



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 22H, PART 24E,PART 27
RSS-GEN, ISSUE 5, APRIL 2018
RSS-130 ISSUE 1, OCTOBER 2013
RSS-132 ISSUE 3, JANUARY 2013
RSS-133 ISSUE 6, JANUARY 2018, AMENDMENT
RSS-139 ISSUE 3, JULY 2015
RSS-199 ISSUE 3, DECEMBER 2016
MEASUREMENT AND TEST REPORT

For

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FCC ID: RBD-S5702L
IC: 20054-S5702L

Report Type: Original Report	Product Type: Smart Phone
Report Number:	RGMA181226003-00D
Report Date:	2019-04-04
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Smart Phone
EUT Model:		S5702L
Multiple Model:		A5700-PB
Rated Input Voltage:		DC3.8V from Battery or DC5V from adapter
Adapter Information	Model:	TPA-46050150UU
	Input:	AC 100-240V, 50/60Hz, 0.3A
	Output:	DC5V, 1500mA
External Dimension:		154mm(L)* 75mm(W)*11mm(H)
Serial Number:		181226003
EUT Received Date:		2019.01.03

Note: The series product model A5700-PB is electrically identical with model S5702L, we selected S5702L for fully testing, the differences details was explained in the declaration letter.

Objective

This report is prepared on behalf of **Shenzhen Jingwah Information Technology Co., Ltd.** in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E Part 27 of the Federal Communication Commissions rules and RSS-130 Issue 1, October 2013, RSS-132, Issue 3, January 2013, RSS-133, Issue 6, January 2018 Amendment, RSS-139, Issue 3 July 2015, RSS-199, Issue 3, December 2016 of the Innovation, Science and Economic Development Canada. RSS-Gen, Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

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 15C DTS submissions with FCC ID: RBD-S5702L.
 FCC Part 15C DSS submissions with FCC ID: RBD-S5702L.
 FCC Part 15B JBP submissions with FCC ID: RBD-S5702L.
 FCC Part 15E NII submissions with FCC ID: RBD-S5702L.
 RSS-247 DTSSs, RSS-247 DSSs, RSS-247 LE-LAN submissions with IC: 20054-S5702L

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.

TIA/EIA 603-D-2010, RSS-130 Issue 1, October 2013, Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz; RSS-132, Issue 3, January 2013, Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz; RSS-133, Issue 6, January 2018 Amendment, 2 GHz Personal Communication Services; RSS-139, Issue 3, JULY 2015, Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz; RSS-199, Issue 3, December 2016, Broadband Radio Service (BRS) Equipment Operating in the Band 2500–2690 MHz; RSS-Gen, Issue 5, April 2018 of the Innovation, Science and Economic Development Canada.

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%

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.

SYSTEM TEST CONFIGURATION

Justification

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

The test items were performed with the EUT operating at testing mode. The device supports GSM/GPRS/EDGE 850/1900 band,WCDMA/HSUPA/HPDPA Band 2/4/5, LTE band 2, 4, 5, 7 and 17.

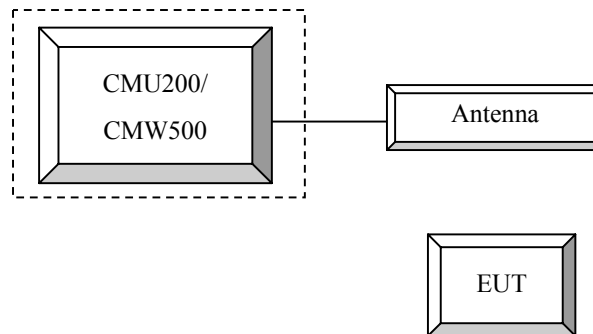
Equipment Modifications

No modification was made to the EUT.

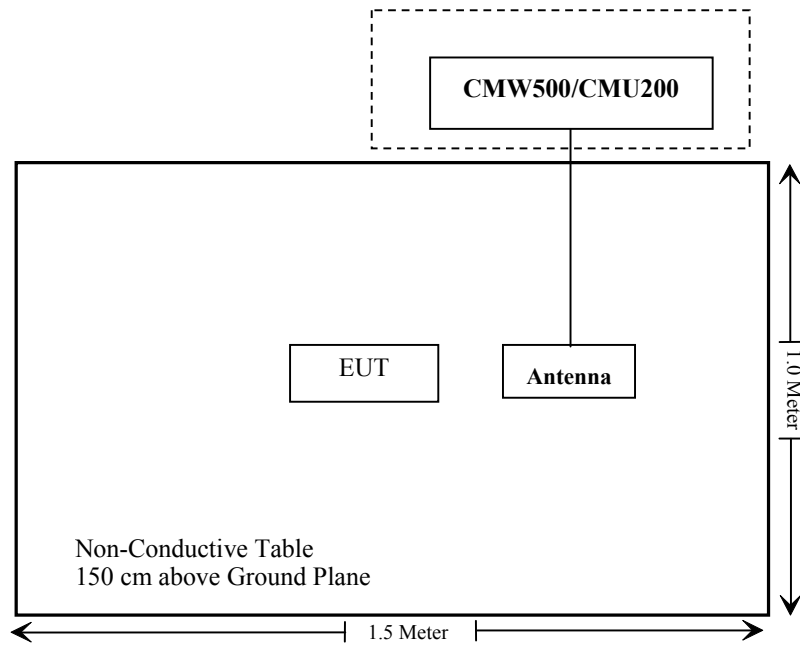
Support Equipment List and Details

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	/	/

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC§1.1310, §2.1093; RSS-102 § 4	RF Exposure	Compliance
FCC§2.1046;§ 22.913 (a); § 24.232 (c);§27.50; RSS-130 §4.4 RSS-132 §5.4 RSS-133 §6.4 RSS-139 §6.5 RSS-199 §4.4	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
RSS-130 §4.1; RSS-132 §5.2 RSS-133 §6.2 RSS-139 §6.2 RSS-199 §4.1	Types of Modulation	Compliance
FCC§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53 RSS-Gen §6.7	Occupied Bandwidth	Compliance
FCC§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53; RSS-130 §4.6; RSS-132 §5.5 RSS-133 §6.5 RSS-139 §6.6 RSS-199 §4.6	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53; RSS-130 §4.6; RSS-132 §5.5 RSS-133 §6.5 RSS-139 §6.6 RSS-199 §4.6	Field Strength of Spurious Radiation	Compliance
FCC§ 22.917 (a); § 24.238 (a); §27.53; RSS-130 §4.6; RSS-132 §5.5 RSS-133 §6.5 RSS-139 §6.6 RSS-199 §4.6	Out of band emission, Band Edge	Compliance
FCC§ 2.1055 § 22.355; § 24.235; §27.54; RSS-130 §4.3; RSS-132 §5.3 RSS-133 §6.3 RSS-139 §6.4 RSS-199 §4.3	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

FCC §1.1310 & §2.1093, RSS-102 §4- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093; RSS-102 §4

Test Result

Compliant, please refer to the SAR report: RGMA181226003-20.

RSS-130 §4.2 & RSS-132 §5.1 & RSS-133 §6.1 & RSS-139 §6.1 & RSS-199 §2.2 - CHANNELLING ARRANGEMENTS & FREQUENCY PLAN

Applicable Standard

According to RSS-130 §4.2, the frequency bands 698-756 MHz and 777-787 MHz are divided into small frequency blocks as per SRSP- 518. Equipment shall operate according to the frequency plan given in the SRSP.

According to RSS-132 §5.1, the frequency bands 824-849 MHz and 869-894 MHz are divided into sub-bands as described in SRSP-503. These sub-bands are:

824-835 MHz, 835-845 MHz, 845-846.5 MHz, and 846.5-849 MHz for mobile transmit; and 869-880 MHz, 880-890 MHz, 890-891.5 MHz, and 891.5-894 MHz for base transmit.

According to RSS-133 §6.1, the frequency plan is described in SRSP-510.

According to RSS-139 §6.1, the frequency plan is described in SRSP-513.

According to RSS-199 §2.2, the frequency plan is described in SRSP-517.

Test Result

According to the test data, channeling arrangement meets all relevant conditions specified in SRSP-503, SRSP-510, SRSP-513, SRSP-517, SRSP-518.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

RSS-130 §4.1 & RSS-132 §5.2 & RSS-133 §6.2 & RSS-139 §6.2 RSS-199 §4.1 - TYPES OF MODULATION

Applicable Standard

According to RSS-130 §4.1, equipment certified under this standard shall employ digital modulation.

According to RSS-132 §5.2, equipment certified under this standard shall use digital modulation.

According to RSS-133 §6.2, the devices shall employ digital modulation techniques.

According to RSS-139 §6.2, the devices may employ any type of modulation techniques. The type of modulation used must be reported.

According to RSS-199 §4.1, equipment certified under this standard shall employ digital modulation.

Test Result

The EUT uses GMSK, 8PSK, QPSK, 16QAM modulation.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50, RSS-130 §4.4&RSS-132 §5.4 & RSS-133 §6.4& RSS-139 §6.5 & RSS-199 §4.4 - 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.

According to RSS-130 §4.4

The transmitter output power shall be measured in terms of average power.

For base and fixed equipment, refer to SRSP-518 for power limits.

The e.i.r.p. shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

According to RSS-132 §5.4

The transmitter output power shall be measured in terms of average power. The equivalent isotropically radiated power (e.i.r.p.) for mobile equipment shall not exceed 11.5 watts. Refer to SRSP-503 for base station e.i.r.p. limits.

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

Refer to SRSP-503 5.1.3 Mobile Stations

The maximum EIRP shall be 11.5 watts for mobile stations.

According to RSS-133 §6.4

The equivalent isotropically radiated power (e.i.r.p.) for transmitters shall not exceed the limits given in SRSP-510.

In addition, the transmitter's peak-to-average power ratio (PAPR) shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

According to RSS-139 §6.5

The equivalent isotropically radiated power (e.i.r.p.) for mobile and portable transmitters shall not exceed one watt. The e.i.r.p. for fixed and base stations in the band 1710-1780 MHz shall not exceed one watt.

Consult SRSP-513 for e.i.r.p. limits on fixed and base stations operating in the band 2110-2180 MHz.

According to RSS-199 §4.4

The transmitter output power shall be measured in terms of average value.

For base station equipment, refer to SRSP-517 for the maximum permissible e.i.r.p.

For mobile subscriber equipment, the e.i.r.p. shall not exceed 2 W. For fixed subscriber equipment, the transmitter output power shall not exceed 2 W and the e.i.r.p. shall be limited to 40 W.

In addition, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time and shall use a signal corresponding to the highest PAPR during periods of continuous transmission.

For equipment with multiple antennas, the transmitter output power and e.i.r.p. shall be measured according to ANSI C63.26-2015.

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	ESCI	100224	2018-12-10	2019-12-10
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	Not Required	/
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2018-05-06	2019-05-06
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
R&S	Universal Radio Communication Tester	CMU200	110 822	2018-12-14	2019-12-14
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-03	2019-08-03

* **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:	19.6~21.3°C
Relative Humidity:	31~52 %
ATM Pressure:	99.7~99.8 kPa

* The testing was performed by Neil Liao, Tyler Pan, Kami Zhou, Carrie He & Tiago Huang on 2019-01-04~2019-01-11.

Conducted Output Power

Cellular Band & PCS Band

Band	Channel No.	Conducted Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Cellular	128	32.10	32.19	31.49	29.81	28.70	26.88	26.06	24.42	23.37
	190	32.40	32.43	31.85	30.20	29.17	26.78	25.96	24.24	23.20
	251	32.30	32.34	31.65	29.93	28.87	26.82	26.00	24.22	23.19
PCS	512	30.90	30.63	29.95	28.14	27.09	27.62	26.55	24.32	23.08
	661	30.90	30.63	29.95	28.11	27.08	27.42	26.34	24.11	22.81
	810	30.90	30.62	29.92	28.10	27.15	27.36	26.24	24.01	22.70

WCDMA Band II

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	23.46	3.08	23.53	3.20	23.56	3.12
HSDPA	1	22.51	4.40	22.57	3.84	22.59	3.36
	2	22.49	3.90	22.51	3.87	22.60	3.47
	3	22.48	4.10	22.48	4.01	22.48	3.28
	4	22.44	3.70	22.44	3.99	22.43	3.42
HSUPA	1	21.23	4.44	21.03	3.56	20.67	3.76
	2	21.19	4.12	20.98	3.51	20.66	3.67
	3	22.18	4.38	20.94	3.47	20.64	3.81
	4	22.14	4.11	21.00	3.44	20.59	3.66
	5	22.11	4.28	20.94	3.34	20.58	3.61

WCDMA Band IV

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	23.75	3.16	23.78	3.08	23.80	3.16
HSDPA	1	22.83	4.52	22.76	3.60	22.81	3.48
	2	22.78	4.38	22.68	3.64	22.79	3.44
	3	22.81	4.49	22.71	3.51	22.75	3.51
	4	22.79	4.51	22.66	3.47	21.98	3.44
HSUPA	1	22.20	4.00	22.07	4.32	22.13	4.36
	2	22.18	3.98	22.01	4.12	22.10	4.41
	3	22.14	4.11	21.94	4.36	21.99	3.89
	4	22.17	3.89	21.92	4.38	21.98	4.40
	5	22.11	3.88	21.89	4.44	21.94	3.94

WCDMA Band V

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	22.90	3.36	22.89	3.12	22.84	3.64
HSDPA	1	21.80	3.56	21.75	4.84	21.71	4.68
	2	21.77	3.51	21.71	4.78	21.69	4.58
	3	21.71	3.46	21.67	4.68	21.66	4.49
	4	21.70	3.61	21.61	4.72	21.61	4.61
HSUPA	1	21.41	4.48	21.39	5.32	21.33	4.48
	2	21.39	4.51	21.31	5.12	21.30	4.44
	3	21.35	4.38	21.28	5.28	21.28	4.50
	4	21.33	4.41	21.26	5.34	21.26	4.38
	5	21.31	4.44	21.22	5.22	21.23	4.55

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	23.69	23.84	23.81
		RB1#3	23.86	23.79	24.02
		RB1#5	23.69	23.51	23.56
		RB3#0	23.42	23.34	23.43
		RB3#3	23.26	23.36	23.31
		RB6#0	22.31	22.44	22.55
	16QAM	RB1#0	22.34	22.51	22.47
		RB1#3	22.40	22.66	22.86
		RB1#5	22.22	22.46	22.65
		RB3#0	23.80	23.82	23.62
		RB3#3	23.62	23.85	23.34
		RB6#0	21.74	21.90	21.41
3MHz	QPSK	RB1#0	23.95	23.91	23.42
		RB1#8	23.72	23.91	23.44
		RB1#14	23.52	23.82	23.47
		RB6#0	22.74	22.86	22.41
		RB6#9	22.74	22.85	22.38
		RB15#0	22.84	22.83	22.39
	16QAM	RB1#0	23.13	22.92	22.50
		RB1#8	23.19	22.96	22.45
		RB1#14	23.29	22.96	22.47
		RB6#0	21.87	21.82	21.35
		RB6#9	21.85	21.84	21.35
		RB15#0	21.88	21.78	21.27
5MHz	QPSK	RB1#0	23.31	23.34	23.29
		RB1#13	23.46	23.44	23.39
		RB1#24	23.33	23.38	23.30
		RB15#0	22.50	22.42	22.42
		RB15#10	22.47	22.43	22.34
		RB25#0	22.38	22.41	22.33
	16QAM	RB1#0	22.14	22.53	22.27
		RB1#13	22.28	22.66	22.35
		RB1#24	22.15	22.58	22.25
		RB15#0	21.43	21.38	21.41
		RB15#10	21.40	21.38	21.32
		RB25#0	21.39	21.35	21.31

10MHz	QPSK	RB1#0	23.41	23.38	23.33
		RB1#25	23.57	23.56	23.59
		RB1#49	23.37	23.41	23.38
		RB25#0	22.45	22.49	22.40
		RB25#25	22.42	22.44	22.35
	RB50#0	22.45	22.43	22.37	
	16QAM	RB1#0	22.76	22.44	22.28
		RB1#25	22.97	22.66	22.48
		RB1#49	22.78	22.46	22.28
		RB25#0	21.44	21.44	21.41
RB25#25		21.41	21.38	21.36	
RB50#0	21.37	21.42	21.34		
15MHz	QPSK	RB1#0	23.35	23.29	23.23
		RB1#38	23.41	23.41	23.35
		RB1#74	23.27	23.31	23.30
		RB36#0	22.56	22.50	22.41
		RB36#39	22.51	22.45	22.44
	RB75#0	22.58	22.53	22.43	
	16QAM	RB1#0	22.68	22.35	22.50
		RB1#38	22.83	22.49	22.57
		RB1#74	22.69	22.38	22.48
		RB36#0	21.47	21.44	21.31
RB36#39		21.45	21.46	21.32	
RB75#0	21.44	21.44	21.36		
20MHz	QPSK	RB1#0	23.13	23.08	23.02
		RB1#50	23.50	23.56	23.44
		RB1#99	23.11	23.20	23.11
		RB50#0	22.36	22.44	22.28
		RB50#50	22.32	22.36	22.26
	RB100#0	22.38	22.39	22.25	
	16QAM	RB1#0	22.30	22.21	22.50
		RB1#50	22.76	22.66	22.87
		RB1#99	22.35	22.25	22.49
		RB50#0	21.32	21.34	21.22
RB50#50		21.30	21.28	21.21	
RB100#0	21.33	21.33	21.18		

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	23.24	23.16	23.19
		RB1#3	23.37	23.31	23.33
		RB1#5	23.18	23.17	23.14
		RB3#0	23.20	23.13	23.12
		RB3#3	23.19	23.14	23.17
		RB6#0	22.23	22.21	22.21
	16QAM	RB1#0	22.08	22.21	22.06
		RB1#3	22.27	22.40	22.21
		RB1#5	22.08	22.22	22.07
		RB3#0	22.31	22.10	22.17
3MHz	QPSK	RB1#0	23.26	23.19	23.26
		RB1#8	23.26	23.24	23.26
		RB1#14	23.19	23.21	23.23
		RB6#0	22.21	22.14	22.18
		RB6#9	22.18	22.22	22.18
		RB15#0	22.21	22.20	22.16
	16QAM	RB1#0	22.63	22.26	22.16
		RB1#8	22.61	22.29	22.16
		RB1#14	22.56	22.26	22.09
		RB6#0	21.17	21.09	21.02
5MHz	QPSK	RB6#9	21.17	21.16	21.00
		RB15#0	21.20	21.13	21.19
		RB1#0	23.07	23.07	23.05
		RB1#13	23.23	23.26	23.24
		RB1#24	23.09	23.09	23.12
		RB15#0	22.21	22.18	22.23
	16QAM	RB15#10	22.19	22.22	22.21
		RB25#0	22.16	22.20	22.16
		RB1#0	21.89	22.31	22.04
		RB1#13	22.01	22.46	22.22
	RB1#24	21.87	22.30	22.11	
	RB15#0	21.19	21.14	21.15	
	RB15#10	21.18	21.20	21.14	
	RB25#0	21.15	21.14	21.11	

10MHz	QPSK	RB1#0	23.17	23.14	23.14
		RB1#25	23.35	23.35	23.39
		RB1#49	23.20	23.20	23.21
		RB25#0	22.21	22.21	22.19
		RB25#25	22.22	22.26	22.16
	RB50#0	22.21	22.22	22.16	
	16QAM	RB1#0	22.57	22.19	22.03
		RB1#25	22.78	22.42	22.22
		RB1#49	22.63	22.24	22.09
		RB25#0	21.22	21.17	21.22
RB25#25		21.26	21.23	21.20	
RB50#0	21.17	21.22	21.20		
15MHz	QPSK	RB1#0	23.10	23.08	23.10
		RB1#38	23.22	23.24	23.23
		RB1#74	23.11	23.16	23.15
		RB36#0	22.27	22.28	22.31
		RB36#39	22.34	22.33	22.29
		RB75#0	22.33	22.30	22.30
	16QAM	RB1#0	22.50	22.14	22.32
		RB1#38	22.64	22.31	22.45
		RB1#74	22.57	22.22	22.37
		RB36#0	21.20	21.24	21.21
		RB36#39	21.28	21.27	21.20
		RB75#0	21.22	21.22	21.17
20MHz	QPSK	RB1#0	22.87	22.93	22.83
		RB1#50	23.36	23.33	23.29
		RB1#99	22.97	23.04	22.95
		RB50#0	22.17	22.14	22.21
		RB50#50	22.25	22.22	22.15
		RB100#0	22.22	22.17	22.14
	16QAM	RB1#0	22.07	22.04	22.28
		RB1#50	22.57	22.45	22.75
		RB1#99	22.20	22.11	22.40
		RB50#0	21.10	21.13	21.14
		RB50#50	21.23	21.20	21.08
		RB100#0	21.20	21.15	21.13

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	23.79	23.77	23.74
		RB1#3	24.01	23.93	24.02
		RB1#5	23.78	23.77	23.81
		RB3#0	23.79	23.76	23.73
		RB3#3	23.84	23.76	23.72
	16QAM	RB6#0	22.80	22.77	22.81
		RB1#0	22.71	22.81	22.63
		RB1#3	22.85	23.04	22.90
		RB1#5	22.71	22.81	22.66
		RB3#0	22.97	22.71	22.76
3MHz	QPSK	RB3#3	22.97	22.71	22.76
		RB6#0	21.77	21.81	21.63
		RB1#0	23.82	22.00	23.80
		RB1#8	23.82	22.01	23.86
		RB1#14	23.79	22.00	23.85
	16QAM	RB6#0	22.72	20.88	22.72
		RB6#9	22.70	22.75	22.72
		RB15#0	20.94	22.78	22.77
		RB1#0	21.47	22.85	22.71
		RB1#8	21.46	22.85	22.68
5MHz	QPSK	RB1#14	21.48	22.84	22.71
		RB6#0	19.96	21.71	21.57
		RB6#9	19.93	21.71	21.56
		RB15#0	20.03	21.71	21.75
		RB1#0	23.71	23.71	23.64
	16QAM	RB1#13	23.88	23.82	23.82
		RB1#24	23.75	23.69	23.72
		RB15#0	22.82	22.76	22.78
		RB15#10	22.83	22.77	22.74
		RB25#0	22.82	22.75	22.71
10MHz	QPSK	RB1#0	22.51	22.88	22.62
		RB1#13	22.67	23.05	22.82
		RB1#24	22.59	22.90	22.66
		RB15#0	21.82	21.71	21.74
		RB15#10	21.80	21.72	21.73
	16QAM	RB25#0	21.81	21.75	21.64
		RB1#0	23.76	23.79	23.74
		RB1#25	23.98	23.96	23.92
		RB1#49	23.81	23.83	23.86
		RB25#0	22.83	22.74	22.75
16QAM	RB25#25	22.90	22.83	22.71	
	RB50#0	22.88	22.82	22.77	
	RB1#0	23.23	22.85	22.64	
	RB1#25	23.40	23.02	22.79	
	RB1#49	23.28	22.86	22.72	
16QAM	RB25#0	21.82	21.74	21.80	
	RB25#25	21.90	21.80	21.76	
	RB50#0	21.84	21.77	21.73	

LTE Band 7

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	22.34	22.44	22.50
		RB1#13	22.44	22.56	22.63
		RB1#24	22.32	22.44	22.50
		RB15#0	21.53	21.60	21.63
		RB15#10	21.48	21.57	21.65
	16QAM	RB25#0	21.46	21.57	21.61
		RB1#0	21.20	21.62	21.51
		RB1#13	21.29	21.81	21.57
		RB1#24	21.24	21.66	21.46
		RB15#0	20.63	20.65	20.70
10MHz	QPSK	RB15#10	20.60	20.60	20.61
		RB25#0	20.61	20.63	20.62
		RB1#0	22.47	22.50	22.52
		RB1#25	22.46	22.56	22.50
		RB1#49	22.31	22.14	22.21
	16QAM	RB25#0	21.53	21.40	21.36
		RB25#25	21.61	21.52	21.52
		RB50#0	21.55	21.61	21.55
		RB1#0	21.69	21.31	21.18
		RB1#25	21.93	21.53	21.40
15MHz	QPSK	RB1#49	21.80	21.34	21.23
		RB25#0	20.66	20.70	20.82
		RB25#25	20.72	20.73	20.78
		RB50#0	20.68	20.74	20.74
		RB1#0	22.40	22.45	22.50
	16QAM	RB1#38	22.47	22.56	22.26
		RB1#74	22.27	22.18	22.11
		RB36#0	21.46	21.55	21.25
		RB36#39	21.63	21.56	21.49
		RB75#0	21.64	21.61	21.68
20MHz	QPSK	RB1#0	21.56	21.42	21.44
		RB1#38	21.90	21.55	21.59
		RB1#74	21.86	21.50	21.41
		RB36#0	20.66	20.78	20.67
		RB36#39	20.80	20.77	20.80
	16QAM	RB75#0	20.72	20.78	20.76
		RB1#0	22.19	22.25	22.19
		RB1#50	22.28	22.63	22.29
		RB1#99	21.89	21.89	21.90
		RB50#0	21.26	21.38	21.15
16QAM	RB50#50	21.57	21.36	21.35	
	RB100#0	21.60	21.58	21.21	
	RB1#0	21.14	21.12	21.36	
	RB1#50	21.90	21.79	21.75	
	RB1#99	21.59	21.37	21.42	
	RB50#0	20.54	20.67	20.36	
	RB50#50	20.78	20.69	20.70	
RB100#0	20.68	20.74	20.76		

LTE Band 17

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)	
5MHz	QPSK	RB1#0	23.72	23.65	23.67	
		RB1#13	23.84	23.83	23.84	
		RB1#24	23.71	23.78	23.75	
		RB15#0	22.84	22.97	22.87	
		RB15#10	22.83	22.77	22.91	
		RB25#0	22.76	22.80	22.85	
	16QAM	RB1#0	22.60	22.86	22.77	
		RB1#13	22.65	23.08	22.87	
		RB1#24	22.54	22.98	22.69	
		RB15#0	21.84	21.86	21.94	
		RB15#10	21.78	21.72	21.97	
		RB25#0	21.79	21.78	21.90	
	10MHz	QPSK	RB1#0	23.74	23.74	23.78
			RB1#25	24.00	23.93	24.02
RB1#49			23.84	23.82	23.92	
RB25#0			22.79	22.89	23.00	
RB25#25			22.79	22.81	22.88	
RB50#0			22.81	22.87	23.03	
16QAM		RB1#0	23.27	22.86	22.72	
		RB1#25	23.38	23.11	22.93	
		RB1#49	23.29	22.91	22.75	
		RB25#0	21.80	21.85	22.03	
		RB25#25	21.79	21.81	22.00	
		RB50#0	21.77	21.87	21.98	

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	3.92	3.84	3.68	13
	100 RB		6.36	6.48	6.40	13
16QAM	1 RB	20 MHz	4.92	4.52	4.80	13
	100 RB		7.12	7.16	7.04	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	4.04	4.16	3.32	13
	100 RB		6.28	6.36	6.28	13
16QAM	1 RB	20 MHz	5.00	4.52	4.16	13
	100 RB		7.16	7.08	6.96	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	4.56	3.68	4.32	13
	50 RB		5.36	5.12	5.32	13
16QAM	1 RB	10 MHz	5.80	4.48	5.32	13
	50 RB		6.28	6.08	6.20	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	5.54	4.76	4.34	13
	100 RB		6.44	6.23	6.35	13
16QAM	1 RB	20 MHz	5.32	5.46	4.76	13
	100 RB		7.65	7.11	7.14	13

PAR, Band 17

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.22	4.34	4.45	13
	50 RB		5.32	5.43	5.75	13
16QAM	1 RB	10 MHz	5.44	4.11	5.74	13
	50 RB		6.56	6.08	6.23	13

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

ERP & EIRP

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	89.56	14.64	0.00	0.97	13.67	38.45	24.78
836.60	V	99.10	27.31	0.00	0.97	26.34	38.45	12.11
EDGE 850 Middle Channel								
836.60	H	79.28	6.36	0.00	0.97	5.39	38.45	33.06
836.60	V	94.86	23.07	0.00	0.97	22.10	38.45	16.35
WCDMA Band V Middle Channel								
836.60	H	79.21	4.29	0.00	0.97	3.32	38.45	35.13
836.60	V	90.20	18.41	0.00	0.97	17.44	38.45	21.01
GSM 1900 Middle Channel								
1880.00	H	91.99	19.38	11.66	2.66	28.38	33.00	4.62
1880.00	V	89.75	17.28	11.66	2.66	26.28	33.00	6.72
EDGE 1900 Middle Channel								
1880.00	H	89.38	16.77	11.66	2.66	25.77	33.00	7.23
1880.00	V	85.64	13.17	11.66	2.66	22.17	33.00	10.83
WCDMA Band II Middle Channel								
1880.00	H	87.40	14.79	11.66	2.66	23.79	33.00	9.21
1880.00	V	85.43	12.96	11.66	2.66	21.96	33.00	11.04
WCDMA Band IV Middle Channel								
1732.60	H	85.24	11.19	10.90	2.51	19.58	30.00	10.42
1732.60	V	85.23	10.86	10.90	2.51	19.25	30.00	10.75

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

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	83.56	10.95	11.66	2.66	19.95	33.00	13.05	
1880.00			V	87.76	15.29	11.66	2.66	24.29	33.00	8.71	
1880.00	3.00		H	83.24	10.63	11.66	2.66	19.63	33.00	13.37	
1880.00			V	85.60	13.13	11.66	2.66	22.13	33.00	10.87	
1880.00	5.00		H	84.95	12.34	11.66	2.66	21.34	33.00	11.66	
1880.00			V	86.50	14.03	11.66	2.66	23.03	33.00	9.97	
1880.00	10.00		H	83.51	10.90	11.66	2.66	19.90	33.00	13.10	
1880.00			V	85.61	13.14	11.66	2.66	22.14	33.00	10.86	
1880.00	15.00		H	82.53	9.92	11.66	2.66	18.92	33.00	14.08	
1880.00			V	85.54	13.07	11.66	2.66	22.07	33.00	10.93	
1880.00	20.00		H	77.99	5.38	11.66	2.66	14.38	33.00	18.62	
1880.00			V	83.64	11.17	11.66	2.66	20.17	33.00	12.83	
1880.00	1.40		16QAM	H	83.85	11.24	11.66	2.66	20.24	33.00	12.76
1880.00				V	86.91	14.44	11.66	2.66	23.44	33.00	9.56
1880.00	3.00			H	82.46	9.85	11.66	2.66	18.85	33.00	14.15
1880.00				V	86.62	14.15	11.66	2.66	23.15	33.00	9.85
1880.00	5.00	H		82.56	9.95	11.66	2.66	18.95	33.00	14.05	
1880.00		V		86.46	13.99	11.66	2.66	22.99	33.00	10.01	
1880.00	10.00	H		80.84	8.23	11.66	2.66	17.23	33.00	15.77	
1880.00		V		84.47	12.00	11.66	2.66	21.00	33.00	12.00	
1880.00	15.00	H		81.14	8.53	11.66	2.66	17.53	33.00	15.47	
1880.00		V		84.24	11.77	11.66	2.66	20.77	33.00	12.23	
1880.00	20.00	H		79.16	6.55	11.66	2.66	15.55	33.00	17.45	
1880.00		V		82.66	10.19	11.66	2.66	19.19	33.00	13.81	

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	84.89	10.84	10.90	2.51	19.23	30.00	10.77	
1732.50			V	86.91	12.54	10.90	2.51	20.93	30.00	9.07	
1732.50	3.00		H	82.20	8.15	10.90	2.51	16.54	30.00	13.46	
1732.50			V	86.16	11.79	10.90	2.51	20.18	30.00	9.82	
1732.50	5.00		H	81.98	7.93	10.90	2.51	16.32	30.00	13.68	
1732.50			V	81.15	6.78	10.90	2.51	15.17	30.00	14.83	
1732.50	10.00		H	81.73	7.68	10.90	2.51	16.07	30.00	13.93	
1732.50			V	84.56	10.19	10.90	2.51	18.58	30.00	11.42	
1732.50	15.00		H	82.10	8.05	10.90	2.51	16.44	30.00	13.56	
1732.50			V	83.37	9.00	10.90	2.51	17.39	30.00	12.61	
1732.50	20.00		H	82.16	8.11	10.90	2.51	16.50	30.00	13.50	
1732.50			V	83.45	9.08	10.90	2.51	17.47	30.00	12.53	
1732.50	1.40		16QAM	H	84.82	10.77	10.90	2.51	19.16	30.00	10.84
1732.50				V	87.28	12.91	10.90	2.51	21.30	30.00	8.70
1732.50	3.00			H	81.58	7.53	10.90	2.51	15.92	30.00	14.08
1732.50				V	81.35	6.98	10.90	2.51	15.37	30.00	14.63
1732.50	5.00	H		82.26	8.21	10.90	2.51	16.60	30.00	13.40	
1732.50		V		85.21	10.84	10.90	2.51	19.23	30.00	10.77	
1732.50	10.00	H		81.51	7.46	10.90	2.51	15.85	30.00	14.15	
1732.50		V		81.90	7.53	10.90	2.51	15.92	30.00	14.08	
1732.50	15.00	H		80.97	6.92	10.90	2.51	15.31	30.00	14.69	
1732.50		V		81.55	7.18	10.90	2.51	15.57	30.00	14.43	
1732.50	20.00	H		81.39	7.34	10.90	2.51	15.73	30.00	14.27	
1732.50		V		82.37	8.00	10.90	2.51	16.39	30.00	13.61	

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	78.93	4.7	0.00	0.50	4.2	38.45	34.25	
836.50			V	90.54	19.28	0.00	0.50	18.78	38.45	19.67	
836.50	3.00		H	78.56	4.33	0.00	0.50	3.83	38.45	34.62	
836.50			V	89.73	18.47	0.00	0.50	17.97	38.45	20.48	
836.50	5.00		H	78.21	3.98	0.00	0.50	3.48	38.45	34.97	
836.50			V	88.64	17.38	0.00	0.50	16.88	38.45	21.57	
836.50	10.00		H	78.12	3.89	0.00	0.50	3.39	38.45	35.06	
836.50			V	88.22	16.96	0.00	0.50	16.46	38.45	21.99	
836.50	1.40		16QAM	H	76.6	2.37	0.00	0.50	1.87	38.45	36.58
836.50				V	88.46	17.2	0.00	0.50	16.7	38.45	21.75
836.50	3.00	H		76.44	2.21	0.00	0.50	1.71	38.45	36.74	
836.50		V		87.66	16.4	0.00	0.50	15.9	38.45	22.55	
836.50	5.00	H		76.03	1.8	0.00	0.50	1.3	38.45	37.15	
836.50		V		86.45	15.19	0.00	0.50	14.69	38.45	23.76	
836.50	10.00	H		76.51	2.28	0.00	0.50	1.78	38.45	36.67	
836.50		V		86.88	15.62	0.00	0.50	15.12	38.45	23.33	

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	77.32	4.71	13.14	3.10	14.75	33.00	18.25	
2535.00			V	82.55	11.40	13.14	3.10	21.44	33.00	11.56	
2535.00	10.00		H	74.93	2.32	13.14	3.10	12.36	33.00	20.64	
2535.00			V	80.56	9.41	13.14	3.10	19.45	33.00	13.55	
2535.00	15.00		H	74.37	1.76	13.14	3.10	11.80	33.00	21.20	
2535.00			V	80.87	9.72	13.14	3.10	19.76	33.00	13.24	
2535.00	20.00		H	74.63	2.02	13.14	3.10	12.06	33.00	20.94	
2535.00			V	80.57	9.42	13.14	3.10	19.46	33.00	13.54	
2535.00	5.00		16QAM	H	77.09	4.48	13.14	3.10	14.52	33.00	18.48
2535.00				V	82.26	11.11	13.14	3.10	21.15	33.00	11.85
2535.00	10.00	H		72.81	0.20	13.14	3.10	10.24	33.00	22.76	
2535.00		V		79.40	8.25	13.14	3.10	18.29	33.00	14.71	
2535.00	15.00	H		73.84	1.23	13.14	3.10	11.27	33.00	21.73	
2535.00		V		79.62	8.47	13.14	3.10	18.51	33.00	14.49	
2535.00	20.00	H		73.29	0.68	13.14	3.10	10.72	33.00	22.28	
2535.00		V		79.98	8.83	13.14	3.10	18.87	33.00	14.13	

LTE Band 17

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)			
710.00	5	QPSK	H	80.27	4.37	0.00	0.39	3.98	34.77	30.79
710.00			V	90.45	17.45	0.00	0.39	17.06	34.77	17.71
710.00	10		H	80.16	4.26	0.00	0.39	3.87	34.77	30.90
710.00			V	90.25	17.25	0.00	0.39	16.86	34.77	17.91
710.00	5	16QAM	H	80.12	4.22	0.00	0.39	3.83	34.77	30.94
710.00			V	89.54	16.54	0.00	0.39	16.15	34.77	18.62
710.00	10		H	79.92	4.02	0.00	0.39	3.63	34.77	31.14
710.00			V	89.24	16.24	0.00	0.39	15.85	34.77	18.92

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, RSS-GEN §6.7- OCCUPIED BANDWIDTH

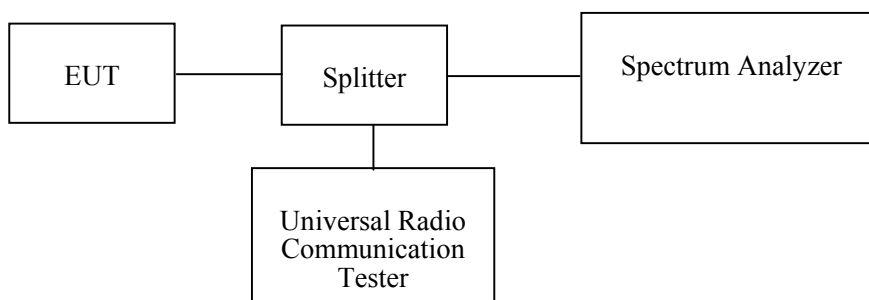
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238 and §27.53; RSS-GEN §6.7

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	EMI Test Receiver	ESPI	100120	2018-12-10	2019-12-10
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	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:	22.3~22.8°C
Relative Humidity:	54~59 %
ATM Pressure:	100.4~101.6 kPa

The testing was performed by Carrie He & Tiago Huang from 2019-01-05 to 2019-04-04.

Test Mode: Transmitting

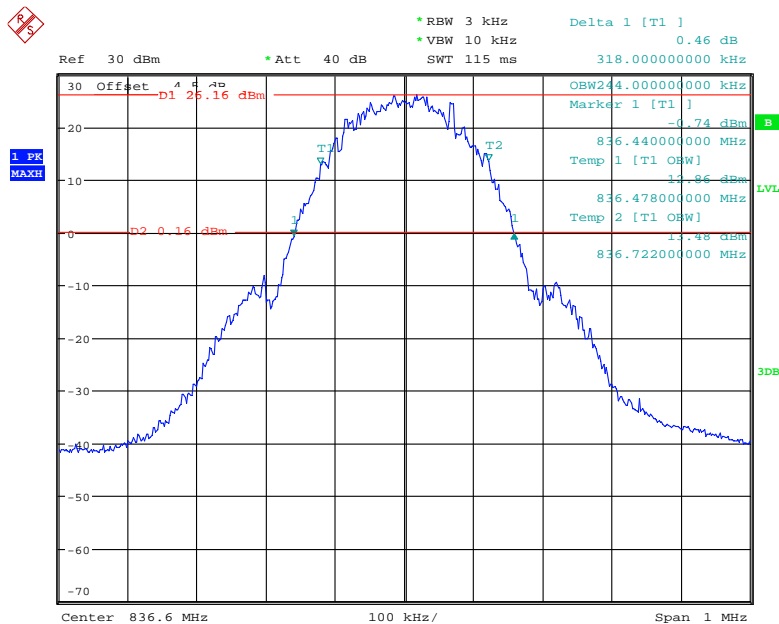
Test Result: Compliant. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.244	0.318
		EDGE	0.248	0.314
PCS		GSM	0.246	0.318
		EDGE	0.246	0.318
WCDMA Band II		Rel 99	4.180	4.740
		HSDPA	4.200	4.740
		HSUPA	4.180	4.740
WCDMA Band IV		Rel 99	4.200	4.760
		HSDPA	4.200	4.740
		HSUPA	4.200	4.740
WCDMA Band V		Rel 99	4.180	4.760
		HSDPA	4.200	4.840
	HSUPA	4.220	5.520	

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.100	1.305
		16QAM	1.106	1.311
	3 MHz	QPSK	2.693	2.862
		16QAM	2.681	2.874
	5 MHz	QPSK	4.569	5.230
		16QAM	4.549	5.230
	10 MHz	QPSK	9.018	10.100
		16QAM	9.018	9.659
	15 MHz	QPSK	13.647	15.210
		16QAM	13.587	15.271
	20 MHz	QPSK	18.036	19.880
		16QAM	18.036	19.880
LTE Band 4	1.4 MHz	QPSK	1.100	1.305
		16QAM	1.106	1.317
	3 MHz	QPSK	2.681	2.886
		16QAM	2.681	2.862
	5 MHz	QPSK	4.549	5.190
		16QAM	4.549	5.170
	10 MHz	QPSK	9.018	9.940
		16QAM	8.978	9.739
	15 MHz	QPSK	13.647	15.271
		16QAM	13.587	15.150
	20 MHz	QPSK	18.036	19.639
		16QAM	18.036	19.559
LTE Band 5	1.4 MHz	QPSK	1.100	1.311
		16QAM	1.106	1.317
	3 MHz	QPSK	2.681	2.862
		16QAM	2.681	2.874
	5 MHz	QPSK	4.549	5.251
		16QAM	4.529	5.110
	10 MHz	QPSK	8.978	10.261
		16QAM	8.978	9.780

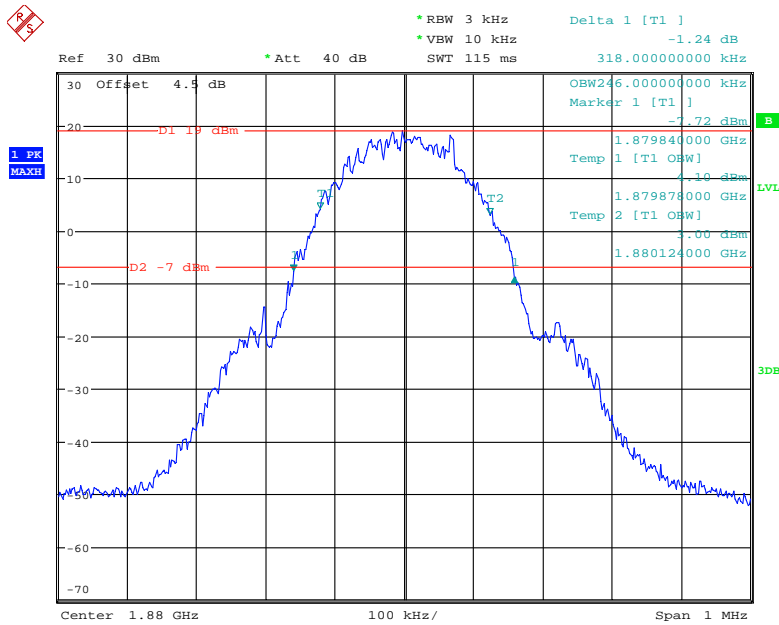
Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 7	5 MHz	QPSK	4.549	5.210
		16QAM	4.549	5.210
	10 MHz	QPSK	9.018	10.140
		16QAM	8.978	9.940
	15 MHz	QPSK	13.587	15.210
		16QAM	13.527	15.210
20 MHz	QPSK	17.956	19.639	
	16QAM	17.956	19.719	
LTE Band 17	5 MHz	QPSK	4.569	5.291
		16QAM	4.549	5.190
	10 MHz	QPSK	8.978	9.980
		16QAM	8.978	9.820

GSM 850 Cellular Band



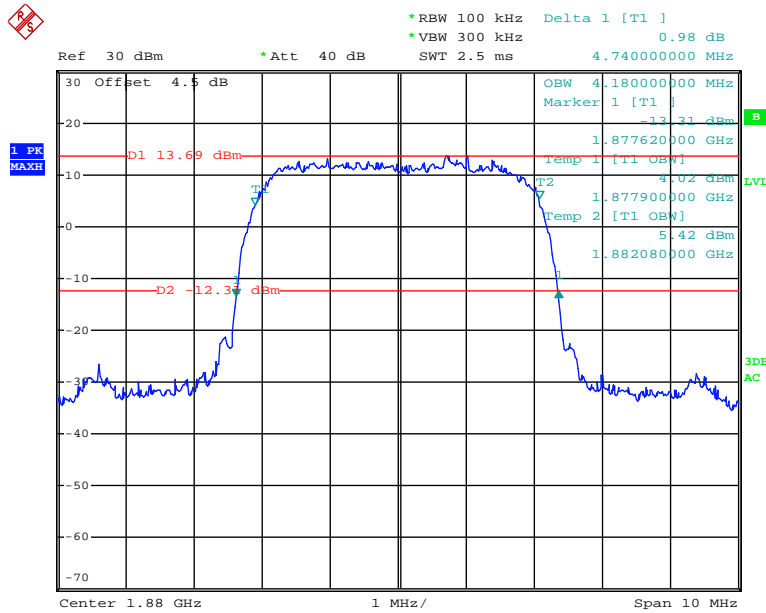
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EDGE PCS1900 Cellular Band



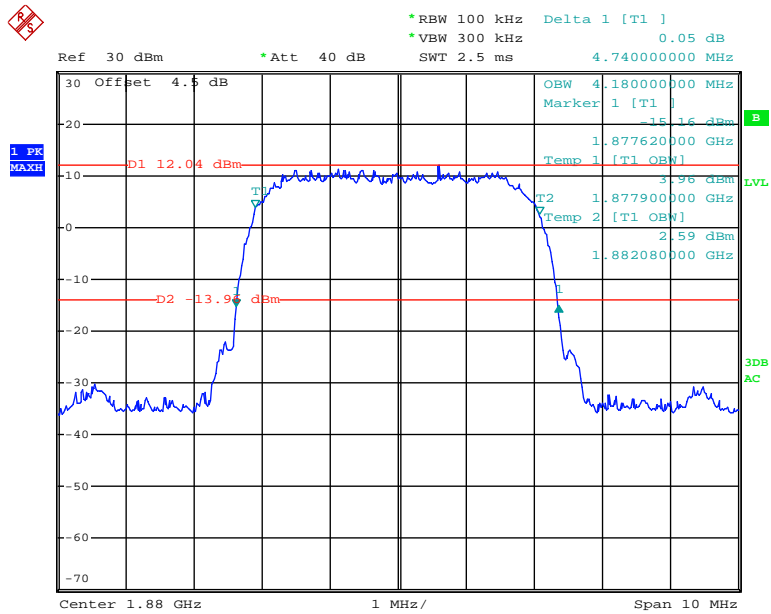
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WCDMA Band II, Rel 99



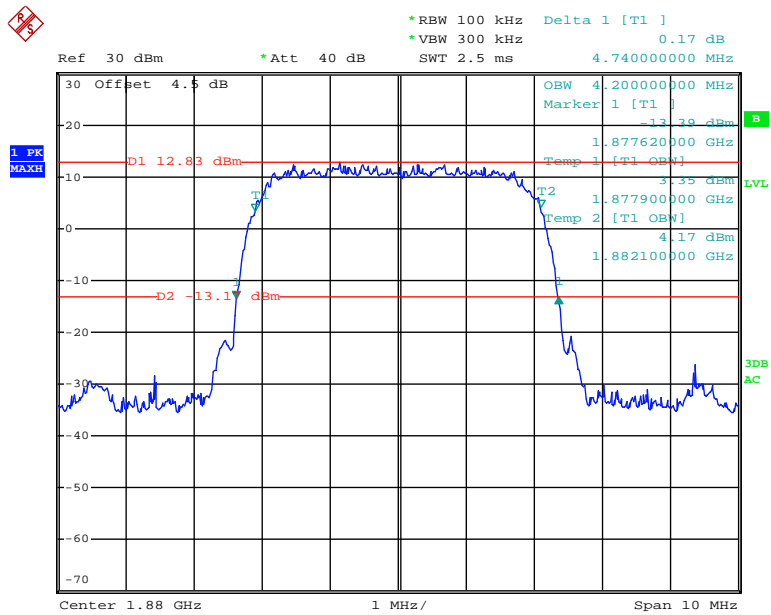
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WCDMA Band II, HSUPA



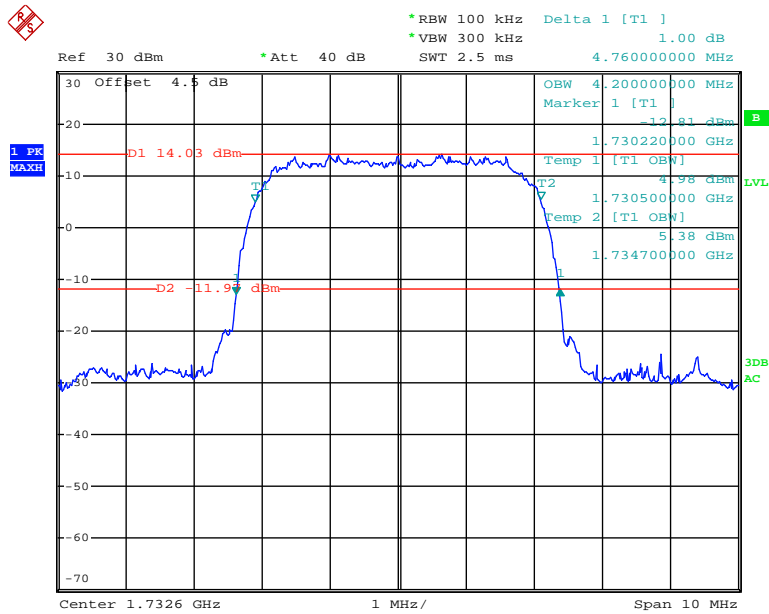
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WCDMA Band II, HSDPA



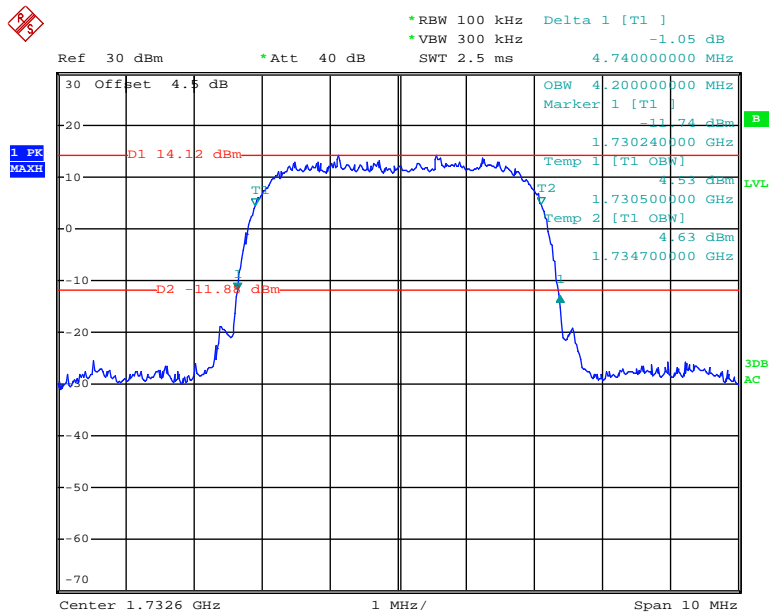
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WCDMA Band IV, Rel 99



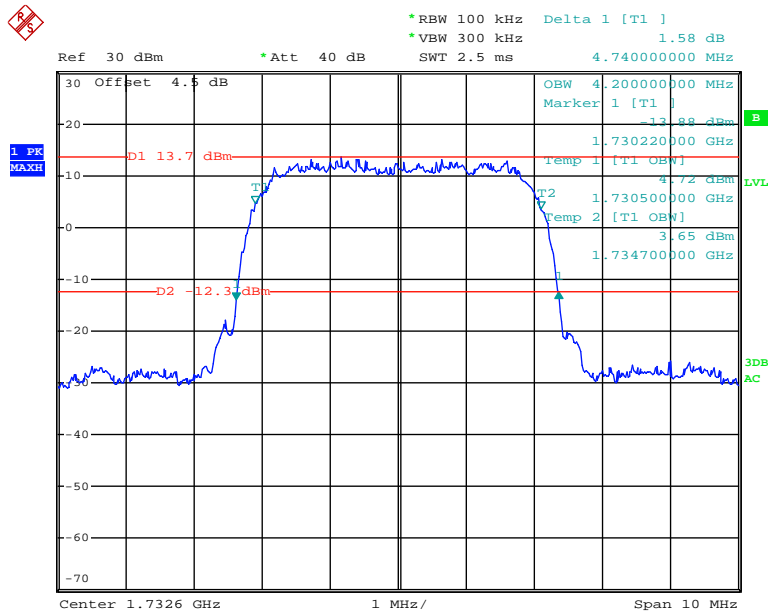
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WCDMA Band IV, HSDPA



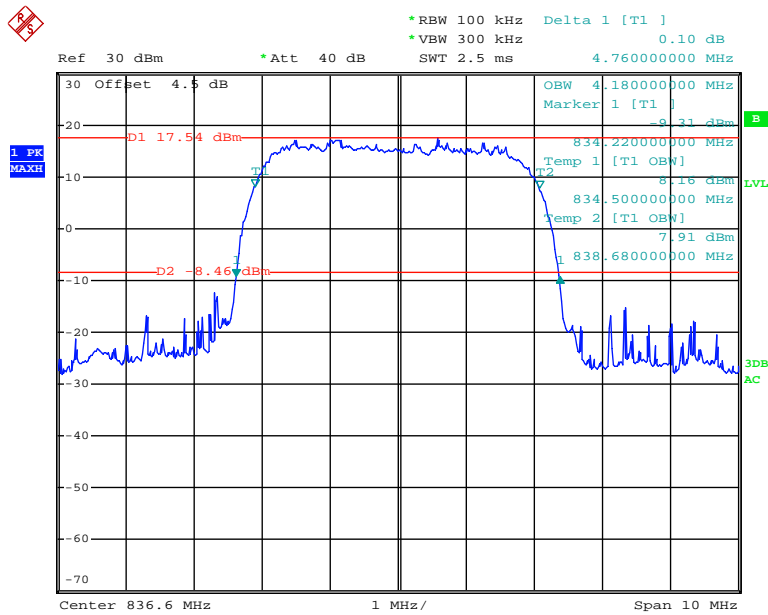
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WCDMA Band IV, HSUPA



