



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

For

**SHENZHEN UNITED TIME TECHNOLOGY
CO.,LTD.**

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FCC ID: ZXTIDONDRDOX1

Report Type: Original Report	Product Type: LTE mobile phone
Report Number: RGMA191128001-00D	
Report Date: 2020-04-07	
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product	LTE mobile phone
Tested Model	Discovery-X1
Frequency Range	EGSM 850: 824-849 MHz(TX); 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 4: 1710-1755 MHz(TX); 2110-2155 MHz(RX) WCDMA Band 5: 824-849 MHz(TX); 869-894 MHz(RX) CDMA BC0: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 4: 1710-1755 MHz(TX); 2110-2155 MHz(RX) LTE Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 7: 2500-2570MHz(TX); 2620-2690MHz(RX) LTE Band 17: 704-716MHz(TX); 734-746MHz(RX)
Conducted Tune Up Output Power	EGSM 850: 33dBm(GMSK), 28dBm(EDGE) PCS 1900: 29dBm(GMSK), 27dBm(EDGE) WCDMA Band 4: 22.5dBm WCDMA Band 5: 22.5dBm CDMA BC0: 23dBm(1XRTT), 22dBm(EVDO) LTE Band 4: 23.5dBm LTE Band 5: 23.5dBm LTE Band 7: 23.5dBm LTE Band 17: 23.0dBm
Antenna Specification	FPC Antennas
Voltage Range	DC 3.8 V from battery or DC 5V from adapter
Date of Test	2019-12-03 to 2020-04-07
Sample serial number	RGMA191128001-RF-S1 (Assigned by Applicant)
Received date	2019-11-28
Sample/EUT Status	Good condition
Adapter information	Model: LM-601E-050200U01CE Input: AC 100-240V, 50/60Hz, 0.35A Output: DC 5V, 2000mA

Objective

This test report is prepared on behalf of *SHENZHEN UNITED TIME TECHNOLOGY CO.,LTD.* in accordance with Part 2-Subpart J, Part 22-Subpart H and Part 24-Subpart E and Subpart 27 of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15.247 DSS, Part 15.247 DTS, Part 15.407 NII and Part 15B JBP submissions with FCC ID: ZXTIDONDRDOX1.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D.

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

Measurement Uncertainty

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

Note: 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.

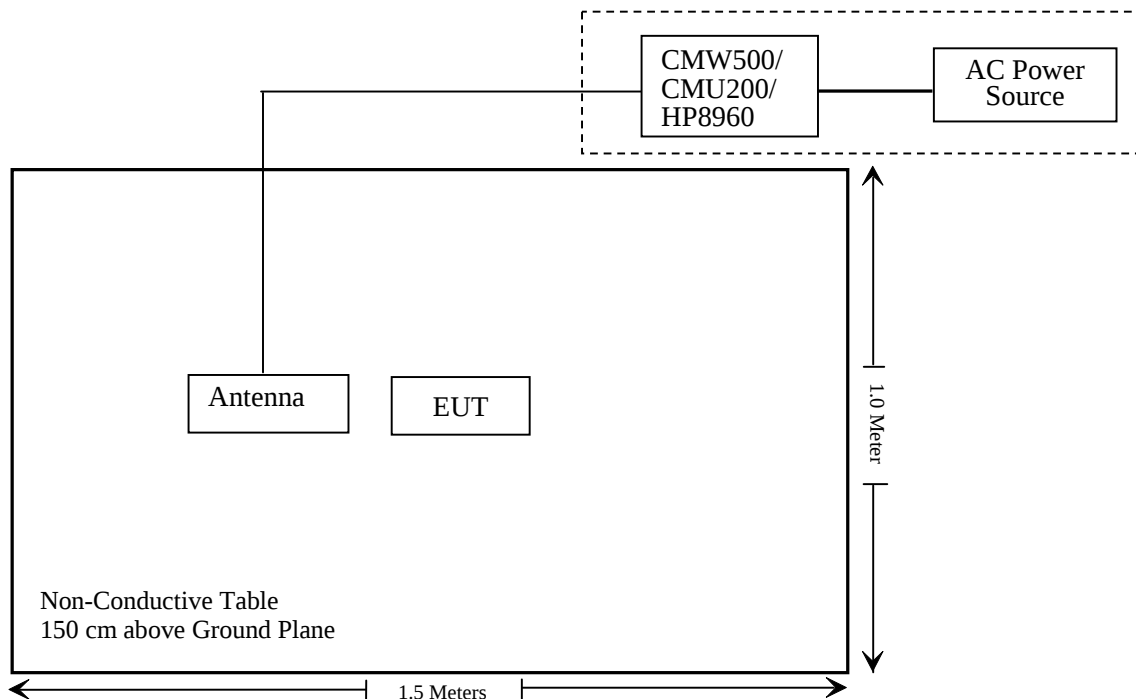
Equipment Modifications

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
Agilent	Wireless communication tester	HP8960	MY50266471

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

Note: * Please refer to SAR report released by BACL, report number: RGMA191128001-SAA.

TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Radiated Emission Test					
R&S	EMI Test Receiver	ESR3	102455	2019/7/9	2020/7/8
Sonoma instrument	Pre-amplifier	310 N	186238	2019/4/20	2020/4/20
Sunol Sciences	Broadband Antenna	JB1	A040904-1	2017/12/22	2020/12/21
COM-POWER	Dipole Antenna	AD-100	721027	NCR	NCR
Unknown	Cable 2	RF Cable 2	F-03-EM197	2019/11/29	2020/11/28
Unknown	Cable	Chamber Cable 1	F-03-EM236	2019/11/29	2020/11/28
Rohde & Schwarz	Spectrum Analyzer	FSV40-N	102259	2019/7/22	2020/07/21
COM-POWER	Pre-amplifier	PA-122	181919	2019/11/29	2020/11/28
Quinstar	Amplifier	QLW-18405536-J0	15964001002	2019/11/29	2020/11/28
Sunol Sciences	Horn Antenna	DRH-118	A052604	2017/12/22	2020/12/21
A.H.System	Horn Antenna	SAS-200/571	135	2018/9/1	2021/8/31
Insulted Wire Inc.	RF Cable	SPS-2503-3150	02222010	2019/11/29	2020/11/28
Unknown	RF Cable	W1101-EQ1 OUT	F-19-EM005	2019/11/29	2020/11/28
MICRO-TRONICS	Passband filter	HPM50111	F-19-EM006	2019/4/20	2020/4/20
Unknown	High Pass filter	1.3GHz	101120	2019/4/20	2020/4/20
Ducommun Technologies	Horn antenna	ARH-4223-02	1007726-02 1304	2017/12/6	2020/12/5
Agilent	Signal Generator	N5183A	MY51040755	2019/12/4	2020/12/4

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
RF Conducted Test					
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2019/3/2	2020/3/1
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200120	2020/3/2	2021/3/1
WEINSCHTEL	3dB Attenuator	Unknown	F-03-EM121	2019/11/29	2020/11/28
Unknown	RF Cable	Unknown	2301 276	2019/11/29	2020/11/28
Weinschel	Power divider	1515	RH386	2019/4/20	2020/4/20
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2019/3/2	2020/3/2
Rohde & Schwarz	SPECTRUM ANALYZER	FSU26	200982	2020/3/2	2021/3/2
Unknown	RF Cable	Unknown	DLO J5/W6102	2019/11/29	2020/11/28
Weinschel	Power divider	1515	MY628	2019/11/29	2020/11/28
Rohde & Schwarz	Universal Radio Communication Tester	CMU200	115500	2019/7/22	2020/7/21
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	1201.002K50-146520-wh	2019/7/9	2020/7/8
Agilent	Wireless communication tester	HP8960	MY50266471	2019/4/24	2020/4/24
instek	DC Power Supply	GPS-3030DD	EM832096	NCR	NCR
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2019/01/05	2020/01/05
ESPEC	Temperature & Humidity Chamber	EL-10KA	9107726	2020/01/05	2021/01/05
Fluke	Digital Multimeter	287	19000011	2019/04/12	2020/04/12

* 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: RGMA191128001-SAA.

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 (b) (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(b), Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

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.

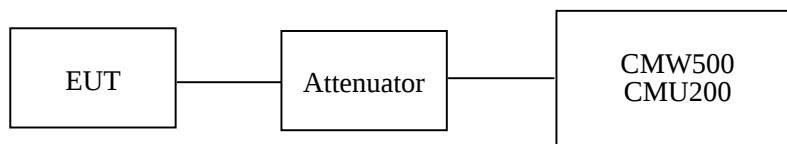
According to §27.50(d), the maximum EIRP must not exceed 1Watts (30dBm) for 1710-1755MHz.

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:	24~25 °C
Relative Humidity:	50~60 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Leo Huang, George Zhong, Charlie Cha and Zero Yan from 2019-12-03 to 2020-01-03.

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

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	128	824.2	32.54	38.45
	190	836.6	32.48	38.45
	251	848.8	32.37	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	128	824.2	32.54	30.53	28.38	27.03	38.45
	190	836.6	32.66	30.44	28.24	27.10	38.45
	251	848.8	32.48	30.45	28.29	27.08	38.45

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	128	824.2	27.32	25.18	23.83	21.15	38.45
	190	836.6	27.34	25.27	23.85	21.22	38.45
	251	848.8	27.68	25.15	23.97	21.18	38.45

2G:**RC1+SO55:**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
CDMA 1*RTT (BC0)	1013	824.70	22.28	38.45
	384	836.52	22.26	38.45
	777	848.31	22.24	38.45

RC3+SO55:

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
CDMA 1*RTT (BC0)	1013	824.70	22.23	38.45
	384	836.52	22.22	38.45
	777	848.31	22.28	38.45

RC3+SO32(FCH):

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
CDMA 1*RTT (BC0)	1013	824.70	22.22	38.45
	384	836.52	22.31	38.45
	777	848.31	22.28	38.45

RC3+SO32(SCH):

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
CDMA 1*RTT (BC0)	1013	824.70	22.24	38.45
	384	836.52	22.31	38.45
	777	848.31	22.56	38.45

3G:**RTAP 153.6kbps Subtype 0:**

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
CDMA EV-DO (BC0)	1013	824.70	21.23	38.45
	384	836.52	21.58	38.45
	777	848.31	21.11	38.45

RETAP 4096pbs Subtype 2:

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
CDMA EV-DO (BC0)	1013	824.70	21.19	38.45
	384	836.52	21.37	38.45
	777	848.31	21.28	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		22.10	21.97	22.14
		HSDPA	1	21.05	21.16	21.46
			2	21.02	21.04	21.38
			3	21.12	21.24	21.51
			4	21.00	21.07	21.39
		HSUPA	1	20.97	20.44	20.25
			2	20.94	20.37	20.18
			3	21.03	20.54	20.29
			4	20.89	20.39	20.16
			5	21.00	20.48	20.30
		HSPA+	1	20.88	20.69	20.81

PCS Band (Part 24E)

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)	Limit (dBm)
GSM	512	1850.2	29.85	33
	661	1880.0	29.79	33
	810	1909.8	29.65	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
GPRS	512	1850.2	29.77	28.14	26.87	24.57	33
	661	1880.0	29.65	28.25	26.91	24.65	33
	810	1909.8	29.64	28.18	26.95	24.78	33

Mode	Channel	Frequency (MHz)	Average Output Power (dBm)				Limit (dBm)
			1 slot	2 slots	3 slots	4 slots	
EGPRS	512	1850.2	26.47	24.58	22.16	20.68	33
	661	1880.0	26.58	24.48	22.38	20.59	33
	810	1909.8	26.55	24.62	22.25	20.48	33

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		22.12	22.43	22.46
		HSDPA	1	21.36	21.71	21.55
			2	21.33	21.68	21.46
			3	21.45	21.78	21.61
			4	21.30	21.59	21.48
		HSUPA	1	21.16	21.48	21.33
			2	21.17	21.44	21.20
			3	21.26	21.57	21.40
			4	21.12	21.36	21.22
			5	21.24	21.60	21.44
		HSPA+	1	21.02	21.22	21.13

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

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.67	13
	Middle	1.58	13
	High	1.49	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.52	13
	Middle	1.49	13
	High	1.33	13

Mode	Channel	PAR (dB)	Limit (dB)
CDMA 1*RTT (BC0)	Low	1.29	13
	Middle	1.38	13
	High	1.46	13

Mode	Channel	PAR (dB)	Limit (dB)
CDMA EV-DO (BC0)	Low	2.16	13
	Middle	2.13	13
	High	2.12	13

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.28	13
	Middle	3.65	13
	High	3.49	13
HSDPA (16QAM)	Low	3.16	13
	Middle	3.07	13
	High	3.08	13
HSUPA (BPSK)	Low	3.06	13
	Middle	3.15	13
	High	3.01	13
HSPA+	Low	3.16	13
	Middle	3.25	13
	High	3.29	13

PCS Band

Mode	Channel	PAR (dB)	Limit (dB)
GSM	Low	1.67	13
	Middle	1.58	13
	High	1.49	13

Mode	Channel	PAR (dB)	Limit (dB)
EGPRS	Low	1.58	13
	Middle	1.62	13
	High	1.53	13

AWS Band

Mode	Channel	PAR (dB)	Limit (dB)
RMC (BPSK)	Low	3.31	13
	Middle	3.66	13
	High	3.45	13
HSDPA (16QAM)	Low	3.13	13
	Middle	3.08	13
	High	3.14	13
HSUPA (BPSK)	Low	3.05	13
	Middle	3.17	13
	High	3.07	13
HSPA+	Low	3.21	13
	Middle	3.33	13
	High	3.13	13

Radiated Power**GSM Mode:**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
ERP for Cellular Band (Part 22H), Middle Channel										
836.6	79.98	309	1.1	H	20.6	1.90	0.0	18.70	38.45	19.75
836.6	88.59	323	1.8	V	28.6	1.90	0.0	26.70	38.45	11.75
EIRP for PCS Band (Part 24E), Middle Channel										
1880.00	85.72	173	2.2	H	16.0	1.30	9.40	24.10	33	8.90
1880.00	85.92	226	1.4	V	16.0	1.30	9.40	24.10	33	8.90

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	75.57	237	2.5	H	16.2	1.90	0.0	14.30	38.45	24.15
836.6	83.75	348	1.6	V	23.8	1.90	0.0	21.90	38.45	16.55
EIRP, PCS Band (Part 24E), Middle Channel										
1880.00	80.88	21	2.5	H	11.2	1.30	9.40	19.30	33	13.70
1880.00	81.25	133	1.4	V	11.4	1.30	9.40	19.50	33	13.50

CDMA 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 CDMA (1*RTT , BC0)										
836.52	78.03	35	2.0	H	18.7	1.90	0.0	16.80	38.45	21.65
836.52	72.36	355	1.4	V	12.4	1.90	0.0	10.50	38.45	27.95
EIRP for CDMA (EV-DO, BC0)										
836.52	79.59	85	1.3	H	20.2	1.90	0.0	18.30	38.45	20.15
836.52	72.87	129	1.8	V	12.9	1.90	0.0	11.00	38.45	27.45

WCDMA Mode:

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (m)	Polar (H/V)	Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
ERP for WCDMA Band V (Part 22H), Middle Channel										
836.6	72.62	347	1.3	H	13.2	1.90	0.0	11.30	38.45	27.15
836.6	79.99	76	2.5	V	20.0	1.90	0.0	18.10	38.45	20.35
EIRP for WCDMA Band IV (Part 27), Middle Channel										
1732.60	84.19	352	1.0	H	10.9	1.30	8.90	18.50	30	11.50
1732.60	83.82	168	1.3	V	11.1	1.30	8.90	18.70	30	11.30

Note:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

dBd is for the ERP, dBi is for EIRP.

LTE Band 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	22.28	22.30	22.48
		RB Size=1, RB Offset=2	22.62	22.82	22.61
		RB Size=1, RB Offset=5	22.33	21.26	22.51
		RB Size=3, RB Offset=0	22.60	22.53	22.54
		RB Size=3, RB Offset=1	22.44	22.50	22.68
		RB Size=3, RB Offset=2	22.49	22.38	22.40
		RB Size=6, RB Offset=0	21.83	21.14	21.49
	16QAM	RB Size=1, RB Offset=0	21.14	21.80	21.81
		RB Size=1, RB Offset=2	21.04	21.19	21.94
		RB Size=1, RB Offset=5	21.79	21.52	21.33
		RB Size=3, RB Offset=0	22.68	21.73	21.70
		RB Size=3, RB Offset=1	22.74	21.16	21.48
		RB Size=3, RB Offset=2	22.08	21.65	21.55
		RB Size=6, RB Offset=0	20.61	20.25	20.37
3.0	QPSK	RB Size=1, RB Offset=0	22.76	22.88	22.74
		RB Size=1, RB Offset=7	22.63	22.73	22.68
		RB Size=1, RB Offset=14	22.61	22.7	22.61
		RB Size=8, RB Offset=0	21.86	21.9	21.87
		RB Size=8, RB Offset=4	21.71	21.73	21.63
		RB Size=8, RB Offset=7	21.53	21.47	21.53
		RB Size=15, RB Offset=0	21.5	21.57	21.42
	16QAM	RB Size=1, RB Offset=0	21.44	21.34	21.47
		RB Size=1, RB Offset=7	21.47	21.39	21.52
		RB Size=1, RB Offset=14	21.37	21.35	21.44
		RB Size=8, RB Offset=0	20.76	20.74	20.81
		RB Size=8, RB Offset=4	20.65	20.52	20.61
		RB Size=8, RB Offset=7	20.57	20.5	20.48
		RB Size=15, RB Offset=0	20.54	20.4	20.53

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	22.63	22.61
		RB Size=1, RB Offset=12	22.82	22.75	22.7
		RB Size=1, RB Offset=24	22.83	22.77	22.76
		RB Size=12, RB Offset=0	21.63	21.56	21.69
		RB Size=12, RB Offset=6	21.72	21.54	21.63
		RB Size=12, RB Offset=11	21.8	21.84	21.71
		RB Size=25, RB Offset=0	21.74	21.8	21.81
	16QAM	RB Size=1, RB Offset=0	21.79	21.7	21.73
		RB Size=1, RB Offset=12	21.84	21.92	21.99
		RB Size=1, RB Offset=24	21.34	21.67	21.43
		RB Size=12, RB Offset=0	20.77	20.95	20.79
		RB Size=12, RB Offset=6	20.70	20.86	20.82
		RB Size=12, RB Offset=11	20.71	20.66	20.61
		RB Size=25, RB Offset=0	20.65	20.61	20.59
10.0	QPSK	RB Size=1, RB Offset=0	22.46	22.43	22.40
		RB Size=1, RB Offset=24	22.2	22.09	22.33
		RB Size=1, RB Offset=49	22.07	22.03	21.92
		RB Size=25, RB Offset=0	21.76	21.8	21.61
		RB Size=25, RB Offset=12	21.63	21.68	21.63
		RB Size=25, RB Offset=24	21.62	21.64	21.73
		RB Size=50, RB Offset=0	21.57	21.6	21.59
	16QAM	RB Size=1, RB Offset=0	22.67	22.57	22.63
		RB Size=1, RB Offset=24	22.48	22.41	22.54
		RB Size=1, RB Offset=49	22.02	22.06	22.07
		RB Size=25, RB Offset=0	20.71	20.51	20.73
		RB Size=25, RB Offset=12	20.86	21	20.92
		RB Size=25, RB Offset=24	20.91	20.99	21.02
		RB Size=50, RB Offset=0	20.93	21.05	21.07

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	22.56	22.67	22.72
		RB Size=1, RB Offset=37	22.87	22.74	22.98
		RB Size=1, RB Offset=74	22.97	22.99	22.93
		RB Size=36, RB Offset=0	21.46	21.56	21.35
		RB Size=36, RB Offset=18	21.29	21.24	21.24
		RB Size=36, RB Offset=37	21.11	20.9	21.03
		RB Size=75, RB Offset=0	21.12	21.22	21.05
	16QAM	RB Size=1, RB Offset=0	21.09	20.89	21.14
		RB Size=1, RB Offset=37	21.05	21.08	20.94
		RB Size=1, RB Offset=74	21.04	20.59	20.94
		RB Size=36, RB Offset=0	20.71	20.68	20.64
		RB Size=36, RB Offset=18	20.6	20.56	20.43
		RB Size=36, RB Offset=37	20.7	20.7	20.66
		RB Size=75, RB Offset=0	20.67	20.6	20.57
20.0	QPSK	RB Size=1, RB Offset=0	22.84	22.85	22.87
		RB Size=1, RB Offset=49	22.98	22.81	22.98
		RB Size=1, RB Offset=99	22.97	22.49	23.07
		RB Size=50, RB Offset=0	21.58	21.55	21.52
		RB Size=50, RB Offset=24	21.30	21.45	21.40
		RB Size=50, RB Offset=49	21.19	21.23	21.03
		RB Size=100, RB Offset=0	21.09	20.98	21.17
	16QAM	RB Size=1, RB Offset=0	22.58	22.33	22.58
		RB Size=1, RB Offset=49	22.54	22.68	22.44
		RB Size=1, RB Offset=99	21.07	21.13	21.06
		RB Size=50, RB Offset=0	20.98	20.8	21.12
		RB Size=50, RB Offset=24	21.02	20.74	20.94
		RB Size=50, RB Offset=49	20.28	20.13	20.37
		RB Size=100, RB Offset=0	20.25	19.95	20.24

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.64	13	Pass
QPSK (100RB Size)	4.53	13	Pass
16QAM (1RB Size)	5.78	13	Pass
16QAM (100RB Size)	5.62	13	Pass

QPSK:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	85.22	83	1.9	H	11.9	1.30	8.90	19.50	30
1732.50	84.87	291	2.1	V	12.1	1.30	8.90	19.70	30
3 MHz Bandwidth									
1732.50	84.28	322	1.6	H	11.0	1.30	8.90	18.60	30
1732.50	83.67	327	2.0	V	10.9	1.30	8.90	18.50	30
5 MHz Bandwidth									
1732.50	85.01	184	1.2	H	11.7	1.30	8.90	19.30	30
1732.50	84.62	347	1.9	V	11.9	1.30	8.90	19.50	30
10 MHz Bandwidth									
1732.50	84.62	28	2.0	H	11.3	1.30	8.90	18.90	30
1732.50	84.07	314	1.4	V	11.3	1.30	8.90	18.90	30
15 MHz Bandwidth									
1732.50	84.87	156	1.8	H	11.5	1.30	8.90	19.10	30
1732.50	84.38	234	1.6	V	11.7	1.30	8.90	19.30	30
20 MHz Bandwidth									
1732.50	84.51	253	1.5	H	11.2	1.30	8.90	18.80	30
1732.50	83.87	43	1.2	V	11.1	1.30	8.90	18.70	30

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
1.4 MHz Bandwidth									
1732.50	85.13	345	1.5	H	11.8	1.30	8.90	19.40	30
1732.50	84.71	216	2.3	V	12.0	1.30	8.90	19.60	30
3 MHz Bandwidth									
1732.50	84.43	262	2.1	H	11.1	1.30	8.90	18.70	30
1732.50	83.81	99	2.2	V	11.1	1.30	8.90	18.70	30
5 MHz Bandwidth									
1732.50	84.92	358	1.6	H	11.6	1.30	8.90	19.20	30
1732.50	84.53	360	1.2	V	11.8	1.30	8.90	19.40	30
10 MHz Bandwidth									
1732.50	84.72	73	1.4	H	11.4	1.30	8.90	19.00	30
1732.50	84.13	92	2.4	V	11.4	1.30	8.90	19.00	30
15 MHz Bandwidth									
1732.50	84.62	130	1.2	H	11.3	1.30	8.90	18.90	30
1732.50	84.17	170	2.3	V	11.4	1.30	8.90	19.00	30
20 MHz Bandwidth									
1732.50	84.38	330	1.6	H	11.1	1.30	8.90	18.70	30
1732.50	83.62	30	2.2	V	10.9	1.30	8.90	18.50	30

LTE Band 5:**Maximum Output Power**

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4	QPSK	RB Size=1, RB Offset=0	22.61	22.49	22.6
		RB Size=1, RB Offset=2	22.83	22.95	22.77
		RB Size=1, RB Offset=5	22.98	23.00	23.15
		RB Size=3, RB Offset=0	22.88	22.98	22.95
		RB Size=3, RB Offset=1	22.94	23.19	22.93
		RB Size=3, RB Offset=2	22.88	22.82	22.87
		RB Size=6, RB Offset=0	22.95	22.56	23.02
	16QAM	RB Size=1, RB Offset=0	22.69	22.40	22.16
		RB Size=1, RB Offset=2	21.37	21.41	21.25
		RB Size=1, RB Offset=5	21.51	21.41	21.60
		RB Size=3, RB Offset=0	21.46	21.56	21.42
		RB Size=3, RB Offset=1	21.47	21.46	21.54
		RB Size=3, RB Offset=2	21.42	21.4	21.44
		RB Size=6, RB Offset=0	21.44	21.29	21.52
3.0	QPSK	RB Size=1, RB Offset=0	22.18	22.22	22.15
		RB Size=1, RB Offset=7	22.3	22.3	22.19
		RB Size=1, RB Offset=14	22.34	22.32	22.21
		RB Size=8, RB Offset=0	21.28	21.41	21.14
		RB Size=8, RB Offset=4	21.35	21.27	21.41
		RB Size=8, RB Offset=7	21.27	21.32	21.14
		RB Size=15, RB Offset=0	21.21	21.36	21.16
	16QAM	RB Size=1, RB Offset=0	22.37	22.21	22.40
		RB Size=1, RB Offset=7	22.35	22.10	22.19
		RB Size=1, RB Offset=14	22.30	22.00	22.36
		RB Size=8, RB Offset=0	20.58	20.39	20.62
		RB Size=8, RB Offset=4	20.33	20.37	20.28
		RB Size=8, RB Offset=7	20.30	20.14	20.35
		RB Size=15, RB Offset=0	20.26	20.17	20.44

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5.0	QPSK	RB Size=1, RB Offset=0	22.18	22.11	22.25
		RB Size=1, RB Offset=12	22.34	22.47	22.38
		RB Size=1, RB Offset=24	22.31	22.23	22.27
		RB Size=12, RB Offset=0	21.49	21.37	21.51
		RB Size=12, RB Offset=6	21.35	21.18	21.41
		RB Size=12, RB Offset=11	21.34	21.36	21.27
		RB Size=25, RB Offset=0	21.42	21.4	21.43
	16QAM	RB Size=1, RB Offset=0	21.48	21.49	21.44
		RB Size=1, RB Offset=12	21.53	21.45	21.42
		RB Size=1, RB Offset=24	21.88	21.27	21.83
		RB Size=12, RB Offset=0	20.52	20.59	20.52
		RB Size=12, RB Offset=6	20.57	20.58	20.46
		RB Size=12, RB Offset=11	20.61	20.58	20.57
		RB Size=25, RB Offset=0	20.59	20.13	20.58
10.0	QPSK	RB Size=1, RB Offset=0	22.3	22.34	22.4
		RB Size=1, RB Offset=24	22.22	22.22	22.27
		RB Size=1, RB Offset=49	22.33	22.00	22.37
		RB Size=25, RB Offset=0	21.43	21.5	21.51
		RB Size=25, RB Offset=12	21.64	21.56	21.61
		RB Size=25, RB Offset=24	21.6	21.65	21.51
		RB Size=50, RB Offset=0	21.52	21.4	21.57
	16QAM	RB Size=1, RB Offset=0	21.42	21.38	21.42
		RB Size=1, RB Offset=24	21.49	21.53	21.55
		RB Size=1, RB Offset=49	21.44	21.51	21.45
		RB Size=25, RB Offset=0	20.37	20.29	20.31
		RB Size=25, RB Offset=12	20.41	20.42	20.52
		RB Size=25, RB Offset=24	20.27	20.36	20.31
		RB Size=50, RB Offset=0	20.26	20.21	20.3

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.09	13	Pass
QPSK (50RB Size)	4.35	13	Pass
16QAM (1RB Size)	5.01	13	Pass
16QAM (50RB Size)	4.93	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	73.69	11	2.3	H	14.3	1.90	0.0	12.40	38.45
836.5	80.68	181	1.7	V	20.7	1.90	0.0	18.80	38.45
3 MHz Bandwidth									
836.5	73.21	4	2.2	H	13.8	1.90	0.0	11.90	38.45
836.5	80.07	297	1.5	V	20.1	1.90	0.0	18.20	38.45
5 MHz Bandwidth									
836.5	73.52	323	1.5	H	14.1	1.90	0.0	12.20	38.45
836.5	80.57	14	1.1	V	20.6	1.90	0.0	18.70	38.45
10 MHz Bandwidth									
836.5	72.88	44	1.5	H	13.5	1.90	0.0	11.60	38.45
836.5	79.58	253	1.6	V	19.6	1.90	0.0	17.70	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	73.52	48	1.7	H	14.1	1.90	0.0	12.20	38.45
836.5	80.03	79	1.5	V	20.0	1.90	0.0	18.10	38.45
3 MHz Bandwidth									
836.5	72.87	257	1.1	H	13.5	1.90	0.0	11.60	38.45
836.5	79.51	267	2.1	V	19.5	1.90	0.0	17.60	38.45
5 MHz Bandwidth									
836.5	73.18	205	2.2	H	13.8	1.90	0.0	11.90	38.45
836.5	79.86	18	2.5	V	19.9	1.90	0.0	18.00	38.45
10 MHz Bandwidth									
836.5	72.14	155	1.9	H	12.8	1.90	0.0	10.90	38.45
836.5	79.29	26	1.1	V	19.3	1.90	0.0	17.40	38.45

LTE Band 7:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.33	22.33	22.38
		RB Size=1, RB Offset=12	22.35	22.49	22.52
		RB Size=1, RB Offset=24	22.54	22.59	22.45
		RB Size=12, RB Offset=0	21.34	21.21	21.49
		RB Size=12, RB Offset=6	21.6	21.53	21.55
		RB Size=12, RB Offset=11	22.09	21.12	21.41
		RB Size=25, RB Offset=0	21.07	21.34	22.22
	16QAM	RB Size=1, RB Offset=0	22.21	21.67	22.02
		RB Size=1, RB Offset=12	22.38	21.76	22.05
		RB Size=1, RB Offset=24	22.50	21.93	22.23
		RB Size=12, RB Offset=0	21.73	20.90	21.22
		RB Size=12, RB Offset=6	21.60	21.08	21.20
		RB Size=12, RB Offset=11	21.54	20.97	21.34
		RB Size=25, RB Offset=0	21.09	20.73	20.59
10	QPSK	RB Size=1, RB Offset=0	22.52	22.63	22.65
		RB Size=1, RB Offset=24	22.47	22.66	22.41
		RB Size=1, RB Offset=49	22.46	22.35	22.64
		RB Size=25, RB Offset=0	21.34	21.45	21.37
		RB Size=25, RB Offset=12	21.66	21.62	21.65
		RB Size=25, RB Offset=24	21.72	21.9	21.68
		RB Size=50, RB Offset=0	21.71	21.54	21.54
	16QAM	RB Size=1, RB Offset=0	21.75	21.75	21.72
		RB Size=1, RB Offset=24	21.69	21.68	21.64
		RB Size=1, RB Offset=49	21.62	21.59	21.65
		RB Size=25, RB Offset=0	21.54	21.65	21.31
		RB Size=25, RB Offset=12	21.05	21.05	21.19
		RB Size=25, RB Offset=24	21.36	21.48	21.76
		RB Size=50, RB Offset=0	21.13	21.58	20.39

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15	QPSK	RB Size=1, RB Offset=0	22.36	22.42	22.23
		RB Size=1, RB Offset=37	22.33	22.49	22.37
		RB Size=1, RB Offset=74	22.39	22.38	22.25
		RB Size=36, RB Offset=0	21.49	21.6	21.44
		RB Size=36, RB Offset=18	21.45	21.01	21.51
		RB Size=36, RB Offset=37	22.33	22.17	22.28
		RB Size=75, RB Offset=0	22.27	22.58	22.14
	16QAM	RB Size=1, RB Offset=0	21.43	21.25	21.32
		RB Size=1, RB Offset=37	21.54	21.55	21.37
		RB Size=1, RB Offset=74	21.45	21.49	21.54
		RB Size=36, RB Offset=0	21.63	21.62	21.59
		RB Size=36, RB Offset=18	21.62	21.7	21.69
		RB Size=36, RB Offset=37	21.65	21.54	21.74
		RB Size=75, RB Offset=0	20.64	20.49	21.97
20	QPSK	RB Size=1, RB Offset=0	22.86	22.96	22.71
		RB Size=1, RB Offset=49	23.02	22.99	23.06
		RB Size=1, RB Offset=99	22.91	22.69	22.85
		RB Size=50, RB Offset=0	21.89	21.85	21.95
		RB Size=50, RB Offset=24	21.84	21.89	21.96
		RB Size=50, RB Offset=49	22.01	21.94	22.07
		RB Size=100, RB Offset=0	22.61	22.55	22.65
	16QAM	RB Size=1, RB Offset=0	22.18	22.28	22.19
		RB Size=1, RB Offset=49	21.84	21.87	21.81
		RB Size=1, RB Offset=99	21.94	21.84	21.94
		RB Size=50, RB Offset=0	21.85	21.72	21.97
		RB Size=50, RB Offset=24	21.87	21.87	21.84
		RB Size=50, RB Offset=49	21.81	21.94	21.96
		RB Size=100, RB Offset=0	21.71	21.77	21.74

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.98	13	Pass
QPSK (100RB Size)	4.39	13	Pass
16QAM (1RB Size)	5.83	13	Pass
16QAM (100RB Size)	5.64	13	Pass

EIRP:**QPSK:**

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	81.62	340	1.3	H	11.5	2.60	10.20	19.10	33
2535.00	80.88	7	1.5	V	11.3	2.60	10.20	18.90	33
10 MHz Bandwidth									
2535.00	80.77	283	1.7	H	10.6	2.60	10.20	18.20	33
2535.00	80.13	232	2.3	V	10.6	2.60	10.20	18.20	33
15 MHz Bandwidth									
2535.00	81.11	322	2.4	H	10.9	2.60	10.20	18.50	33
2535.00	80.52	210	2.3	V	11.0	2.60	10.20	18.60	33
20 MHz Bandwidth									
2535.00	80.82	288	1.8	H	10.7	2.60	10.20	18.30	33
2535.00	80.27	272	1.5	V	10.7	2.60	10.20	18.30	33

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
2535.00	81.53	268	2.3	H	11.4	2.60	10.20	19.00	33
2535.00	80.72	128	2.5	V	11.2	2.60	10.20	18.80	33
10 MHz Bandwidth									
2535.00	80.92	35	1.8	H	10.8	2.60	10.20	18.40	33
2535.00	80.52	249	1.5	V	11.0	2.60	10.20	18.60	33
15 MHz Bandwidth									
2535.00	80.83	213	2.5	H	10.7	2.60	10.20	18.30	33
2535.00	80.07	151	2.2	V	10.5	2.60	10.20	18.10	33
20 MHz Bandwidth									
2535.00	80.71	274	1.6	H	10.5	2.60	10.20	18.10	33
2535.00	80.16	175	1.2	V	10.6	2.60	10.20	18.20	33

LTE Band 17:

Bandwidth (MHz)	Modulation	RB size/RB Offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5	QPSK	RB Size=1, RB Offset=0	22.69	22.42	22.42
		RB Size=1, RB Offset=12	22.62	22.29	22.37
		RB Size=1, RB Offset=24	22.44	22.10	22.13
		RB Size=12, RB Offset=0	21.82	21.88	21.92
		RB Size=12, RB Offset=6	21.81	21.82	21.89
		RB Size=12, RB Offset=11	21.75	21.76	21.74
		RB Size=25, RB Offset=0	21.81	21.51	22.31
	16QAM	RB Size=1, RB Offset=0	22.34	22.22	22.25
		RB Size=1, RB Offset=12	22.20	22.28	22.13
		RB Size=1, RB Offset=24	22.06	22.23	21.89
		RB Size=12, RB Offset=0	21.05	21.02	21.02
		RB Size=12, RB Offset=6	21.25	21.21	21.17
		RB Size=12, RB Offset=11	20.96	21.03	20.84
		RB Size=25, RB Offset=0	20.90	20.79	20.76
10	QPSK	RB Size=1, RB Offset=0	22.68	22.43	22.44
		RB Size=1, RB Offset=24	22.61	22.26	22.33
		RB Size=1, RB Offset=49	22.45	22.13	22.14
		RB Size=25, RB Offset=0	21.81	21.92	21.93
		RB Size=25, RB Offset=12	21.81	21.81	21.89
		RB Size=25, RB Offset=24	21.75	21.77	21.73
		RB Size=50, RB Offset=0	21.81	21.52	22.25
	16QAM	RB Size=1, RB Offset=0	22.29	22.24	22.30
		RB Size=1, RB Offset=24	22.24	22.23	22.13
		RB Size=1, RB Offset=49	22.04	22.22	21.85
		RB Size=25, RB Offset=0	21.05	21.04	21.03
		RB Size=25, RB Offset=12	21.28	21.17	21.18
		RB Size=25, RB Offset=24	21.01	21.04	20.79
		RB Size=50, RB Offset=0	20.89	20.78	20.79

Peak-to-average ratio (PAR)

Modulation	Middle Channel (dB)	PAR Limit (dB)	Result
QPSK (1RB Size)	4.36	13	Pass
QPSK (50RB Size)	4.58	13	Pass
16QAM (1RB Size)	5.45	13	Pass
16QAM (50RB Size)	5.67	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									
710	76.03	70	1.2	H	8.2	1.56	0.0	6.64	34.77
710	86.63	59	1.1	V	20.3	1.56	0.0	18.74	34.77
10 MHz Bandwidth									
710	76.58	271	1.6	H	8.8	1.56	0.0	7.24	34.77
710	86.15	284	1.2	V	19.8	1.56	0.0	18.24	34.77

16QAM:

Frequency (MHz)	Receiver Reading (dBμV)	Turn table Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBi)		
Middle Channel									
5 MHz Bandwidth									
710	76.39	159	2.3	H	8.6	1.56	0.0	7.04	34.77
710	86.42	255	1.7	V	20.1	1.56	0.0	18.54	34.77
10 MHz Bandwidth									
710	75.11	228	2.0	H	7.3	1.56	0.0	5.74	34.77
710	84.42	356	2.5	V	18.1	1.56	0.0	16.54	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

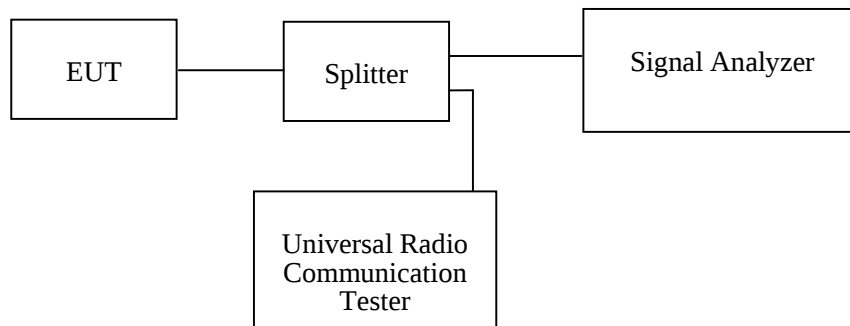
Applicable Standard

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

The testing was performed by Leo Huang and George Zhong from 2019-12-03 to 2020-03-13.

