FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

BLU Products, Inc.

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

FCC ID: YHLBLUG6

Report Type:	**Product Type:**
Original Report	Mobile phone

Report Number:	RSZ190507003-00D
Report Date:	2019-05-31
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TABLE OF CONTENTS

GENERAL INFORMATION **3**
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) 3
OBJECTIVE 3
RELATED SUBMITTAL(S)/GRANT(S) 3
TEST METHODOLOGY 4
MEASUREMENT UNCERTAINTY 4
TEST FACILITY 4
SYSTEM TEST CONFIGURATION **5**
DESCRIPTION OF TEST CONFIGURATION 5
EQUIPMENT MODIFICATIONS 5
SUPPORT EQUIPMENT LIST AND DETAILS 5
BLOCK DIAGRAM OF TEST SETUP 5
SUMMARY OF TEST RESULTS **6**
TEST EQUIPMENT LIST **7**
FCC §1.1307(B) & §2.1093 - RF EXPOSURE INFORMATION **9**
APPLICABLE STANDARD 9
TEST RESULT 9
FCC §2.1047 - MODULATION CHARACTERISTIC **10**
FCC § 2.1046, § 22.913 (A) & § 24.232 (C); §27.50 (D) (H) - RF OUTPUT POWER **11**
APPLICABLE STANDARD 11
TEST PROCEDURE 11
TEST DATA 11
FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 - OCCUPIED BANDWIDTH **38**
APPLICABLE STANDARD 38
TEST PROCEDURE 38
TEST DATA 38
FCC §2.1051, §22.917(A) & §24.238(A); §27.53 (H) (M) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS **74**
APPLICABLE STANDARD 74
TEST PROCEDURE 74
TEST DATA 74
FCC § 2.1053; § 22.917 (A);§ 24.238 (A); §27.53 (H)(M) SPURIOUS RADIATED EMISSIONS **101**
APPLICABLE STANDARD 101
TEST PROCEDURE 101
TEST DATA 101
FCC § 22.917 (A);§ 24.238 (A); §27.53 (H)(M) - BAND EDGES **106**
APPLICABLE STANDARD 106
TEST PROCEDURE 106
TEST DATA 106
FCC § 2.1055; § 22.355; § 24.235; §27.54 - FREQUENCY STABILITY **164**
APPLICABLE STANDARD 164
TEST PROCEDURE 164
TEST DATA 165

GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Mobile phone
Tested Model	G6
Multiple Models	V7,VIVO X5
Voltage Range	DC 3.8V from battery or DC 5.0V from adapter
Frequency Range	Cellular: 824-849 MHz PCS: 1850-1910 MHz WCDMA B2/LTE B2: 1850-1910 MHz WCDMA B5/LTE B5: 824-849 MHz WCDMA B4/LTE B4: 1710- 1755 MHz LTE B12: 699-716 MHz LTE B17: 704-716 MHz
Transmit Power	GSM850: 32.83dBm(GMSK), 25.90dBm(8PSK) PCS1900: 28.73dBm(GMSK), 24.95dBm(8PSK) WCDMA Band 2: 22.30dBm WCDMA Band 4: 22.15dBm WCDMA Band 5: 22.39dBm LTE Band 2: 22.21dBm LTE Band 4: 22.25dBm LTE Band 5: 21.85dBm LTE Band 12: 21.98dBm LTE Band 17: 22.03dBm
Modulation Technique	2G: GMSK,8PSK 3G: BPSK, QPSK, 16QAM 4G: QPSK, 16QAM
Antenna Specification	2G/3G/4G:FPC Antennas
Date of Test	2019-05-09~2019-05-24
Sample serial number	1234567890123
Received date	2019-05-07
Sample/EUT Status	Good condition
Adapter information	Model: US-CR-1500 Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5V, 1500mA

Notes: This series products mode V7, VIVO X5 *and* G6 *are are identical schematics, model* G6 *was selected for fully testing, the detailed information can be referred to the attached declaration letter which was stated and guaranteed by the applicant.*

Objective

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

The objective is to determine the compliance of the EUT with FCC rules for output power, modulation characteristic, occupied bandwidth, and spurious emission at antenna terminal, spurious radiated emission, frequency stability and band edge.

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS, Part 15.247 DTS and Part 15B JBP submissions with FCC ID: YHLBLUG6.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

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

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

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

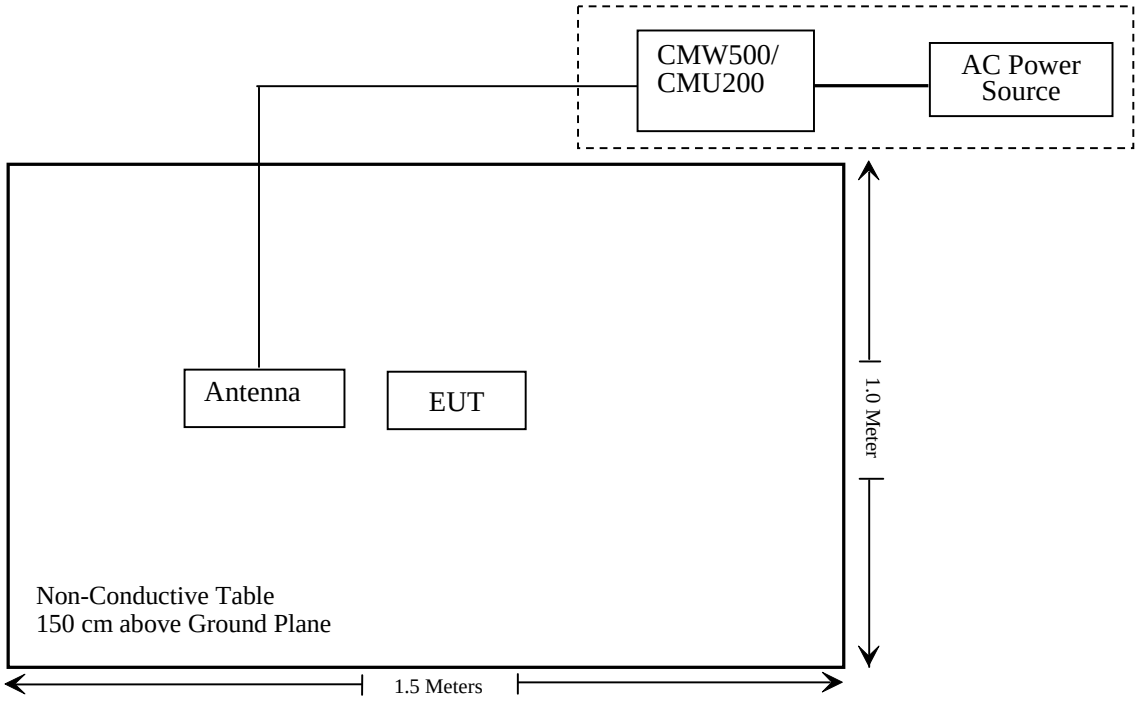
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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

Note: * Please refer to SAR report released by BACL, report number: RSZ190507003-20.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2018-06-23	2019-06-23
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Agilent	Signal Generator	N5183A	MY51040755	2018-12-03	2019-12-03
Rohde & Schwarz	EMI Test Receiver	ESR	1316.3003K03-101746-zn	2018-07-11	2019-07-11
COM-POWER	Dipole Antenna	AD-100	41000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	RG-214	1	2018-11-12	2019-11-12
Ducommun technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-04	2017-12-29	2020-12-28
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2017-12-29	2020-12-28
Heatsink Required	Amplifier	QLW-18405536-J0	15964001002	2018-11-12	2019-11-12

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
ROHDE & SCHWARZ	Signal and Spectrum Analyzer	FSV40	101473	2018-06-22	2019-06-22
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019-01-05	2020-01-05
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2019-01-15	2020-01-15
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1316.3003K03-101746-zn	2018-08-19	2019-08-19
Ducommun Technologies	RF Cable	RG-214	3	Each Time	
WEINSCHEL	10dB Attenuator	5324	AU 3842	Each Time	
WEINSCHEL	3dB Attenuator	6231	666	Each Time	
Unknown	Power Splitter	1620	129	Each Time	

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

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

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RSZ190507003-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E & 27 there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c); §27.50 (d) (h) - RF OUTPUT POWER

Applicable Standard

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

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

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

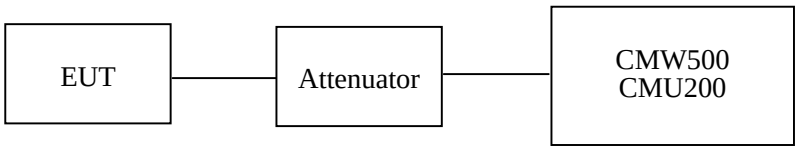
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

According to §27.50(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.

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 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Kieron Luo on 2019-05-21 to 2019-05-24.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.75	38.45
	190	836.6	32.83	38.45
	251	848.8	32.69	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	31.37	28.89	27.09	24.98	38.45
	190	836.6	31.35	28.90	27.14	25.12	38.45
	251	848.8	31.28	28.85	27.08	25.09	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	25.90	24.93	23.01	21.42	38.45
	190	836.6	25.82	24.97	23.00	21.48	38.45
	251	848.8	25.76	24.63	23.08	21.64	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		22.39	22.14	22.35
		HSDPA	1	21.65	21.53	21.59
			2	21.71	21.59	21.63
			3	21.77	21.64	21.70
			4	21.82	21.67	21.72
		HSUPA	1	21.58	21.49	21.48
			2	21.61	21.51	21.55
			3	21.66	21.58	21.59
			4	21.71	21.60	21.67
			5	21.73	21.65	21.74
		HSPA+	1	21.21	21.33	21.28

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.68	33
	661	1880.0	28.73	33
	810	1909.8	28.56	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.03	25.41	24.37	22.23	33
	661	1880.0	28.31	25.62	24.54	22.34	33
	810	1909.8	28.26	25.50	24.35	22.15	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	24.54	23.37	22.67	20.31	33
	661	1880.0	24.05	23.46	22.05	19.74	33
	810	1909.8	24.95	23.99	21.87	19.62	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		22.22	22.26	22.30
		HSDPA	1	21.27	21.32	21.44
			2	21.34	21.36	21.49
			3	21.37	21.42	21.56
			4	21.42	21.49	21.59
		HSUPA	1	21.33	21.35	21.39
			2	21.35	21.41	21.43
			3	21.40	21.49	21.48
			4	21.46	21.53	21.52
			5	21.49	21.55	21.54
		HSPA+	1	20.47	20.35	20.31

AWS Band (Part 27)

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band IV)	Normal	RMC12.2k		21.64	21.85	22.15
		HSDPA	1	20.64	20.75	21.02
			2	20.57	20.67	20.91
			3	20.71	20.81	21.10
			4	20.60	20.65	20.93
		HSUPA	1	20.35	20.48	20.56
			2	20.36	20.39	20.48
			3	20.37	20.32	20.61
			4	20.34	20.38	20.44
			5	20.35	20.38	20.60
		HSPA+	1	20.47	20.35	20.31

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.21	13
	Middle	1.13	13
	High	1.22	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.23	13
	Middle	1.22	13
	High	1.31	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.56	13
	Middle	3.63	13
	High	3.85	13
HSDPA (16QAM)	Low	4.87	13
	Middle	3.66	13
	High	3.86	13
HSUPA (BPSK)	Low	3.88	13
	Middle	3.64	13
	High	3.74	13
HSPA+	Low	3.81	13
	Middle	3.32	13
	High	3.41	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.23	13
	Middle	1.08	13
	High	1.14	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.42	13
	Middle	1.53	13
	High	1.41	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.22	13
	Middle	3.21	13
	High	3.22	13
HSDPA (16QAM)	Low	3.23	13
	Middle	3.23	13
	High	3.25	13
HSUPA (BPSK)	Low	3.89	13
	Middle	3.63	13
	High	3.85	13
HSPA+	Low	3.25	13
	Middle	3.46	13
	High	3.53	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.18	13
	Middle	3.18	13
	High	3.17	13
HSDPA (16QAM)	Low	3.18	13
	Middle	3.19	13
	High	3.19	13
HSUPA (BPSK)	Low	3.19	13
	Middle	3.20	13
	High	3.21	13
HSPA+	Low	3.61	13
	Middle	3.33	13
	High	3.28	13

Radiated Power
GSM Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi/dBd)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	85.23	100	2.2	H	25.9	1.90	0.0	24.00	38.45	14.45
836.6	92.08	279	2.0	V	32.1	1.90	0.0	30.20	38.45	8.25
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	87.22	348	1.1	H	17.2	1.30	9.40	25.30	33	7.70
1880.00	82.33	55	1.7	V	12.1	1.30	9.40	20.20	33	12.80

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi/dBd)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	80.67	344	1.8	H	20.7	1.90	0.0	18.80	38.45	19.55
836.6	85.92	326	1.6	V	26.5	1.90	0.0	24.60	38.45	13.75
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	84.89	94	1.1	H	14.8	1.30	9.40	22.90	33	10.10
1880.00	78.14	195	1.8	V	7.9	1.30	9.40	16.00	33	17.00

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi/dBd)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	83.44	210	2.1	H	21.0	0.7	0.0	20.30	38.45	18.15
836.6	78.29	110	1.8	V	17.9	0.7	0.0	17.20	38.45	21.25
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	81.74	11	1.9	H	12.1	1.30	9.40	20.20	33	12.80
1880.00	79.26	326	2.5	V	9.4	1.30	9.40	17.50	33	15.50
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	85.03	97	2.4	H	11.7	1.30	8.90	19.30	30	10.70
1732.60	82.82	265	2.3	V	10.1	1.30	8.90	17.70	30	12.30

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	21.54	21.48	21.42
		RB Size=1, RB Offset=2	21.42	21.42	21.35
		RB Size=1, RB Offset=5	21.08	21.02	20.98
		RB Size=3, RB Offset=0	21.65	21.59	21.54
		RB Size=3, RB Offset=1	21.97	21.93	21.84
		RB Size=3, RB Offset=2	21.13	21.06	20.96
		RB Size=6, RB Offset=0	21.54	21.48	21.42
	16QAM	RB Size=1, RB Offset=0	21.34	21.25	21.18
		RB Size=1, RB Offset=2	21.28	21.20	21.14
		RB Size=1, RB Offset=5	20.92	20.87	20.81
		RB Size=3, RB Offset=0	21.44	21.40	21.32
		RB Size=3, RB Offset=1	21.79	21.70	21.65
		RB Size=3, RB Offset=2	20.86	20.80	20.72
		RB Size=6, RB Offset=0	21.34	21.25	21.18
3.0	QPSK	RB Size=1, RB Offset=0	21.81	21.84	21.81
		RB Size=1, RB Offset=7	21.59	21.52	21.42
		RB Size=1, RB Offset=14	21.58	21.52	21.49
		RB Size=8, RB Offset=0	22.11	22.11	22.00
		RB Size=8, RB Offset=4	21.79	21.77	21.71
		RB Size=8, RB Offset=7	21.07	21.07	20.95
		RB Size=15, RB Offset=0	20.94	20.92	20.86
	16QAM	RB Size=1, RB Offset=0	21.73	21.62	21.56
		RB Size=1, RB Offset=7	21.39	21.32	21.25
		RB Size=1, RB Offset=14	21.41	21.29	21.22
		RB Size=8, RB Offset=0	21.92	21.83	21.72
		RB Size=8, RB Offset=4	21.65	21.61	21.53
		RB Size=8, RB Offset=7	20.83	20.73	20.63
		RB Size=15, RB Offset=0	20.80	20.73	20.66

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	21.48	21.36
		RB Size=1, RB Offset=12	21.23	21.24	21.20
		RB Size=1, RB Offset=24	20.85	20.84	20.80
		RB Size=12, RB Offset=0	21.71	21.71	21.63
		RB Size=12, RB Offset=6	21.37	21.36	21.23
		RB Size=12, RB Offset=11	20.67	20.66	20.54
		RB Size=25, RB Offset=0	21.33	21.48	21.36
	16QAM	RB Size=1, RB Offset=0	21.23	21.17	21.10
		RB Size=1, RB Offset=12	21.11	21.05	20.95
		RB Size=1, RB Offset=24	20.69	20.62	20.52
		RB Size=12, RB Offset=0	21.54	21.47	21.42
		RB Size=12, RB Offset=6	21.18	21.14	21.10
		RB Size=12, RB Offset=11	20.43	20.38	20.34
		RB Size=25, RB Offset=0	21.23	21.17	21.10
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	21.48	21.48	21.36
		RB Size=1, RB Offset=49	20.61	20.57	20.52
		RB Size=1, RB Offset=99	21.43	21.43	21.35
		RB Size=50, RB Offset=0	21.58	21.59	21.48
		RB Size=50, RB Offset=24	21.76	21.76	21.68
		RB Size=50, RB Offset=49	21.09	21.08	20.97
		RB Size=100, RB Offset=0	21.48	21.48	21.36
	16QAM	RB Size=1, RB Offset=0	21.26	21.20	21.14
		RB Size=1, RB Offset=49	20.48	20.42	20.34
		RB Size=1, RB Offset=99	21.30	21.22	21.12
		RB Size=50, RB Offset=0	21.40	21.34	21.25
		RB Size=50, RB Offset=24	21.55	21.42	21.30
		RB Size=50, RB Offset=49	20.92	20.83	20.73
		RB Size=100, RB Offset=0	21.26	21.20	21.14

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.95	13	Pass
QPSK (100RB Size)	7.66	13	Pass
16QAM (1RB Size)	7.75	13	Pass
16QAM (100RB Size)	7.38	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	82.11	0	2.3	H	12.4	1.30	9.40	20.50	33
1880.00	81.52	177	2.5	V	11.6	1.30	9.40	19.70	33
3 MHz Bandwidth									
1880.00	82.09	56	1.6	H	12.4	1.30	9.40	20.50	33
1880.00	81.73	257	1.9	V	11.8	1.30	9.40	19.90	33
5 MHz Bandwidth									
1880.00	82.01	140	1.2	H	12.3	1.30	9.40	20.40	33
1880.00	81.13	78	1.1	V	11.2	1.30	9.40	19.30	33
10 MHz Bandwidth									
1880.00	81.86	114	1.5	H	12.2	1.30	9.40	20.30	33
1880.00	81.24	189	1.5	V	11.3	1.30	9.40	19.40	33
15 MHz Bandwidth									
1880.00	81.62	208	2.4	H	11.9	1.30	9.40	20.00	33
1880.00	80.58	207	1.1	V	10.7	1.30	9.40	18.80	33
20 MHz Bandwidth									
1880.00	81.26	280	2.5	H	11.6	1.30	9.40	19.70	33
1880.00	80.11	164	1.6	V	10.2	1.30	9.40	18.30	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1880.00	82.62	135	1.4	H	12.9	1.30	9.40	21.00	33
1880.00	82.43	287	2.0	V	12.5	1.30	9.40	20.60	33
3 MHz Bandwidth									
1880.00	82.47	153	1.8	H	12.8	1.30	9.40	20.90	33
1880.00	82.11	76	1.4	V	12.2	1.30	9.40	20.30	33
5 MHz Bandwidth									
1880.00	82.44	235	2.3	H	12.8	1.30	9.40	20.90	33
1880.00	82.19	129	1.4	V	12.3	1.30	9.40	20.40	33
10 MHz Bandwidth									
1880.00	82.35	112	2.2	H	12.7	1.30	9.40	20.80	33
1880.00	82.01	360	2.5	V	12.1	1.30	9.40	20.20	33
15 MHz Bandwidth									
1880.00	82.15	202	2.5	H	12.5	1.30	9.40	20.60	33
1880.00	82.09	34	1.9	V	12.2	1.30	9.40	20.30	33
20 MHz Bandwidth									
1880.00	82.10	94	2.1	H	12.4	1.30	9.40	20.50	33
1880.00	81.93	359	1.7	V	12.0	1.30	9.40	20.10	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	21.53	21.53	21.47
		RB Size=1, RB Offset=2	21.25	21.22	21.19
		RB Size=1, RB Offset=5	21.40	21.35	21.27
		RB Size=3, RB Offset=0	21.68	21.67	21.57
		RB Size=3, RB Offset=1	21.30	21.28	21.20
		RB Size=3, RB Offset=2	20.80	20.77	20.70
		RB Size=6, RB Offset=0	21.31	21.26	21.21
	16QAM	RB Size=1, RB Offset=0	21.44	21.37	21.30
		RB Size=1, RB Offset=2	21.08	21.01	20.92
		RB Size=1, RB Offset=5	21.23	21.11	21.04
		RB Size=3, RB Offset=0	21.53	21.44	21.34
		RB Size=3, RB Offset=1	21.15	21.07	21.03
		RB Size=3, RB Offset=2	20.58	20.53	20.49
		RB Size=6, RB Offset=0	21.12	21.08	20.99
3.0	QPSK	RB Size=1, RB Offset=0	21.37	21.48	21.40
		RB Size=1, RB Offset=7	21.10	21.09	21.03
		RB Size=1, RB Offset=14	20.97	20.91	20.86
		RB Size=8, RB Offset=0	21.43	21.42	21.31
		RB Size=8, RB Offset=4	21.49	21.45	21.33
		RB Size=8, RB Offset=7	21.04	21.06	21.00
		RB Size=15, RB Offset=0	21.37	21.48	21.40
	16QAM	RB Size=1, RB Offset=0	21.29	21.26	21.15
		RB Size=1, RB Offset=7	20.99	20.94	20.86
		RB Size=1, RB Offset=14	20.79	20.69	20.63
		RB Size=8, RB Offset=0	21.23	21.11	21.01
		RB Size=8, RB Offset=4	21.24	21.20	21.09
		RB Size=8, RB Offset=7	20.93	20.88	20.79
		RB Size=15, RB Offset=0	21.29	21.26	21.15

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	21.39	21.33	21.25
		RB Size=1, RB Offset=12	21.04	21.05	21.00
		RB Size=1, RB Offset=24	20.95	20.93	20.89
		RB Size=12, RB Offset=0	21.53	21.55	21.44
		RB Size=12, RB Offset=6	20.82	20.85	20.82
		RB Size=12, RB Offset=11	21.22	21.24	21.13
		RB Size=25, RB Offset=0	20.58	20.58	20.54
	16QAM	RB Size=1, RB Offset=0	21.19	21.10	21.07
		RB Size=1, RB Offset=12	20.96	20.88	20.77
		RB Size=1, RB Offset=24	20.85	20.79	20.73
		RB Size=12, RB Offset=0	21.33	21.27	21.19
		RB Size=12, RB Offset=6	20.78	20.70	20.66
		RB Size=12, RB Offset=11	21.06	20.96	20.90
		RB Size=25, RB Offset=0	20.43	20.40	20.33
10.0	QPSK	RB Size=1, RB Offset=0	21.55	21.48	21.37
		RB Size=1, RB Offset=24	21.21	21.19	21.09
		RB Size=1, RB Offset=49	21.07	21.09	21.01
		RB Size=25, RB Offset=0	21.80	21.76	21.70
		RB Size=25, RB Offset=12	22.01	22.02	21.94
		RB Size=25, RB Offset=24	21.02	20.99	20.87
		RB Size=50, RB Offset=0	21.55	21.48	21.37
	16QAM	RB Size=1, RB Offset=0	21.30	21.22	21.09
		RB Size=1, RB Offset=24	20.96	20.92	20.88
		RB Size=1, RB Offset=49	20.90	20.85	20.78
		RB Size=25, RB Offset=0	21.66	21.55	21.44
		RB Size=25, RB Offset=12	21.89	21.77	21.72
		RB Size=25, RB Offset=24	20.78	20.67	20.58
		RB Size=50, RB Offset=0	21.30	21.22	21.09

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	21.96	21.96	21.91
		RB Size=1, RB Offset=37	21.60	21.60	21.53
		RB Size=1, RB Offset=74	21.36	21.38	21.29
		RB Size=36, RB Offset=0	22.23	22.25	22.15
		RB Size=36, RB Offset=18	21.93	21.94	21.81
		RB Size=36, RB Offset=37	21.52	21.52	21.40
		RB Size=75, RB Offset=0	21.81	21.76	21.65
	16QAM	RB Size=1, RB Offset=0	21.84	21.75	21.72
		RB Size=1, RB Offset=37	21.47	21.41	21.29
		RB Size=1, RB Offset=74	21.25	21.12	21.08
		RB Size=36, RB Offset=0	22.05	22.00	21.94
		RB Size=36, RB Offset=18	21.70	21.60	21.53
		RB Size=36, RB Offset=37	21.33	21.27	21.19
		RB Size=75, RB Offset=0	21.56	21.53	21.45
20.0	QPSK	RB Size=1, RB Offset=0	21.85	21.85	22.07
		RB Size=1, RB Offset=49	21.42	21.81	21.92
		RB Size=1, RB Offset=99	21.69	21.73	21.86
		RB Size=50, RB Offset=0	21.43	21.77	21.70
		RB Size=50, RB Offset=24	21.38	21.39	21.94
		RB Size=50, RB Offset=49	21.56	21.35	21.93
		RB Size=100, RB Offset=0	21.70	21.44	21.60
	16QAM	RB Size=1, RB Offset=0	21.89	21.93	22.01
		RB Size=1, RB Offset=49	21.84	21.87	21.63
		RB Size=1, RB Offset=99	21.63	21.59	21.79
		RB Size=50, RB Offset=0	21.84	21.46	21.86
		RB Size=50, RB Offset=24	21.80	21.68	21.55
		RB Size=50, RB Offset=49	21.56	21.47	21.23
		RB Size=100, RB Offset=0	21.80	21.63	21.97

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.73	13	Pass
QPSK (100RB Size)	6.84	13	Pass
16QAM (1RB Size)	7.30	13	Pass
16QAM (100RB Size)	7.32	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	86.38	21	1.3	H	13.1	1.30	8.90	20.70	30
1732.50	84.13	269	1.0	V	11.4	1.30	8.90	19.00	30
3 MHz Bandwidth									
1732.50	86.21	158	1.7	H	12.9	1.30	8.90	20.50	30
1732.50	84.11	73	2.4	V	11.4	1.30	8.90	19.00	30
5 MHz Bandwidth									
1732.50	86.04	121	1.1	H	12.7	1.30	8.90	20.30	30
1732.50	84.35	352	1.3	V	11.6	1.30	8.90	19.20	30
10 MHz Bandwidth									
1732.50	85.98	59	2.3	H	12.7	1.30	8.90	20.30	30
1732.50	84.02	187	1.9	V	11.3	1.30	8.90	18.90	30
15 MHz Bandwidth									
1732.50	86.33	337	1.2	H	13.0	1.30	8.90	20.60	30
1732.50	83.92	326	1.9	V	11.2	1.30	8.90	18.80	30
20 MHz Bandwidth									
1732.50	85.78	90	1.8	H	12.5	1.30	8.90	20.10	30
1732.50	83.69	2	2.4	V	11.0	1.30	8.90	18.60	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	86.57	221	2.3	H	13.2	1.30	8.90	20.80	30
1732.50	84.63	101	2.2	V	11.9	1.30	8.90	19.50	30
3 MHz Bandwidth									
1732.50	86.62	97	2.1	H	13.3	1.30	8.90	20.90	30
1732.50	84.33	295	2.5	V	11.6	1.30	8.90	19.20	30
5 MHz Bandwidth									
1732.50	86.38	125	1.5	H	13.1	1.30	8.90	20.70	30
1732.50	84.57	323	2.3	V	11.8	1.30	8.90	19.40	30
10 MHz Bandwidth									
1732.50	86.22	138	1.2	H	12.9	1.30	8.90	20.50	30
1732.50	83.93	153	1.5	V	11.2	1.30	8.90	18.80	30
15 MHz Bandwidth									
1732.50	86.31	95	2.1	H	13.0	1.30	8.90	20.60	30
1732.50	84.19	101	2.2	V	11.5	1.30	8.90	19.10	30
20 MHz Bandwidth									
1732.50	86.02	24	1.9	H	12.7	1.30	8.90	20.30	30
1732.50	83.54	89	2.0	V	10.8	1.30	8.90	18.40	30

LTE Band 5:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	21.28	21.48	21.39
		RB Size=1, RB Offset=2	20.80	20.77	20.67
		RB Size=1, RB Offset=5	21.01	21.02	20.90
		RB Size=3, RB Offset=0	21.40	21.35	21.30
		RB Size=3, RB Offset=1	21.80	21.74	21.63
		RB Size=3, RB Offset=2	20.85	20.83	20.76
		RB Size=6, RB Offset=0	21.28	21.48	21.39
	16QAM	RB Size=1, RB Offset=0	21.29	21.25	21.14
		RB Size=1, RB Offset=2	20.63	20.57	20.49
		RB Size=1, RB Offset=5	20.85	20.79	20.74
		RB Size=3, RB Offset=0	21.23	21.13	21.05
		RB Size=3, RB Offset=1	21.54	21.46	21.33
		RB Size=3, RB Offset=2	20.66	20.62	20.50
		RB Size=6, RB Offset=0	21.29	21.25	21.14
3.0	QPSK	RB Size=1, RB Offset=0	21.30	21.32	21.19
		RB Size=1, RB Offset=7	20.91	20.87	20.83
		RB Size=1, RB Offset=14	20.82	20.79	20.74
		RB Size=8, RB Offset=0	21.52	21.49	21.42
		RB Size=8, RB Offset=4	21.27	21.26	21.18
		RB Size=8, RB Offset=7	20.50	20.52	20.39
		RB Size=15, RB Offset=0	21.20	21.17	21.11
	16QAM	RB Size=1, RB Offset=0	21.12	21.03	20.98
		RB Size=1, RB Offset=7	20.76	20.67	20.64
		RB Size=1, RB Offset=14	20.61	20.51	20.43
		RB Size=8, RB Offset=0	21.38	21.30	21.25
		RB Size=8, RB Offset=4	21.11	21.06	21.03
		RB Size=8, RB Offset=7	20.34	20.24	20.18
		RB Size=15, RB Offset=0	21.07	20.96	20.92

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	21.38	21.48	21.44
		RB Size=1, RB Offset=12	20.85	20.80	20.69
		RB Size=1, RB Offset=24	20.78	20.79	20.73
		RB Size=12, RB Offset=0	21.48	21.50	21.45
		RB Size=12, RB Offset=6	21.68	21.69	21.59
		RB Size=12, RB Offset=11	20.88	20.83	20.71
		RB Size=25, RB Offset=0	21.38	21.48	21.44
	16QAM	RB Size=1, RB Offset=0	21.33	21.22	21.15
		RB Size=1, RB Offset=12	20.57	20.45	20.40
		RB Size=1, RB Offset=24	20.69	20.59	20.53
		RB Size=12, RB Offset=0	21.33	21.22	21.12
		RB Size=12, RB Offset=6	21.50	21.47	21.41
		RB Size=12, RB Offset=11	20.66	20.61	20.58
		RB Size=25, RB Offset=0	21.33	21.22	21.15
10.0	QPSK	RB Size=1, RB Offset=0	21.46	21.68	21.57
		RB Size=1, RB Offset=24	20.88	20.91	20.80
		RB Size=1, RB Offset=49	21.02	21.02	20.98
		RB Size=25, RB Offset=0	21.50	21.45	21.34
		RB Size=25, RB Offset=12	21.85	21.81	21.70
		RB Size=25, RB Offset=24	21.04	21.01	20.98
		RB Size=50, RB Offset=0	21.46	21.68	21.57
	16QAM	RB Size=1, RB Offset=0	21.53	21.45	21.36
		RB Size=1, RB Offset=24	20.71	20.66	20.55
		RB Size=1, RB Offset=49	20.85	20.75	20.70
		RB Size=25, RB Offset=0	21.24	21.12	21.06
		RB Size=25, RB Offset=12	21.60	21.54	21.45
		RB Size=25, RB Offset=24	20.89	20.79	20.66
		RB Size=50, RB Offset=0	21.53	21.45	21.36

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.73	13	Pass
QPSK (50RB Size)	6.84	13	Pass
16QAM (1RB Size)	7.08	13	Pass
16QAM (50RB Size)	7.82	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	80.33	175	1.4	H	17.9	0.7	0.0	17.20	38.45
836.5	81.69	172	1.8	V	21.3	0.7	0.0	20.60	38.45
3 MHz Bandwidth									
836.5	80.54	358	1.2	H	18.1	0.7	0.0	17.40	38.45
836.5	81.53	4	1.7	V	21.1	0.7	0.0	20.40	38.45
5 MHz Bandwidth									
836.5	80.21	286	1.3	H	17.8	0.7	0.0	17.10	38.45
836.5	81.46	147	1.0	V	21.0	0.7	0.0	20.30	38.45
10 MHz Bandwidth									
836.5	79.97	186	1.0	H	17.6	0.7	0.0	16.90	38.45
836.5	81.52	164	2.4	V	21.1	0.7	0.0	20.40	38.45

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
836.5	79.83	186	1.7	H	17.4	0.7	0.0	16.70	38.45
836.5	81.86	110	1.4	V	21.4	0.7	0.0	20.70	38.45
3 MHz Bandwidth									
836.5	80.02	348	1.5	H	17.6	0.7	0.0	16.90	38.45
836.5	81.52	0	1.0	V	21.1	0.7	0.0	20.40	38.45
5 MHz Bandwidth									
836.5	80.35	87	2.0	H	18.0	0.7	0.0	17.30	38.45
836.5	81.27	269	1.8	V	20.8	0.7	0.0	20.10	38.45
10 MHz Bandwidth									
836.5	79.58	297	2.0	H	17.2	0.7	0.0	16.50	38.45
836.5	81.38	112	1.0	V	20.9	0.7	0.0	20.20	38.45

LTE Band 12:

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	21.77	21.76	21.72
		RB Size=1, RB Offset=12	21.39	21.35	21.29
		RB Size=1, RB Offset=24	21.57	21.60	21.48
		RB Size=12, RB Offset=0	21.81	21.82	21.69
		RB Size=12, RB Offset=6	21.50	21.52	21.43
		RB Size=12, RB Offset=11	21.40	21.40	21.35
		RB Size=25, RB Offset=0	20.57	20.56	20.45
	16QAM	RB Size=1, RB Offset=0	21.66	21.58	21.52
		RB Size=1, RB Offset=12	21.21	21.11	20.99
		RB Size=1, RB Offset=24	21.40	21.32	21.27
		RB Size=12, RB Offset=0	21.63	21.59	21.48
		RB Size=12, RB Offset=6	21.37	21.27	21.24
		RB Size=12, RB Offset=11	21.29	21.17	21.05
		RB Size=25, RB Offset=0	20.38	20.25	20.20
3	QPSK	RB Size=1, RB Offset=0	21.58	21.68	21.60
		RB Size=1, RB Offset=24	21.29	21.31	21.26
		RB Size=1, RB Offset=49	20.71	20.73	20.61
		RB Size=25, RB Offset=0	21.62	21.62	21.57
		RB Size=25, RB Offset=12	21.69	21.69	21.64
		RB Size=25, RB Offset=24	21.48	21.46	21.38
		RB Size=50, RB Offset=0	21.58	21.68	21.60
	16QAM	RB Size=1, RB Offset=0	21.48	21.43	21.37
		RB Size=1, RB Offset=24	21.15	21.06	21.01
		RB Size=1, RB Offset=49	20.50	20.46	20.42
		RB Size=25, RB Offset=0	21.48	21.41	21.34
		RB Size=25, RB Offset=12	21.61	21.48	21.41
		RB Size=25, RB Offset=24	21.26	21.20	21.09
		RB Size=50, RB Offset=0	21.48	21.43	21.37

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	21.81	21.83	21.70
		RB Size=1, RB Offset=37	21.49	21.42	21.34
		RB Size=1, RB Offset=74	21.41	21.35	21.27
		RB Size=36, RB Offset=0	21.95	21.97	21.85
		RB Size=36, RB Offset=18	21.37	21.38	21.28
		RB Size=36, RB Offset=37	21.60	21.60	21.54
		RB Size=75, RB Offset=0	21.43	21.41	21.30
	16QAM	RB Size=1, RB Offset=0	21.69	21.70	21.64
		RB Size=1, RB Offset=37	21.44	21.39	21.32
		RB Size=1, RB Offset=74	21.32	21.26	21.18
		RB Size=36, RB Offset=0	21.89	21.85	21.76
		RB Size=36, RB Offset=18	21.52	21.46	21.40
		RB Size=36, RB Offset=37	21.39	21.35	21.26
		RB Size=75, RB Offset=0	21.25	21.23	21.15
10	QPSK	RB Size=1, RB Offset=0	21.58	21.47	21.36
		RB Size=1, RB Offset=49	21.20	21.09	21.00
		RB Size=1, RB Offset=99	21.13	21.05	20.95
		RB Size=50, RB Offset=0	21.73	21.61	21.55
		RB Size=50, RB Offset=24	21.28	21.24	21.18
		RB Size=50, RB Offset=49	21.19	21.14	21.09
		RB Size=100, RB Offset=0	21.10	21.02	20.99
	16QAM	RB Size=1, RB Offset=0	21.65	21.68	21.61
		RB Size=1, RB Offset=49	21.05	21.00	20.93
		RB Size=1, RB Offset=99	21.33	21.27	21.16
		RB Size=50, RB Offset=0	21.68	21.66	21.61
		RB Size=50, RB Offset=24	21.97	21.98	21.90
		RB Size=50, RB Offset=49	21.40	21.40	21.33
		RB Size=100, RB Offset=0	21.65	21.68	21.61

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.76	13	Pass
QPSK (50RB Size)	6.17	13	Pass
16QAM (1RB Size)	7.15	13	Pass
16QAM (50RB Size)	7.89	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	80.11	80	1.3	H	16.8	0.6	0.0	16.18	34.77
707.5	83.72	29	1.7	V	21.3	0.6	0.0	20.68	34.77
3 MHz Bandwidth									
707.5	80.42	88	1.5	H	17.1	0.6	0.0	16.48	34.77
707.5	83.51	76	2.2	V	21.1	0.6	0.0	20.48	34.77
5 MHz Bandwidth									
707.5	79.65	86	1.7	H	16.4	0.6	0.0	15.78	34.77
707.5	83.27	82	1.8	V	20.9	0.6	0.0	20.28	34.77
10 MHz Bandwidth									
707.5	79.54	72	2.5	H	16.2	0.6	0.0	15.58	34.77
707.5	82.87	28	2.1	V	20.5	0.6	0.0	19.88	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
707.5	80.31	48	1.1	H	17.0	0.6	0.0	16.38	34.77
707.5	83.93	290	1.1	V	21.5	0.6	0.0	20.88	34.77
3 MHz Bandwidth									
707.5	80.24	141	2.3	H	16.9	0.6	0.0	16.28	34.77
707.5	83.68	106	2.1	V	21.3	0.6	0.0	20.68	34.77
5 MHz Bandwidth									
707.5	80.52	56	1.5	H	17.2	0.6	0.0	16.58	34.77
707.5	83.51	143	1.9	V	21.1	0.6	0.0	20.48	34.77
10 MHz Bandwidth									
707.5	79.68	302	2.2	H	16.4	0.6	0.0	15.78	34.77
707.5	83.14	119	2.3	V	20.7	0.6	0.0	20.08	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	21.48	21.38	21.33
		RB Size=1, RB Offset=12	20.84	20.80	20.73
		RB Size=1, RB Offset=24	21.12	21.02	20.89
		RB Size=12, RB Offset=0	21.56	21.43	21.34
		RB Size=12, RB Offset=6	21.83	21.80	21.74
		RB Size=12, RB Offset=11	21.21	21.10	21.00
		RB Size=25, RB Offset=0	21.48	21.38	21.33
	16QAM	RB Size=1, RB Offset=0	21.89	21.87	21.79
		RB Size=1, RB Offset=12	21.62	21.56	21.48
		RB Size=1, RB Offset=24	21.78	21.72	21.63
		RB Size=12, RB Offset=0	22.03	21.99	21.87
		RB Size=12, RB Offset=6	21.59	21.57	21.52
		RB Size=12, RB Offset=11	21.11	21.14	21.04
		RB Size=25, RB Offset=0	21.26	21.28	21.19
10	QPSK	RB Size=1, RB Offset=0	21.72	21.66	21.55
		RB Size=1, RB Offset=24	21.39	21.28	21.22
		RB Size=1, RB Offset=49	21.50	21.43	21.37
		RB Size=25, RB Offset=0	21.84	21.73	21.66
		RB Size=25, RB Offset=12	21.48	21.41	21.36
		RB Size=25, RB Offset=24	21.06	20.90	20.83
		RB Size=50, RB Offset=0	21.12	21.07	21.04
	16QAM	RB Size=1, RB Offset=0	21.44	21.68	21.61
		RB Size=1, RB Offset=24	21.06	20.99	20.87
		RB Size=1, RB Offset=49	21.03	20.96	20.92
		RB Size=25, RB Offset=0	21.82	21.82	21.70
		RB Size=25, RB Offset=12	21.66	21.64	21.57
		RB Size=25, RB Offset=24	21.08	21.03	20.94
		RB Size=50, RB Offset=0	21.44	21.68	21.61

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.84	13	Pass
QPSK (50RB Size)	6.53	13	Pass
16QAM (1RB Size)	6.54	13	Pass
16QAM (50RB Size)	7.32	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
5 MHz Bandwidth									
710	80.63	104	1.9	H	17.3	0.6	0.0	16.68	34.77
710	83.62	256	2.2	V	21.2	0.6	0.0	20.58	34.77
10 MHz Bandwidth									
710	80.17	65	2.0	H	16.9	0.6	0.0	16.28	34.77
710	83.34	221	1.2	V	20.9	0.6	0.0	20.28	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBµV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
5 MHz Bandwidth									
710	79.69	131	1.2	H	16.4	0.6	0.0	15.78	34.77
710	83.74	199	1.3	V	21.3	0.6	0.0	20.68	34.77
10 MHz Bandwidth									
710	80.03	79	1.4	H	16.7	0.6	0.0	16.08	34.77
710	83.25	196	1.8	V	20.8	0.6	0.0	20.18	34.77

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

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

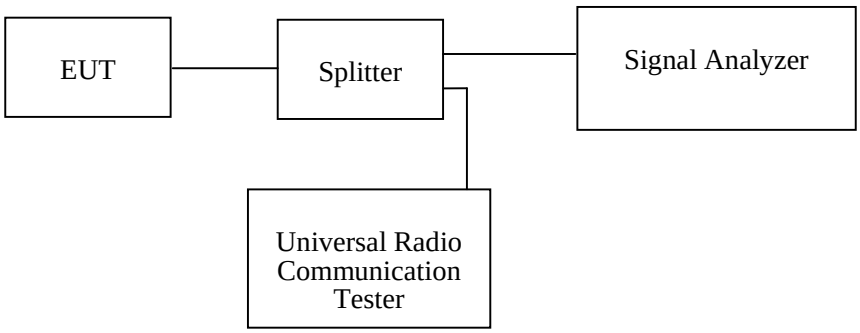
Applicable Standard

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

Test Procedure

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

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



Test Data

Environmental Conditions

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

The testing was performed by Kieron Luo on 2019-05-21 to 2019-05-24.

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	243.13	318.40
EGPRS(8PSK)	836.6	244.57	309.70

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.14	4.67
HSUPA (BPSK)	836.6	4.15	4.69
HSDPA (16QAM)	836.6	4.17	4.67

PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	241.68	319.80
EGPRS(8PSK)	1880.0	243.13	308.20

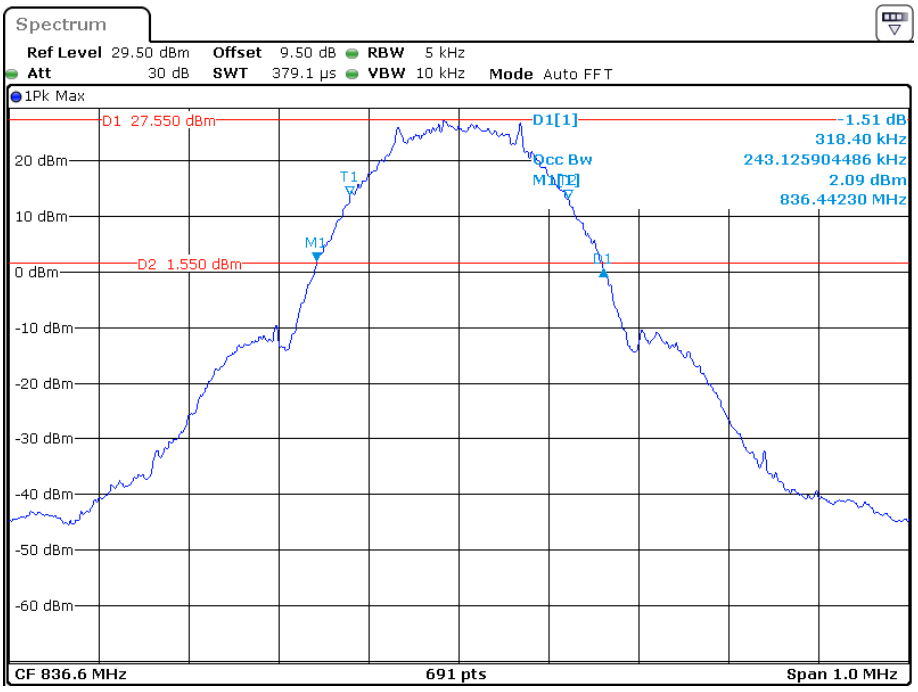
Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.15	4.67
HSUPA (BPSK)	1880.0	4.15	4.67
HSDPA (16QAM)	1880.0	4.17	4.66

AWS Band (Part 27)

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1732.6	4.14	4.66
HSUPA (BPSK)	1732.6	4.15	4.66
HSDPA (16QAM)	1732.6	4.15	4.67

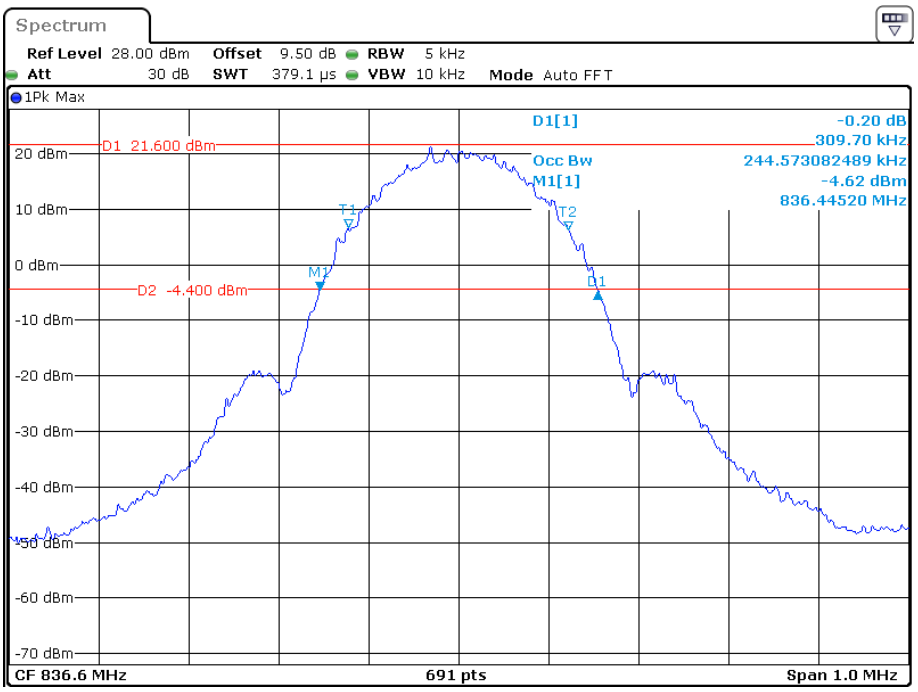
Cellular Band (Part 22H)

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



Date: 21.MAY.2019 16:10:17

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



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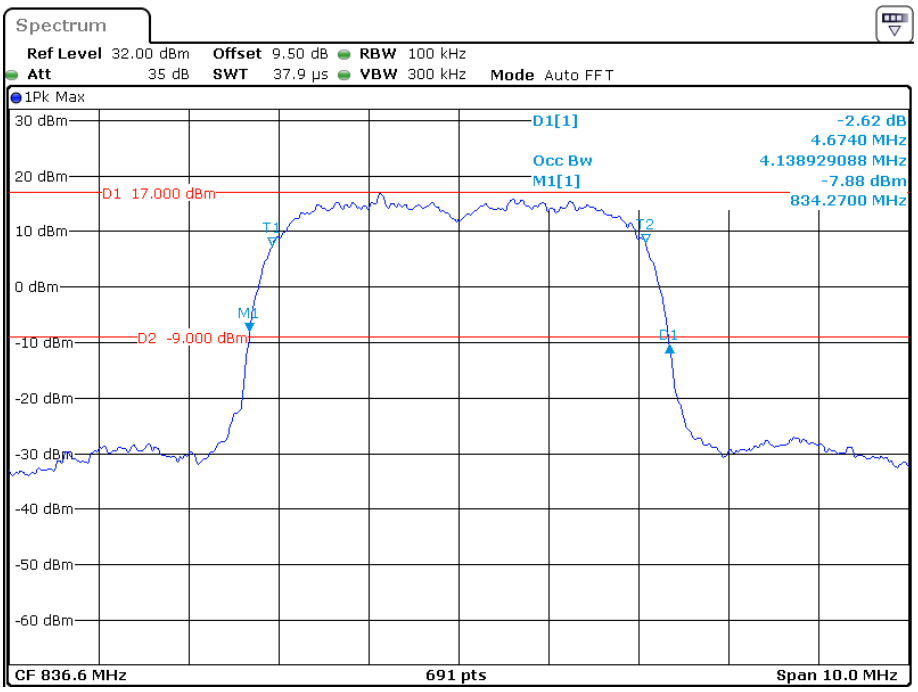
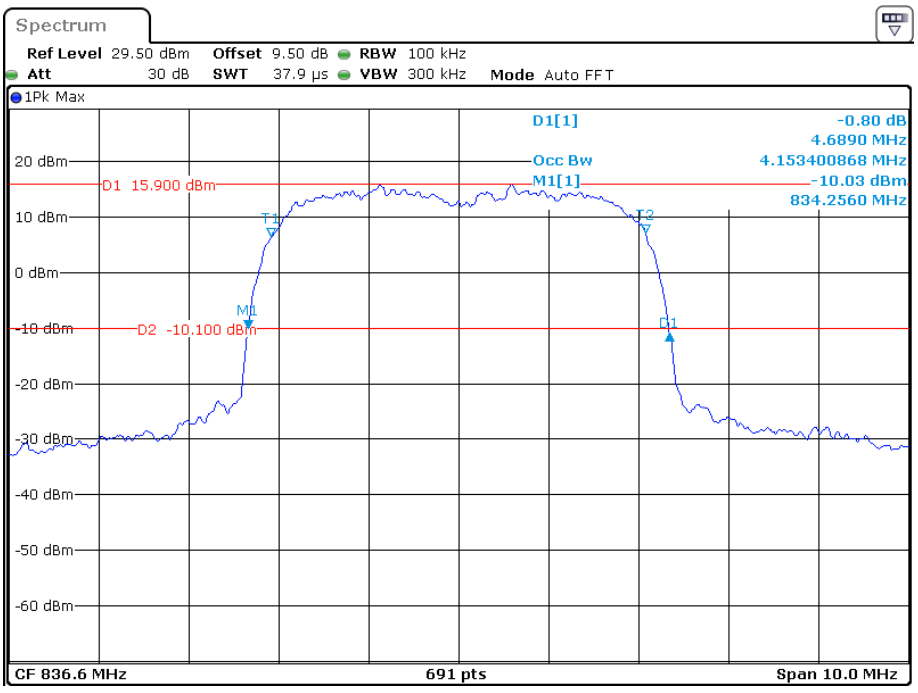
26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode



Date: 21.MAY.2019 17:14:05

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



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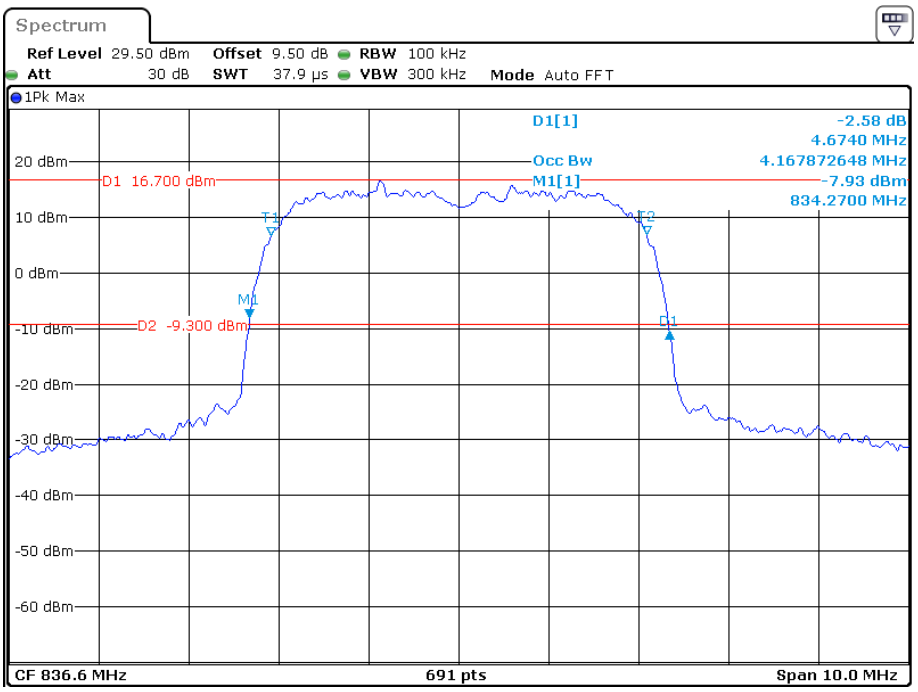
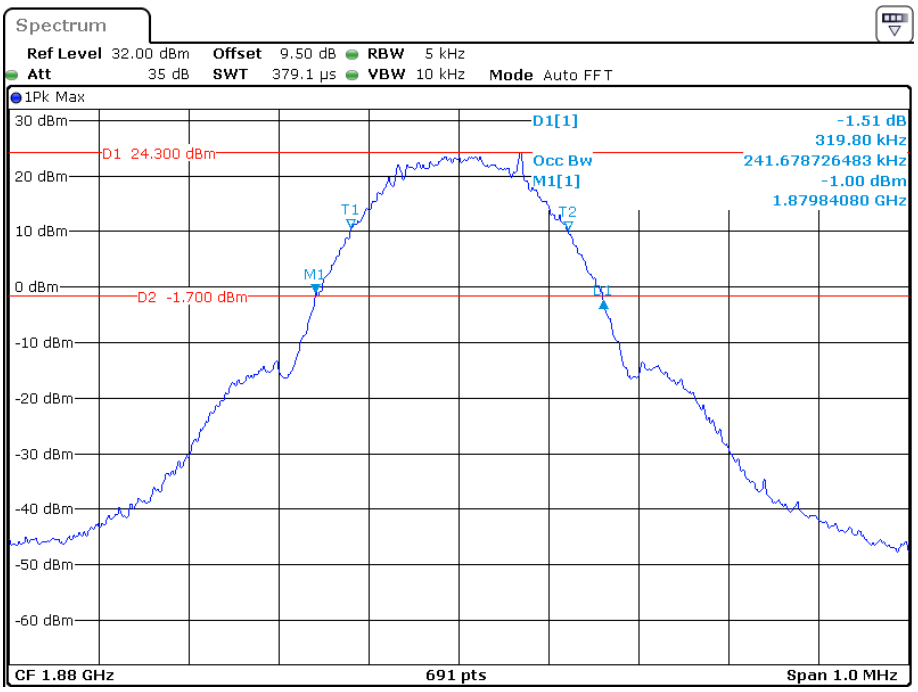
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 21.MAY.2019 18:16:23

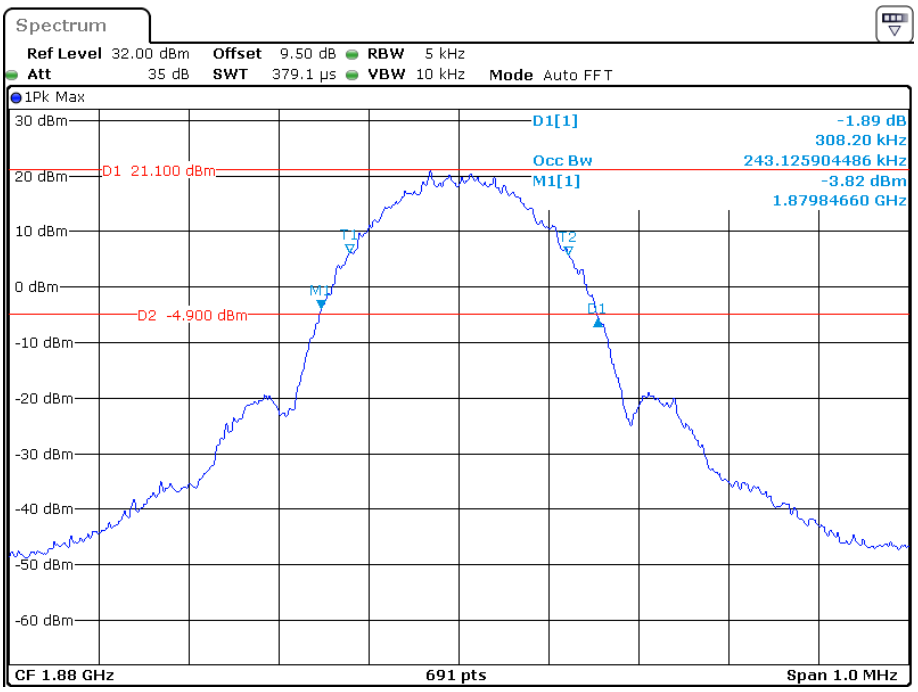
PCS Band (Part 24E)

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



Date: 21.MAY.2019 16:40:31

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



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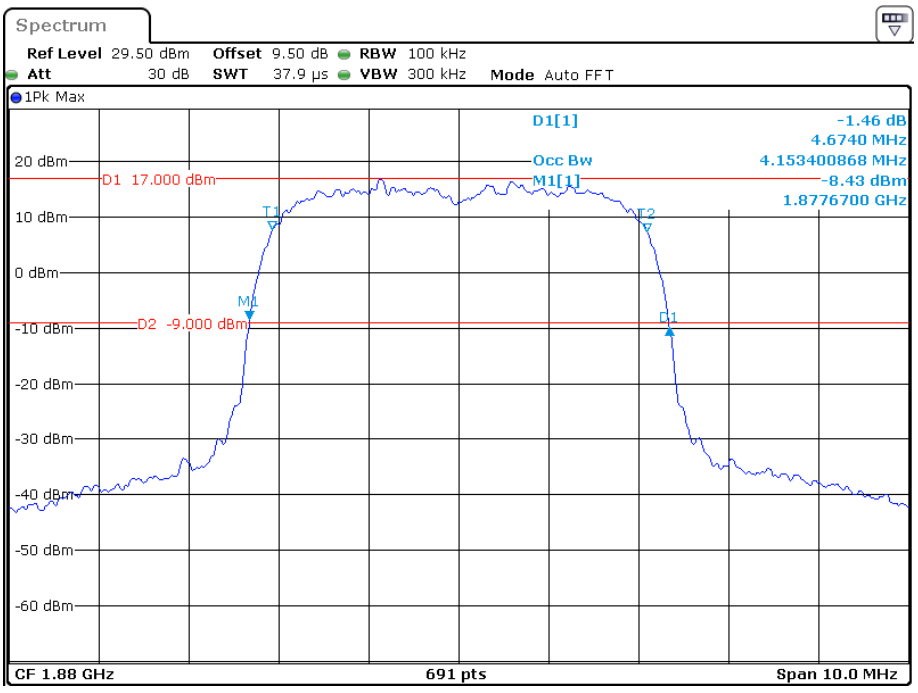
26 dB Emissions &99% Occupied Bandwidth for RMC (BPSK) Mode



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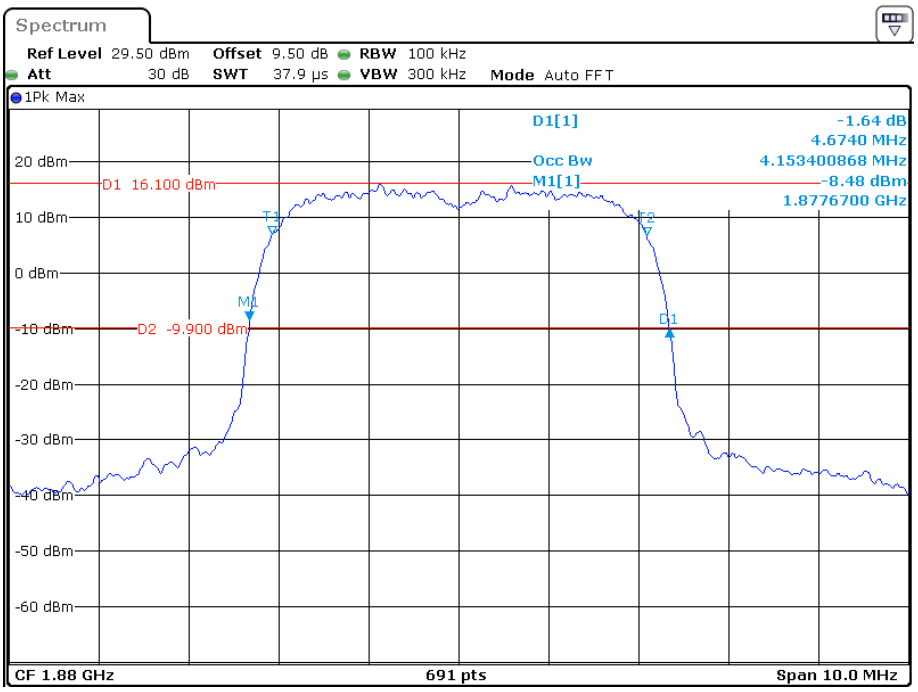
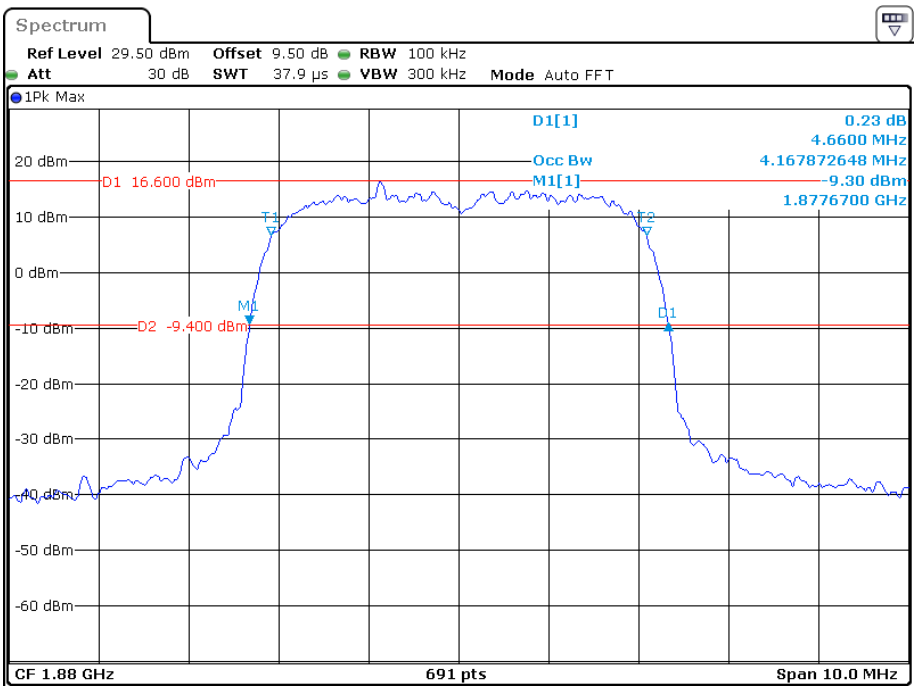
26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode



Date: 21.MAY.2019 18:30:00

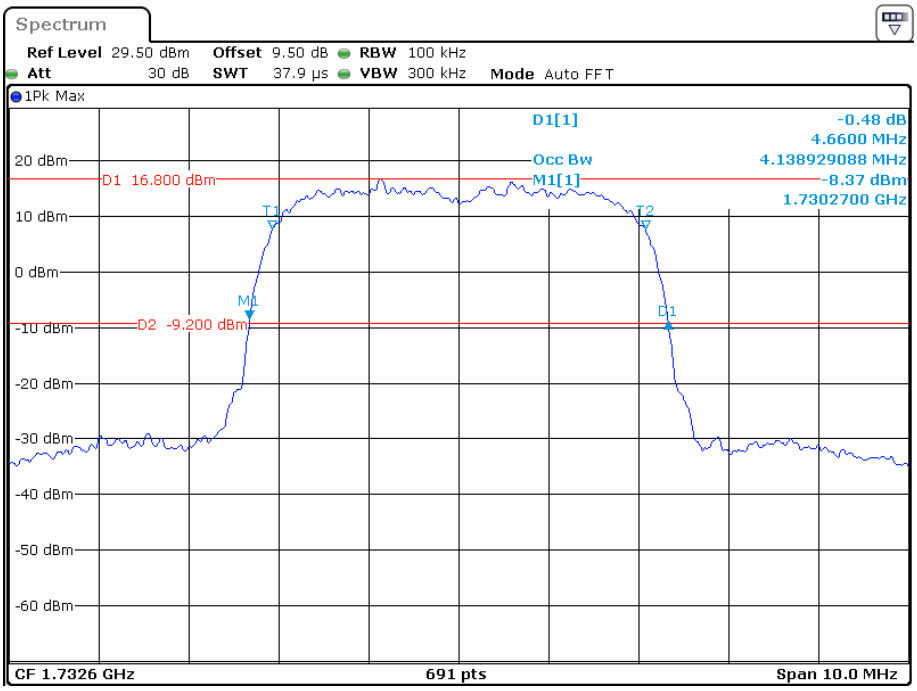
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 21.MAY.2019 18:20:38

AWS Band (Part 27)

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



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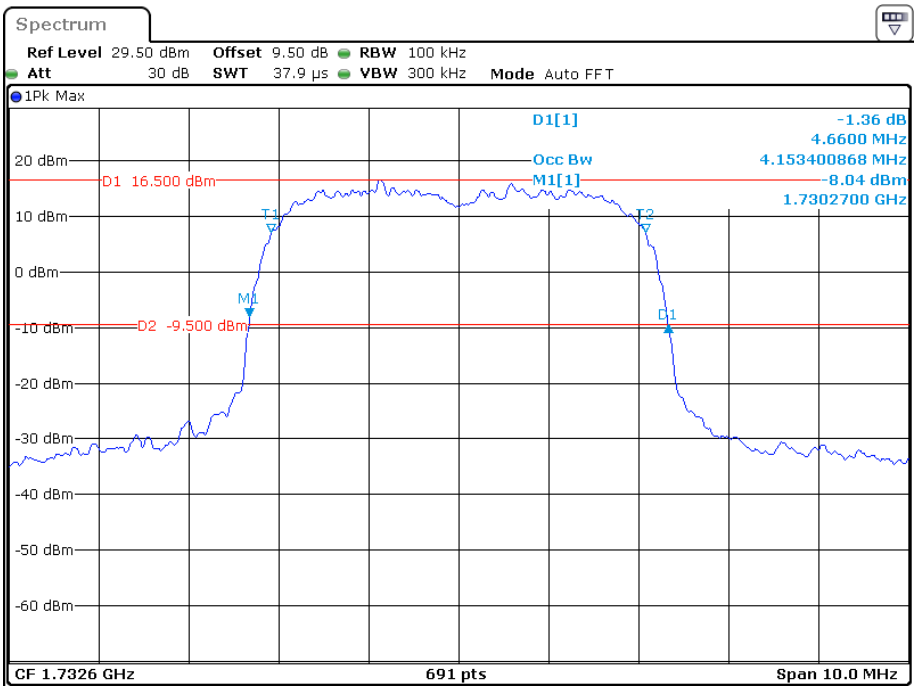
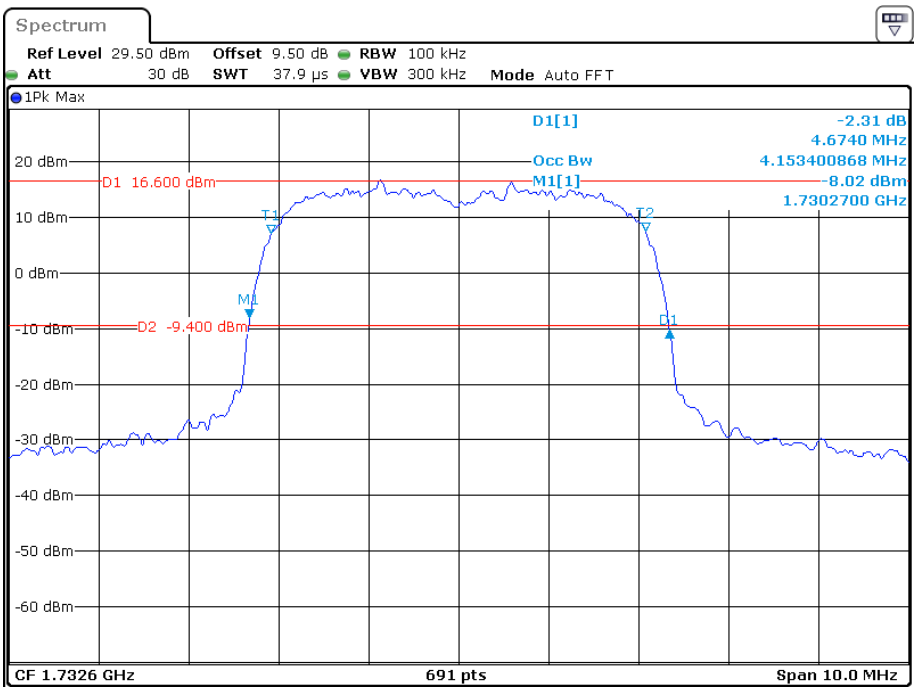
26 dB Emissions &99% Occupied Bandwidth for HSUPA (BPSK) Mode



Date: 21.MAY.2019 18:32:41

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



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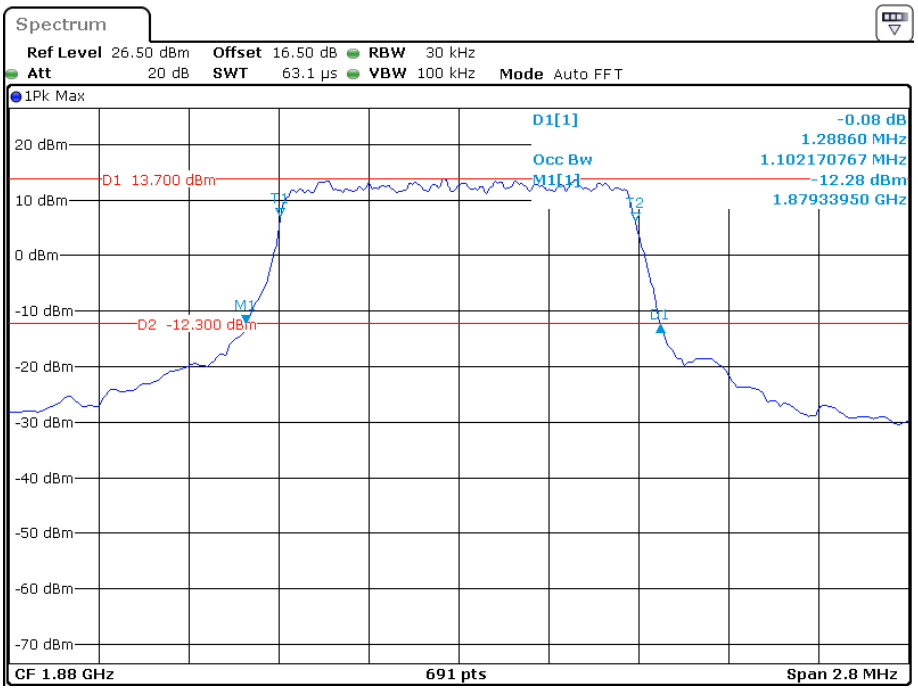
LTE Band 2: (Middle Channel)

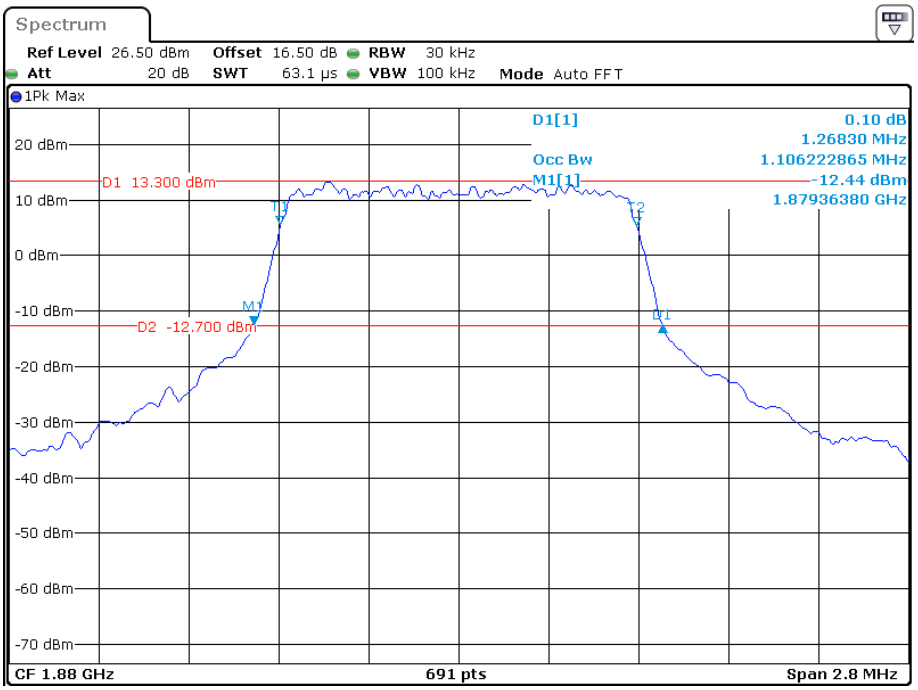
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.29
	16QAM	1.11	1.27
3.0	QPSK	2.70	3.01
	16QAM	2.69	3.00
5.0	QPSK	4.54	5.34
	16QAM	4.54	5.30
10.0	QPSK	8.97	9.73
	16QAM	8.97	9.78
15.0	QPSK	13.46	14.74
	16QAM	13.46	14.66
20.0	QPSK	17.95	19.58
	16QAM	17.95	19.52

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



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

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



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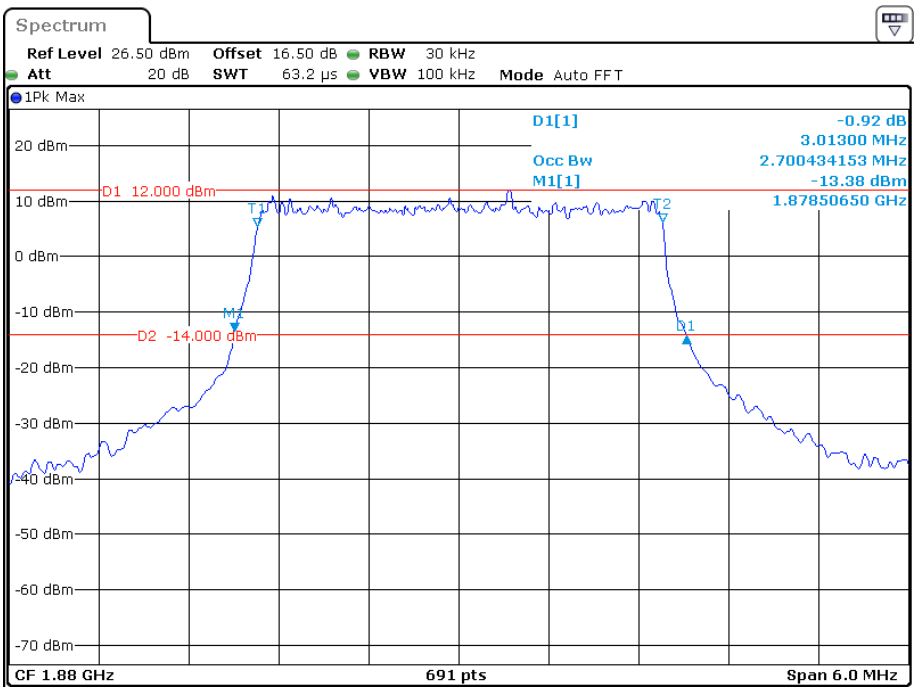
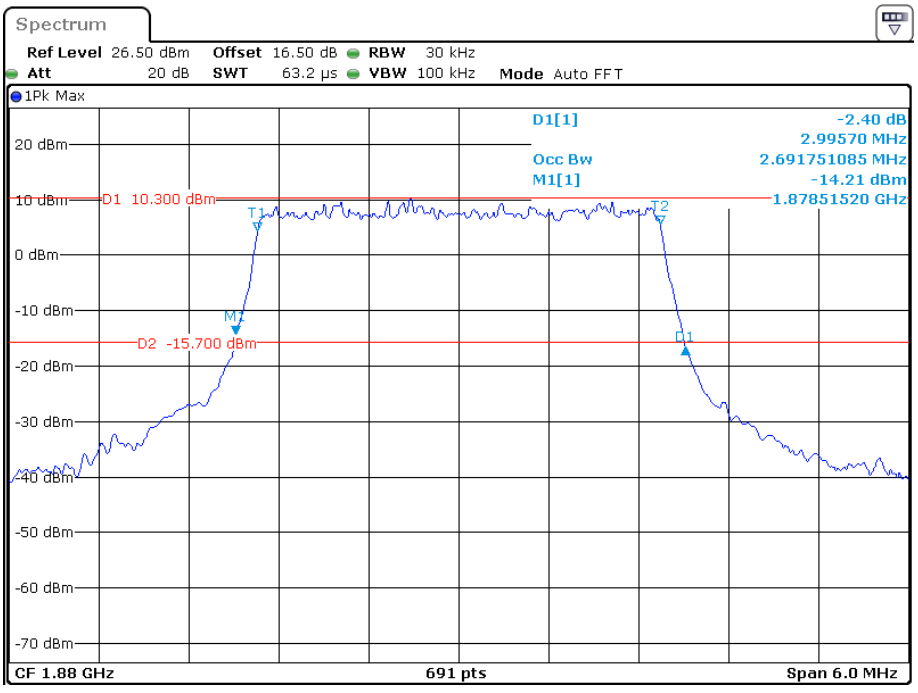
QPSK (3.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



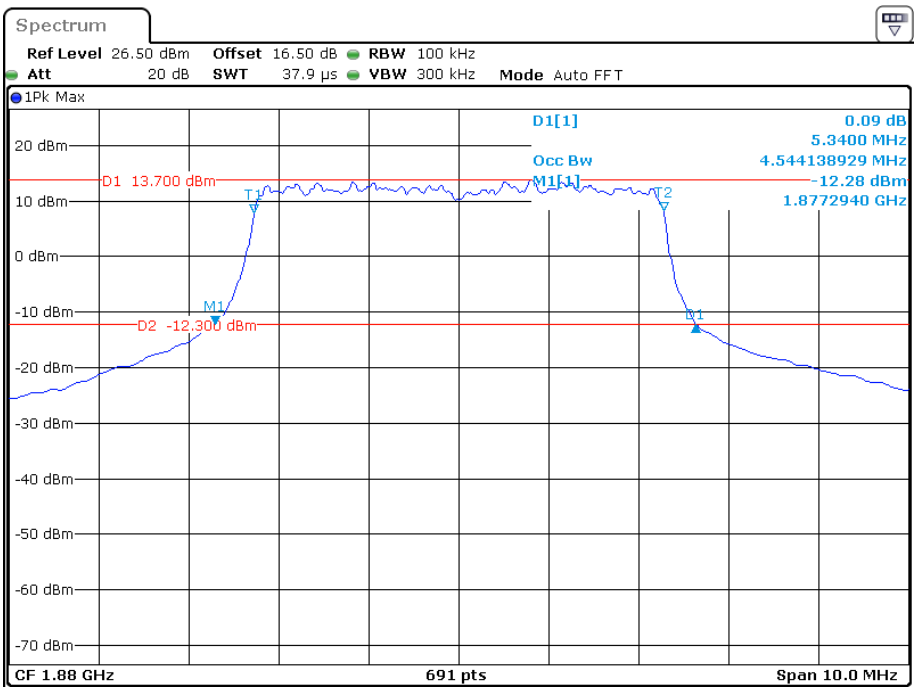
Date: 24.MAY.2019 15:45:09

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



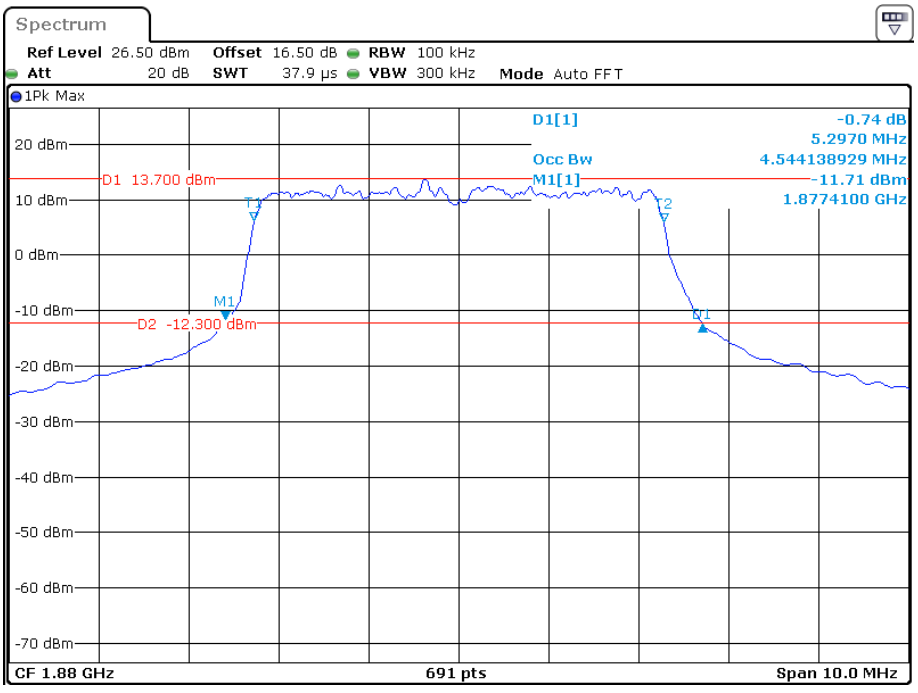
Date: 24.MAY.2019 15:47:08

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



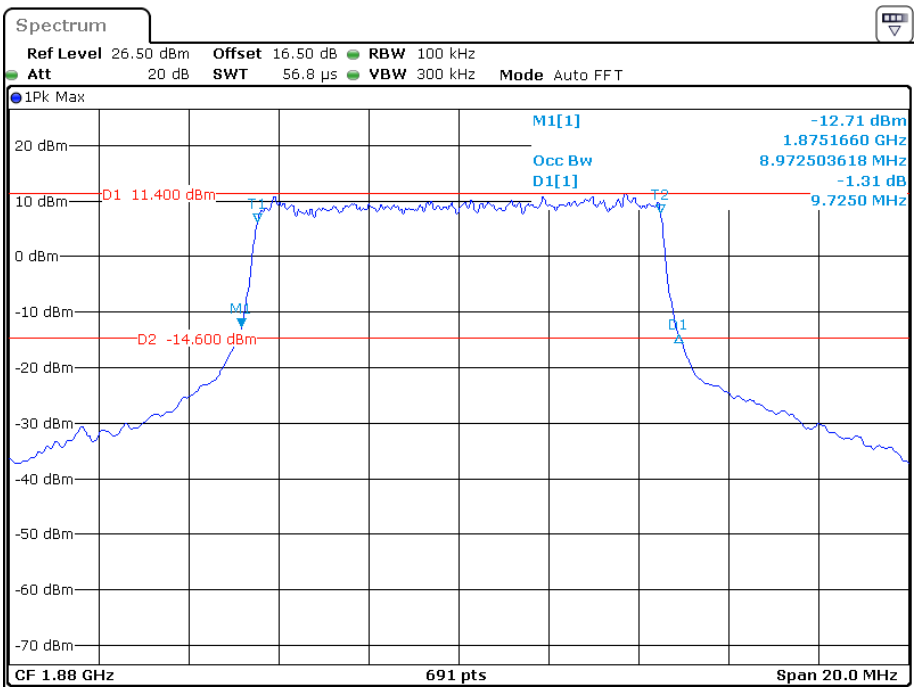
Date: 24.MAY.2019 15:42:18

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



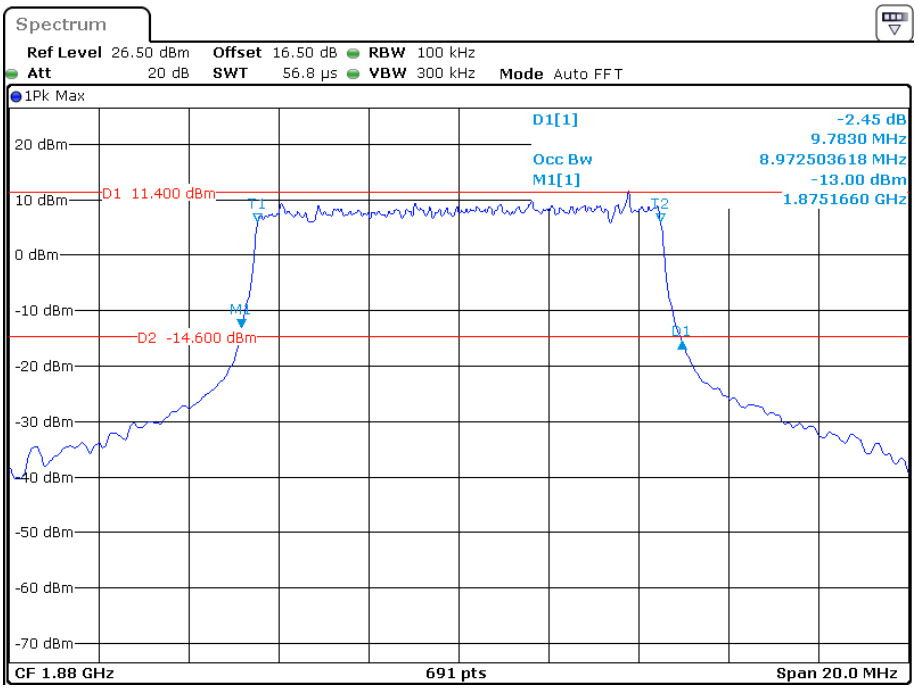
Date: 24.MAY.2019 15:43:30

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



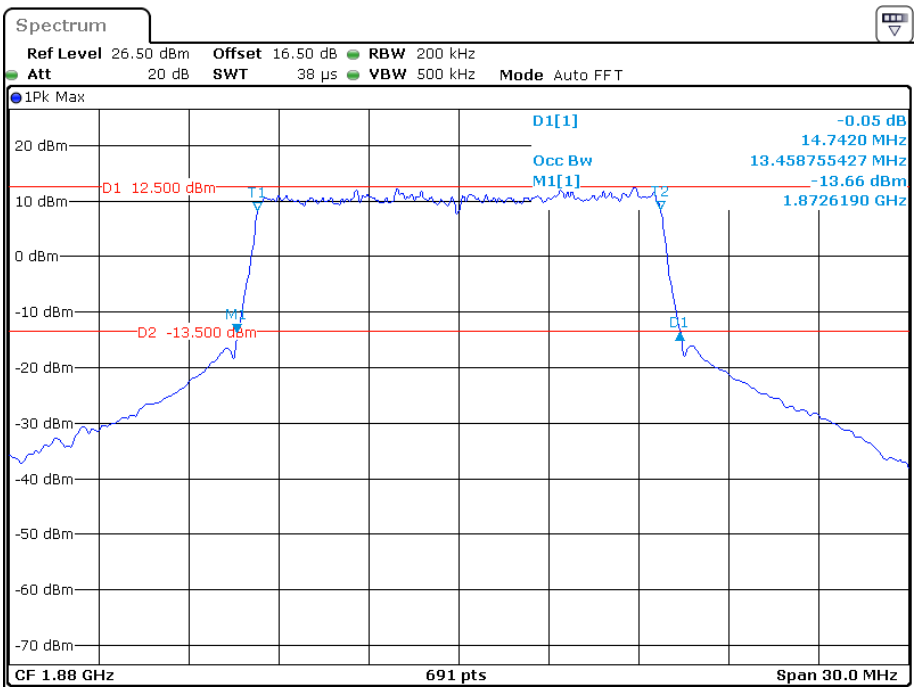
Date: 24.MAY.2019 15:40:12

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



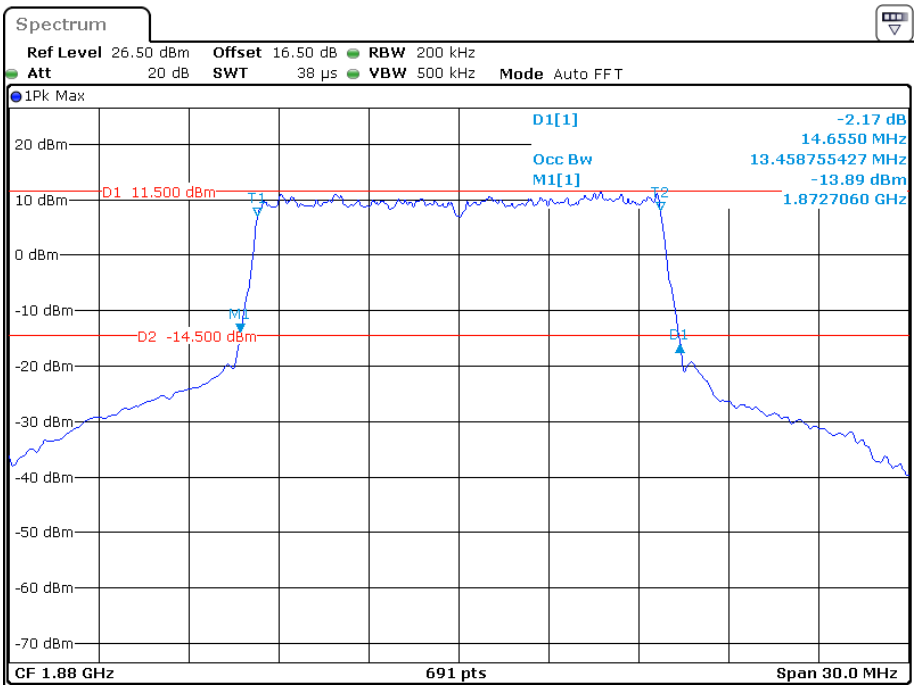
Date: 24.MAY.2019 15:38:54

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



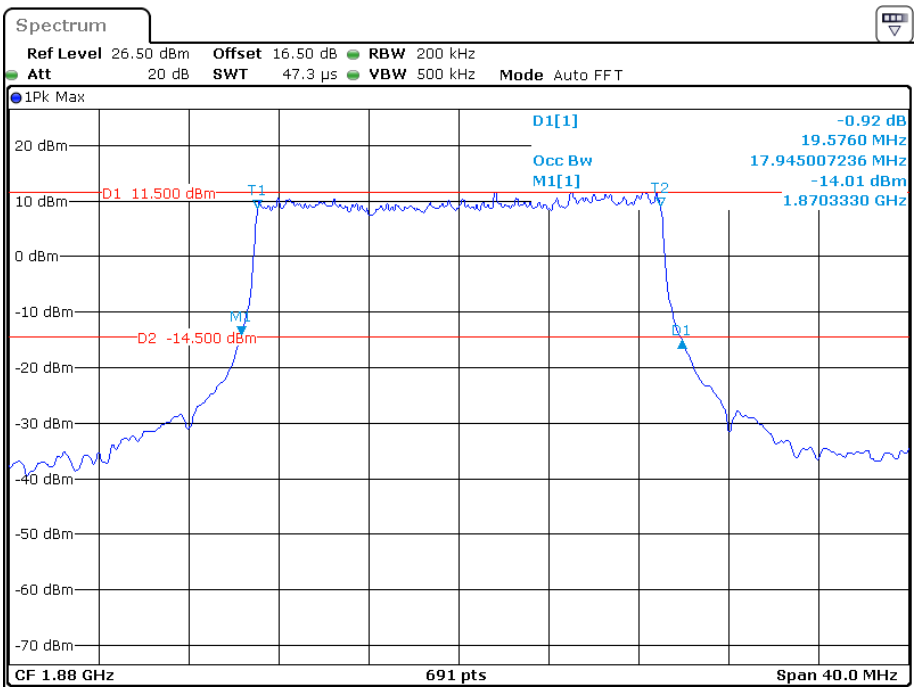
Date: 24.MAY.2019 15:53:07

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



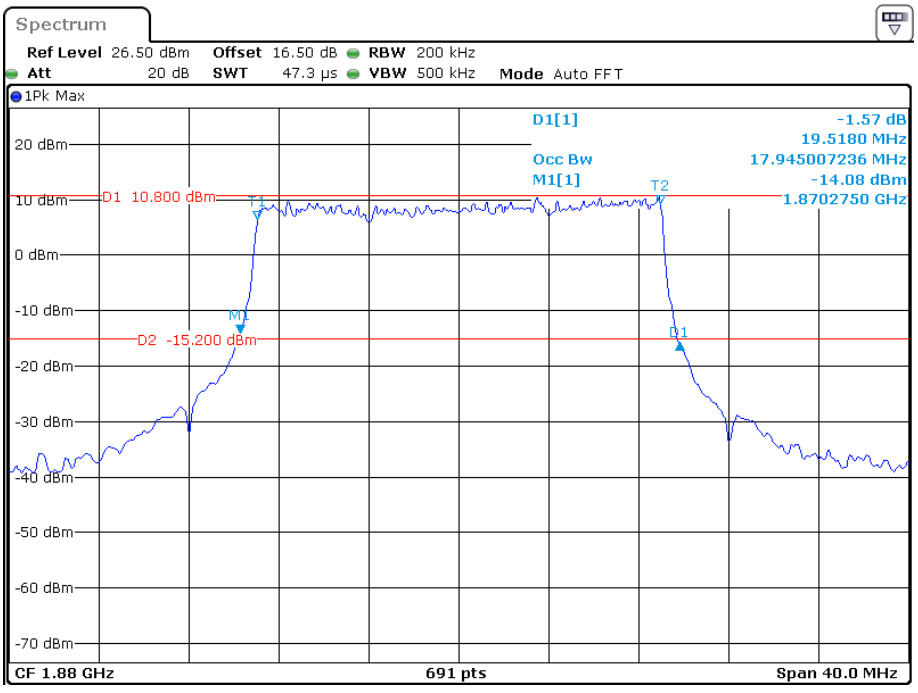
Date: 24.MAY.2019 15:54:24

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



Date: 24.MAY.2019 15:56:30

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

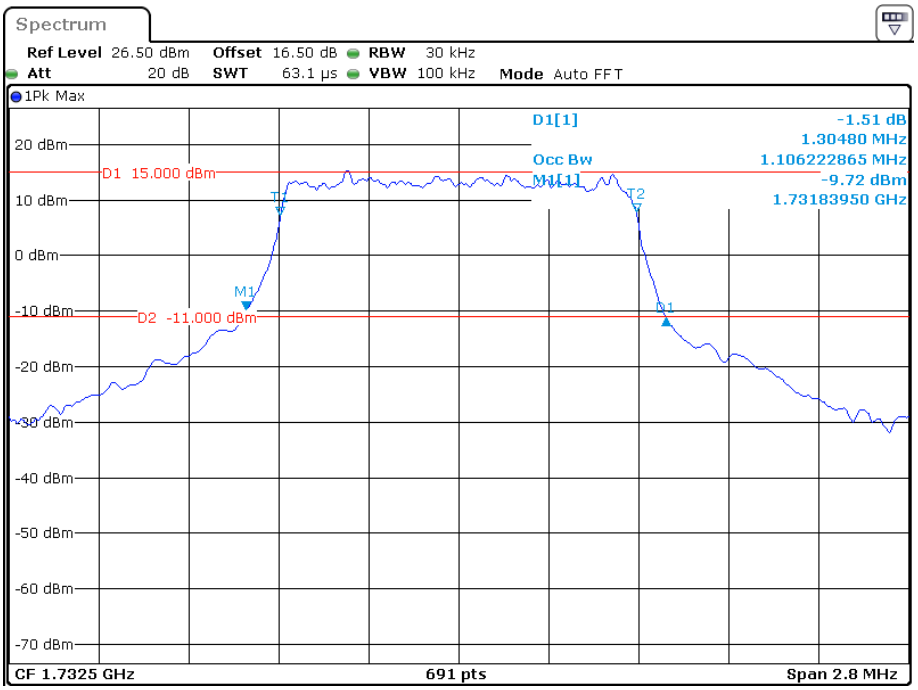


Date: 24.MAY.2019 15:58:16

LTE Band 4: (Middle Channel)

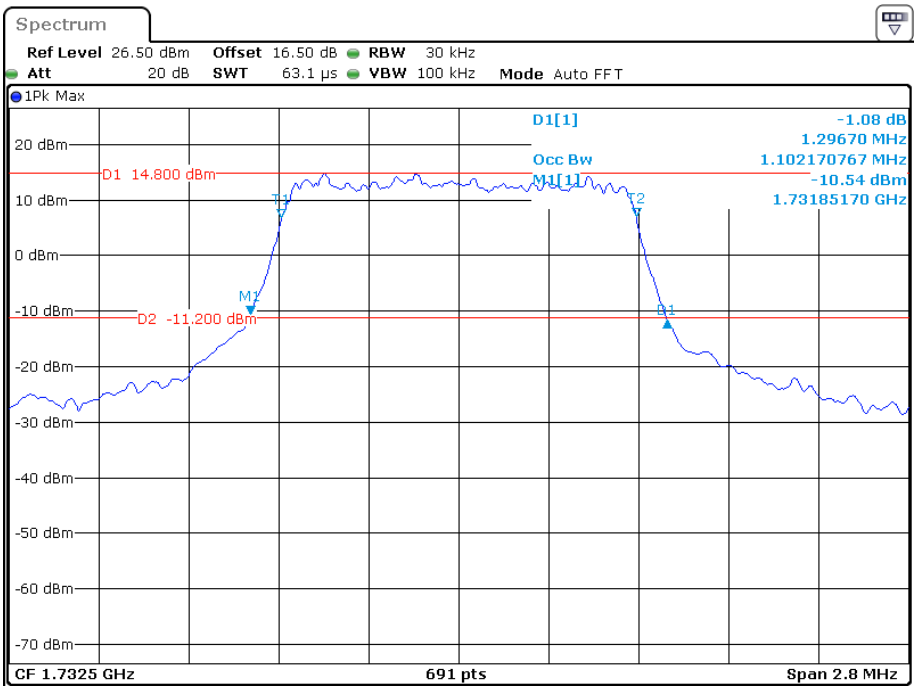
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.11	1.30
	16QAM	1.10	1.30
3.0	QPSK	2.70	3.01
	16QAM	2.69	3.02
5.0	QPSK	4.54	5.29
	16QAM	4.53	5.26
10.0	QPSK	8.97	9.78
	16QAM	8.94	9.81
15.0	QPSK	13.50	14.71
	16QAM	13.46	14.62
20.0	QPSK	17.89	19.41
	16QAM	17.95	19.65

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



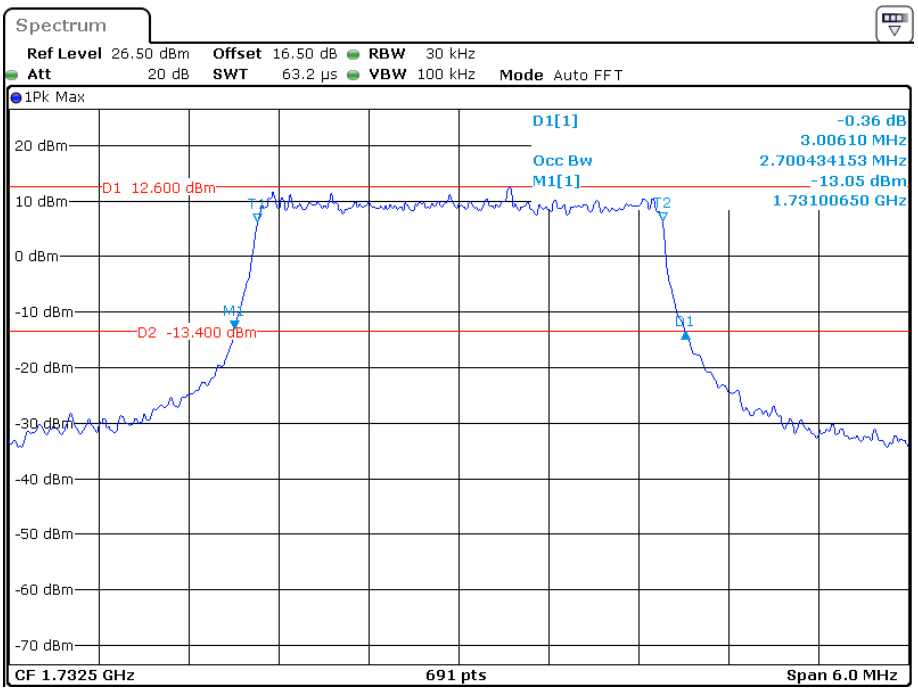
Date: 24.MAY.2019 16:37:06

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



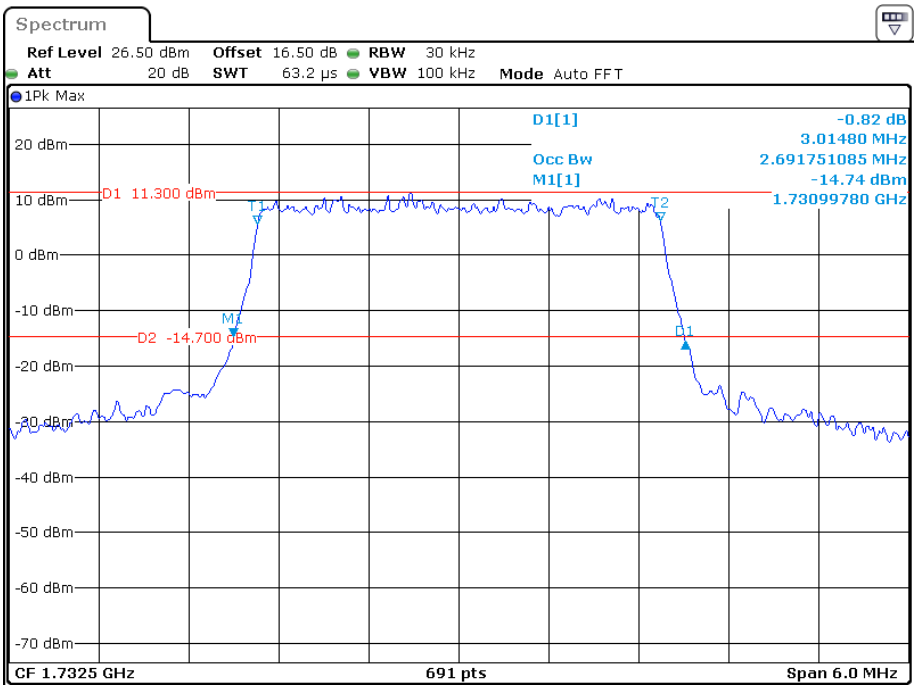
Date: 24.MAY.2019 16:01:52

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



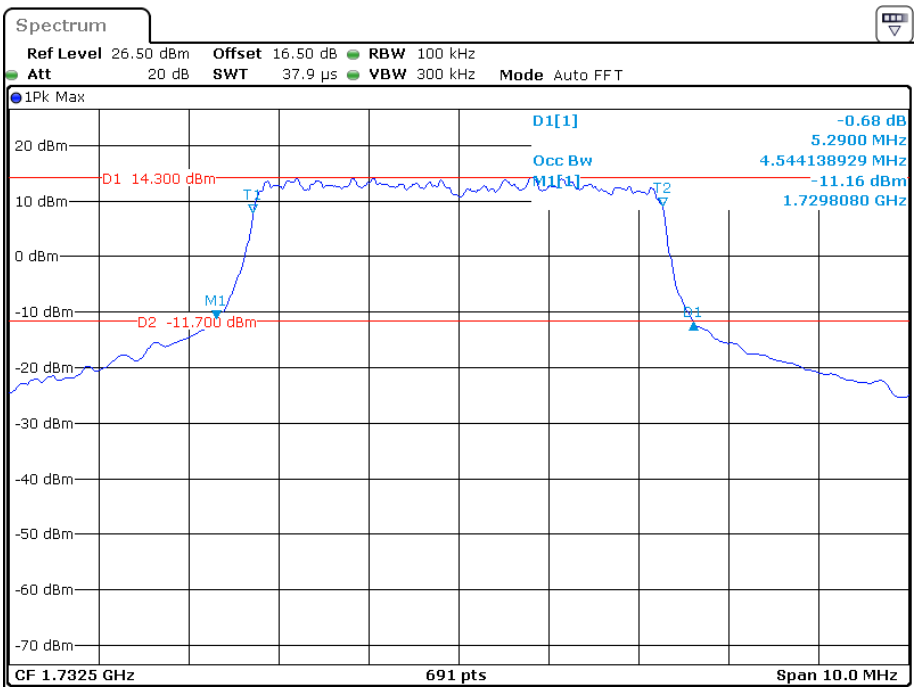
Date: 24.MAY.2019 16:39:57

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



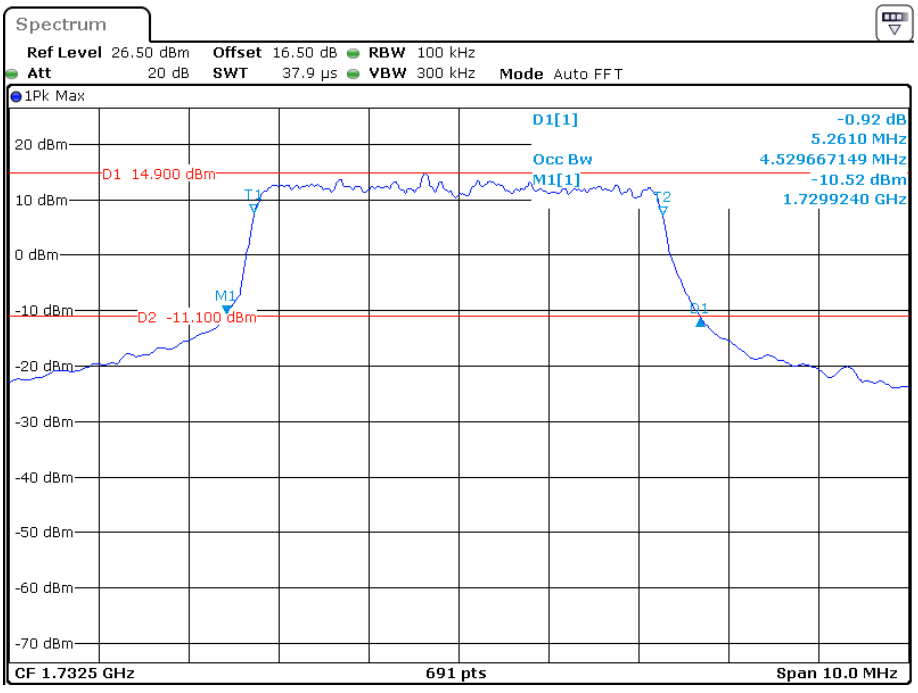
Date: 24.MAY.2019 16:38:58

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



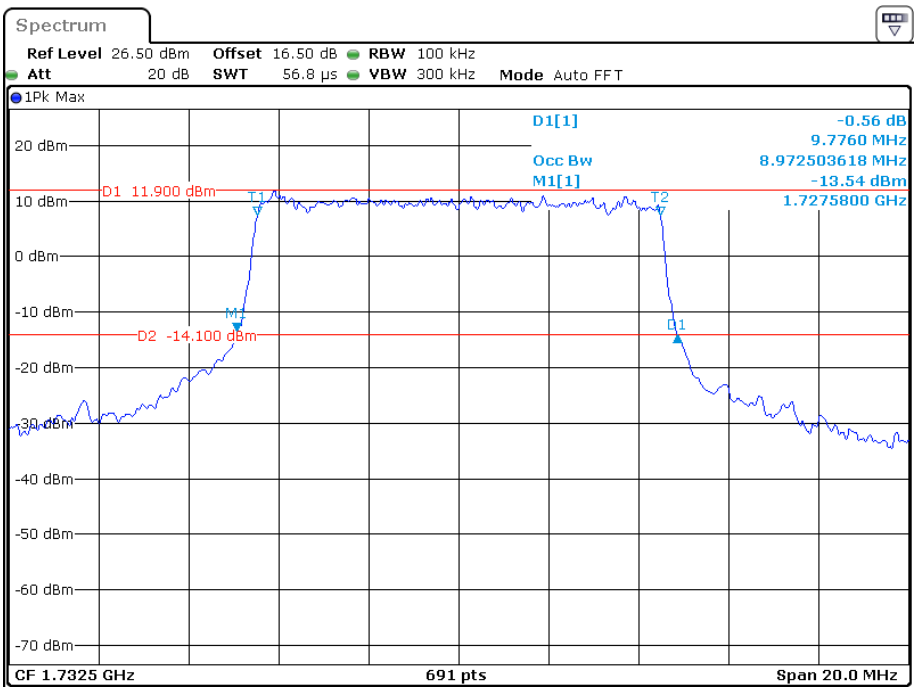
Date: 24.MAY.2019 16:42:54

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



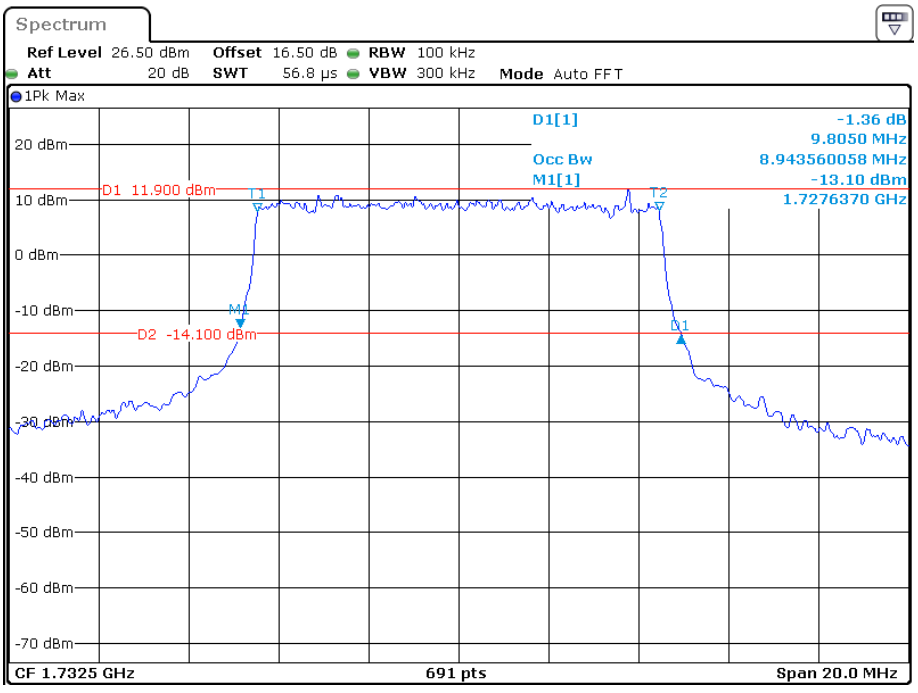
Date: 24.MAY.2019 16:41:32

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



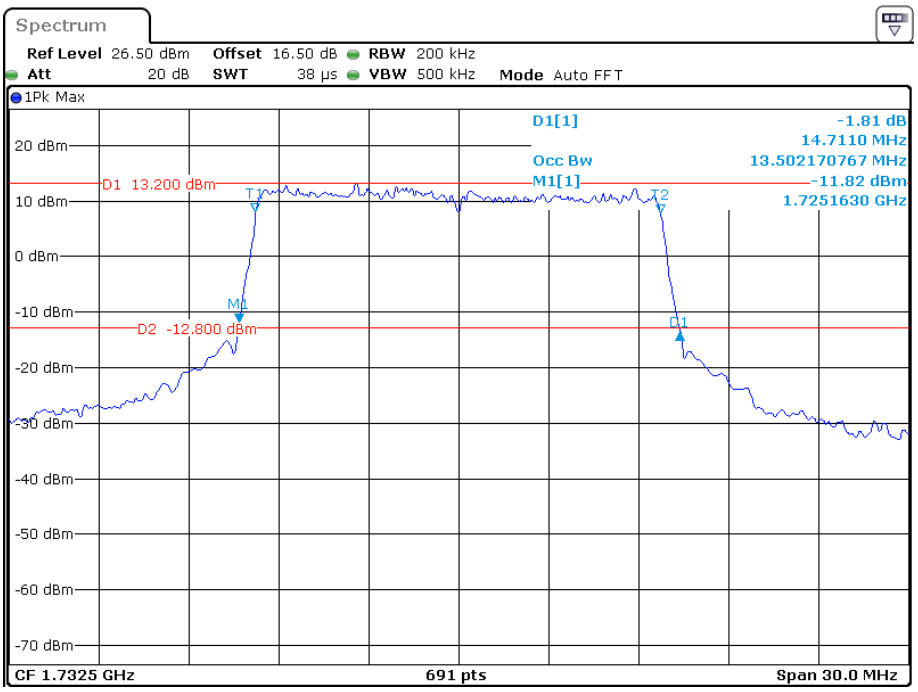
Date: 24.MAY.2019 16:44:42

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



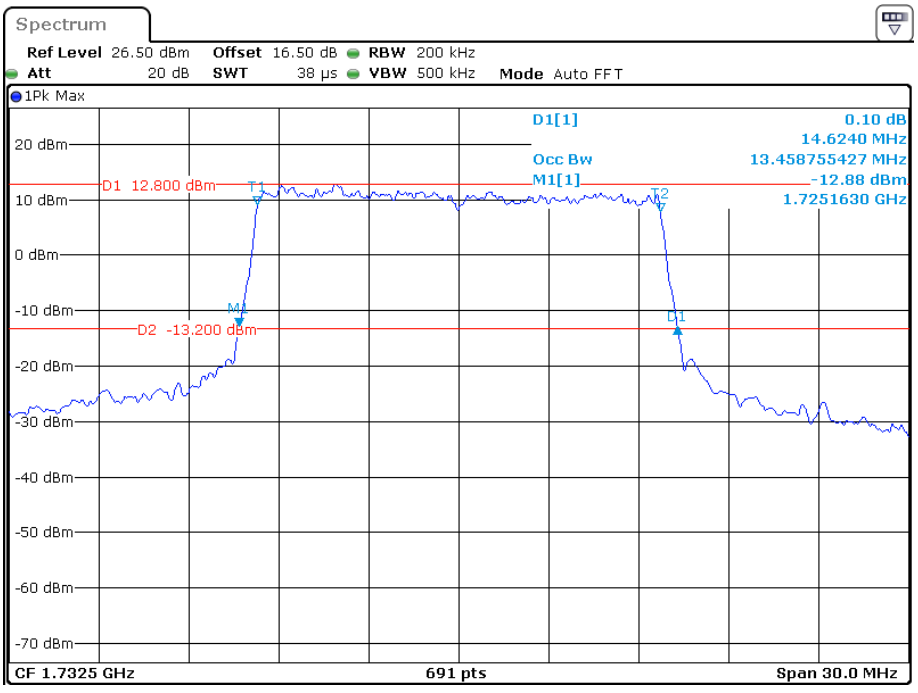
Date: 24.MAY.2019 16:45:29

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



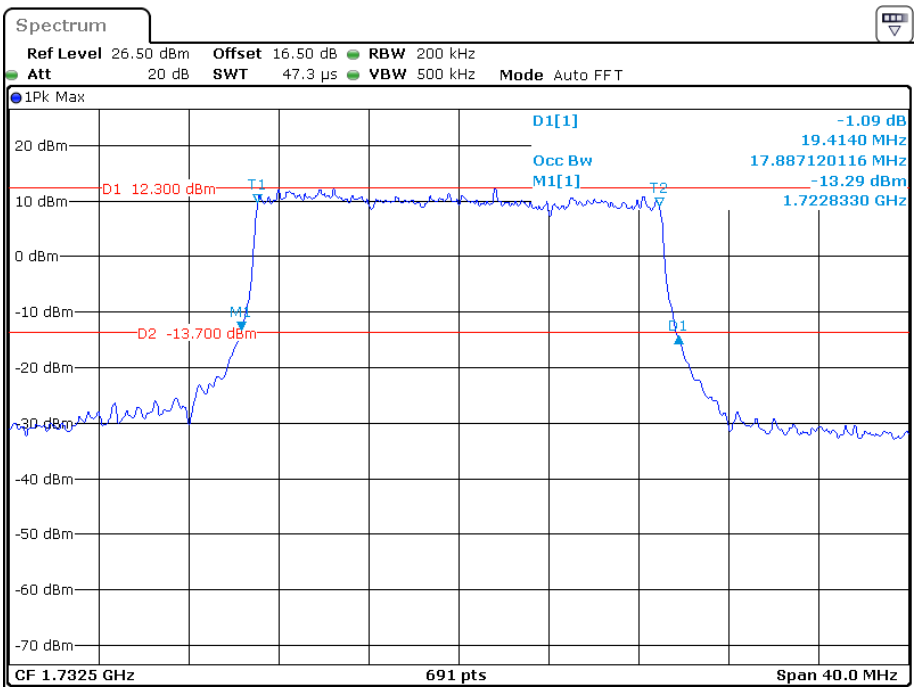
Date: 24.MAY.2019 16:48:29

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



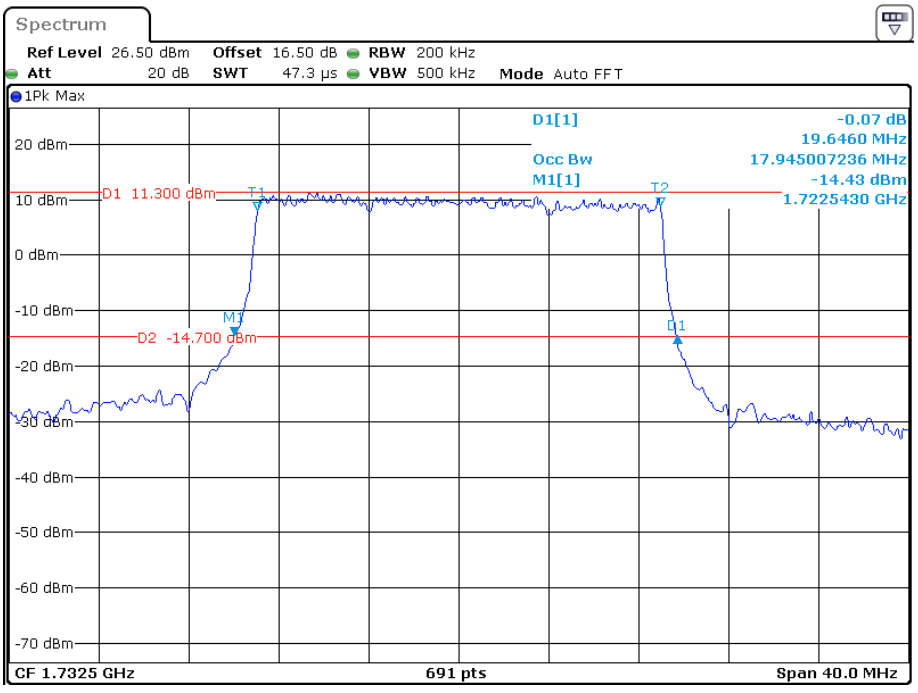
Date: 24.MAY.2019 16:47:30

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



Date: 24.MAY.2019 16:51:24

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

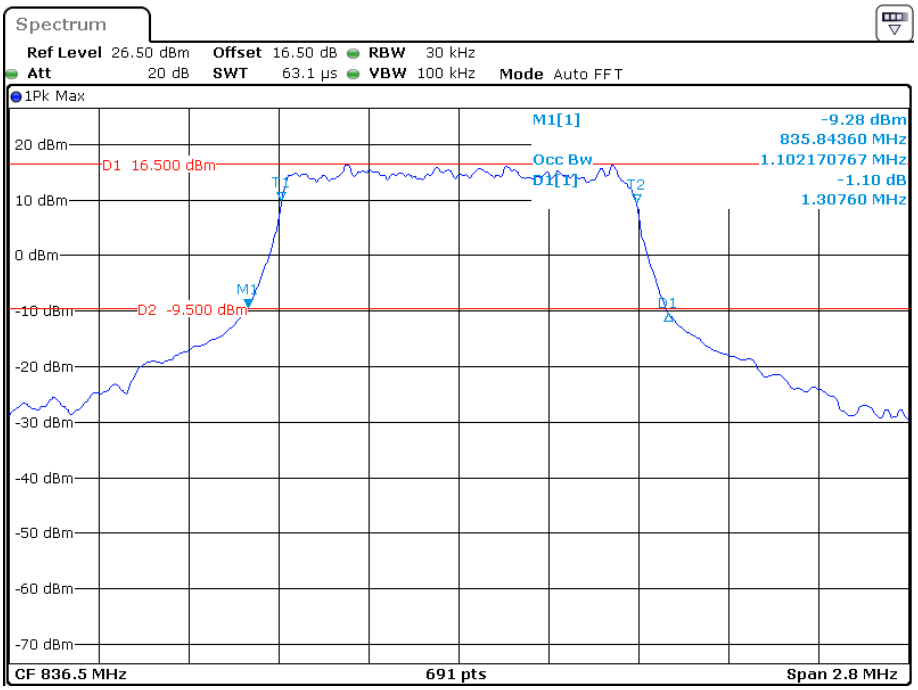


Date: 24.MAY.2019 16:50:21

LTE Band 5: (Middle Channel)

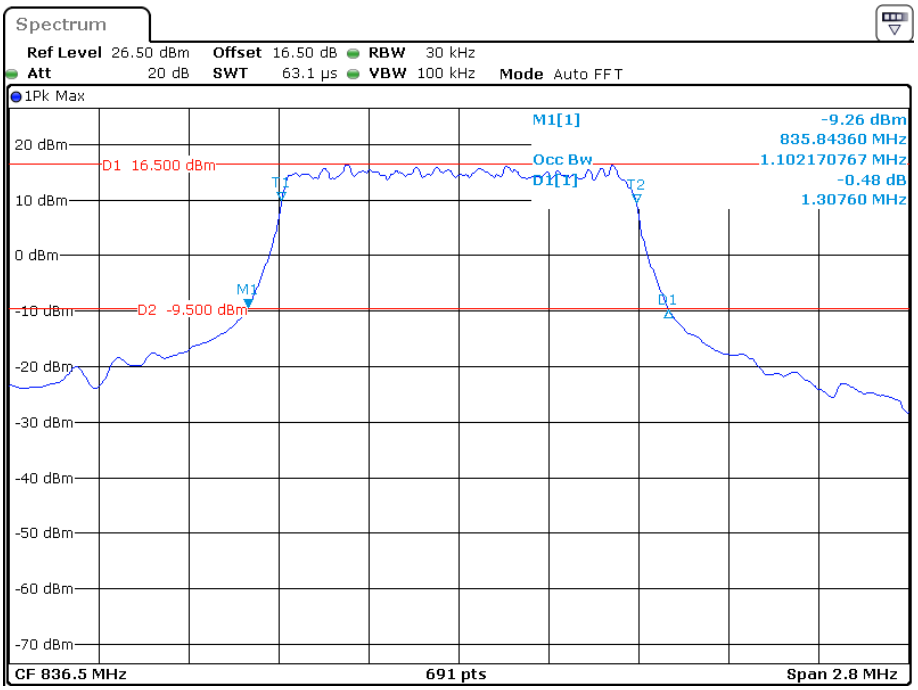
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.31
	16QAM	1.10	1.31
3.0	QPSK	2.70	3.00
	16QAM	2.69	3.00
5.0	QPSK	4.54	5.35
	16QAM	4.53	5.29
10.0	QPSK	8.97	9.86
	16QAM	8.97	9.75

