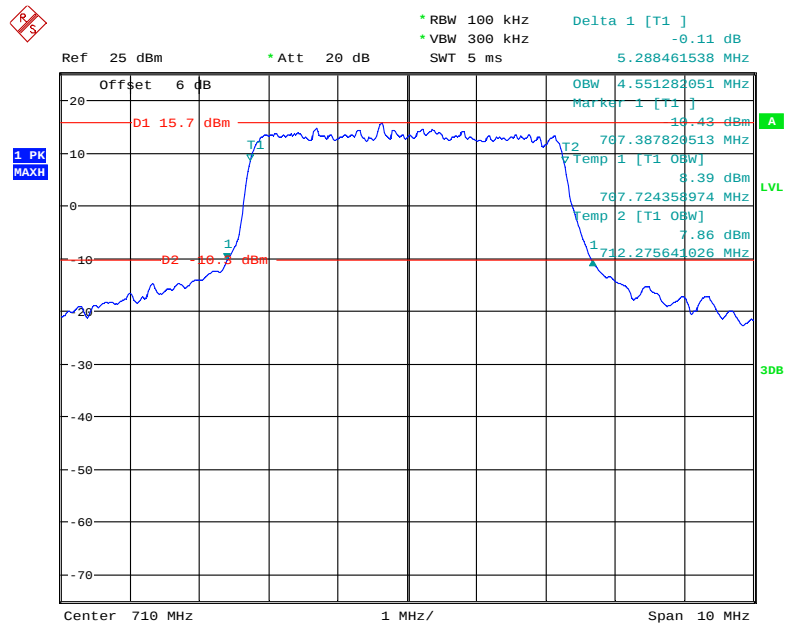
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.55	5.42
	16QAM	4.55	5.29
10.0	QPSK	8.97	9.90
	16QAM	8.97	9.87

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

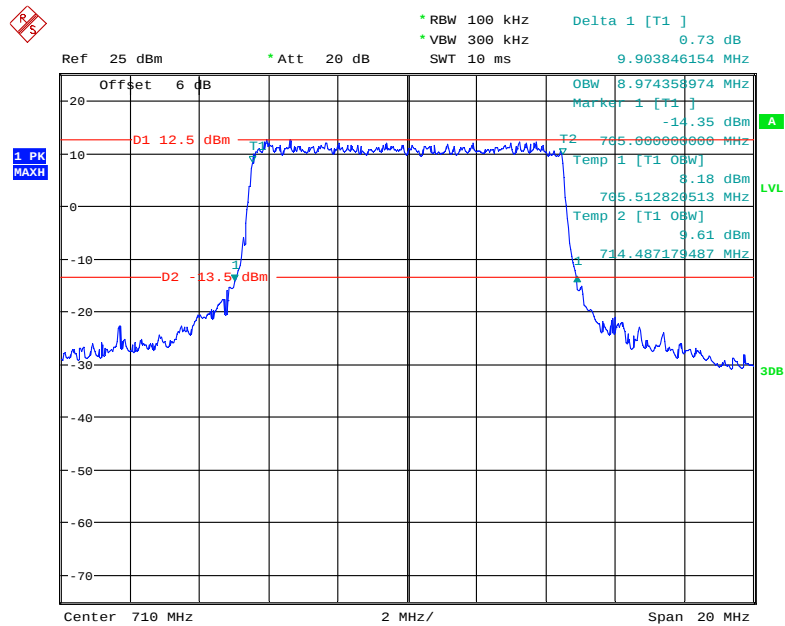


Date: 24.JUL.2019 14:13:05

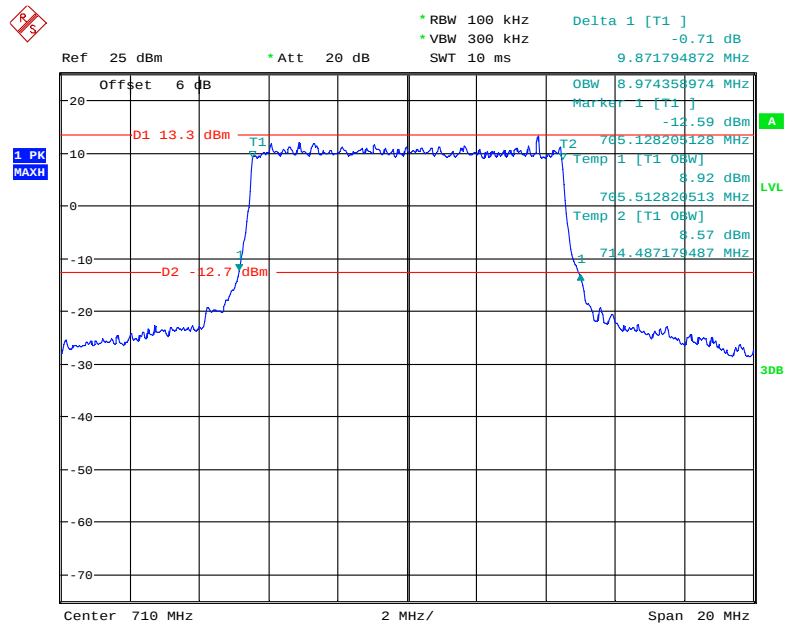
16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 24.JUL.2019 14:18:58

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

Date: 24.JUL.2019 14:05:42

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

Date: 24.JUL.2019 14:10:12

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

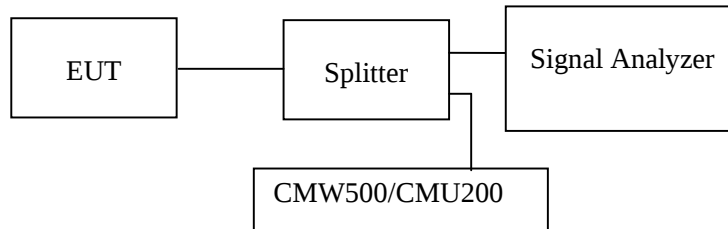
Applicable Standard

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:	25 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by George Zhong and Kieron Luo from 2019-07-23 to 2019-07-24.

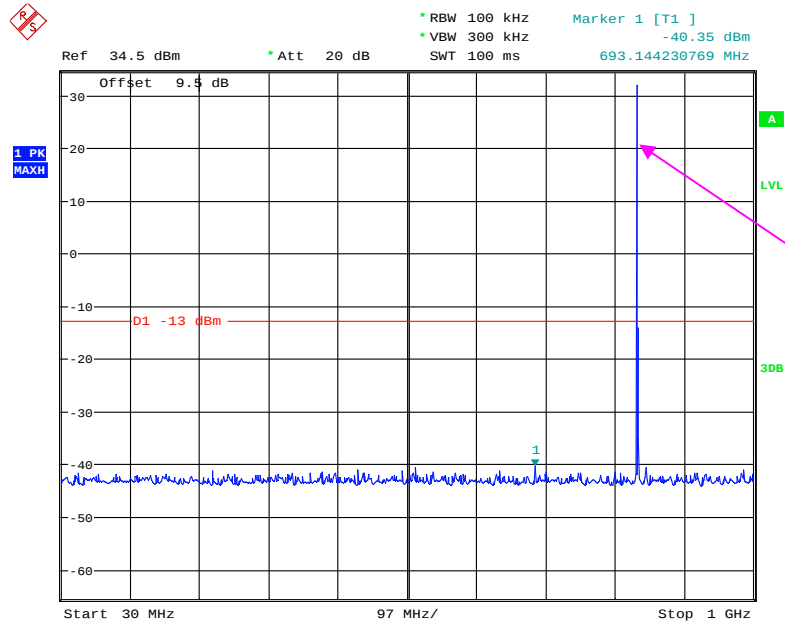
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

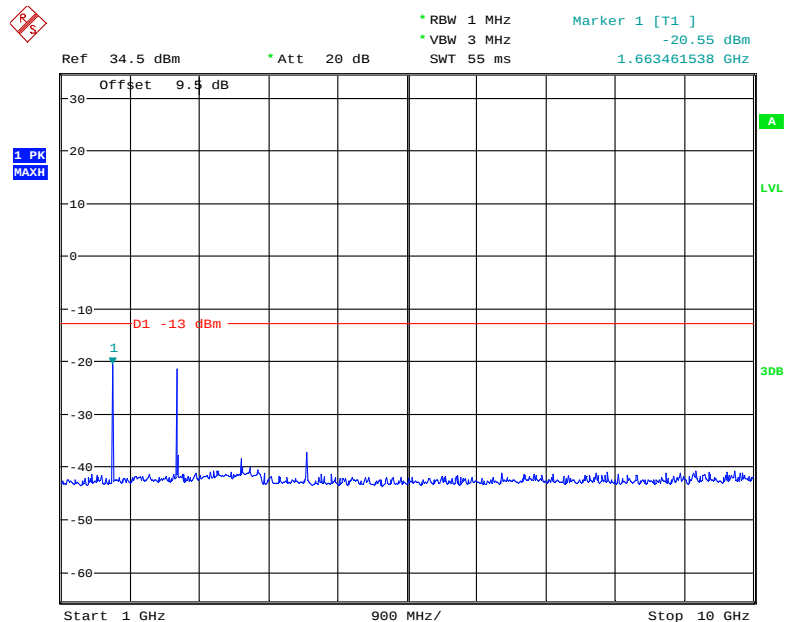
30 MHz – 1 GHz (GSM Mode)



Fundamental test

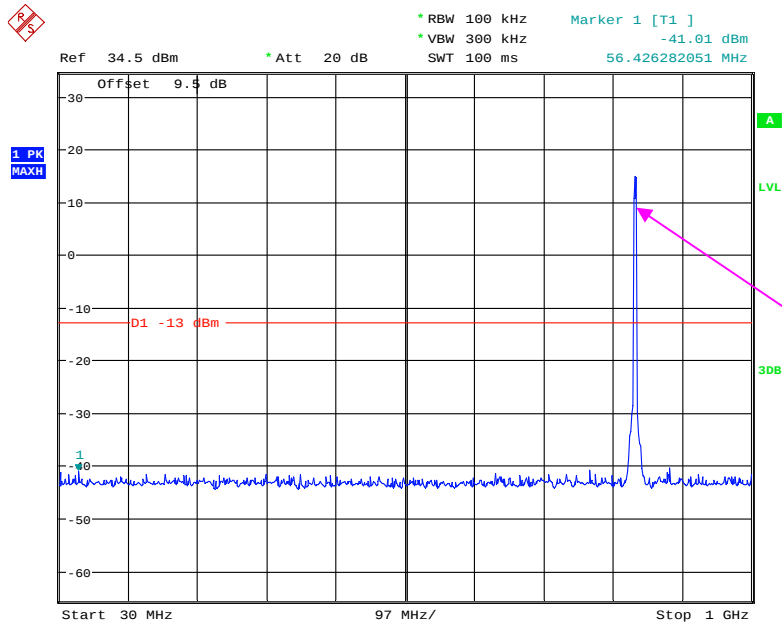
Date: 23.JUL.2019 22:33:22

1 GHz – 10 GHz (GSM Mode)



Date: 23.JUL.2019 22:34:10

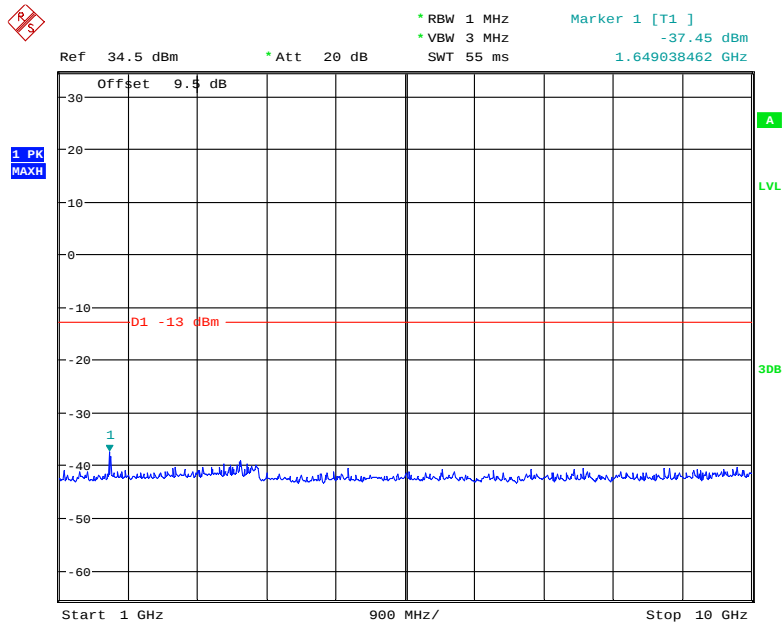
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 24.JUL.2019 00:11:44

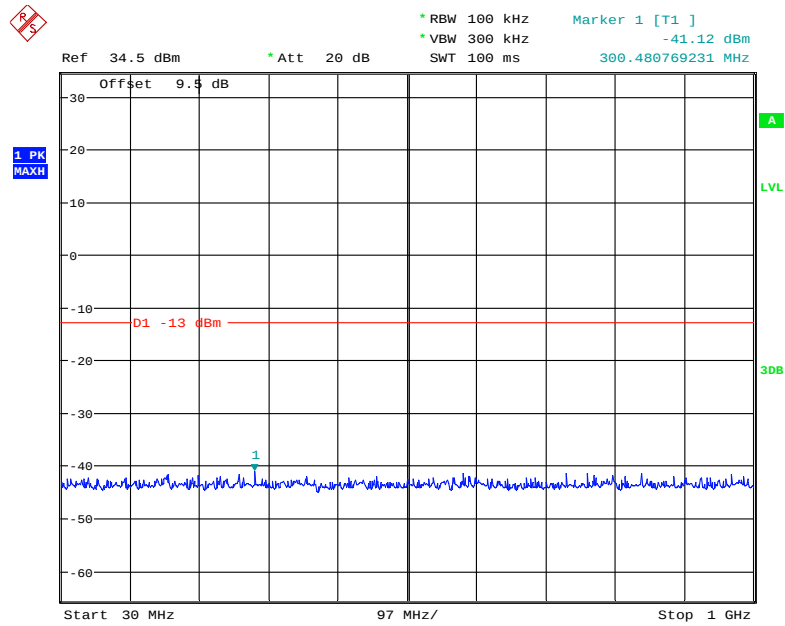
1 GHz – 10 GHz (WCDMA Mode)



Date: 24.JUL.2019 00:10:59

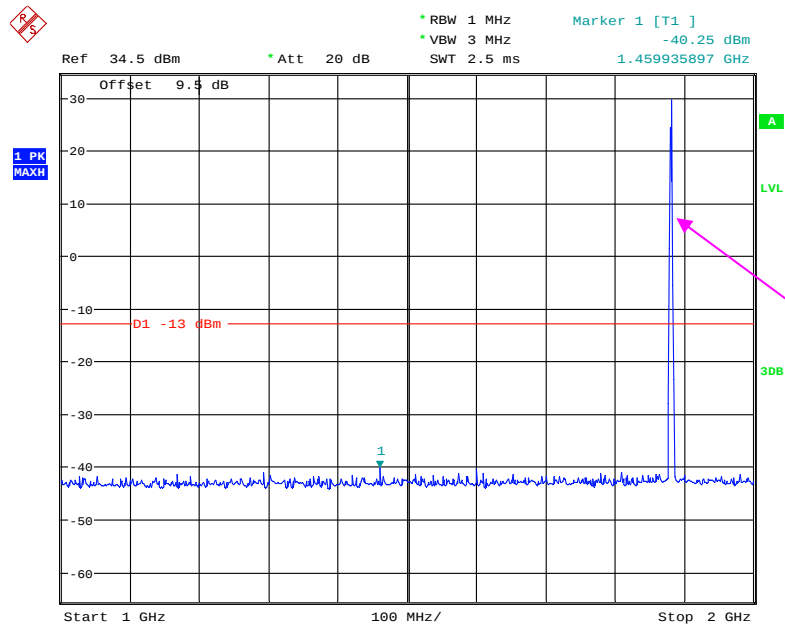
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 23.JUL.2019 22:39:21

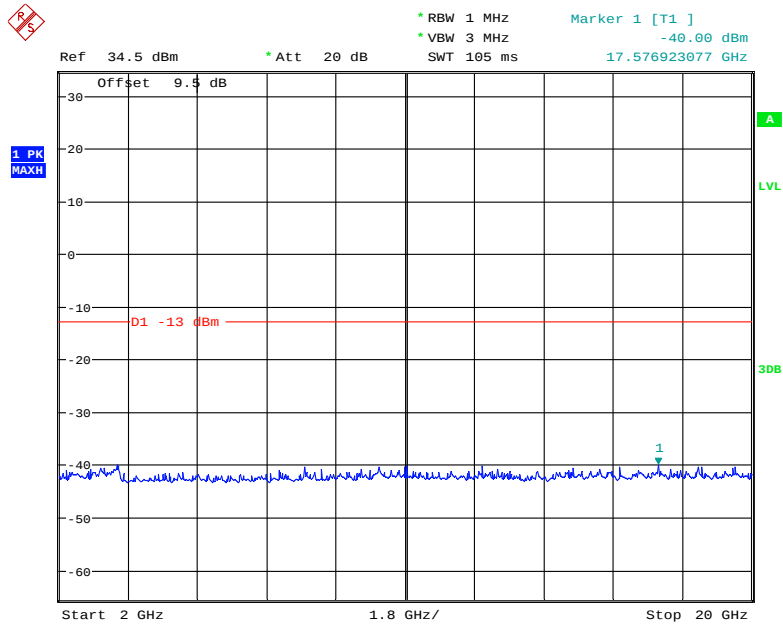
1 GHz – 2 GHz (GSM Mode)



Fundamental test

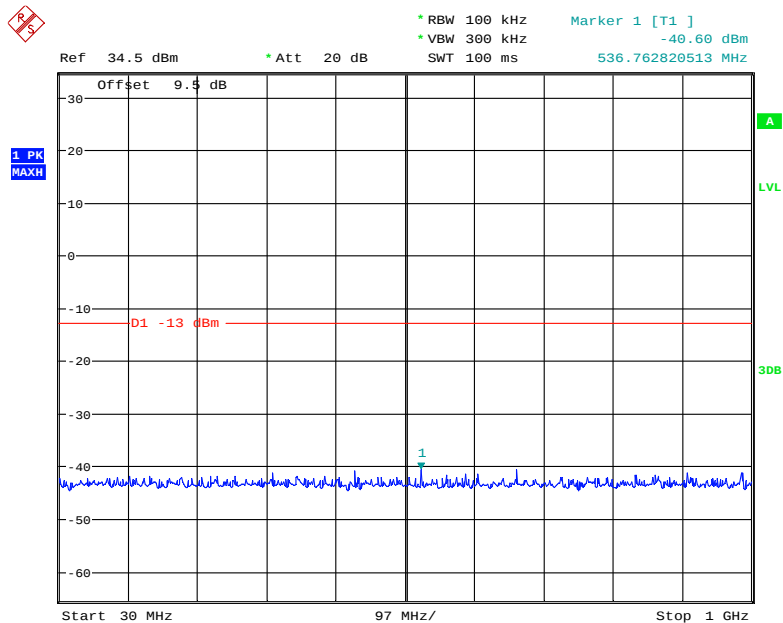
Date: 23.JUL.2019 22:38:05

2 GHz – 20 GHz (GSM Mode)



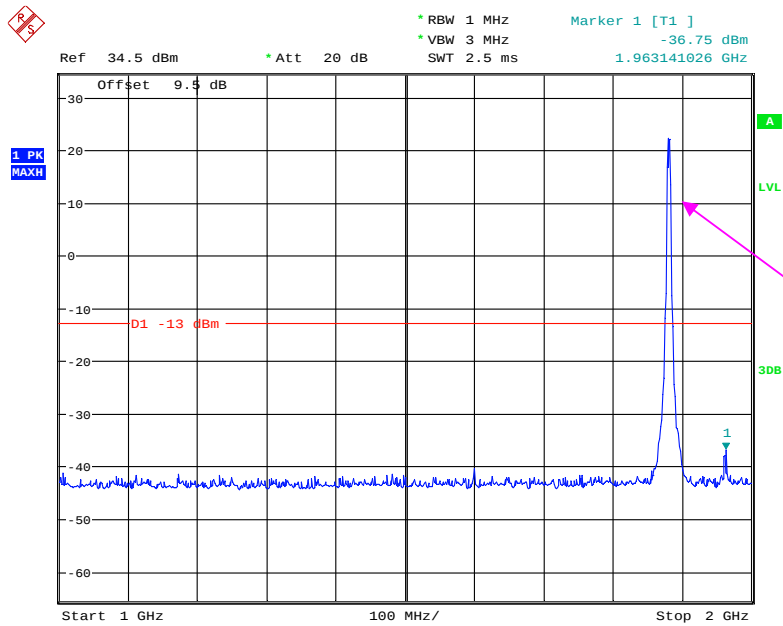
Date: 23.JUL.2019 22:38:48

30 MHz – 1 GHz (WCDMA Mode)



Date: 24.JUL.2019 00:04:15

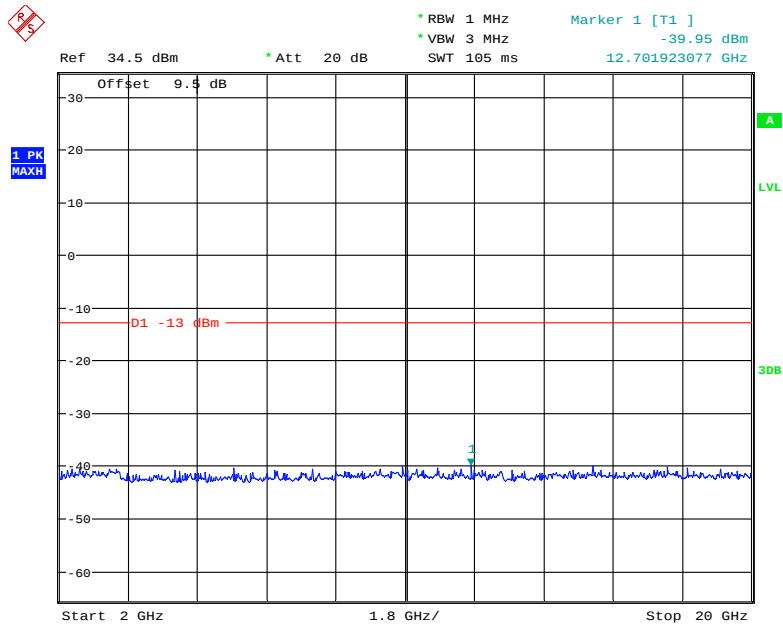
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 24.JUL.2019 00:04:59

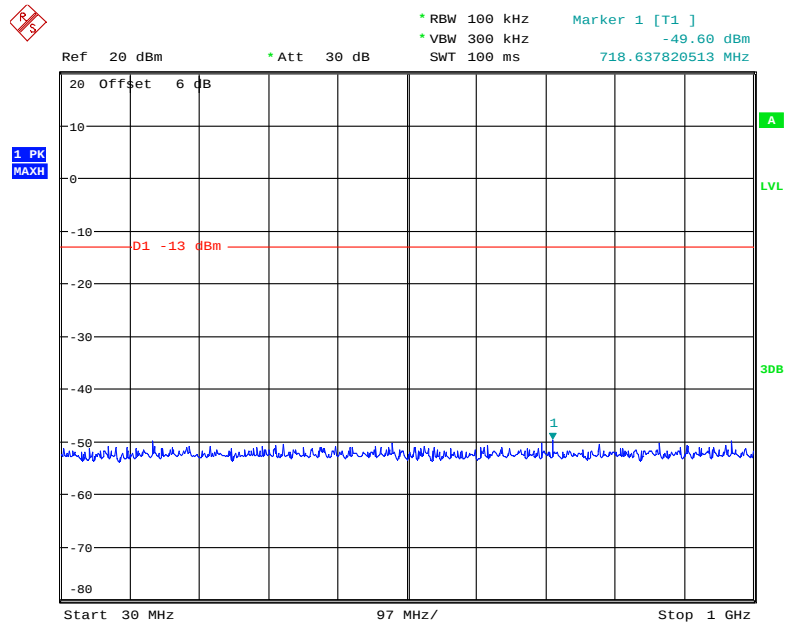
2 GHz – 20 GHz (WCDMA Mode)



Date: 24.JUL.2019 00:05:43

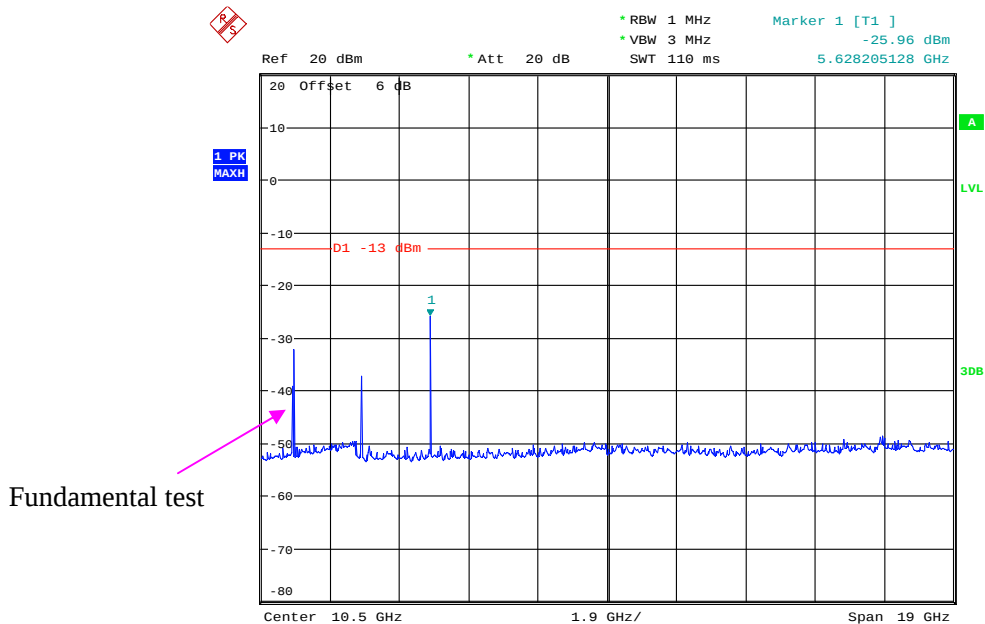
LTE Band 2:

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



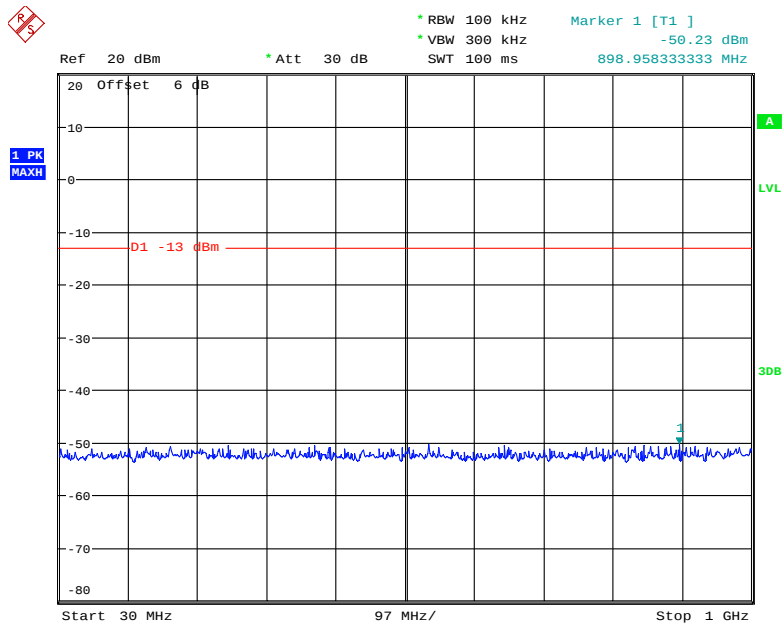
Date: 24.JUL.2019 13:23:02

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



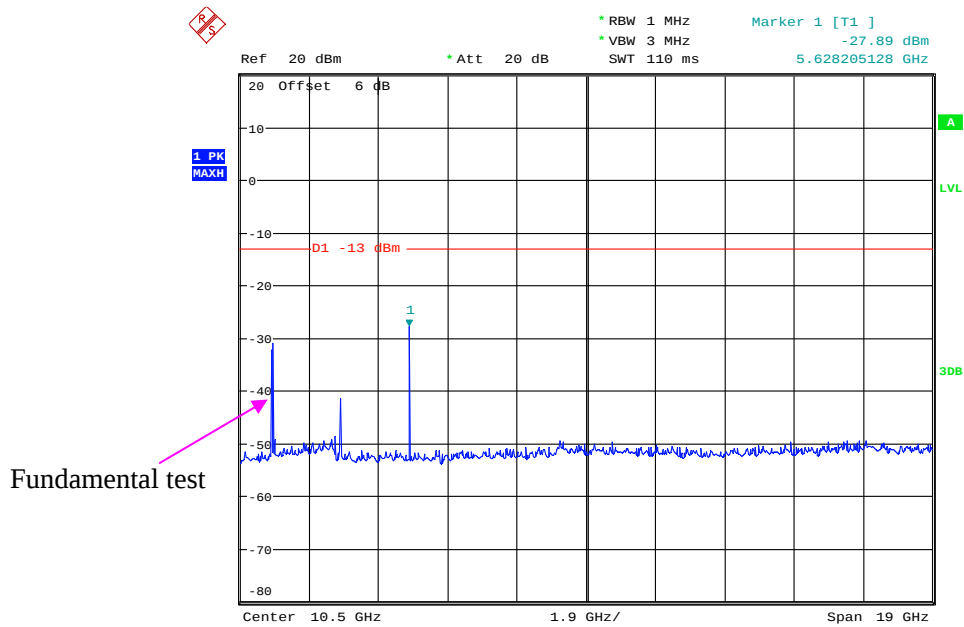
Date: 24.JUL.2019 13:27:42

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



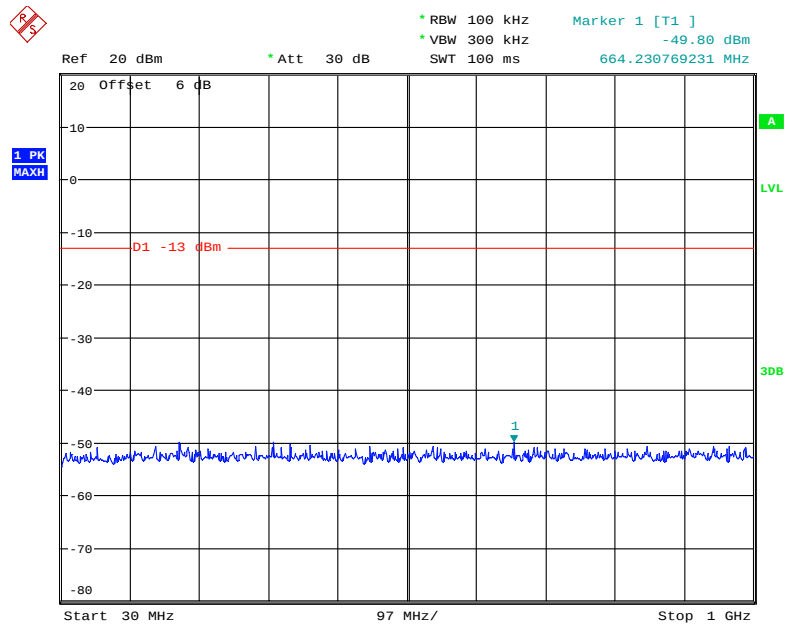
Date: 24.JUL.2019 13:23:31

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



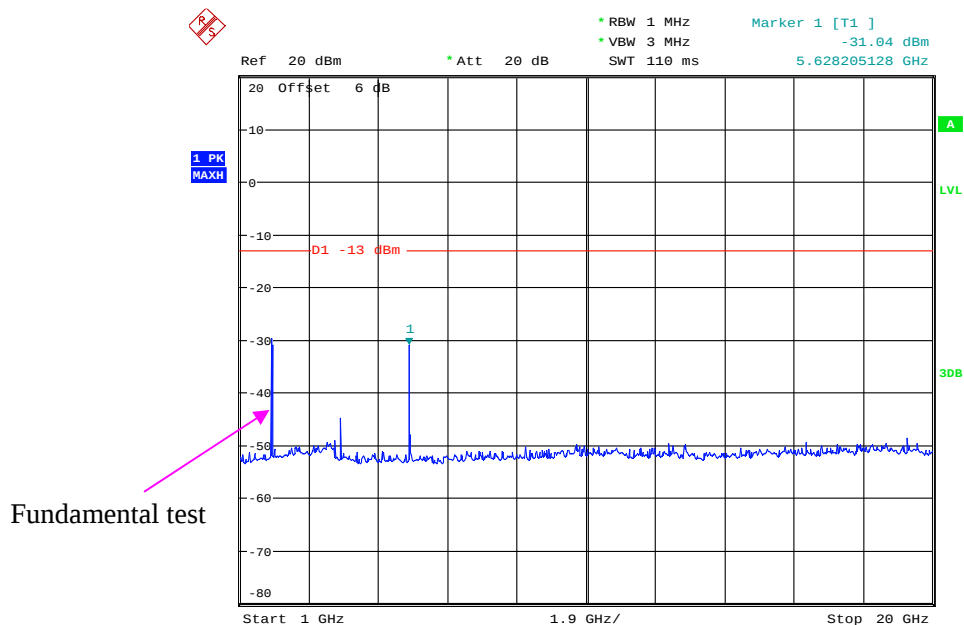
Date: 24.JUL.2019 13:28:33

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



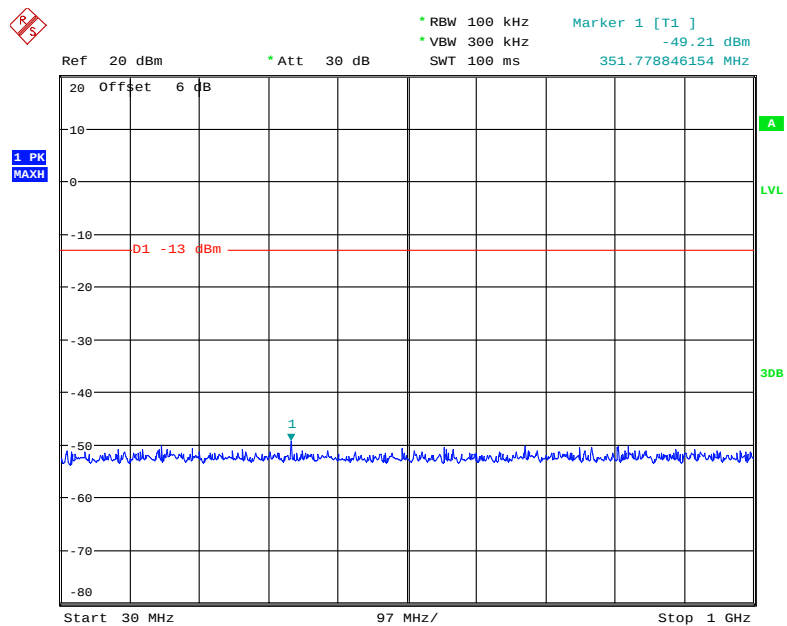
Date: 24.JUL.2019 13:23:56

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



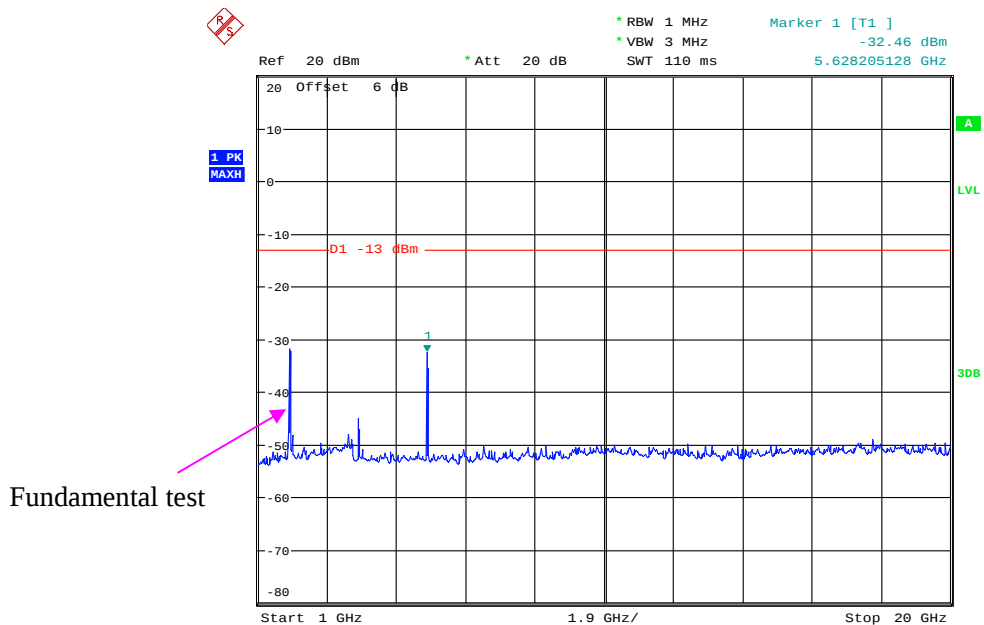
Date: 24.JUL.2019 13:24:05

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



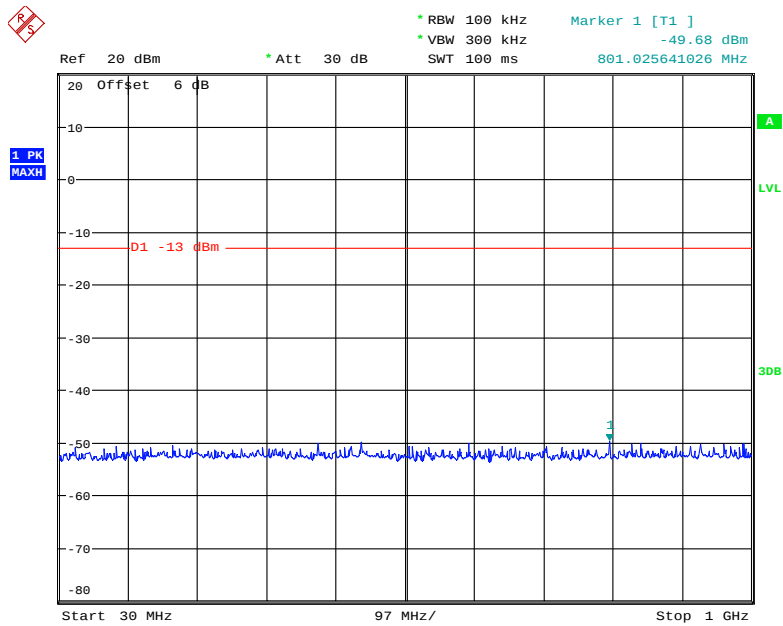
Date: 24.JUL.2019 13:24:26

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



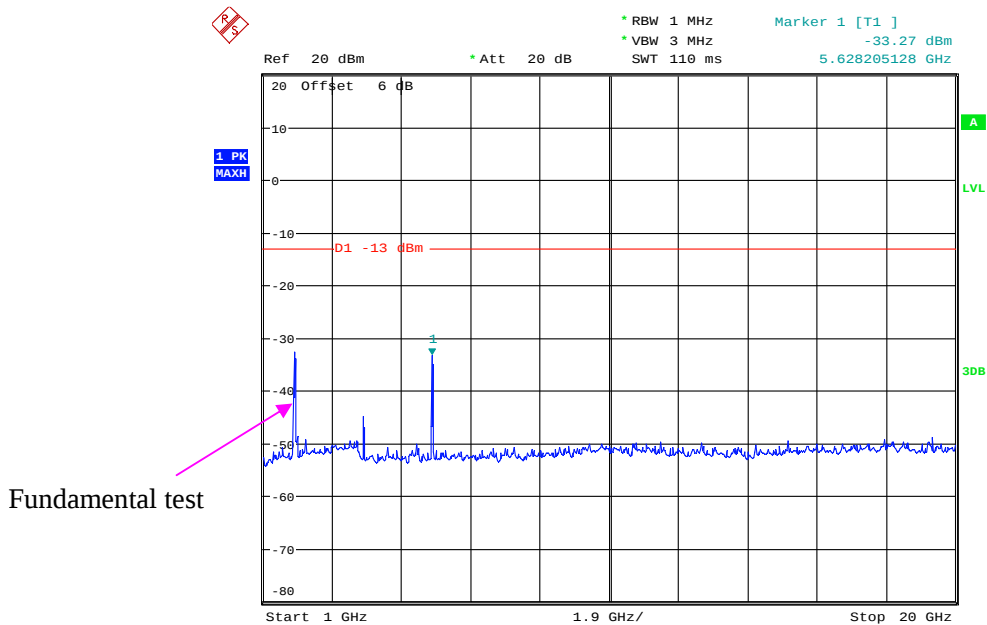
Date: 24.JUL.2019 13:24:35

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



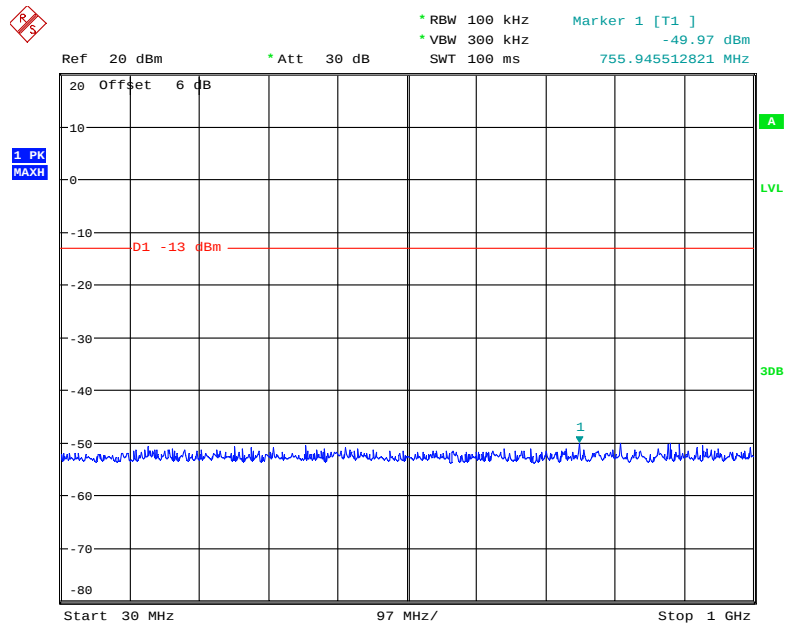
Date: 24.JUL.2019 13:24:57

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



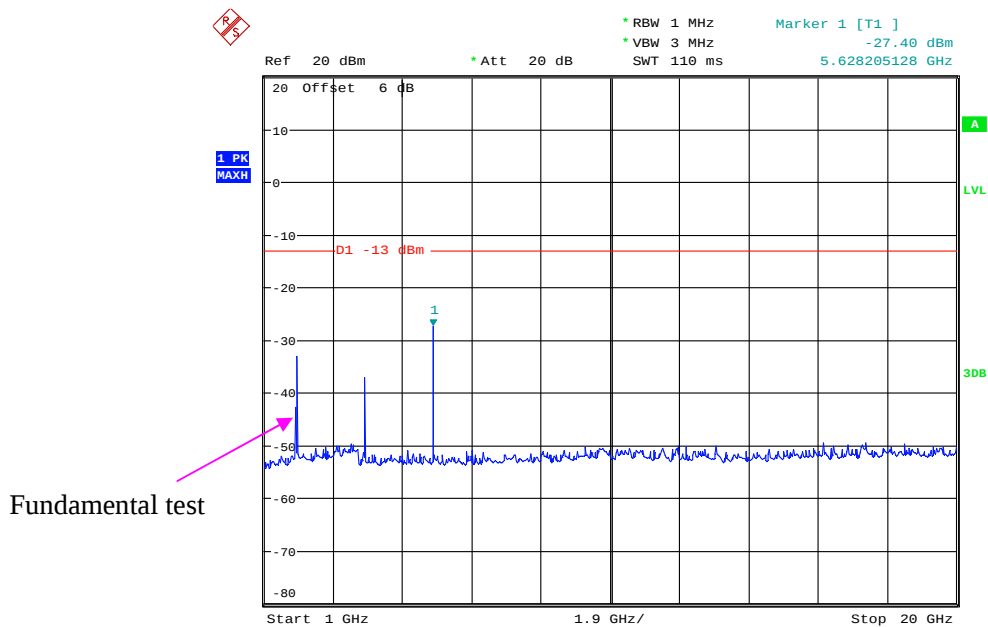
Date: 24.JUL.2019 13:25:06

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



Date: 24.JUL.2019 13:30:53

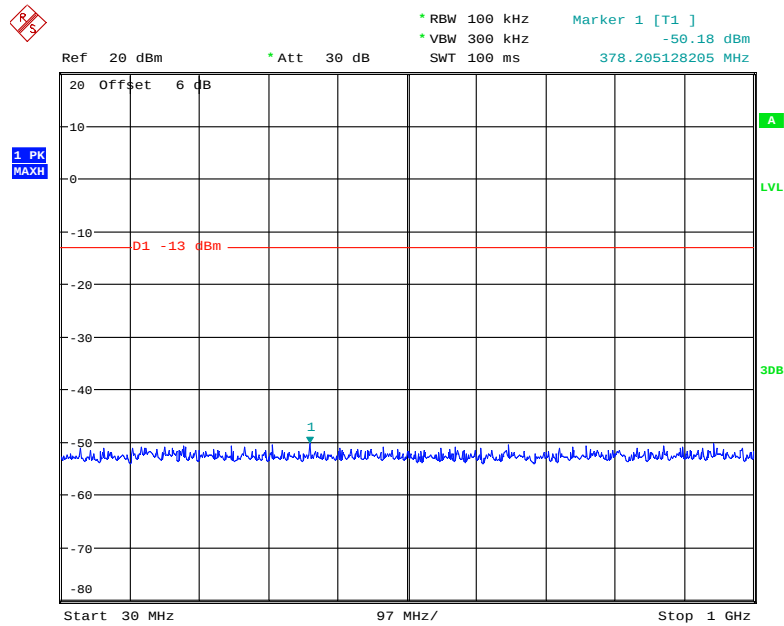
1 GHz - 20 GHz (20.0 MHz, Middle Channel)



Date: 24.JUL.2019 13:31:43

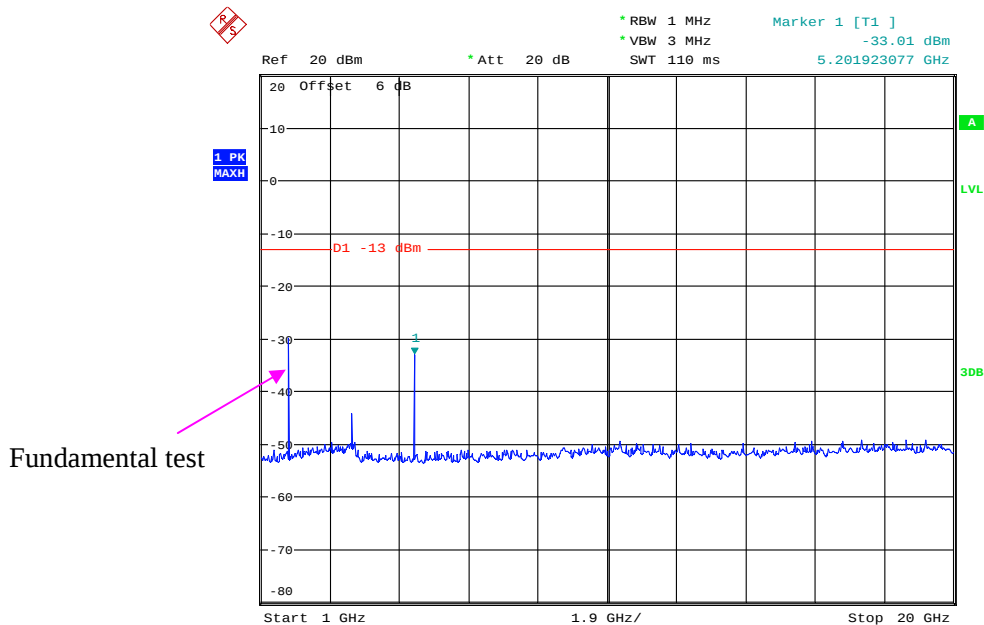
LTE Band 4:

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



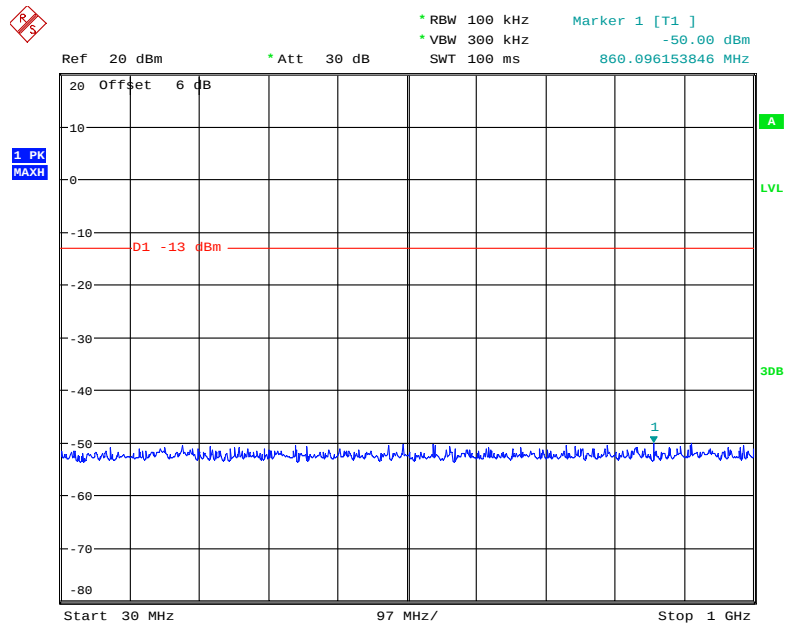
Date: 24.JUL.2019 13:36:10

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



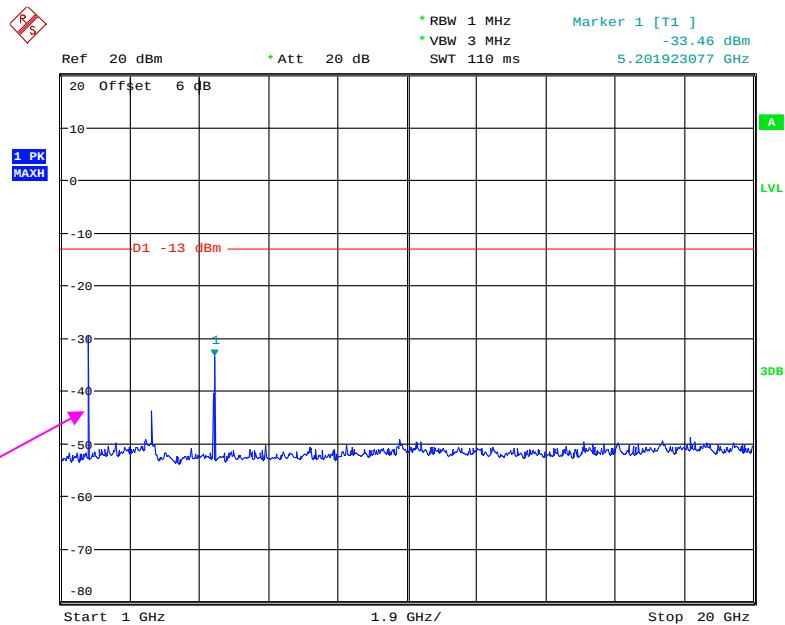
Date: 24.JUL.2019 13:40:07

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



Date: 24.JUL.2019 13:37:11

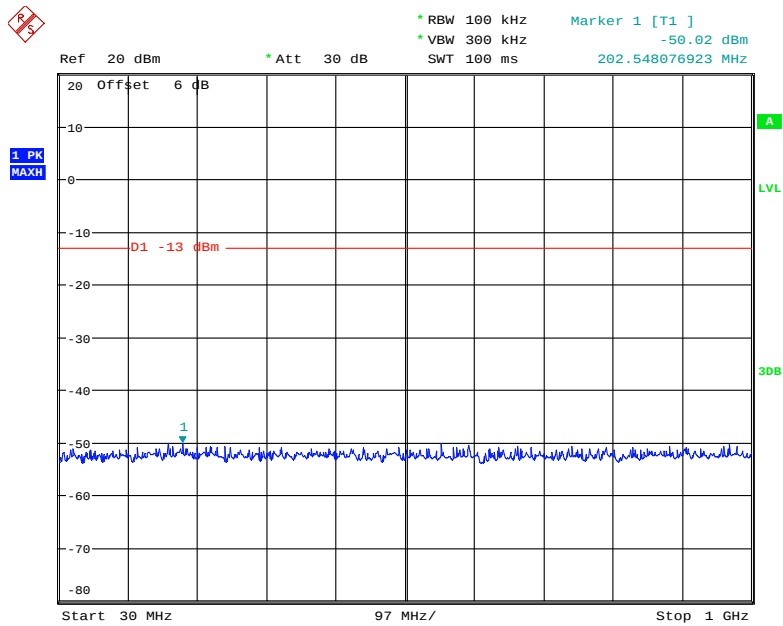
1 GHz - 20 GHz (3.0 MHz, Middle Channel)



Fundamental test

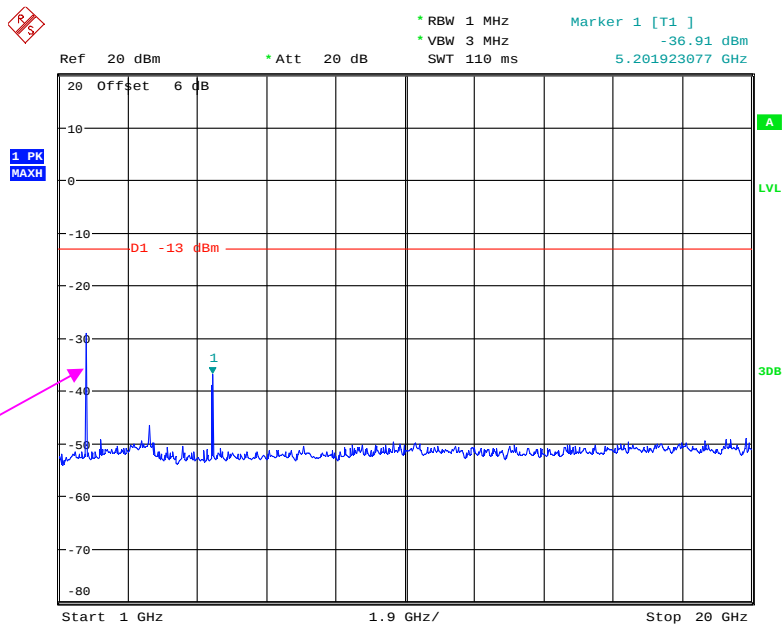
Date: 24.JUL.2019 13:37:21

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



Date: 24.JUL.2019 13:37:40

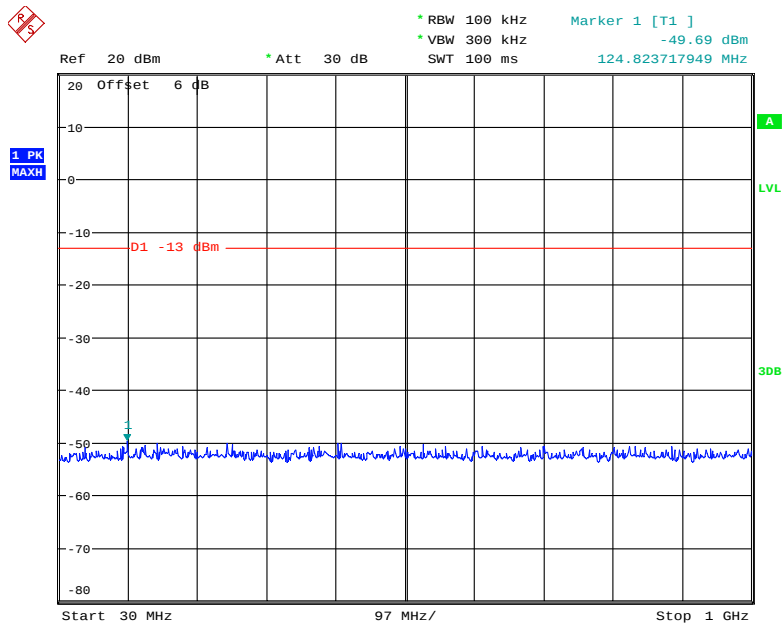
1 GHz - 20 GHz (5.0 MHz, Middle Channel)



Fundamental test

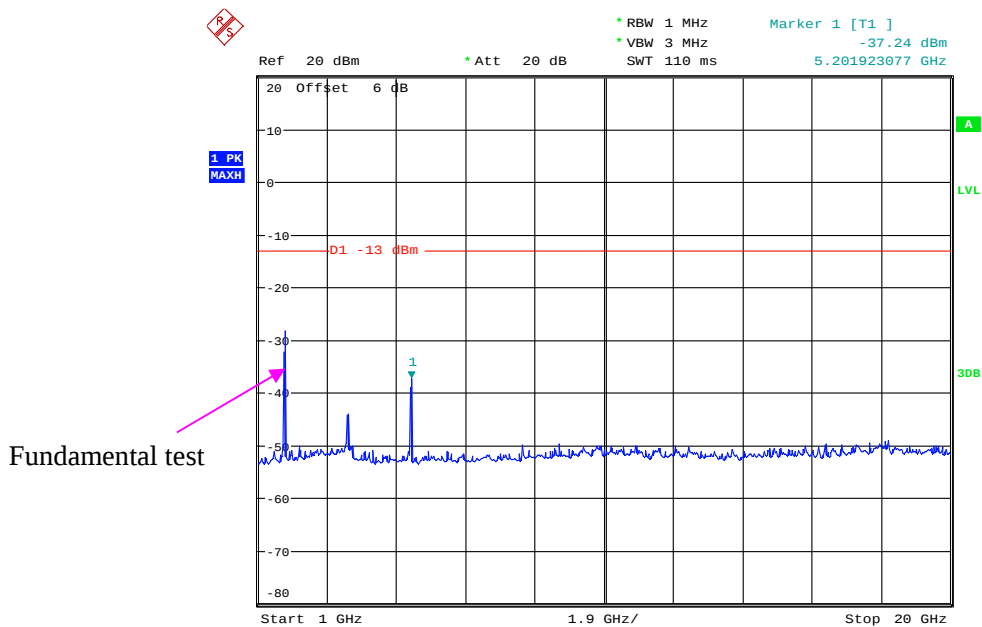
Date: 24.JUL.2019 13:37:50

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



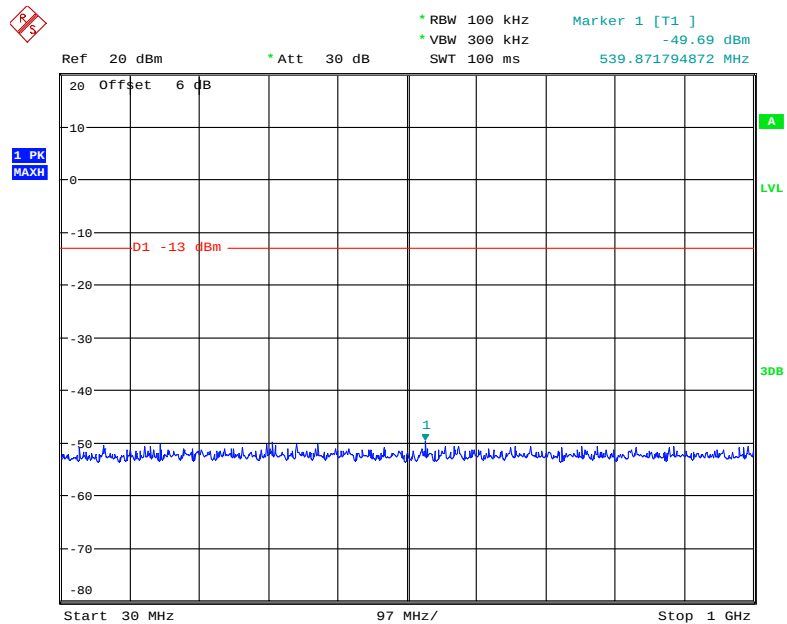
Date: 24.JUL.2019 13:38:10

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



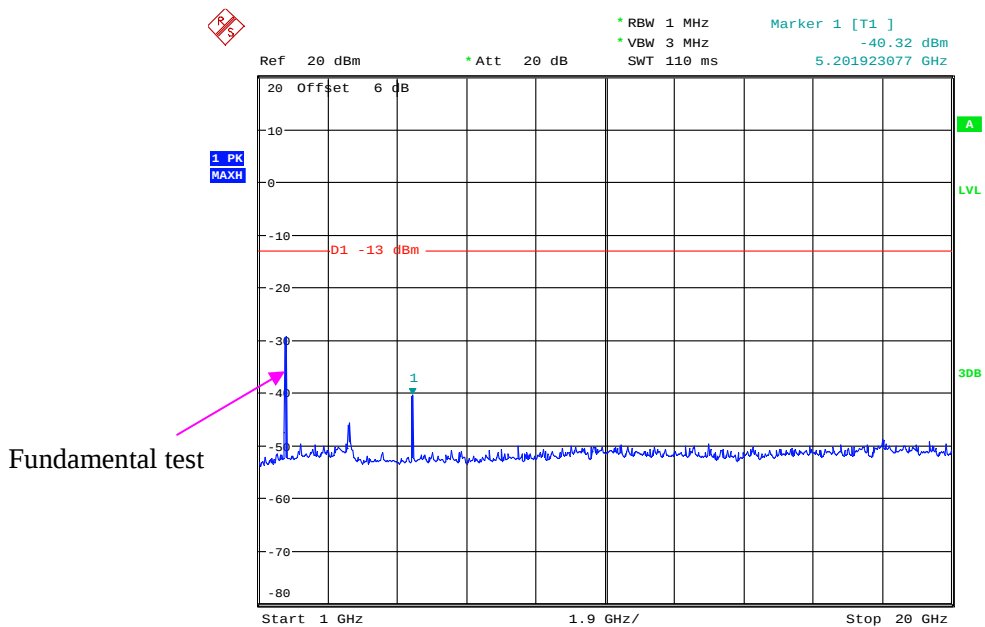
Date: 24.JUL.2019 13:38:19

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



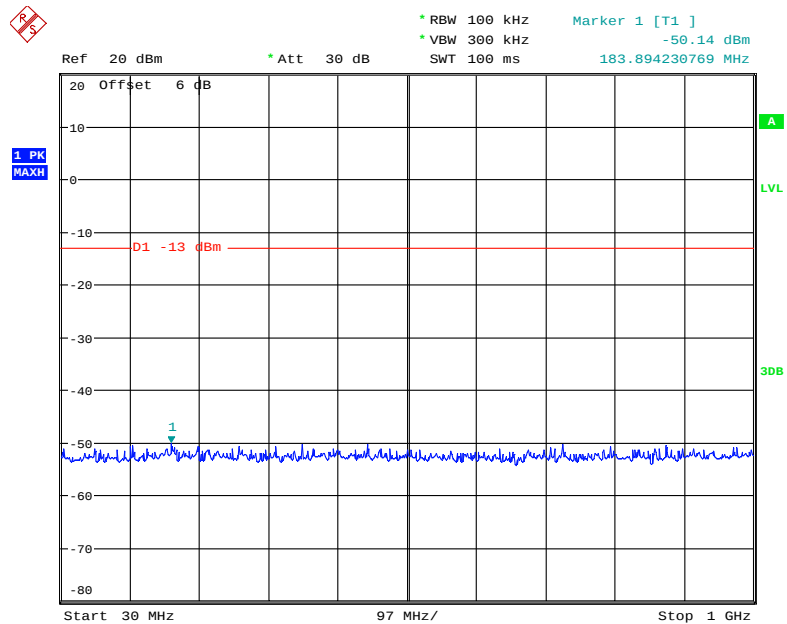
Date: 24.JUL.2019 13:38:42

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



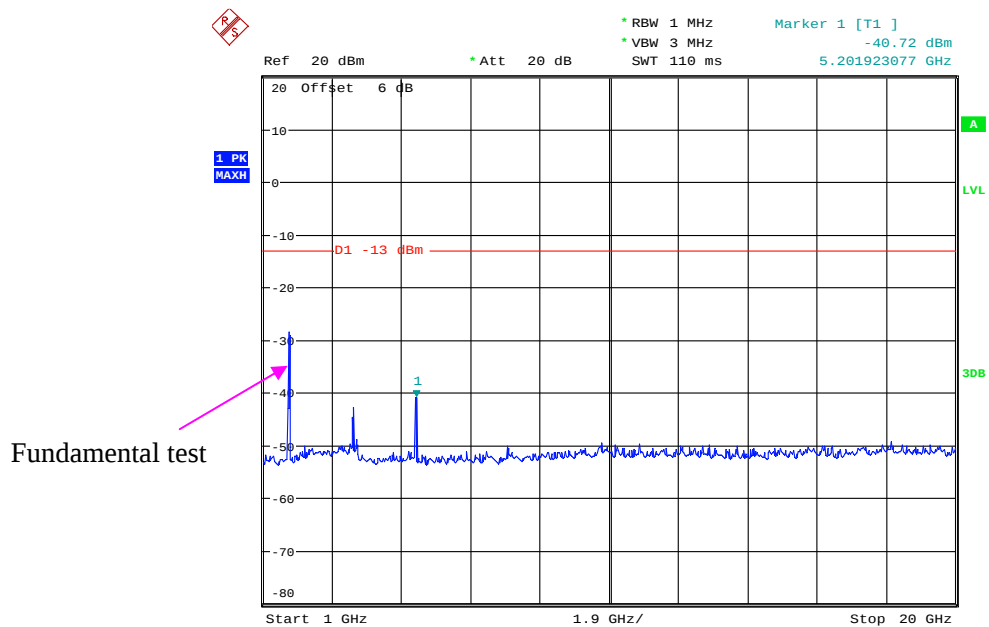
Date: 24.JUL.2019 13:38:52

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

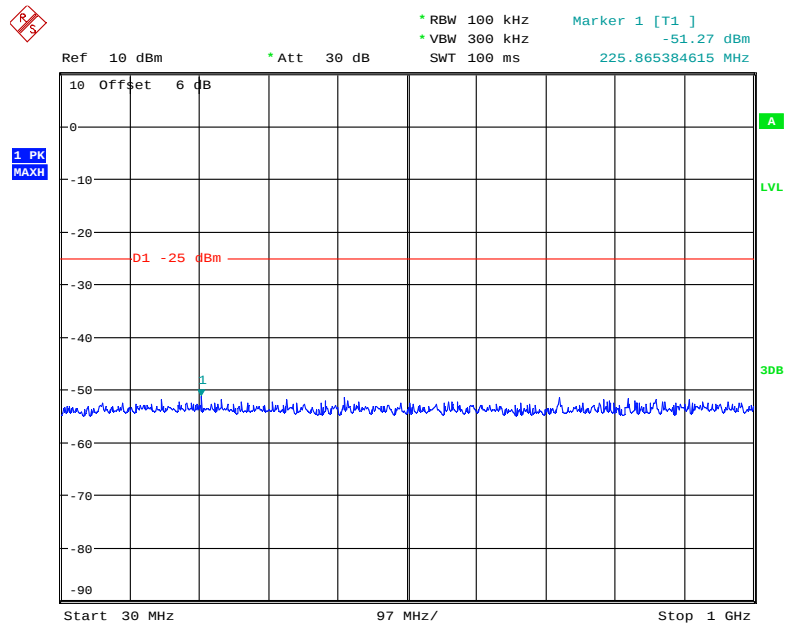


Date: 24.JUL.2019 13:39:11

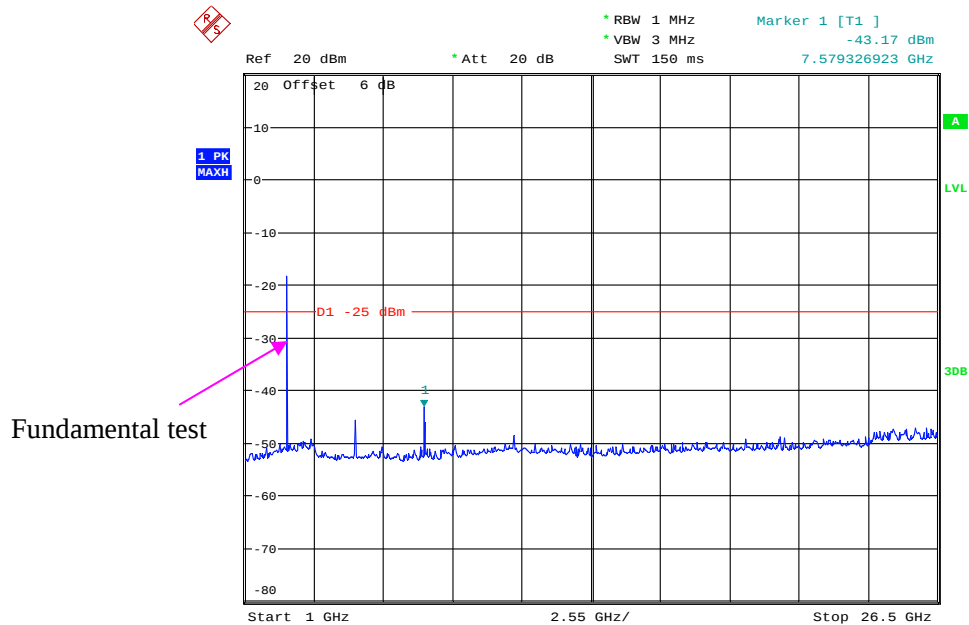
1 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 24.JUL.2019 13:39:21

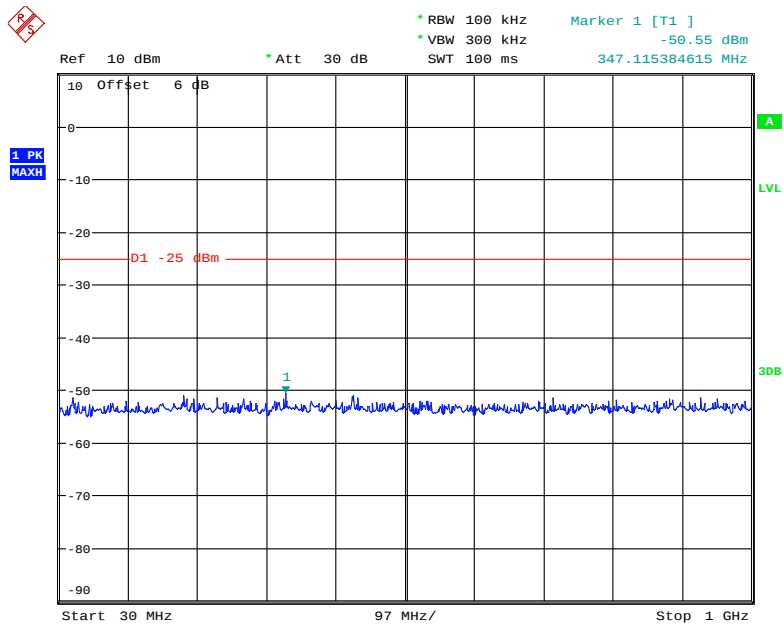
LTE Band 7:**30 MHz - 1 GHz (5 MHz, Middle Channel)**

Date: 24.JUL.2019 13:48:47

1 GHz – 26.5 GHz (5 MHz, Middle Channel)

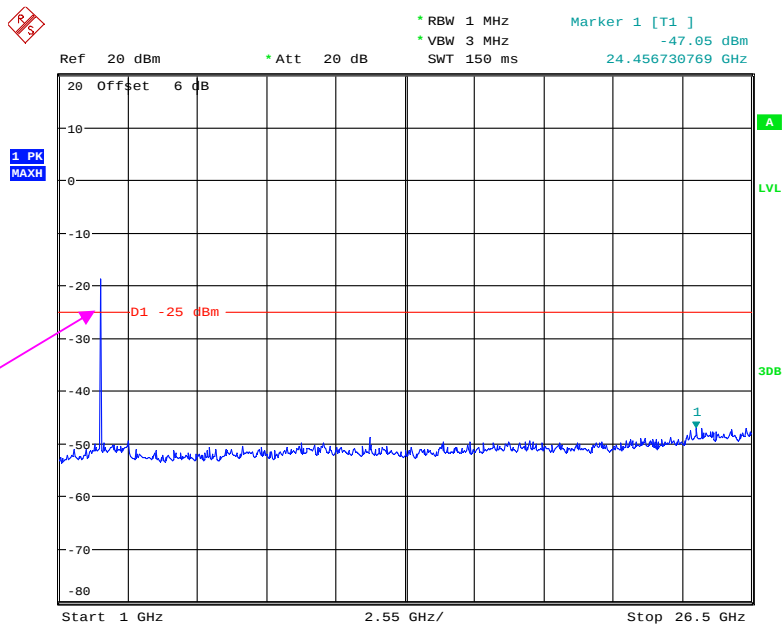
Date: 24.JUL.2019 13:48:57

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



Date: 24.JUL.2019 13:49:18

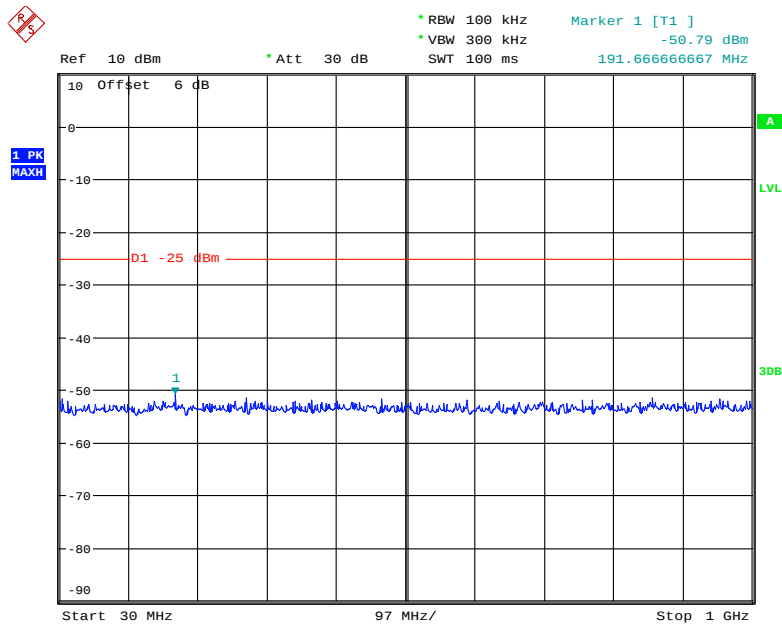
1 GHz – 26.5 GHz (10 MHz, Middle Channel)



