TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 22H, PART 24E

FCC PART 27

MEASUREMENT AND TEST REPORT

For

MFOURTEL MEXICO S.A. DE C.V.

Av. Ejercito Nacional 436 Piso 3 Chapultepec, Morales Miguel Hidalgo D.F 11570, Mexico

FCC ID: CLNWILINK2A

Report Type:	**Product Type:**
Original Report	Router

Report Number:	RDG180913007-00B
Report Date:	2018-09-28
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:		Router
EUT Model:		WiLink 2
FCC ID:		CLNWILINK2A
Rated Input Voltage:		12 VDC from adapter
Adapter Information	**Model:**	ZL-A012W1201000
	Input:	AC 100-240V, 50/60Hz, 0.5A
	Output:	DC 12V, 1A
External Dimension:		18.5cm(L)*11.8cm(W)*3.14cm(H)
Serial Number:		180913007
EUT Received Date:		2018-09-13

Objective

This report is prepared on behalf of ***MFOURTEL MEXICO S.A. DE C.V.*** 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.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: CLNWILINK2A.

Test Methodology

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

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

Applicable Standards: TIA/EIA 603-D-2010.

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz:5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
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.

The test items were performed with the EUT operating at testing mode. The device supports WCDMA/HSUPA/HPDPA/HSPA+/DC-HSDPA Band 2 and band 5, LTE band 4, 5, 7 and 66.

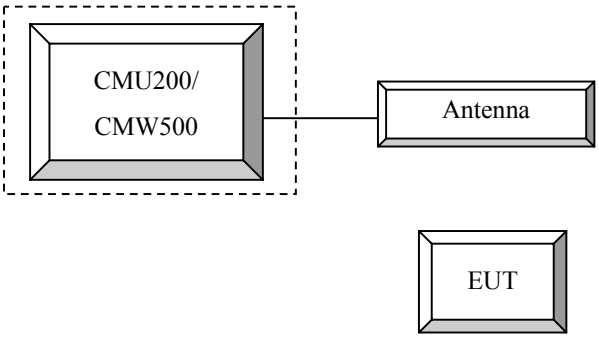
Equipment Modifications

No modification was made to the EUT.

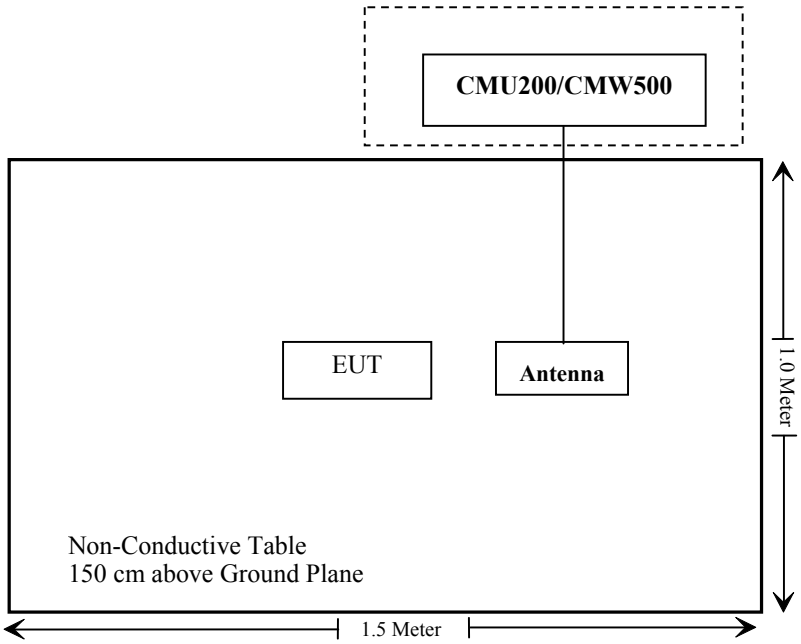
Support Equipment List and Details

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

FCC Rules	Description of Test	Result
§1.1310, §2.1091	Maximum Permissible Exposure	Compliance
§2.1046; § 22.913 (a); § 24.232 (c); §27.50	RF Output Power	Compliance
§ 2.1047(d)	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53	Out of band emission, Band Edge	Compliance
§ 2.1055 § 22.355; § 24.235; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

§1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Applicable Standard

According to subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculation formula:

Prediction of power density at the distance of the applicable MPE limit
$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm^2);
P = power input to the antenna (in appropriate units, e.g., mW);
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

Calculated Data:

Mode	Frequency (MHz)	Antenna Gain		Conducted output power including Tune-up Tolerance		Evaluation Distance (cm)	Power Density (mW/cm^2)	MPE Limit (mW/cm^2)
		(dBi)	(numeric)	(dBm)	(mW)			
WLAN	2412-2462	3.6	2.29	30	1000.00	20.00	0.46	1.0
WCDMA band 2	1850-1910	4.8	3.02	23	199.53	20.00	0.12	1.0
WCDMA Band 5	824-849	2.7	1.86	23.5	223.87	20.00	0.08	0.55
LTE band 4	1710-1755	4.8	3.02	23	199.53	20.00	0.12	1.0
LTE band 5	824-849	2.7	1.86	23.5	223.87	20.00	0.08	0.55
LTE Band 7	2500-2570	4.8	3.02	22	158.49	20.00	0.10	1.0
LTE band 66	1710-1780	4.8	3.02	22	158.49	20.00	0.10	1.0

The WLAN and WWAN can transmit simultaneously:

$$\sum_i \frac{S_i}{S_{Limit,i}}$$

$=S_{WLAN}/S_{limit\text{-}WLAN}+ S_{WWAN}/S_{limit\text{-}WWAN}$

$=0.46/1+0.08/0.55$

$=0.61$

< 1.0

Result: The device meet FCC MPE at 20 cm distance

FCC §2.1047(d) - 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.

FCC § 2.1046, § 22.913 (a) & § 24.232 (c) & § 27.50 - RF OUTPUT POWER

Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC §2.1046 and §24.232 (C), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

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

According to §27.50

(b)(10) Portable stations (hand-held devices) transmitting in the 746-757 MHz, 776-788 MHz, and 805-806 MHz bands are limited to 3 watts ERP.

(c) (10) Portable stations (hand-held devices) in the 600 MHz uplink band and the 698-746 MHz band, and fixed and mobile stations in the 600 MHz uplink band are limited to 3 watts ERP.

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

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

Test Procedure

GSM/GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900
Press Connection control to choose the different menus
Press RESET > choose all the reset all settings
Connection Press Signal Off to turn off the signal and change settings
Network Support > GSM + GPRS or GSM + EGSM
Main Service > Packet Data
Service selection > Test Mode A – Auto Slot Config. off
MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting
> Slot configuration > Uplink/Gamma
> 33 dBm for GPRS 850
> 30 dBm for GPRS 1900
> 27 dBm for EGPRS 850
> 26 dBm for EGPRS 1900
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset > + 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not stable)
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

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

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

WCDMA-Release 99

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

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

WCDMA HSDPA

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	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
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2018-06-16	2019-06-16
R&S	Universal Radio Communication Tester	CMU200	110 822	2017-12-14	2018-12-14
Agilent	Signal Generator	E8247C	MY43321350	2017-12-11	2018-12-11
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2018-06-16	2019-06-16
R&S	Universal Radio Communication Tester	CMU200	106 891	2017-12-14	2018-12-14
Agilent	Signal Generator	E8247C	MY43321350	2017-12-11	2018-12-11

*** 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:	27.1~27.3°C
Relative Humidity:	39~41 %
ATM Pressure:	100.6 kPa

** The testing was performed by Sunny Cen & Vern Shen on 2018-09-20*

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	22.38	3.24	22.15	3.17	21.81	3.14
HSDPA	1	19.56	4.20	19.53	4.29	19.31	4.39
	2	19.54	4.30	19.80	4.30	19.81	4.40
	3	19.83	4.40	19.50	4.34	19.88	4.41
	4	20.00	4.10	19.93	4.28	19.64	4.39
HSUPA	1	20.37	3.49	20.05	4.29	20.01	4.07
	2	20.33	3.41	20.14	4.31	20.15	4.06
	3	20.55	3.43	20.16	4.35	20.20	4.05
	4	20.35	3.45	20.15	4.31	20.15	4.05
	5	20.41	3.42	20.11	4.32	20.11	4.04
DC-HSDPA	1	20.47	3.44	20.42	4.29	20.60	4.09
	2	20.60	3.46	20.45	4.28	20.56	4.11
	3	20.48	3.39	20.57	4.32	20.50	4.05
	4	20.55	3.41	20.58	4.31	20.56	4.08
HSPA+ (16QAM)	1	20.60	3.42	20.41	4.36	20.53	4.06

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	23.22	2.66	23.42	3.01	23.49	2.40
HSDPA	1	20.75	3.91	20.78	4.26	20.70	3.94
	2	20.74	3.94	20.82	4.35	20.82	3.94
	3	20.89	3.92	20.74	4.29	20.72	3.99
	4	20.80	3.94	20.77	4.36	20.87	3.95
HSUPA	1	21.49	3.94	21.24	3.37	21.18	3.78
	2	21.98	3.98	21.29	3.36	21.20	3.78
	3	21.91	3.96	21.26	3.40	21.14	3.74
	4	21.89	3.97	21.25	3.39	21.15	3.73
	5	21.90	3.98	21.29	3.40	21.23	3.75
DC-HSDPA	1	21.93	3.99	21.21	3.36	21.24	3.76
	2	21.84	3.96	21.24	3.38	21.19	3.76
	3	21.97	3.97	21.25	3.41	21.15	3.80
	4	21.92	3.98	21.35	3.35	21.15	3.74
HSPA+ (16QAM)	1	21.89	3.95	21.31	3.40	21.20	3.74

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	21.81	21.95	22.16
		RB1#3	21.81	21.90	22.27
		RB1#5	21.87	21.93	22.22
		RB3#0	22.04	22.05	22.08
		RB3#3	21.92	22.08	22.19
		RB6#0	20.89	21.14	21.03
	16QAM	RB1#0	21.26	21.12	21.18
		RB1#3	21.36	20.95	21.34
		RB1#5	21.41	20.82	21.22
		RB3#0	21.03	21.14	21.12
		RB3#3	21.05	20.97	21.07
		RB6#0	20.06	20.12	20.16
3MHz	QPSK	RB1#0	22.00	22.41	21.82
		RB1#8	22.04	22.36	21.78
		RB1#14	21.93	22.15	21.83
		RB6#0	20.97	21.19	20.93
		RB6#9	20.97	21.05	21.00
		RB15#0	21.06	21.08	20.94
	16QAM	RB1#0	21.24	21.56	20.78
		RB1#8	21.13	21.74	20.87
		RB1#14	21.05	21.50	20.95
		RB6#0	20.56	20.34	20.36
		RB6#9	20.16	20.33	20.46
		RB15#0	20.06	20.30	20.13
5MHz	QPSK	RB1#0	22.03	22.00	21.90
		RB1#13	21.84	22.01	22.00
		RB1#24	21.91	21.89	22.11
		RB15#0	21.10	21.16	21.13
		RB15#10	20.98	21.07	21.06
		RB25#0	21.05	21.18	21.12
	16QAM	RB1#0	20.46	21.44	20.85
		RB1#13	20.52	21.54	21.00
		RB1#24	20.30	21.42	20.71
		RB15#0	20.19	20.09	20.16
		RB15#10	20.69	20.07	20.19
		RB25#0	20.18	20.18	20.14

10MHz	QPSK	RB1#0	21.94	22.18	21.99
		RB1#25	22.16	22.00	22.26
		RB1#49	21.97	21.86	22.11
		RB25#0	20.95	21.16	21.06
		RB25#25	21.06	21.10	21.14
		RB50#0	20.90	21.14	21.02
	16QAM	RB1#0	21.26	21.14	20.64
		RB1#25	22.04	21.62	20.78
		RB1#49	21.19	21.47	20.66
		RB25#0	20.16	20.34	20.13
		RB25#25	20.36	20.16	20.32
		RB50#0	20.19	20.29	20.18
15MHz	QPSK	RB1#0	21.93	22.03	22.14
		RB1#38	21.94	22.12	22.06
		RB1#74	21.99	21.99	22.04
		RB36#0	21.14	21.13	21.07
		RB36#39	21.31	21.01	21.22
		RB75#0	21.09	21.18	21.00
	16QAM	RB1#0	21.27	21.47	21.68
		RB1#38	21.09	21.50	21.93
		RB1#74	20.91	21.43	21.66
		RB36#0	20.15	20.02	20.00
		RB36#39	20.07	20.12	20.08
		RB75#0	20.36	20.19	20.18
20MHz	QPSK	RB1#0	22.26	21.87	22.22
		RB1#50	22.43	22.44	22.28
		RB1#99	22.09	21.98	22.28
		RB50#0	21.16	21.25	21.13
		RB50#50	21.36	21.22	21.04
		RB100#0	21.28	21.37	21.08
	16QAM	RB1#0	21.89	21.64	21.11
		RB1#50	22.50	22.10	20.91
		RB1#99	21.98	20.88	20.87
		RB50#0	20.14	20.15	20.11
		RB50#50	20.23	20.15	20.15
		RB100#0	20.17	20.25	20.16

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.52	22.72	22.84
		RB1#3	22.84	22.73	22.81
		RB1#5	22.79	22.84	22.74
		RB3#0	22.56	22.92	22.80
		RB3#3	22.70	22.83	22.98
		RB6#0	21.65	21.93	21.82
	16QAM	RB1#0	21.49	21.97	22.14
		RB1#3	21.56	22.22	22.24
		RB1#5	21.62	21.97	22.31
		RB3#0	21.70	21.95	21.81
		RB3#3	22.06	22.03	22.00
		RB6#0	20.86	20.75	20.98
3MHz	QPSK	RB1#0	21.56	22.65	22.95
		RB1#8	22.38	22.66	22.99
		RB1#14	22.47	22.76	23.10
		RB6#0	21.64	21.79	21.90
		RB6#9	21.81	21.78	21.91
		RB15#0	21.79	21.97	21.90
	16QAM	RB1#0	22.27	22.05	22.30
		RB1#8	22.32	21.99	22.12
		RB1#14	22.34	22.03	22.28
		RB6#0	21.00	20.70	20.97
		RB6#9	21.11	20.71	21.02
		RB15#0	21.02	20.90	20.90
5MHz	QPSK	RB1#0	20.01	22.63	22.71
		RB1#13	22.78	22.77	22.87
		RB1#24	22.52	22.79	22.92
		RB15#0	21.77	21.88	21.98
		RB15#10	21.83	21.93	21.94
		RB25#0	21.81	21.89	21.97
	16QAM	RB1#0	21.82	21.41	21.54
		RB1#13	22.16	21.74	21.49
		RB1#24	21.91	21.72	21.49
		RB15#0	20.77	20.95	20.89
		RB15#10	20.68	20.93	20.82
		RB25#0	20.78	20.91	20.91
10MHz	QPSK	RB1#0	22.70	22.63	22.98
		RB1#25	23.09	23.14	23.29
		RB1#49	22.70	22.91	22.77
		RB25#0	21.98	21.91	21.98
		RB25#25	21.88	21.95	22.13
		RB50#0	21.86	22.03	21.94
	16QAM	RB1#0	21.67	22.15	22.61
		RB1#25	22.23	22.52	23.04
		RB1#49	21.41	22.09	22.59
		RB25#0	21.13	20.92	20.87
		RB25#25	20.90	21.02	21.10
		RB50#0	20.83	20.92	20.89

LTE Band 7

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	20.24	20.93	20.74
		RB1#13	20.56	20.53	20.82
		RB1#24	20.05	20.73	21.24
		RB15#0	20.29	20.20	21.45
		RB15#10	20.61	21.14	21.07
		RB25#0	20.03	20.55	20.80
	16QAM	RB1#0	21.41	20.32	20.49
		RB1#13	21.13	20.93	20.25
		RB1#24	20.13	20.86	20.84
		RB15#0	20.53	20.40	20.68
		RB15#10	20.98	20.90	21.34
		RB25#0	20.44	21.08	20.66
10MHz	QPSK	RB1#0	21.11	21.11	21.35
		RB1#25	21.49	20.58	20.46
		RB1#49	20.44	20.87	20.89
		RB25#0	20.67	20.08	20.07
		RB25#25	21.27	20.79	20.93
		RB50#0	20.90	20.53	20.28
	16QAM	RB1#0	21.28	20.16	20.43
		RB1#25	20.40	20.10	20.52
		RB1#49	20.73	21.04	21.28
		RB25#0	20.64	20.88	20.59
		RB25#25	20.09	20.66	21.19
		RB50#0	20.84	21.00	20.56
15MHz	QPSK	RB1#0	20.81	21.19	20.35
		RB1#38	20.34	20.61	20.27
		RB1#74	21.13	20.70	20.38
		RB36#0	20.29	21.47	20.38
		RB36#39	20.55	20.48	20.28
		RB75#0	20.19	20.26	20.11
	16QAM	RB1#0	20.67	21.49	20.67
		RB1#38	20.16	20.35	20.09
		RB1#74	20.95	21.18	21.44
		RB36#0	21.19	20.56	20.39
		RB36#39	20.82	20.20	20.67
		RB75#0	21.33	21.22	20.96
20MHz	QPSK	RB1#0	21.25	21.34	20.33
		RB1#50	20.99	20.74	20.69
		RB1#99	20.48	21.17	20.04
		RB50#0	20.91	20.45	20.49
		RB50#50	20.78	20.39	21.26
		RB100#0	20.39	20.02	20.62
	16QAM	RB1#0	20.77	20.74	21.05
		RB1#50	20.14	21.41	20.94
		RB1#99	20.59	20.35	20.87
		RB50#0	20.55	20.12	20.33
		RB50#50	20.59	20.15	21.03
		RB100#0	20.94	21.28	20.12

LTE Band 66

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	21.92	21.39	21.81
		RB1#3	21.75	21.05	21.15
		RB1#5	21.07	21.02	21.13
		RB3#0	21.17	21.49	21.16
		RB3#3	21.19	21.41	21.87
		RB6#0	21.34	21.28	21.17
	16QAM	RB1#0	20.01	20.99	20.12
		RB1#3	20.13	20.58	20.80
		RB1#5	20.18	20.16	20.06
		RB3#0	20.51	20.66	20.45
		RB3#3	20.91	20.88	20.09
		RB6#0	20.48	20.32	20.27
3MHz	QPSK	RB1#0	21.24	21.93	21.36
		RB1#8	21.74	21.60	21.02
		RB1#14	21.89	21.91	21.10
		RB6#0	21.51	21.29	21.36
		RB6#9	21.76	21.53	21.49
		RB15#0	21.38	21.26	21.21
	16QAM	RB1#0	20.41	20.48	20.12
		RB1#8	20.13	20.26	20.28
		RB1#14	20.72	20.29	20.26
		RB6#0	20.71	20.13	20.69
		RB6#9	20.70	20.32	20.93
		RB15#0	20.29	20.24	20.12
5MHz	QPSK	RB1#0	21.93	21.38	21.86
		RB1#13	21.34	21.83	21.15
		RB1#24	21.71	21.69	21.06
		RB15#0	21.61	21.86	21.28
		RB15#10	21.33	21.28	21.95
		RB25#0	21.30	21.33	21.17
	16QAM	RB1#0	20.12	20.07	20.12
		RB1#13	20.13	20.18	20.48
		RB1#24	20.54	20.52	20.62
		RB15#0	20.26	20.78	20.06
		RB15#10	20.23	20.11	20.88
		RB25#0	20.43	20.23	20.10
10MHz	QPSK	RB1#0	21.56	21.90	21.63
		RB1#25	21.28	21.22	21.83
		RB1#49	21.03	21.67	21.49
		RB25#0	21.51	21.46	21.26
		RB25#25	21.13	21.20	21.83
		RB50#0	21.27	21.42	21.19
	16QAM	RB1#0	20.01	20.19	20.12
		RB1#25	20.13	20.93	20.71
		RB1#49	20.52	20.34	20.92
		RB25#0	20.97	20.17	20.74
		RB25#25	20.59	20.68	20.24
		RB50#0	20.48	20.48	20.21

15MHz	QPSK	RB1#0	21.35	21.28	21.55
		RB1#38	21.22	21.29	21.84
		RB1#74	21.29	21.23	21.83
		RB36#0	21.20	21.87	21.61
		RB36#39	21.41	21.99	21.73
		RB75#0	21.36	21.33	21.28
	16QAM	RB1#0	20.21	20.17	20.12
		RB1#38	20.13	20.40	20.12
		RB1#74	20.57	20.46	20.43
		RB36#0	20.76	20.17	20.89
		RB36#39	20.78	21.00	20.52
		RB75#0	20.38	20.37	20.20
20MHz	QPSK	RB1#0	21.53	21.19	21.88
		RB1#50	21.07	21.07	21.68
		RB1#99	21.64	21.53	21.12
		RB50#0	21.06	21.80	21.02
		RB50#50	21.54	21.75	21.87
		RB100#0	21.21	21.43	21.18
	16QAM	RB1#0	20.02	20.95	20.12
		RB1#50	20.13	20.69	20.59
		RB1#99	20.61	20.02	20.67
		RB50#0	20.19	20.67	20.55
		RB50#50	20.86	20.79	20.70
		RB100#0	20.42	20.32	20.42

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.68	4.56	4.92	13
	100 RB		6.48	6.32	6.36	13
16QAM	1 RB	20 MHz	5.40	5.44	5.76	13
	100 RB		7.24	7.12	7.20	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	3.48	4.32	4.24	13
	50 RB		5.12	5.12	5.04	13
16QAM	1 RB	10 MHz	4.36	5.32	5.24	13
	50 RB		6.00	6.08	5.88	13

PAR, Band 7

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	3.48	4.04	3.96	13
	100 RB		6.40	6.48	6.24	13
16QAM	1 RB	20 MHz	4.40	4.92	4.64	13
	100 RB		6.92	7.20	6.92	13

PAR, Band 66

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.76	4.96	4.60	13
	100 RB		6.28	6.40	6.52	13
16QAM	1 RB	20 MHz	5.76	6.12	5.28	13
	100 RB		7.28	7.20	7.12	13

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

ERP & EIRP

Part 22H

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 Middle Channel								
836.60	H	94.90	19.98	0.00	0.97	19.01	38.45	19.44
836.60	V	98.53	26.74	0.00	0.97	25.77	38.45	12.68

Part 24E

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 Middle Channel								
1880.00	H	87.80	13.02	11.14	1.56	22.60	33.00	10.40
1880.00	V	89.46	14.49	11.14	1.56	24.07	33.00	8.93

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

LTE Band 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 1.4 MHz Middle Channel								
1732.500	H	89.56	14.35	10.70	1.52	23.53	30.00	6.47
1732.500	V	88.32	12.81	10.70	1.52	21.99	30.00	8.01
16QAM 1.4 MHz Middle Channel								
1732.500	H	91.10	15.89	10.70	1.52	25.07	30.00	4.93
1732.500	V	88.61	13.10	10.70	1.52	22.28	30.00	7.72
QPSK 3 MHz Middle Channel								
1732.500	H	90.05	14.84	10.70	1.52	24.02	30.00	5.98
1732.500	V	88.29	12.78	10.70	1.52	21.96	30.00	8.04
16QAM 3 MHz Middle Channel								
1732.500	H	90.67	15.46	10.70	1.52	24.64	30.00	5.36
1732.500	V	88.39	12.88	10.70	1.52	22.06	30.00	7.94
QPSK 5 MHz Middle Channel								
1732.500	H	89.82	14.61	10.70	1.52	23.79	30.00	6.21
1732.500	V	87.19	11.68	10.70	1.52	20.86	30.00	9.14
16QAM 5 MHz Middle Channel								
1732.500	H	90.92	15.71	10.70	1.52	24.89	30.00	5.11
1732.500	V	87.94	12.43	10.70	1.52	21.61	30.00	8.39
QPSK 10 MHz Middle Channel								
1732.500	H	88.99	13.78	10.70	1.52	22.96	30.00	7.04
1732.500	V	86.88	11.37	10.70	1.52	20.55	30.00	9.45
16QAM 10 MHz Middle Channel								
1732.500	H	88.91	13.70	10.70	1.52	22.88	30.00	7.12
1732.500	V	87.71	12.20	10.70	1.52	21.38	30.00	8.62
QPSK 15 MHz Middle Channel								
1732.500	H	88.40	13.19	10.70	1.52	22.37	30.00	7.63
1732.500	V	86.33	10.82	10.70	1.52	20.00	30.00	10.00
16QAM 15 MHz Middle Channel								
1732.500	H	88.70	13.49	10.70	1.52	22.67	30.00	7.33
1732.500	V	87.11	11.60	10.70	1.52	20.78	30.00	9.22
QPSK 20 MHz Middle Channel								
1732.500	H	87.30	12.09	10.70	1.52	21.27	30.00	8.73
1732.500	V	84.83	9.32	10.70	1.52	18.50	30.00	11.50
16QAM 20 MHz Middle Channel								
1732.500	H	88.46	13.25	10.70	1.52	22.43	30.00	7.57
1732.500	V	86.09	10.58	10.70	1.52	19.76	30.00	10.24

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 1.4 MHz Middle Channel								
836.500	H	98.20	23.27	0.00	0.97	22.30	38.45	16.15
836.500	V	98.87	27.08	0.00	0.97	26.11	38.45	12.34
16QAM 1.4 MHz Middle Channel								
836.500	H	98.08	23.15	0.00	0.97	22.18	38.45	16.27
836.500	V	98.75	26.96	0.00	0.97	25.99	38.45	12.46
QPSK 3 MHz Middle Channel								
836.500	H	97.46	22.53	0.00	0.97	21.56	38.45	16.89
836.500	V	98.07	26.28	0.00	0.97	25.31	38.45	13.14
16QAM 3 MHz Middle Channel								
836.500	H	97.28	22.35	0.00	0.97	21.38	38.45	17.07
836.500	V	98.05	26.26	0.00	0.97	25.29	38.45	13.16
QPSK 5 MHz Middle Channel								
836.500	H	97.63	22.70	0.00	0.97	21.73	38.45	16.72
836.500	V	98.27	26.48	0.00	0.97	25.51	38.45	12.94
16QAM 5 MHz Middle Channel								
836.500	H	97.68	22.75	0.00	0.97	21.78	38.45	16.67
836.500	V	98.14	26.35	0.00	0.97	25.38	38.45	13.07
QPSK 10 MHz Middle Channel								
836.500	H	97.23	22.30	0.00	0.97	21.33	38.45	17.12
836.500	V	97.45	25.66	0.00	0.97	24.69	38.45	13.76
16QAM 10 MHz Middle Channel								
836.500	H	96.95	22.02	0.00	0.97	21.05	38.45	17.40
836.500	V	97.22	25.43	0.00	0.97	24.46	38.45	13.99

LTE Band 7

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 5 MHz Middle Channel								
2535.00	H	87.23	14.14	12.21	1.79	24.56	33.00	8.44
2535.00	V	86.56	13.18	12.21	1.79	23.60	33.00	9.40
16QAM 5MHz Middle Channel								
2535.00	H	87.25	14.16	12.21	1.79	24.58	33.00	8.42
2535.00	V	86.91	13.53	12.21	1.79	23.95	33.00	9.05
QPSK 10 MHz Middle Channel								
2535.00	H	86.18	13.09	12.21	1.79	23.51	33.00	9.49
2535.00	V	85.65	12.27	12.21	1.79	22.69	33.00	10.31
16QAM 10 MHz Middle Channel								
2535.00	H	86.62	13.53	12.21	1.79	23.95	33.00	9.05
2535.00	V	86.32	12.94	12.21	1.79	23.36	33.00	9.64
QPSK 15 MHz Middle Channel								
2535.00	H	83.72	10.63	12.21	1.79	21.05	33.00	11.95
2535.00	V	83.25	9.87	12.21	1.79	20.29	33.00	12.71
16QAM 15 MHz Middle Channel								
2535.00	H	84.39	11.30	12.21	1.79	21.72	33.00	11.28
2535.00	V	83.34	9.96	12.21	1.79	20.38	33.00	12.62
QPSK 20 MHz Middle Channel								
2535.00	H	84.66	11.57	12.21	1.79	21.99	33.00	11.01
2535.00	V	84.50	11.12	12.21	1.79	21.54	33.00	11.46
16QAM 20 MHz Middle Channel								
2535.00	H	84.65	11.56	12.21	1.79	21.98	33.00	11.02
2535.00	V	84.63	11.25	12.21	1.79	21.67	33.00	11.33

LTE Band 66

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 1.4 MHz Middle Channel								
1745.00	H	88.26	13.09	10.74	1.52	22.31	30.00	7.69
1745.00	V	86.85	11.39	10.74	1.52	20.61	30.00	9.39
16QAM 1.4 MHz Middle Channel								
1745.00	H	88.86	13.69	10.74	1.52	22.91	30.00	7.09
1745.00	V	86.55	11.09	10.74	1.52	20.31	30.00	9.69
QPSK 3 MHz Middle Channel								
1745.00	H	88.92	13.75	10.74	1.52	22.97	30.00	7.03
1745.00	V	87.27	11.81	10.74	1.52	21.03	30.00	8.97
16QAM 3 MHz Middle Channel								
1745.00	H	89.39	14.22	10.74	1.52	23.44	30.00	6.56
1745.00	V	88.46	13.00	10.74	1.52	22.22	30.00	7.78
QPSK 5 MHz Middle Channel								
1745.00	H	88.29	13.12	10.74	1.52	22.34	30.00	7.66
1745.00	V	86.81	11.35	10.74	1.52	20.57	30.00	9.43
16QAM 5 MHz Middle Channel								
1745.00	H	88.51	13.34	10.74	1.52	22.56	30.00	7.44
1745.00	V	87.56	12.10	10.74	1.52	21.32	30.00	8.68
QPSK 10 MHz Middle Channel								
1745.00	H	87.06	11.89	10.74	1.52	21.11	30.00	8.89
1745.00	V	85.14	9.68	10.74	1.52	18.90	30.00	11.10
16QAM 10 MHz Middle Channel								
1745.00	H	87.50	12.33	10.74	1.52	21.55	30.00	8.45
1745.00	V	86.51	11.05	10.74	1.52	20.27	30.00	9.73
QPSK 15 MHz Middle Channel								
1745.00	H	86.46	11.29	10.74	1.52	20.51	30.00	9.49
1745.00	V	85.99	10.53	10.74	1.52	19.75	30.00	10.25
16QAM 15 MHz Middle Channel								
1745.00	H	86.50	11.33	10.74	1.52	20.55	30.00	9.45
1745.00	V	85.53	10.07	10.74	1.52	19.29	30.00	10.71
QPSK 20 MHz Middle Channel								
1745.00	H	86.13	10.96	10.74	1.52	20.18	30.00	9.82
1745.00	V	85.81	10.35	10.74	1.52	19.57	30.00	10.43
16QAM 20 MHz Middle Channel								
1745.00	H	86.23	11.06	10.74	1.52	20.28	30.00	9.72
1745.00	V	85.89	10.43	10.74	1.52	19.65	30.00	10.35

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

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

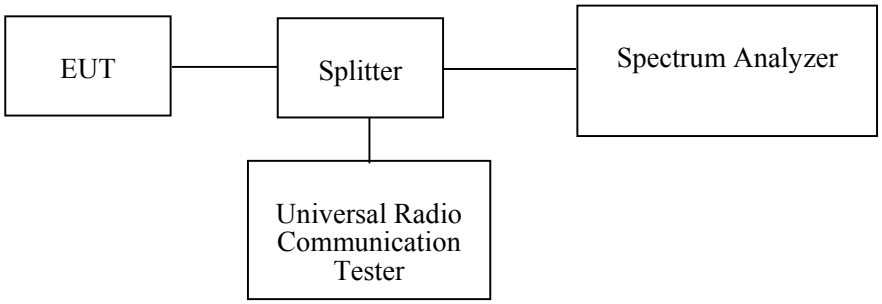
Applicable Standard

FCC §2.1049, §22.917, §22.905, §24.238 and §27.53.

Test Procedure

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

The 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESPI	100120	2017-12-11	2018-12-11
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
narda	Attenuator	6dB	6dB-1	Each time	N/A
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:	26.9~27.8°C
Relative Humidity:	47 ~ 61 %
ATM Pressure:	100.2~100.8 kPa

The testing was performed by Elena Lei from 2018-09-19 to 2018-09-24.

