FCC PART 22H, PART 24E
FCC PART 27
RSS-130 ISSUE 1, OCTOBER 2013
RSS-132 ISSUE 3, JANUARY 2013
RSS-133 ISSUE 6, JANUARY 2013
RSS-139 ISSUE 3, JULY 2015
RSS-GEN ISSUE 4, NOVEMBER 2014

MEASUREMENT AND TEST REPORT

For

DT Research, Inc.

6F, NO.1, NingPo E. St. Taipei, 100 Taiwan

FCC ID: YE3801I
IC: 7647A-801I

Report Type:	**Product Type:**
Original Report	Mobile Tablet

Report Number:	RDG171205015-00C
Report Date:	2018-01-22
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Mobile Tablet
EUT Model:		DT301A
FCC ID:		YE3801I
IC:		7647A-801I
Rated Input Voltage:		DC 11.4V from battery or DC 19V from Adapter
Adapter Information	**Model:**	A11-065N1A
	Input:	100-240V~1.7A, 50/60Hz
	Output:	DC 19V, 3.42A 65W
External Dimension:		Length (28.5cm)*Width (20cm)*High (5.4cm)
Serial Number:		171205015
EUT Received Date:		2017.12.07

Note: The device used SIERRA WIRELESS^{TM}'s MC7354 module, FCC ID: N7NMC7355, which support WCDMA Band II and Band V, CDMA2000(850/1900 band) 1xRTT and EVDO Rav.A and LTE band 2/4//5/13/17, all of the other functions eg. GSM,GRPS,EDGE, and other band were disabled by software.

Objective

This report is prepared on behalf of ***DT Research, Inc.*** in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E of the Federal Communications Commission's rules.
Part 2, Part 27 of the Federal Communication Commissions rules.
RSS-130 Issue 1, October 2013, RSS-132, Issue 3, January 2013, RSS-133, Issue 6, January 2013, RSS-139, Issue 3 of the Innovation, Science and Economic Development Canada.

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: YE3801I.
FCC Part 15C DSS submissions with FCC ID: YE3801I.
FCC Part 15E NII submissions with FCC ID: YE3801I.
RSS-247 DTSs/DSSs/LE-LAN submissions with IC: 7647A-801I.

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

And:
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 2013, 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.

TIA/EIA 603-D-2010

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz:5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
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 test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218,the FCC Designation No. : CN1220.

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

SYSTEM TEST CONFIGURATION

Justification

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

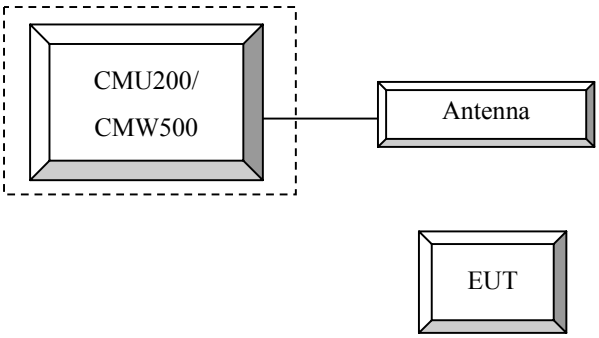
Equipment Modifications

No modification was made to the EUT.

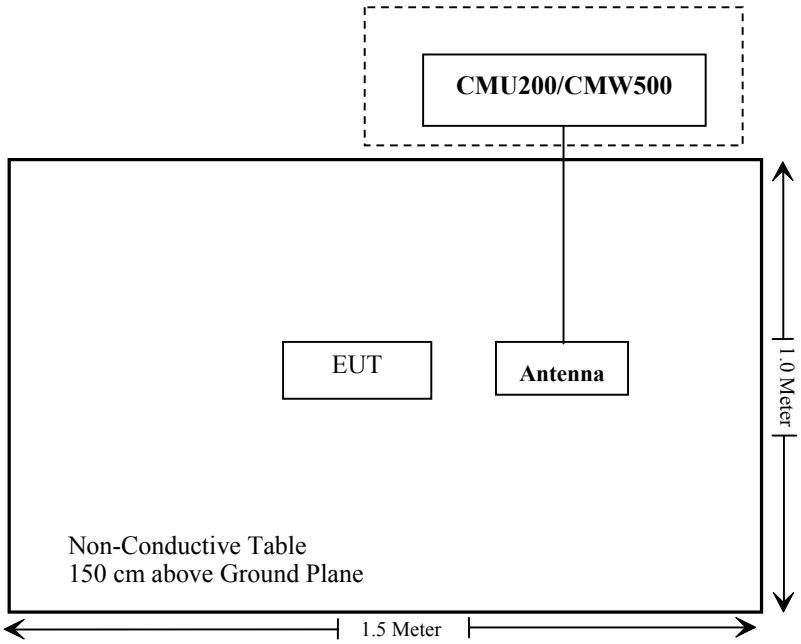
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universial Radio Communication Tester	CMU200	109038
R&S	Wideband Radio Communication Tester	CMW500	147473
N/A	ANTENNA	N/A	N/A

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	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	Types of Modulation	Compliance
RSS-130 §4.2 RSS-132 §4.1 RSS-133 §6.1 RSS-139 §6.1	Frequency Sub-bands Frequency Plan	Compliance
FCC§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53 RSS-Gen §6.6	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	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	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	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	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: RDG171205015-20.

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 §4.2 & RSS-132 §5.1 & RSS-133 §6.1 & RSS-139 §6.1 - 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.

Test Result

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

RSS-130 §4.1 & RSS-132 §5.2 & RSS-133 §6.2 & RSS-139 §6.2 - 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.

Test Result

The EUT uses GMSK, 8PSK, QPSK, 16QAM, 64QAM modulation.

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

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. Moreover, base station transmitters operating in the band 1930-1995 MHz shall not have output power exceeding 100 watts.

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.

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

Test Procedure

CDMA 1x RTT

Maximum output power is verified on the high, middle and low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. Steps 3 and 4 are measured using Loopback Service Option SO55 with power control bits in "All Up" condition. Step 10 is measured using TDSO/SO32 with power control bits in the "Bits Hold" condition (i.e. alternative Up/Down Bits).

Table 4.4.5.2-1. Test Parameters for Maximum RF Output Power with a Single Traffic Code Channel, Spreading Rate 1

Parameter	Units	Value
$\hat{I}_{or}$	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
Traffic E	dB	-7.4

Table 4.4.5.2-2. Test Parameters for Maximum RF Output Power with Multiple Traffic Code Channels, Spreading Rate 1

Parameter	Units	Value
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

EVDO

Maximum output power is verified on the high, middle and low channels according to procedures in section 3.1.2.3.4 of 3GPP2 C.S0033-0/TIA-866 for Rev. 0, section 4.3.4 of 3GPP2 C.S0033-A for Rev. A.

Maximum output power is measured for Rev. 0 and Rev. A in Subtype 0/1 and Subtype 2 Physical Layer configurations, respectively.

WCDMA-Release 99

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

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

WCDMA HSDPA

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/ βd	2/15	12/15	15/8	15/4
	βhs	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			
	Ahs=βhs/ βc	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				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/ βd	11/15	6/15	15/9	2/15	-
	βhs	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				
	Ahs=βhs/ βc	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_FCIs	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 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	

HSPA+

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

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_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 β_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
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

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

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

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			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 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
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	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31
ETS LINDGREN	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
HP	Signal Generator	1026	320408	2017-12-14	2018-12-14
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-21	2018-07-21
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31

*** 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:	23.7~26.2°C
Relative Humidity:	30.8~35 %
ATM Pressure:	102~102.2 kPa

** The testing was performed by Blake Yang & Steven Zuo from 2017-12-15 to 2017-12-18.*

Conducted Output Power

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	22.90	2.96	22.53	3.24	22.57	3.08
HSDPA	1	22.27	3.56	21.96	3.44	21.93	3.56
	2	22.22	3.35	22.14	3.82	22.02	3.24
	3	22.41	3.63	21.76	3.19	21.90	3.24
	4	22.25	3.86	22.15	3.54	22.13	3.50
HSUPA	1	21.72	3.56	21.44	3.96	21.35	3.64
	2	21.81	3.37	21.42	4.24	21.45	3.36
	3	21.60	3.19	21.72	3.81	21.19	3.67
	4	21.81	3.71	21.59	4.18	21.44	3.43
	5	21.56	3.49	21.20	4.30	21.50	3.77
DC-HSDPA	1	21.46	3.68	21.4	4.14	21.6	3.56
	2	21.92	3.40	21.20	3.67	21.43	3.56
	3	21.96	3.87	21.28	3.56	21.49	3.38
	4	21.74	3.23	21.46	3.83	21.58	3.72
HSPA+	1	21.64	3.59	21.29	3.77	21.62	3.67

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	22.81	3.16	22.77	3.04	22.75	3.16
HSDPA	1	22.11	3.56	22.35	3.44	22.25	4.36
	2	22.34	3.70	22.67	3.24	22.08	4.74
	3	21.81	3.24	22.61	3.27	22.60	4.66
	4	22.34	3.37	22.70	3.59	21.95	4.20
HSUPA	1	21.63	3.68	21.72	3.72	21.84	3.60
	2	21.72	4.06	21.83	3.64	22.08	3.76
	3	22.10	3.47	21.78	3.90	21.04	3.36
	4	21.52	3.86	21.82	3.62	21.37	3.89
	5	21.53	3.41	21.77	3.80	21.62	3.59
DC-HSDPA	1	21.35	3.69	21.4	3.58	20.99	3.37
	2	21.43	3.37	21.15	3.35	21.33	3.74
	3	21.98	3.81	21.40	4.04	21.50	3.30
	4	22.09	3.37	21.15	3.88	21.45	3.95
HSPA+	1	21.74	3.37	21.47	3.72	21.04	3.58

CDMA 1x RTT

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			RC1+SO55	RC3+SO55	RC3+SO32 (FCH)	RC3+SO32 (SCH)
BC0	1013	824.70	23.72	23.79	23.71	23.75
	384	836.52	23.81	23.85	23.82	23.83
	777	848.31	23.69	23.76	23.68	23.73
BC1	25	1851.25	23.63	23.53	23.63	23.59
	600	1880.00	23.59	23.45	23.59	23.57
	1175	1908.75	23.69	23.56	23.70	23.64

EVDO

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)	
			RTAP 153.6kbps Subtype 0	RETAP 4096pbs Subtype 2
BC0	1013	824.70	23.89	23.6
	384	836.52	24.18	23.69
	777	848.31	23.33	23.77
BC1	25	1851.25	23.91	23.89
	600	1880.00	23.18	23.73
	1175	1908.75	23.49	23.78

LTE Band 2 (PART 24)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	23.42	23.35	23.5
		1#3	23.71	23.29	23.5
		1#5	23.47	23.26	23.51
		3#0	23.6	23.51	23.35
		3#3	22.27	22.37	22.83
		6#0	22.44	22.36	22.57
	16-QAM	1#0	22.27	22.18	22.22
		1#3	21.99	22.24	22.21
		1#5	22.32	22.16	22.29
		3#0	22.19	21.97	21.98
		3#3	21.83	21.77	21.79
		6#0	21.83	21.82	21.98
3M	QPSK	1#0	23.45	23.24	23.47
		1#8	23.21	23.01	23.29
		1#14	23.5	23.37	23.56
		10#0	23.62	23.11	23.69
		10#5	22.5	22.14	22.22
		15#0	22.34	22.23	22.44
	16-QAM	1#0	22.29	22.02	22.21
		1#8	22.08	21.94	21.99
		1#14	22.36	22.13	22.3
		10#0	22.32	22	22.47
		10#5	21.81	21.83	21.97
		15#0	21.92	21.95	21.93
5M	QPSK	1#0	23.47	23.22	23.48
		1#13	23.63	23.24	23.43
		1#24	23.59	23.32	23.6
		10#0	23.73	23.14	23.66
		10#15	22.14	21.92	22.15
		25#0	22.31	22.22	22.38
	16-QAM	1#0	22.66	22.07	22.58
		1#13	22.51	22.1	22.51
		1#24	22.84	22.15	22.6
		10#0	22.92	22.27	22.35
		10#15	21.85	21.96	21.83
		25#0	21.93	21.84	21.93

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
10M	QPSK	1#0	23.38	23.17	23.36
		1#25	23.57	23.37	23.5
		1#49	23.51	23.18	23.52
		25#0	23.21	22.87	23.26
		25#25	21.94	22.27	22.32
		50#0	22.24	22.2	22.31
	16-QAM	1#0	22.26	21.95	22.1
		1#25	21.97	22.25	22.06
		1#49	22.39	22	22.29
		25#0	22.17	21.76	21.97
		25#25	21.98	21.83	21.93
		50#0	21.82	21.89	21.81
15M	QPSK	1#0	23.46	23.2	23.31
		1#38	23.74	23.04	23.6
		1#74	23.44	23.19	23.48
		36#0	23.55	23.27	23.31
		36#39	22.64	22.18	22.38
		75#0	22.34	22.07	22.13
	16-QAM	1#0	22.2	22.41	22.55
		1#38	22.13	22.61	22.61
		1#74	22.34	22.39	22.84
		36#0	22.2	22.25	22.32
		36#39	21.84	21.94	21.97
		75#0	21.93	21.81	21.83
20M	QPSK	1#0	23.39	23.31	23.26
		1#50	23.4	23.11	23.07
		1#99	23.38	23.3	23.53
		50#0	23.58	23.46	23.18
		50#50	22.54	22.39	21.99
		100#0	22.31	22.27	22.19
	16-QAM	1#0	22.48	22.48	22.97
		1#50	22.46	22.4	22.94
		1#99	22.47	22.51	23.23
		50#0	22.33	22.44	23.11
		50#50	21.86	21.91	21.83
		100#0	21.92	21.84	21.97

LTE Band 4 (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	23.31	23.36	23.29
		1#3	23.51	23.62	23.46
		1#5	23.29	23.34	23.31
		3#0	23.37	23.27	23.15
		3#3	22.09	22.51	22.6
		6#0	22.23	22.37	22.41
	16-QAM	1#0	22.14	22.11	22.11
		1#3	22.14	22.29	22.16
		1#5	22.17	22.18	22.16
		3#0	22.37	22.27	22.23
		3#3	21.82	21.95	21.86
		6#0	21.94	21.94	21.95
3M	QPSK	1#0	23.27	23.28	23.46
		1#8	23.52	23.09	23.58
		1#14	23.24	23.36	23.28
		10#0	23.48	23.17	23.33
		10#5	22.08	22.14	22.27
		15#0	22.24	22.34	22.36
	16-QAM	1#0	22.18	22.17	22.07
		1#8	22.28	22.45	22.15
		1#14	22.09	22.12	22.1
		10#0	22.42	22.44	21.92
		10#5	21.94	21.96	21.91
		15#0	21.81	21.82	21.81
5M	QPSK	1#0	23.37	23.3	23.33
		1#13	23.64	23.13	23.62
		1#24	23.37	23.42	23.34
		10#0	23.07	23.44	23.62
		10#15	22.34	22.21	22.27
		25#0	22.15	22.29	22.24
	16-QAM	1#0	22.55	22.03	22.45
		1#13	22.75	21.98	22.69
		1#24	22.45	22.05	22.4
		10#0	22.75	21.93	22.24
		10#15	21.87	21.95	21.91
		25#0	21.89	21.91	21.86

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
10M	QPSK	1#0	23.2	23.27	23.16
		1#25	22.94	23.32	22.86
		1#49	23.18	23.42	23.35
		25#0	23.13	23.08	23.34
		25#25	21.92	22.35	21.99
		50#0	21.95	22.1	22.12
	16-QAM	1#0	22.01	21.92	22.87
		1#25	22.23	21.94	22.73
		1#49	21.92	22.35	22.9
		25#0	21.86	22.18	22.99
		25#25	21.86	21.89	21.85
		50#0	21.83	21.91	21.98
15M	QPSK	1#0	23.21	23.04	23.35
		1#38	23.1	23.18	23.23
		1#74	23.29	23.34	23.36
		36#0	23	22.77	23.23
		36#39	22.05	21.87	22.41
		75#0	21.86	22.15	22.25
	16-QAM	1#0	22.16	22.29	22.52
		1#38	22.14	22.31	22.31
		1#74	22.11	22.59	22.3
		36#0	22.19	22.13	22.71
		36#39	21.98	21.93	21.85
		75#0	21.94	21.88	21.85
20M	QPSK	1#0	23.26	23.15	23.51
		1#50	23.5	23.23	23.65
		1#99	23.53	23.77	23.36
		50#0	23.53	23.07	23.29
		50#50	21.86	22.2	22.56
		100#0	22.07	22.04	22.38
	16-QAM	1#0	22.37	22.15	22.75
		1#50	22.41	21.95	23.04
		1#99	22.26	23.16	23.06
		50#0	22.67	22.41	22.52
		50#50	21.88	21.81	21.92
		100#0	21.91	21.85	21.88

LTE Band 5 (PART 22)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	23.7	23.88	23.69
		1#3	23.91	23.58	23.59
		1#5	23.74	23.84	23.66
		3#0	23.75	23.85	23.87
		3#3	22.94	22.78	22.89
		6#0	22.79	22.94	22.76
	16-QAM	1#0	22.62	22.69	22.43
		1#3	22.34	22.9	22.32
		1#5	22.59	22.69	22.45
		3#0	22.37	22.5	22.34
		3#3	22.56	22.81	22.36
		6#0	22.67	22.95	22.69
3M	QPSK	1#0	23.72	23.8	23.65
		1#8	23.42	23.75	23.94
		1#14	23.73	23.84	23.7
		10#0	23.42	23.54	23.8
		10#5	22.32	23.05	22.96
		15#0	22.61	22.82	22.75
	16-QAM	1#0	22.58	22.51	22.48
		1#8	22.53	22.39	22.64
		1#14	22.61	22.58	22.42
		10#0	22.67	22.78	22.51
		10#5	22.63	22.8	22.52
		15#0	22.72	22.86	22.81
5M	QPSK	1#0	23.81	23.65	23.73
		1#13	23.93	23.64	23.55
		1#24	23.84	23.76	23.87
		10#0	23.56	23.67	23.92
		10#15	22.74	22.52	24.16
		25#0	22.65	22.7	24.21
	16-QAM	1#0	23.01	22.36	22.88
		1#13	23.04	22.39	22.83
		1#24	23.1	22.5	23.05
		10#0	22.95	22.56	22.82
		10#15	22.59	22.69	23.14
		25#0	22.57	22.83	23.2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
10M	QPSK	1#0	23.64	23.54	23.74
		1#25	23.6	23.32	23.79
		1#49	23.66	23.76	23.79
		25#0	23.45	23.74	23.59
		25#25	22.64	22.78	22.56
		50#0	22.53	22.75	22.66
	16-QAM	1#0	23.04	22.29	22.67
		1#25	23.02	22.28	22.56
		1#49	23.23	22.54	22.71
		25#0	23.21	22.47	22.62
		25#25	22.83	22.43	22.38
		50#0	22.54	22.72	22.65

LTE Band 13 (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	23.72	23.6	23.87
		1#13	23.88	23.68	23.7
		1#24	23.91	23.73	23.61
		10#0	23.6	23.32	23.73
		10#15	22.48	22.63	22.72
		25#0	22.62	22.75	22.78
	16-QAM	1#0	22.92	22.32	22.98
		1#13	22.99	22.5	23.07
		1#24	23.13	22.55	22.63
		10#0	23.04	22.1	23.06
		10#15	22.31	22.06	22.81
		25#0	22.59	22.82	22.71
10M	QPSK	1#0	/	23.5	/
		1#25	/	23.49	/
		1#49	/	23.58	/
		25#0	/	23.75	/
		25#25	/	22.69	/
		50#0	/	22.68	/
	16-QAM	1#0	/	23.08	/
		1#25	/	23.02	/
		1#49	/	23.18	/
		25#0	/	23.18	/
		25#25	/	23.21	/
		50#0	/	22.59	/

LTE Band 17 (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	23.31	23.75	23.68
		1#13	23.11	23.54	23.55
		1#24	23.95	23.67	23.26
		10#0	23.13	23.7	23.58
		10#15	22.76	22.97	22.55
		25#0	22.58	22.73	22.58
	16-QAM	1#0	22.68	22.5	22.78
		1#13	22.88	22.2	22.75
		1#24	23.13	22.43	22.41
		10#0	22.89	22.46	22.91
		10#15	22.35	22.02	22.55
		25#0	22.61	22.79	22.49
10M	QPSK	1#0	23.84	23.52	23.62
		1#25	23.65	23.41	23.78
		1#49	23.76	23.45	23.28
		25#0	23.88	23.59	23.36
		25#25	22.32	22.31	22.33
		50#0	22.5	22.56	22.55
	16-QAM	1#0	23.5	22.16	22.35
		1#25	23.68	22.91	22.35
		1#49	23.28	22.31	22.26
		25#0	23.25	22.42	22.13
		25#25	22.49	22.7	22.29
		50#0	22.51	22.46	22.55

PAR, CDMA2000:

Frequency Band	Test Mode	Test Status	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limits (dB)
BC0	1x RTT	RC1+SO55	4.12	3.68	3.2	13
	1xEVDO Rev. 0	RTAP 153.6kbps	5.32	5.12	5.04	13
BC0	1x RTT	RC1+SO55	3.92	3.84	3.8	13
	1xEVDO Rev. 0	RTAP 153.6kbps	5.8	4.92	5.64	13

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	4.00	4.64	4.16	13
	100 RB		6.24	6.56	6.48	13
16QAM	1 RB	20 MHz	4.80	5.36	4.76	13
	100 RB		7.08	7.28	7.16	13

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	2.52	3.36	4.64	13
	100 RB		6.36	6.44	6.60	13
16QAM	1 RB	20 MHz	3.36	4.08	5.72	13
	100 RB		6.84	7.20	7.24	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	4.84	4.12	4.40	13
	50 RB		5.68	5.48	5.44	13
16QAM	1 RB	10 MHz	5.68	5.20	5.88	13
	50 RB		6.60	6.32	6.32	13

PAR, Band 13

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	/	4.12	/	13
	50 RB		/	5.24	/	13
16QAM	1 RB	10 MHz	/	5.24	/	13
	50 RB		/	6.24	/	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	5.24	4.04	4.16	13
	50 RB		5.24	5.36	5.48	13
16QAM	1 RB	10 MHz	4.64	4.72	5.36	13
	50 RB		6.20	6.20	6.32	13

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

ERP & EIRP

CDMA 2000:

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)			
BC0 1xRTT RC1+SO55 Middle Channel (836.52MHz)								
836.520	H	92.62	17.7	0.0	1	16.7	38.5	21.8
836.520	V	90.57	18.8	0.0	1	17.8	38.5	20.7
BC0 1xEvDO RTAP 153.6kbps Middle Channel (836.52MHz)								
836.520	H	94.12	19.2	0.0	1	18.2	38.5	20.3
836.520	V	89.93	18.1	0.0	1	17.1	38.5	21.4
BC1 1xRTT RC1+SO55 Middle Channel(1880MHz)								
1880.000	H	86.38	13.8	11.7	2.7	22.8	33.0	10.2
1880.000	V	84.52	12.1	11.7	2.7	21.1	33.0	11.9
BC1 1xEvDO RTAP 153.6kbps Middle Channel (1880MHz)								
1880.000	H	85.31	12.7	11.7	2.7	21.7	33.0	11.3
1880.000	V	84.14	11.7	11.7	2.7	20.7	33.0	12.3

WCDMA:

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)			
WCDMA Band 5								
836.600	H	94.67	19.7	0.0	1	18.7	38.5	19.8
836.600	V	90.82	19	0.0	1	18.0	38.5	20.5
WCDMA Band 2								
1880.000	H	86.53	13.9	11.7	2.7	22.9	33.0	10.1
1880.000	V	85.26	12.8	11.7	2.7	21.8	33.0	11.2

LTE Band 2:

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 1.4MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	87.15	14.5	11.7	2.7	23.5	33.0	9.5
1880.000	V	86.63	14.2	11.7	2.7	23.2	33.0	9.8
16QAM 1.4MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	87.02	14.4	11.7	2.7	23.4	33.0	9.6
1880.000	V	86.24	13.8	11.7	2.7	22.8	33.0	10.2
QPSK 3MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	87.48	14.9	11.7	2.7	23.9	33.0	9.1
1880.000	V	86.55	14.1	11.7	2.7	23.1	33.0	9.9
16QAM 3MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	87.29	14.7	11.7	2.7	23.7	33.0	9.3
1880.000	V	86.43	14	11.7	2.7	23.0	33.0	10.0
QPSK 5MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	87.59	15	11.7	2.7	24.0	33.0	9.0
1880.000	V	86.46	14	11.7	2.7	23.0	33.0	10.0
16QAM 5MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	86.29	13.7	11.7	2.7	22.7	33.0	10.3
1880.000	V	86.37	13.9	11.7	2.7	22.9	33.0	10.1
QPSK 10MHz Bandwidth Middle Channel(1880.0MHz)								
1880.000	H	86.97	14.4	11.7	2.7	23.4	33.0	9.6
1880.000	V	86.15	13.7	11.7	2.7	22.7	33.0	10.3
16QAM 10MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	86.78	14.2	11.7	2.7	23.2	33.0	9.8
1880.000	V	85.92	13.5	11.7	2.7	22.5	33.0	10.5
QPSK 15MHz Bandwidth Middle Channel(1880.0MHz)								
1880.000	H	86.59	14	11.7	2.7	23.0	33.0	10.0
1880.000	V	85.68	13.2	11.7	2.7	22.2	33.0	10.8
16QAM 15MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	86.37	13.8	11.7	2.7	22.8	33.0	10.2
1880.000	V	85.45	13	11.7	2.7	22.0	33.0	11.0
QPSK 20MHz Bandwidth Middle Channel(1880.0MHz)								
1880.000	H	86.78	14.2	11.7	2.7	23.2	33.0	9.8
1880.000	V	86.12	13.7	11.7	2.7	22.7	33.0	10.3
16QAM 20MHz Bandwidth Middle Channel (1880.0MHz)								
1880.000	H	86.46	13.9	11.7	2.7	22.9	33.0	10.1
1880.000	V	85.87	13.4	11.7	2.7	22.4	33.0	10.6

LTE Band 4:

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 1.4MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.86	14.8	10.9	2.5	23.2	30.0	6.8
1732.500	V	88.47	14.1	10.9	2.5	22.5	30.0	7.5
16QAM 1.4MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.57	14.5	10.9	2.5	22.9	30.0	7.1
1732.500	V	88.12	13.8	10.9	2.5	22.2	30.0	7.8
QPSK 3MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.84	14.8	10.9	2.5	23.2	30.0	6.8
1732.500	V	88.67	14.3	10.9	2.5	22.7	30.0	7.3
16QAM 3MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.25	14.2	10.9	2.5	22.6	30.0	7.4
1732.500	V	88.32	14	10.9	2.5	22.4	30.0	7.6
QPSK 5MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.84	14.8	10.9	2.5	23.2	30.0	6.8
1732.500	V	88.36	14	10.9	2.5	22.4	30.0	7.6
16QAM 5MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	88.23	14.2	10.9	2.5	22.6	30.0	7.4
1732.500	V	88.18	13.8	10.9	2.5	22.2	30.0	7.8
QPSK 10MHz Bandwidth Middle Channel(1732.5MHz)								
1732.500	H	87.69	13.6	10.9	2.5	22.0	30.0	8.0
1732.500	V	87.53	13.2	10.9	2.5	21.6	30.0	8.4
16QAM 10MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	87.57	13.5	10.9	2.5	21.9	30.0	8.1
1732.500	V	87.34	13	10.9	2.5	21.4	30.0	8.6
QPSK 15MHz Bandwidth Middle Channel(1732.5MHz)								
1732.500	H	87.94	13.9	10.9	2.5	22.3	30.0	7.7
1732.500	V	87.45	13.1	10.9	2.5	21.5	30.0	8.5
16QAM 15MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	87.62	13.6	10.9	2.5	22.0	30.0	8.0
1732.500	V	87.34	13	10.9	2.5	21.4	30.0	8.6
QPSK 20MHz Bandwidth Middle Channel(1732.5MHz)								
1732.500	H	87.27	13.2	10.9	2.5	21.6	30.0	8.4
1732.500	V	87.18	12.8	10.9	2.5	21.2	30.0	8.8
16QAM 20MHz Bandwidth Middle Channel (1732.5MHz)								
1732.500	H	87.15	13.1	10.9	2.5	21.5	30.0	8.5
1732.500	V	86.89	12.5	10.9	2.5	20.9	30.0	9.1

LTE Band 5

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 1.4MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	96.67	21.7	0.0	1	20.7	38.5	17.8
836.500	V	94.87	23.1	0.0	1	22.1	38.5	16.4
16QAM 1.4MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	96.85	21.9	0.0	1	20.9	38.5	17.6
836.500	V	94.24	22.4	0.0	1	21.4	38.5	17.1
QPSK 3MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	97.31	22.4	0.0	1	21.4	38.5	17.1
836.500	V	95.72	23.9	0.0	1	22.9	38.5	15.6
16QAM 3MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	97.92	23	0.0	1	22.0	38.5	16.5
836.500	V	95.38	23.6	0.0	1	22.6	38.5	15.9
QPSK 5MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	97.65	22.7	0.0	1	21.7	38.5	16.8
836.500	V	95.85	24.1	0.0	1	23.1	38.5	15.4
16QAM 5MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	97.12	22.2	0.0	1	21.2	38.5	17.3
836.500	V	95.44	23.6	0.0	1	22.6	38.5	15.9
QPSK 10MHz Bandwidth Middle Channel(836.5MHz)								
836.500	H	96.58	21.7	0.0	1	20.7	38.5	17.8
836.500	V	94.86	23.1	0.0	1	22.1	38.5	16.4
16QAM 10MHz Bandwidth Middle Channel (836.5MHz)								
836.500	H	96.11	21.2	0.0	1	20.2	38.5	18.3
836.500	V	94.57	22.8	0.0	1	21.8	38.5	16.7

LTE Band 13

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 5MHz Bandwidth Middle Channel (782MHz)								
782.000	H	95.70	20.2	0.0	0.9	19.3	34.8	15.5
782.000	V	93.83	21.2	0.0	0.9	20.3	34.8	14.5
16QAM 5MHz Bandwidth Middle Channel (782MHz)								
782.000	H	95.41	19.9	0.0	0.9	19.0	34.8	15.8
782.000	V	93.52	20.9	0.0	0.9	20.0	34.8	14.8
QPSK 10MHz Bandwidth Middle Channel(782MHz)								
782.000	H	95.12	19.6	0.0	0.9	18.7	34.8	16.1
782.000	V	93.78	21.2	0.0	0.9	20.3	34.8	14.5
16QAM 10MHz Bandwidth Middle Channel (782MHz)								
782.000	H	94.62	19.1	0.0	0.9	18.2	34.8	16.6
782.000	V	93.34	20.7	0.0	0.9	19.8	34.8	15.0

LTE Band 17

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 5MHz Bandwidth Middle Channel (710MHz)								
710.000	H	95.09	18.3	0.0	0.9	17.4	34.8	17.4
710.000	V	94.30	19.9	0.0	0.9	19.0	34.8	15.8
16QAM 5MHz Bandwidth Middle Channel (710MHz)								
710.000	H	94.27	17.5	0.0	0.9	16.6	34.8	18.2
710.000	V	93.36	19	0.0	0.9	18.1	34.8	16.7
QPSK 10MHz Bandwidth Middle Channel(710MHz)								
710.000	H	94.23	17.4	0.0	0.9	16.5	34.8	18.3
710.000	V	93.75	19.4	0.0	0.9	18.5	34.8	16.3
16QAM 10MHz Bandwidth Middle Channel (710MHz)								
710.000	H	94.91	18.1	0.0	0.9	17.2	34.8	17.6
710.000	V	93.26	18.9	0.0	0.9	18.0	34.8	16.8

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
4) For LTE Band 13 and 17the limits in the table were the stricter for US FCC and Canada ISEDC.

FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53 AND RSS-GEN §6.6 - OCCUPIED BANDWIDTH

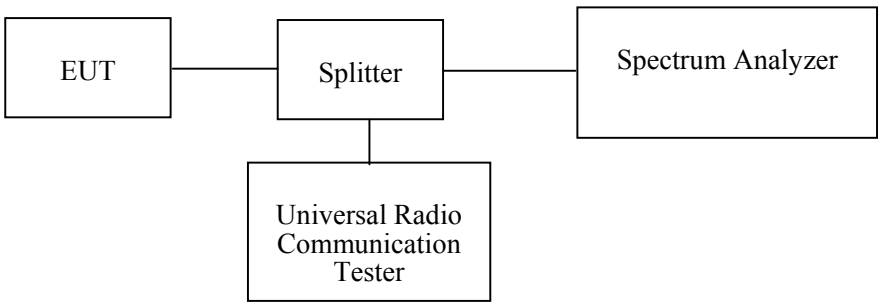
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238 and §27.53, RSS-GEN §6.6

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	FSIQ 26	831929/005	2017-08-31	2018-08-31
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-21	2018-07-21
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	RF Attenuator	10dB	10dB-1	Each Time	/
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each Time	/
Pasternack	Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	24.9~25.1°C
Relative Humidity:	41~42 %
ATM Pressure:	101.2~101.4 kPa

The testing was performed by Kami Zhou from 2017-12-07 to 2017-12-28.

Test Mode: Transmitting

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

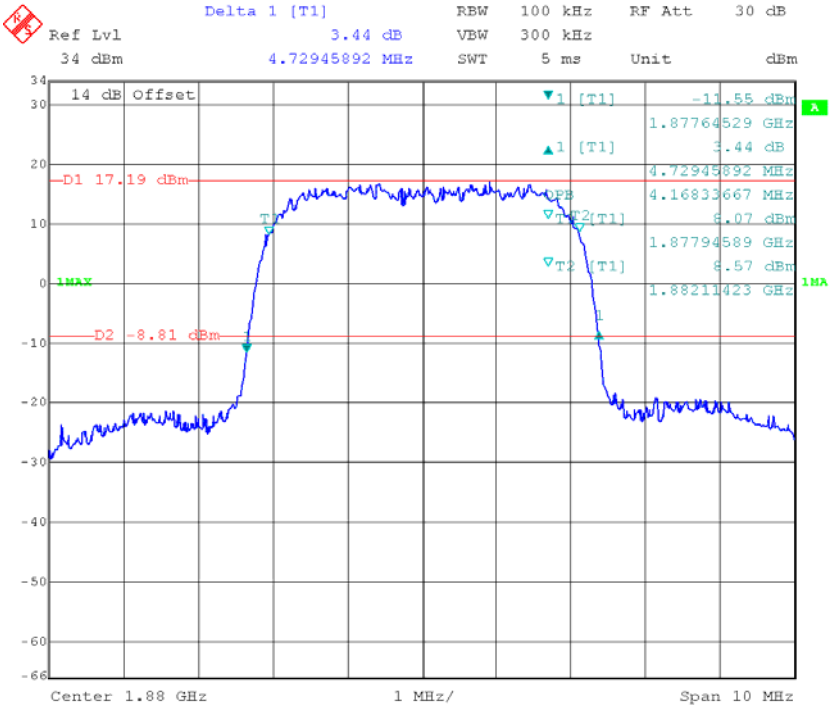
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
WCDMA Band Ⅱ	M	Rel 99	4.168	4.729
		HSDPA	4.208	4.749
		HSUPA	4.168	4.729
WCDMA Band V		Rel 99	4.168	4.709
		HSDPA	4.168	4.609
		HSUPA	4.168	4.709

CDMA 2000:

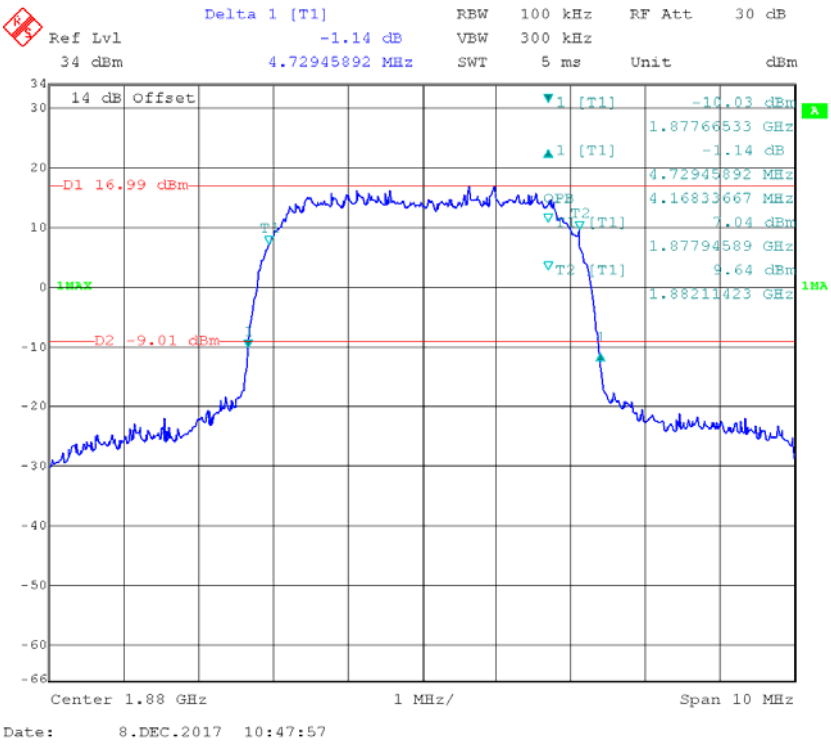
Band	Channel	Configuration		99% Occupied Bandwidth (MHz)	26 dB Bandwidth (MHz)
BC0	384	1xRTT	RC1+SO55	1.287	1.449
			RC3+SO55	1.281	1.443
		1xEvDO	RTAP 153.6kbps	1.275	1.449
BC1	600	1xRTT	RC1+SO55	1.281	1.455
			RC3+SO55	1.275	1.449
		1xEvDO	RTAP 153.6kbps	1.281	1.437

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 2	QPSK	1.4	M	1.112	1.335
		3		2.766	3.201
		5		4.549	5.137
		10		9.092	10.338
		15		13.527	15.296
		20		17.956	19.616
	16QAM	1.4	M	1.118	1.335
		3		2.754	3.201
		5		4.529	5.130
		10		9.092	10.296
		15		13.527	15.117
		20		17.956	19.693
LTE Band 4	QPSK	1.4	M	1.112	1.353
		3		2.778	3.240
		5		4.549	5.143
		10		9.138	10.421
		15		13.587	15.100
		20		18.116	19.880
	16QAM	1.4	M	1.118	1.341
		3		2.790	3.216
		5		4.549	5.160
		10		9.138	10.381
		15		13.587	15.100
		20		18.116	19.639
LTE Band 5	QPSK	1.4	M	1.106	1.335
		3		2.766	3.219
		5		4.529	5.111
		10		9.098	10.292
	16QAM	1.4	M	1.106	1.317
		3		2.778	3.207
		5		4.529	5.091
		10		9.058	10.332
LTE Band 13	QPSK	5	M	4.529	5.150
		10		9.058	10.341
	16QAM	5	M	4.549	5.130
		10		9.058	10.261
LTE Band 17	QPSK	5	M	4.529	5.090
		10		9.098	10.261
	16QAM	5	M	4.529	5.110
		10		9.098	10.240

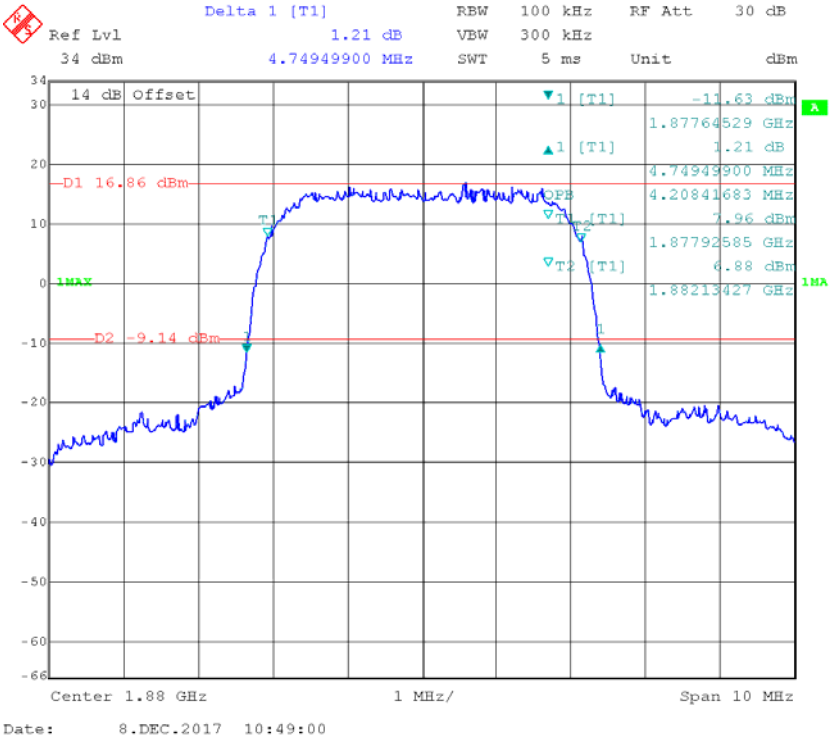
WCDMA Band II, Rel 99



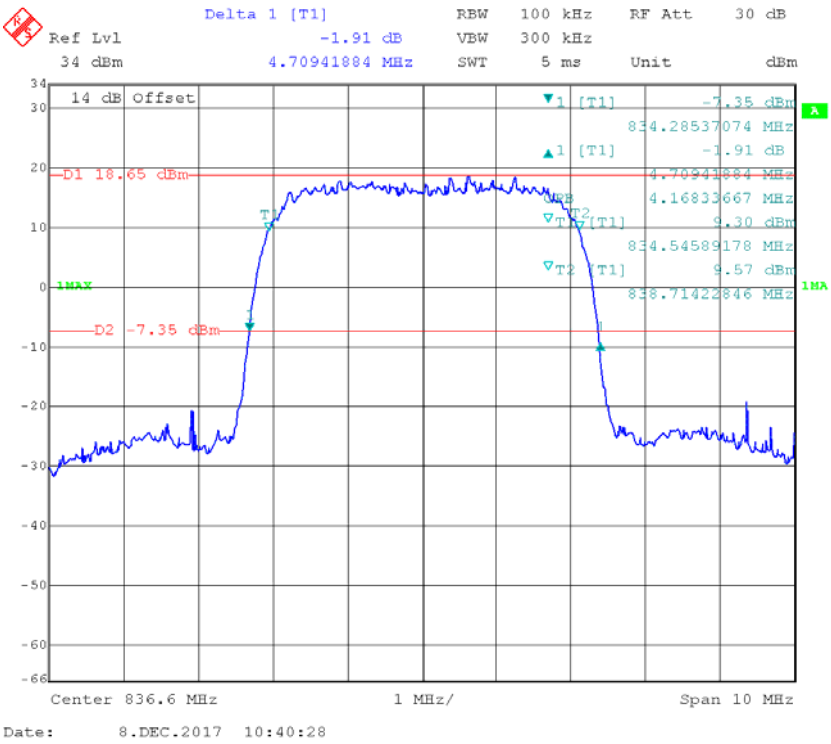
WCDMA Band II, HSUPA



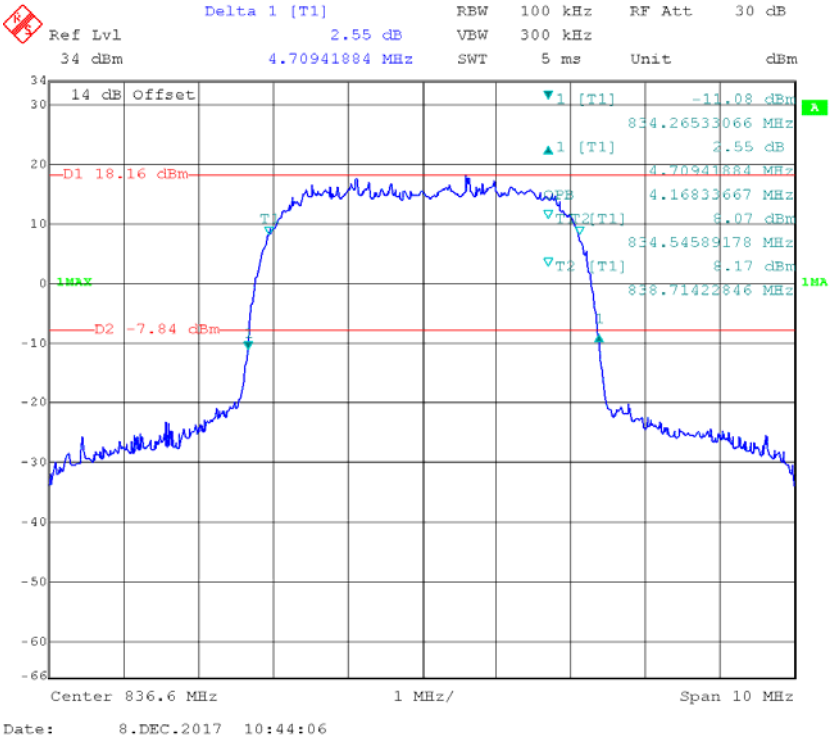
WCDMA Band II, HSDPA



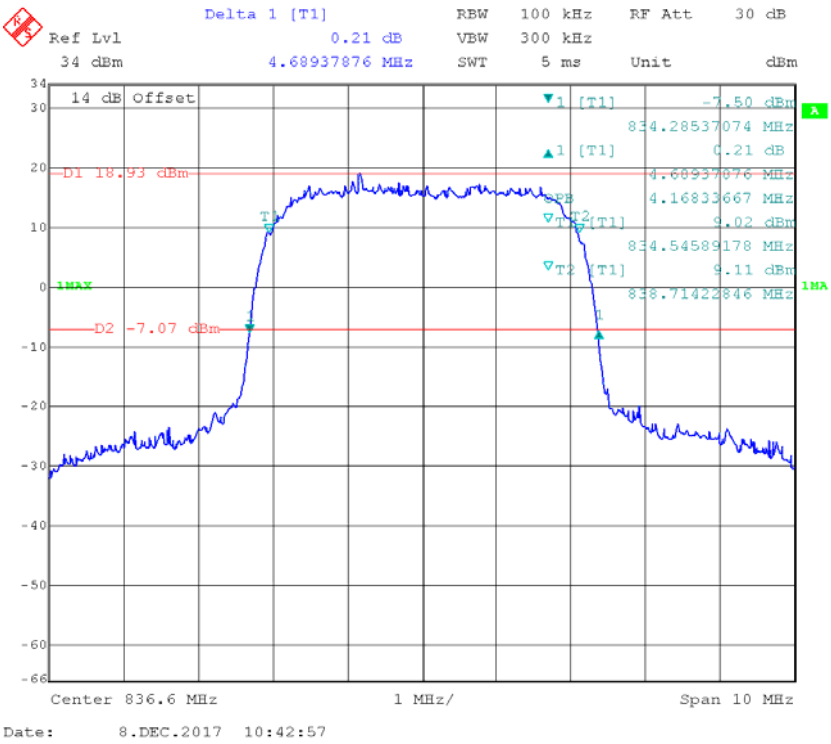
WCDMA Band V, Rel 99



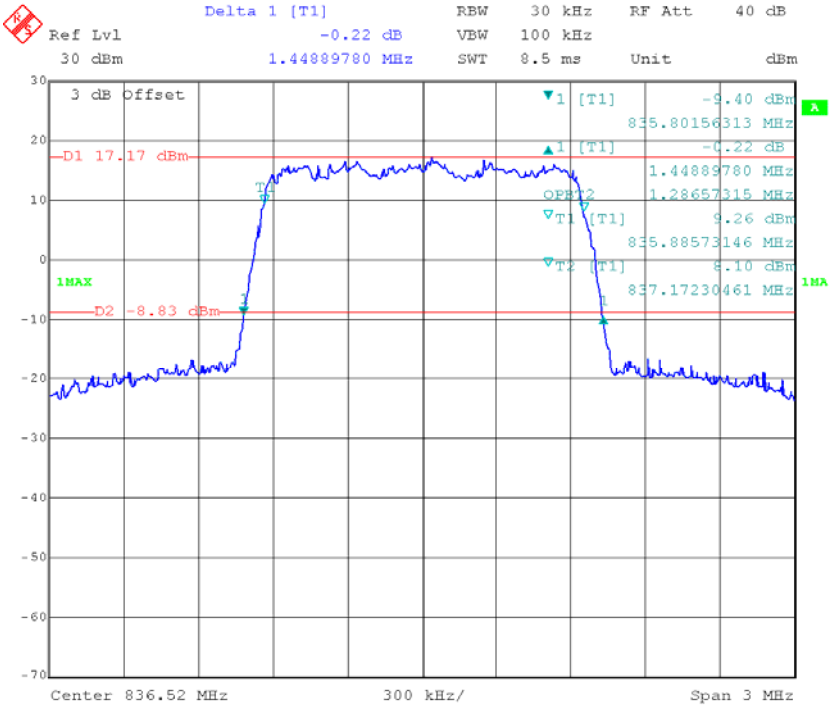
WCDMA Band V, HSUPA



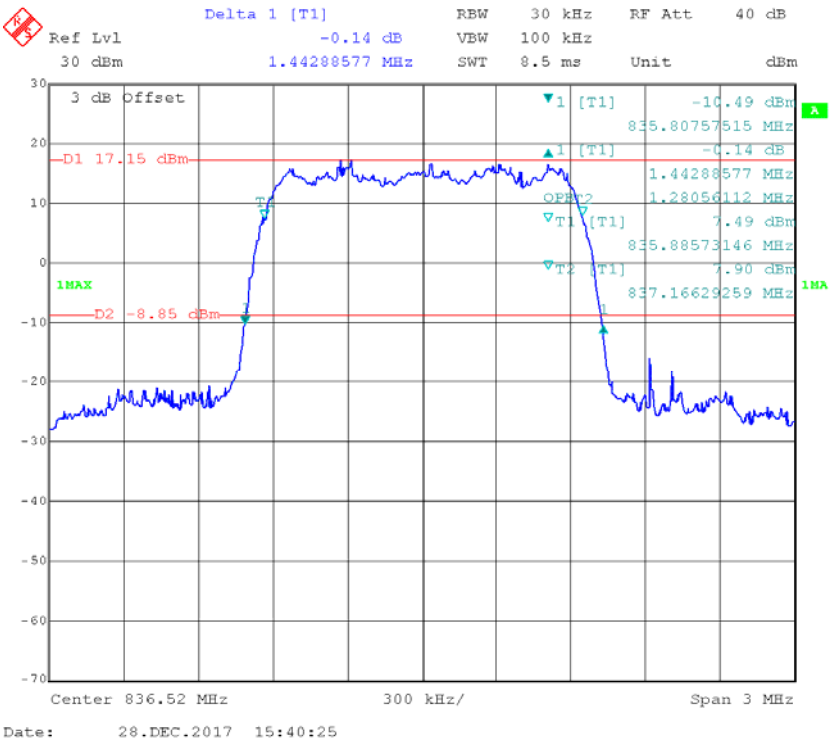
WCDMA Band V, HSDPA



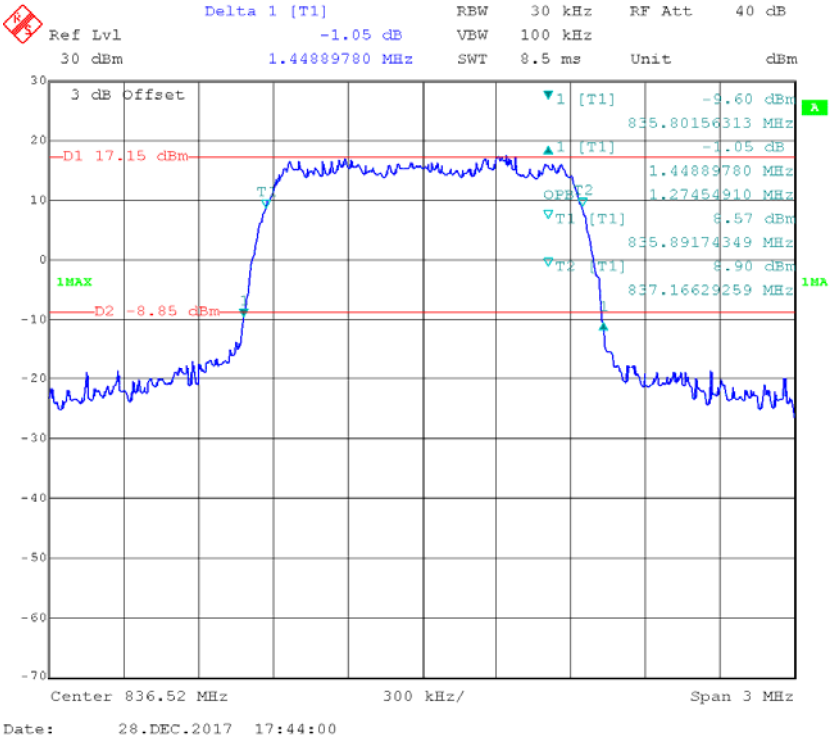
CDMA BC0- RC1+SO55



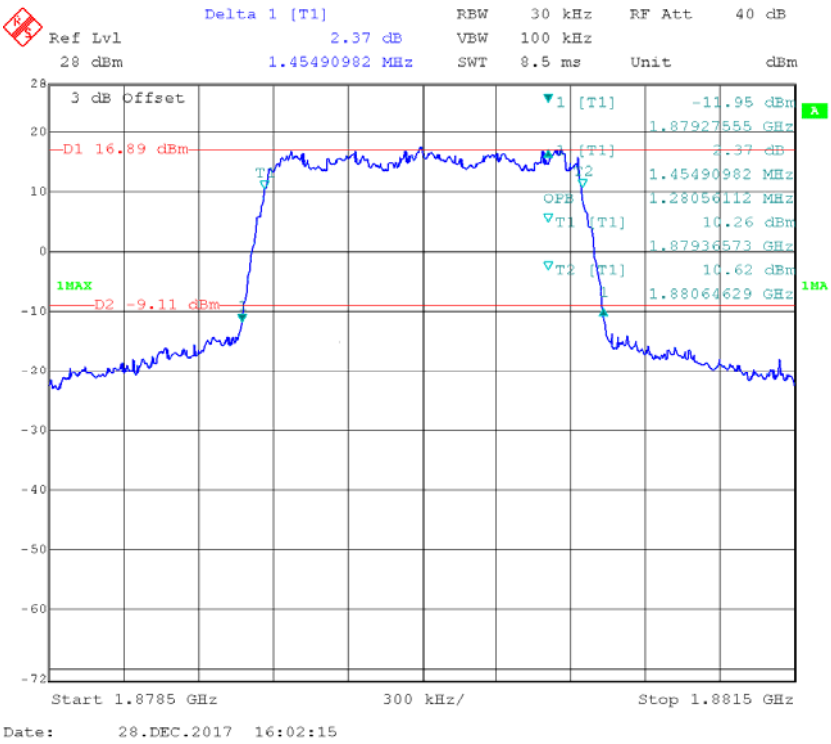
CDMA BC0- RC3+SO55



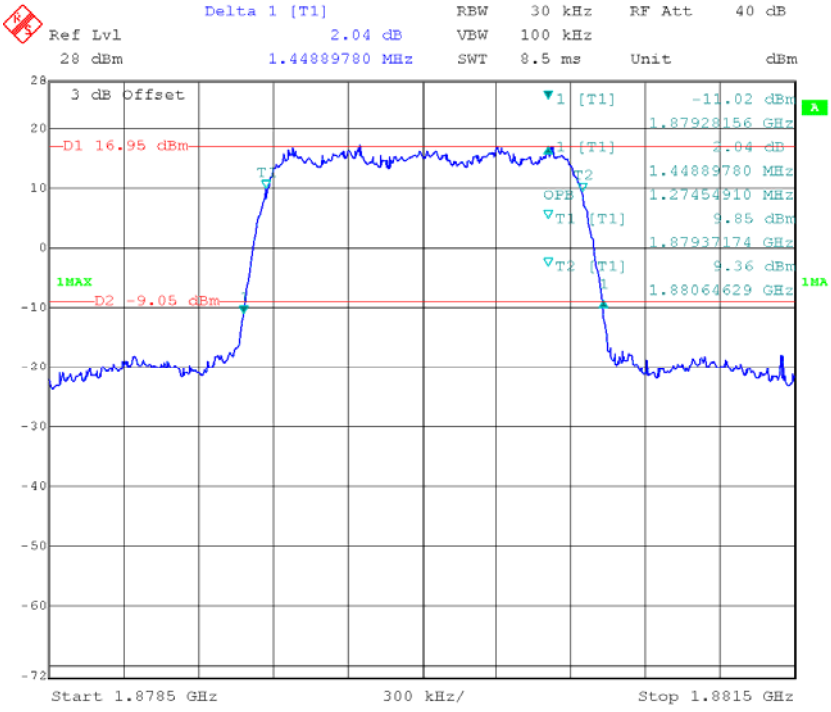
CDMA BC0- RTAP 153.6kbps



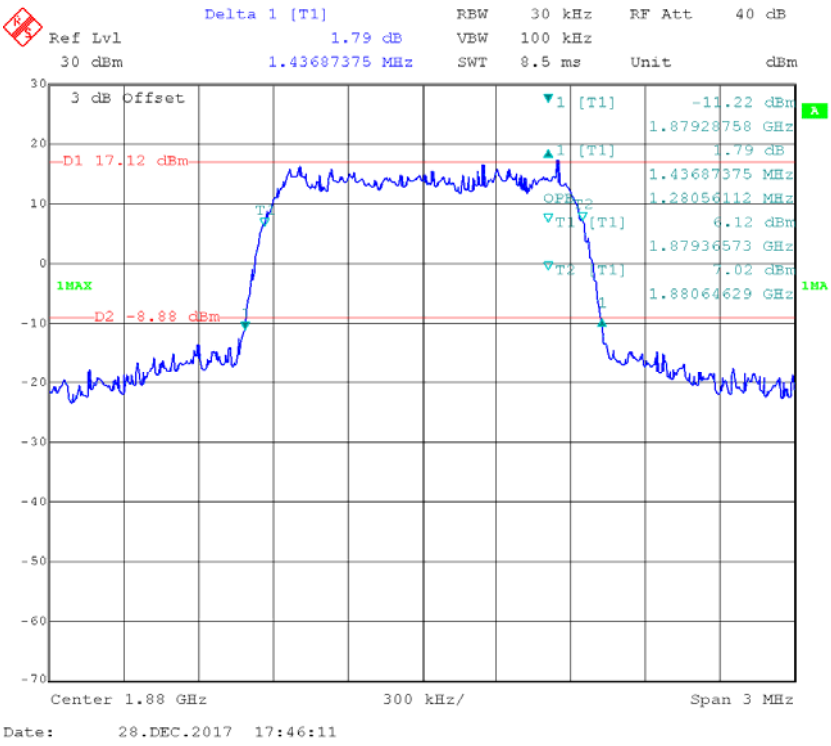
CDMA BC1- RC1+SO55



CDMA BC1- RC3+SO55

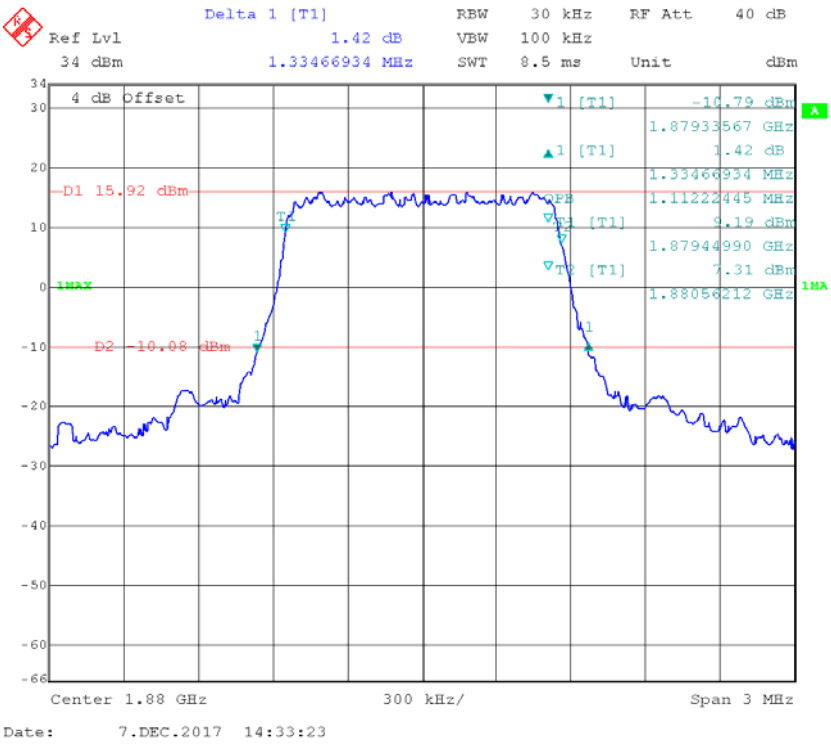


CDMA BC1- RTAP 153.6kbps

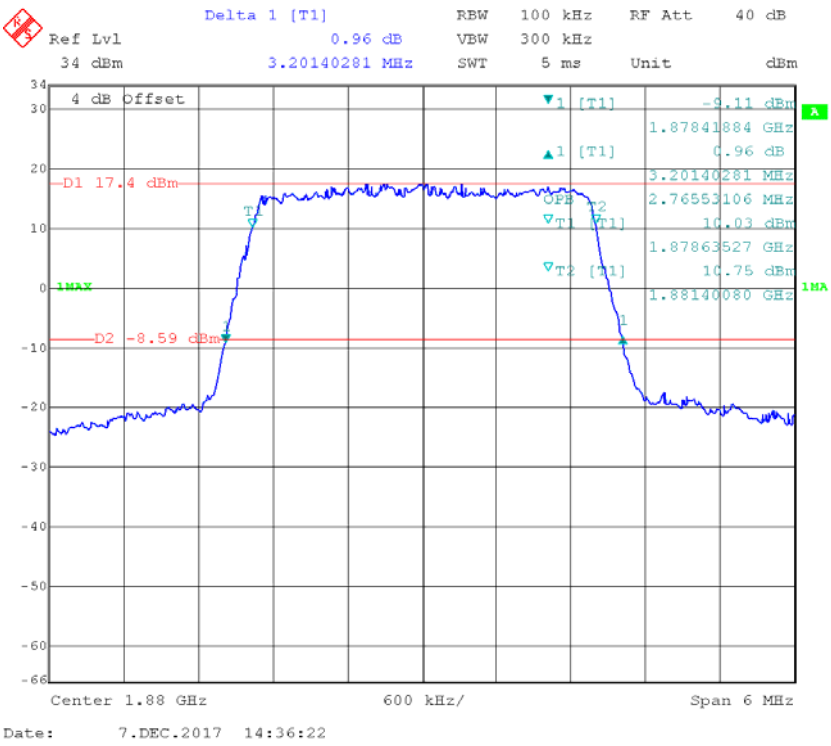


LTE Band 2

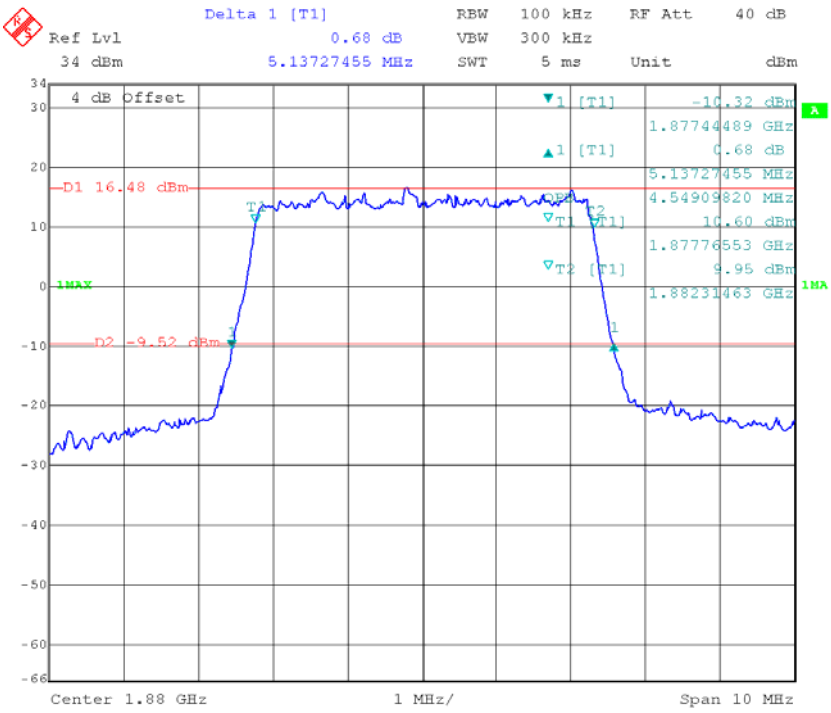
QPSK_1.4 MHz



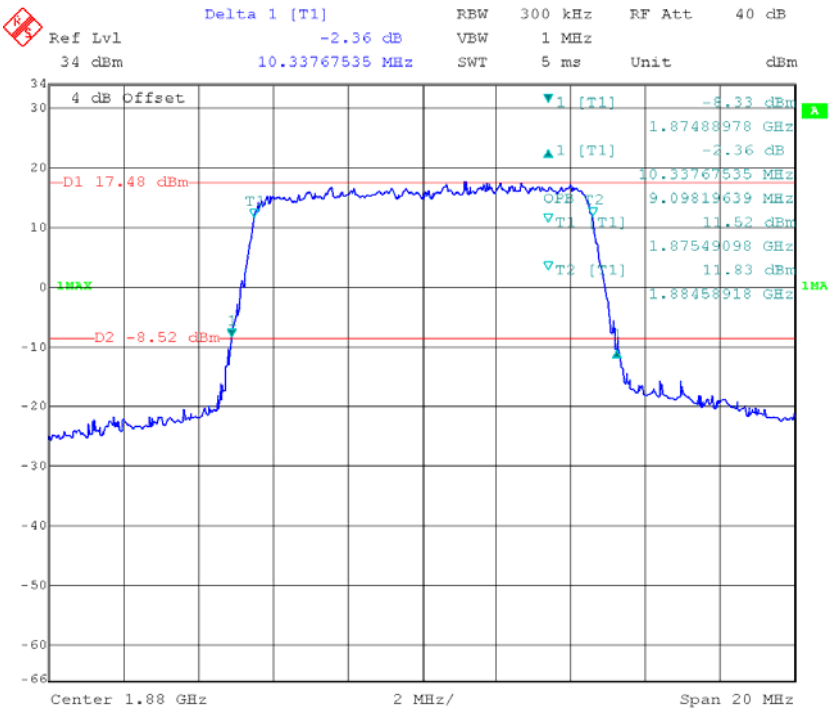
QPSK_3 MHz



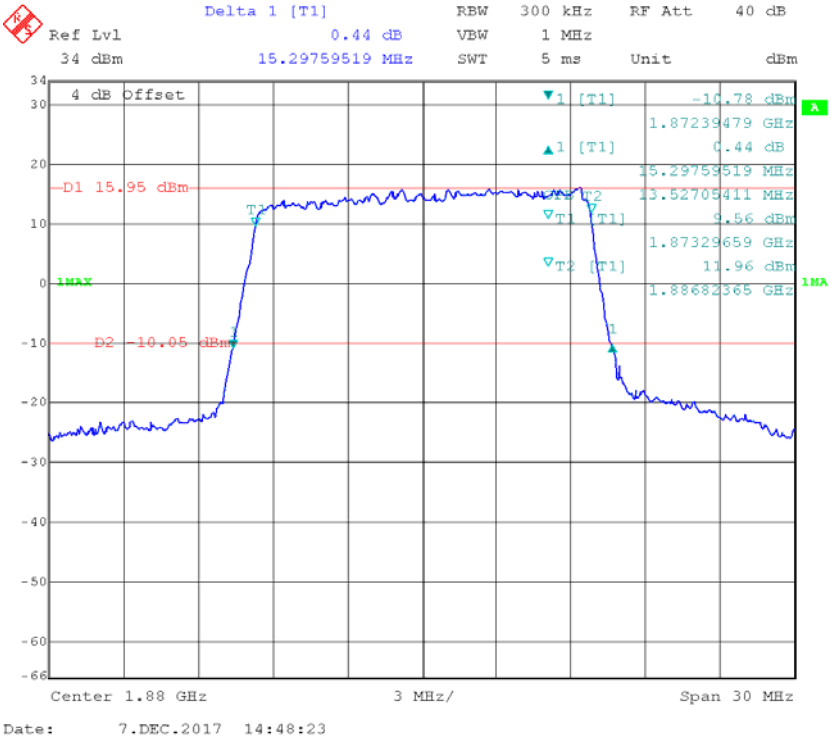
QPSK_5 MHz



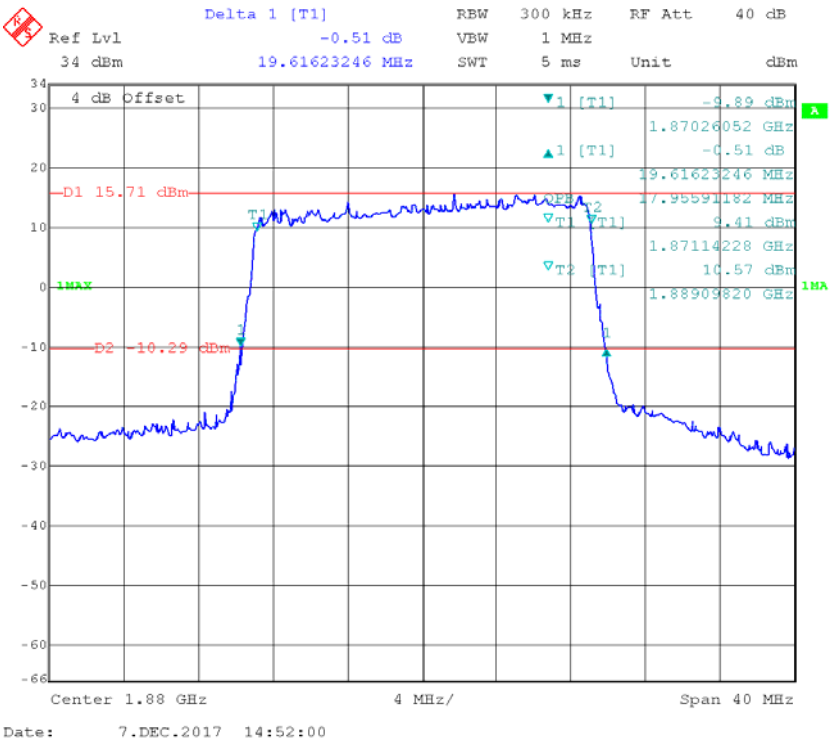
QPSK_10 MHz



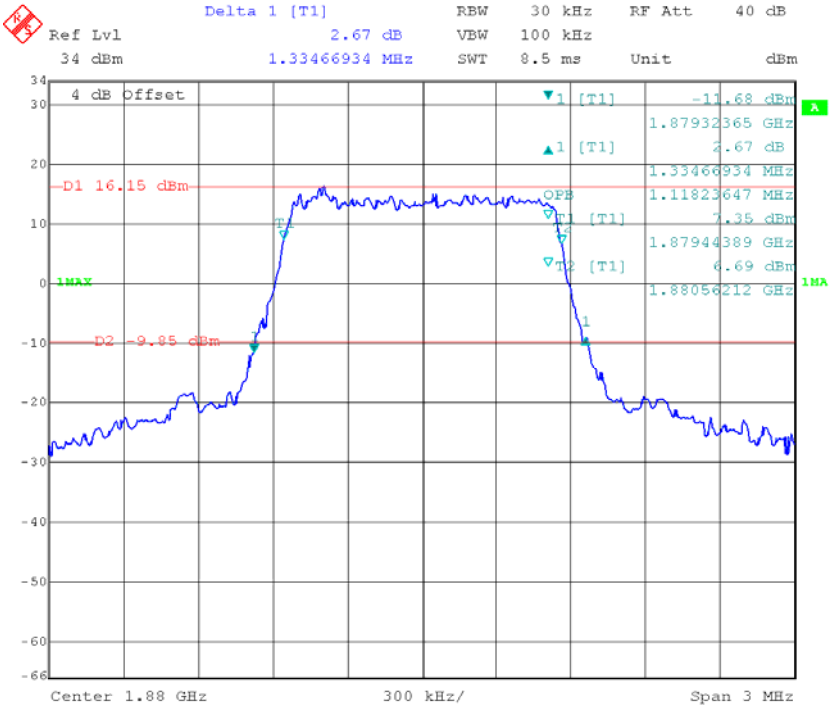
QPSK_15 MHz



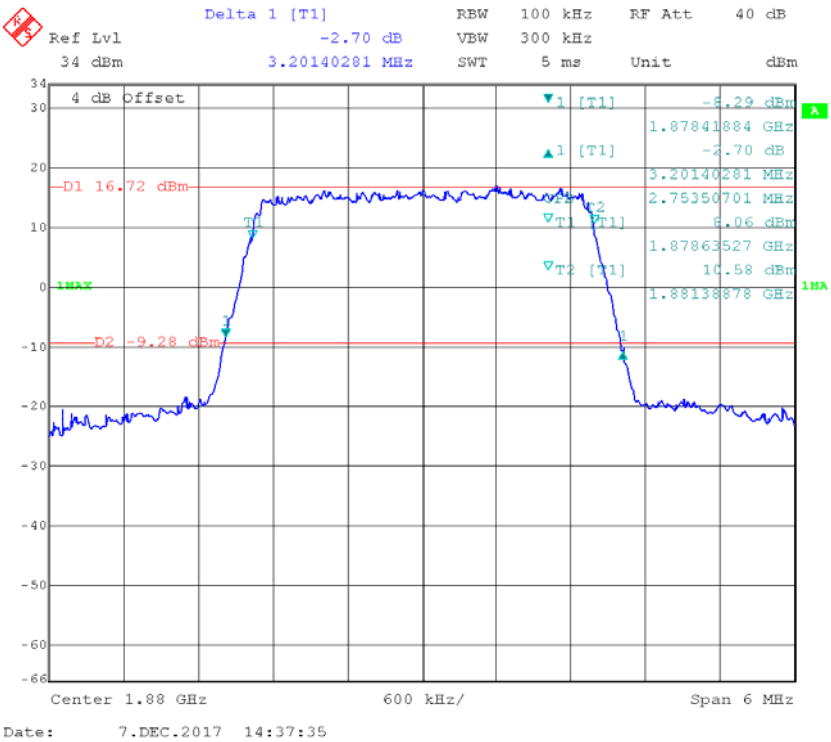
QPSK_20 MHz



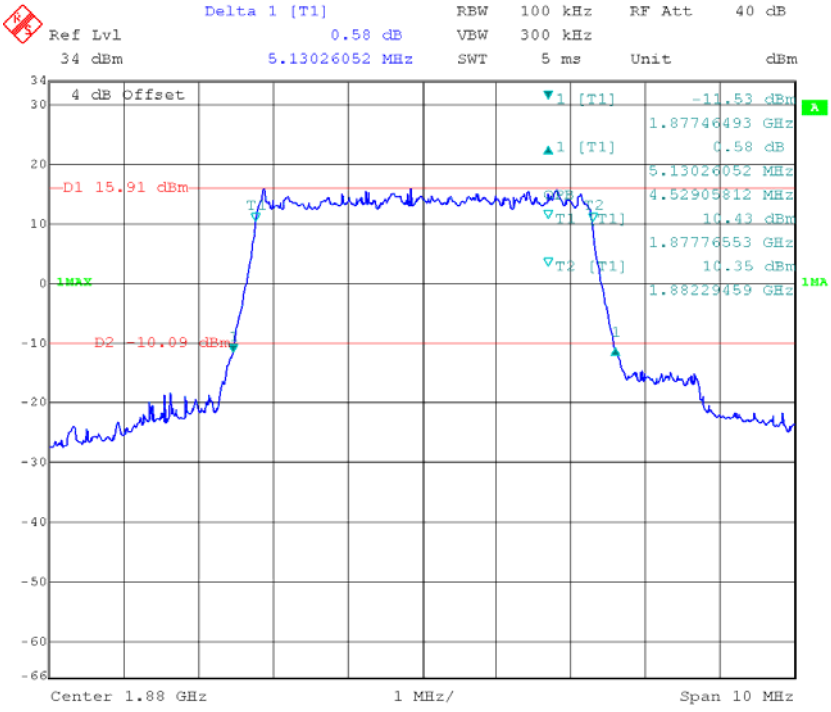
16QAM_1.4 MHz



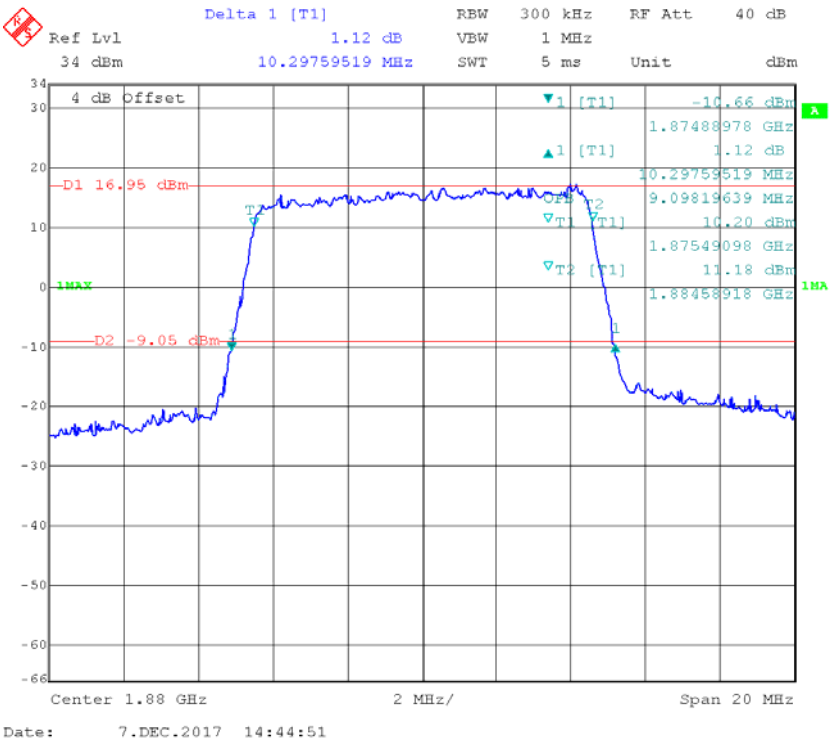
16QAM_3 MHz



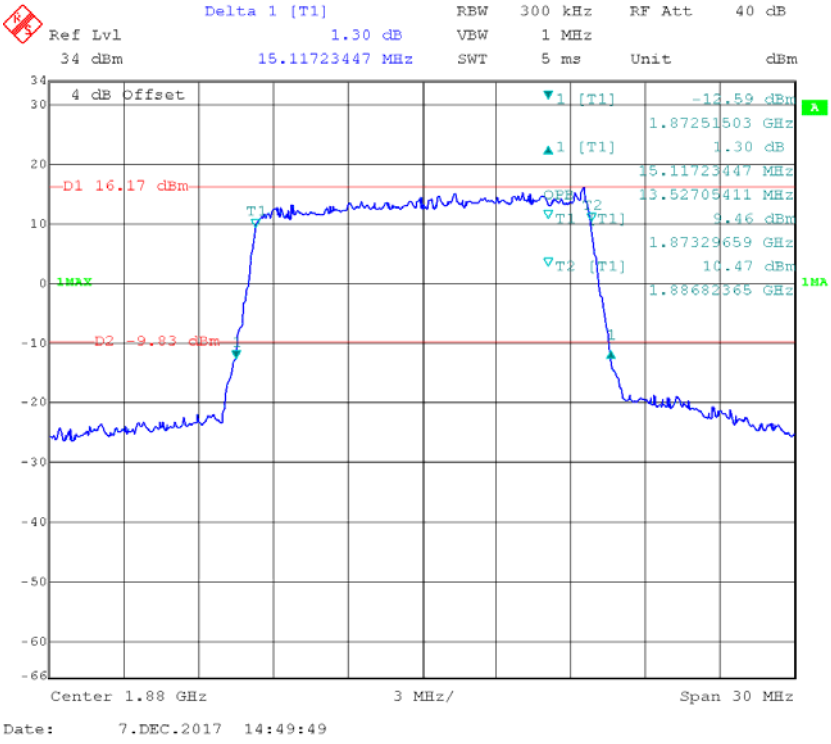
16QAM_5 MHz



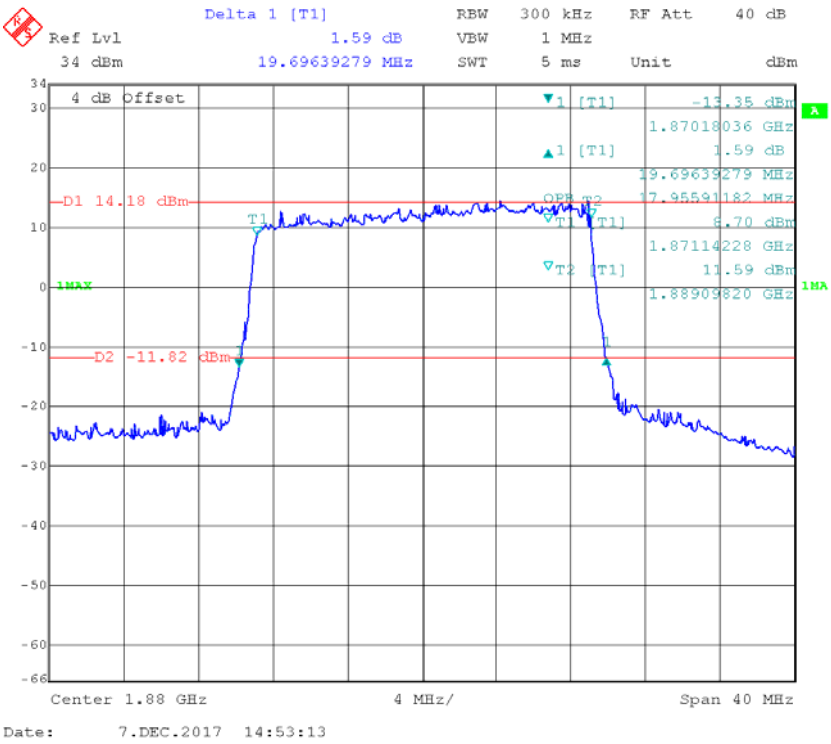
16QAM_10 MHz



16QAM_15 MHz

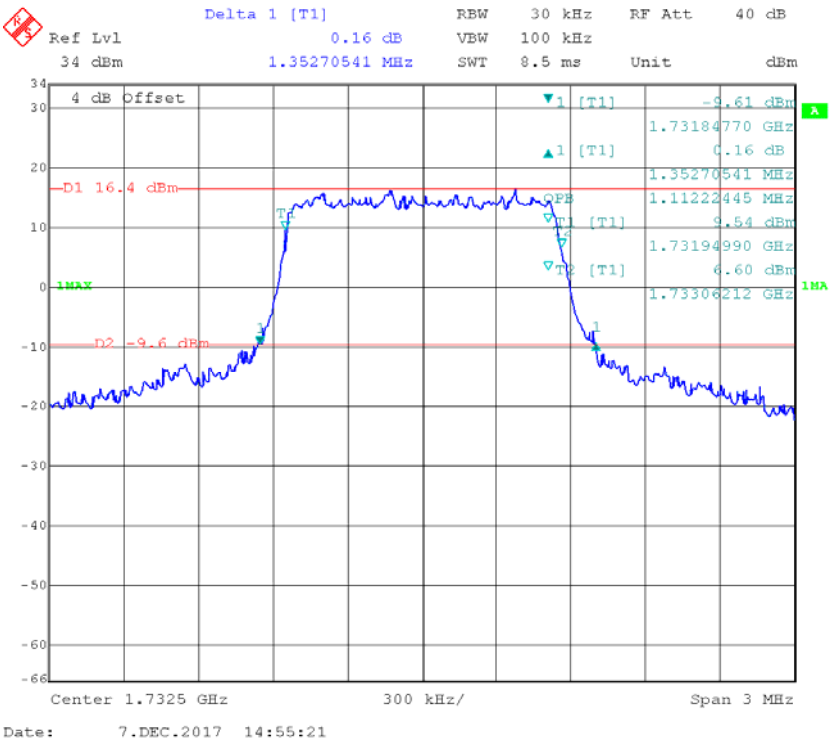


16QAM_20 MHz

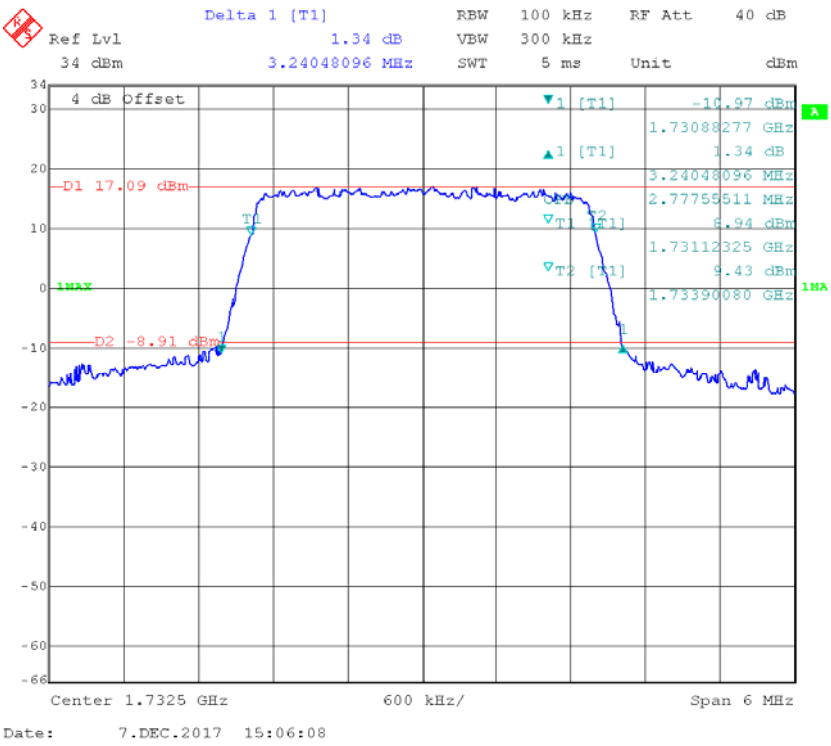


LTE Band 4:

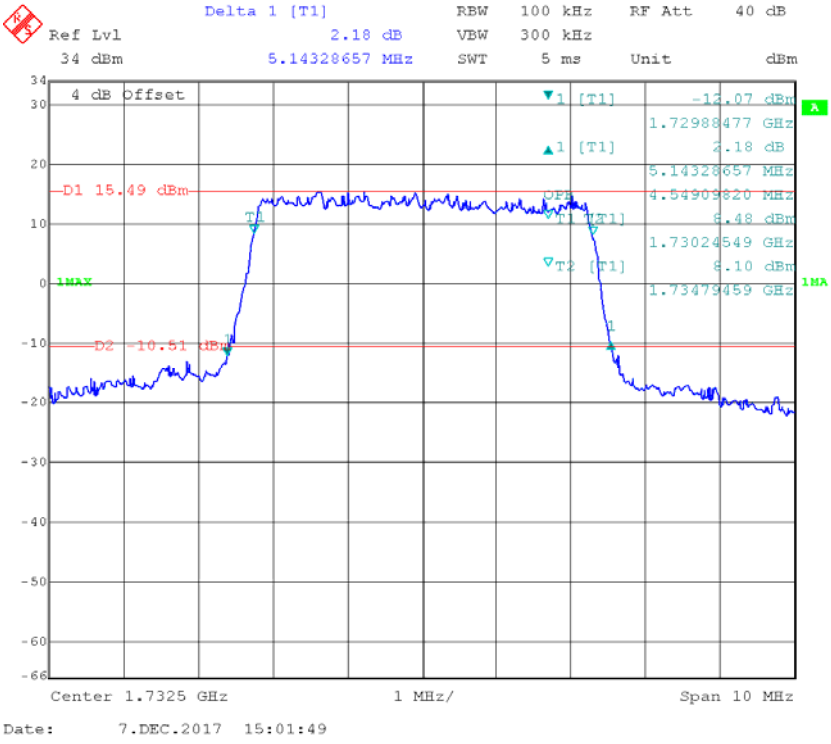
QPSK_1.4 MHz



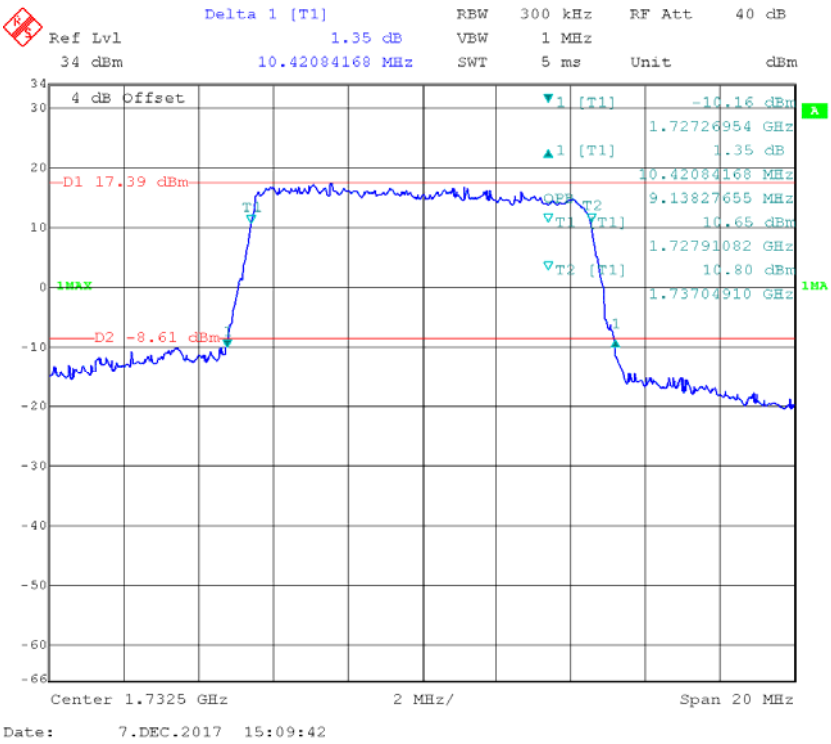
QPSK_3 MHz



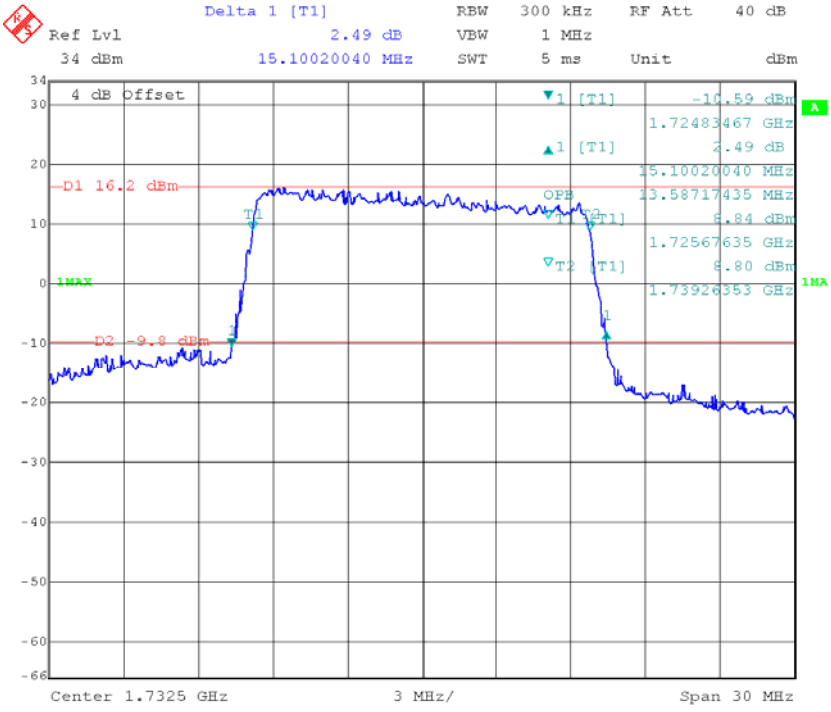
QPSK_5 MHz



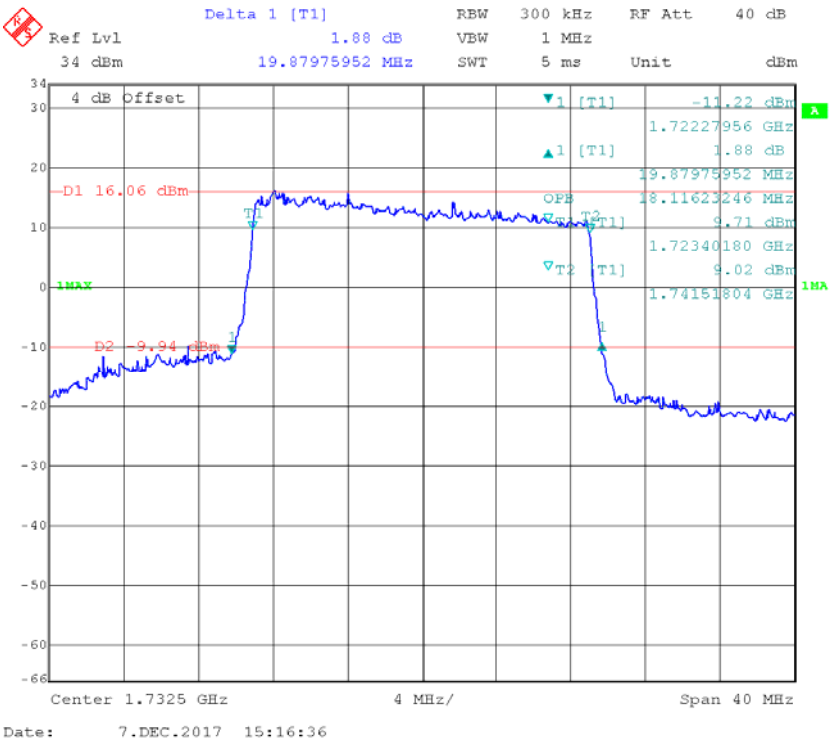
QPSK_10 MHz



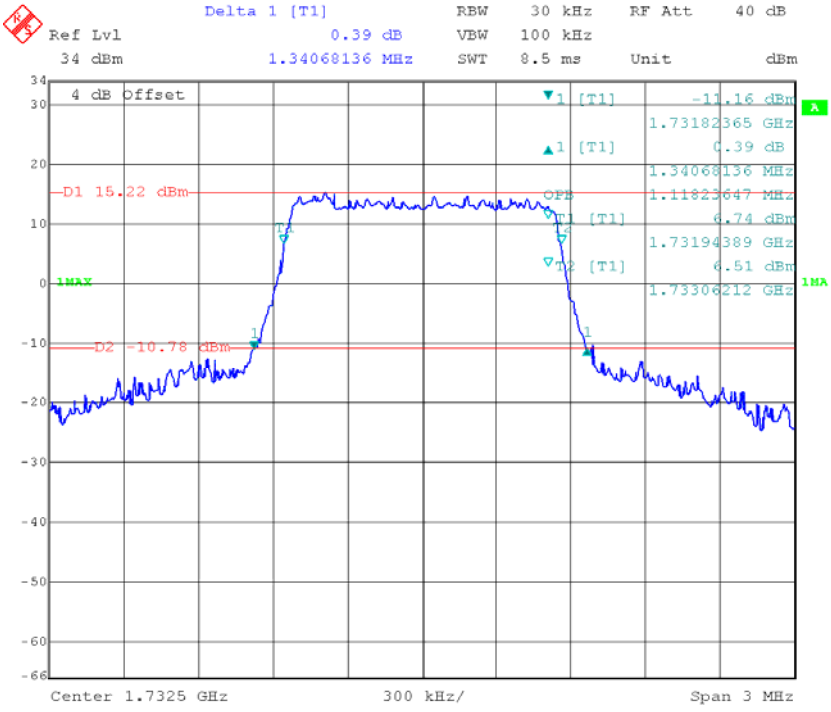
QPSK_15 MHz



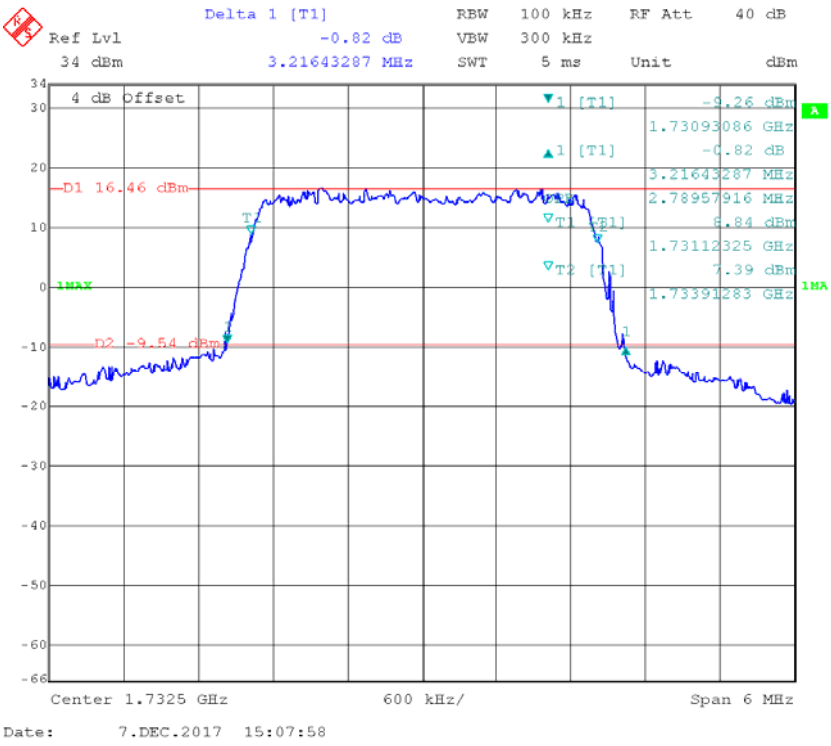
QPSK_20 MHz



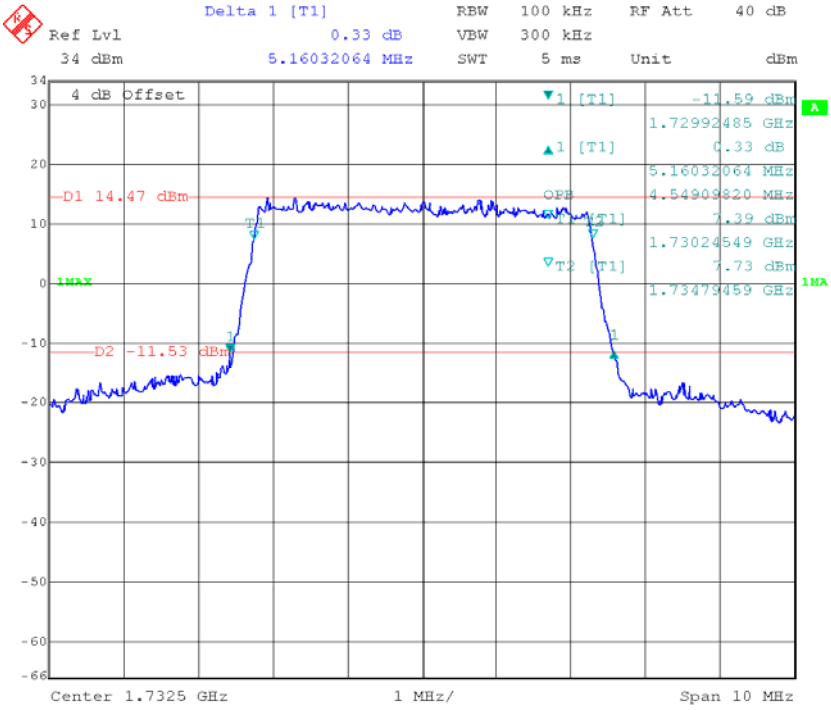
16QAM_1.4 MHz



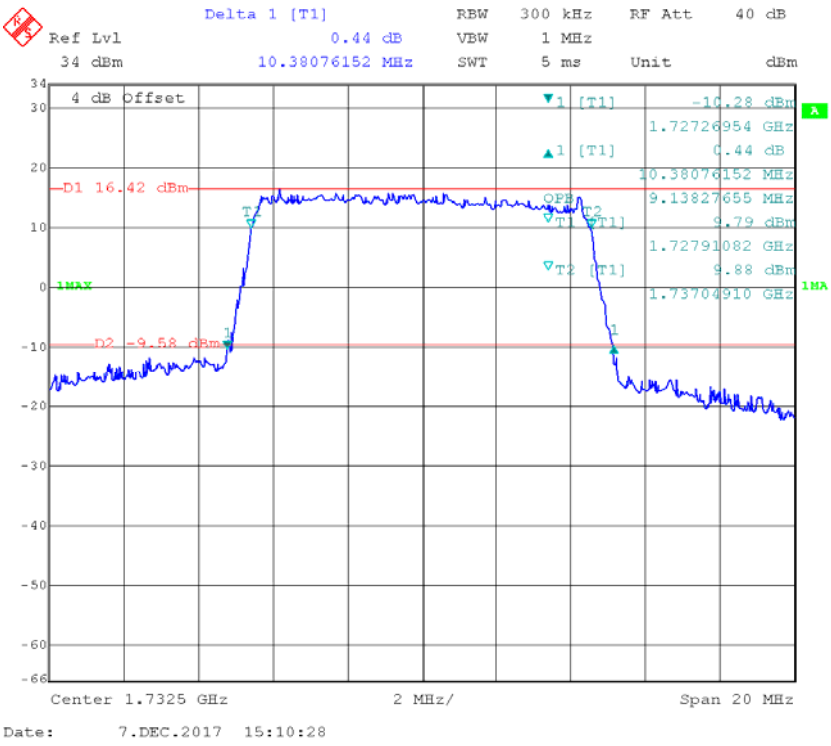
16QAM_3 MHz



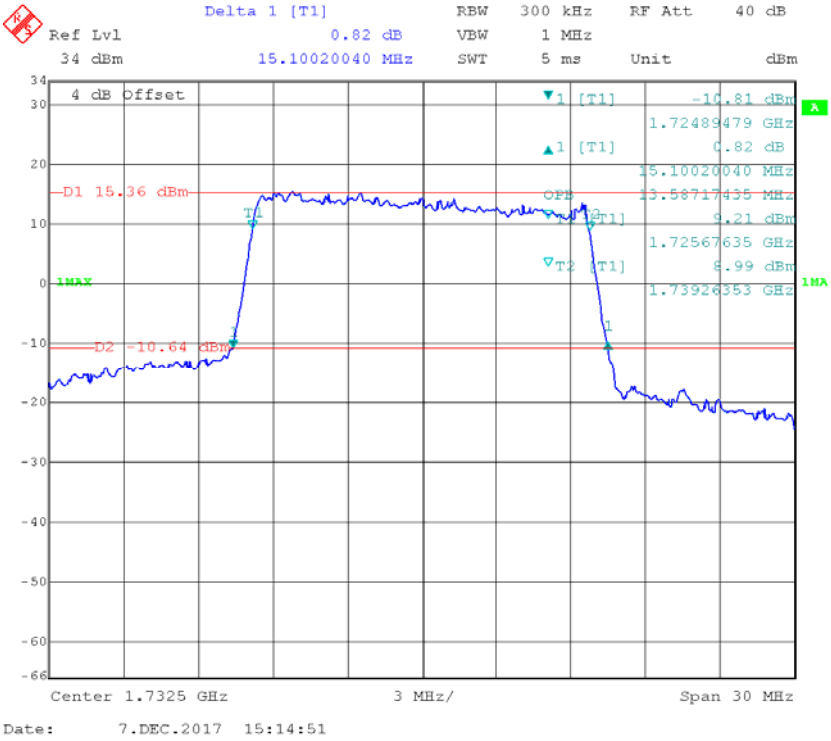
16QAM_5 MHz



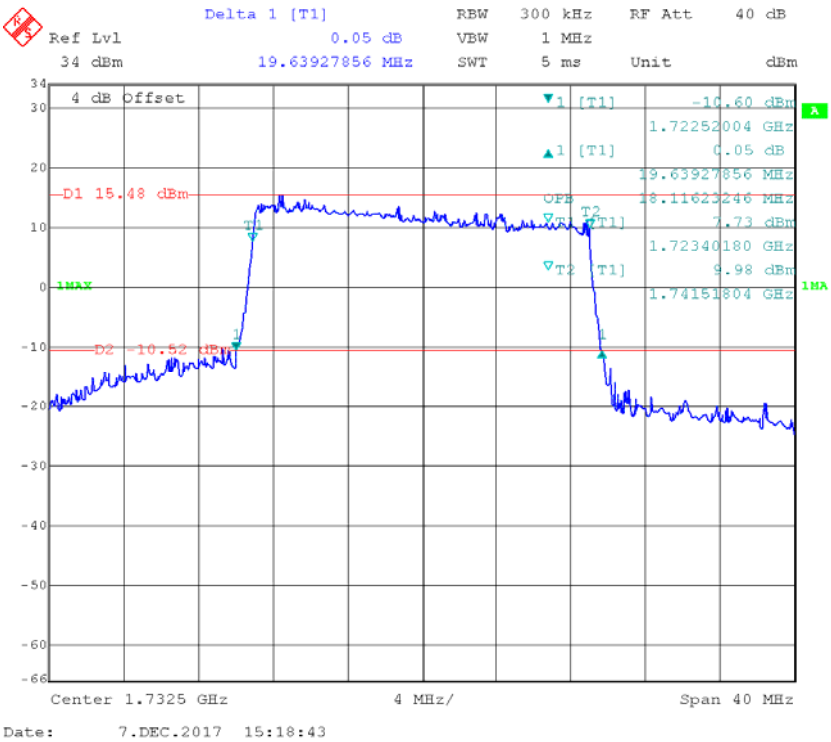
16QAM_10 MHz



16QAM_15 MHz

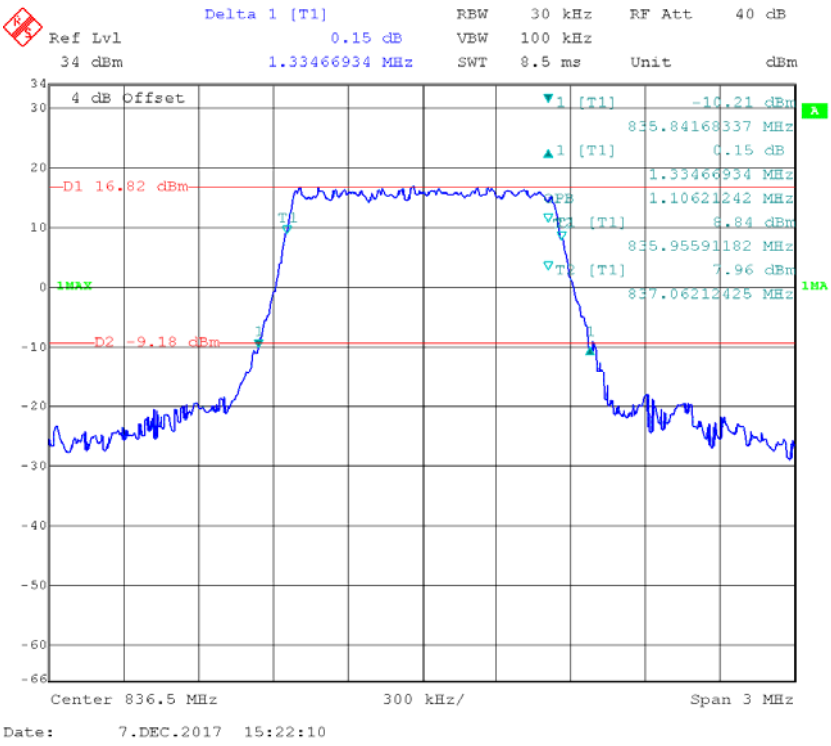


16QAM_20 MHz

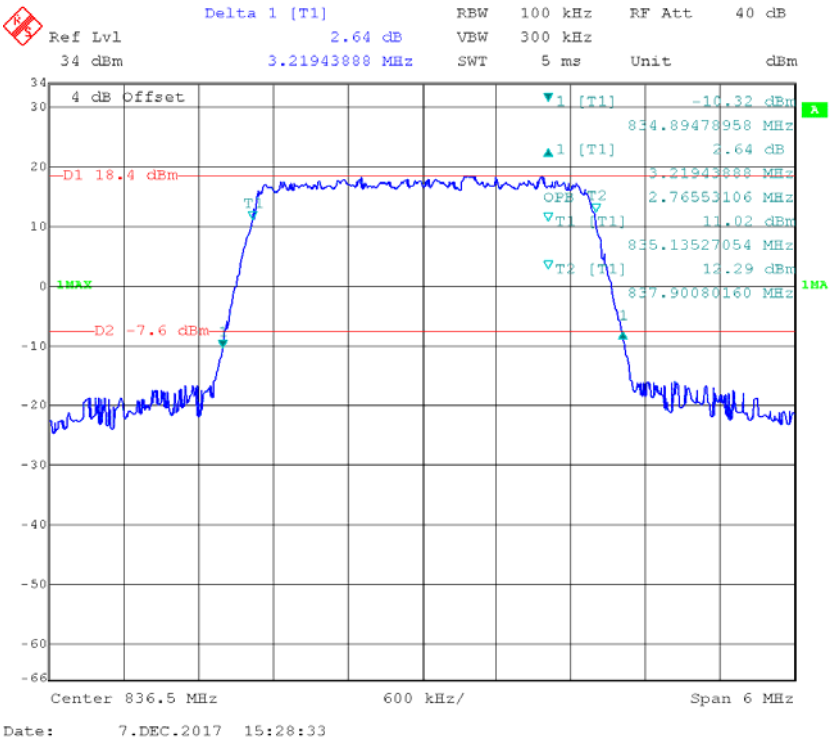


LTE Band 5:

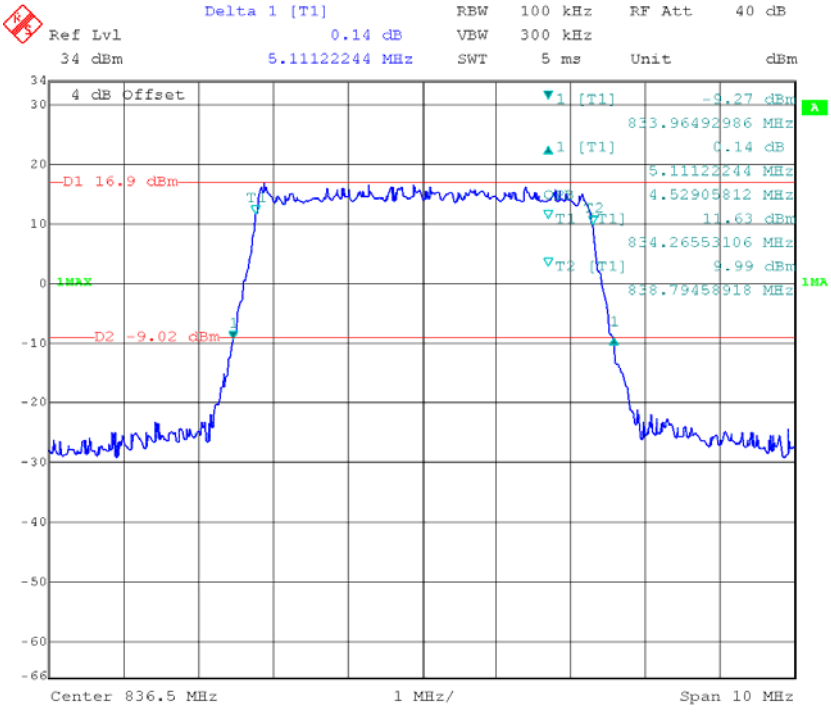
QPSK_1.4 MHz



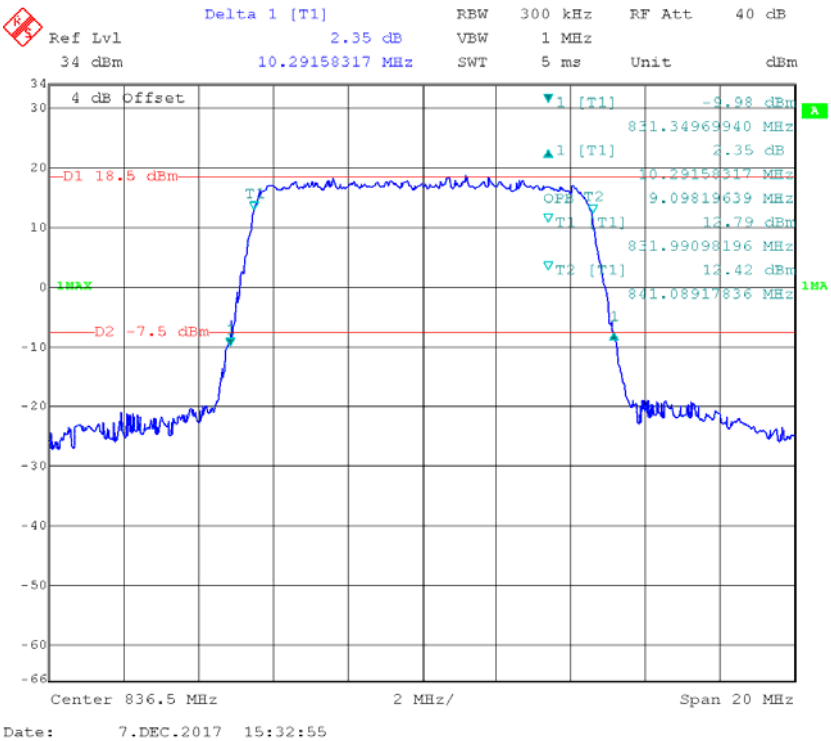
QPSK_3 MHz



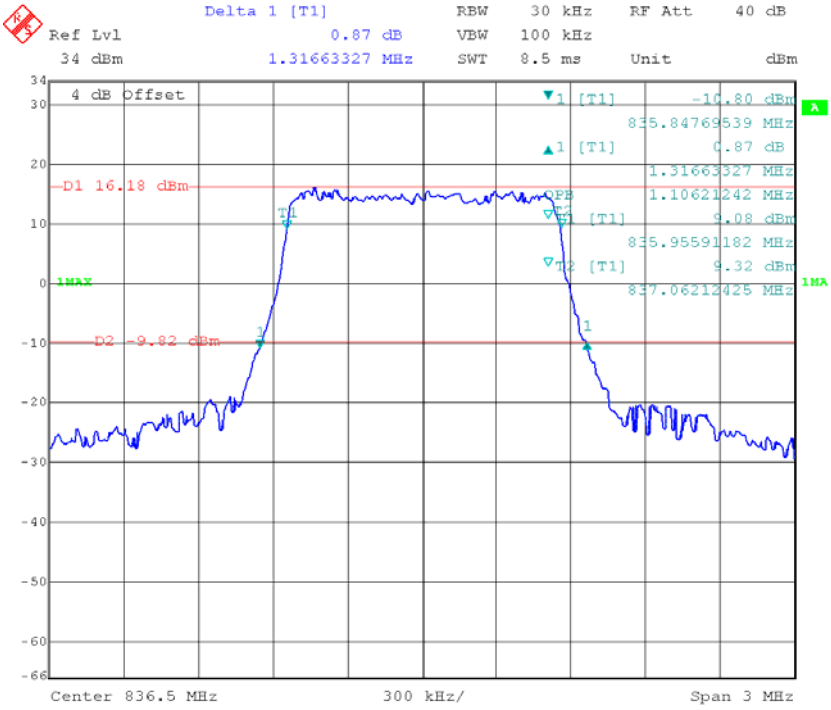
QPSK_5 MHz



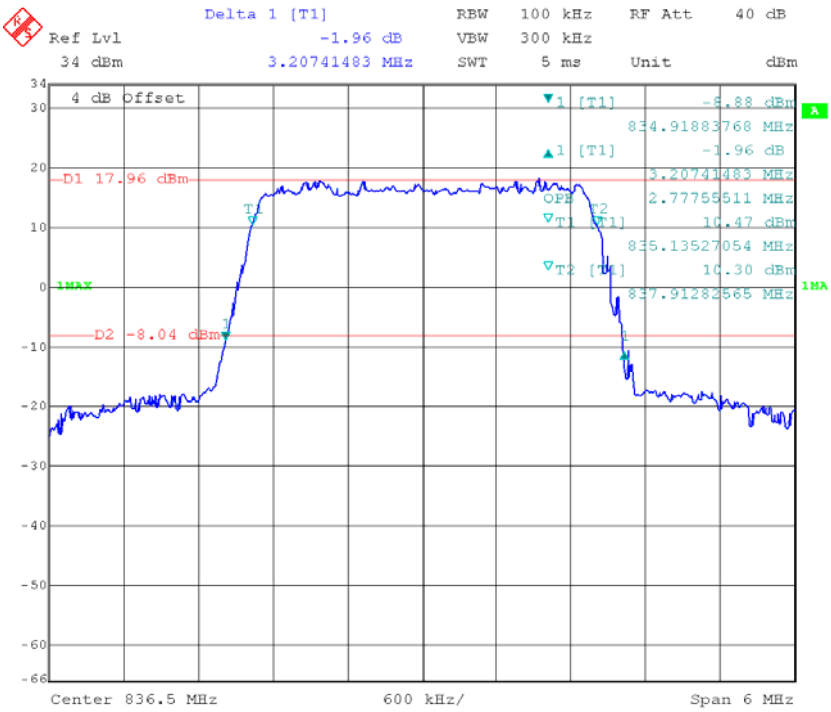
QPSK_10 MHz



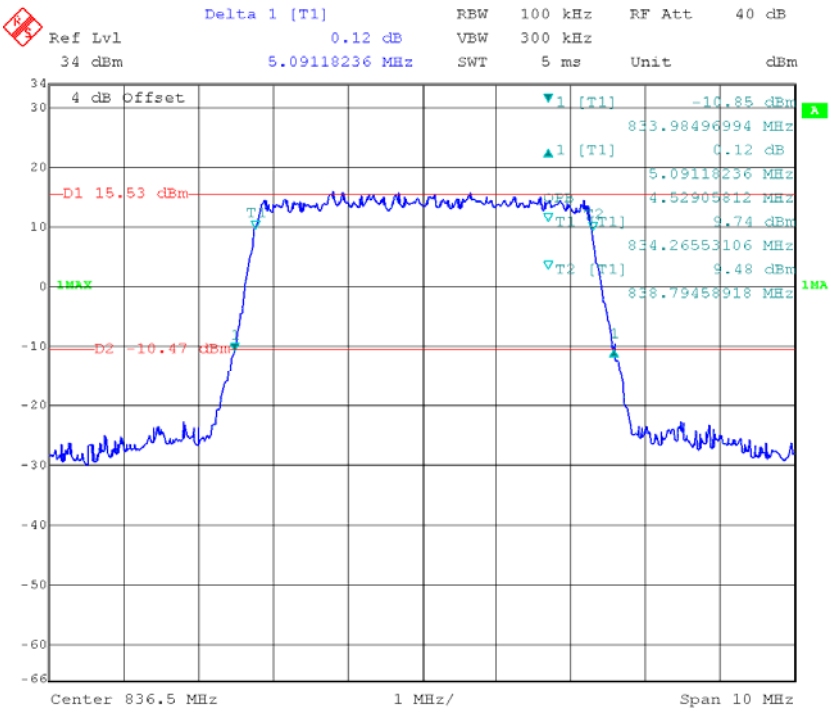
16QAM_1.4 MHz



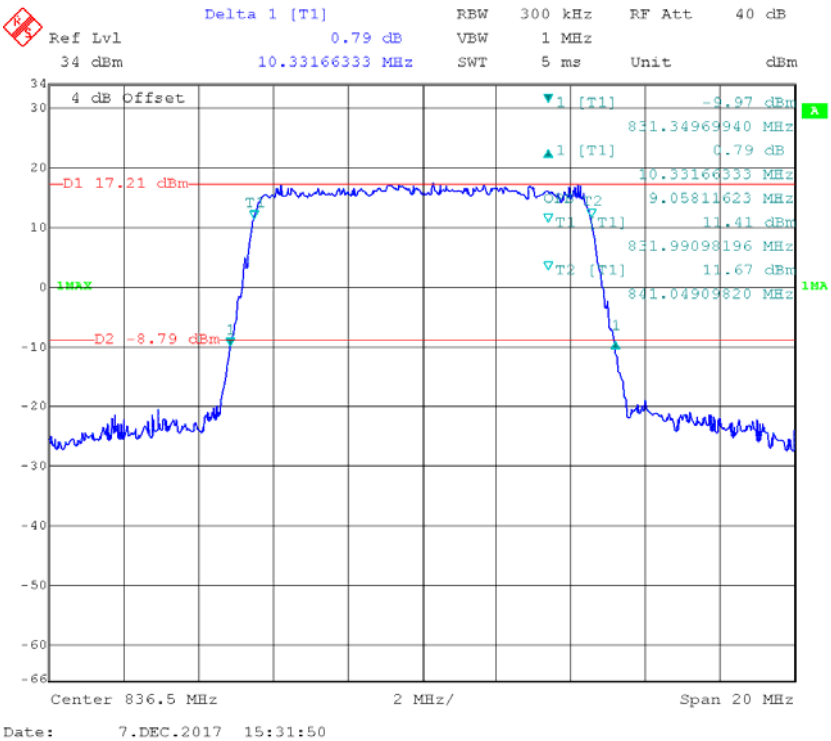
16QAM_3 MHz



16QAM_5 MHz

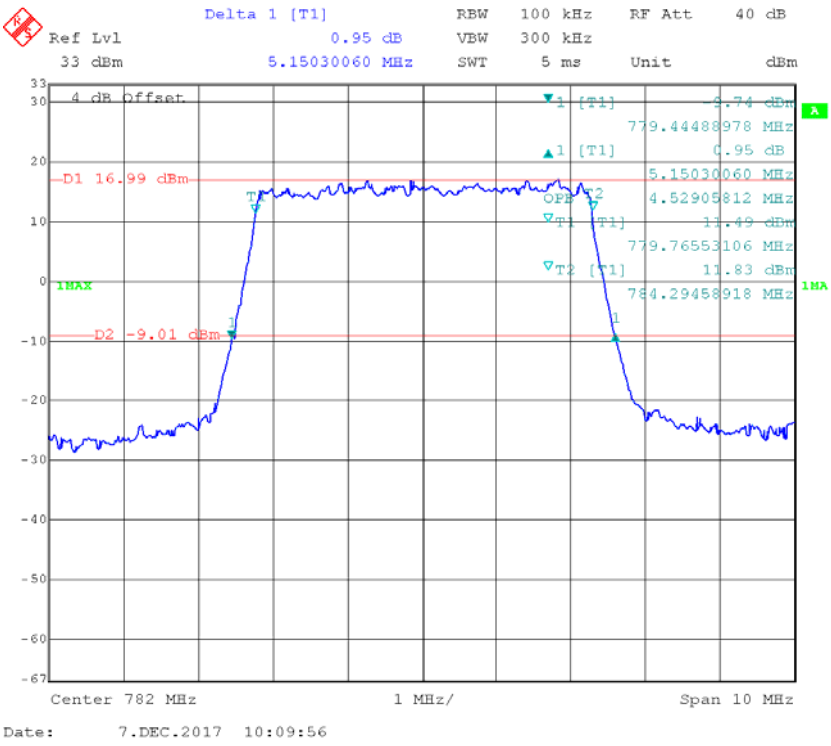


16QAM_10 MHz

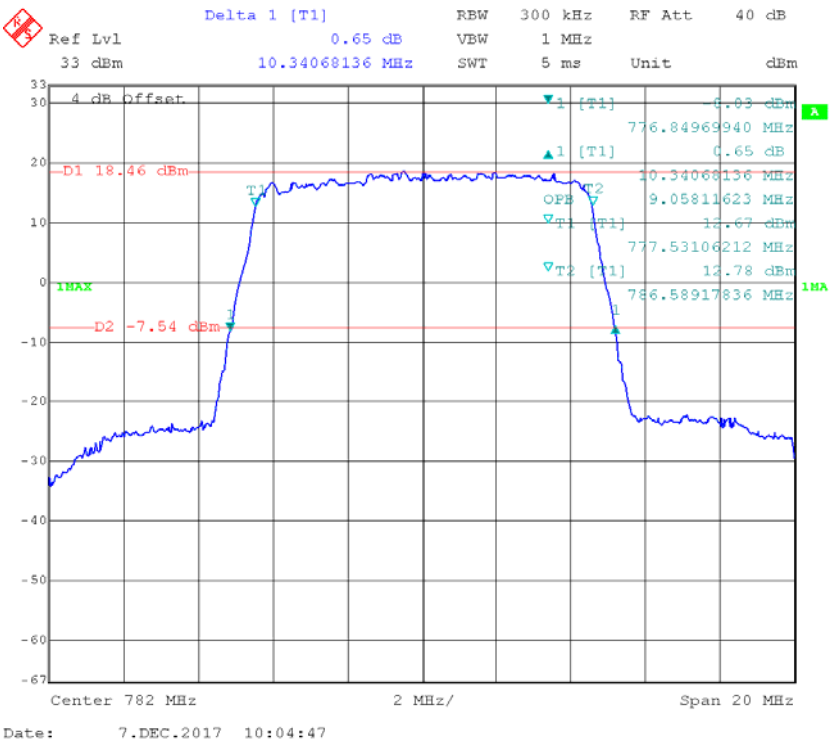


LTE Band 13:

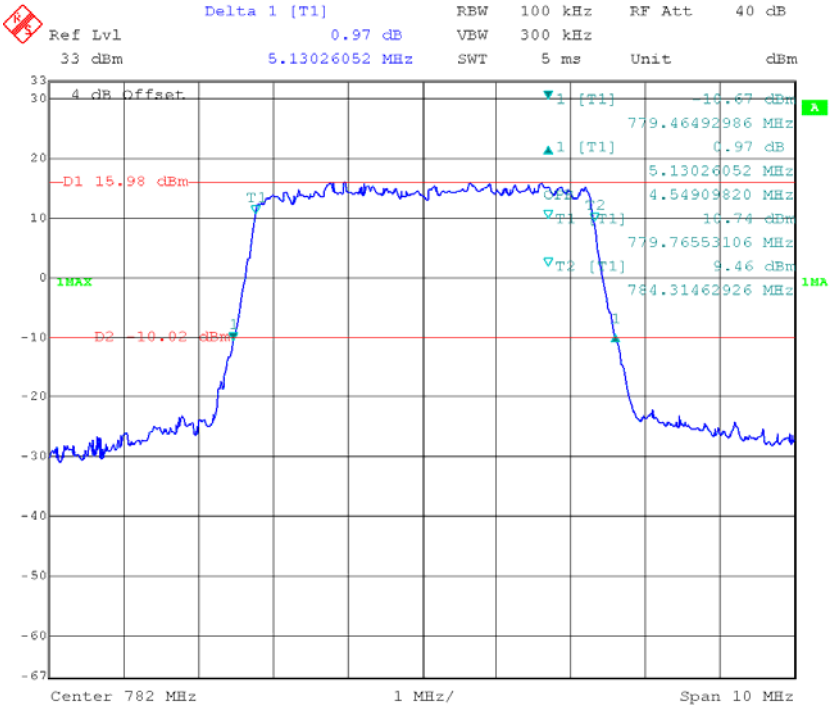
QPSK_5 MHz



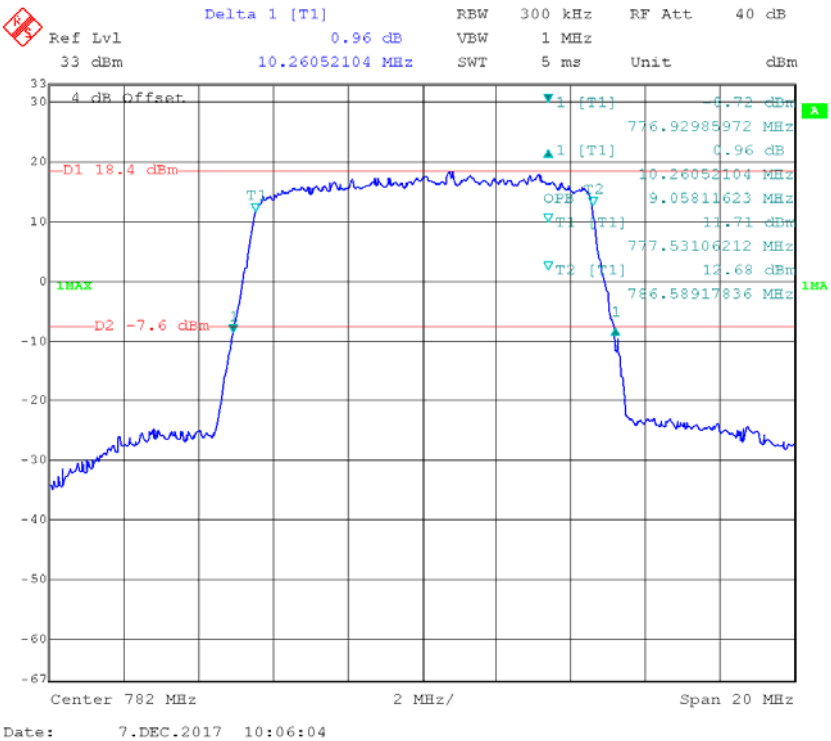
QPSK_10 MHz



16QAM_5 MHz

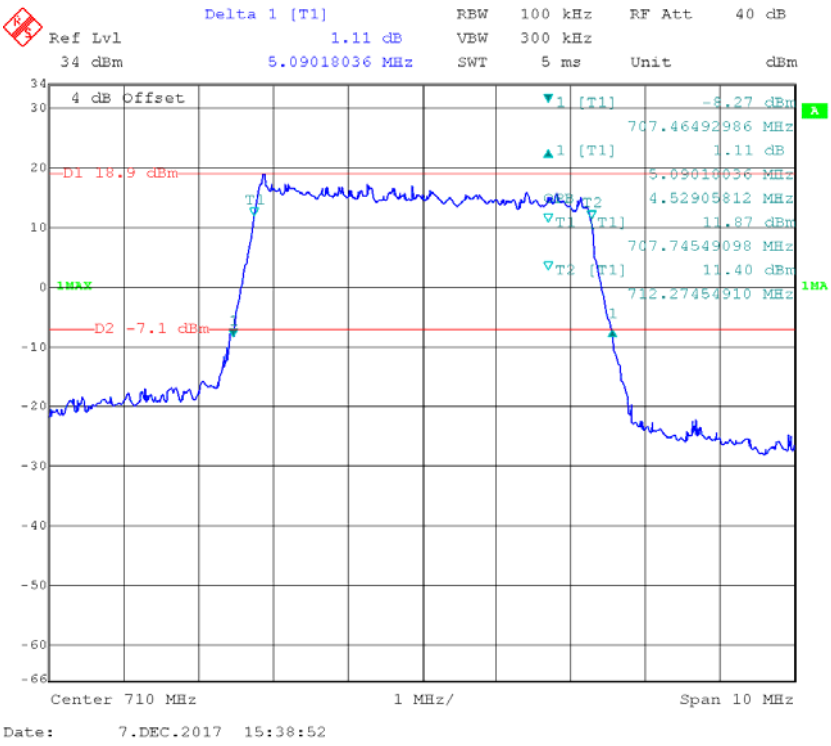


16QAM_10 MHz

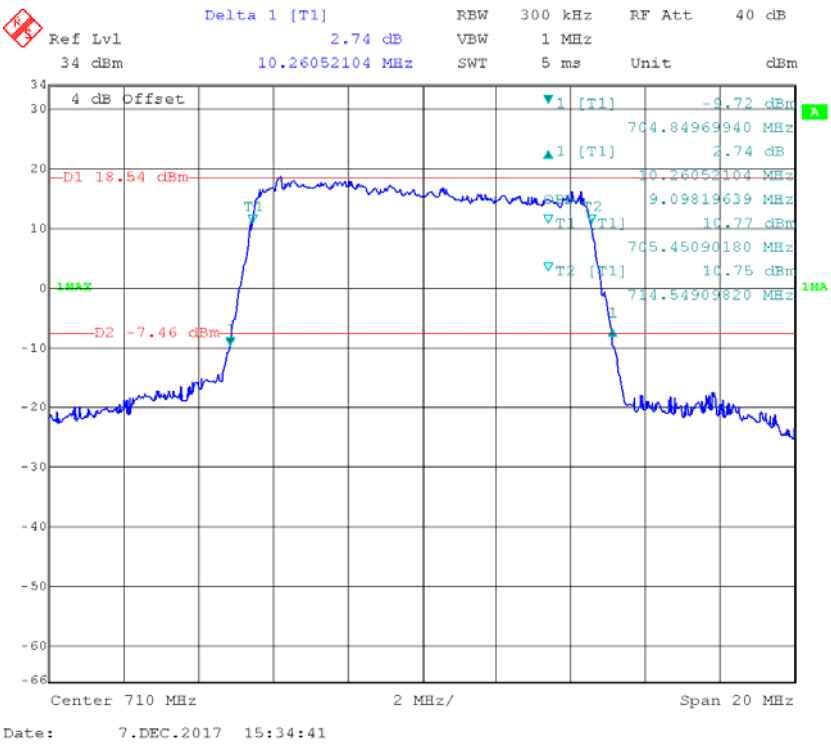


LTE Band 17:

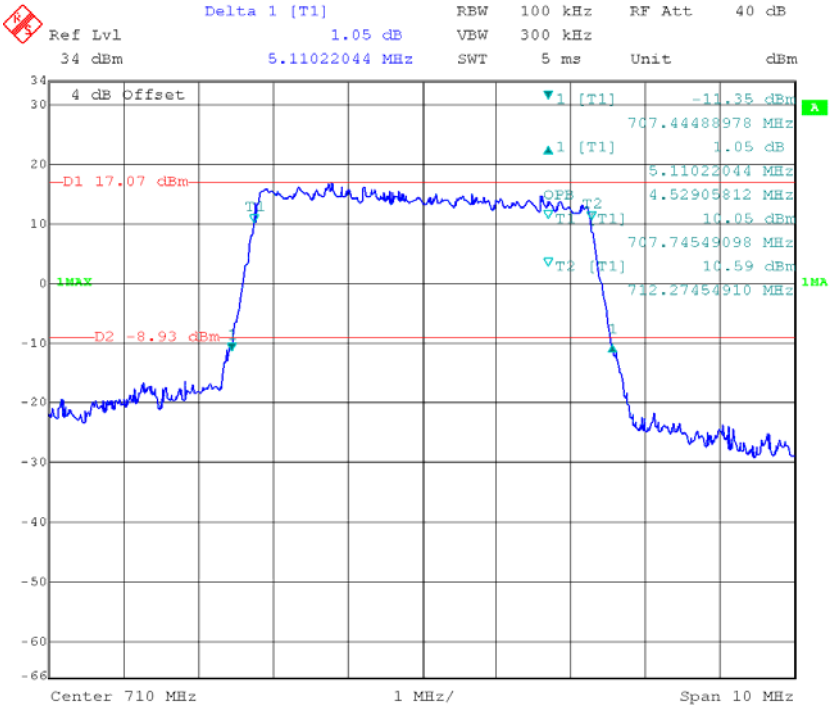
QPSK_5 MHz



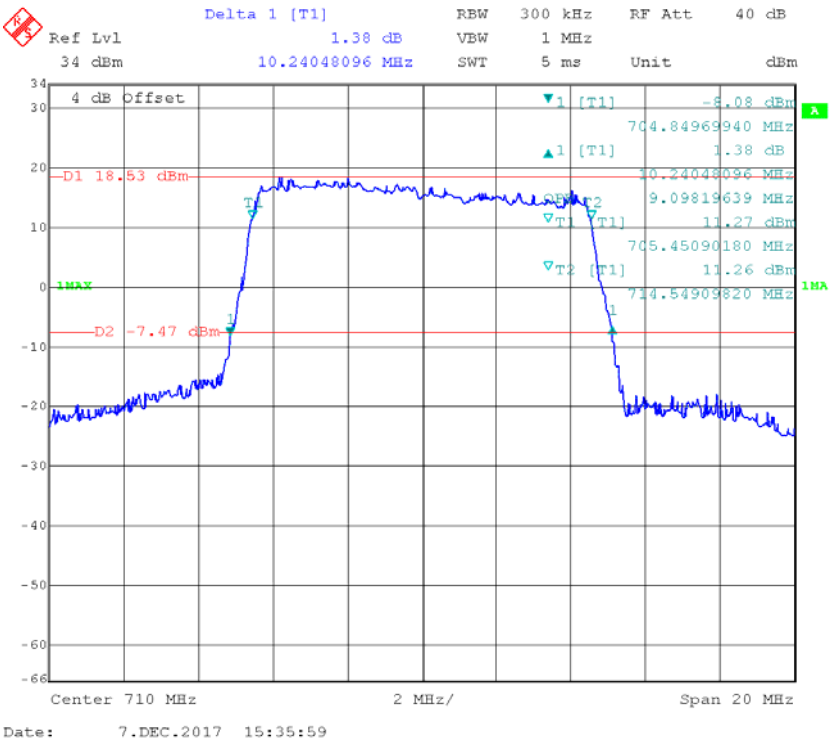
QPSK_10 MHz



16QAM_5 MHz



16QAM_10 MHz



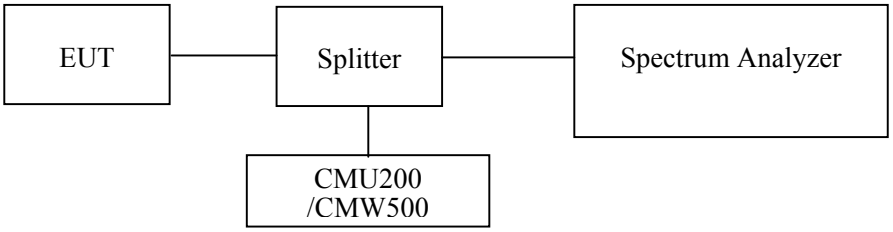
FCC §2.1051, §22.917(a) & §24.238(a) & §27.53 AND RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5& RSS-139 §6.6 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

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.

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	Universal Radio Communication Tester	CMU200	109 038	2017-07-21	2018-07-21
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each Time	/
Pasternack	Coaxial Cable	0.5m	C-5	Each Time	/
Unknown	RF Attenuator	10dB	10dB-1	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31

*** 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

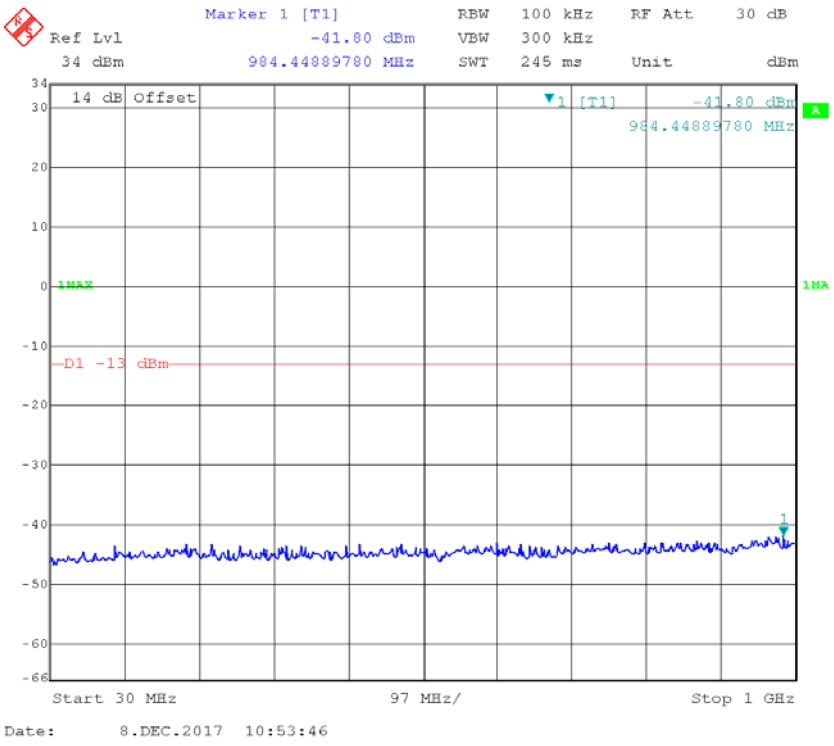
Environmental Conditions

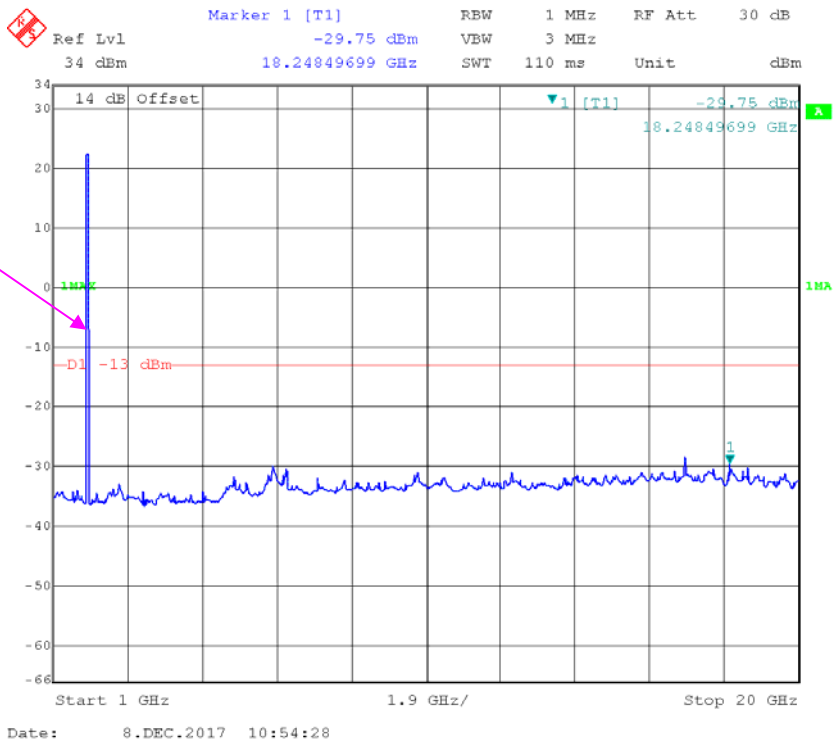
Temperature:	24.9~25.1°C
Relative Humidity:	41~42 %
ATM Pressure:	101.2~101.4 kPa

The testing was performed by Kami Zhou from 2017-12-07 to 2017-12-28.

Please refer to the following plots.

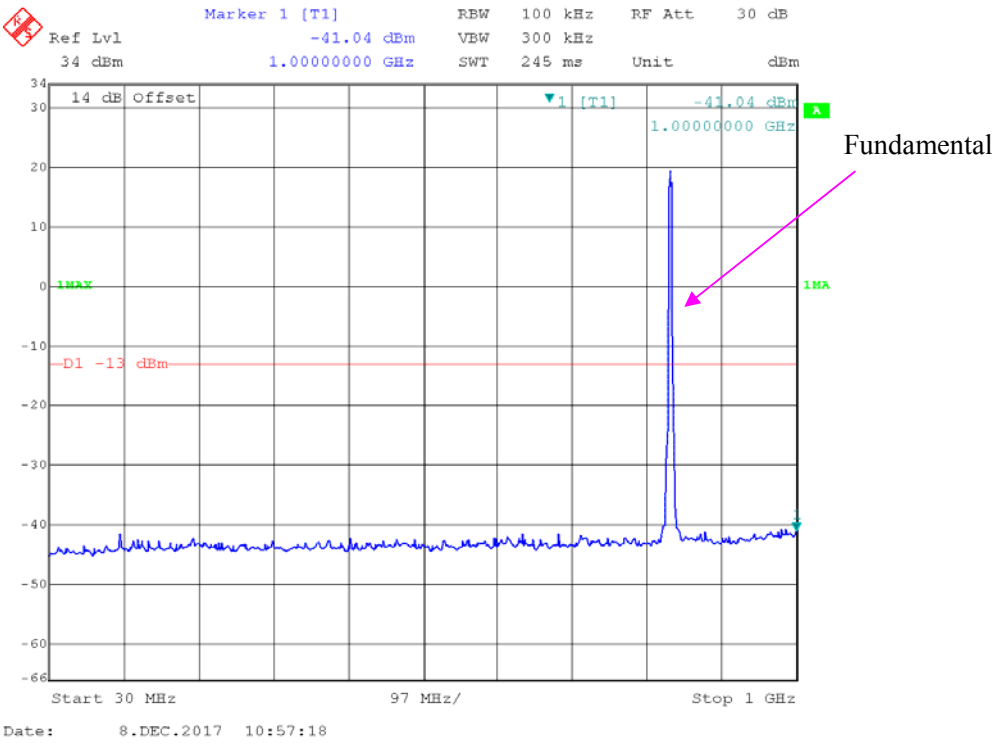
WCDMA Band II,Rel99

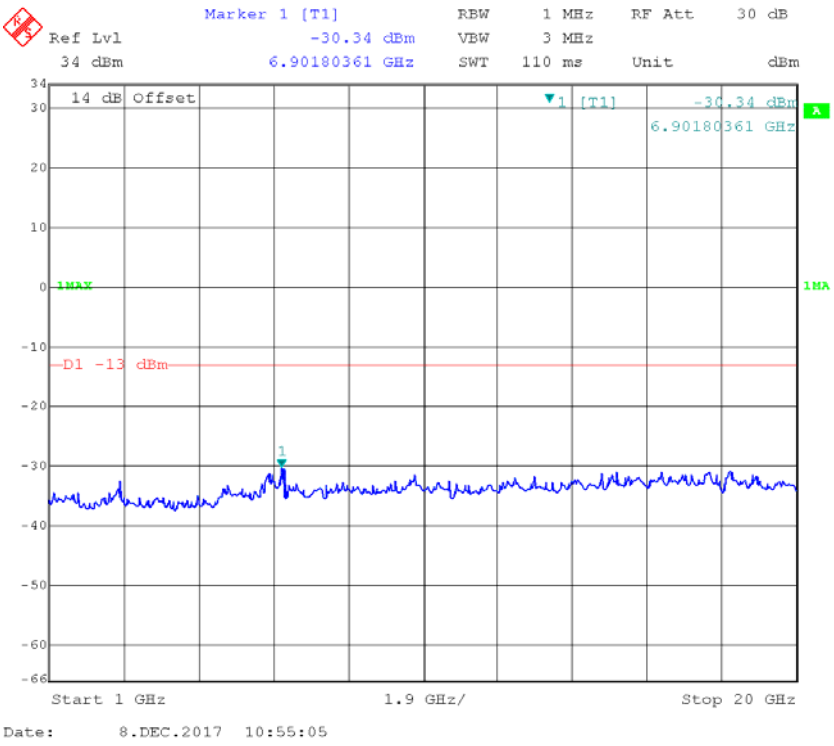




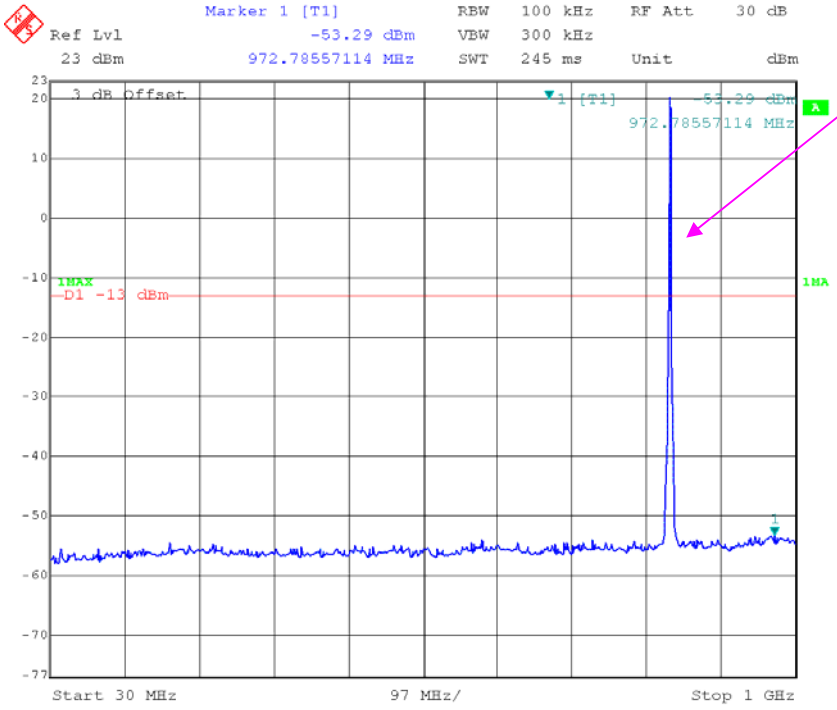
Fundamental

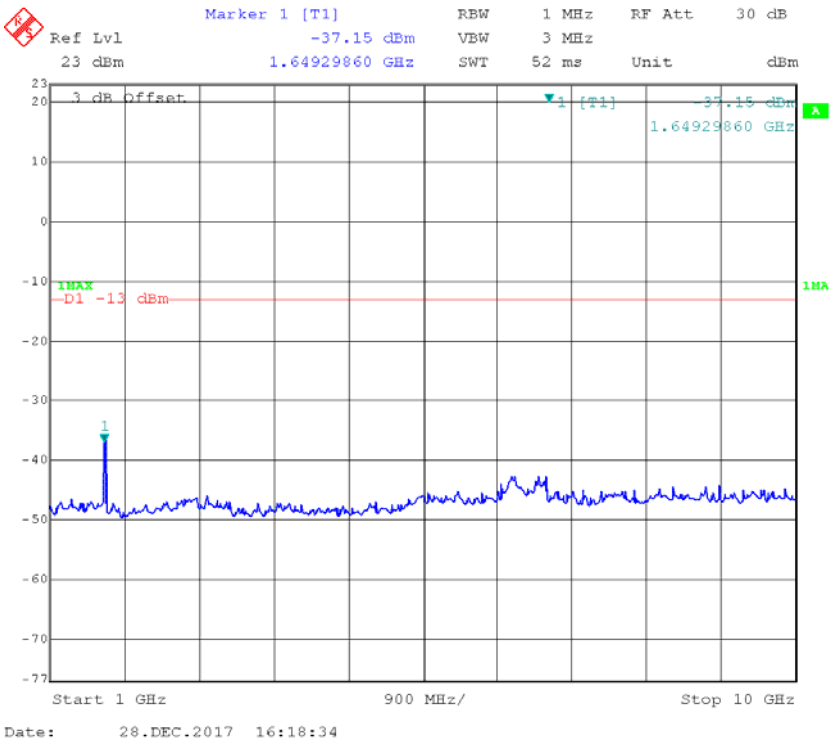
WCDMA Band V,Rel99



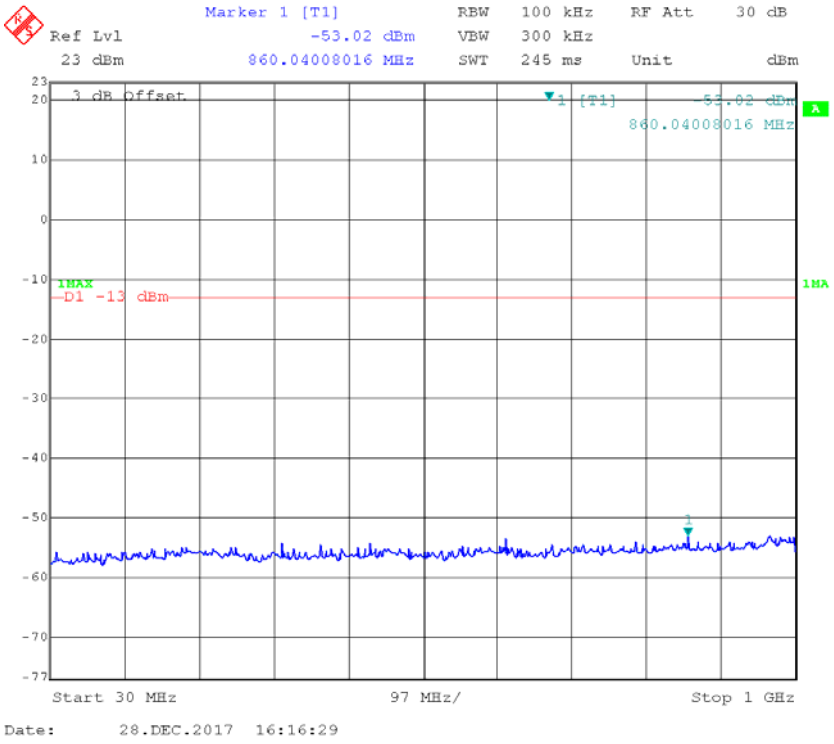


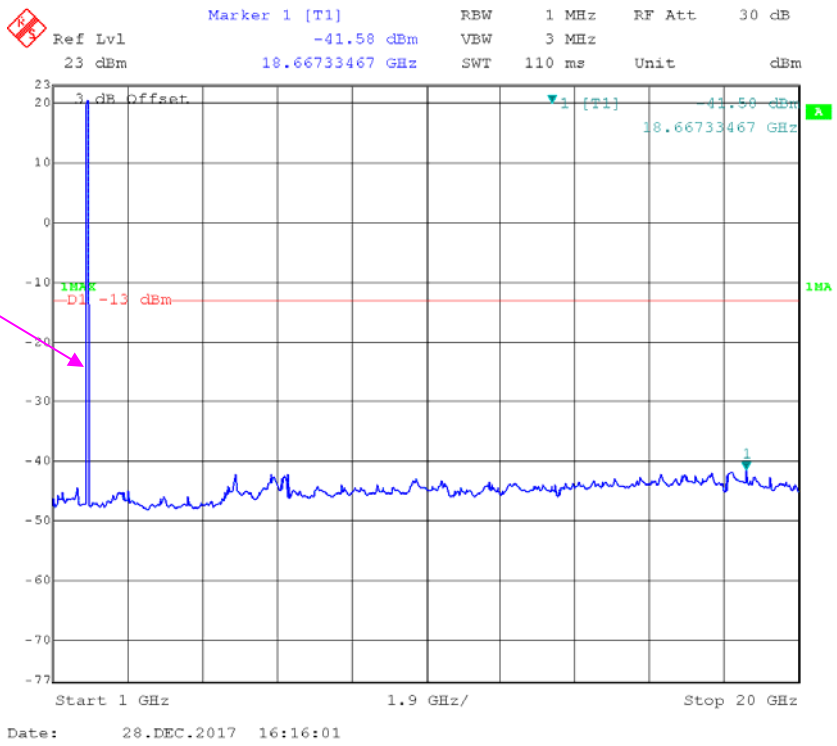
BC0-RC1_Middle Channel





BC1-RC1 _Middle Channel

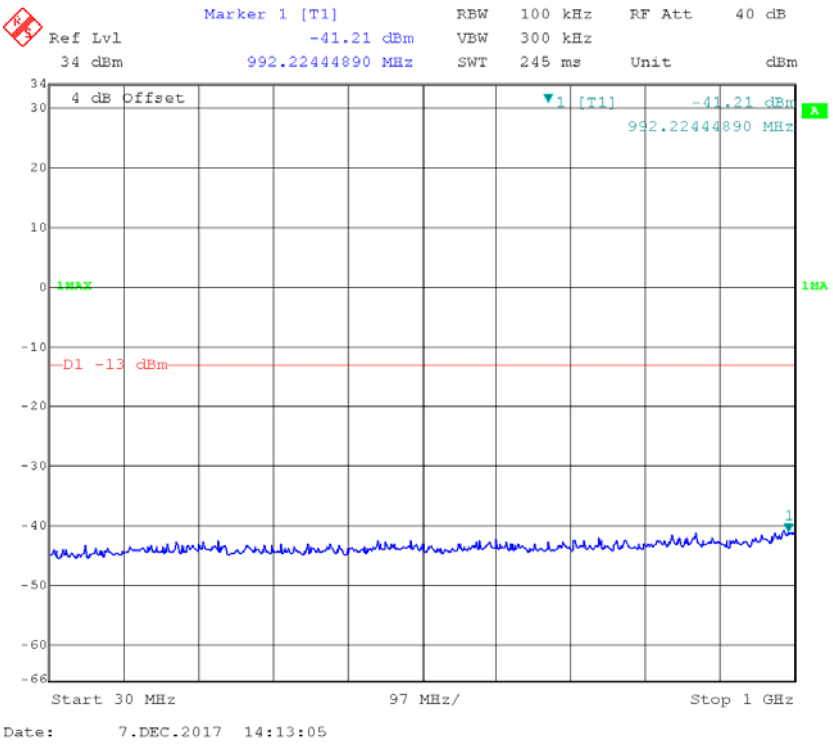


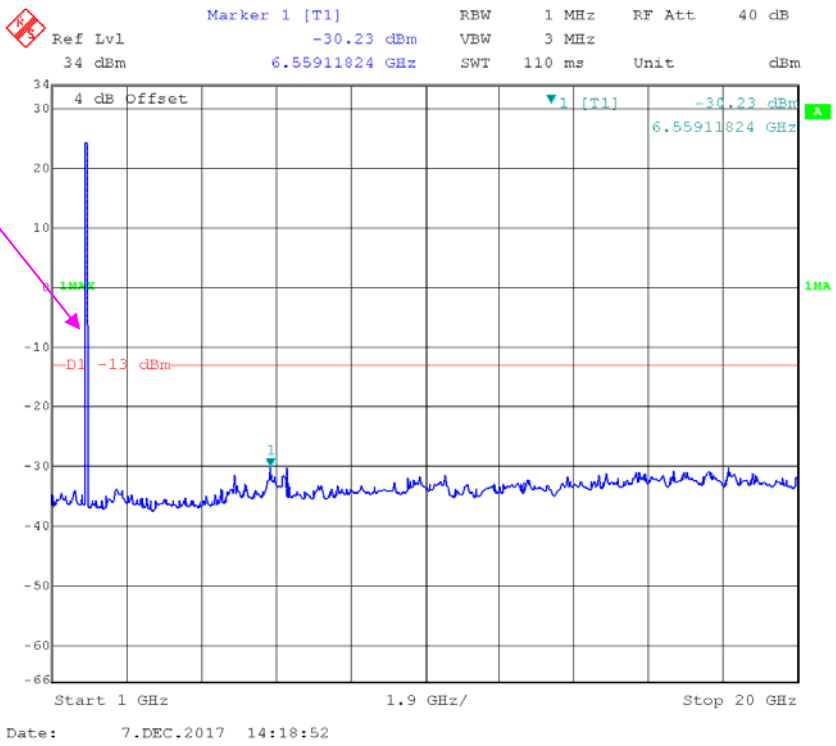


Fundamental

LTE Band 2 (Middle Channel)

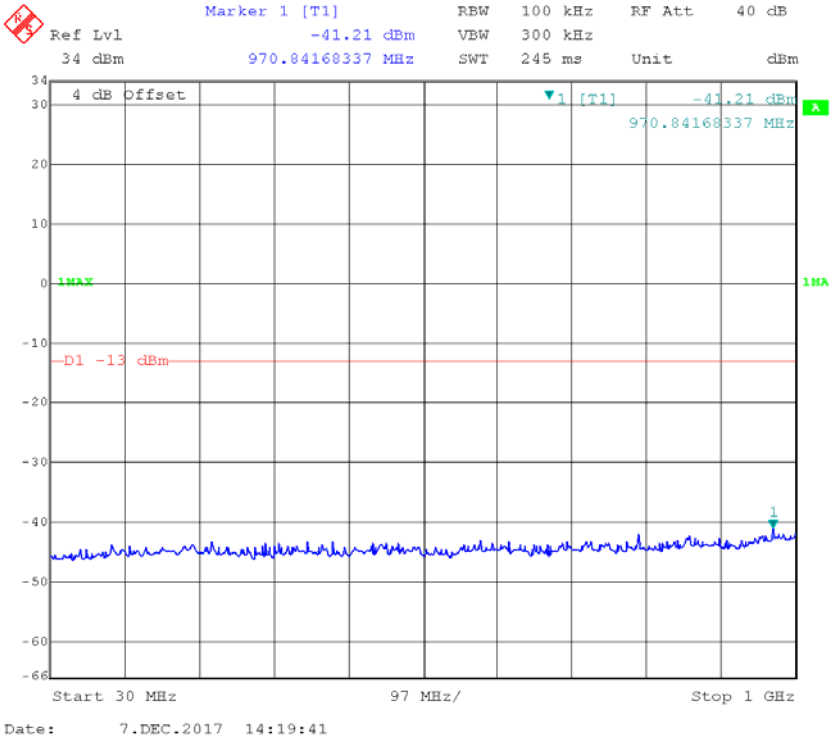
QPSK_1.4 MHz

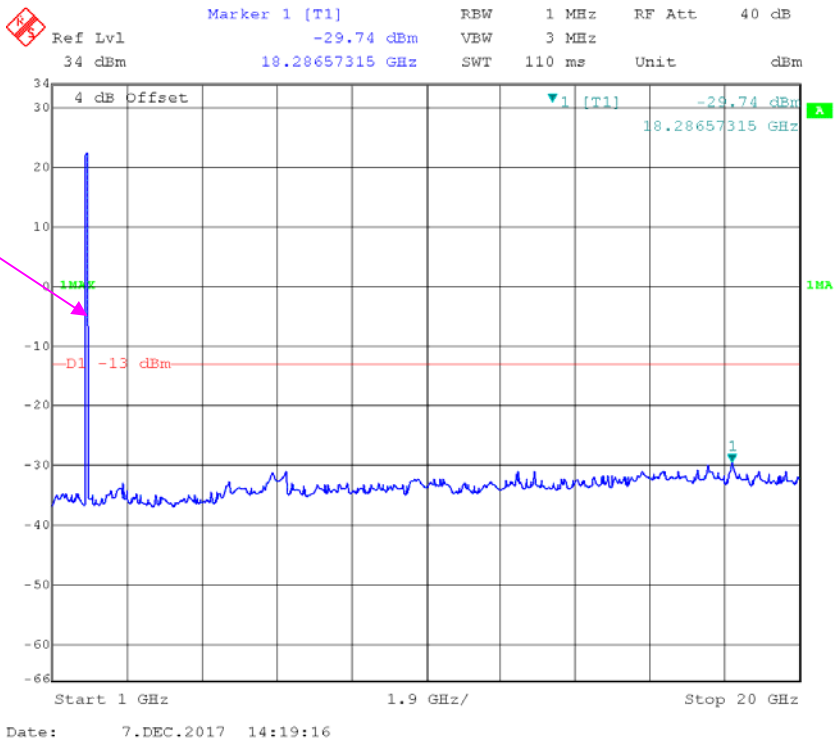




Fundamental

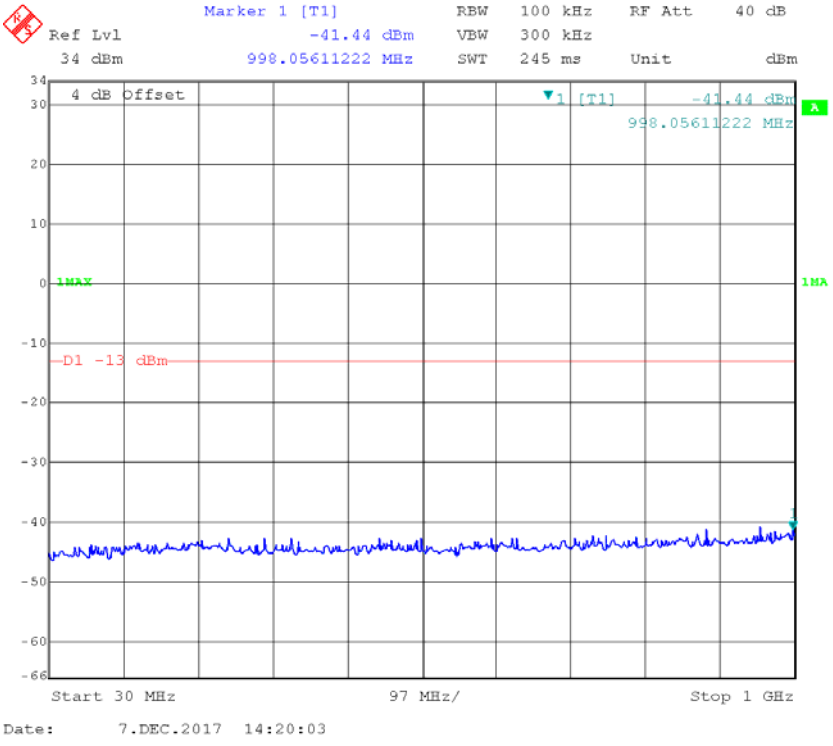
QPSK_3 MHz

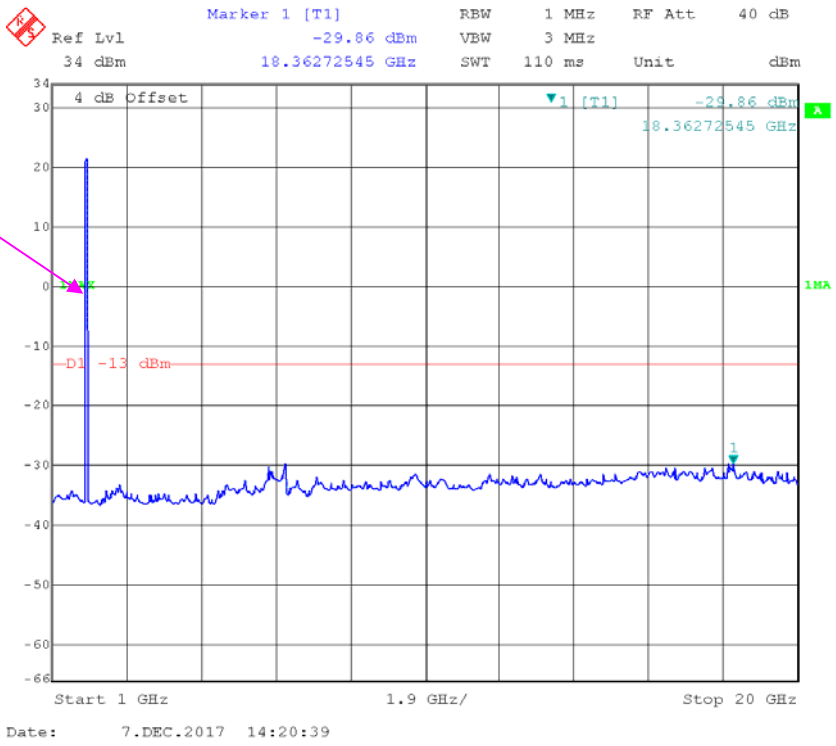




Fundamental

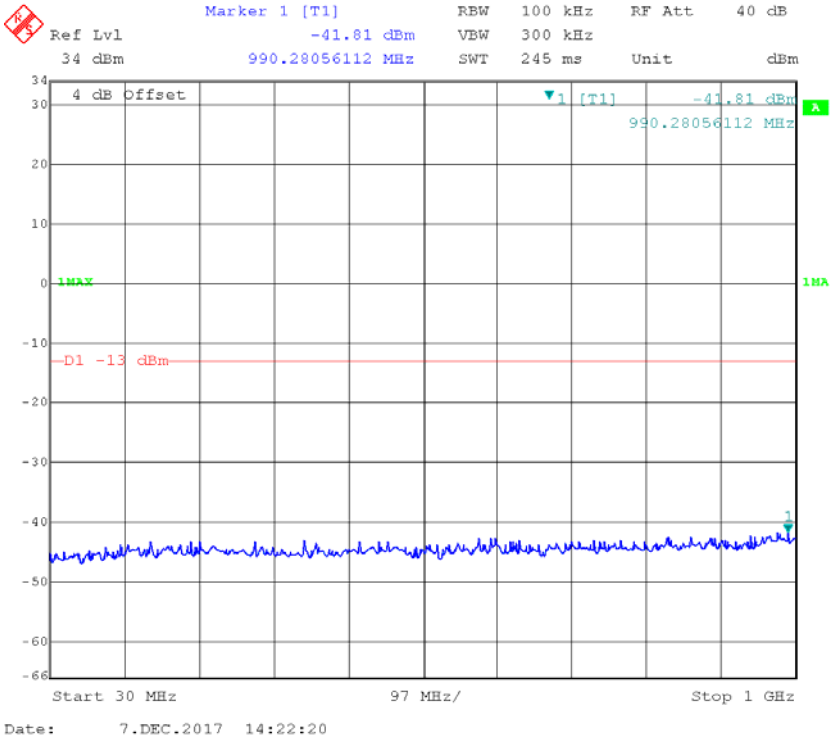
QPSK_5 MHz

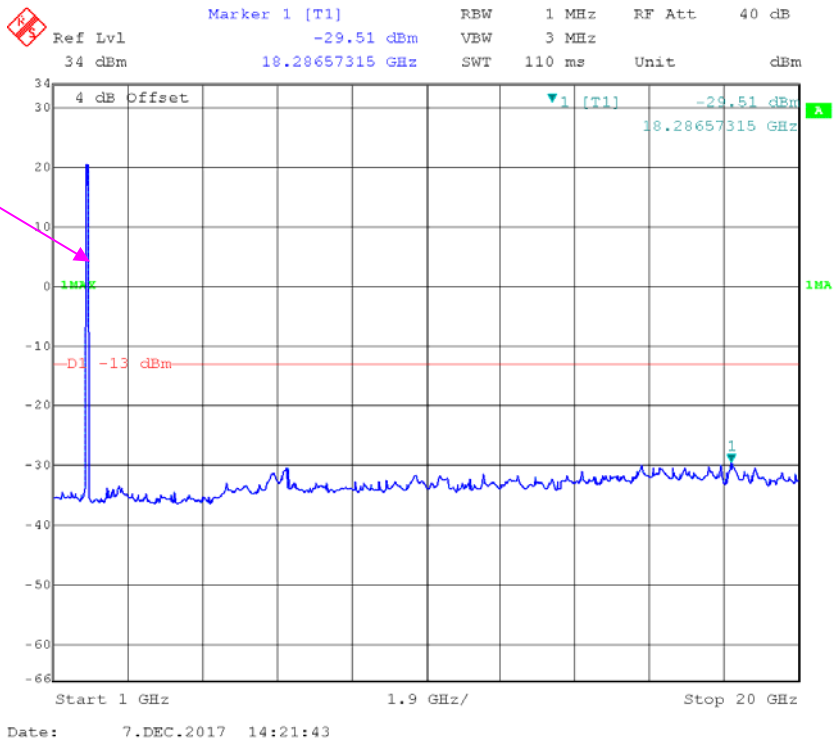




Fundamental

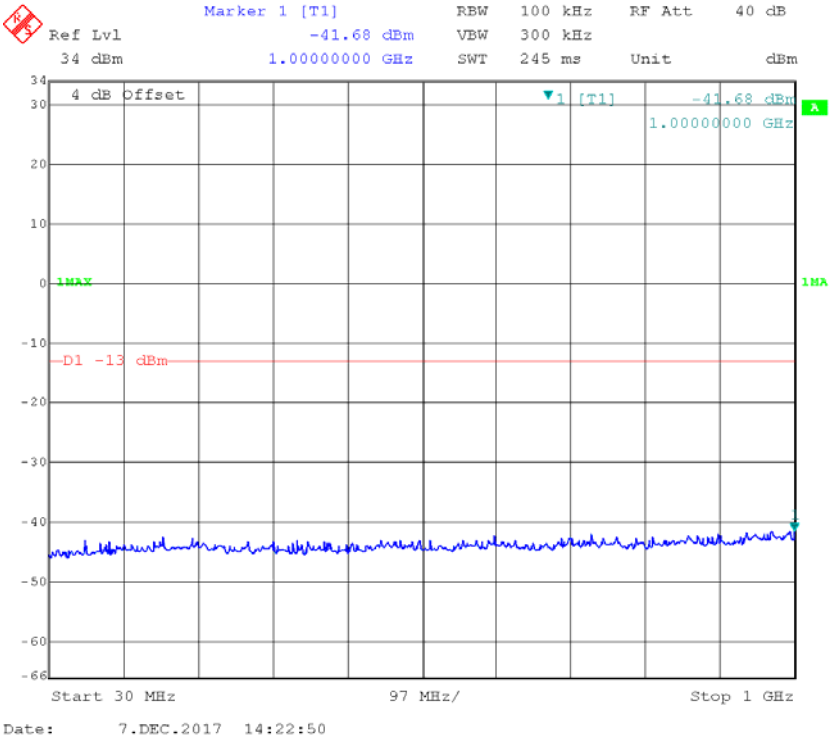
QPSK_10 MHz

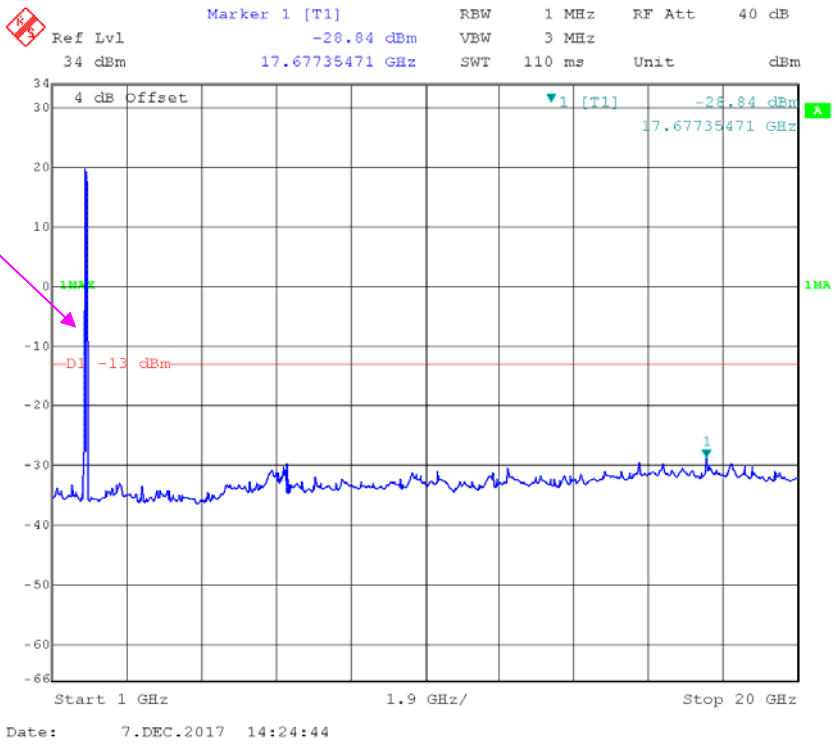




Fundamental

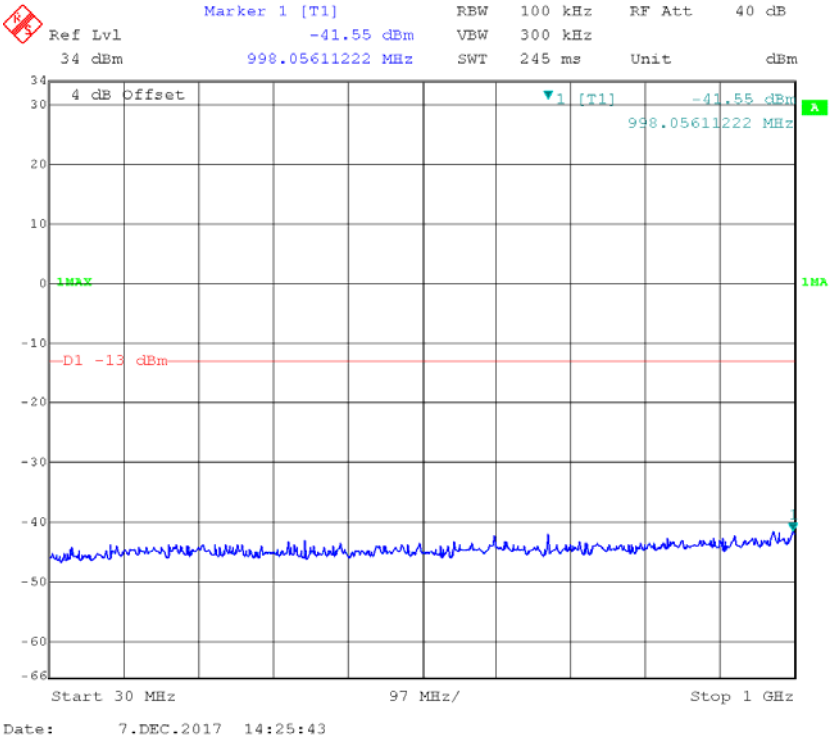
QPSK_15 MHz

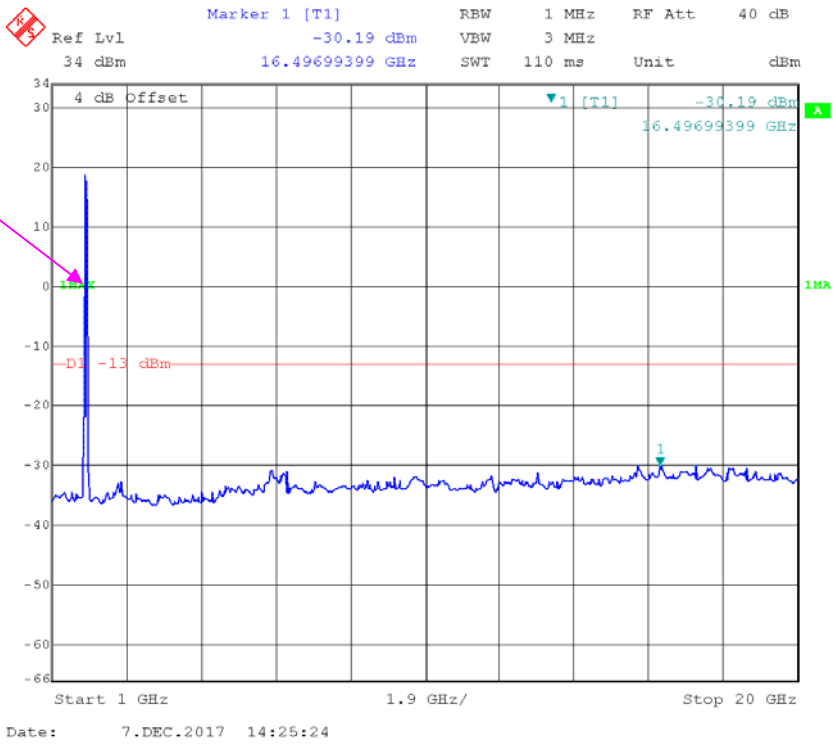




Fundamental

QPSK_20 MHz

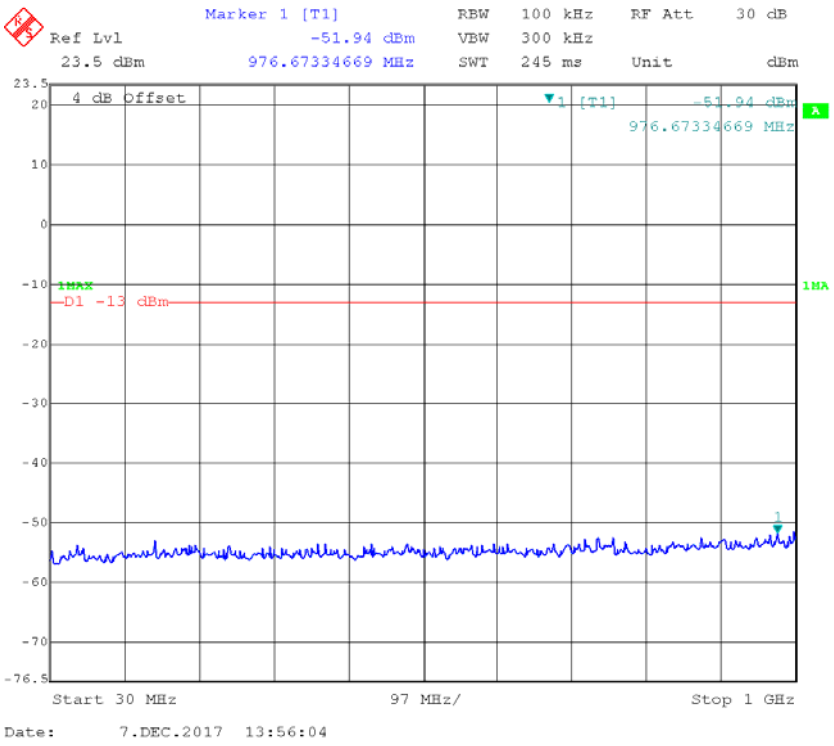


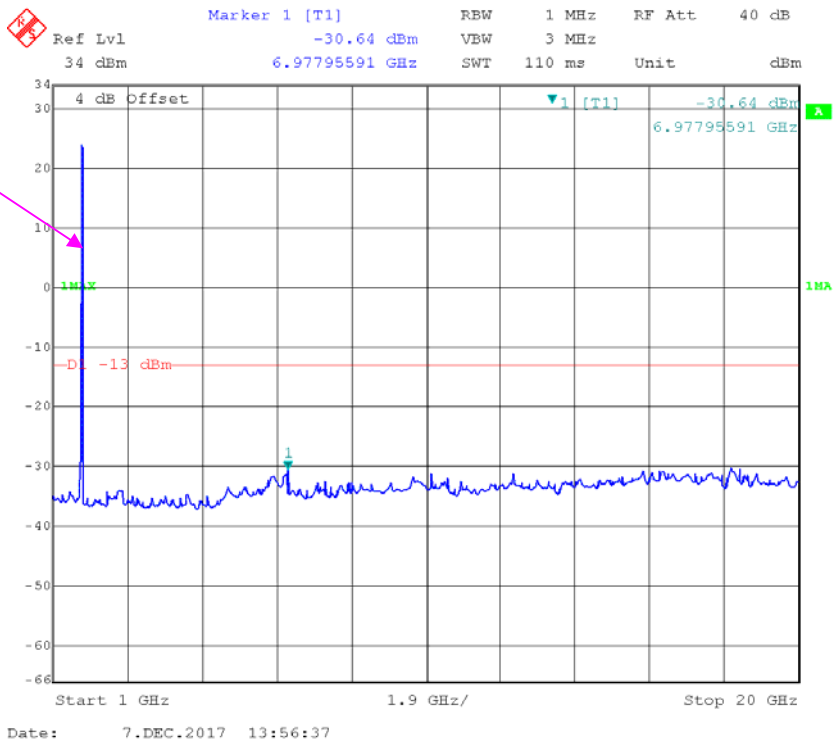


Fundamental

LTE Band 4 (Middle Channel)

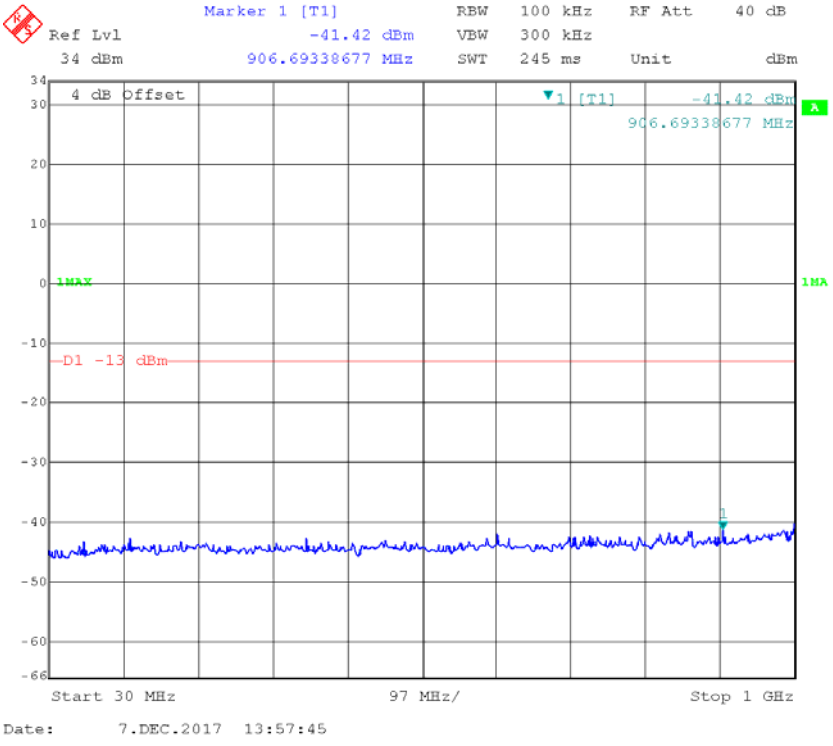
QPSK_1.4 MHz

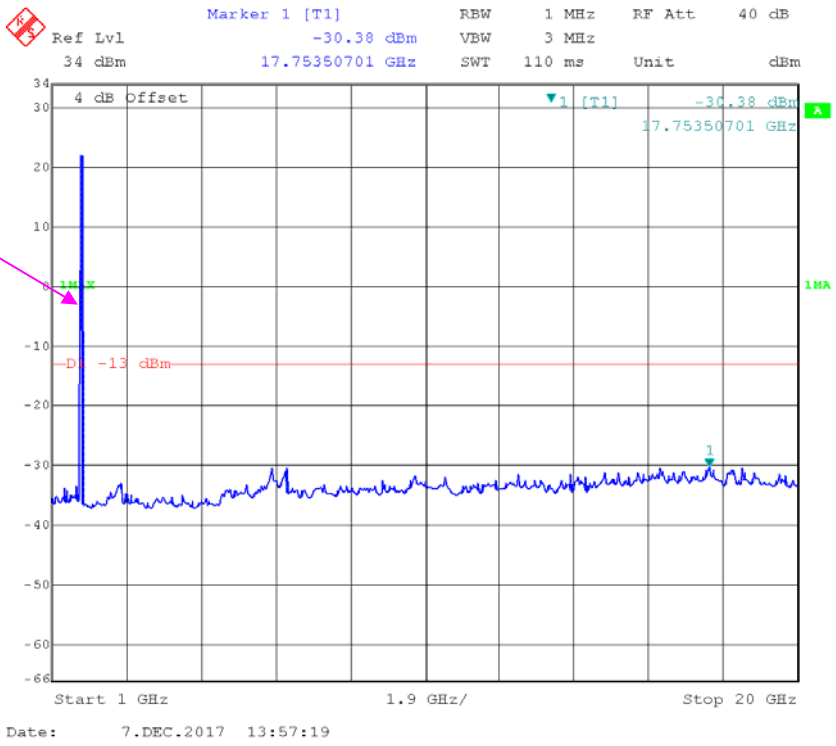




Fundamental

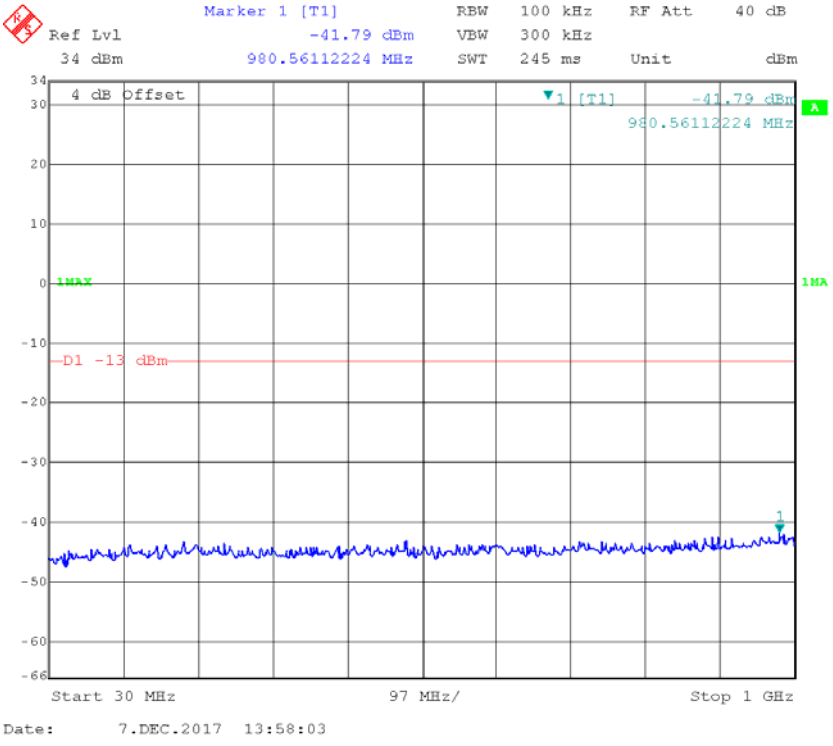
QPSK_3 MHz

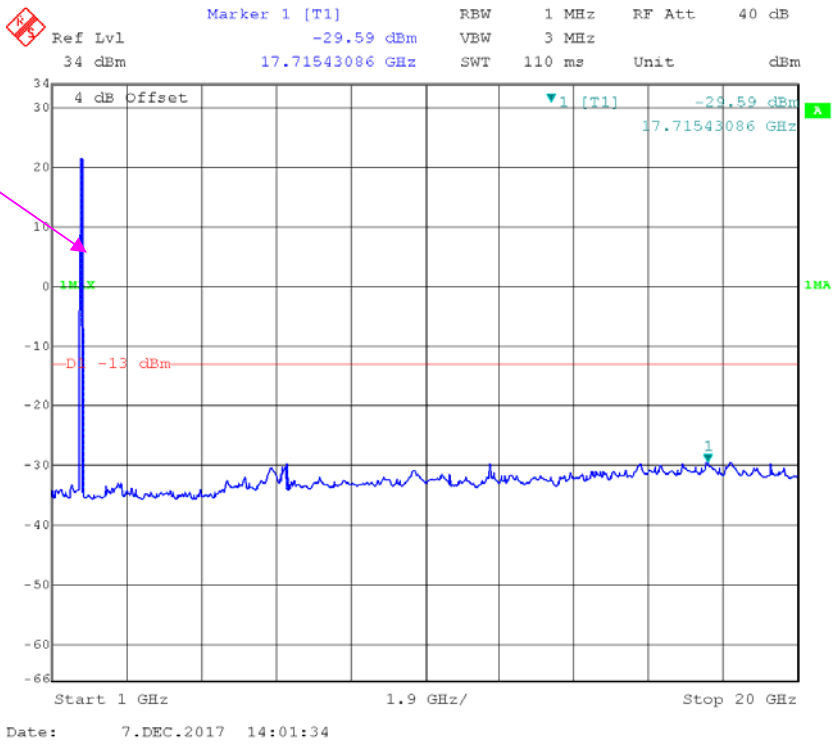




Fundamental

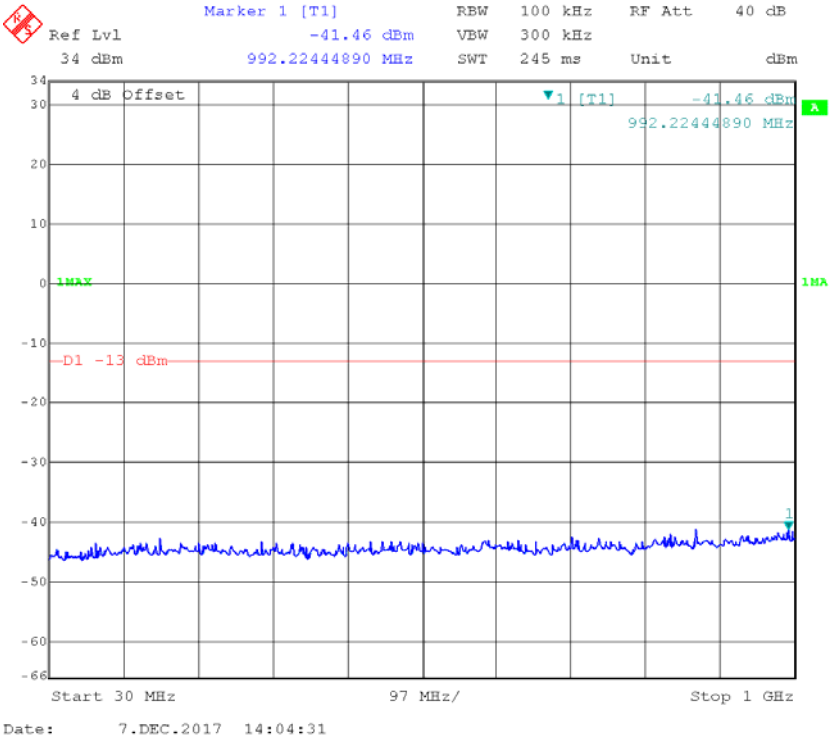
QPSK_5 MHz

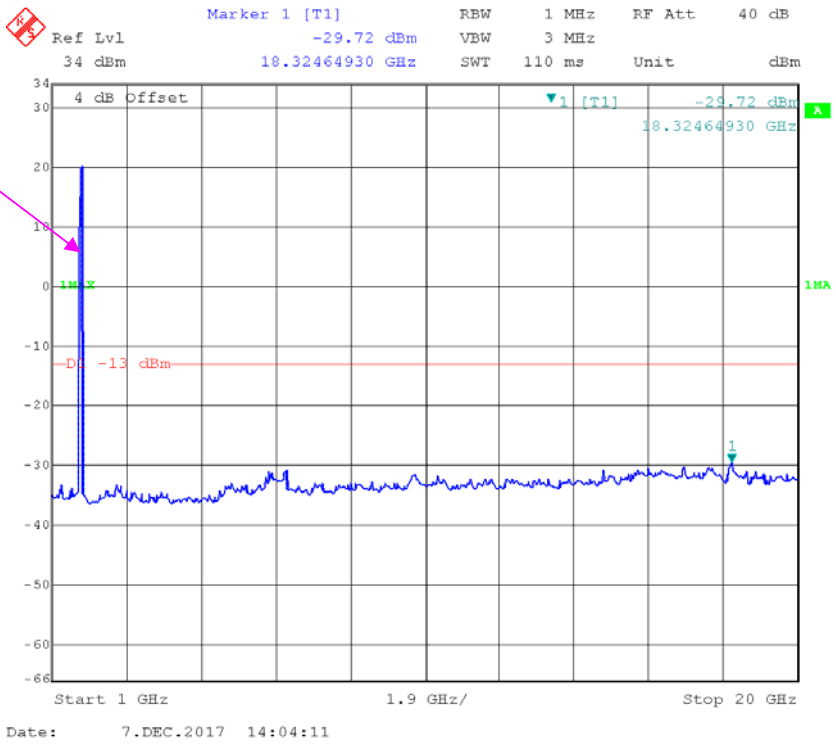




Fundamental

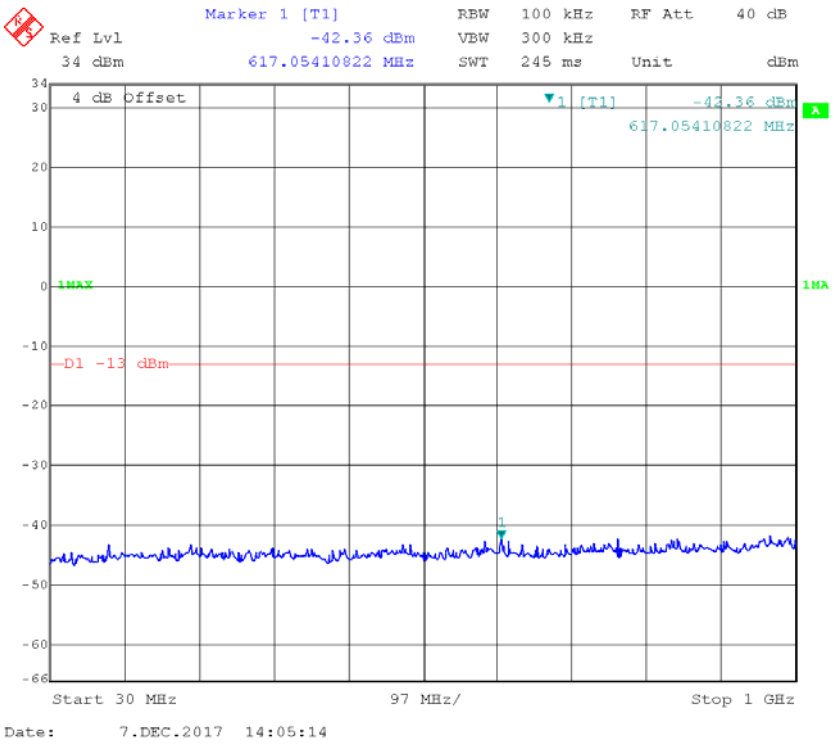
QPSK_10 MHz



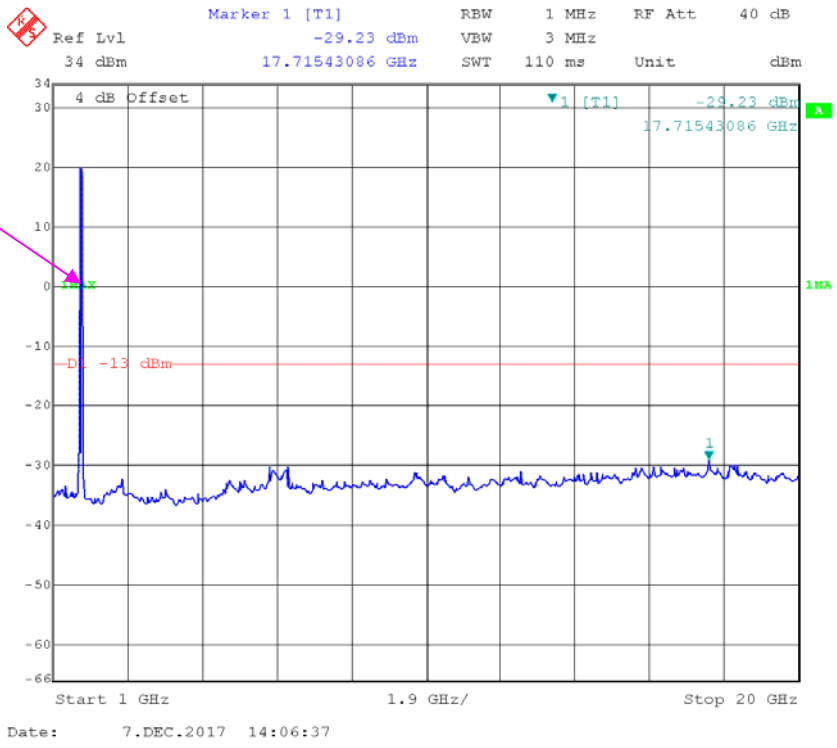


Fundamental

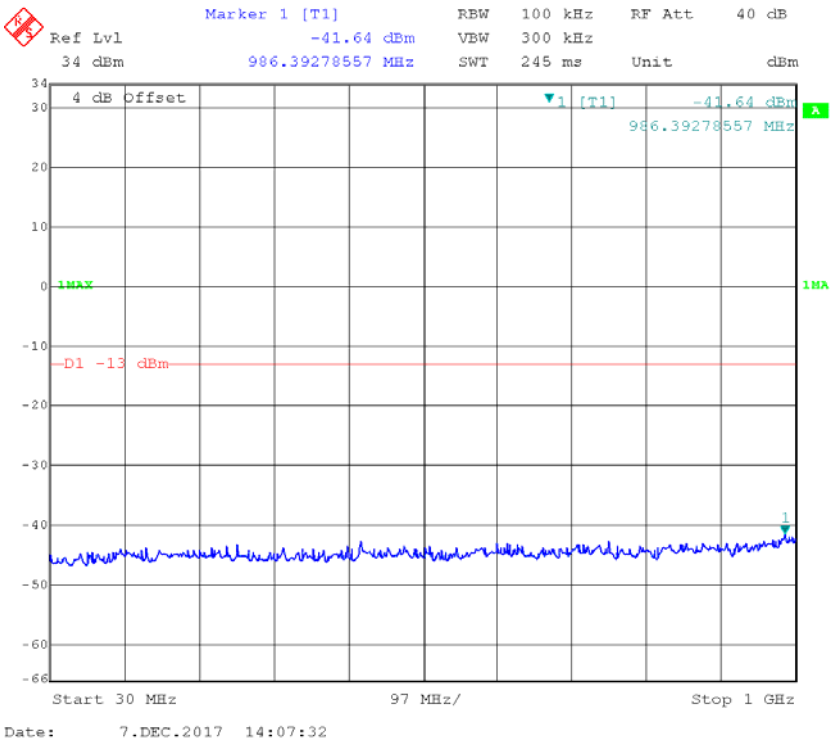
QPSK_15 MHz

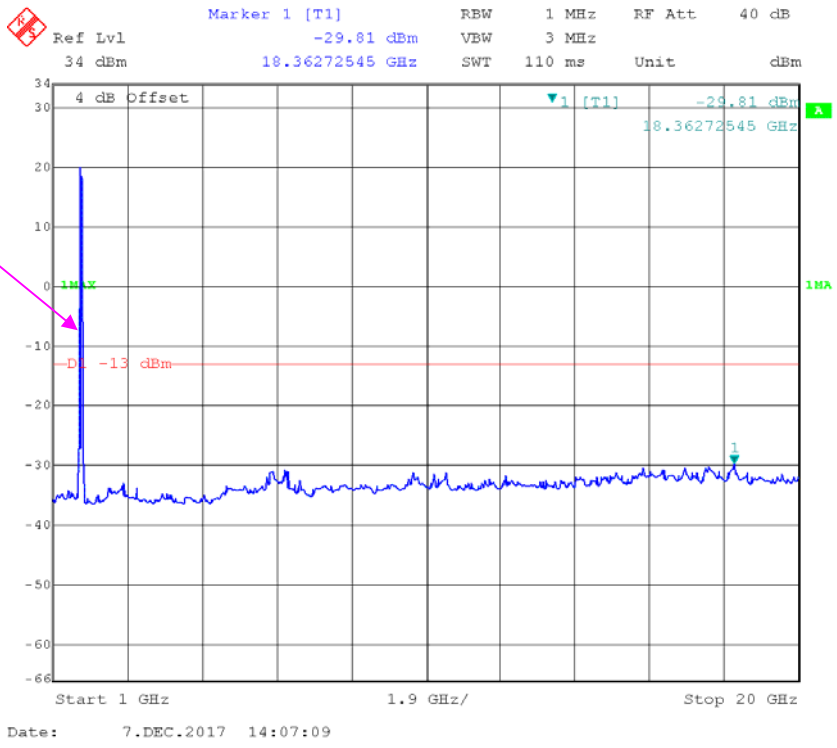


Fundamental



QPSK_20 MHz

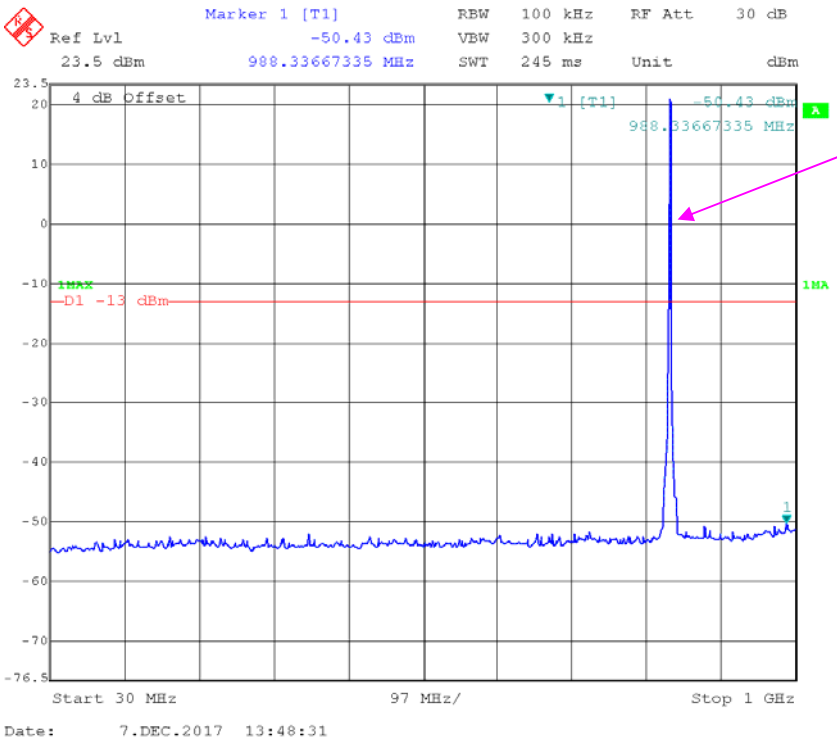




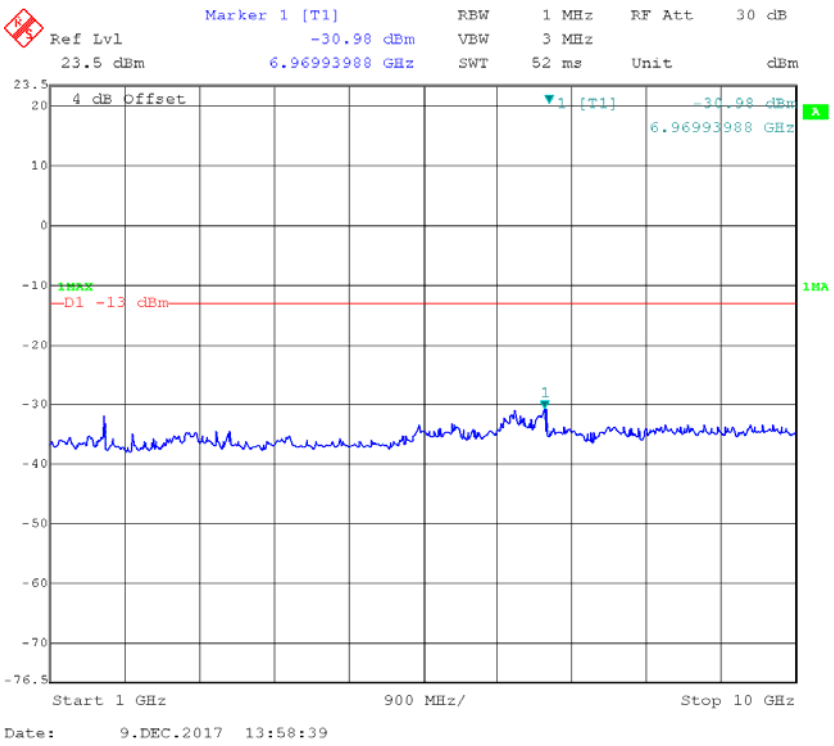
Fundamental

LTE Band 5 (Middle Channel)

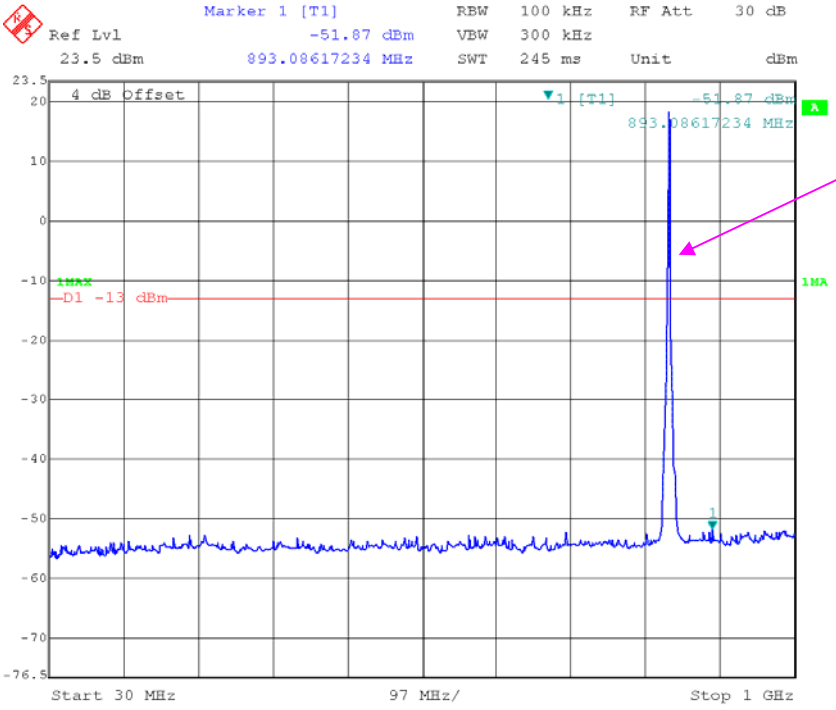
QPSK_1.4 MHz



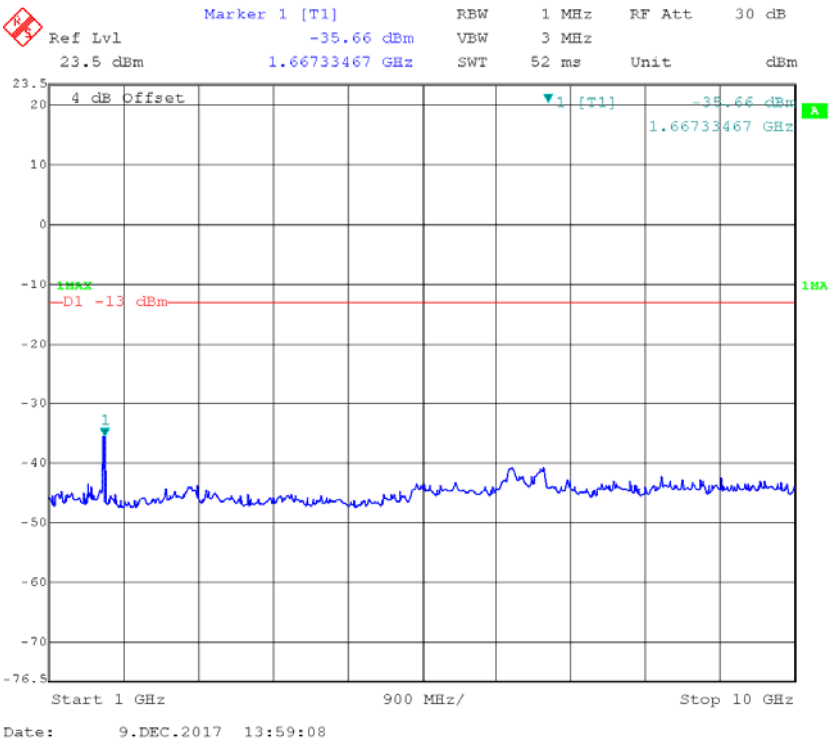
Fundamental



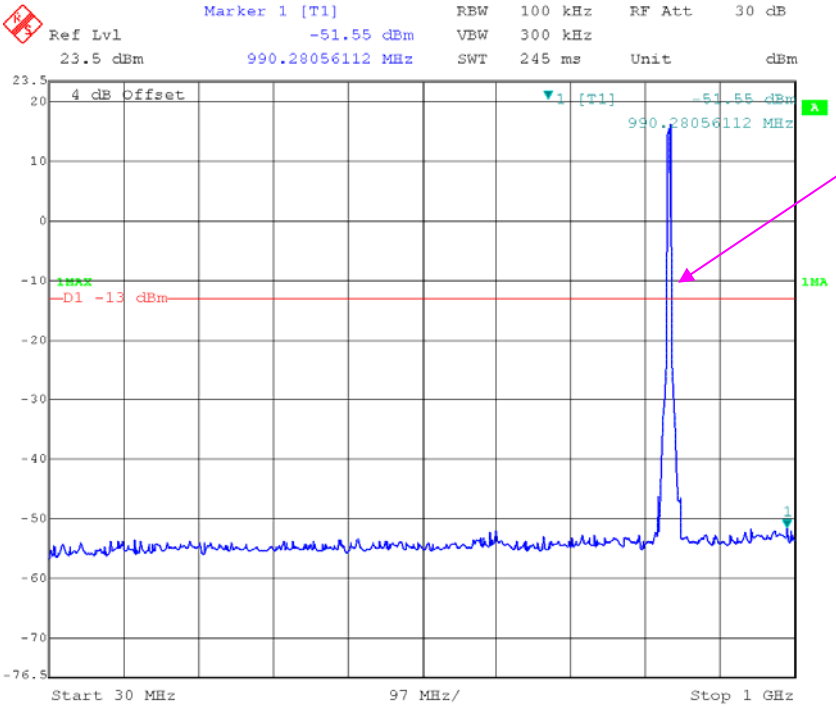
QPSK_3 MHz

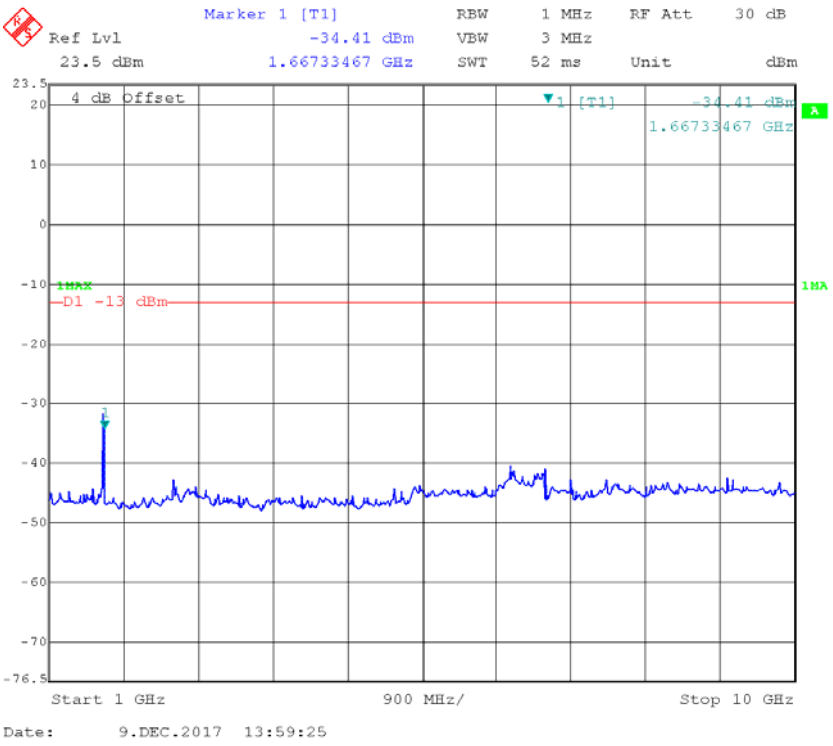


Fundamental

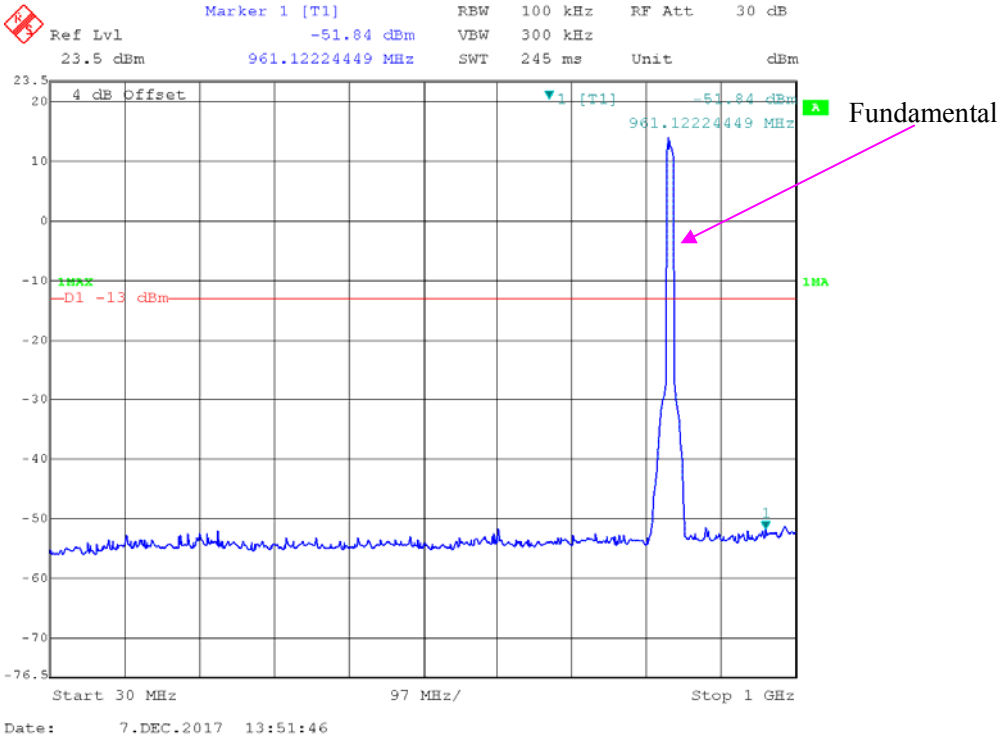


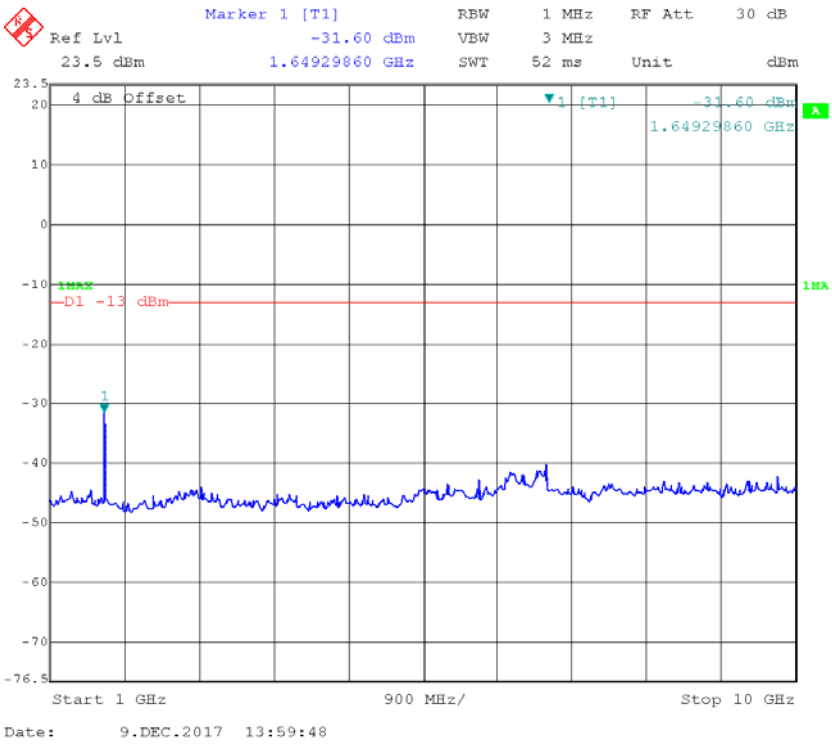
QPSK_5 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-51.55 dBm
VBW 300 kHz
23.5 dBm
990.28056112 MHz
SWT 245 ms
Unit dBm
4 dB Offset
1 [T1] -51.55 dBm
990.28056112 MHz
1MAX
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 7.DEC.2017 13:50:25
Fundamental


Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-34.41 dBm
VBW 3 MHz
23.5 dBm
1.66733467 GHz
SWT 52 ms
Unit dBm
4 dB Offset
1 [T1] -34.41 dBm
1.66733467 GHz
1MAX
D1 -13 dBm
1MA
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 9.DEC.2017 13:59:25

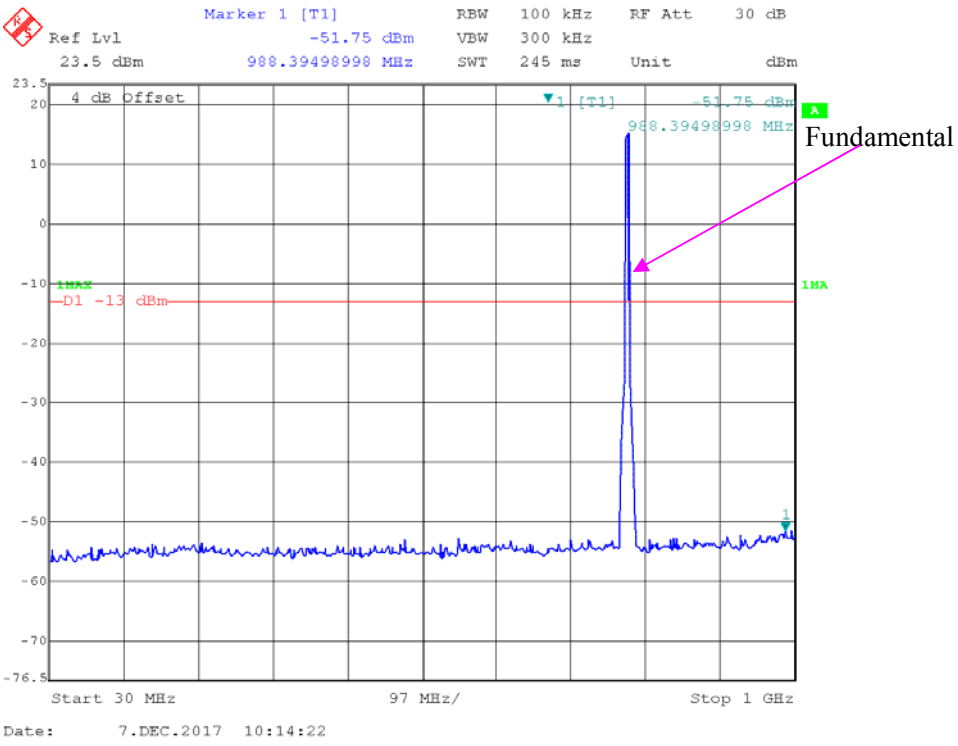
QPSK_10 MHz

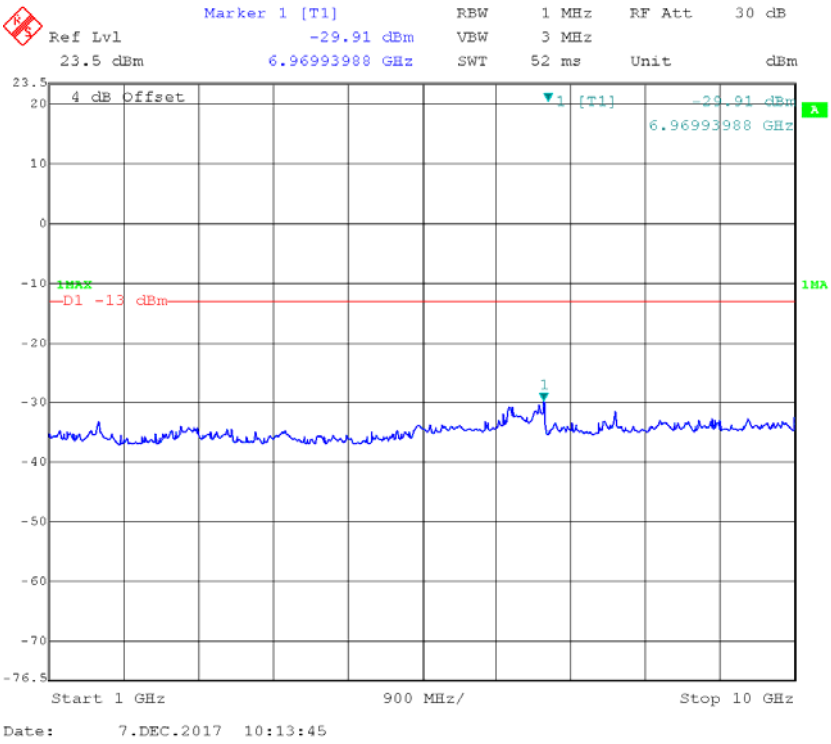

Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-51.84 dBm
VBW 300 kHz
23.5 dBm
961.12224449 MHz
SWT 245 ms
Unit dBm
4 dB Offset
1 [T1] -51.84 dBm
961.12224449 MHz
1MAX
D1 -13 dBm
1MA
Fundamental
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 7.DEC.2017 13:51:46


Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-31.60 dBm
VBW 3 MHz
23.5 dBm
1.64929860 GHz
SWT 52 ms
Unit dBm
4 dB Offset
1 [T1] -31.60 dBm
1.64929860 GHz
1MAX
D1 -13 dBm
1MA
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 9.DEC.2017 13:59:48

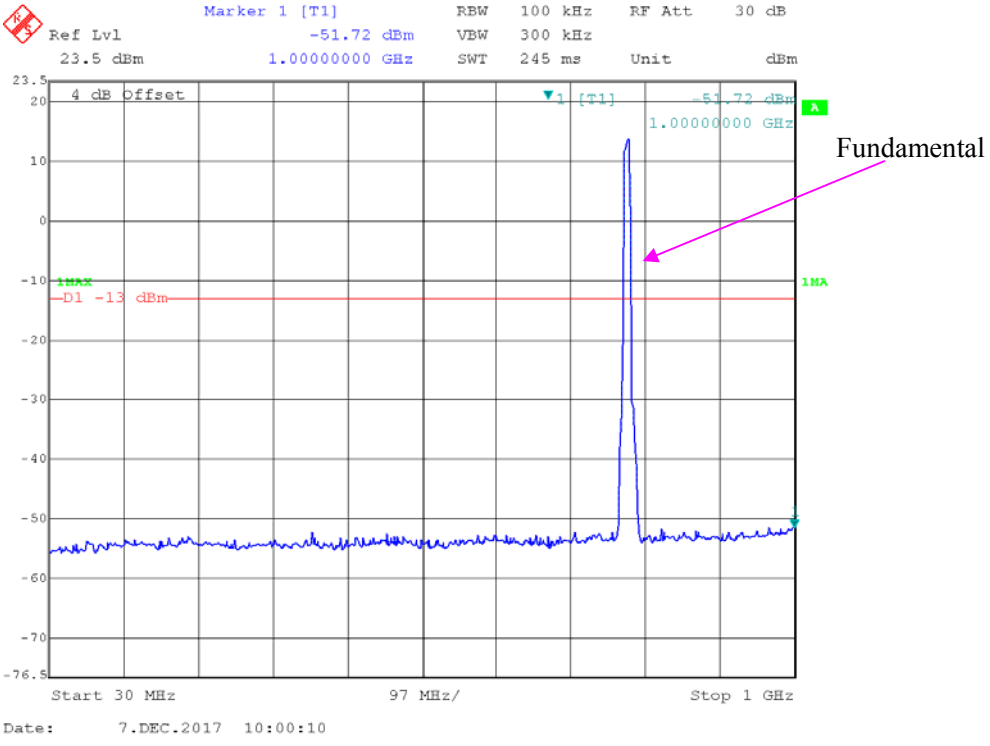
LTE Band 13 (Middle Channel)

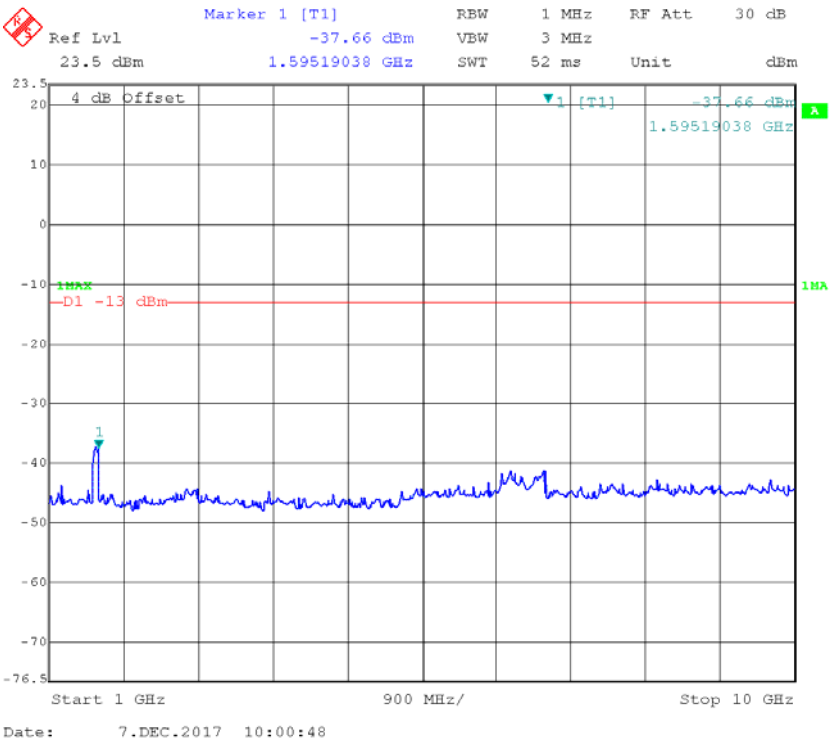
QPSK_5 MHz





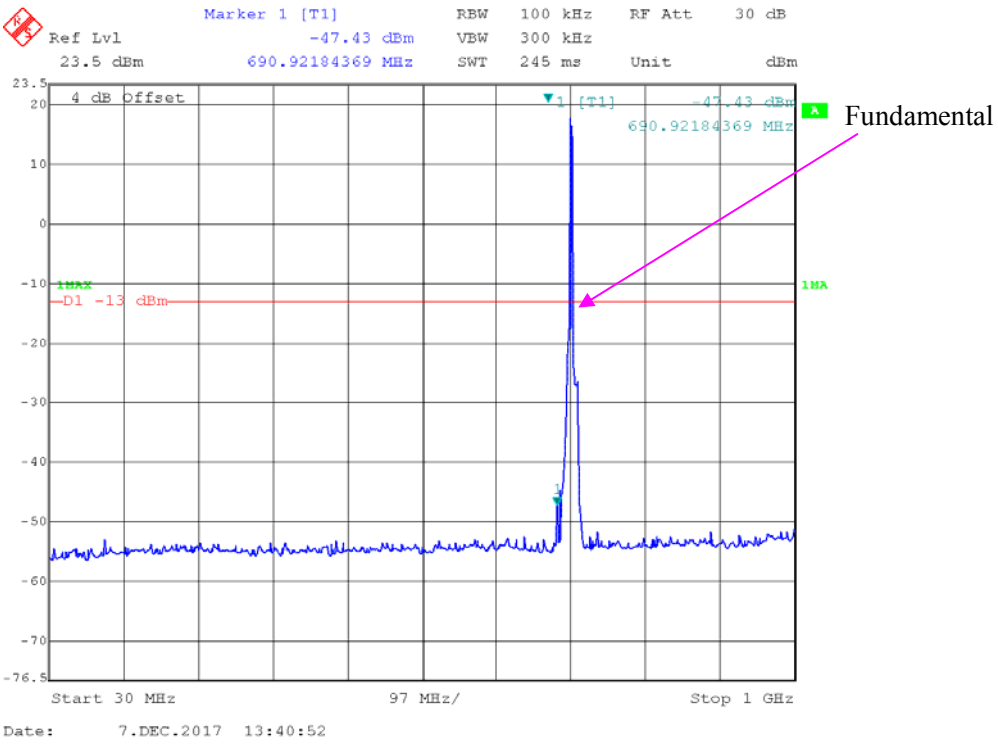
QPSK_10 MHz

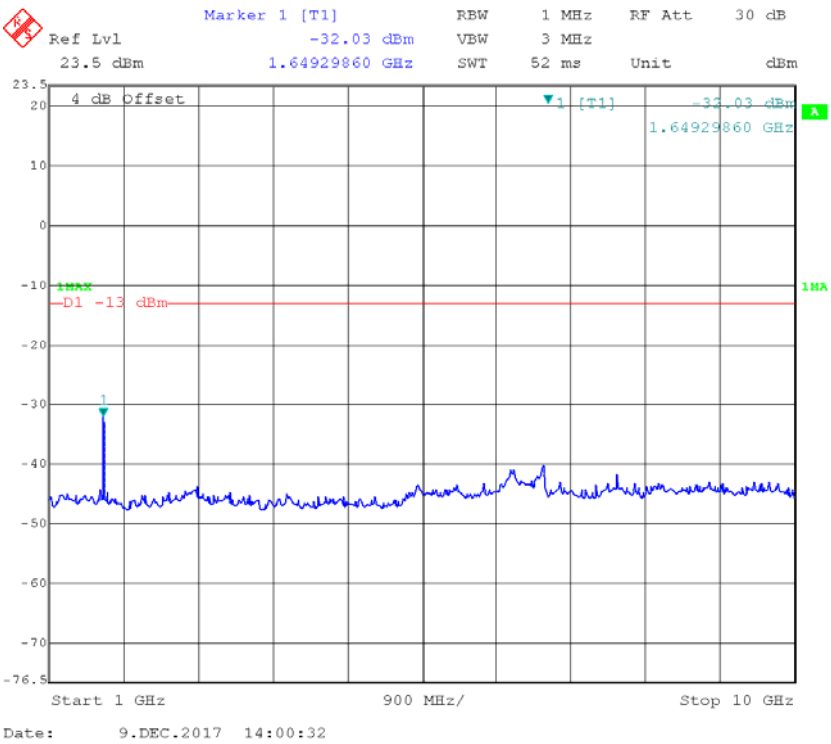

Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-51.72 dBm
VBW 300 kHz
23.5 dBm
1.00000000 GHz
SWT 245 ms
Unit dBm
4 dB Offset
1 [T1]
-51.72 dBm
1.00000000 GHz
Fundamental
1MAX
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 7.DEC.2017 10:00:10


Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-37.66 dBm
VBW 3 MHz
23.5 dBm
1.59519038 GHz
SWT 52 ms
Unit dBm
4 dB Offset
1 [T1]
-37.66 dBm
1.59519038 GHz
1MAX
D1 -13 dBm
1MA
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 7.DEC.2017 10:00:48

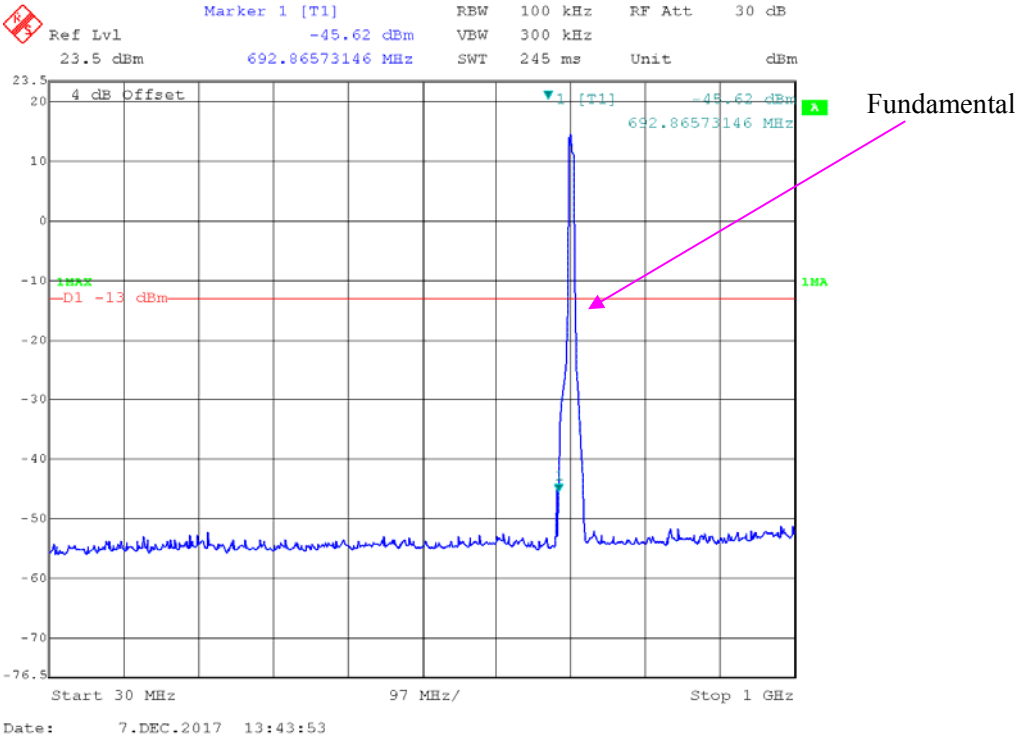
LTE Band 17 (Middle Channel)

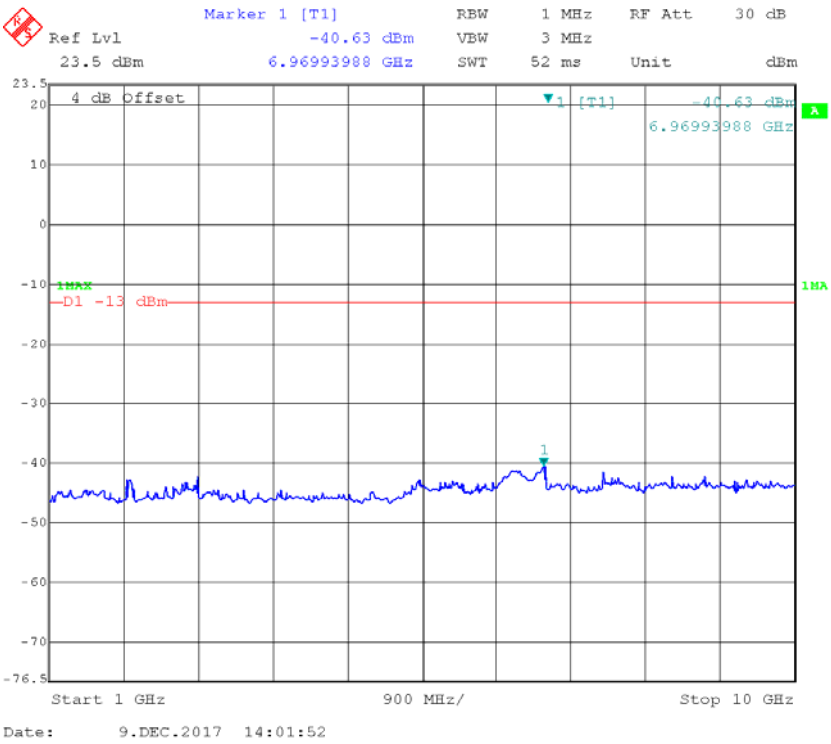
QPSK_5 MHz





QPSK_10 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 30 dB
Ref Lvl
-45.62 dBm
VBW 300 kHz
23.5 dBm
692.86573146 MHz
SWT 245 ms
Unit dBm
4 dB Offset
1 [T1] -45.62 dBm
692.86573146 MHz
1MAX
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 7.DEC.2017 13:43:53
Fundamental


Marker 1 [T1]
RBW 1 MHz
RF Att 30 dB
Ref Lvl
-40.63 dBm
VBW 3 MHz
23.5 dBm
6.96993988 GHz
SWT 52 ms
Unit dBm
4 dB Offset
1 [T1]
6.96993988 GHz
1MAX
D1 -13 dBm
1MA
Start 1 GHz
900 MHz/
Stop 10 GHz
Date: 9.DEC.2017 14:01:52

FCC §2.1053, §22.917 & §24.238 & §27.53 AND RSS-130 §4.6 & RSS-132 §5.5 & RSS-133 §6.5 & RSS-139 §6.6 - 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.

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 (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (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	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2018-11-10
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31
ETS LINDGREN	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Mini-Circuit	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
HP	Signal Generator	1026	320408	2017-12-14	2018-12-14
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05

*** 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:	20.1~26.8 °C
Relative Humidity:	30.8~37 %
ATM Pressure:	102~102.2 kPa

** The testing was performed by Sunny Cen & Steven Zuo from 2017-12-15 to 2017-12-18.*

EUT Operation Mode: Transmitting

Cellular Band (PART 22H&RSS-132)

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)			
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	54.62	-59.6	10.6	0.7	-49.7	-13.0	36.7
1673.200	V	64.35	-50.5	10.6	0.7	-40.6	-13.0	27.6
2509.800	H	52.38	-60.6	13.1	1.2	-48.7	-13.0	35.7
2509.800	V	48.89	-64.2	13.1	1.2	-52.3	-13.0	39.3
3346.400	H	47.75	-62.9	13.8	1.6	-50.7	-13.0	37.7
3346.400	V	47.36	-63.3	13.8	1.6	-51.1	-13.0	38.1
59.000	H	76.80	-30.2	-10.8	0.2	-41.2	-13.0	28.2
61.000	V	71.20	-36.8	-9.8	0.2	-46.8	-13.0	33.8
BC0 RC1 Middle Channel (836.52MHz)								
1673.040	H	48.32	-65.9	10.6	0.7	-56.0	-13.0	43.0
1673.040	V	47.11	-67.7	10.6	0.7	-57.8	-13.0	44.8
2509.560	H	43.51	-69.5	13.1	1.2	-57.6	-13.0	44.6
2509.560	V	43.75	-69.3	13.1	1.2	-57.4	-13.0	44.4
442.000	H	48.50	-56.1	0.0	0.7	-56.8	-13.0	43.8
442.000	V	43.10	-64.7	0.0	0.7	-65.4	-13.0	52.4

PCS Band(PART 24E&RSS-133)

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)			
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	48.69	-60.1	13.8	1.6	-47.9	-13.0	34.9
3760.000	V	59.35	-49.3	13.8	1.6	-37.1	-13.0	24.1
5640.000	H	57.26	-48.8	14.0	1.3	-36.1	-13.0	23.1
5640.000	V	53.68	-52.2	14.0	1.3	-39.5	-13.0	26.5
59.000	H	78.40	-28.6	-10.8	0.2	-39.6	-13.0	26.6
61.000	V	70.30	-37.7	-9.8	0.2	-47.7	-13.0	34.7
BC1 RC1 Middle Channel (1880MHz)								
3760.000	H	47.32	-61.5	13.8	1.6	-49.3	-13.0	36.3
3760.000	V	50.25	-58.4	13.8	1.6	-46.2	-13.0	33.2
5640.000	H	44.32	-61.7	14.0	1.3	-49.0	-13.0	36.0
5640.000	V	43.66	-62.3	14.0	1.3	-49.6	-13.0	36.6
374.000	H	47.50	-58.3	0.0	0.6	-58.9	-13.0	45.9
374.000	V	42.80	-65.8	0.0	0.6	-66.4	-13.0	53.4

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1880.000 MHz								
3760.000	H	51.67	-57.1	13.8	1.6	-44.9	-13.0	31.9
3760.000	V	50.73	-57.9	13.8	1.6	-45.7	-13.0	32.7
5640.000	H	56.84	-49.2	14.0	1.3	-36.5	-13.0	23.5
5640.000	V	59.33	-46.6	14.0	1.3	-33.9	-13.0	20.9
4235.000	H	46.45	-62.5	13.9	1.3	-49.9	-13.0	36.9
4235.000	V	46.38	-62.6	13.9	1.3	-50.0	-13.0	37.0
378.000	H	48.50	-57.2	0.0	0.6	-57.8	-13.0	44.8
378.000	V	43.40	-65.2	0.0	0.6	-65.8	-13.0	52.8

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								
3465.000	H	55.49	-54.8	13.9	1.6	-42.5	-13.0	29.5
3465.000	V	51.49	-58.8	13.9	1.6	-46.5	-13.0	33.5
5197.500	H	52.74	-53.7	14.0	1.5	-41.2	-13.0	28.2
5197.500	V	52.49	-54	14.0	1.5	-41.5	-13.0	28.5
4165.000	H	45.84	-63.2	13.9	1.5	-50.8	-13.0	37.8
4165.000	V	45.49	-63.6	13.9	1.5	-51.2	-13.0	38.2
527.000	H	49.60	-54.1	0.0	0.7	-54.8	-13.0	41.8
527.000	V	43.20	-63.6	0.0	0.7	-64.3	-13.0	51.3

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								
1673.000	H	53.68	-60.5	10.6	0.7	-50.6	-13.0	37.6
1673.000	V	50.64	-64.2	10.6	0.7	-54.3	-13.0	41.3
2509.500	H	60.48	-52.5	13.1	1.2	-40.6	-13.0	27.6
2509.500	V	58.37	-54.7	13.1	1.2	-42.8	-13.0	29.8
3346.000	H	48.62	-62	13.8	1.6	-49.8	-13.0	36.8
3346.000	V	47.33	-63.4	13.8	1.6	-51.2	-13.0	38.2
2162.000	H	46.43	-66.2	11.0	1.1	-56.3	-13.0	43.3
2162.000	V	45.48	-67	11.0	1.1	-57.1	-13.0	44.1
547.000	H	52.20	-51	0.0	0.7	-51.7	-13.0	38.7
547.000	V	43.60	-62.8	0.0	0.7	-63.5	-13.0	50.5

LTE Band 13 (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:782MHz								
1564.000	H	51.37	-63.6	9.9	0.9	-54.6	-13.0	41.6
1564.000	V	49.94	-65.4	9.9	0.9	-56.4	-13.0	43.4
2346.000	H	57.53	-54.9	11.7	1.3	-44.5	-13.0	31.5
2346.000	V	52.64	-59.8	11.7	1.3	-49.4	-13.0	36.4
3128.000	H	48.72	-61.9	13.3	1.8	-50.4	-13.0	37.4
3128.000	V	48.49	-62.2	13.3	1.8	-50.7	-13.0	37.7
3910.000	H	48.48	-59.4	13.5	1.5	-47.4	-13.0	34.4
3910.000	V	47.97	-59.9	13.5	1.5	-47.9	-13.0	34.9
1766.000	H	54.49	-59.8	11.0	0.7	-49.5	-13.0	36.5
1766.000	V	53.16	-61.7	11.0	0.7	-51.4	-13.0	38.4
372.000	H	51.20	-54.7	0.0	0.6	-55.3	-13.0	42.3
372.000	V	42.60	-66.1	0.0	0.6	-66.7	-13.0	53.7

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								
1420.000	H	50.76	-62.8	9.1	1.2	-54.9	-13.0	41.9
1420.000	V	49.92	-64.2	9.1	1.2	-56.3	-13.0	43.3
2130.000	H	49.79	-63	11.2	1.1	-52.9	-13.0	39.9
2130.000	V	48.66	-64.1	11.2	1.1	-54.0	-13.0	41.0
2840.000	H	48.53	-63.5	13.4	1.4	-51.5	-13.0	38.5
2840.000	V	48.36	-63.9	13.4	1.4	-51.9	-13.0	38.9
3550.000	H	48.32	-61.8	14.0	1.6	-49.4	-13.0	36.4
3550.000	V	47.78	-62.4	14.0	1.6	-50.0	-13.0	37.0
1765.000	H	62.37	-51.9	11.0	0.7	-41.6	-13.0	28.6
1765.000	V	61.15	-53.7	11.0	0.7	-43.4	-13.0	30.4
544.000	H	49.30	-54	0.0	0.7	-54.7	-13.0	41.7
544.000	V	42.40	-64	0.0	0.7	-64.7	-13.0	51.7

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 AND RSS-130 §4.6 & RSS-132 §5.5 & RSS-133& RSS-139 §6.6- BAND EDGES

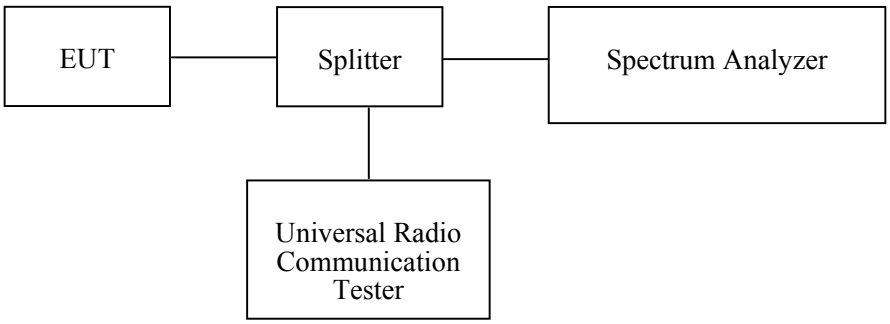
Applicable Standard

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

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	Universal Radio Communication Tester	CMU200	109 038	2017-07-21	2018-07-21
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each Time	/
Pasternack	Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
R&S	Spectrum Analyzer	FSIQ 26	831929/005	2017-08-31	2018-08-31

*** 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

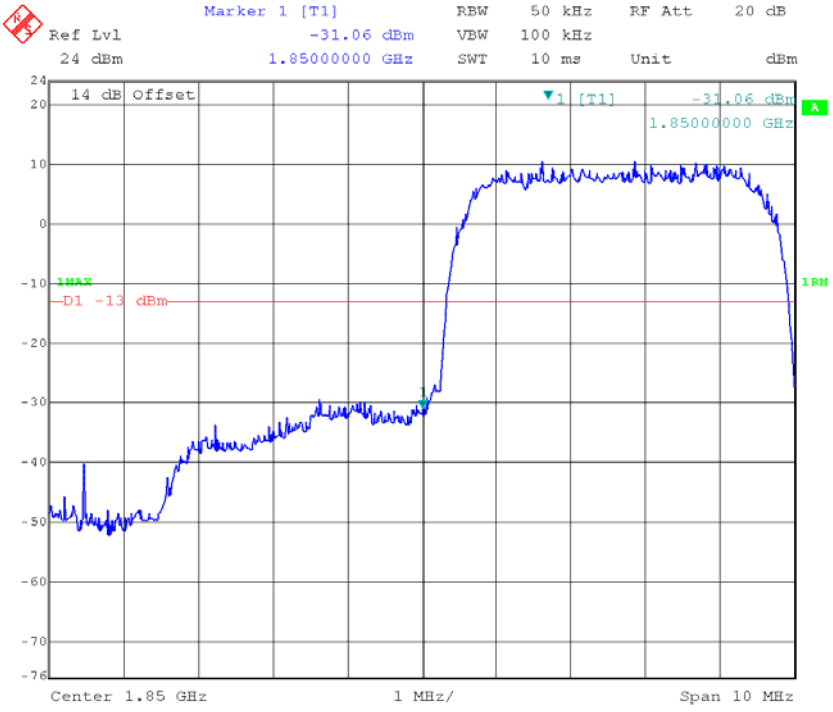
Temperature:	24.8~25.1°C
Relative Humidity:	41~49 %
ATM Pressure:	100.8~101.4 kPa

The testing was performed by Kami Zhou from 2017-12-07 to 2018-01-22.

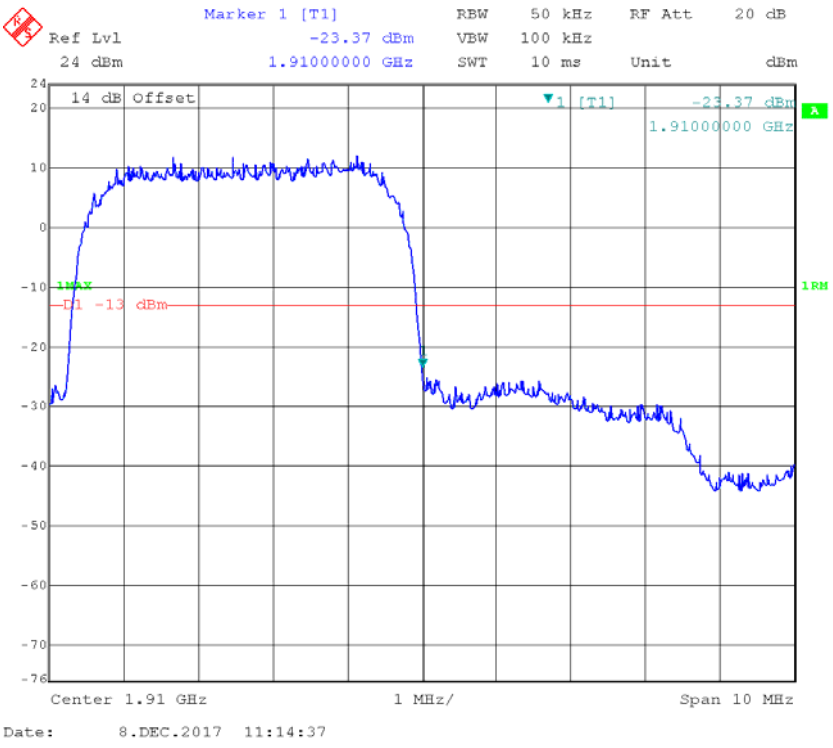
Test Mode: Transmitting

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

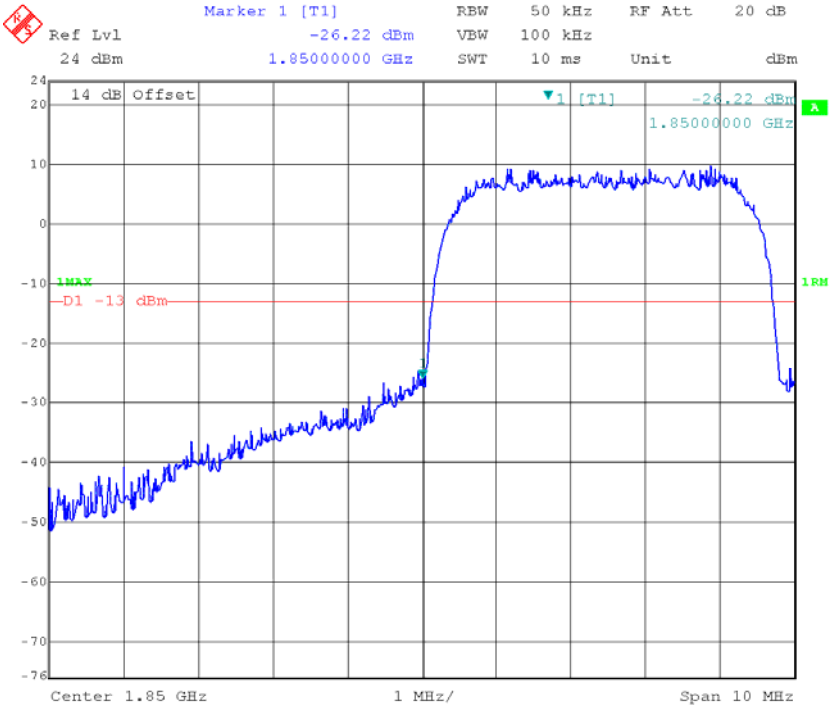
WCDMA Band II Rel 99, Left Band Edge



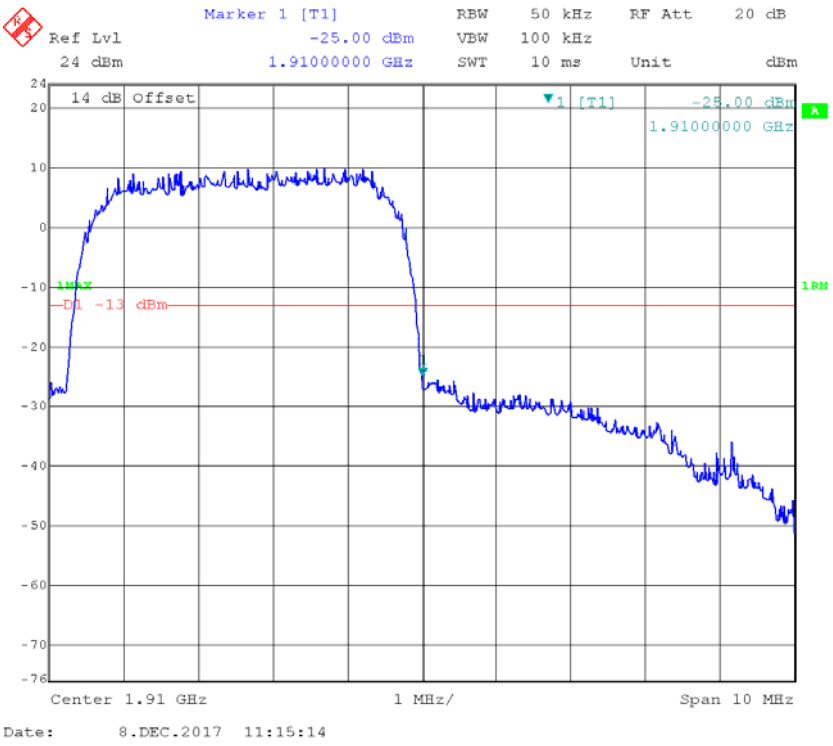
WCDMA Band II Rel 99, Right Band Edge



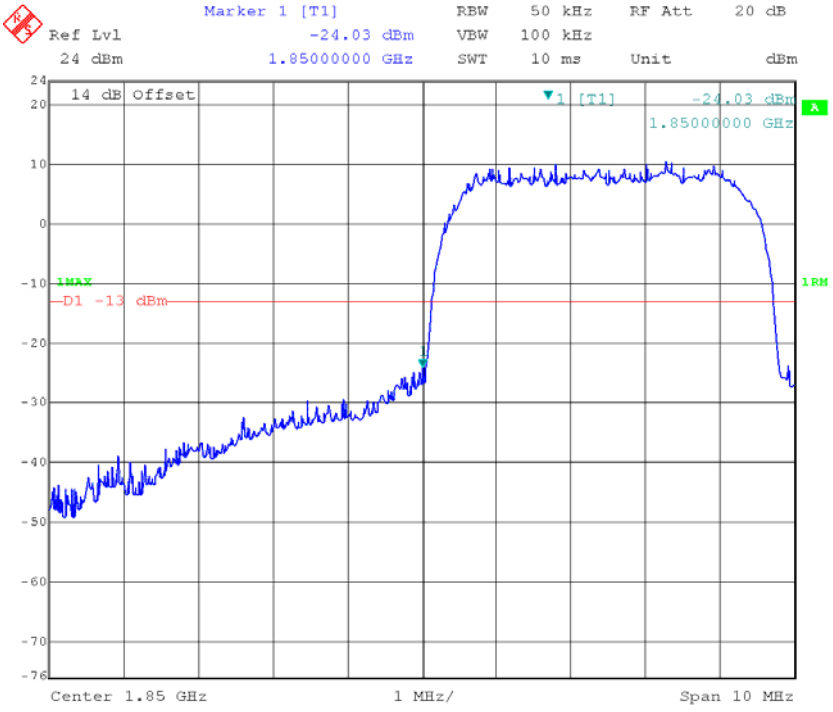
WCDMA Band II HSUPA, Left Band Edge



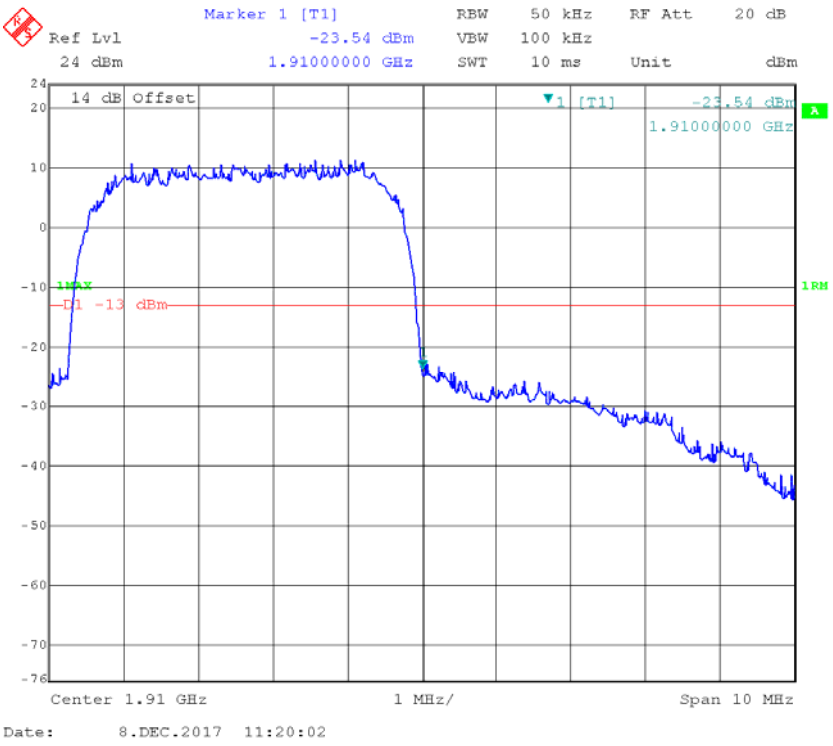
WCDMA Band II HSUPA, Right Band Edge



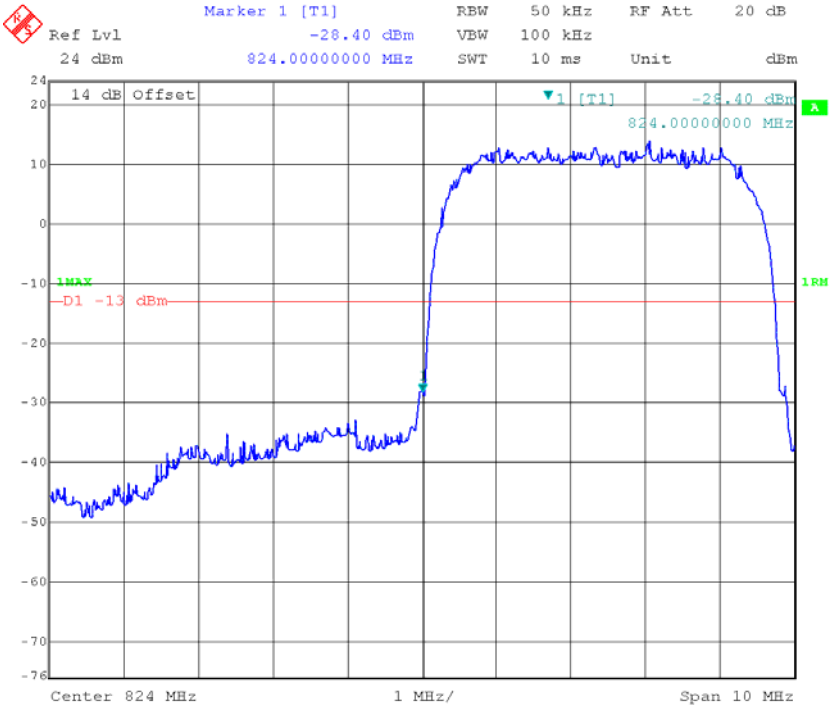
WCDMA Band II HSDPA, Left Band Edge



WCDMA Band II HSDPA, Right Band Edge

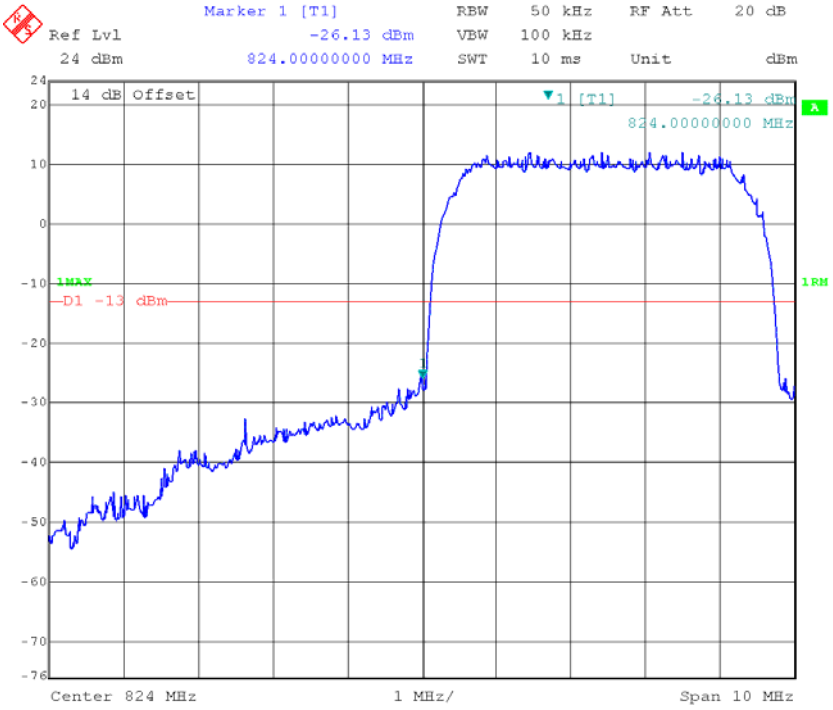


WCDMA Band V Rel 99, Left Band Edge

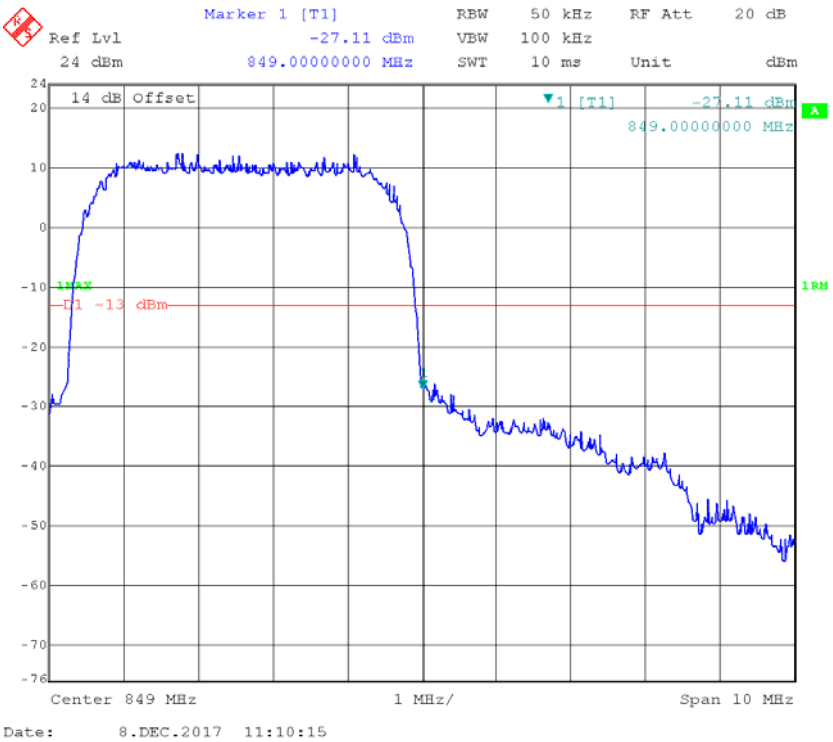


WCDMA Band V Rel 99, Right Band Edge

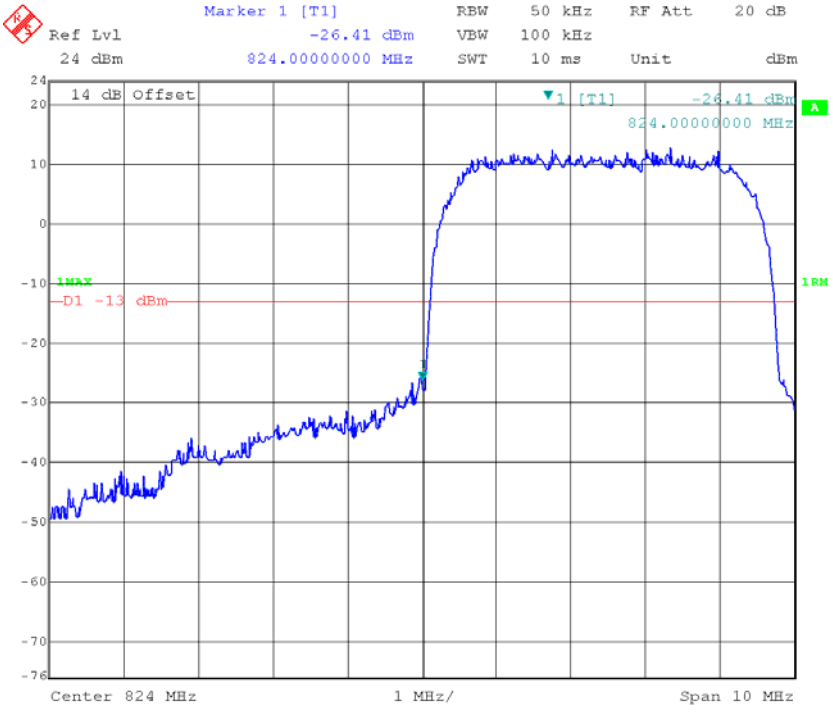
WCDMA Band V HSUPA, Left Band Edge



WCDMA Band V HSUPA, Right Band Edge

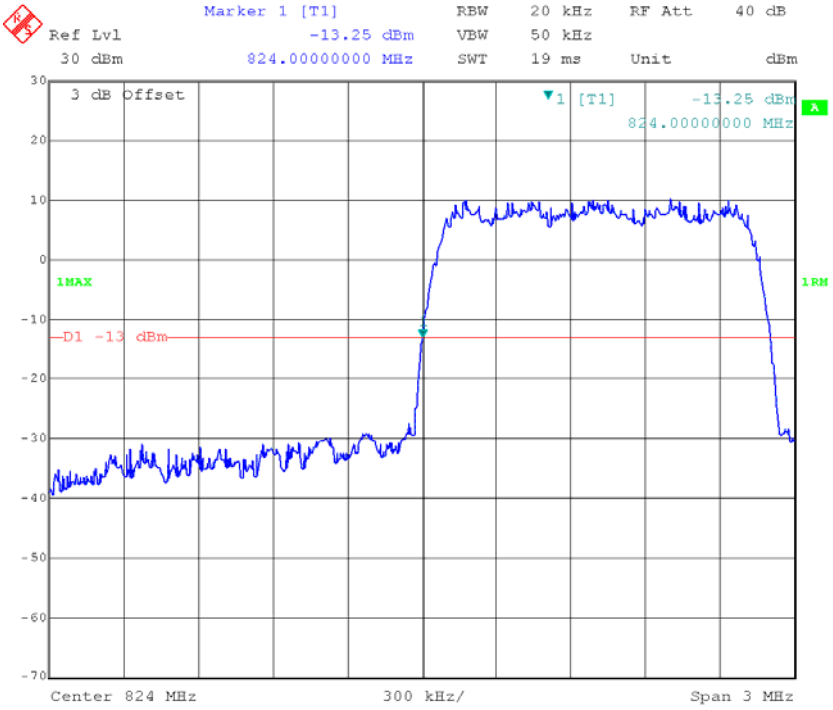


WCDMA Band V HSDPA, Left Band Edge

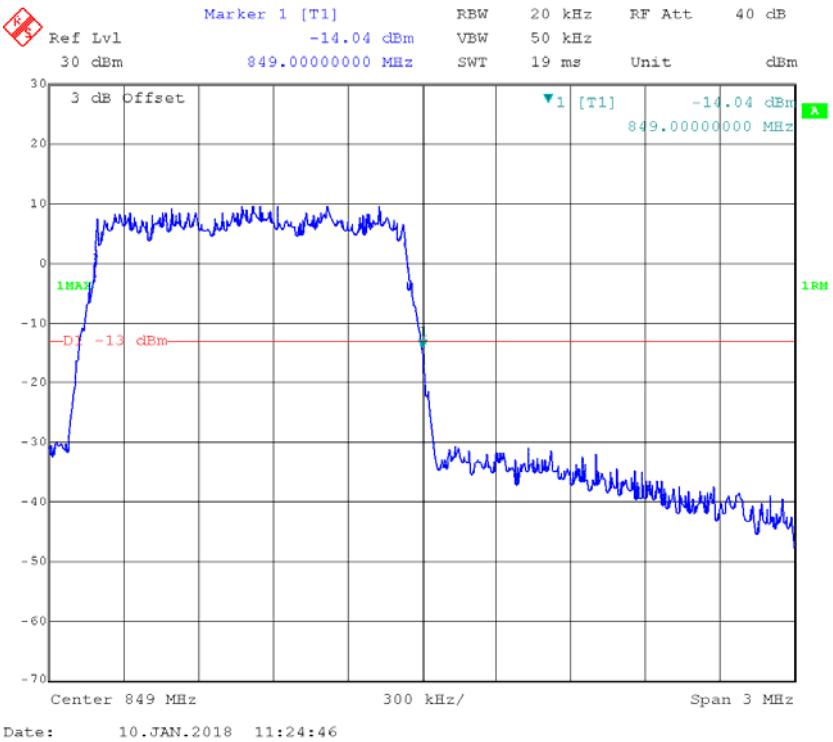


WCDMA Band V HSDPA, Right Band Edge

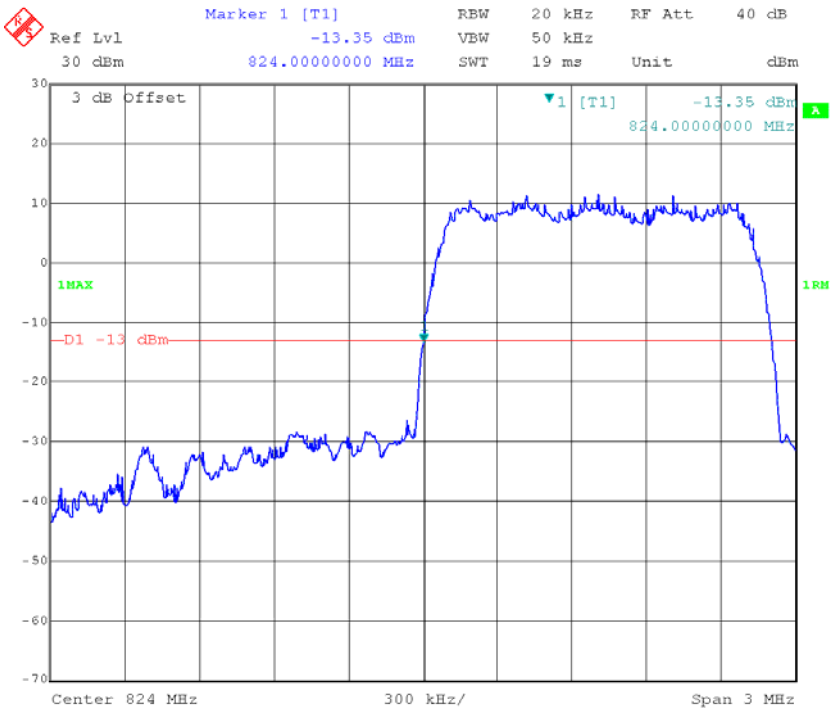
BC0-RC1, Left Band Edge



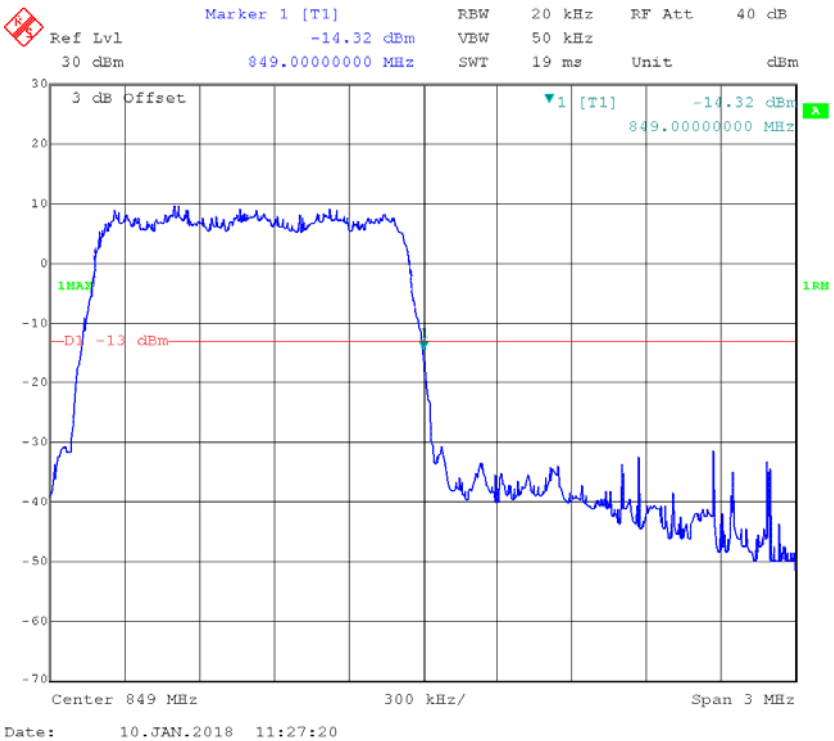
BC0-RC1, Right Band Edge



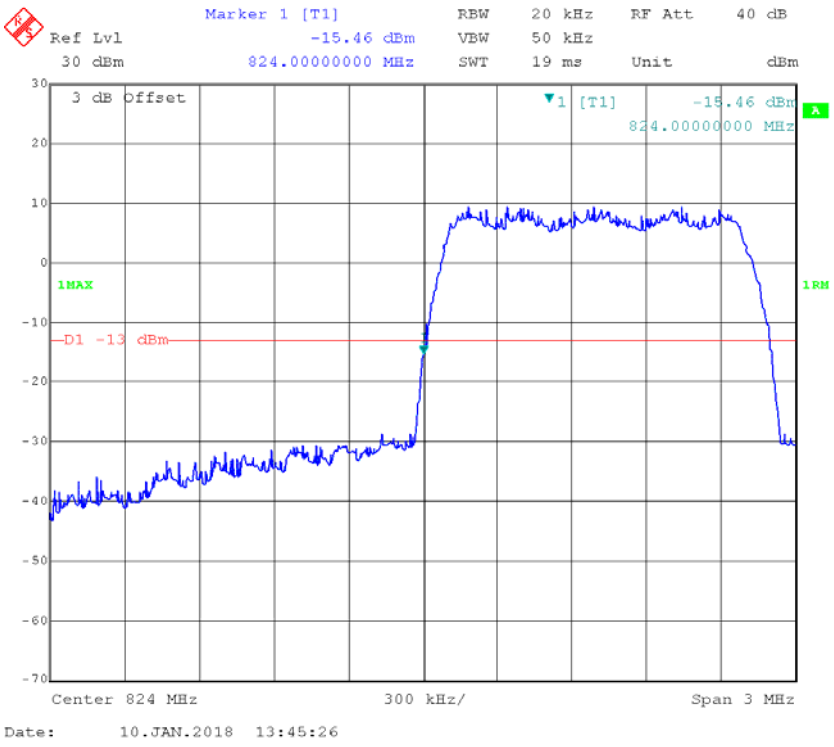
BC0-RC3, Left Band Edge



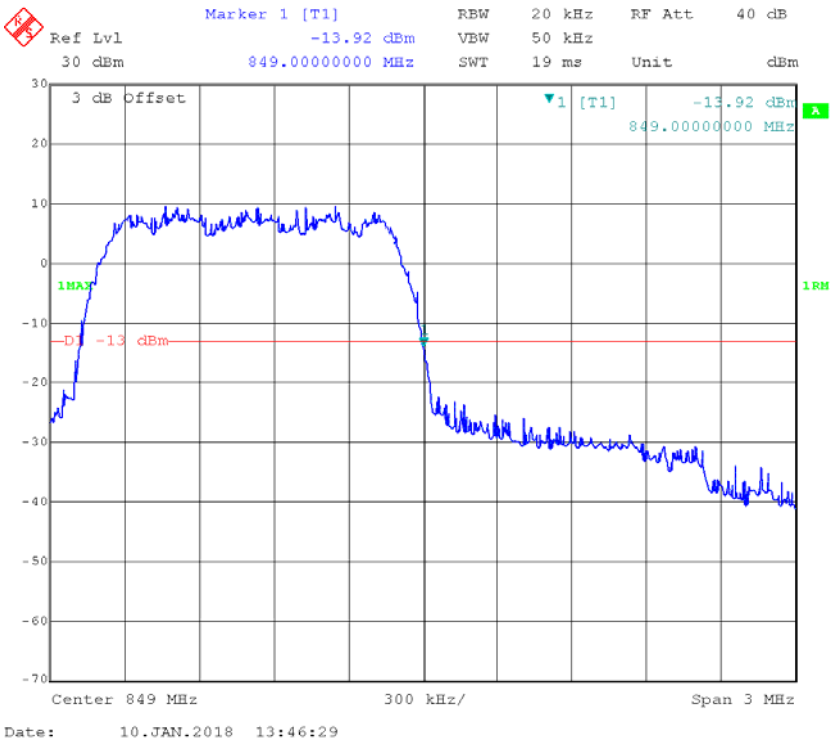
BC0-RC3, Right Band Edge



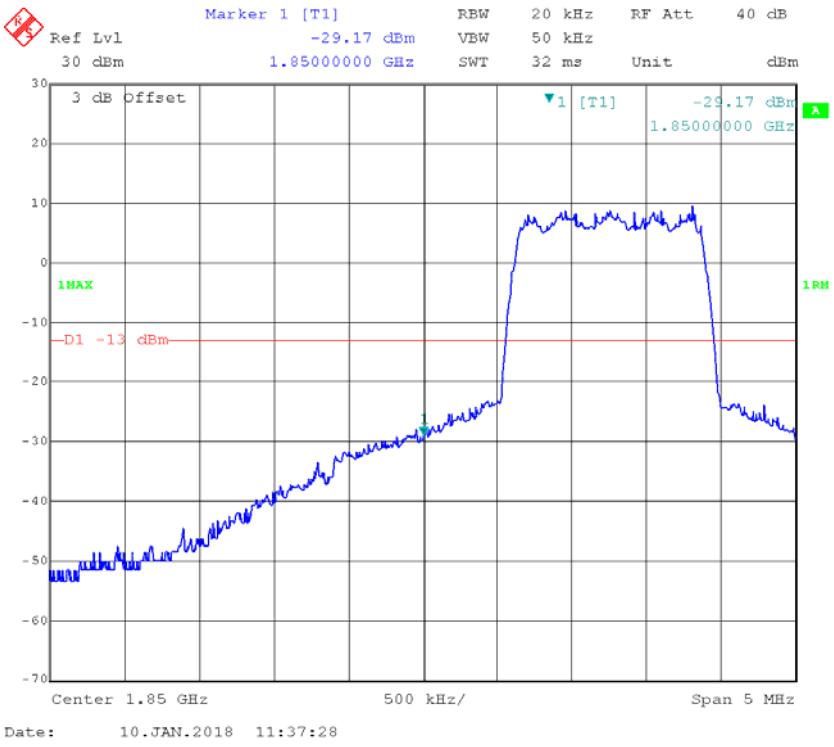
BC0-Rel. A, Left Band Edge



BC0-Rel. A, Right Band Edge

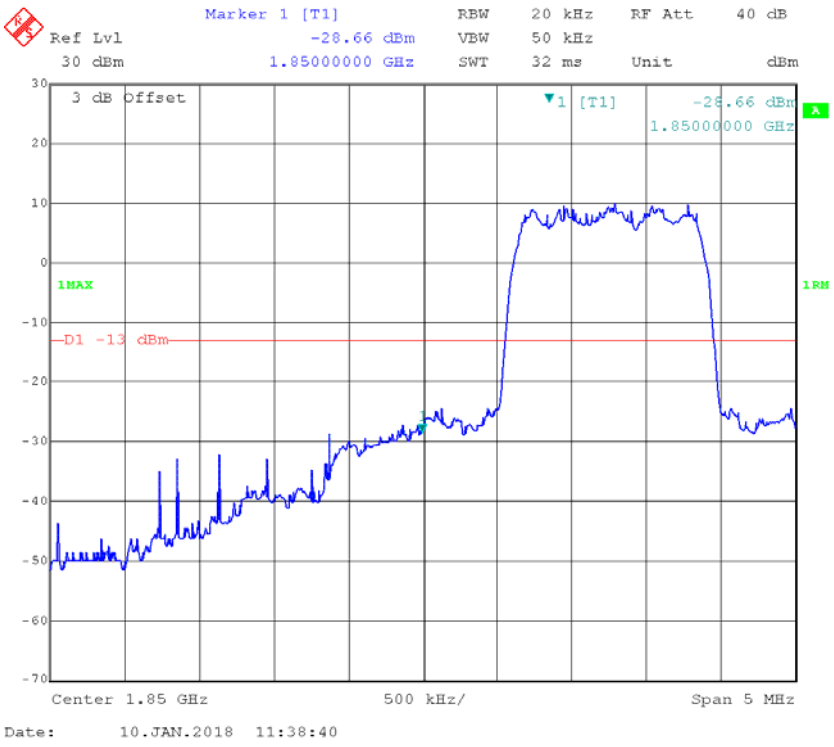


BC1-RC1, Left Band Edge



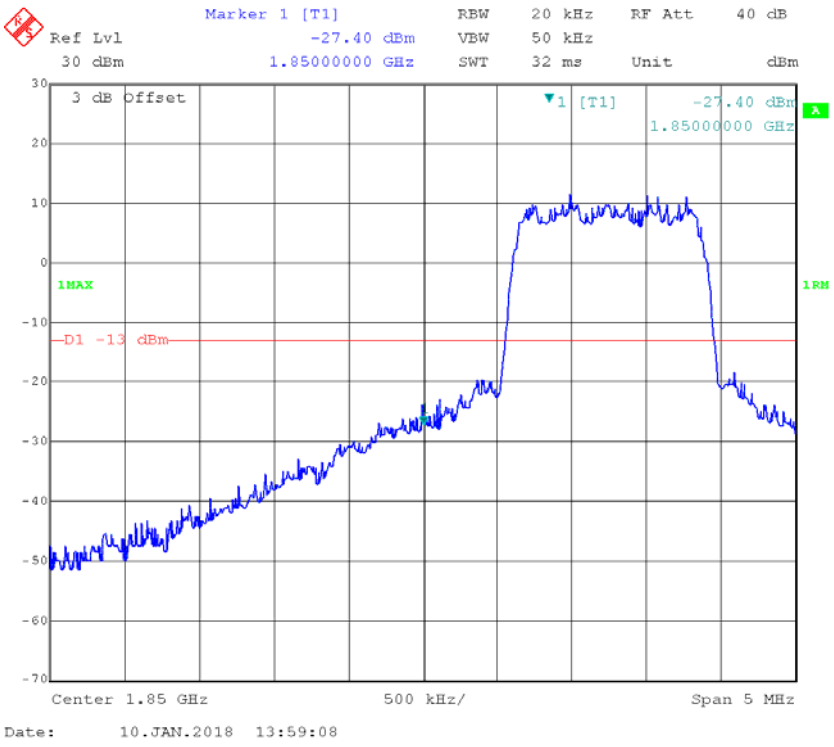
BC1-RC1, Right Band Edge

BC1-RC3, Left Band Edge

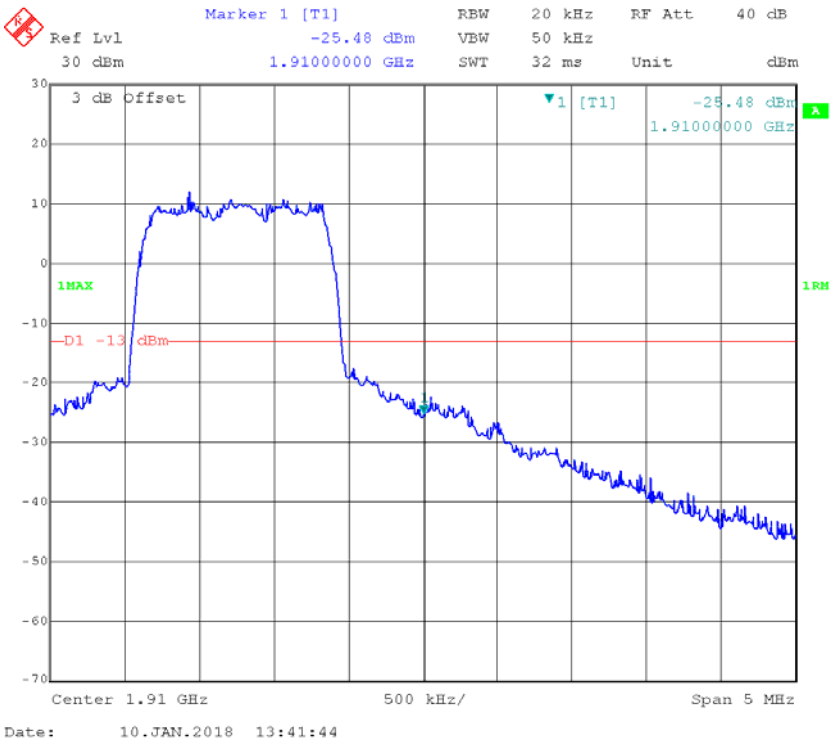


BC1-RC3, Right Band Edge

BC1-Rel.A, Left Band Edge

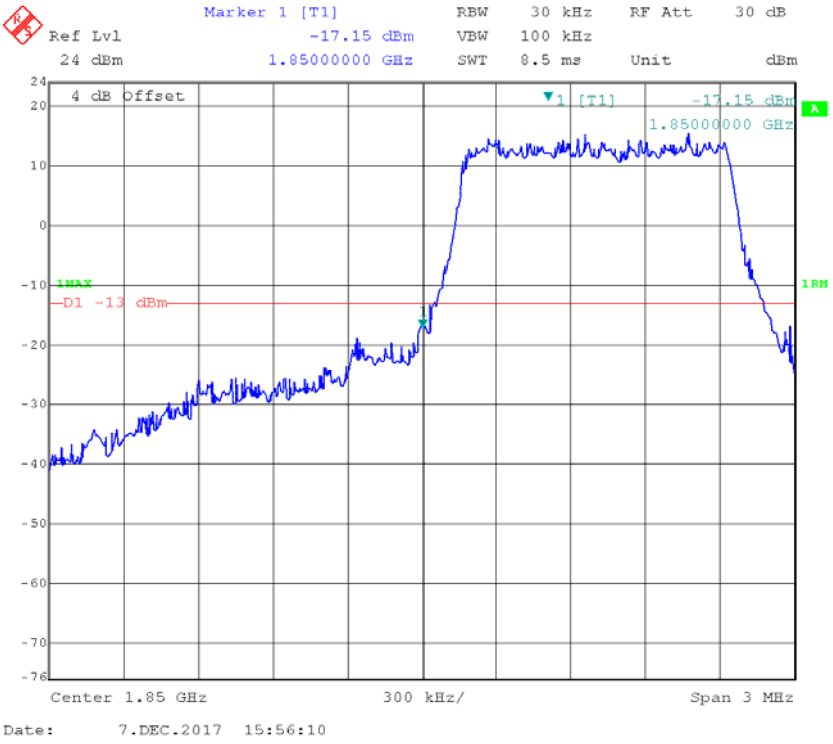


BC1-Rel.A, Right Band Edge



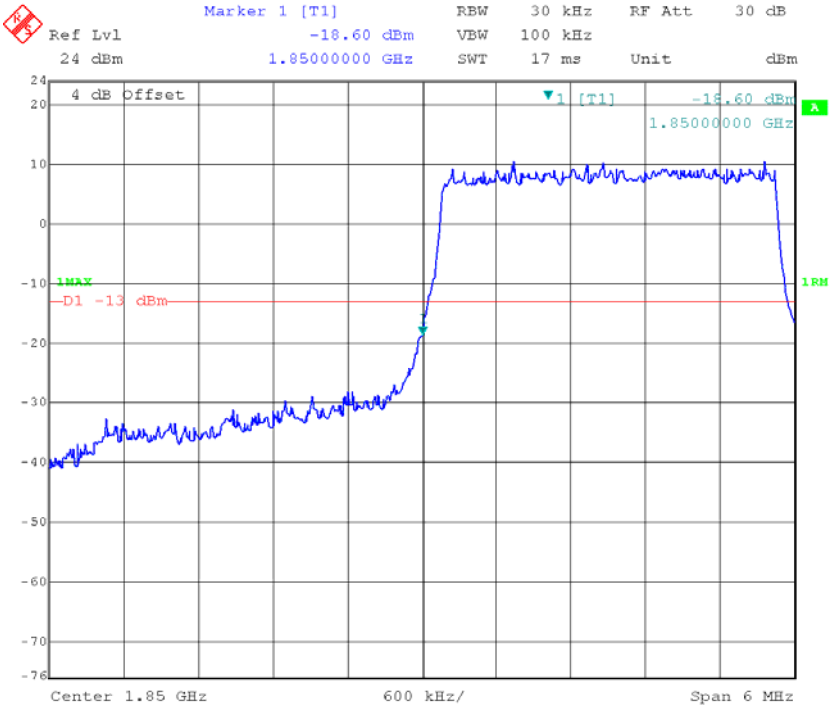
LTE Band II

QPSK_1.4MHz_ 6 RB_ Left

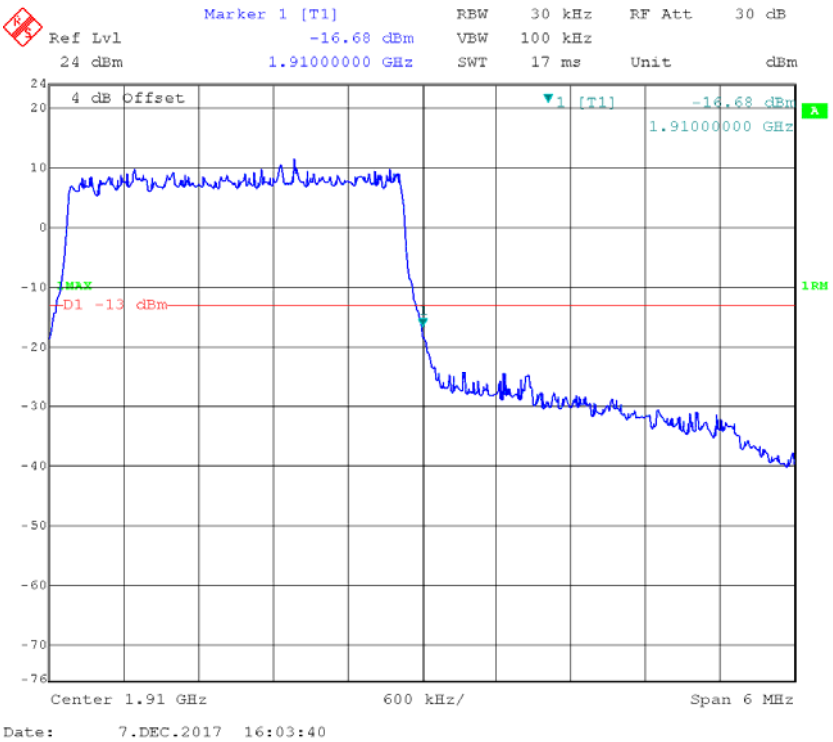


QPSK_1.4MHz_ 6 RB_ Right

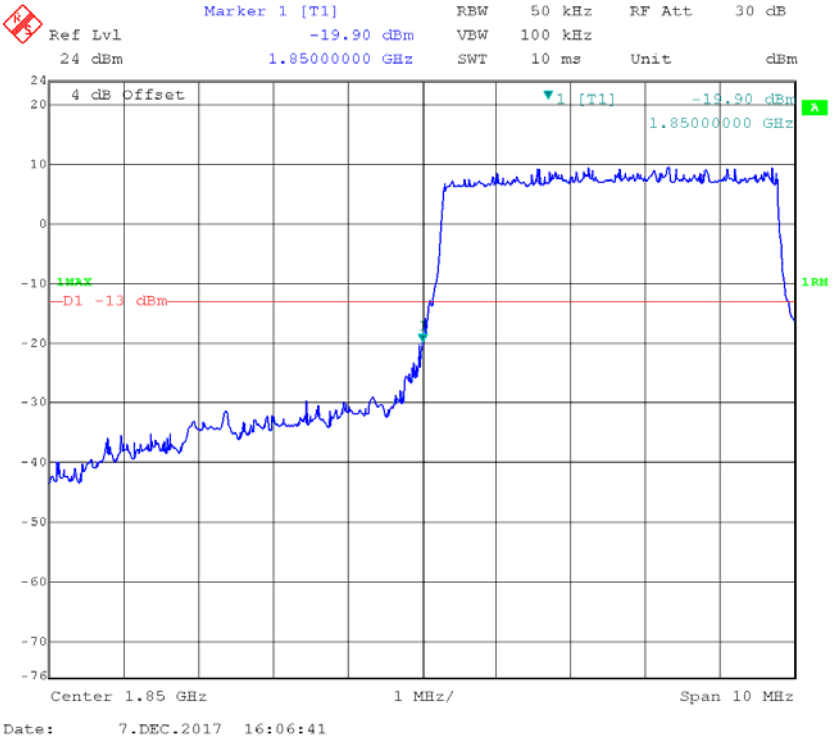
QPSK_3MHz_ 15 RB_ Left



QPSK_3MHz_ 15 RB_ Right

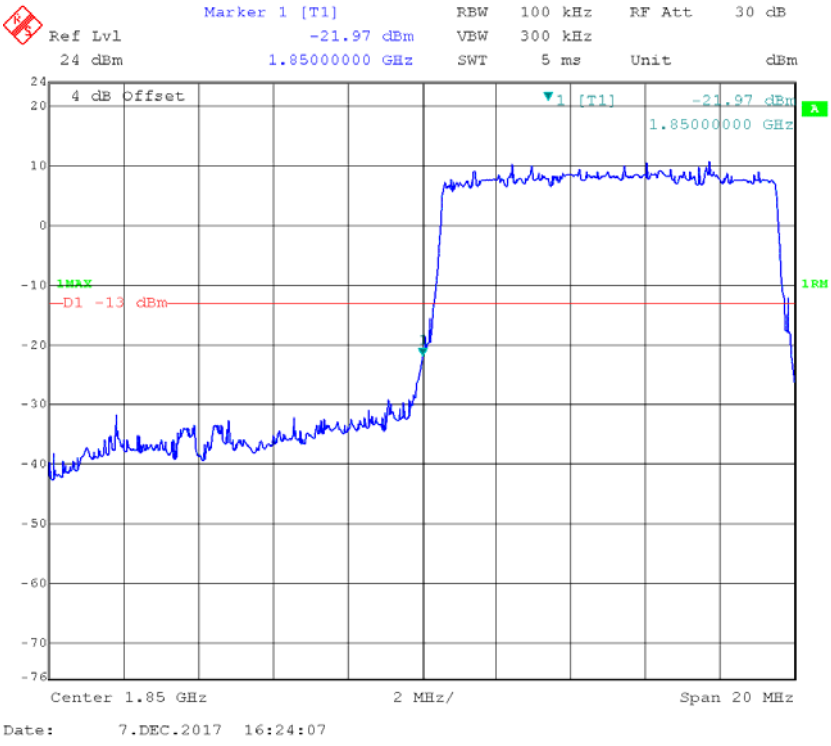


QPSK_5MHz_ 25 RB_ Left



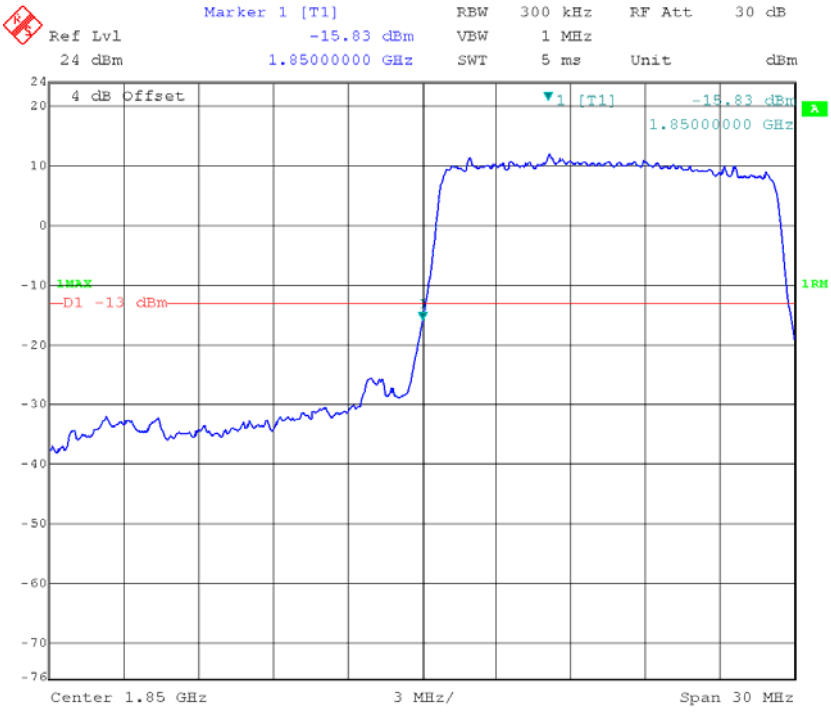
QPSK_5MHz_ 25 RB_ Right

QPSK_10MHz_ 50 RB_ Left

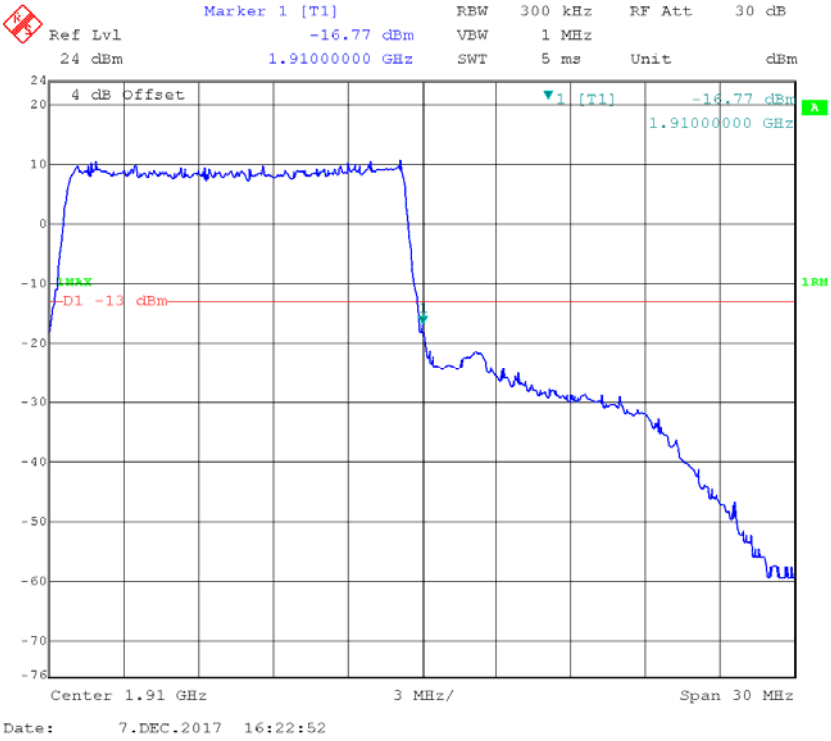


QPSK_10MHz_ 50 RB_ Right

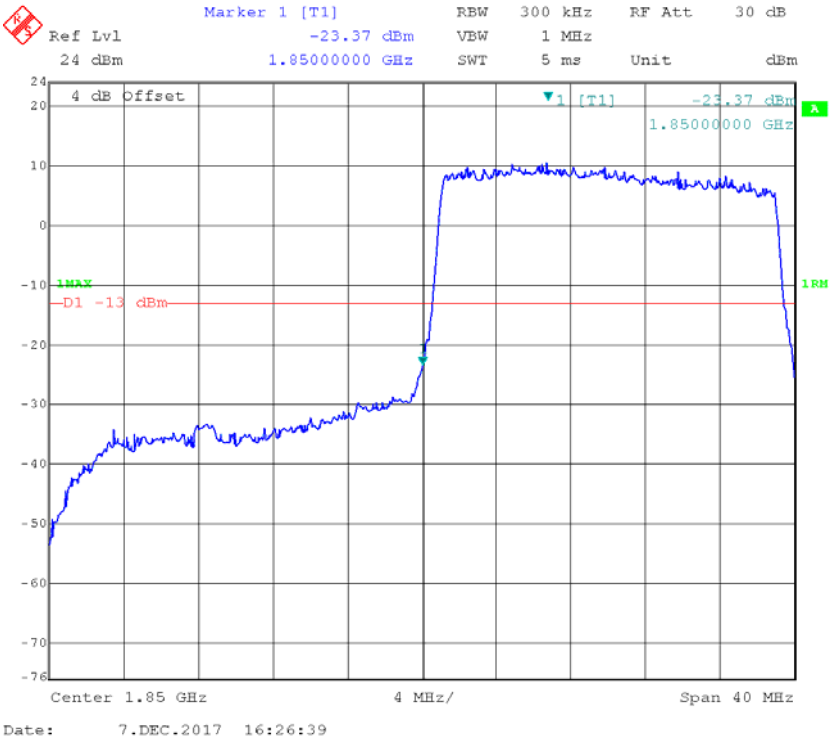
QPSK_15MHz_ 75 RB_ Left



QPSK_15MHz_ 75 RB_ Right

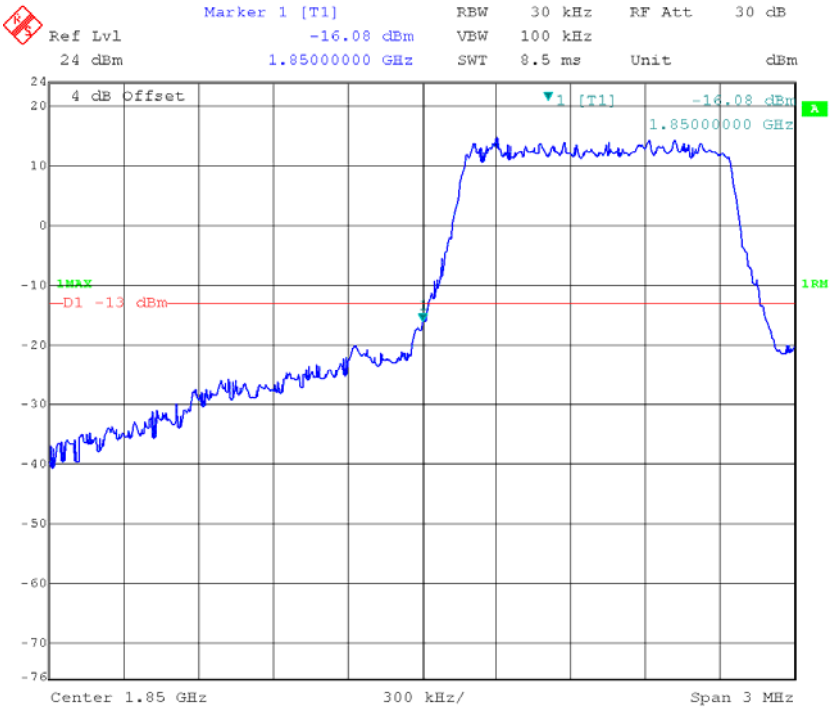


QPSK_20MHz_ FULL RB_ Left



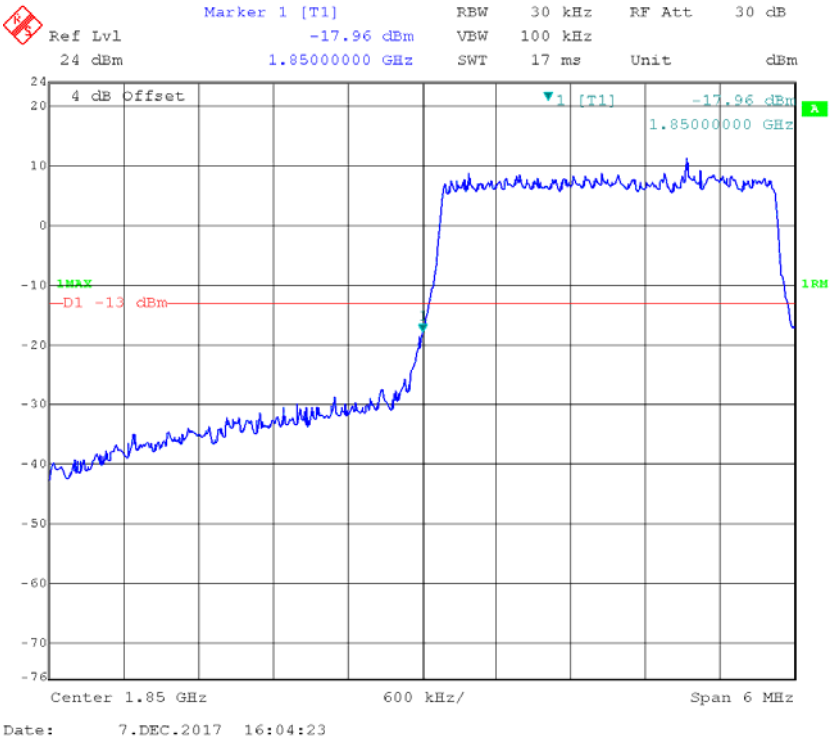
QPSK_20MHz_ FULL RB_ Right

16QAM_1.4MHz_ 6 RB_ Left



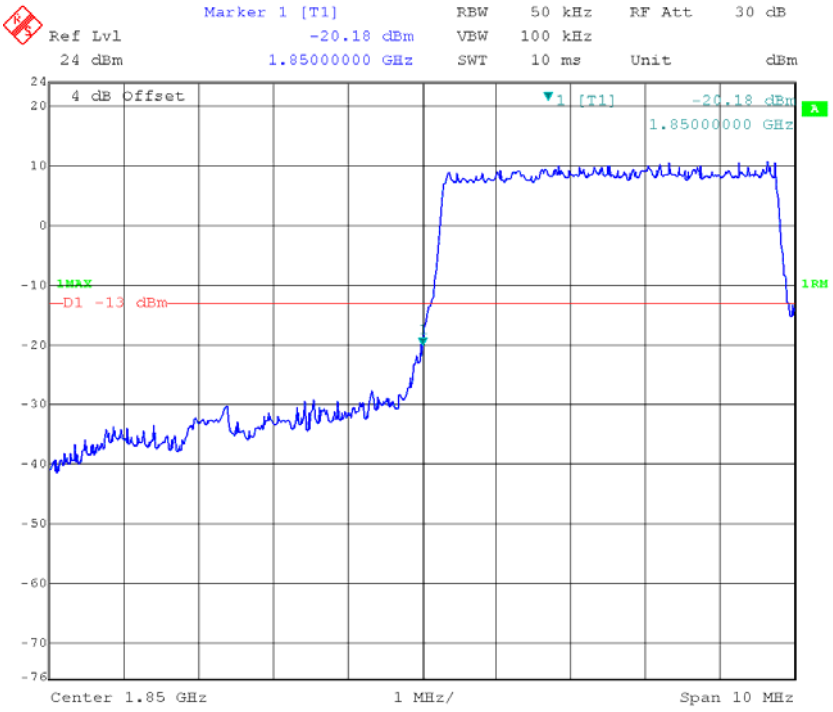
16QAM_1.4MHz_ 6 RB_ Right

16QAM_3MHz_ 15 RB_ Left

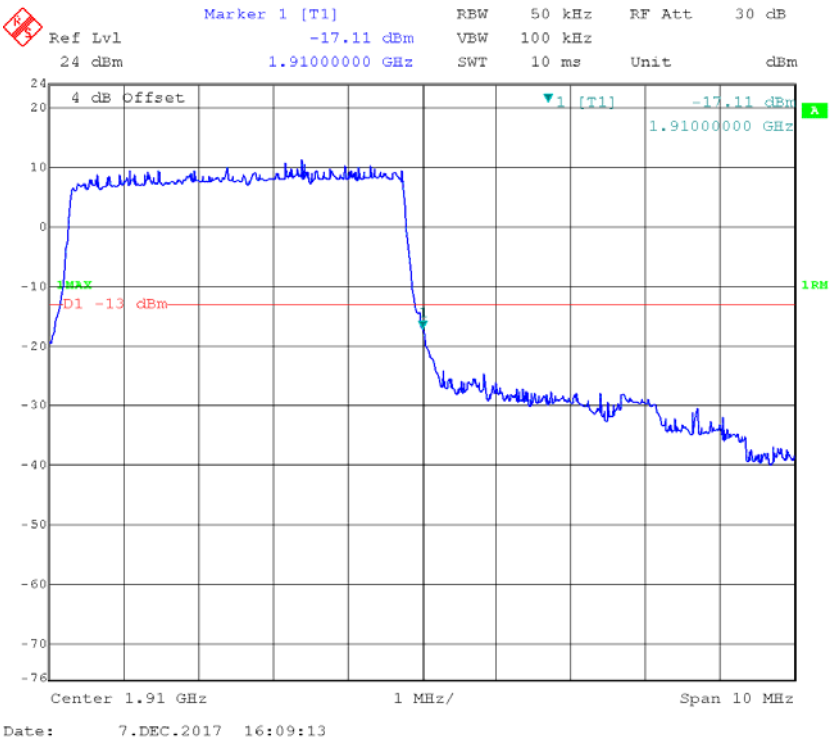


16QAM_3MHz_ 15 RB_ Right

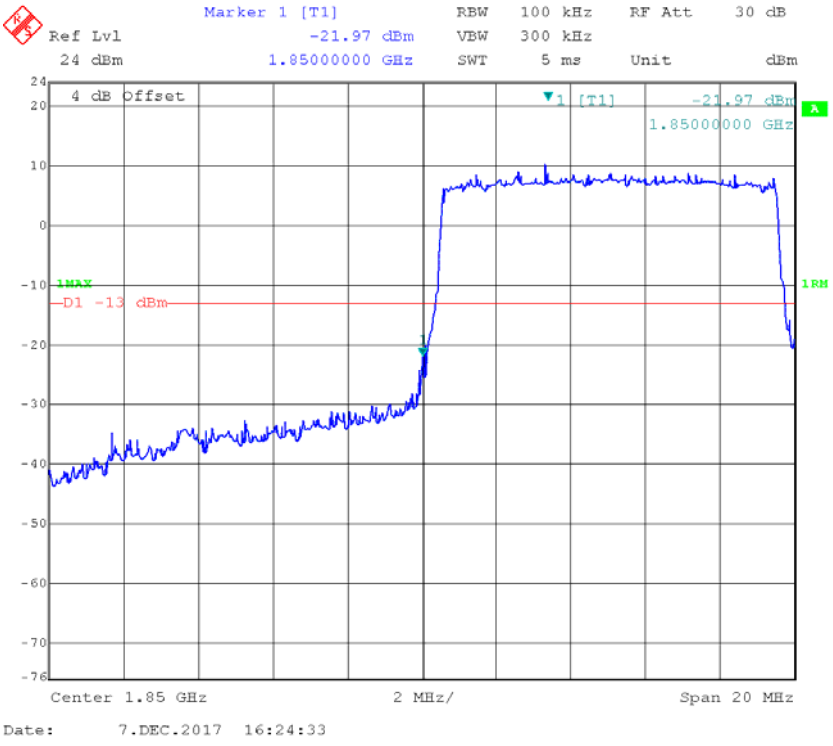
16QAM_5MHz_ 25 RB_ Left



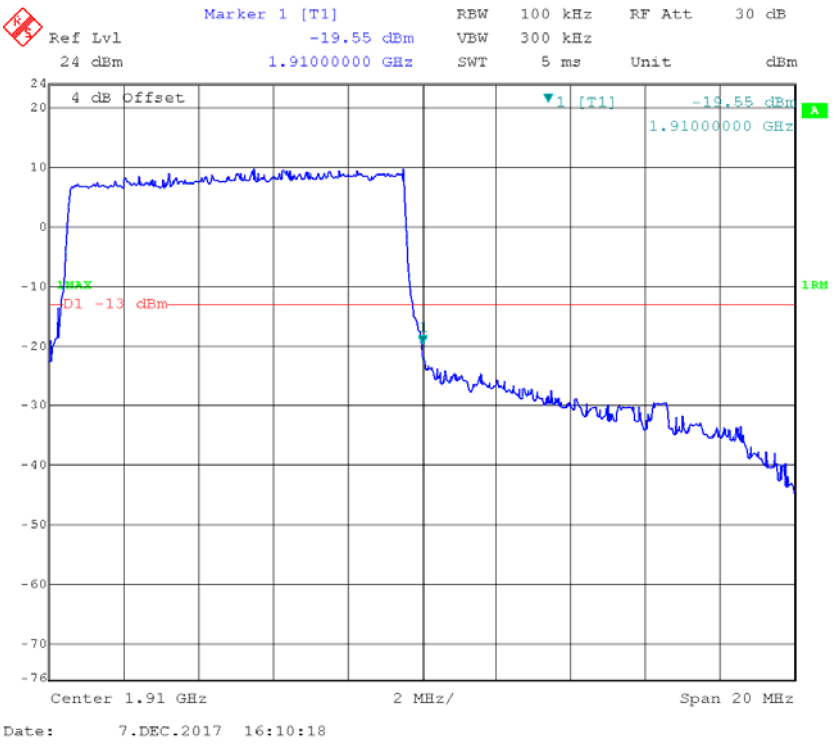
16QAM_5MHz_ 25 RB_ Right



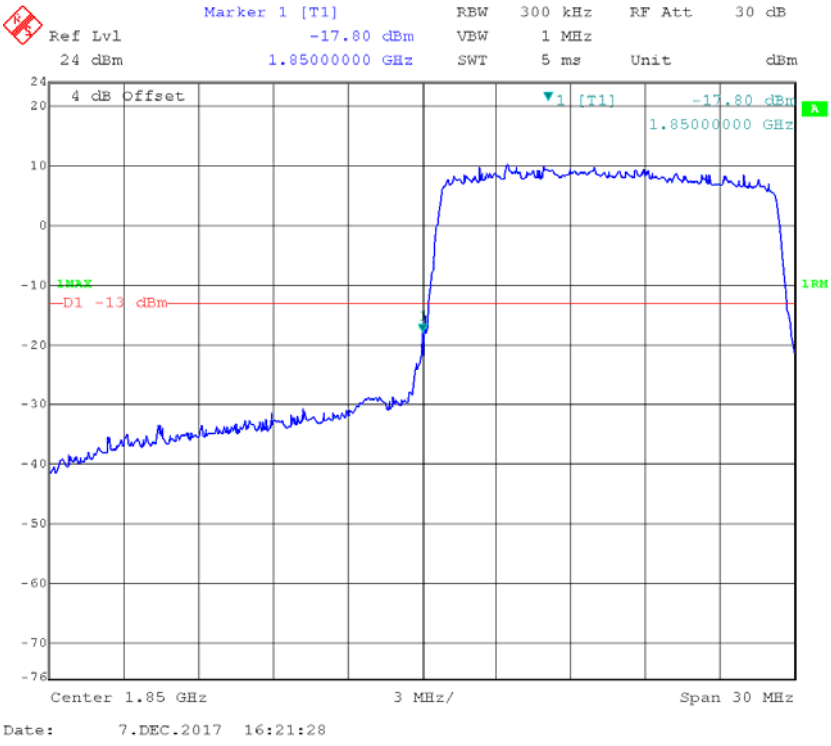
16QAM_10MHz_ 50 RB_ Left



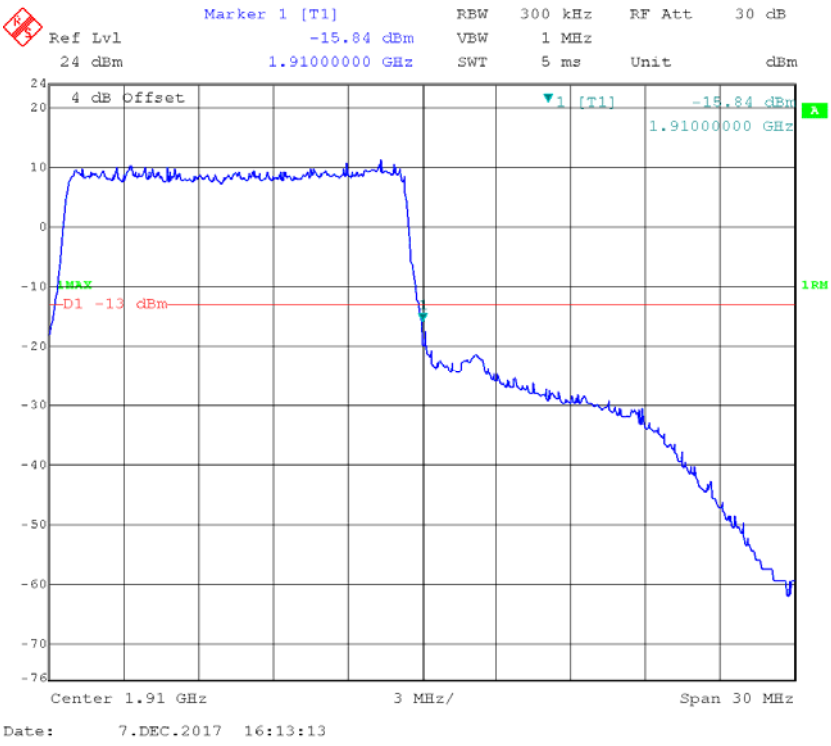
16QAM_10MHz_ 50 RB_ Right



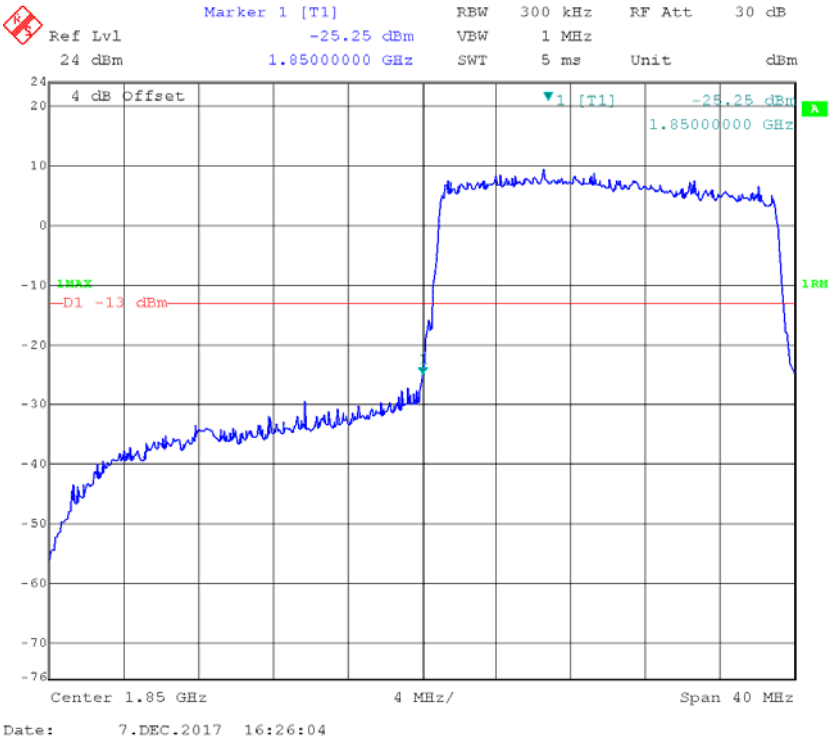
16QAM_15MHz_ 75 RB_ Left



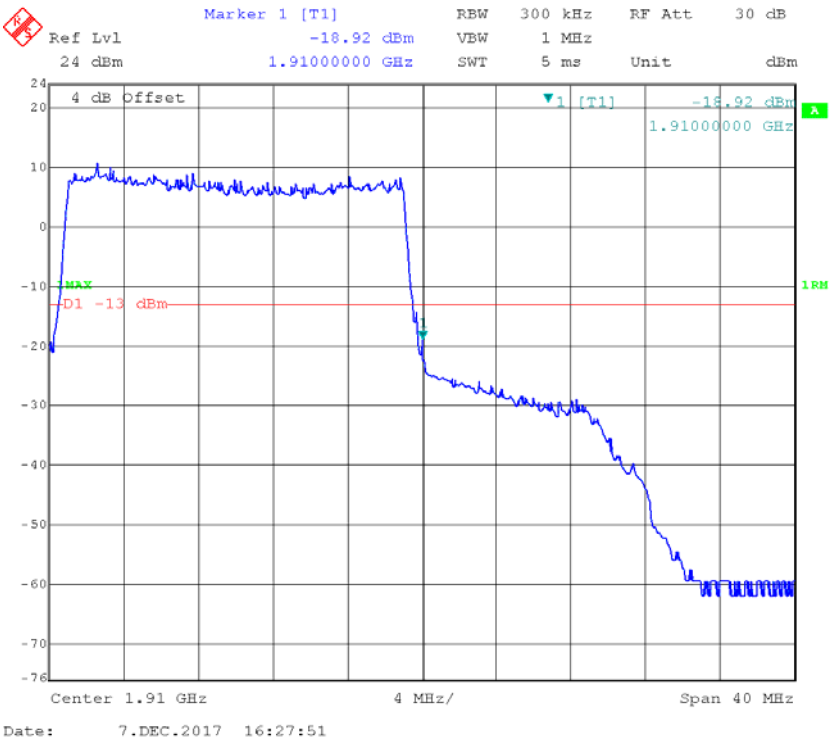
16QAM_15MHz_ 75 RB_ Right



16QAM_20MHz_ FULL RB_ Left

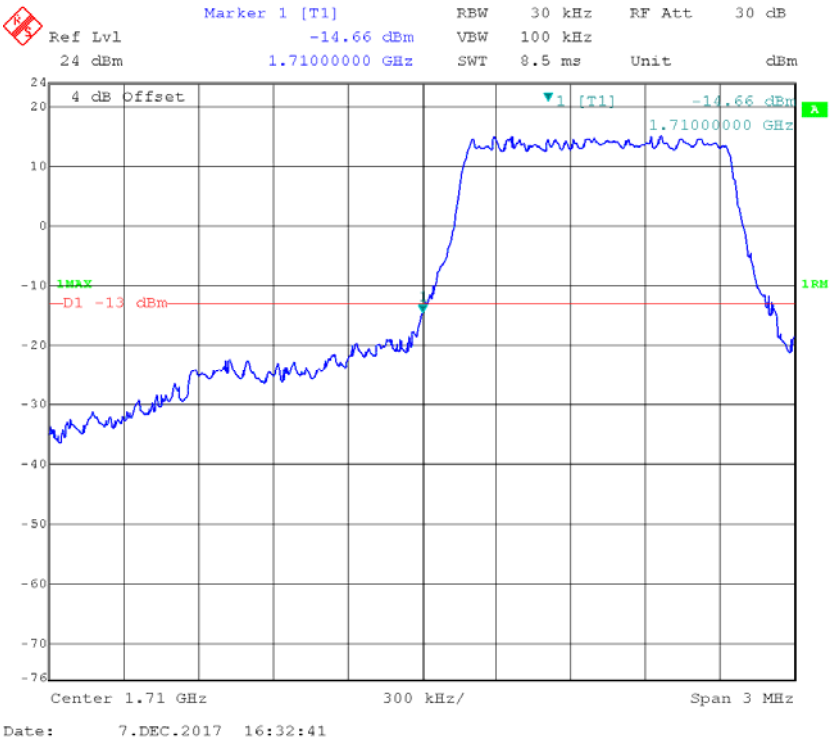


16QAM_20MHz_ FULL RB_ Right

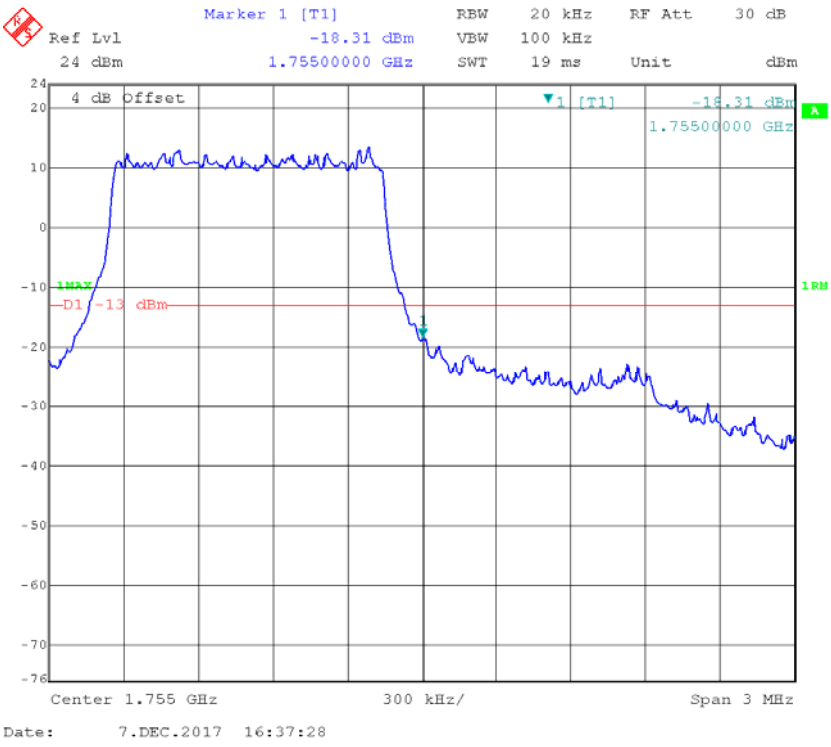


LTE Band IV

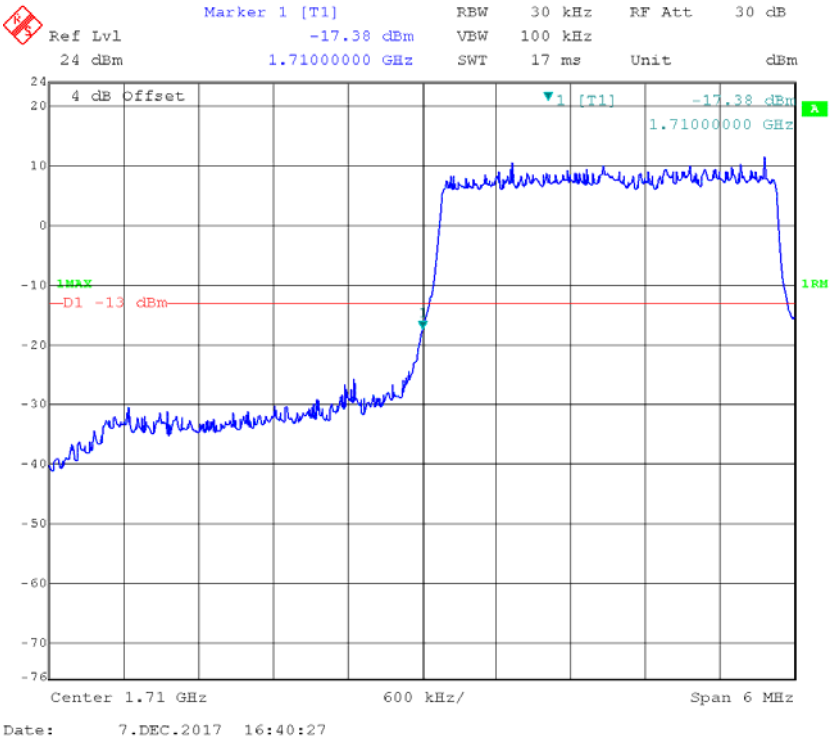
QPSK_1.4MHz_ 6 RB_ Left



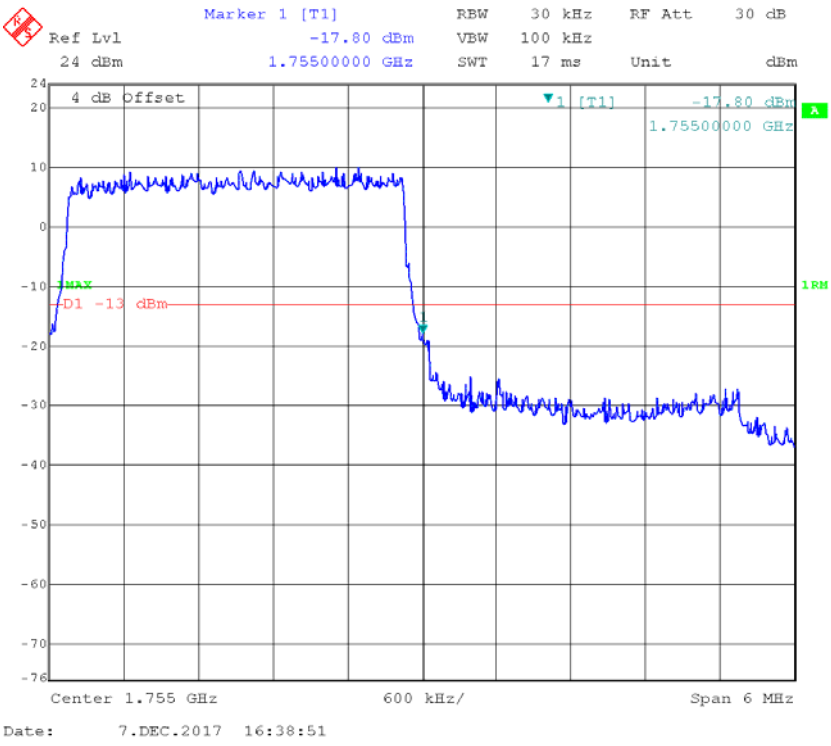
QPSK_1.4MHz_ 6 RB_ Right



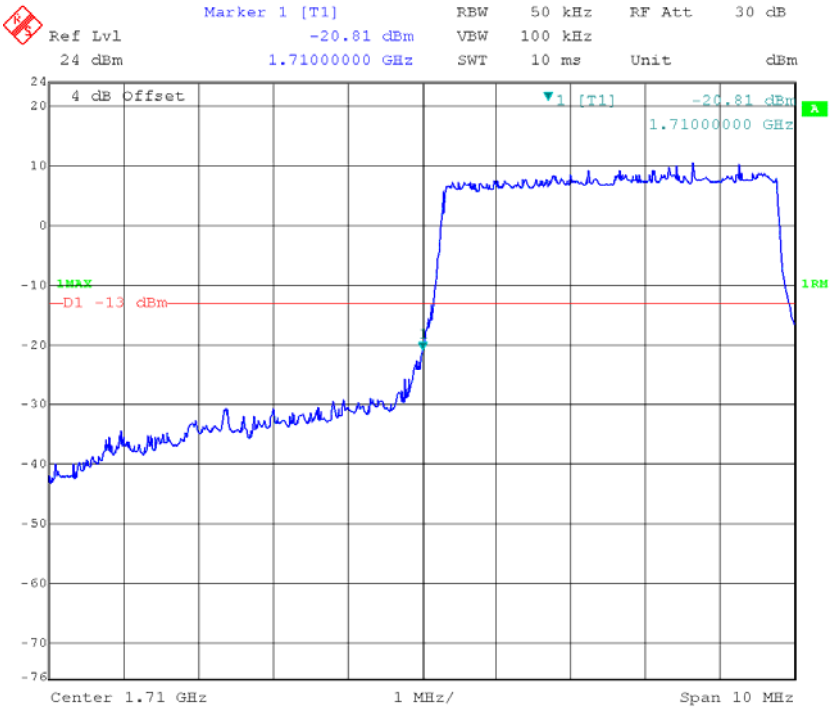
QPSK_3MHz_ 15 RB_ Left



QPSK_3MHz_ 15 RB_ Right

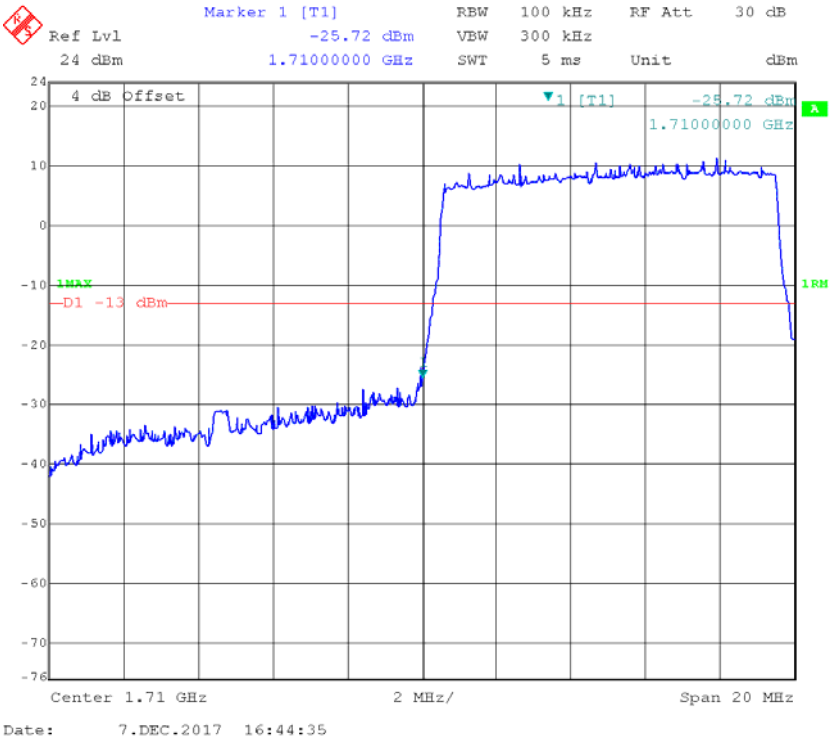


QPSK_5MHz_ 25 RB_ Left

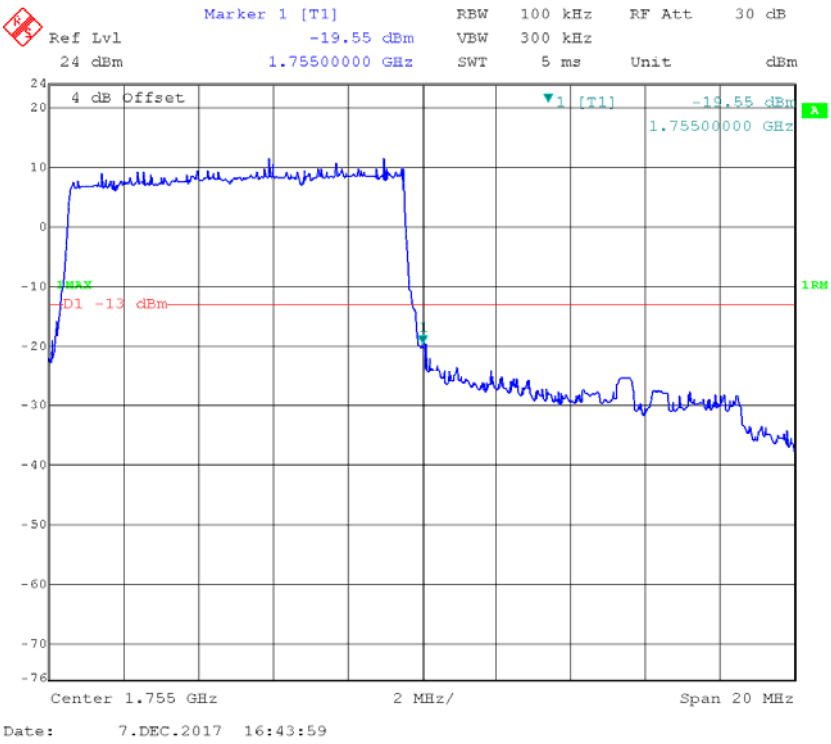


QPSK_5MHz_ 25 RB_ Right

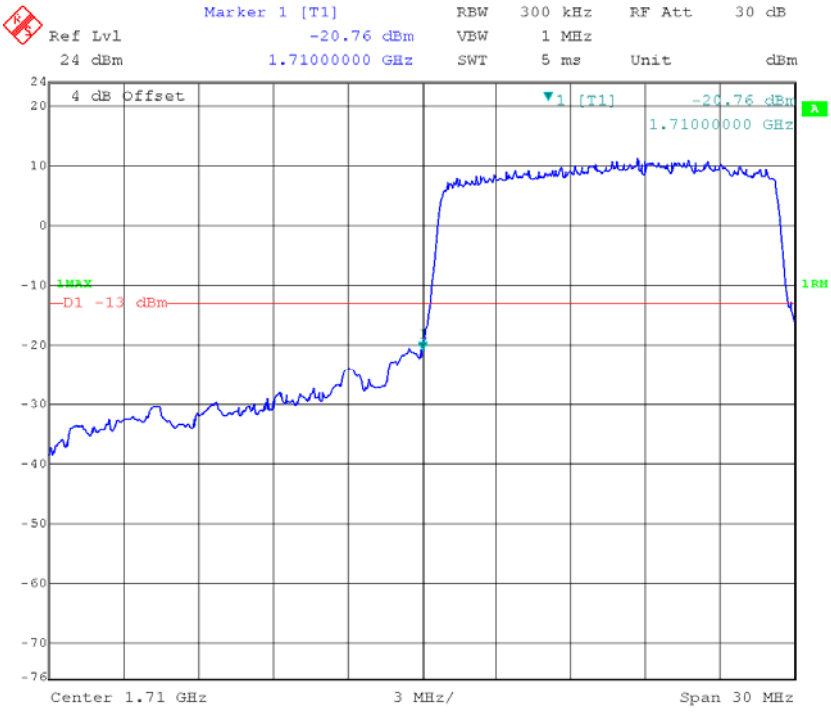
QPSK_10MHz_ 50 RB_ Left



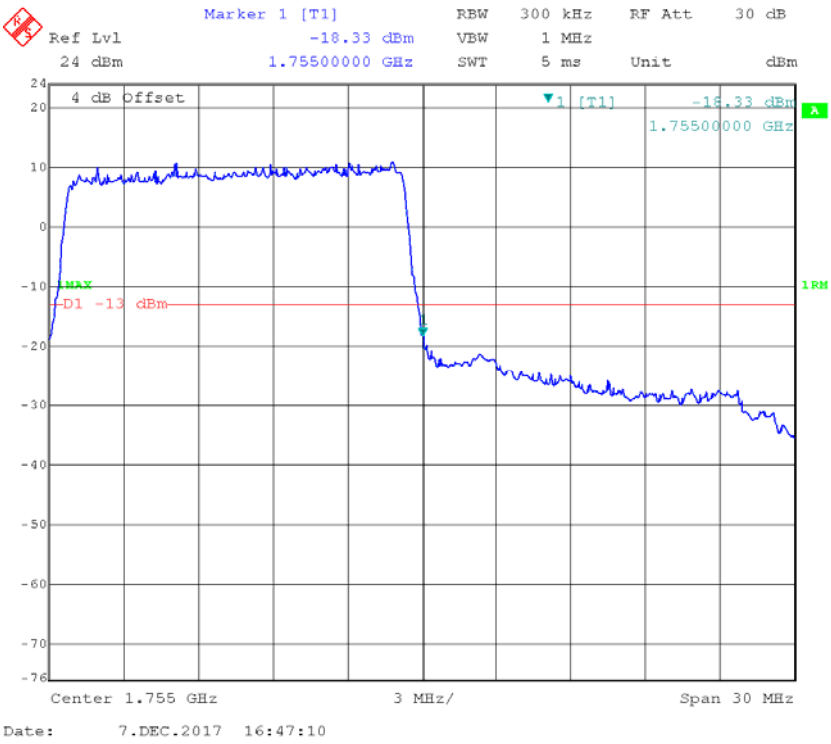
QPSK_10MHz_ 50 RB_ Right



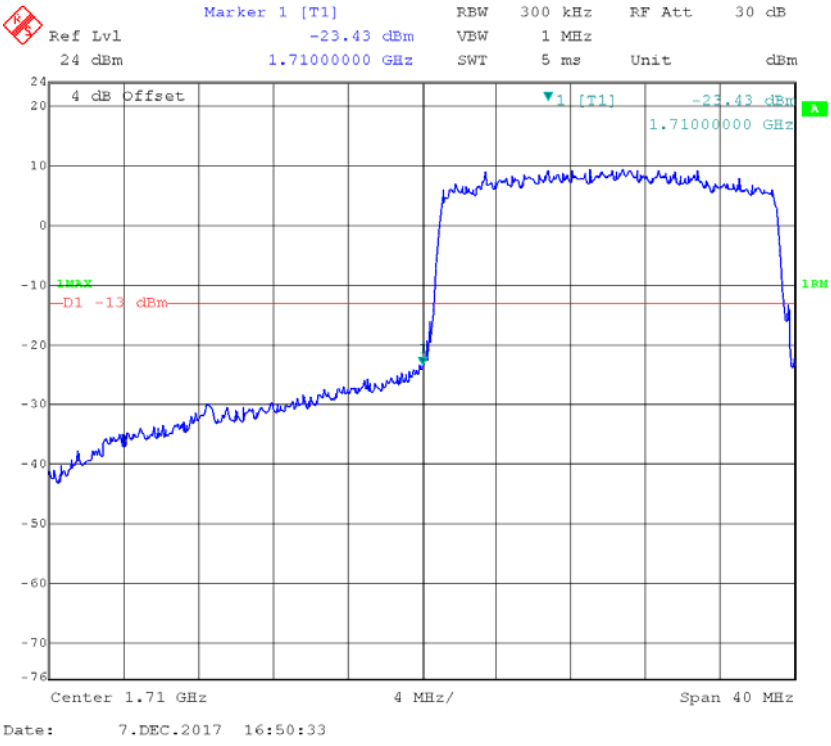
QPSK_15MHz_ 75 RB_ Left



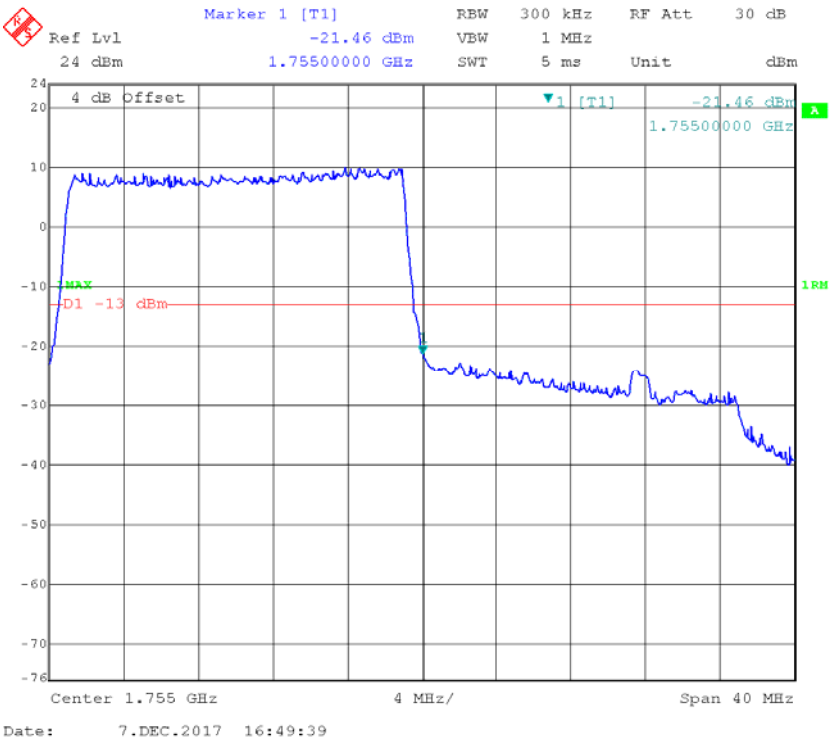
QPSK_15MHz_ 75 RB_ Right



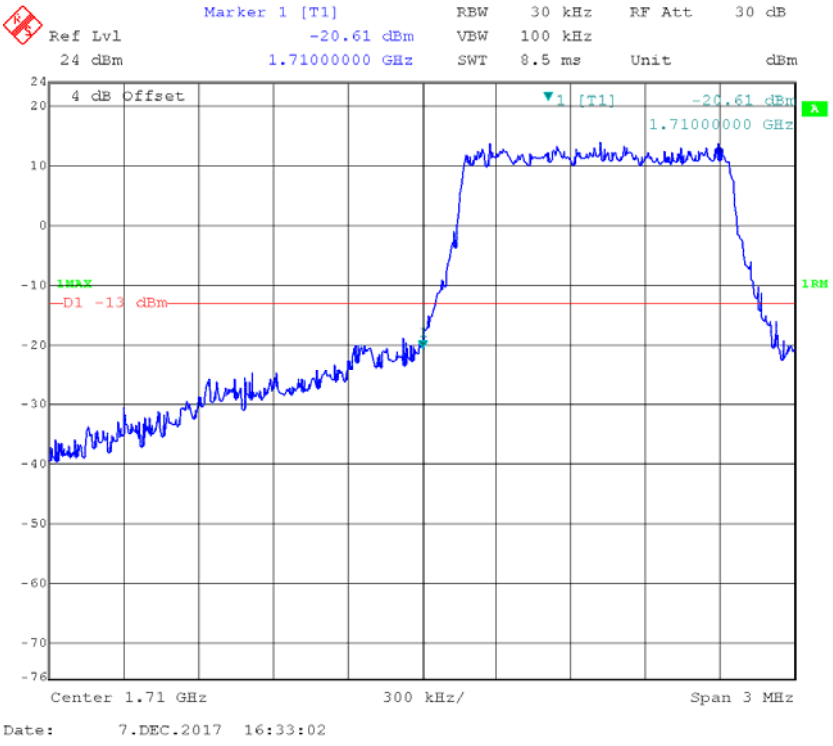
QPSK_20MHz_ FULL RB_ Left



QPSK_20MHz_ FULL RB_ Right

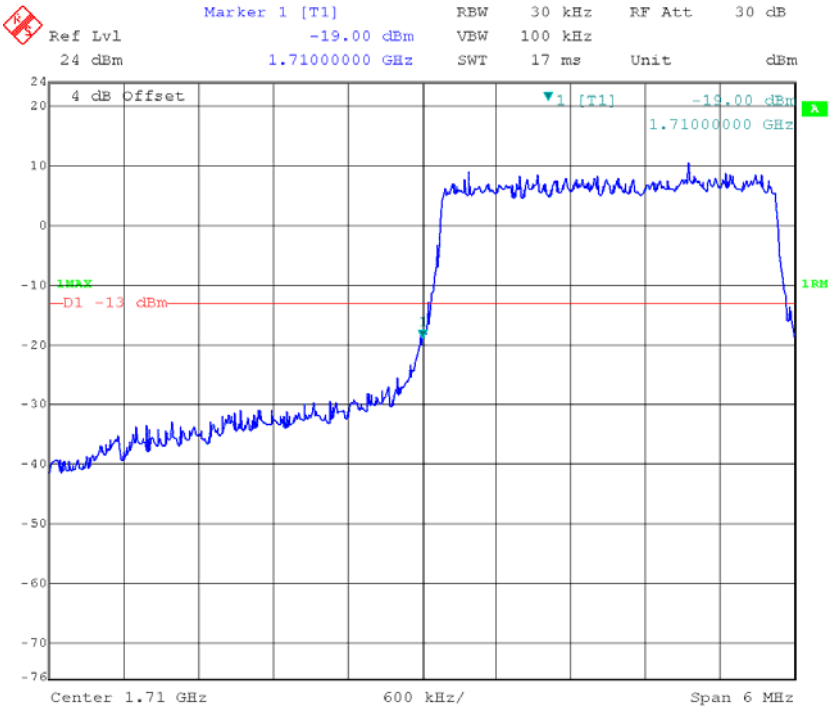


16QAM_1.4MHz_ 6 RB_ Left

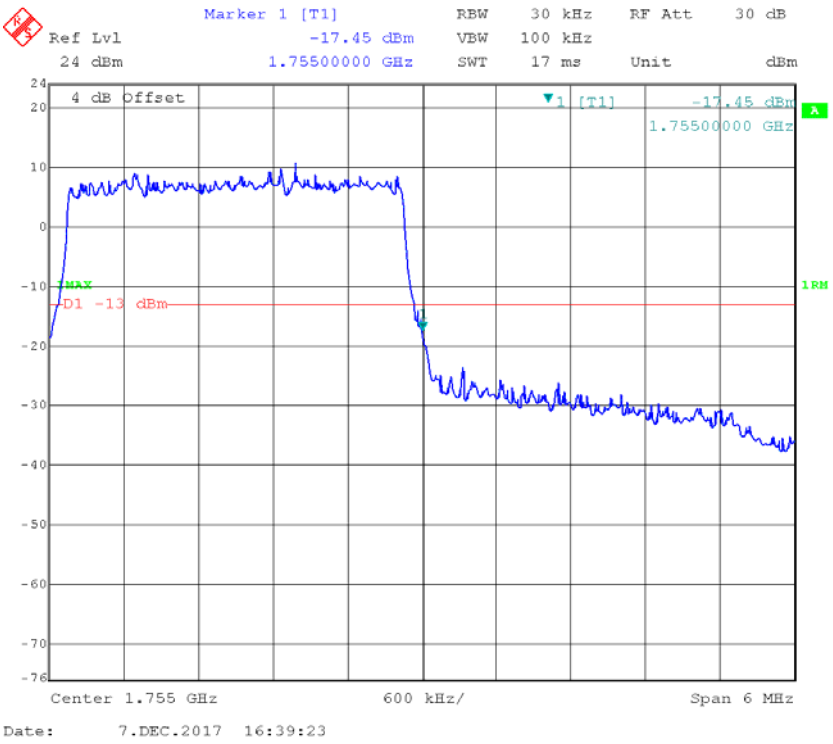


16QAM_1.4MHz_ 6 RB_ Right

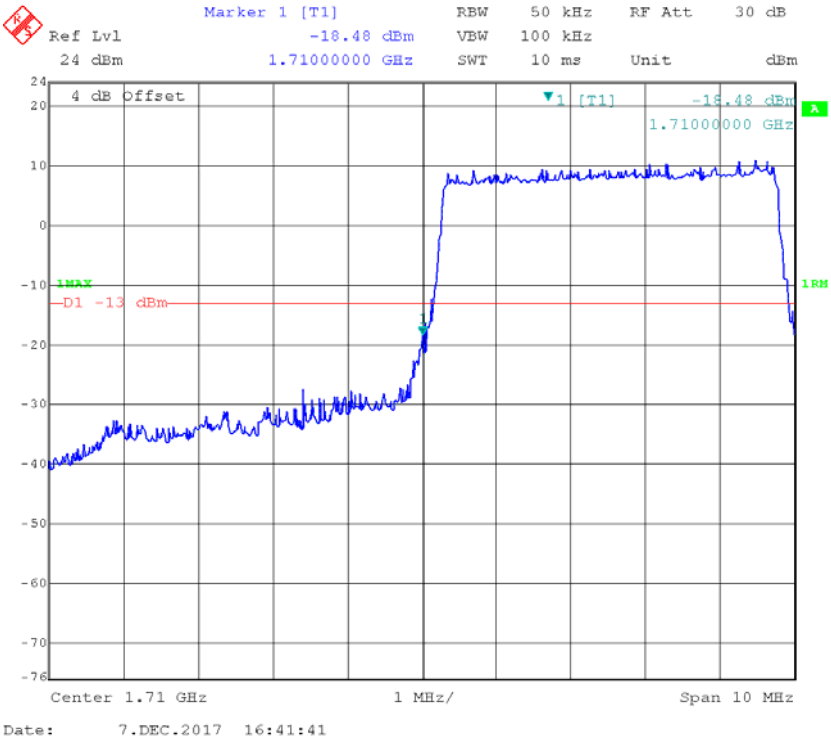
16QAM_3MHz_ 15 RB_ Left



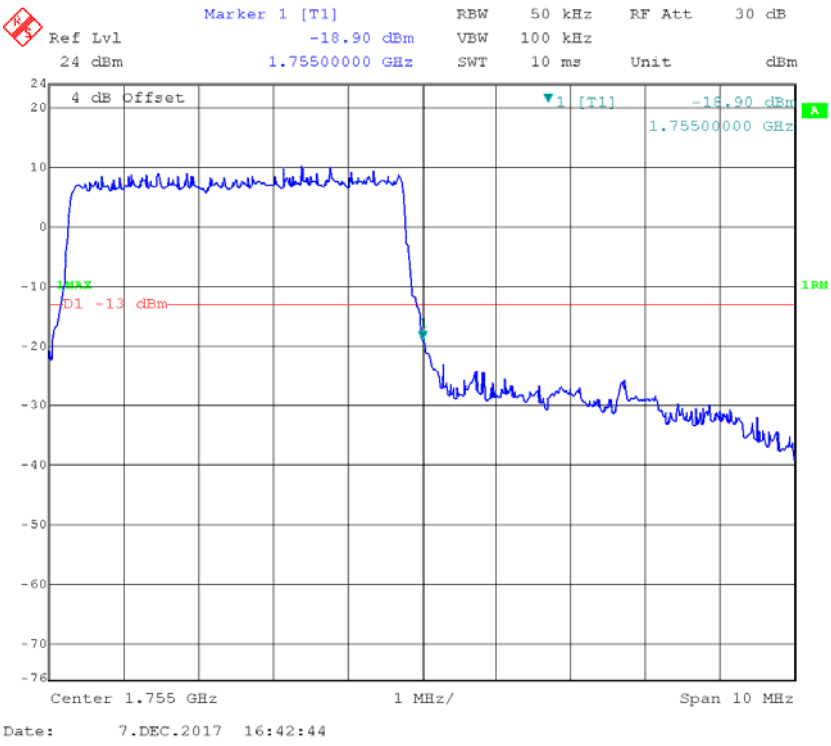
16QAM_3MHz_ 15 RB_ Right



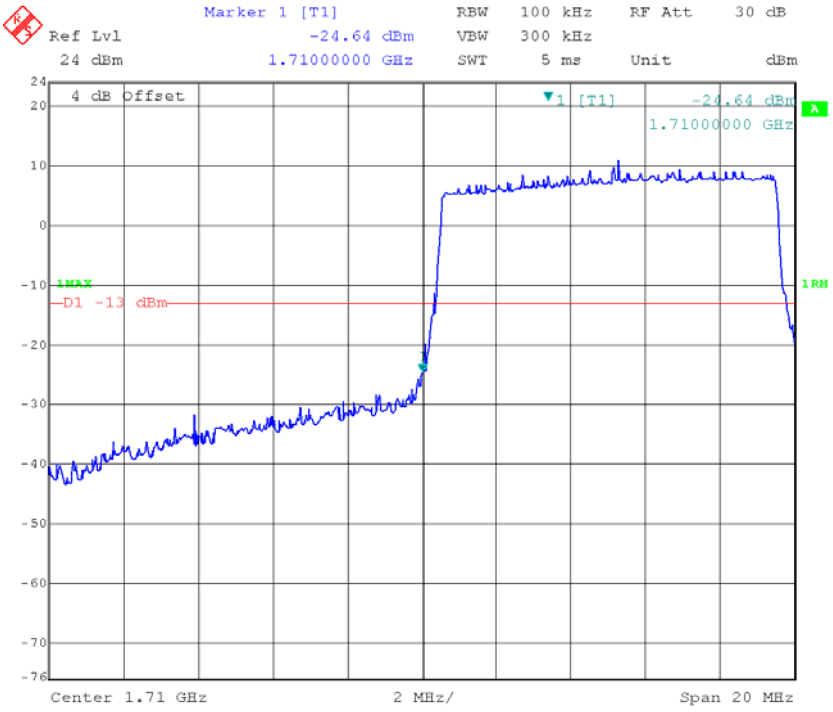
16QAM_5MHz_ 25 RB_ Left



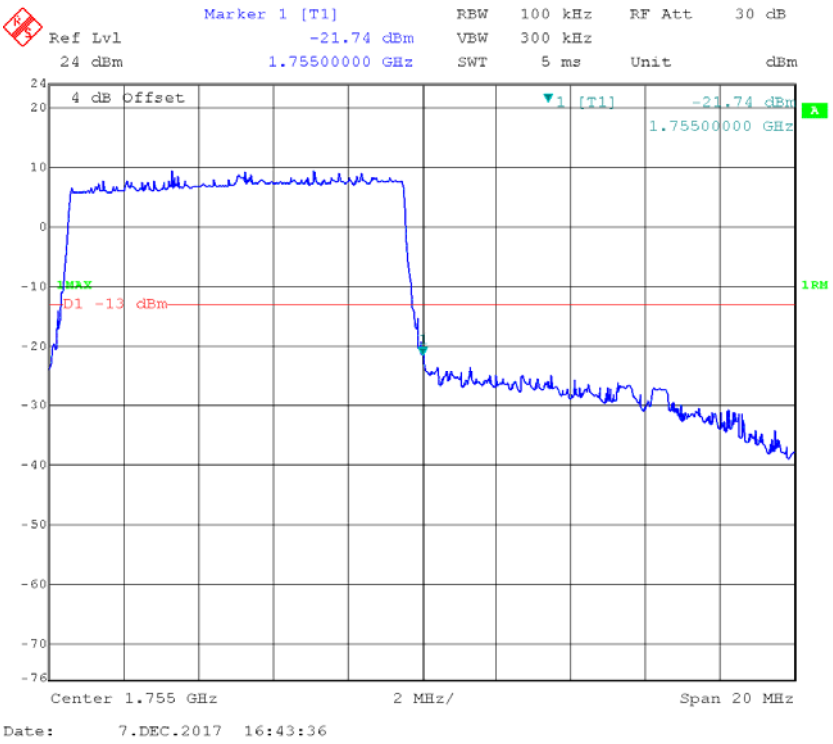
16QAM_5MHz_ 25 RB_ Right



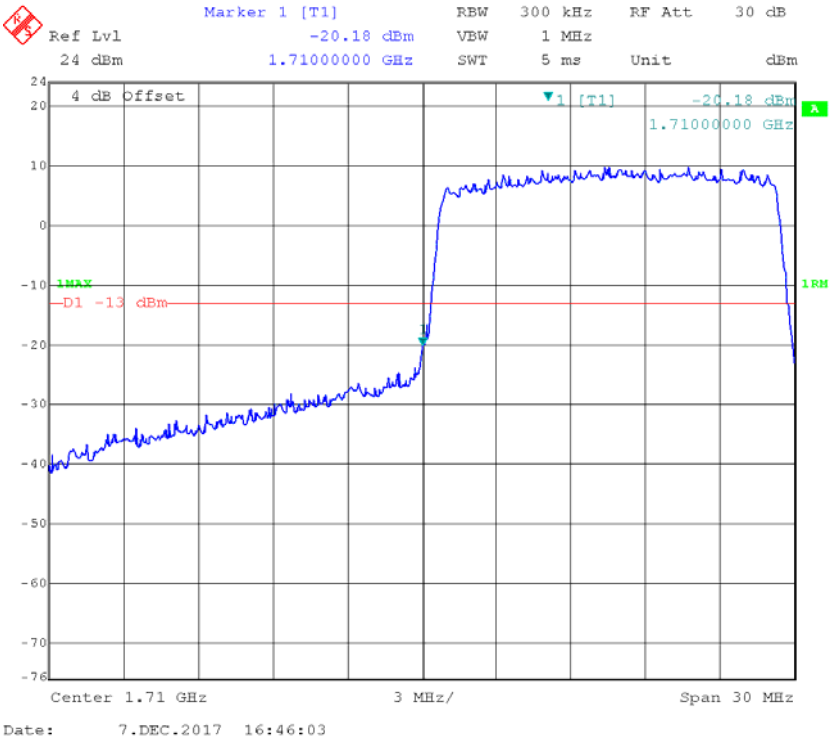
16QAM_10MHz_ 50 RB_ Left



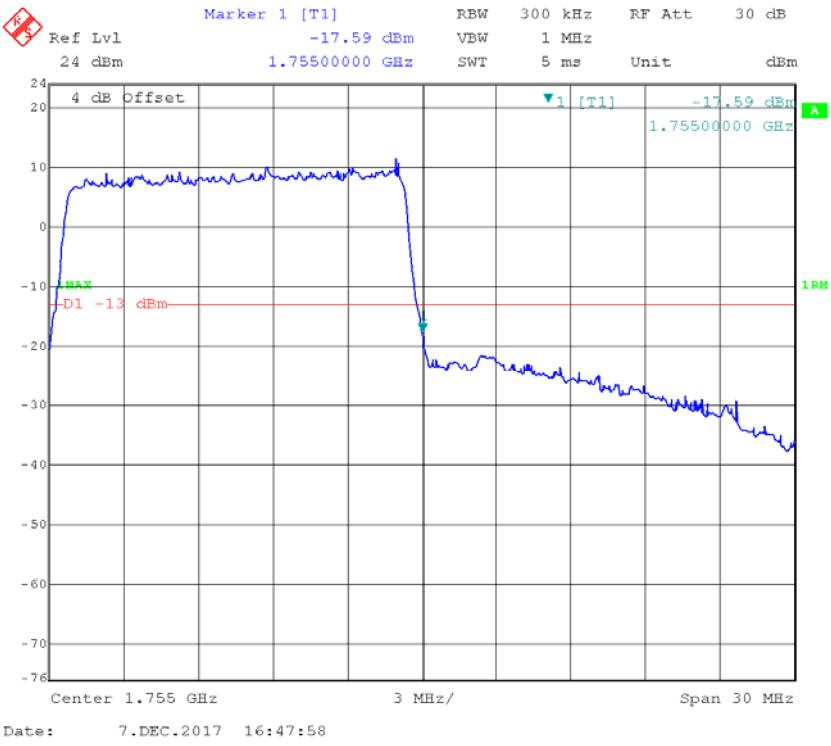
16QAM_10MHz_ 50 RB_ Right



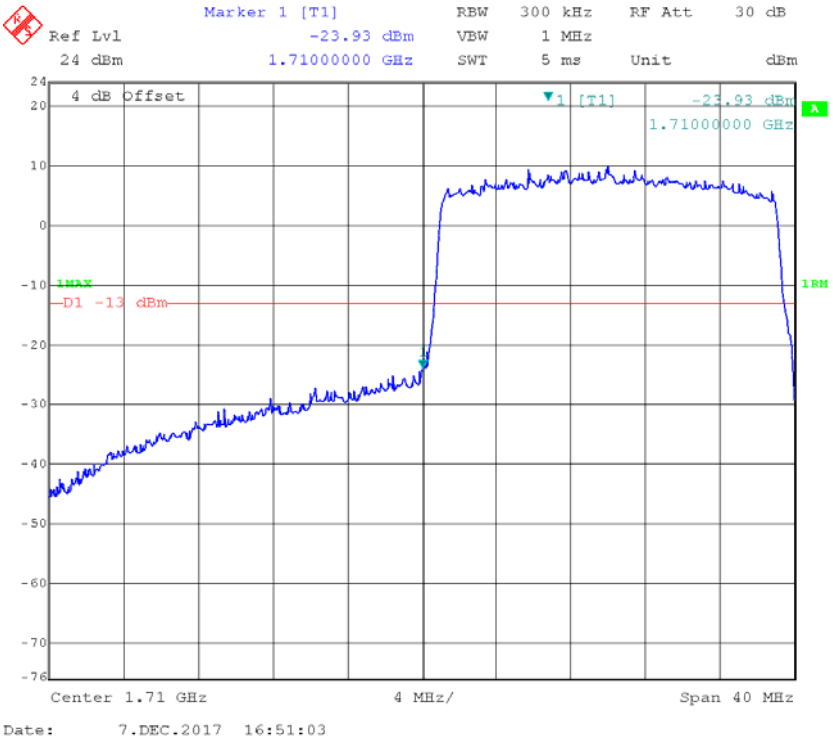
16QAM_15MHz_ 75 RB_ Left



16QAM_15MHz_ 75 RB_ Right



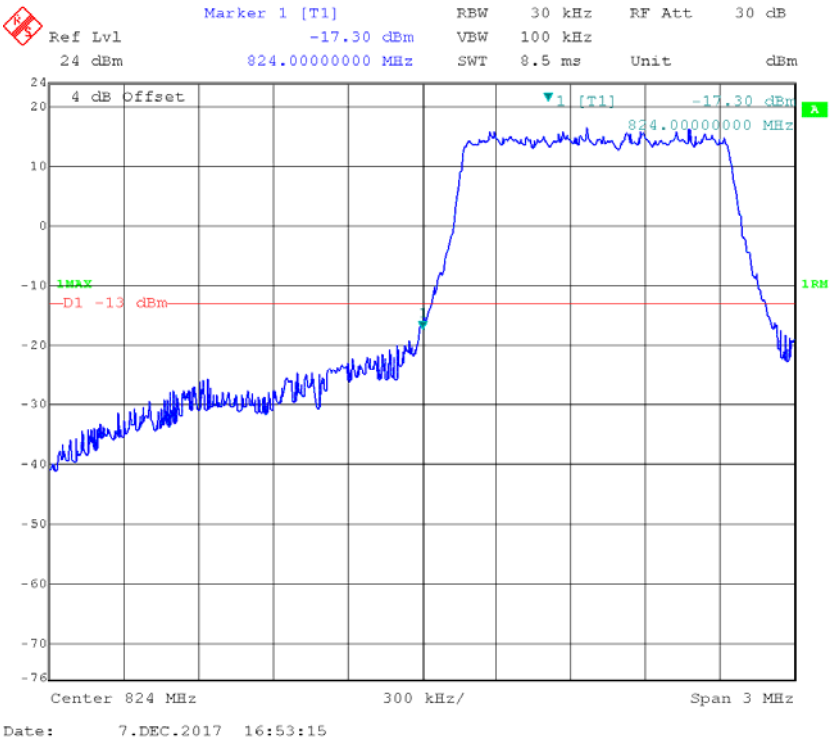
16QAM_20MHz_ FULL RB_ Left



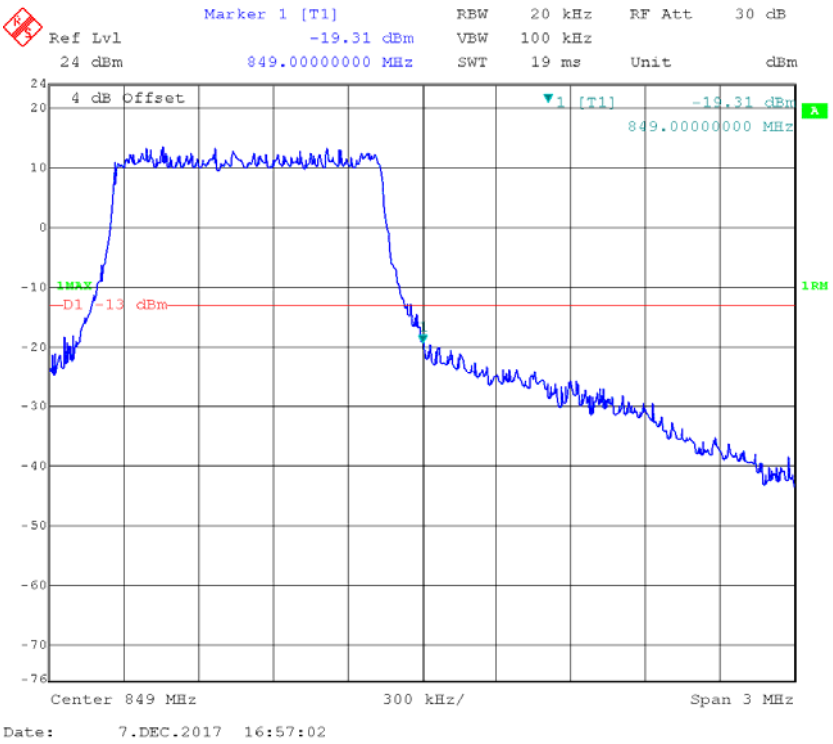
16QAM_20MHz_ FULL RB_ Right

LTE Band V

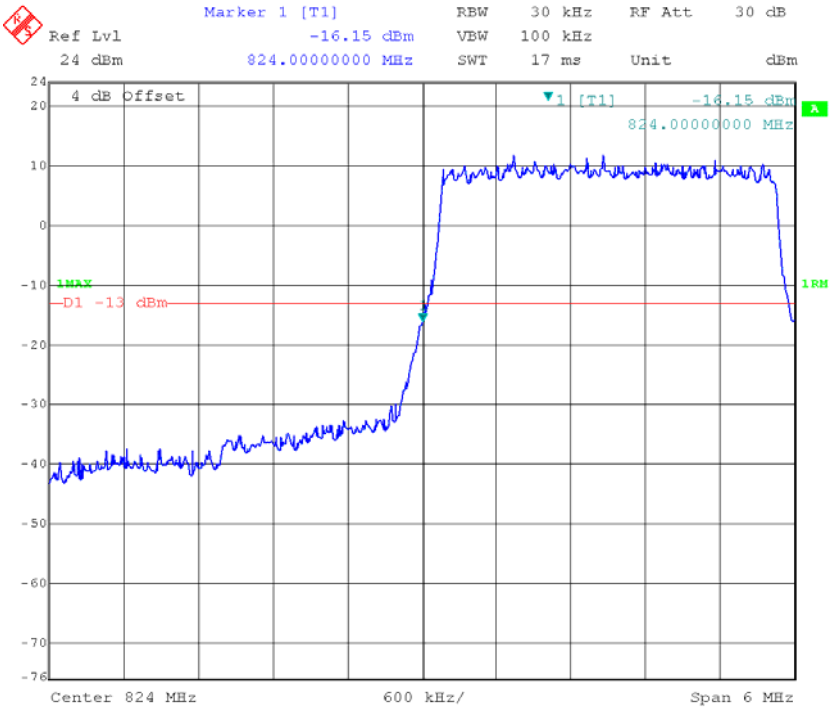
QPSK_1.4MHz_ 6 RB_ Left



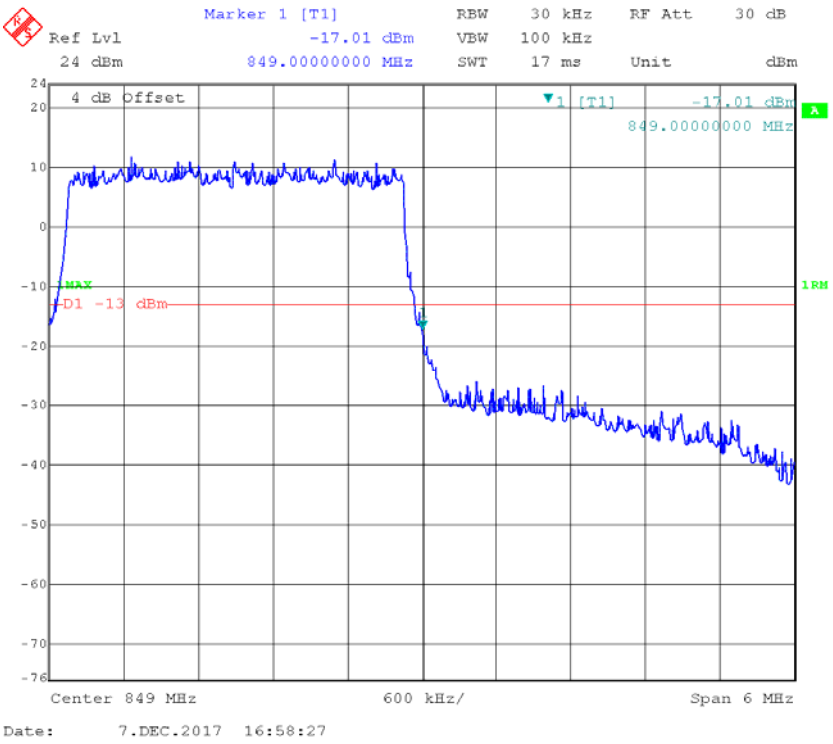
QPSK_1.4MHz_ 6 RB_ Right



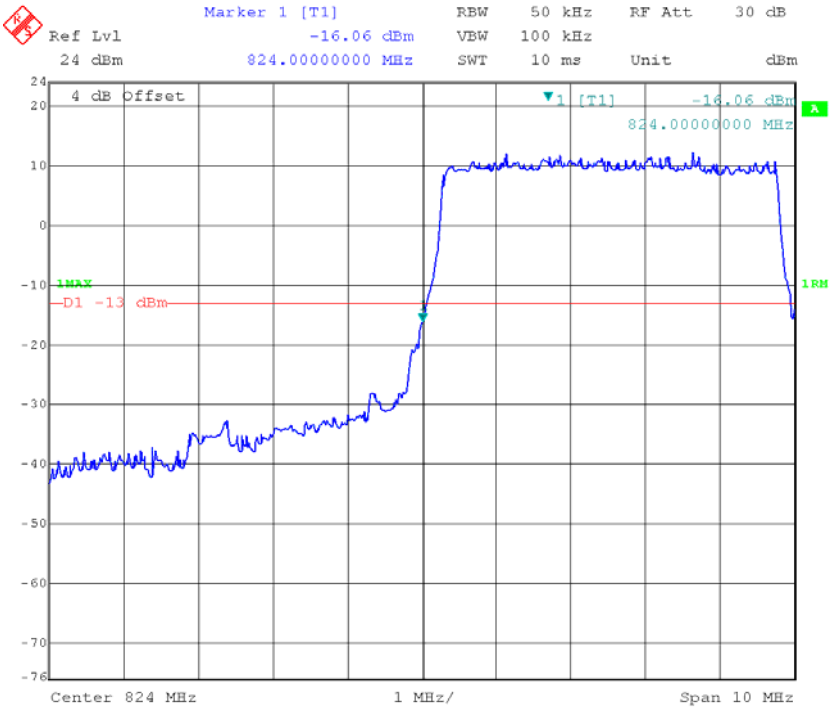
QPSK_3MHz_ 15 RB_ Left



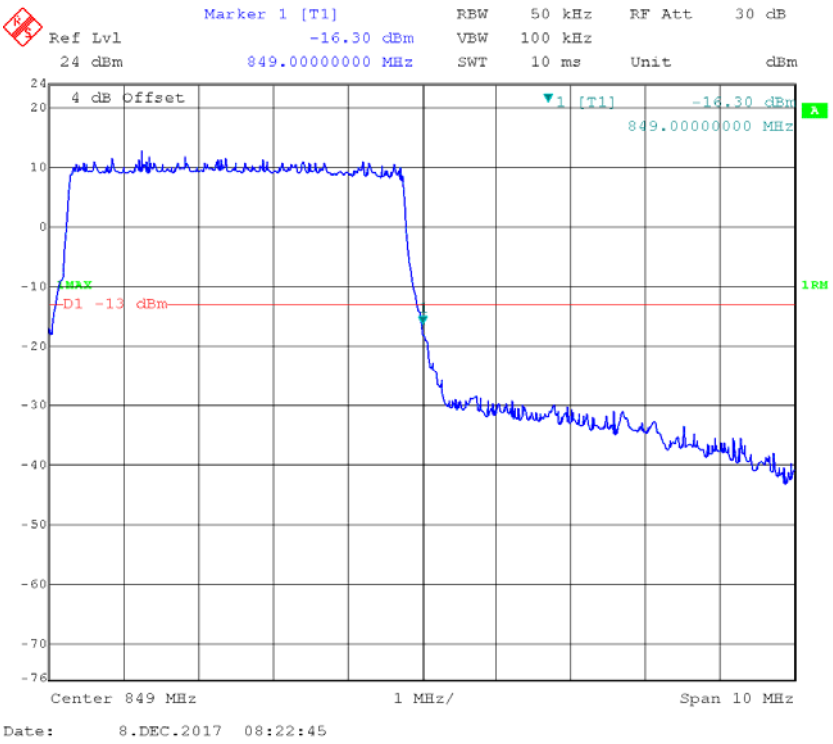
QPSK_3MHz_ 15 RB_ Right



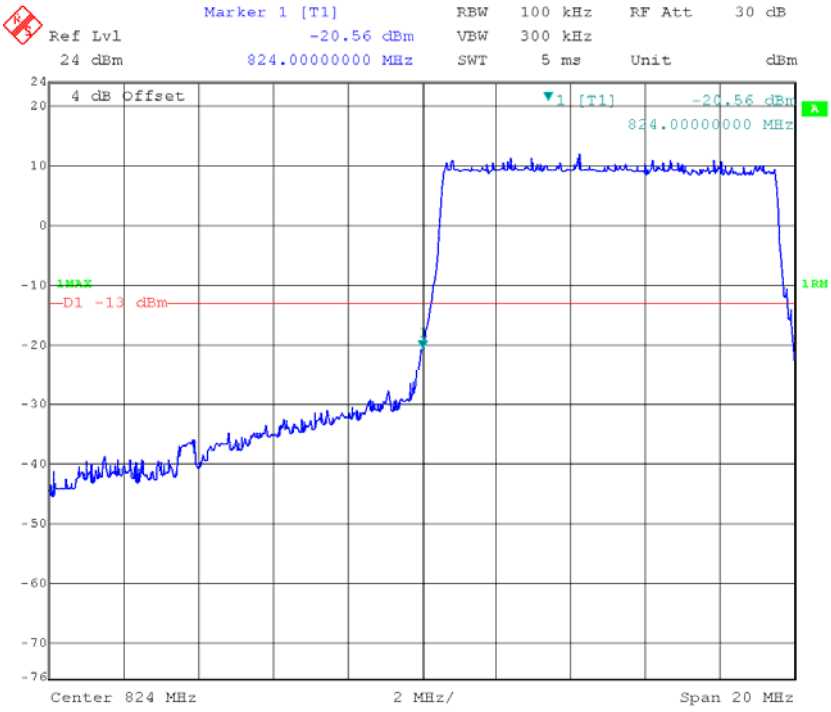
QPSK_5MHz_ 25 RB_ Left



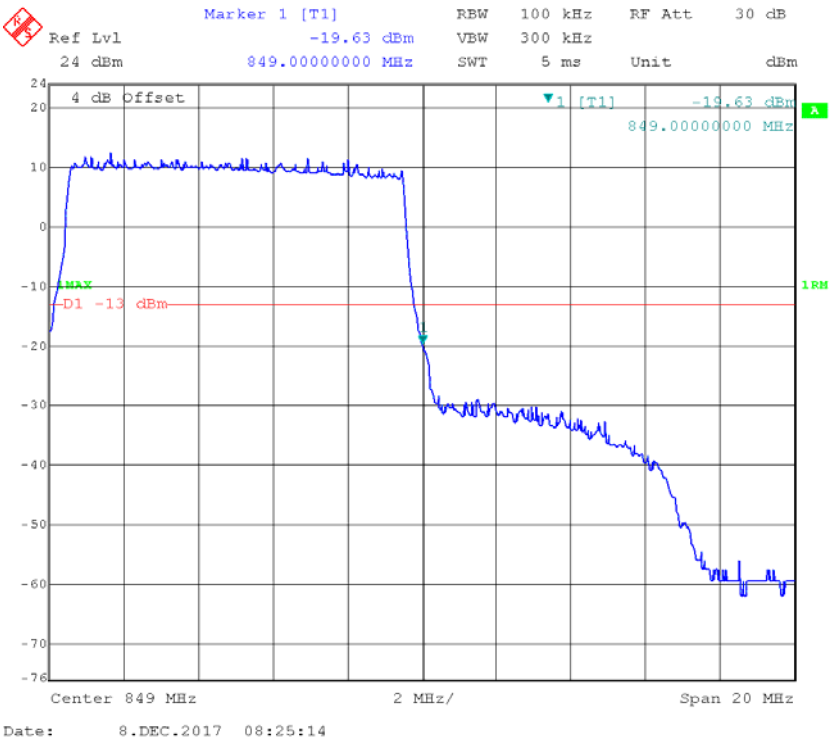
QPSK_5MHz_ 25 RB_ Right



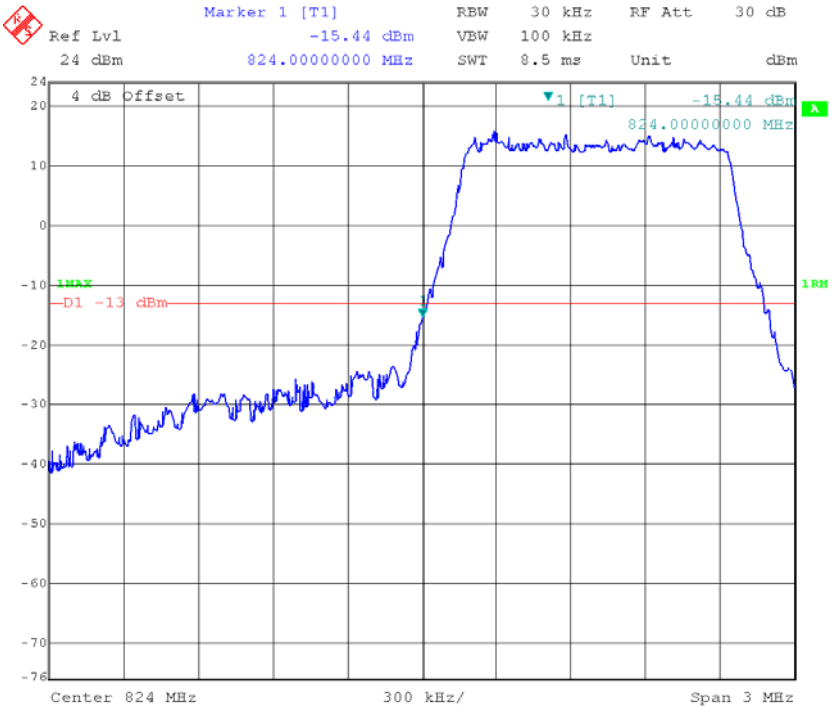
QPSK_10MHz_ 50 RB_ Left



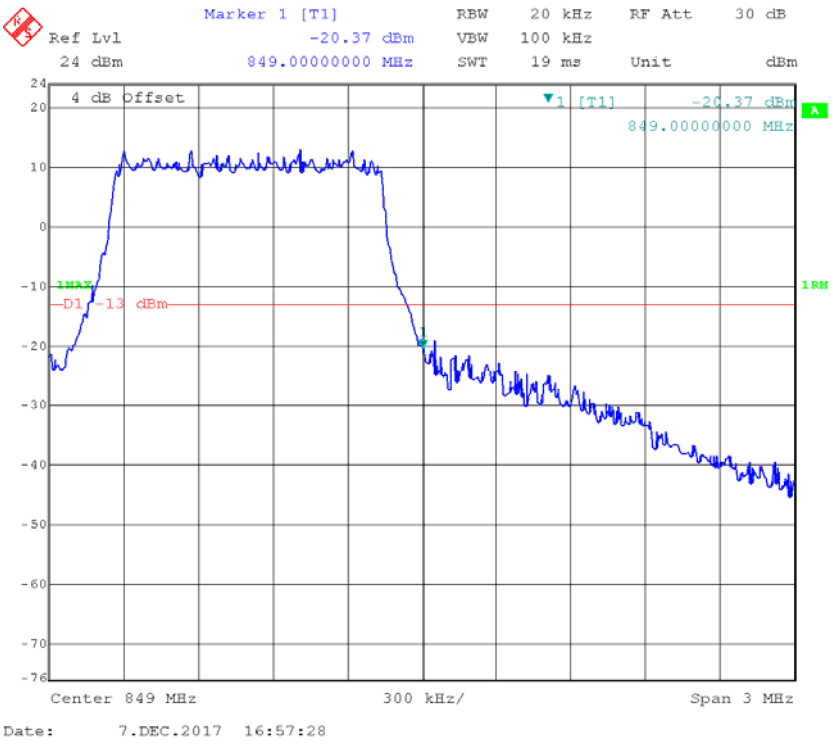
QPSK_10MHz_ 50 RB_ Right



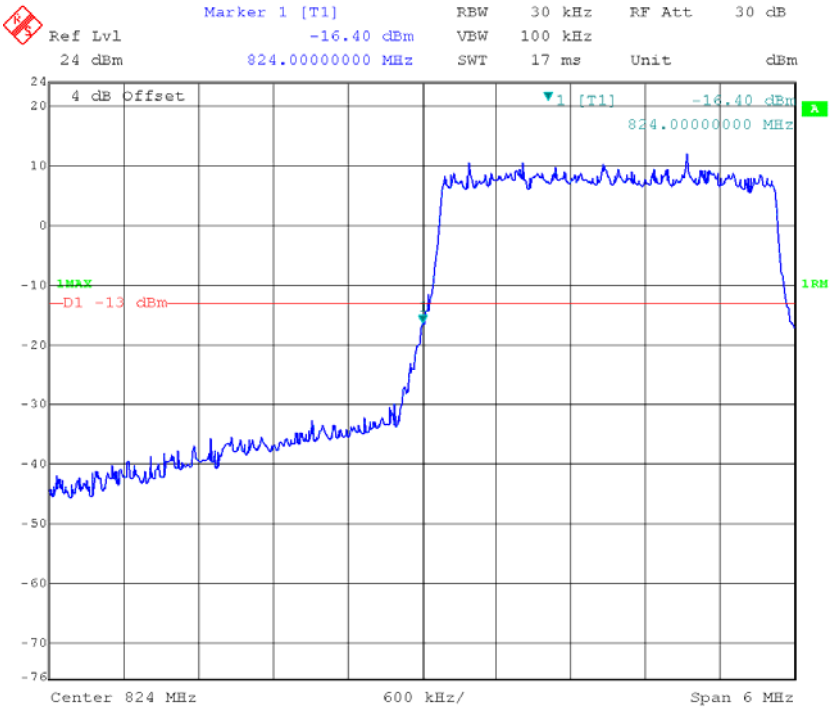
16QAM_1.4MHz_ 6 RB_ Left



16QAM_1.4MHz_ 6 RB_ Right

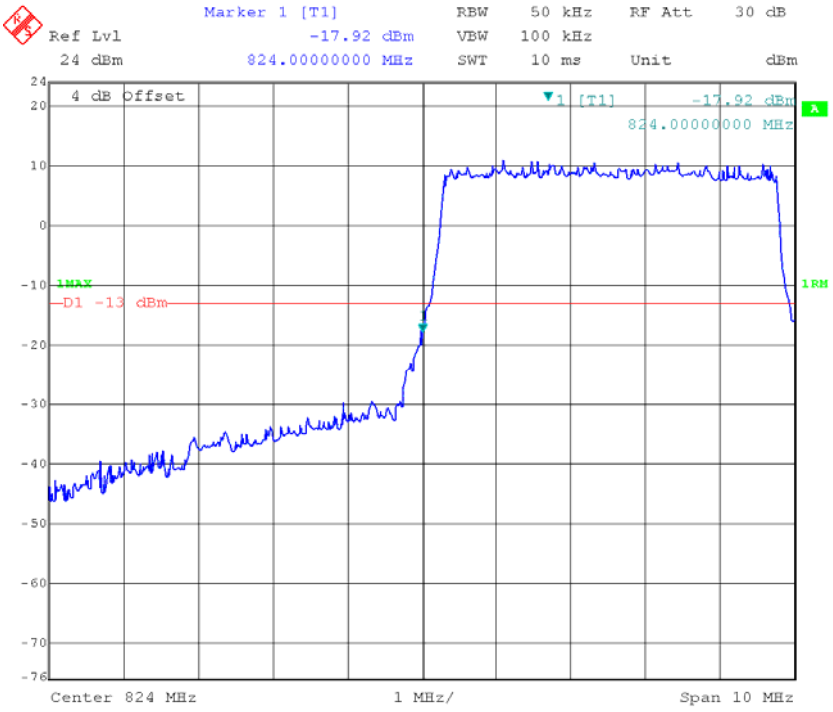


16QAM_3MHz_ 15 RB_ Left

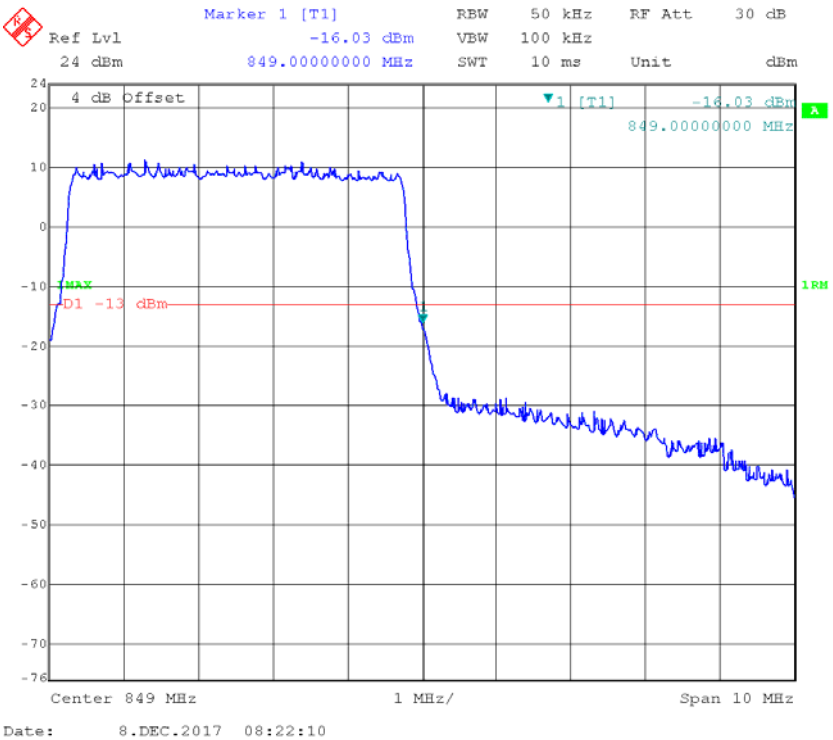


16QAM_3MHz_ 15 RB_ Right

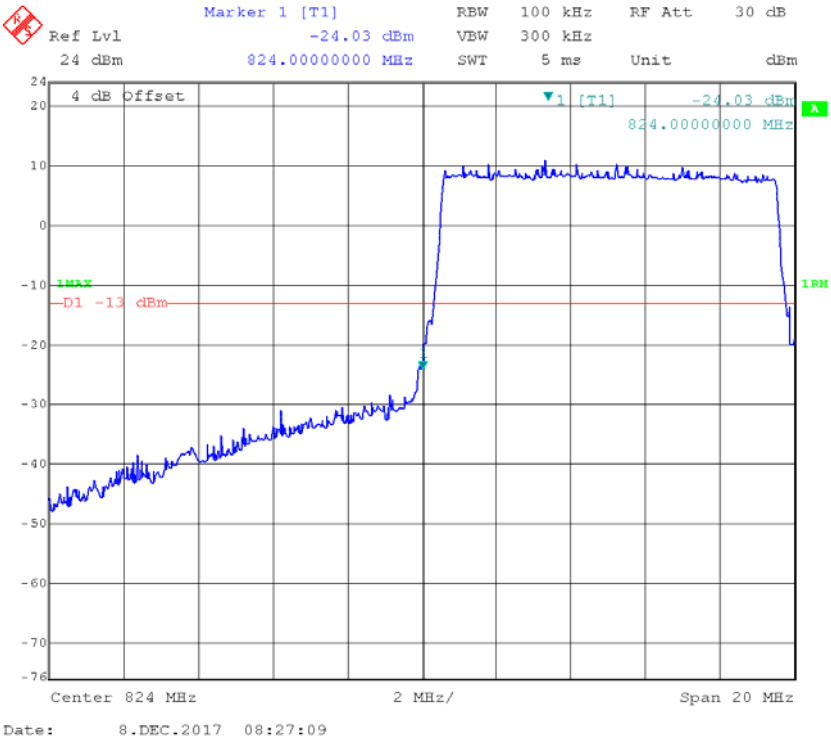
16QAM_5MHz_ 25 RB_ Left



16QAM_5MHz_ 25 RB_ Right



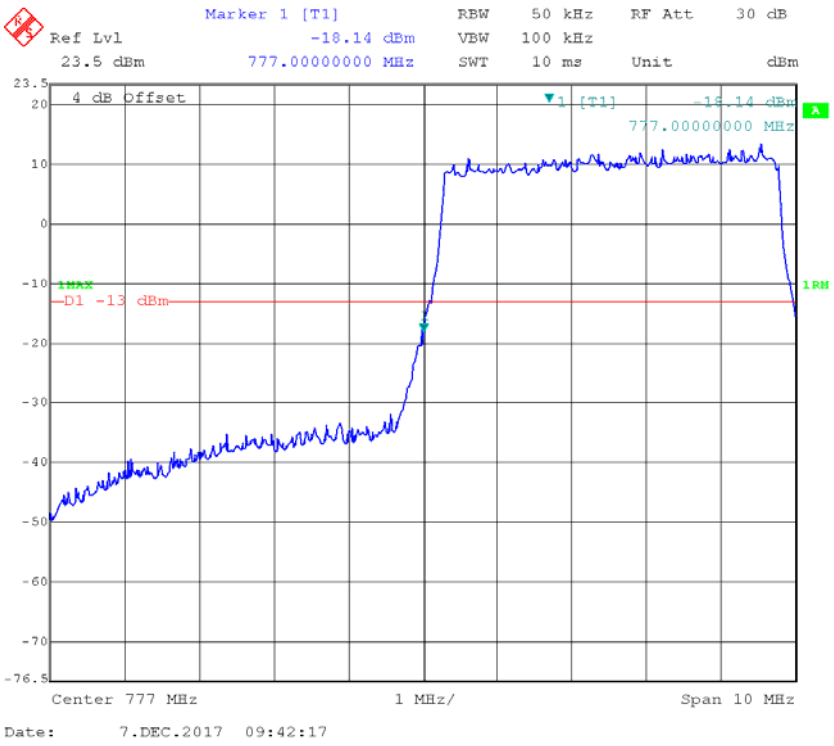
16QAM_10MHz_ 50 RB_ Left



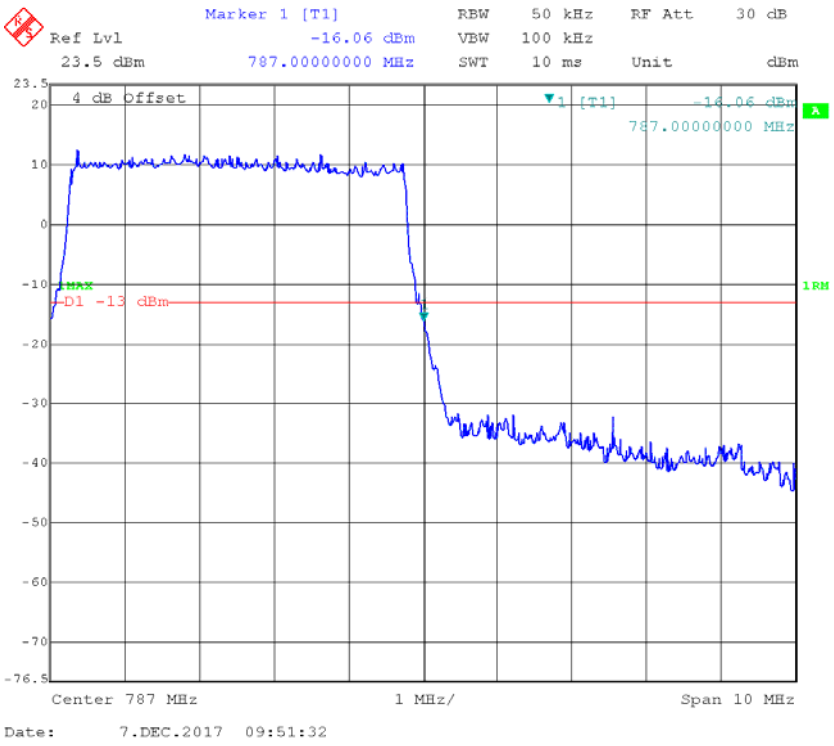
16QAM_10MHz_ 50 RB_ Right

LTE Band XIII

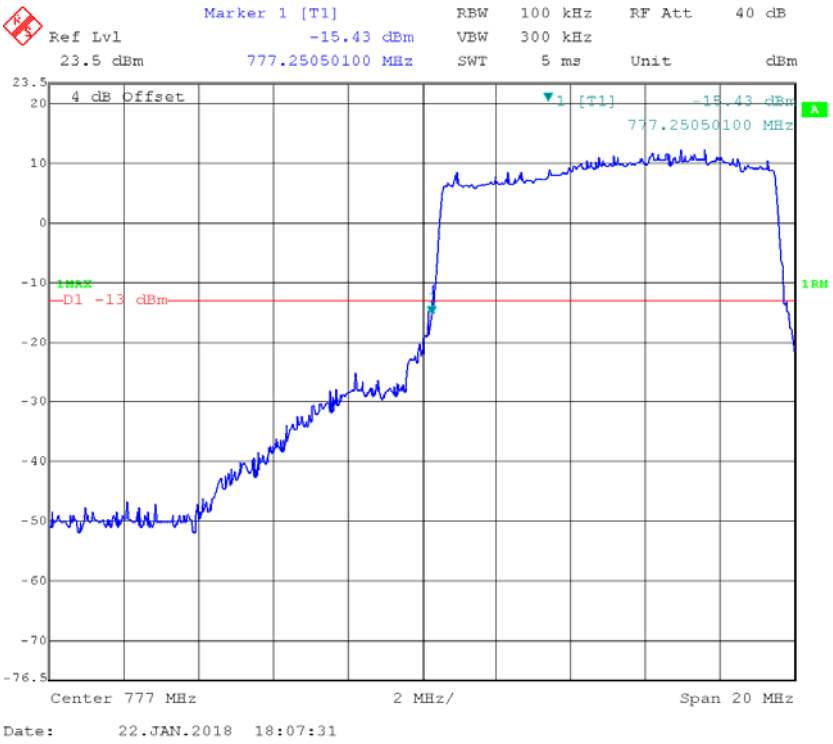
QPSK_5MHz_ 25 RB_ Left



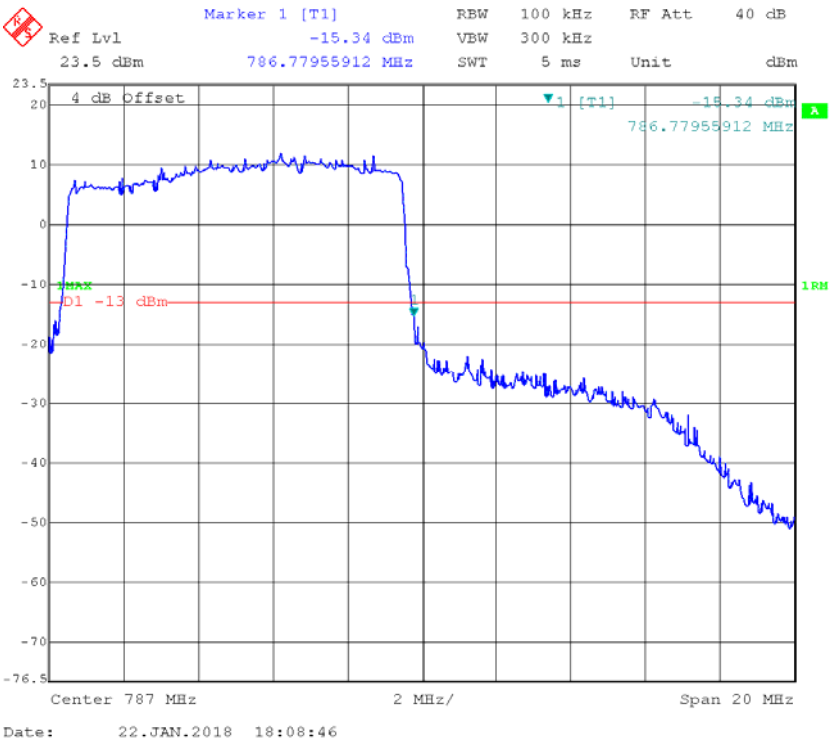
QPSK_5MHz_ 25 RB_ Right



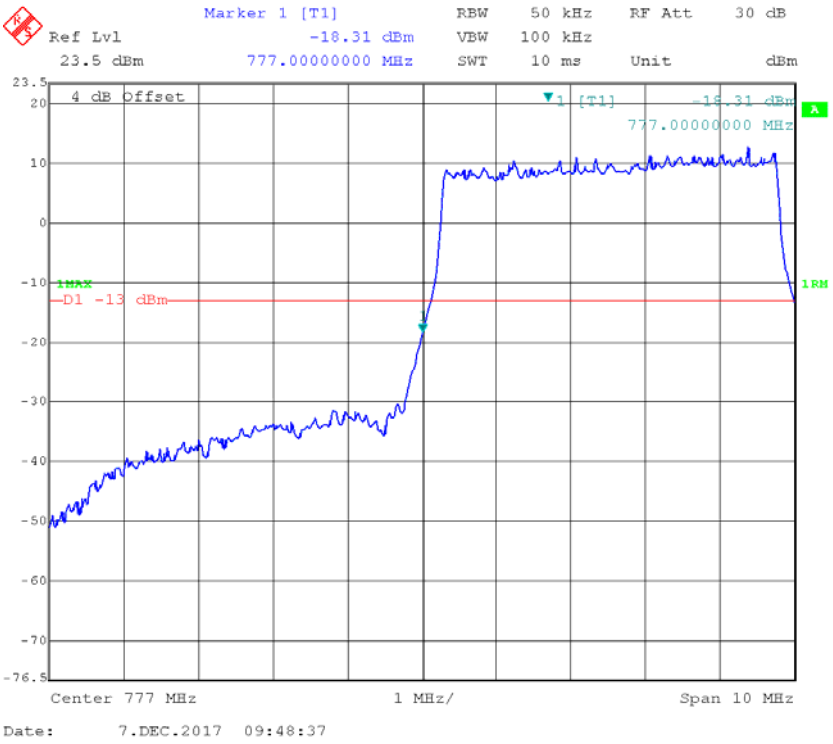
QPSK_10MHz_ 50 RB_ Left



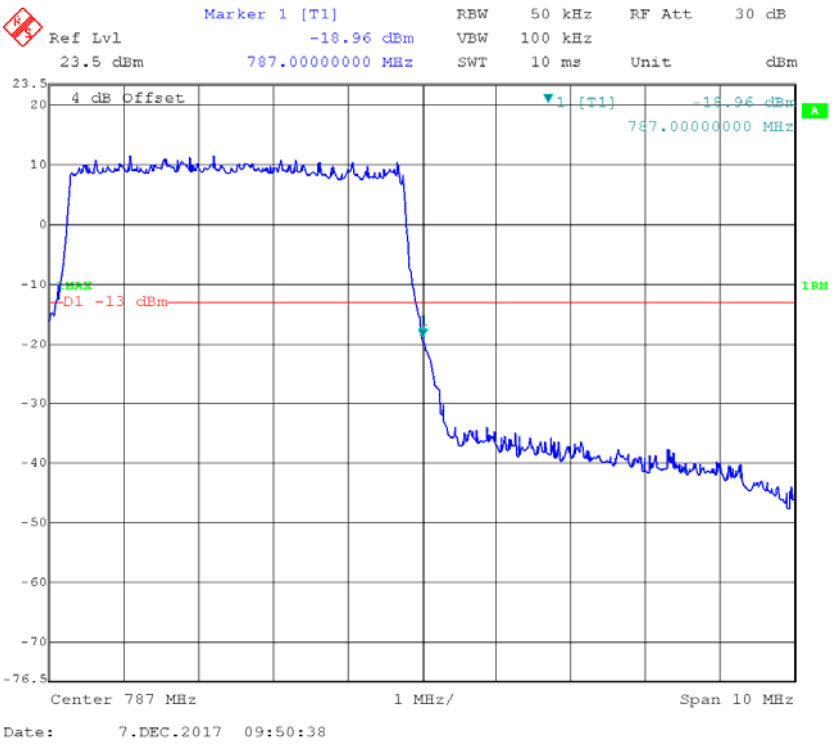
QPSK_10MHz_ 50 RB_ Right



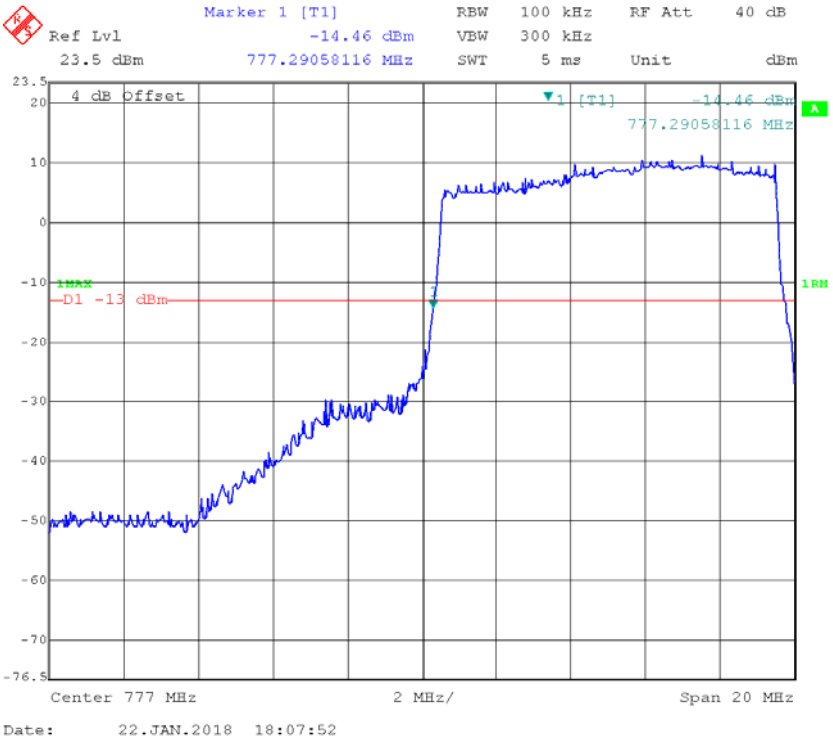
16QAM_5MHz_ 25 RB_ Left



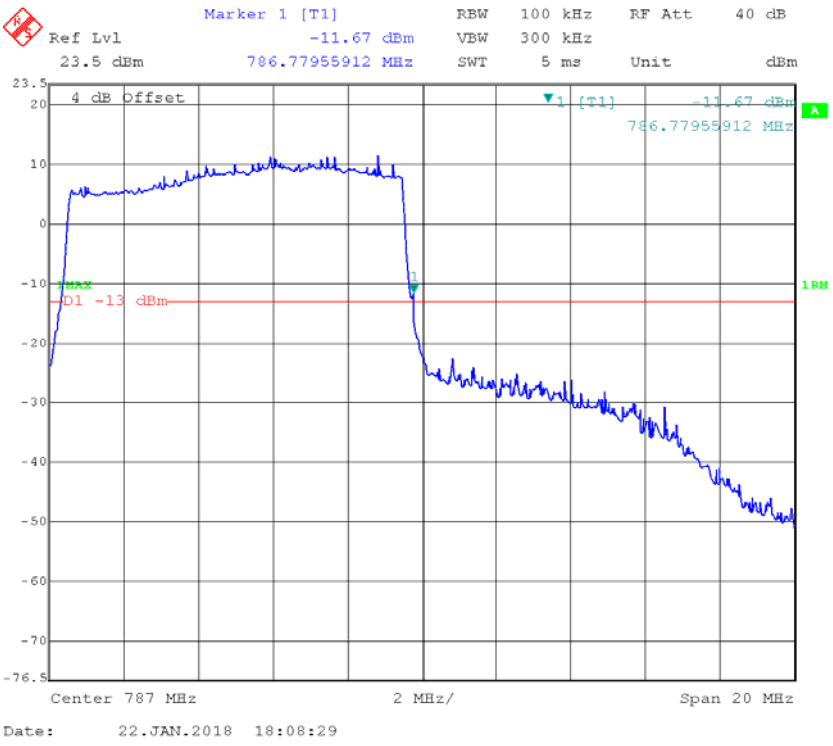
16QAM _5MHz_ 25 RB_ Right



16QAM _10MHz_ 50 RB

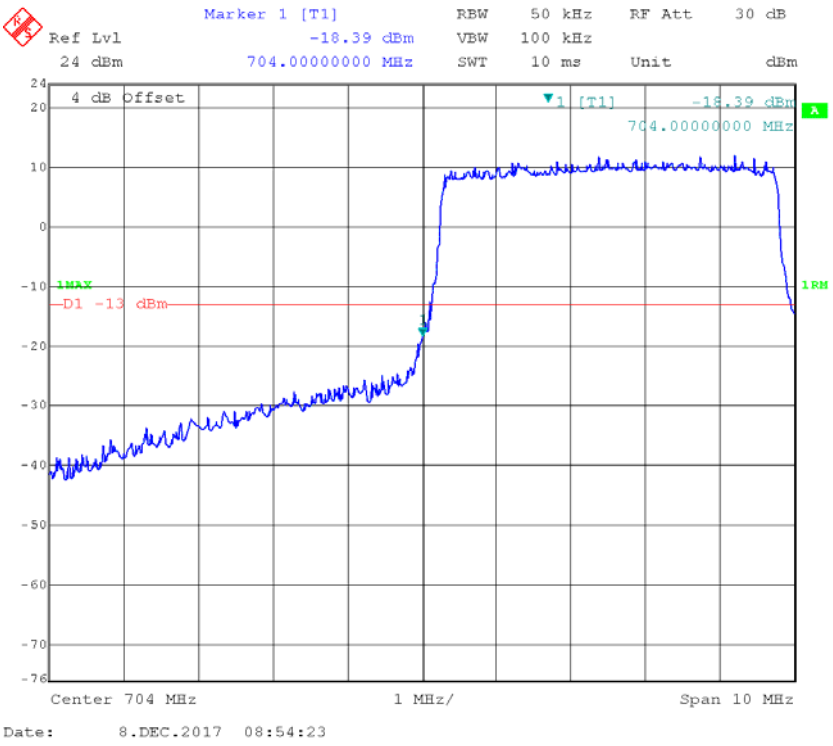


16QAM_10MHz_ 50 RB_ Left

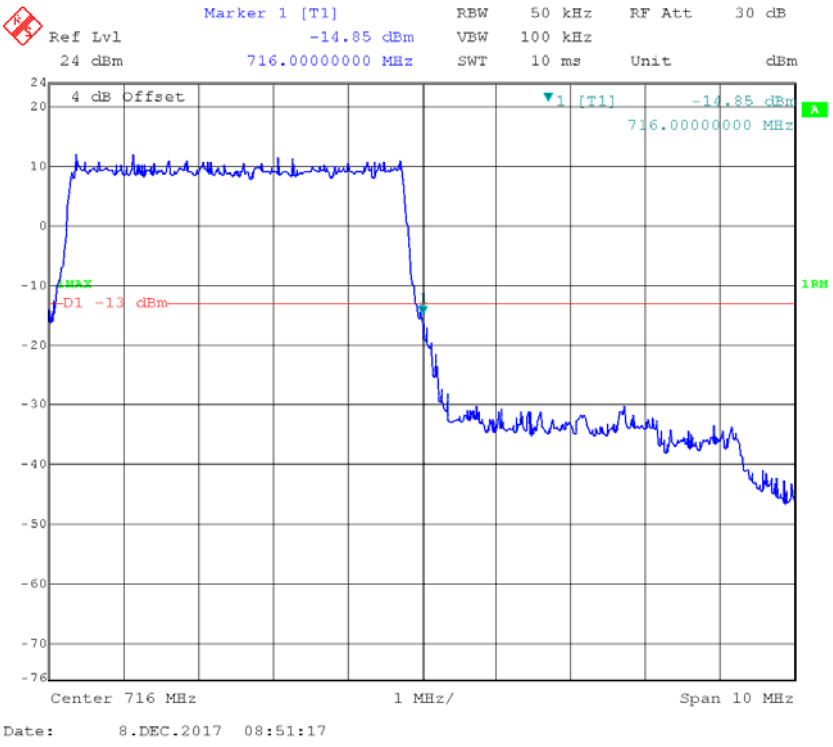


LTE Band XVII:

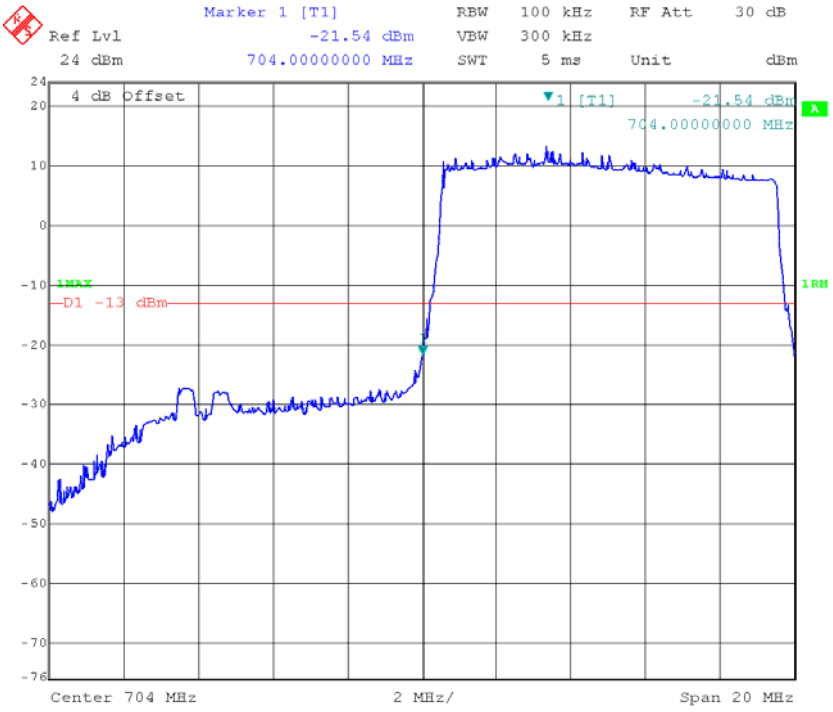
QPSK_5MHz_ 25 RB_ Left



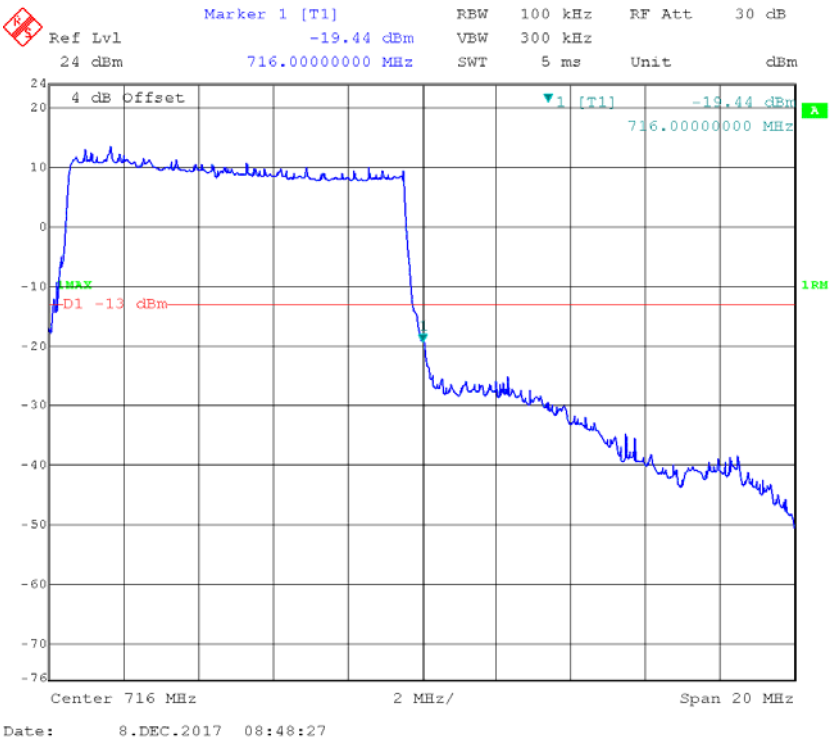
QPSK_5MHz_ 25 RB_ Right



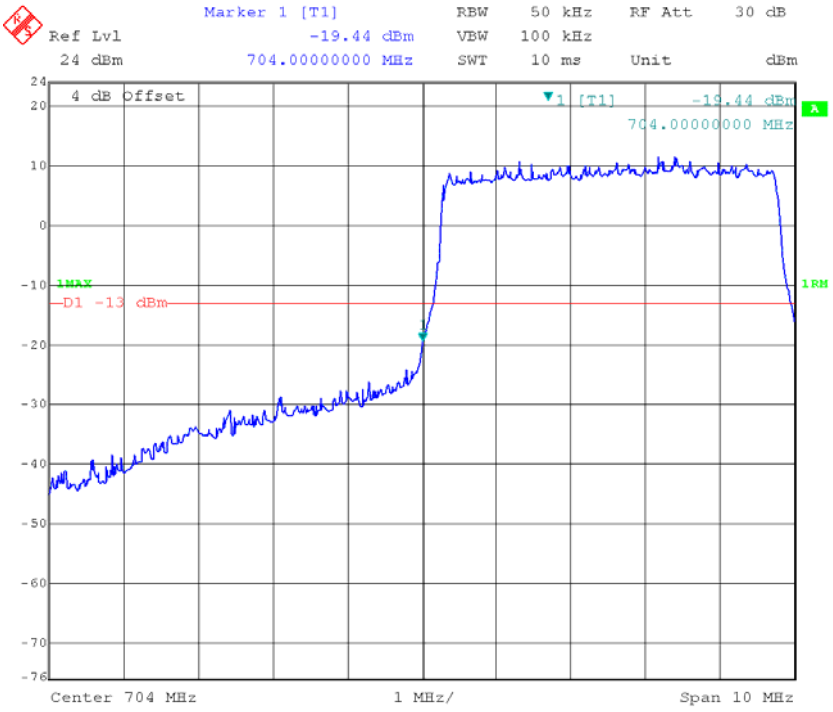
QPSK_10MHz_ 50 RB_ Left



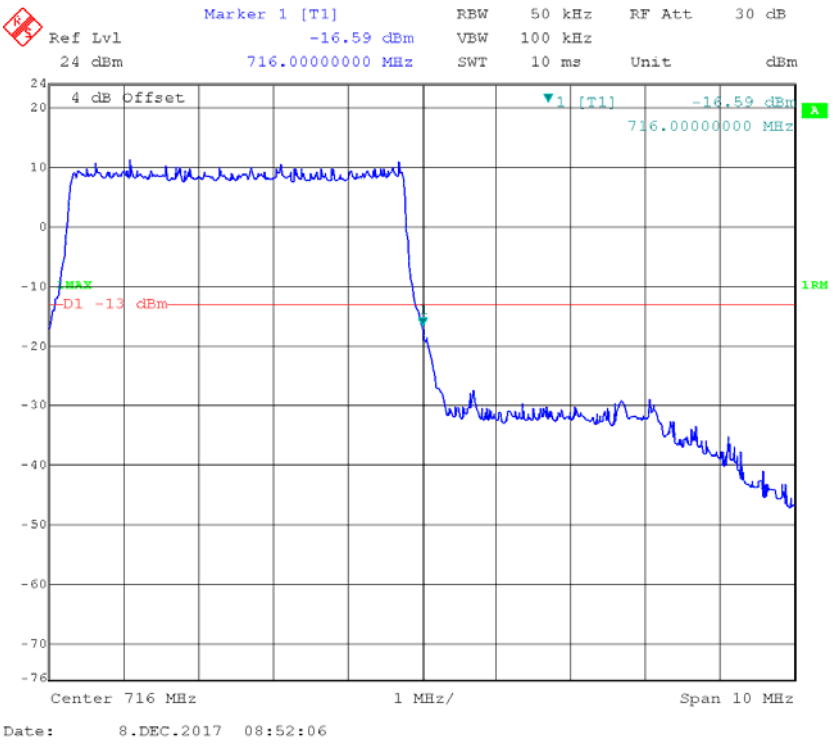
QPSK_10MHz_ 50 RB_ Right



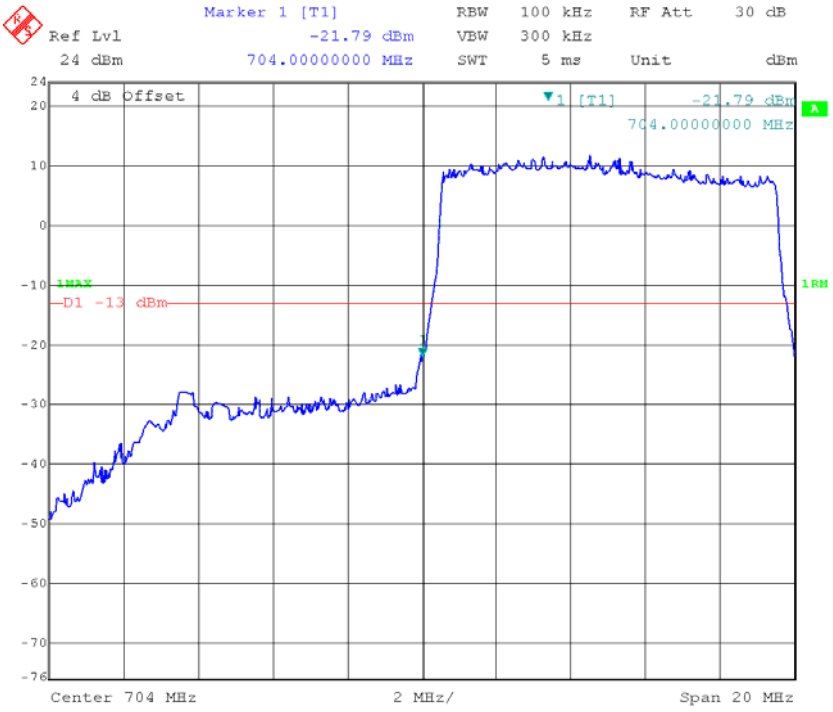
16QAM_5MHz_ 25 RB_ Left



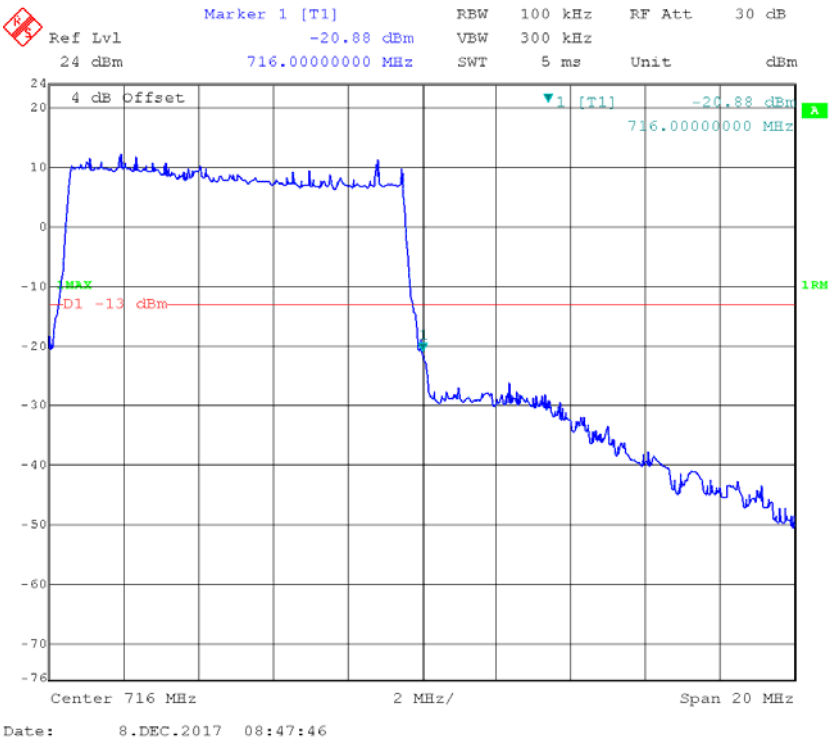
16QAM_5MHz_ 25 RB_ Right



16QAM_10MHz_ 50 RB_ Left



16QAM_10MHz_ 50 RB_ Right



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

Applicable Standard

FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235，§27.54 and RSS-130 §4.3 & RSS-132 §5.3 & RSS-133 §6.3 & RSS-139 §6.4

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

The transmitter frequency stability limit shall be determined as follows:

(a) The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded;

(b) Using a resolution bandwidth of 1% of the occupied bandwidth, a reference point at the unwanted emission level which complies with the attenuation of 43 + 10 log10 p (watts) on the emission mask of the lowest and highest channel shall be selected, and the frequency at these points shall be recorded as fL and fH respectively.

The applicant shall ensure frequency stability by showing that fL minus the frequency offset and fH plus the frequency offset shall be within the frequency range in which the equipment is designed to operate.

According to RSS-132 §5.3

The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations and ±1.5 ppm for base stations.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the occupied bandwidth stays within each of the sub-bands (see Section 5.1) when tested to the temperature and supply voltage variations specified in RSS-Gen.

According to RSS-133 §6.3

The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

In lieu of meeting the above stability values, the test report may show that the frequency stability is sufficient to ensure that the emission bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

According to RSS-139 §6.4

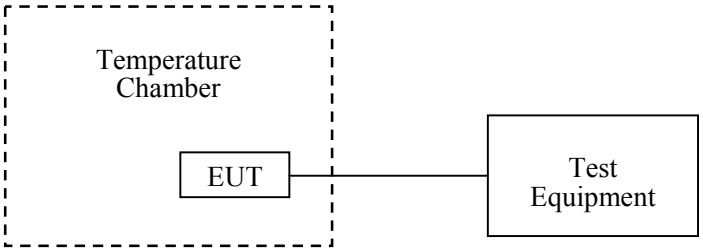
The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-08-28	2018-08-28
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-21	2018-07-21
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
UNI-T	Multimeter	UT39A	M130199938	2017-04-02	2018-04-02
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/
Unknown	RF Attenuator	10dB	10dB-1	Each Time	/
Pro instrument	DC Power Supply	pps3300	N/A	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:	24.8 °C
Relative Humidity:	42 %
ATM Pressure:	101.7 kPa

The testing was performed by Kami Zhou on 2017-12-09.

Cellular Band (Part 22H)

BC0 RC1,Middle Channel, fo = 836.52 MHz			
Power Supplied	**Temperature**	**Frequency Error**	**Frequency Error**
Vdc	**℃**	**Hz**	**ppm**
11.4	-30	-5.6	-0.007
	-20	-6.4	-0.008
	-10	-2.5	-0.003
	0	6.4	0.008
	10	-6.1	-0.007
	20	-7.2	-0.009
	30	-8.9	-0.011
	40	-4.3	-0.005
	50	-5.4	-0.006
8.25	25	-3.8	-0.005
13.05	25	-2.8	-0.003

BC0Rel.A, Middle Channel, fo = 836.52 MHz			
Power Supplied	**Temperature**	**Frequency Error**	**Frequency Error**
Vdc	**℃**	**Hz**	**ppm**
11.4	-30	0.3	0.000
	-20	-9.7	-0.012
	-10	-3.3	-0.004
	0	4	0.005
	10	-3.4	-0.004
	20	-12	-0.014
	30	-7.5	-0.009
	40	-4.6	-0.005
	50	-8.9	-0.011
8.25	25	-2.8	-0.003
13.05	25	0.9	0.001

PCS Band (Part 24E)

BC1 RC1,Middle Channel, fo = 1880MHz			
Power Supplied	**Temperature**	**Frequency Error**	**Frequency Error**
Vdc	**℃**	**Hz**	**ppm**
11.4	-30	2.4	0.001
	-20	-6.3	-0.003
	-10	-3	-0.002
	0	-6.3	-0.003
	10	-7.6	-0.004
	20	-6.6	-0.004
	30	-15	-0.008
	40	3.2	0.002
	50	-6.8	-0.004
8.25	25	-6.2	-0.003
13.05	25	-7.3	-0.004

BC1 Rel.A, Middle Channel, fo = 1880MHz			
Power Supplied	**Temperature**	**Frequency Error**	**Frequency Error**
Vdc	**℃**	**Hz**	**ppm**
11.4	-30	-2.4	-0.001
	-20	-8	-0.004
	-10	-2.5	-0.001
	0	-6.4	-0.003
	10	-1.6	-0.001
	20	-0.5	0.000
	30	-15	-0.008
	40	3.3	0.002
	50	-7.4	-0.004
8.25	25	-5.3	-0.003
13.05	25	1.3	0.001

WCDMA Band II: R99

Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	-5	-0.003	Pass
-20		-2	-0.001	
-10		-1	-0.001	
0		2	0.001	
10		0	0.000	
20		-1	-0.001	
30		-5	-0.003	
40		-3	-0.002	
50		-4	-0.002	
25	8.25	1	0.001	
25	13.05	2	0.001	

WCDMA Band Ⅴ: R99

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	-2	-0.002	Pass
-20		-4	-0.005	
-10		0	0.000	
0		2	0.002	
10		-1	-0.001	
20		-2	-0.002	
30		2	0.002	
40		-2	-0.002	
50		1	0.001	
25	8.25	0	0.000	
25	13.05	1	0.001	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	0.01	0.0000	Pass
-20		-0.29	-0.0002	Pass
-10		8.20	0.0044	Pass
0		1.16	0.0006	Pass
10		0.78	0.0004	Pass
20		8.50	0.0045	Pass
30		5.21	0.0028	Pass
40		3.93	0.0021	Pass
50		6.89	0.0037	Pass
25	8.25	5.61	0.0030	Pass
25	13.05	1.62	0.0009	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	2.04	0.0011	Pass
-20		0.95	0.0005	Pass
-10		4.18	0.0022	Pass
0		3.25	0.0017	Pass
10		0.11	0.0001	Pass
20		0.25	0.0001	Pass
30		1.26	0.0007	Pass
40		2.98	0.0016	Pass
50		6.11	0.0033	Pass
25	8.25	3.65	0.0019	Pass
25	13.05	0.96	0.0005	Pass

LTE Band 4:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	5.60	0.0032	Pass
-20		6.66	0.0038	Pass
-10		4.59	0.0026	Pass
0		1.00	0.0006	Pass
10		8.84	0.0051	Pass
20		8.89	0.0051	Pass
30		1.86	0.0011	Pass
40		0.33	0.0002	Pass
50		0.30	0.0002	Pass
25	8.25	7.13	0.0041	Pass
25	13.05	4.31	0.0025	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	7.24	0.0042	Pass
-20		4.43	0.0026	Pass
-10		5.20	0.0030	Pass
0		2.64	0.0015	Pass
10		4.49	0.0026	Pass
20		1.33	0.0008	Pass
30		2.22	0.0013	Pass
40		3.15	0.0018	Pass
50		4.83	0.0028	Pass
25	8.25	5.38	0.0031	Pass
25	13.05	5.25	0.0030	Pass

LTE Band 5:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 836.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	7.53	0.0090	Pass
-20		6.13	0.0073	Pass
-10		0.37	0.0004	Pass
0		0.67	0.0008	Pass
10		3.50	0.0042	Pass
20		3.59	0.0043	Pass
30		6.46	0.0077	Pass
40		8.42	0.0101	Pass
50		8.69	0.0104	Pass
25	8.25	5.49	0.0066	Pass
25	13.05	8.29	0.0099	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =836.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	12.95	0.0155	Pass
-20		9.27	0.0111	Pass
-10		8.63	0.0103	Pass
0		10.22	0.0122	Pass
10		10.34	0.0124	Pass
20		6.80	0.0081	Pass
30		4.80	0.0057	Pass
40		11.06	0.0132	Pass
50		11.65	0.0139	Pass
25	8.25	9.05	0.0108	Pass
25	13.05	12.71	0.0050	Pass

LTE Band 13:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 782 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	10.28	0.0131	Pass
-20		9.29	0.0119	Pass
-10		8.12	0.0104	Pass
0		8.01	0.0102	Pass
10		8.65	0.0111	Pass
20		2.73	0.0035	Pass
30		9.11	0.0116	Pass
40		5.72	0.0073	Pass
50		3.54	0.0045	Pass
25	8.25	4.13	0.0053	Pass
25	13.05	10.27	0.0131	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =782 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	0.55	0.0007	Pass
-20		2.31	0.0030	Pass
-10		-0.97	-0.0012	Pass
0		-0.55	-0.0007	Pass
10		3.42	0.0044	Pass
20		1.81	0.0023	Pass
30		-0.06	-0.0001	Pass
40		-3.27	-0.0042	Pass
50		3.27	0.0042	Pass
25	8.25	-0.12	-0.0002	Pass
25	13.05	2.57	0.0033	Pass

LTE Band 17:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 710 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	-1.03	-0.0015	Pass
-20		-0.97	-0.0014	Pass
-10		-0.99	-0.0014	Pass
0		-0.82	-0.0012	Pass
10		-1.07	-0.0015	Pass
20		-0.85	-0.0012	Pass
30		-0.81	-0.0011	Pass
40		-1.56	-0.0022	Pass
50		-1.05	-0.0015	Pass
25	8.25	-0.84	-0.0012	Pass
25	13.05	-0.83	-0.0012	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c = 710 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	11.4	-1.04	-0.0015	Pass
-20		-0.84	-0.0012	Pass
-10		-1.52	-0.0021	Pass
0		-1.44	-0.0020	Pass
10		-1.92	-0.0027	Pass
20		-1.54	-0.0022	Pass
30		-1.69	-0.0024	Pass
40		-1.79	-0.0025	Pass
50		-1.37	-0.0019	Pass
25	8.25	-1.51	-0.0021	Pass
25	13.05	-1.78	-0.0025	Pass

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 *******