



TESTING LABORATORY
CERTIFICATE #4820.01



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

For

MAXWEST COMMUNICATION LIMITED

ROOM 1802B FORTRESS TOWER 250 KING'S ROAD NORTH POINT, Hong Kong

FCC ID:2ASP8ASTRO4P

Report Type: Original Report	Product Type: Mobile Phone
Report Number:	RDG191108017-00C
Report Date:	2019-11-26
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:	Mobile Phone
EUT Model:	Astro 4P
Operation modes:	GSM Voice, GPRS/EDGE Data, WCDMA(R99 (Voice+Data), HSDPA/HSUPA/HSPA+) FDD-LTE
Operation Frequency:	GSM 850: 824-849 MHz(TX); 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 2:1850-1910 MHz(TX), 1930-1990 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 7:2500-2570 MHz(TX), 2620-2690 MHz(RX)
Maximum Output Power: (Conducted)	GSM 850 :31.2 dBm; PCS 1900:29.2 dBm WCDMA Band 2: 22.38 dBm; WCDMA Band 5: 22.91 dBm LTE band 2: 22.26 dBm, LTE band 4: 22.24 dBm LTE band 5: 23.04 dBm, LTE Band 7: 21.79 dBm
Modulation Type:	GMSK, 8PSK, BPSK, QPSK, 16QAM
Adapter Information	Model: Astro 4P
	Input: 100-240Vac 50/60Hz 0.15A
	Output: 5.0Vac 500mA
Rated Input Voltage:	DC 3.8V from battery or 5V from Adapter
Serial Number:	RDG191108017-RF-S1
EUT Received Date:	2019.11.8
EUT Status:	Good

Objective

This report is prepared on behalf of **MAXWEST COMMUNICATION LIMITED** in accordance with: Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E, Part 27 of the Federal Communications Commission's rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15B JBP submissions with FCC ID: 2ASP8ASTRO4P
 FCC Part 15C DSS submissions with FCC ID: 2ASP8ASTRO4P
 FCC Part 15C DTS submissions with FCC ID: 2ASP8ASTRO4P

Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part 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-2010.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp.(Dongguan).

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz: 5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

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

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0022.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “△”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D 2010.

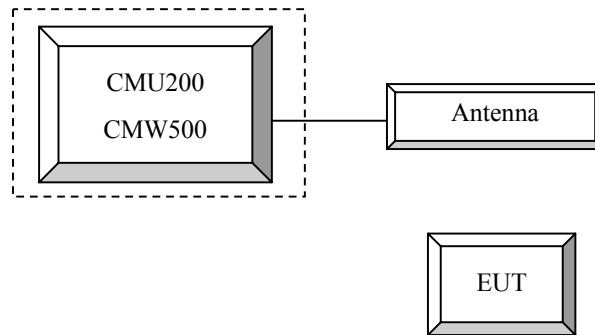
Equipment Modifications

No modification was made to the EUT.

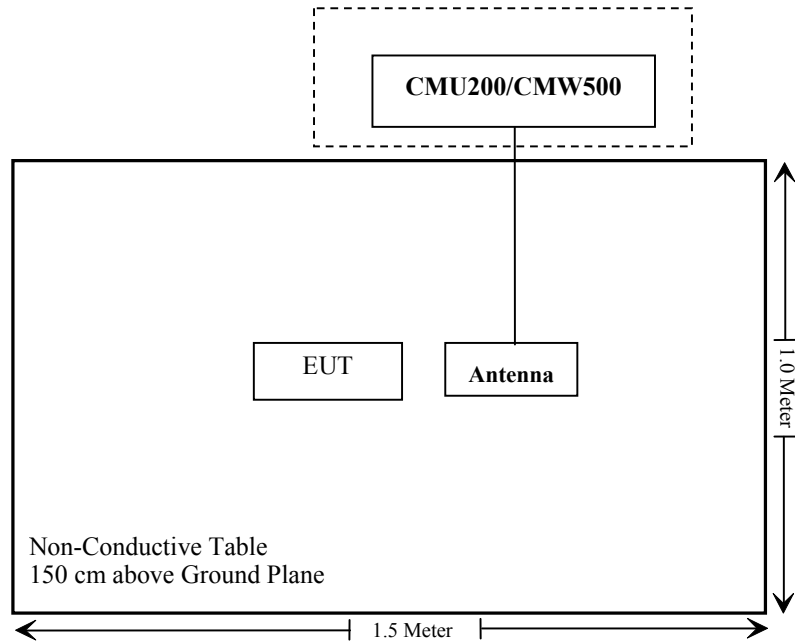
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	106 891
R&S	Wideband Radio Communication Tester	CMW500	147473
Un-Known	ANTENNA	Un-Known	Un-Known

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC§1.1310, §2.1093	RF Exposure	Compliance
FCC§2.1046;§ 22.913 (a); § 24.232 (c);§27.50	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
FCC§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
FCC§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
FCC§ 22.917 (a); § 24.238 (a); §27.53;	Out of band emission, Band Edge	Compliance
FCC§ 2.1055 § 22.355; § 24.235; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

FCC §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliance, please refer to the SAR report: RDG191108017-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

According to FCC § 2.1047(d), Part 22H & 24E 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- 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.

According to §24.232 (d) Power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with paragraph (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of §24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

According to §27.50

(b)(10) 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.

(c) (10) 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.

(d), (4) Fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(h),(2) Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

Test Procedure

GSM/GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900
 Press Connection control to choose the different menus
 Press RESET > choose all the reset all settings
 Connection Press Signal Off to turn off the signal and change settings
 Network Support > GSM + GPRS or GSM + EGSM
 Main Service > Packet Data
 Service selection > Test Mode A – Auto Slot Config. off
 MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting
 > Slot configuration > Uplink/Gamma
 > 33 dBm for GPRS 850
 > 30 dBm for GPRS 1900
 > 27 dBm for EGPRS 850
 > 26 dBm for EGPRS 1900
 BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
 Frequency Offset > + 0 Hz
 Mode > BCCH and TCH

 BCCH Level > -85 dBm (May need to adjust if link is not stable)
 BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

 Channel Type > Off
 P0 > 4 dB
 Slot Config > Unchanged (if already set under MS signal)
 TCH > choose desired test channel
 Hopping > Off
 Main Timeslot > 3
 Network Coding Scheme > CS4 (GPRS) and MCS5 (EGPRS)

 Bit Stream > 2E9-1 PSR Bit Stream
 AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
 Connection Press Signal on to turn on the signal and change settings

WCDMA-Release 99

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification. The EUT has a nominal maximum output power of 24dBm (+1.7/-3.7).

WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	βc / βd	8/15

WCDMA HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c / β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

WCDMA HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSUPA	HSUPA	HSUPA	HSUPA	HSUPA
	Subset	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{hs}	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
MPR(dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	$A_{hs}=\beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_FCI	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	

HSPA+

The following tests were conducted according to the test requirements in Table C.11.1.4 of 3GPP TS 34.121-1

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105

- Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{HS} = 30/15 * \beta_c$.
- Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
- Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.
- Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
- Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

DC-HSDPA

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
<p>Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.</p> <p>Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.</p>		

LTE (FDD):

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS_01".

Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N _{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
NS_04	6.6.2.2.2	41	20	>10	≤ 1
			5	>6	≤ 1
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

Radiated method:

ANSI/TIA-603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
R&S	Wideband Radio Communication Tester	CMW500	147473	2019-08-03	2020-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	/

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

Test Data

Environmental Conditions

Test Items:	Radiation Below 1GHz	Radiation Above 1GHz	Conducted Output Power
Temperature:	26.3 °C	24.9°C	26.5 °C
Relative Humidity:	42%	43 %	60%
ATM Pressure:	100.3 kPa	100.4 kPa	100.3kPa
Tester:	Neil Liao	Tyler Pan	Blake Yang
Test Date:	2019-11-18	2019-11-22	2019-11-18

Test Result: Compliance

Conducted Output Power

Cellular Band & PCS Band

Band	Channel No.	Conducted Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slots	GPRS 3 TX Slots	GPRS 4 TX Slots	EGPRS 1 TX Slot	EGPRS 2 TX Slots	EGPRS 3 TX Slots	EGPRS 4 TX Slots
Cellular	128	31.2	31.13	30.25	27.83	26.81	26.54	25.88	24.79	23.94
	190	31.2	31.19	30.27	27.86	26.86	26.48	25.74	24.66	23.76
	251	31.1	31.03	30.22	27.78	26.75	26.24	25.63	24.39	23.51
PCS	512	29.2	29.15	28.42	26.64	25.54	25.84	24.85	23.97	23.12
	661	29	28.96	28.21	26.45	25.36	25.79	24.82	23.89	23.08
	810	28.8	28.75	28.07	26.27	25.17	25.72	24.79	23.86	23.04

WCDMA Band 2

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.19	3.20	22.38	3.12	22.31	2.68
HSDPA	1	20.02	5.60	20.16	5.68	20.11	5.64
	2	19.85	5.53	19.97	5.53	19.92	5.73
	3	19.91	5.80	20.07	5.73	20.18	5.64
	4	20.20	5.73	20.12	5.84	19.93	5.61
HSUPA	1	20.04	5.36	20.13	5.64	20.08	6.12
	2	20.01	5.70	20.11	5.63	20.26	5.75
	3	20.01	5.51	19.95	5.45	19.83	5.76
	4	19.82	5.84	20.12	5.79	20.03	5.64
	5	20.01	5.54	20.00	5.99	19.94	5.42
DC-HSDPA	1	19.90	5.69	20.13	5.56	20.19	5.49
	2	19.82	5.69	19.86	5.43	19.99	5.83
	3	19.81	5.63	19.93	5.72	20.14	5.79
	4	20.25	5.83	20.27	5.95	20.08	5.49
HSPA+ (16QAM)	1	20.21	5.29	20.21	5.67	20.18	6.29

WCDMA Band 5

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.82	2.88	22.85	2.80	22.91	2.96
HSDPA	1	20.06	5.76	20.08	5.32	20.14	5.52
	2	20.14	5.63	20.05	5.21	20.14	5.64
	3	19.96	5.70	19.94	5.51	20.04	5.71
	4	20.03	5.77	20.09	5.44	20.33	5.66
HSUPA	1	20.03	6.24	20.05	5.28	20.11	5.00
	2	20.22	5.64	19.99	5.35	20.22	5.69
	3	20.14	5.68	19.95	5.40	20.18	5.59
	4	19.89	5.81	19.79	5.45	19.91	5.75
	5	20.14	5.76	19.90	5.45	20.28	5.63
DC-HSDPA	1	20.25	5.94	19.91	5.13	20.04	5.59
	2	20.16	5.67	19.93	5.12	20.21	5.54
	3	19.79	5.72	19.86	5.43	19.92	5.89
	4	20.09	5.86	20.22	5.43	20.41	5.85
HSPA+ (16QAM)	1	20.01	6.11	20.03	5.33	20.27	4.85

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.23	21.63	21.64
		RB1#3	21.92	21.83	20.12
		RB1#5	21.72	21.62	19.49
		RB3#0	21.80	21.73	20.19
		RB3#3	21.81	21.68	19.42
		RB6#0	20.83	20.79	19.74
	16QAM	RB1#0	20.72	20.61	20.57
		RB1#3	20.95	20.78	19.71
		RB1#5	20.79	20.63	19.29
		RB3#0	20.96	20.91	20.12
		RB3#3	20.91	20.92	19.42
		RB6#0	19.76	19.71	19.78
3MHz	QPSK	RB1#0	21.77	21.72	22.26
		RB1#8	21.75	21.70	21.74
		RB1#14	21.72	21.67	19.83
		RB6#0	20.81	20.74	20.71
		RB6#9	20.79	20.74	20.65
		RB15#0	20.84	20.75	20.62
	16QAM	RB1#0	21.32	20.83	20.61
		RB1#8	21.35	20.99	20.59
		RB1#14	21.33	20.88	20.55
		RB6#0	19.86	20.12	19.61
		RB6#9	19.84	20.21	19.55
		RB15#0	19.88	20.15	19.67
5MHz	QPSK	RB1#0	21.66	21.72	22.05
		RB1#13	21.81	21.74	21.75
		RB1#24	21.70	21.71	20.14
		RB15#0	20.88	21.08	20.67
		RB15#10	20.85	21.16	20.54
		RB25#0	20.84	21.15	20.56
	16QAM	RB1#0	20.59	21.24	20.57
		RB1#13	20.74	21.39	20.68
		RB1#24	20.61	21.29	20.53
		RB15#0	19.89	20.21	19.69
		RB15#10	19.87	20.14	19.56
		RB25#0	19.88	20.16	19.61

10MHz	QPSK	RB1#0	21.80	21.66	21.68
		RB1#25	21.85	21.85	21.85
		RB1#49	21.68	21.67	20.25
		RB25#0	20.83	20.77	20.50
		RB25#25	20.77	20.86	20.50
	RB50#0	20.85	20.87	20.56	
	16QAM	RB1#0	21.37	20.99	20.61
		RB1#25	21.45	21.22	20.76
		RB1#49	21.38	21.24	20.56
		RB25#0	19.91	20.18	19.66
RB25#25		19.82	20.12	19.65	
RB50#0	19.82	20.15	19.65		
15MHz	QPSK	RB1#0	21.70	21.84	21.66
		RB1#38	21.76	21.94	21.73
		RB1#74	21.94	21.83	20.51
		RB36#0	20.91	21.26	20.71
		RB36#39	20.89	21.15	20.73
		RB75#0	20.92	21.21	20.75
	16QAM	RB1#0	21.27	21.27	21.07
		RB1#38	21.42	21.30	21.08
		RB1#74	21.46	21.20	20.84
		RB36#0	19.91	20.26	19.75
		RB36#39	19.87	20.17	19.78
		RB75#0	19.87	20.22	19.76
20MHz	QPSK	RB1#0	21.55	21.56	21.42
		RB1#50	21.86	21.90	21.88
		RB1#99	21.57	21.55	21.50
		RB50#0	20.91	20.75	20.84
		RB50#50	20.96	20.54	20.94
		RB100#0	20.96	20.63	20.93
	16QAM	RB1#0	20.95	20.81	20.97
		RB1#50	21.26	21.09	21.37
		RB1#99	20.96	20.75	20.88
		RB50#0	19.90	19.70	19.94
		RB50#50	19.95	19.97	19.99
		RB100#0	19.94	20.13	19.99

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	21.63	21.68	21.60
		RB1#3	21.82	21.86	21.77
		RB1#5	21.67	21.71	21.61
		RB3#0	21.80	21.79	21.67
		RB3#3	21.72	21.75	21.71
		RB6#0	20.77	20.83	20.71
	16QAM	RB1#0	20.69	20.87	20.65
		RB1#3	20.84	20.98	20.91
		RB1#5	20.72	20.89	21.01
		RB3#0	20.98	20.83	21.07
		RB3#3	21.04	20.82	21.25
		RB6#0	19.76	19.83	20.10
3MHz	QPSK	RB1#0	22.24	21.75	22.13
		RB1#8	21.70	21.75	22.01
		RB1#14	21.69	21.75	21.74
		RB6#0	20.76	20.81	20.98
		RB6#9	20.79	20.81	21.01
		RB15#0	20.79	20.82	21.21
	16QAM	RB1#0	21.35	20.98	21.18
		RB1#8	21.31	20.98	21.17
		RB1#14	21.33	20.93	21.19
		RB6#0	19.86	19.82	20.13
		RB6#9	19.99	19.88	20.12
		RB15#0	20.31	19.93	20.24
5MHz	QPSK	RB1#0	22.17	21.70	22.02
		RB1#13	21.78	21.79	21.95
		RB1#24	21.65	21.70	21.61
		RB15#0	20.90	20.83	20.98
		RB15#10	20.98	20.84	21.19
		RB25#0	20.86	20.84	21.18
	16QAM	RB1#0	20.59	21.06	21.10
		RB1#13	20.73	21.17	21.27
		RB1#24	20.61	21.07	21.01
		RB15#0	20.08	19.81	20.27
		RB15#10	20.36	19.92	20.21
		RB25#0	20.24	20.14	20.25

10MHz	QPSK	RB1#0	22.20	21.74	21.69
		RB1#25	21.94	21.94	21.86
		RB1#49	21.78	21.75	21.69
		RB25#0	20.89	20.84	20.71
		RB25#25	20.82	20.85	20.89
	RB50#0	20.83	20.89	21.13	
	16QAM	RB1#0	21.30	20.93	20.89
		RB1#25	21.55	21.11	21.18
		RB1#49	21.41	20.98	20.84
		RB25#0	19.91	19.86	20.26
RB25#25		20.18	20.02	20.25	
RB50#0	20.12	19.98	20.20		
15MHz	QPSK	RB1#0	22.13	21.71	21.66
		RB1#38	21.79	21.80	21.70
		RB1#74	21.71	21.58	21.66
		RB36#0	20.88	20.86	20.76
		RB36#39	21.07	20.87	20.81
		RB75#0	20.99	20.91	21.02
	16QAM	RB1#0	21.25	20.87	21.04
		RB1#38	21.39	20.94	21.19
		RB1#74	21.35	20.89	21.19
		RB36#0	20.04	19.88	20.18
		RB36#39	20.26	19.94	20.21
		RB75#0	20.35	20.09	20.24
20MHz	QPSK	RB1#0	21.86	21.86	21.46
		RB1#50	21.93	21.88	21.82
		RB1#99	22.13	21.53	21.51
		RB50#0	21.28	20.86	20.78
		RB50#50	21.34	21.03	20.81
		RB100#0	21.35	20.93	20.74
	16QAM	RB1#0	21.20	21.06	20.83
		RB1#50	21.57	21.48	21.20
		RB1#99	21.17	21.14	20.83
		RB50#0	20.30	19.89	19.94
		RB50#50	20.31	20.13	20.23
		RB100#0	20.31	20.14	20.24

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	23.04	22.68	22.53
		RB1#3	23.04	22.81	22.86
		RB1#5	23.03	22.60	22.59
		RB3#0	22.63	22.64	22.59
		RB3#3	22.80	22.63	22.66
		RB6#0	21.84	21.64	21.66
	16QAM	RB1#0	21.92	21.66	21.50
		RB1#3	21.98	21.85	21.71
		RB1#5	21.98	21.67	21.54
		RB3#0	22.24	21.59	21.65
		RB3#3	22.23	21.56	21.67
		RB6#0	21.10	20.68	20.58
3MHz	QPSK	RB1#0	22.73	22.70	22.66
		RB1#8	22.56	22.69	22.65
		RB1#14	22.63	22.65	22.65
		RB6#0	21.82	21.66	21.59
		RB6#9	21.98	21.60	21.61
		RB15#0	22.02	21.66	21.64
	16QAM	RB1#0	22.18	21.73	21.60
		RB1#8	22.39	21.74	21.60
		RB1#14	22.57	21.70	21.60
		RB6#0	21.15	20.66	20.58
		RB6#9	21.12	20.71	20.74
		RB15#0	21.17	20.65	20.98
5MHz	QPSK	RB1#0	22.80	22.61	22.53
		RB1#13	22.73	22.73	22.65
		RB1#24	22.56	22.55	22.55
		RB15#0	21.58	21.60	21.78
		RB15#10	21.77	21.75	21.62
		RB25#0	21.93	21.65	21.63
	16QAM	RB1#0	21.53	21.83	21.62
		RB1#13	21.91	21.91	21.67
		RB1#24	21.42	21.79	21.59
		RB15#0	21.08	20.59	20.81
		RB15#10	21.07	20.73	21.08
		RB25#0	21.10	20.71	21.03
10MHz	QPSK	RB1#0	23.04	22.68	22.66
		RB1#25	22.74	22.78	22.78
		RB1#49	22.73	22.64	22.72
		RB25#0	21.67	21.63	21.51
		RB25#25	21.60	21.90	21.53
		RB50#0	21.66	21.78	21.54
	16QAM	RB1#0	22.05	21.73	21.51
		RB1#25	22.27	21.90	21.70
		RB1#49	22.21	21.71	21.61
		RB25#0	20.76	20.74	20.69
		RB25#25	20.65	20.94	21.08
		RB50#0	20.69	20.84	21.05

LTE Band 7

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	21.41	21.42	21.58
		RB1#13	21.53	21.56	21.71
		RB1#24	21.45	21.50	21.64
		RB15#0	20.47	20.60	20.82
		RB15#10	20.60	20.61	20.82
		RB25#0	20.52	20.61	20.80
	16QAM	RB1#0	20.33	20.76	20.66
		RB1#13	20.45	20.88	20.82
		RB1#24	20.32	20.80	20.72
		RB15#0	19.49	19.55	19.84
		RB15#10	19.58	19.57	19.81
		RB25#0	19.54	19.57	19.74
10MHz	QPSK	RB1#0	21.46	21.50	21.60
		RB1#25	21.68	21.74	21.66
		RB1#49	21.51	21.56	21.79
		RB25#0	20.45	20.66	20.82
		RB25#25	20.69	20.73	20.80
		RB50#0	20.56	20.70	20.87
	16QAM	RB1#0	20.98	20.70	20.62
		RB1#25	21.12	20.89	20.83
		RB1#49	20.97	20.71	20.78
		RB25#0	19.41	19.65	19.90
		RB25#25	19.66	19.72	19.86
		RB50#0	19.53	19.67	19.83
15MHz	QPSK	RB1#0	21.44	21.38	21.58
		RB1#38	21.50	21.54	21.70
		RB1#74	21.46	21.53	21.69
		RB36#0	20.43	20.66	20.85
		RB36#39	20.56	20.73	20.84
		RB75#0	20.52	20.69	20.88
	16QAM	RB1#0	20.92	20.59	20.95
		RB1#38	21.01	20.75	21.05
		RB1#74	20.94	20.66	21.03
		RB36#0	19.41	19.65	19.79
		RB36#39	19.60	19.69	19.77
		RB75#0	19.48	19.67	19.76
20MHz	QPSK	RB1#0	21.28	21.23	21.30
		RB1#50	21.62	21.75	21.64
		RB1#99	21.28	21.42	21.47
		RB50#0	20.35	20.67	20.75
		RB50#50	20.36	20.73	20.64
		RB100#0	20.35	20.69	20.67
	16QAM	RB1#0	20.55	20.48	20.88
		RB1#50	20.96	20.94	21.22
		RB1#99	20.61	20.63	21.01
		RB50#0	19.23	19.61	19.69
		RB50#50	19.33	19.72	19.57
		RB100#0	19.33	19.67	19.63

PAR, Band 2

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	7.88	8.44	7.88	13
	100 RB		6.36	6.20	6.56	13
16QAM	1 RB	20 MHz	7.56	8.52	7.48	13
	100 RB		7.20	6.84	7.16	13

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	6.92	6.76	7.12	13
	100 RB		6.40	6.20	6.20	13
16QAM	1 RB	20 MHz	7.32	7.12	7.44	13
	100 RB		7.12	7.04	7.04	13

PAR, Band 5

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.60	4.36	4.52	13
	50RB		5.36	5.32	5.16	13
16QAM	1 RB	10 MHz	5.28	5.16	5.40	13
	50 RB		6.16	6.24	5.96	13

PAR, Band 7

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	6.32	6.43	7.22	13
	100 RB		6.55	6.65	6.22	13
16QAM	1 RB	20 MHz	7.32	7.23	7.45	13
	100 RB		7.32	7.41	7.87	13

Note: peak-to-average ratio (PAR) <13 dB.

ERP & EIRP

Part 22H

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM 850 Middle Channel								
836.60	H	90.34	15.42	0.00	0.97	14.45	38.45	24.00
836.60	V	100.96	29.17	0.00	0.97	28.20	38.45	10.25
EGPRS850 Middle Channel								
836.60	H	86.09	11.17	0.00	0.97	10.20	38.45	28.25
836.60	V	95.96	24.17	0.00	0.97	23.20	38.45	15.25
WCDMA R99 Band 5 middle channel								
836.60	H	84.41	9.49	0.00	0.97	8.52	38.45	29.93
836.60	V	93.11	21.32	0.00	0.97	20.35	38.45	18.10

Part 24E

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
PCS 1900 Middle Channel								
1880.00	H	91.21	18.60	11.66	2.66	27.60	33.00	5.40
1880.00	V	90.36	17.89	11.66	2.66	26.89	33.00	6.11
EGPRS1900 Middle Channel								
1880.00	H	86.89	14.28	11.66	2.66	23.28	33.00	9.72
1880.00	V	85.81	13.34	11.66	2.66	22.34	33.00	10.66
WCDMA R99 Band 2 middle channel								
1880.00	H	87.40	14.79	11.66	2.66	23.79	33.00	9.21
1880.00	V	86.53	14.06	11.66	2.66	23.06	33.00	9.94

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

LTE Band 2

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)				
1880.00	1.40	QPSK	H	85.30	12.69	11.66	2.66	21.69	33.00	11.31	
1880.00			V	84.65	12.18	11.66	2.66	21.18	33.00	11.82	
1880.00	3.00		H	85.10	12.49	11.66	2.66	21.49	33.00	11.51	
1880.00			V	84.50	12.03	11.66	2.66	21.03	33.00	11.97	
1880.00	5.00		H	84.97	12.36	11.66	2.66	21.36	33.00	11.64	
1880.00			V	84.25	11.78	11.66	2.66	20.78	33.00	12.22	
1880.00	10.00		H	84.85	12.24	11.66	2.66	21.24	33.00	11.76	
1880.00			V	84.11	11.64	11.66	2.66	20.64	33.00	12.36	
1880.00	15.00		H	84.36	11.75	11.66	2.66	20.75	33.00	12.25	
1880.00			V	84.03	11.56	11.66	2.66	20.56	33.00	12.44	
1880.00	20.00		H	84.10	11.49	11.66	2.66	20.49	33.00	12.51	
1880.00			V	84.24	11.77	11.66	2.66	20.77	33.00	12.23	
1880.00	1.40		16QAM	H	85.27	12.66	11.66	2.66	21.66	33.00	11.34
1880.00				V	84.68	12.21	11.66	2.66	21.21	33.00	11.79
1880.00	3.00			H	85.05	12.44	11.66	2.66	21.44	33.00	11.56
1880.00				V	84.16	11.69	11.66	2.66	20.69	33.00	12.31
1880.00	5.00	H		84.83	12.22	11.66	2.66	21.22	33.00	11.78	
1880.00		V		83.67	11.20	11.66	2.66	20.20	33.00	12.80	
1880.00	10.00	H		84.35	11.74	11.66	2.66	20.74	33.00	12.26	
1880.00		V		83.50	11.03	11.66	2.66	20.03	33.00	12.97	
1880.00	15.00	H		83.67	11.06	11.66	2.66	20.06	33.00	12.94	
1880.00		V		83.25	10.78	11.66	2.66	19.78	33.00	13.22	
1880.00	20.00	H		82.94	10.33	11.66	2.66	19.33	33.00	13.67	
1880.00		V		83.18	10.71	11.66	2.66	19.71	33.00	13.29	

LTE Band 4

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)				
1732.50	1.40	QPSK	H	84.01	9.96	10.90	2.51	18.35	30.00	11.65	
1732.50			V	82.15	7.78	10.90	2.51	16.17	30.00	13.83	
1732.50	3.00		H	83.64	9.59	10.90	2.51	17.98	30.00	12.02	
1732.50			V	82.35	7.98	10.90	2.51	16.37	30.00	13.63	
1732.50	5.00		H	83.45	9.40	10.90	2.51	17.79	30.00	12.21	
1732.50			V	82.19	7.82	10.90	2.51	16.21	30.00	13.79	
1732.50	10.00		H	83.33	9.28	10.90	2.51	17.67	30.00	12.33	
1732.50			V	82.24	7.87	10.90	2.51	16.26	30.00	13.74	
1732.50	15.00		H	83.44	9.39	10.90	2.51	17.78	30.00	12.22	
1732.50			V	82.51	8.14	10.90	2.51	16.53	30.00	13.47	
1732.50	20.00		H	84.20	10.15	10.90	2.51	18.54	30.00	11.46	
1732.50			V	82.96	8.59	10.90	2.51	16.98	30.00	13.02	
1732.50	1.40		16QAM	H	83.25	9.20	10.90	2.51	17.59	30.00	12.41
1732.50				V	82.25	7.88	10.90	2.51	16.27	30.00	13.73
1732.50	3.00			H	83.14	9.09	10.90	2.51	17.48	30.00	12.52
1732.50				V	82.16	7.79	10.90	2.51	16.18	30.00	13.82
1732.50	5.00	H		83.09	9.04	10.90	2.51	17.43	30.00	12.57	
1732.50		V		82.41	8.04	10.90	2.51	16.43	30.00	13.57	
1732.50	10.00	H		82.97	8.92	10.90	2.51	17.31	30.00	12.69	
1732.50		V		81.32	6.95	10.90	2.51	15.34	30.00	14.66	
1732.50	15.00	H		82.86	8.81	10.90	2.51	17.20	30.00	12.80	
1732.50		V		81.74	7.37	10.90	2.51	15.76	30.00	14.24	
1732.50	20.00	H		83.19	9.14	10.90	2.51	17.53	30.00	12.47	
1732.50		V		81.96	7.59	10.90	2.51	15.98	30.00	14.02	

LTE Band 5

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)				
836.50	1.40	QPSK	H	81.50	6.57	0.00	0.97	5.60	38.45	32.85	
836.50			V	91.60	19.81	0.00	0.97	18.84	38.45	19.61	
836.50	3.00		H	81.43	6.50	0.00	0.97	5.53	38.45	32.92	
836.50			V	91.42	19.63	0.00	0.97	18.66	38.45	19.79	
836.50	5.00		H	81.24	6.31	0.00	0.97	5.34	38.45	33.11	
836.50			V	91.31	19.52	0.00	0.97	18.55	38.45	19.90	
836.50	10.00		H	81.03	6.10	0.00	0.97	5.13	38.45	33.32	
836.50			V	90.95	19.16	0.00	0.97	18.19	38.45	20.26	
836.50	1.40		16QAM	H	80.20	5.27	0.00	0.97	4.30	38.45	34.15
836.50				V	90.50	18.71	0.00	0.97	17.74	38.45	20.71
836.50	3.00	H		80.11	5.18	0.00	0.97	4.21	38.45	34.24	
836.50		V		90.45	18.66	0.00	0.97	17.69	38.45	20.76	
836.50	5.00	H		80.17	5.24	0.00	0.97	4.27	38.45	34.18	
836.50		V		90.63	18.84	0.00	0.97	17.87	38.45	20.58	
836.50	10.00	H		79.98	5.05	0.00	0.97	4.08	38.45	34.37	
836.50		V		90.05	18.26	0.00	0.97	17.29	38.45	21.16	

LTE Band 7

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)	
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)				
2535.00	5.00	QPSK	H	83.82	11.21	13.14	3.10	21.25	33.00	11.75	
2535.00			V	81.26	10.11	13.14	3.10	20.15	33.00	12.85	
2535.00	10.00		H	83.56	10.95	13.14	3.10	20.99	33.00	12.01	
2535.00			V	81.07	9.92	13.14	3.10	19.96	33.00	13.04	
2535.00	15.00		H	83.36	10.75	13.14	3.10	20.79	33.00	12.21	
2535.00			V	80.96	9.81	13.14	3.10	19.85	33.00	13.15	
2535.00	20.00		H	83.55	10.94	13.14	3.10	20.98	33.00	12.02	
2535.00			V	81.23	10.08	13.14	3.10	20.12	33.00	12.88	
2535.00	5.00		16QAM	H	83.47	10.86	13.14	3.10	20.90	33.00	12.10
2535.00				V	81.02	9.87	13.14	3.10	19.91	33.00	13.09
2535.00	10.00	H		83.06	10.45	13.14	3.10	20.49	33.00	12.51	
2535.00		V		80.33	9.18	13.14	3.10	19.22	33.00	13.78	
2535.00	15.00	H		82.44	9.83	13.14	3.10	19.87	33.00	13.13	
2535.00		V		80.16	9.01	13.14	3.10	19.05	33.00	13.95	
2535.00	20.00	H		83.06	10.45	13.14	3.10	20.49	33.00	12.51	
2535.00		V		80.45	9.30	13.14	3.10	19.34	33.00	13.66	

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

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

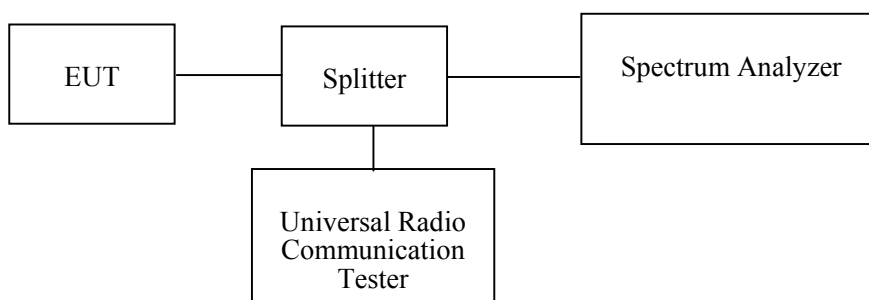
Applicable Standard

FCC §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 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2019-05-09	2020-05-09
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	Each time	/
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	/

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

Test Data

Environmental Conditions

Temperature:	26.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.3kPa
Tester:	Blake Yang
Test Date:	2019-11-18

Test Mode: Transmitting

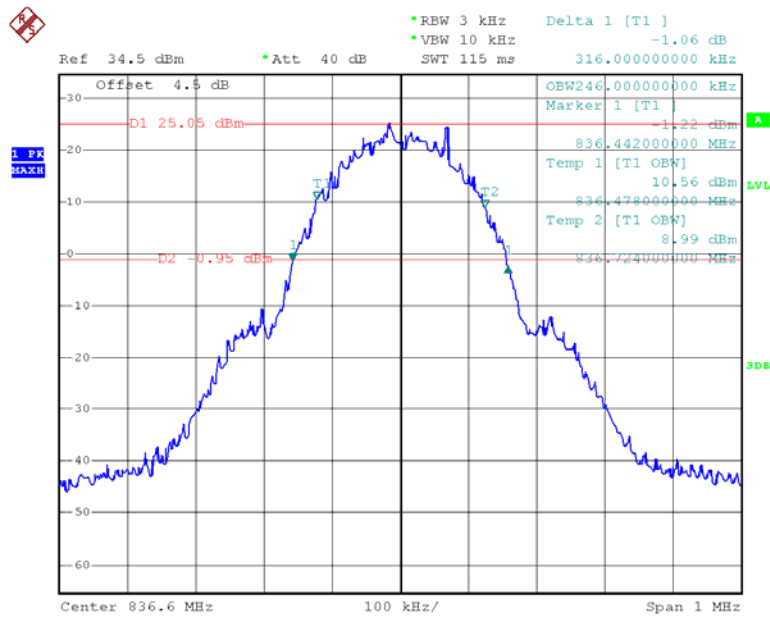
Test Result: Compliance. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	Middle	GSM	0.246	0.316
		EGPRS	0.250	0.320
PCS		GSM	0.242	0.318
		EGPRS	0.248	0.316
WCDMA Band 2		Rel 99	4.180	4.740
		HSDPA	4.180	4.760
		HSUPA	4.200	4.740
WCDMA Band 5		Rel 99	4.180	4.760
		HSDPA	4.240	5.180
		HSUPA	4.220	5.140

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.094	1.287
		16QAM	1.100	1.305
	3 MHz	QPSK	2.681	2.862
		16QAM	2.681	2.862
	5 MHz	QPSK	4.529	5.130
		16QAM	4.549	5.190
	10 MHz	QPSK	8.978	9.779
		16QAM	8.938	9.699
	15 MHz	QPSK	13.527	14.970
		16QAM	13.527	15.090
	20 MHz	QPSK	17.876	19.238
		16QAM	17.956	19.639
LTE Band 4	1.4 MHz	QPSK	1.100	1.299
		16QAM	1.100	1.311
	3 MHz	QPSK	2.693	2.874
		16QAM	2.693	2.874
	5 MHz	QPSK	4.529	5.210
		16QAM	4.529	5.070
	10 MHz	QPSK	8.978	9.859
		16QAM	8.978	9.739
	15 MHz	QPSK	13.527	14.970
		16QAM	13.527	15.451
	20 MHz	QPSK	17.876	19.399
		16QAM	17.956	19.479

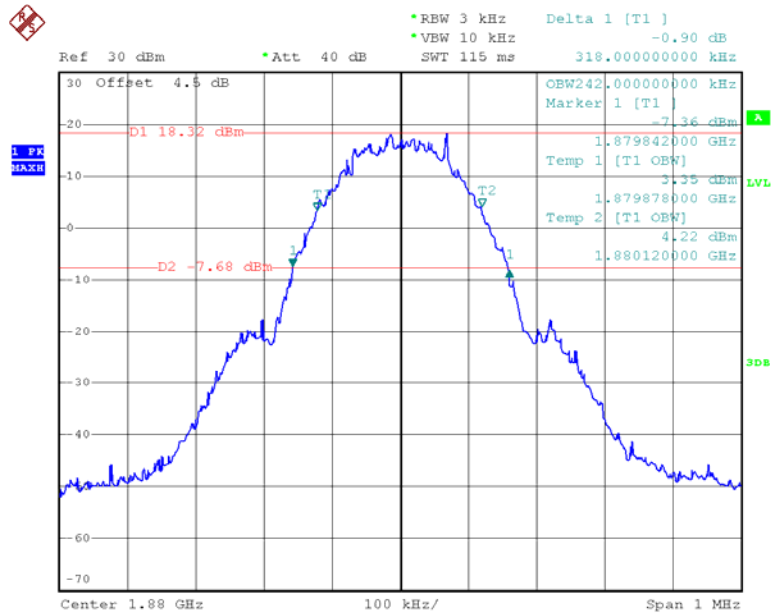
Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 5	1.4 MHz	QPSK	1.100	1.299
		16QAM	1.100	1.311
	3 MHz	QPSK	2.681	2.862
		16QAM	2.681	2.874
	5 MHz	QPSK	4.549	5.210
		16QAM	4.549	5.210
	10 MHz	QPSK	9.018	9.859
		16QAM	9.018	9.820
LTE Band 7	5 MHz	QPSK	4.569	5.251
		16QAM	4.549	5.251
	10 MHz	QPSK	8.978	9.900
		16QAM	8.978	9.659
	15 MHz	QPSK	13.527	15.030
		16QAM	13.527	15.210
	20 MHz	QPSK	17.956	19.399
		16QAM	17.956	19.559

GSM Cellular 850



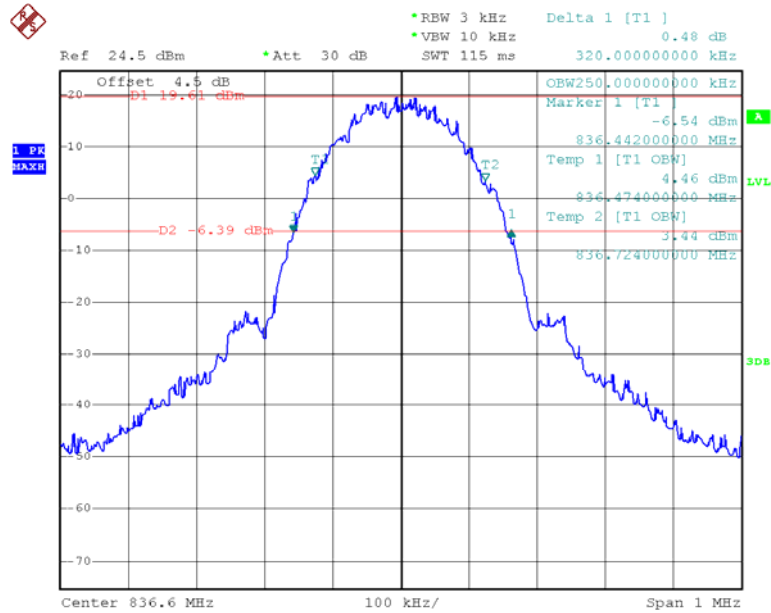
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GSM PCS 1900



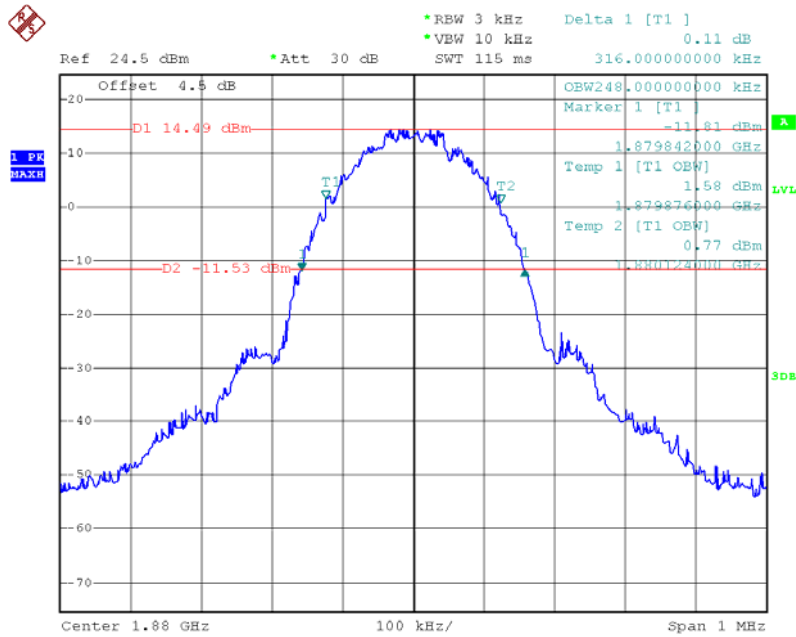
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EDGE Cellular 850



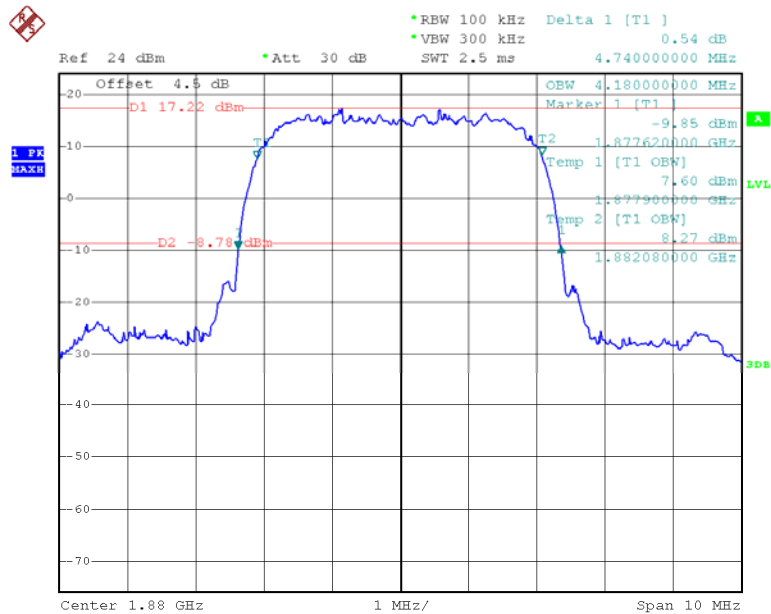
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EDGE PCS 1900



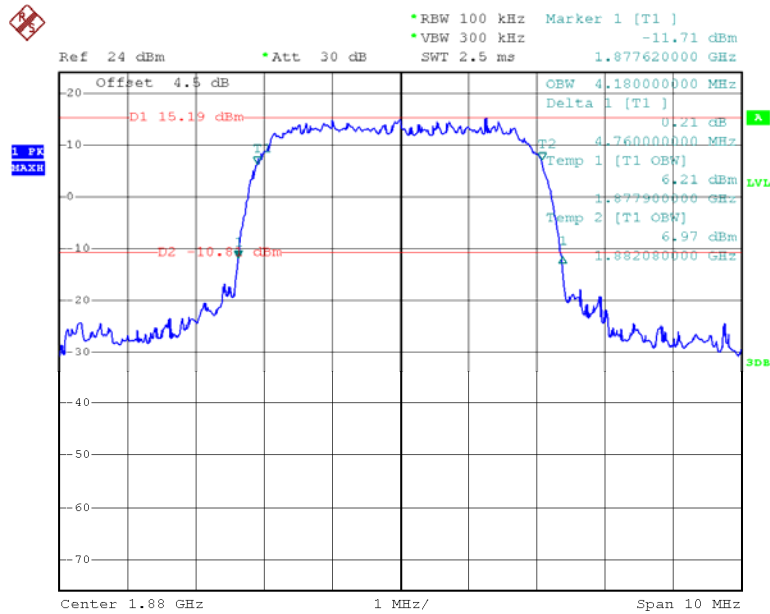
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WCDMA Band 2 Rel 99



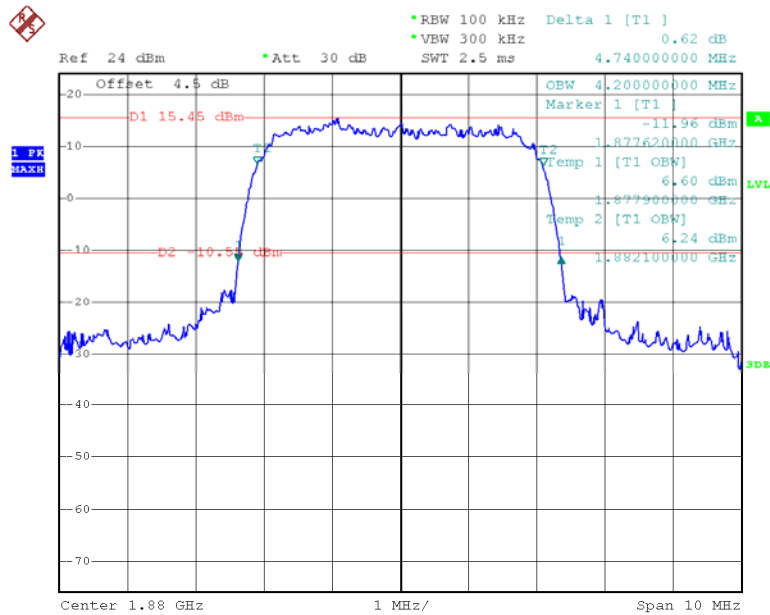
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WCDMA Band 2 HSDPA



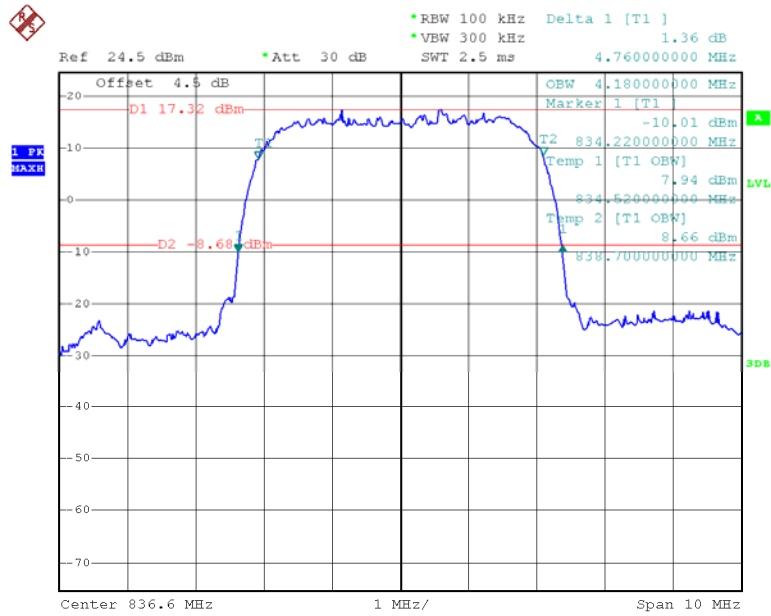
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WCDMA Band 2 HSUPA



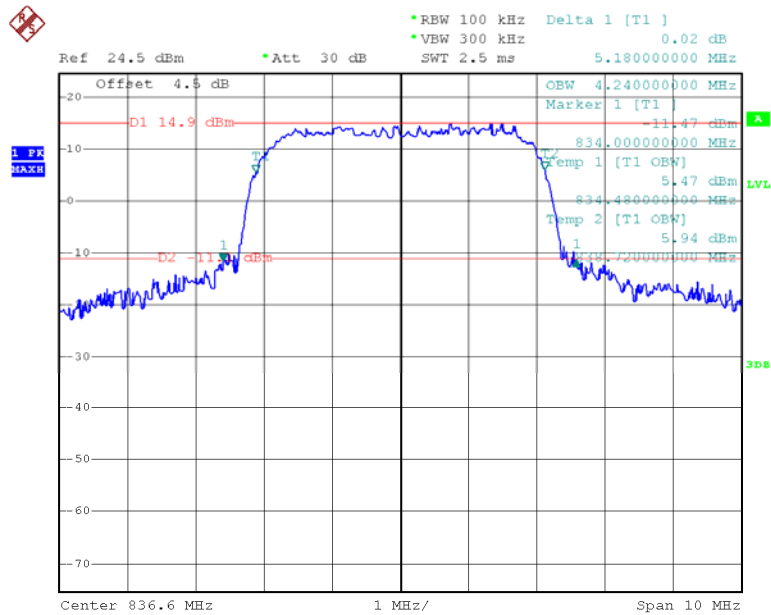
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WCDMA Band 5 Rel 99



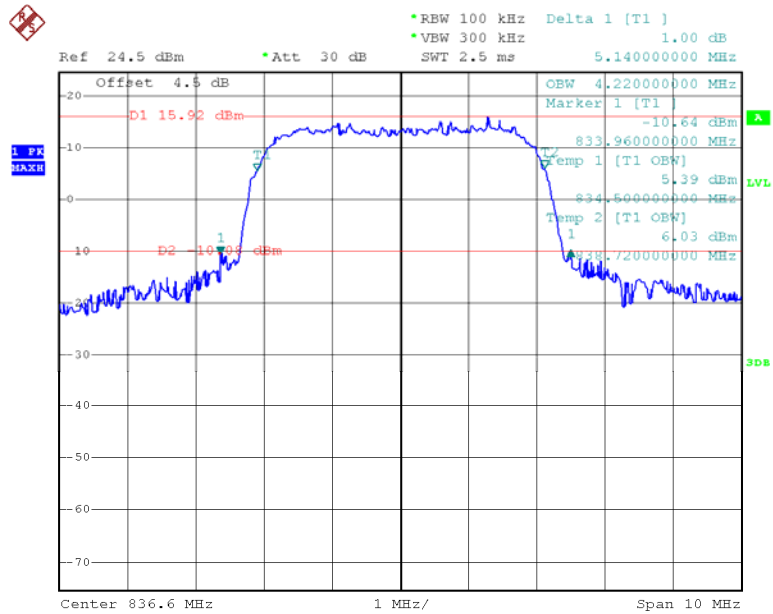
Date: 18.NOV.2019 17:50:17

WCDMA Band 5 HSDPA



Date: 18.NOV.2019 17:52:44

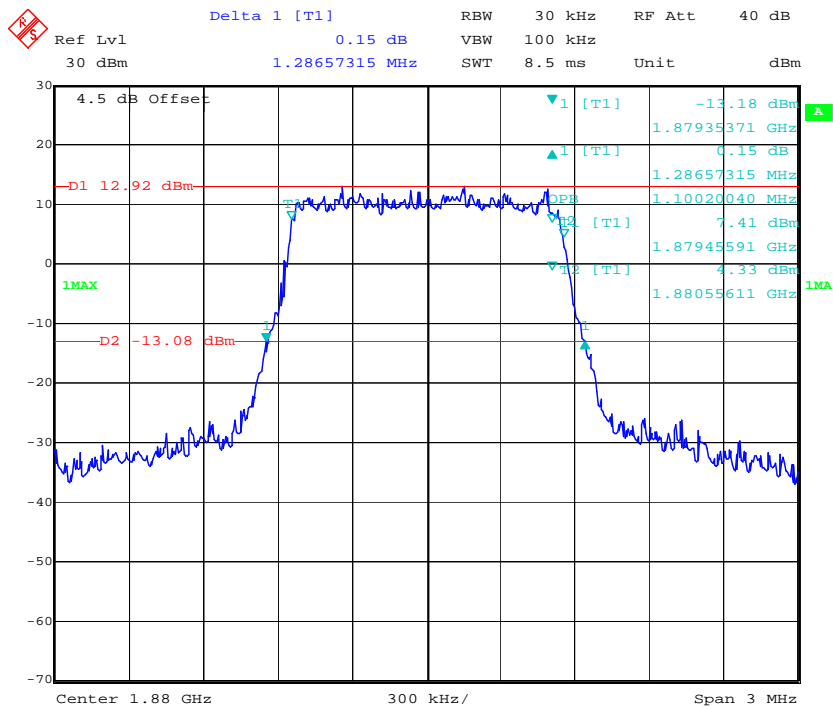
WCDMA Band 5 HSUPA



Date: 18.NOV.2019 17:55:15

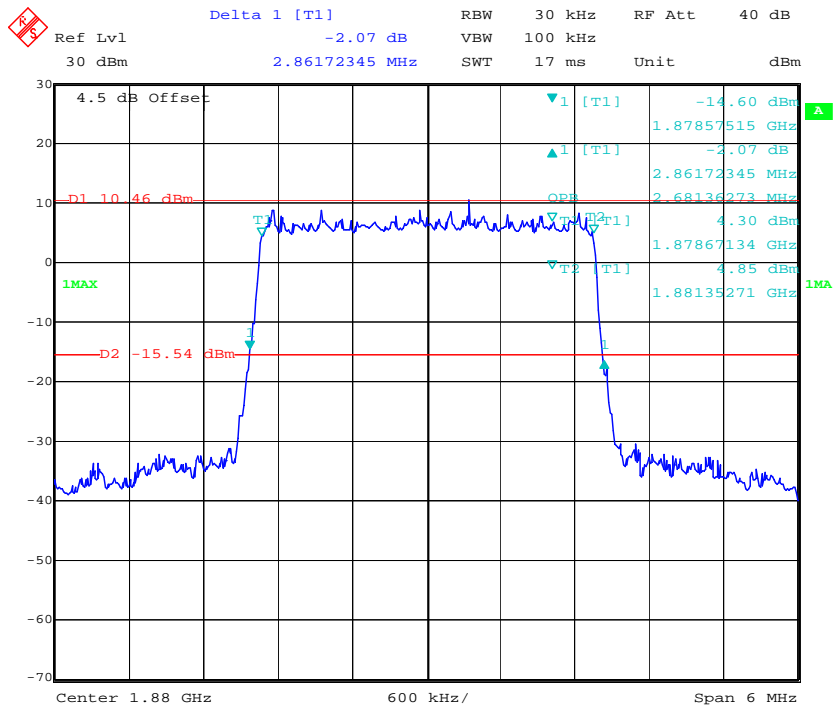
LTE Band 2

QPSK_1.4 MHz

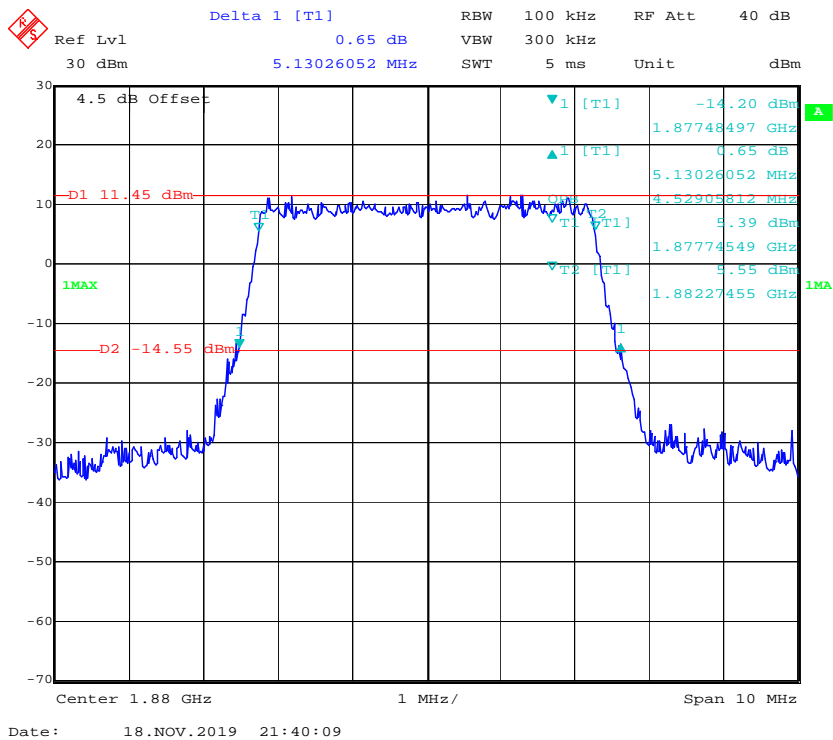


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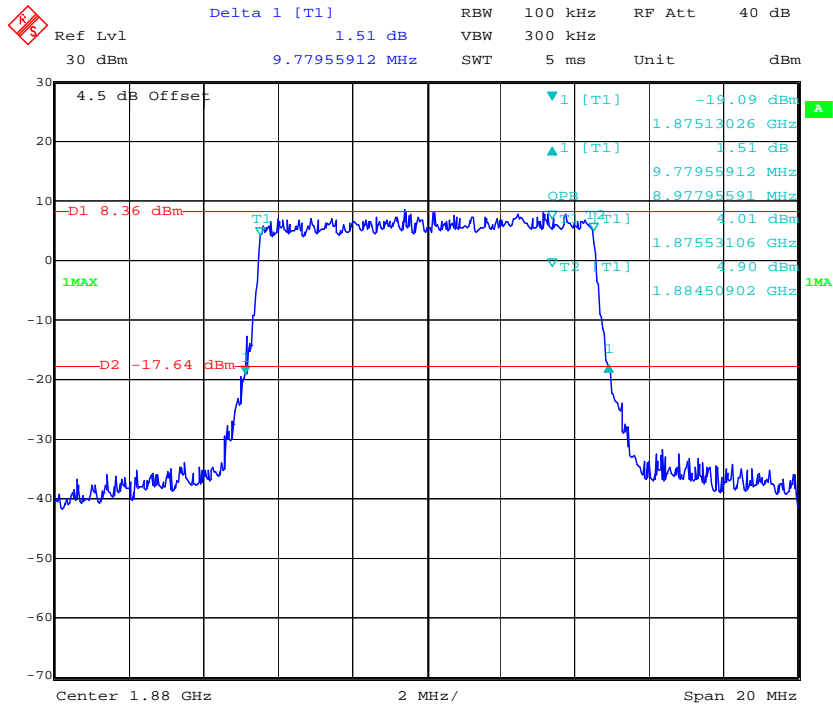
QPSK_3 MHz