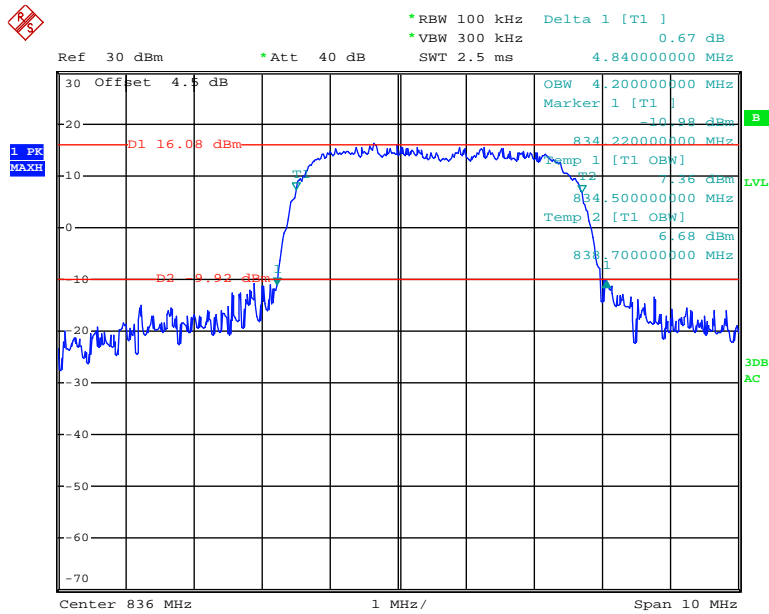
Date: 5.JAN.2019 11:27:18

WCDMA Band V, Rel 99



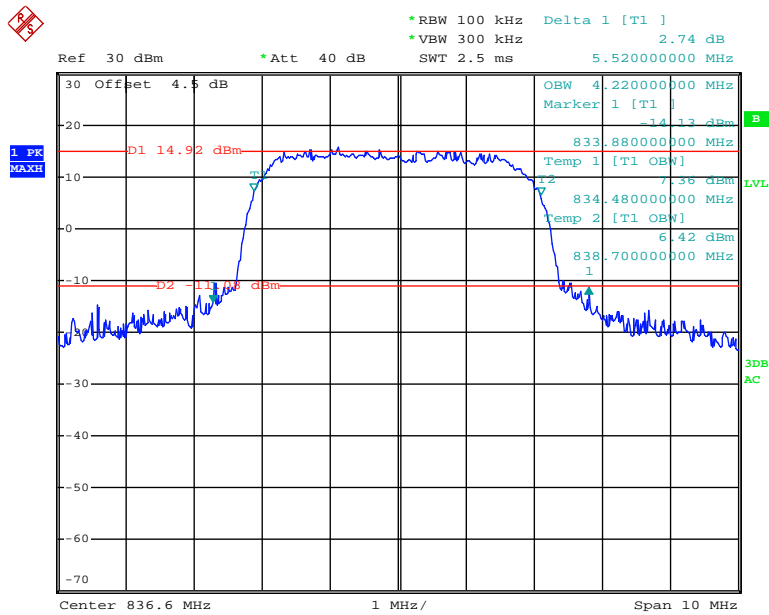
Date: 5.JAN.2019 10:36:24

WCDMA Band V, HSDPA



Date: 5.JAN.2019 11:08:52

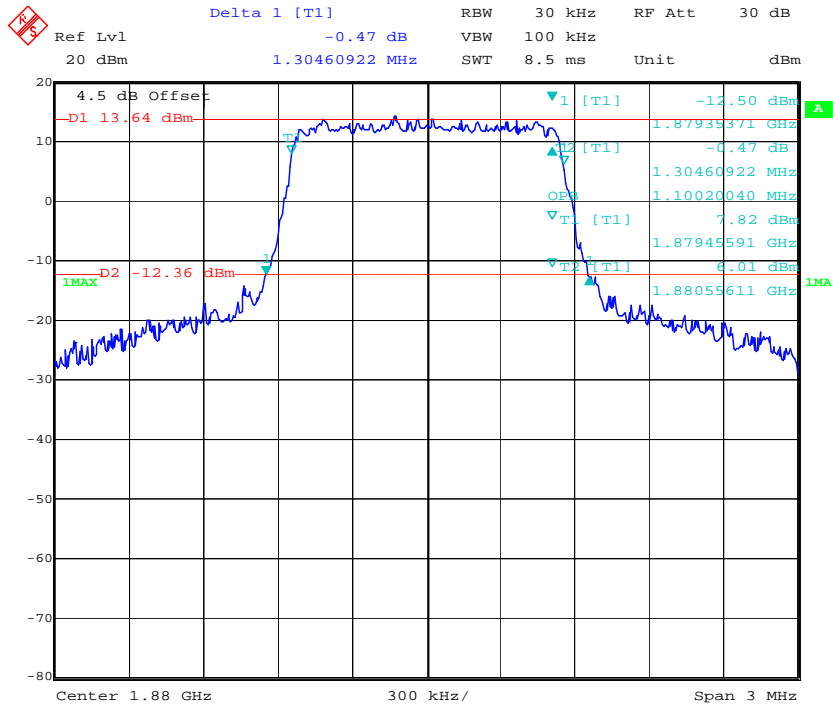
WCDMA Band V, HSUPA



Date: 5.JAN.2019 11:28:49

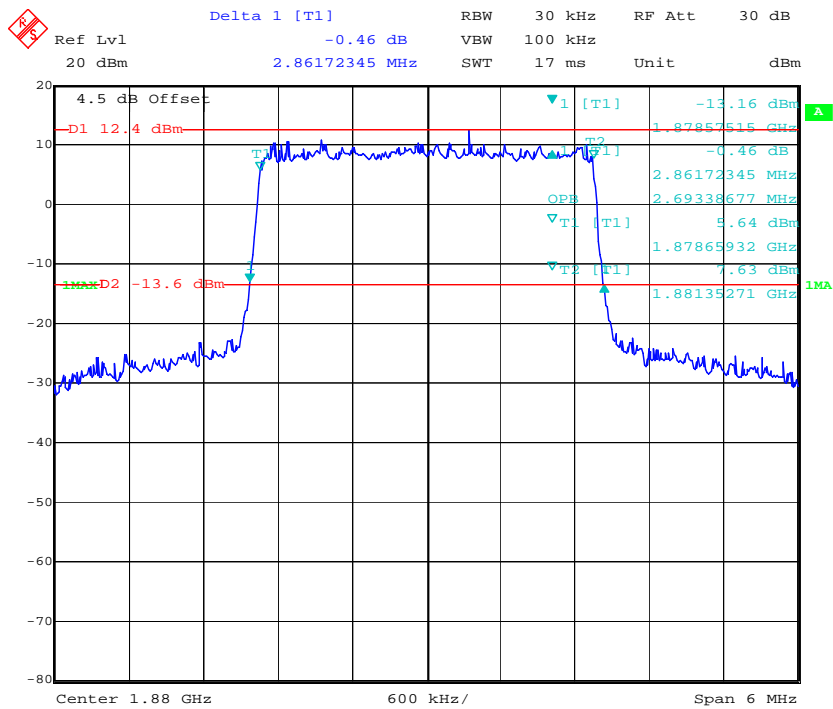
LTE Band 2

QPSK_1.4 MHz



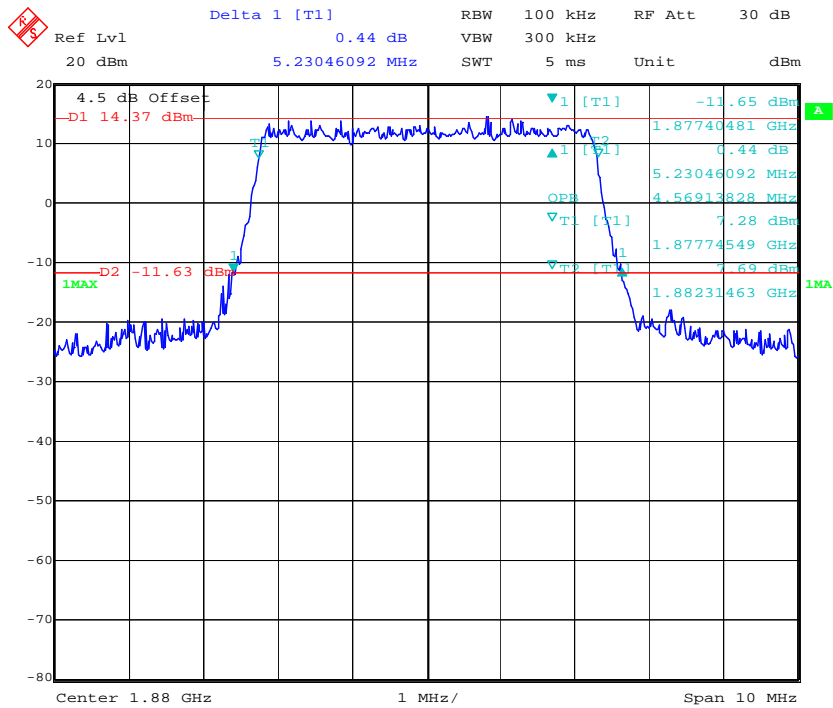
Date: 7.JAN.2019 21:17:30

QPSK_3 MHz



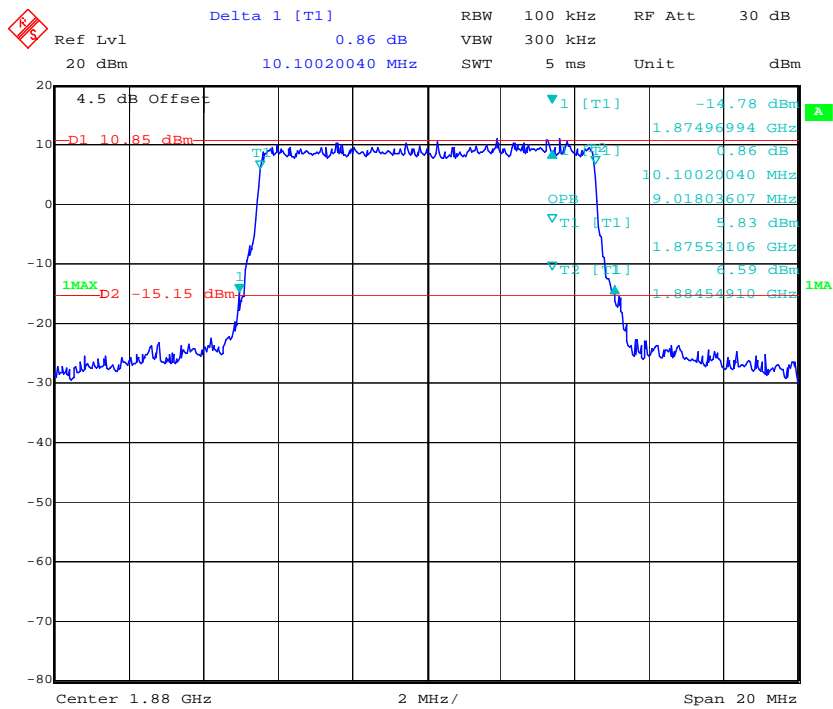
Date: 7.JAN.2019 21:18:42

QPSK_5 MHz



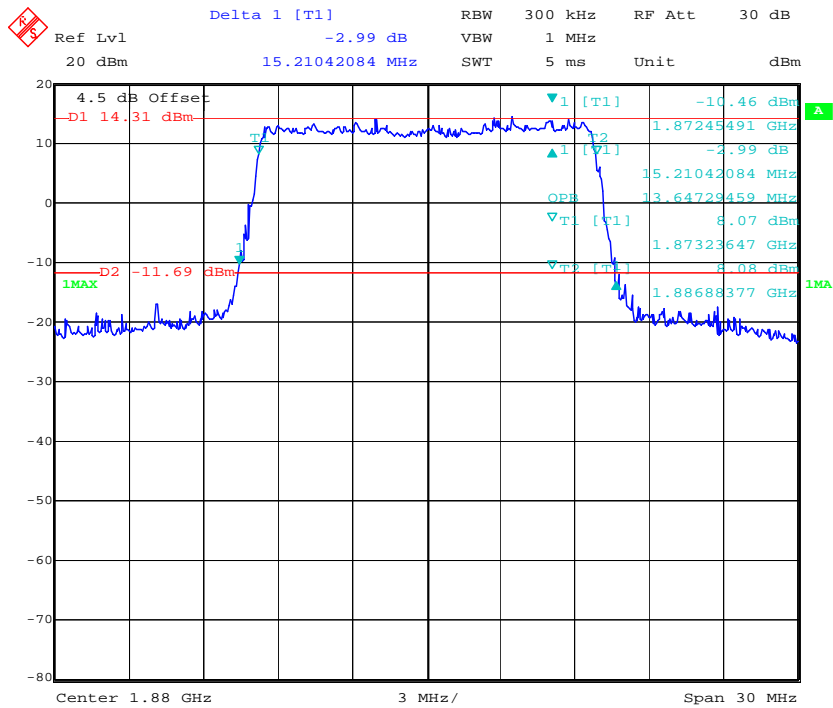
Date: 7.JAN.2019 21:20:07

QPSK_10 MHz



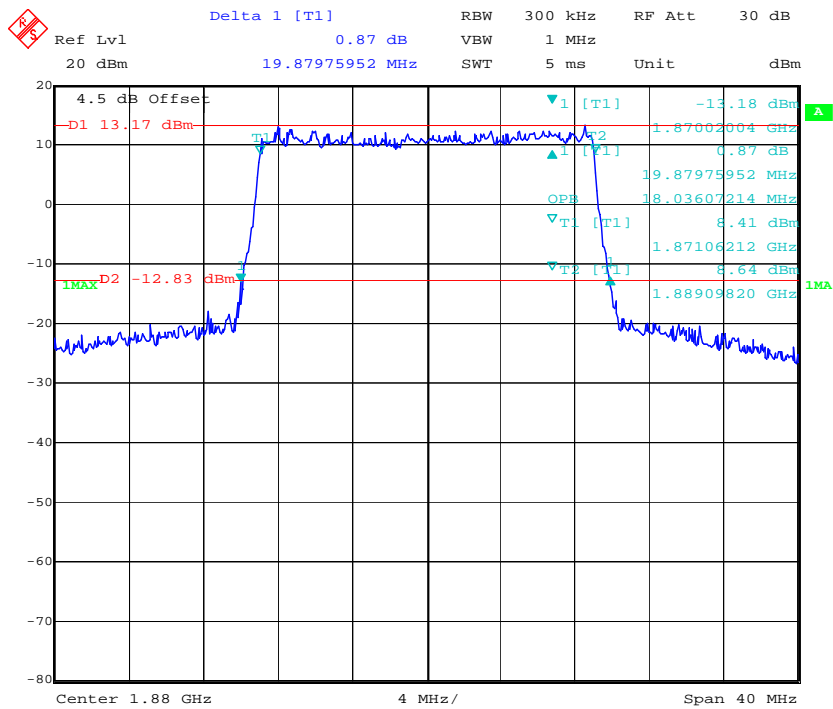
Date: 7.JAN.2019 21:21:41

QPSK_15 MHz



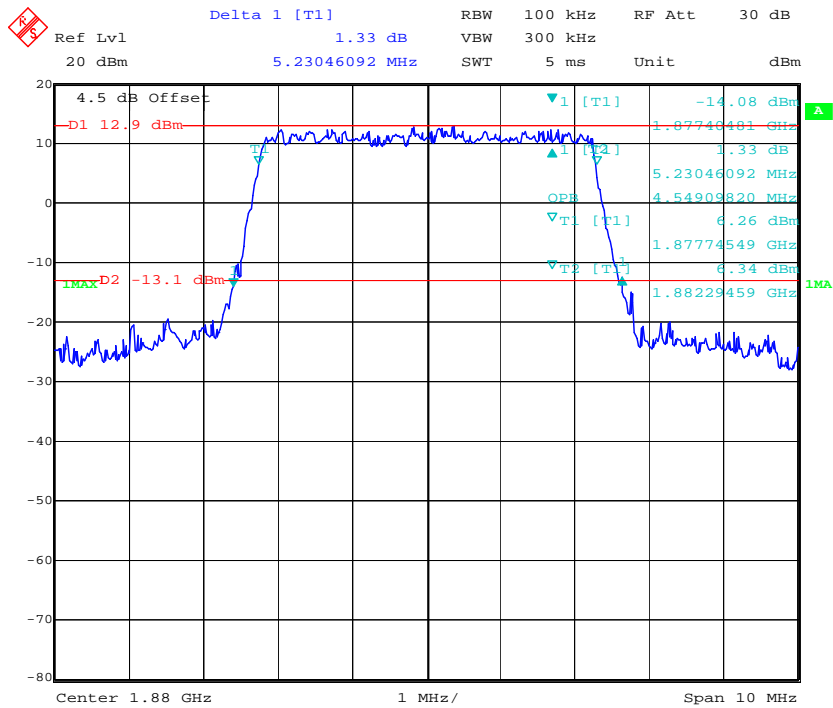
Date: 7.JAN.2019 21:23:00

QPSK_20 MHz



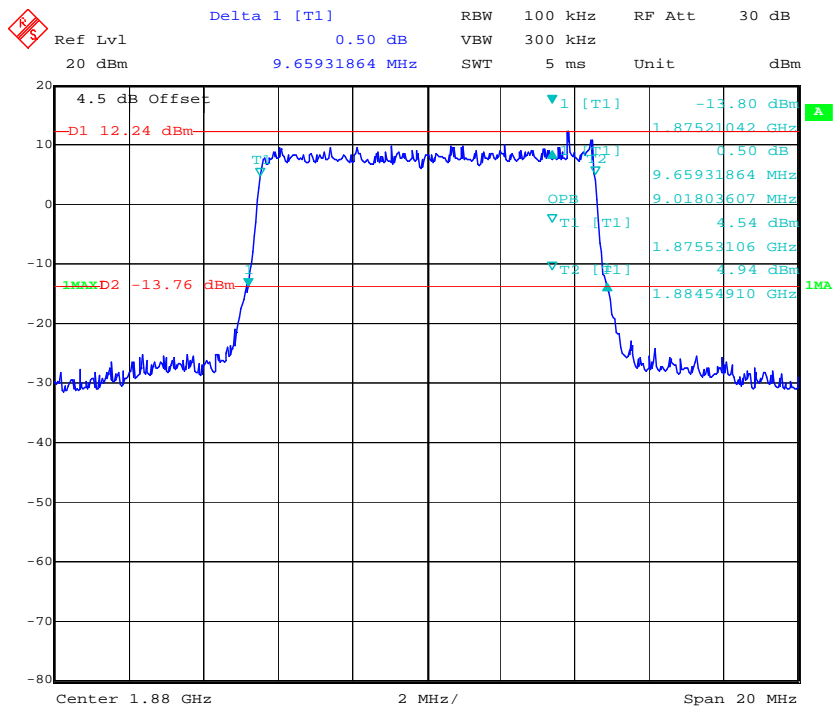
Date: 7.JAN.2019 21:24:18

16QAM_5 MHz



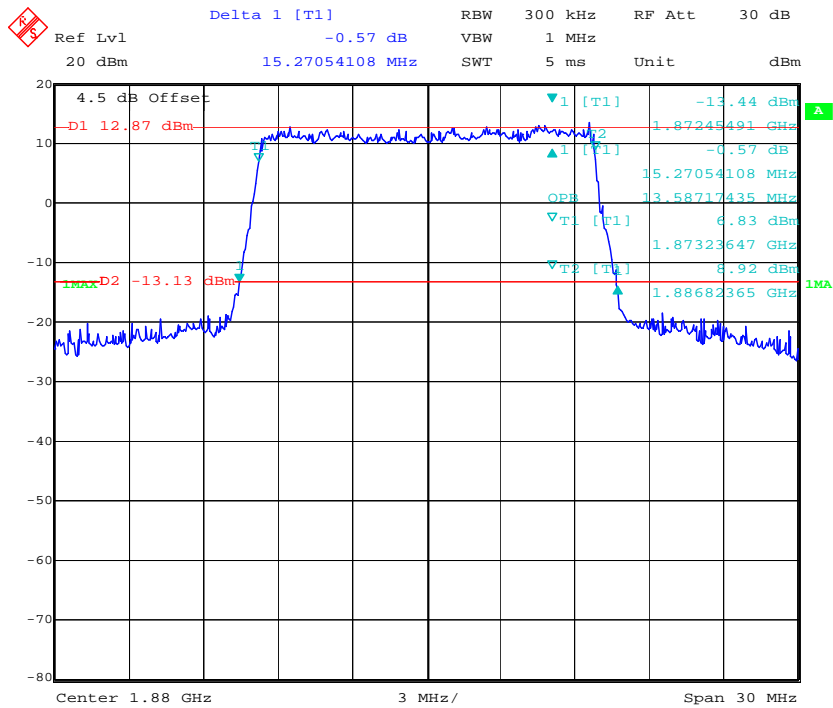
Date: 7.JAN.2019 21:20:56

16QAM_10 MHz

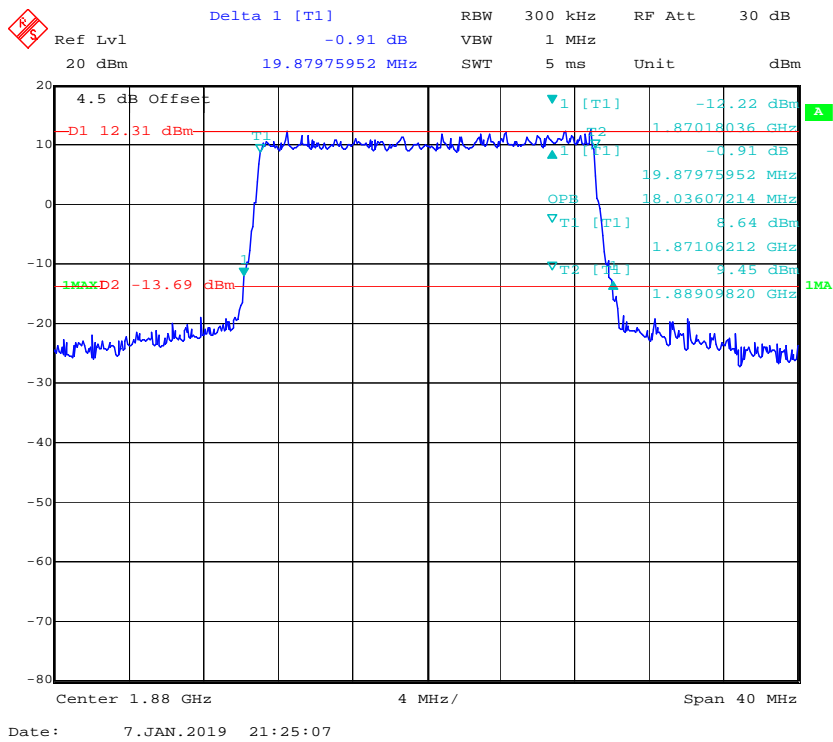


Date: 7.JAN.2019 21:22:14

16QAM_15 MHz

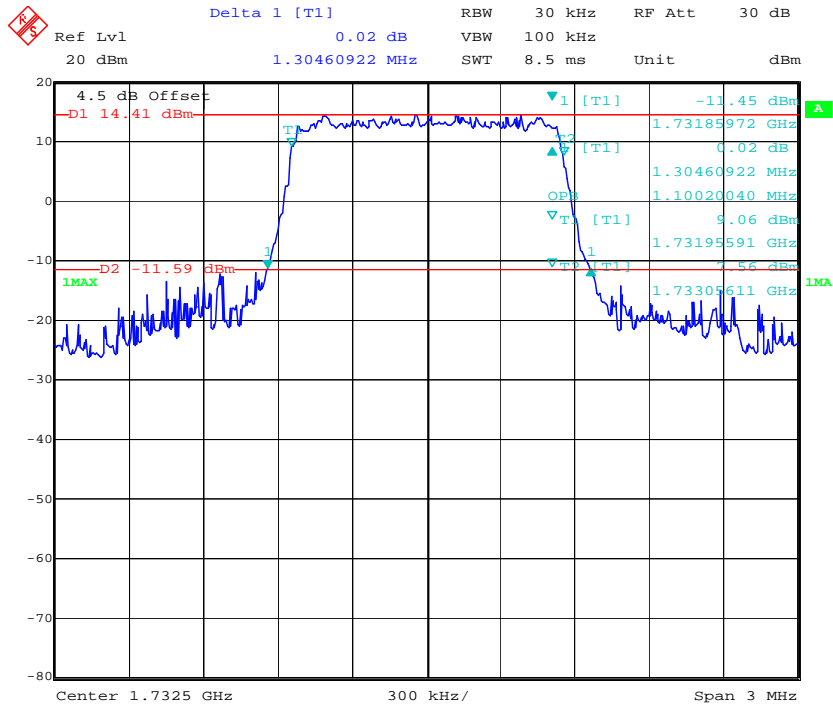


16QAM_20 MHz



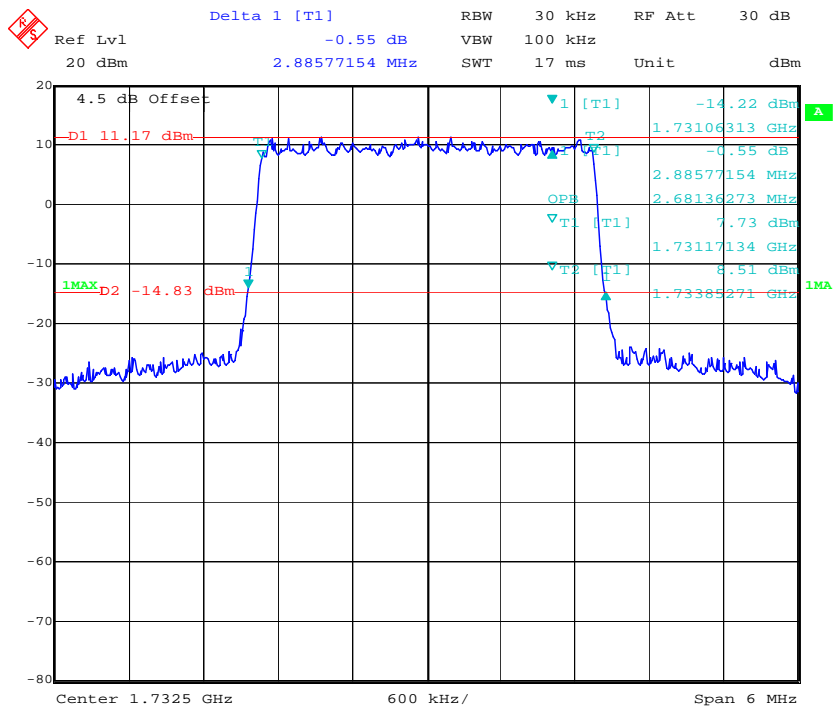
LTE Band 4

QPSK_1.4 MHz



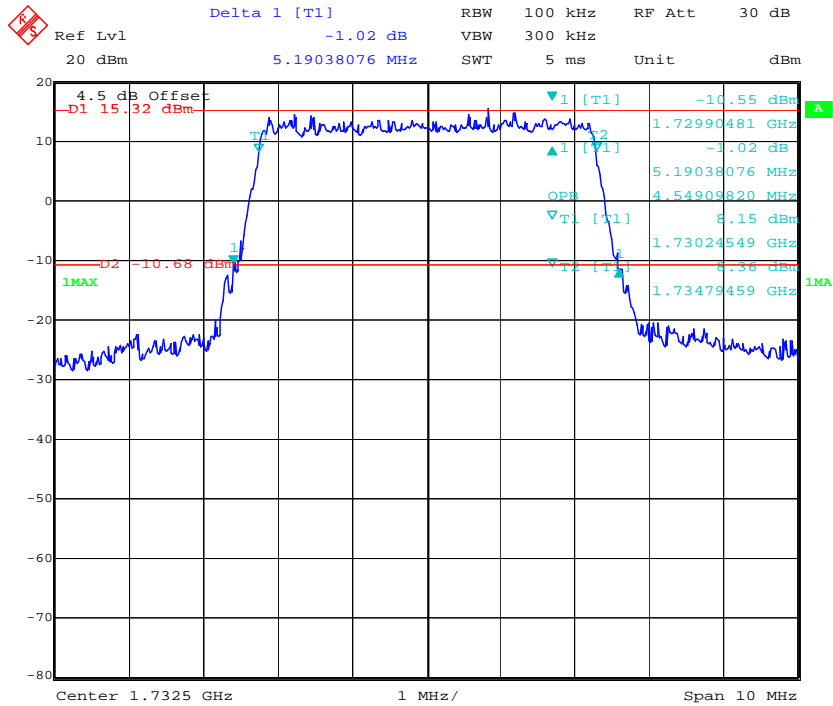
Date: 7.JAN.2019 21:25:53

QPSK_3 MHz



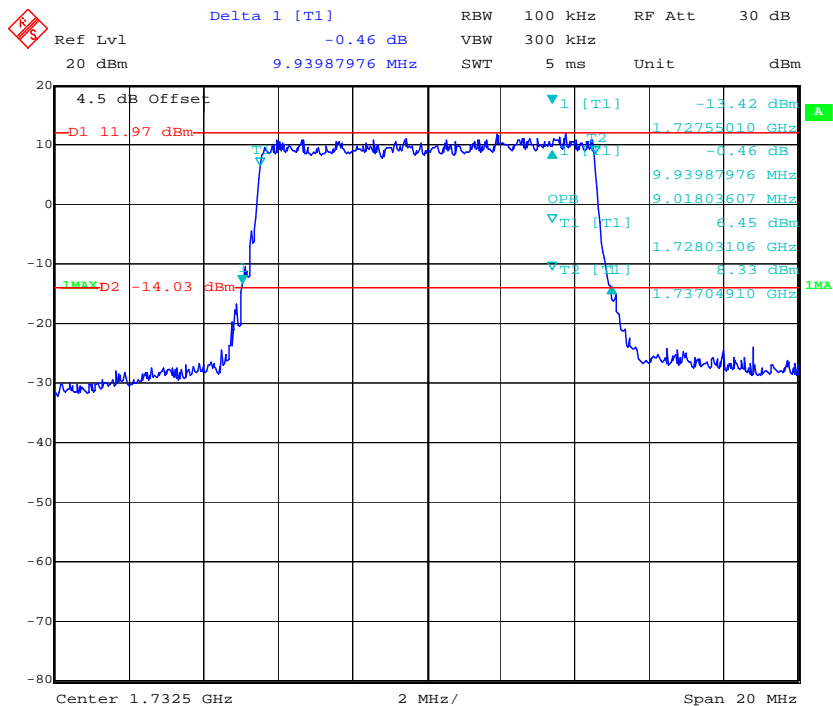
Date: 7.JAN.2019 21:27:06

QPSK_5 MHz



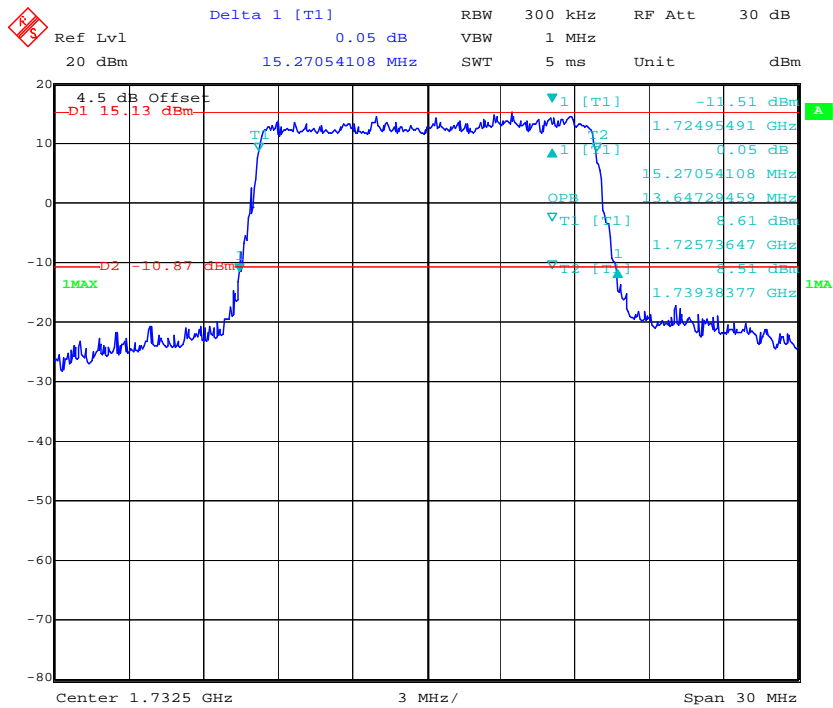
Date: 7.JAN.2019 21:28:14

QPSK_10 MHz



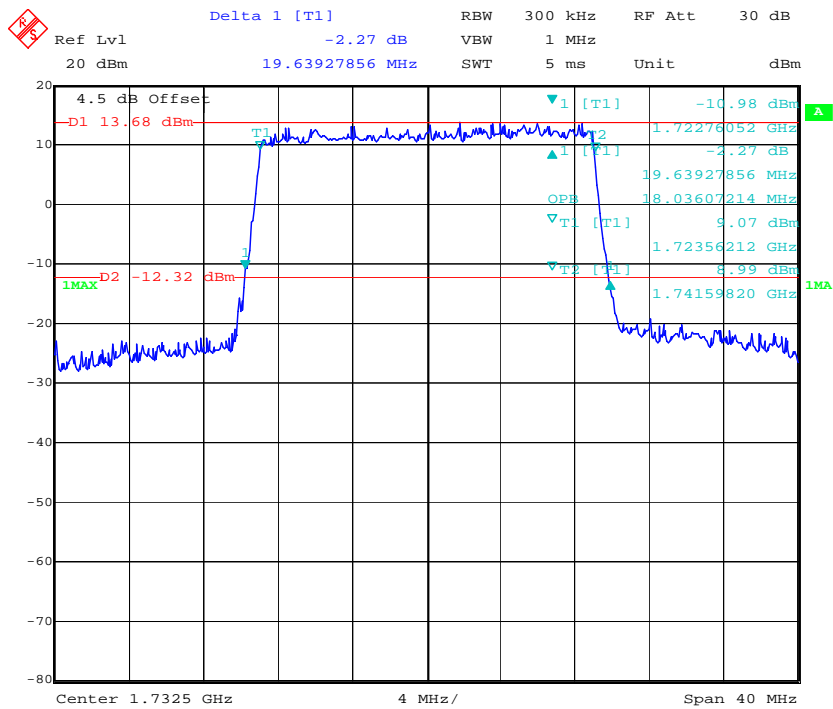
Date: 7.JAN.2019 21:29:42

QPSK_15 MHz



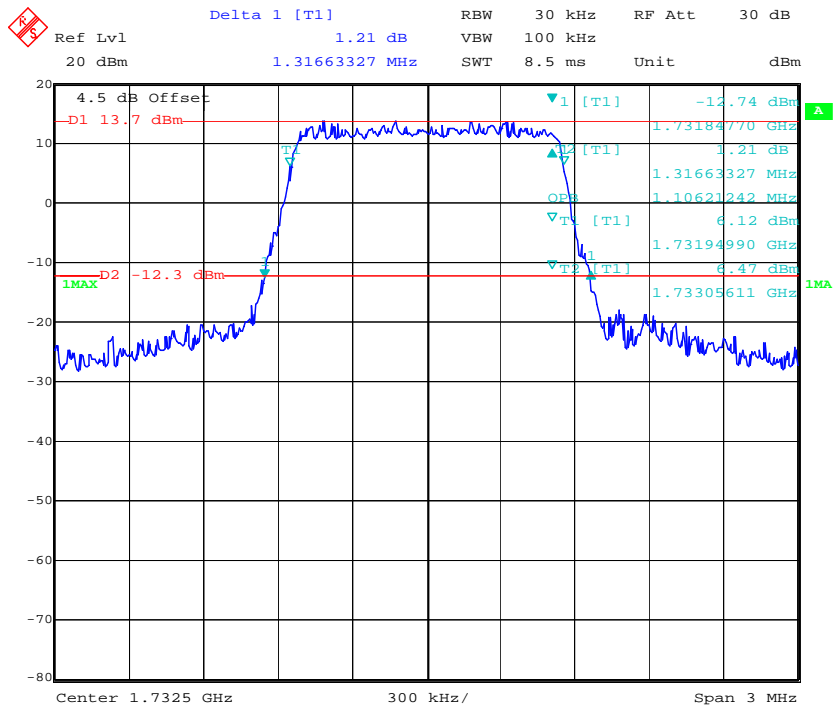
Date: 7.JAN.2019 21:31:07

QPSK_20 MHz



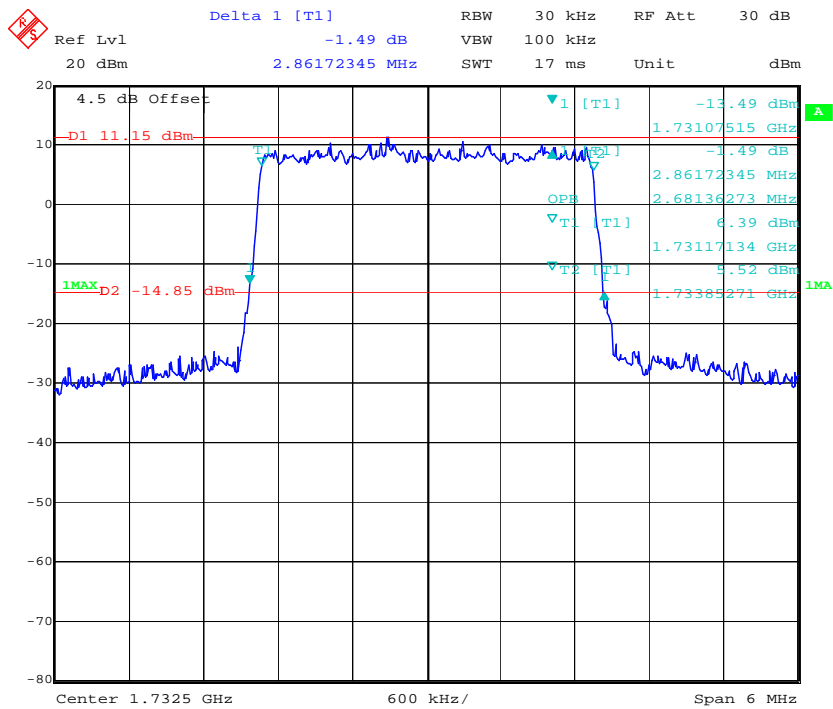
Date: 7.JAN.2019 21:32:39

16QAM_1.4 MHz



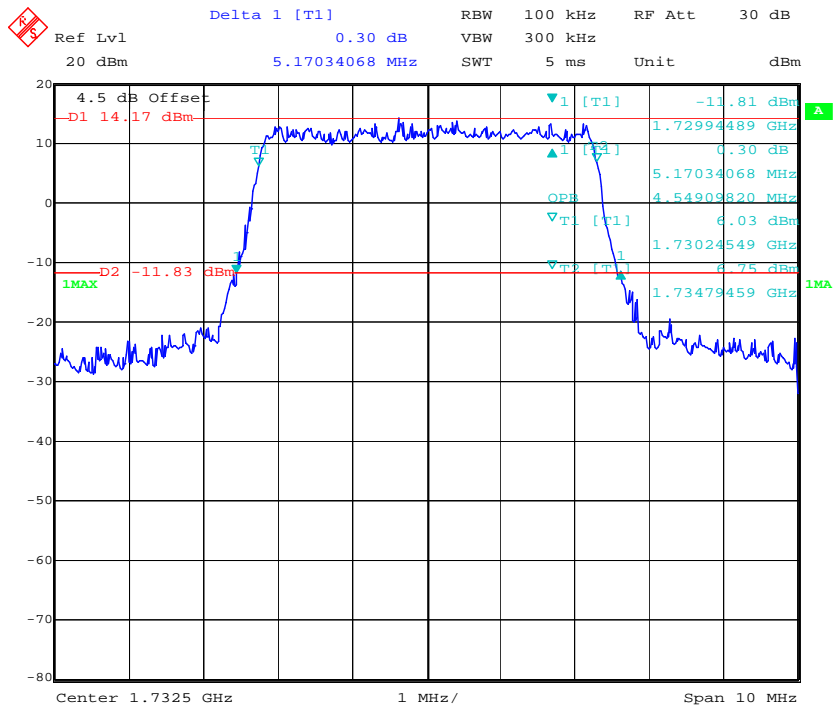
Date: 7.JAN.2019 21:26:25

16QAM_3 MHz

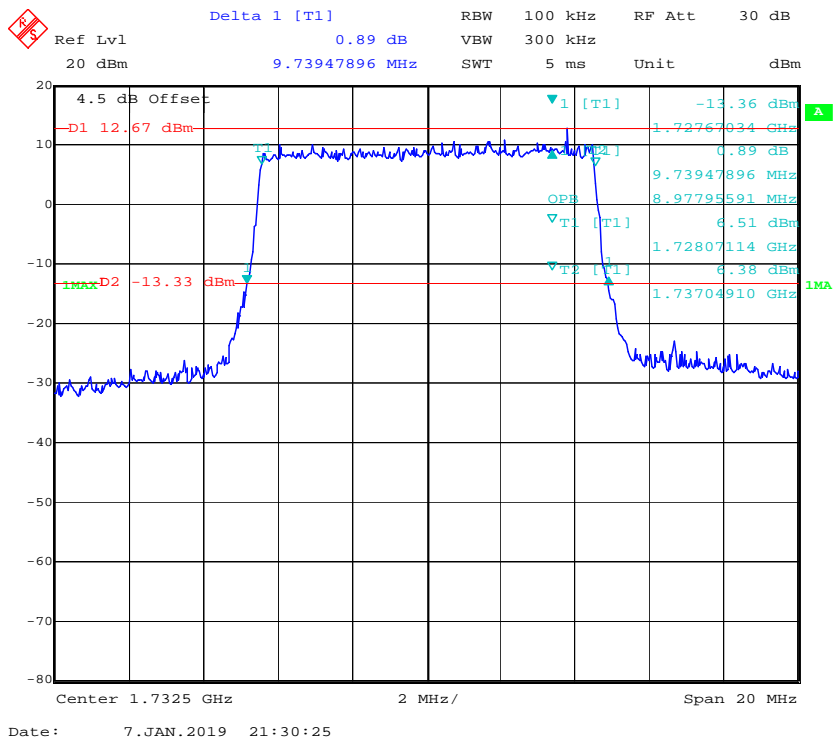


Date: 7.JAN.2019 21:27:35

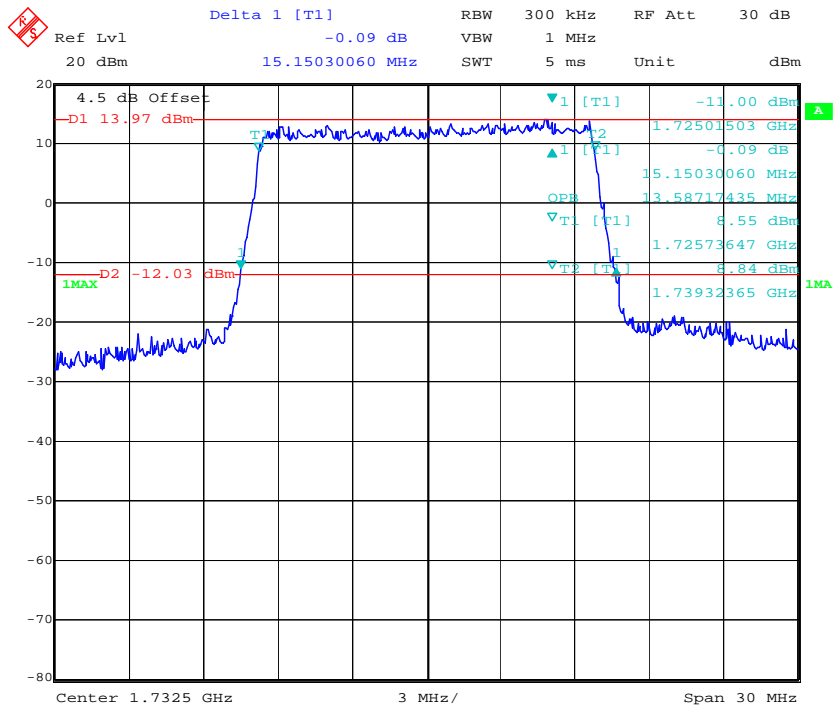
16QAM_5 MHz



16QAM_10 MHz

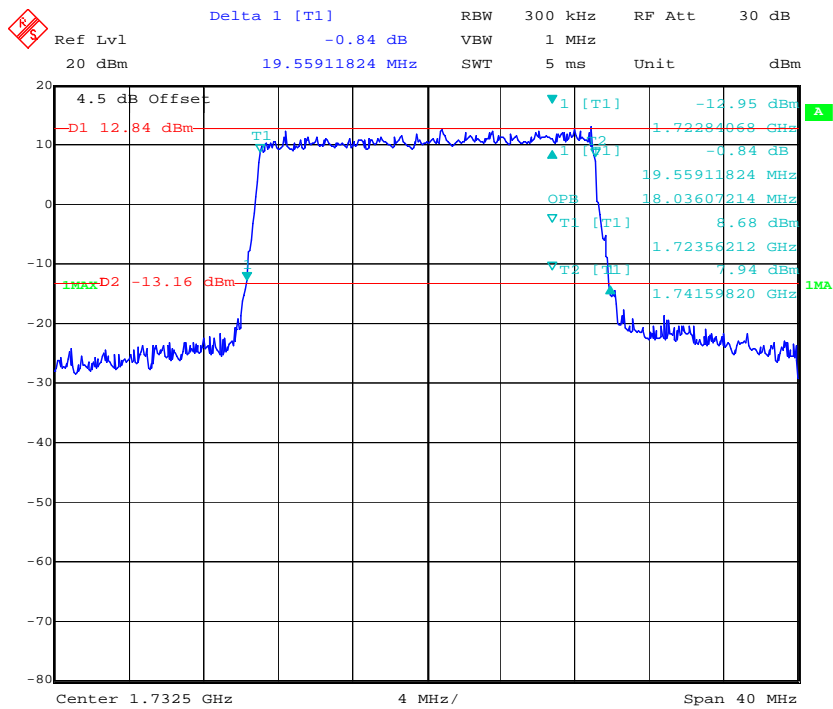


16QAM_15 MHz



Date: 7.JAN.2019 21:31:50

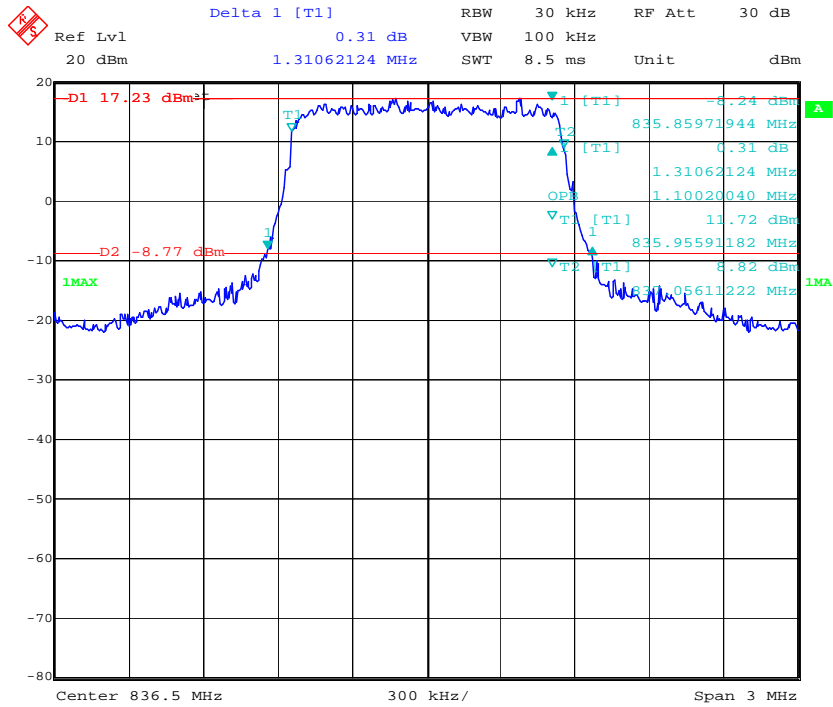
16QAM_20 MHz



Date: 7.JAN.2019 21:33:18

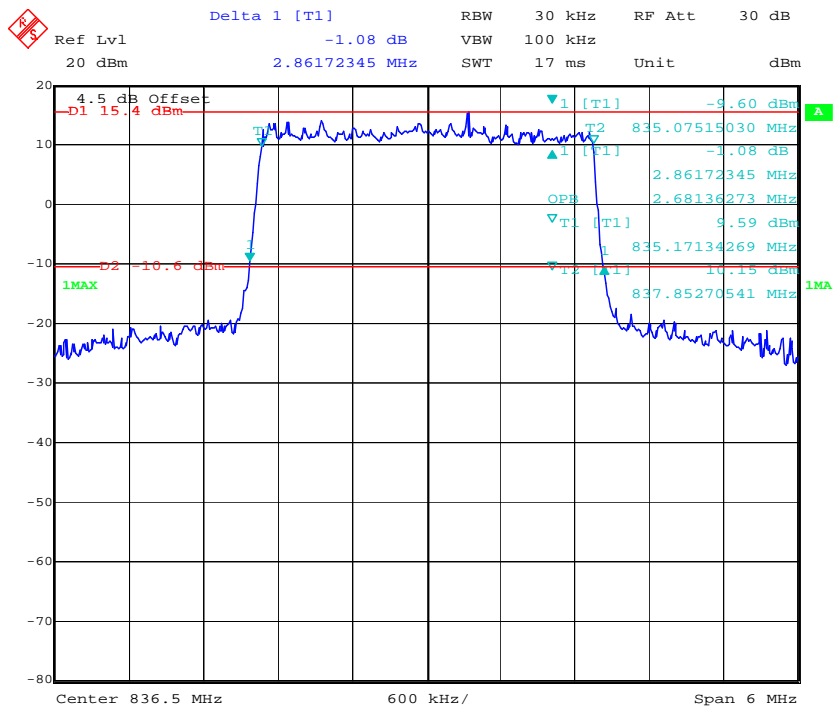
LTE Band 5:

QPSK_1.4 MHz



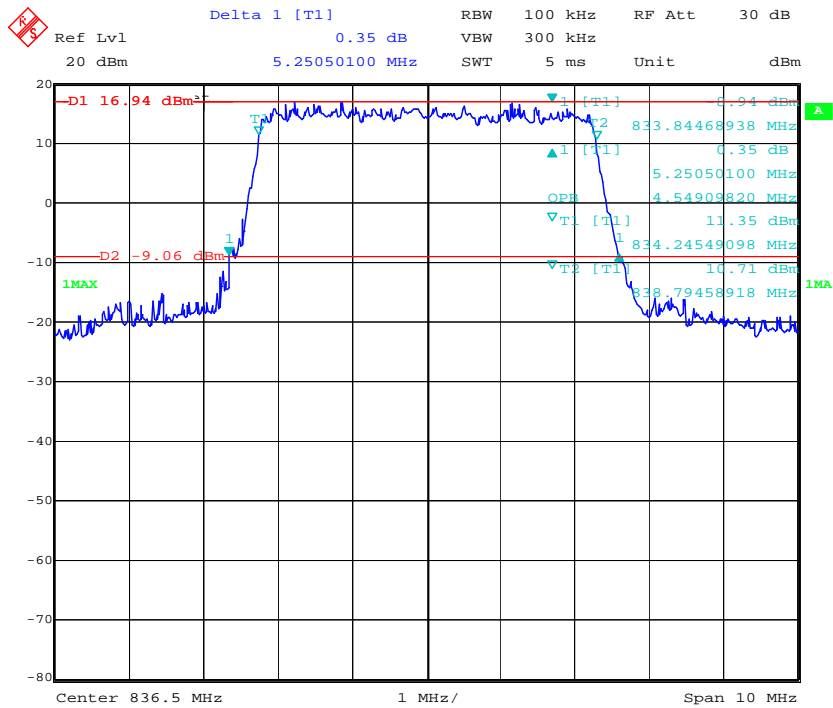
Date: 7.JAN.2019 21:33:54

QPSK_3 MHz



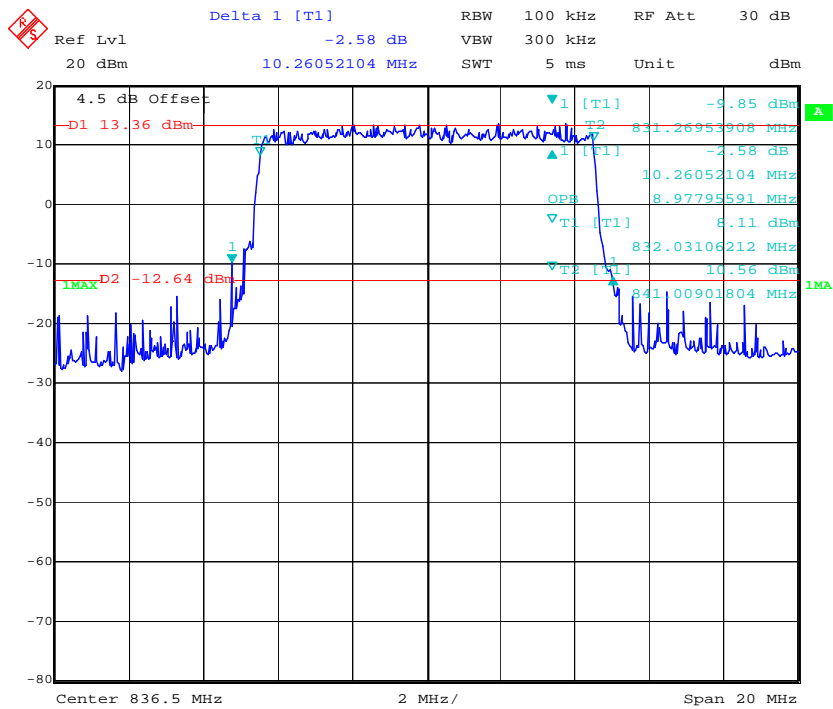
Date: 7.JAN.2019 21:35:13

QPSK_5 MHz



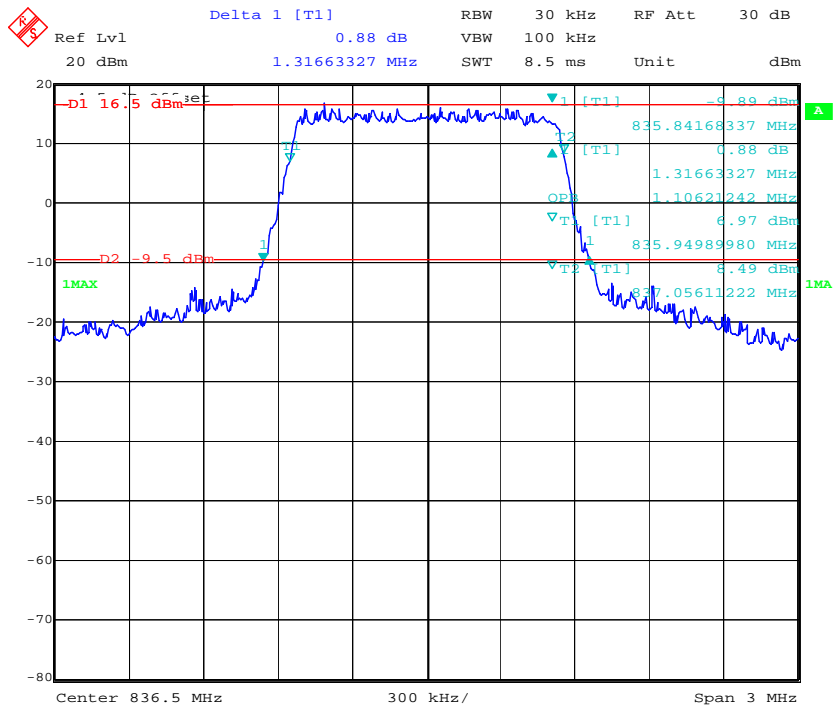
Date: 7.JAN.2019 21:36:34

QPSK_10 MHz

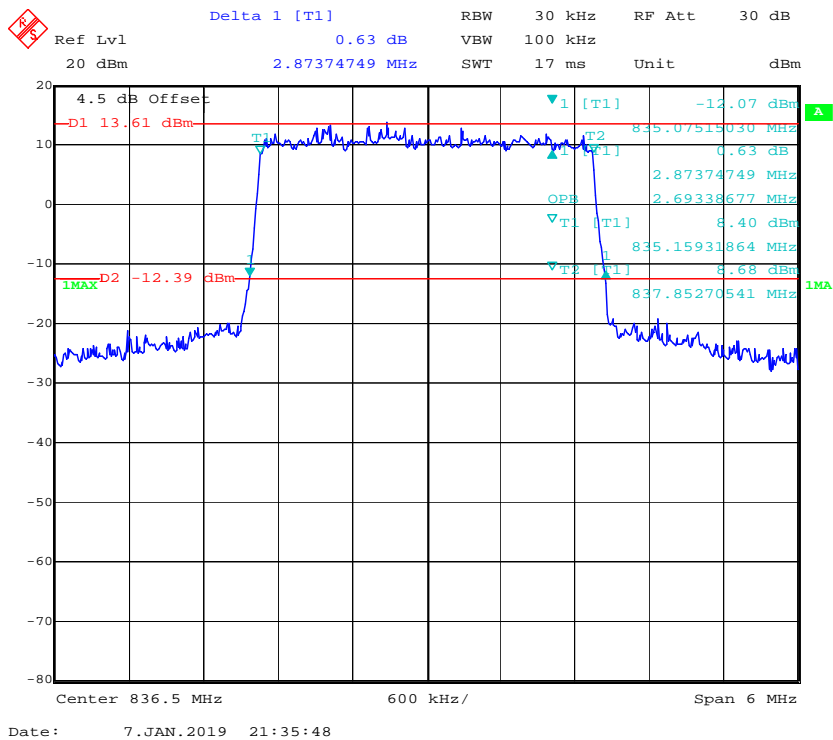


Date: 7.JAN.2019 21:37:46

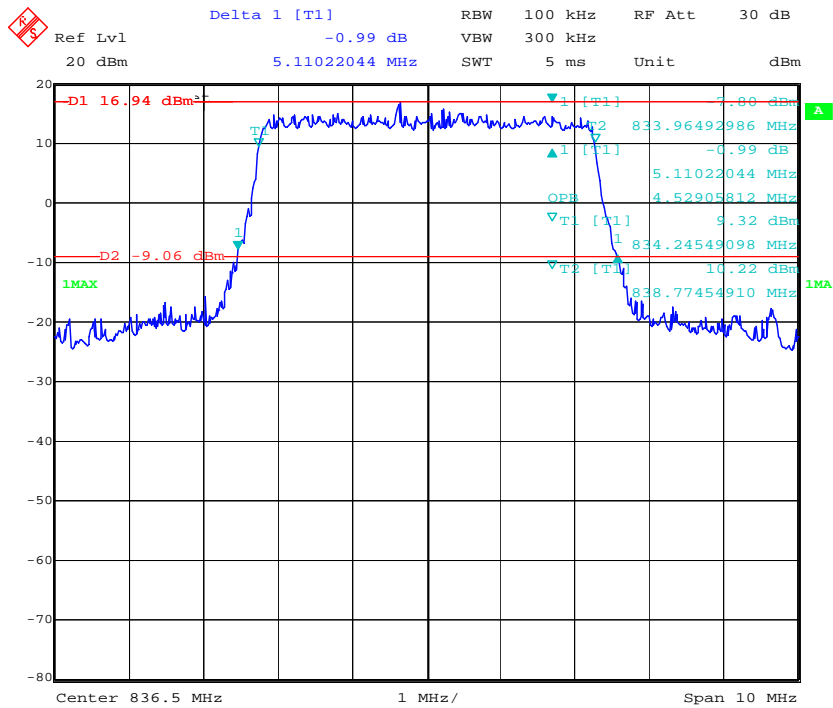
16QAM_1.4 MHz



16QAM_3 MHz

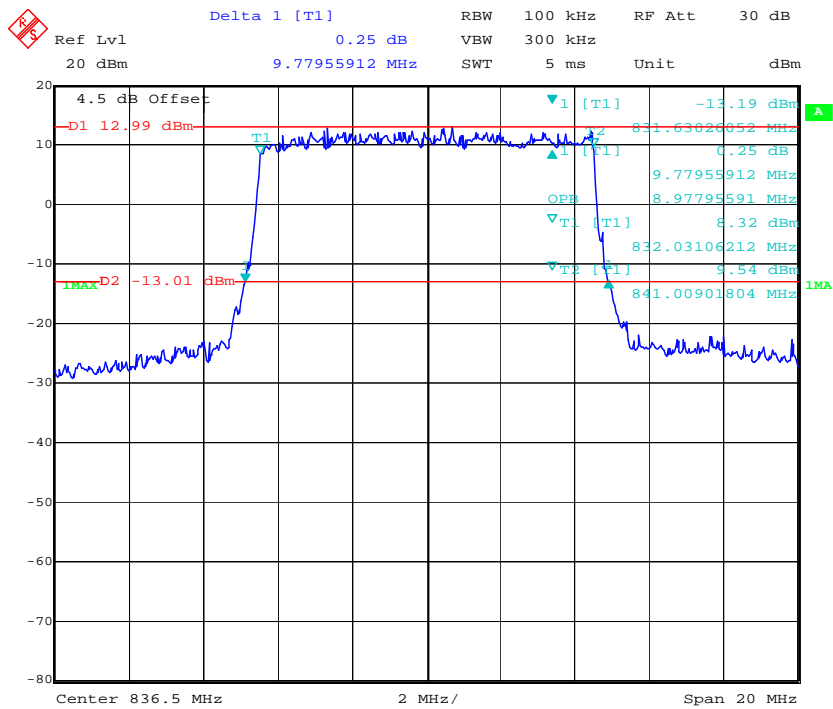


16QAM_5 MHz



Date: 7.JAN.2019 21:37:04

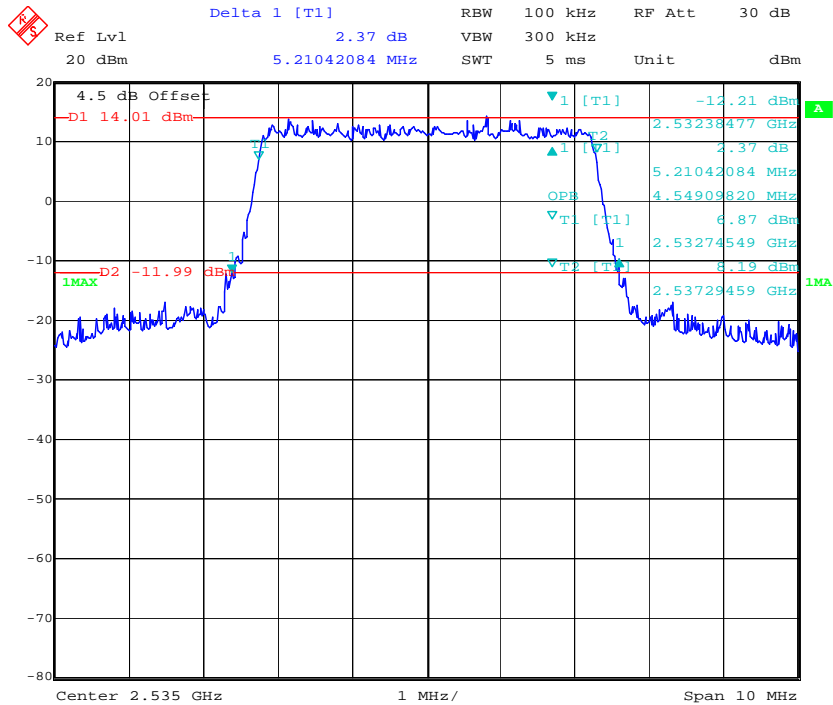
16QAM_10 MHz



Date: 7.JAN.2019 21:38:22

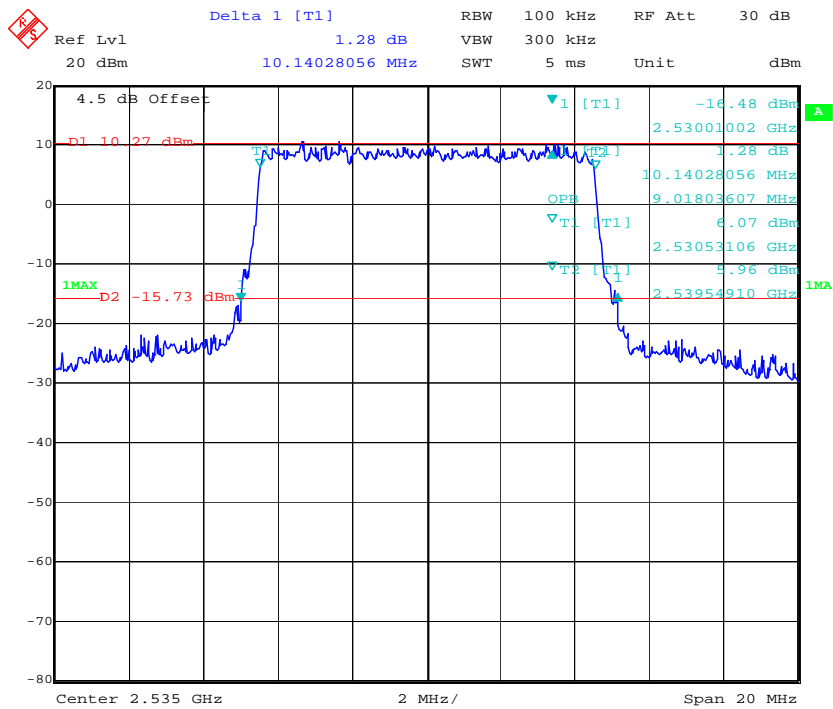
LTE Band 7:

QPSK_5 MHz



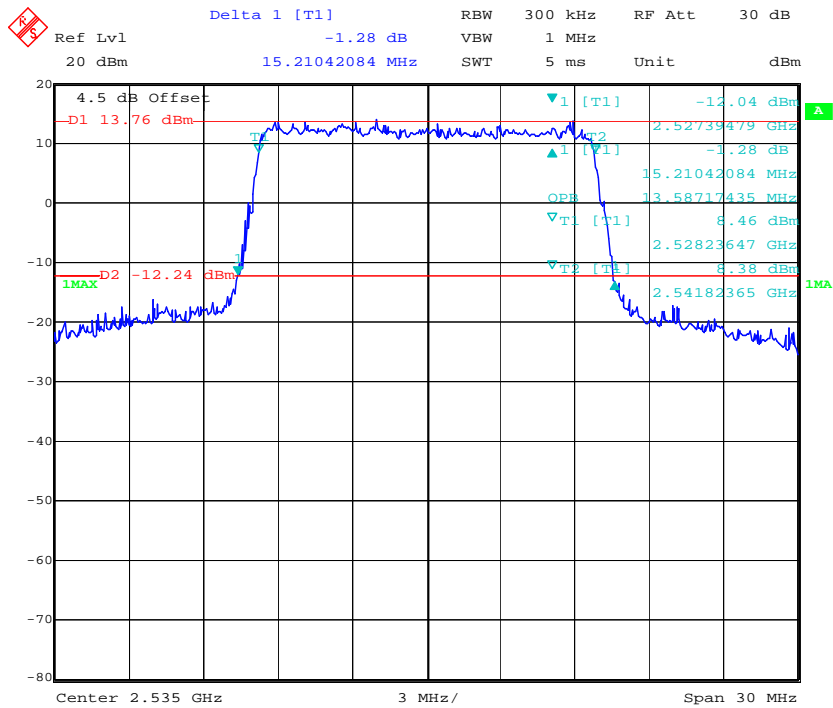
Date: 7.JAN.2019 21:39:09

QPSK_10 MHz

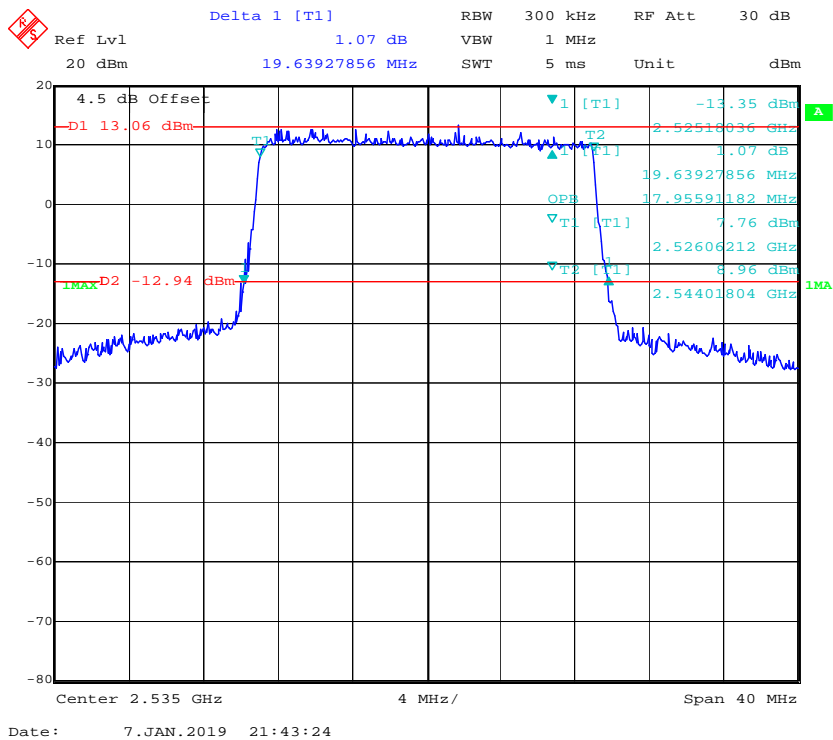


Date: 7.JAN.2019 21:40:37

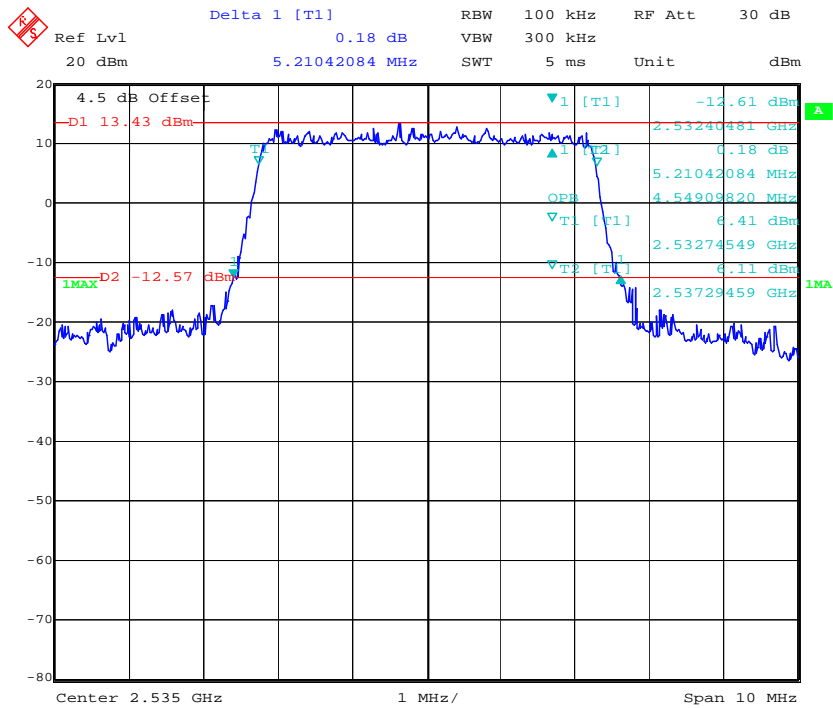
QPSK_15 MHz



QPSK_20 MHz

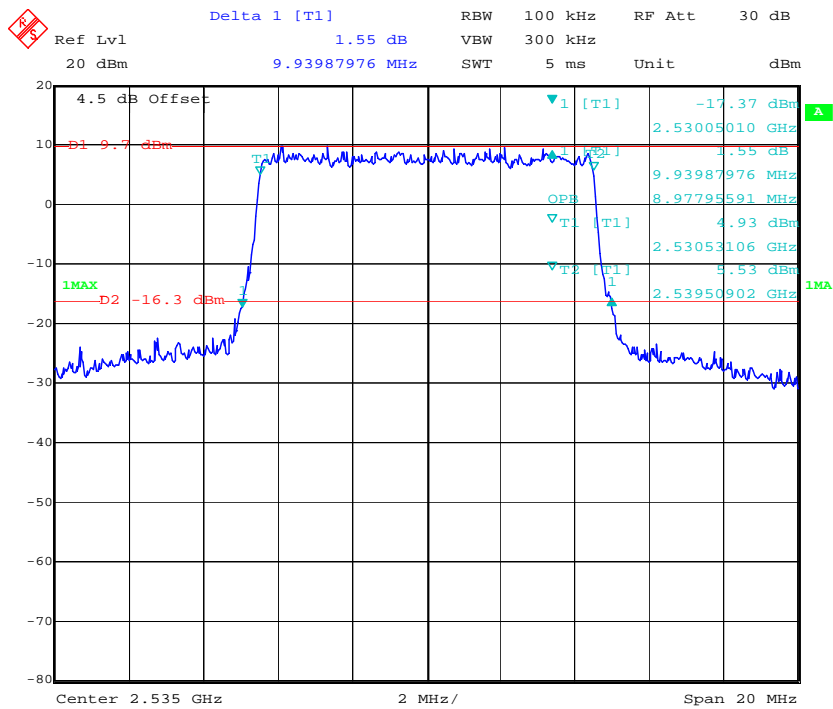


16QAM_5 MHz



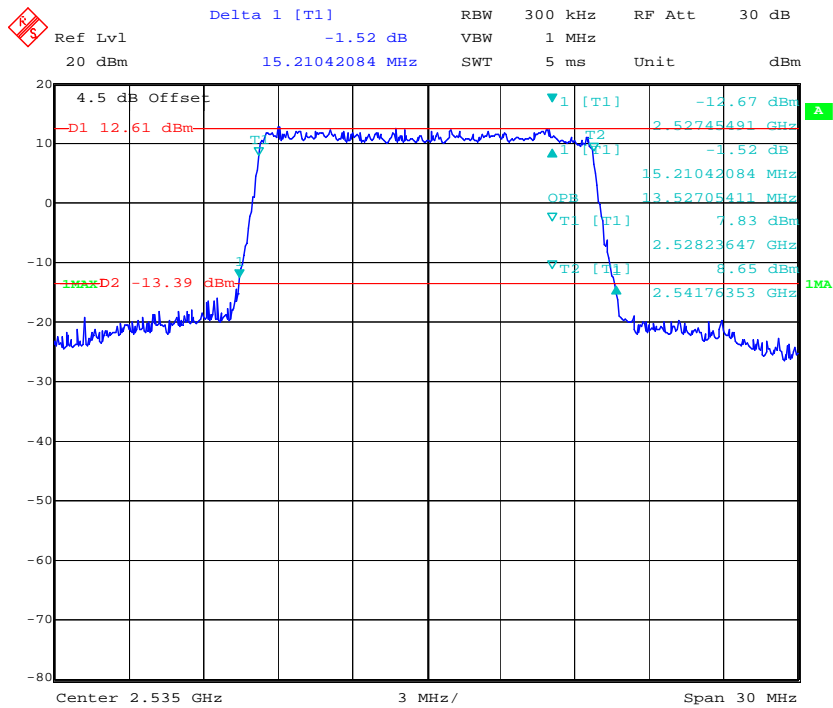
Date: 7.JAN.2019 21:40:01

16QAM_10 MHz

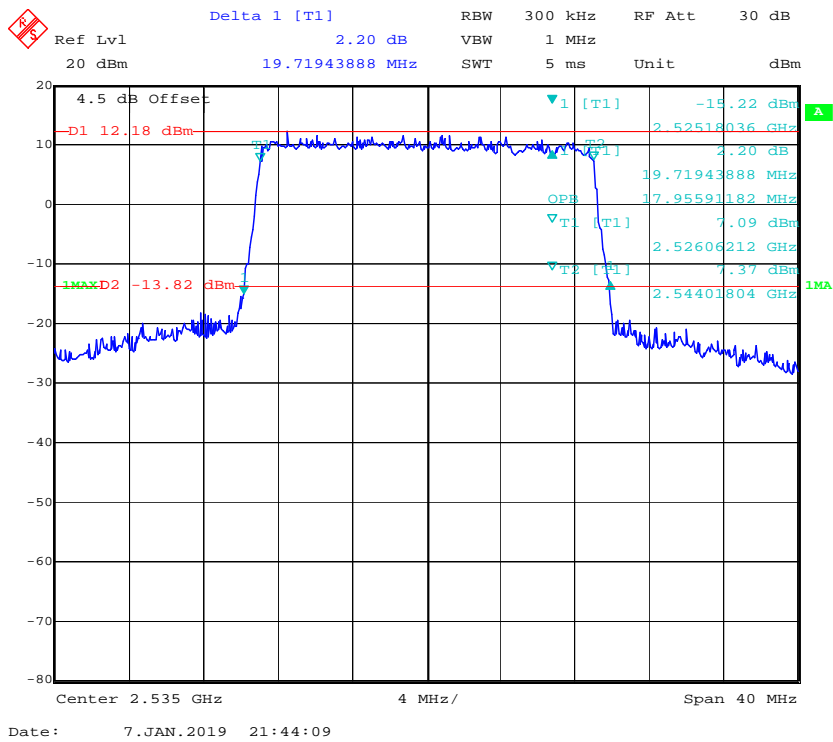


Date: 7.JAN.2019 21:41:16

16QAM_15 MHz

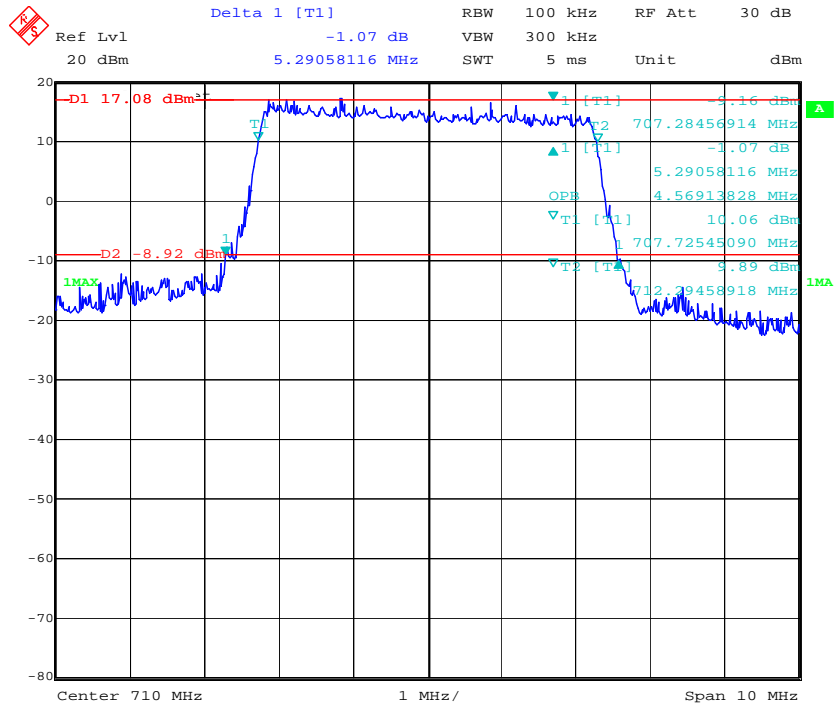


16QAM_20 MHz



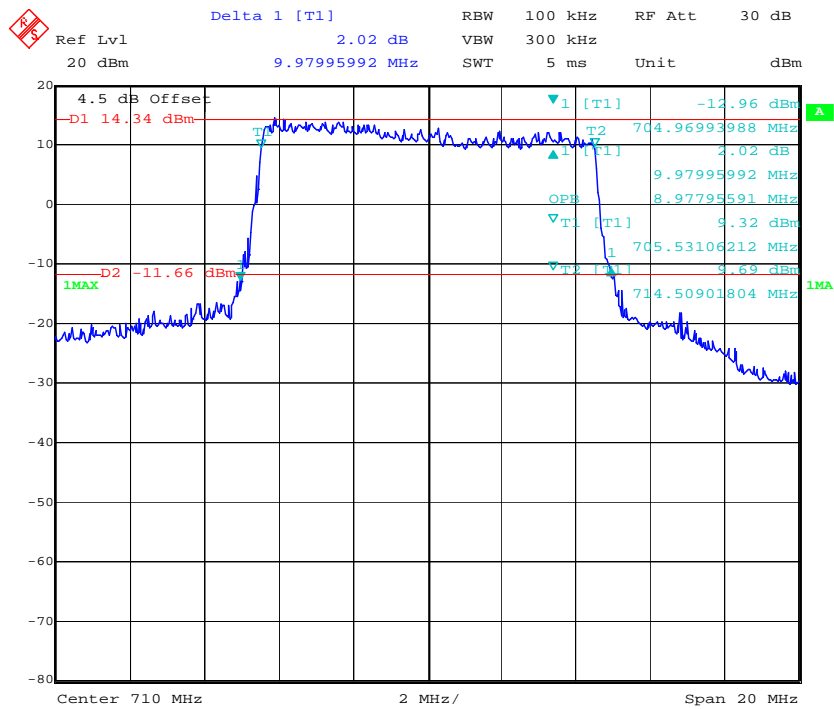
LTE Band 17:

QPSK_5 MHz



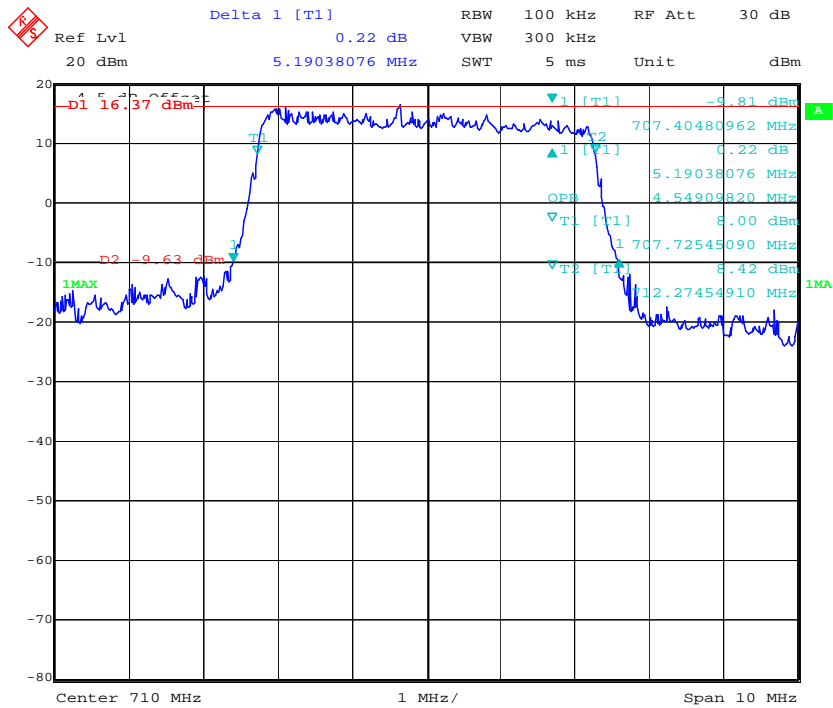
Date: 7.JAN.2019 21:44:49

QPSK_10 MHz



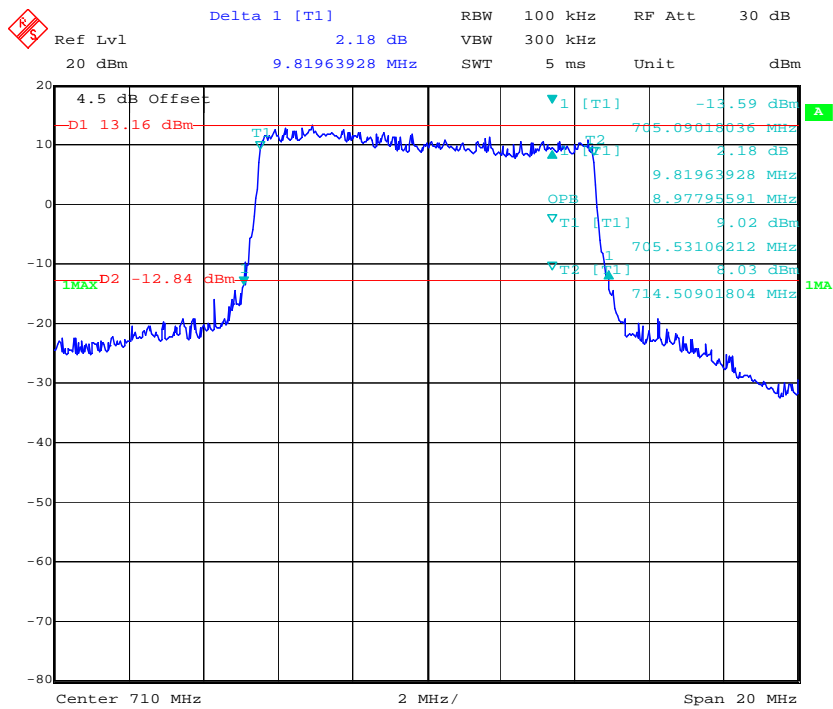
Date: 7.JAN.2019 21:46:17

16QAM_5 MHz



Date: 7.JAN.2019 21:45:32

16QAM_10 MHz



Date: 7.JAN.2019 21:46:47

FCC §2.1051, §22.917(a) & §24.238(a) & §27.53, RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5& RSS-139 §6.6 & RSS-199 §4.6 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Applicable Standard

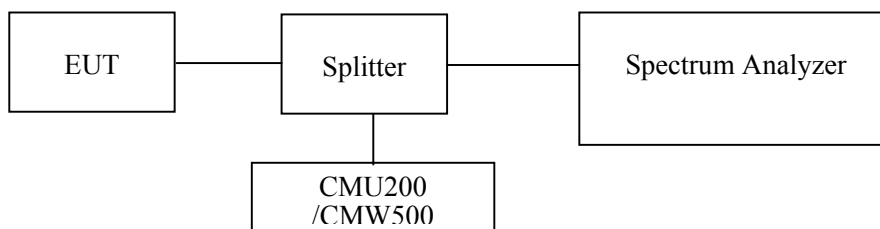
FCC §2.1051, §22.917(a) , §24.238(a) and §27.53.

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

According to RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5& RSS-139 §6.6 & RSS-199 §4.6.

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	2019-01-04	2020-01-04
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	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

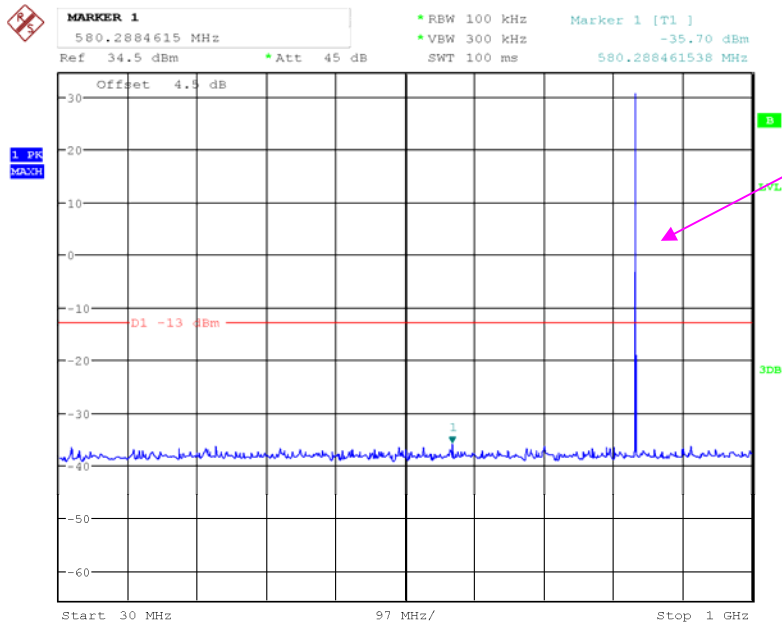
Environmental Conditions

Temperature:	23.9~25.2°C
Relative Humidity:	44~46 %
ATM Pressure:	100.6~101.6 kPa

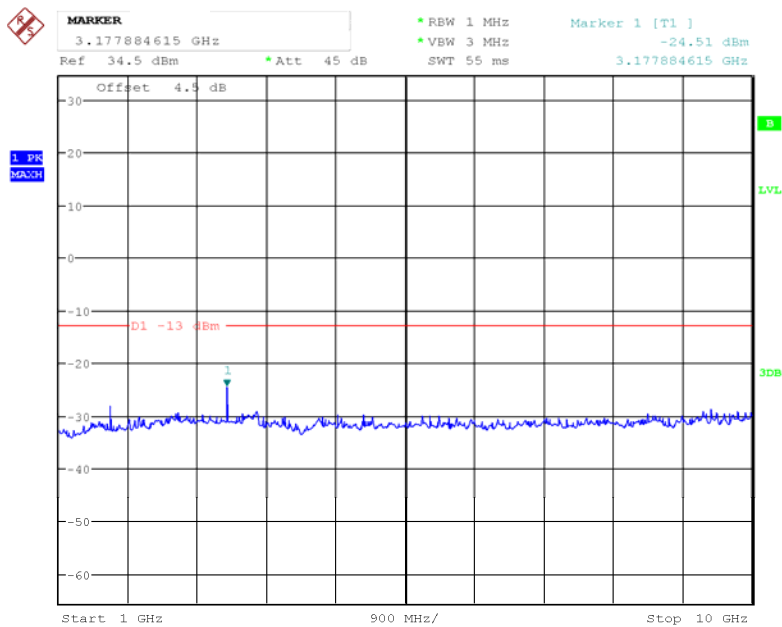
The testing was performed by Carrie He & Tiago Huang from 2019-01-04 to 2019-01-05.

Please refer to the following plots.

GSM850_Middle Channel

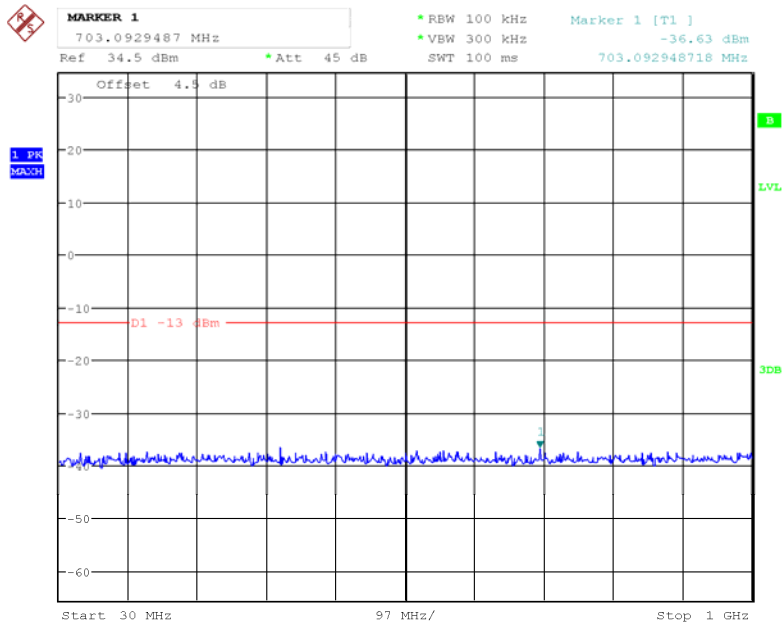


Date: 5.JAN.2019 11:49:54



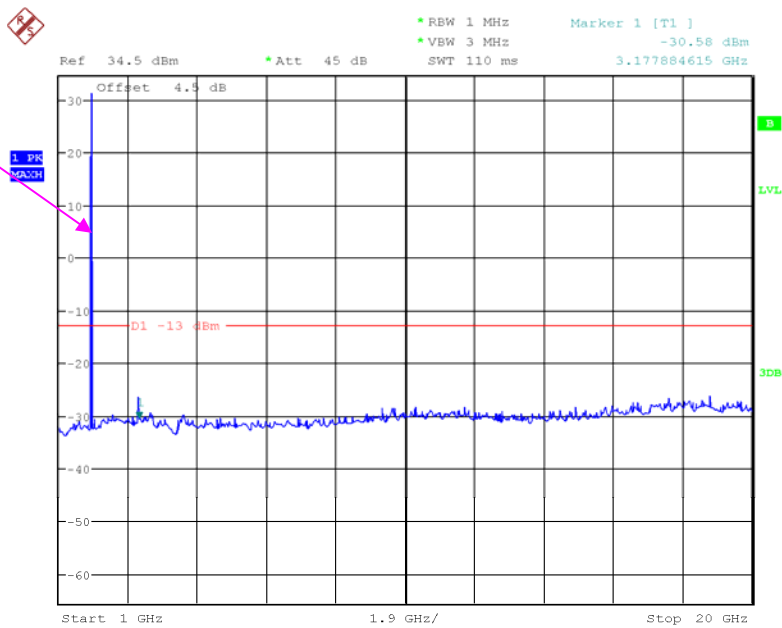
Date: 5.JAN.2019 11:50:59

PCS 1900_ Middle Channel



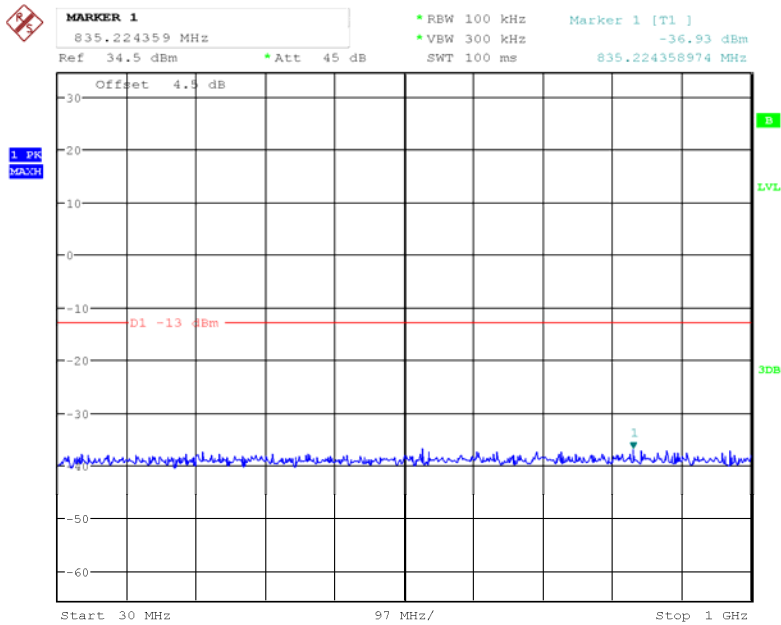
Date: 5.JAN.2019 11:54:33

Fundamental



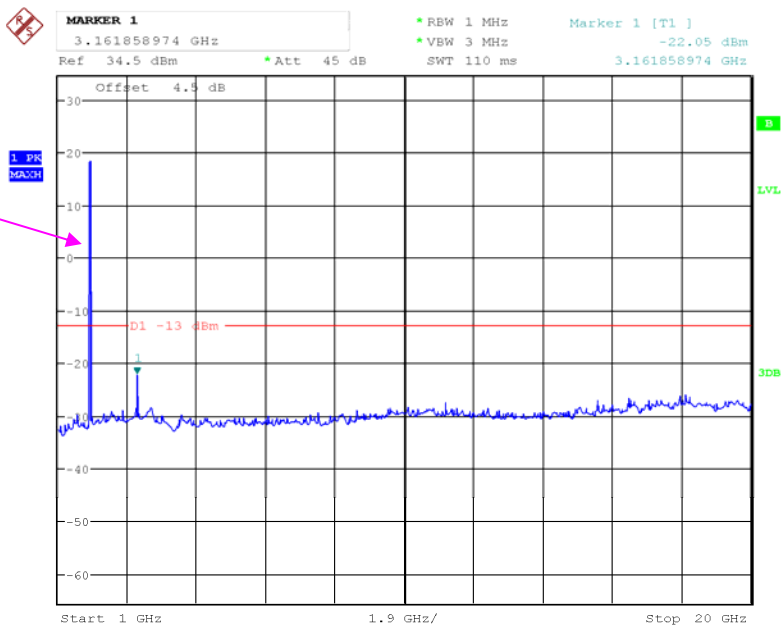
Date: 5.JAN.2019 11:53:51

WCDMA Band II, Rel99



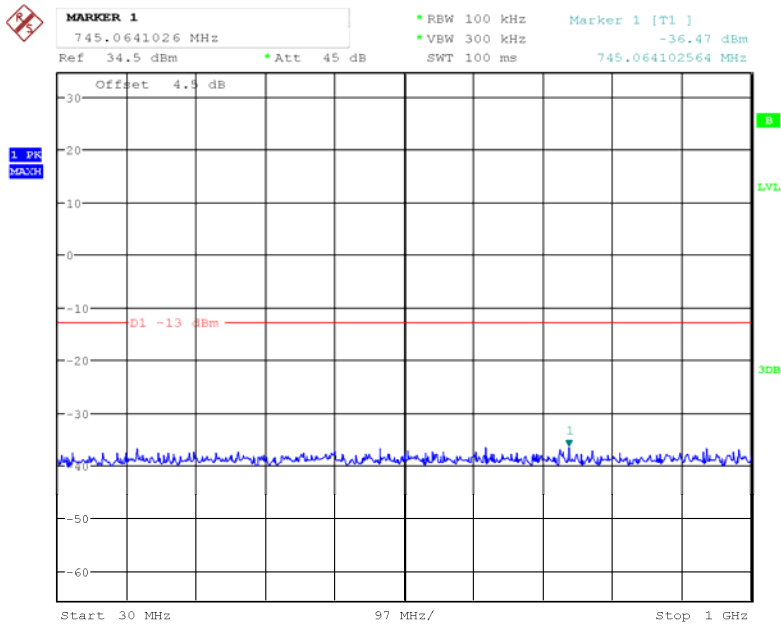
Date: 5.JAN.2019 12:02:15

Fundamental



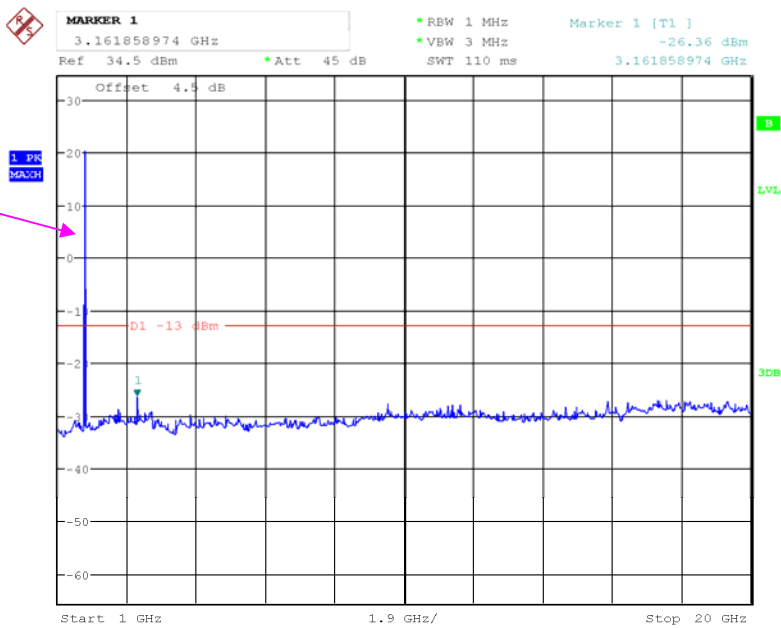
Date: 5.JAN.2019 12:03:01

WCDMA Band IV,Rel99



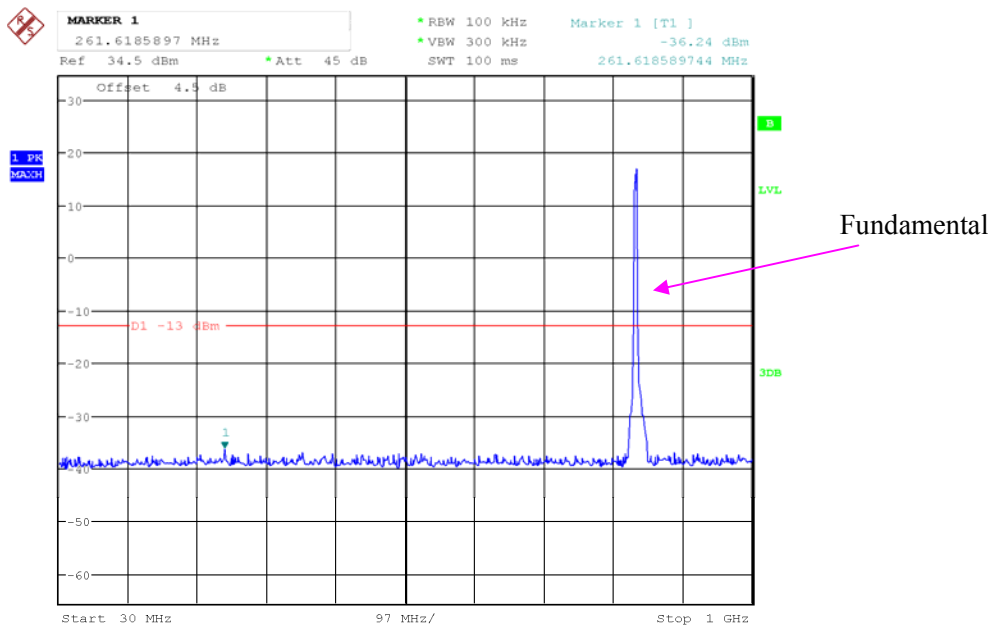
Date: 5.JAN.2019 12:04:20

Fundamental

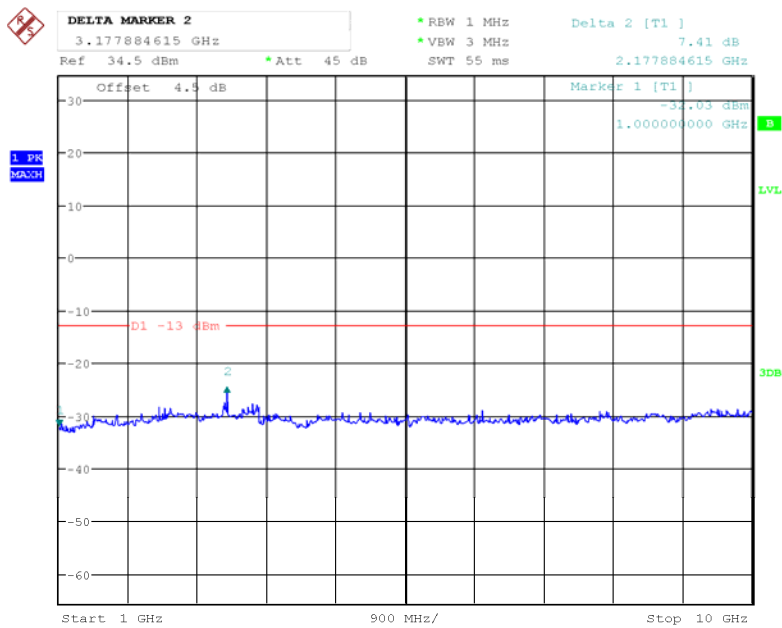


Date: 5.JAN.2019 12:03:51

WCDMA Band V,Rel99



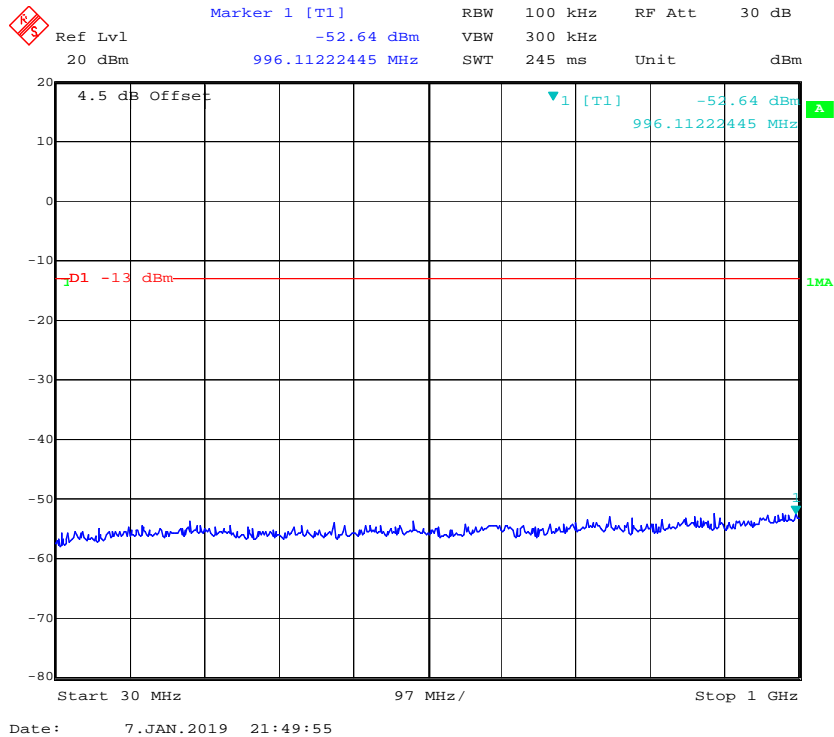
Date: 5.JAN.2019 12:05:18



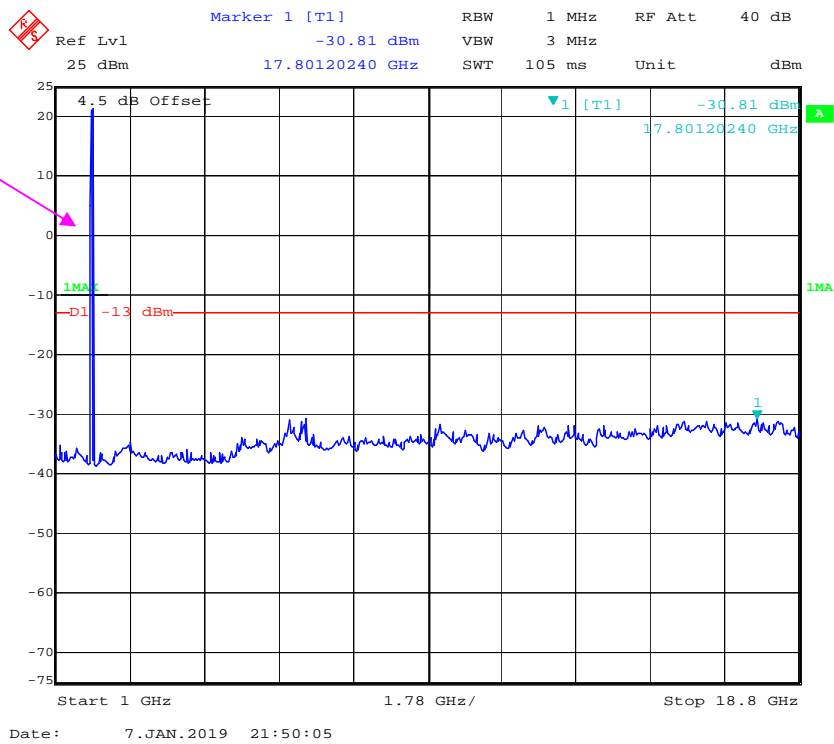
Date: 5.JAN.2019 12:07:17

LTE Band 2 (Middle Channel)

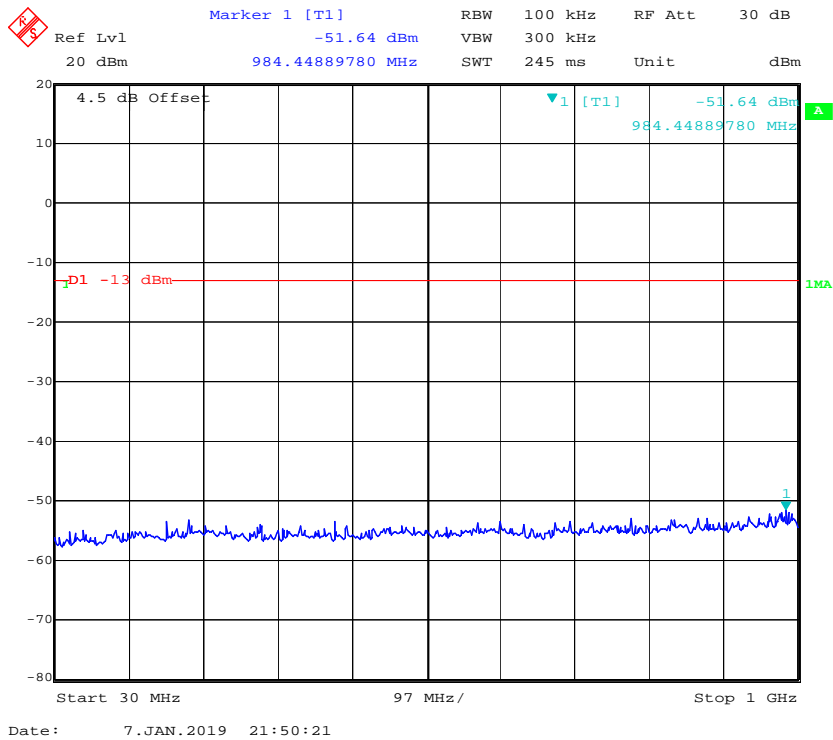
QPSK_1.4 MHz



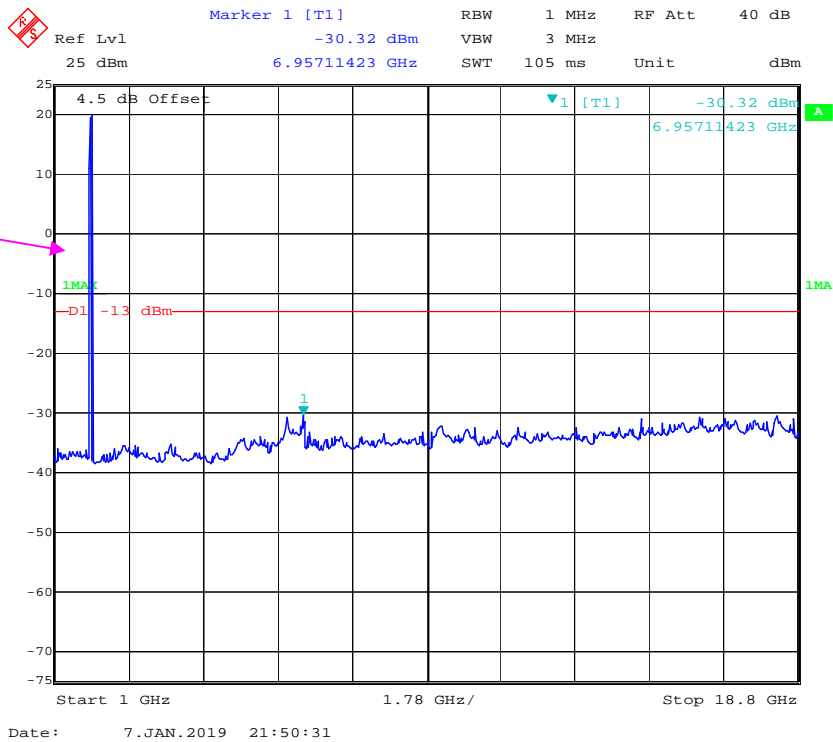
Fundamental



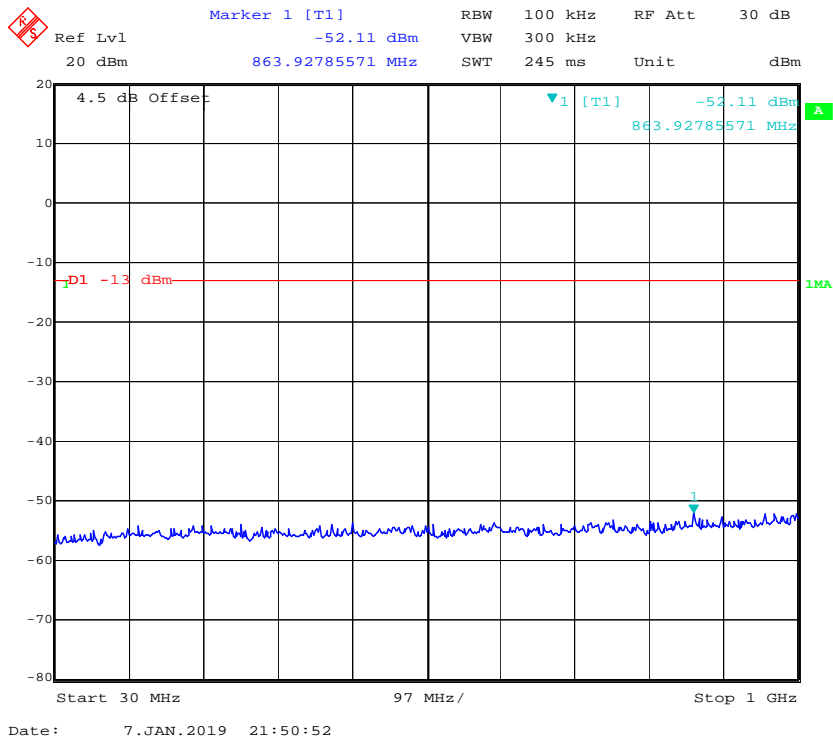
QPSK_3 MHz



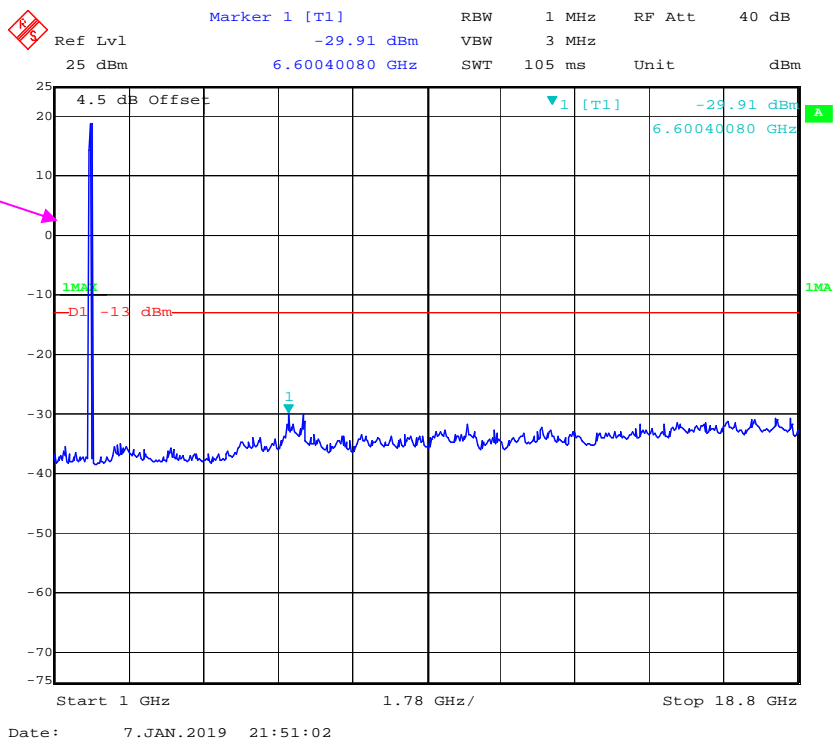
Fundamental



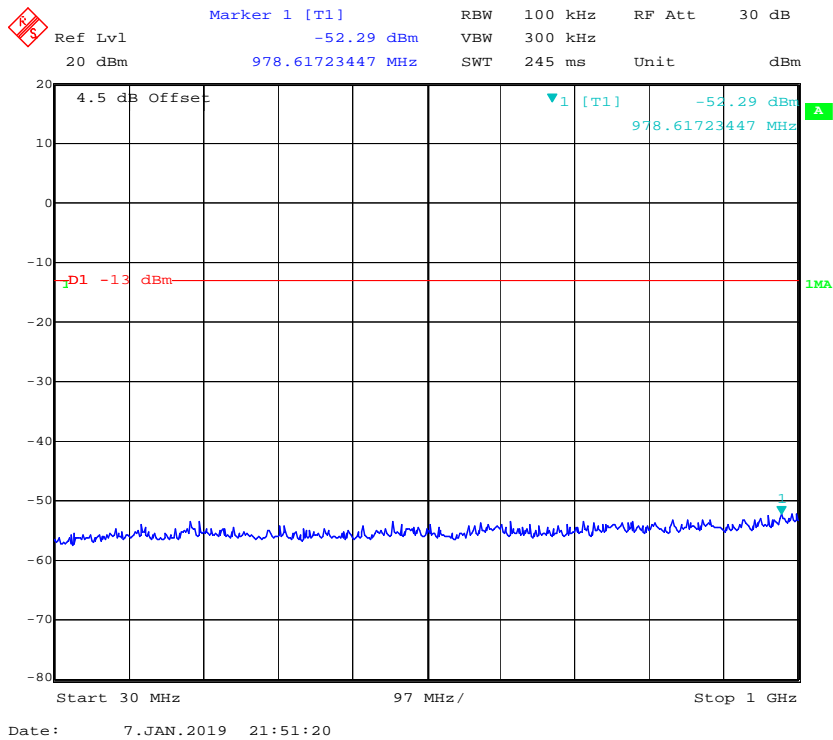
QPSK_5 MHz



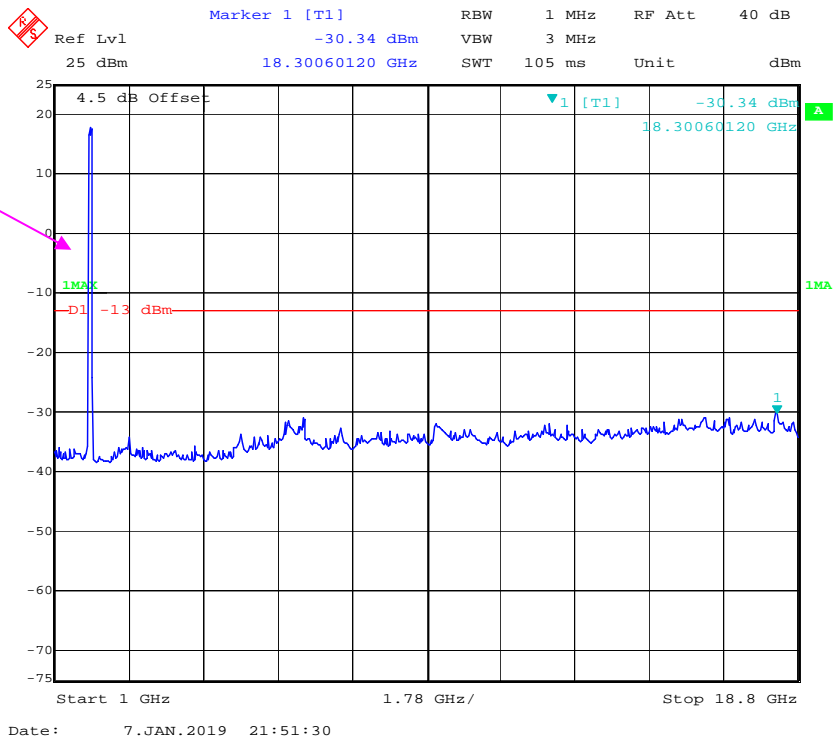
Fundamental



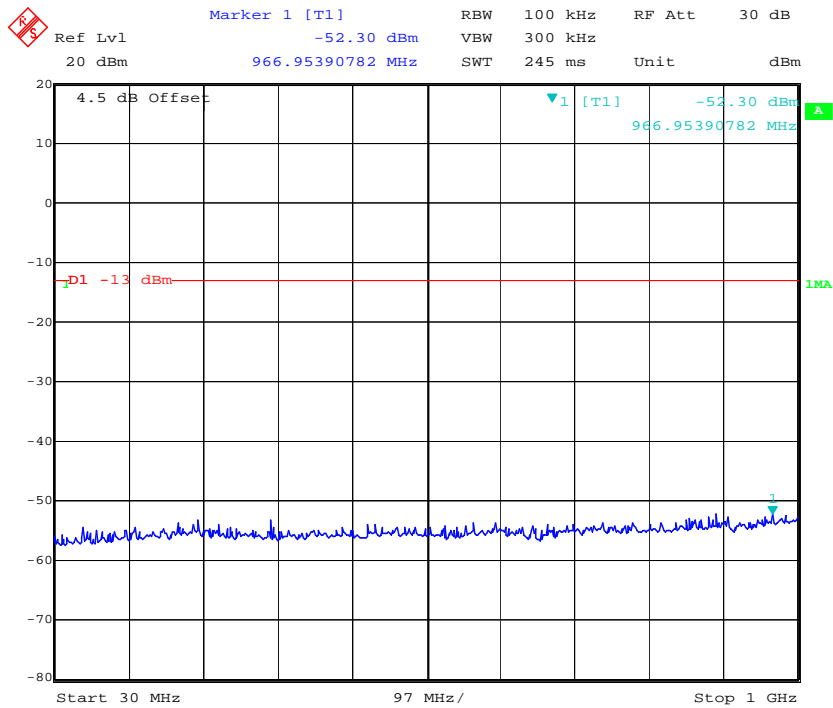
QPSK_10 MHz



Fundamental

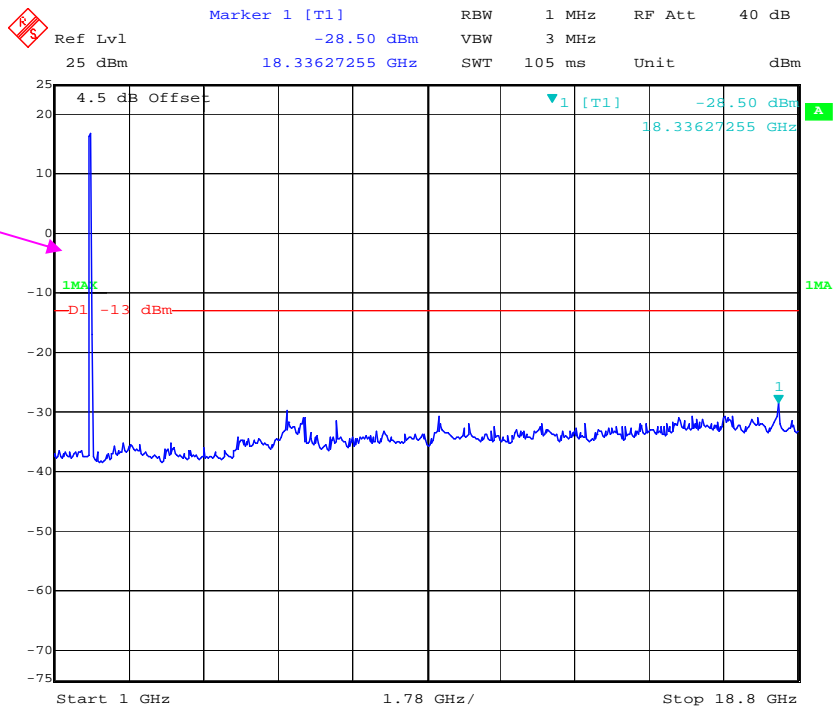


QPSK_15 MHz



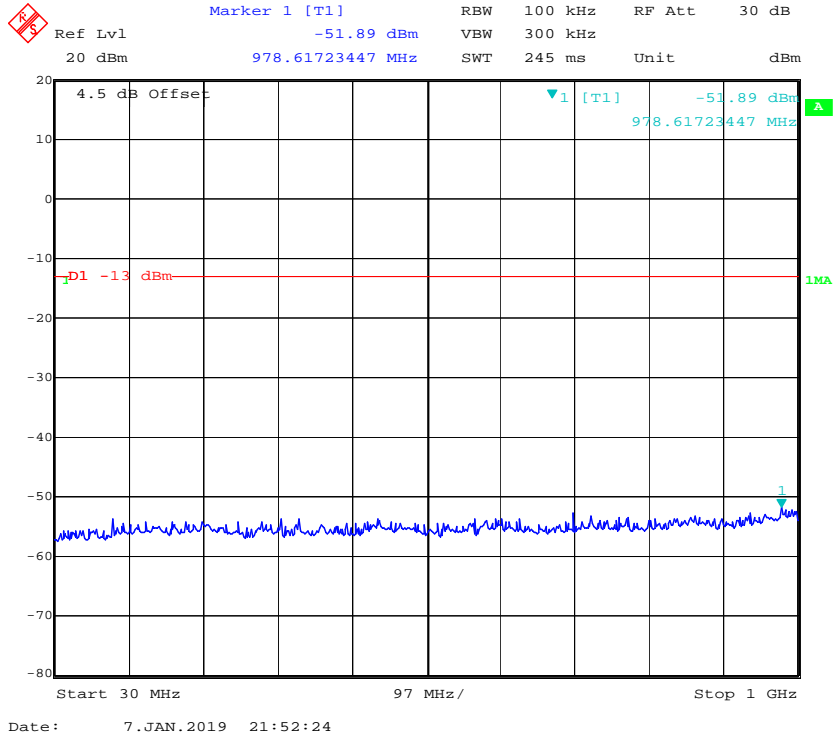
Date: 7.JAN.2019 21:51:50

Fundamental

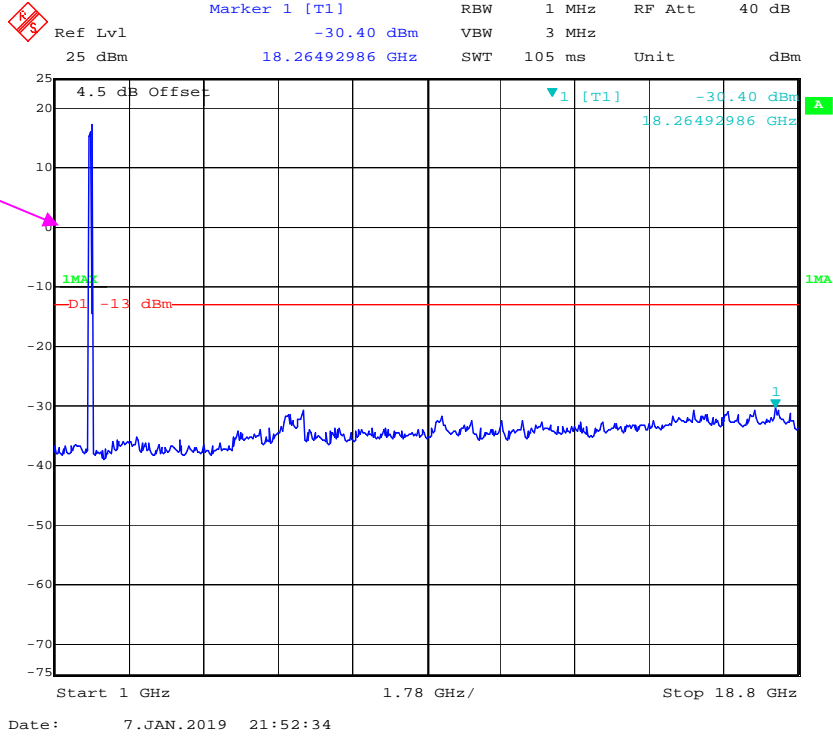


Date: 7.JAN.2019 21:52:04

QPSK_20 MHz

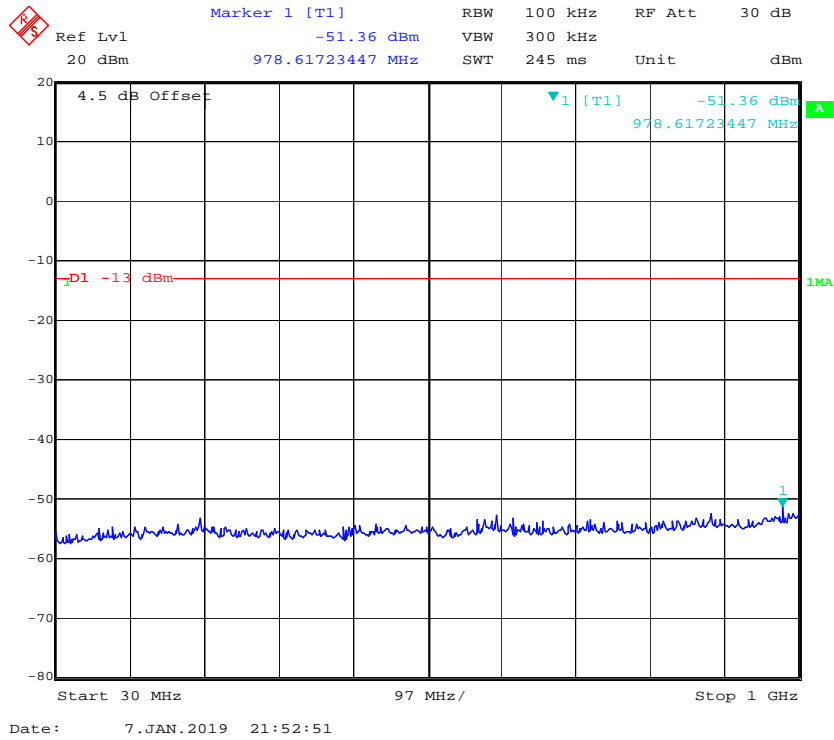


Fundamental

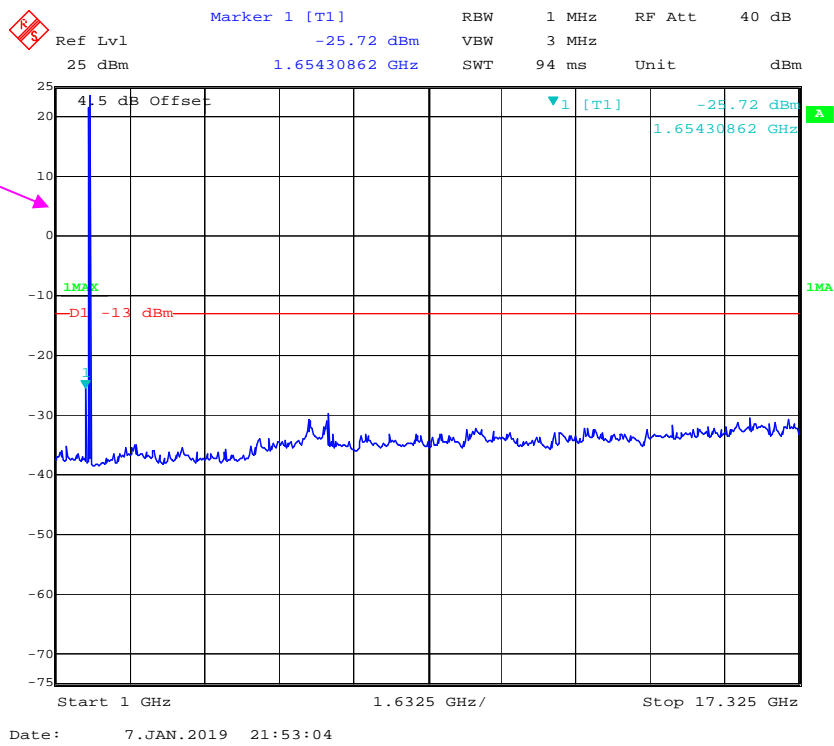


LTE Band 4 (Middle Channel)

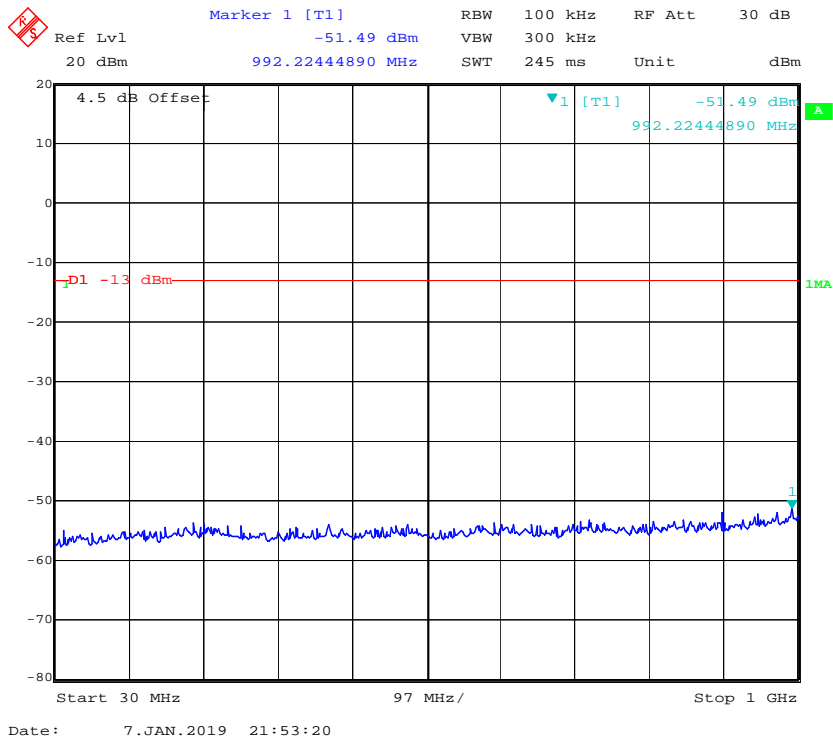
QPSK_1.4 MHz



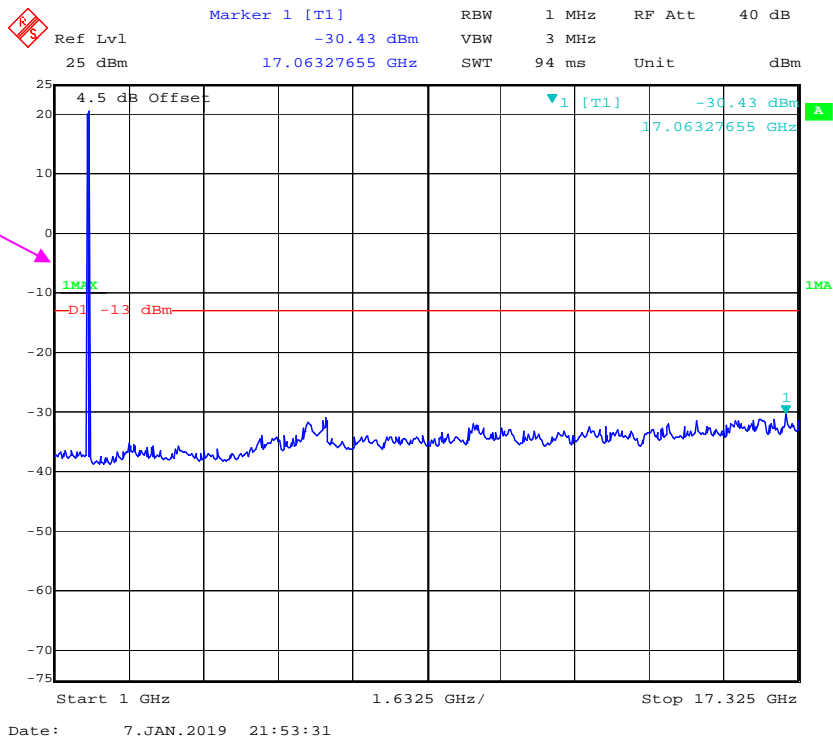
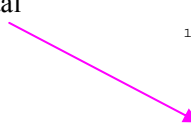
Fundamental



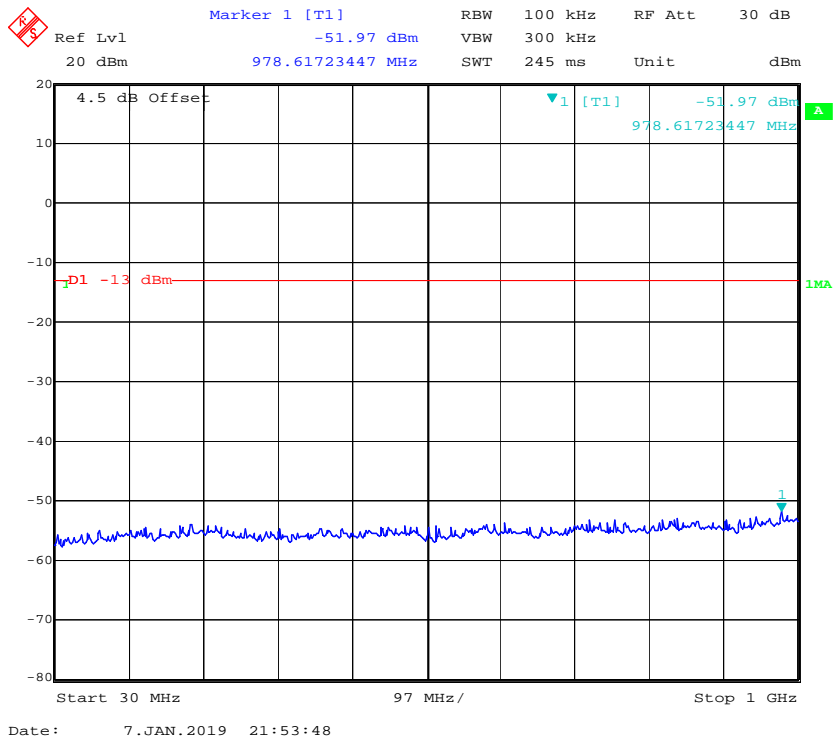
QPSK_3 MHz



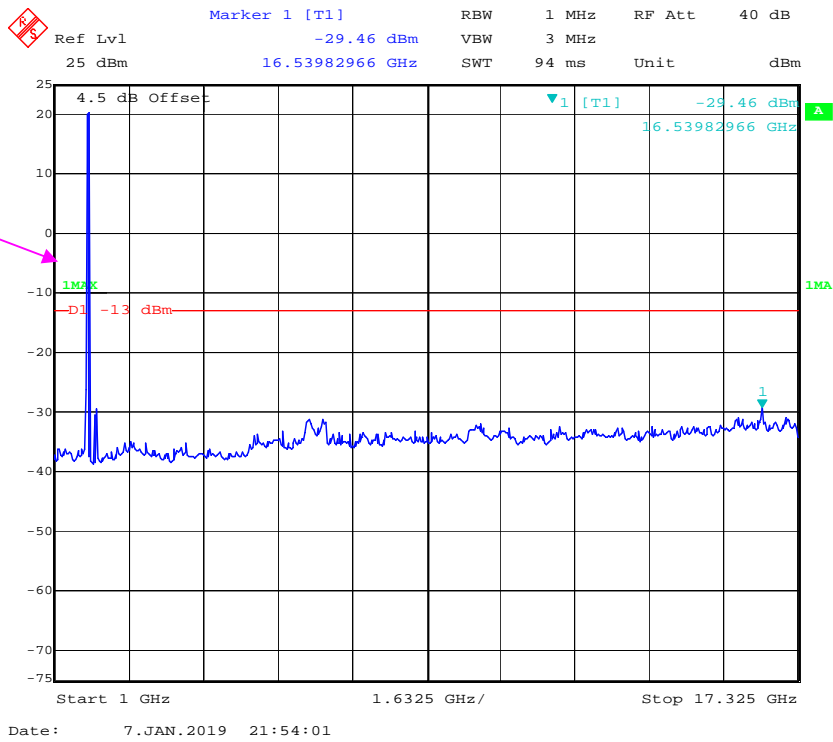
Fundamental



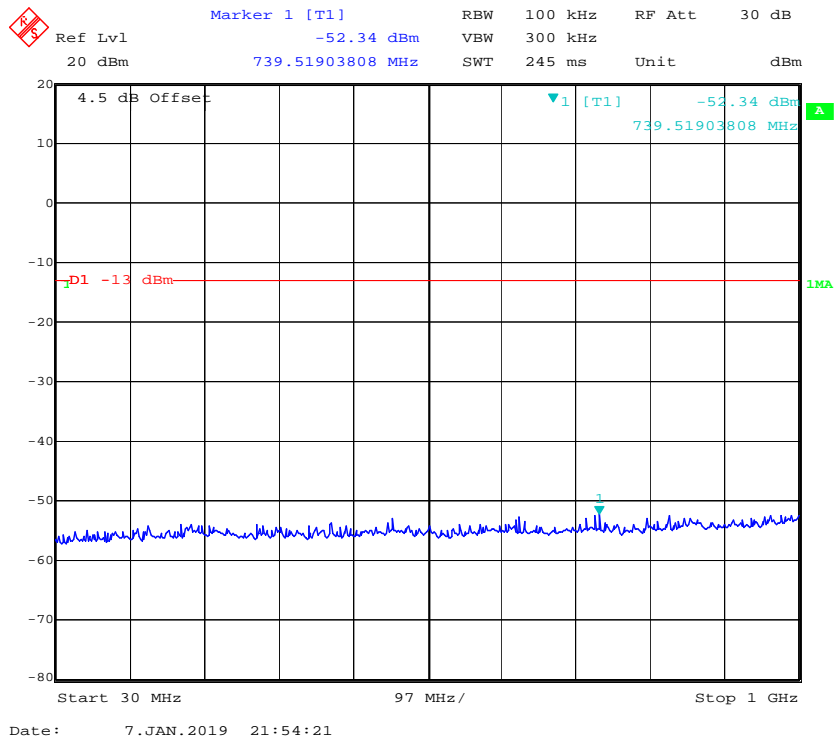
QPSK_5 MHz



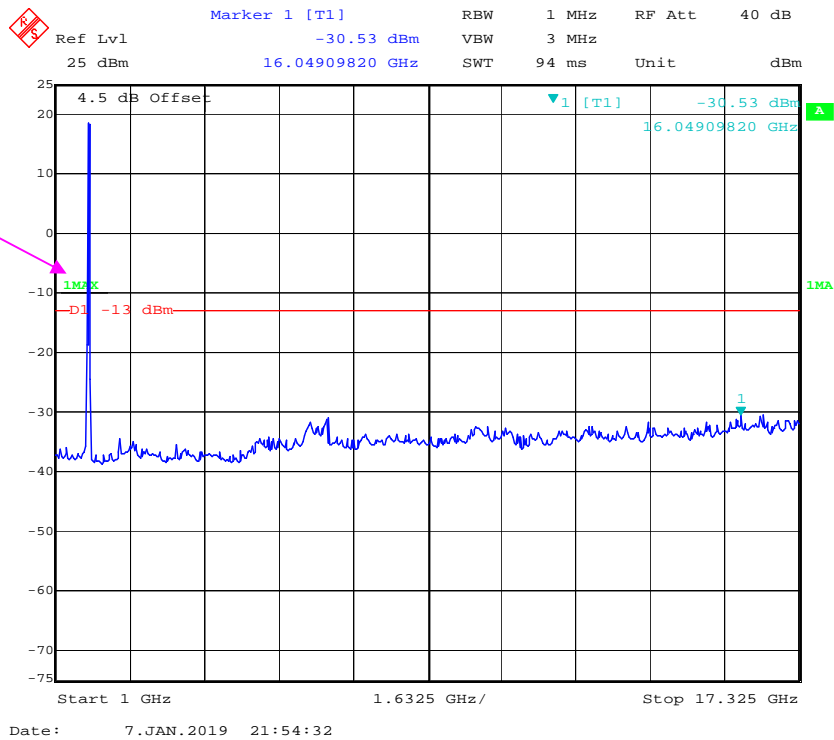
Fundamental



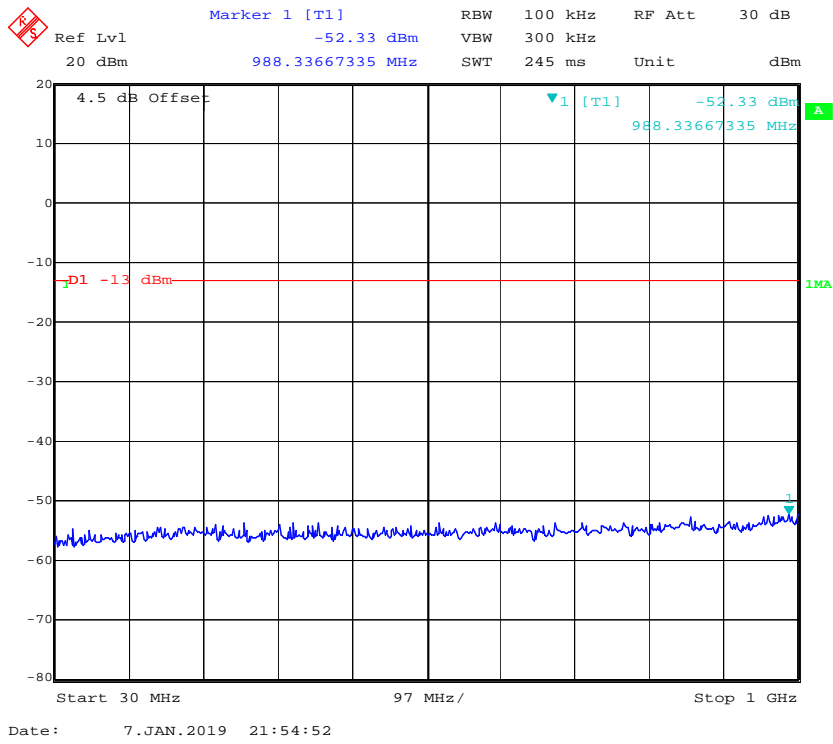
QPSK_10 MHz



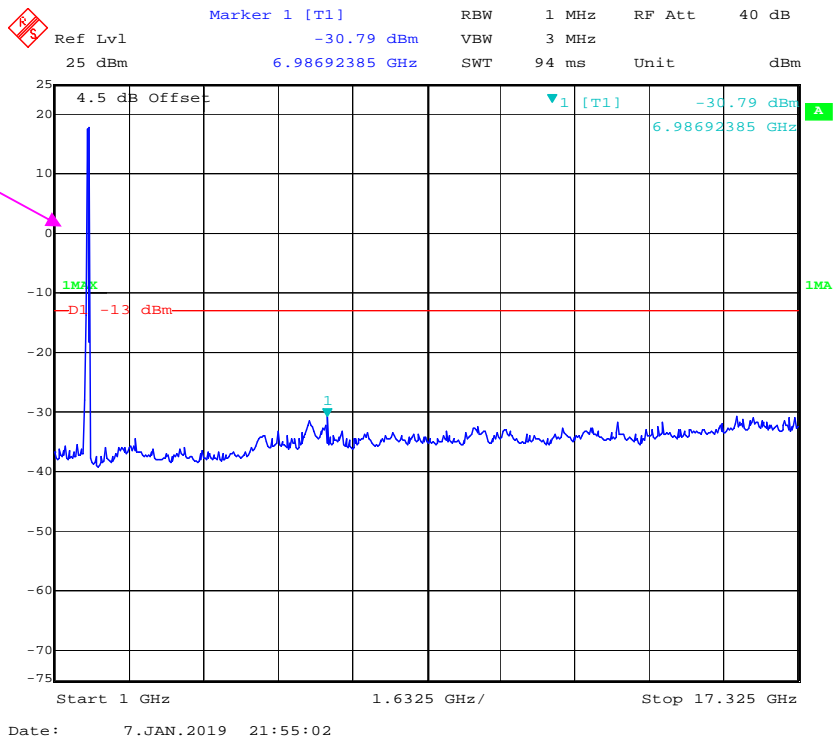
Fundamental



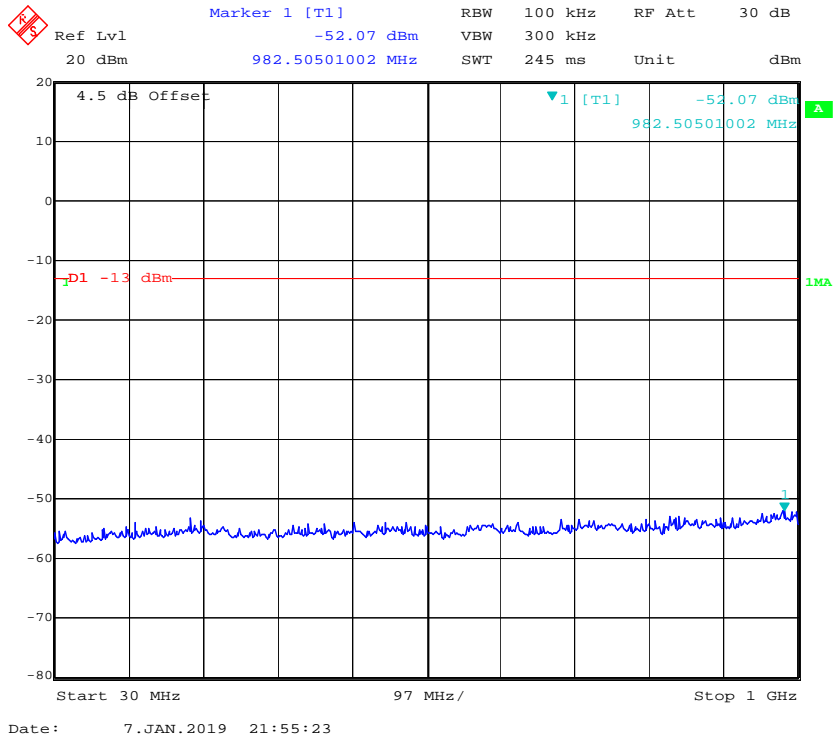
QPSK_15 MHz



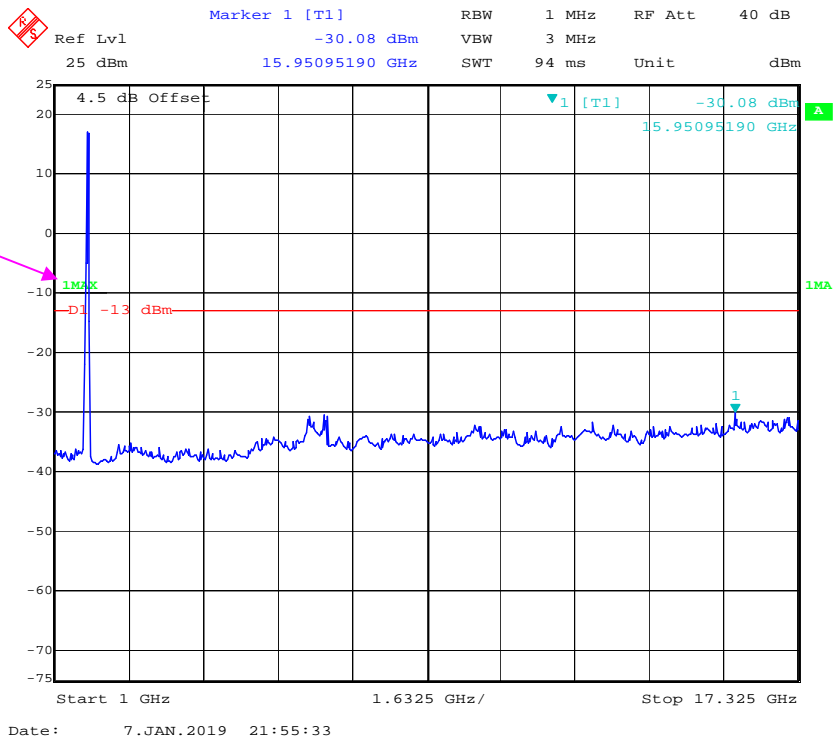
Fundamental



QPSK_20 MHz

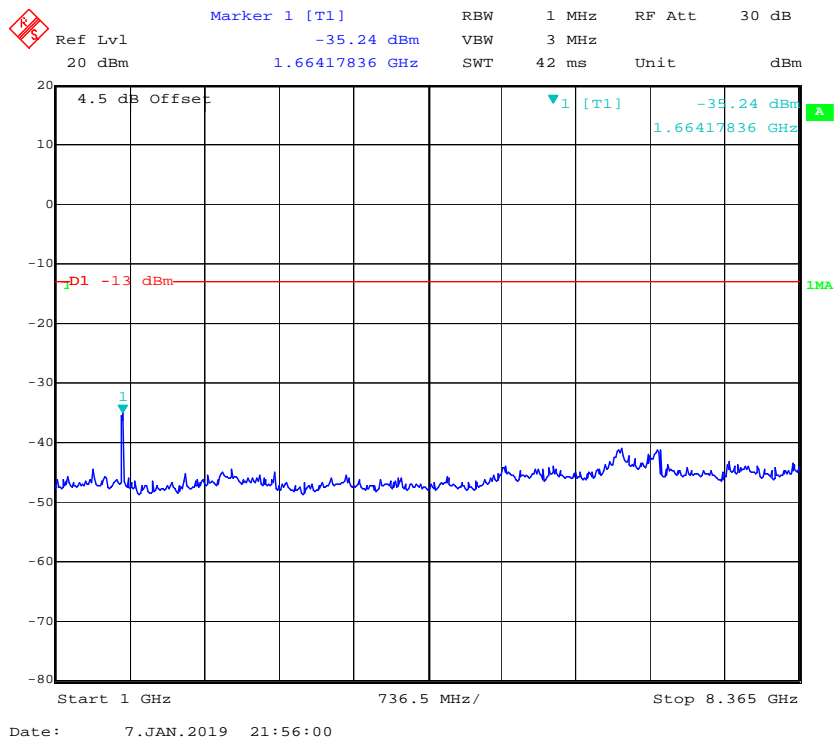
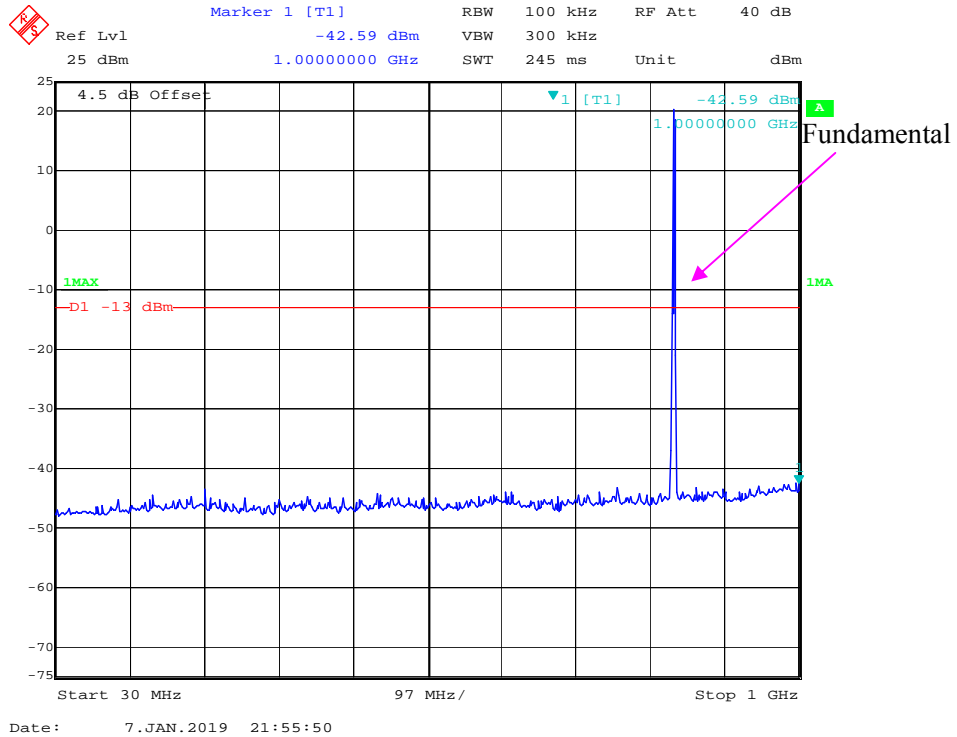


Fundamental



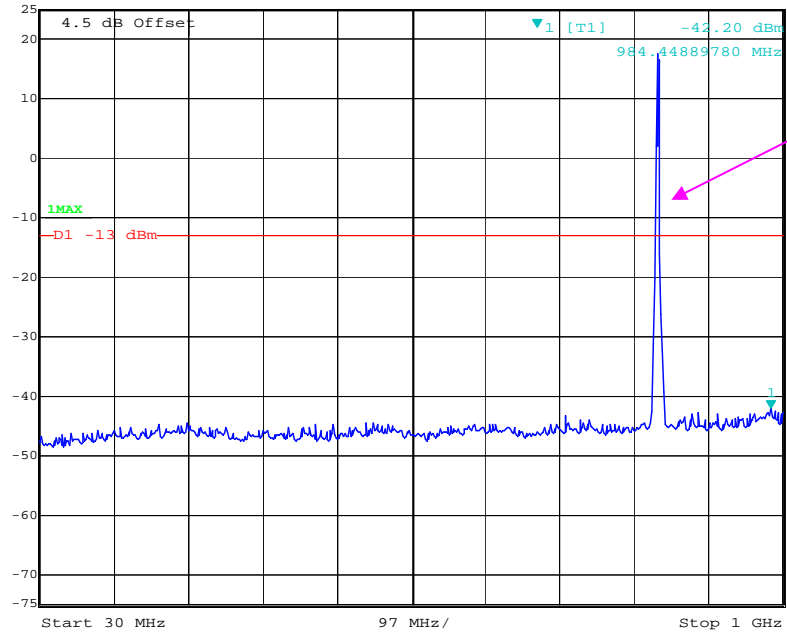
LTE Band 5 (Middle Channel)

QPSK_1.4 MHz



QPSK_3 MHz

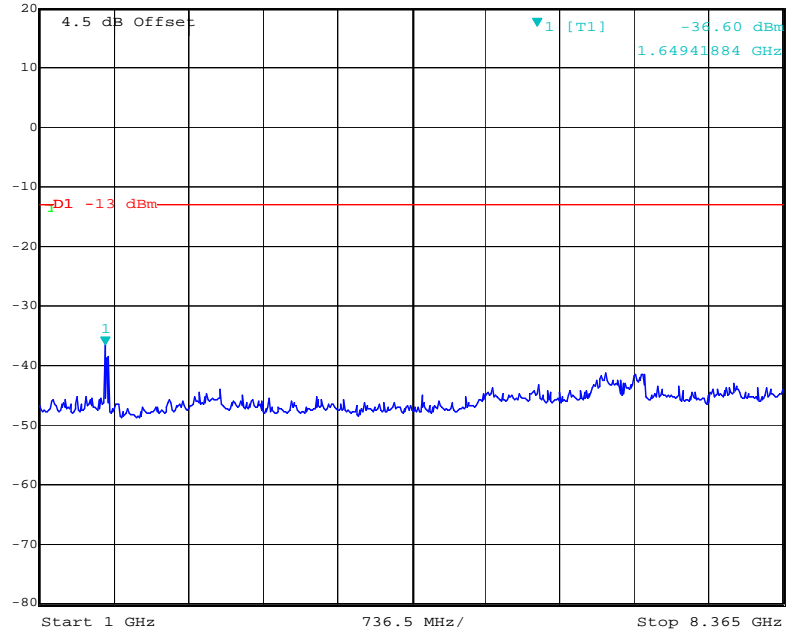
	Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
	Ref Lvl	-42.20 dBm	VBW	300 kHz	
	25 dBm	984.44889780 MHz	SWT	245 ms	Unit dBm



Fundamental

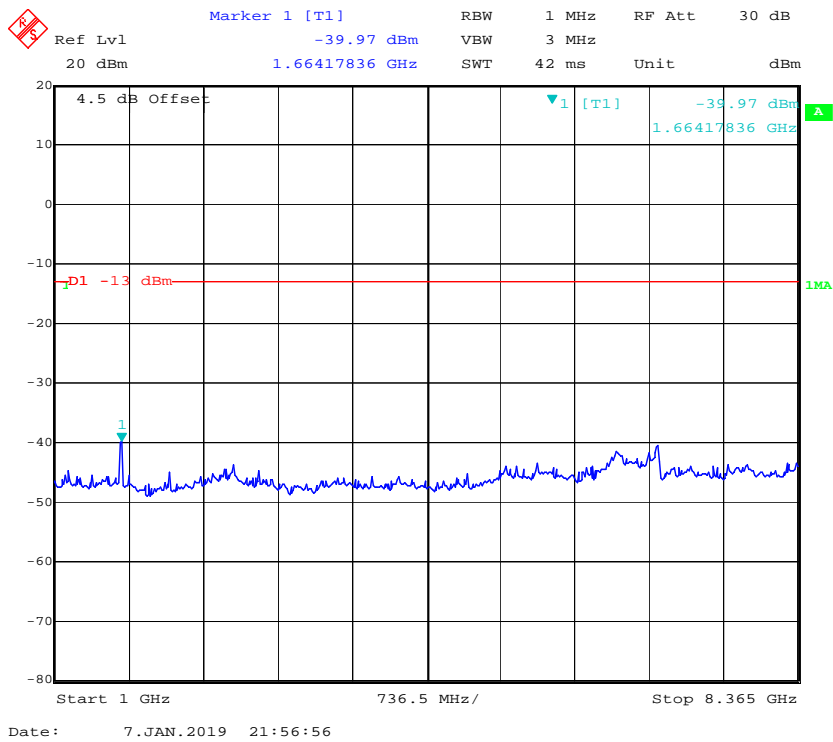
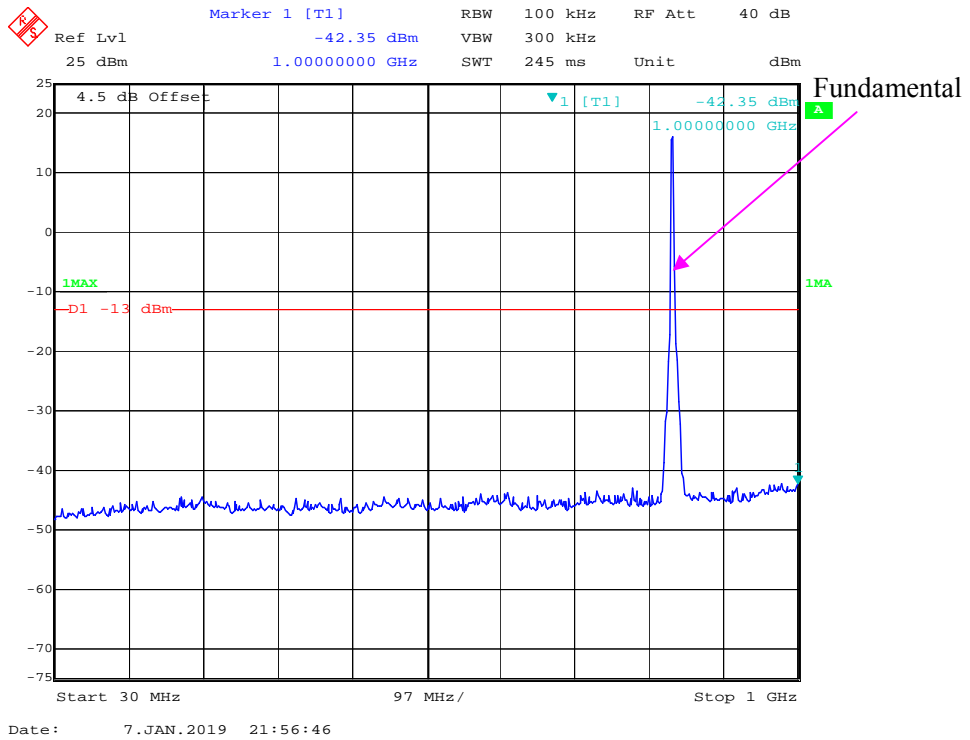
Date: 7.JAN.2019 21:56:16

	Marker 1 [T1]	RBW	1 MHz	RF Att	30 dB
	Ref Lvl	-36.60 dBm	VBW	3 MHz	
	20 dBm	1.64941884 GHz	SWT	42 ms	Unit dBm

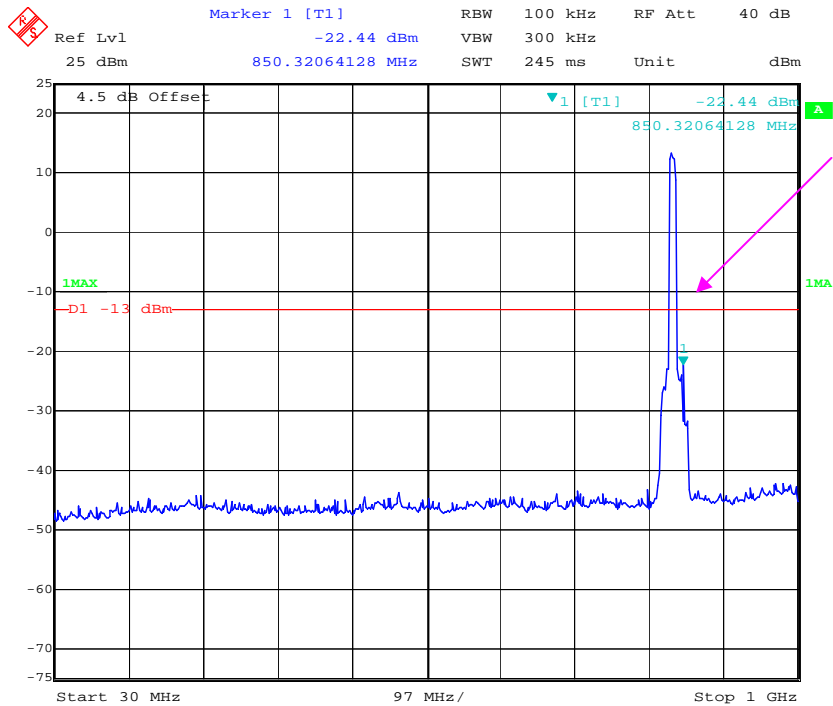


Date: 7.JAN.2019 21:56:25

QPSK_5 MHz

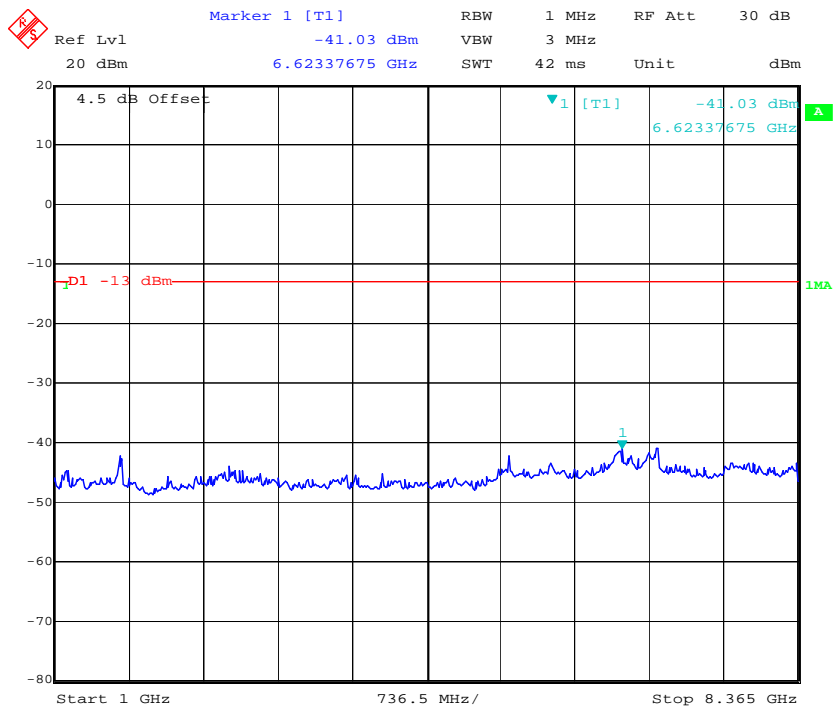


QPSK_10 MHz



Fundamental

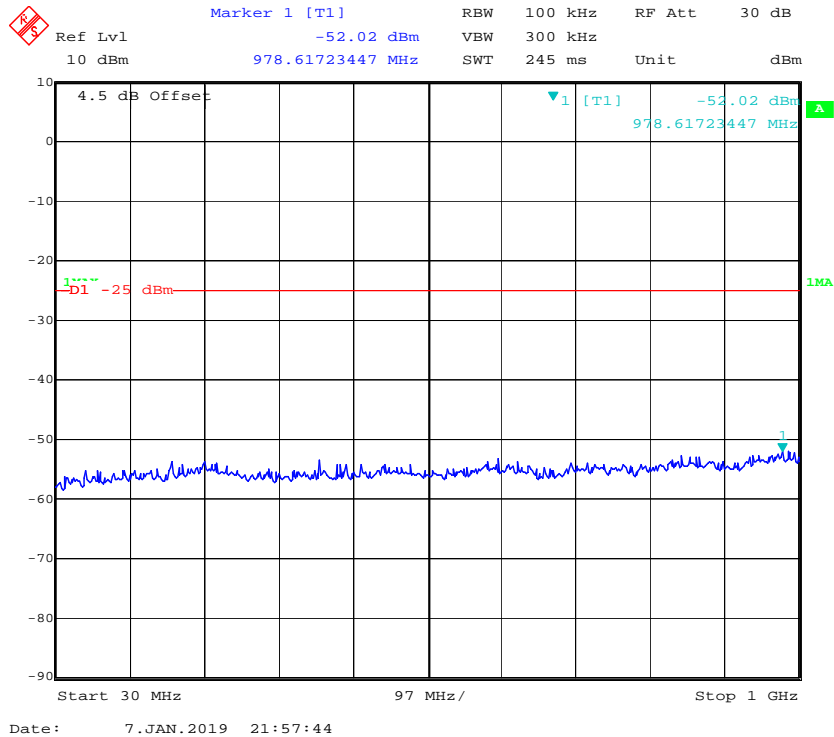
Date: 7.JAN.2019 21:57:13



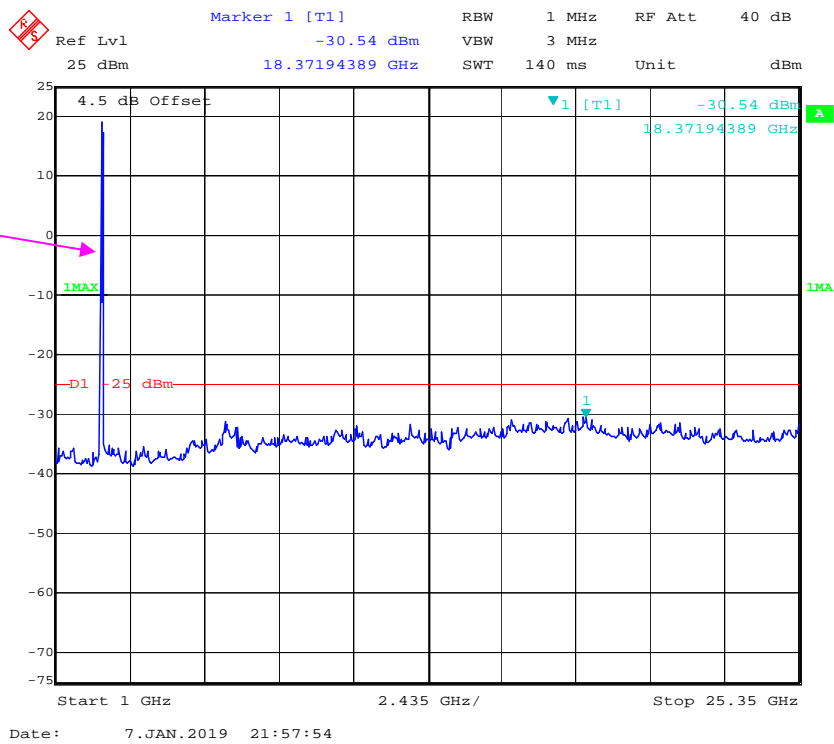
Date: 7.JAN.2019 21:57:26

LTE Band 7 (Middle Channel)

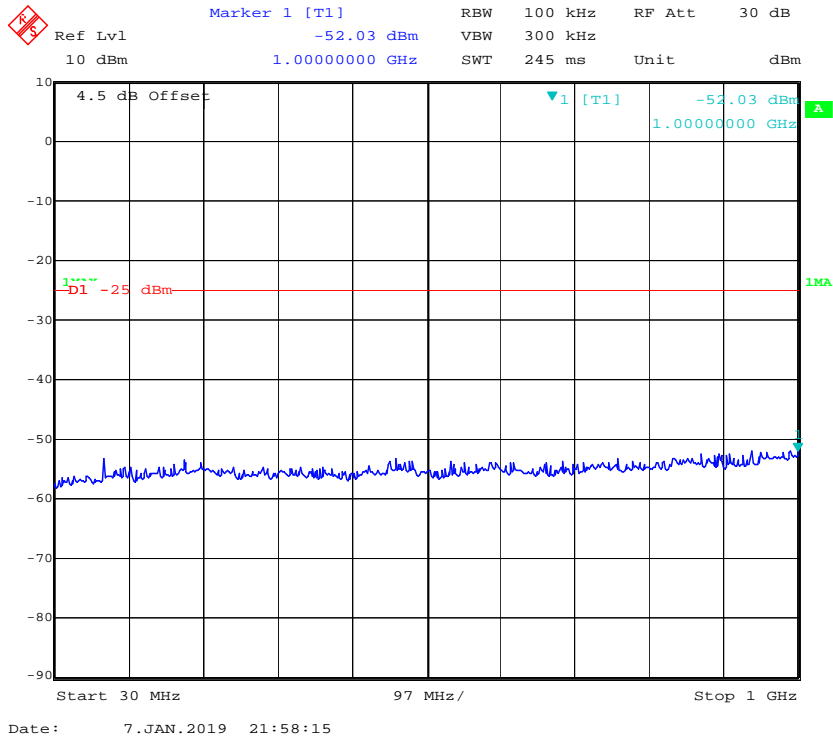
QPSK_5 MHz



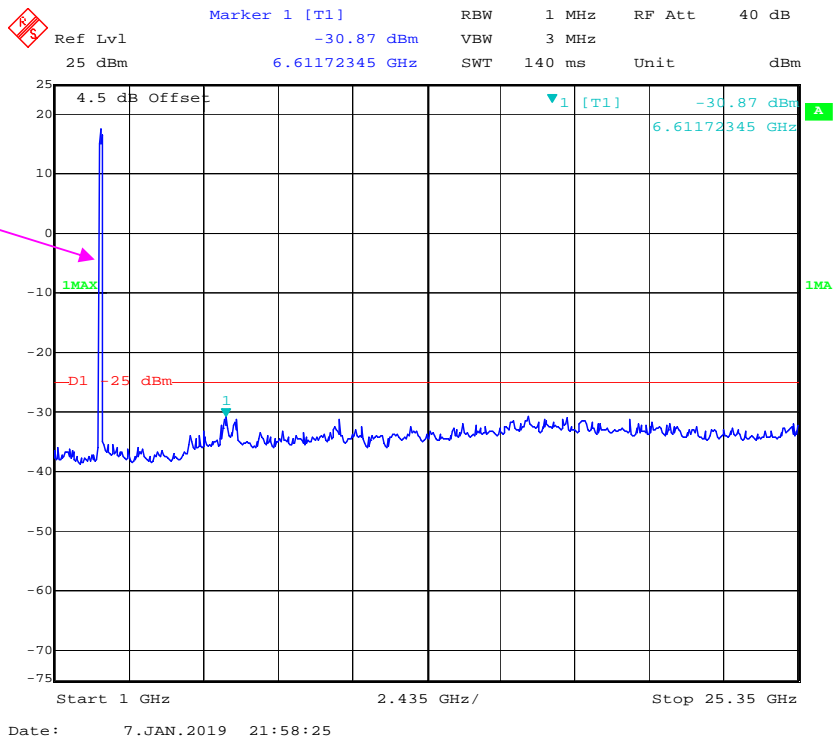
Fundamental



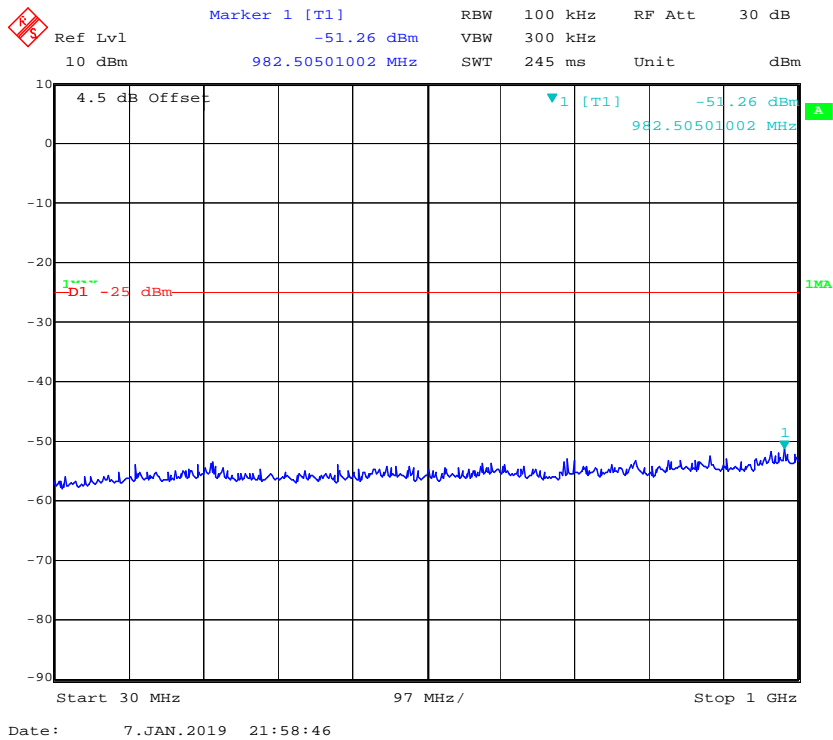
QPSK_10 MHz



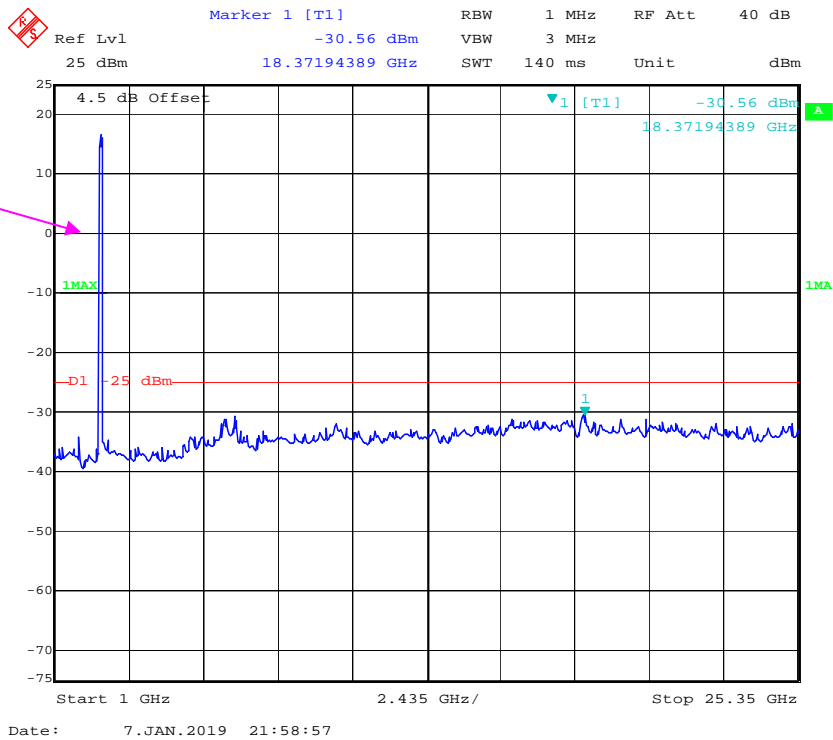
Fundamental



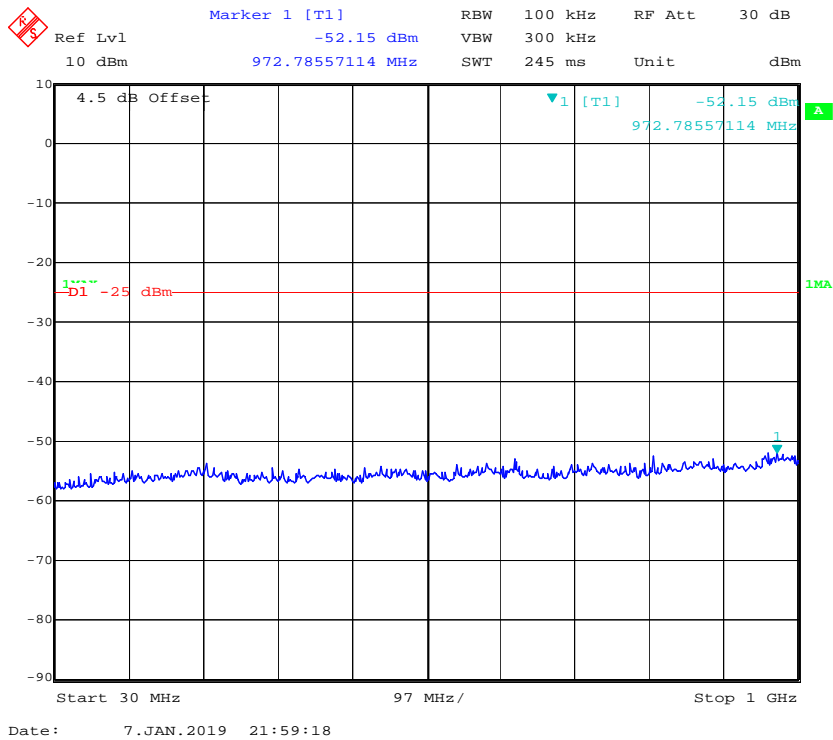
QPSK_15 MHz



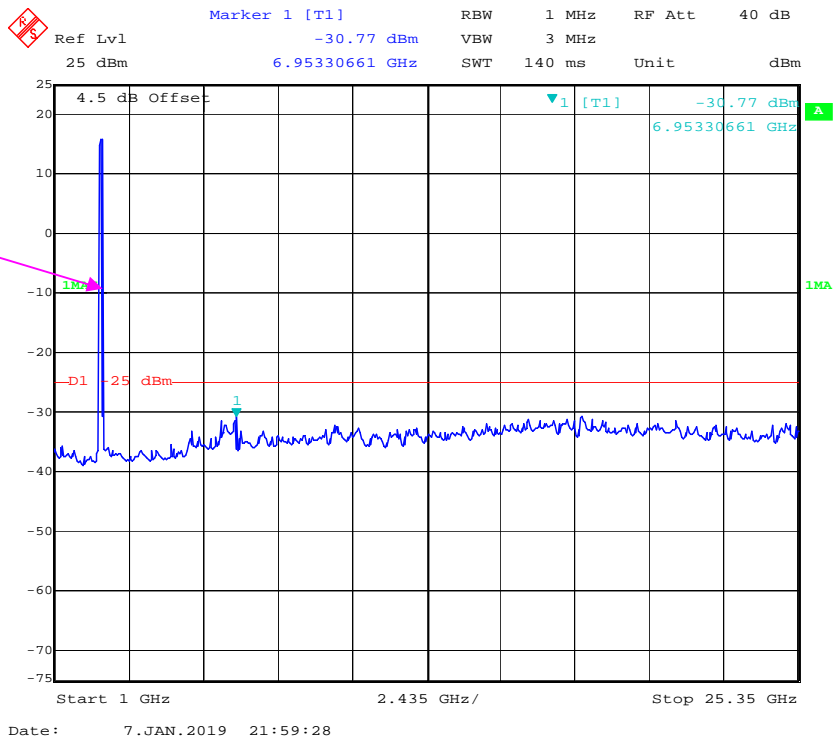
Fundamental



QPSK_20 MHz

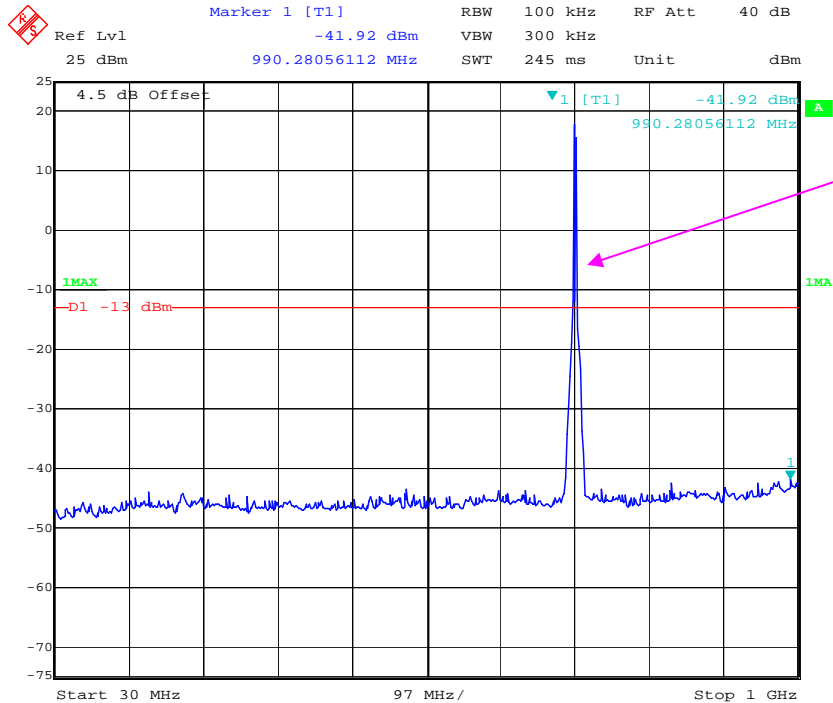


Fundamental



LTE Band 17 (Middle Channel)

QPSK_5 MHz

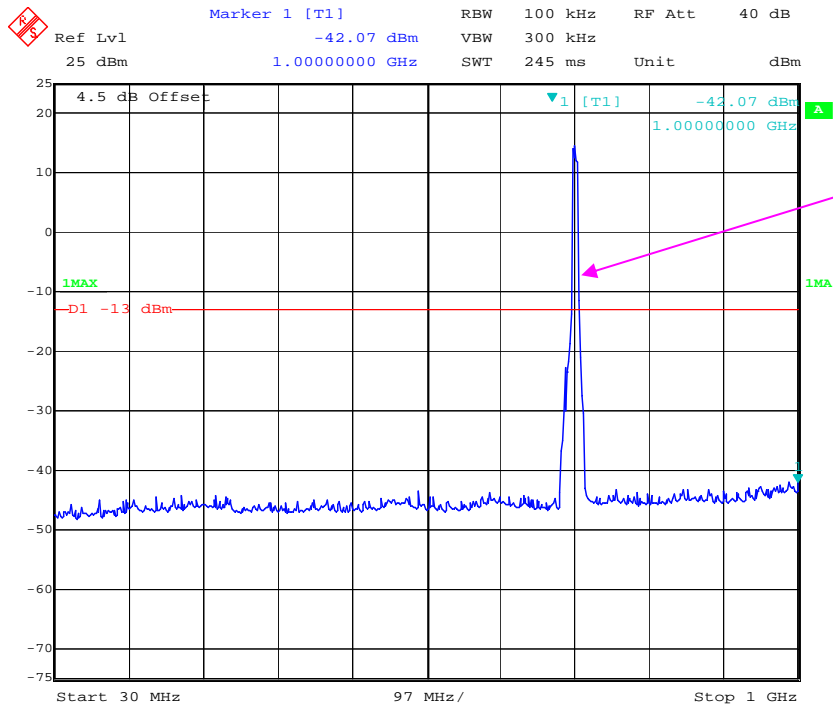


Date: 7.JAN.2019 21:59:50

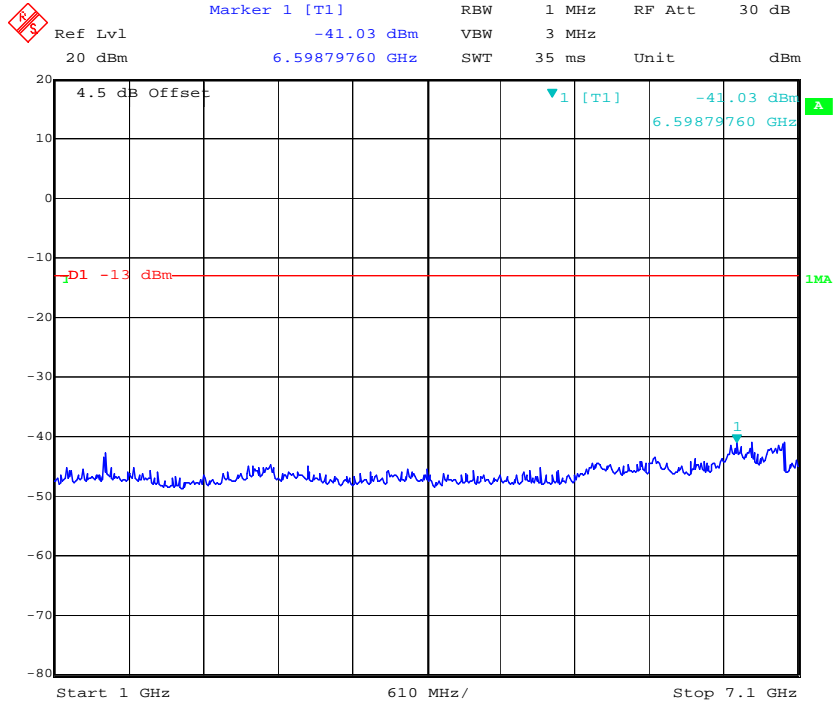


Date: 7.JAN.2019 21:59:59

QPSK_10 MHz



Date: 7.JAN.2019 22:02:13



Date: 7.JAN.2019 22:02:23

FCC §2.1053, §22.917 & §24.238 & §27.53, RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6 & RSS-199 §4.6 - SPURIOUS RADIATED EMISSIONS

Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53;
RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6 & RSS-199 §4.6

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	ESCI	100224	2018-12-10	2019-12-10
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	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2018-05-06	2019-05-06
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-01-04	2020-01-04
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	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-2.4J2.4J-50	C-0700-02	2018-06-27	2019-06-27
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
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	2018-06-27	2019-06-27
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF1710-1785MN-0383-003	0383003	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF1850-1910MS-0935V2	0935V2	2018-06-16	2019-06-16

* **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:	20.9~24.1°C
Relative Humidity:	45~52 %
ATM Pressure:	101.3~101.6 kPa

* The testing was performed by Tyler Pan, Kami Zhou, Neil Liao on 2019-01-10~2019-01-11.