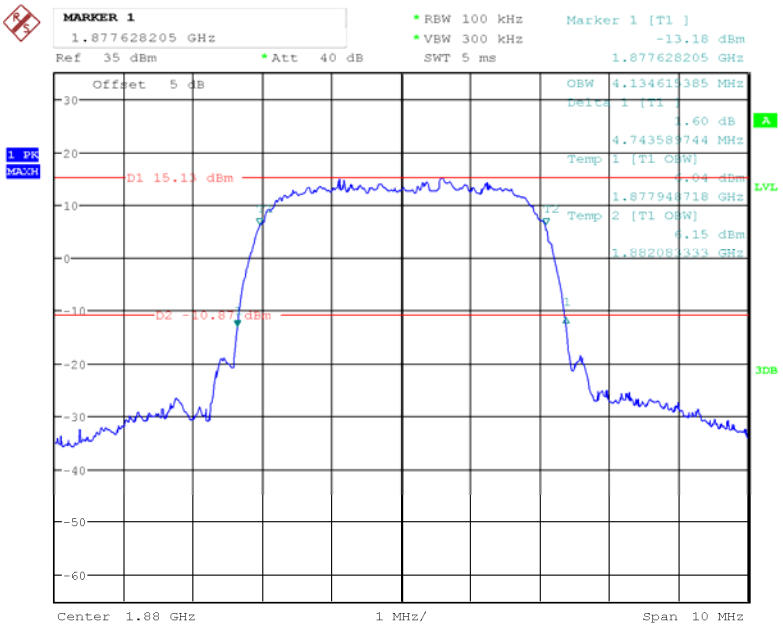
Test Mode: Transmitting

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	4.13	4.74
		HSDPA	4.13	4.76
		HSUPA	4.14	4.77
WCDMA Band V		Rel 99	4.12	4.74
		HSDPA	4.13	4.74
		HSUPA	4.14	4.73

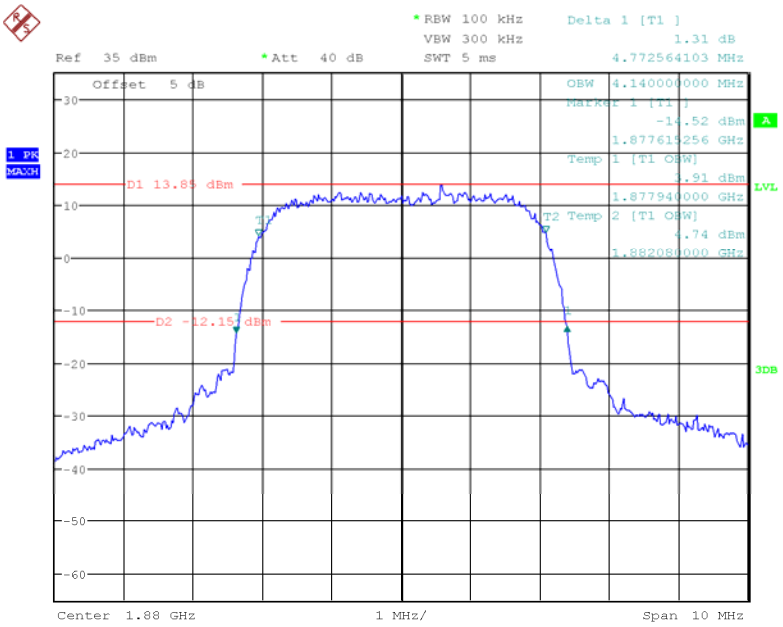
Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 4	1.4 MHz	QPSK	1.098	1.332
		16QAM	1.098	1.296
	3 MHz	QPSK	2.760	3.096
		16QAM	2.760	3.084
	5 MHz	QPSK	4.540	5.048
		16QAM	4.520	5.068
	10 MHz	QPSK	8.960	9.828
		16QAM	8.960	9.668
	15 MHz	QPSK	13.560	15.128
		16QAM	13.500	15.008
	20 MHz	QPSK	18.000	19.488
		16QAM	18.000	19.488
LTE Band 5	1.4 MHz	QPSK	1.104	1.320
		16QAM	1.104	1.332
	3 MHz	QPSK	2.748	3.084
		16QAM	2.760	3.072
	5 MHz	QPSK	4.520	5.048
		16QAM	4.520	5.048
	10 MHz	QPSK	8.960	9.828
		16QAM	8.960	9.708
LTE Band 7	5 MHz	QPSK	4.540	5.020
		16QAM	4.520	5.080
	10 MHz	QPSK	9.000	9.860
		16QAM	8.920	9.740
	15 MHz	QPSK	13.560	14.980
		16QAM	13.560	14.920
	20 MHz	QPSK	18.000	19.480
		16QAM	17.920	19.560
LTE Band 66	1.4 MHz	QPSK	1.110	1.308
		16QAM	1.098	1.308
	3 MHz	QPSK	2.760	3.078
		16QAM	2.760	3.090
	5 MHz	QPSK	4.540	5.070
		16QAM	4.520	5.030
	10 MHz	QPSK	8.960	9.890
		16QAM	8.960	9.770
	15 MHz	QPSK	13.500	15.070
		16QAM	13.500	15.130
	20 MHz	QPSK	18.000	19.490
		16QAM	18.080	19.650

WCDMA Band II, Rel 99



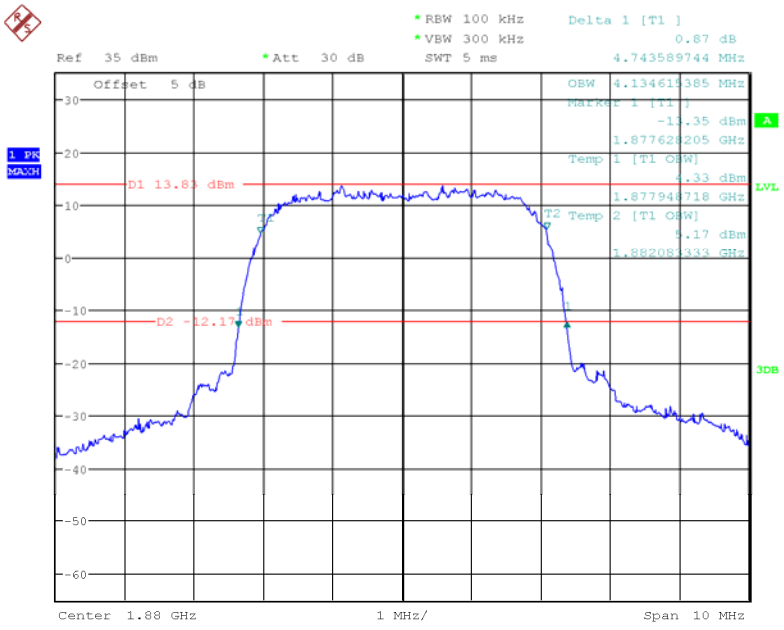
Date: 24.SEP.2018 11:26:09

WCDMA Band II, HSUPA



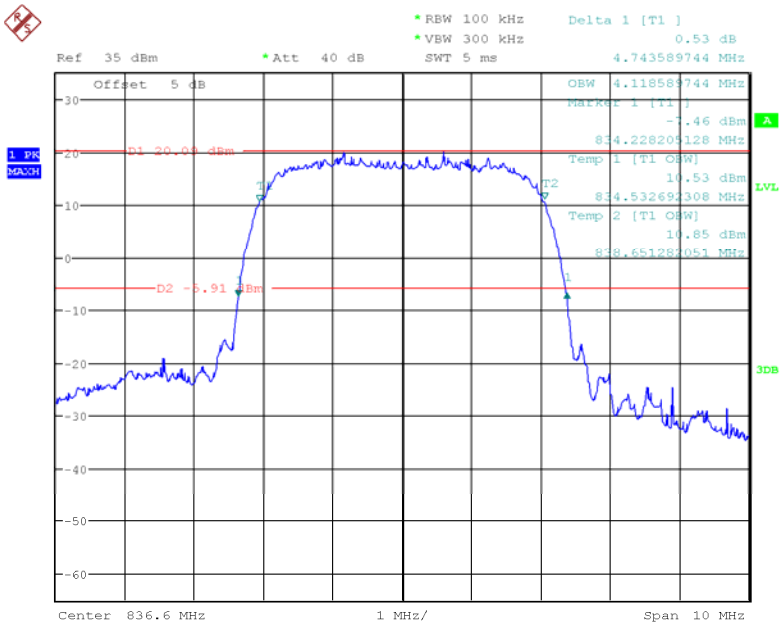
Date: 24.SEP.2018 10:50:47

WCDMA Band II, HSDPA



Date: 24.SEP.2018 11:45:40

WCDMA Band V, Rel 99



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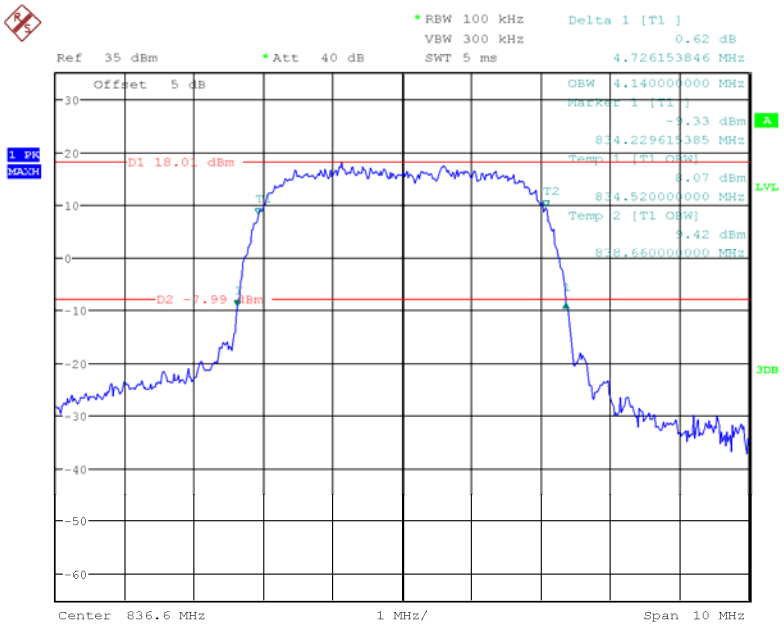
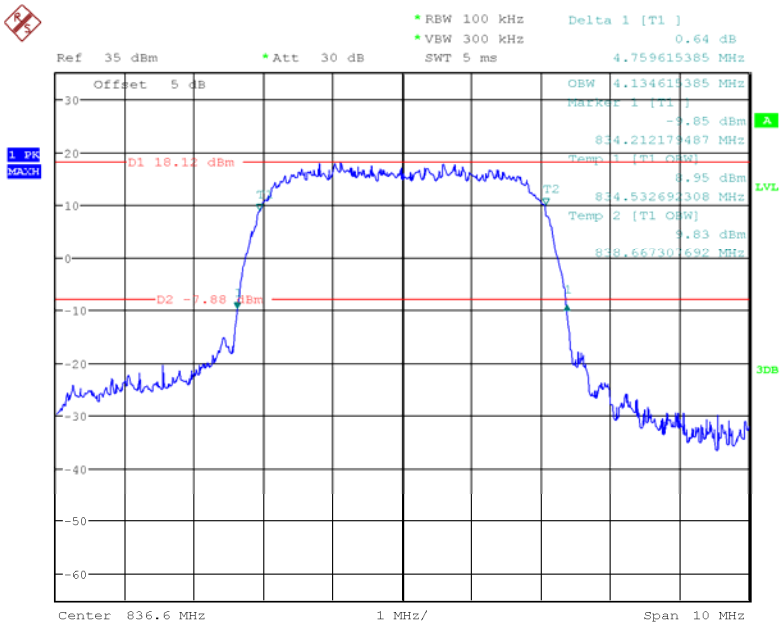
WCDMA Band V, HSUPA



Date: 24.SEP.2018 10:49:04

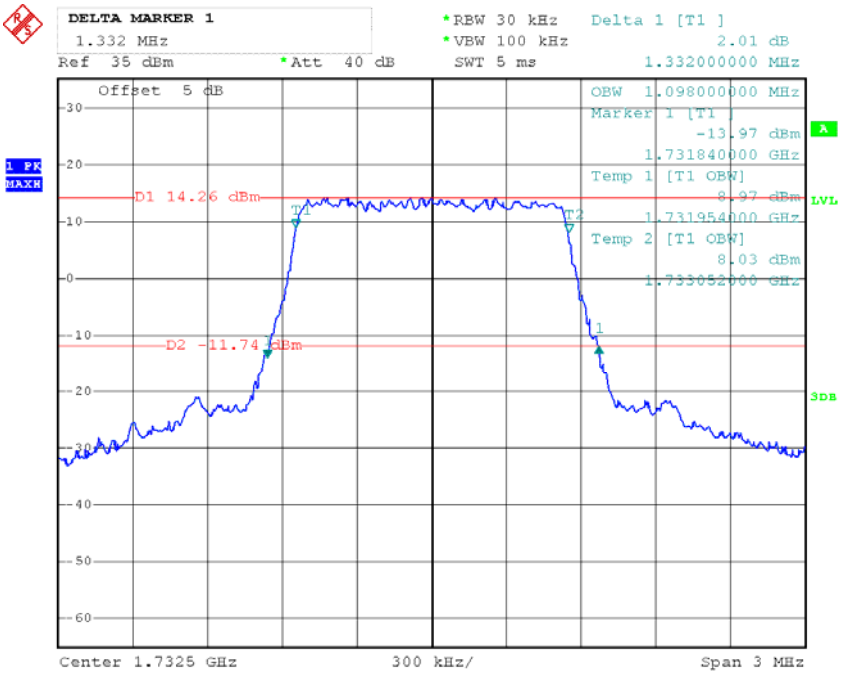
WCDMA Band V, HSDPA



Date: 24.SEP.2018 11:43:31

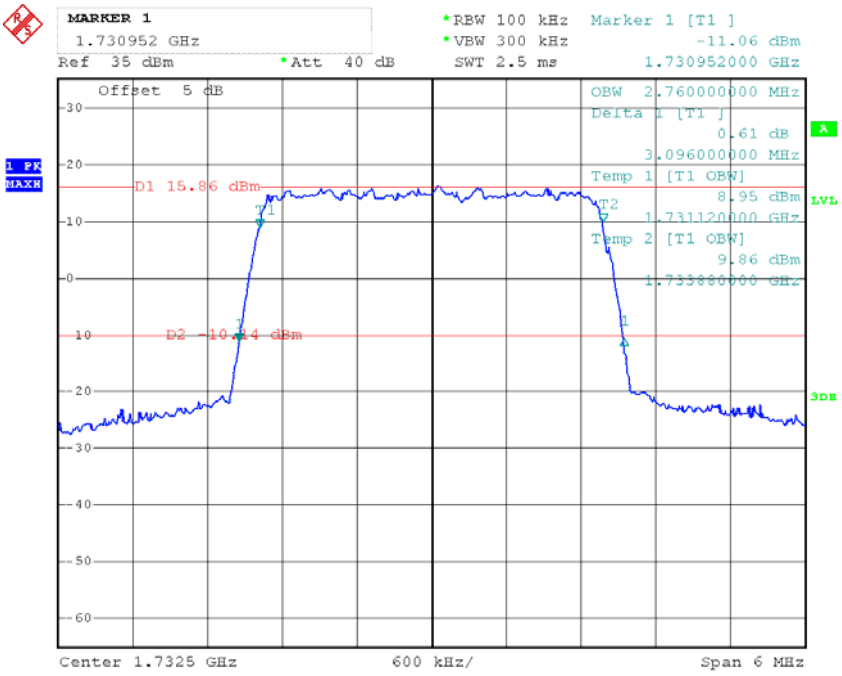
LTE Band 4

QPSK_1.4 MHz



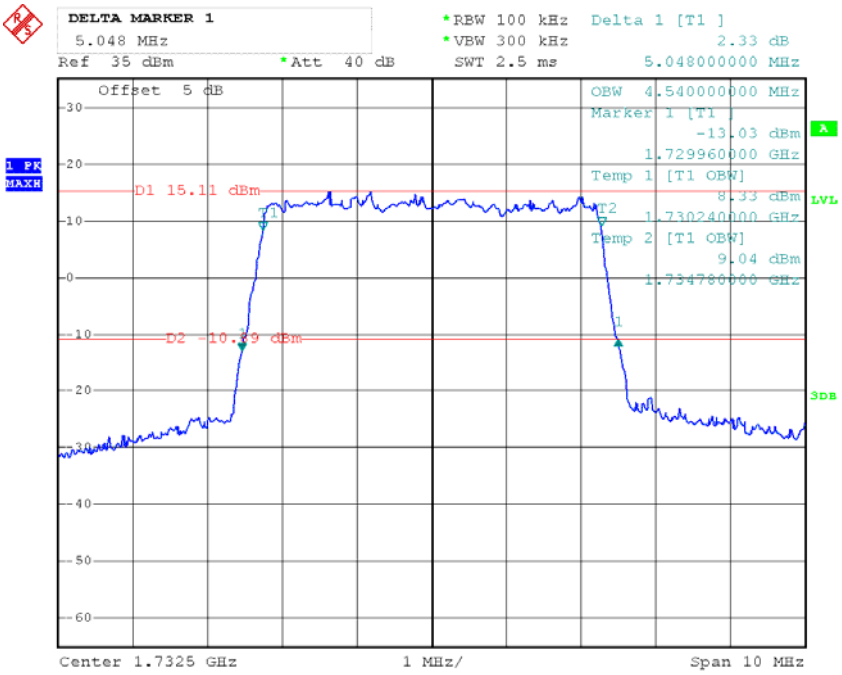
Date: 19.SEP.2018 11:09:45

QPSK_3 MHz



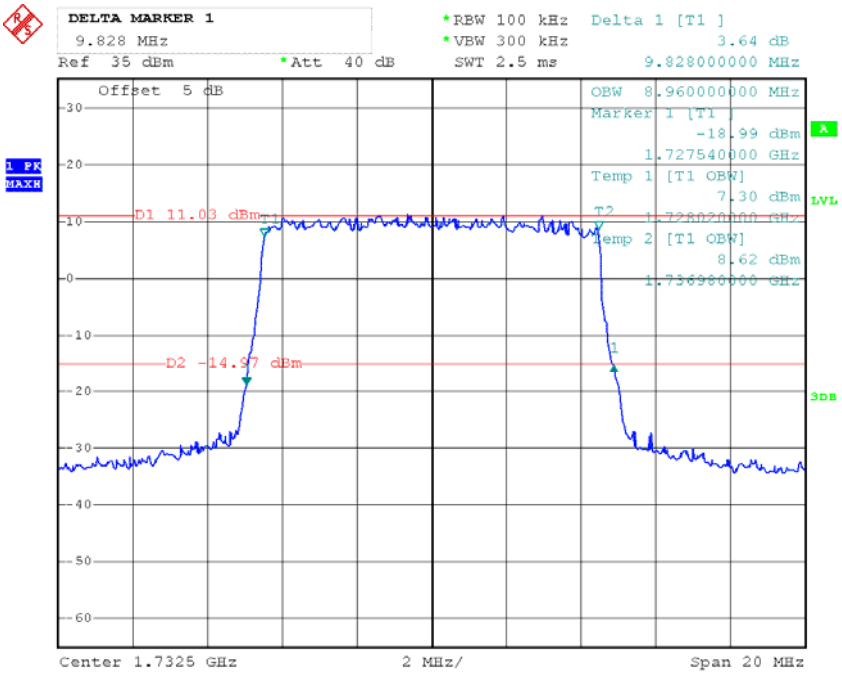
Date: 19.SEP.2018 11:12:30

QPSK_5 MHz



Date: 19.SEP.2018 11:14:58

QPSK_10 MHz



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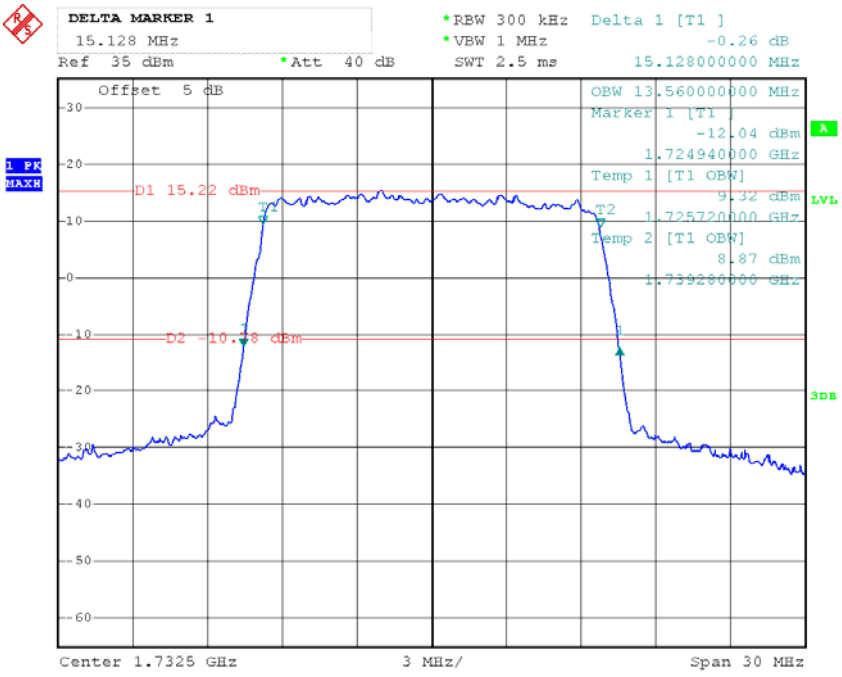
QPSK_15 MHz



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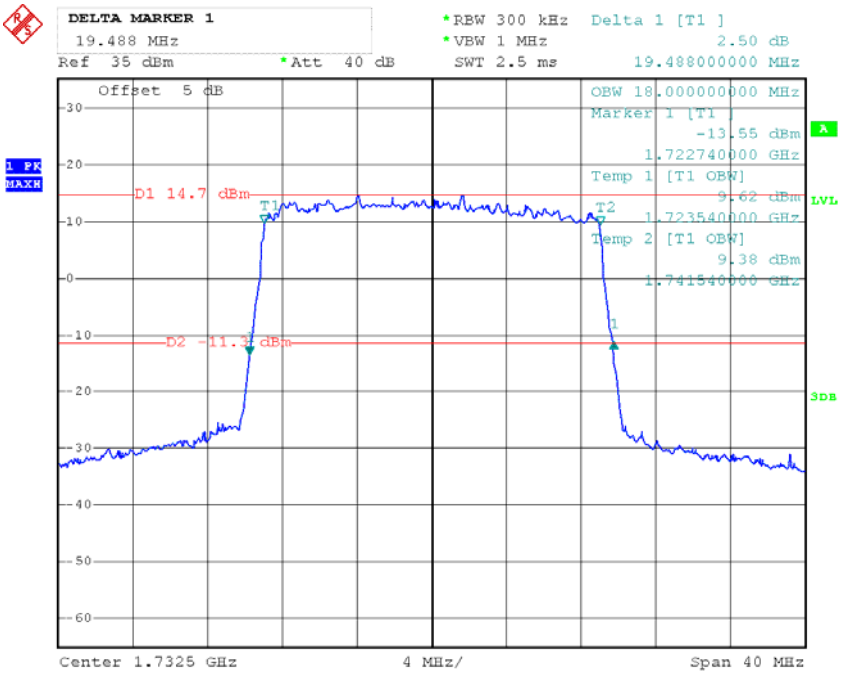
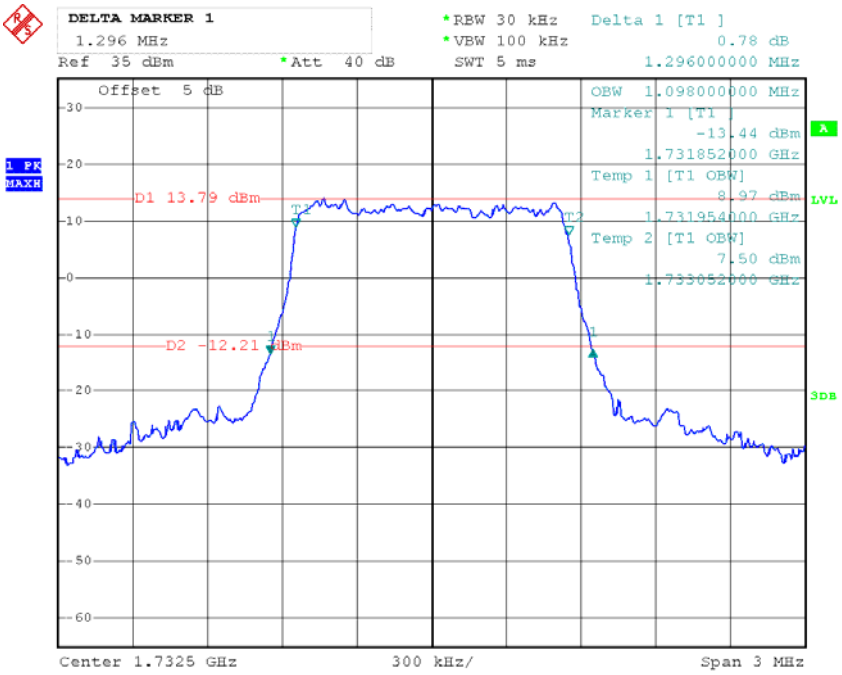
QPSK_20 MHz



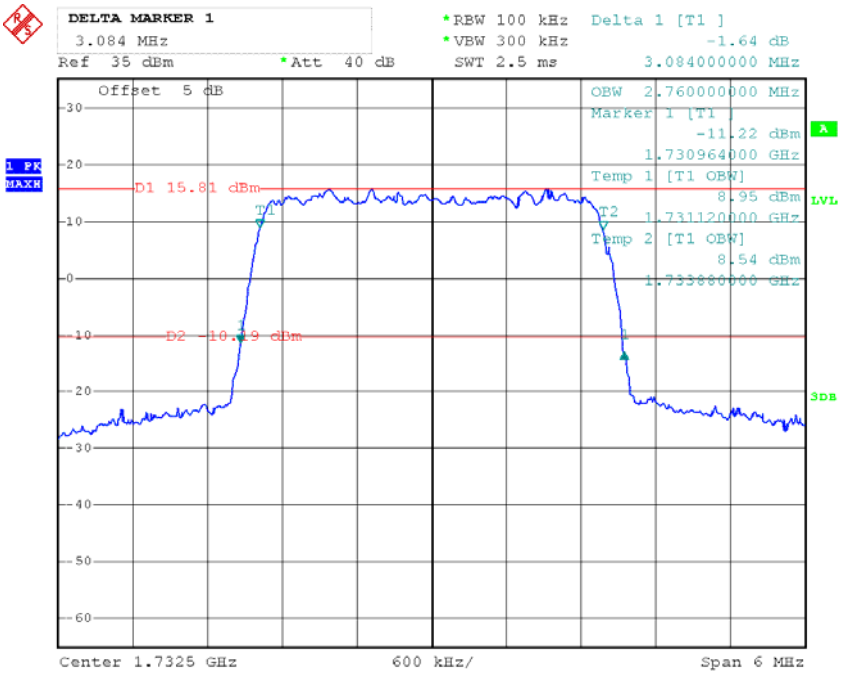
Date: 19.SEP.2018 11:27:43

16QAM_1.4 MHz



Date: 19.SEP.2018 11:08:59

16QAM_3 MHz



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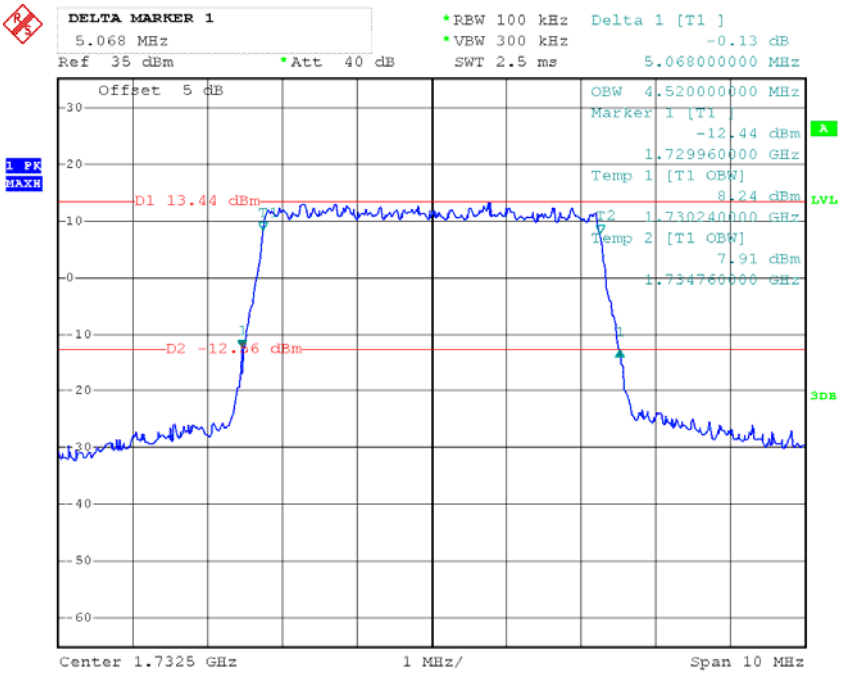
16QAM_5 MHz



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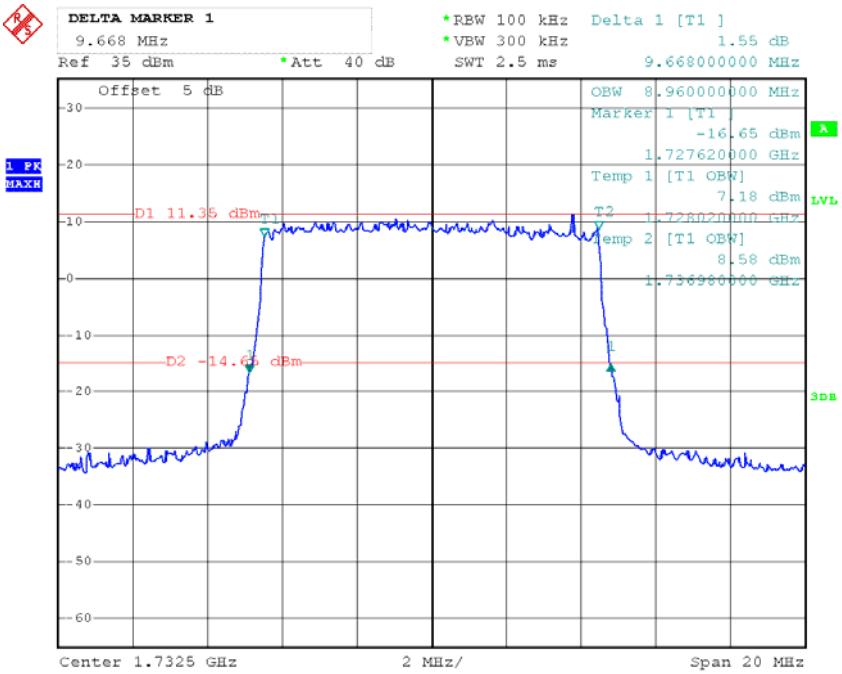
16QAM_10 MHz



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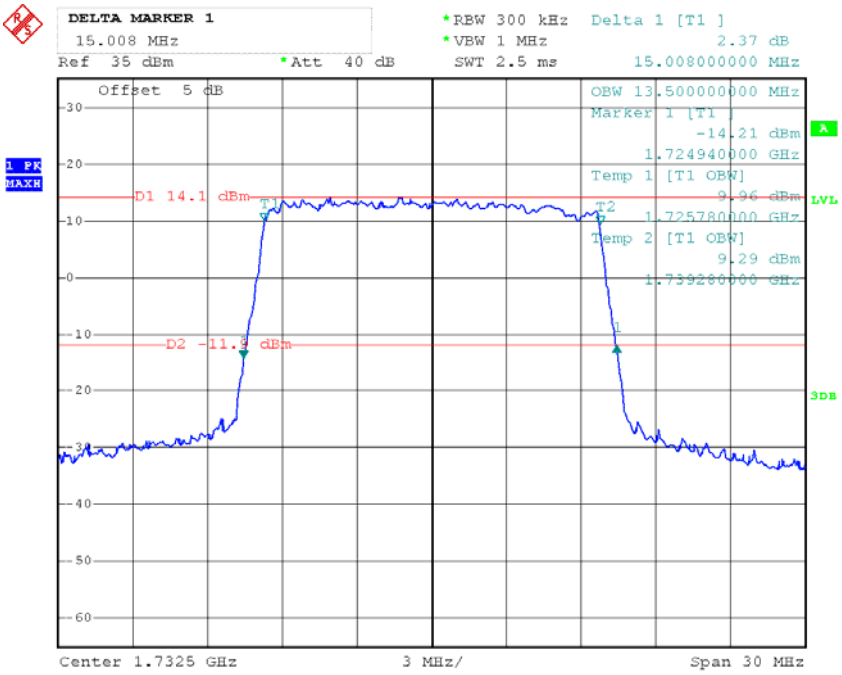
16QAM_15 MHz