Fundamental test

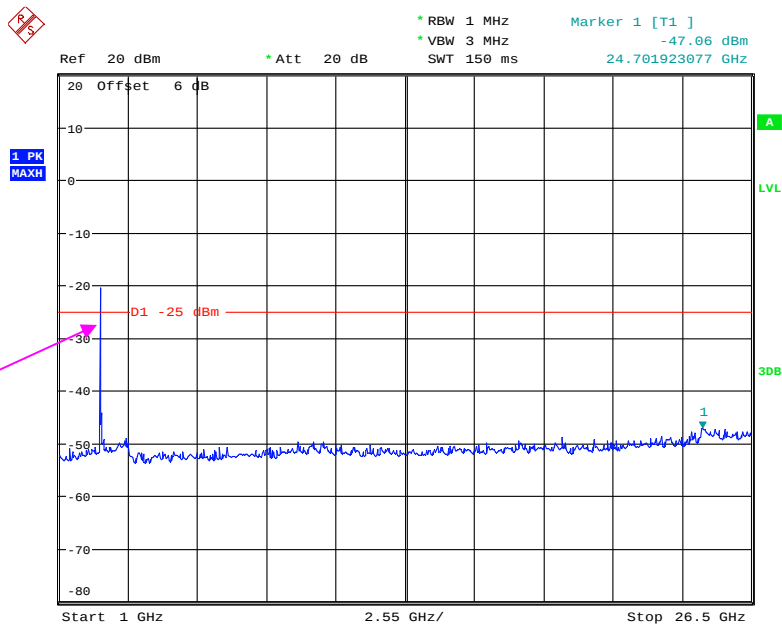
Date: 24.JUL.2019 13:49:27

30 MHz - 1 GHz (15 MHz, Middle Channel)



Date: 24.JUL.2019 13:49:50

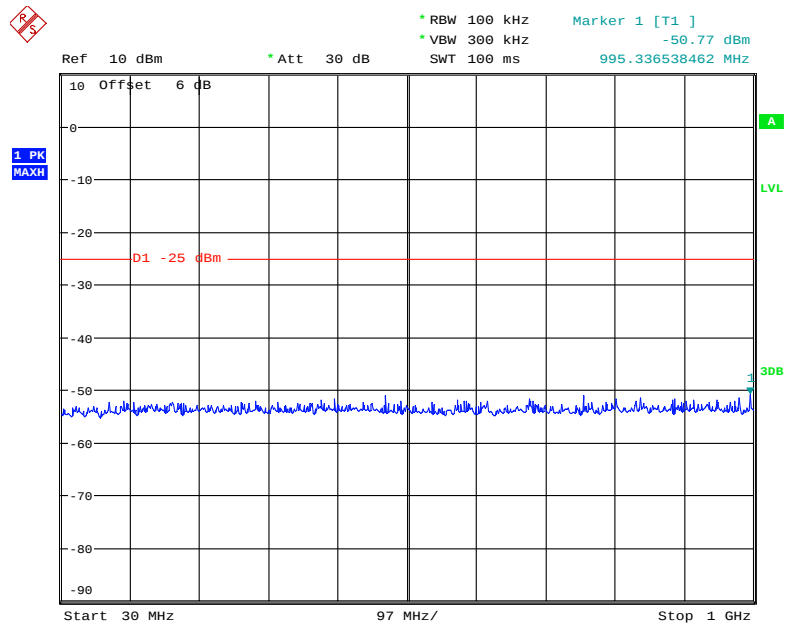
1 GHz - 26.5 GHz (15 MHz, Middle Channel)



Fundamental test

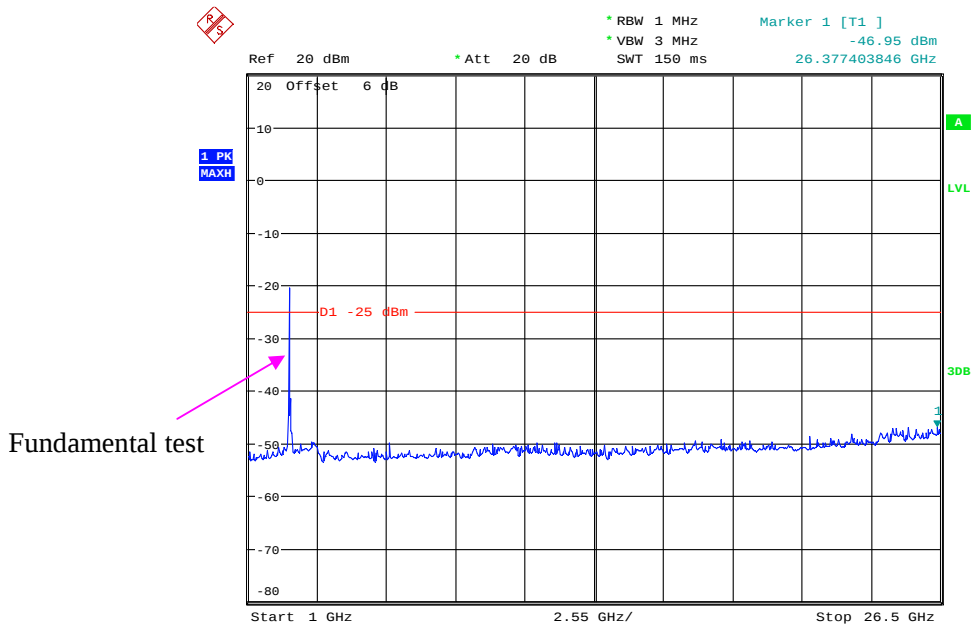
Date: 24.JUL.2019 13:50:00

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

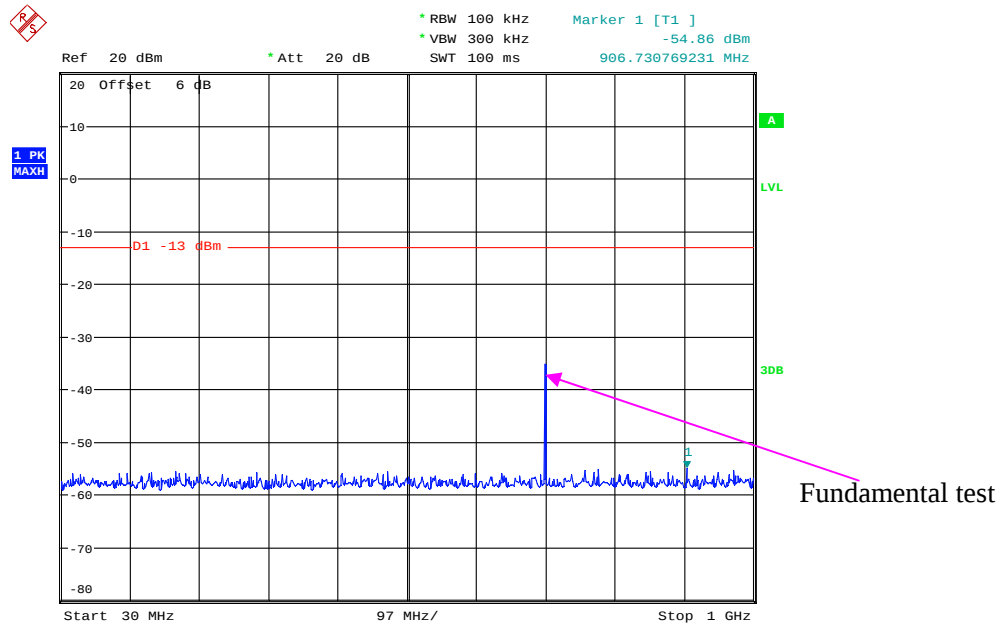


Date: 24.JUL.2019 13:50:20

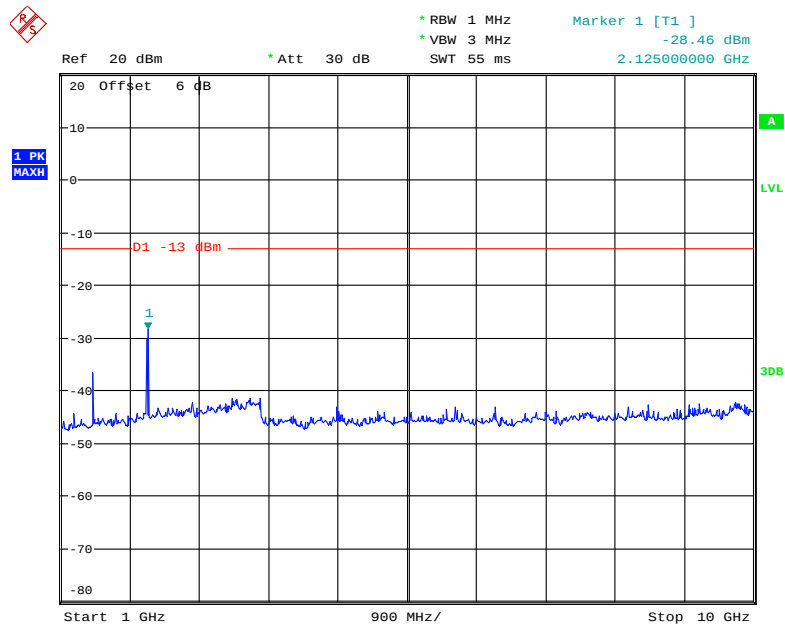
1 GHz - 26.5 GHz (20 MHz, Middle Channel)



Date: 24.JUL.2019 13:50:29

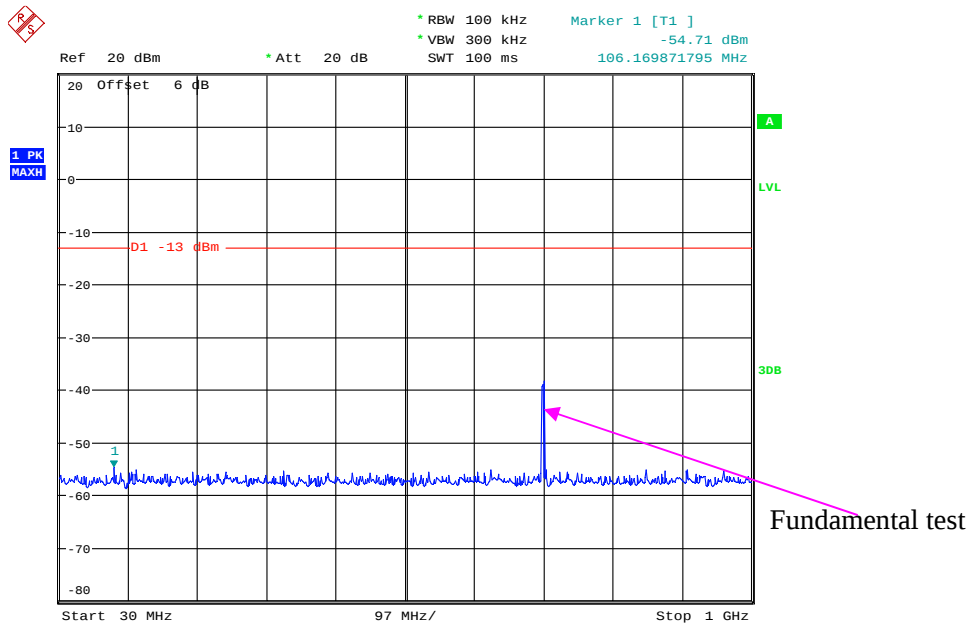
LTE Band 12:**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Date: 24.JUL.2019 13:52:33

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

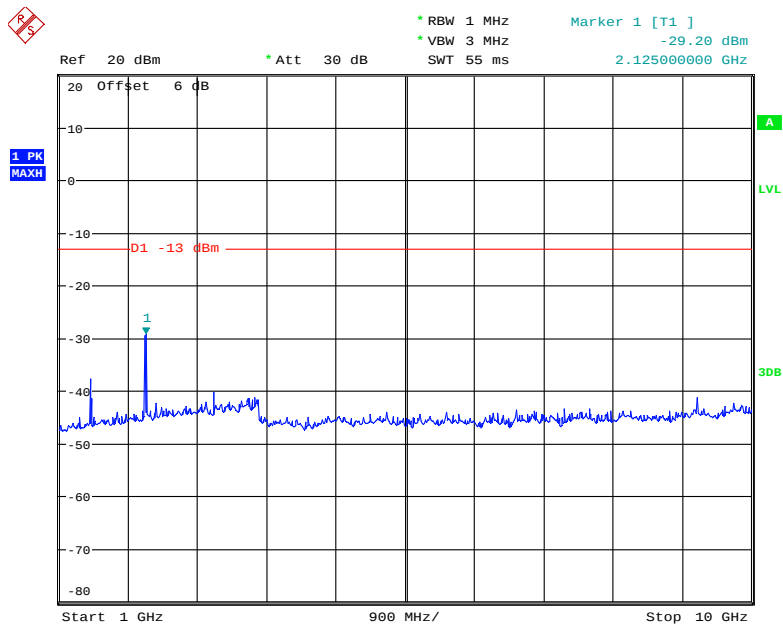
Date: 24.JUL.2019 13:52:43

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



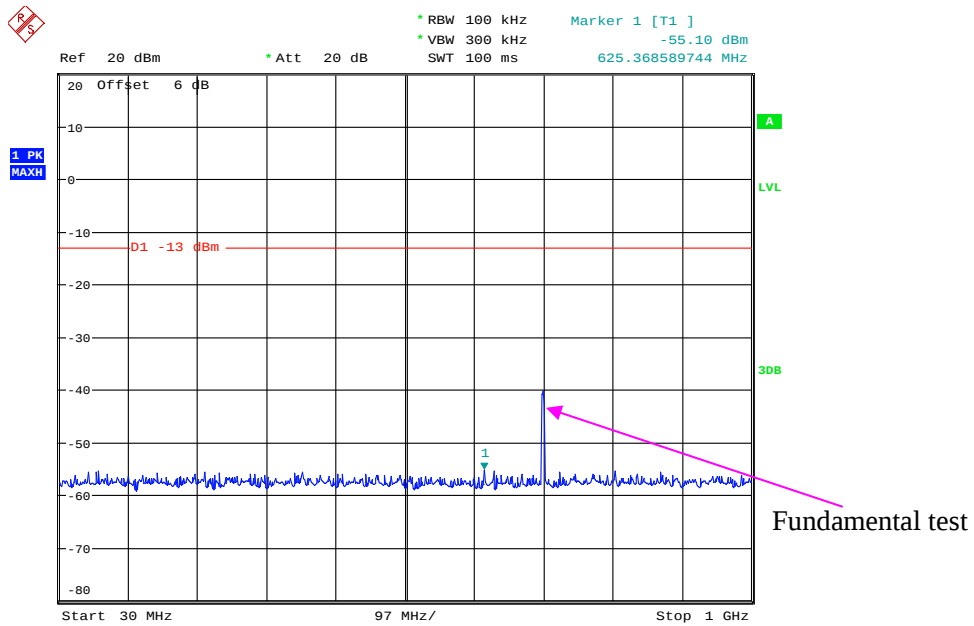
Date: 24.JUL.2019 13:53:02

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



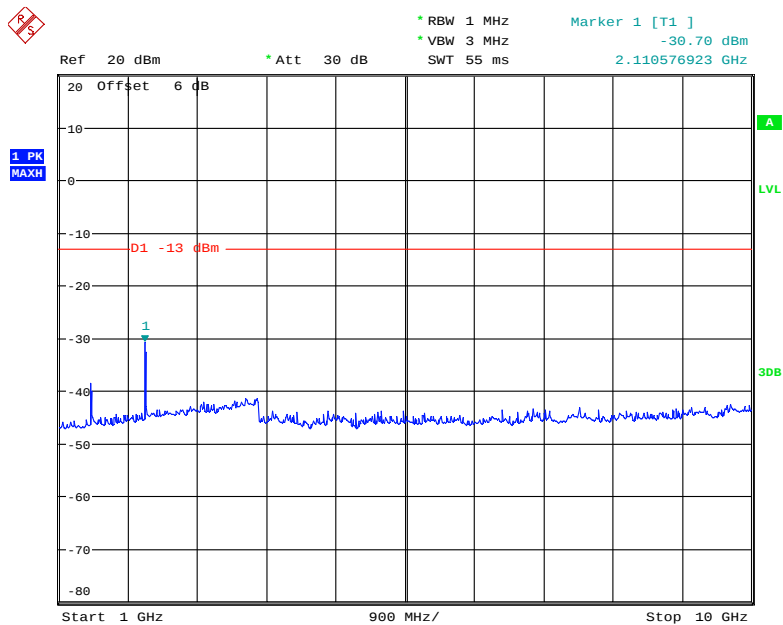
Date: 24.JUL.2019 13:53:12

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



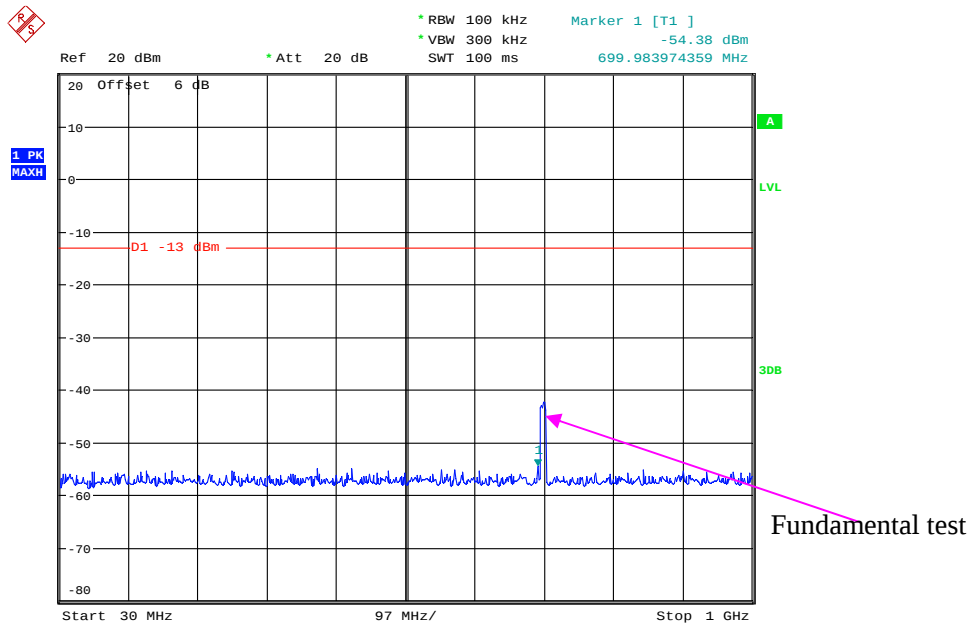
Date: 24.JUL.2019 13:53:28

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



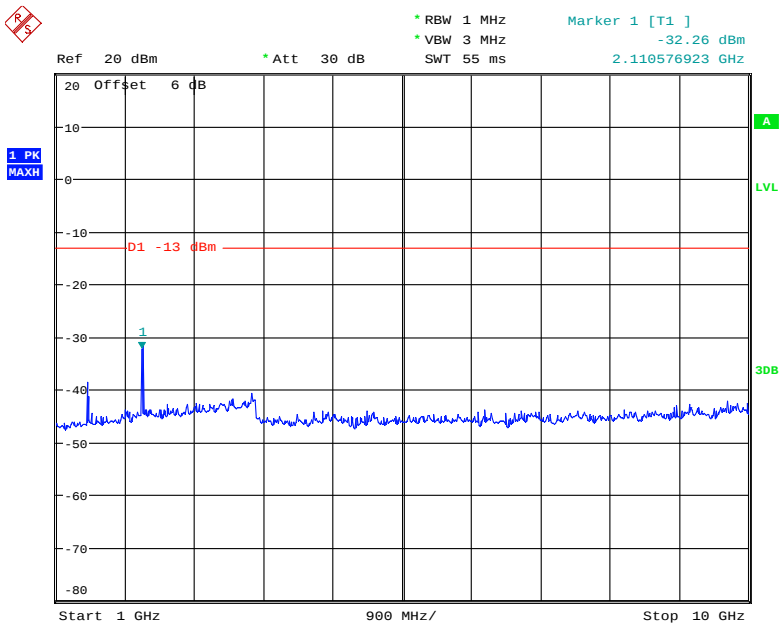
Date: 24.JUL.2019 13:53:41

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

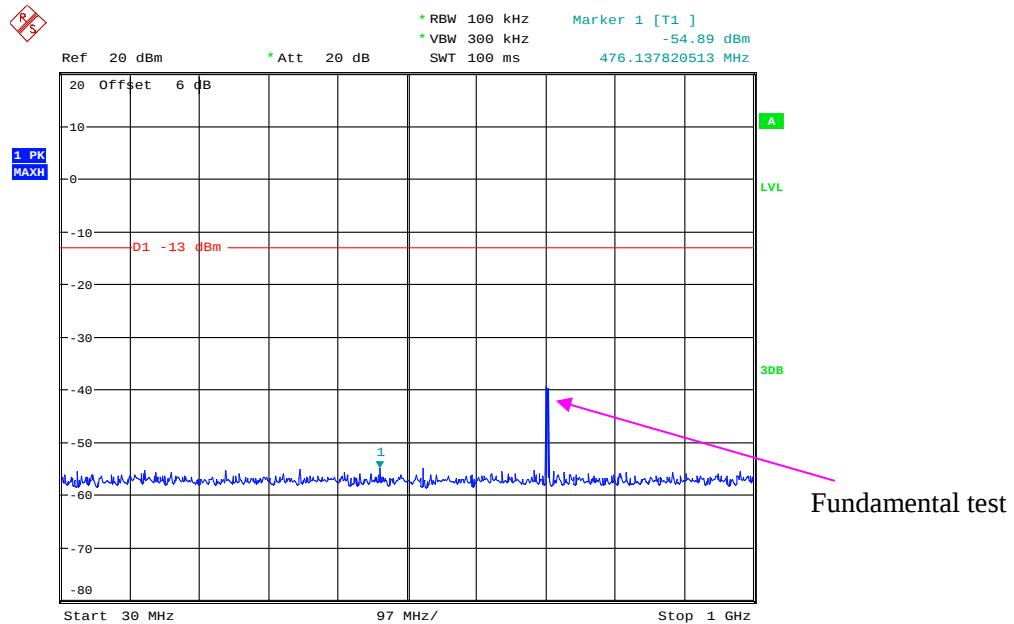


Date: 24.JUL.2019 13:54:01

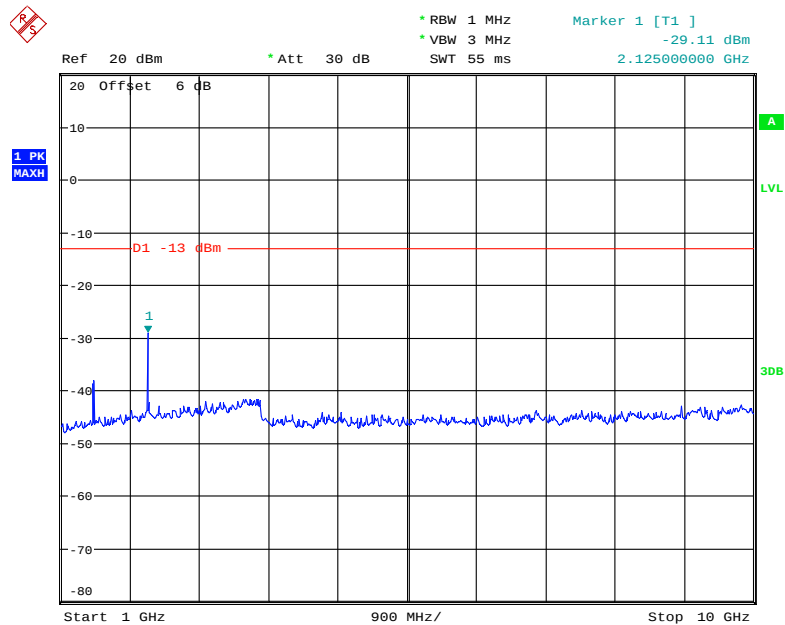
1 GHz - 10 GHz (10.0 MHz, Middle Channel)



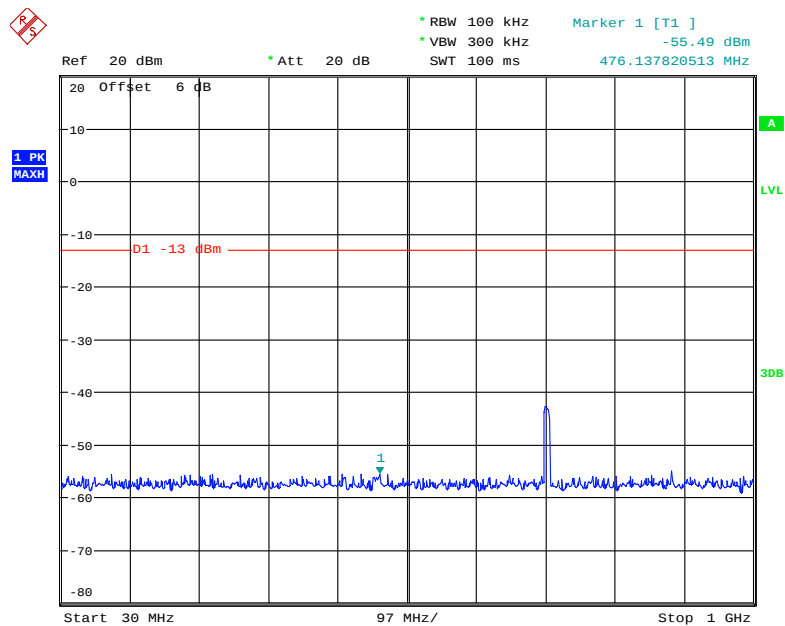
Date: 24.JUL.2019 13:54:11

LTE Band 17:**30 MHz – 1.0 GHz (5.0 MHz, Middle Channel)**

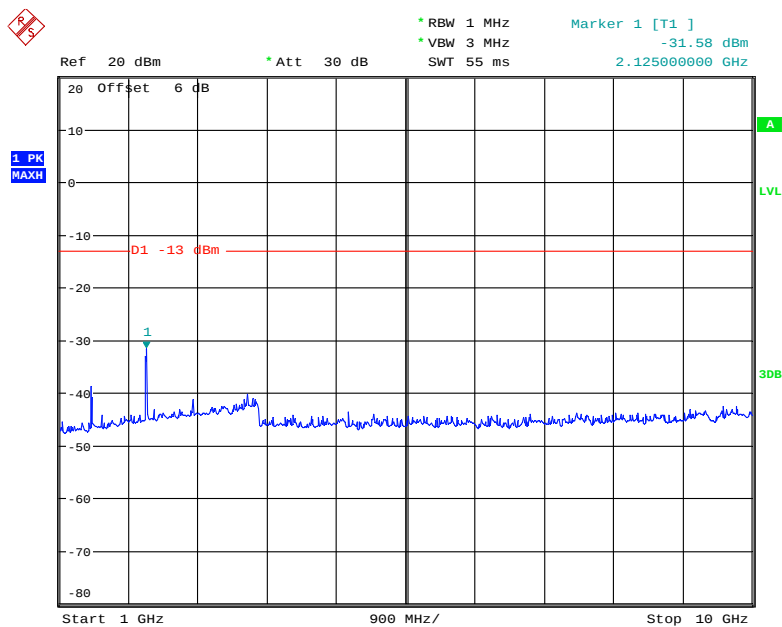
Date: 24.JUL.2019 13:54:31

1 GHz – 10GHz (5 MHz, Middle Channel)

Date: 24.JUL.2019 13:54:40

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

Date: 24.JUL.2019 13:54:58

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

Date: 24.JUL.2019 13:55:07

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 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by Curry Xiang on 2019-08-21.

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										
245.31	32.55	284	2.1	H	-64.5	0.31	0	-46.20	-13	33.20
245.31	33.91	268	2.0	V	-63.1	0.31	0	-45.60	-13	32.60
1673.20	55.41	277	1.2	H	-50.9	1.30	8.90	-43.30	-13	30.30
1673.20	58.03	95	1.6	V	-47.7	1.30	8.90	-40.10	-13	27.10
2509.80	56.07	15	1.7	H	-47.3	2.60	10.20	-39.70	-13	26.70
2509.80	53.20	146	1.0	V	-49.5	2.60	10.20	-41.90	-13	28.90
3346.40	43.10	15	1.7	H	-57.8	1.50	11.70	-47.60	-13	34.60
3346.40	43.21	205	1.4	V	-57.7	1.50	11.70	-47.50	-13	34.50
WCDMA Mode, Middle channel										
245.31	33.36	326	1.4	H	-63.6	0.31	0	-46.20	-13	33.20
245.31	33.29	88	2.0	V	-63.7	0.31	0	-45.60	-13	32.60
1673.20	48.84	136	2.4	H	-57.5	1.30	8.90	-49.90	-13	36.90
1673.20	50.64	177	2.3	V	-55.1	1.30	8.90	-47.50	-13	34.50
2509.80	49.85	359	1.6	H	-53.5	2.60	10.20	-45.90	-13	32.90
2509.80	48.31	313	1.6	V	-54.4	2.60	10.20	-46.80	-13	33.80
3346.40	44.28	52	1.1	H	-56.6	1.50	11.70	-46.40	-13	33.40
3346.40	43.16	19	1.8	V	-57.8	1.50	11.70	-47.60	-13	34.60

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
245.31	32.41	333	1.7	H	-64.6	0.31	0	-46.20	-13	33.20
245.31	33.96	179	1.5	V	-63.0	0.31	0	-45.60	-13	32.60
3760.00	49.52	304	2.1	H	-52.5	1.50	11.80	-42.20	-13	29.20
3760.00	47.33	249	1.0	V	-54.3	1.50	11.80	-44.00	-13	31.00
WCDMA Mode Band II, Middle channel										
245.31	32.19	134	2.4	H	-64.8	0.31	0	-46.20	-13	33.20
245.31	32.53	158	2.4	V	-64.5	0.31	0	-45.60	-13	32.60
3760.00	46.40	329	1.3	H	-55.7	1.50	11.80	-45.40	-13	32.40
3760.00	45.29	315	2.2	V	-56.3	1.50	11.80	-46.00	-13	33.00

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level	Limit	Margin
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)	(dBm)	(dBm)	(dB)
Band 2 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
245.31	32.69	87	2.5	H	-64.3	0.31	0	-64.61	-13	51.61
245.31	32.46	145	2.1	V	-64.5	0.31	0	-64.81	-13	51.81
3760.00	45.41	92	1.6	H	-56.6	1.50	11.80	-46.30	-13	33.30
3760.00	43.40	173	1.9	V	-58.2	1.50	11.80	-47.90	-13	34.90
Band 4 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
245.31	32.12	255	2.4	H	-64.9	0.31	0	-65.21	-13	52.21
245.31	33.44	199	1.6	V	-63.6	0.31	0	-63.91	-13	50.91
3465.00	43.01	261	2.0	H	-57.7	1.50	12.00	-47.20	-13	34.20
3465.00	43.19	58	1.1	V	-58.3	1.50	12.00	-47.80	-13	34.80
Band 7 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
245.31	32.39	199	2.3	H	-64.6	0.31	0	-64.91	-25	39.91
245.31	32.30	63	2.5	V	-64.7	0.31	0	-65.01	-25	40.01
5070.00	43.30	349	2.1	H	-56.7	1.60	12.10	-46.20	-25	21.20
5070.00	43.87	52	1.5	V	-56.1	1.60	12.10	-45.60	-25	20.60
Band 12 (1.4 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
245.31	32.91	71	1.4	H	-64.1	0.31	0	-64.41	-13	51.41
245.31	32.07	225	2.3	V	-64.9	0.31	0	-65.21	-13	52.21
1415.00	53.81	295	1.6	H	-54.4	1.60	7.90	-48.10	-13	35.10
1415.00	53.42	332	1.1	V	-55.0	1.60	7.90	-48.70	-13	35.70
2122.50	42.95	44	1.5	H	-58.2	1.30	9.70	-49.80	-13	36.80
2122.50	43.36	208	1.9	V	-58.6	1.30	9.70	-50.20	-13	37.20
2830.00	43.02	126	1.8	H	-60.9	1.80	10.50	-52.20	-13	39.20
2830.00	43.26	97	1.3	V	-60.4	1.80	10.50	-51.70	-13	38.70
3537.50	42.49	26	2.4	H	-58.4	1.50	12.00	-47.90	-13	34.90
3537.50	43.05	286	1.7	V	-58.6	1.50	12.00	-48.10	-13	35.10

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 17 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
245.31	33.43	114	2.3	H	-63.6	0.31	0	-63.91	-13	50.91
245.31	32.96	1	1.1	V	-64.0	0.31	0	-64.31	-13	51.31
1420.00	55.01	68	1.7	H	-53.2	1.60	7.90	-46.90	-13	33.90
1420.00	54.70	292	1.8	V	-53.7	1.60	7.90	-47.40	-13	34.40
2130.00	42.98	302	1.8	H	-58.1	1.30	9.70	-49.70	-13	36.70
2130.00	43.26	157	1.6	V	-58.7	1.30	9.70	-50.30	-13	37.30
2840.00	42.81	297	1.4	H	-61.1	1.80	10.50	-52.40	-13	39.40
2840.00	43.97	345	1.1	V	-59.6	1.80	10.50	-50.90	-13	37.90
3550.00	43.39	294	2.3	H	-58.3	1.50	12.10	-47.70	-13	34.70
3550.00	43.24	307	1.8	V	-57.9	1.50	12.10	-47.30	-13	34.30

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.

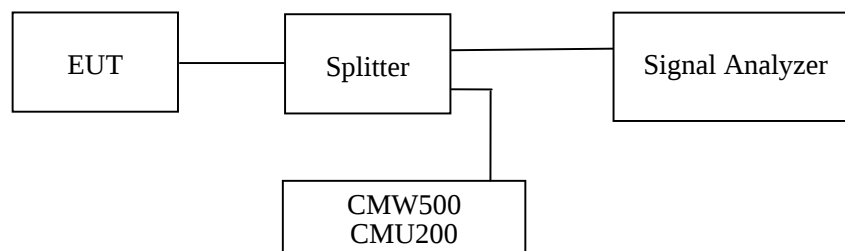
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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**

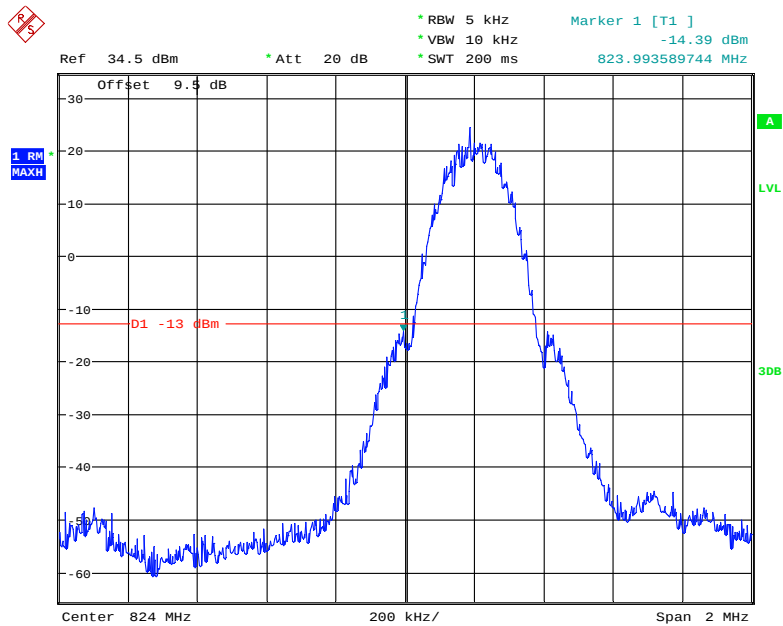
Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by George Zhong and Kieron Luo from 2019-07-23 to 2019-07-24.