EUT Operation Mode: Transmitting

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	65.77	-48.44	10.6	0.73	-38.6	-13.0	25.6
1673.200	V	68.11	-46.7	10.6	0.73	-36.8	-13.0	23.8
2509.800	H	59.98	-53.04	13.1	1.25	-41.2	-13.0	28.2
2509.800	V	64.04	-49.01	13.1	1.25	-37.2	-13.0	24.2
3346.400	H	47.56	-63.1	13.8	1.61	-50.9	-13.0	37.9
3346.400	V	48.21	-62.5	13.8	1.61	-50.3	-13.0	37.3
125.060	H	38.24	-65.82	0.0	0.32	-66.1	-13.0	53.1
198.780	V	35.67	-74.9	0.0	0.49	-75.4	-13.0	62.4
WCDMA Band V R99, Frequency:836.600 MHz								
1673.200	H	45.27	-68.94	10.6	0.73	-59.1	-13.0	46.1
1673.200	V	46.71	-68.1	10.6	0.73	-58.2	-13.0	45.2
2509.800	H	49.47	-63.55	13.1	1.25	-51.7	-13.0	38.7
2509.800	V	50.17	-62.88	13.1	1.25	-51.0	-13.0	38.0
3346.400	H	46.41	-64.25	13.8	1.61	-52.0	-13.0	39.0
3346.400	V	46.73	-63.98	13.8	1.61	-51.8	-13.0	38.8
174.000	H	35.55	-73.42	0.0	0.43	-73.9	-13.0	60.9
174.000	V	35.74	-76.49	0.0	0.43	-76.9	-13.0	63.9

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	49.35	-59.45	13.8	1.63	-47.3	-13.0	34.3
3760.000	V	50.05	-58.62	13.8	1.63	-46.5	-13.0	33.5
5640.000	H	45.98	-60.05	14.0	1.31	-47.3	-13.0	34.3
5640.000	V	45.63	-60.28	14.0	1.31	-47.6	-13.0	34.6
175.000	H	38.01	-71.09	0.0	0.43	-71.5	-13.0	58.5
208.300	V	35.42	-75.41	0.0	0.49	-75.9	-13.0	62.9
WCDMA Band II R99, Frequency: 1880.000 MHz								
3760.000	H	54.73	-54.07	13.8	1.63	-41.9	-13.0	28.9
3760.000	V	53.88	-54.79	13.8	1.63	-42.7	-13.0	29.7
5640.000	H	47.31	-58.72	14.0	1.31	-46.0	-13.0	33.0
5640.000	V	46.61	-59.3	14.0	1.31	-46.6	-13.0	33.6
430.000	H	35.66	-68.98	0.0	0.64	-69.6	-13.0	56.6
274.000	V	36.04	-75.33	0.0	0.51	-75.8	-13.0	62.8
WCDMA Band IV R99, Frequency: 1732.600 MHz								
3465.200	H	48.24	-62	13.9	1.62	-49.7	-13.0	36.7
3465.200	V	54.53	-55.74	13.9	1.62	-43.5	-13.0	30.5
5197.800	H	48.82	-57.6	14.0	1.52	-45.1	-13.0	32.1
5197.800	V	47.80	-58.69	14.0	1.52	-46.2	-13.0	33.2
405.000	H	36.70	-68.08	0.0	0.62	-68.7	-13.0	55.7
469.000	V	36.11	-71.43	0.0	0.68	-72.1	-13.0	59.1

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	60.43	-48.37	13.76	1.63	-36.24	-13.00	23.24
3760.00	V	59.51	-49.16	13.76	1.63	-37.03	-13.00	24.03
5640.00	H	56.52	-49.51	14.02	1.31	-36.80	-13.00	23.80
5640.00	V	53.33	-52.58	14.02	1.31	-39.87	-13.00	26.87
541.55	H	35.71	-67.65	0.00	0.73	-68.38	-13.00	55.38
541.55	V	35.56	-70.92	0.00	0.73	-71.65	-13.00	58.65

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	52.18	-58.06	13.91	1.62	-45.77	-13.00	32.77
3465.00	V	56.05	-54.23	13.91	1.62	-41.94	-13.00	28.94
5197.50	H	47.63	-58.79	14.00	1.52	-46.31	-13.00	33.31
5197.50	V	53.85	-52.64	14.00	1.52	-40.16	-13.00	27.16
243.44	H	35.74	-73.42	0.00	0.50	-73.92	-13.00	60.92
617.21	V	35.19	-69.94	0.00	0.79	-70.73	-13.00	57.73

LTE Band 5 (30MHz-10GHz):

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: 836.500 MHz								
1673.00	H	47.98	-66.24	10.61	0.73	-56.36	-13.00	43.36
1673.00	V	48.93	-65.89	10.61	0.73	-56.01	-13.00	43.01
2509.50	H	50.12	-62.90	13.11	1.25	-51.04	-13.00	38.04
2509.50	V	55.32	-57.73	13.11	1.25	-45.87	-13.00	32.87
3346.00	H	47.63	-63.03	13.83	1.61	-50.81	-13.00	37.81
3346.00	V	47.92	-62.79	13.83	1.61	-50.57	-13.00	37.57
169.00	H	35.99	-72.31	0.00	0.42	-72.73	-13.00	59.73
175.00	V	35.74	-76.48	0.00	0.43	-76.91	-13.00	63.91

LTE Band 7 (30MHz-26.5GHz):

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: 2535.000 MHz								
5070.00	H	48.73	-58.07	13.93	1.34	-45.48	-25.00	20.48
5070.00	V	49.48	-57.13	13.93	1.34	-44.54	-25.00	19.54
7605.00	H	46.64	-53.72	13.21	1.40	-41.91	-25.00	16.91
7605.00	V	47.49	-53.27	13.21	1.40	-41.46	-25.00	16.46
175.50	H	37.29	-71.88	0.00	0.43	-72.31	-25.00	47.31
209.00	V	36.44	-74.42	0.00	0.49	-74.91	-25.00	49.91

LTE Band 17 (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: 710.000 MHz								
1420.00	H	51.75	-61.85	9.10	1.23	-53.98	-13.00	40.98
1420.00	V	55.49	-58.61	9.10	1.23	-50.74	-13.00	37.74
2130.00	H	47.78	-64.97	11.22	1.11	-54.86	-13.00	41.86
2130.00	V	47.39	-65.33	11.22	1.11	-55.22	-13.00	42.22
2840.00	H	46.42	-65.62	13.42	1.36	-53.56	-13.00	40.56
2840.00	V	46.55	-65.73	13.42	1.36	-53.67	-13.00	40.67
306.00	H	35.47	-72.94	0.00	0.53	-73.47	-13.00	60.47
574.00	V	35.89	-69.99	0.00	0.75	-70.74	-13.00	57.74

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, RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6 & RSS-199 §4.6 - BAND EDGES

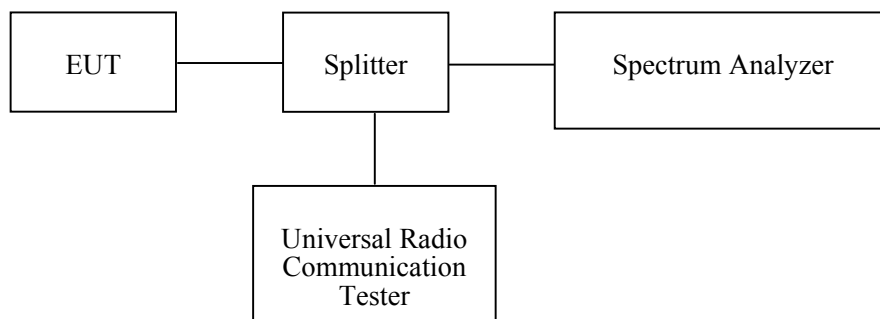
Applicable Standard

FCC § 2.1053, §22.917, § 24.238 and § 27.53;
 RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6 & RSS-199 §4.6

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	EMI Test Receiver	ESCI	101121	2018-03-23	2019-03-23
R&S	EMI Test Receiver	ESPI	100120	2018-12-10	2019-12-10
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	Each time	N/A
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	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

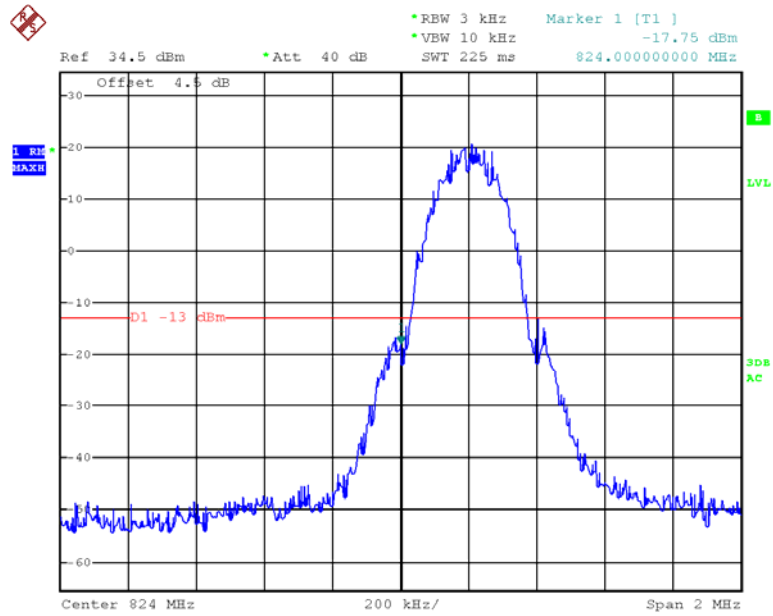
Temperature:	23.9~26.6°C
Relative Humidity:	35~56 %
ATM Pressure:	100.2~102.1 kPa

The testing was performed by Carrie He & Tiago Huang from 2019-01-05 to 2019-01-25.

Test Mode: Transmitting

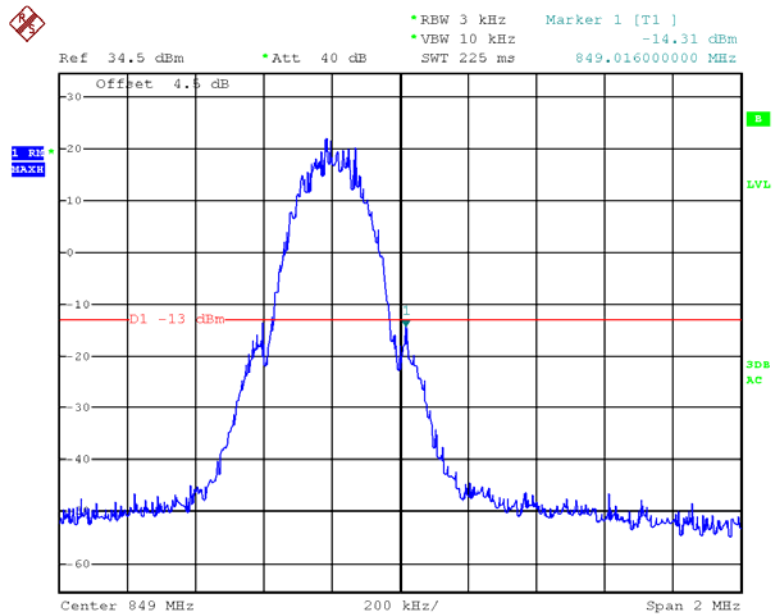
Test Result: Compliant. Please refer to the following plots.