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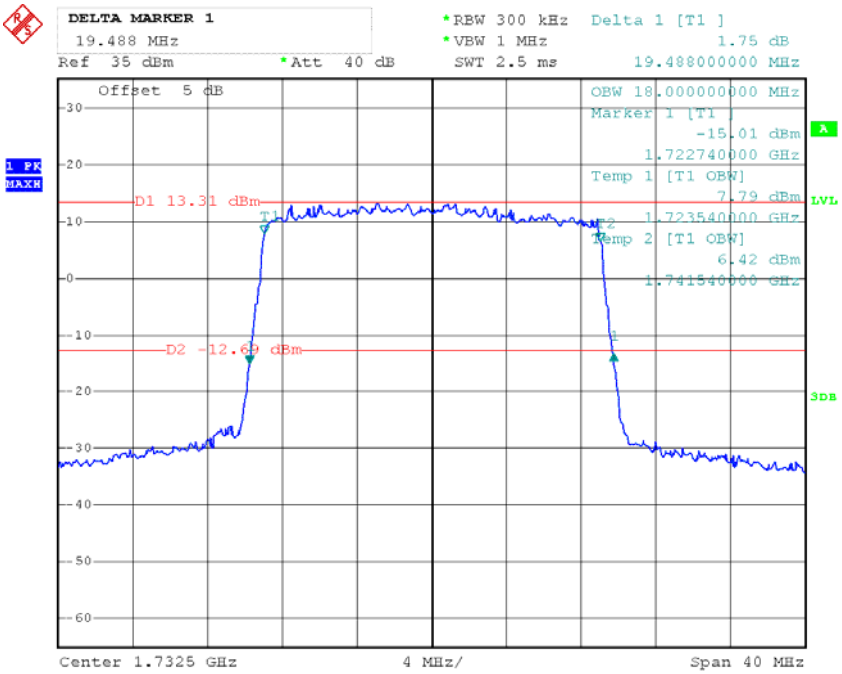
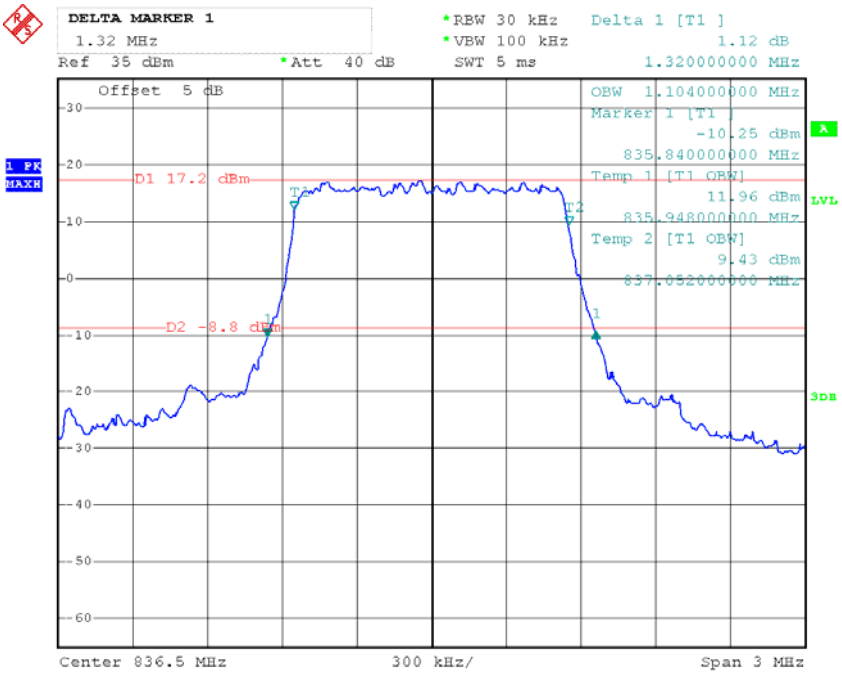
16QAM_20 MHz



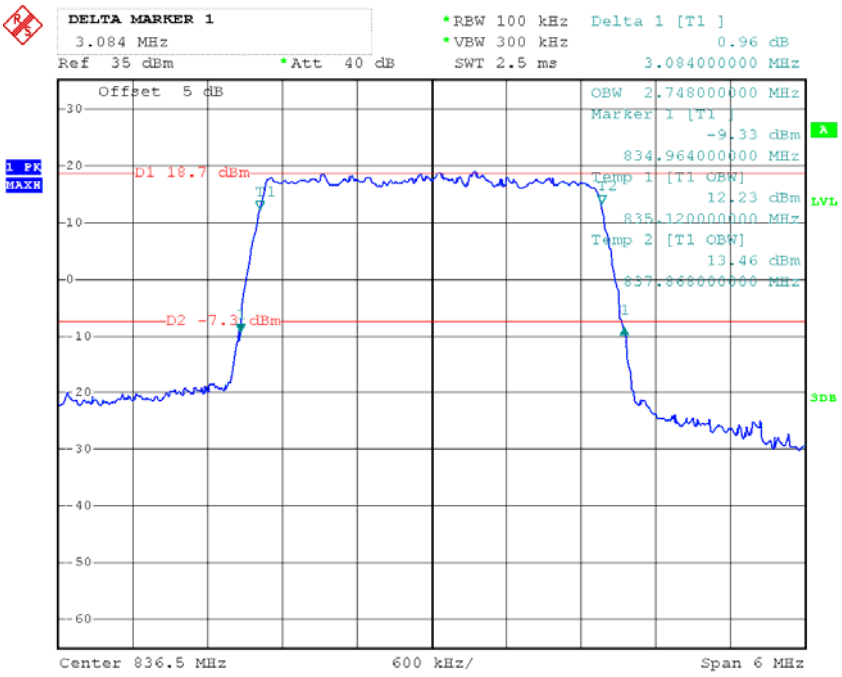
Date: 19.SEP.2018 11:25:29

LTE Band 5:

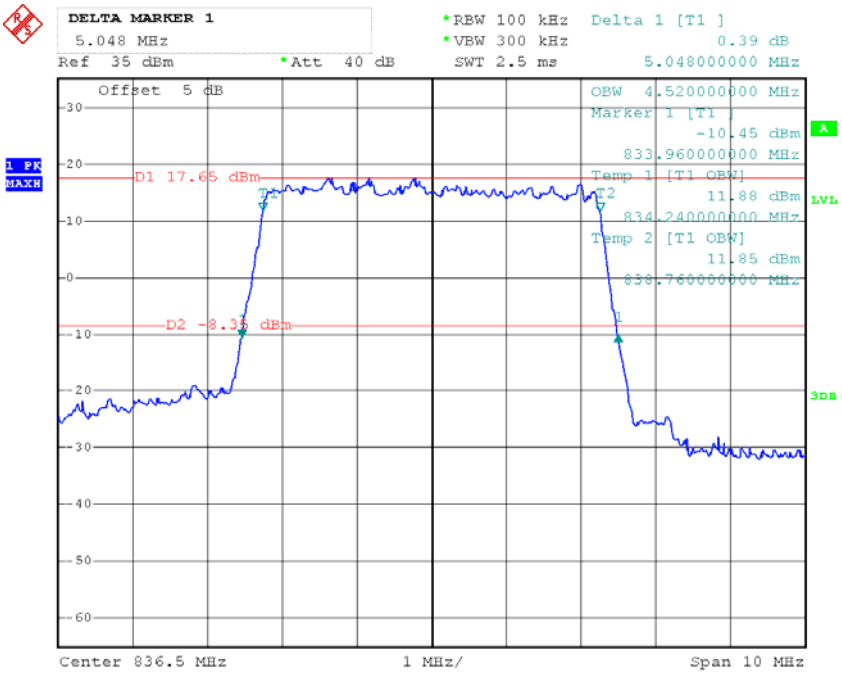
QPSK_1.4 MHz



QPSK_3 MHz

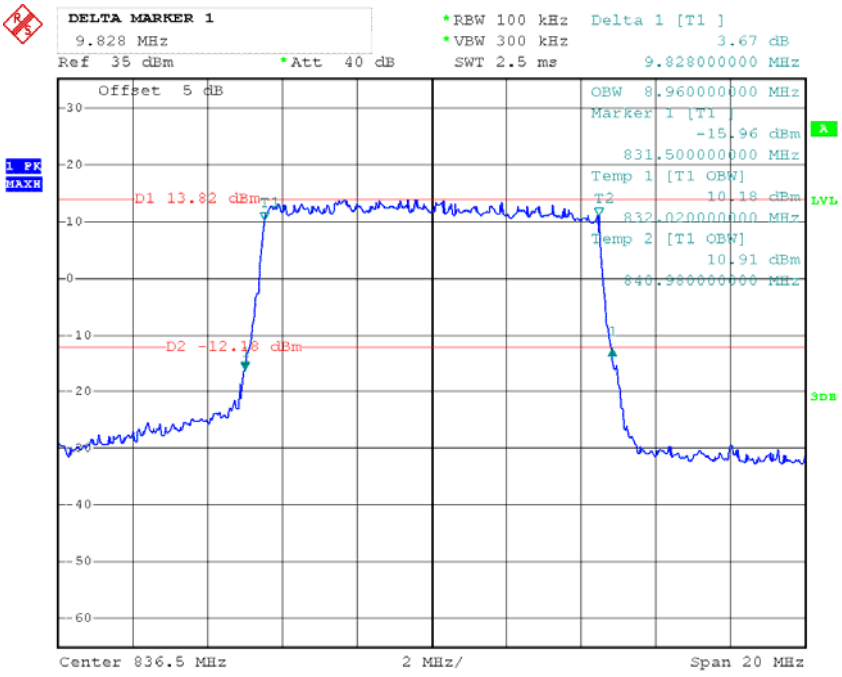


QPSK_5 MHz



Date: 19.SEP.2018 11:39:54

QPSK_10 MHz



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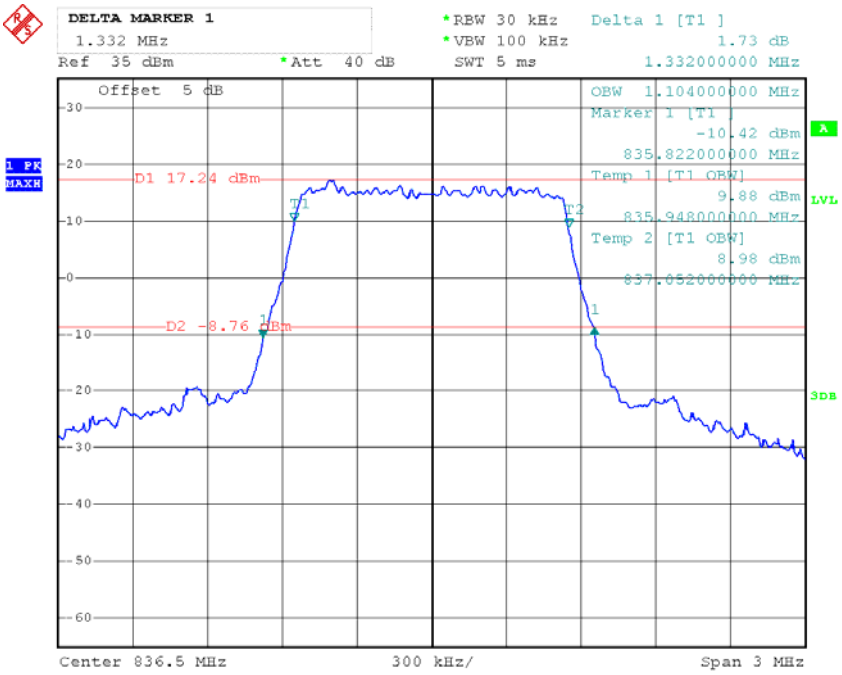
16QAM_1.4 MHz



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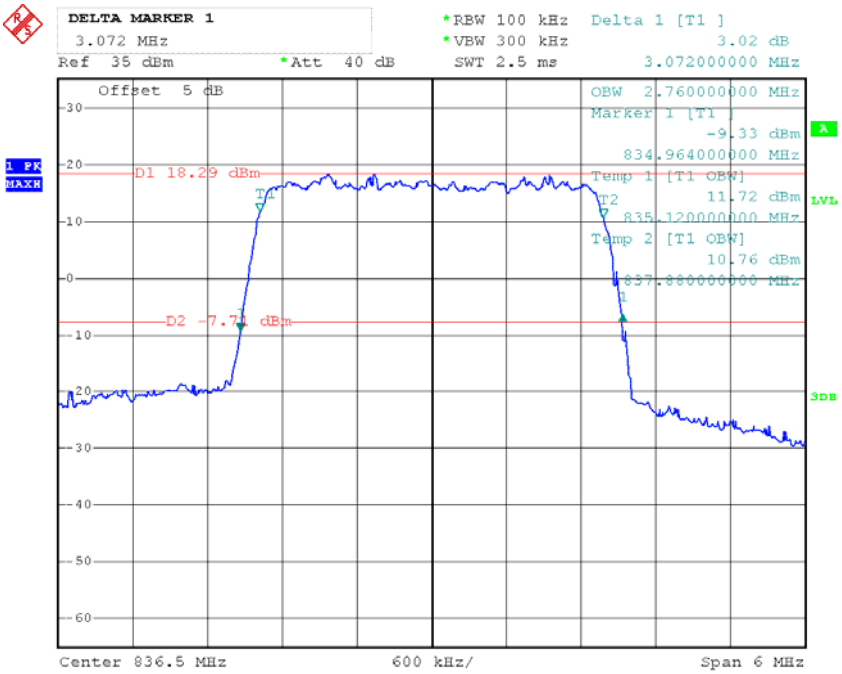
16QAM_3 MHz



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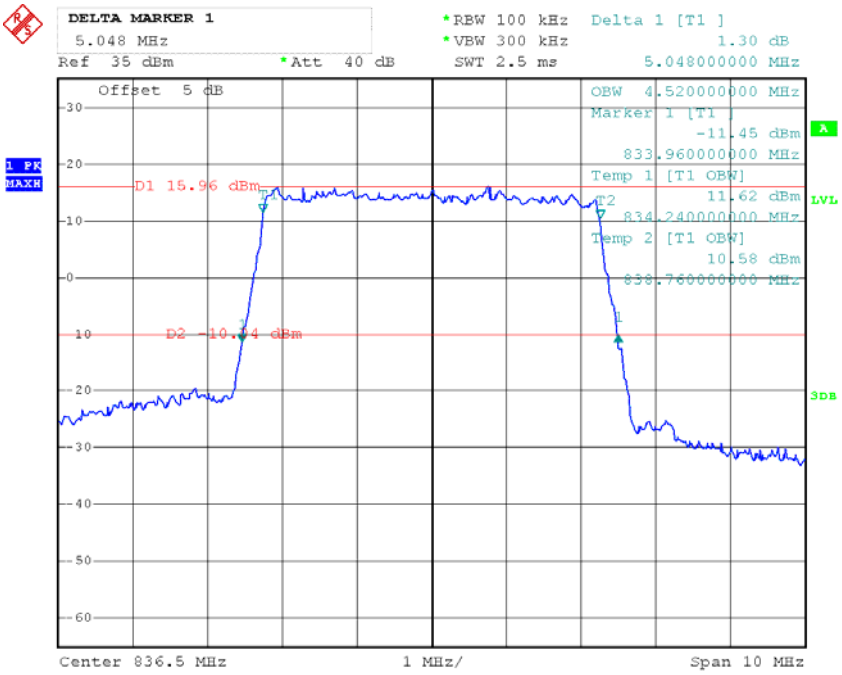
16QAM_5 MHz



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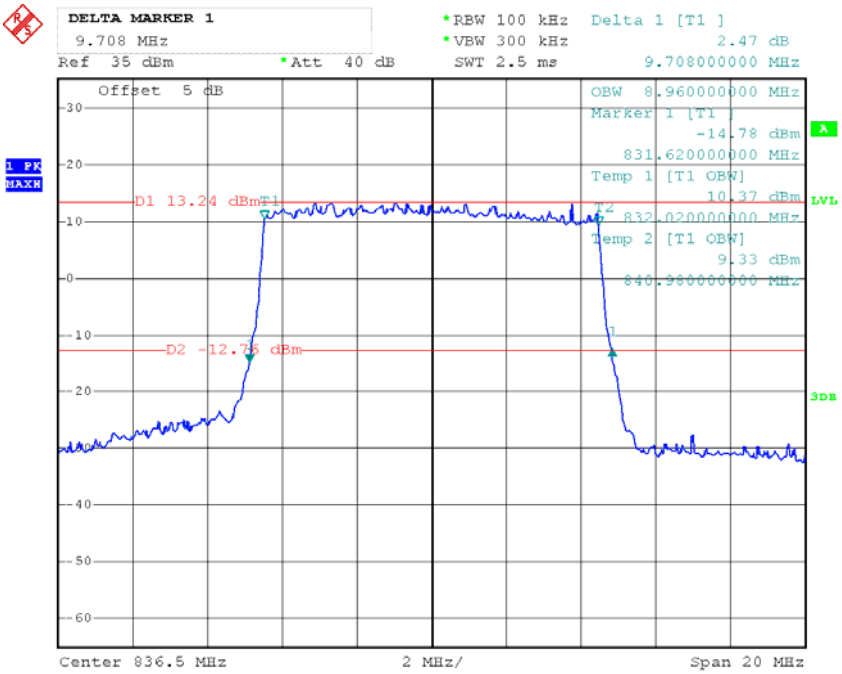
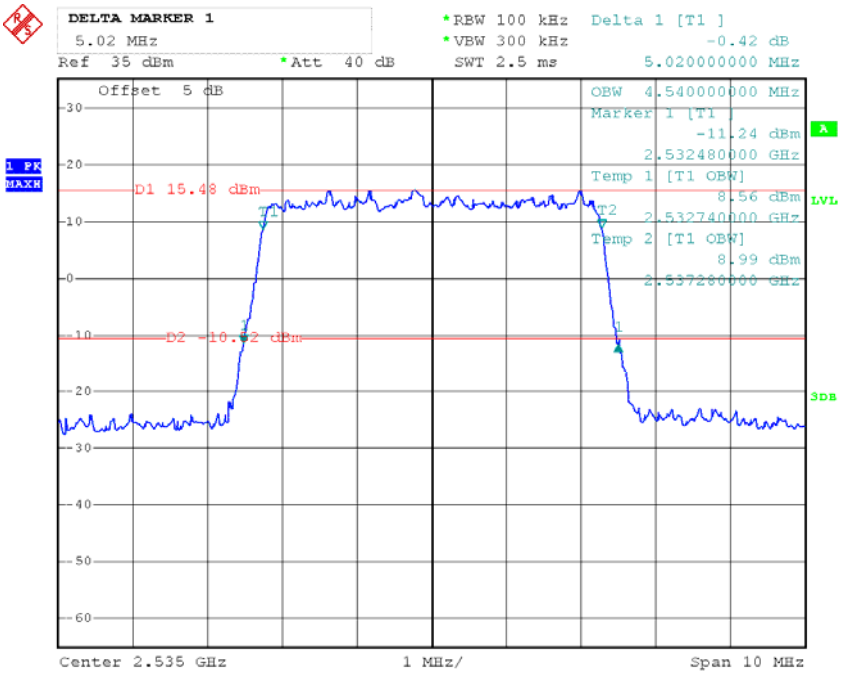
16QAM_10 MHz



Date: 19.SEP.2018 11:42:11

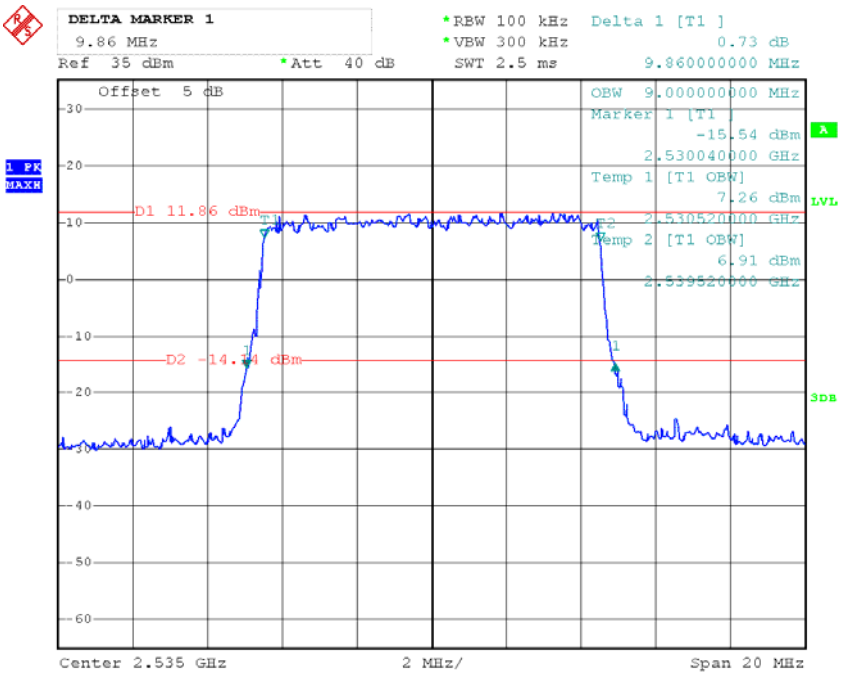
LTE Band 7:

QPSK_5 MHz



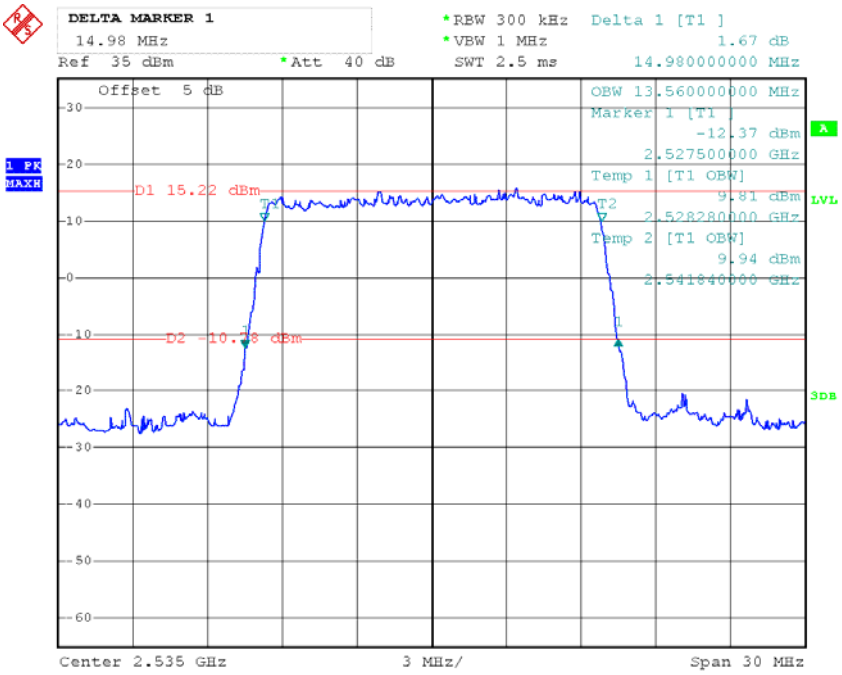
Date: 19.SEP.2018 11:46:51

QPSK_10 MHz



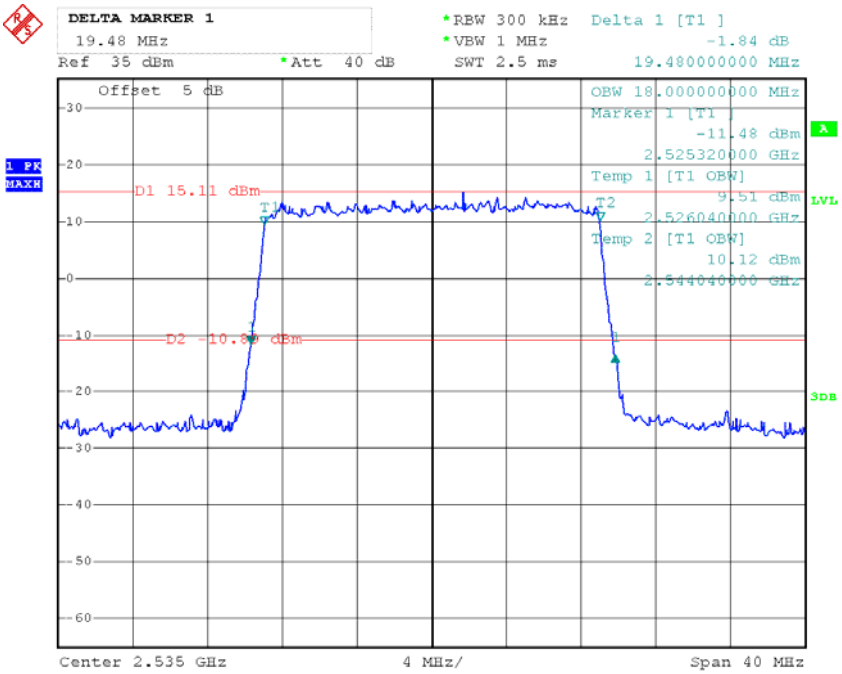
Date: 19.SEP.2018 11:49:13

QPSK_15 MHz



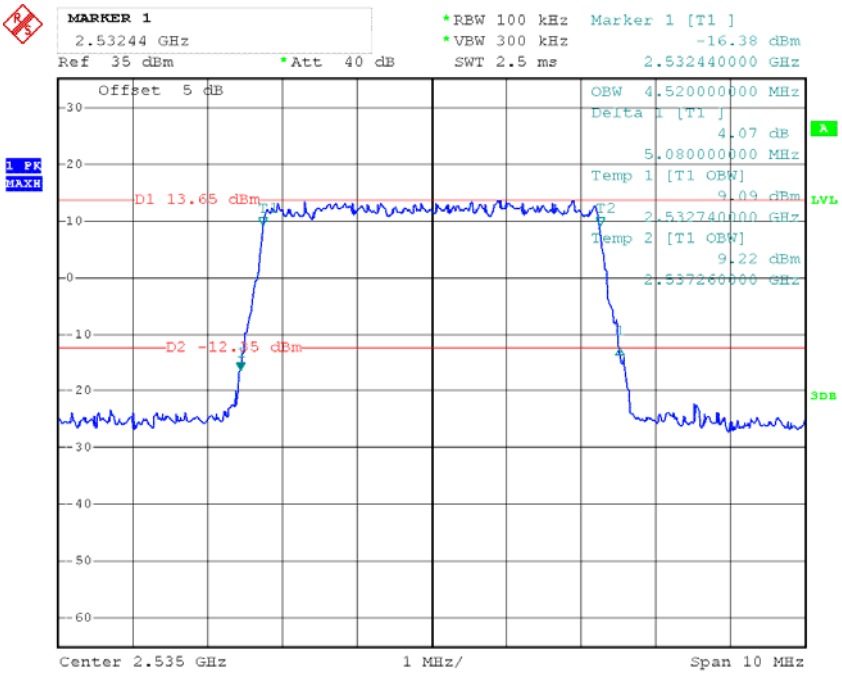
Date: 19.SEP.2018 11:51:15

QPSK_20 MHz



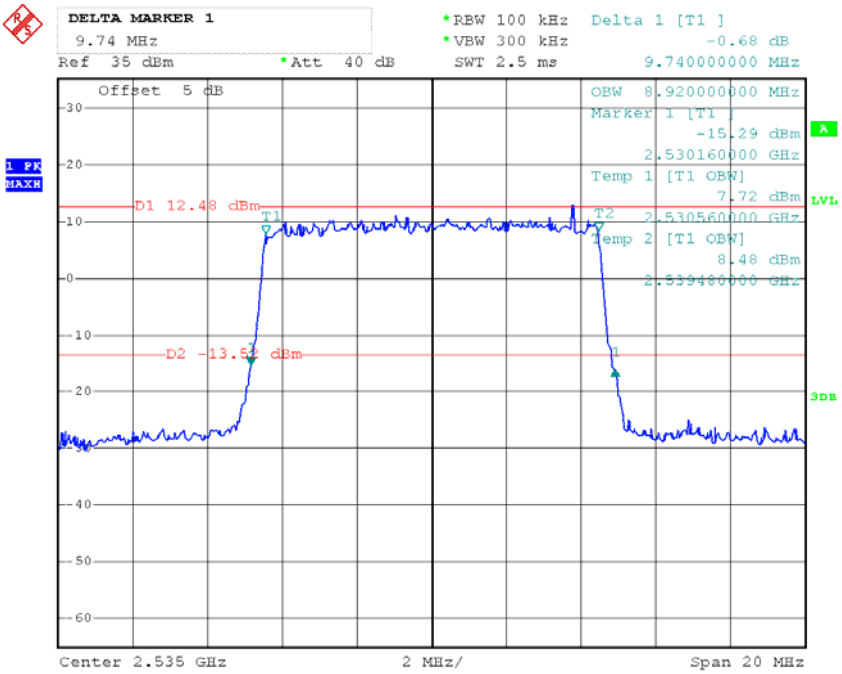
Date: 19.SEP.2018 11:52:55

16QAM_5 MHz



Date: 19.SEP.2018 11:45:42

16QAM_10 MHz



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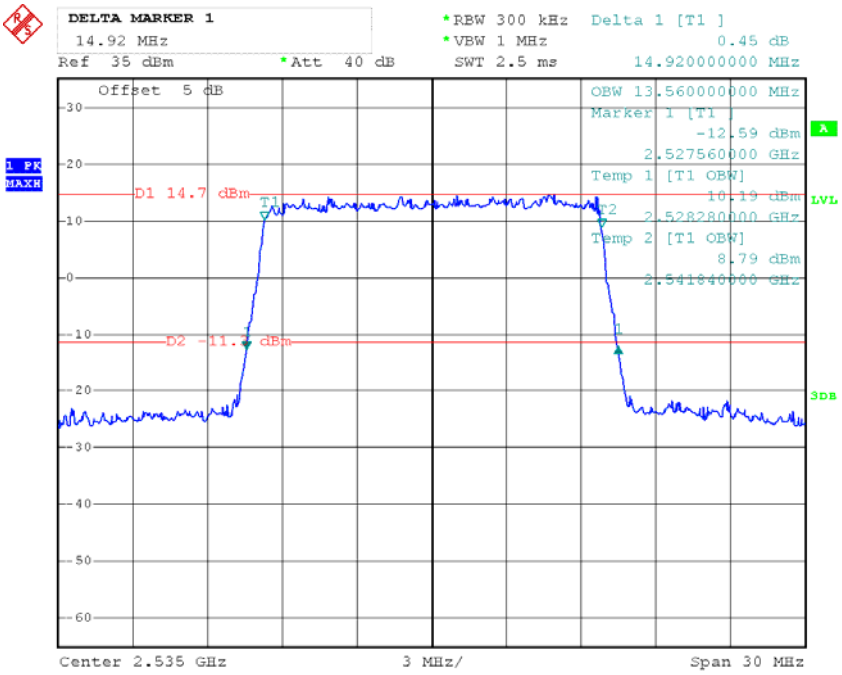
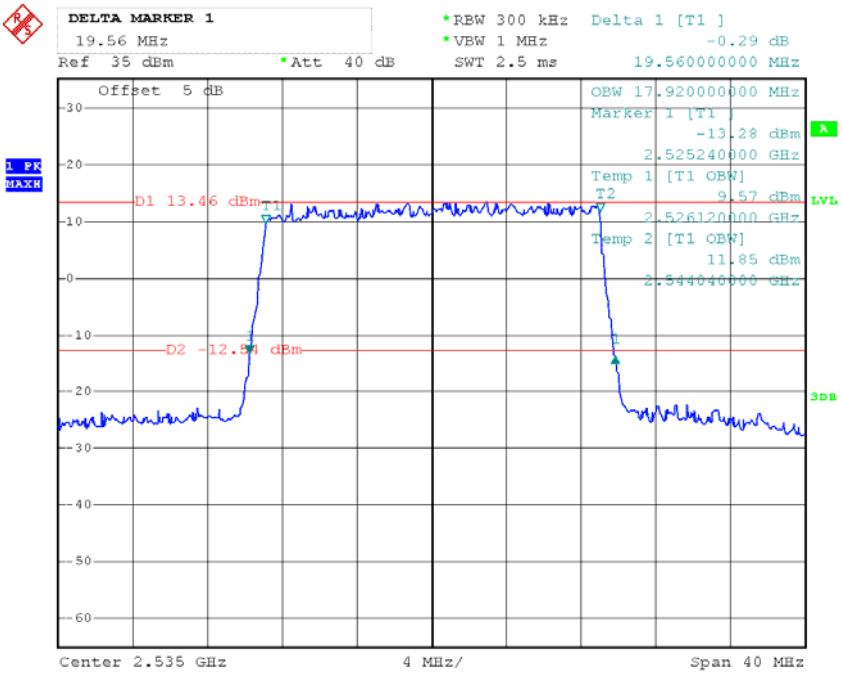
16QAM_15 MHz