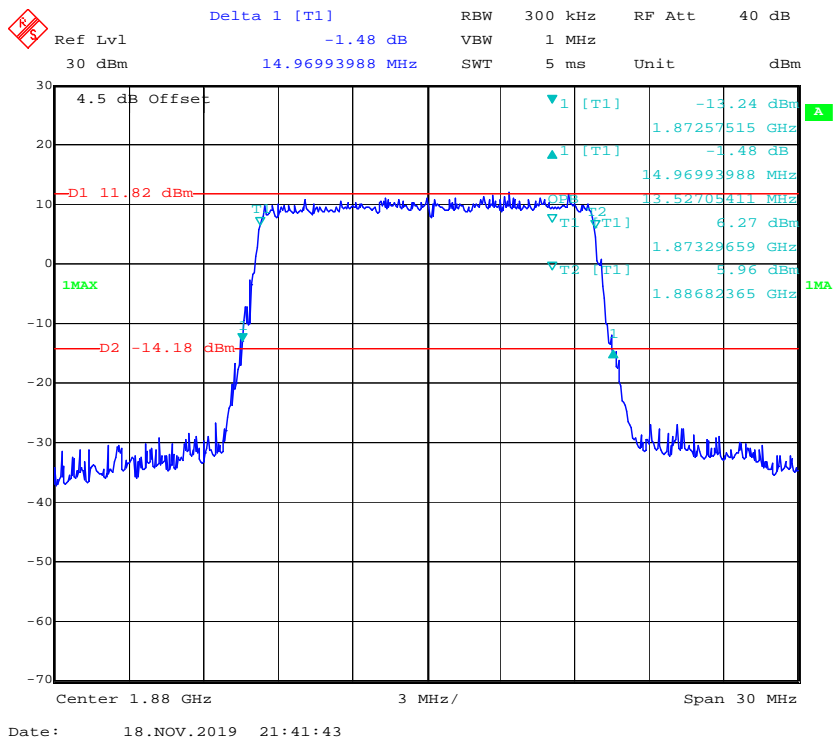
QPSK_5 MHz



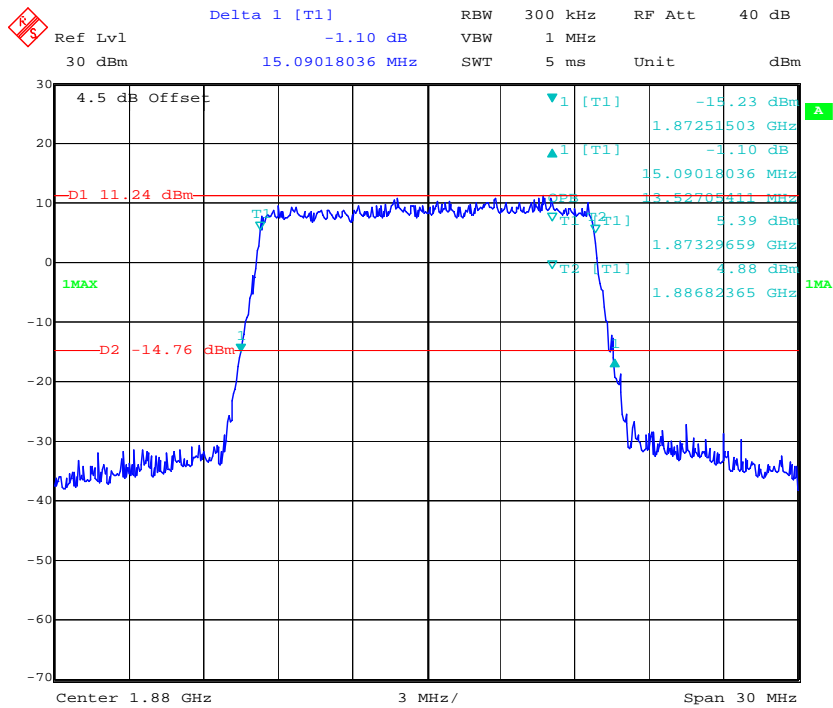
QPSK_10 MHz



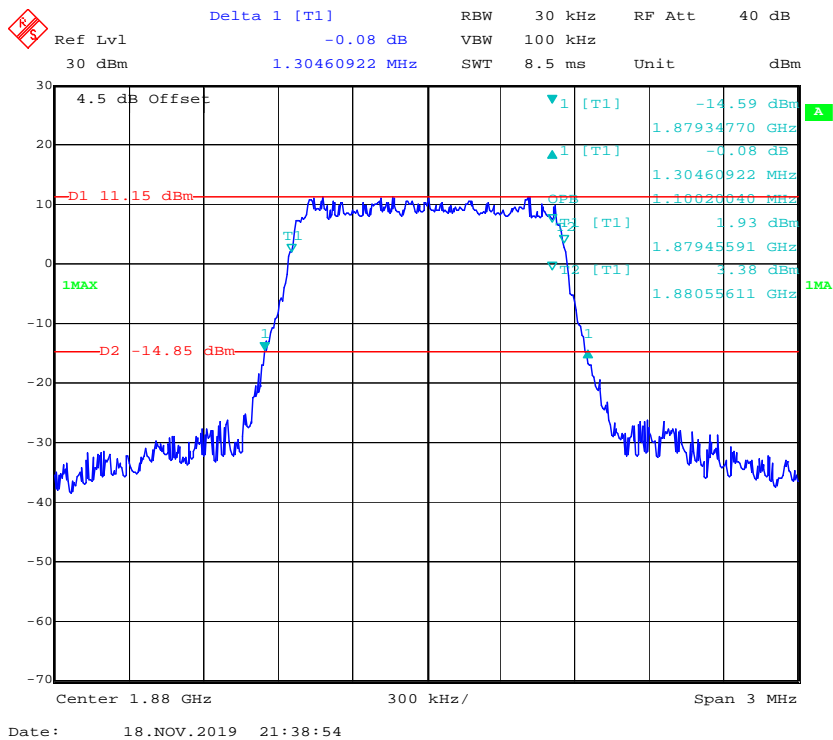
QPSK_15 MHz



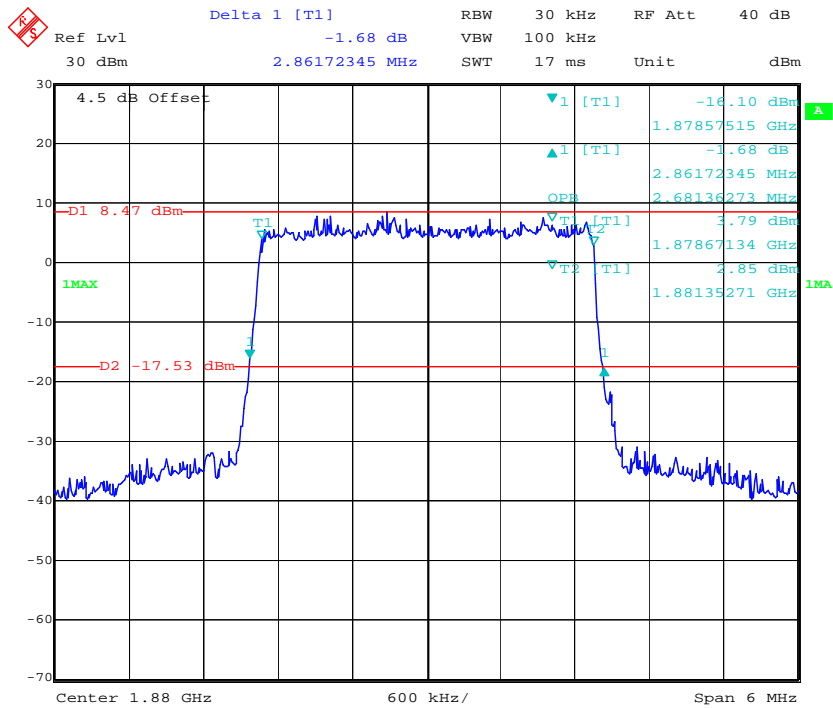
QPSK_20 MHz



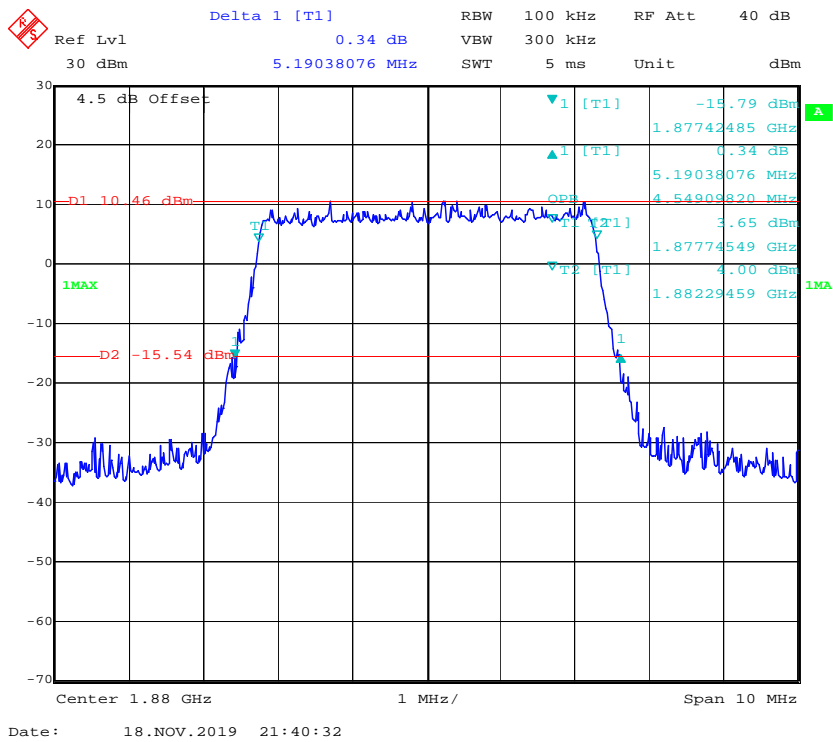
16QAM_1.4 MHz



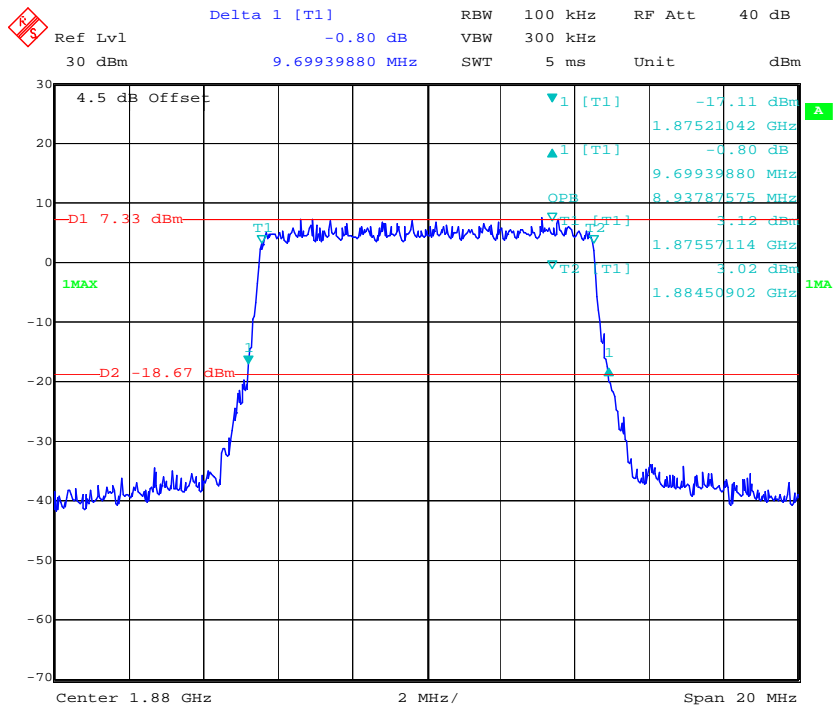
16QAM_3 MHz



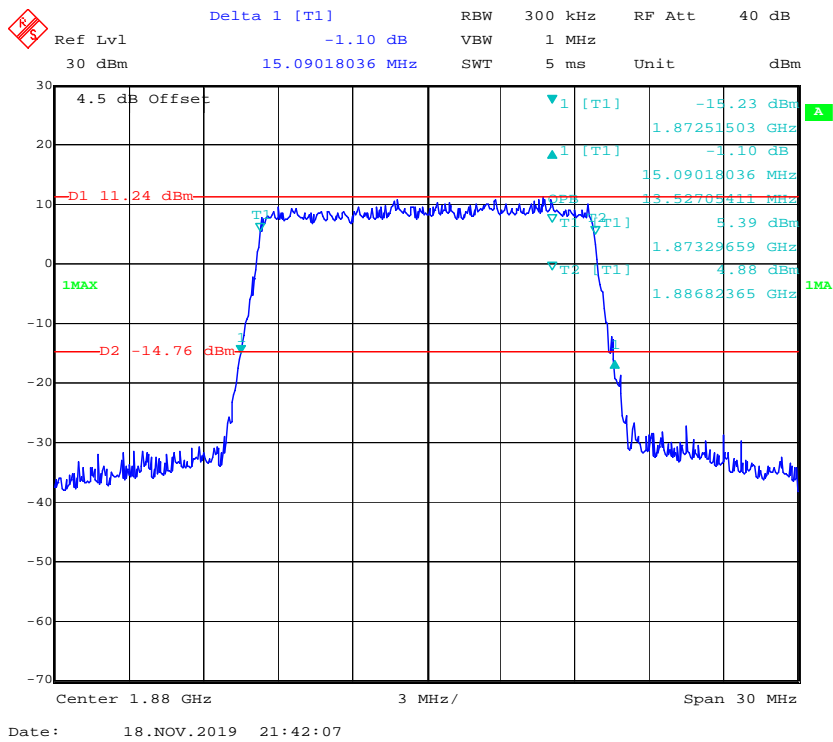
16QAM_5 MHz



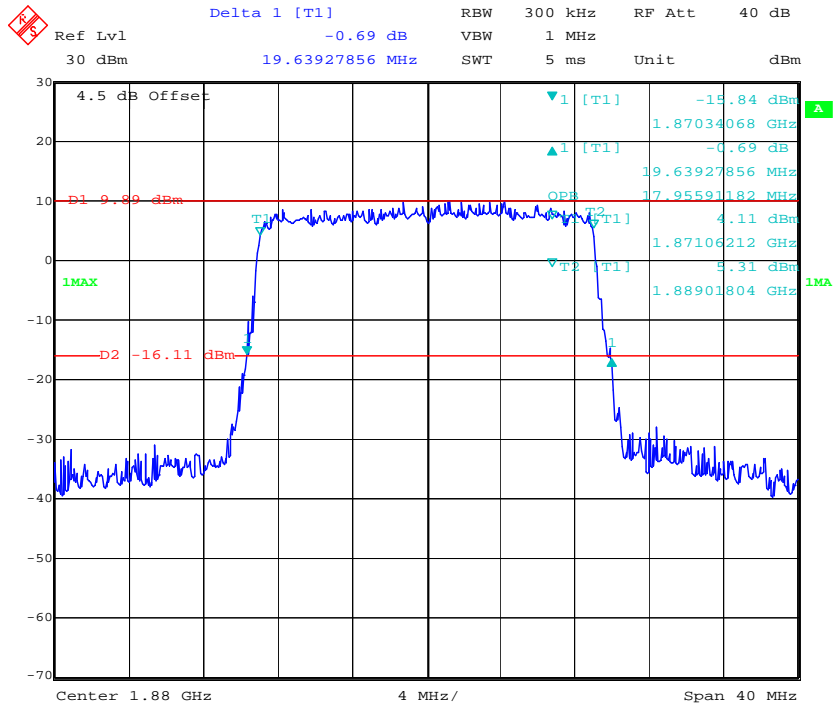
16QAM_10 MHz



16QAM_15 MHz

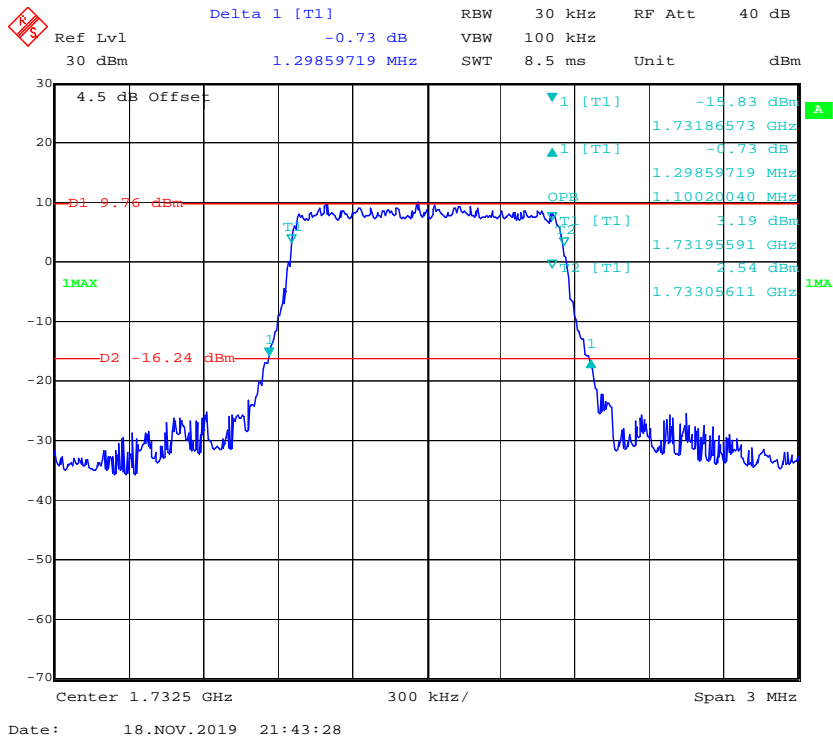


16QAM_20 MHz

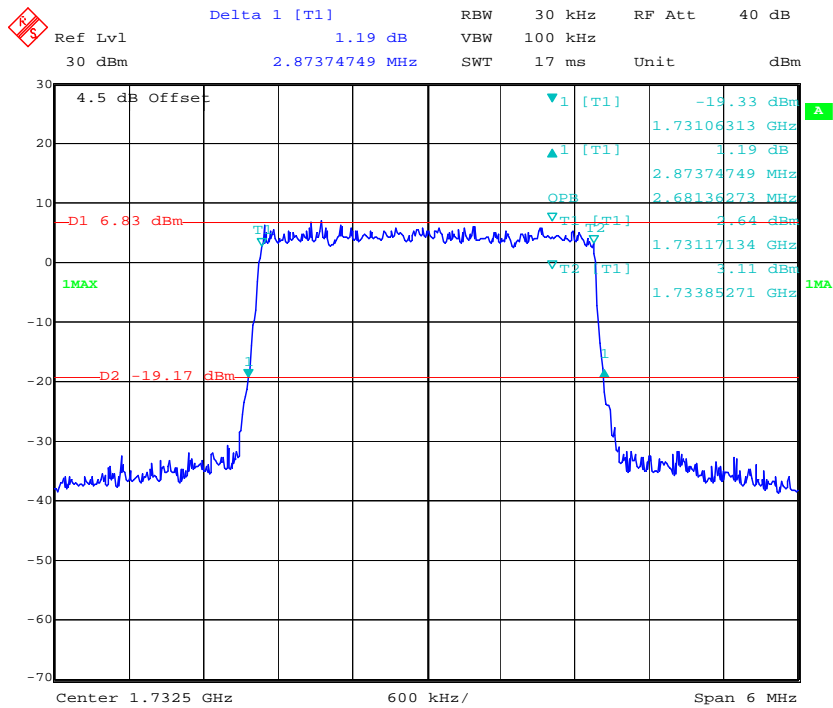


LTE Band 4

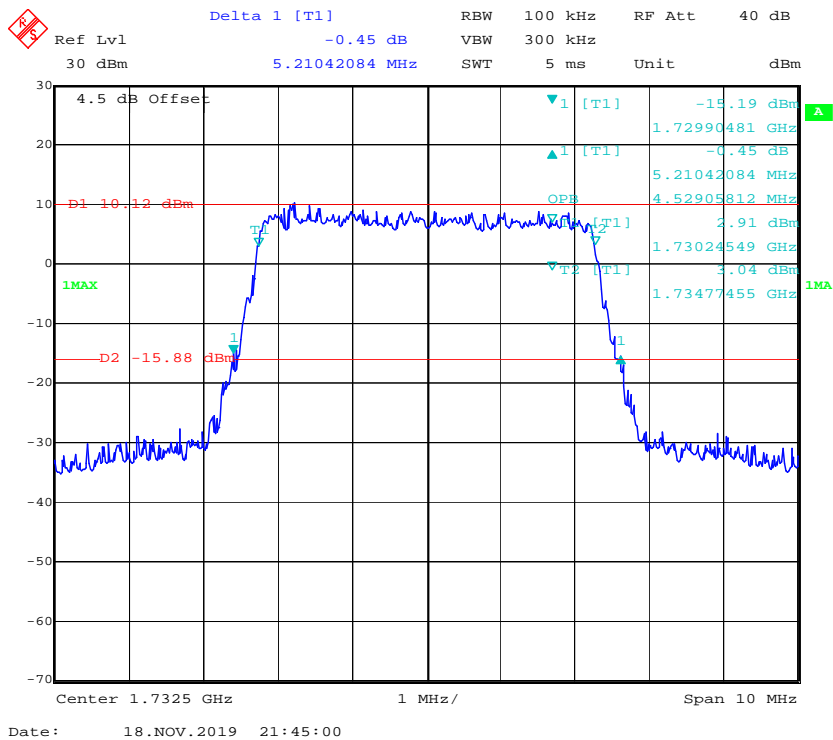
QPSK_1.4 MHz



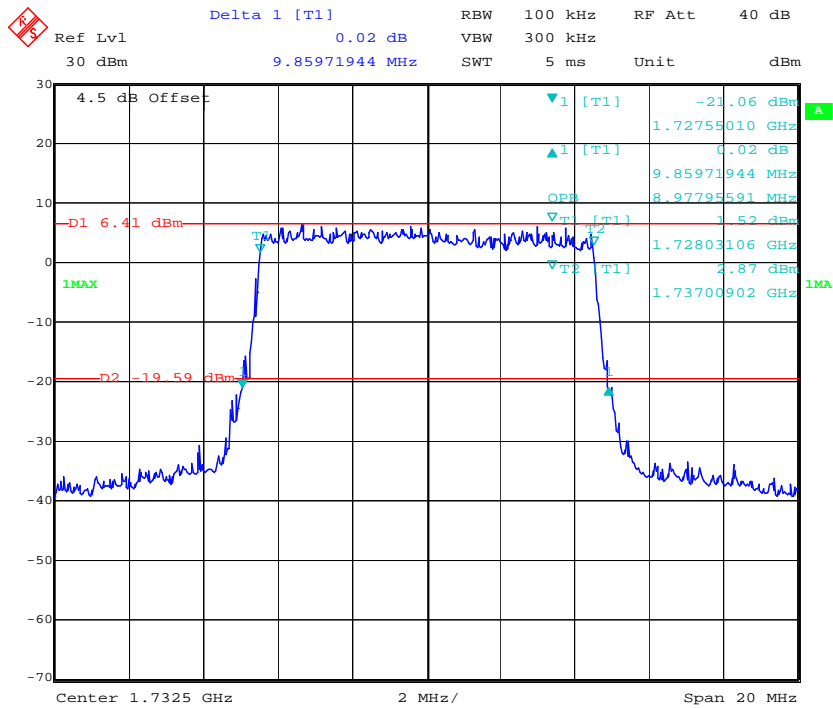
QPSK_3 MHz



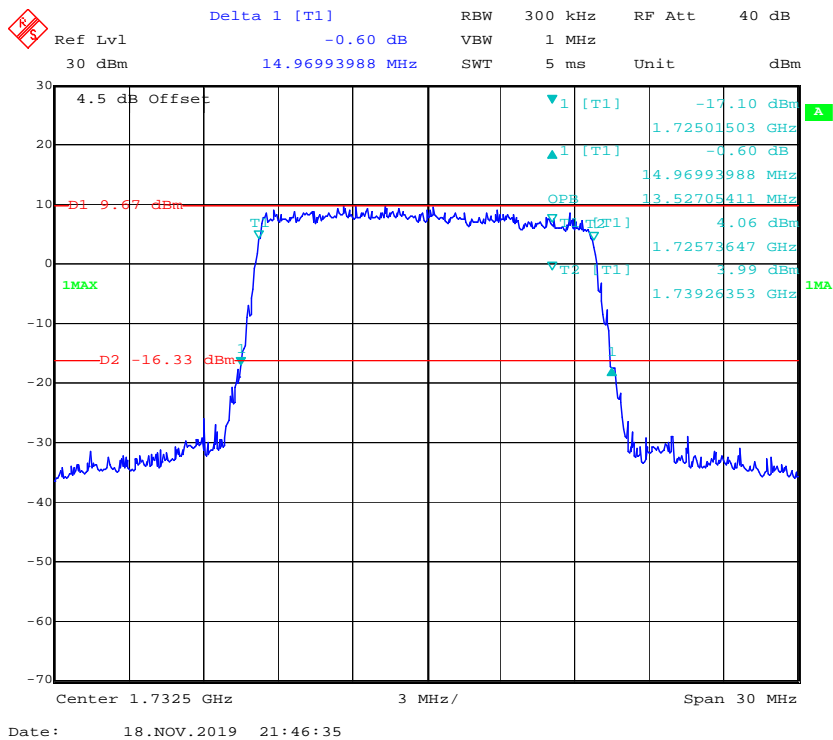
QPSK_5 MHz



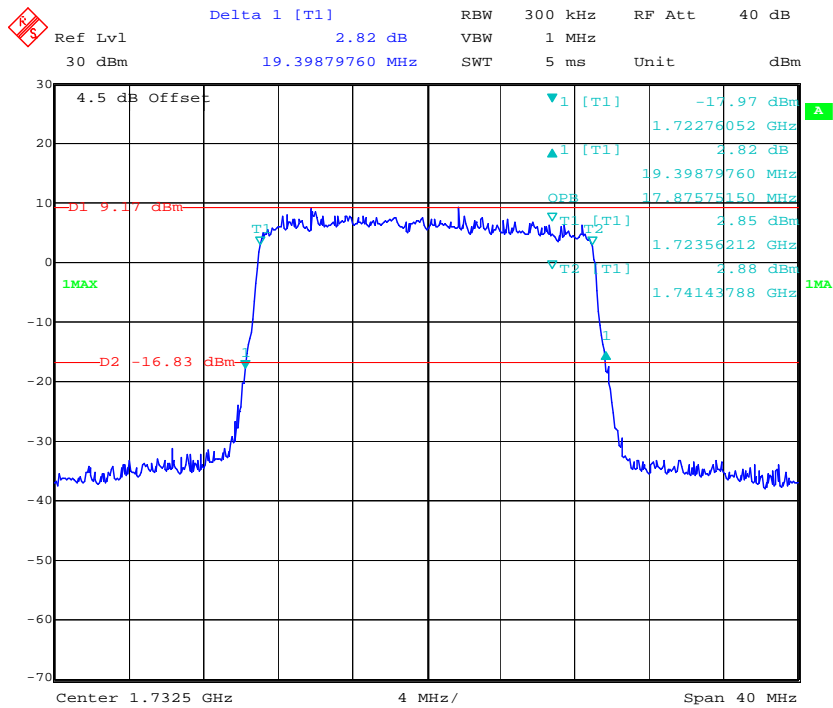
QPSK_10 MHz



QPSK_15 MHz

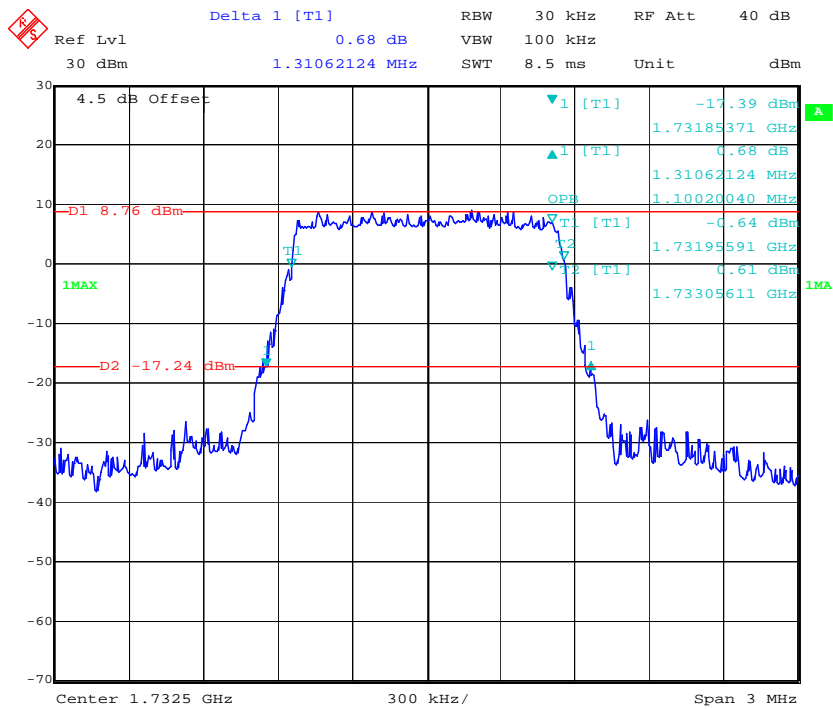


QPSK_20 MHz



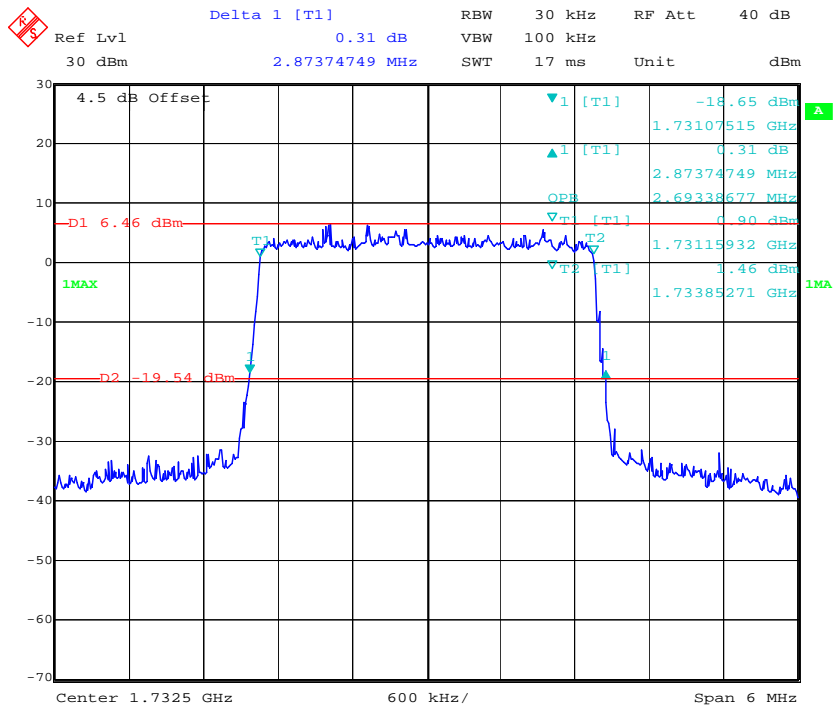
Date: 18.NOV.2019 21:47:27

16QAM_1.4 MHz

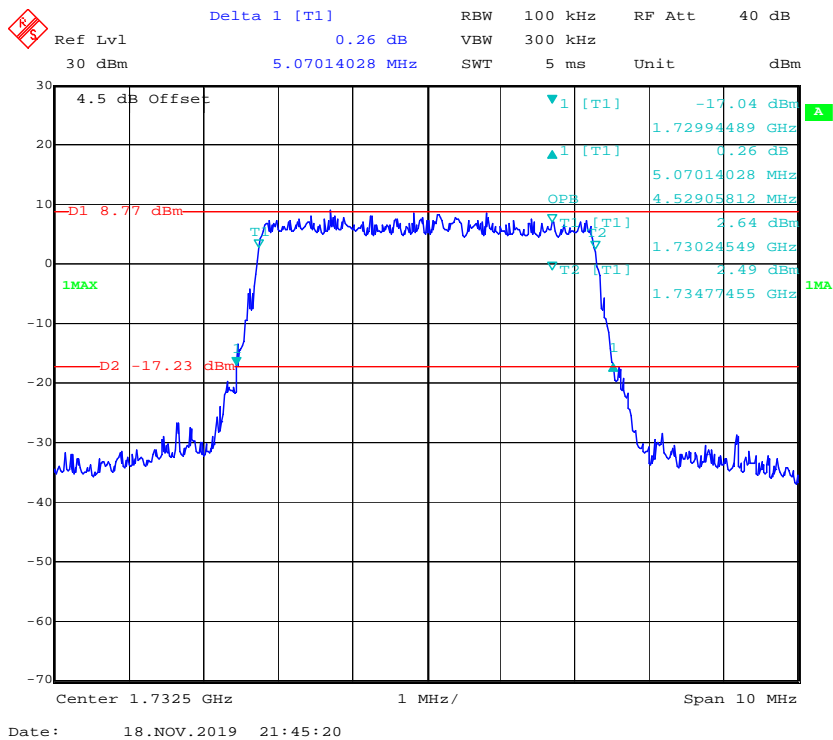


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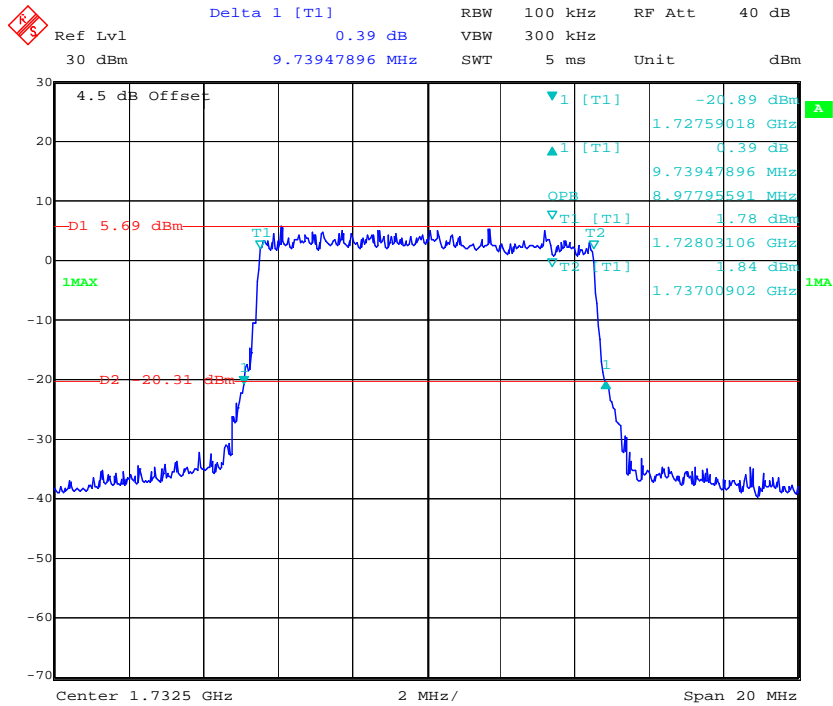
16QAM_3 MHz



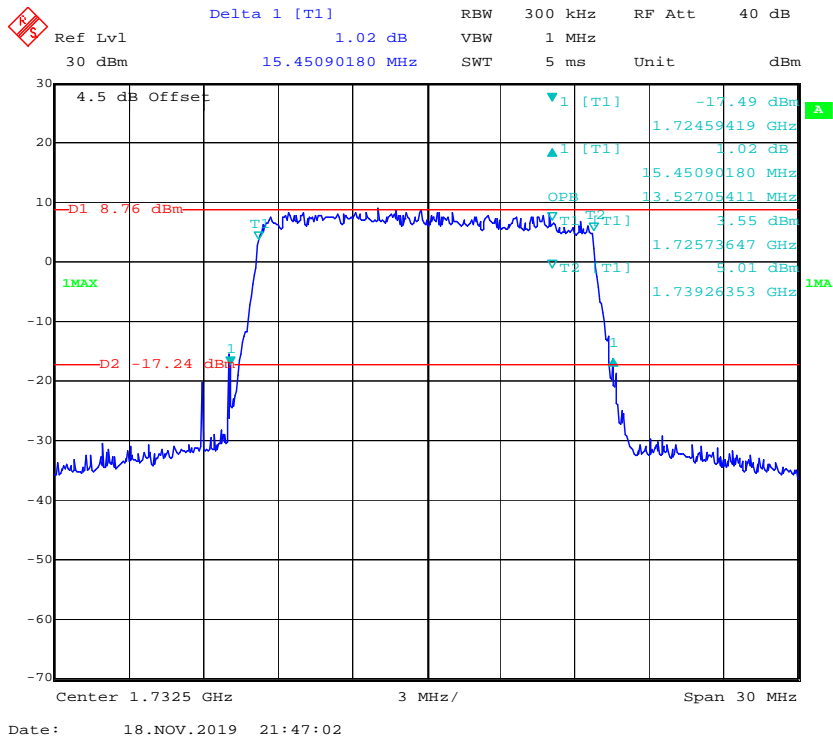
16QAM_5 MHz



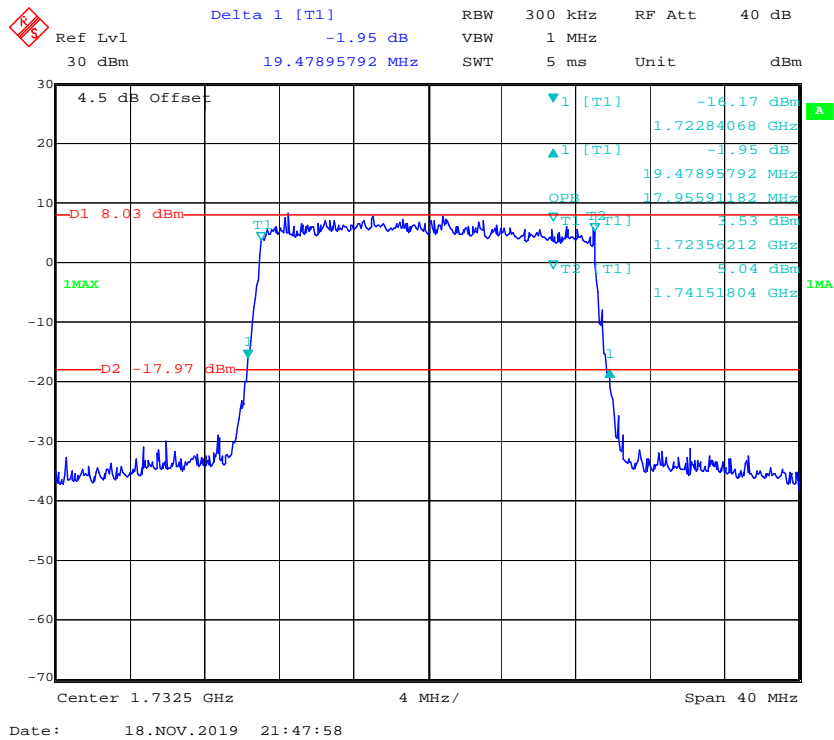
16QAM_10 MHz



16QAM_15 MHz

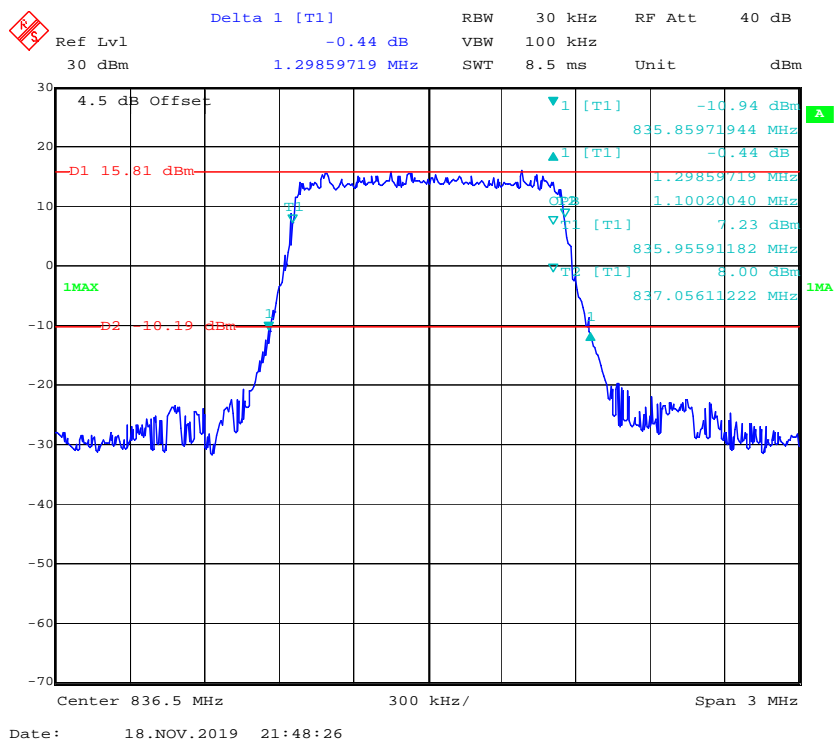


16QAM_20 MHz



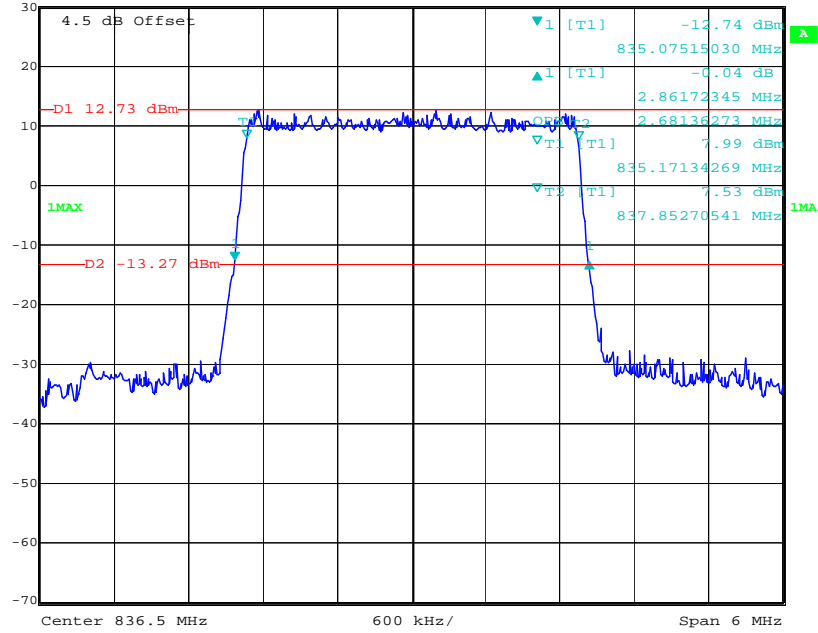
LTE Band 5:

QPSK_1.4 MHz



QPSK_3 MHz

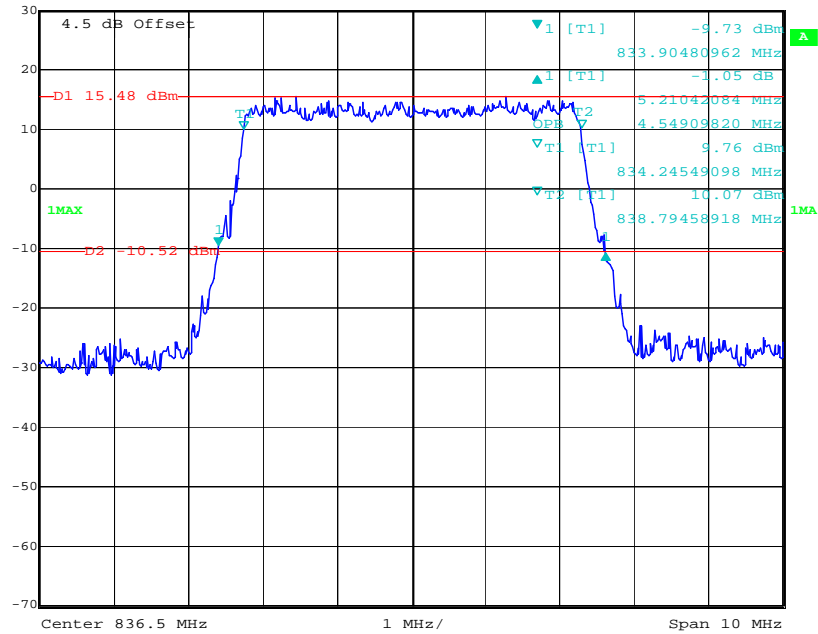
FS
 Delta 1 [T1] RBW 30 kHz RF Att 40 dB
 Ref Lvl -0.04 dB VBW 100 kHz
 30 dBm 2.86172345 MHz SWT 17 ms Unit dBm



Date: 18.NOV.2019 21:49:13

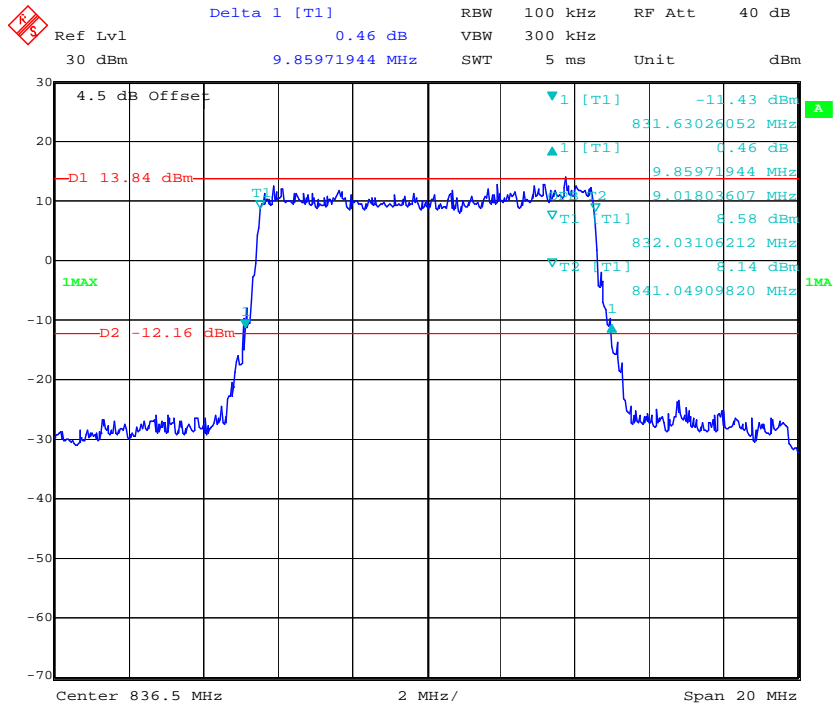
QPSK_5 MHz

FS
 Delta 1 [T1] RBW 100 kHz RF Att 40 dB
 Ref Lvl -1.05 dB VBW 300 kHz
 30 dBm 5.21042084 MHz SWT 5 ms Unit dBm

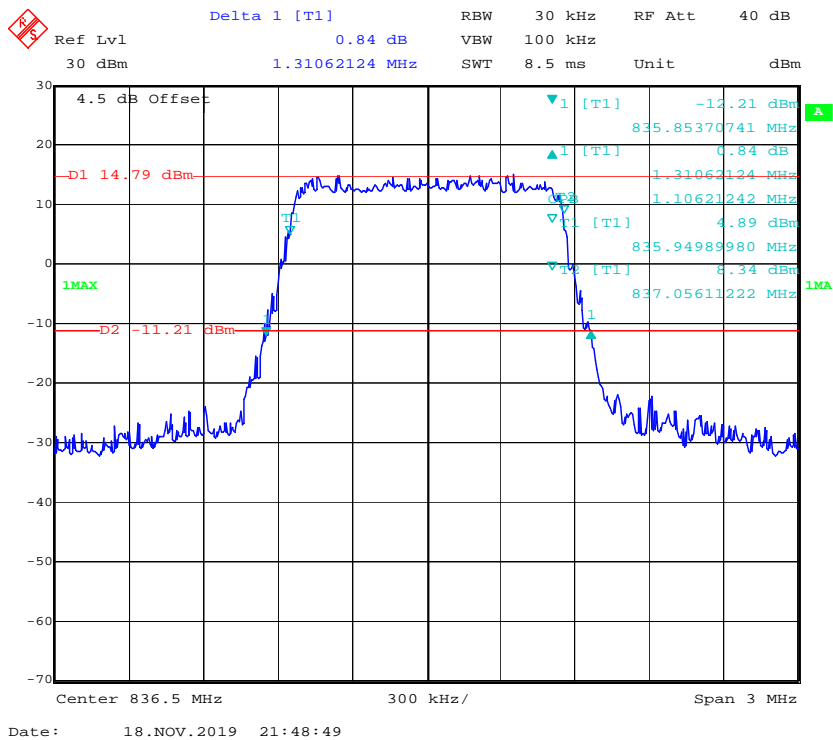


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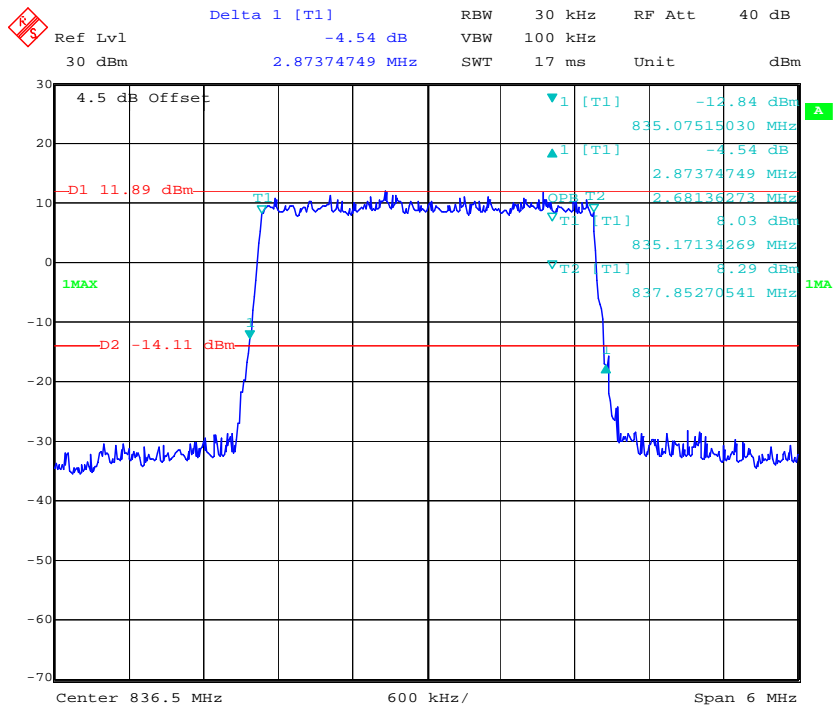
QPSK_10 MHz