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	317.31
EGPRS(8PSK)	836.6	250.00	320.51

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
CDMA (1*RTT) BC0	836.52	1.28	1.44
CDMA (EV-DO) BC0	836.52	1.27	1.44

Mode	Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
RMC (BPSK)	836.6	4.17	4.70
HSUPA (BPSK)	836.6	4.18	4.70
HSDPA (16QAM)	836.6	4.18	4.71

PCS Band (Part 24E)

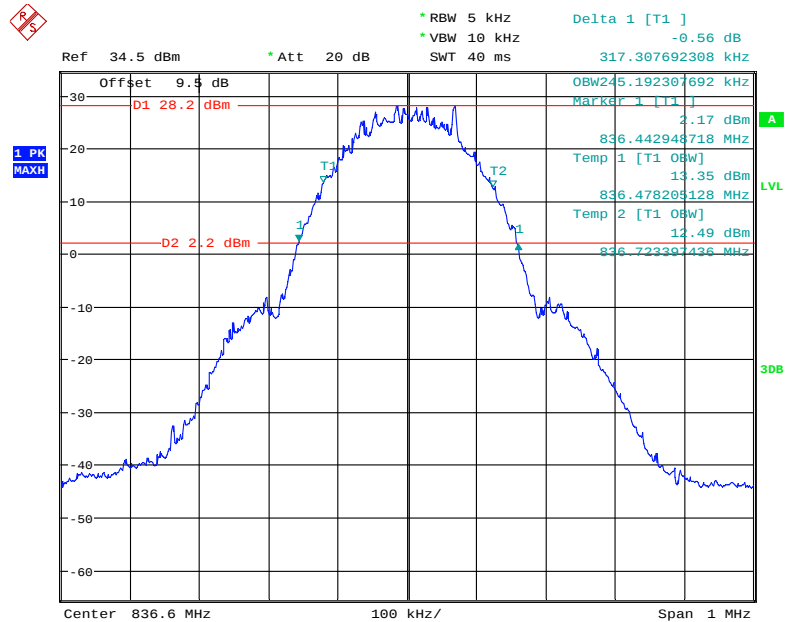
Mode	Frequency (MHz)	99% Occupied Bandwidth (kHz)	26 dB Emission Bandwidth (kHz)
GSM(GMSK)	1880.0	245.19	314.10
EGPRS(8PSK)	1880.0	253.21	323.72

AWS Band (Part 27)

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

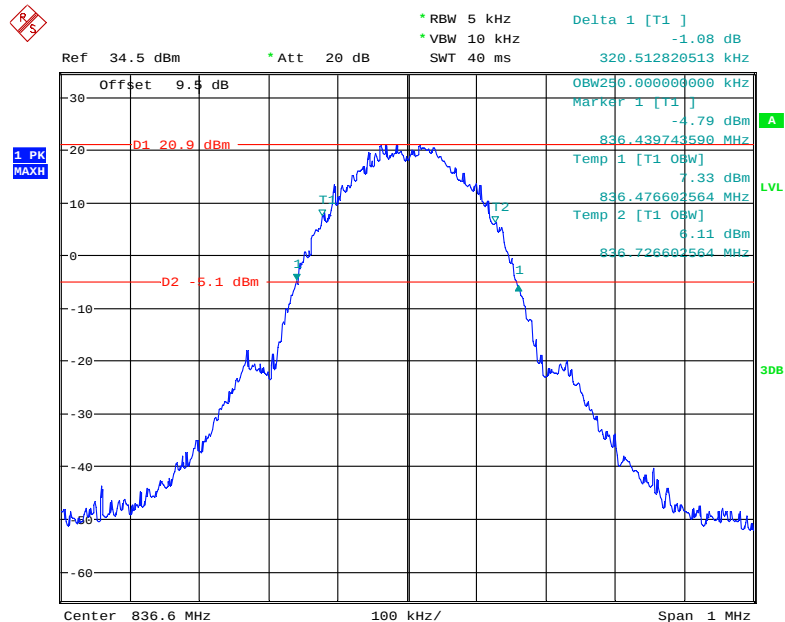
Cellular Band (Part 22H)

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



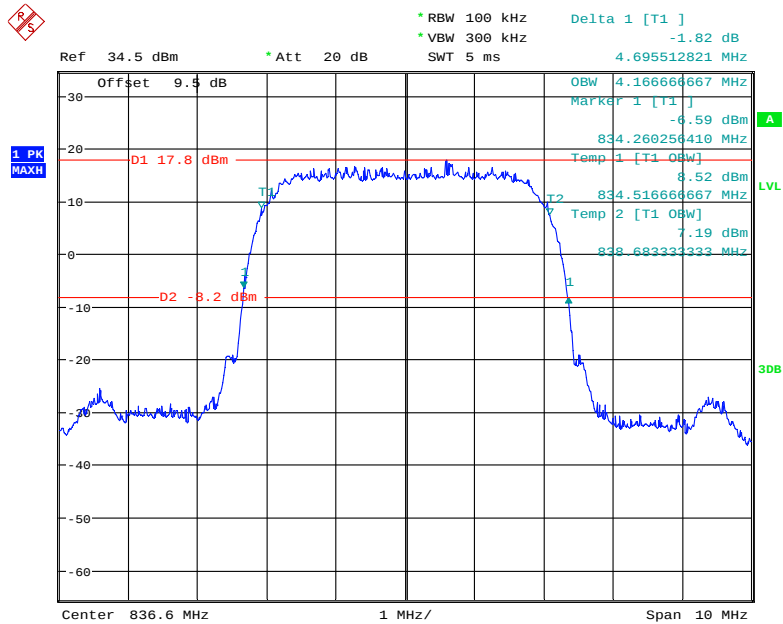
Date: 3.DEC.2019 22:18:59

26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode



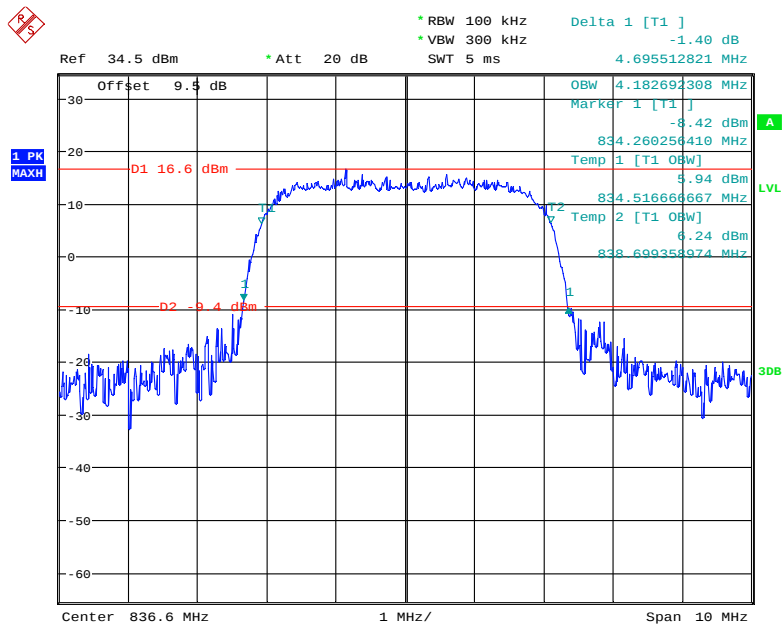
Date: 3.DEC.2019 22:39:39

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



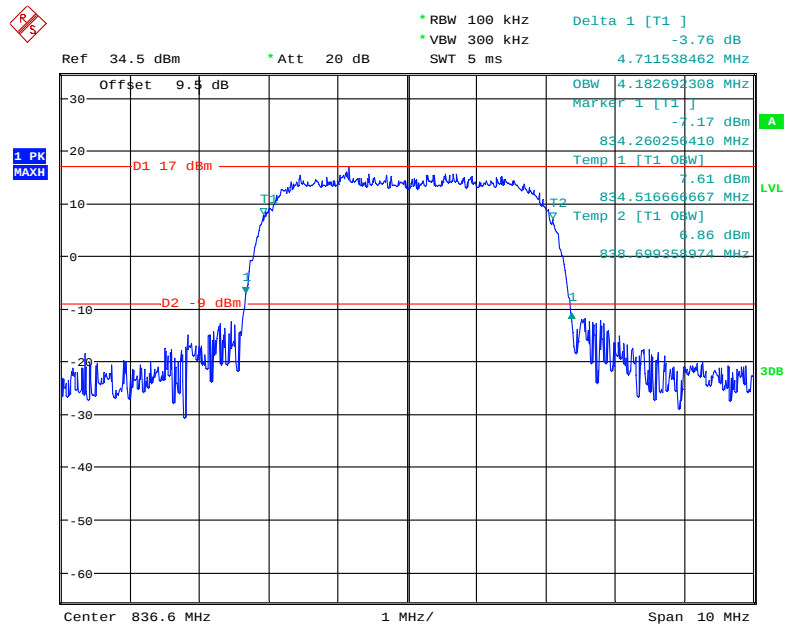
Date: 16.DEC.2019 21:14:39

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



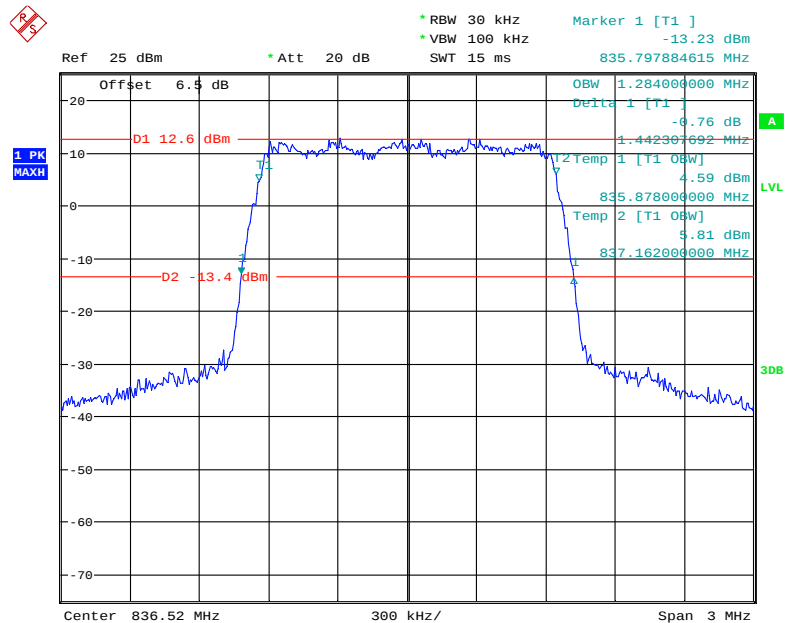
Date: 16.DEC.2019 21:10:37

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



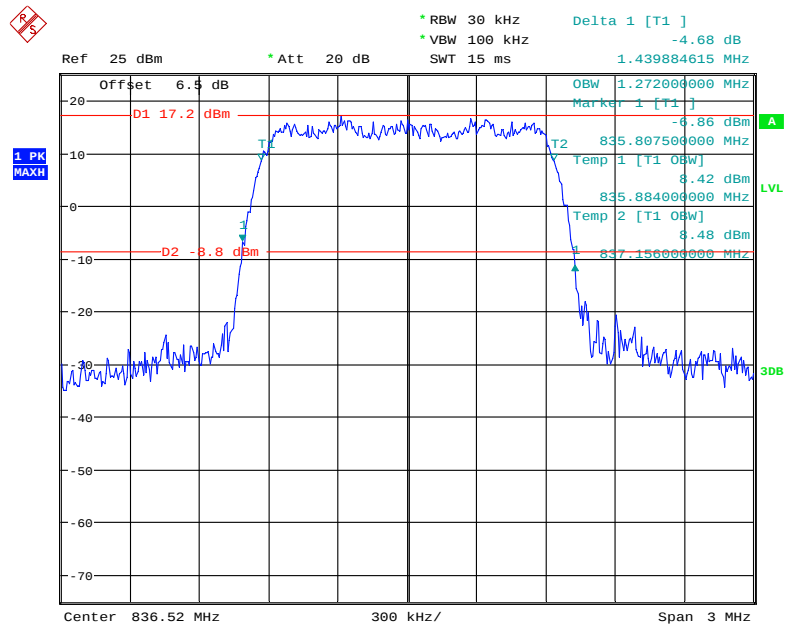
Date: 16.DEC.2019 21:08:45

26 dB Emissions & 99% Occupied Bandwidth for CDMA (1*RTT, BC0) Mode, Middle Channel



Date: 26.DEC.2019 14:56:33

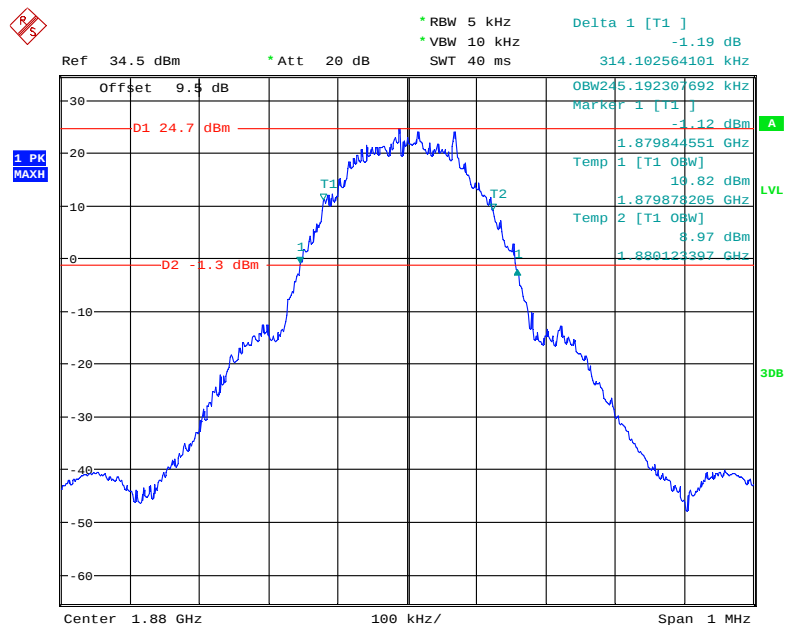
26 dB Emissions & 99% Occupied Bandwidth for CDMA (EV-DO, BC0) Mode, Middle Channel



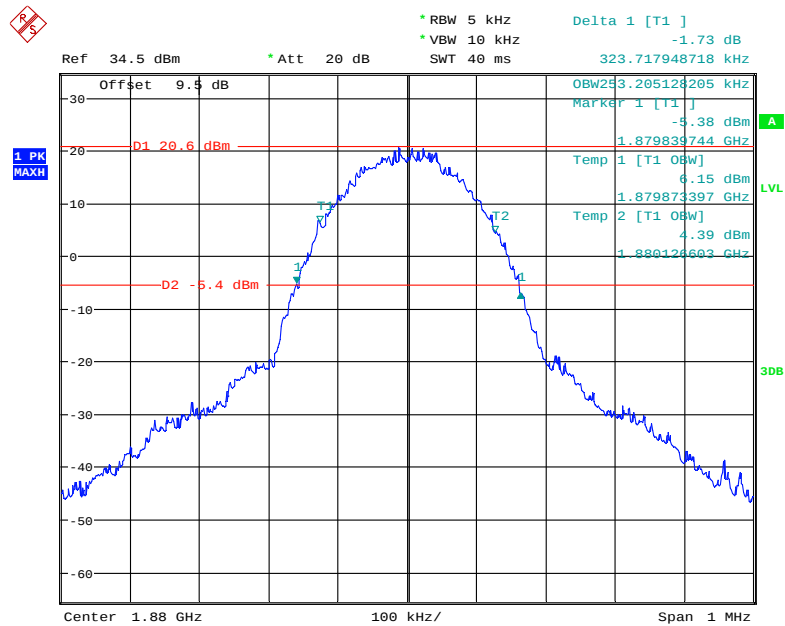
Date: 26.DEC.2019 15:17:34

PCS Band (Part 24E)

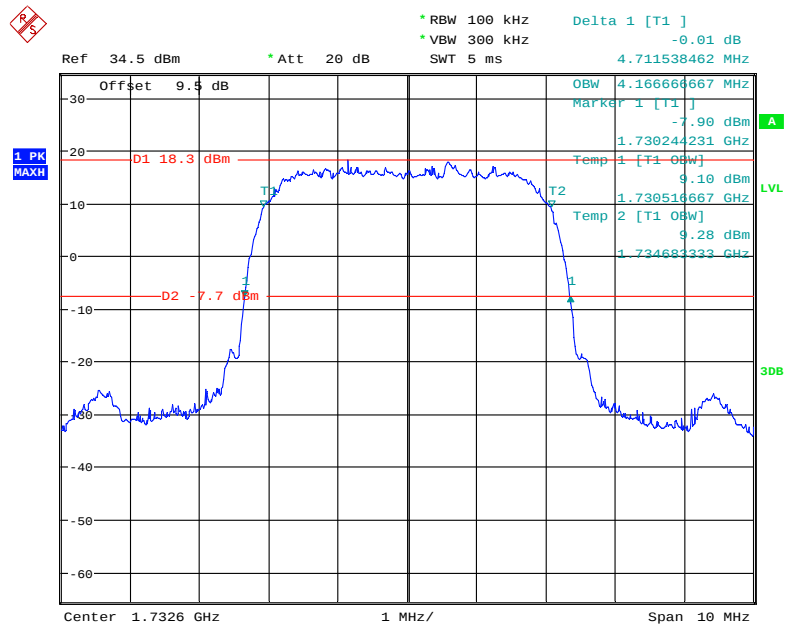
26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode



Date: 3.DEC.2019 22:26:48

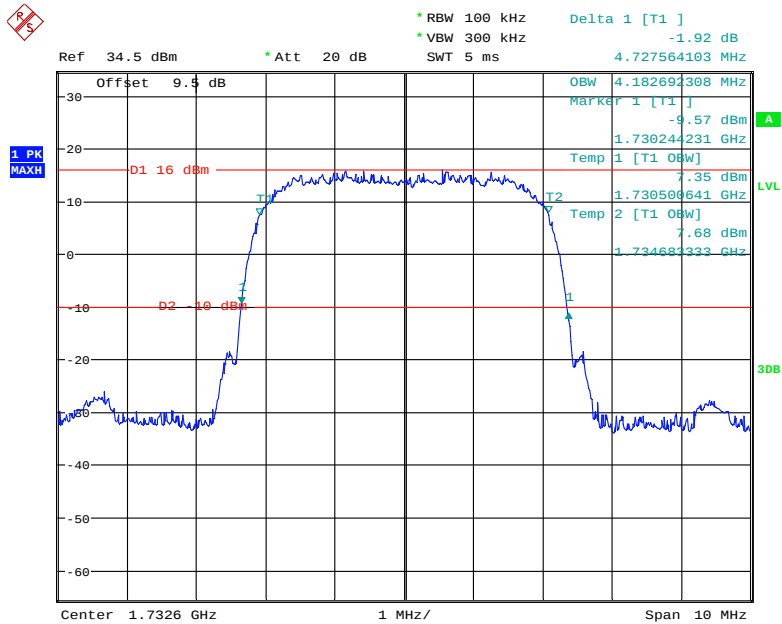
26 dB Emissions & 99% Occupied Bandwidth for EDGE Mode

Date: 3.DEC.2019 22:37:47

AWS Band (Part 27)**26 dB Emissions & 99% Occupied Bandwidth for GSM (GMSK) Mode**

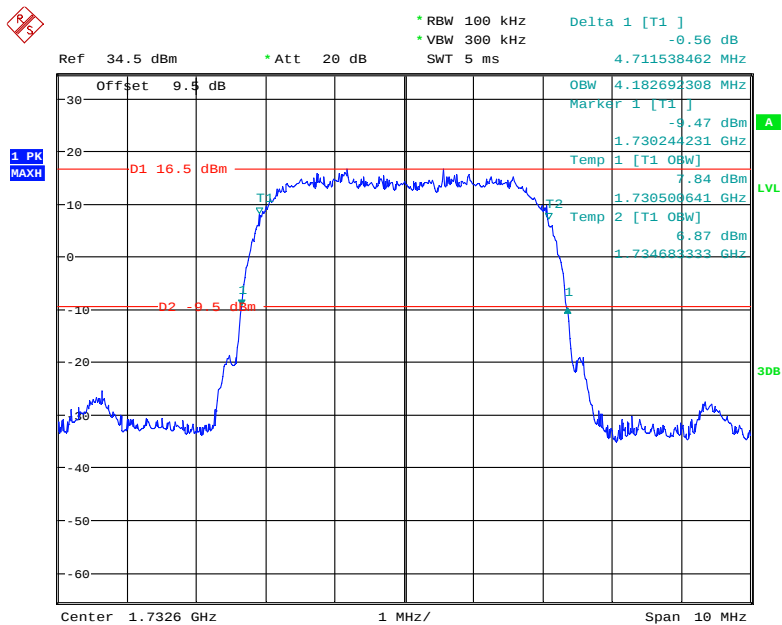
Date: 16.DEC.2019 21:23:54

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



Date: 16.DEC.2019 21:25:50

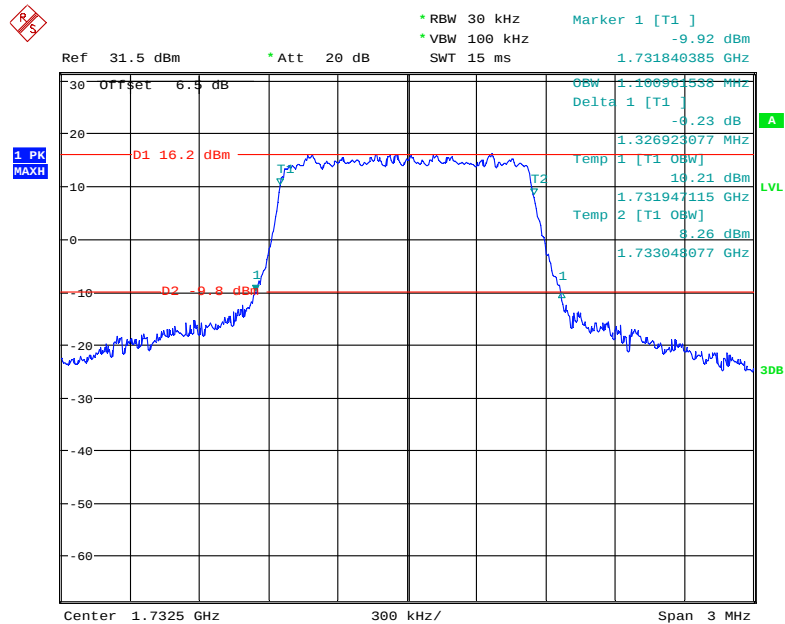
26 dB Emissions & 99% Occupied Bandwidth for HSDPA (16QAM) Mode



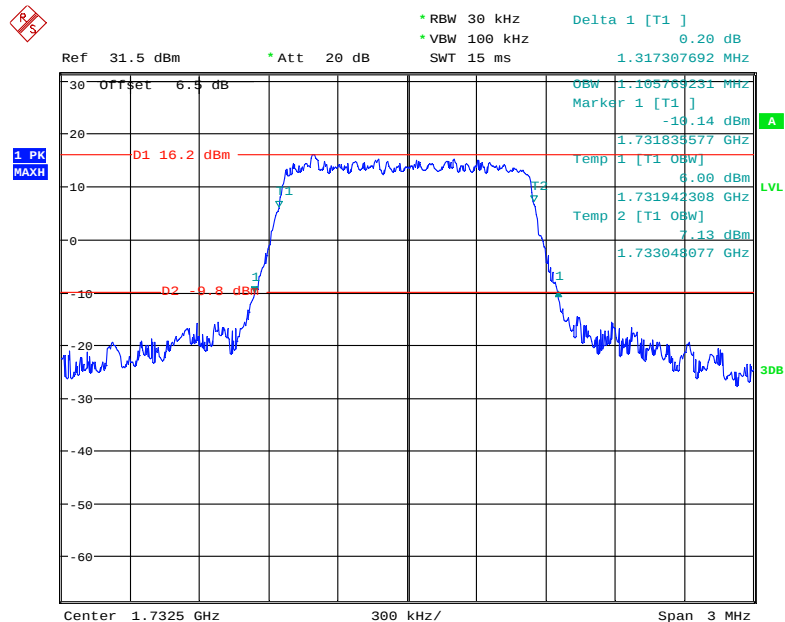
Date: 16.DEC.2019 21:26:43

LTE Band 4: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.33
	16QAM	1.11	1.32
3.0	QPSK	2.69	2.91
	16QAM	2.68	2.89
5.0	QPSK	4.55	5.18
	16QAM	4.52	5.18
10.0	QPSK	8.97	10.01
	16QAM	8.97	9.76
15.0	QPSK	13.46	15.04
	16QAM	13.51	14.94
20.0	QPSK	17.88	19.38
	16QAM	17.95	19.45

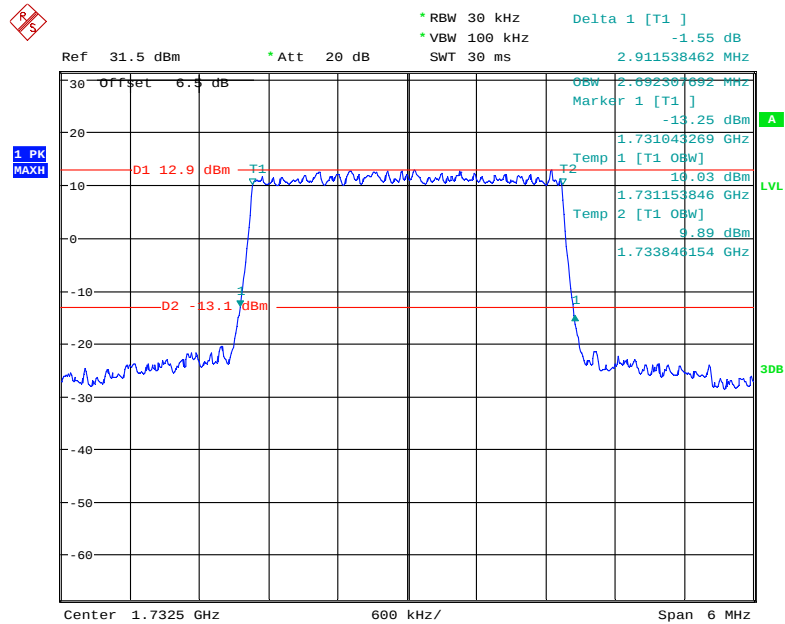
QPSK (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 23.DEC.2019 13:54:08

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

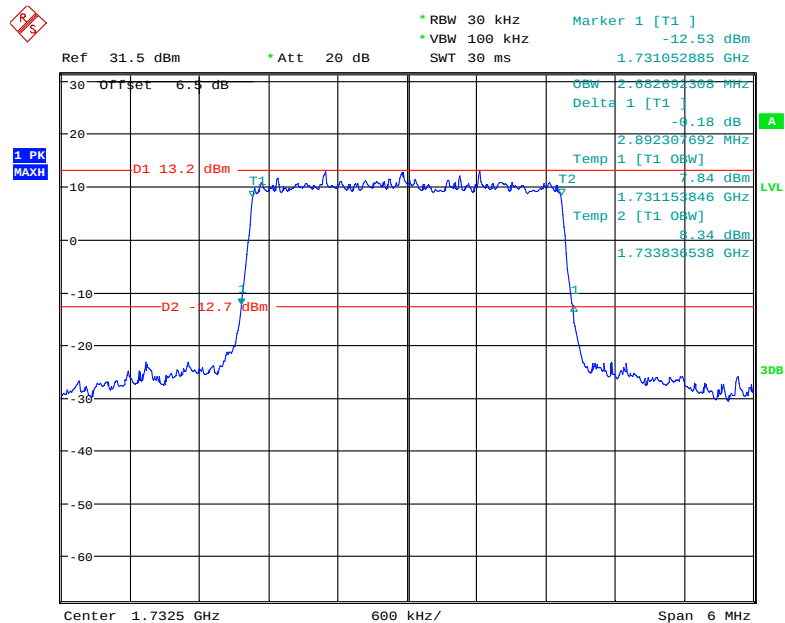
Date: 23.DEC.2019 13:54:29

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



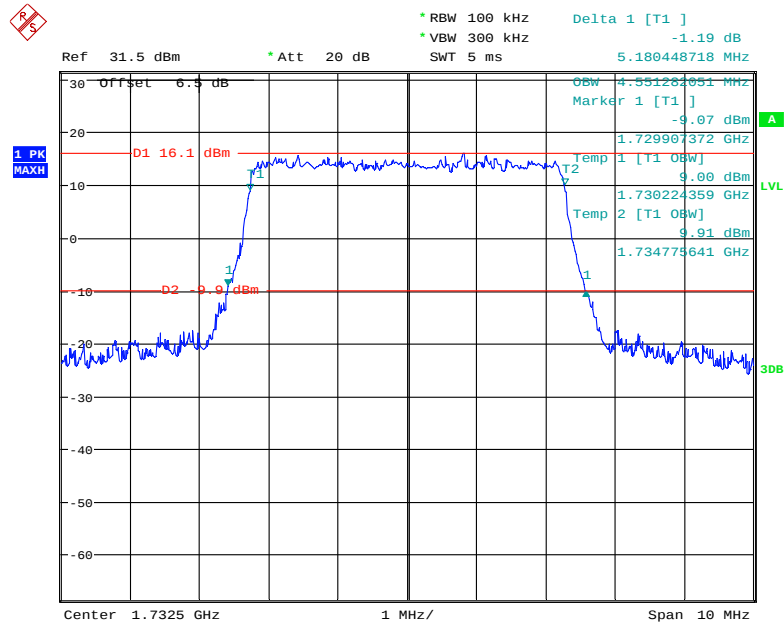
Date: 23.DEC.2019 13:57:20

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



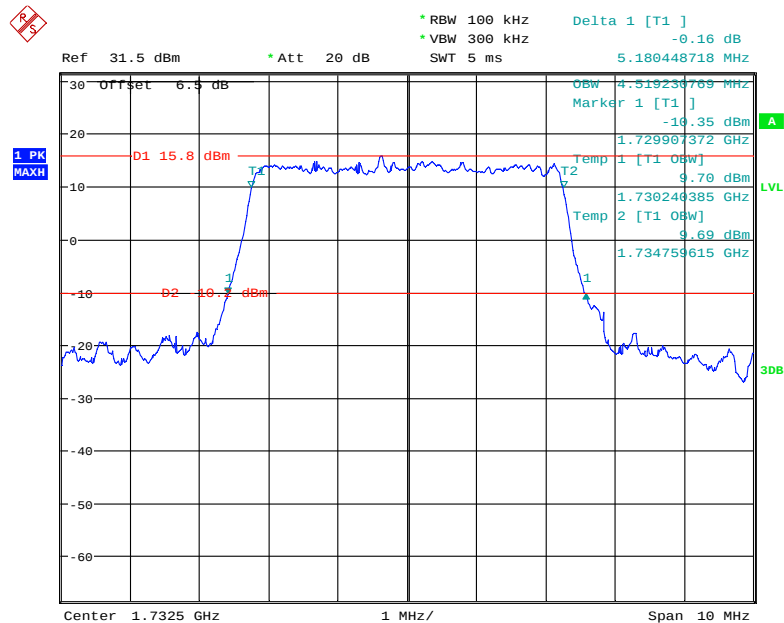
Date: 23.DEC.2019 13:58:11

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

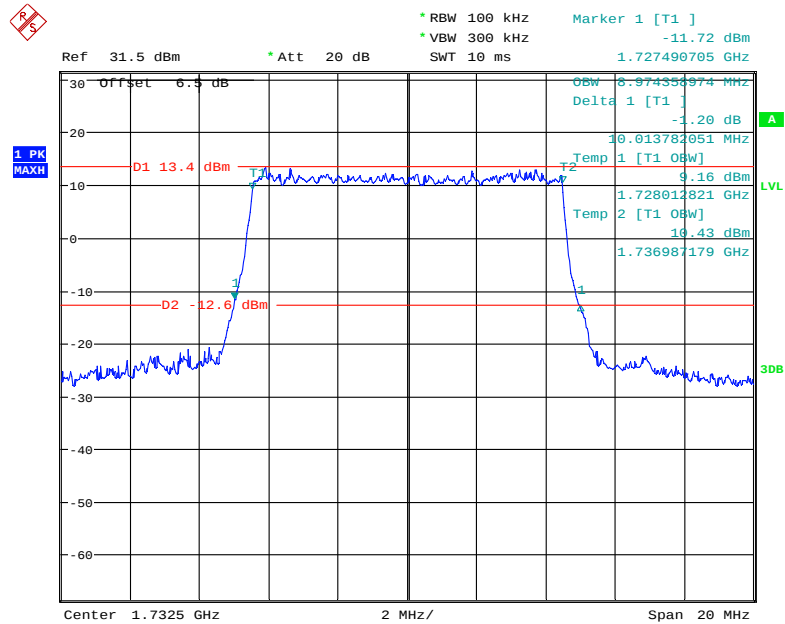


Date: 23.DEC.2019 13:38:32

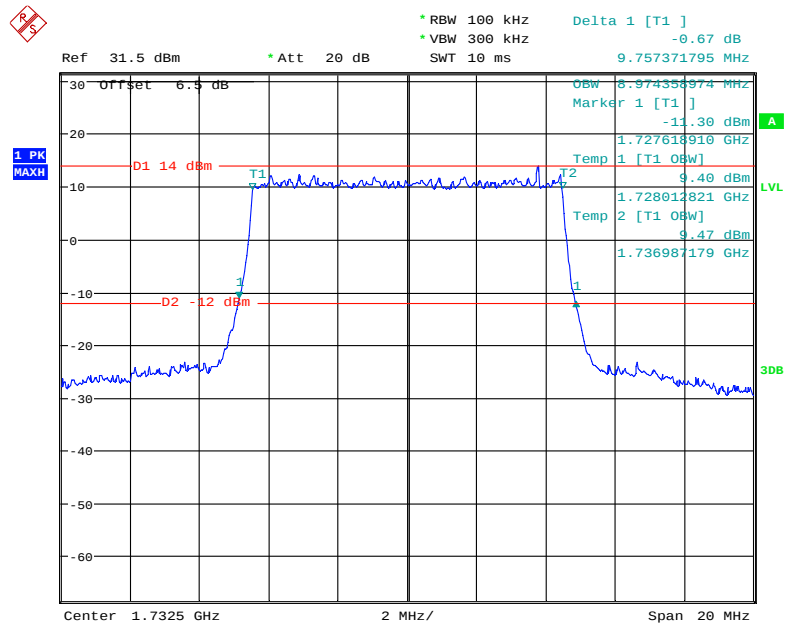
16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



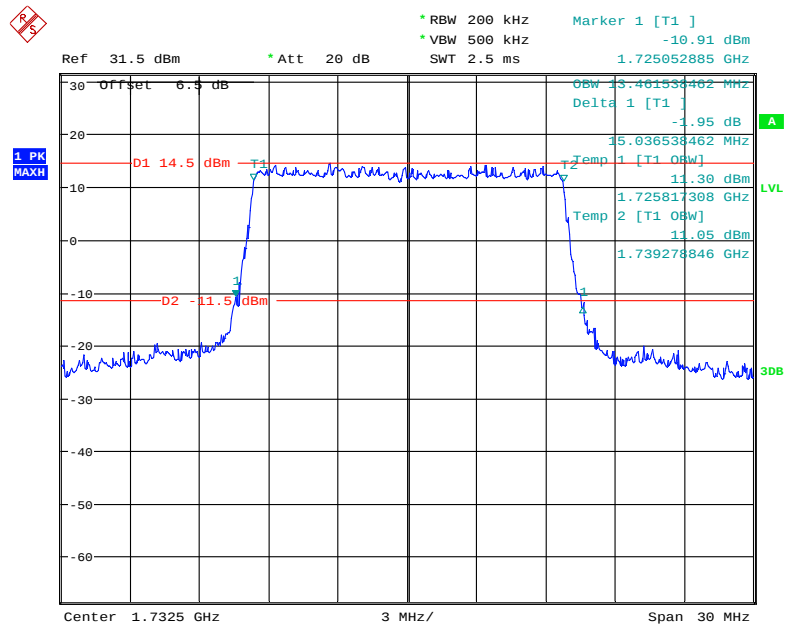
Date: 23.DEC.2019 13:37:58

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

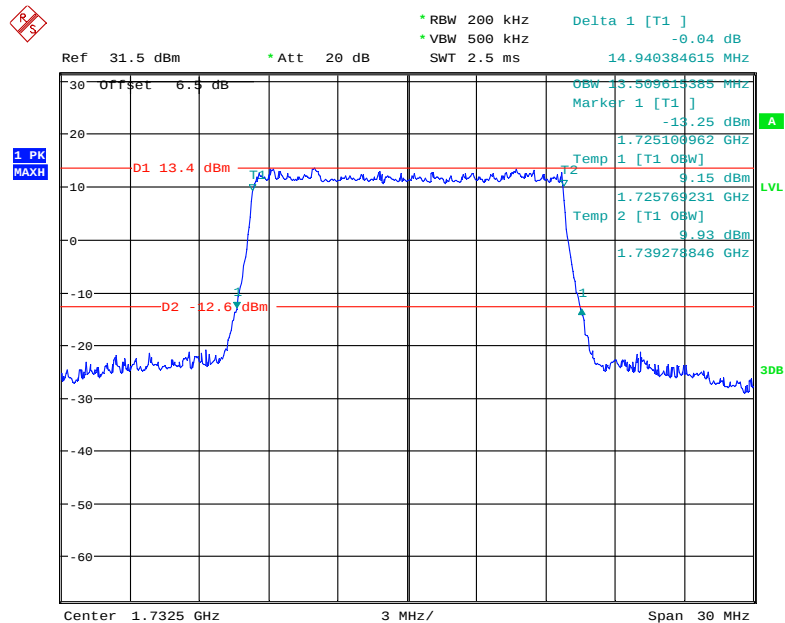
Date: 23.DEC.2019 13:47:15

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

Date: 23.DEC.2019 13:46:10

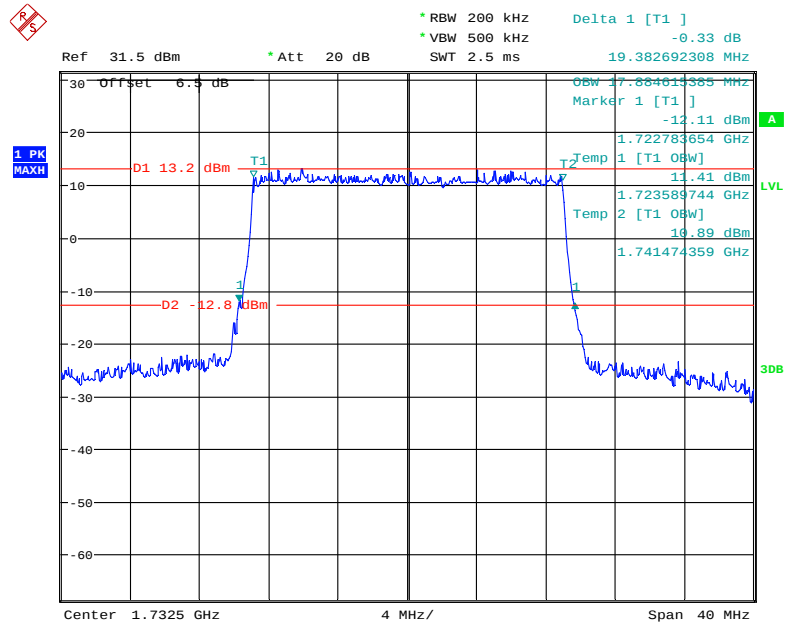
QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 23.DEC.2019 14:00:20

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

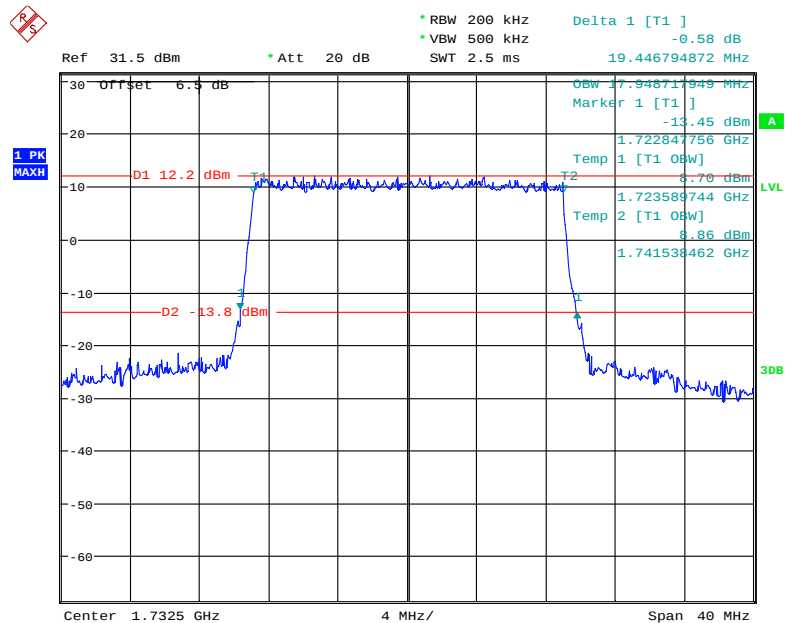
Date: 23.DEC.2019 13:59:21

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



Date: 23.DEC.2019 14:02:01

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

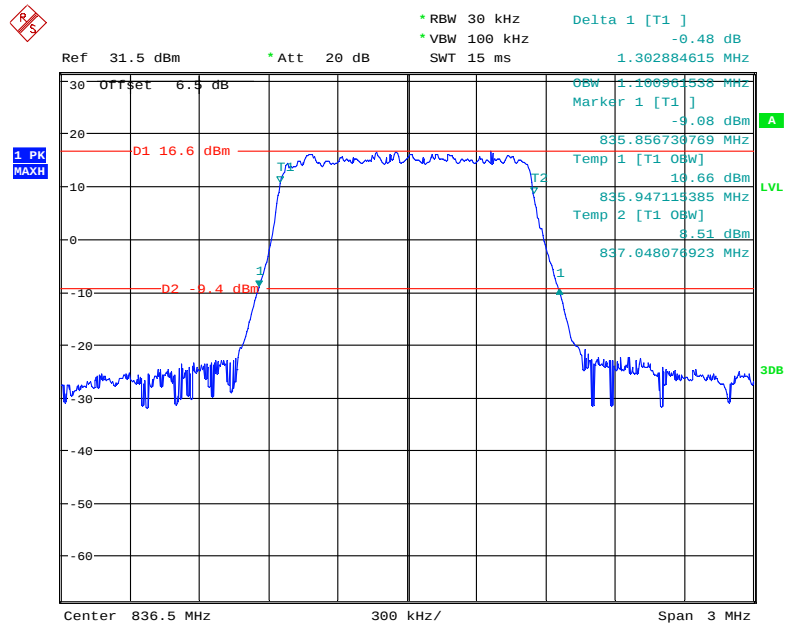


Date: 23.DEC.2019 14:01:15

LTE Band 5: (Middle Channel)

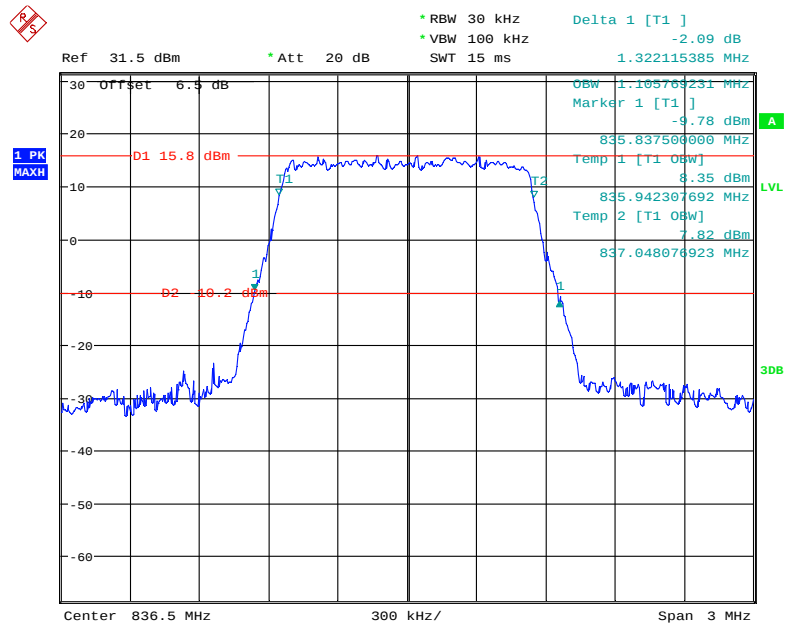
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
1.4	QPSK	1.10	1.30
	16QAM	1.11	1.32
3.0	QPSK	2.68	2.87
	16QAM	2.68	2.90
5.0	QPSK	4.54	5.22
	16QAM	4.52	5.15
10.0	QPSK	8.97	9.89
	16QAM	8.97	9.86

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

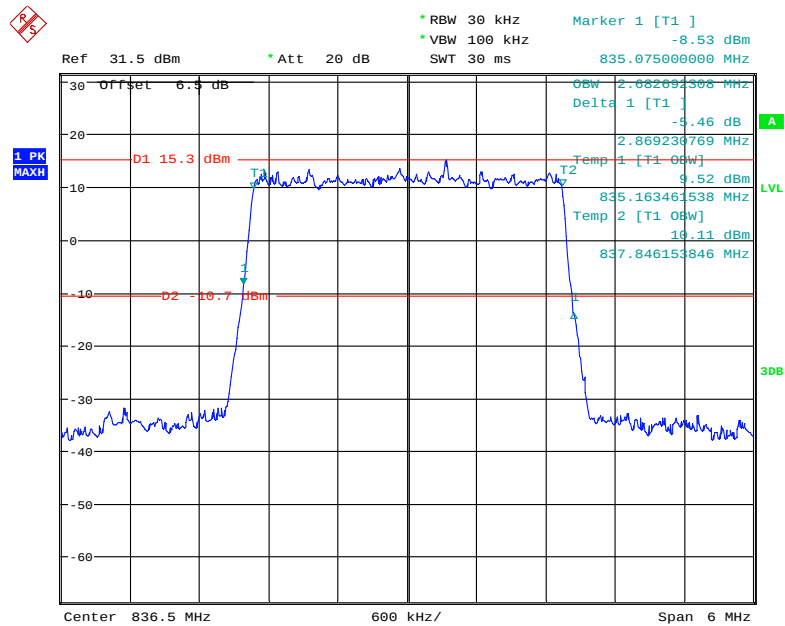


Date: 23.DEC.2019 14:15:42

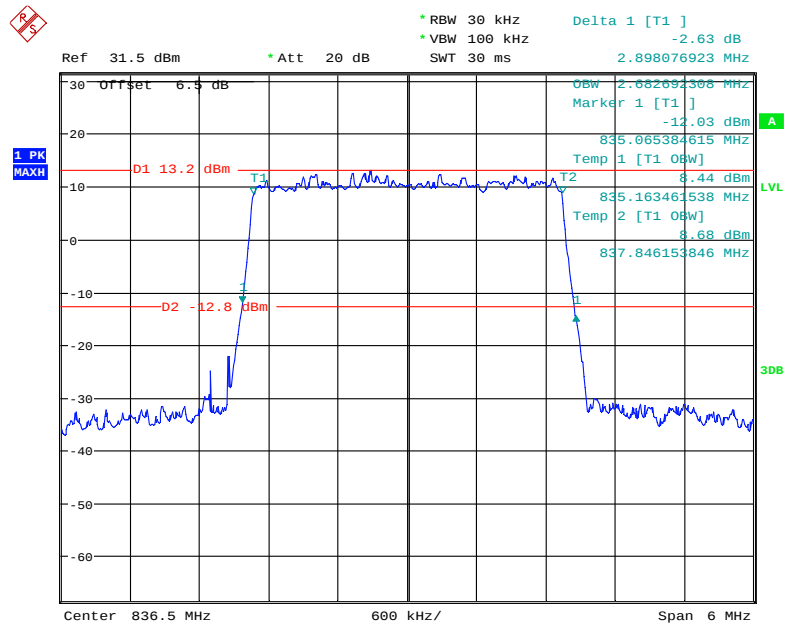
16-QAM (1.4 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