Date: 19.SEP.2018 11:50:26

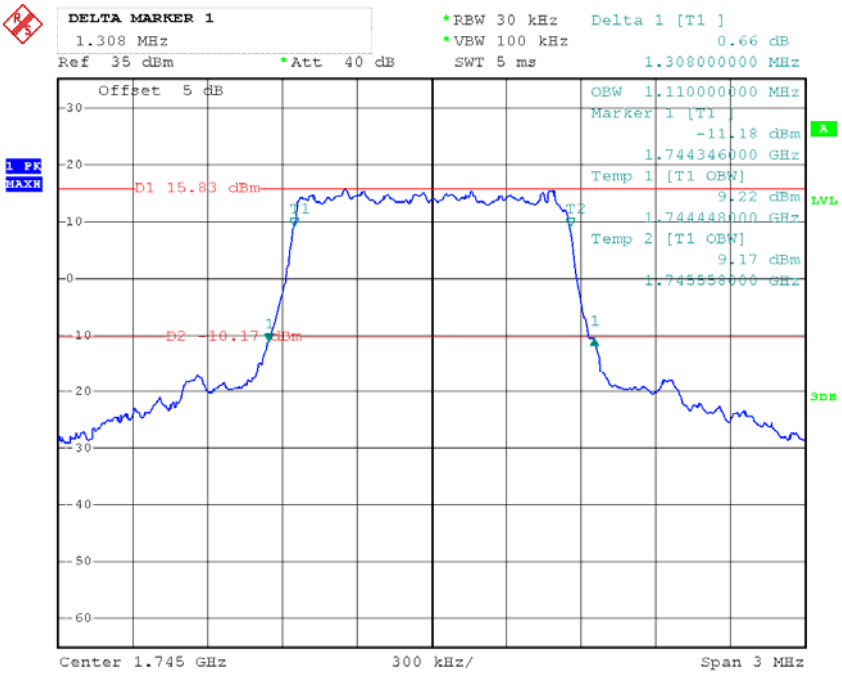
16QAM_20 MHz



Date: 19.SEP.2018 11:52:19

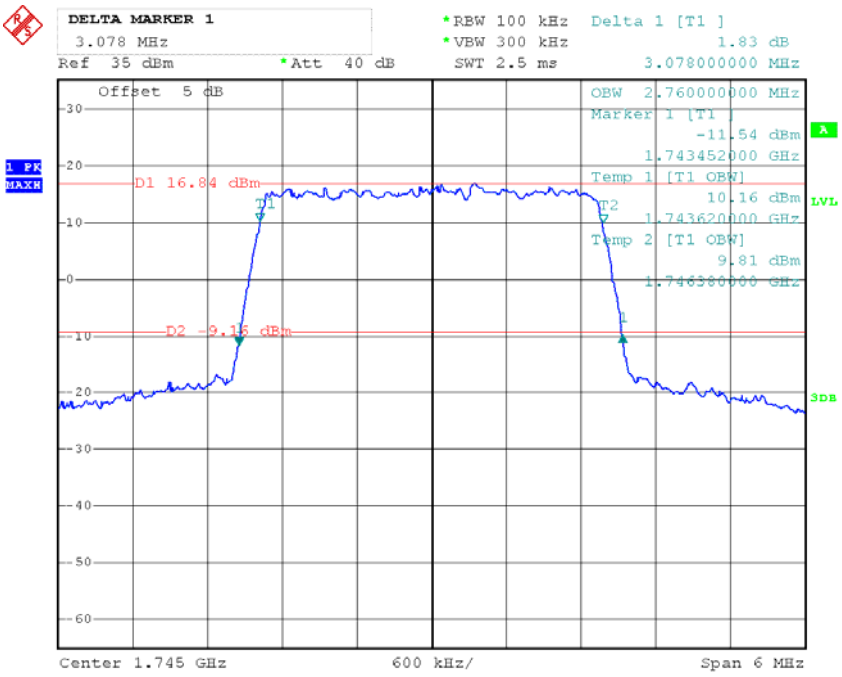
LTE Band 66:

QPSK_1.4 MHz



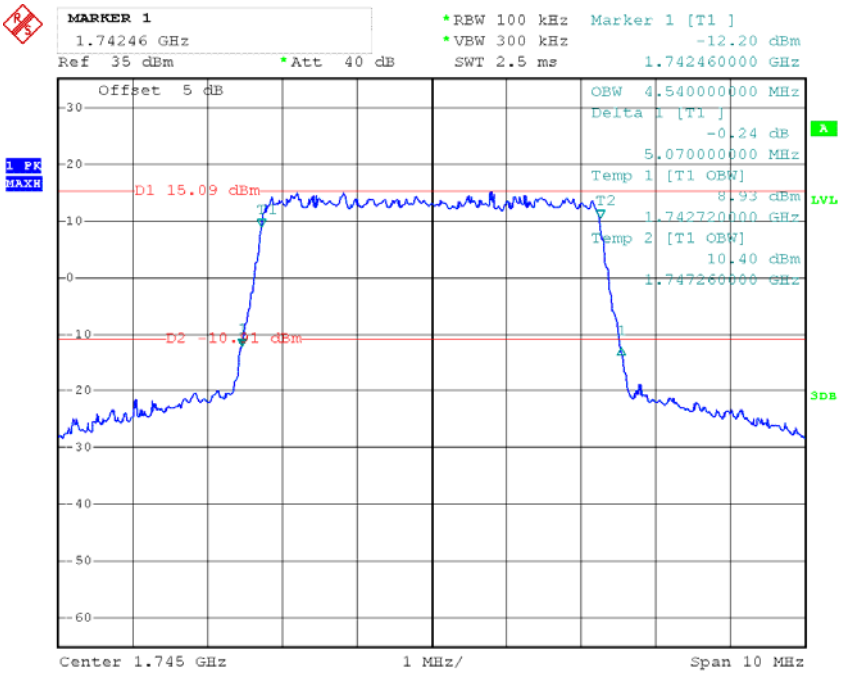
Date: 19.SEP.2018 14:31:33

QPSK_3 MHz



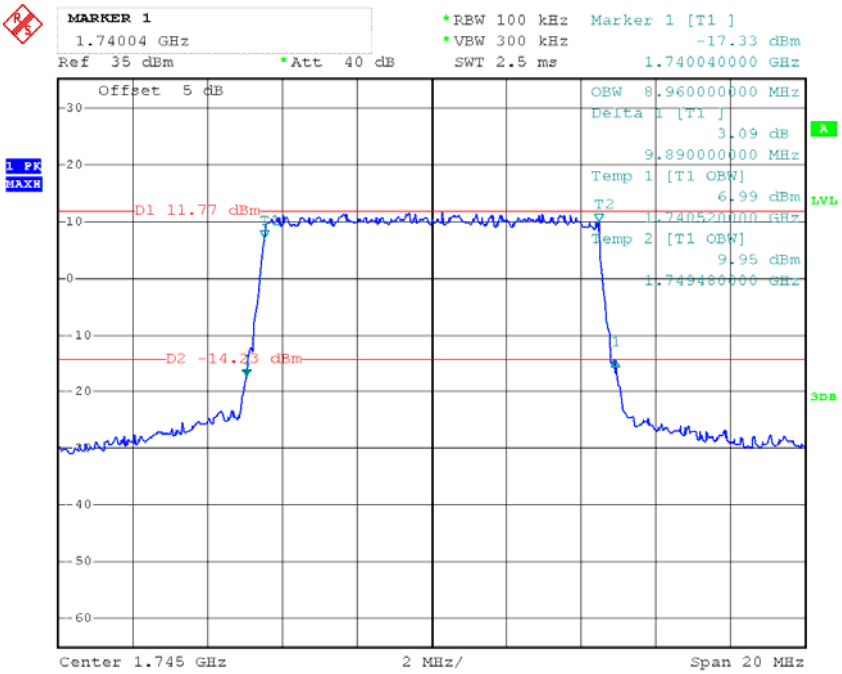
Date: 19.SEP.2018 14:34:52

QPSK_5 MHz



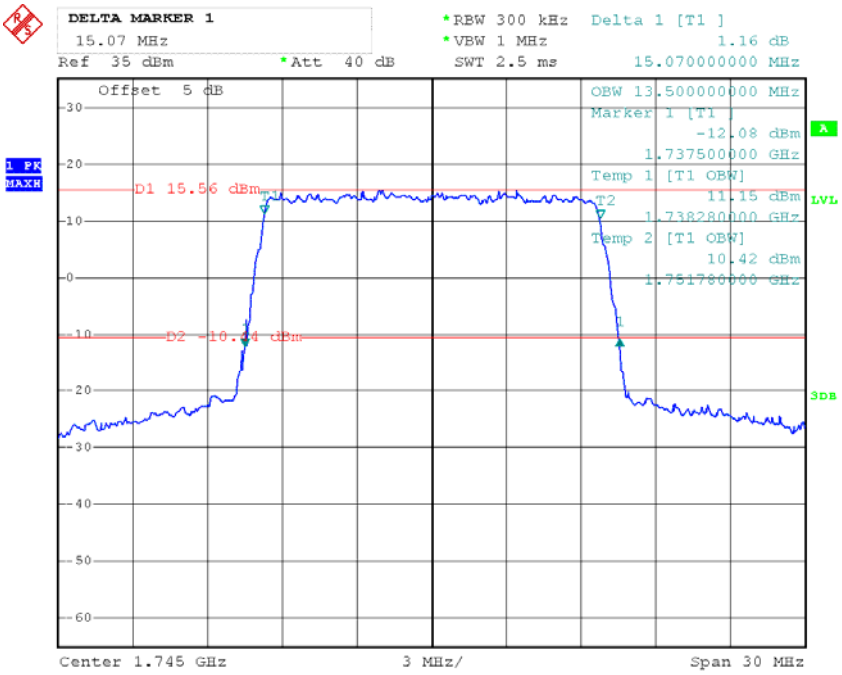
Date: 19.SEP.2018 14:37:35

QPSK_10 MHz



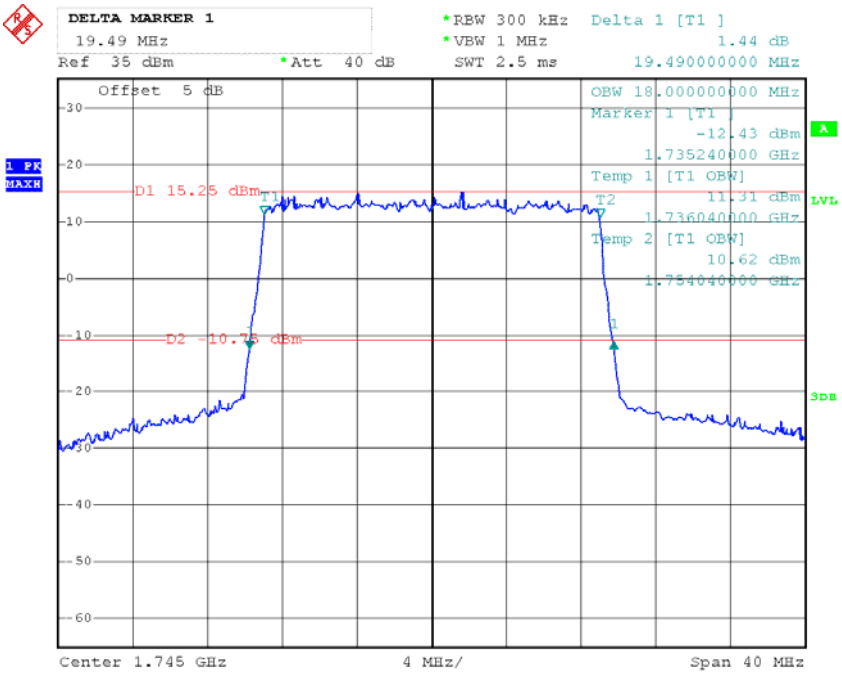
Date: 19.SEP.2018 14:40:32

QPSK_15 MHz



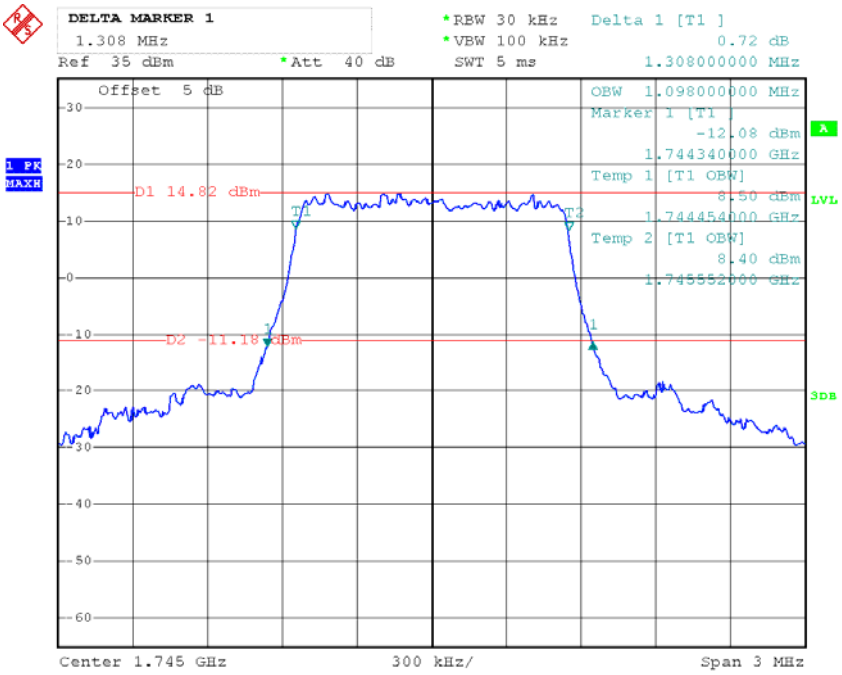
Date: 19.SEP.2018 14:42:57

QPSK_20 MHz



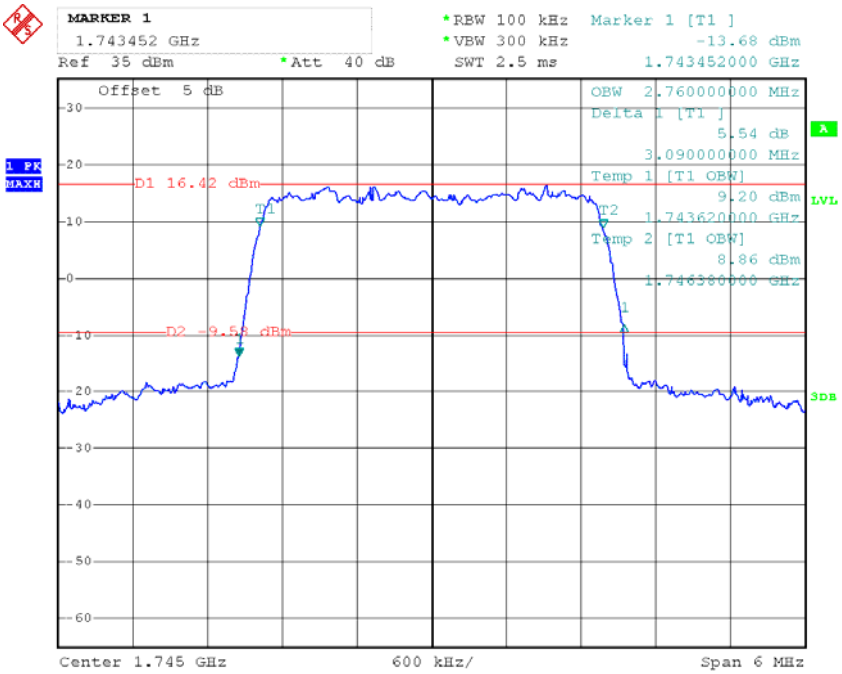
Date: 19.SEP.2018 14:45:25

16QAM_1.4 MHz



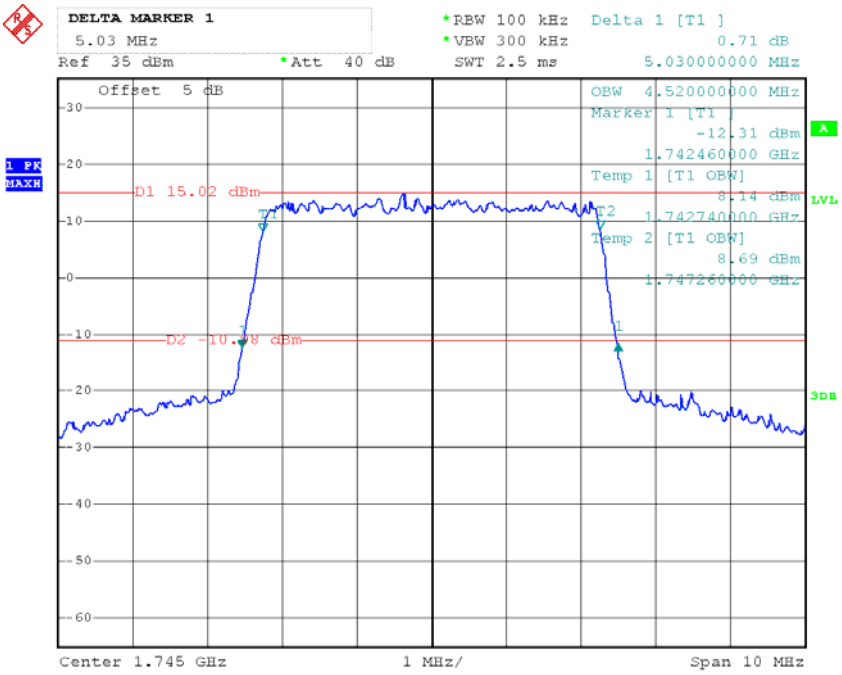
Date: 19.SEP.2018 14:30:14

16QAM_3 MHz



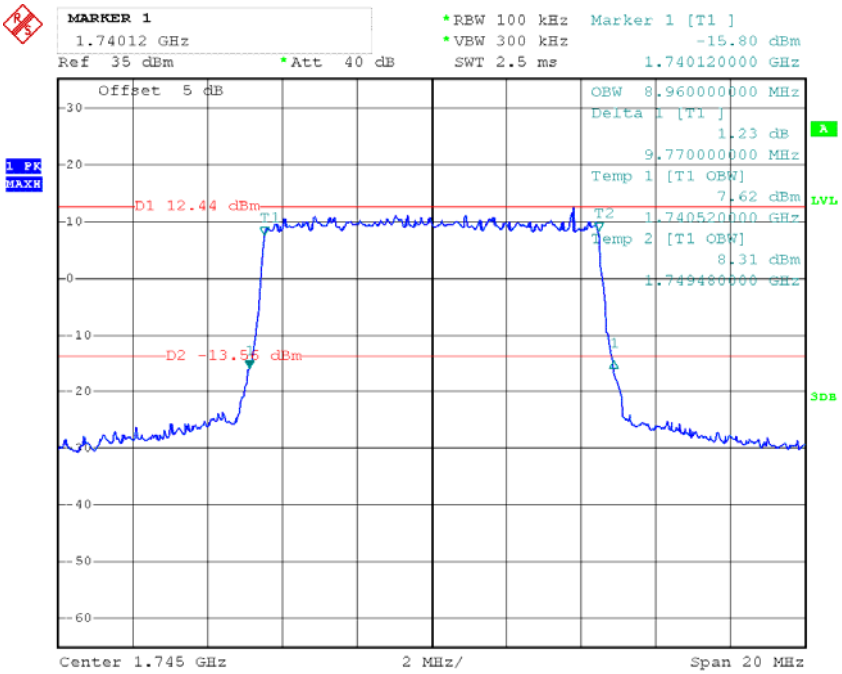
Date: 19.SEP.2018 14:33:39

16QAM_5 MHz



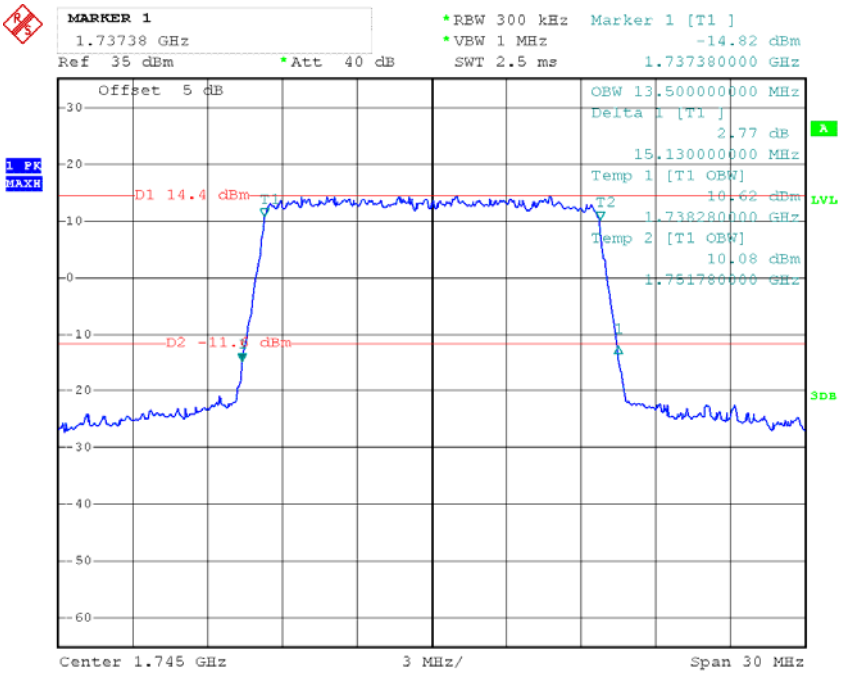
Date: 19.SEP.2018 14:36:31

16QAM_10 MHz



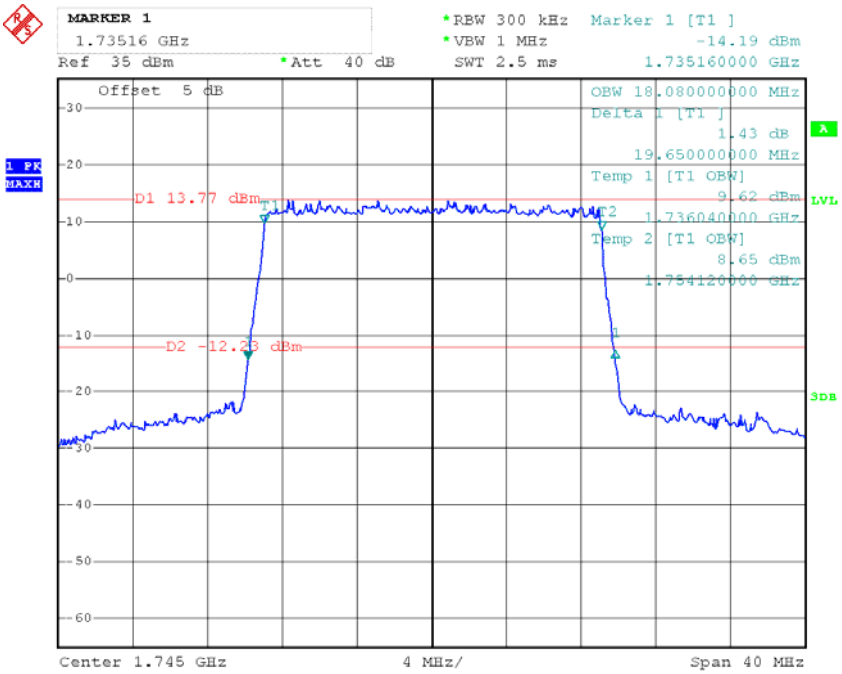
Date: 19.SEP.2018 14:39:24

16QAM_15 MHz



Date: 19.SEP.2018 14:41:50

16QAM_20 MHz



Date: 19.SEP.2018 14:44:29

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

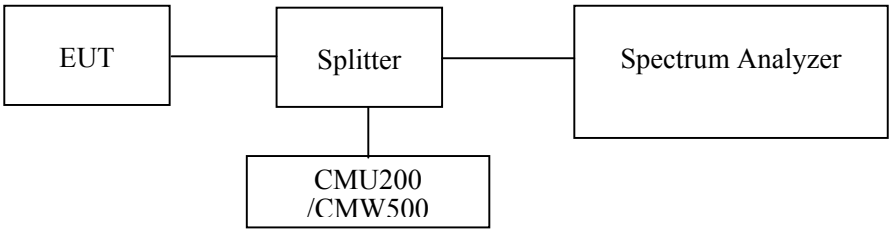
Applicable Standard

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

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

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2018-07-18	2019-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-31	2019-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	EMI Test Receiver	ESPI	100120	2017-12-11	2018-12-11
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04

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

Test Data

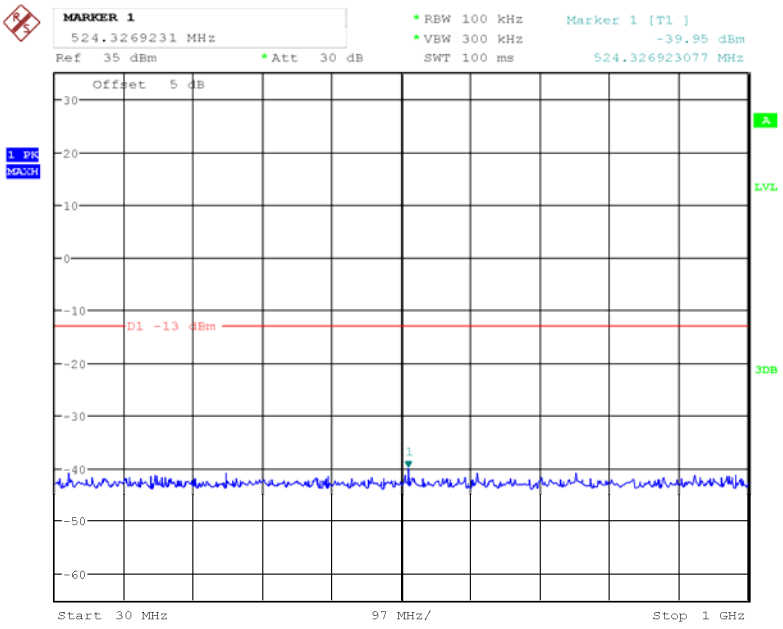
Environmental Conditions

Temperature:	26.9~27.8°C
Relative Humidity:	47 ~ 61 %
ATM Pressure:	100.2~100.8 kPa

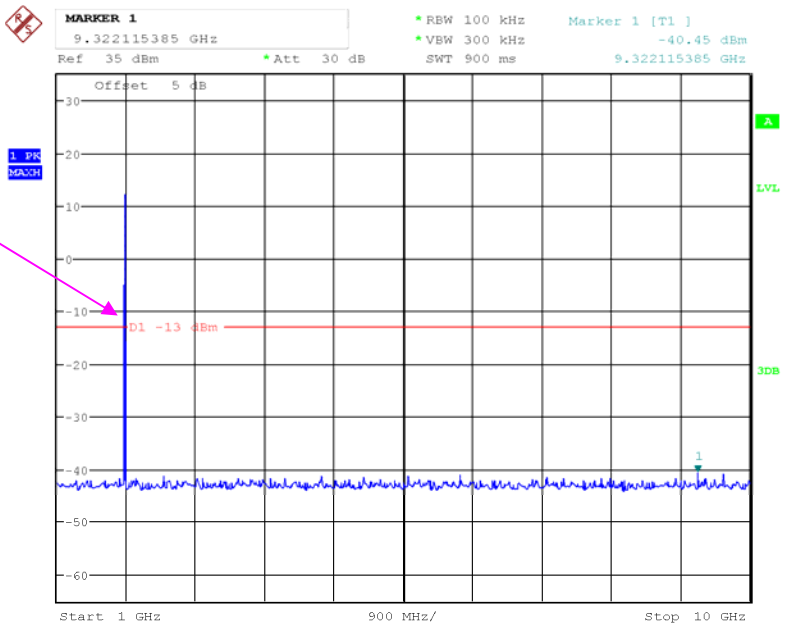
The testing was performed by Elena Lei from 2018-09-19 to 2018-09-24.

Please refer to the following plots.