GSM 850, Left Band Edge



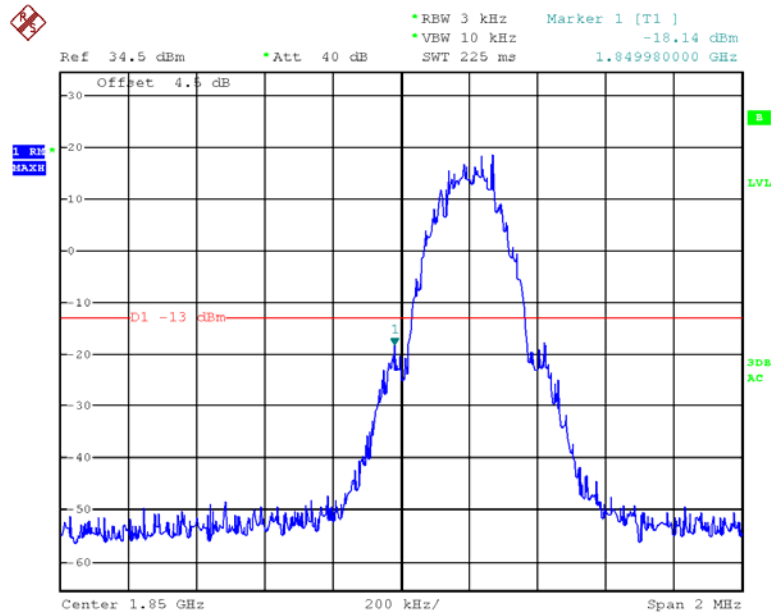
Date: 5.JAN.2019 13:31:01

GSM 850, Right Band Edge



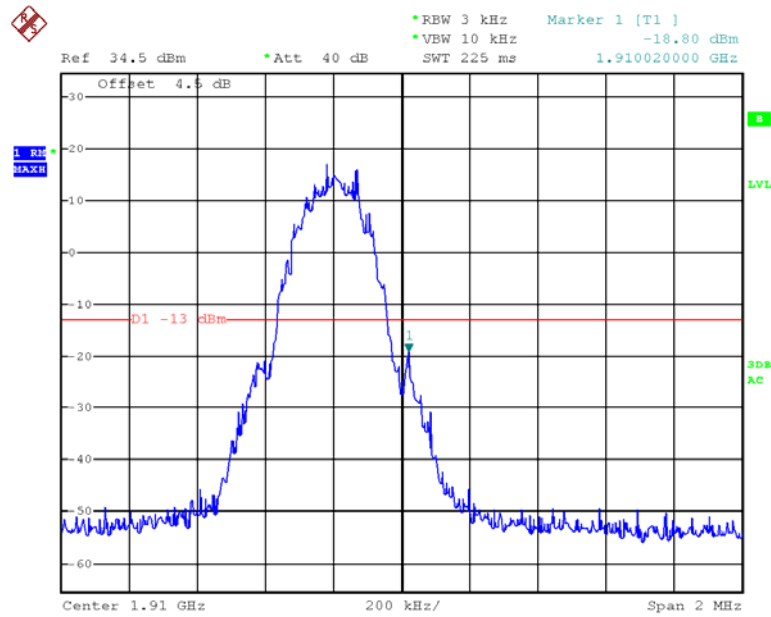
Date: 5.JAN.2019 13:33:03

GSM 1900, Left Band Edge



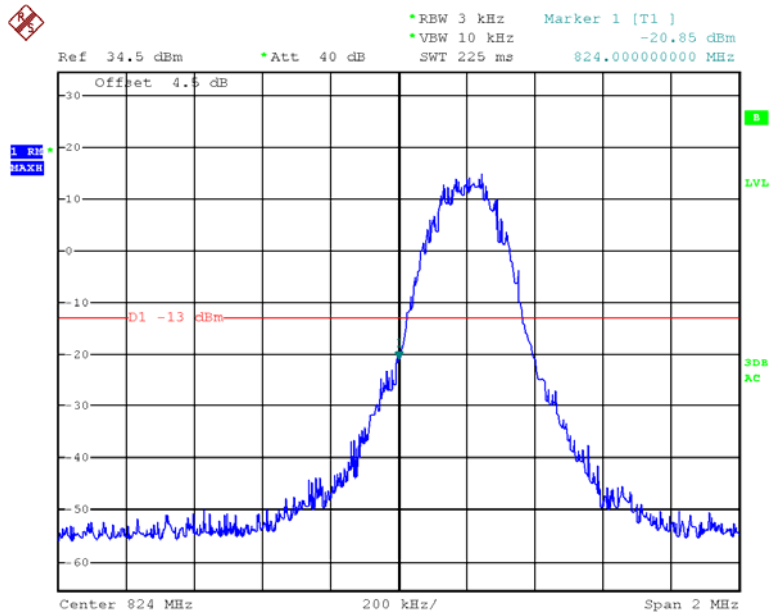
Date: 5.JAN.2019 13:34:50

GSM 1900, Right Band Edge



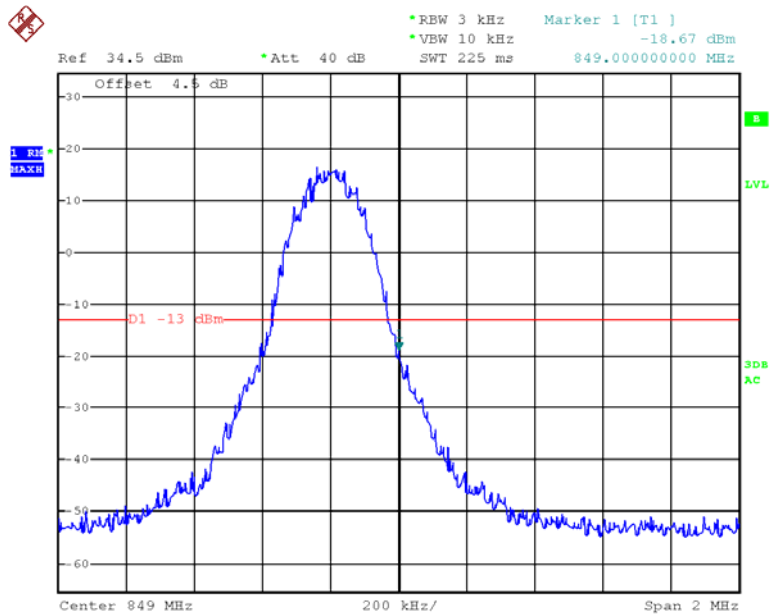
Date: 5.JAN.2019 13:35:58

EDGE 850, Left Band Edge



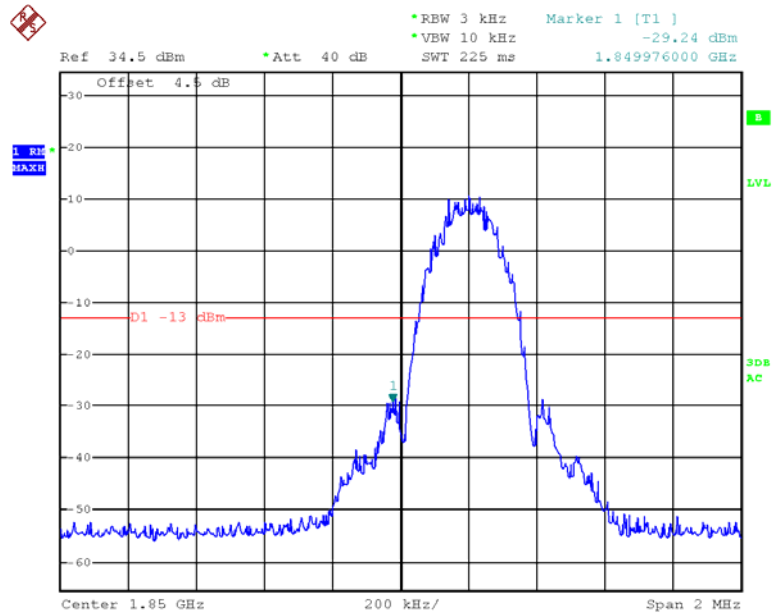
Date: 5.JAN.2019 13:47:52

EDGE 850, Right Band Edge



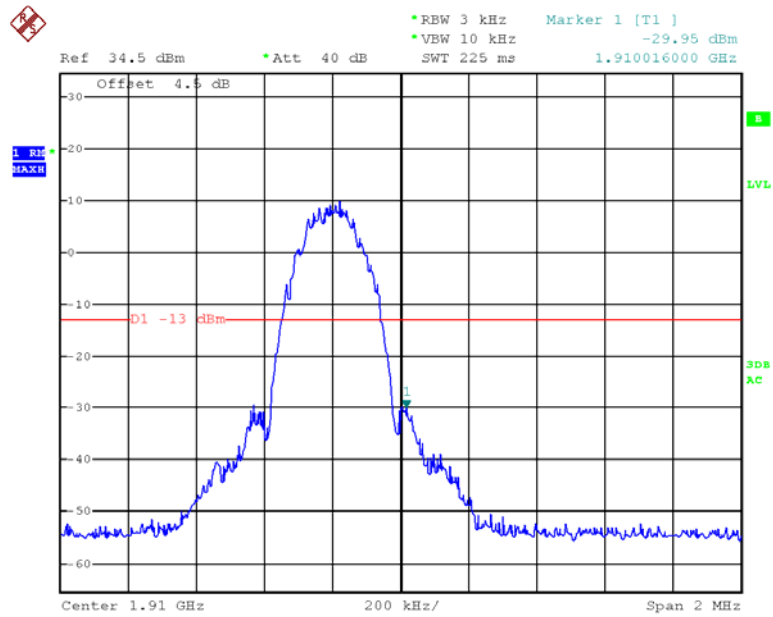
Date: 5.JAN.2019 13:50:02

EDGE 1900, Left Band Edge



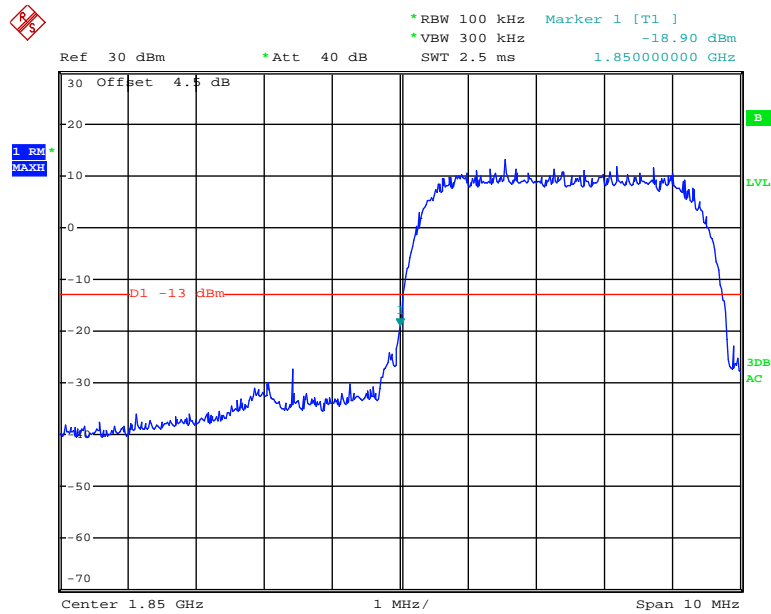
Date: 5.JAN.2019 13:43:18

EDGE 1900, Right Band Edge



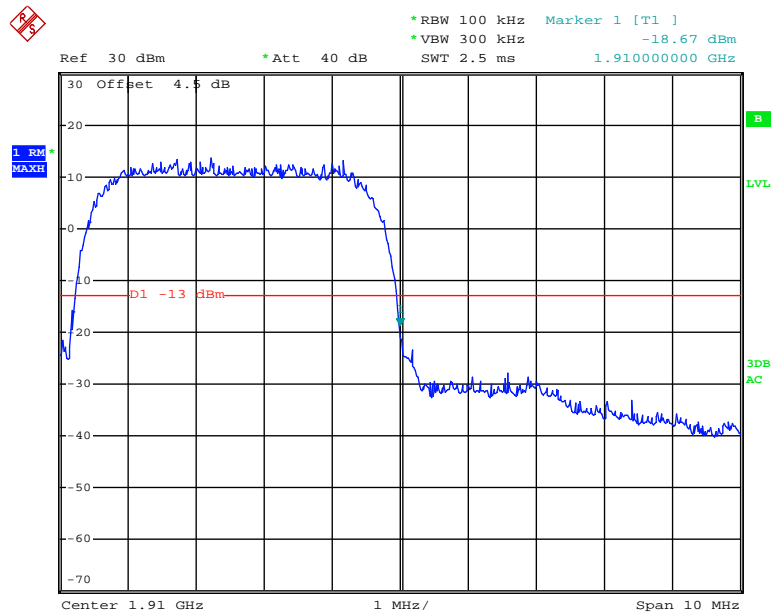
Date: 5.JAN.2019 13:45:05

WCDMA Band II Rel 99, Left Band Edge



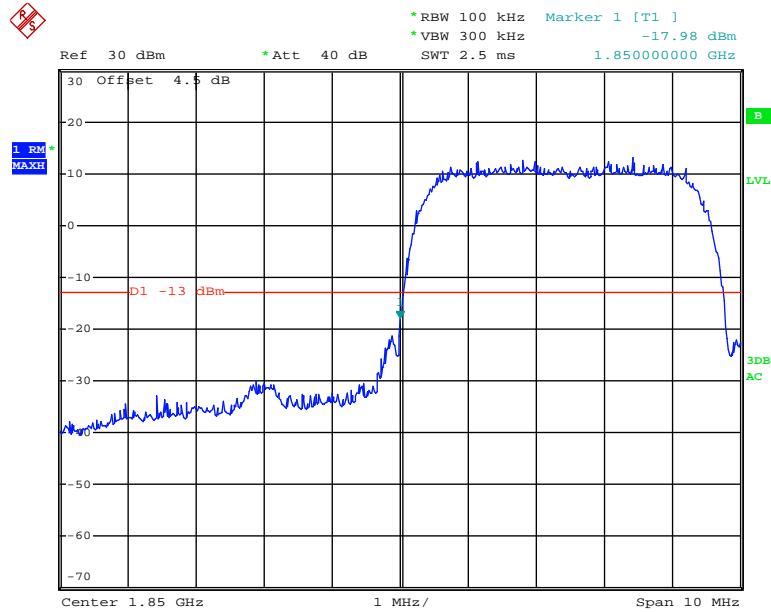
Date: 5.JAN.2019 10:56:10

WCDMA Band II Rel 99, Right Band Edge



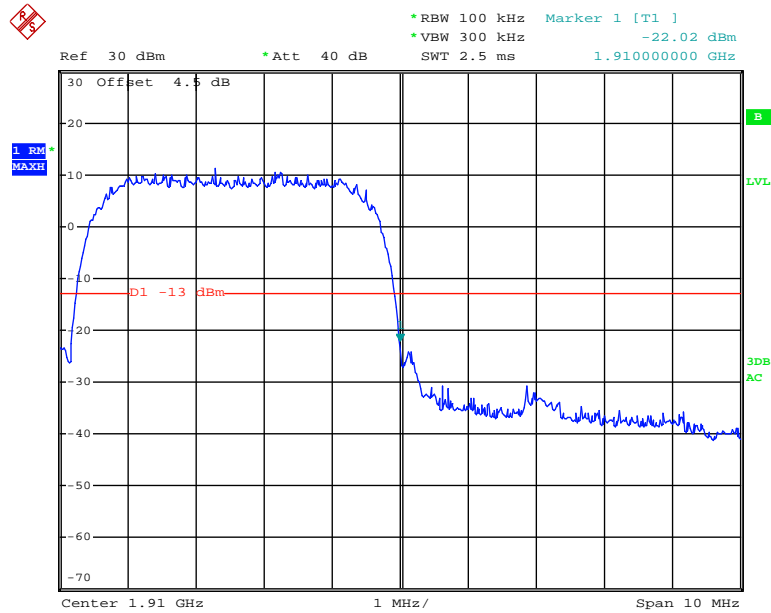
Date: 5.JAN.2019 10:57:07

WCDMA Band II HSDPA, Left Band Edge



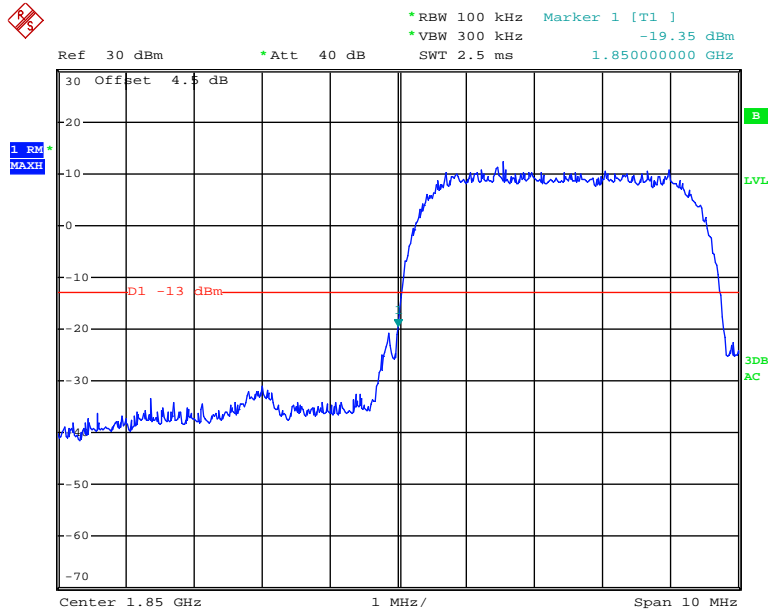
Date: 5.JAN.2019 10:58:47

WCDMA Band II HSDPA, Right Band Edge



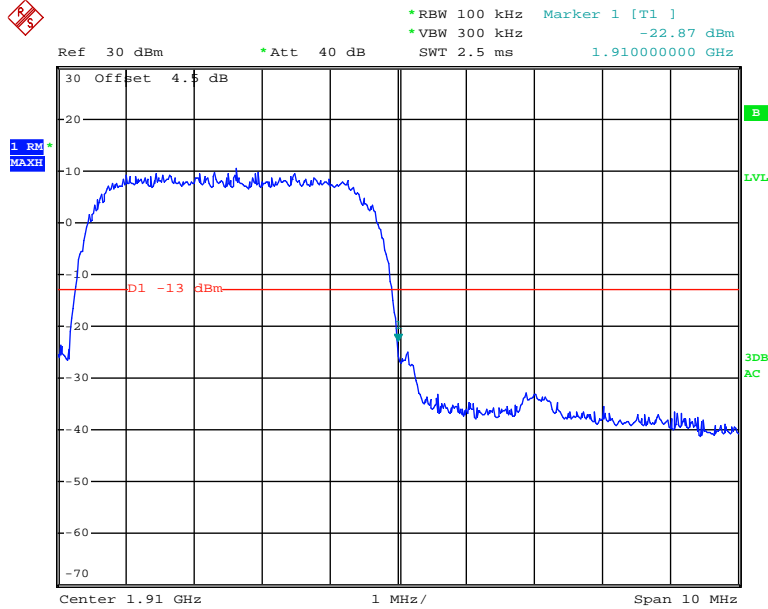
Date: 5.JAN.2019 10:59:32

WCDMA Band II HSUPA, Left Band Edge



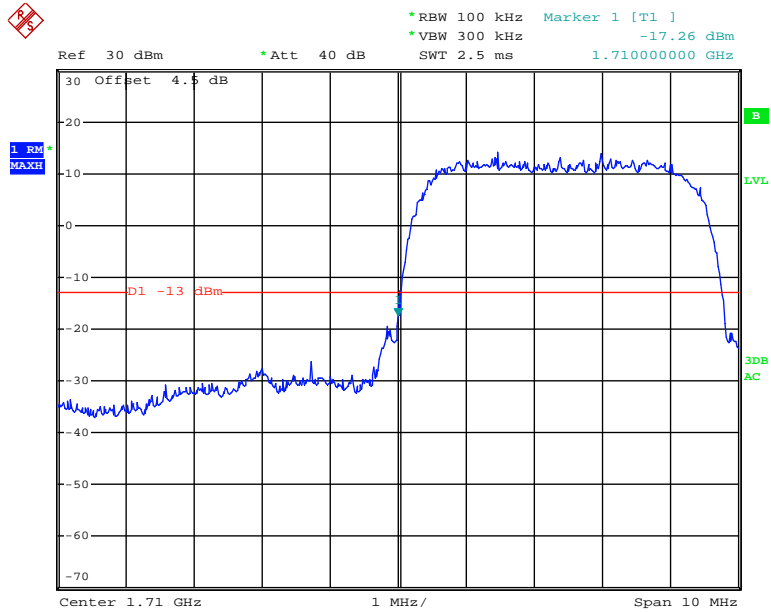
Date: 5.JAN.2019 11:35:42

WCDMA Band II HSUPA, Right Band Edge



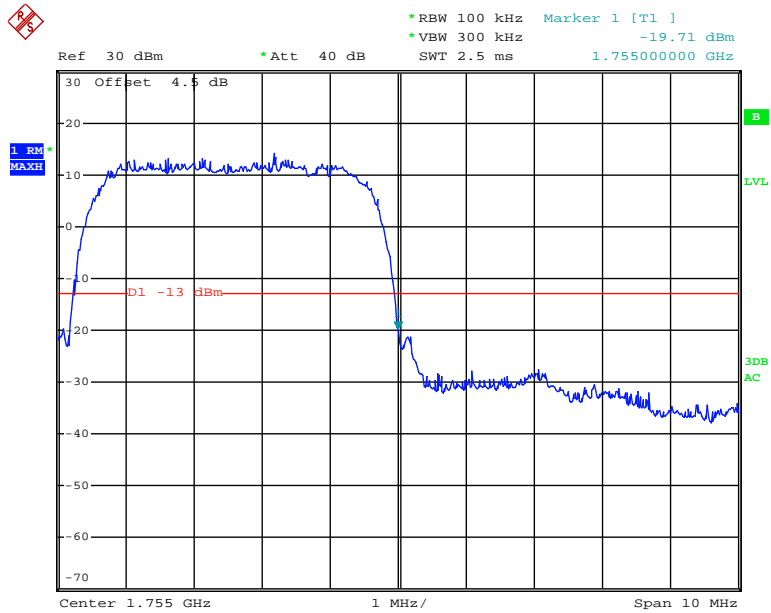
Date: 5.JAN.2019 11:36:46

WCDMA Band IV Rel 99, Left Band Edge



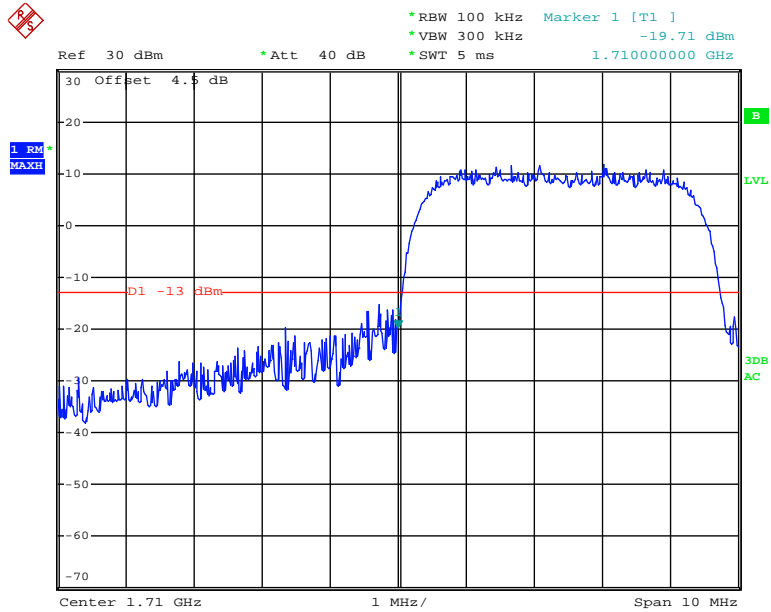
Date: 5.JAN.2019 10:48:52

WCDMA Band IV Rel 99, Right Band Edge



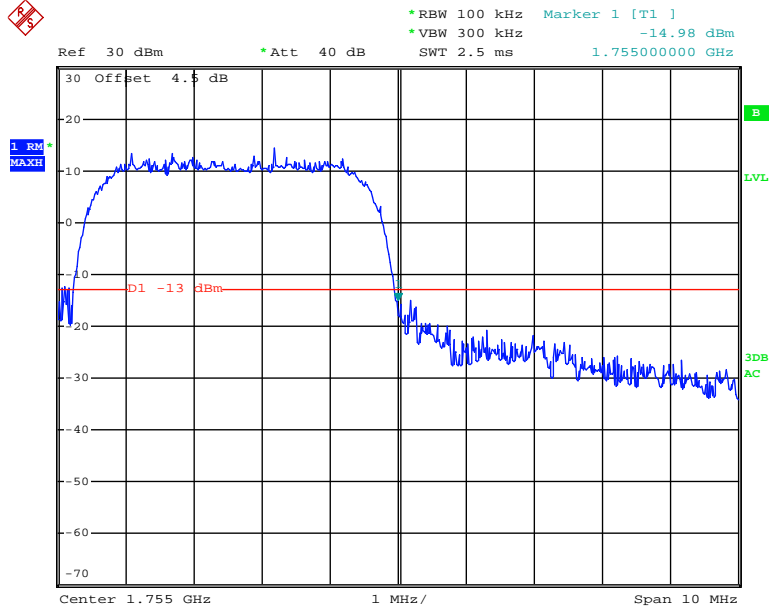
Date: 5.JAN.2019 10:49:31

WCDMA Band IV HSDPA, Left Band Edge



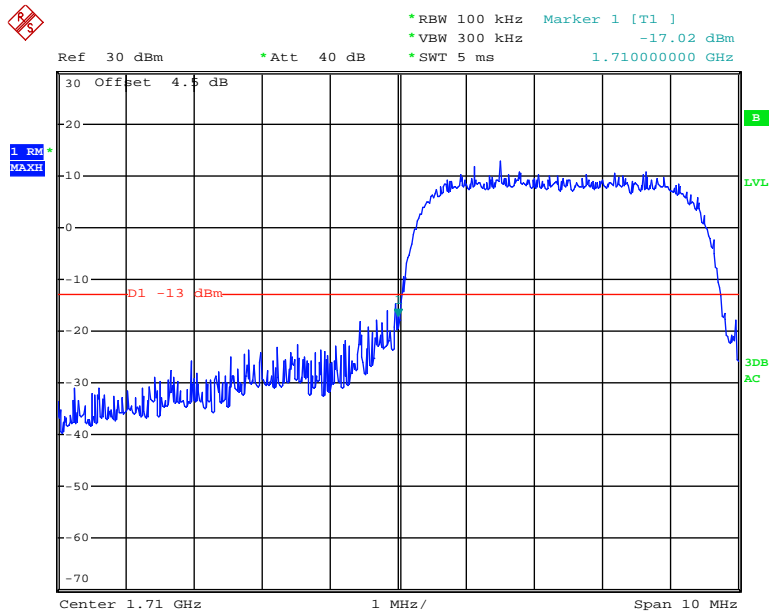
Date: 5.JAN.2019 11:00:38

WCDMA Band IV HSDPA, Right Band Edge



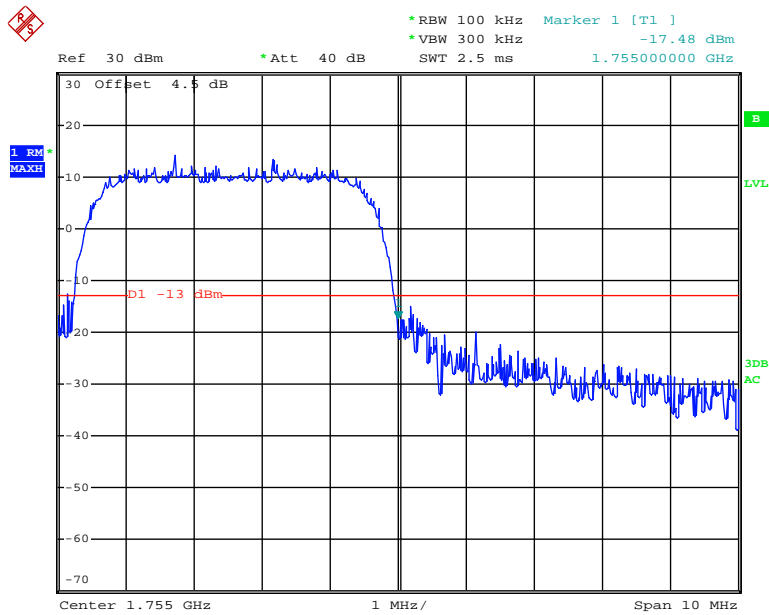
Date: 5.JAN.2019 11:01:38

WCDMA Band IV HSUPA, Left Band Edge



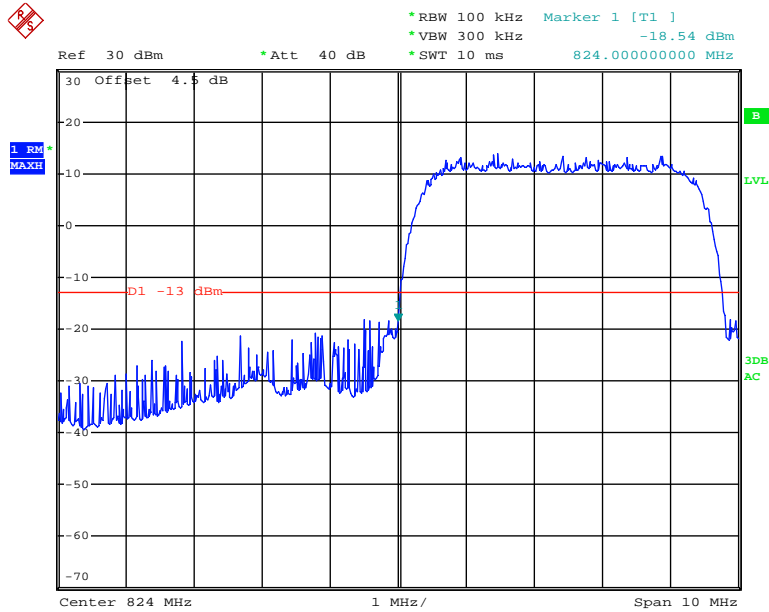
Date: 5.JAN.2019 11:32:18

WCDMA Band IV HSUPA, Right Band Edge



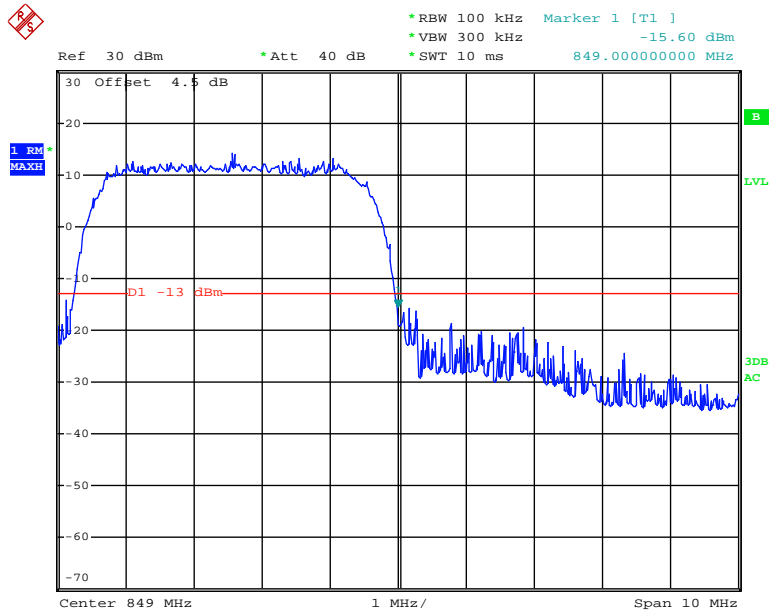
Date: 5.JAN.2019 11:31:41

WCDMA Band V Rel 99, Left Band Edge



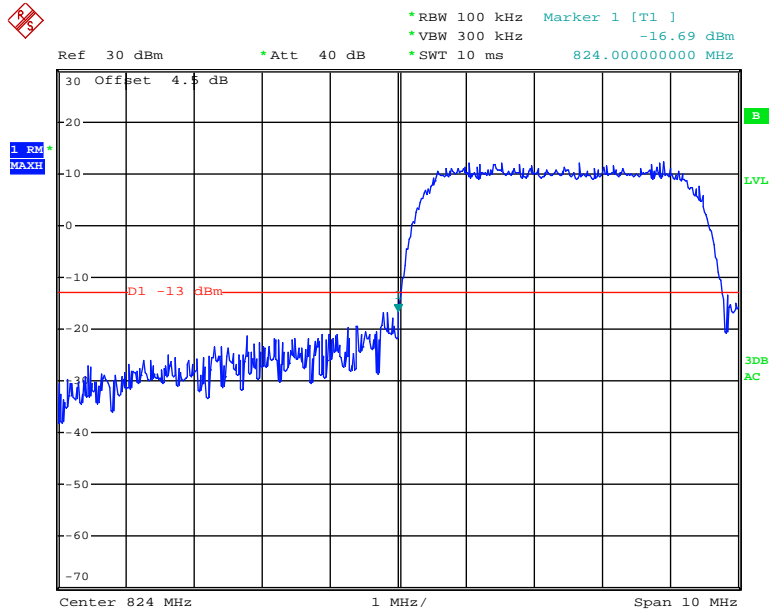
Date: 5.JAN.2019 10:54:23

WCDMA Band V Rel 99, Right Band Edge



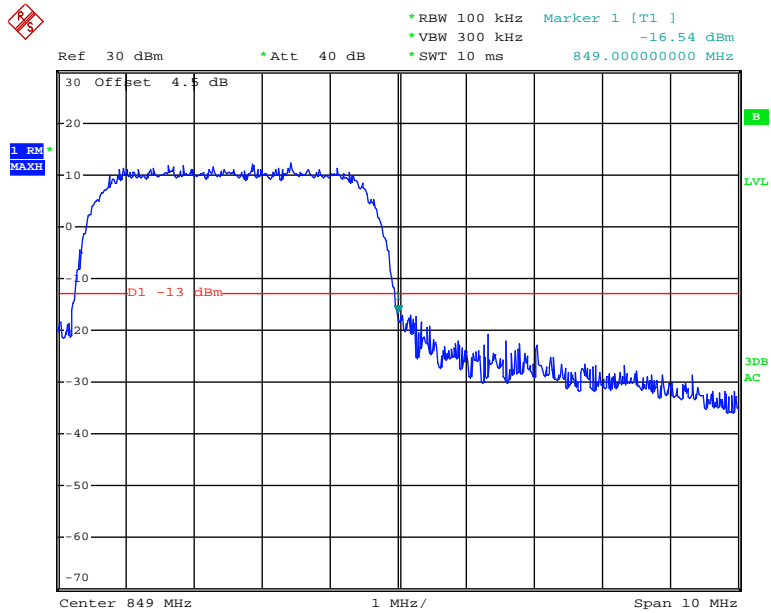
Date: 5.JAN.2019 10:55:03

WCDMA Band V HSDPA, Left Band Edge



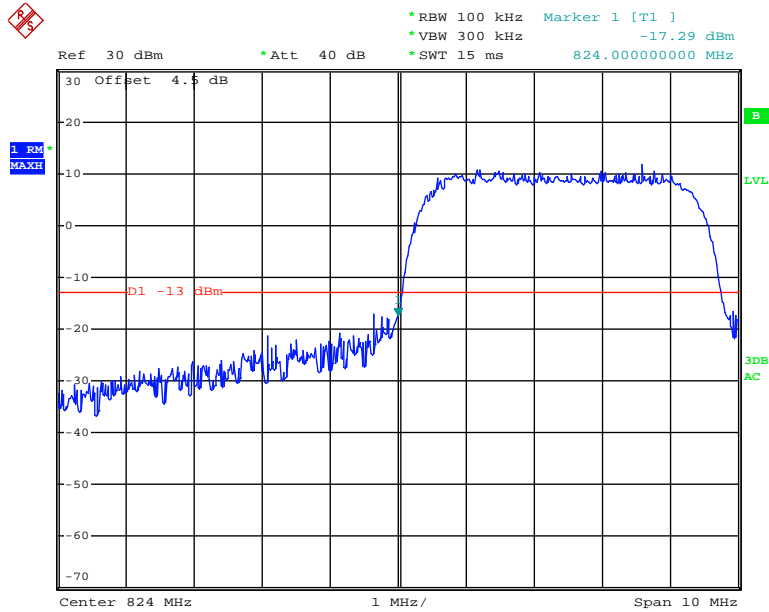
Date: 5.JAN.2019 11:02:34

WCDMA Band V HSDPA, Right Band Edge



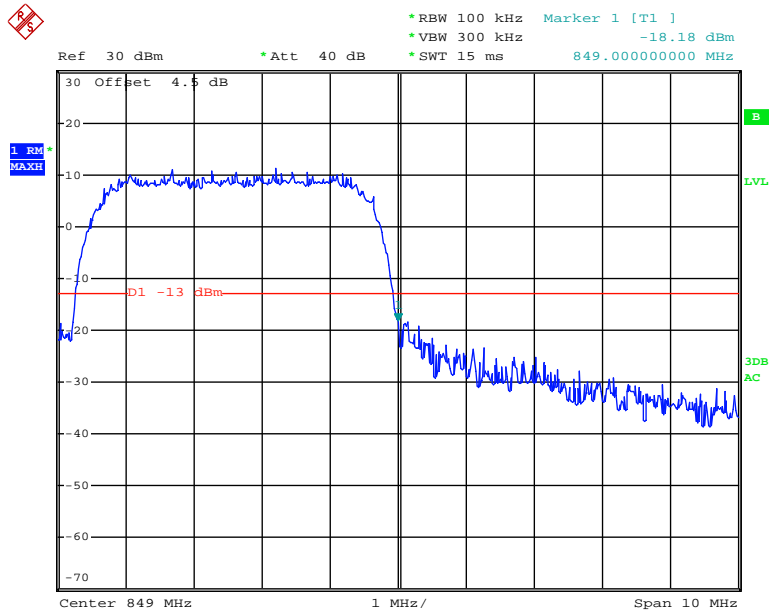
Date: 5.JAN.2019 11:03:01

WCDMA Band V HSUPA, Left Band Edge



Date: 5.JAN.2019 11:33:16

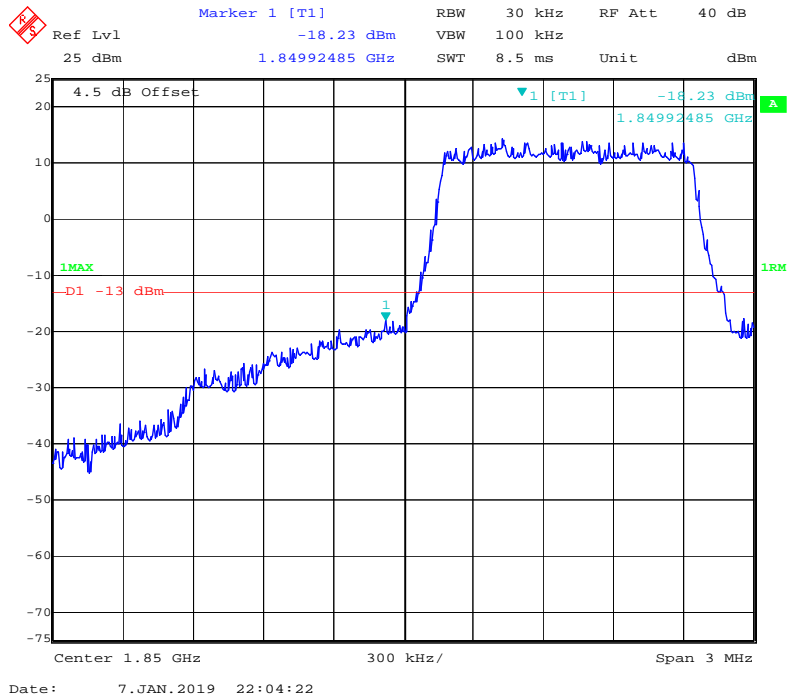
WCDMA Band V HSUPA, Right Band Edge



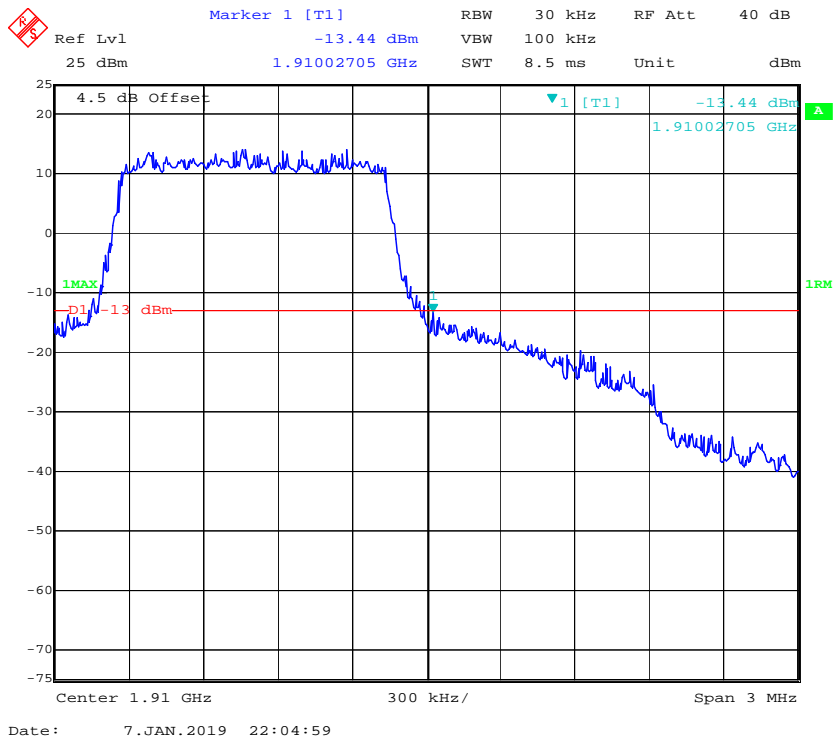
Date: 5.JAN.2019 11:33:52

LTE Band 2

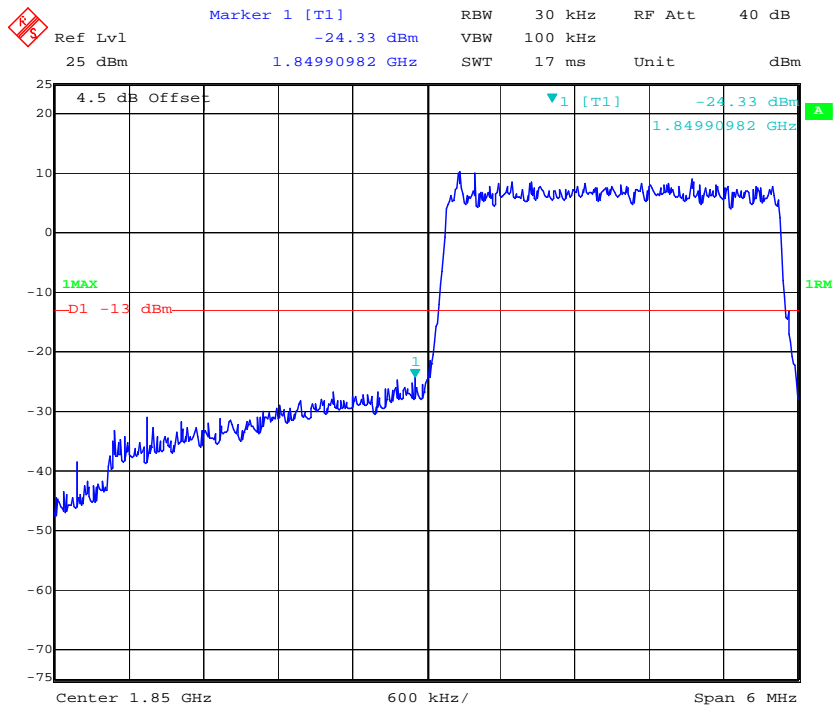
QPSK_1.4MHz_6 RB_ Left



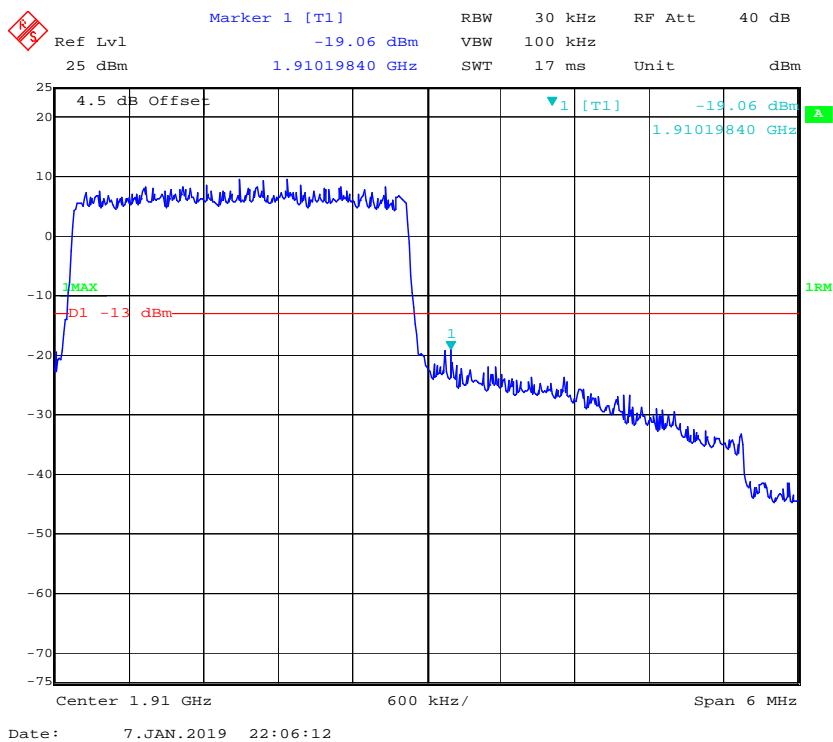
QPSK_1.4MHz_6 RB_ Right



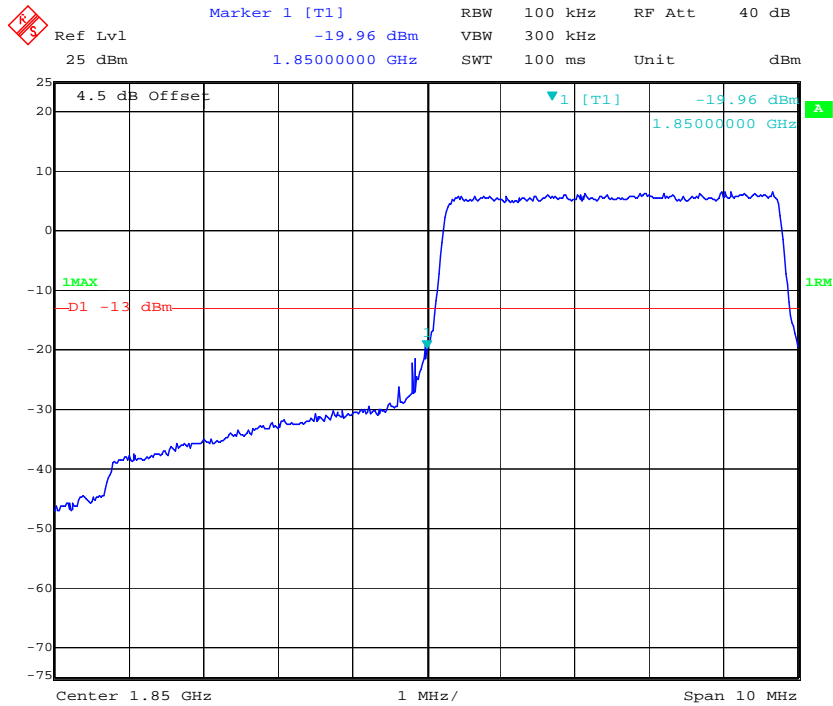
QPSK_3MHz_15 RB_Left



QPSK_3MHz_15 RB_Right

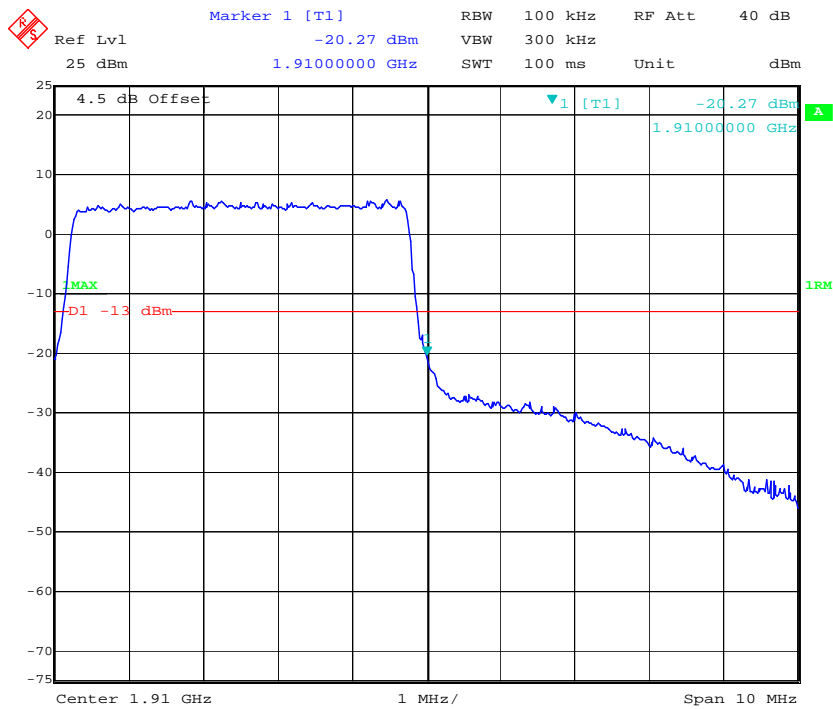


QPSK_5MHz_25 RB_Left



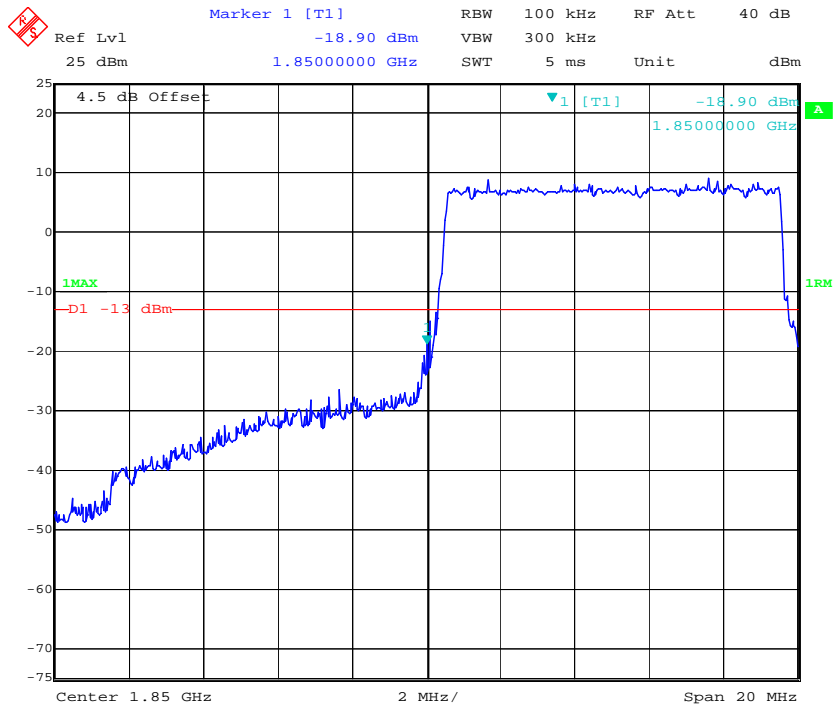
Date: 7.JAN.2019 22:55:26

QPSK_5MHz_25 RB_Right

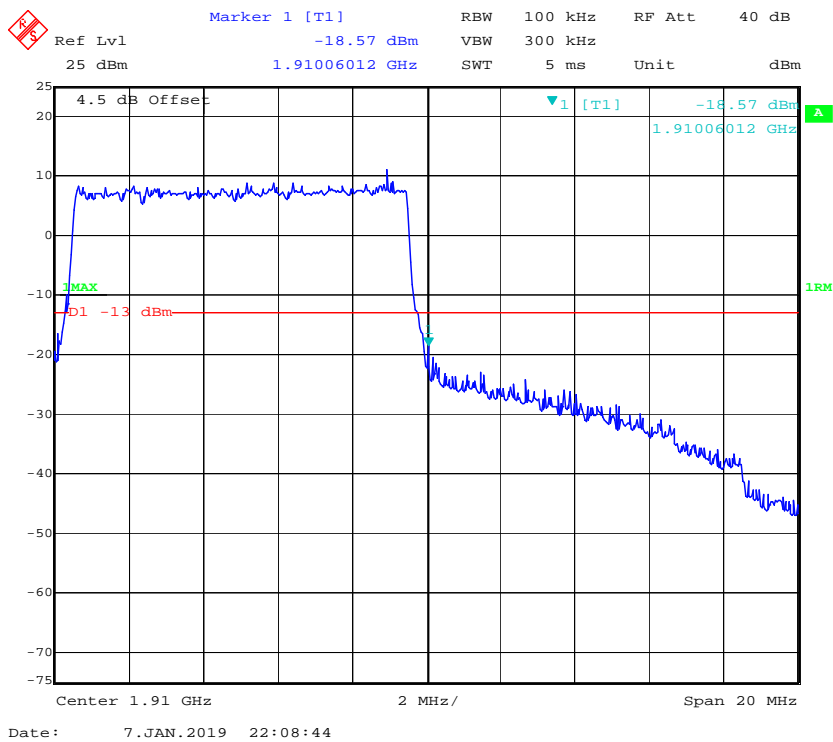


Date: 7.JAN.2019 22:53:32

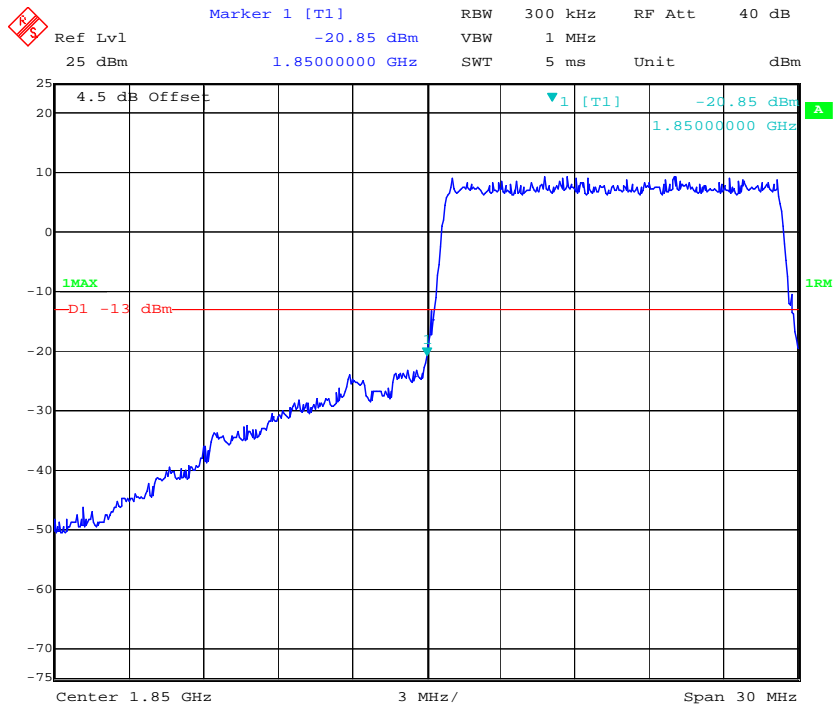
QPSK_10MHz_50 RB_Left



QPSK_10MHz_50 RB_Right

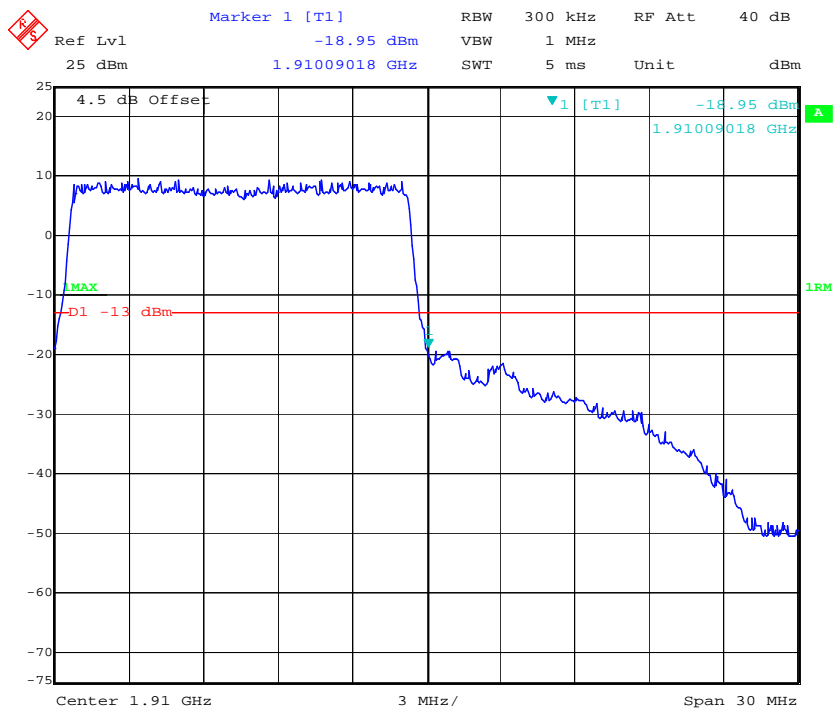


QPSK_15MHz_75 RB_Left



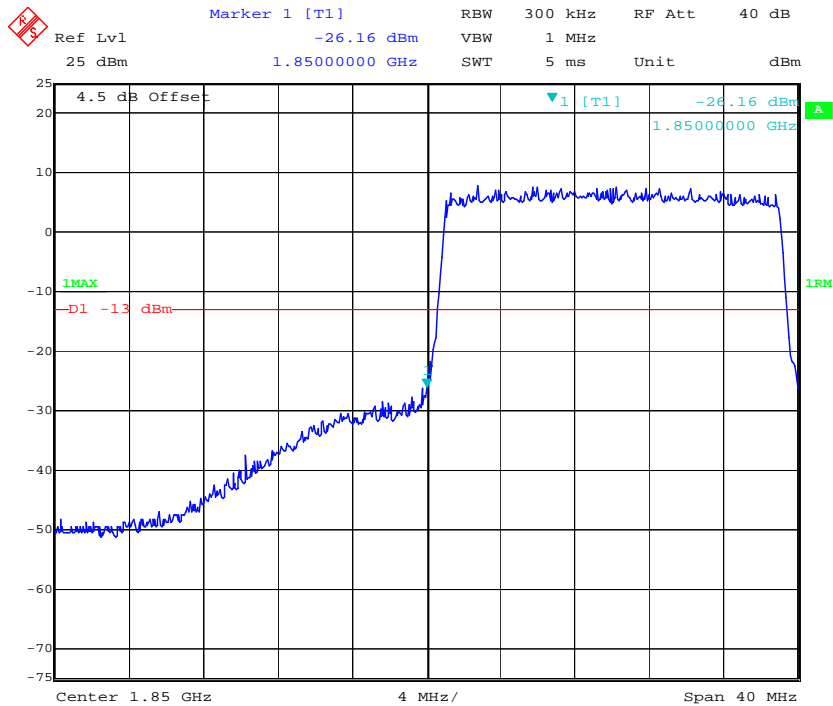
Date: 7.JAN.2019 22:09:23

QPSK_15MHz_75 RB_Right



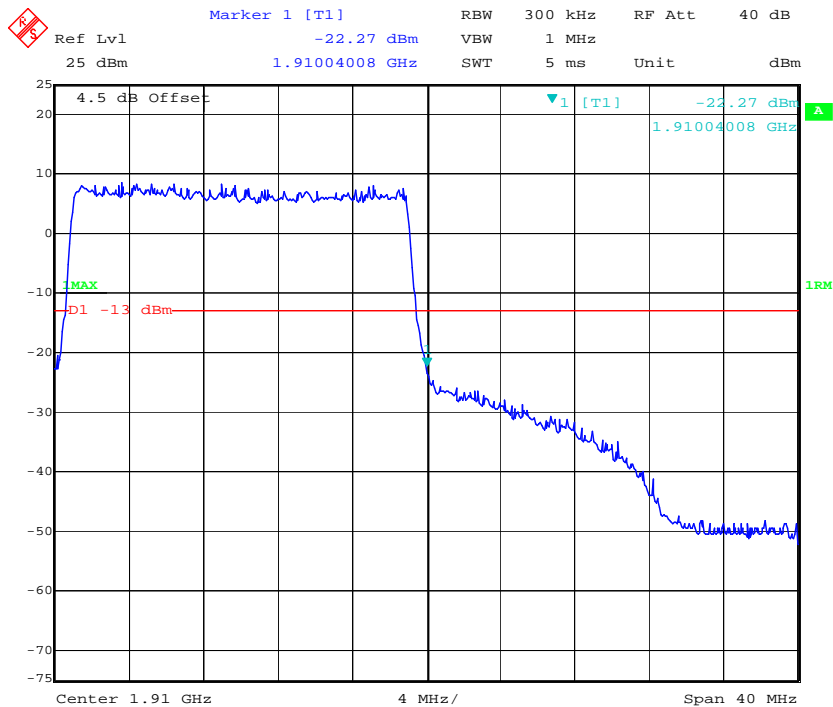
Date: 7.JAN.2019 22:10:03

QPSK_20MHz_FULL RB_Left



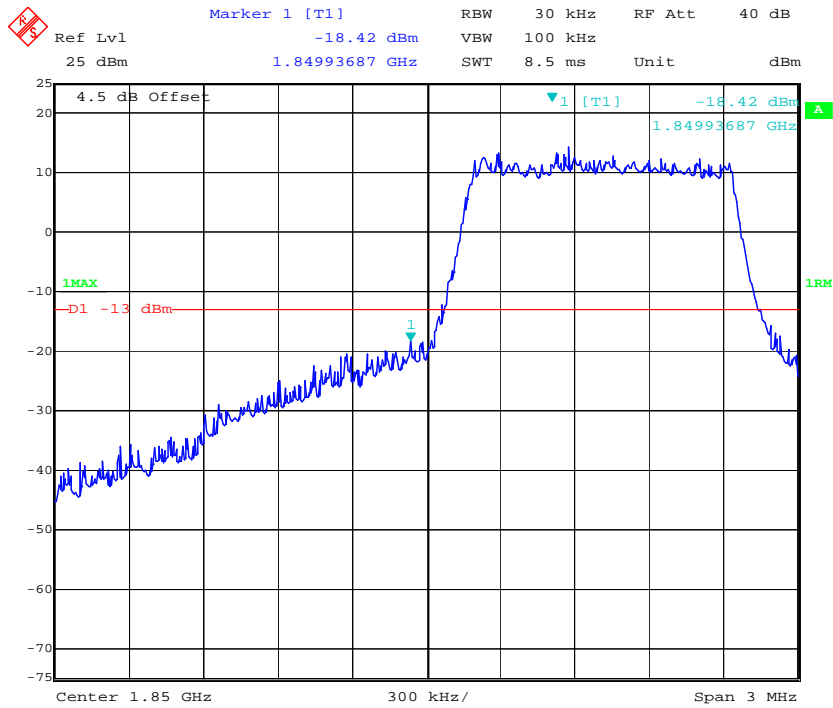
Date: 7.JAN.2019 22:10:42

QPSK_20MHz_FULL RB_Right

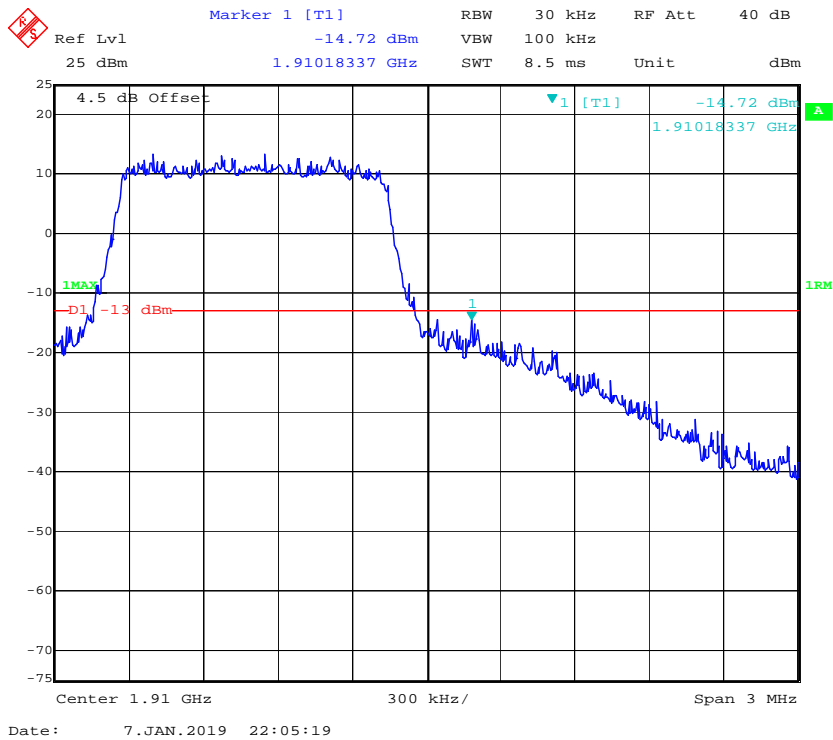


Date: 7.JAN.2019 22:11:25

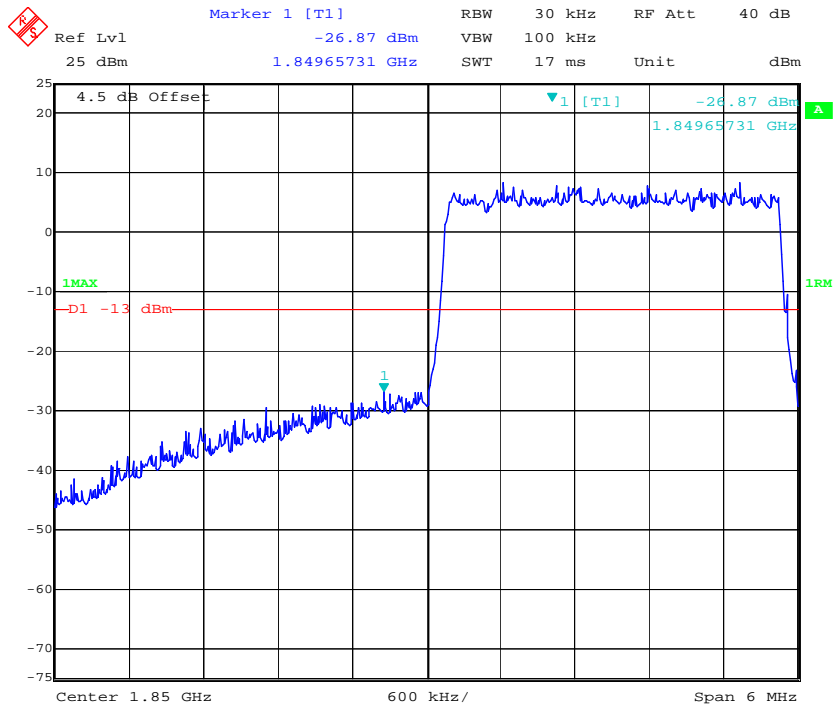
16QAM_1.4MHz_6 RB_Left



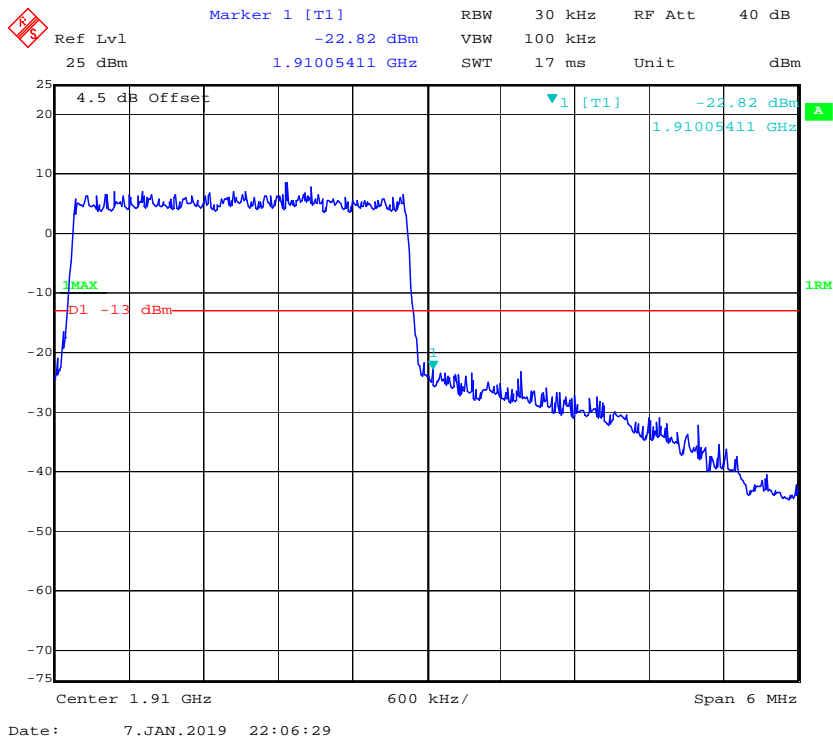
16QAM_1.4MHz_6 RB_Right



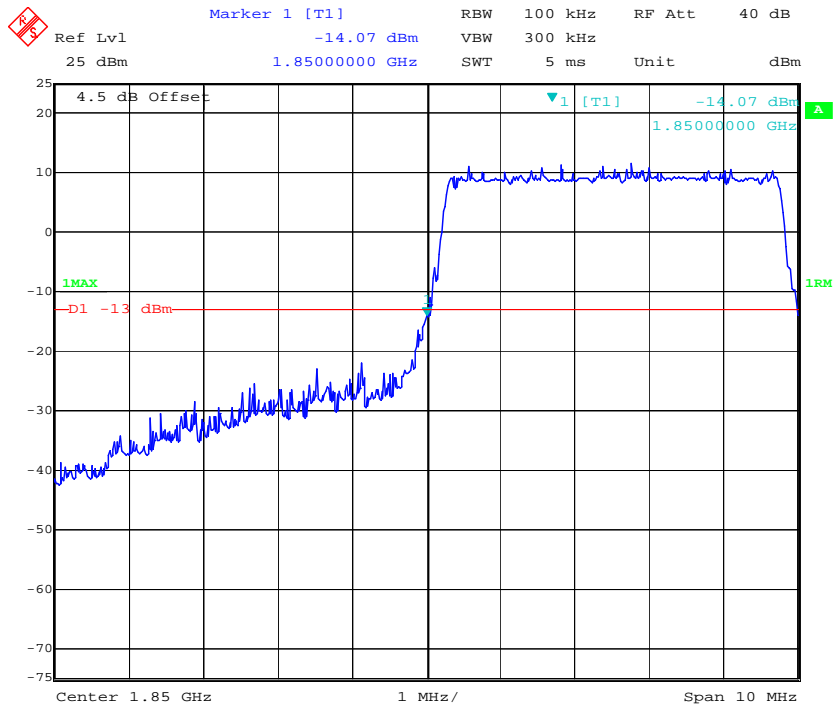
16QAM_3MHz_15 RB_Left



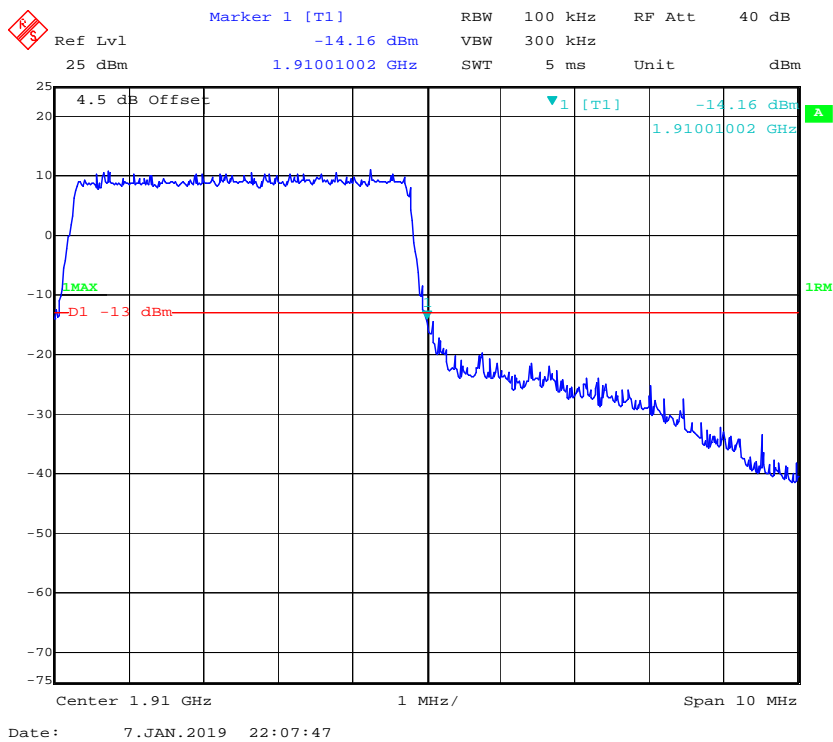
16QAM_3MHz_15 RB_Right



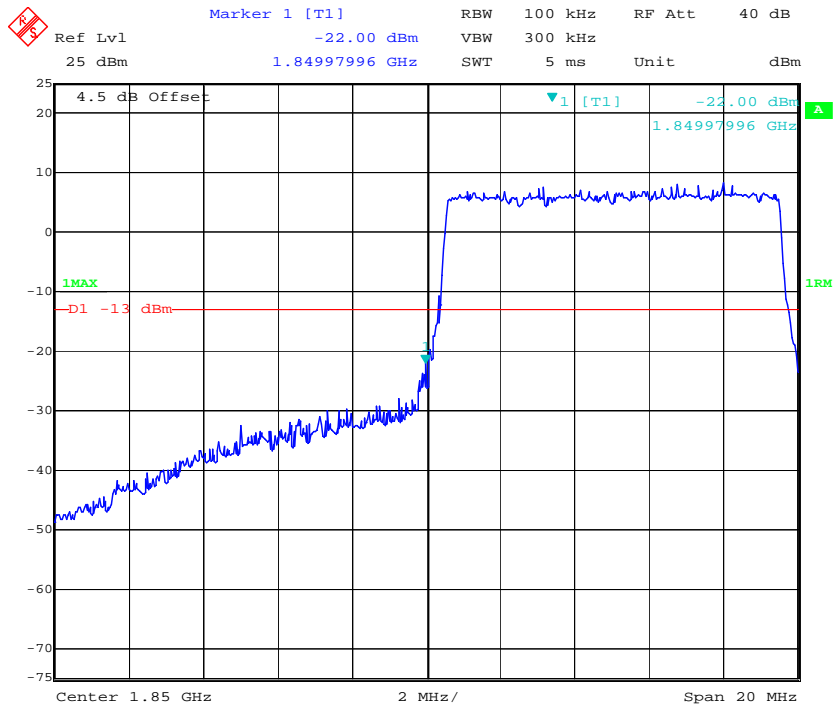
16QAM_5MHz_25 RB_Left



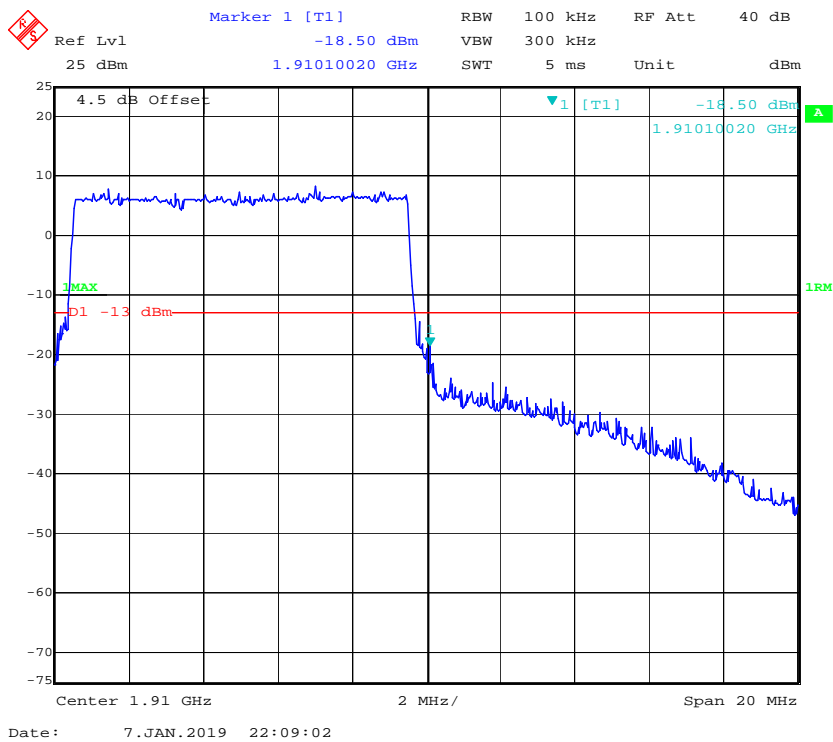
16QAM_5MHz_25 RB_Right



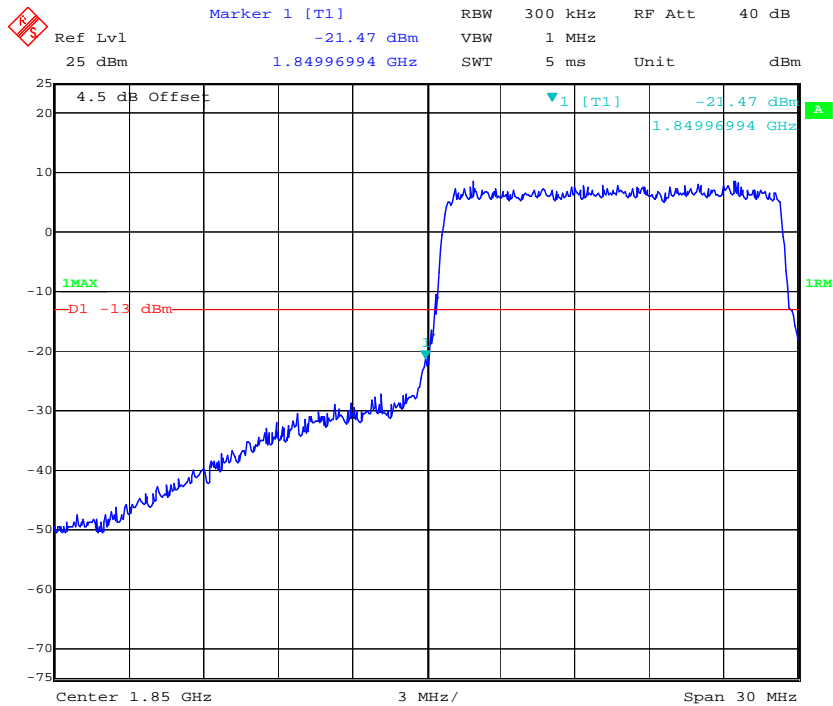
16QAM_10MHz_50 RB_Left



16QAM_10MHz_50 RB_Right

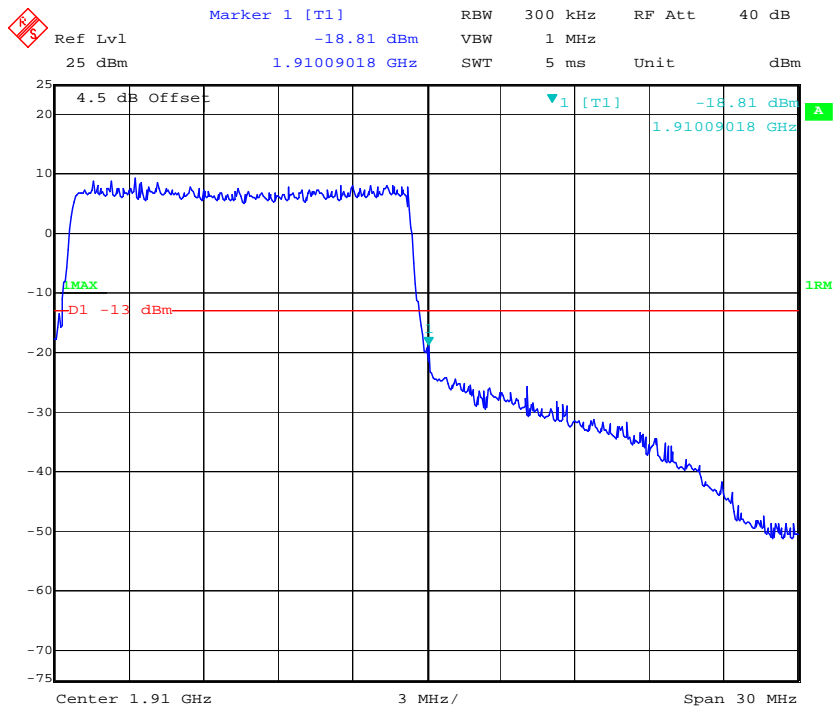


16QAM_15MHz_75 RB_Left



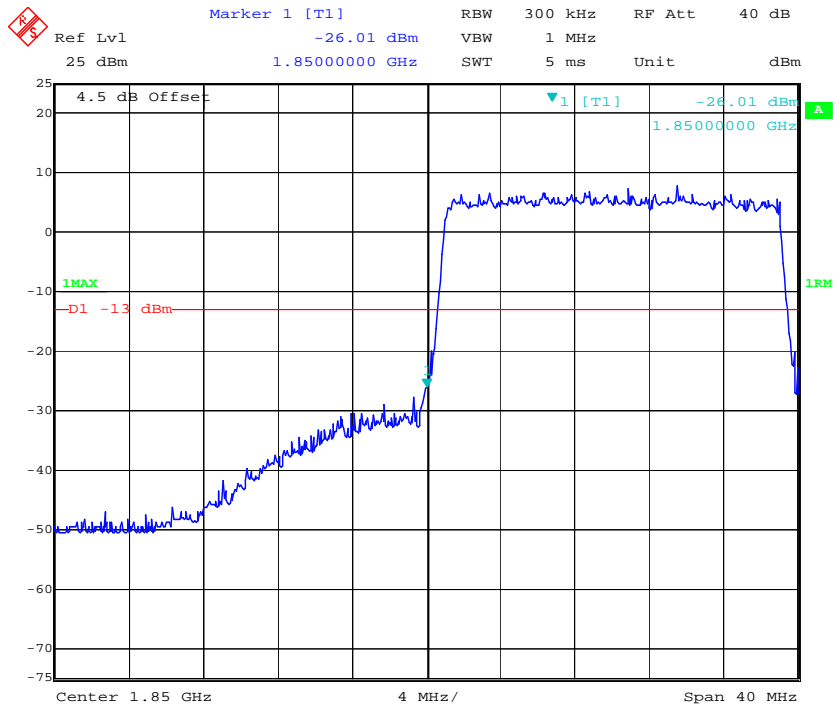
Date: 7.JAN.2019 22:09:44

16QAM_15MHz_75 RB_Right



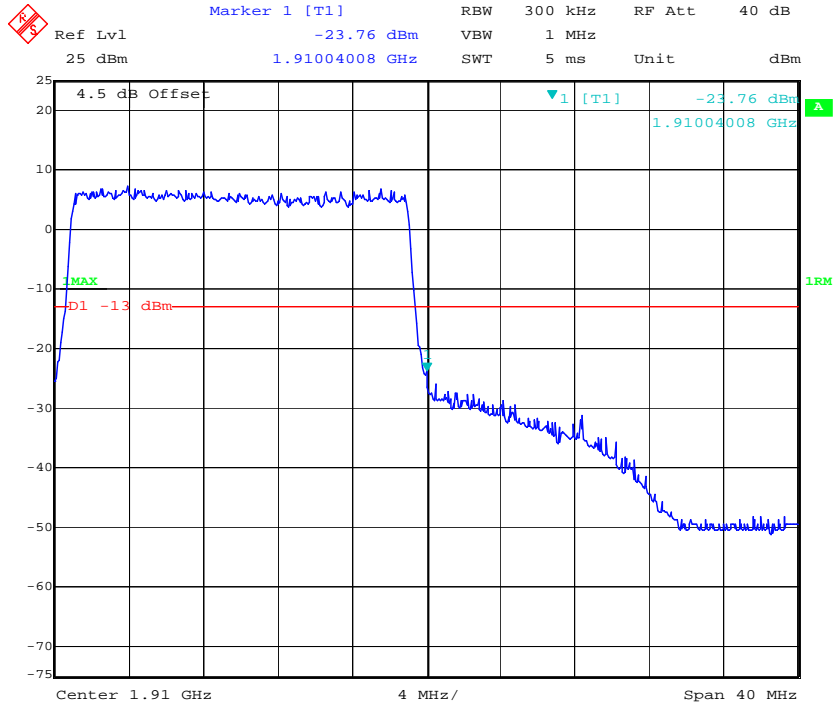
Date: 7.JAN.2019 22:10:21

16QAM_20MHz_FULL RB_Left



Date: 7.JAN.2019 22:11:03

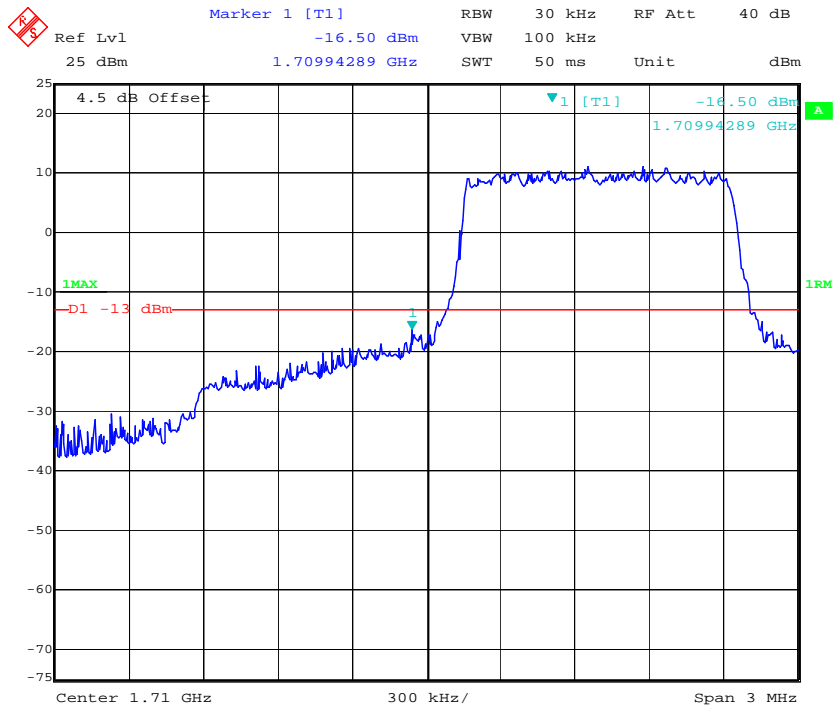
16QAM_20MHz_FULL RB_Right



Date: 7.JAN.2019 22:11:46

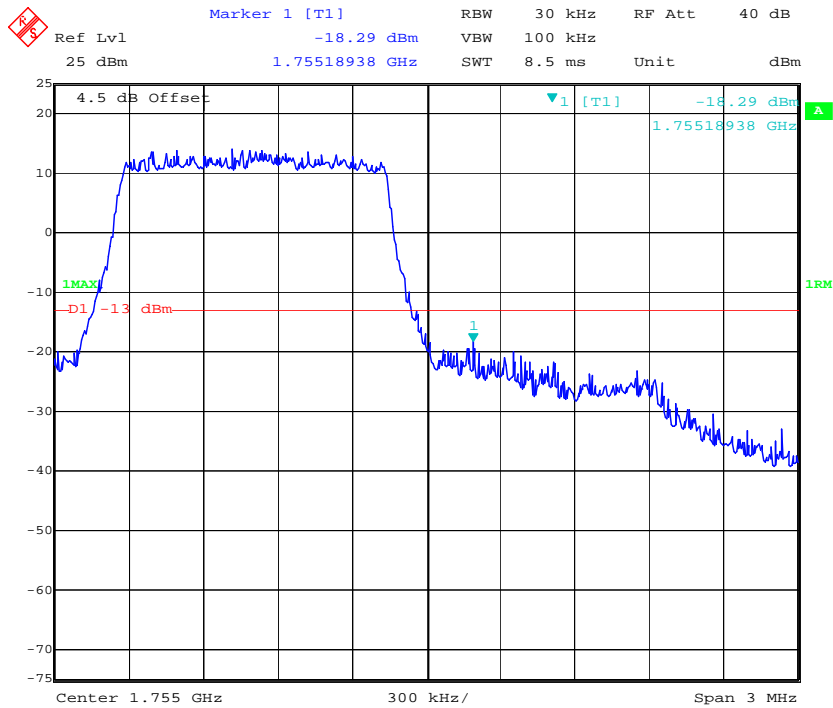
LTE Band 4

QPSK_1.4MHz_6 RB_ Left



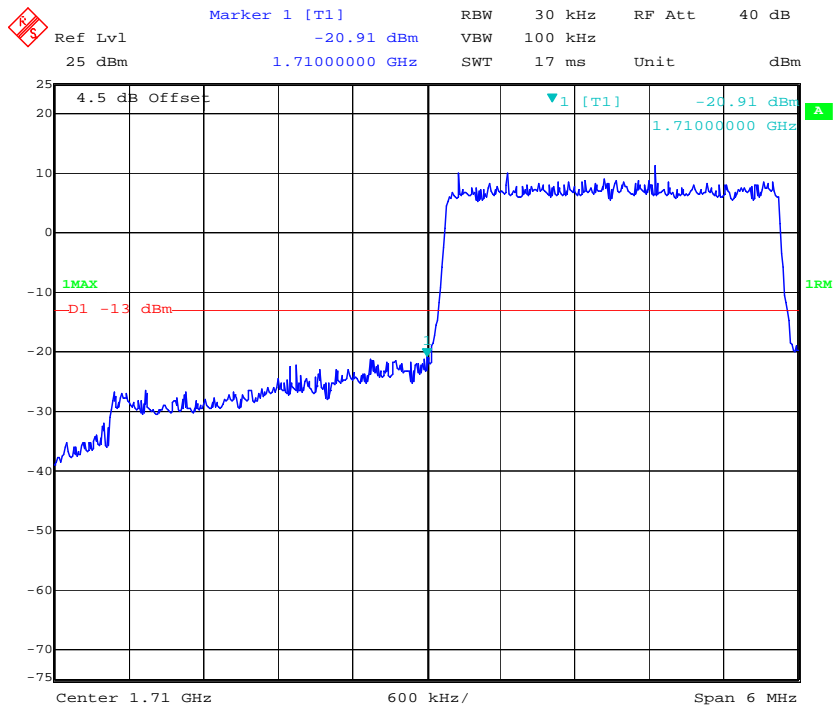
Date: 7.JAN.2019 22:12:28

QPSK_1.4MHz_6 RB_ Right

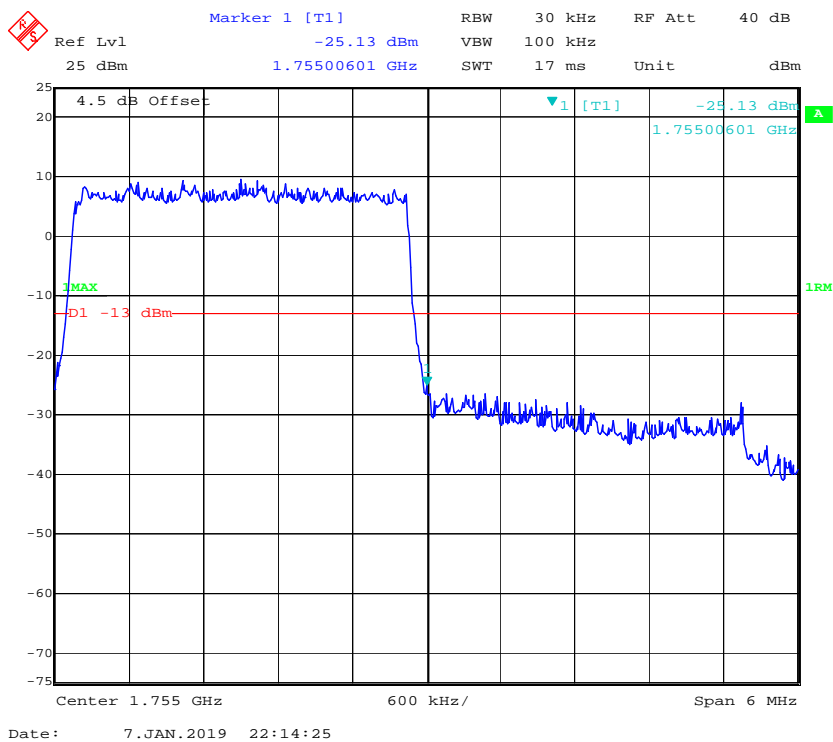


Date: 7.JAN.2019 22:13:09

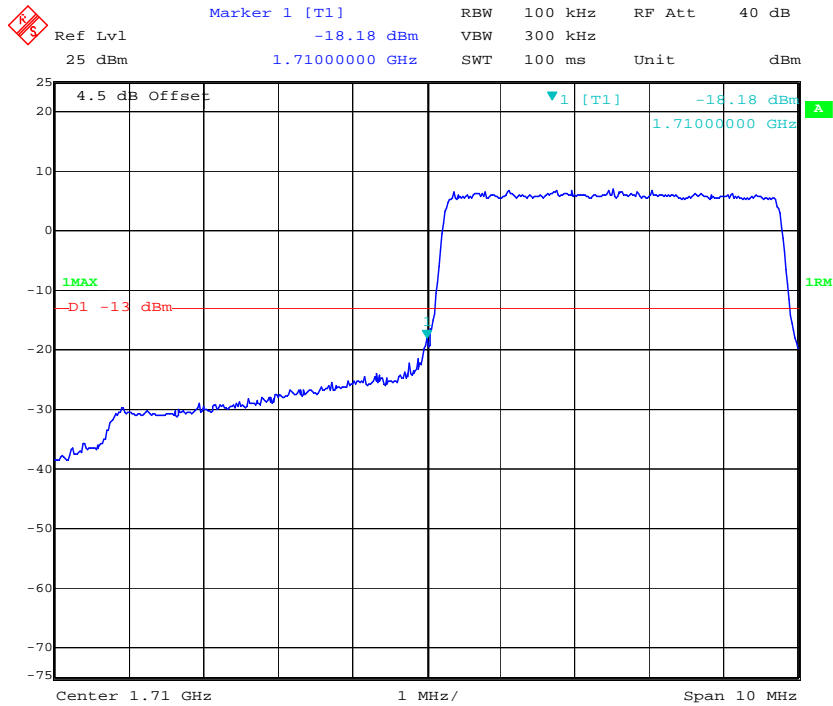
QPSK_3MHz_15 RB_ Left



QPSK_3MHz_15 RB_ Right



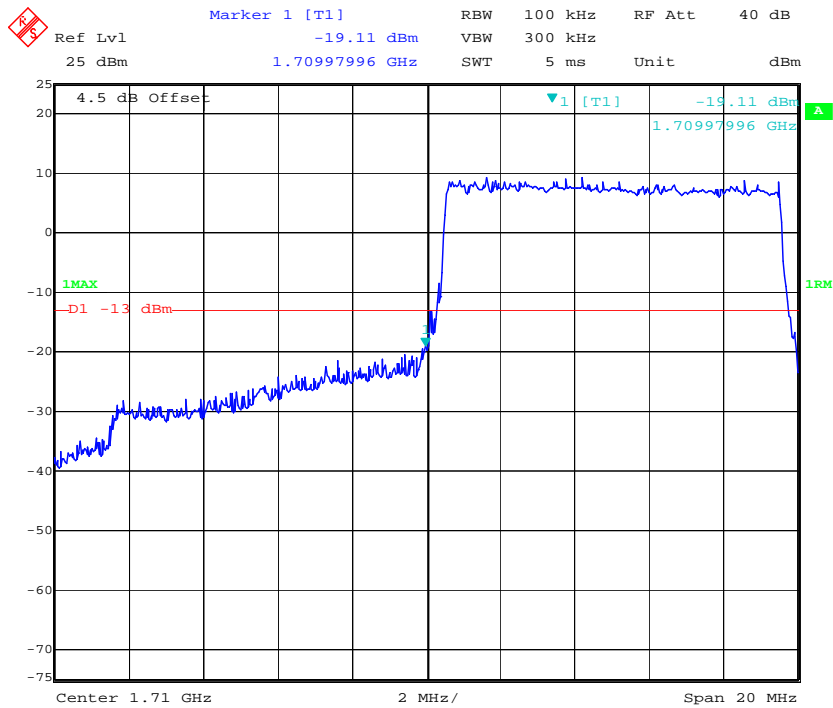
QPSK_5MHz_25 RB_Left



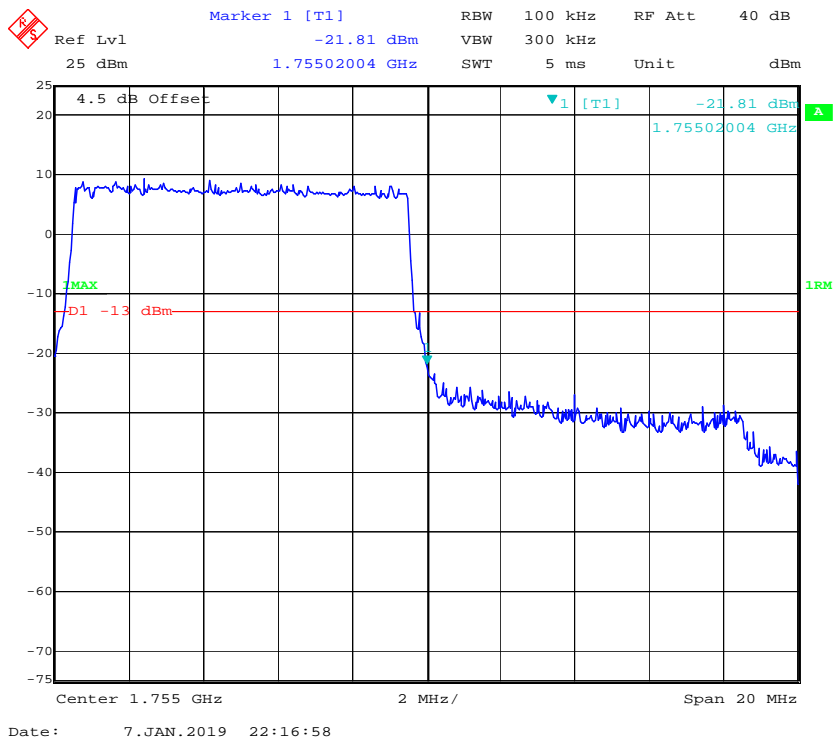
QPSK_5MHz_25 RB_Right



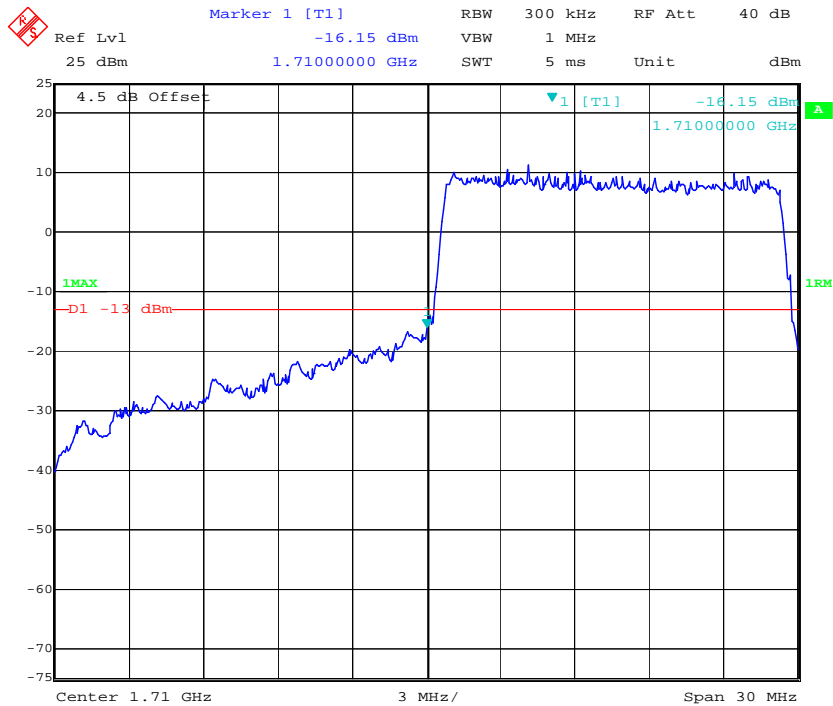
QPSK_10MHz_50 RB_Left



QPSK_10MHz_50 RB_Right

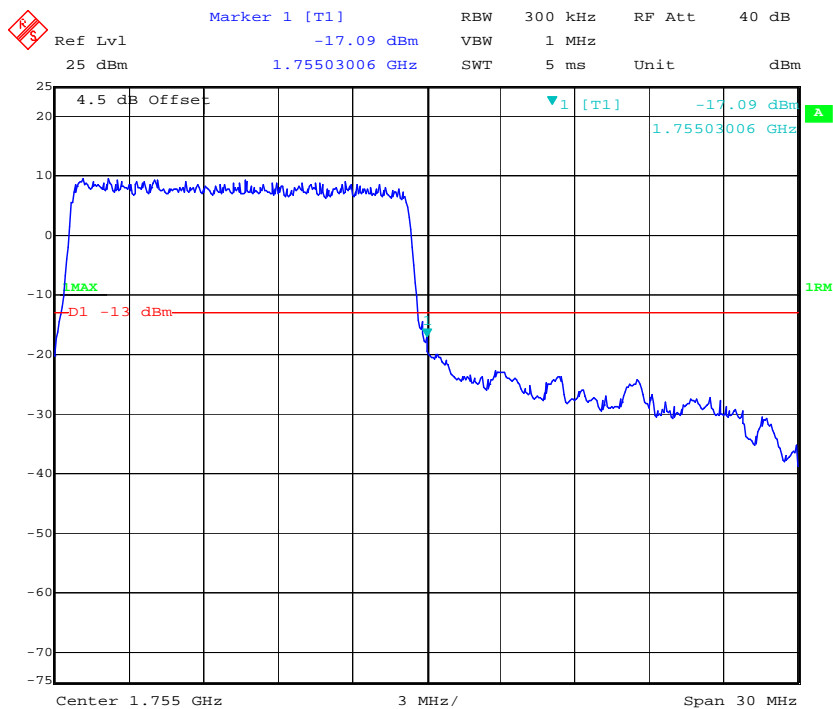


QPSK_15MHz_75 RB_Left



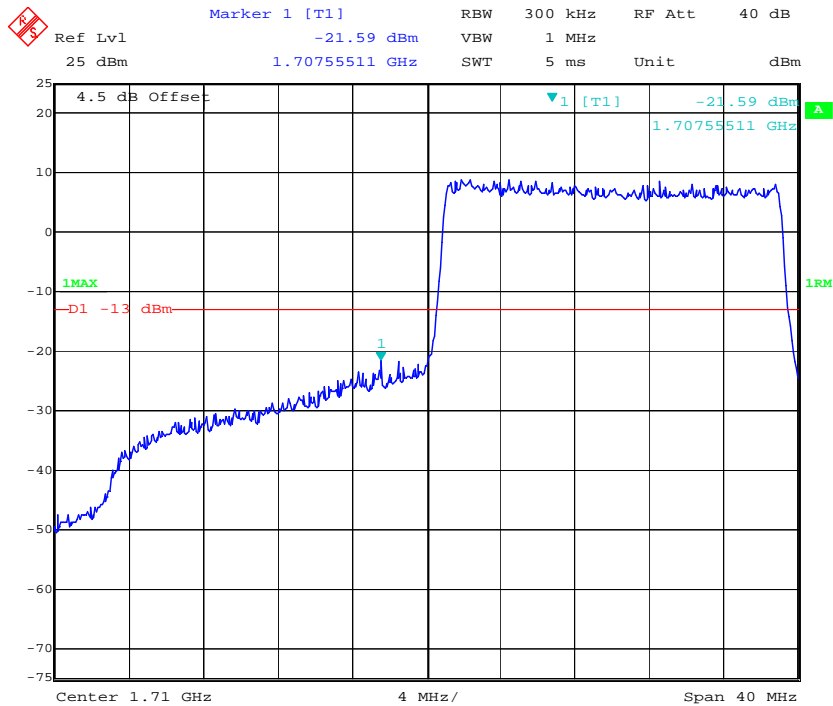
Date: 7.JAN.2019 22:17:34

QPSK_15MHz_75 RB_Right

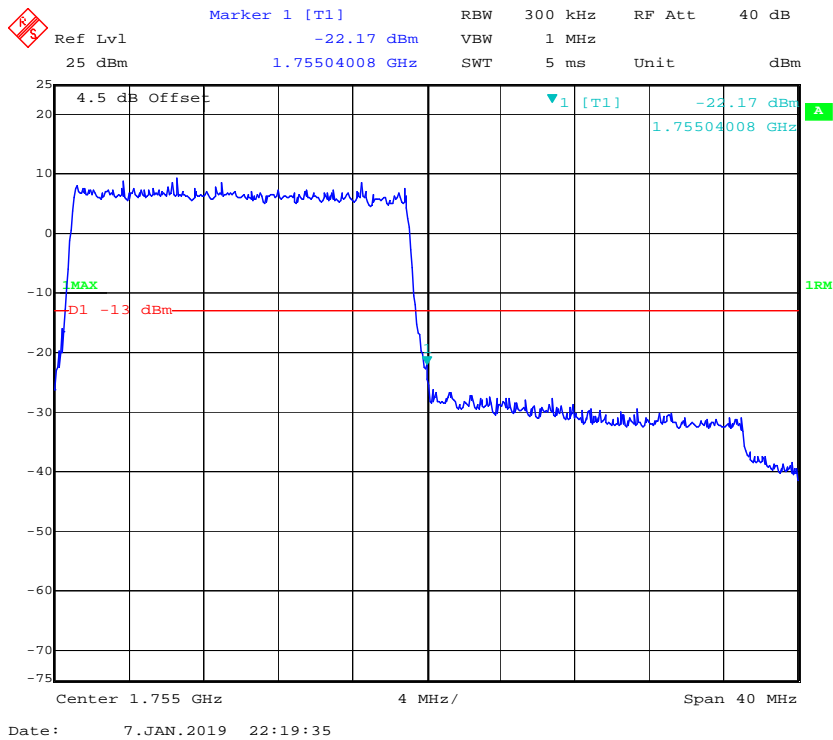


Date: 7.JAN.2019 22:18:10

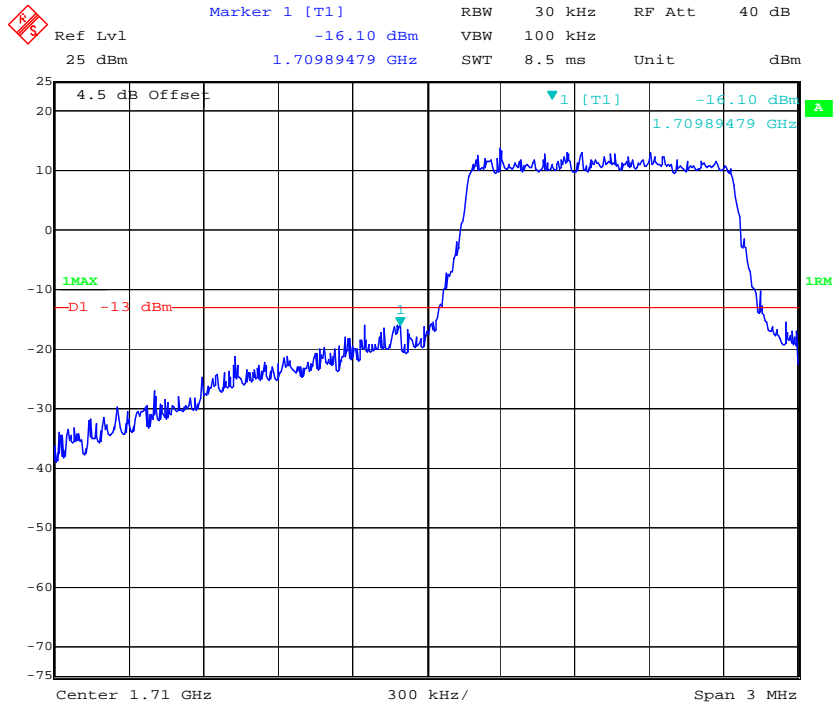
QPSK_20MHz_FULL RB_Left



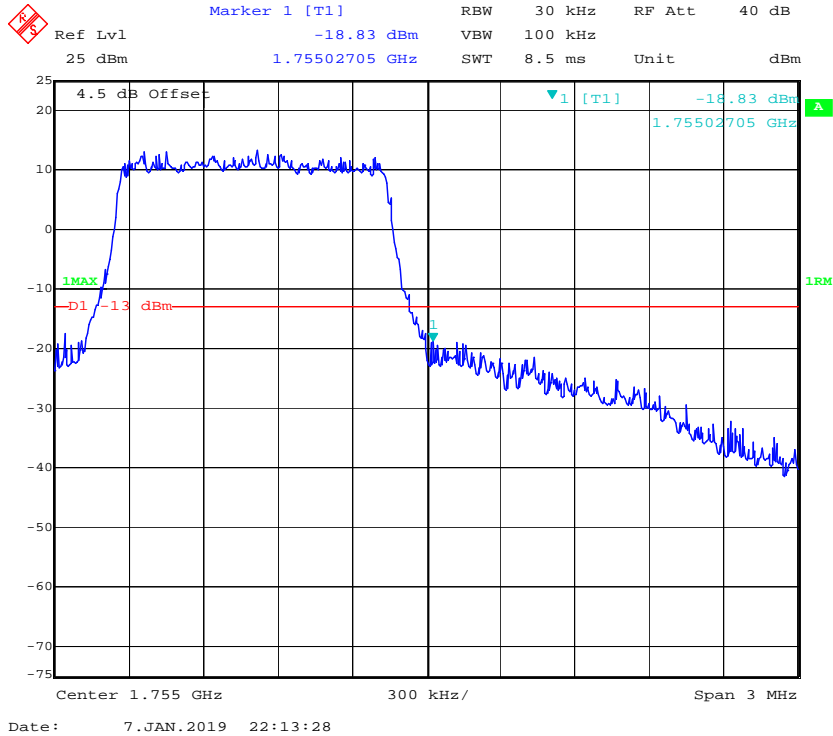
QPSK_20MHz_FULL RB_Right



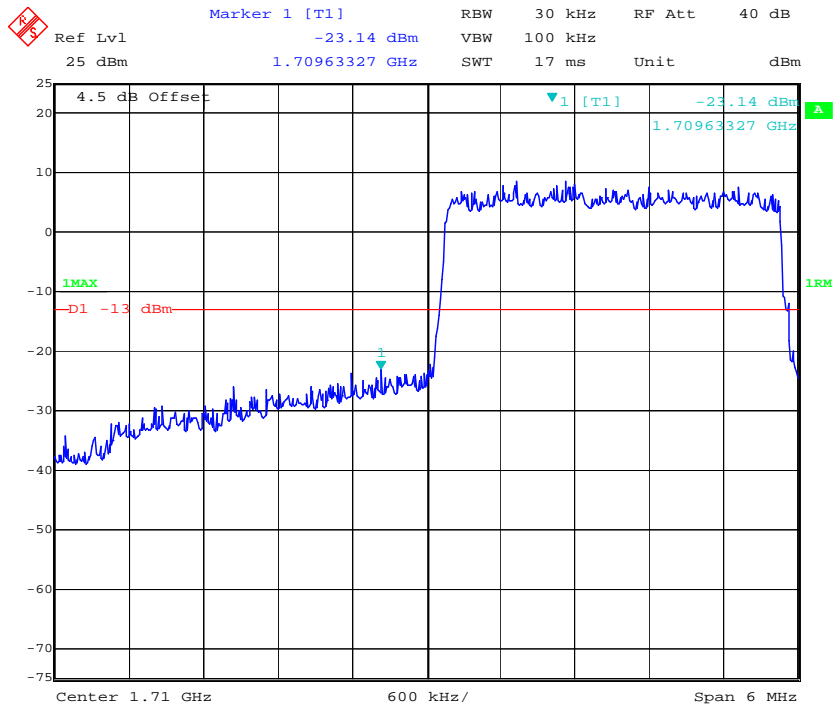