EUT operation mode: Transmitting

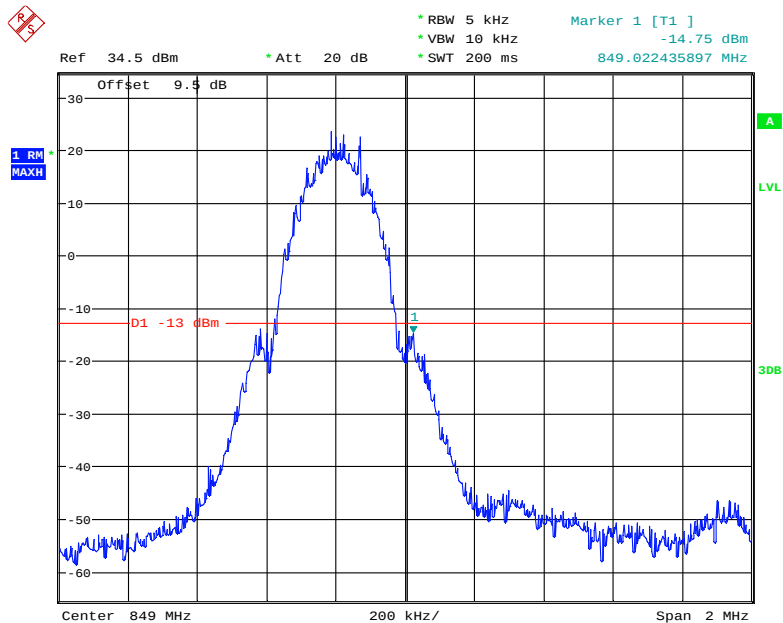
Test Result: Compliance. Please refer to the following plots.

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



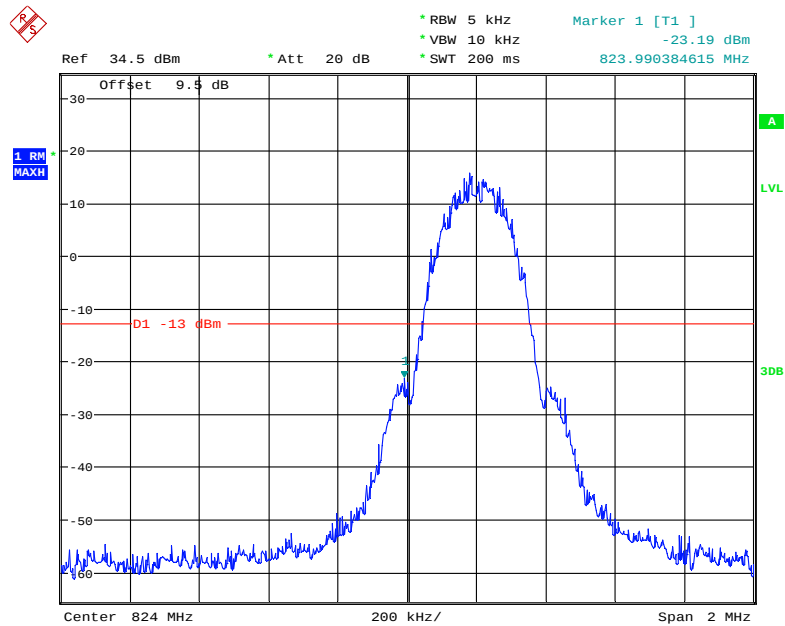
Date: 23.JUL.2019 22:25:08

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



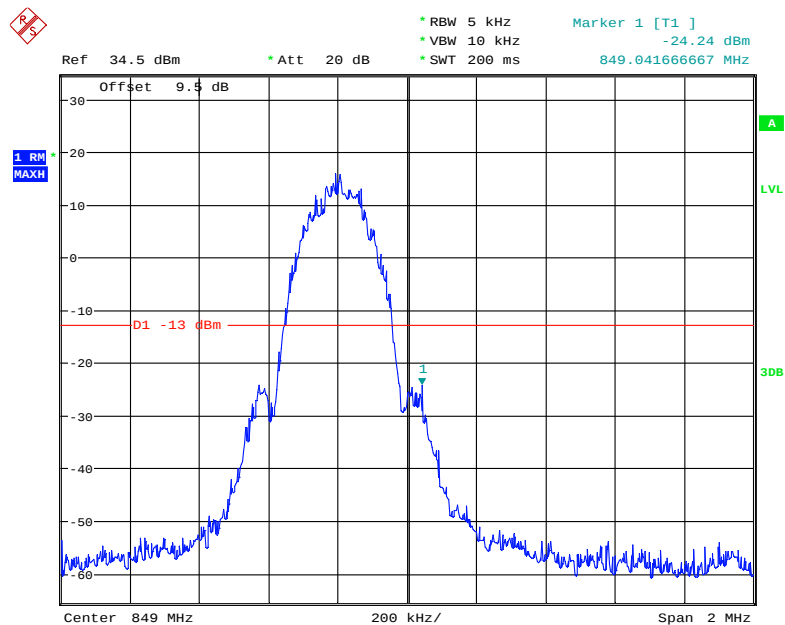
Date: 23.JUL.2019 22:26:39

Cellular Band, Left Band Edge for EDGE Mode



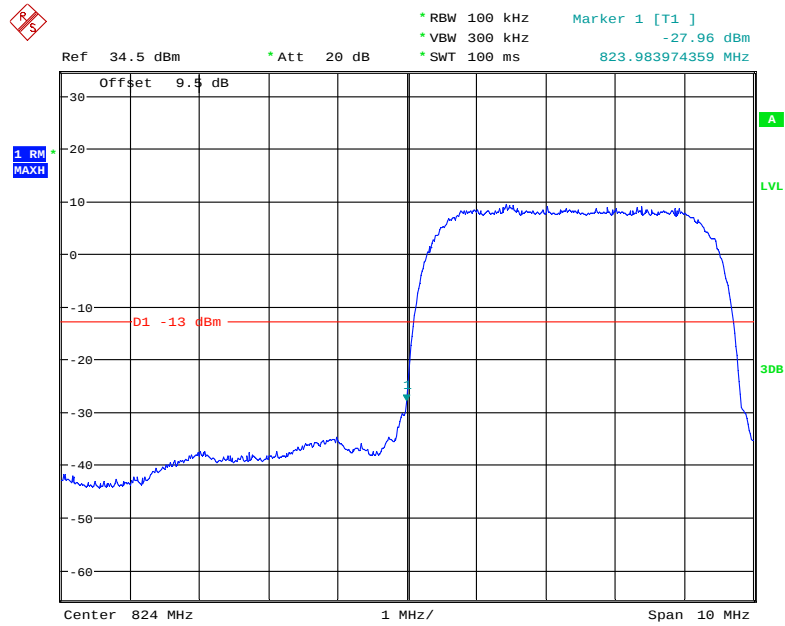
Date: 23.JUL.2019 23:00:12

Cellular Band, Right Band Edge for EDGE Mode



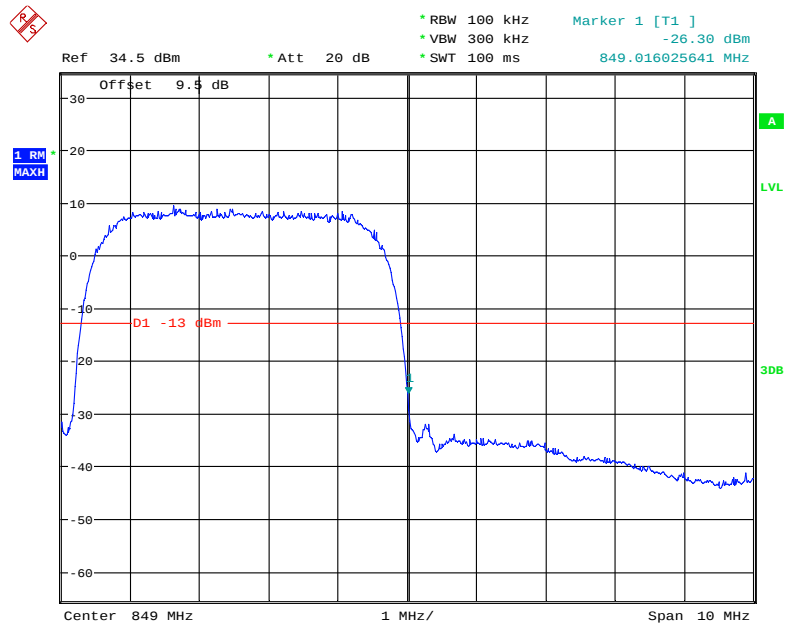
Date: 23.JUL.2019 23:01:02

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



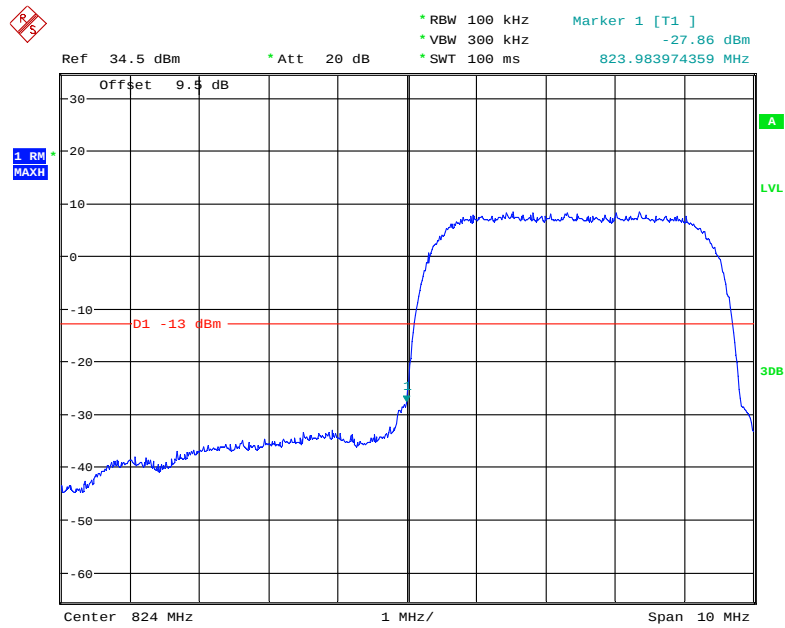
Date: 24.JUL.2019 00:16:08

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



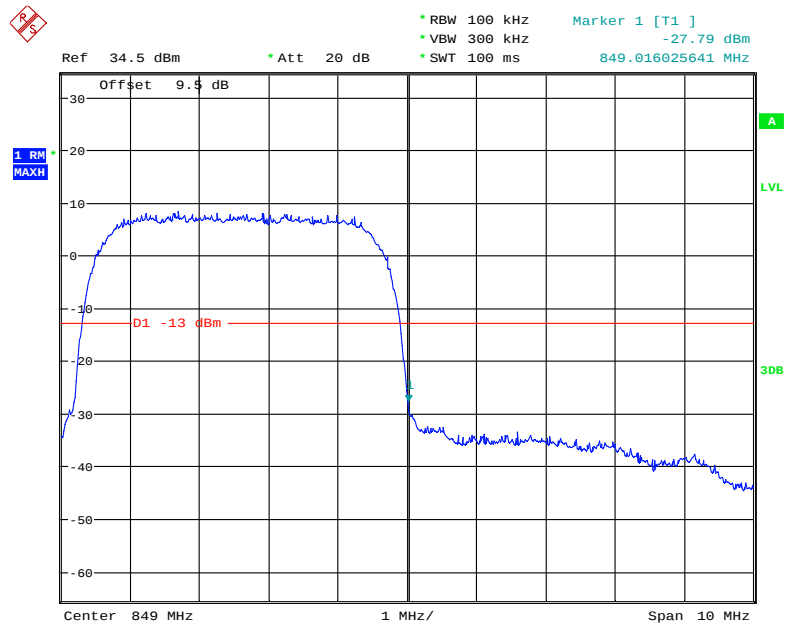
Date: 24.JUL.2019 00:16:36

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



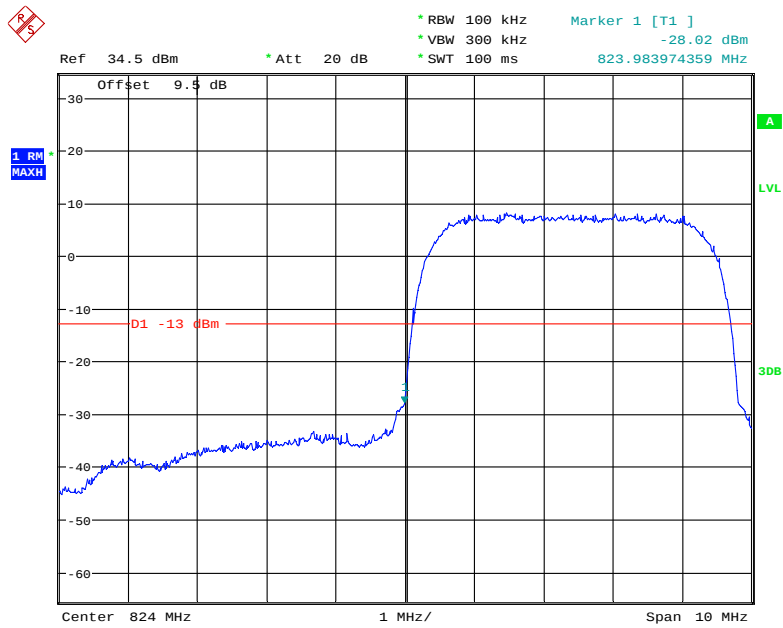
Date: 24.JUL.2019 00:18:54

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



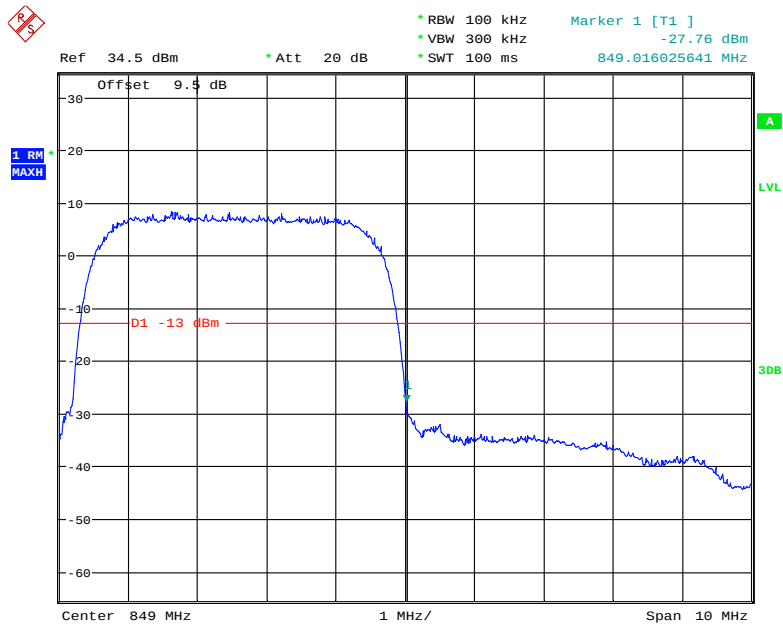
Date: 24.JUL.2019 00:19:49

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



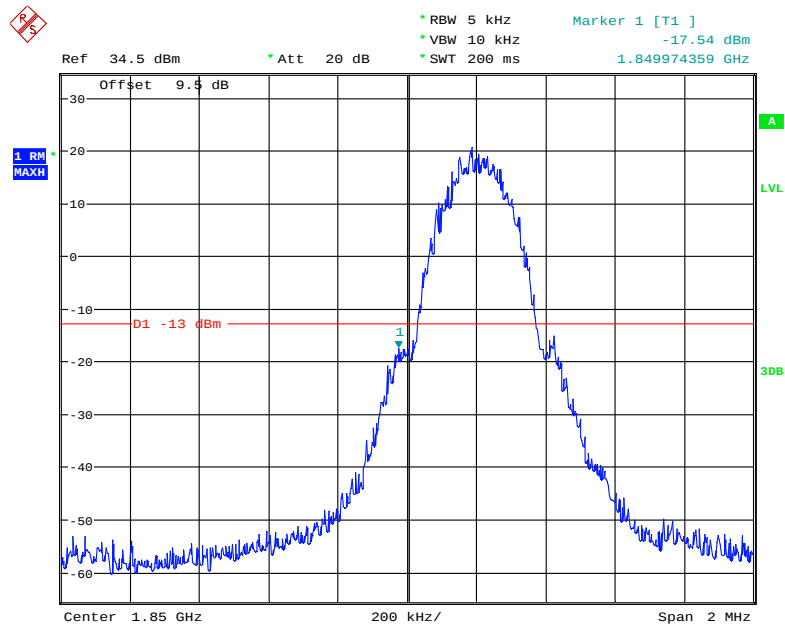
Date: 24.JUL.2019 00:18:11

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



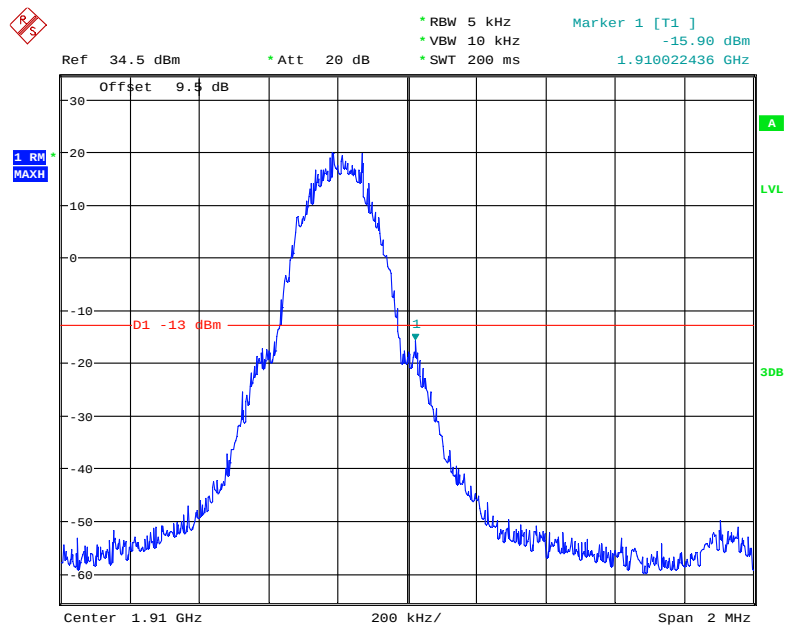
Date: 24.JUL.2019 00:17:40

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



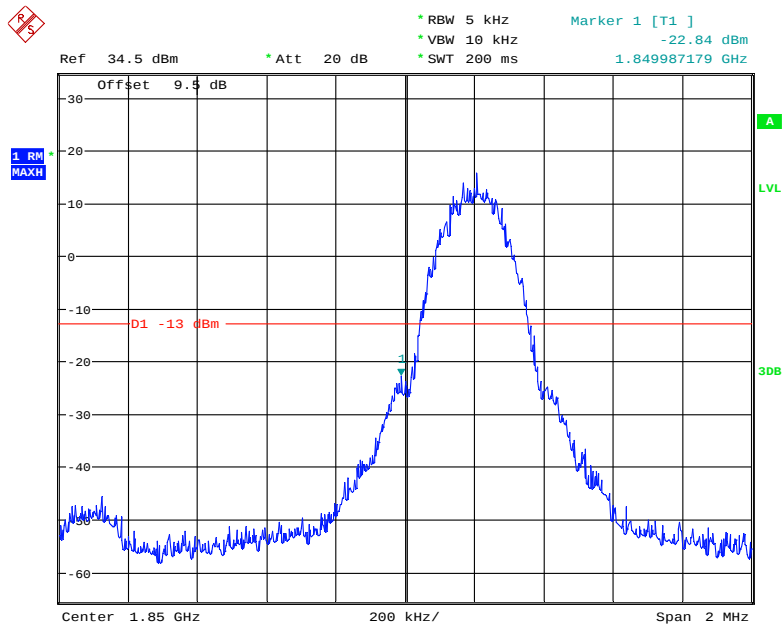
Date: 23.JUL.2019 23:15:02

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



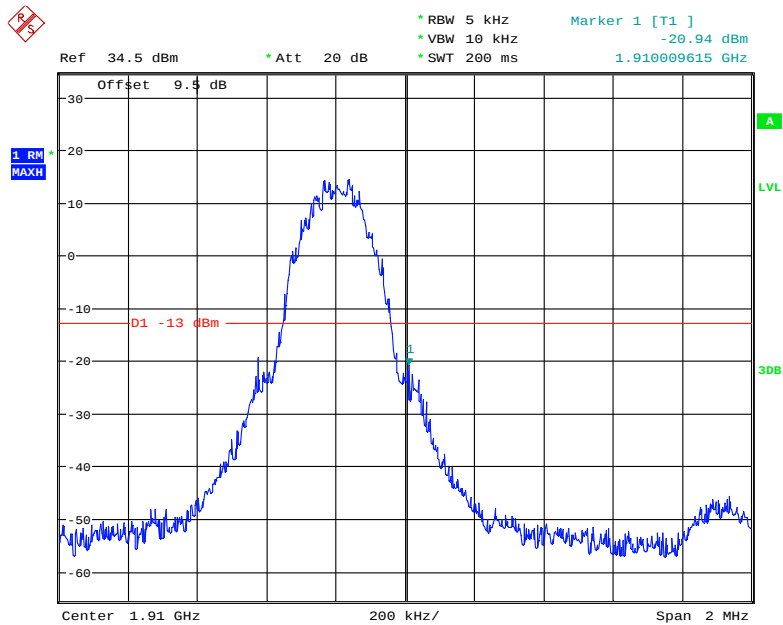
Date: 23.JUL.2019 23:15:43

PCS Band, Left Band Edge for EDGE Mode



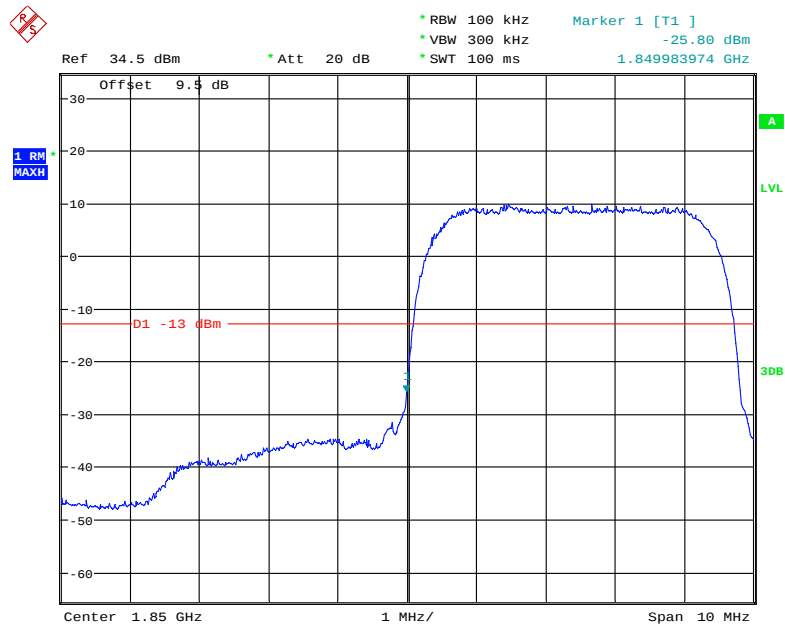
Date: 23.JUL.2019 23:11:58

PCS Band, Right Band Edge for EDGE Mode



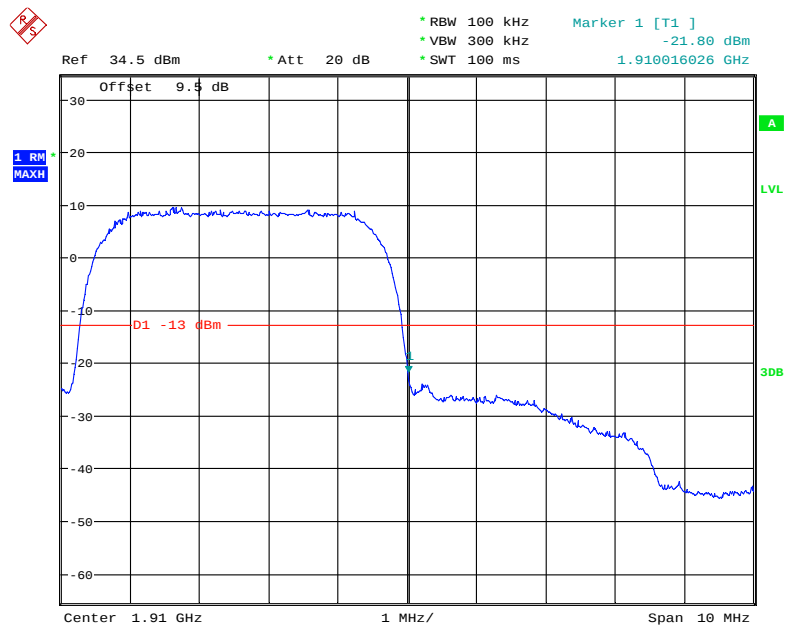
Date: 23.JUL.2019 23:12:47

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



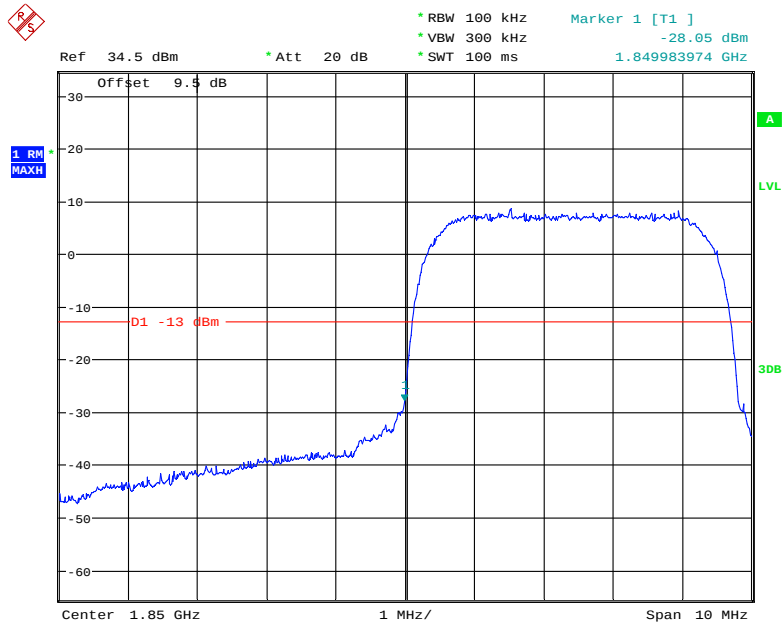
Date: 23.JUL.2019 23:58:43

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



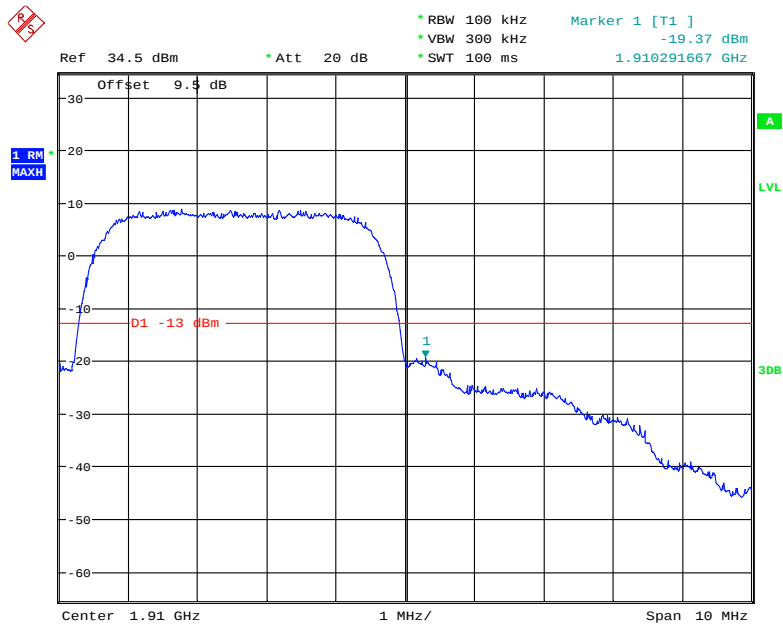
Date: 23.JUL.2019 23:58:00

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



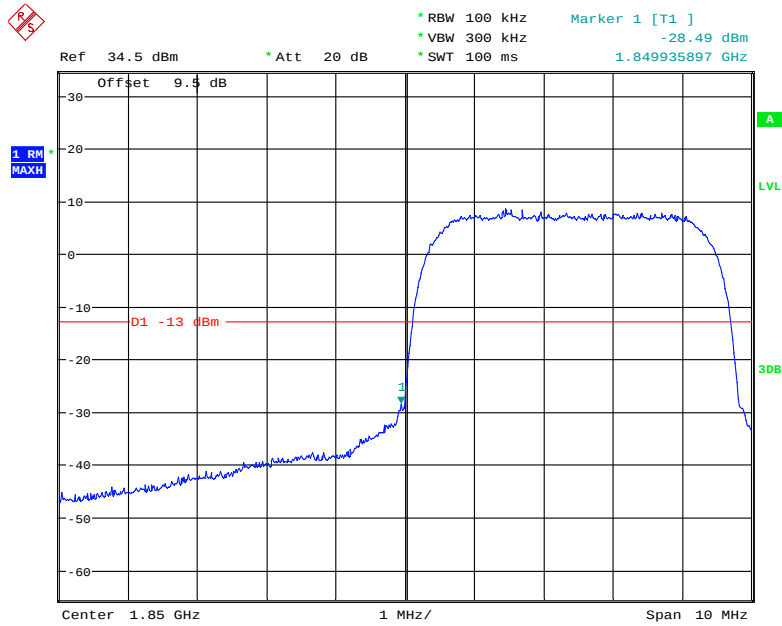
Date: 23.JUL.2019 23:25:04

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



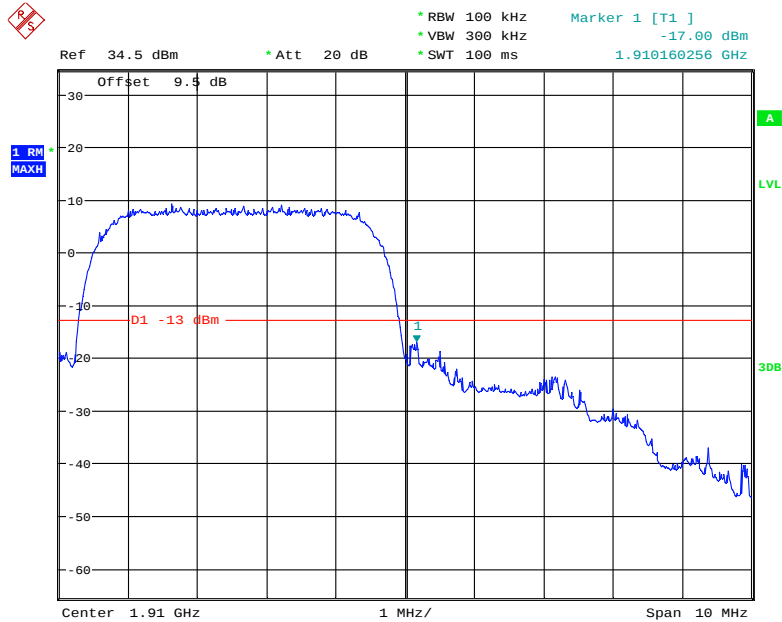
Date: 23.JUL.2019 23:25:55

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

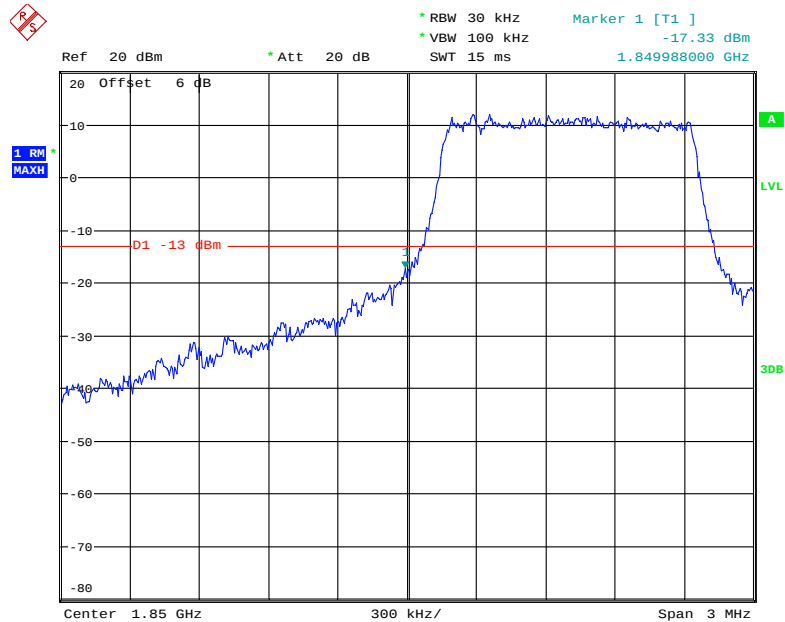


Date: 23.JUL.2019 23:55:54

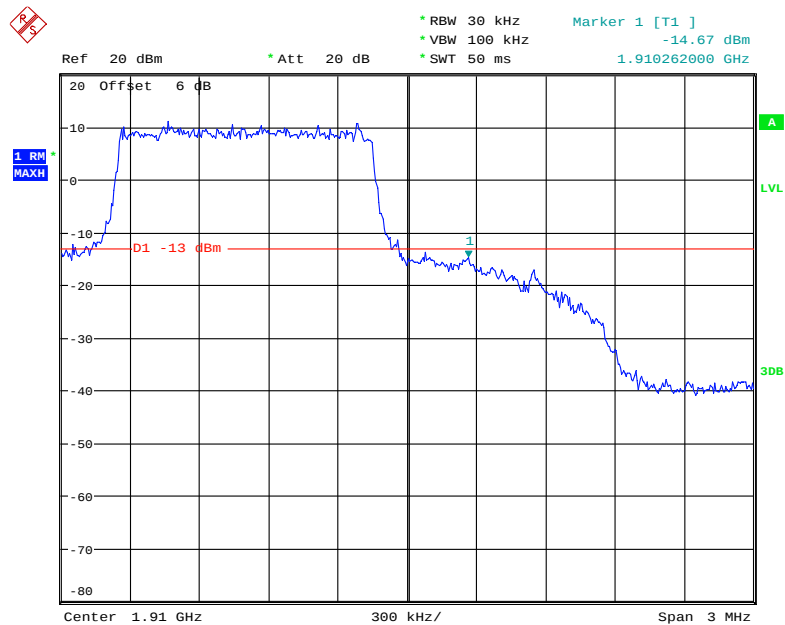
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



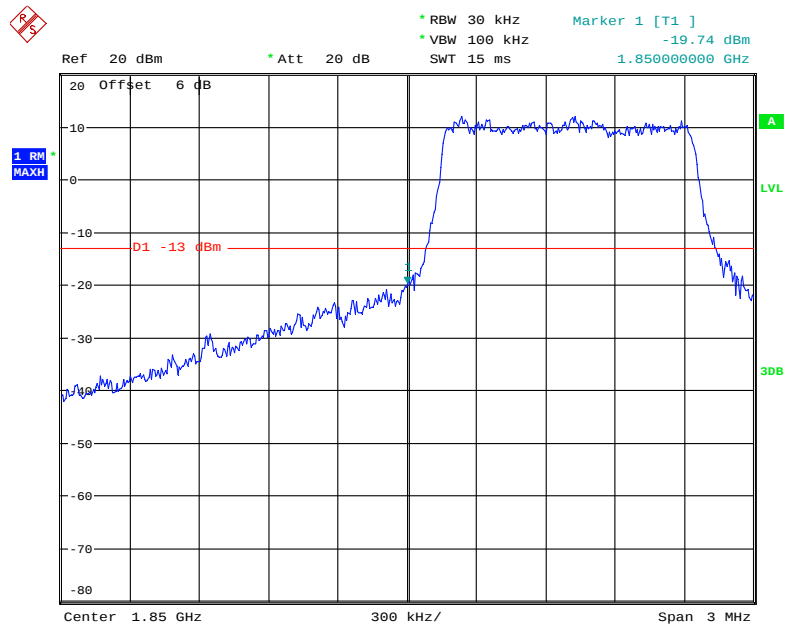
Date: 23.JUL.2019 23:56:32

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

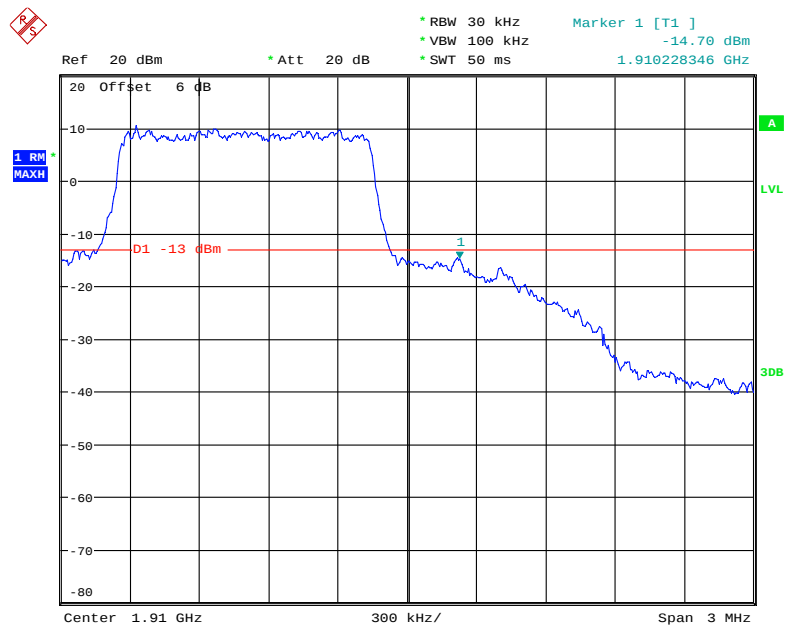
Date: 24.JUL.2019 10:34:42

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

Date: 24.JUL.2019 11:28:31

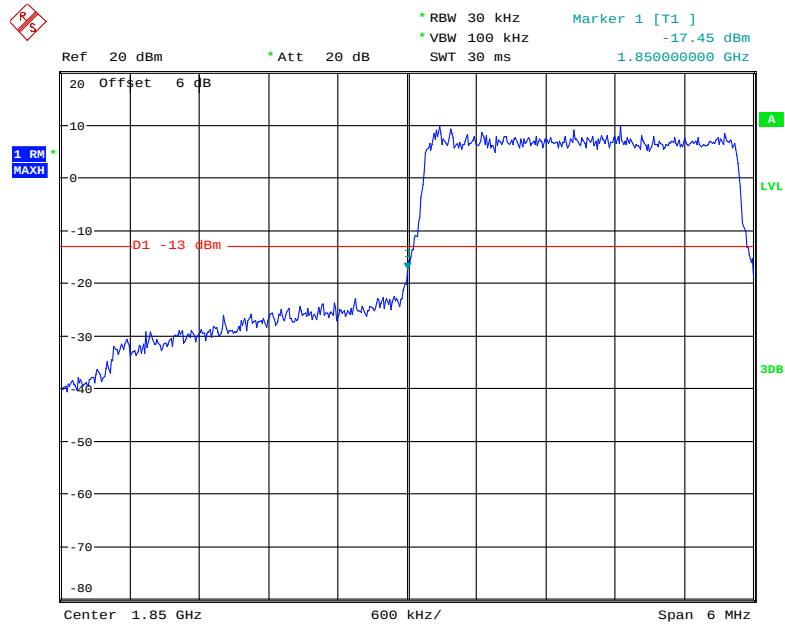
16-QAM (1.4 MHz, FULL RB) - Left Band Edge