WCDMA Band II,Rel99

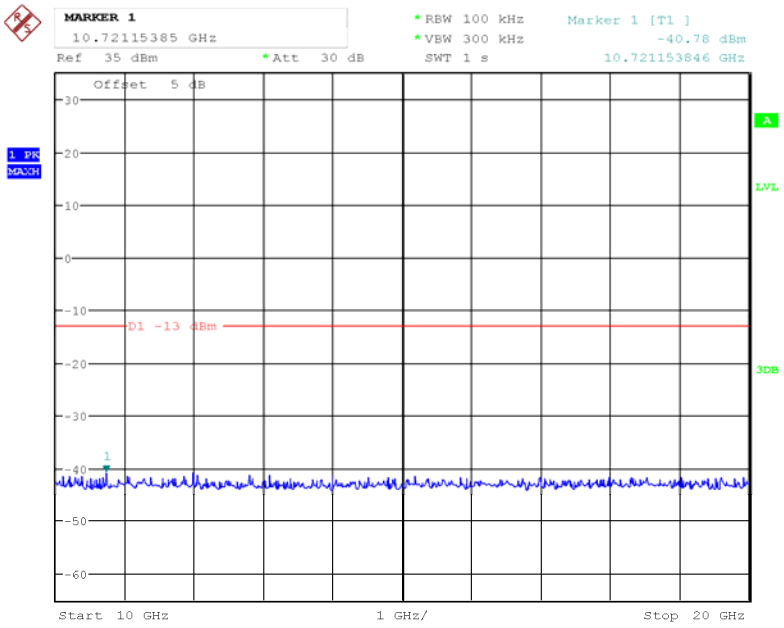


Date: 24.SEP.2018 11:47:55



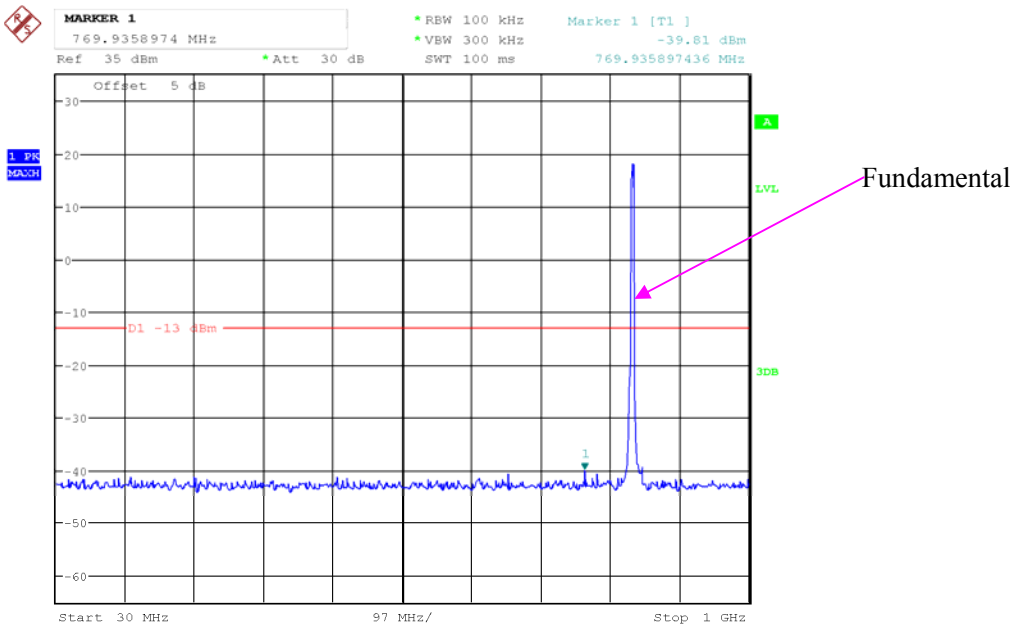
Fundamental

Date: 24.SEP.2018 11:48:31

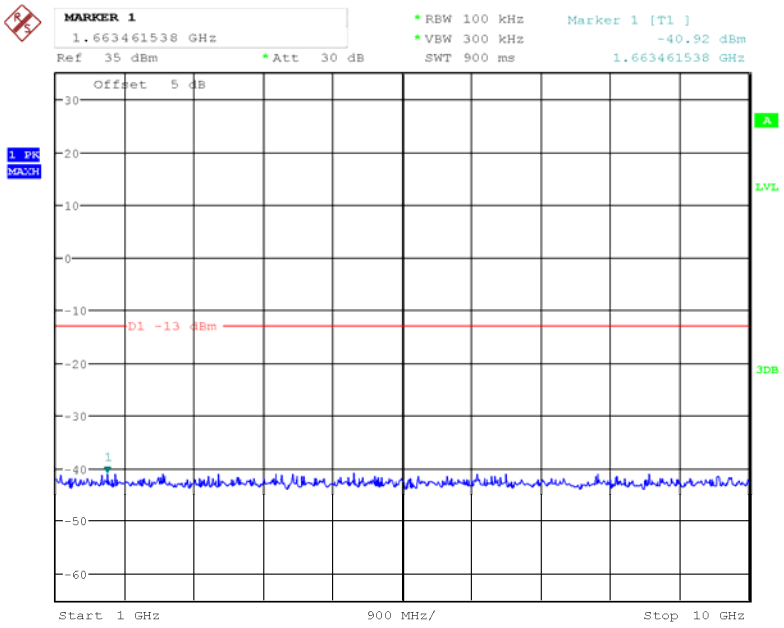


Date: 24.SEP.2018 11:49:03

WCDMA Band V,Rel99

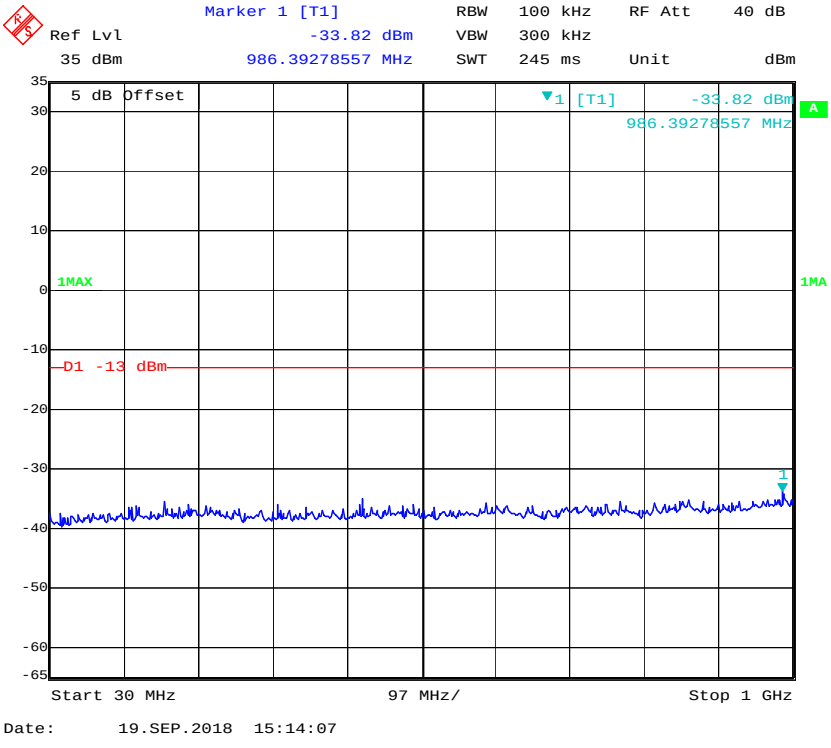


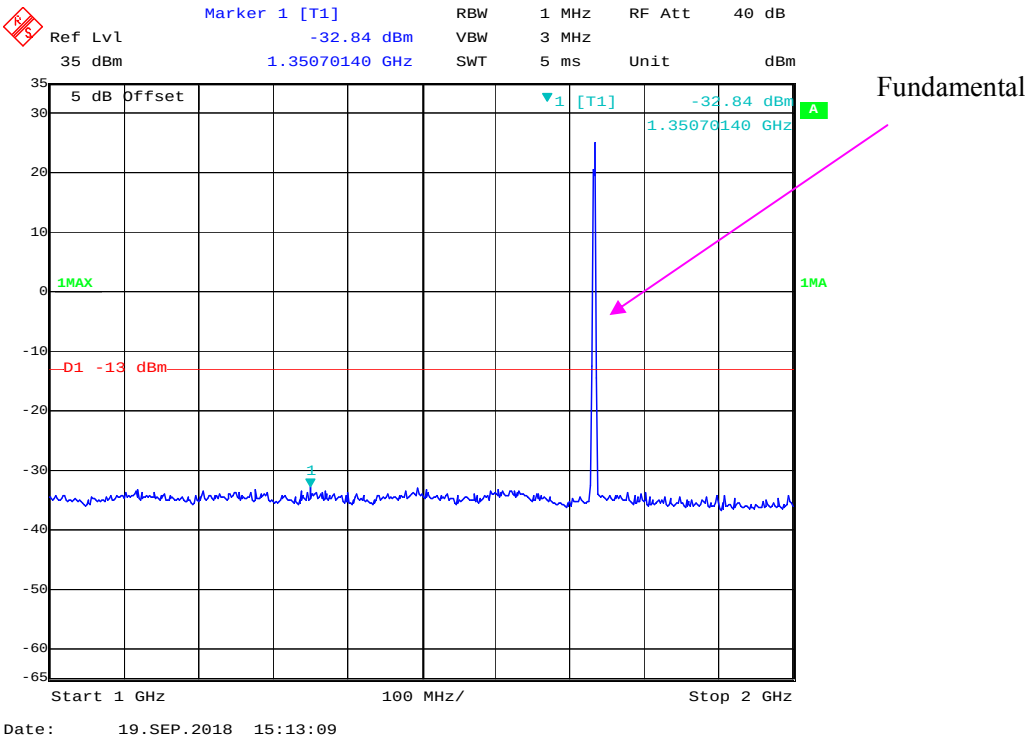
Date: 24.SEP.2018 11:50:04

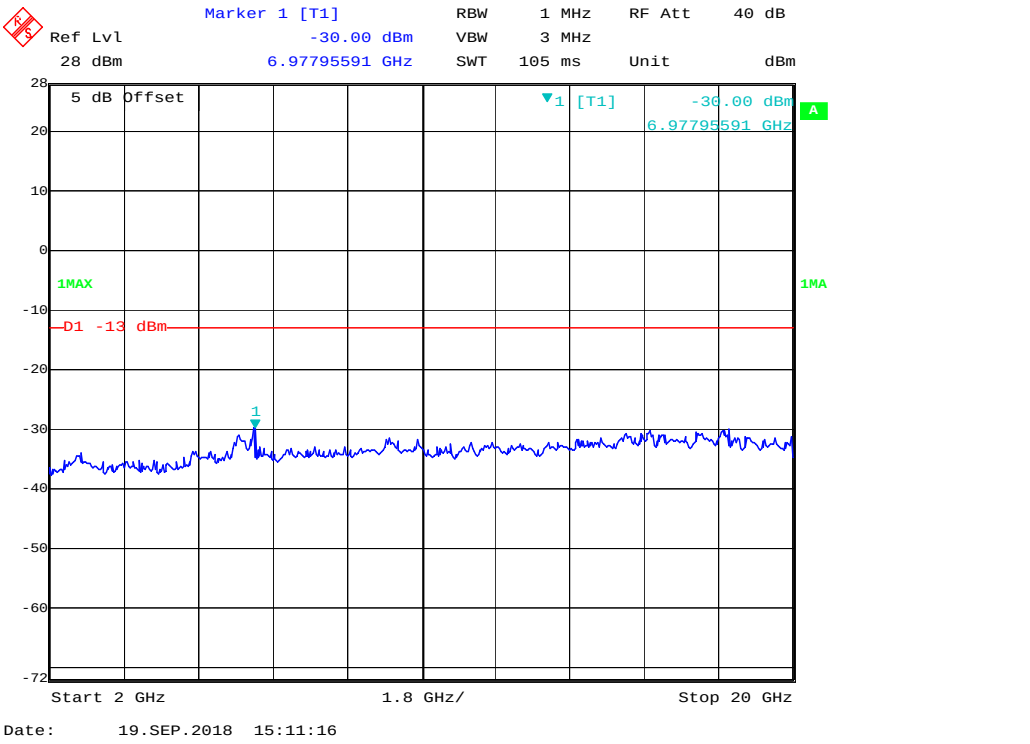


LTE Band 4 (Middle Channel)

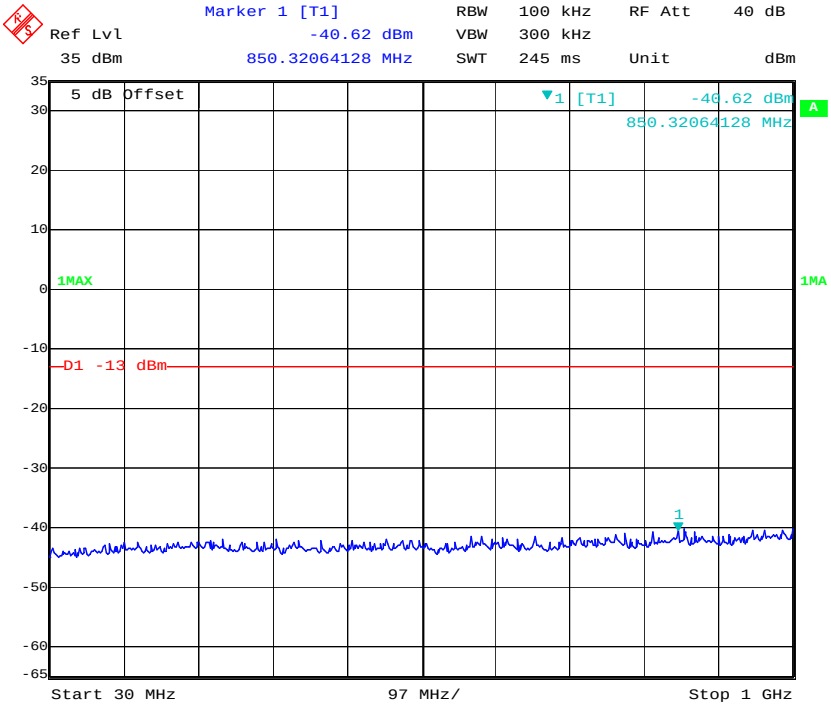
QPSK_1.4 MHz



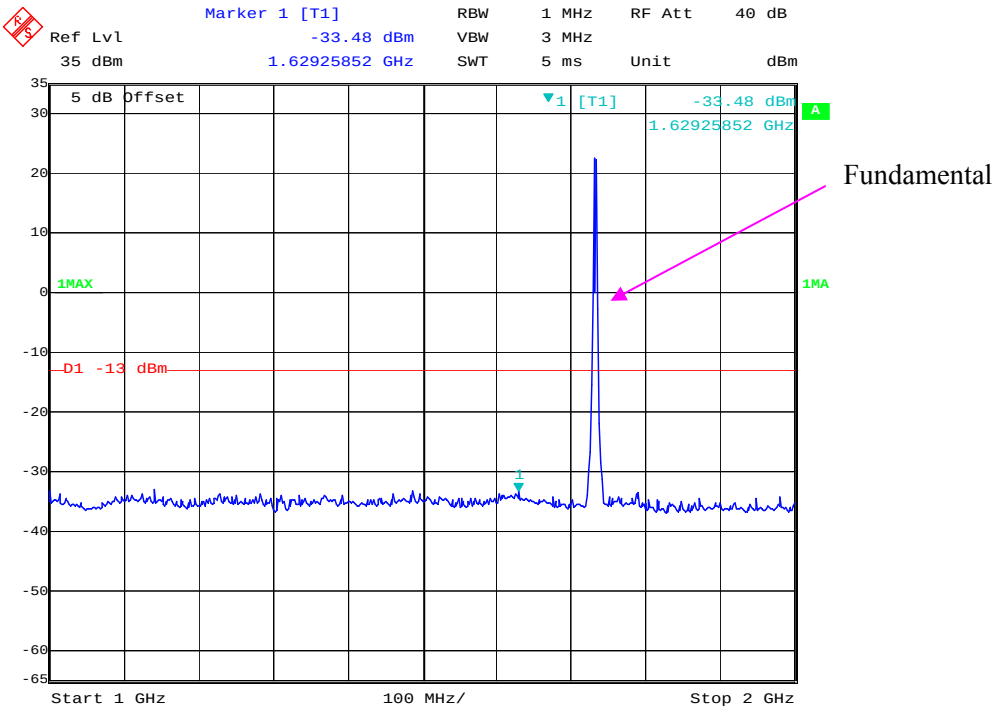

Marker 1 [T1]
Ref Lvl
35 dBm
-32.84 dBm
1.35070140 GHz
RBW 1 MHz
VBW 3 MHz
SWT 5 ms
RF Att 40 dB
Unit dBm
5 dB Offset
1 [T1] -32.84 dBm
1.35070140 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
100 MHz/
Stop 2 GHz
Date: 19.SEP.2018 15:13:09
Fundamental


Marker 1 [T1]
Ref Lvl
28 dBm
-30.00 dBm
6.97795591 GHz
RBW 1 MHz
VBW 3 MHz
SWT 105 ms
RF Att 40 dB
Unit dBm
5 dB Offset
1 [T1] -30.00 dBm
6.97795591 GHz
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:11:16

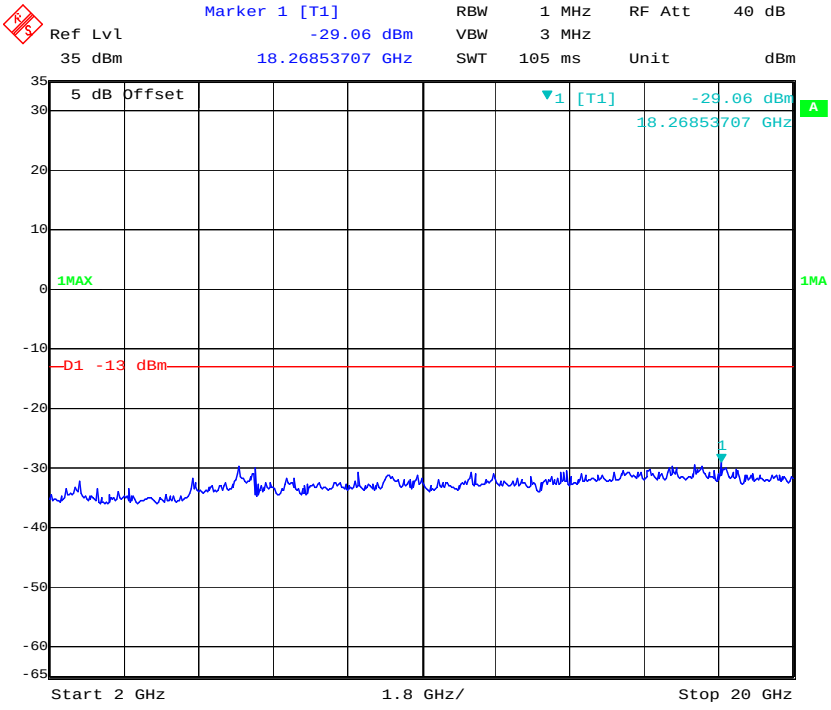
QPSK_3 MHz



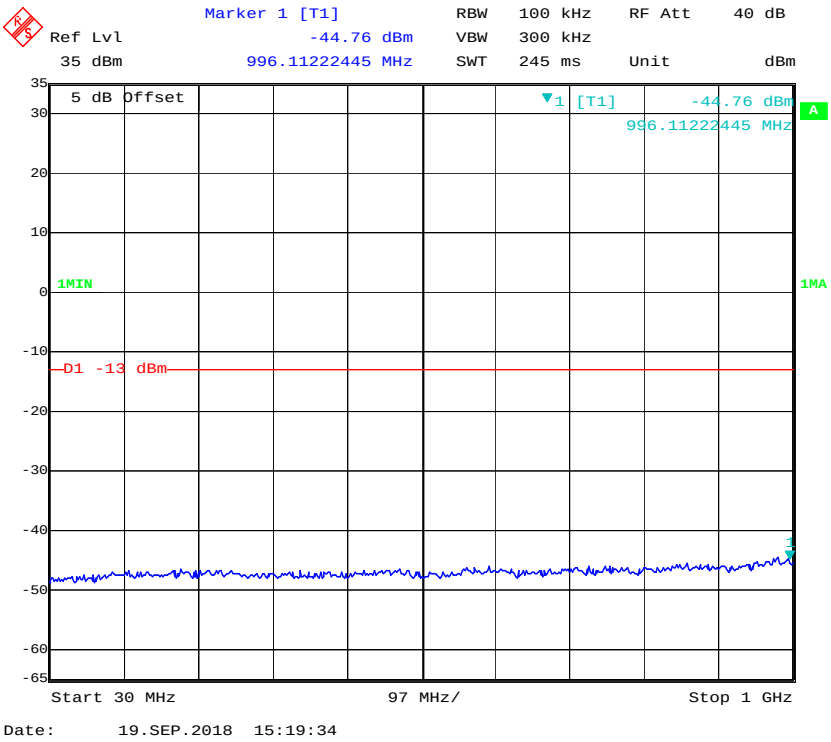
Date: 19.SEP.2018 15:20:09

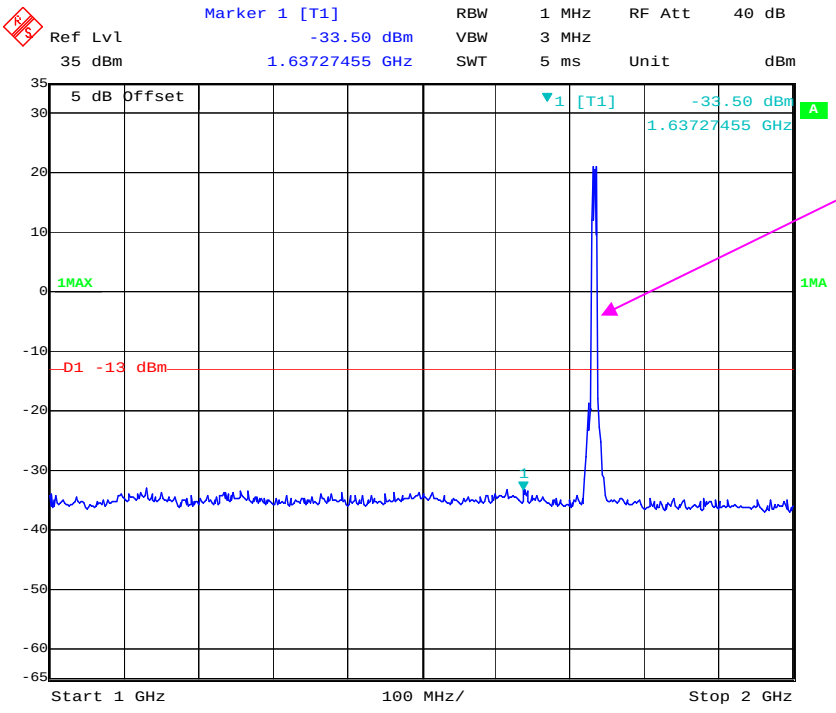


Date: 19.SEP.2018 15:20:48

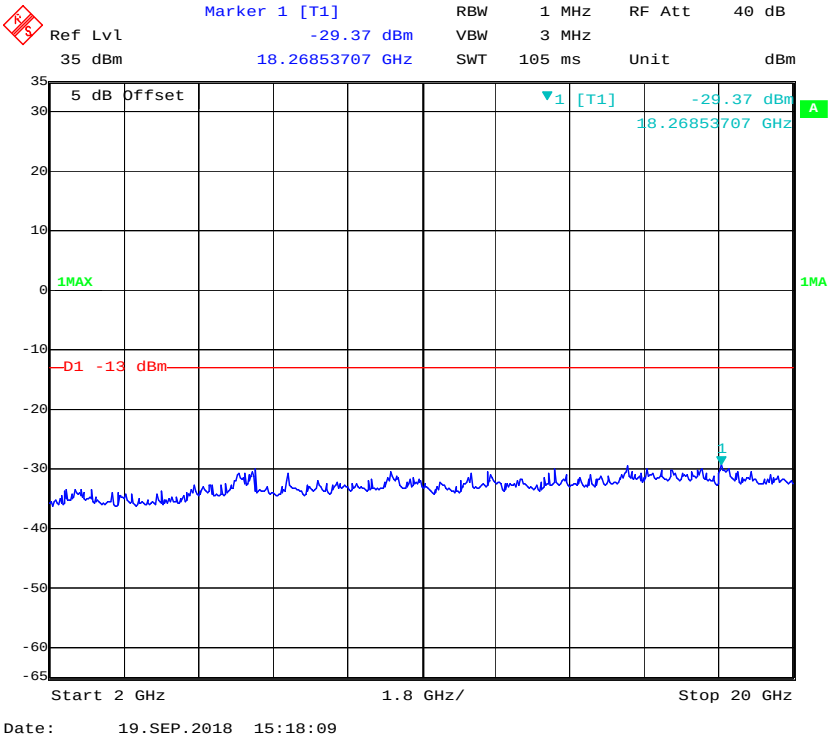

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-29.06 dBm
VBW 3 MHz
35 dBm
18.26853707 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1] -29.06 dBm
18.26853707 GHz
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:22:09

QPSK_5 MHz

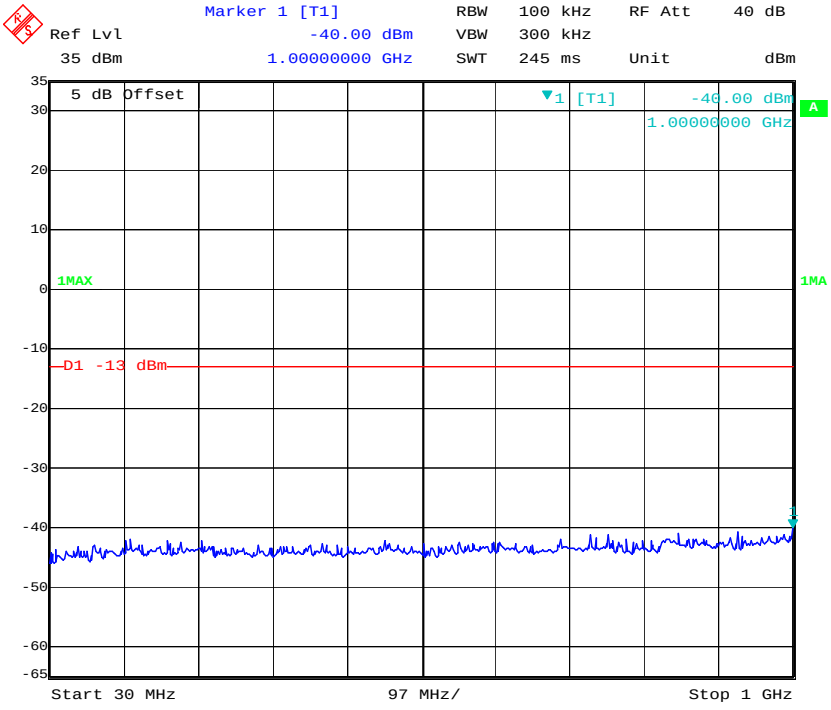

Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-44.76 dBm
VBW 300 kHz
35 dBm
996.11222445 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1] -44.76 dBm
996.11222445 MHz
1MIN
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:19:34

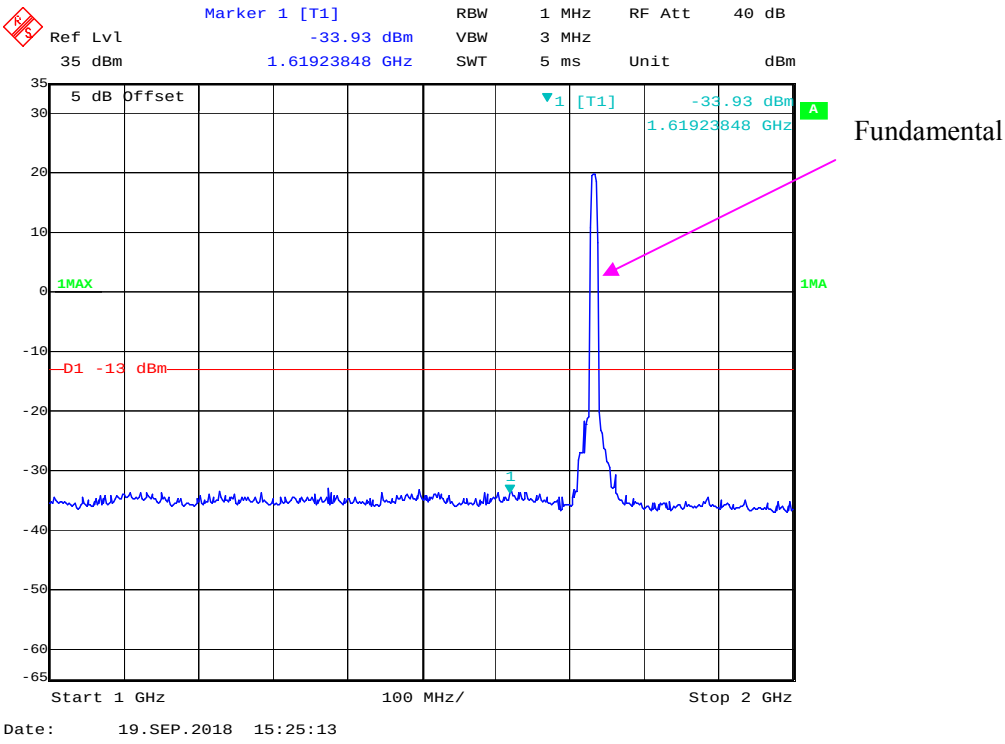


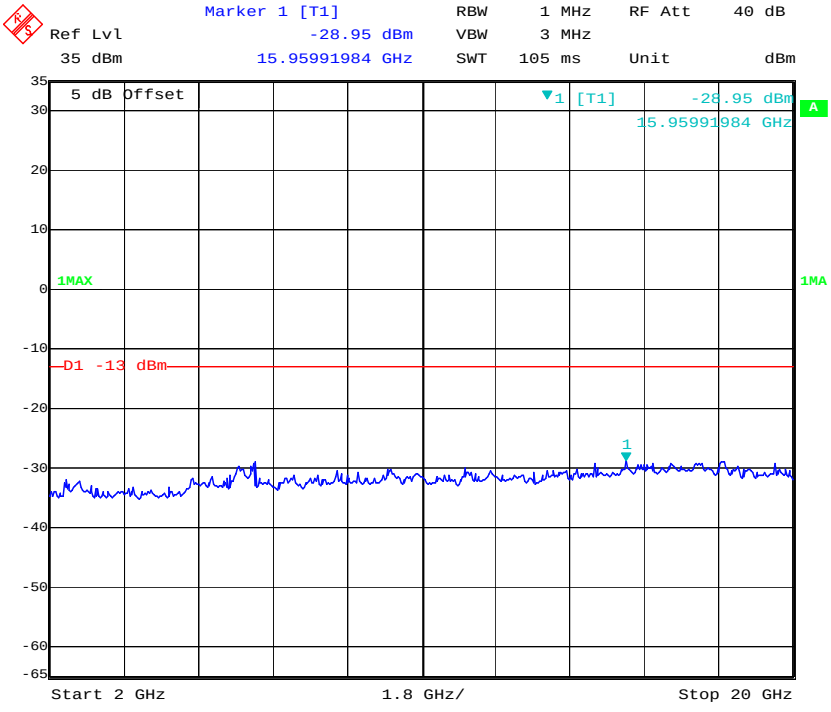
Fundamental



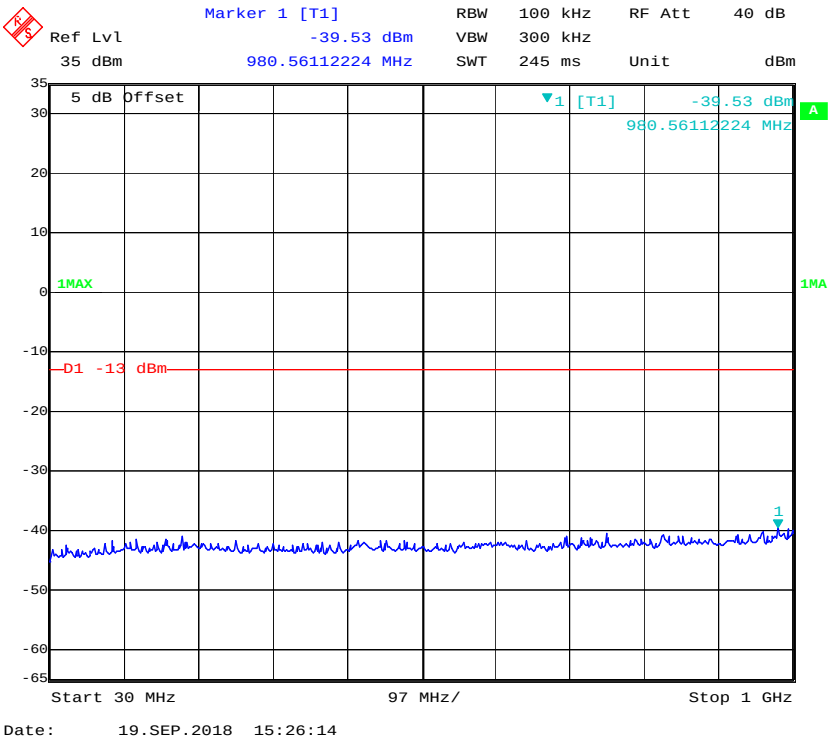
QPSK_10 MHz

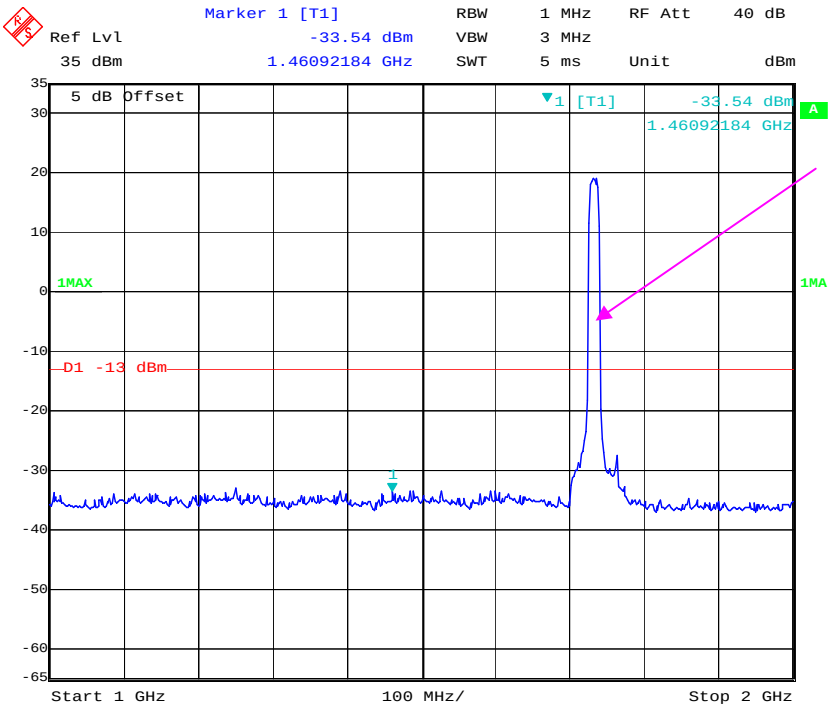

Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-40.00 dBm
VBW 300 kHz
35 dBm
1.00000000 GHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1]
-40.00 dBm
1.00000000 GHz
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:25:40


Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-33.93 dBm
VBW 3 MHz
35 dBm
1.61923848 GHz
SWT 5 ms
Unit dBm
5 dB Offset
1 [T1]
-33.93 dBm
1.61923848 GHz
1MAX
1MA
D1 -13 dBm
Fundamental
Start 1 GHz
100 MHz/
Stop 2 GHz
Date: 19.SEP.2018 15:25:13

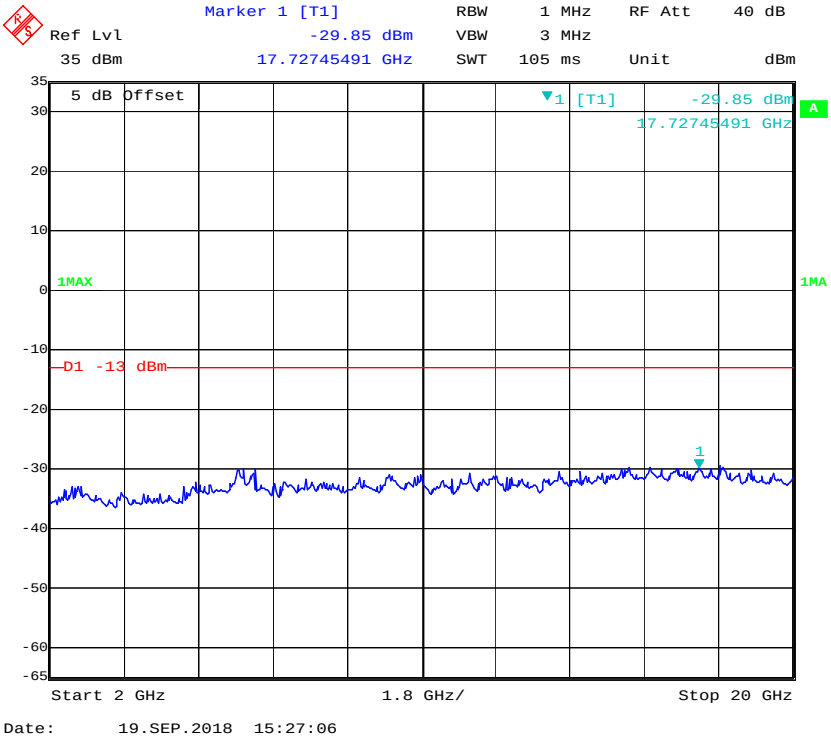

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-28.95 dBm
VBW 3 MHz
35 dBm
15.95991984 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1]
-28.95 dBm
15.95991984 GHz
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:24:39