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



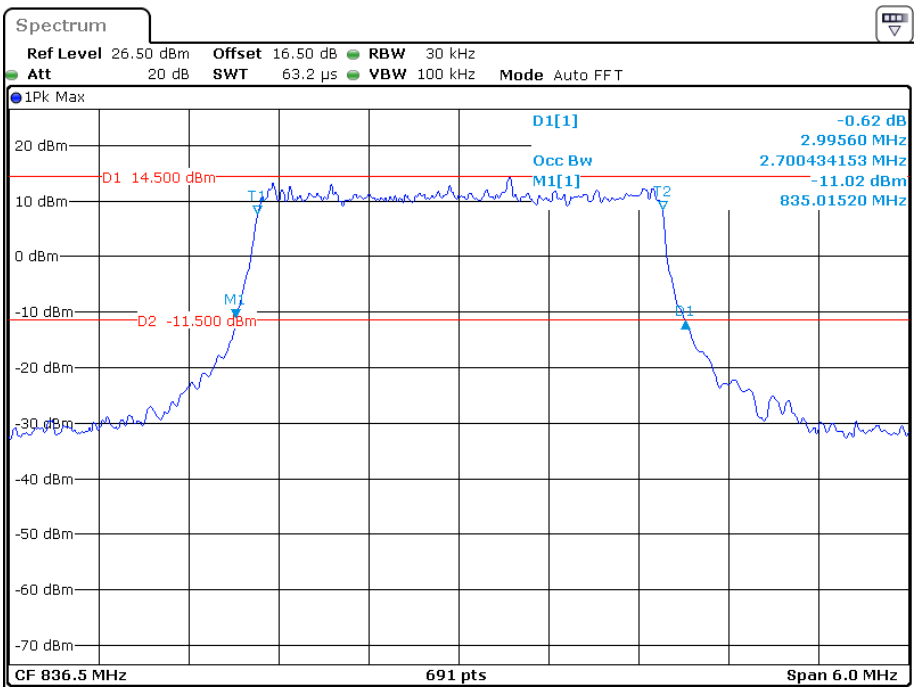
Date: 24.MAY.2019 16:56:24

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



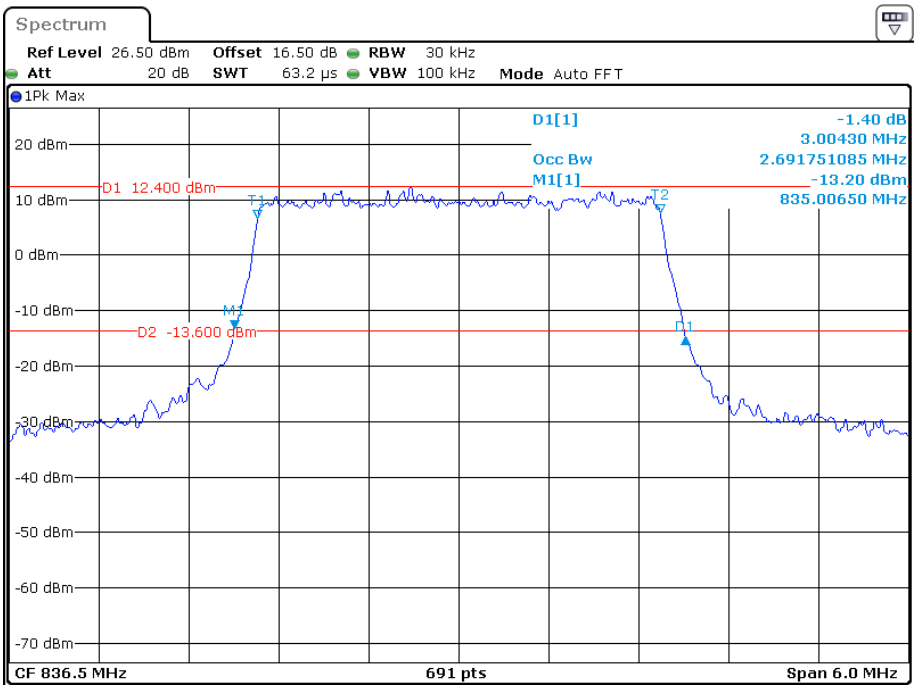
Date: 24.MAY.2019 16:55:54

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



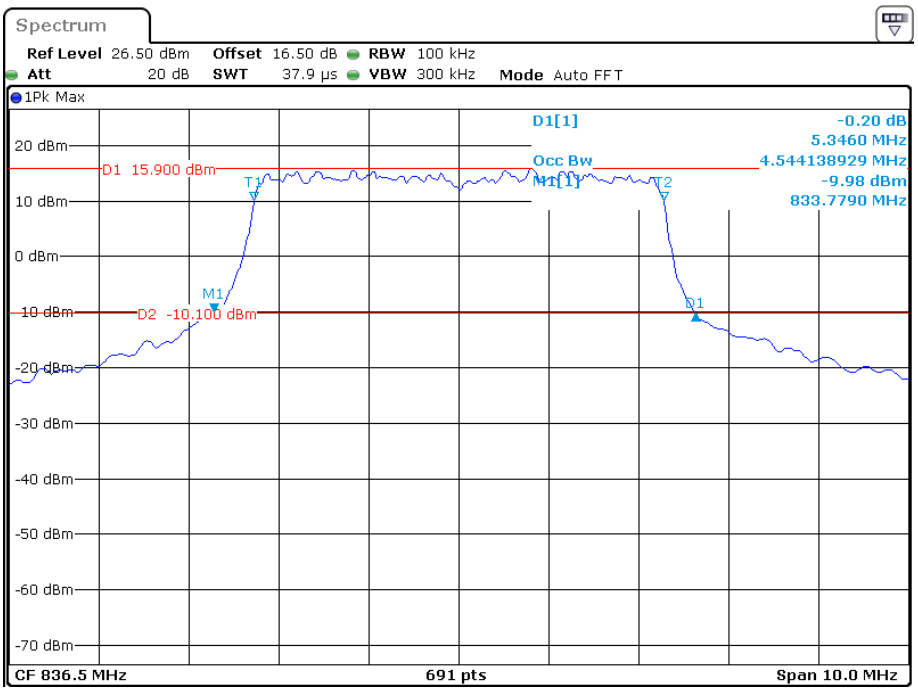
Date: 24.MAY.2019 16:57:51

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



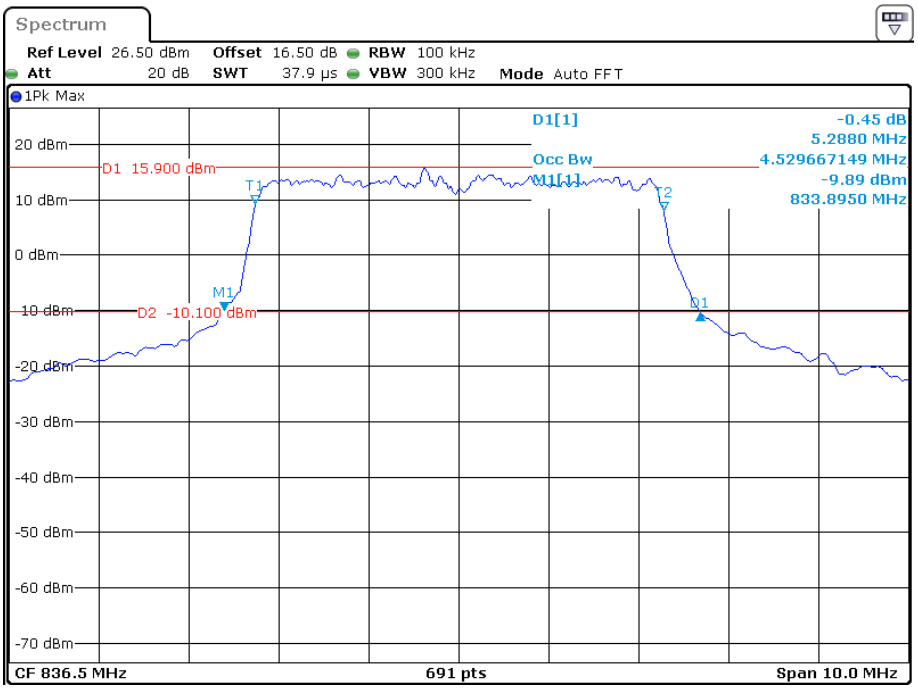
Date: 24.MAY.2019 16:58:54

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



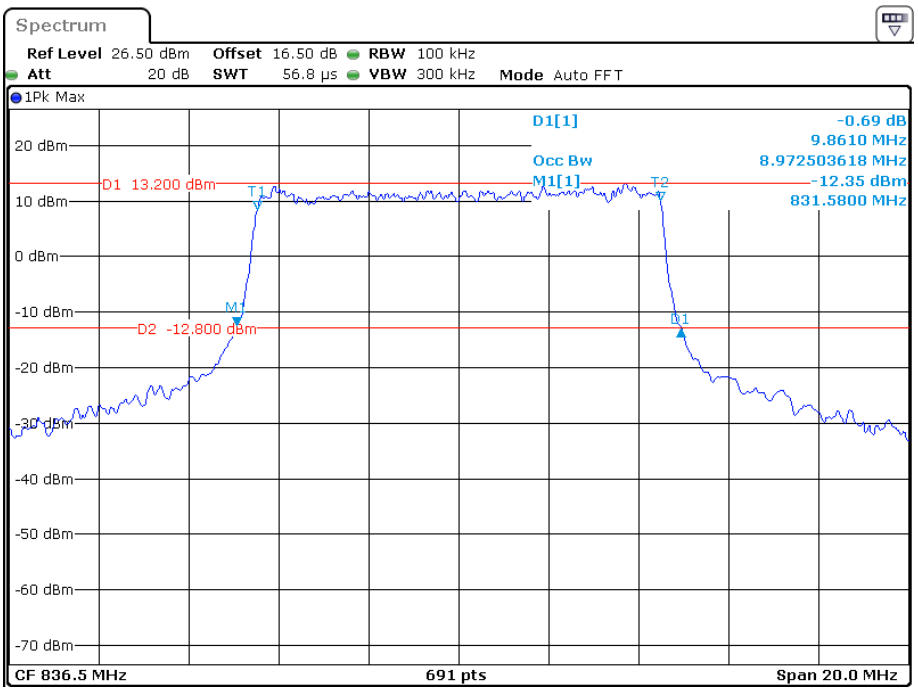
Date: 24.MAY.2019 17:00:30

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



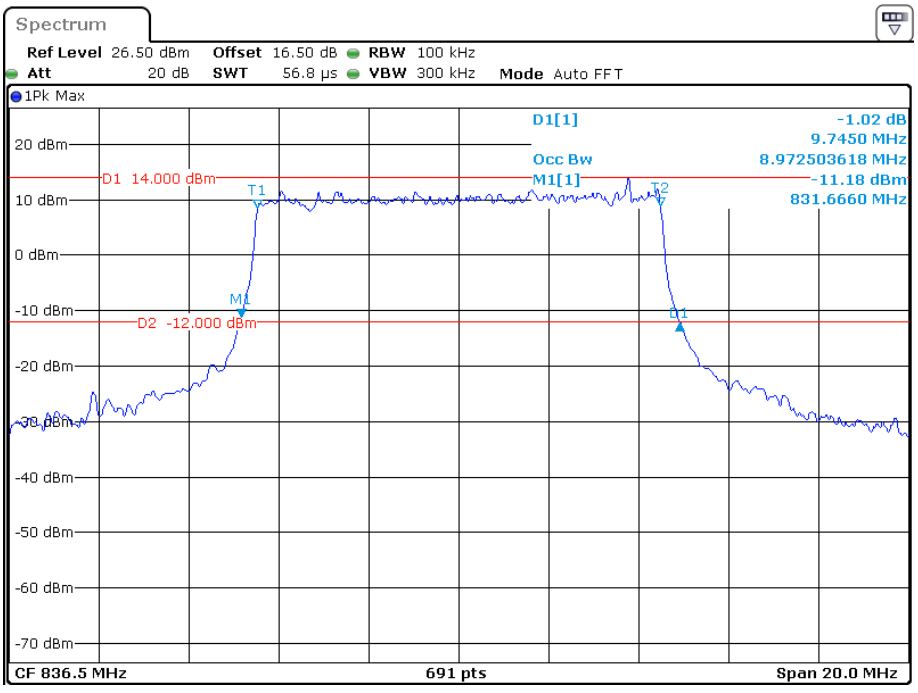
Date: 24.MAY.2019 17:01:16

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



Date: 24.MAY.2019 17:03:46

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

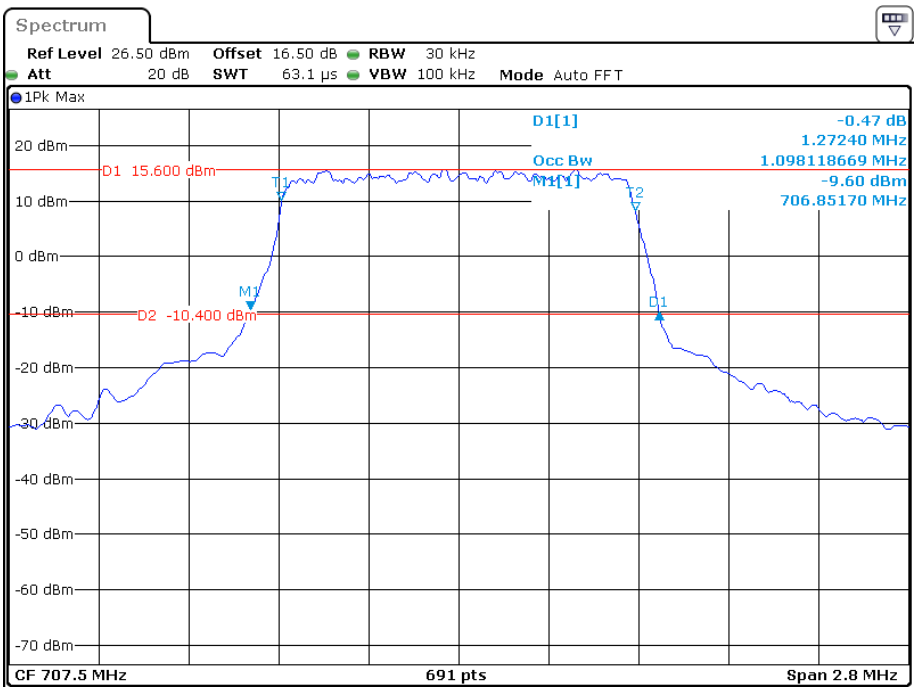


Date: 24.MAY.2019 17:02:36

LTE Band 12: (Middle Channel)

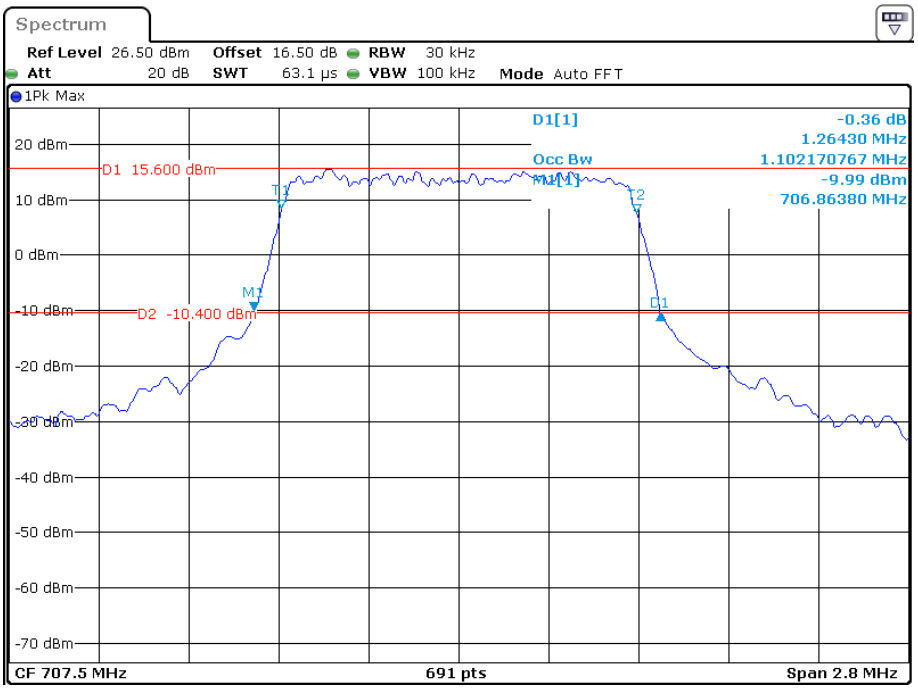
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.27
	16QAM	1.10	1.26
3.0	QPSK	2.70	3.00
	16QAM	2.68	2.99
5.0	QPSK	4.54	5.21
	16QAM	4.53	5.28
10.0	QPSK	8.97	9.93
	16QAM	8.97	9.90

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



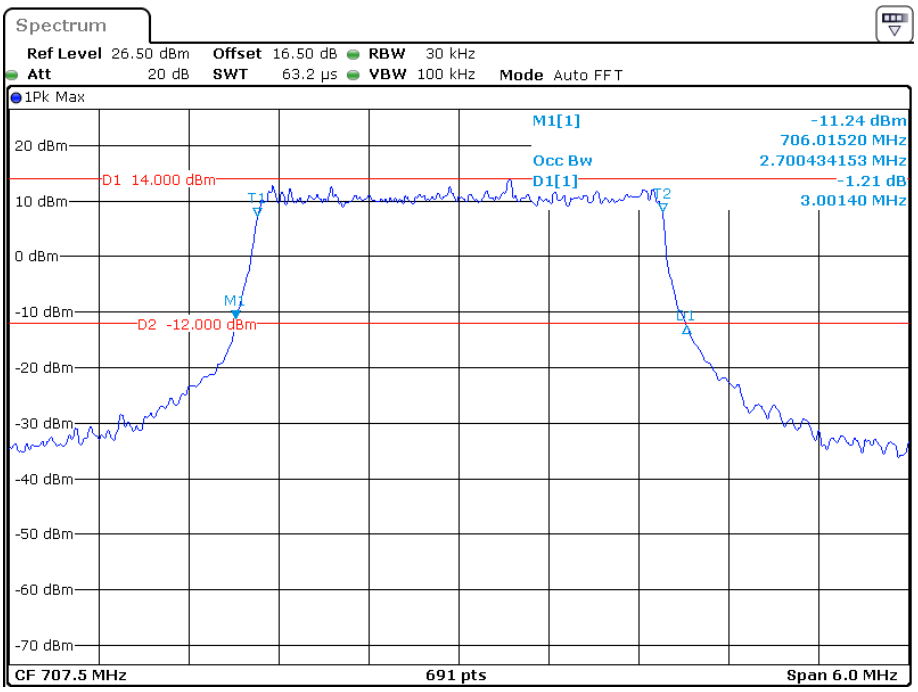
Date: 24.MAY.2019 17:15:32

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



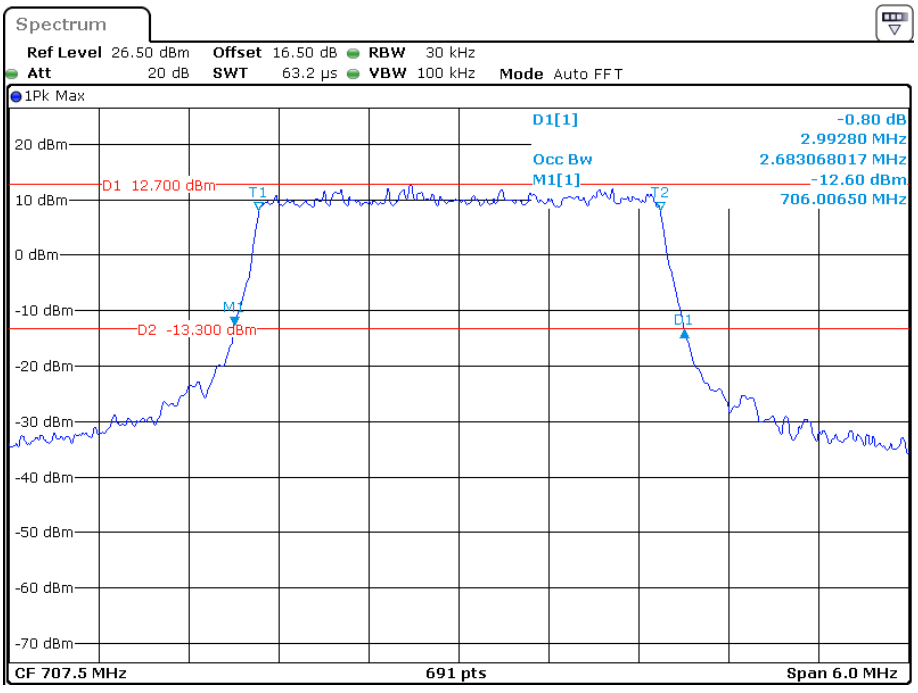
Date: 24.MAY.2019 17:16:05

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



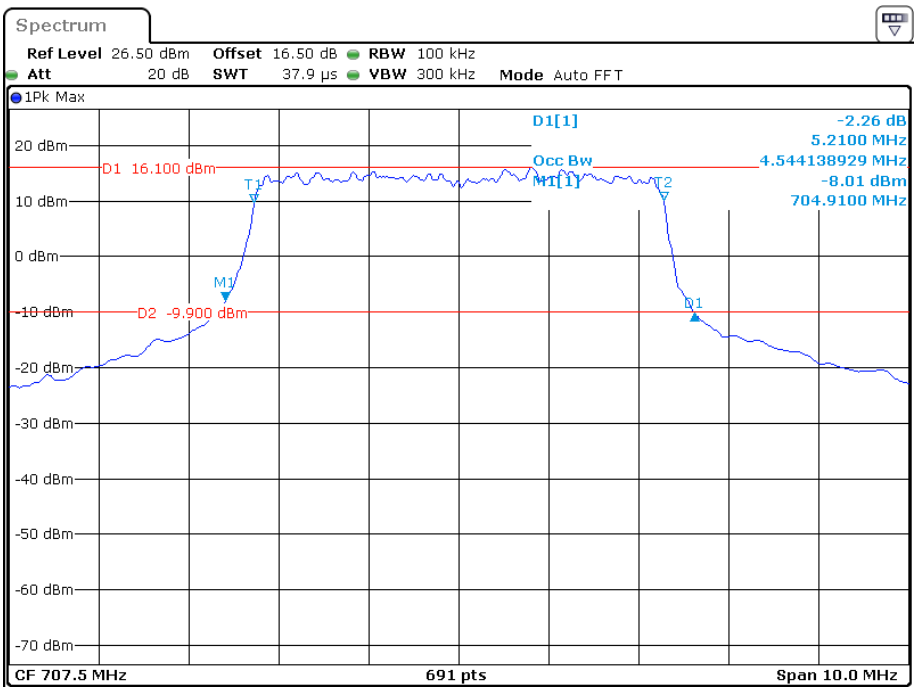
Date: 24.MAY.2019 17:14:27

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



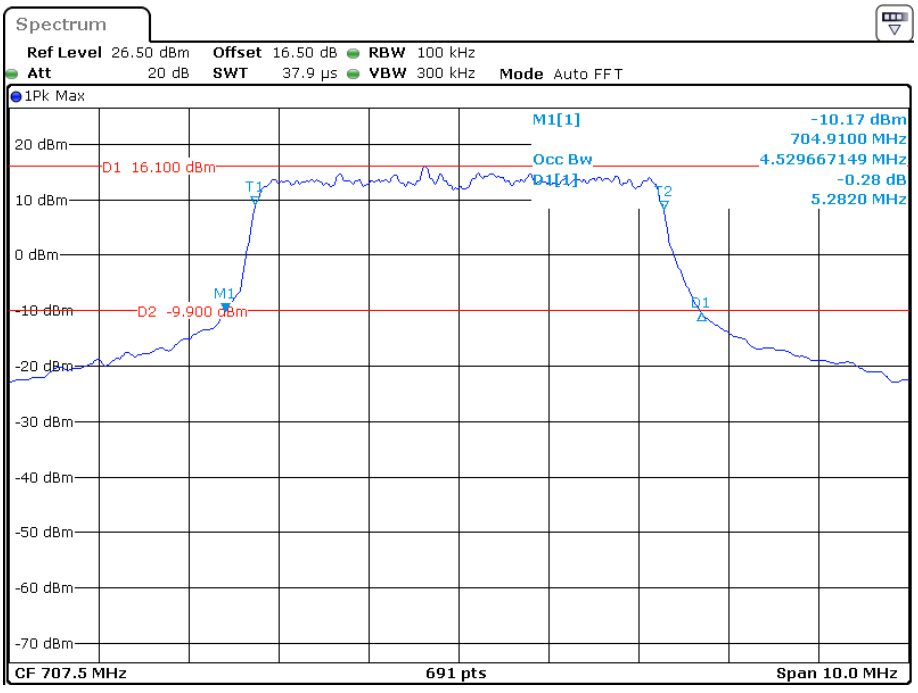
Date: 24.MAY.2019 17:13:07

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



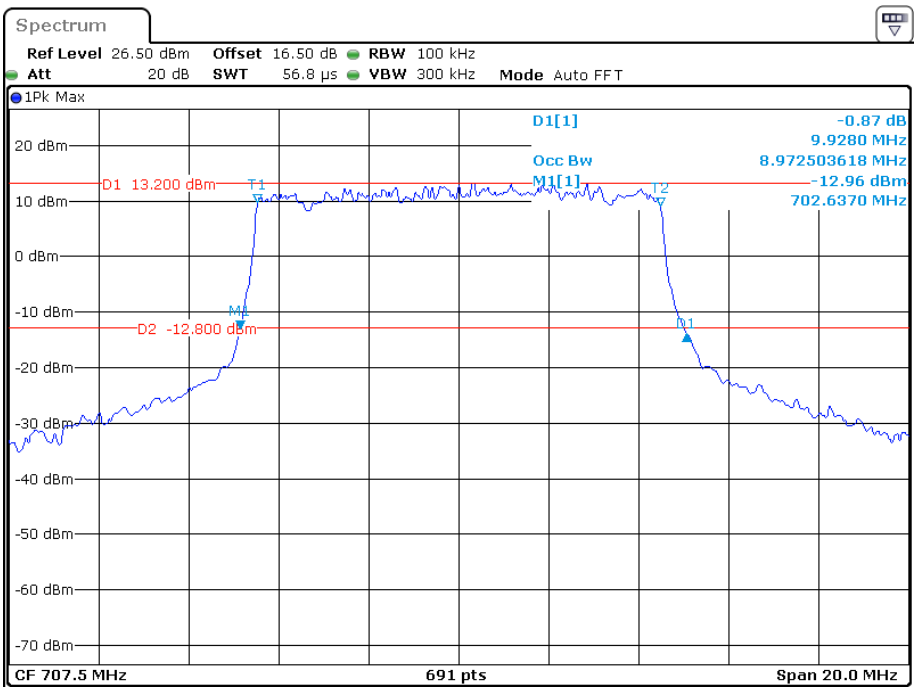
Date: 24.MAY.2019 17:11:33

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



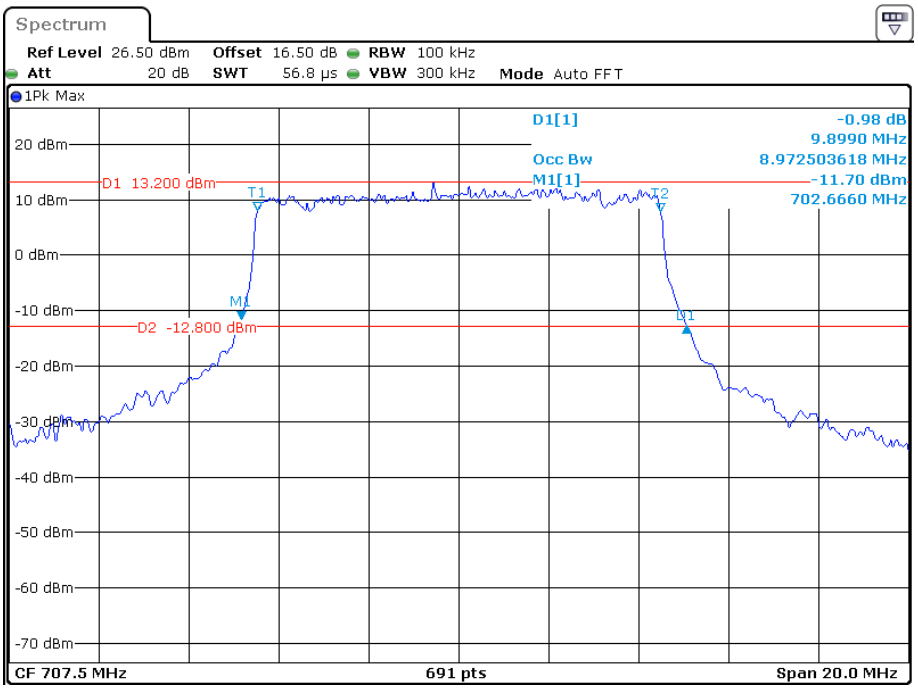
Date: 24.MAY.2019 17:10:52

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



Date: 24.MAY.2019 17:08:41

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

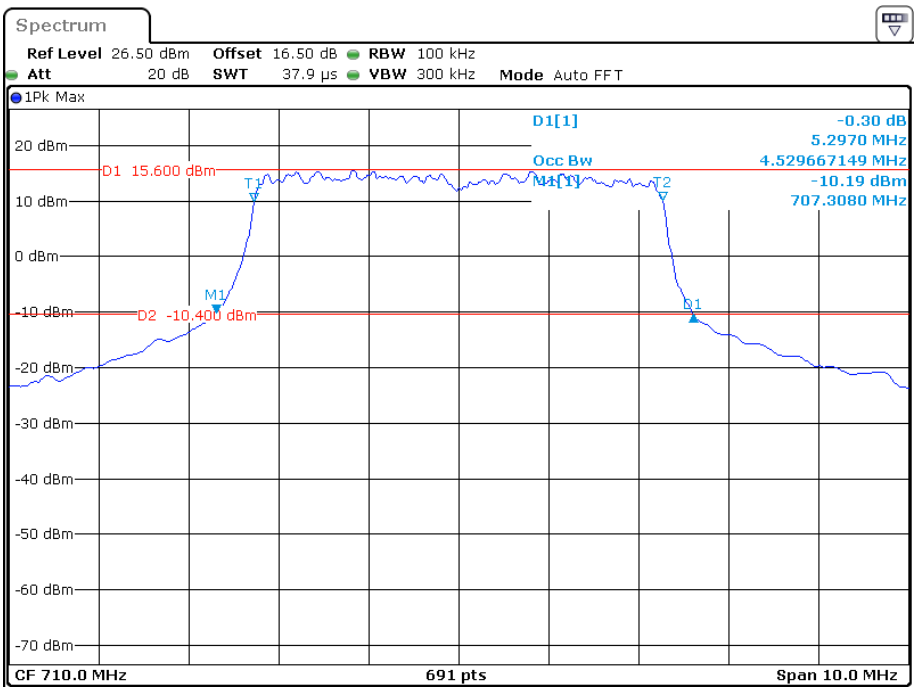


Date: 24.MAY.2019 17:09:23

LTE Band 17: (Middle Channel)

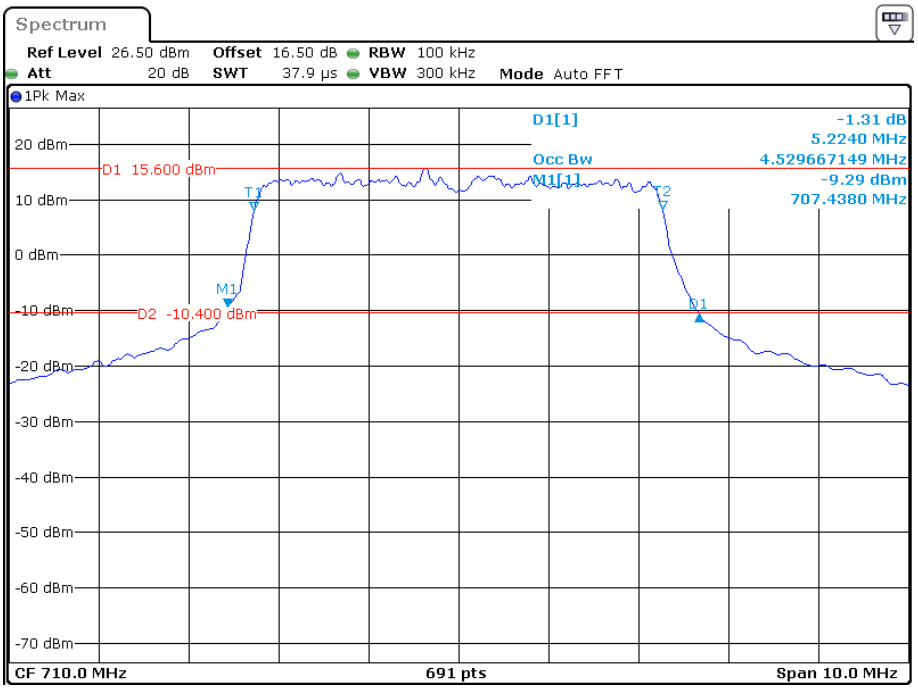
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.53	5.30
	16QAM	4.53	5.22
10.0	QPSK	8.97	9.91
	16QAM	8.94	9.94

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



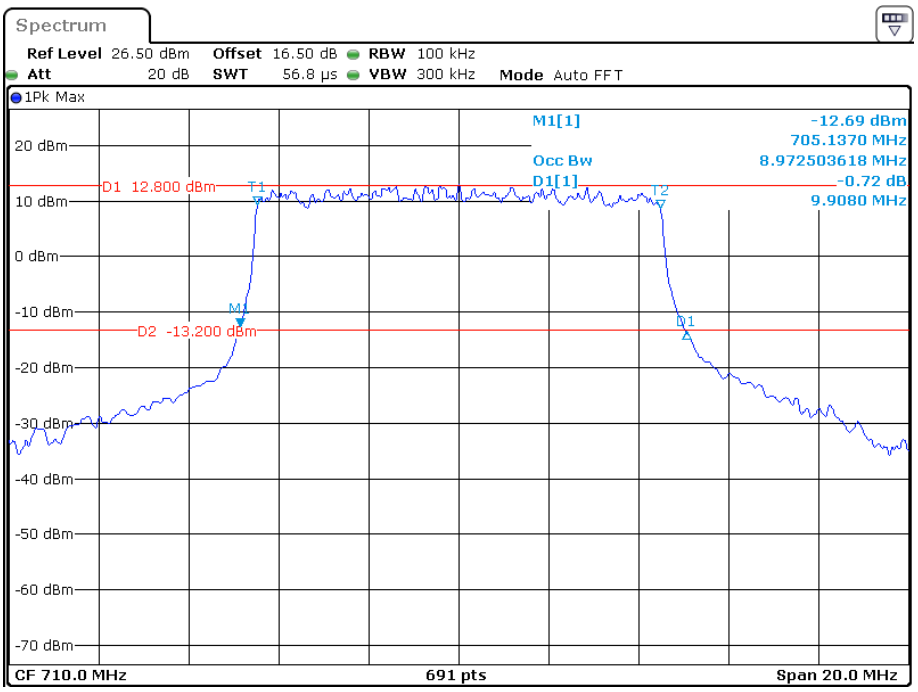
Date: 24.MAY.2019 17:20:57

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



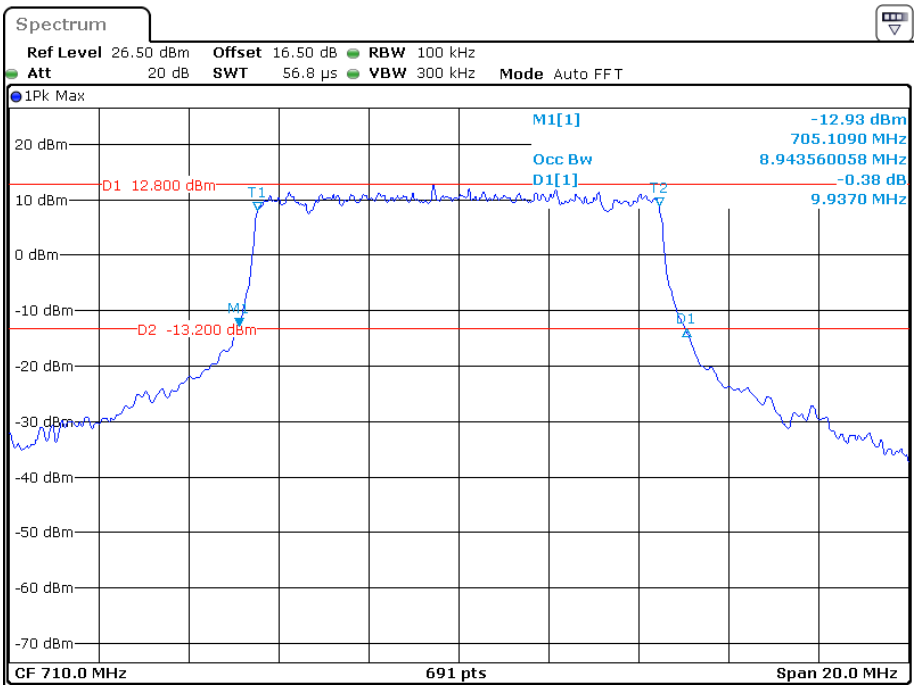
Date: 24.MAY.2019 17:21:49

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



Date: 24.MAY.2019 17:19:59

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



Date: 24.MAY.2019 17:19:26

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

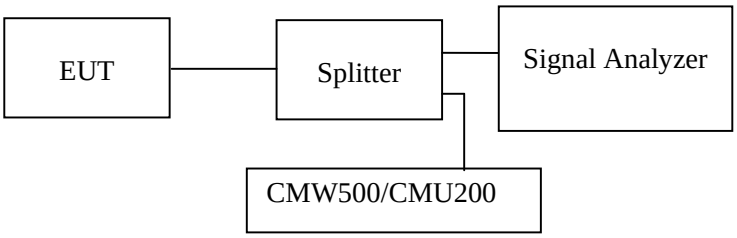
Applicable Standard

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

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

Test Procedure

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



Test Data

Environmental Conditions

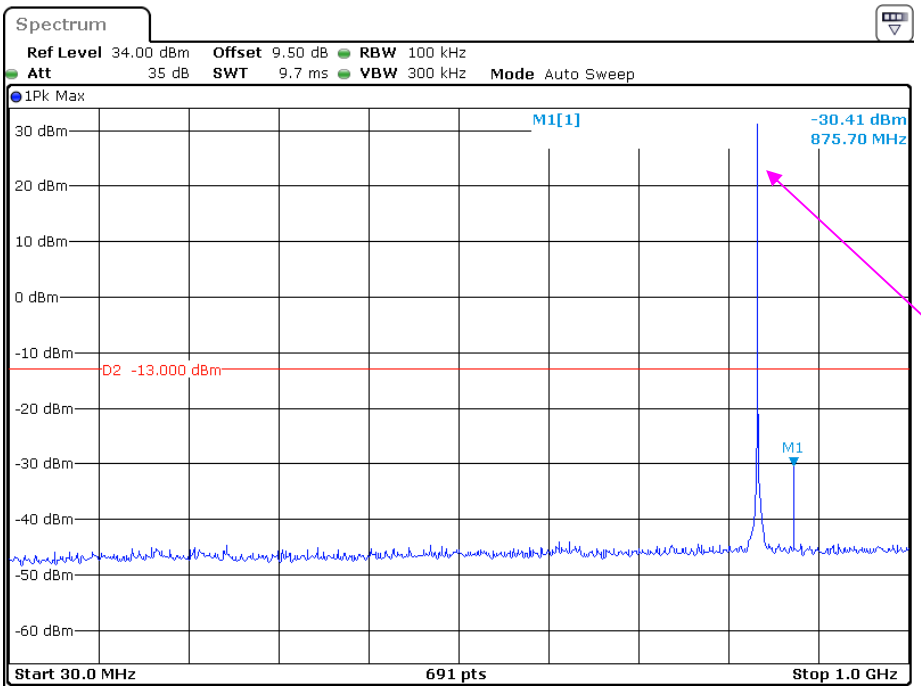
Temperature:	24~25 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Kieron Luo on 2019-05-21 to 2019-05-30.

EUT operation mode: Transmitting

Cellular Band (Part 22H)

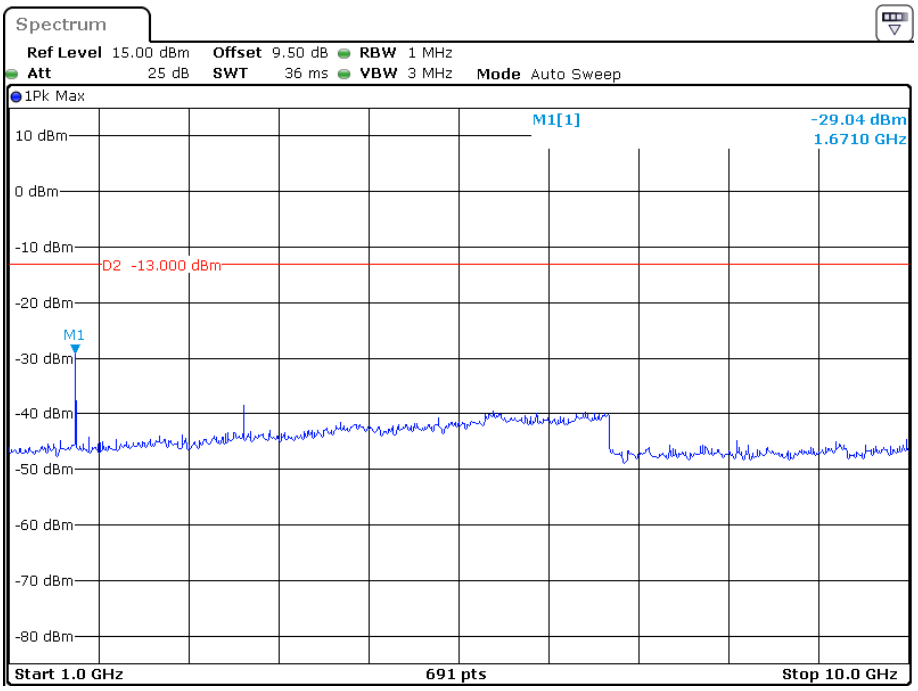
30 MHz – 1 GHz (GSM Mode)



Fundamental test

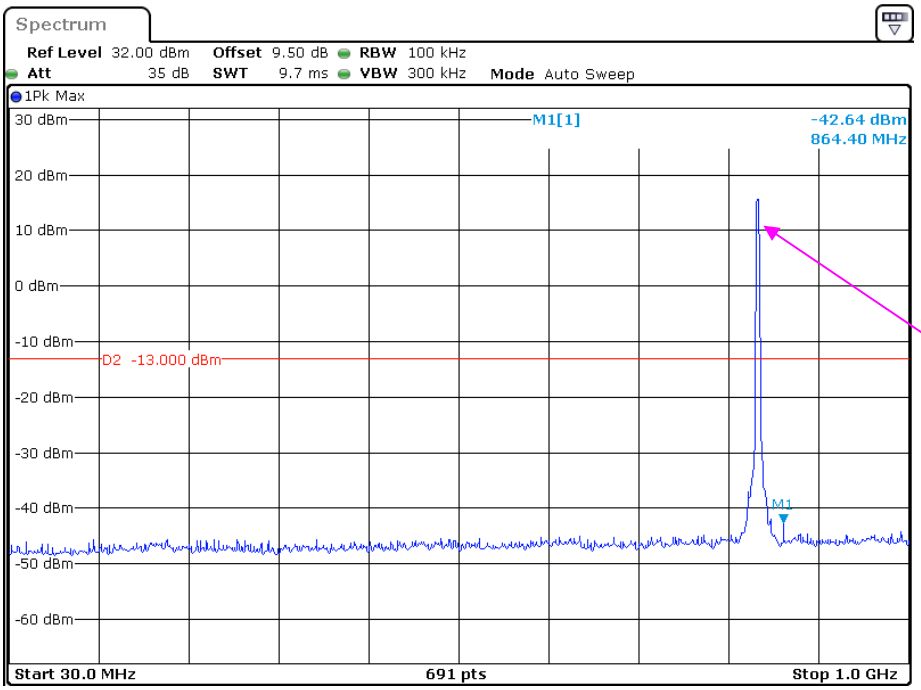
Date: 21.MAY.2019 16:24:52

1 GHz – 10 GHz (GSM Mode)



Date: 21.MAY.2019 16:26:47

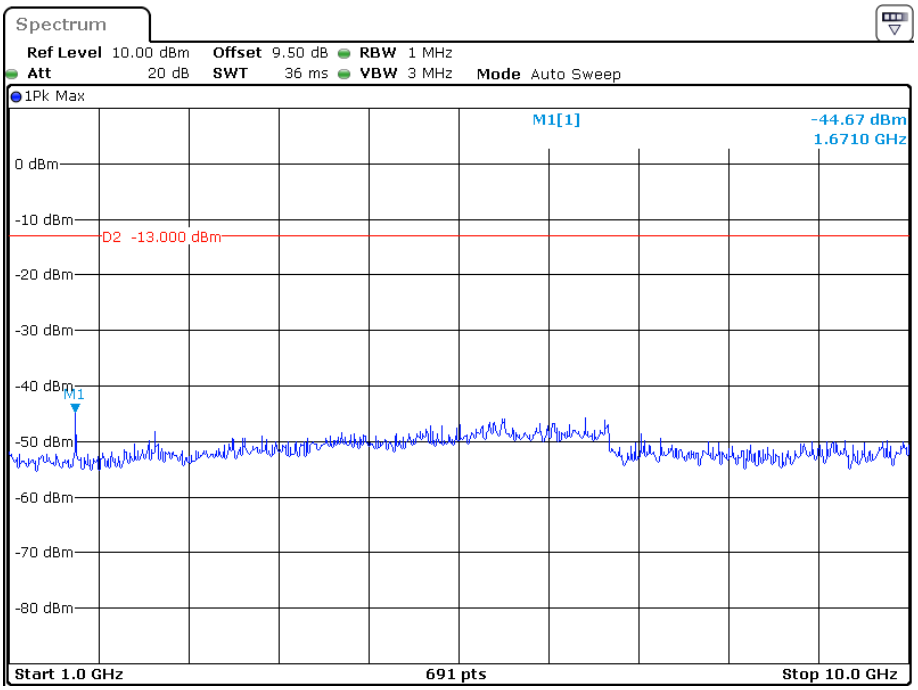
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 21.MAY.2019 17:19:38

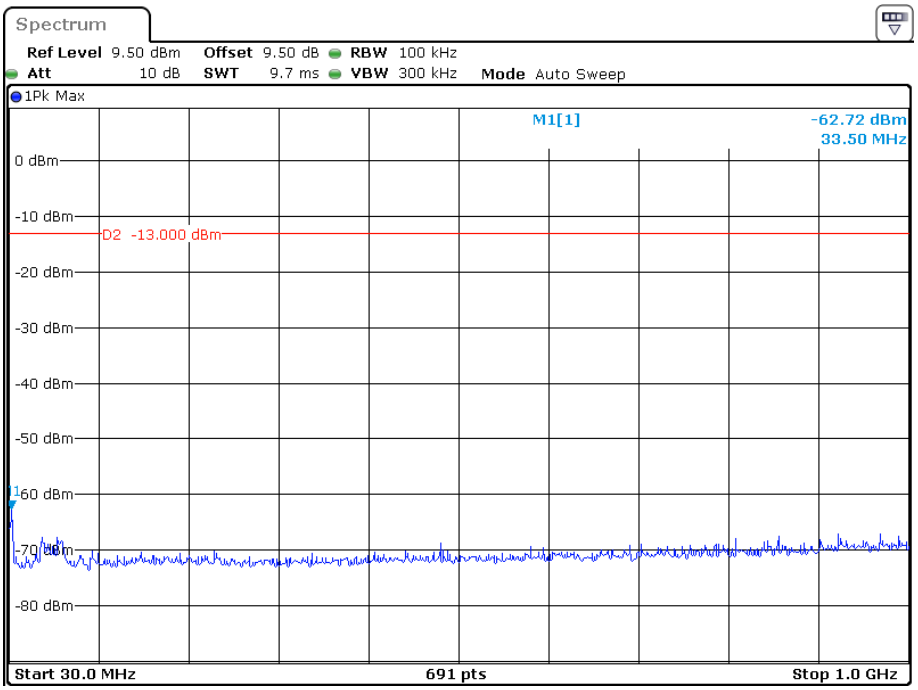
1 GHz – 10 GHz (WCDMA Mode)



Date: 21.MAY.2019 17:20:30

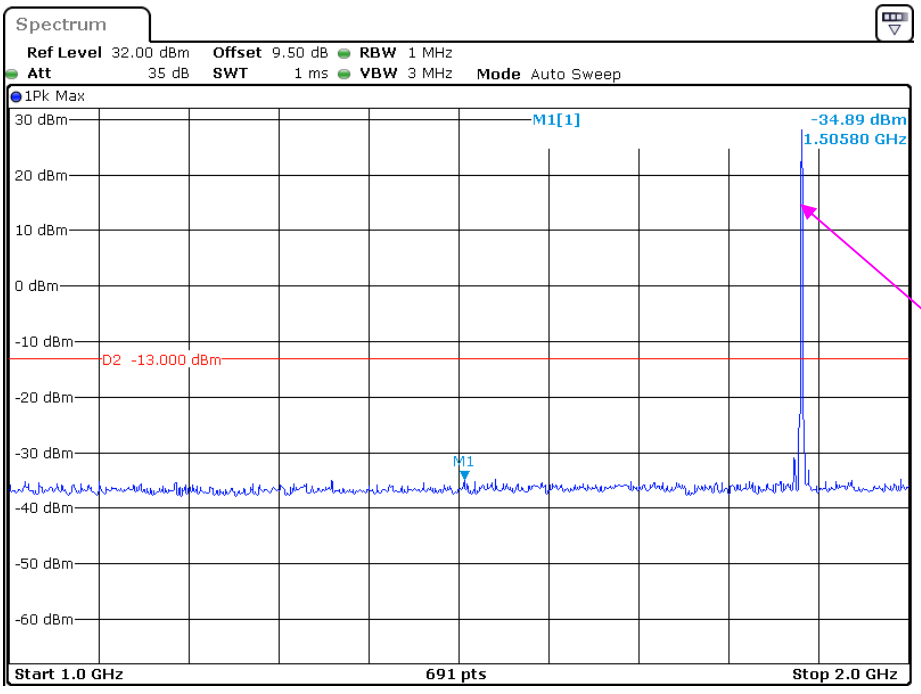
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 21.MAY.2019 16:34:40

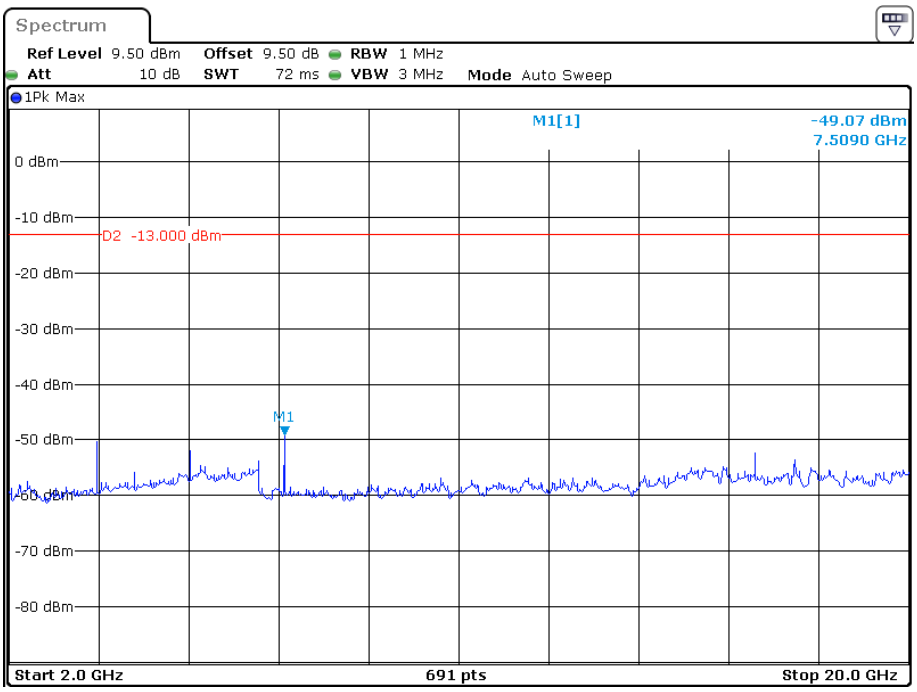
1 GHz – 2 GHz (GSM Mode)



Fundamental test

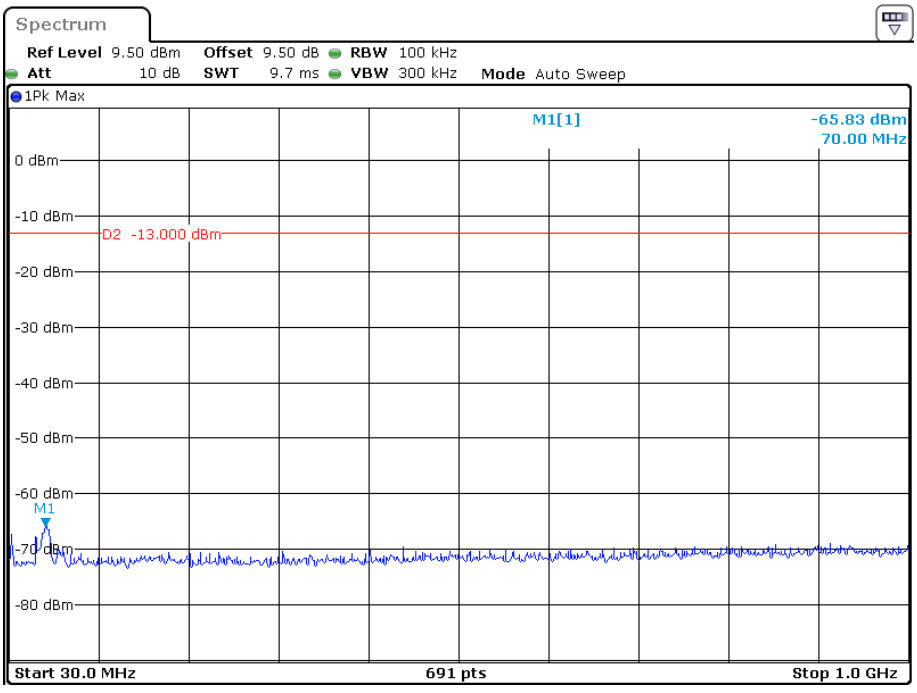
Date: 21.MAY.2019 16:38:07

2 GHz – 20 GHz (GSM Mode)



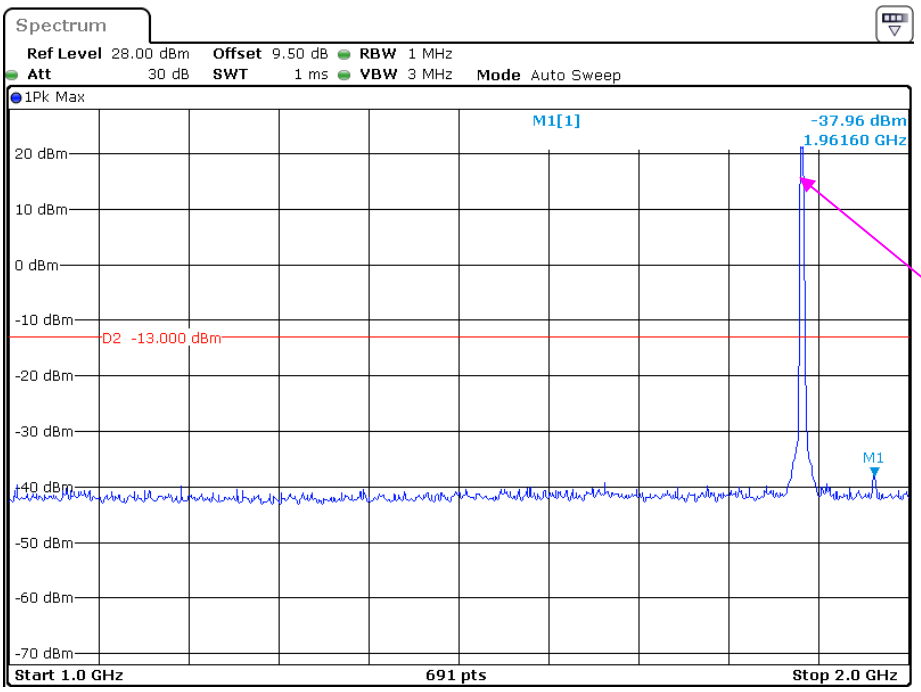
Date: 21.MAY.2019 16:35:59

30 MHz – 1 GHz (WCDMA Mode)



Date: 21.MAY.2019 17:34:21

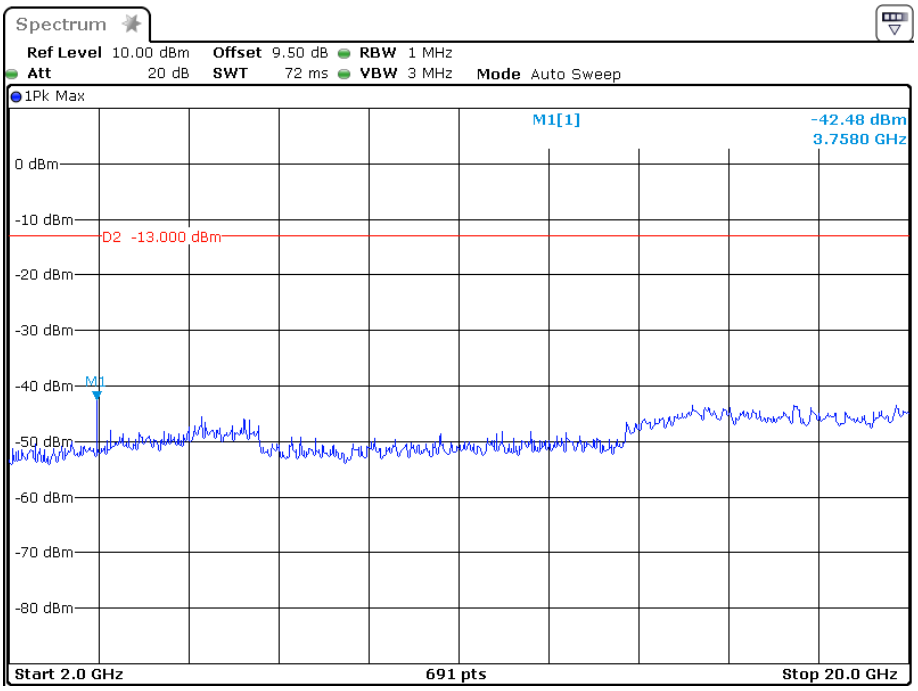
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 21.MAY.2019 17:30:20

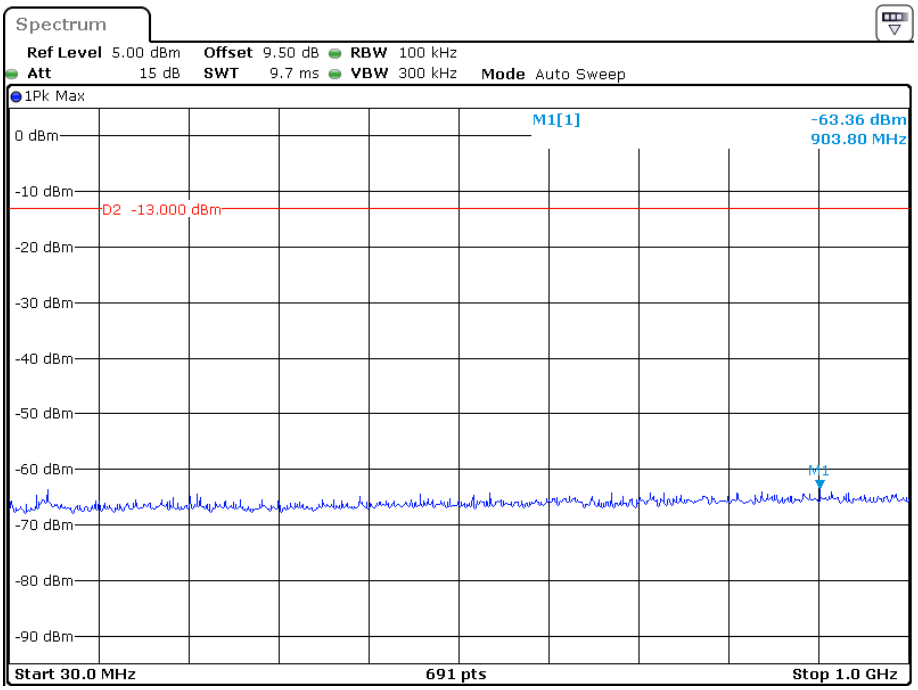
2 GHz – 20 GHz (WCDMA Mode)



Date: 21.MAY.2019 17:32:57

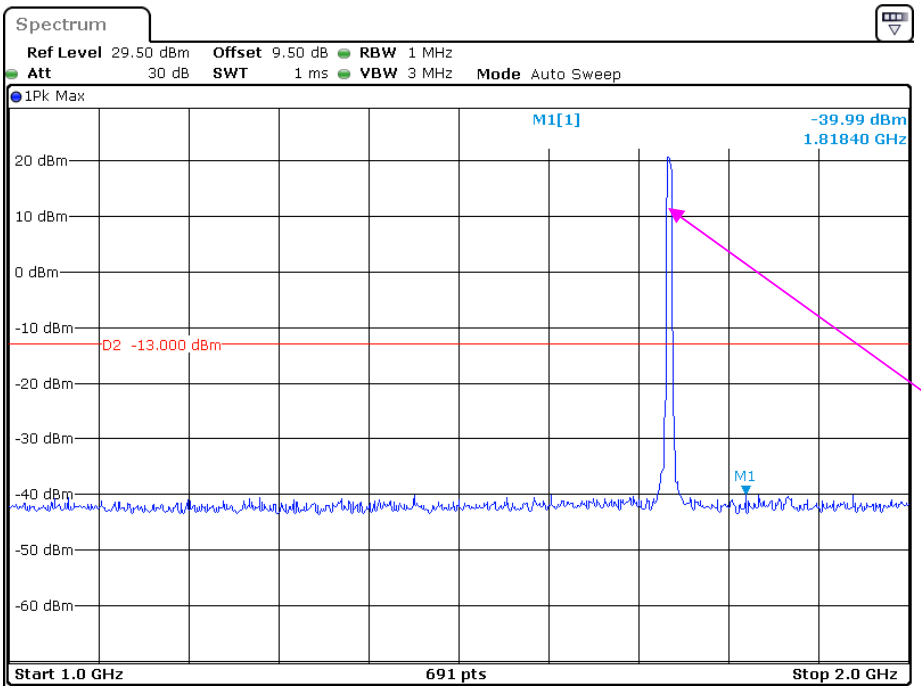
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



Date: 21.MAY.2019 18:02:08

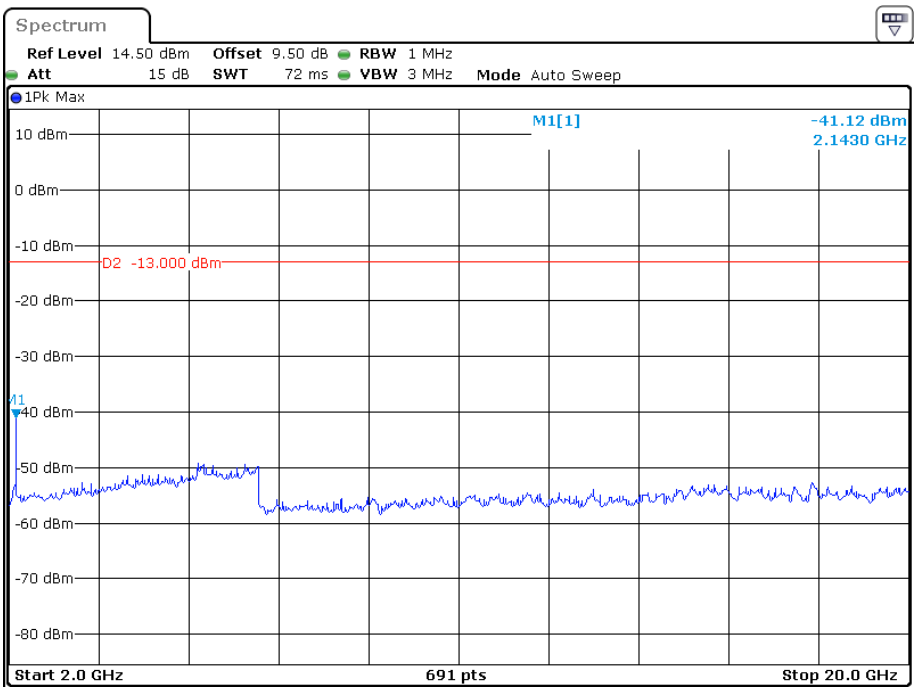
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 21.MAY.2019 17:59:46

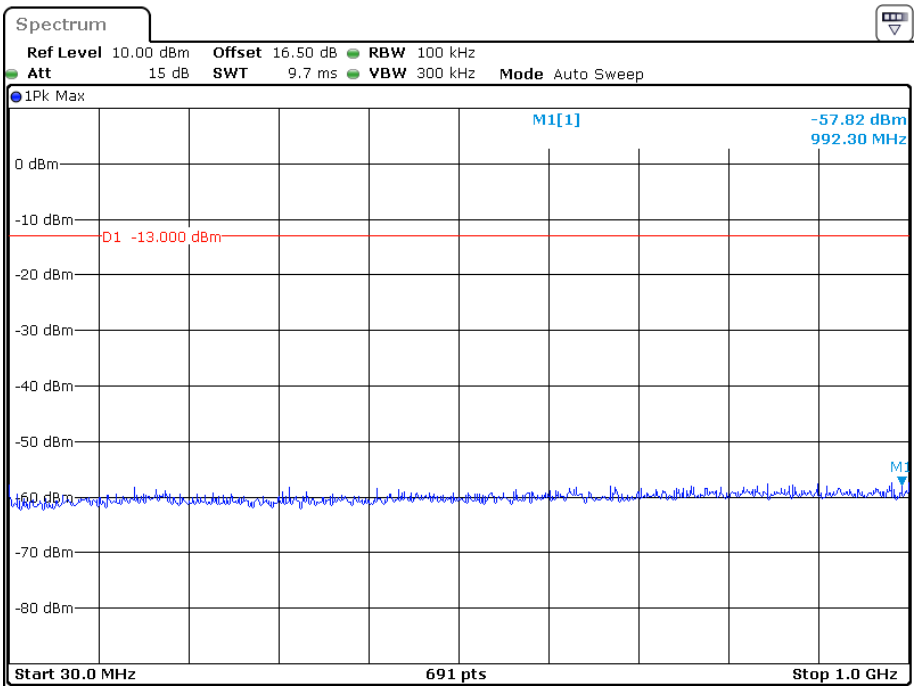
2 GHz – 20 GHz (WCDMA Mode)



Date: 21.MAY.2019 18:00:45

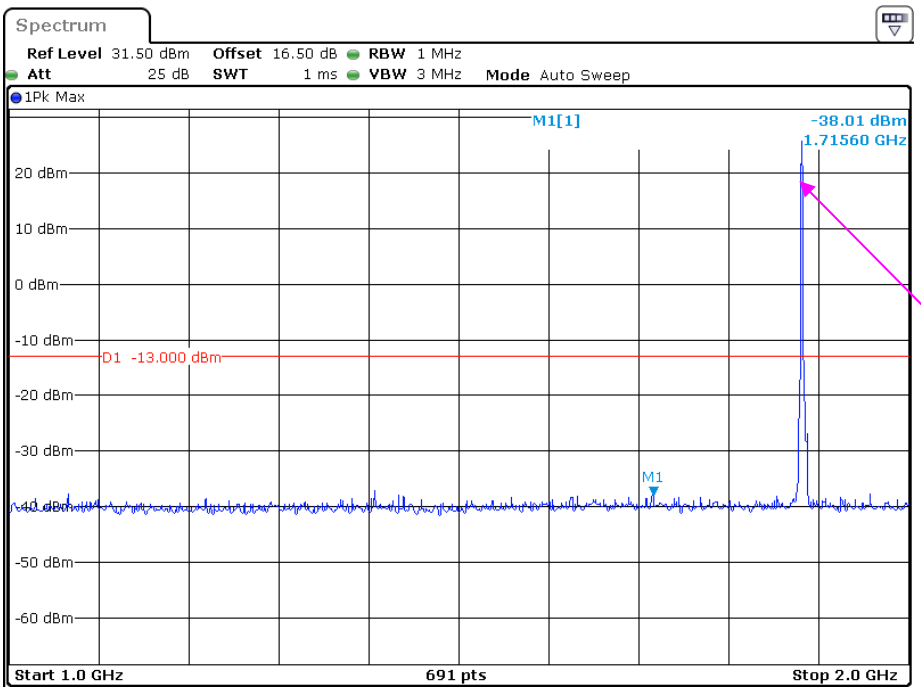
LTE Band 2:

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



Date: 25.MAY.2019 17:39:32

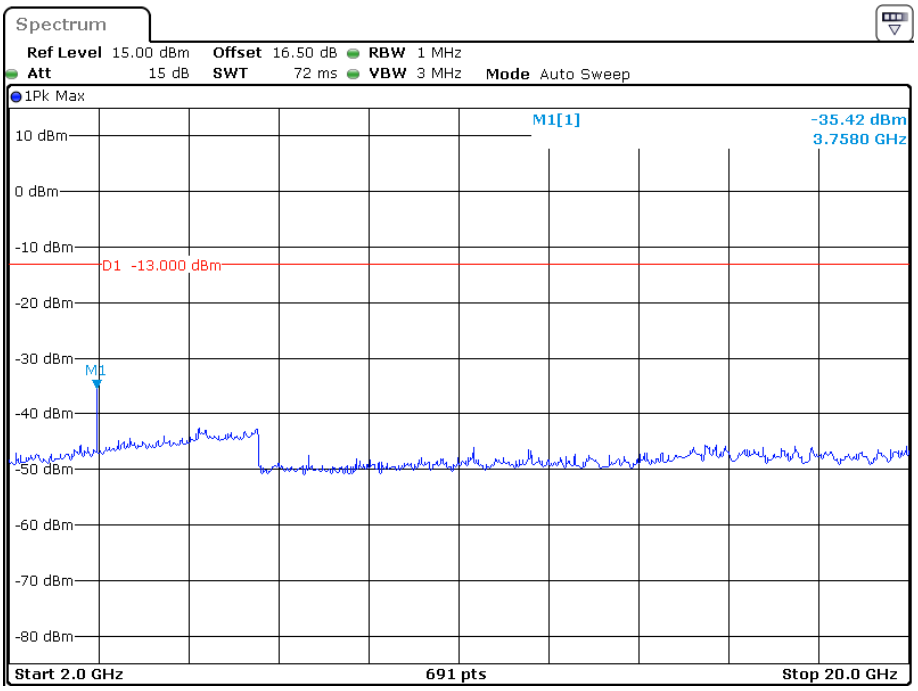
1 GHz – 2 GHz (1.4 MHz, Middle Channel)



Fundamental test

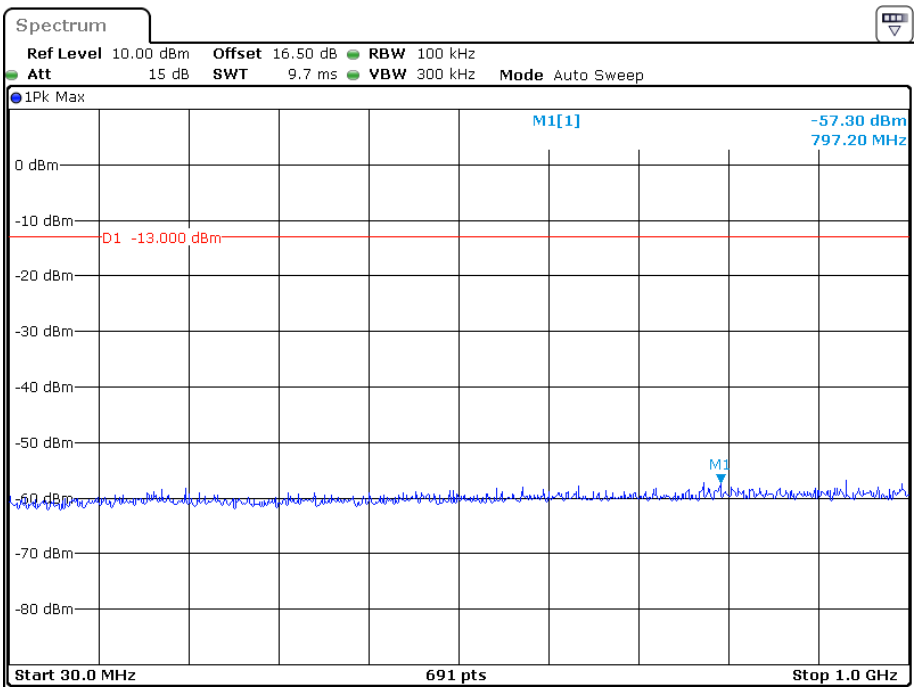
Date: 25.MAY.2019 17:01:12

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



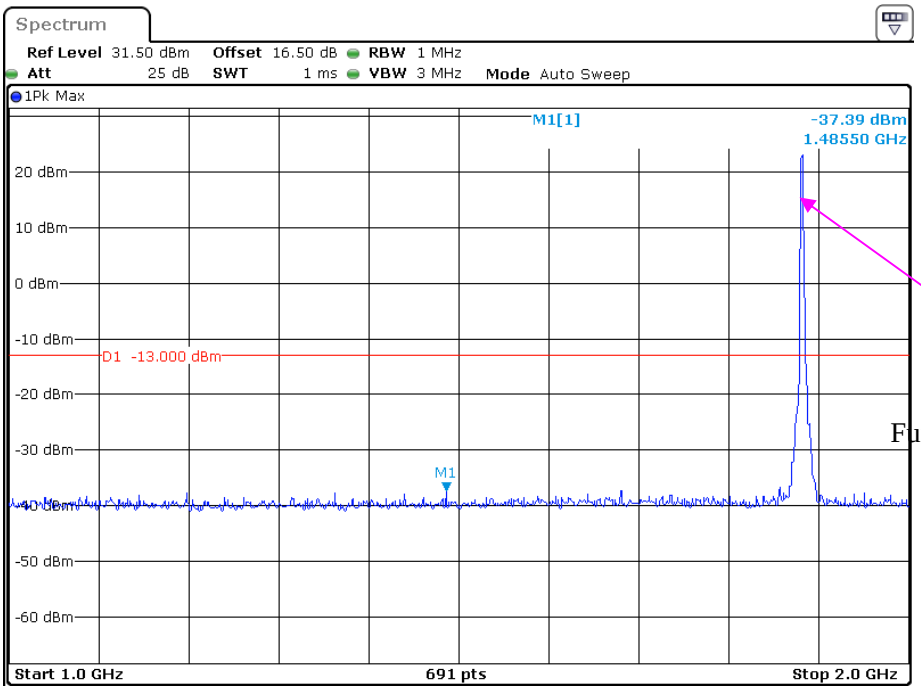
Date: 25.MAY.2019 17:33:10

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



Date: 25.MAY.2019 17:38:47

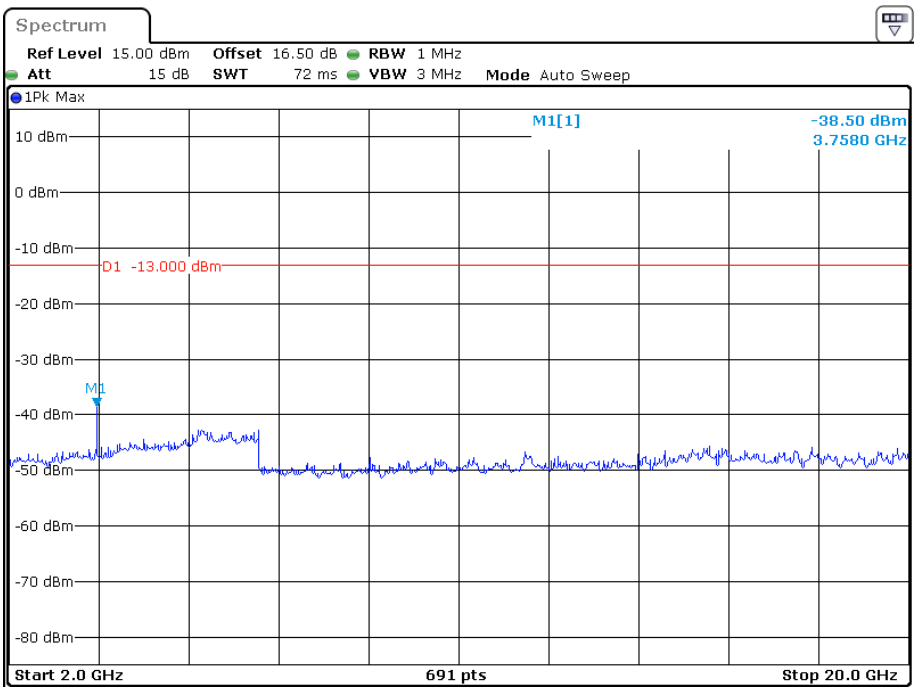
1 GHz – 2 GHz (3.0 MHz, Middle Channel)



Fundamental test

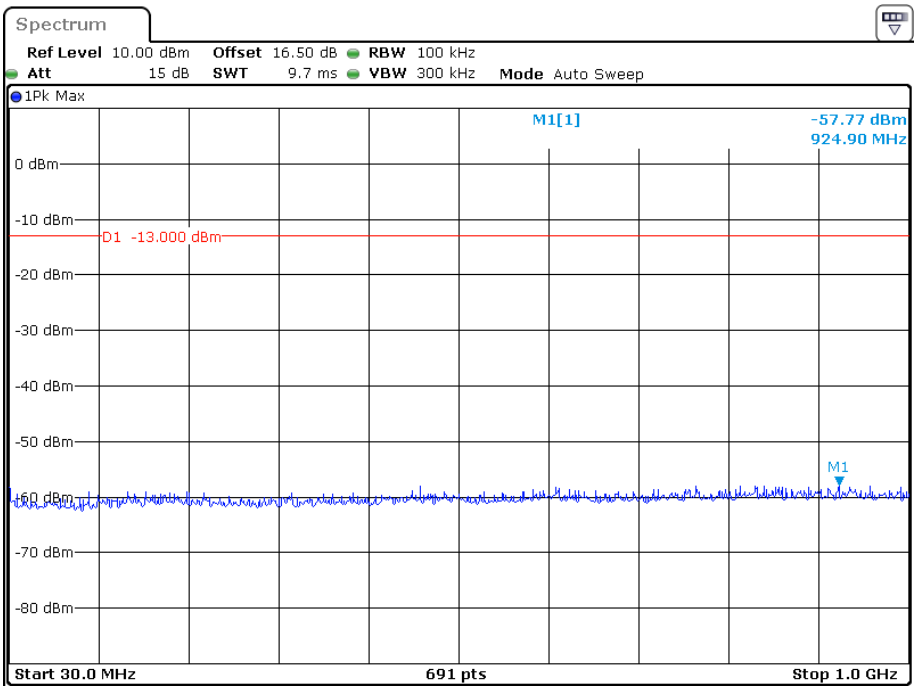
Date: 25.MAY.2019 17:00:46

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



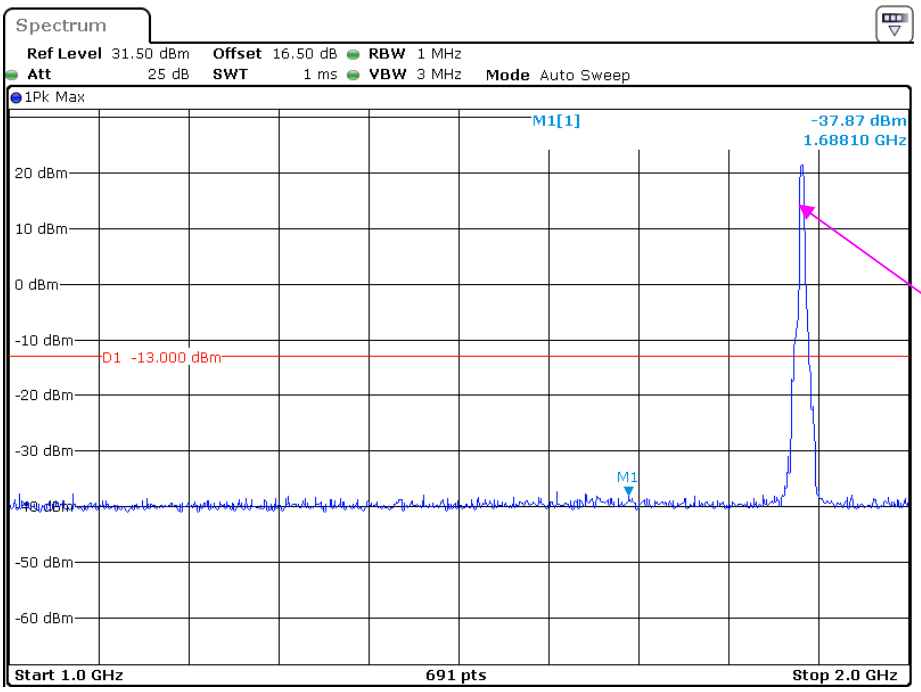
Date: 25.MAY.2019 17:33:31

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



Date: 25.MAY.2019 17:37:56

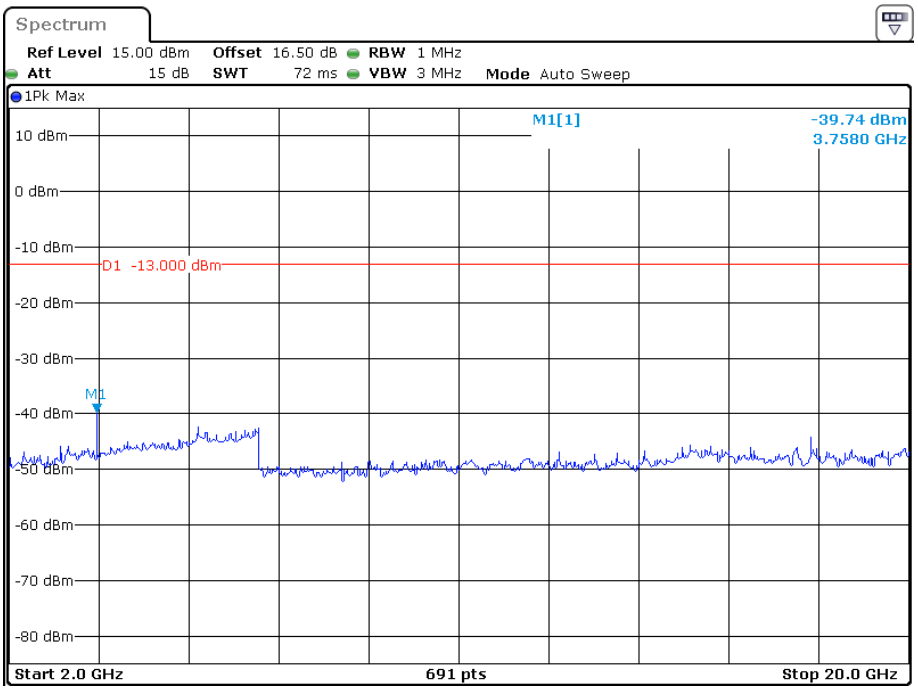
1 GHz – 2 GHz (5.0 MHz, Middle Channel)



Fundamental test

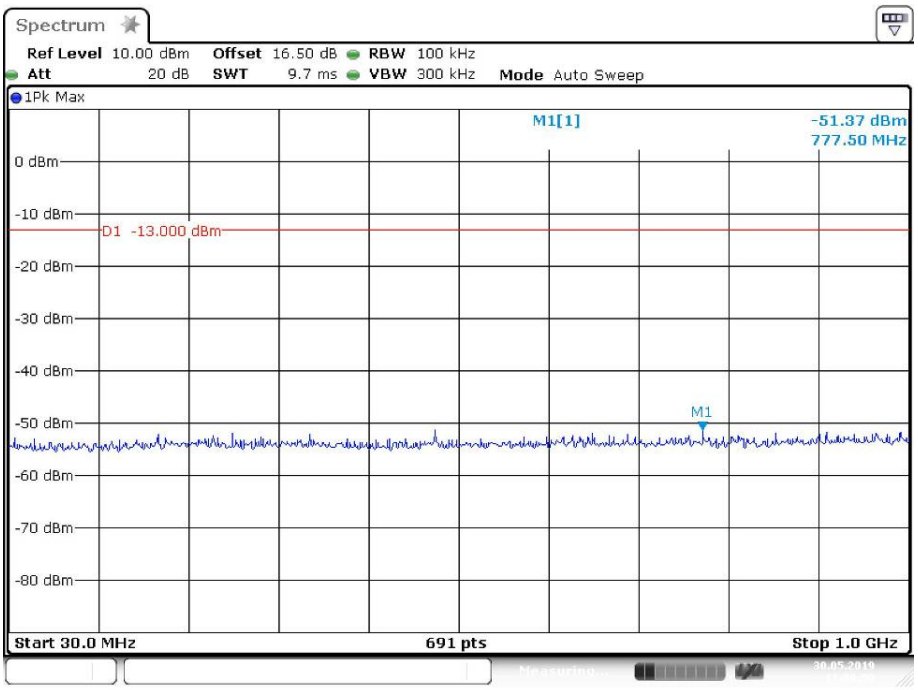
Date: 25.MAY.2019 17:01:56

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



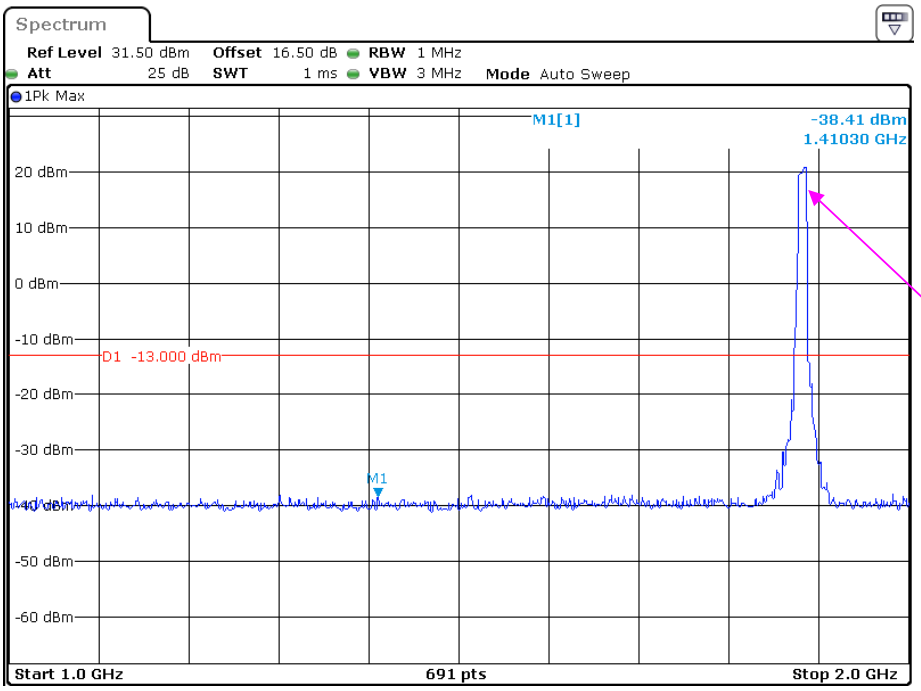
Date: 25.MAY.2019 17:33:49

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



Date: 30.MAY.2019 11:09:59

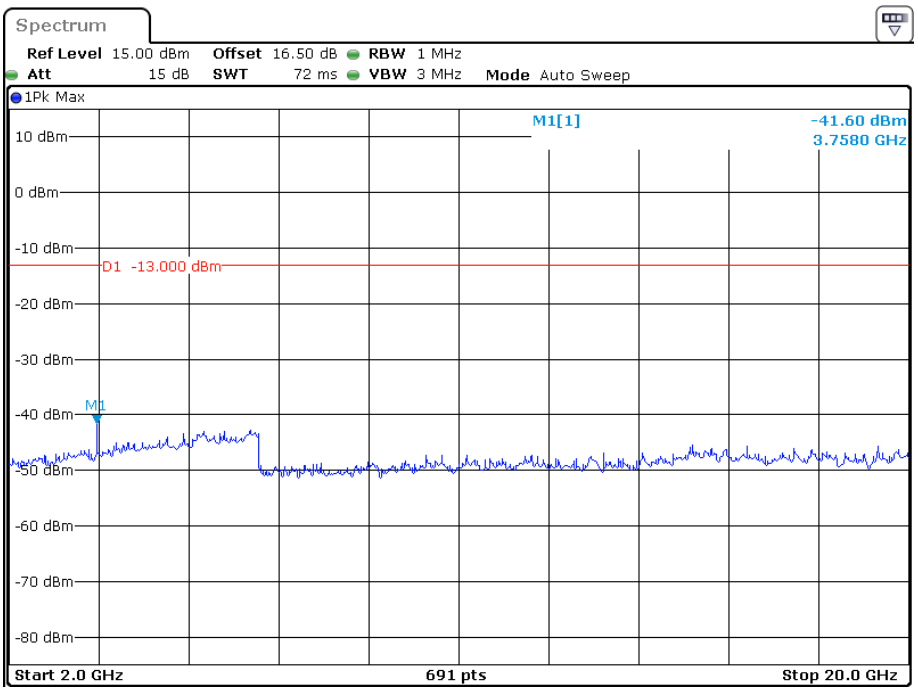
1 GHz – 2 GHz (10.0 MHz, Middle Channel)



Fundamental test

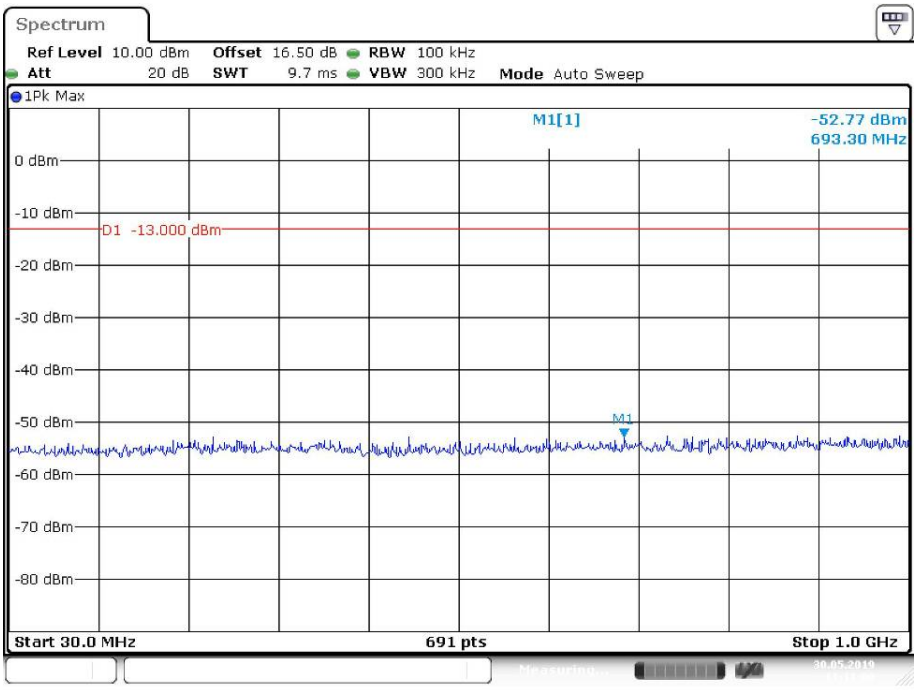
Date: 25.MAY.2019 17:02:52

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



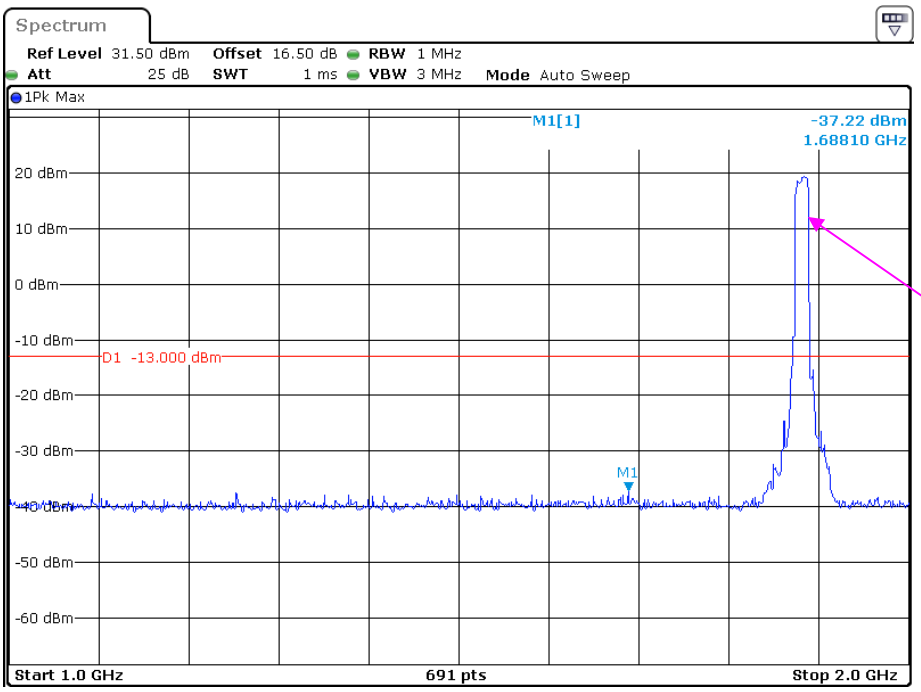
Date: 25.MAY.2019 17:34:11

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



Date: 30.MAY.2019 11:11:00

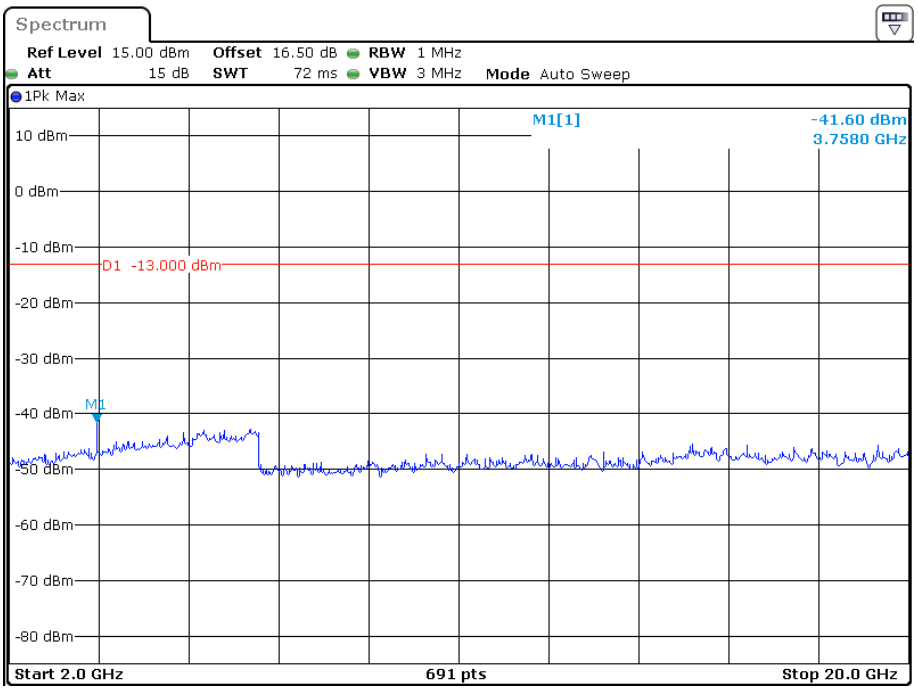
1 GHz – 2 GHz (15.0 MHz, Middle Channel)



Fundamental test

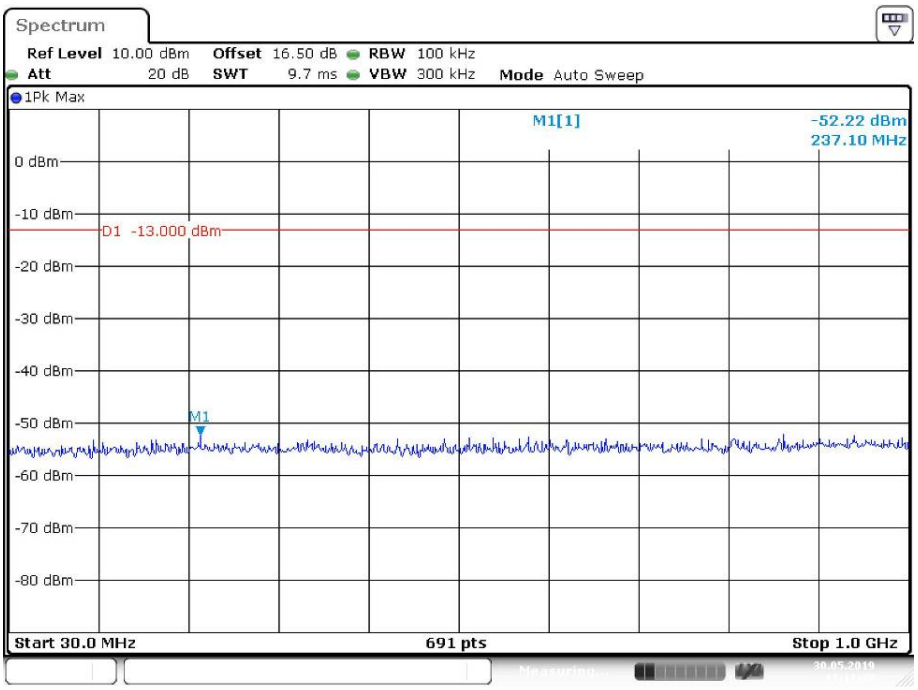
Date: 25.MAY.2019 17:03:35

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

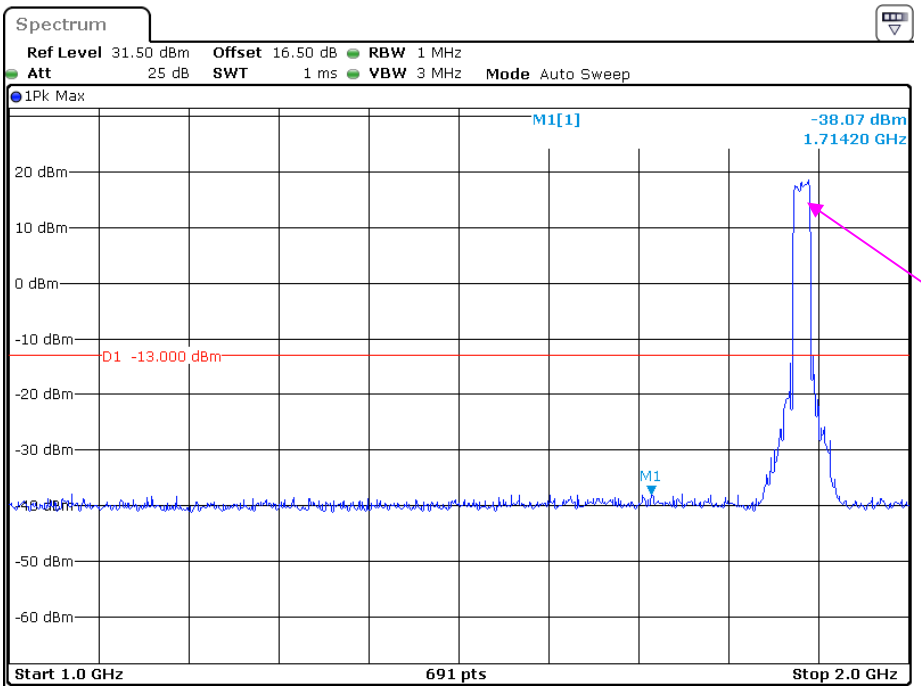


Date: 25.MAY.2019 17:34:11

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

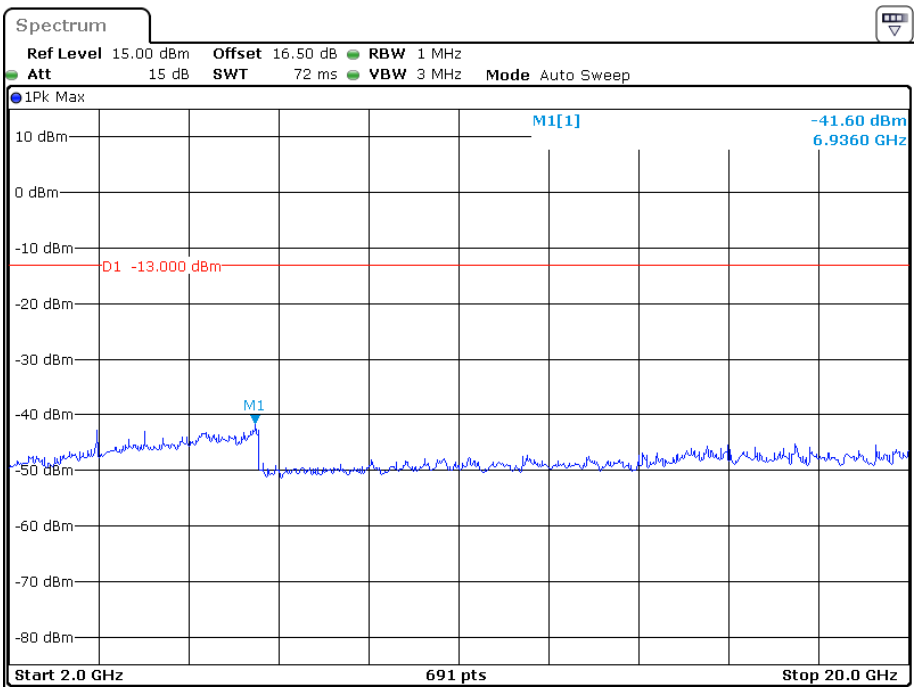


1 GHz – 2 GHz (20.0 MHz, Middle Channel)



Fundamental test

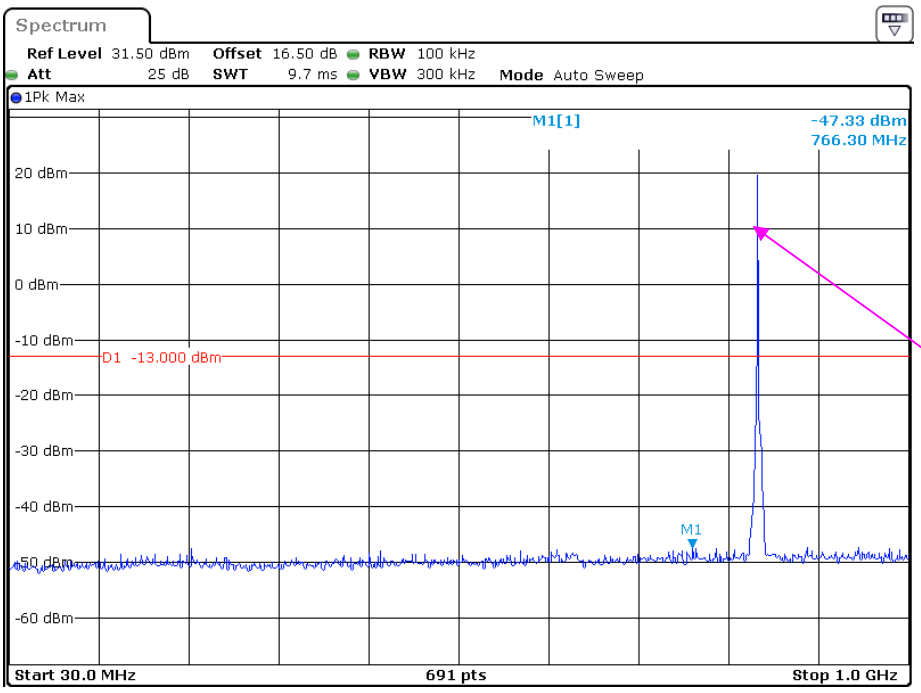
2 GHz – 20 GHz (20.0 MHz, Middle Channel)



Date: 25.MAY.2019 17:34:55

LTE Band 5:

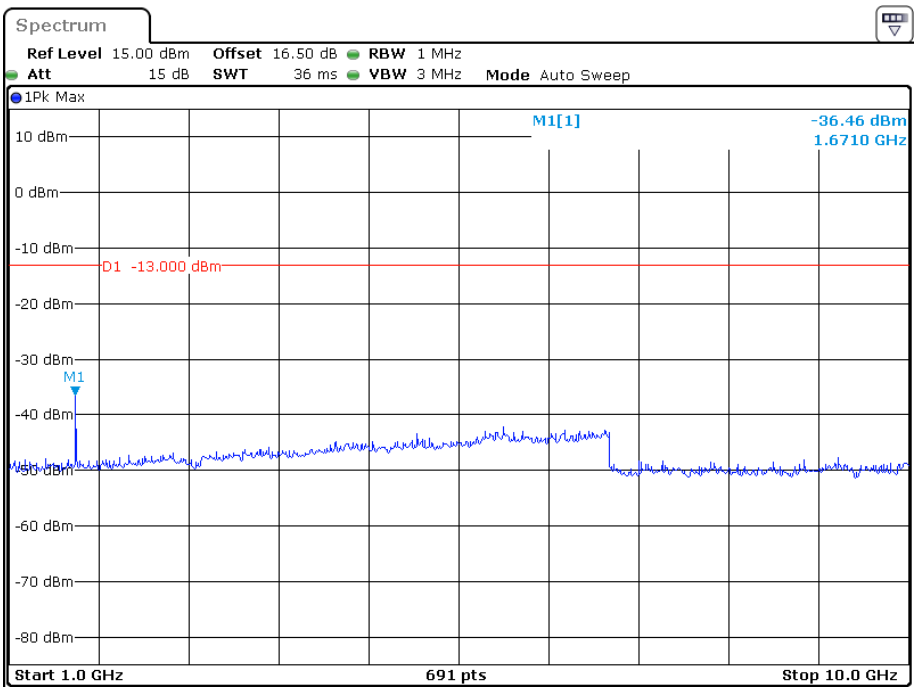
30 MHz - 1 GHz (1.4 MHz, Middle Channel)



Fundamental test

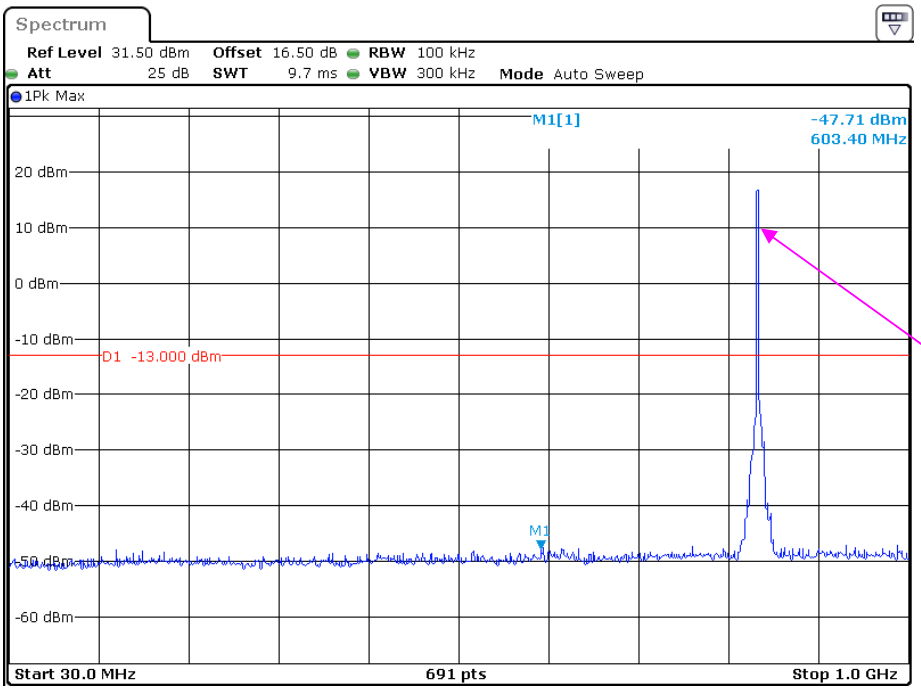
Date: 25.MAY.2019 17:15:25

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



Date: 25.MAY.2019 17:26:31

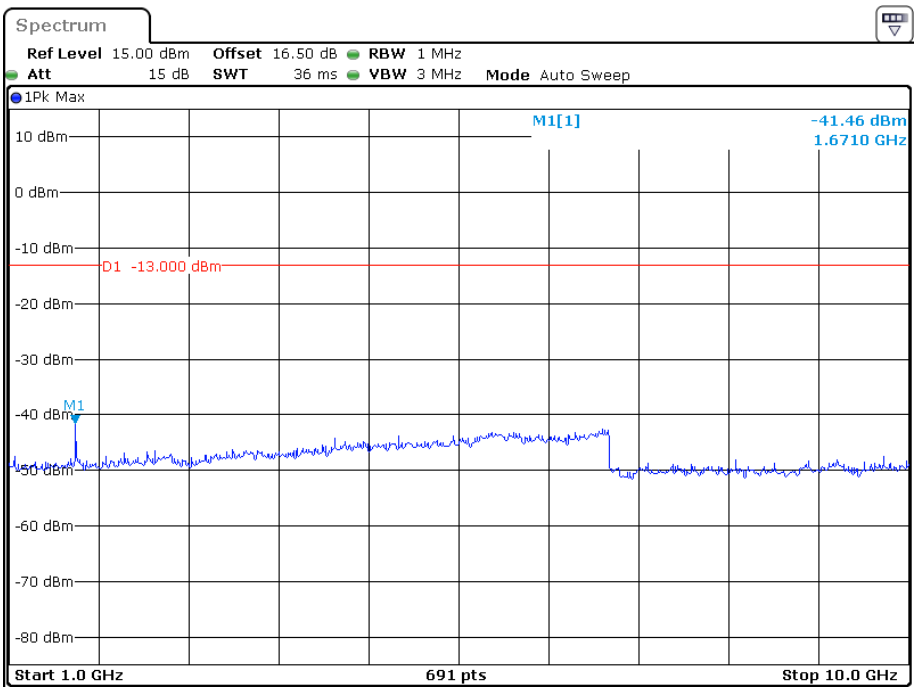
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



Fundamental test

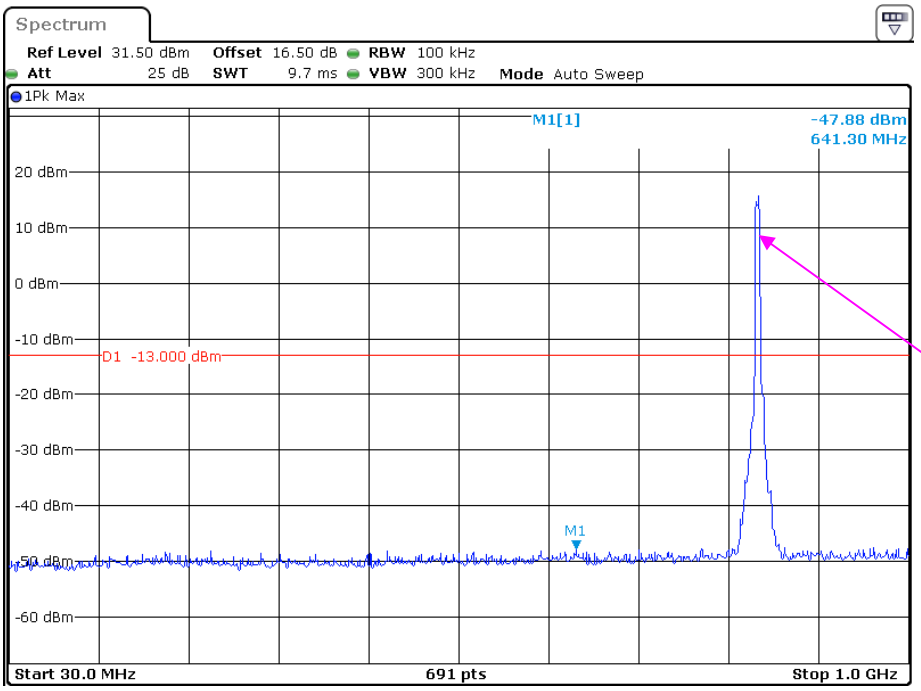
Date: 25.MAY.2019 17:13:47

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



Date: 25.MAY.2019 17:26:58

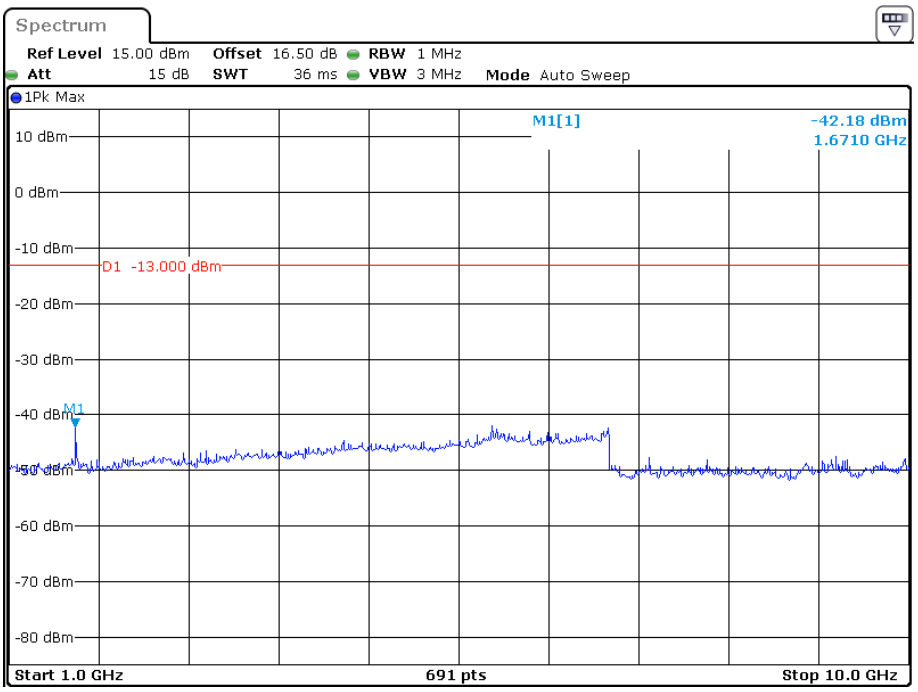
30 MHz - 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

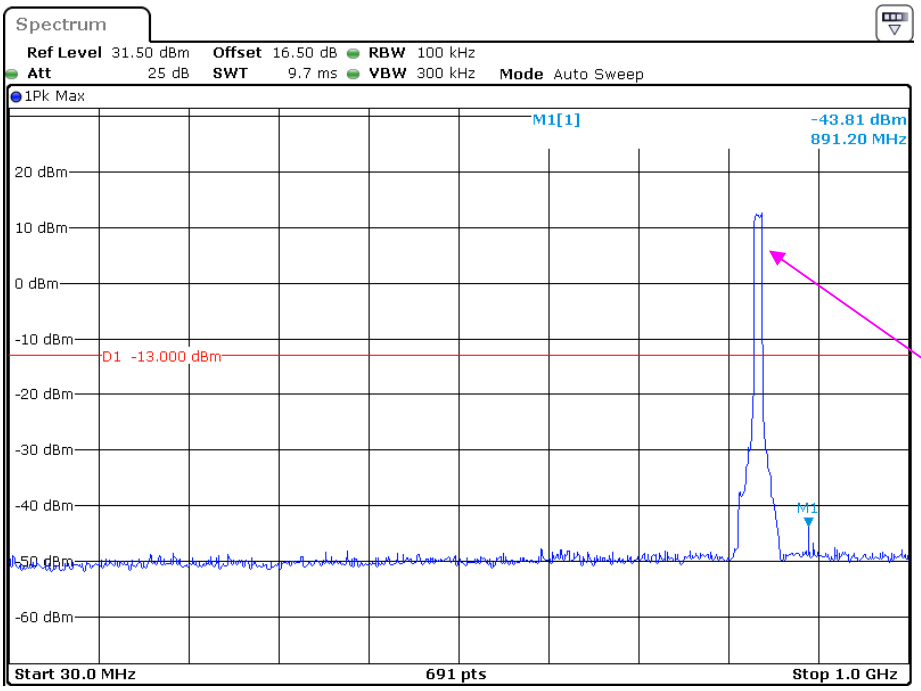
Date: 25.MAY.2019 17:13:19

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



Date: 25.MAY.2019 17:27:18

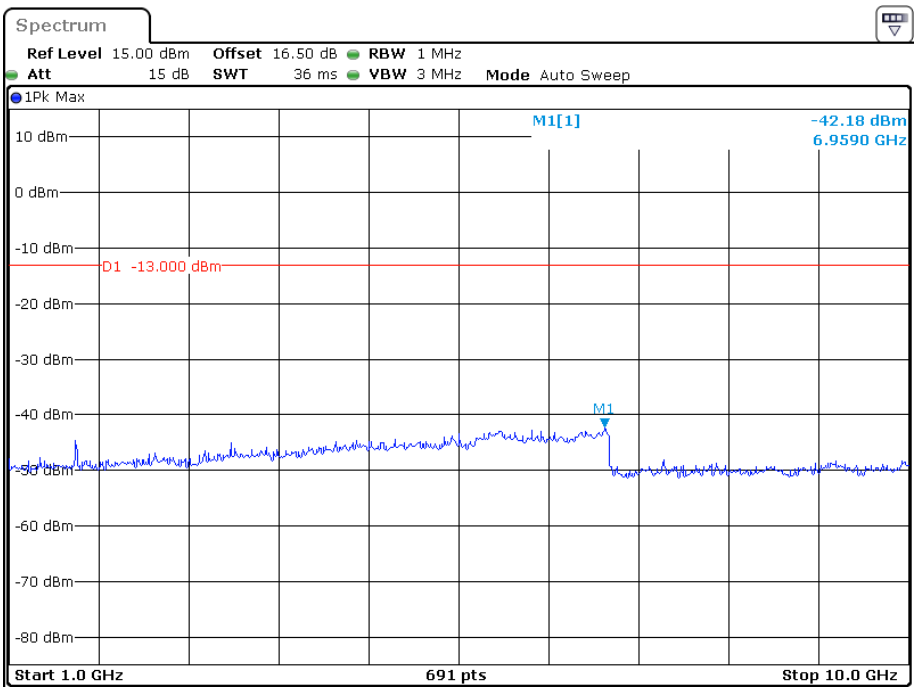
30 MHz - 1 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 25.MAY.2019 17:12:28

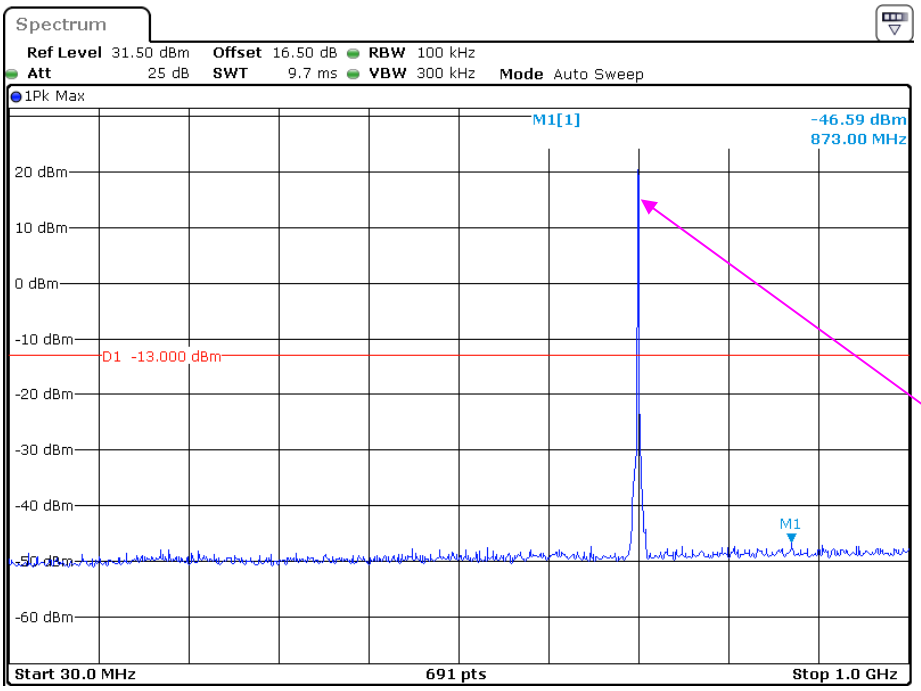
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 25.MAY.2019 17:27:43

LTE Band 12:

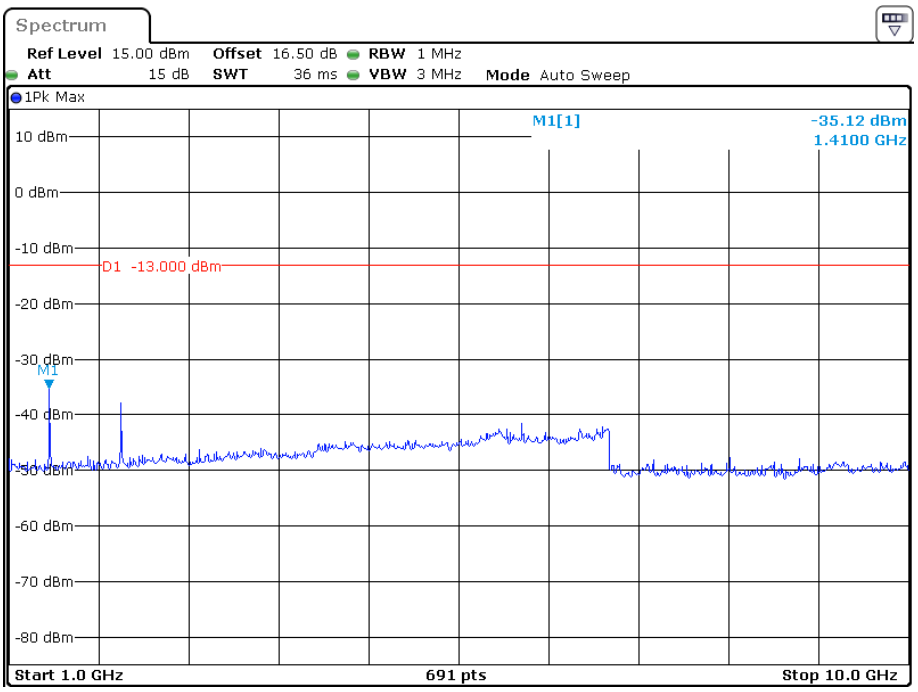
30 MHz – 1 GHz (1.4 MHz, Middle Channel)



Fundamental test

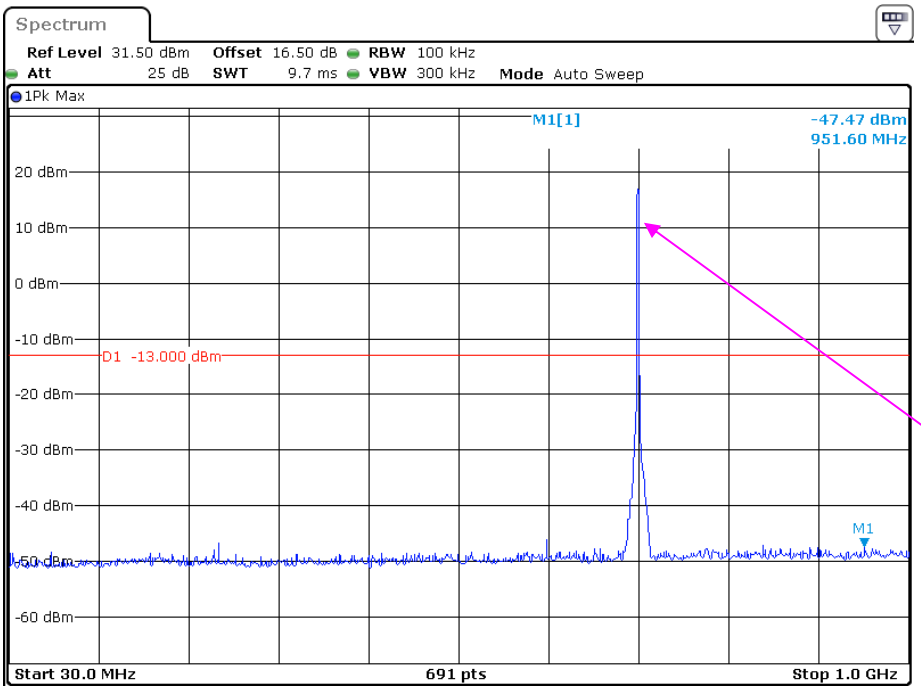
Date: 25.MAY.2019 17:16:56

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



Date: 25.MAY.2019 17:25:45

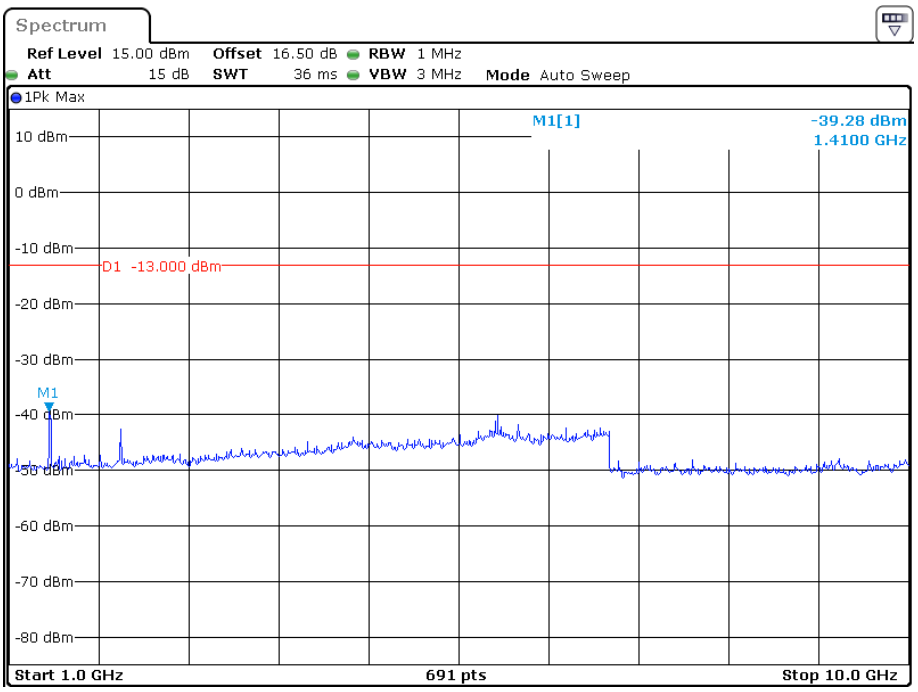
30 MHz – 1 GHz (3.0MHz, Middle Channel)



Fundamental test

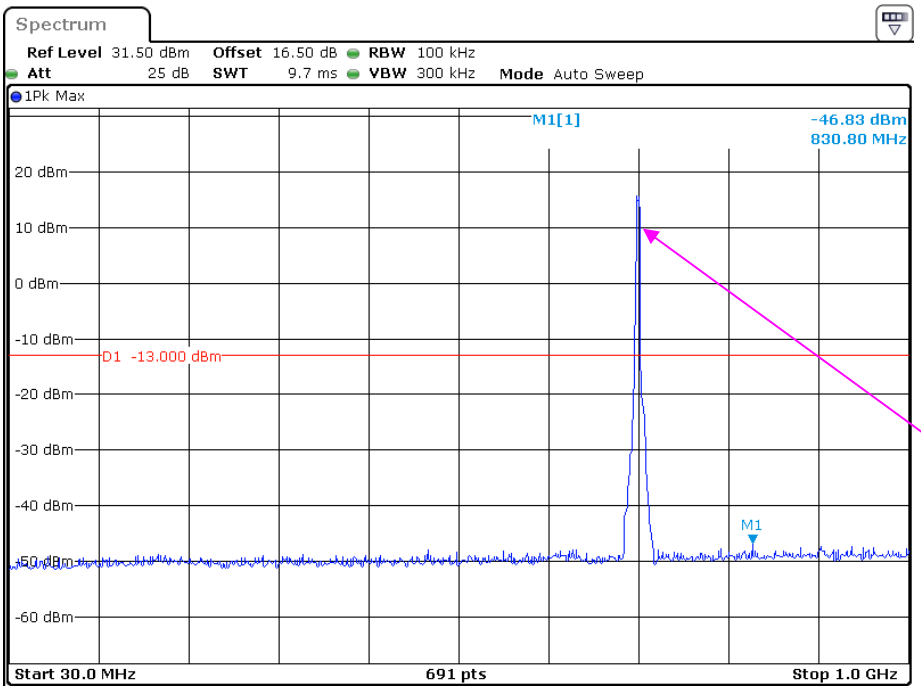
Date: 25.MAY.2019 17:17:28

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



Date: 25.MAY.2019 17:25:21

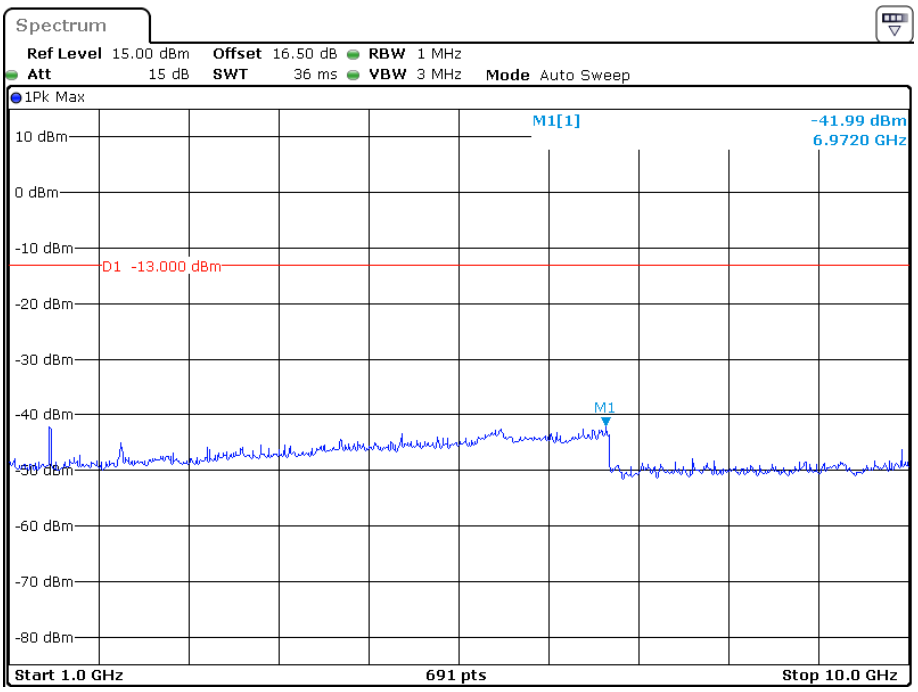
30 MHz – 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

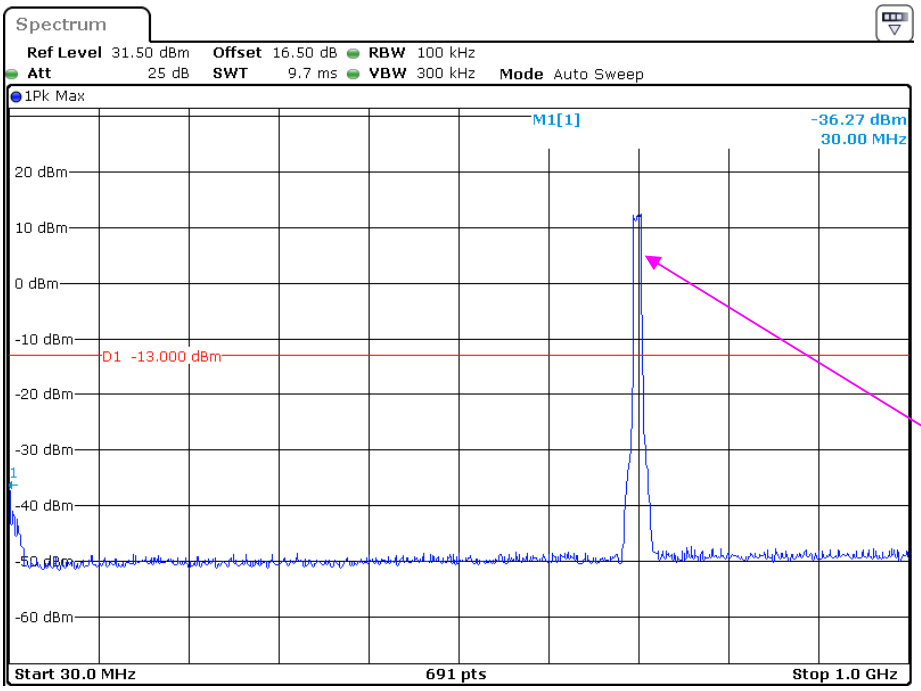
Date: 25.MAY.2019 17:18:20

1 GHz – 10.0 GHz (5.0 MHz, Middle Channel)



Date: 25.MAY.2019 17:24:53

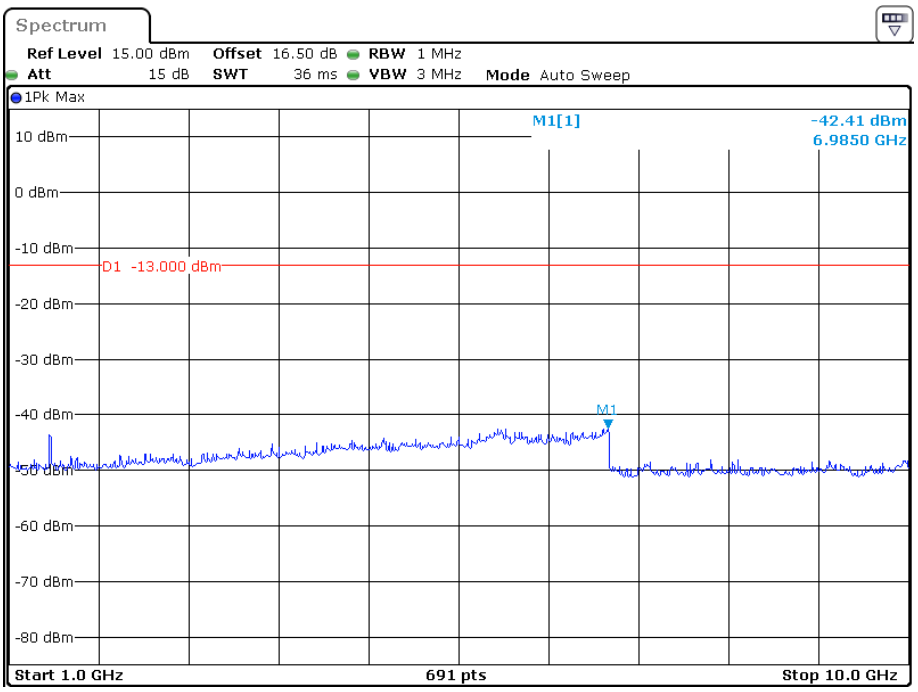
30 MHz – 1.0 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 25.MAY.2019 17:19:28

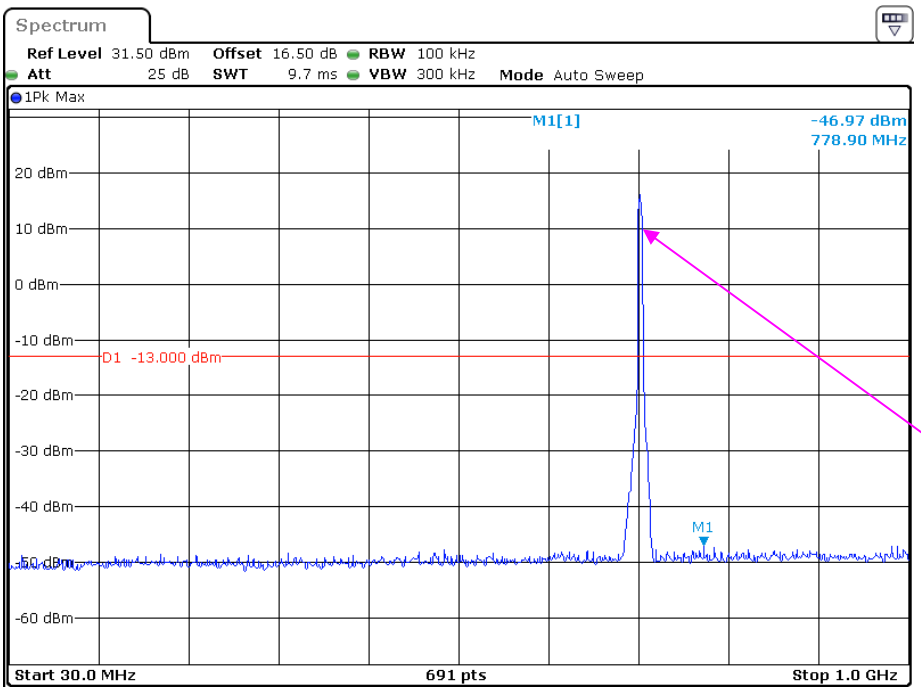
1 GHz – 10.0 GHz (10.0 MHz, Middle Channel)



Date: 25.MAY.2019 17:24:24

LTE Band 17:

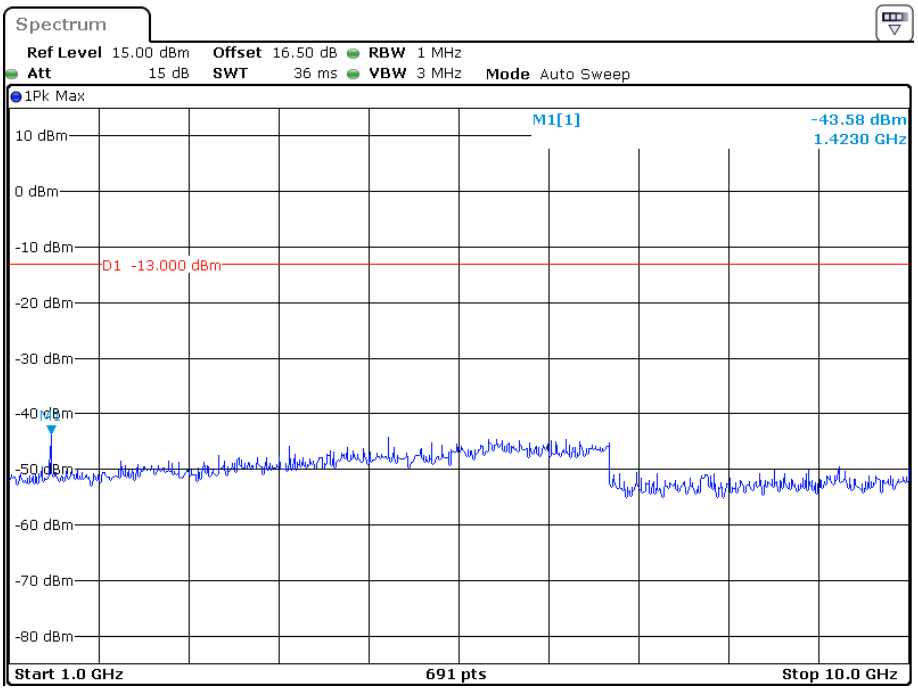
30 MHz – 1 GHz (5.0 MHz, Middle Channel)



Fundamental test

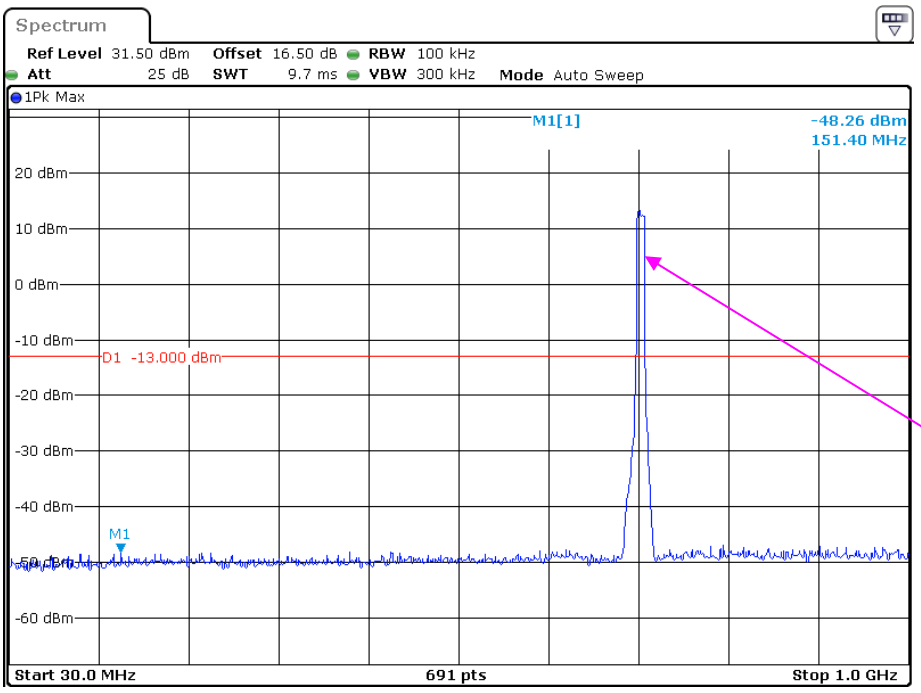
Date: 25.MAY.2019 17:21:33

1 GHz – 10.0 GHz (5.0 MHz, Middle Channel)



Date: 25.MAY.2019 17:22:56

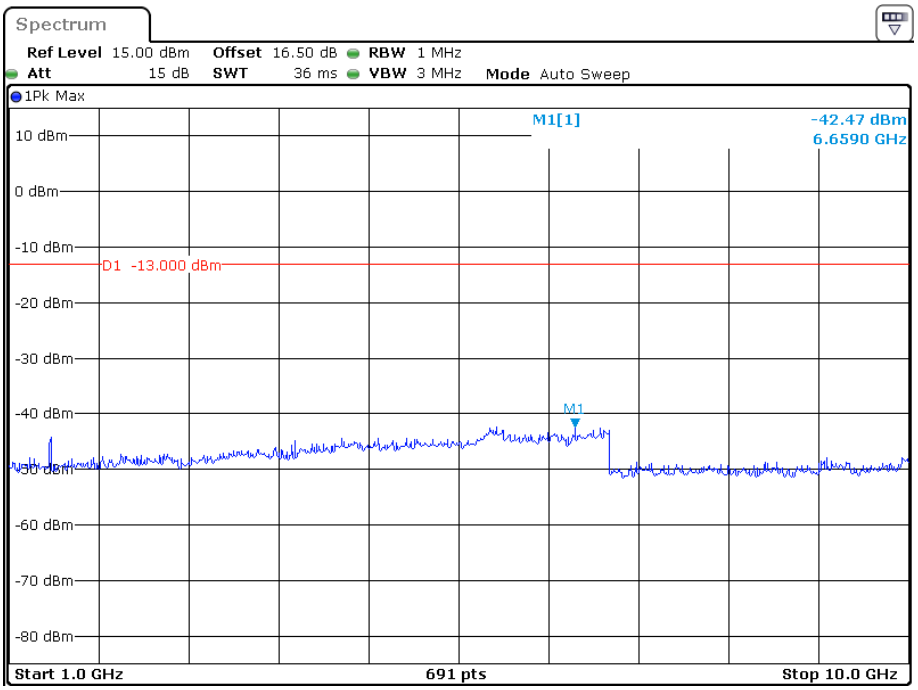
30 MHz – 1.0 GHz (10.0 MHz, Middle Channel)



Fundamental test

Date: 25.MAY.2019 17:21:03

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



Date: 25.MAY.2019 17:23:42

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

Applicable Standard

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

Test Procedure

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

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

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

Test Data

Environmental Conditions

Temperature:	25 ℃
Relative Humidity:	50 %
ATM Pressure:	101.0 kPa

The testing was performed by Curry Xiang on 2019-05-09.

EUT operation mode: Transmitting

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
241.62	32.67	196	1.2	H	-64.3	0.31	0	-64.61	-13	51.61
241.62	32.31	114	1.0	V	-64.7	0.31	0	-65.01	-13	52.01
1673.20	49.20	346	2.4	H	-57.1	1.30	8.90	-49.50	-13	36.50
1673.20	53.56	339	1.7	V	-52.2	1.30	8.90	-44.60	-13	31.60
2509.80	45.47	195	2.2	H	-57.9	2.60	10.20	-50.30	-13	37.30
2509.80	46.21	170	1.2	V	-56.5	2.60	10.20	-48.90	-13	35.90
3346.40	43.18	142	1.1	H	-57.7	1.50	11.70	-47.50	-13	34.50
3346.40	45.78	142	1.7	V	-55.1	1.50	11.70	-44.90	-13	31.90
WCDMA Mode, Middle channel										
241.62	32.04	35	2.3	H	-65.0	0.31	0	-65.31	-13	52.31
241.62	32.71	4	1.4	V	-64.3	0.31	0	-64.61	-13	51.61
1673.20	42.93	248	1.5	H	-63.4	1.30	8.90	-55.80	-13	42.80
1673.20	43.53	6	2.1	V	-62.2	1.30	8.90	-54.60	-13	41.60
2509.80	48.02	66	1.2	H	-55.3	2.60	10.20	-47.70	-13	34.70
2509.80	46.14	44	1.8	V	-56.6	2.60	10.20	-49.00	-13	36.00
3346.40	42.34	121	2.3	H	-58.6	1.50	11.70	-48.40	-13	35.40
3346.40	42.20	268	1.0	V	-58.7	1.50	11.70	-48.50	-13	35.50

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	2 Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
241.62	33.57	313	1.0	H	-63.4	0.31	0	-63.71	-13	50.71
241.62	32.20	188	2.2	V	-64.8	0.31	0	-65.11	-13	52.11
3760.00	44.17	154	1.0	H	-57.9	1.50	11.80	-47.60	-13	34.60
3760.00	44.59	322	1.3	V	-57.0	1.50	11.80	-46.70	-13	33.70
WCDMA Mode Band II, Middle channel										
241.62	32.50	271	1.8	H	-64.5	0.31	0	-64.81	-13	51.81
241.62	33.49	91	1.2	V	-63.5	0.31	0	-63.81	-13	50.81
3760.00	43.73	79	1.6	H	-58.3	1.50	11.80	-48.00	-13	35.00
3760.00	43.80	297	1.5	V	-57.8	1.50	11.80	-47.50	-13	34.50

30 MHz ~ 20 GHz:

AWS Band (Part 27)

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
241.62	32.82	275	1.6	H	-64.2	0.31	0	-64.51	-13	51.51
241.62	32.02	104	1.3	V	-65.0	0.31	0	-65.31	-13	52.31
3465.20	43.41	88	1.5	H	-57.3	1.50	12.00	-46.80	-13	33.80
3465.20	43.01	313	1.3	V	-58.5	1.50	12.00	-48.00	-13	35.00

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd)			
Band 2										
Test frequency range:30 MHz ~ 20 GHz										
241.62	32.14	322	2.2	H	-64.9	0.31	0	-65.21	-13	52.21
241.62	33.70	62	1.2	V	-63.3	0.31	0	-63.61	-13	50.61
3760.00	43.66	140	1.7	H	-58.4	1.50	11.80	-48.10	-13	35.10
3760.00	43.55	150	1.9	V	-58.0	1.50	11.80	-47.70	-13	34.70
Band 4										
Test frequency range:30 MHz ~ 20 GHz										
241.62	33.38	80	2.5	H	-63.6	0.31	0	-63.91	-13	50.91
241.62	33.91	64	1.6	V	-63.1	0.31	0	-63.41	-13	50.41
3465.00	42.52	178	1.9	H	-58.2	1.50	12.00	-47.70	-13	34.70
3465.00	43.30	108	1.9	V	-58.2	1.50	12.00	-47.70	-13	34.70
Band 5										
Test frequency range:30 MHz ~ 10 GHz										
241.62	33.25	131	1.0	H	-63.7	0.31	0	-64.01	-13	51.01
241.62	33.92	220	1.3	V	-63.1	0.31	0	-63.41	-13	50.41
1673.00	46.79	195	2.4	H	-59.5	1.30	8.90	-51.90	-13	38.90
1673.00	43.64	174	1.7	V	-62.1	1.30	8.90	-54.50	-13	41.50
2509.50	45.32	54	1.4	H	-58.0	2.60	10.20	-50.40	-13	37.40
2509.50	45.74	145	1.6	V	-57.0	2.60	10.20	-49.40	-13	36.40
3346.00	42.21	291	2.4	H	-58.7	1.50	11.70	-48.50	-13	35.50
3346.00	42.39	327	1.2	V	-58.5	1.50	11.70	-48.30	-13	35.30
Band 12										
Test frequency range:30 MHz ~ 10 GHz										
241.62	33.07	56	1.4	H	-63.9	0.31	0	-64.21	-13	51.21
241.62	32.47	52	1.4	V	-64.5	0.31	0	-64.81	-13	51.81
1415.00	42.96	218	2.4	H	-65.2	1.60	7.90	-58.90	-13	45.90
1415.00	43.08	35	1.7	V	-65.4	1.60	7.90	-59.10	-13	46.10
2122.50	42.65	85	1.0	H	-58.5	1.30	9.70	-50.10	-13	37.10
2122.50	42.20	145	2.1	V	-59.8	1.30	9.70	-51.40	-13	38.40
2830.00	43.44	71	1.6	H	-60.5	1.80	10.50	-51.80	-13	38.80
2830.00	42.47	197	1.9	V	-61.1	1.80	10.50	-52.40	-13	39.40
3537.50	43.16	291	1.5	H	-57.7	1.50	12.00	-47.20	-13	34.20
3537.50	43.46	174	1.6	V	-58.2	1.50	12.00	-47.70	-13	34.70

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi/dBd			
Band 17										
Test frequency range:30 MHz ~ 10 GHz										
241.62	33.08	264	1.4	H	-63.9	0.31	0	-64.21	-13	51.21
241.62	33.67	2	1.4	V	-63.3	0.31	0	-63.61	-13	50.61
1420.00	43.27	310	2.4	H	-64.9	1.60	7.90	-58.60	-13	45.60
1420.00	42.54	76	2.2	V	-65.9	1.60	7.90	-59.60	-13	46.60
2130.00	43.10	50	2.0	H	-58.0	1.30	9.70	-49.60	-13	36.60
2130.00	42.90	123	2.0	V	-59.1	1.30	9.70	-50.70	-13	37.70
2840.00	43.05	28	2.3	H	-60.9	1.80	10.50	-52.20	-13	39.20
2840.00	42.93	89	2.2	V	-60.7	1.80	10.50	-52.00	-13	39.00
3550.00	43.73	176	2.2	H	-58.0	1.50	12.10	-47.40	-13	34.40
3550.00	43.26	64	1.8	V	-57.9	1.50	12.10	-47.30	-13	34.30

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

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

Applicable Standard

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

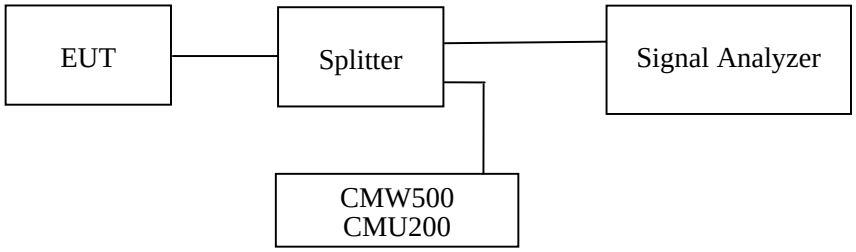
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

Test Procedure

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

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



Test Data

Environmental Conditions

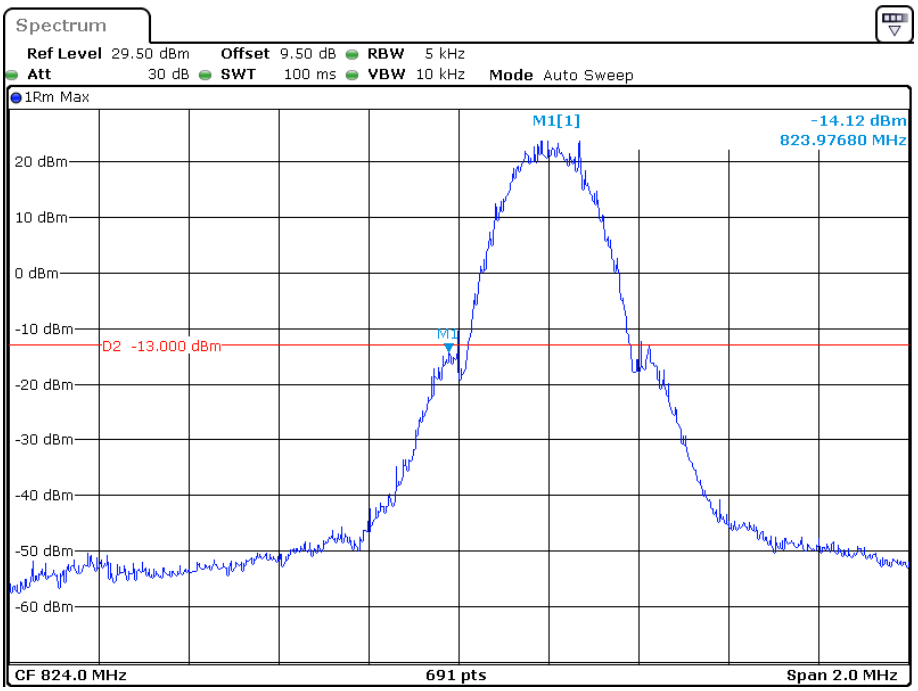
Temperature:	24~25 ℃
Relative Humidity:	50~55 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Kieron Luo on 2019-05-21 to 2019-05-24.

EUT operation mode: Transmitting

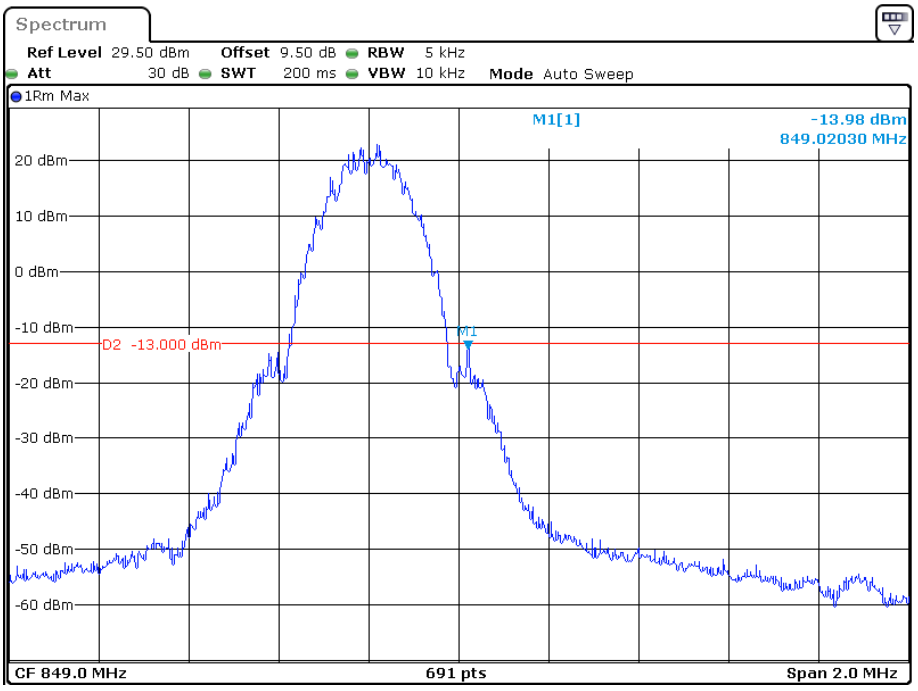
Test Result: Compliance. Please refer to the following plots.

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



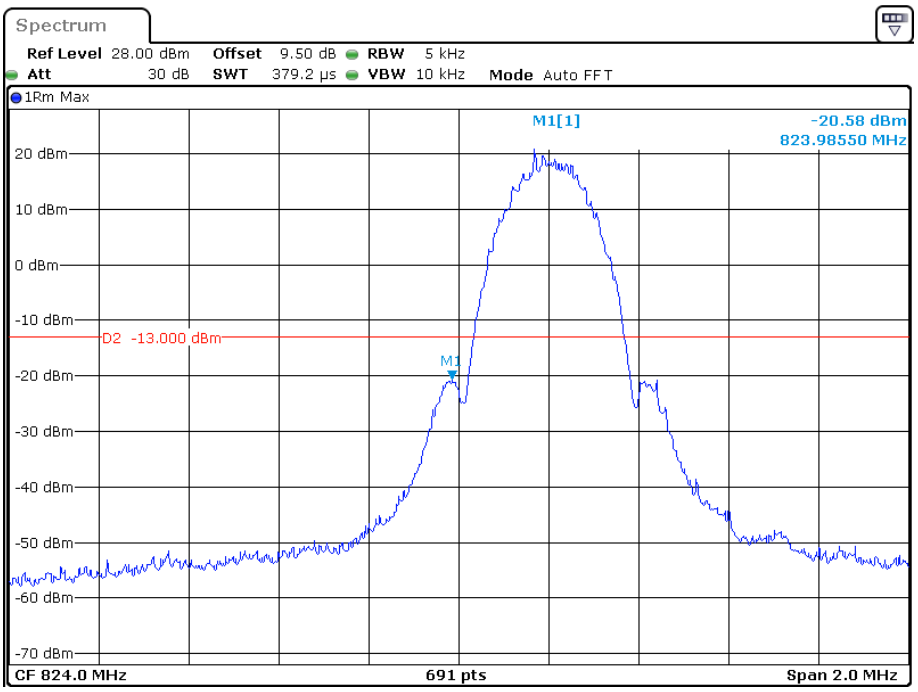
Date: 21.MAY.2019 16:18:35

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



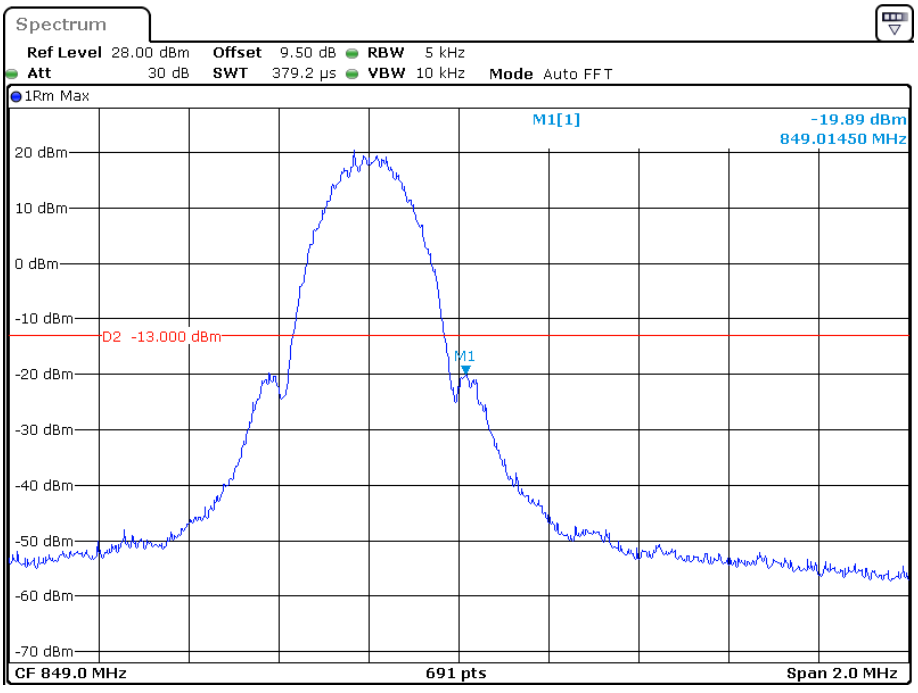
Date: 21.MAY.2019 16:20:52

Cellular Band, Left Band Edge for EDGE Mode



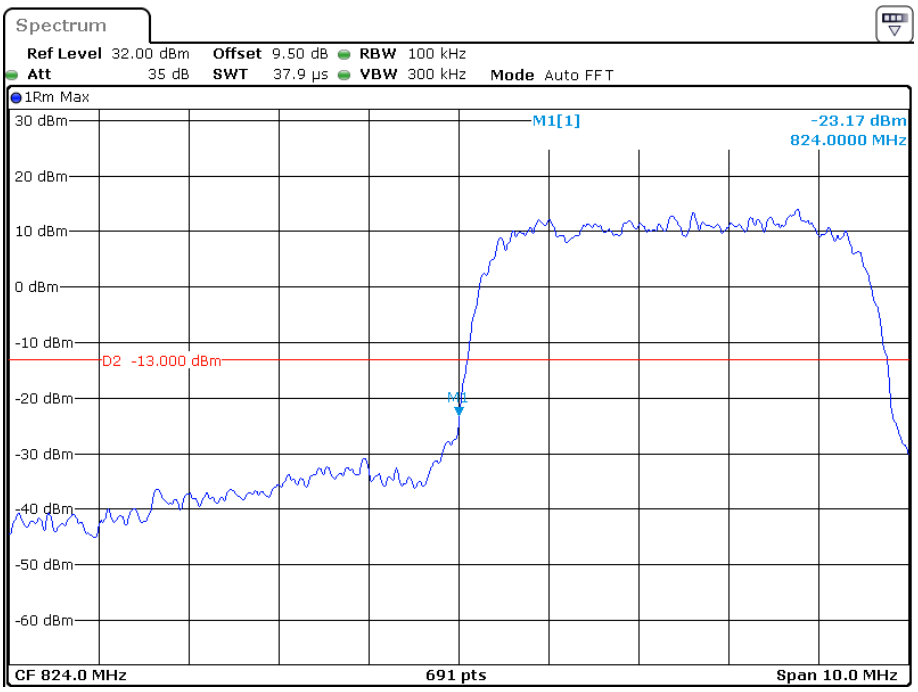
Date: 21.MAY.2019 16:02:27

Cellular Band, Right Band Edge for EDGE Mode



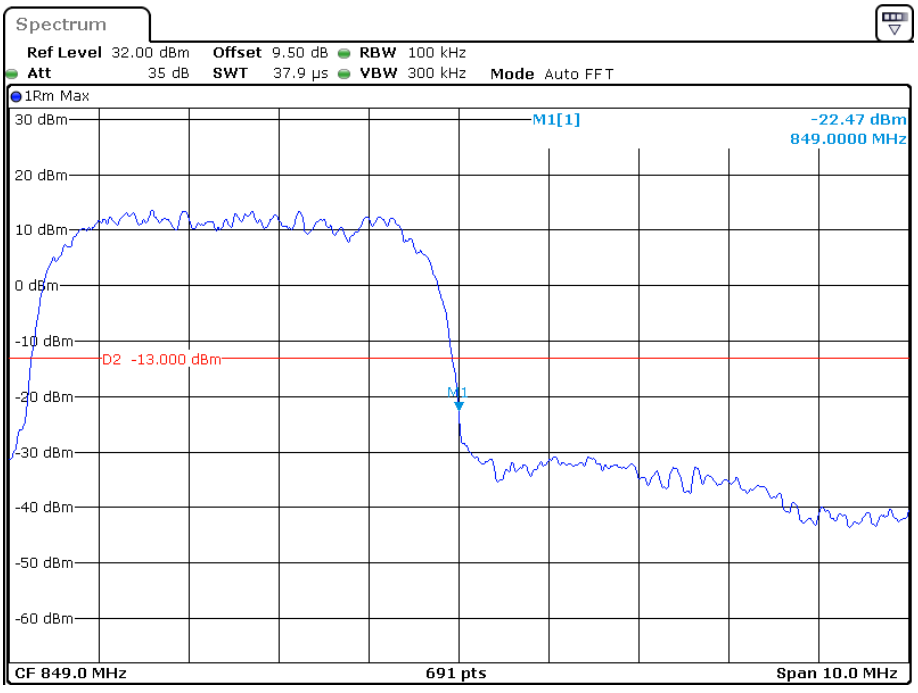
Date: 21.MAY.2019 16:04:42

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



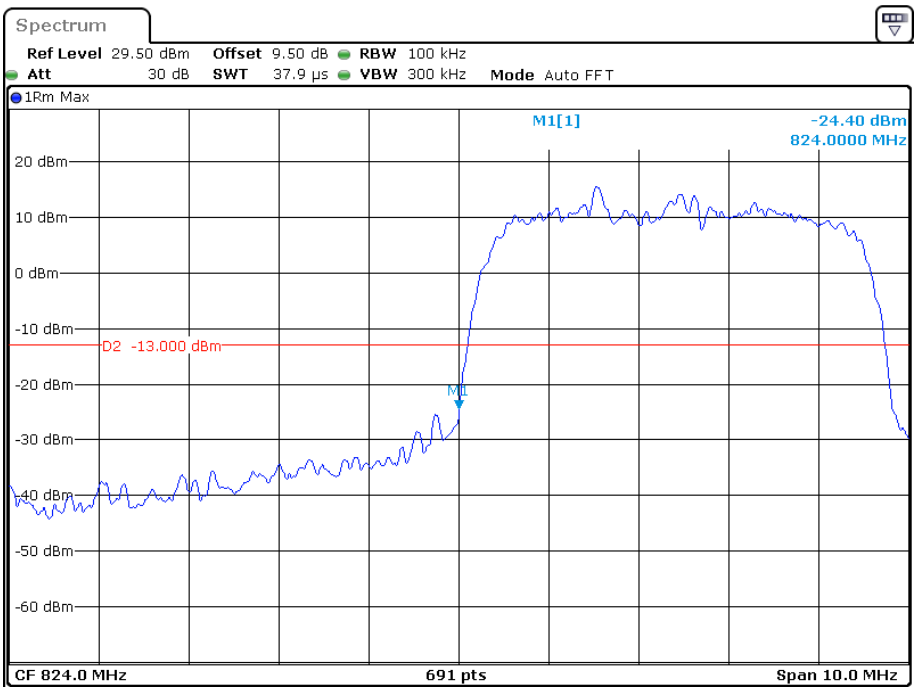
Date: 21.MAY.2019 17:16:35

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



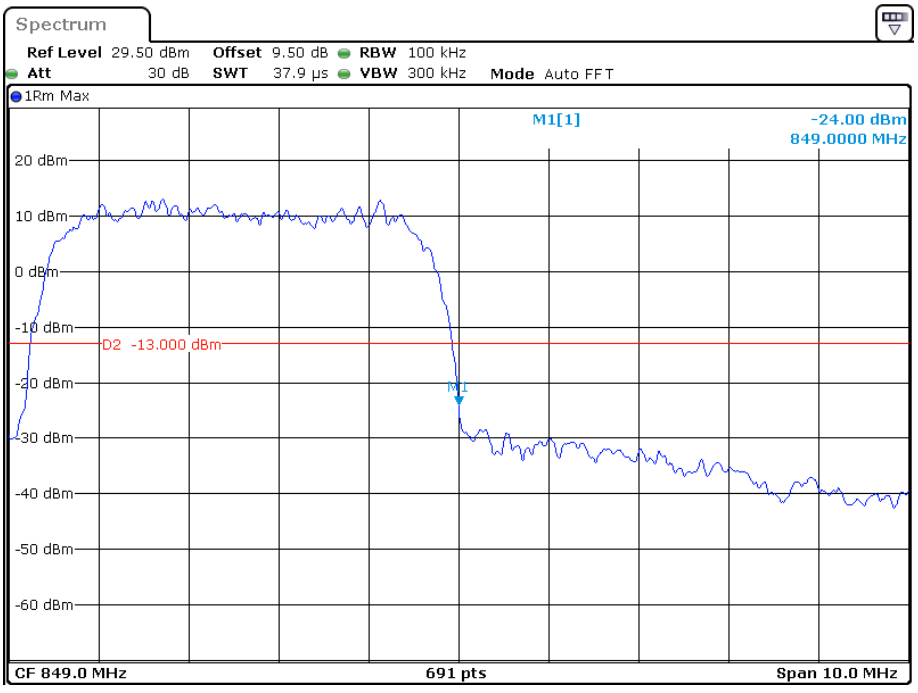
Date: 21.MAY.2019 17:17:25

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



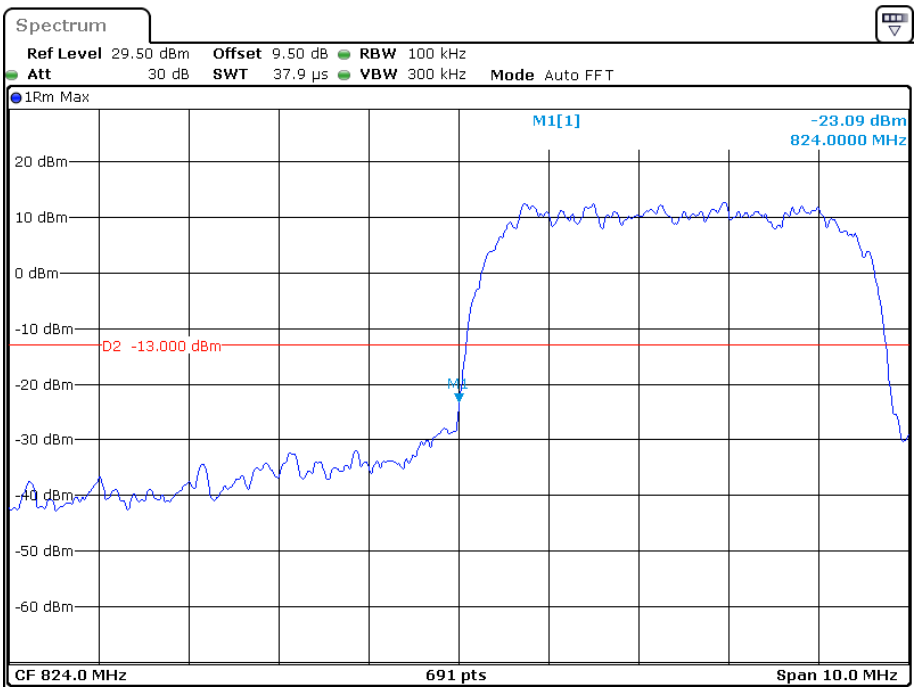
Date: 21.MAY.2019 18:13:24

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



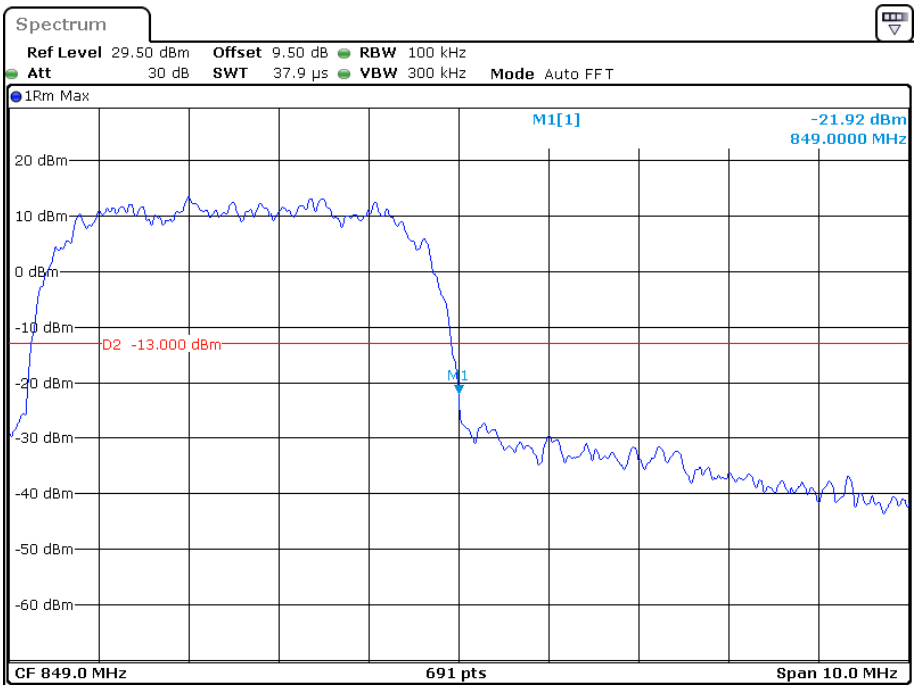
Date: 21.MAY.2019 18:14:02

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



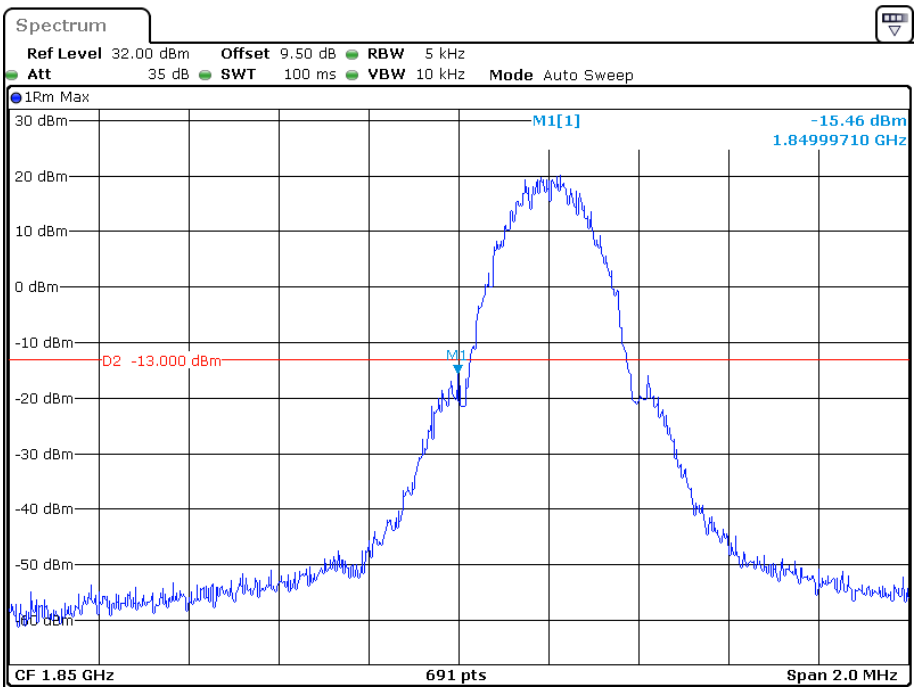
Date: 21.MAY.2019 18:36:18

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



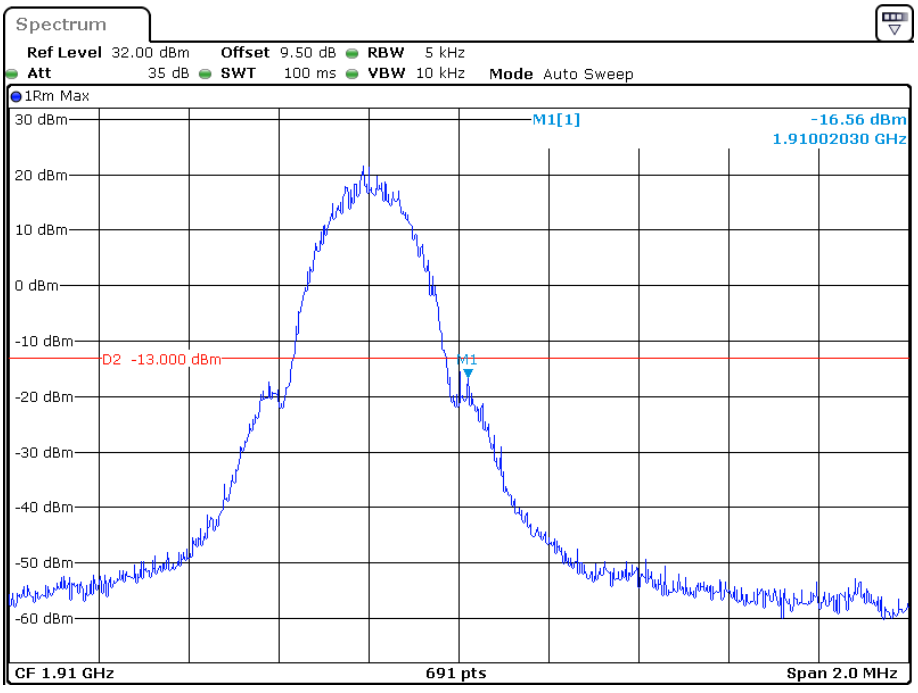
Date: 21.MAY.2019 18:37:35

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



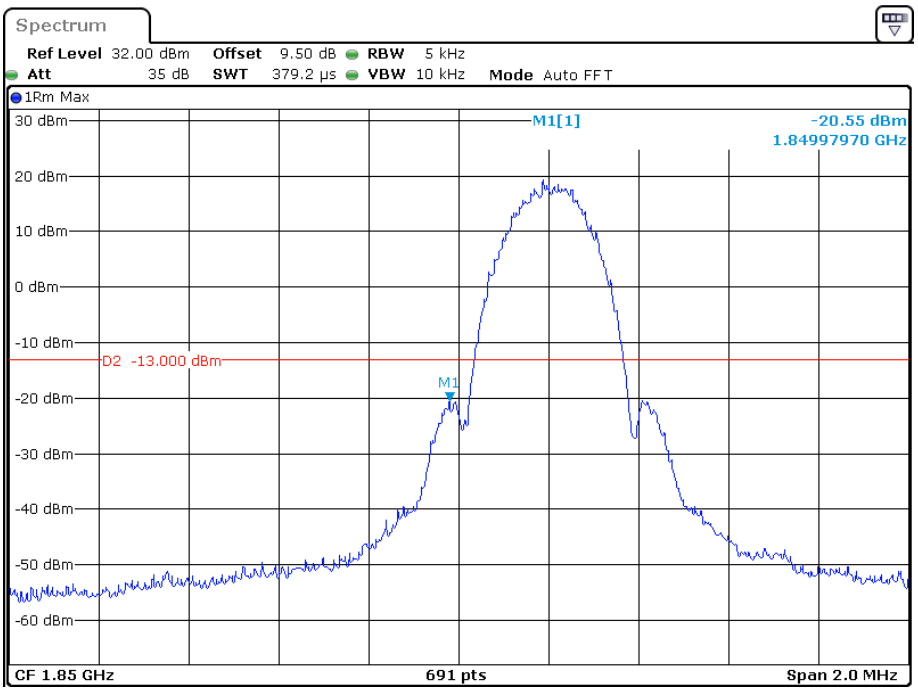
Date: 21.MAY.2019 16:44:43

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



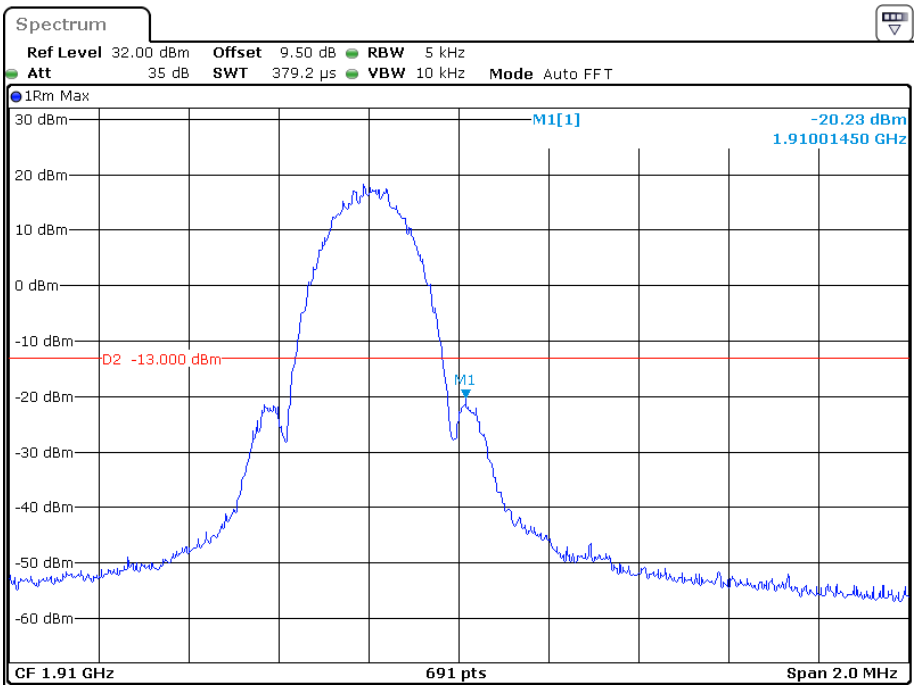
Date: 21.MAY.2019 16:46:16

PCS Band, Left Band Edge for EDGE Mode



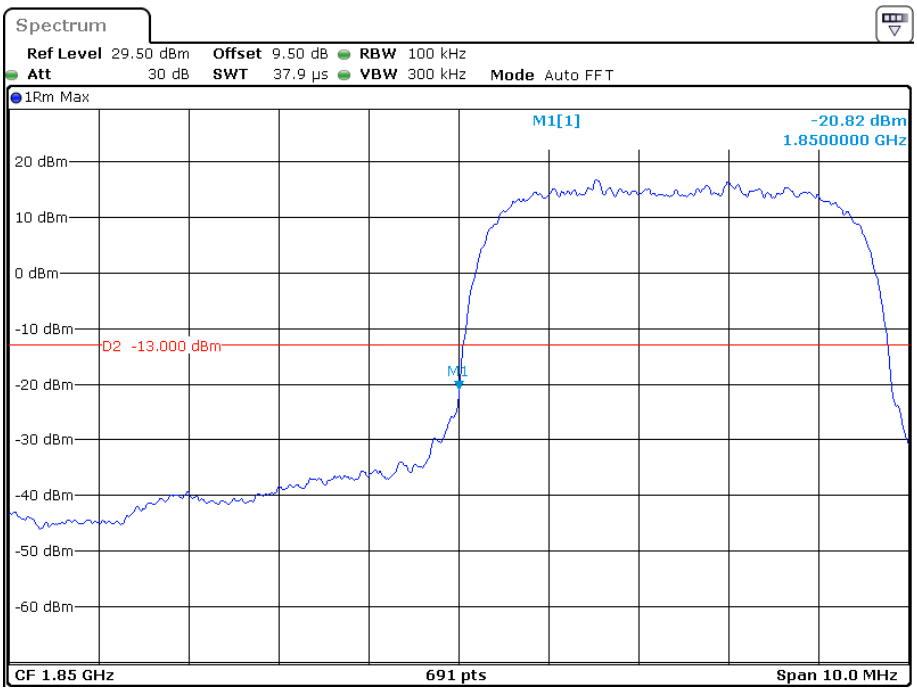
Date: 21.MAY.2019 16:59:09

PCS Band, Right Band Edge for EDGE Mode



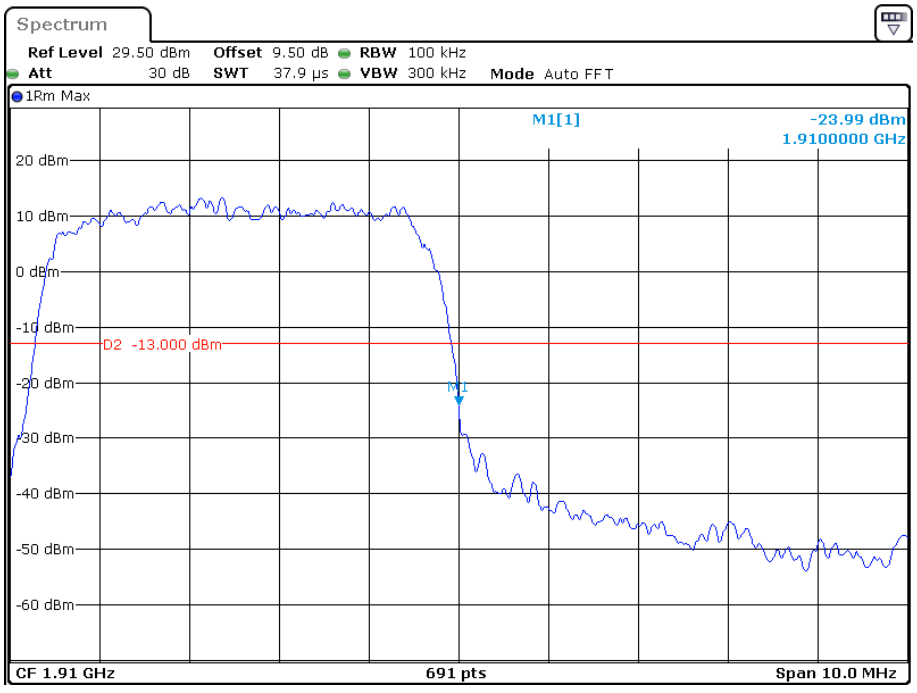
Date: 21.MAY.2019 16:58:03

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



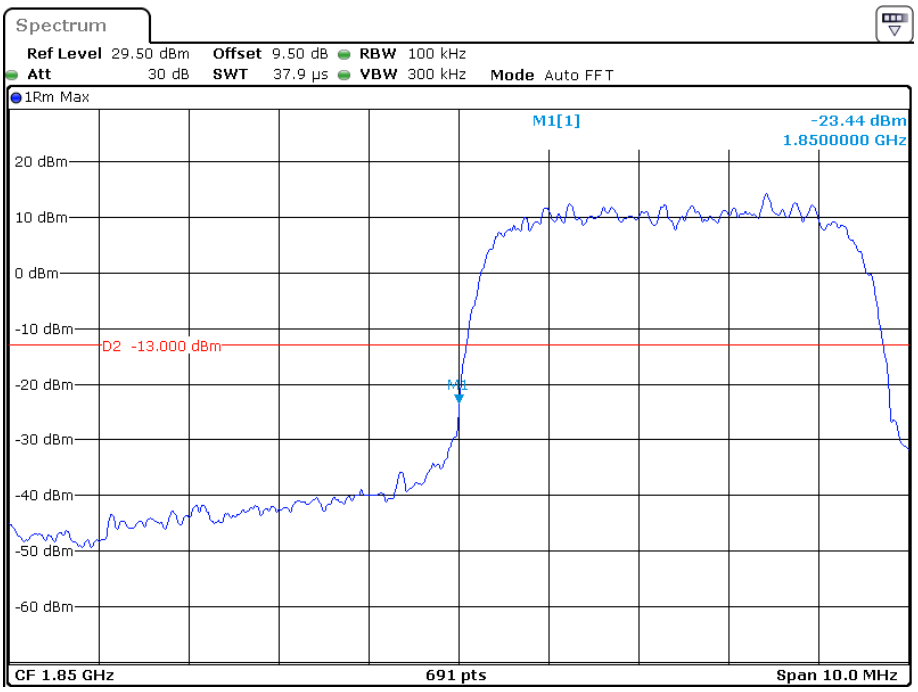
Date: 21.MAY.2019 17:39:24

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



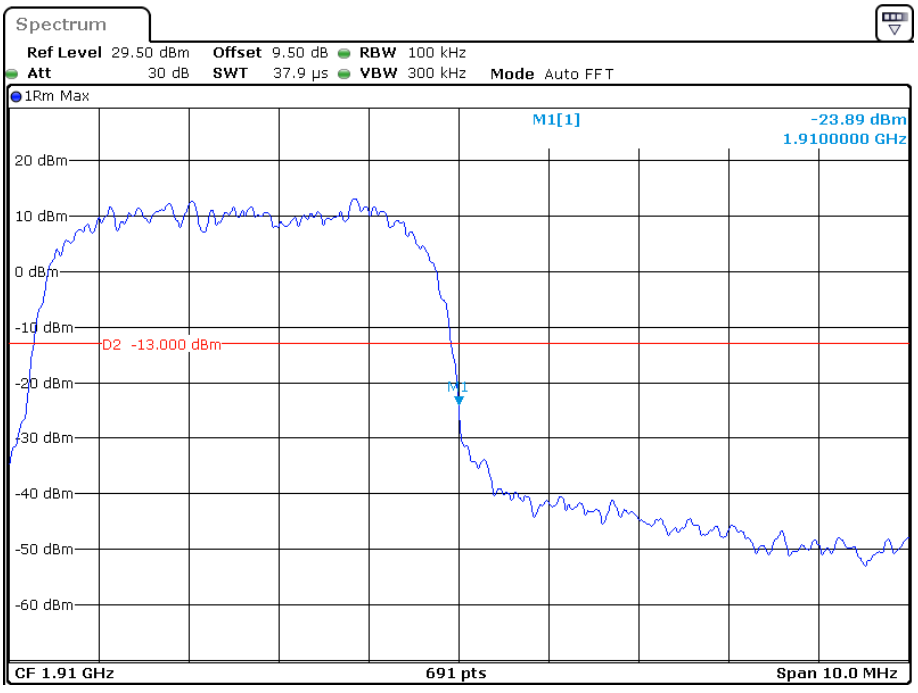
Date: 21.MAY.2019 17:40:23

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



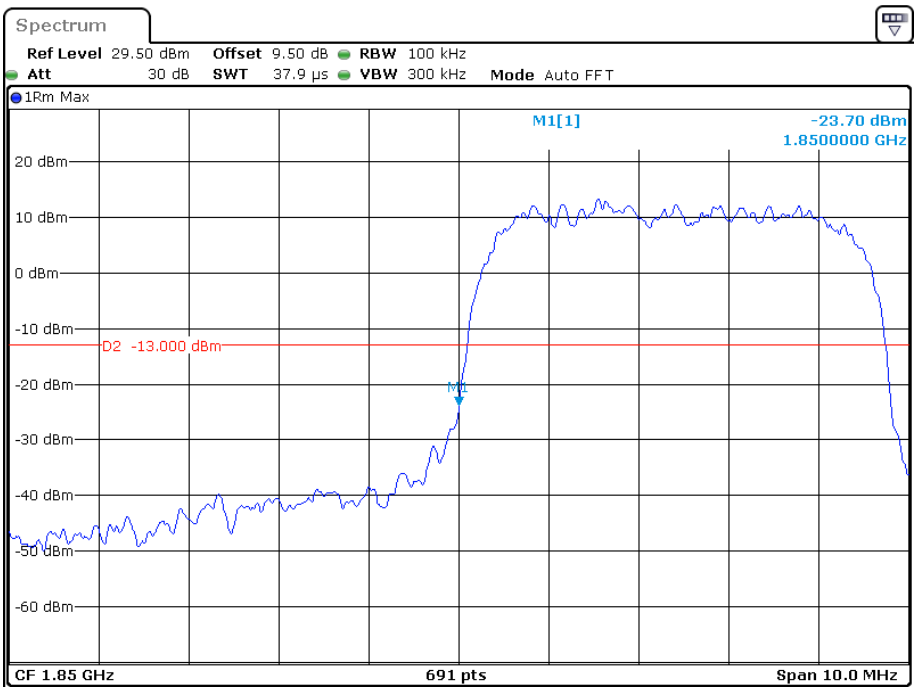
Date: 21.MAY.2019 18:21:41

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



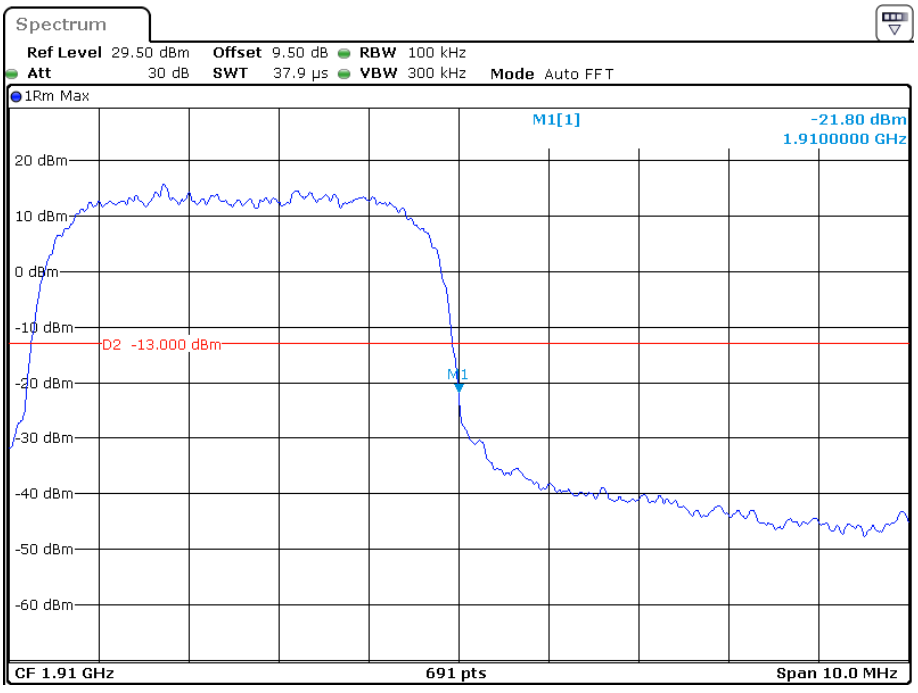
Date: 21.MAY.2019 18:22:24

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



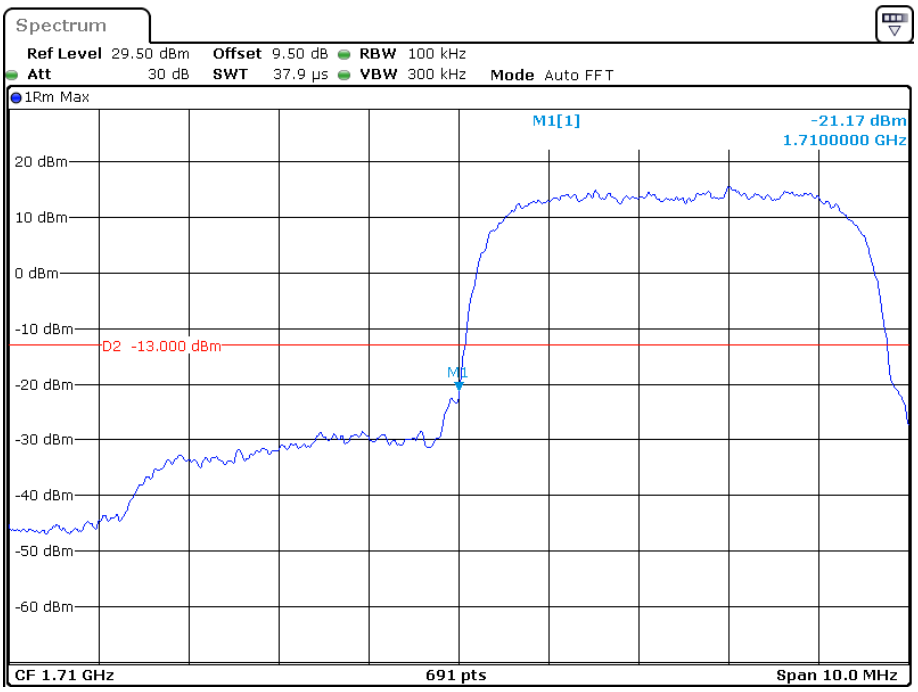
Date: 21.MAY.2019 18:27:10

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



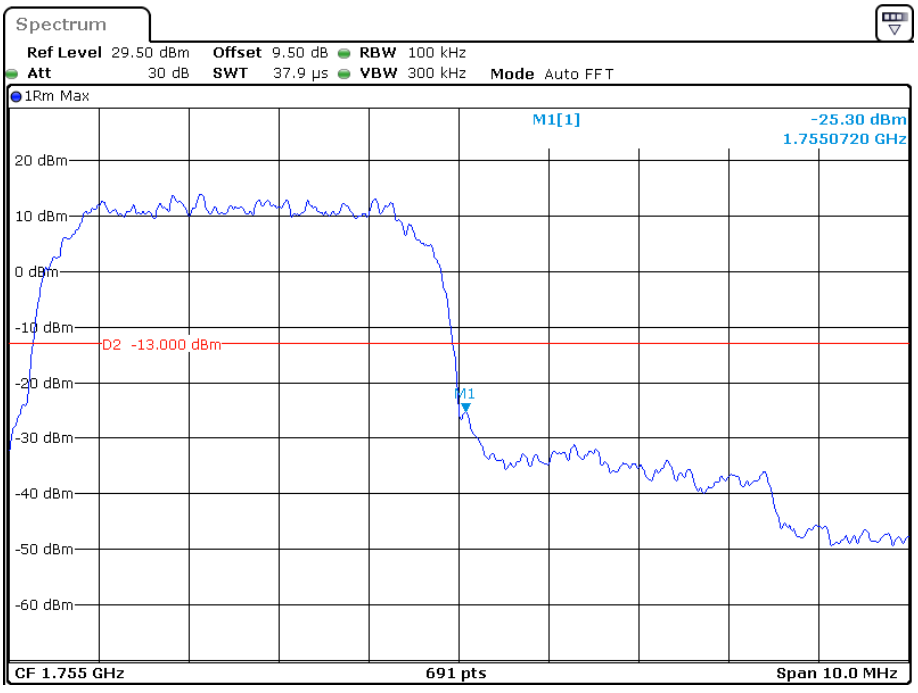
Date: 21.MAY.2019 18:26:19

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



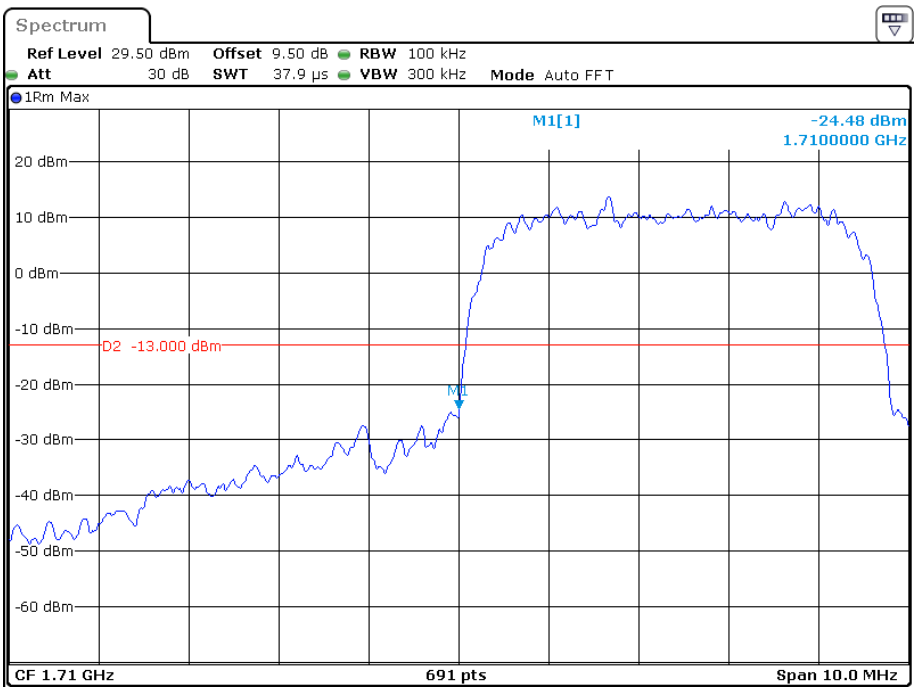
Date: 21.MAY.2019 17:55:20

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



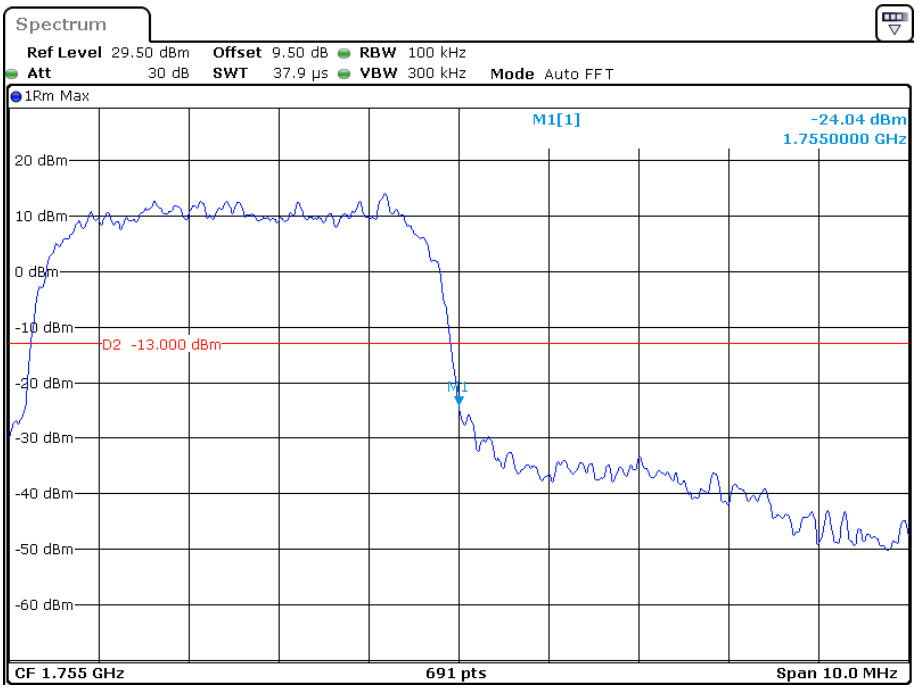
Date: 21.MAY.2019 17:54:06

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



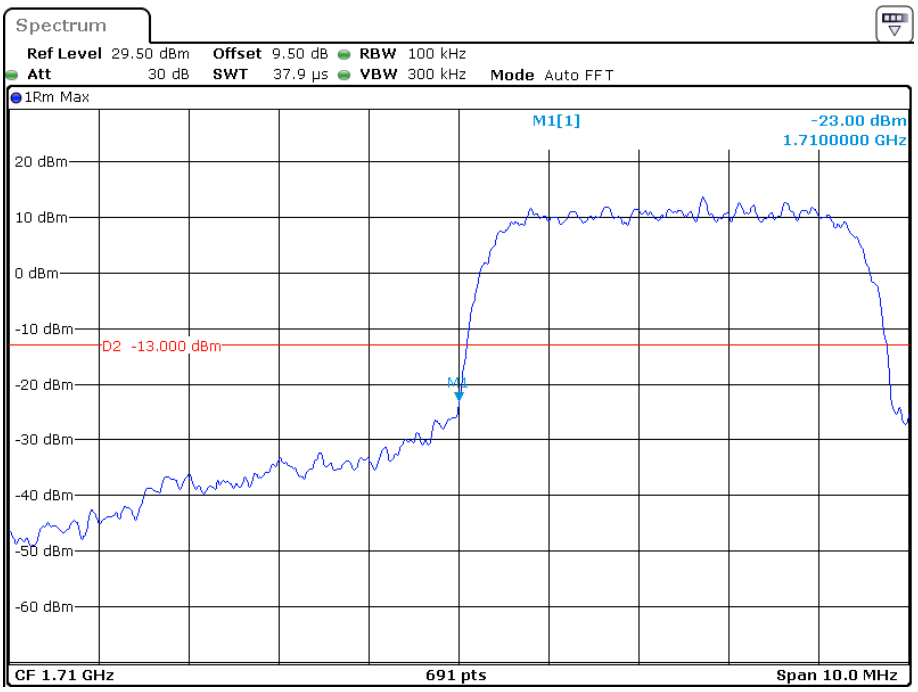
Date: 21.MAY.2019 18:10:41

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



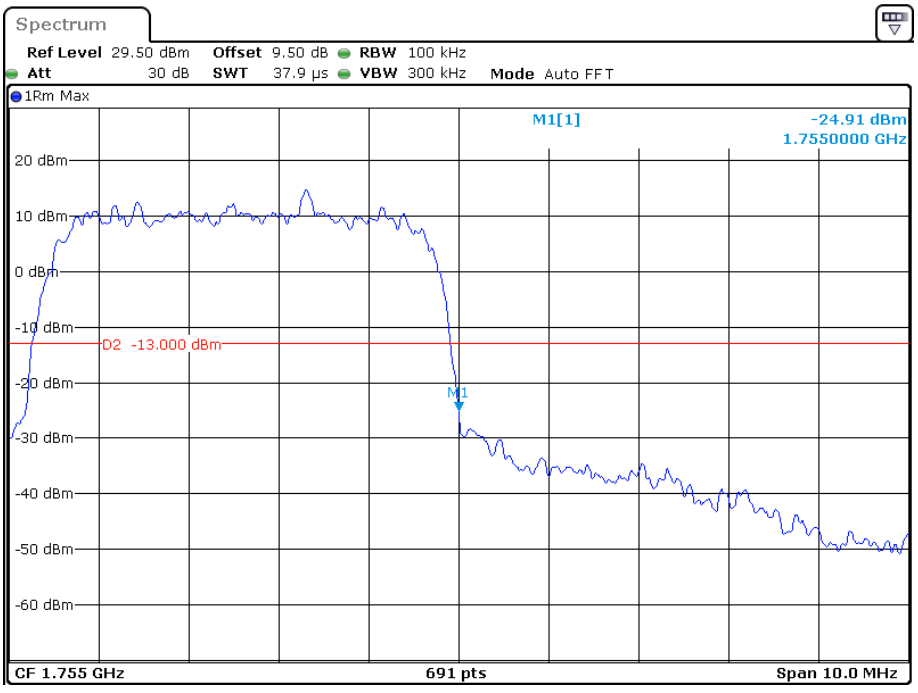
Date: 21.MAY.2019 18:11:33

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



Date: 21.MAY.2019 18:33:57

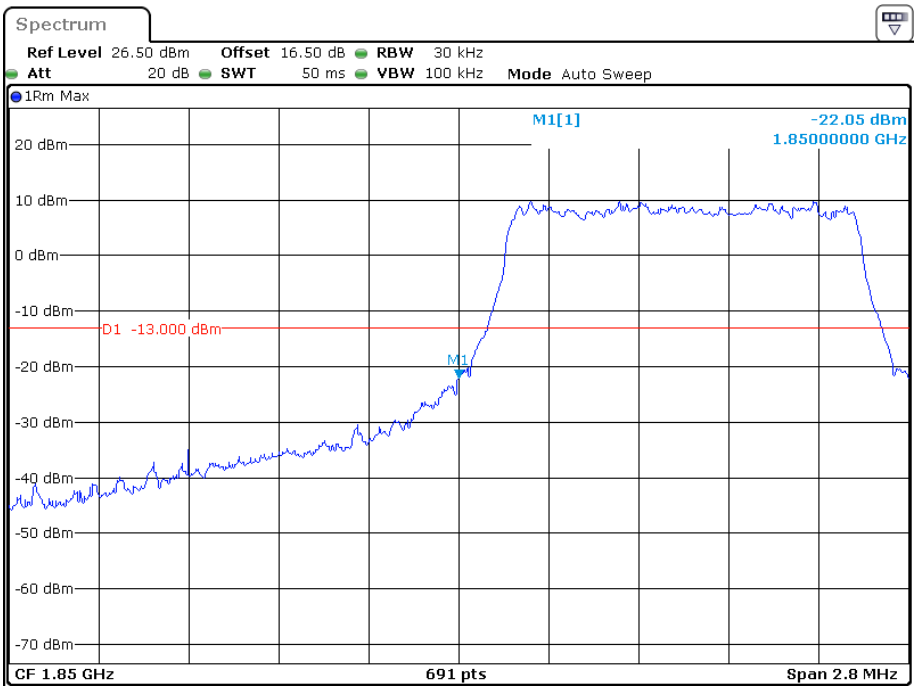
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



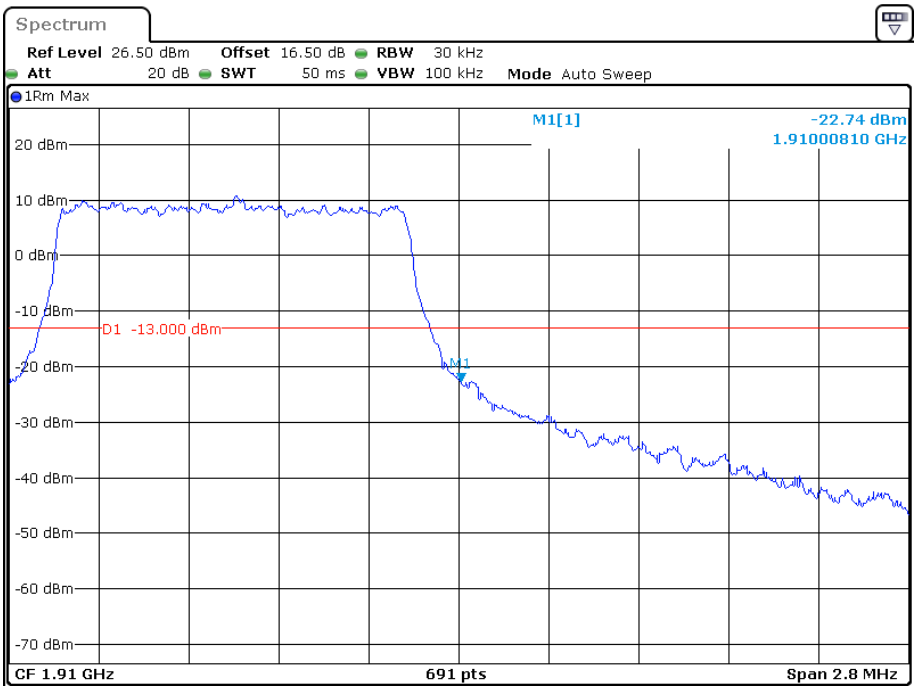
Date: 21.MAY.2019 18:34:49

Band 2:

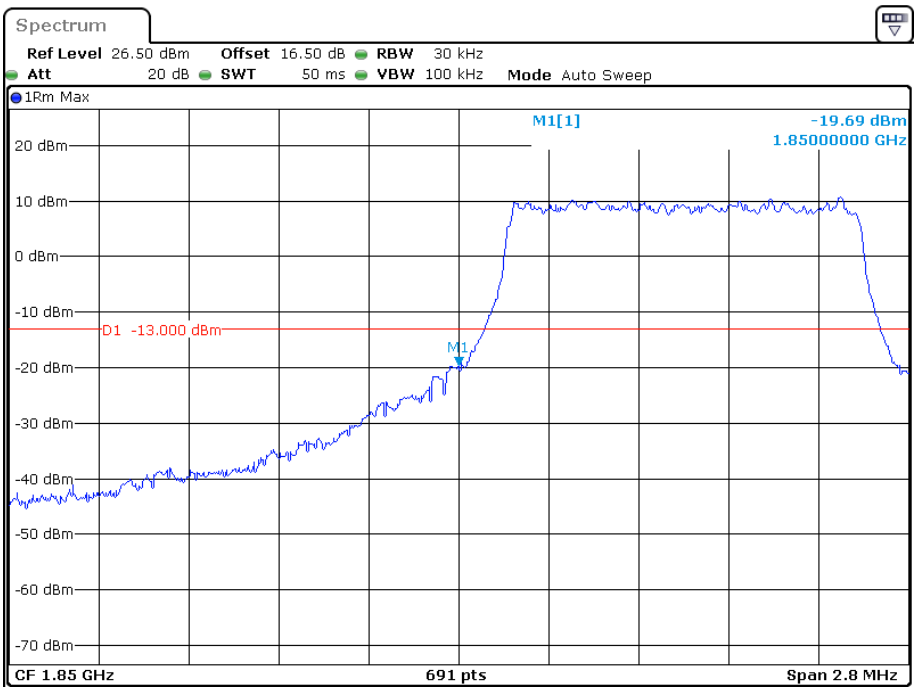
QPSK (1.4 MHz, FULL RB) - Left Band Edge



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

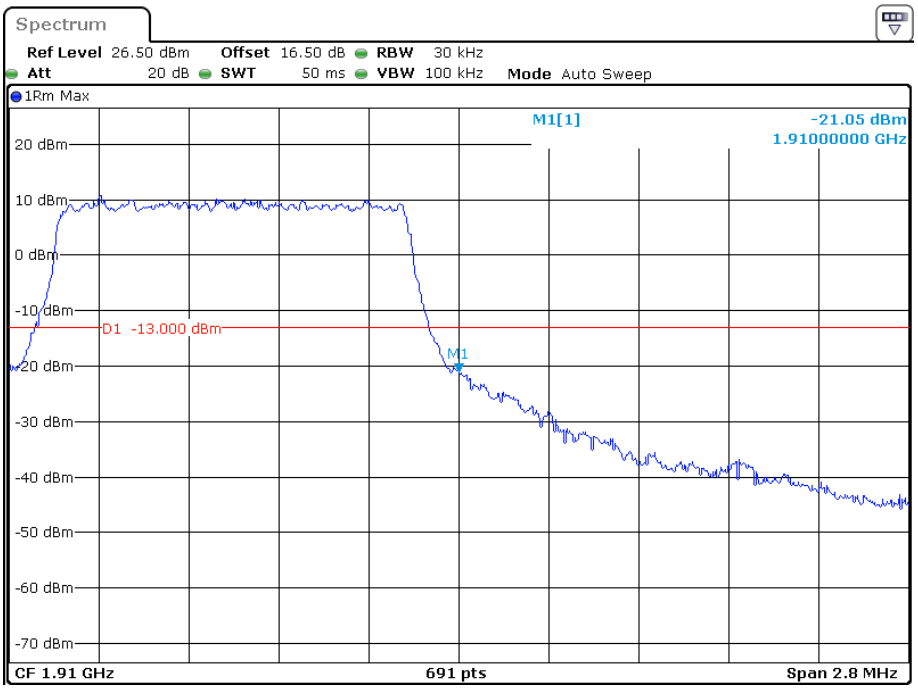


16-QAM (1.4 MHz, FULL RB) - Left Band Edge



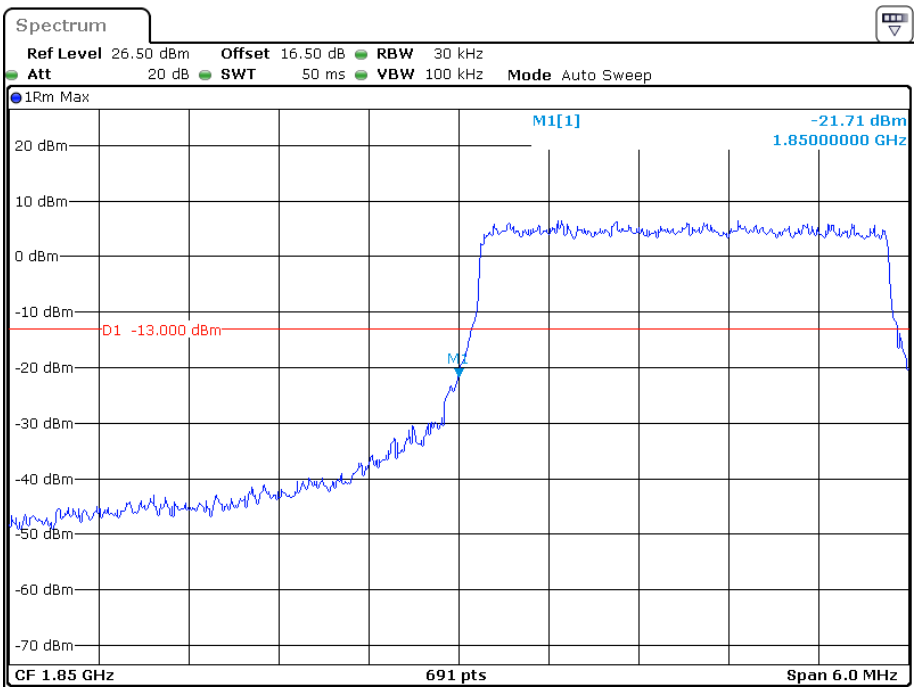
Date: 24.MAY.2019 19:20:59

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



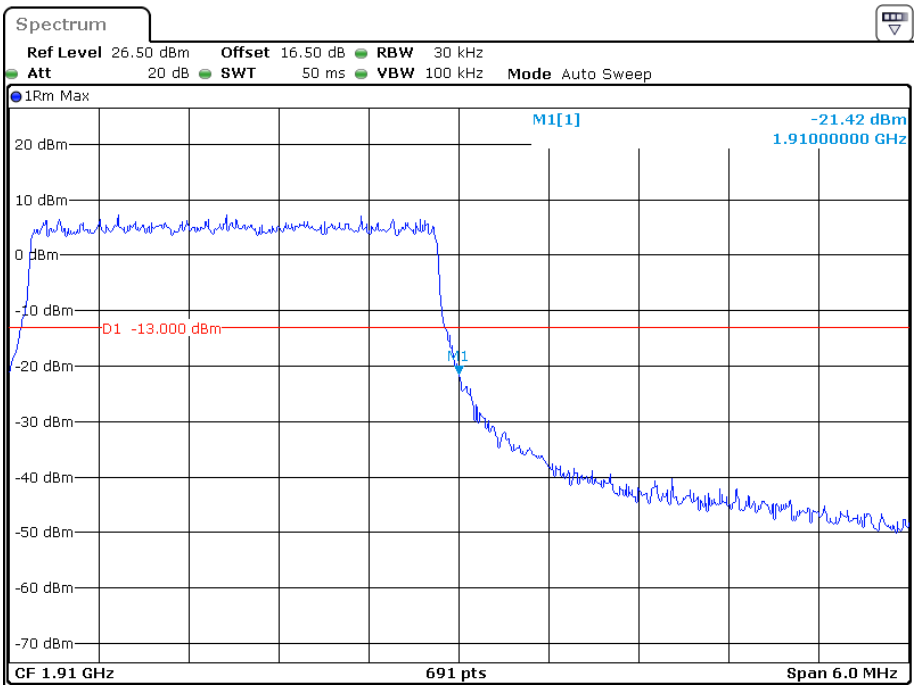
Date: 24.MAY.2019 19:19:29

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



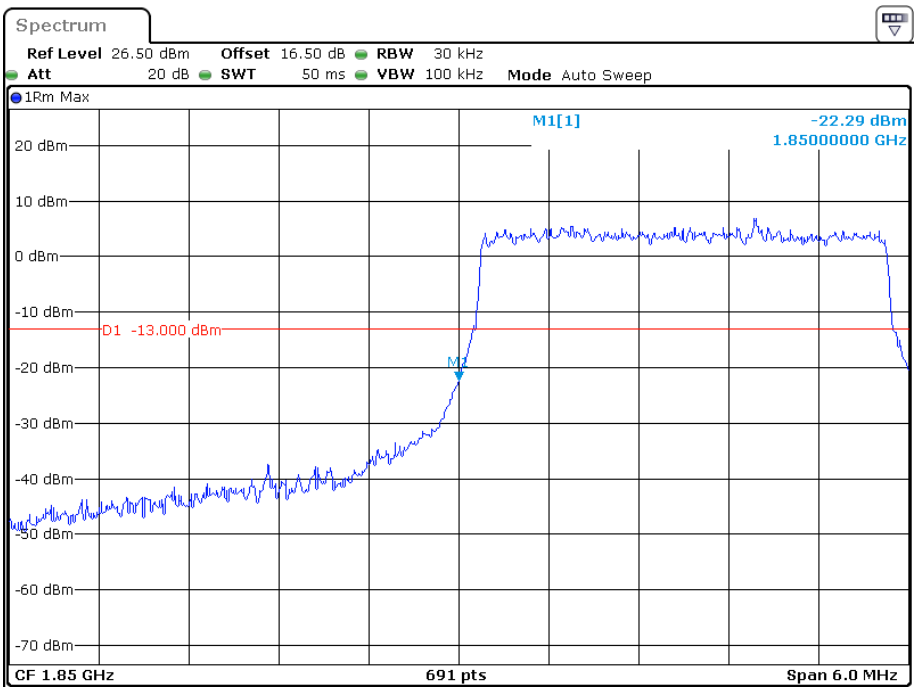
Date: 24.MAY.2019 19:15:28

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



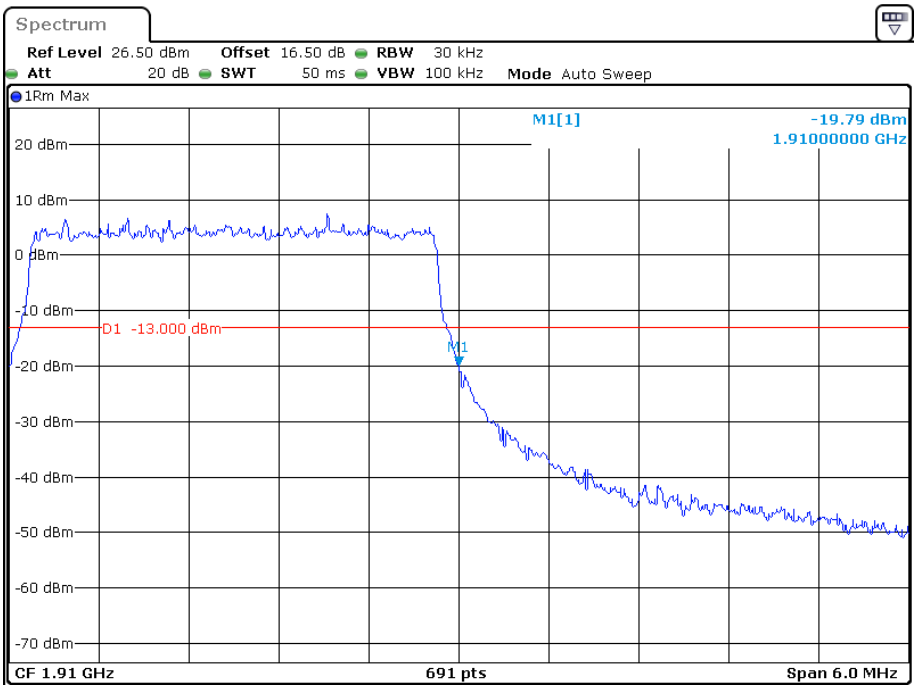
Date: 24.MAY.2019 19:17:35

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



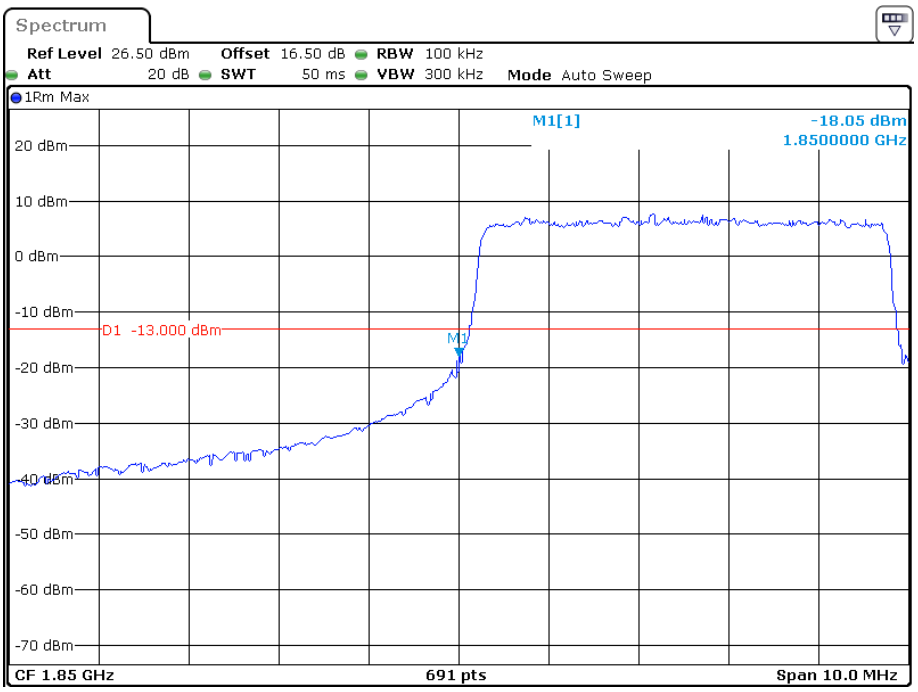
Date: 24.MAY.2019 19:15:55

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



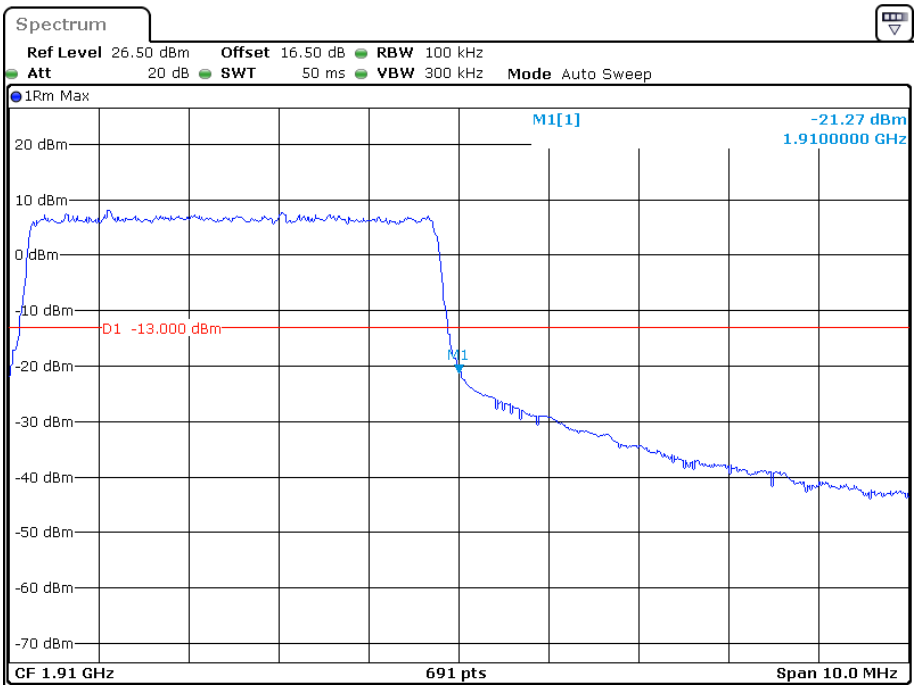
Date: 24.MAY.2019 19:17:11

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



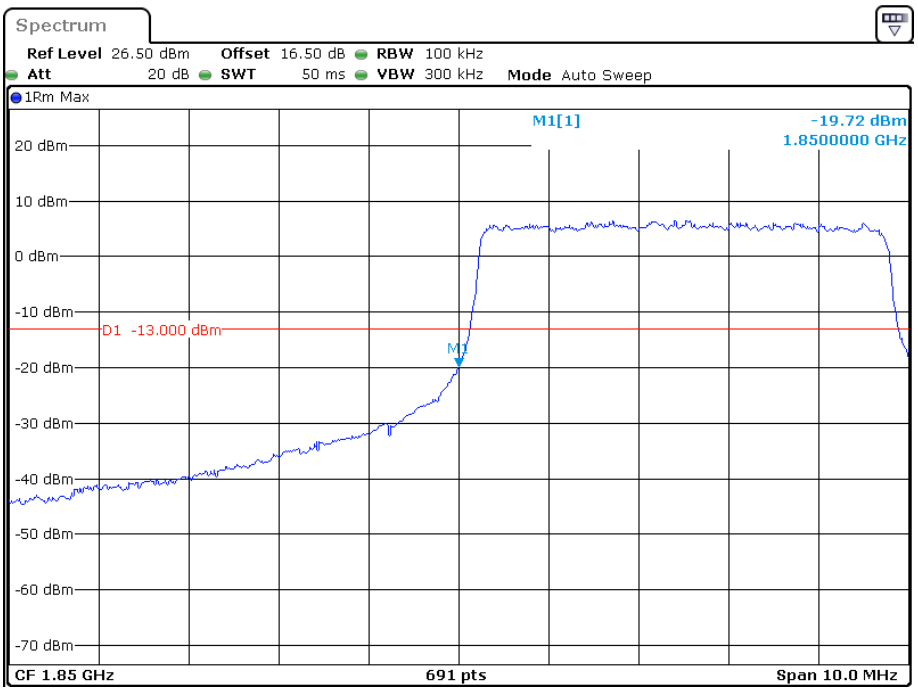
Date: 24.MAY.2019 19:14:19

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



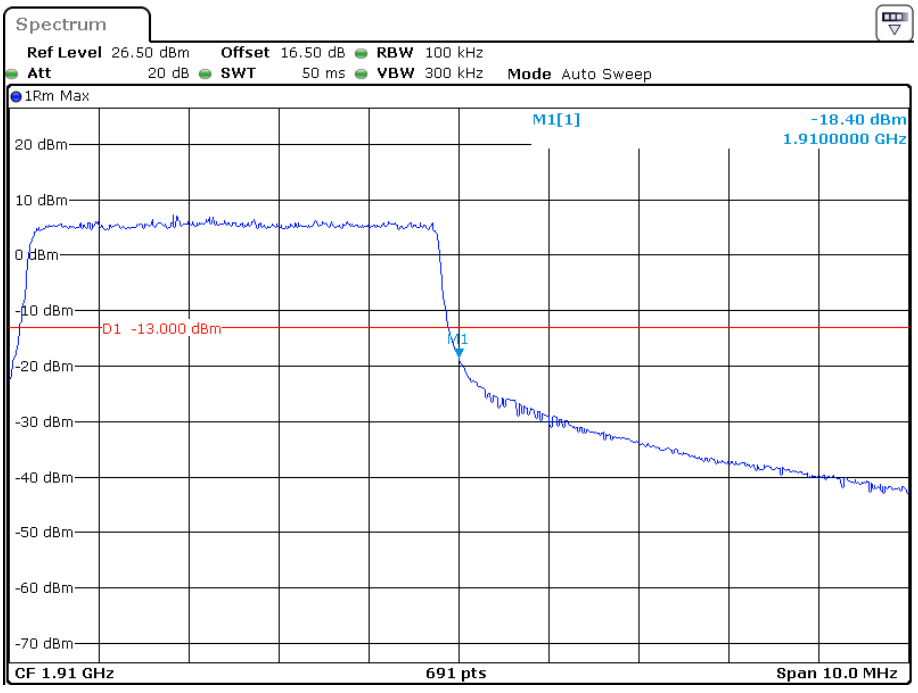
Date: 24.MAY.2019 19:12:10

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



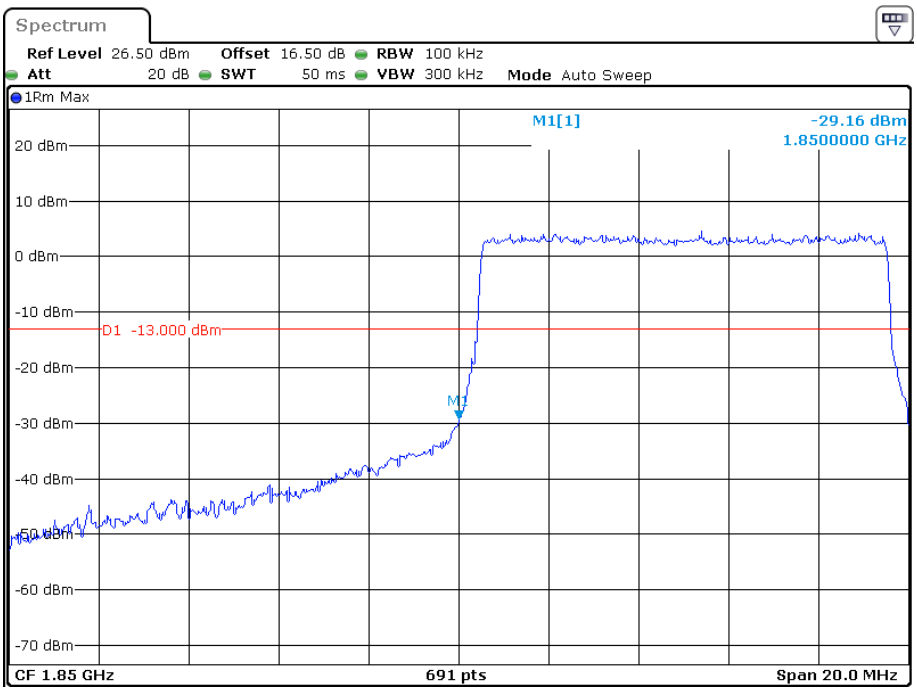
Date: 24.MAY.2019 19:13:41

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



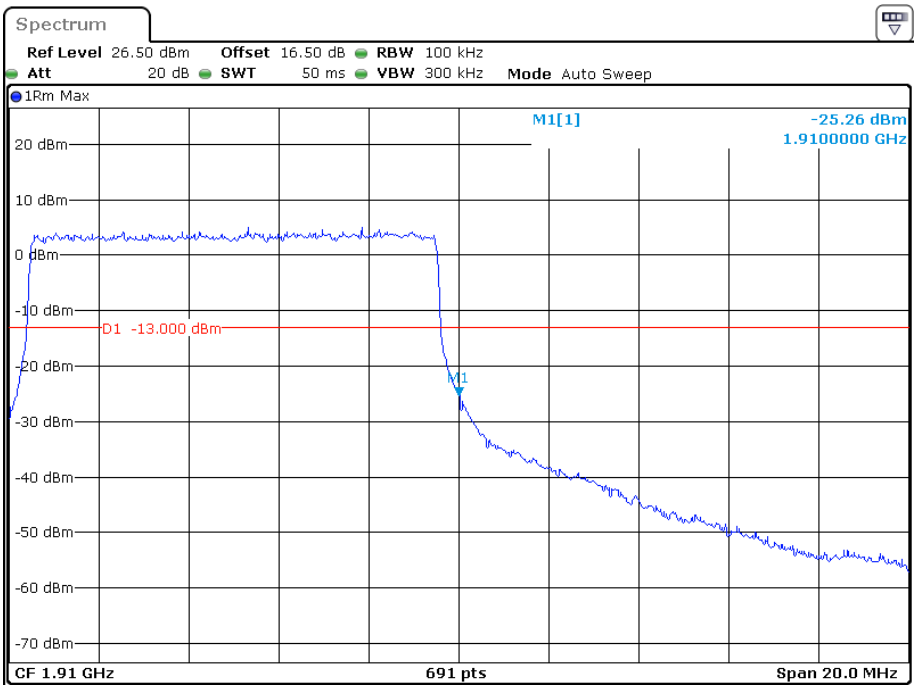
Date: 24.MAY.2019 19:12:37

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



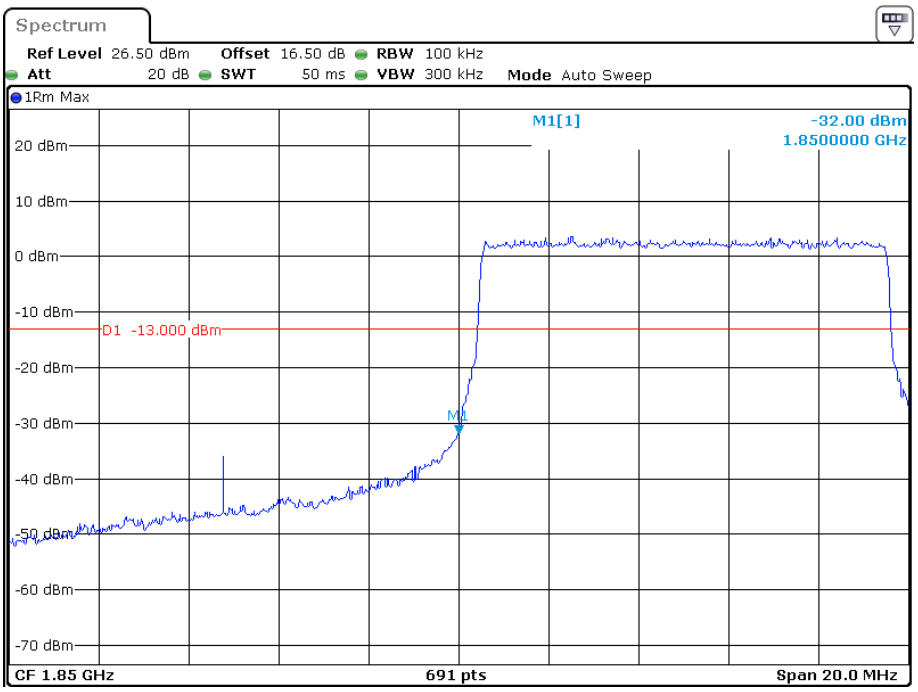
Date: 24.MAY.2019 19:08:41

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



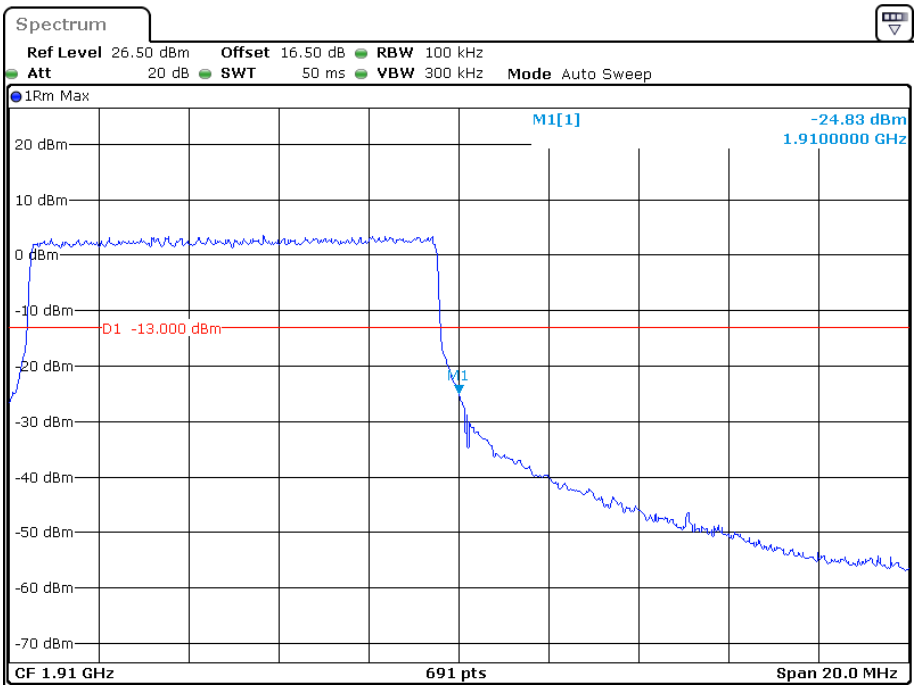
Date: 24.MAY.2019 19:11:06

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



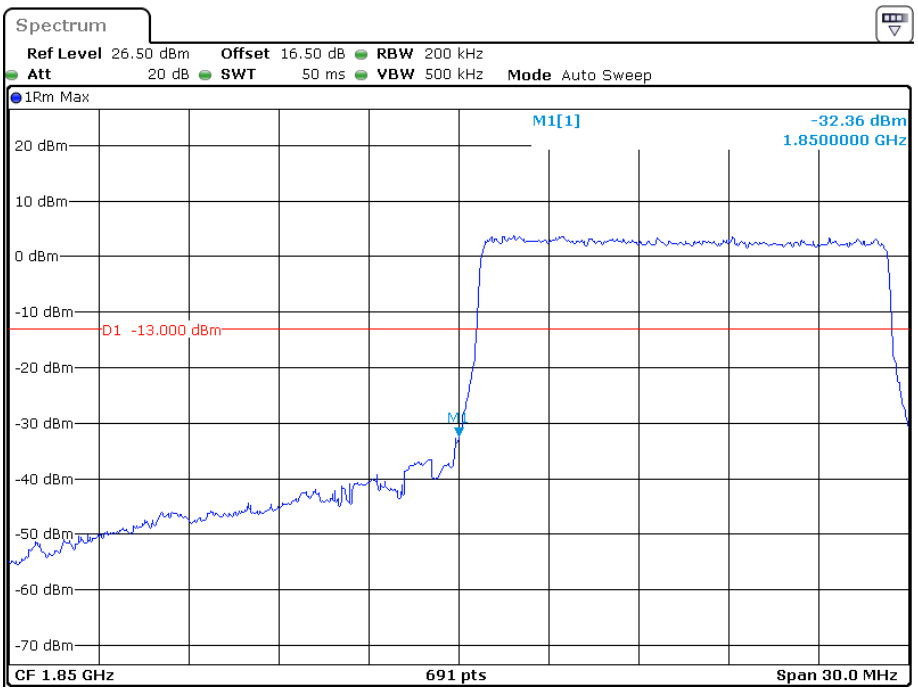
Date: 24.MAY.2019 19:09:10

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



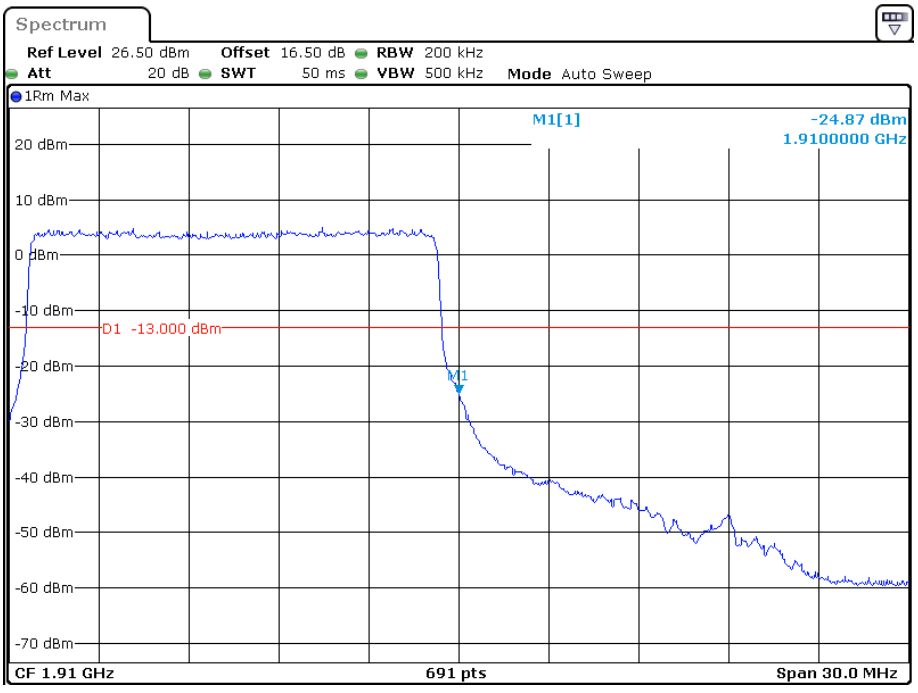
Date: 24.MAY.2019 19:10:29

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



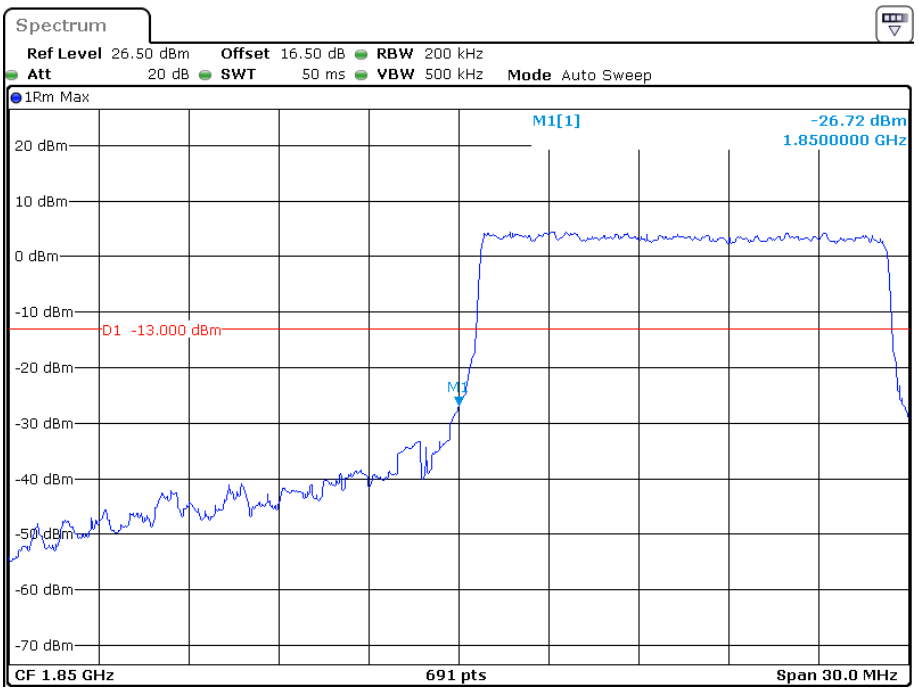
Date: 24.MAY.2019 19:07:45

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



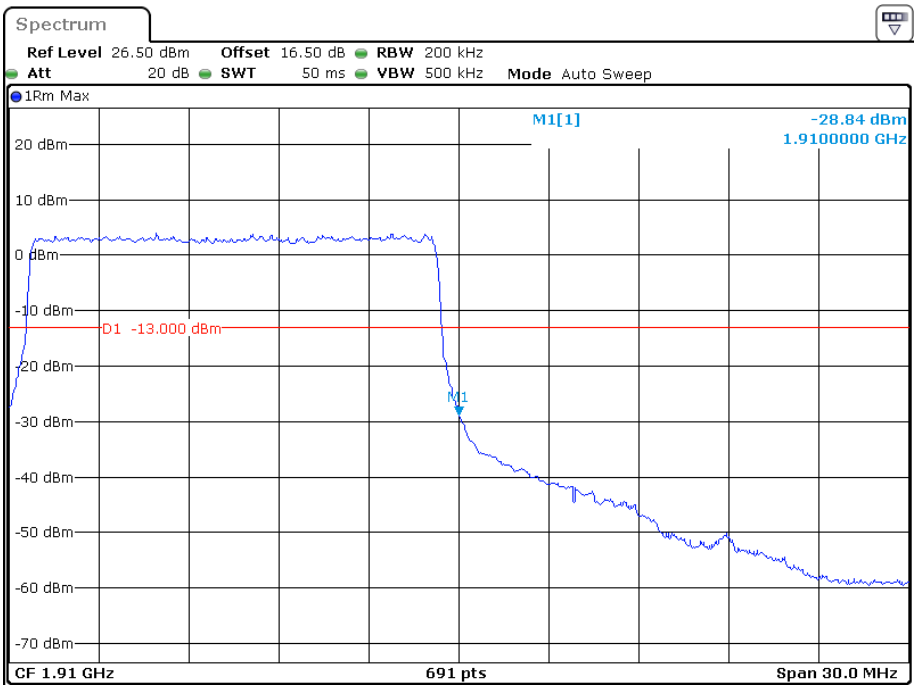
Date: 24.MAY.2019 19:04:52

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



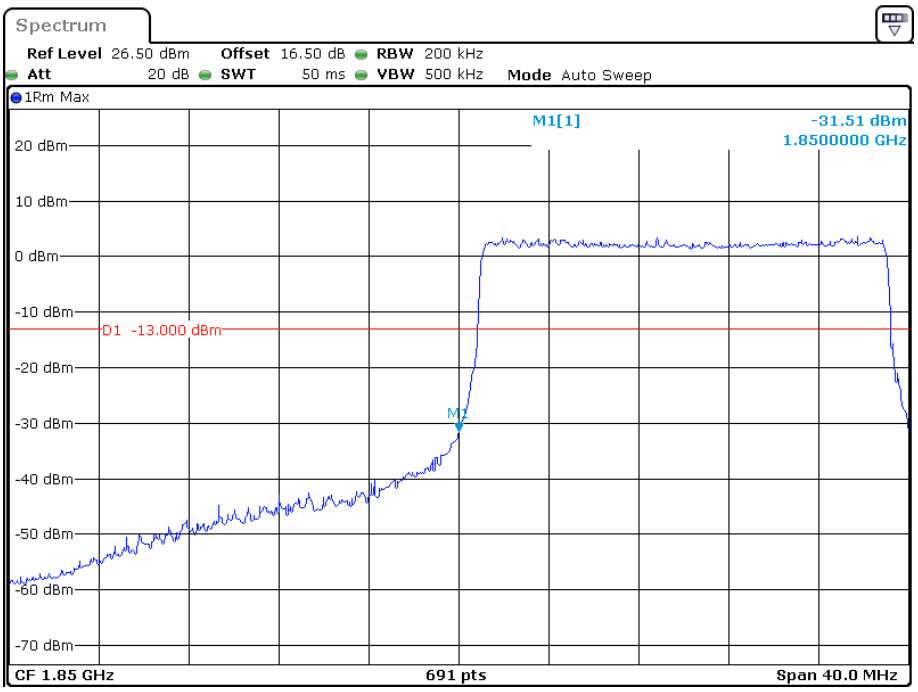
Date: 24.MAY.2019 19:07:20

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



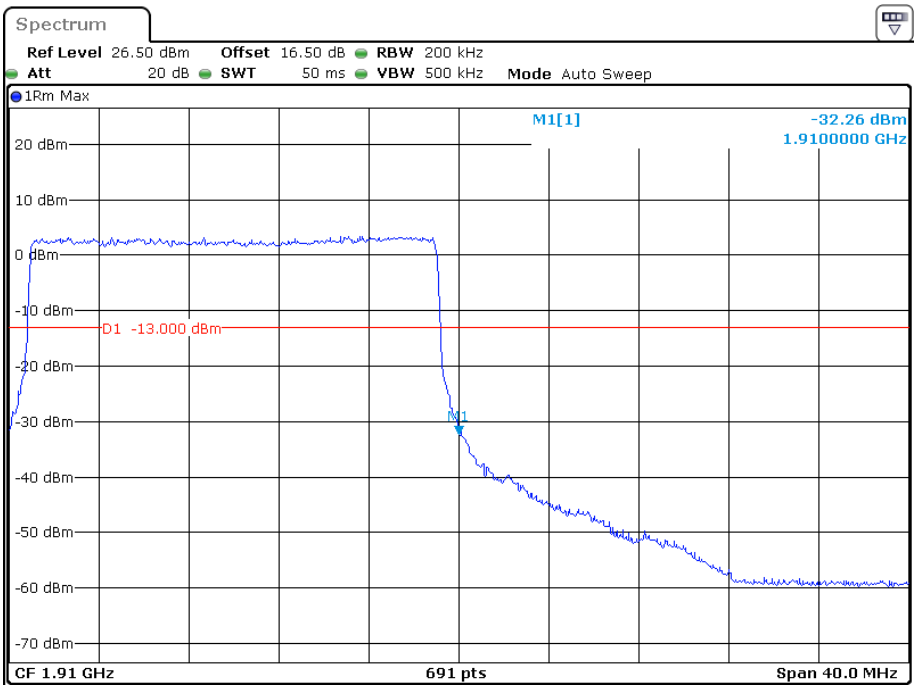
Date: 24.MAY.2019 19:05:40

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



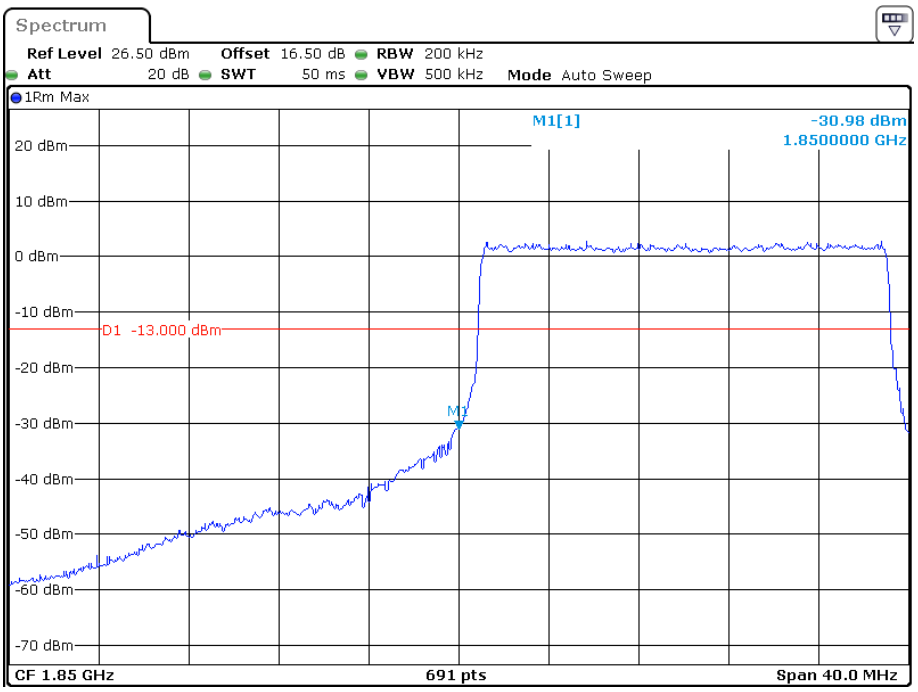
Date: 24.MAY.2019 19:00:35

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



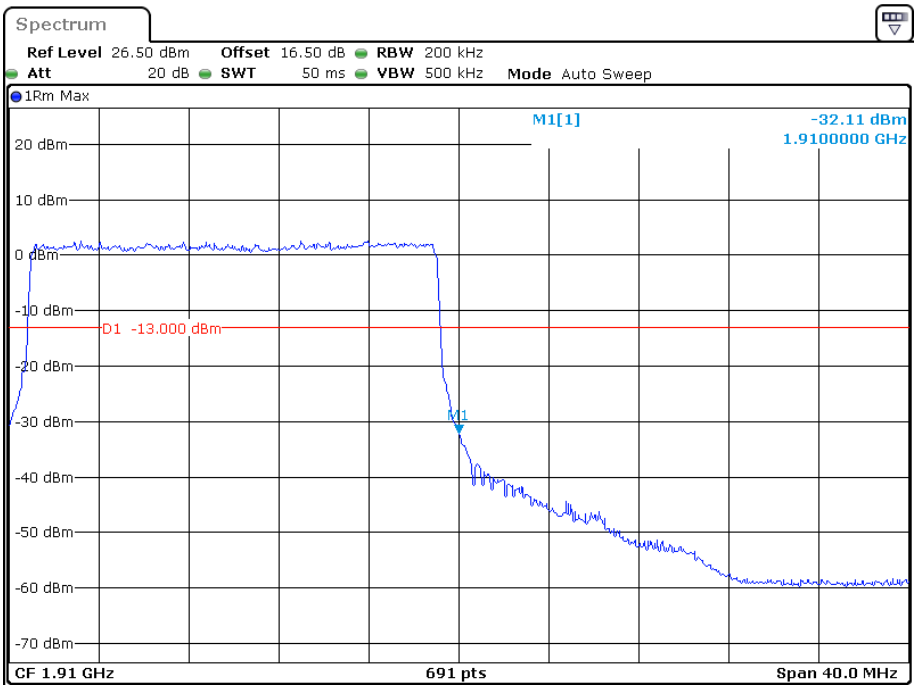
Date: 24.MAY.2019 19:03:07

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



Date: 24.MAY.2019 19:01:08

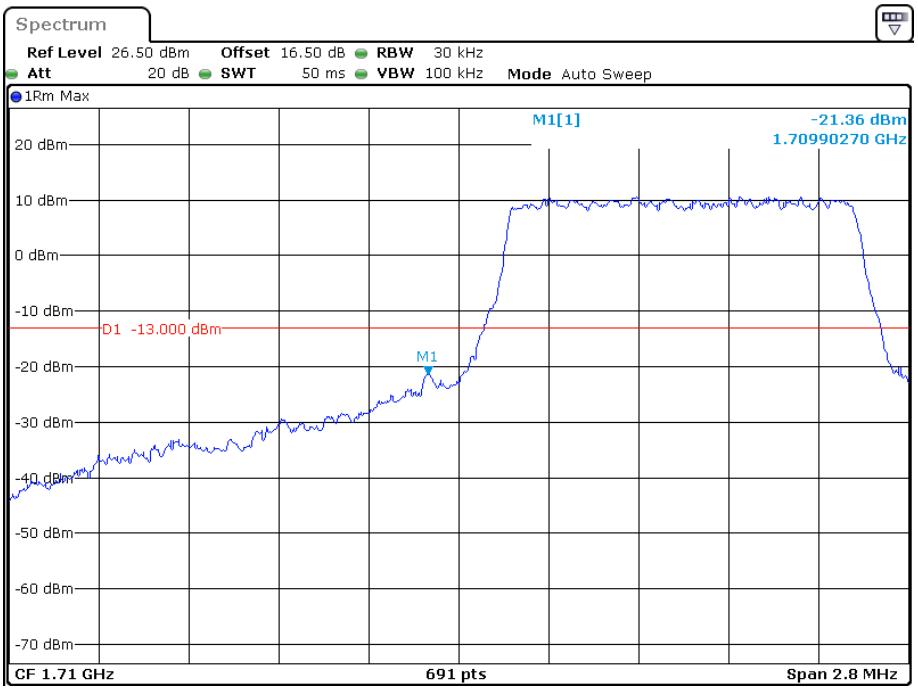
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 24.MAY.2019 19:02:34

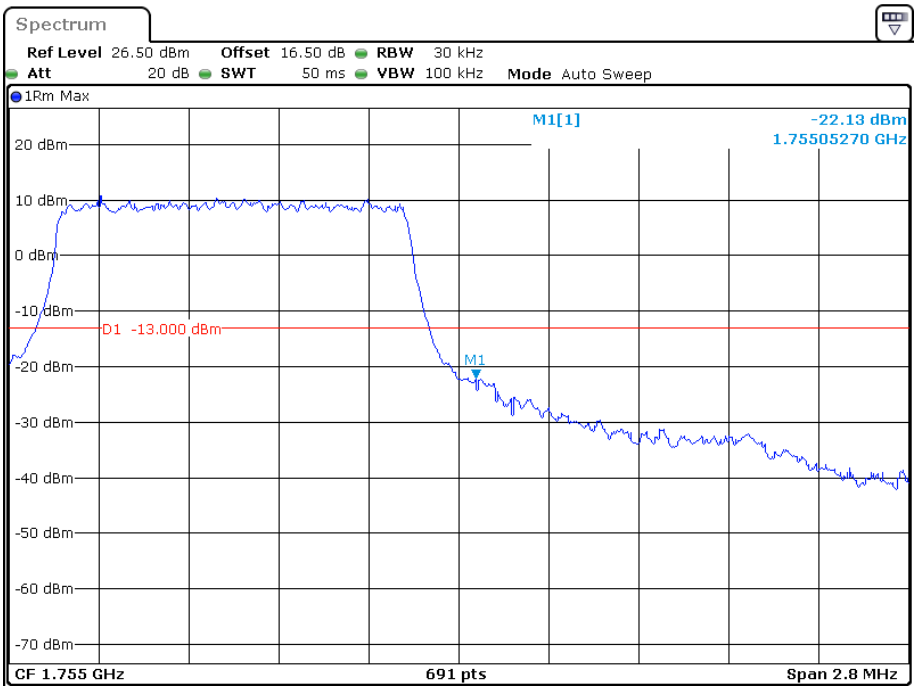
Band 4:

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



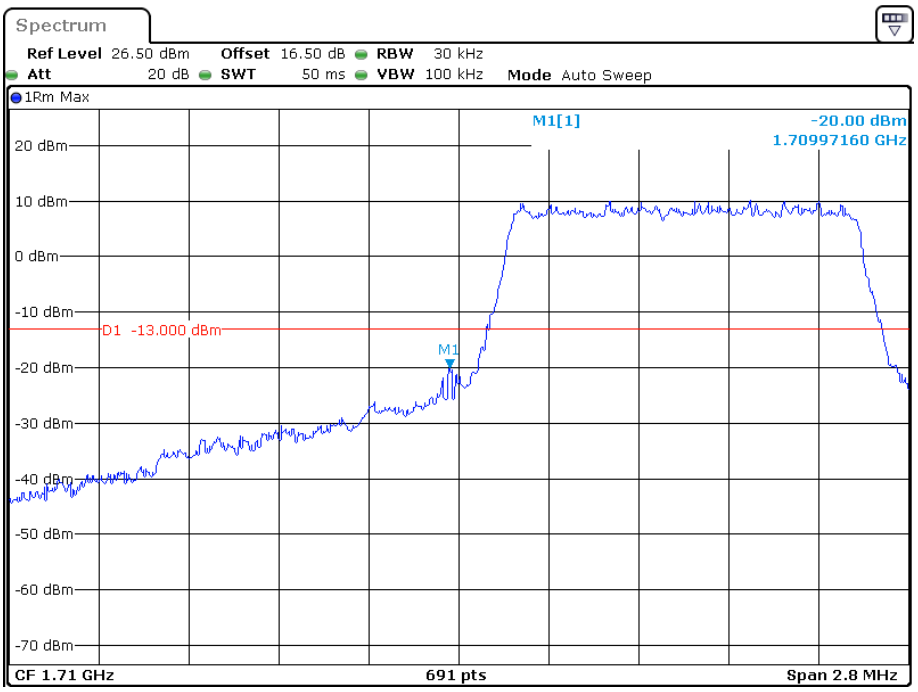
Date: 24.MAY.2019 18:36:47

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



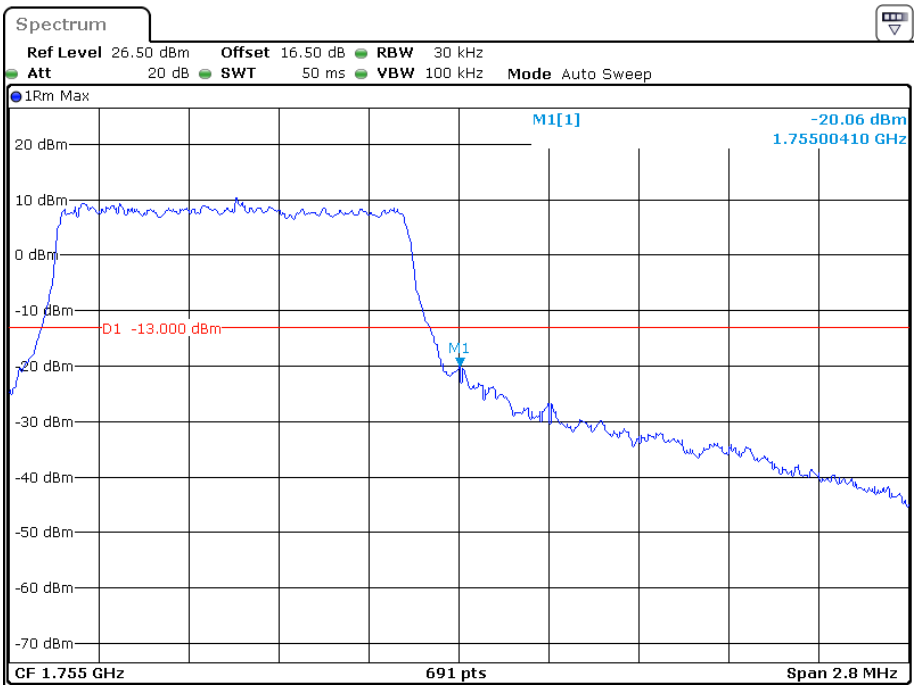
Date: 24.MAY.2019 18:38:12

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



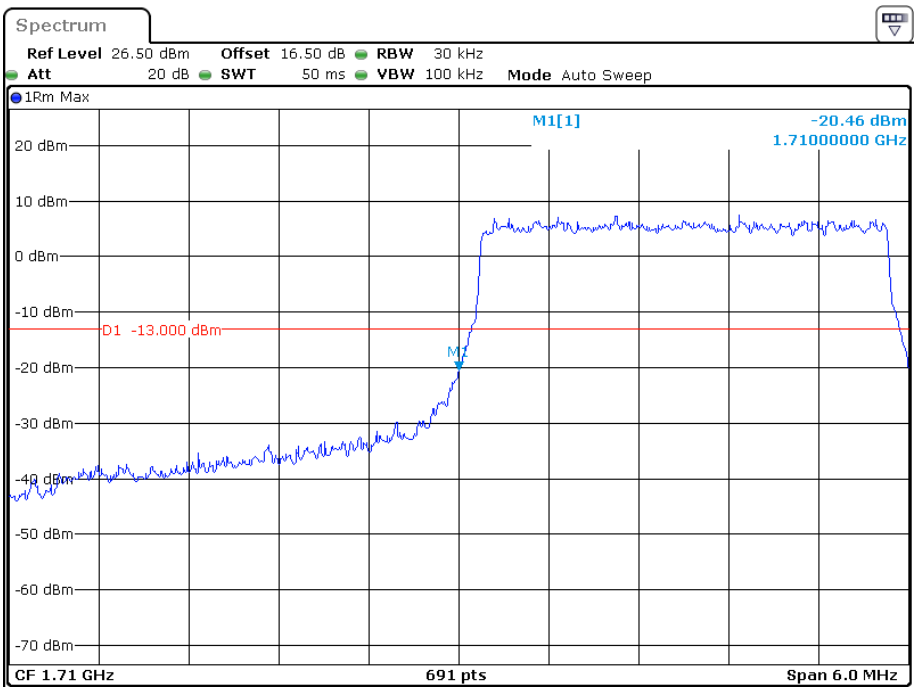
Date: 24.MAY.2019 18:35:58

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



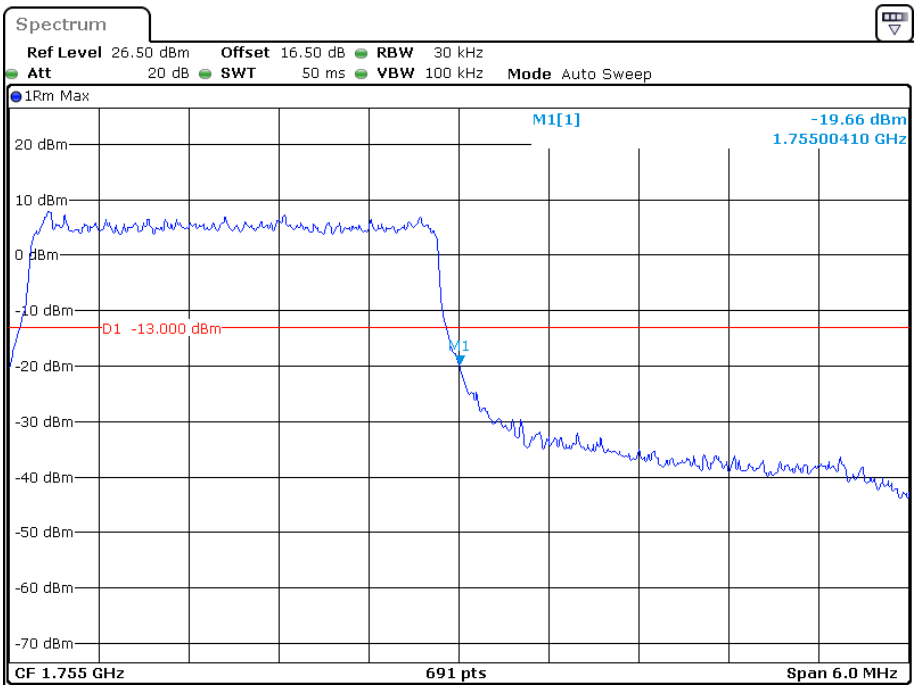
Date: 24.MAY.2019 18:38:54

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



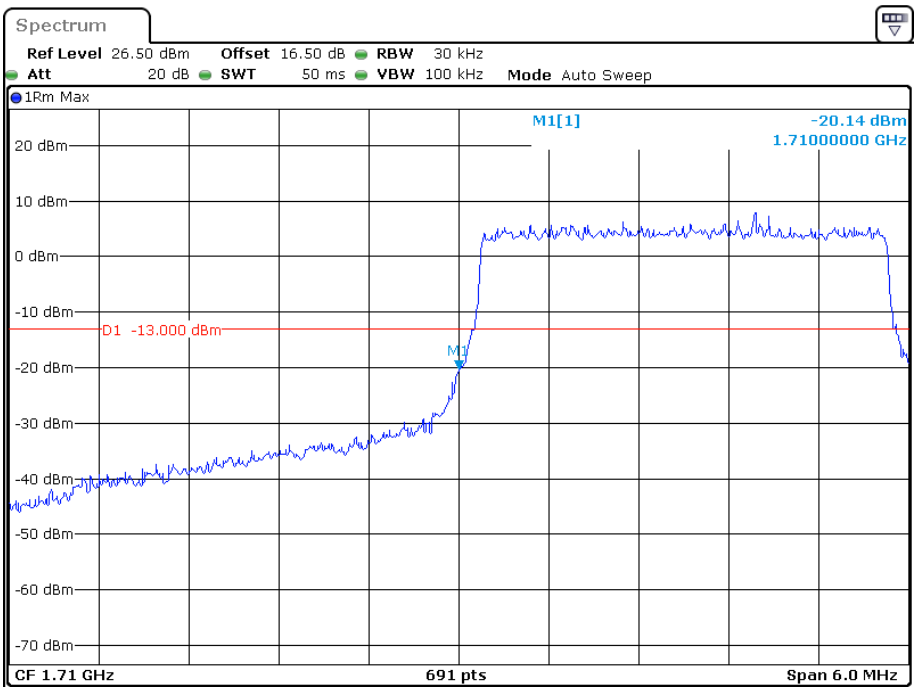
Date: 24.MAY.2019 18:42:18

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



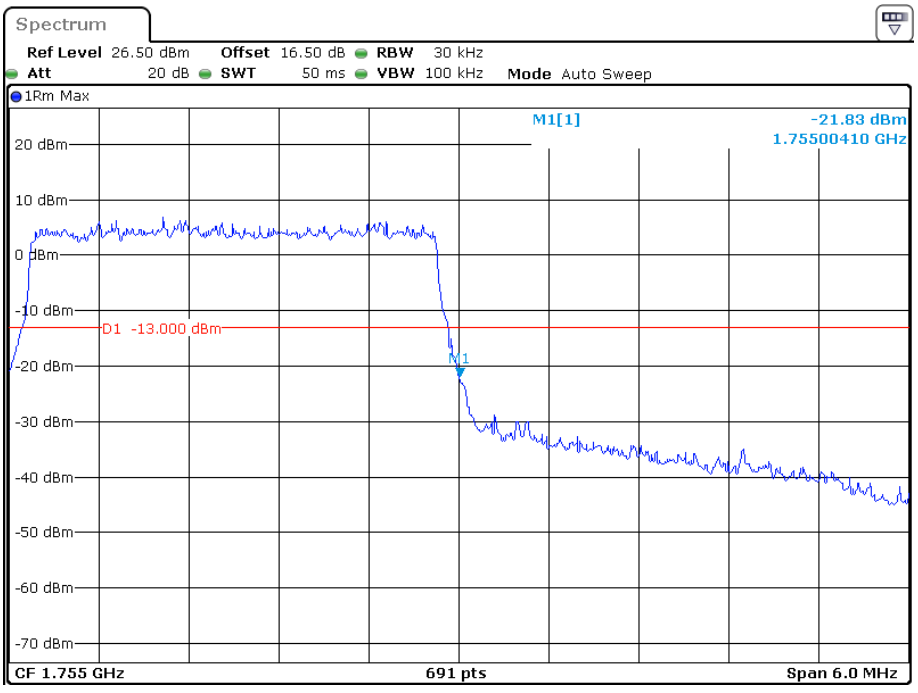
Date: 24.MAY.2019 18:40:24

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



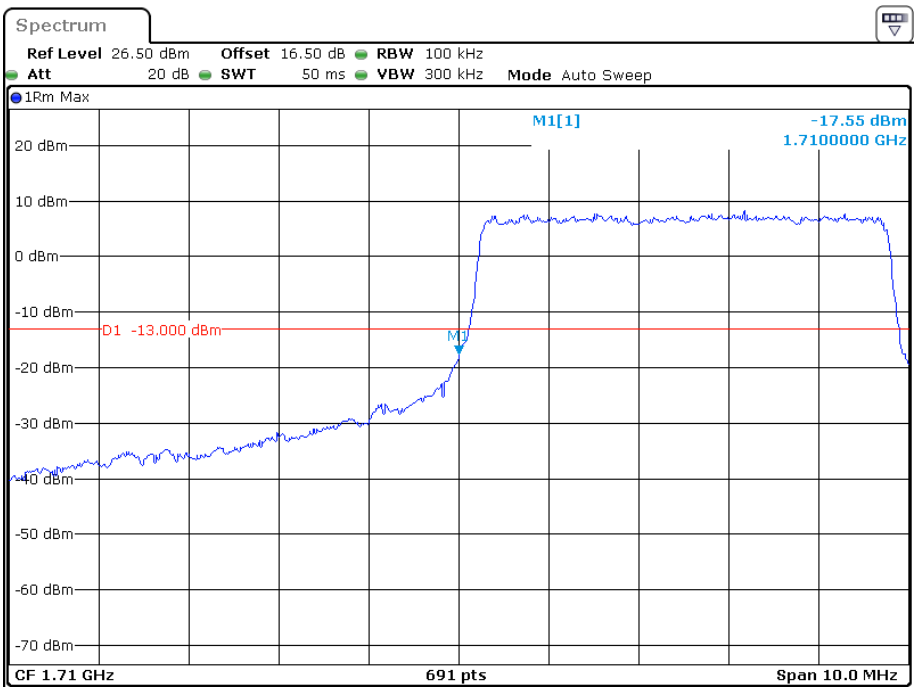
Date: 24.MAY.2019 18:41:50

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



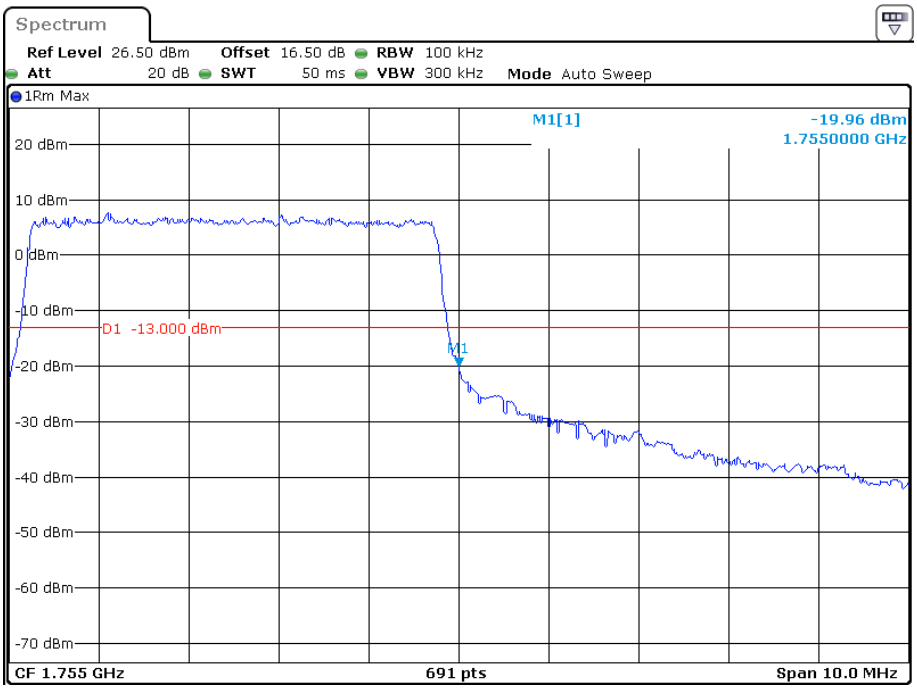
Date: 24.MAY.2019 18:40:56

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



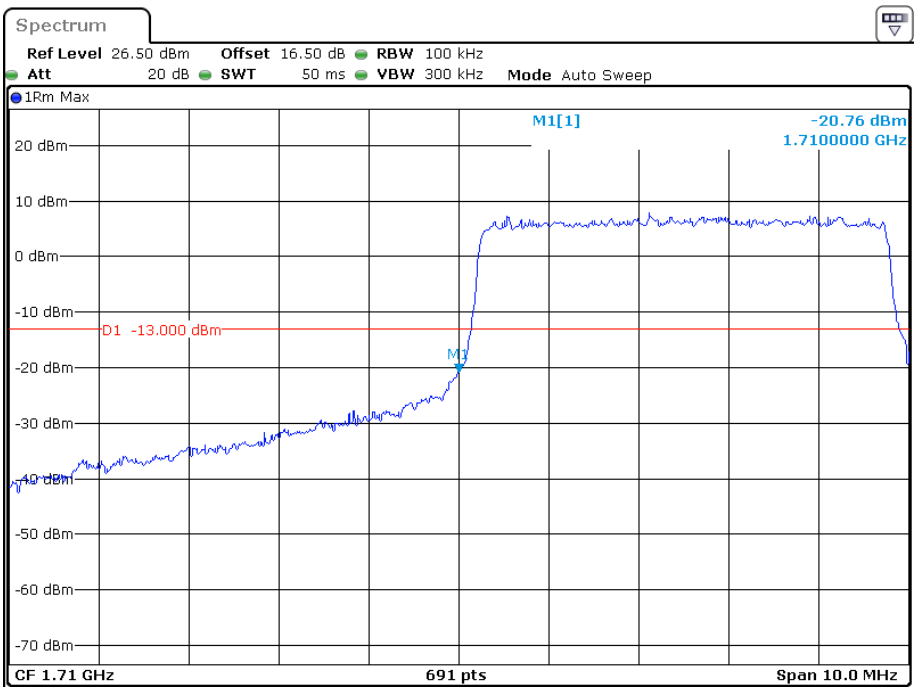
Date: 24.MAY.2019 18:43:30

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



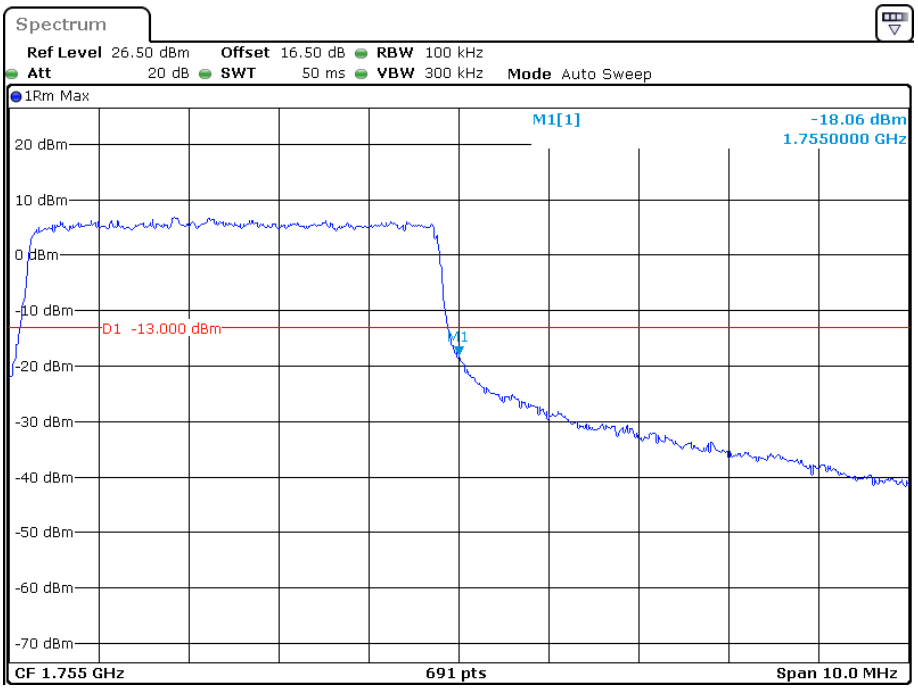
Date: 24.MAY.2019 18:45:44

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



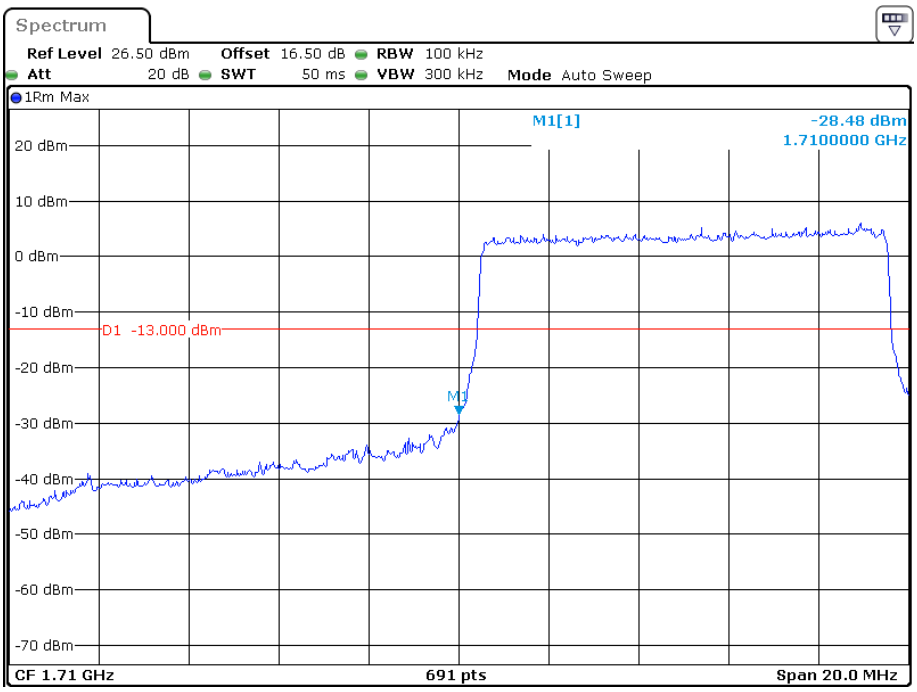
Date: 24.MAY.2019 18:43:59

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



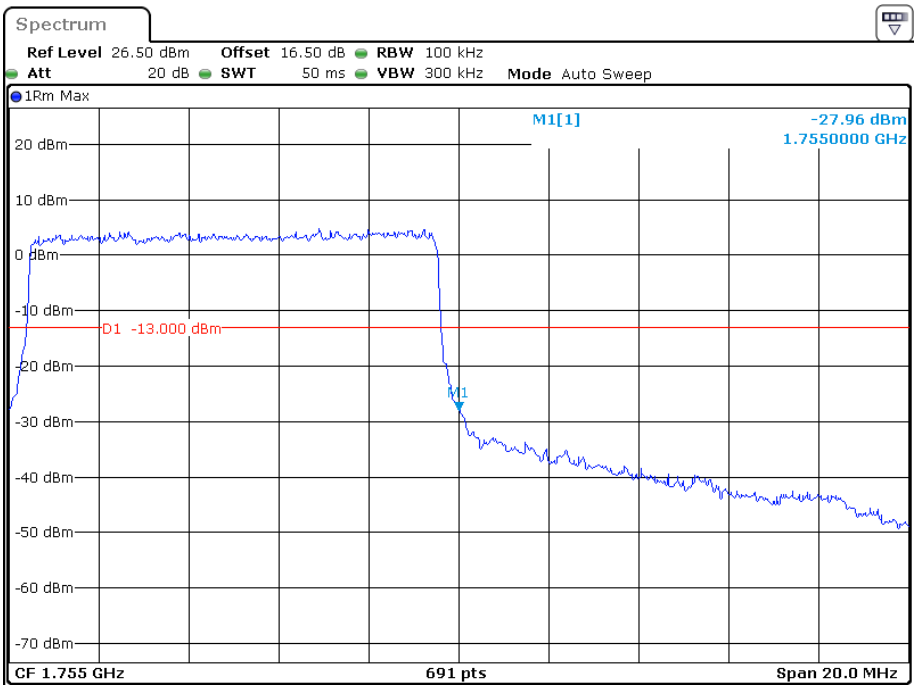
Date: 24.MAY.2019 18:45:11

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



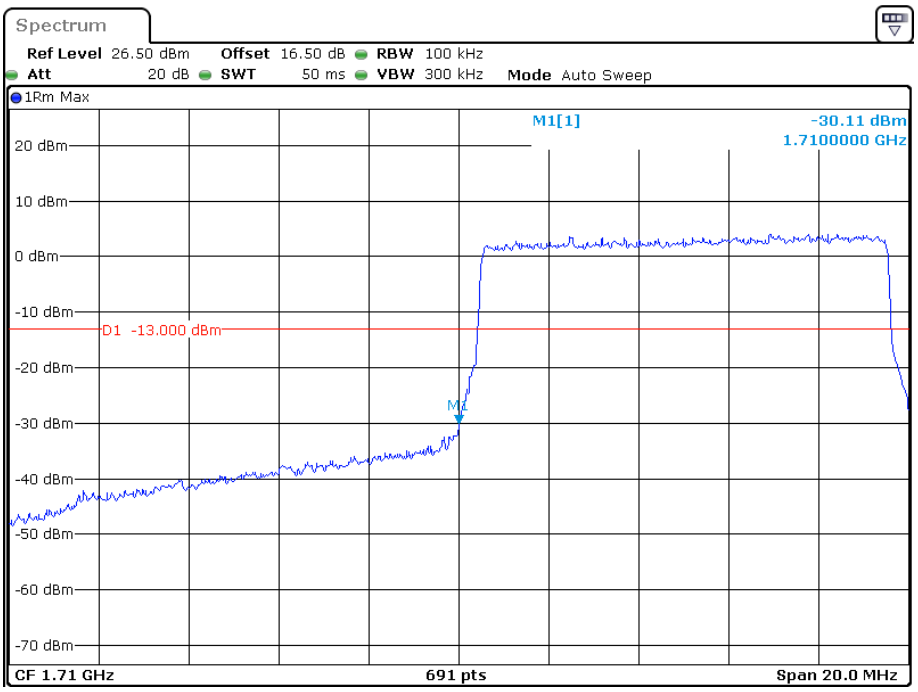
Date: 24.MAY.2019 18:48:57

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



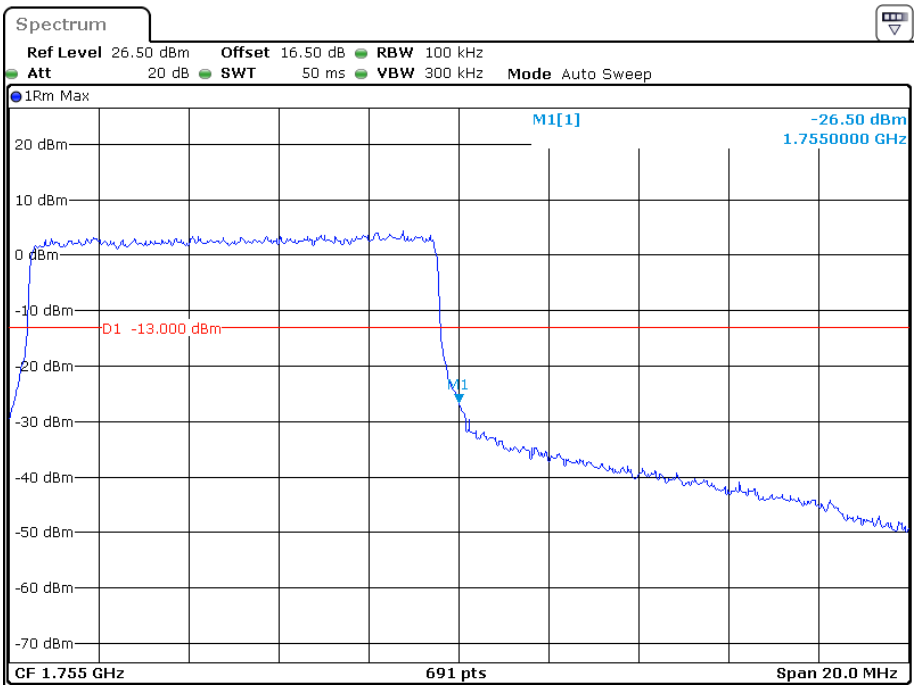
Date: 24.MAY.2019 18:46:53

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



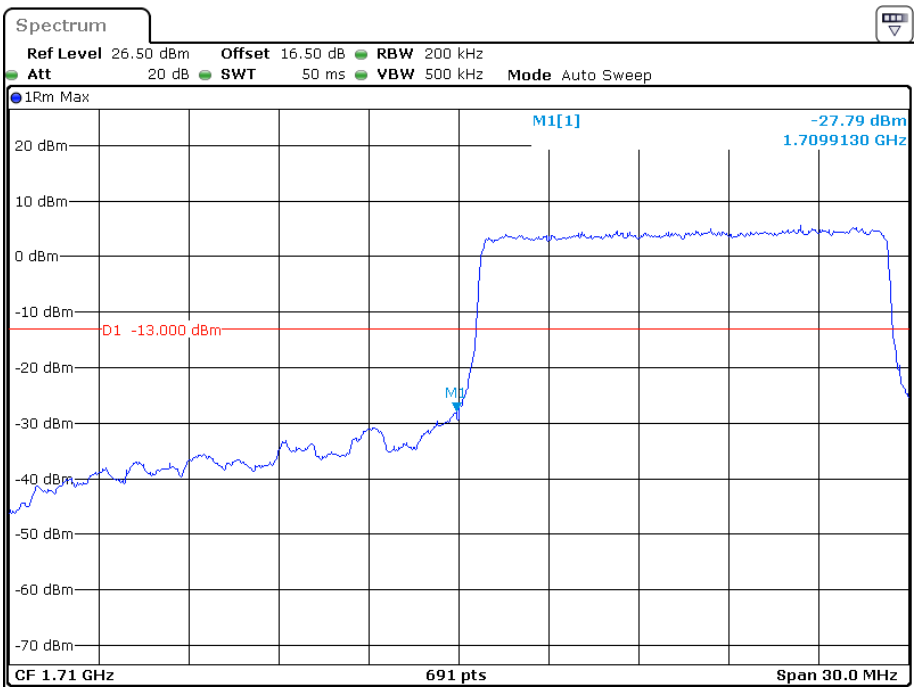
Date: 24.MAY.2019 18:48:29

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



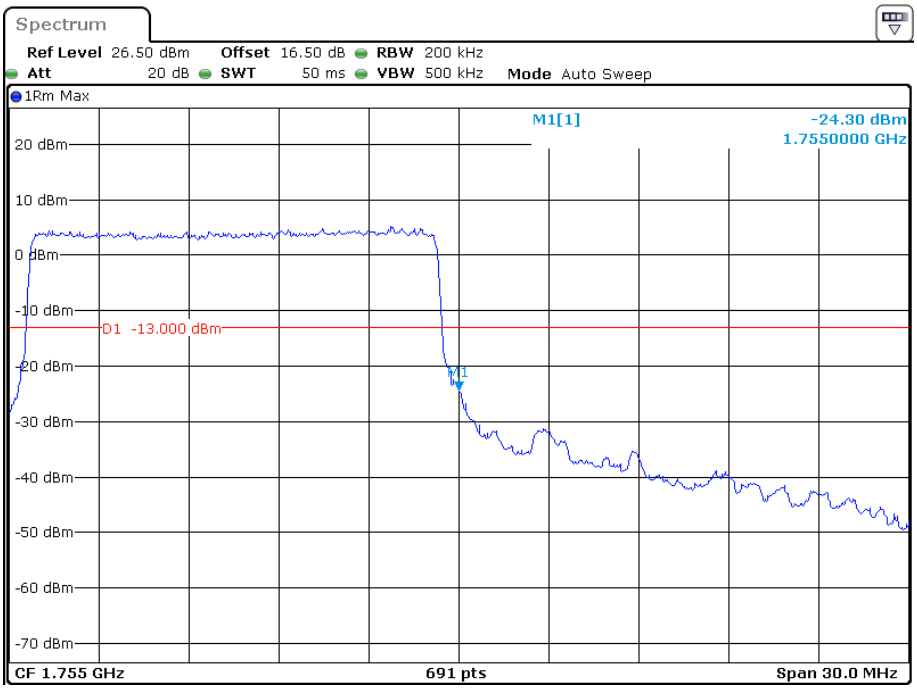
Date: 24.MAY.2019 18:47:27

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



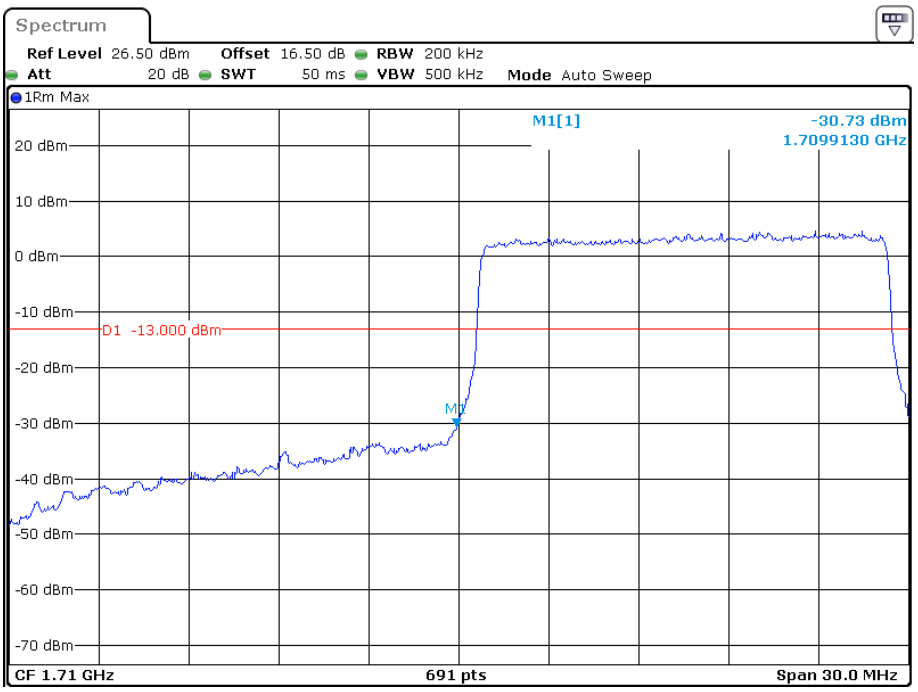
Date: 24.MAY.2019 18:50:33

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



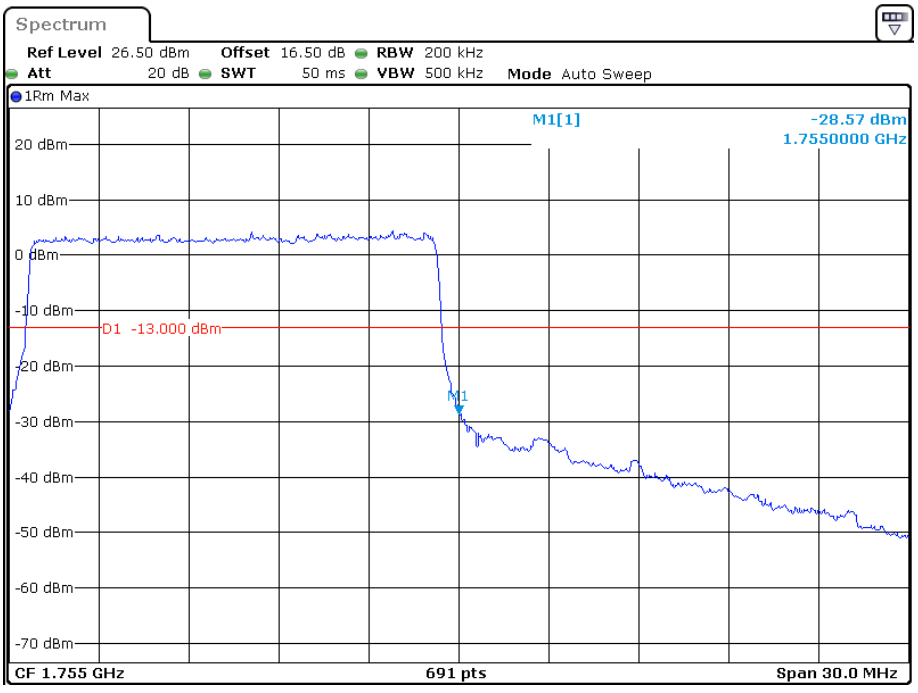
Date: 24.MAY.2019 18:52:57

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



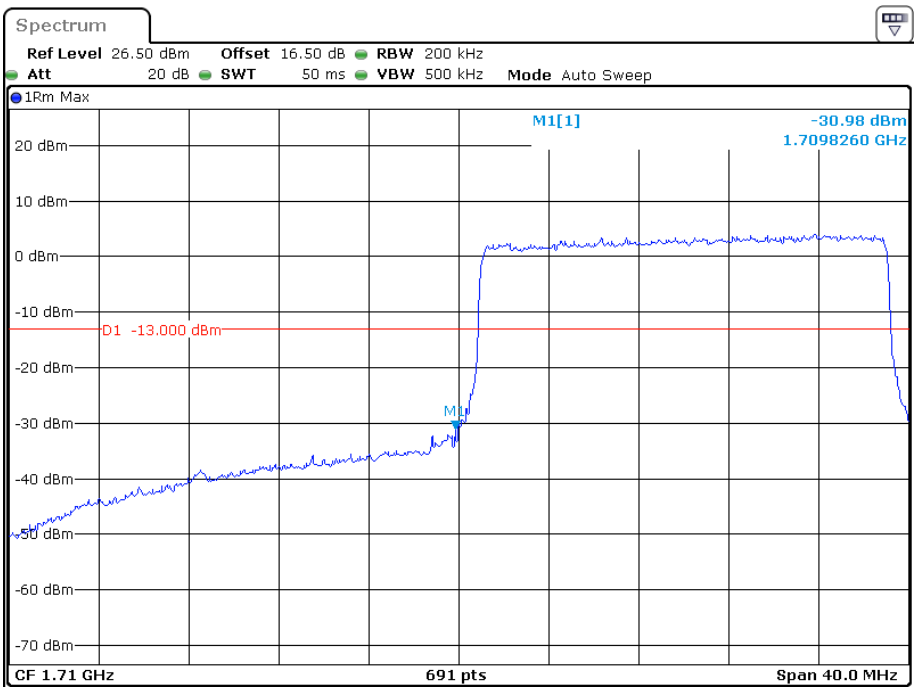
Date: 24.MAY.2019 18:51:04

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



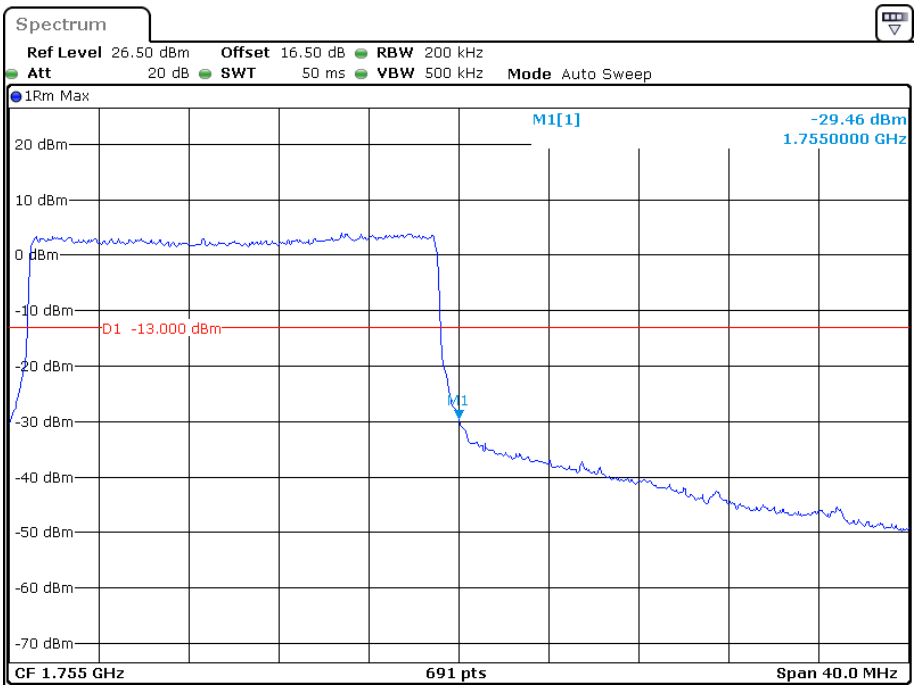
Date: 24.MAY.2019 18:52:08

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



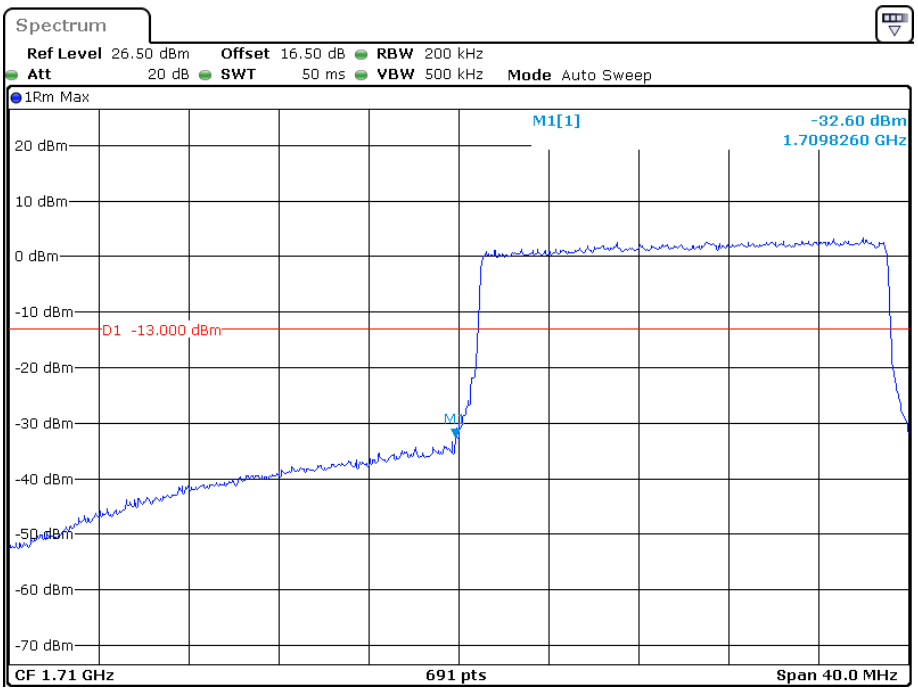
Date: 24.MAY.2019 18:58:08

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



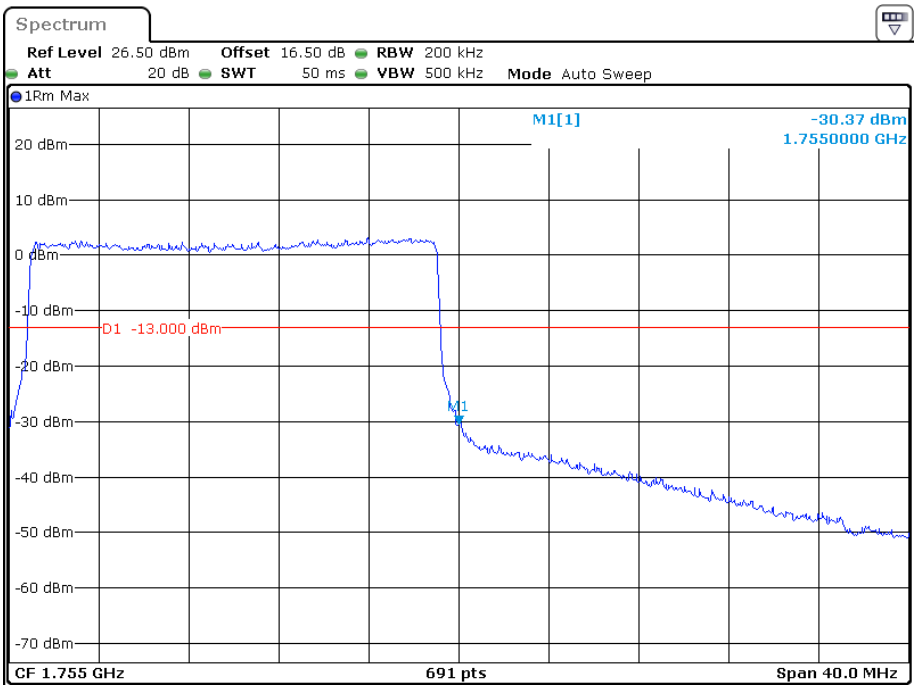
Date: 24.MAY.2019 18:55:10

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



Date: 24.MAY.2019 18:57:36

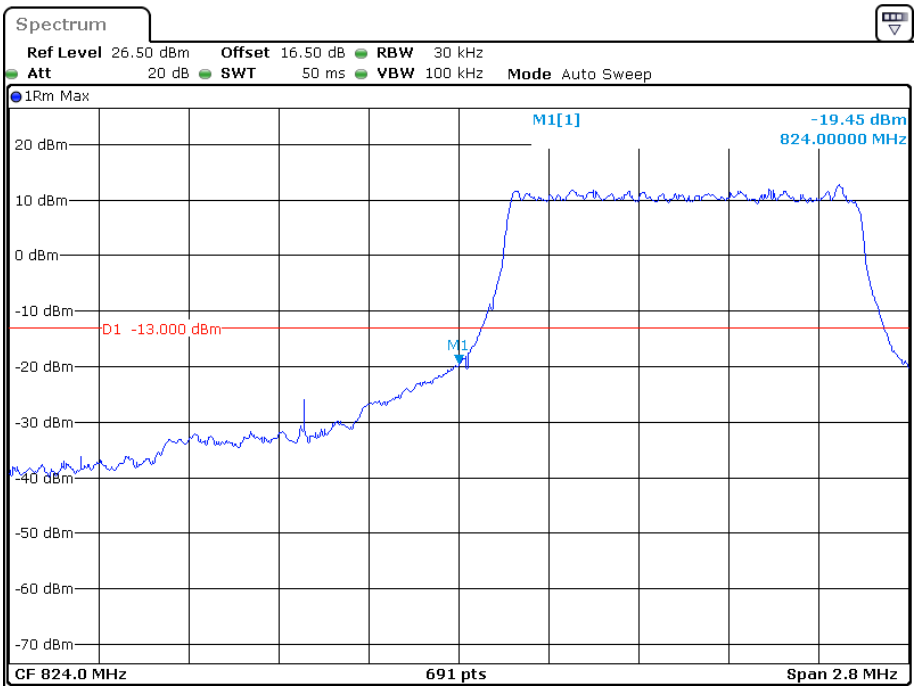
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 24.MAY.2019 18:55:43

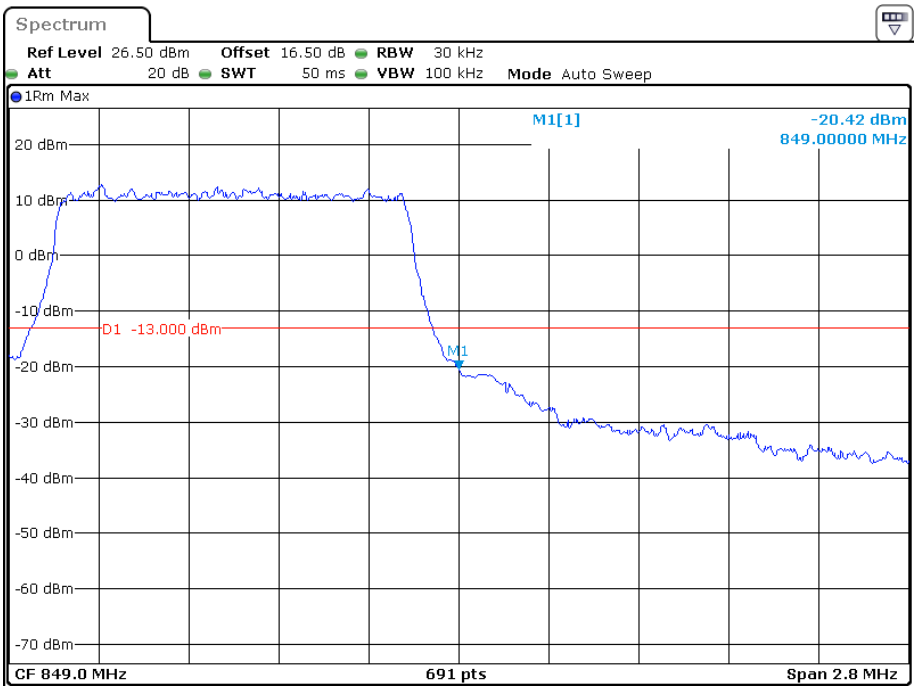
Band 5:

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



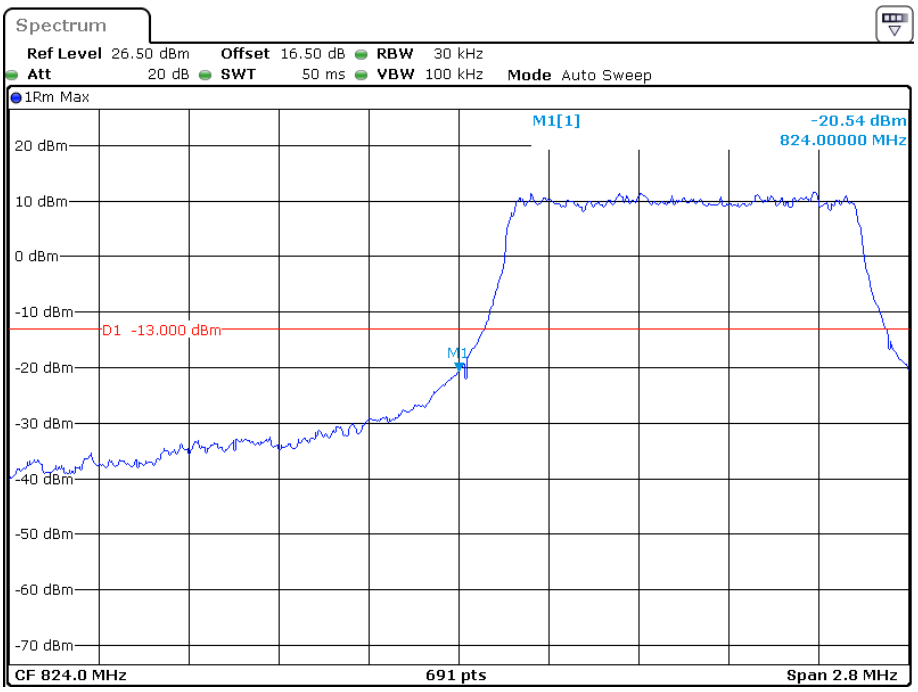
Date: 24.MAY.2019 18:33:25

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



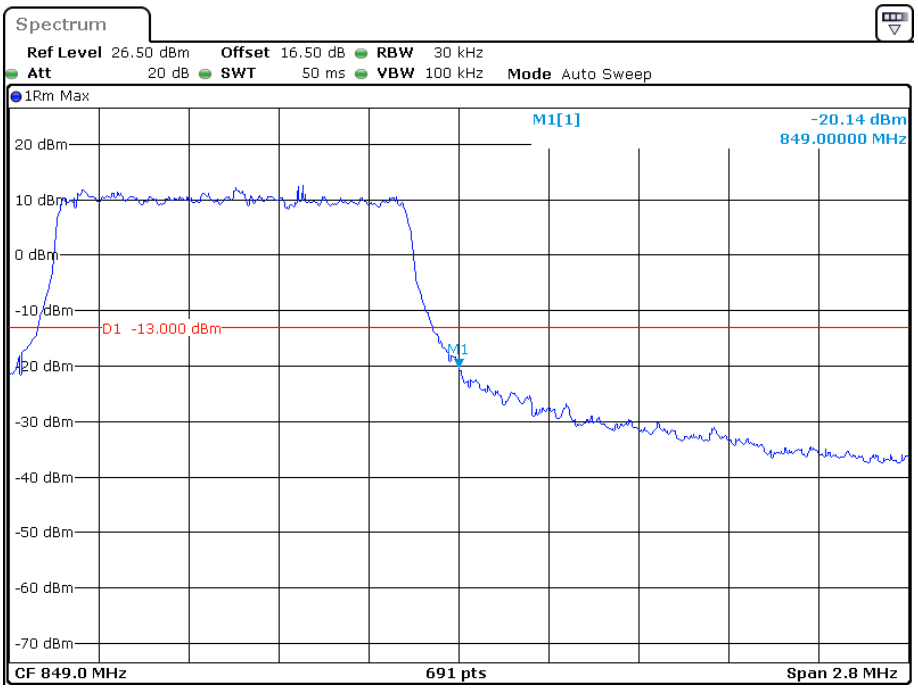
Date: 24.MAY.2019 18:31:56

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



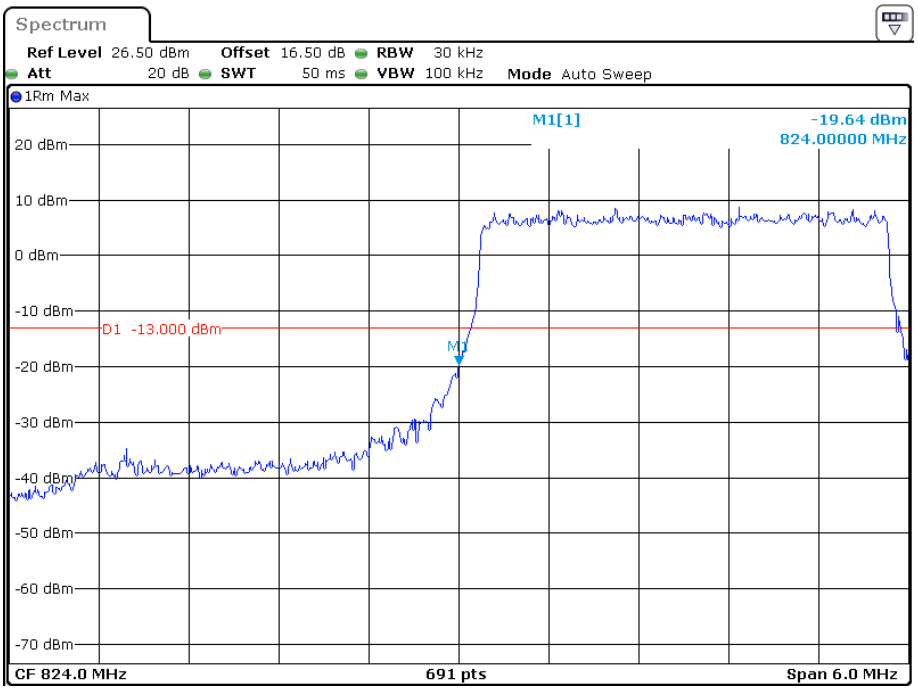
Date: 24.MAY.2019 18:34:10

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



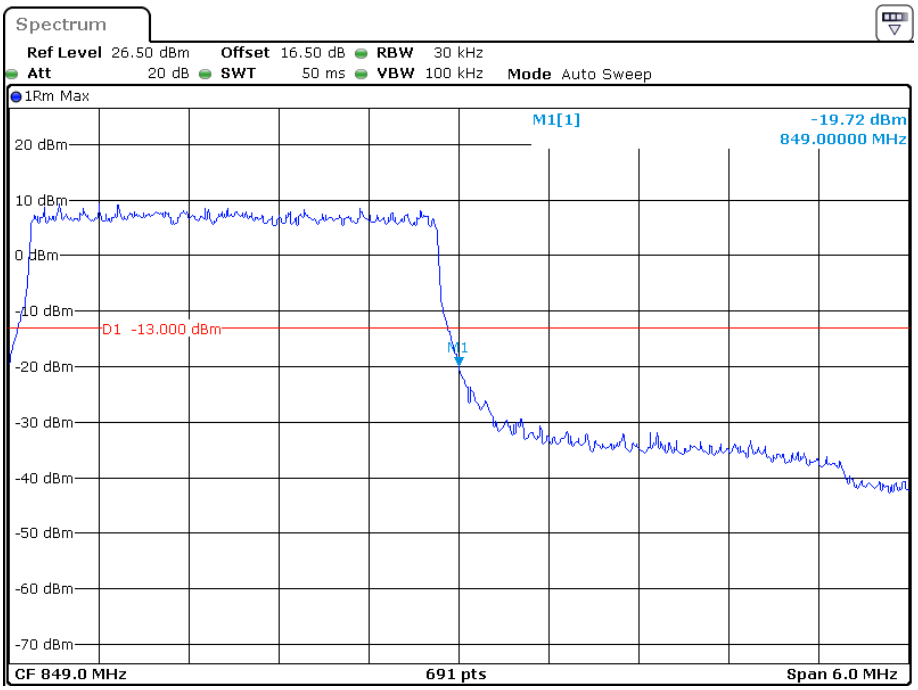
Date: 24.MAY.2019 18:31:15

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



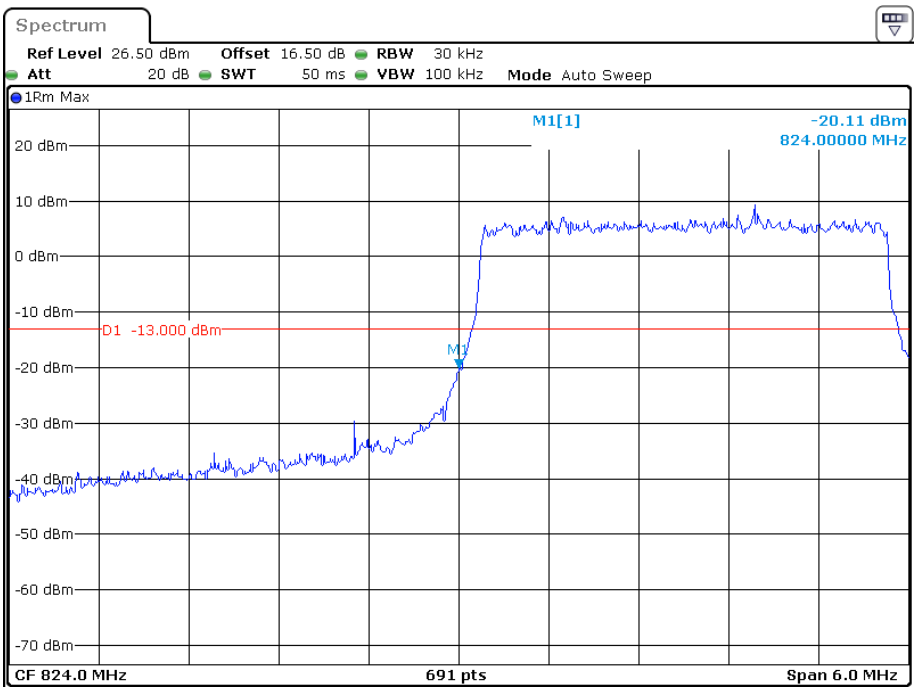
Date: 24.MAY.2019 18:27:50

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



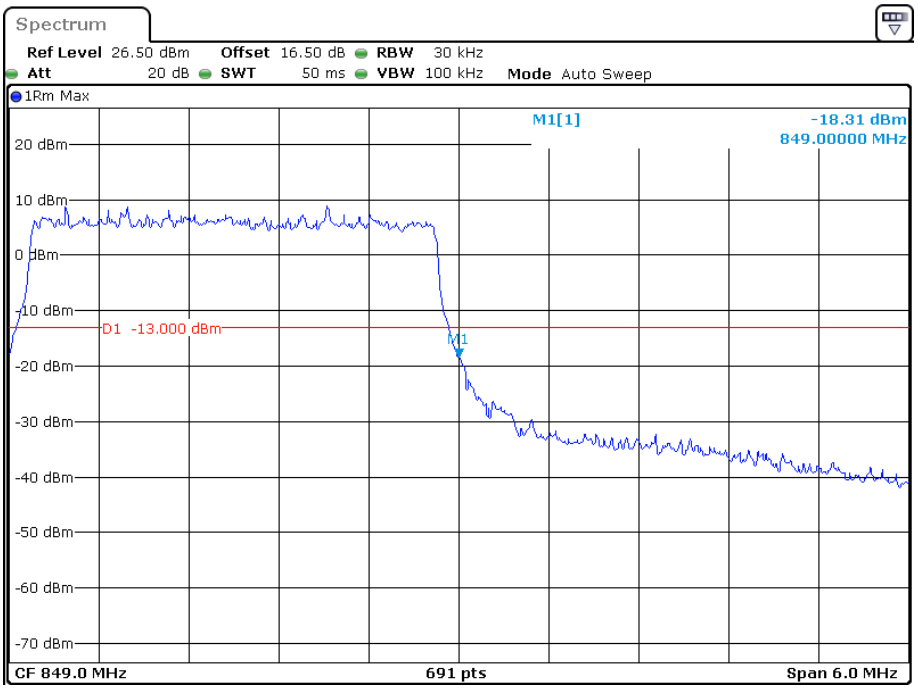
Date: 24.MAY.2019 18:30:00

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



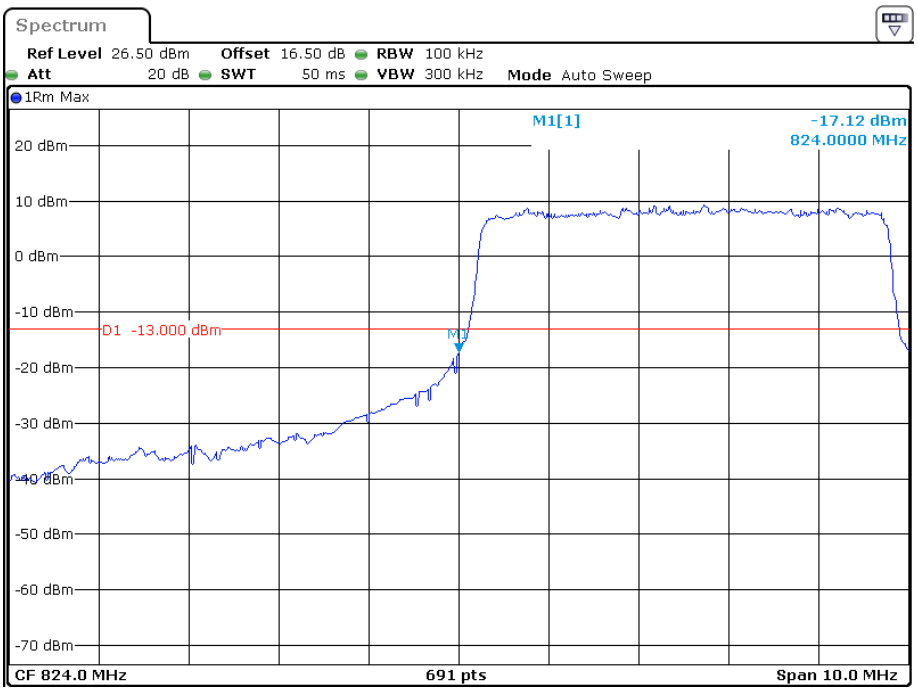
Date: 24.MAY.2019 18:28:20

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



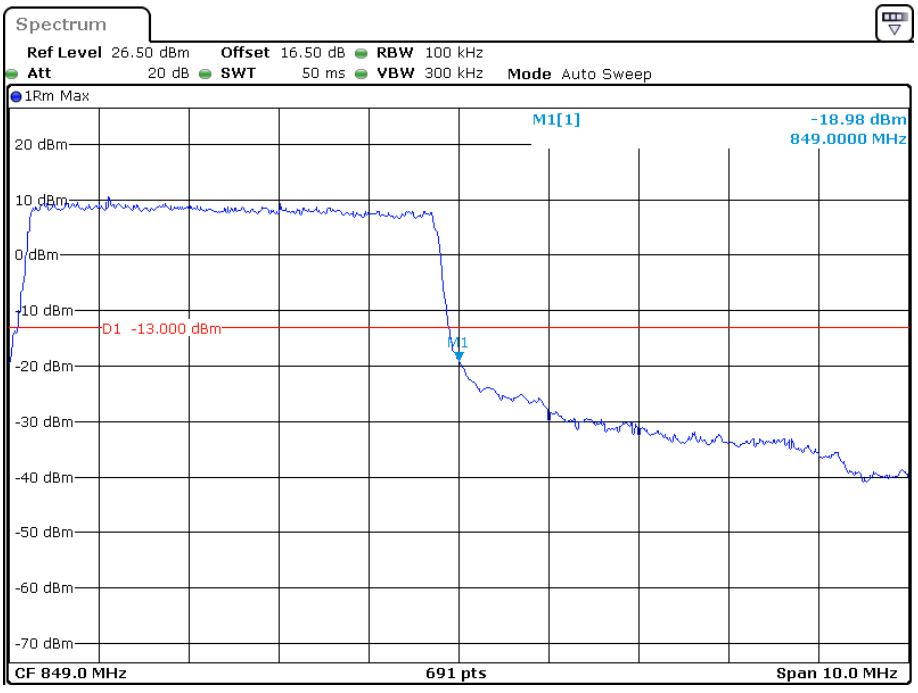
Date: 24.MAY.2019 18:29:30

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



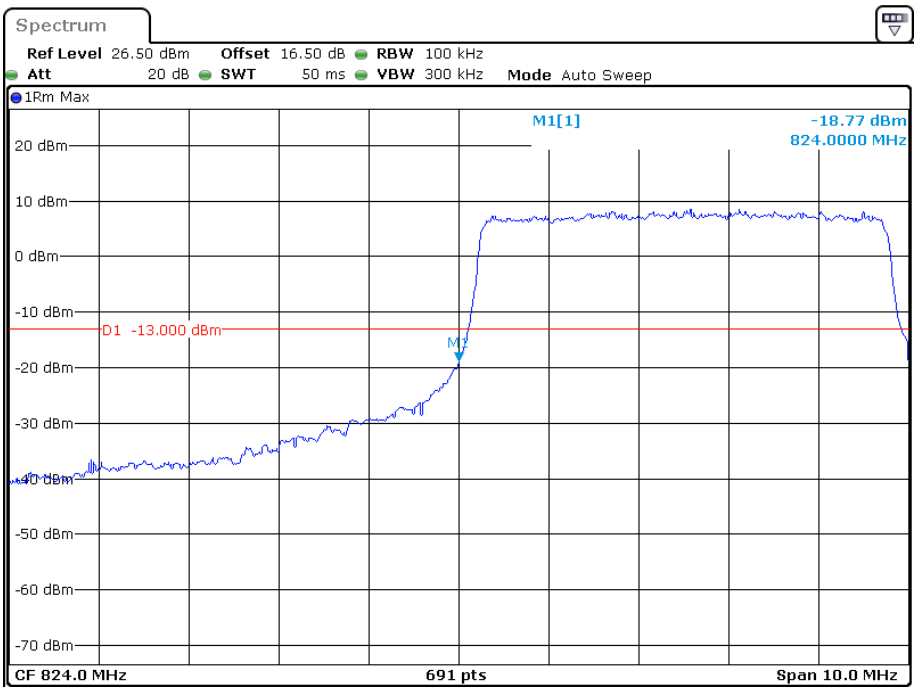
Date: 24.MAY.2019 18:26:39

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



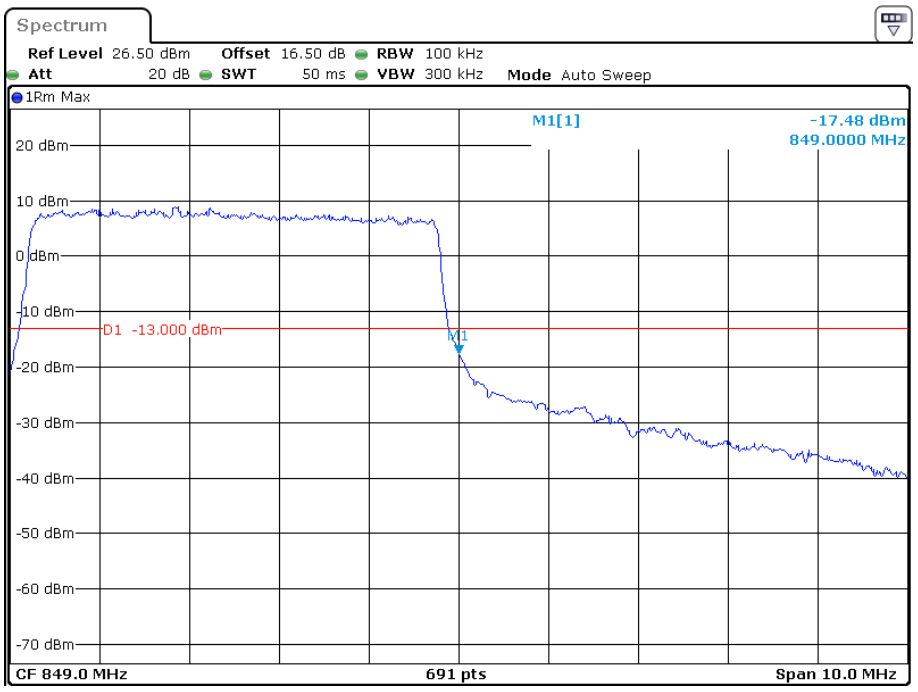
Date: 24.MAY.2019 18:23:40

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



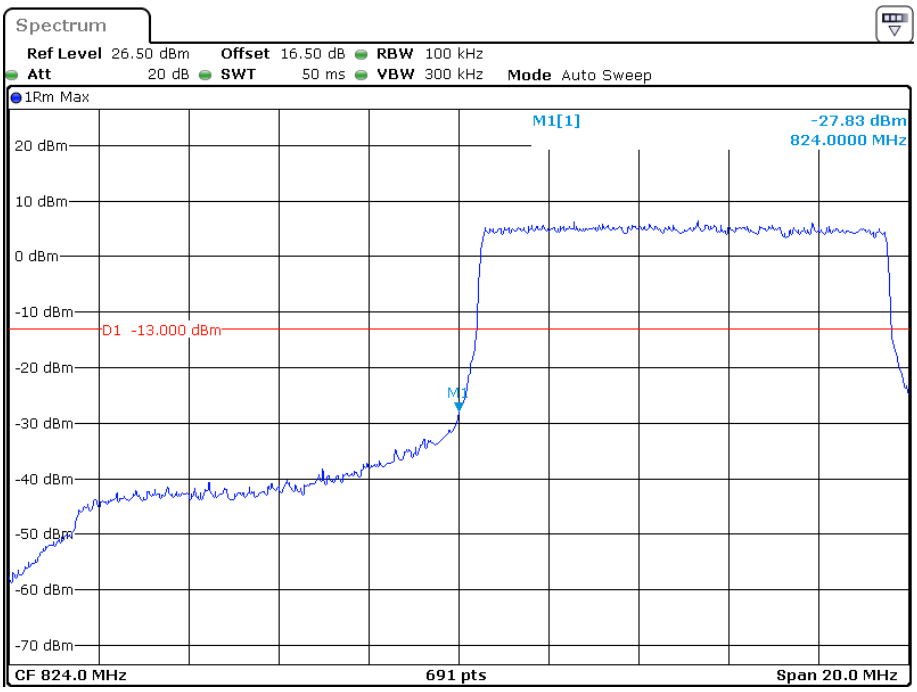
Date: 24.MAY.2019 18:25:57

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



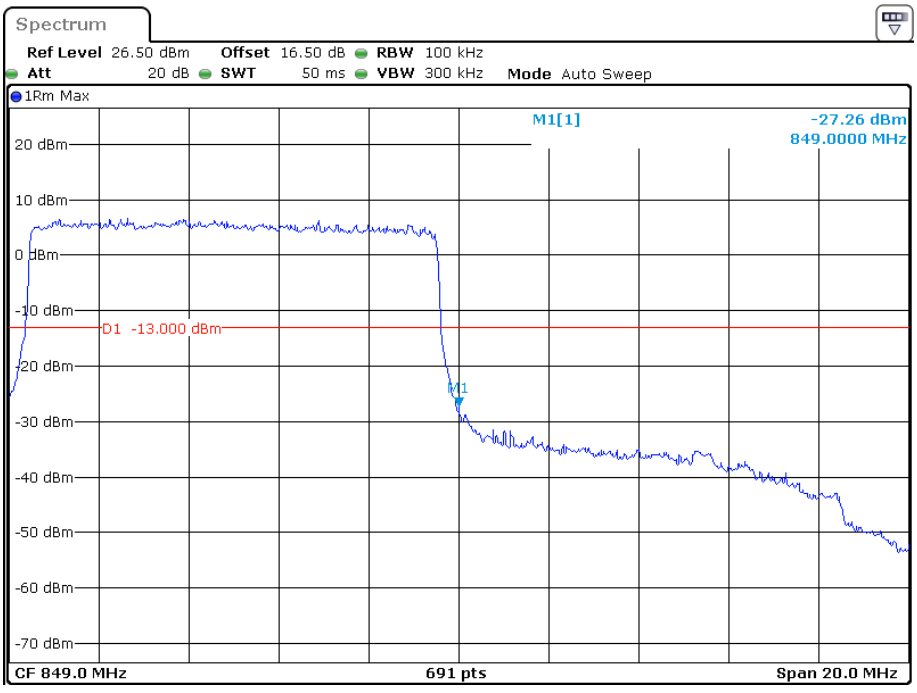
Date: 24.MAY.2019 18:24:11

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



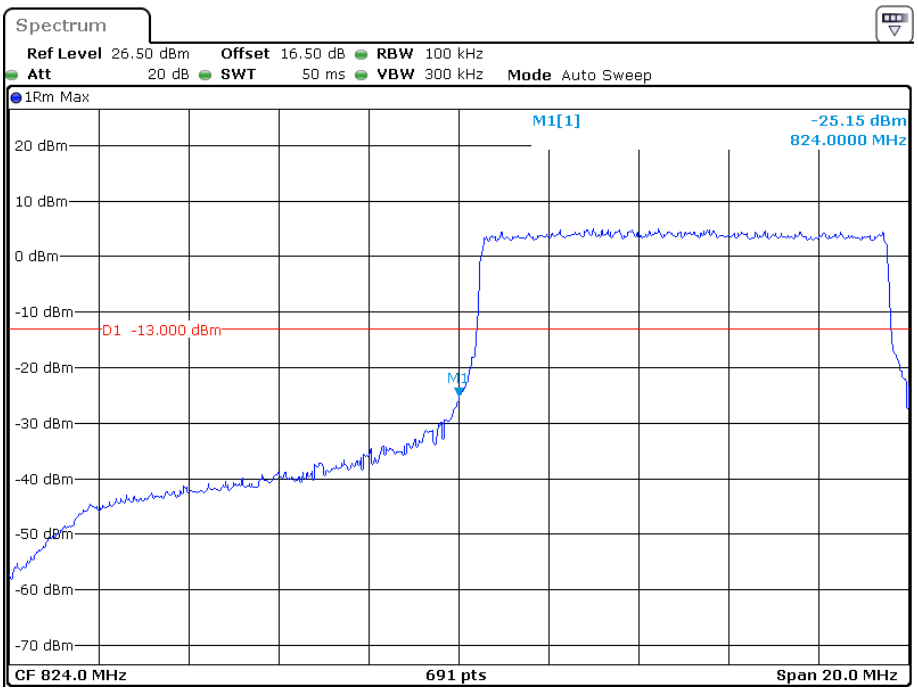
Date: 24.MAY.2019 18:20:08

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



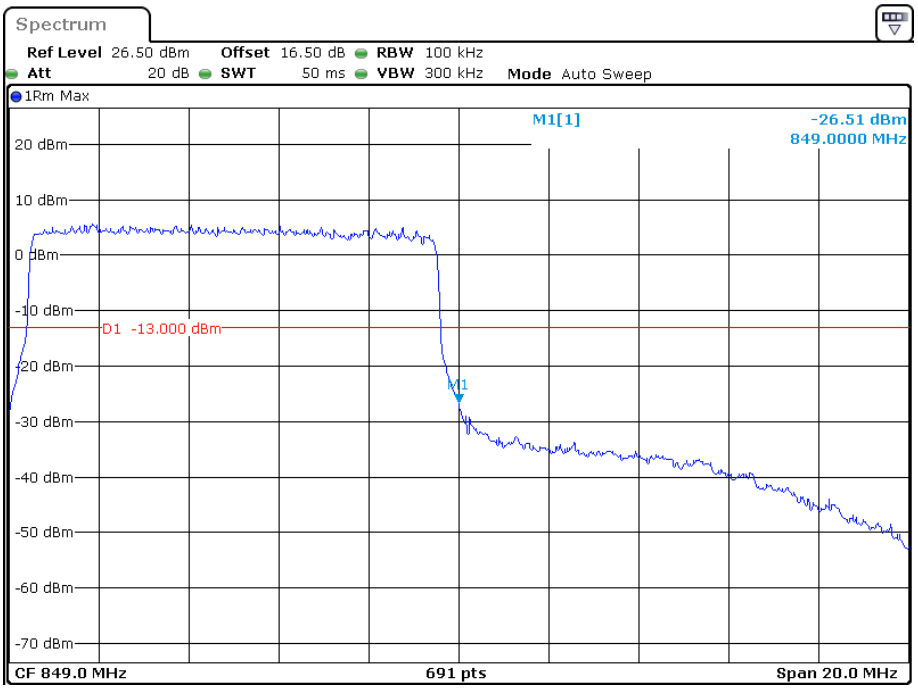
Date: 24.MAY.2019 18:22:24

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



Date: 24.MAY.2019 18:20:52

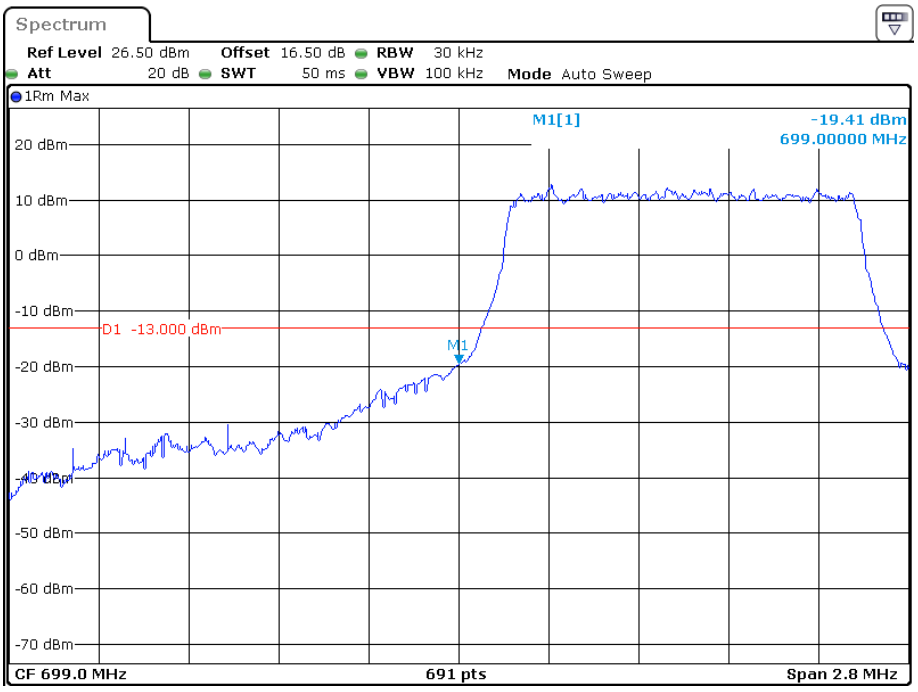
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 24.MAY.2019 18:21:55

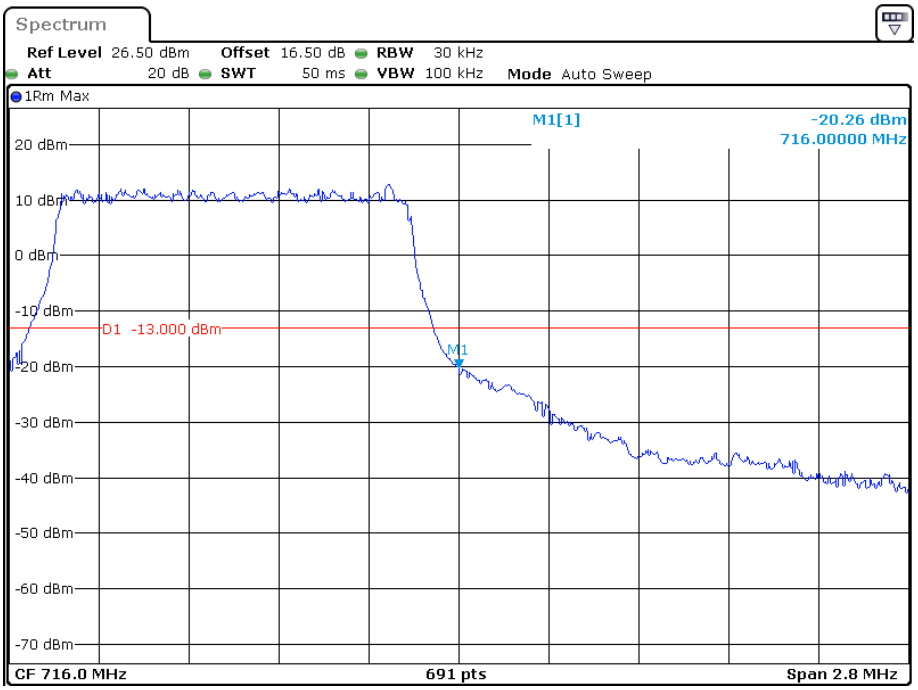
Band 12

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



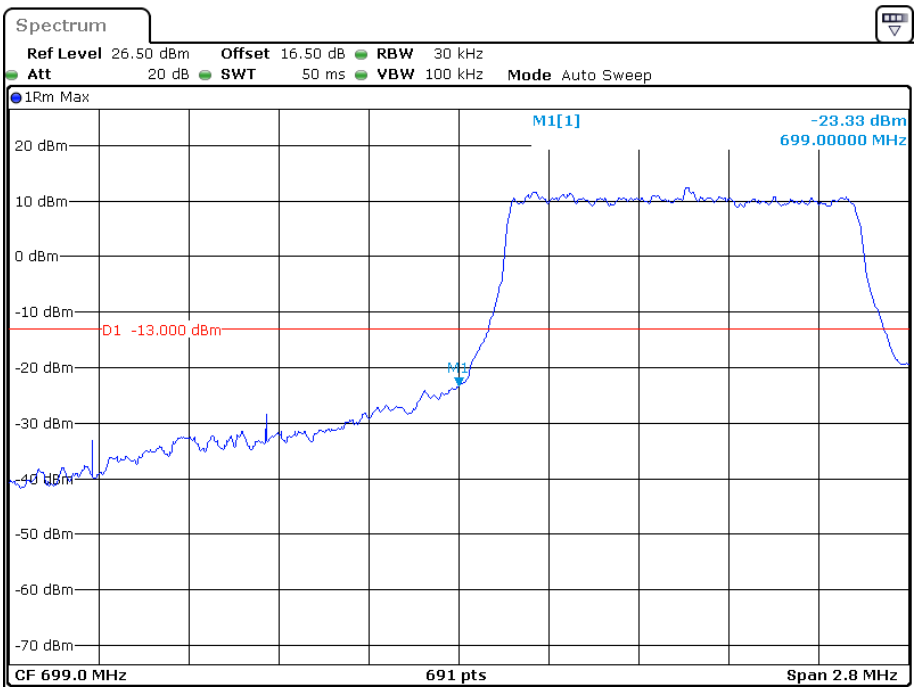
Date: 24.MAY.2019 17:50:50

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



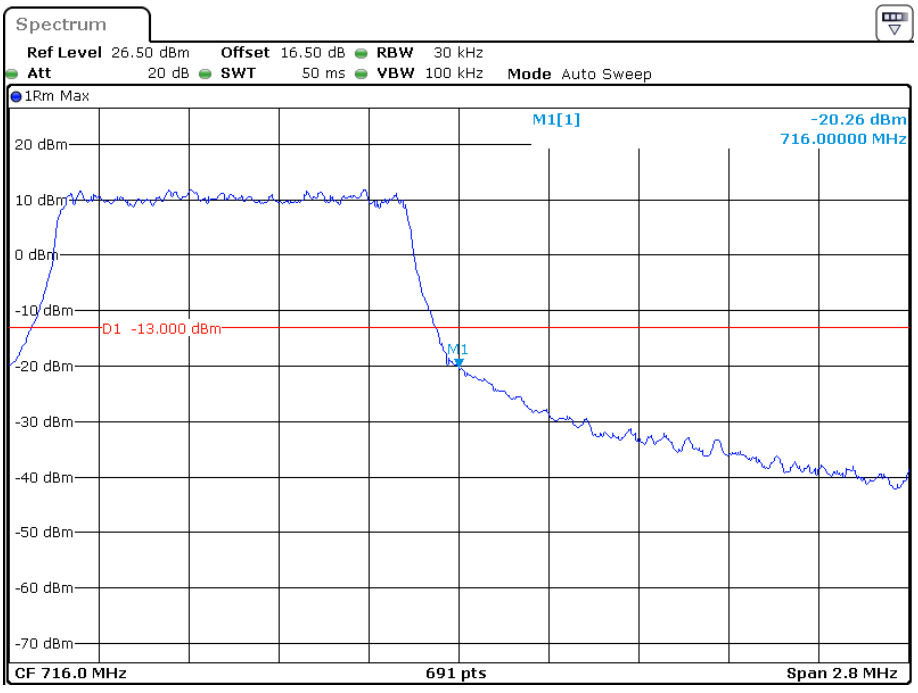
Date: 24.MAY.2019 17:58:45

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



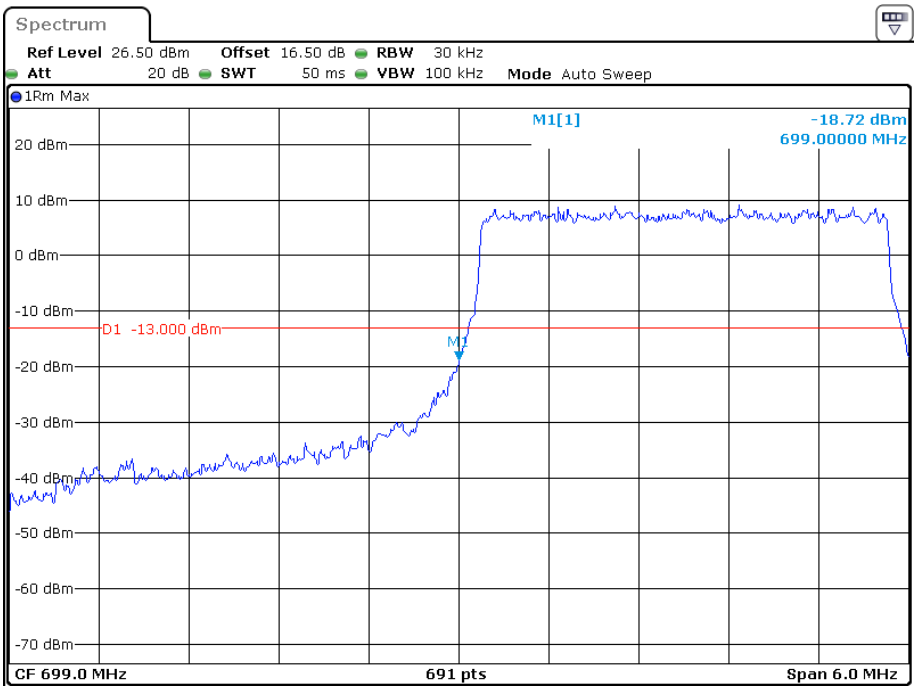
Date: 24.MAY.2019 17:49:51

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



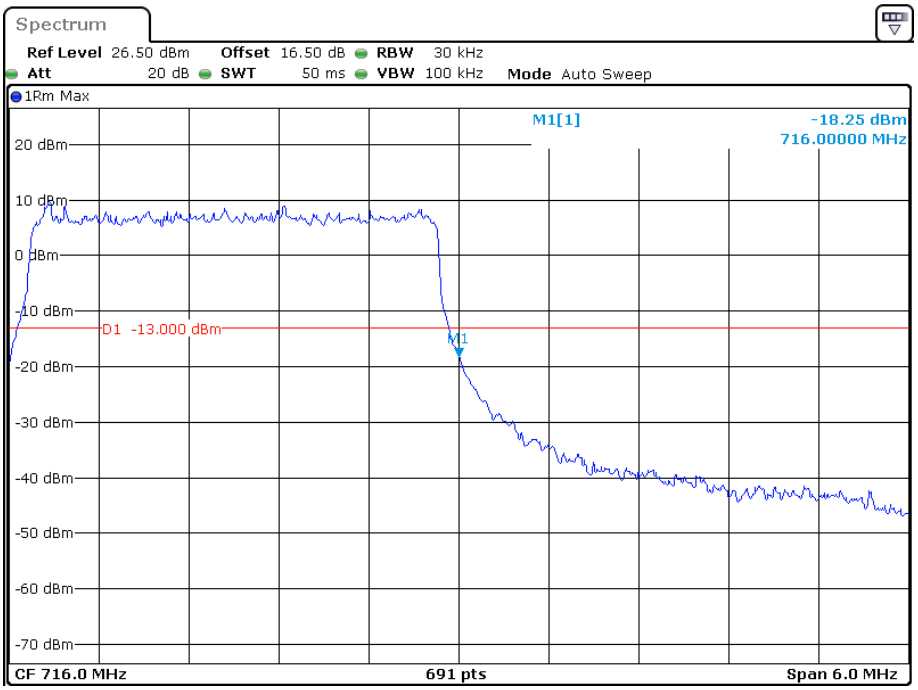
Date: 24.MAY.2019 17:59:38

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



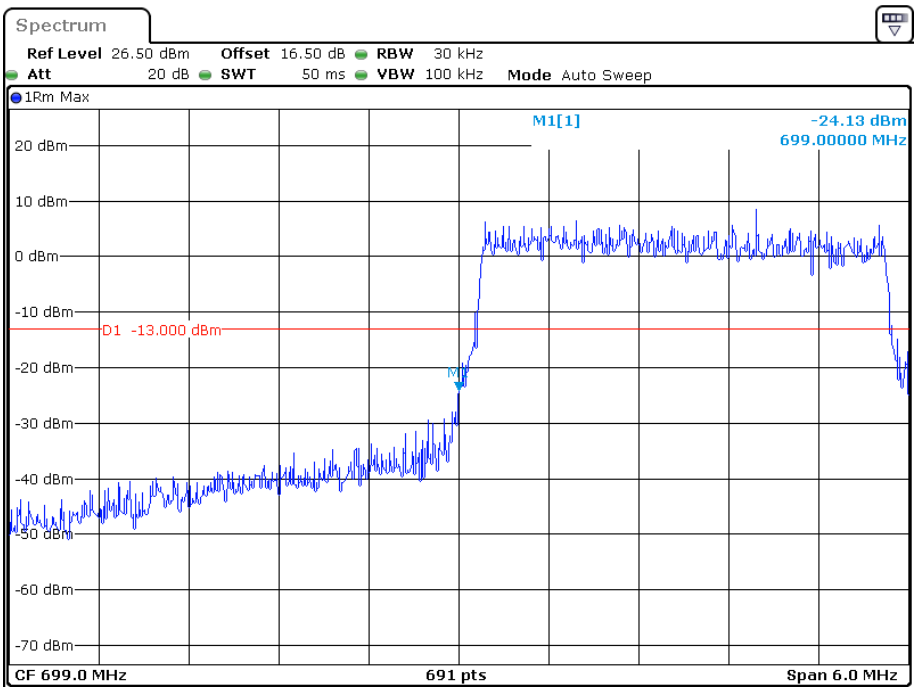
Date: 24.MAY.2019 18:07:59

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



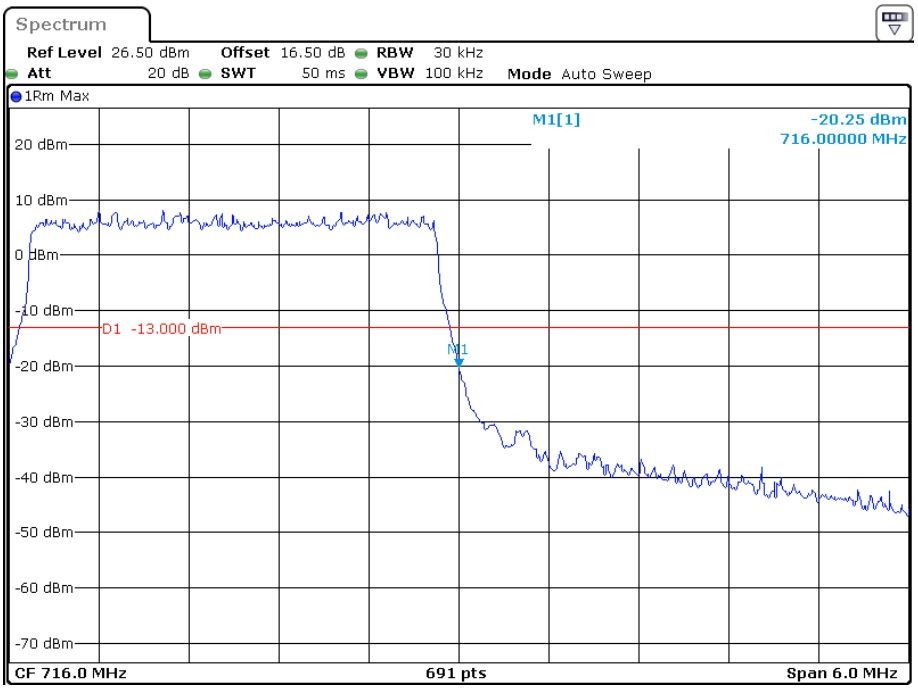
Date: 24.MAY.2019 18:01:22

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



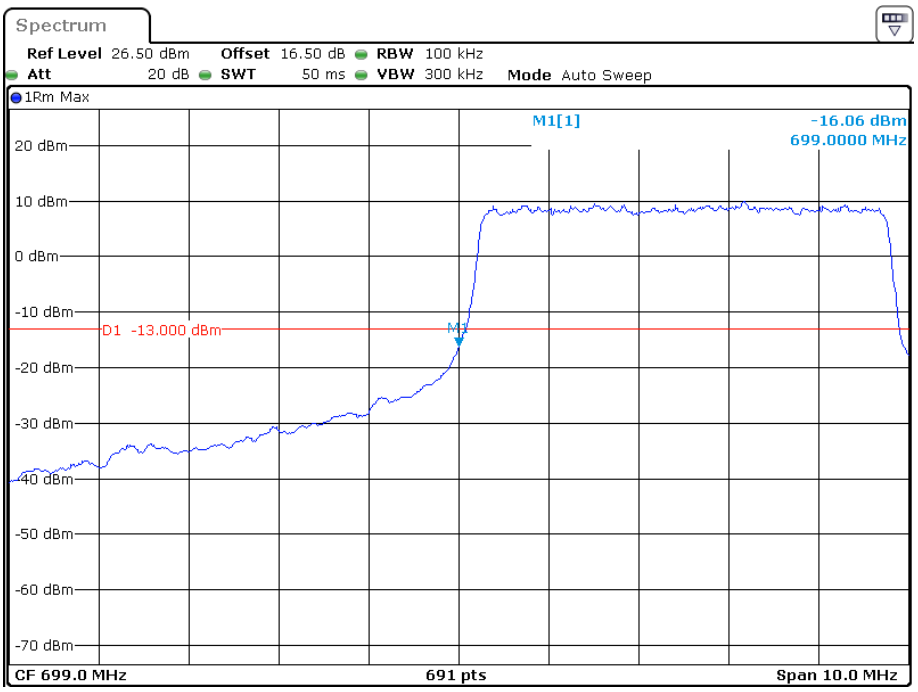
Date: 24.MAY.2019 18:04:33

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



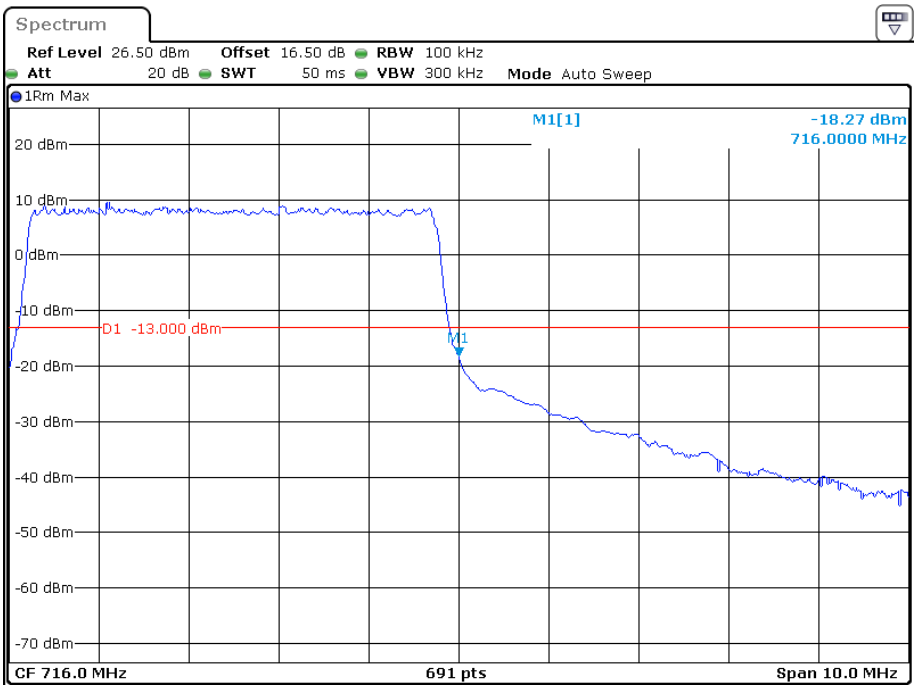
Date: 24.MAY.2019 18:02:00

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



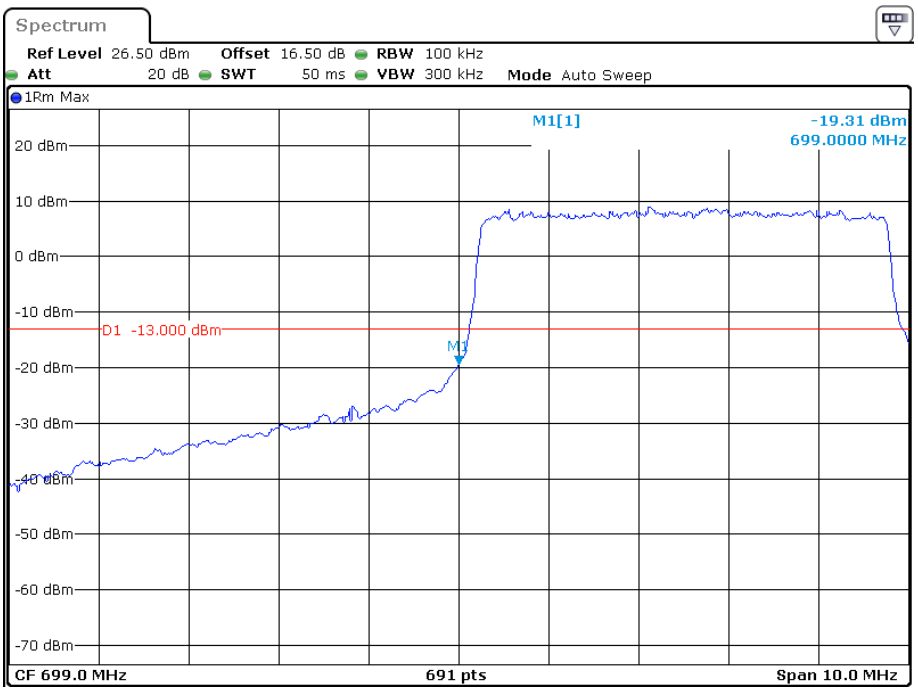
Date: 24.MAY.2019 18:09:54

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



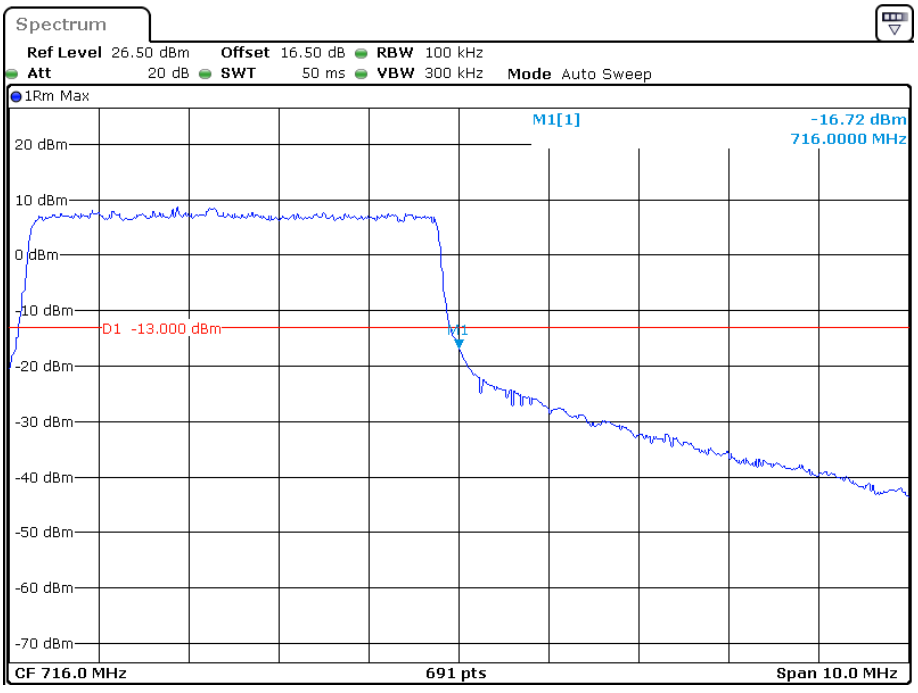
Date: 24.MAY.2019 18:12:51

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



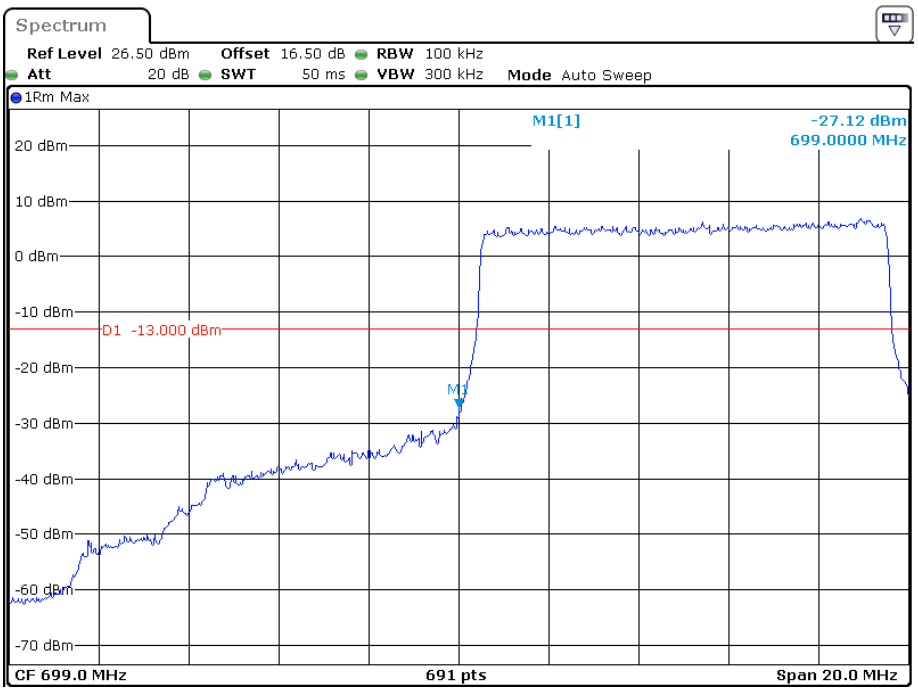
Date: 24.MAY.2019 18:10:51

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



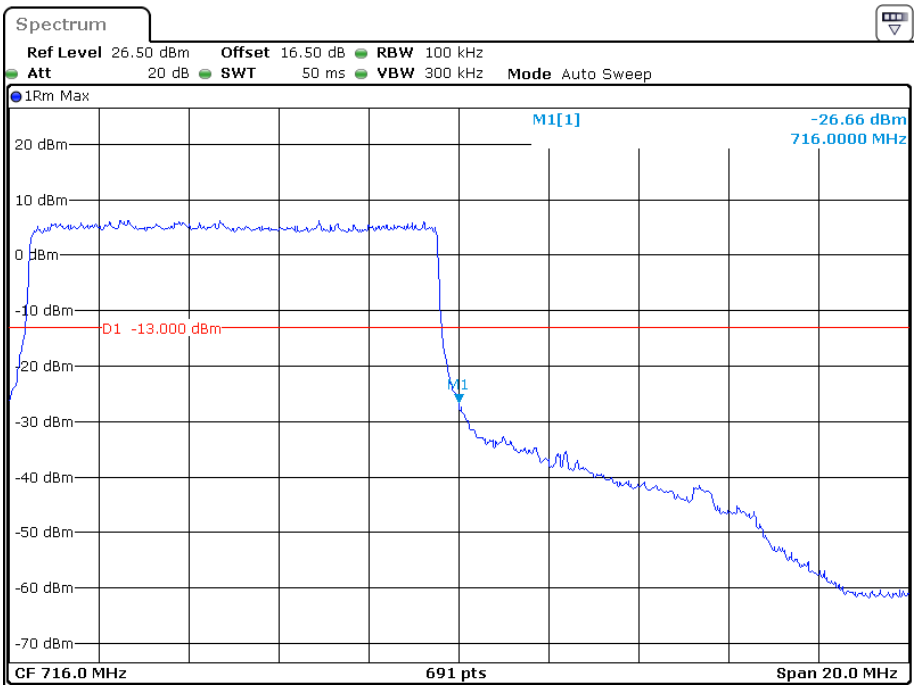
Date: 24.MAY.2019 18:12:08

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



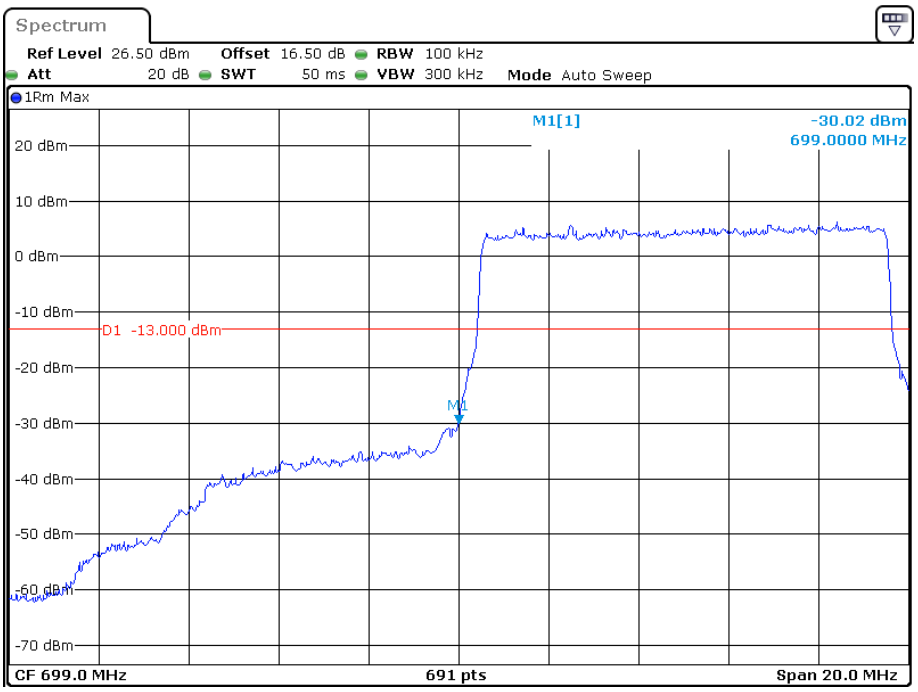
Date: 24.MAY.2019 18:17:53

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



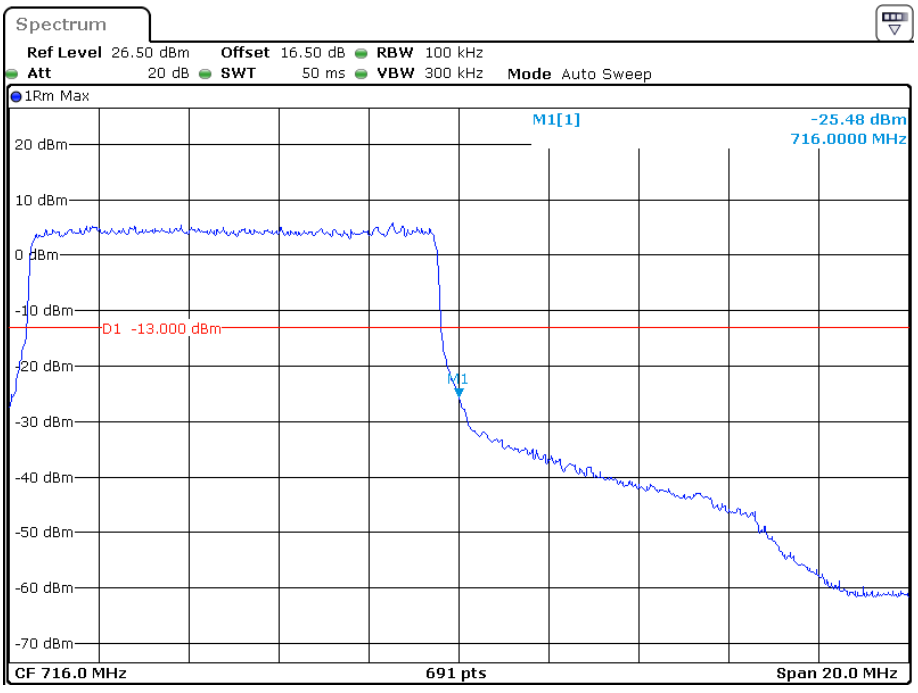
Date: 24.MAY.2019 18:15:11

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



Date: 24.MAY.2019 18:17:24

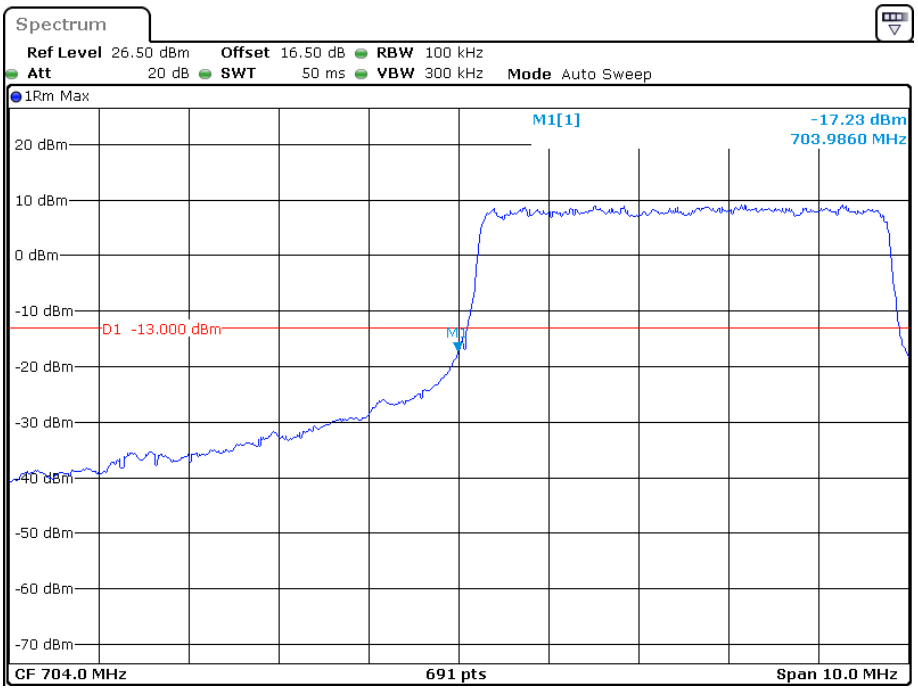
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



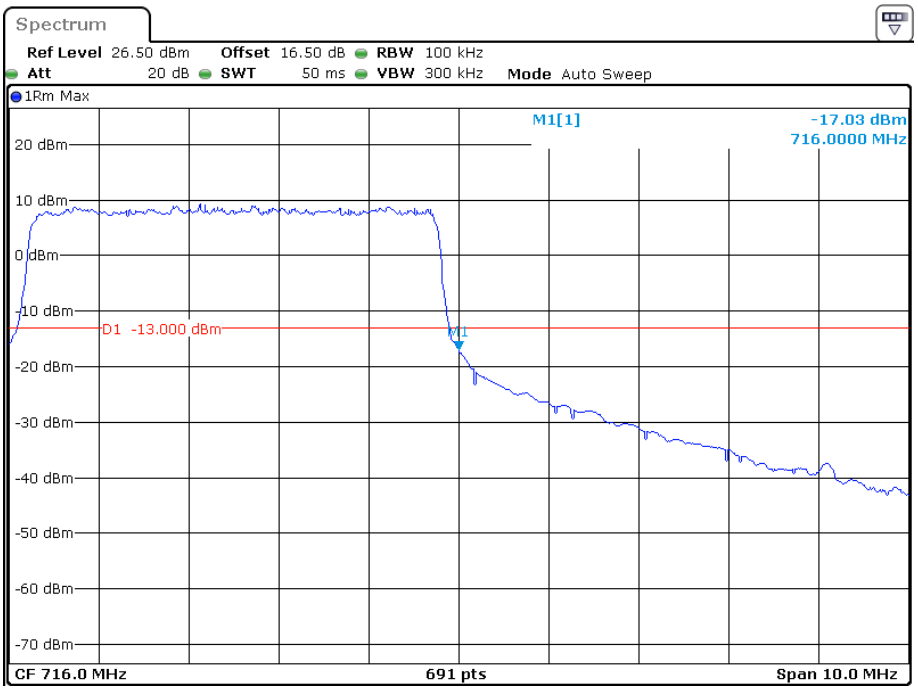
Date: 24.MAY.2019 18:16:04

Band 17:

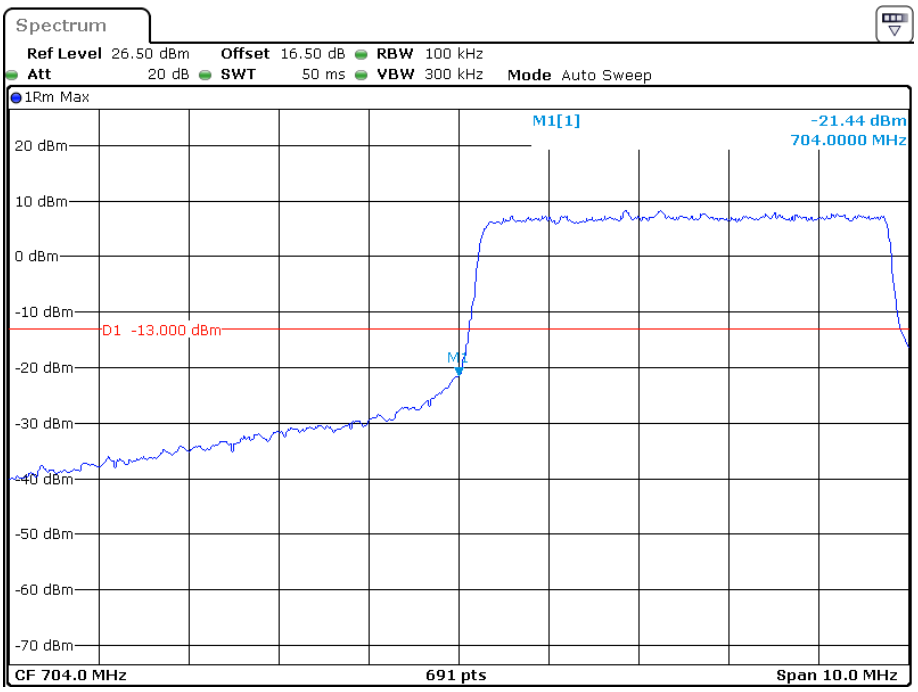
QPSK (5.0 MHz, FULL RB) - Left Band Edge



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

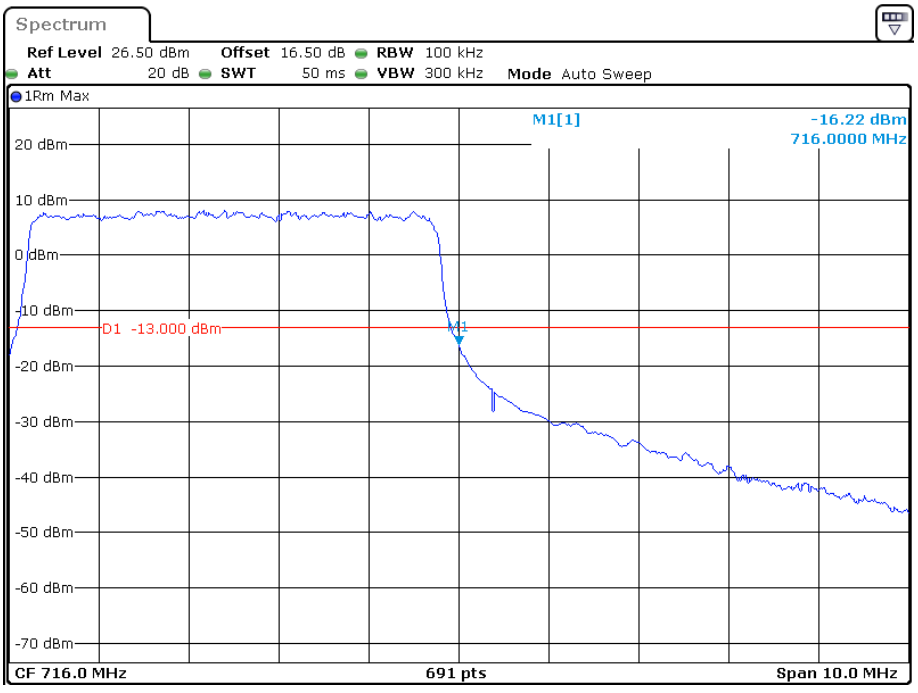


16-QAM (5.0 MHz, FULL RB) - Left Band Edge



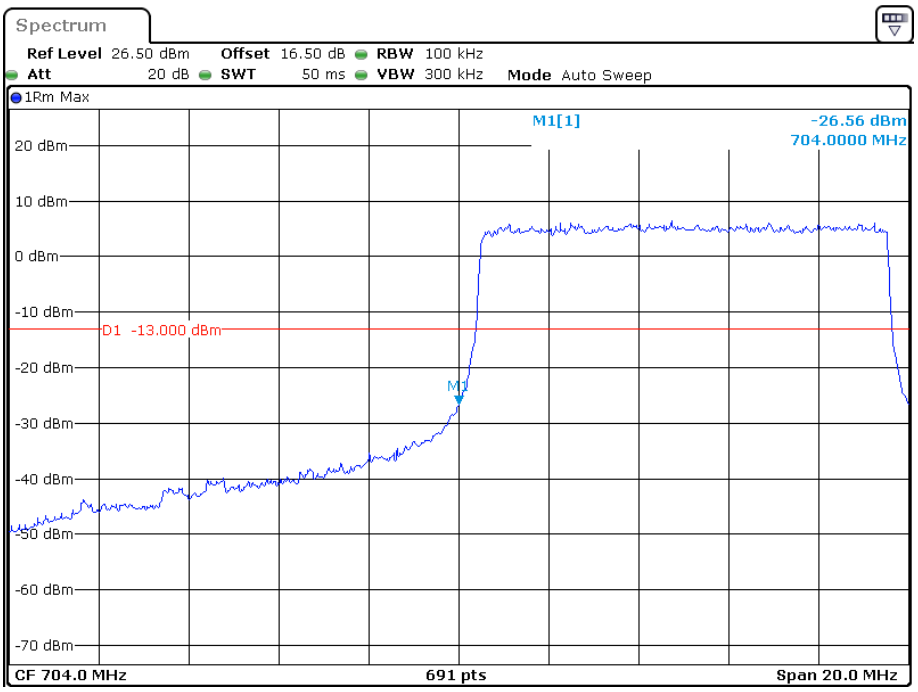
Date: 24.MAY.2019 17:31:57

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



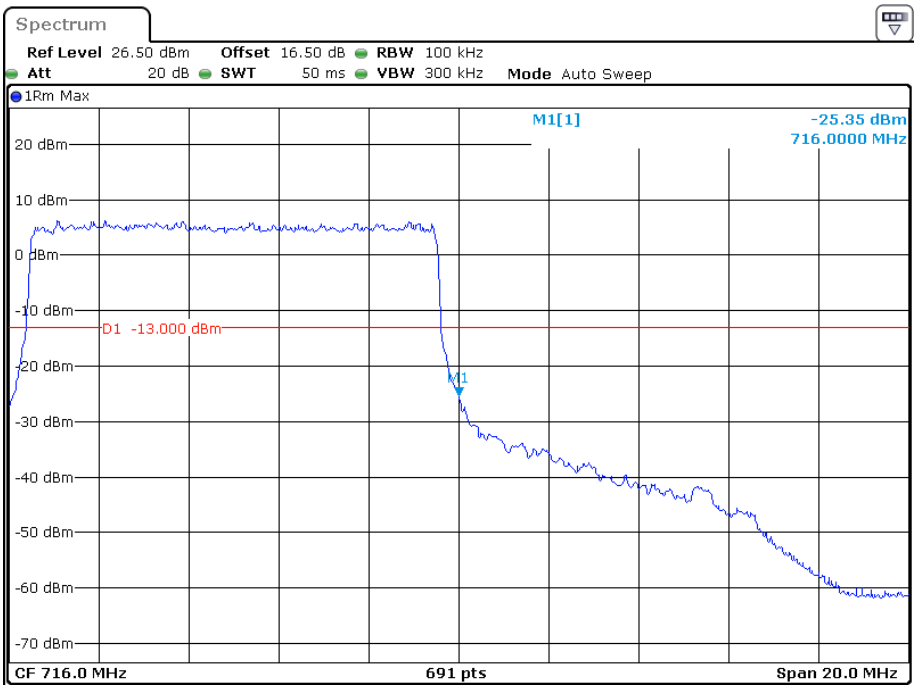
Date: 24.MAY.2019 17:34:55

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



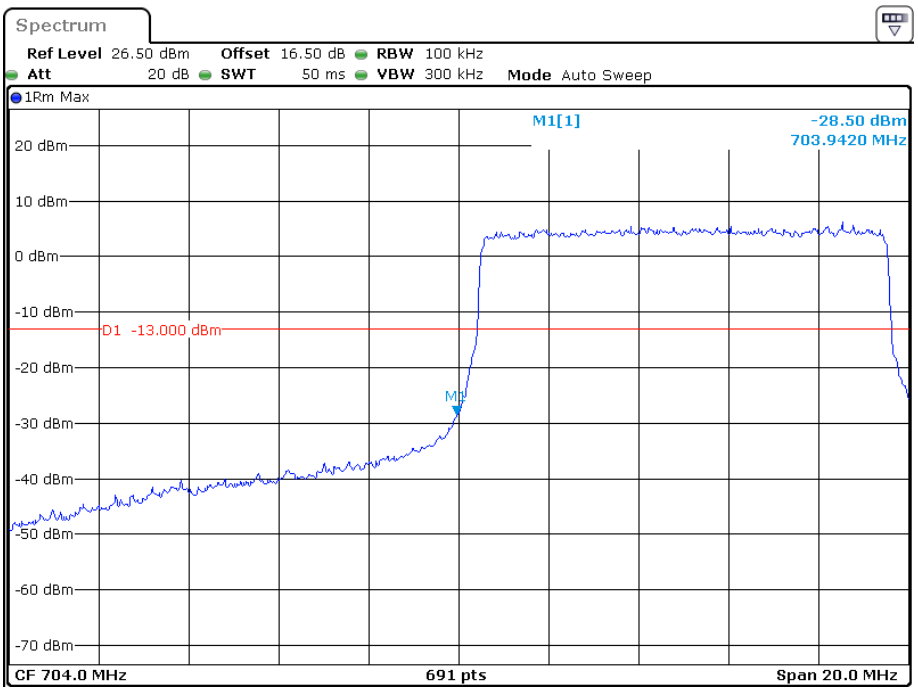
Date: 24.MAY.2019 17:38:50

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



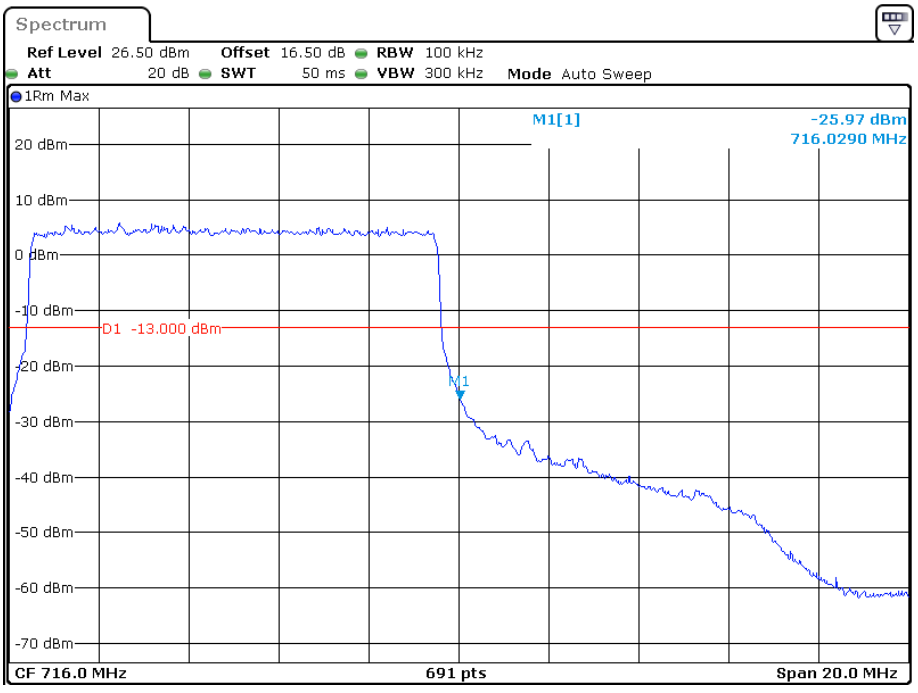
Date: 24.MAY.2019 17:45:31

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



Date: 24.MAY.2019 17:39:48

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



Date: 24.MAY.2019 17:44:44

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

Applicable Standard

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

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

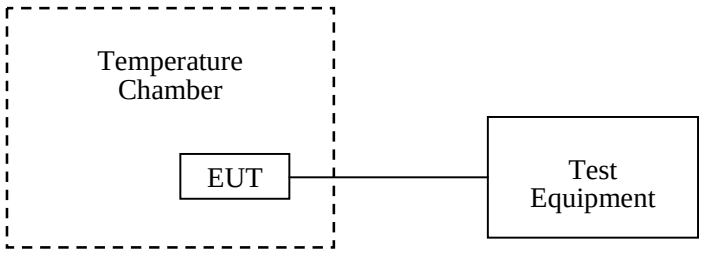
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

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

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

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



Test Data

Environmental Conditions

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

The testing was performed by Kieron Luo on 2019-05-21 to 2019-05-24.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

GSM Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-18	-0.0215	2.5
-20		-18	-0.0215	2.5
-10		-16	-0.0191	2.5
0		-17	-0.0203	2.5
10		-15	-0.0179	2.5
20		-14	-0.0167	2.5
30		-12	-0.0143	2.5
40		-13	-0.0155	2.5
50		-15	-0.0179	2.5
20	V min.= 3.6	-16	-0.0191	2.5
	V max.= 4.2	-12	-0.0143	2.5

EDGE Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	8	0.0096	2.5
-20		9	0.0108	2.5
-10		10	0.0120	2.5
0		8	0.0096	2.5
10		7	0.0084	2.5
20		6	0.0072	2.5
30		5	0.0060	2.5
40		4	0.0048	2.5
50		3	0.0036	2.5
20	V min.= 3.6	5	0.0060	2.5
	V max.= 4.2	8	0.0096	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-6	-0.0072	2.5
-20		-7	-0.0084	2.5
-10		-4	-0.0048	2.5
0		-3	-0.0036	2.5
10		-5	-0.0060	2.5
20		-3	-0.0036	2.5
30		-2	-0.0024	2.5
40		-1	-0.0012	2.5
50		-1	-0.0012	2.5
20	V min.= 3.6	-4	-0.0048	2.5
	V max.= 4.2	-1	-0.0012	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-29	-0.0154	pass
-20		-24	-0.0128	pass
-10		-25	-0.0133	pass
0		-28	-0.0149	pass
10		-26	-0.0138	pass
20		-25	-0.0133	pass
30		-23	-0.0122	pass
40		-25	-0.0133	pass
50		-27	-0.0144	pass
20	V min.= 3.6	-25	-0.0133	pass
	V max.= 4.2	-29	-0.0154	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-14	-0.0074	pass
-20		-12	-0.0064	pass
-10		-10	-0.0053	pass
0		-9	-0.0048	pass
10		-11	-0.0059	pass
20		-12	-0.0064	pass
30		-13	-0.0069	pass
40		-15	-0.0080	pass
50		-16	-0.0085	pass
20	V min.= 3.6	-13	-0.0069	pass
	V max.= 4.2	-10	-0.0053	pass

WCDMA Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	6	0.0032	pass
-20		5	0.0027	pass
-10		4	0.0021	pass
0		3	0.0016	pass
10		3	0.0016	pass
20		4	0.0021	pass
30		6	0.0032	pass
40		5	0.0027	pass
50		4	0.0021	pass
20	V min.= 3.6	3	0.0016	pass
	V max.= 4.2	6	0.0032	pass

AWS Band (Part 27)

Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.0041	1754.9959	1710	1755
-20		1710.0028	1754.9980	1710	1755
-10		1710.0037	1754.9946	1710	1755
0		1710.0037	1754.9972	1710	1755
10		1710.0038	1754.9961	1710	1755
20		1710.0032	1755.0009	1710	1755
30		1710.0044	1754.9971	1710	1755
40		1710.0083	1754.9931	1710	1755
50		1710.0084	1754.9955	1710	1755
20	V min.= 3.6	1710.0050	1754.9958	1710	1755
	V max.= 4.2	1710.0028	1754.9977	1710	1755

LTE:
QPSK:

Band 2:

10.0 MHz Middle Channel, f_o=1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-4	-0.0021	pass
-20		-2	-0.0011	pass
-10		-3	-0.0016	pass
0		-2	-0.0011	pass
10		-3	-0.0016	pass
20		-2	-0.0011	pass
30		-1	-0.0005	pass
40		-2	-0.0011	pass
50		-2	-0.0011	pass
20	V min.= 3.6	-3	-0.0016	pass
	V max.= 4.2	-1	-0.0005	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.1125	1754.8717	1710	1755
-20		1710.0647	1754.8564	1710	1755
-10		1710.1127	1754.8714	1710	1755
0		1710.0436	1754.8032	1710	1755
10		1710.2369	1754.7580	1710	1755
20		1710.1128	1754.8728	1710	1755
30		1710.0790	1754.8758	1710	1755
40		1710.0677	1754.8315	1710	1755
50		1710.1125	1754.8718	1710	1755
20	V min.= 3.6	1710.1087	1754.8774	1710	1755
	V max.= 4.2	1710.1112	1754.8771	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o=836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-6	-0.0072	2.5
-20		-4	-0.0048	2.5
-10		-1	-0.0012	2.5
0		-4	-0.0048	2.5
10		-3	-0.0036	2.5
20		-3	-0.0036	2.5
30		-2	-0.0024	2.5
40		-1	-0.0012	2.5
50		1	0.0012	2.5
20	V min.= 3.6	-5	-0.0060	2.5
	V max.= 4.2	1	0.0012	2.5

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	699.1592	715.8728	699	716
-20		699.1593	715.8756	699	716
-10		699.1601	715.8729	699	716
0		699.1617	715.8753	699	716
10		699.1582	715.8729	699	716
20		699.1557	715.8759	699	716
30		699.1600	715.8703	699	716
40		699.1631	715.8779	699	716
50		699.1565	715.8707	699	716
20	V min.= 3.6	699.1561	715.8757	699	716
	V max.= 4.2	699.1590	715.8701	699	716

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	704.1486	715.9672	704	716
-20		704.1242	715.9684	704	716
-10		704.0926	715.9655	704	716
0		704.0891	715.9660	704	716
10		704.0293	715.9638	704	716
20		704.0321	715.9673	704	716
30		704.0348	715.9649	704	716
40		704.0378	715.9617	704	716
50		704.0360	715.9609	704	716
20	V min.= 3.6	704.1110	715.9670	704	716
	V max.= 4.2	704.2073	715.9648	704	716

16QAM:

Band 2:

10.0 MHz Middle Channel, f_o =1880MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	-5	-0.0027	pass
-20		-2	-0.0011	pass
-10		-3	-0.0016	pass
0		-6	-0.0032	pass
10		-3	-0.0016	pass
20		-2	-0.0011	pass
30		-1	-0.0005	pass
40		0	0.0000	pass
50		-1	-0.0005	pass
20	V min.= 3.6	-4	-0.0021	pass
	V max.= 4.2	-1	-0.0005	pass

Band 4:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	1710.1125	1754.8717	1710	1755
-20		1710.0647	1754.8564	1710	1755
-10		1710.1127	1754.8717	1710	1755
0		1710.0438	1754.8032	1710	1755
10		1710.2425	1754.7580	1710	1755
20		1710.1230	1754.9130	1710	1755
30		1710.0790	1754.8758	1710	1755
40		1710.0687	1754.8313	1710	1755
50		1710.1120	1754.8718	1710	1755
20	V min.= 3.6	1710.0295	1754.7905	1710	1755
	V max.= 4.2	1710.0147	1754.7822	1710	1755

Band 5:

10.0 MHz Middle Channel, f_o=836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-6	-0.0072	2.5
-20		-4	-0.0048	2.5
-10		-1	-0.0012	2.5
0		-4	-0.0048	2.5
10		-3	-0.0036	2.5
20		-3	-0.0036	2.5
30		-5	-0.0060	2.5
40		-3	-0.0036	2.5
50		-1	-0.0012	2.5
20	V min.= 3.6	-5	-0.0060	2.5
	V max.= 4.2	-6	-0.0072	2.5

Band 12:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	699.2324	715.7683	699	716
-20		699.2356	715.7676	699	716
-10		699.2320	715.7667	699	716
0		699.2357	715.7666	699	716
10		699.2346	715.7638	699	716
20		699.2370	715.7679	699	716
30		699.2334	715.7649	699	716
40		699.2373	715.7648	699	716
50		699.2331	715.7617	699	716
20	V min.= 3.6	699.2334	715.7623	699	716
	V max.= 4.2	699.2368	715.7638	699	716

Band 17:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	704.2957	715.7604	704	716
-20		704.3055	715.7636	704	716
-10		704.3293	715.7647	704	716
0		704.2658	715.7677	704	716
10		704.2387	715.7632	704	716
20		704.2363	715.7650	704	716
30		704.2389	715.7634	704	716
40		704.2432	715.7635	704	716
50		704.2456	715.7624	704	716
20	V min.= 3.6	704.2433	715.7644	704	716
	V max.= 4.2	704.2689	715.7617	704	716

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