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BACL
Bay Area Compliance Labs Corp.

FCC PART 27

FCC PART 22H, PART 24E

TEST REPORT

For

KRIPTO MOBILE CORPORATION

7236 NW 31ST ST., MIAMI, Florida, United States

FCC ID: 2APX7K55H

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

Report Number: RSZ190917001-00D

Report Date: 2019-10-12

Reviewed By: Jacob Kong, RF Engineer

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	Mobile phone
Tested Model	K55h
Frequency Range	Cellular: 824-849 MHz PCS: 1850-1910 MHz WCDMA B2: 1850-1910 MHz WCDMA B5: 824-849 MHz LTE B4: 1710- 1755 MHz LTE B7: 2500-2570 MHz
Conducted Average Power	GSM850: 31.90 dBm, EGPRS850: 26.04 dBm PCS1900: 28.90 dBm，EGPRS1900: 24.50 dBm WCDMA Band 2: 22.41 dBm; WCDMA Band 5: 22.09 dBm LTE Band 4: 22.85dBm; LTE Band 7: 23.88 dBm
Modulation Technique	2G: GMSK,8PSK 3G: BPSK, QPSK, 16QAM,64QAM 4G: QPSK, 16QAM
Antenna Specification	2G/3G/4G:FPC Antennas
Voltage Range	DC 3.8V battery or DC 5.0V from adapter
Date of Test	2019-09-24 to 2019-10-16.
Sample serial number	190917001(Assigned by BACL, Shenzhen)
Received date	2019-09-17
Sample/EUT Status	Good condition
Adapter information	Model:C55h Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 5V, 1.0A

Objective

This test report is prepared on behalf of *KRIPTO MOBILE CORPORATION* in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Part 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 FCC Part15.407 NII submissions with
FCC ID: 2APX7K55H.

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: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

Test Facility

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

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

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

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

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

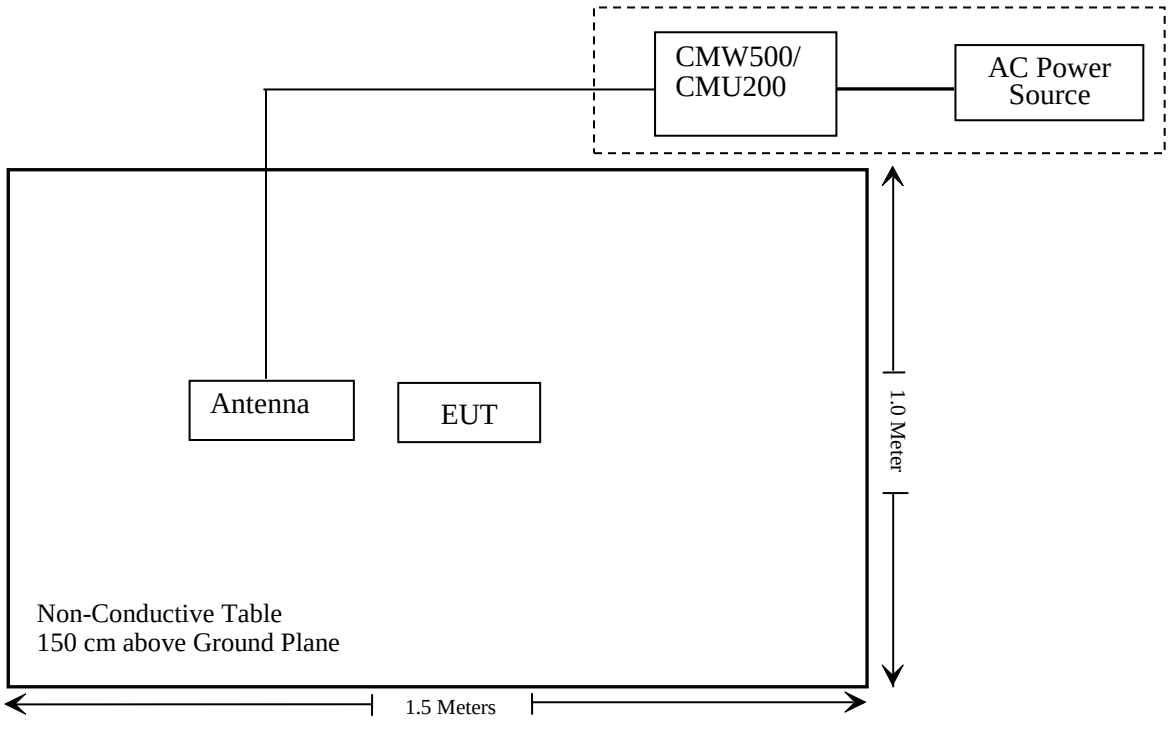
Equipment Modifications

No modification was made to the EUT.

Support Equipment List and Details

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

Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§ 1.1307 , §2.1093	RF Exposure (SAR)	Compliance*
§2.1046; § 22.913 (a); § 24.232 (c); §27.50 (c) (d) (h)	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051; § 22.917 (a); § 24.238 (a); §27.53 (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: RSZ190917001-SA

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017-12-22	2020-12-21
Rohde & Schwarz	Signal Analyzer	FSEM	845987/005	2019-07-22	2020-07-21
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017-12-22	2020-12-21
COM-POWER	Pre-amplifier	PA-122	181919	2018-11-12	2019-11-12
Sonoma Instrument	Amplifier	310N	186238	2018-11-12	2019-11-12
Agilent	Signal Generator	N5183A	MY51040755	2018-12-03	2019-12-03
Rohde & Schwarz	EMI Test Receiver	ESR3	102455	2019-07-09	2020-07-08
COM-POWER	Dipole Antenna	AD-100	41000	NCR	NCR
A.H. System	Horn Antenna	SAS-200/571	135	2018-09-01	2021-08-31
UTiFLEX MICRO-C0AX	RF Cable	UFA147A-2362-100100	MFR64639 231029-003	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	104PEA	218124002	2018-11-12	2019-11-12
Ducommun Technologies	RF Cable	RG-214	1	2019-05-21	2019-11-19
Ducommun Technologies	RF Cable	RG-214	2	2018-11-12	2019-11-12
Ducommun Technologies	Horn Antenna	ARH-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
Wainwright Germany	Band Reject Filter	WRCG1850/1910-1835/1925-40/8SS	22	2019-03-02	2020-03-01
Wainwright Germany	Band Reject Filter	WRCG823/850-813/860-40/8SS	7	2019-03-02	2020-03-01
Wainwright Germany	Band Reject Filter	WRCG1786-1689/1806	2	2019-03-02	2020-03-01

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	Spectrum Analyzer	FSU26	200120	2019-03-02	2020-03-01
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019-01-05	2020-01-05
Long Wei	DC Power Supply	TPR-6420D	398363	NCR	NCR
KEYSIGHT	Vector signal source	N5182B	MY53051503	2019-07-22	2020-07-21
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	106891	2019-01-15	2020-01-15
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2019-07-09	2020-07-08
Ducommun Technologies	RF Cable	RG-214	3	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: RSZ190917001-SA.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

Applicable Standard

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

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

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

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

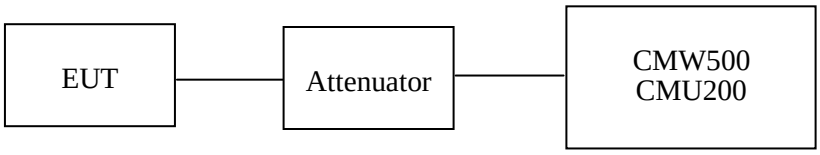
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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

Test Procedure

Conducted method:

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



Radiated method:

TIA 603-D section 2.2.17

Test Data

Environmental Conditions

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

The testing was performed by James Fu on 2019-09-24.

Conducted Power

Cellular Band (Part 22H)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	31.70	38.45
	190	836.6	31.80	38.45
	251	848.8	31.90	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	31.73	29.77	27.64	26.51	38.45
	190	836.6	31.86	29.75	27.61	26.46	38.45
	251	848.8	31.82	29.73	27.62	26.43	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	25.20	23.19	21.33	20.12	38.45
	190	836.6	25.67	23.20	21.32	20.14	38.45
	251	848.8	26.04	23.44	21.34	20.11	38.45

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band V)	Normal	RMC12.2k		21.89	21.98	21.97
		HSDPA	1	21.88	21.91	21.92
			2	21.94	21.96	21.97
			3	22.01	22.00	22.04
			4	22.03	22.06	22.09
		HSUPA	1	21.47	21.62	21.57
			2	21.55	21.67	21.62
			3	21.58	21.74	21.67
			4	21.61	21.79	21.72
			5	21.68	21.81	21.78
		HSPA+	1	21.73	21.84	21.84

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	28.70	33
	661	1880.0	28.70	33
	810	1909.8	28.90	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	28.63	26.04	24.78	23.44	33
	661	1880.0	28.67	26.06	24.82	23.52	33
	810	1909.8	28.90	26.51	24.76	23.48	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	24.50	22.10	21.48	19.36	33
	661	1880.0	24.34	21.93	21.36	19.24	33
	810	1909.8	24.41	22.62	21.42	19.60	33

Mode	Test Condition	Test Mode	3GPP Sub Test	Average Output Power (dBm)		
				Low Frequency	Middle Frequency	High Frequency
WCDMA (Band II)	Normal	RMC12.2k		21.94	21.95	22.16
		HSDPA	1	22.01	22.03	22.27
			2	22.07	22.09	22.32
			3	22.09	22.13	22.39
			4	22.14	22.17	22.41
		HSUPA	1	21.61	21.62	21.72
			2	21.68	21.67	21.75
			3	21.74	21.71	21.79
			4	21.77	21.78	21.86
			5	21.82	21.84	21.93
		HSPA+	1	21.85	21.88	21.95

Peak-to-average ratio (PAR)

Cellular Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.37	13
	Middle	1.33	13
	High	1.35	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.36	13
	Middle	1.34	13
	High	1.31	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	2.44	13
	Middle	2.43	13
	High	2.47	13
HSDPA (16QAM)	Low	2.88	13
	Middle	2.87	13
	High	2.91	13
HSUPA (BPSK)	Low	2.79	13
	Middle	2.75	13
	High	2.78	13
HSPA+	Low	2.85	13
	Middle	2.63	13
	High	2.48	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.41	13
	Middle	1.39	13
	High	1.37	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.43	13
	Middle	1.38	13
	High	1.36	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.38	13
	Middle	3.33	13
	High	3.37	13
HSDPA (16QAM)	Low	3.55	13
	Middle	3.54	13
	High	3.52	13
HSUPA (BPSK)	Low	3.51	13
	Middle	3.49	13
	High	3.47	13
HSPA+	Low	3.09	13
	Middle	3.35	13
	High	3.22	13

Radiated Power
GSM Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	93.68	59	1.6	H	30.1	1.88	0.0	28.22	38.45	10.23
836.6	94.41	132	2.5	V	32.6	1.88	0.0	30.72	38.45	7.73
EIRP for PCS Band (Part 24E), Middle Channel										
1880	89.21	46	1.9	H	19.5	1.30	9.40	27.6	33	5.4
1880	88.33	149	1.5	V	18.4	1.30	9.40	26.5	33	6.5

EDGE Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)			
ERP, Cellular Band (Part 22H), Middle Channel										
836.6	88.62	111	1.1	H	25.0	1.88	0.0	23.12	38.45	15.33
836.6	89.39	80	1.6	V	27.6	1.88	0.0	25.72	38.45	12.73
EIRP, PCS Band (Part 24E), Middle Channel										
1880	85.72	227	1.3	H	16.0	1.30	9.40	24.10	33	8.9
1880	84.58	72	1.8	V	14.7	1.30	9.40	22.80	33	10.2

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBi)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	84.91	309	1.1	H	21.3	1.88	0.0	19.42	38.45	19.03
836.6	85.36	359	2.3	V	23.6	1.88	0.0	21.72	38.45	16.73
EIRP for WCDMA Band II (Part 24E), Middle Channel										
1880.00	82.75	178	1.8	H	13.1	1.30	9.40	21.20	33	11.8
1880.00	82.19	225	2.4	V	12.3	1.30	9.40	20.40	33	12.6

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

LTE Band 4:

Maximum Output Power

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.43	22.36	22.54
		RB Size=1, RB Offset=2	22.33	22.18	22.53
		RB Size=1, RB Offset=5	22.43	22.10	22.53
		RB Size=3, RB Offset=0	22.73	22.58	22.59
		RB Size=3, RB Offset=1	22.51	22.61	22.63
		RB Size=3, RB Offset=2	22.52	22.43	22.49
		RB Size=6, RB Offset=0	21.51	21.46	21.40
	16QAM	RB Size=1, RB Offset=0	21.85	21.86	21.85
		RB Size=1, RB Offset=2	21.79	21.82	21.84
		RB Size=1, RB Offset=5	21.67	21.87	21.79
		RB Size=3, RB Offset=0	22.85	21.83	21.82
		RB Size=3, RB Offset=1	22.82	21.82	21.80
		RB Size=3, RB Offset=2	22.49	21.76	21.67
		RB Size=6, RB Offset=0	20.76	20.76	20.68
3.0	QPSK	RB Size=1, RB Offset=0	22.56	22.49	22.41
		RB Size=1, RB Offset=7	22.28	22.37	22.23
		RB Size=1, RB Offset=14	22.31	22.23	22.20
		RB Size=8, RB Offset=0	21.54	21.51	21.74
		RB Size=8, RB Offset=4	21.49	21.51	21.74
		RB Size=8, RB Offset=7	21.31	21.31	21.67
		RB Size=15, RB Offset=0	21.67	21.65	21.65
	16QAM	RB Size=1, RB Offset=0	21.83	21.72	21.56
		RB Size=1, RB Offset=7	21.69	21.59	21.49
		RB Size=1, RB Offset=14	21.79	21.36	21.27
		RB Size=8, RB Offset=0	20.76	20.73	20.75
		RB Size=8, RB Offset=4	20.74	20.58	20.83
		RB Size=8, RB Offset=7	20.69	20.71	20.59
		RB Size=15, RB Offset=0	20.67	20.80	20.69

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.68	22.68	22.72
		RB Size=1, RB Offset=12	22.63	22.65	22.58
		RB Size=1, RB Offset=24	22.44	22.40	22.64
		RB Size=12, RB Offset=0	21.74	21.61	21.70
		RB Size=12, RB Offset=6	21.74	21.70	21.61
		RB Size=12, RB Offset=11	21.58	21.70	21.64
		RB Size=25, RB Offset=0	21.88	21.75	21.72
	16QAM	RB Size=1, RB Offset=0	21.86	21.93	21.94
		RB Size=1, RB Offset=12	21.88	21.81	21.82
		RB Size=1, RB Offset=24	21.64	21.66	21.62
		RB Size=12, RB Offset=0	20.97	20.95	20.96
		RB Size=12, RB Offset=6	20.93	20.82	20.96
		RB Size=12, RB Offset=11	20.84	20.74	20.78
		RB Size=25, RB Offset=0	20.89	20.69	20.53
10.0	QPSK	RB Size=1, RB Offset=0	22.71	22.66	22.85
		RB Size=1, RB Offset=24	22.76	22.65	22.71
		RB Size=1, RB Offset=49	22.60	22.79	22.71
		RB Size=25, RB Offset=0	21.69	21.82	21.82
		RB Size=25, RB Offset=12	21.60	21.85	21.83
		RB Size=25, RB Offset=24	21.56	21.46	21.70
		RB Size=50, RB Offset=0	21.81	21.82	21.80
	16QAM	RB Size=1, RB Offset=0	22.09	22.24	22.17
		RB Size=1, RB Offset=24	22.14	22.16	22.18
		RB Size=1, RB Offset=49	22.23	22.19	22.02
		RB Size=25, RB Offset=0	20.81	20.97	20.87
		RB Size=25, RB Offset=12	20.59	20.64	20.96
		RB Size=25, RB Offset=24	20.57	20.74	20.70
		RB Size=50, RB Offset=0	20.93	20.79	20.91

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15.0	QPSK	RB Size=1, RB Offset=0	22.64	22.66	22.58
		RB Size=1, RB Offset=37	22.75	22.50	22.49
		RB Size=1, RB Offset=74	22.42	22.35	22.46
		RB Size=36, RB Offset=0	21.90	21.93	21.88
		RB Size=36, RB Offset=18	22.01	21.85	21.74
		RB Size=36, RB Offset=37	21.97	21.60	21.84
		RB Size=75, RB Offset=0	21.66	21.54	21.57
	16QAM	RB Size=1, RB Offset=0	21.73	21.53	21.72
		RB Size=1, RB Offset=37	21.61	21.57	21.60
		RB Size=1, RB Offset=74	21.62	21.39	21.52
		RB Size=36, RB Offset=0	20.88	20.65	20.76
		RB Size=36, RB Offset=18	20.70	20.47	20.50
		RB Size=36, RB Offset=37	20.54	20.48	20.50
		RB Size=75, RB Offset=0	20.69	20.74	20.86
20.0	QPSK	RB Size=1, RB Offset=0	22.63	22.40	22.40
		RB Size=1, RB Offset=49	22.65	22.39	22.50
		RB Size=1, RB Offset=99	22.74	22.33	22.22
		RB Size=50, RB Offset=0	21.88	21.94	21.94
		RB Size=50, RB Offset=24	21.93	21.75	21.97
		RB Size=50, RB Offset=49	21.68	21.77	21.86
		RB Size=100, RB Offset=0	21.79	21.55	21.50
	16QAM	RB Size=1, RB Offset=0	22.32	22.25	22.36
		RB Size=1, RB Offset=49	22.14	22.30	22.29
		RB Size=1, RB Offset=99	22.10	22.15	22.39
		RB Size=50, RB Offset=0	21.14	21.06	20.95
		RB Size=50, RB Offset=24	20.95	21.12	21.10
		RB Size=50, RB Offset=49	20.83	20.96	21.04
		RB Size=100, RB Offset=0	20.81	20.75	20.78

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	6.36	13	Pass
QPSK (100RB Size)	6.29	13	Pass
16QAM (1RB Size)	7.41	13	Pass
16QAM (100RB Size)	7.34	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	87.23	344	2.5	H	13.9	1.30	8.90	21.50	30
1732.50	84.63	245	2.0	V	11.9	1.30	8.90	19.50	30
3 MHz Bandwidth									
1732.50	86.73	91	1.9	H	13.4	1.3	8.9	21.00	30
1732.50	84.22	81	1.6	V	11.5	1.3	8.9	19.10	30
5 MHz Bandwidth									
1732.50	86.66	56	2.4	H	13.3	1.30	8.90	20.90	30
1732.50	84.17	118	2.1	V	11.4	1.30	8.90	19.00	30
10 MHz Bandwidth									
1732.50	85.96	242	2.1	H	12.6	1.30	8.90	20.20	30
1732.50	84.13	115	1.5	V	11.4	1.30	8.90	19.00	30
15 MHz Bandwidth									
1732.50	85.61	135	2.4	H	12.3	1.30	8.90	19.90	30
1732.50	83.95	318	2.5	V	11.2	1.30	8.90	18.80	30
20 MHz Bandwidth									
1732.50	85.30	185	1.7	H	12.0	1.30	8.90	19.60	30
1732.50	83.42	173	1.6	V	10.7	1.30	8.90	18.30	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	87.59	194	2.1	H	14.3	1.30	8.90	21.90	30
1732.50	84.81	264	1.2	V	12.1	1.30	8.90	19.70	30
3 MHz Bandwidth									
1732.50	87.65	227	1.2	H	14.3	1.30	8.90	21.90	30
1732.50	84.68	193	2.3	V	12.0	1.30	8.90	19.60	30
5 MHz Bandwidth									
1732.50	87.11	104	1.8	H	13.8	1.30	8.90	21.40	30
1732.50	84.50	108	2.2	V	11.8	1.30	8.90	19.40	30
10 MHz Bandwidth									
1732.50	86.76	349	2.1	H	13.4	1.30	8.90	21.00	30
1732.50	84.18	17	2.0	V	11.5	1.30	8.90	19.10	30
15 MHz Bandwidth									
1732.50	86.25	324	2.1	H	12.9	1.30	8.90	20.50	30
1732.50	83.99	106	1.2	V	11.3	1.30	8.90	18.90	30
20 MHz Bandwidth									
1732.50	86.01	106	1.0	H	12.7	1.30	8.90	20.30	30
1732.50	83.75	252	2.0	V	11.0	1.30	8.90	18.60	30

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	23.13	23.04	22.51
		RB Size=1, RB Offset=12	22.68	22.59	22.36
		RB Size=1, RB Offset=24	23.31	22.94	22.79
		RB Size=12, RB Offset=0	21.99	21.64	21.28
		RB Size=12, RB Offset=6	22.10	21.69	21.36
		RB Size=12, RB Offset=11	22.07	21.56	21.51
		RB Size=25, RB Offset=0	21.99	21.57	22.39
	16QAM	RB Size=1, RB Offset=0	22.66	21.94	22.12
		RB Size=1, RB Offset=12	22.52	21.78	22.04
		RB Size=1, RB Offset=24	22.72	21.90	22.34
		RB Size=12, RB Offset=0	21.83	20.85	21.37
		RB Size=12, RB Offset=6	21.60	21.09	21.33
		RB Size=12, RB Offset=11	21.66	20.94	21.30
		RB Size=25, RB Offset=0	20.99	20.77	20.54
10	QPSK	RB Size=1, RB Offset=0	22.66	22.52	22.70
		RB Size=1, RB Offset=24	22.71	22.31	22.61
		RB Size=1, RB Offset=49	22.61	22.21	22.70
		RB Size=25, RB Offset=0	21.82	21.59	22.01
		RB Size=25, RB Offset=12	21.77	21.78	21.96
		RB Size=25, RB Offset=24	21.69	21.78	21.98
		RB Size=50, RB Offset=0	22.04	21.40	21.58
	16QAM	RB Size=1, RB Offset=0	21.99	22.07	21.96
		RB Size=1, RB Offset=24	21.62	22.09	22.02
		RB Size=1, RB Offset=49	21.74	22.26	22.01
		RB Size=25, RB Offset=0	21.12	21.24	21.29
		RB Size=25, RB Offset=12	21.19	21.17	20.93
		RB Size=25, RB Offset=24	21.03	21.36	21.16
		RB Size=50, RB Offset=0	21.06	20.62	20.65

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.75	22.58	23.82
		RB Size=1, RB Offset=37	22.56	22.69	23.63
		RB Size=1, RB Offset=74	22.83	22.66	23.88
		RB Size=36, RB Offset=0	21.94	21.84	22.88
		RB Size=36, RB Offset=18	22.05	21.73	23.22
		RB Size=36, RB Offset=37	22.14	21.94	22.97
		RB Size=75, RB Offset=0	22.02	21.22	22.23
	16QAM	RB Size=1, RB Offset=0	21.99	21.66	22.58
		RB Size=1, RB Offset=37	21.99	21.49	22.77
		RB Size=1, RB Offset=74	22.16	21.73	22.82
		RB Size=36, RB Offset=0	21.12	20.97	21.83
		RB Size=36, RB Offset=18	21.26	20.99	21.81
		RB Size=36, RB Offset=37	20.99	21.06	21.79
		RB Size=75, RB Offset=0	20.65	20.48	21.31
20	QPSK	RB Size=1, RB Offset=0	22.83	22.85	23.49
		RB Size=1, RB Offset=49	22.65	22.90	23.36
		RB Size=1, RB Offset=99	22.90	23.06	23.81
		RB Size=50, RB Offset=0	21.98	22.15	22.73
		RB Size=50, RB Offset=24	22.05	22.17	22.77
		RB Size=50, RB Offset=49	22.08	22.06	22.87
		RB Size=100, RB Offset=0	22.13	21.73	22.46
	16QAM	RB Size=1, RB Offset=0	22.07	22.21	22.82
		RB Size=1, RB Offset=49	21.93	22.39	22.68
		RB Size=1, RB Offset=99	22.18	22.32	22.99
		RB Size=50, RB Offset=0	21.29	21.24	22.02
		RB Size=50, RB Offset=24	21.38	21.50	22.18
		RB Size=50, RB Offset=49	21.12	21.41	21.91
		RB Size=100, RB Offset=0	21.17	20.73	21.46

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	5.68	13	Pass
QPSK (100RB Size)	5.58	13	Pass
16QAM (1RB Size)	6.58	13	Pass
16QAM (100RB Size)	6.49	13	Pass

EIRP:

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535	84.23	86	1.4	H	14.1	2.60	10.20	21.70	33
2535	82.11	322	1.8	V	12.6	2.60	10.20	20.20	33
10 MHz Bandwidth									
2535	84.11	49	1.6	H	13.9	2.60	10.20	21.50	33
2535	82.02	252	1.7	V	12.5	2.60	10.20	20.10	33
15 MHz Bandwidth									
2535	82.82	257	1.3	H	12.7	2.60	10.20	20.30	33
2535	80.94	343	2.0	V	11.4	2.60	10.20	19.00	33
20 MHz Bandwidth									
2535	82.11	33	2.0	H	11.9	2.60	10.20	19.50	33
2535	80.76	72	1.2	V	11.2	2.60	10.20	18.80	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535	84.1	108	2.1	H	13.9	2.60	10.20	21.50	33
2535	81.96	274	1.8	V	12.4	2.60	10.20	20.00	33
10 MHz Bandwidth									
2535	83.92	289	1.5	H	13.8	2.60	10.20	21.40	33
2535	81.8	53	2.3	V	12.2	2.60	10.20	19.80	33
15 MHz Bandwidth									
2535	83.52	56	1.1	H	13.4	2.60	10.20	21.00	33
2535	81.68	245	1.8	V	12.1	2.60	10.20	19.70	33
20 MHz Bandwidth									
2535	83.37	226	2.1	H	13.2	2.60	10.20	20.80	33
2535	81.54	209	2.4	V	12.0	2.60	10.20	19.60	33

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

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

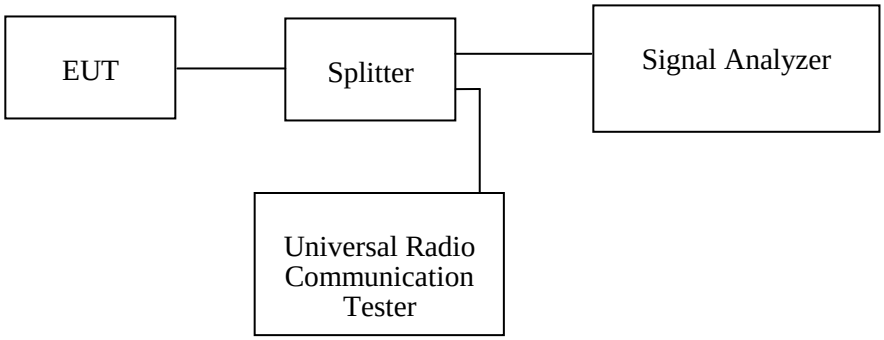
Applicable Standard

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

Test Procedure

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

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



Test Data

Environmental Conditions

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

The testing was performed by James Fu on 2019-09-24 and 2019-09-25.