QPSK_15 MHz

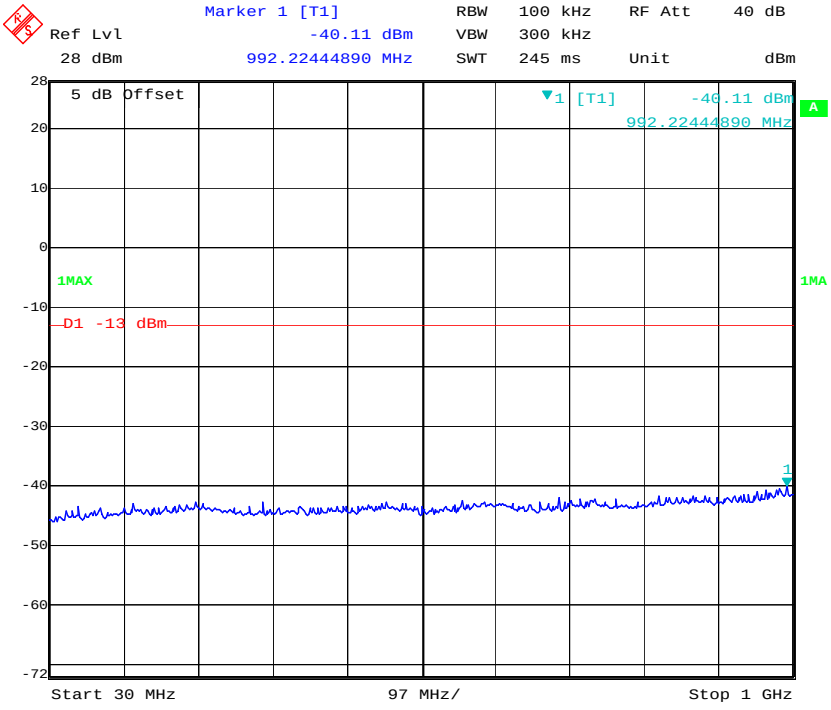

Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-39.53 dBm
VBW 300 kHz
35 dBm
980.56112224 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1]
-39.53 dBm
980.56112224 MHz
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:26:14



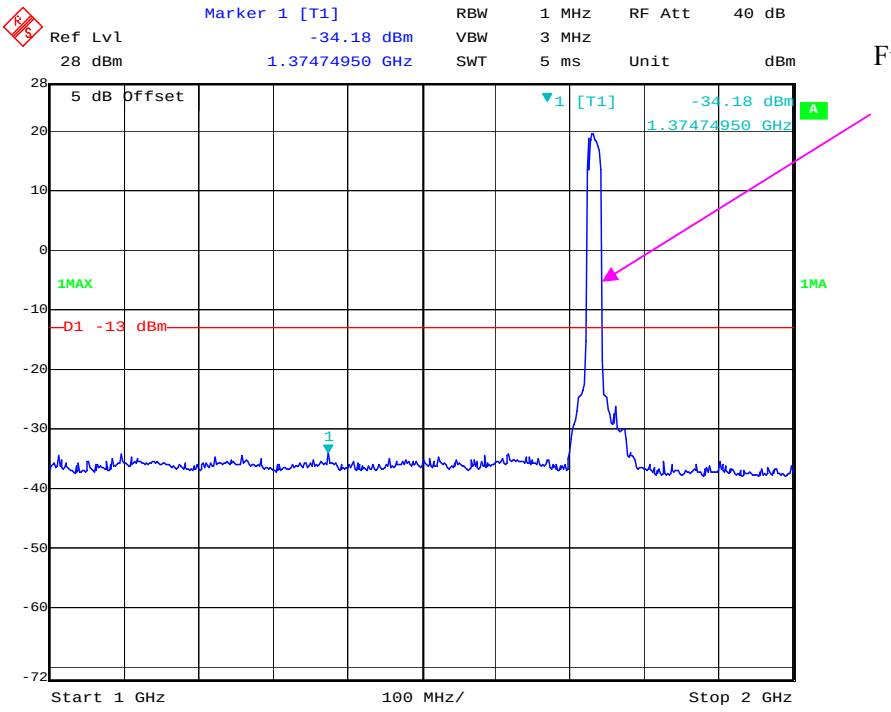
Fundamental



QPSK_20 MHz

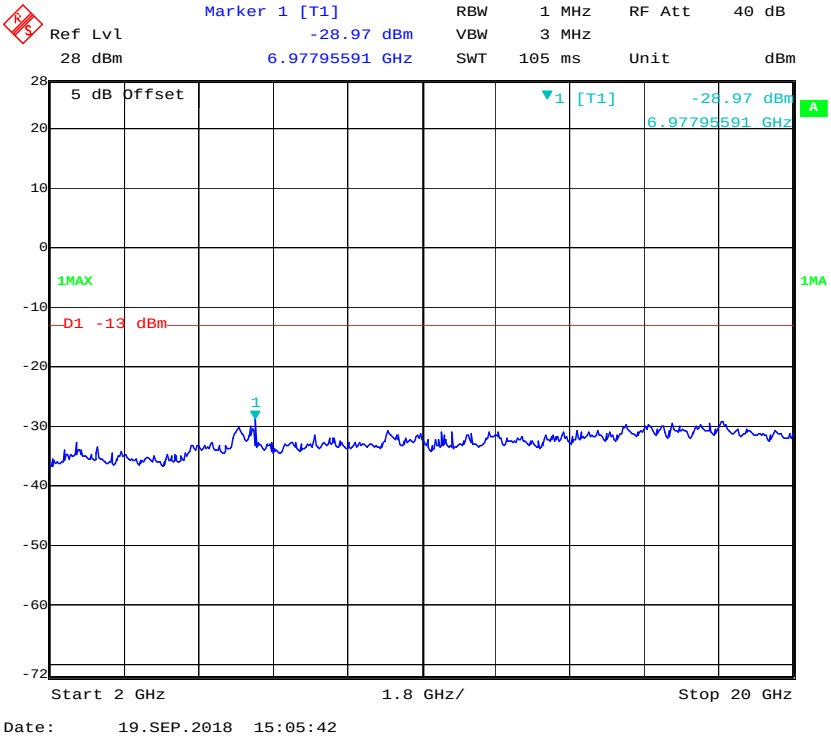


Date: 19.SEP.2018 15:01:10



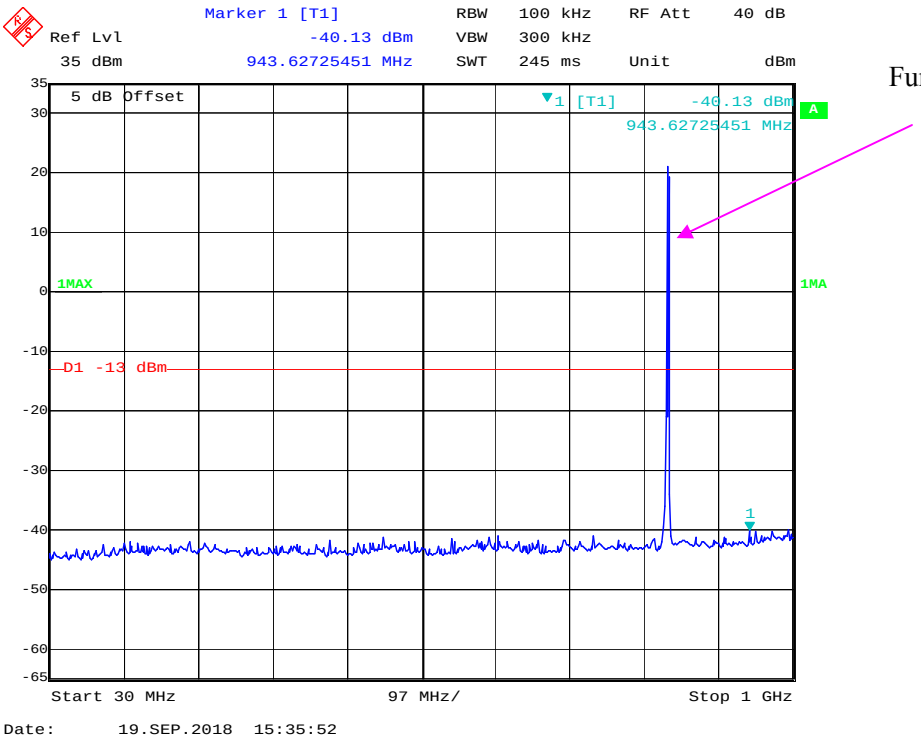
Fundamental

Date: 19.SEP.2018 15:02:48

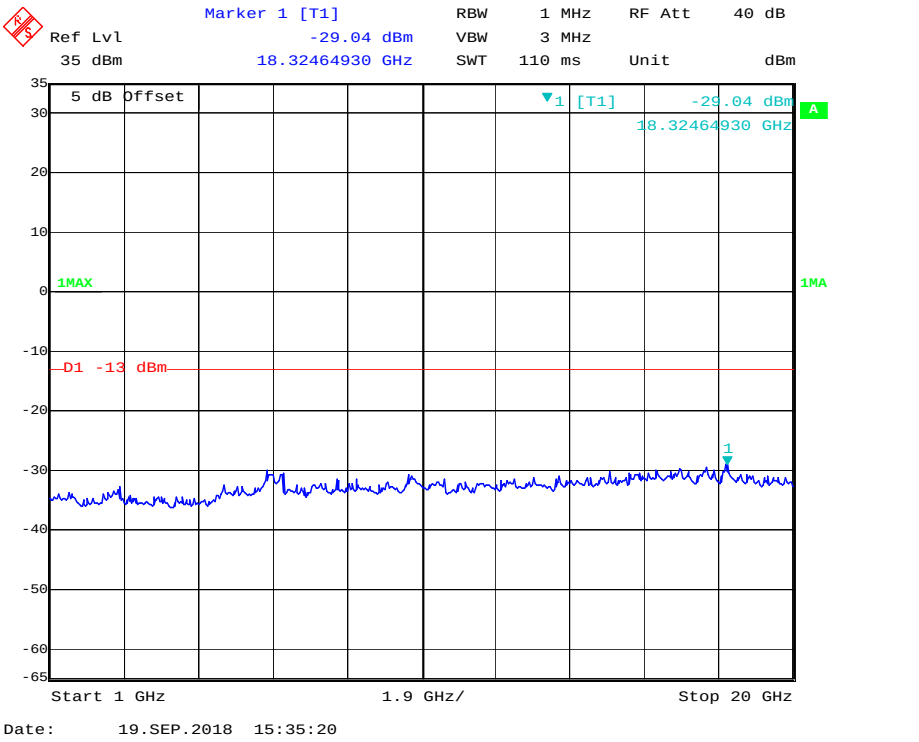

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-28.97 dBm
VBW 3 MHz
28 dBm
6.97795591 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1]
-28.97 dBm
6.97795591 GHz
A
1MAX
1MA
D1 -13 dBm
28
20
10
0
-10
-20
-30
-40
-50
-60
-72
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:05:42

LTE Band 5 (Middle Channel)

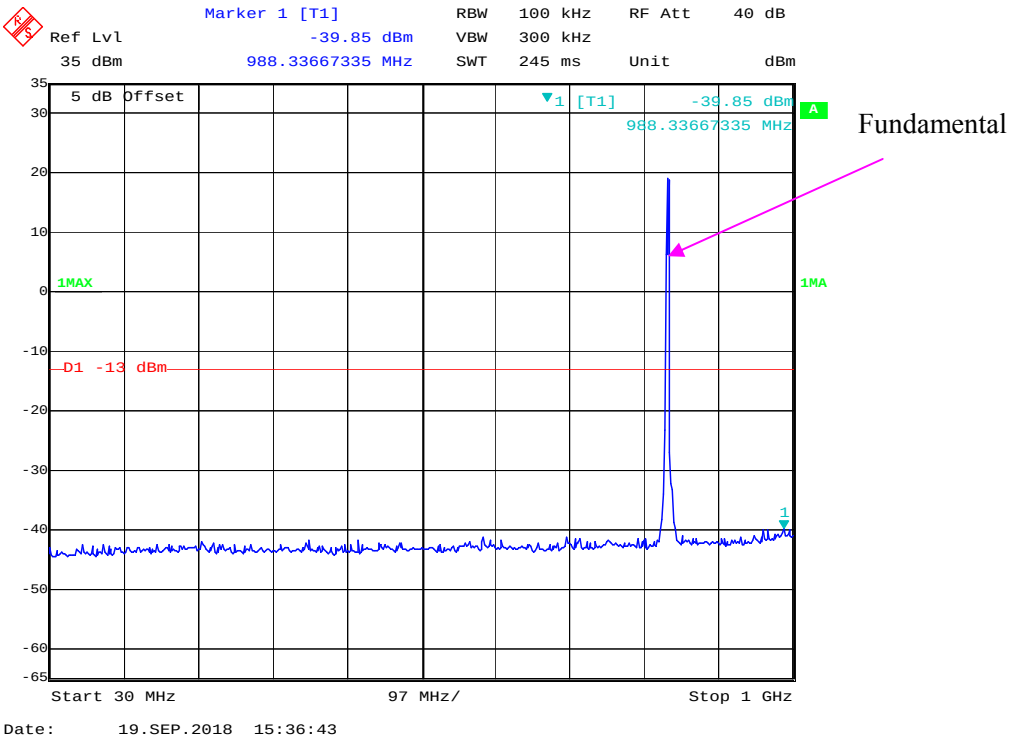
QPSK_1.4 MHz



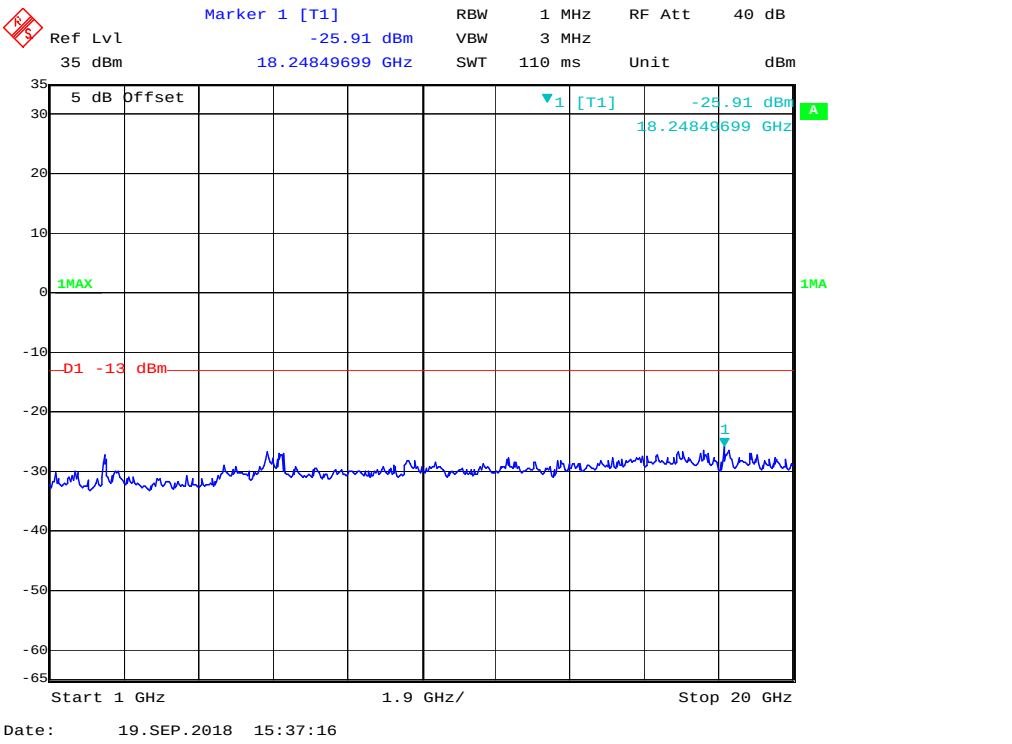
Fundamental



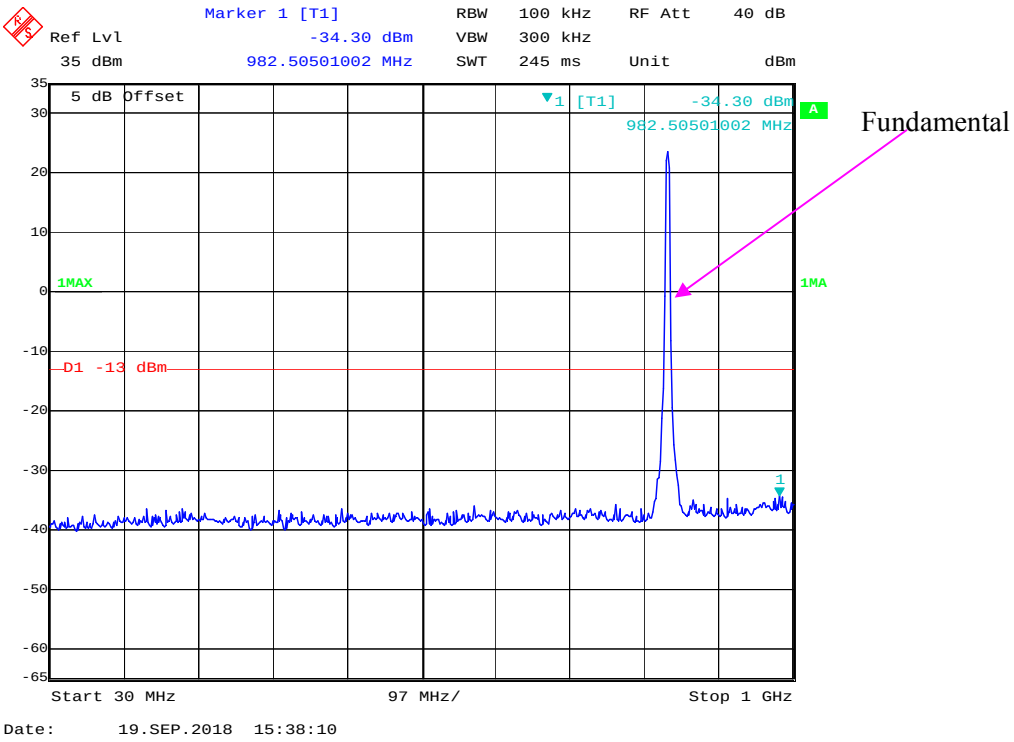
QPSK_3 MHz

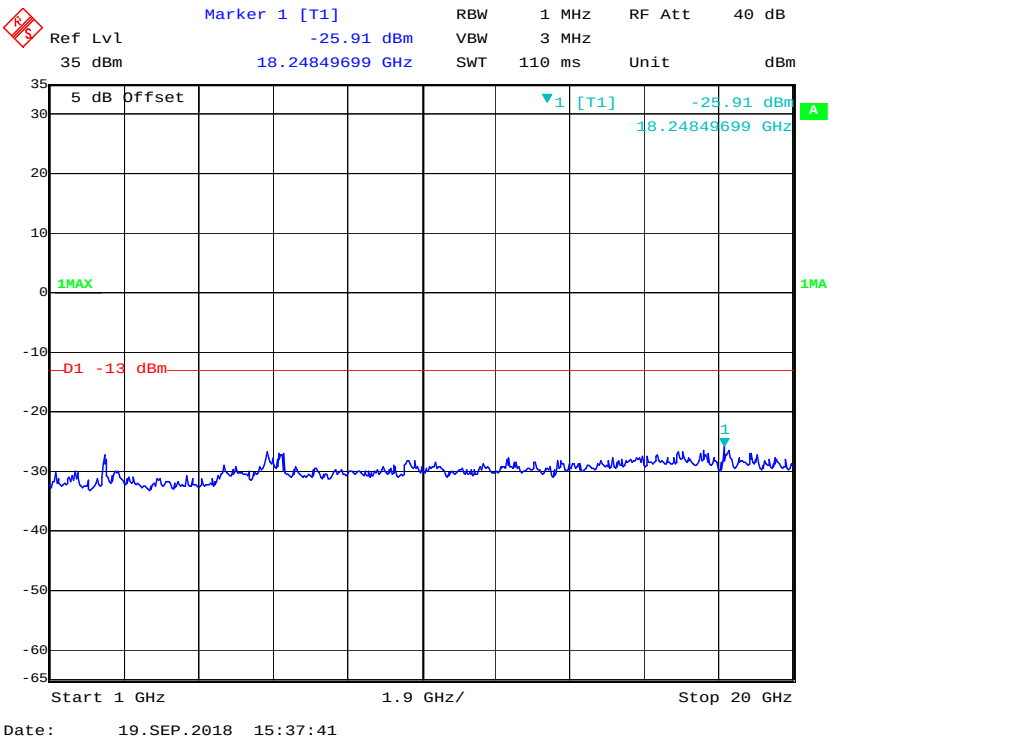


Fundamental

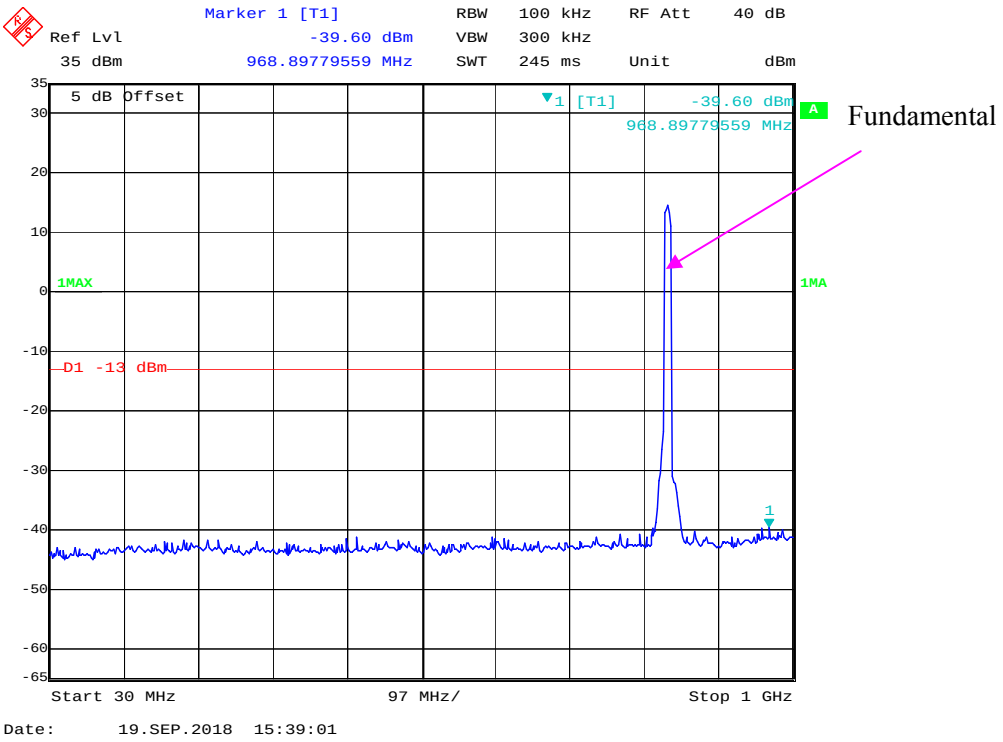


QPSK_5 MHz

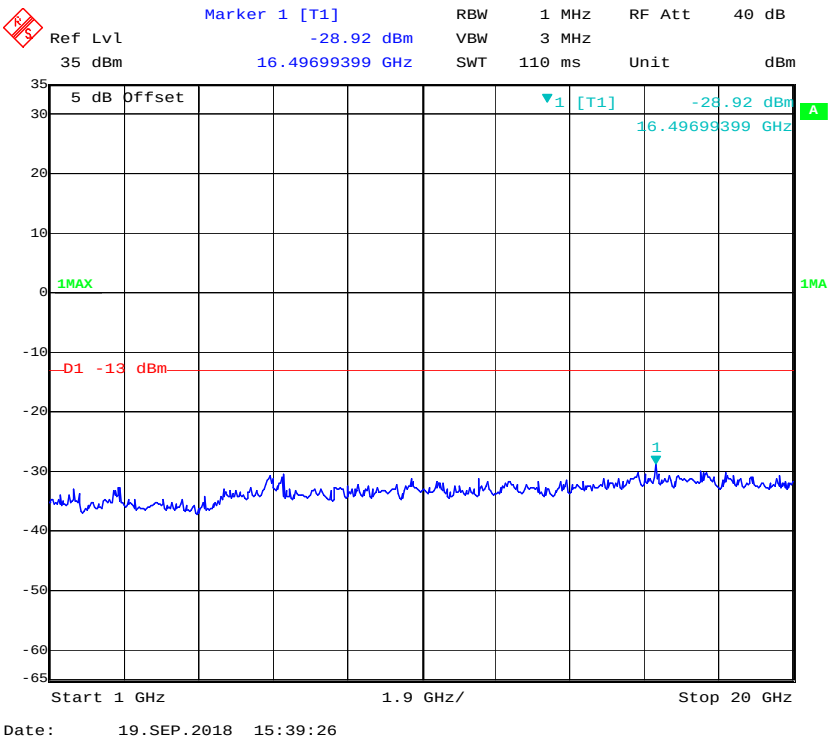

Marker 1 [T1]
Ref Lvl
35 dBm
-34.30 dBm
982.50501002 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 40 dB
Unit dBm
5 dB Offset
1 [T1] -34.30 dBm
982.50501002 MHz
1MAX
1MA
D1 -13 dBm
Fundamental
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:38:10


Marker 1 [T1]
Ref Lvl
35 dBm
-25.91 dBm
18.24849699 GHz
RBW 1 MHz
VBW 3 MHz
SWT 110 ms
RF Att 40 dB
Unit dBm
5 dB Offset
1 [T1] -25.91 dBm
18.24849699 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.9 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:37:41

QPSK_10 MHz



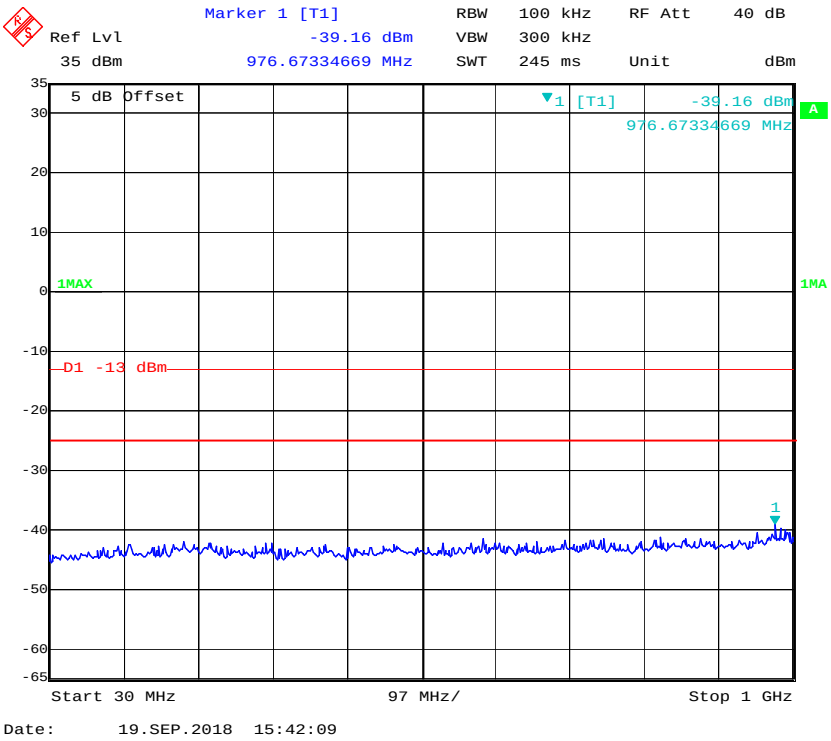
Date: 19.SEP.2018 15:39:01

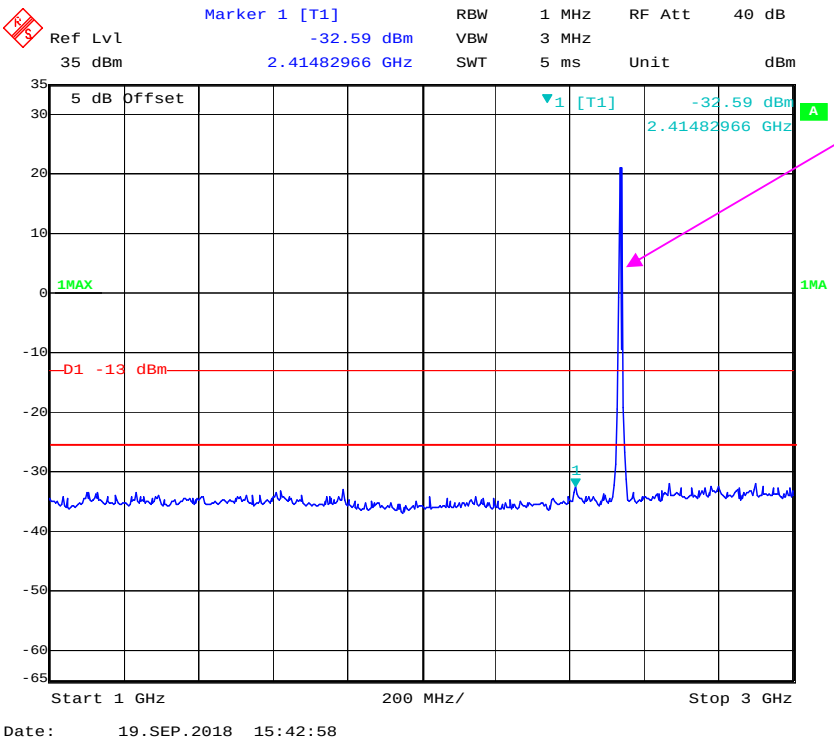


Date: 19.SEP.2018 15:39:26

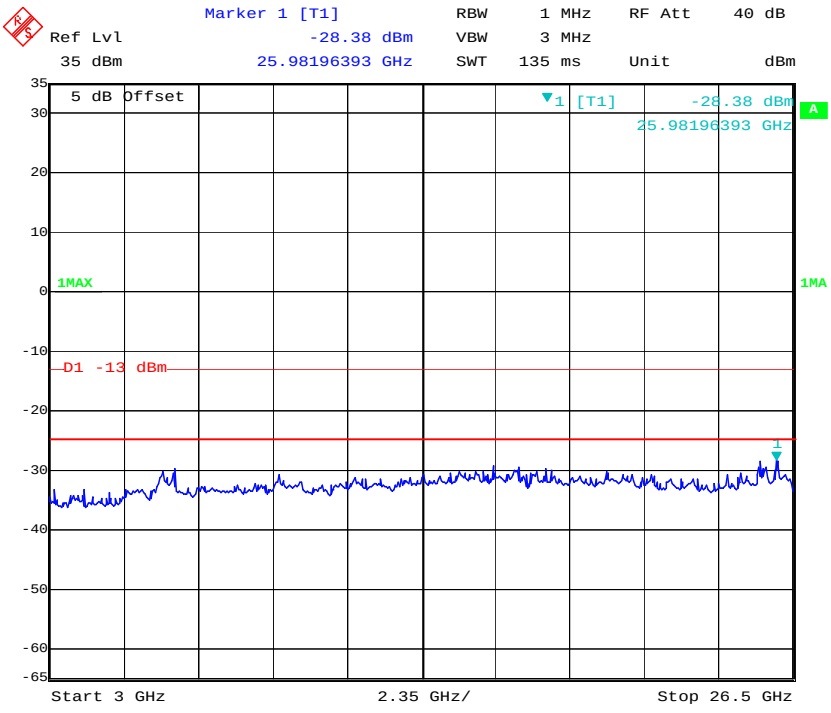
LTE Band 7 (Middle Channel, the emissions under limit -25dBm)