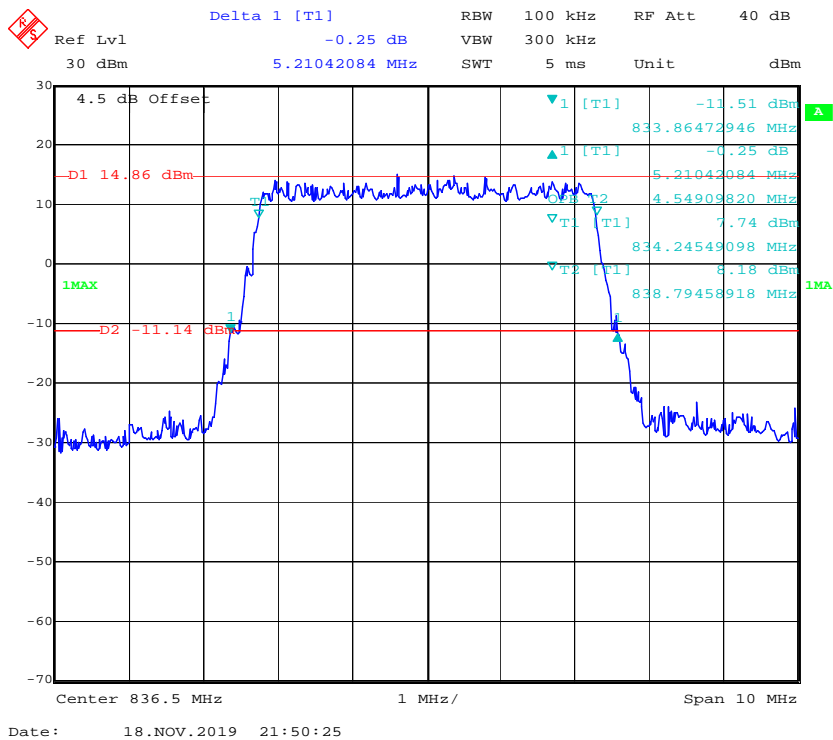
16QAM_1.4 MHz



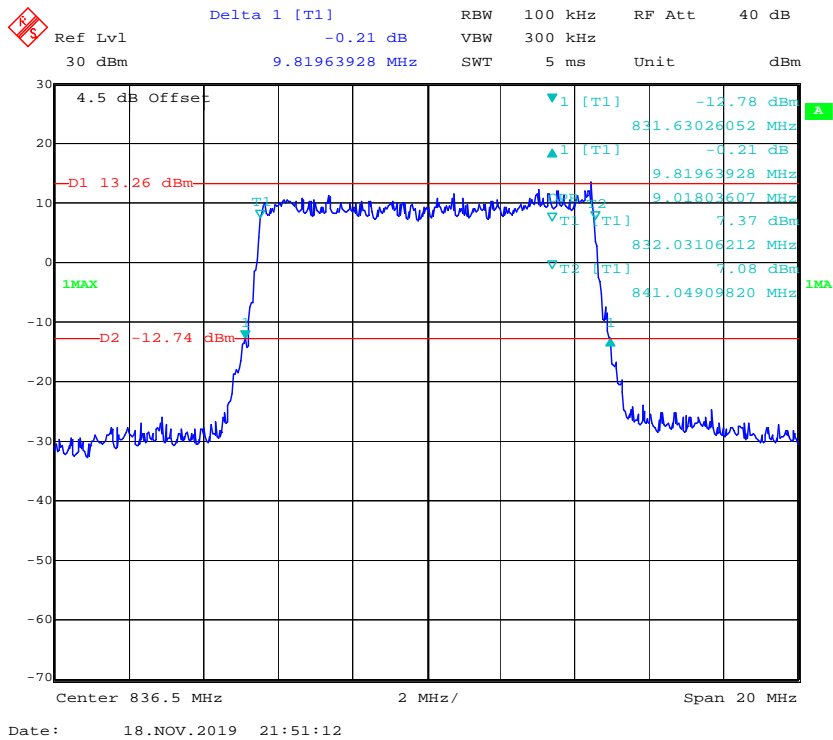
16QAM_3 MHz



16QAM_5 MHz

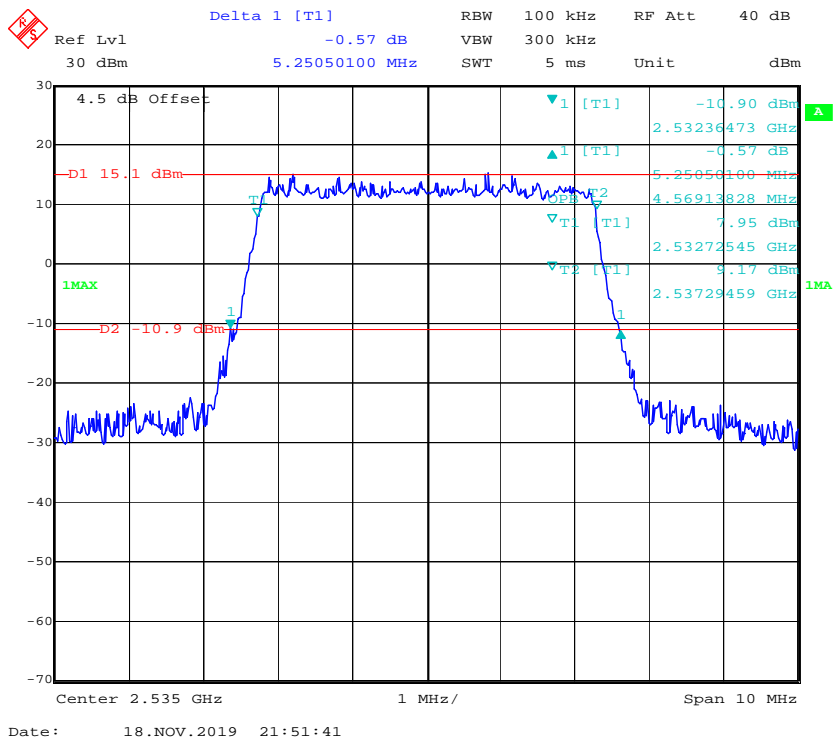


16QAM_10 MHz

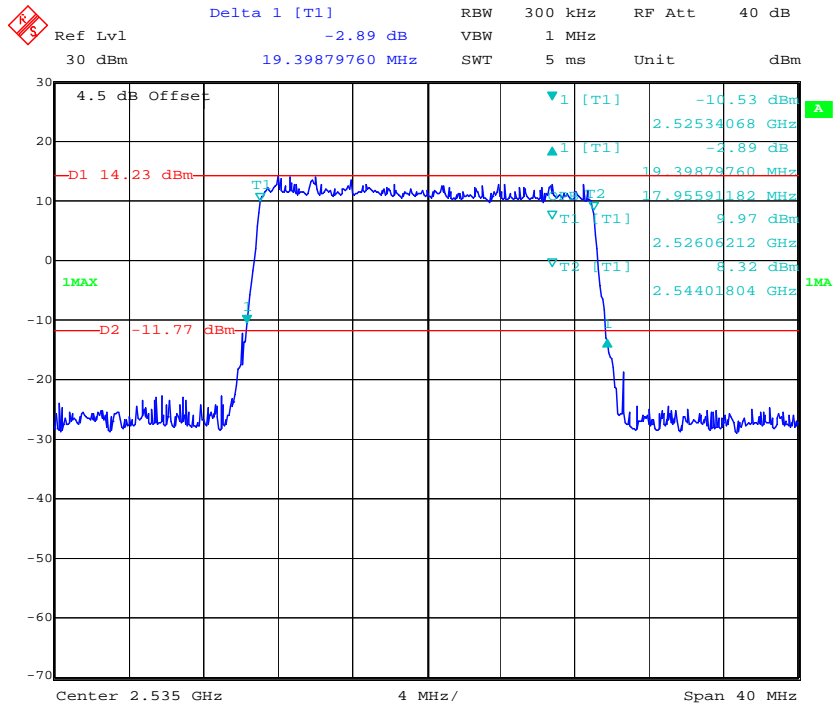


LTE Band 7:

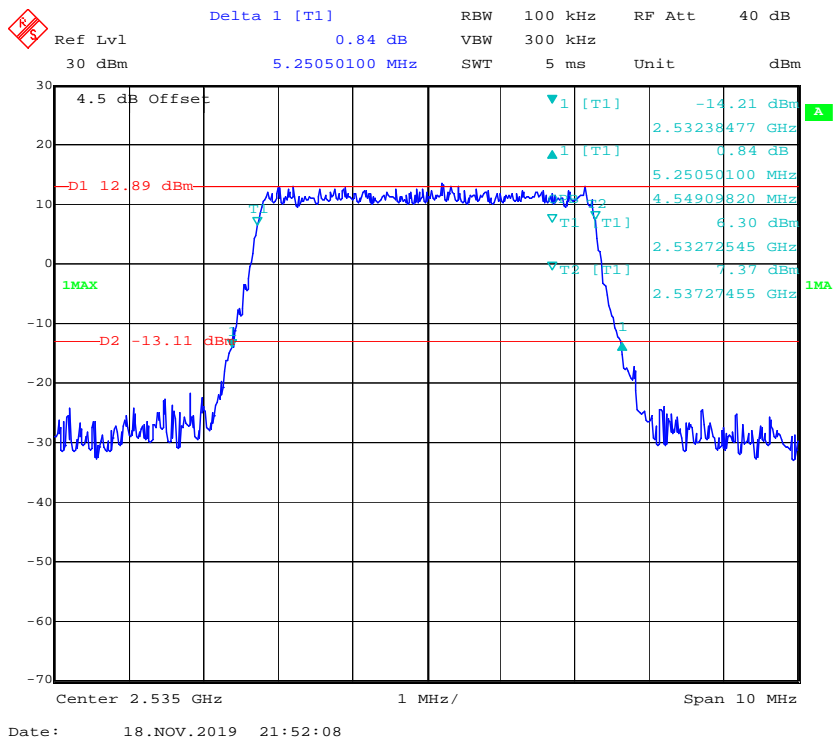
QPSK_5 MHz



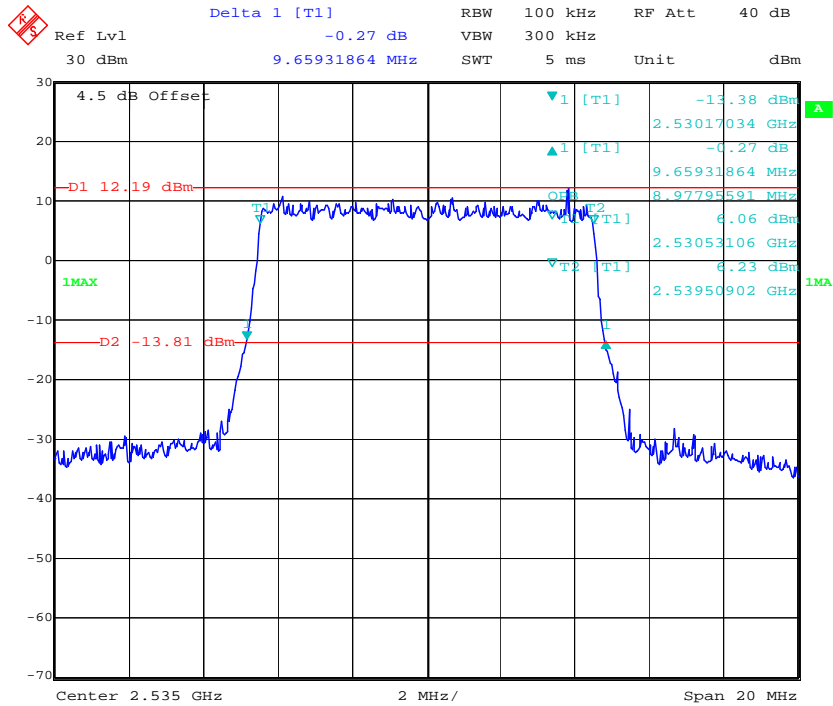
QPSK_20 MHz



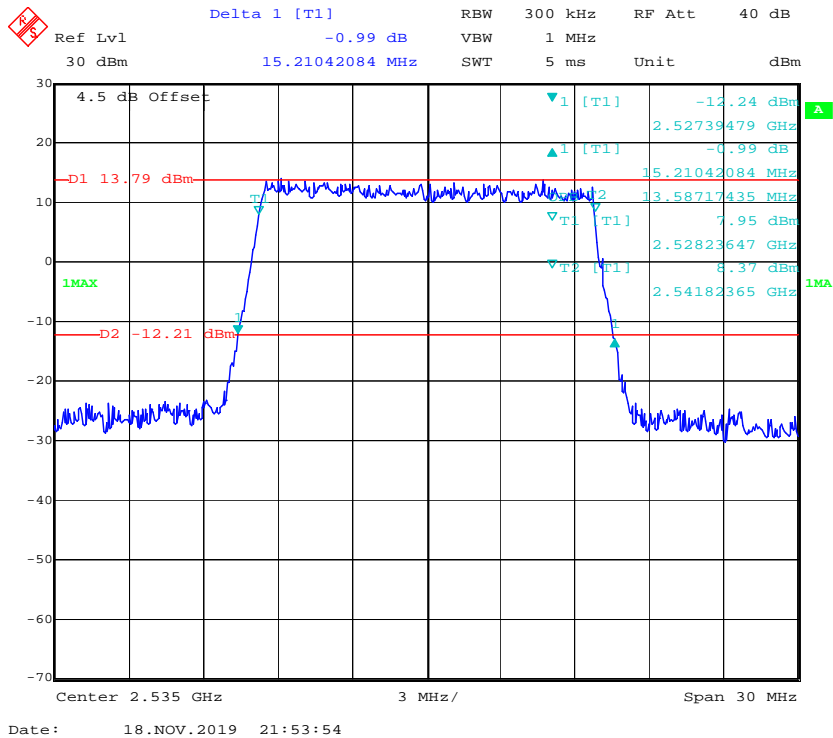
16QAM_5 MHz



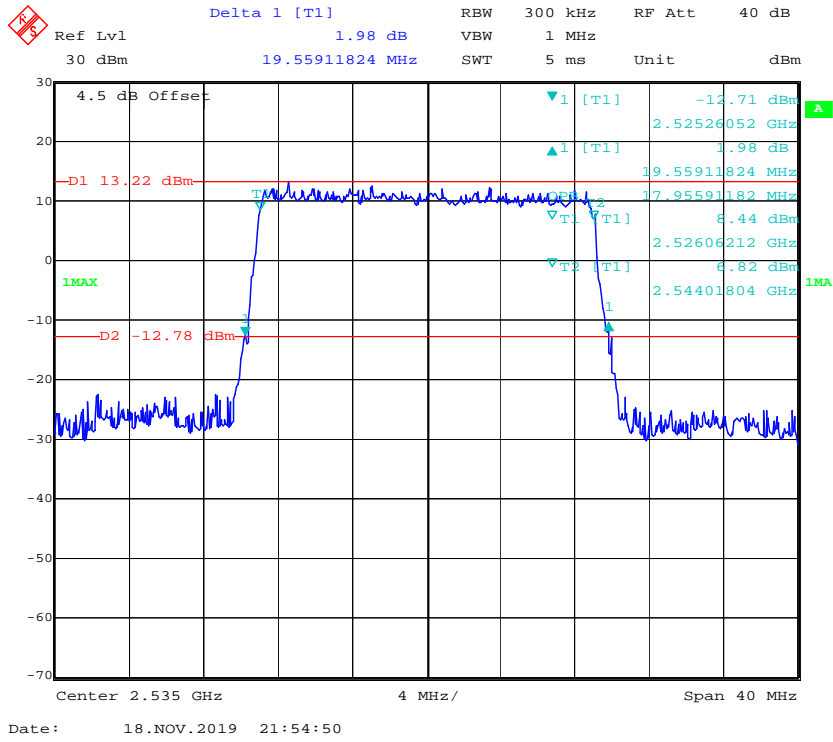
16QAM_10 MHz



16QAM_15 MHz



16QAM_20 MHz



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

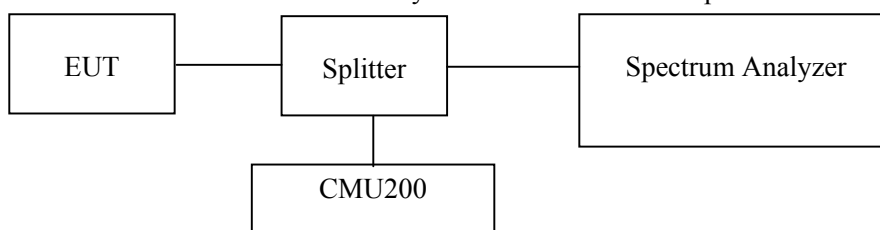
Applicable Standard

FCC §2.1051, §22.917(a) , §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. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2019-05-09	2020-05-09
R&S	Spectrum Analyzer	FSP 38	100478	2018-12-10	2019-12-10
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	Each time	/
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	/

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

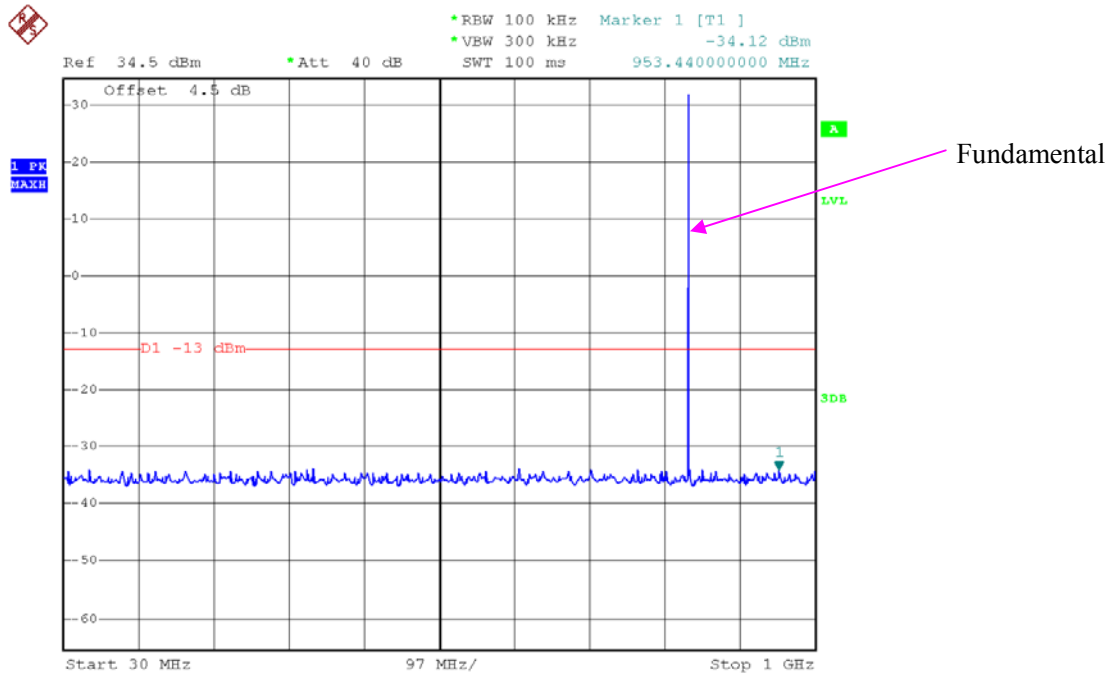
Test Data

Environmental Conditions

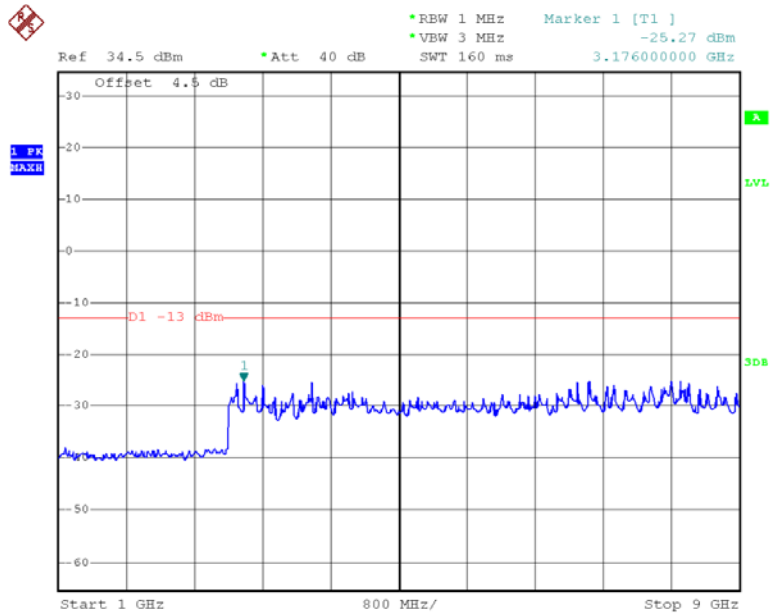
Temperature:	26.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.3kPa
Tester:	Blake Yang
Test Date:	2019-11-18

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

GSM850 Middle Channel

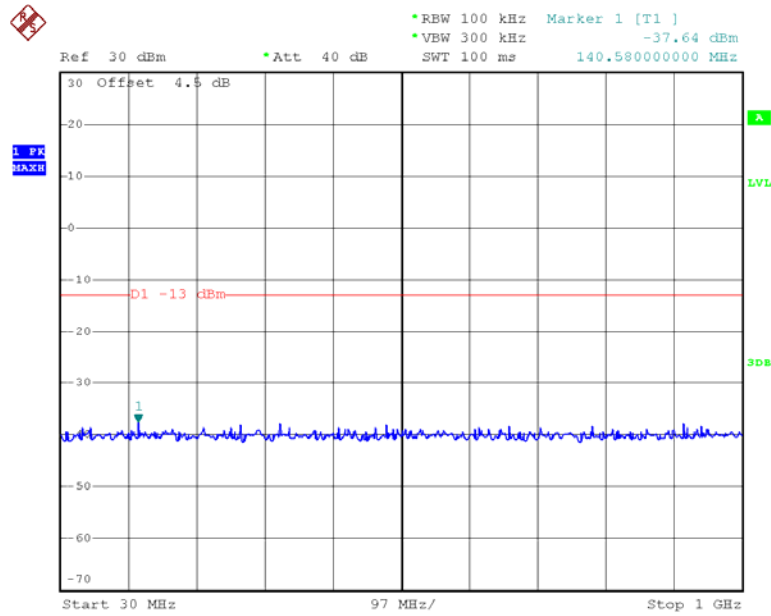


Date: 18.NOV.2019 22:21:06



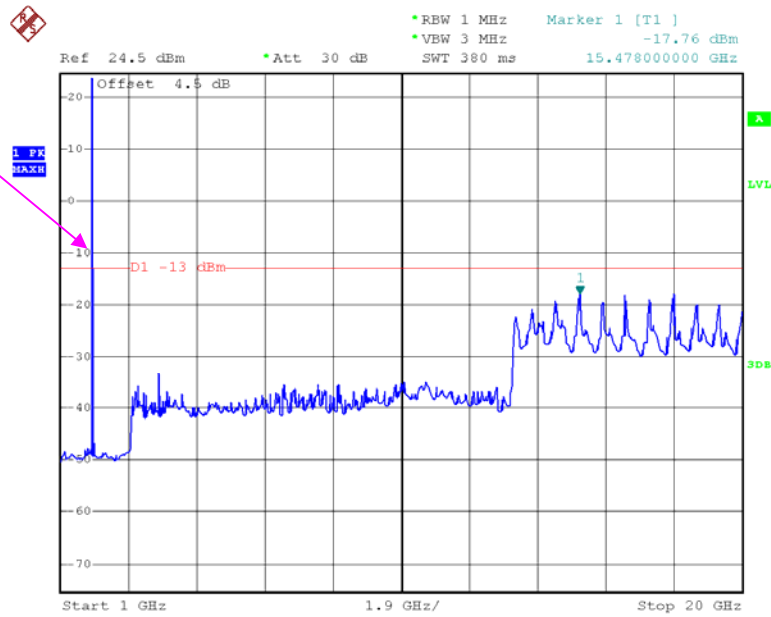
Date: 18.NOV.2019 22:21:41

PCS 1900 Middle Channel

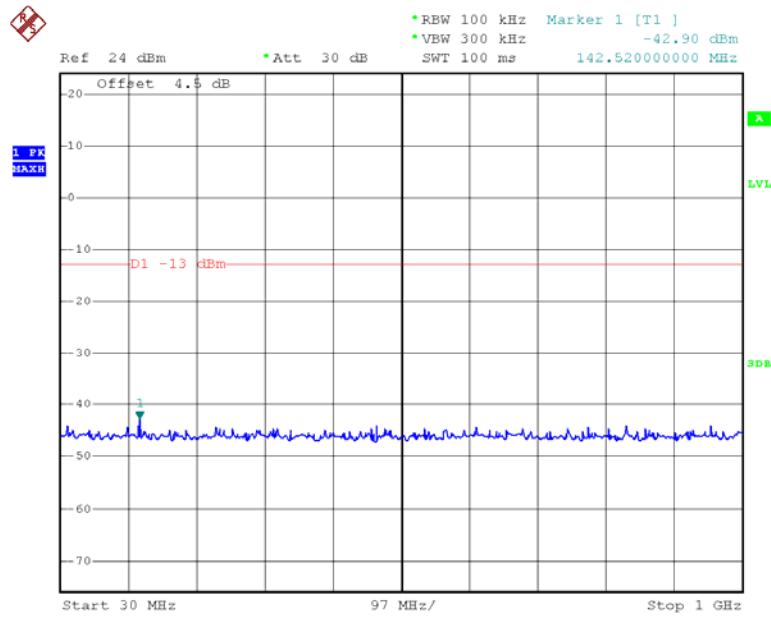


Date: 18.NOV.2019 22:43:03

Fundamental



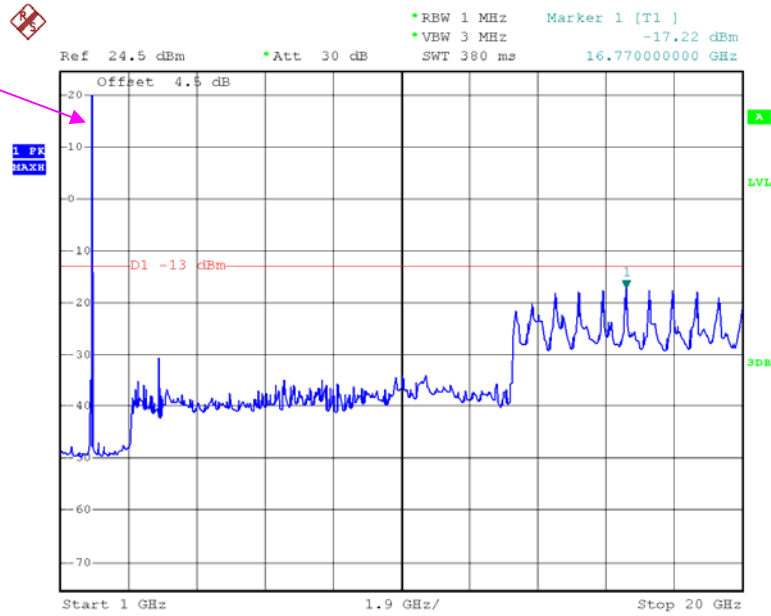
Date: 18.NOV.2019 22:43:44



Date: 18.NOV.2019 17:43:23

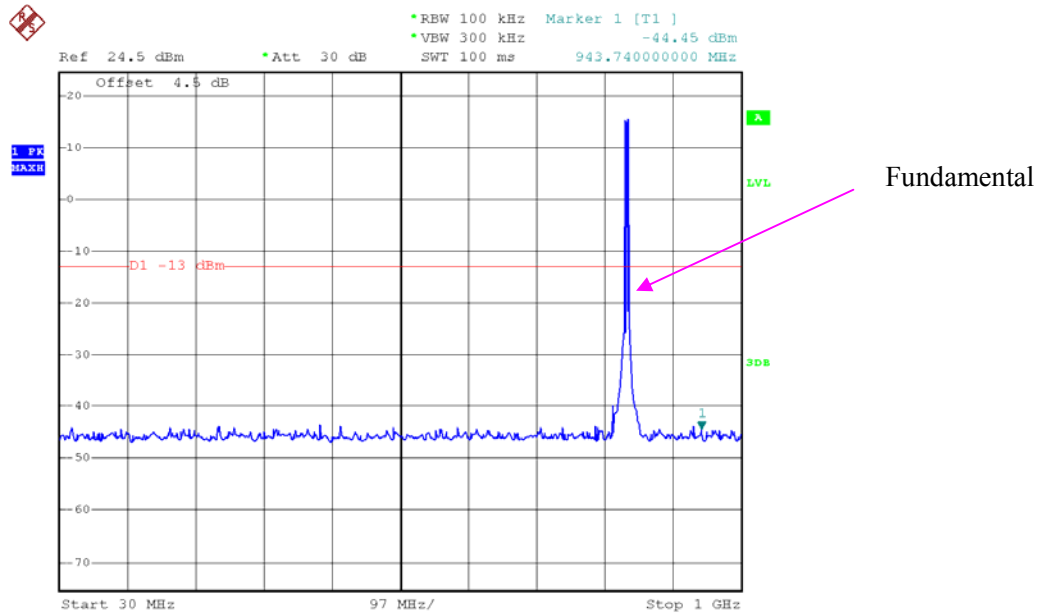
WCDMA Band 2 Rel 99 Middle Channel

Fundamental

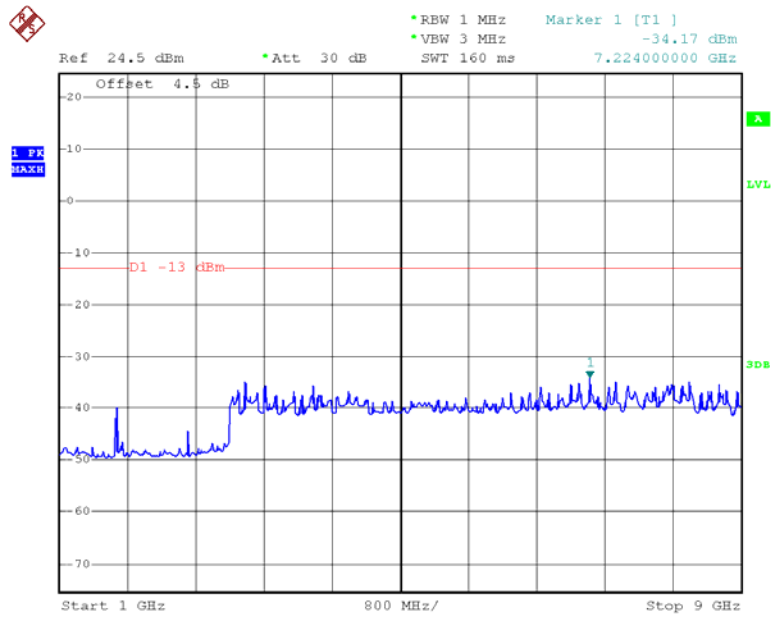


Date: 18.NOV.2019 17:44:24

WCDMA Band 5 Rel 99 Middle Channel



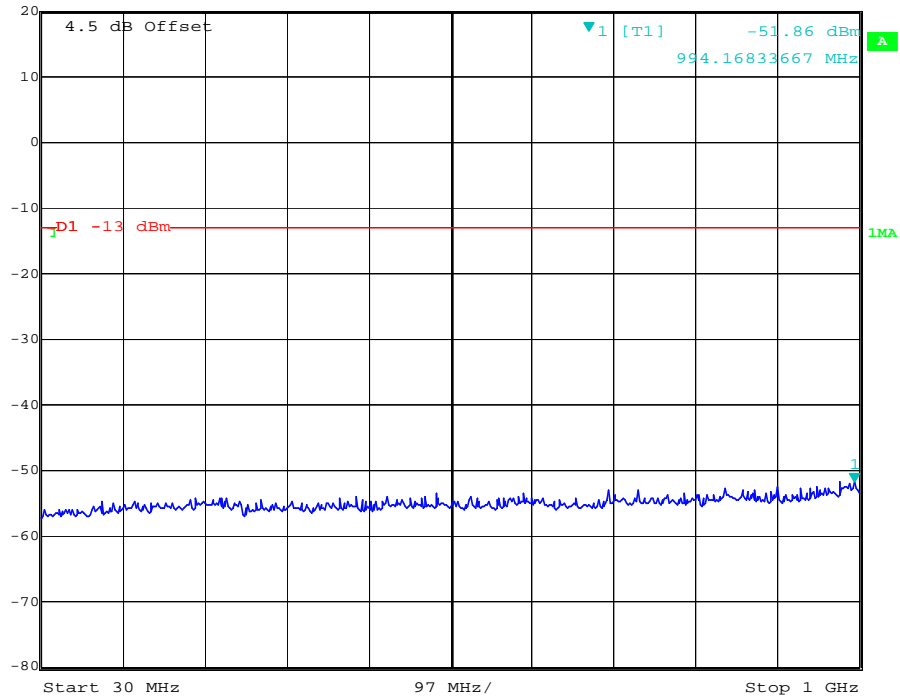
Date: 18.NOV.2019 17:48:29



Date: 18.NOV.2019 17:47:36

LTE Band 2_1.4 MHz_Middle_QPSK

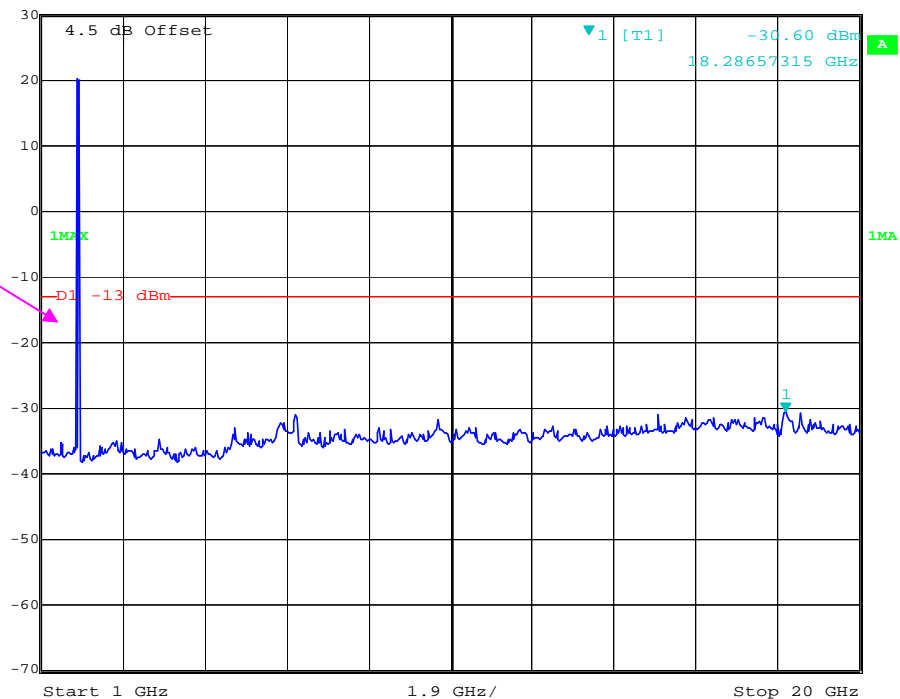
Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -51.86 dBm VBW 300 kHz
20 dBm 994.16833667 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:38:53

Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -30.60 dBm VBW 3 MHz
30 dBm 18.28657315 GHz SWT 110 ms Unit dBm

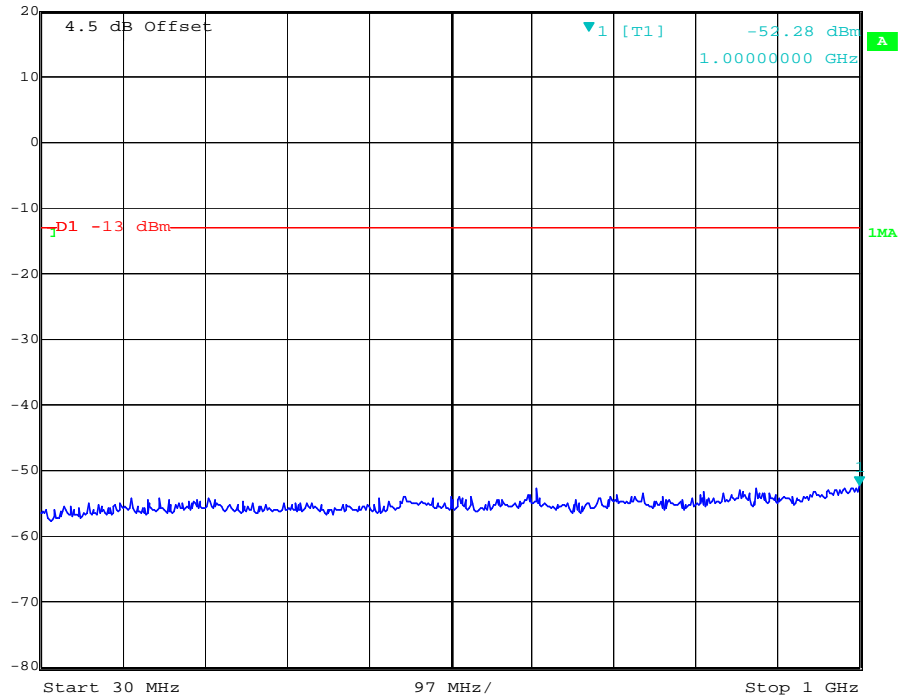
Fundamental



Date: 18.NOV.2019 22:39:05

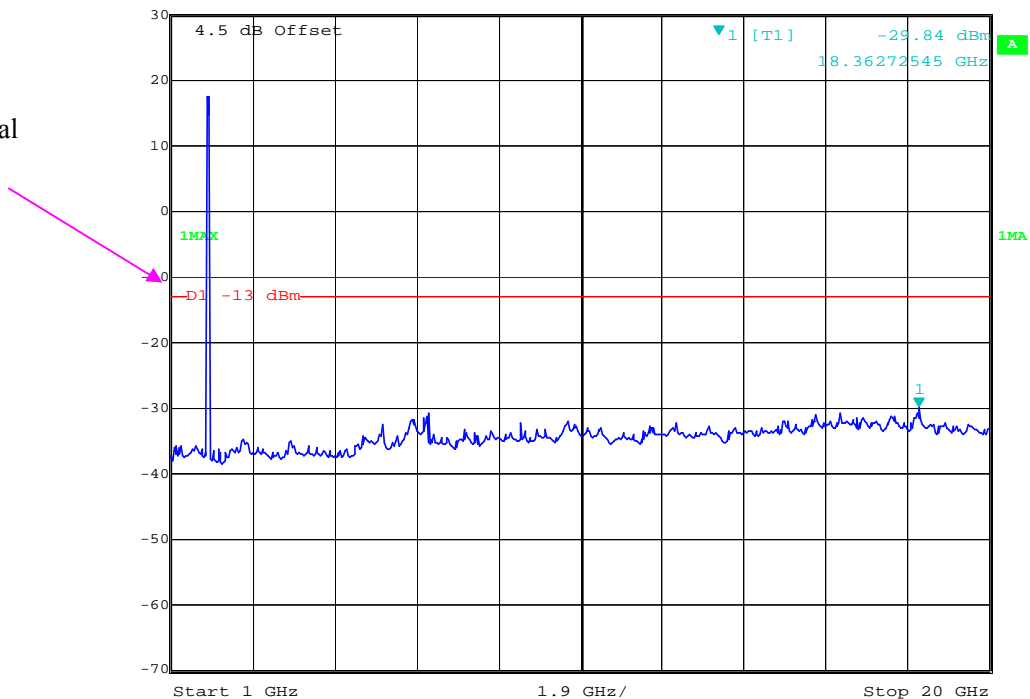
LTE Band 2_3 MHz_Middle_QPSK

Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -52.28 dBm VBW 300 kHz
20 dBm 1.00000000 GHz SWT 245 ms Unit dBm

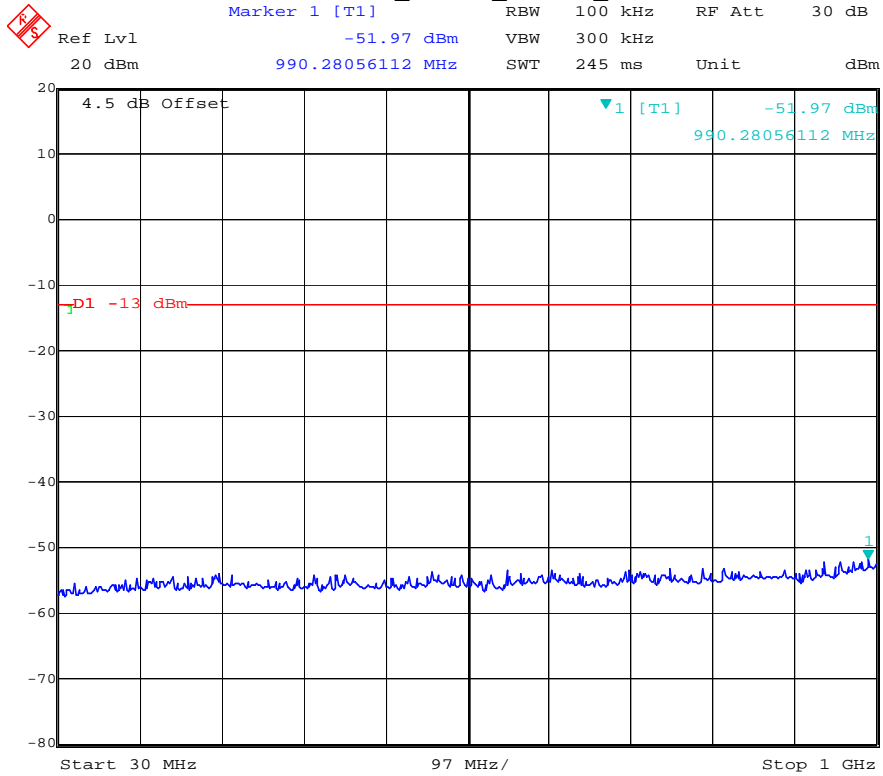


Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -29.84 dBm VBW 3 MHz
30 dBm 18.36272545 GHz SWT 110 ms Unit dBm

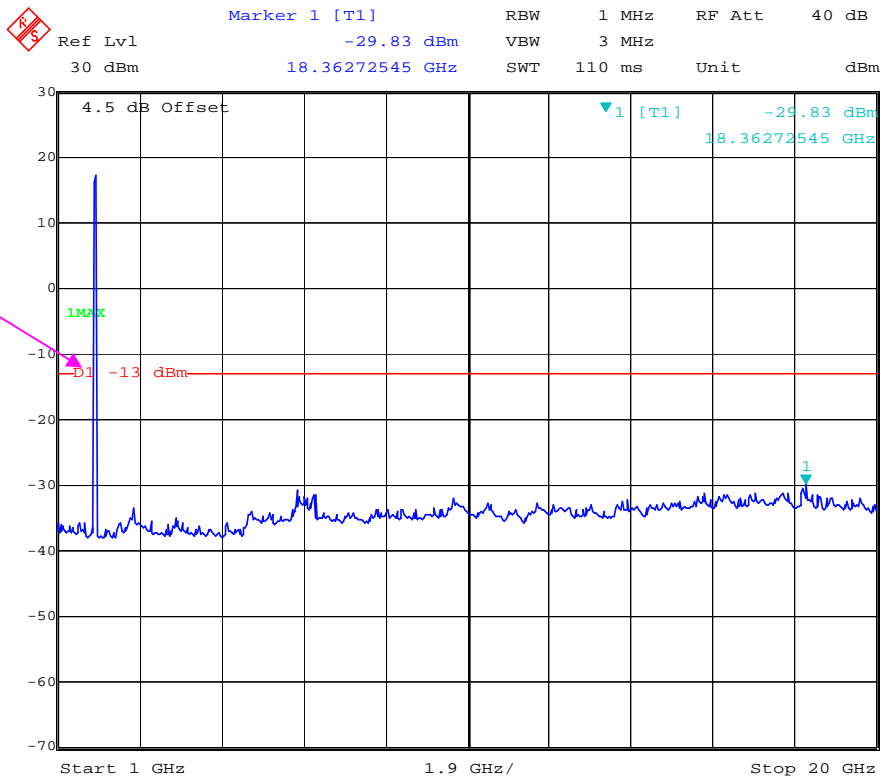
Fundamental



LTE Band 2_5 MHz_Middle_QPSK



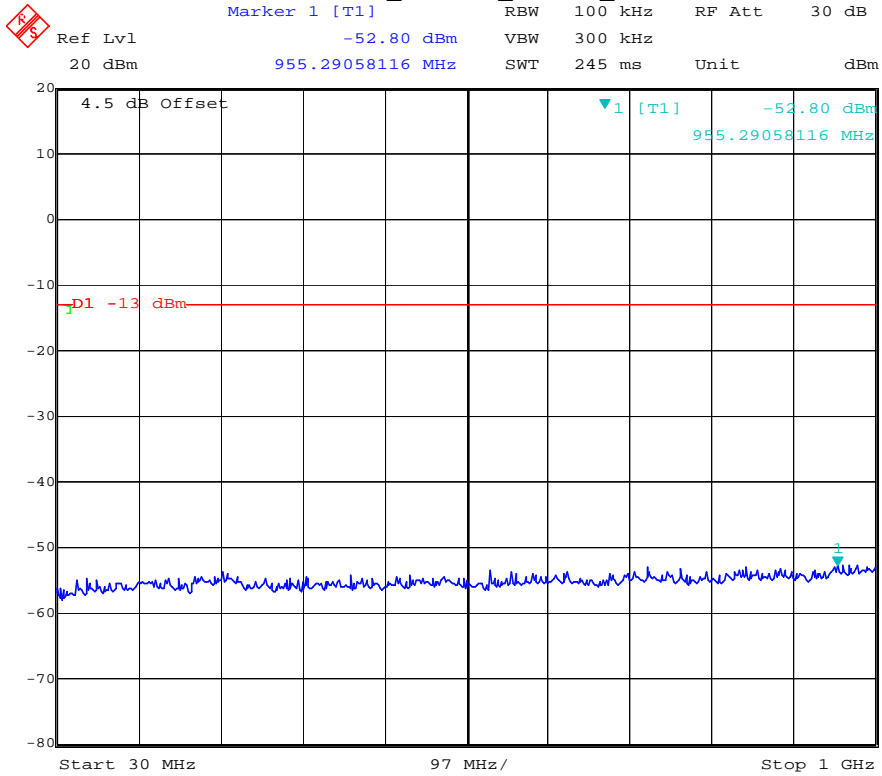
Date: 18.NOV.2019 22:39:55



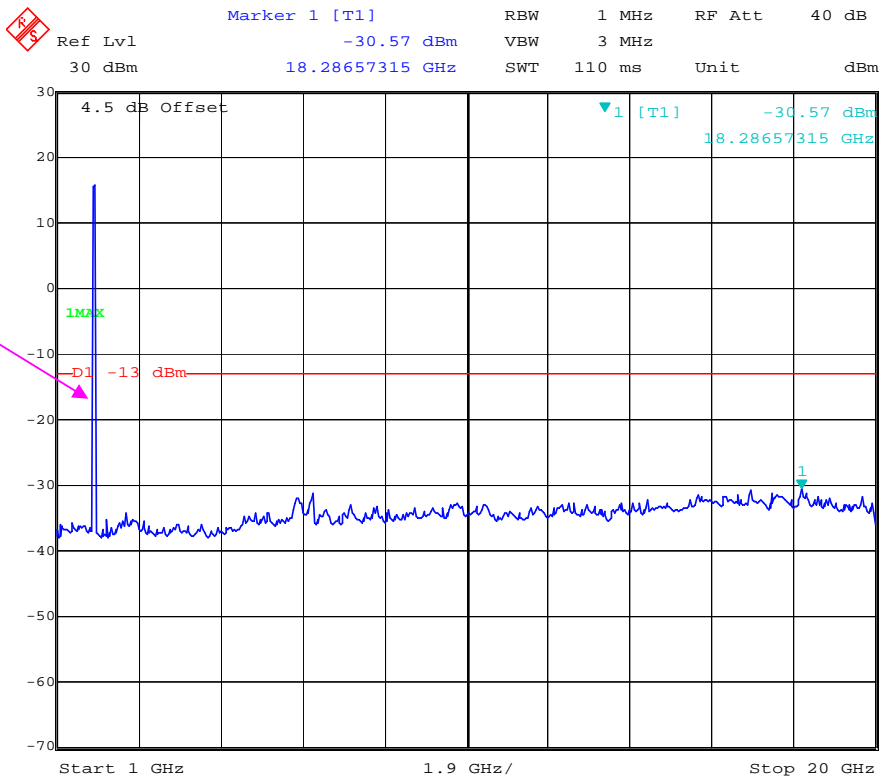
Fundamental

Date: 18.NOV.2019 22:40:07

LTE Band 2_10 MHz_Middle_QPSK



Date: 18.NOV.2019 22:40:26

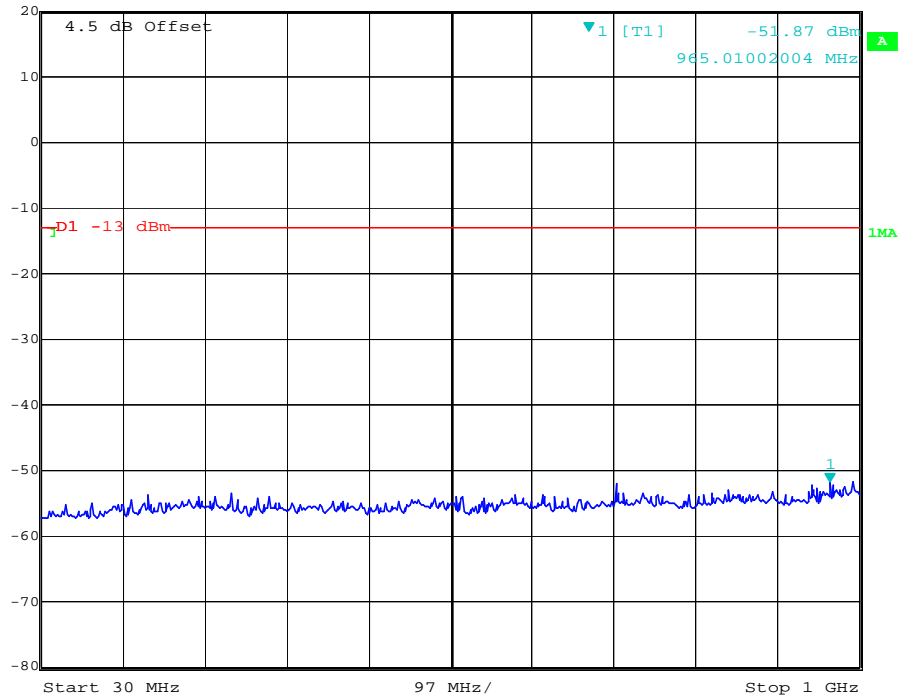


Fundamental

Date: 18.NOV.2019 22:40:38

LTE Band 2_15 MHz_Middle_QPSK

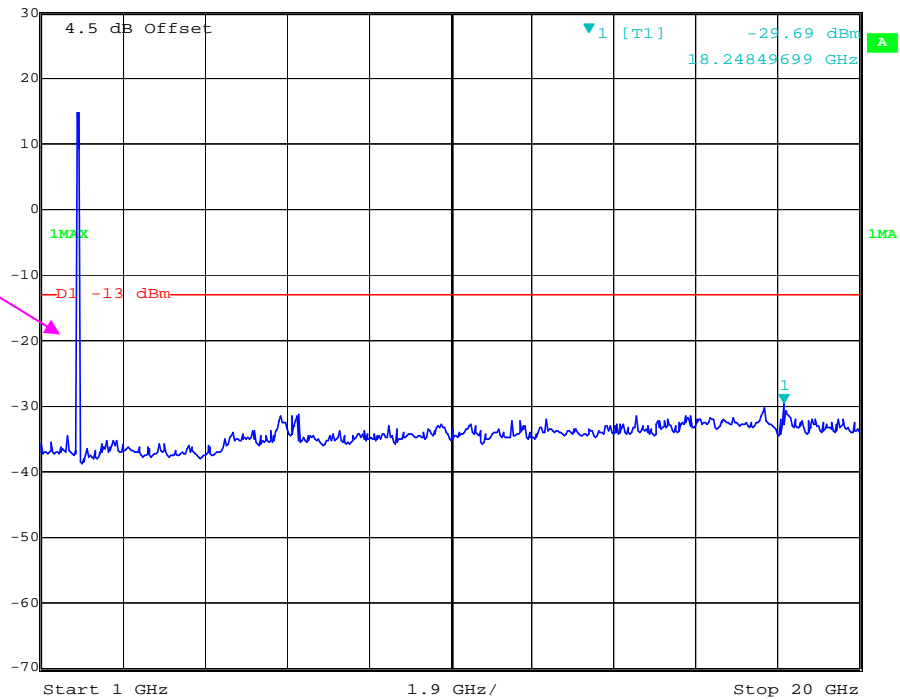
Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -51.87 dBm VBW 300 kHz
20 dBm 965.01002004 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:41:01

Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -29.69 dBm VBW 3 MHz
30 dBm 18.24849699 GHz SWT 110 ms Unit dBm