Date: 24.JUL.2019 10:35:17

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

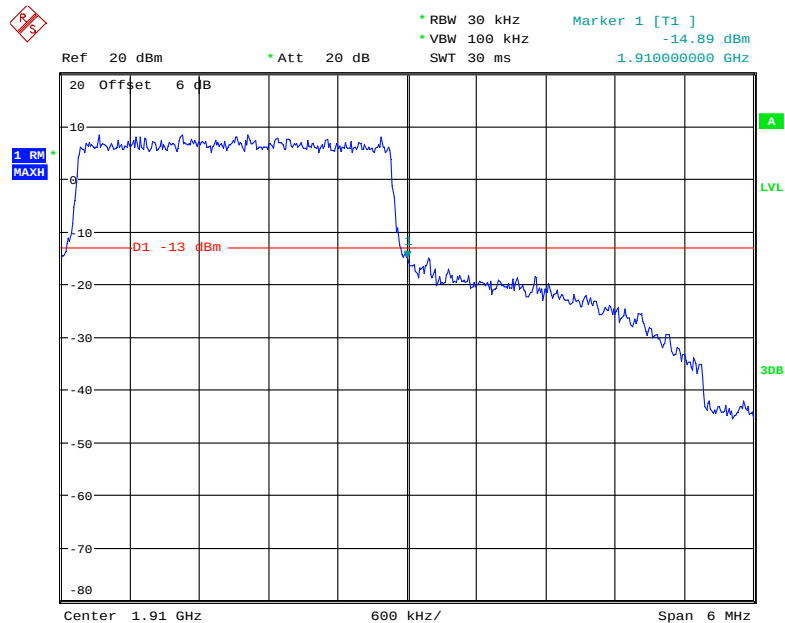
Date: 24.JUL.2019 11:27:23

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



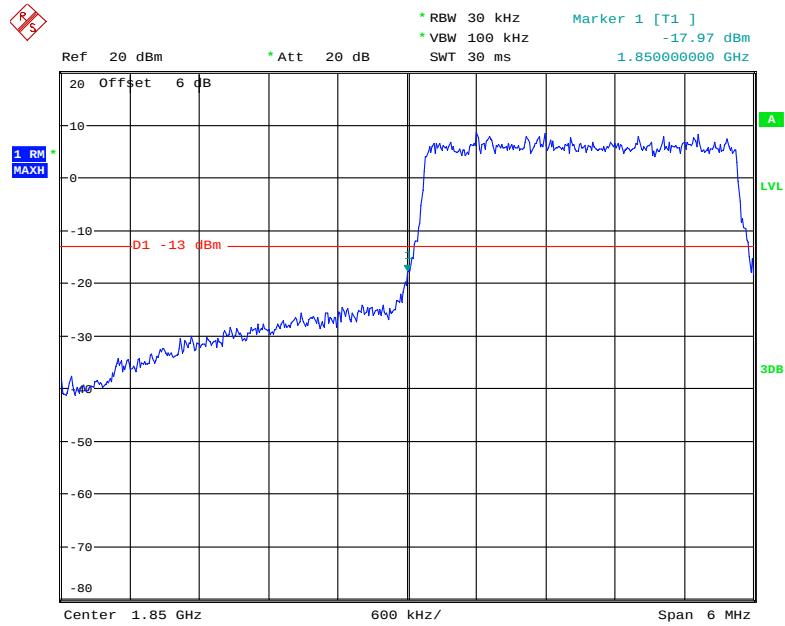
Date: 24.JUL.2019 10:36:49

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



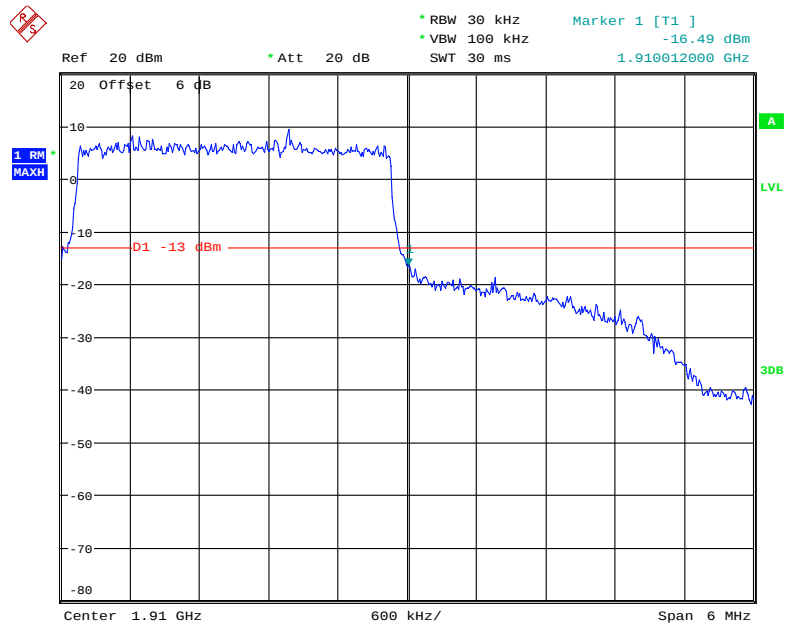
Date: 24.JUL.2019 10:37:41

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



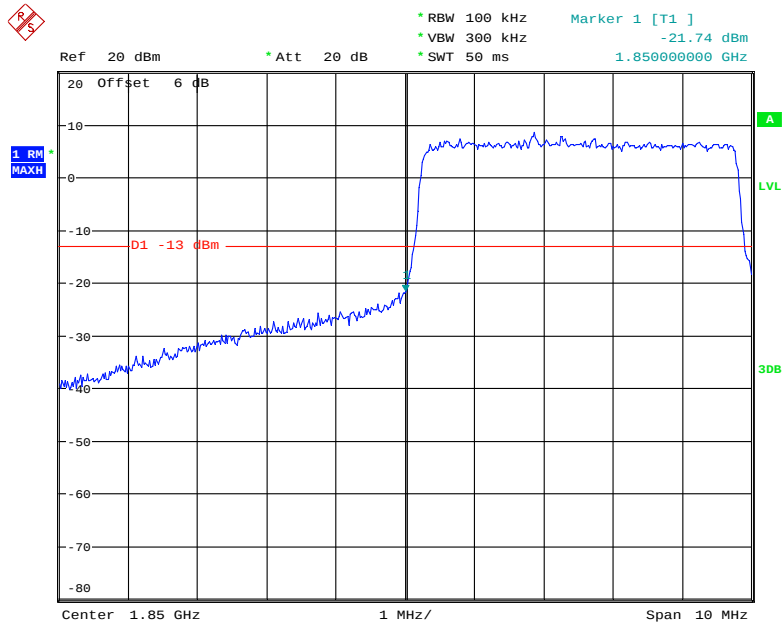
Date: 24.JUL.2019 10:37:15

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



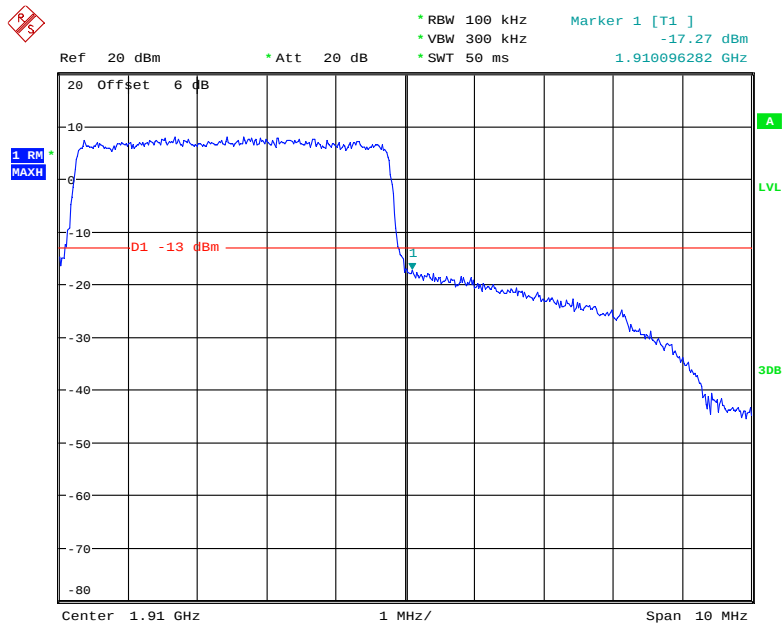
Date: 24.JUL.2019 10:38:10

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



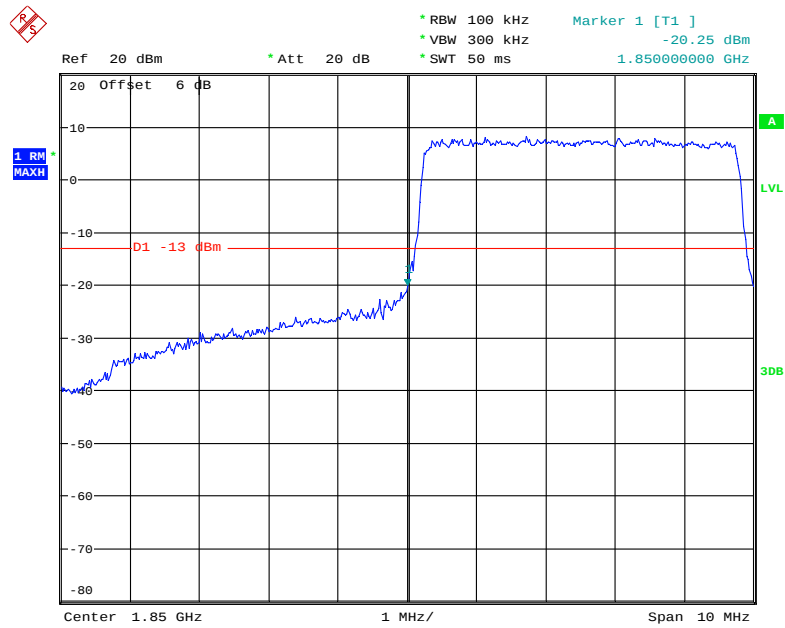
Date: 24.JUL.2019 11:32:53

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



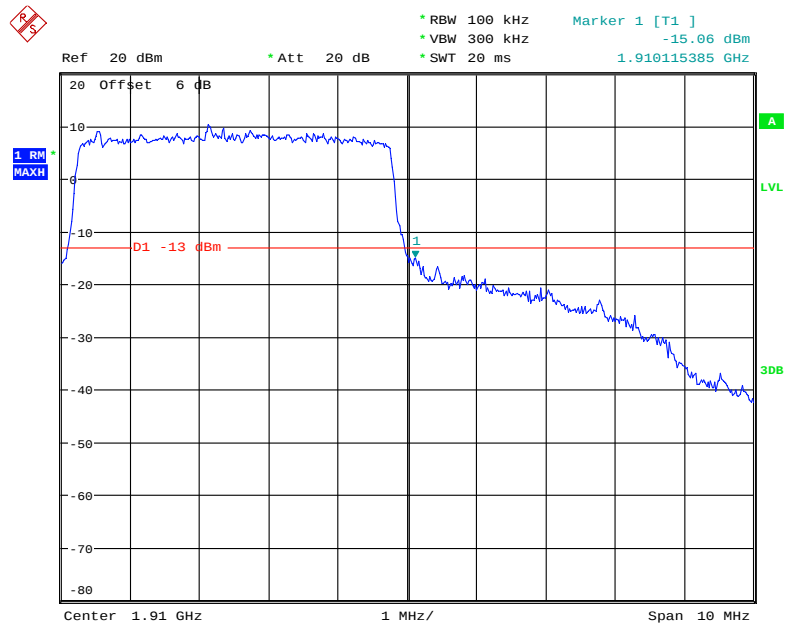
Date: 24.JUL.2019 11:31:15

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



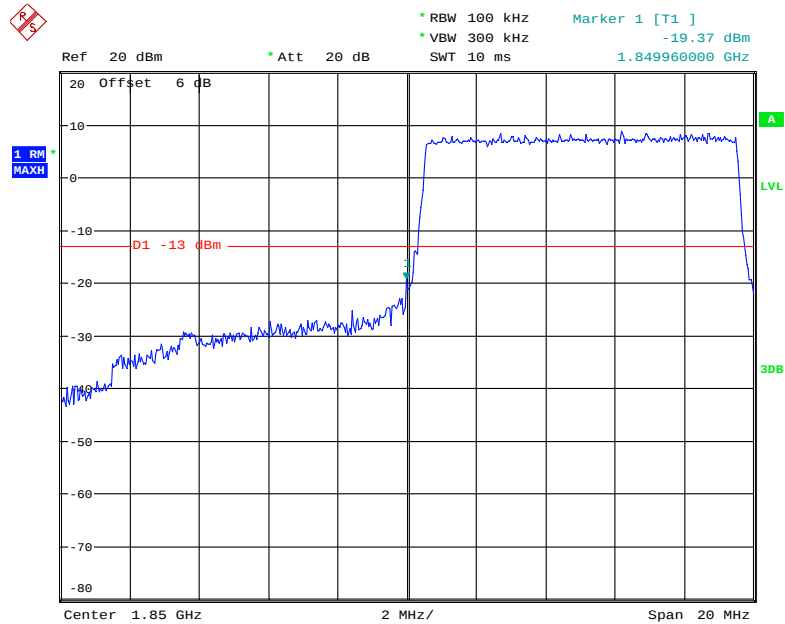
Date: 24.JUL.2019 11:32:09

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



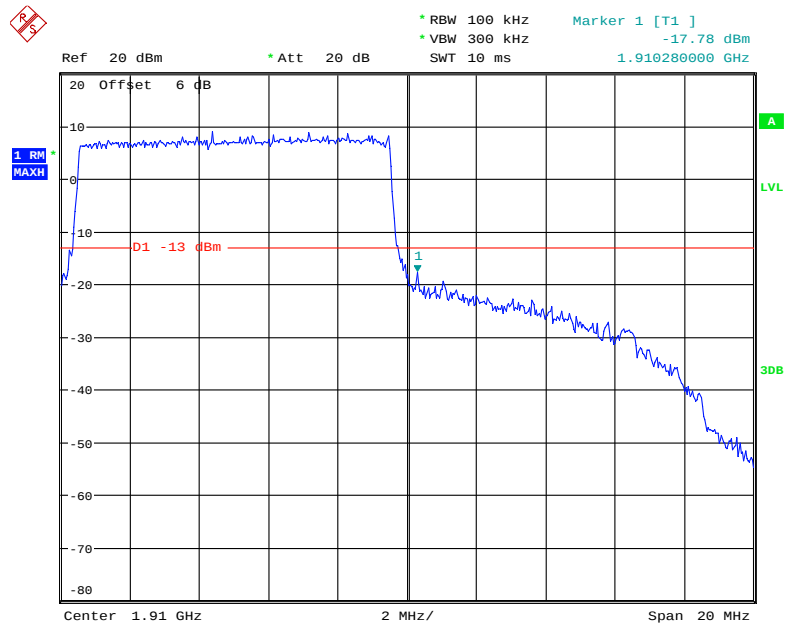
Date: 24.JUL.2019 11:30:14

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



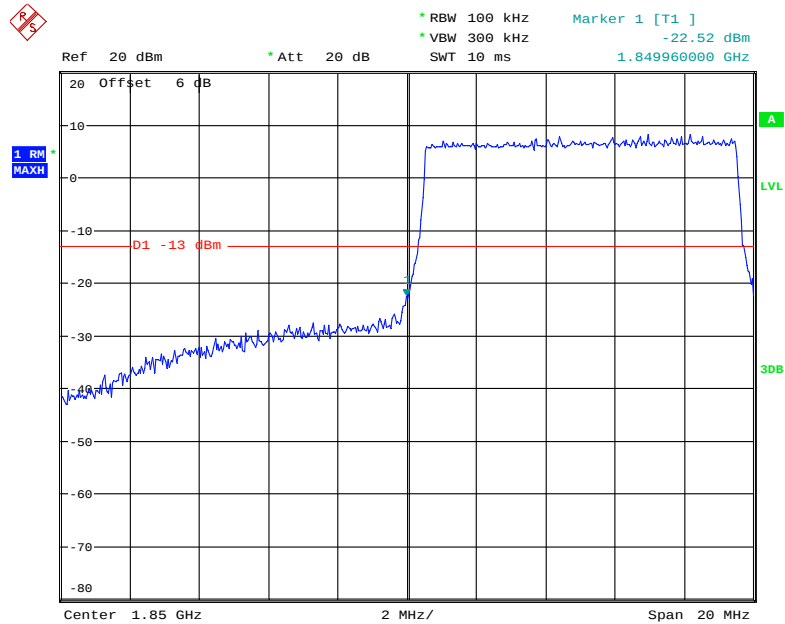
Date: 24.JUL.2019 10:41:06

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



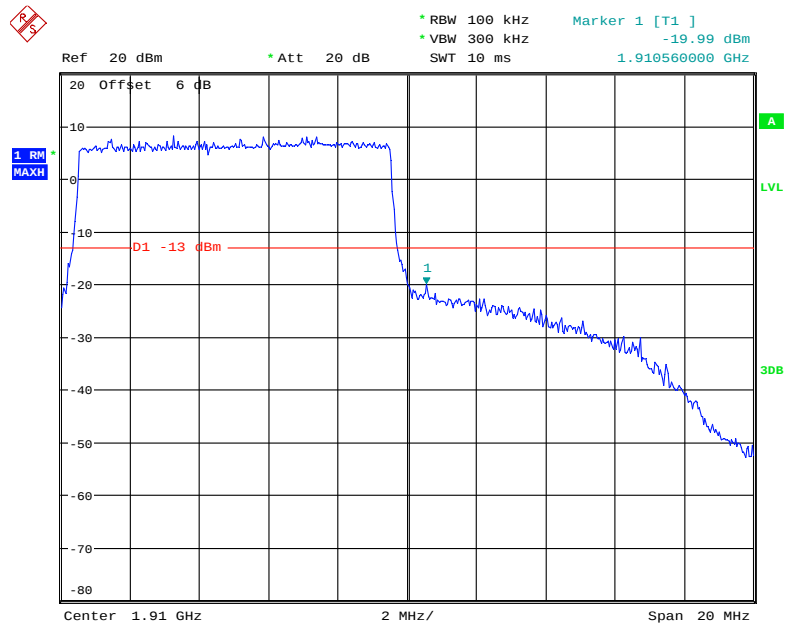
Date: 24.JUL.2019 10:42:01

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



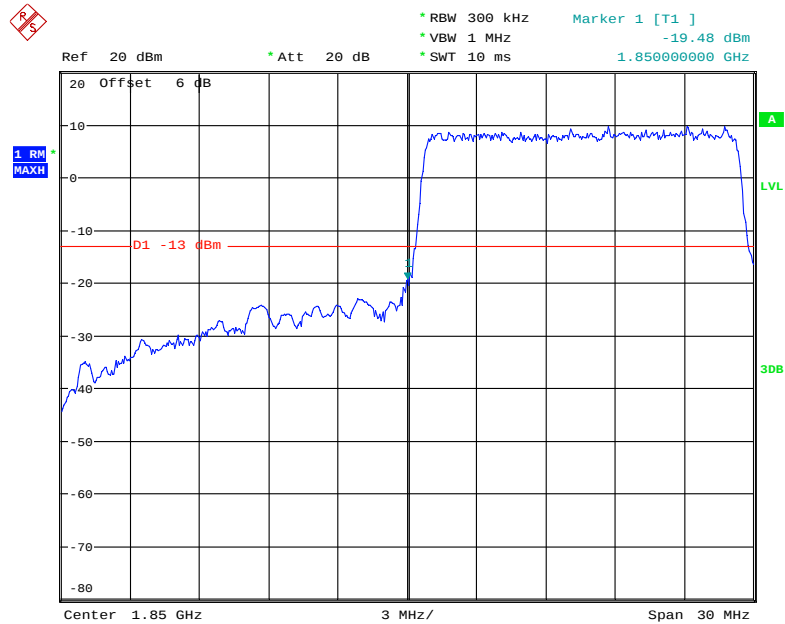
Date: 24.JUL.2019 10:41:33

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



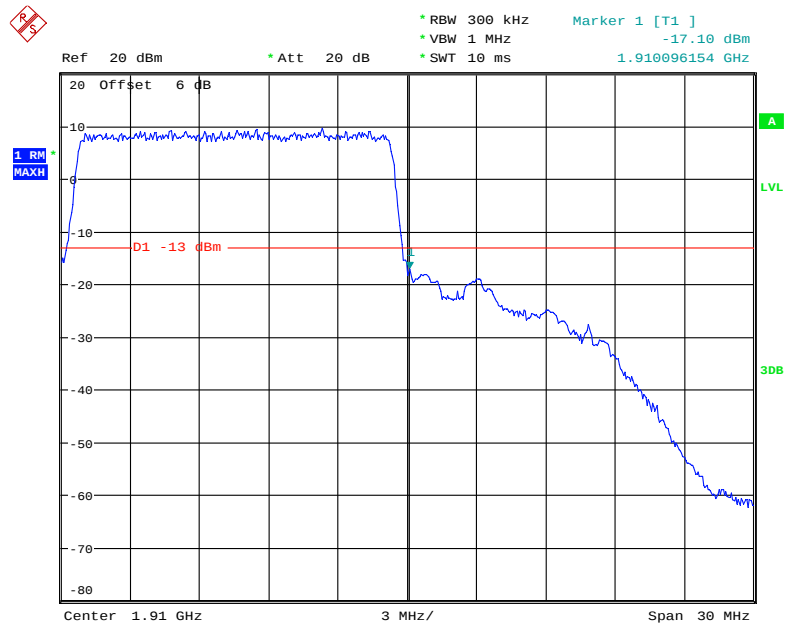
Date: 24.JUL.2019 10:42:33

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



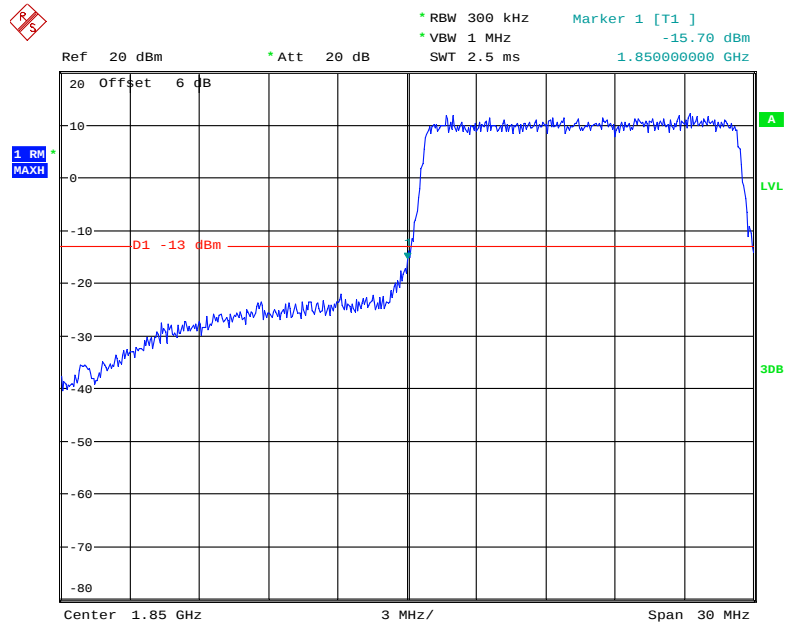
Date: 24.JUL.2019 11:37:24

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



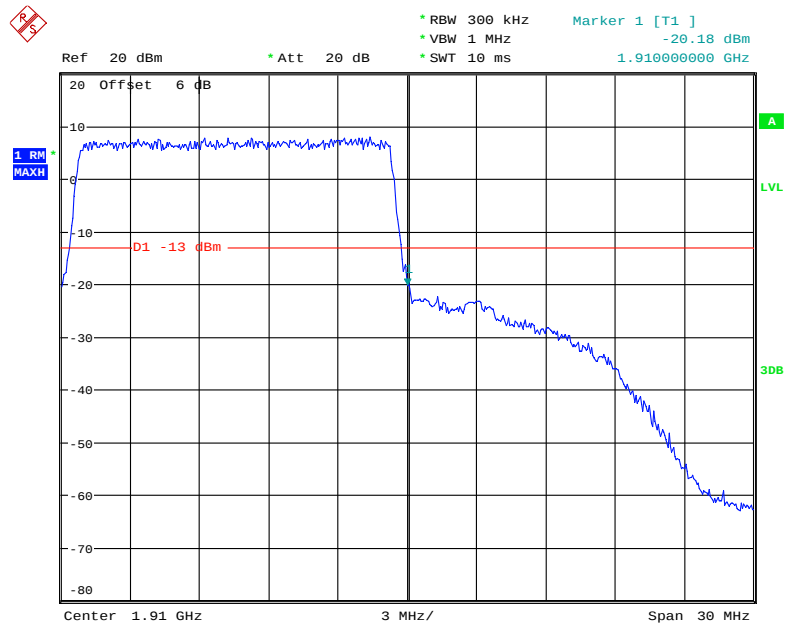
Date: 24.JUL.2019 11:36:30

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



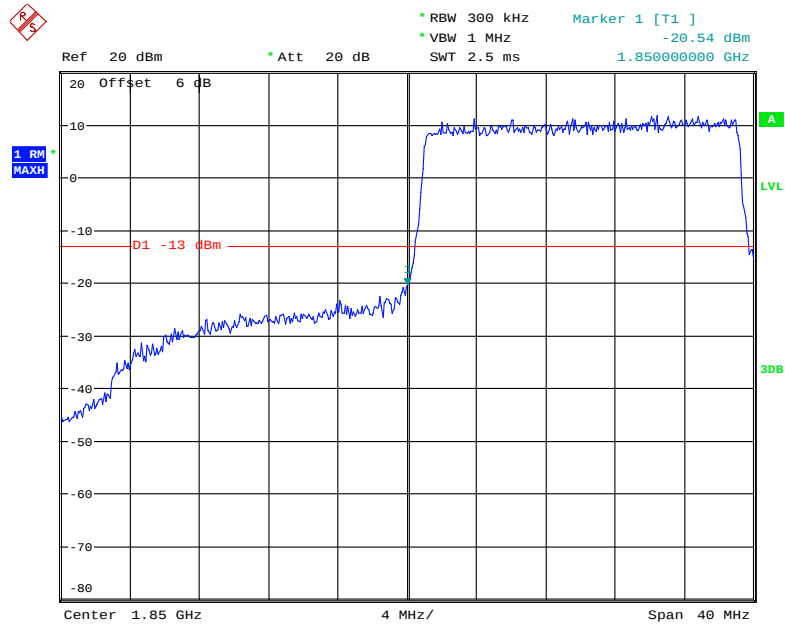
Date: 24.JUL.2019 10:43:41

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



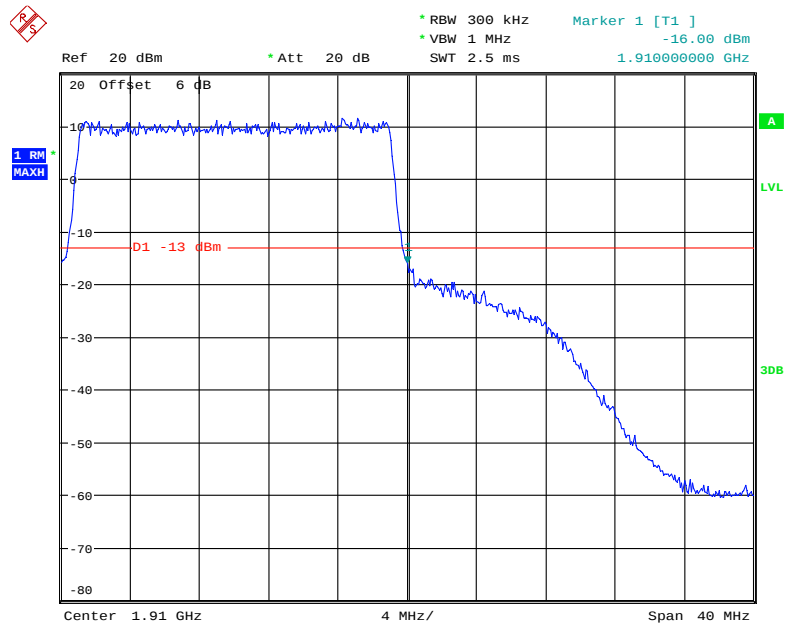
Date: 24.JUL.2019 11:34:53

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



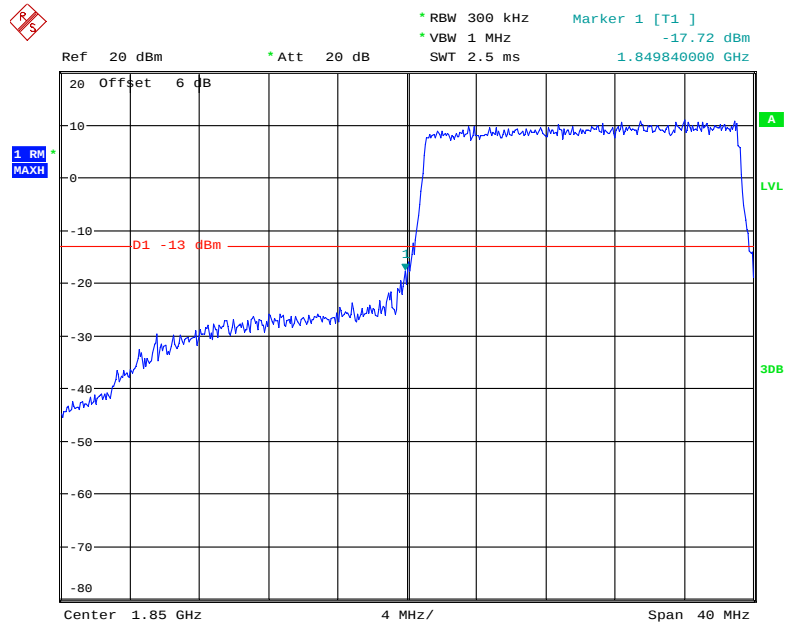
Date: 24.JUL.2019 10:45:31

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



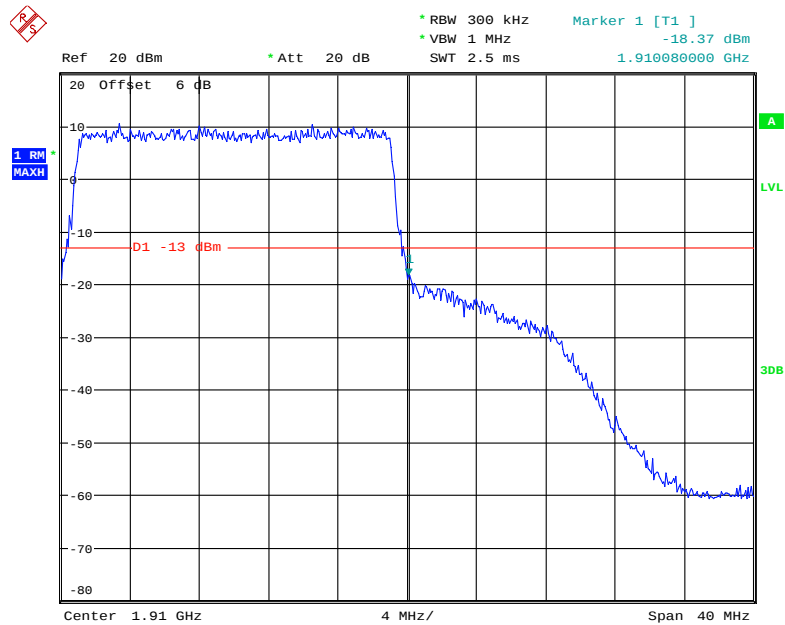
Date: 24.JUL.2019 10:46:57

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

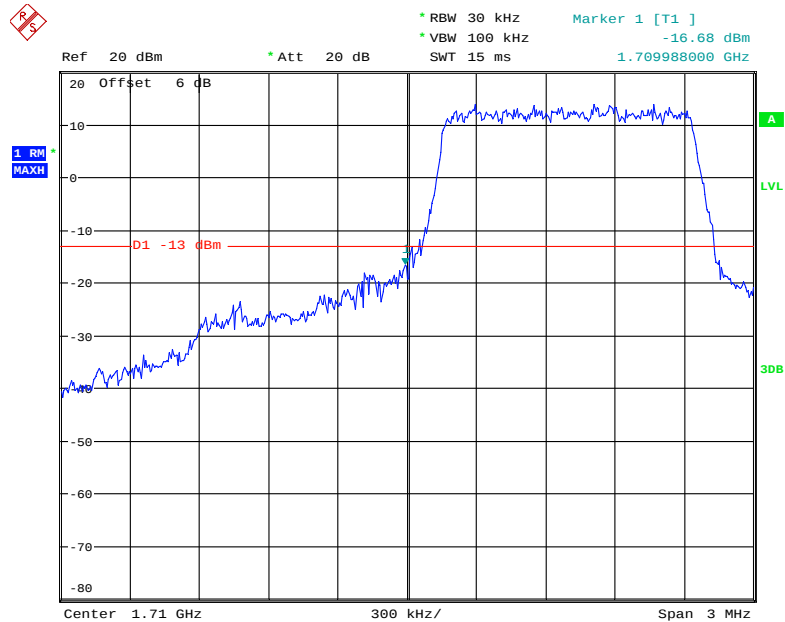


Date: 24.JUL.2019 10:46:18

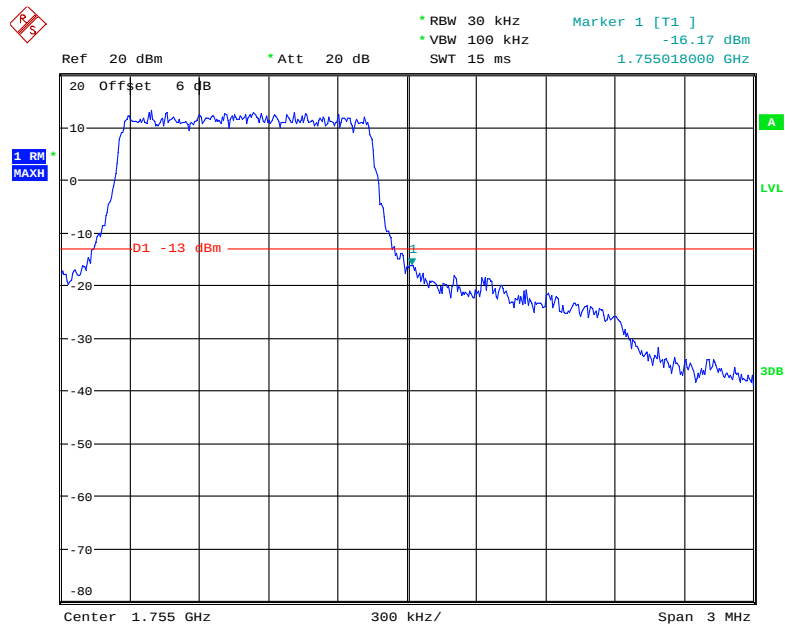
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



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

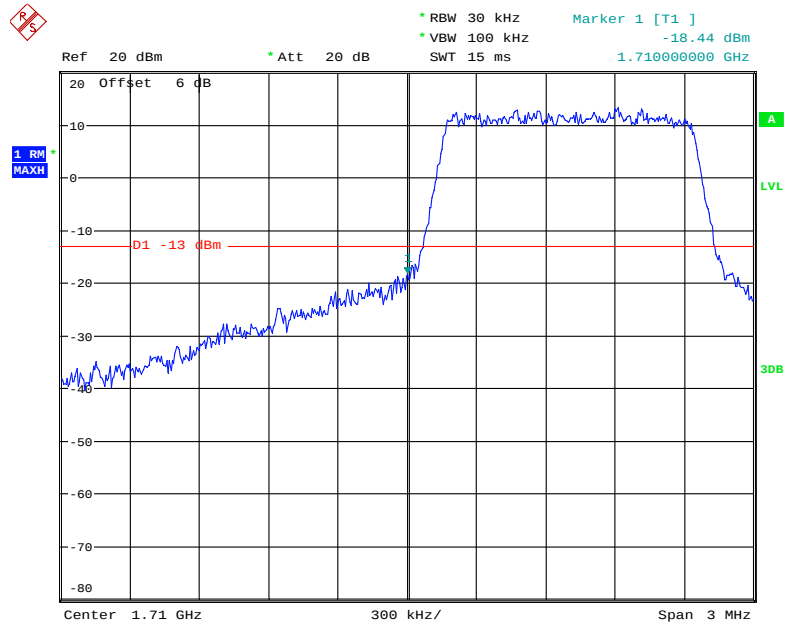
Band 4:**QPSK (1.4 MHz, FULL RB) - Left Band Edge**

Date: 24.JUL.2019 10:47:53

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

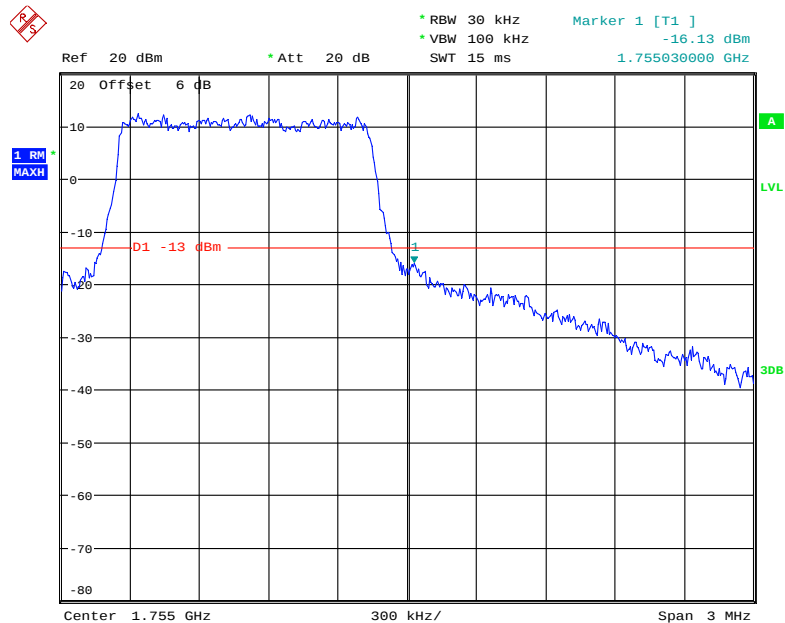
Date: 24.JUL.2019 10:48:48

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



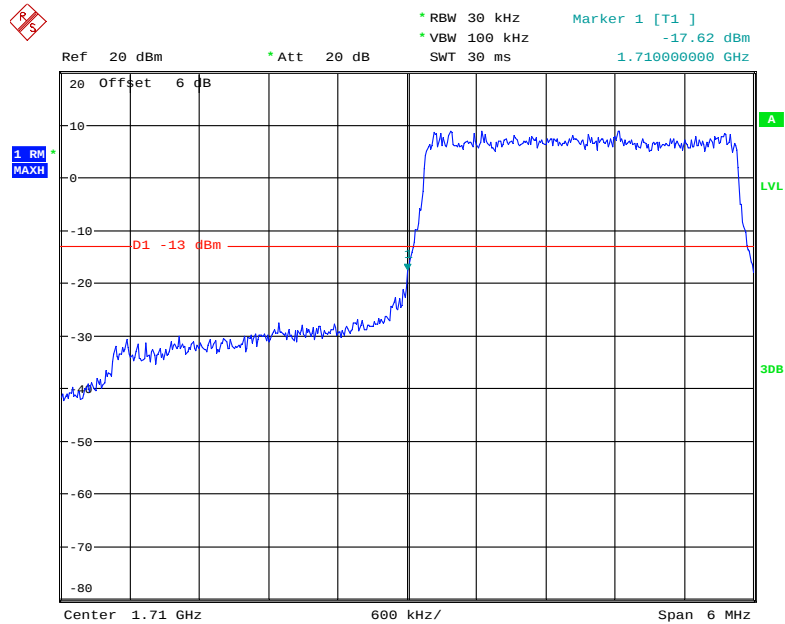
Date: 24.JUL.2019 10:48:21

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



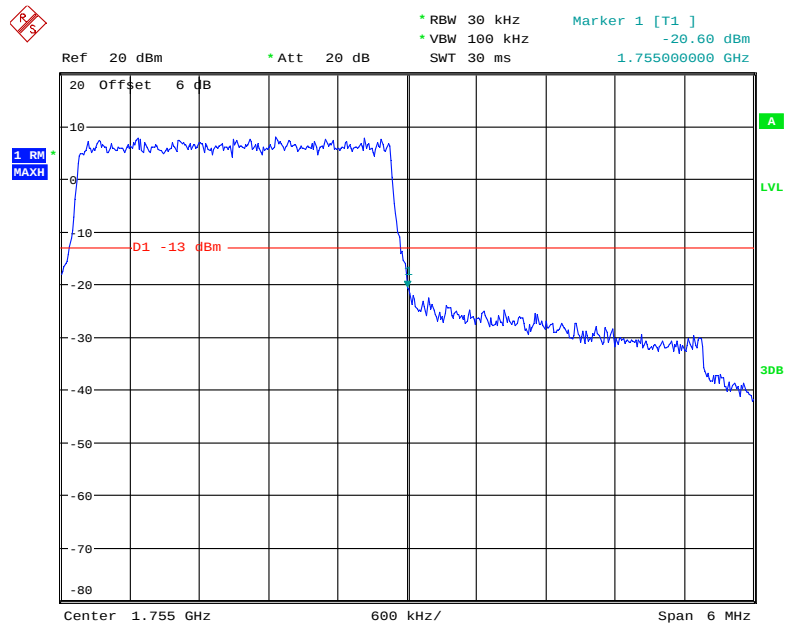
Date: 24.JUL.2019 10:49:20

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



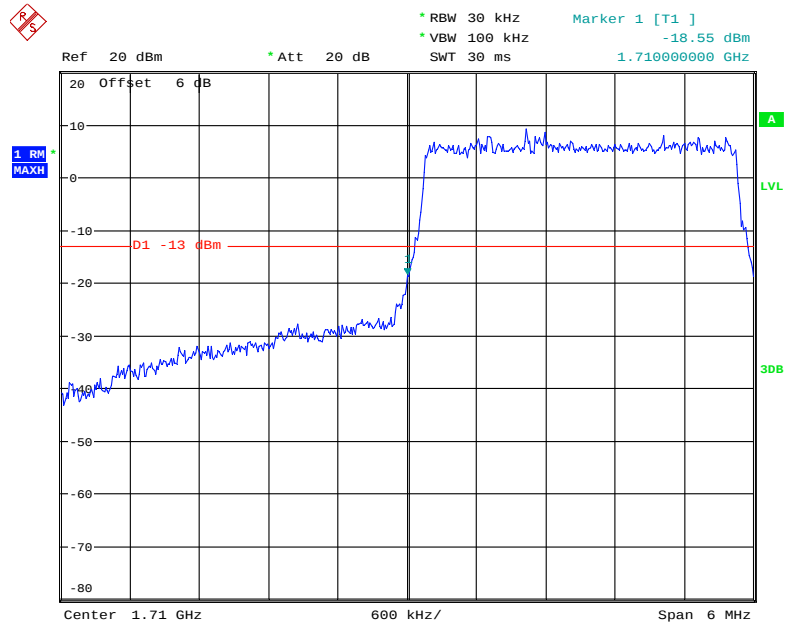
Date: 24.JUL.2019 10:49:46

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



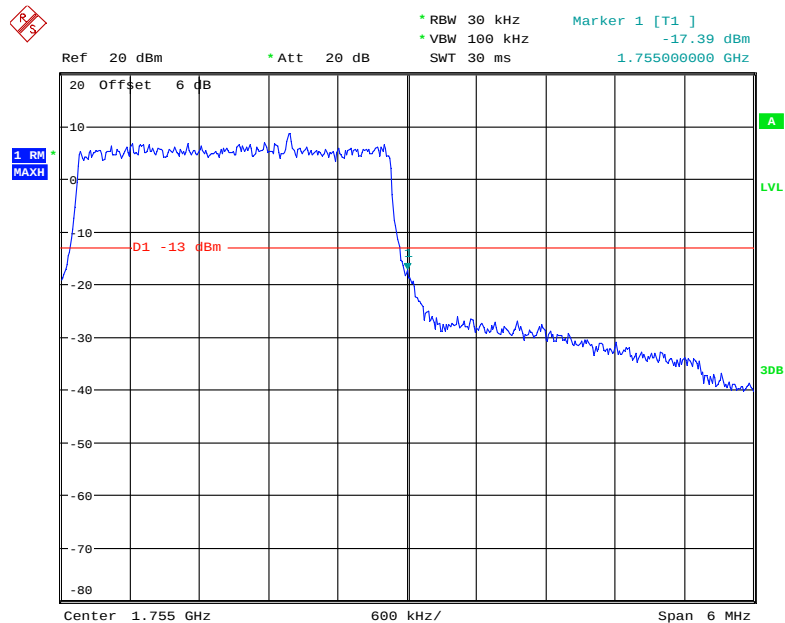
Date: 24.JUL.2019 10:50:32

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



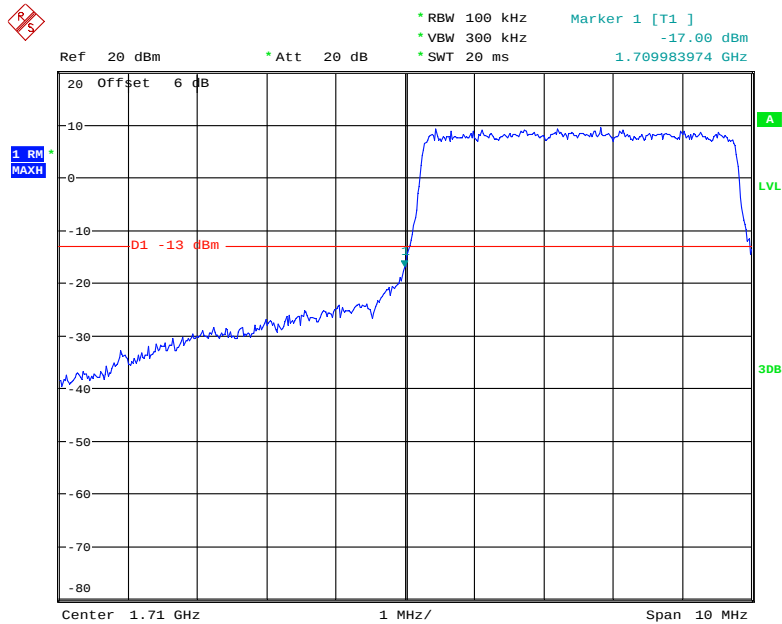
Date: 24.JUL.2019 10:50:09

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



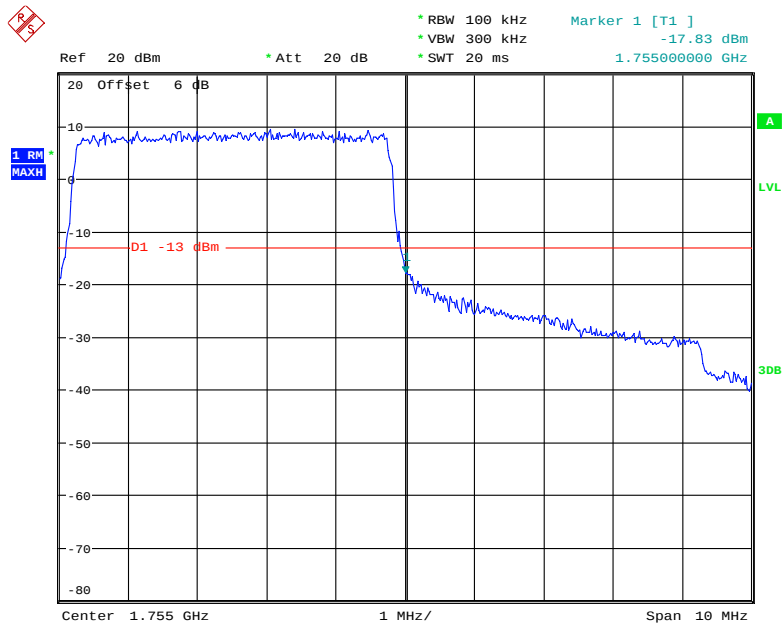
Date: 24.JUL.2019 10:50:58

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



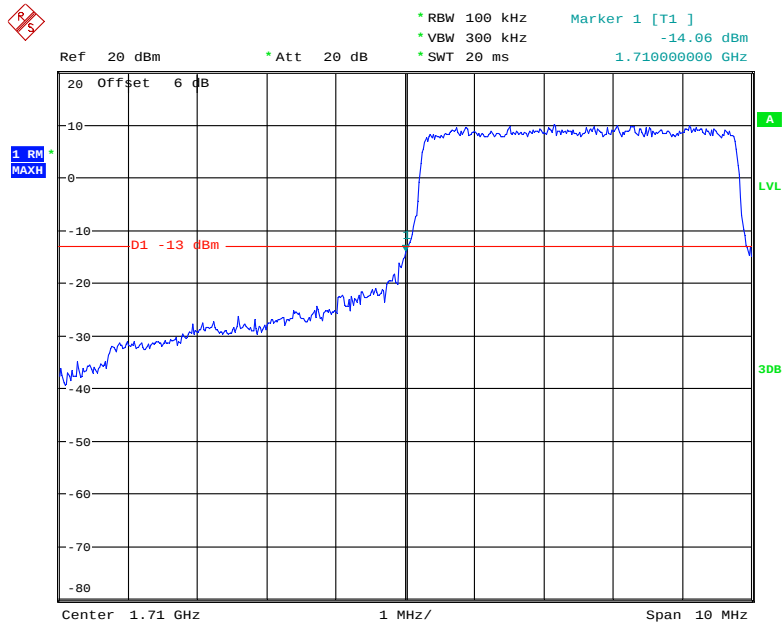
Date: 24.JUL.2019 11:44:16

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



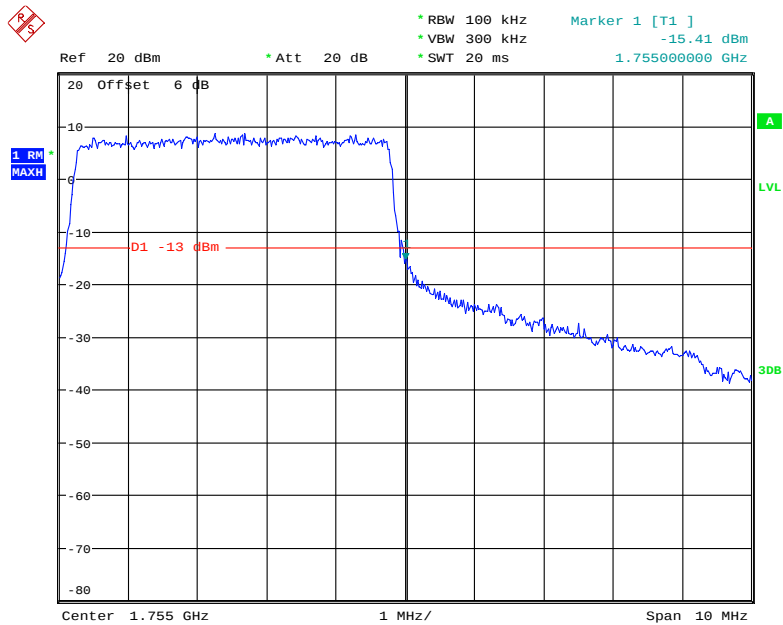
Date: 24.JUL.2019 11:42:06

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



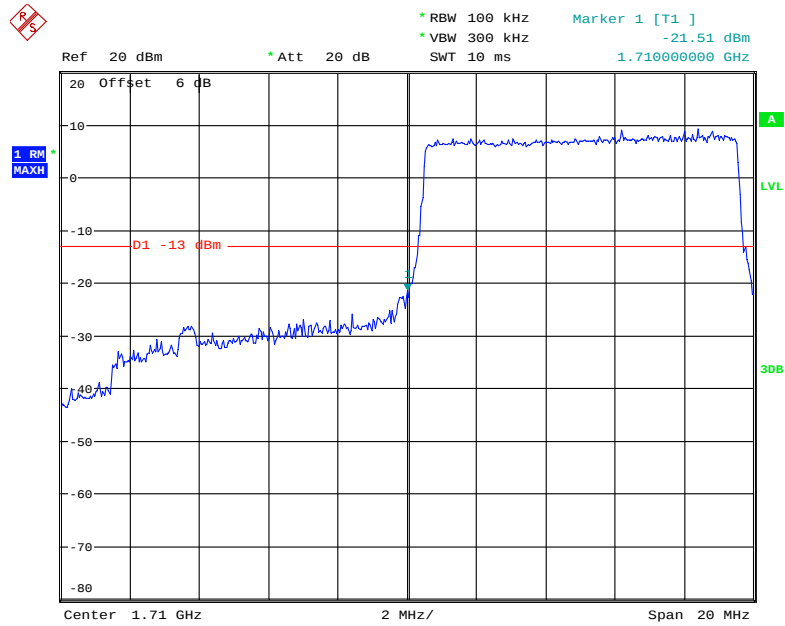
Date: 24.JUL.2019 11:43:14

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



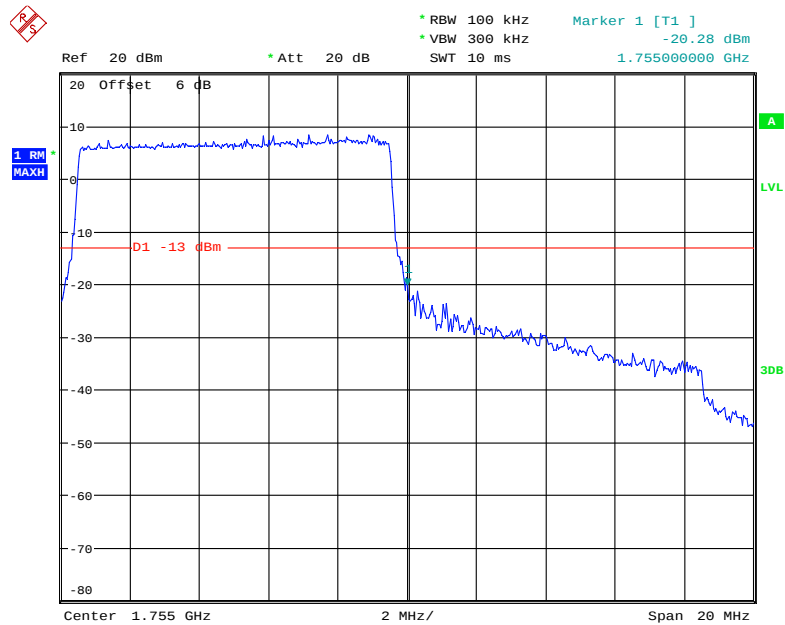
Date: 24.JUL.2019 11:41:20

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



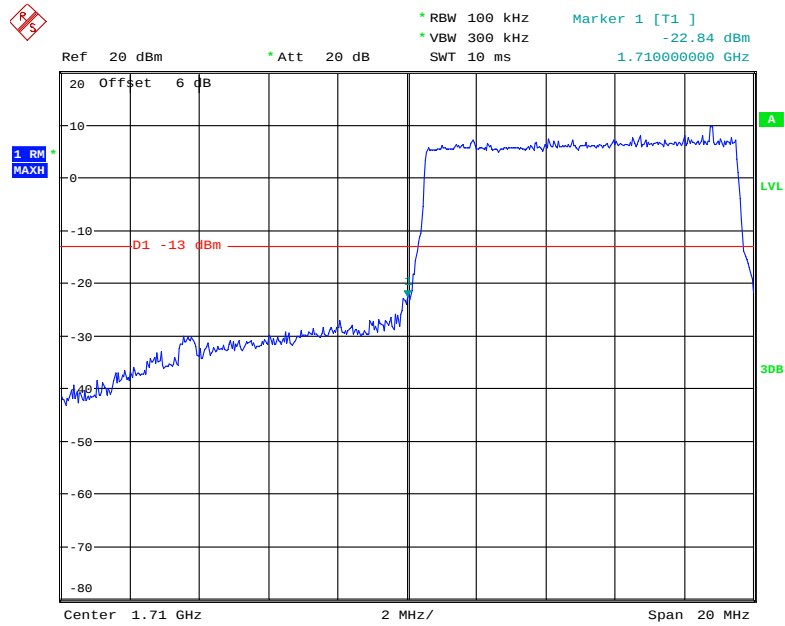
Date: 24.JUL.2019 10:55:09

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



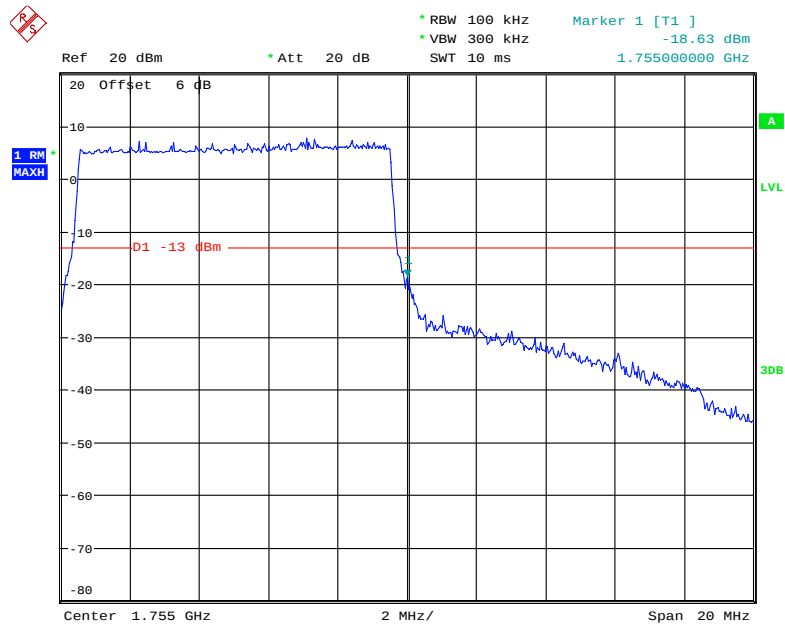
Date: 24.JUL.2019 10:56:09

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



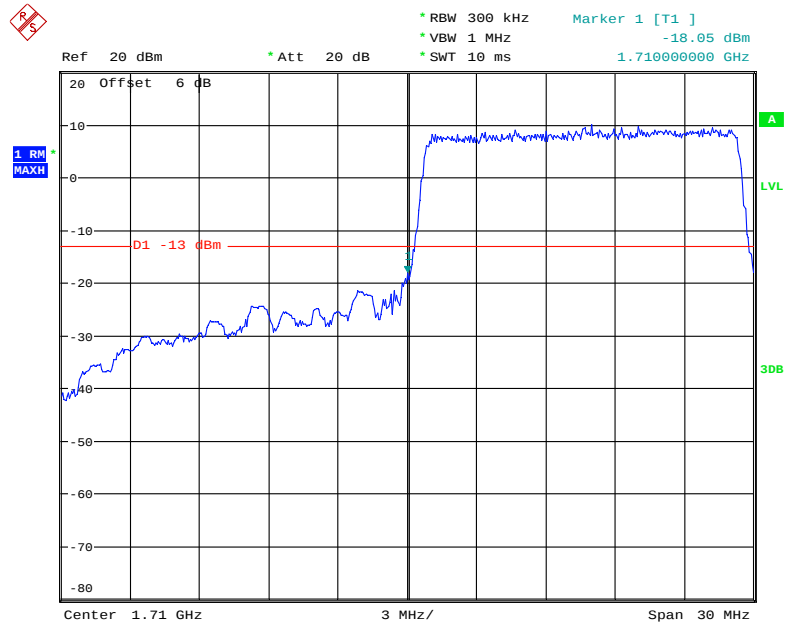
Date: 24.JUL.2019 10:55:39

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



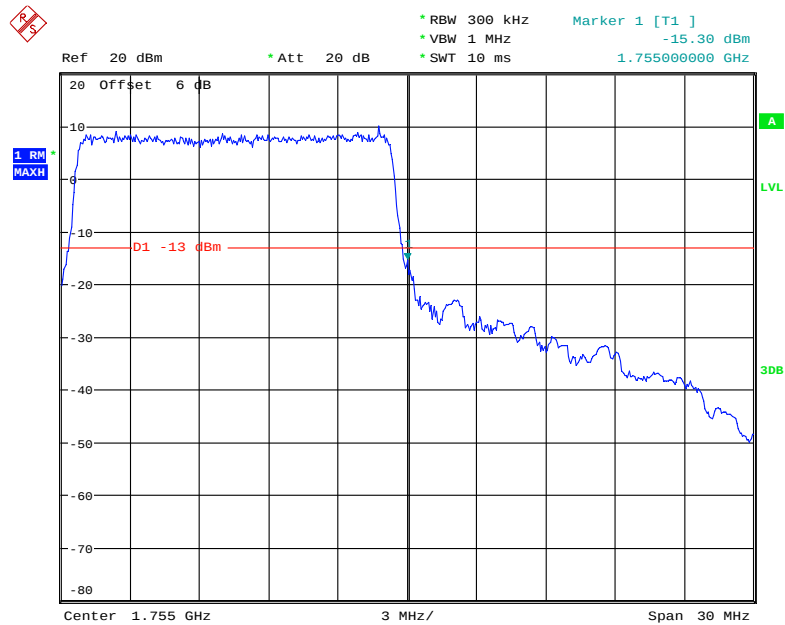
Date: 24.JUL.2019 10:56:45

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



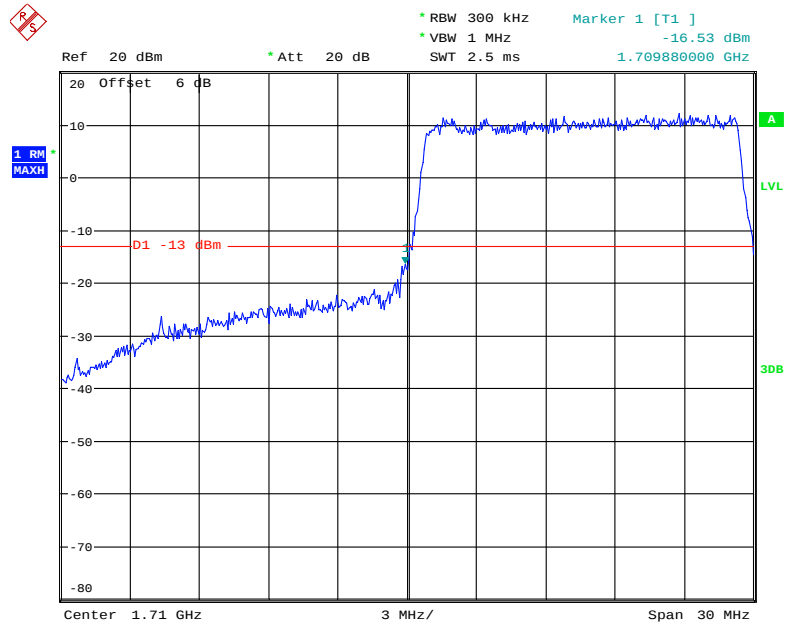
Date: 24.JUL.2019 13:12:18

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



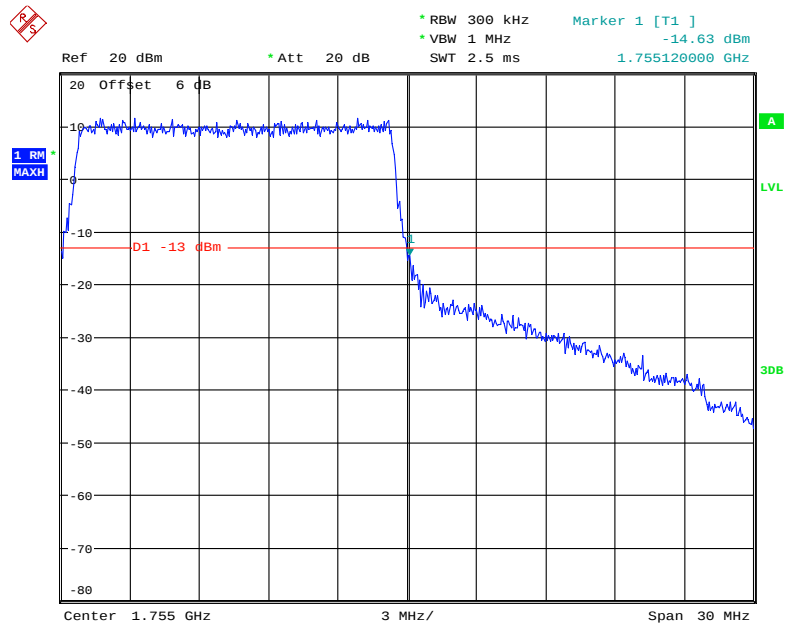
Date: 24.JUL.2019 11:46:19

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



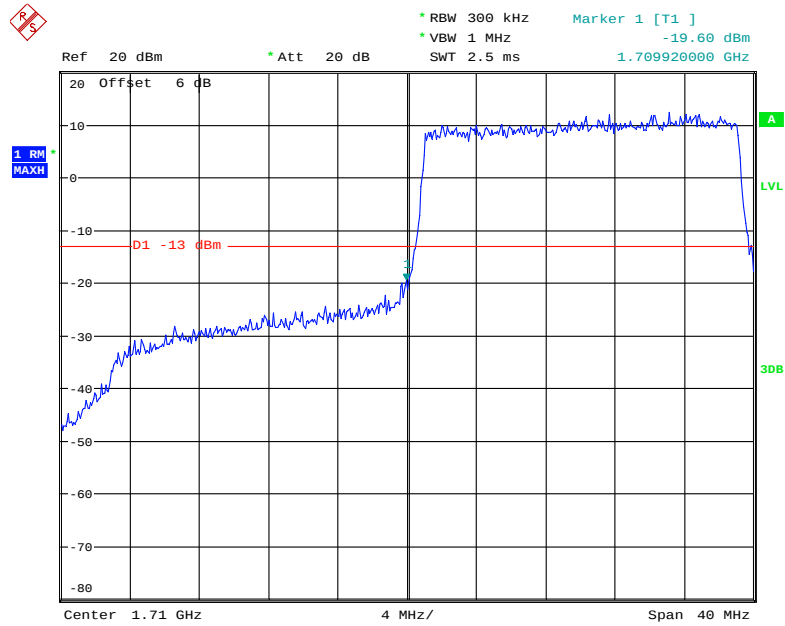
Date: 24.JUL.2019 10:57:57

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



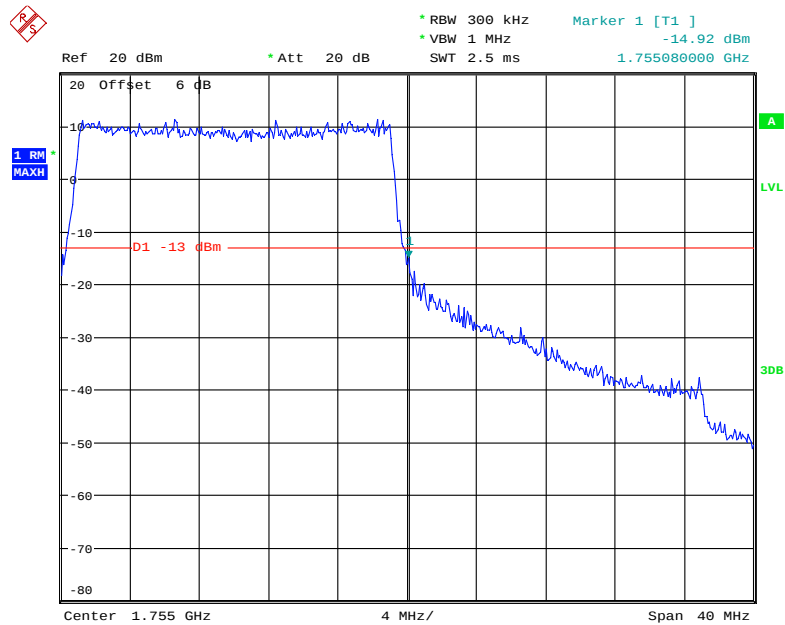
Date: 24.JUL.2019 10:59:14

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



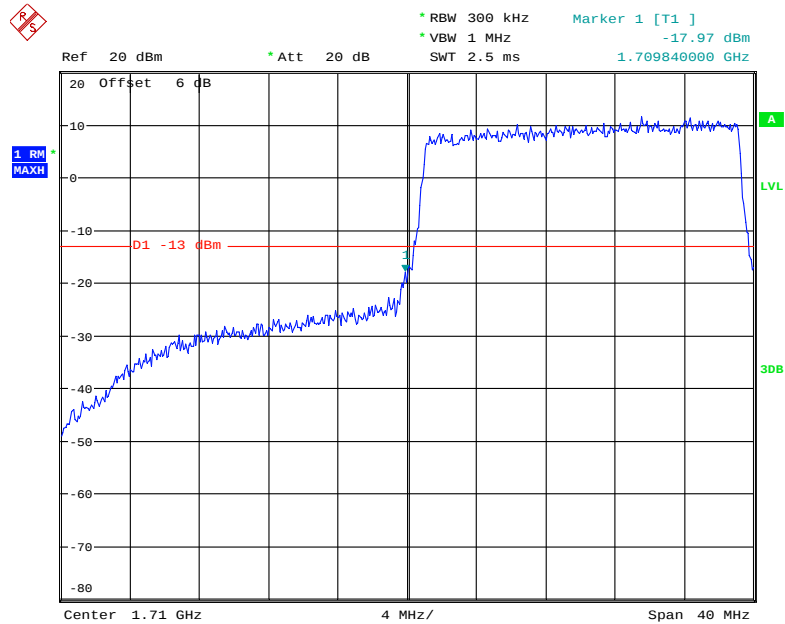
Date: 24.JUL.2019 10:59:53

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



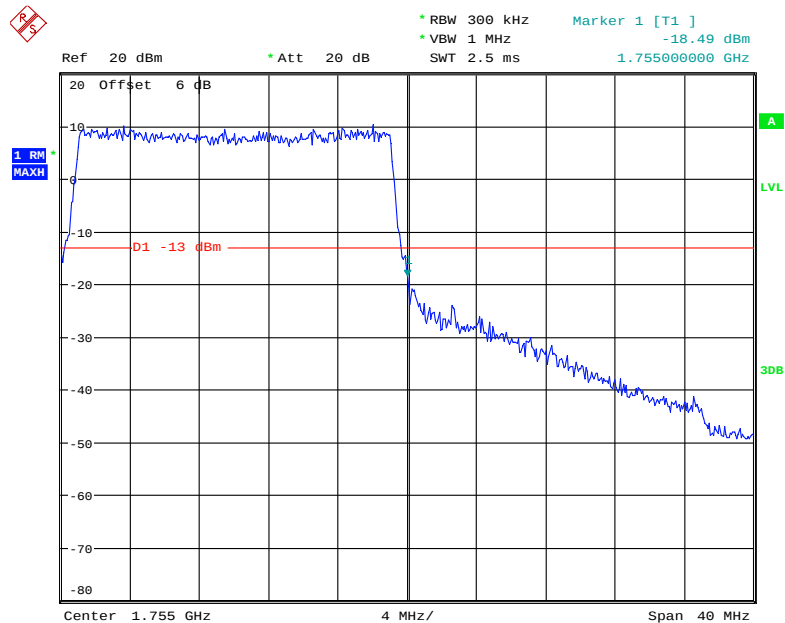
Date: 24.JUL.2019 11:01:07

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



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

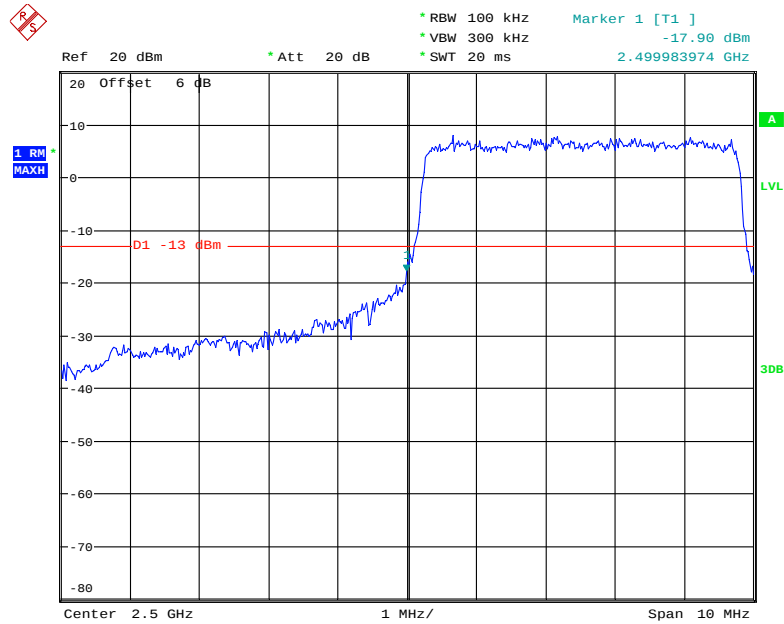
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 24.JUL.2019 11:01:42

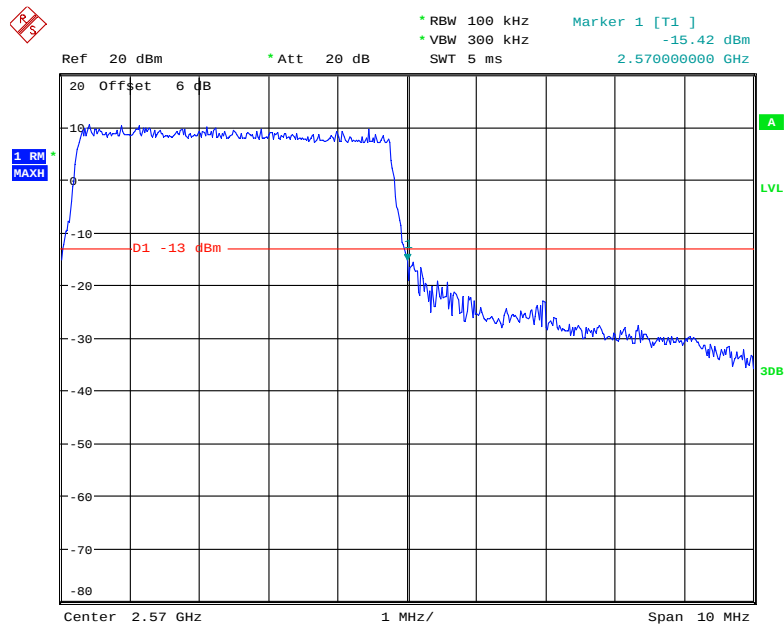
Band 7:

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



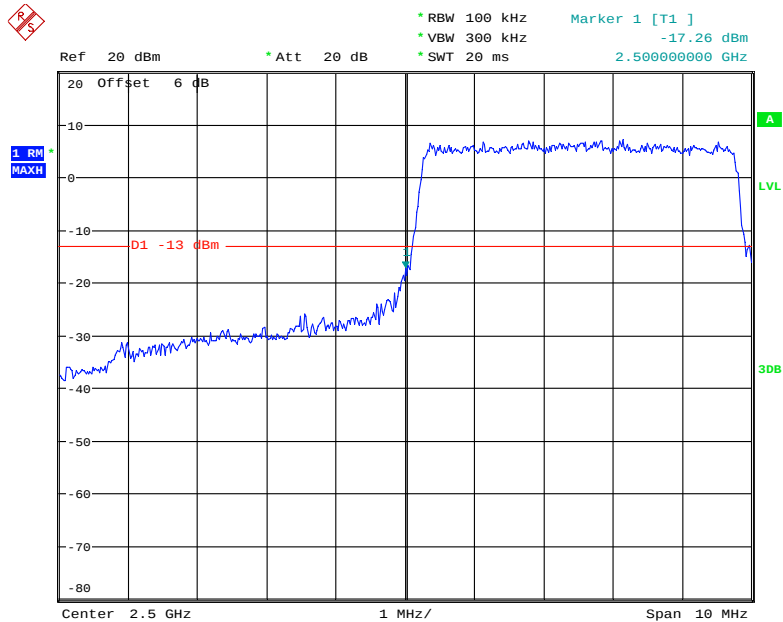
Date: 24.JUL.2019 11:51:49

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



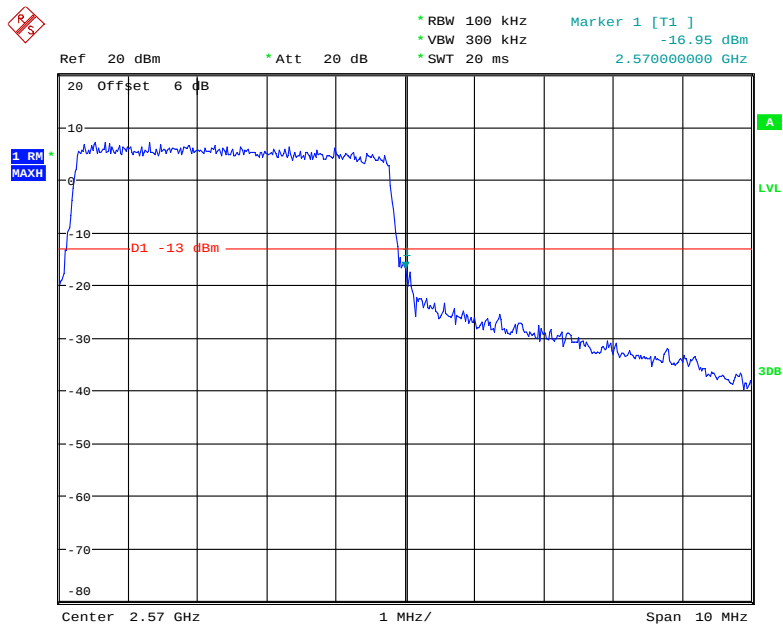
Date: 24.JUL.2019 11:03:16

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



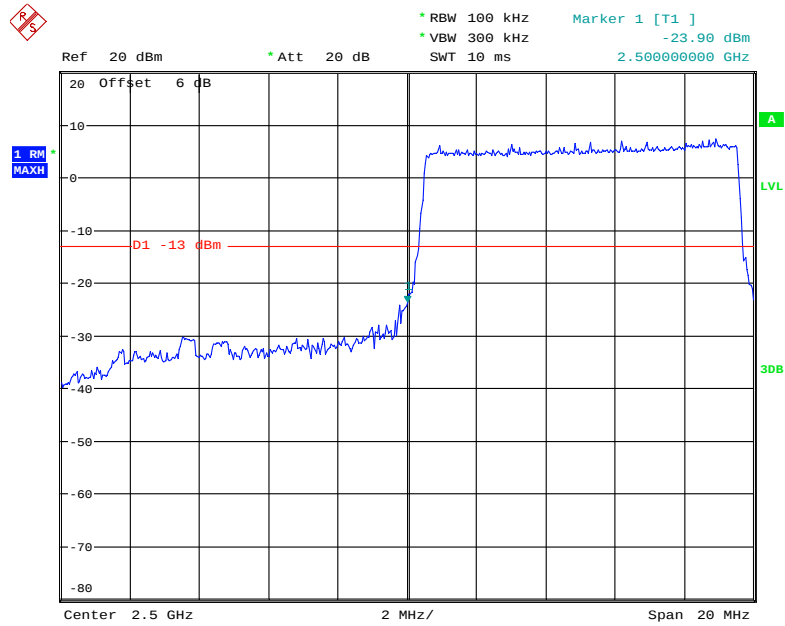
Date: 24.JUL.2019 11:51:00

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



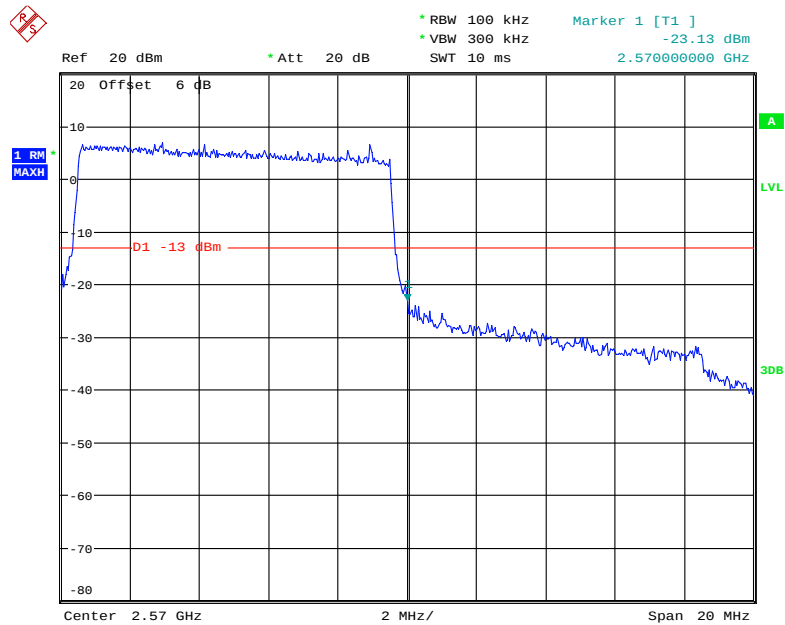
Date: 24.JUL.2019 11:49:57

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



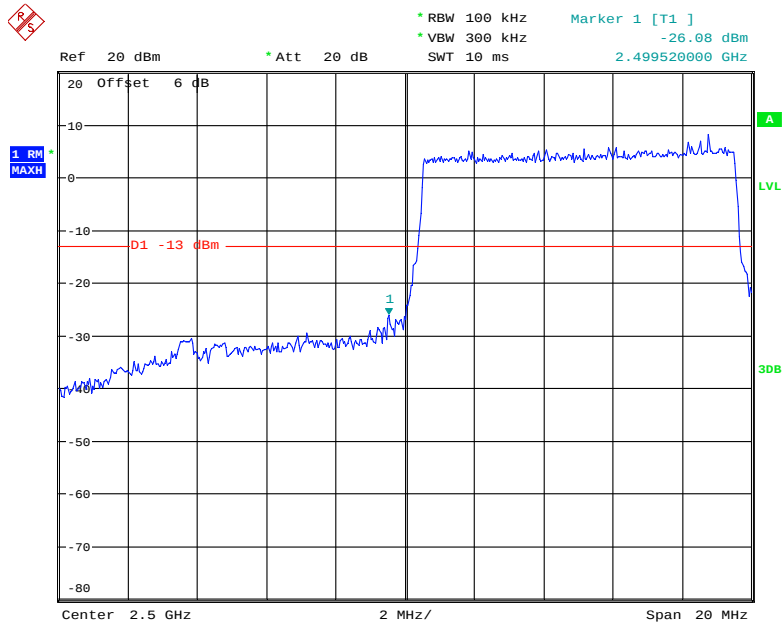
Date: 24.JUL.2019 11:04:19

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



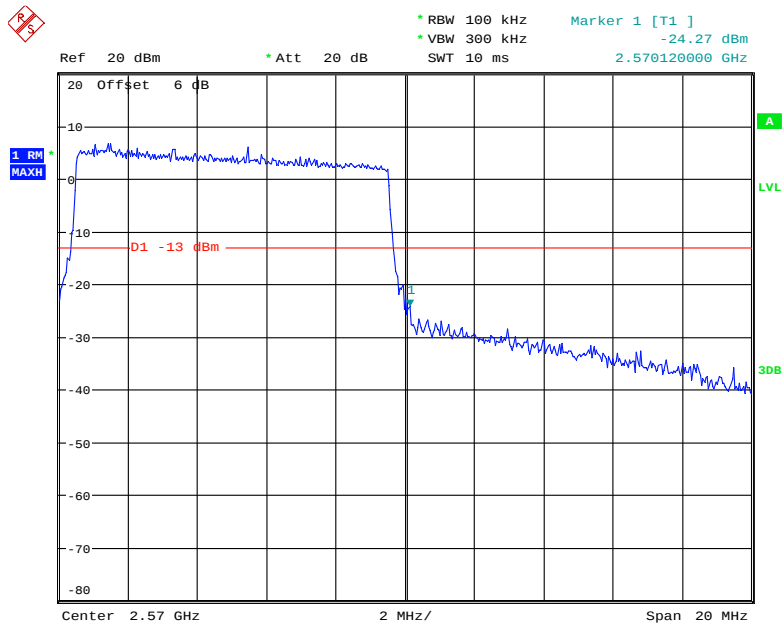
Date: 24.JUL.2019 11:05:16

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



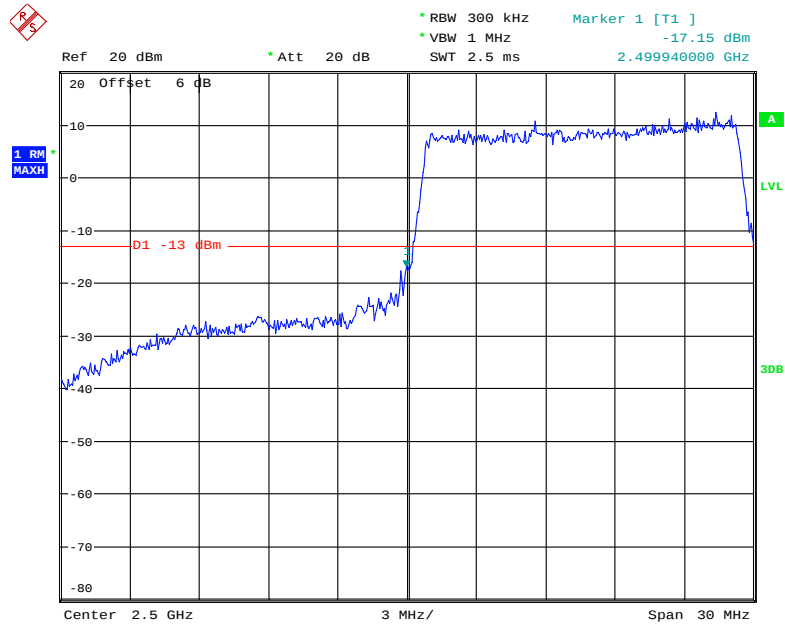
Date: 24.JUL.2019 11:04:45

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



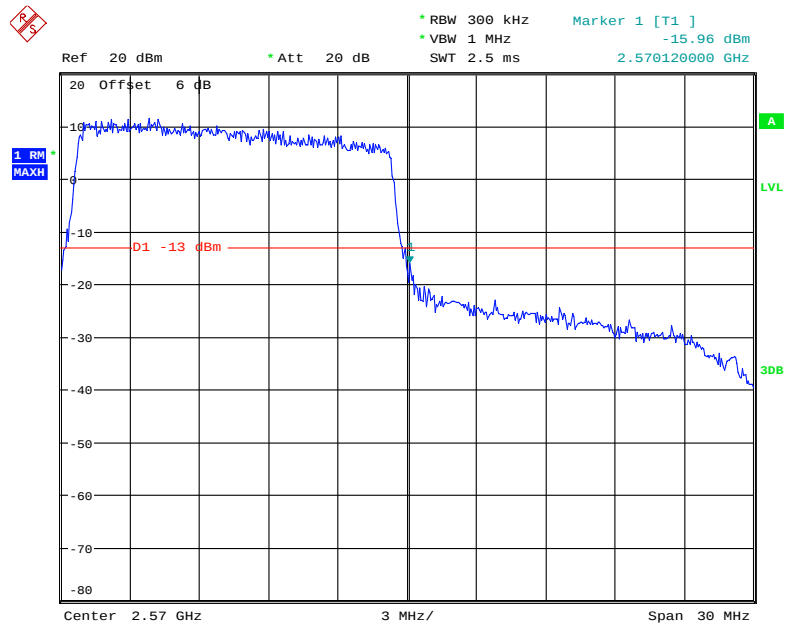
Date: 24.JUL.2019 11:05:43

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



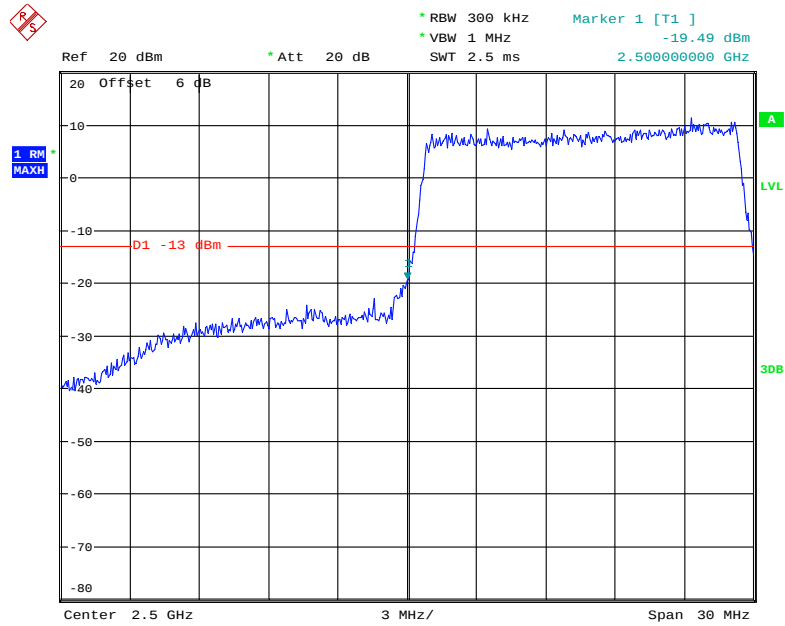
Date: 24.JUL.2019 11:06:18

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



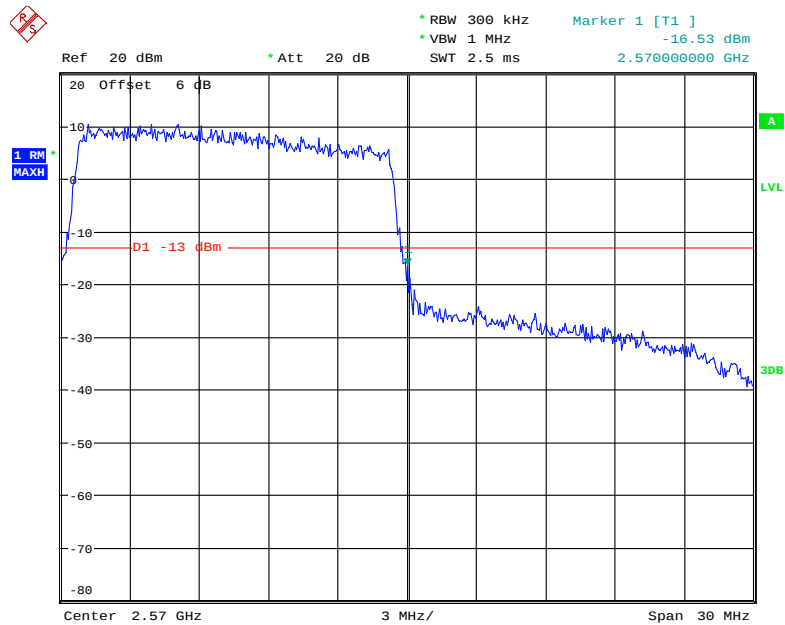
Date: 24.JUL.2019 11:07:27

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



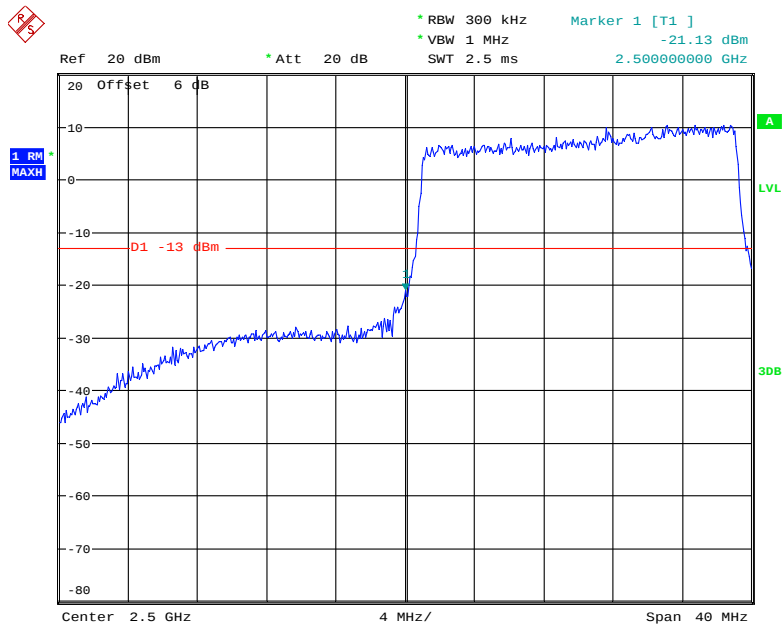
Date: 24.JUL.2019 11:06:50

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



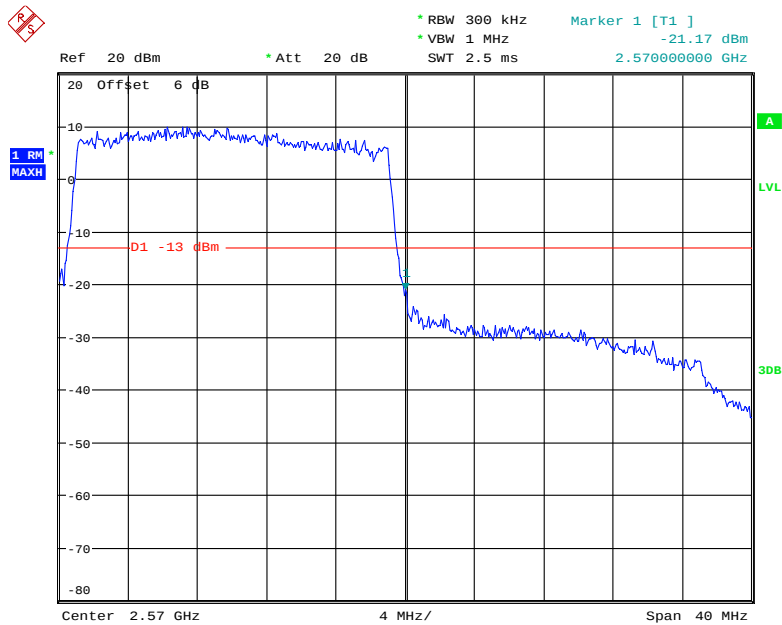
Date: 24.JUL.2019 11:07:53

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



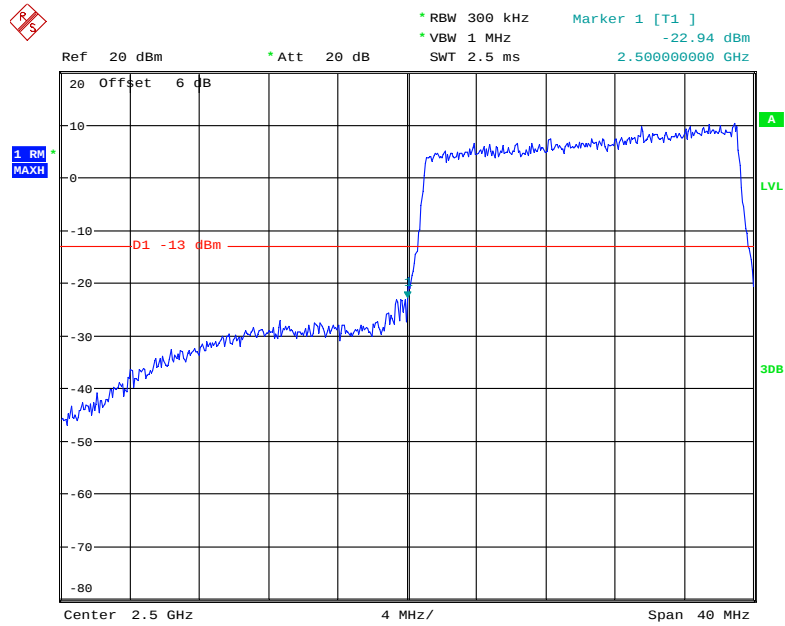
Date: 24.JUL.2019 11:08:32

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



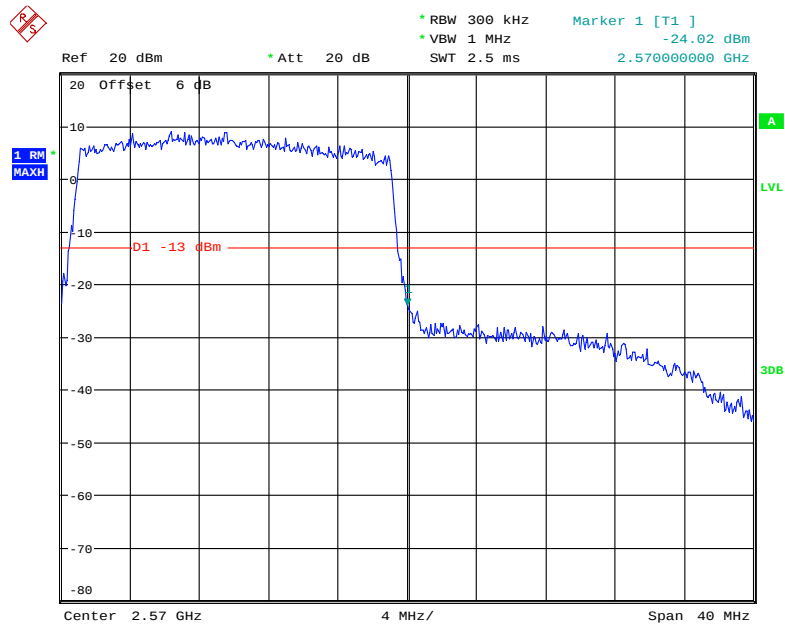
Date: 24.JUL.2019 11:09:49

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



Date: 24.JUL.2019 11:09:10

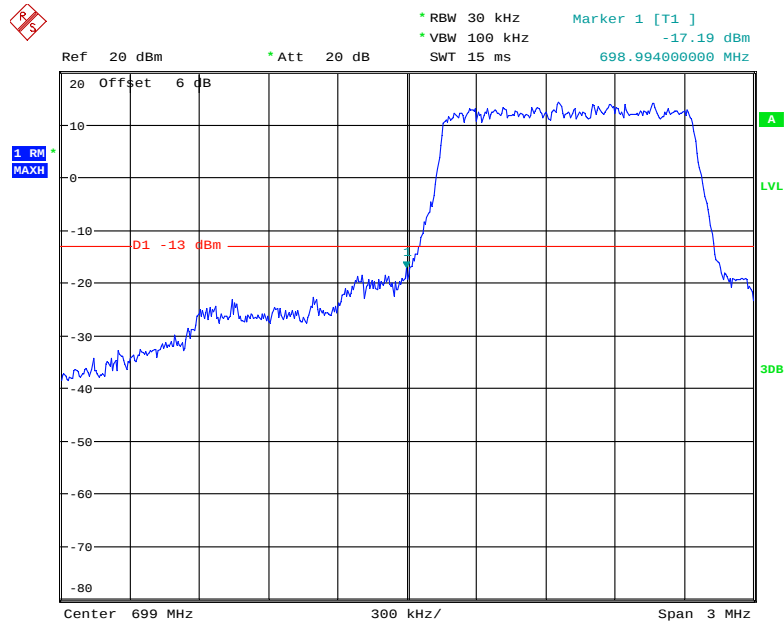
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 24.JUL.2019 11:10:22

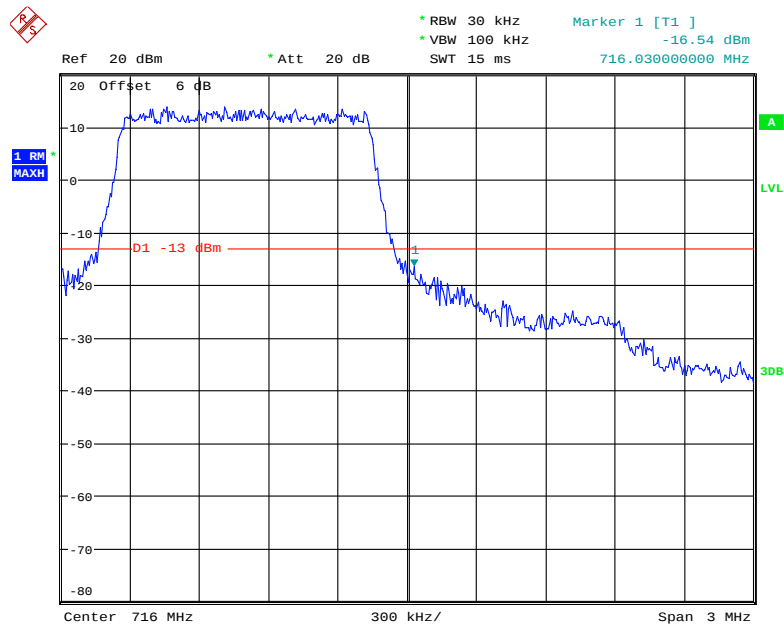
Band 12:

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



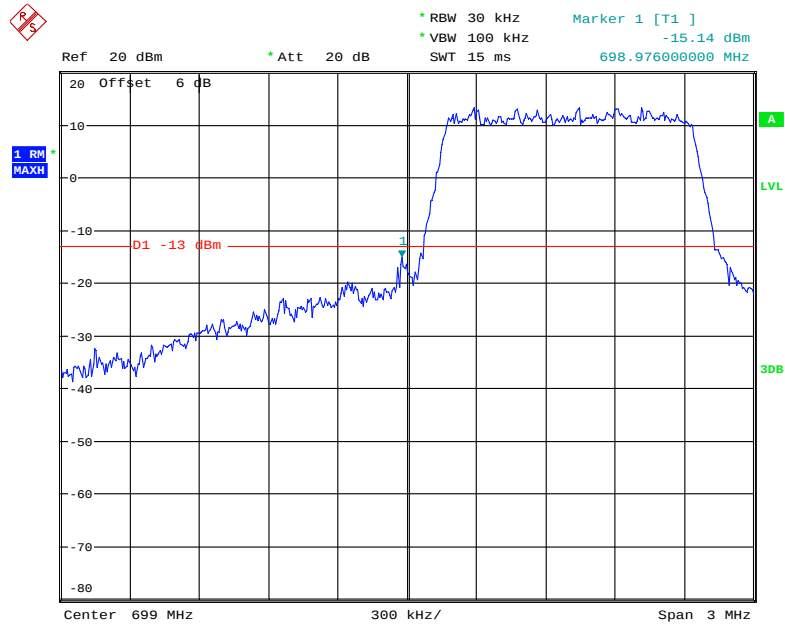
Date: 24.JUL.2019 11:11:00

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



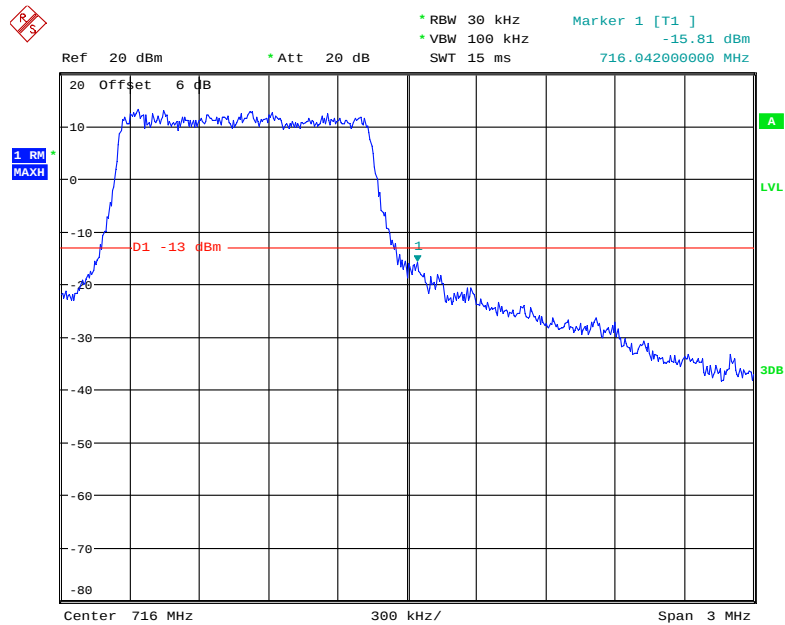
Date: 24.JUL.2019 11:11:55

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



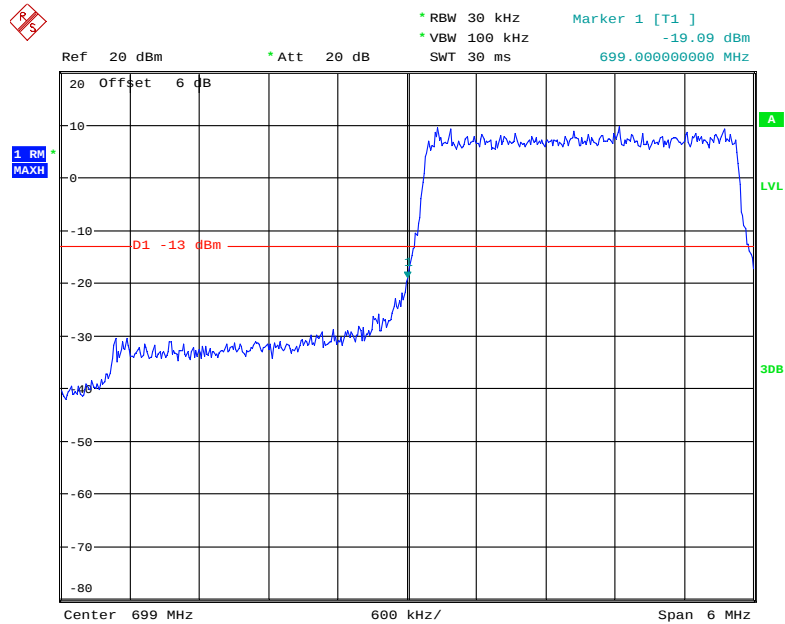
Date: 24.JUL.2019 11:11:29

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



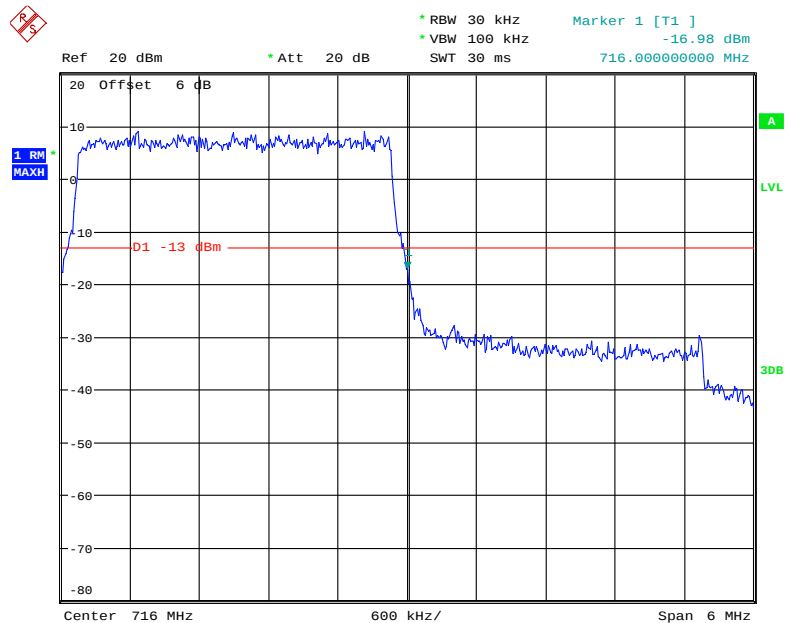
Date: 24.JUL.2019 11:12:24

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



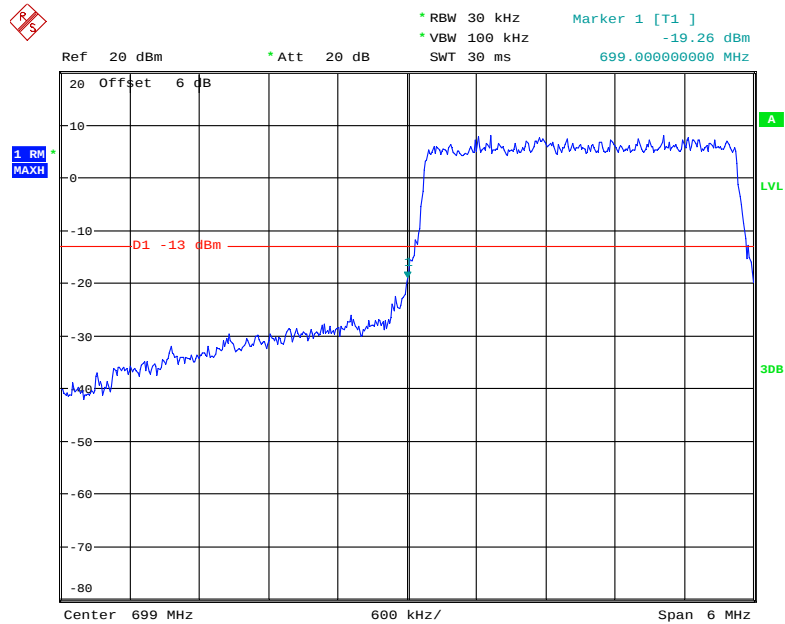
Date: 24.JUL.2019 11:12:57

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



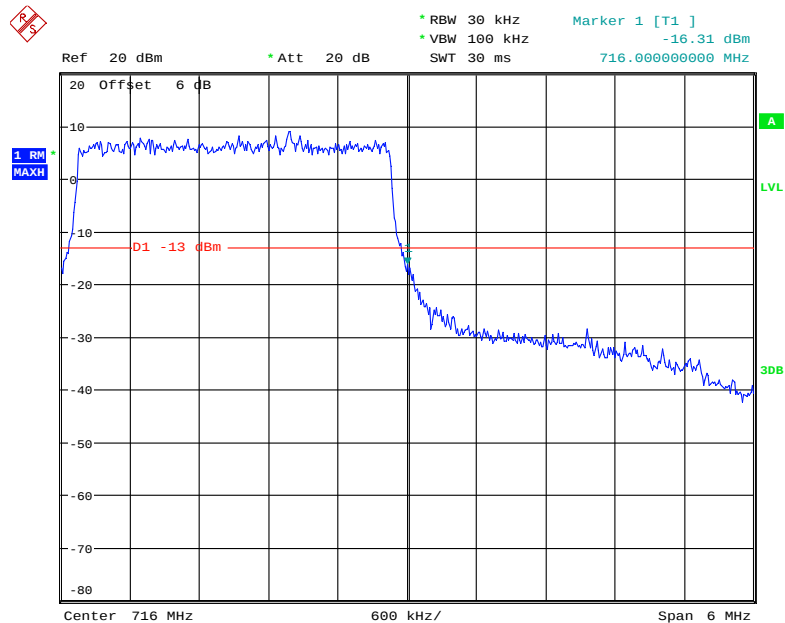
Date: 24.JUL.2019 11:13:50

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



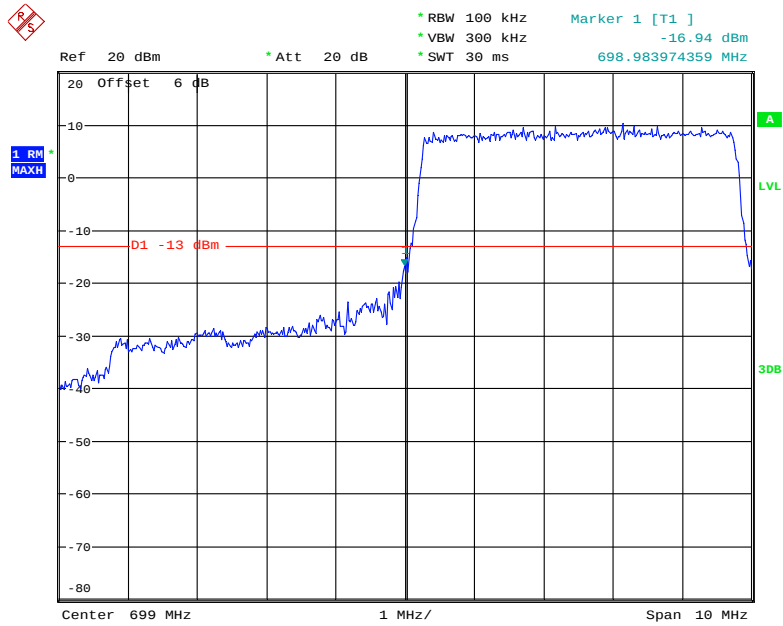
Date: 24.JUL.2019 11:13:23

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



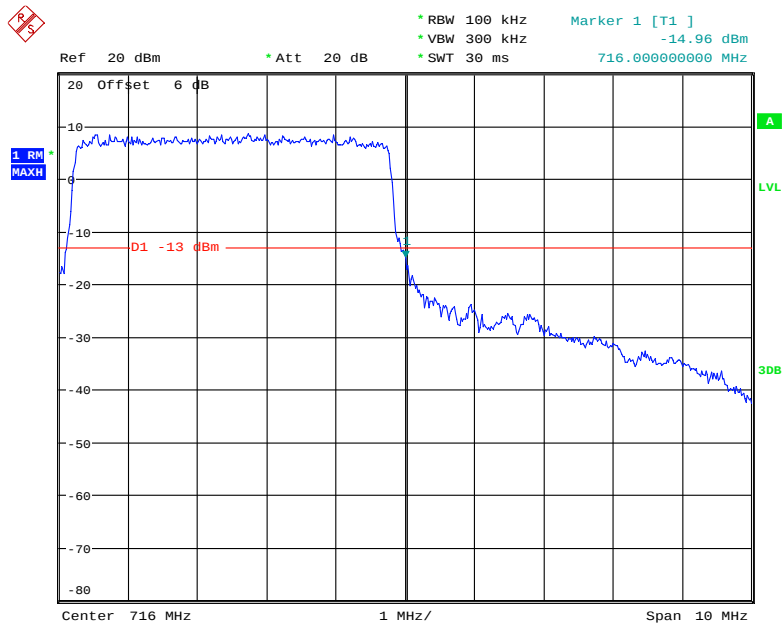
Date: 24.JUL.2019 11:14:16

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



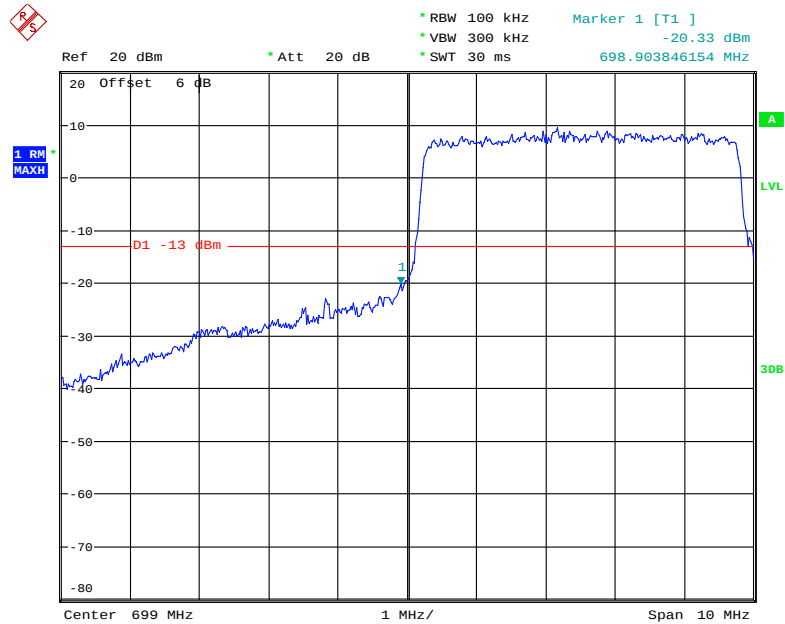
Date: 24.JUL.2019 13:04:53

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



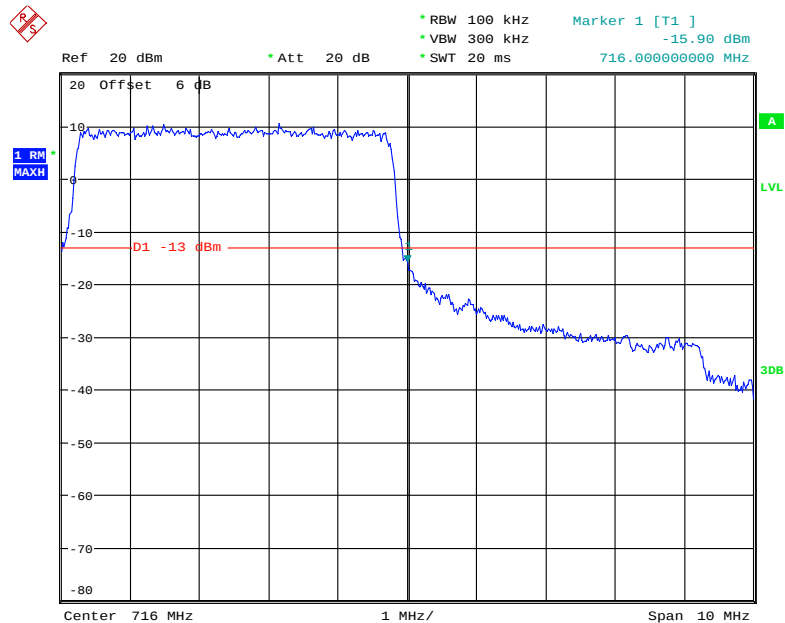
Date: 24.JUL.2019 11:56:03

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



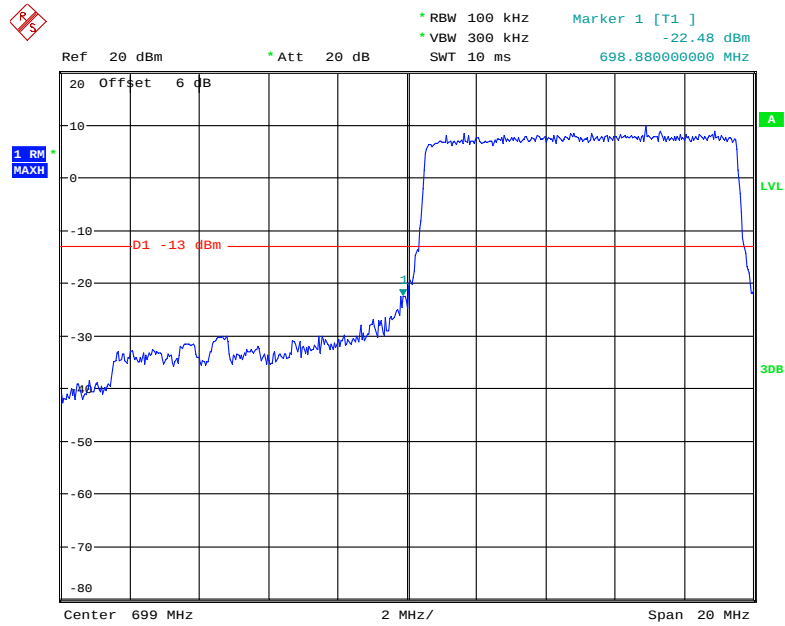
Date: 24.JUL.2019 13:04:06

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



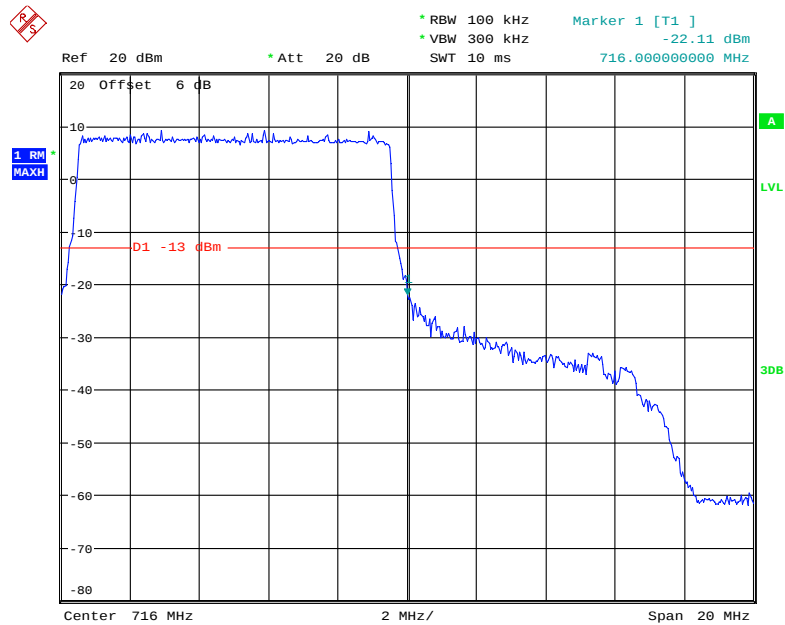
Date: 24.JUL.2019 11:55:01

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



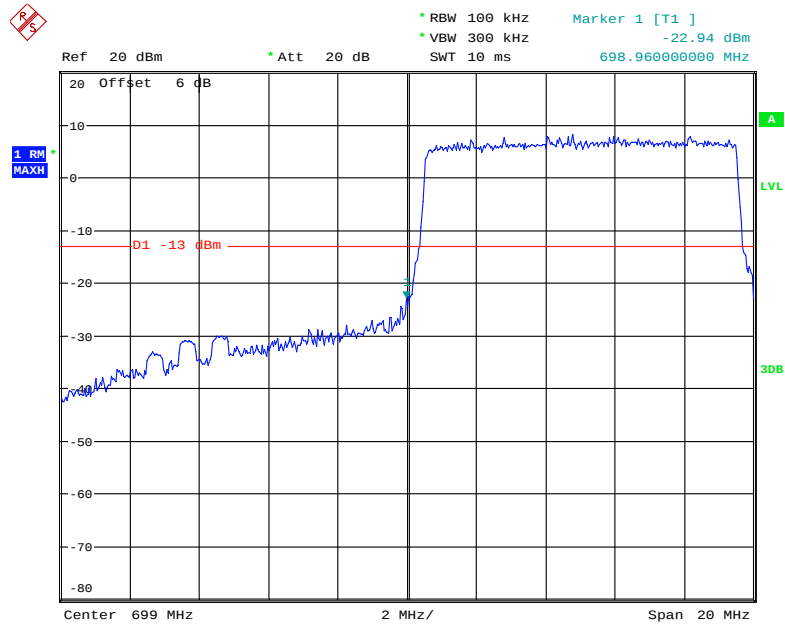
Date: 24.JUL.2019 11:17:18

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



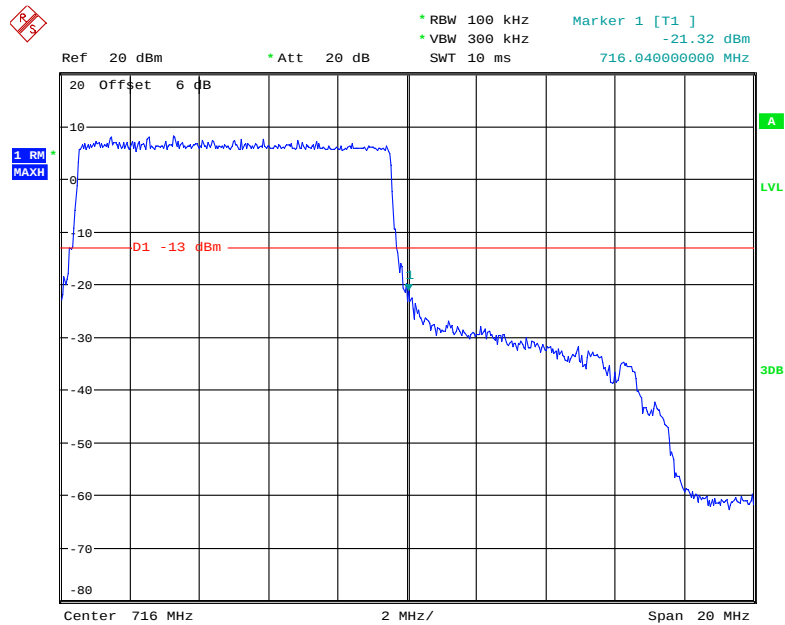
Date: 24.JUL.2019 11:18:16

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



Date: 24.JUL.2019 11:17:45

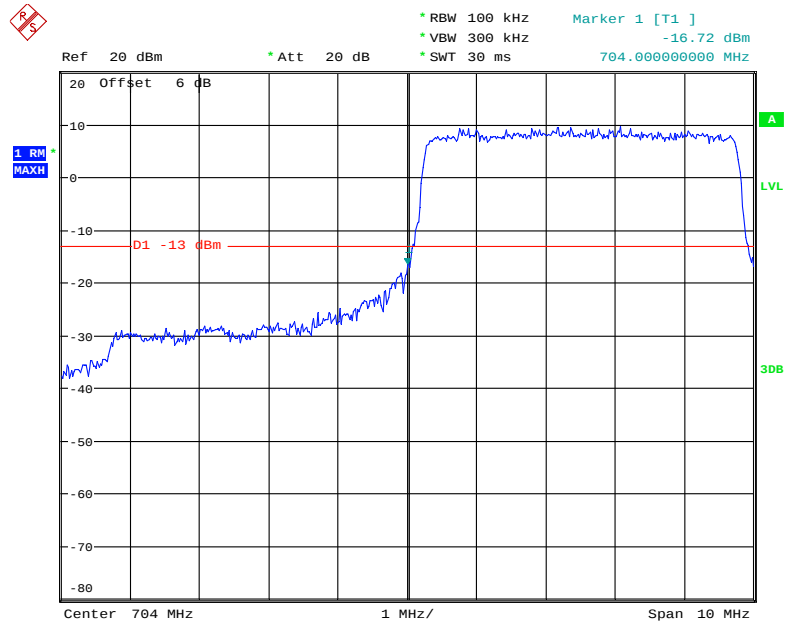
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 24.JUL.2019 11:18:40

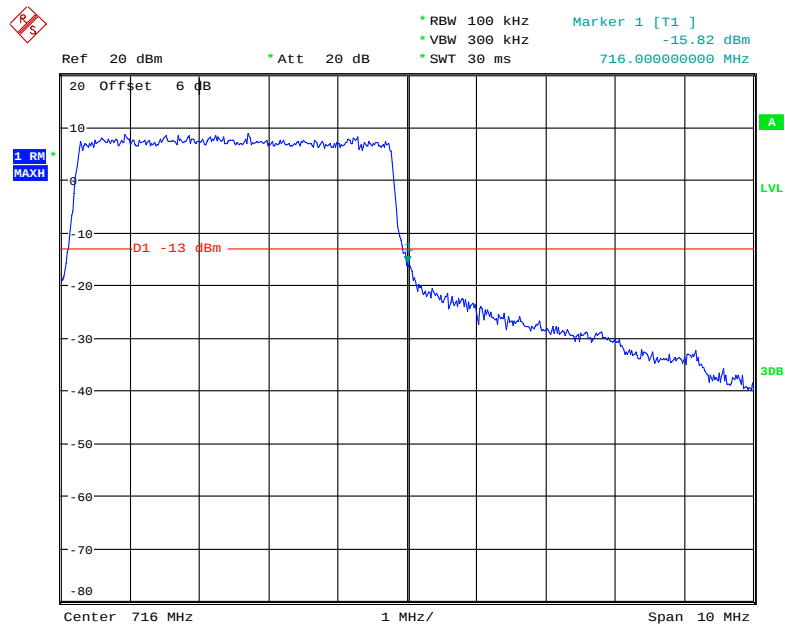
Band 17:

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



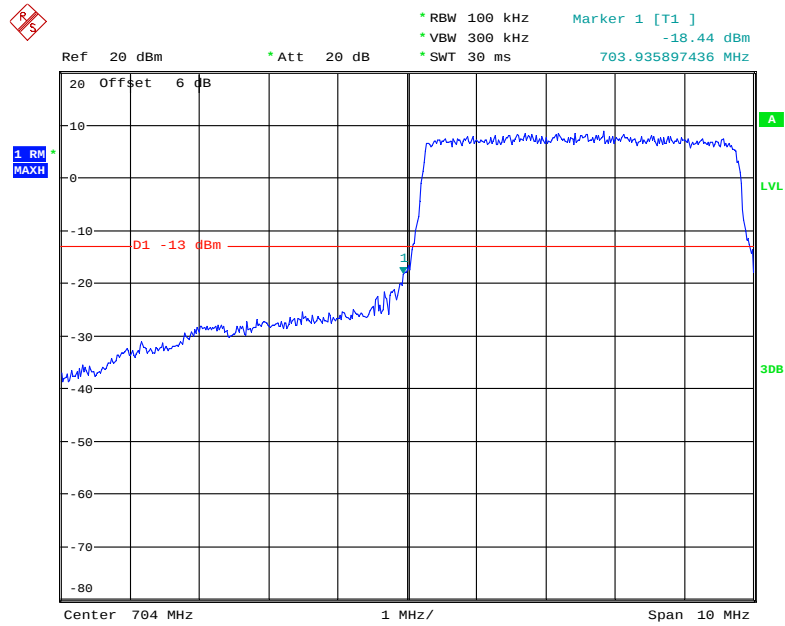
Date: 24.JUL.2019 13:09:33

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



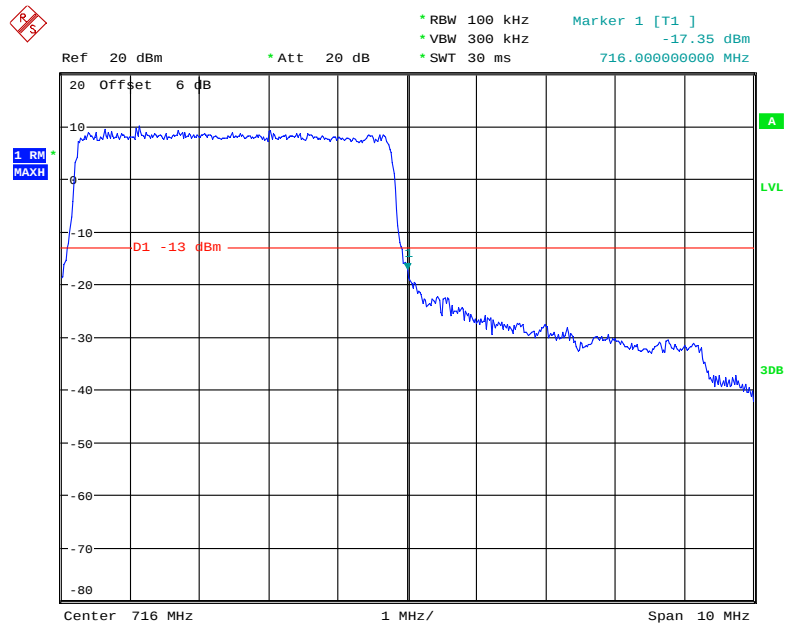
Date: 24.JUL.2019 13:07:52

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



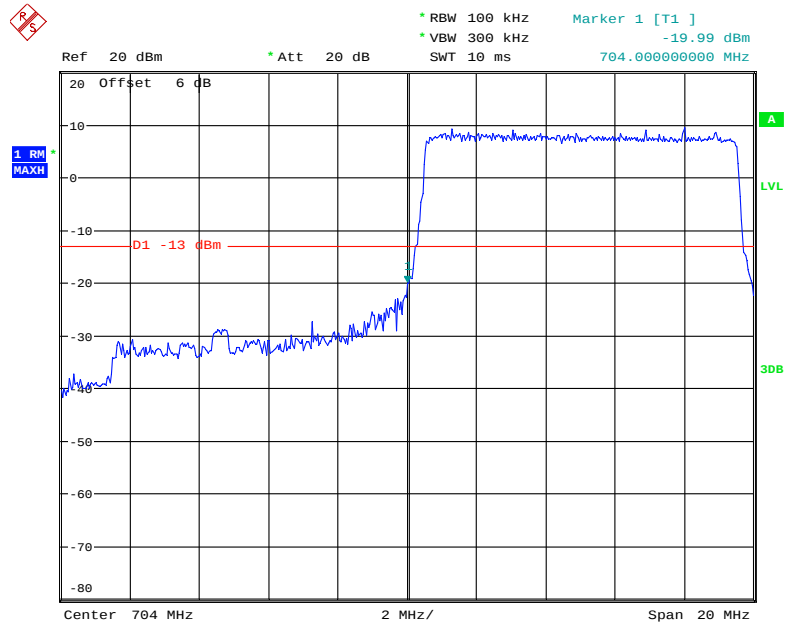
Date: 24.JUL.2019 13:08:52

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



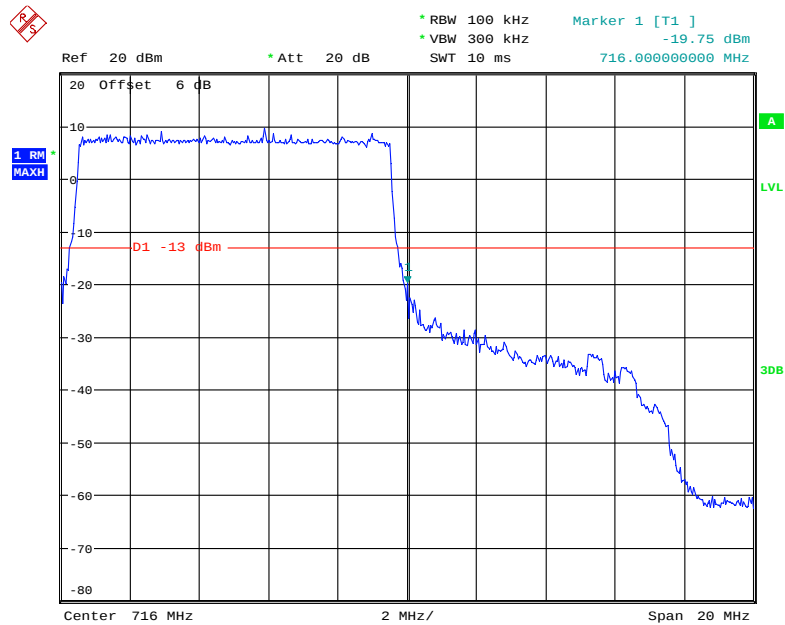
Date: 24.JUL.2019 13:07:08

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



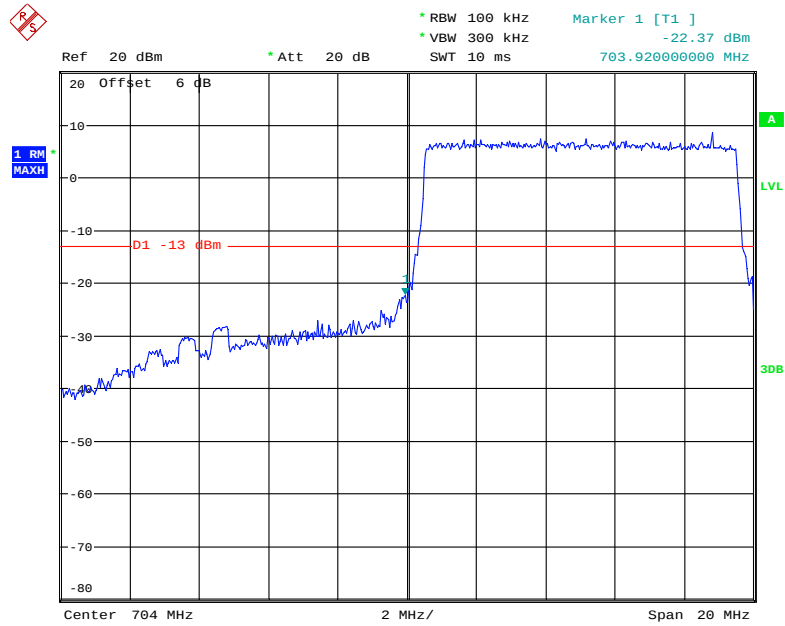
Date: 24.JUL.2019 11:21:28

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



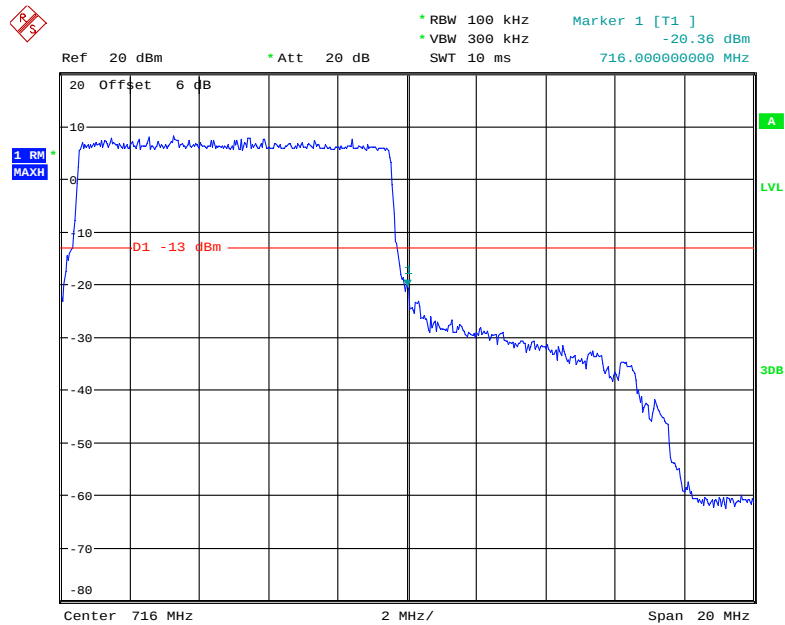
Date: 24.JUL.2019 11:22:13

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



Date: 24.JUL.2019 11:21:51

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



Date: 24.JUL.2019 11:22:40

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

Applicable Standard

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

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

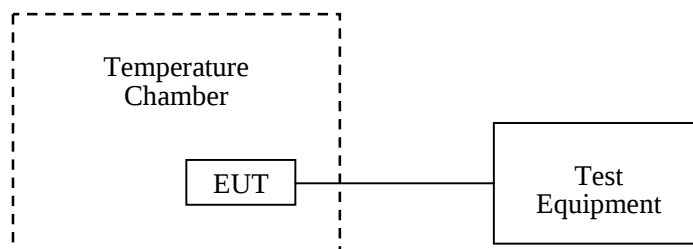
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

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

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

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



Test Data**Environmental Conditions**

Temperature:	25 °C
Relative Humidity:	51 %
ATM Pressure:	101.0 kPa

The testing was performed by George Zhong and Kieron Luo from 2019-07-23 to 2019-07-24.

EUT operation mode: Transmitting

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

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

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	2	0.0024	2.5
-20		5	0.0060	2.5
-10		4	0.0048	2.5
0		5	0.0060	2.5
10		0	0.0000	2.5
20		2	0.0024	2.5
30		1	0.0012	2.5
40		-2	-0.0024	2.5
50		-1	-0.0012	2.5
20	V min.= 3.6	1	0.0012	2.5
	V max.= 4.35	2	0.0024	2.5

EDGE Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	5	0.0060	2.5
-20		3	0.0036	2.5
-10		4	0.0048	2.5
0		5	0.0060	2.5
10		4	0.0048	2.5
20		2	0.0024	2.5
30		3	0.0036	2.5
40		1	0.0012	2.5
50		-1	-0.0012	2.5
20	V min.= 3.6	1	0.0012	2.5
	V max.= 4.35	-4	-0.0048	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	2	0.0024	2.5
-20		3	0.0036	2.5
-10		6	0.0072	2.5
0		5	0.0060	2.5
10		4	0.0048	2.5
20		2	0.0024	2.5
30		3	0.0036	2.5
40		1	0.0012	2.5
50		0	0.0000	2.5
20	V min.= 3.6	1	0.0012	2.5
	V max.= 4.35	4	0.0048	2.5

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

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-1	-0.0005	pass
-20		1	0.0005	pass
-10		3	0.0016	pass
0		4	0.0021	pass
10		2	0.0011	pass
20		3	0.0016	pass
30		1	0.0005	pass
40		0	0.0000	pass
50		-2	-0.0011	pass
20	V min.= 3.6	1	0.0005	pass
	V max.= 4.35	4	0.0021	pass

EDGE Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	5	0.0060	pass
-20		3	0.0036	pass
-10		4	0.0048	pass
0		5	0.0060	pass
10		4	0.0048	pass
20		2	0.0024	pass
30		3	0.0036	pass
40		1	0.0012	pass
50		-1	-0.0012	pass
20	V min.= 3.6	1	0.0012	pass
	V max.= 4.35	-4	-0.0048	pass

WCDMA Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	2	0.0011	pass
-20		1	0.0005	pass
-10		5	0.0027	pass
0		6	0.0032	pass
10		5	0.0027	pass
20		3	0.0016	pass
30		4	0.0021	pass
40		2	0.0011	pass
50		3	0.0016	pass
20	V min.= 3.6	2	0.0011	pass
	V max.= 4.35	5	0.0027	pass

LTE:
QPSK:

Band 2:

10.0 MHz Middle Channel, $f_0=1880\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-7	-0.0037	pass
-20		-6	-0.0032	pass
-10		-4	-0.0021	pass
0		-3	-0.0016	pass
10		-2	-0.0011	pass
20		-5	-0.0027	pass
30		-4	-0.0021	pass
40		-8	-0.0043	pass
50		-7	-0.0037	pass
20	V min.= 3.6	-3	-0.0016	pass
	V max.= 4.35	-2	-0.0011	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.3556	1754.7096	1710	1755
-20		1710.3505	1754.7107	1710	1755
-10		1710.3518	1754.7131	1710	1755
0		1710.3511	1754.7098	1710	1755
10		1710.3540	1754.7090	1710	1755
20		1710.3526	1754.7115	1710	1755
30		1710.3506	1754.7139	1710	1755
40		1710.3565	1754.7127	1710	1755
50		1710.3534	1754.7108	1710	1755
20	V min.= 3.6	1710.3572	1754.7096	1710	1755
	V max.= 4.35	1710.3552	1754.7113	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	2500.3536	2569.6174	2500	2570
-20		2500.3509	2569.6161	2500	2570
-10		2500.3505	2569.6141	2500	2570
0		2500.3547	2569.6139	2500	2570
10		2500.3557	2569.6138	2500	2570
20		2500.3526	2569.6154	2500	2570
30		2500.3566	2569.6195	2500	2570
40		2500.3553	2569.6163	2500	2570
50		2500.3560	2569.6126	2500	2570
20	V min.= 3.6	2500.3534	2569.6189	2500	2570
	V max.= 4.35	2500.3503	2569.6137	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	699.2172	715.7716	699	716
-20		699.2150	715.7764	699	716
-10		699.2117	715.7725	699	716
0		699.2114	715.7706	699	716
10		699.2138	715.7724	699	716
20		699.2178	715.7713	699	716
30		699.2111	715.7729	699	716
40		699.2149	715.7754	699	716
50		699.2142	715.7752	699	716
20	V min.= 3.6	699.2135	715.7746	699	716
	V max.= 4.35	699.2151	715.7719	699	716

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	704.5254	715.4476	704	716
-20		704.5238	715.4495	704	716
-10		704.5277	715.4484	704	716
0		704.5244	715.4522	704	716
10		704.5238	715.4492	704	716
20		704.5244	715.4473	704	716
30		704.5252	715.4520	704	716
40		704.5251	715.4496	704	716
50		704.5264	715.4501	704	716
20	V min.= 3.6	704.5271	715.4501	704	716
	V max.= 4.35	704.5274	715.4526	704	716

16QAM:**Band 2:**

10.0 MHz Middle Channel, f ₀ =1880MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-4	-0.0021	pass
-20		-1	-0.0005	pass
-10		1	0.0005	pass
0		2	0.0011	pass
10		0	0.0000	pass
20		-2	-0.0011	pass
30		-1	-0.0005	pass
40		0	0.0000	pass
50		-3	-0.0016	pass
20	V min.= 3.6	-4	-0.0021	pass
	V max.= 4.35	2	0.0011	pass

Band 4:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.2904	1754.7428	1710	1755
-20		1710.2871	1754.7446	1710	1755
-10		1710.2888	1754.7457	1710	1755
0		1710.2893	1754.7445	1710	1755
10		1710.2928	1754.7482	1710	1755
20		1710.2885	1754.7436	1710	1755
30		1710.2909	1754.7471	1710	1755
40		1710.2860	1754.7447	1710	1755
50		1710.2857	1754.7408	1710	1755
20	V min.= 3.6	1710.2882	1754.7464	1710	1755
	V max.= 4.35	1710.2867	1754.7424	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	2500.3193	2569.6162	2500	2570
-20		2500.3185	2569.6174	2500	2570
-10		2500.3187	2569.6173	2500	2570
0		2500.3226	2569.6137	2500	2570
10		2500.3240	2569.6134	2500	2570
20		2500.3205	2569.6154	2500	2570
30		2500.3186	2569.6145	2500	2570
40		2500.3239	2569.6155	2500	2570
50		2500.3240	2569.6138	2500	2570
20	V min.= 3.6	2500.3192	2569.6135	2500	2570
	V max.= 4.35	2500.3223	2569.6135	2500	2570

Band 12:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	699.3650	715.6299	699	716
-20		699.3598	715.6279	699	716
-10		699.3614	715.6281	699	716
0		699.3639	715.6299	699	716
10		699.3621	715.6257	699	716
20		699.3636	715.6238	699	716
30		699.3661	715.6271	699	716
40		699.3646	715.6246	699	716
50		699.3624	715.6229	699	716
20	V min.= 3.6	699.3618	715.6236	699	716
	V max.= 4.35	699.3621	715.6228	699	716

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	704.3605	715.6572	704	716
-20		704.3611	715.6564	704	716
-10		704.3636	715.6499	704	716
0		704.3636	715.6575	704	716
10		704.3592	715.6528	704	716
20		704.3577	715.6508	704	716
30		704.3573	715.6539	704	716
40		704.3614	715.6577	704	716
50		704.3576	715.6576	704	716
20	V min.= 3.6	704.3627	715.6505	704	716
	V max.= 4.35	704.3562	715.6524	704	716

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