QPSK_5 MHz

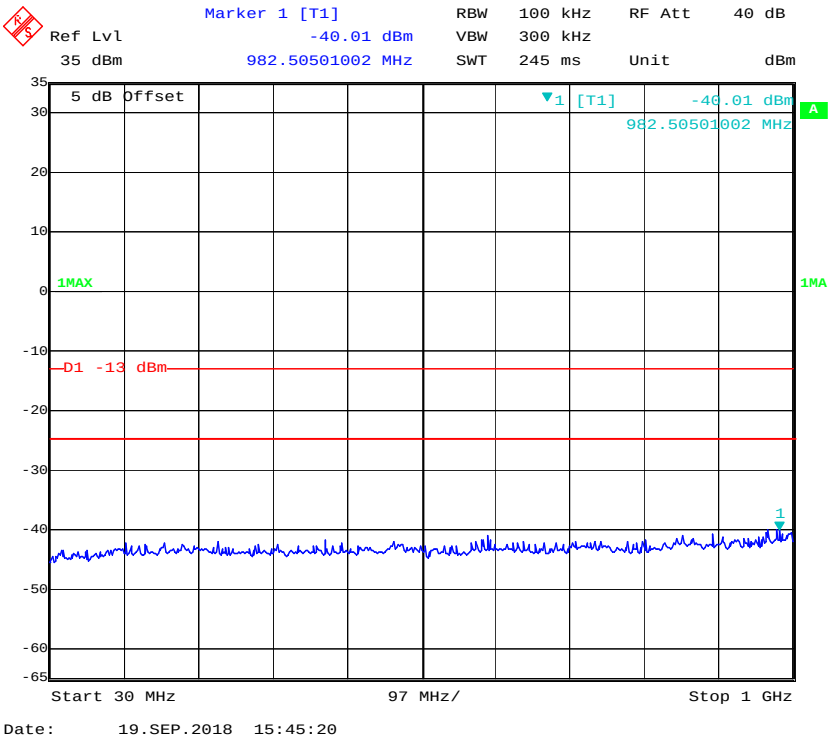


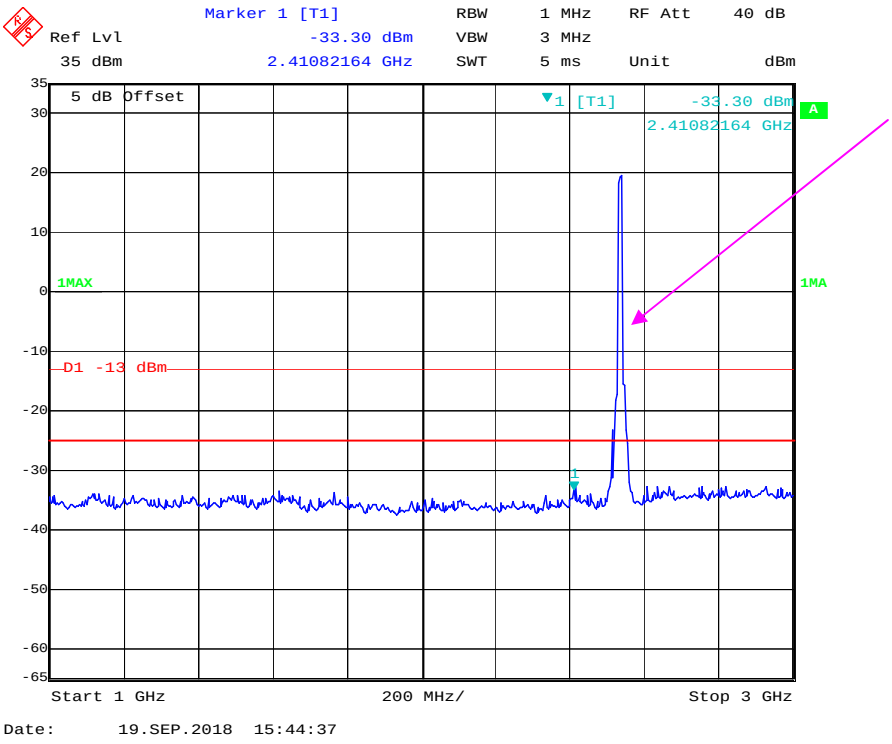


Fundamental

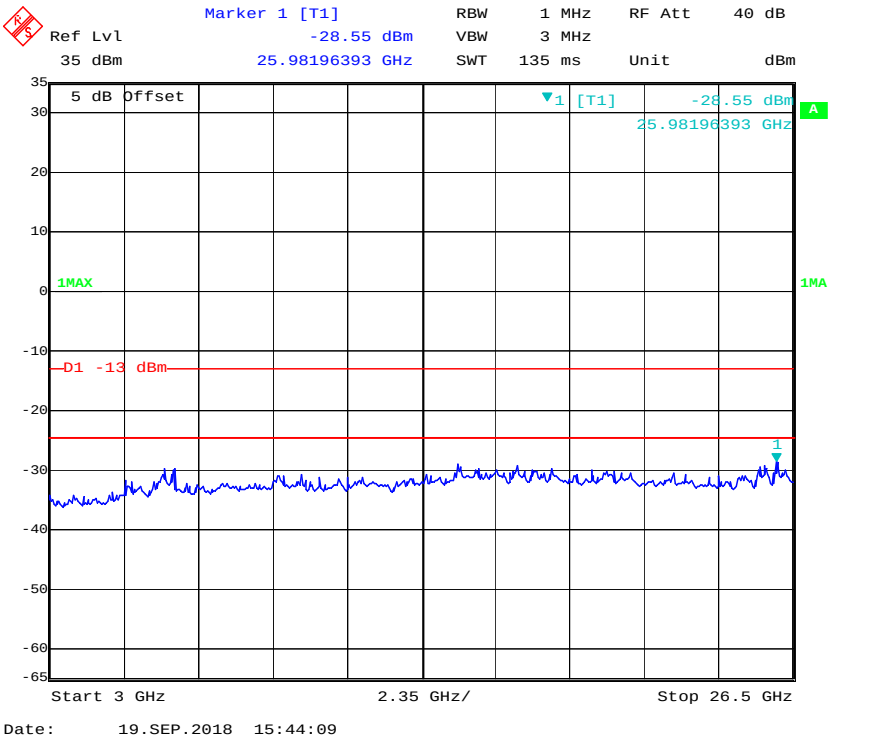

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-28.38 dBm
VBW 3 MHz
35 dBm
25.98196393 GHz
SWT 135 ms
Unit dBm
5 dB Offset
1 [T1] -28.38 dBm
25.98196393 GHz
1MAX
1MA
D1 -13 dBm
Start 3 GHz
2.35 GHz/
Stop 26.5 GHz
Date: 19.SEP.2018 15:43:30

QPSK_10 MHz

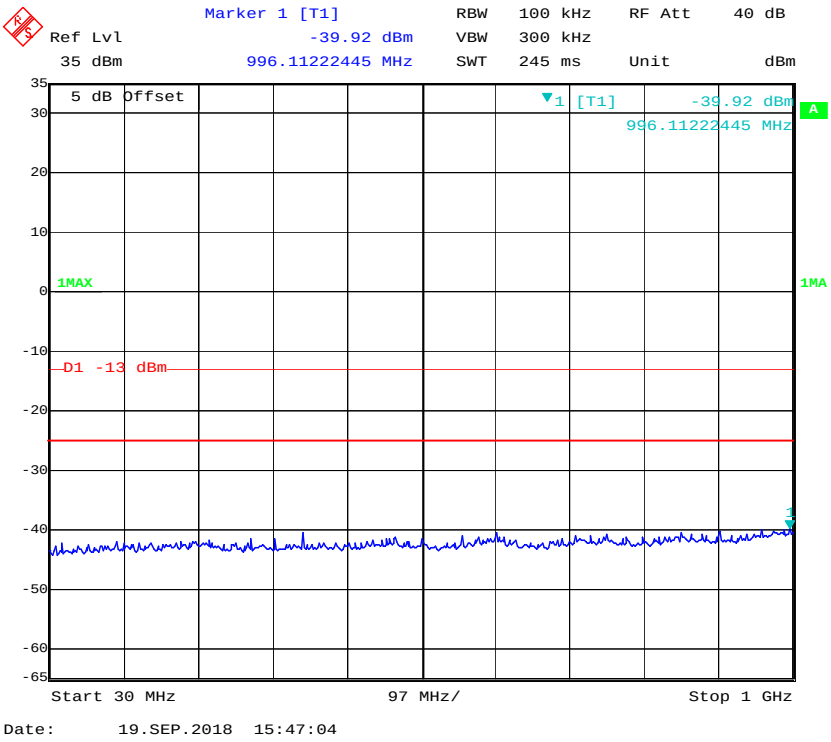

Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-40.01 dBm
VBW 300 kHz
35 dBm
982.50501002 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1] -40.01 dBm
982.50501002 MHz
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:45:20

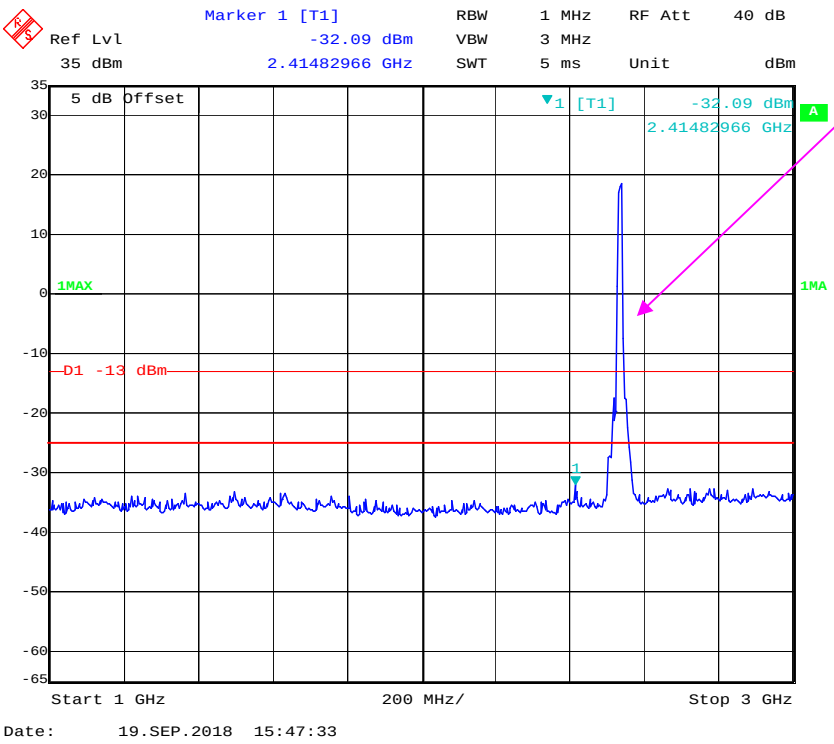


Fundamental

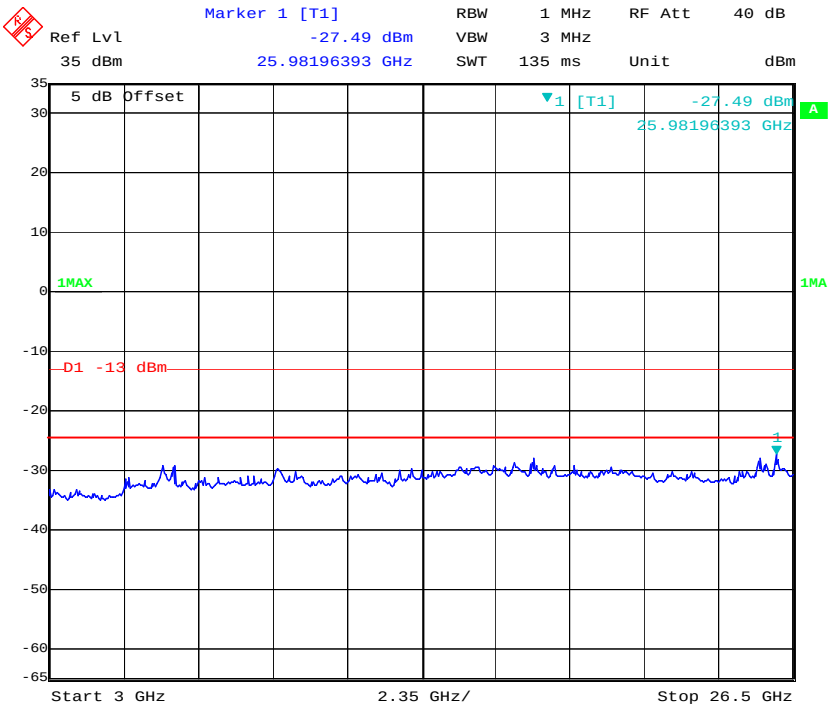


QPSK_15 MHz

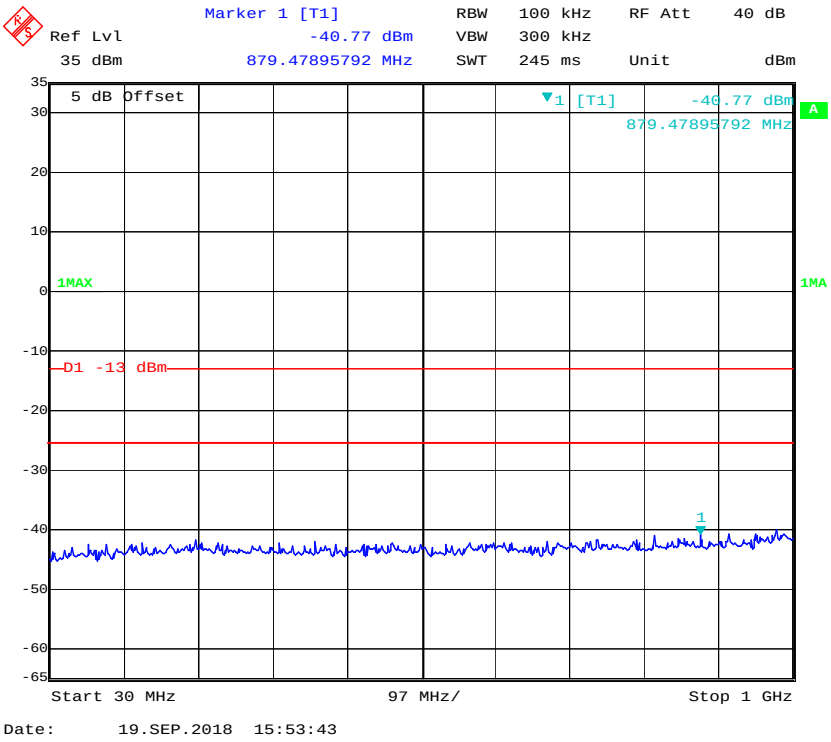




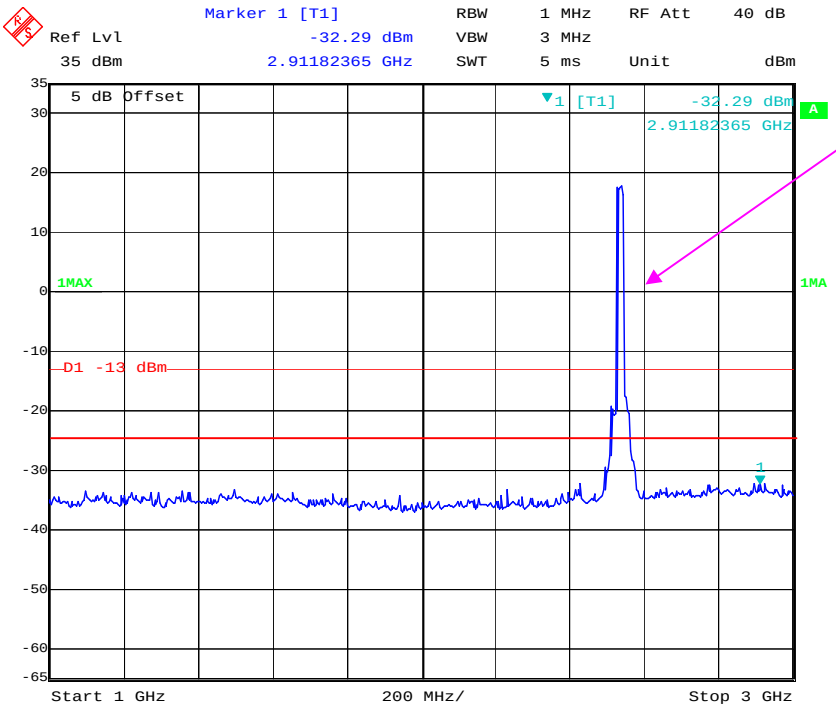
Fundamental

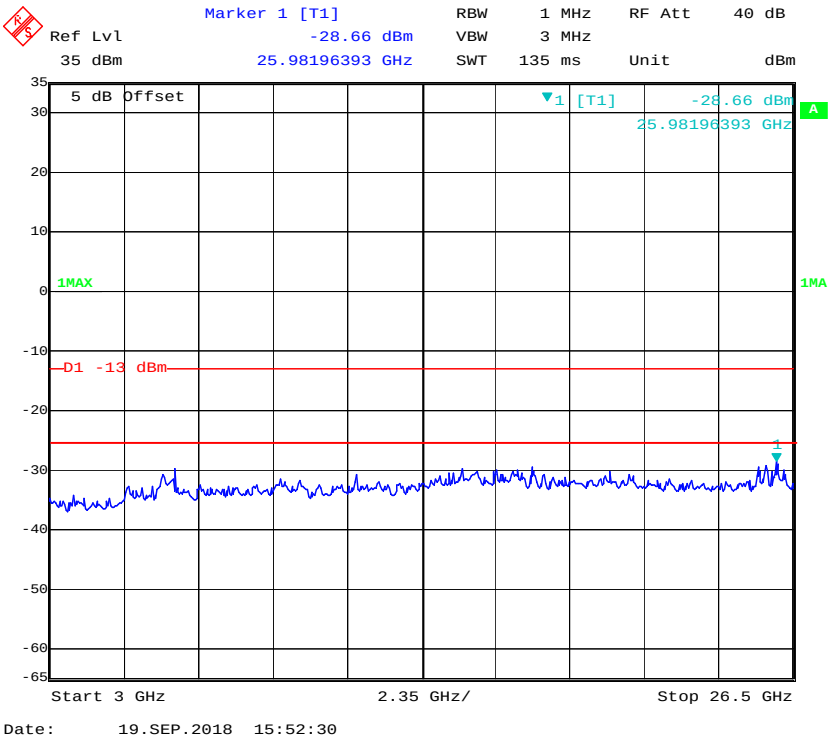

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-27.49 dBm
VBW 3 MHz
35 dBm
25.98196393 GHz
SWT 135 ms
Unit dBm
5 dB Offset
1 [T1]
-27.49 dBm
25.98196393 GHz
1MAX
1MA
D1 -13 dBm
Start 3 GHz
2.35 GHz/
Stop 26.5 GHz
Date: 19.SEP.2018 15:51:41

QPSK_20 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-40.77 dBm
VBW 300 kHz
35 dBm
879.47895792 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1]
879.47895792 MHz
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:53:43

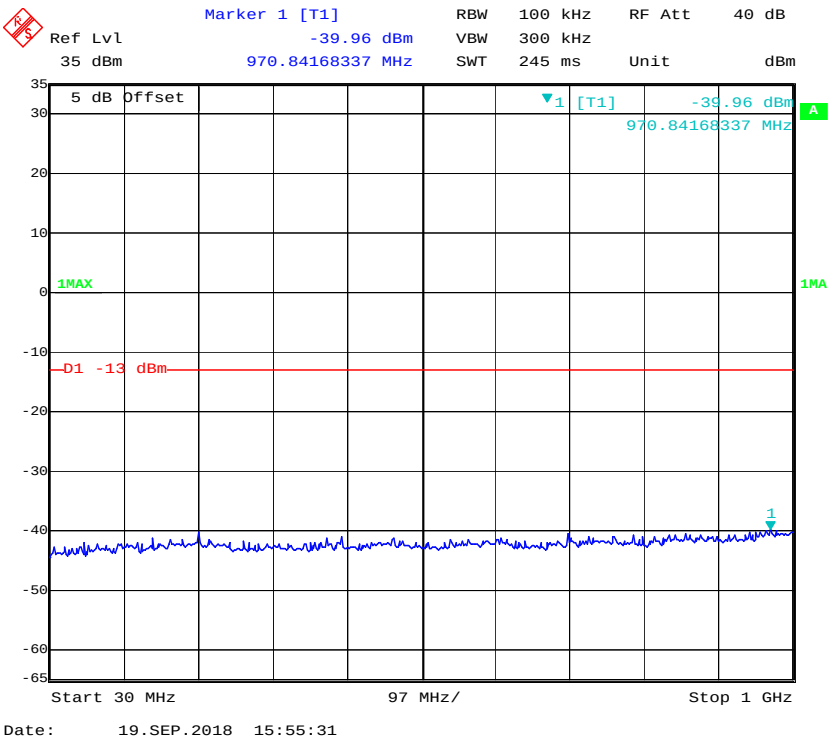
Fundamental

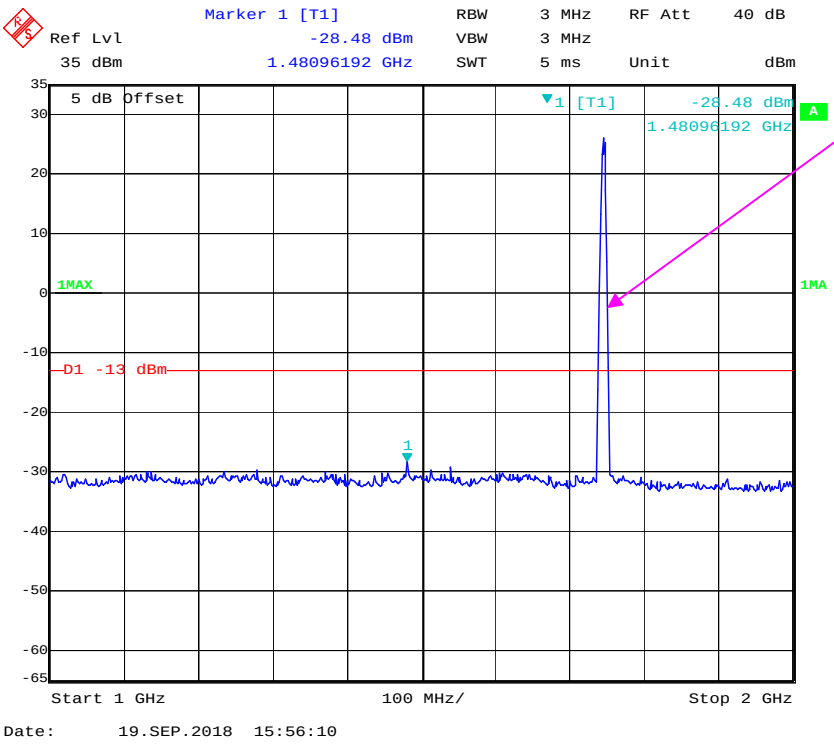




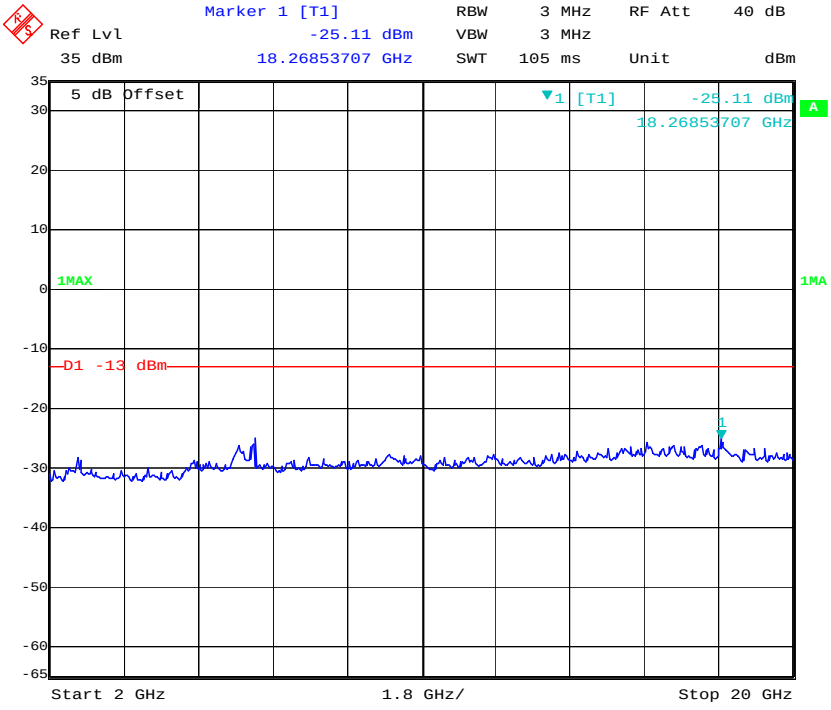
LTE Band 66 (Middle Channel)

QPSK_1.4 MHz

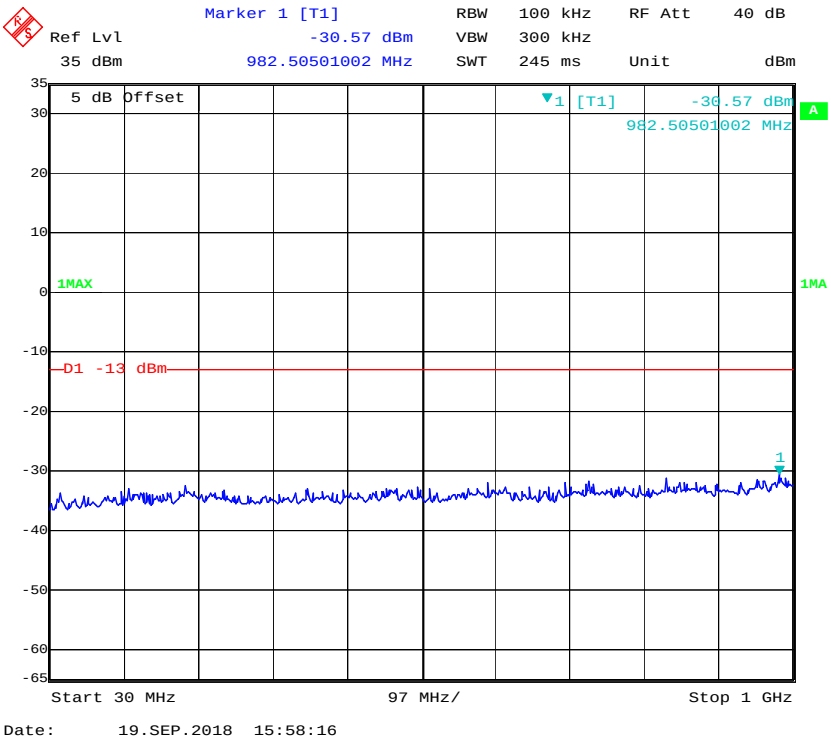


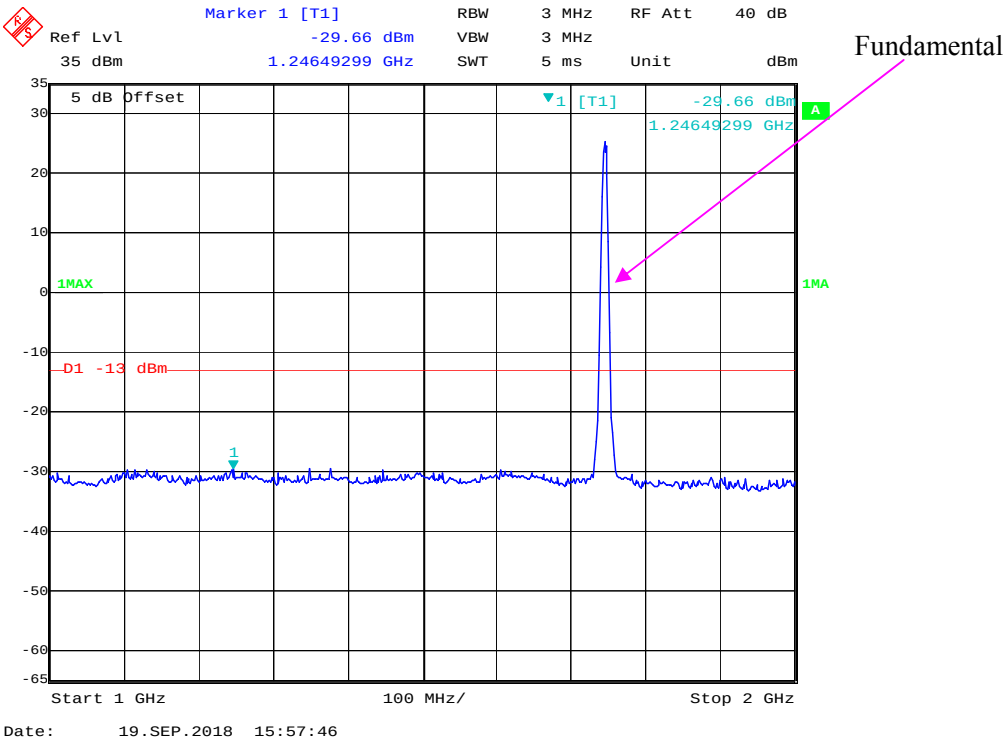


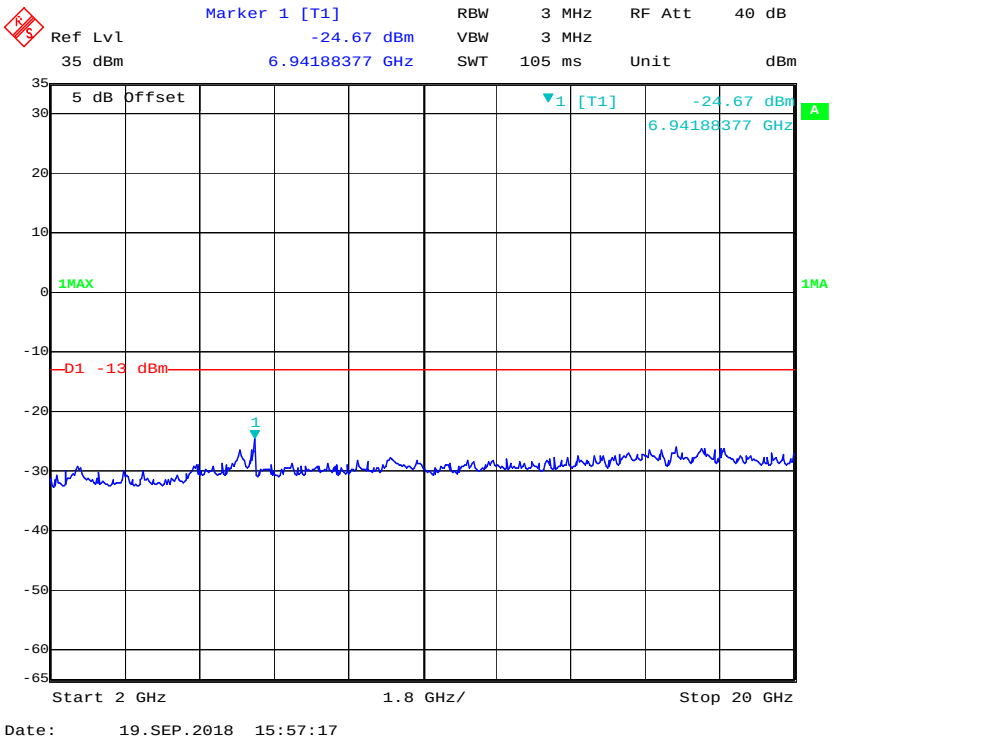
Fundamental


Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
-25.11 dBm
VBW 3 MHz
35 dBm
18.26853707 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1] -25.11 dBm
18.26853707 GHz
A
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:56:32

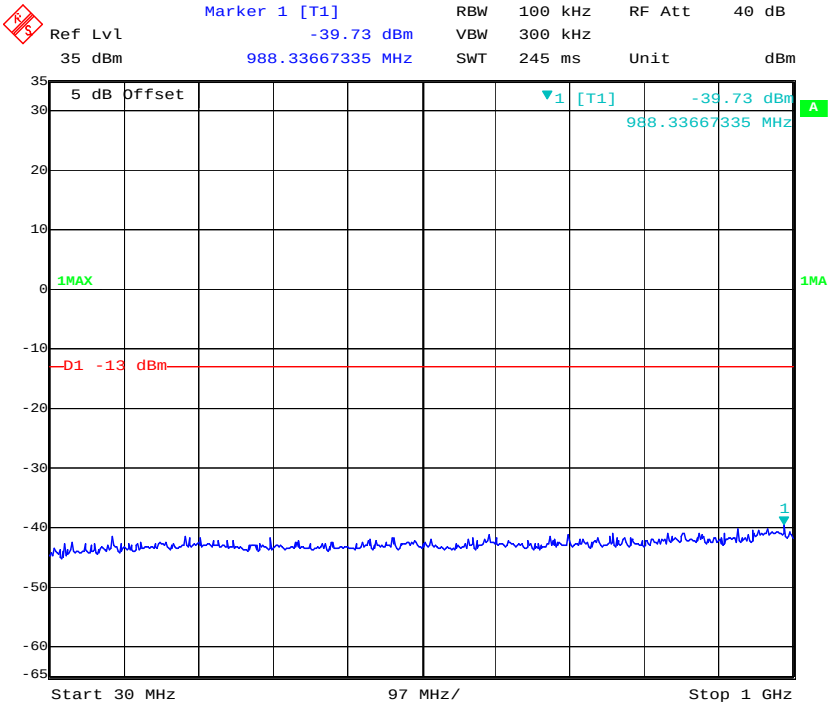
QPSK_3 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-30.57 dBm
VBW 300 kHz
35 dBm
982.50501002 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1] -30.57 dBm
982.50501002 MHz
A
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 15:58:16