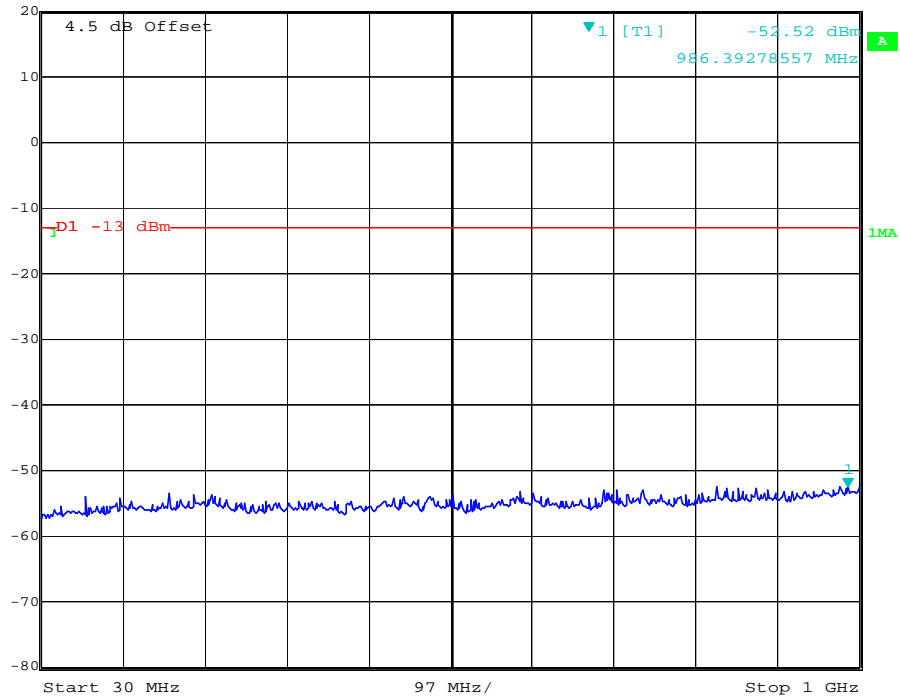
Fundamental



Date: 18.NOV.2019 22:41:13

LTE Band 2_20 MHz_Middle_QPSK

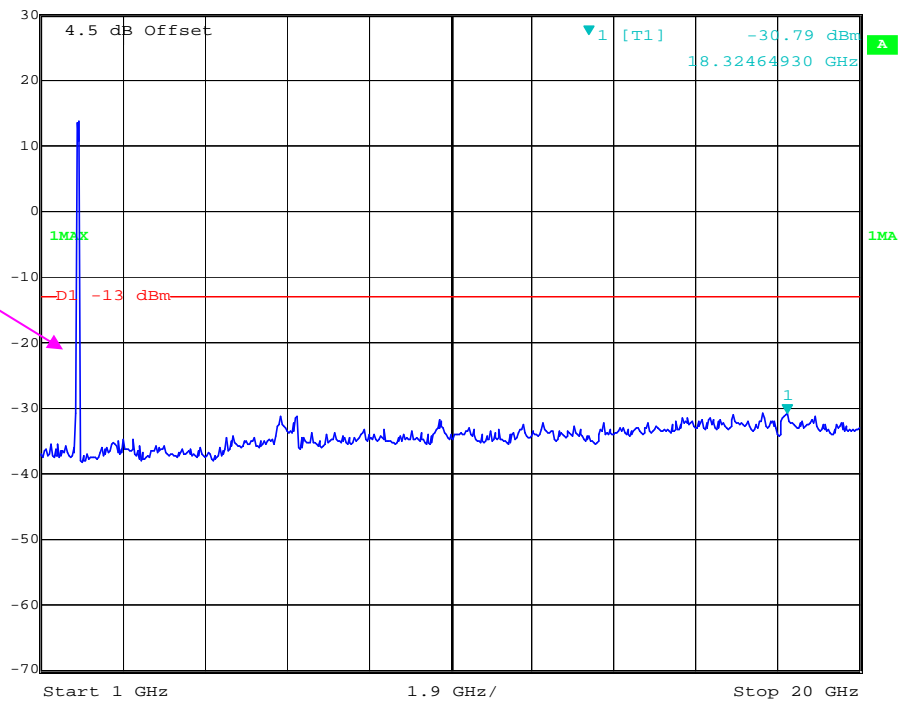
⊠ Marker 1 [T1] RBW 100 kHz RF Att 30 dB
 Ref Lvl -52.52 dBm VBW 300 kHz
 20 dBm 986.39278557 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:41:39

⊠ Marker 1 [T1] RBW 1 MHz RF Att 40 dB
 Ref Lvl -30.79 dBm VBW 3 MHz
 30 dBm 18.32464930 GHz SWT 110 ms Unit dBm

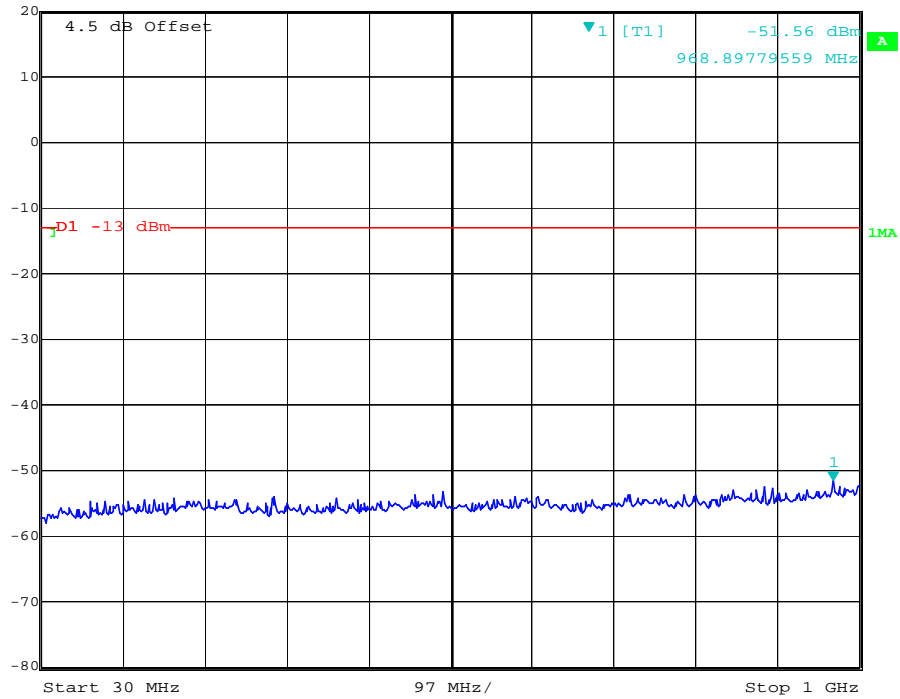
Fundamental



Date: 18.NOV.2019 22:41:51

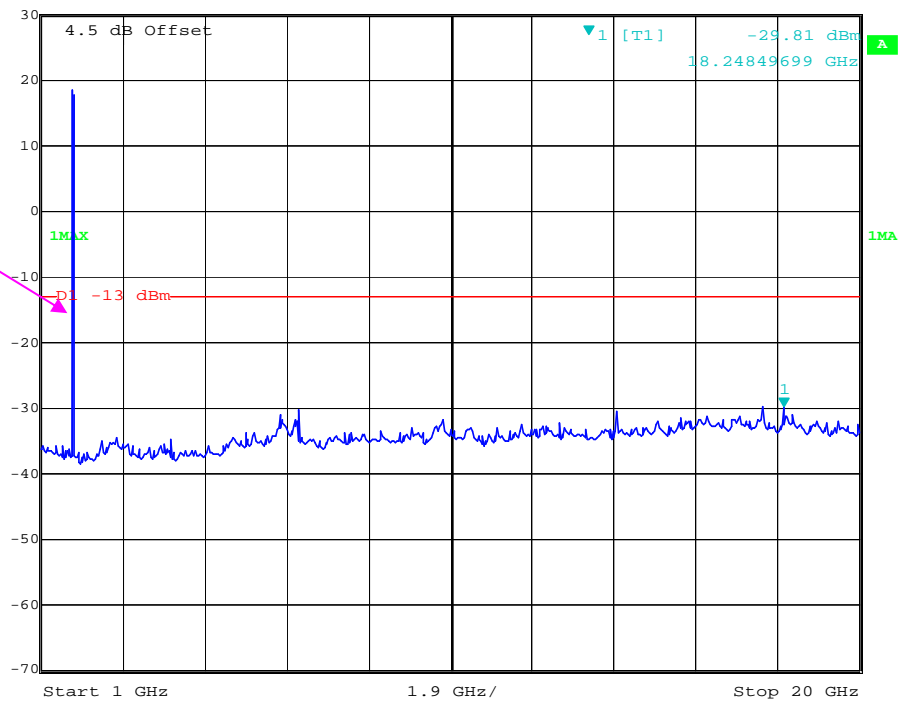
LTE Band 4 1.4 MHz Middle QPSK

E9
 Ref Lvl 20 dBm
 Marker 1 [T1] -51.56 dBm
 RBW 100 kHz RF Att 30 dB
 VBW 300 kHz
 968.89779559 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:42:09

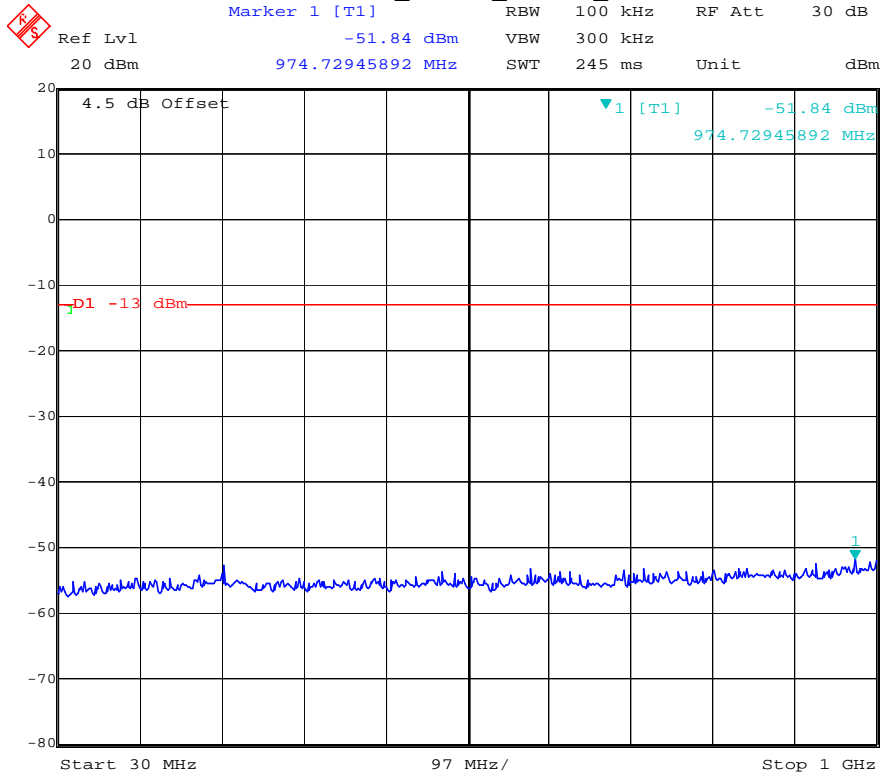
E9
 Ref Lvl 30 dBm
 Marker 1 [T1] -29.81 dBm
 RBW 1 MHz RF Att 40 dB
 VBW 3 MHz
 18.24849699 GHz SWT 110 ms Unit dBm



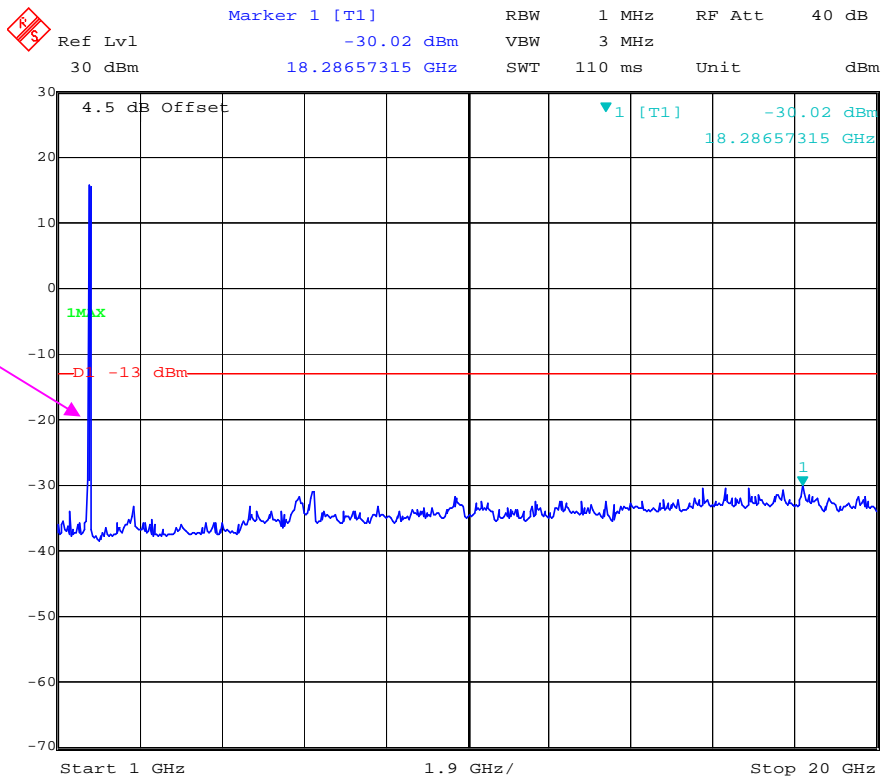
Fundamental

Date: 18.NOV.2019 22:42:21

LTE Band 4_3 MHz_Middle_QPSK



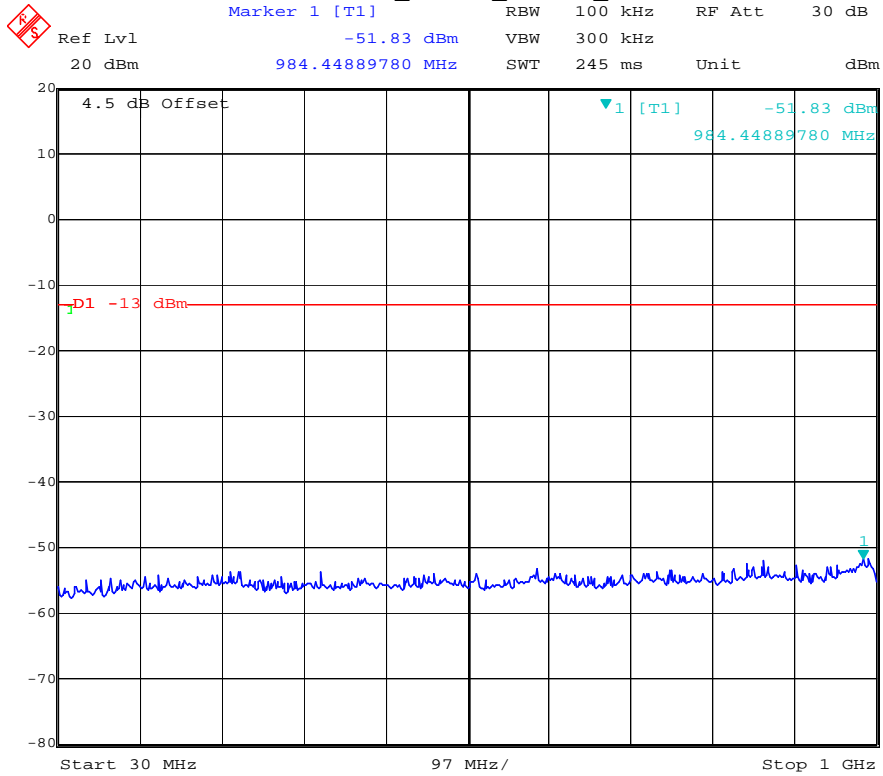
Date: 18.NOV.2019 22:42:39



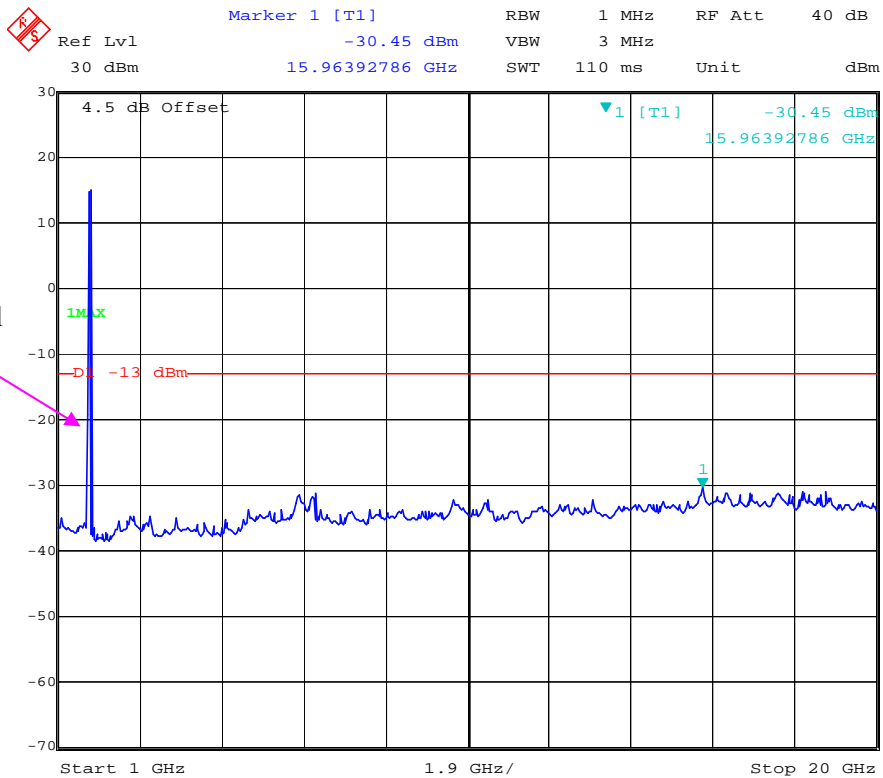
Fundamental

Date: 18.NOV.2019 22:42:51

LTE Band 4_5 MHz_Middle_QPSK



Date: 18.NOV.2019 22:43:10

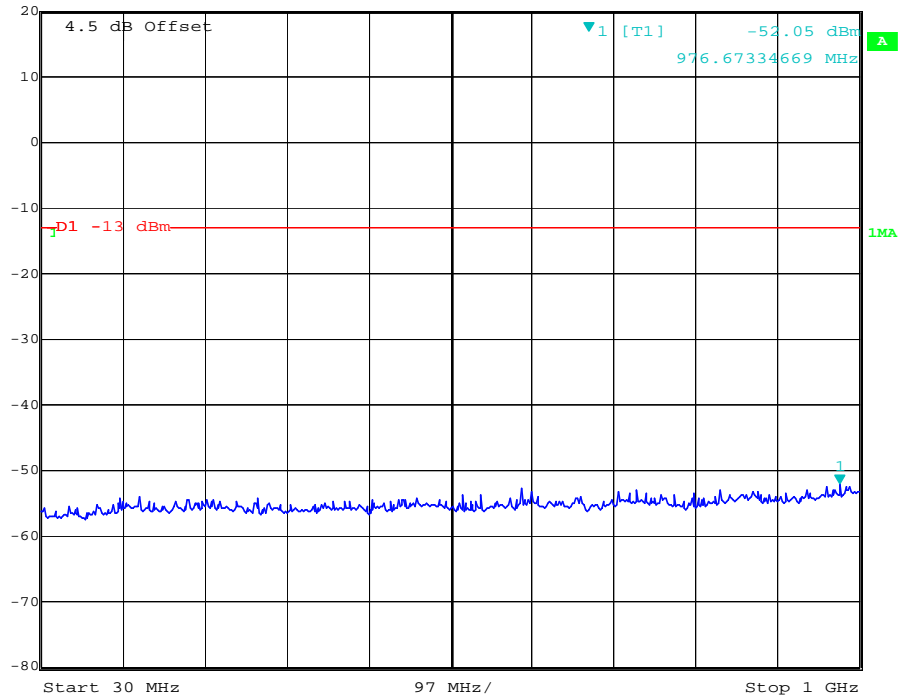


Fundamental

Date: 18.NOV.2019 22:43:22

LTE Band 4_10 MHz_Middle_QPSK

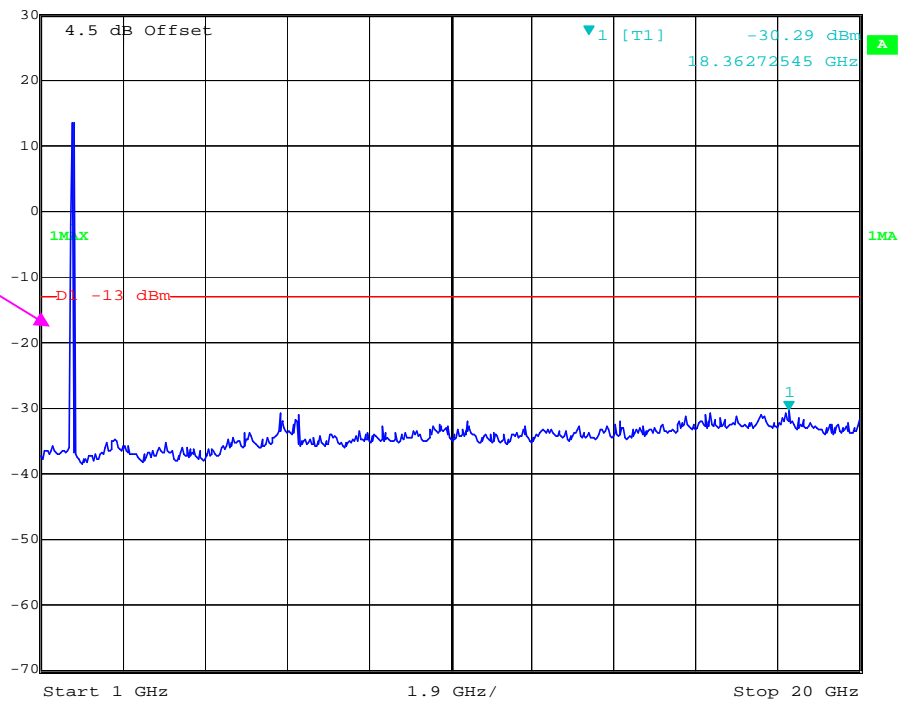
Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -52.05 dBm VBW 300 kHz
20 dBm 976.67334669 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:43:42

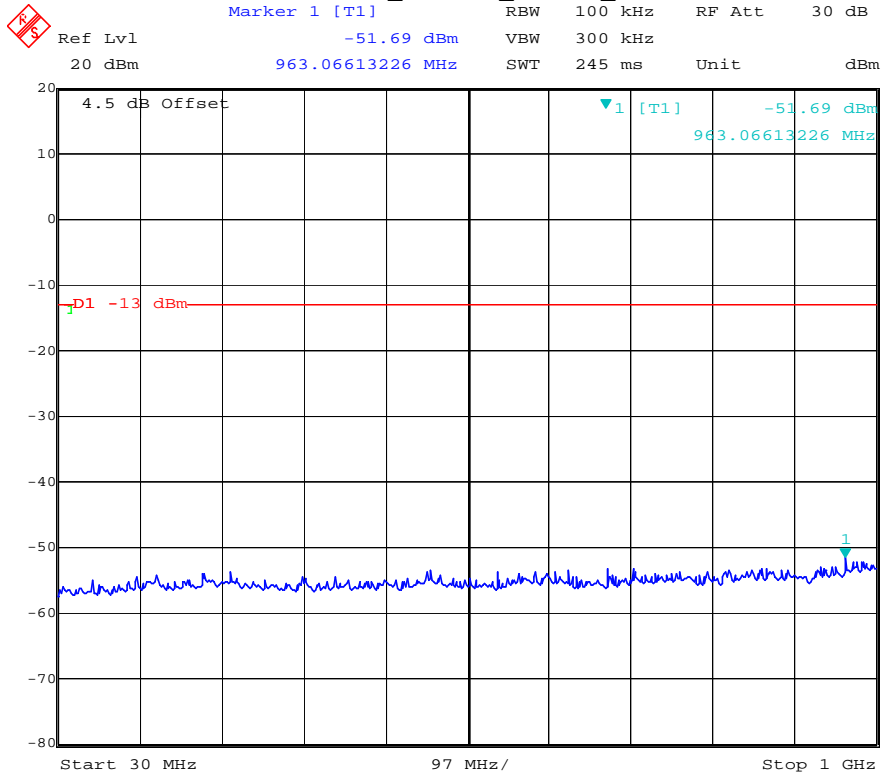
Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -30.29 dBm VBW 3 MHz
30 dBm 18.36272545 GHz SWT 110 ms Unit dBm

Fundamental

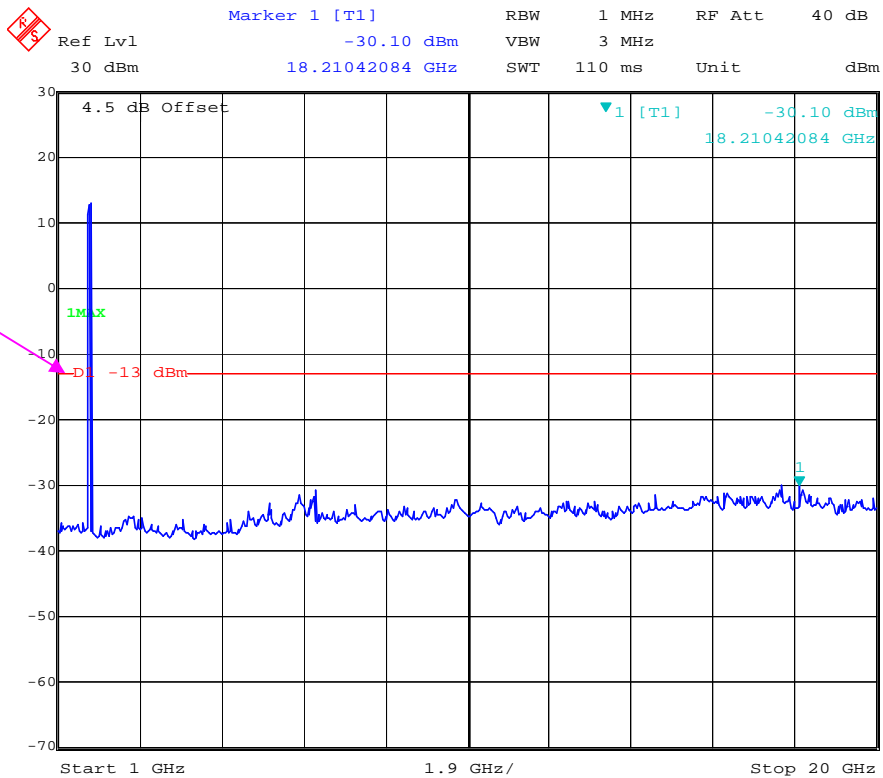


Date: 18.NOV.2019 22:43:53

LTE Band 4_15 MHz_Middle_QPSK



Date: 18.NOV.2019 22:44:16

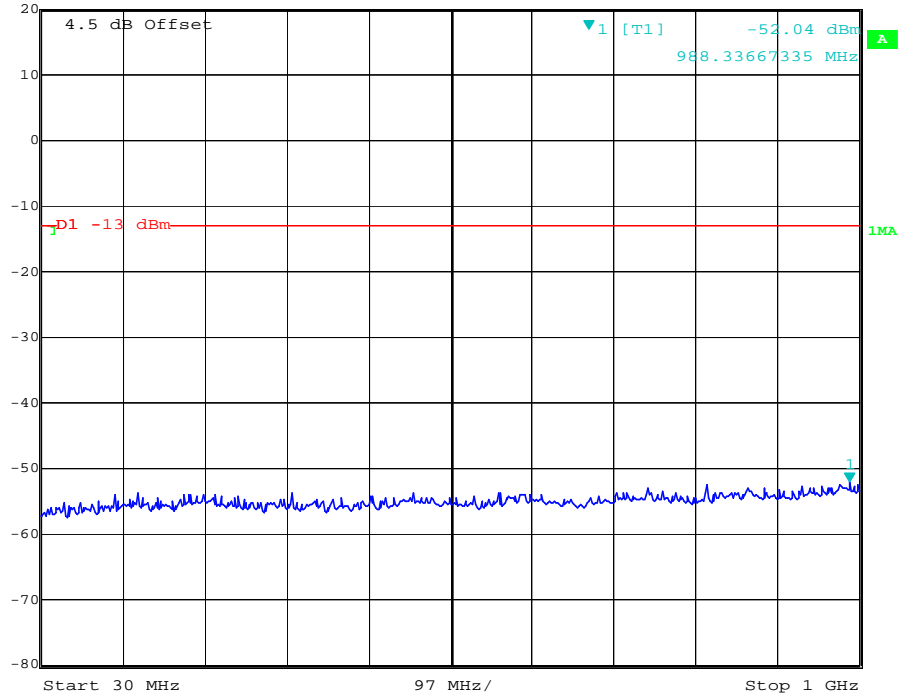


Fundamental

Date: 18.NOV.2019 22:44:28

LTE Band 4_20 MHz_Middle_QPSK

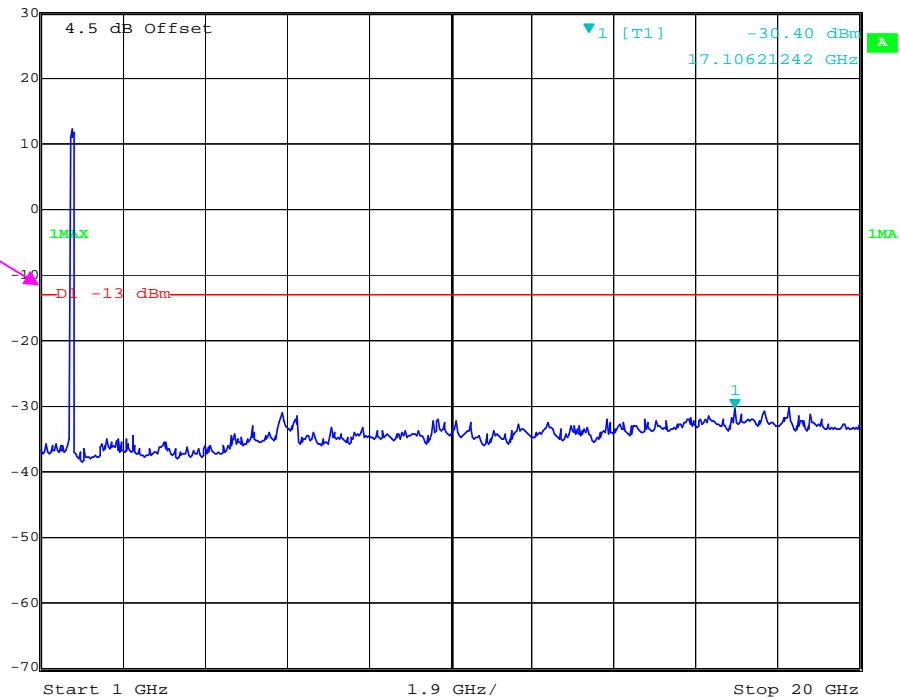
Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -52.04 dBm VBW 300 kHz
20 dBm 988.33667335 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:44:53

Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -30.40 dBm VBW 3 MHz
30 dBm 17.10621242 GHz SWT 110 ms Unit dBm

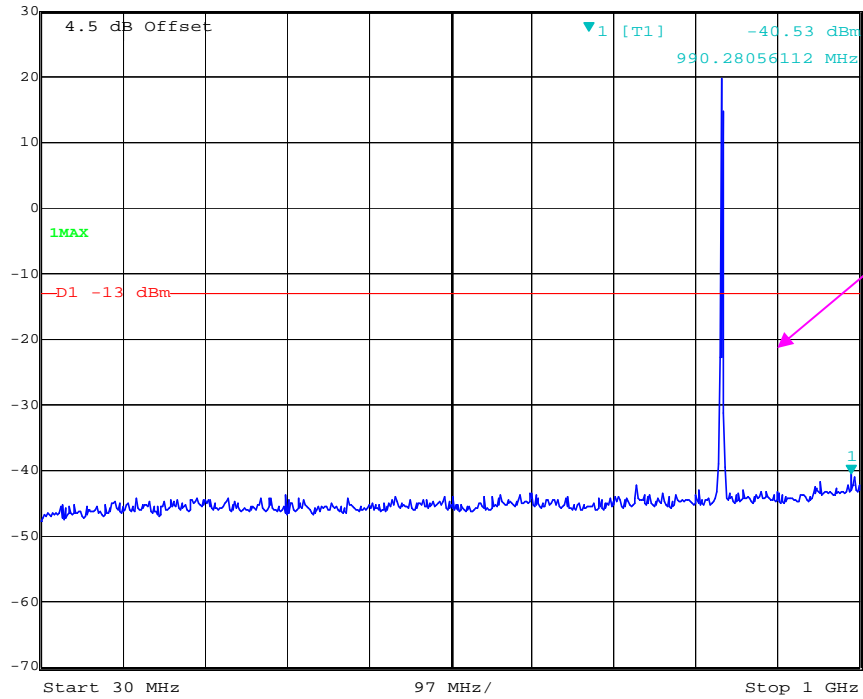
Fundamental



Date: 18.NOV.2019 22:45:05

LTE Band 5_1.4 MHz_Middle_QPSK

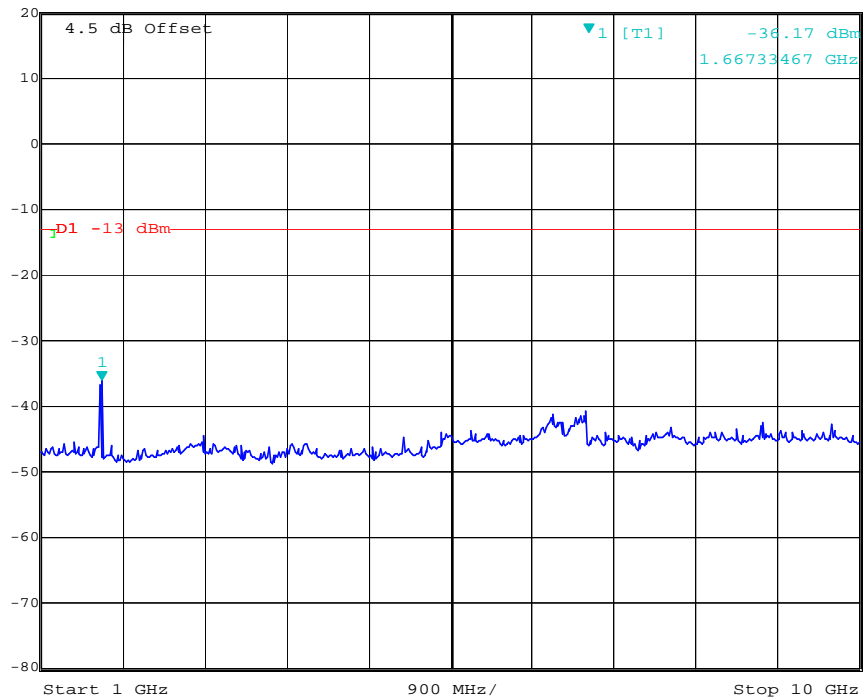
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -40.53 dBm VBW 300 kHz
30 dBm 990.28056112 MHz SWT 245 ms Unit dBm



Fundamental

Date: 18.NOV.2019 22:45:24

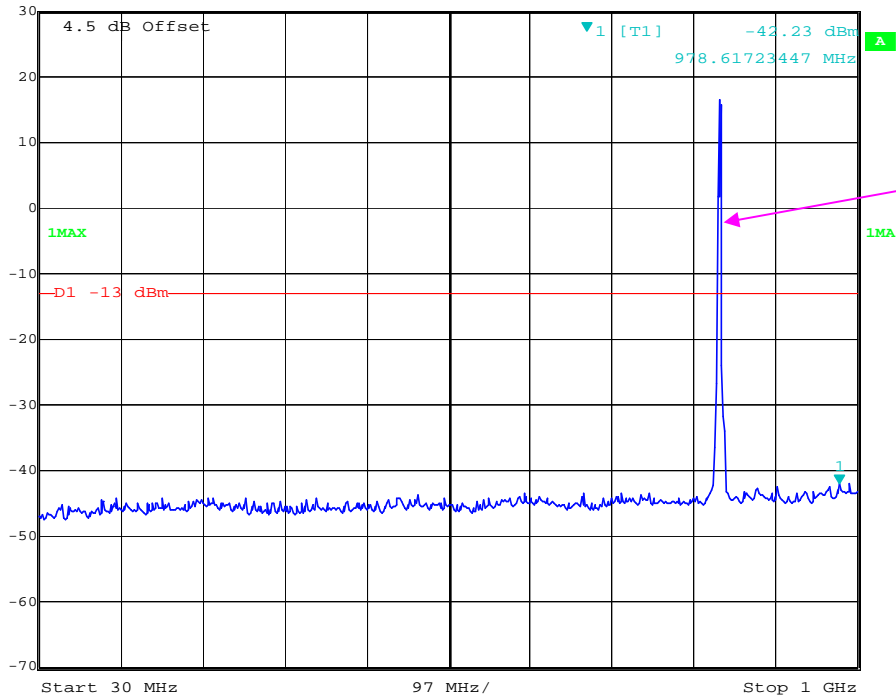
Marker 1 [T1] RBW 1 MHz RF Att 30 dB
Ref Lvl -36.17 dBm VBW 3 MHz
20 dBm 1.66733467 GHz SWT 52 ms Unit dBm



Date: 18.NOV.2019 22:45:35

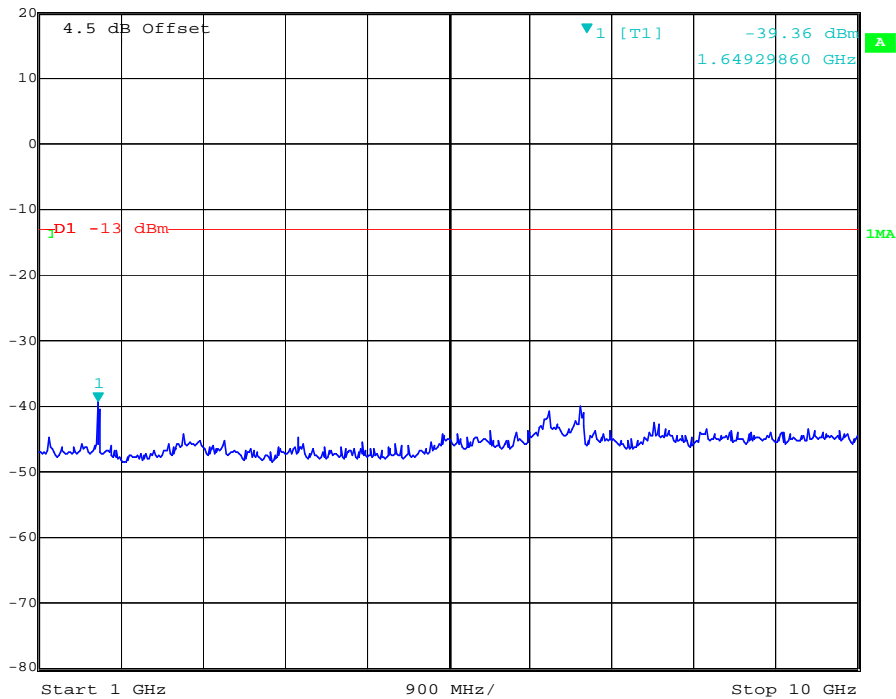
LTE Band 5_3 MHz_Middle_QPSK

Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -42.23 dBm VBW 300 kHz
30 dBm 978.61723447 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:45:53

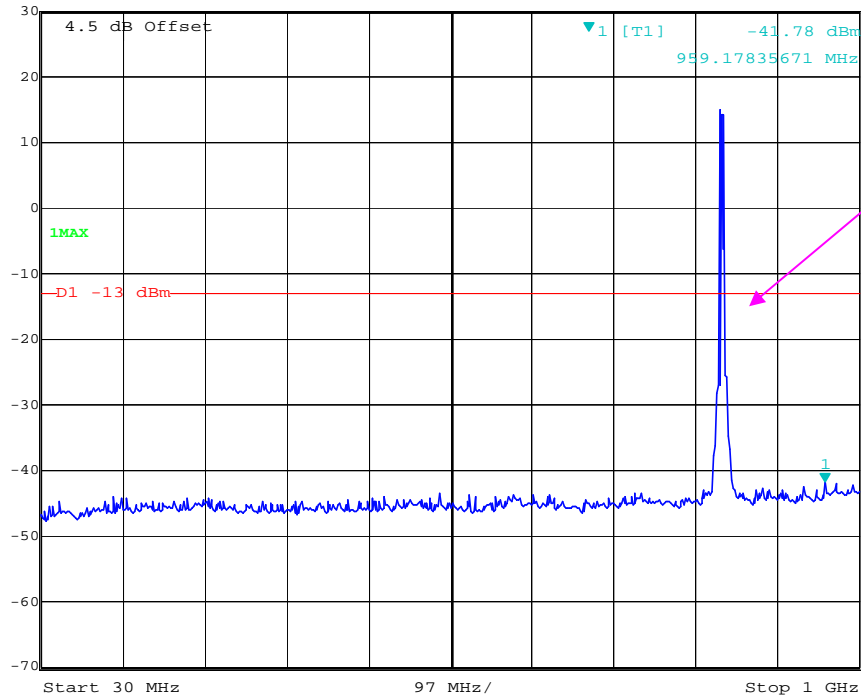
Marker 1 [T1] RBW 1 MHz RF Att 30 dB
Ref Lvl -39.36 dBm VBW 3 MHz
20 dBm 1.64929860 GHz SWT 52 ms Unit dBm



Date: 18.NOV.2019 22:46:04

LTE Band 5_5 MHz_Middle_QPSK

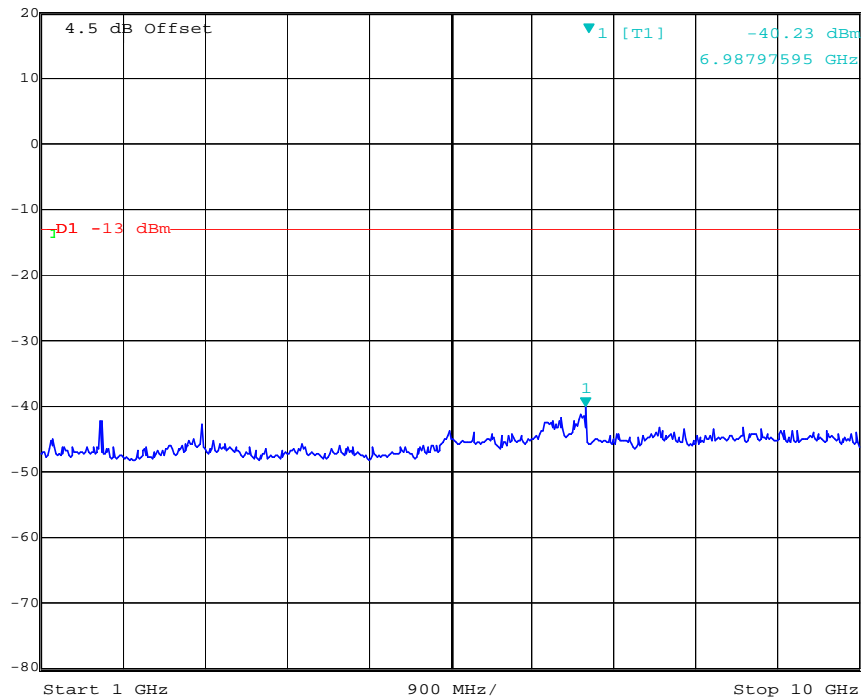
Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -41.78 dBm VBW 300 kHz
30 dBm 959.17835671 MHz SWT 245 ms Unit dBm



Fundamental

Date: 18.NOV.2019 22:46:24

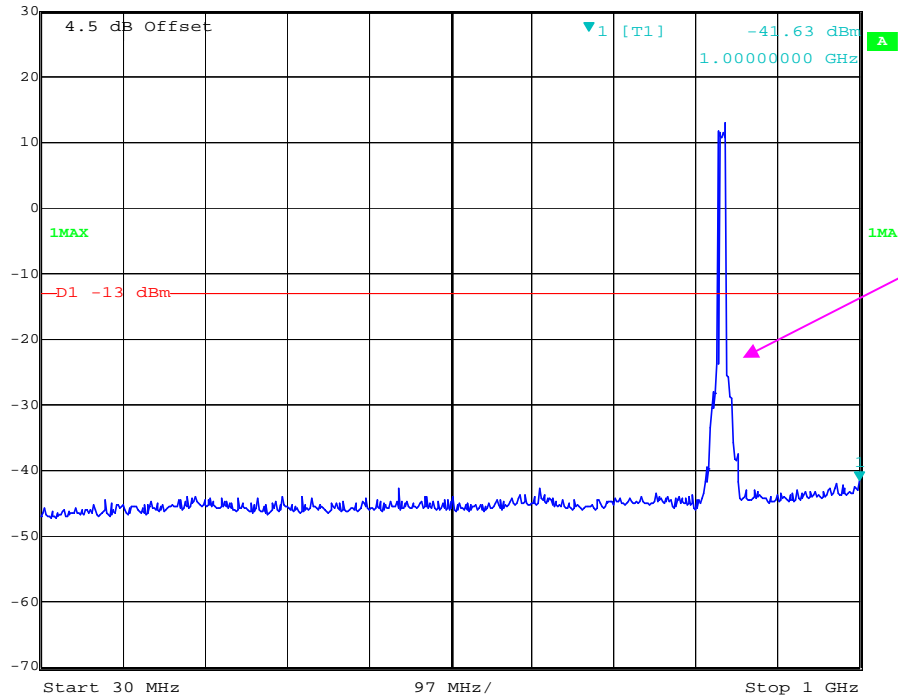
Marker 1 [T1] RBW 1 MHz RF Att 30 dB
Ref Lvl -40.23 dBm VBW 3 MHz
20 dBm 6.98797595 GHz SWT 52 ms Unit dBm



Date: 18.NOV.2019 22:46:35

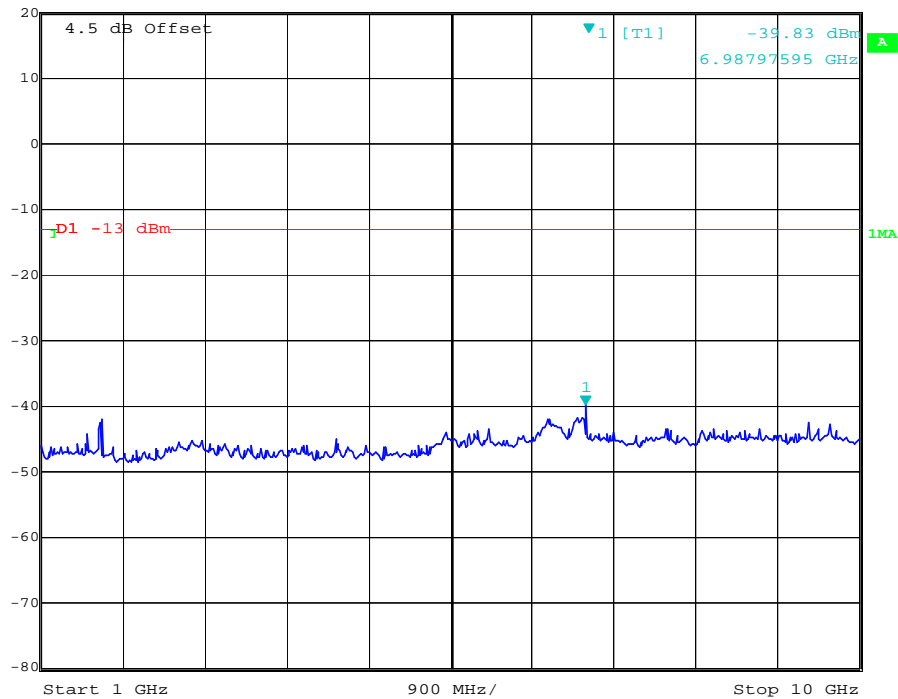
LTE Band 5_10 MHz_Middle_QPSK

Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -41.63 dBm VBW 300 kHz
30 dBm 1.00000000 GHz SWT 245 ms Unit dBm



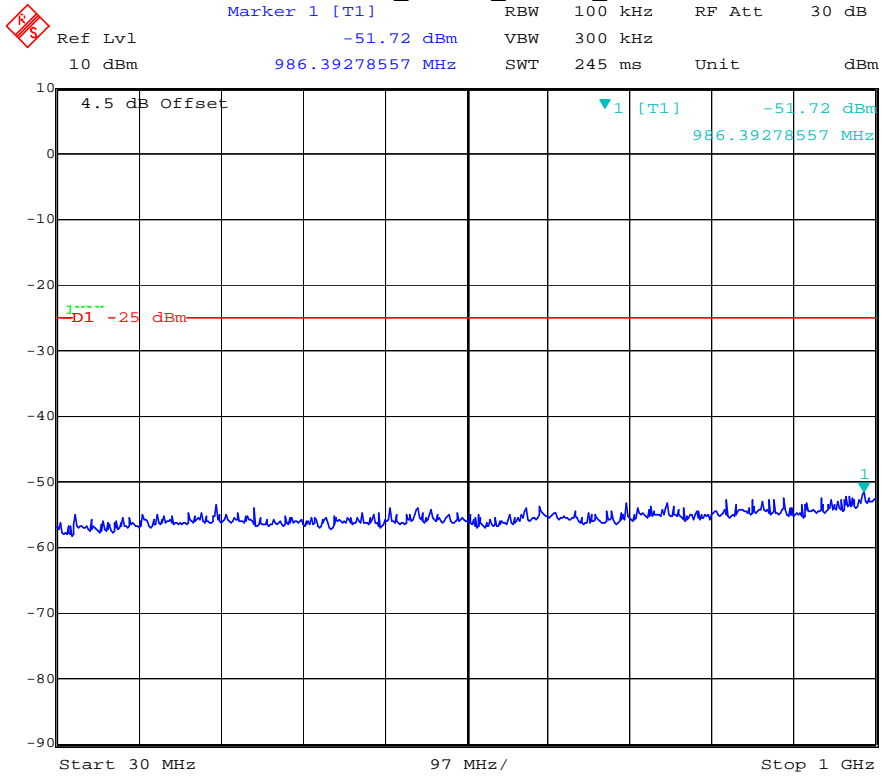
Date: 18.NOV.2019 22:46:55

Marker 1 [T1] RBW 1 MHz RF Att 30 dB
Ref Lvl -39.83 dBm VBW 3 MHz
20 dBm 6.98797595 GHz SWT 52 ms Unit dBm

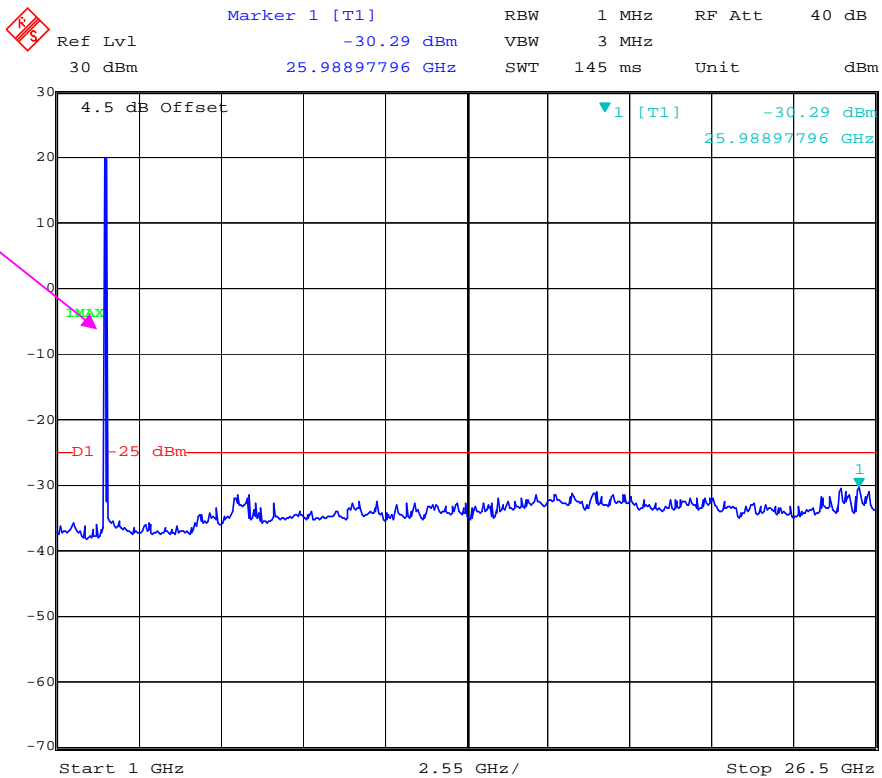


Date: 18.NOV.2019 22:47:06

LTE Band 7_5 MHz_Middle_QPSK



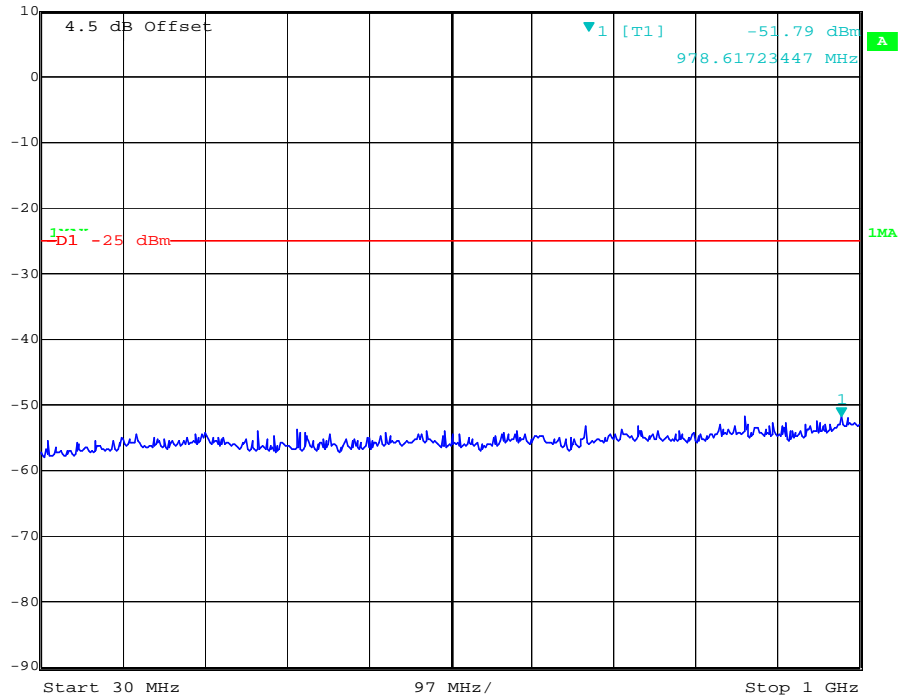
Date: 18.NOV.2019 22:47:25



Date: 18.NOV.2019 22:47:37

LTE Band 7_10 MHz_Middle_QPSK

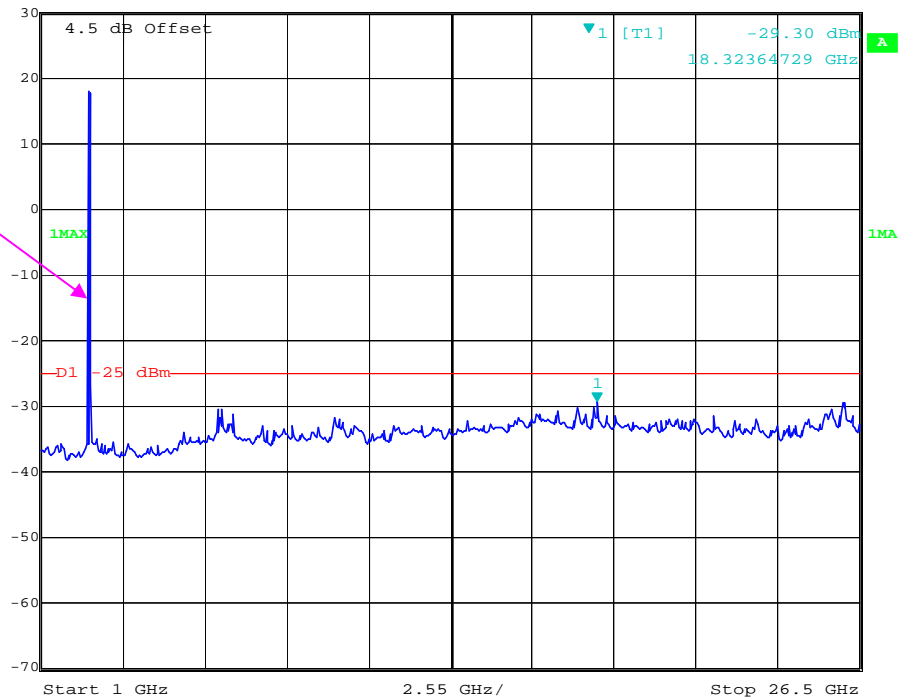
Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -51.79 dBm VBW 300 kHz
10 dBm 978.61723447 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:47:57

Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -29.30 dBm VBW 3 MHz
30 dBm 18.32364729 GHz SWT 145 ms Unit dBm

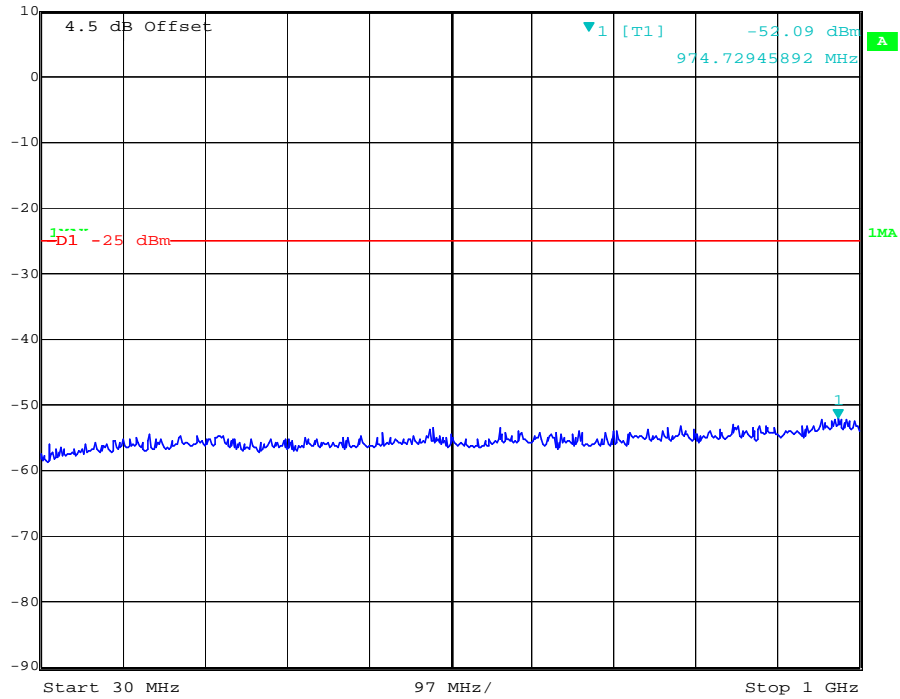
Fundamental



Date: 18.NOV.2019 22:48:09

LTE Band 7_15 MHz_Middle_QPSK

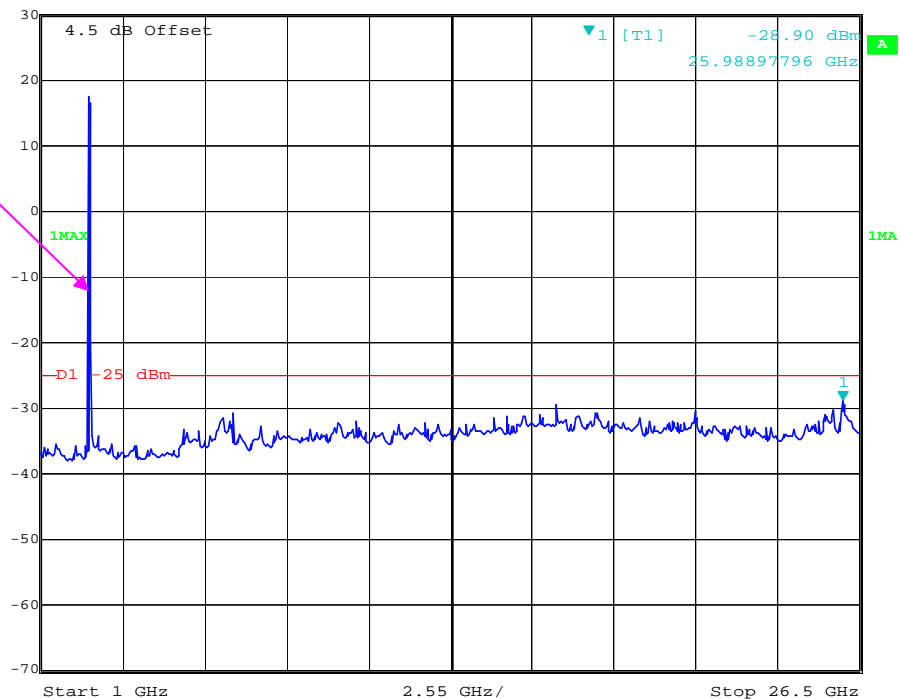
Marker 1 [T1] RBW 100 kHz RF Att 30 dB
Ref Lvl -52.09 dBm VBW 300 kHz
10 dBm 974.72945892 MHz SWT 245 ms Unit dBm



Date: 18.NOV.2019 22:48:32

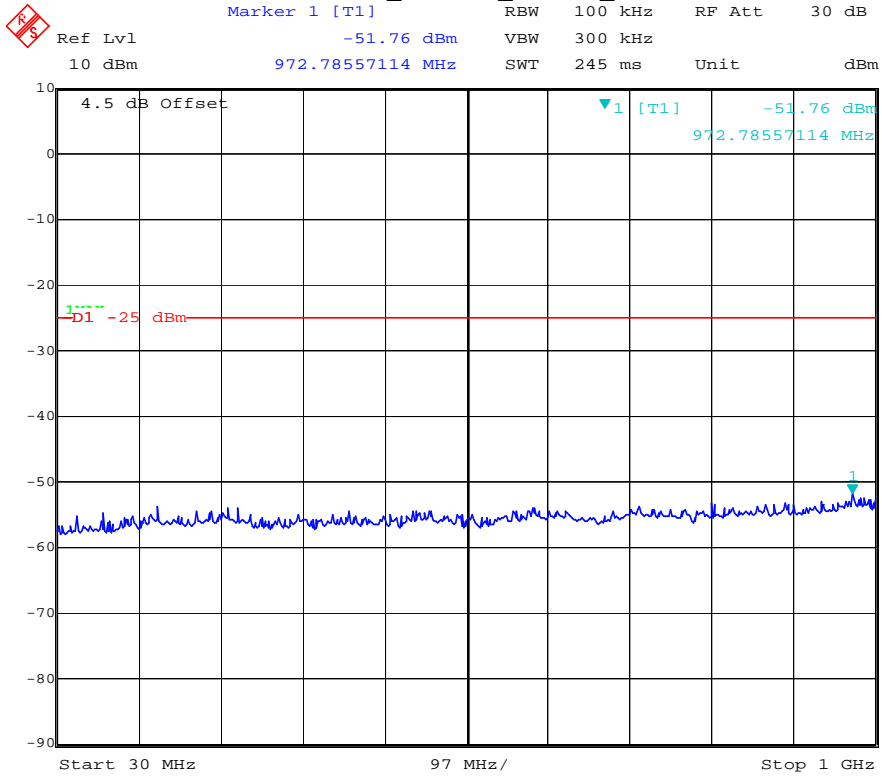
Marker 1 [T1] RBW 1 MHz RF Att 40 dB
Ref Lvl -28.90 dBm VBW 3 MHz
30 dBm 25.98897796 GHz SWT 145 ms Unit dBm

Fundamental

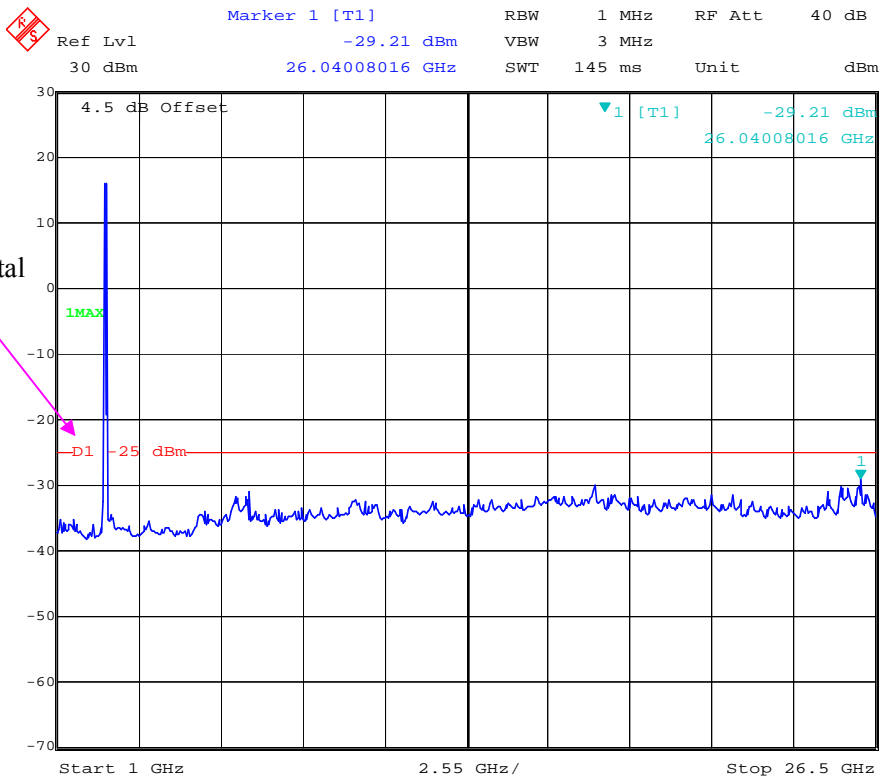


Date: 18.NOV.2019 22:48:44

LTE Band 7_20 MHz_Middle_QPSK



Date: 18.NOV.2019 22:49:08



Date: 18.NOV.2019 22:49:20

FCC §2.1053, §22.917 & §24.238 & §27.53- SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 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 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.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \lg(\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \text{Log}_{10}(\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-05-06	2020-05-06
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2019-06-16	2020-06-16
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2019-09-05	2020-09-05
Sinoscite	Band-stop filter	BSF1710-1785MN-0383-003	0383003	2019-06-16	2020-06-16
Sinoscite	Band-stop filter	BSF1850-1910MS-0935V2	0935V2	2019-06-16	2020-06-16
Sinoscite	Band-stop filter	BSF2500-2750MS-1439-001	1437001	2019-06-16	2020-06-16
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27

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

Test Data

Environmental Conditions

Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	26.3 °C	24.9°C
Relative Humidity:	42%	43 %
ATM Pressure:	100.3 kPa	100.4 kPa
Tester:	Neil Liao	Tyler Pan
Test Date:	2019-11-18	2019-11-22

Test Result: Compliance.

EUT Operation Mode: Transmitting

Cellular Band (PART 22H)

30 MHz-10 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM850, Frequency:836.600 MHz								
1673.200	H	53.59	-50.35	10.6	0.73	-40.5	-13.0	27.5
1673.200	V	46.32	-58.22	10.6	0.73	-48.3	-13.0	35.3
2509.800	H	61.45	-41.46	13.1	1.25	-29.6	-13.0	16.6
2509.800	V	58.27	-44.67	13.1	1.25	-32.8	-13.0	19.8
3346.400	H	41.99	-57.69	13.8	1.61	-45.5	-13.0	32.5
3346.400	V	34.45	-65.27	13.8	1.61	-53.1	-13.0	40.1
524.800	H	37.38	-67.29	0.0	0.35	-67.6	-13.0	54.6
171.100	V	36.99	-70.64	0.0	0.24	-70.9	-13.0	57.9
WCDMA Band V, Frequency:836.600 MHz								
1673.200	H	41.95	-61.99	10.6	0.73	-52.1	-13.0	39.1
1673.200	V	39.87	-64.67	10.6	0.73	-54.8	-13.0	41.8
2509.800	H	47.91	-55	13.1	1.25	-43.1	-13.0	30.1
2509.800	V	50.73	-52.21	13.1	1.25	-40.4	-13.0	27.4
3346.400	H	37.20	-62.48	13.8	1.61	-50.3	-13.0	37.3
3346.400	V	39.96	-59.76	13.8	1.61	-47.5	-13.0	34.5
209.320	H	37.58	-72.46	0.0	0.2	-72.7	-13.0	59.7
108.950	V	36.18	-69.94	0.0	0.15	-70.1	-13.0	57.1

PCS Band (PART 24E)

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	53.82	-43.82	13.8	1.63	-31.7	-13.0	18.7
3760.000	V	51.44	-46.06	13.8	1.63	-33.9	-13.0	20.9
5640.000	H	53.34	-40.25	14.0	1.31	-27.5	-13.0	14.5
5640.000	V	41.01	-52.47	14.0	1.31	-39.8	-13.0	26.8
217.000	H	36.99	-72.91	0.0	0.21	-73.1	-13.0	60.1
457.360	V	37.24	-66.08	0.0	0.36	-66.4	-13.0	53.4
WCDMA Band II, Frequency:1880.000 MHz								
3760.000	H	45.08	-52.56	13.8	1.63	-40.4	-13.0	27.4
3760.000	V	47.40	-50.1	13.8	1.63	-38.0	-13.0	25.0
5640.000	H	51.72	-41.87	14.0	1.31	-29.2	-13.0	16.2
5640.000	V	41.66	-51.82	14.0	1.31	-39.1	-13.0	26.1
433.600	H	37.43	-68.9	0.0	0.37	-69.3	-13.0	56.3
550.100	V	36.35	-65.01	0.0	0.36	-65.4	-13.0	52.4

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency:1880.000 MHz								
3760.00	H	45.11	-52.53	13.76	1.63	-40.40	-13.00	27.40
3760.00	V	47.96	-49.54	13.76	1.63	-37.41	-13.00	24.41
5640.00	H	52.70	-40.89	14.02	1.31	-28.18	-13.00	15.18
5640.00	V	44.05	-49.43	14.02	1.31	-36.72	-13.00	23.72
597.80	H	38.01	-64.17	0.00	0.76	-64.93	-13.00	51.93
558.30	V	37.85	-68.32	0.00	0.74	-69.06	-13.00	56.06

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency:1732.500 MHz								
3465.00	H	43.55	-55.64	13.91	1.62	-43.35	-13.00	30.35
3465.00	V	42.45	-56.77	13.91	1.62	-44.48	-13.00	31.48
5197.50	H	48.22	-46.47	14.00	1.52	-33.99	-13.00	20.99
5197.50	V	45.11	-49.65	14.00	1.52	-37.17	-13.00	24.17
548.70	H	36.19	-67.02	0.00	0.73	-67.75	-13.00	54.75
498.20	V	35.39	-71.89	0.00	0.71	-72.60	-13.00	59.60

LTE Band 5(30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 836.500 MHz								
1673.00	H	42.39	-61.55	10.61	0.73	-51.67	-13.00	38.67
1673.00	V	43.26	-61.28	10.61	0.73	-51.40	-13.00	38.40
2509.50	H	50.93	-51.98	13.11	1.25	-40.12	-13.00	27.12
2509.50	V	51.89	-51.05	13.11	1.25	-39.19	-13.00	26.19
3346.00	H	36.79	-62.89	13.83	1.61	-50.67	-13.00	37.67
3346.00	V	40.79	-58.93	13.83	1.61	-46.71	-13.00	33.71
484.10	H	35.38	-68.94	0.00	0.69	-69.63	-13.00	56.63
464.50	V	35.54	-72.04	0.00	0.67	-72.71	-13.00	59.71

LTE Band 7 (30MHz-26.5GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 2535.000 MHz								
5070.00	H	45.22	-49.89	13.93	1.34	-37.30	-25.00	12.30
5070.00	V	46.76	-48.16	13.93	1.34	-35.57	-25.00	10.57
7605.00	H	36.85	-52.03	13.21	1.40	-40.22	-25.00	15.22
7605.00	V	37.63	-51.65	13.21	1.40	-39.84	-25.00	14.84
578.32	H	35.89	-66.70	0.00	0.75	-67.45	-25.00	42.45
440.60	V	35.70	-72.10	0.00	0.65	-72.75	-25.00	47.75

Note:

- 1) The unit of Antenna Gain is dBd for frequency below 1GHz, and the unit of Antenna Gain is dBi for frequency above 1GHz.
- 2) Absolute Level = Substituted Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

FCC §22.917(a) & §24.238(a) & §27.53 - BAND EDGES

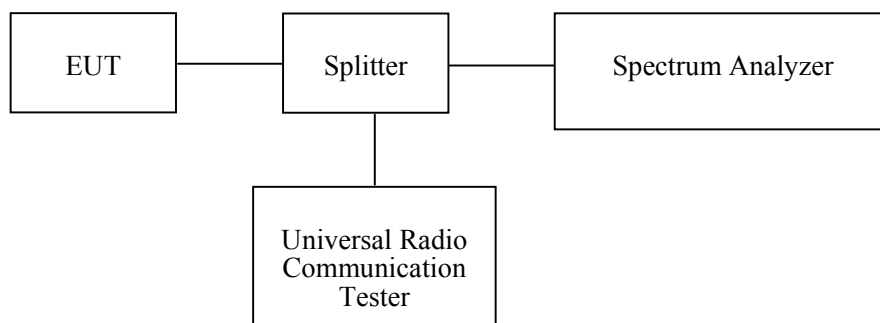
Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53

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 Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2019-05-09	2020-05-09
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	Each time	/
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	/

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

Test Data

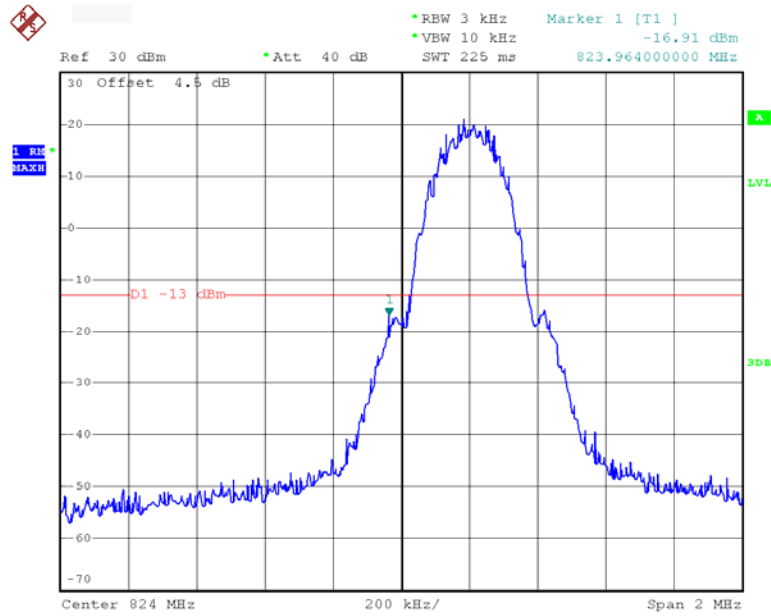
Environmental Conditions

Temperature:	26.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.3kPa
Tester:	Blake Yang
Test Date:	2019-11-18

Test Mode: Transmitting

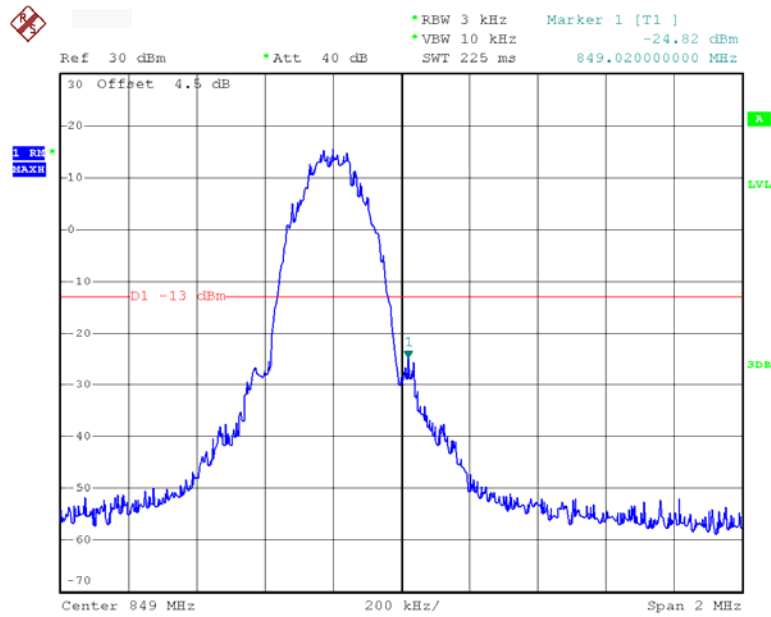
Test Result: Compliance. Please refer to the following plots.

GSM 850, Left Band Edge



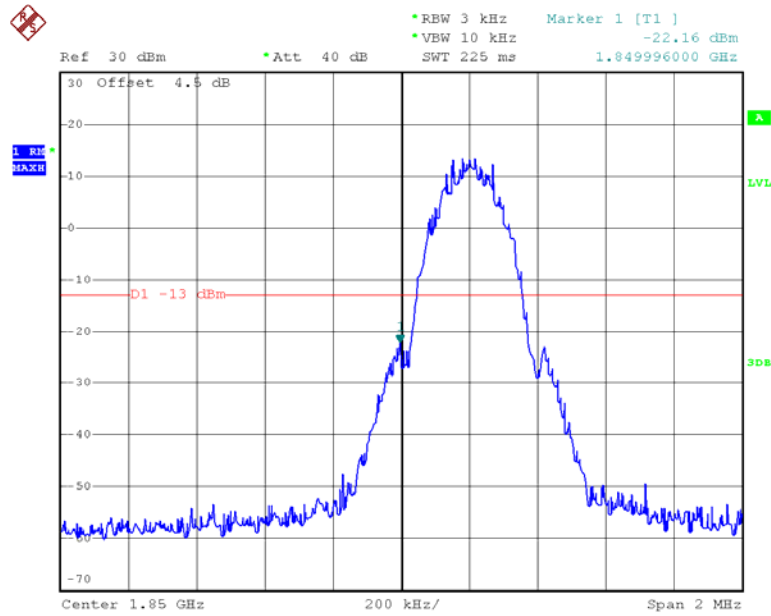
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GSM 850, Right Band Edge



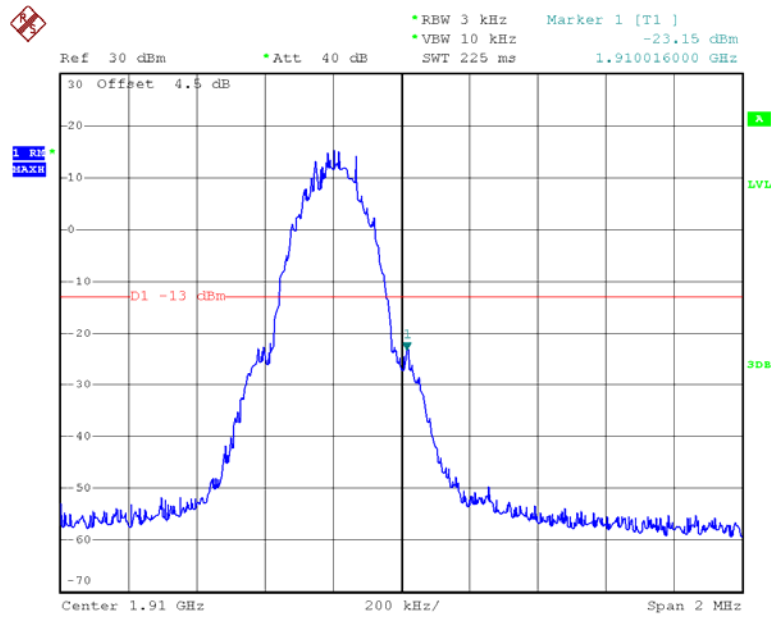
Date: 18.NOV.2019 22:26:31

GSM 1900, Left Band Edge



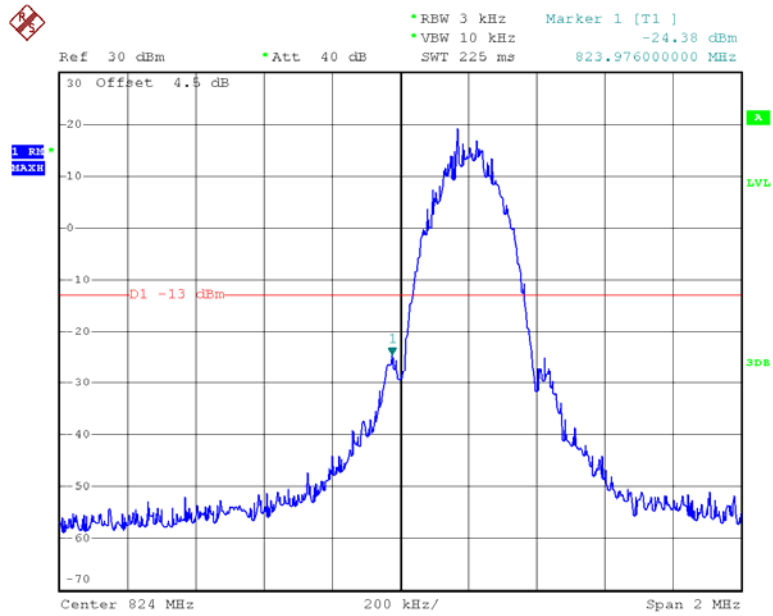
Date: 18.NOV.2019 22:36:57

GSM 1900, Right Band Edge



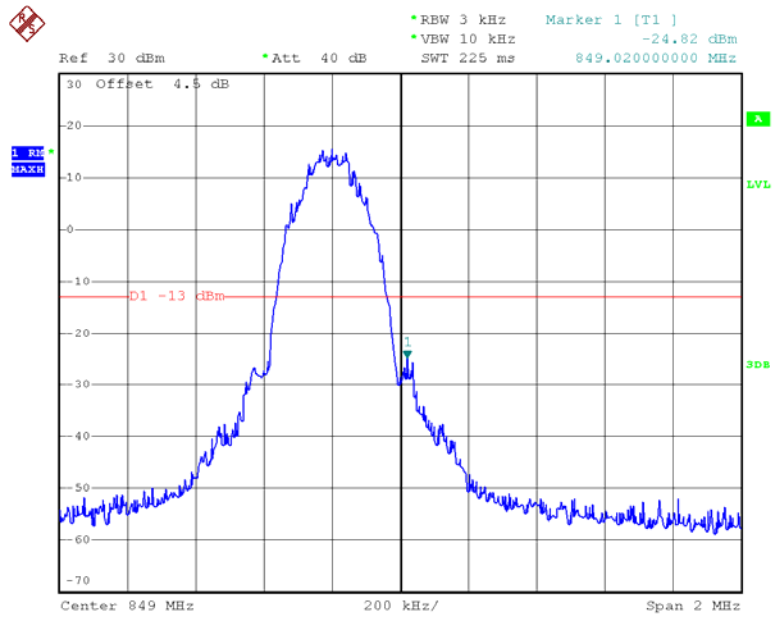
Date: 18.NOV.2019 22:36:10

EDGE 850, Left Band Edge



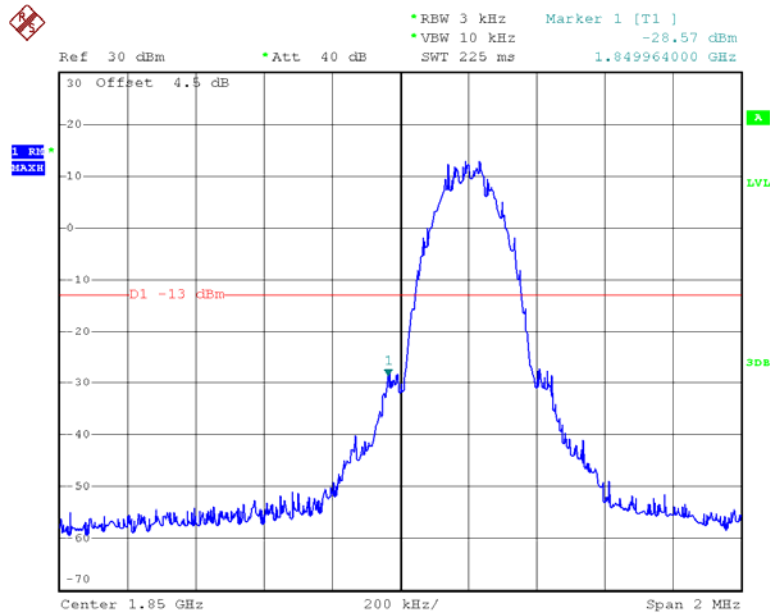
Date: 18.NOV.2019 22:27:20

EDGE 850, Right Band Edge



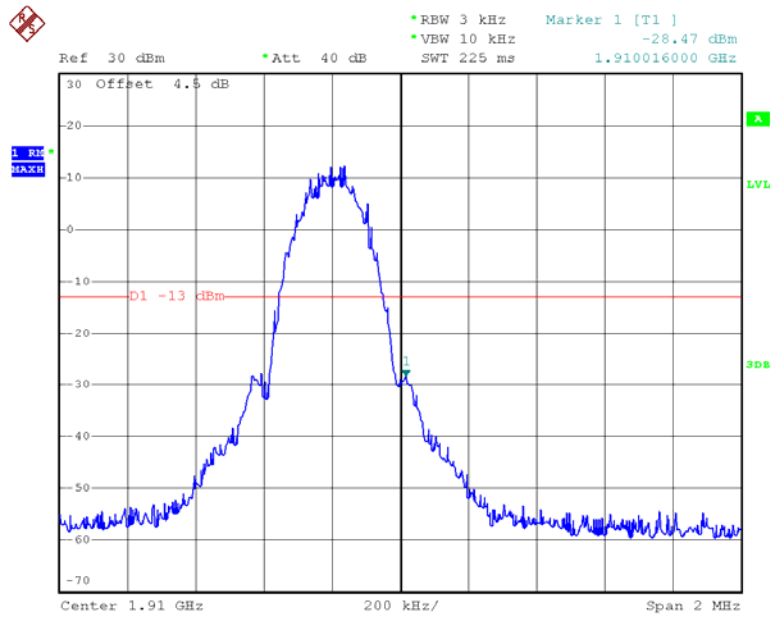
Date: 18.NOV.2019 22:26:31

EDGE 1900, Left Band Edge



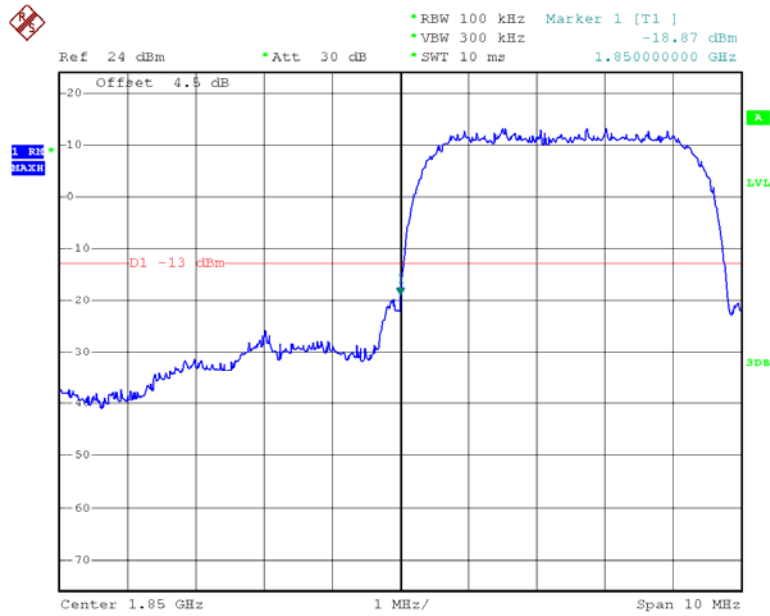
Date: 18.NOV.2019 22:33:07

EDGE 1900, Right Band Edge



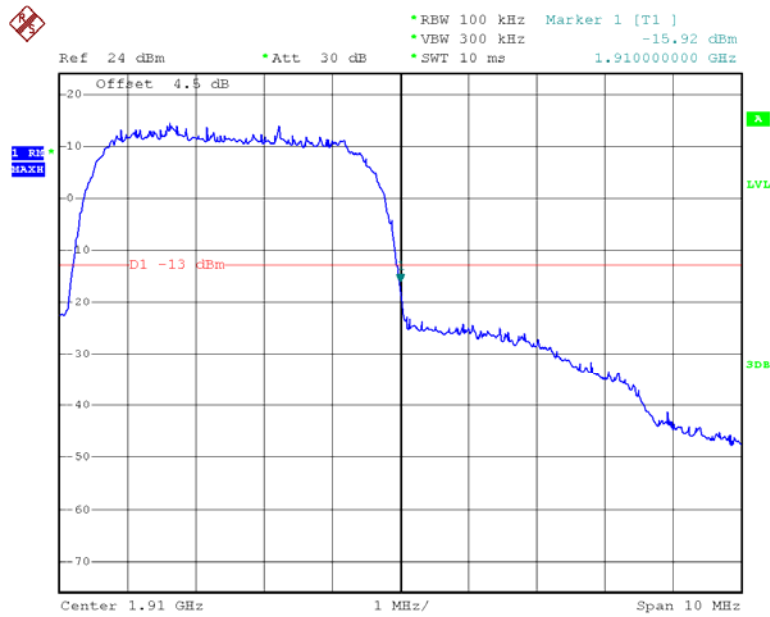
Date: 18.NOV.2019 22:34:12

WCDMA Band 2 Rel 99, Left Band Edge



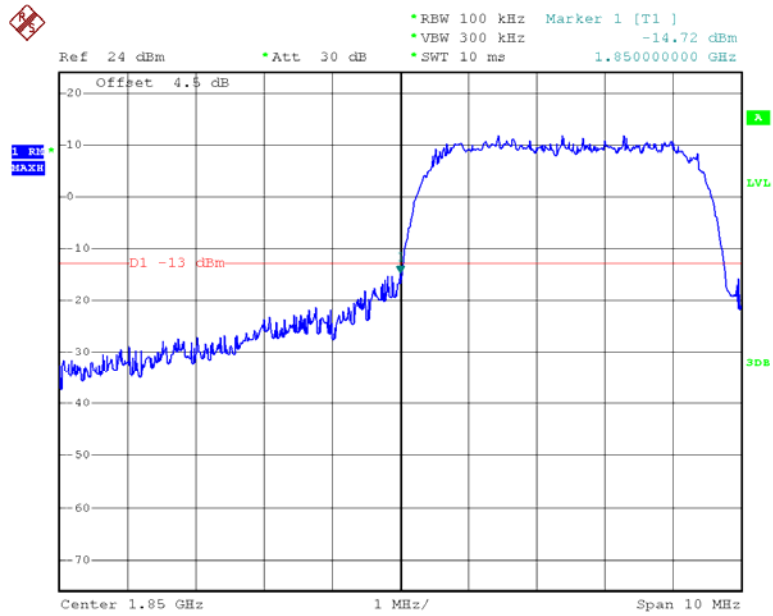
Date: 18.NOV.2019 16:58:12

WCDMA Band 2 Rel 99, Right Band Edge



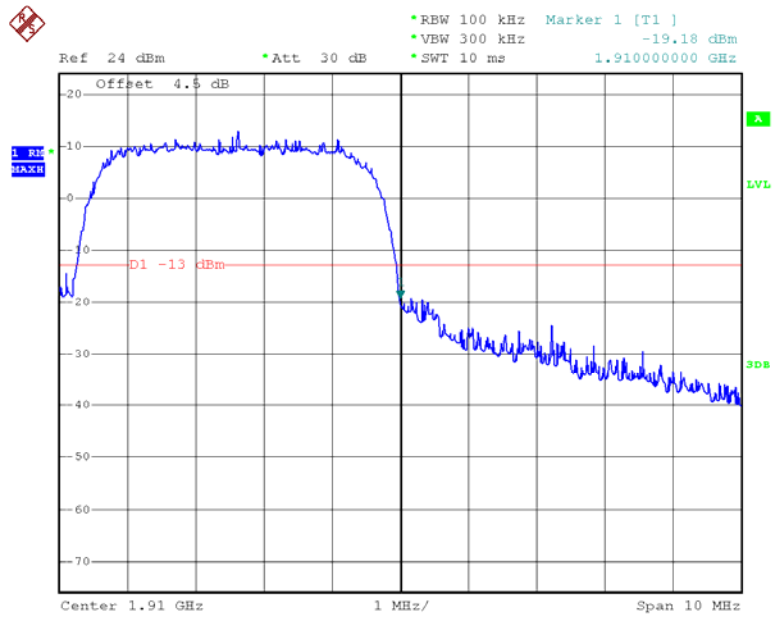
Date: 18.NOV.2019 16:59:00

WCDMA Band 2 HSDPA, Left Band Edge



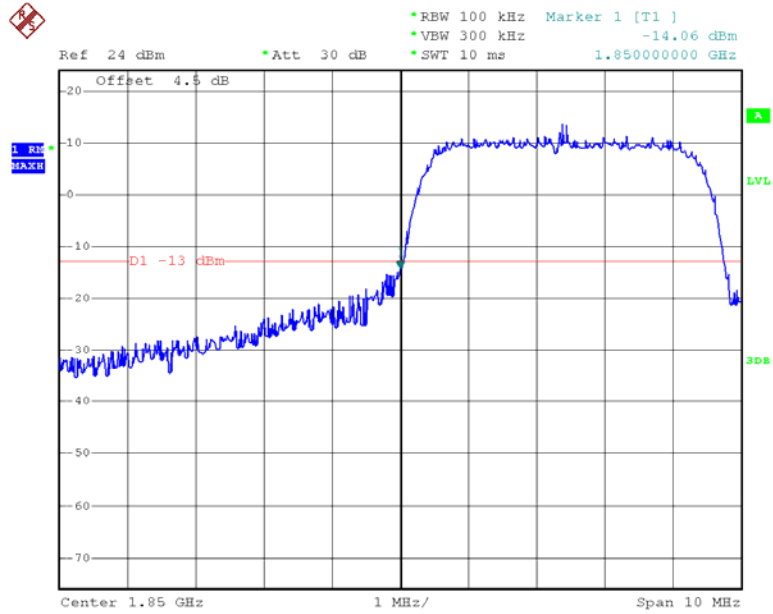
Date: 18.NOV.2019 17:00:48

WCDMA Band 2 HSDPA, Right Band Edge



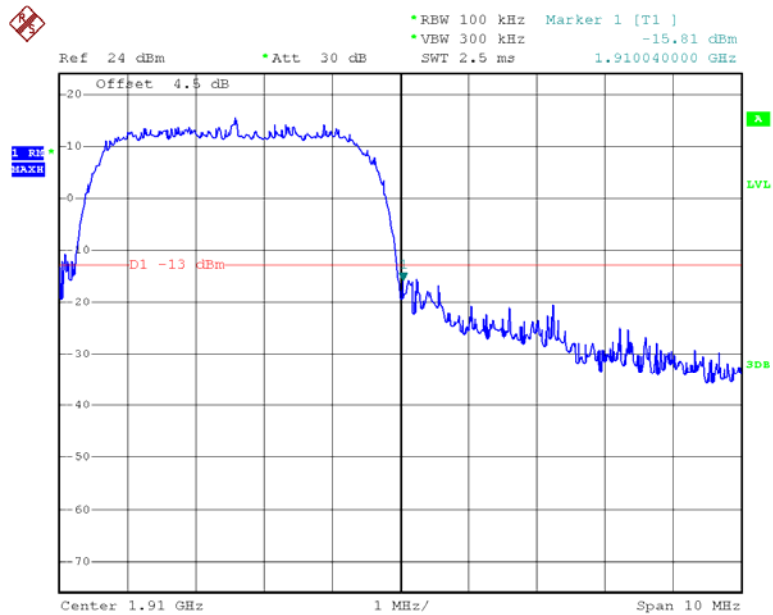
Date: 18.NOV.2019 17:00:03

WCDMA Band 2 HSUPA, Left Band Edge



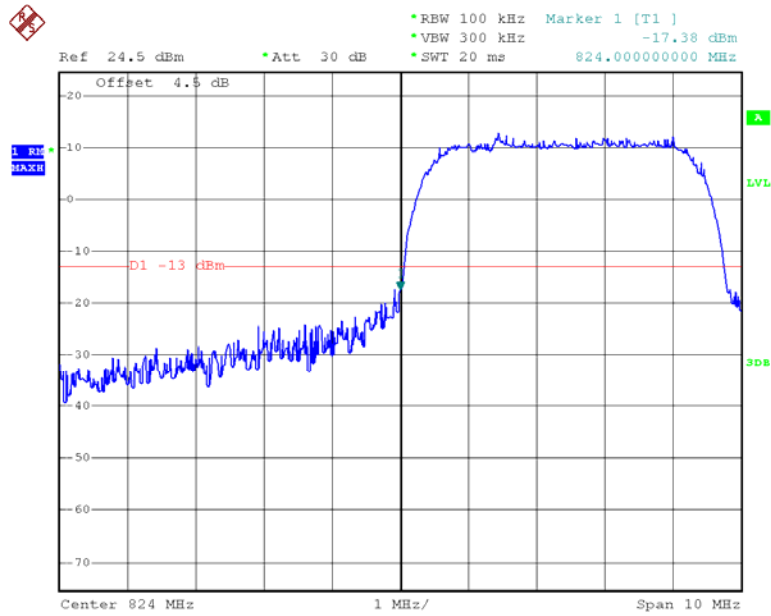
Date: 18.NOV.2019 17:02:05

WCDMA Band 2 HSUPA, Right Band Edge



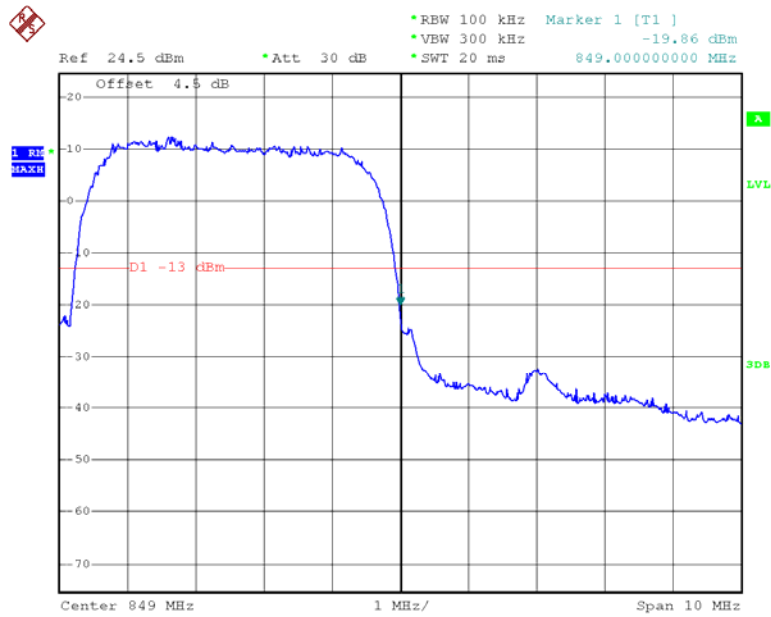
Date: 18.NOV.2019 17:08:32

WCDMA Band 5 Rel 99, Left Band Edge



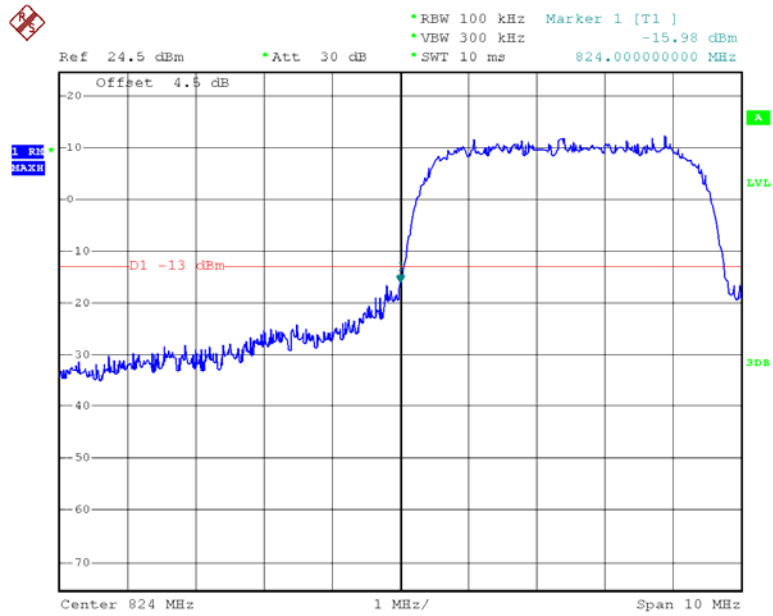
Date: 18.NOV.2019 18:03:43

WCDMA Band 5 Rel 99, Right Band Edge



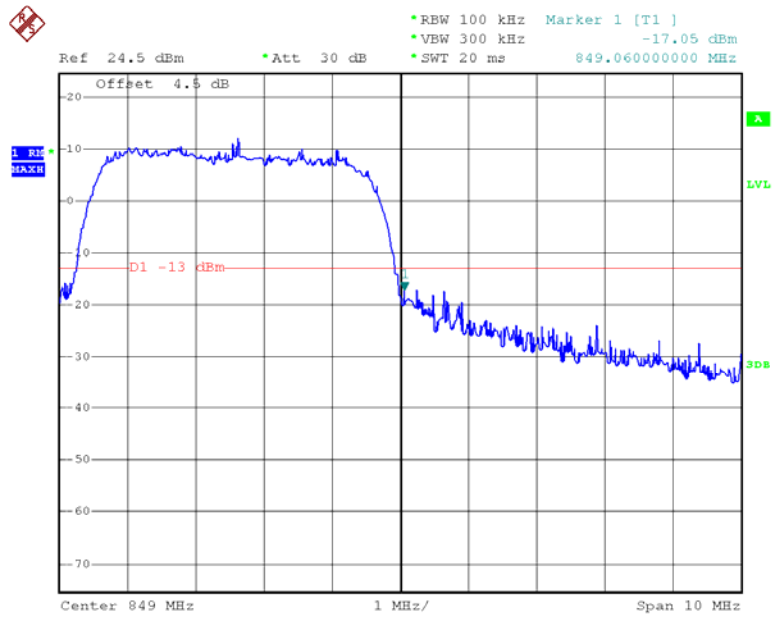
Date: 18.NOV.2019 18:04:24

WCDMA Band 5 HSDPA, Left Band Edge



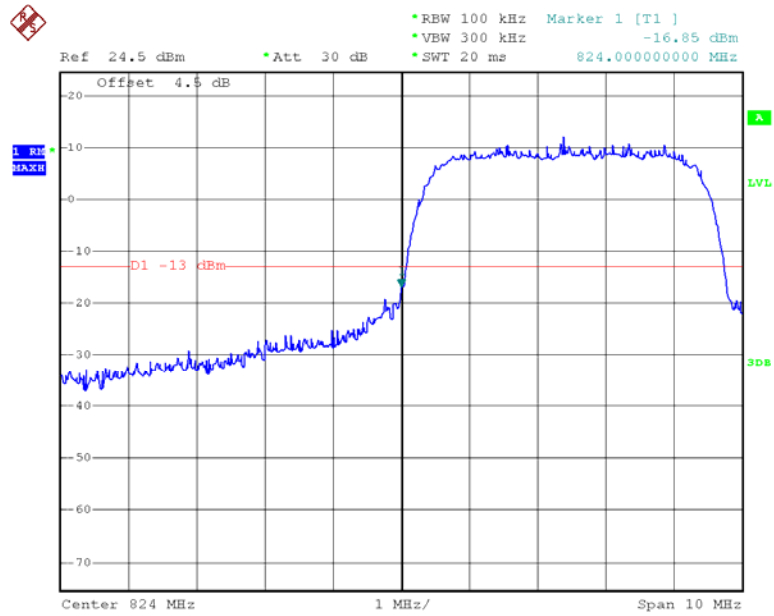
Date: 18.NOV.2019 17:57:58

WCDMA Band 5 HSDPA, Right Band Edge



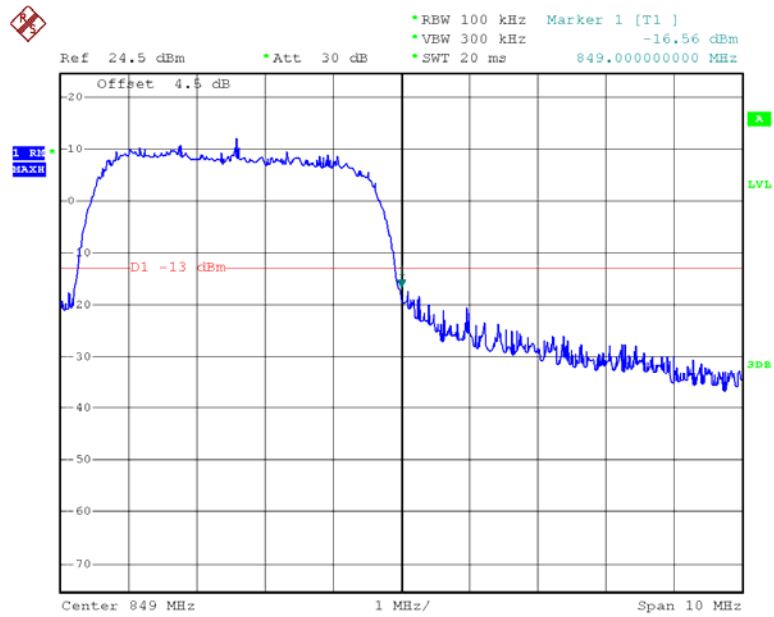
Date: 18.NOV.2019 18:00:04

WCDMA Band 5 HSUPA, Left Band Edge



Date: 18.NOV.2019 18:01:34

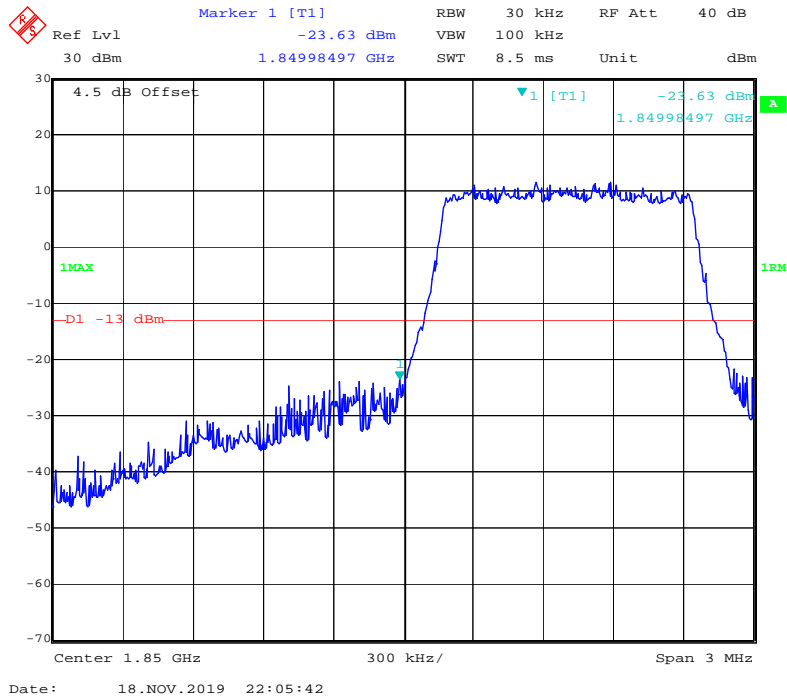
WCDMA Band 5 HSUPA, Right Band Edge



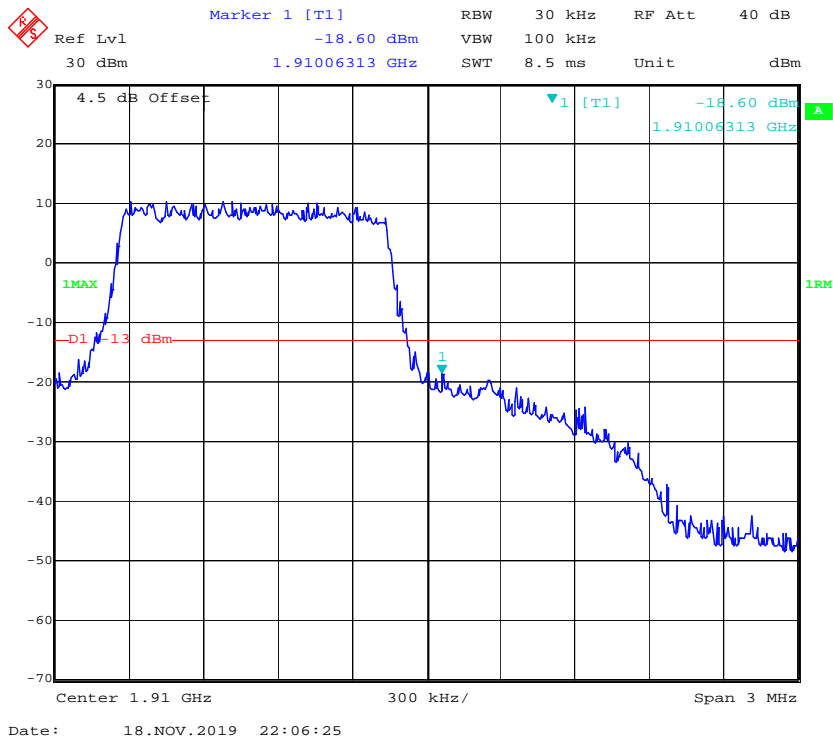
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LTE Band 2