EUT operation mode: Transmitting

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

Cellular Band (Part 22H)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	836.6	245.19	318.59
EGPRS(8PSK)	836.6	245.19	312.50

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.199	4.814
HSUPA (BPSK)	836.6	4.215	5.256
HSDPA (16QAM)	836.6	4.231	5.776

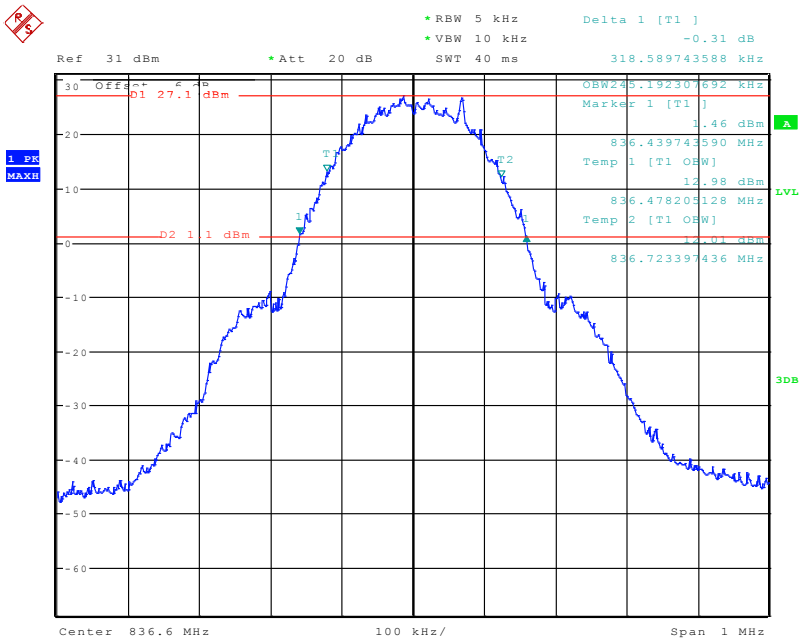
PCS Band (Part 24E)

Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	246.79	311.86
EGPRS(8PSK)	1880.0	241.99	309.29

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	1880.0	4.199	4.888
HSUPA (BPSK)	1880.0	4.199	4.728
HSDPA (16QAM)	1880.0	4.167	4.728

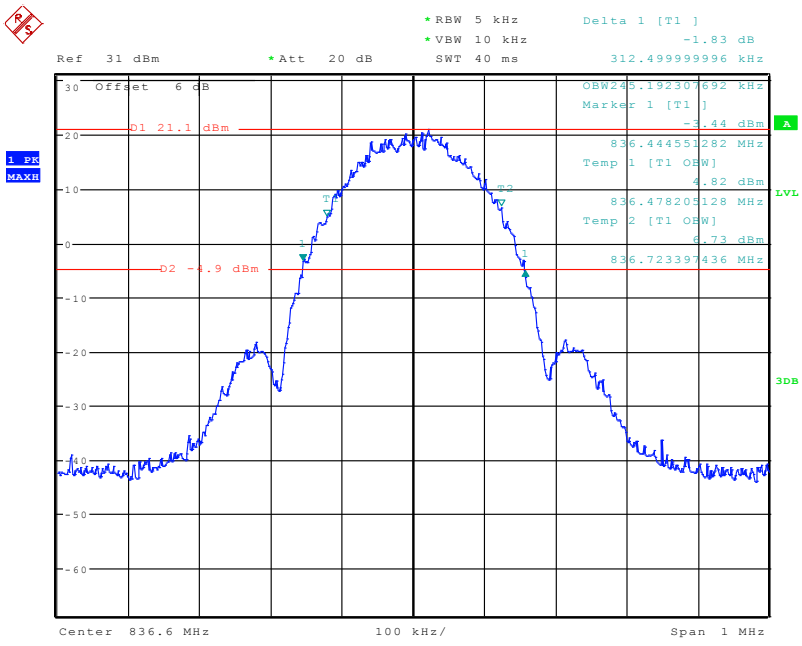
Cellular Band (Part 22H)

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



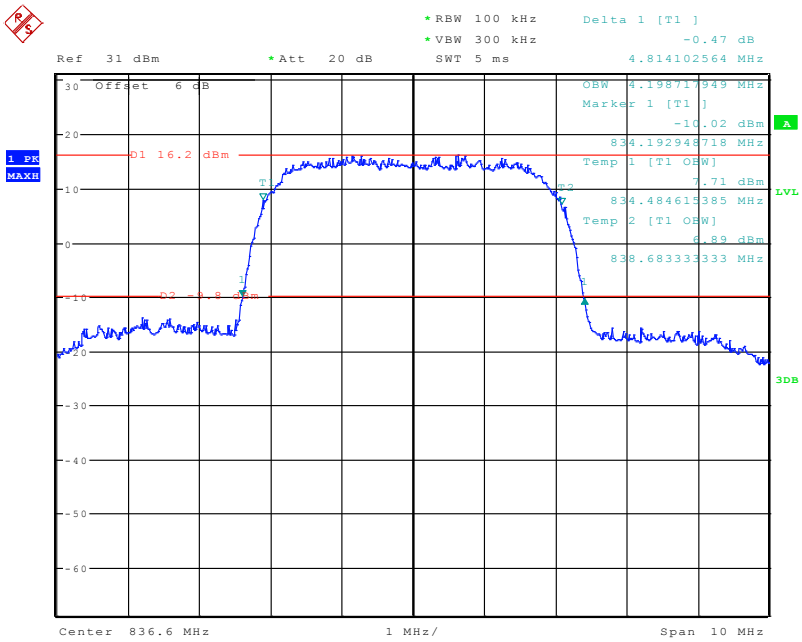
Date: 24.SEP.2019 20:45:04

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



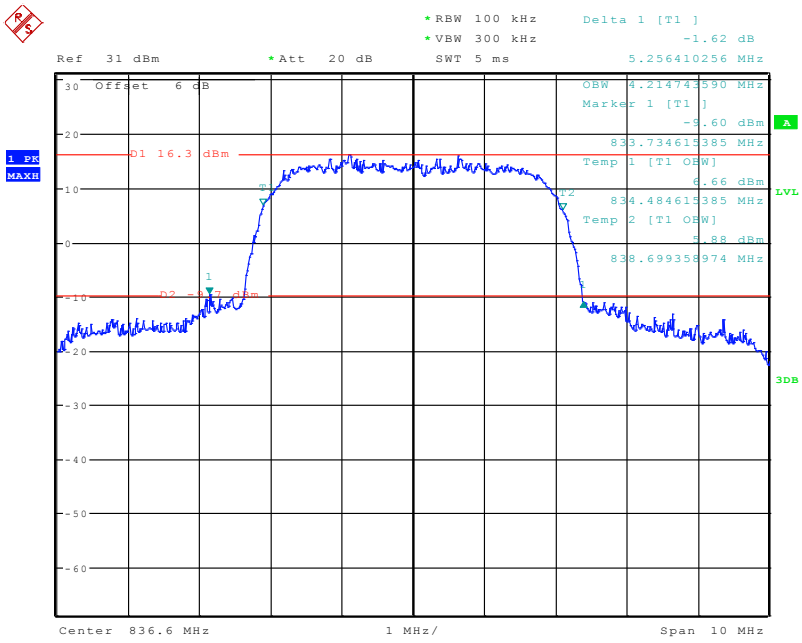
Date: 24.SEP.2019 21:03:37

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



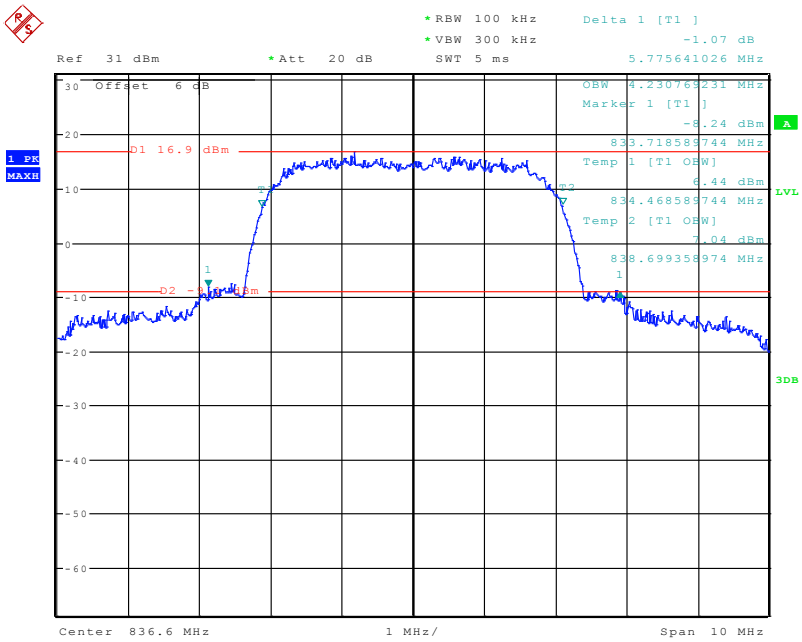
Date: 24.SEP.2019 19:50:07

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



Date: 24.SEP.2019 19:53:35

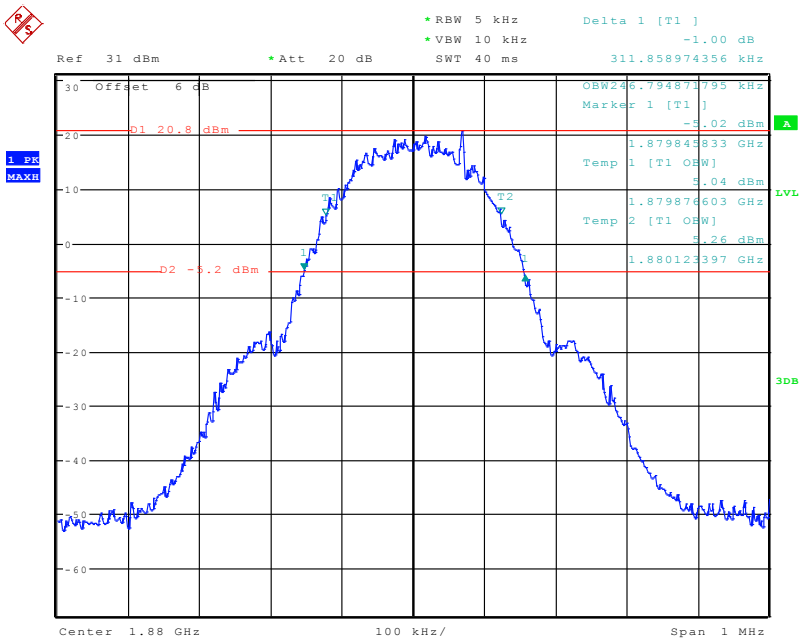
26 dB Emissions &99% Occupied Bandwidth for HSDPA (16QAM) Mode



Date: 24.SEP.2019 19:52:01

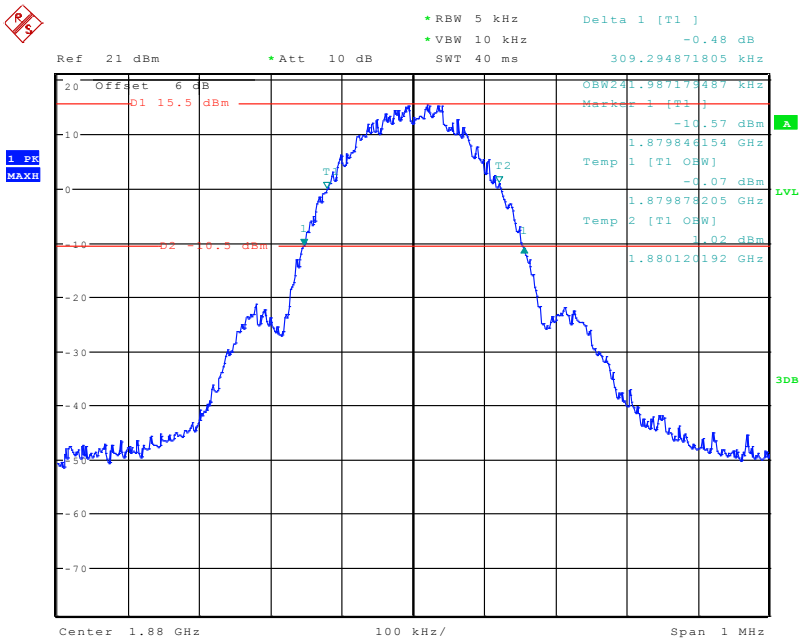
PCS Band (Part 24E)

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



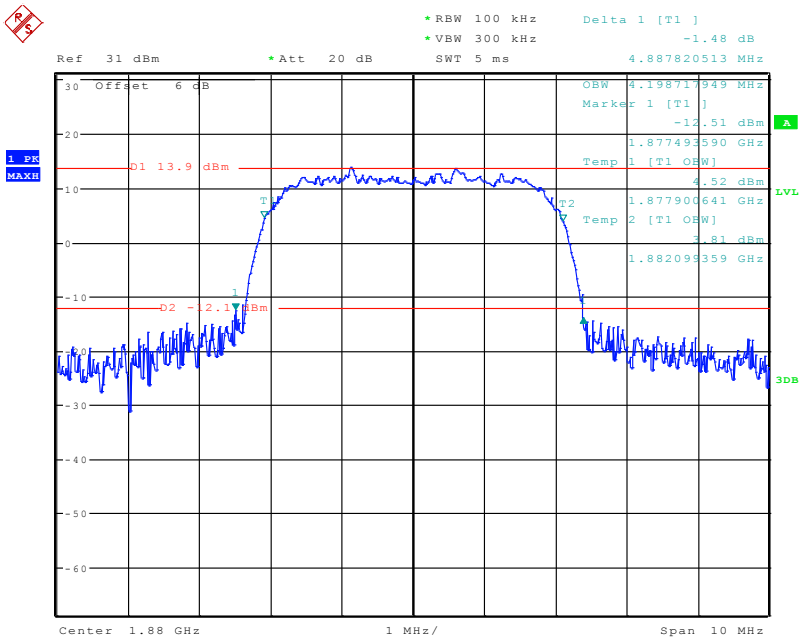
Date: 24.SEP.2019 21:05:49

26 dB Emissions &99% Occupied Bandwidth for EDGE Mode



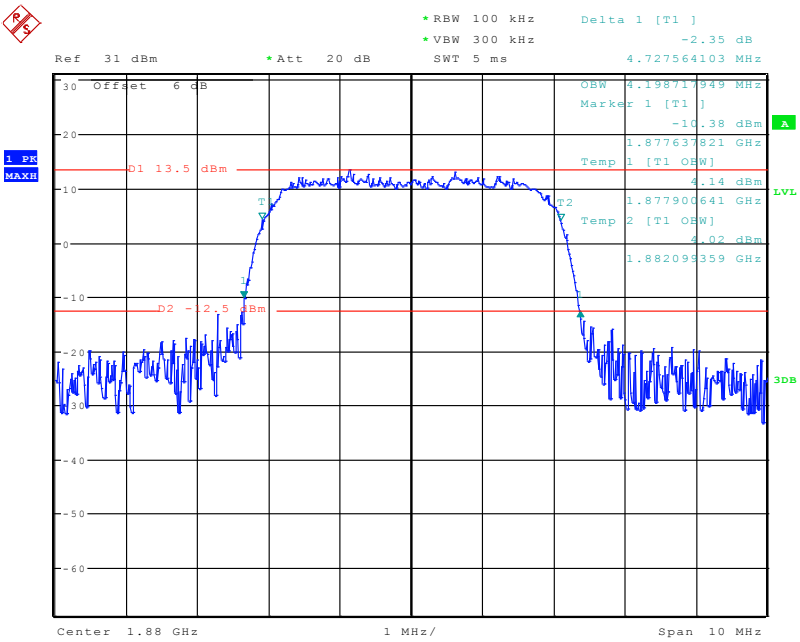
Date: 24.SEP.2019 21:19:33

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



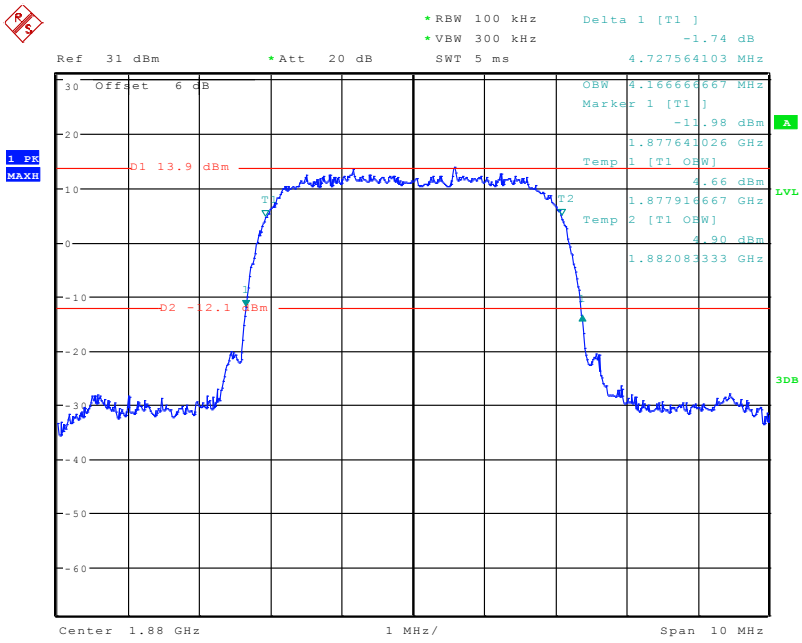
Date: 24.SEP.2019 20:10:39

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



Date: 24.SEP.2019 20:15:57

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

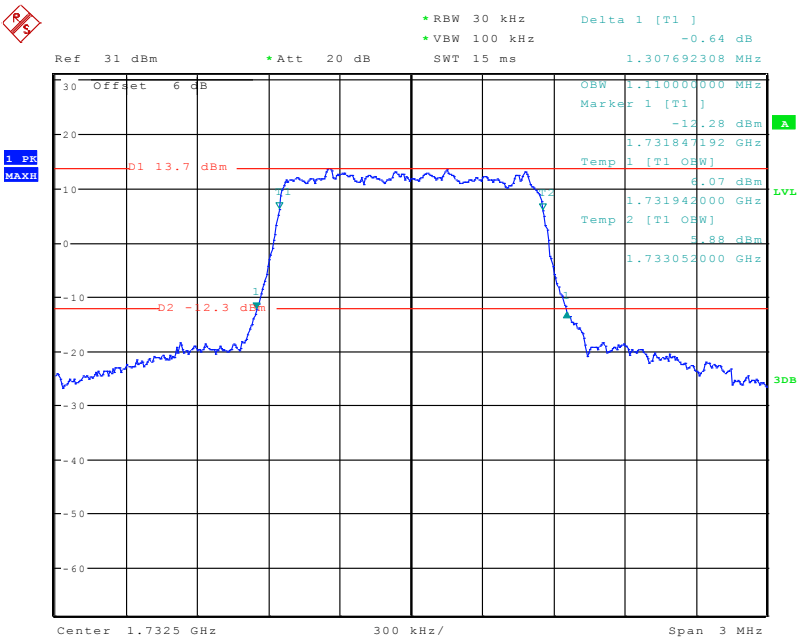


Date: 24.SEP.2019 20:18:16

LTE Band 4: (Middle Channel)

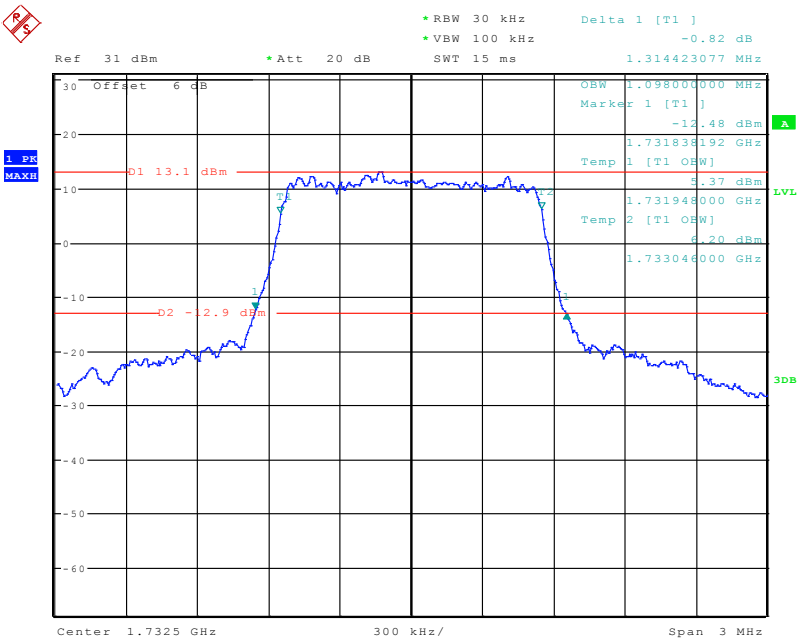
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.110	1.308
	16QAM	1.098	1.314
3.0	QPSK	2.688	2.908
	16QAM	2.688	2.894
5.0	QPSK	4.560	5.240
	16QAM	4.540	5.254
10.0	QPSK	9.000	10.051
	16QAM	9.000	9.968
15.0	QPSK	13.440	14.962
	16QAM	13.440	14.837
20.0	QPSK	17.920	19.291
	16QAM	17.920	19.256