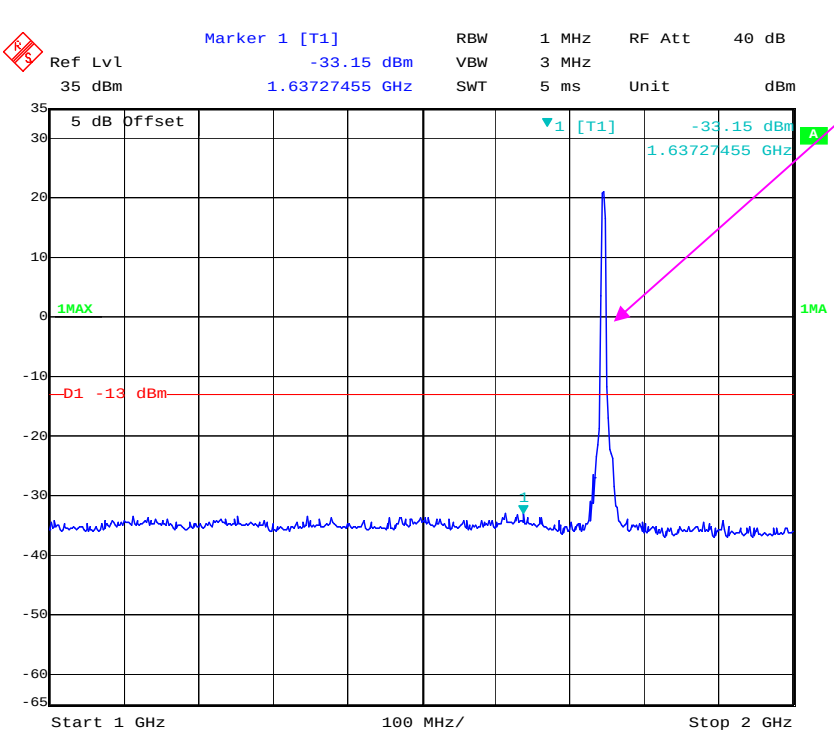

Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
-29.66 dBm
VBW 3 MHz
35 dBm
1.24649299 GHz
SWT 5 ms
Unit dBm
Fundamental
5 dB Offset
1 [T1]
-29.66 dBm
1.24649299 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
100 MHz/
Stop 2 GHz
Date: 19.SEP.2018 15:57:46


Marker 1 [T1]
RBW 3 MHz
RF Att 40 dB
Ref Lvl
-24.67 dBm
VBW 3 MHz
35 dBm
6.94188377 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1]
-24.67 dBm
6.94188377 GHz
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 15:57:17

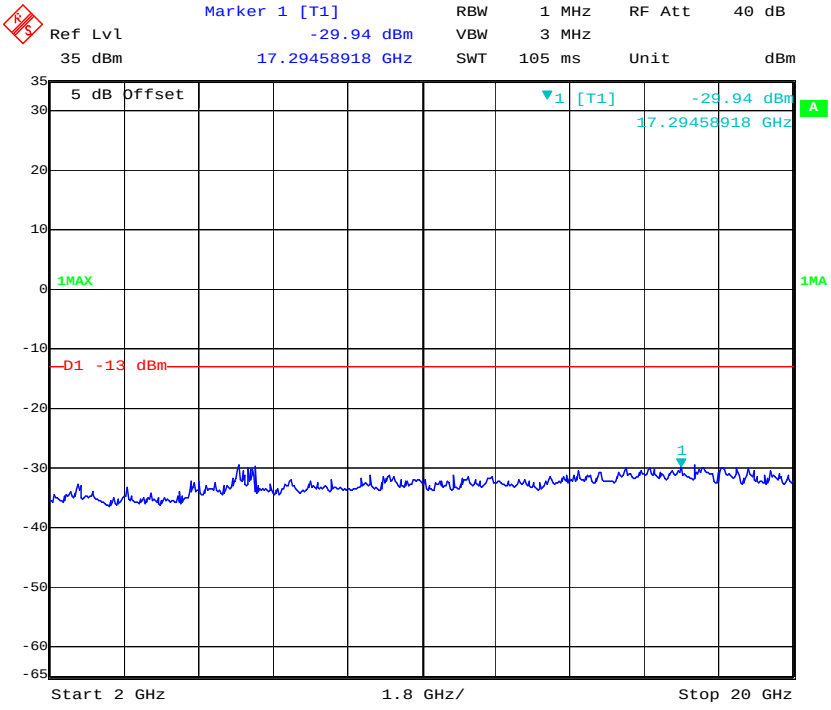
QPSK_5 MHz



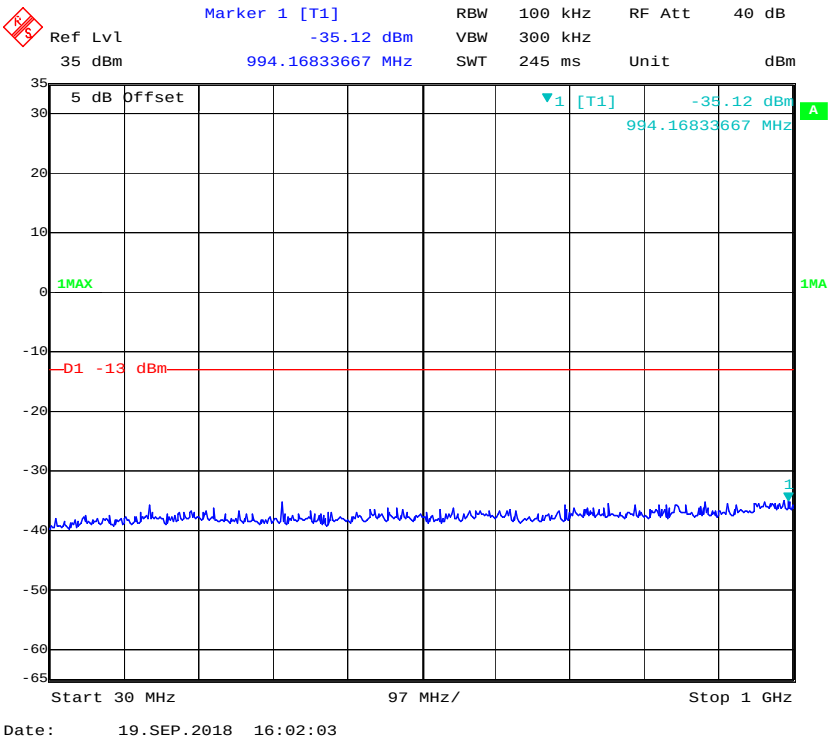
Date: 19.SEP.2018 15:59:02

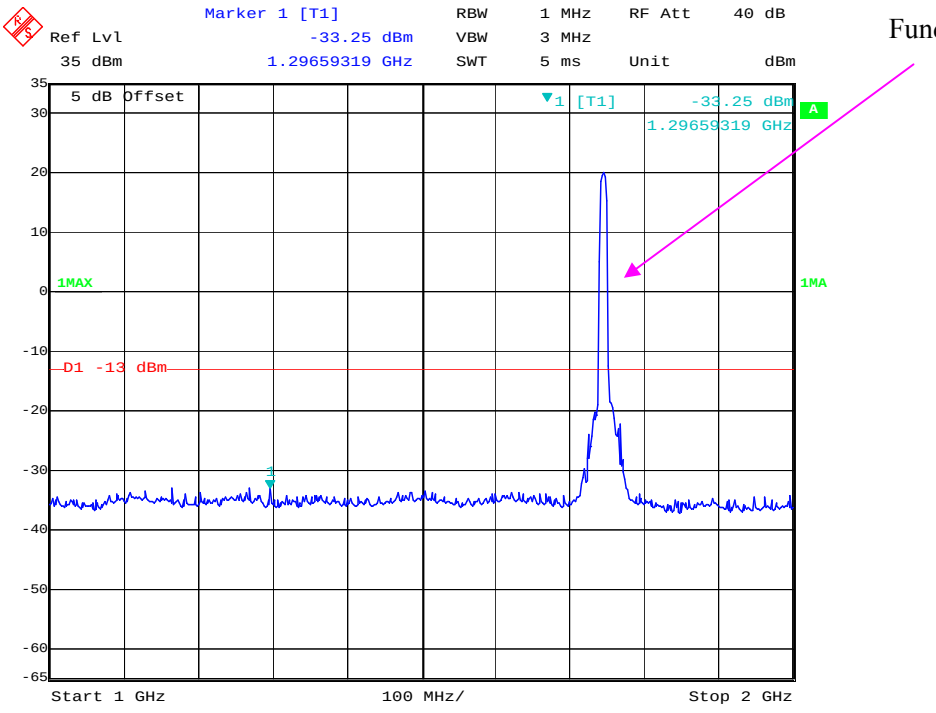


Date: 19.SEP.2018 15:59:42

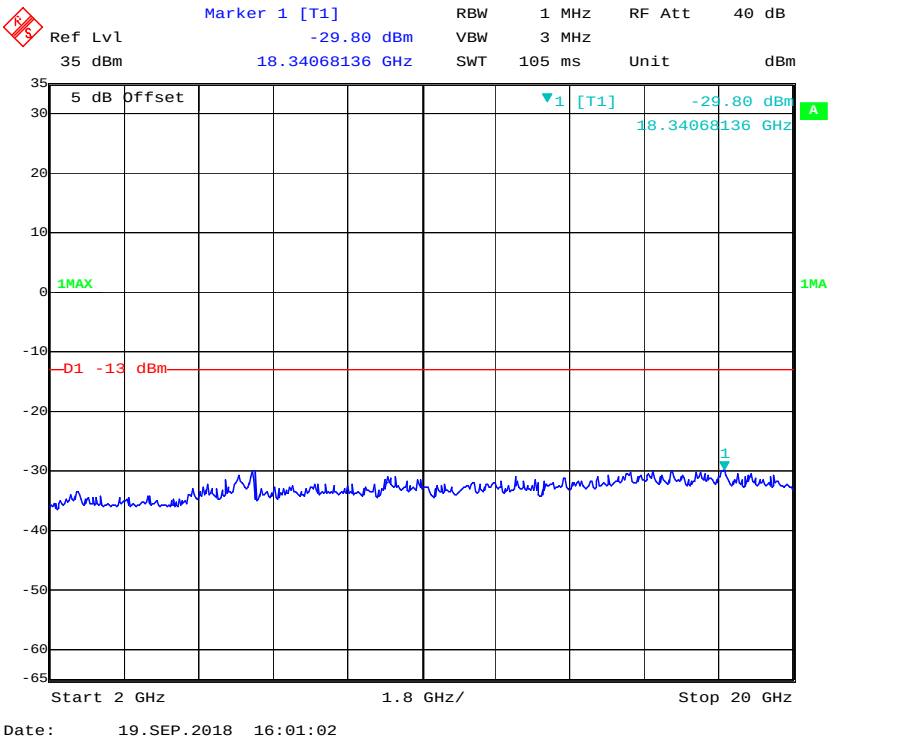

Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-29.94 dBm
VBW 3 MHz
35 dBm
17.29458918 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1] -29.94 dBm
17.29458918 GHz
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 16:00:15

QPSK_10 MHz

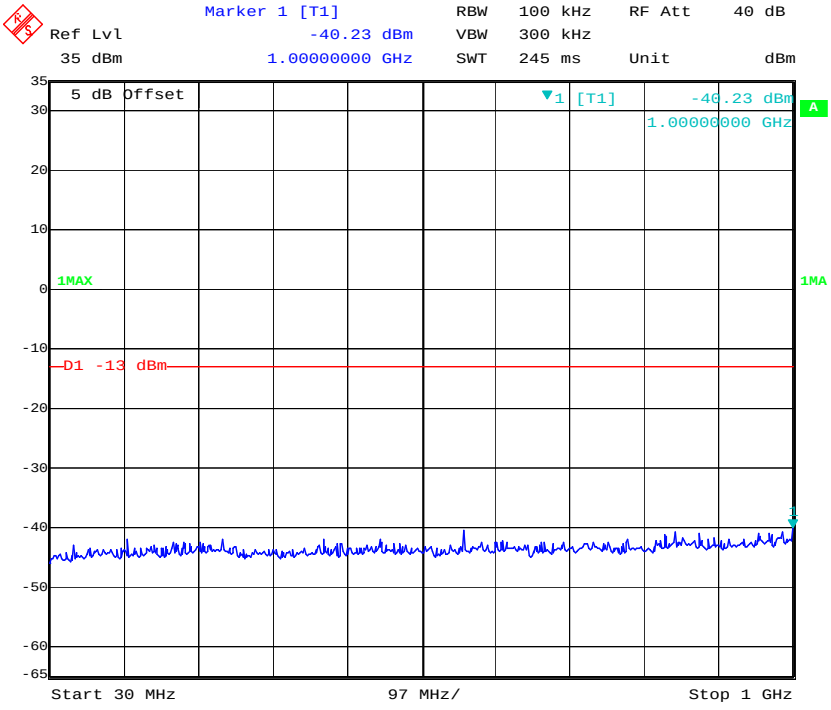

Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-35.12 dBm
VBW 300 kHz
35 dBm
994.16833667 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1] -35.12 dBm
994.16833667 MHz
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 16:02:03

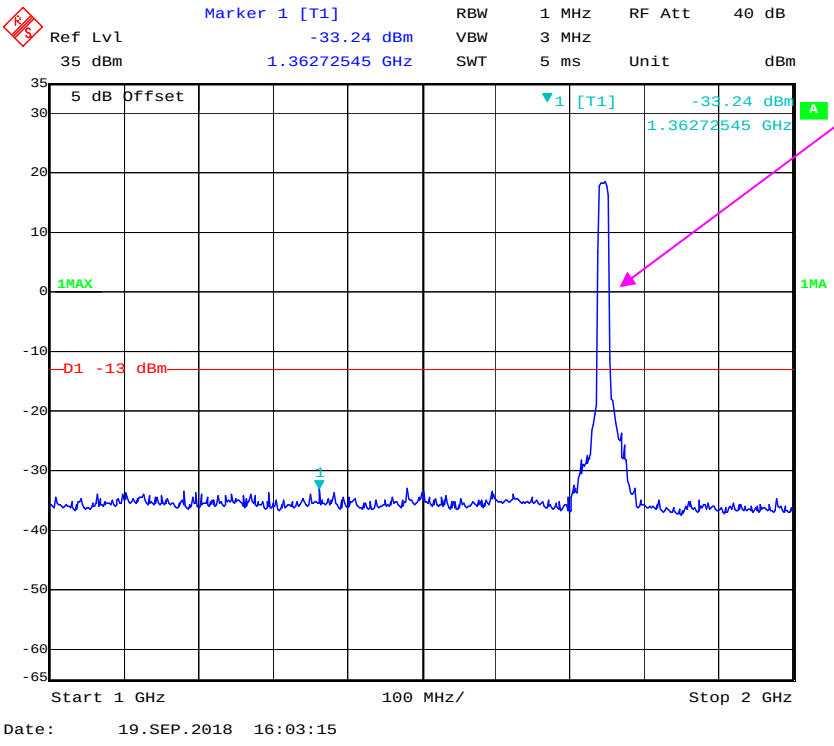


Fundamental

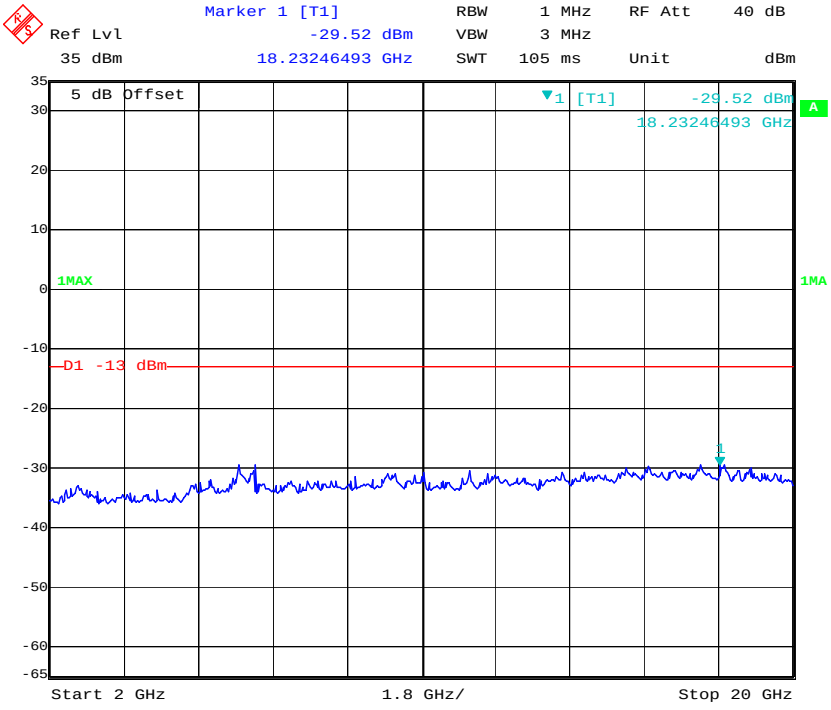


QPSK_15 MHz

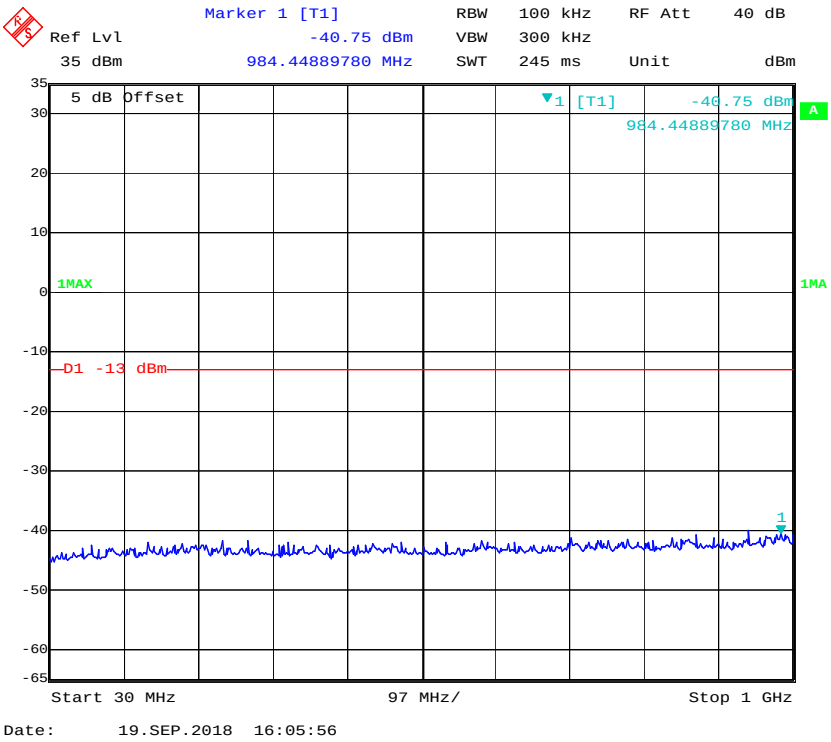




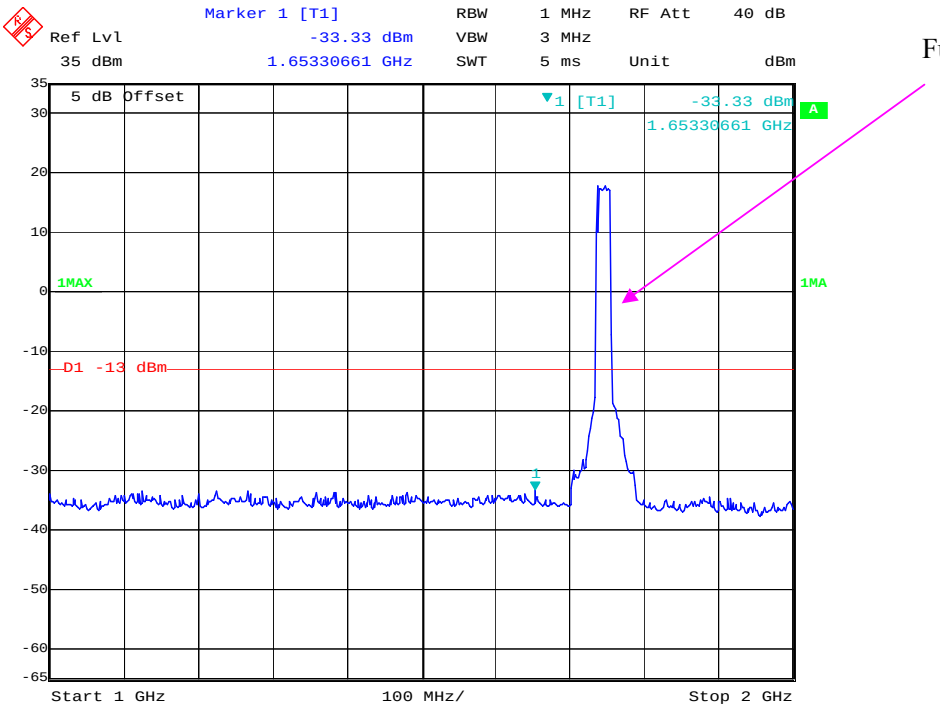
Fundamental


Marker 1 [T1]
RBW 1 MHz
RF Att 40 dB
Ref Lvl
-29.52 dBm
VBW 3 MHz
35 dBm
18.23246493 GHz
SWT 105 ms
Unit dBm
5 dB Offset
1 [T1]
-29.52 dBm
18.23246493 GHz
1MAX
1MA
D1 -13 dBm
Start 2 GHz
1.8 GHz/
Stop 20 GHz
Date: 19.SEP.2018 16:03:40

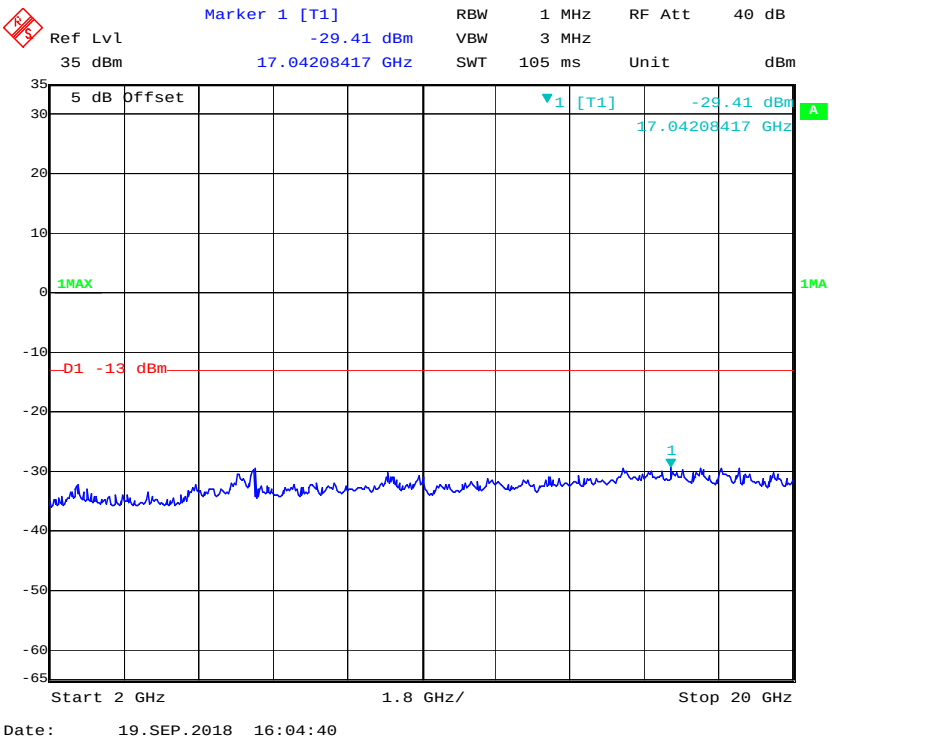
QPSK_20 MHz


Marker 1 [T1]
RBW 100 kHz
RF Att 40 dB
Ref Lvl
-40.75 dBm
VBW 300 kHz
35 dBm
984.44889780 MHz
SWT 245 ms
Unit dBm
5 dB Offset
1 [T1]
-40.75 dBm
984.44889780 MHz
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 19.SEP.2018 16:05:56

QPSK_20 MHz



Fundamental



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

Applicable Standard

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

Test Procedure

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

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

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

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

Spurious emissions in dB = 10 lg (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
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
HP	Amplifier	8447D	2727A05902	2018-09-05	2019-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2018-09-05	2019-09-05
HP	Signal Generator	1026	320408	2017-12-08	2018-12-08
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	2017-06-16	2020-06-15
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	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2018-09-05	2019-09-05
Sinoscite	Band-stop filter	BSF1710-1785MN-0383-003	0383003	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF2500-2750MS-1439-001	1437001	2018-06-16	2019-06-16
Micro-tronics	High Pass Filter	HPM50111	S/N-G217	2018-06-16	2019-06-16

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

Test Data

Environmental Conditions

Temperature:	27.1~27.3 °C
Relative Humidity:	39~41 %
ATM Pressure:	100.6 kPa

** The testing was performed by Sunny Cen & Vern Shen on 2018-09-20*

EUT Operation Mode: Transmitting

WCDMA Band V (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	42.44	-61.94	10.5	1.27	-52.7	-13.0	39.7
1673.200	V	42.37	-61.94	10.5	1.27	-52.7	-13.0	39.7
2509.800	H	41.75	-61.02	12.2	1.25	-50.1	-13.0	37.1
2509.800	V	43.21	-60.95	12.2	1.25	-50.0	-13.0	37.0
3346.400	H	37.70	-63.49	12.3	1.58	-52.8	-13.0	39.8
3346.400	V	37.79	-62.33	12.3	1.58	-51.7	-13.0	38.7
438.000	H	48.76	-55.83	0.0	0.65	-56.5	-13.0	43.5
438.000	V	53.24	-54.58	0.0	0.65	-55.2	-13.0	42.2

WCDMA Band II (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	39.39	-60.82	12.3	1.53	-50.1	-13.0	37.1
3760.000	V	39.85	-60.06	12.3	1.53	-49.3	-13.0	36.3
5640.000	H	37.37	-57.93	13.0	1.28	-46.2	-13.0	33.2
5640.000	V	37.27	-58.34	13.0	1.28	-46.6	-13.0	33.6
336.000	H	45.86	-61.4	0.0	0.55	-62.0	-13.0	49.0
336.000	V	48.95	-60.38	0.0	0.55	-60.9	-13.0	47.9

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1732.500 MHz								
3465.00	H	37.83	-63.14	12.21	1.60	-52.53	-13.00	39.53
3465.00	V	38.34	-61.22	12.21	1.60	-50.61	-13.00	37.61
5197.50	H	37.24	-58.84	12.92	1.36	-47.28	-13.00	34.28
5197.50	V	37.55	-58.50	12.92	1.36	-46.94	-13.00	33.94
142.00	H	53.84	-52.16	0.00	0.36	-52.52	-13.00	39.52
53.00	V	57.76	-45.43	-13.52	0.22	-59.17	-13.00	46.17

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								
1673.20	H	41.27	-63.11	10.52	1.27	-53.86	-13.00	40.86
1673.20	V	40.85	-63.46	10.52	1.27	-54.21	-13.00	41.21
2509.80	H	37.95	-64.82	12.20	1.25	-53.87	-13.00	40.87
2509.80	V	38.43	-65.73	12.20	1.25	-54.78	-13.00	41.78
3346.40	H	37.21	-63.98	12.26	1.58	-53.30	-13.00	40.30
3346.40	V	37.22	-62.90	12.26	1.58	-52.22	-13.00	39.22
377.00	H	47.55	-58.14	0.00	0.59	-58.73	-13.00	45.73
377.00	V	52.62	-55.97	0.00	0.59	-56.56	-13.00	43.56

LTE Band 7 (30MHz-26.5GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency: 2535.000 MHz								
5070.00	H	37.77	-58.54	12.97	1.41	-46.98	-25.00	21.98
5070.00	V	37.78	-58.30	12.97	1.41	-46.74	-25.00	21.74
7605.00	H	36.69	-54.69	12.84	1.40	-43.25	-25.00	18.25
7605.00	V	36.17	-55.88	12.84	1.40	-44.44	-25.00	19.44
623.00	H	45.75	-56.22	0.00	0.80	-57.02	-25.00	32.02
623.00	V	48.62	-56.43	0.00	0.80	-57.23	-25.00	32.23

LTE Band 66 (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:1745.000 MHz								
3490.00	H	37.96	-62.96	12.20	1.61	-52.37	-13.00	39.37
3490.00	V	39.45	-60.00	12.20	1.61	-49.41	-13.00	36.41
5235.00	H	38.04	-57.98	12.91	1.35	-46.42	-13.00	33.42
5235.00	V	37.58	-58.47	12.91	1.35	-46.91	-13.00	33.91
338.00	H	45.58	-61.60	0.00	0.55	-62.15	-13.00	49.15
338.00	V	48.61	-60.68	0.00	0.55	-61.23	-13.00	48.23

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

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

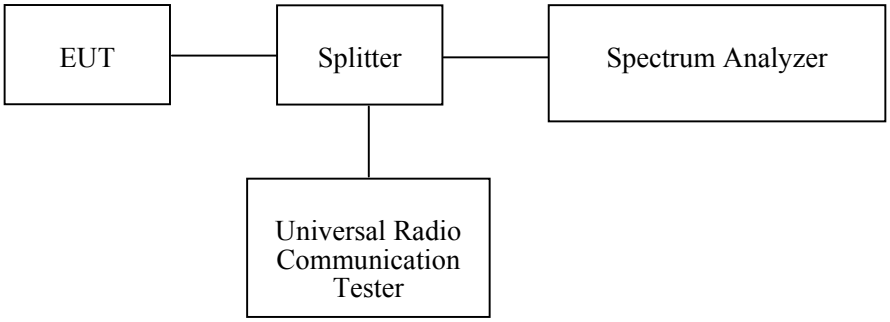
Applicable Standard

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

Test Procedure

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

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2018-07-18	2019-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-31	2019-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	EMI Test Receiver	ESPI	100120	2017-12-11	2018-12-11
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03

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

Test Data

Environmental Conditions

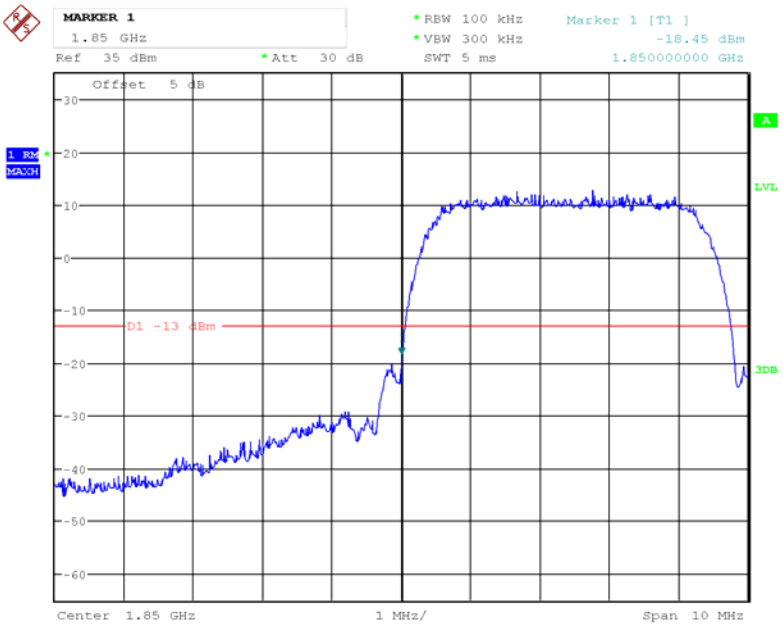
Temperature:	26.9~27.8°C
Relative Humidity:	47 ~ 61 %
ATM Pressure:	100.2~100.6 kPa

The testing was performed by Elena Lei from 2018-09-20 to 2018-09-24.

Test Mode: Transmitting

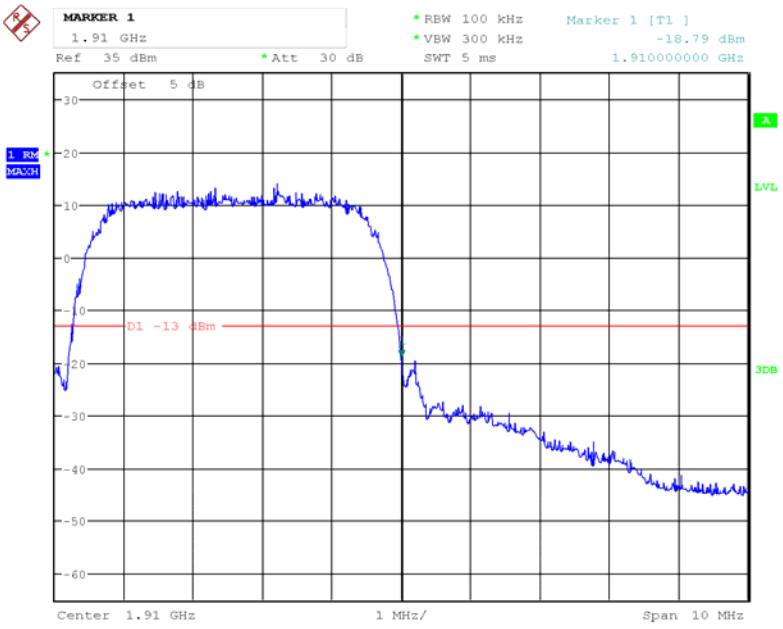
Test Result: Compliant. Please refer to the following plots.

WCDMA Band II Rel 99, