



TESTING LABORATORY
CERTIFICATE #4820.01



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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-S5003L
IC: 20054-S5003L

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Smart Phone
EUT Model:		S5003L
Multiple Model:		A5000-PB
Rated Input Voltage:		DC3.7V from Battery or DC5V from adapter
Adapter Information	Model:	TPA-95A050100UU
	Input:	AC 100-240V, 50/60Hz, 0.15A
	Output:	DC5V, 1000mA
External Dimension:		146mm(L)* 73mm(W)*11mm(H)
Serial Number:		181226002
EUT Received Date:		2019.01.03

Note: The series product model A5000-PB is electrically identical with model S5003L, we selected S5003L 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-S5003L.
FCC Part 15C DSS submissions with FCC ID: RBD-S5003L.
FCC Part 15B JBP submissions with FCC ID: RBD-S5003L.
FCC Part 15E NII submissions with FCC ID: RBD-S5003L.
RSS-247 DTSSs, RSS-247 DSSs, RSS-247 LE-LAN submissions with IC: 20054-S5003L

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.

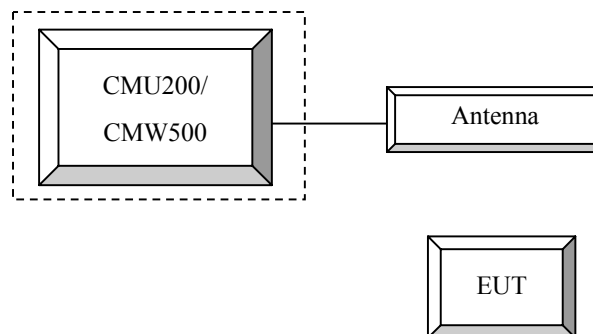
Equipment Modifications

No modification was made to the EUT.

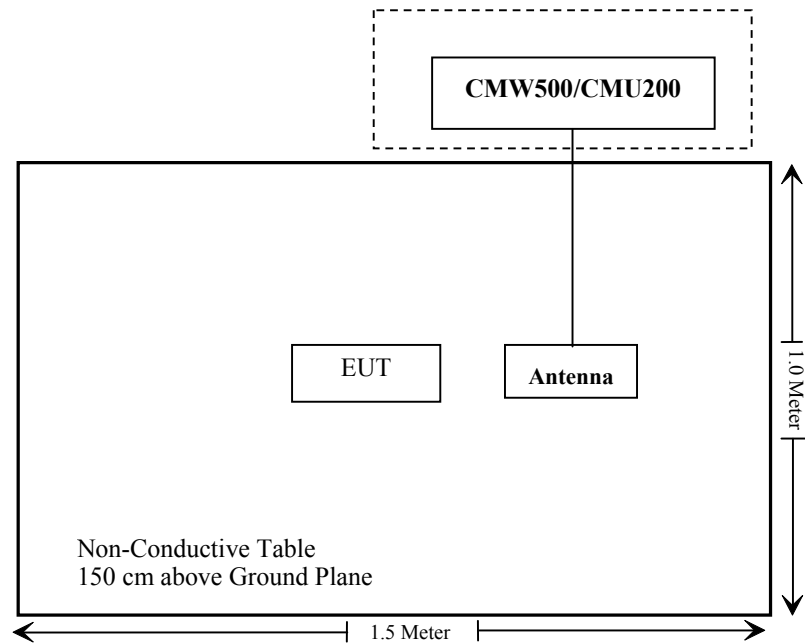
Support Equipment List and Details

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: RGMA181226002-20.

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, 64QAM 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
	β_c / β_d	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 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 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 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 (Note 3)	β_d	β_{HS} (Note 1)	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: Δ_{ACK} , Δ_{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
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.		
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.		

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
64 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
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	See Table 6.2.4-4	
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
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, Elena Lei on 2019-01-09~2019-01-14.

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	33.10	33.10	32.10	30.27	29.01	26.83	26.09	24.42	23.50
	190	33.10	33.11	32.15	30.38	29.13	26.78	26.06	24.30	23.39
	251	33.10	33.10	32.22	30.45	29.30	26.63	25.82	24.18	23.18
PCS	512	30.40	30.45	29.78	28.04	26.90	26.92	25.92	23.72	22.47
	661	30.20	30.23	29.53	27.73	26.68	27.12	26.05	23.89	22.68
	810	30.10	30.16	29.40	27.65	26.56	26.71	25.58	23.37	22.15

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	23.32	2.18	23.54	2.50	23.41	2.21
HSDPA	1	22.50	2.85	22.55	2.92	22.46	3.01
	2	22.48	2.87	22.53	2.89	22.48	3.02
	3	22.58	2.93	22.61	2.86	22.44	2.97
	4	22.48	2.89	22.53	2.92	22.44	3.01
HSUPA	1	22.47	2.76	22.56	2.95	22.45	3.37
	2	22.47	2.70	22.52	2.99	22.45	3.37
	3	22.50	2.77	22.62	2.98	22.42	3.35
	4	22.37	2.86	22.41	2.90	22.30	3.37
	5	22.47	2.55	22.56	3.09	22.24	3.51

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	23.18	2.66	23.19	2.76	23.07	2.56
HSDPA	1	22.17	4.13	22.55	3.40	22.46	4.10
	2	22.16	4.12	22.53	3.42	22.47	4.07
	3	22.13	4.09	22.61	3.36	22.42	4.14
	4	22.15	4.13	22.59	3.38	22.46	4.08
HSUPA	1	22.08	3.59	22.20	3.30	22.05	2.98
	2	22.14	3.57	22.18	3.28	22.07	2.94
	3	22.17	3.62	22.23	3.31	22.05	3.01
	4	22.23	3.74	22.35	3.30	22.20	2.83
	5	22.08	3.73	21.99	3.30	22.05	2.91

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	22.63	2.72	22.57	2.60	22.76	2.24
HSDPA	1	21.78	4.17	21.64	3.65	21.84	3.37
	2	21.80	4.17	21.67	3.63	21.86	3.35
	3	21.82	4.15	21.62	3.65	21.80	3.33
	4	21.78	4.21	21.68	3.69	21.88	3.37
HSUPA	1	21.69	3.97	21.57	3.24	21.78	3.75
	2	21.69	4.01	21.55	3.20	21.80	3.69
	3	21.72	3.96	21.48	3.21	21.84	3.74
	4	21.64	4.07	21.42	3.19	21.73	3.65
	5	21.83	4.04	21.71	3.24	21.85	3.54

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.51	22.41	21.68
		RB1#3	22.54	22.12	21.35
		RB1#5	22.55	22.20	21.23
		RB3#0	22.38	22.28	21.54
		RB3#3	22.37	22.19	21.28
		RB6#0	21.48	21.37	20.68
	16QAM	RB1#0	21.30	21.49	20.72
		RB1#3	21.37	21.29	20.48
		RB1#5	21.30	21.38	20.42
		RB3#0	21.45	21.28	20.72
		RB3#3	21.49	21.20	20.49
		RB6#0	20.37	20.45	19.80
3MHz	QPSK	RB1#0	21.99	22.16	21.86
		RB1#8	21.94	21.88	21.39
		RB1#14	22.06	21.93	21.04
		RB6#0	21.26	21.28	21.04
		RB6#9	21.36	21.12	20.54
		RB15#0	21.32	21.19	20.83
	16QAM	RB1#0	21.44	21.35	20.93
		RB1#8	21.45	21.08	20.52
		RB1#14	21.59	21.17	20.22
		RB6#0	20.41	20.38	20.12
		RB6#9	20.43	20.25	19.64
		RB15#0	20.40	20.25	20.02
5MHz	QPSK	RB1#0	21.74	22.08	21.88
		RB1#13	21.55	21.40	21.18
		RB1#24	22.02	21.80	20.90
		RB15#0	20.81	20.75	20.77
		RB15#10	21.00	20.67	20.39
		RB25#0	20.90	20.74	20.58
	16QAM	RB1#0	20.75	21.37	21.02
		RB1#13	20.57	20.74	20.35
		RB1#24	21.13	21.17	20.15
		RB15#0	19.95	19.82	19.86
		RB15#10	20.14	19.75	19.56
		RB25#0	20.07	19.86	19.72

10MHz	QPSK	RB1#0	21.36	21.74	21.59
		RB1#25	21.71	21.31	21.52
		RB1#49	21.76	21.05	20.47
		RB25#0	20.79	20.78	20.83
		RB25#25	21.12	20.52	20.50
		RB50#0	20.98	20.66	20.68
	16QAM	RB1#0	20.83	20.93	20.55
		RB1#25	21.27	20.54	20.58
		RB1#49	21.35	20.29	19.60
		RB25#0	19.93	19.90	19.98
		RB25#25	20.27	19.64	19.64
		RB50#0	20.09	19.77	19.75
15MHz	QPSK	RB1#0	21.49	22.03	22.03
		RB1#38	22.50	21.13	21.79
		RB1#74	22.49	22.04	21.01
		RB36#0	21.31	21.49	21.24
		RB36#39	21.50	20.73	20.92
		RB75#0	21.29	20.85	21.04
	16QAM	RB1#0	21.25	21.74	21.23
		RB1#38	21.56	20.97	21.11
		RB1#74	21.68	20.92	20.37
		RB36#0	20.08	20.26	20.37
		RB36#39	20.33	19.70	20.06
		RB75#0	20.17	20.02	20.23
20MHz	QPSK	RB1#0	21.80	22.38	21.91
		RB1#50	22.30	21.59	21.90
		RB1#99	22.19	21.59	21.11
		RB50#0	21.32	21.32	21.24
		RB50#50	21.47	20.70	21.04
		RB100#0	21.43	21.04	21.11
	16QAM	RB1#0	21.19	21.61	21.39
		RB1#50	21.67	20.87	21.51
		RB1#99	21.63	20.96	20.76
		RB50#0	20.38	20.43	20.28
		RB50#50	20.43	19.81	20.15
		RB100#0	20.42	20.15	20.26

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.53	22.41	22.16
		RB1#3	22.55	22.25	22.25
		RB1#5	22.55	22.37	22.19
		RB3#0	22.58	22.36	22.14
		RB3#3	22.56	22.31	22.16
		RB6#0	21.57	21.41	21.15
	16QAM	RB1#0	21.46	21.51	21.09
		RB1#3	21.51	21.54	21.17
		RB1#5	21.51	21.47	21.10
		RB3#0	21.69	21.43	21.16
		RB3#3	21.74	21.42	21.16
		RB6#0	20.54	20.41	20.02
3MHz	QPSK	RB1#0	22.52	22.39	22.15
		RB1#8	22.52	22.32	22.19
		RB1#14	22.50	22.37	22.14
		RB6#0	21.56	21.41	21.13
		RB6#9	21.55	21.40	21.16
		RB15#0	21.57	21.41	21.15
	16QAM	RB1#0	21.96	21.50	21.10
		RB1#8	21.96	21.52	21.09
		RB1#14	21.92	21.47	21.08
		RB6#0	20.57	20.40	20.04
		RB6#9	20.57	20.42	20.04
		RB15#0	20.60	20.36	20.17
5MHz	QPSK	RB1#0	22.54	22.35	22.19
		RB1#13	22.53	21.82	22.17
		RB1#24	22.47	22.36	22.14
		RB15#0	21.59	20.95	21.21
		RB15#10	21.54	21.04	21.18
		RB25#0	21.52	21.03	21.13
	16QAM	RB1#0	21.42	21.65	21.21
		RB1#13	21.40	21.23	21.18
		RB1#24	21.35	21.63	21.14
		RB15#0	20.59	20.07	20.21
		RB15#10	20.55	20.17	20.17
		RB25#0	20.55	20.21	20.14

10MHz	QPSK	RB1#0	22.59	21.84	22.27
		RB1#25	22.52	21.76	22.22
		RB1#49	22.53	21.81	22.08
		RB25#0	21.52	20.93	21.17
		RB25#25	21.52	21.01	21.16
		RB50#0	21.53	20.98	21.18
	16QAM	RB1#0	21.99	21.03	21.20
		RB1#25	21.99	21.05	21.16
		RB1#49	21.99	21.08	21.12
		RB25#0	20.55	20.10	20.26
		RB25#25	20.56	20.21	20.24
		RB50#0	20.53	20.17	20.20
15MHz	QPSK	RB1#0	22.58	22.32	22.37
		RB1#38	22.52	21.66	22.27
		RB1#74	22.35	22.12	22.25
		RB36#0	21.61	20.99	21.38
		RB36#39	21.65	21.05	21.34
		RB75#0	21.63	21.02	21.39
	16QAM	RB1#0	21.99	21.52	21.67
		RB1#38	21.99	20.97	21.55
		RB1#74	21.93	21.43	21.51
		RB36#0	20.58	20.16	20.31
		RB36#39	20.61	20.26	20.28
		RB75#0	20.60	20.21	20.32
20MHz	QPSK	RB1#0	22.59	22.57	22.44
		RB1#50	22.53	22.42	22.33
		RB1#99	21.63	22.42	22.32
		RB50#0	21.54	21.51	21.37
		RB50#50	21.34	21.47	21.29
		RB100#0	21.52	21.48	21.32
	16QAM	RB1#0	21.83	22.05	21.70
		RB1#50	21.80	21.86	21.58
		RB1#99	20.96	21.94	21.55
		RB50#0	20.52	20.52	20.36
		RB50#50	20.44	20.46	20.27
		RB100#0	20.52	20.48	20.33

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.72	22.71	22.73
		RB1#3	22.75	22.49	22.73
		RB1#5	22.75	22.59	22.62
		RB3#0	22.81	22.58	22.68
		RB3#3	22.83	22.50	22.64
		RB6#0	21.76	21.68	21.71
	16QAM	RB1#0	21.72	21.86	21.60
		RB1#3	21.75	21.77	21.70
		RB1#5	21.75	21.85	21.60
		RB3#0	21.97	21.72	21.66
		RB3#3	22.04	21.69	21.66
3MHz	QPSK	RB1#0	22.66	22.68	22.67
		RB1#8	22.72	22.61	22.74
		RB1#14	22.71	22.68	22.63
		RB6#0	21.74	21.72	21.63
		RB6#9	21.77	21.72	21.70
		RB15#0	21.81	21.77	21.67
	16QAM	RB1#0	22.15	21.84	21.60
		RB1#8	22.28	21.80	21.60
		RB1#14	22.26	21.83	21.57
		RB6#0	20.78	20.72	20.55
		RB6#9	20.83	20.75	20.56
5MHz	QPSK	RB1#0	22.75	22.75	22.71
		RB1#13	22.78	22.12	22.51
		RB1#24	22.78	22.71	22.51
		RB15#0	21.84	21.30	21.71
		RB15#10	21.87	21.33	21.70
		RB25#0	21.80	21.33	21.65
	16QAM	RB1#0	21.66	22.04	21.73
		RB1#13	21.70	21.51	21.69
		RB1#24	21.70	22.00	21.68
		RB15#0	20.88	20.45	20.72
		RB15#10	20.91	20.46	20.70
10MHz	QPSK	RB25#0	20.86	20.50	20.67
		RB1#0	22.74	22.75	22.72
		RB1#25	22.81	22.23	22.77
		RB1#49	22.36	22.74	22.36
		RB25#0	21.84	21.63	21.71
		RB25#25	21.81	21.64	21.68
		RB50#0	21.83	21.63	21.70
	16QAM	RB1#0	22.28	21.92	21.74
		RB1#25	22.36	21.47	21.70
		RB1#49	22.03	21.89	21.50
		RB25#0	20.88	20.79	20.82
		RB25#25	20.87	20.80	20.79
		RB50#0	20.85	20.79	20.76

LTE Band 7

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	19.29	21.22	21.40
		RB1#13	21.48	21.18	20.82
		RB1#24	21.35	21.16	21.09
		RB15#0	20.44	20.21	20.19
		RB15#10	20.44	20.21	20.26
		RB25#0	20.38	20.18	20.21
	16QAM	RB1#0	20.20	20.41	20.38
		RB1#13	20.22	20.38	19.98
		RB1#24	20.19	20.35	20.36
		RB15#0	19.44	19.20	19.41
		RB15#10	19.42	19.17	19.43
		RB25#0	19.41	19.19	19.41
10MHz	QPSK	RB1#0	21.69	21.21	21.27
		RB1#25	21.64	21.19	20.83
		RB1#49	21.51	21.23	20.59
		RB25#0	20.44	20.21	20.11
		RB25#25	20.43	20.22	20.08
		RB50#0	20.45	20.21	20.07
	16QAM	RB1#0	20.76	20.28	20.17
		RB1#25	20.74	20.26	19.98
		RB1#49	20.73	20.27	19.91
		RB25#0	19.44	19.25	19.41
		RB25#25	19.42	19.24	19.45
		RB50#0	19.42	19.24	19.43
15MHz	QPSK	RB1#0	21.75	21.24	21.31
		RB1#38	21.57	21.24	20.97
		RB1#74	21.44	21.34	20.87
		RB36#0	20.68	20.35	20.48
		RB36#39	20.59	20.39	20.11
		RB75#0	20.63	20.38	20.35
	16QAM	RB1#0	20.80	20.32	20.52
		RB1#38	20.72	20.26	20.40
		RB1#74	20.70	20.35	20.36
		RB36#0	19.56	19.32	19.41
		RB36#39	19.50	19.33	19.49
		RB75#0	19.54	19.33	19.47
20MHz	QPSK	RB1#0	21.72	21.28	21.21
		RB1#50	21.48	21.23	21.24
		RB1#99	21.40	21.37	20.74
		RB50#0	20.44	20.27	20.31
		RB50#50	20.38	20.28	20.27
		RB100#0	20.41	20.26	20.36
	16QAM	RB1#0	20.67	20.36	20.66
		RB1#50	20.57	20.27	20.69
		RB1#99	20.58	20.40	20.56
		RB50#0	19.40	19.30	19.32
		RB50#50	19.36	19.27	19.46
		RB100#0	19.39	19.27	19.35

LTE Band 17

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	22.28	22.66	22.80
		RB1#13	21.60	22.37	22.55
		RB1#24	22.02	22.66	22.55
		RB15#0	21.20	21.61	21.74
		RB15#10	21.02	21.65	21.71
		RB25#0	21.24	21.66	21.66
	16QAM	RB1#0	21.52	21.95	21.73
		RB1#13	21.02	21.85	21.69
		RB1#24	21.38	21.86	21.66
		RB15#0	20.62	20.67	20.66
		RB15#10	20.42	20.63	20.63
		RB25#0	20.62	20.64	20.62
10MHz	QPSK	RB1#0	22.73	22.72	22.67
		RB1#25	22.56	22.53	22.62
		RB1#49	22.63	22.55	22.51
		RB25#0	21.68	21.68	21.69
		RB25#25	21.73	21.71	21.68
		RB50#0	21.70	21.70	21.68
	16QAM	RB1#0	22.03	21.73	21.67
		RB1#25	22.13	21.80	21.72
		RB1#49	22.09	21.79	21.65
		RB25#0	20.70	20.65	20.73
		RB25#25	20.72	20.66	20.68
		RB50#0	20.67	20.66	20.66

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	2.79	3.72	3.94	13
	100 RB		5.06	5.16	5.06	13
16QAM	1 RB	20 MHz	3.85	4.71	4.74	13
	100 RB		5.87	6.06	5.90	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	4.10	4.65	4.20	13
	100 RB		5.35	5.51	5.32	13
16QAM	1 RB	20 MHz	4.97	5.16	5.10	13
	100 RB		6.22	6.31	6.19	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	4.78	3.65	4.87	13
	50 RB		5.29	5.58	5.42	13
16QAM	1 RB	10 MHz	5.74	4.55	5.74	13
	50 RB		6.25	6.35	6.28	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	5.92	4.16	4.04	13
	100 RB		6.20	6.12	6.36	13
16QAM	1 RB	20 MHz	5.88	5.04	4.76	13
	100 RB		7.24	7.08	7.12	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	4.24	4.24	4.20	13
	50 RB		5.20	5.24	5.36	13
16QAM	1 RB	10 MHz	5.48	4.72	5.54	13
	50 RB		6.28	6.08	6.24	13

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

ERP & EIRP

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)			
GSM 850 Middle Channel								
836.60	H	87.76	12.84	0.00	0.97	11.87	38.45	26.58
836.60	V	100.53	28.74	0.00	0.97	27.77	38.45	10.68
EDGE 850 Middle Channel								
836.60	H	82.71	7.79	0.00	0.97	6.82	38.45	31.63
836.60	V	95.28	23.49	0.00	0.97	22.52	38.45	15.93
WCDMA Band V Middle Channel								
836.60	H	79.47	4.55	0.00	0.97	3.58	38.45	34.87
836.60	V	91.99	20.20	0.00	0.97	19.23	38.45	19.22
GSM 1900 Middle Channel								
1880.00	H	93.08	20.47	11.66	2.66	29.47	33.00	3.53
1880.00	V	90.78	18.31	11.66	2.66	27.31	33.00	5.69
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	87.25	14.64	11.66	2.66	23.64	33.00	9.36
1880.00	V	83.14	10.67	11.66	2.66	19.67	33.00	13.33
WCDMA Band IV Middle Channel								
1732.60	H	87.04	12.99	10.90	2.51	21.38	30.00	8.62
1732.60	V	87.57	13.20	10.90	2.51	21.59	30.00	8.41

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	87.16	14.55	11.66	2.66	23.55	33.00	9.45
1880.00			V	82.75	10.28	11.66	2.66	19.28	33.00	13.72
1880.00	3.00		H	86.16	13.55	11.66	2.66	22.55	33.00	10.45
1880.00			V	84.37	11.90	11.66	2.66	20.90	33.00	12.10
1880.00	5.00		H	84.73	12.12	11.66	2.66	21.12	33.00	11.88
1880.00			V	81.86	9.39	11.66	2.66	18.39	33.00	14.61
1880.00	10.00		H	85.69	13.08	11.66	2.66	22.08	33.00	10.92
1880.00			V	83.52	11.05	11.66	2.66	20.05	33.00	12.95
1880.00	15.00		H	84.04	11.43	11.66	2.66	20.43	33.00	12.57
1880.00			V	81.41	8.94	11.66	2.66	17.94	33.00	15.06
1880.00	20.00		H	84.60	11.99	11.66	2.66	20.99	33.00	12.01
1880.00			V	81.47	9.00	11.66	2.66	18.00	33.00	15.00
1880.00	1.40	16QAM	H	86.76	14.15	11.66	2.66	23.15	33.00	9.85
1880.00			V	83.73	11.26	11.66	2.66	20.26	33.00	12.74
1880.00	3.00		H	85.13	12.52	11.66	2.66	21.52	33.00	11.48
1880.00			V	82.31	9.84	11.66	2.66	18.84	33.00	14.16
1880.00	5.00		H	84.87	12.26	11.66	2.66	21.26	33.00	11.74
1880.00			V	81.01	8.54	11.66	2.66	17.54	33.00	15.46
1880.00	10.00		H	86.46	13.85	11.66	2.66	22.85	33.00	10.15
1880.00			V	82.61	10.14	11.66	2.66	19.14	33.00	13.86
1880.00	15.00		H	83.90	11.29	11.66	2.66	20.29	33.00	12.71
1880.00			V	80.83	8.36	11.66	2.66	17.36	33.00	15.64
1880.00	20.00		H	83.93	11.32	11.66	2.66	20.32	33.00	12.68
1880.00			V	80.88	8.41	11.66	2.66	17.41	33.00	15.59

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	88.35	14.30	10.90	2.51	22.69	30.00	7.31
1732.50			V	85.20	10.83	10.90	2.51	19.22	30.00	10.78
1732.50	3.00		H	87.38	13.33	10.90	2.51	21.72	30.00	8.28
1732.50			V	85.08	10.71	10.90	2.51	19.10	30.00	10.90
1732.50	5.00		H	86.81	12.76	10.90	2.51	21.15	30.00	8.85
1732.50			V	84.02	9.65	10.90	2.51	18.04	30.00	11.96
1732.50	10.00		H	88.26	14.21	10.90	2.51	22.60	30.00	7.40
1732.50			V	85.70	11.33	10.90	2.51	19.72	30.00	10.28
1732.50	15.00		H	86.49	12.44	10.90	2.51	20.83	30.00	9.17
1732.50			V	83.61	9.24	10.90	2.51	17.63	30.00	12.37
1732.50	20.00		H	86.67	12.62	10.90	2.51	21.01	30.00	8.99
1732.50			V	84.13	9.76	10.90	2.51	18.15	30.00	11.85
1732.50	1.40	16QAM	H	88.15	14.10	10.90	2.51	22.49	30.00	7.51
1732.50			V	85.23	10.86	10.90	2.51	19.25	30.00	10.75
1732.50	3.00		H	87.08	13.03	10.90	2.51	21.42	30.00	8.58
1732.50			V	84.26	9.89	10.90	2.51	18.28	30.00	11.72
1732.50	5.00		H	86.18	12.13	10.90	2.51	20.52	30.00	9.48
1732.50			V	83.63	9.26	10.90	2.51	17.65	30.00	12.35
1732.50	10.00		H	87.57	13.52	10.90	2.51	21.91	30.00	8.09
1732.50			V	84.93	10.56	10.90	2.51	18.95	30.00	11.05
1732.50	15.00		H	85.69	11.64	10.90	2.51	20.03	30.00	9.97
1732.50			V	83.10	8.73	10.90	2.51	17.12	30.00	12.88
1732.50	20.00		H	86.18	12.13	10.90	2.51	20.52	30.00	9.48
1732.50			V	82.85	8.48	10.90	2.51	16.87	30.00	13.13

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	76.87	2.64	0.00	0.50	2.14	38.45	36.31
836.50			V	89.27	18.01	0.00	0.50	17.51	38.45	20.94
836.50	3.00		H	76.80	2.57	0.00	0.50	2.07	38.45	36.38
836.50			V	89.22	17.96	0.00	0.50	17.46	38.45	20.99
836.50	5.00		H	76.84	2.61	0.00	0.50	2.11	38.45	36.34
836.50			V	88.97	17.71	0.00	0.50	17.21	38.45	21.24
836.50	10.00		H	76.65	2.42	0.00	0.50	1.92	38.45	36.53
836.50			V	88.26	17.00	0.00	0.50	16.50	38.45	21.95
836.50	1.40	16QAM	H	75.79	1.56	0.00	0.50	1.06	38.45	37.39
836.50			V	88.82	17.56	0.00	0.50	17.06	38.45	21.39
836.50	3.00		H	75.84	1.61	0.00	0.50	1.11	38.45	37.34
836.50			V	88.74	17.48	0.00	0.50	16.98	38.45	21.47
836.50	5.00		H	75.55	1.32	0.00	0.50	0.82	38.45	37.63
836.50			V	88.66	17.40	0.00	0.50	16.90	38.45	21.55
836.50	10.00		H	75.60	1.37	0.00	0.50	0.87	38.45	37.58
836.50			V	88.43	17.17	0.00	0.50	16.67	38.45	21.78

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	82.61	10.00	13.14	3.10	20.04	33.00	12.96
2535.00			V	79.65	8.50	13.14	3.10	18.54	33.00	14.46
2535.00	10.00		H	82.14	9.53	13.14	3.10	19.57	33.00	13.43
2535.00			V	79.52	8.37	13.14	3.10	18.41	33.00	14.59
2535.00	15.00		H	82.32	9.71	13.14	3.10	19.75	33.00	13.25
2535.00			V	79.64	8.49	13.14	3.10	18.53	33.00	14.47
2535.00	20.00		H	79.80	7.19	13.14	3.10	17.23	33.00	15.77
2535.00			V	77.66	6.51	13.14	3.10	16.55	33.00	16.45
2535.00	5.00	16QAM	H	82.34	9.73	13.14	3.10	19.77	33.00	13.23
2535.00			V	79.94	8.79	13.14	3.10	18.83	33.00	14.17
2535.00	10.00		H	81.21	8.60	13.14	3.10	18.64	33.00	14.36
2535.00			V	78.68	7.53	13.14	3.10	17.57	33.00	15.43
2535.00	15.00		H	81.09	8.48	13.14	3.10	18.52	33.00	14.48
2535.00			V	78.52	7.37	13.14	3.10	17.41	33.00	15.59
2535.00	20.00		H	80.21	7.60	13.14	3.10	17.64	33.00	15.36
2535.00			V	78.93	7.78	13.14	3.10	17.82	33.00	15.18

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	77.06	1.16	0.00	0.39	0.77	34.77	34.00
710.00			V	93.35	20.35	0.00	0.39	19.96	34.77	14.81
710.00	10		H	76.84	0.94	0.00	0.39	0.55	34.77	34.22
710.00			V	92.98	19.98	0.00	0.39	19.59	34.77	15.18
710.00	5	16QAM	H	76.64	0.74	0.00	0.39	0.35	34.77	34.42
710.00			V	93.17	20.17	0.00	0.39	19.78	34.77	14.99
710.00	10		H	76.25	0.35	0.00	0.39	-0.04	34.77	34.81
710.00			V	92.67	19.67	0.00	0.39	19.28	34.77	15.49

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

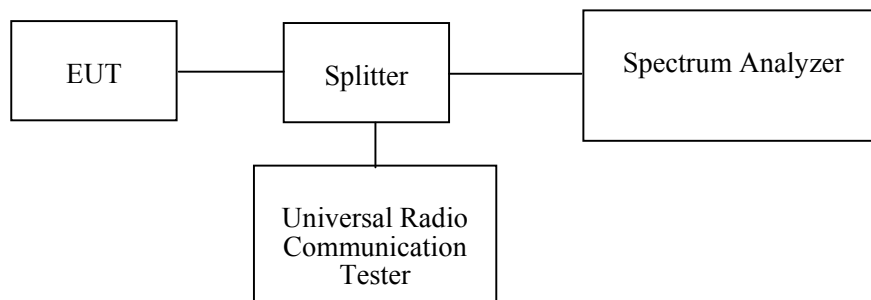
Applicable Standard

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	Spectrum Analyzer	FSU 26	200256	2019-01-04	2020-01-04
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 Elena Lei from 2019-01-04 to 2019-01-05.

Test Mode: Transmitting

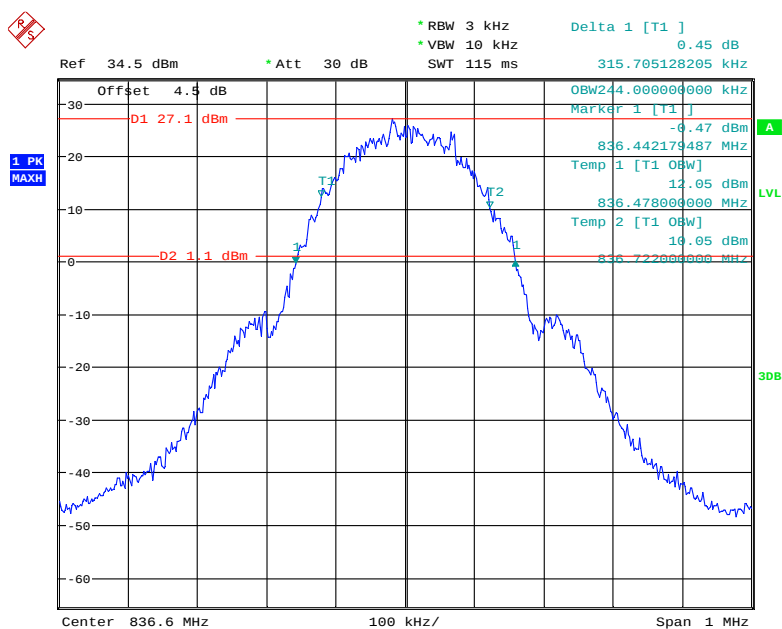
Test Result: Compliant. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.244	0.316
		EDGE	0.258	0.322
PCS		GSM	0.242	0.315
		EDGE	0.250	0.315
WCDMA Band II		Rel 99	4.215	4.904
		HSDPA	4.215	4.888
		HSUPA	4.199	4.888
WCDMA Band IV		Rel 99	4.198	4.872
		HSDPA	4.215	4.904
		HSUPA	4.231	4.888
WCDMA Band V		Rel 99	4.215	4.872
		HSDPA	4.231	4.904
		HSUPA	4.231	4.904

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.104	1.269
		16QAM	1.104	1.269
	3 MHz	QPSK	2.700	2.934
		16QAM	2.700	2.934
	5 MHz	QPSK	4.540	5.050
		16QAM	4.520	5.030
	10 MHz	QPSK	8.960	9.780
		16QAM	8.960	9.579
	15 MHz	QPSK	13.560	14.910
		16QAM	13.560	14.910
LTE Band 4	1.4 MHz	QPSK	1.104	1.275
		16QAM	1.110	1.269
	3 MHz	QPSK	2.700	2.898
		16QAM	2.700	2.934
	5 MHz	QPSK	4.540	5.050
		16QAM	4.540	5.010
	10 MHz	QPSK	9.000	9.739
		16QAM	8.960	9.659
	15 MHz	QPSK	13.560	14.910
		16QAM	13.560	14.850
LTE Band 5	1.4 MHz	QPSK	1.098	1.269
		16QAM	1.110	1.281
	3 MHz	QPSK	2.700	2.910
		16QAM	2.688	2.922
	5 MHz	QPSK	4.540	5.030
		16QAM	4.540	5.010
	10 MHz	QPSK	9.000	9.499
		16QAM	9.000	9.619

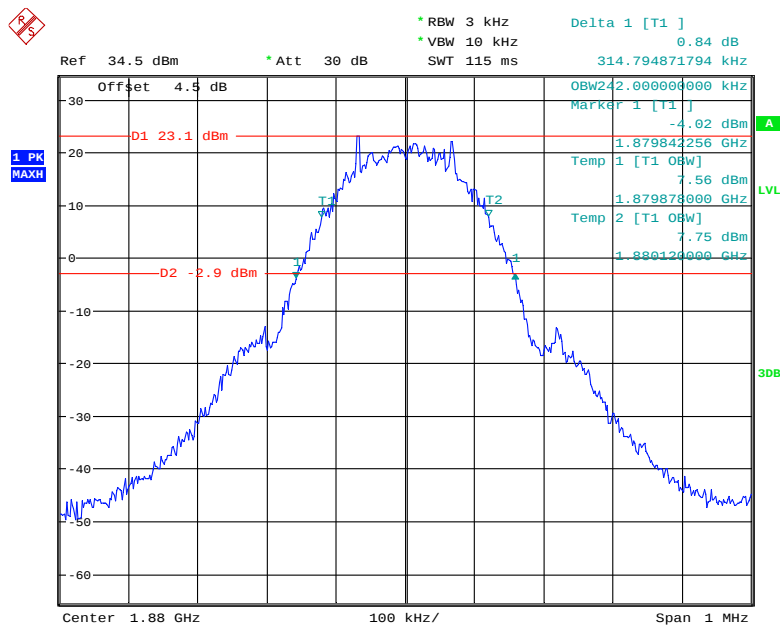
Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 7	5 MHz	QPSK	4.520	5.010
		16QAM	4.520	5.010
	10 MHz	QPSK	8.960	9.780
		16QAM	8.960	9.619
	15 MHz	QPSK	13.620	14.910
		16QAM	13.500	14.910
LTE Band 17	5 MHz	QPSK	4.540	5.030
		16QAM	4.540	5.050
	10 MHz	QPSK	9.000	9.820
		16QAM	8.960	9.579

GSM 850 Cellular Band



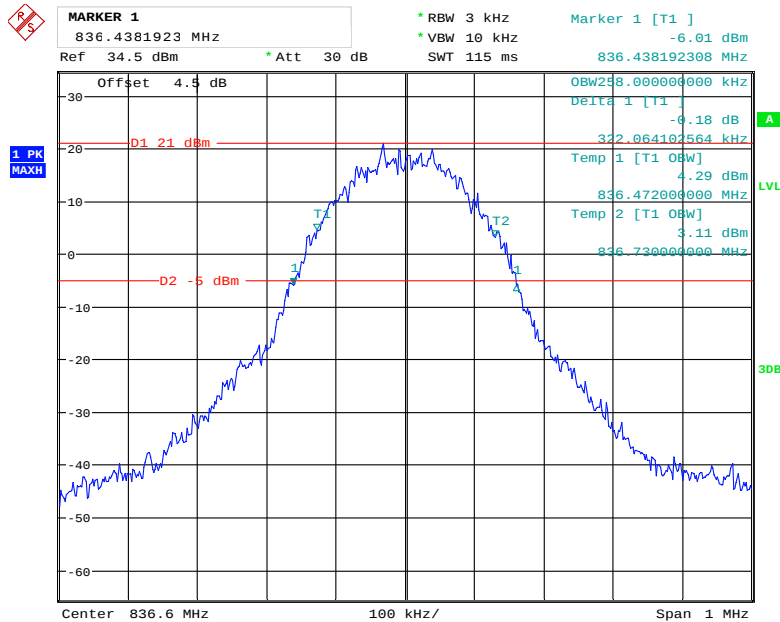
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GSM PCS1900 Cellular Band



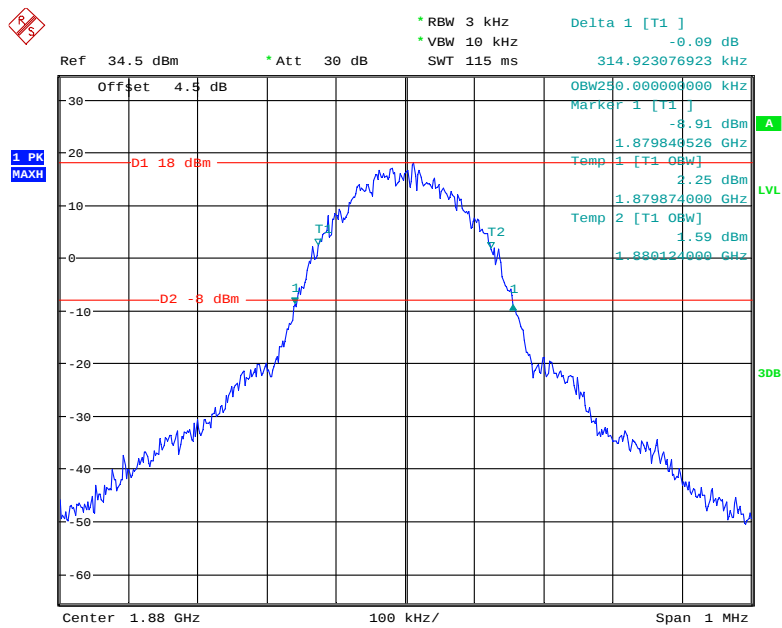
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EDGE 850 Cellular Band



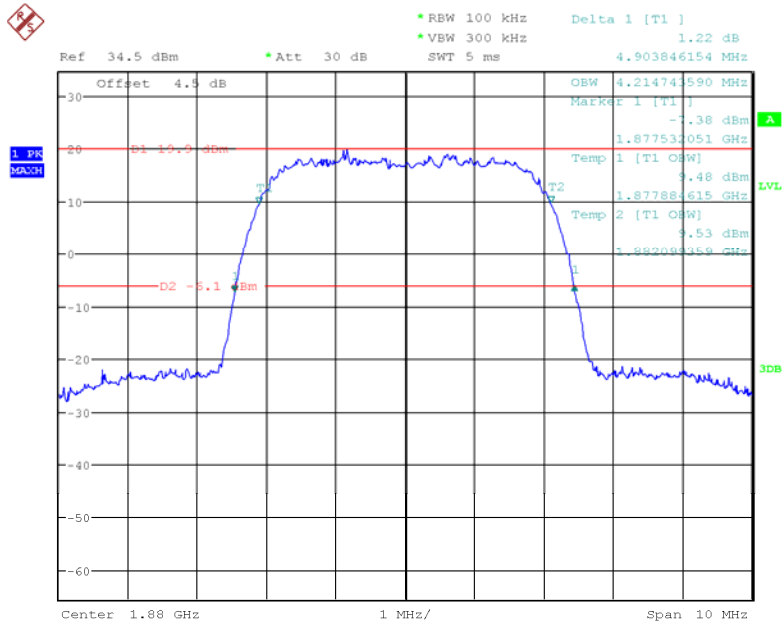
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EDGE PCS1900 Cellular Band



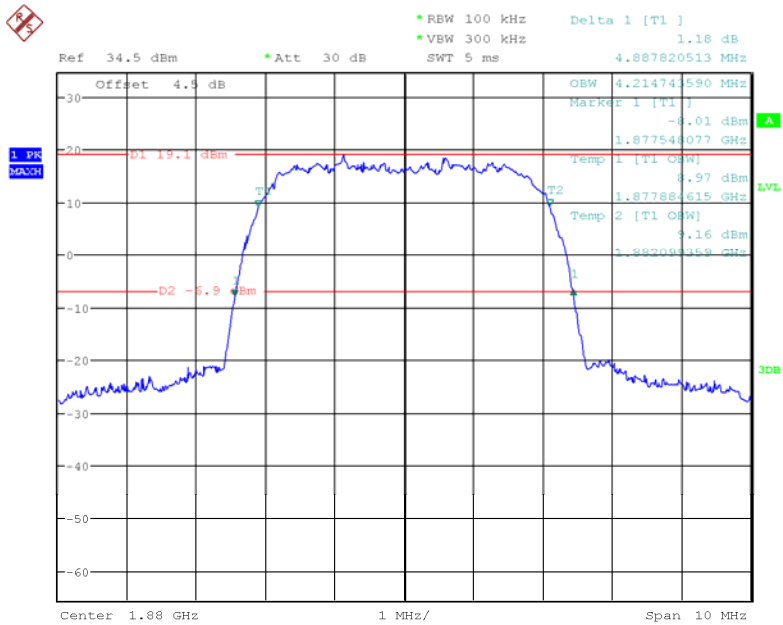
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WCDMA Band II, Rel 99



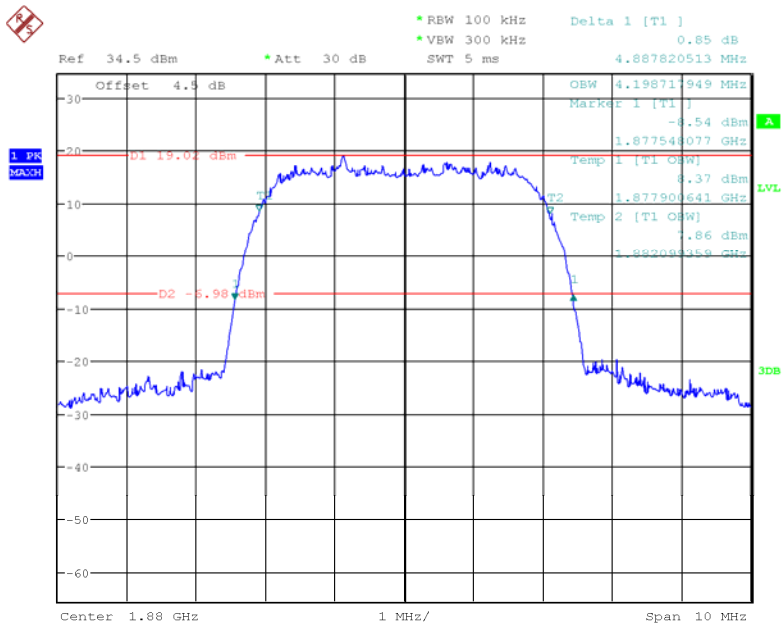
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WCDMA Band II, HSUPA



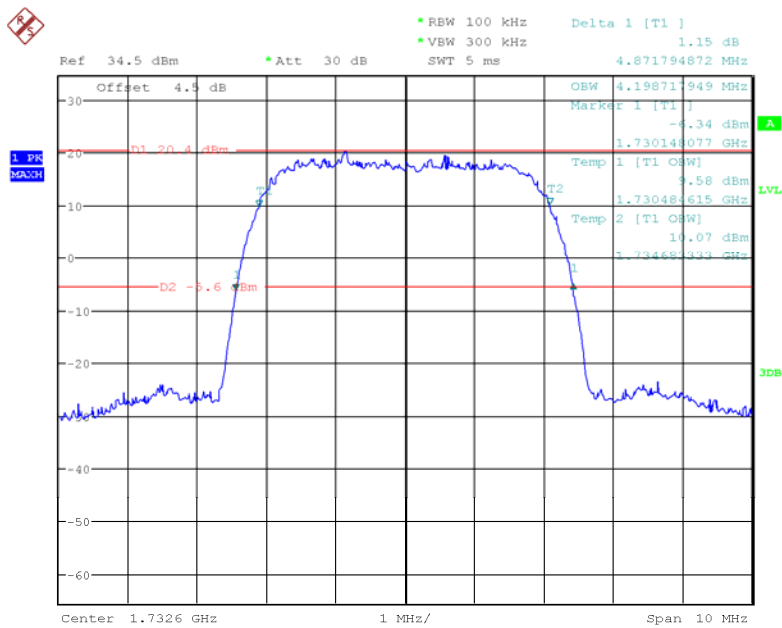
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WCDMA Band II, HSDPA



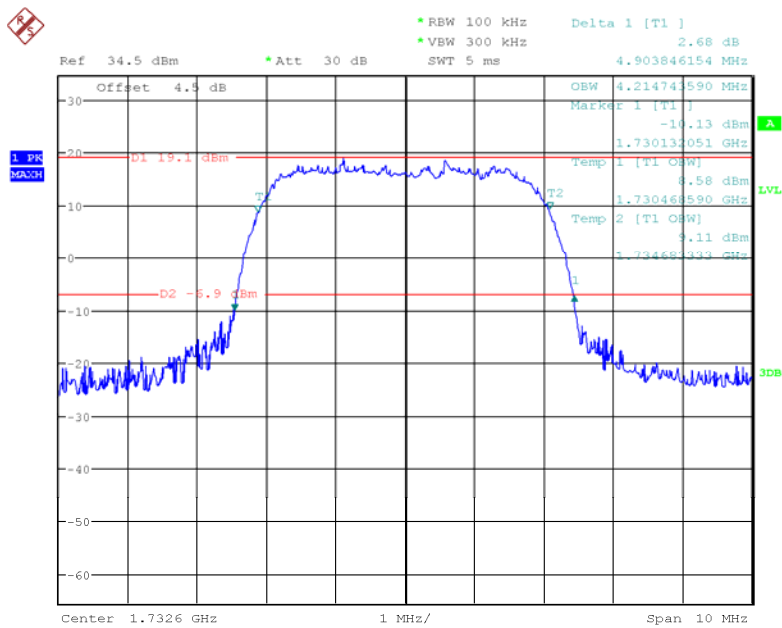
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WCDMA Band IV, Rel 99



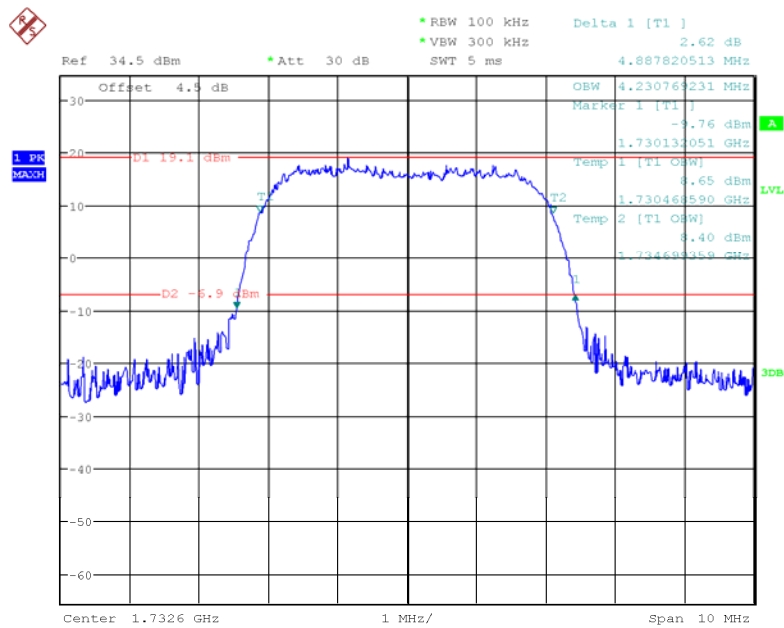
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WCDMA Band IV, HSDPA



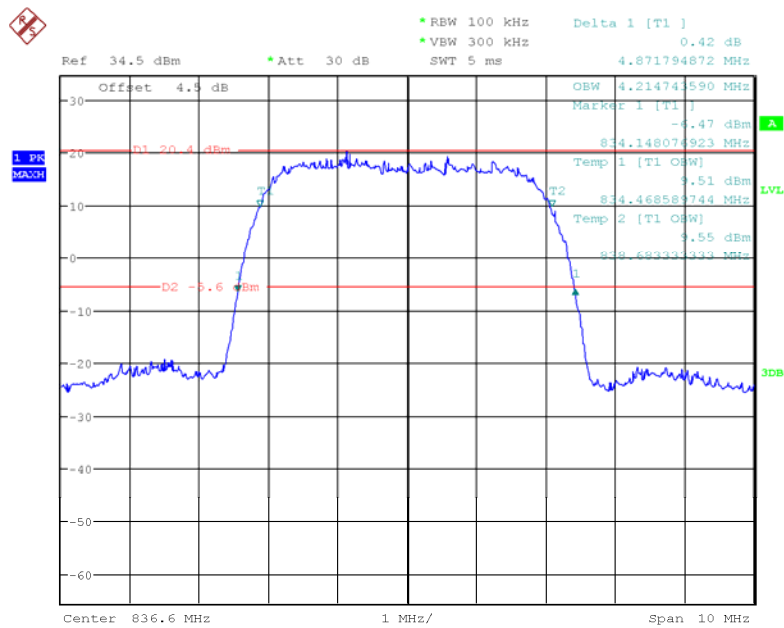
Date: 5.JAN.2019 14:10:20

WCDMA Band IV, HSUPA



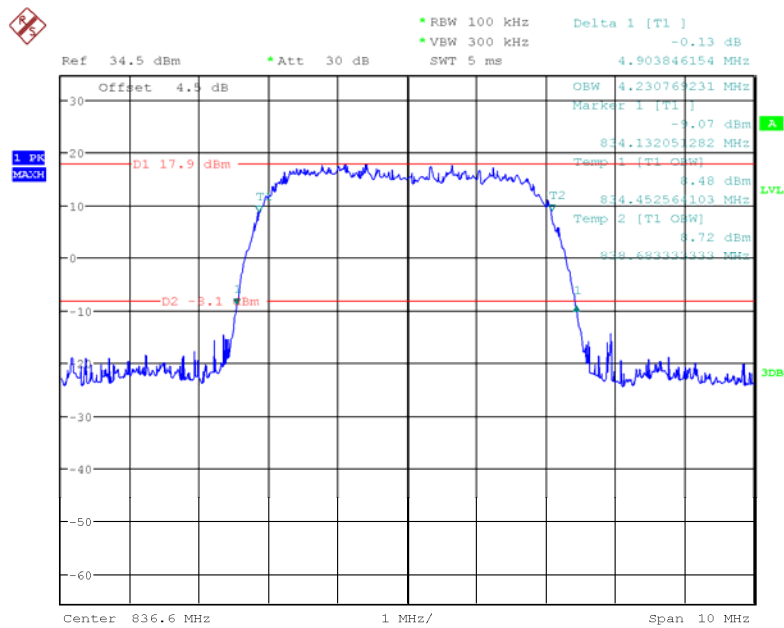
Date: 5.JAN.2019 14:17:39

WCDMA Band V, Rel 99



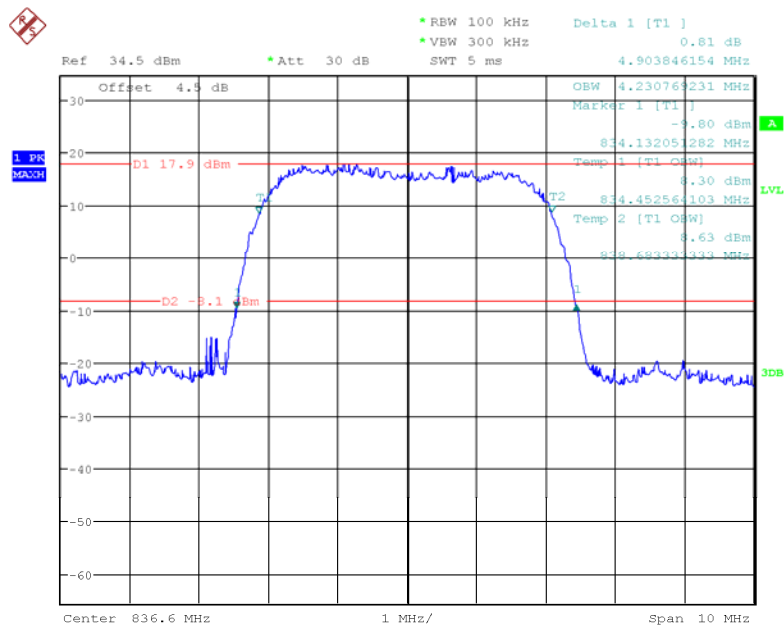
Date: 5.JAN.2019 14:03:55

WCDMA Band V, HSDPA



Date: 5.JAN.2019 14:14:58

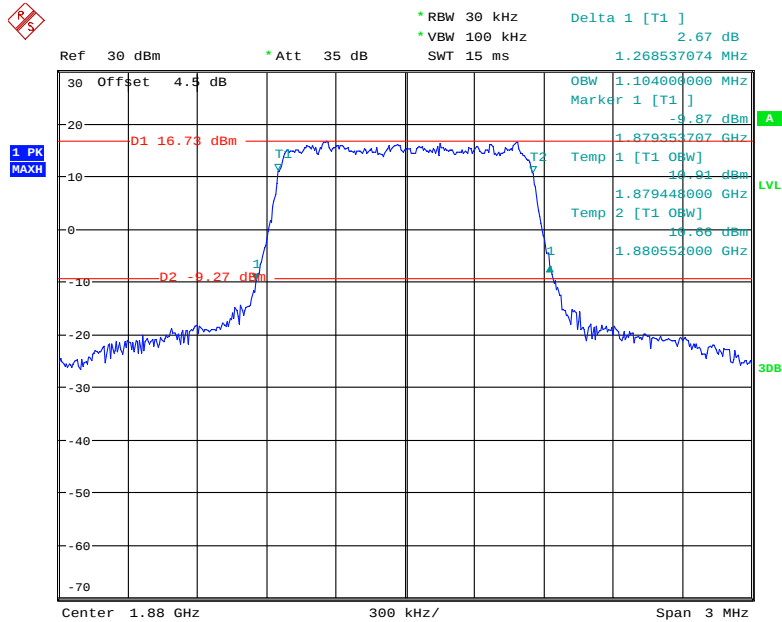
WCDMA Band V, HSUPA



Date: 5.JAN.2019 14:16:42

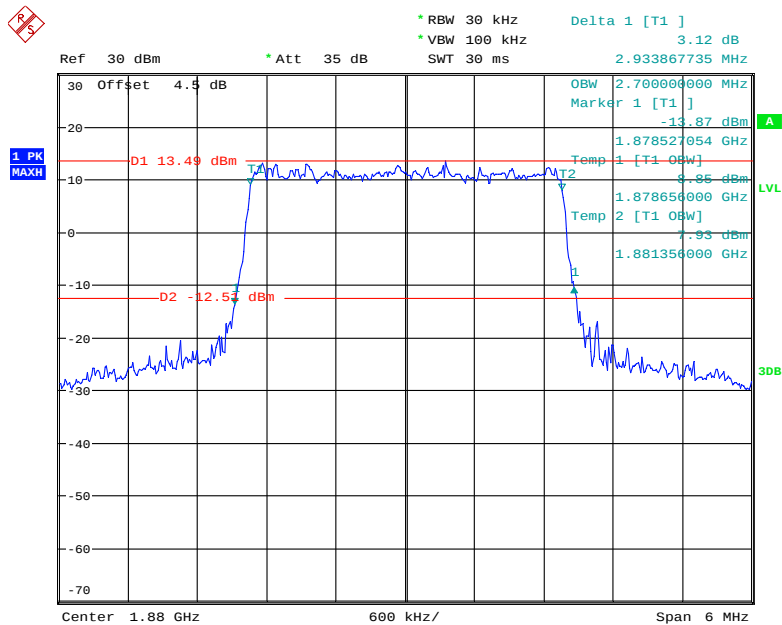
LTE Band 2

QPSK_1.4 MHz



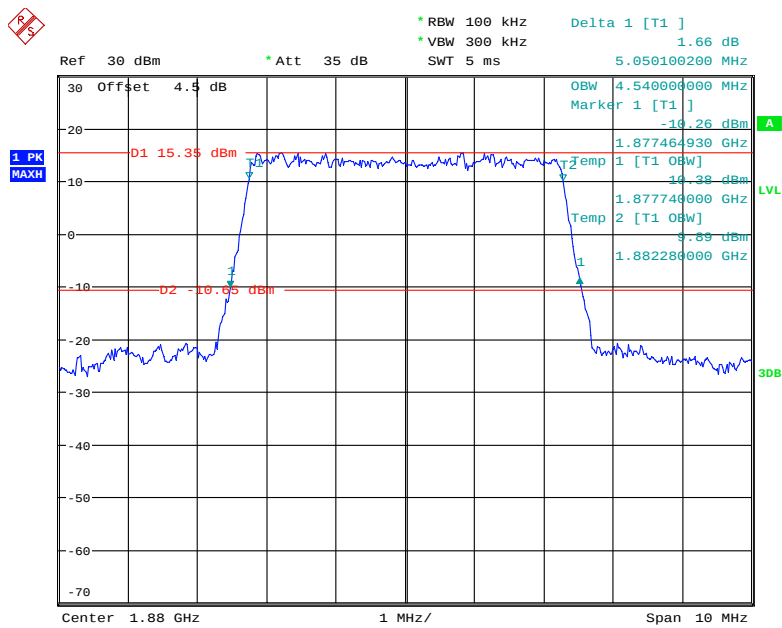
Date: 4.JAN.2019 11:58:01

QPSK_3 MHz



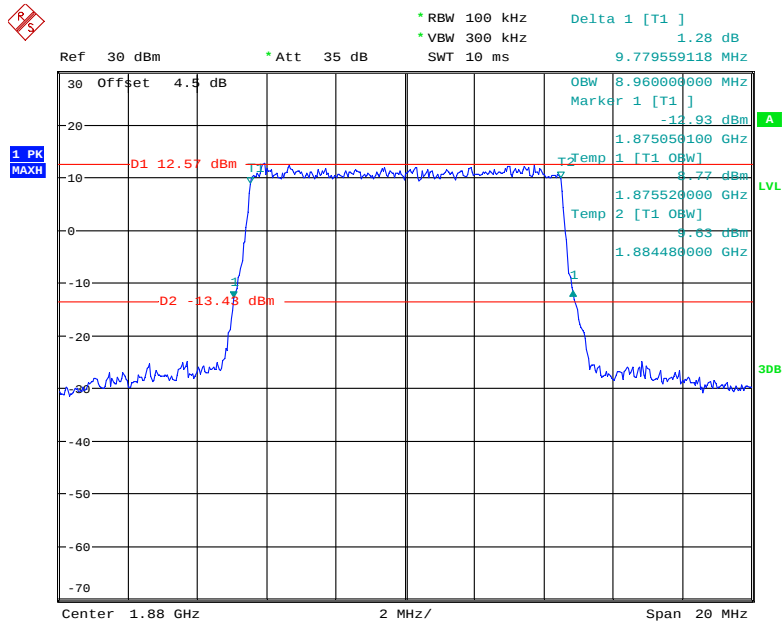
Date: 4.JAN.2019 11:59:10

QPSK_5 MHz



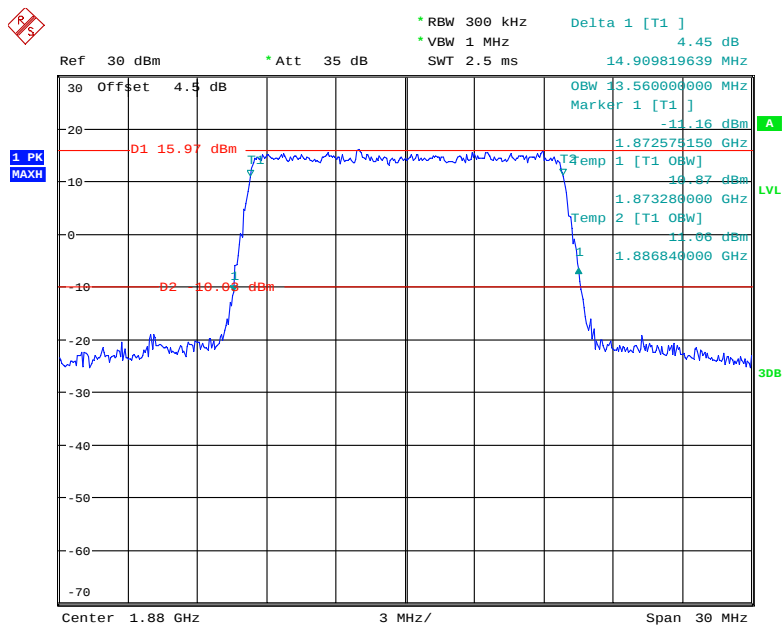
Date: 4.JAN.2019 12:00:19

QPSK_10 MHz



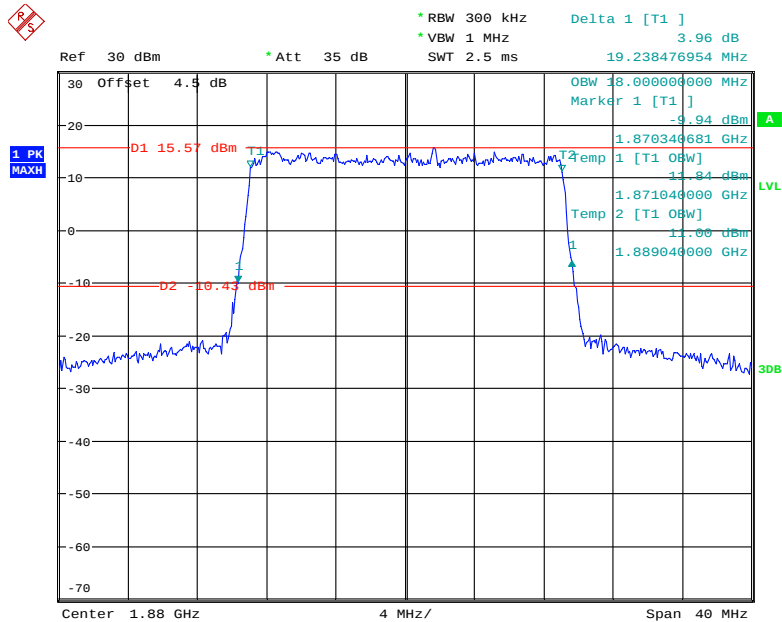
Date: 4.JAN.2019 12:01:40

QPSK_15 MHz



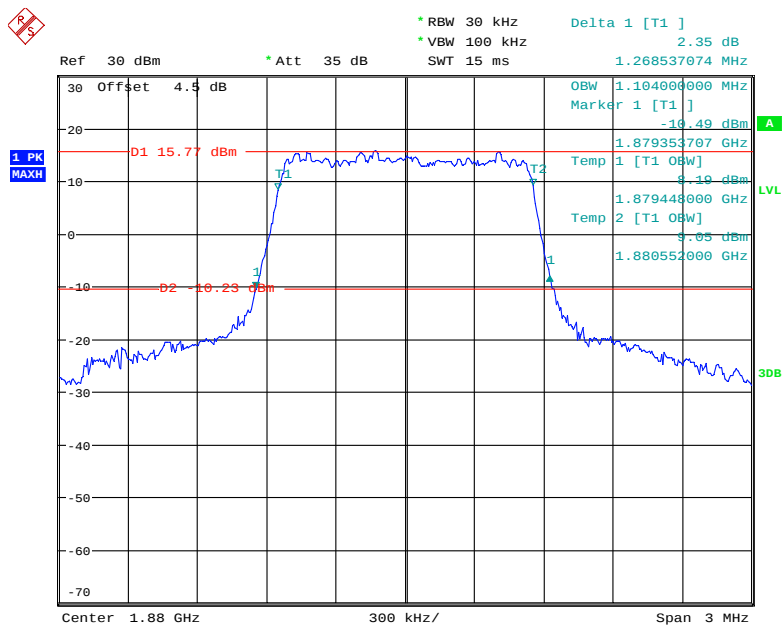
Date: 4.JAN.2019 12:03:01

QPSK_20 MHz



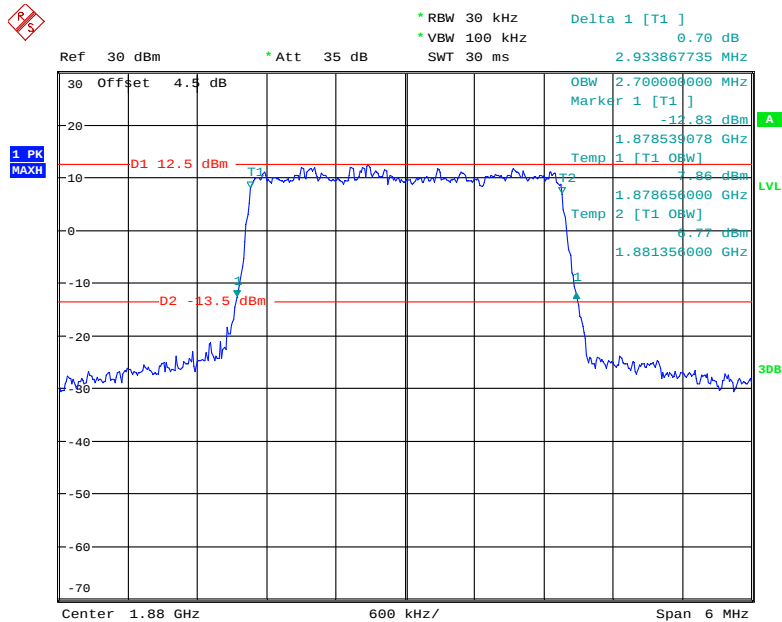
Date: 4.JAN.2019 12:04:27

16QAM_1.4 MHz



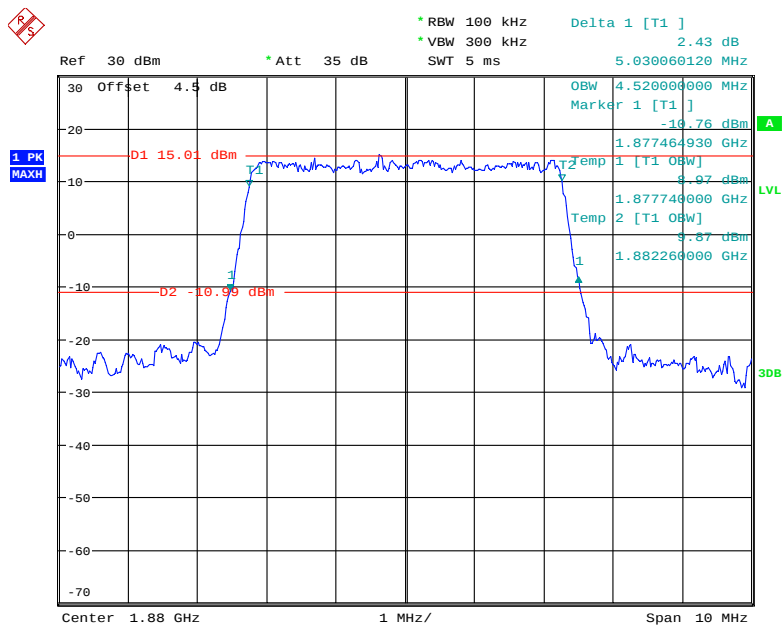
Date: 4.JAN.2019 11:58:36

16QAM_3 MHz



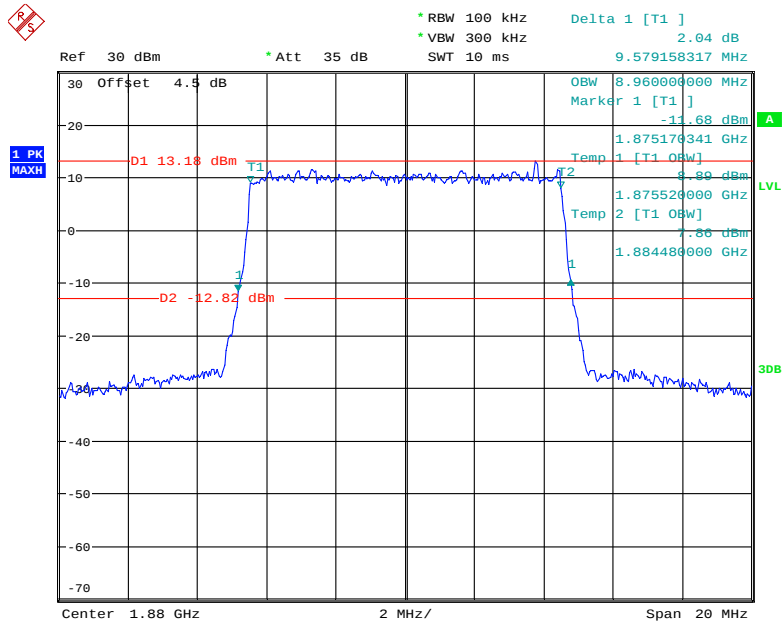
Date: 4.JAN.2019 11:59:40

16QAM_5 MHz



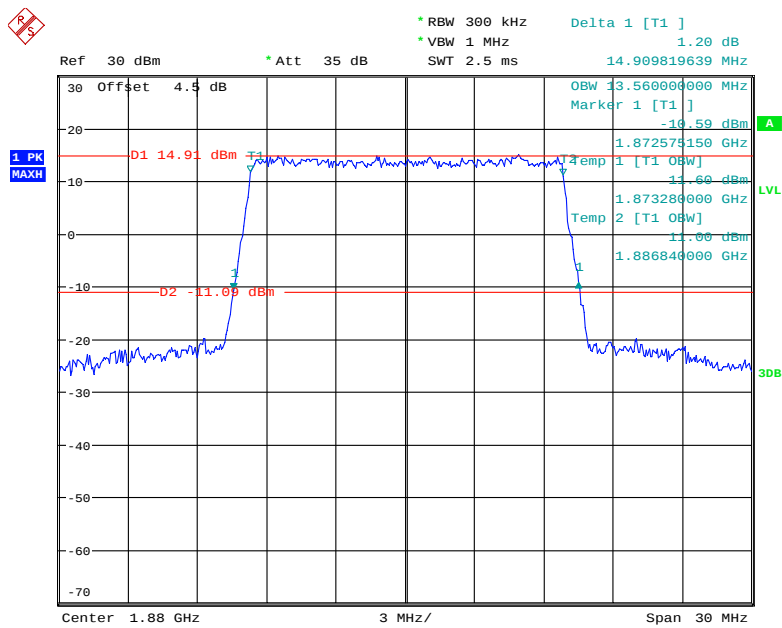
Date: 4.JAN.2019 12:01:06

16QAM_10 MHz



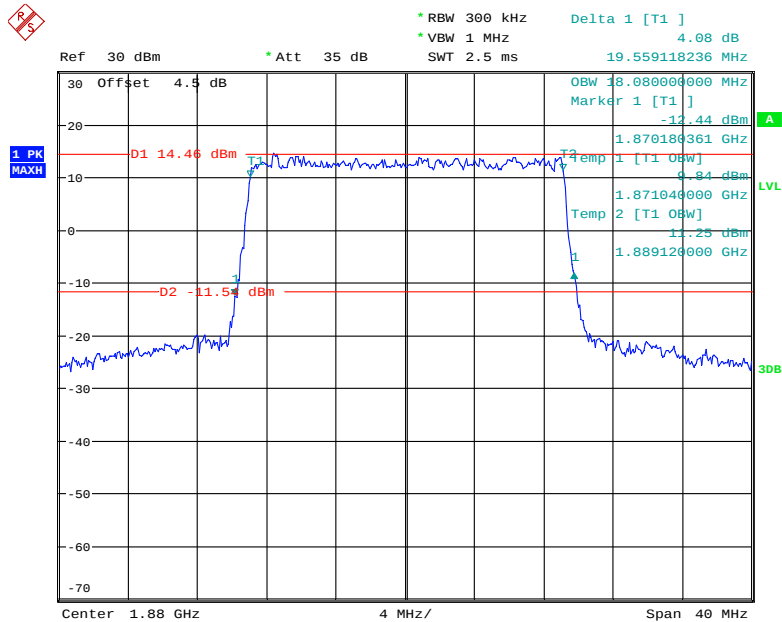
Date: 4.JAN.2019 12:02:20

16QAM_15 MHz



Date: 4.JAN.2019 12:03:45

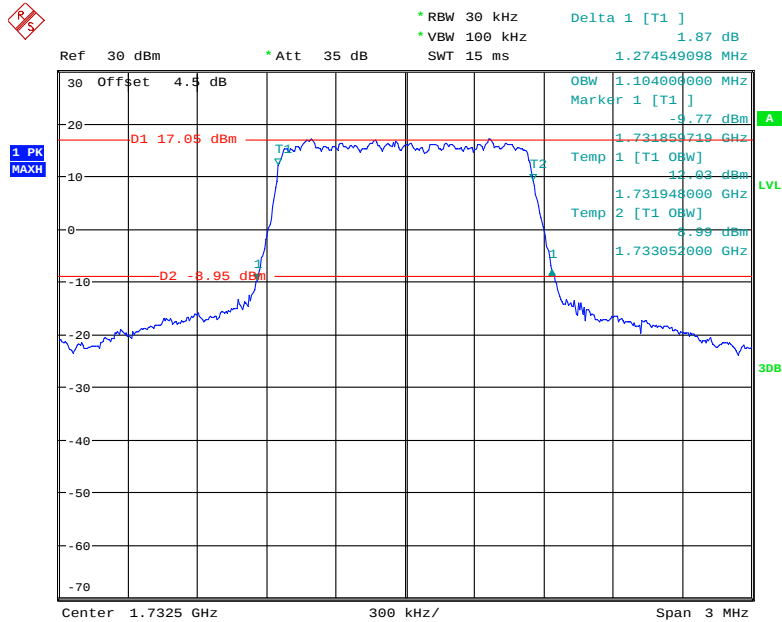
16QAM_20 MHz



Date: 4.JAN.2019 12:05:17

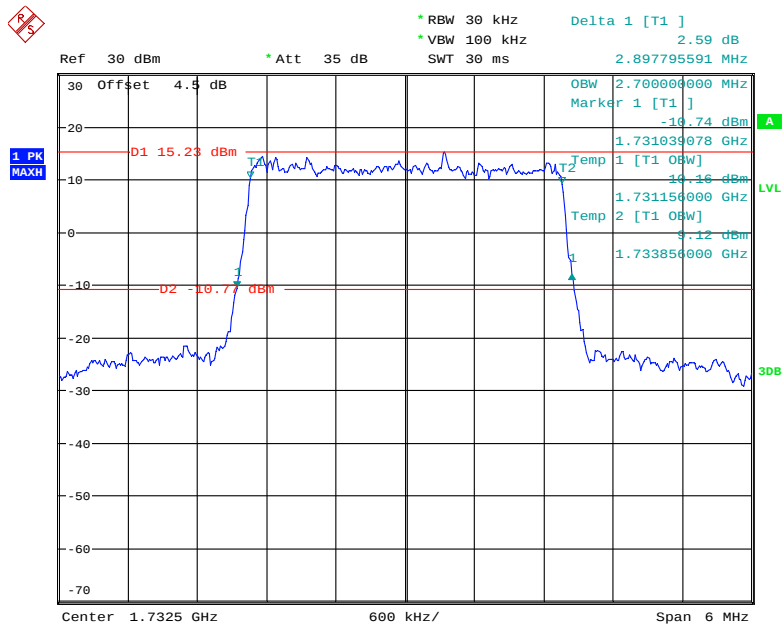
LTE Band 4

QPSK_1.4 MHz



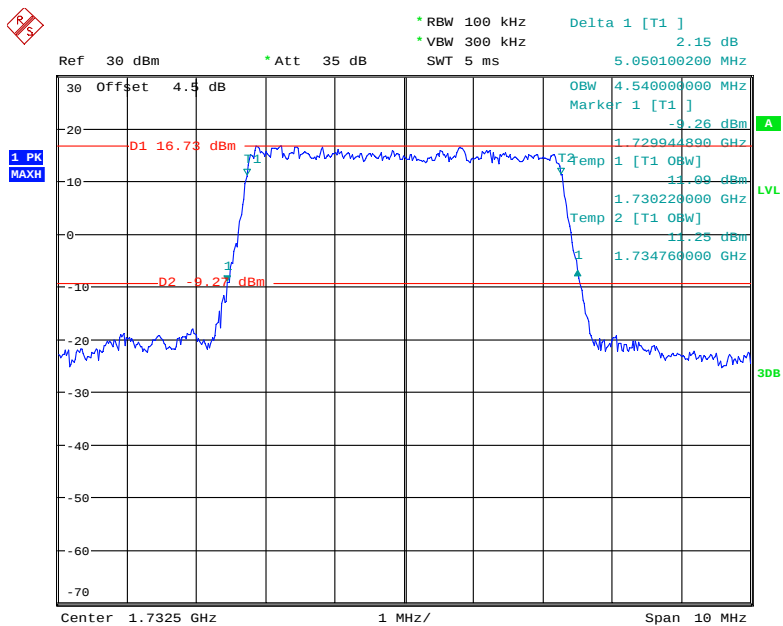
Date: 4.JAN.2019 12:06:02

QPSK_3 MHz



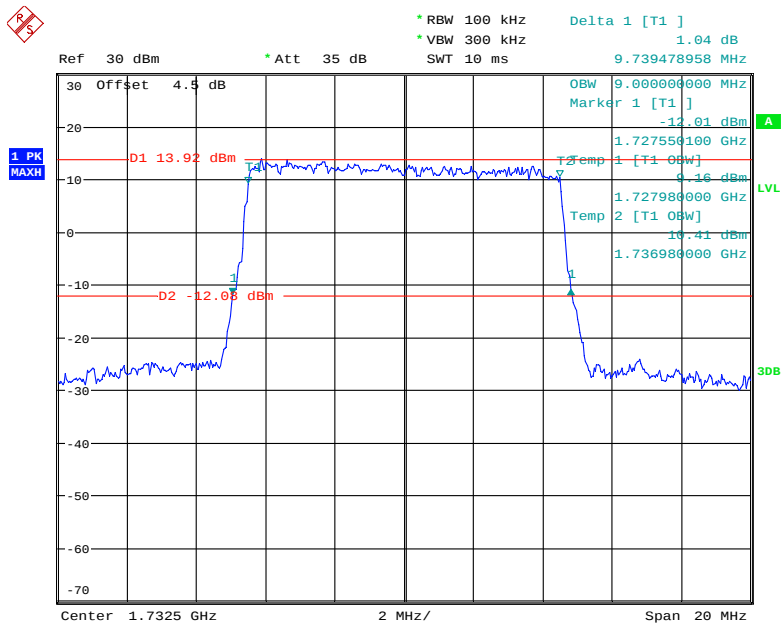
Date: 4.JAN.2019 12:07:04

QPSK_5 MHz



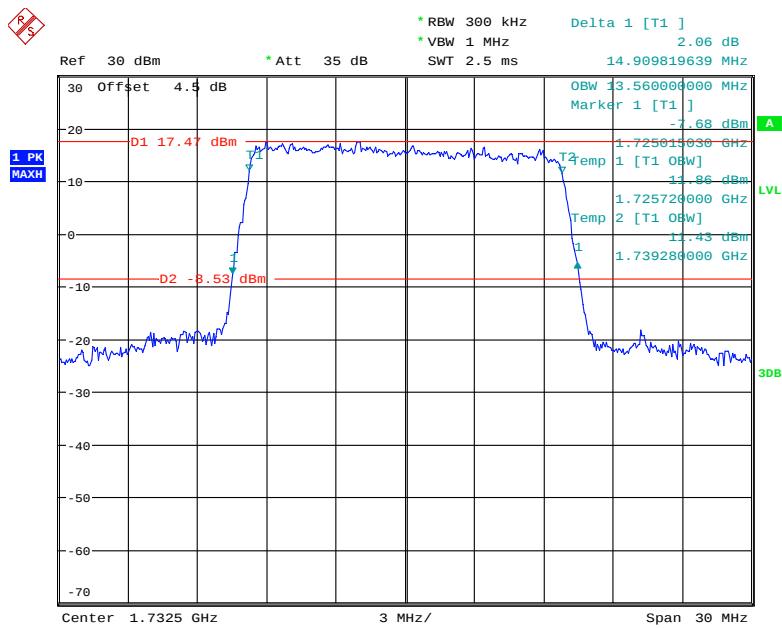
Date: 4.JAN.2019 12:08:21

QPSK_10 MHz



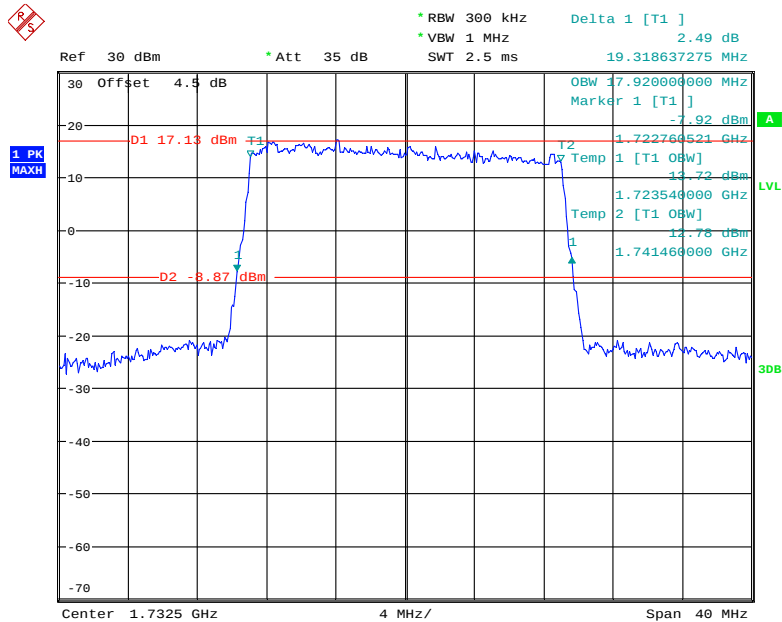
Date: 4.JAN.2019 12:09:32

QPSK_15 MHz



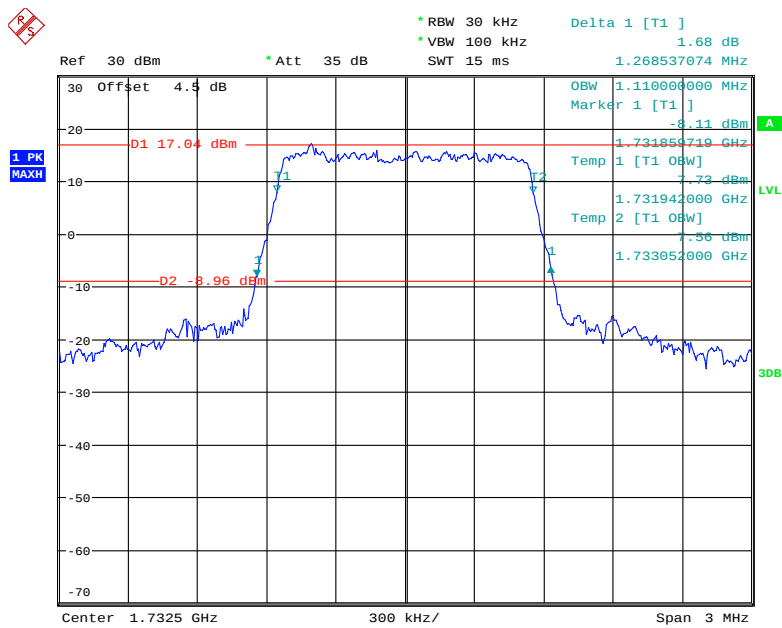
Date: 4.JAN.2019 12:10:57

QPSK_20 MHz



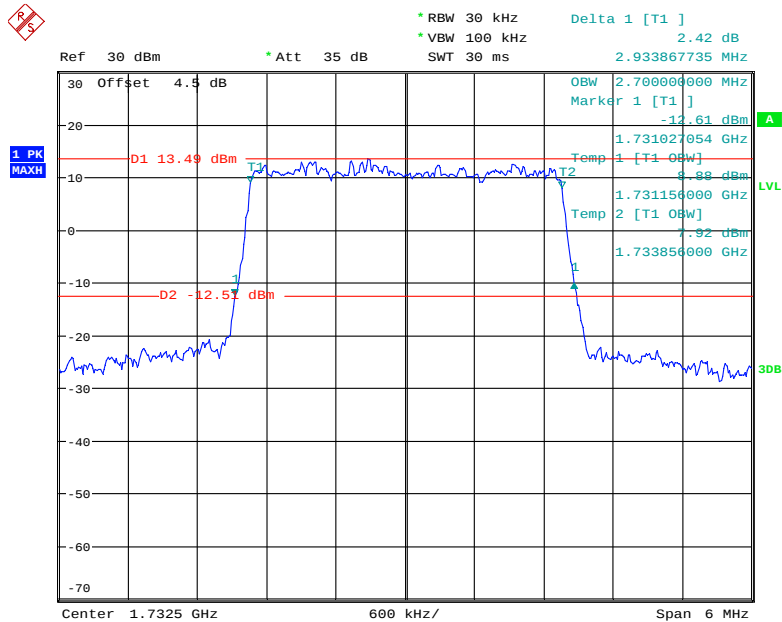
Date: 4.JAN.2019 12:12:33

16QAM_1.4 MHz



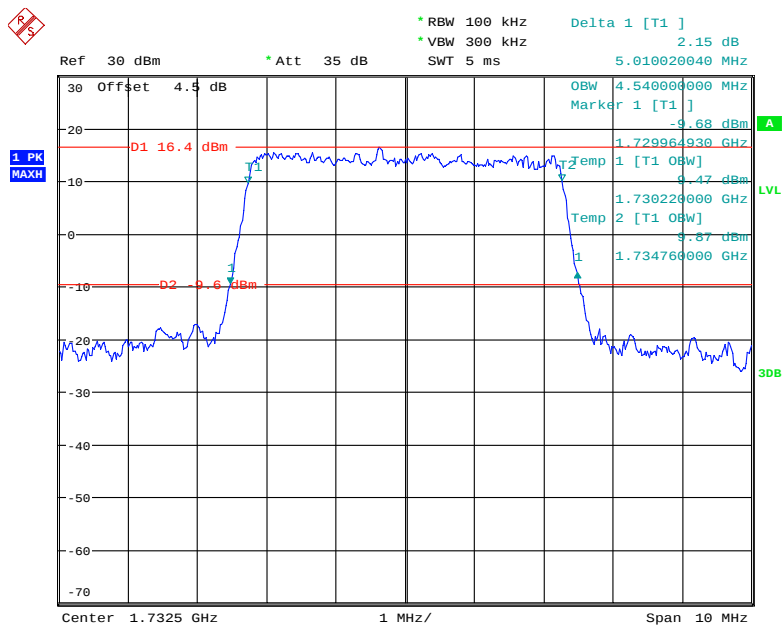
Date: 4.JAN.2019 12:06:30

16QAM_3 MHz



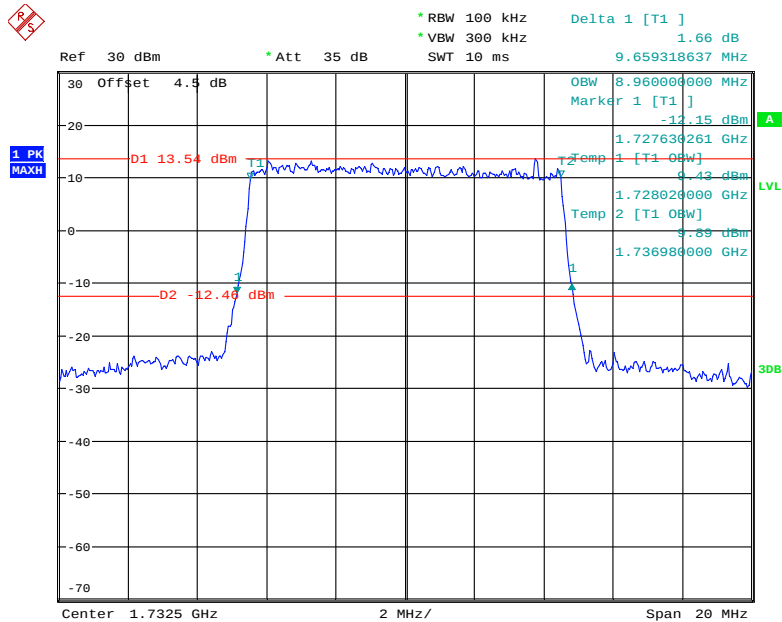
Date: 4.JAN.2019 12:07:39

16QAM_5 MHz



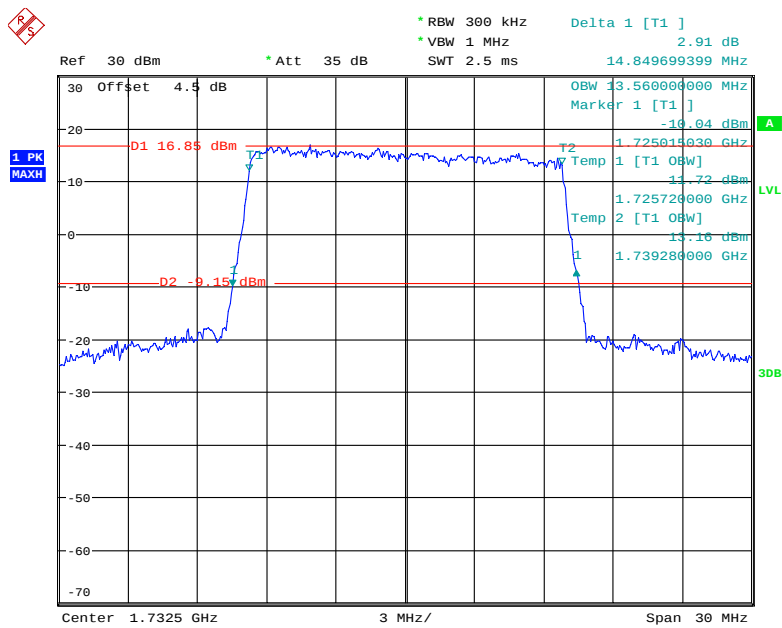
Date: 4.JAN.2019 12:08:57

16QAM_10 MHz



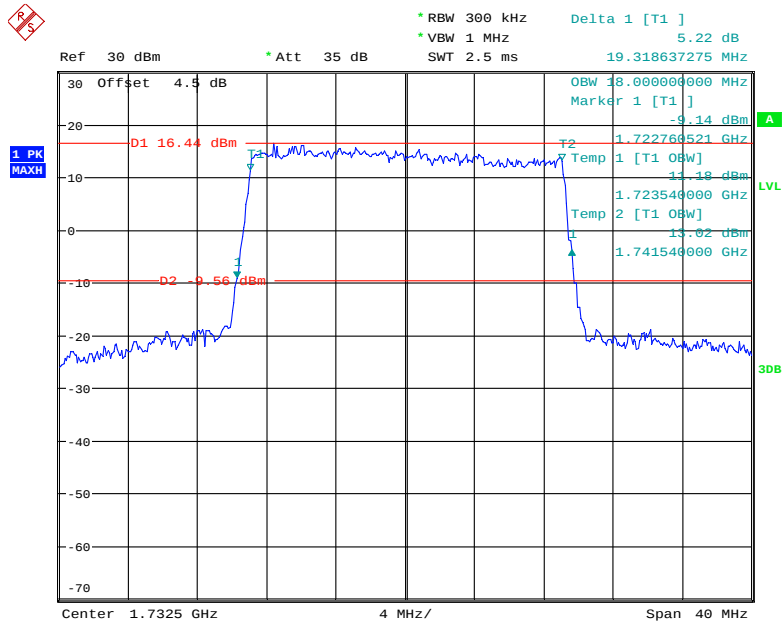
Date: 4.JAN.2019 12:10:11

16QAM_15 MHz



Date: 4.JAN.2019 12:11:43

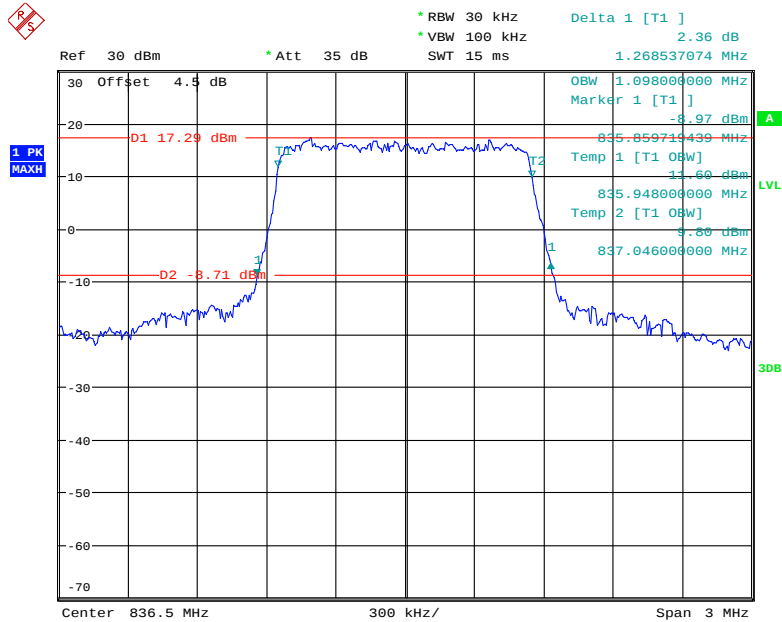
16QAM_20 MHz



Date: 4.JAN.2019 12:13:23

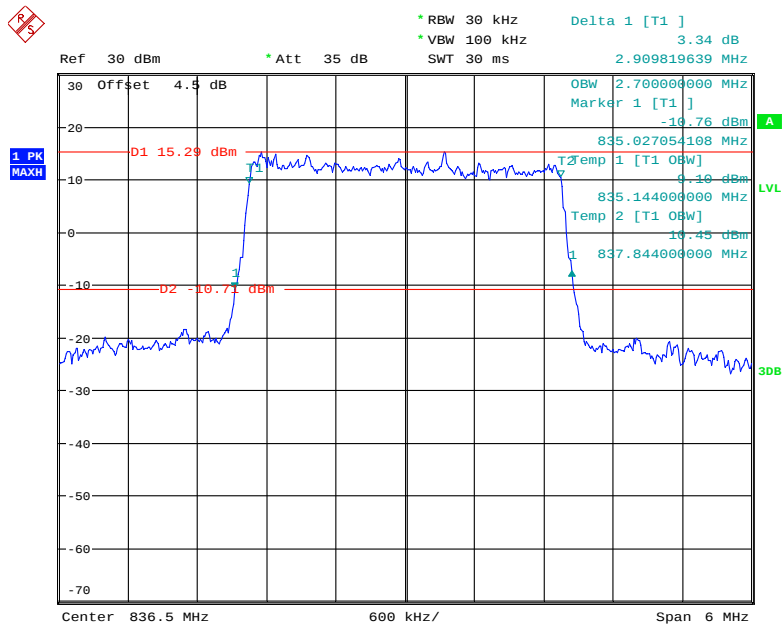
LTE Band 5:

QPSK_1.4 MHz



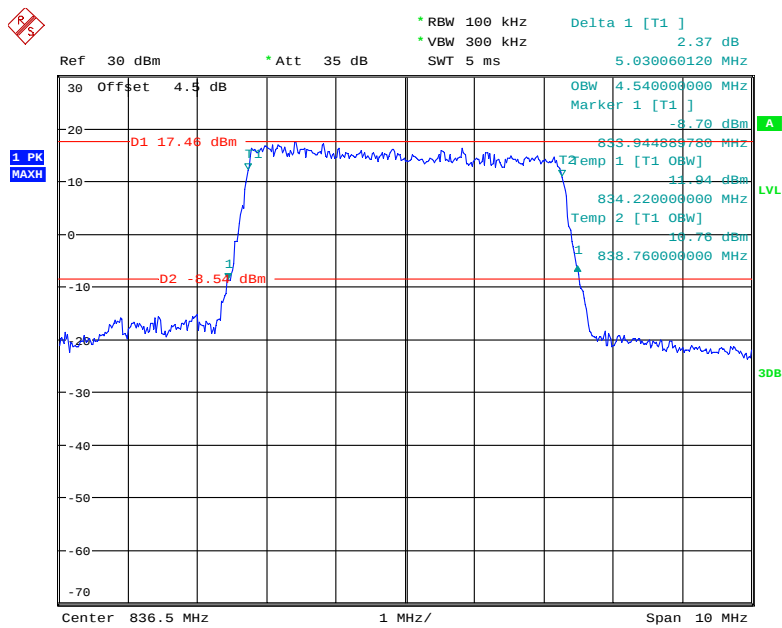
Date: 4.JAN.2019 12:14:05

QPSK_3 MHz



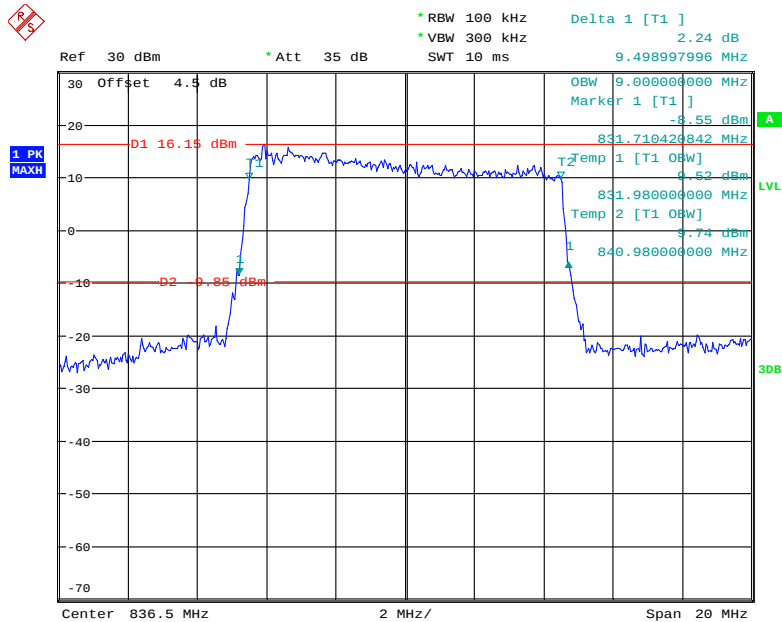
Date: 4.JAN.2019 12:15:14

QPSK_5 MHz

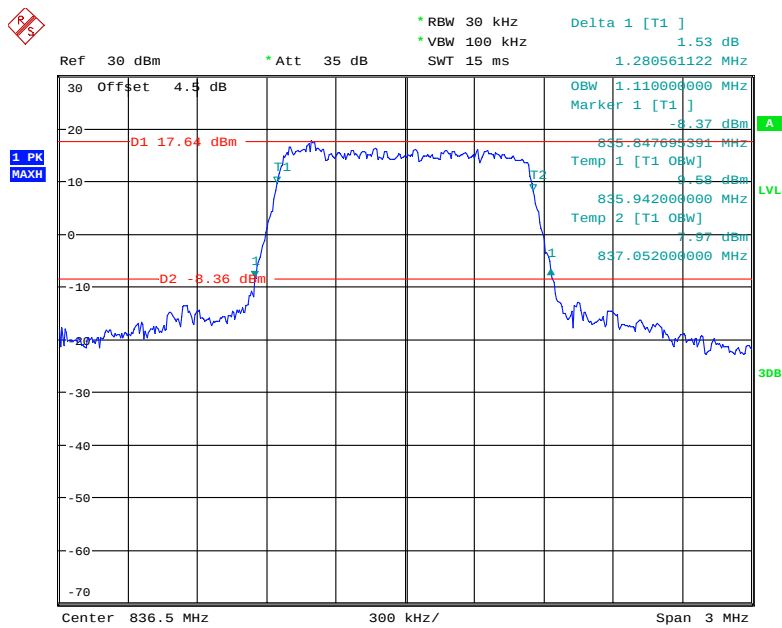


Date: 4.JAN.2019 12:16:37

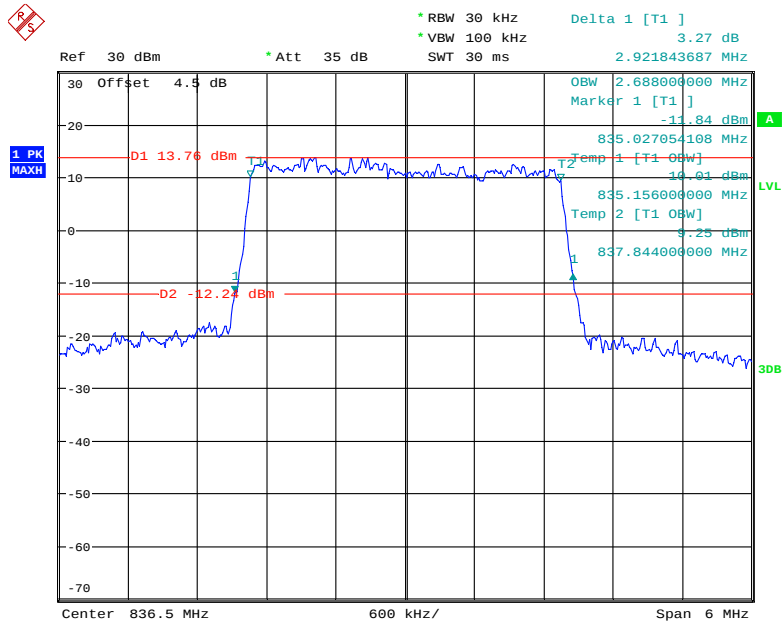
QPSK_10 MHz



Date: 4.JAN.2019 12:18:03

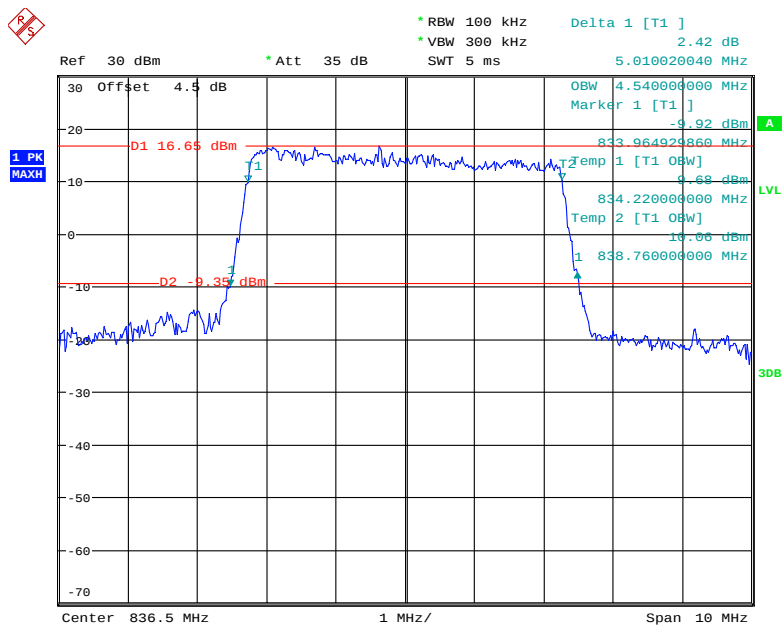
16QAM_1.4 MHz

Date: 4.JAN.2019 12:14:44

16QAM_3 MHz

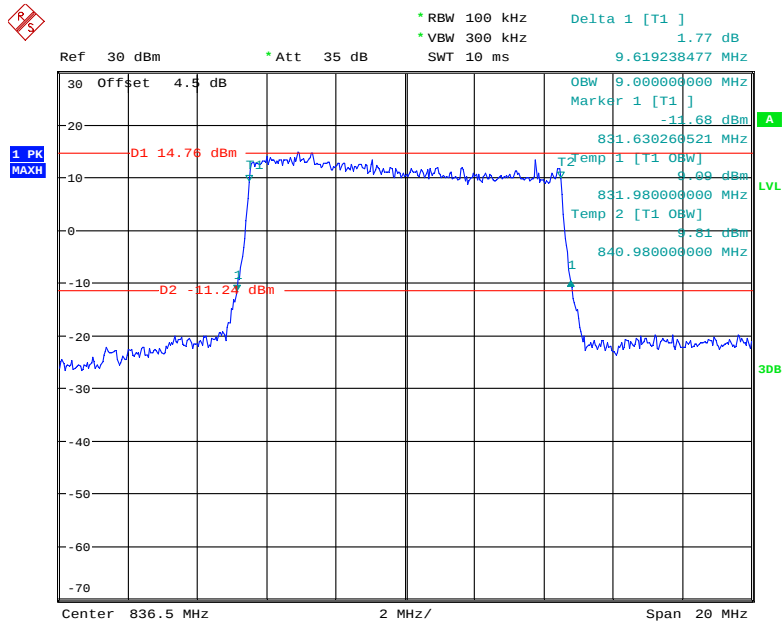
Date: 4.JAN.2019 12:15:48

16QAM_5 MHz

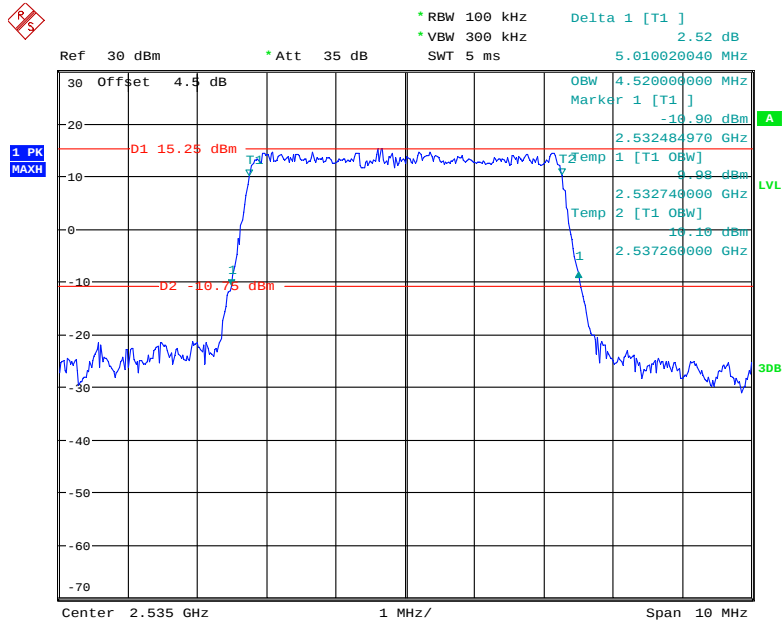


Date: 4.JAN.2019 12:17:21

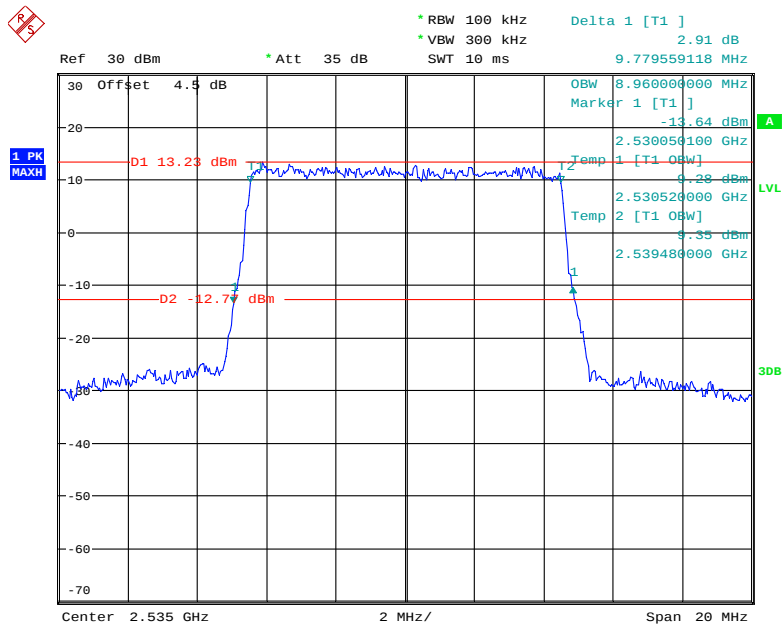
16QAM_10 MHz



Date: 4.JAN.2019 12:18:50

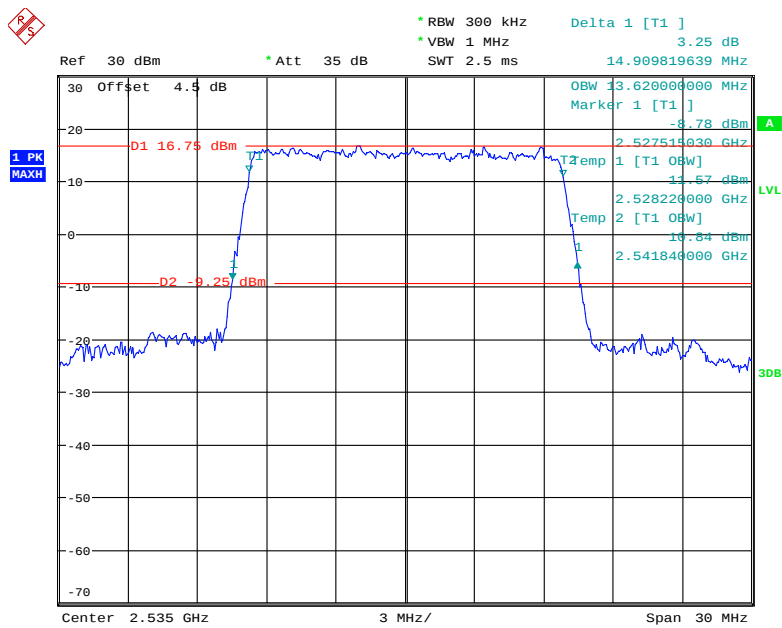
LTE Band 7:**QPSK_5 MHz**

Date: 4.JAN.2019 12:20:16

QPSK_10 MHz

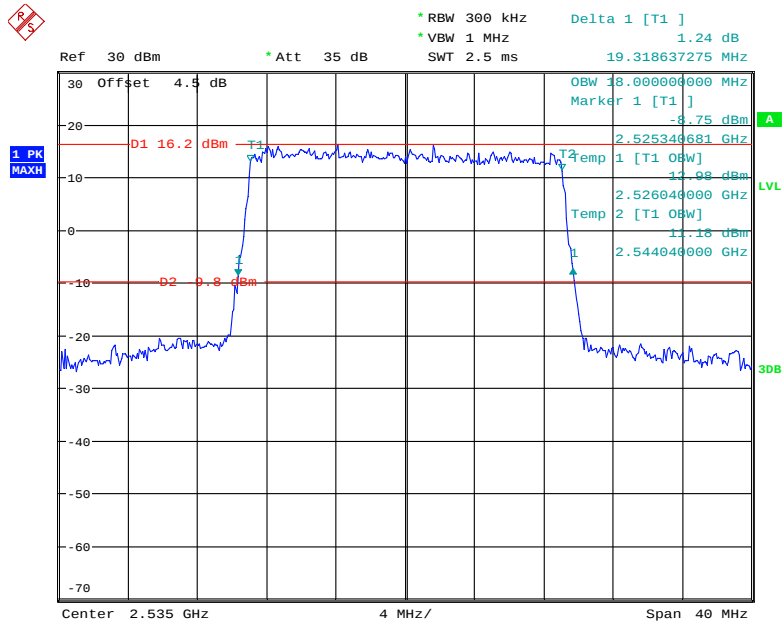
Date: 4.JAN.2019 12:21:42

QPSK_15 MHz



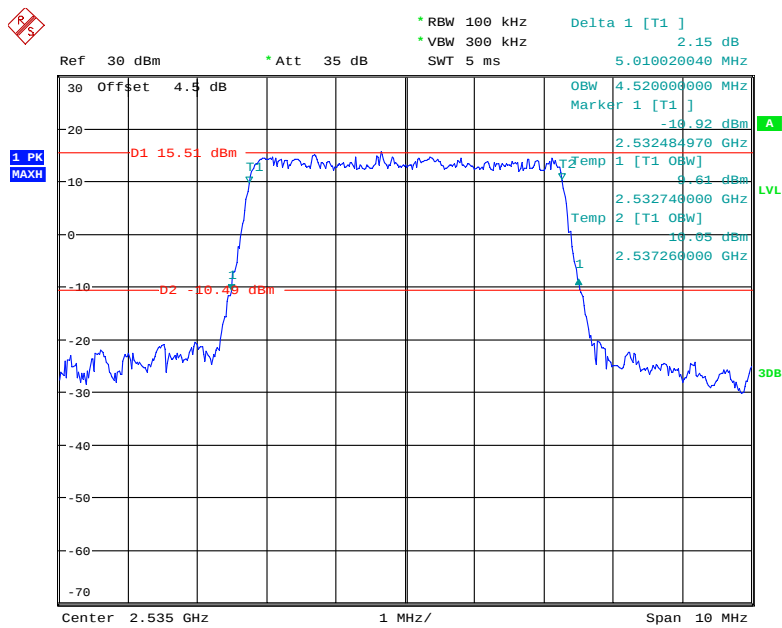
Date: 4.JAN.2019 12:23:11

QPSK_20 MHz



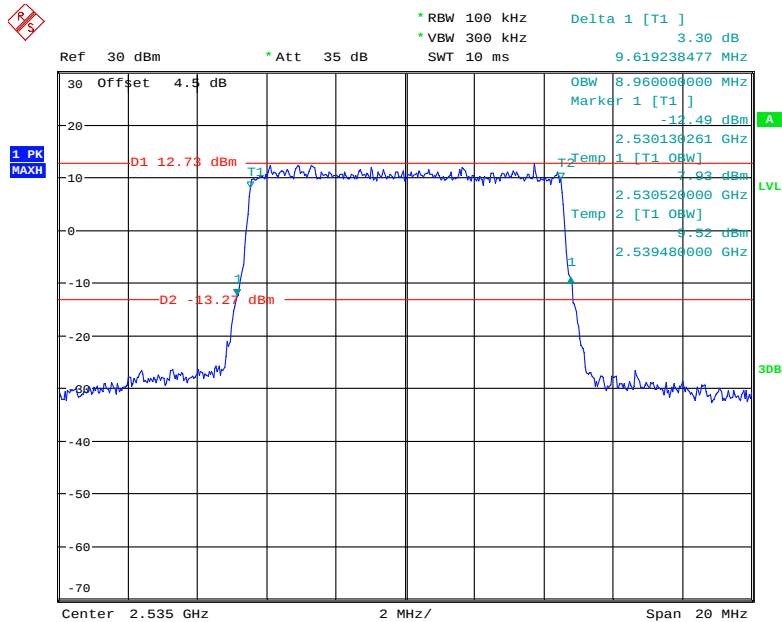
Date: 4.JAN.2019 12:24:39

16QAM_5 MHz



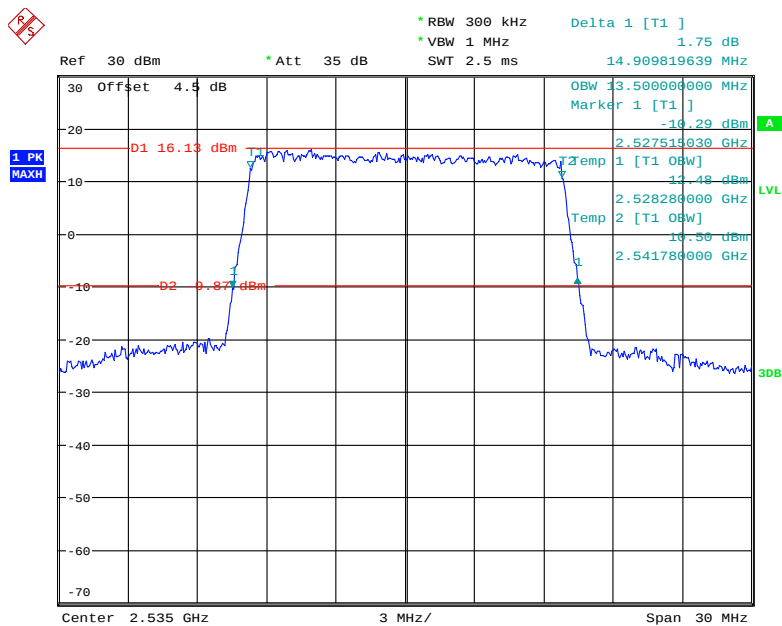
Date: 4.JAN.2019 12:21:03

16QAM_10 MHz



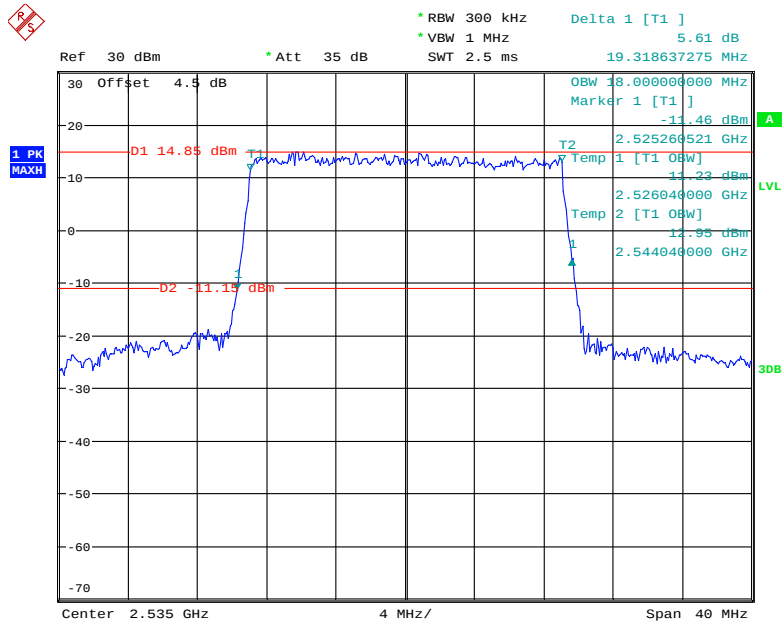
Date: 4.JAN.2019 12:22:14

16QAM_15 MHz

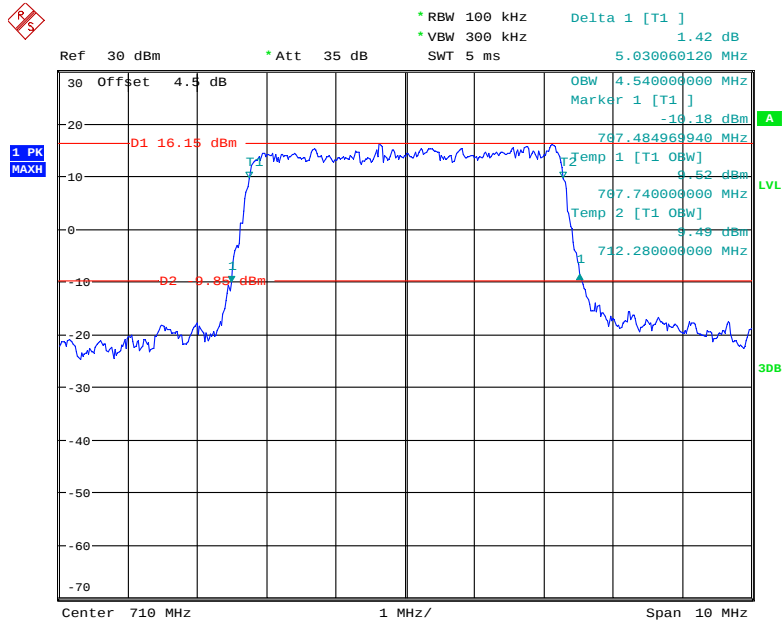


Date: 4.JAN.2019 12:23:54

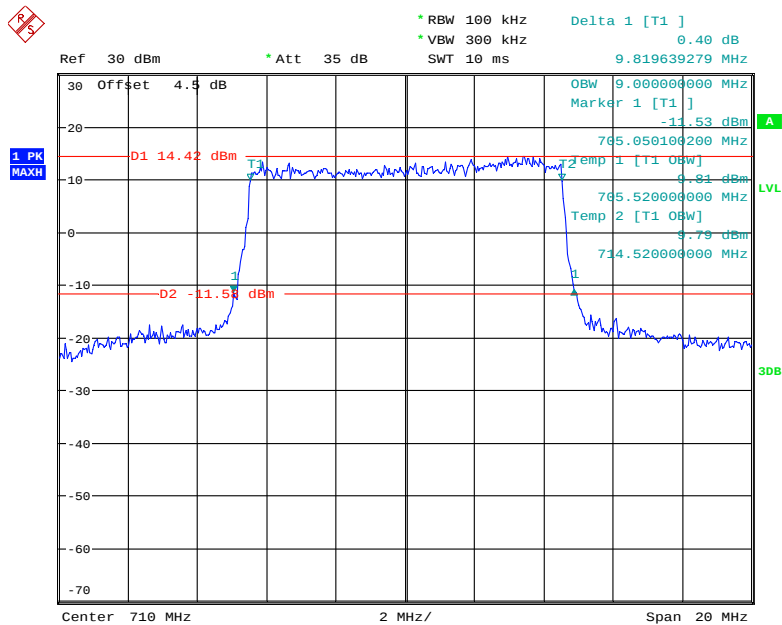
16QAM_20 MHz



Date: 4.JAN.2019 12:25:22

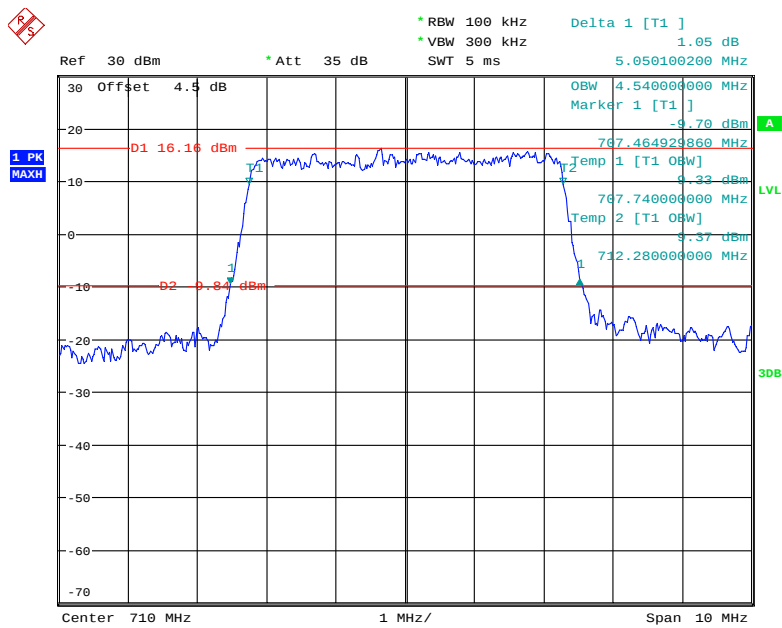
LTE Band 17:**QPSK_5 MHz**

Date: 4.JAN.2019 12:26:22

QPSK_10 MHz

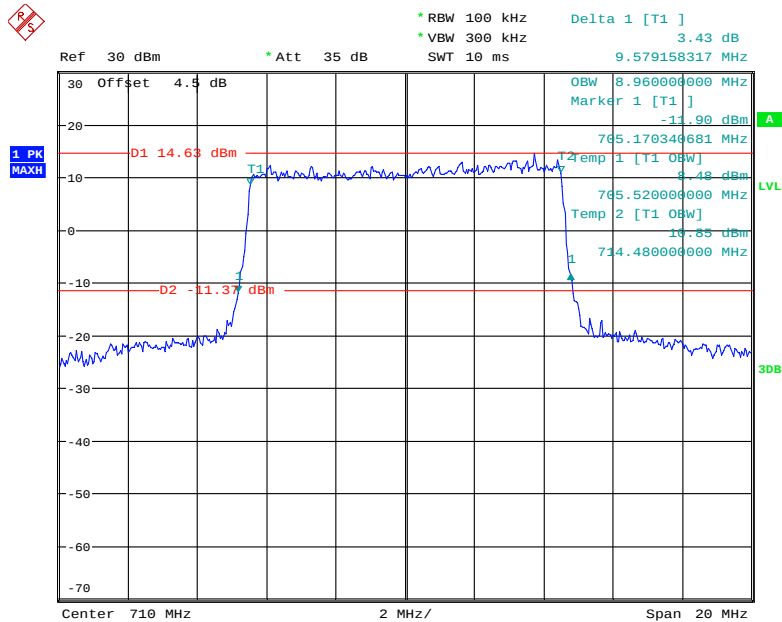
Date: 4.JAN.2019 12:27:33

16QAM_5 MHz



Date: 4.JAN.2019 12:26:58

16QAM_10 MHz



Date: 4.JAN.2019 12:28:12

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

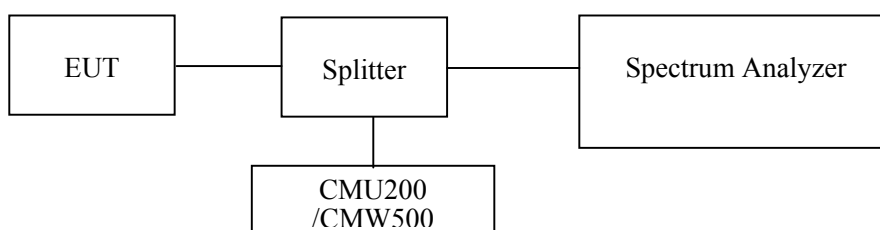
FCC §2.1051, §22.917(a) , §24.238(a) and §27.53.

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
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

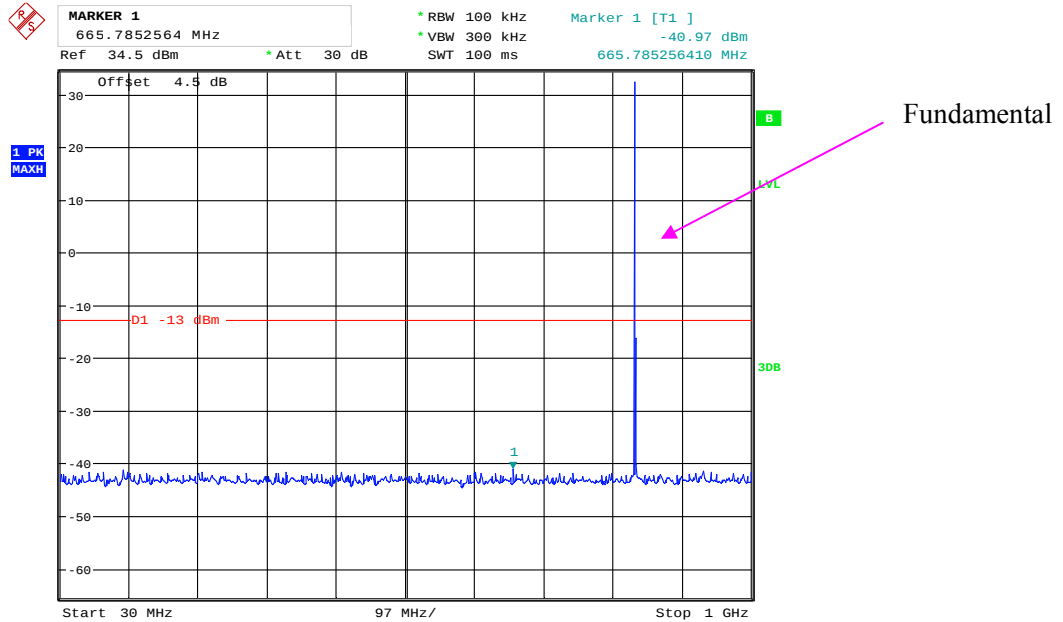
Environmental Conditions

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

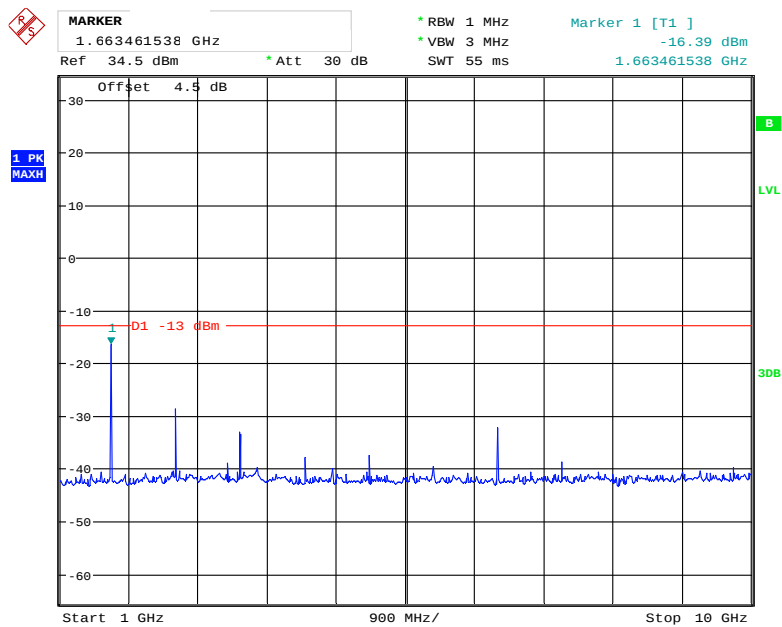
The testing was performed by Elena Lei from 2019-01-04 to 2019-01-05.

Please refer to the following plots.

GSM850_Middle Channel

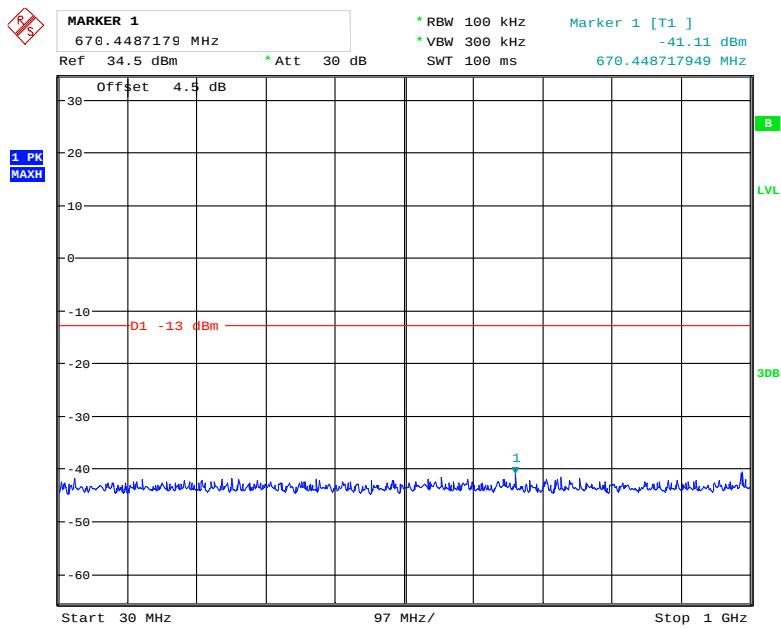


Date: 5.JAN.2019 11:14:55



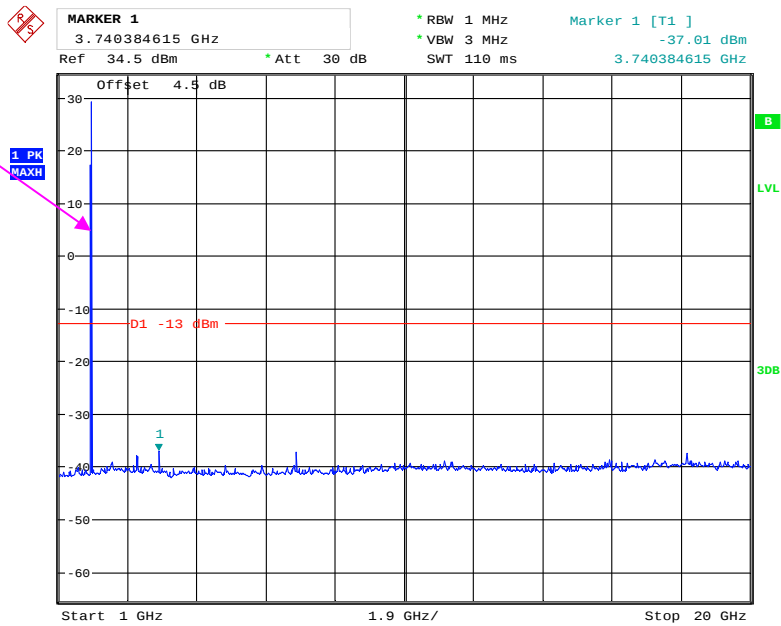
Date: 5.JAN.2019 11:13:34

PCS 1900_ Middle Channel



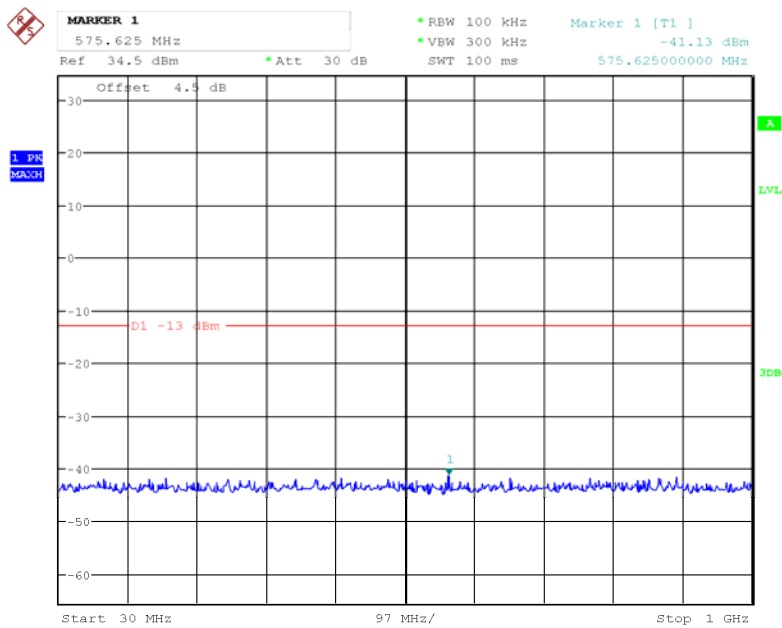
Date: 5.JAN.2019 11:09:59

Fundamental



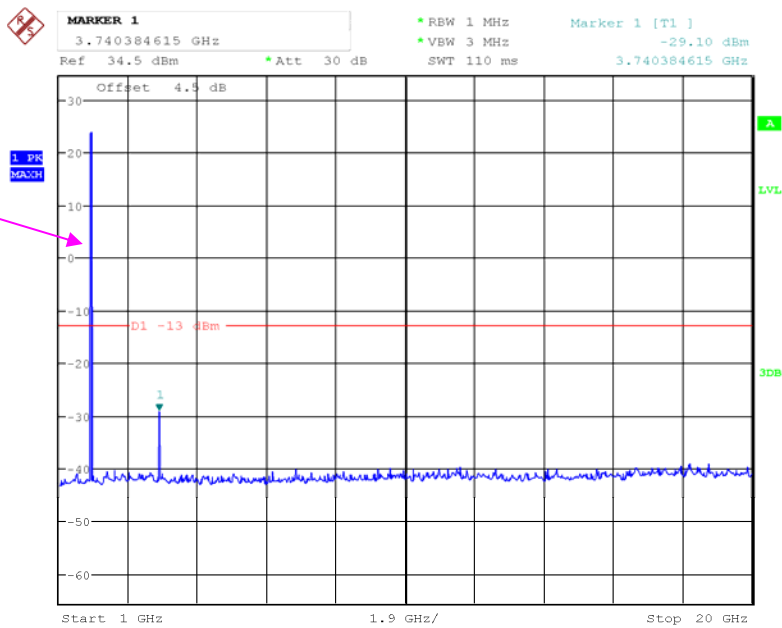
Date: 5.JAN.2019 11:12:43

WCDMA Band II, Rel99



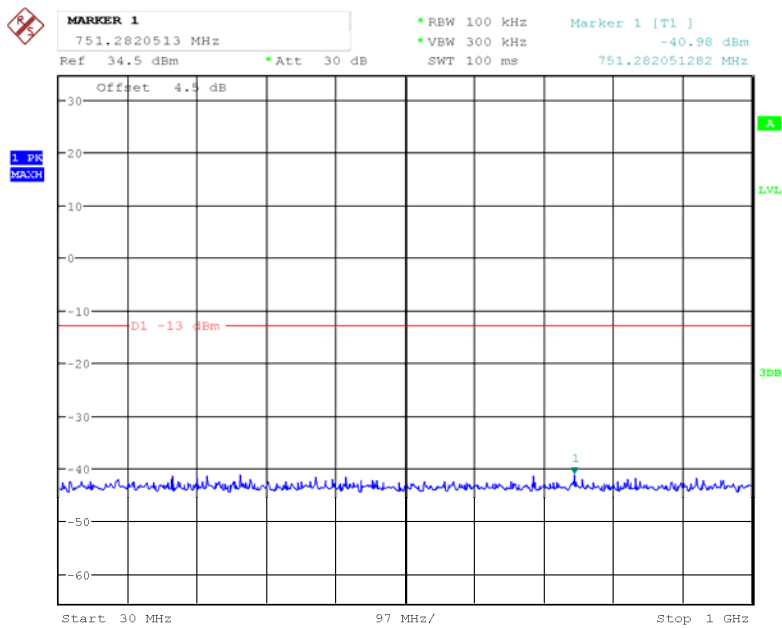
Date: 5.JAN.2019 13:58:54

Fundamental



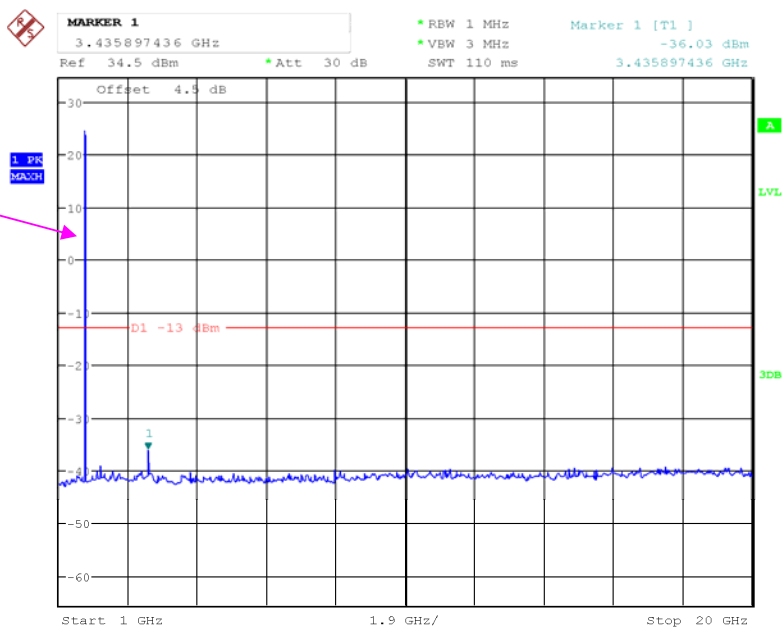
Date: 5.JAN.2019 13:58:25

WCDMA Band IV,Rel99



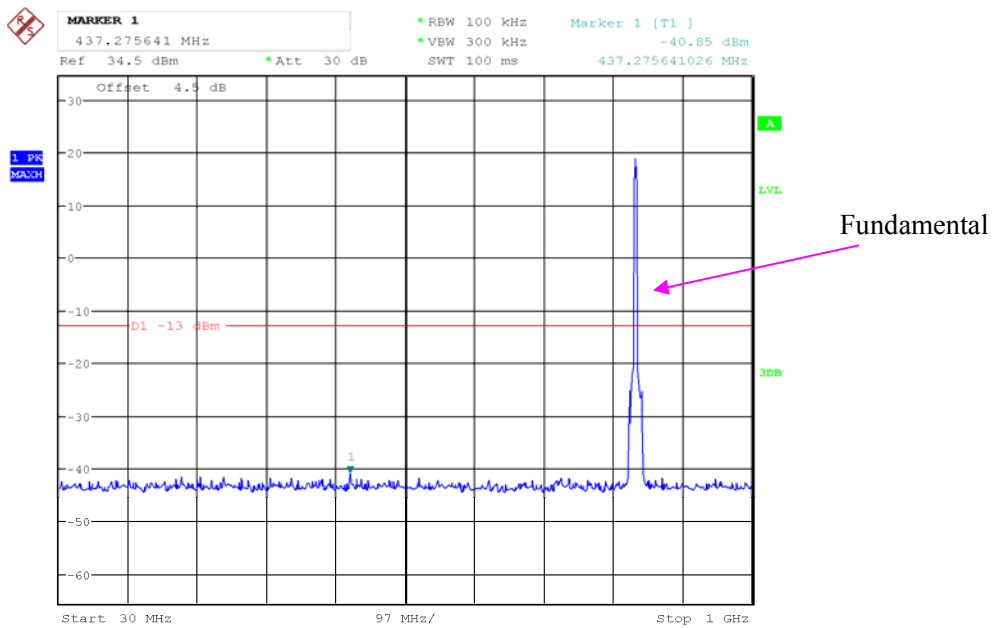
Date: 5.JAN.2019 13:56:28

Fundamental

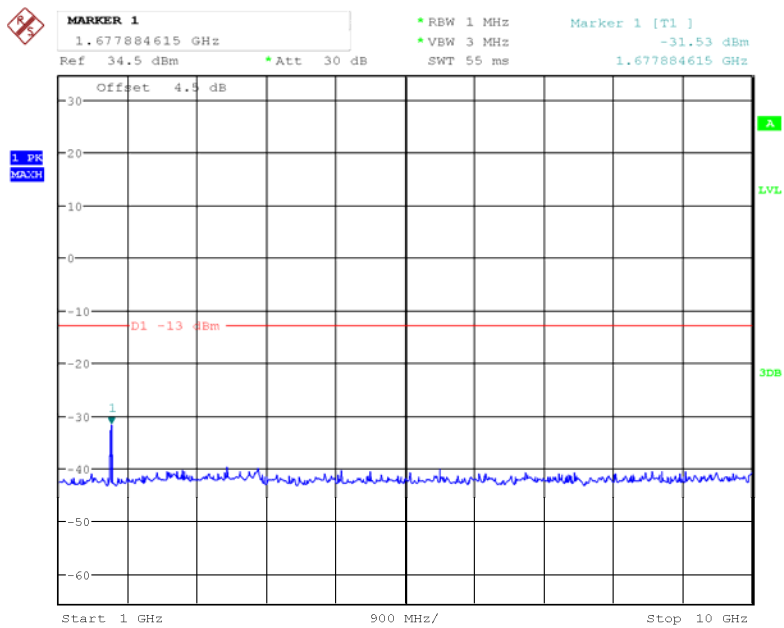


Date: 5.JAN.2019 13:55:51

WCDMA Band V, Rel99

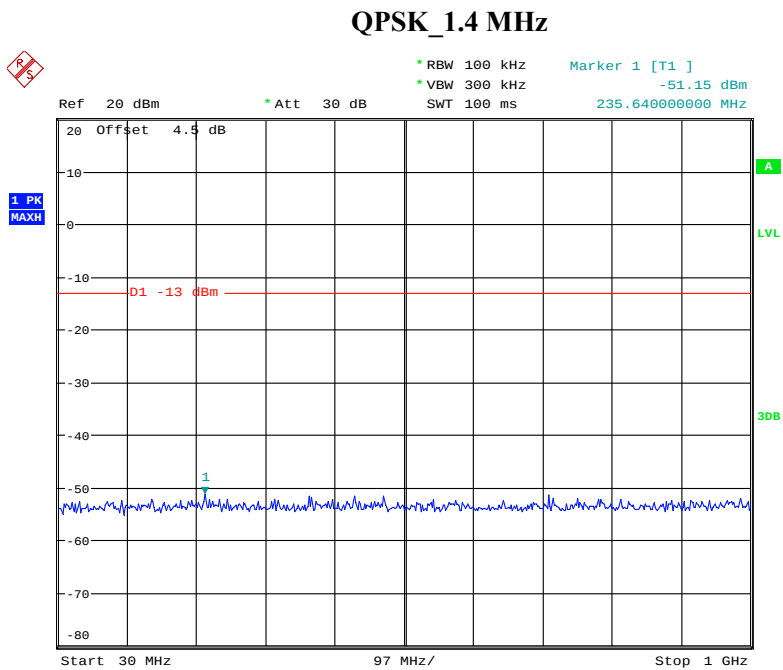


Date: 5.JAN.2019 13:57:25

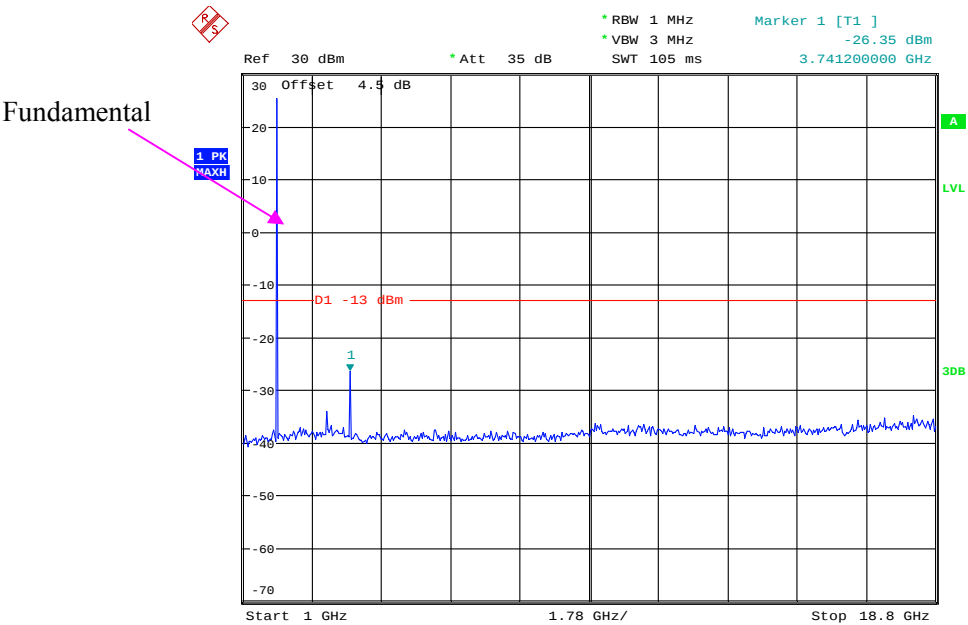


Date: 5.JAN.2019 13:57:49

LTE Band 2 (Middle Channel)

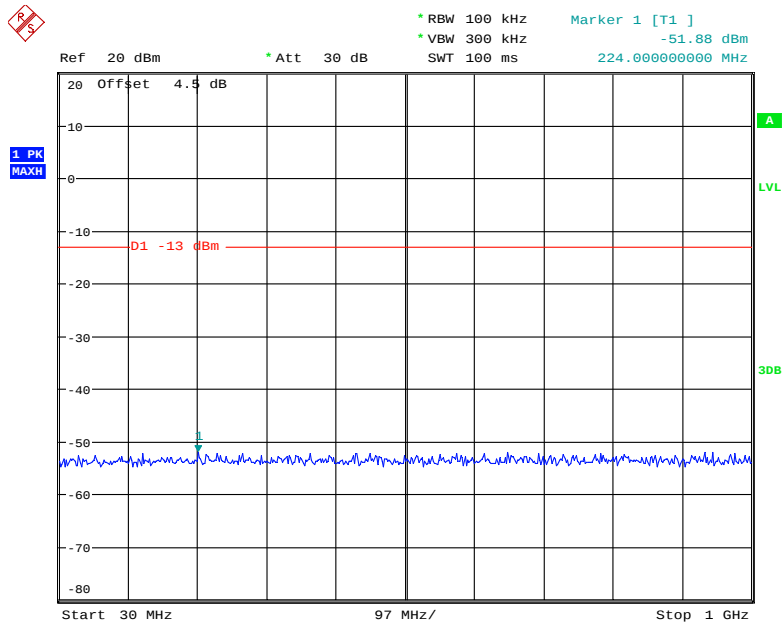


Date: 4.JAN.2019 12:57:40

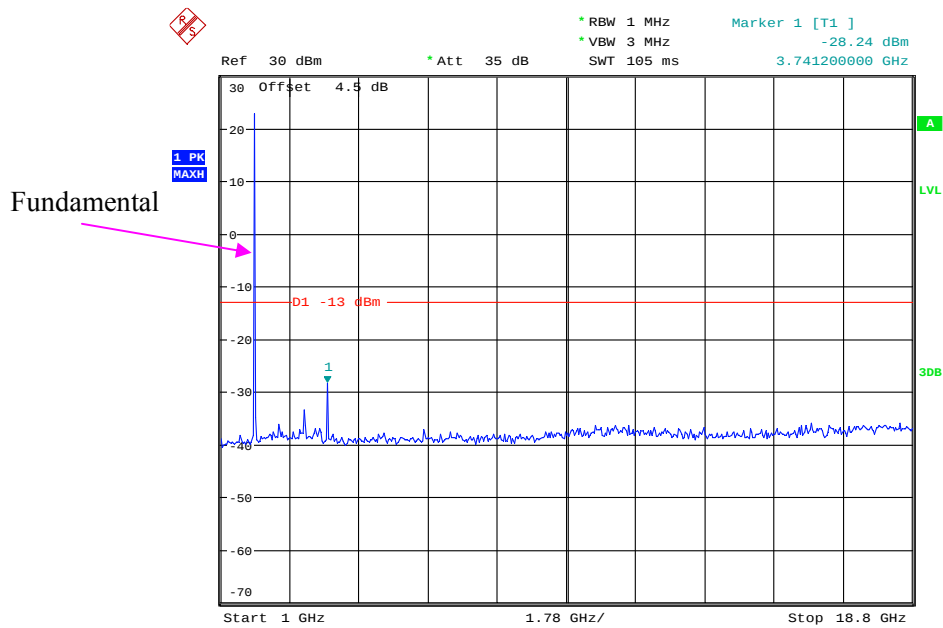


Date: 4.JAN.2019 12:57:52

QPSK_3 MHz

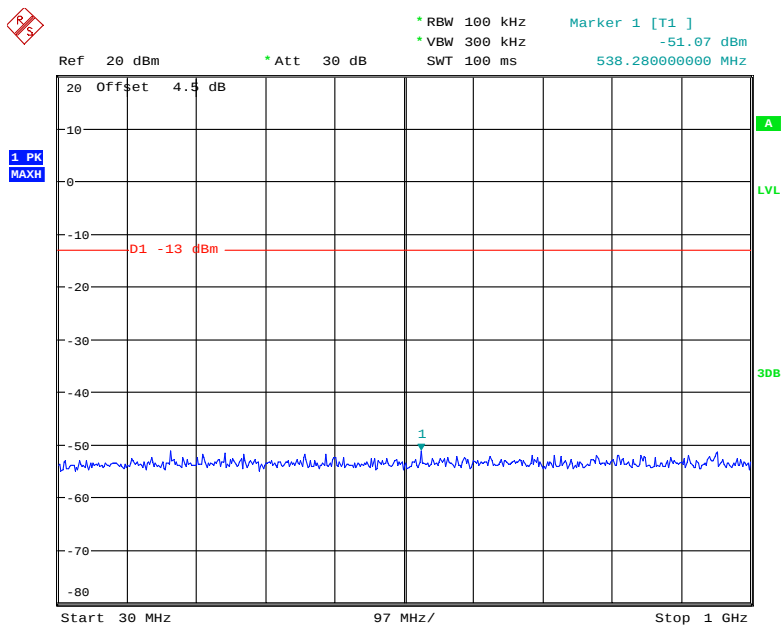


Date: 4.JAN.2019 12:58:13



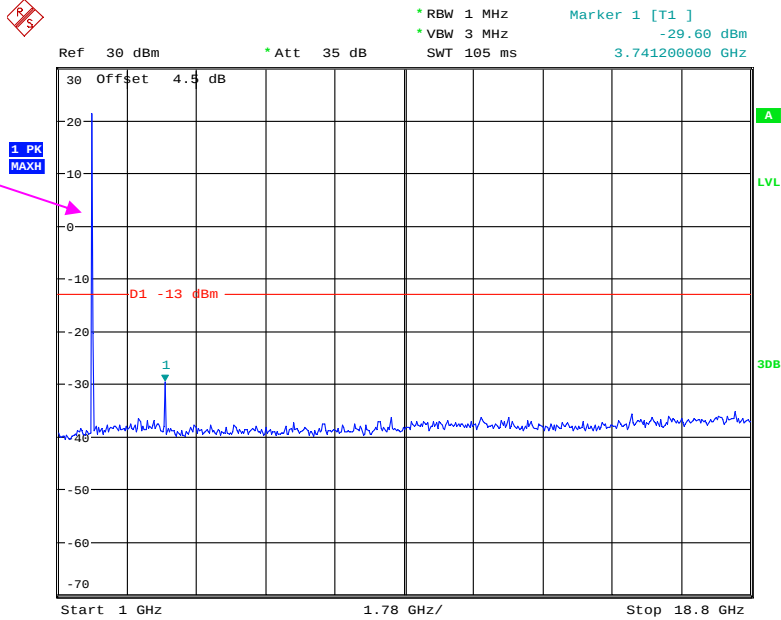
Date: 4.JAN.2019 12:58:24

QPSK_5 MHz



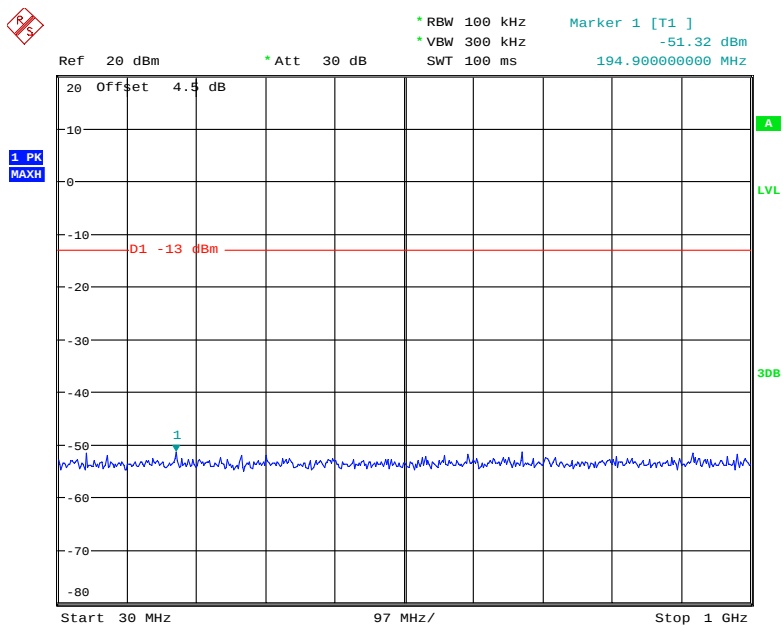
Date: 4.JAN.2019 12:58:46

Fundamental

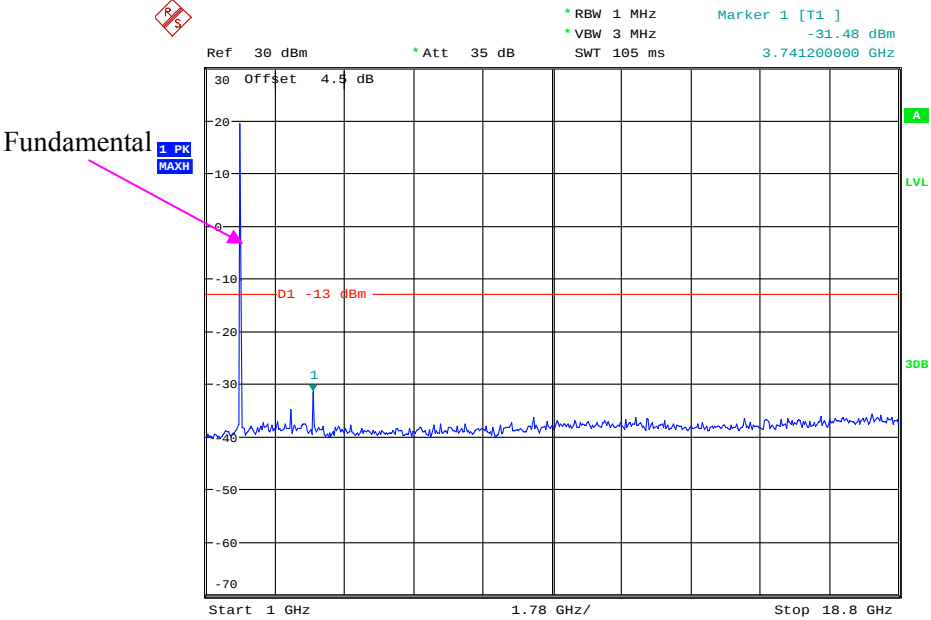


Date: 4.JAN.2019 12:58:57

QPSK_10 MHz

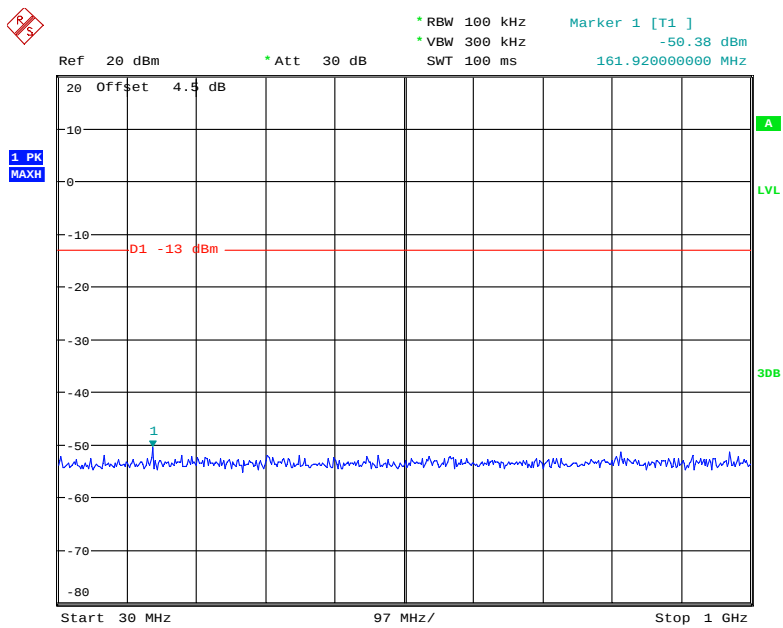


Date: 4.JAN.2019 12:59:19

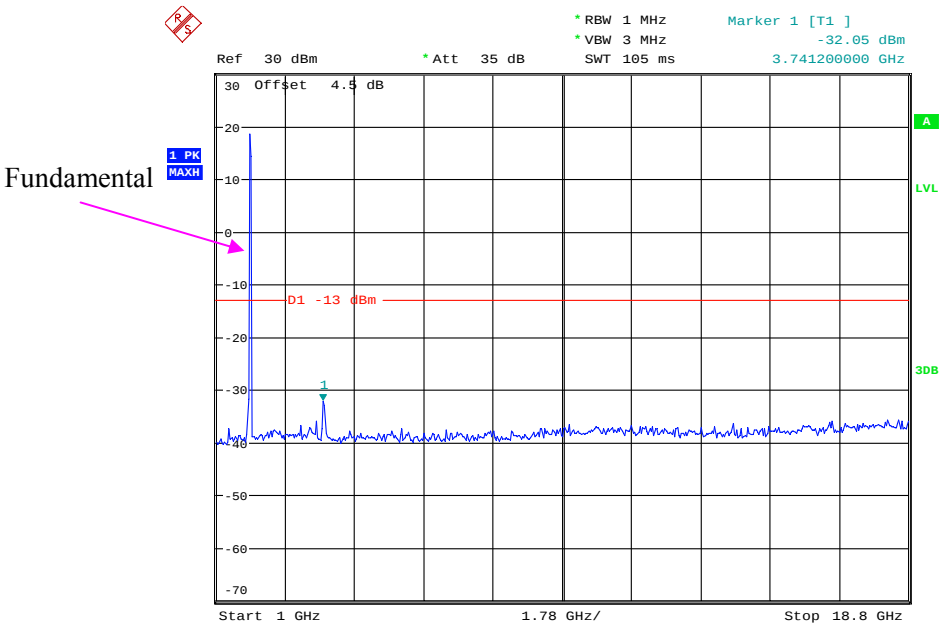


Date: 4.JAN.2019 12:59:30

QPSK_15 MHz

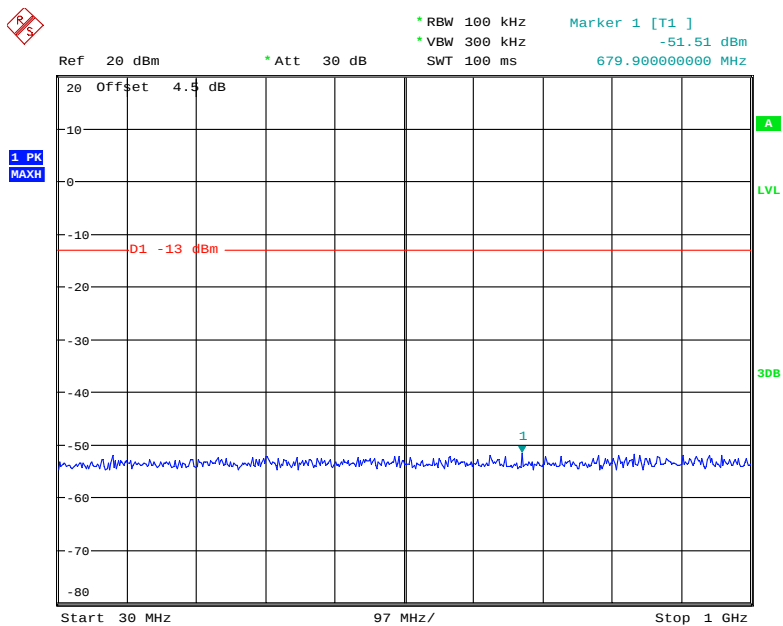


Date: 4.JAN.2019 12:59:56



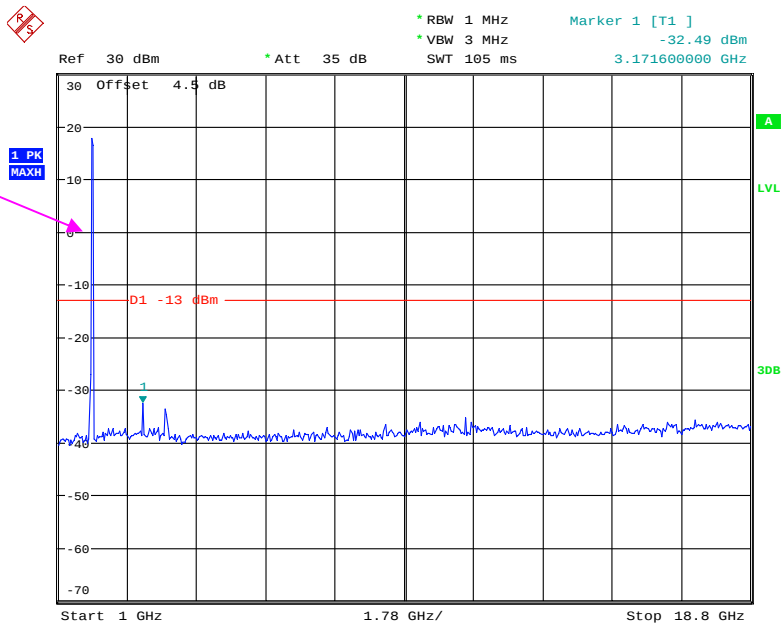
Date: 4.JAN.2019 13:00:07

QPSK_20 MHz



Date: 4.JAN.2019 13:00:32

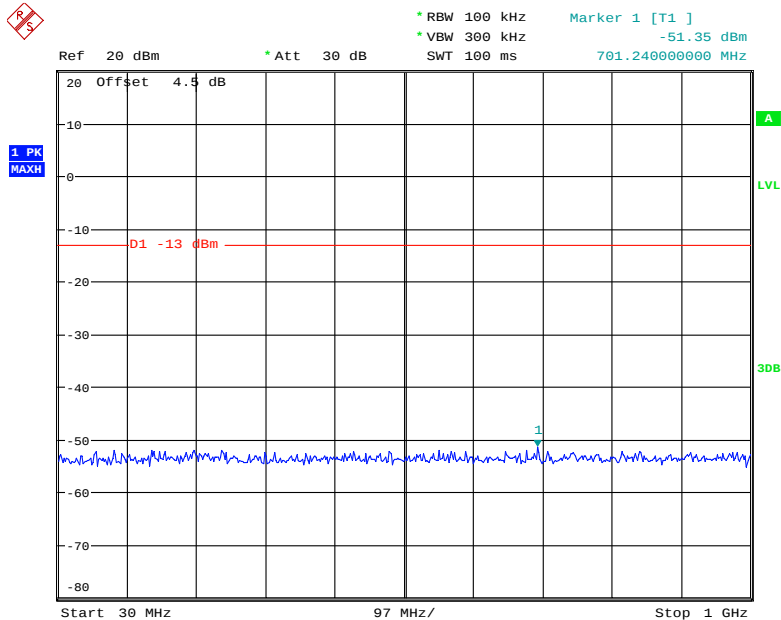
Fundamental



Date: 4.JAN.2019 13:00:43

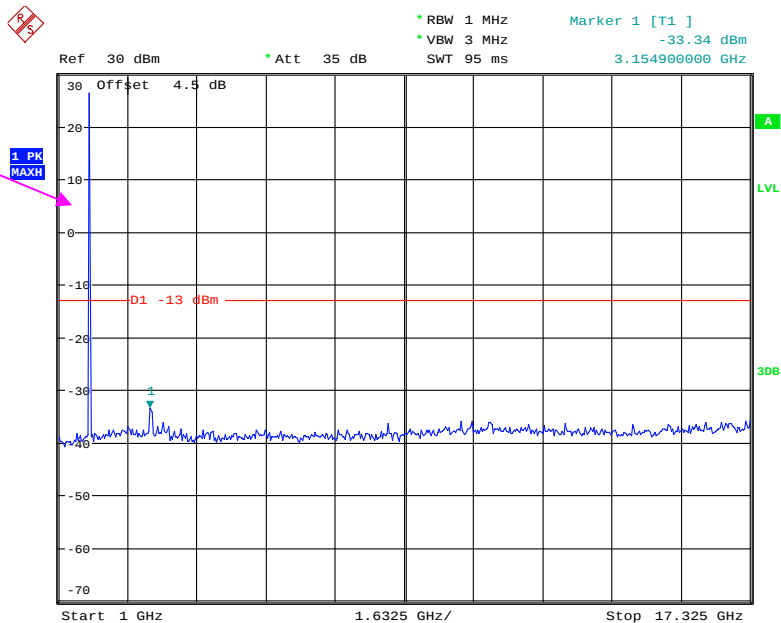
LTE Band 4 (Middle Channel)

QPSK_1.4 MHz



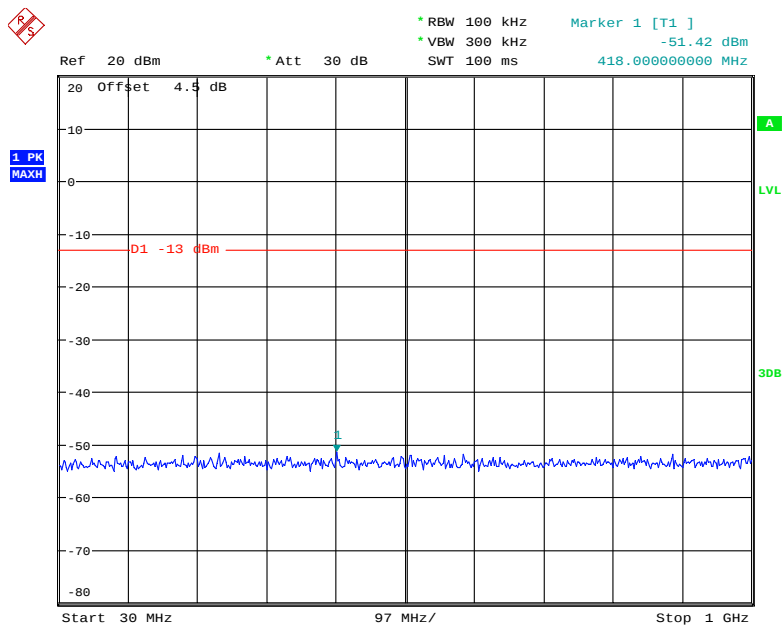
Date: 4.JAN.2019 13:01:05

Fundamental



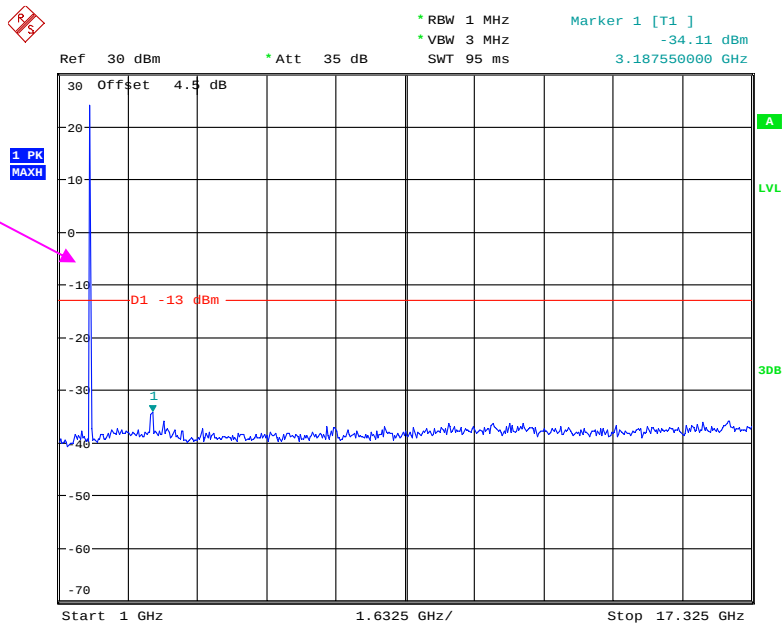
Date: 4.JAN.2019 13:01:19

QPSK_3 MHz



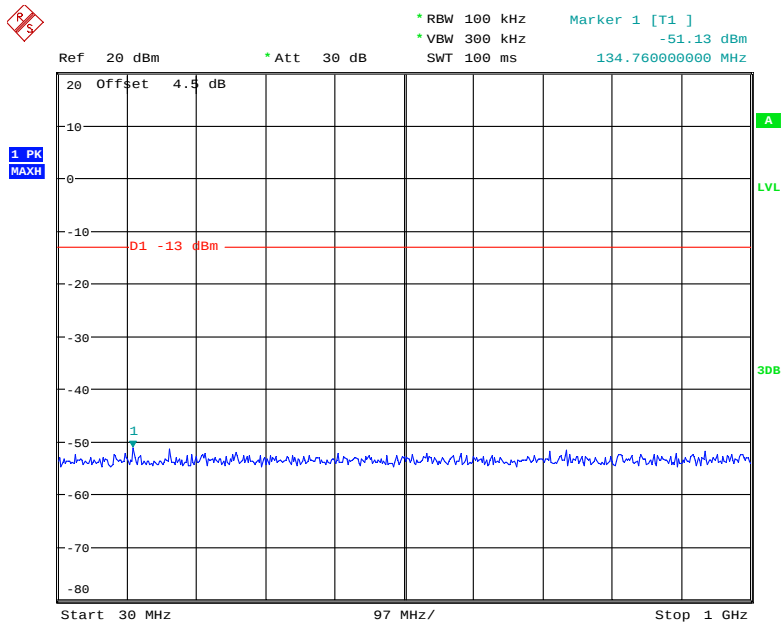
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Fundamental



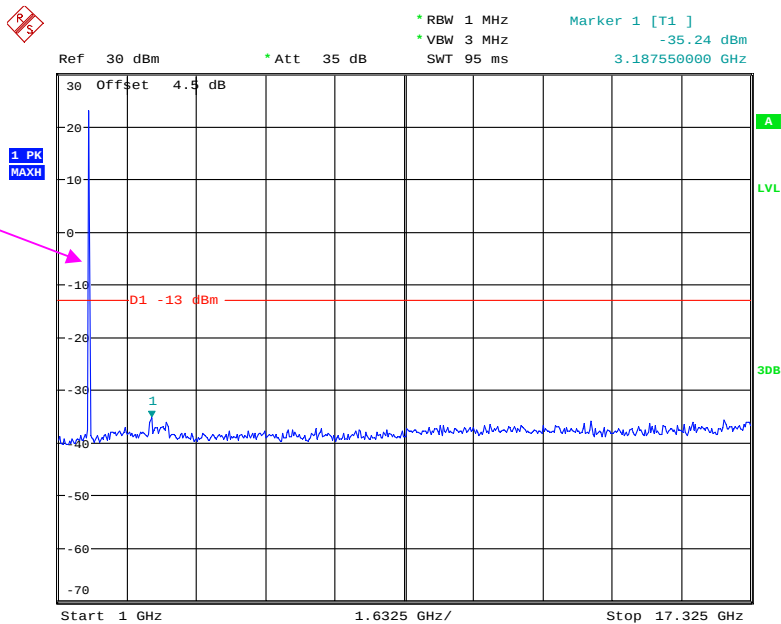
Date: 4.JAN.2019 13:01:55

QPSK_5 MHz



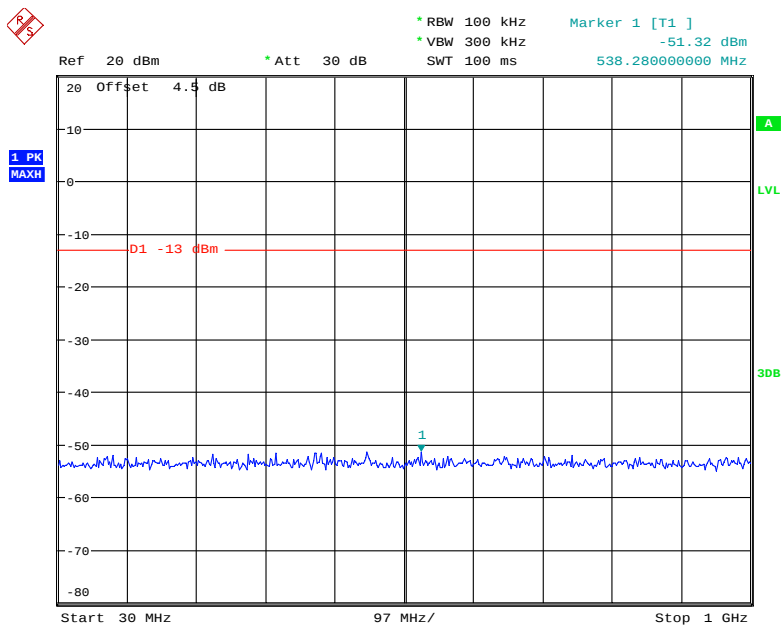
Date: 4.JAN.2019 13:02:17

Fundamental

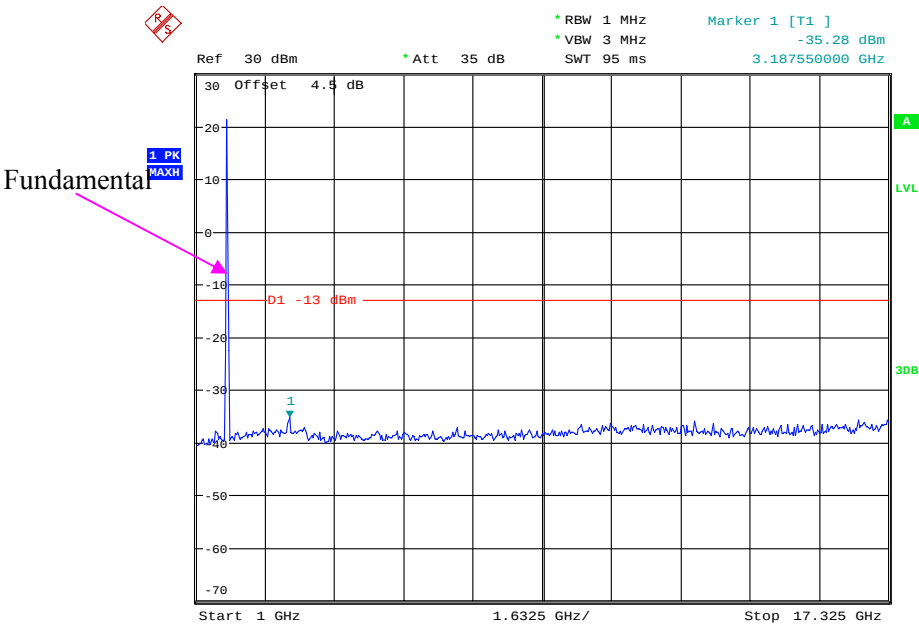


Date: 4.JAN.2019 13:02:31

QPSK_10 MHz

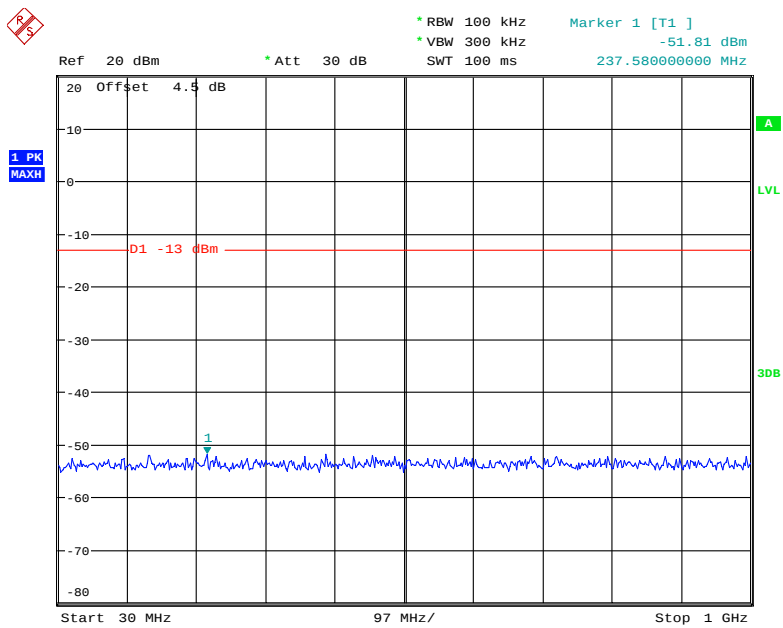


Date: 4.JAN.2019 13:02:54



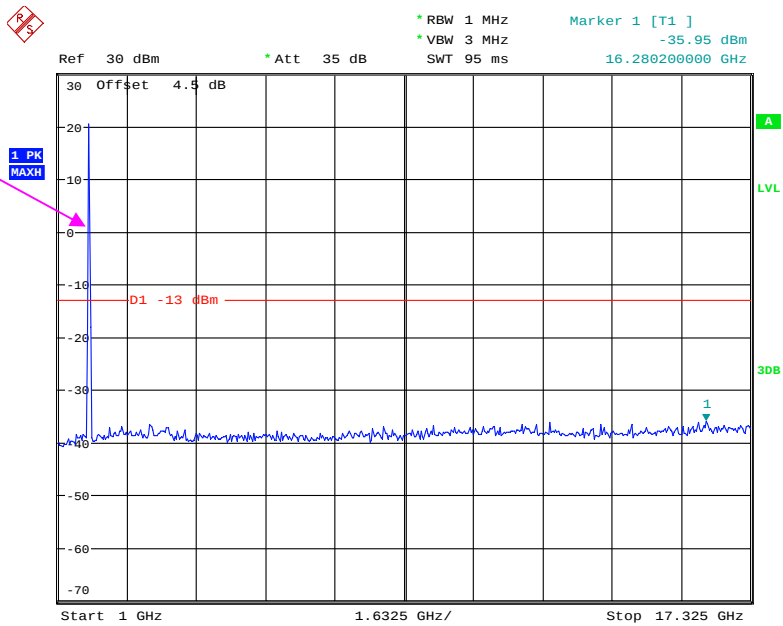
Date: 4.JAN.2019 13:03:09

QPSK_15 MHz



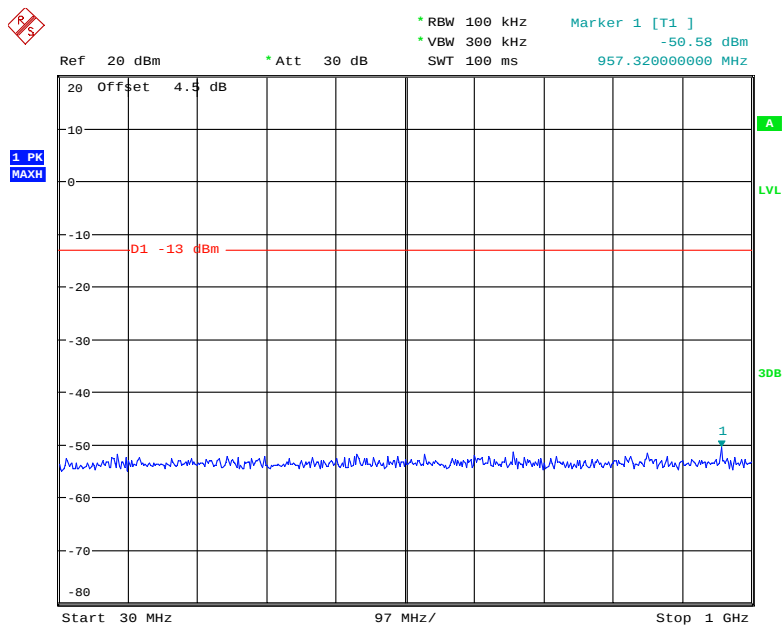
Date: 4.JAN.2019 13:03:30

Fundamental



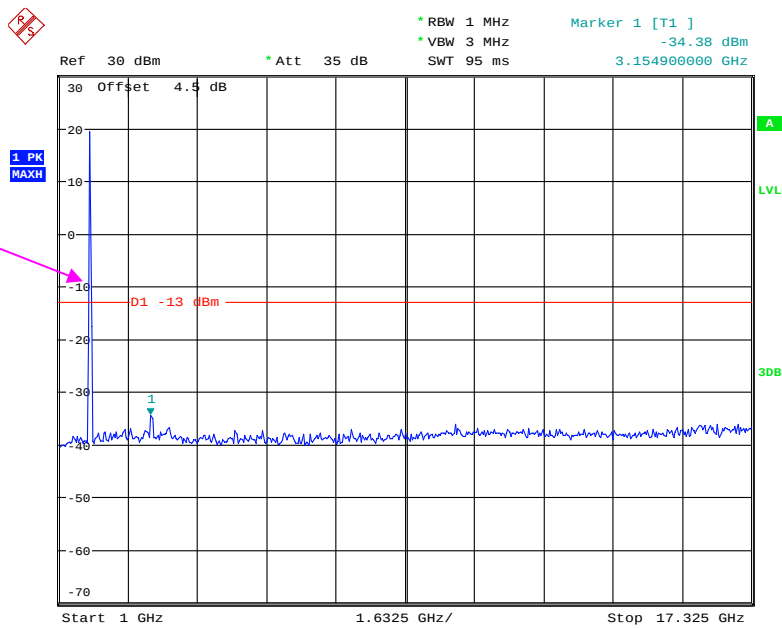
Date: 4.JAN.2019 13:03:41

QPSK_20 MHz



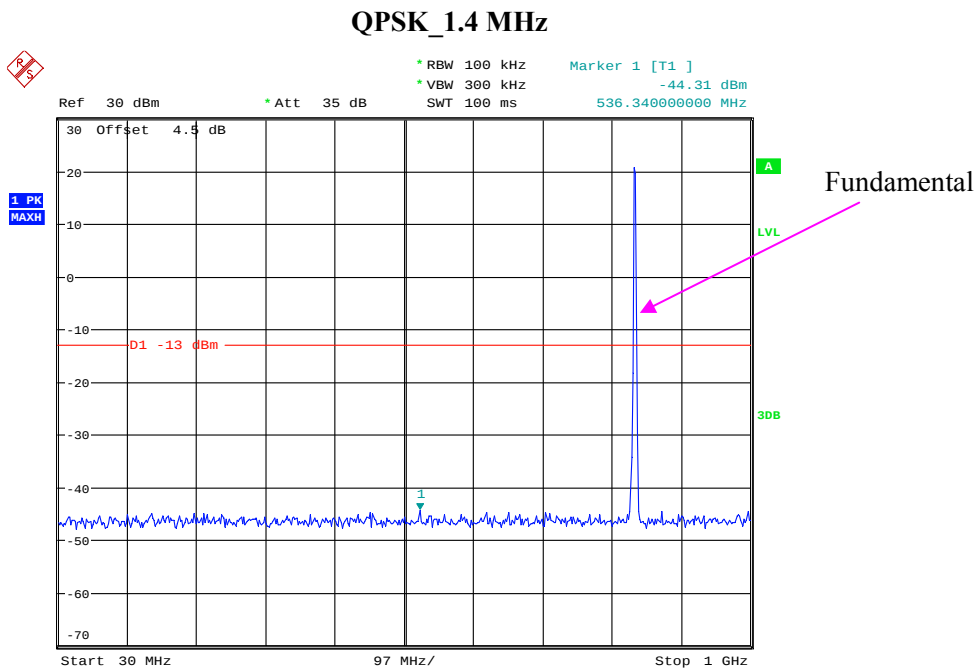
Date: 4.JAN.2019 13:04:07

Fundamental

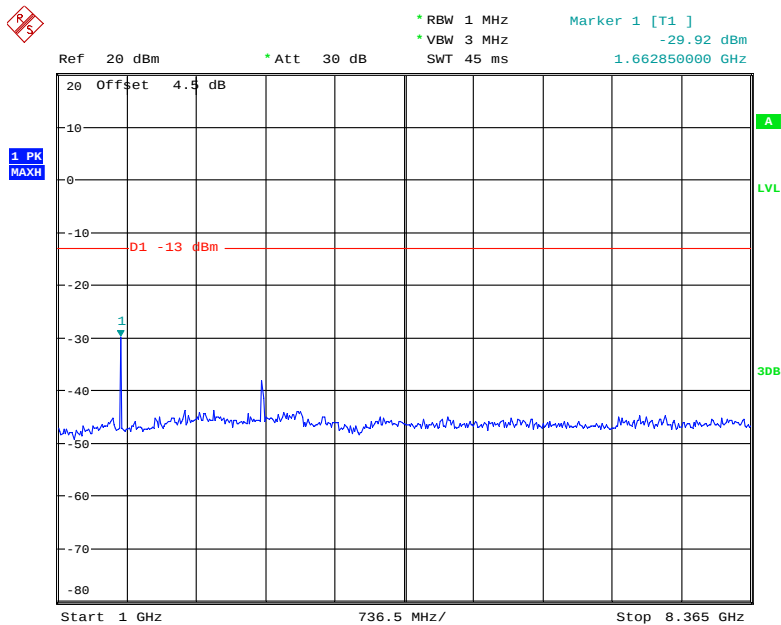


Date: 4.JAN.2019 13:04:18

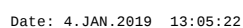
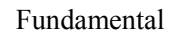
LTE Band 5 (Middle Channel)



Date: 4.JAN.2019 13:04:36



Date: 4.JAN.2019 13:04:51



Ref 20 dBm Att 30 dB RBW 1 MHz VBW 3 MHz SWT 45 ms Marker 1 [T1] -35.42 dBm 1.662850000 GHz

20 Offset 4.5 dB

1 PK MAXH

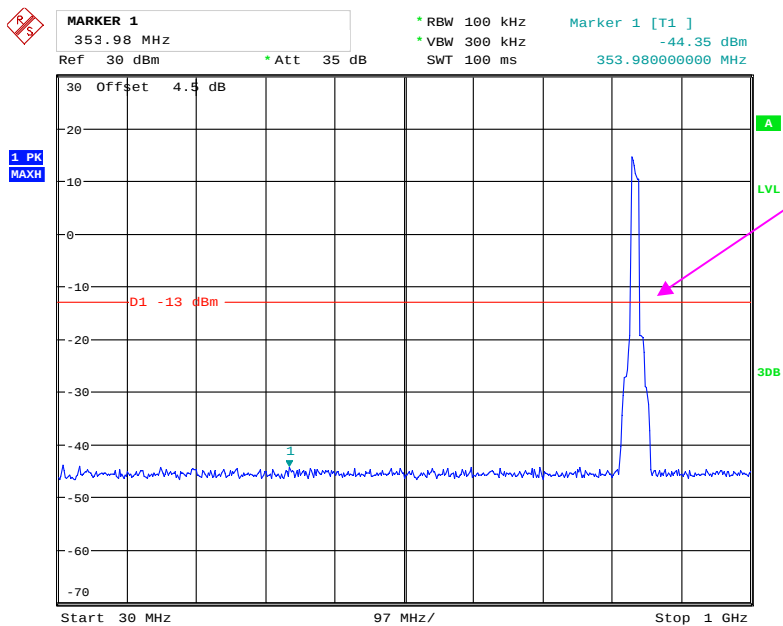
D1 -13 dBm

1

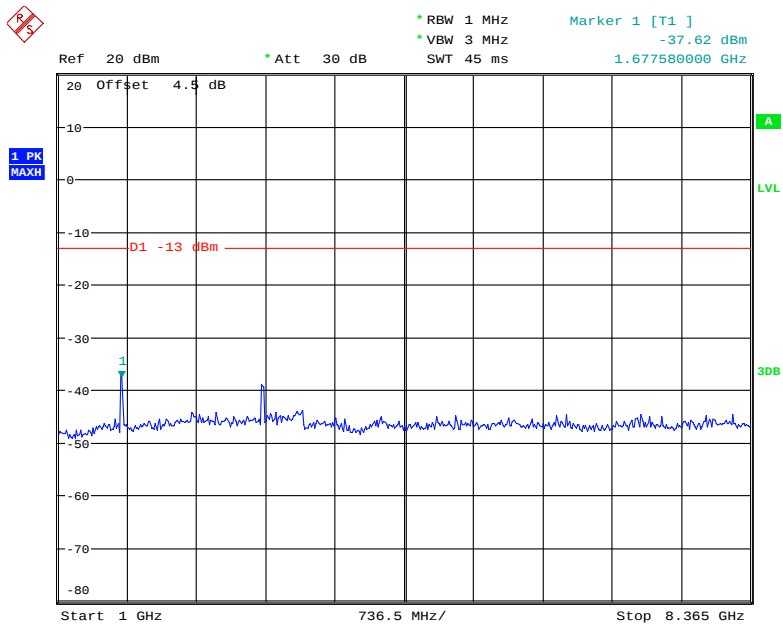
Start 1 GHz 736.5 MHz/ Stop 8.365 GHz

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QPSK_10 MHz



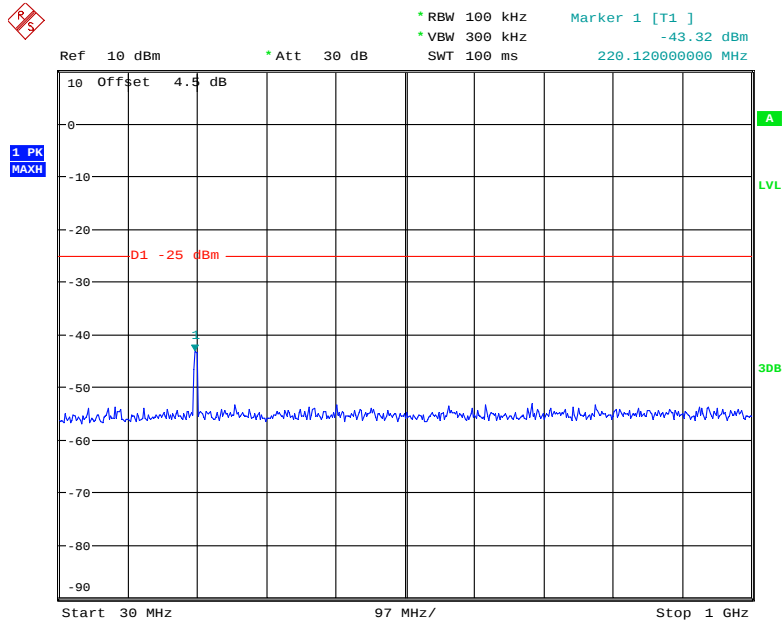
Date: 4.JAN.2019 15:40:49



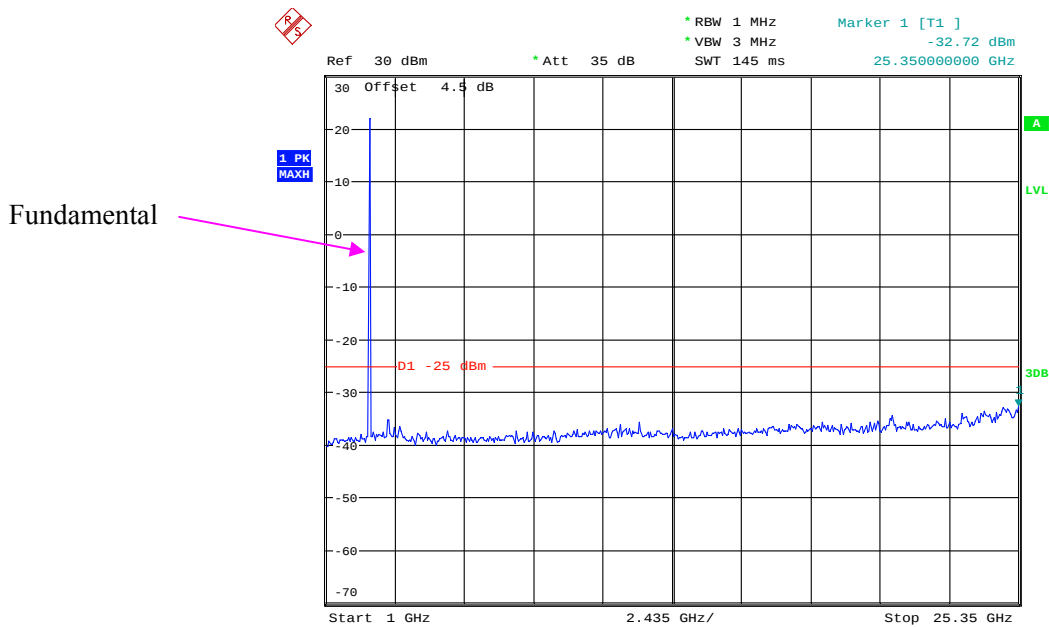
Date: 4.JAN.2019 13:06:29

LTE Band 7 (Middle Channel)

QPSK_5 MHz

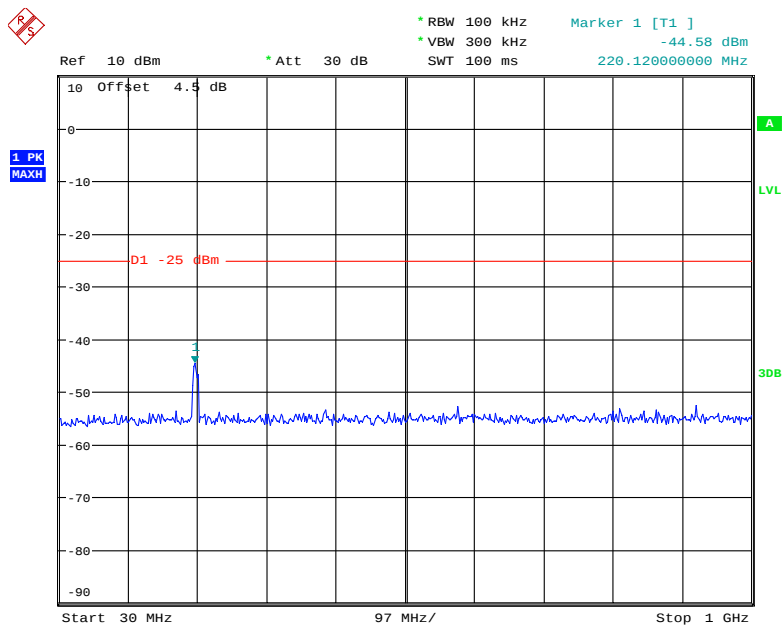


Date: 4.JAN.2019 13:07:23



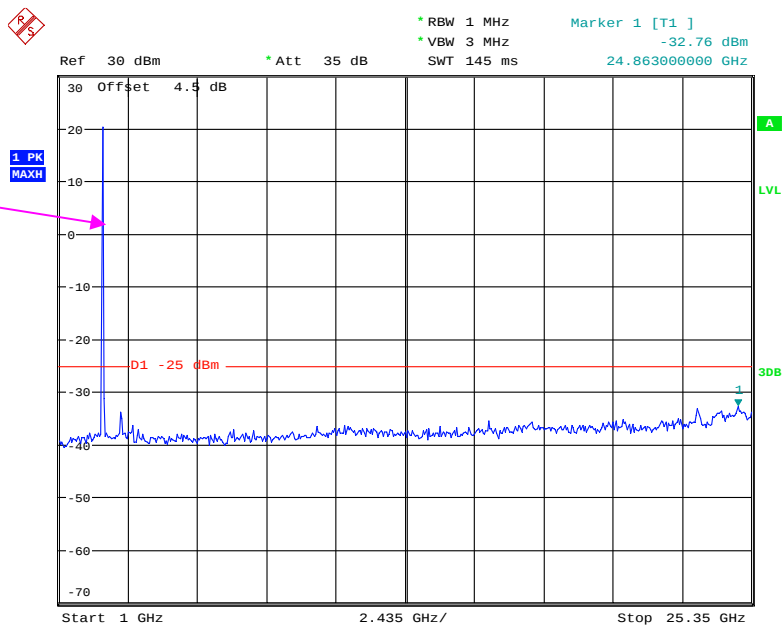
Date: 4.JAN.2019 13:07:33

QPSK_10 MHz



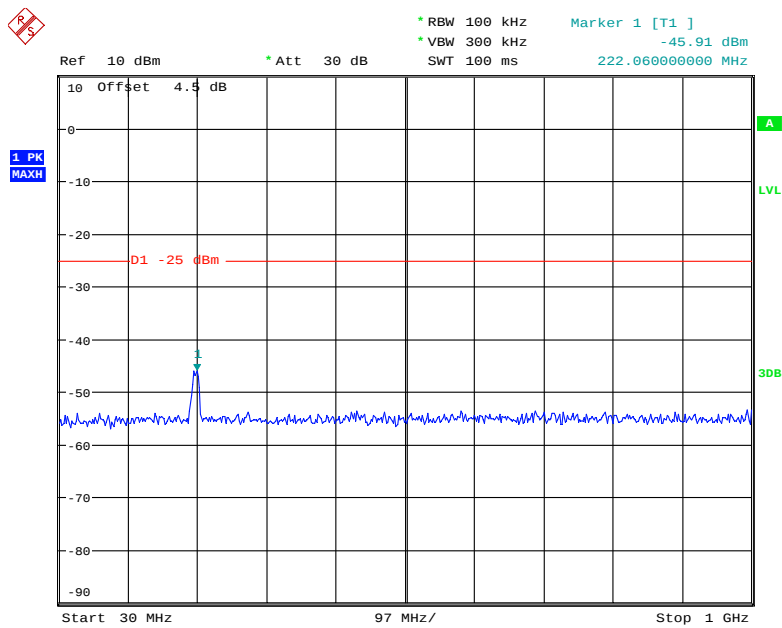
Date: 4.JAN.2019 13:07:56

Fundamental



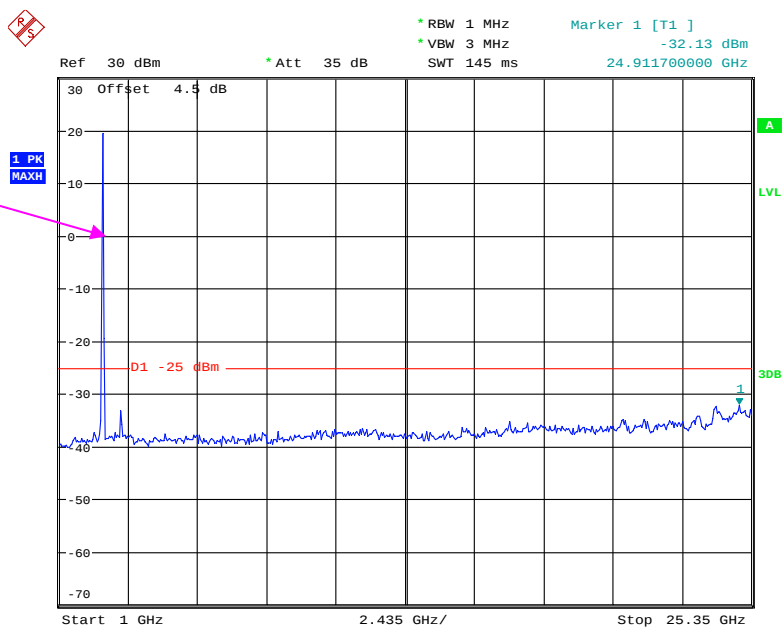
Date: 4.JAN.2019 13:08:07

QPSK_15 MHz



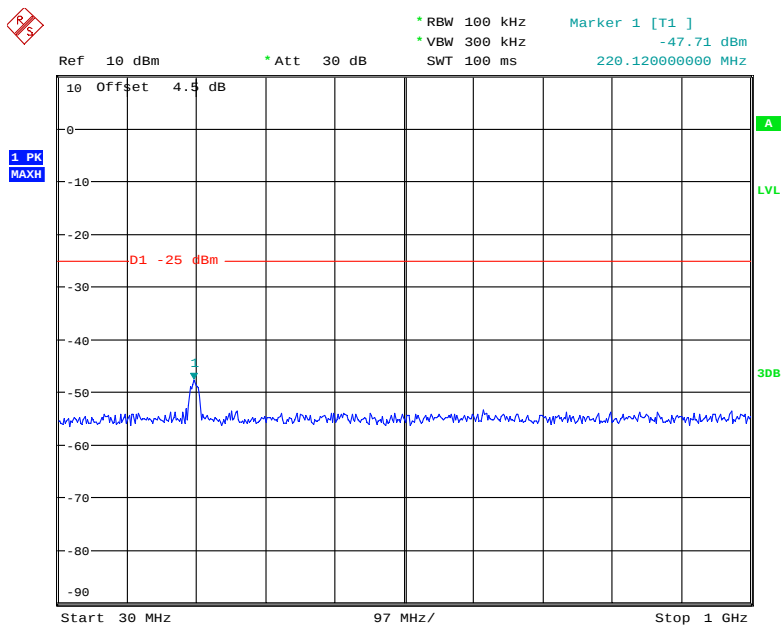
Date: 4.JAN.2019 13:08:32

Fundamental

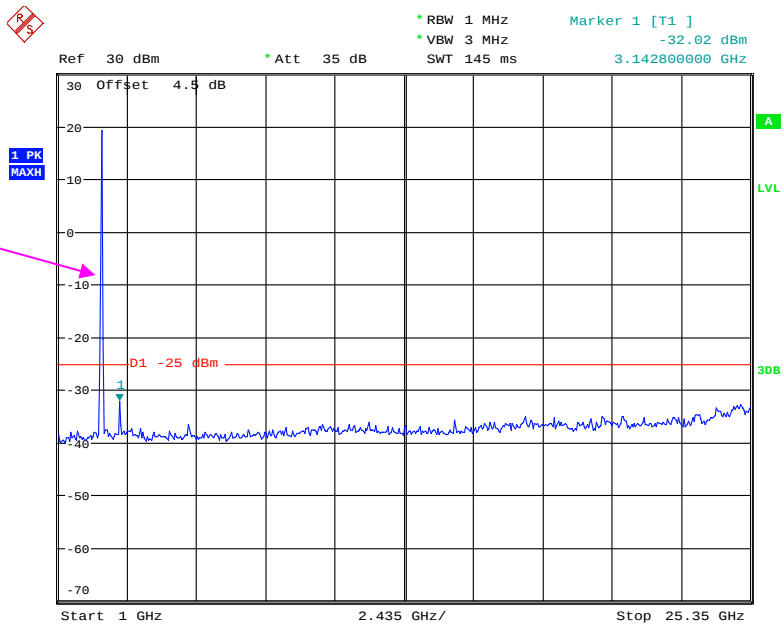


Date: 4.JAN.2019 13:08:46

QPSK_20 MHz



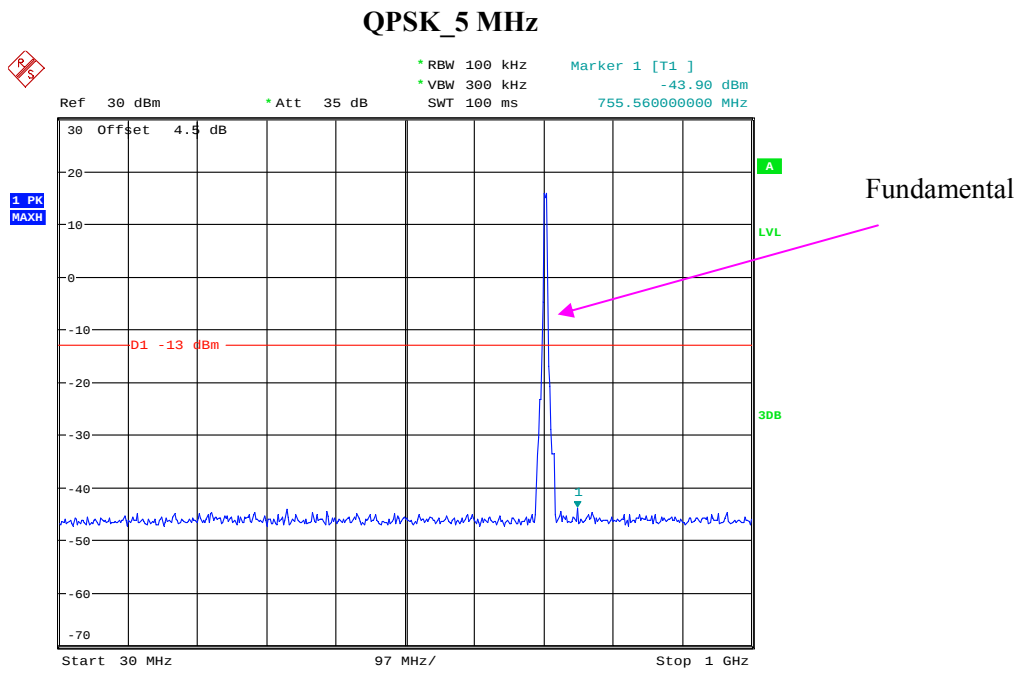
Date: 4.JAN.2019 13:09:12



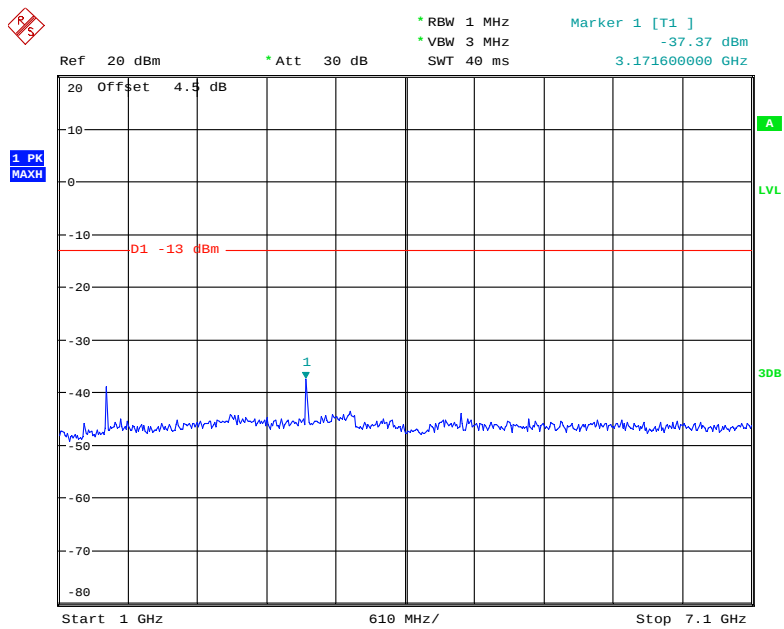
Fundamental

Date: 4.JAN.2019 13:09:26

LTE Band 17 (Middle Channel)

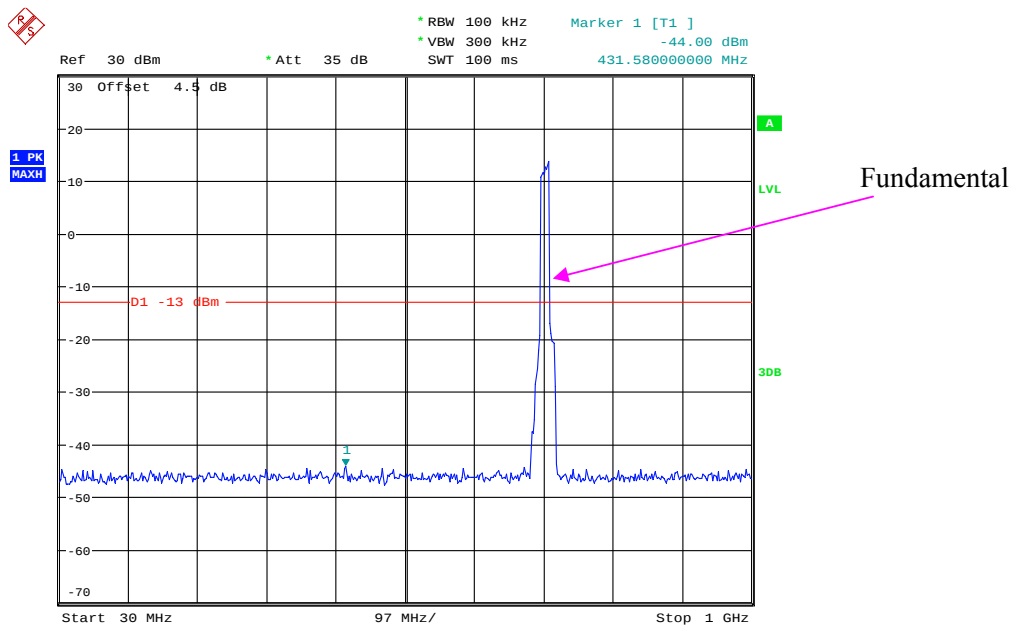


Date: 4.JAN.2019 13:09:55

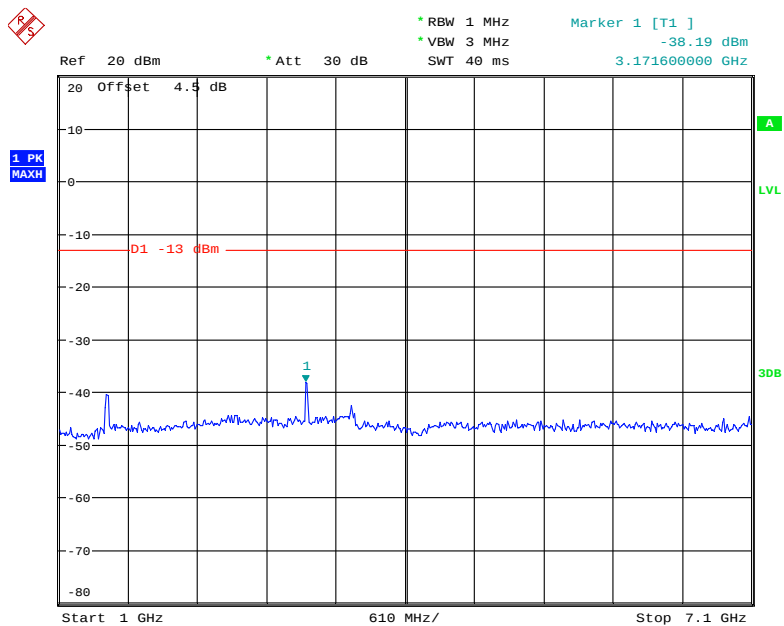


Date: 4.JAN.2019 13:10:09

QPSK_10 MHz



Date: 4.JAN.2019 13:10:32



Date: 4.JAN.2019 13:10:46

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 = $43 + 10 \log_{10} (\text{power out in Watts})$

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 2019-01-05~2019-01-14.

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	60.44	-53.77	10.6	0.73	-43.9	-13.0	30.9
1673.200	V	64.10	-50.71	10.6	0.73	-40.8	-13.0	27.8
2509.800	H	67.43	-45.59	13.1	1.25	-33.7	-13.0	20.7
2509.800	V	61.85	-51.2	13.1	1.25	-39.3	-13.0	26.3
3346.400	H	50.80	-59.86	13.8	1.61	-47.6	-13.0	34.6
3346.400	V	52.00	-58.71	13.8	1.61	-46.5	-13.0	33.5
198.780	H	36.54	-72.17	0.0	0.49	-72.7	-13.0	59.7
146.400	V	37.21	-75.39	0.0	0.37	-75.8	-13.0	62.8
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	58.40	-55.81	10.6	0.73	-45.9	-13.0	32.9
1673.200	V	60.08	-54.73	10.6	0.73	-44.9	-13.0	31.9
2509.800	H	50.69	-62.33	13.1	1.25	-50.5	-13.0	37.5
2509.800	V	51.01	-62.04	13.1	1.25	-50.2	-13.0	37.2
3346.400	H	44.84	-65.82	13.8	1.61	-53.6	-13.0	40.6
3346.400	V	45.23	-65.48	13.8	1.61	-53.3	-13.0	40.3
955.380	H	39.46	-55.38	0.0	0.88	-56.3	-13.0	43.3
103.720	V	42.13	-70.4	0.0	0.27	-70.7	-13.0	57.7

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	58.34	-50.46	13.8	1.63	-38.3	-13.0	25.3
3760.000	V	61.51	-47.16	13.8	1.63	-35.0	-13.0	22.0
5640.000	H	55.44	-50.59	14.0	1.31	-37.9	-13.0	24.9
5640.000	V	55.76	-50.15	14.0	1.31	-37.4	-13.0	24.4
175.500	H	39.05	-70.12	0.0	0.43	-70.6	-13.0	57.6
260.860	V	35.66	-76.42	0.0	0.51	-76.9	-13.0	63.9
WCDMA Band II R99,Frequency: 1880.000 MHz								
3760.000	H	59.39	-49.41	13.8	1.63	-37.3	-13.0	24.3
3760.000	V	62.04	-46.63	13.8	1.63	-34.5	-13.0	21.5
5640.000	H	46.59	-59.44	14.0	1.31	-46.7	-13.0	33.7
5640.000	V	46.96	-58.95	14.0	1.31	-46.2	-13.0	33.2
179.380	H	35.62	-74.07	0.0	0.44	-74.5	-13.0	61.5
633.350	V	35.69	-69.2	0.0	0.82	-70.0	-13.0	57.0
WCDMA Band IV R99,Frequency: 1732.600 MHz								
3465.200	H	45.56	-64.68	13.9	1.62	-52.4	-13.0	39.4
3465.200	V	46.97	-63.3	13.9	1.62	-51.0	-13.0	38.0
5197.800	H	46.12	-60.3	14.0	1.52	-47.8	-13.0	34.8
5197.800	V	47.15	-59.34	14.0	1.52	-46.9	-13.0	33.9
559.230	H	35.73	-67.26	0.0	0.74	-68.0	-13.0	55.0
624.000	V	36.10	-68.93	0.0	0.8	-69.7	-13.0	56.7

LTE Band 2 (30MHz-20GHz):

EYE Data 1 (COMB1 TO COM2)								
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	62.64	-46.16	13.76	1.63	-34.03	-13.00	21.03
3760.00	V	66.67	-42.00	13.76	1.63	-29.87	-13.00	16.87
5640.00	H	52.89	-53.14	14.02	1.31	-40.43	-13.00	27.43
5640.00	V	55.11	-50.80	14.02	1.31	-38.09	-13.00	25.09
635.00	H	35.64	-66.25	0.00	0.82	-67.07	-13.00	54.07
569.32	V	35.29	-70.67	0.00	0.74	-71.41	-13.00	58.41

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	46.59	-63.65	13.91	1.62	-51.36	-13.00	38.36
3465.00	V	45.93	-64.35	13.91	1.62	-52.06	-13.00	39.06
5197.50	H	46.12	-60.30	14.00	1.52	-47.82	-13.00	34.82
5197.50	V	46.33	-60.16	14.00	1.52	-47.68	-13.00	34.68
619.76	H	35.48	-66.51	0.00	0.80	-67.31	-13.00	54.31
189.08	V	35.43	-75.97	0.00	0.46	-76.43	-13.00	63.43

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	59.93	-54.29	10.61	0.73	-44.41	-13.00	31.41
1673.00	V	60.00	-54.82	10.61	0.73	-44.94	-13.00	31.94
2509.50	H	60.33	-52.69	13.11	1.25	-40.83	-13.00	27.83
2509.50	V	60.35	-52.70	13.11	1.25	-40.84	-13.00	27.84
3346.00	H	46.16	-64.50	13.83	1.61	-52.28	-13.00	39.28
3346.00	V	45.94	-64.77	13.83	1.61	-52.55	-13.00	39.55
128.94	H	35.62	-68.91	0.00	0.33	-69.24	-13.00	56.24
103.72	V	36.73	-75.80	0.00	0.27	-76.07	-13.00	63.07

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	54.01	-52.79	13.93	1.34	-40.20	-25.00	15.20
5070.00	V	51.60	-55.01	13.93	1.34	-42.42	-25.00	17.42
7605.00	H	51.85	-48.51	13.21	1.40	-36.70	-25.00	11.70
7605.00	V	49.32	-51.44	13.21	1.40	-39.63	-25.00	14.63
475.26	H	35.74	-68.63	0.00	0.69	-69.32	-25.00	44.32
613.55	V	35.19	-70.00	0.00	0.78	-70.78	-25.00	45.78

LTE Band 17 (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: 710.000 MHz								
1420.00	H	51.49	-62.11	9.10	1.23	-54.24	-13.00	41.24
1420.00	V	51.42	-62.68	9.10	1.23	-54.81	-13.00	41.81
2130.00	H	64.08	-48.67	11.22	1.11	-38.56	-13.00	25.56
2130.00	V	58.74	-53.98	11.22	1.11	-43.87	-13.00	30.87
2840.00	H	44.80	-67.24	13.42	1.36	-55.18	-13.00	42.18
2840.00	V	45.21	-67.07	13.42	1.36	-55.01	-13.00	42.01
245.28	H	36.54	-72.64	0.00	0.50	-73.14	-13.00	60.14
138.75	V	35.97	-76.61	0.00	0.35	-76.96	-13.00	63.96

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

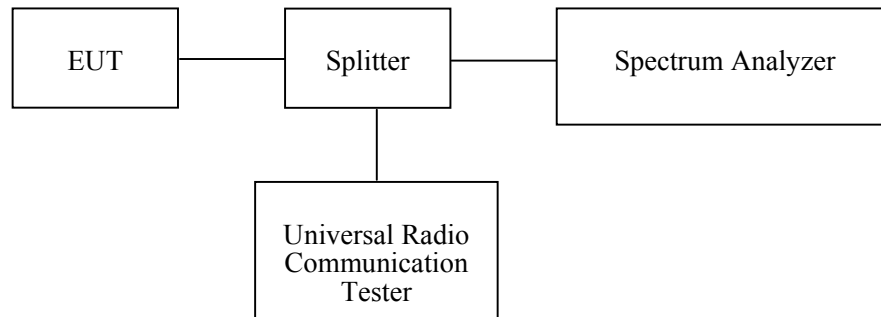
FCC §22.917(a) & §24.238(a) & §27.53, RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6 & RSS-199 §4.6 - BAND EDGES**Applicable Standard**

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	Spectrum Analyzer	FSU 26	200256	2019-01-04	2020-01-04
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**

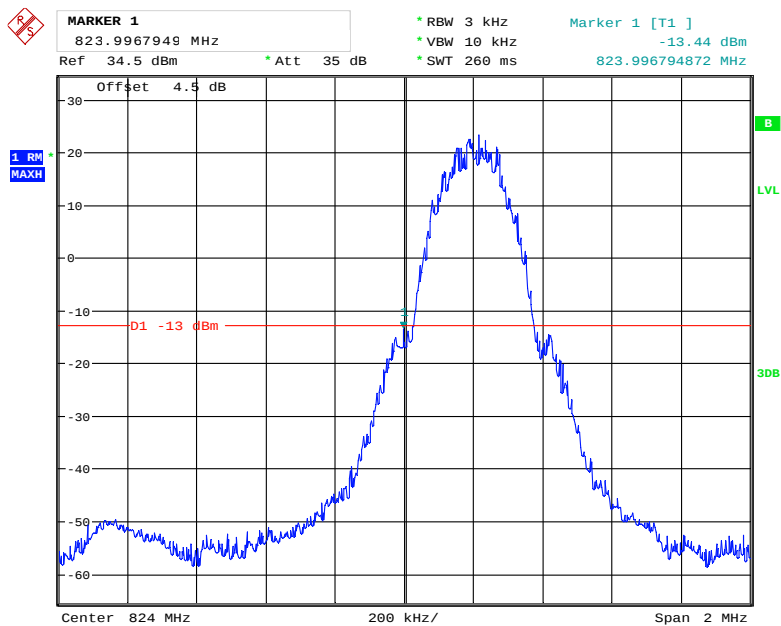
Temperature:	23.9~25.2°C
Relative Humidity:	44~46 %
ATM Pressure:	100.6~101.7 kPa

The testing was performed by Elena Lei from 2019-01-04 to 2019-01-09.

Test Mode: Transmitting

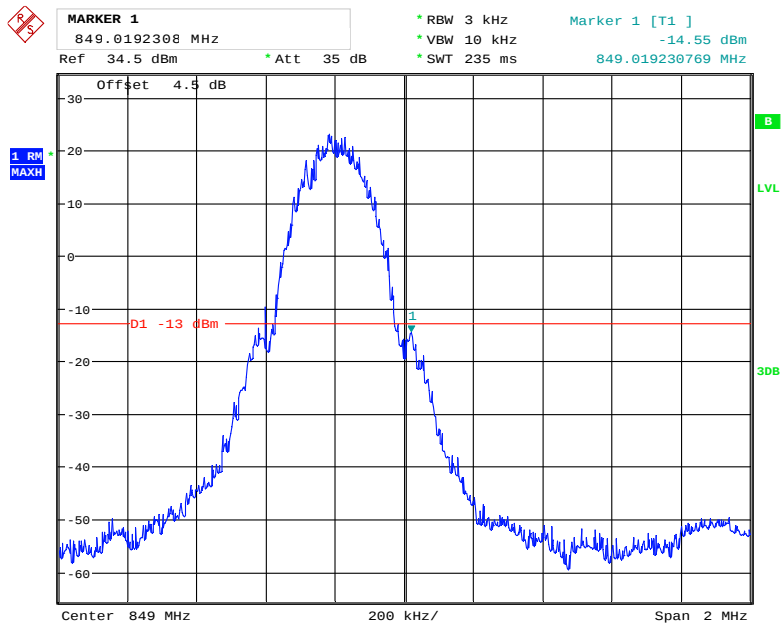
Test Result: Compliant. Please refer to the following plots.

GSM 850, Left Band Edge



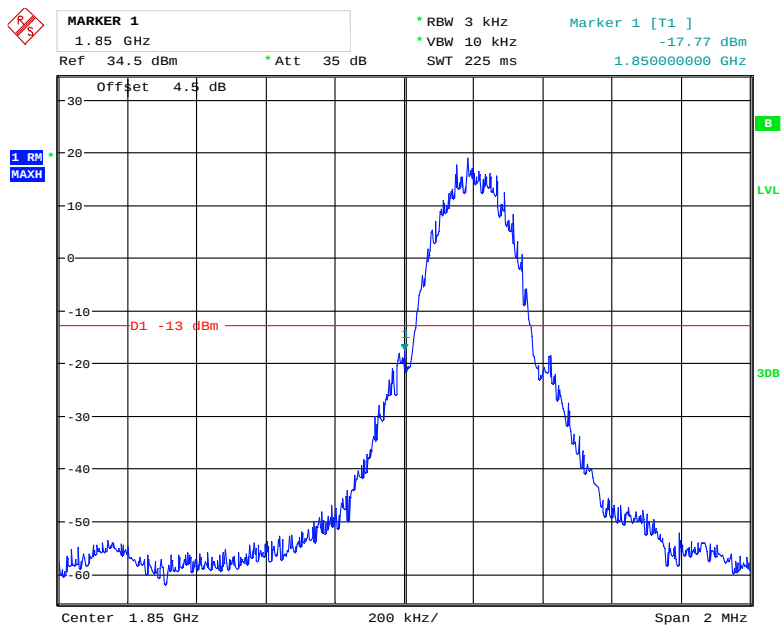
Date: 5.JAN.2019 11:17:36

GSM 850, Right Band Edge



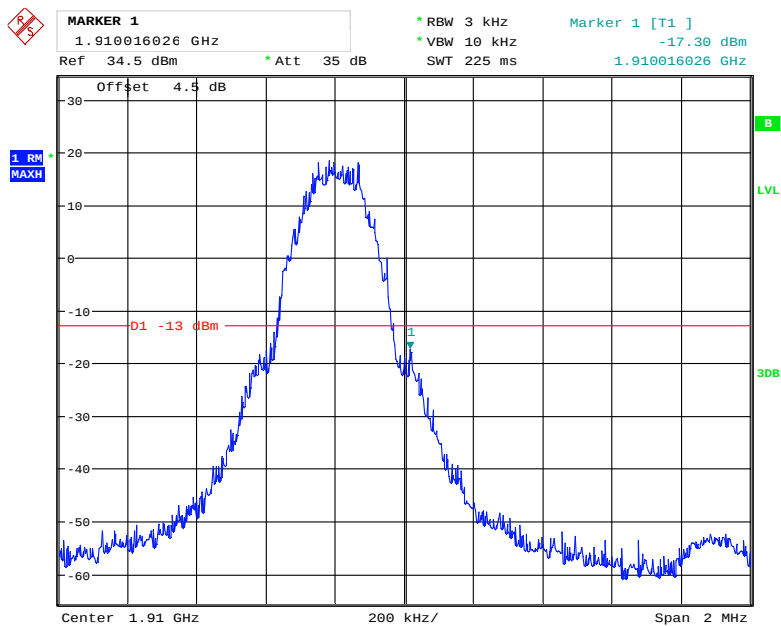
Date: 5.JAN.2019 11:19:00

GSM 1900, Left Band Edge



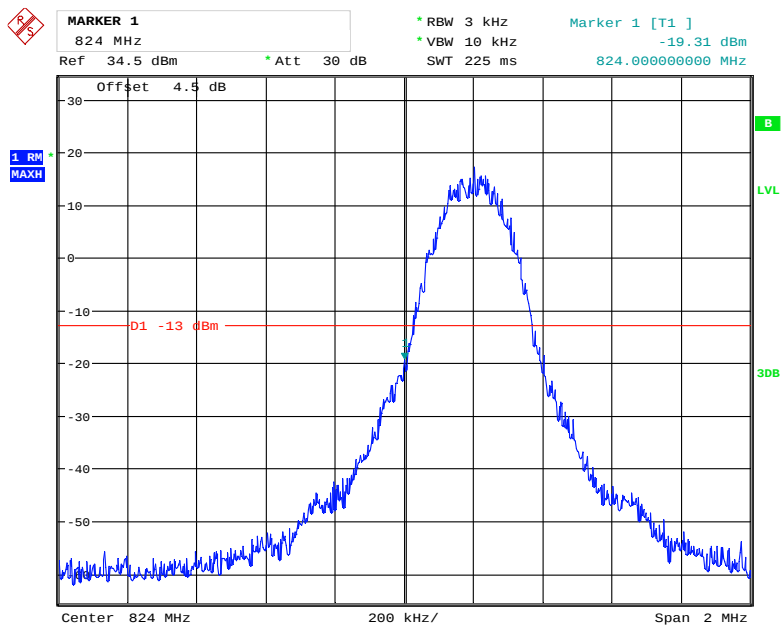
Date: 5.JAN.2019 11:20:37

GSM 1900, Right Band Edge



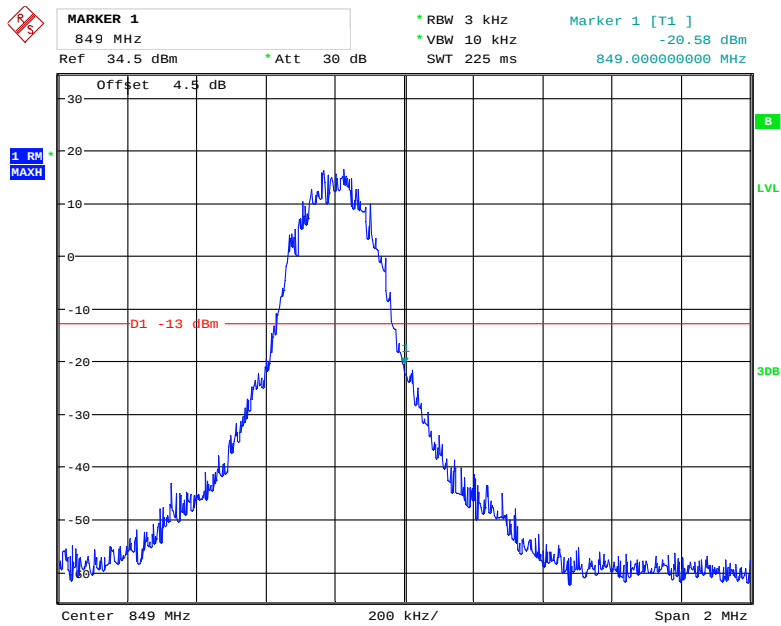
Date: 5.JAN.2019 11:20:02

EDGE 850, Left Band Edge



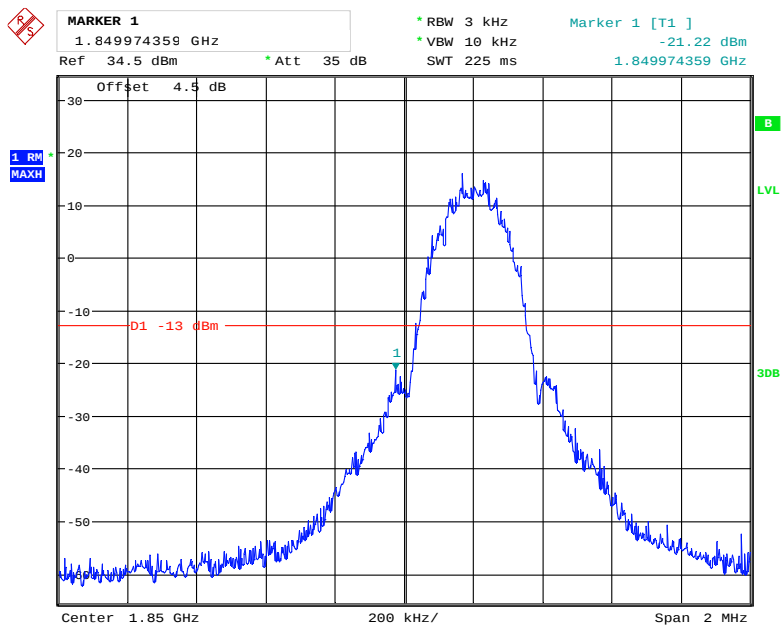
Date: 5.JAN.2019 11:30:03

EDGE 850, Right Band Edge



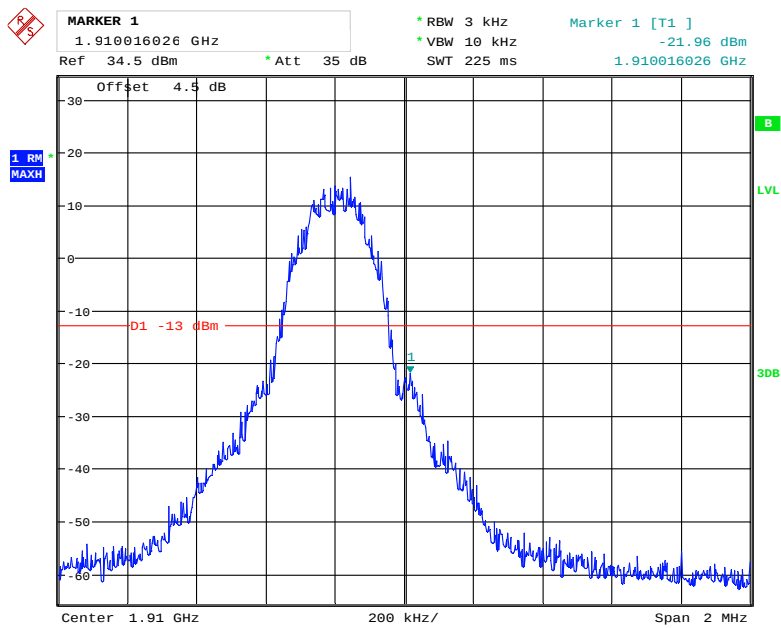
Date: 5.JAN.2019 11:30:44

EDGE 1900, Left Band Edge



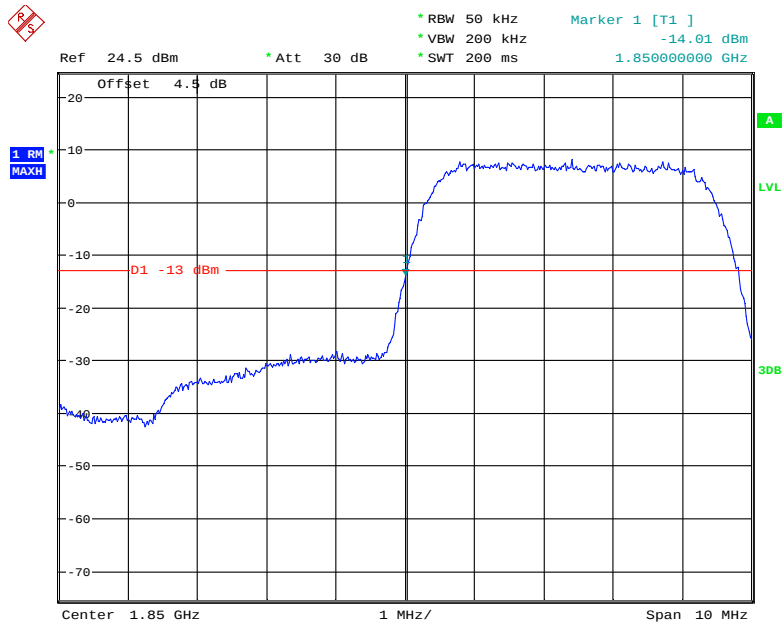
Date: 5.JAN.2019 11:24:53

EDGE 1900, Right Band Edge



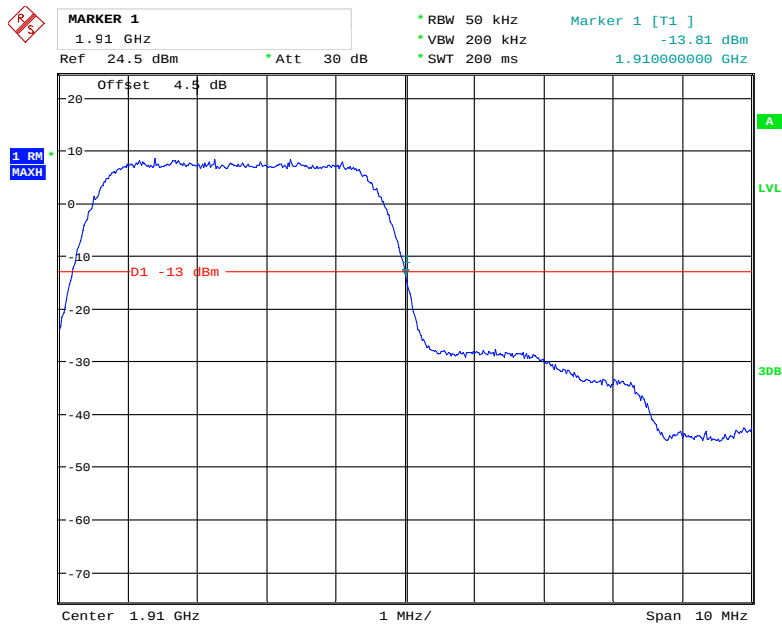
Date: 5.JAN.2019 11:25:36

WCDMA Band II Rel 99, Left Band Edge



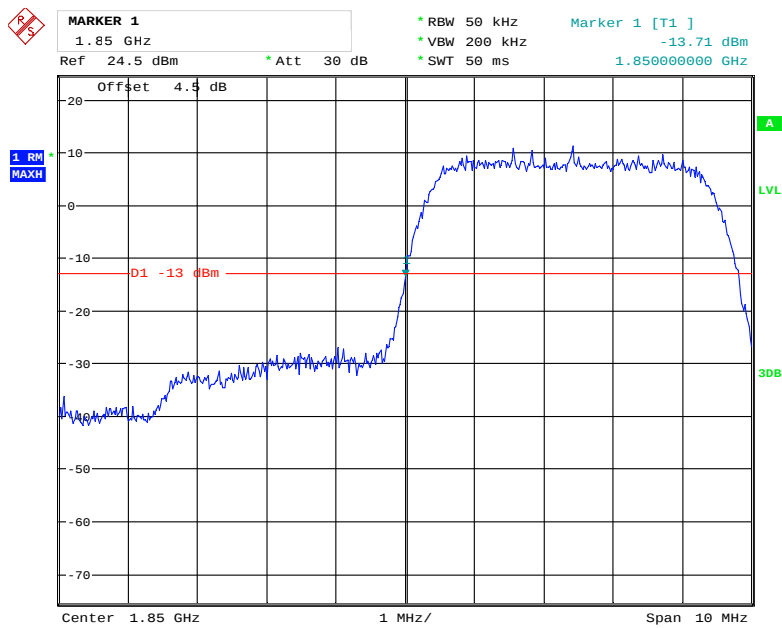
Date: 9.JAN.2019 18:33:12

WCDMA Band II Rel 99, Right Band Edge



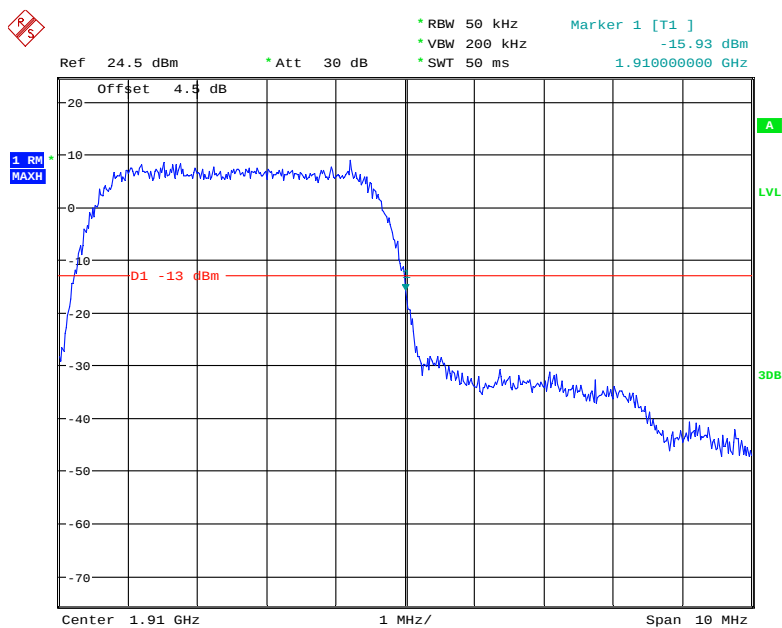
Date: 9.JAN.2019 18:34:00

WCDMA Band II HSDPA, Left Band Edge



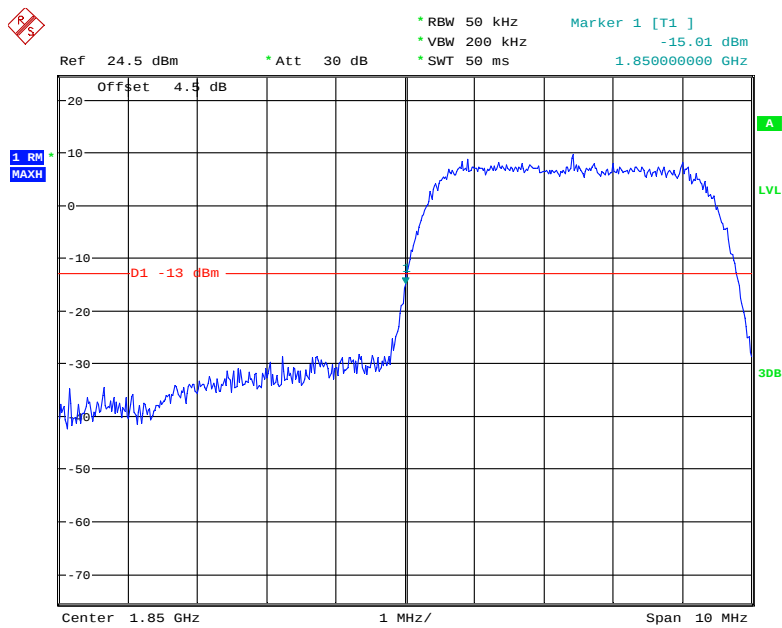
Date: 9.JAN.2019 18:35:27

WCDMA Band II HSDPA, Right Band Edge



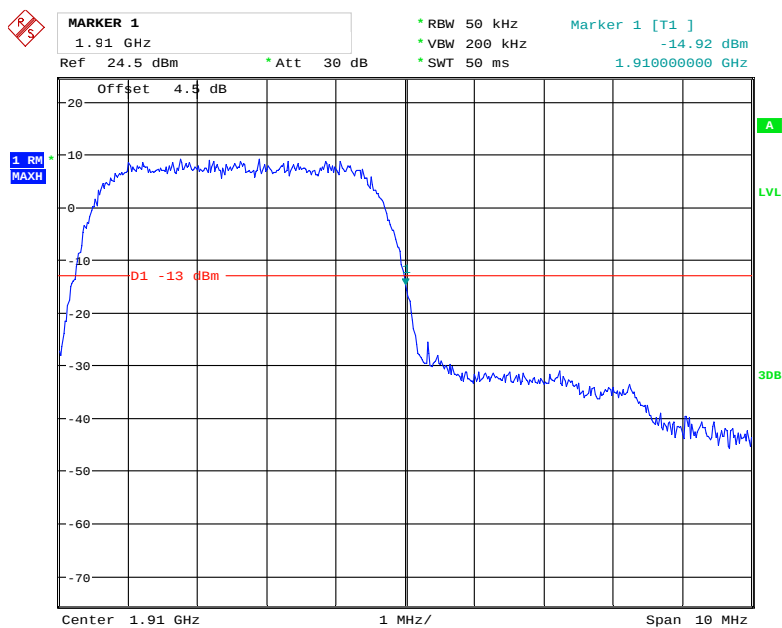
Date: 9.JAN.2019 18:35:05

WCDMA Band II HSUPA, Left Band Edge



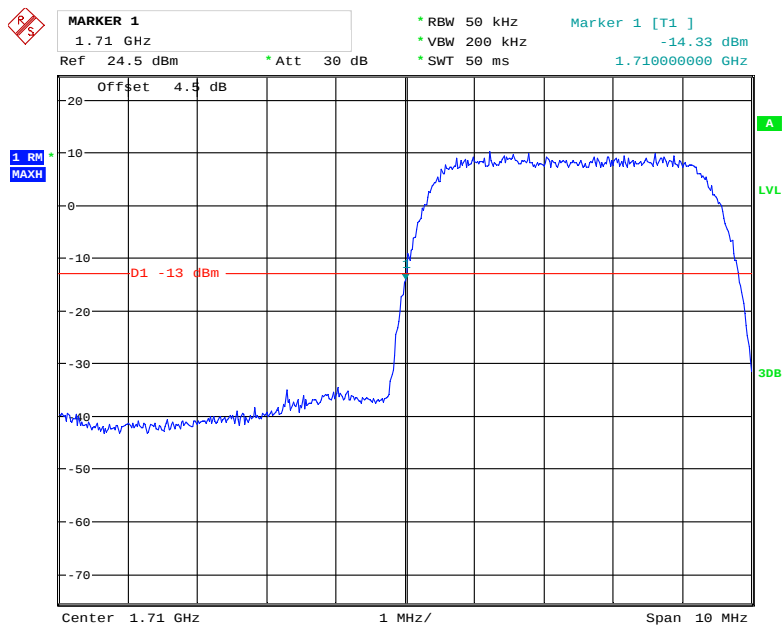
Date: 9.JAN.2019 18:35:59

WCDMA Band II HSUPA, Right Band Edge



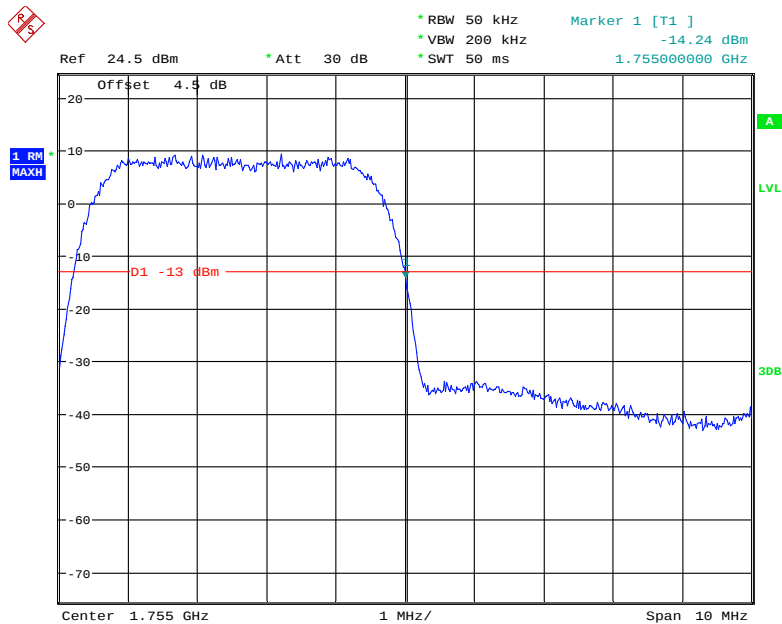
Date: 9.JAN.2019 18:40:26

WCDMA Band IV Rel 99, Left Band Edge



Date: 9.JAN.2019 18:44:53

WCDMA Band IV Rel 99, Right Band Edge



Date: 9.JAN.2019 18:43:59

Ref 24.5 dBm Att 30 dB RBW 50 kHz VBW 200 kHz SWT 50 ms Marker 1 [T1] -15.02 dBm 1.710000000 GHz

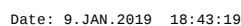
Offset 4.5 dB

1.71 GHz 1 MHz/ 10 MHz

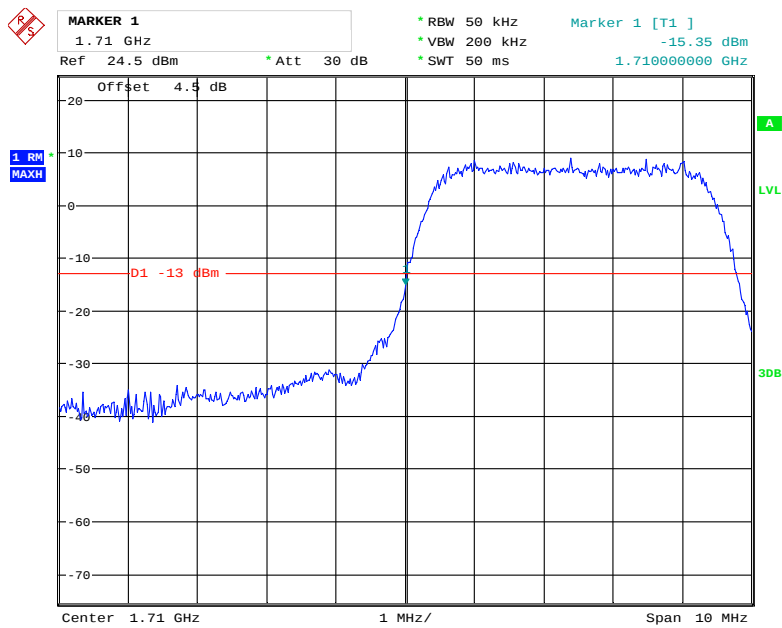
D1 -13 dBm

1.710000000 GHz

WCDMA Band IV HSDPA, Right Band Edge

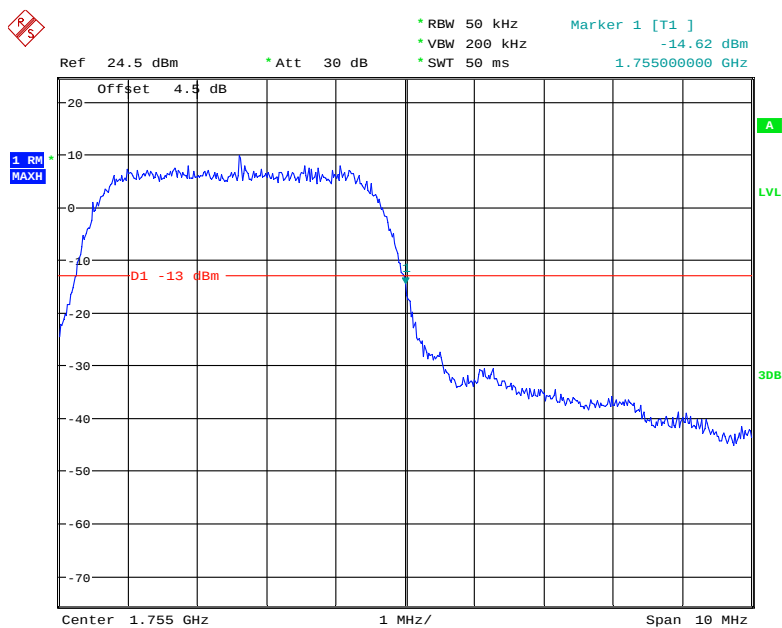


WCDMA Band IV HSUPA, Left Band Edge



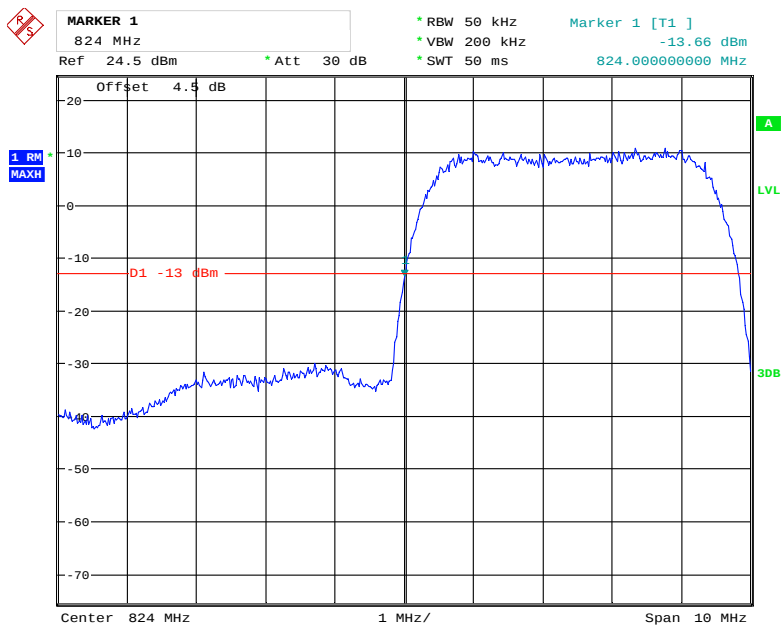
Date: 9.JAN.2019 18:41:19

WCDMA Band IV HSUPA, Right Band Edge



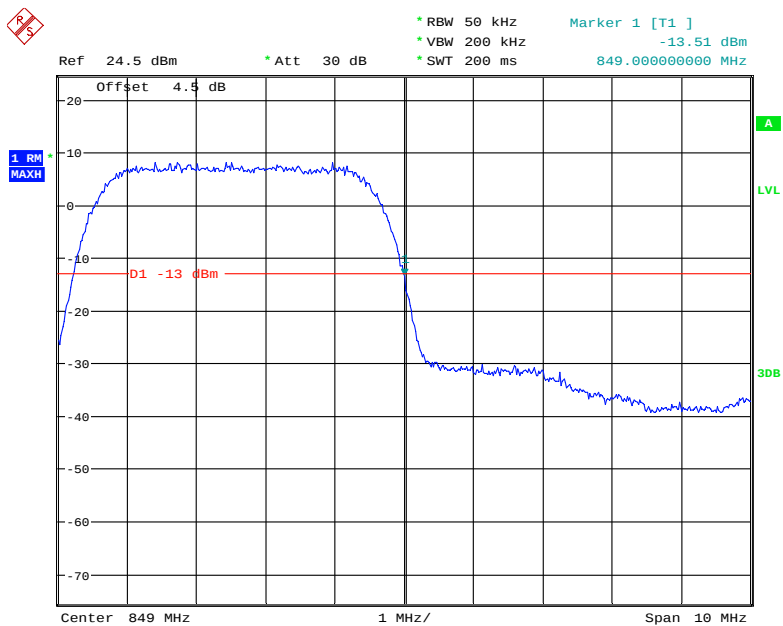
Date: 9.JAN.2019 18:43:30

WCDMA Band V Rel 99, Left Band Edge



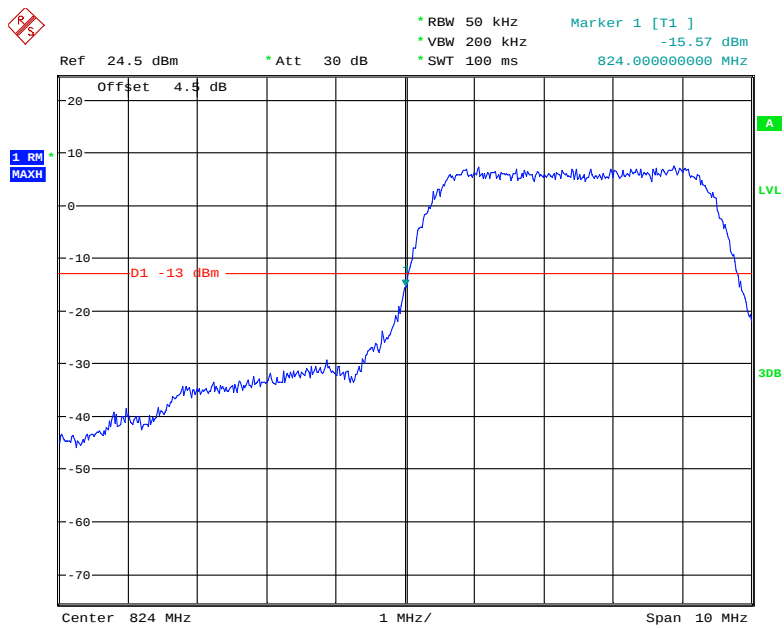
Date: 9.JAN.2019 18:45:34

WCDMA Band V Rel 99, Right Band Edge



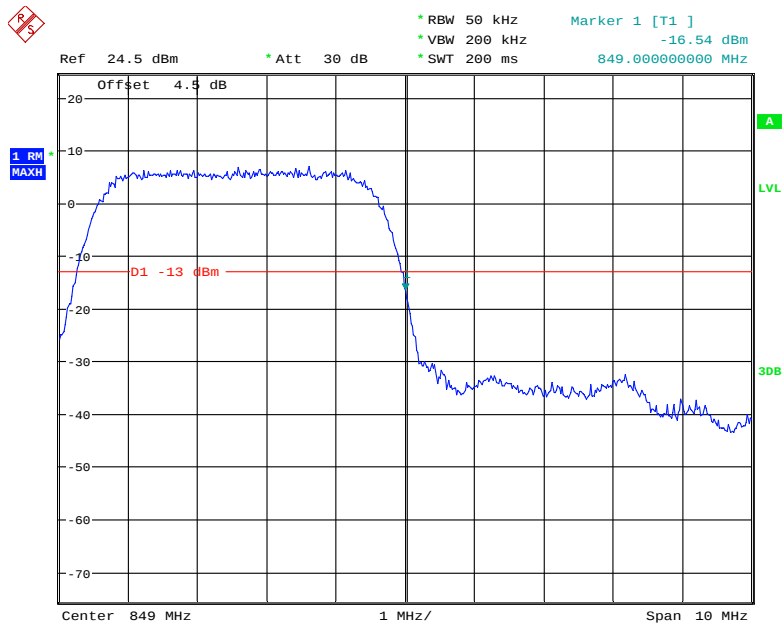
Date: 9.JAN.2019 18:46:13

WCDMA Band V HSDPA, Left Band Edge



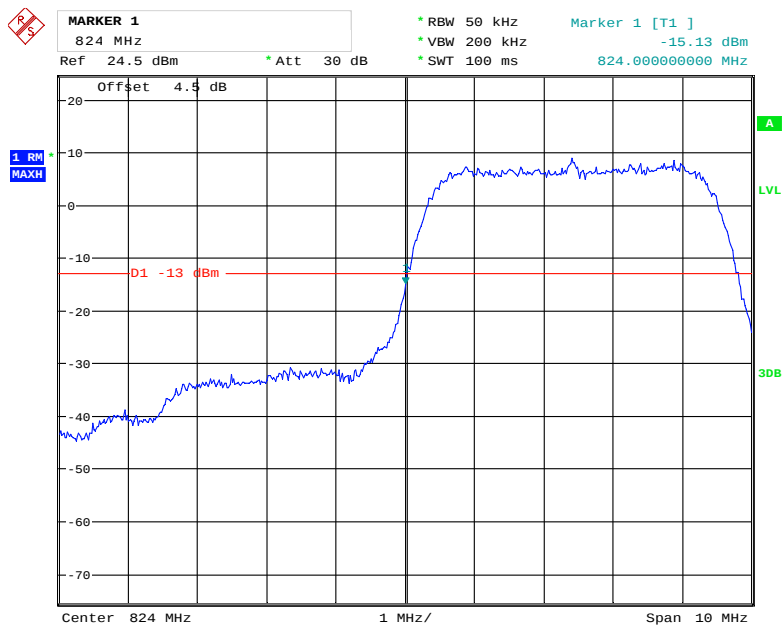
Date: 9.JAN.2019 18:48:17

WCDMA Band V HSDPA, Right Band Edge



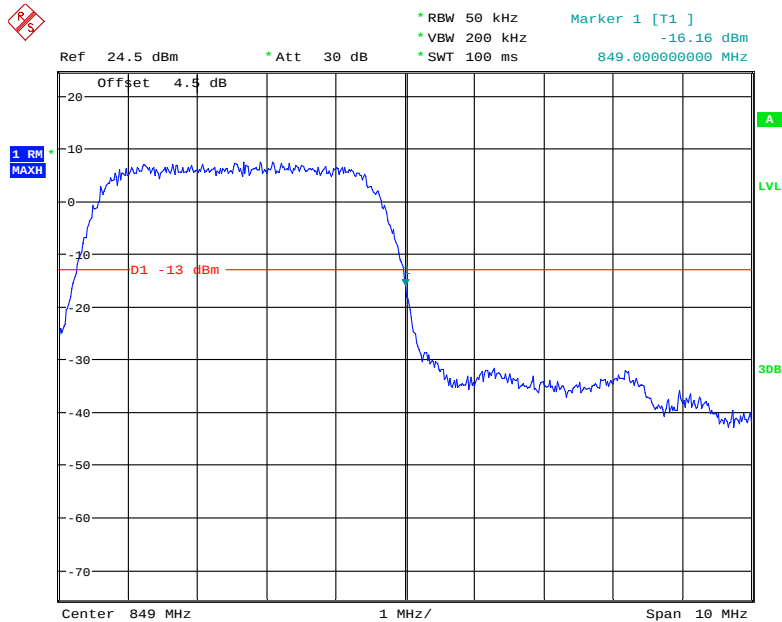
Date: 9.JAN.2019 18:46:44

WCDMA Band V HSUPA, Left Band Edge



Date: 9.JAN.2019 18:47:49

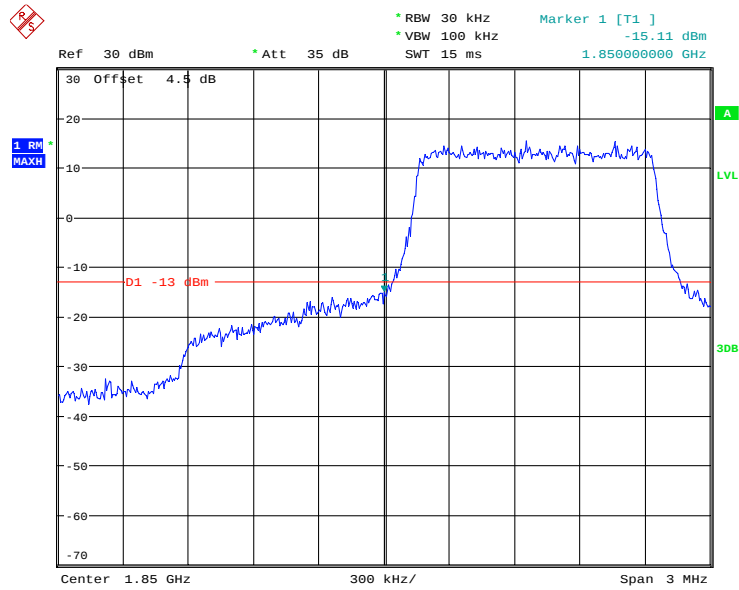
WCDMA Band V HSUPA, Right Band Edge



Date: 9.JAN.2019 18:47:22

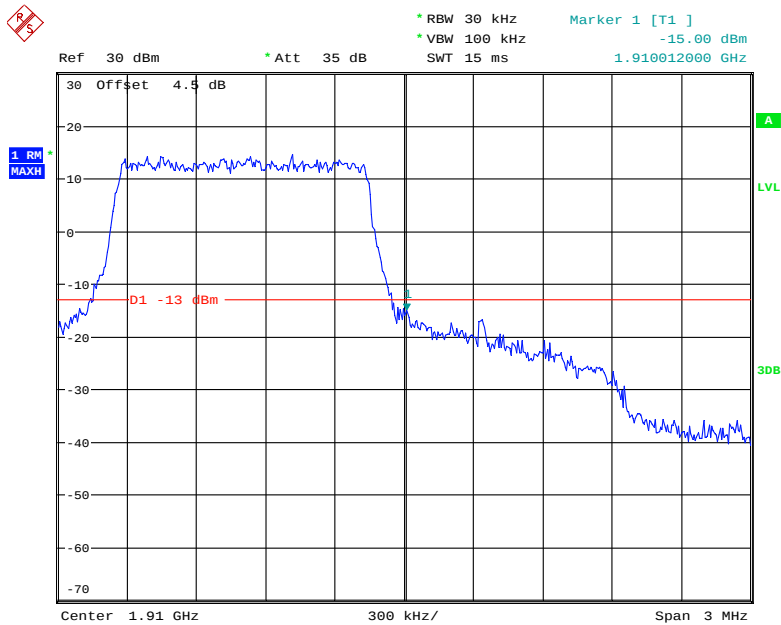
LTE Band 2

QPSK_1.4MHz_6 RB_ Left



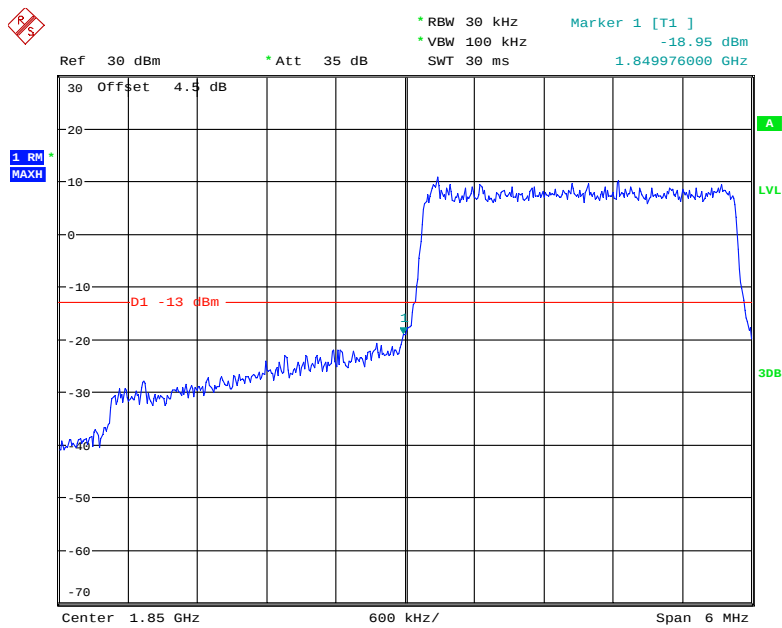
Date: 4.JAN.2019 13:11:30

QPSK_1.4MHz_6 RB_ Right



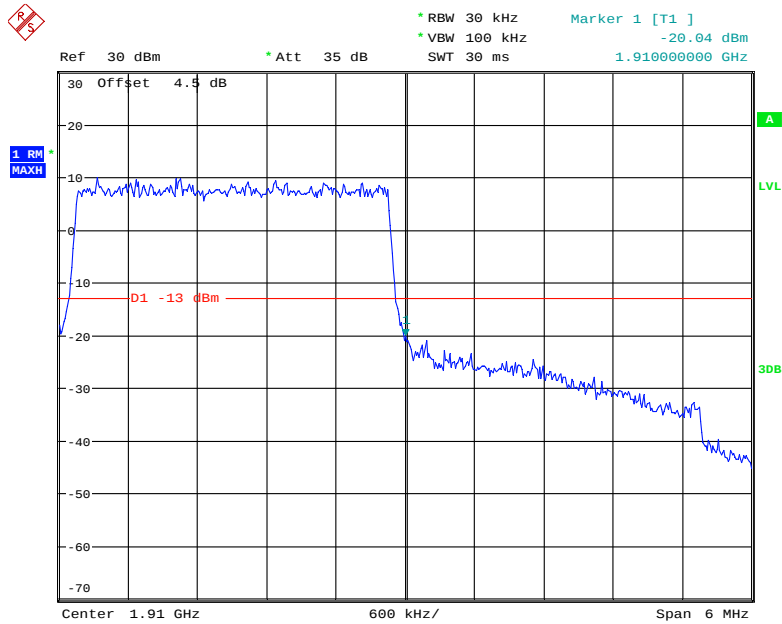
Date: 4.JAN.2019 13:12:12

QPSK_3MHz_15 RB_Left



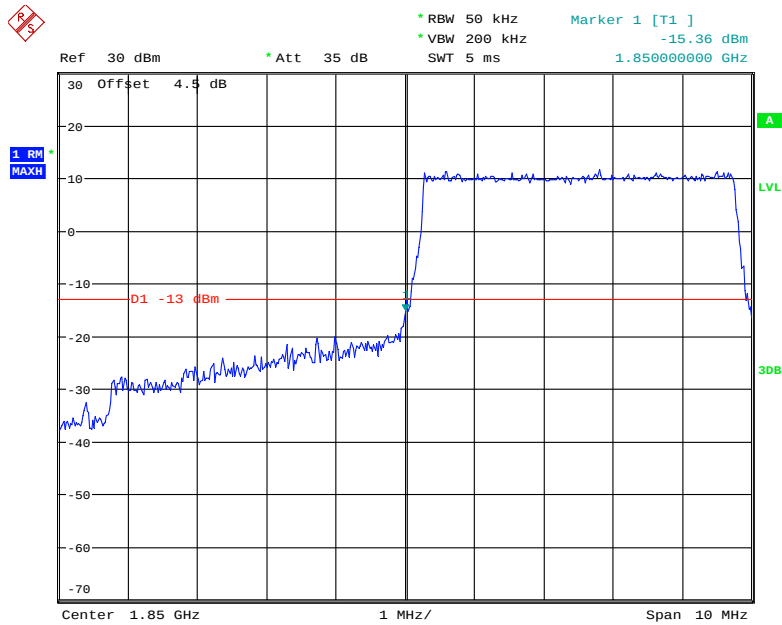
Date: 4.JAN.2019 13:12:52

QPSK_3MHz_15 RB_Right



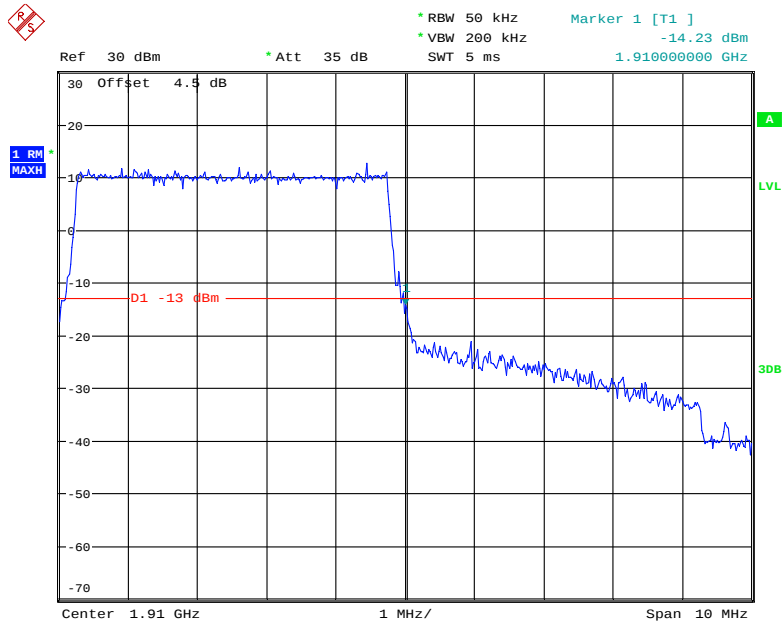
Date: 4.JAN.2019 13:13:30

QPSK_5MHz_25 RB_ Left



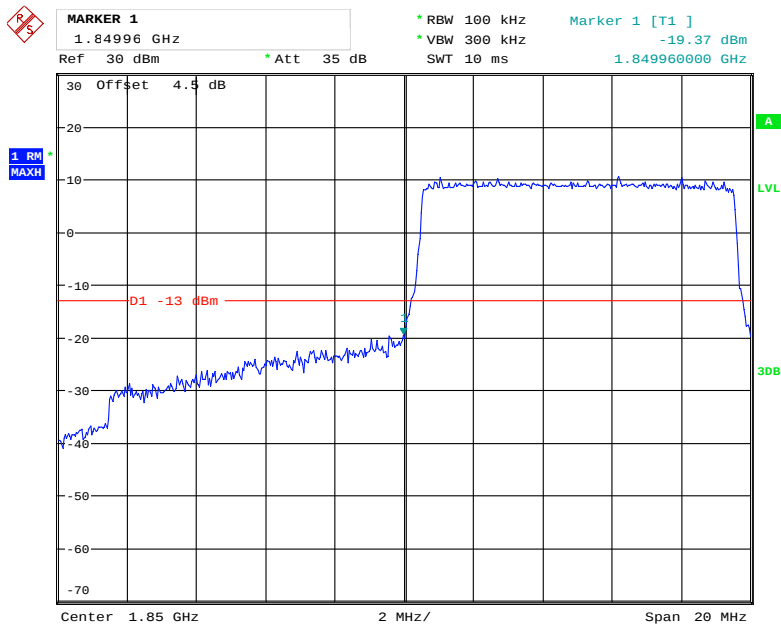
Date: 4.JAN.2019 13:14:38

QPSK_5MHz_25 RB_ Right



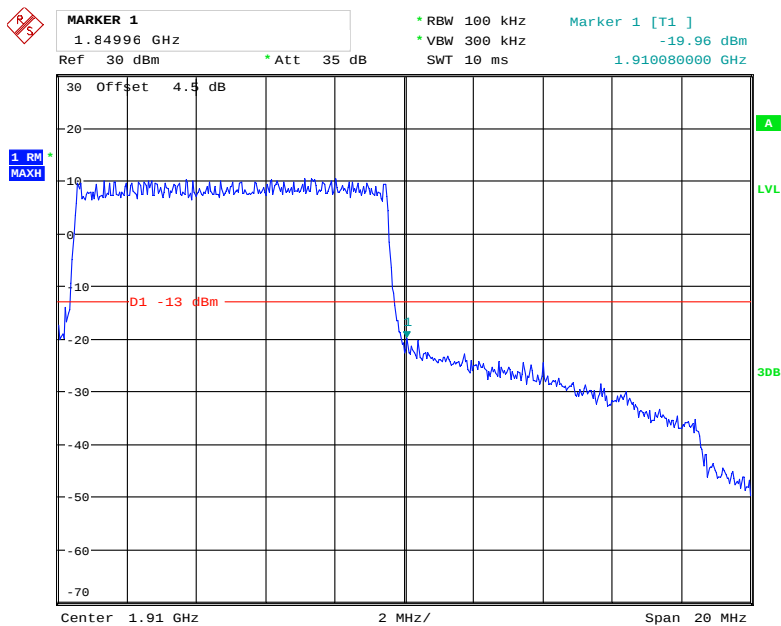
Date: 4.JAN.2019 13:15:37

QPSK_10MHz_50 RB_ Left

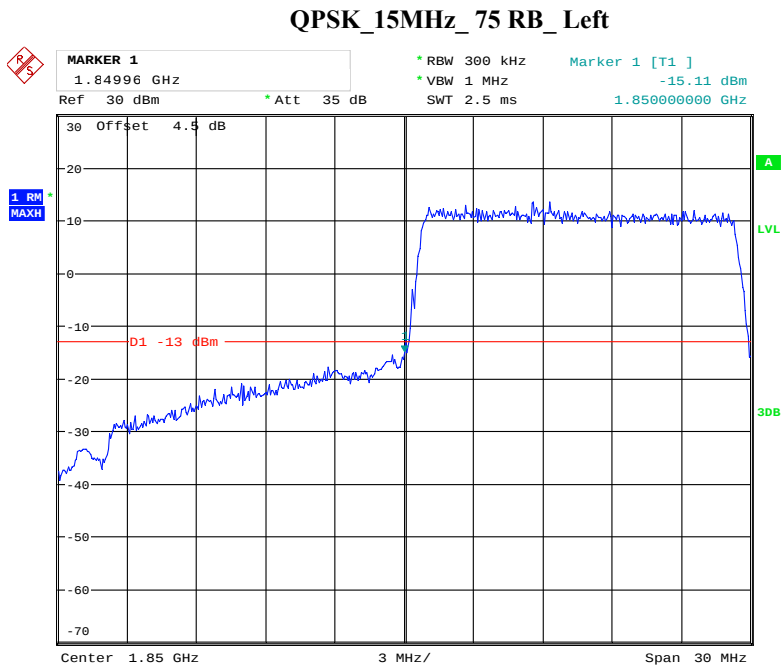


Date: 4.JAN.2019 13:20:27

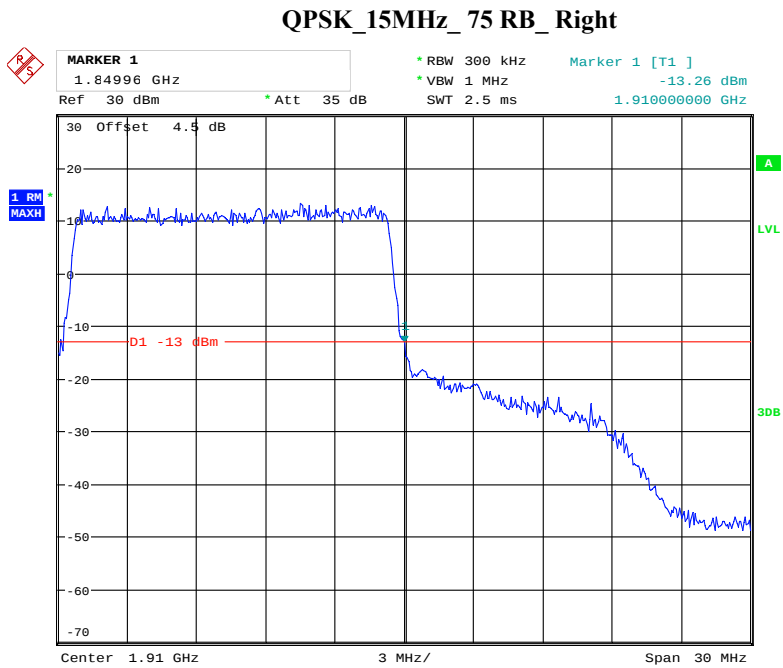
QPSK_10MHz_50 RB_ Right



Date: 4.JAN.2019 13:21:02

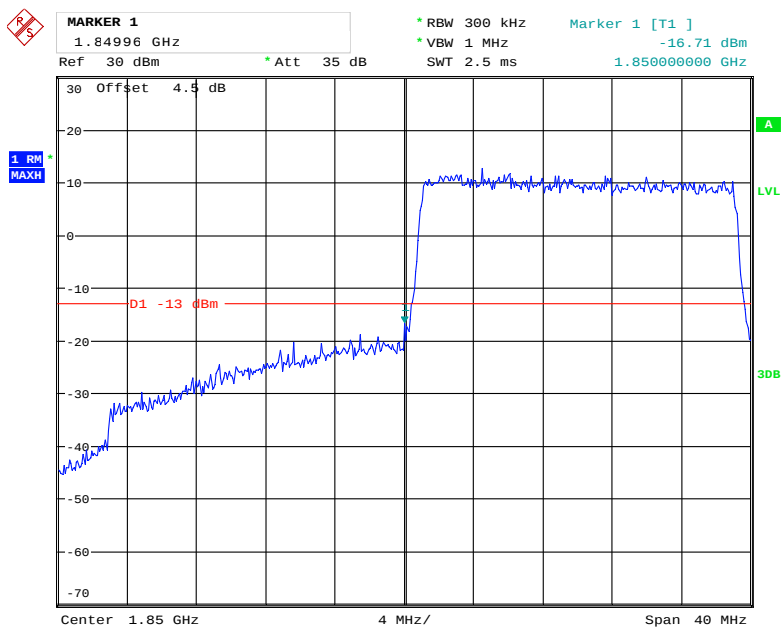


Date: 4.JAN.2019 13:21:47



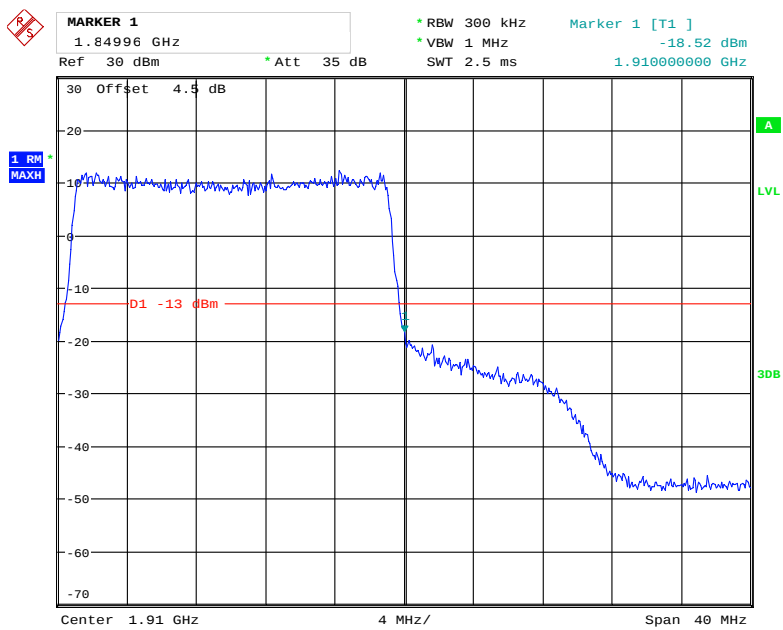
Date: 4.JAN.2019 13:22:29

QPSK_20MHz_ FULL RB_ Left

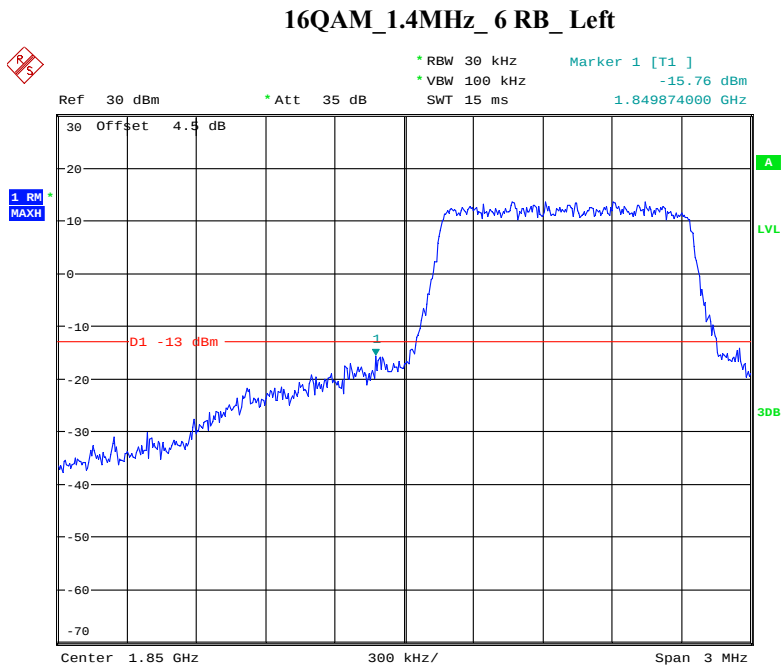


Date: 4.JAN.2019 13:23:20

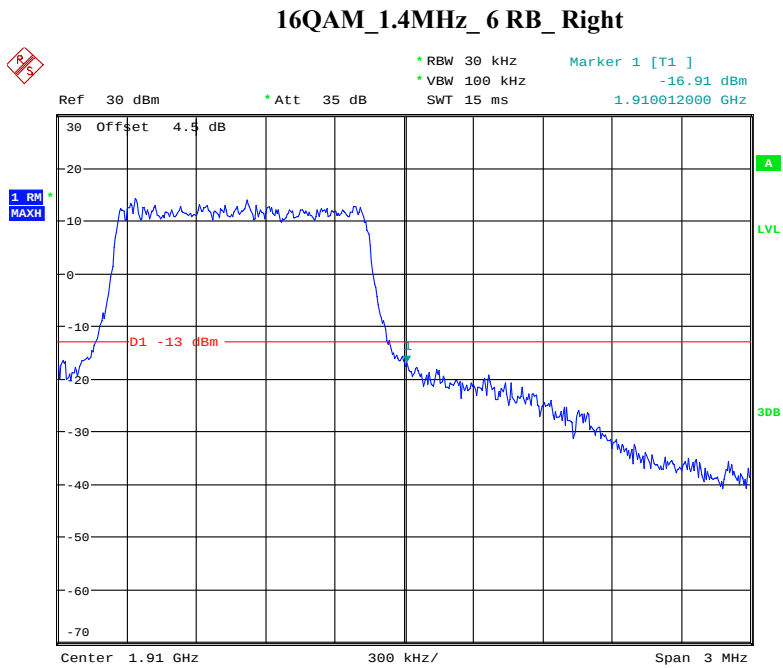
QPSK_20MHz_ FULL RB_ Right



Date: 4.JAN.2019 13:24:09

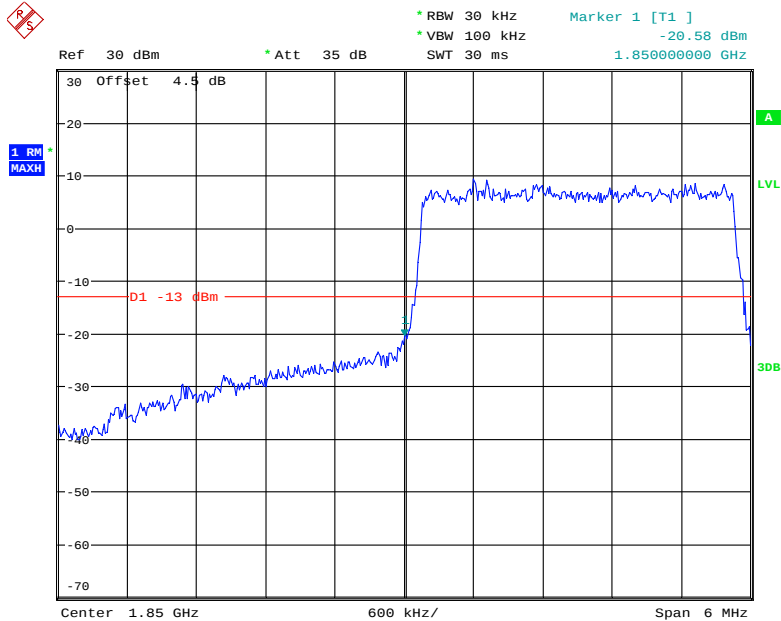


Date: 4.JAN.2019 13:11:52



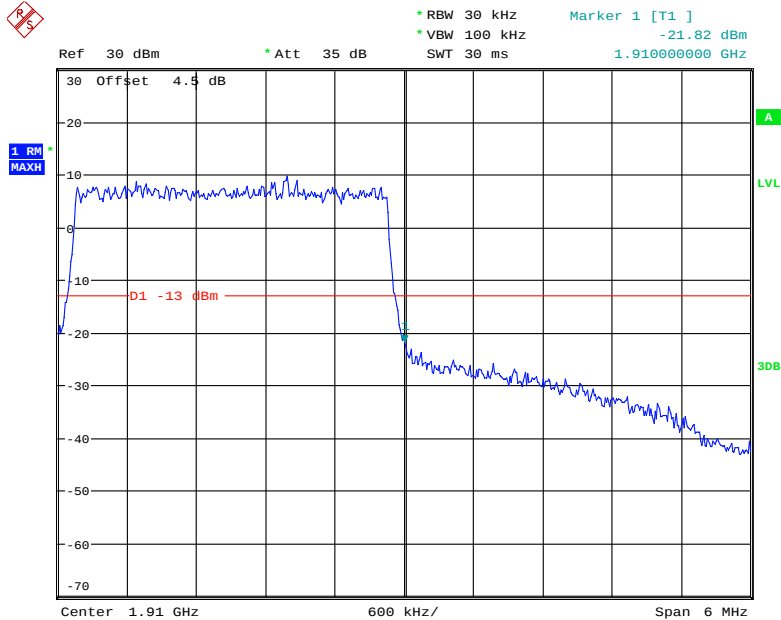
Date: 4.JAN.2019 13:12:31

16QAM_3MHz_15 RB_ Left



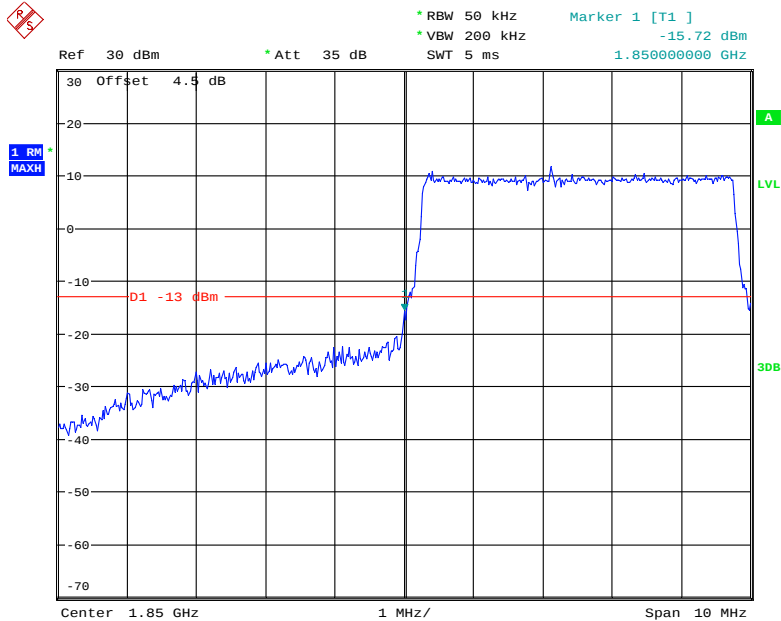
Date: 4.JAN.2019 13:13:11

16QAM_3MHz_15 RB_ Right



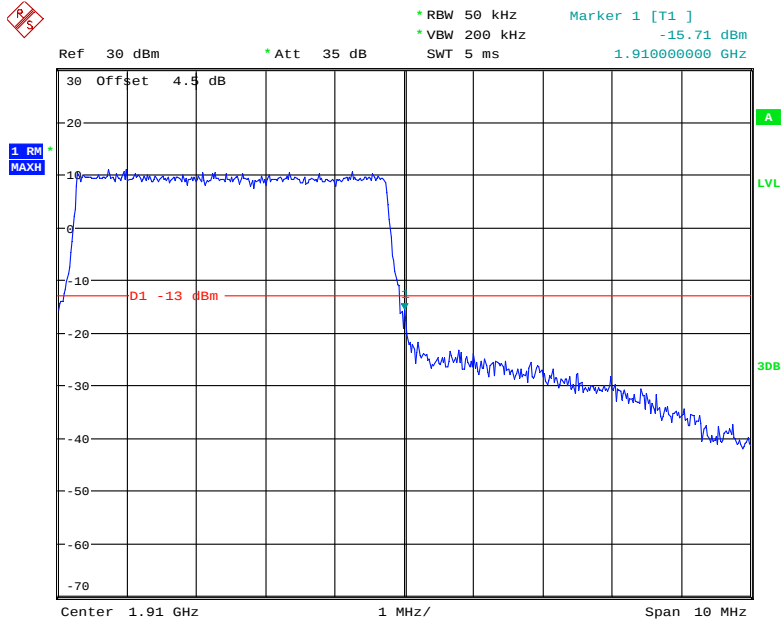
Date: 4.JAN.2019 13:13:49

16QAM_5MHz_25 RB_ Left

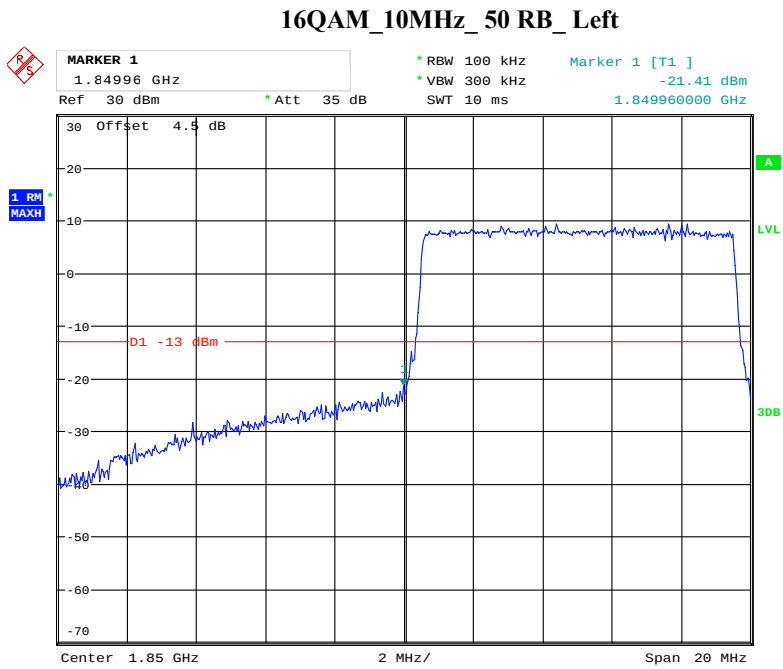


Date: 4.JAN.2019 13:15:05

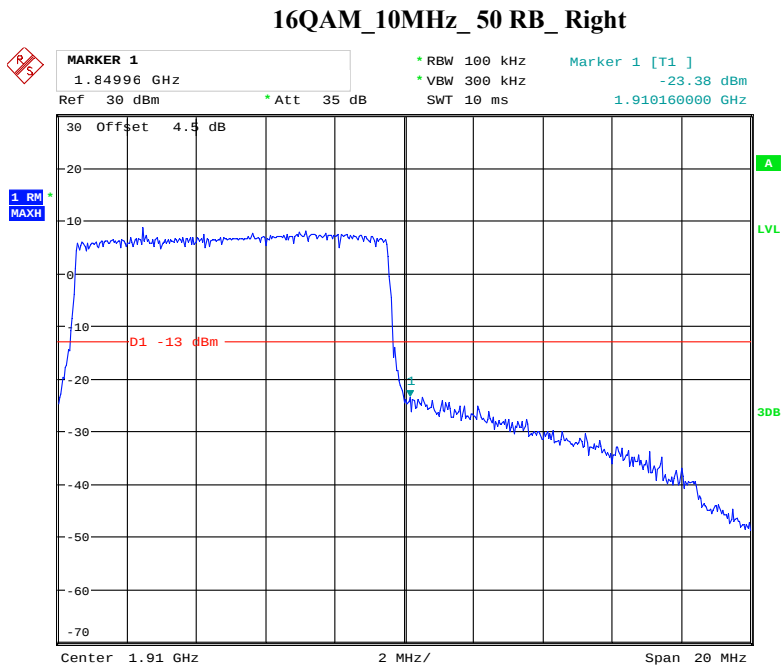
16QAM_5MHz_25 RB_ Right



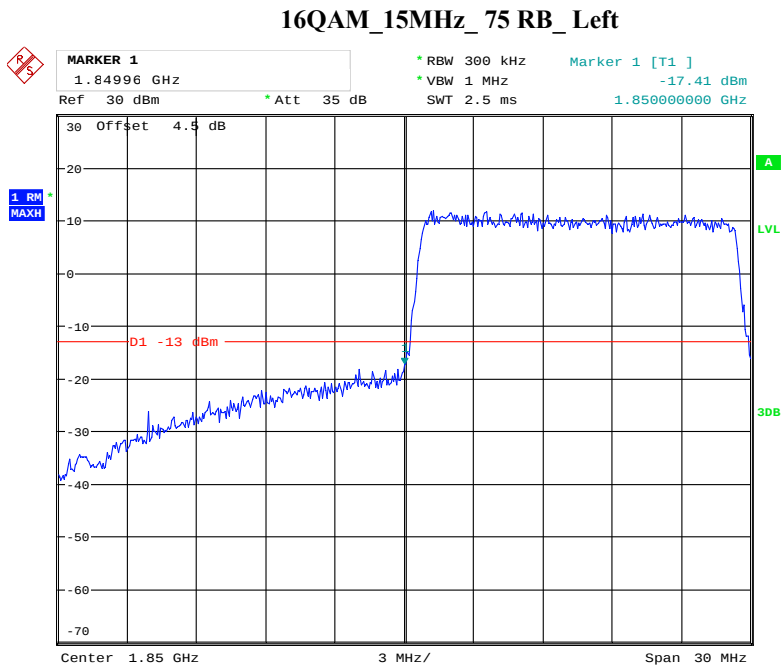
Date: 4.JAN.2019 13:16:11



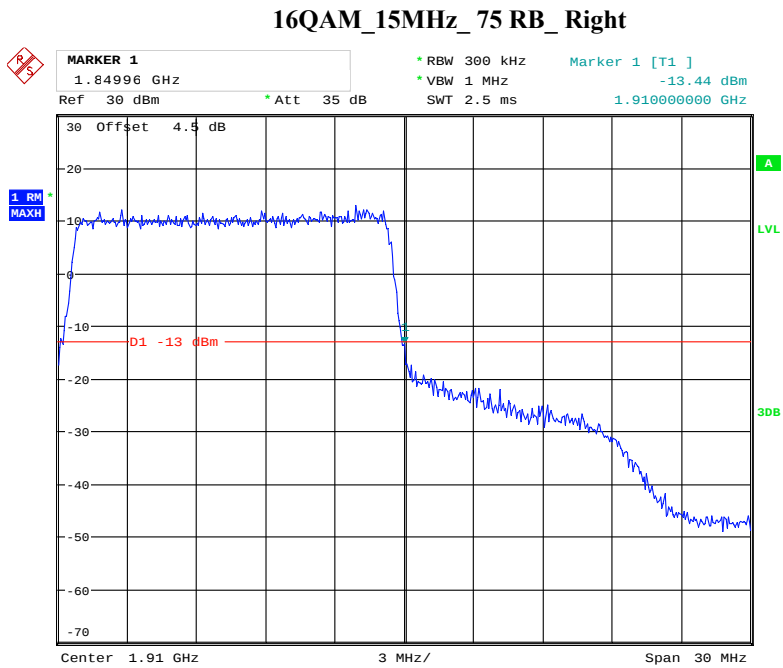
Date: 4.JAN.2019 13:20:45



Date: 4.JAN.2019 13:21:19

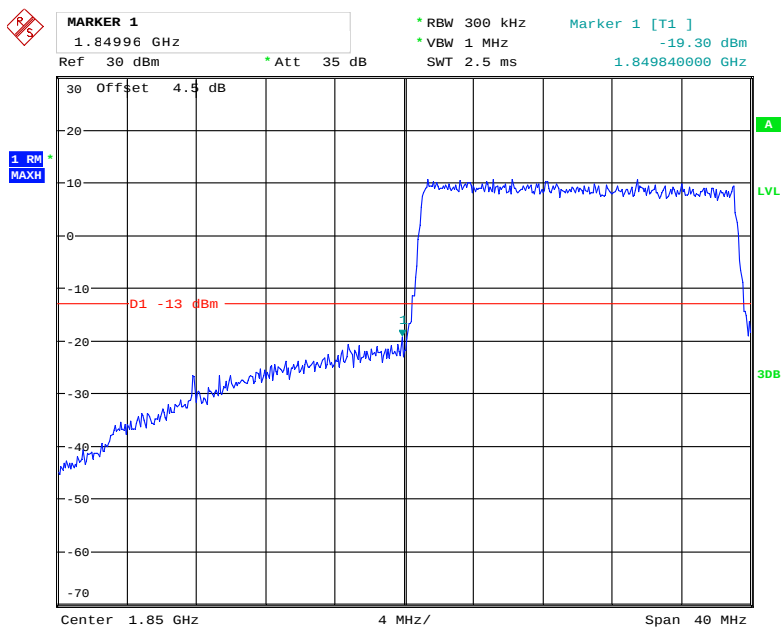


Date: 4.JAN.2019 13:22:08



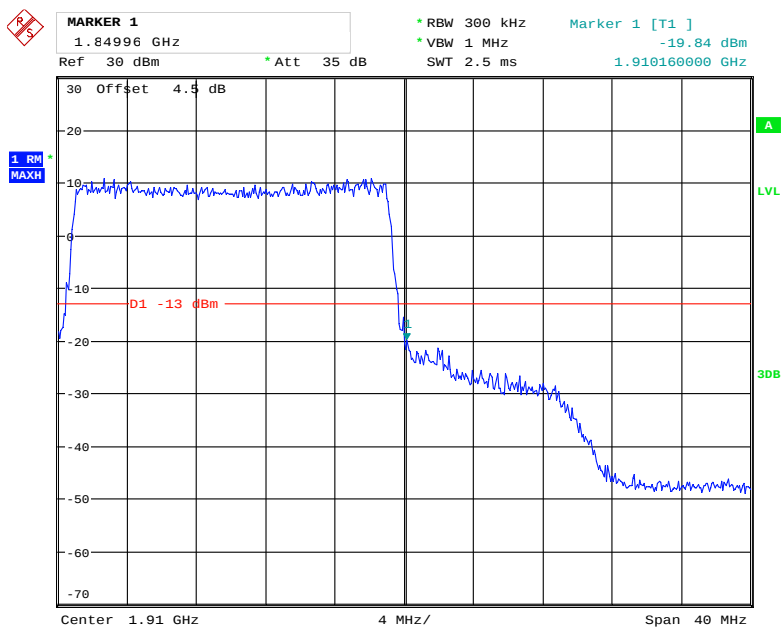
Date: 4.JAN.2019 13:22:53

16QAM_20MHz_ FULL RB_ Left



Date: 4.JAN.2019 13:23:44

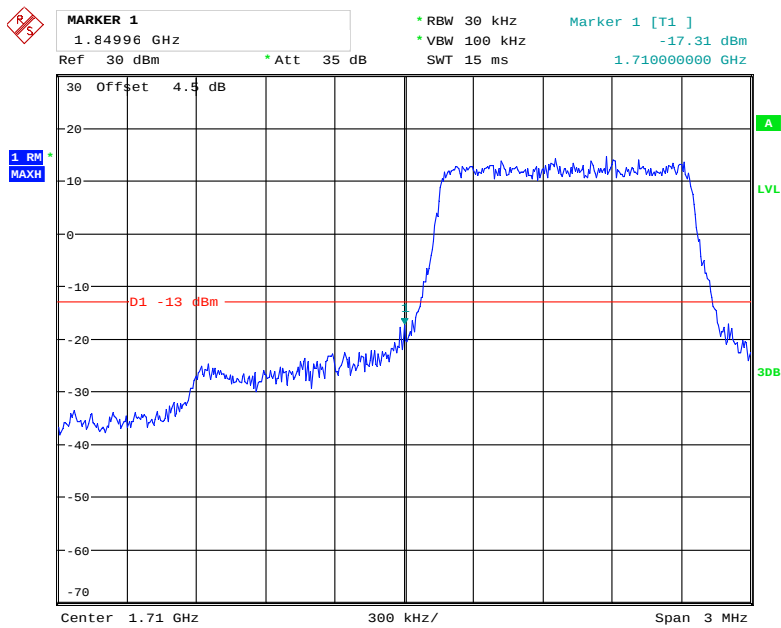
16QAM_20MHz_ FULL RB_ Right



Date: 4.JAN.2019 13:24:29

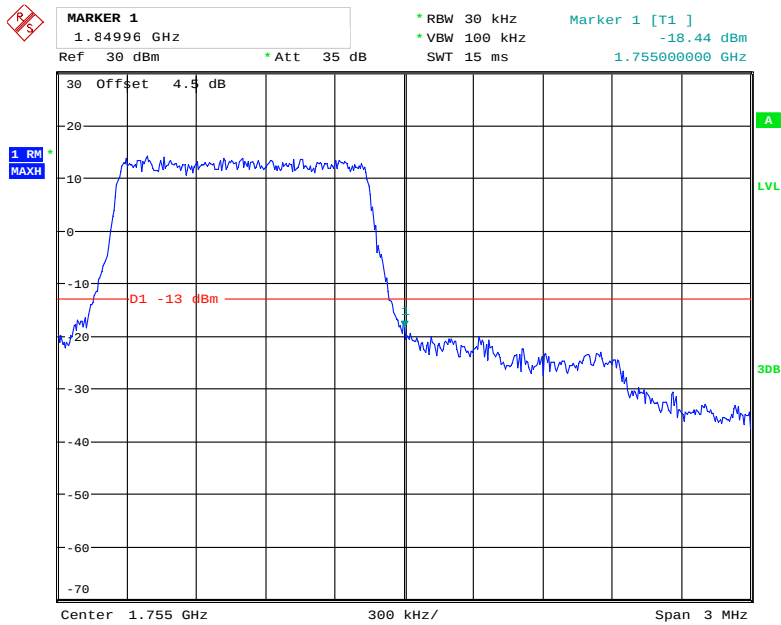
LTE Band 4

QPSK_1.4MHz_6 RB_ Left



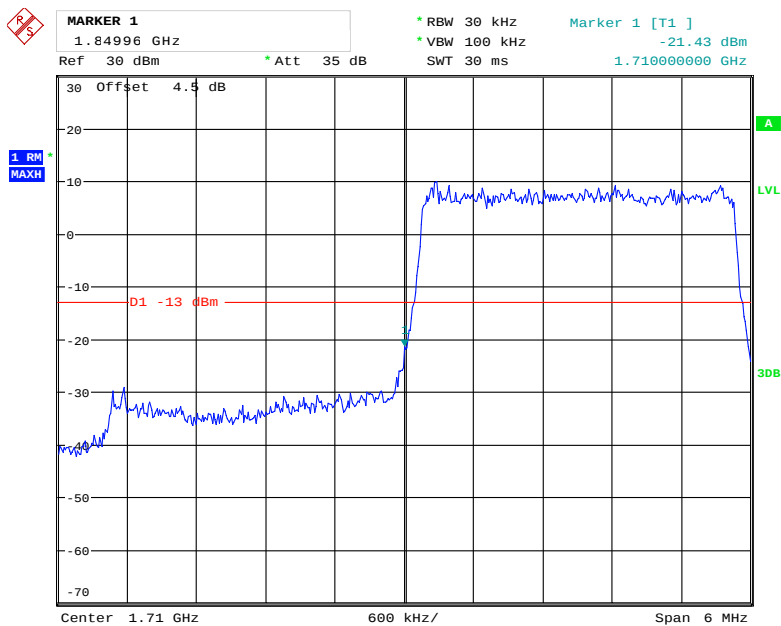
Date: 4.JAN.2019 13:24:50

QPSK_1.4MHz_6 RB_ Right



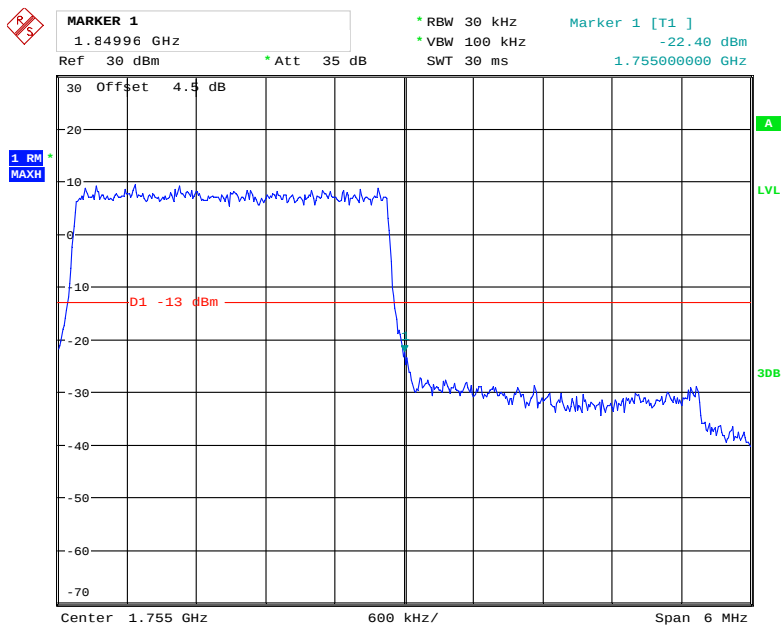
Date: 4.JAN.2019 13:25:29

QPSK_3MHz_15 RB_ Left



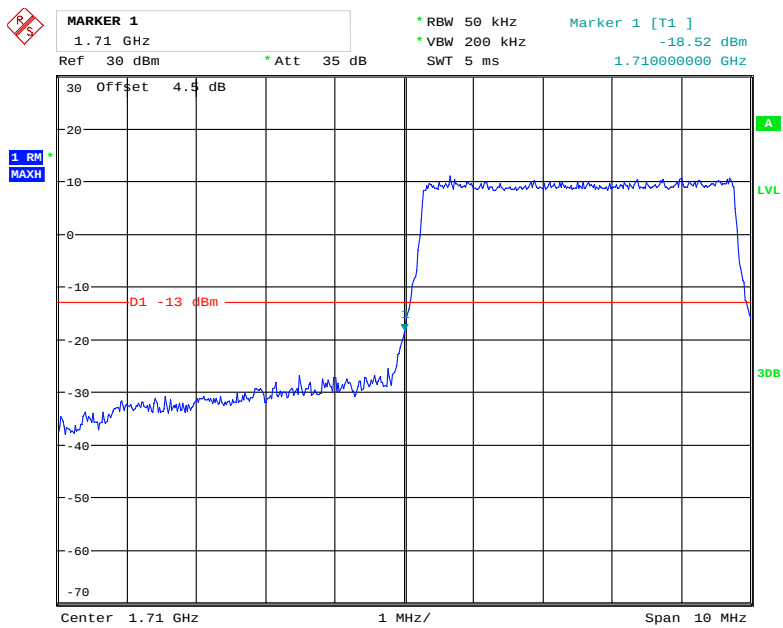
Date: 4.JAN.2019 13:26:01

QPSK_3MHz_15 RB_ Right



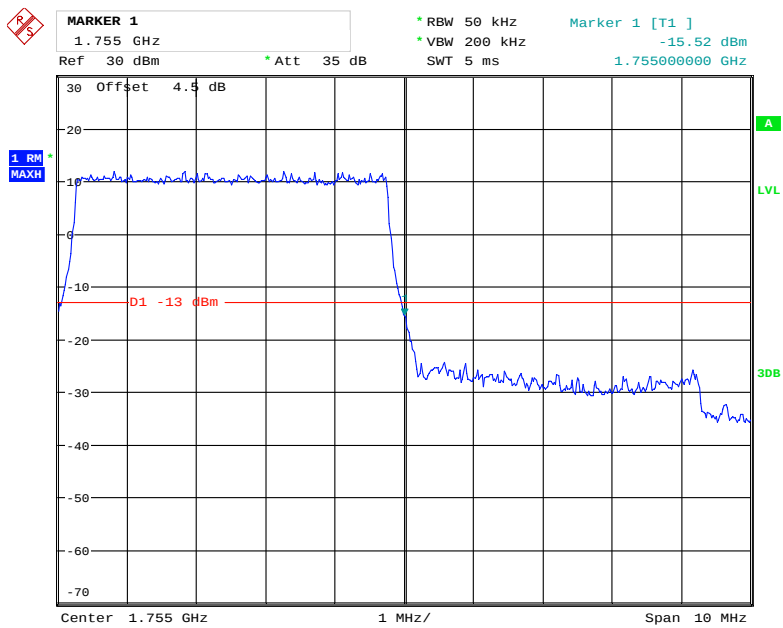
Date: 4.JAN.2019 13:26:31

QPSK_5MHz_25 RB_ Left



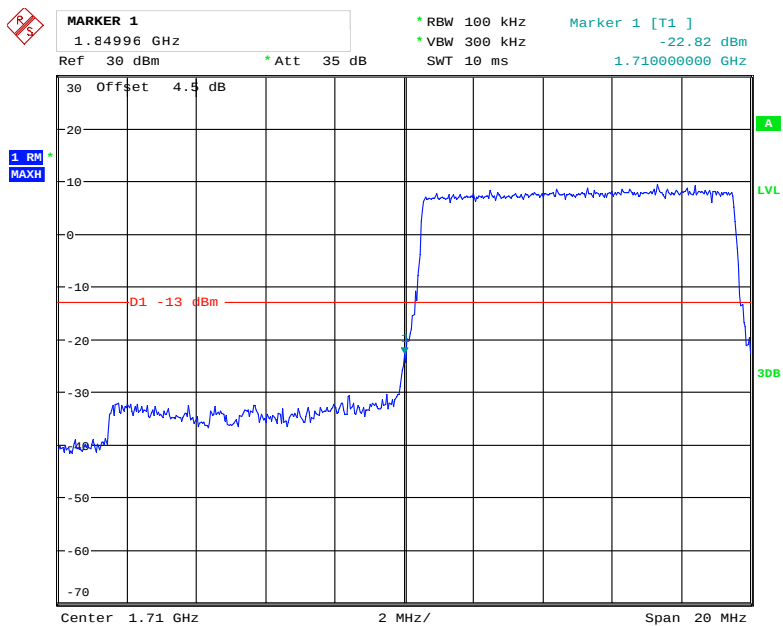
Date: 4.JAN.2019 15:14:19

QPSK_5MHz_25 RB_ Right



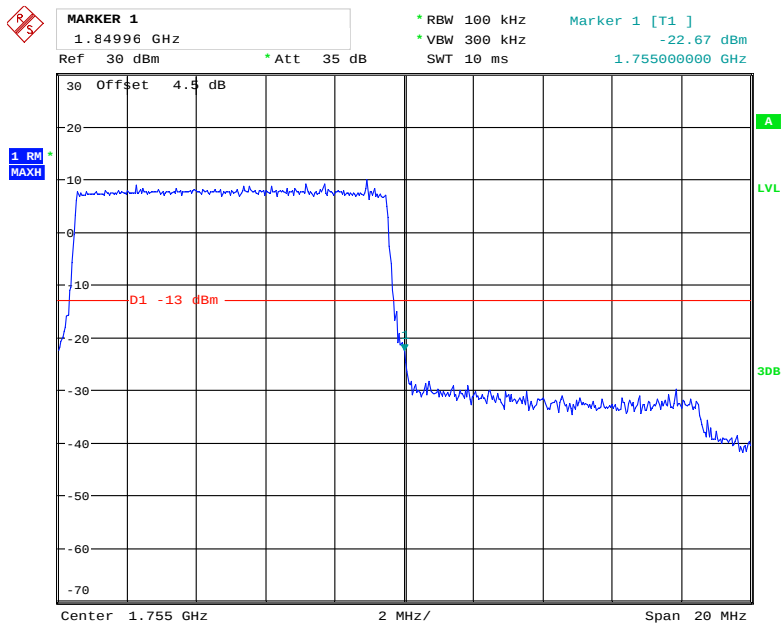
Date: 4.JAN.2019 15:17:10

QPSK_10MHz_50 RB_Left



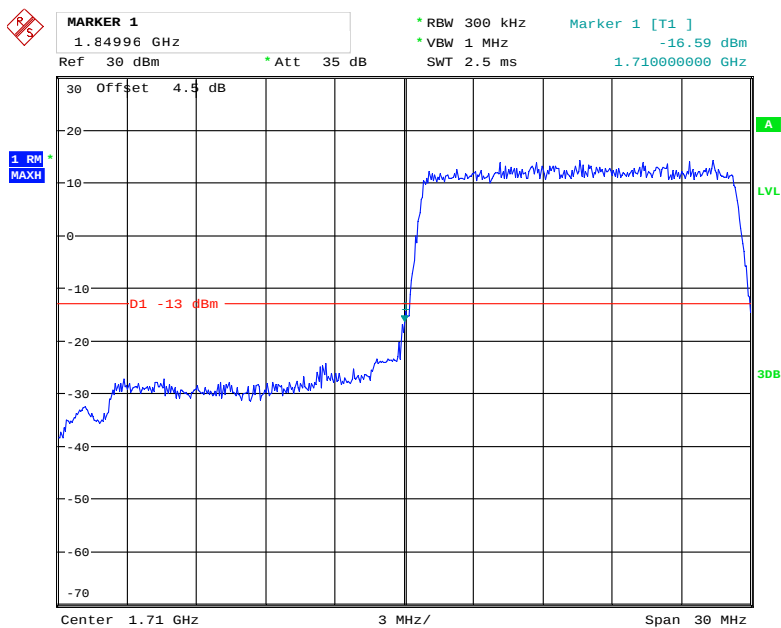
Date: 4.JAN.2019 13:28:23

QPSK_10MHz_50 RB_Right



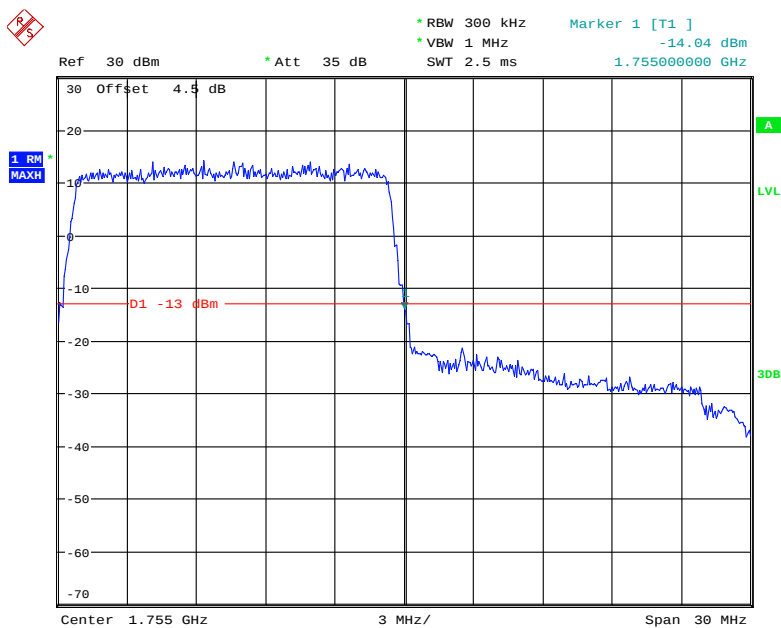
Date: 4.JAN.2019 13:28:55

QPSK_15MHz_75 RB_ Left



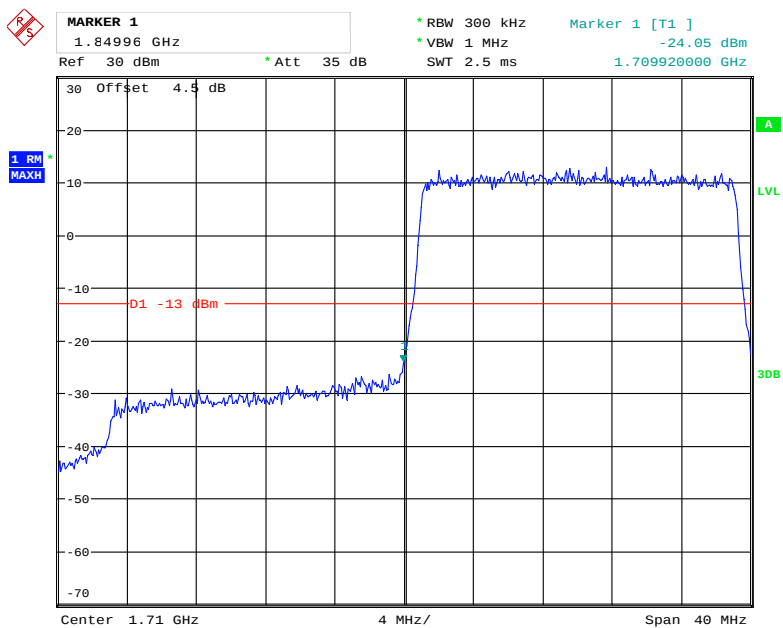
Date: 4.JAN.2019 13:29:41

QPSK_15MHz_75 RB_ Right



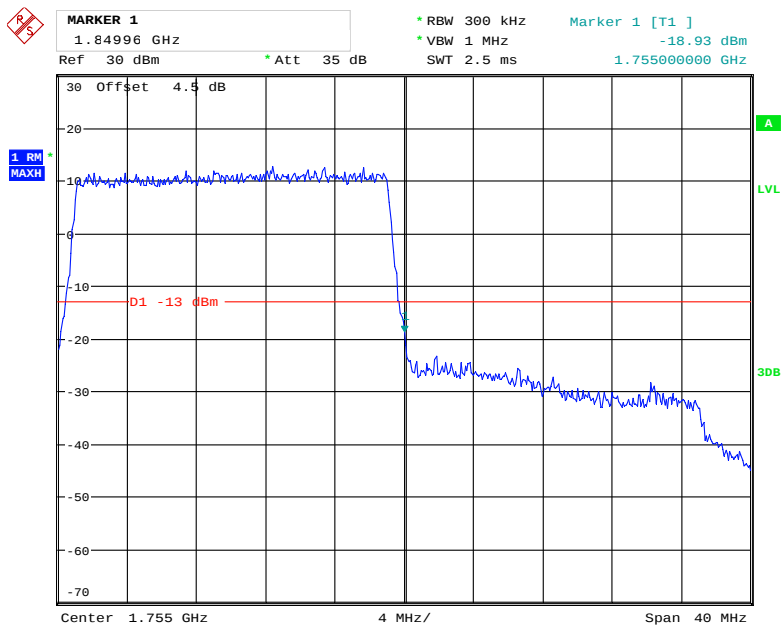
Date: 4.JAN.2019 15:20:05

QPSK_20MHz_FULL RB_Left

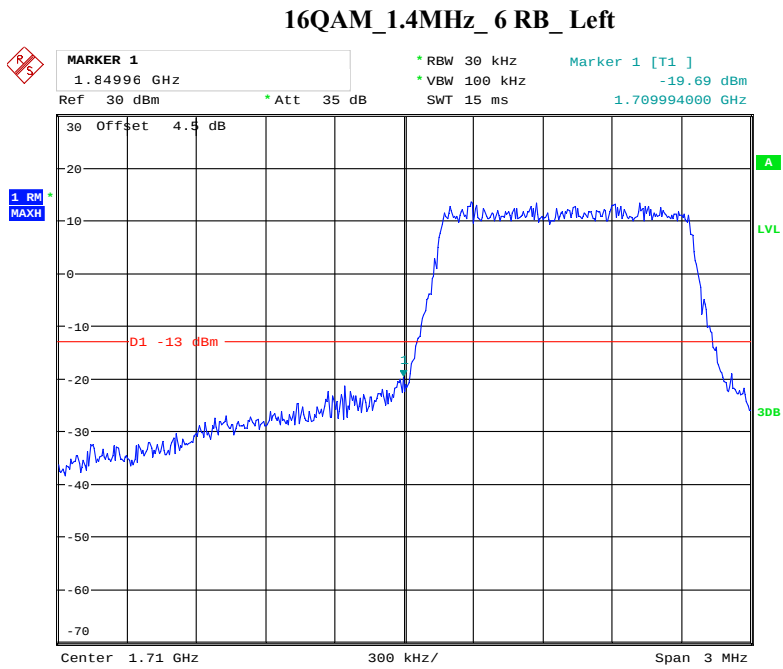


Date: 4.JAN.2019 14:00:10

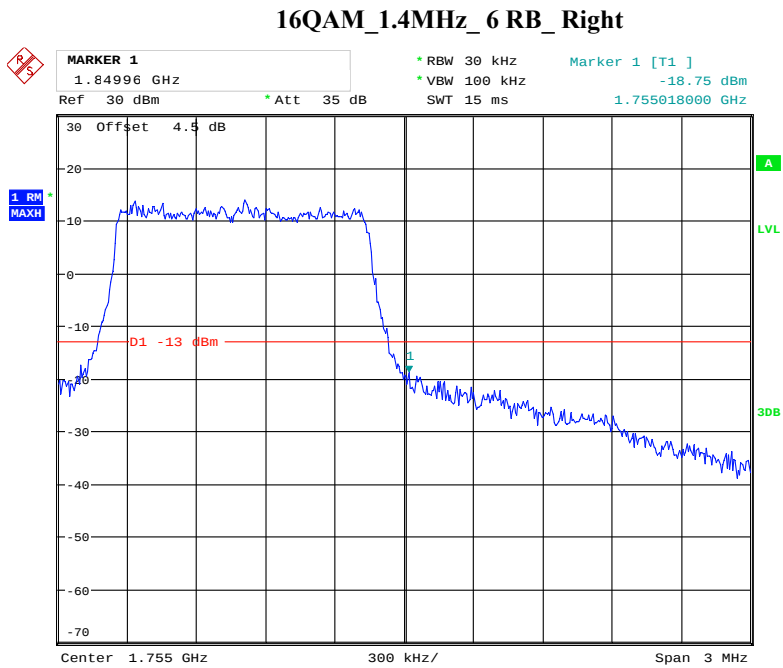
QPSK_20MHz_FULL RB_Right



Date: 4.JAN.2019 14:00:52

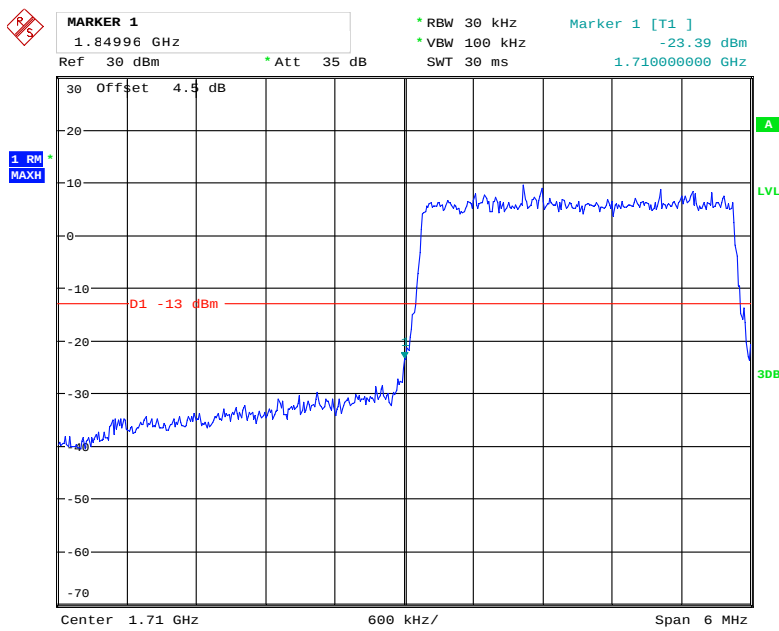


Date: 4.JAN.2019 13:25:10



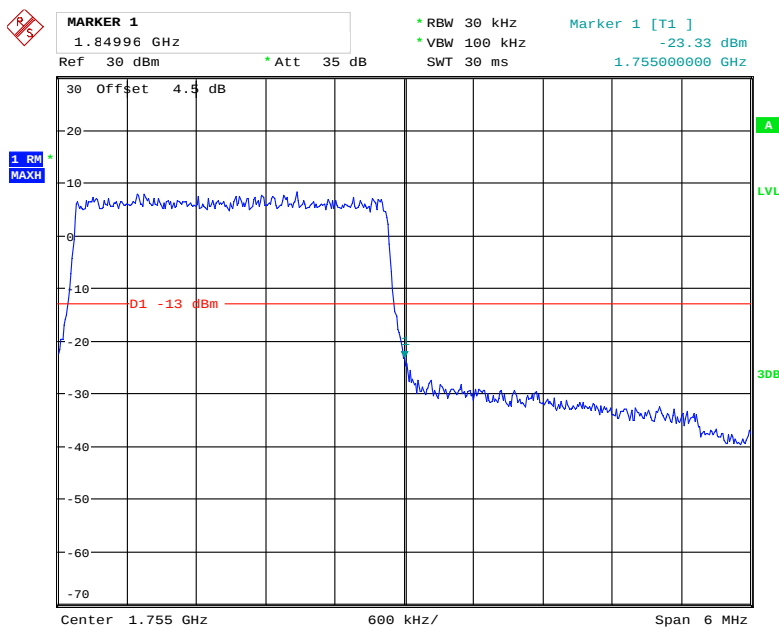
Date: 4.JAN.2019 13:25:44

16QAM_3MHz_15 RB_ Left

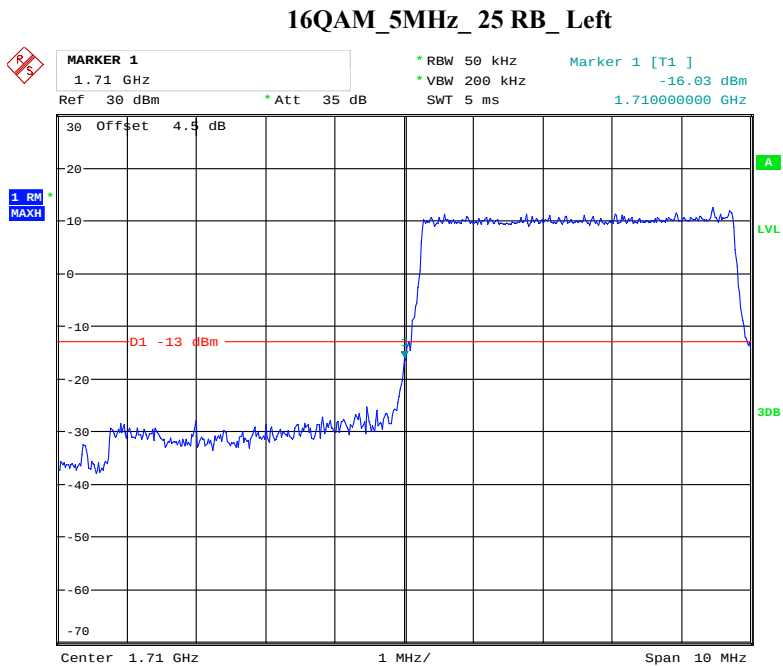


Date: 4.JAN.2019 13:26:16

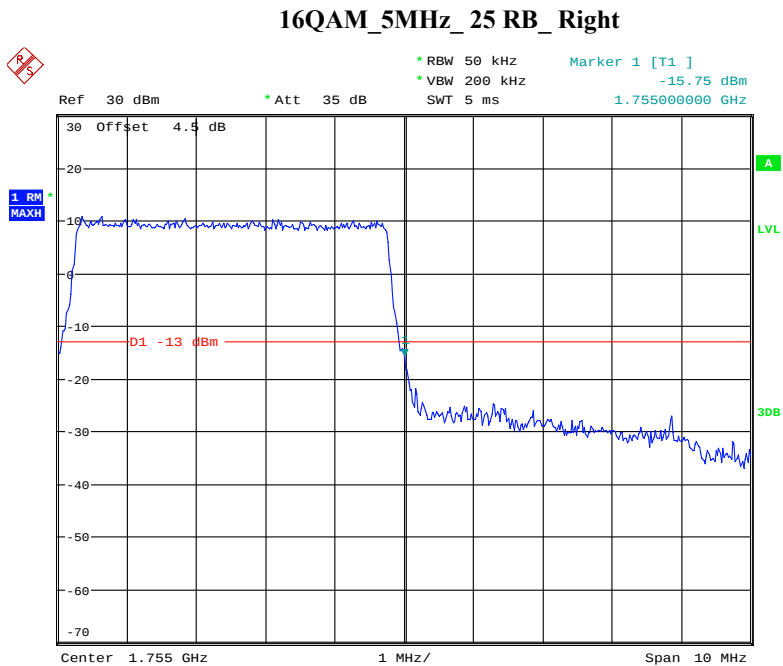
16QAM_3MHz_15 RB_ Right



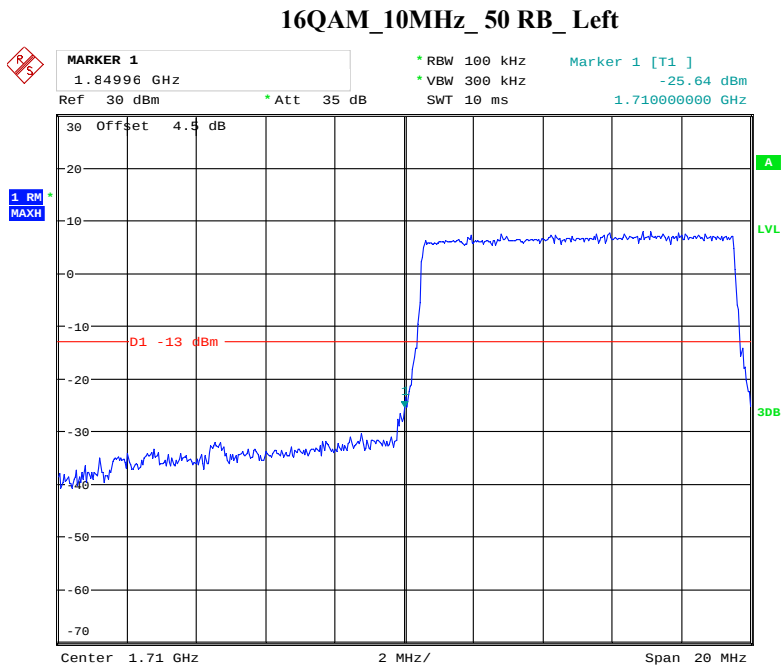
Date: 4.JAN.2019 13:26:46



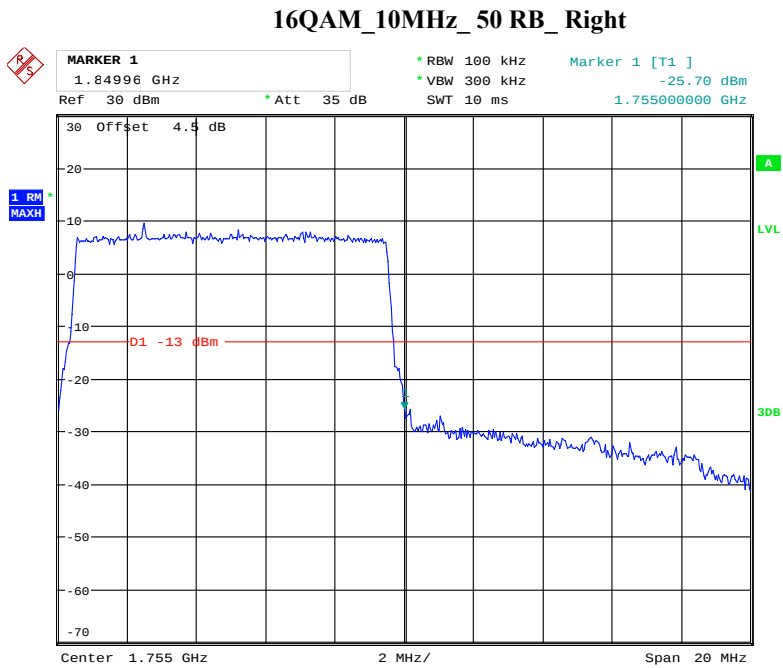
Date: 4.JAN.2019 15:15:13



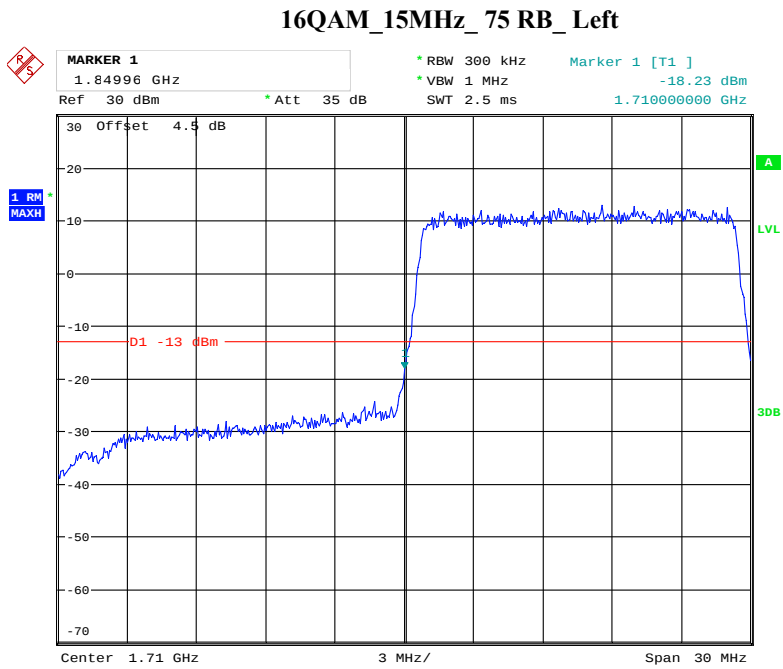
Date: 4.JAN.2019 15:17:57



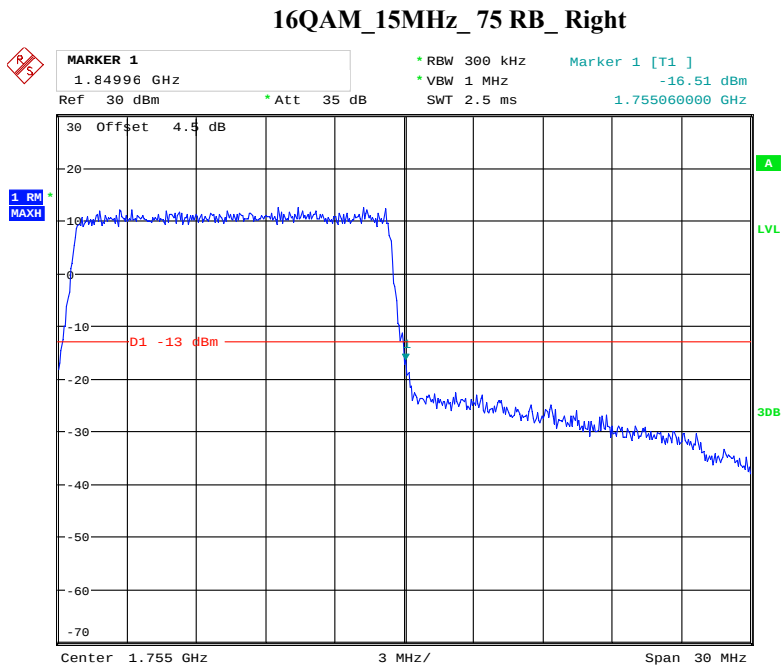
Date: 4.JAN.2019 13:28:39



Date: 4.JAN.2019 13:29:15

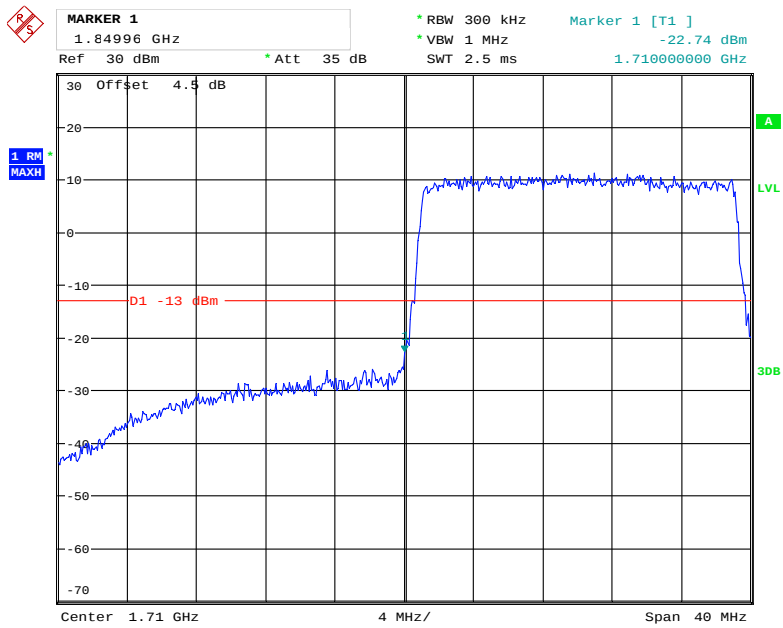


Date: 4.JAN.2019 13:30:00



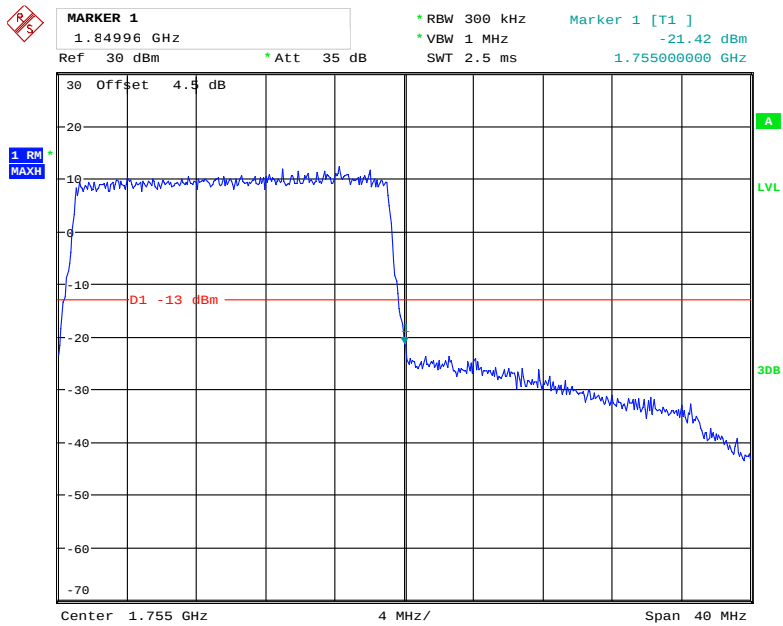
Date: 4.JAN.2019 13:59:44

16QAM_20MHz_ FULL RB_ Left



Date: 4.JAN.2019 14:00:29

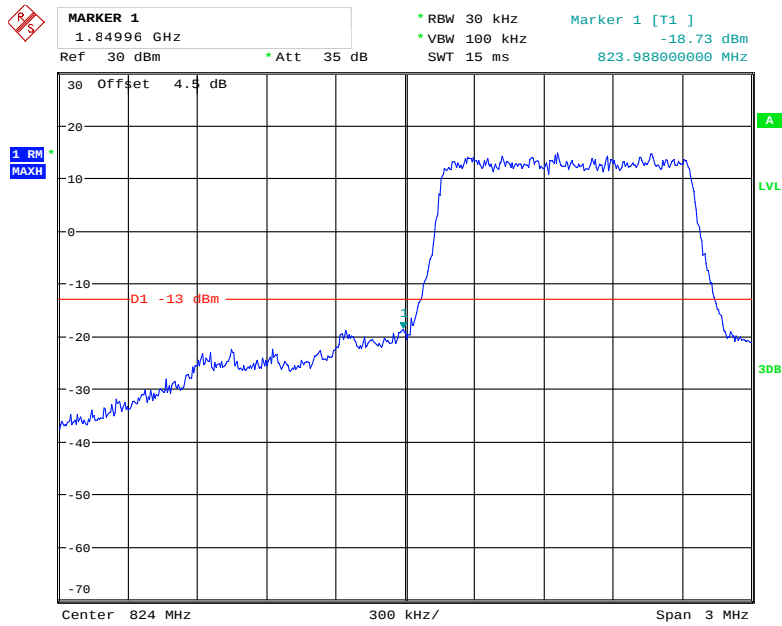
16QAM_20MHz_ FULL RB_ Right



Date: 4.JAN.2019 14:01:14

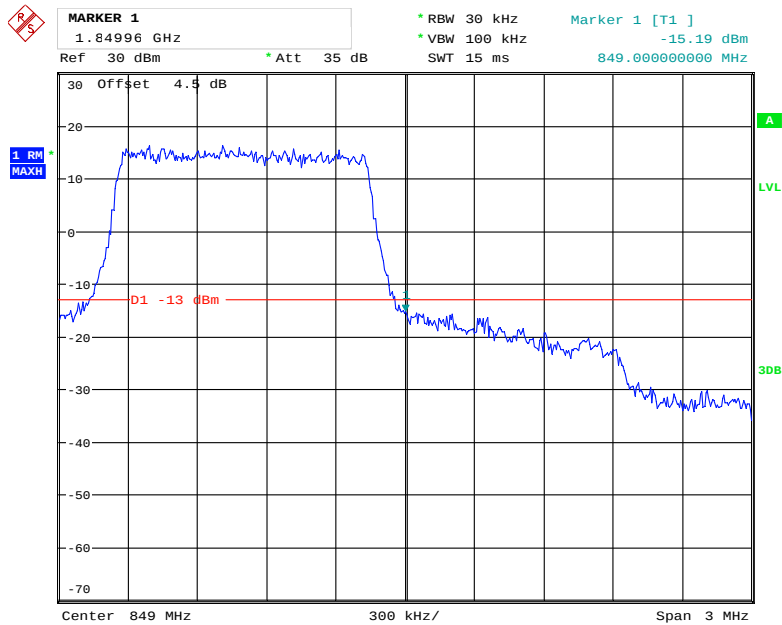
LTE Band 5

QPSK_1.4MHz_6 RB_ Left



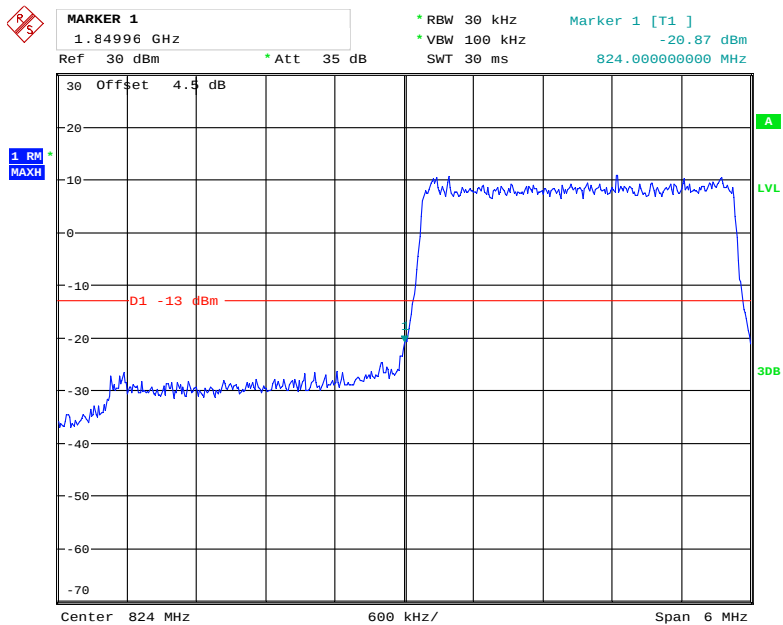
Date: 4.JAN.2019 14:01:36

QPSK_1.4MHz_6 RB_ Right



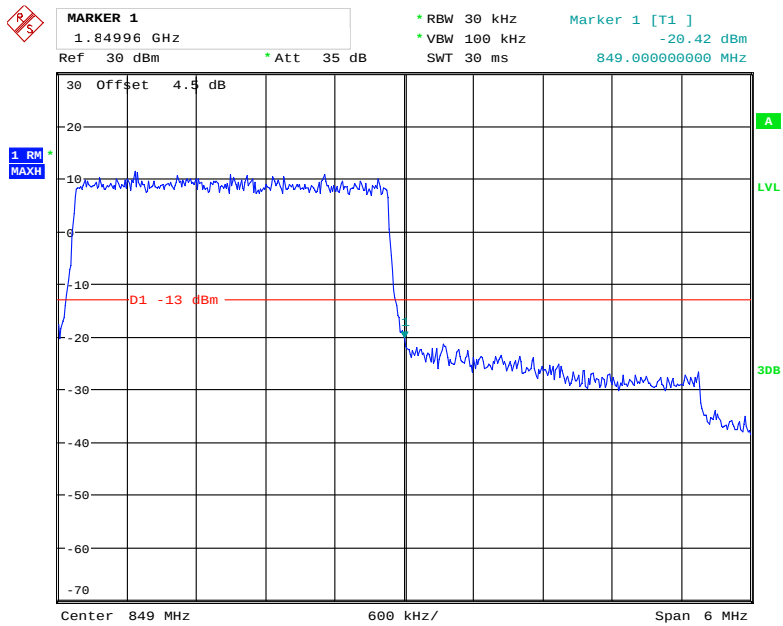
Date: 4.JAN.2019 14:02:09

QPSK_3MHz_15 RB_Left



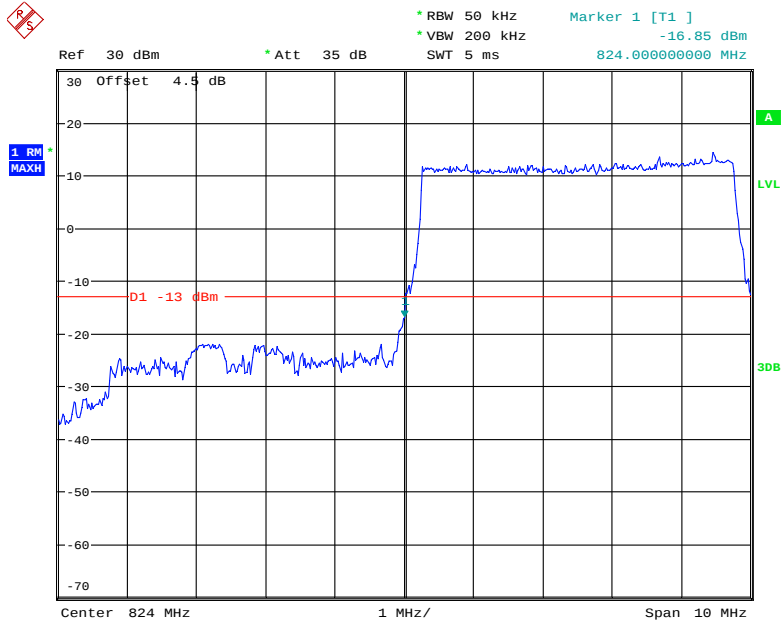
Date: 4.JAN.2019 14:02:49

QPSK_3MHz_15 RB_Right



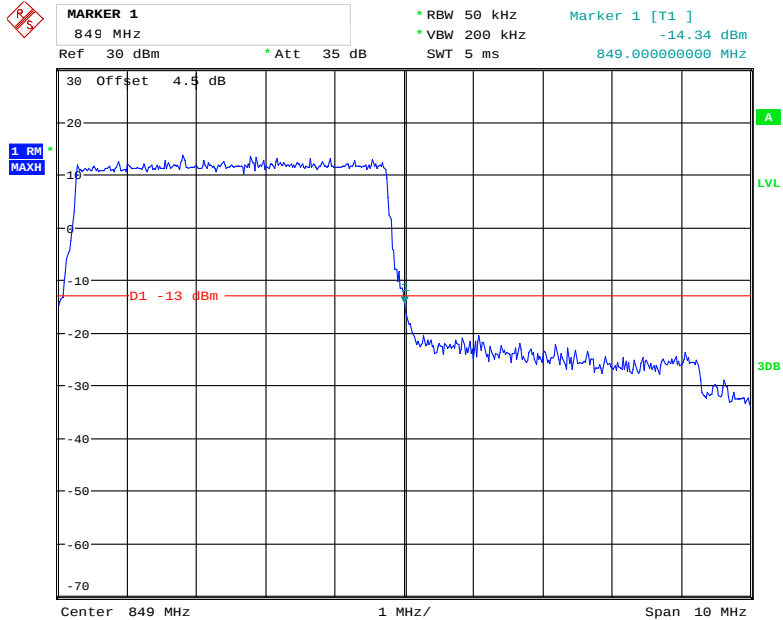
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QPSK_5MHz_25 RB_ Left



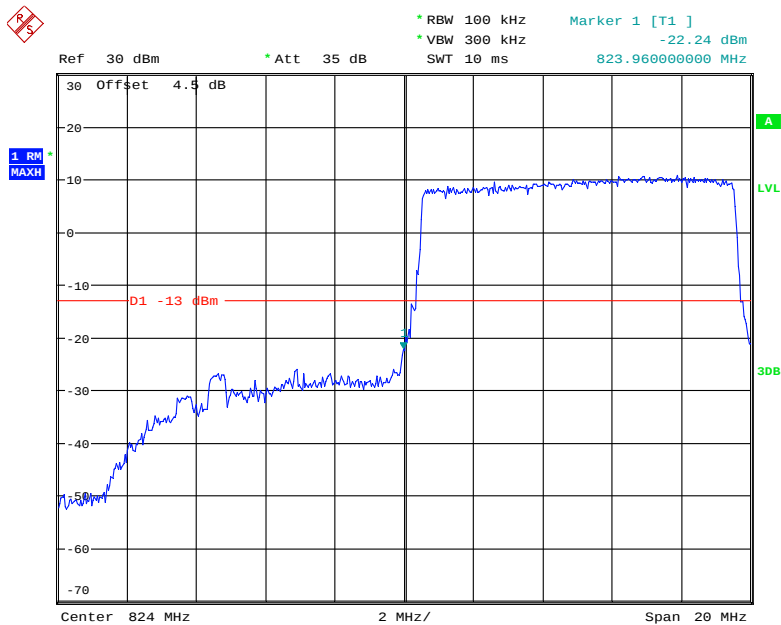
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QPSK_5MHz_25 RB_ Right



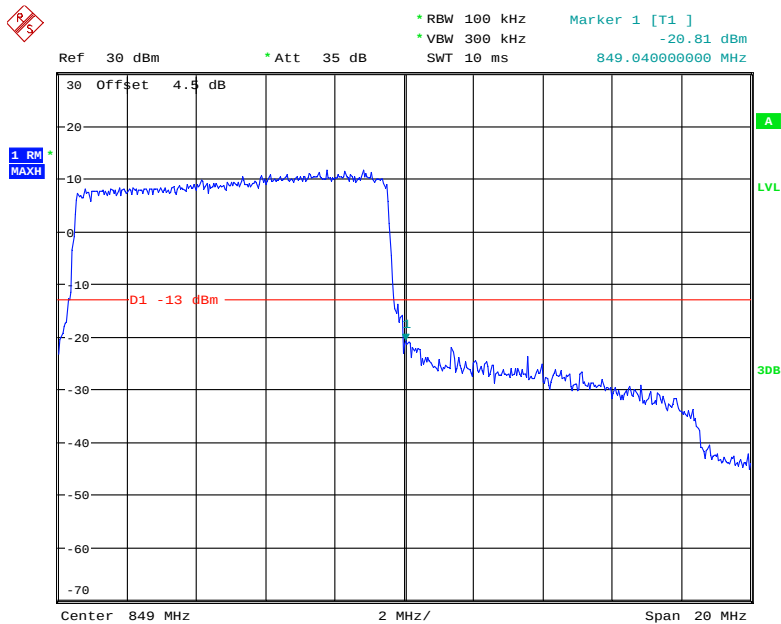
Date: 4.JAN.2019 15:22:06

QPSK_10MHz_50 RB_ Left

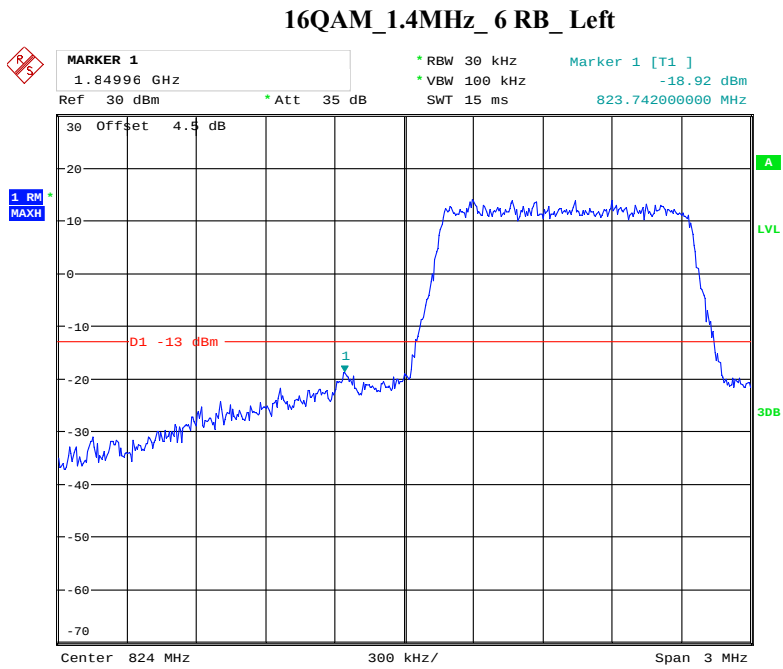


Date: 4.JAN.2019 14:05:31

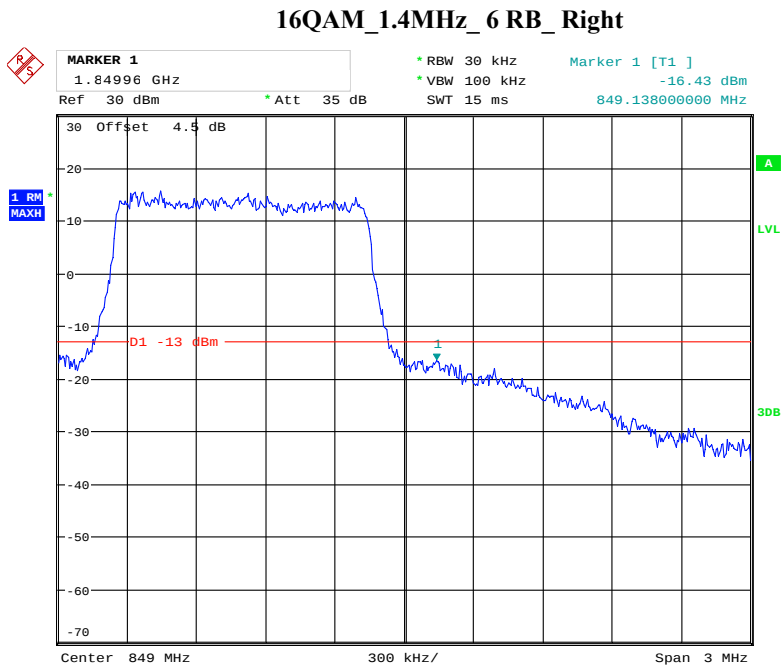
QPSK_10MHz_50 RB_ Right



Date: 4.JAN.2019 14:06:04

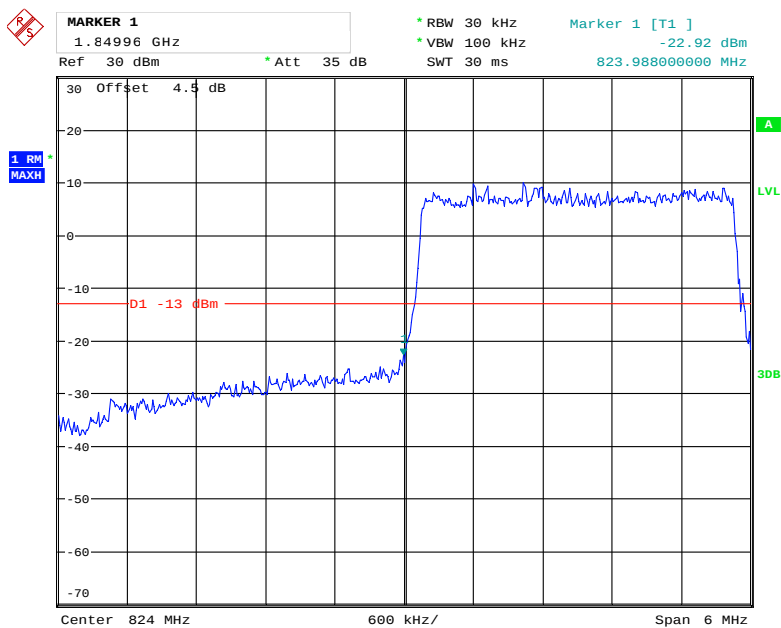


Date: 4.JAN.2019 14:01:50



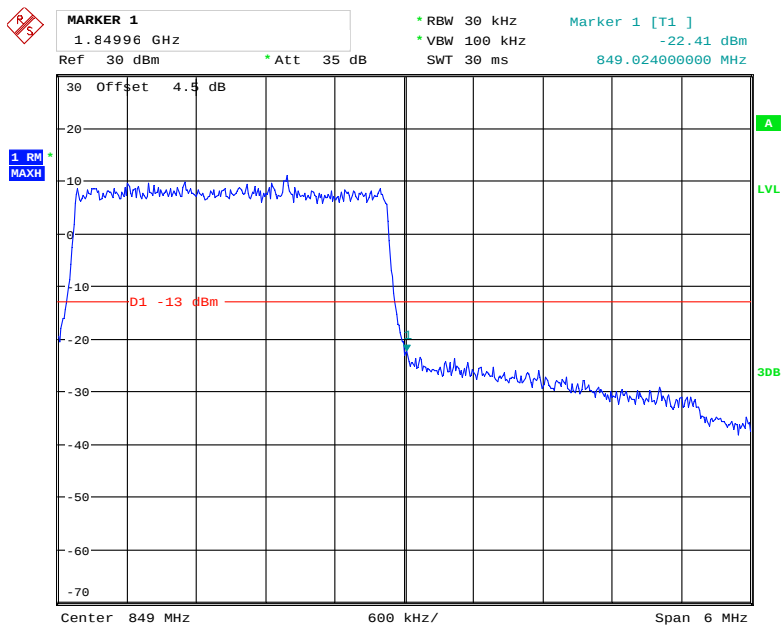
Date: 4.JAN.2019 14:02:28

16QAM_3MHz_15 RB_ Left

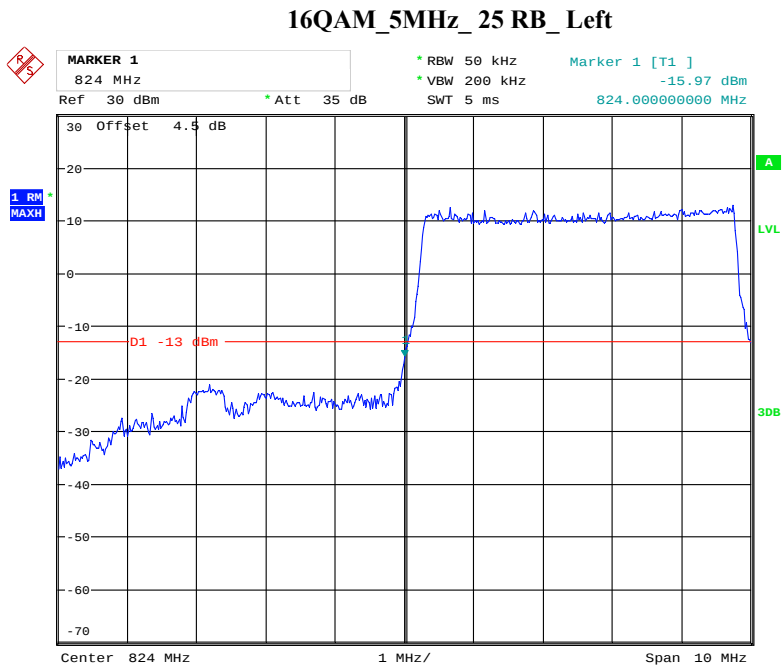


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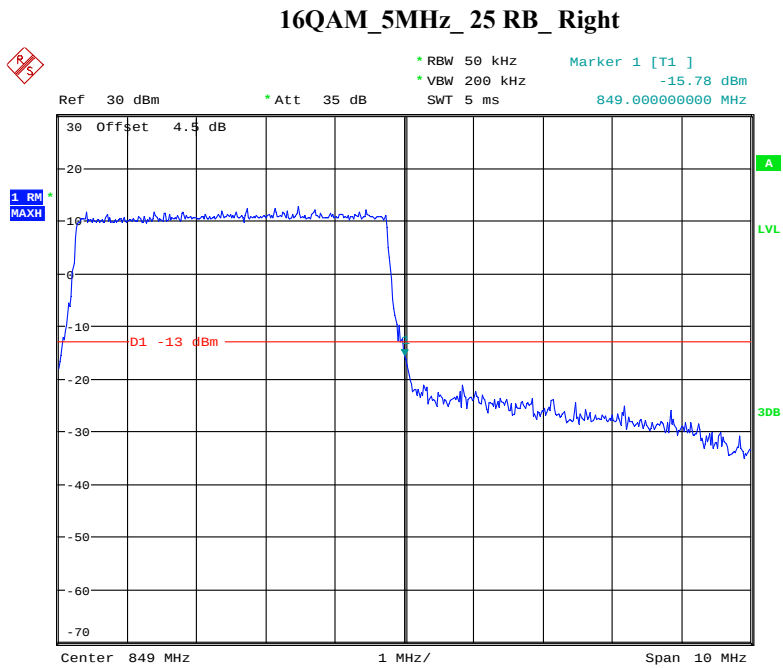
16QAM_3MHz_15 RB_ Right



Date: 4.JAN.2019 14:03:33

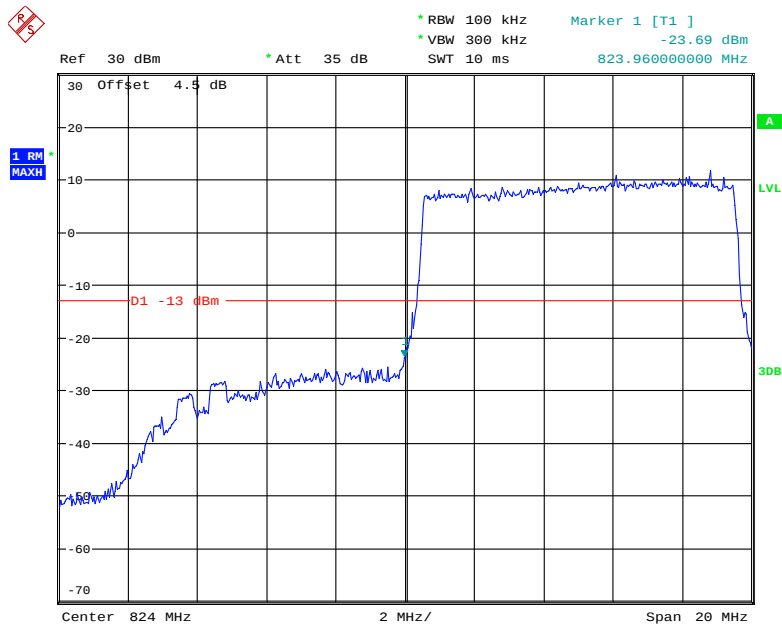


Date: 4.JAN.2019 15:23:24



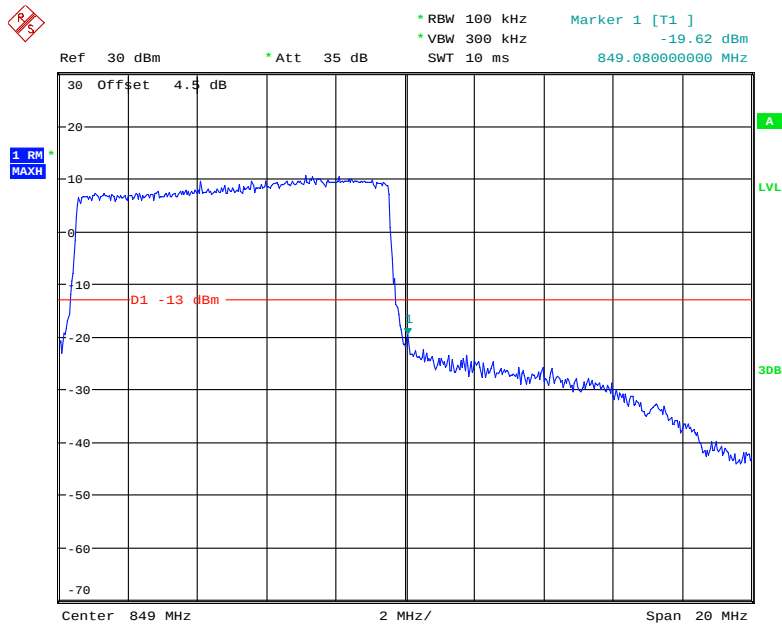
Date: 4.JAN.2019 15:22:34

16QAM_10MHz_ 50 RB_ Left



Date: 4.JAN.2019 14:05:47

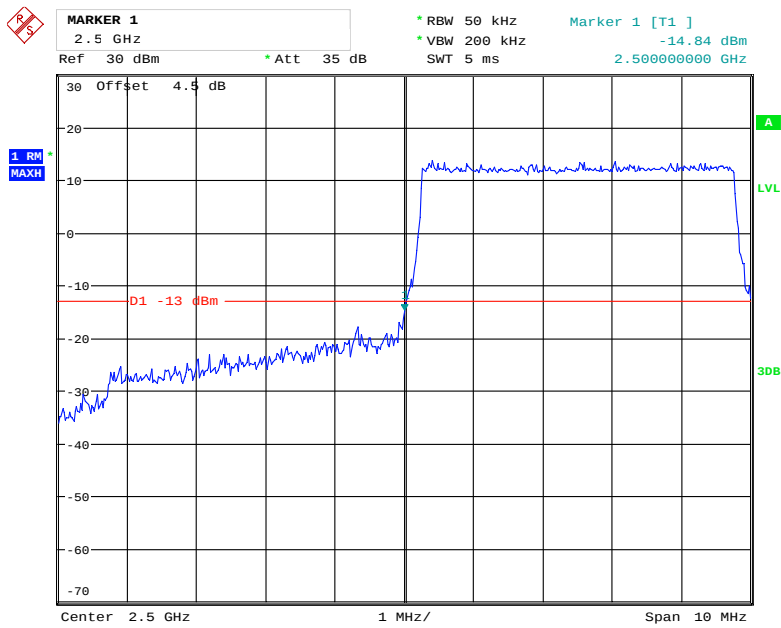
16QAM_10MHz_ 50 RB_ Right



Date: 4.JAN.2019 14:06:24

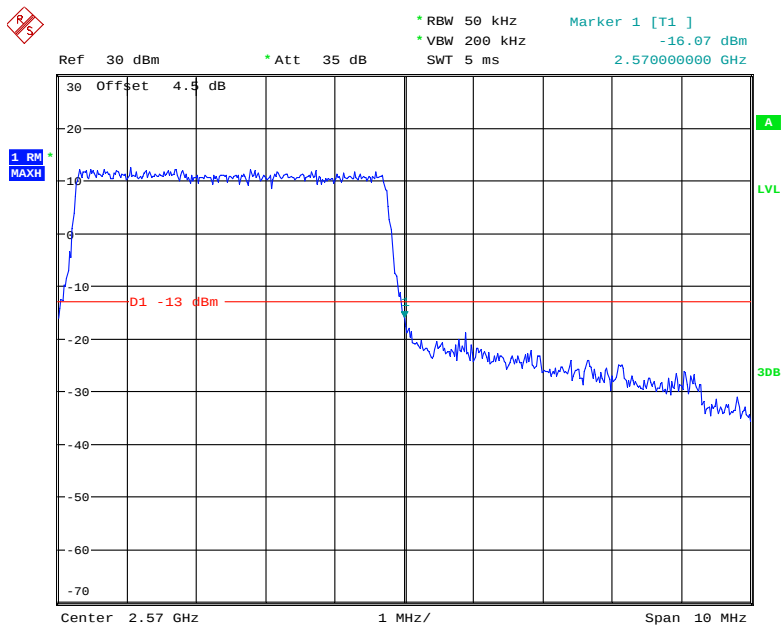
LTE Band 7

QPSK_5MHz_25 RB_Left



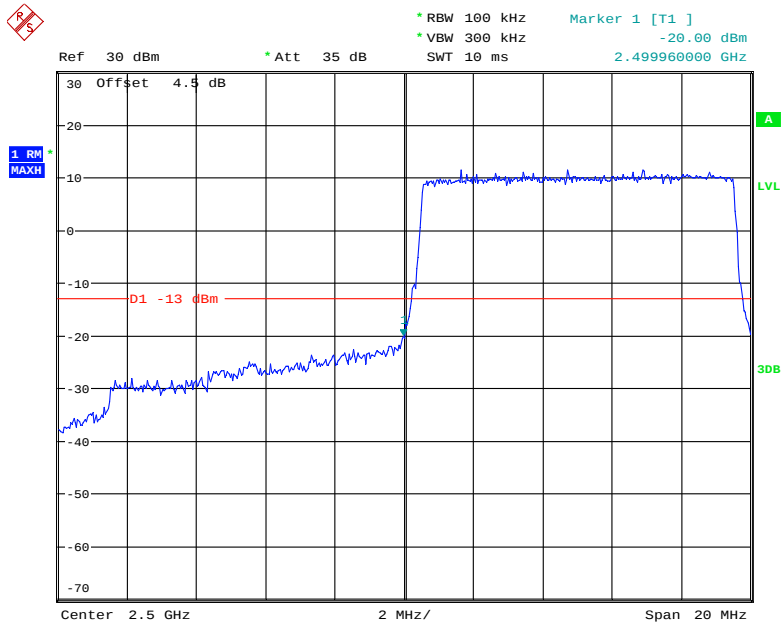
Date: 4.JAN.2019 15:27:36

QPSK_5MHz_25 RB_Right



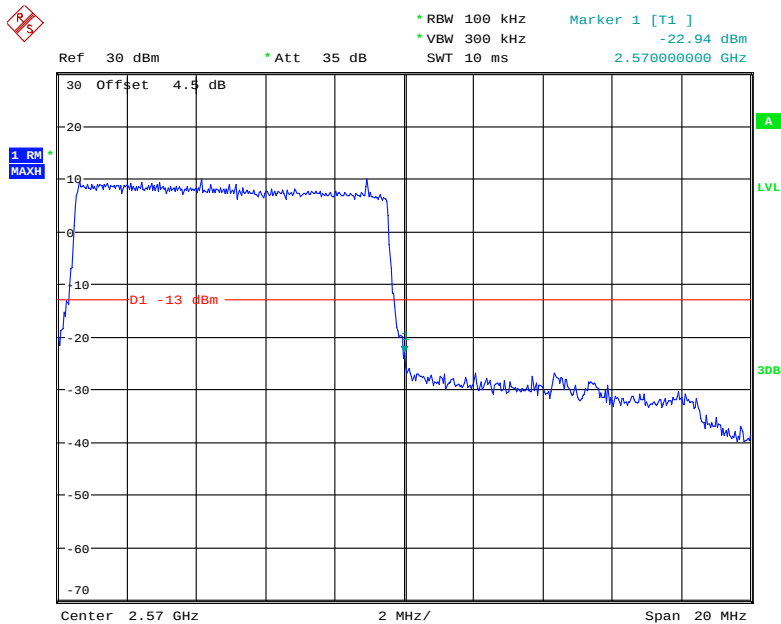
Date: 4.JAN.2019 15:26:25

QPSK_10MHz_50 RB_ Left



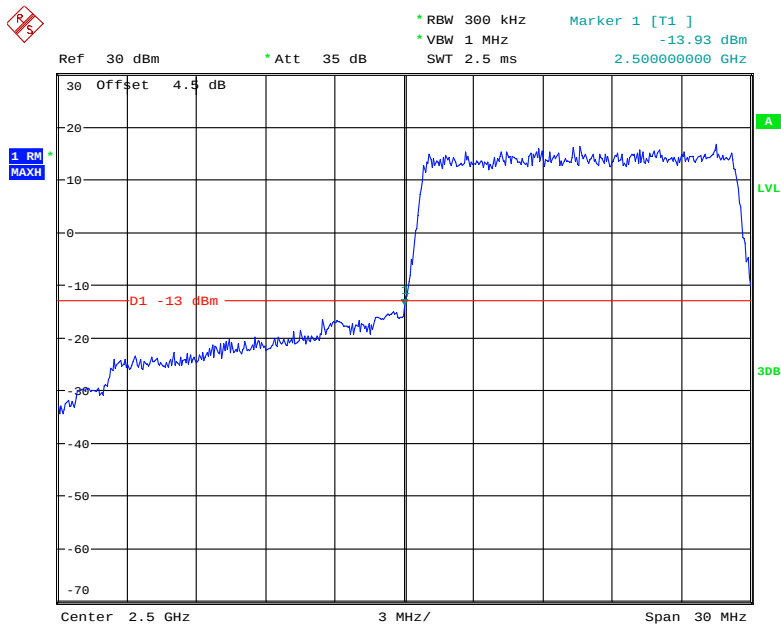
Date: 4.JAN.2019 14:08:41

QPSK_10MHz_50 RB_ Right



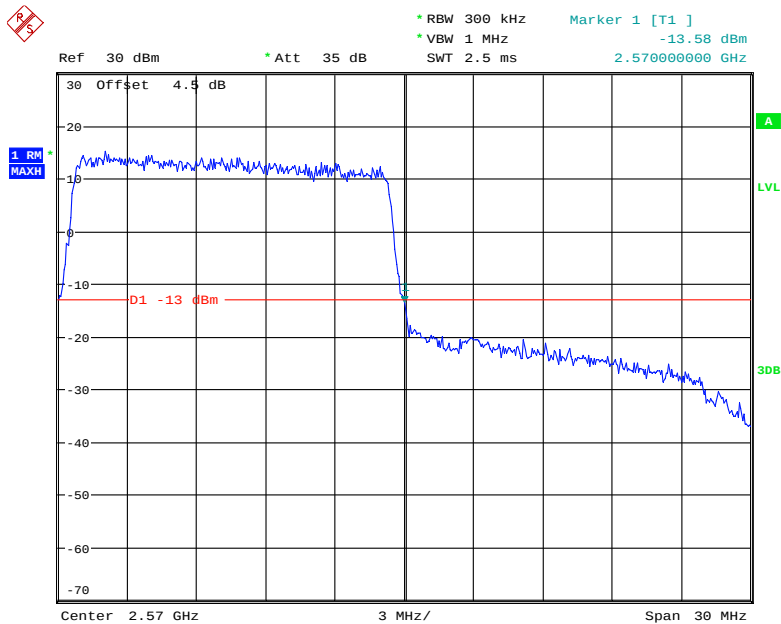
Date: 4.JAN.2019 14:09:14

QPSK_15MHz_ 75 RB_ Left



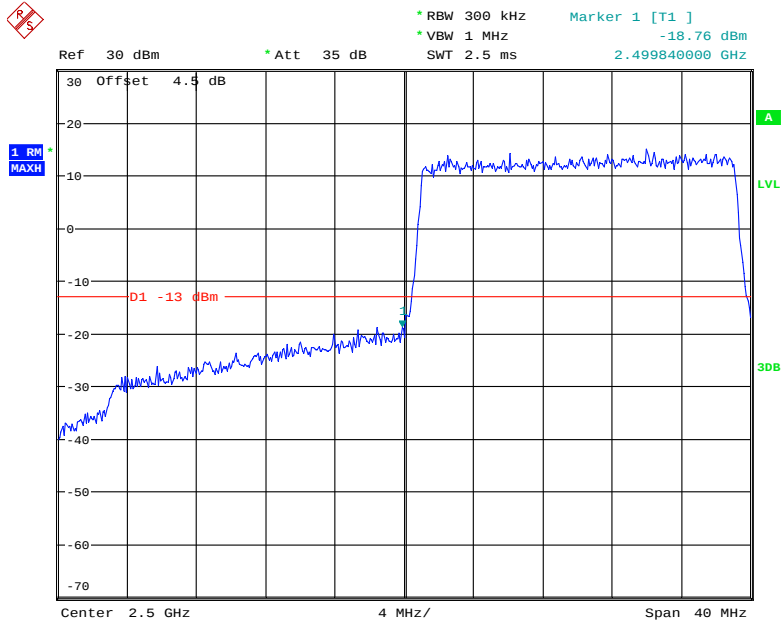
Date: 4.JAN.2019 14:10:01

QPSK_15MHz_ 75 RB_ Right



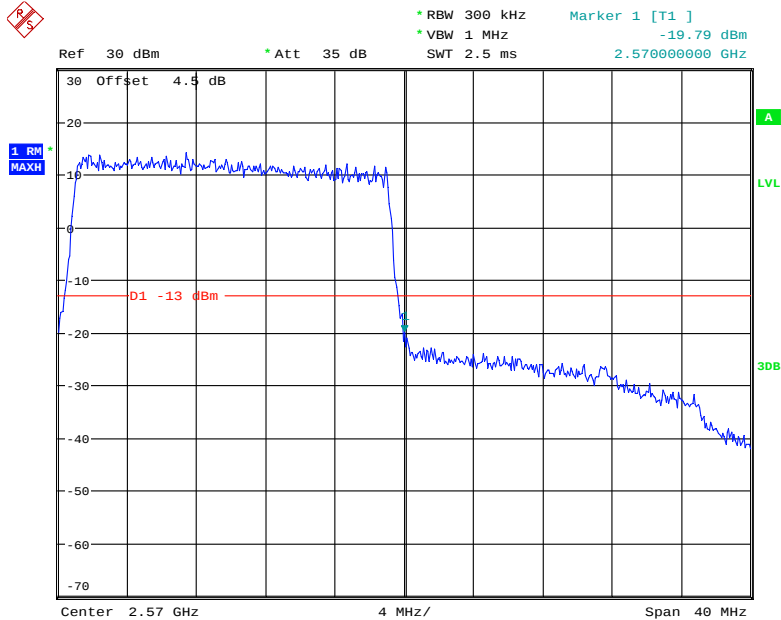
Date: 4.JAN.2019 14:10:48

QPSK_20MHz_FULL RB_Left



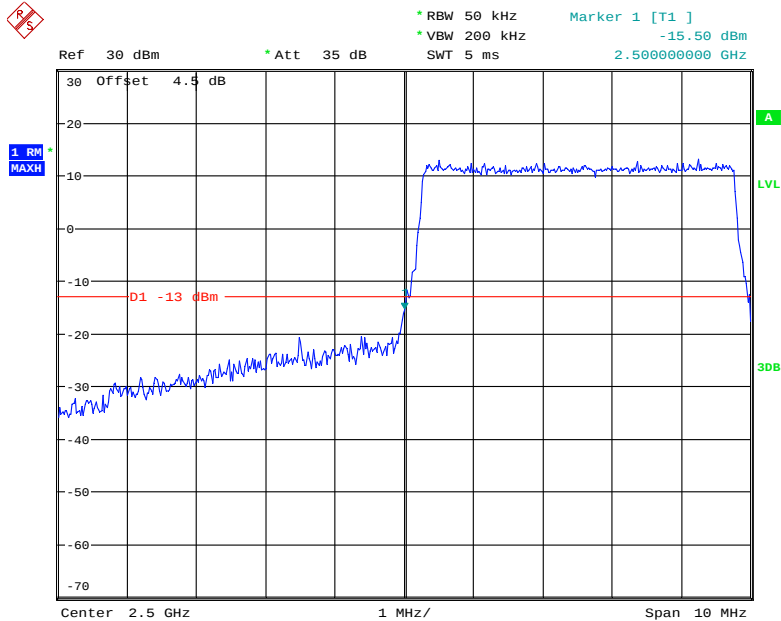
Date: 4.JAN.2019 14:11:41

QPSK_20MHz_FULL RB_Right



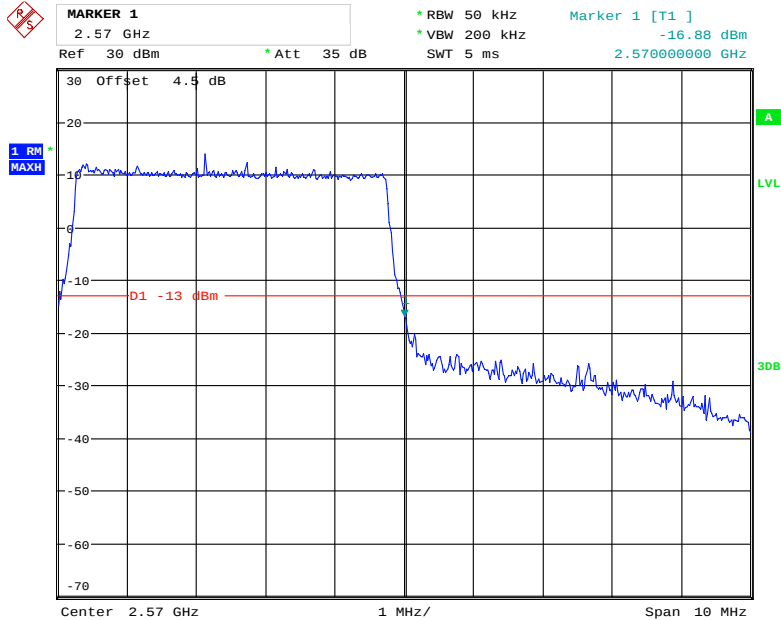
Date: 4.JAN.2019 14:12:25

16QAM_5MHz_25 RB_ Left

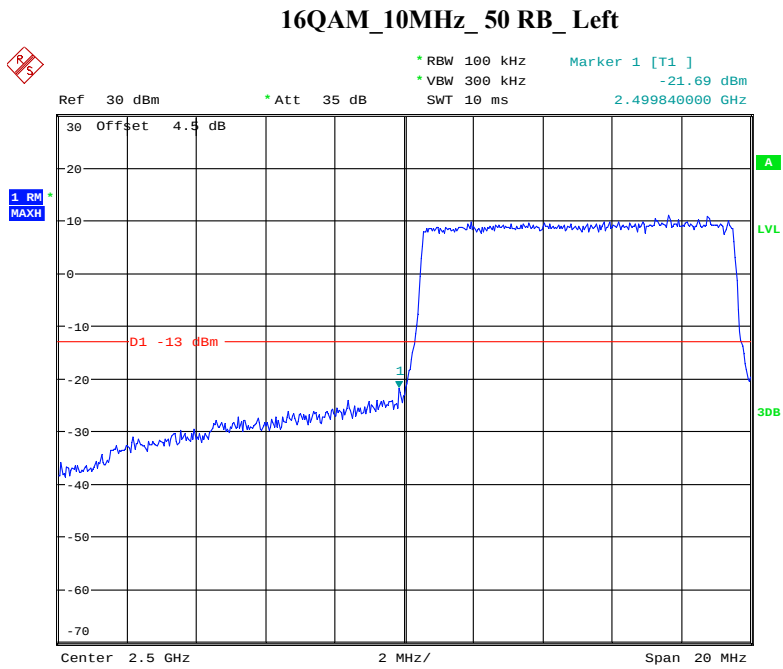


Date: 4.JAN.2019 15:27:57

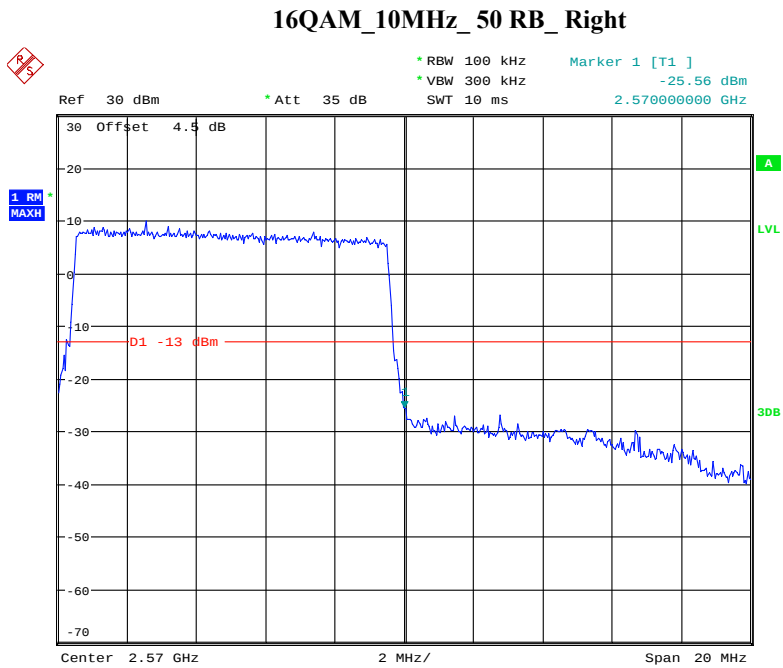
16QAM_5MHz_25 RB_ Right



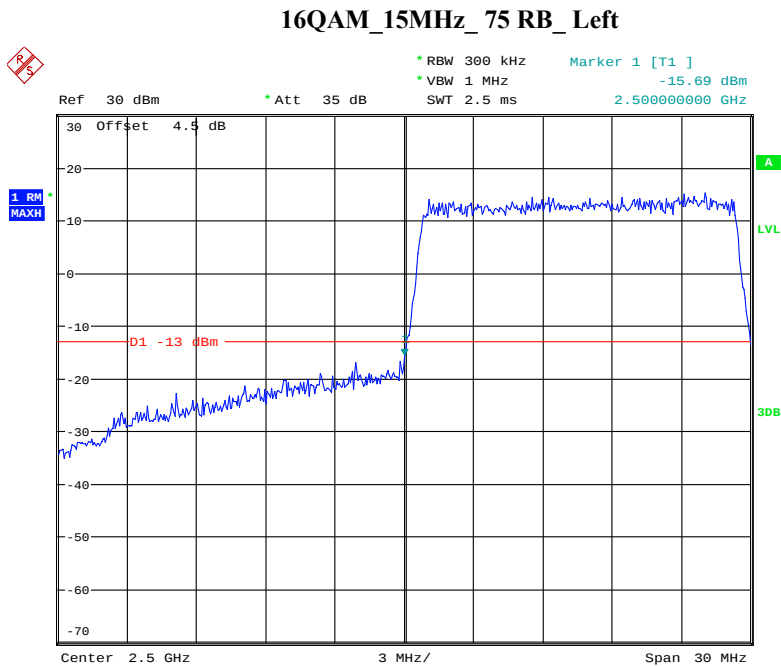
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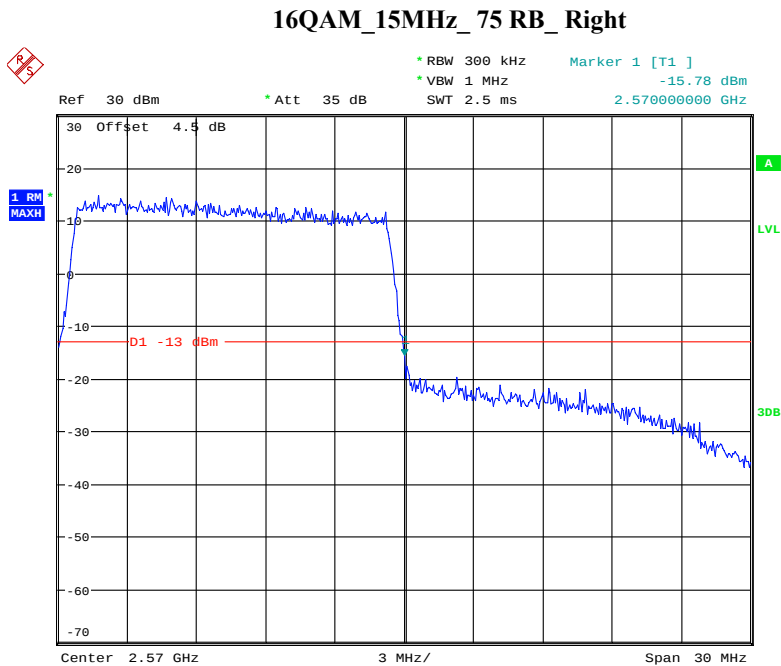
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Date: 4.JAN.2019 14:09:30

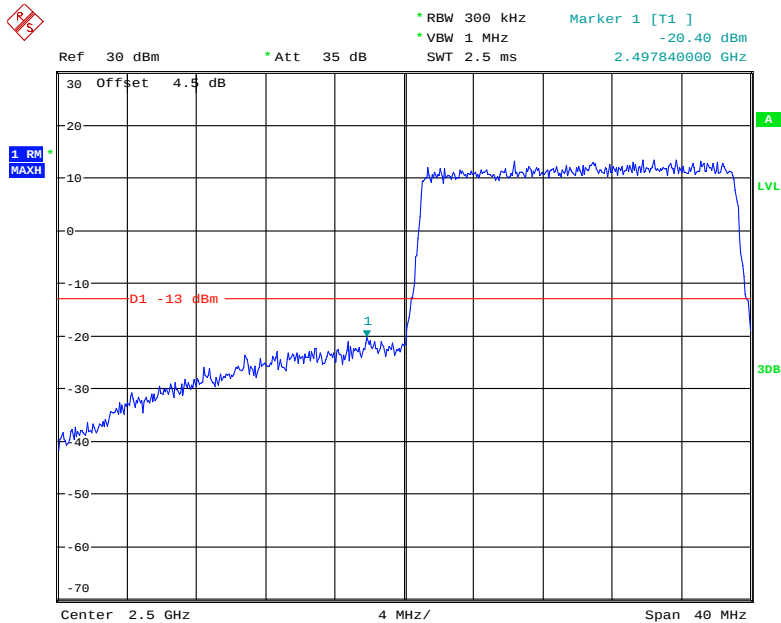


Date: 4.JAN.2019 14:10:24



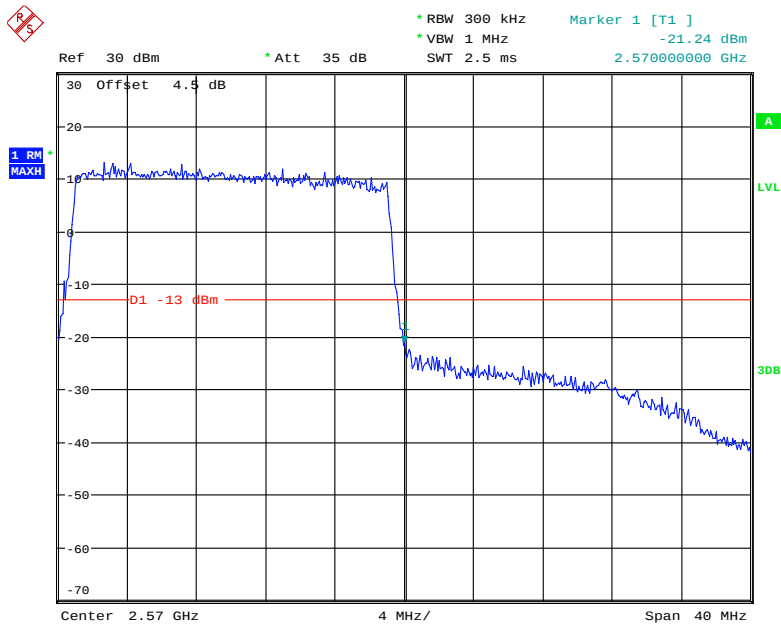
Date: 4.JAN.2019 14:11:11

16QAM_20MHz_FULL RB_Left



Date: 4.JAN.2019 14:12:05

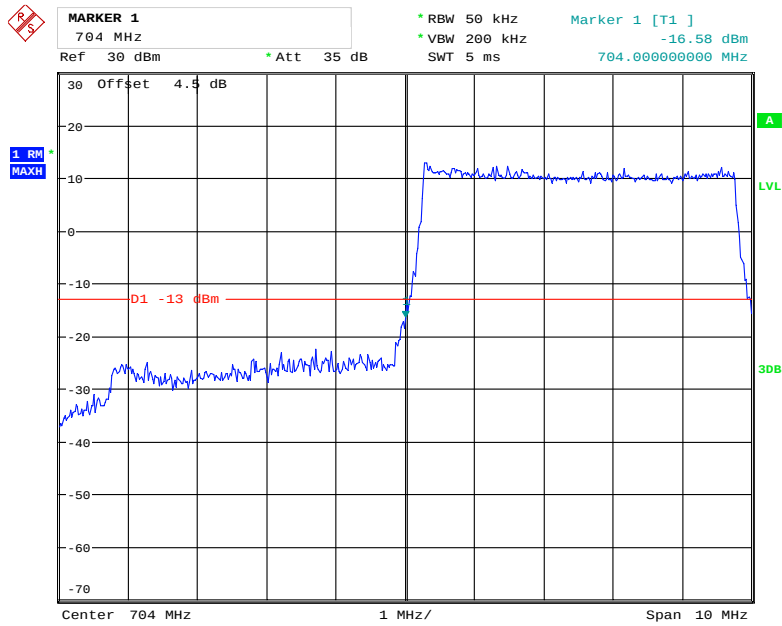
16QAM_20MHz_FULL RB_Right



Date: 4.JAN.2019 14:12:48

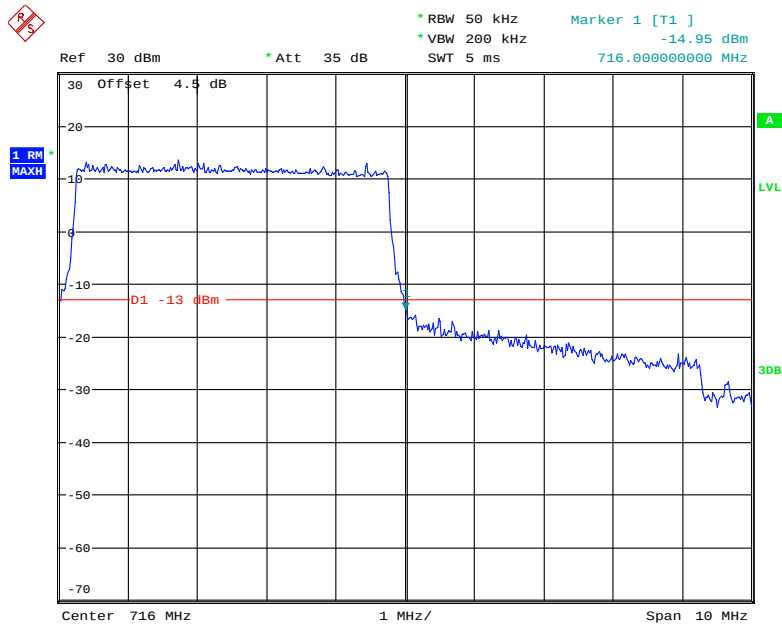
LTE Band 17

QPSK_5MHz_25 RB_Left



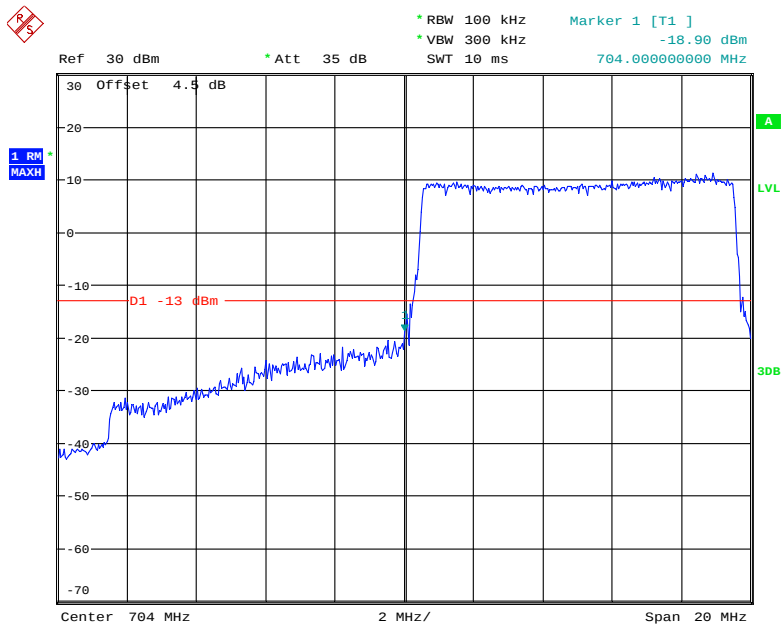
Date: 4.JAN.2019 14:13:23

QPSK_5MHz_25 RB_Right



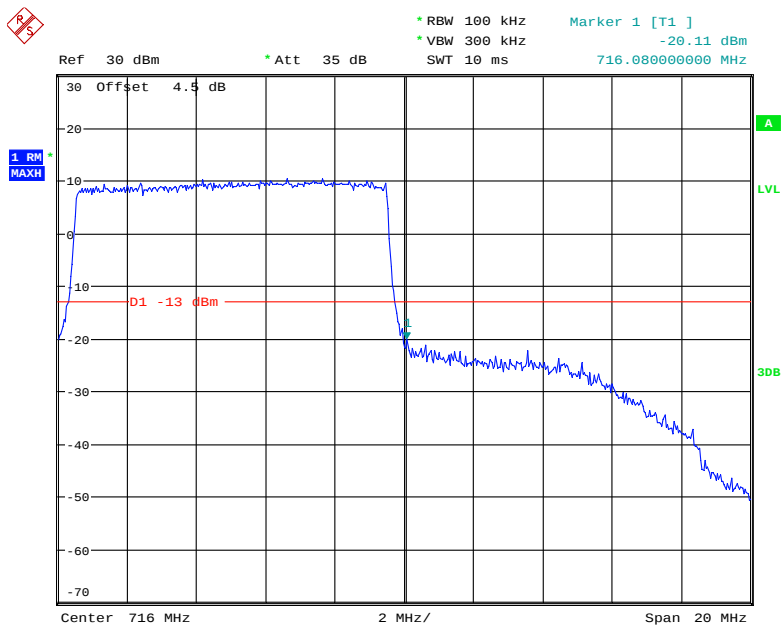
Date: 4.JAN.2019 15:32:20

QPSK_10MHz_50 RB_ Left

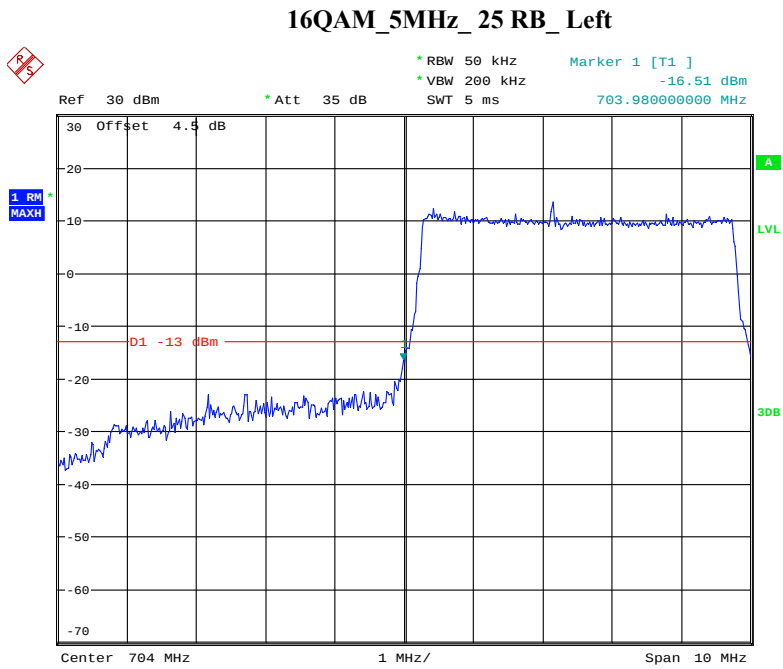


Date: 4.JAN.2019 14:15:13

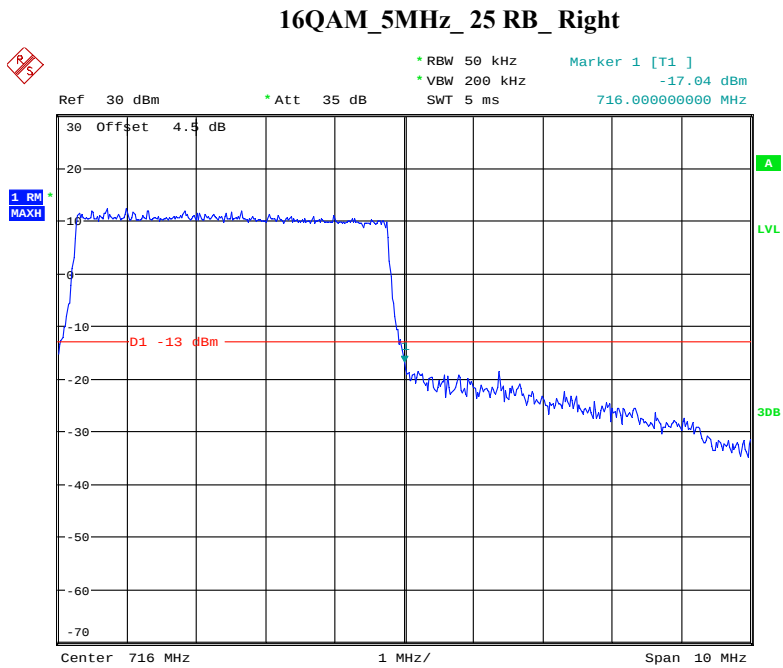
QPSK_10MHz_50 RB_ Right



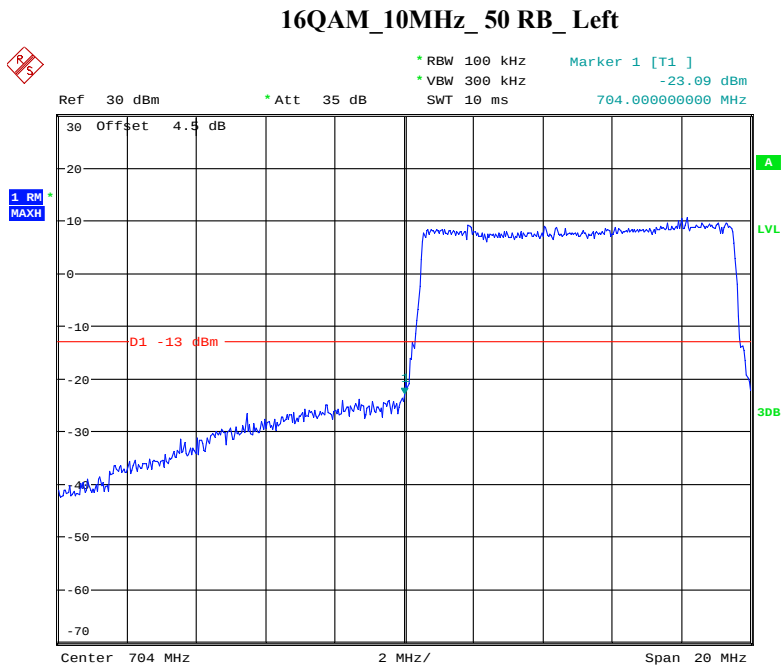
Date: 4.JAN.2019 14:15:50



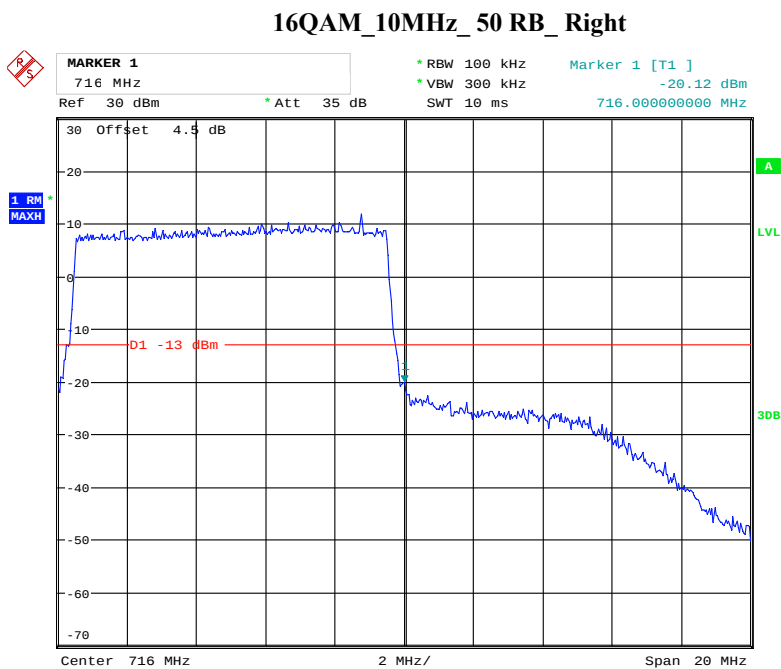
Date: 4.JAN.2019 14:13:58



Date: 4.JAN.2019 14:14:53



Date: 4.JAN.2019 14:15:33



Date: 4.JAN.2019 15:37:45

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.

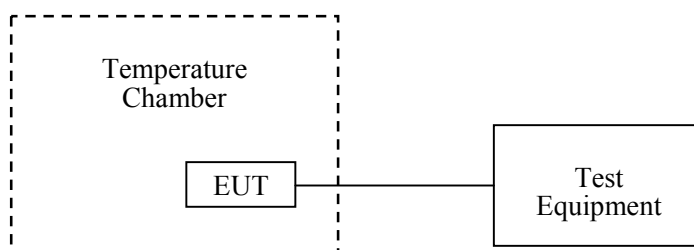
According to RSS-130 §4.3 & RSS-132 §5.3 & RSS-133 §6.3 & RSS-139 §6.4 & RSS-199 §4.3

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	Spectrum Analyzer	FSU 26	200256	2019-01-04	2020-01-04
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:	23.9~25.2°C
Relative Humidity:	44~46 %
ATM Pressure:	100.6~101.6 kPa

The testing was performed by Elena Lei from 2019-01-04 to 2019-01-05.

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	6	0.00717	2.5
-20		10	0.01195	
-10		6	0.00717	
0		10	0.01195	
10		1	0.00120	
20		4	0.00478	
30		7	0.00837	
40		3	0.00359	
50		2	0.00239	
20	3.5	11	0.01315	
20	4.2	14	0.01673	

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	4	0.00478	2.5
-20		8	0.00956	
-10		8	0.00956	
0		8	0.00956	
10		6	0.00717	
20		18	0.02152	
30		4	0.00478	
40		3	0.00359	
50		6	0.00717	
20	3.5	12	0.01434	
20	4.2	12	0.01434	

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	6	0.00319	2.5
-20		5	0.00266	
-10		3	0.00160	
0		12	0.00638	
10		7	0.00372	
20		-5	-0.00266	
30		0	0.00000	
40		7	0.00372	
50		2	0.00106	
20	3.5	14	0.00745	
20	4.2	12	0.00638	

8PSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	2	0.00106	2.5
-20		9	0.00479	
-10		9	0.00479	
0		11	0.00585	
10		4	0.00213	
20		-3	-0.00160	
30		4	0.00213	
40		2	0.00106	
50		2	0.00106	
20	3.5	9	0.00479	
20	4.2	16	0.00851	

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	3.7	7	0.00372	2.5
-20		8	0.00426	
-10		8	0.00426	
0		12	0.00638	
10		7	0.00372	
20		8	0.00426	
30		1	0.00053	
40		5	0.00266	
50		5	0.00266	
20	3.5	13	0.00691	
20	4.2	15	0.00798	

WCDMA Band V: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	2	0.00239	2.5
-20		9	0.01076	
-10		4	0.00478	
0		10	0.01195	
10		7	0.00837	
20		10	0.01195	
30		0	0.00000	
40		4	0.00478	
50		7	0.00837	
20	3.5	15	0.01793	
20	4.2	15	0.01793	

WCDMA Band IV: R99

Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	1710.502	1754.480	1710	1755
-20		1710.581	1754.547	1710	1755
-10		1710.572	1754.482	1710	1755
0		1710.512	1754.471	1710	1755
10		1710.524	1754.543	1710	1755
20		1710.585	1754.699	1710	1755
30		1710.536	1754.568	1710	1755
40		1710.541	1754.469	1710	1755
50		1710.600	1754.444	1710	1755
20	3.5	1710.593	1754.472	1710	1755
20	4.2	1710.520	1754.473	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	3.7	1.23	0.0007	2.5
-20		1.38	0.0007	
-10		1.21	0.0006	
0		1.19	0.0006	
10		1.30	0.0007	
20		1.23	0.0007	
30		1.31	0.0007	
40		1.31	0.0007	
50		1.31	0.0007	
20	3.5	1.20	0.0006	2.5
20	4.2	1.18	0.0006	

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	3.7	-3.61	-0.0019	2.5
-20		-3.60	-0.0019	
-10		-3.62	-0.0019	
0		-3.65	-0.0019	
10		-3.45	-0.0018	
20		-3.66	-0.0019	
30		-3.65	-0.0019	
40		-3.60	-0.0019	
50		-3.73	-0.002	
20	3.5	-3.66	-0.0019	
20	4.2	-3.59	-0.0019	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	1710.50	1754.48	1710	1755
-20		1710.58	1754.54	1710	1755
-10		1710.57	1754.48	1710	1755
0		1710.51	1754.47	1710	1755
10		1710.52	1754.54	1710	1755
20		1710.52	1754.48	1710	1755
30		1710.53	1754.47	1710	1755
40		1710.54	1754.46	1710	1755
50		1710.60	1754.44	1710	1755
20	3.5	1710.59	1754.27	1710	1755
20	4.2	1710.52	1754.47	1710	1755

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
℃	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	1710.56	1754.46	1710	1755
-20		1710.53	1754.51	1710	1755
-10		1710.61	1754.48	1710	1755
0		1710.55	1754.47	1710	1755
10		1710.59	1754.42	1710	1755
20		1710.56	1754.48	1710	1755
30		1710.57	1754.48	1710	1755
40		1710.58	1754.46	1710	1755
50		1710.64	1754.56	1710	1755
20	3.5	1710.56	1754.27	1710	1755
20	4.2	1710.55	1754.47	1710	1755

LTE Band 5:

Middle Channel, f _c = 836.5 MHz, Channel Bandwidth:10MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISED Limit
℃	V _{DC}	Hz	ppm	ppm
-30	3.7	1.28	0.0015	2.5
-20		1.38	0.0016	
-10		-1.25	-0.0015	
0		1.27	0.0015	
10		1.16	0.0014	
20		-1.90	-0.0023	
30		1.55	0.0019	
40		1.35	0.0016	
50		-1.27	-0.0015	
20	3.5	1.11	0.0013	
20	4.2	1.18	0.0014	

Middle Channel, $f_c = 836.5$ MHz, Channel Bandwidth:10MHz				
Temperature	Voltage	Frequency Error	Frequency Error	FCC/ISED Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	-1.23	-0.0015	2.5
-20		1.38	0.0016	
-10		1.25	0.0015	
0		1.31	0.0016	
10		1.16	0.0014	
20		-1.46	-0.0017	
30		1.31	0.0016	
40		1.39	0.0017	
50		-1.33	-0.0016	
20	3.5	1.17	0.0014	
20	4.2	-1.28	-0.0015	

LTE Band 7:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	2500.50	2569.50	2500	2570
-20		2500.49	2569.48	2500	2570
-10		2500.57	2569.43	2500	2570
0		2500.51	2569.47	2500	2570
10		2500.58	2569.45	2500	2570
20		2500.52	2569.48	2500	2570
30		2500.53	2569.49	2500	2570
40		2500.56	2569.50	2500	2570
50		2500.52	2569.52	2500	2570
20	3.5	2500.38	2569.34	2500	2570
20	4.2	2500.53	2569.48	2500	2570

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	2500.54	2569.46	2500	2570
-20		2500.58	2569.45	2500	2570
-10		2500.52	2569.48	2500	2570
0		2500.51	2569.47	2500	2570
10		2500.52	2569.48	2500	2570
20		2500.52	2569.48	2500	2570
30		2500.51	2569.49	2500	2570
40		2500.52	2569.52	2500	2570
50		2500.56	2569.48	2500	2570
20	3.5	2500.66	2569.27	2500	2570
20	4.2	2500.51	2569.49	2500	2570

LTE Band 17:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	704.52	715.46	704	716
-20		704.61	715.54	704	716
-10		704.47	715.48	704	716
0		704.51	715.47	704	716
10		704.58	715.48	704	716
20		704.52	715.48	704	716
30		704.52	715.47	704	716
40		704.56	715.46	704	716
50		704.48	715.48	704	716
20	3.5	704.66	715.34	704	716
20	4.2	704.53	715.49	704	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		FCC/ISED Limit (MHz)	
°C	V _{DC}	F _L	F _H	F _L	F _H
-30	3.7	704.52	715.46	704	716
-20		704.49	715.51	704	716
-10		704.52	715.53	704	716
0		704.52	715.48	704	716
10		704.46	715.54	704	716
20		704.52	715.48	704	716
30		704.52	715.48	704	716
40		704.56	715.46	704	716
50		704.60	715.64	704	716
20	3.5	704.52	715.62	704	716
20	4.2	704.52	715.48	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 *****