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



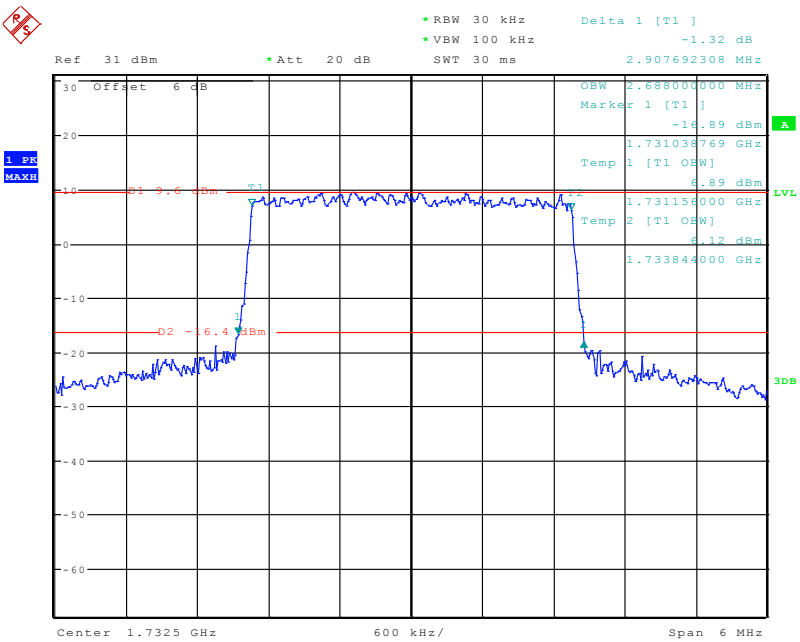
Date: 24.SEP.2019 22:40:55

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



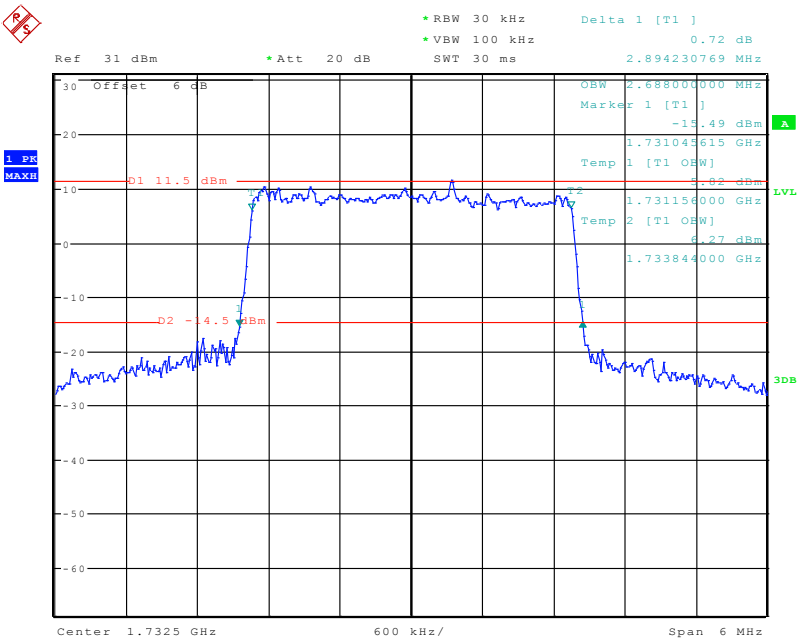
Date: 24.SEP.2019 22:44:01

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



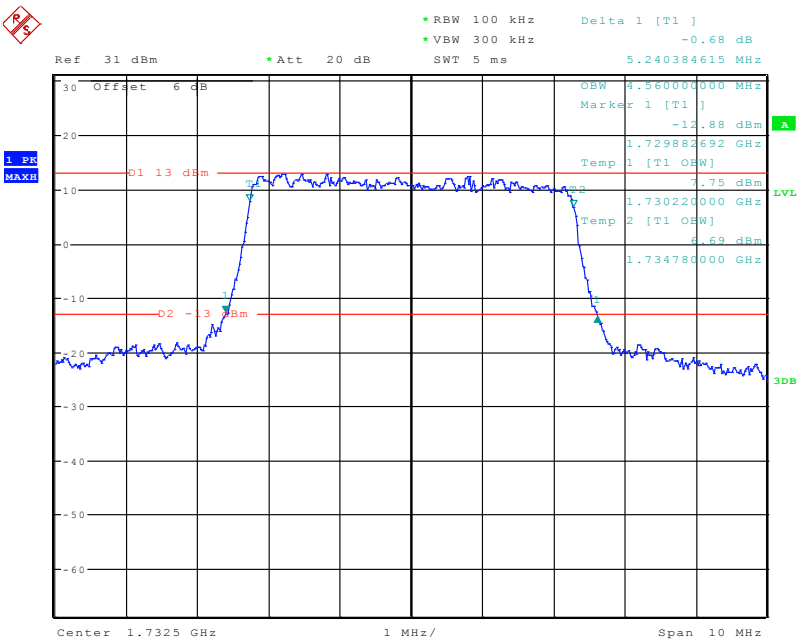
Date: 24.SEP.2019 22:47:15

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



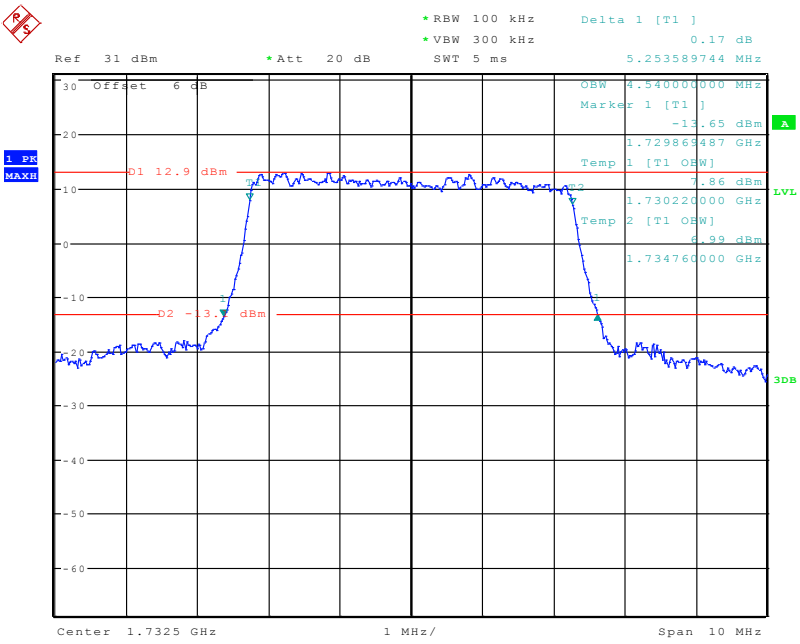
Date: 24.SEP.2019 22:45:30

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



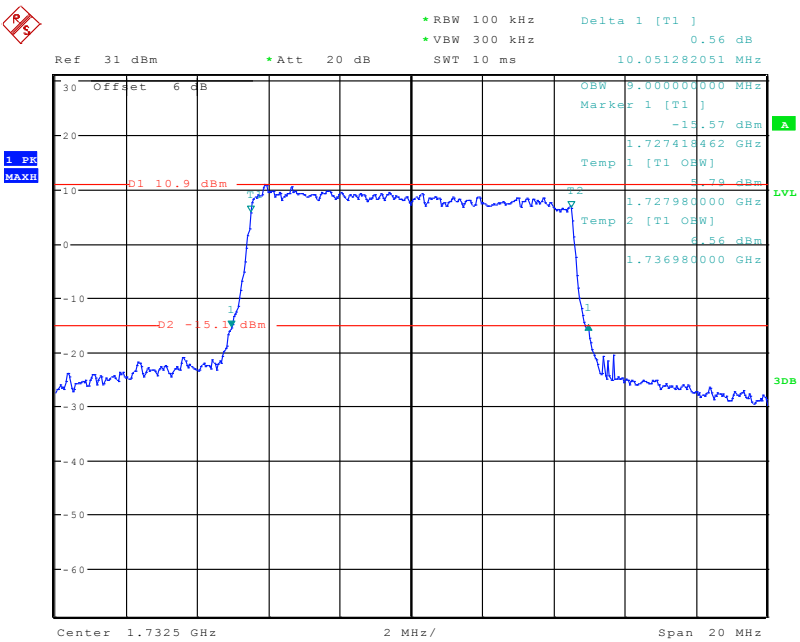
Date: 24.SEP.2019 22:48:15

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



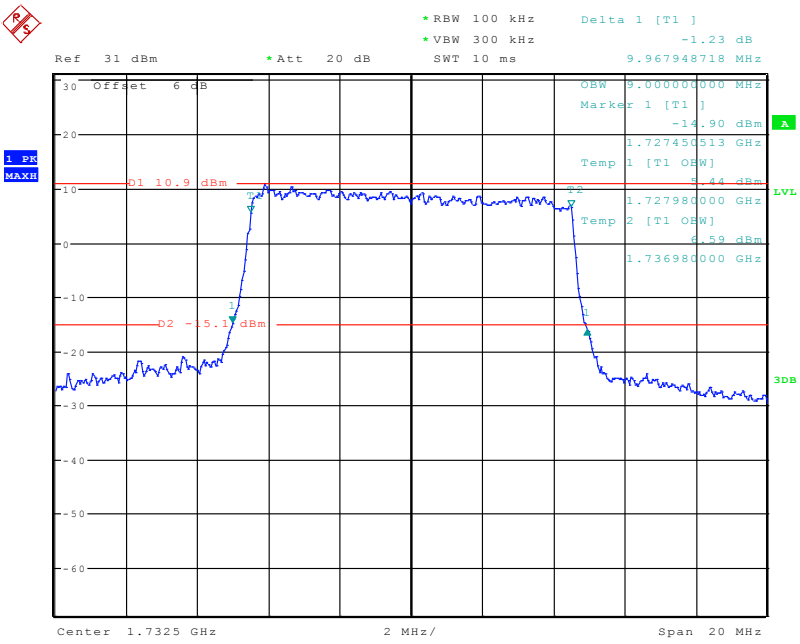
Date: 24.SEP.2019 22:50:29

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



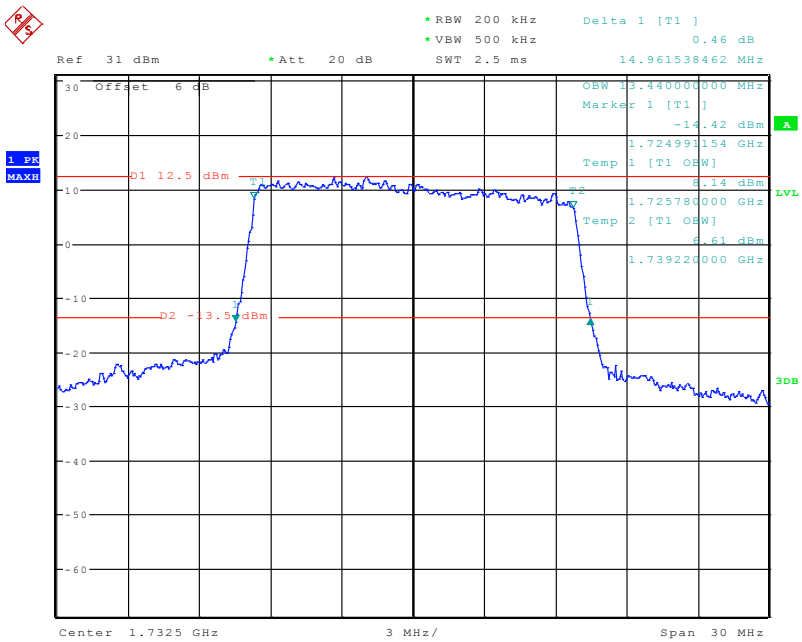
Date: 24.SEP.2019 22:55:05

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



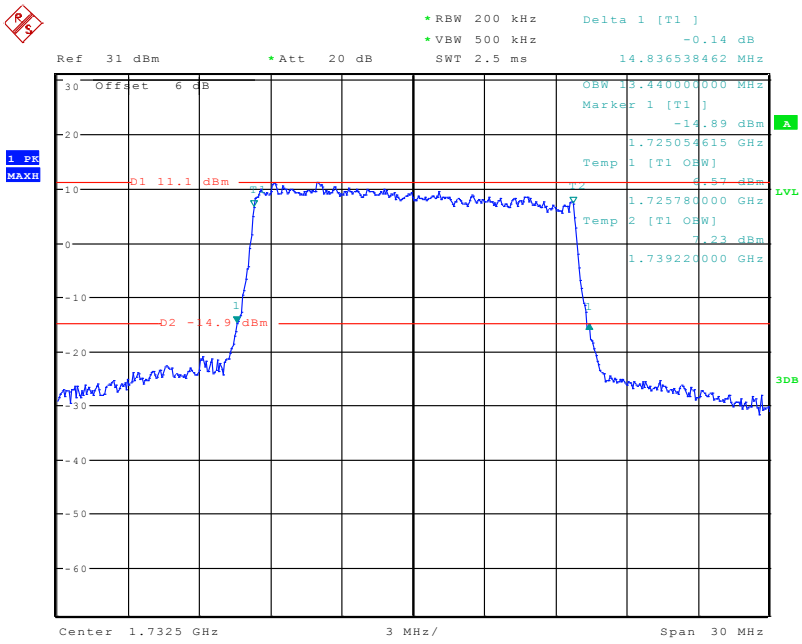
Date: 24.SEP.2019 22:52:23

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



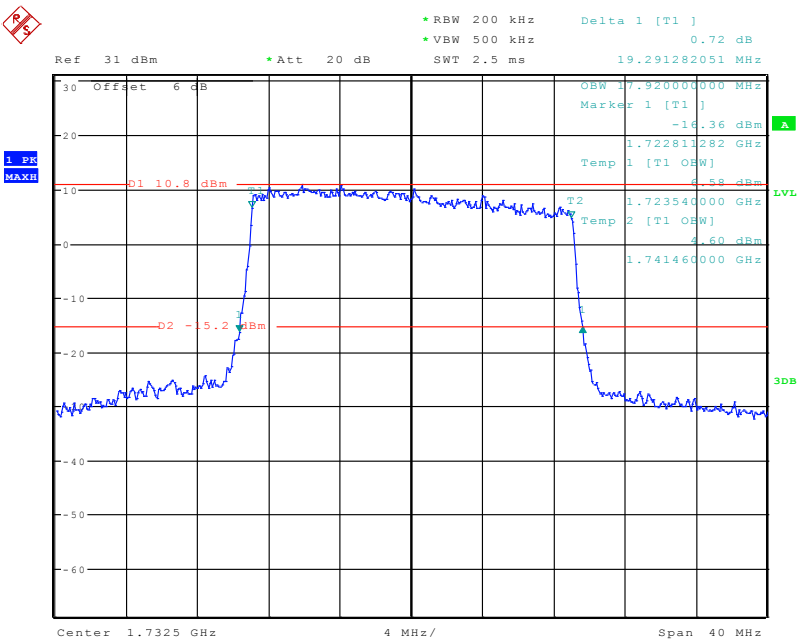
Date: 24.SEP.2019 22:58:38

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



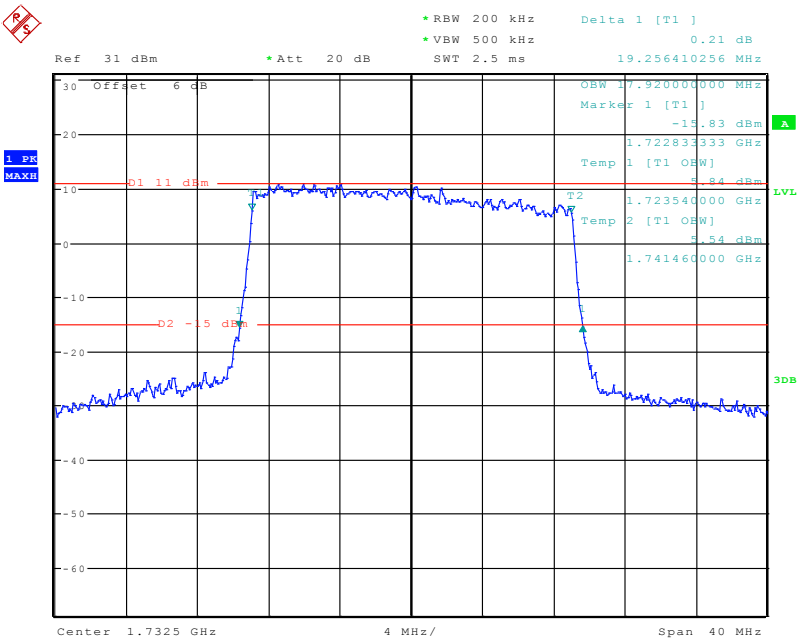
Date: 24.SEP.2019 23:04:53

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



Date: 24.SEP.2019 23:07:31

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

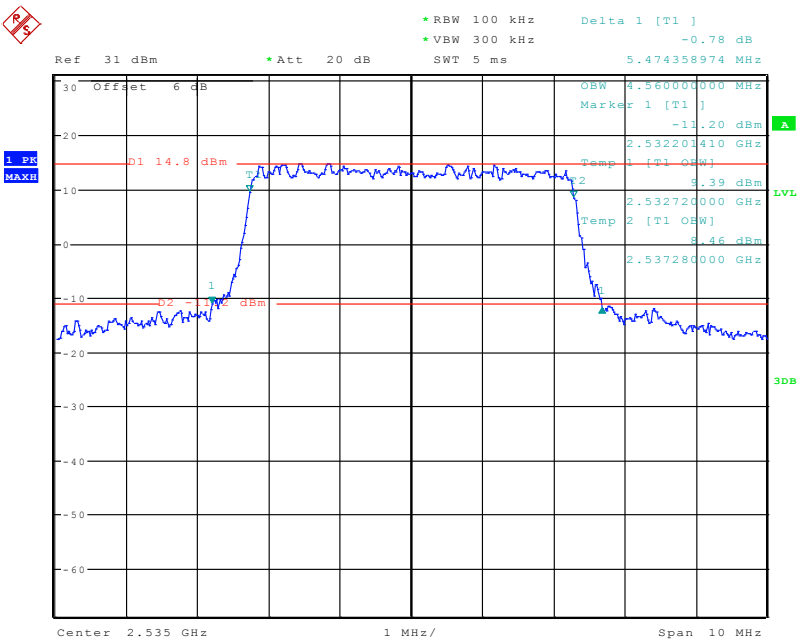


Date: 24.SEP.2019 23:06:24

LTE Band 7: (Middle Channel)

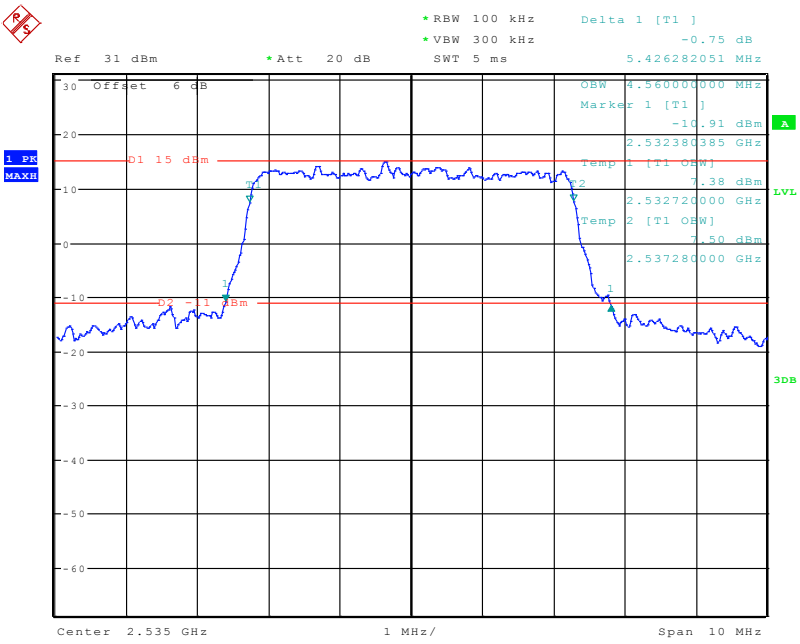
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.560	5.474
	16QAM	4.560	5.426
10.0	QPSK	9.040	10.397
	16QAM	9.000	9.941
15.0	QPSK	13.620	16.192
	16QAM	13.560	17.346
20.0	QPSK	18.000	23.423
	16QAM	18.000	23.231

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



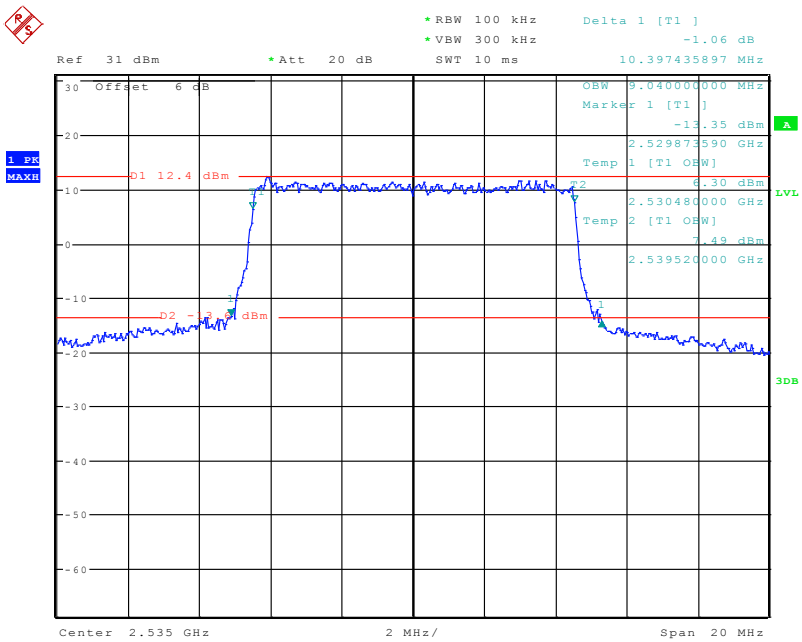
Date: 25.SEP.2019 20:42:16

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



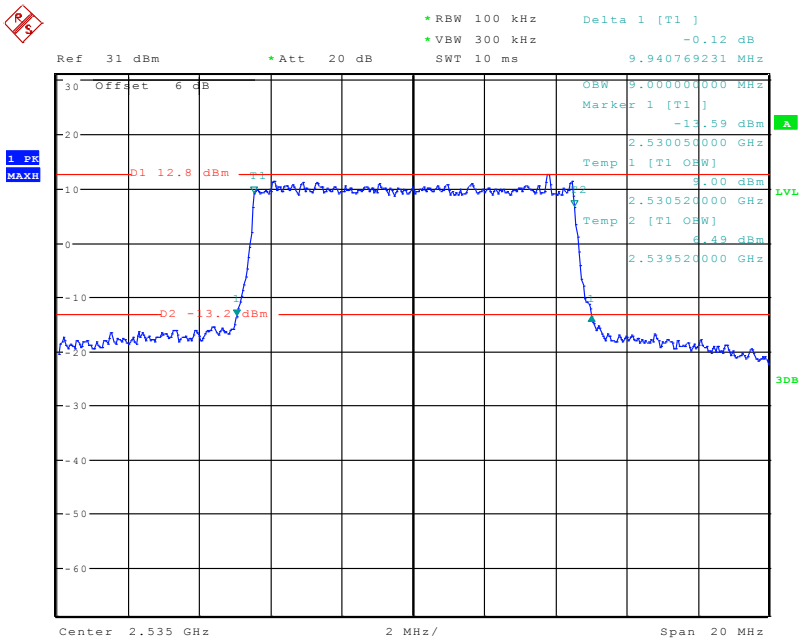
Date: 25.SEP.2019 20:41:16

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



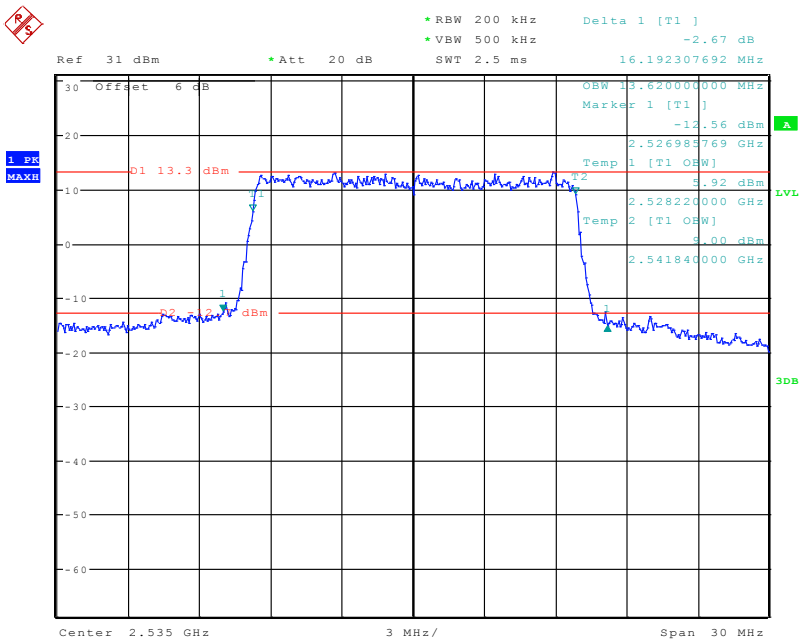
Date: 25.SEP.2019 20:36:55

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



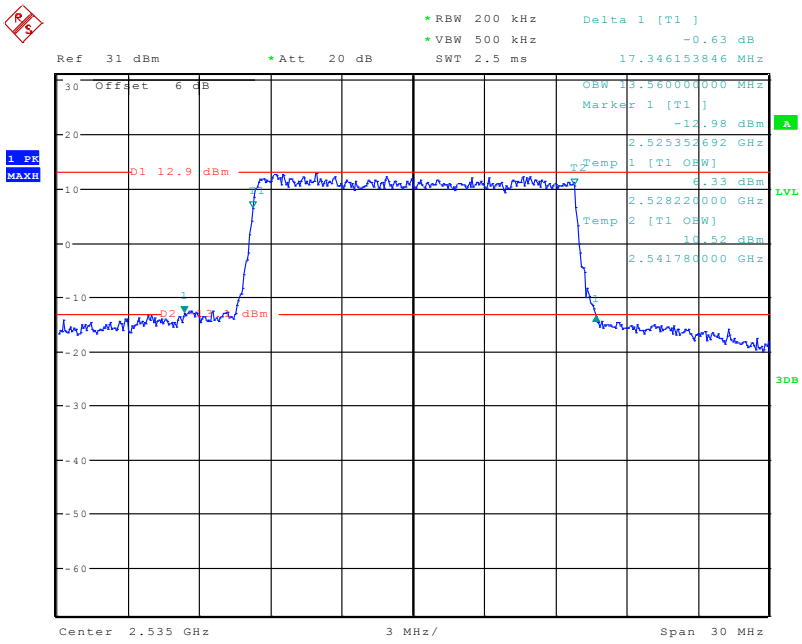
Date: 25.SEP.2019 20:38:27

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



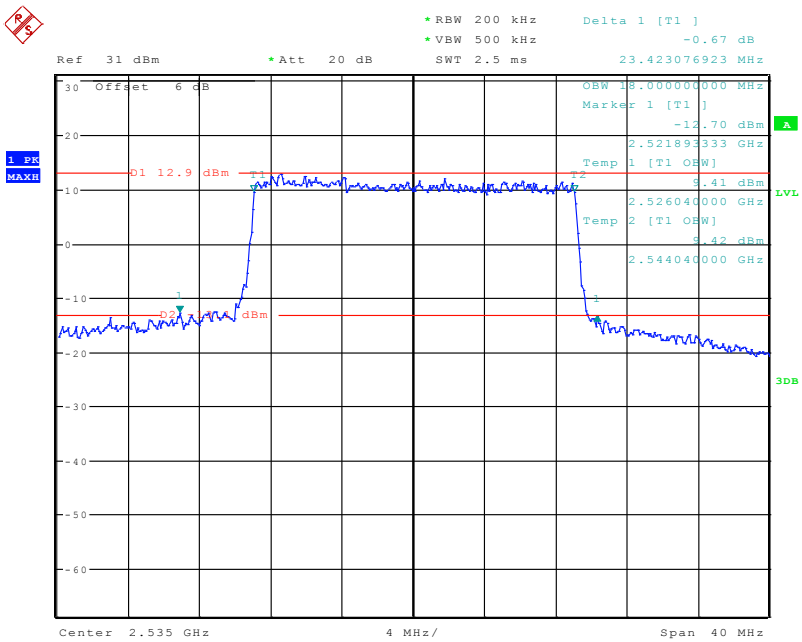
Date: 25.SEP.2019 20:44:56

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



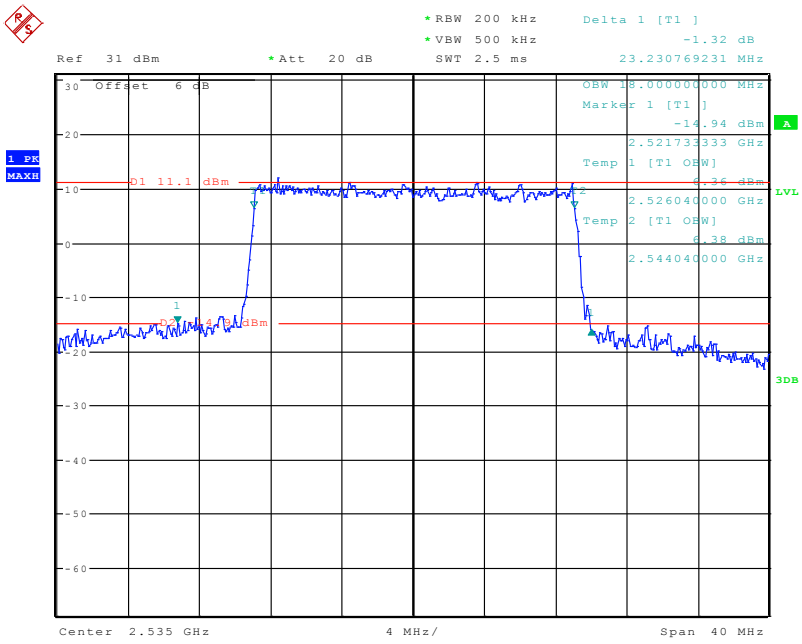
Date: 25.SEP.2019 20:45:56

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



Date: 25.SEP.2019 20:48:42

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



Date: 25.SEP.2019 20:49:33

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

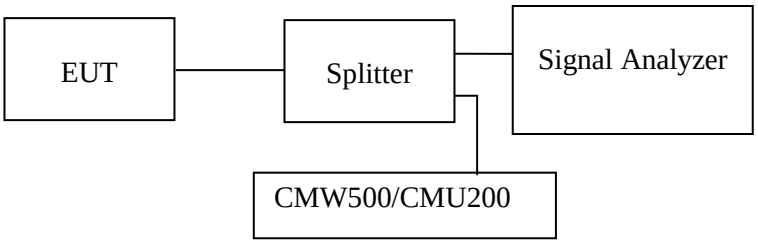
Applicable Standard

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

The testing was performed by James Fu on 2019-09-24 and 2019-10-16.

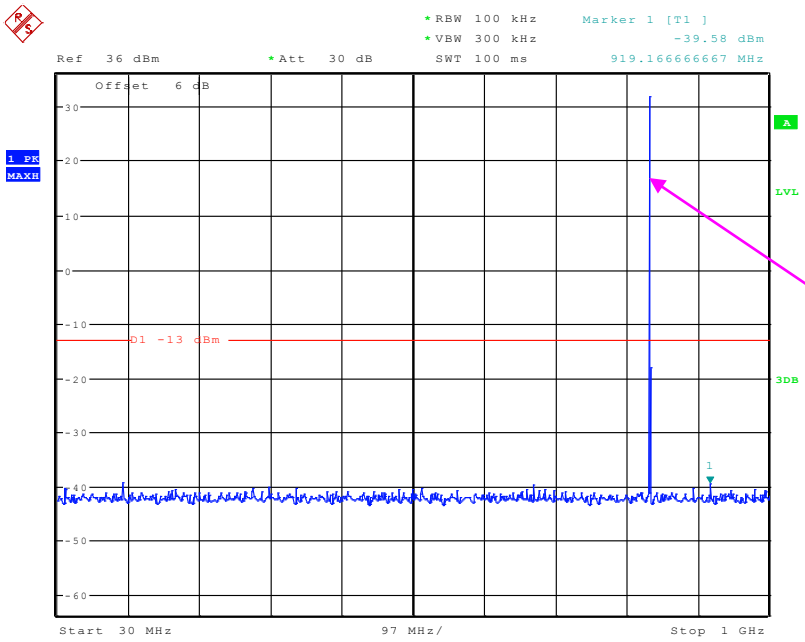
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

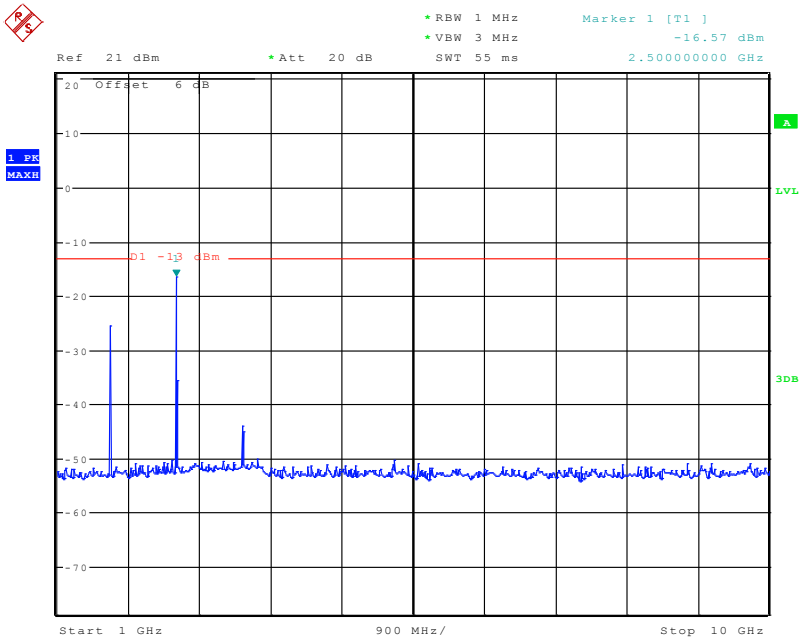
30 MHz – 1 GHz (GSM Mode)



Fundamental test

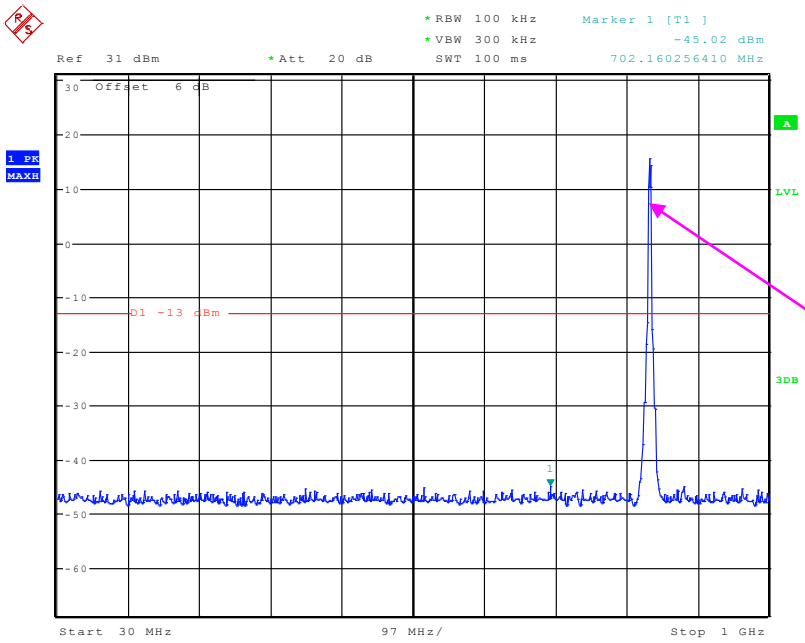
Date: 24.SEP.2019 20:46:17

1 GHz – 10 GHz (GSM Mode)



Date: 24.SEP.2019 20:46:52

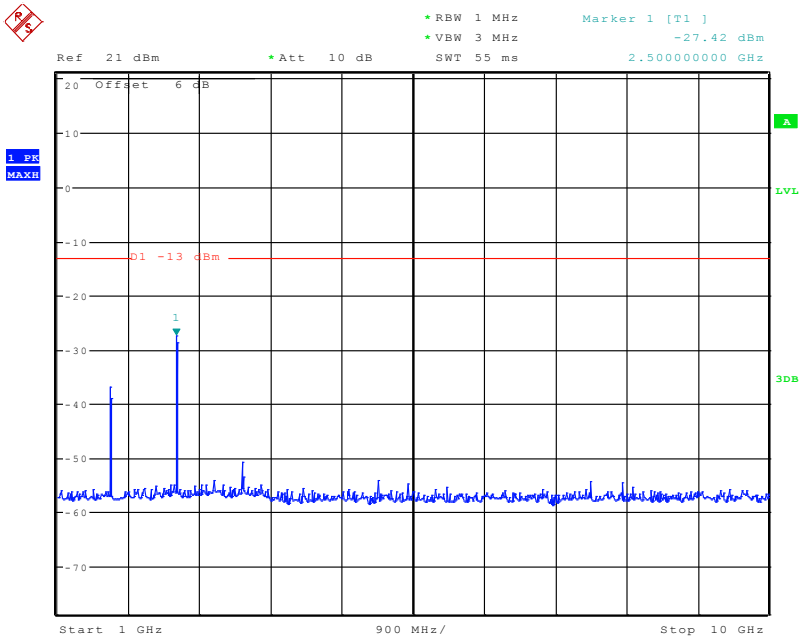
30 MHz – 1 GHz (WCDMA Mode)



Fundamental test

Date: 24.SEP.2019 19:59:42

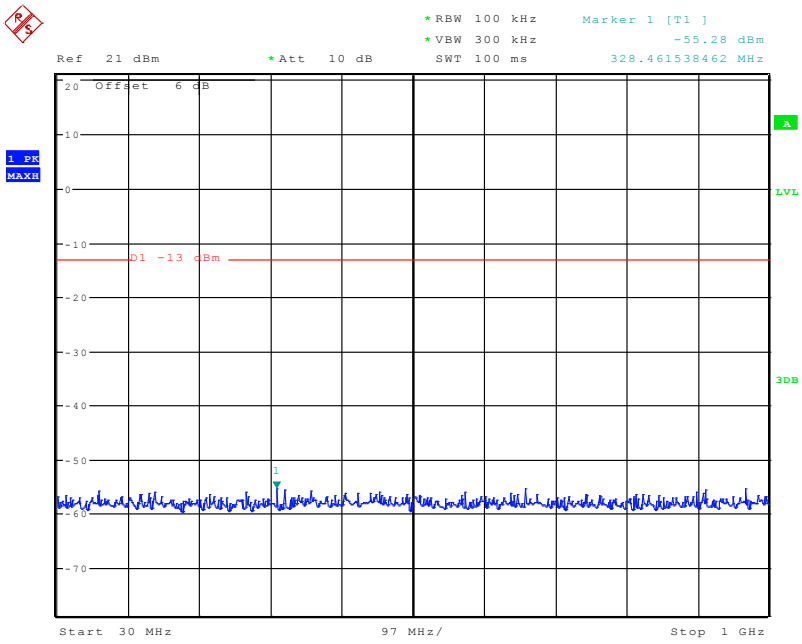
1 GHz – 10 GHz (WCDMA Mode)



Date: 24.SEP.2019 20:00:14

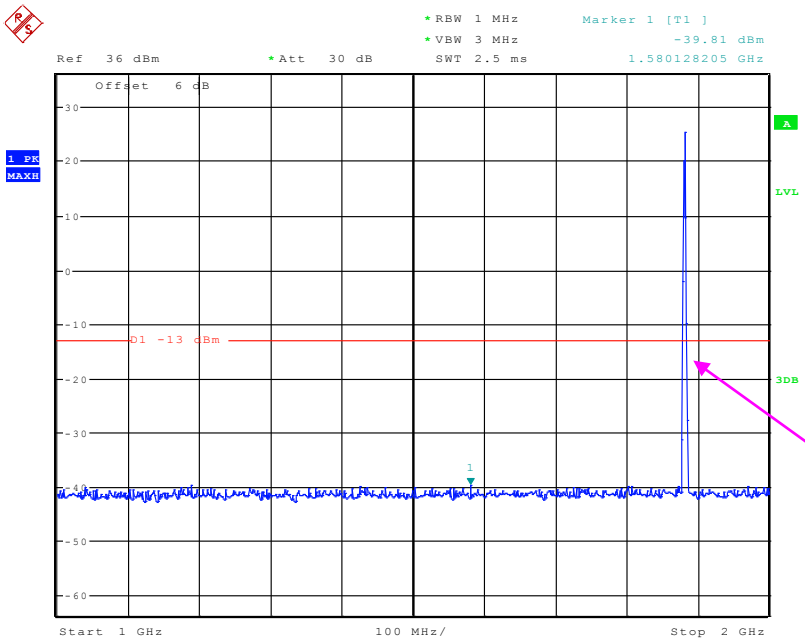
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 24.SEP.2019 21:10:06

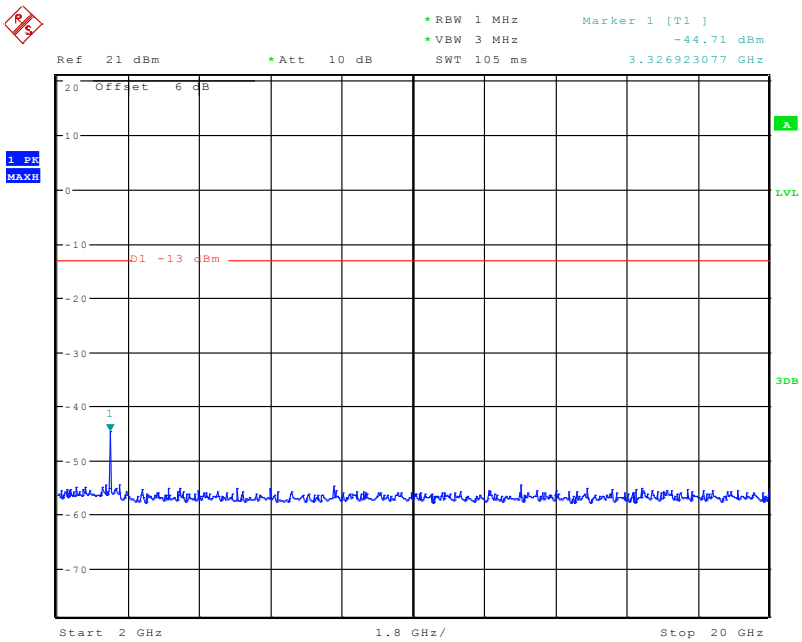
1 GHz – 2 GHz (GSM Mode)



Fundamental test

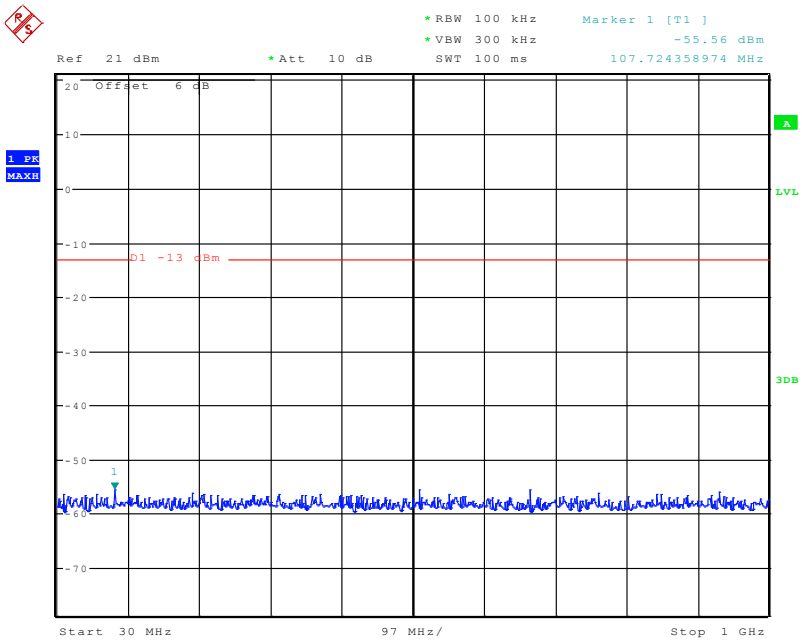
Date: 24.SEP.2019 21:10:44

2 GHz – 20 GHz (GSM Mode)



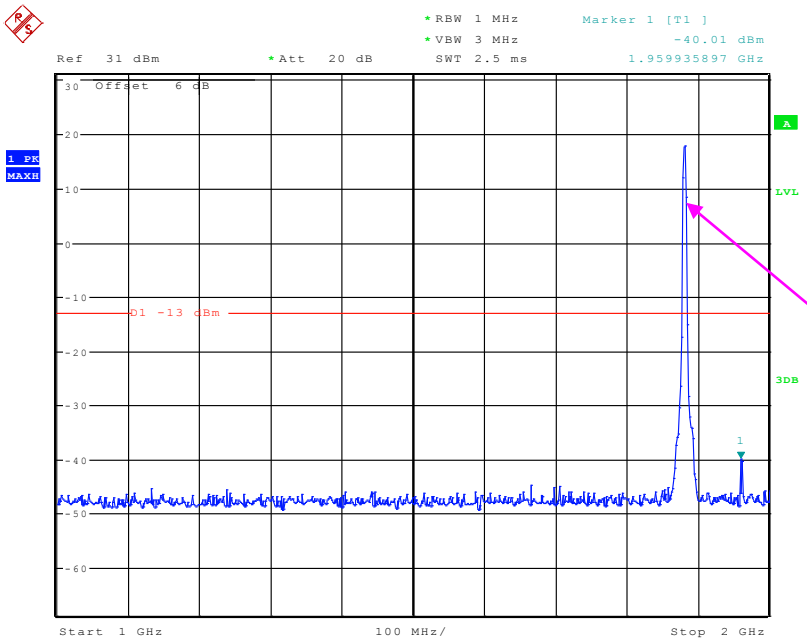
Date: 24.SEP.2019 21:12:10

30 MHz – 1 GHz (WCDMA Mode)



Date: 24.SEP.2019 20:07:08

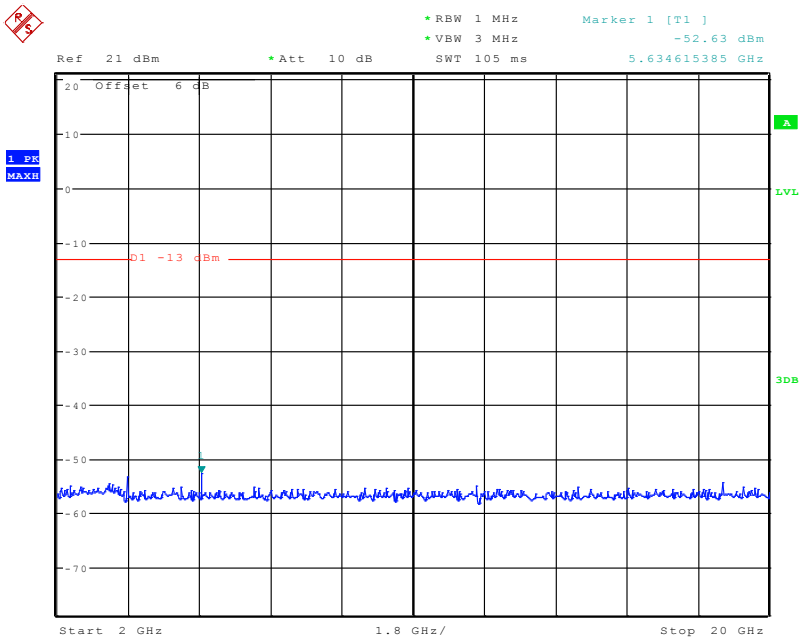
1 GHz – 2 GHz (WCDMA Mode)



Fundamental test

Date: 24.SEP.2019 20:07:35

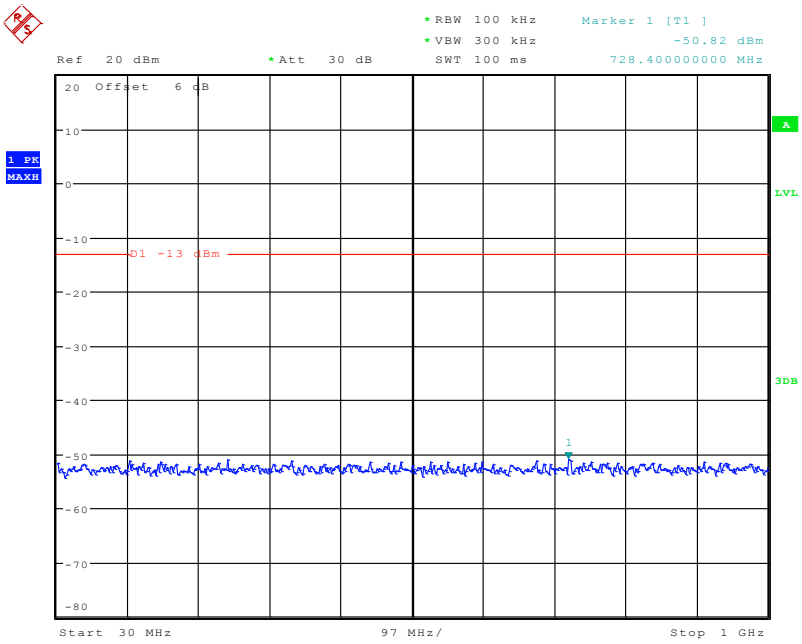
2 GHz – 20 GHz (WCDMA Mode)



Date: 24.SEP.2019 20:07:54

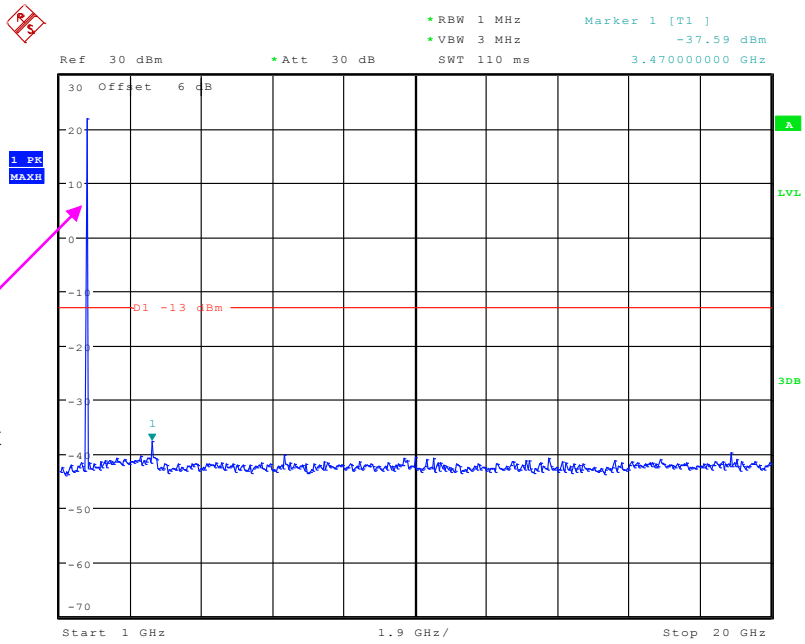
LTE Band 4:

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



Date: 24.SEP.2019 22:06:14

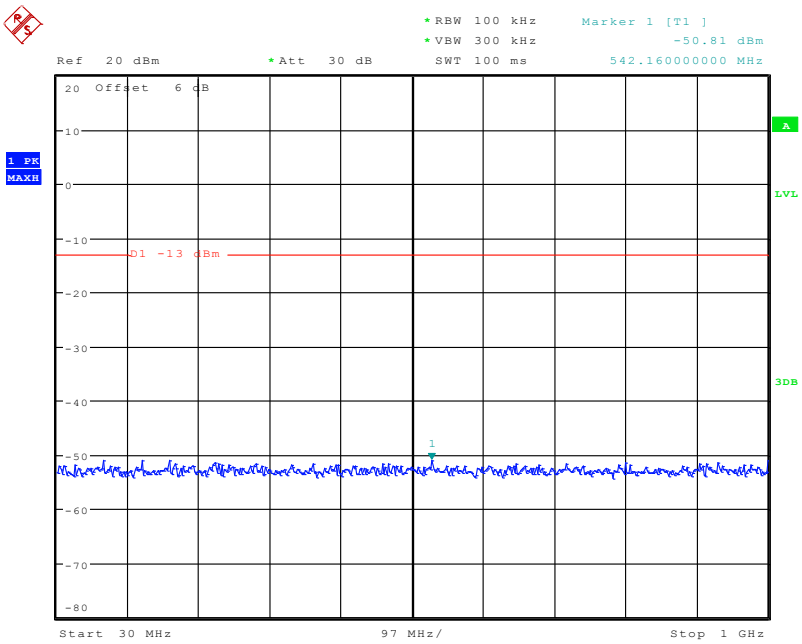
1 GHz – 20 GHz (1.4 MHz, Middle Channel)



Fundamental test

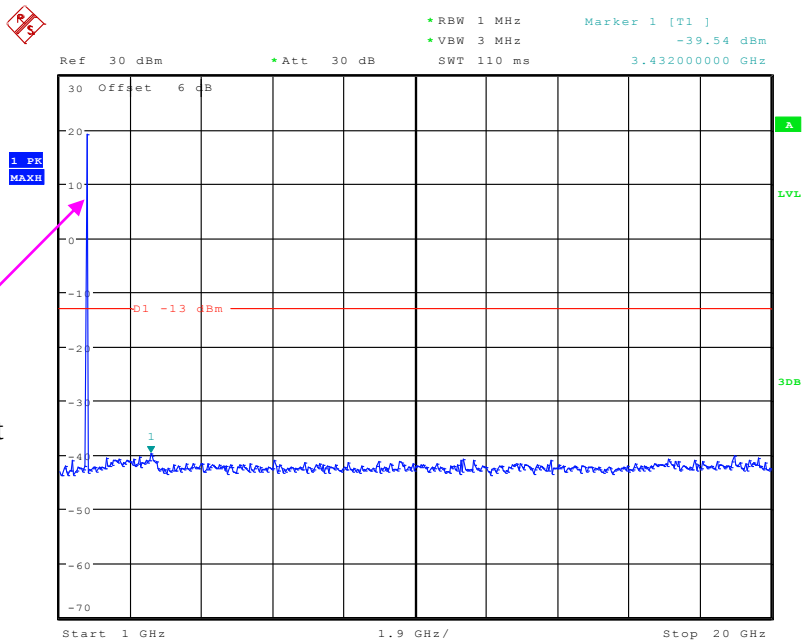
Date: 24.SEP.2019 22:06:24

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



Date: 24.SEP.2019 22:06:41

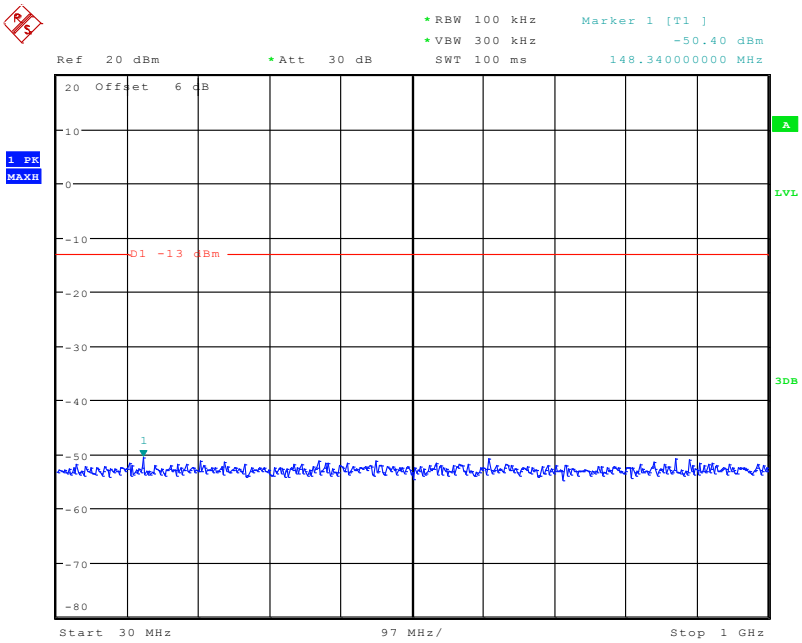
1 GHz – 20 GHz (3.0 MHz, Middle Channel)



Fundamental test

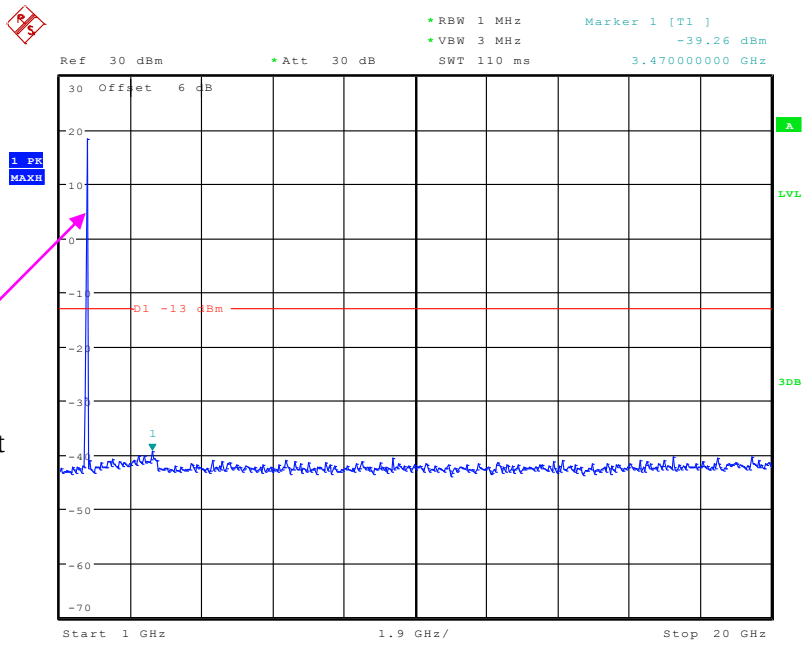
Date: 24.SEP.2019 22:06:52

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



Date: 24.SEP.2019 22:07:08

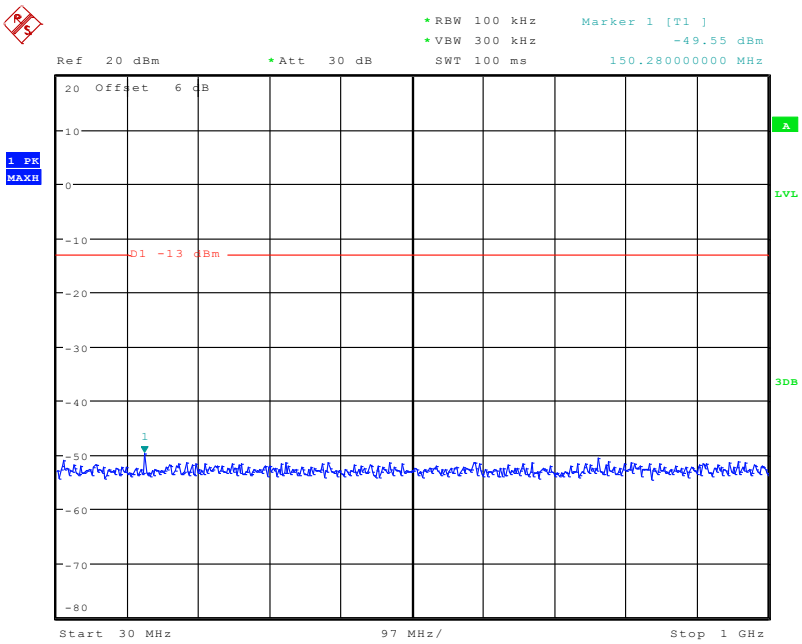
1 GHz – 20 GHz (5.0 MHz, Middle Channel)



Fundamental test

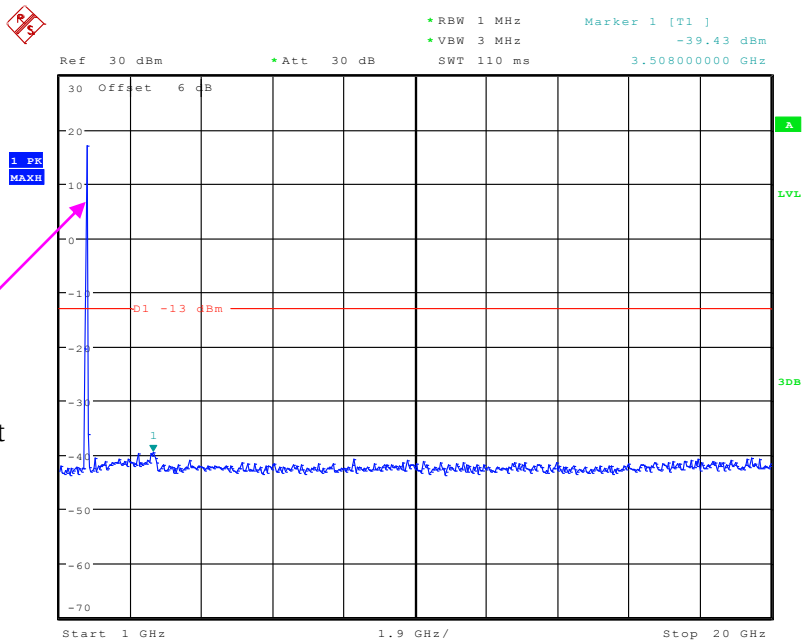
Date: 24.SEP.2019 22:07:19

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



Date: 24.SEP.2019 22:07:36

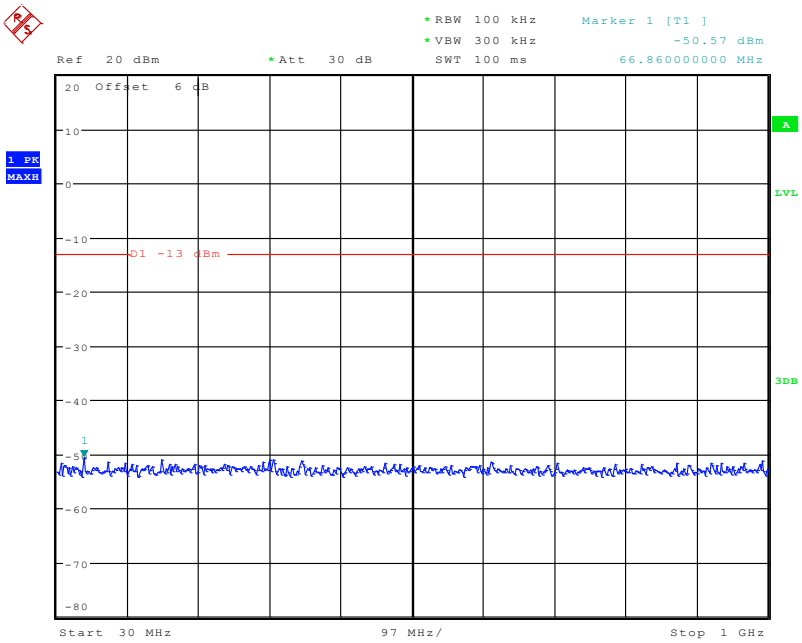
1 GHz – 20 GHz (10.0 MHz, Middle Channel)



Fundamental test

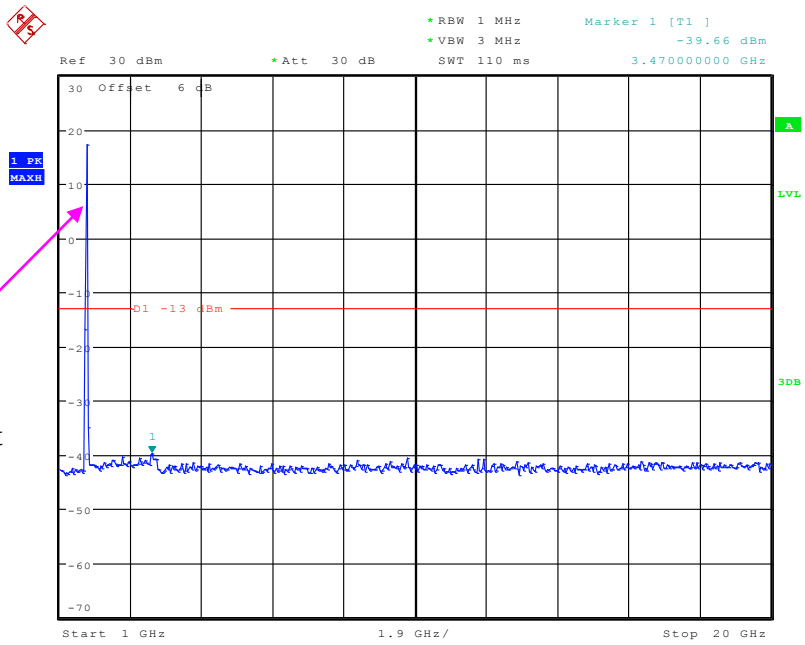
Date: 24.SEP.2019 22:07:46

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



Date: 24.SEP.2019 22:08:05

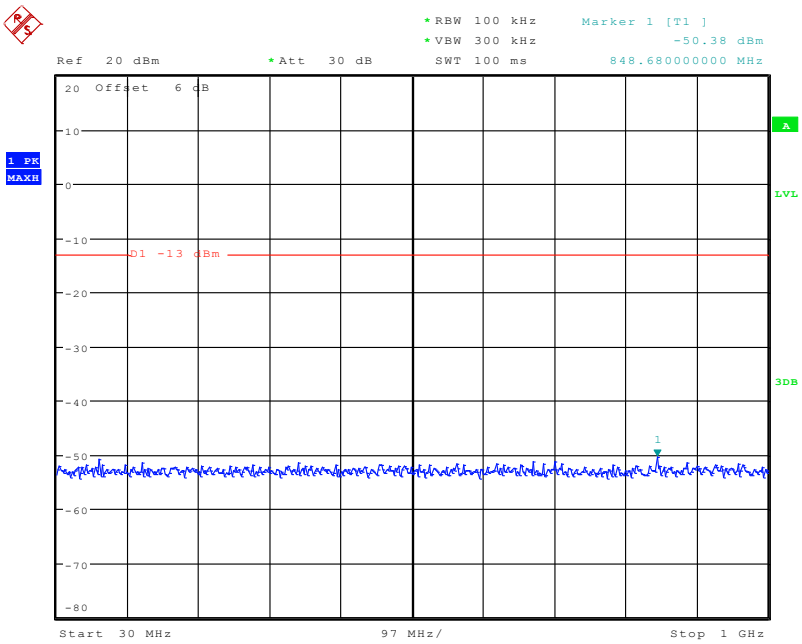
1 GHz – 20 GHz (15.0 MHz, Middle Channel)



Fundamental test

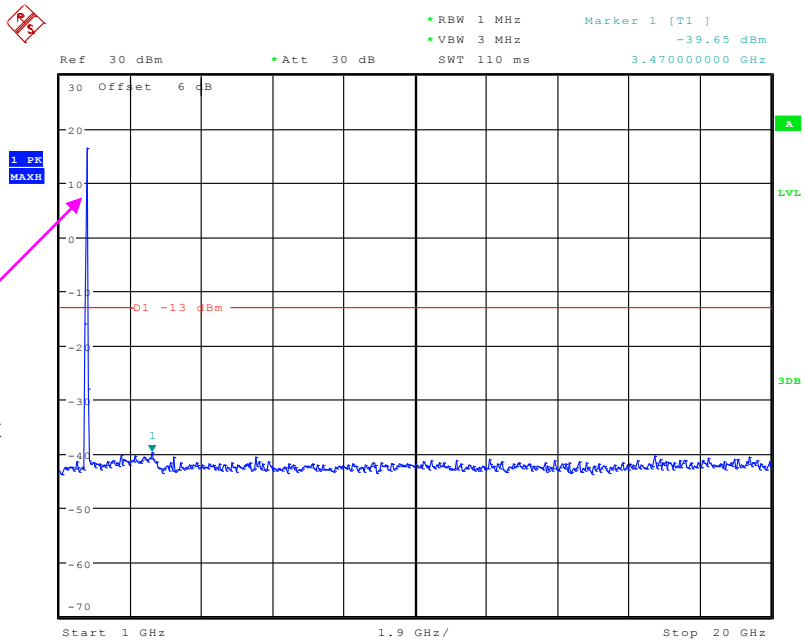
Date: 24.SEP.2019 22:08:16

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



Date: 24.SEP.2019 22:08:34

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

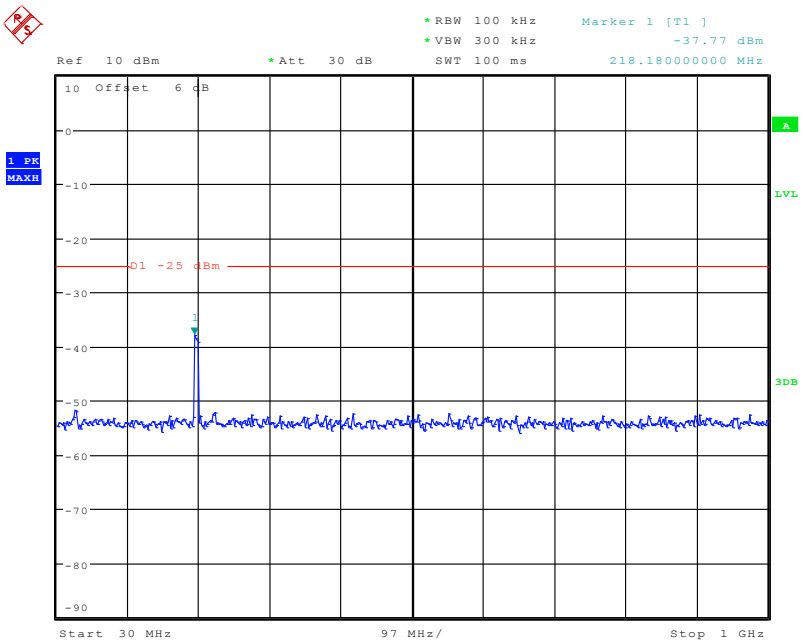


Fundamental test

Date: 24.SEP.2019 22:08:45

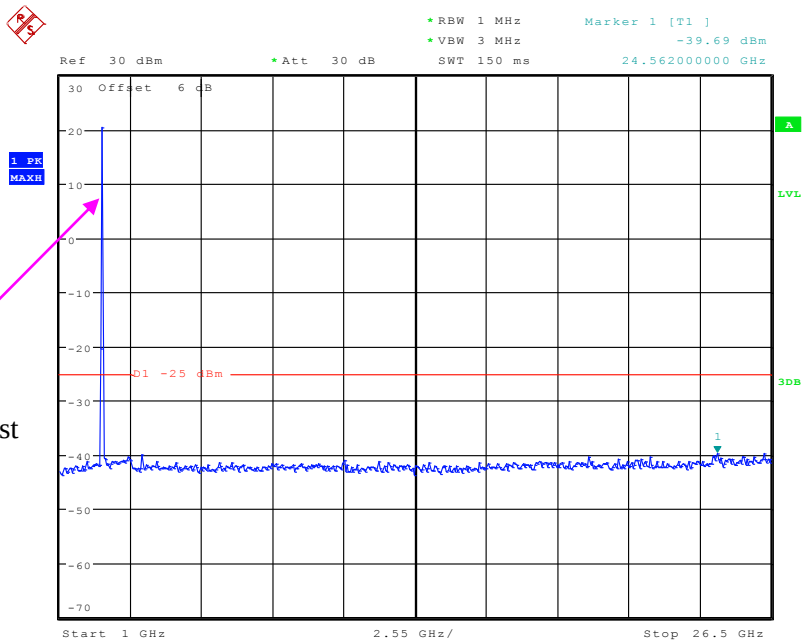
LTE Band 7:

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



Date: 24.SEP.2019 22:09:02

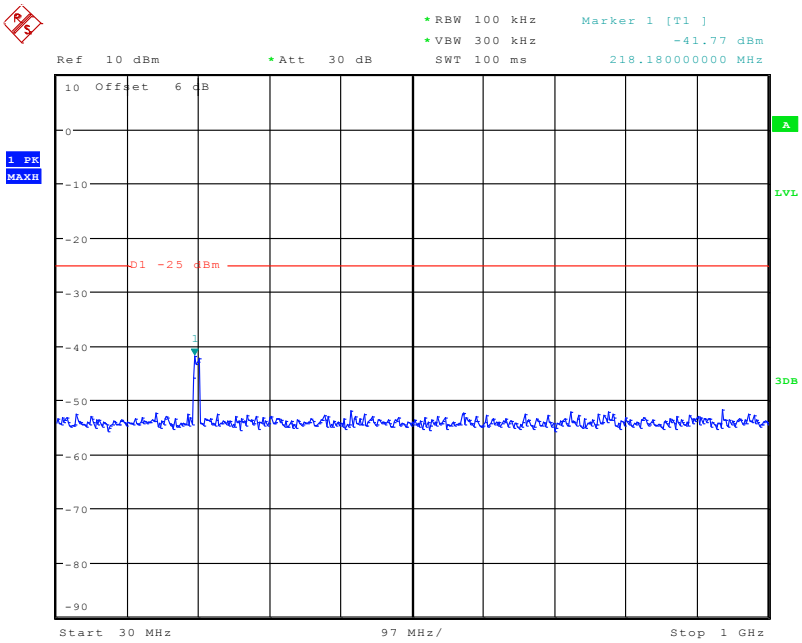
1 GHz – 26.5 GHz (5.0 MHz, Middle Channel)



Fundamental test

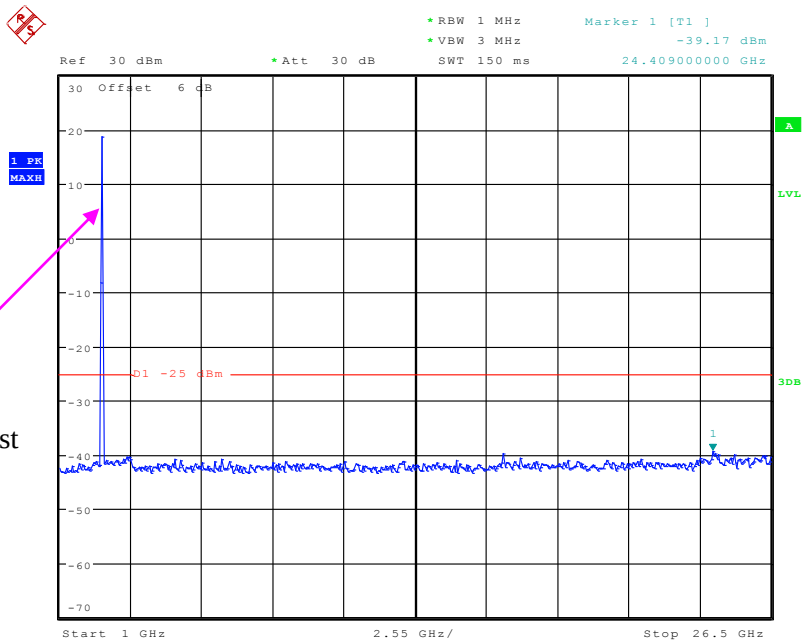
Date: 24.SEP.2019 22:09:12

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



Date: 24.SEP.2019 22:09:29

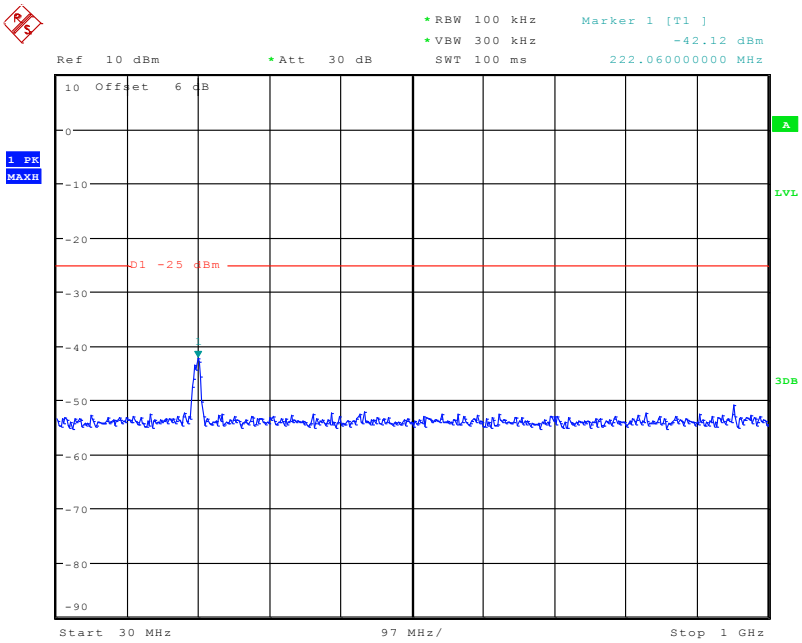
1 GHz – 26.5 GHz (10.0 MHz, Middle Channel)



Fundamental test

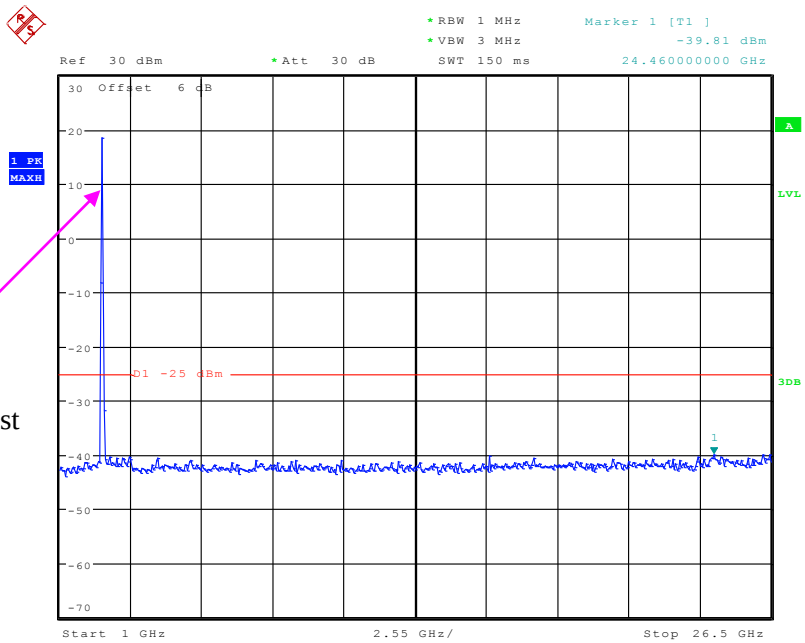
Date: 24.SEP.2019 22:09:39

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



Date: 24.SEP.2019 22:10:01

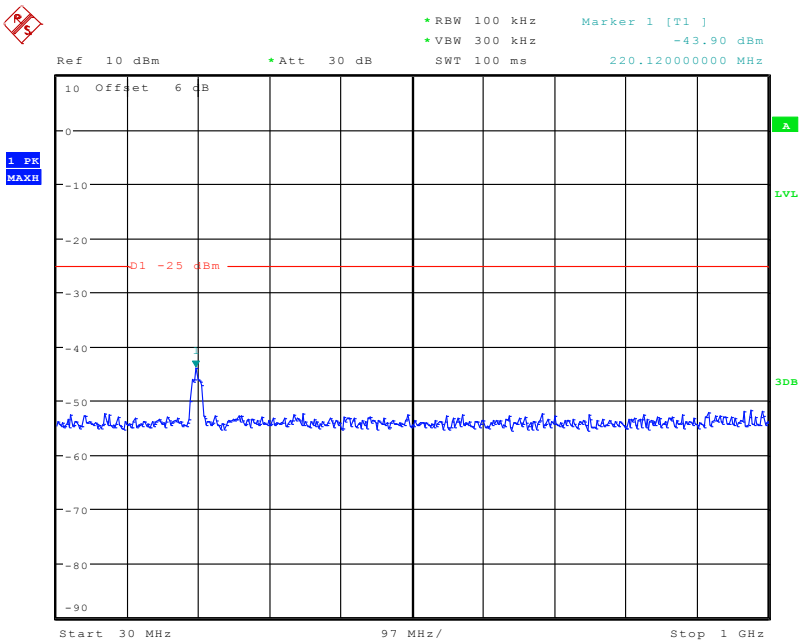
1 GHz – 26.5 GHz (15.0 MHz, Middle Channel)



Fundamental test

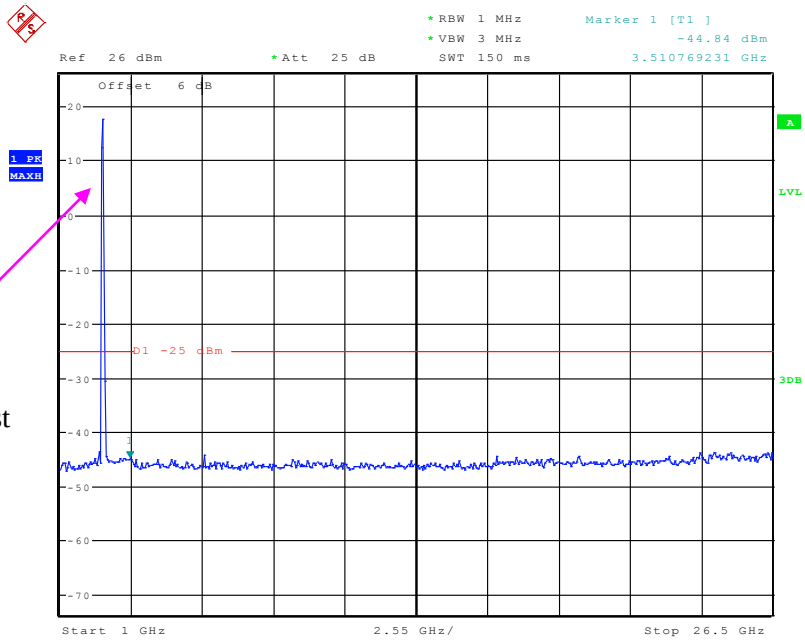
Date: 24.SEP.2019 22:10:12

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



Date: 24.SEP.2019 22:10:31

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



Fundamental test

Date: 16.OCT.2019 19:10:42

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:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by Curry Xiang on 2019-09-24.

EUT operation mode: Transmitting

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
387.90	33.21	259	2.1	H	-66.3	1.08	0.0	-67.38	-13	54.38
387.90	32.98	141	1.1	V	-65.3	1.08	0.0	-66.38	-13	53.38
1673.20	68.73	175	1.7	H	-37.6	1.30	8.90	-30.00	-13	17.00
1673.20	68.11	77	1.1	V	-37.6	1.30	8.90	-30.00	-13	17.00
2509.80	62.39	274	2.2	H	-41.0	2.60	10.20	-33.40	-13	20.40
2509.80	65.03	169	1.4	V	-37.7	2.60	10.20	-30.10	-13	17.10
3346.40	54.89	87	1.9	H	-46.0	1.50	11.70	-35.80	-13	22.80
3346.40	55.23	260	2.3	V	-45.7	1.50	11.70	-35.50	-13	22.50
WCDMA Mode, Middle channel										
562.3	33.69	268	2.0	H	-65.8	1.08	0.0	-66.88	-13	53.88
562.3	33.2	37	2.0	V	-65.1	1.08	0.0	-66.18	-13	53.18
1673.20	46.77	290	2.3	H	-59.6	1.30	8.90	-52.00	-13	39.00
1673.20	45.38	54	1.5	V	-60.4	1.30	8.90	-52.80	-13	39.80
2509.80	48.06	120	1.4	H	-55.3	2.60	10.20	-47.70	-13	34.70
2509.80	50.72	215	2.1	V	-52.0	2.60	10.20	-44.40	-13	31.40
3346.40	43.51	35	2.4	H	-57.4	1.50	11.70	-47.20	-13	34.20
3346.40	43.86	267	1.8	V	-57.1	1.50	11.70	-46.90	-13	33.90

30 MHz ~ 20 GHz:

PCS Band (Part 24E)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
387.90	33.09	282	1.4	H	-66.4	1.08	0.0	-67.48	-13	54.48
387.90	32.80	333	1.8	V	-65.5	1.08	0.0	-66.58	-13	53.58
3760.00	48.13	11	2.3	H	-53.9	1.50	11.80	-43.60	-13	30.60
3760.00	49.63	61	1.3	V	-52.0	1.50	11.80	-41.70	-13	28.70
5640.00	51.13	271	1.3	H	-48.6	1.70	12.40	-37.90	-13	24.90
5640.00	49.51	260	2.2	V	-49.8	1.70	12.40	-39.10	-13	26.10
WCDMA Mode Band II, Middle channel										
562.3	33.86	19	1.2	H	-65.7	1.08	0.0	-66.78	-13	53.78
562.3	33.45	77	1.6	V	-64.9	1.08	0.0	-65.98	-13	52.98
3760.00	43.95	309	2.2	H	-58.1	1.50	11.80	-47.80	-13	34.80
3760.00	44.25	103	2.4	V	-57.3	1.50	11.80	-47.00	-13	34.00

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)			
Band 4										
Test frequency range:30 MHz ~ 18 GHz										
562.30	33.26	181	1.1	H	-66.3	1.08	0.0	-67.38	-13	54.38
562.30	33.17	339	2.0	V	-65.1	1.08	0.0	-66.18	-13	53.18
3465.00	43.84	258	1.1	H	-56.9	1.50	12.00	-46.40	-13	33.40
3465.00	43.33	247	1.9	V	-58.2	1.50	12.00	-47.70	-13	34.70
5197.50	45.11	61	2.2	H	-55.0	1.60	12.10	-44.50	-13	31.50
5197.50	48.57	103	1.8	V	-51.0	1.60	12.10	-40.50	-13	27.50
Band 7										
Test frequency range:30 MHz ~ 26 GHz										
562.30	33.10	318	1.7	H	-66.4	1.08	0.0	-67.48	-25	42.48
562.30	32.99	315	1.5	V	-65.3	1.08	0.0	-66.38	-25	41.38
5070.00	44.03	132	1.3	H	-56.0	1.60	12.10	-45.50	-25	20.50
5070.00	43.65	59	1.1	V	-56.4	1.60	12.10	-45.90	-25	20.90

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.

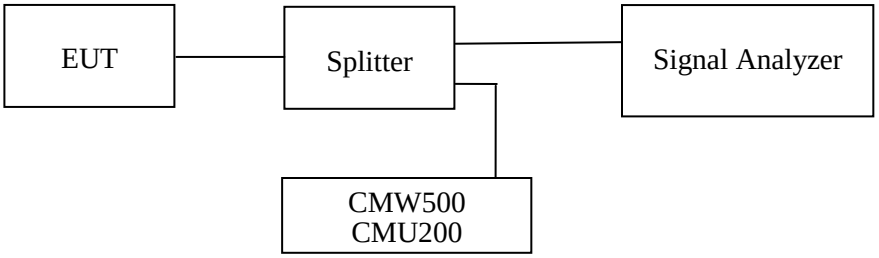
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

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

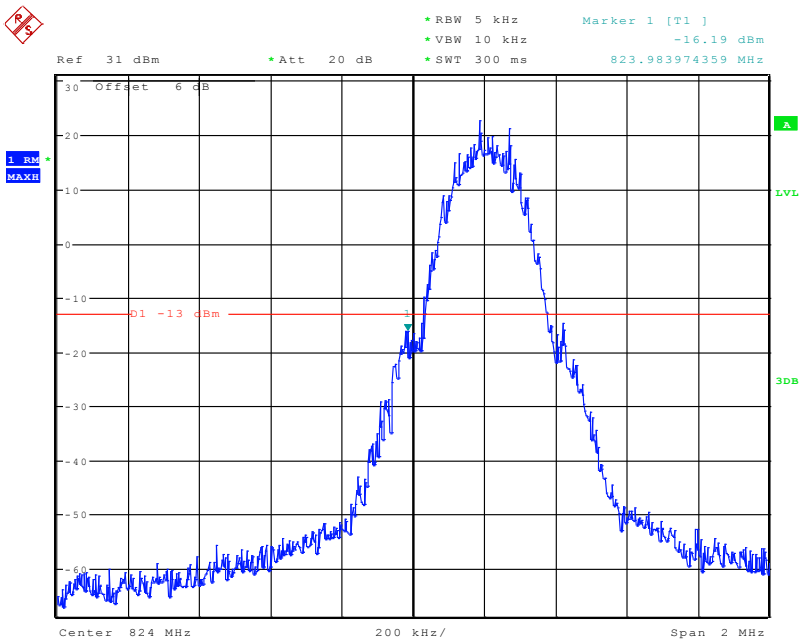
Temperature:	25 ℃
Relative Humidity:	52 %
ATM Pressure:	101.0 kPa

The testing was performed by James Fu on 2019-09-24 and 2019-09-25.

EUT operation mode: Transmitting

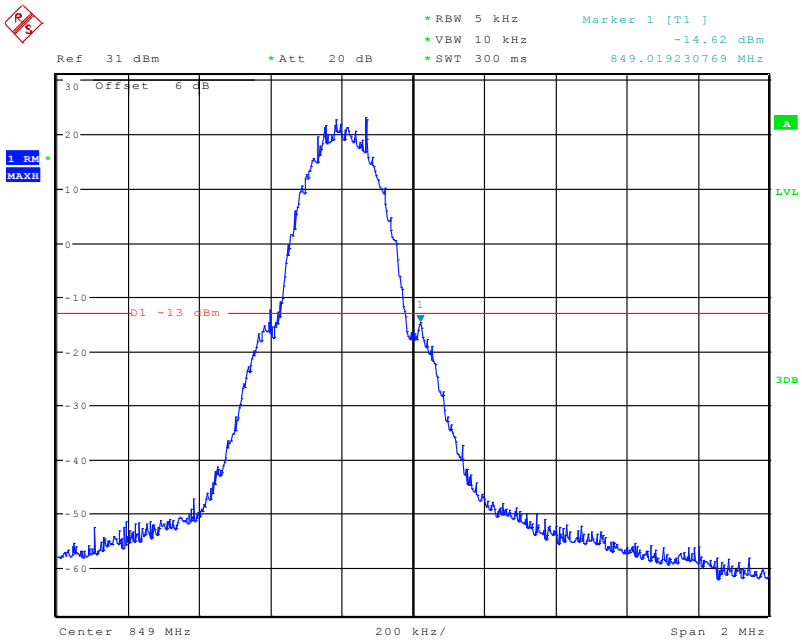
Test Result: Compliance. Please refer to the following plots.

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



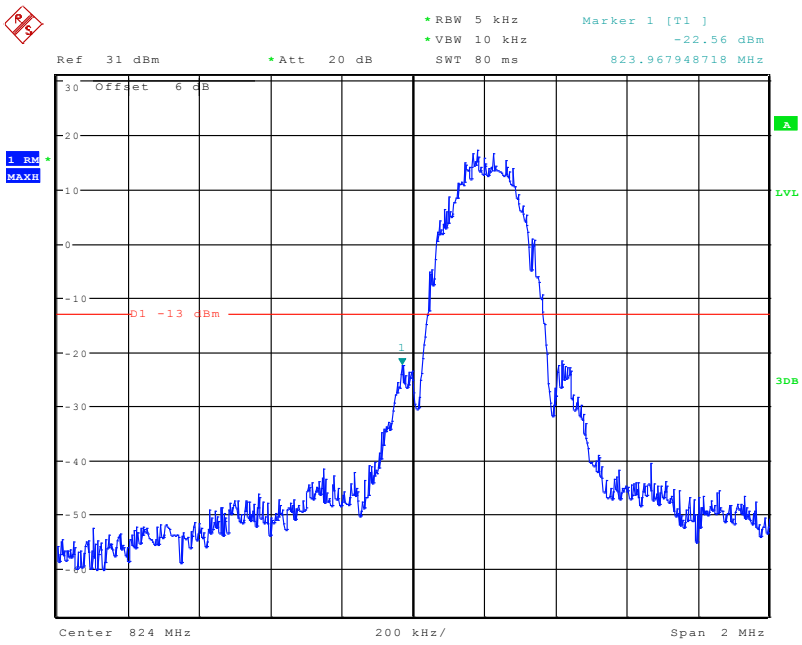
Date: 24.SEP.2019 20:48:24

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



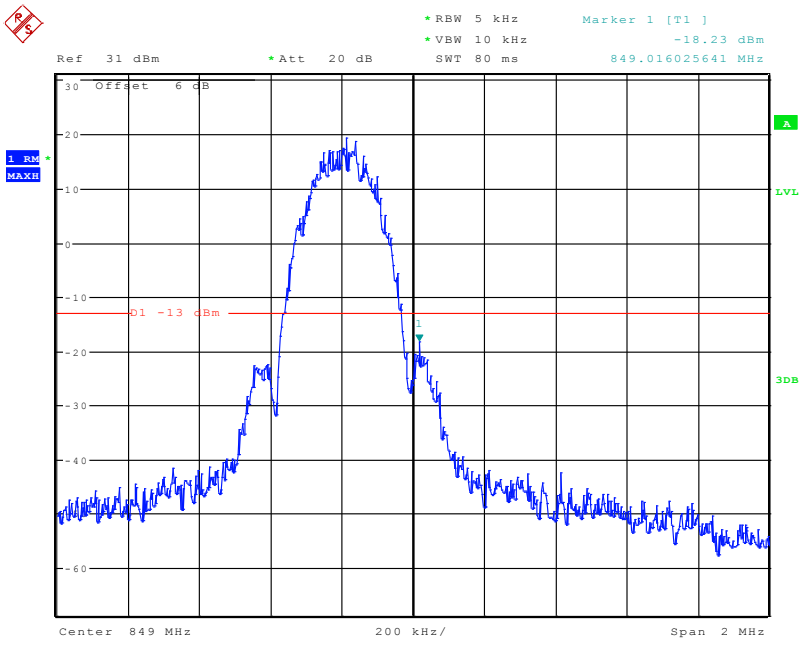
Date: 24.SEP.2019 20:50:48

Cellular Band, Left Band Edge for EDGE Mode



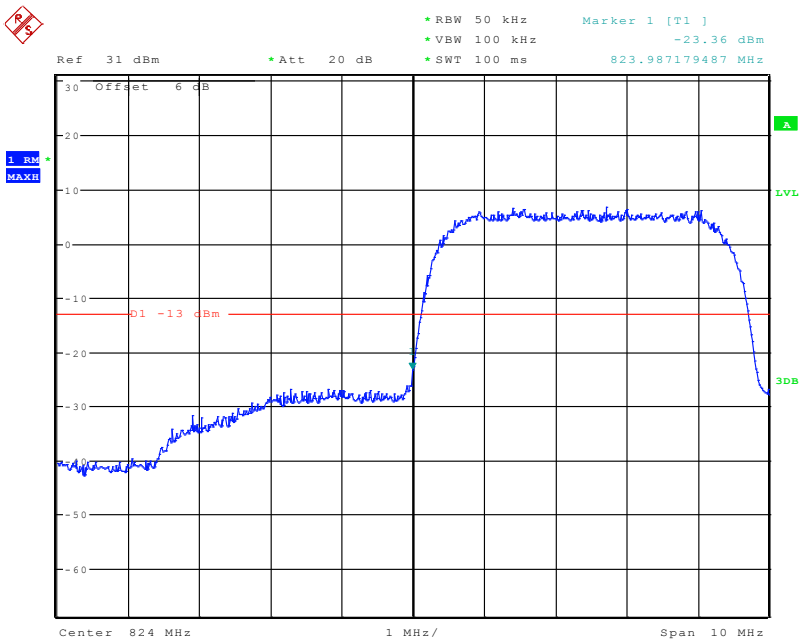
Date: 24.SEP.2019 20:52:16

Cellular Band, Right Band Edge for EDGE Mode



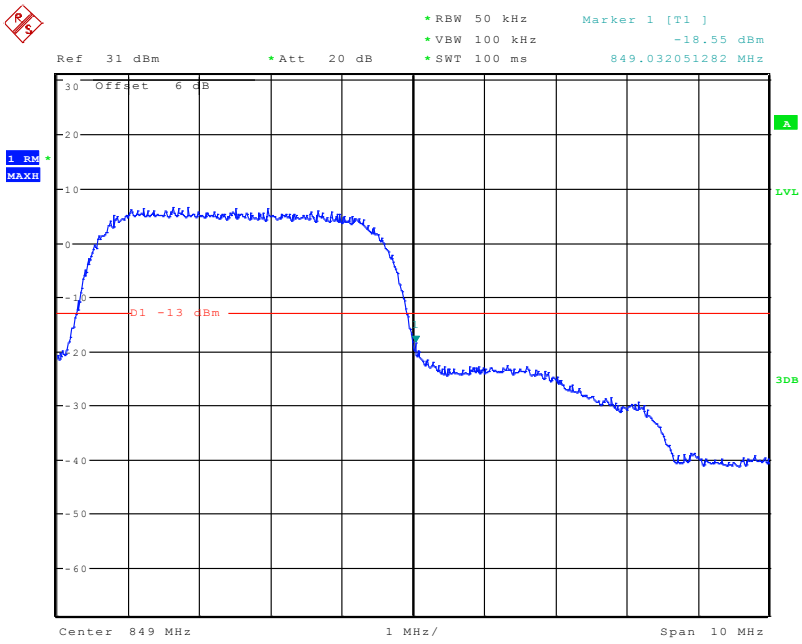
Date: 24.SEP.2019 20:52:49

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



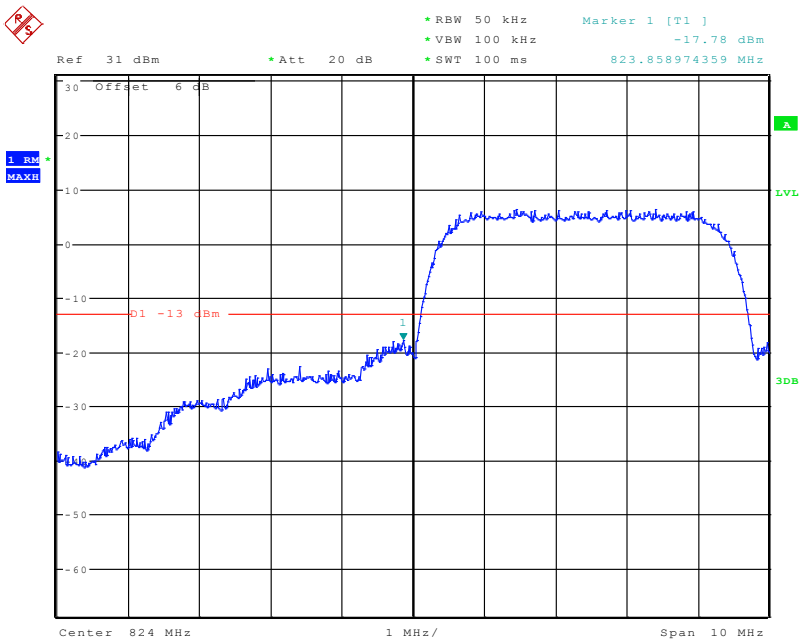
Date: 24.SEP.2019 19:57:44

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



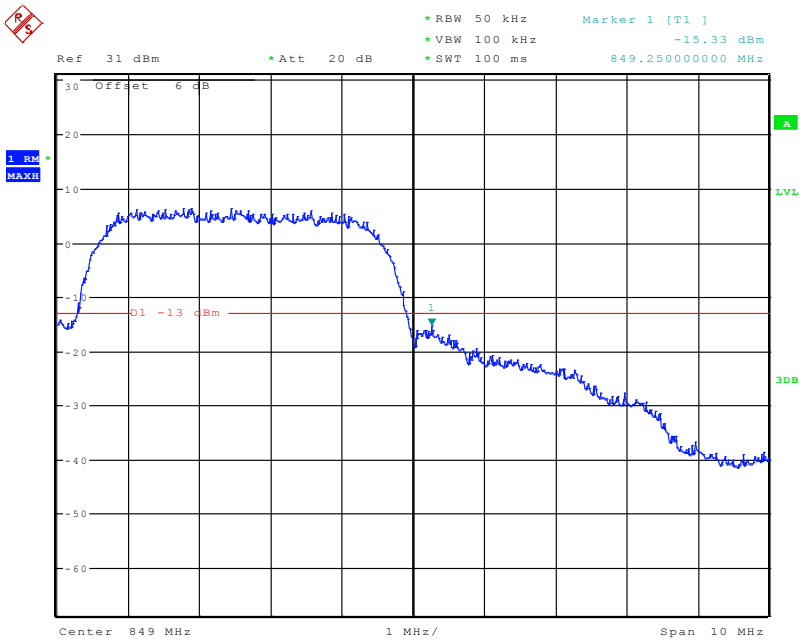
Date: 24.SEP.2019 19:58:11

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



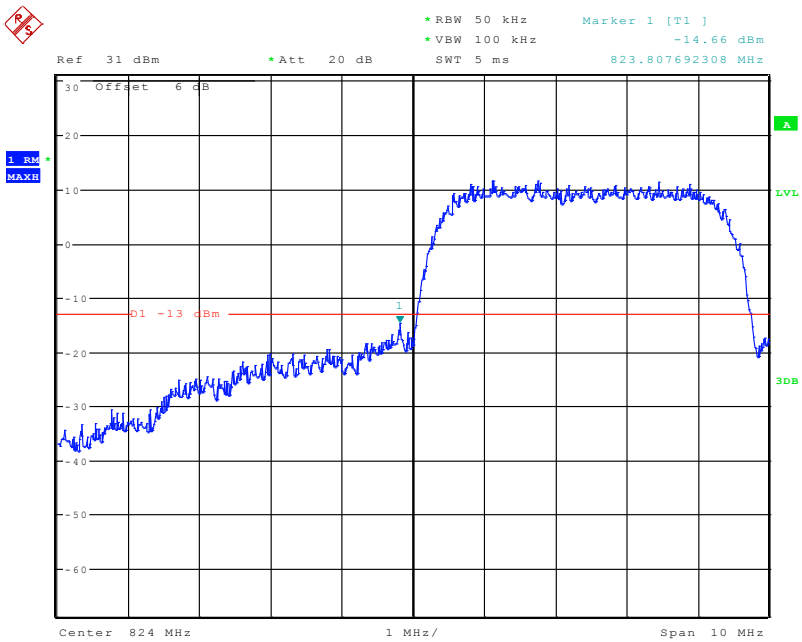
Date: 24.SEP.2019 19:56:59

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



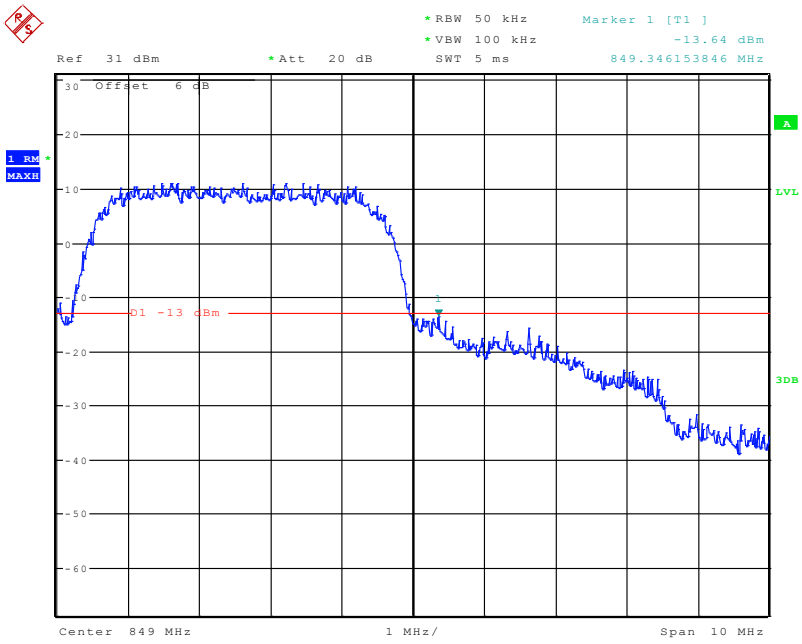
Date: 24.SEP.2019 19:56:30

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



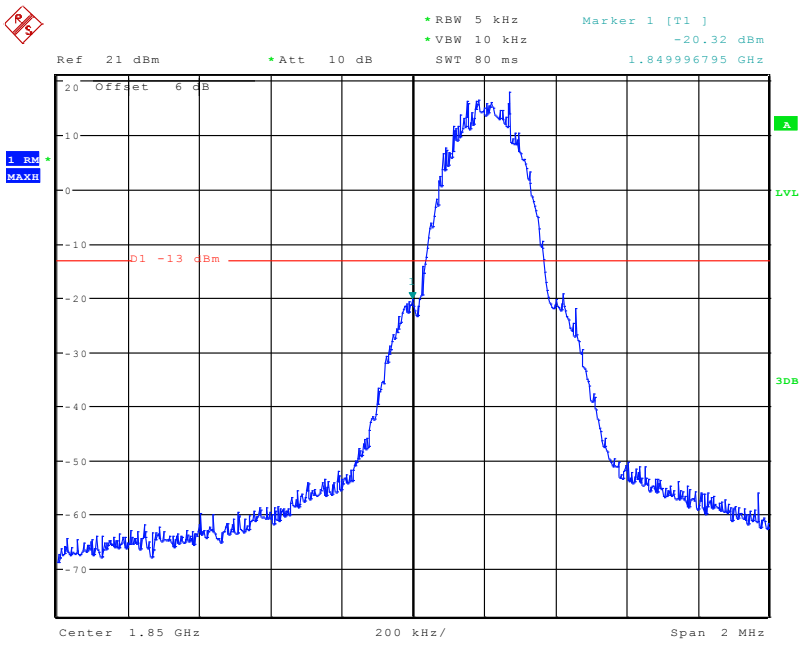
Date: 24.SEP.2019 19:55:08

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



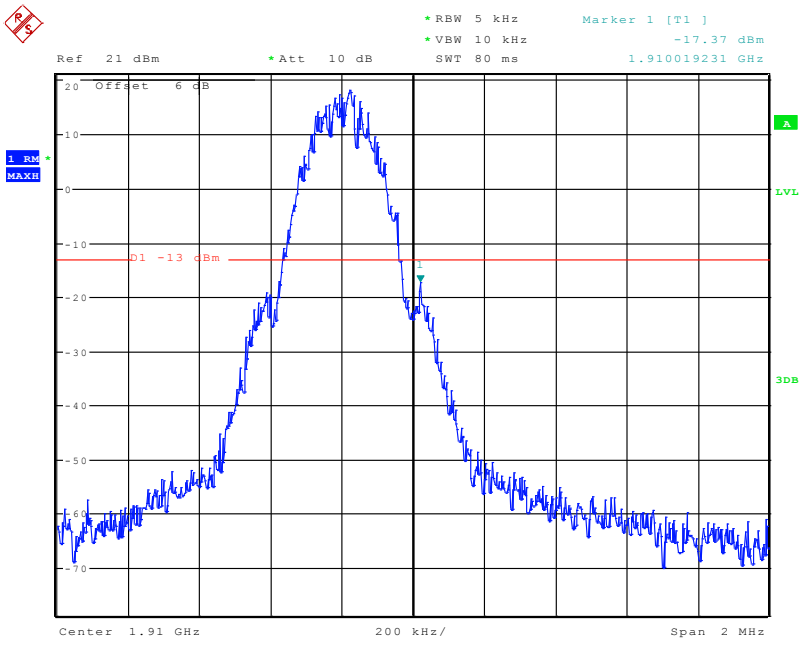
Date: 24.SEP.2019 19:55:38

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



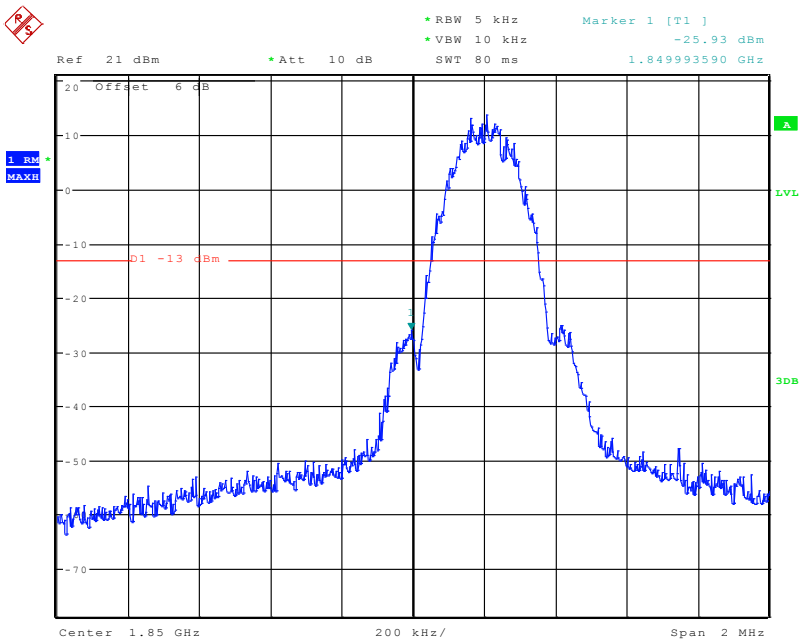
Date: 24.SEP.2019 21:13:42

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



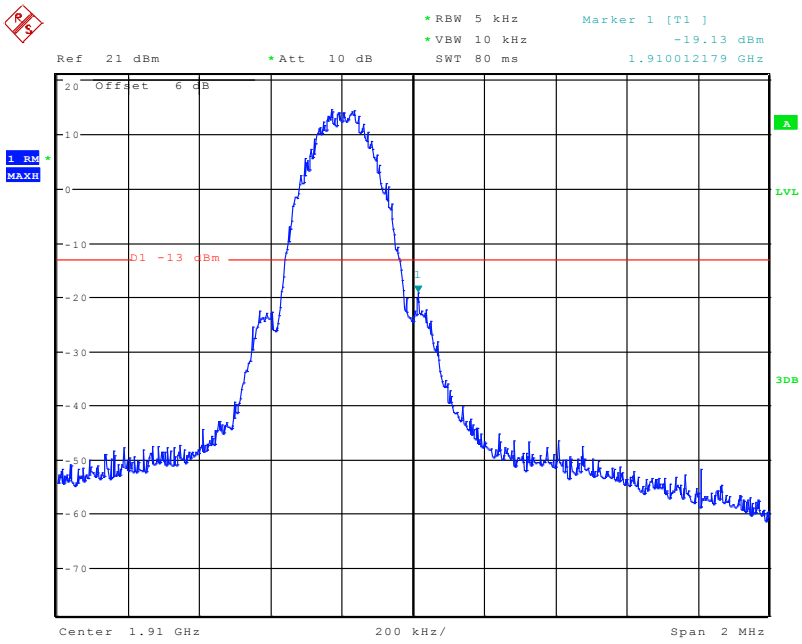
Date: 24.SEP.2019 21:14:24

PCS Band, Left Band Edge for EDGE Mode



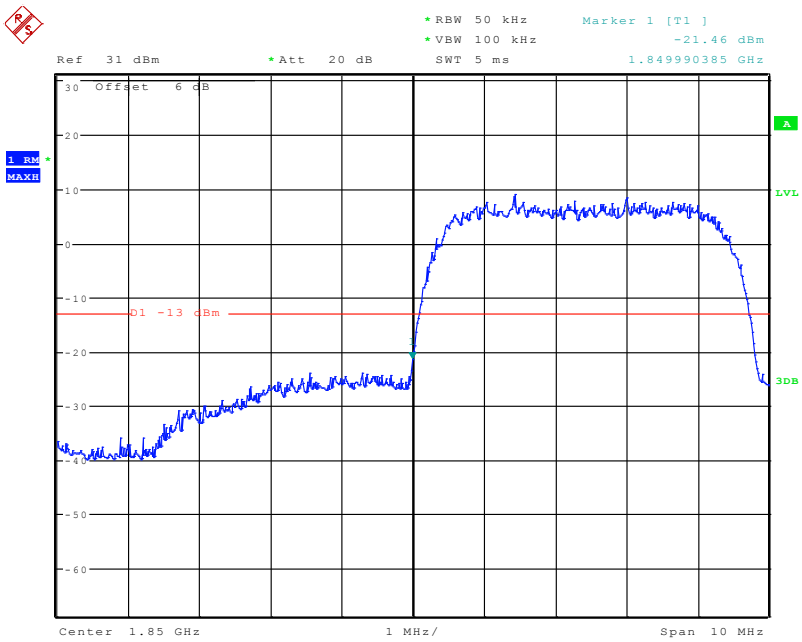
Date: 24.SEP.2019 21:16:22

PCS Band, Right Band Edge for EDGE Mode



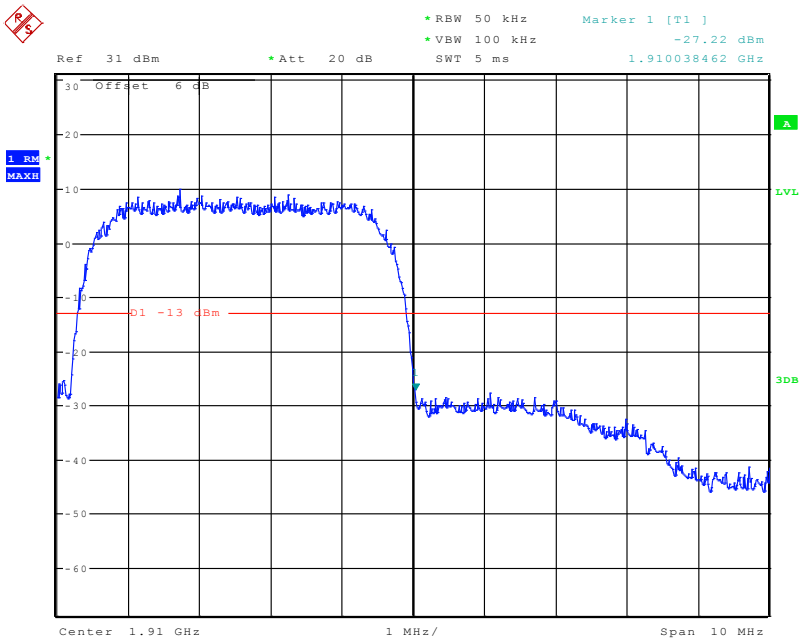
Date: 24.SEP.2019 21:18:16

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



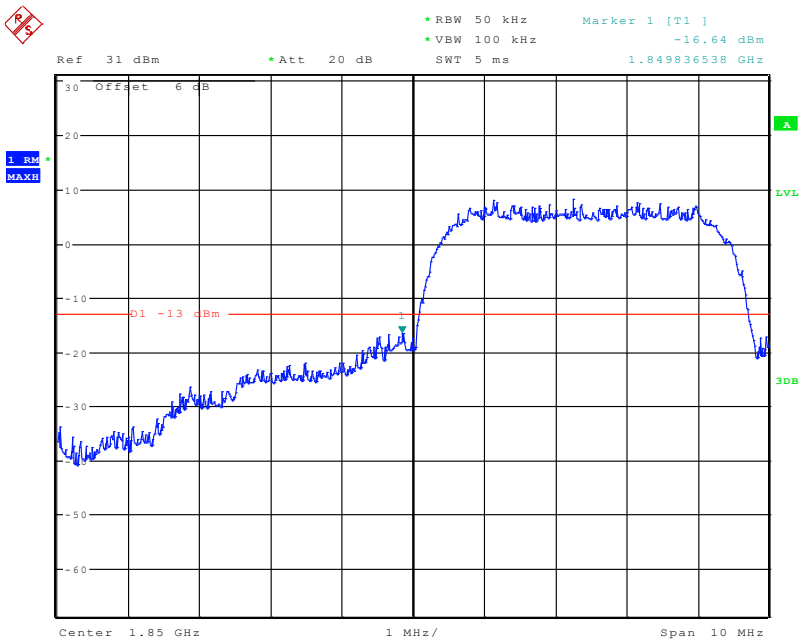
Date: 24.SEP.2019 20:25:25

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



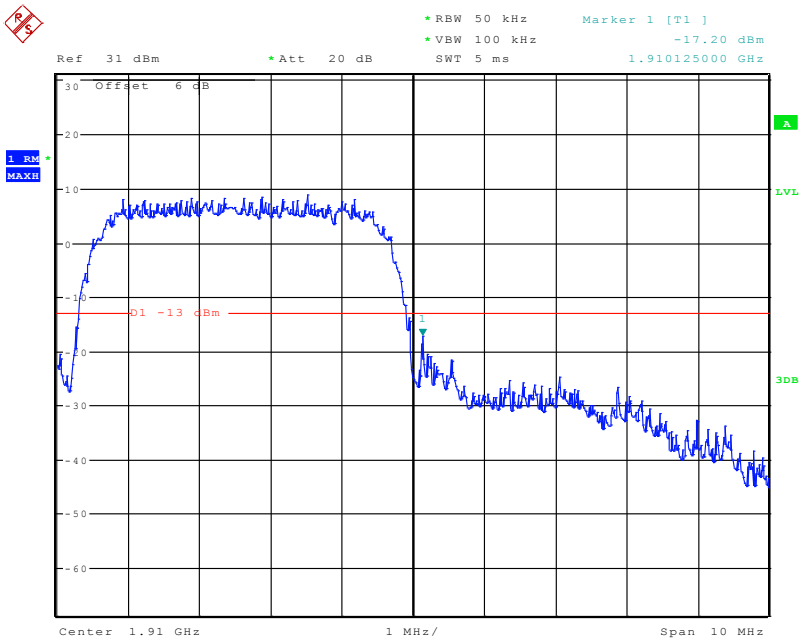
Date: 24.SEP.2019 20:26:18

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



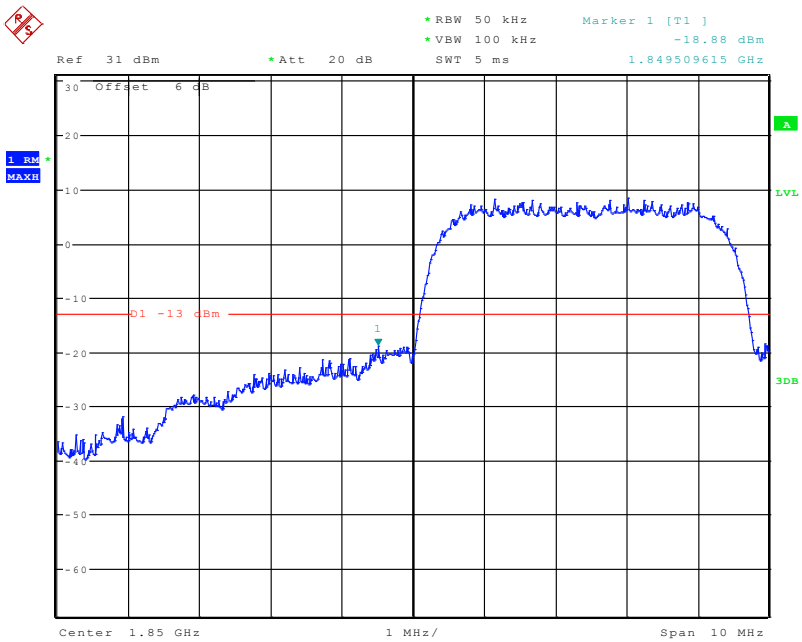
Date: 24.SEP.2019 20:31:00

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



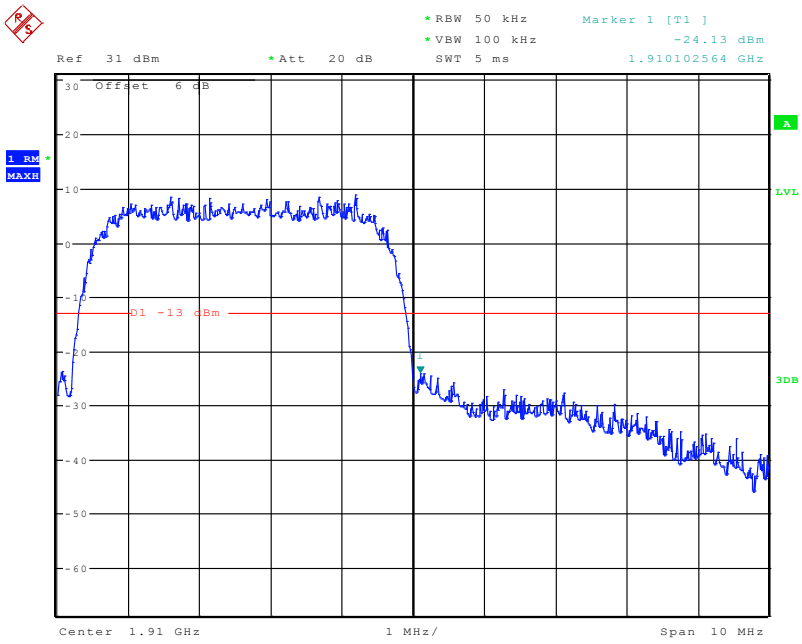
Date: 24.SEP.2019 20:31:30

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



Date: 24.SEP.2019 20:28:04

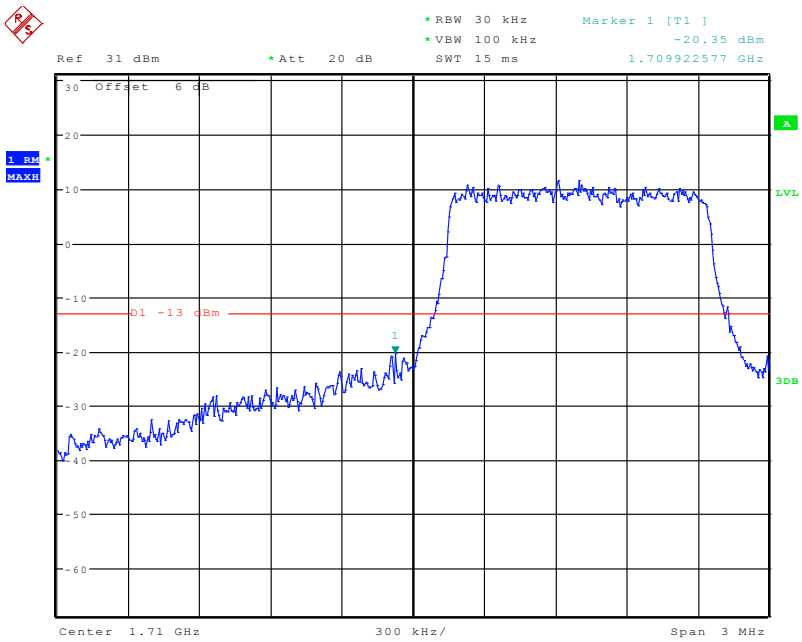
PCS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 24.SEP.2019 20:26:58

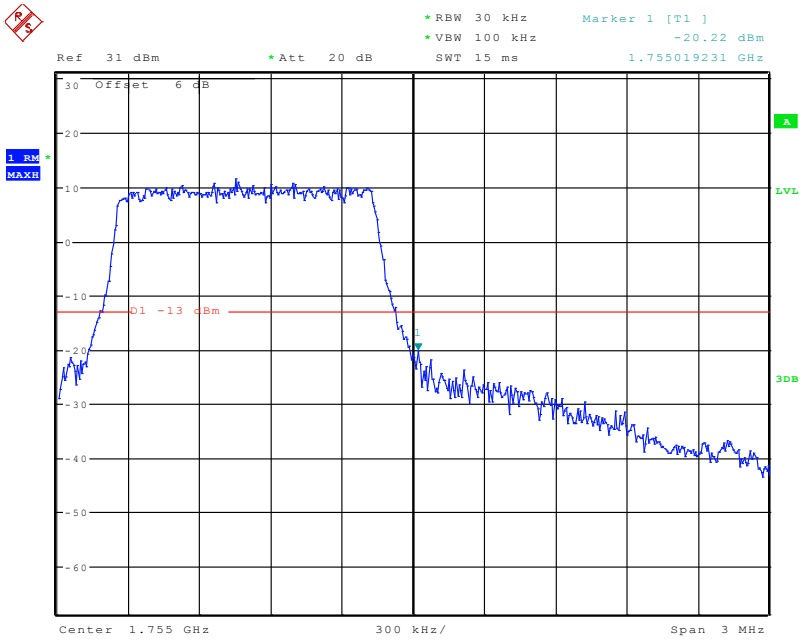
Band 4:

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



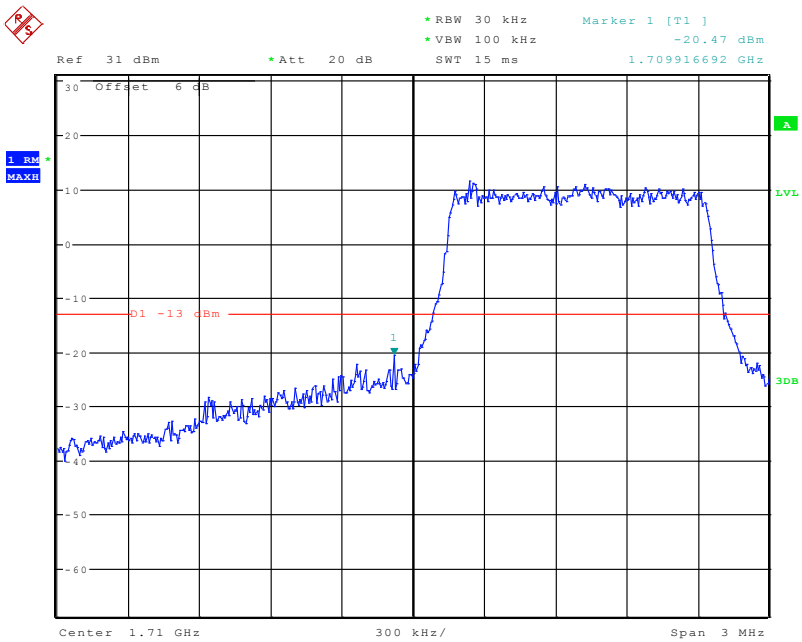
Date: 24.SEP.2019 23:20:12

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



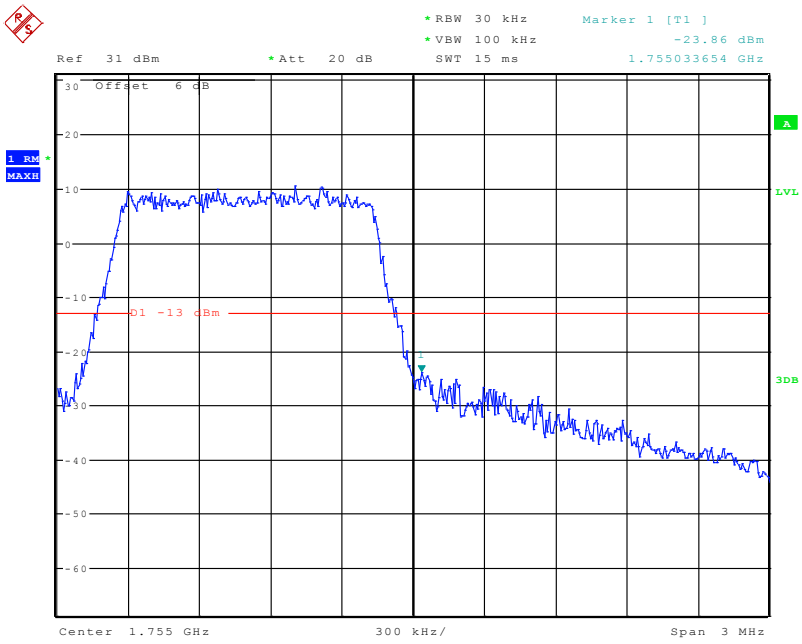
Date: 24.SEP.2019 23:19:15

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



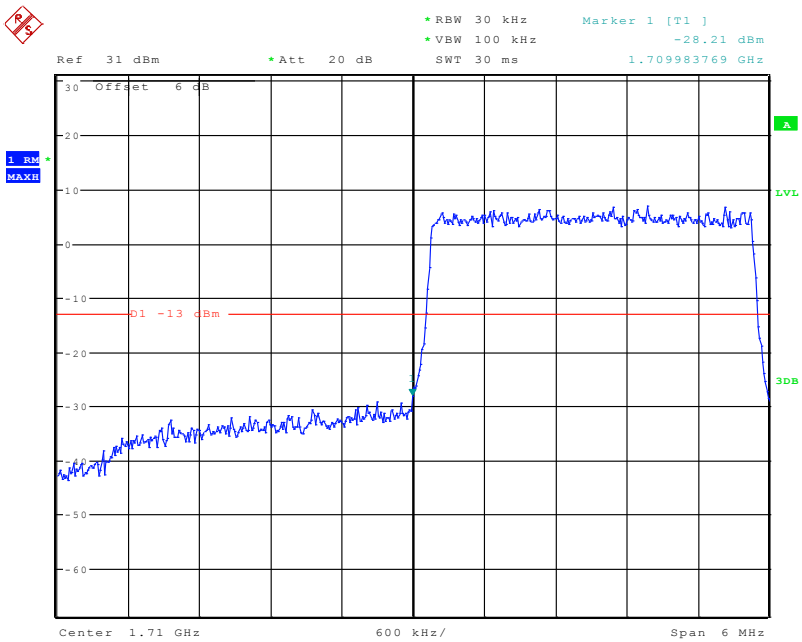
Date: 24.SEP.2019 23:09:26

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



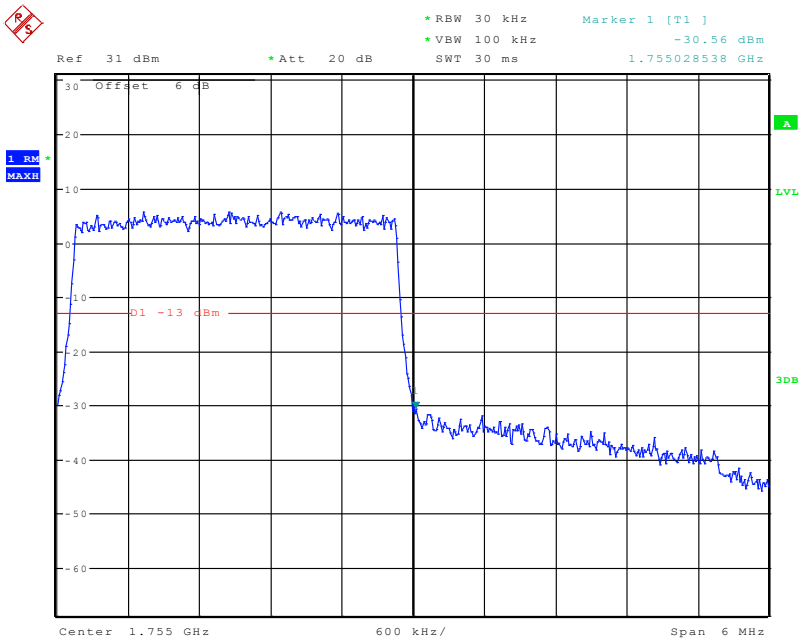
Date: 24.SEP.2019 23:19:43

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



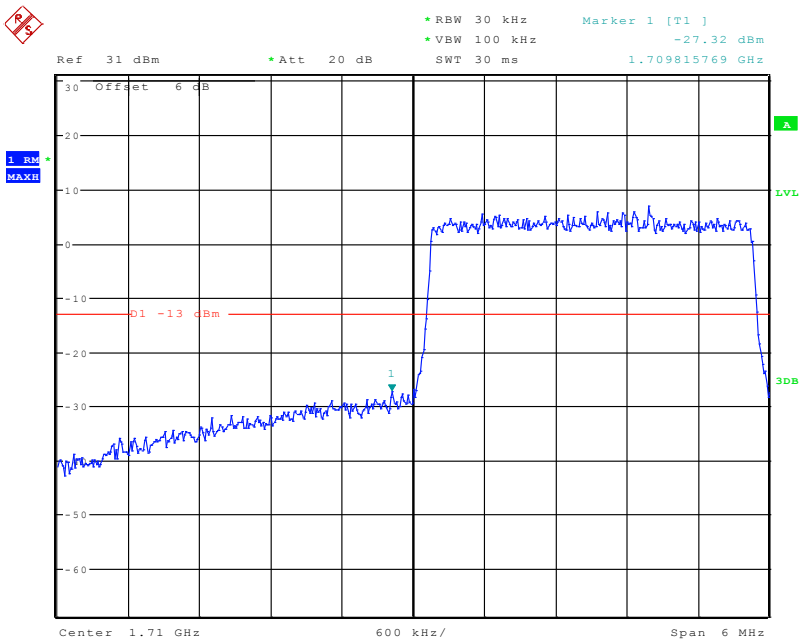
Date: 24.SEP.2019 23:20:53

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



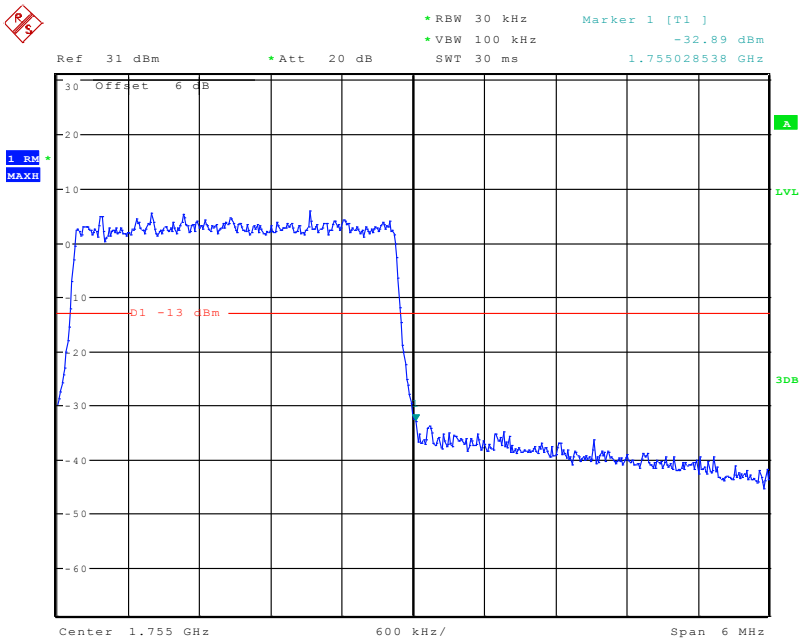
Date: 25.SEP.2019 00:01:11

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



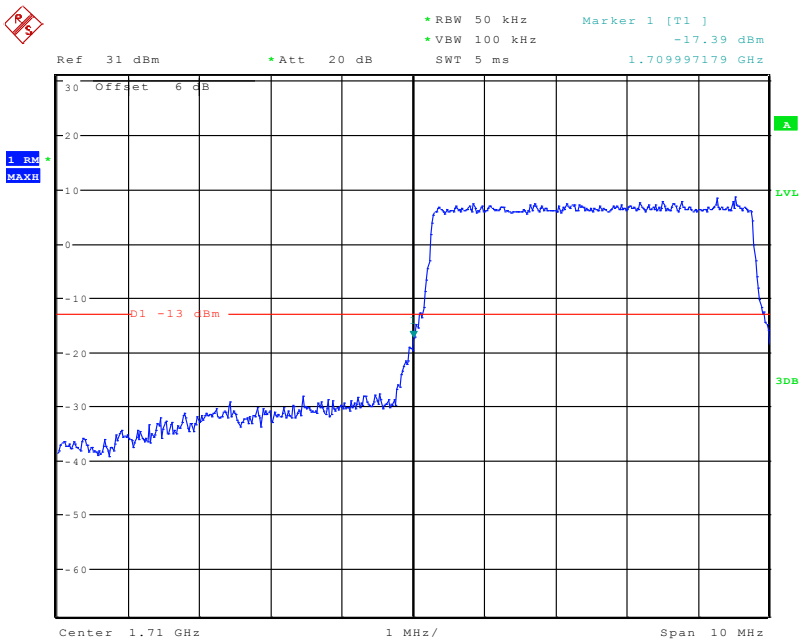
Date: 25.SEP.2019 00:00:20

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



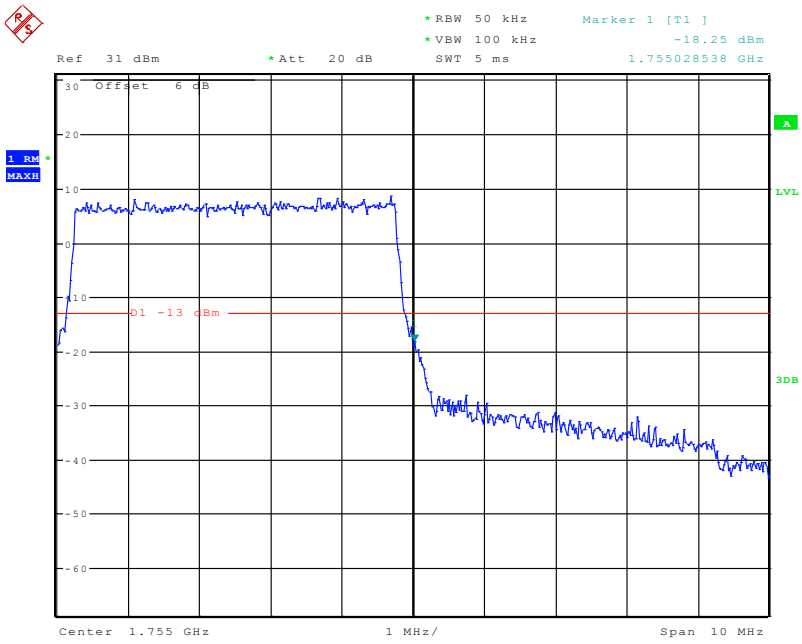
Date: 25.SEP.2019 00:00:50

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



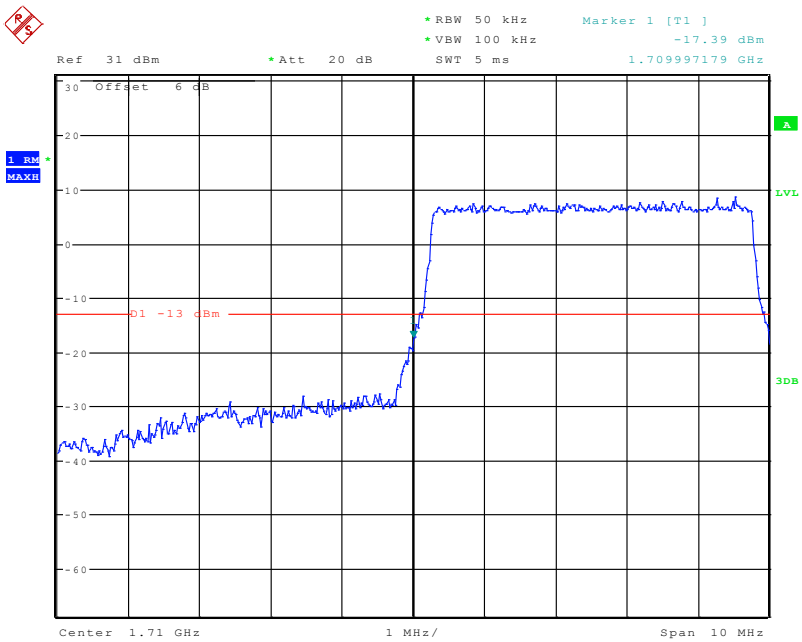
Date: 25.SEP.2019 00:03:40

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



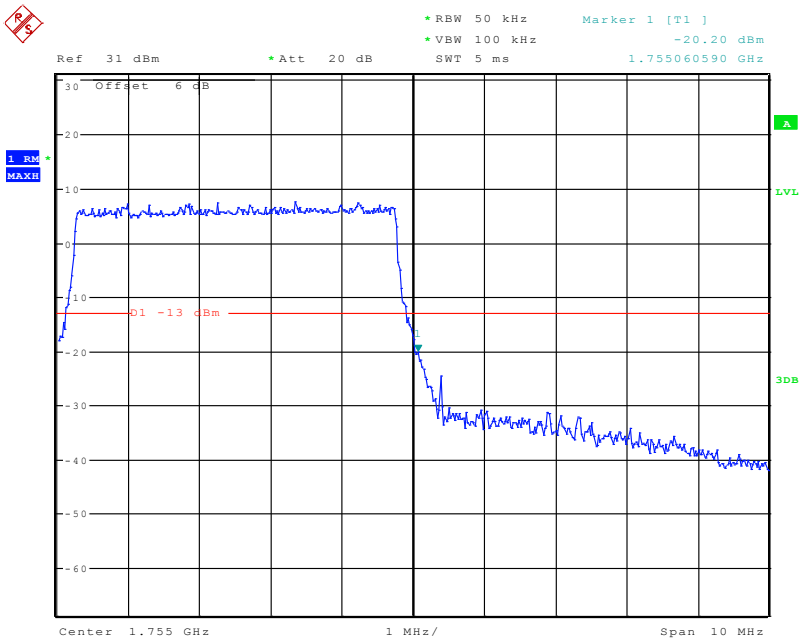
Date: 25.SEP.2019 00:02:13

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



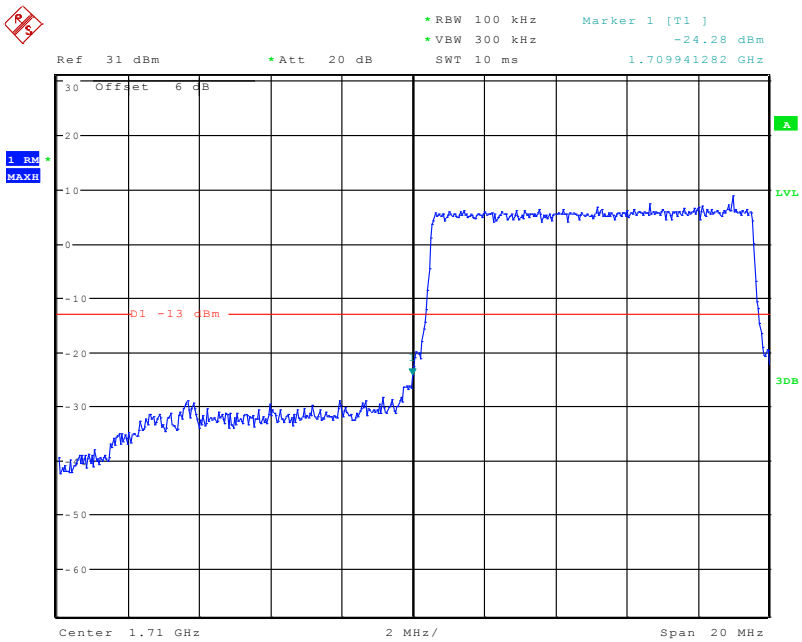
Date: 25.SEP.2019 00:03:40

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



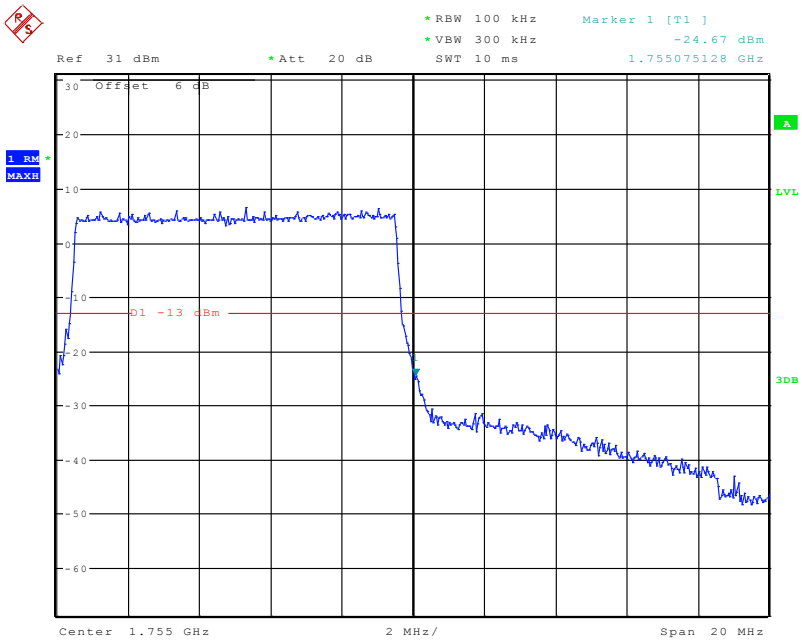
Date: 25.SEP.2019 00:03:00

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



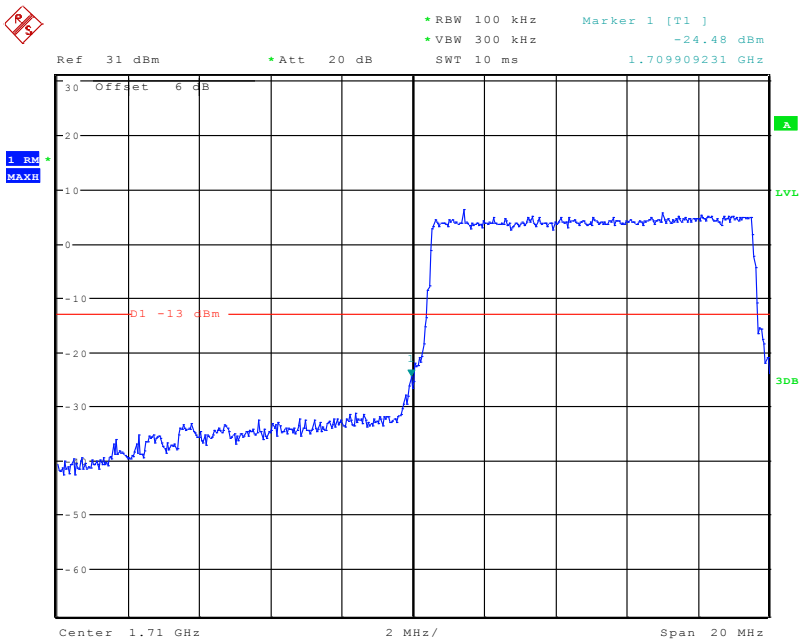
Date: 25.SEP.2019 00:13:14

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



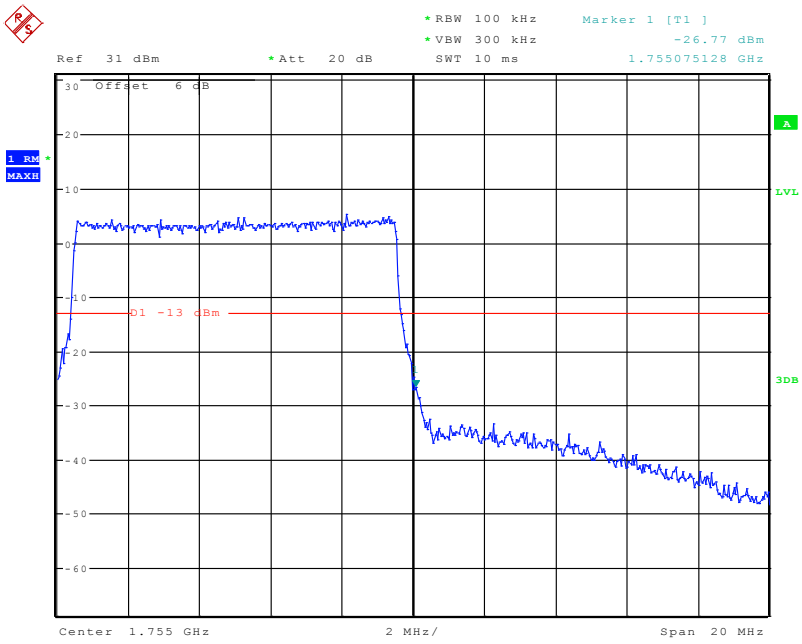
Date: 25.SEP.2019 00:19:17

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



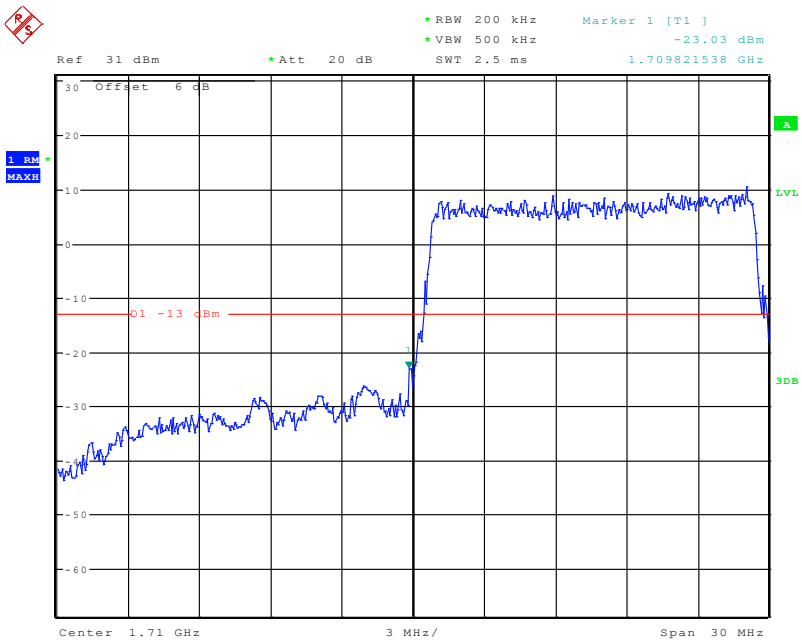
Date: 25.SEP.2019 00:18:31

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



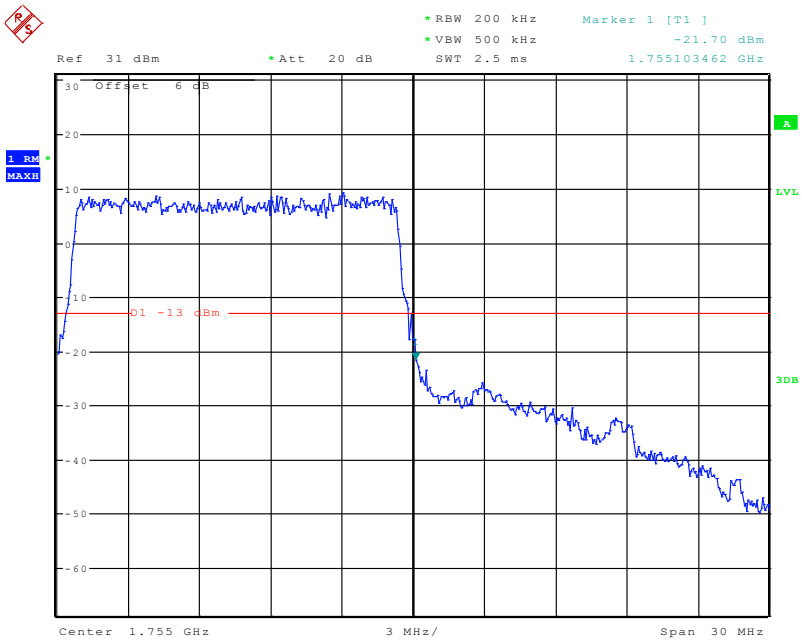
Date: 25.SEP.2019 00:18:56

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



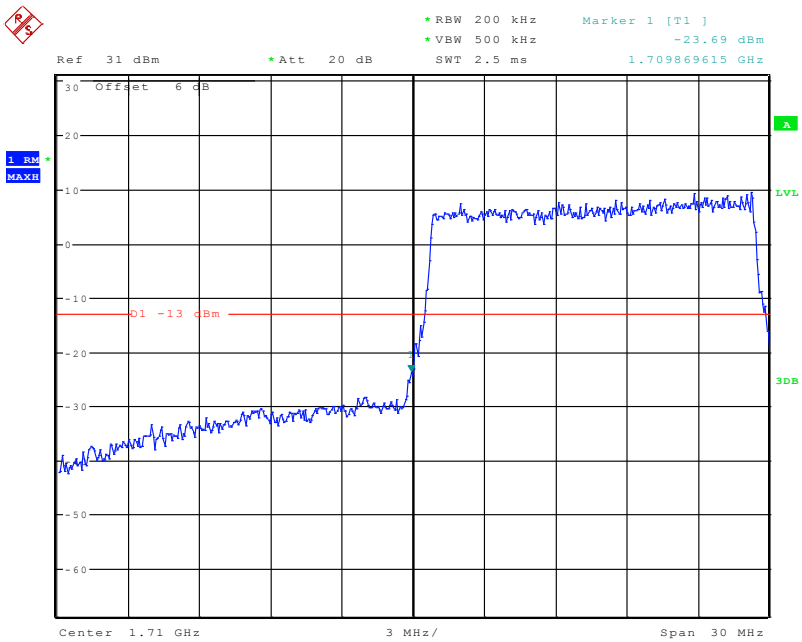
Date: 25.SEP.2019 00:26:10

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



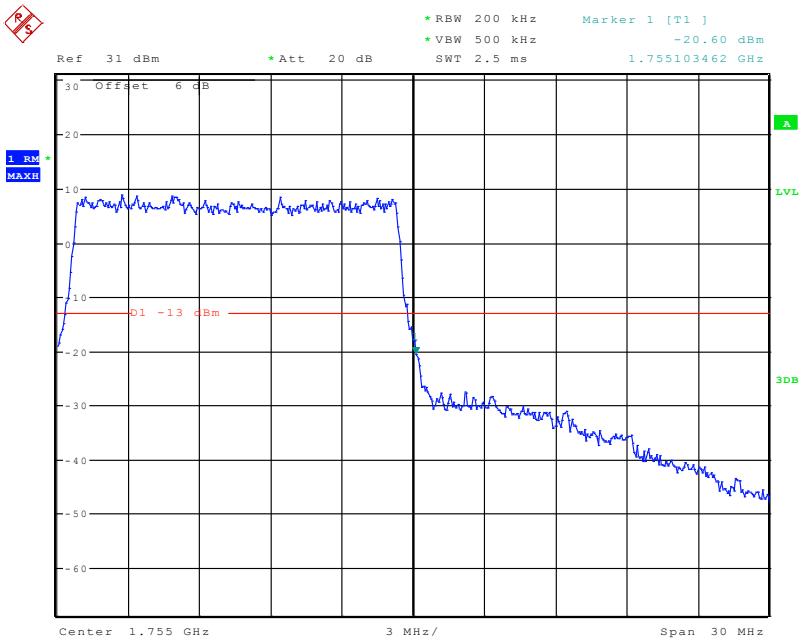
Date: 25.SEP.2019 00:29:55

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



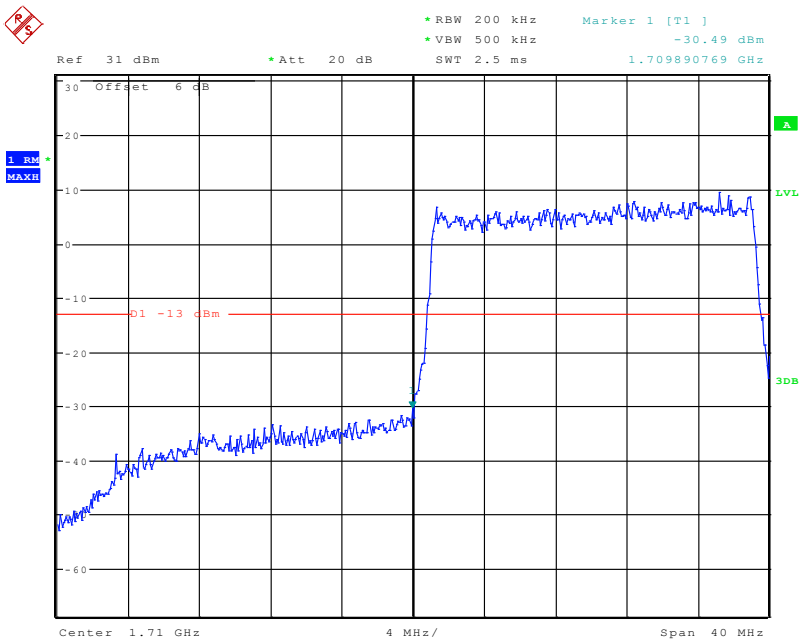
Date: 25.SEP.2019 00:26:43

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



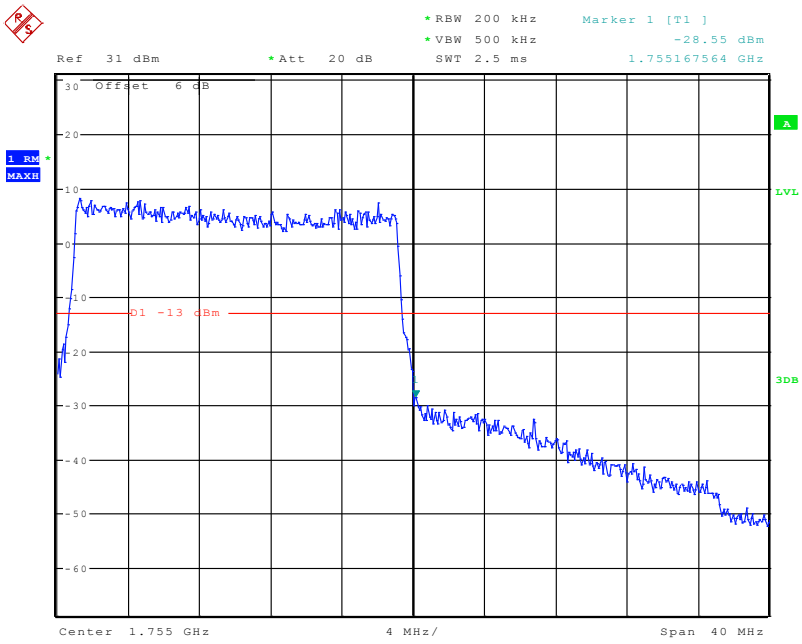
Date: 25.SEP.2019 00:29:24

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



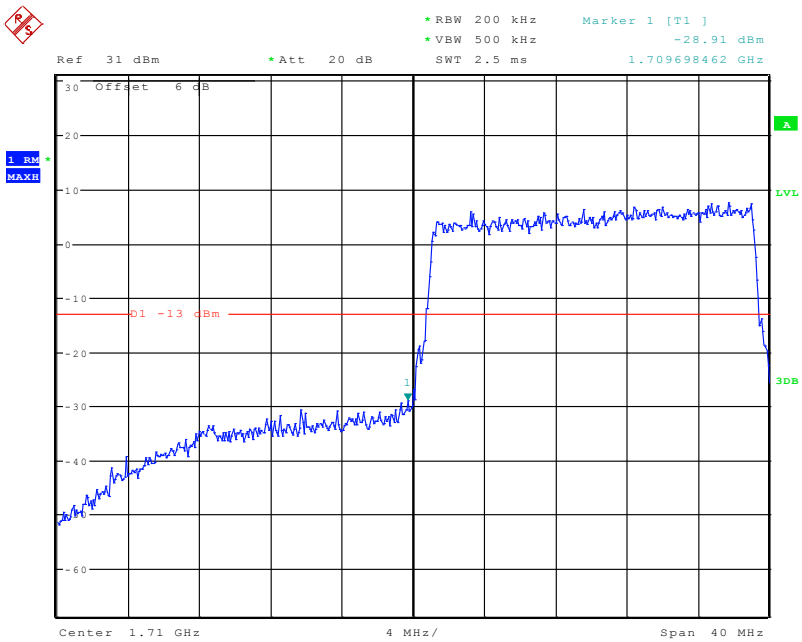
Date: 25.SEP.2019 00:33:17

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



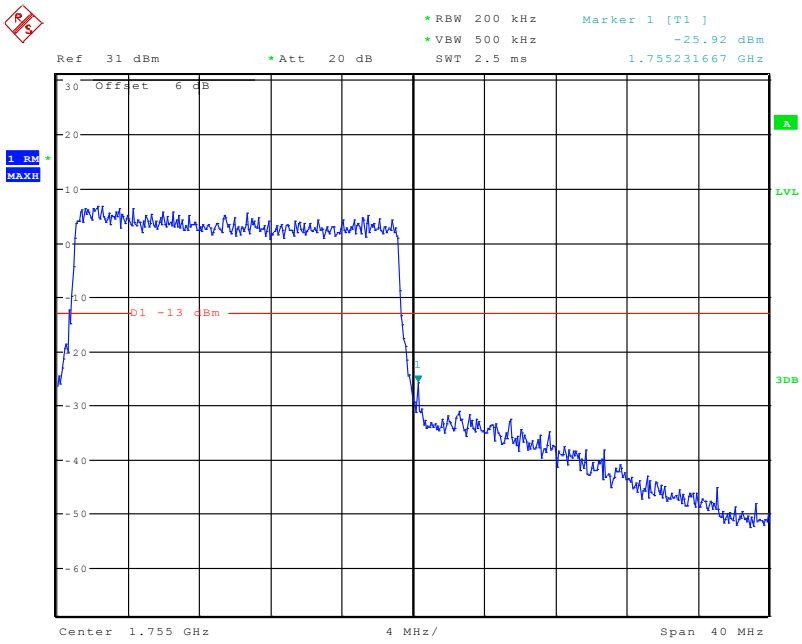
Date: 25.SEP.2019 00:31:44

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



Date: 25.SEP.2019 00:32:59

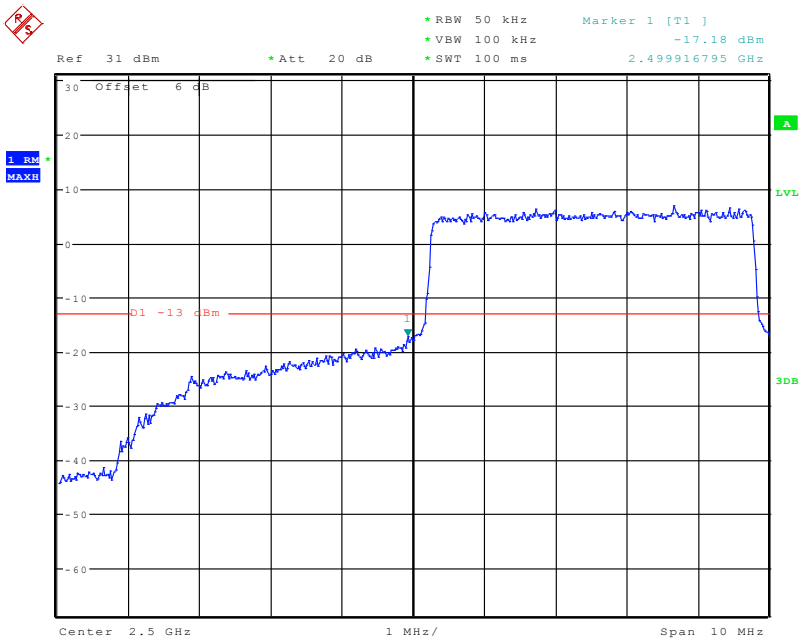
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 25.SEP.2019 00:32:04

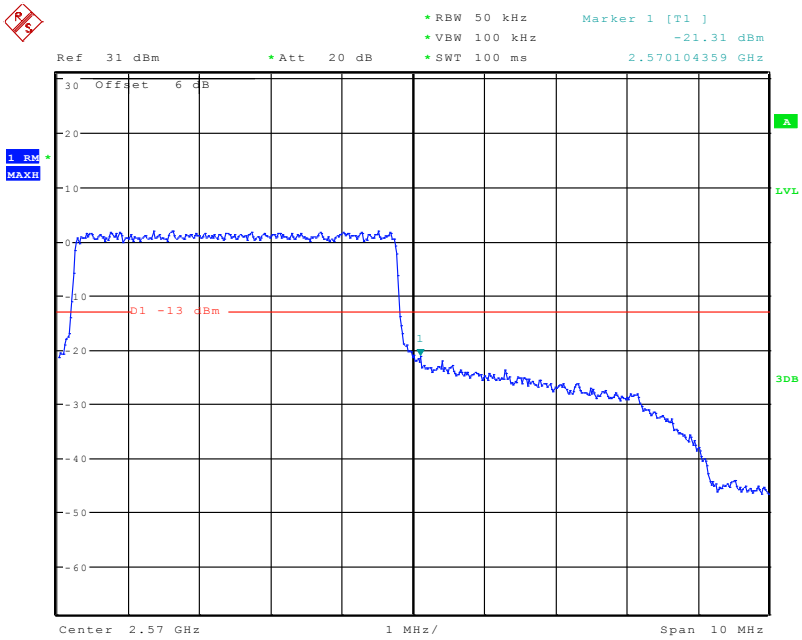
Band 7:

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



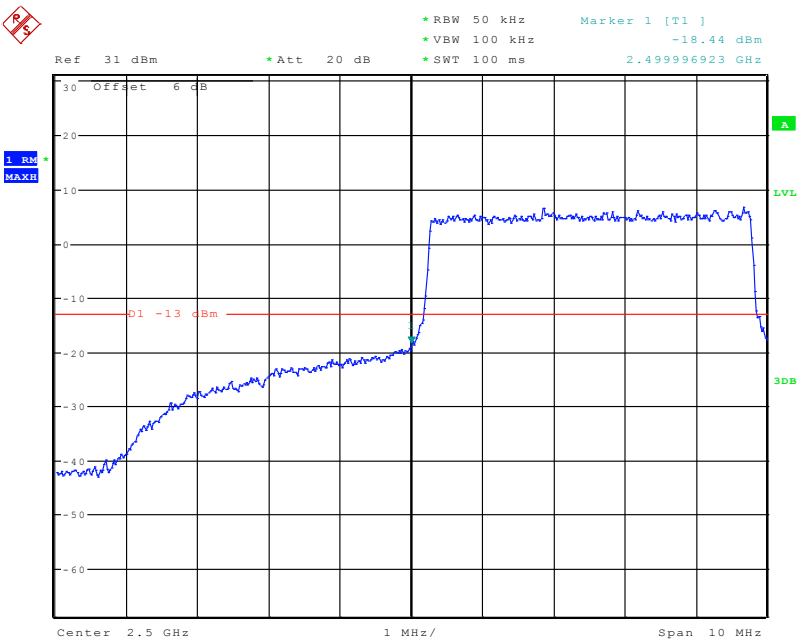
Date: 25.SEP.2019 20:55:02

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



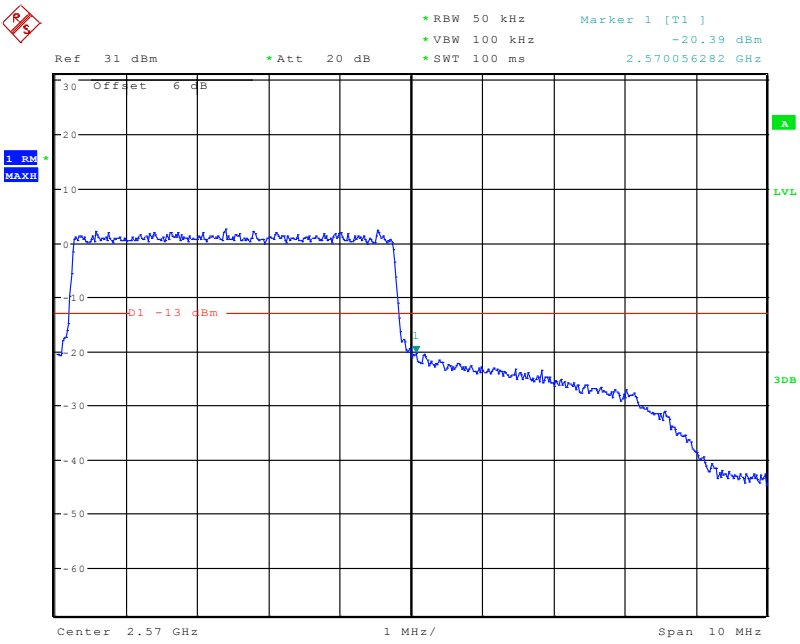
Date: 25.SEP.2019 20:59:32

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



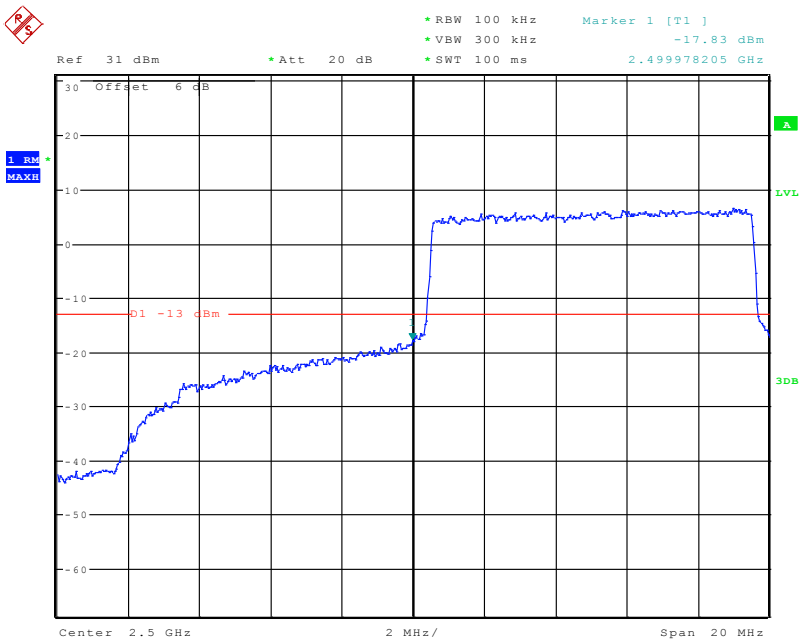
Date: 25.SEP.2019 20:58:42

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



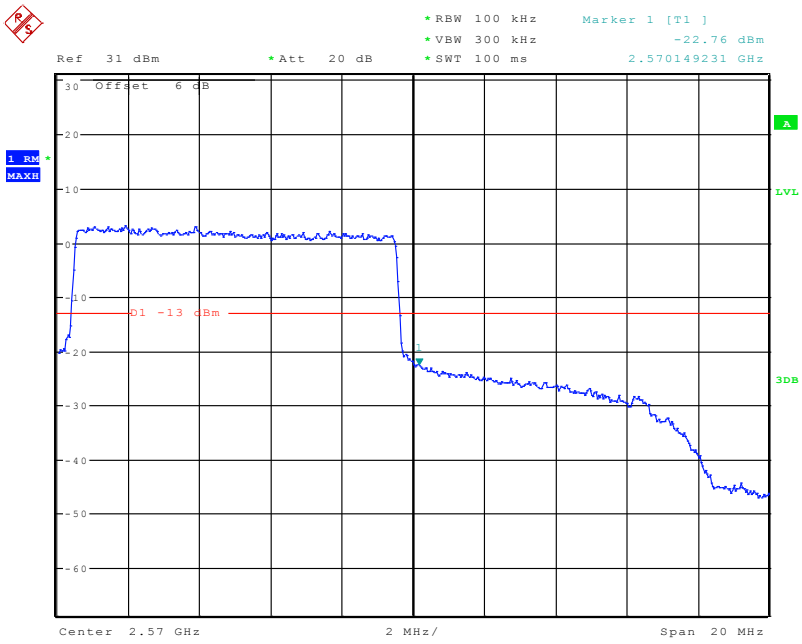
Date: 25.SEP.2019 20:59:11

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



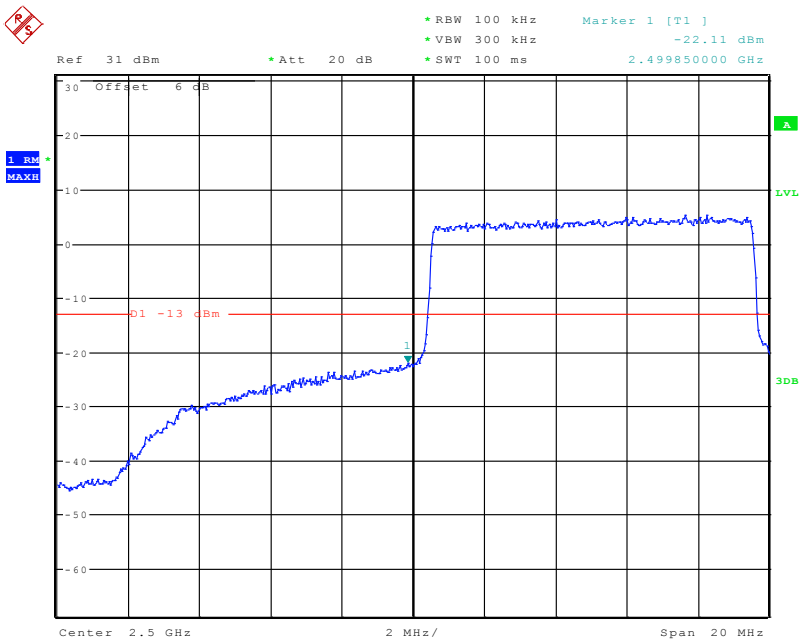
Date: 25.SEP.2019 21:09:31

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



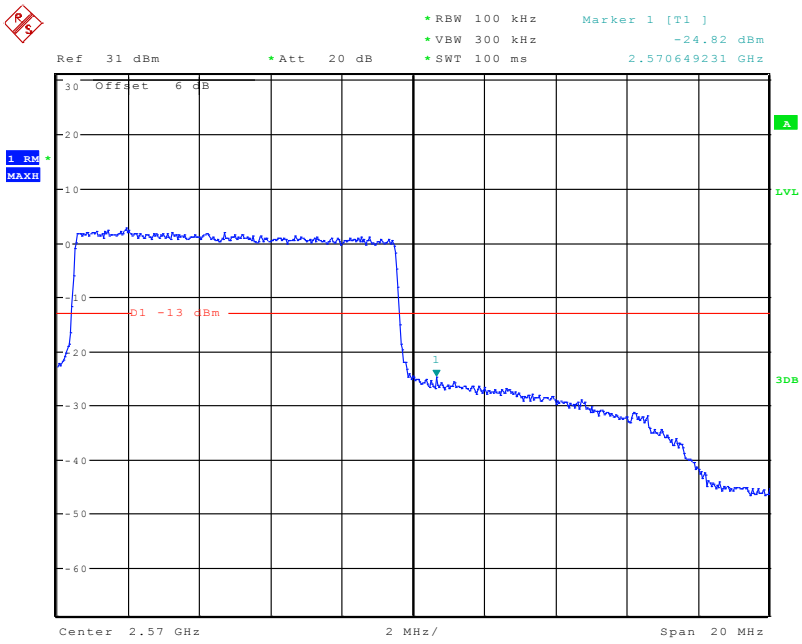
Date: 25.SEP.2019 21:09:01

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



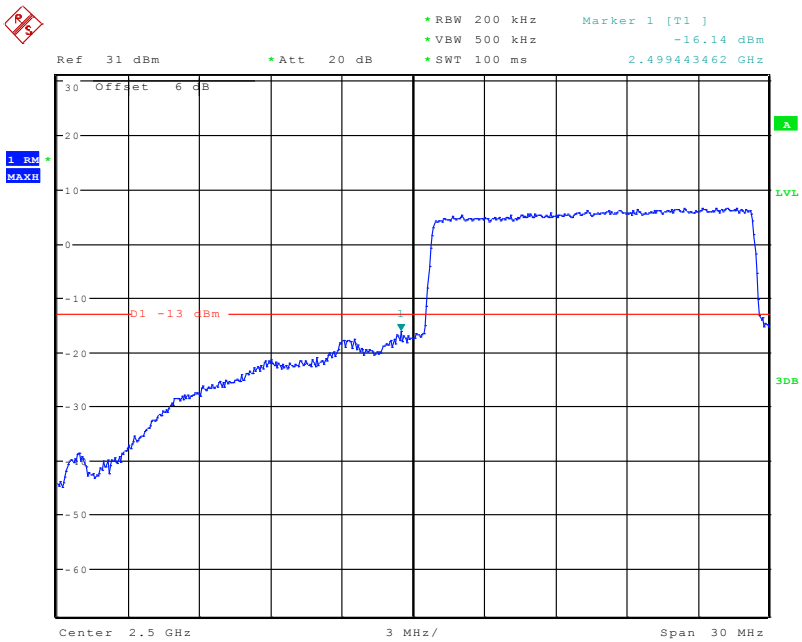
Date: 25.SEP.2019 21:13:25

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



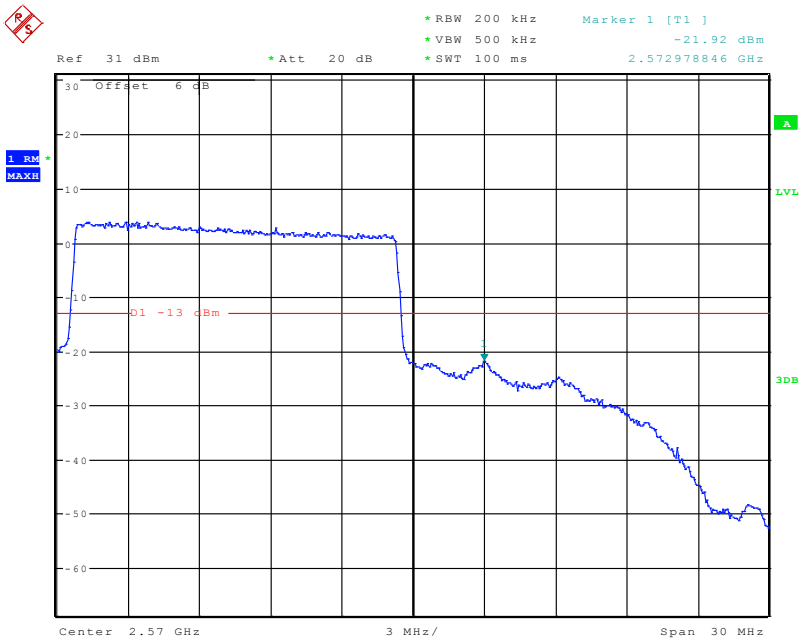
Date: 25.SEP.2019 21:08:24

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



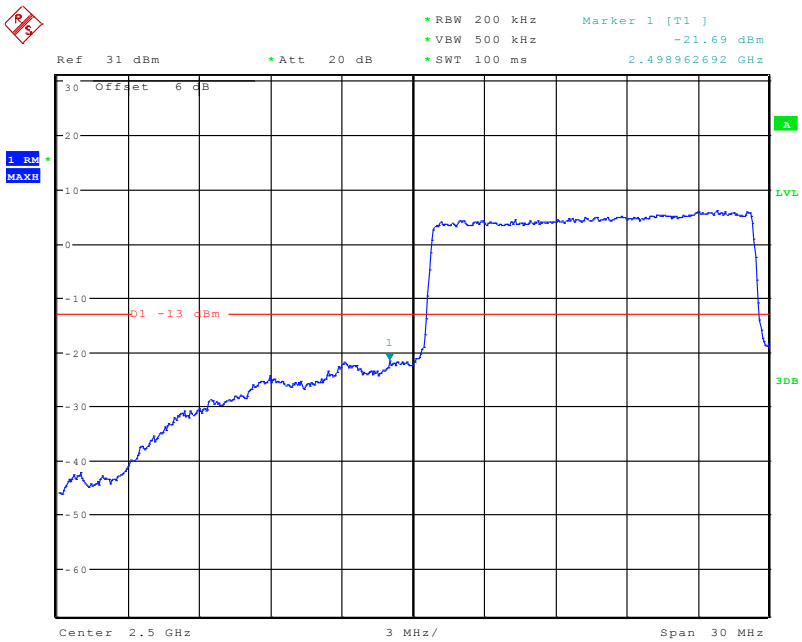
Date: 25.SEP.2019 21:15:13

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



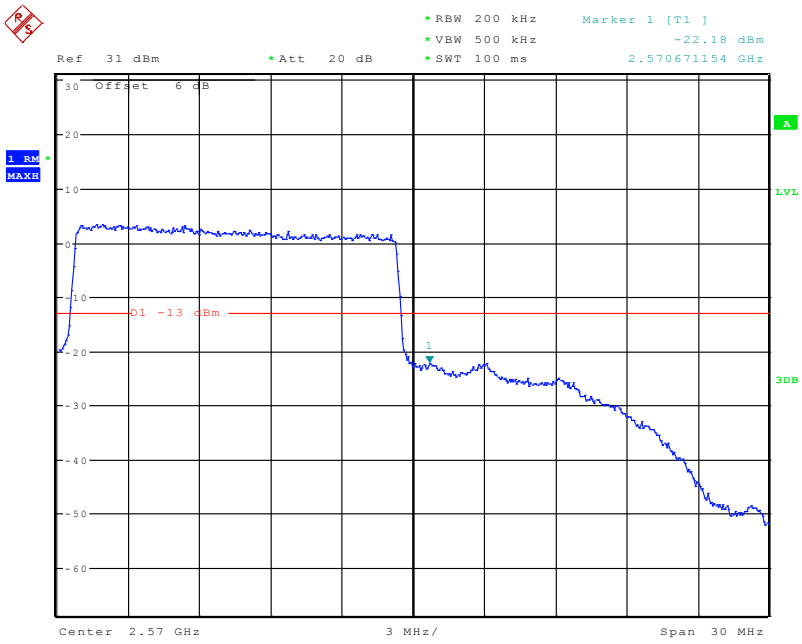
Date: 25.SEP.2019 21:15:47

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



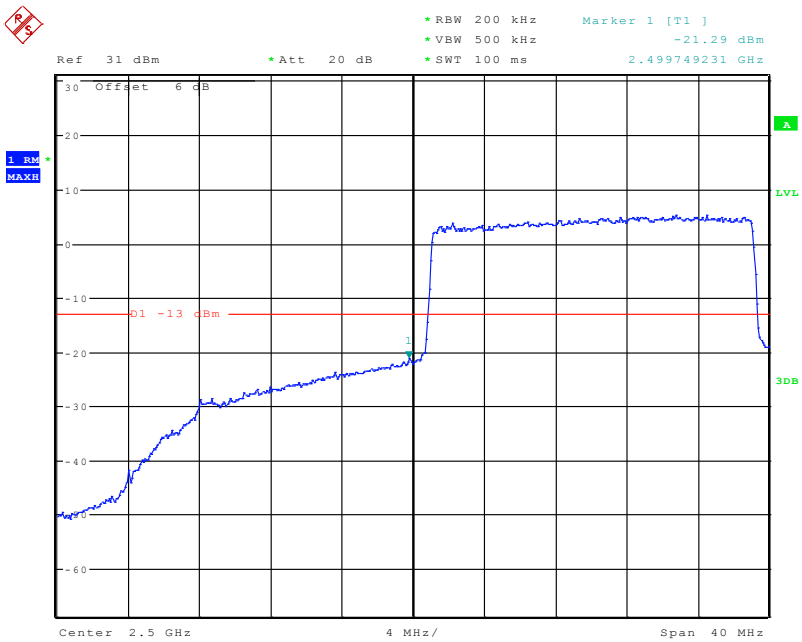
Date: 25.SEP.2019 21:14:58

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



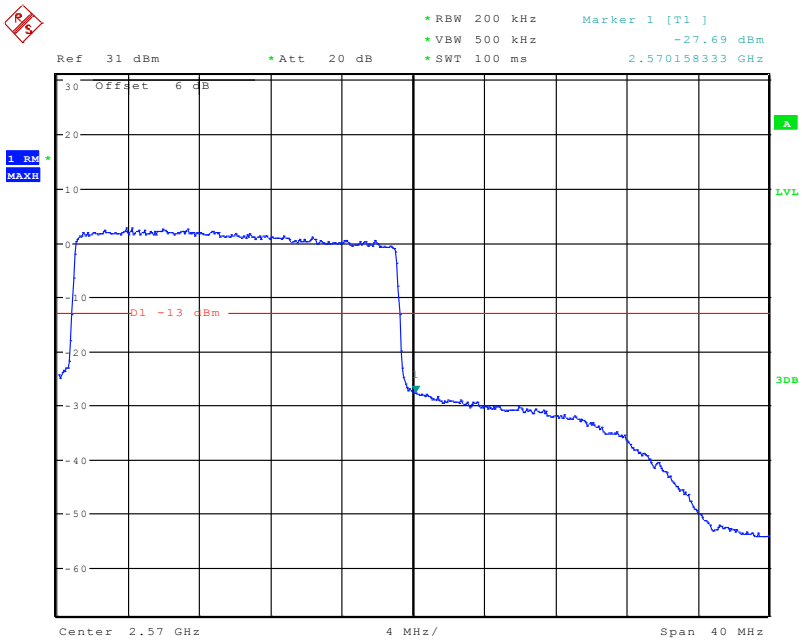
Date: 25.SEP.2019 21:16:12

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



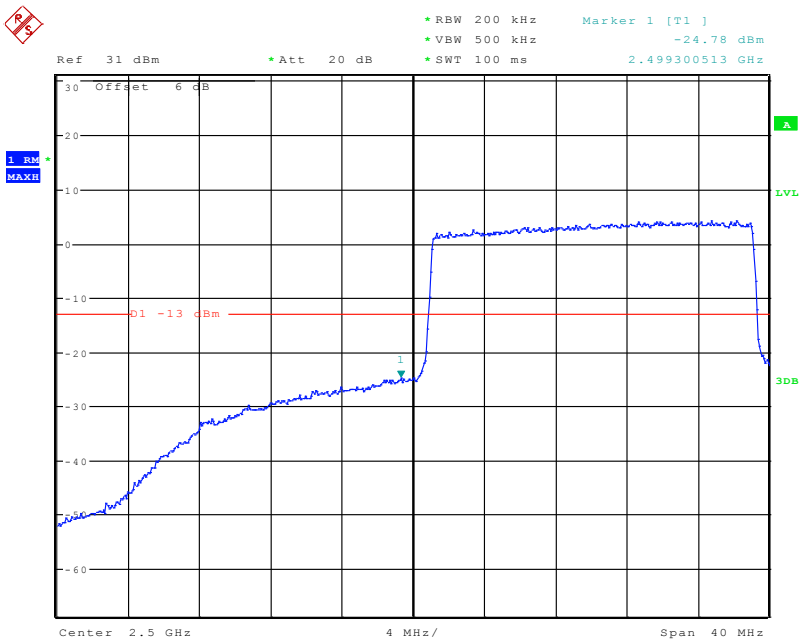
Date: 25.SEP.2019 21:25:28

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



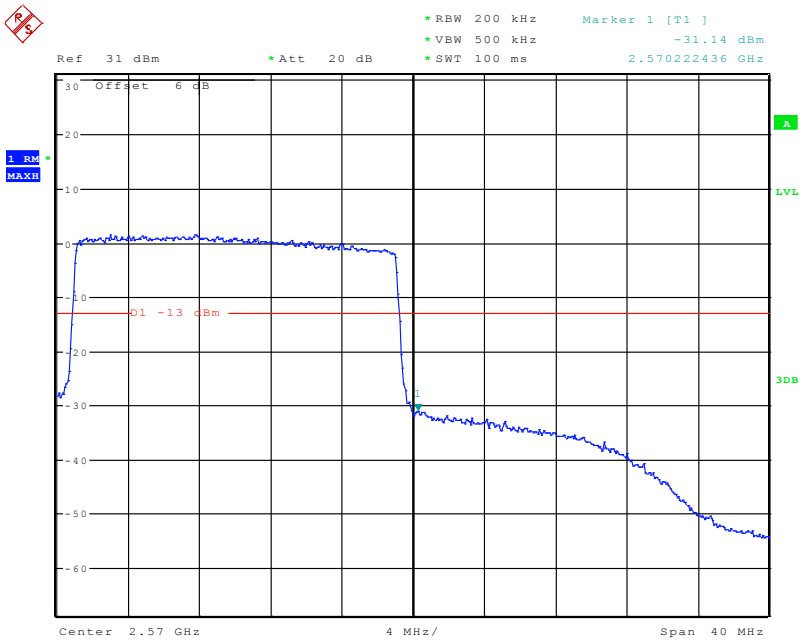
Date: 25.SEP.2019 21:25:06

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



Date: 25.SEP.2019 21:25:50

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



Date: 25.SEP.2019 21:24:44

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

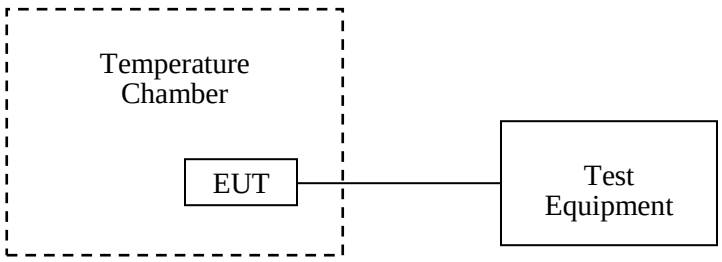
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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

The testing was performed by James Fu on 2019-09-25.

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	-17	-0.0203	2.5
-20		-15	-0.0179	2.5
-10		-13	-0.0155	2.5
0		-10	-0.0120	2.5
10		-11	-0.0131	2.5
20		-9	-0.0108	2.5
30		-8	-0.0096	2.5
40		-6	-0.0072	2.5
50		-4	-0.0048	2.5
20	V min.= 3.6	-2	-0.0024	2.5
	V max.= 4.3	1	0.0012	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	-17	-0.0203	2.5
-20		-14	-0.0167	2.5
-10		-11	-0.0131	2.5
0		-9	-0.0108	2.5
10		-8	-0.0096	2.5
20		-7	-0.0084	2.5
30		-5	-0.0060	2.5
40		-4	-0.0048	2.5
50		-2	-0.0024	2.5
20	V min.= 3.6	2	0.0024	2.5
	V max.= 4.3	6	0.0072	2.5

WCDMA Mode

Middle Channel, f_o =836.6MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	-16	-0.0191	2.5
-20		-14	-0.0167	2.5
-10		-11	-0.0131	2.5
0		-10	-0.0120	2.5
10		-8	-0.0096	2.5
20		-7	-0.0084	2.5
30		-5	-0.0060	2.5
40		-4	-0.0048	2.5
50		-1	-0.0012	2.5
20	V min.= 3.6	3	0.0036	2.5
	V max.= 4.3	4	0.0048	2.5

PCS Band (Part 24E)

GSM Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Result**
-30	3.8	11	0.0059	pass
-20		14	0.0074	pass
-10		17	0.0090	pass
0		19	0.0101	pass
10		22	0.0117	pass
20		27	0.0144	pass
30		29	0.0154	pass
40		31	0.0165	pass
50		34	0.0181	pass
20	V min.= 3.6	37	0.0197	pass
	V max.= 4.3	41	0.0218	pass

EDGE Mode

Middle Channel, f_o =1880.0 MHz				
Temperature (℃)	**Voltage Supplied (V_{DC})**	**Frequency Error (Hz)**	**Frequency Error (ppm)**	**Limit (ppm)**
-30	3.8	19	0.0101	pass
-20		22	0.0117	pass
-10		25	0.0133	pass
0		26	0.0138	pass
10		28	0.0149	pass
20		31	0.0165	pass
30		33	0.0176	pass
40		37	0.0197	pass
50		38	0.0202	pass
20	V min.= 3.6	41	0.0218	pass
	V max.= 4.3	43	0.0229	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	-15	-0.0080	pass
-20		-11	-0.0059	pass
-10		-6	-0.0032	pass
0		-5	-0.0027	pass
10		-4	-0.0021	pass
20		-3	-0.0016	pass
30		-2	-0.0011	pass
40		2	0.0011	pass
50		5	0.0027	pass
20	V min.= 3.6	7	0.0037	pass
	V max.= 4.3	9	0.0048	pass

LTE:
QPSK:

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	1710.5325	1754.7641	1710	1755
-20		1710.5331	1754.7662	1710	1755
-10		1710.5358	1754.7651	1710	1755
0		1710.5327	1754.7659	1710	1755
10		1710.5333	1754.7647	1710	1755
20		1710.5338	1754.7639	1710	1755
30		1710.5316	1754.7632	1710	1755
40		1710.5342	1754.7667	1710	1755
50		1710.5343	1754.7653	1710	1755
20	V min.= 3.6	1710.5315	1754.7658	1710	1755
	V max.= 4.3	1710.5370	1754.7643	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2500.4582	2569.7129	2500	2570
-20		2500.4588	2569.7108	2500	2570
-10		2500.4615	2569.7115	2500	2570
0		2500.4569	2569.7108	2500	2570
10		2500.4589	2569.7109	2500	2570
20		2500.4588	2569.7145	2500	2570
30		2500.4621	2569.7105	2500	2570
40		2500.4592	2569.7105	2500	2570
50		2500.4608	2569.7090	2500	2570
20	V min.= 3.6	2500.4578	2569.7116	2500	2570
	V max.= 4.3	2500.4576	2569.7100	2500	2570

16QAM:

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	1710.4876	1754.5302	1710	1755
-20		1710.4905	1754.5288	1710	1755
-10		1710.4890	1754.5296	1710	1755
0		1710.4878	1754.5279	1710	1755
10		1710.4885	1754.5278	1710	1755
20		1710.4915	1754.5272	1710	1755
30		1710.4901	1754.5284	1710	1755
40		1710.4881	1754.5290	1710	1755
50		1710.4912	1754.5309	1710	1755
20	V min.= 3.6	1710.4893	1754.5284	1710	1755
	V max.= 4.3	1710.4894	1754.5289	1710	1755

Band 7:

10 MHz Bandwidth					
Temperature (℃)	**Power Supplied (V_{DC})**	**F_L (MHz)**	**F_H (MHz)**	**F_L Limit (MHz)**	**F_H Limit (MHz)**
-30	3.8	2500.7231	2569.3356	2500	2570
-20		2500.7244	2569.3347	2500	2570
-10		2500.7259	2569.3366	2500	2570
0		2500.7233	2569.3340	2500	2570
10		2500.7245	2569.3353	2500	2570
20		2500.7252	2569.3374	2500	2570
30		2500.7246	2569.3351	2500	2570
40		2500.7267	2569.3349	2500	2570
50		2500.7238	2569.3345	2500	2570
20	V min.= 3.6	2500.7269	2569.3369	2500	2570
	V max.= 4.3	2500.7252	2569.3341	2500	2570

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