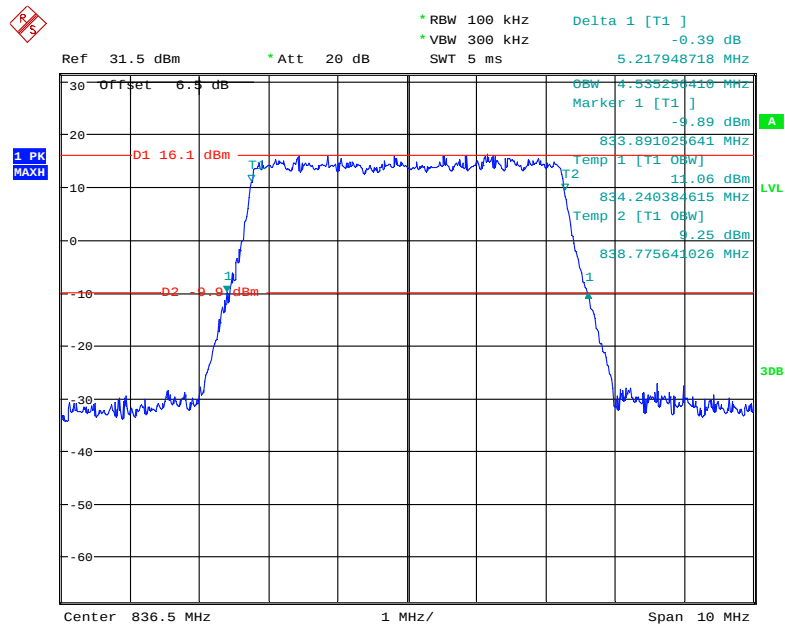
Date: 23.DEC.2019 14:14:02

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

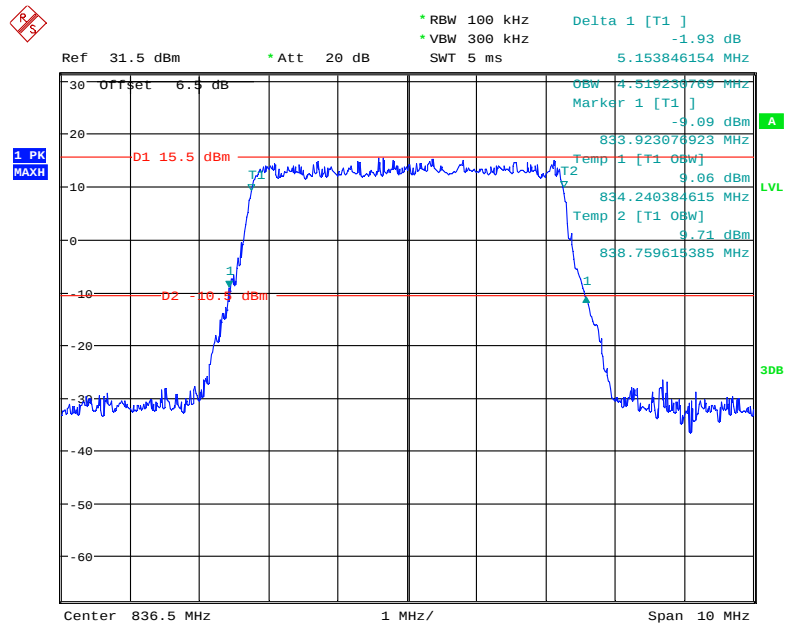
Date: 23.DEC.2019 14:10:41

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

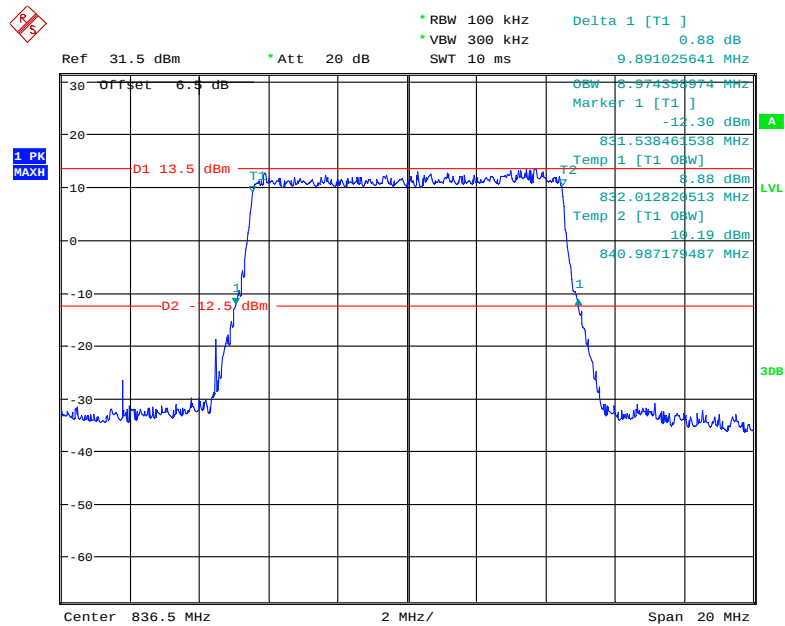
Date: 23.DEC.2019 14:09:55

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

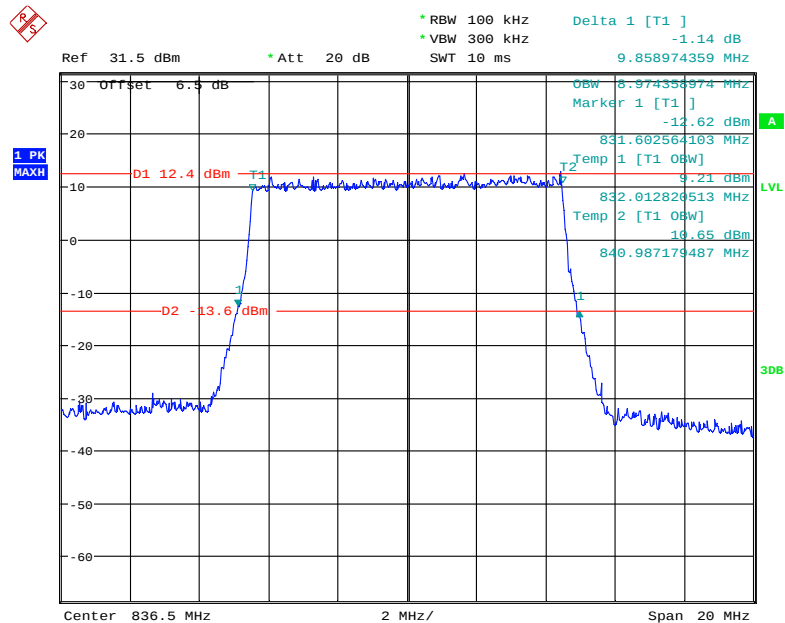
Date: 23.DEC.2019 14:06:52

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

Date: 23.DEC.2019 14:07:40

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

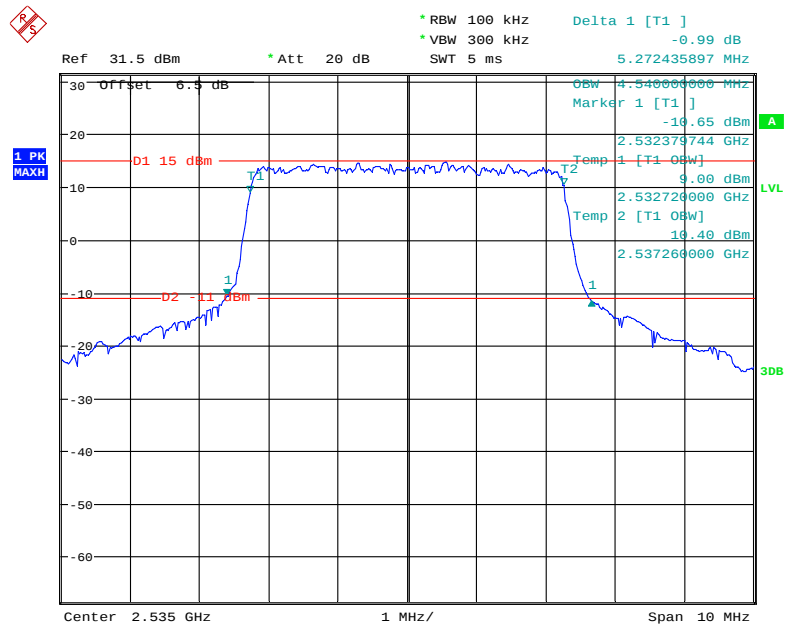
Date: 23.DEC.2019 14:04:37

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

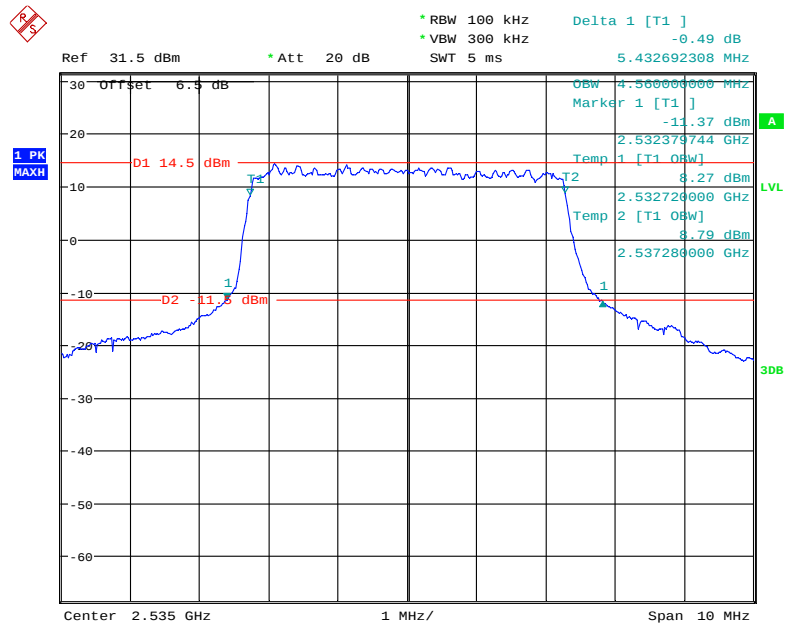
Date: 23.DEC.2019 14:05:52

LTE Band 7: (Middle Channel)

Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.54	5.27
	16QAM	4.56	5.43
10.0	QPSK	9.01	10.12
	16QAM	8.97	9.77
15.0	QPSK	13.51	15.09
	16QAM	13.46	15.00
20.0	QPSK	17.95	19.21
	16QAM	17.95	19.34

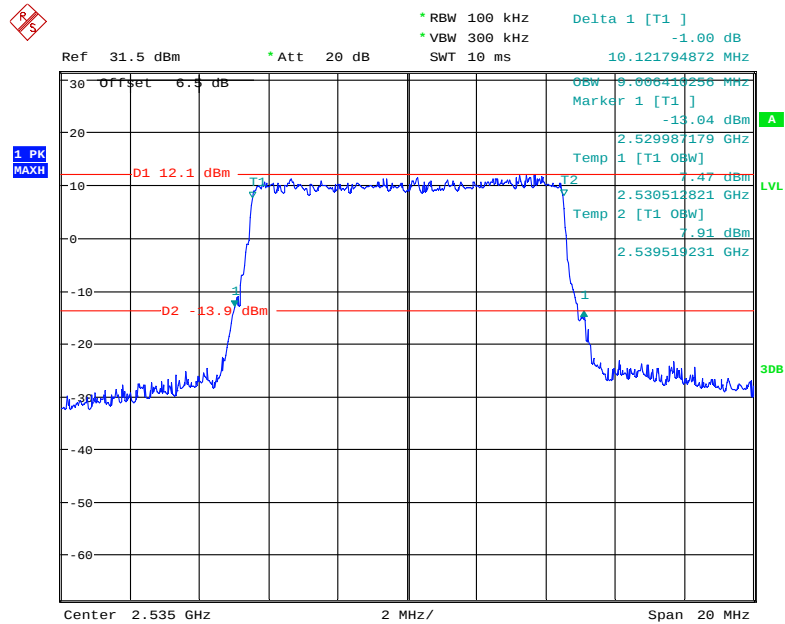
QPSK (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 13.MAR.2020 00:22:26

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

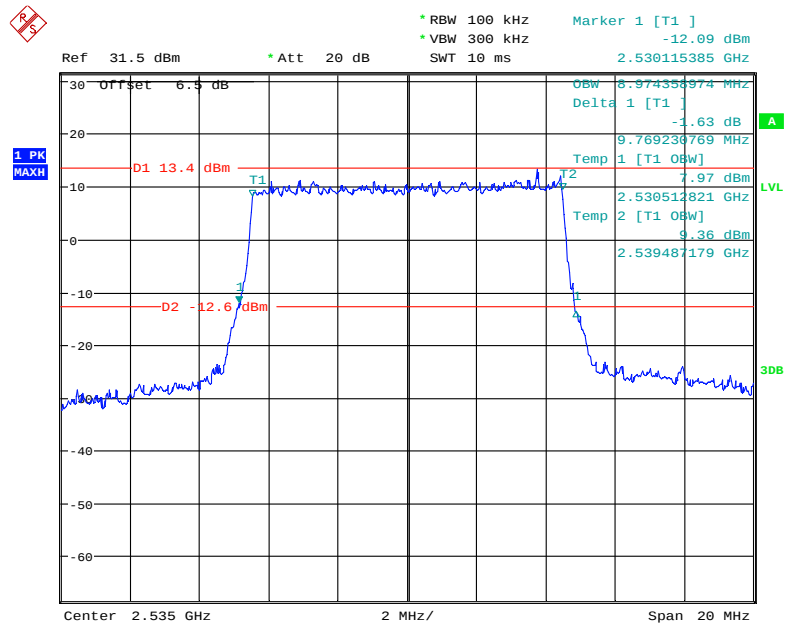
Date: 13.MAR.2020 00:25:37

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

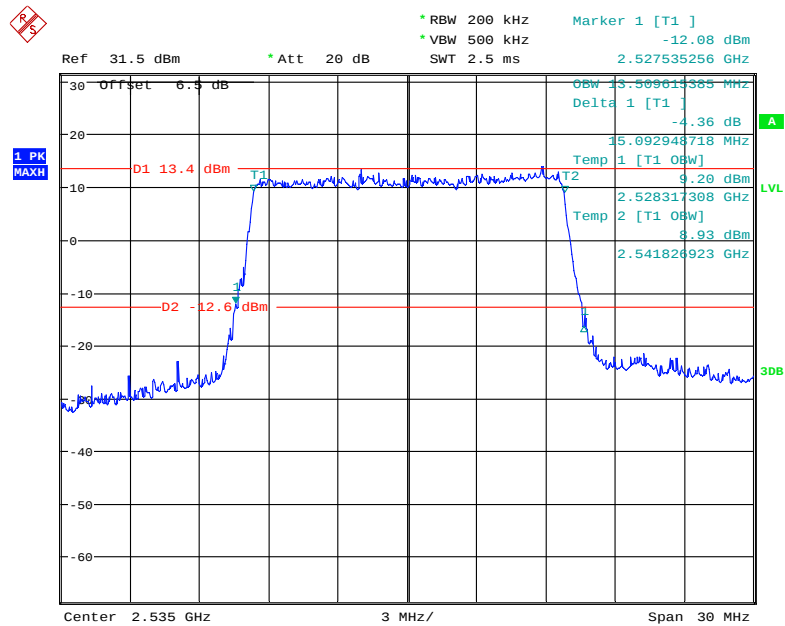


Date: 23.DEC.2019 14:24:09

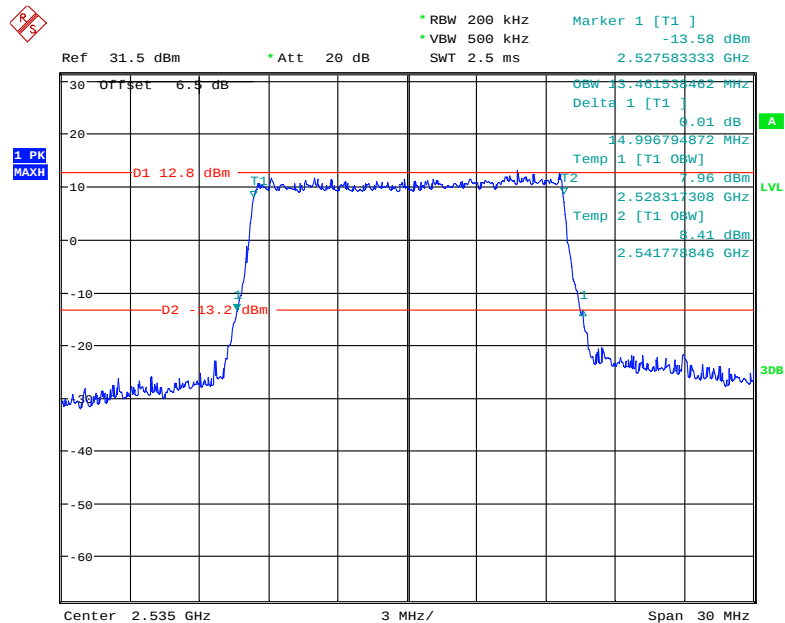
16-QAM (10.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 23.DEC.2019 14:23:18

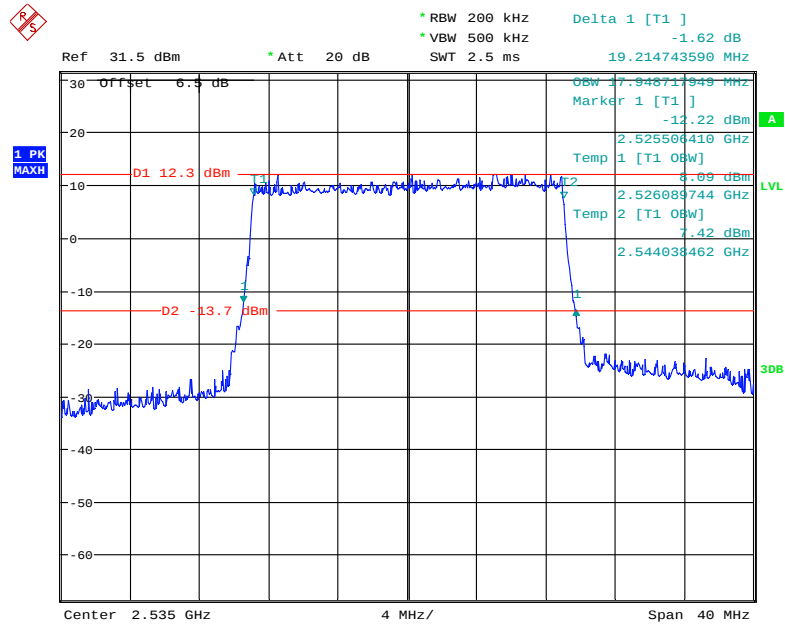
QPSK (15.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel

Date: 23.DEC.2019 14:25:43

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

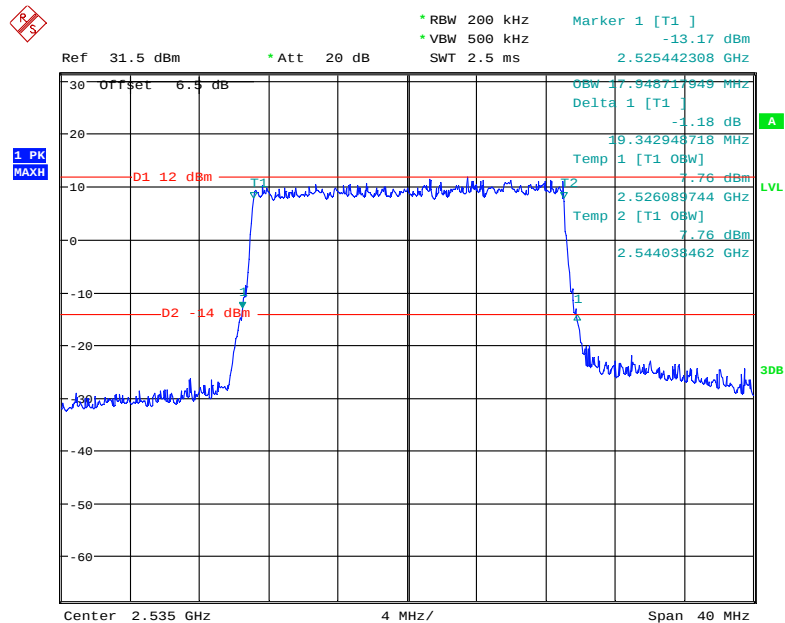
Date: 23.DEC.2019 14:26:45

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



Date: 23.DEC.2019 14:28:03

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

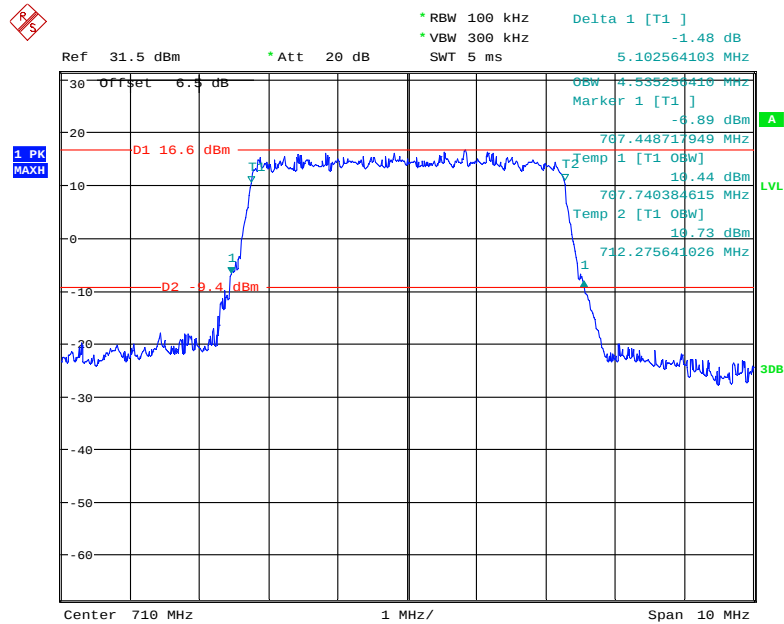


Date: 23.DEC.2019 14:29:27

LTE Band 17: (Middle Channel)

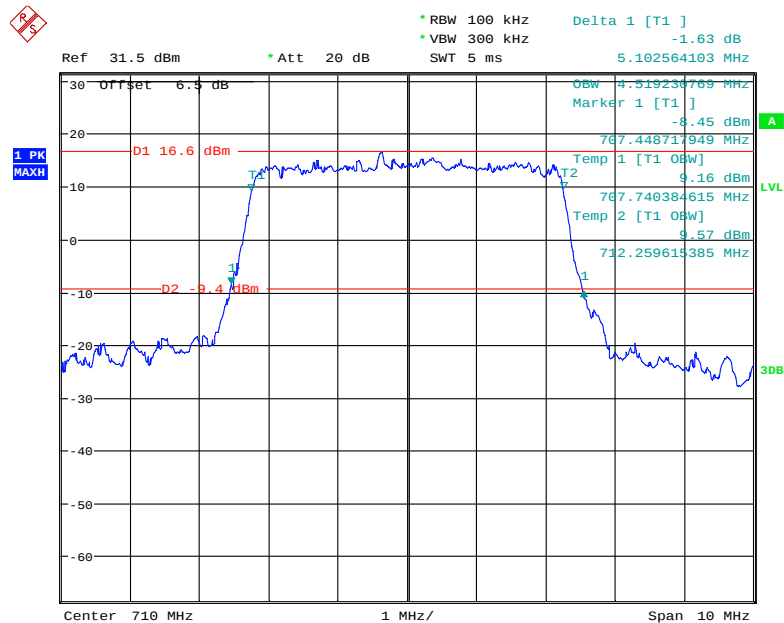
Bandwidth (MHz)	Modulation	99% Occupied Bandwidth (MHz)	26 dB Emission Bandwidth (MHz)
5.0	QPSK	4.54	5.10
	16QAM	4.52	5.10
10.0	QPSK	8.91	9.84
	16QAM	8.91	9.78

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

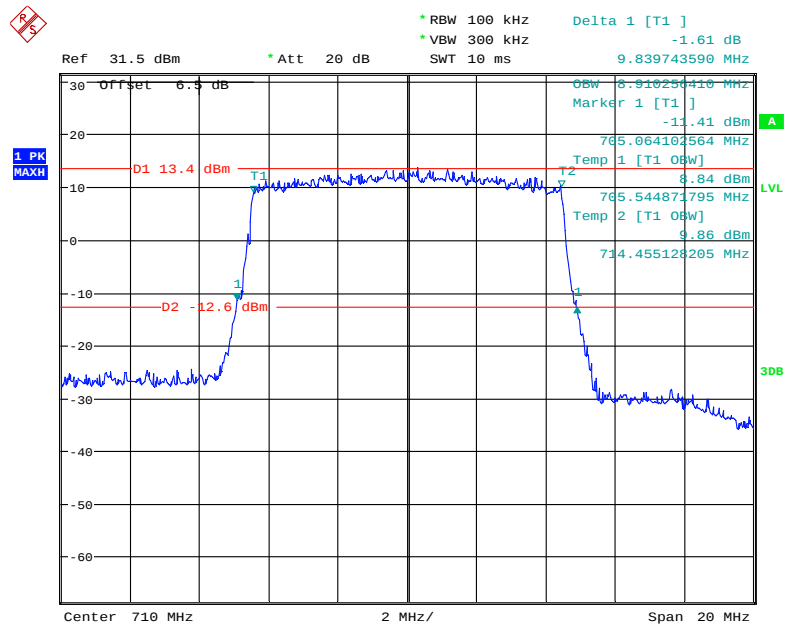


Date: 23.DEC.2019 14:49:25

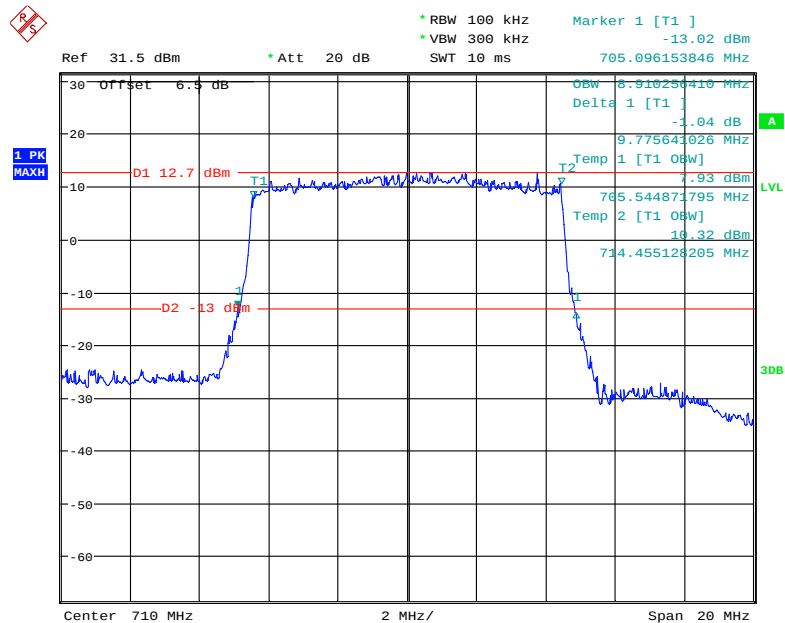
16-QAM (5.0 MHz) - 26 dB Bandwidth & 99% Occupied Bandwidth, Middle channel



Date: 23.DEC.2019 14:48:51

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

Date: 23.DEC.2019 14:51:29

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

Date: 23.DEC.2019 14:50:59

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

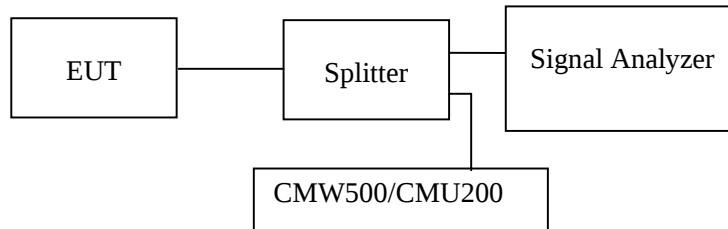
Applicable Standard

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

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

Test Procedure

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



Test Data

Environmental Conditions

Temperature:	24~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Leo Huang and George Zhong from 2019-12-03 to 2019-12-26.

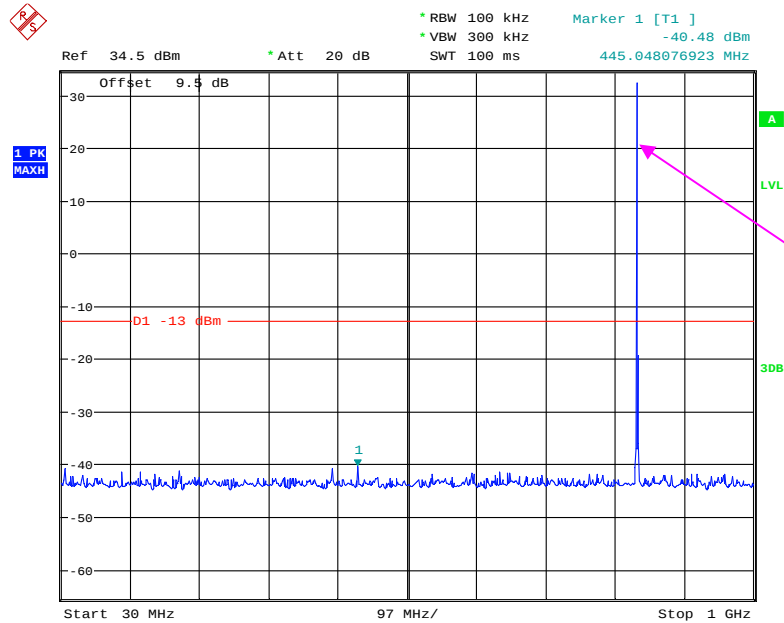
Test result: Compliance.

EUT operation mode: transmitting

Please refer to the following plots.

Cellular Band (Part 22H)

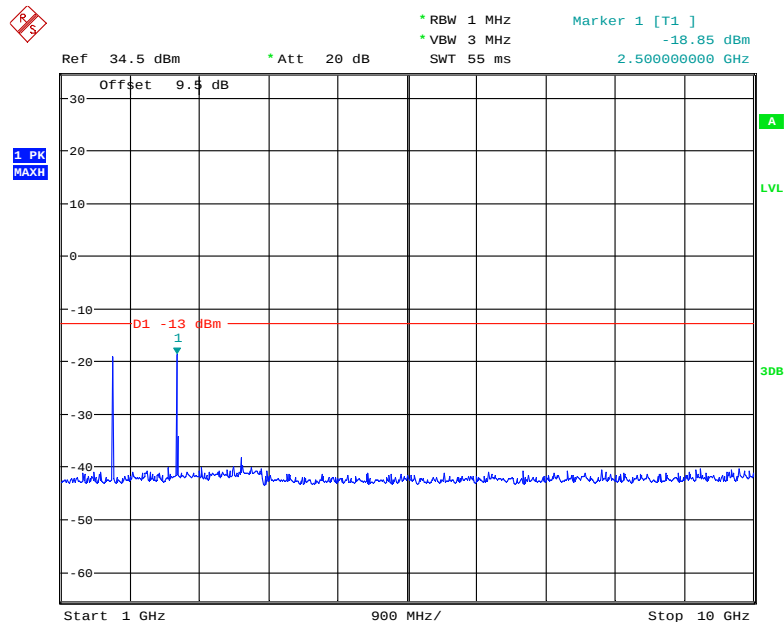
30 MHz – 1 GHz (GSM Mode)



Fundamental test

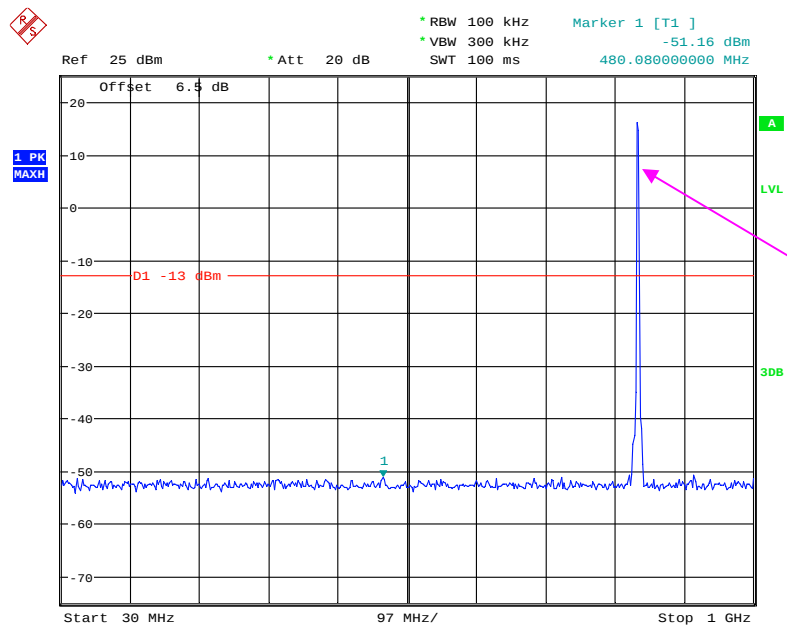
Date: 3.DEC.2019 22:20:36

1 GHz – 10 GHz (GSM Mode)



Date: 3.DEC.2019 22:21:22

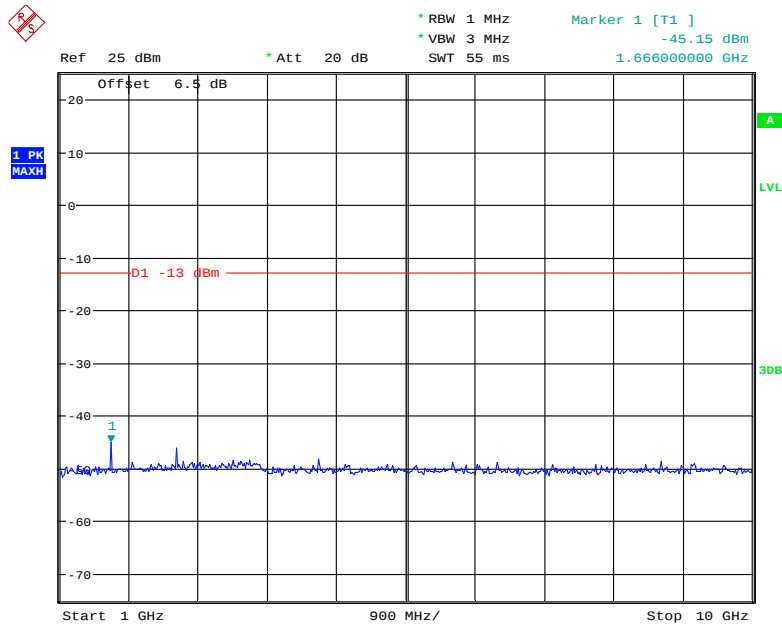
30 MHz – 1 GHz CDMA (1*RTT BC 0) Mode, Middle channel



Fundamental test

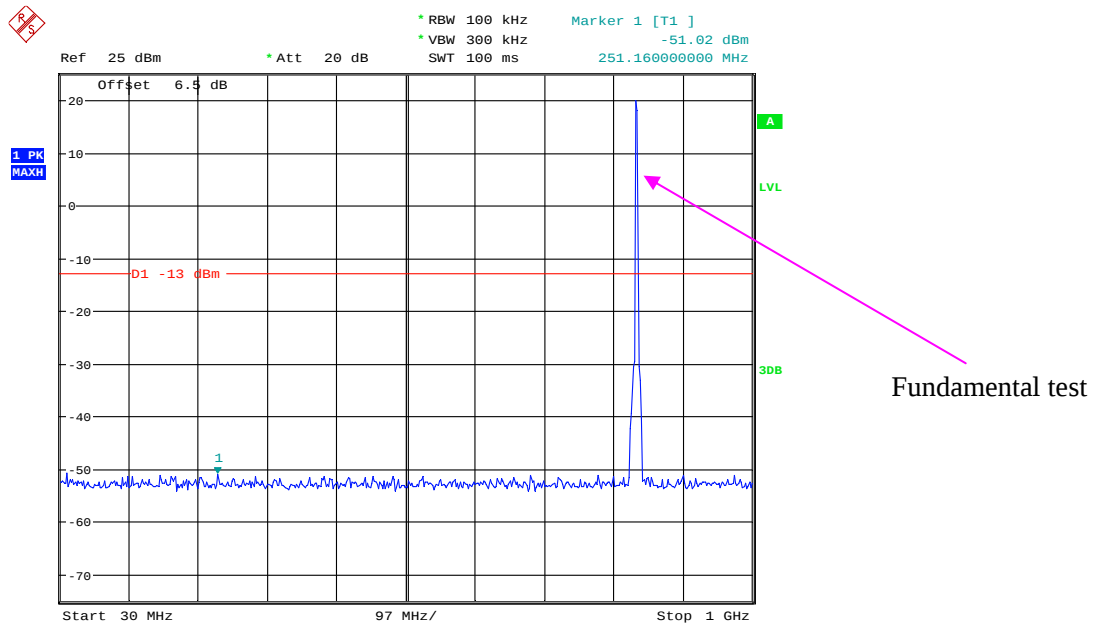
Date: 26.DEC.2019 15:00:37

1 GHz – 10 GHz CDMA (1*RTT BC 0) Mode, Middle channel



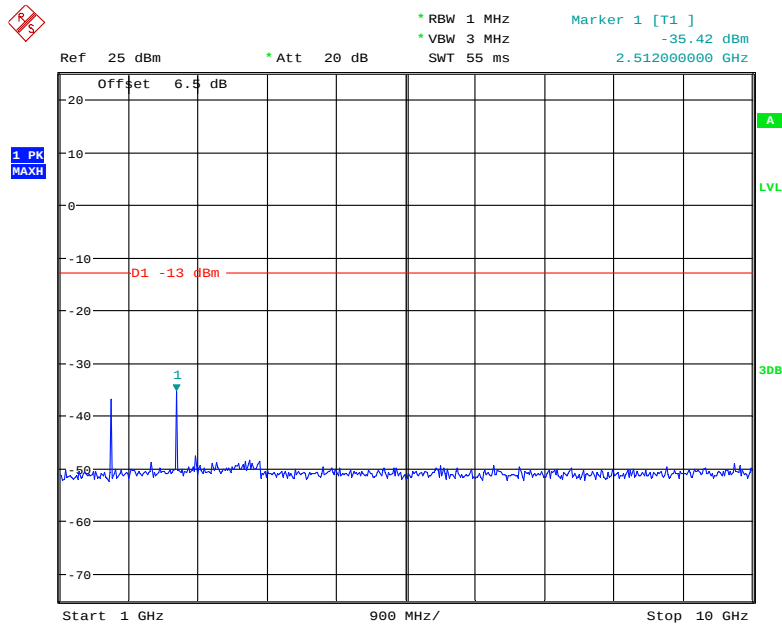
Date: 26.DEC.2019 15:01:10

30 MHz – 1 GHz CDMA (EV-DO, BC0) Mode, Middle channel



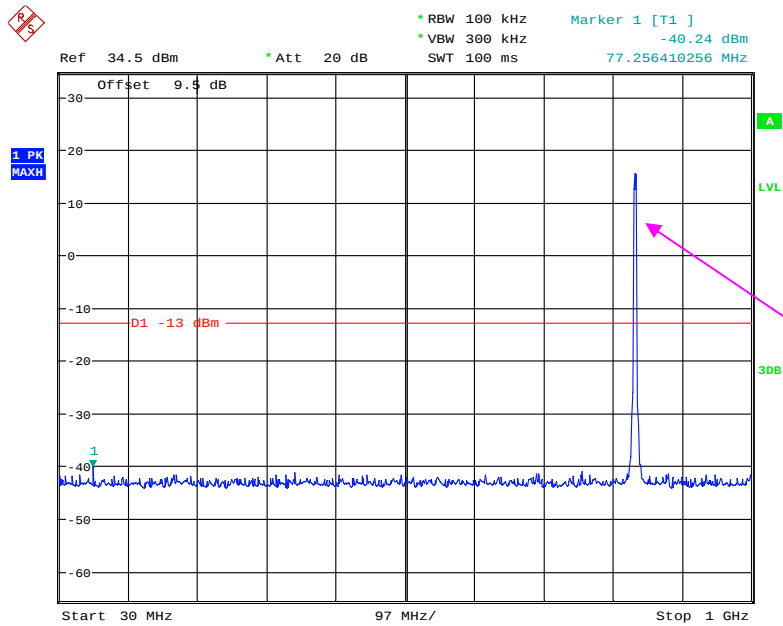
Date: 26.DEC.2019 15:14:49

1 GHz – 10 GHz CDMA (EV-DO, BC0) Mode, Middle channel



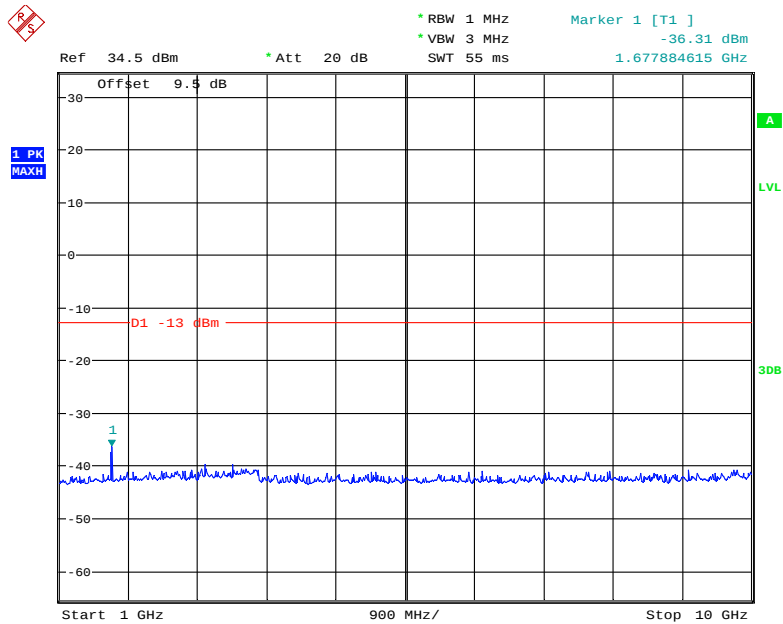
Date: 26.DEC.2019 15:14:22

30 MHz – 1 GHz (WCDMA Mode)



Date: 16.DEC.2019 21:15:54

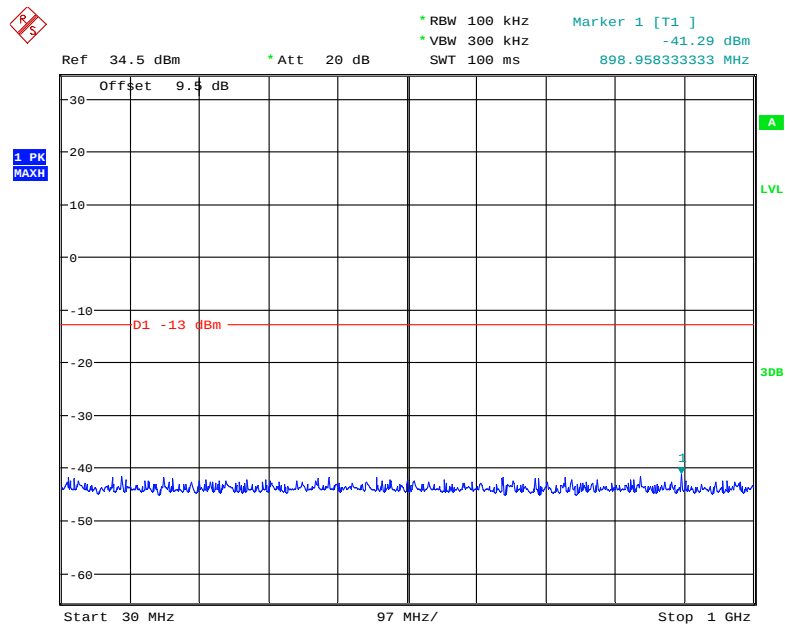
1 GHz – 10 GHz (WCDMA Mode)



Date: 16.DEC.2019 21:16:33

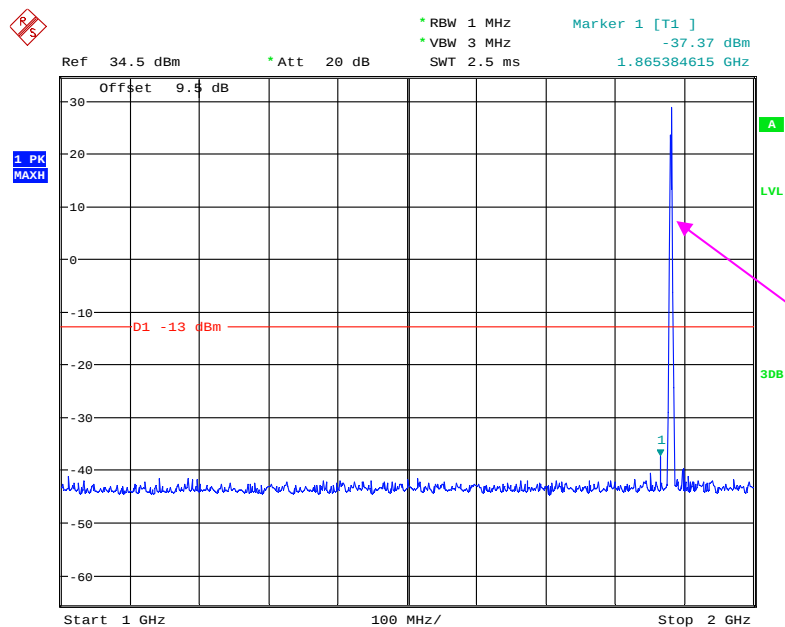
PCS Band (Part 24E)

30 MHz – 1 GHz (GSM Mode)



Date: 3.DEC.2019 22:24:53

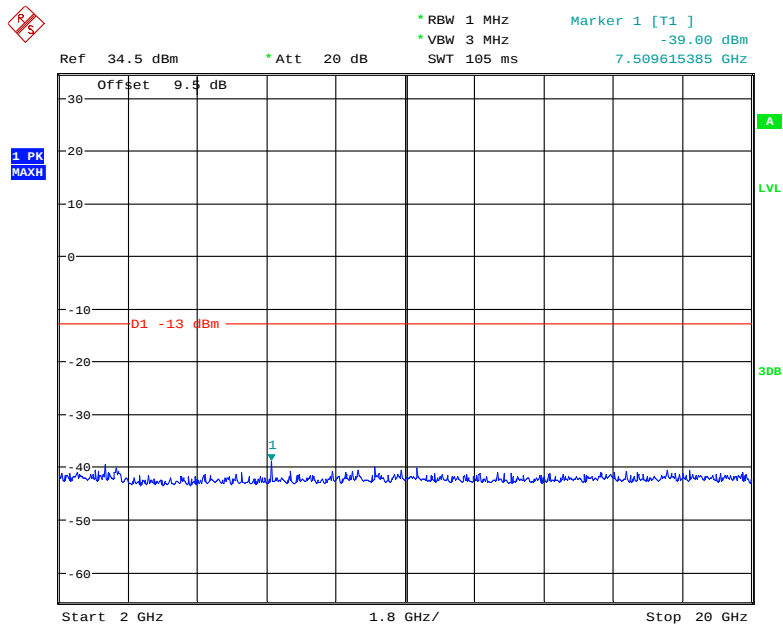
1 GHz – 2 GHz (GSM Mode)



Fundamental test

Date: 3.DEC.2019 22:24:07

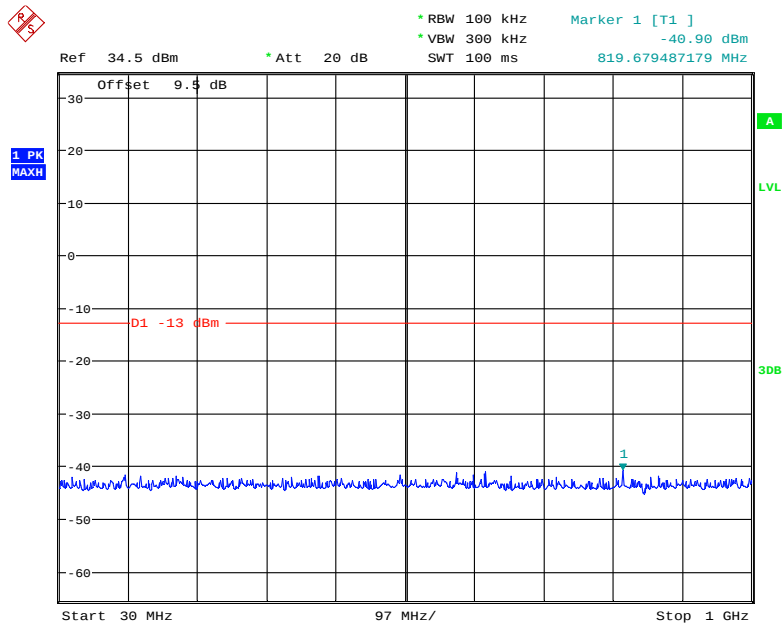
2 GHz – 20 GHz (GSM Mode)



Date: 3.DEC.2019 22:24:35

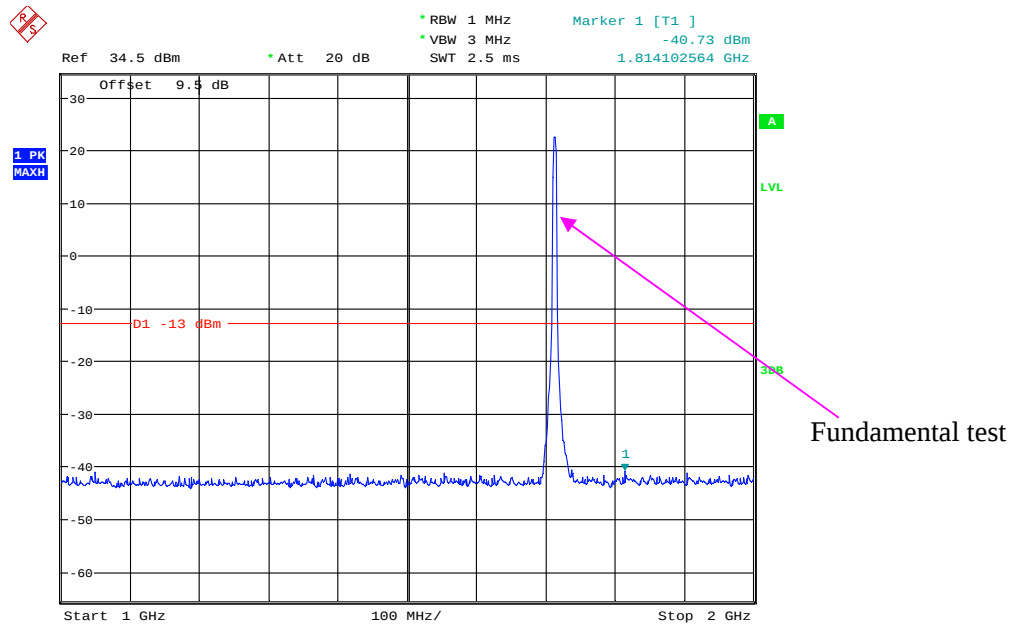
AWS Band (Part 27)