16QAM_1.4MHz_6 RB_Left



16QAM_1.4MHz_6 RB_Right



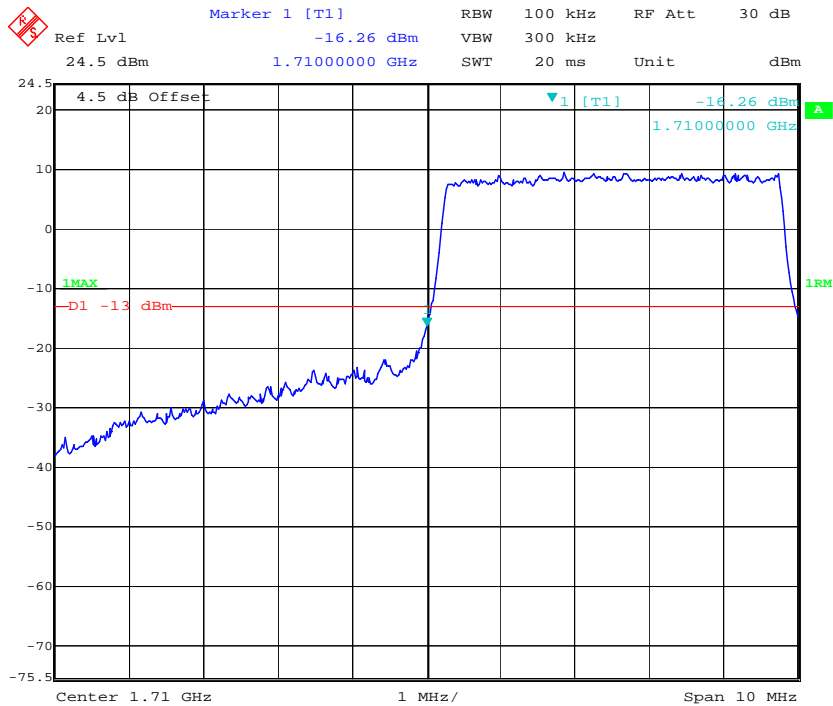
16QAM_3MHz_15 RB_Left



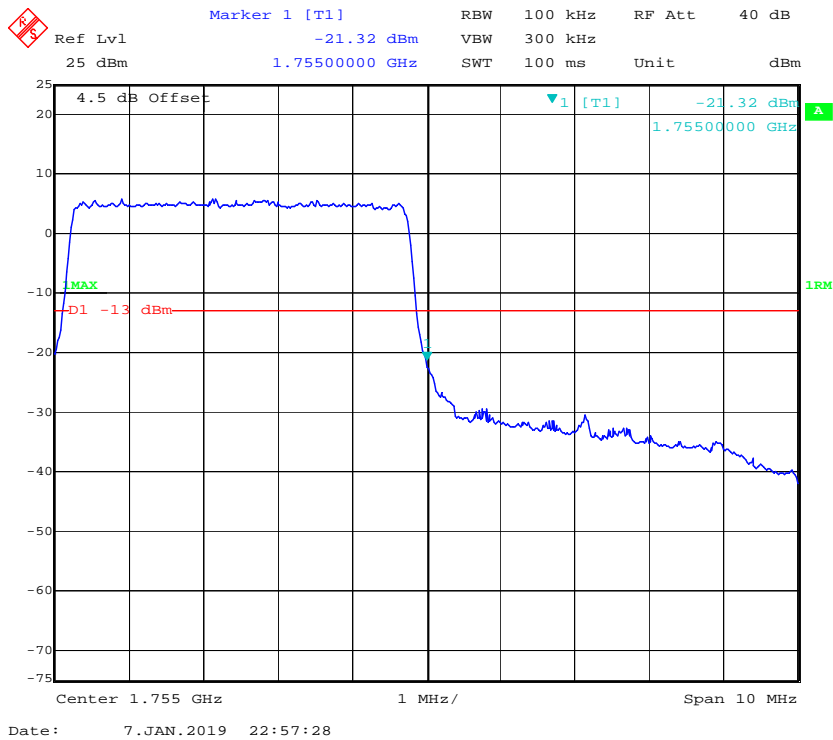
16QAM_3MHz_15 RB_Right



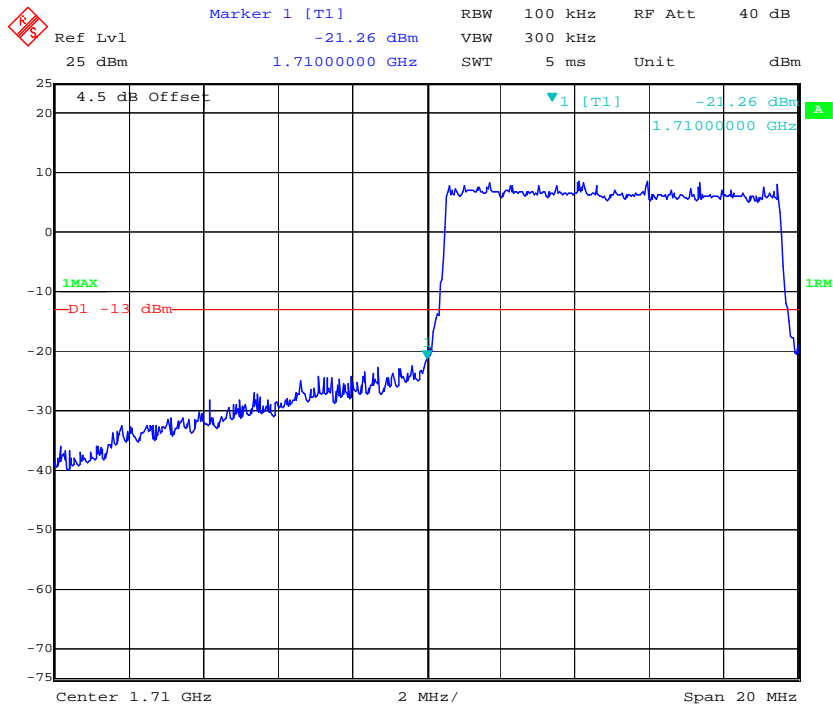
16QAM_5MHz_25 RB_Left



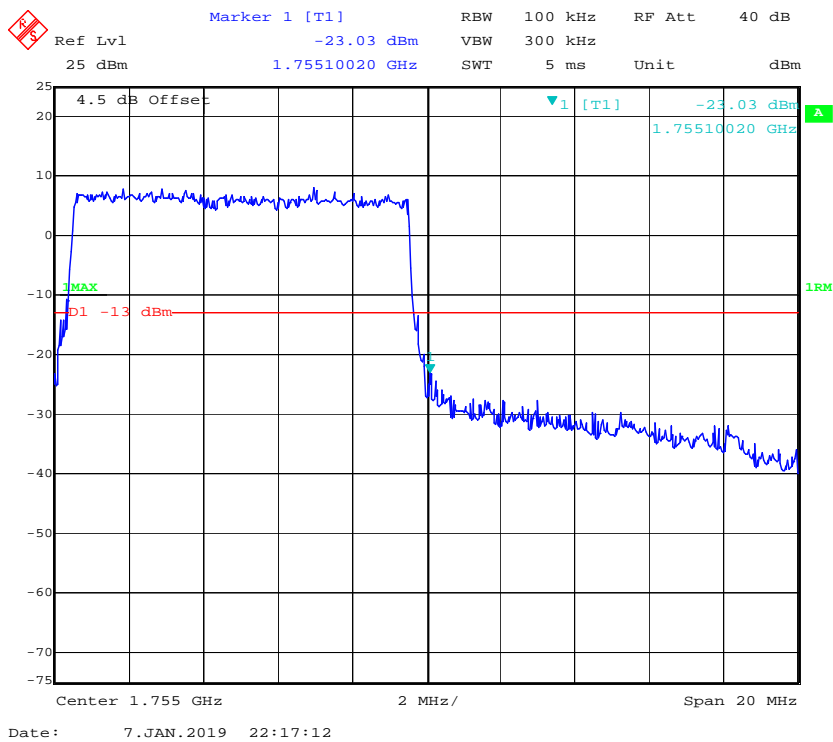
16QAM_5MHz_25 RB_Right



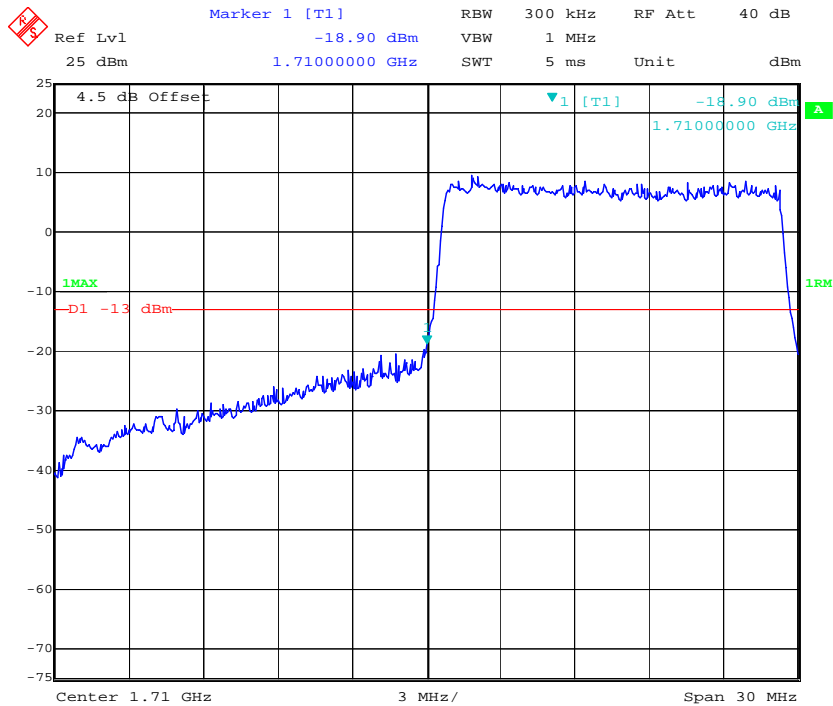
16QAM_10MHz_50 RB_Left



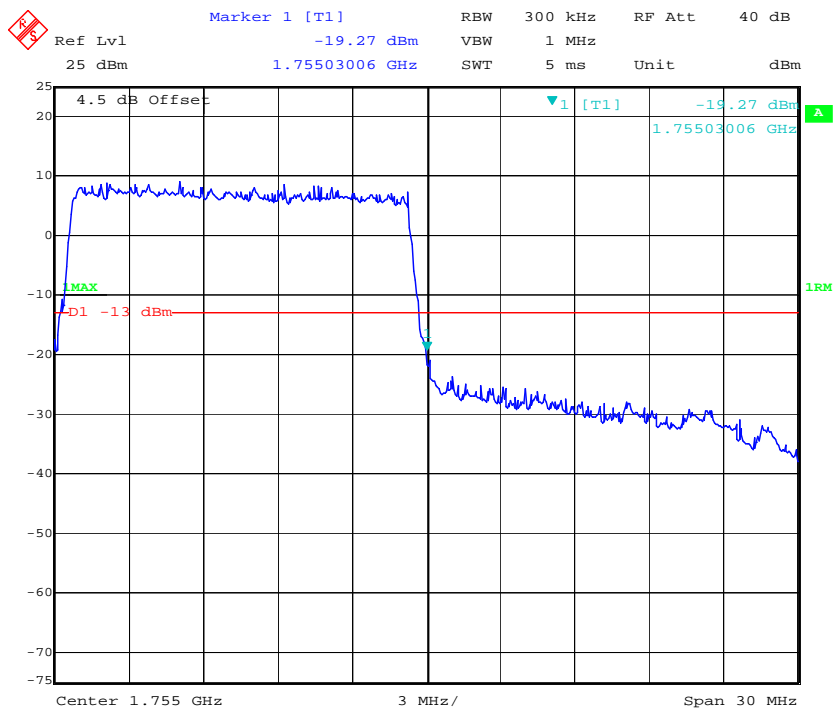
16QAM_10MHz_50 RB_Right



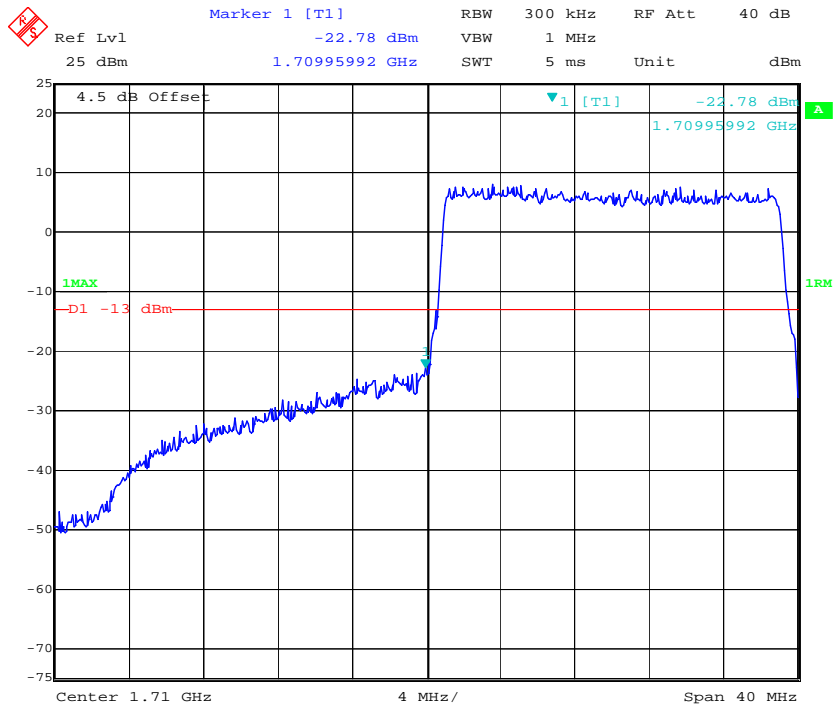
16QAM_15MHz_75 RB_Left



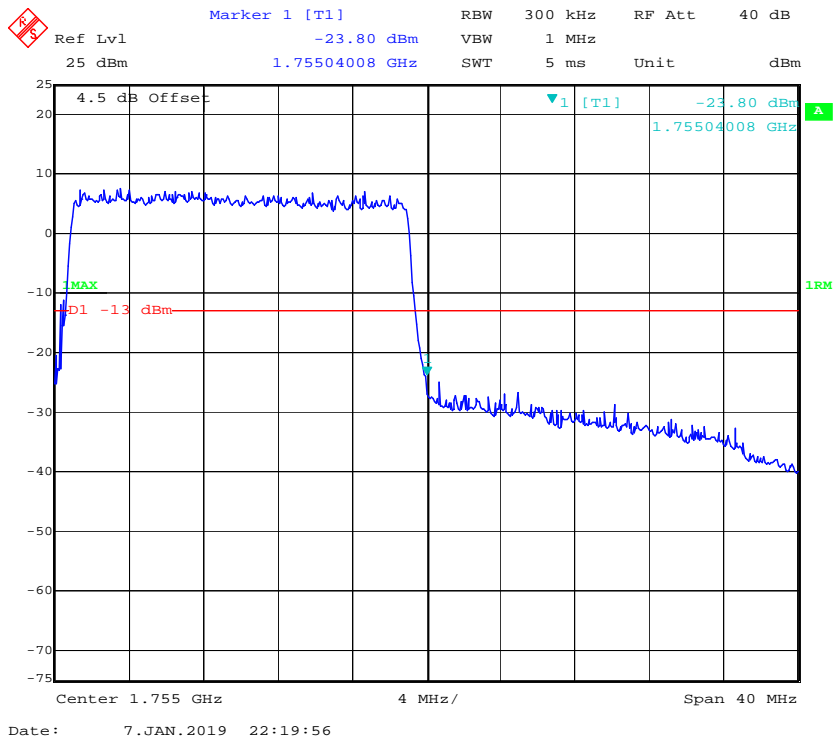
16QAM_15MHz_75 RB_Right



16QAM_20MHz_FULL RB_Left

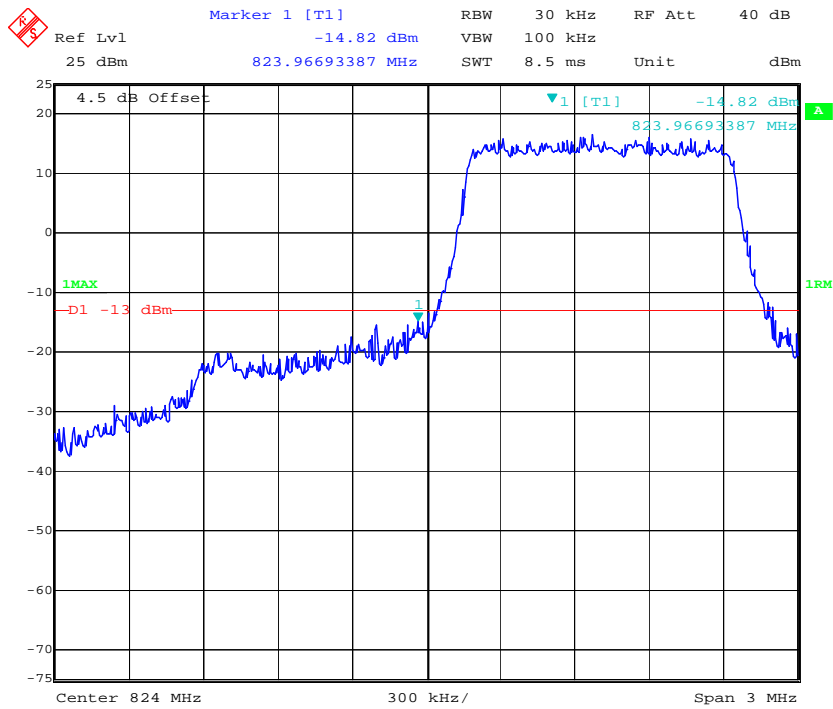


16QAM_20MHz_FULL RB_Right



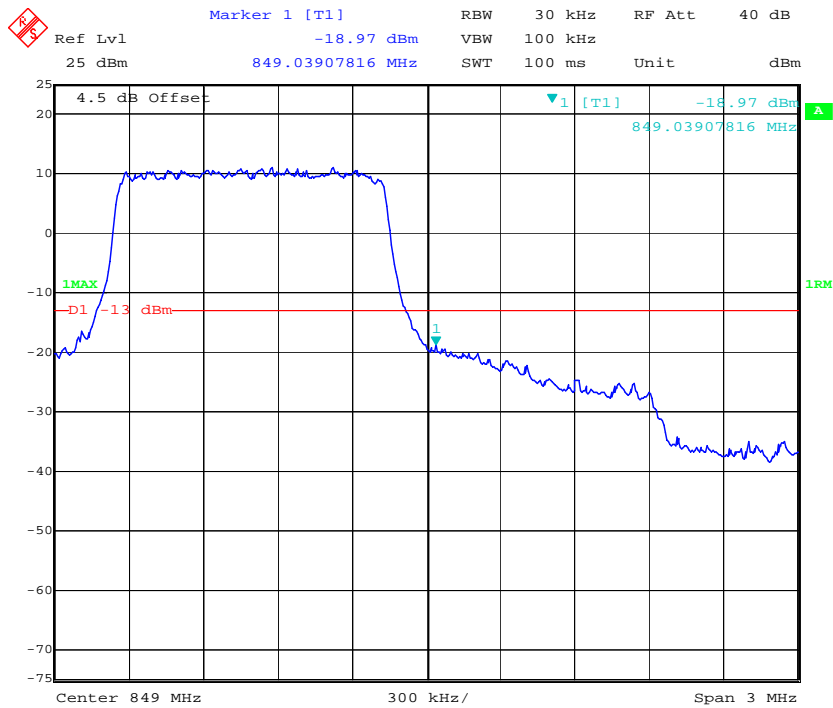
LTE Band 5

QPSK_1.4MHz_6 RB_ Left



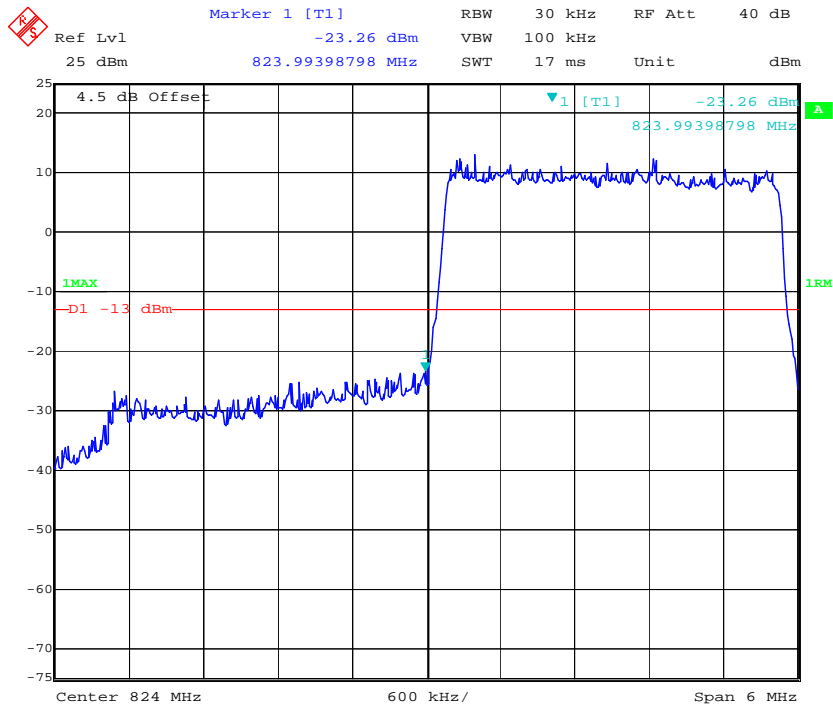
Date: 7.JAN.2019 22:20:20

QPSK_1.4MHz_6 RB_ Right

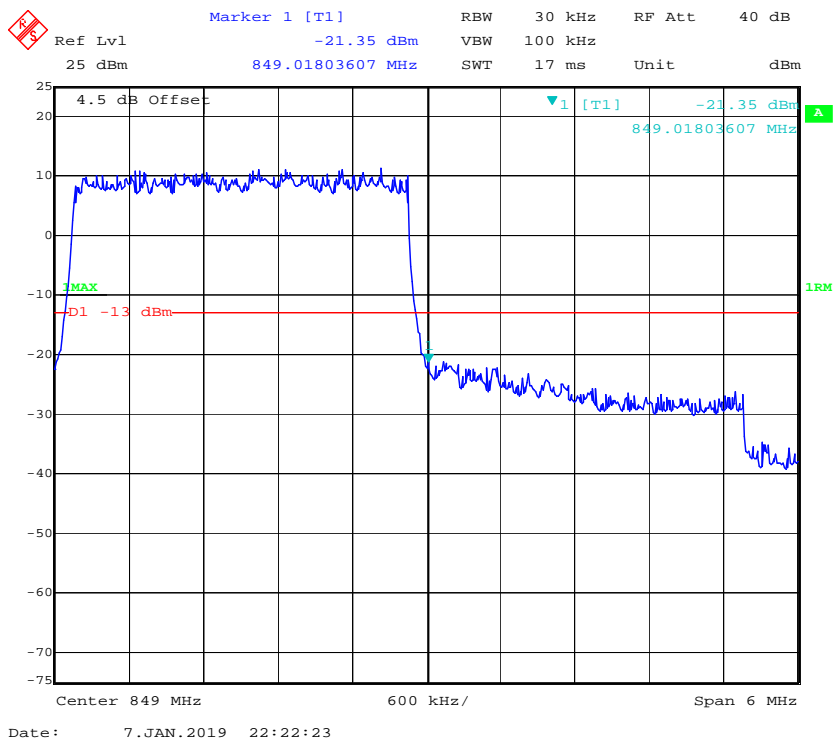


Date: 7.JAN.2019 23:01:55

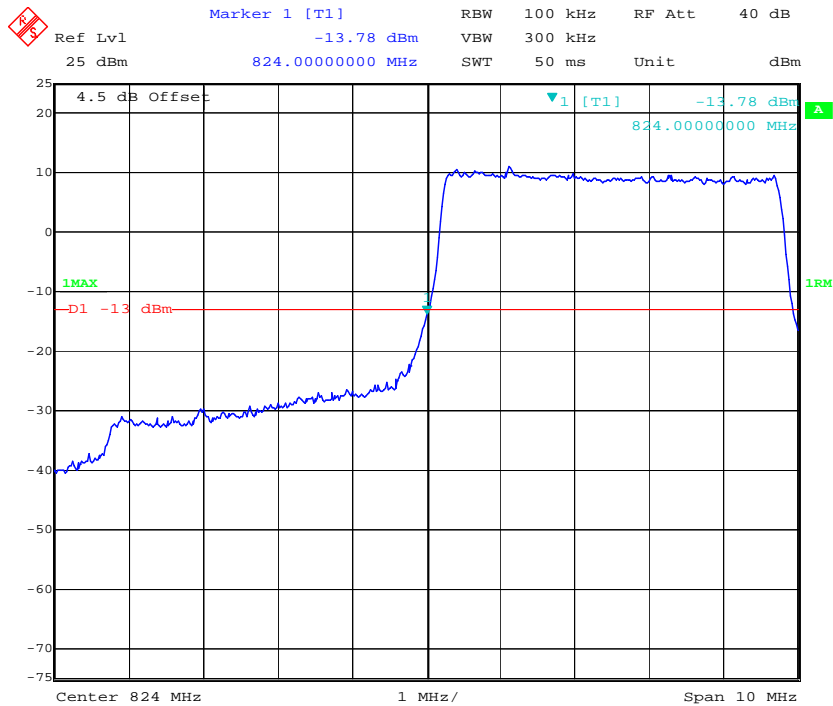
QPSK_3MHz_15 RB_Left



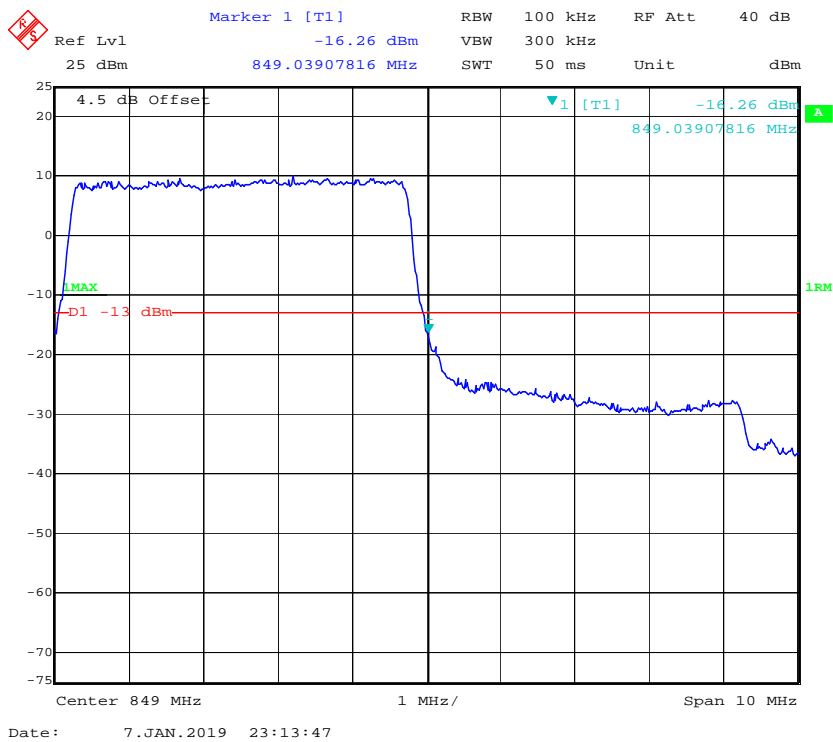
QPSK_3MHz_15 RB_Right



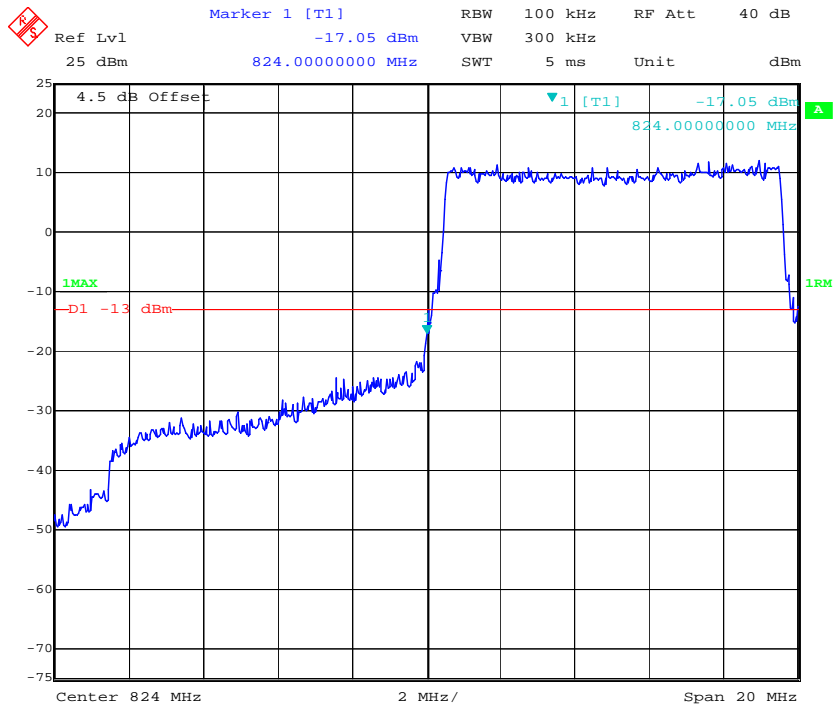
QPSK_5MHz_25 RB_Left



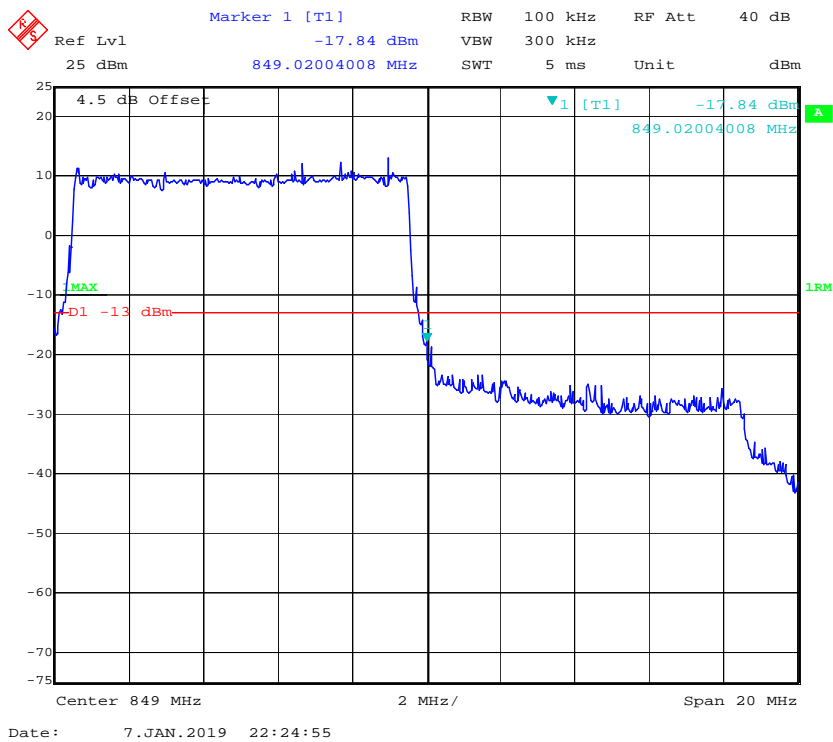
QPSK_5MHz_25 RB_Right



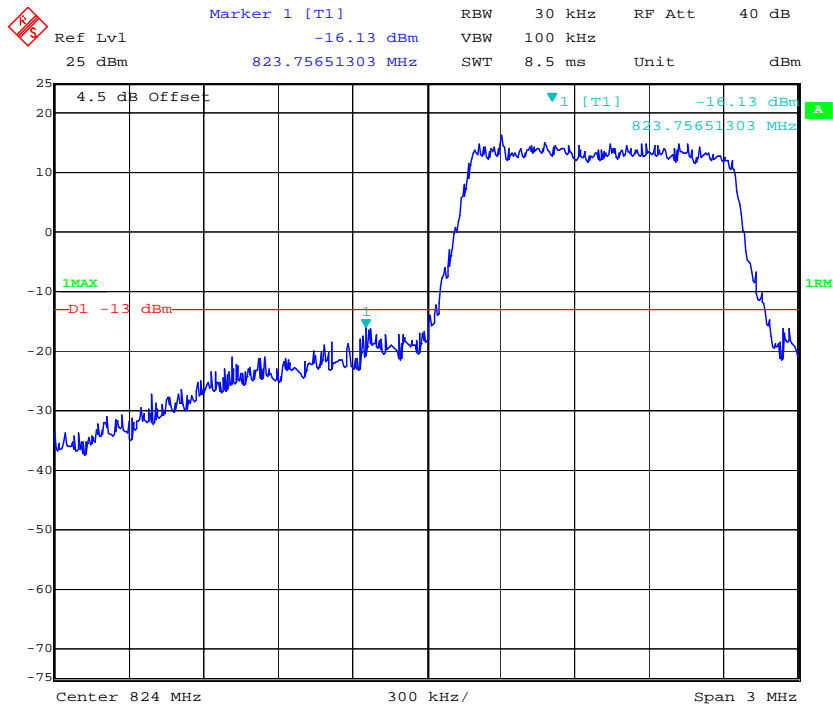
QPSK_10MHz_50 RB_Left



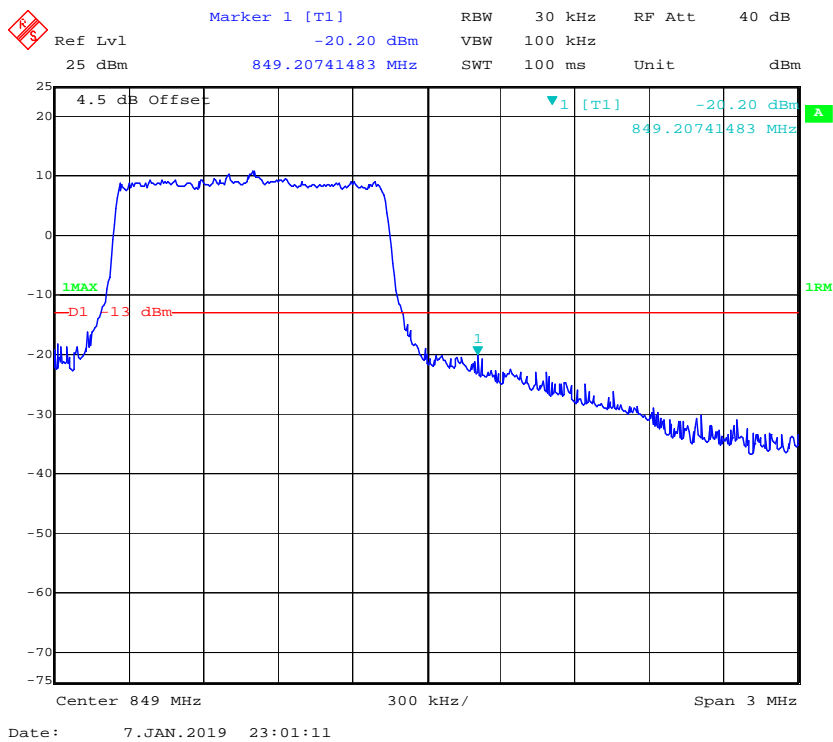
QPSK_10MHz_50 RB_Right



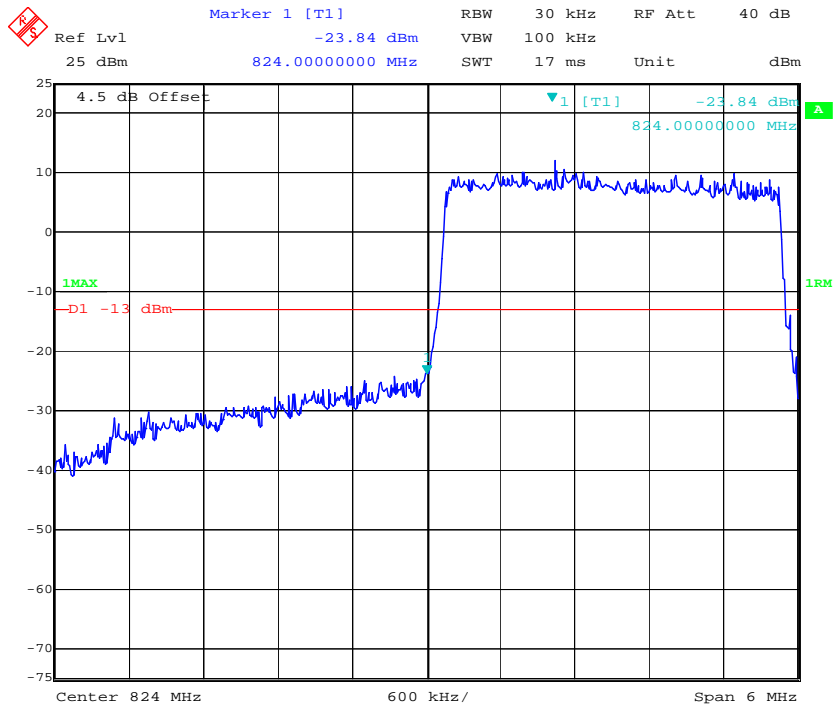
16QAM_1.4MHz_6 RB_Left



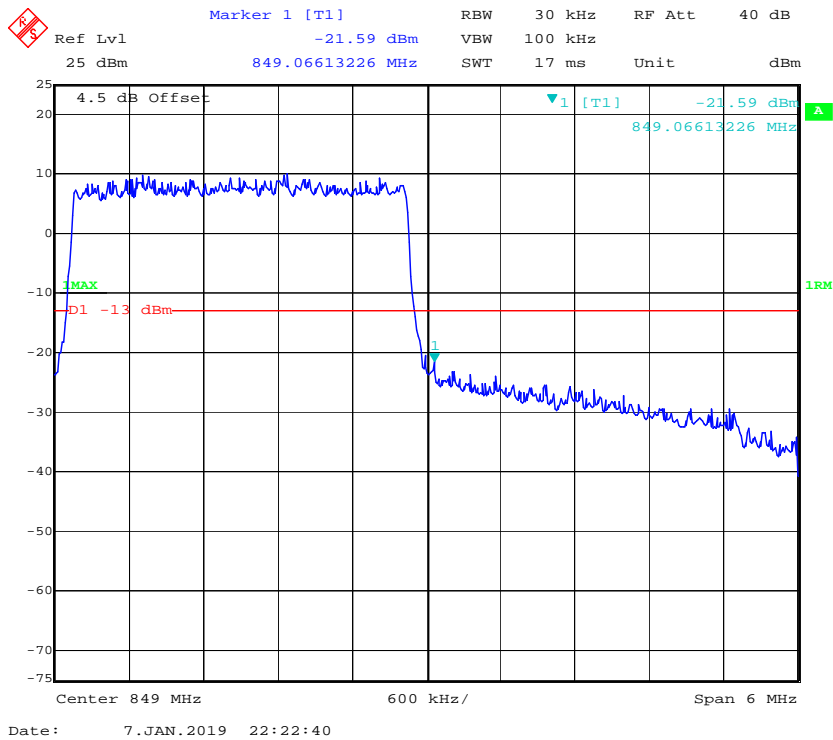
16QAM_1.4MHz_6 RB_Right



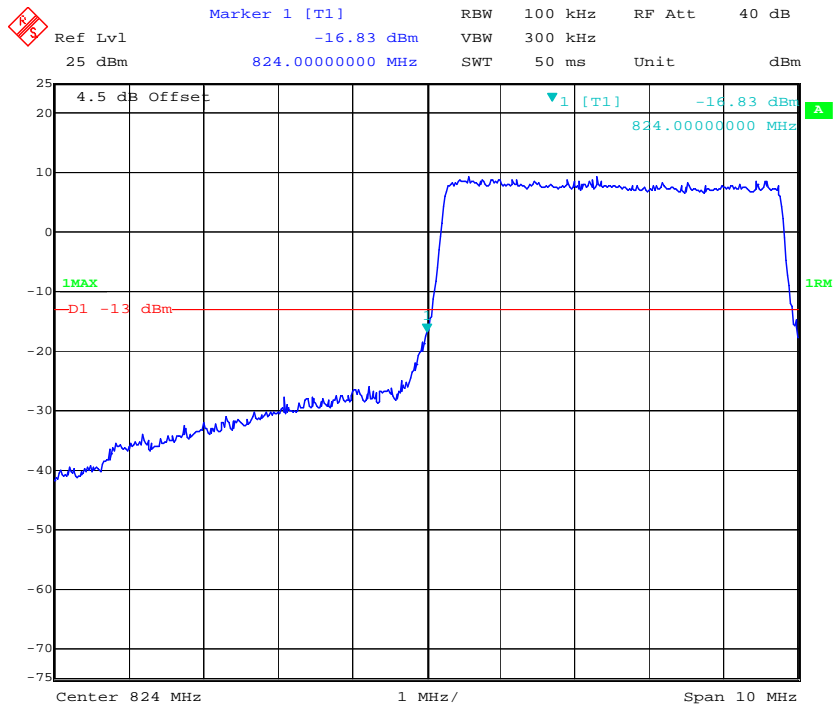
16QAM_3MHz_15 RB_Left



16QAM_3MHz_15 RB_Right

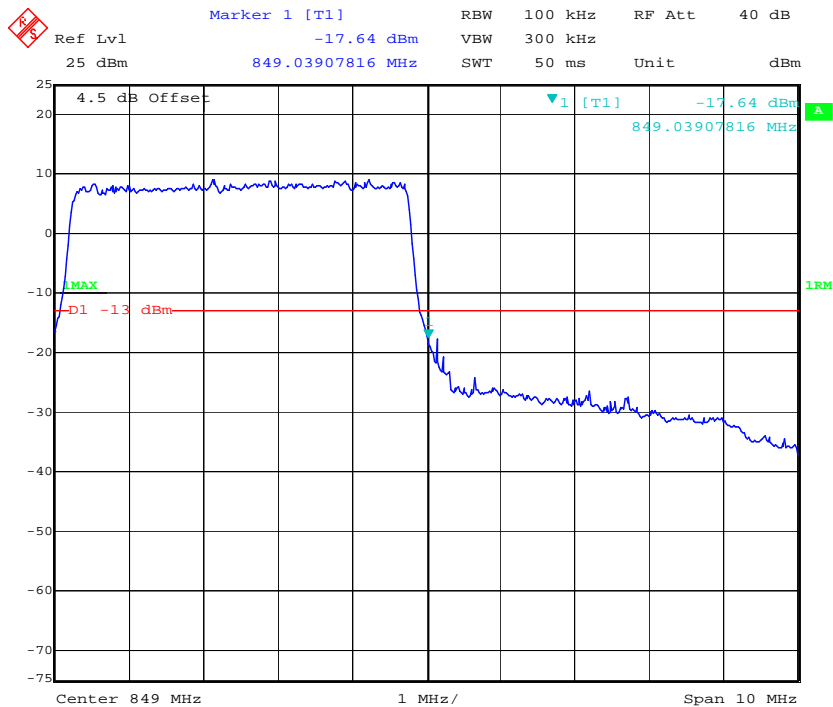


16QAM_5MHz_25 RB_Left



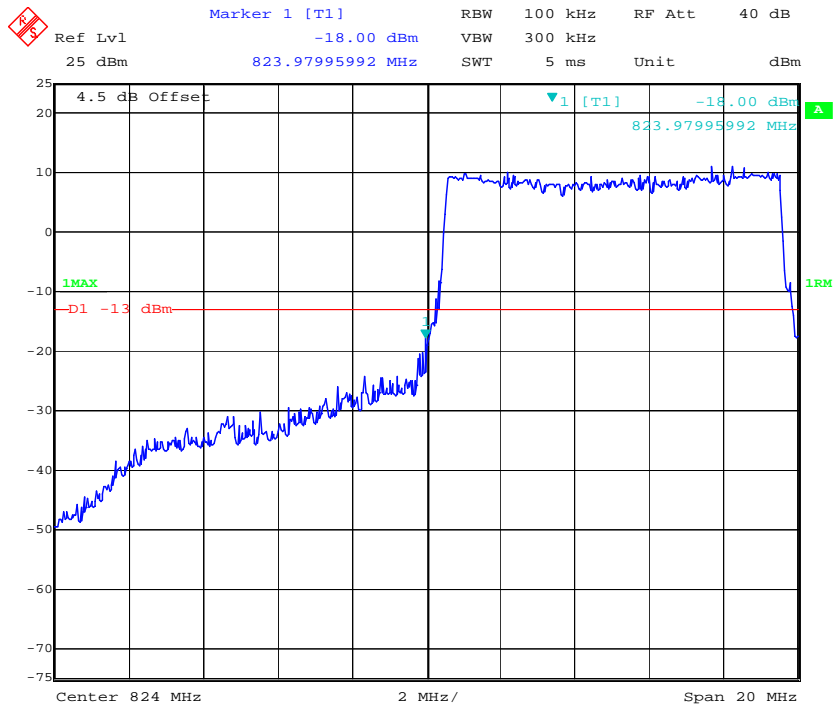
Date: 7.JAN.2019 23:15:15

16QAM_5MHz_25 RB_Right



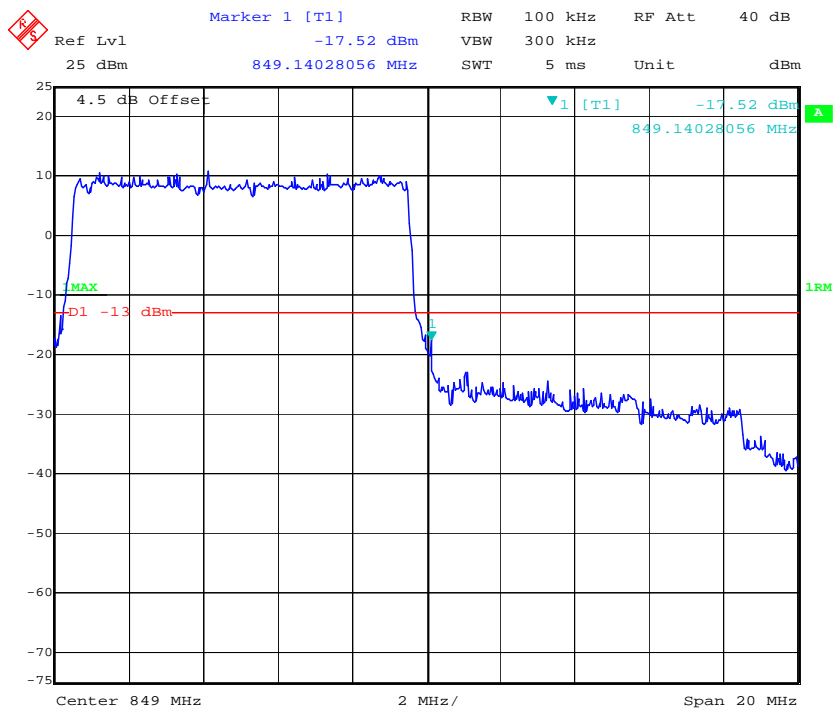
Date: 7.JAN.2019 23:13:22

16QAM_10MHz_50 RB_Left



Date: 7.JAN.2019 22:24:40

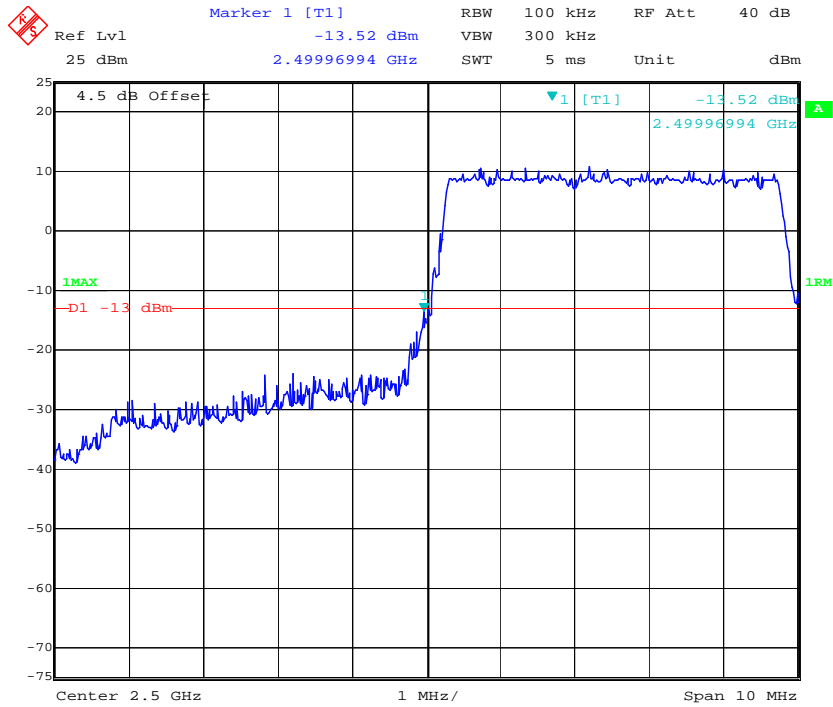
16QAM_10MHz_50 RB_Right



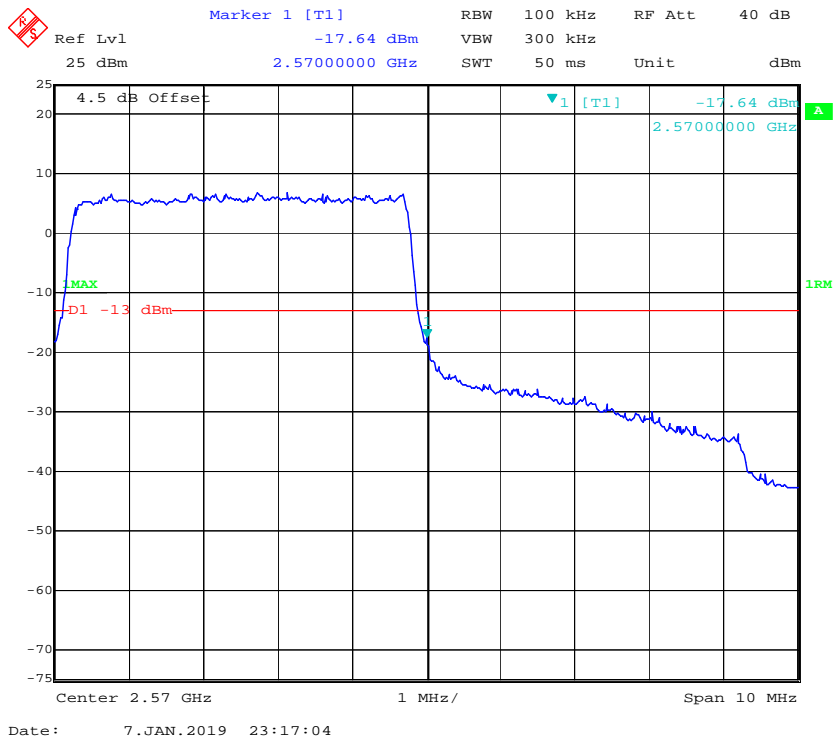
Date: 7.JAN.2019 22:25:13

LTE Band 7

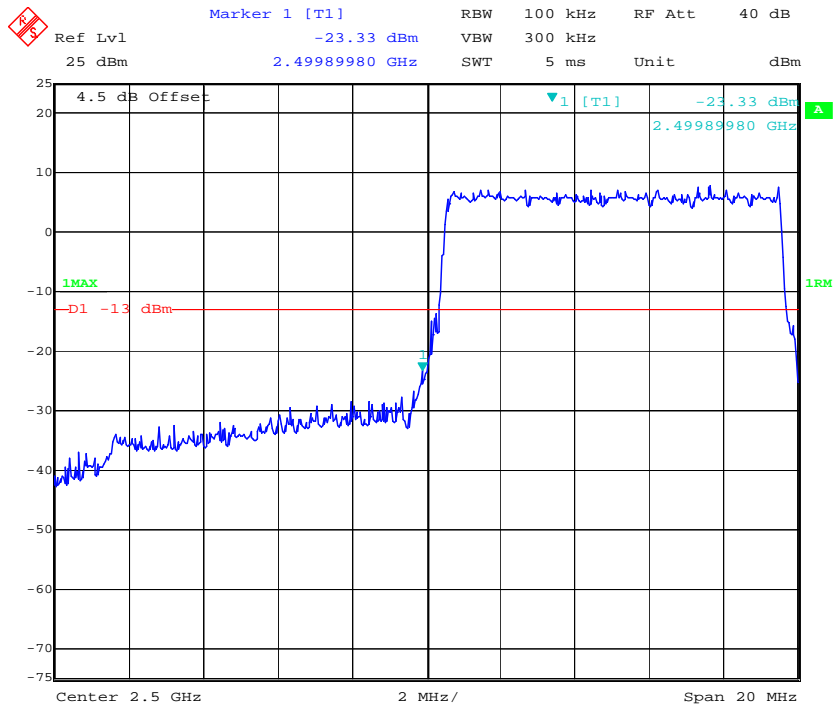
QPSK_5MHz_25 RB_Left



QPSK_5MHz_25 RB_Right

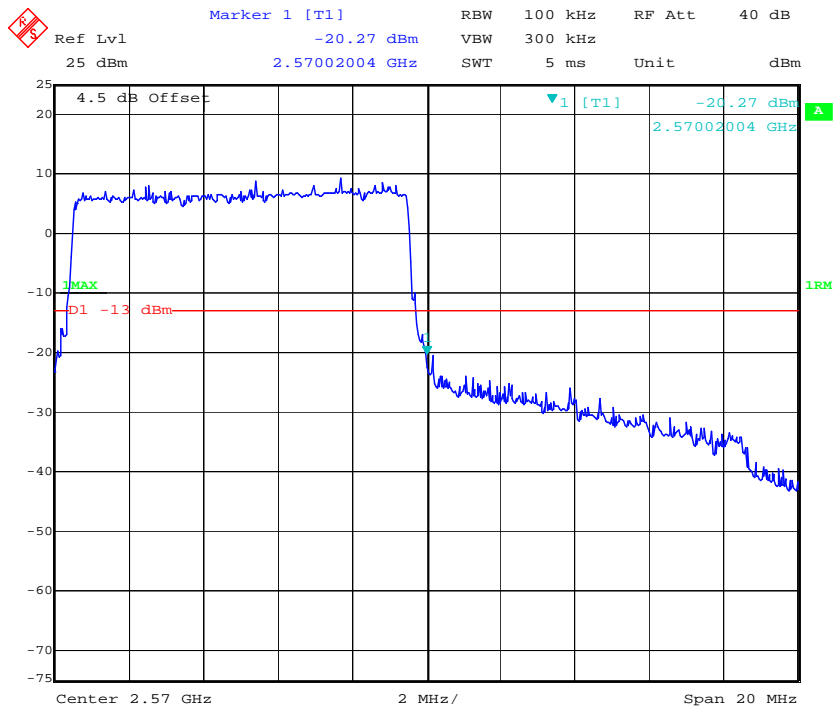


QPSK_10MHz_50 RB_Left



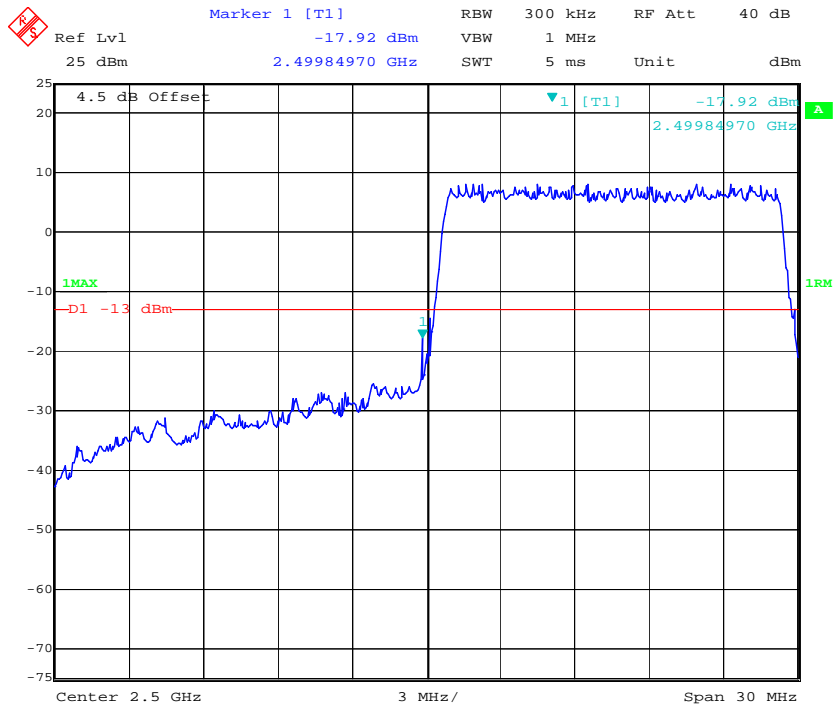
Date: 7.JAN.2019 22:26:48

QPSK_10MHz_50 RB_Right



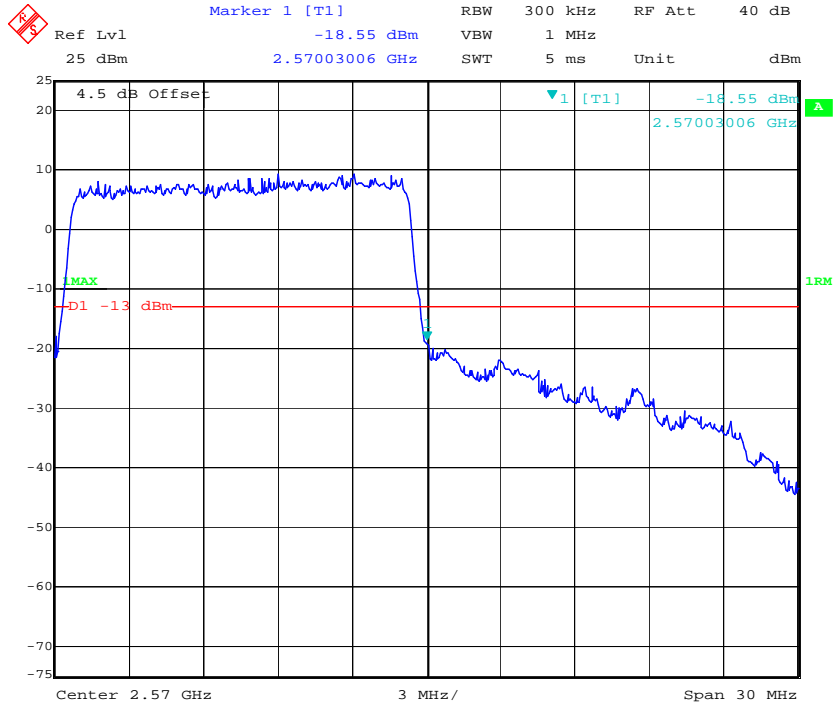
Date: 7.JAN.2019 22:27:22

QPSK_15MHz_75 RB_Left



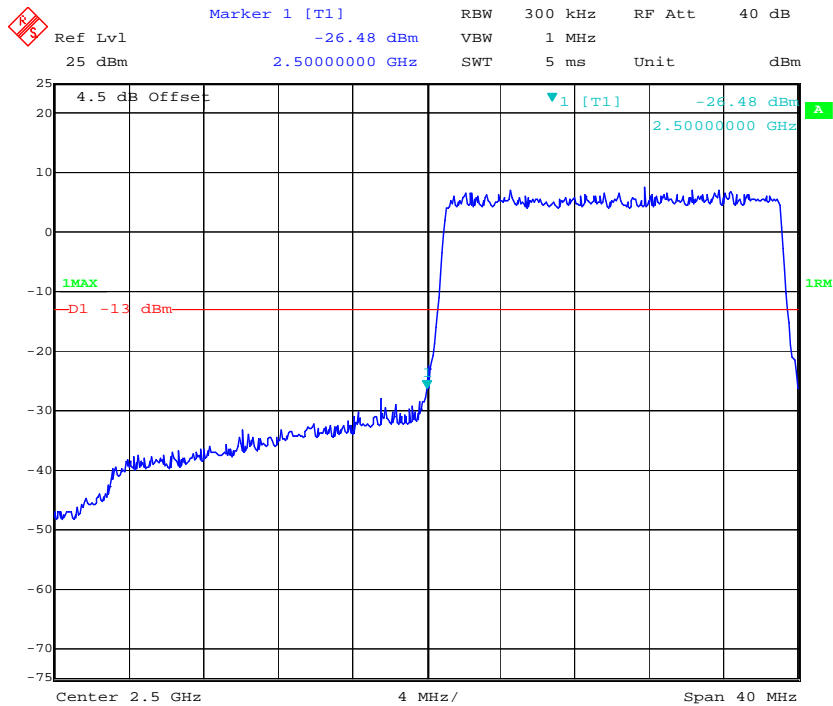
Date: 7.JAN.2019 22:28:01

QPSK_15MHz_75 RB_Right



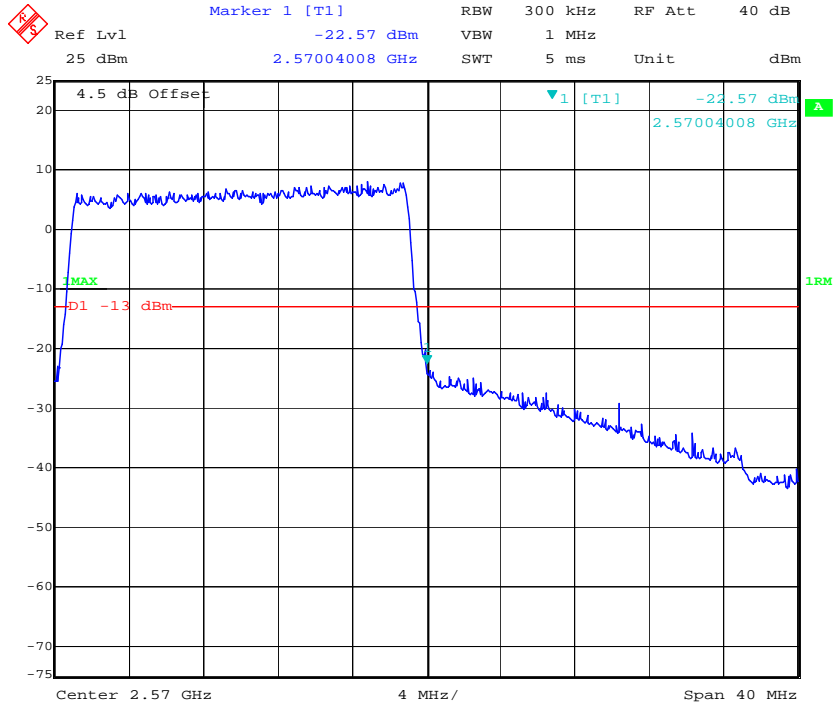
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QPSK_20MHz_FULL RB_Left



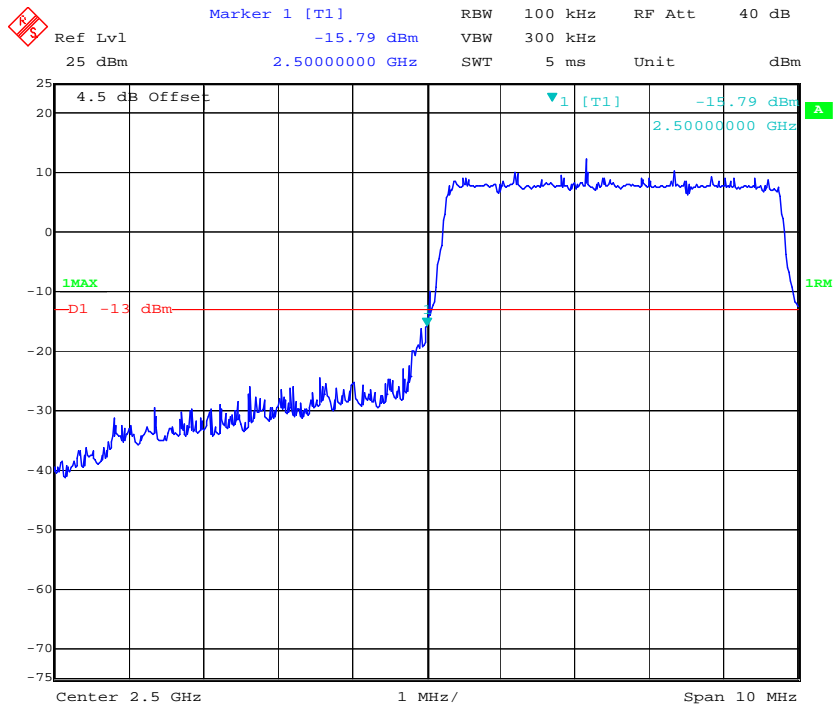
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QPSK_20MHz_FULL RB_Right

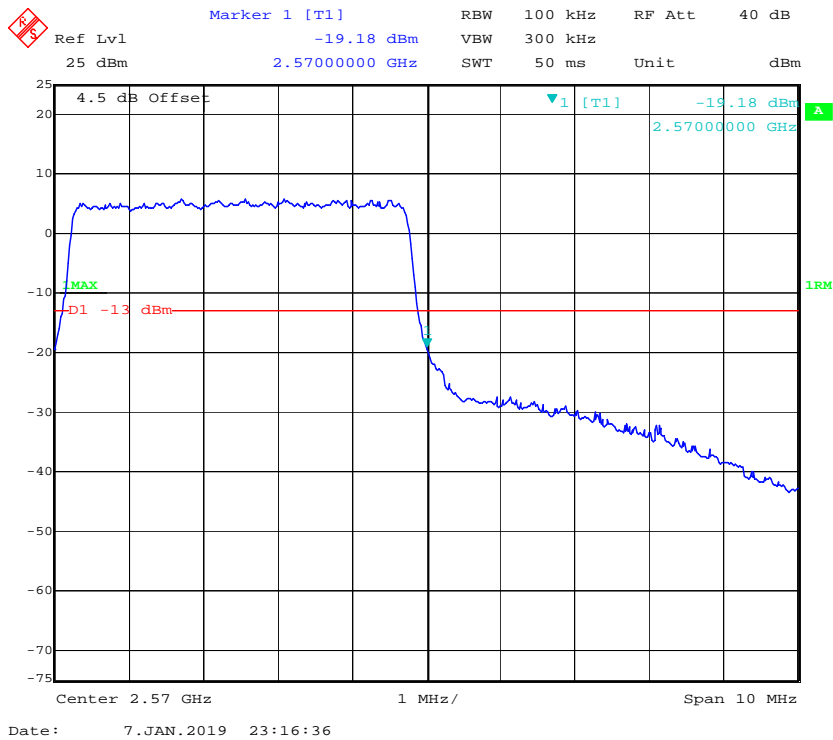


Date: 7.JAN.2019 22:30:00

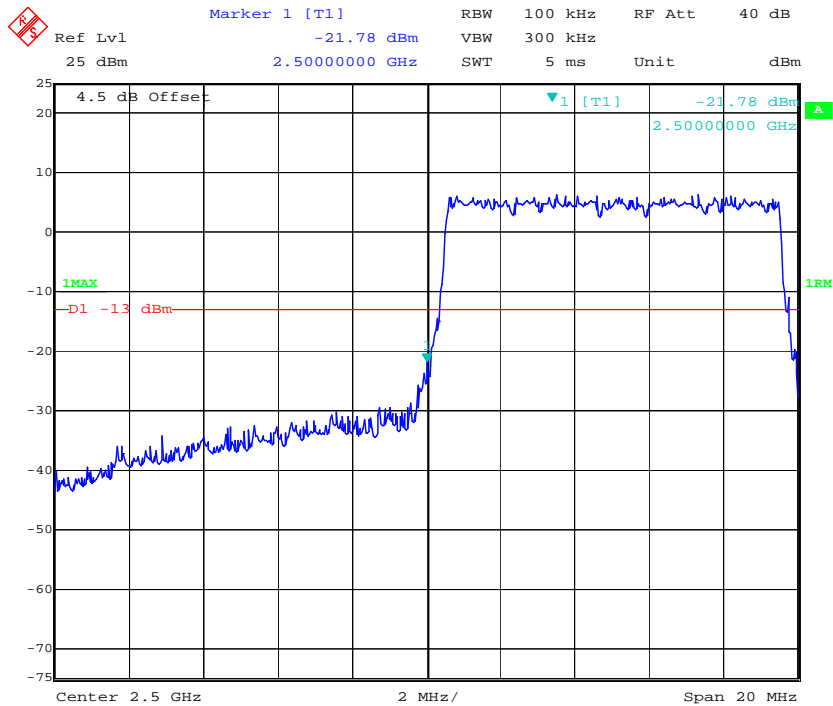
16QAM_5MHz_25 RB_Left



16QAM_5MHz_25 RB_Right

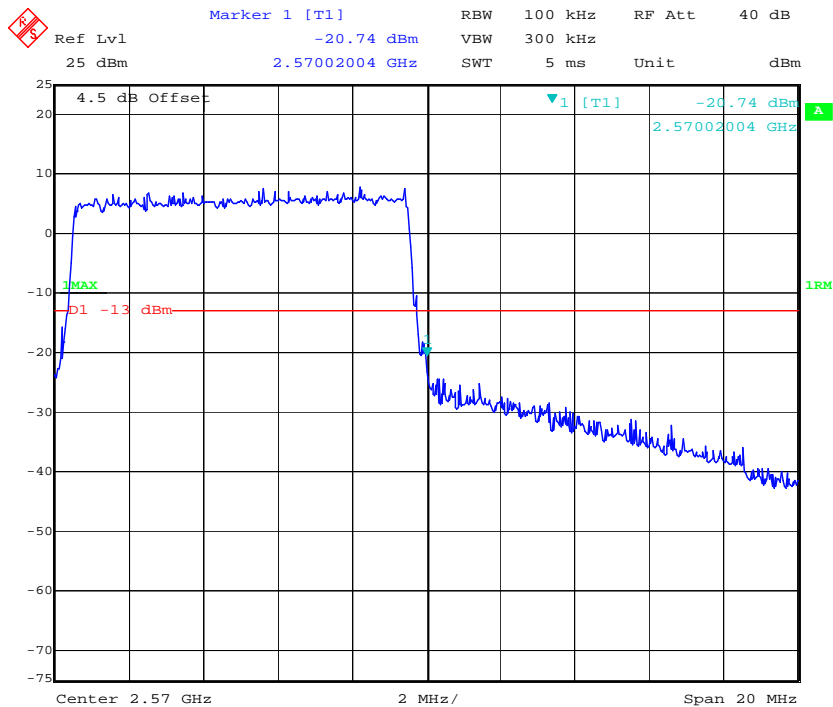


16QAM_10MHz_50 RB_Left



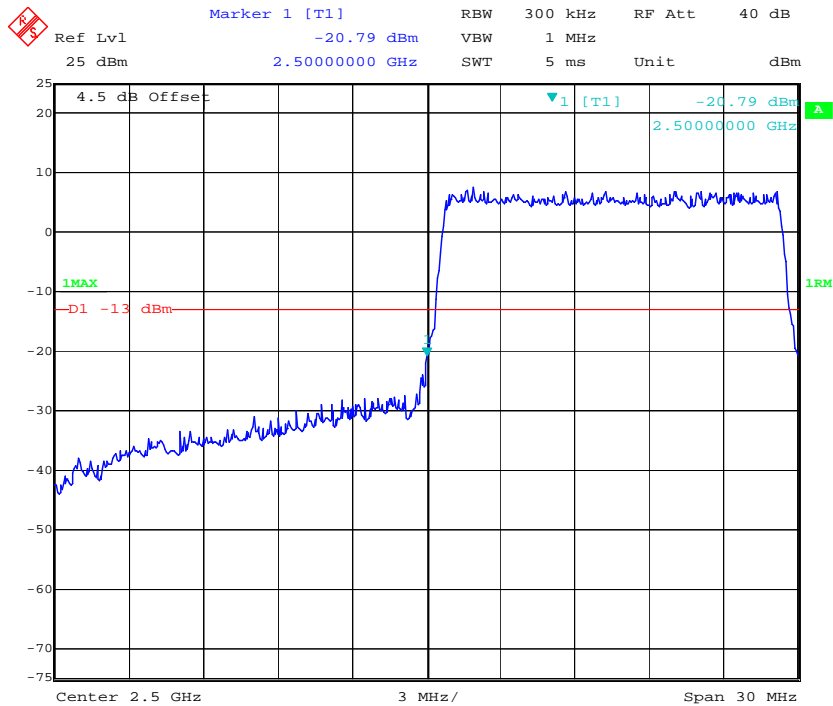
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16QAM_10MHz_50 RB_Right



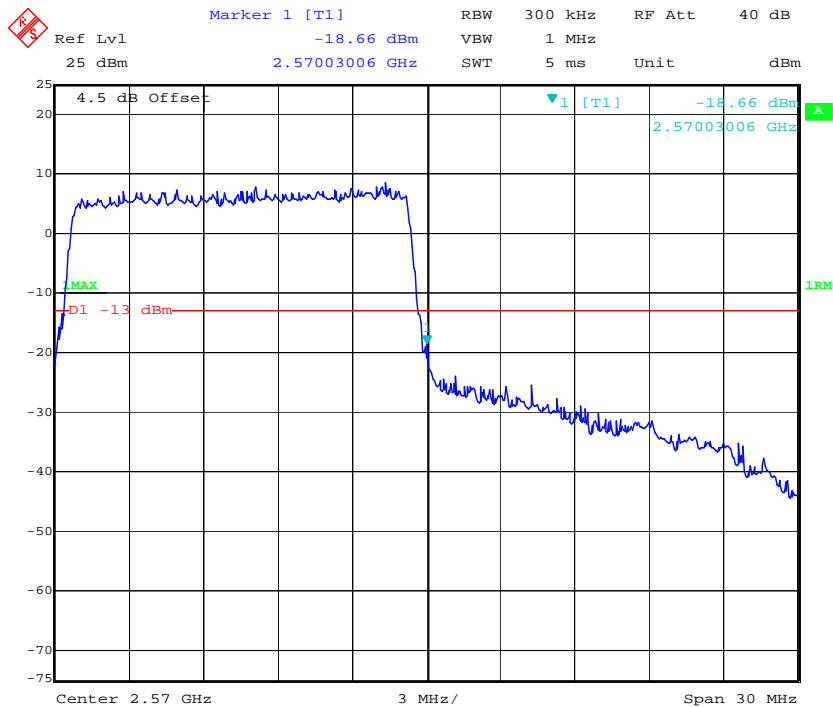
Date: 7.JAN.2019 22:27:40

16QAM_15MHz_75 RB_Left



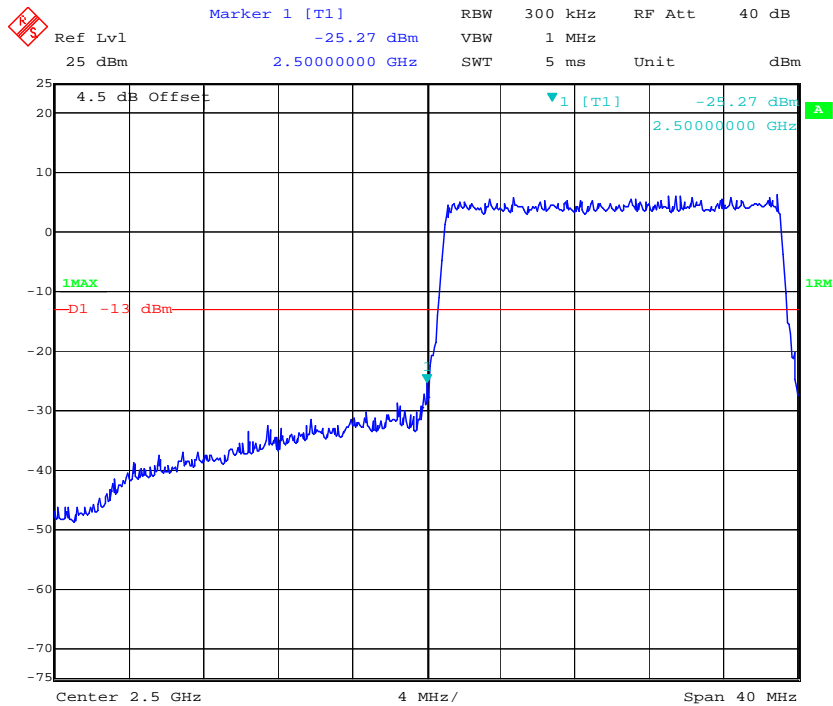
Date: 7.JAN.2019 22:28:19

16QAM_15MHz_75 RB_Right

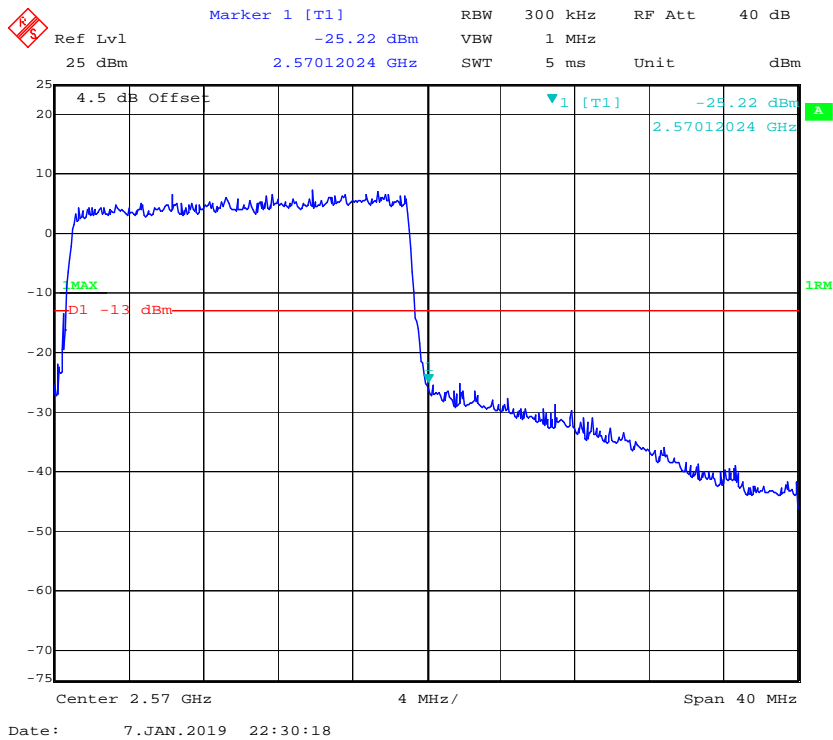


Date: 7.JAN.2019 22:28:56

16QAM_20MHz_FULL RB_Left

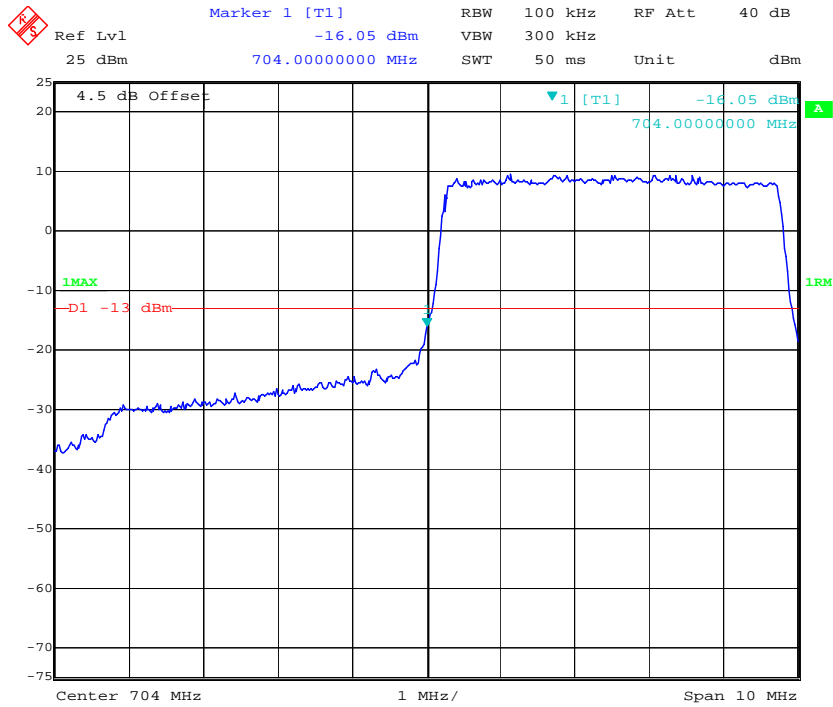


16QAM_20MHz_FULL RB_Right

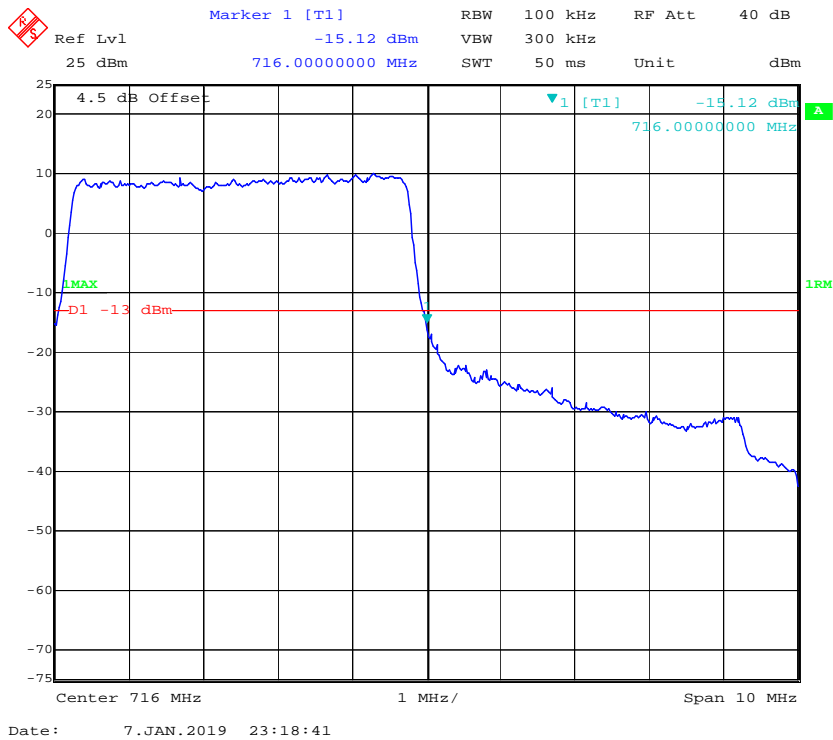


LTE Band 17

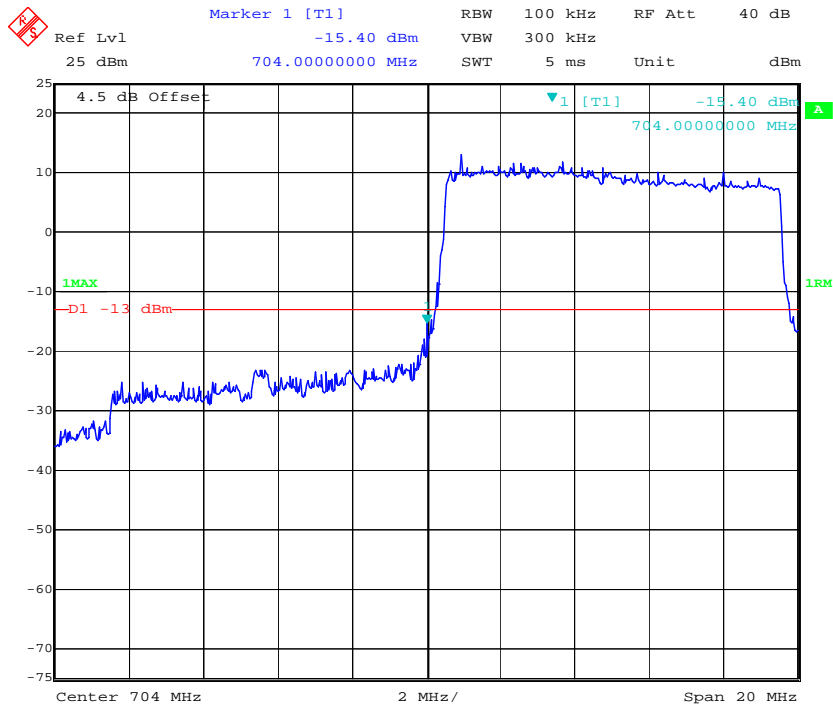
QPSK_5MHz_25 RB_Left



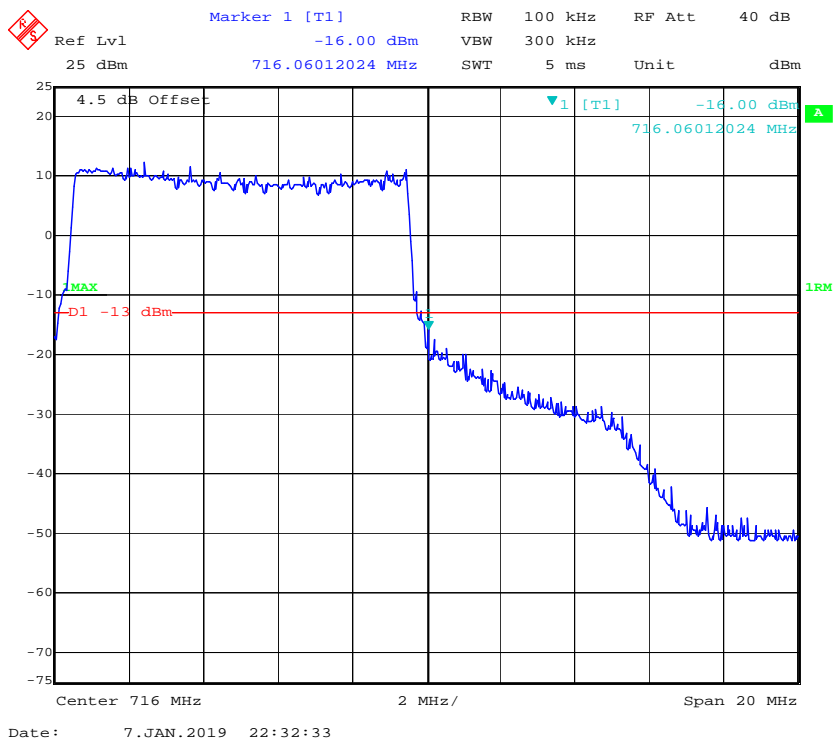
QPSK_5MHz_25 RB_Right



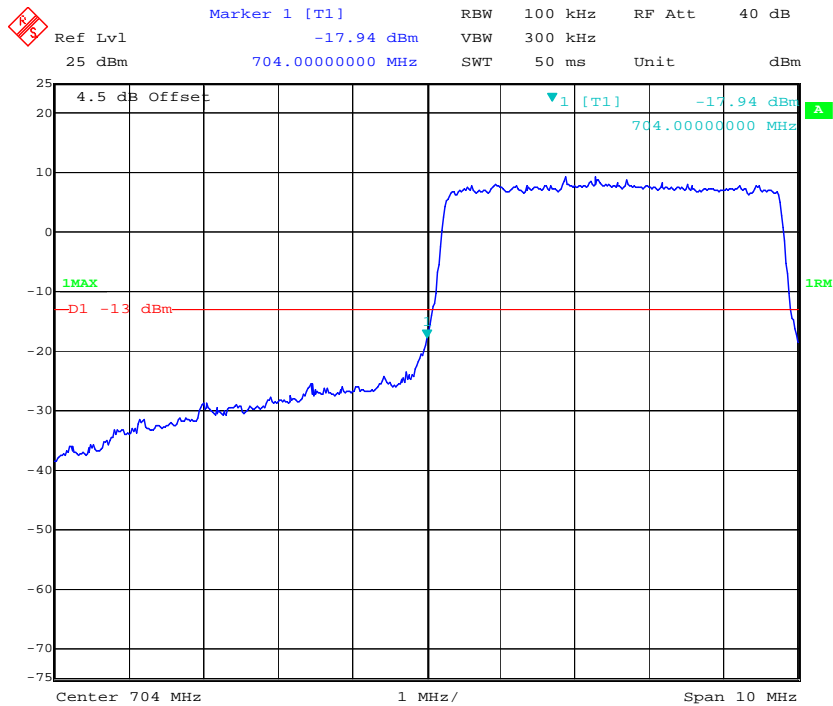
QPSK_10MHz_50 RB_Left



QPSK_10MHz_50 RB_Right

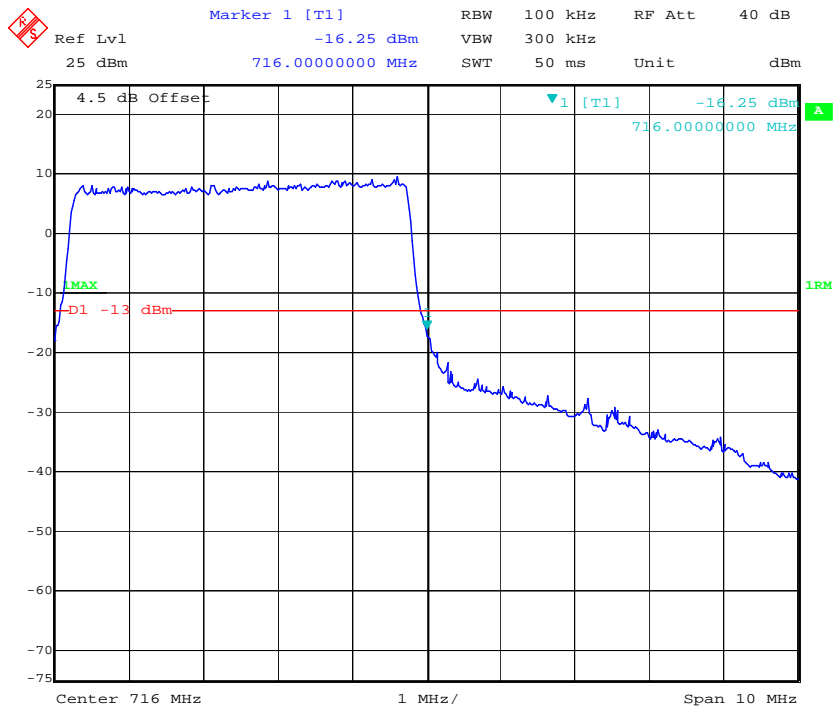


16QAM_5MHz_25 RB_Left



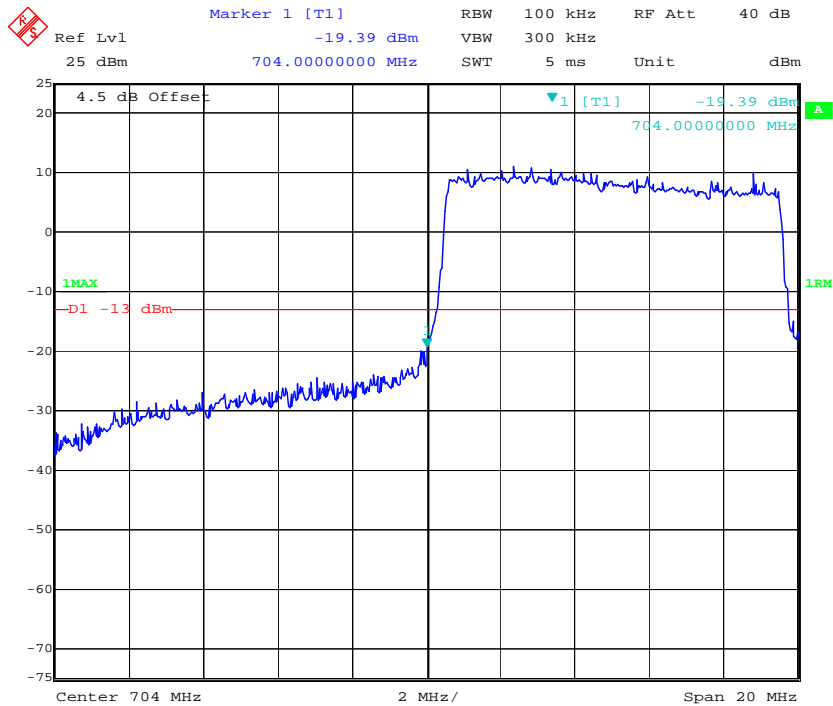
Date: 7.JAN.2019 23:19:51

16QAM_5MHz_25 RB_Right



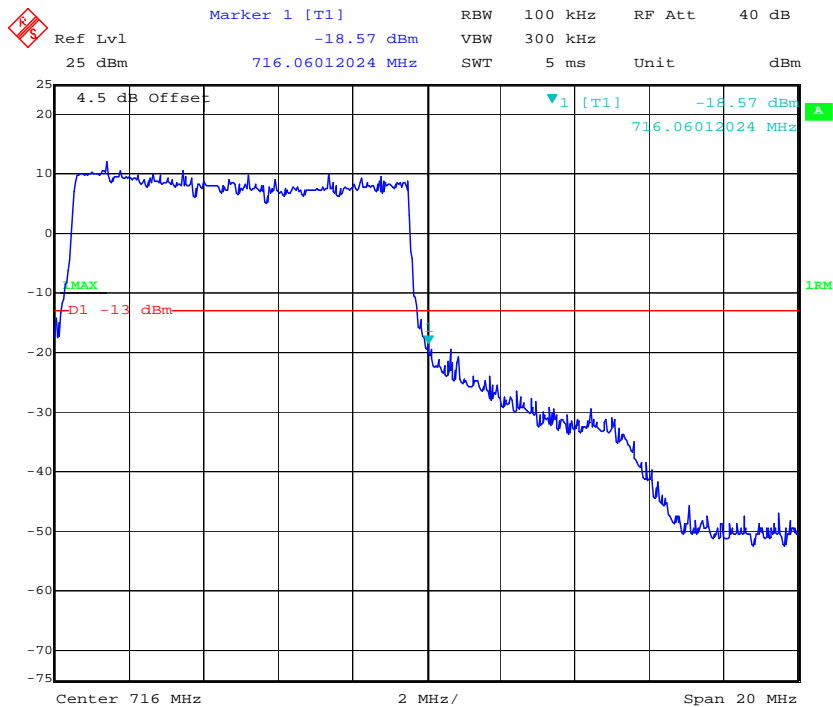
Date: 7.JAN.2019 23:19:00

16QAM_10MHz_50 RB_Left



Date: 7.JAN.2019 22:32:15

16QAM_10MHz_50 RB_Right



Date: 7.JAN.2019 22:32:51

FCC §2.1055, §22.355 & §24.235 & §27.54, RSS-130 §4.3 & RSS-132 §5.3 & RSS-133 §6.3 & RSS-139 §6.4 & RSS-199 §4.3 - FREQUENCY STABILITY

Applicable Standard

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

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

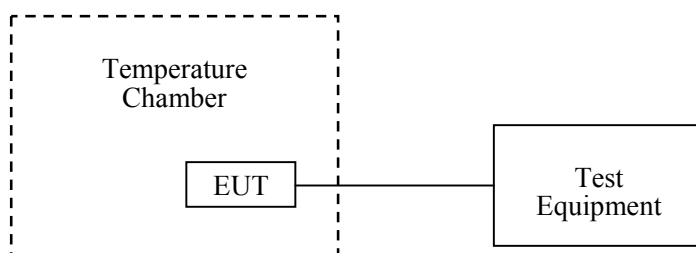
According to RSS-130 §4.3 & RSS-132 §5.3 & RSS-133 §6.3 & RSS-139 §6.4 & RSS-199 §4.3

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC 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 AC 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 AC 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
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-03	2019-08-03
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2018-03-26	2019-03-26
UNI-T	Multimeter	UT39A	M130199938	2018-07-24	2019-07-24
R&S	EMI Test Receiver	ESCI	101121	2018-03-23	2019-03-23
R&S	EMI Test Receiver	ESPI	100120	2018-12-10	2019-12-10
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:	22.3~22.8°C
Relative Humidity:	54~59 %
ATM Pressure:	100.4~101.6 kPa

The testing was performed by Carrie He & Tiago Huang from 2019-01-05 to 2019-01-07.

Cellular Band (Part 22H)

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	6	0.00717	2.5
-20		9	0.01076	
-10		7	0.00837	
0		10	0.01195	
10		8	0.00956	
20		11	0.01315	
30		5	0.00598	
40		10	0.01195	
50		8	0.00956	
20		3.5	7	
20	4.2	10	0.01195	

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	25	0.02988	2.5
-20		18	0.02152	
-10		24	0.02869	
0		17	0.02032	
10		20	0.02391	