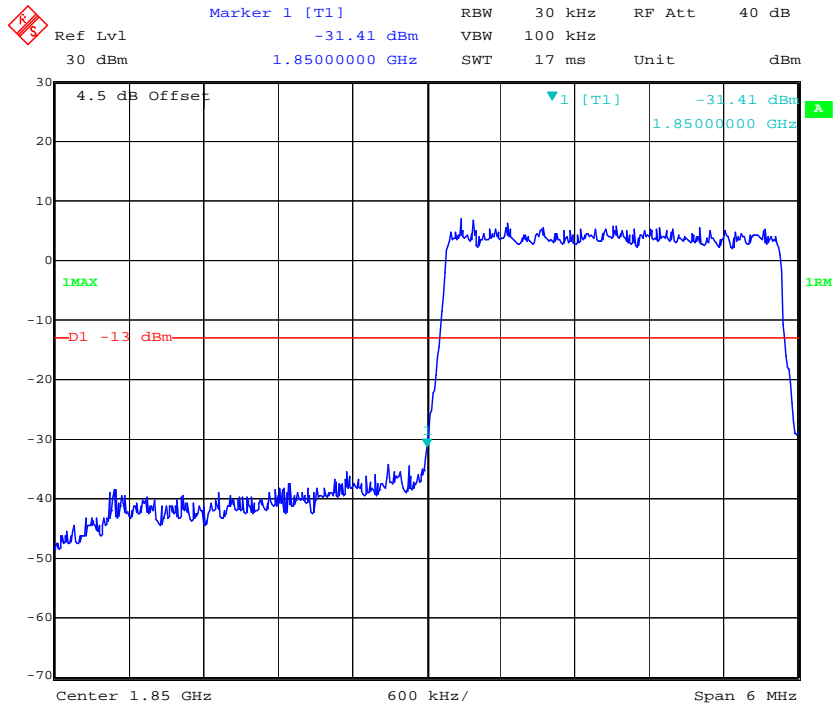
QPSK_1.4MHz_6 RB_ Left



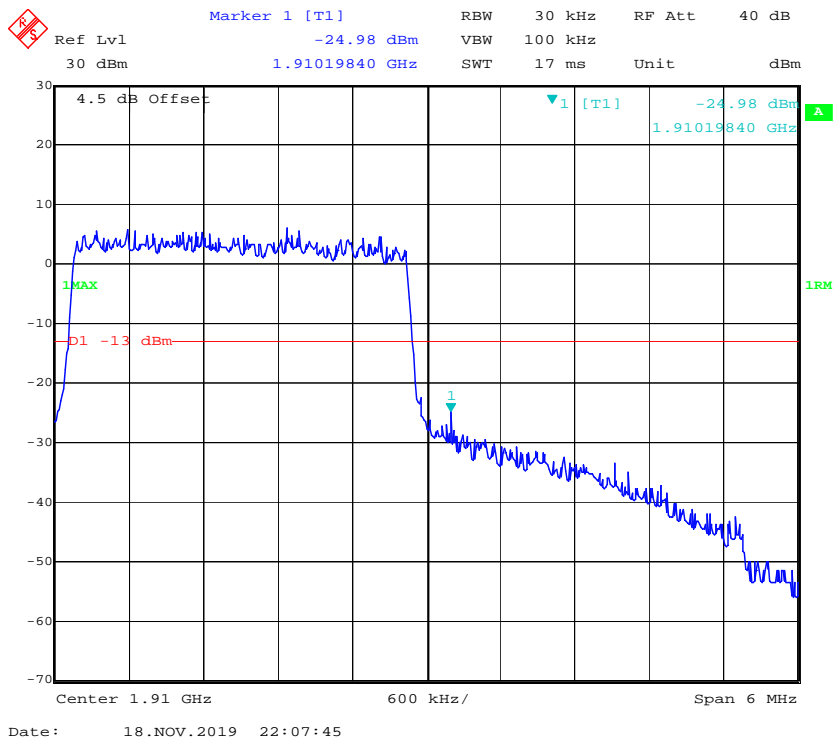
QPSK_1.4MHz_6 RB_ Right



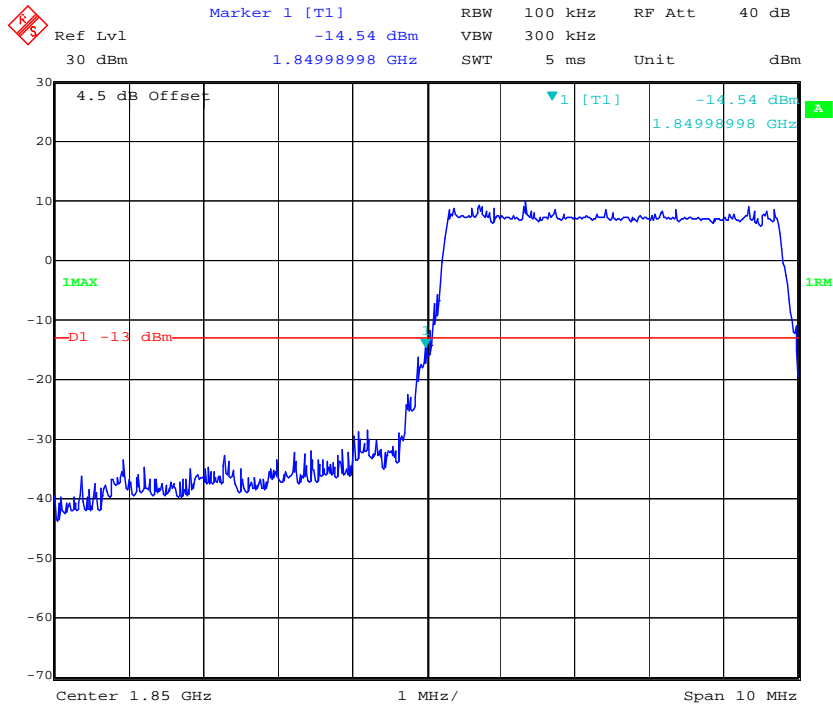
QPSK_3MHz_15 RB_Left



QPSK_3MHz_15 RB_Right

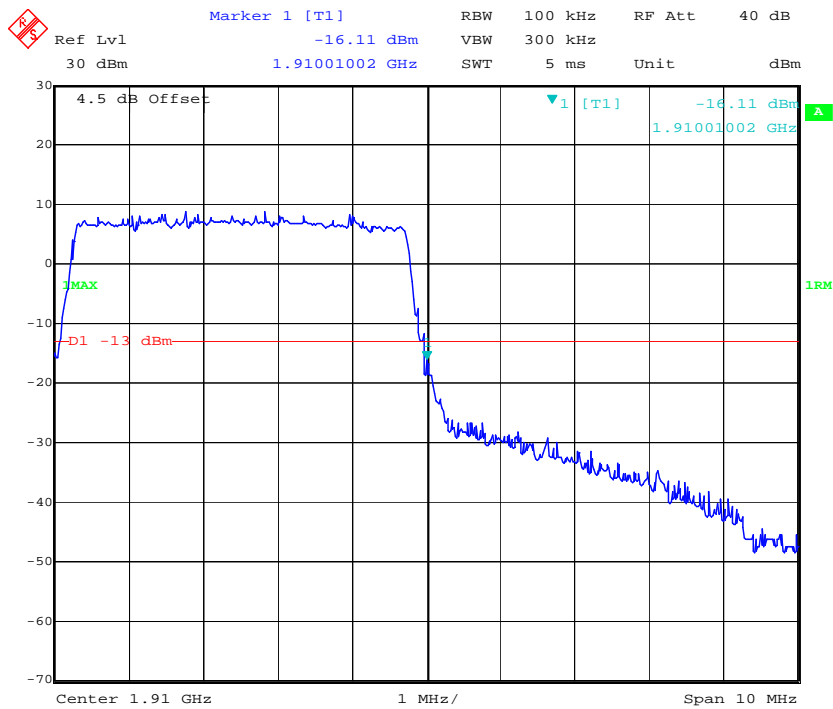


QPSK_5MHz_25 RB_Left



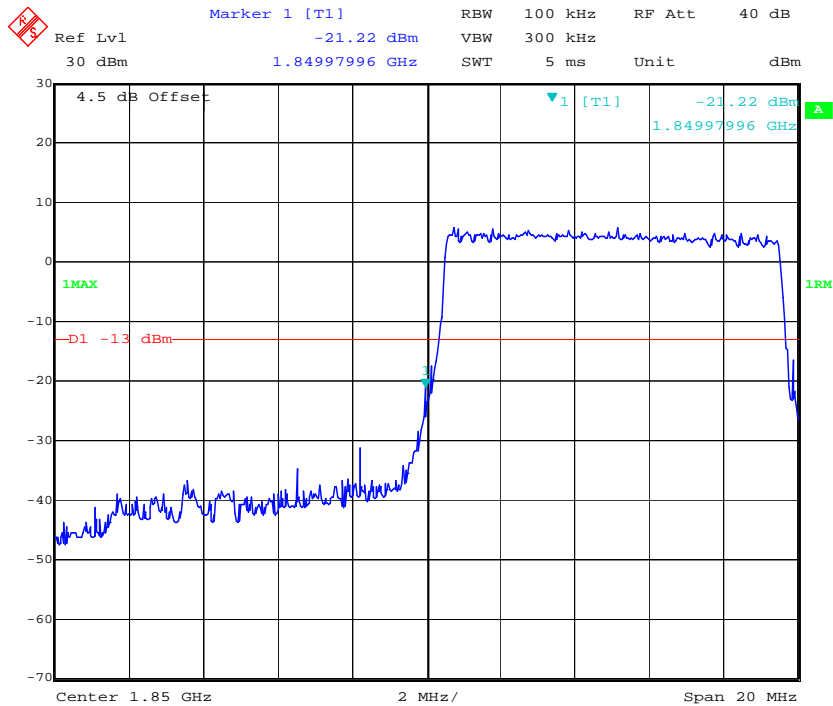
Date: 18.NOV.2019 22:08:28

QPSK_5MHz_25 RB_Right

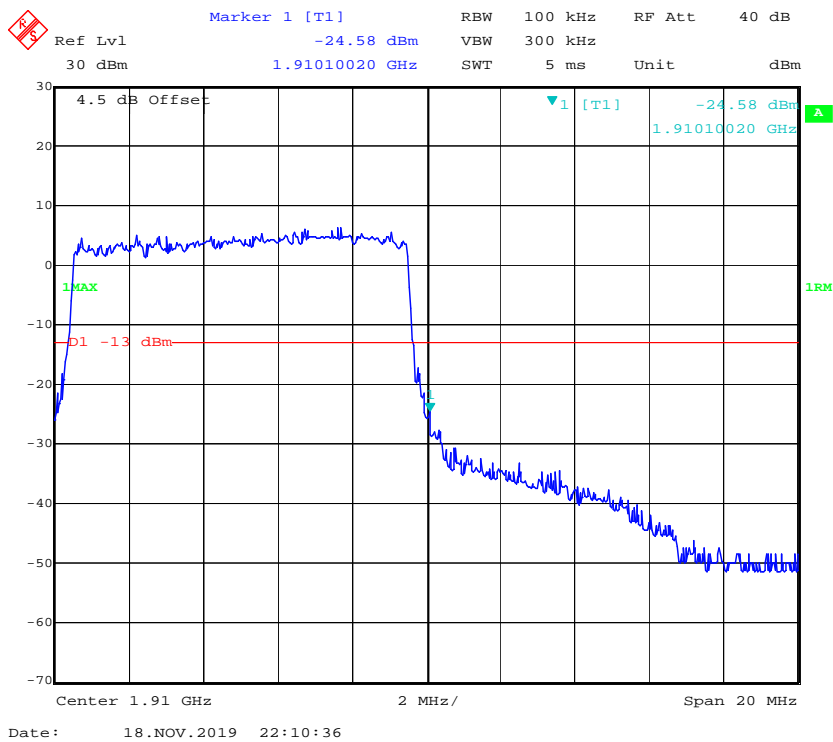


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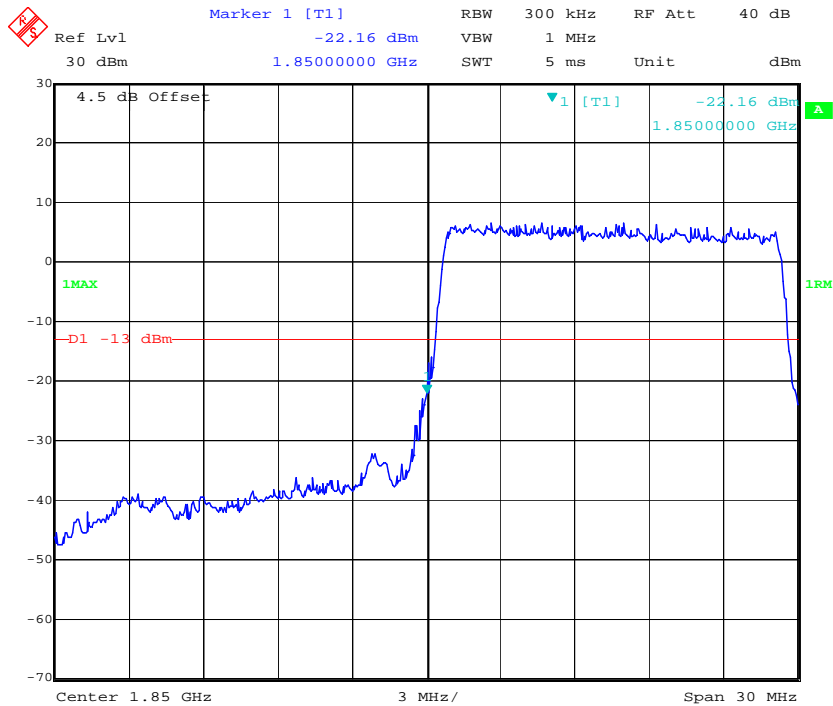
QPSK_10MHz_50 RB_Left



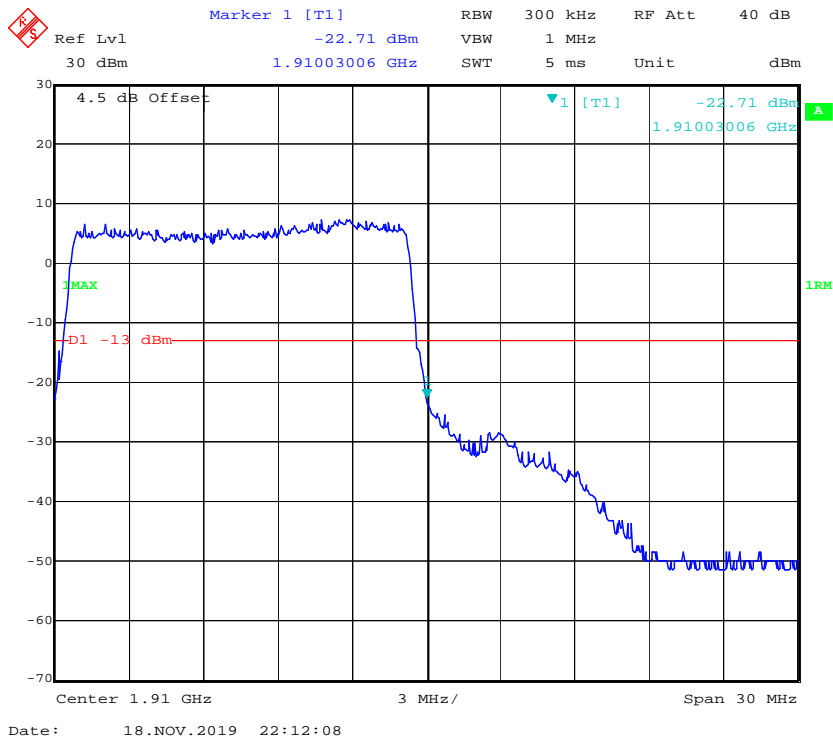
QPSK_10MHz_50 RB_Right



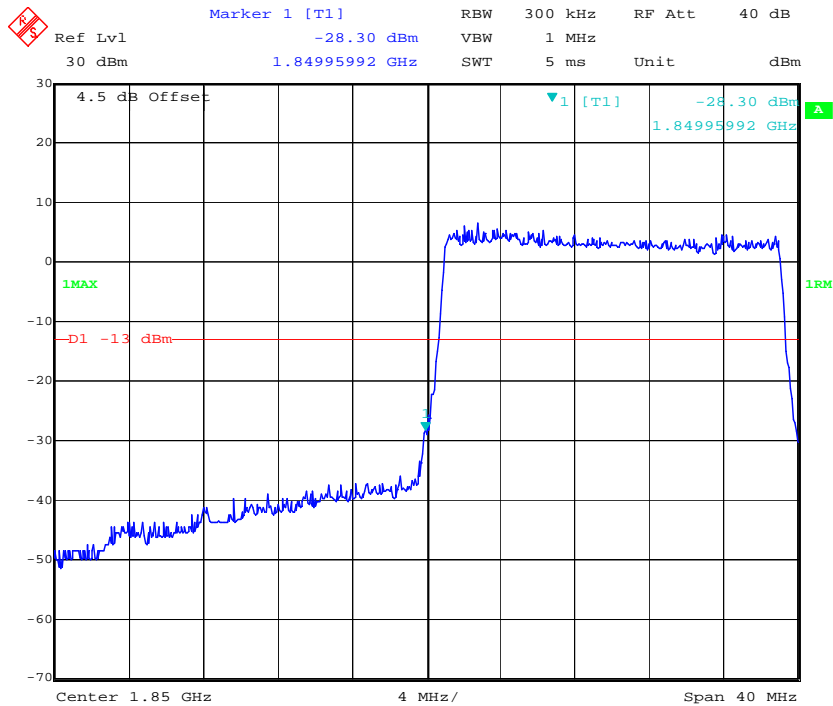
QPSK_15MHz_75 RB_Left



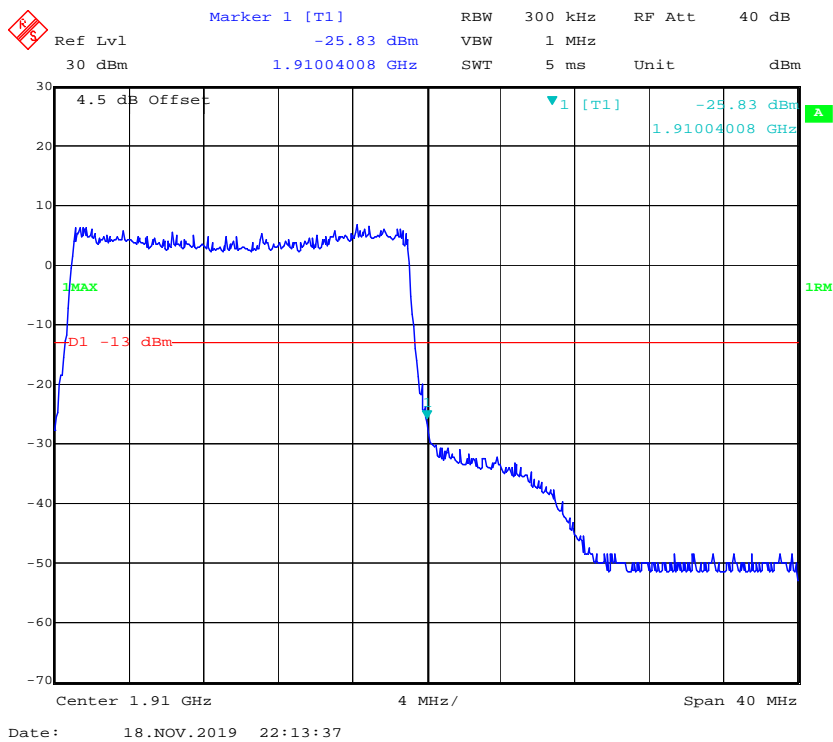
QPSK_15MHz_75 RB_Right



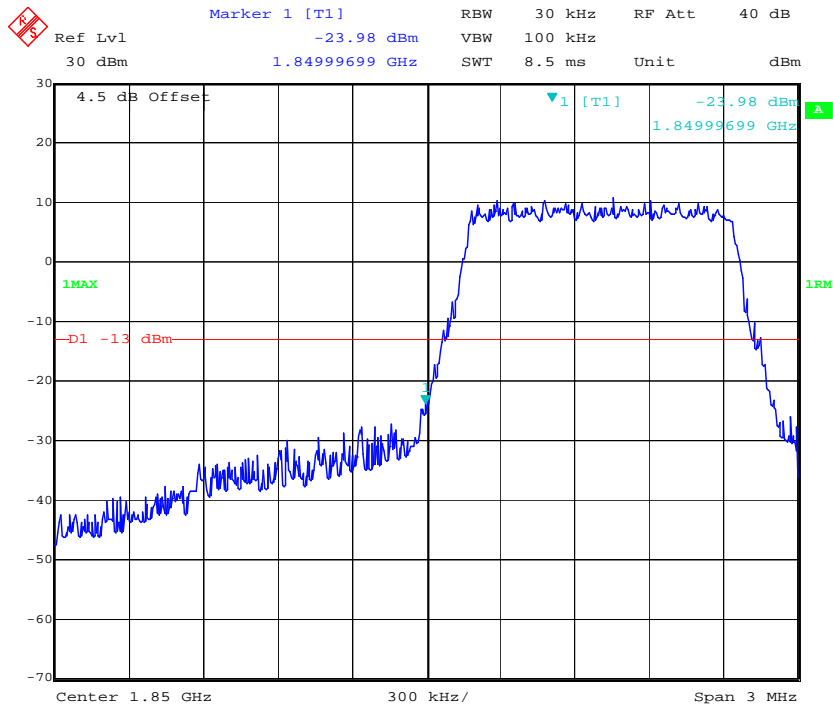
QPSK_20MHz_FULL RB_Left



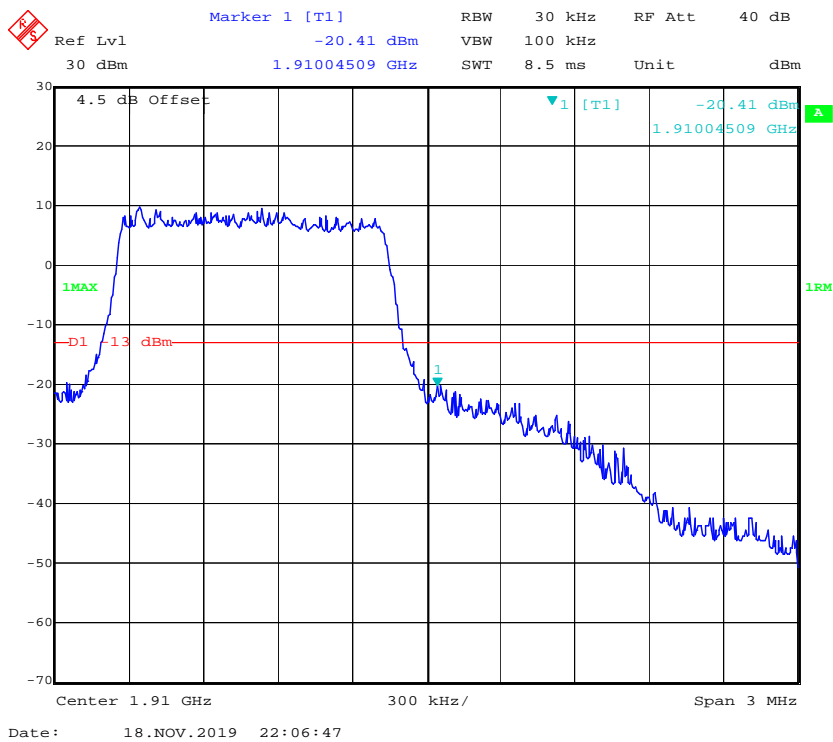
QPSK_20MHz_FULL RB_Right



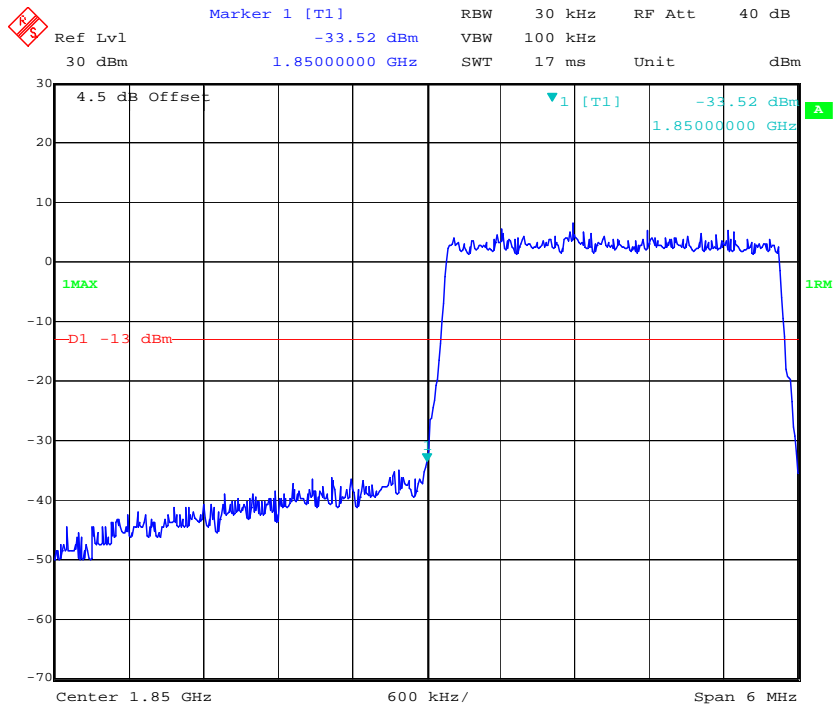
16QAM_1.4MHz_6 RB_Left



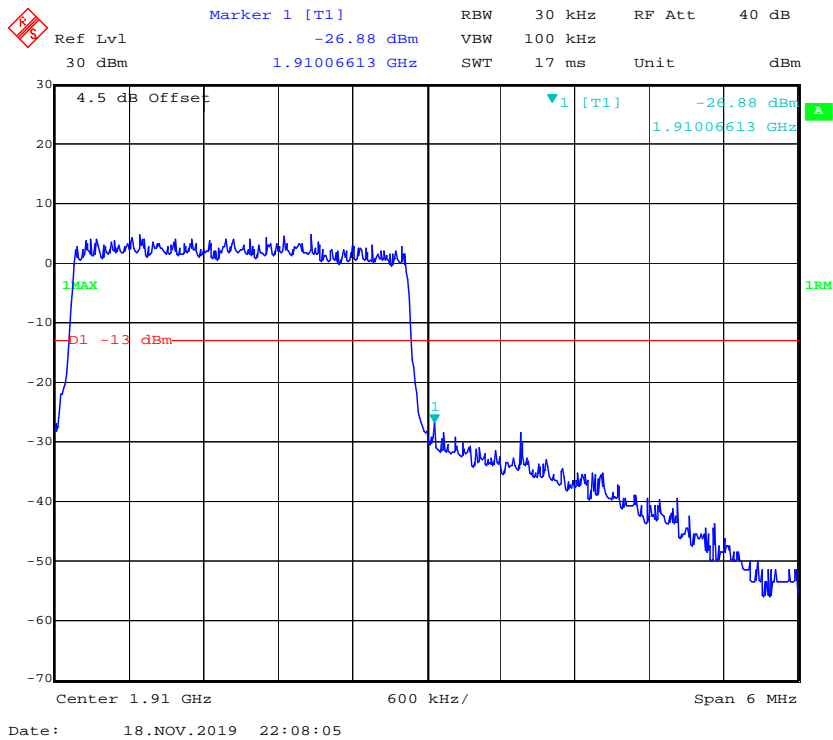
16QAM_1.4MHz_6 RB_Right



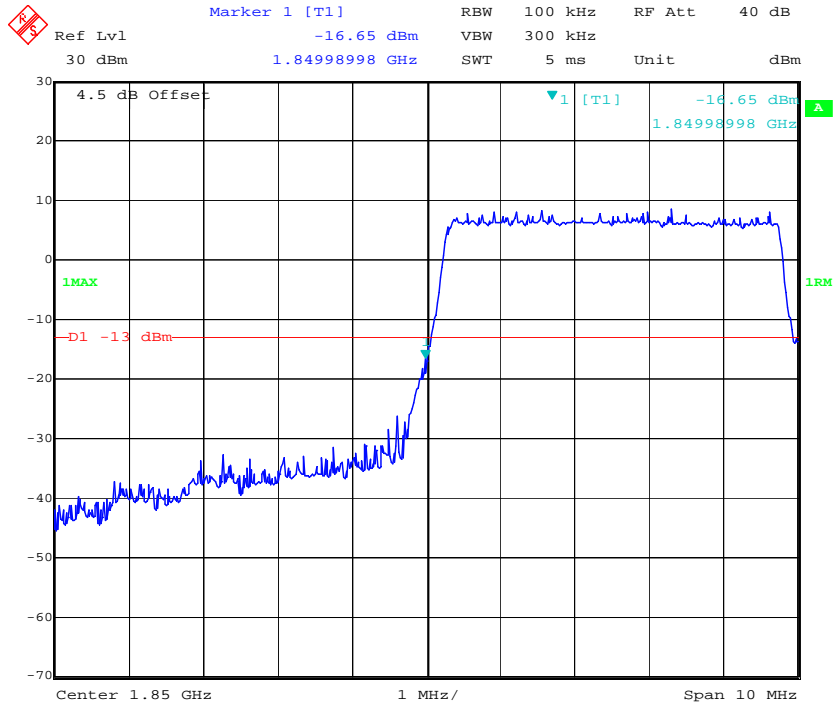
16QAM_3MHz_15 RB_Left



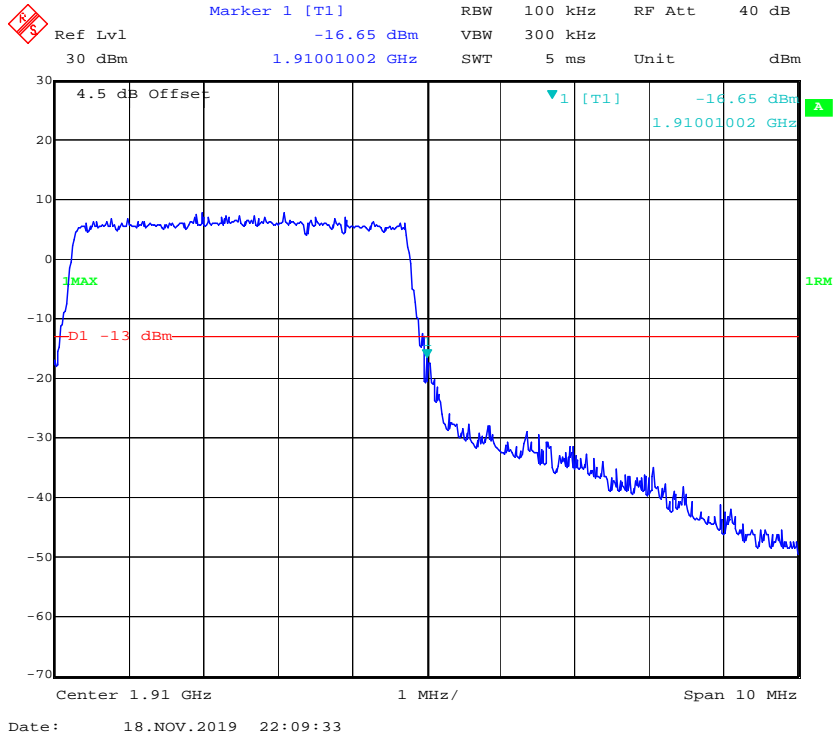
16QAM_3MHz_15 RB_Right



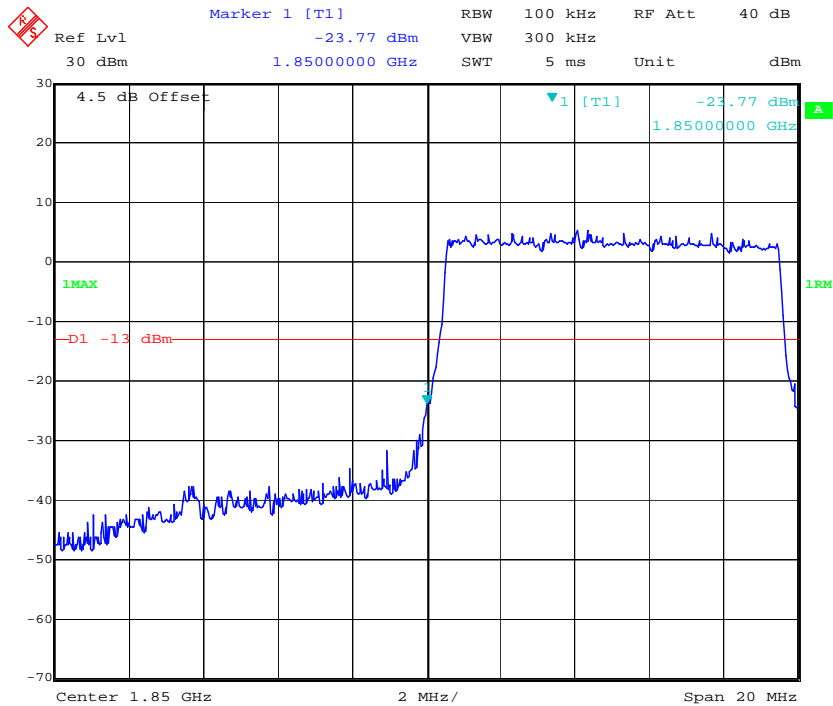
16QAM_5MHz_25 RB_Left



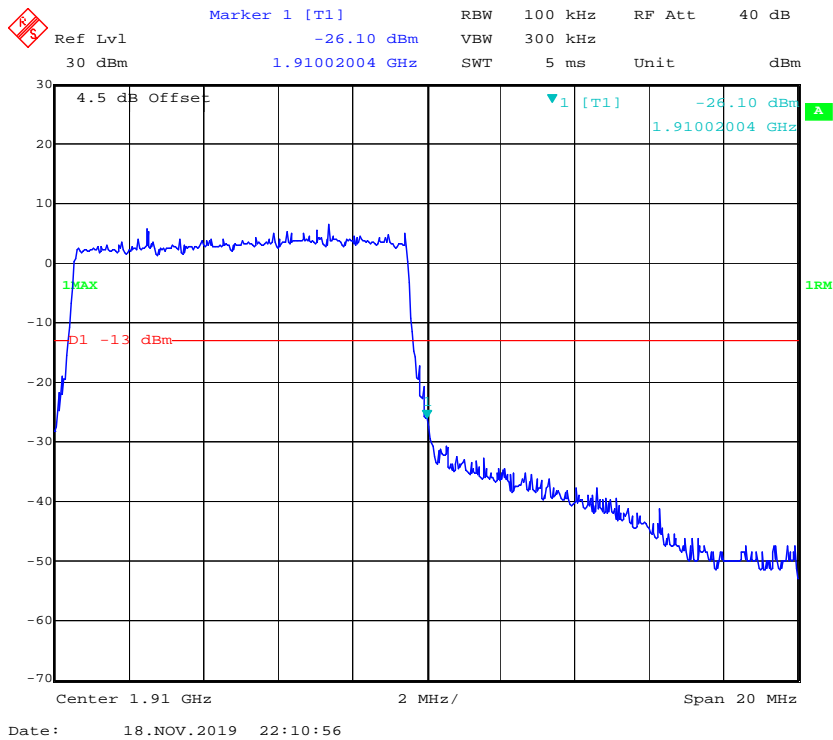
16QAM_5MHz_25 RB_Right



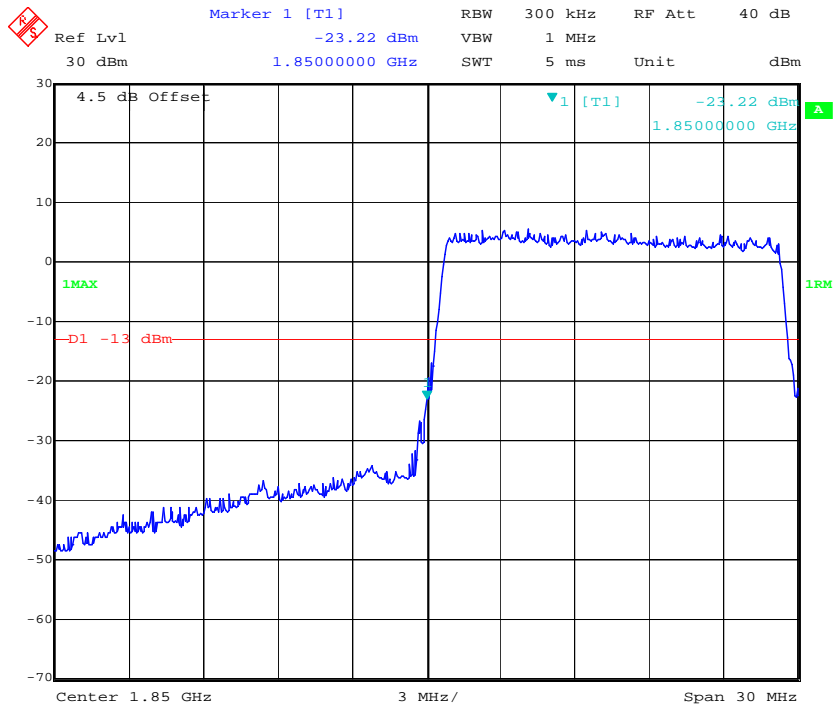
16QAM_10MHz_50 RB_Left



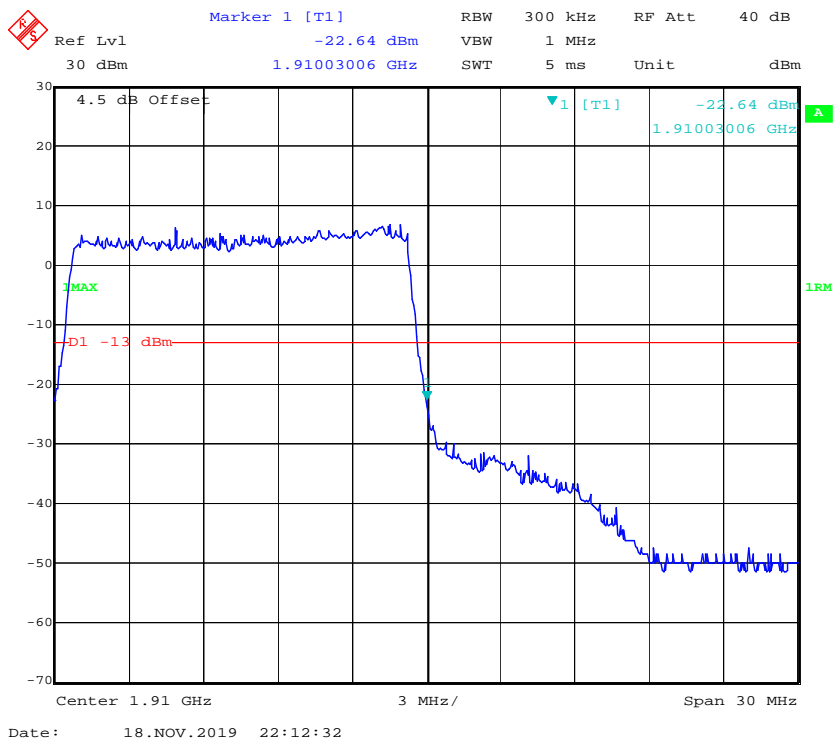
16QAM_10MHz_50 RB_Right



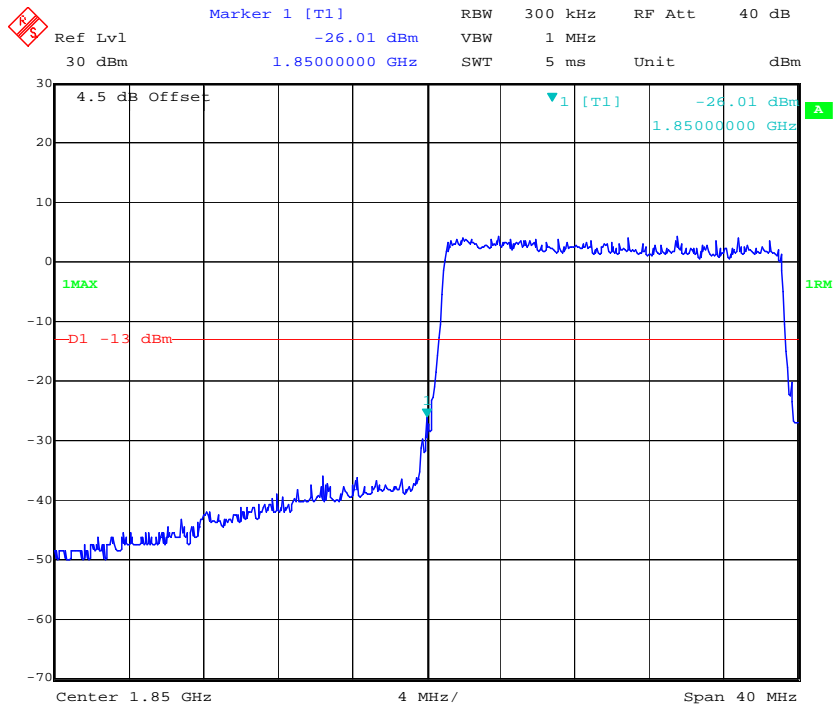
16QAM_15MHz_75 RB_Left



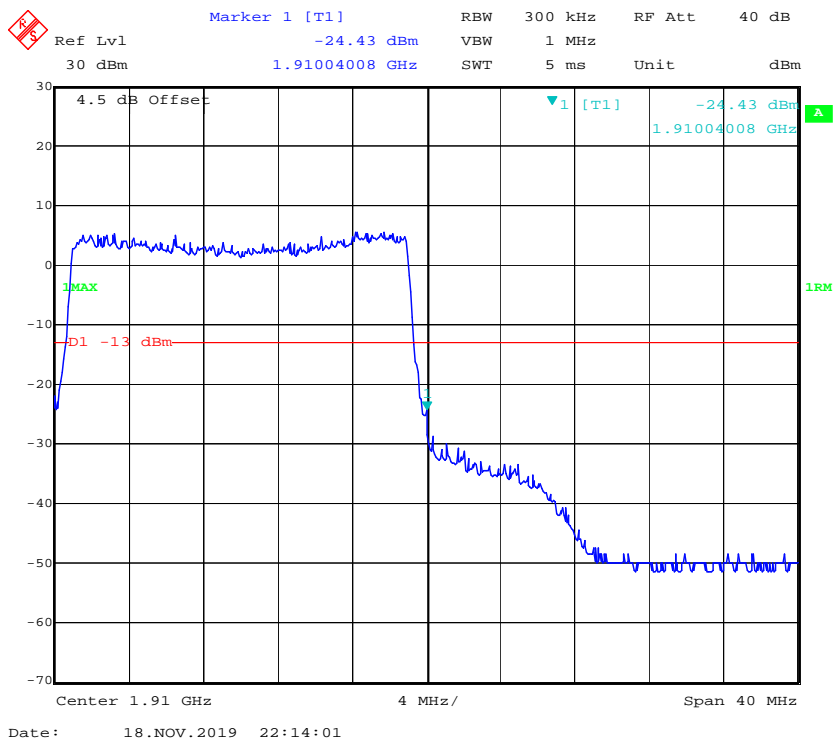
16QAM_15MHz_75 RB_Right



16QAM_20MHz_FULL RB_Left

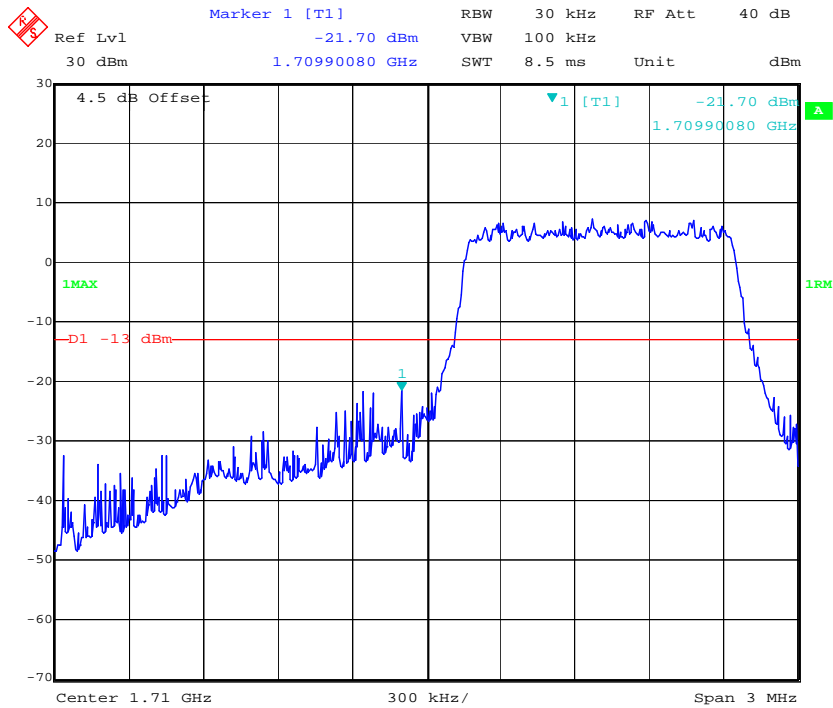


16QAM_20MHz_FULL RB_Right

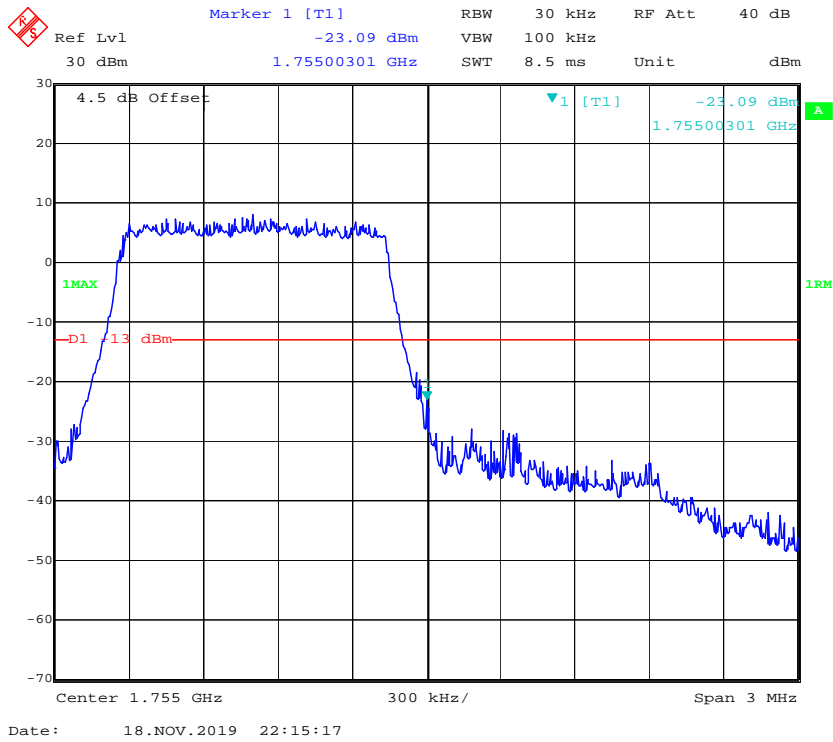


LTE Band 4

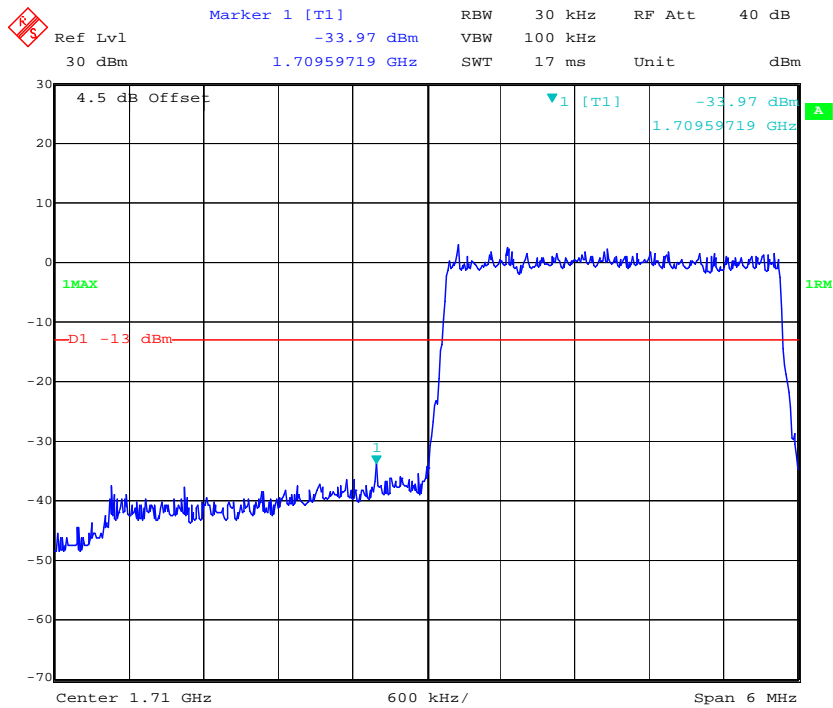
QPSK_1.4MHz_6 RB_Left



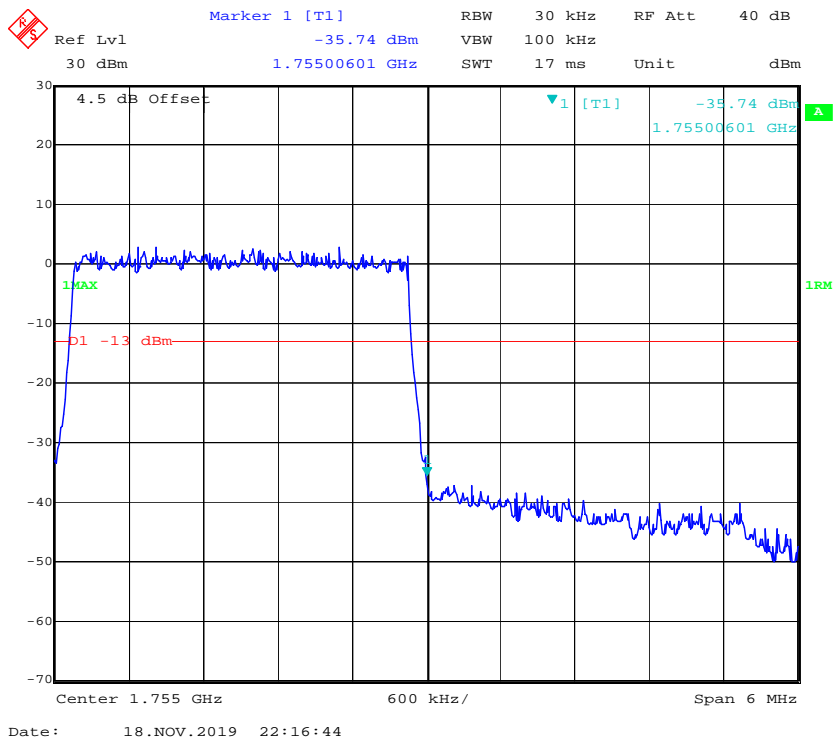
QPSK_1.4MHz_6 RB_Right



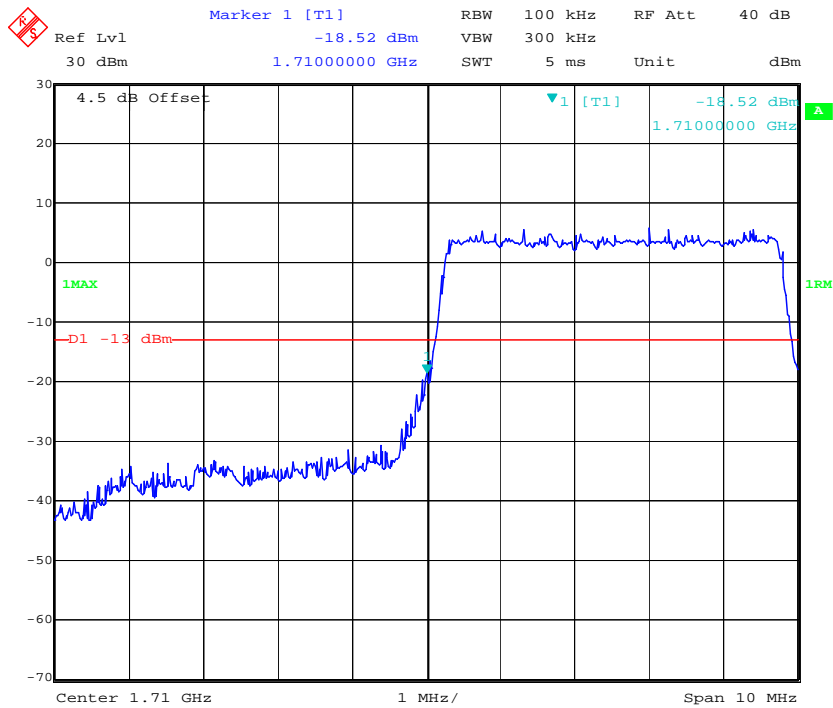
QPSK_3MHz_15 RB_Left



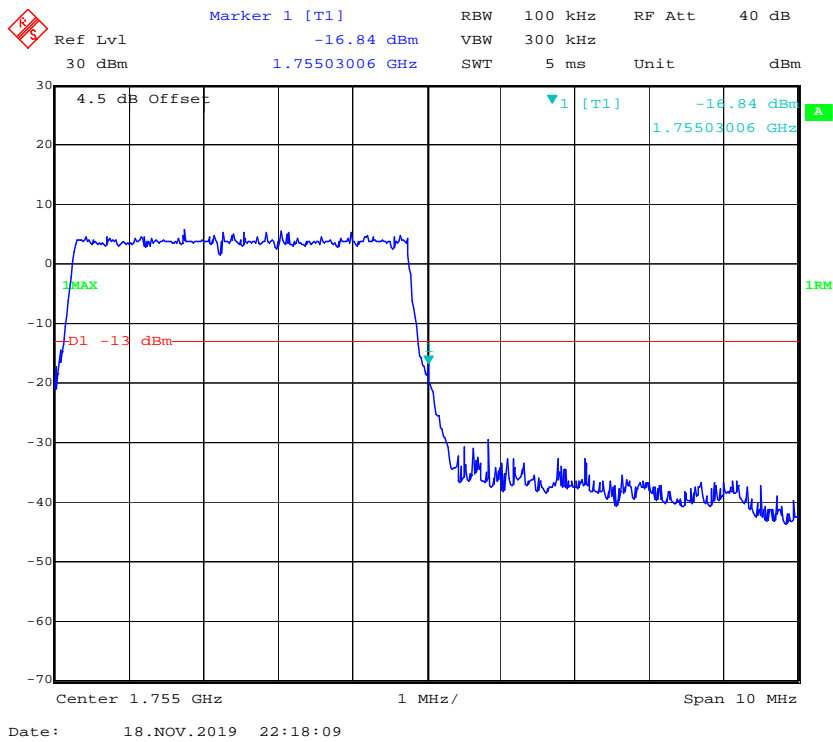
QPSK_3MHz_15 RB_Right



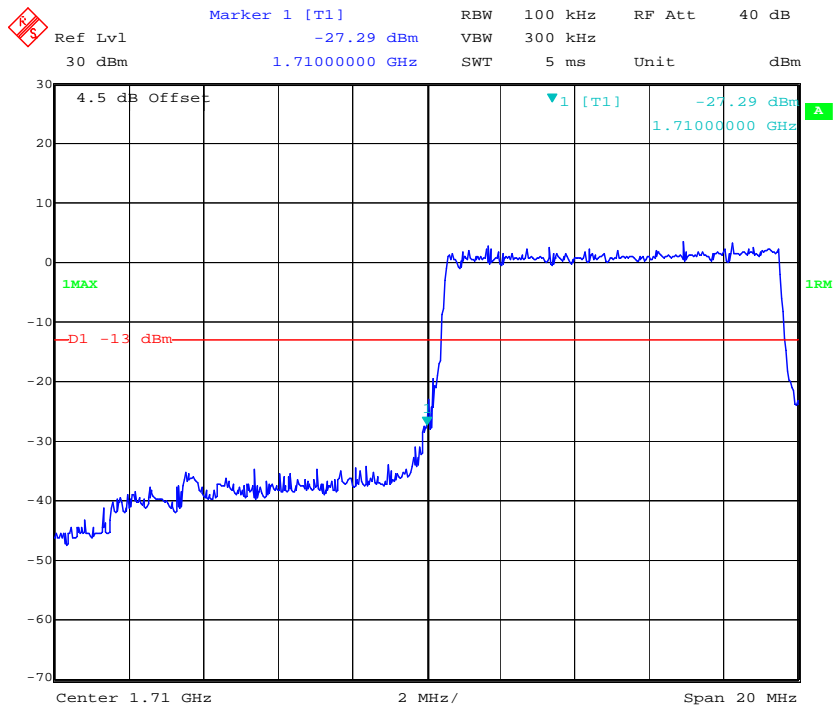
QPSK_5MHz_25 RB_Left



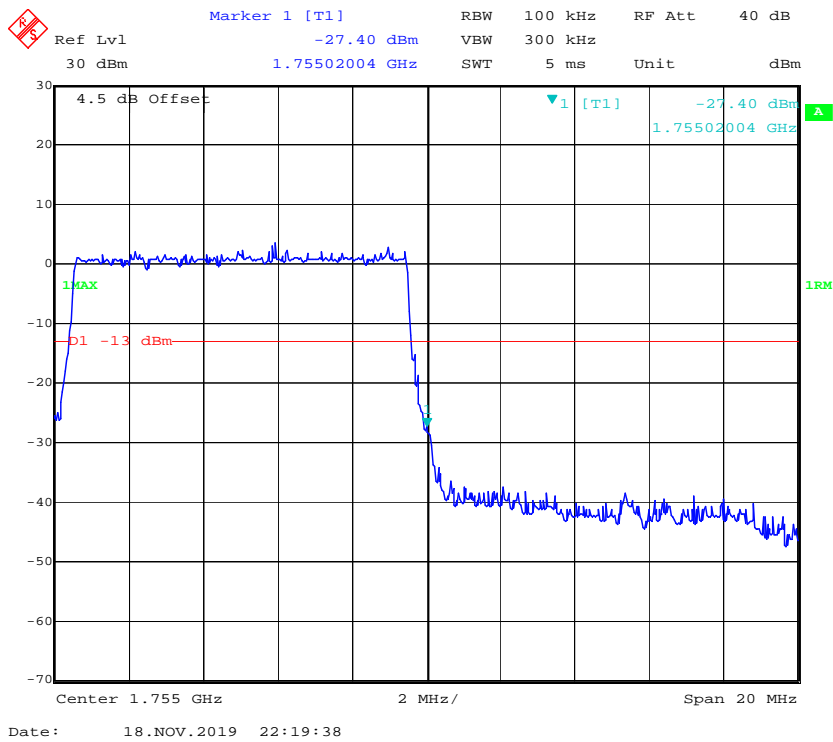
QPSK_5MHz_25 RB_Right




QPSK_10MHz_50 RB_Left

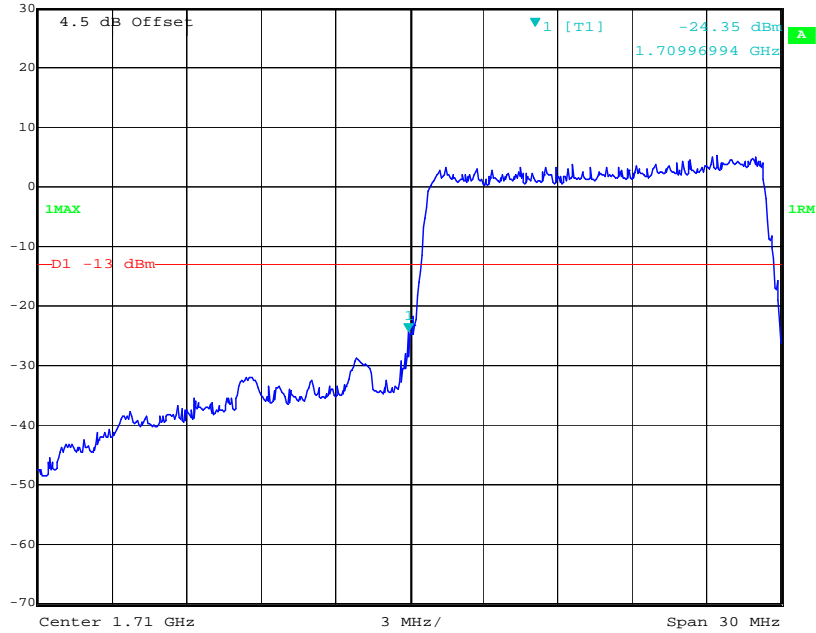


QPSK_10MHz_50 RB_Right




QPSK_15MHz_75 RB_Left

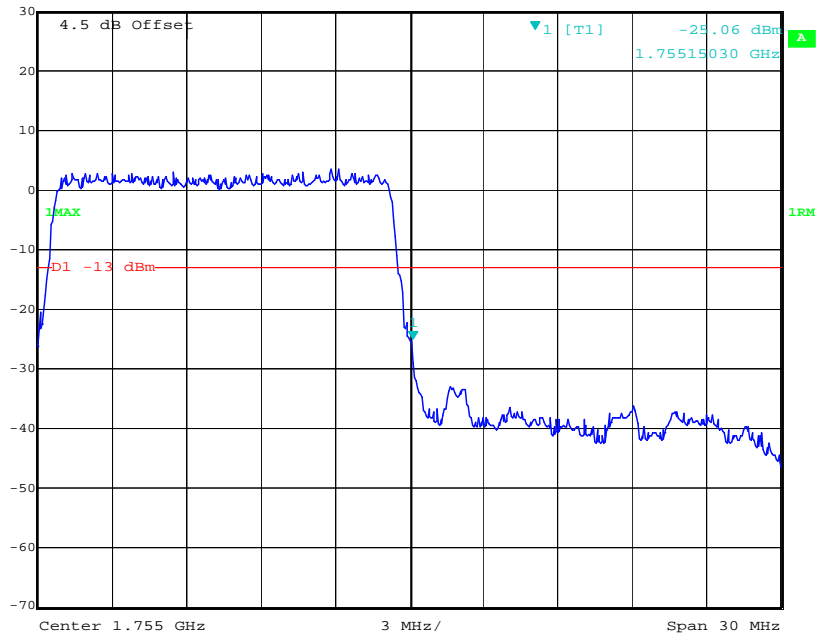
 Marker 1 [T1] RBW 300 kHz RF Att 40 dB
Ref Lvl -24.35 dBm VBW 1 MHz
30 dBm 1.70996994 GHz SWT 5 ms Unit dBm



Date: 18.NOV.2019 22:20:25

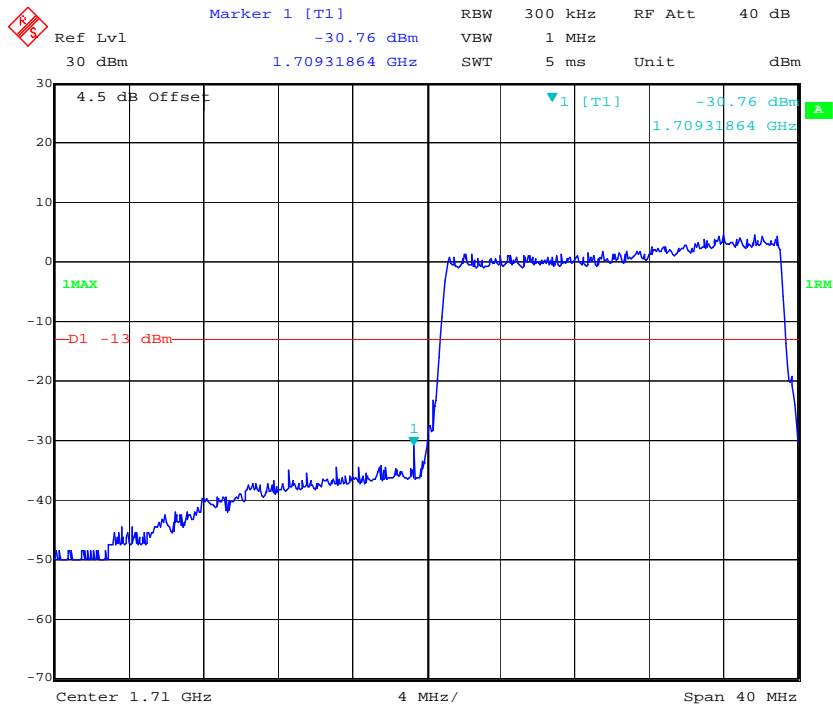
QPSK_15MHz_75 RB_Right

 Marker 1 [T1] RBW 300 kHz RF Att 40 dB
Ref Lvl -25.06 dBm VBW 1 MHz
30 dBm 1.75515030 GHz SWT 5 ms Unit dBm

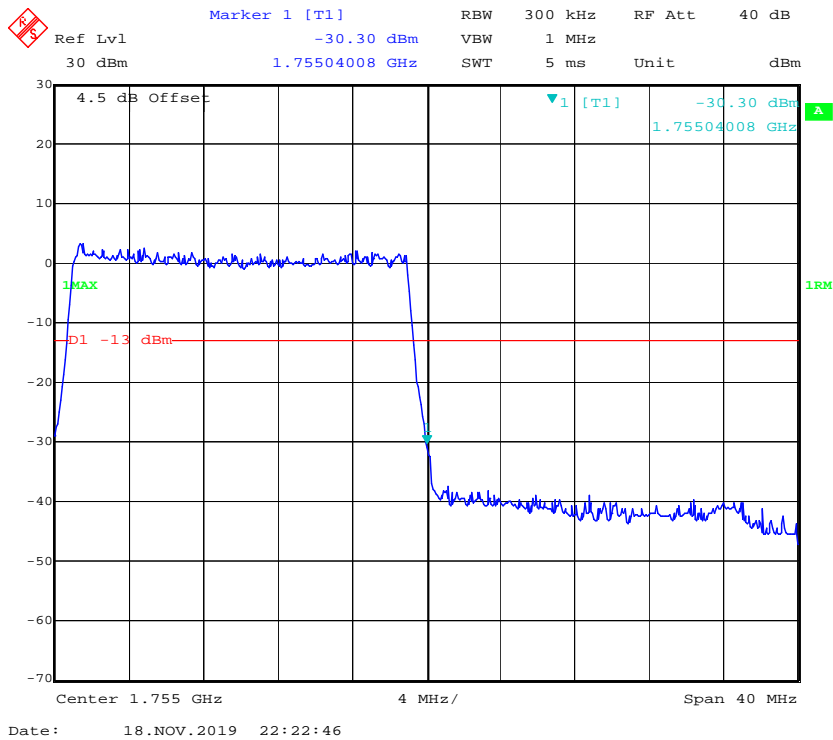


Date: 18.NOV.2019 22:21:11

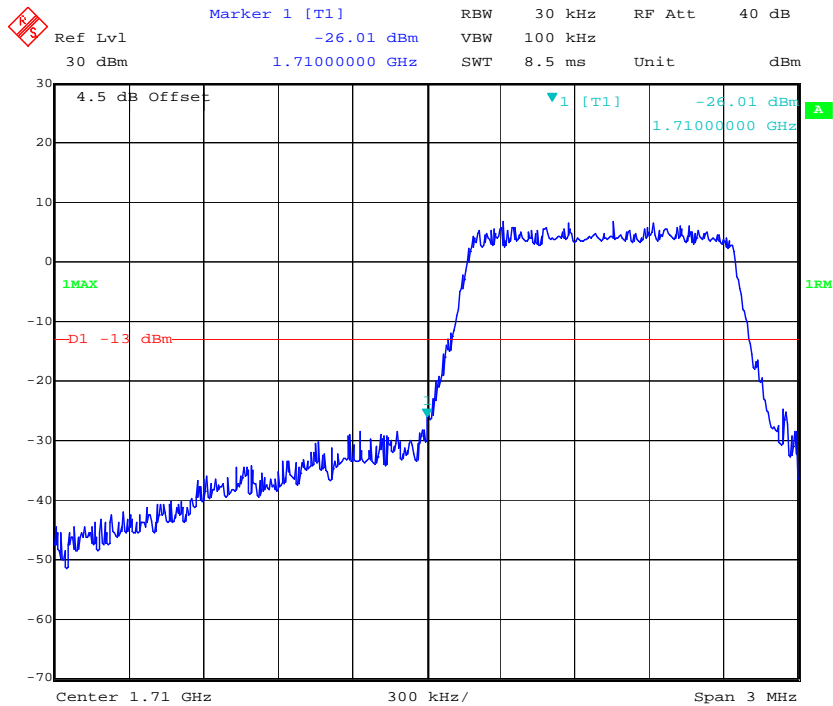
QPSK_20MHz_FULL RB_Left



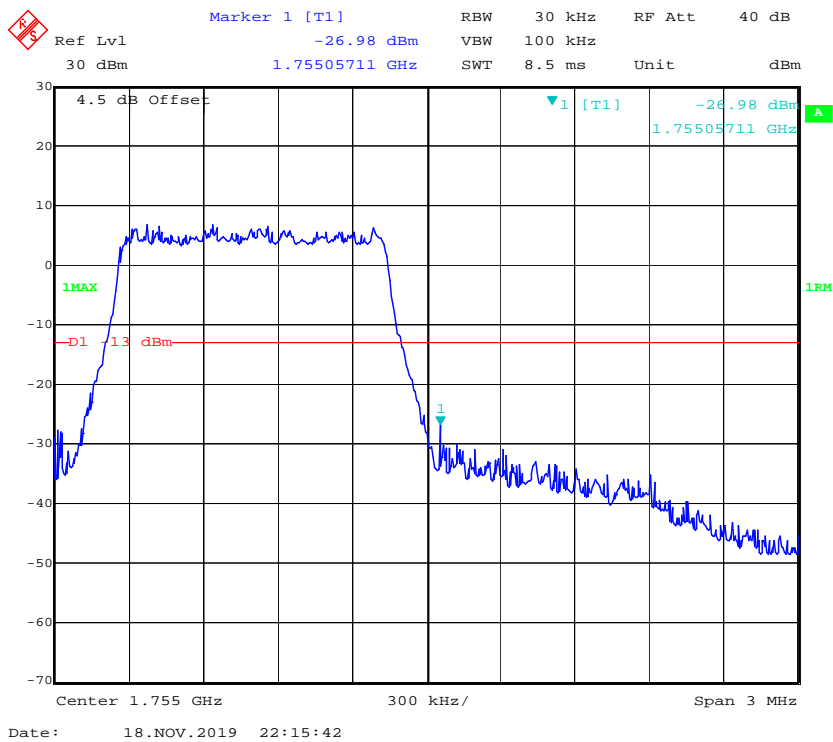
QPSK_20MHz_FULL RB_Right



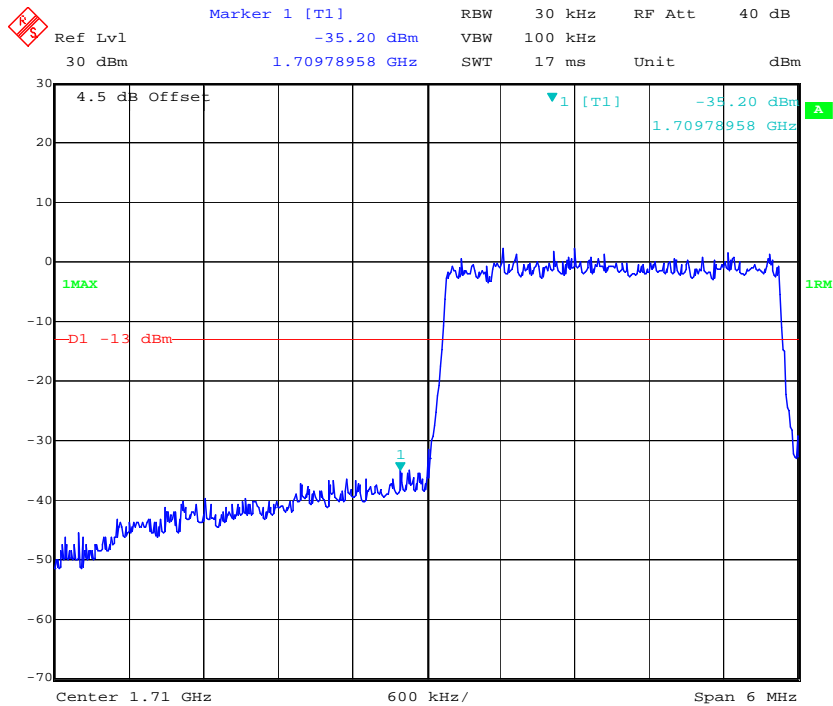
16QAM_1.4MHz_6 RB_Left



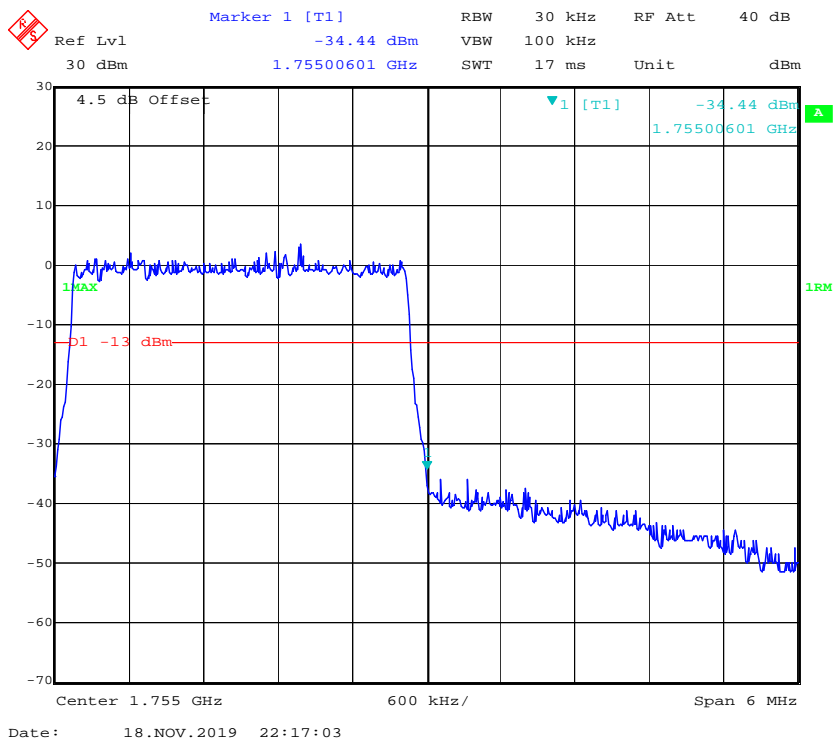
16QAM_1.4MHz_6 RB_Right



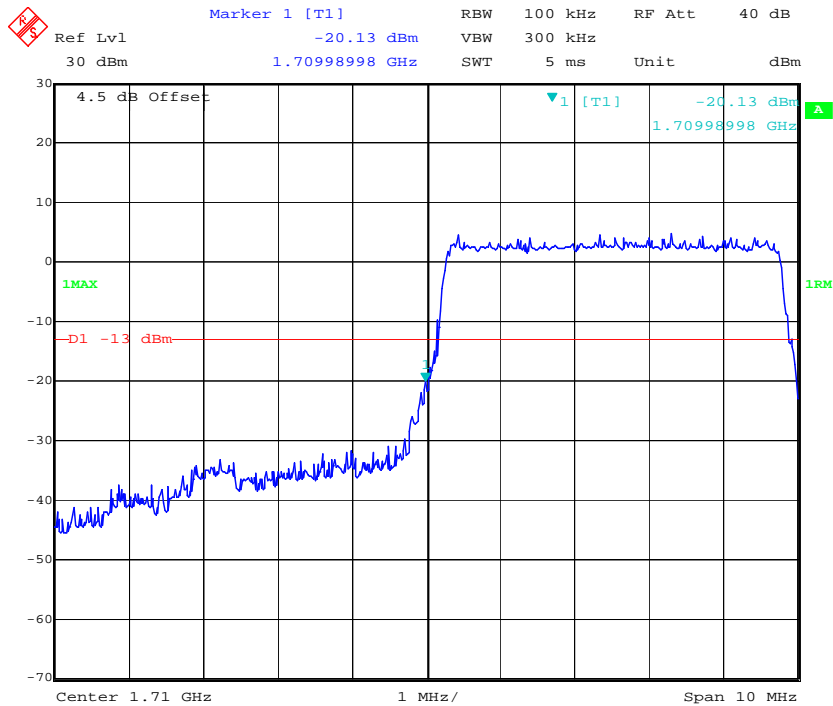
16QAM_3MHz_15 RB_Left



16QAM_3MHz_15 RB_Right

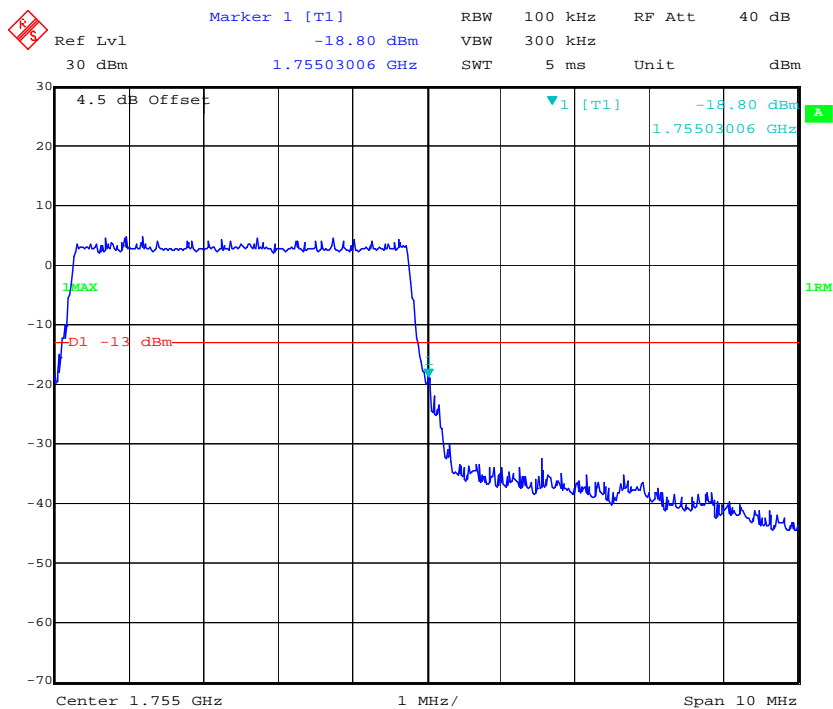


16QAM_5MHz_25 RB_Left



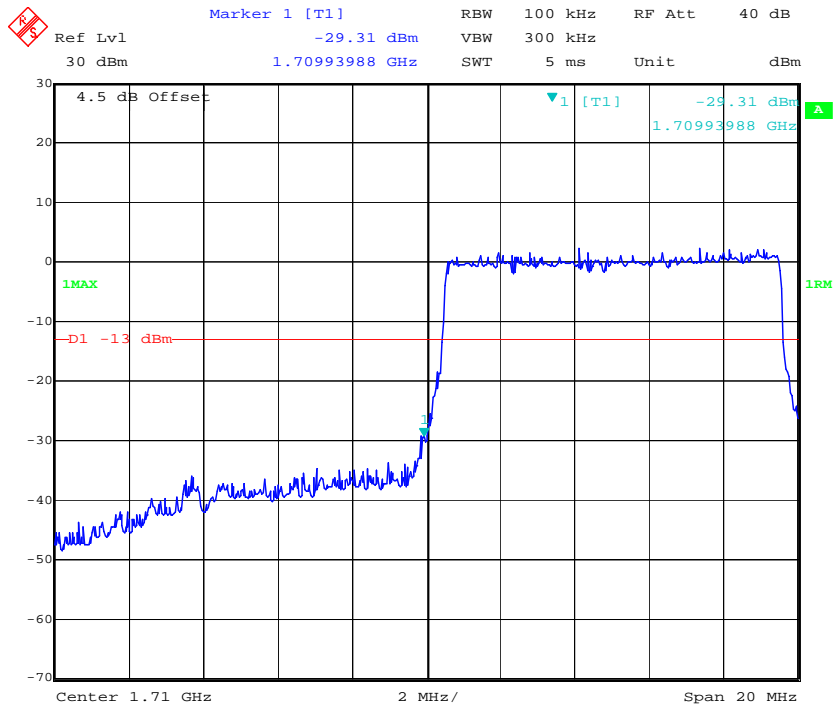
Date: 18.NOV.2019 22:17:48

16QAM_5MHz_25 RB_Right



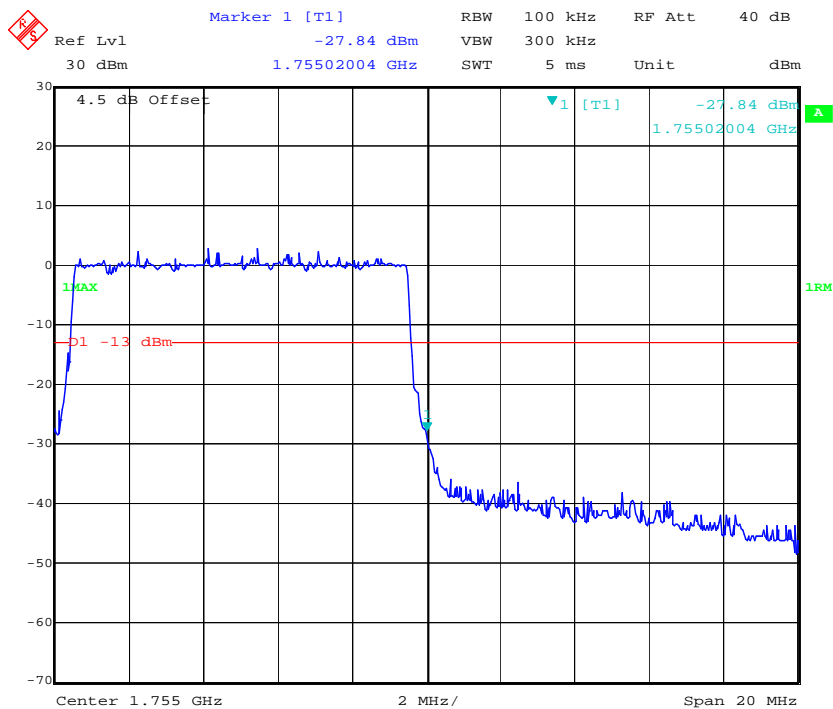
Date: 18.NOV.2019 22:18:33

16QAM_10MHz_50 RB_Left



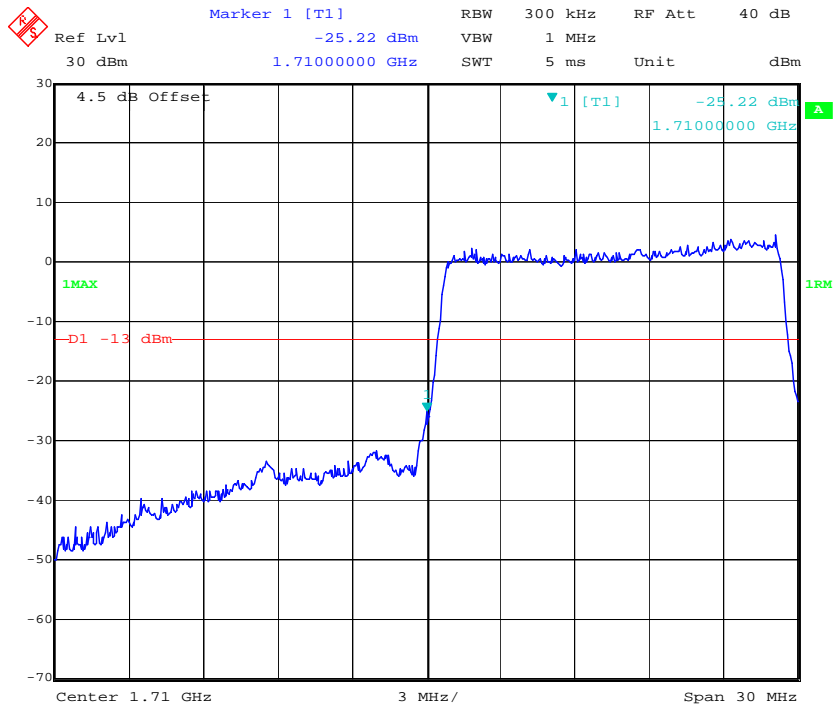
Date: 18.NOV.2019 22:19:17

16QAM_10MHz_50 RB_Right

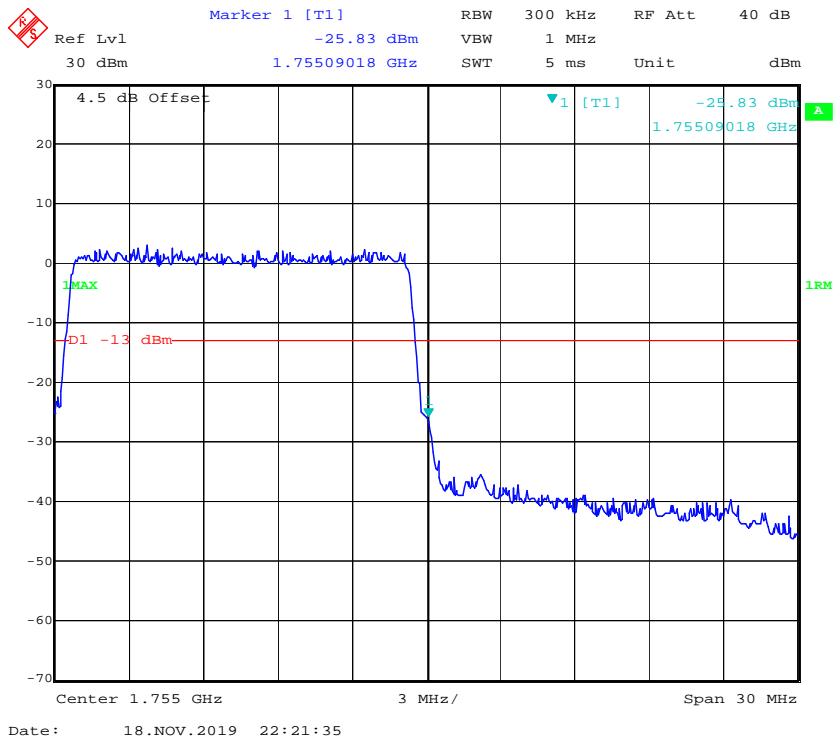


Date: 18.NOV.2019 22:19:58

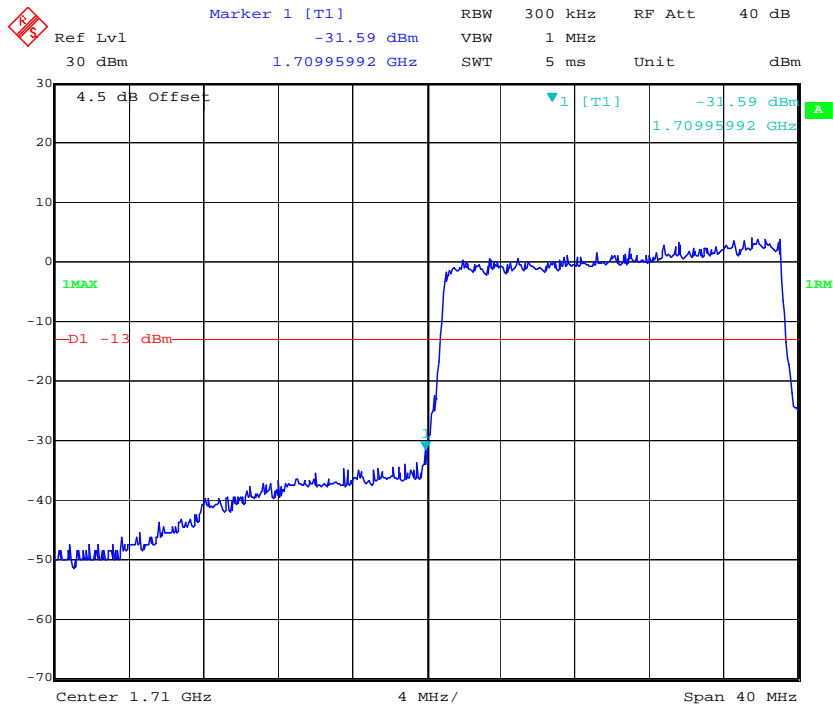
16QAM_15MHz_75 RB_Left



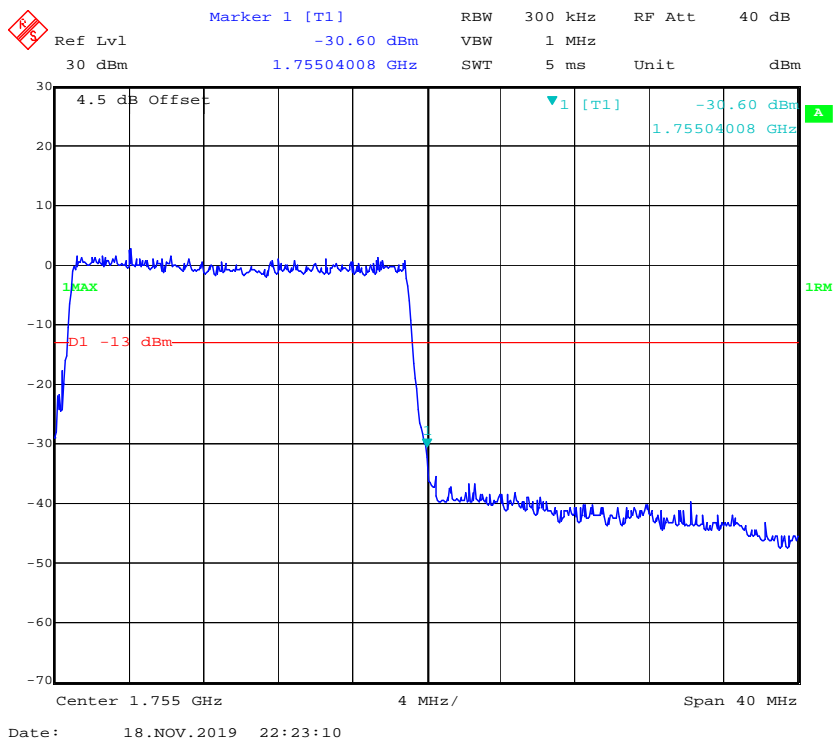
16QAM_15MHz_75 RB_Right



16QAM_20MHz_FULL RB_Left

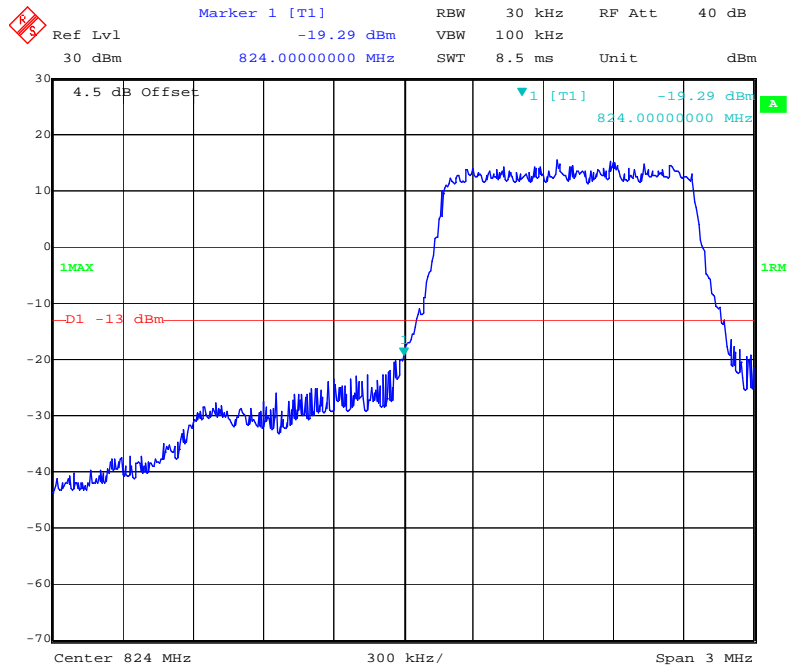


16QAM_20MHz_FULL RB_Right



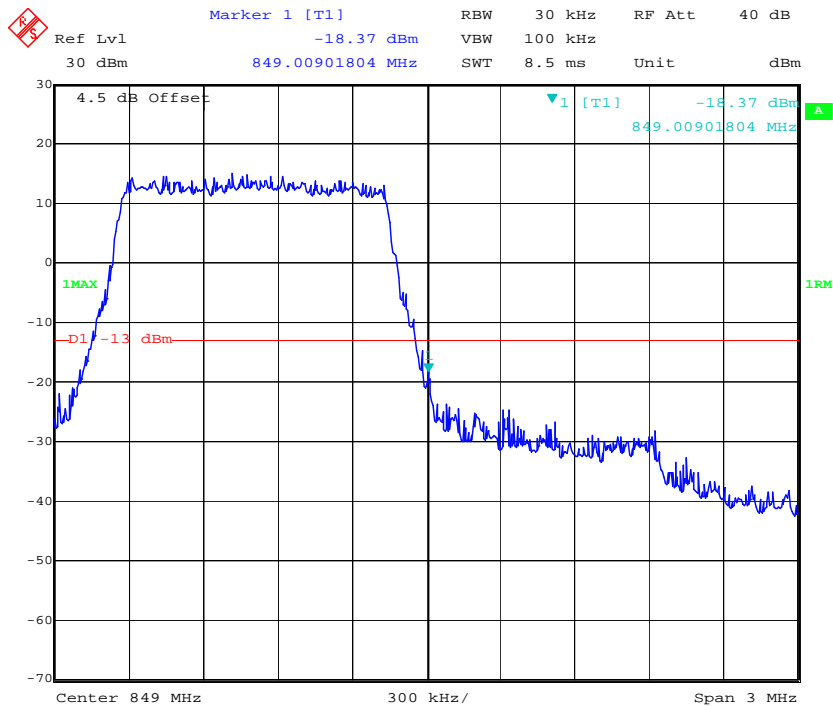
LTE Band 5

QPSK_1.4MHz_6 RB_Left



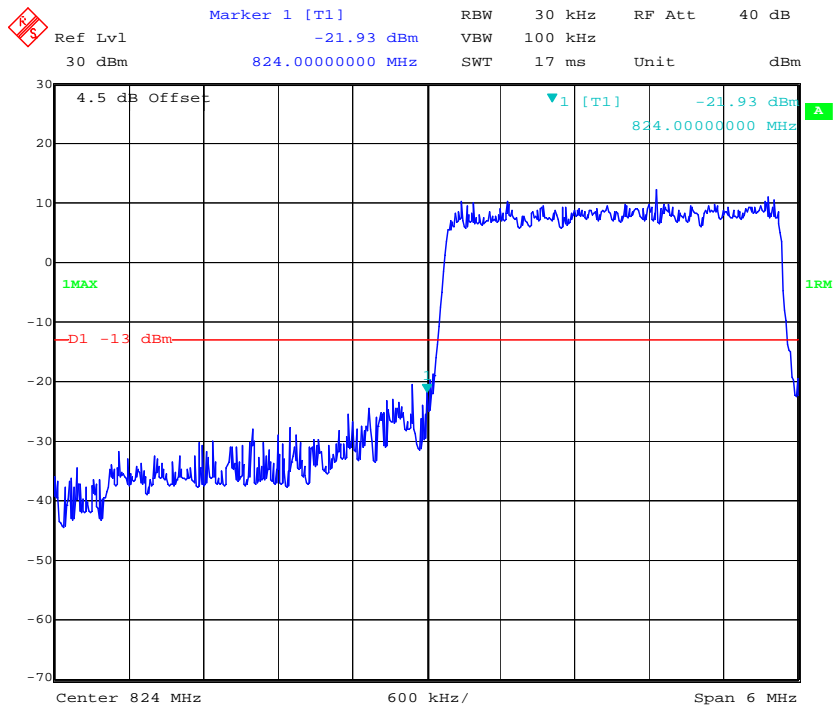
Date: 18.NOV.2019 22:23:36

QPSK_1.4MHz_6 RB_Right

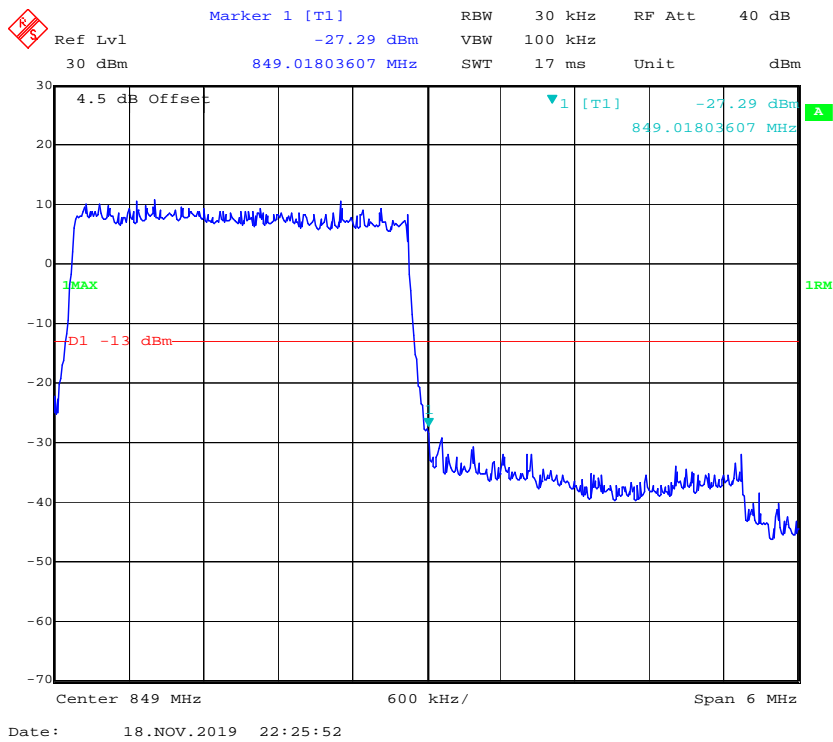


Date: 18.NOV.2019 22:24:18

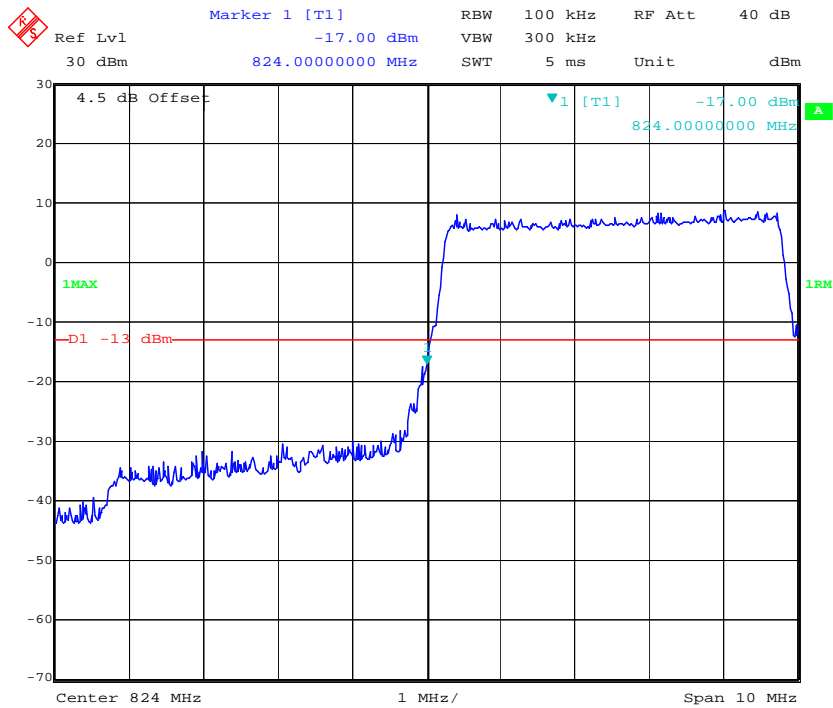
QPSK_3MHz_15 RB_Left



QPSK_3MHz_15 RB_Right

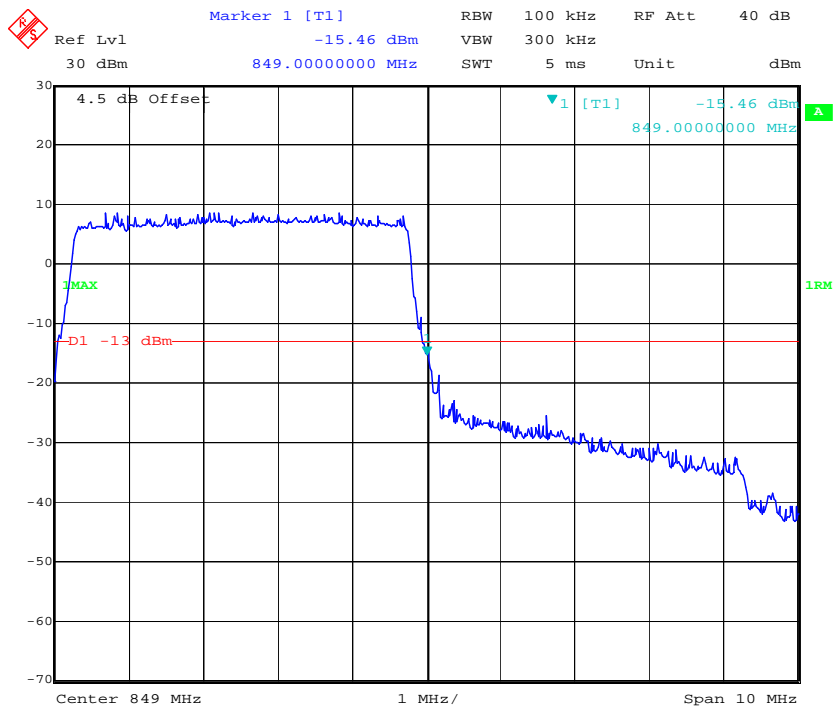


QPSK_5MHz_25 RB_Left




Date: 19.NOV.2019 18:18:18

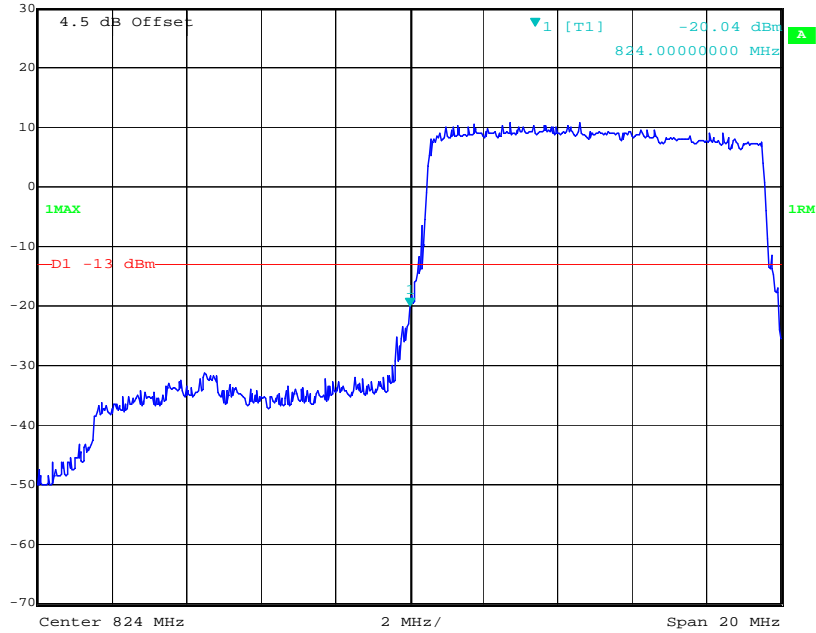
QPSK_5MHz_25 RB_Right



Date: 19.NOV.2019 18:21:31


QPSK_10MHz_50 RB_Left

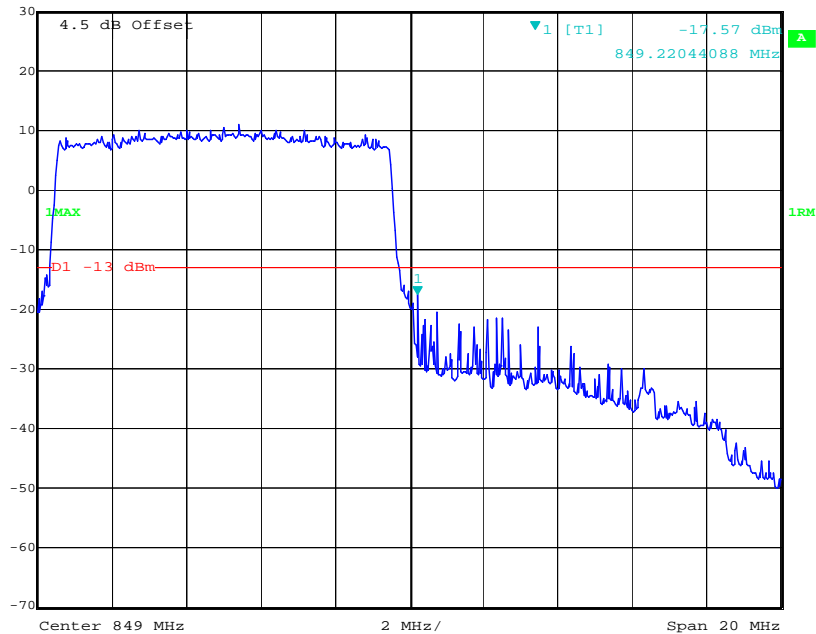
 Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -20.04 dBm VBW 300 kHz
30 dBm 824.0000000 MHz SWT 5 ms Unit dBm



Date: 18.NOV.2019 22:28:07

QPSK_10MHz_50 RB_Right

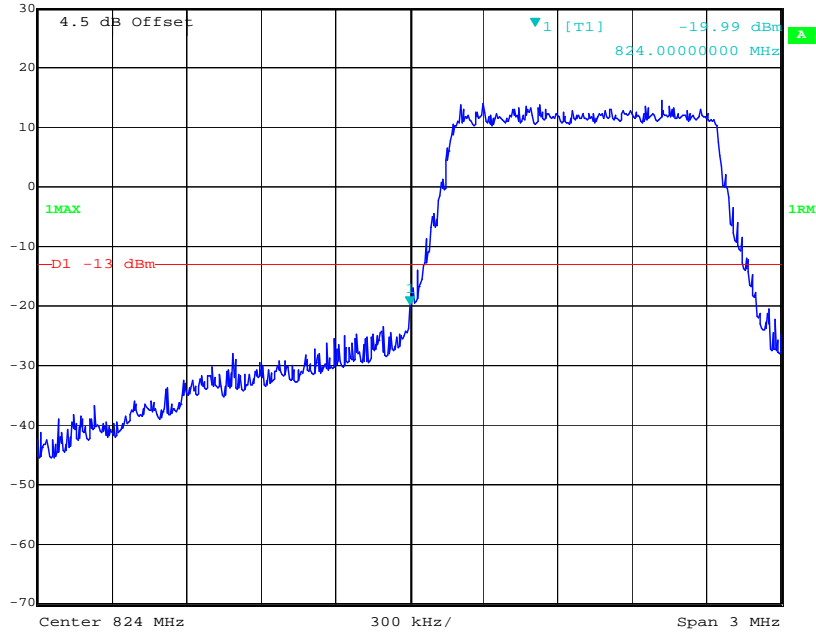
 Marker 1 [T1] RBW 100 kHz RF Att 40 dB
Ref Lvl -17.57 dBm VBW 300 kHz
30 dBm 849.22044088 MHz SWT 5 ms Unit dBm



Date: 18.NOV.2019 22:28:48

16QAM_1.4MHz_6 RB_Left

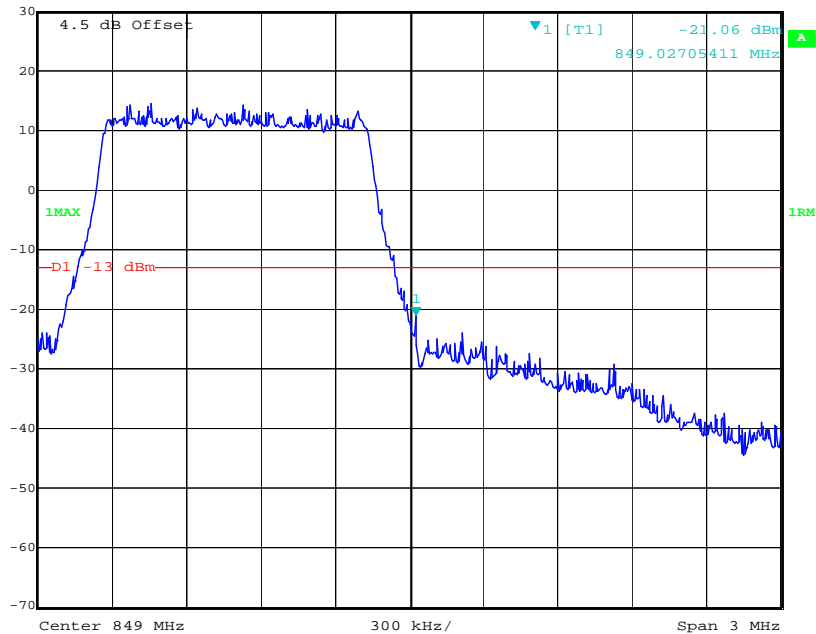
✖ Ref Lvl 30 dBm
 Marker 1 [T1] -19.99 dBm
 824.00000000 MHz
 RBW 30 kHz
 VBW 100 kHz
 RF Att 40 dB
 Unit dBm
 SWT 8.5 ms



Date: 18.NOV.2019 22:23:55

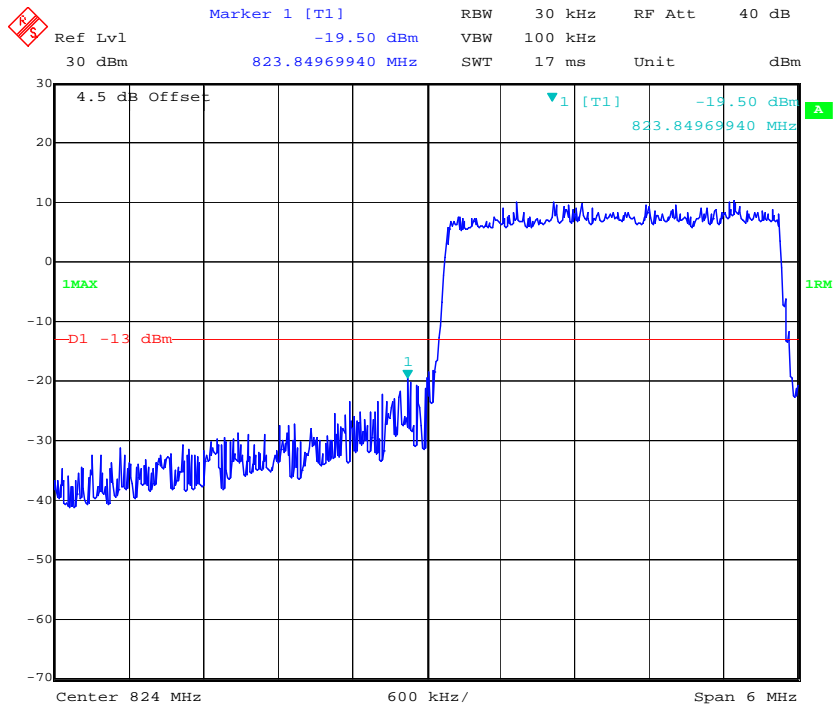
16QAM_1.4MHz_6 RB_Right

✖ Ref Lvl 30 dBm
 Marker 1 [T1] -21.06 dBm
 849.02705411 MHz
 RBW 30 kHz
 VBW 100 kHz
 RF Att 40 dB
 Unit dBm
 SWT 8.5 ms

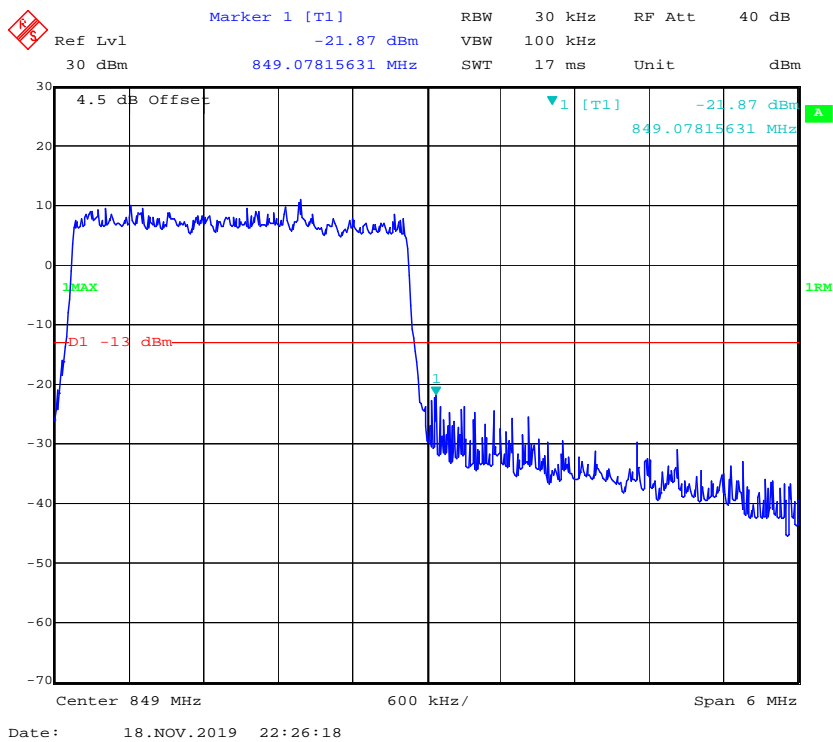


Date: 18.NOV.2019 22:24:37

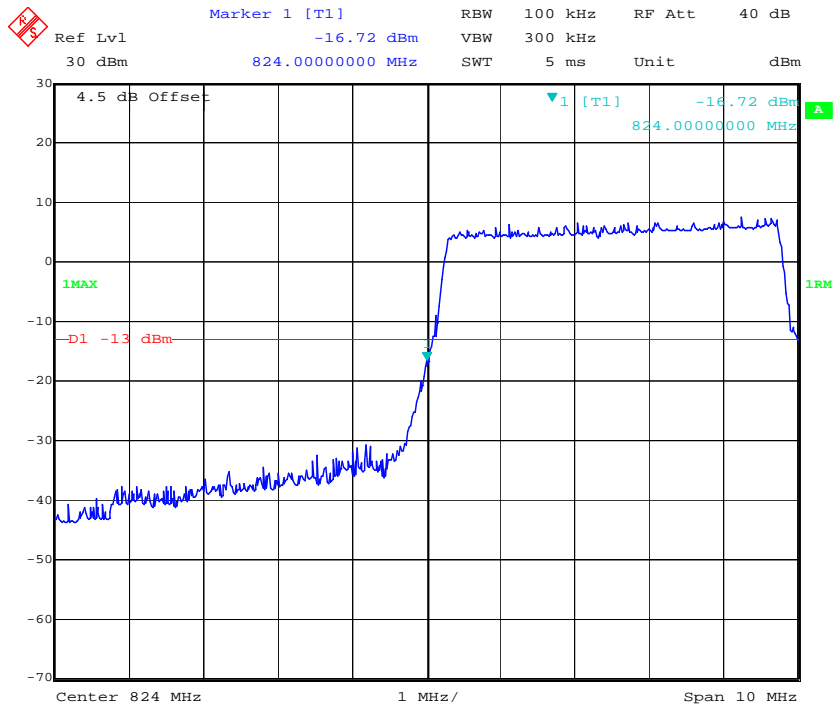
16QAM_3MHz_15 RB_Left



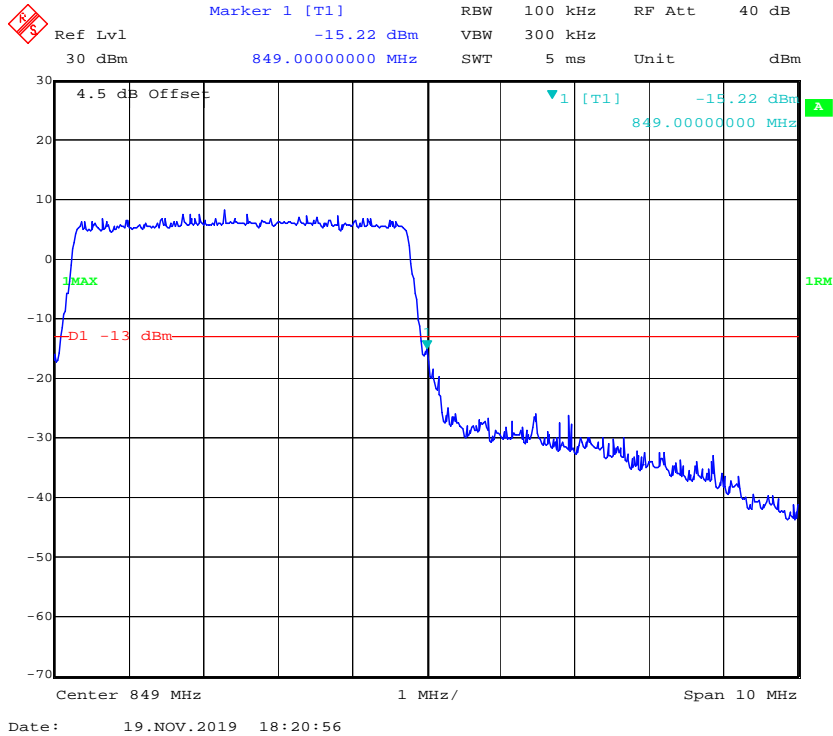
16QAM_3MHz_15 RB_Right



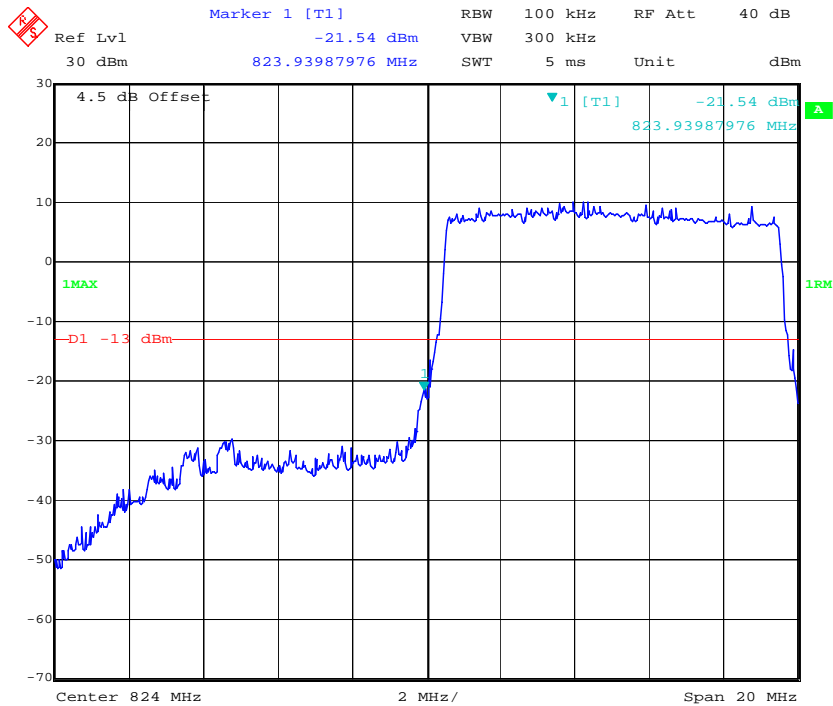
16QAM_5MHz_25 RB_Left



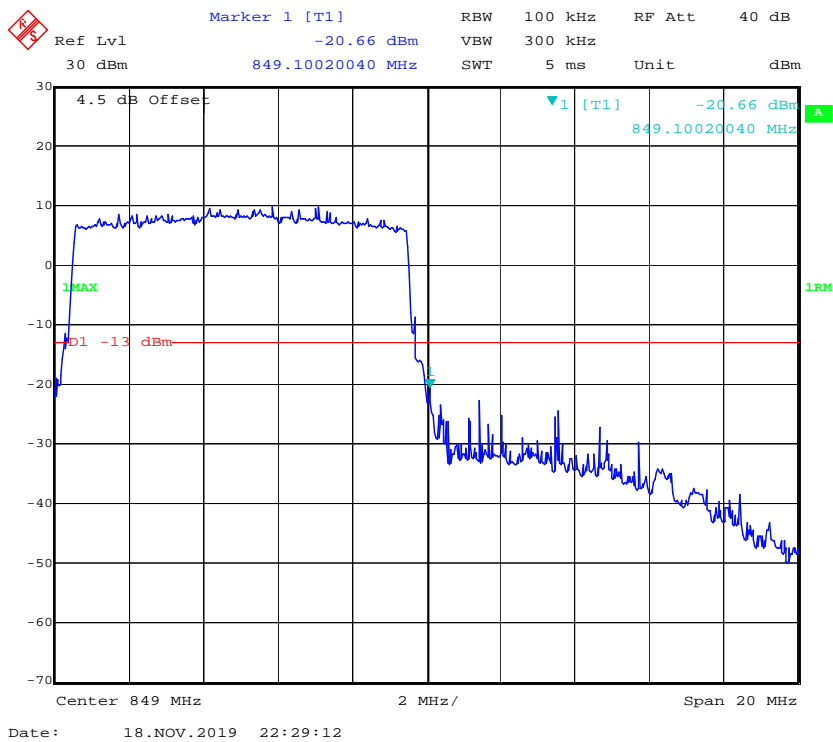
16QAM_5MHz_25 RB_Right



16QAM_10MHz_50 RB_Left

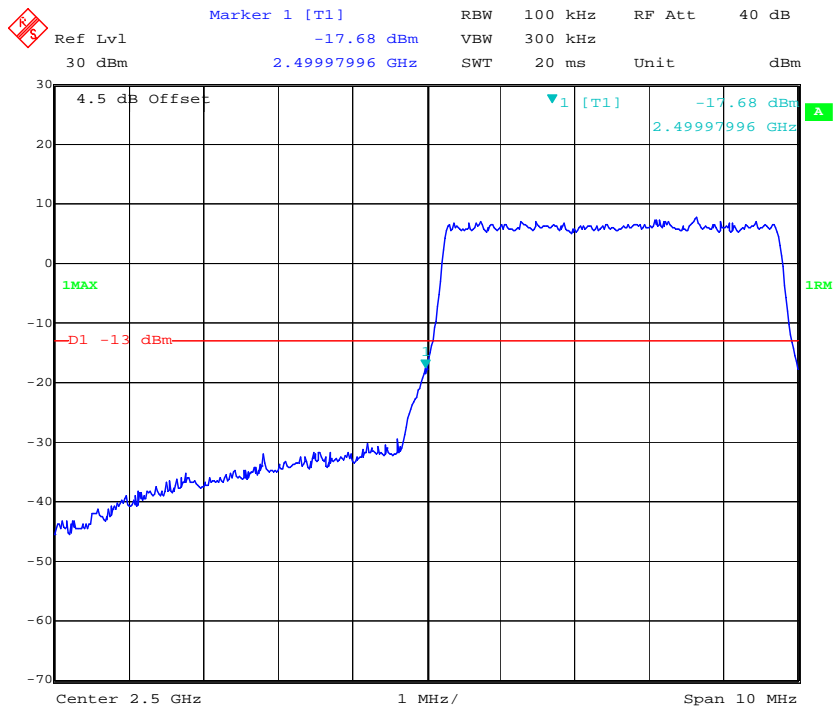


16QAM_10MHz_50 RB_Right

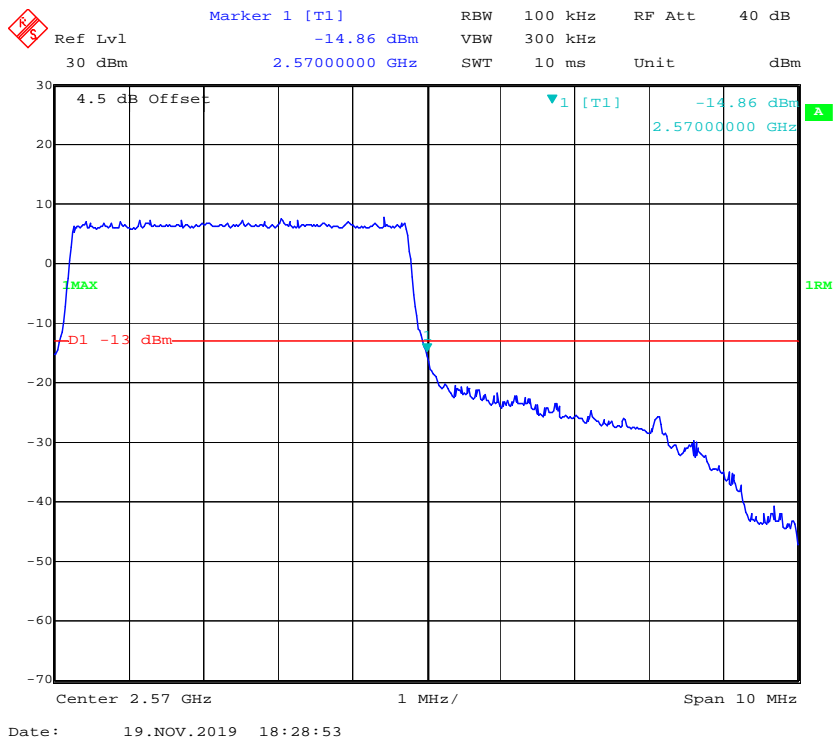


LTE Band 7

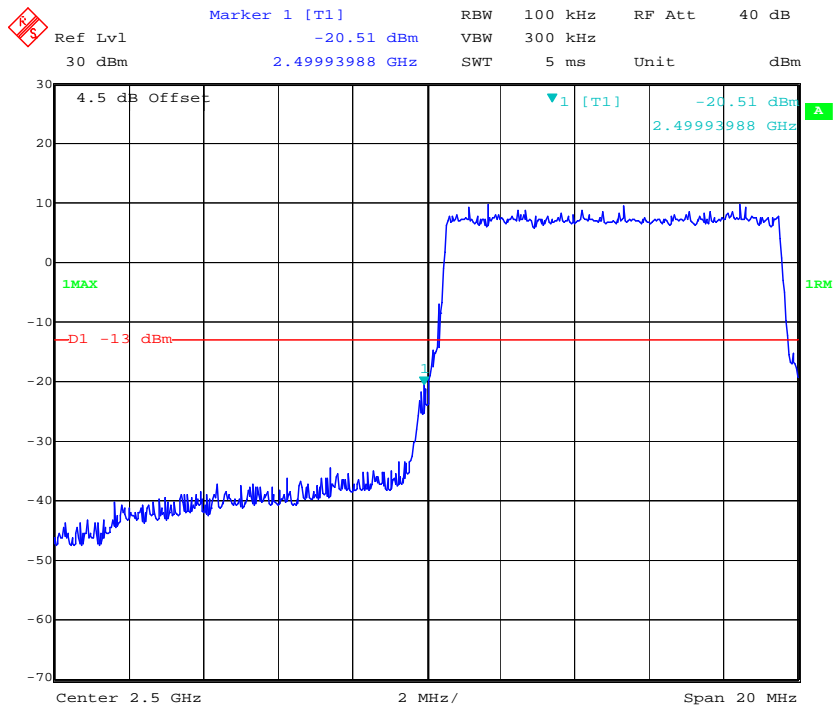
QPSK_5MHz_25 RB_Left



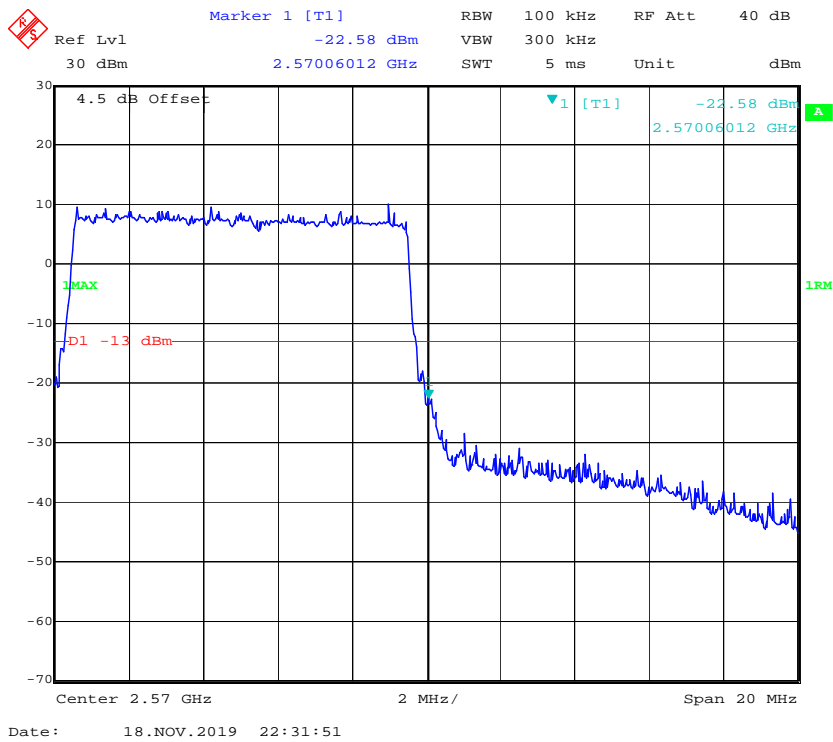
QPSK_5MHz_25 RB_Right




QPSK_10MHz_50 RB_Left

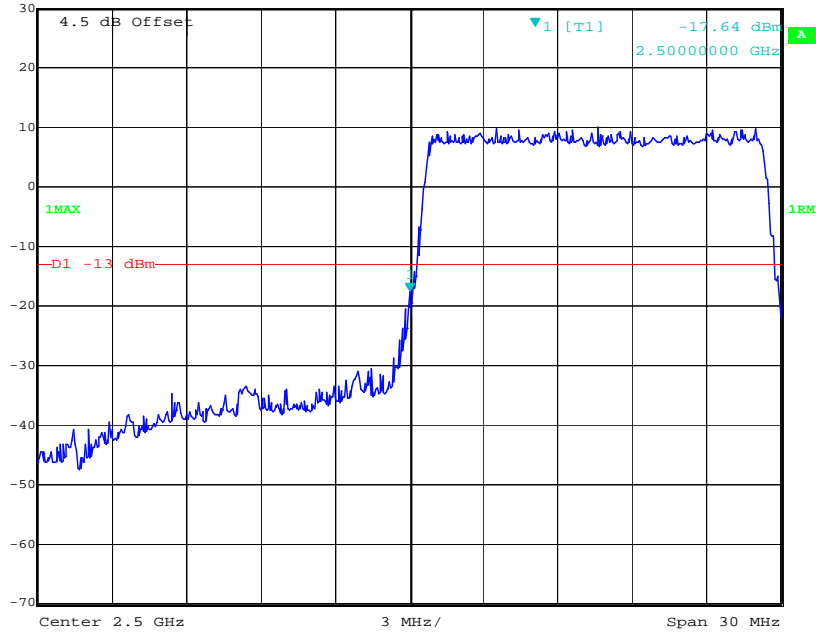


QPSK_10MHz_50 RB_Right




QPSK_15MHz_75 RB_Left

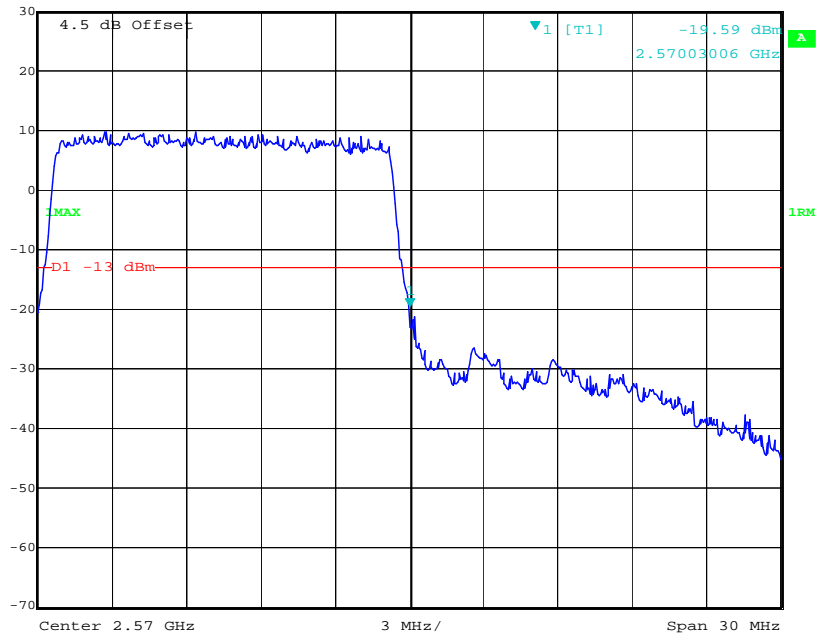
 Marker 1 [T1] RBW 300 kHz RF Att 40 dB
Ref Lvl -17.64 dBm VBW 1 MHz
30 dBm 2.5000000 GHz SWT 5 ms Unit dBm



Date: 18.NOV.2019 22:32:35

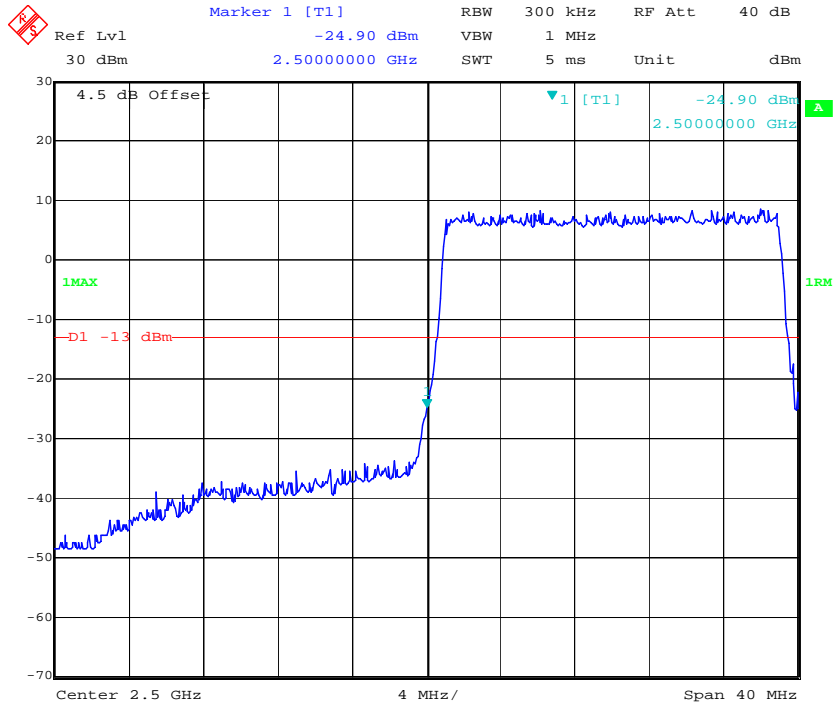
QPSK_15MHz_75 RB_Right

 Marker 1 [T1] RBW 300 kHz RF Att 40 dB
Ref Lvl -19.59 dBm VBW 1 MHz
30 dBm 2.57003006 GHz SWT 5 ms Unit dBm

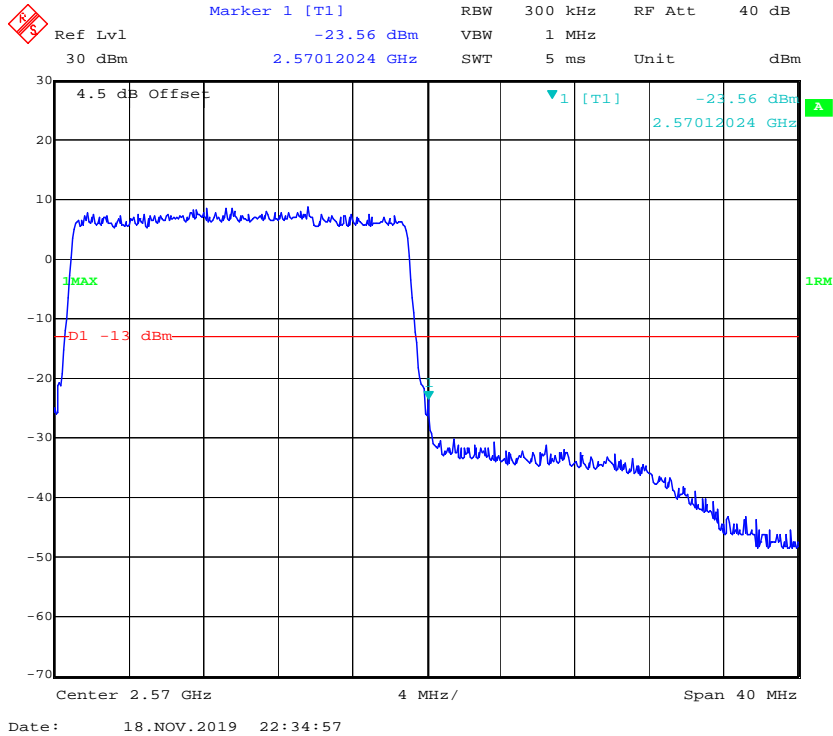


Date: 18.NOV.2019 22:33:18

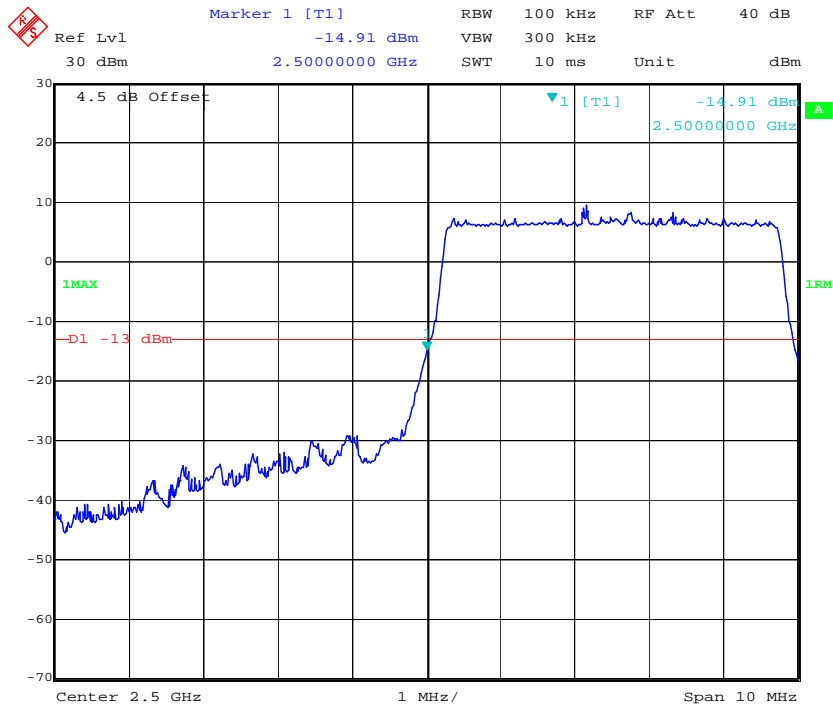
QPSK_20MHz_FULL RB_Left



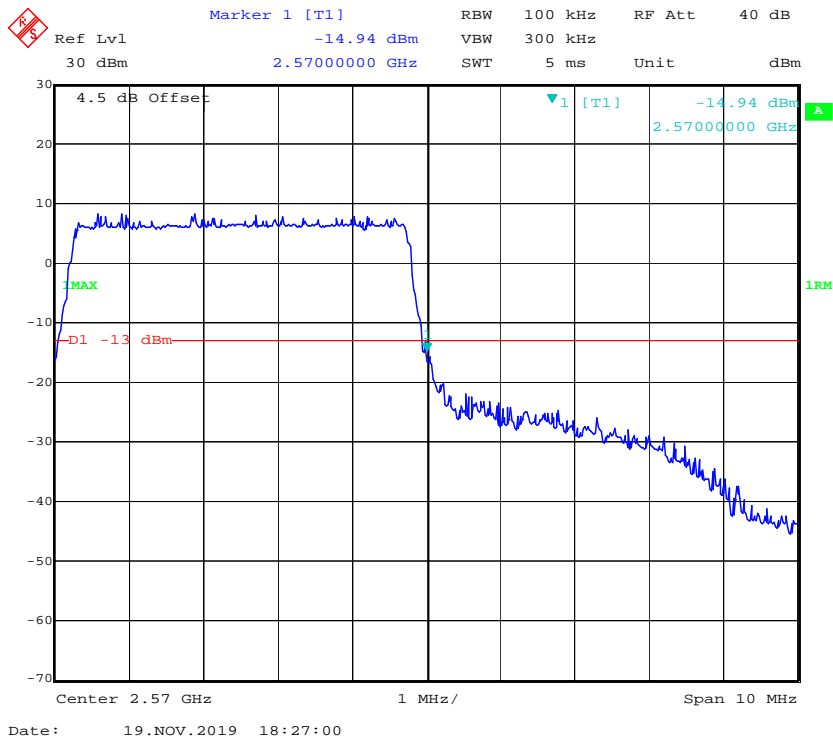
QPSK_20MHz_FULL RB_Right



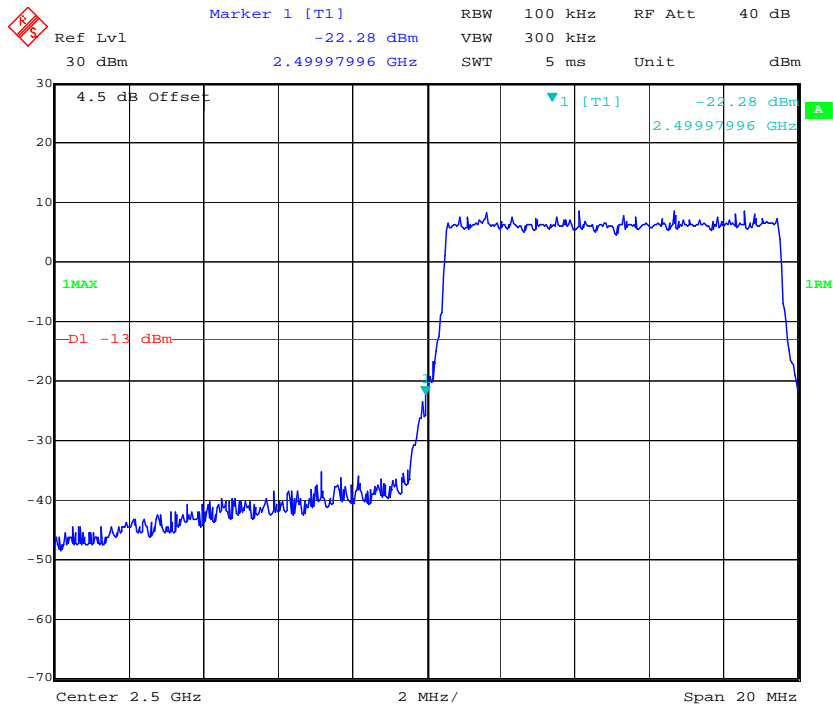
16QAM_5MHz_25 RB_Left



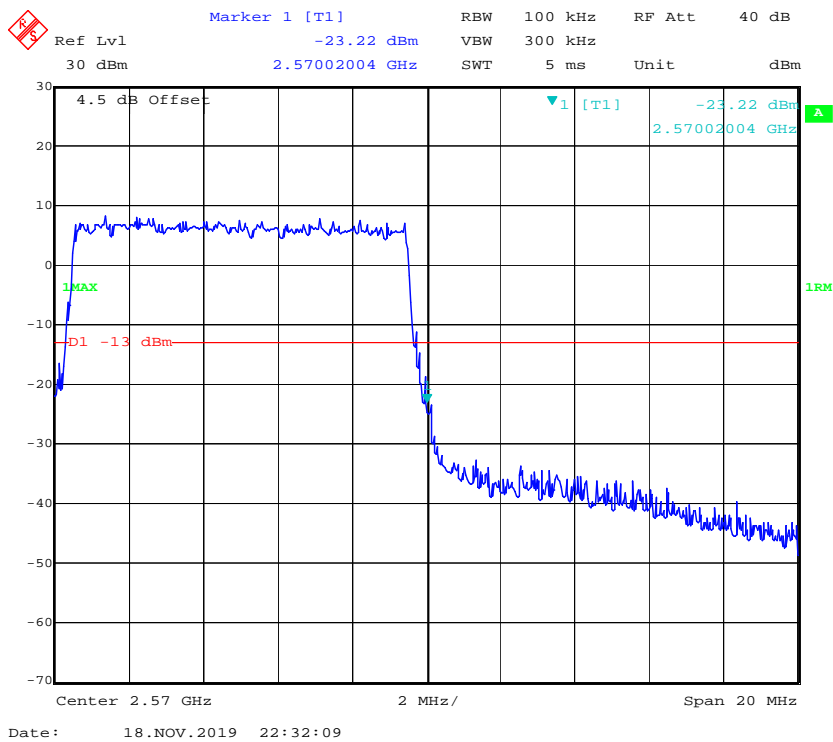
16QAM_5MHz_25 RB_Right



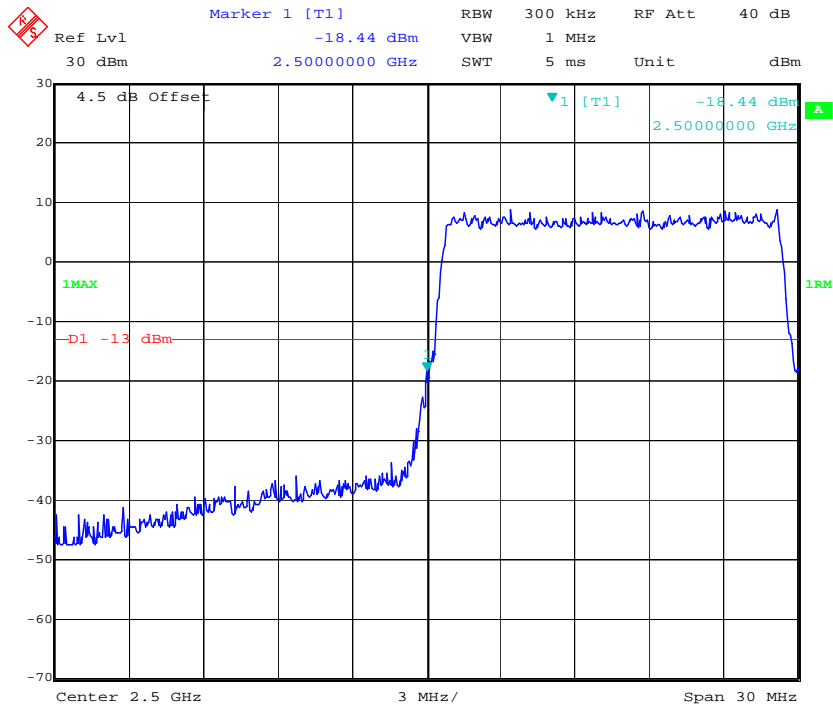
16QAM_10MHz_50 RB_Left



16QAM_10MHz_50 RB_Right

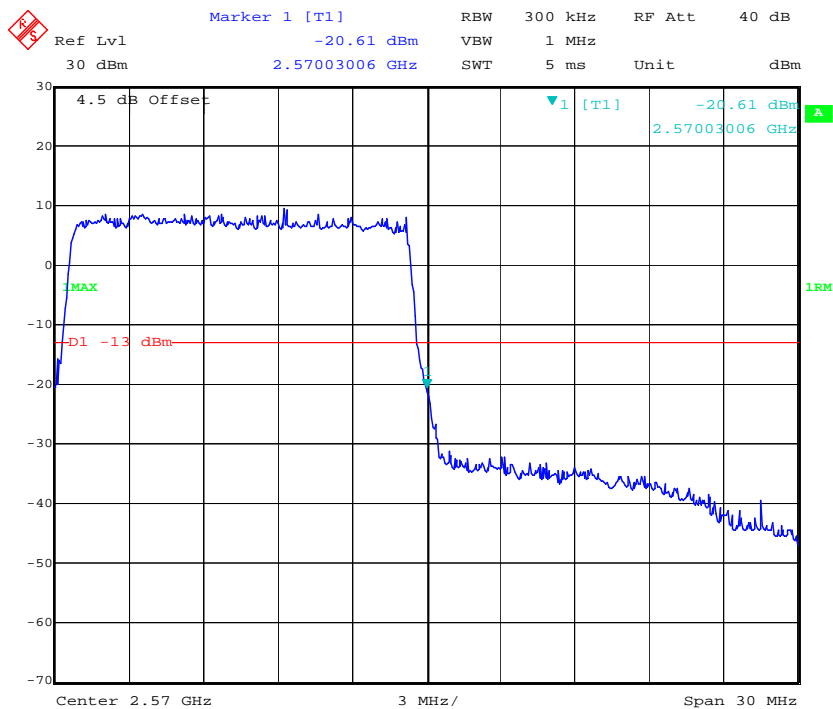


16QAM_15MHz_75 RB_Left



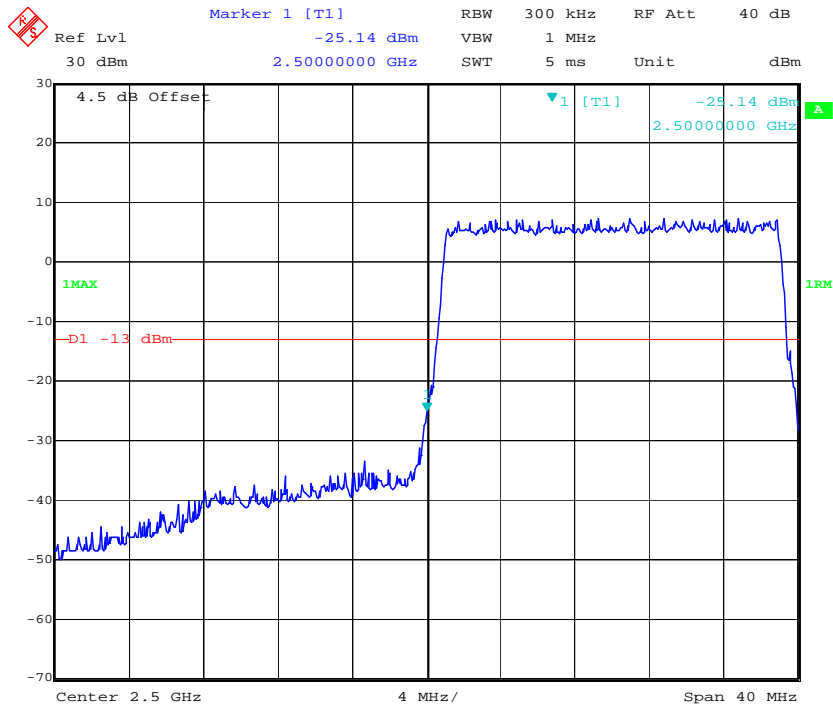
Date: 18.NOV.2019 22:32:56

16QAM_15MHz_75 RB_Right

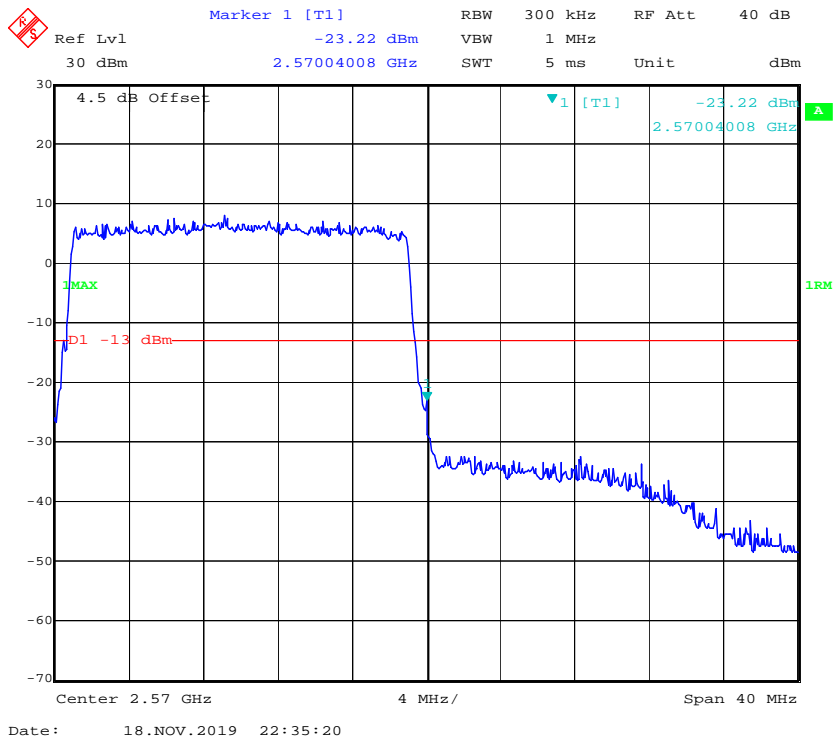


Date: 18.NOV.2019 22:33:42

16QAM_20MHz_FULL RB_Left



16QAM_20MHz_FULL RB_Right



FCC §2.1055, §22.355 & §24.235 & §27.54 - FREQUENCY STABILITY

Applicable Standard

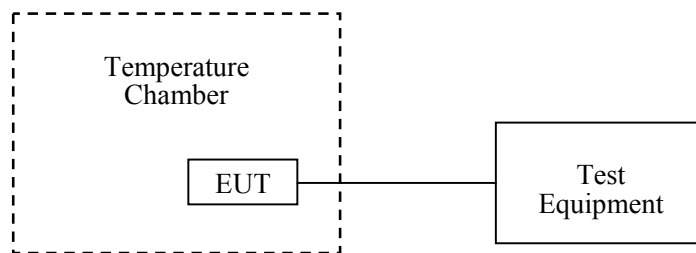
FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235, §27.54

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 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: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSU 26	200256	2019-05-09	2020-05-09
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2019-08-03	2020-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201048	Each time	N/A
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	Each time	N/A
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
R&S	Wideband Radio Communication Tester	CMW500	147473	2019-08-03	2020-08-03
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2019-03-26	2020-03-26
UNI-T	Multimeter	UT39A	M130199938	2019-07-24	2020-07-24
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

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

Test Data**Environmental Conditions**

Temperature:	26.5 °C
Relative Humidity:	60 %
ATM Pressure:	100.3kPa
Tester:	Blake Yang
Test Date:	2019-11-18

Test Result: Compliance.

Cellular Band

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	2	0.00239	2.5
-20		5	0.00598	
-10		3	0.00359	
0		5	0.00598	
10		7	0.00837	
20		8	0.00956	
30		6	0.00717	
40		5	0.00598	
50		3	0.00359	
20		3.6	4	
20	4.35	6	0.00717	

EGPRS, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	10	0.01195	2.5
-20		9	0.01076	
-10		11	0.01315	
0		12	0.01434	
10		10	0.01195	
20		13	0.01554	
30		12	0.01434	
40		8	0.00956	
50		4	0.00478	
20		3.6	7	
20	4.35	10	0.01195	

PCS Band

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	30	0.01596	Pass
-20		32	0.01702	
-10		34	0.01809	
0		31	0.01649	
10		29	0.01543	
20		35	0.01862	
30		33	0.01755	
40		31	0.01649	
50		30	0.01596	
20		3.6	28	
20	4.35	34	0.01809	

EGPRS, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	24	0.01277	Pass
-20		26	0.01383	
-10		31	0.01649	
0		20	0.01064	
10		34	0.01809	
20		38	0.02021	
30		25	0.01330	
40		27	0.01436	
50		26	0.01383	
20		3.6	21	
20	4.35	31	0.01649	

WCDMA Band II: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	16	0.00851	Pass
-20		22	0.01170	
-10		26	0.01383	
0		13	0.00691	
10		24	0.01277	
20		31	0.01649	
30		25	0.01330	
40		21	0.01117	
50		26	0.01383	
20		3.6	23	
20	4.35	18	0.00957	

WCDMA Band V: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limits
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	-4	-0.00478	2.5
-20		-8	-0.00956	
-10		-6	-0.00717	
0		-9	-0.01076	
10		-10	-0.01195	
20		-12	-0.01434	
30		-6	-0.00717	
40		-6	-0.00717	
50		-8	-0.00956	
20		3.6	-9	
20	4.35	-4	-0.00478	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V_{DC}	Hz	ppm	
-30	3.8	10	0.0053	Pass
-20		12	0.0064	
-10		9	0.0048	
0		12	0.0064	
10		4	0.0021	
20		10	0.0053	
30		11	0.0059	
40		12	0.0064	
50		6	0.0032	
20		4.35	9	
20	3.6	8	0.0043	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V_{DC}	Hz	ppm	
-30	3.8	5	0.0027	Pass
-20		8	0.0043	
-10		10	0.0053	
0		6	0.0032	
10		9	0.0048	
20		10	0.0053	
30		5	0.0027	
40		11	0.0059	
50		10	0.0053	
20		4.35	5	
20	3.6	12	0.0064	

LTE Band 5

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limits
°C	V_{DC}	Hz	ppm	ppm
-30	3.8	-14	-0.0167	2.5
-20		-10	-0.0120	
-10		-13	-0.0155	
0		-12	-0.0143	
10		-13	-0.0155	
20		-15	-0.0179	
30		-18	-0.0215	
40		-12	-0.0143	
50		-18	-0.0215	
20		4.35	-14	
20	3.6	-15	-0.0179	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limits
°C	V_{DC}	Hz	ppm	ppm
-30	3.8	-13	-0.0155	2.5
-20		-17	-0.0203	
-10		-11	-0.0132	
0		-10	-0.0120	
10		-18	-0.0215	
20		-15	-0.0179	
30		-17	-0.0203	
40		-16	-0.0191	
50		-11	-0.0132	
20		4.35	-11	
20	3.6	-12	-0.0143	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.8	1710.53119	1754.50949	1710	1755
-20		1710.53147	1754.50911	1710	1755
-10		1710.53171	1754.50949	1710	1755
0		1710.53177	1754.50921	1710	1755
10		1710.53142	1754.50903	1710	1755
20		1710.53106	1754.50902	1710	1755
30		1710.53118	1754.50915	1710	1755
40		1710.53206	1754.50928	1710	1755
50		1710.53114	1754.50966	1710	1755
20		4.35	1710.53186	1754.50940	1710
20	3.6	1710.53113	1754.50975	1710	1755

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.8	1710.53152	1754.50949	1710	1755
-20		1710.53113	1754.51001	1710	1755
-10		1710.53172	1754.50923	1710	1755
0		1710.53170	1754.50987	1710	1755
10		1710.53114	1754.50945	1710	1755
20		1710.53106	1754.50902	1710	1755
30		1710.53113	1754.50919	1710	1755
40		1710.53116	1754.50969	1710	1755
50		1710.53198	1754.50928	1710	1755
20		4.35	1710.53185	1754.50937	1710
20	3.6	1710.53149	1754.50988	1710	1755

LTE Band 7:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.8	2500.53121	2569.50925	2500	2570
-20		2500.53168	2569.50964	2500	2570
-10		2500.53198	2569.50910	2500	2570
0		2500.53182	2569.50907	2500	2570
10		2500.53163	2569.50945	2500	2570
20		2500.53106	2569.50902	2500	2570
30		2500.53149	2569.50985	2500	2570
40		2500.53119	2569.50935	2500	2570
50		2500.53145	2569.50928	2500	2570
20		4.35	2500.53194	2569.50903	2500
20	3.6	2500.53150	2569.50916	2500	2570

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.8	2500.53183	2569.51000	2500	2570
-20		2500.53195	2569.50978	2500	2570
-10		2500.53137	2569.50958	2500	2570
0		2500.53150	2569.50950	2500	2570
10		2500.53196	2569.50933	2500	2570
20		2500.53106	2569.54910	2500	2570
30		2500.53173	2569.50970	2500	2570
40		2500.53172	2569.50994	2500	2570
50		2500.53119	2569.50920	2500	2570
20		4.35	2500.53187	2569.50924	2500
20	3.6	2500.53149	2569.50949	2500	2570

Note: The fundamental emissions stay within the authorized bands of operation based on the frequency deviation measured is small, the extreme voltage was declared by applicant.

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