30 MHz – 1 GHz (WCDMA Mode)



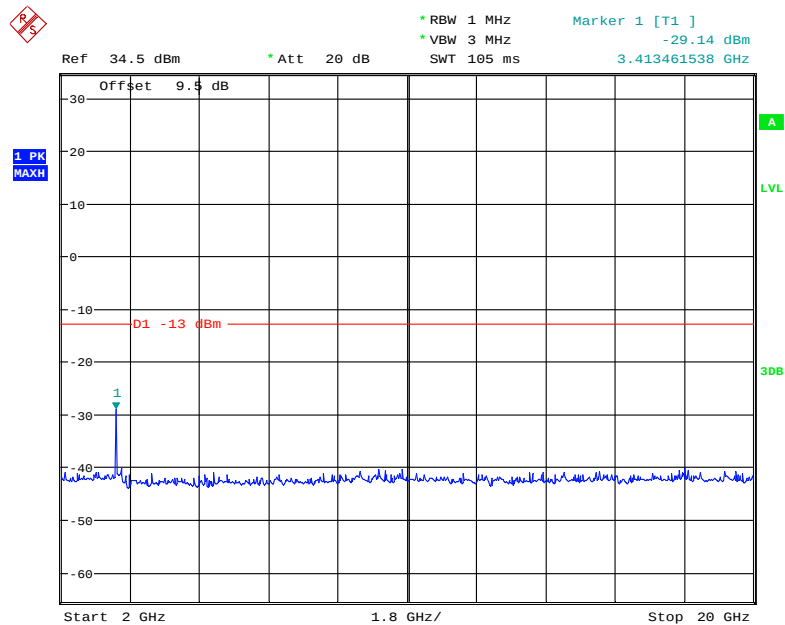
Date: 16.DEC.2019 21:21:10

1 GHz – 2 GHz (WCDMA Mode)

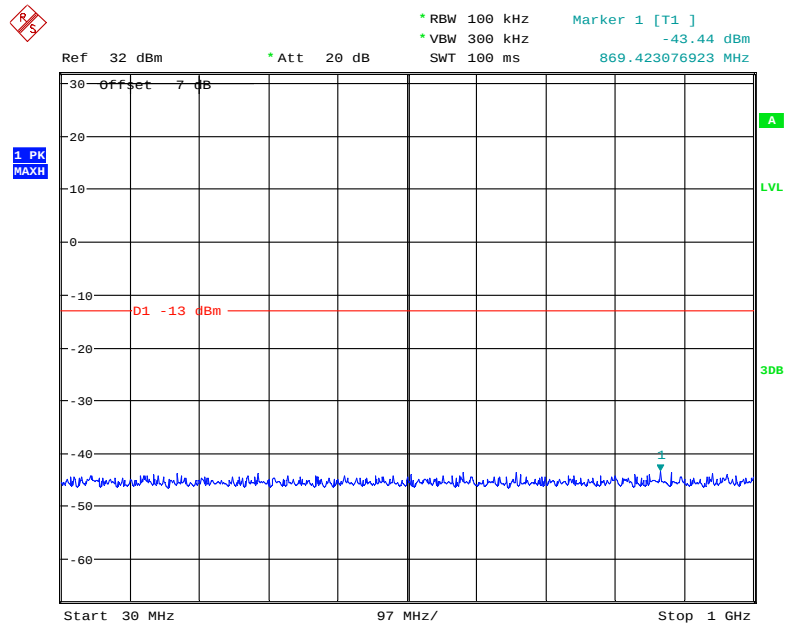


Date: 16.DEC.2019 21:20:08

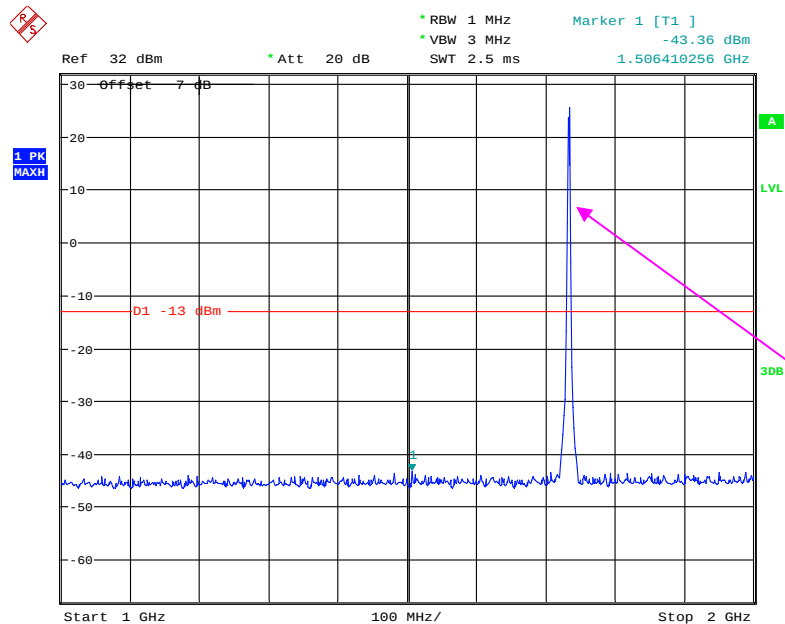
2 GHz – 20 GHz (WCDMA Mode)



Date: 16.DEC.2019 21:20:36

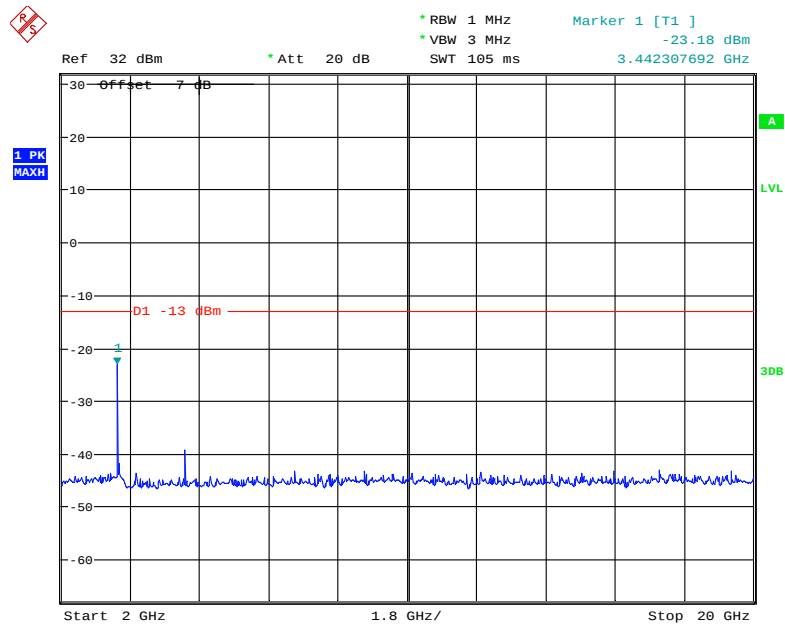
LTE Band 4:**30 MHz - 1 GHz (1.4 MHz, Middle Channel)**

Date: 17.DEC.2019 23:07:51

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

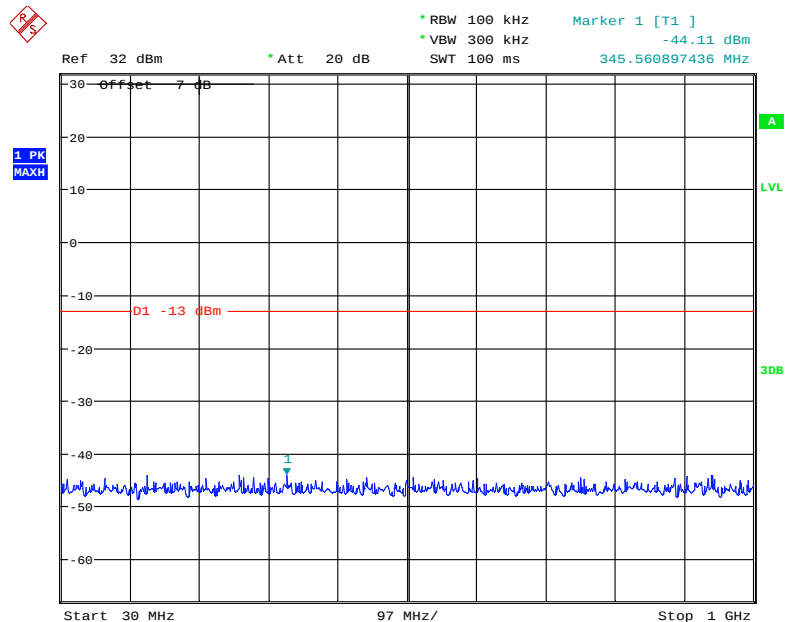
Date: 17.DEC.2019 23:10:44

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

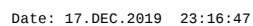


Date: 17.DEC.2019 23:17:03

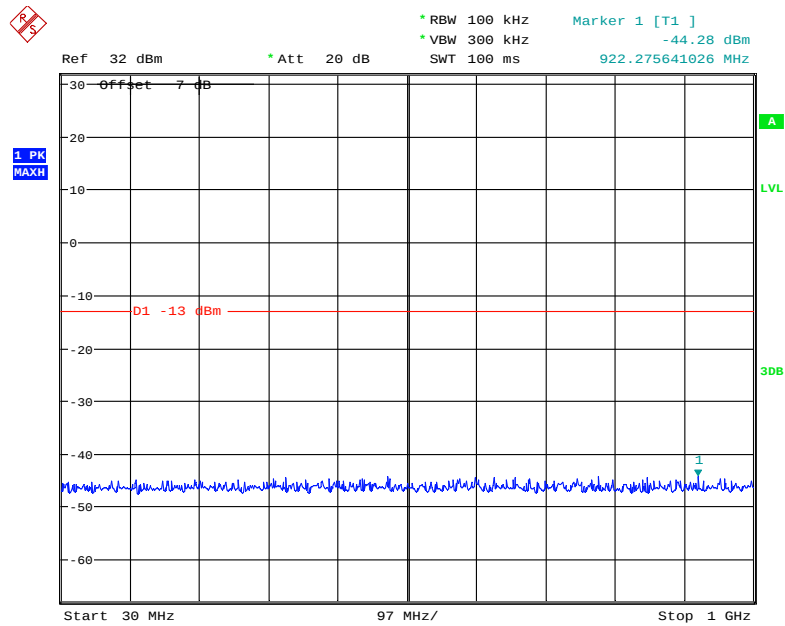
30 MHz - 1 GHz (3.0 MHz, Middle Channel)



Date: 17.DEC.2019 23:08:43

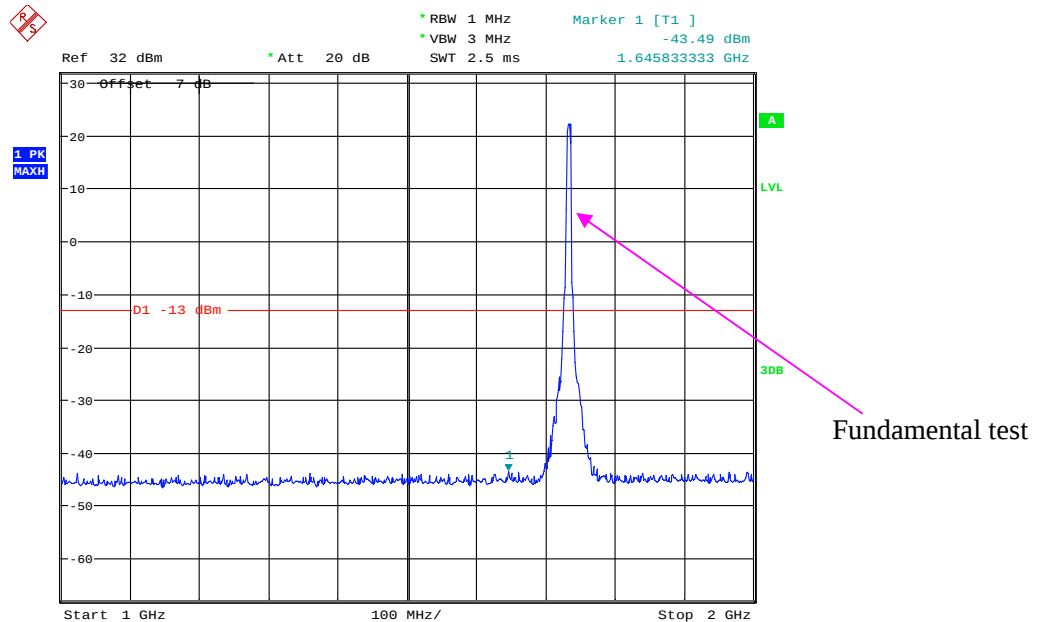


30 MHz - 1 GHz (5.0 MHz, Middle Channel)



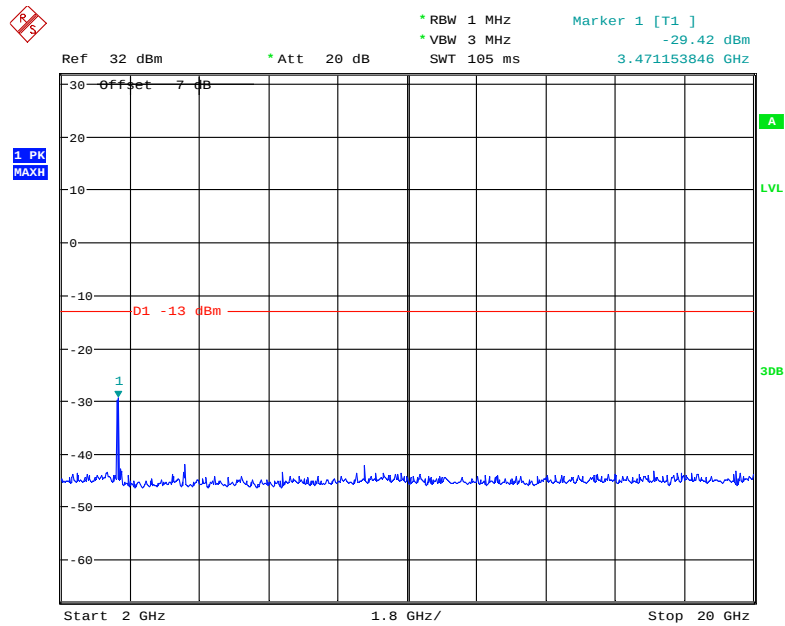
Date: 17.DEC.2019 23:08:57

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



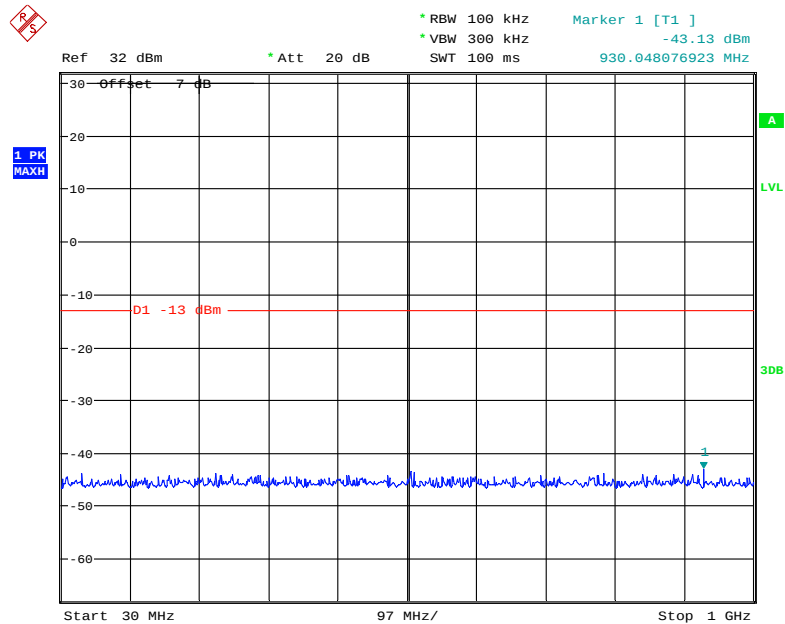
Date: 17.DEC.2019 23:12:53

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



Date: 17.DEC.2019 23:16:31

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



Date: 17.DEC.2019 23:09:11

Ref 32 dBm * Att 20 dB * RBW 1 MHz * VBW 3 MHz * SWT 2.5 ms Marker 1 [T1] -43.43 dBm 1.204487179 GHz

Offset 7 dB

1 PK MAXH

D1 -13 dBm

Start 1 GHz 100 MHz/ Stop 2 GHz

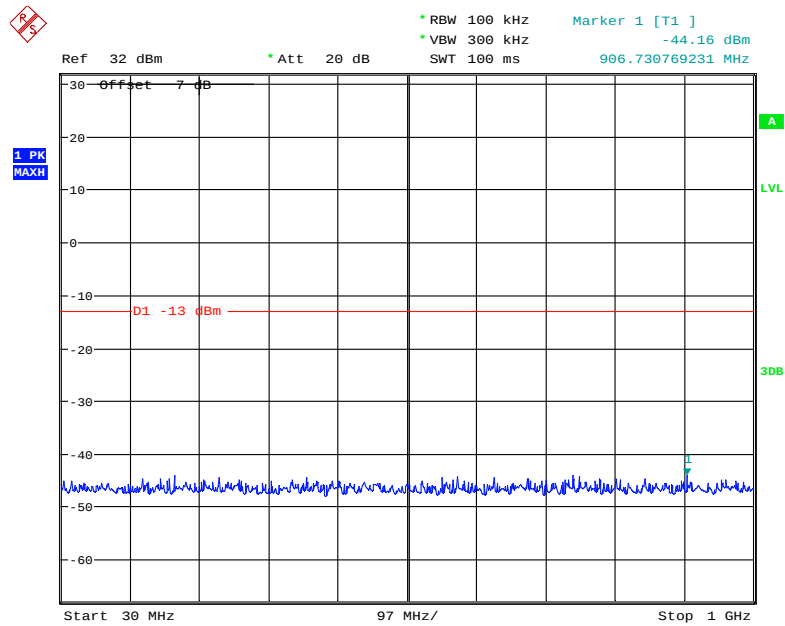
Fundamental test

Ref 32 dBm * Att 20 dB * RBW 1 MHz VBW 3 MHz SWT 105 ms Marker 1 [T1] -30.24 dBm
 Offset 7 dB 3.471153846 GHz

1 PK MAXH
 D1 -13 dBm
 1
 Start 2 GHz 1.8 GHz/ Stop 20 GHz

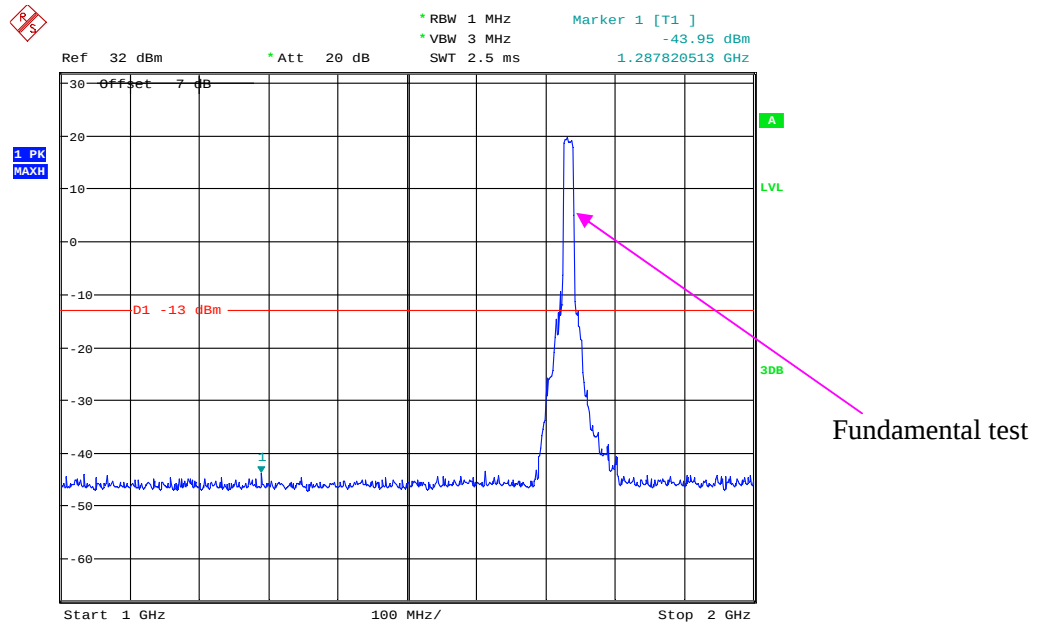
Page 76 of 150

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



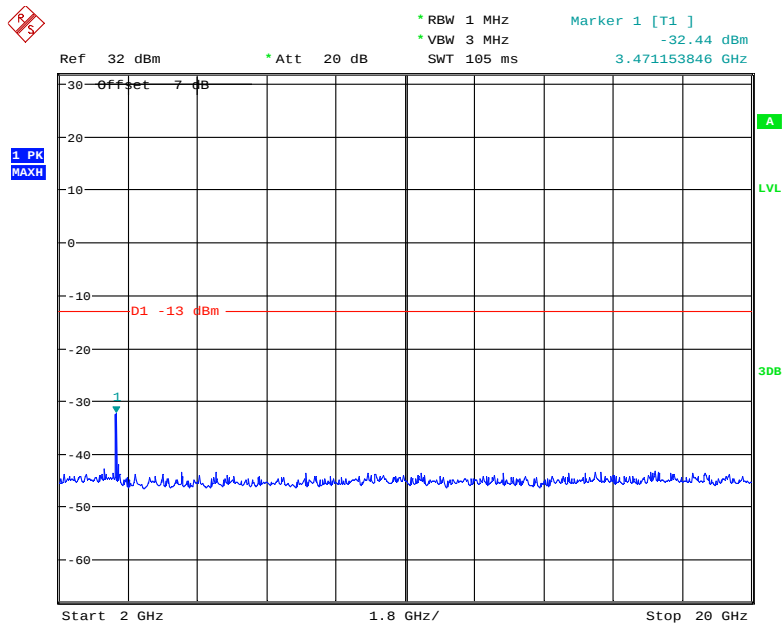
Date: 17.DEC.2019 23:09:22

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



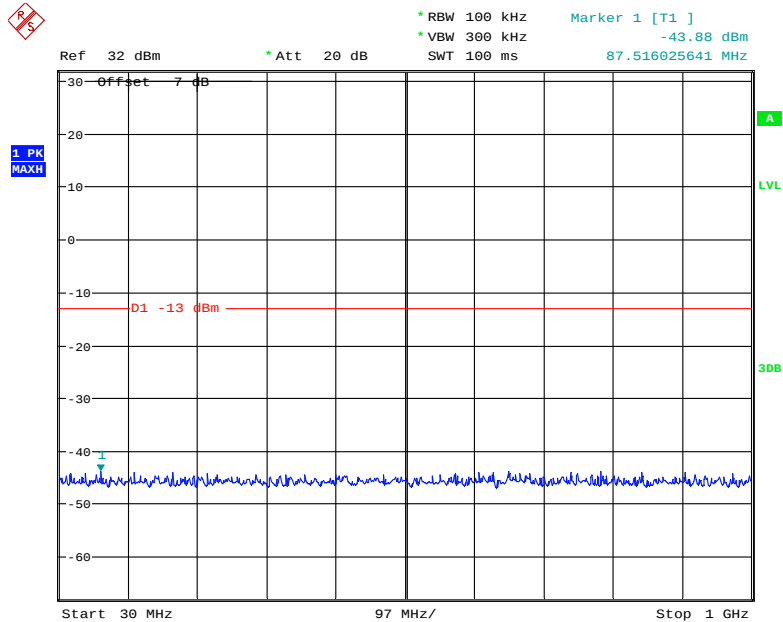
Date: 17.DEC.2019 23:13:50

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



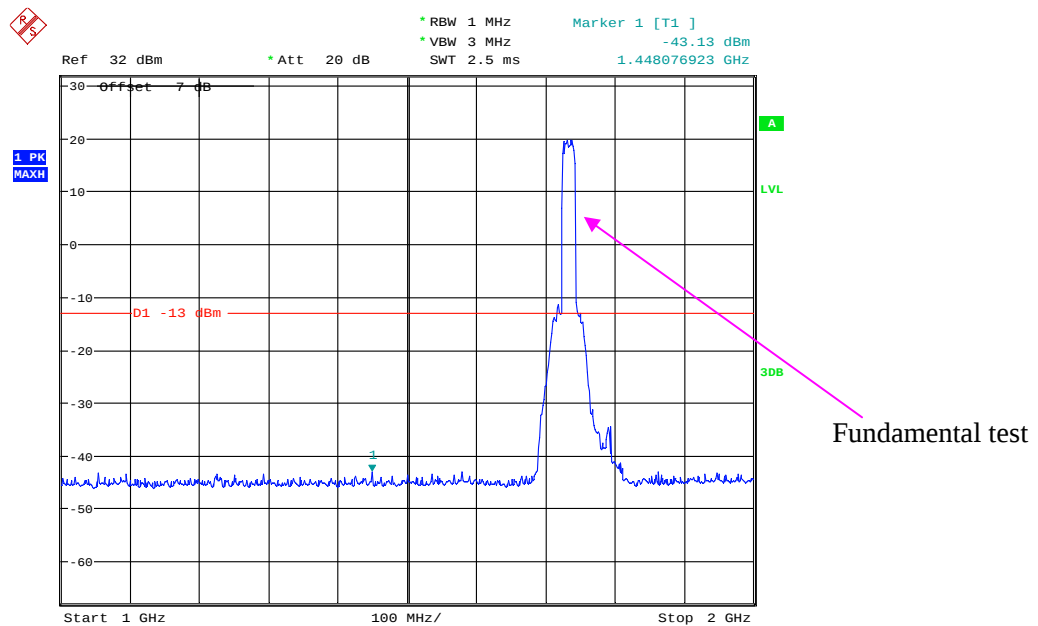
Date: 17.DEC.2019 23:16:05

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



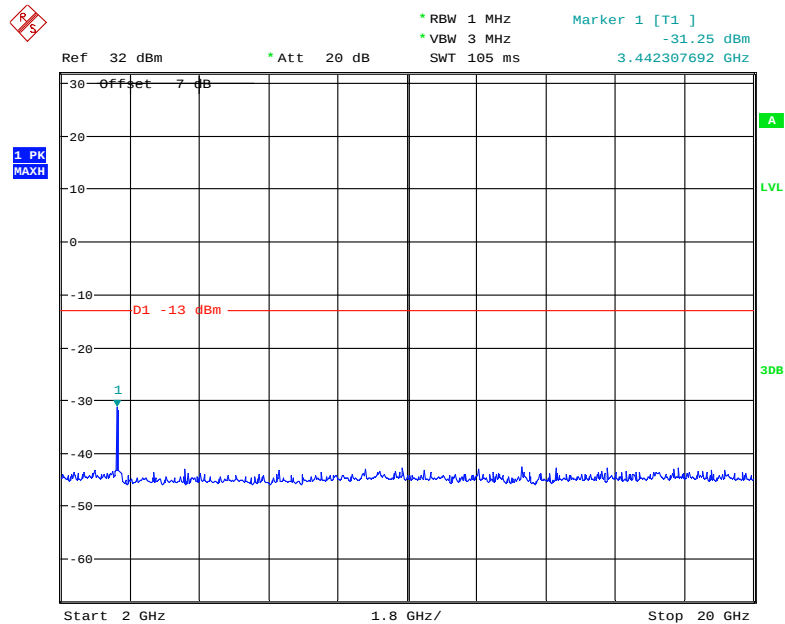
Date: 17.DEC.2019 23:09:34

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



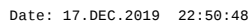
Date: 17.DEC.2019 23:15:02

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



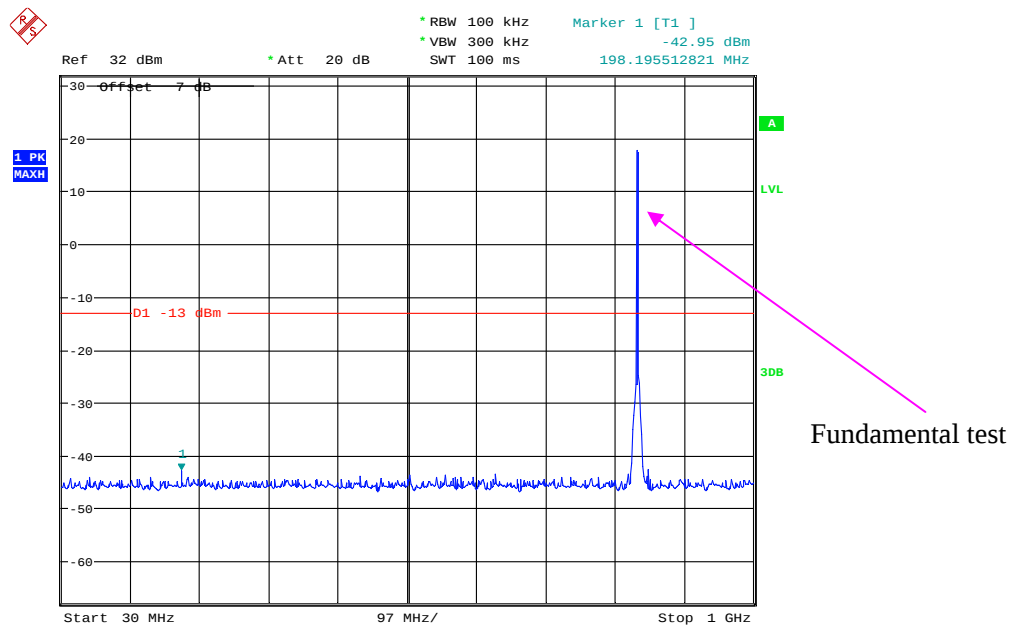
Date: 17.DEC.2019 23:15:49

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



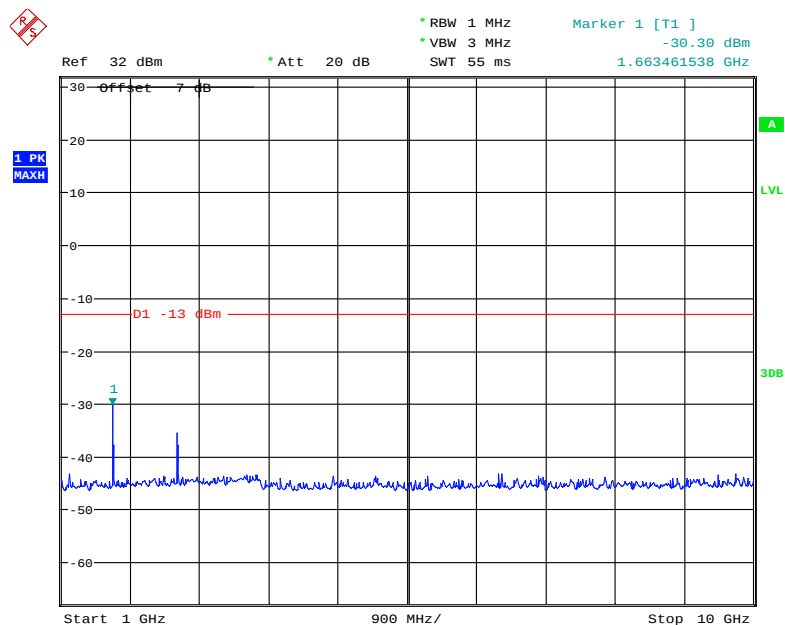
Date: 17.DEC.2019 22:51:48

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



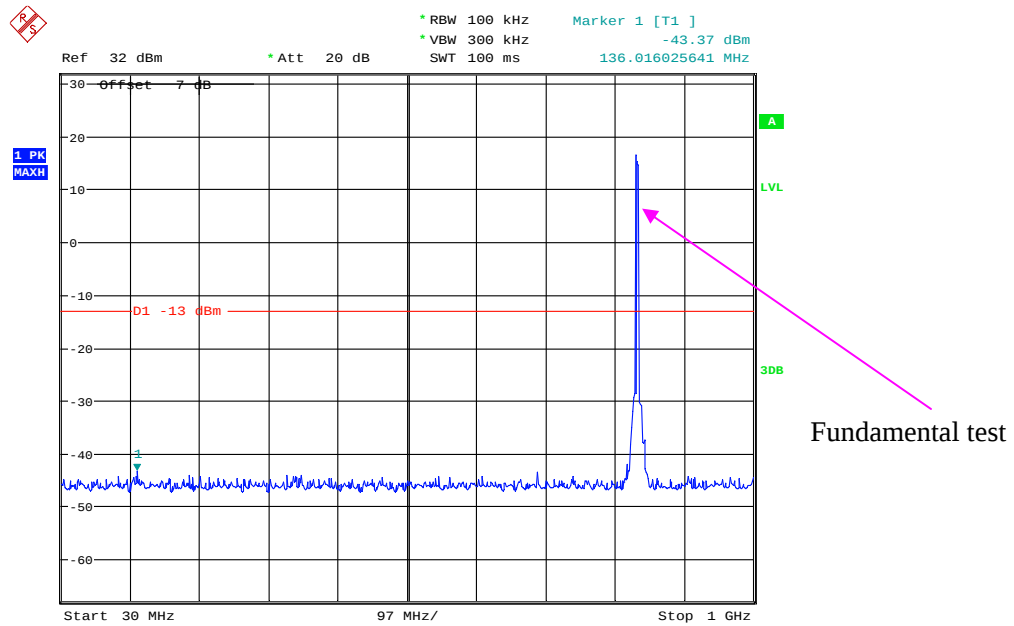
Date: 17.DEC.2019 22:53:41

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



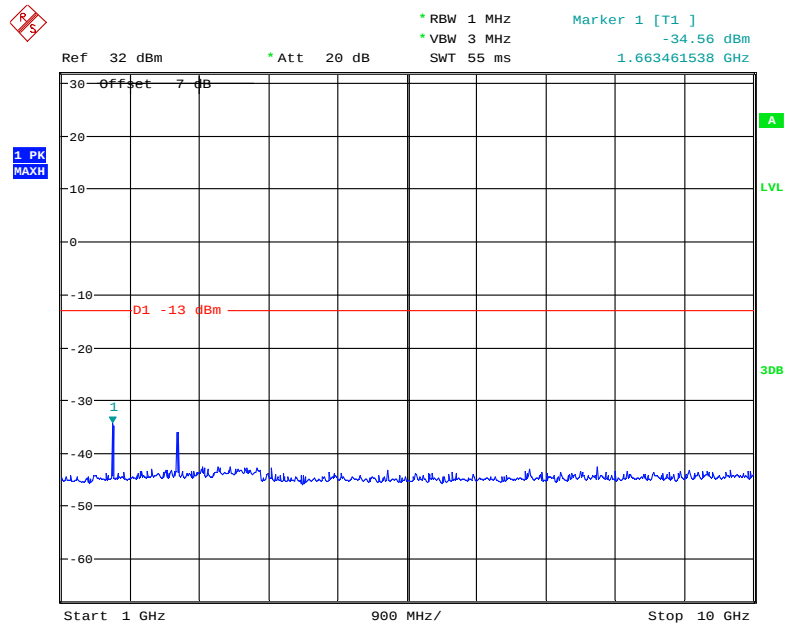
Date: 17.DEC.2019 22:53:04

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



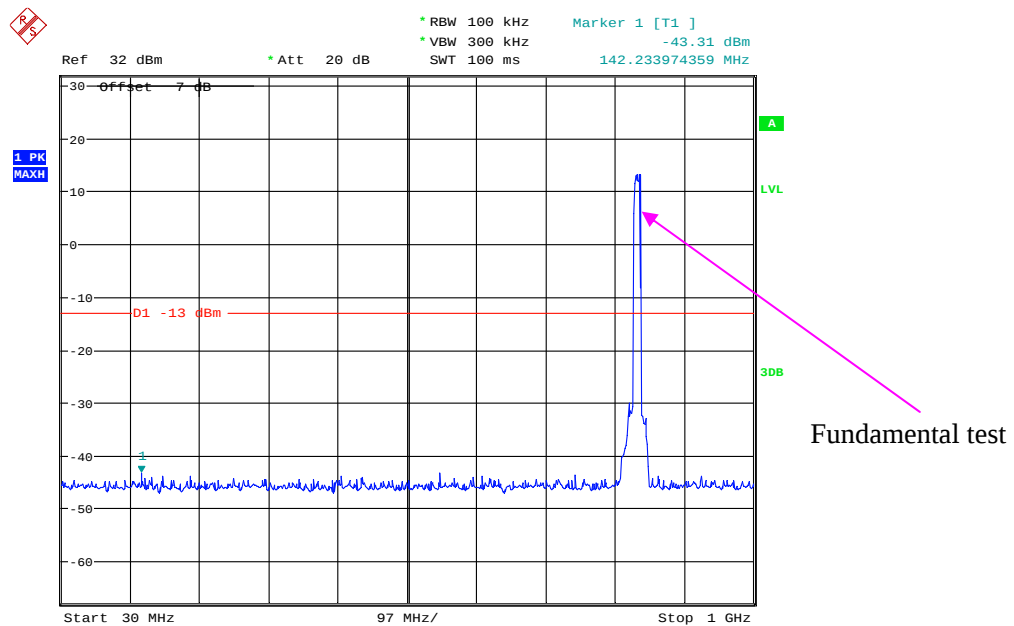
Date: 17.DEC.2019 22:54:16

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



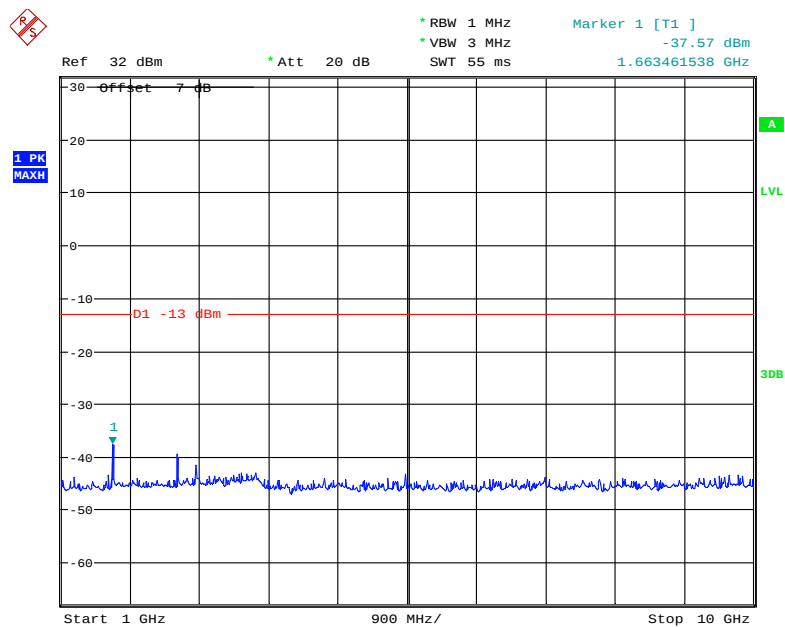
Date: 17.DEC.2019 22:55:00

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



Date: 17.DEC.2019 22:55:56

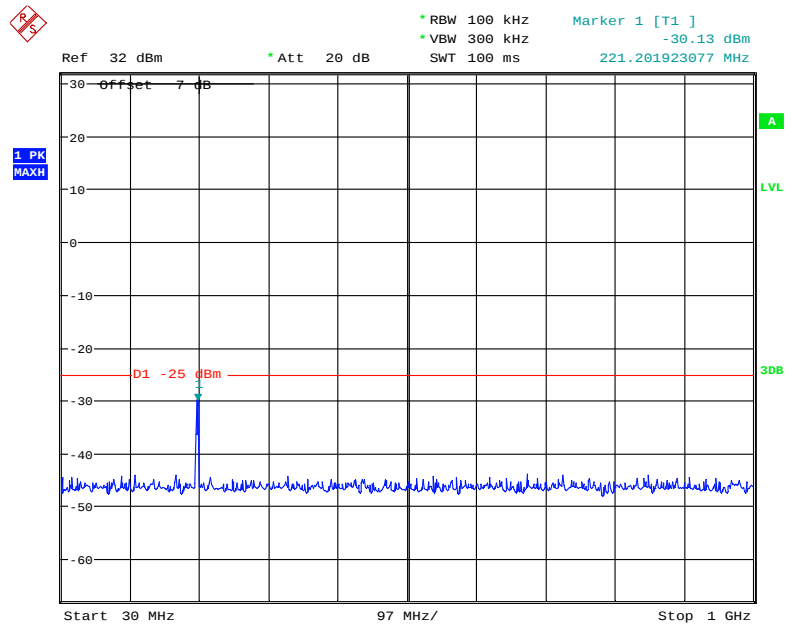
1 GHz – 10 GHz (10.0 MHz, Middle Channel)



Date: 17.DEC.2019 22:55:25

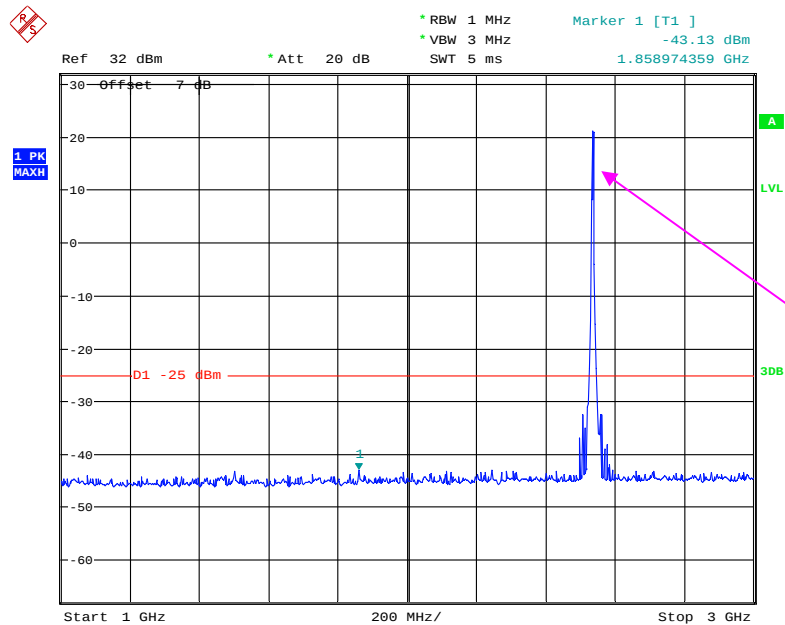
LTE Band 7:

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



Date: 17.DEC.2019 23:04:47

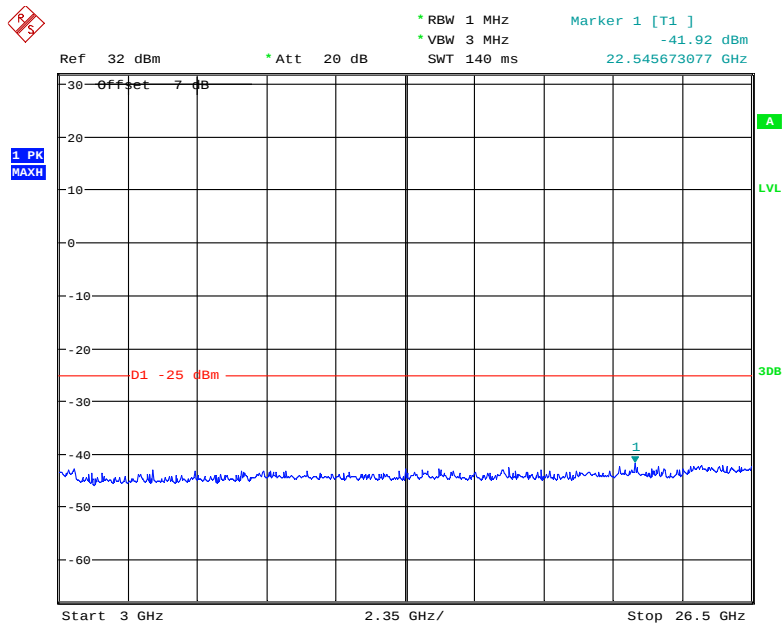
1 GHz – 3.0 GHz (5.0 MHz, Middle Channel)



Fundamental test

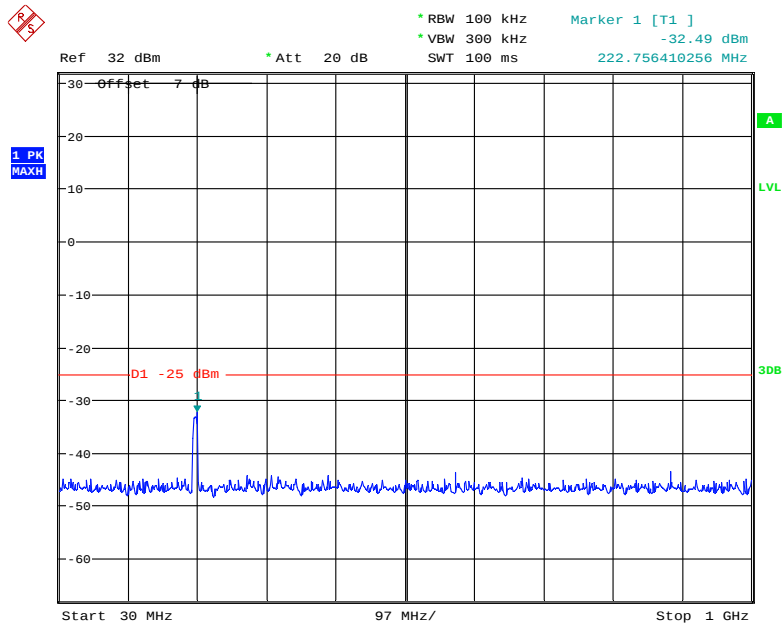
Date: 17.DEC.2019 23:02:59

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



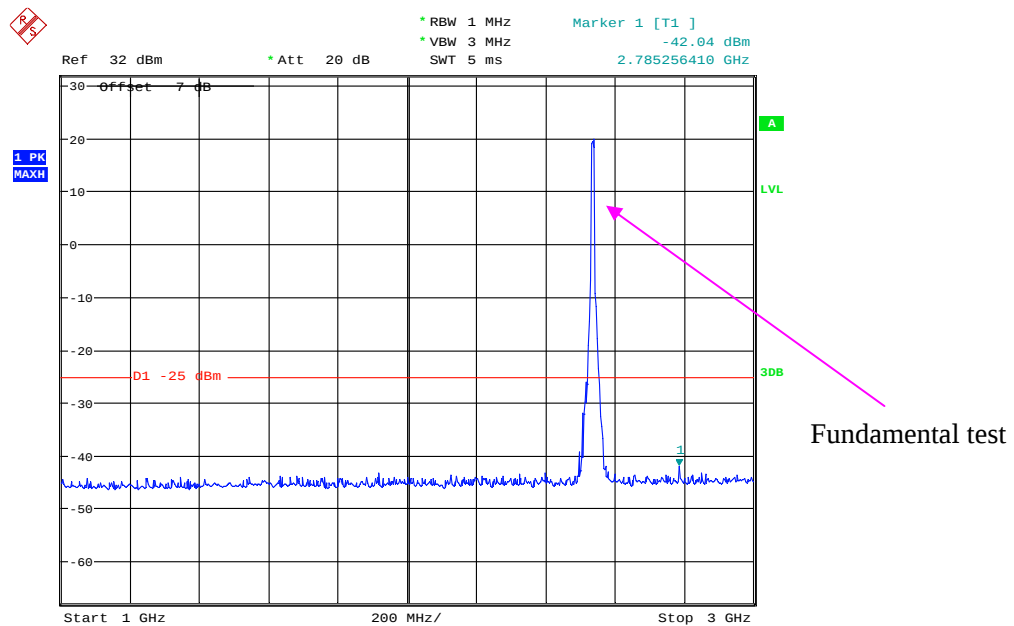
Date: 17.DEC.2019 23:03:40

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



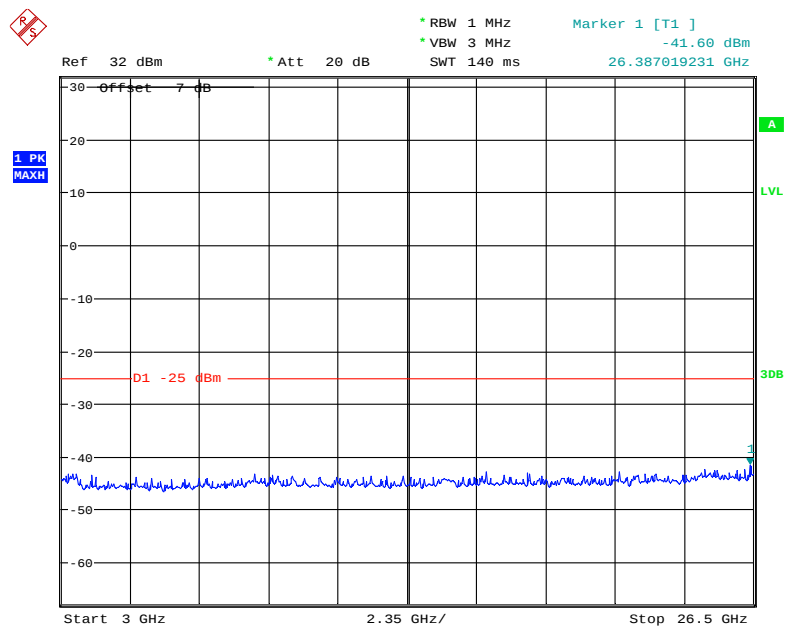
Date: 17.DEC.2019 23:05:10

1 GHz – 3 GHz (10.0 MHz, Middle Channel)



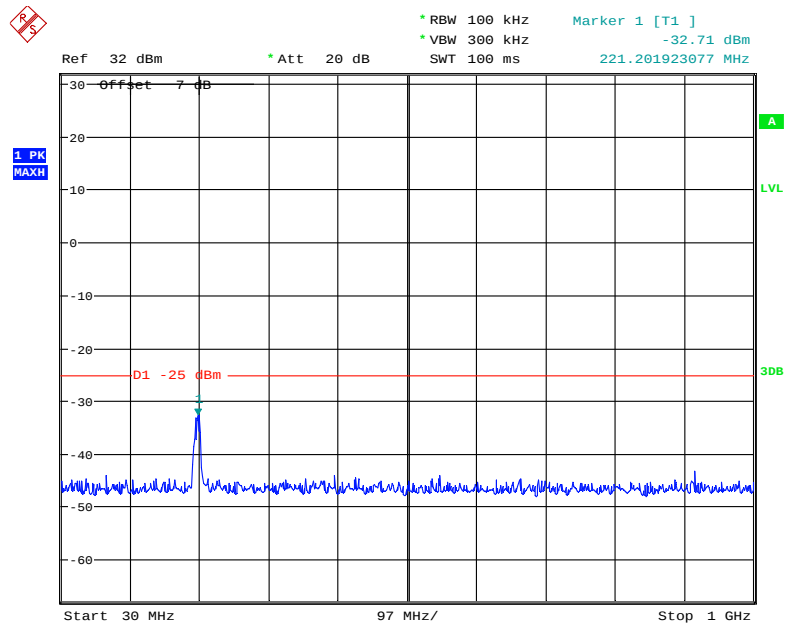
Date: 17.DEC.2019 23:02:21

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



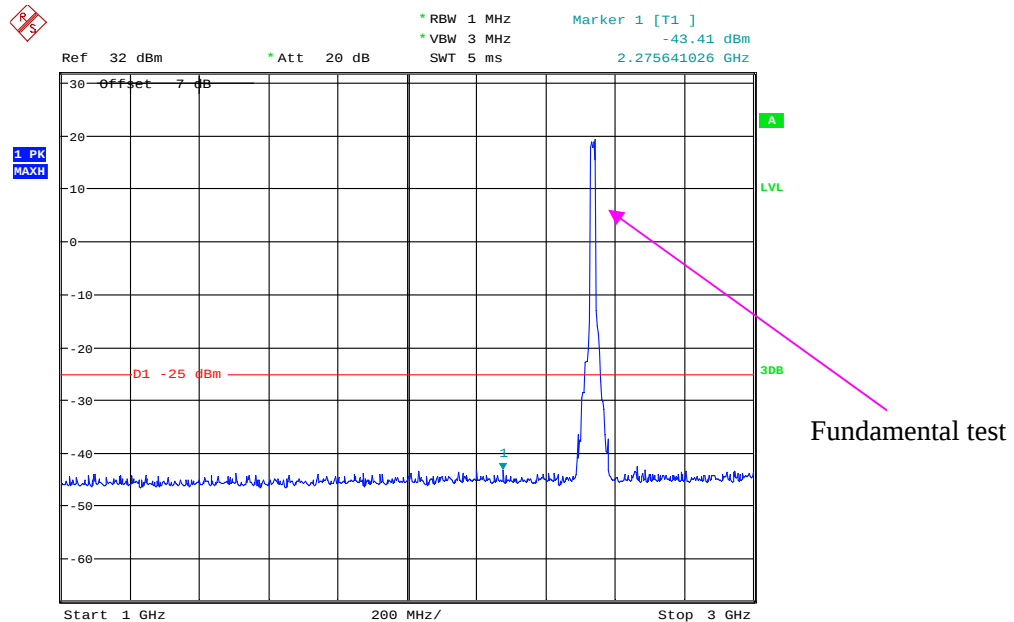
Date: 17.DEC.2019 23:03:55

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



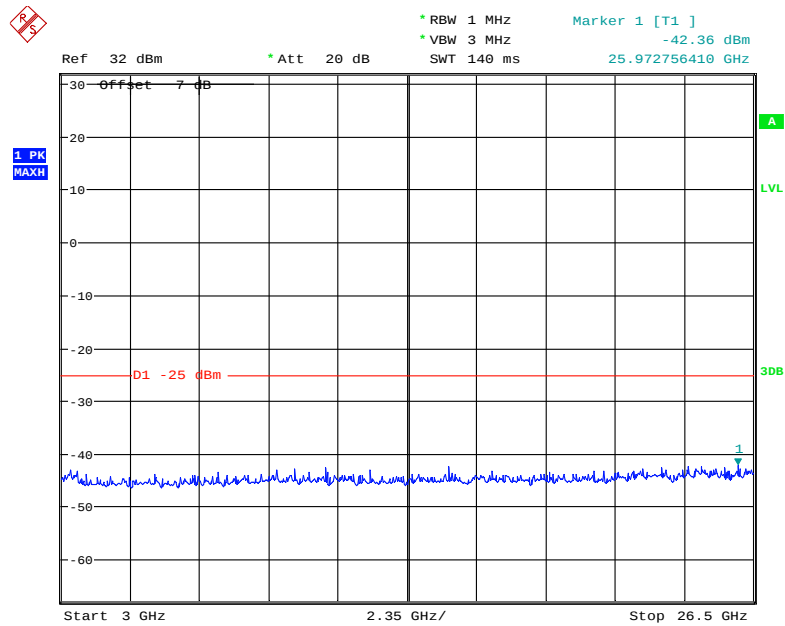
Date: 17.DEC.2019 23:05:23

1 GHz – 3 GHz (15.0 MHz, Middle Channel)



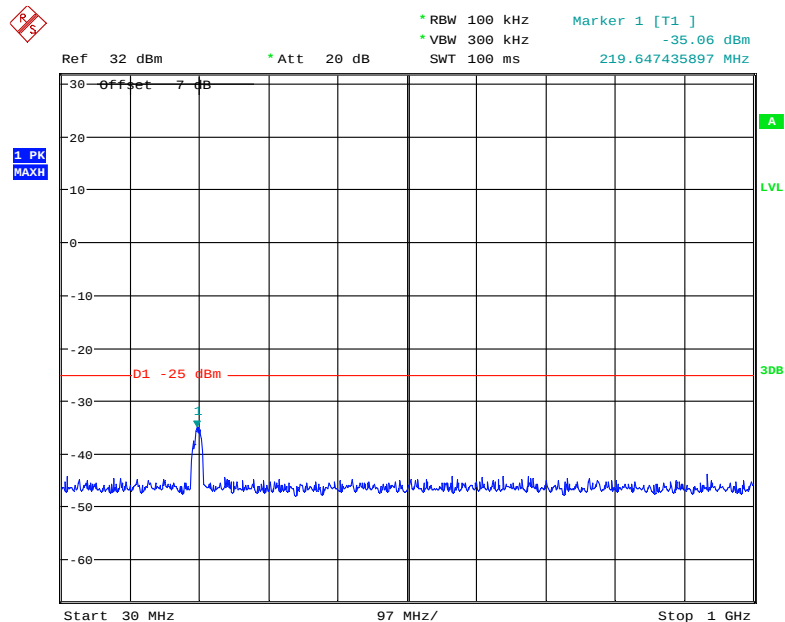
Date: 17.DEC.2019 23:01:54

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



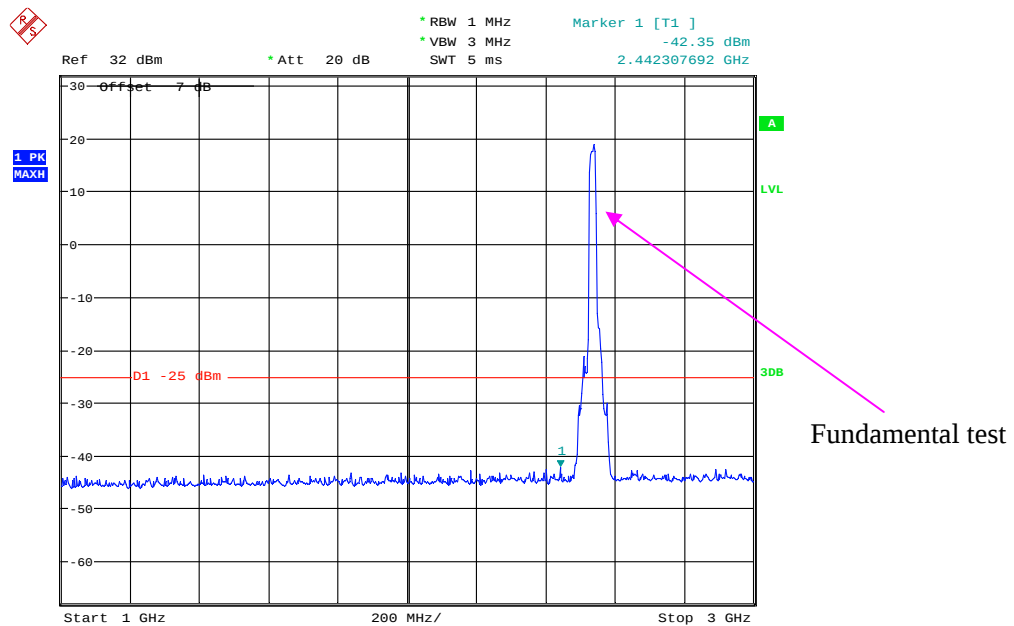
Date: 17.DEC.2019 23:04:06

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



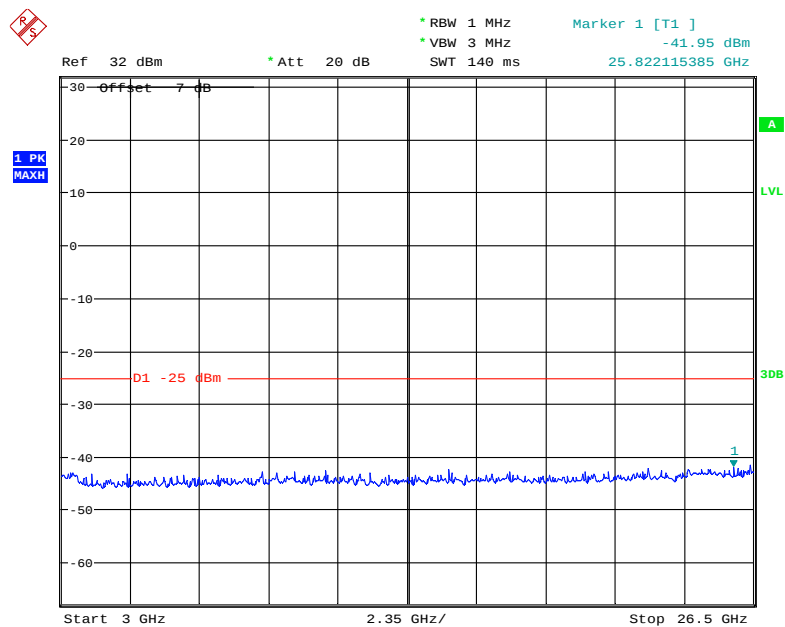
Date: 17.DEC.2019 23:05:38

1 GHz – 3 GHz (20.0 MHz, Middle Channel)



Date: 17.DEC.2019 23:01:27

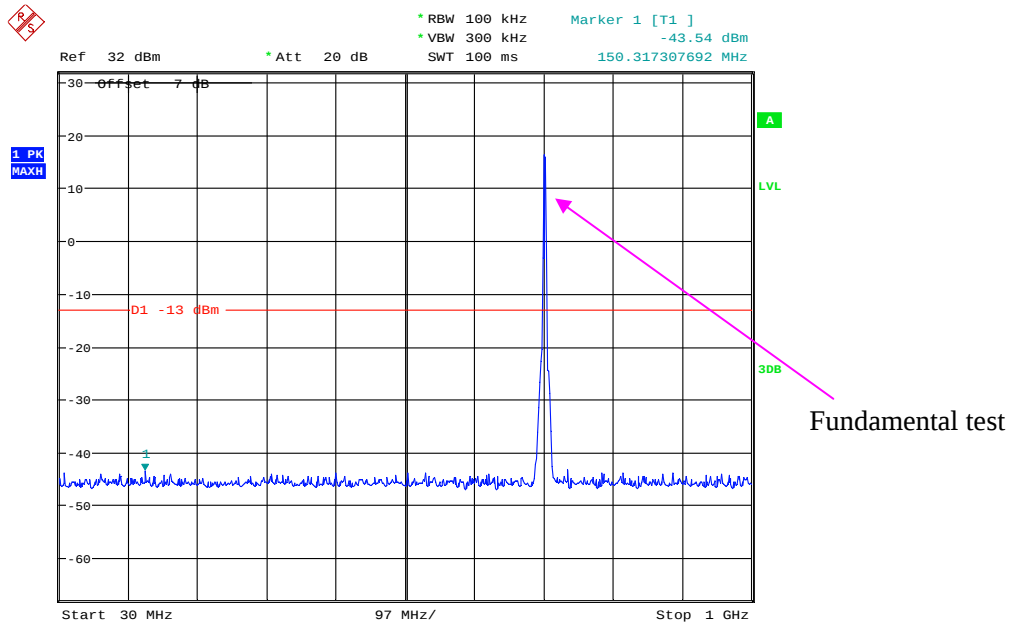
3 GHz – 26.5 GHz (20.0 MHz, Middle Channel)



Date: 17.DEC.2019 23:04:16

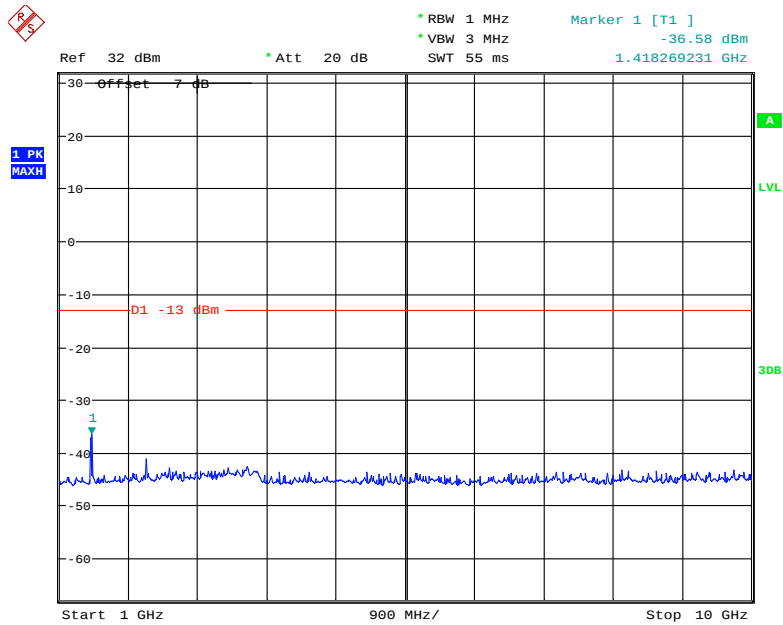
LTE Band 17:

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



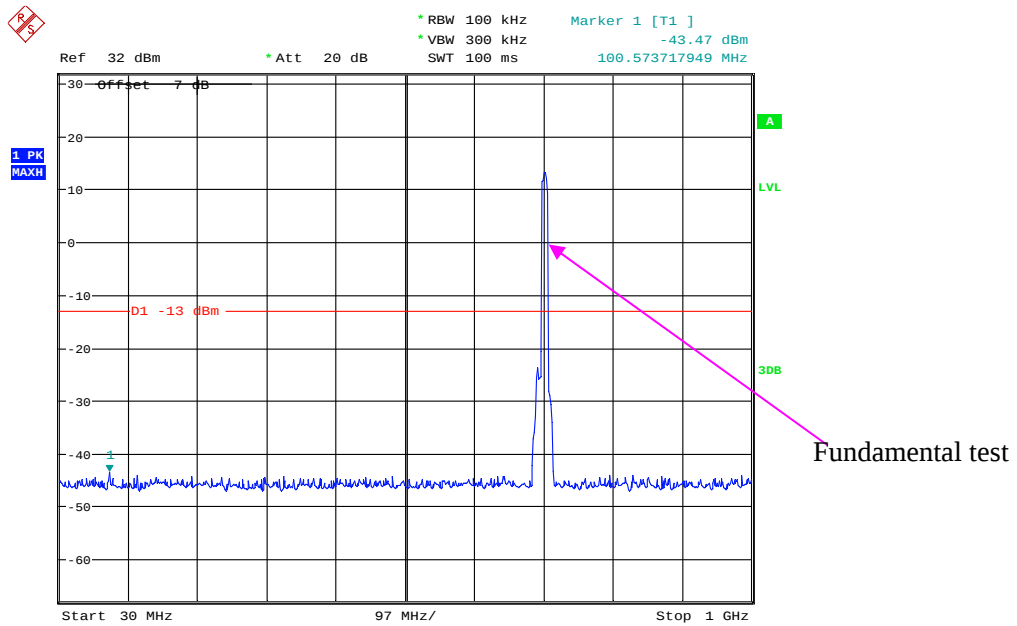
Date: 17.DEC.2019 23:23:13

1 GHz – 10GHz (5 MHz, Middle Channel)



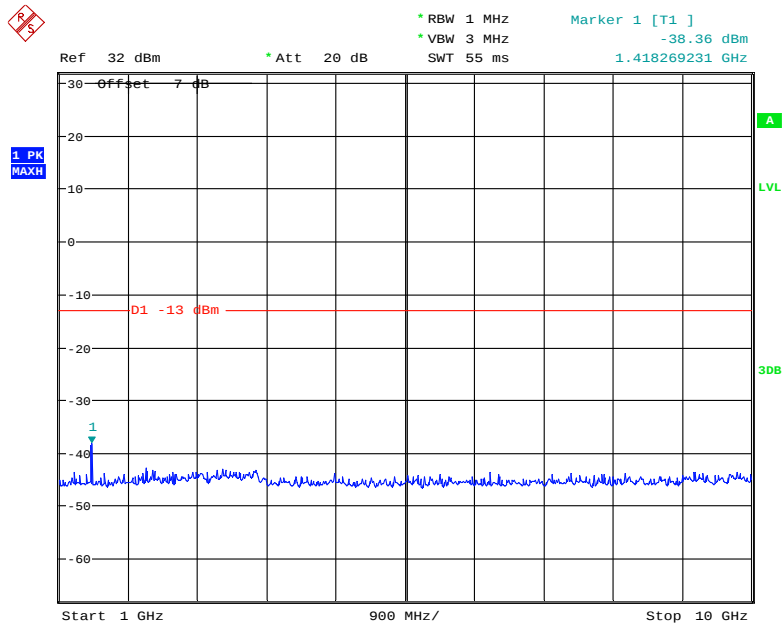
Date: 17.DEC.2019 23:20:37

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



Date: 17.DEC.2019 23:22:37

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



Date: 17.DEC.2019 23:22:03

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

Applicable Standard

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

Test Procedure

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

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

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

Test Data**Environmental Conditions**

Temperature:	24~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.9~101.0 kPa

*The testing was performed by Charlie Cha and Zero Yan from 2019-12-07 to 2020-01-03
EUT operation mode: Transmitting*

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

30 MHz ~ 10 GHz:

Cellular Band (Part 22H)

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 22H	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
316.8	34.26	296	1.0	H	-67.2	0.71	0.0	-67.91	-13	54.91
316.8	35.42	184	1.8	V	-64.4	0.71	0.0	-65.11	-13	52.11
1804.00	55.61	287	1.7	H	-49.4	1.30	9.30	-41.40	-13	28.40
1804.00	53.11	15	1.8	V	-51.5	1.30	9.30	-43.50	-13	30.50
2706.00	63.89	99	2.4	H	-39.2	2.00	10.40	-30.80	-13	17.80
2706.00	61.21	237	2.1	V	-41.5	2.00	10.40	-33.10	-13	20.10
3608.00	46.26	134	1.6	H	-55.5	1.50	12.10	-44.90	-13	31.90
3608.00	44.88	342	1.7	V	-56.3	1.50	12.10	-45.70	-13	32.70
WCDMA Mode, Middle channel										
318.3	34.57	188	2.3	H	-66.9	0.71	0.0	-67.61	-13	54.61
318.3	35.24	98	1.8	V	-64.6	0.71	0.0	-65.31	-13	52.31
1673.20	49.75	171	2.1	H	-56.6	1.30	8.90	-49.00	-13	36.00
1673.20	47.74	196	1.9	V	-58.0	1.30	8.90	-50.40	-13	37.40
2509.80	44.88	249	1.8	H	-58.5	2.60	10.20	-50.90	-13	37.90
2509.80	43.51	117	1.8	V	-59.2	2.60	10.20	-51.60	-13	38.60
3346.40	44.32	342	1.6	H	-56.6	1.50	11.70	-46.40	-13	33.40
3346.40	43.89	1	1.4	V	-57.0	1.50	11.70	-46.80	-13	33.80
CDMA (1*RTT , BC0), Middle channel										
312.6	33.67	346	2.0	H	-67.8	0.71	0.0	-68.51	-13	55.51
312.6	34.19	227	1.5	V	-65.7	0.71	0.0	-66.41	-13	53.41
1673.04	43.95	22	1.5	H	-62.8	1.30	8.90	-55.20	-13	42.20
1673.04	43.96	280	1.9	V	-62.2	1.30	8.90	-54.60	-13	41.60
2509.56	43.52	156	2.1	H	-60.5	2.60	10.20	-52.90	-13	39.90
2509.56	43.49	21	1.2	V	-59.9	2.60	10.20	-52.30	-13	39.30
CDMA(EV-DO, BC0), Middle channel										
321.3	33.49	218	1.8	H	-68.0	0.71	0.0	-68.71	-13	55.71
321.3	34.46	308	1.7	V	-65.4	0.71	0.0	-66.11	-13	53.11
1673.04	44.66	47	2.1	H	-62.1	1.30	8.90	-54.50	-13	41.50
1673.04	46.16	336	2.5	V	-60.0	1.30	8.90	-52.40	-13	39.40
2509.56	44.14	5	1.7	H	-59.9	2.60	10.20	-52.30	-13	39.30
2509.56	44.47	172	1.4	V	-58.9	2.60	10.20	-51.30	-13	38.30

30 MHz ~ 20 GHz:**PCS Band (Part 24E)**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 24E	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
GSM Mode, middle channel										
321.3	33.64	161	1.8	H	-67.8	0.71	0.0	-68.51	-13	55.51
321.3	34.71	252	1.5	V	-65.1	0.71	0.0	-65.81	-13	52.81
3760.00	46.37	279	1.7	H	-55.7	1.50	11.80	-45.40	-13	32.40
3760.00	45.98	345	2.2	V	-55.6	1.50	11.80	-45.30	-13	32.30
5640.00	43.95	350	2.0	H	-55.7	1.70	12.40	-45.00	-13	32.00
5640.00	44.26	152	1.3	V	-55.1	1.70	12.40	-44.40	-13	31.40
7520.00	57.34	153	1.0	H	-38.6	1.90	10.70	-29.80	-13	16.80
7520.00	54.12	157	1.9	V	-41.4	1.90	10.70	-32.60	-13	19.60

30 MHz ~ 20 GHz:**AWS Band (Part 27)**

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	FCC Part 27	
			Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)		Limit (dBm)	Margin (dB)
WCDMA Mode Band IV, Middle channel										
326.4	33.57	219	2.1	H	-67.9	0.71	0.0	-68.61	-13	55.61
326.4	34.65	118	1.5	V	-65.2	0.71	0.0	-65.91	-13	52.91
3465.20	53.75	83	1.7	H	-47.1	1.50	12.00	-36.60	-13	23.60
3465.20	51.62	163	2.1	V	-50.0	1.50	12.00	-39.50	-13	26.50

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

Frequency	Receiver	Turntable	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
(MHz)	Reading (dBμV)	Angle Degree	Height (m)	Polar (H/V)	Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
Band 4 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 20 GHz										
312.4	32.67	152	1.5	H	-68.8	0.71	0.0	-69.51	-13	56.51
312.4	33.42	19	2.0	V	-66.4	0.71	0.0	-67.11	-13	54.11
3465.00	52.22	166	2.3	H	-48.5	1.50	12.00	-38.00	-13	25.00
3465.00	52.34	90	2.0	V	-49.2	1.50	12.00	-38.70	-13	25.70
Band 5 (1.4 MHz, Middle Channel)										
Test frequency range:30 MHz ~ 10 GHz										
316.3	34.12	28	1.1	H	-67.4	0.71	0.0	-68.11	-13	55.11
316.3	35.26	211	1.8	V	-64.6	0.71	0.0	-65.31	-13	52.31
1673.00	52.39	314	1.1	H	-53.9	1.30	8.90	-46.30	-13	33.30
1673.00	50.19	127	2.2	V	-55.5	1.30	8.90	-47.90	-13	34.90
2509.50	48.27	115	2.4	H	-55.1	2.60	10.20	-47.50	-13	34.50
2509.50	46.18	110	1.1	V	-56.6	2.60	10.20	-49.00	-13	36.00
Band 7 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 26.5GHz										
317.5	33.49	102	1.7	H	-68.0	0.71	0.0	-68.71	-25	43.71
317.5	34.67	27	1.4	V	-65.2	0.71	0.0	-65.91	-25	40.91
5070.00	44.87	336	2.1	H	-55.1	1.60	12.10	-44.60	-25	19.60
5070.00	43.85	51	2.3	V	-56.2	1.60	12.10	-45.70	-25	20.70
Band 17 (5 MHz, Middle Channel)										
Test frequency range: 30 MHz ~ 10GHz										
321.7	34.51	1	1.2	H	-67.0	0.71	0.0	-67.71	-13	54.71
321.7	35.29	244	1.3	V	-64.6	0.71	0.0	-65.31	-13	52.31
1420.00	44.59	296	2.1	H	-63.6	1.60	7.90	-57.30	-13	44.30
1420.00	44.38	219	2.2	V	-64.1	1.60	7.90	-57.80	-13	44.80

Note:

Absolute Level = Substituted Level - Cable loss + Antenna Gain

Margin = Limit- Absolute Level

dBd is for the ERP, dBi is for EIRP.

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

Applicable Standard

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

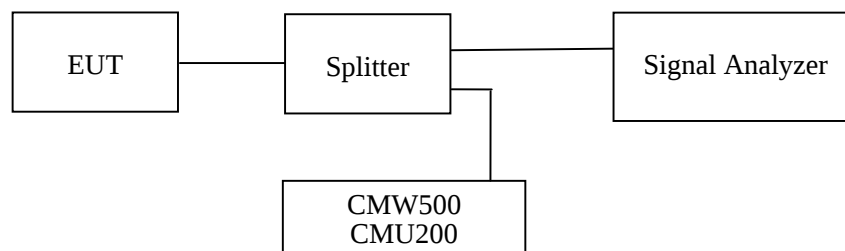
According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

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

Test Procedure

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

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



Test Data

Environmental Conditions

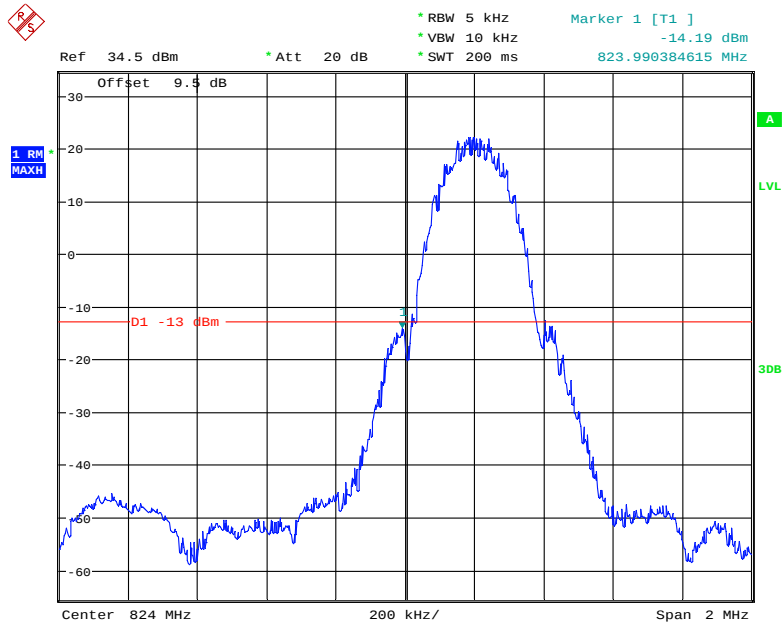
Temperature:	24~25 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Leo Huang and George Zhong from 2019-12-03 to 2020-04-07.

EUT operation mode: Transmitting

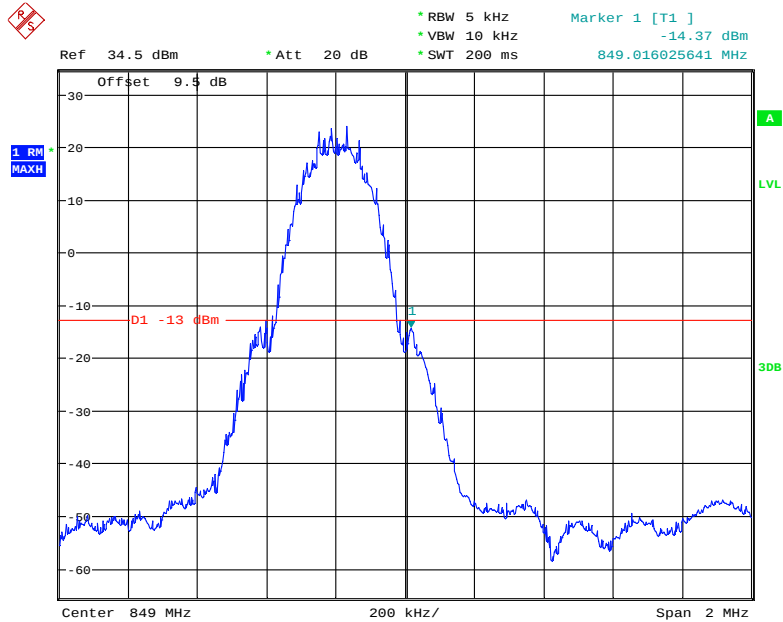
Test Result: Compliance. Please refer to the following plots.

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



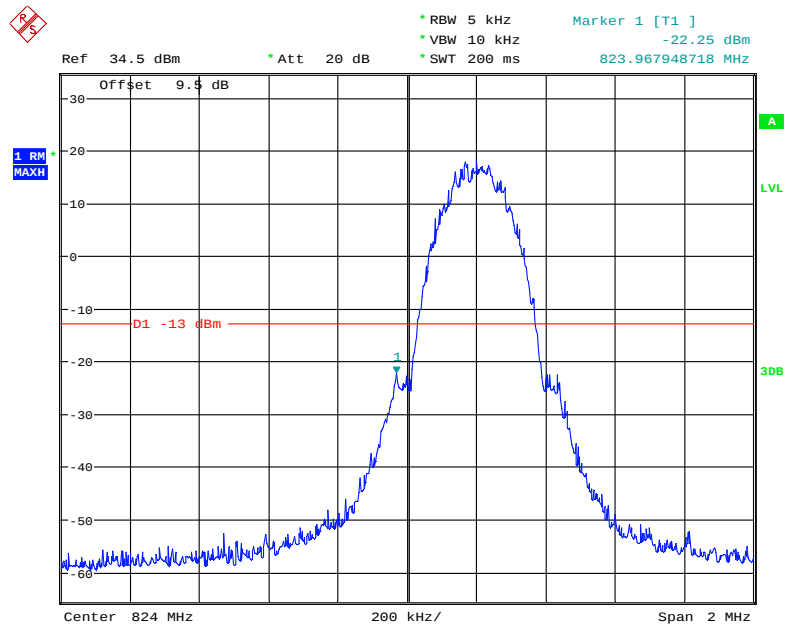
Date: 3.DEC.2019 22:13:52

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



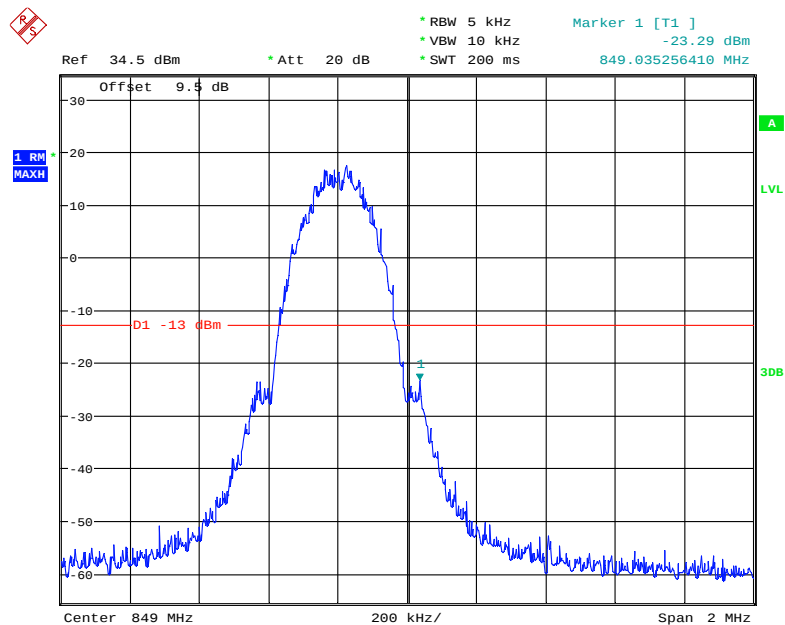
Date: 3.DEC.2019 22:15:39

Cellular Band, Left Band Edge for EDGE Mode



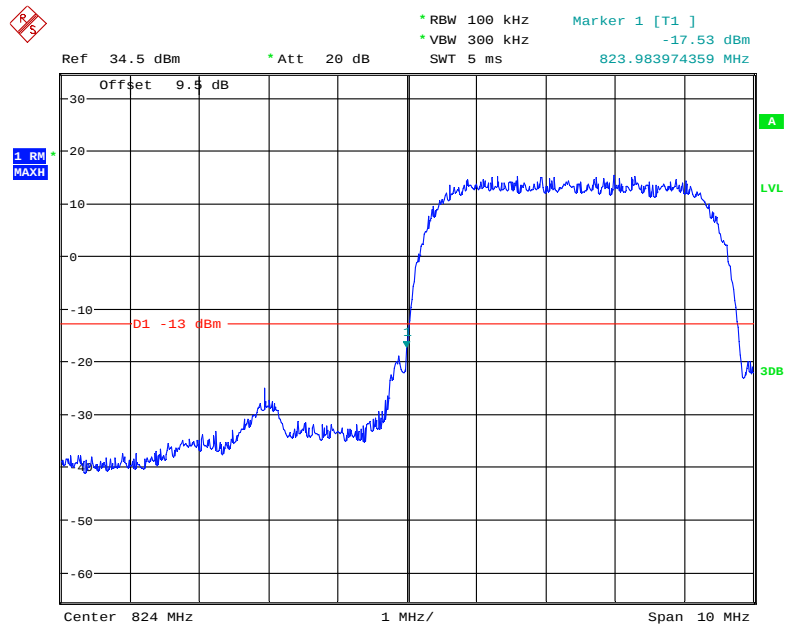
Date: 3.DEC.2019 22:42:07

Cellular Band, Right Band Edge for EDGE Mode



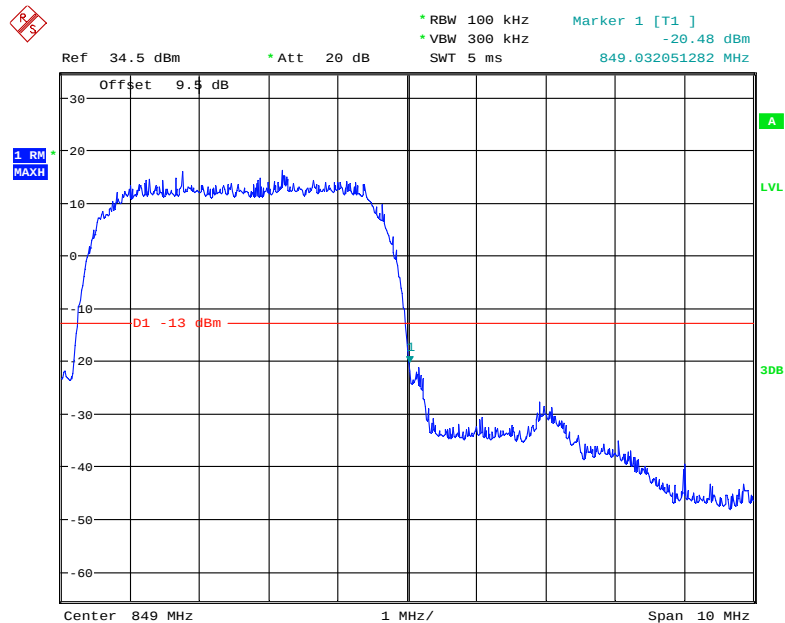
Date: 3.DEC.2019 22:43:30

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



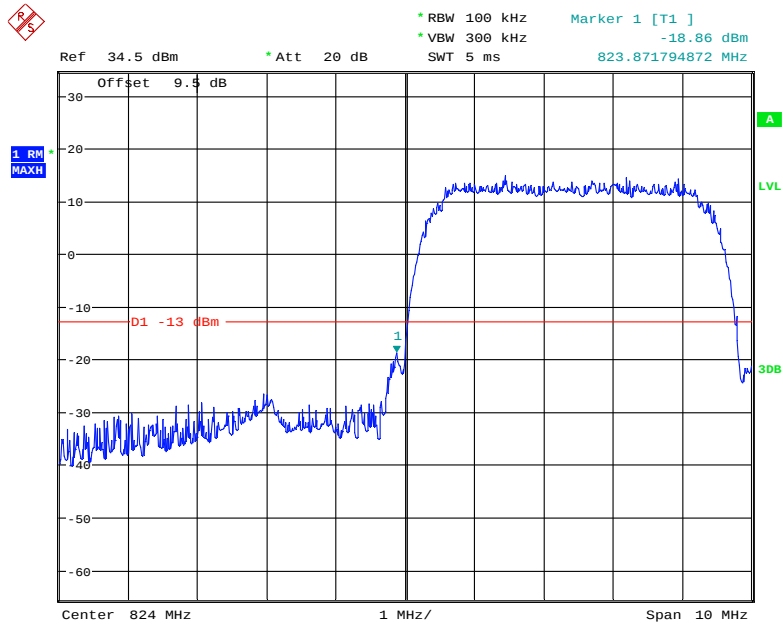
Date: 16.DEC.2019 21:13:07

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



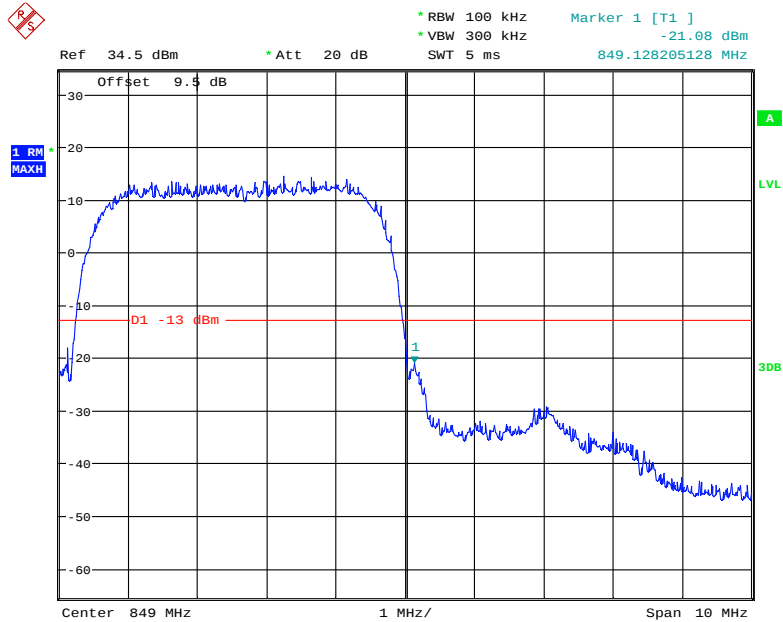
Date: 16.DEC.2019 21:13:32

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



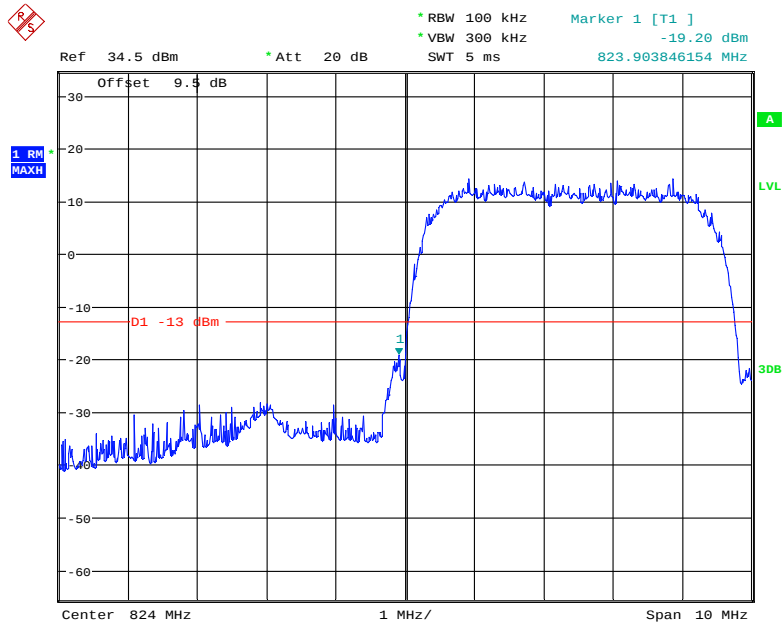
Date: 16.DEC.2019 21:05:03

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



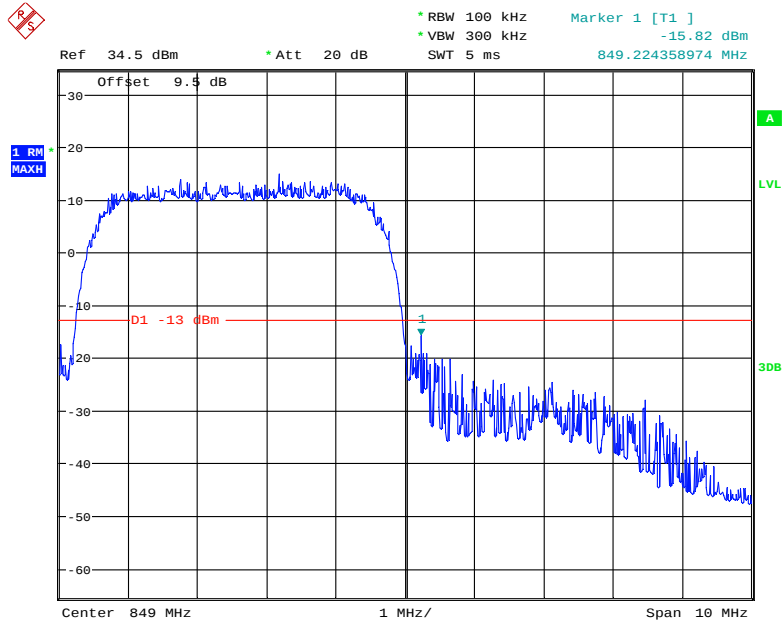
Date: 16.DEC.2019 21:06:07

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



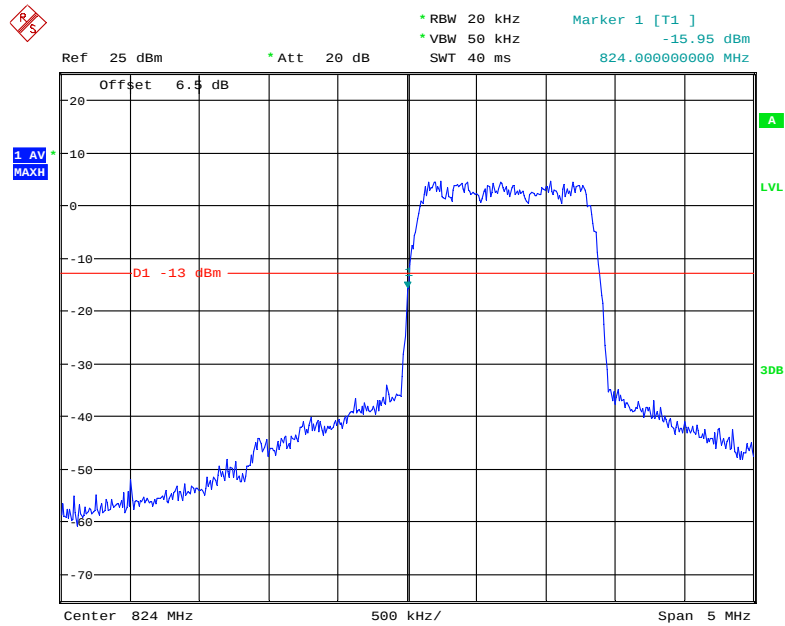
Date: 16.DEC.2019 21:12:12

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



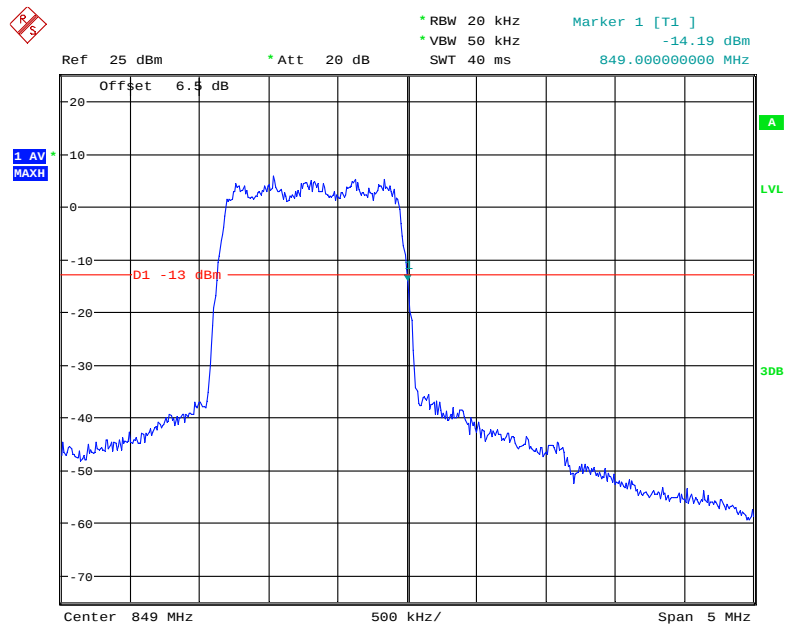
Date: 16.DEC.2019 21:11:36

Cellular Band, Left Band Edge for CDMA (1*RTT, BC0) Mode



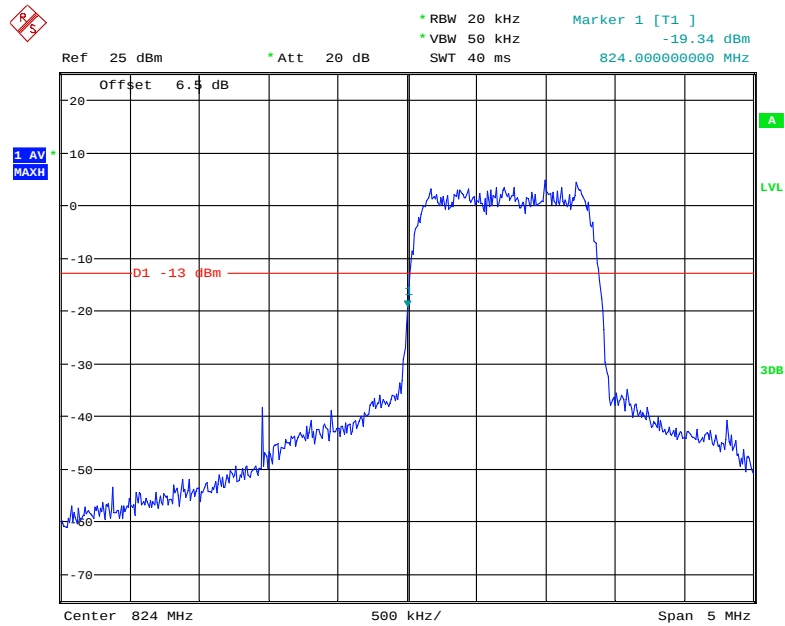
Date: 26.DEC.2019 14:49:41

Cellular Band, Right Band Edge for CDMA (1*RTT, BC0) Mode



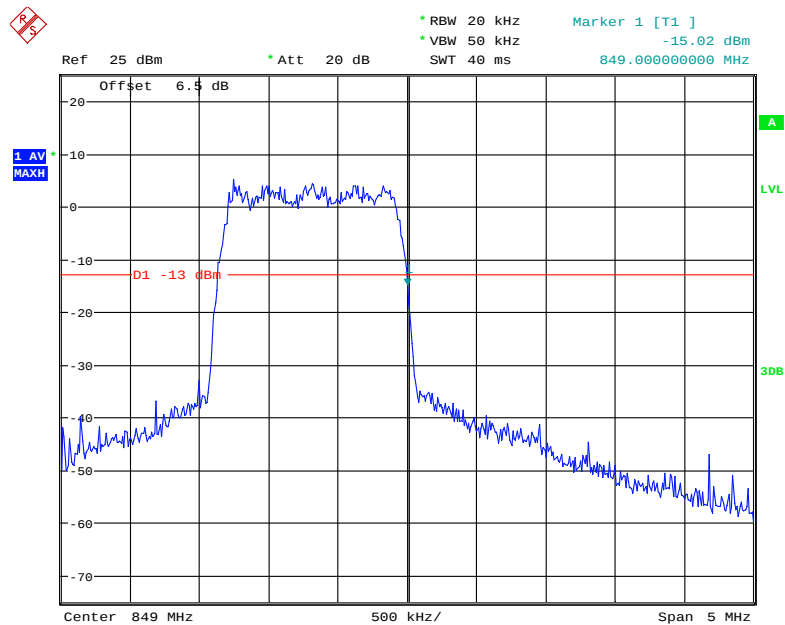
Date: 26.DEC.2019 14:48:53

Cellular Band, Left Band Edge for CDMA (EV-DO, BC0) Mode



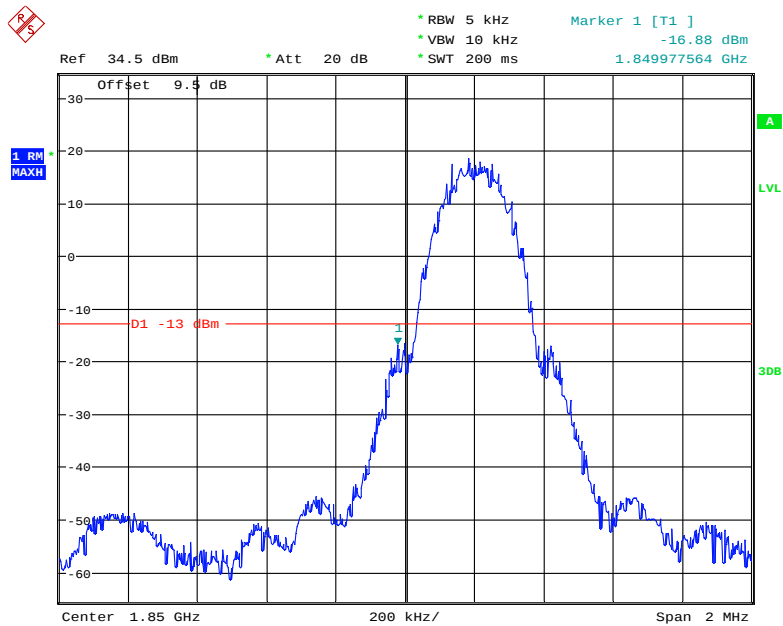
Date: 26.DEC.2019 15:30:35

Cellular Band, Right Band Edge for CDMA (EV-DO, BC0) Mode



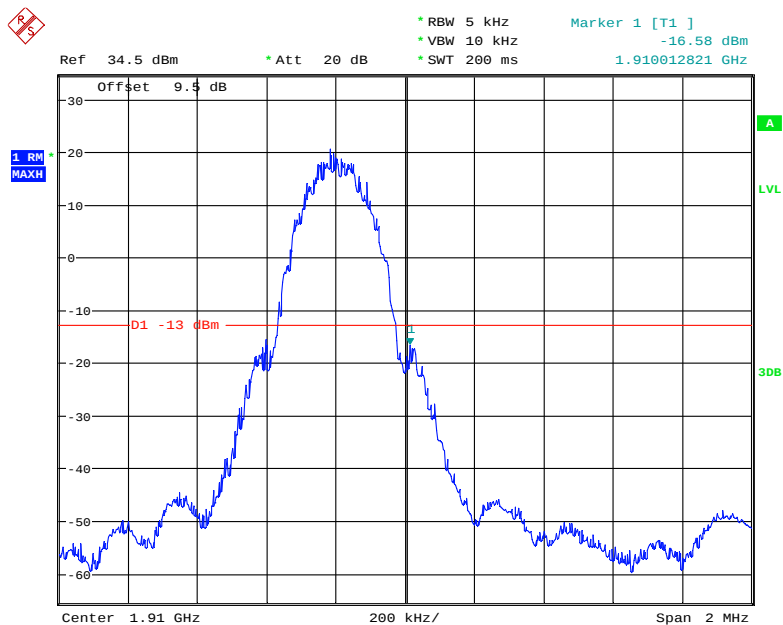
Date: 26.DEC.2019 15:29:56

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



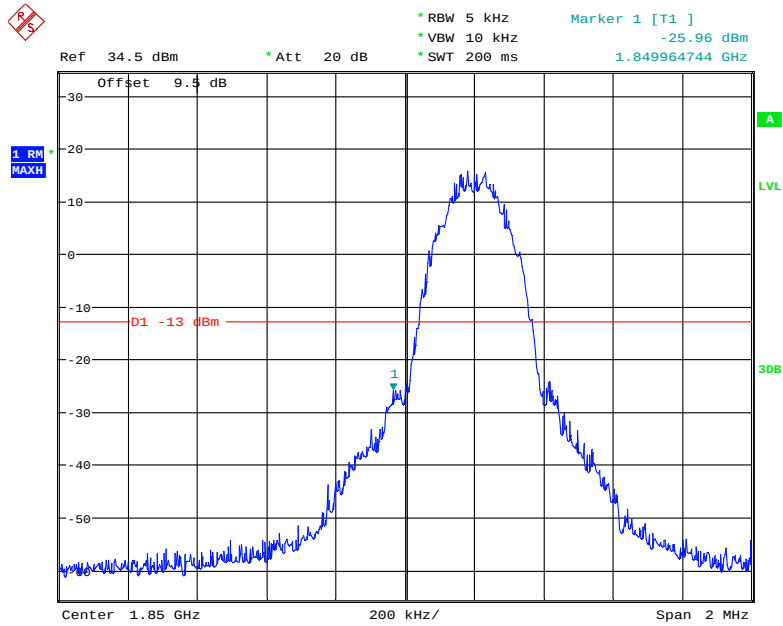
Date: 3.DEC.2019 22:28:05

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



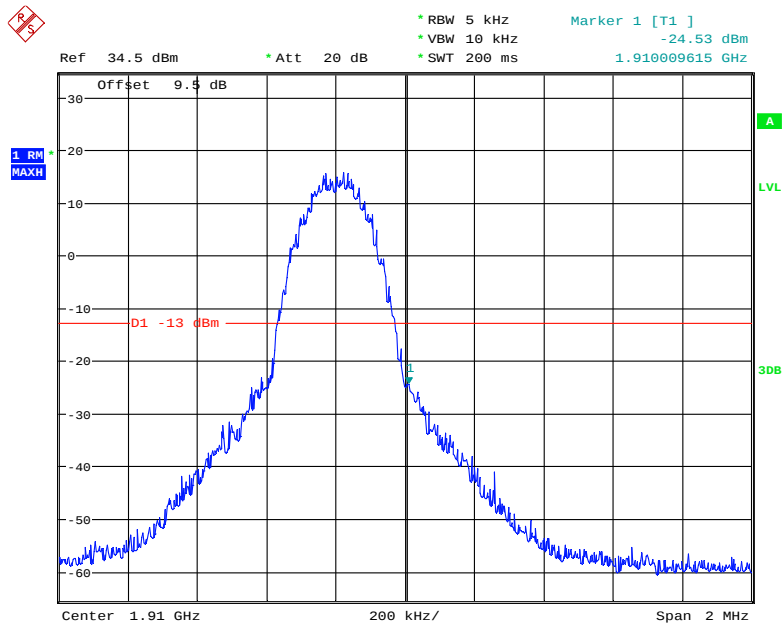
Date: 3.DEC.2019 22:28:53

PCS Band, Left Band Edge for EDGE Mode



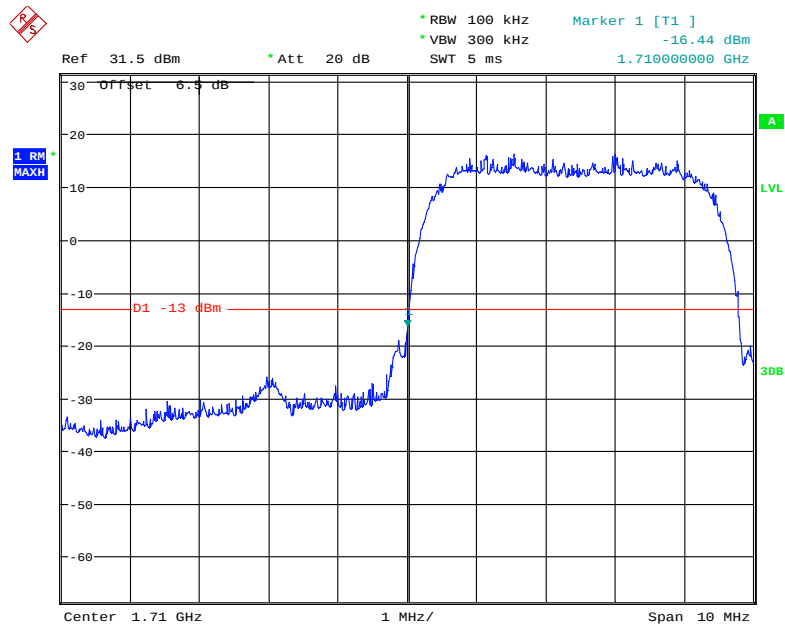
Date: 3.DEC.2019 22:32:54

PCS Band, Right Band Edge for EDGE Mode



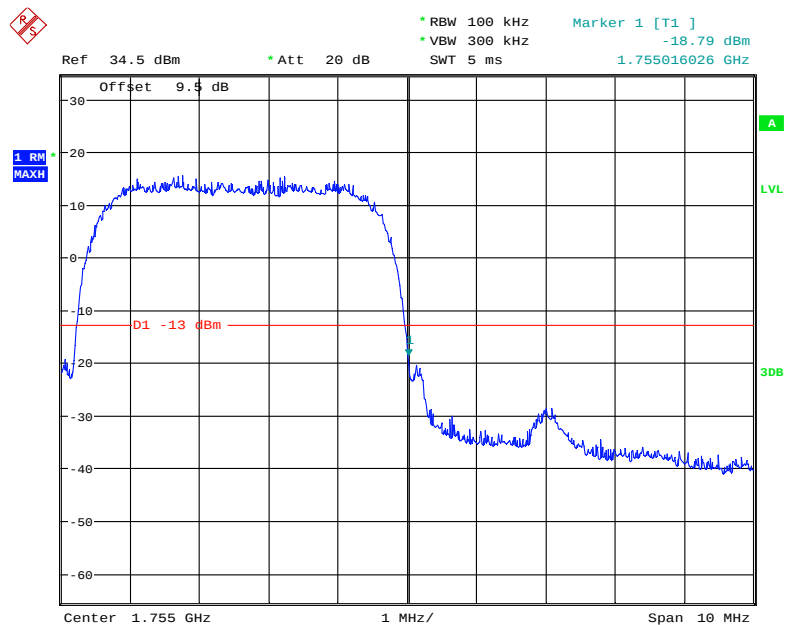
Date: 3.DEC.2019 22:32:04

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



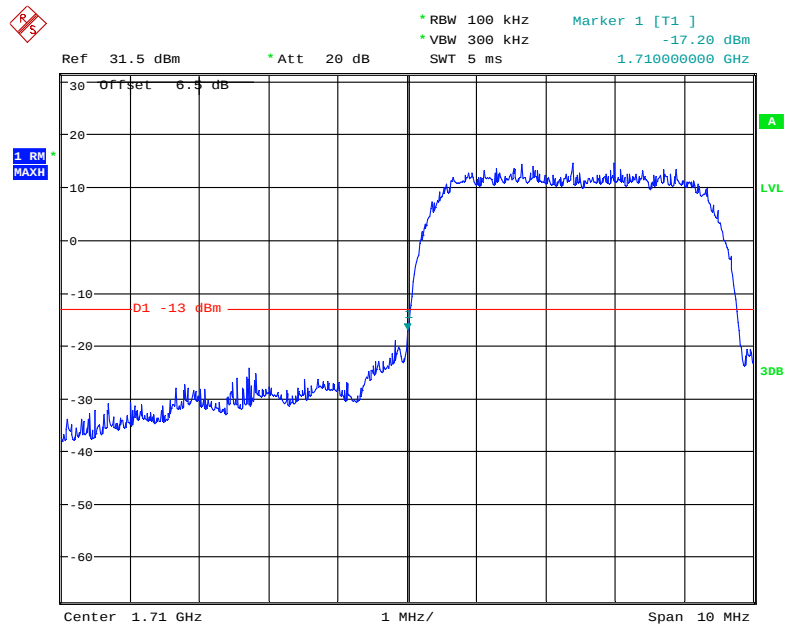
Date: 7.APR.2020 16:09:19

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



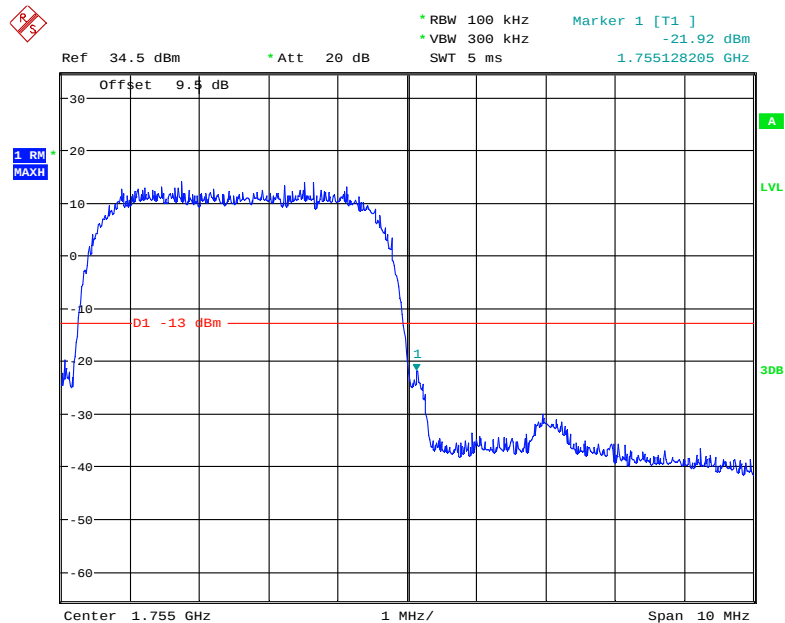
Date: 16.DEC.2019 21:31:14

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



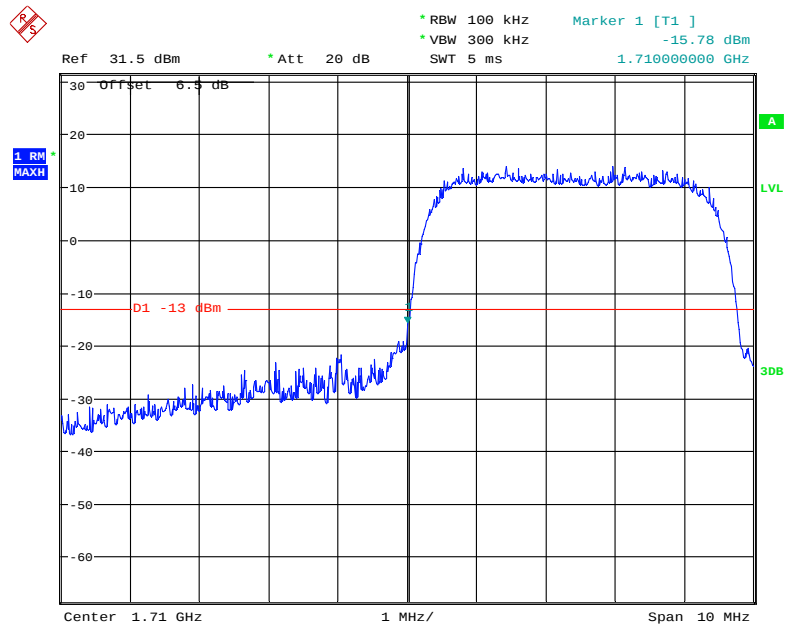
Date: 7.APR.2020 16:12:37

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



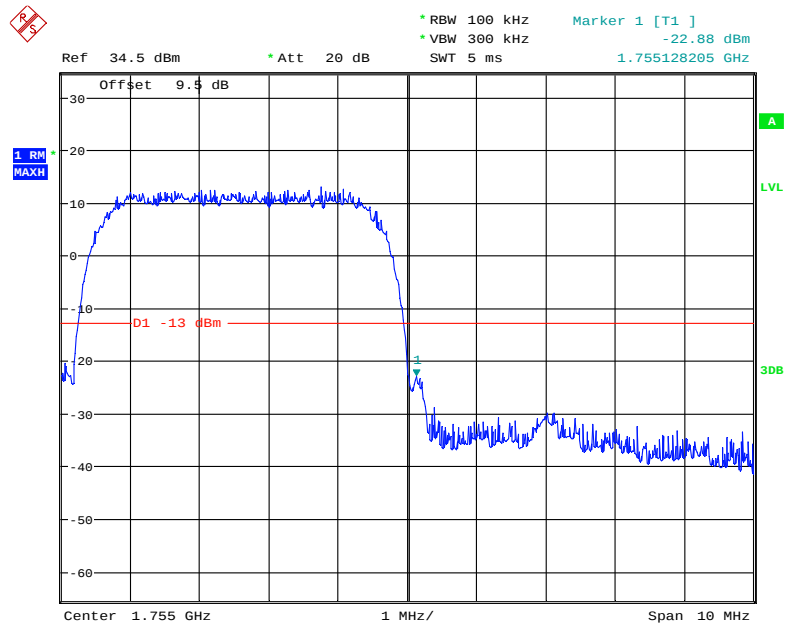
Date: 16.DEC.2019 21:28:26

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



Date: 7.APR.2020 16:15:14

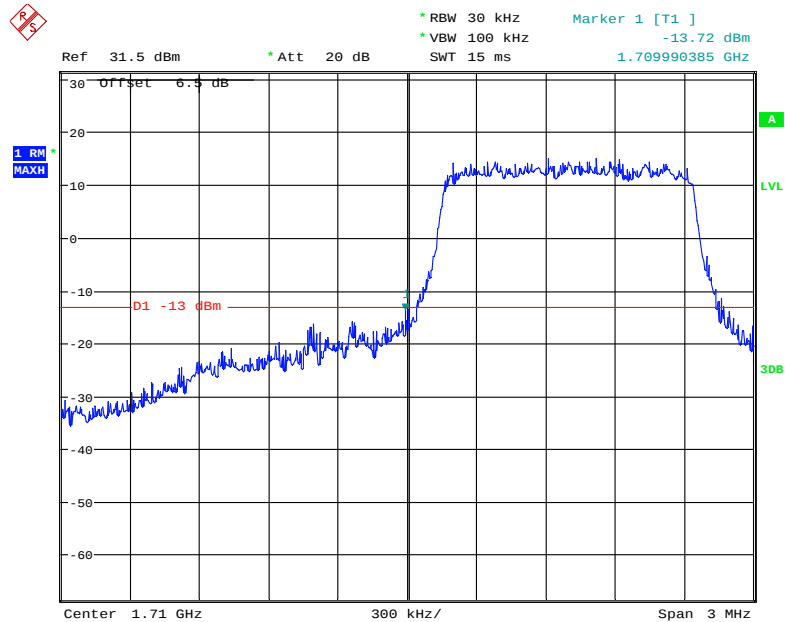
AWS Band, Right Band Edge for HSUPA (BPSK) Mode



Date: 16.DEC.2019 21:29:02

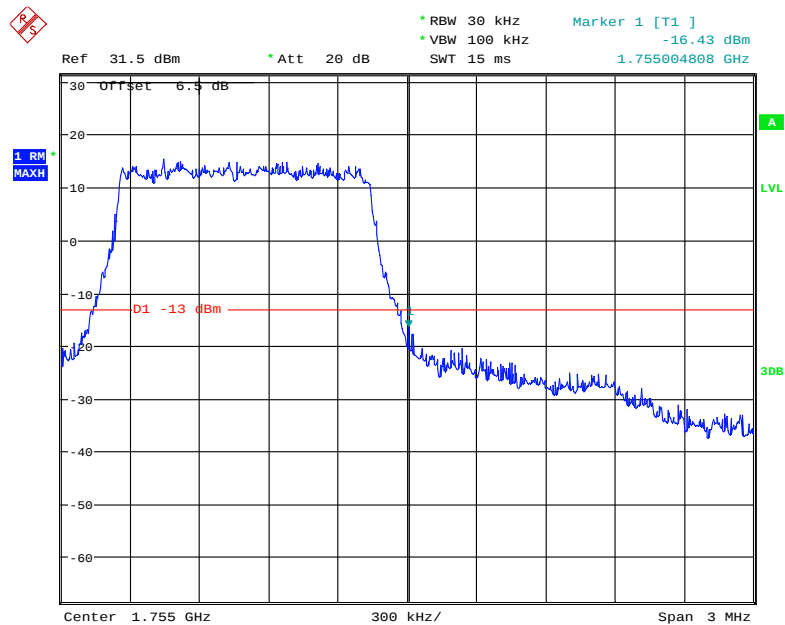
Band 4:

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



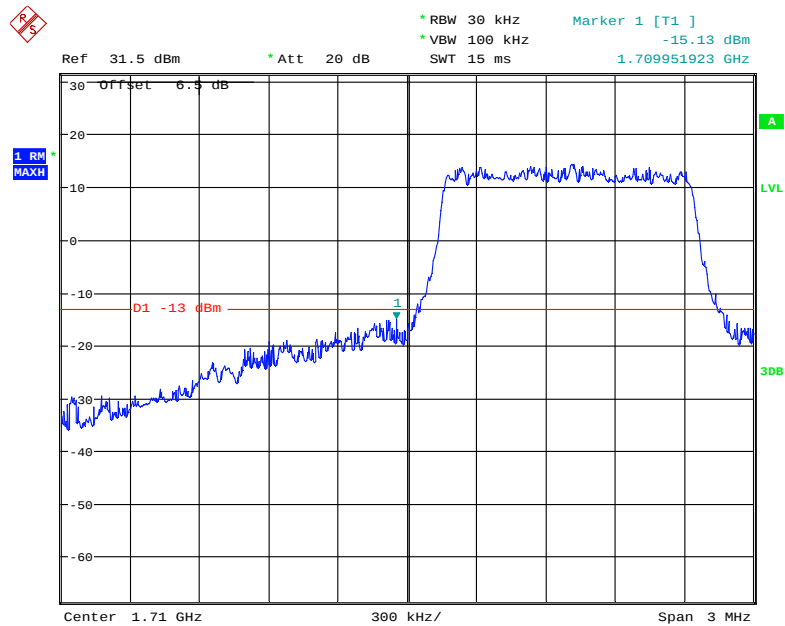
Date: 23.DEC.2019 10:50:16

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



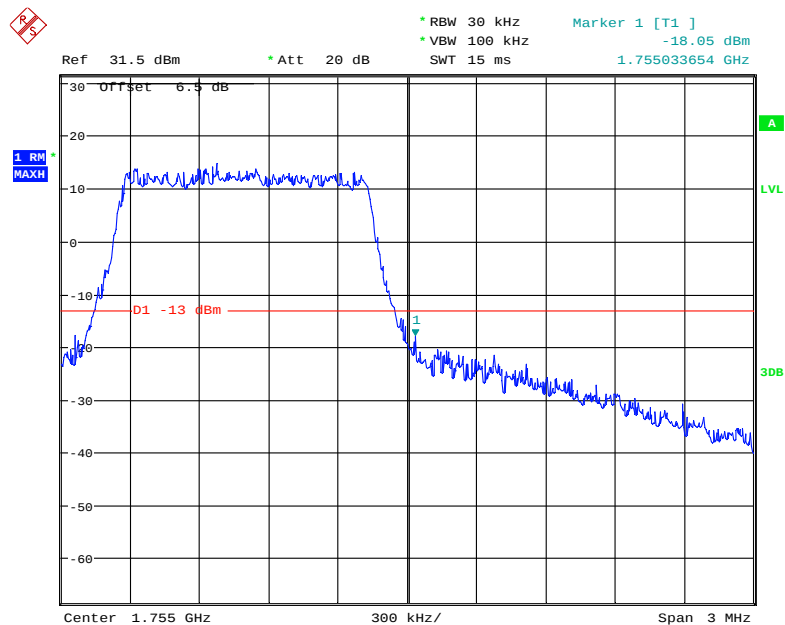
Date: 23.DEC.2019 10:52:01

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



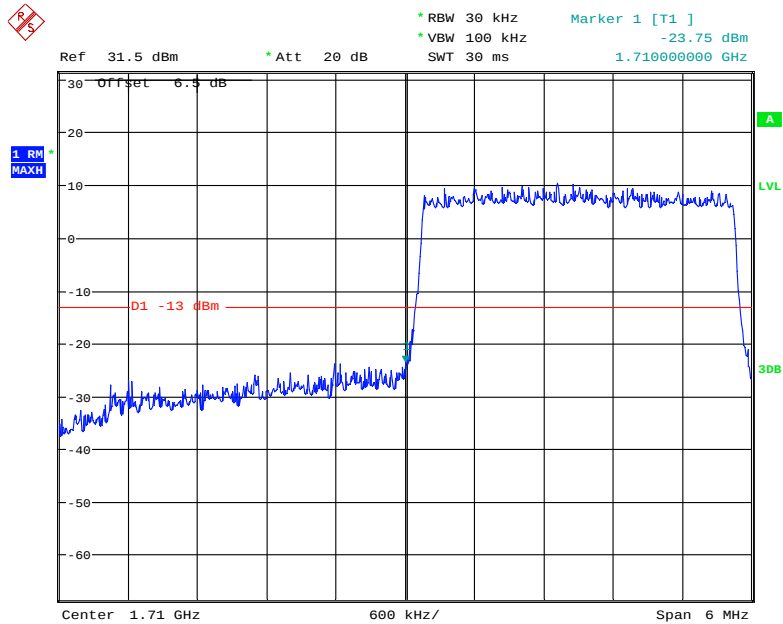
Date: 23.DEC.2019 10:51:05

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



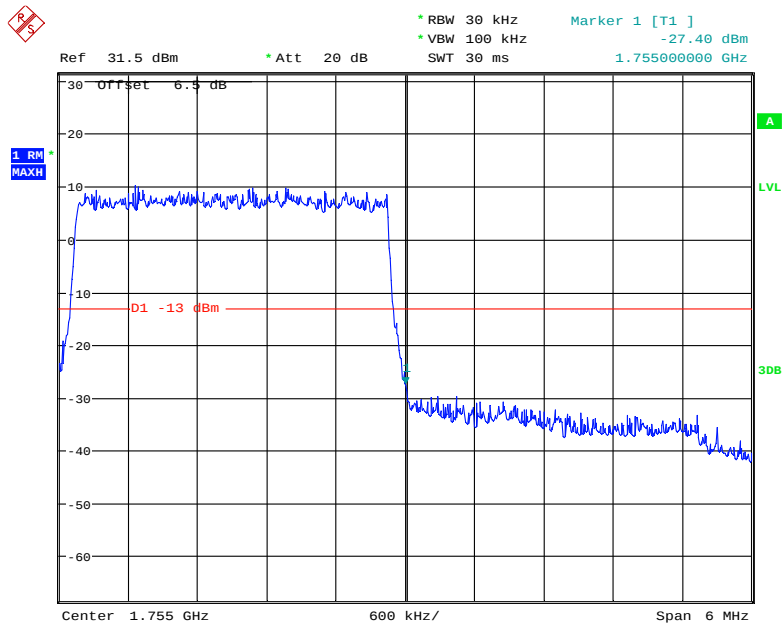
Date: 23.DEC.2019 10:51:37

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



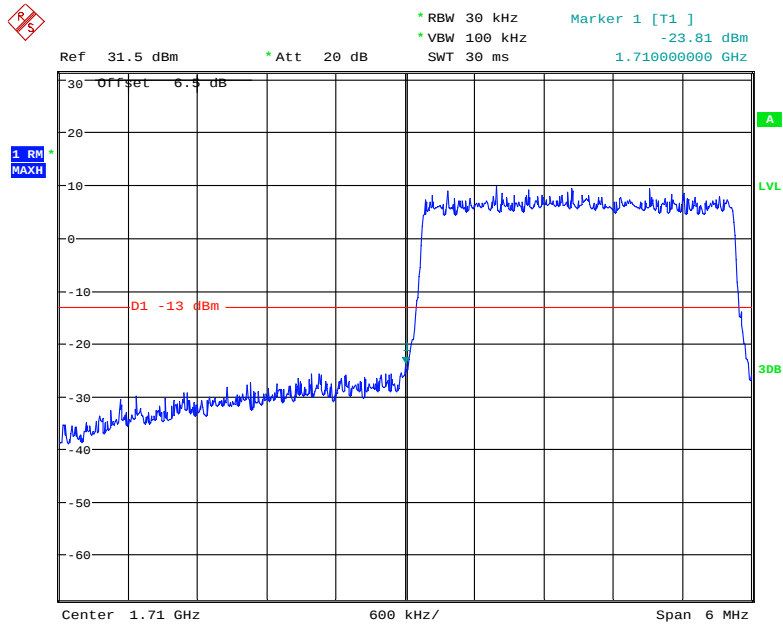
Date: 23.DEC.2019 10:48:40

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



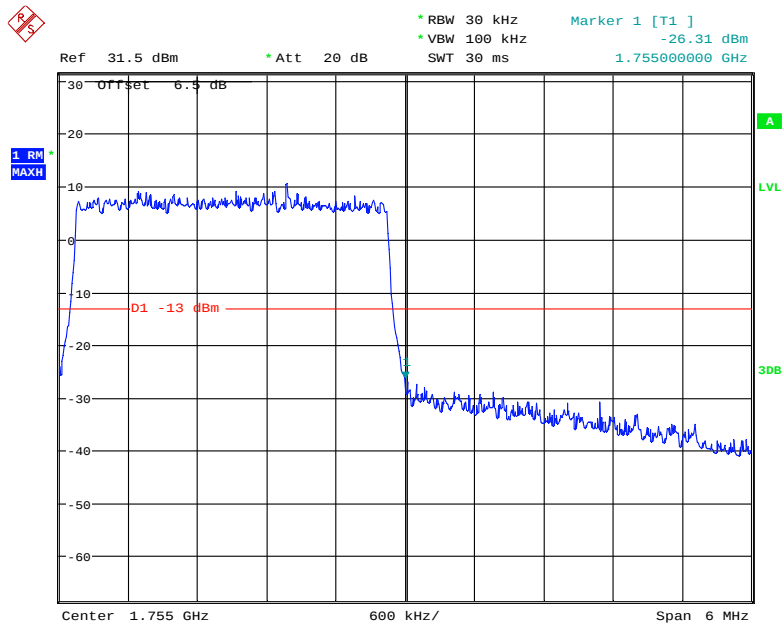
Date: 23.DEC.2019 10:48:05

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



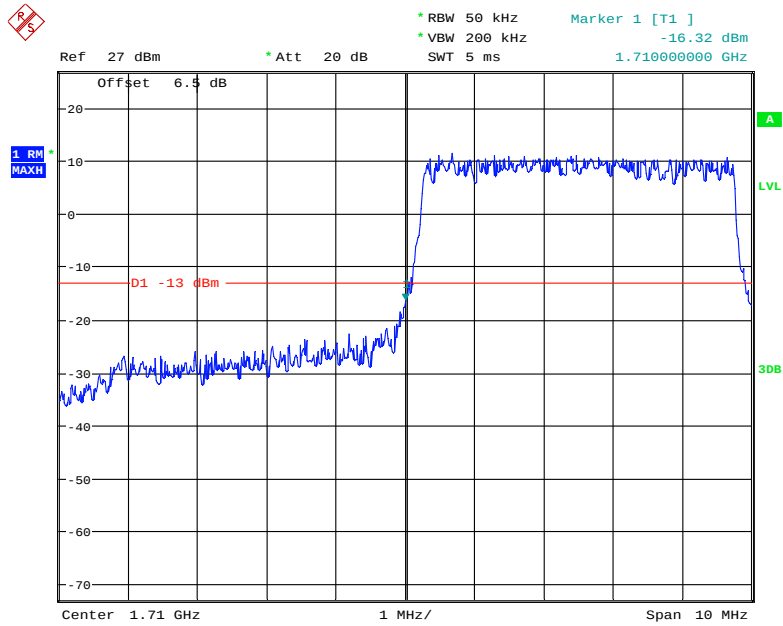
Date: 23.DEC.2019 10:48:57

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



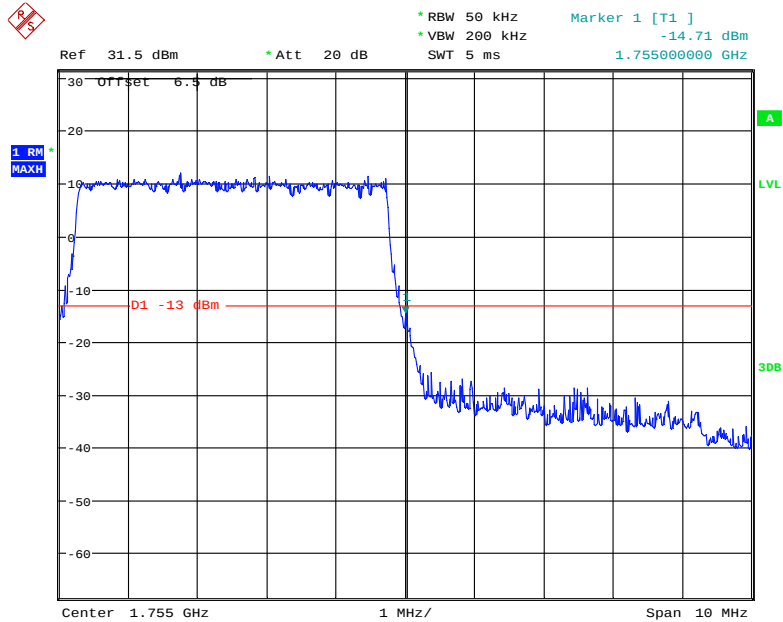
Date: 23.DEC.2019 10:47:44

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



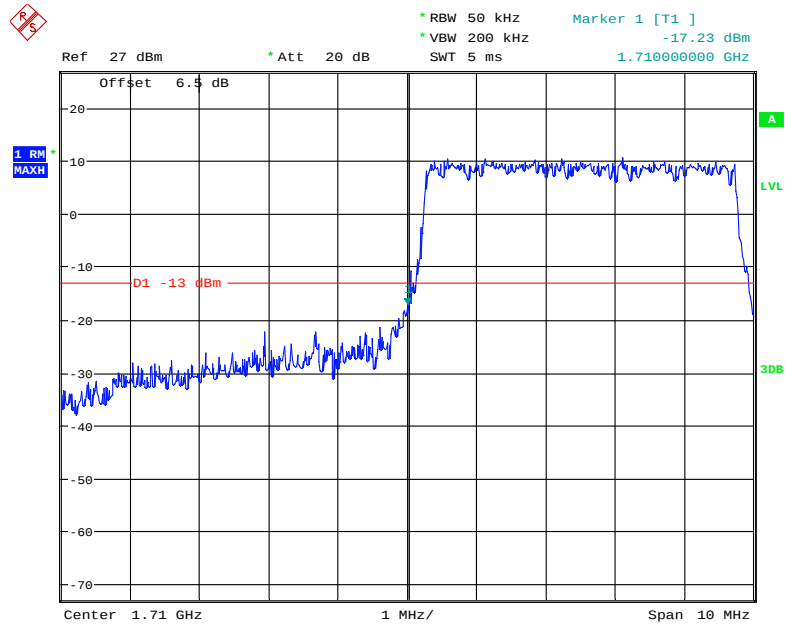
Date: 7.APR.2020 15:44:57

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



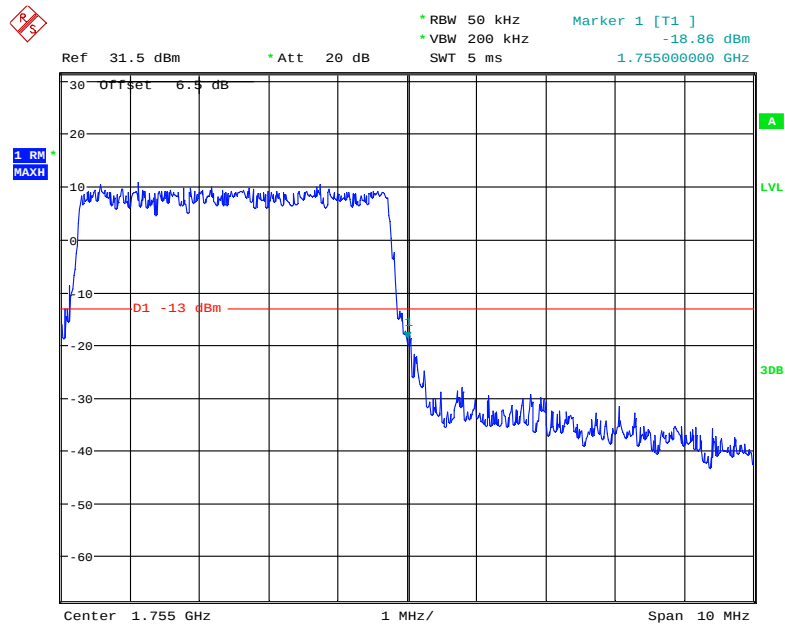
Date: 23.DEC.2019 10:45:15

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



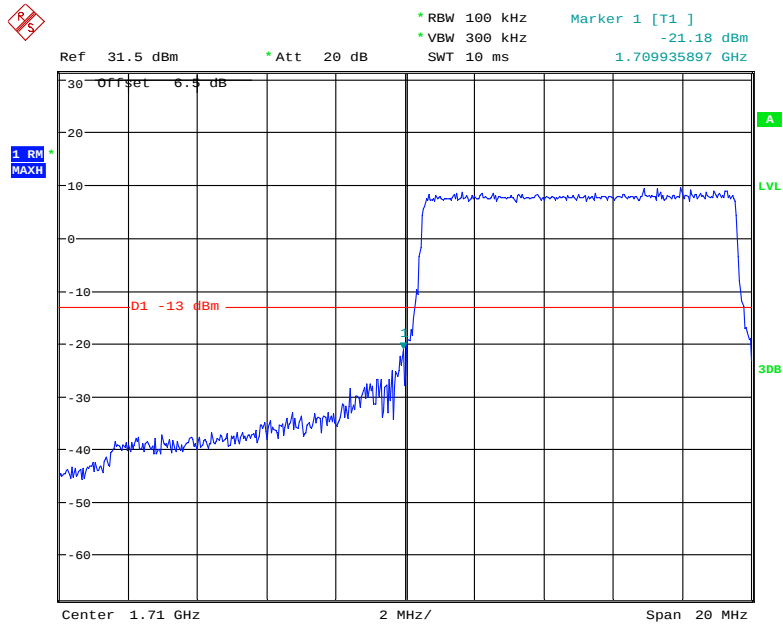
Date: 7.APR.2020 15:46:10

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



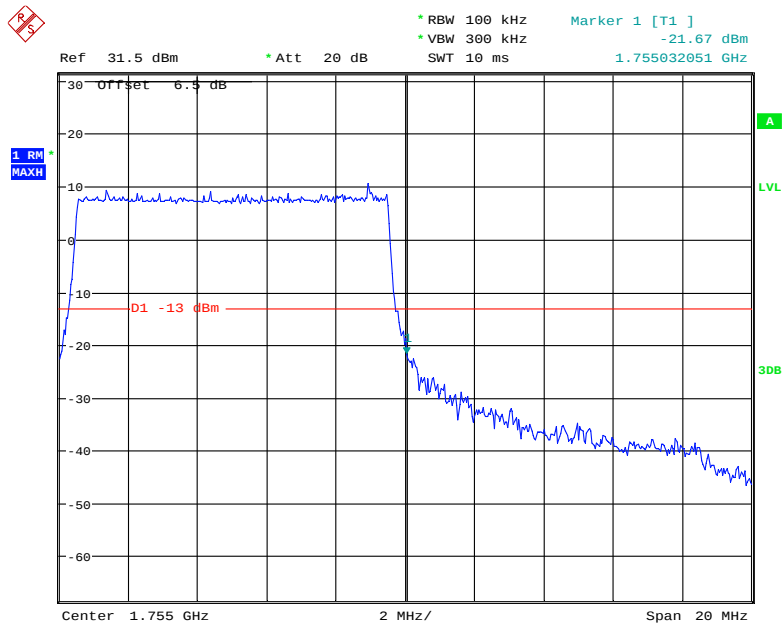
Date: 23.DEC.2019 10:45:31

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



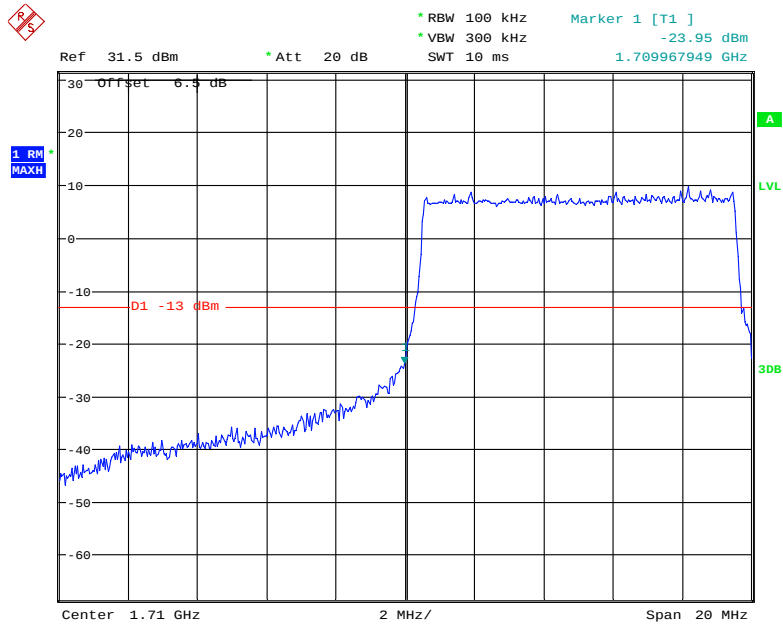
Date: 13.MAR.2020 00:37:29

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



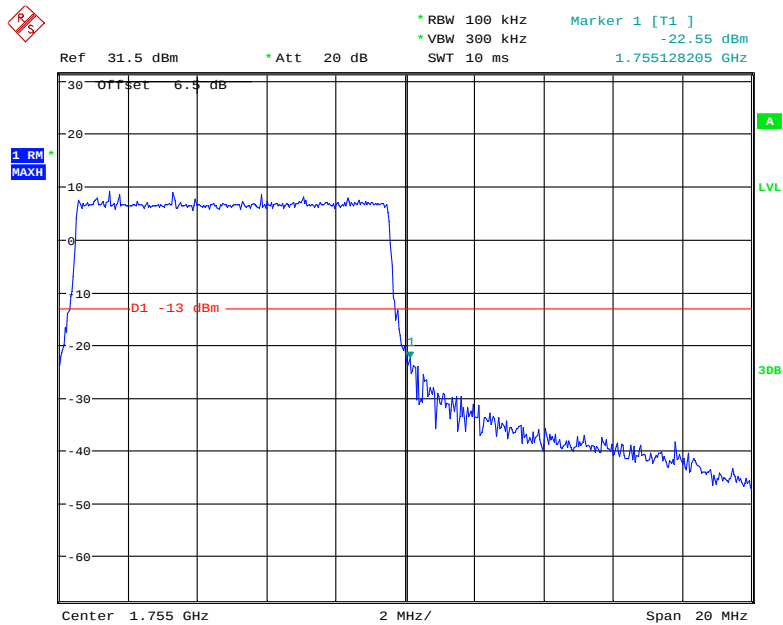
Date: 13.MAR.2020 00:38:22

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



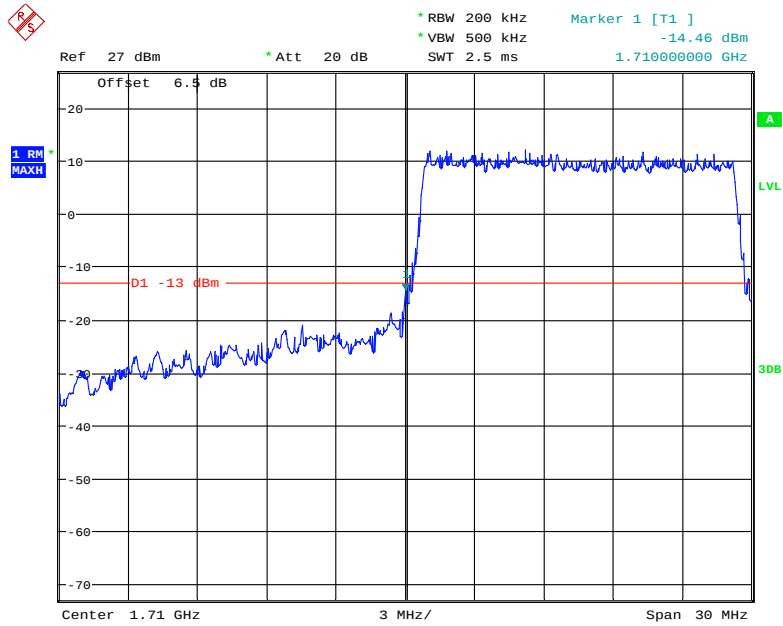
Date: 13.MAR.2020 00:36:58

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



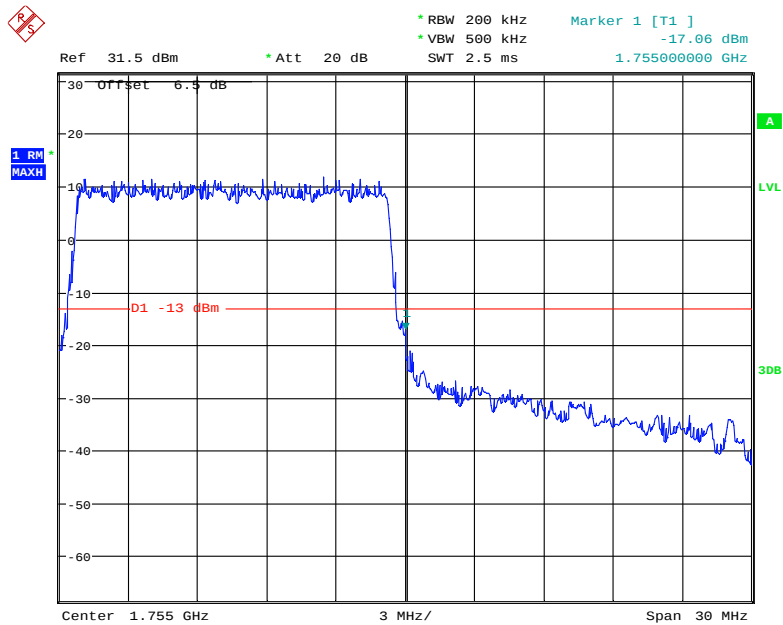
Date: 13.MAR.2020 00:38:46

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



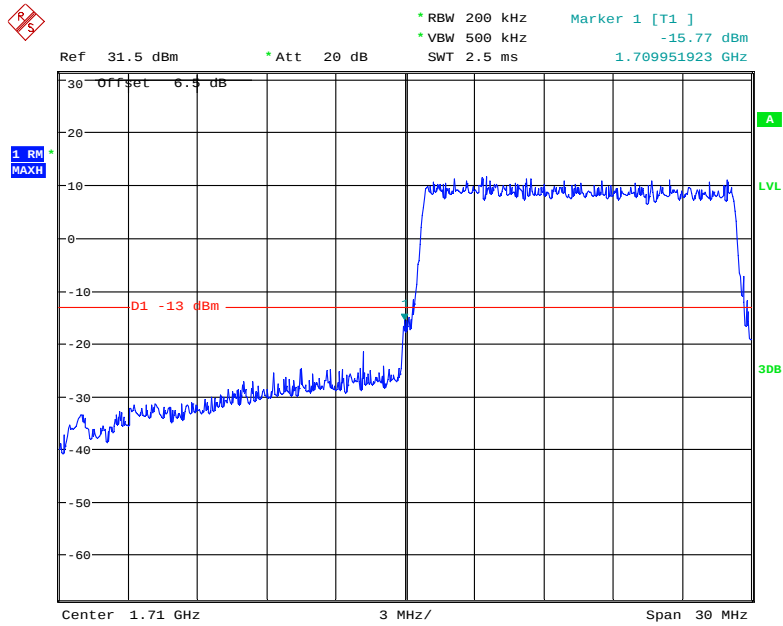
Date: 7.APR.2020 15:49:01

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



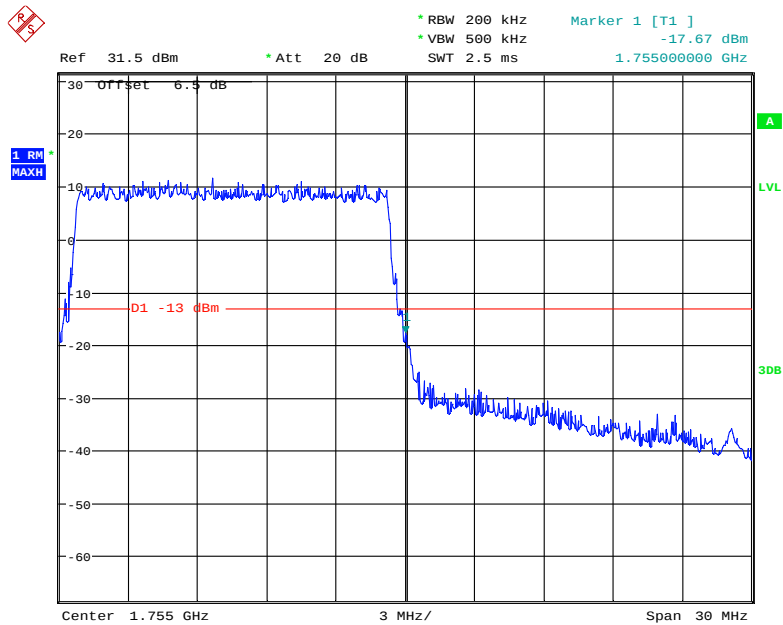
Date: 23.DEC.2019 10:14:37

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



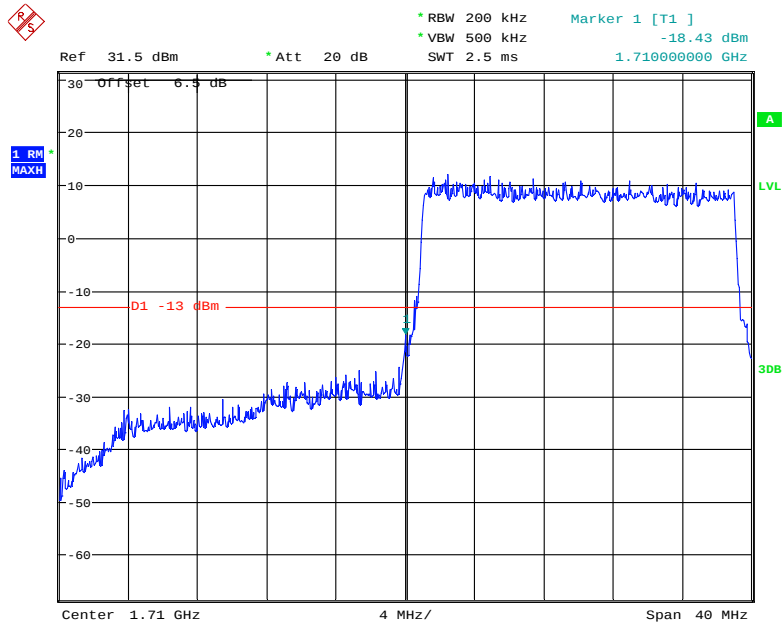
Date: 23.DEC.2019 10:15:51

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



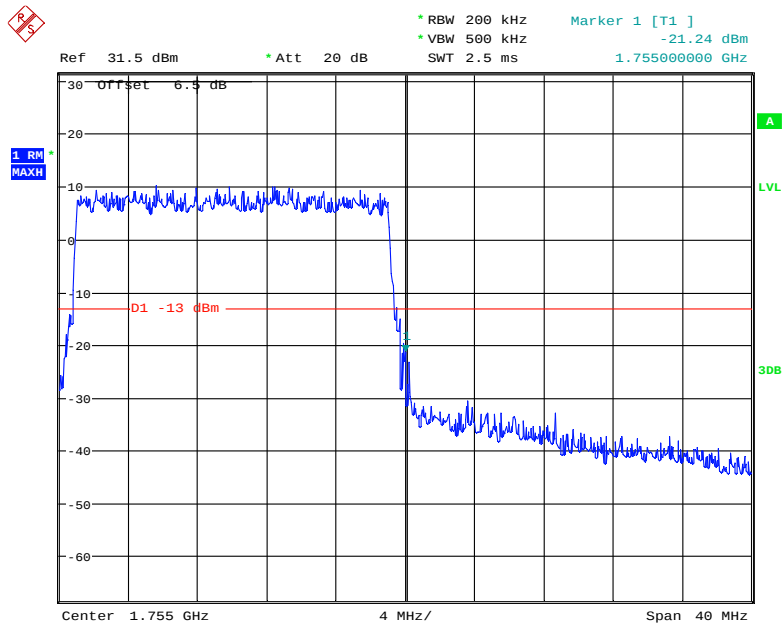
Date: 23.DEC.2019 10:15:11

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



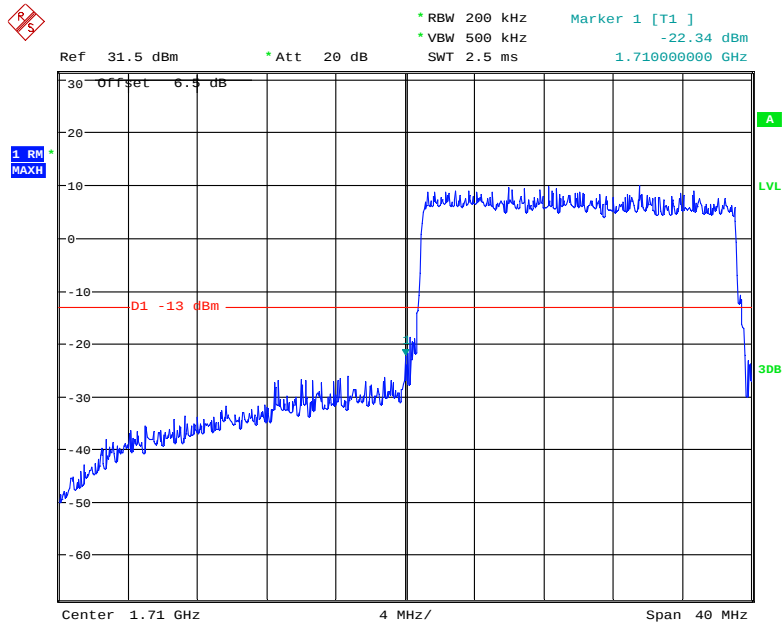
Date: 23.DEC.2019 10:17:14

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



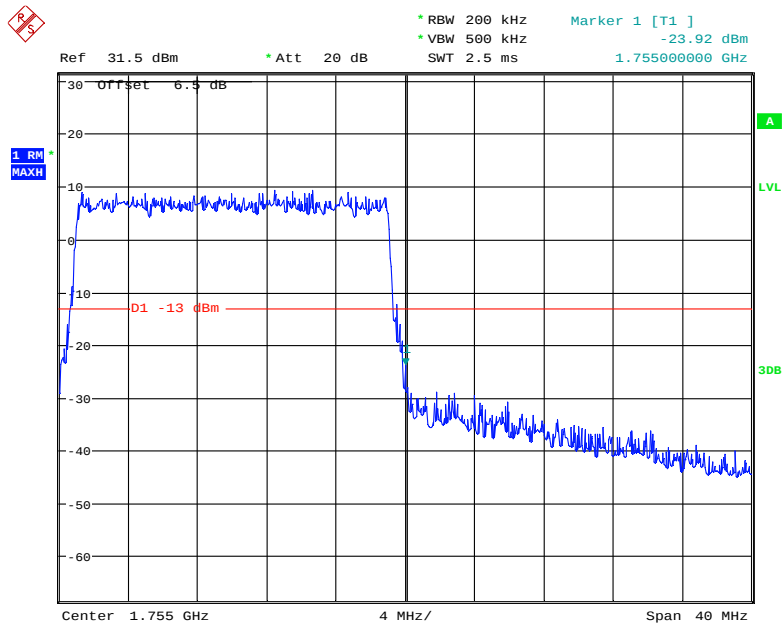
Date: 23.DEC.2019 10:18:31

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



Date: 23.DEC.2019 10:17:34

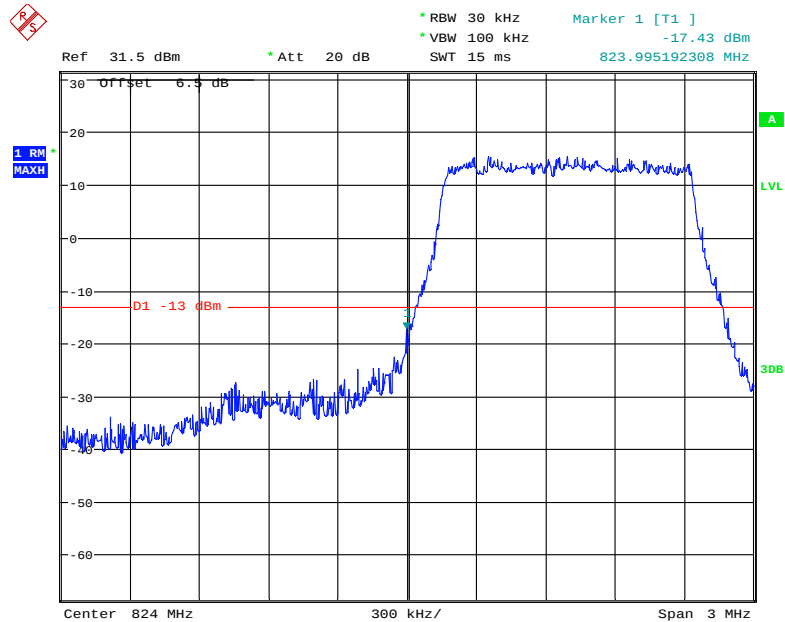
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 23.DEC.2019 10:18:07

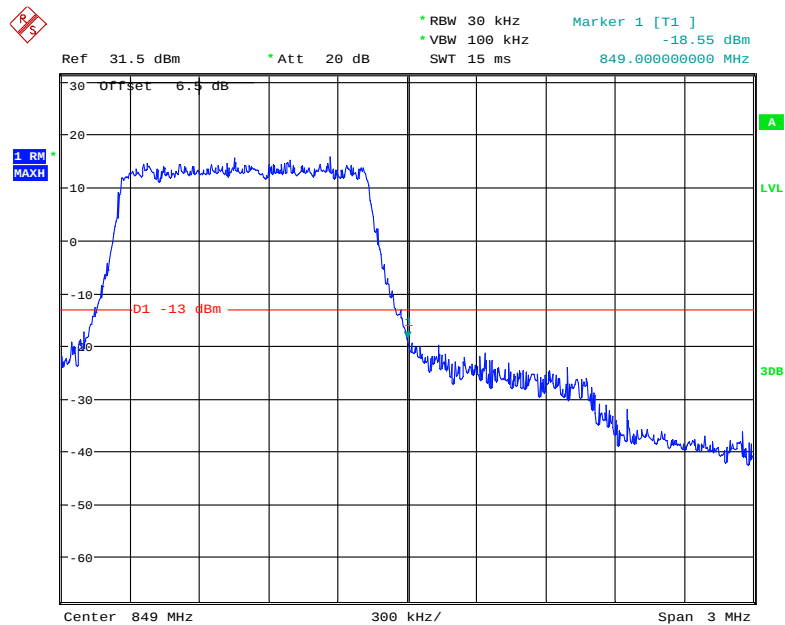
Band 5:

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



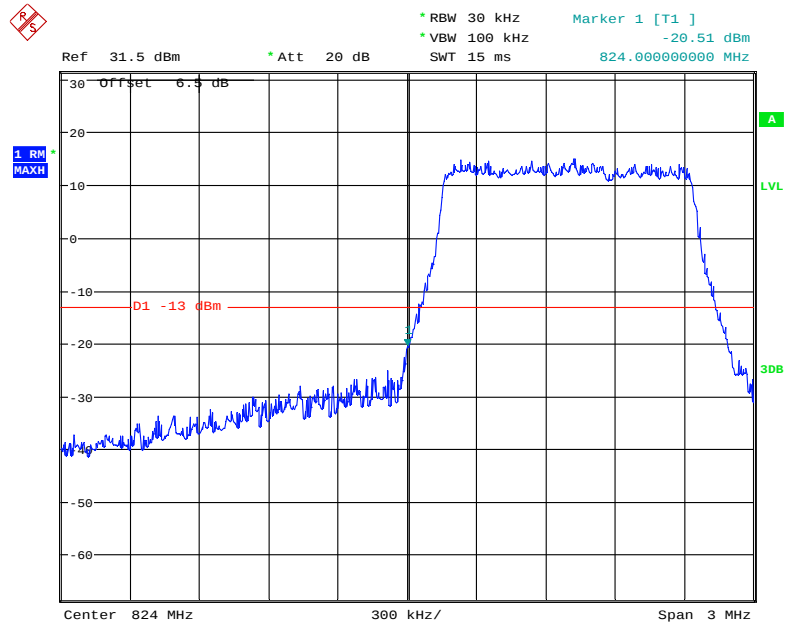
Date: 21.DEC.2019 15:16:23

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



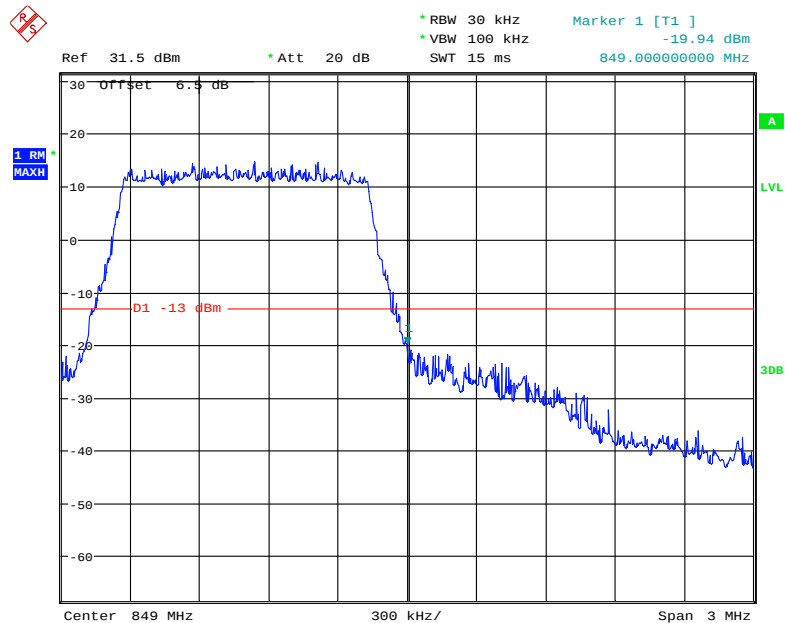
Date: 21.DEC.2019 15:22:16

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



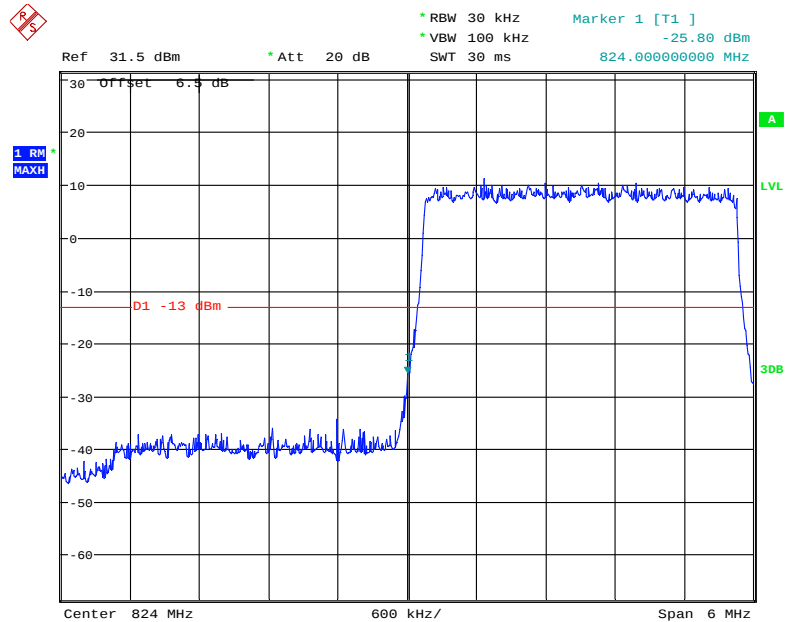
Date: 21.DEC.2019 15:17:05

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



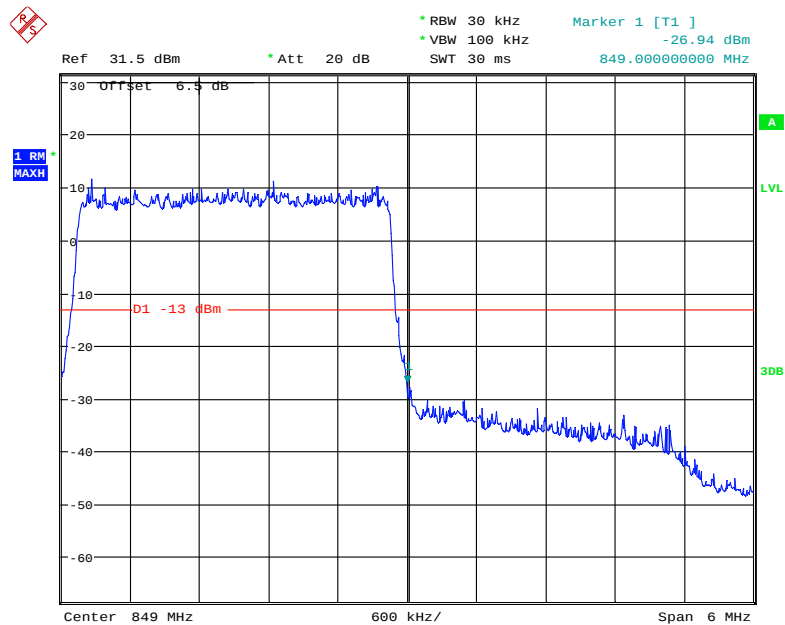
Date: 21.DEC.2019 15:21:50

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



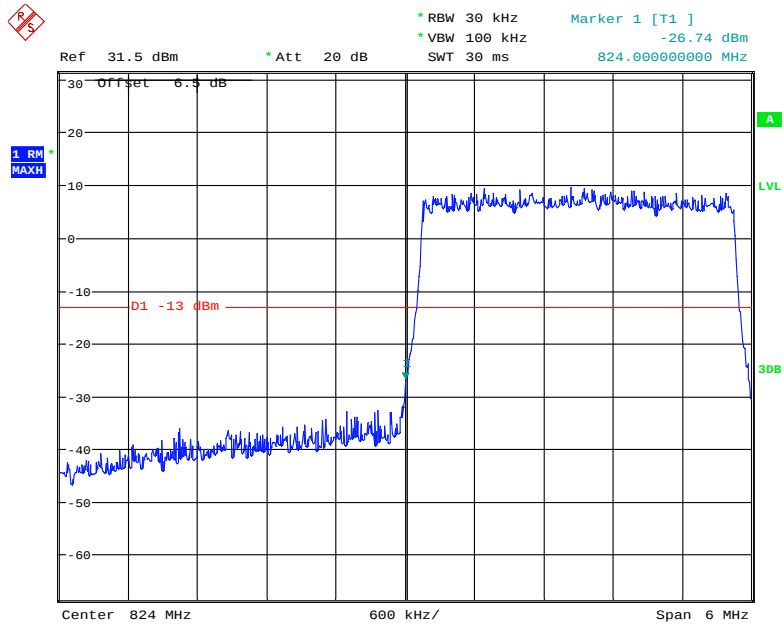
Date: 21.DEC.2019 14:42:17

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



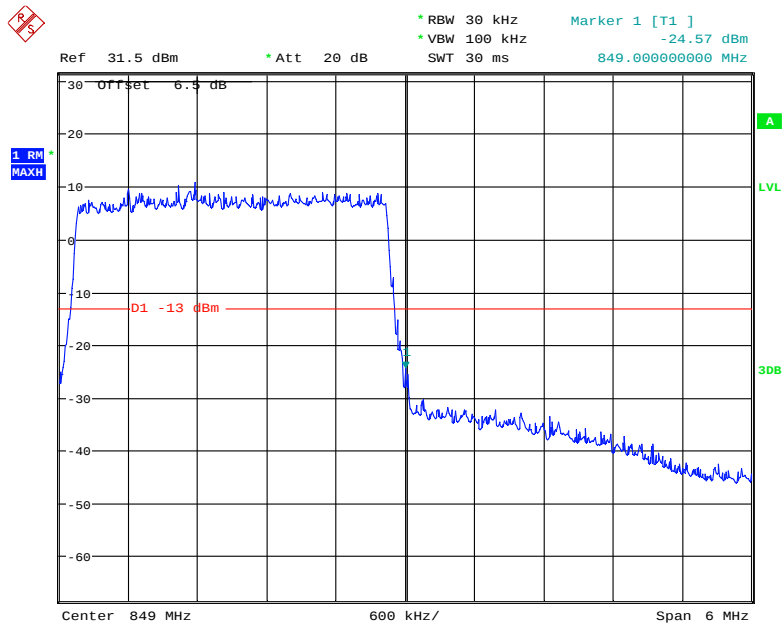
Date: 21.DEC.2019 14:41:08

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



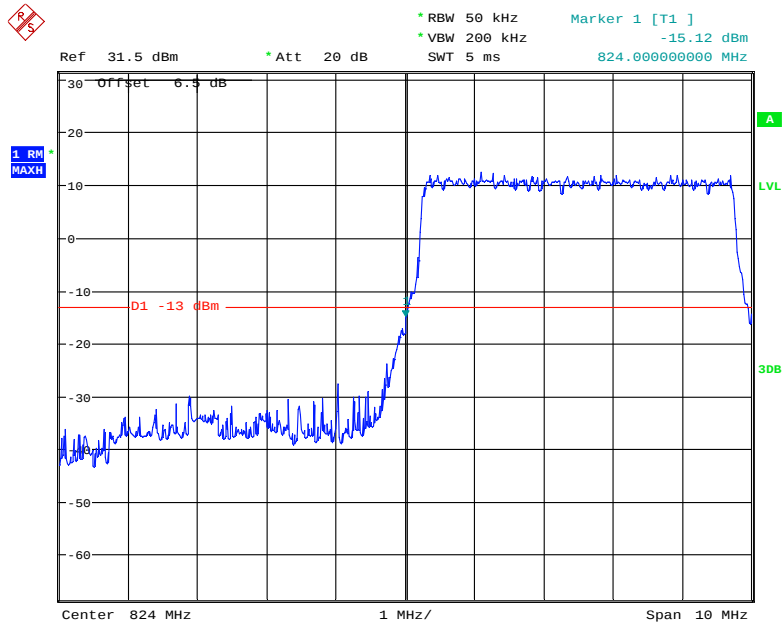
Date: 21.DEC.2019 14:42:34

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



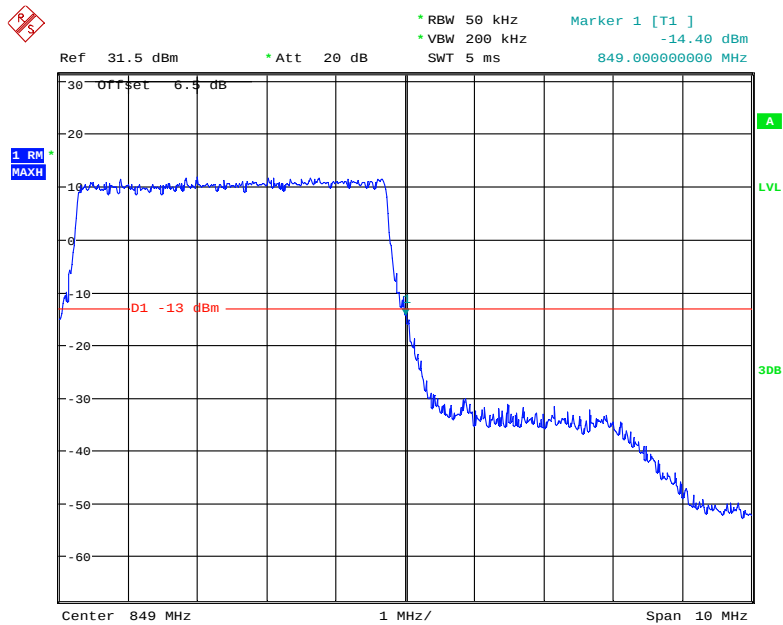
Date: 21.DEC.2019 14:40:50

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



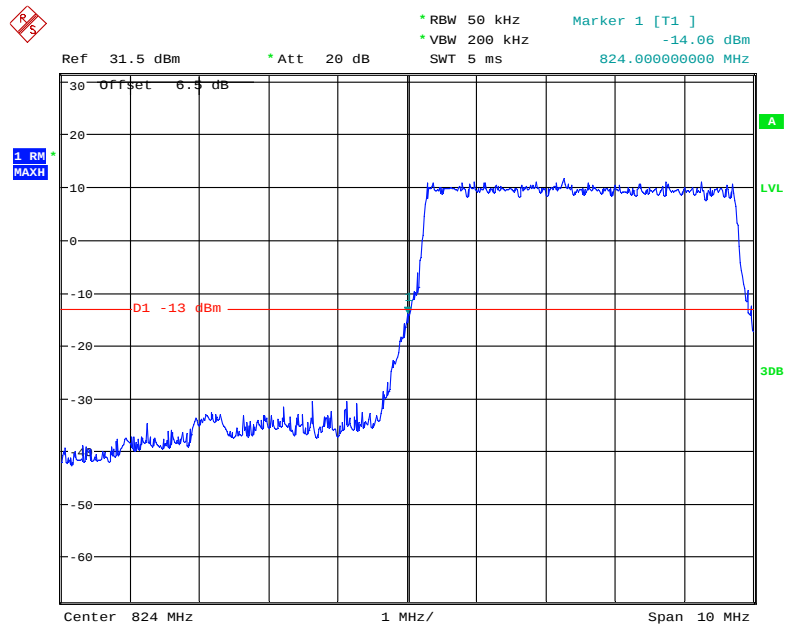
Date: 21.DEC.2019 14:37:33

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



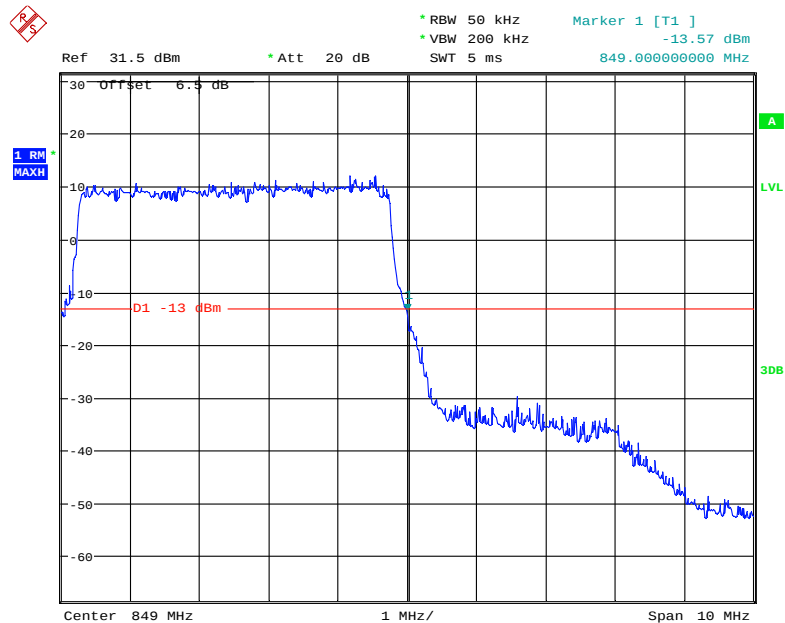
Date: 21.DEC.2019 14:38:18

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



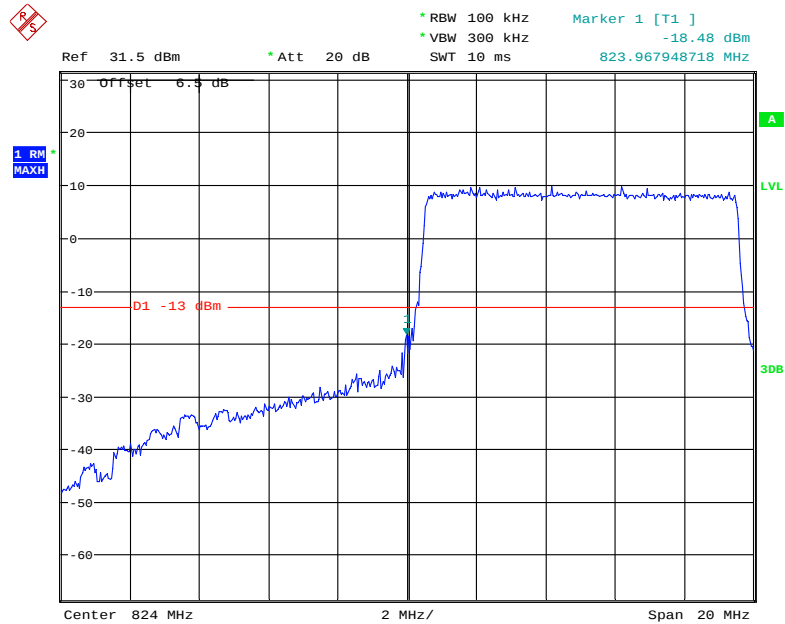
Date: 21.DEC.2019 14:36:56

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



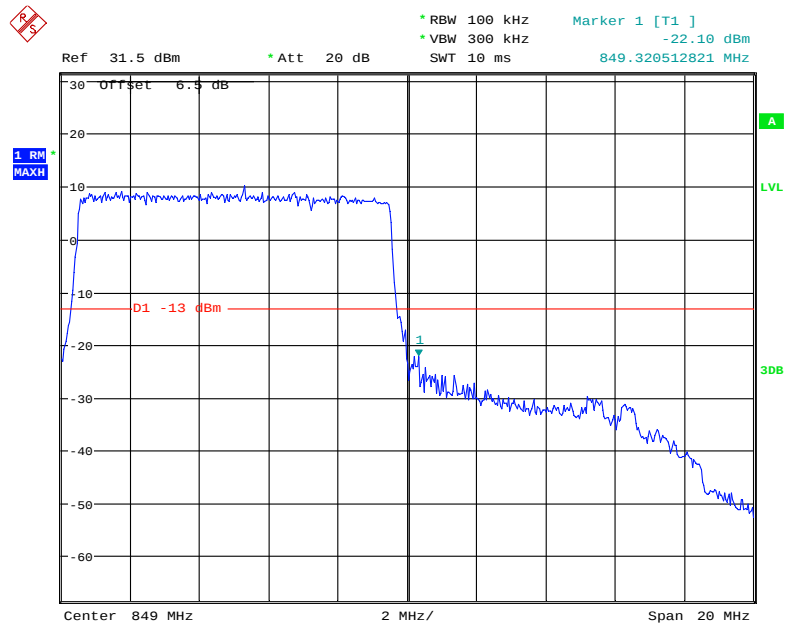
Date: 21.DEC.2019 14:39:06

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



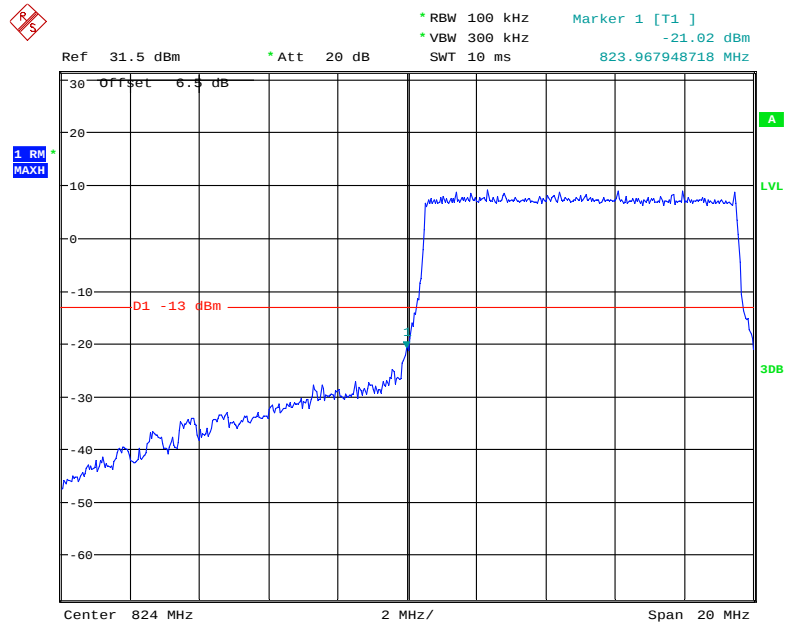
Date: 13.MAR.2020 00:33:44

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



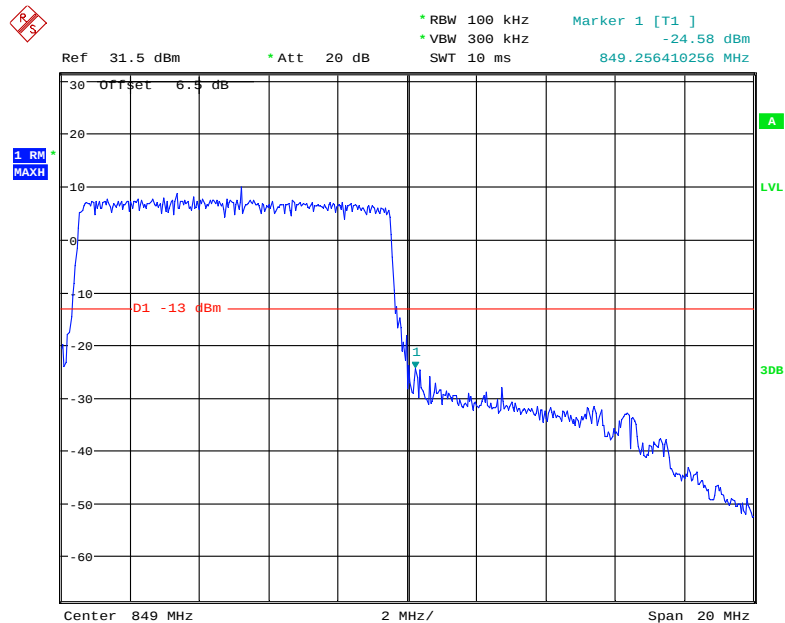
Date: 13.MAR.2020 00:34:46

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



Date: 13.MAR.2020 00:32:54

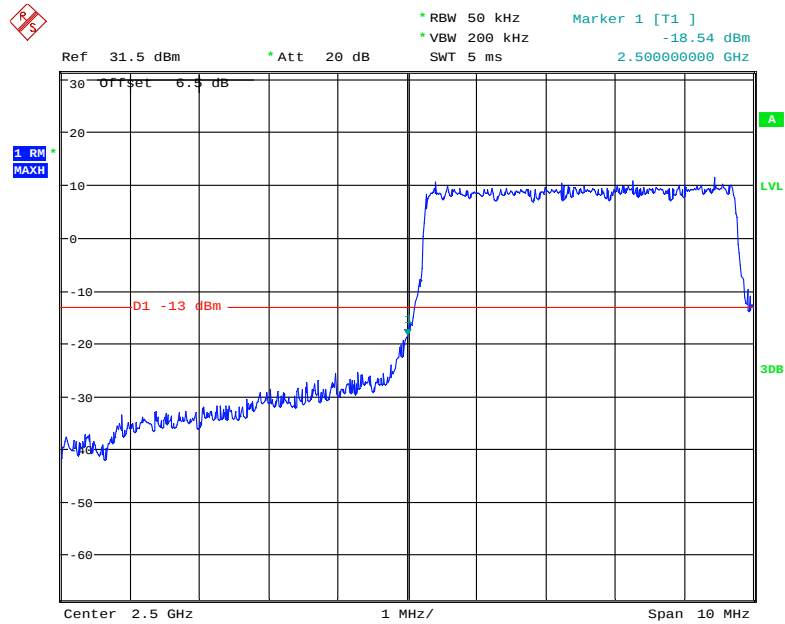
16-QAM (10.0 MHz, FULL RB) - Right Band Edge



Date: 13.MAR.2020 00:35:05

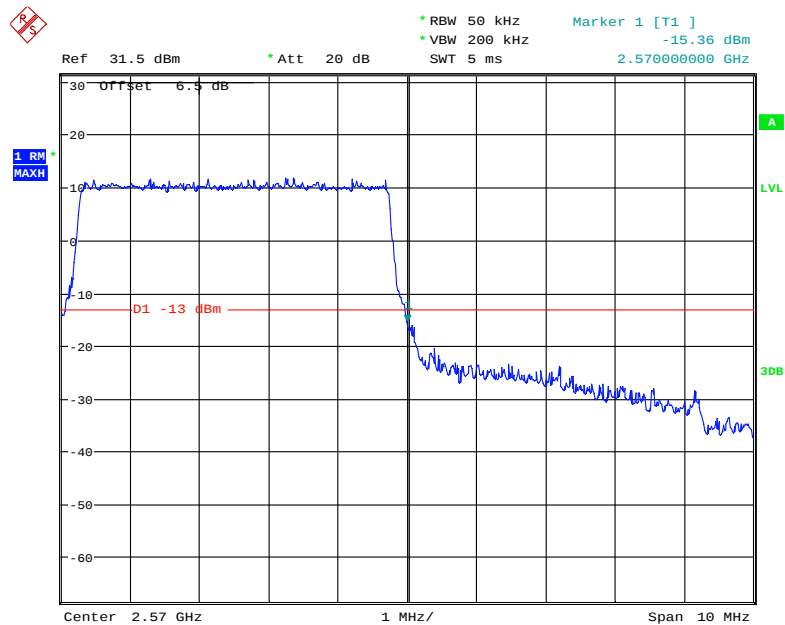
Band 7:

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



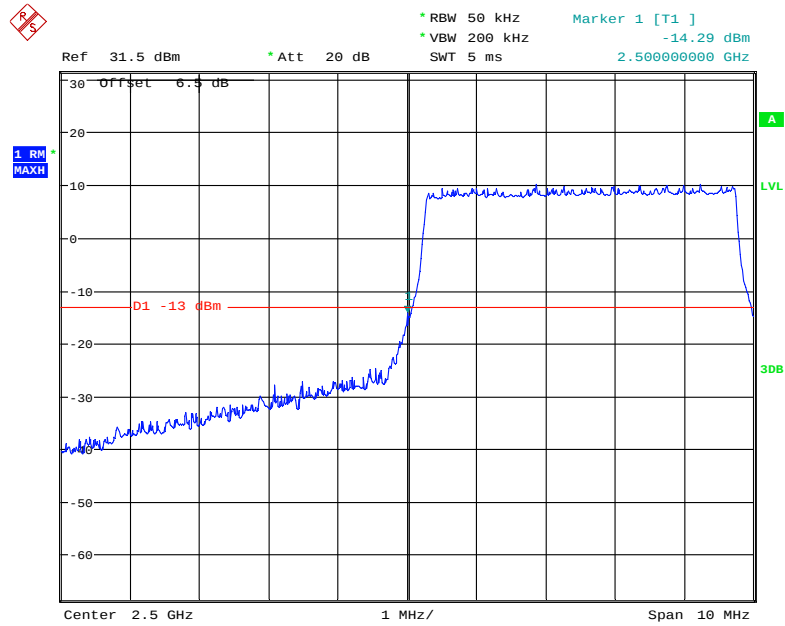
Date: 23.DEC.2019 09:26:14

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



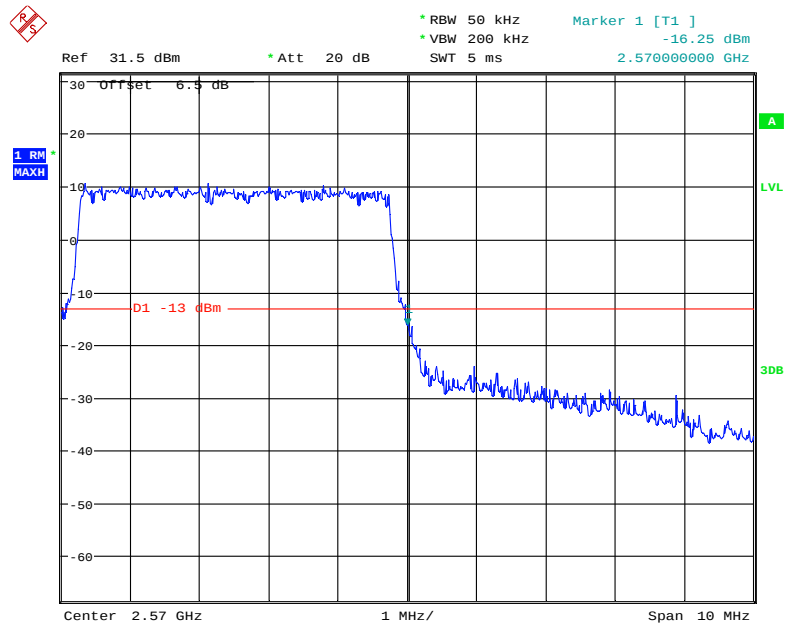
Date: 23.DEC.2019 09:27:05

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



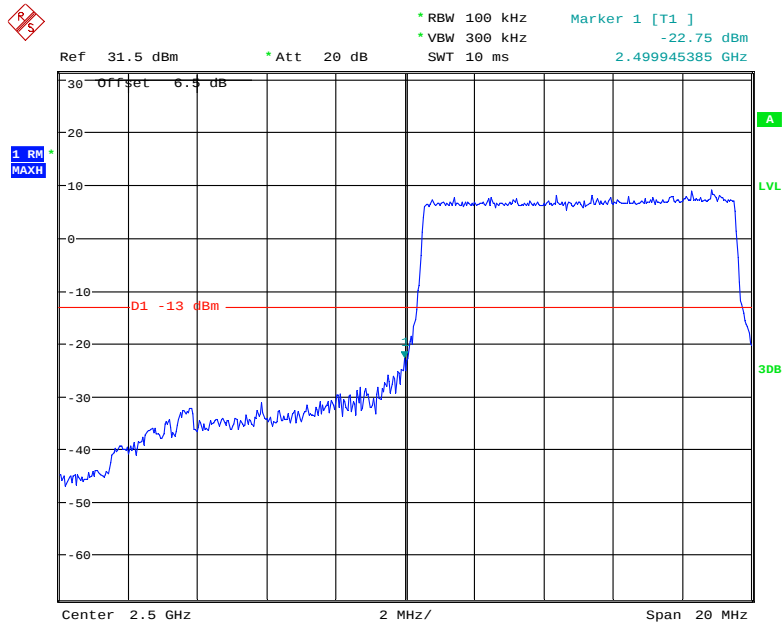
Date: 23.DEC.2019 09:25:46

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



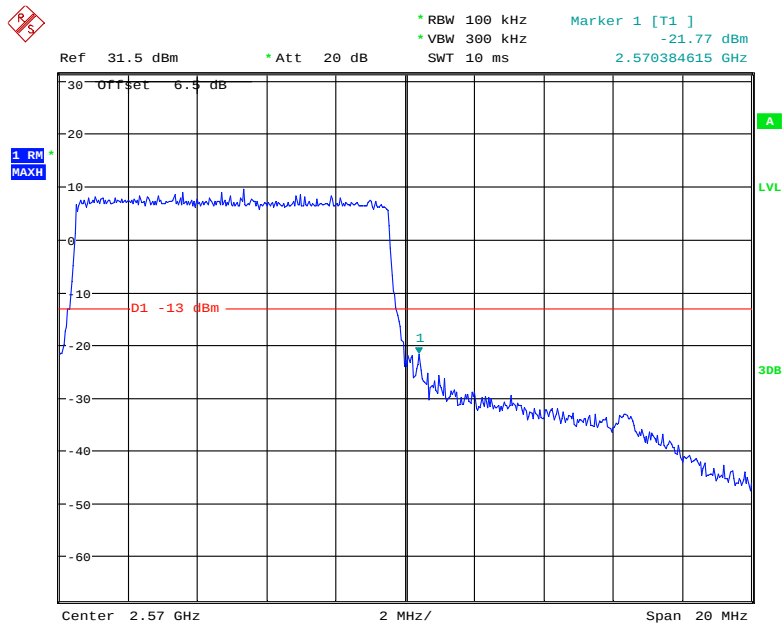
Date: 23.DEC.2019 09:27:40

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



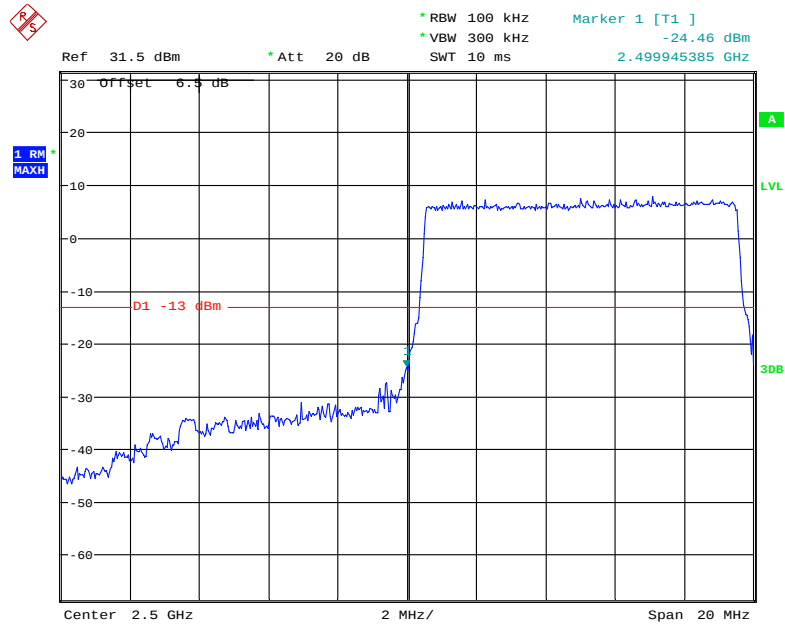
Date: 13.MAR.2020 00:30:37

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



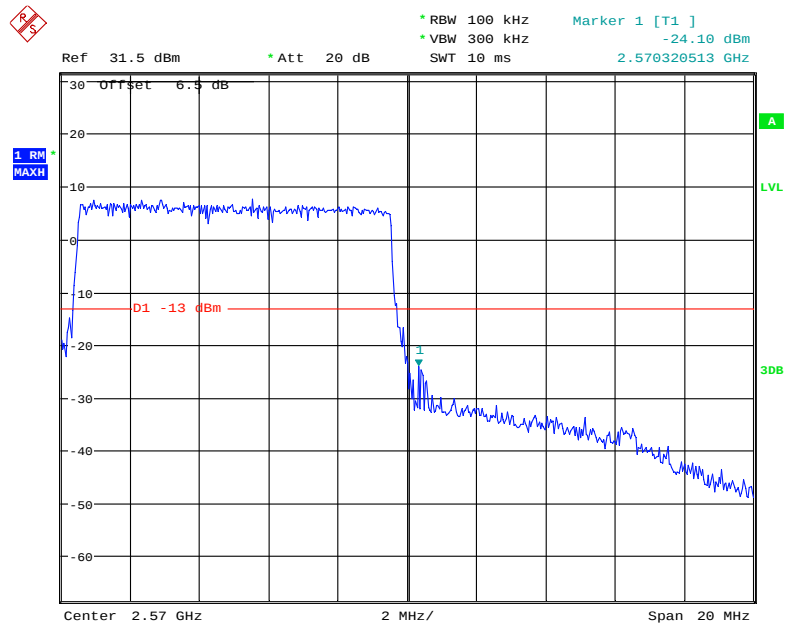
Date: 13.MAR.2020 00:31:16

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



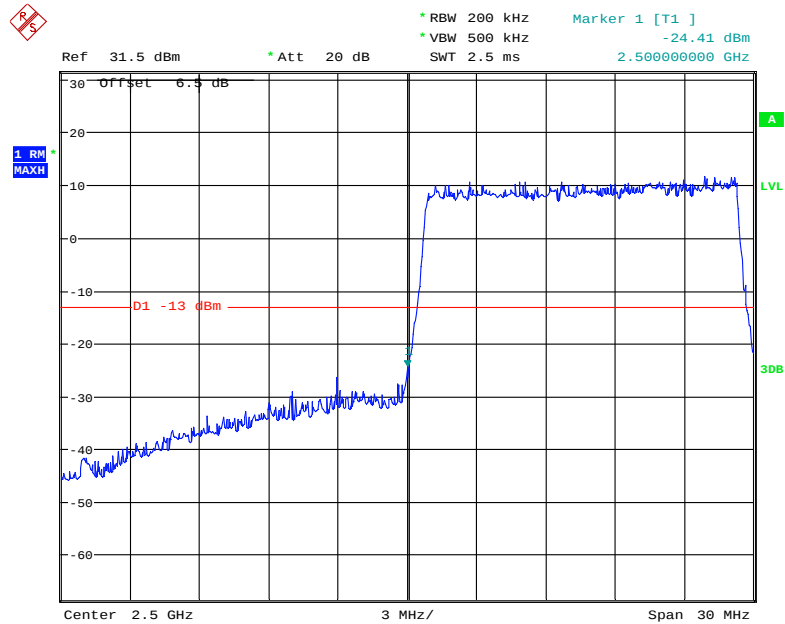
Date: 13.MAR.2020 00:29:30

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



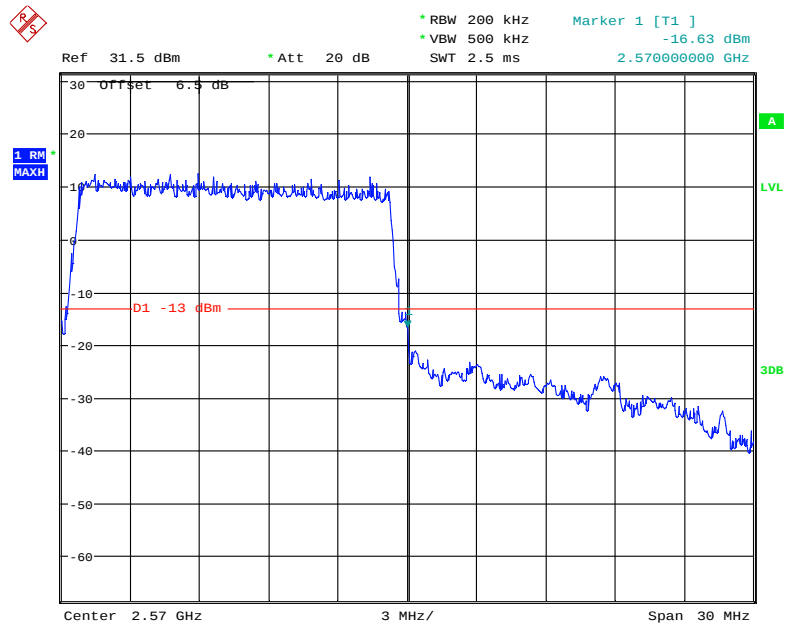
Date: 13.MAR.2020 00:31:36

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



Date: 7.APR.2020 16:25:46

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



Date: 23.DEC.2019 11:01:07

Ref 31.5 dBm * Att 20 dB * RBW 200 kHz * VBW 500 kHz * SWT 2.5 ms Marker 1 [T1] -19.50 dBm 2.500000000 GHz

Offset 6.5 dB

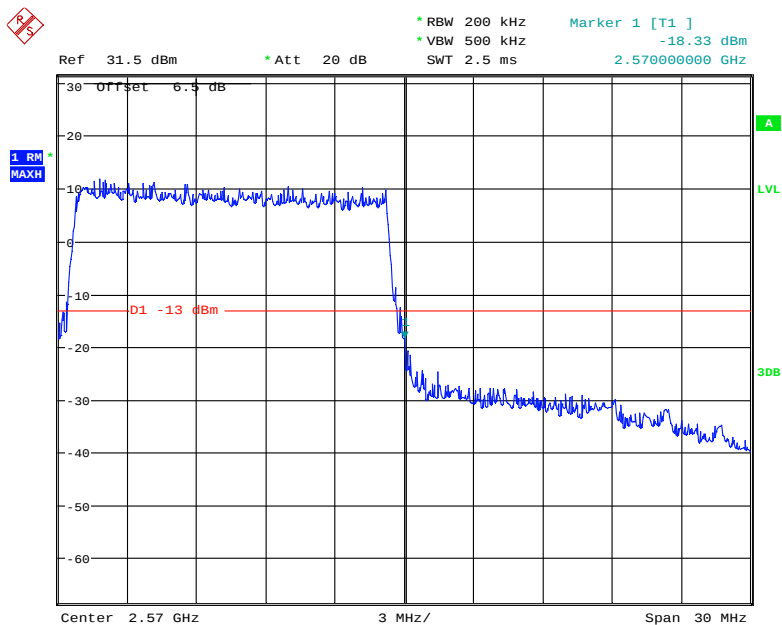
1 RM MAXH

D1 -13 dBm

Center 2.5 MHz 3 MHz/ Span 30 MHz

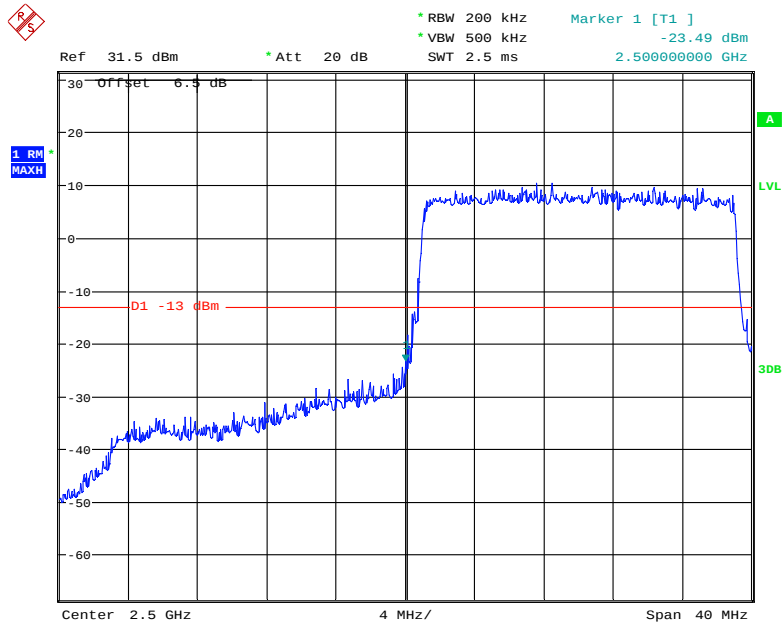
LVL 30dB

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



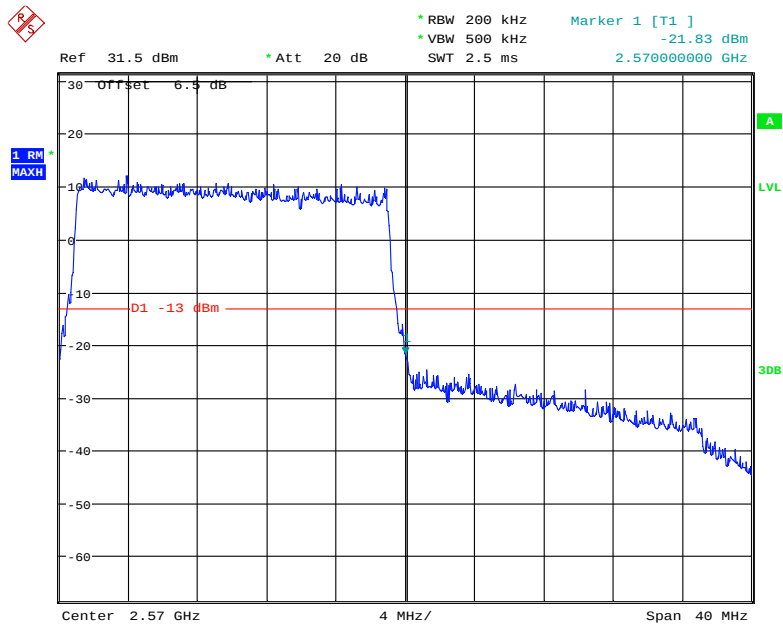
Page 134 of 150

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



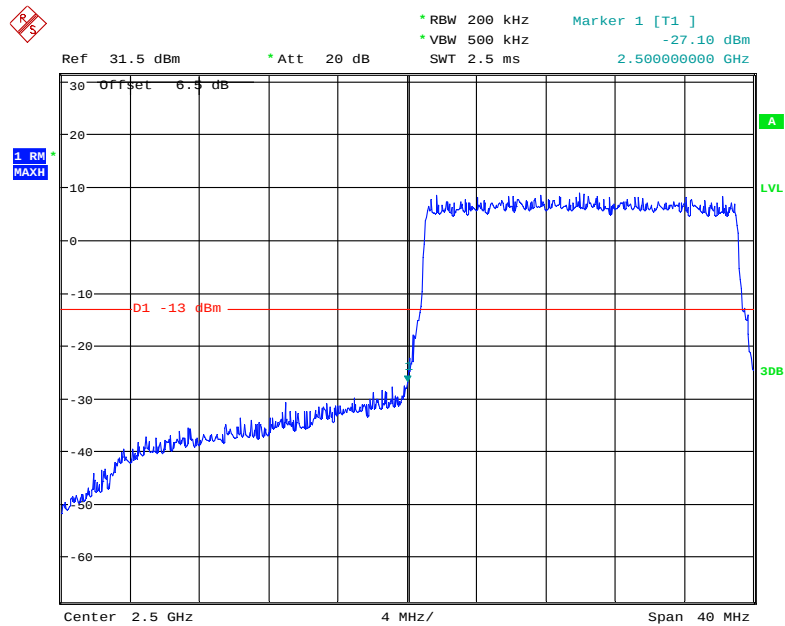
Date: 23.DEC.2019 11:05:58

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



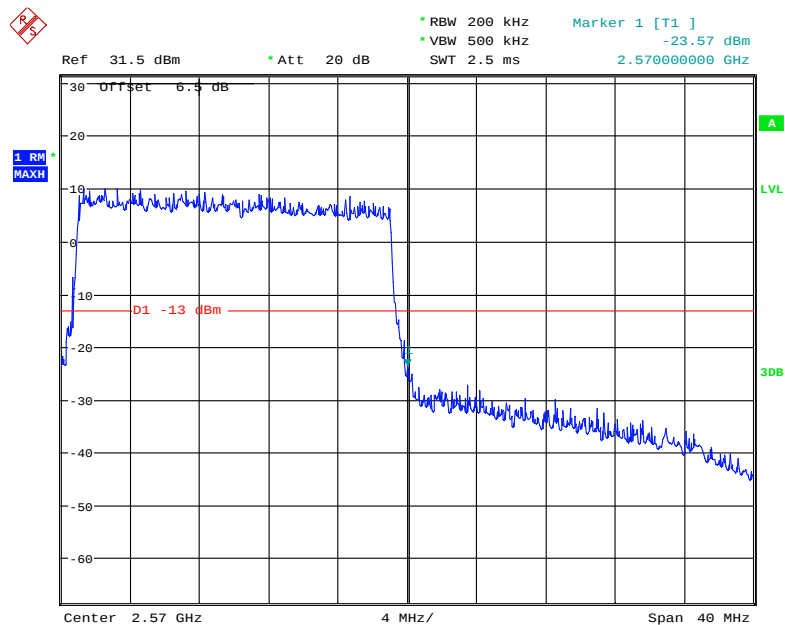
Date: 23.DEC.2019 11:04:06

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



Date: 23.DEC.2019 11:05:29

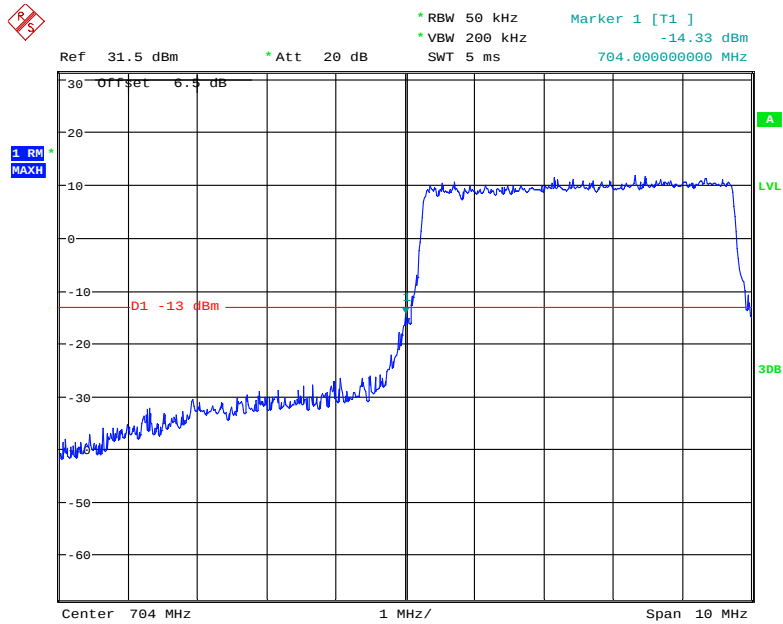
16-QAM (20.0 MHz, FULL RB) - Right Band Edge



Date: 23.DEC.2019 11:04:41

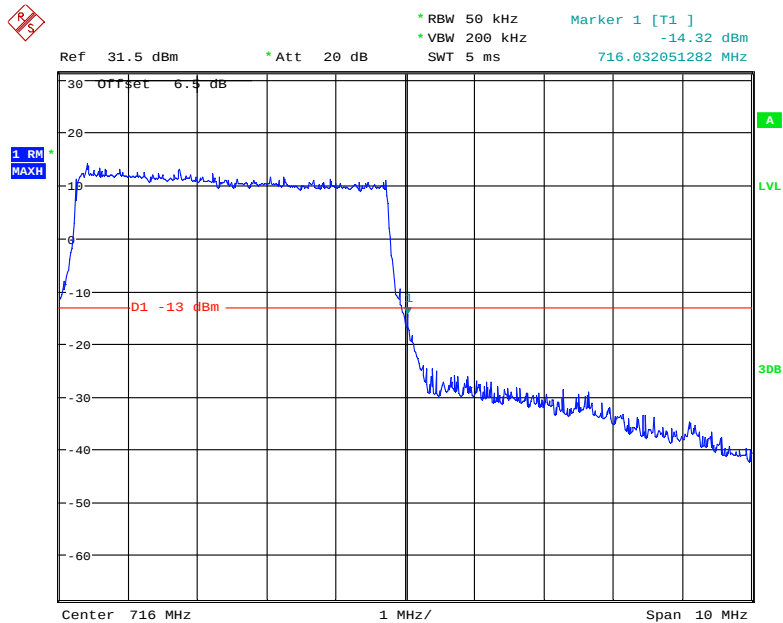
Band 17:

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



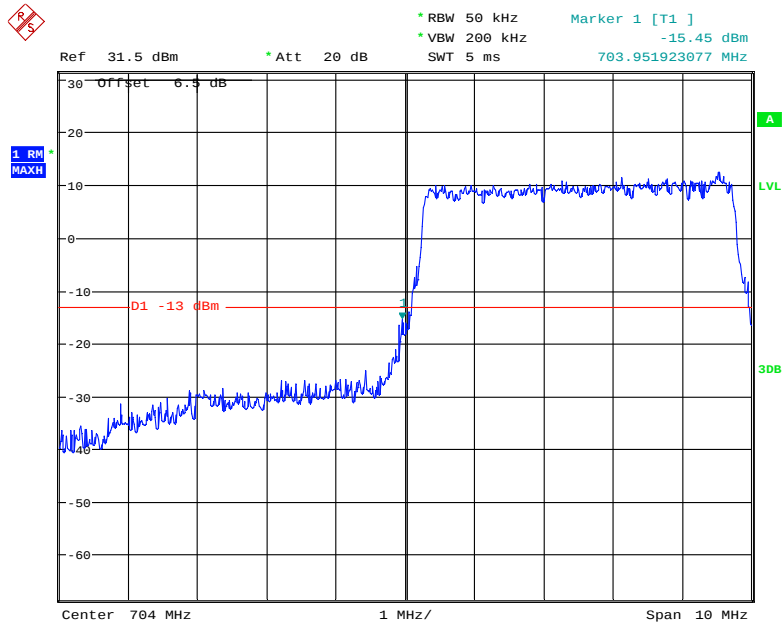
Date: 7.APR.2020 15:58:33

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



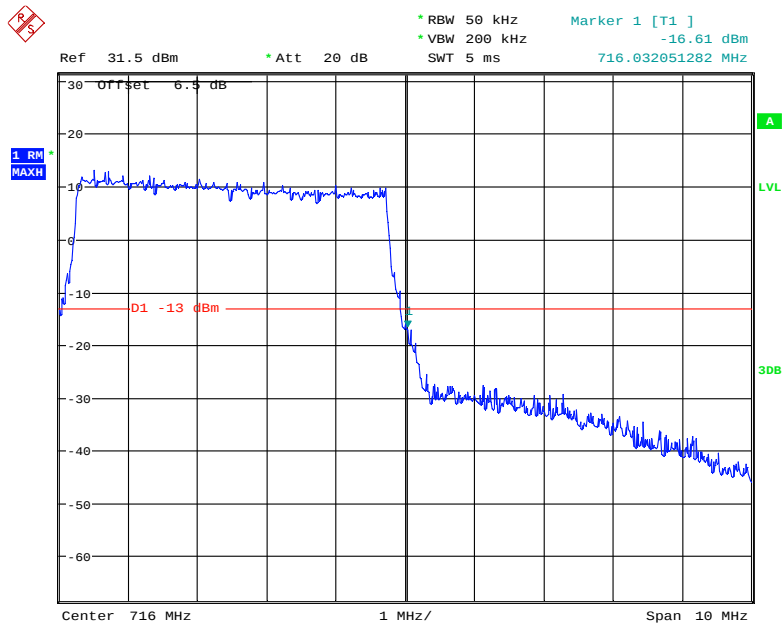
Date: 23.DEC.2019 15:12:48

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



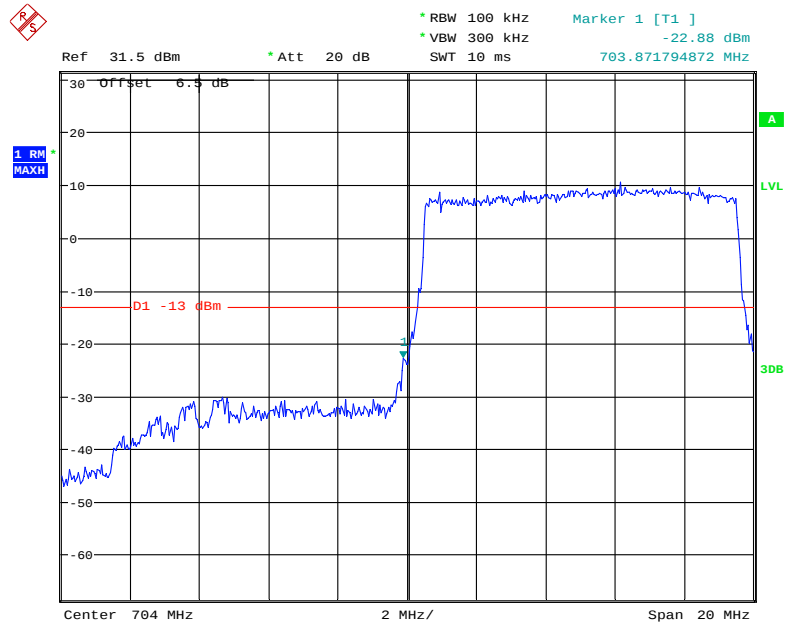
Date: 23.DEC.2019 15:14:37

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



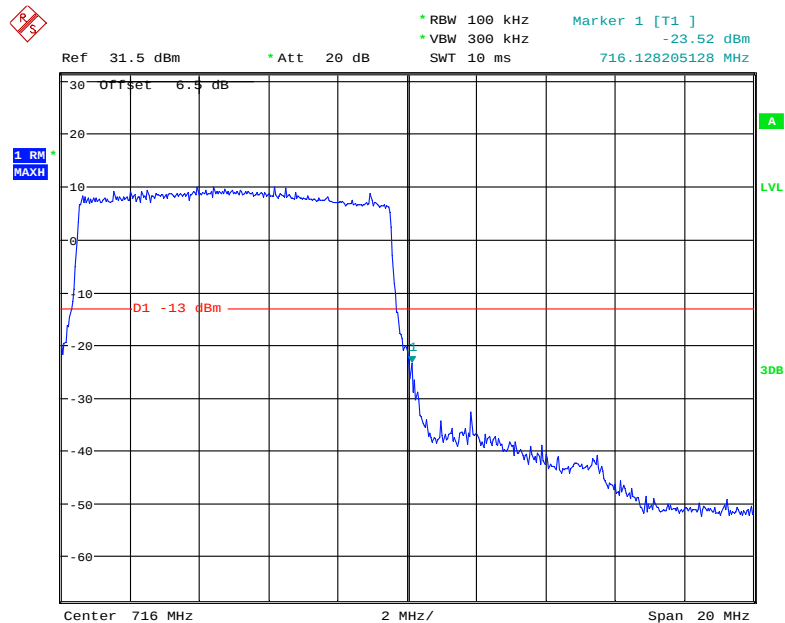
Date: 23.DEC.2019 15:13:39

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



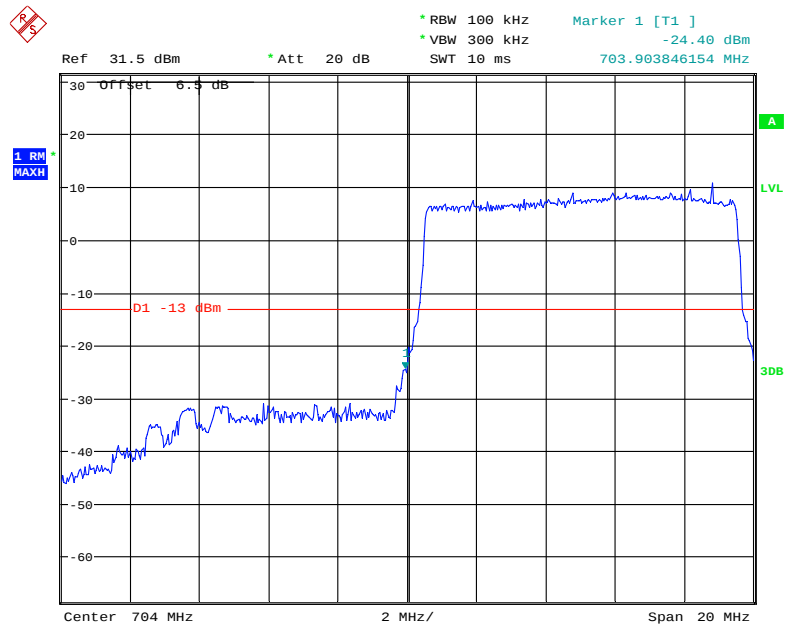
Date: 13.MAR.2020 00:47:33

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



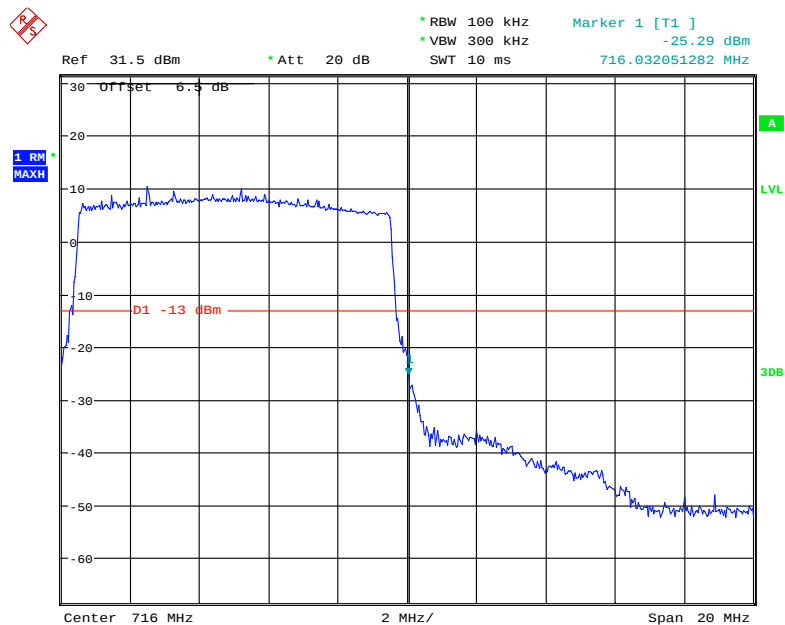
Date: 13.MAR.2020 00:48:00

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



Date: 13.MAR.2020 00:46:48

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



Date: 13.MAR.2020 00:48:35

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

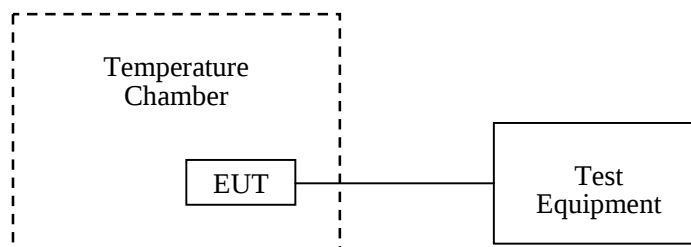
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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 °C
Relative Humidity:	50~52 %
ATM Pressure:	100.9~101.0 kPa

The testing was performed by Leo Huang and George Zhong from 2019-12-03 to 2019-12-26.

EUT operation mode: Transmitting

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

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

Middle Channel, $f_0 = 836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	3	0.0036	2.5
-20		-5	-0.0060	2.5
-10		6	0.0072	2.5
0		-5	-0.0060	2.5
10		1	0.0012	2.5
20		4	0.0048	2.5
30		-4	-0.0048	2.5
40		2	0.0024	2.5
50		-3	-0.0036	2.5
20	V min.= 3.6	1	0.0012	2.5
	V max.= 4.2	-5	-0.0060	2.5

EDGE Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	5	0.0060	2.5
-20		-6	-0.0072	2.5
-10		1	0.0012	2.5
0		-4	-0.0048	2.5
10		9	0.0108	2.5
20		5	0.0060	2.5
30		6	0.0072	2.5
40		-2	-0.0024	2.5
50		3	0.0036	2.5
20	V min.= 3.6	1	0.0012	2.5
	V max.= 4.2	-5	-0.0060	2.5

CDMA (1*RTT, BC0) Mode

Middle Channel, $f_0=836.52\text{MHz}$				
Temperature (°C)	Power Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	2	0.0024	2.5
-20		1	0.0012	2.5
-10		2	0.0024	2.5
0		3	0.0036	2.5
10		2	0.0024	2.5
20		3	0.0036	2.5
30		2	0.0024	2.5
40		3	0.0036	2.5
50		2	0.0024	2.5
25	V min.= 3.6	1	0.0012	2.5
	V max.= 4.2	3	0.0036	2.5

CDMA (EV-DO, BC0) Mode

Middle Channel, $f_0=836.52\text{MHz}$				
Temperature (°C)	Power Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	1	0.0012	2.5
-20		3	0.0036	2.5
-10		2	0.0024	2.5
0		3	0.0036	2.5
10		3	0.0036	2.5
20		1	0.0012	2.5
30		1	0.0012	2.5
40		3	0.0036	2.5
50		1	0.0012	2.5
25	V min.= 3.6	2	0.0024	2.5
	V max.= 4.2	3	0.0036	2.5

WCDMA Mode

Middle Channel, $f_0=836.6\text{MHz}$				
Temperature (°C)	Voltage Supplied (V_{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	3.8	3	0.0036	2.5
-20		6	0.0072	2.5
-10		-1	-0.0012	2.5
0		2	0.0024	2.5
10		4	0.0048	2.5
20		5	0.0060	2.5
30		2	0.0024	2.5
40		6	0.0072	2.5
50		2	0.0024	2.5
20	V min.= 3.6	1	0.0012	2.5
	V max.= 4.2	-4	-0.0048	2.5

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

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	6	0.0032	pass
-20		4	0.0021	pass
-10		-5	-0.0027	pass
0		2	0.0011	pass
10		-2	-0.0011	pass
20		-5	-0.0027	pass
30		-8	-0.0043	pass
40		1	0.0005	pass
50		4	0.0021	pass
20	V min.= 3.6	9	0.0048	pass
	V max.= 4.2	3	0.0016	pass

EDGE Mode

Middle Channel, $f_0 = 1880.0$ MHz				
Temperature (°C)	Voltage Supplied (V _{DC})	Frequency Error (Hz)	Frequency Error (ppm)	Result
-30	3.8	-1	-0.0005	pass
-20		-4	-0.0021	pass
-10		-7	-0.0037	pass
0		-5	-0.0027	pass
10		-3	-0.0016	pass
20		-2	-0.0011	pass
30		0	0.0000	pass
40		1	0.0005	pass
50		3	0.0016	pass
20	V min.= 3.6	-1	-0.0005	pass
	V max.= 4.2	2	0.0011	pass

AWS Band (Part 27)

Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.1114	1754.9984	1710	1755
-20		1710.1754	1754.9971	1710	1755
-10		1710.1128	1754.9975	1710	1755
0		1710.1685	1754.9958	1710	1755
10		1710.1584	1754.9949	1710	1755
20		1710.1961	1754.9985	1710	1755
30		1710.1580	1754.9966	1710	1755
40		1710.1332	1754.9974	1710	1755
50		1710.1563	1754.9987	1710	1755
20	V min.= 3.6	1710.1624	1754.9962	1710	1755
	V max.= 4.2	1710.1775	1754.9987	1710	1755

LTE:**QPSK:****Band 4:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.4809	1754.5026	1710	1755
-20		1710.4876	1754.5003	1710	1755
-10		1710.4866	1754.5048	1710	1755
0		1710.4869	1754.5020	1710	1755
10		1710.4829	1754.5021	1710	1755
20		1710.4875	1754.5016	1710	1755
30		1710.4854	1754.5006	1710	1755
40		1710.4846	1754.5007	1710	1755
50		1710.4849	1754.5020	1710	1755
20	V min.= 3.6	1710.4813	1754.5049	1710	1755
	V max.= 4.2	1710.4820	1754.5032	1710	1755

Band 5:

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

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	2500.5219	2569.3720	2500	2570
-20		2500.5220	2569.3715	2500	2570
-10		2500.5245	2569.3728	2500	2570
0		2500.5209	2569.3723	2500	2570
10		2500.5231	2569.3716	2500	2570
20		2500.5248	2569.3692	2500	2570
30		2500.5264	2569.3750	2500	2570
40		2500.5217	2569.3750	2500	2570
50		2500.5221	2569.3700	2500	2570
20	V min.= 3.6	2500.5216	2569.3742	2500	2570
	V max.= 4.2	2500.5257	2569.3746	2500	2570

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	704.4277	715.6496	704	716
-20		704.4205	715.6485	704	716
-10		704.4219	715.6451	704	716
0		704.4245	715.6464	704	716
10		704.4234	715.6471	704	716
20		704.4224	715.6520	704	716
30		704.4255	715.6517	704	716
40		704.4219	715.6471	704	716
50		704.4266	715.6497	704	716
20	V min.= 3.6	704.4282	715.6489	704	716
	V max.= 4.2	704.4244	715.6475	704	716

16QAM:**Band 4:**

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	1710.5345	1754.4336	1710	1755
-20		1710.5325	1754.4310	1710	1755
-10		1710.5373	1754.4289	1710	1755
0		1710.5327	1754.4285	1710	1755
10		1710.5324	1754.4291	1710	1755
20		1710.5329	1754.4300	1710	1755
30		1710.5341	1754.4299	1710	1755
40		1710.5312	1754.4288	1710	1755
50		1710.5296	1754.4296	1710	1755
20	V min.= 3.6	1710.5333	1754.4313	1710	1755
	V max.= 4.2	1710.5367	1754.4321	1710	1755

Band 5:

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

Band 7:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	2500.5189	2569.4398	2500	2570
-20		2500.5181	2569.4369	2500	2570
-10		2500.5211	2569.4391	2500	2570
0		2500.5187	2569.4391	2500	2570
10		2500.5192	2569.4373	2500	2570
20		2500.5177	2569.4390	2500	2570
30		2500.5236	2569.4387	2500	2570
40		2500.5232	2569.4413	2500	2570
50		2500.5212	2569.4410	2500	2570
20	V min.= 3.6	2500.5212	2569.4399	2500	2570
	V max.= 4.2	2500.5202	2569.4349	2500	2570

Band 17:

10 MHz Bandwidth					
Temperature (°C)	Power Supplied (V _{DC})	F _L (MHz)	F _H (MHz)	F _L Limit (MHz)	F _H Limit (MHz)
-30	3.8	704.4344	715.6225	704	716
-20		704.4369	715.6221	704	716
-10		704.4310	715.6164	704	716
0		704.4304	715.6196	704	716
10		704.4328	715.6182	704	716
20		704.4311	715.6181	704	716
30		704.4339	715.6210	704	716
40		704.4335	715.6230	704	716
50		704.4298	715.6200	704	716
20	V min.= 3.6	704.4314	715.6177	704	716
	V max.= 4.2	704.4330	715.6202	704	716

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