20		27	0.03227	
30		22	0.02630	
40		24	0.02869	
50		18	0.02152	
20		3.5	15	
20	4.2	26	0.03108	

PCS Band (Part 24E)

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V_{DC}	Hz	ppm	ppm
-30	3.8	16	0.00851	2.5
-20		18	0.00957	
-10		19	0.01011	
0		16	0.00851	
10		17	0.00904	
20		21	0.01117	
30		15	0.00798	
40		11	0.00585	
50		17	0.00904	
20		3.5	15	
20	4.2	20	0.01064	

8PSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V_{DC}	Hz	ppm	ppm
-30	3.8	18	0.00957	2.5
-20		12	0.00638	
-10		14	0.00745	
0		16	0.00851	
10		22	0.01170	
20		23	0.01223	
30		11	0.00585	
40		14	0.00745	
50		20	0.01064	
20		3.5	19	
20	4.2	23	0.01223	

WCDMA Band II: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	-8	-0.00426	2.5
-20		-7	-0.00372	
-10		-4	-0.00213	
0		-6	-0.00319	
10		-7	-0.00372	
20		-5	-0.00266	
30		-9	-0.00479	
40		-8	-0.00426	
50		-10	-0.00532	
20		3.5	-9	
20	4.2	-4	-0.00213	

WCDMA Band V: R99

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		-5	-0.00598	
0		-6	-0.00717	
10		-4	-0.00478	
20		-1	-0.00120	
30		-4	-0.00478	
40		-2	-0.00239	
50		0	0.00000	
20		3.5	-6	
20	4.2	-3	-0.00359	

WCDMA Band IV: R99

Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
		F _L	F _H	F _L	F _H
°C	V _{DC}				
-30	3.8	1710.51	1754.42	1710	1755
-20		1710.73	1754.33	1710	1755
-10		1710.26	1754.59	1710	1755
0		1710.50	1754.33	1710	1755
10		1710.59	1754.67	1710	1755
20		1710.64	1754.32	1710	1755
30		1710.23	1754.43	1710	1755
40		1710.32	1754.25	1710	1755
50		1710.55	1754.43	1710	1755
20		3.5	1710.44	1754.41	1710
20	4.2	1710.69	1754.53	1710	1755

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, f _c = 1880 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	-8.12	-0.00432	2.5
-20		-12.42	-0.00661	
-10		-4.28	-0.00228	
0		-0.36	-0.00019	
10		-5.72	-0.00304	
20		8.72	0.00464	
30		-5.05	-0.00269	
40		1.34	0.00071	
50		-7.56	-0.00402	
20		3.5	-12.34	
20	4.2	1.12	0.00060	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	-2.32	-0.0012	2.5
-20		-11.02	-0.0059	
-10		3.54	0.0019	
0		3.05	0.0016	
10		11.21	0.0060	
20		-2.77	-0.0015	
30		11.48	0.0061	
40		-9.56	-0.0051	
50		12.20	0.0065	
20		3.5	3.03	
20	4.2	5.82	0.0031	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
		F _L	F _H	F _L	F _H
°C	V _{DC}				
-30	3.8	1710.48865	1754.50934	1710	1755
-20		1710.48990	1754.50776	1710	1755
-10		1710.48928	1754.50795	1710	1755
0		1710.49167	1754.50697	1710	1755
10		1710.49031	1754.50964	1710	1755
20		1710.49098	1754.50902	1710	1755
30		1710.49084	1754.51021	1710	1755
40		1710.49040	1754.50900	1710	1755
50		1710.49132	1754.51013	1710	1755
20		3.5	1710.49112	1754.50801	1710
20	4.2	1710.48937	1754.50680	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	1710.48917	1754.50906	1710	1755
-20		1710.49183	1754.50795	1710	1755
-10		1710.49200	1754.50822	1710	1755
0		1710.49125	1754.50737	1710	1755
10		1710.48904	1754.50982	1710	1755
20		1710.49098	1754.50902	1710	1755
30		1710.48966	1754.50837	1710	1755
40		1710.48957	1754.50859	1710	1755
50		1710.48995	1754.50934	1710	1755
20		3.5	1710.49152	1754.50747	1710
20	4.2	1710.49206	1754.50944	1710	1755

LTE Band 5:

Middle Channel, f _c = 836.5 MHz, Channel Bandwidth:10MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	4.50	0.00538	2.5
-20		-6.01	-0.00718	
-10		-12.13	-0.01450	
0		6.50	0.00777	
10		5.33	0.00637	
20		-0.60	-0.00072	
30		11.21	0.01340	
40		-10.72	-0.01282	
50		-6.22	-0.00744	
20		3.5	3.99	
20	4.2	9.96	0.01191	

Middle Channel, $f_c = 836.5$ MHz, Channel Bandwidth:10MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	-0.46	-0.00055	2.5
-20		-3.90	-0.00466	
-10		-5.16	-0.00617	
0		1.93	0.00231	
10		8.34	0.00997	
20		2.41	0.00288	
30		0.32	0.00038	
40		-0.64	-0.00077	
50		-9.30	-0.01112	
20		3.5	8.80	
20	4.2	5.78	0.00691	

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	2500.53097	2569.50959	2500	2570
-20		2500.53126	2569.50712	2500	2570
-10		2500.53225	2569.50884	2500	2570
0		2500.52988	2569.50716	2500	2570
10		2500.53194	2569.50862	2500	2570
20		2500.53106	2569.50902	2500	2570
30		2500.53122	2569.50759	2500	2570
40		2500.53099	2569.50997	2500	2570
50		2500.53140	2569.50702	2500	2570
20		3.5	2500.52950	2569.50821	2500
20	4.2	2500.53033	2569.50744	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	2500.52967	2569.50965	2500	2570
-20		2500.53021	2569.50835	2500	2570
-10		2500.53191	2569.50773	2500	2570
0		2500.52930	2569.51023	2500	2570
10		2500.53180	2569.50692	2500	2570
20		2500.49098	2569.50902	2500	2570
30		2500.52908	2569.50749	2500	2570
40		2500.53199	2569.50716	2500	2570
50		2500.53089	2569.50666	2500	2570
20		3.5	2500.53122	2569.50935	2500
20	4.2	2500.52924	2569.50760	2500	2570

LTE Band 17:

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	704.48126	715.50978	704	716
-20		704.50092	715.50811	704	716
-10		704.49767	715.50737	704	716
0		704.50481	715.51011	704	716
10		704.48671	715.50815	704	716
20		704.49098	715.50901	704	716
30		704.50113	715.50773	704	716
40		704.47808	715.50946	704	716
50		704.50619	715.50930	704	716
20		3.5	704.48510	715.50936	704
20	4.2	704.49702	715.51012	704	716

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	704.48783	715.50755	704	716
-20		704.46853	715.50670	704	716
-10		704.48488	715.50920	704	716
0		704.50405	715.50840	704	716
10		704.50520	715.50810	704	716
20		704.49098	715.50901	704	716
30		704.49264	715.50744	704	716
40		704.47709	715.50910	704	716
50		704.50512	715.50889	704	716
20		3.5	704.48828	715.50798	704
20	4.2	704.50203	715.50772	704	716

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 *******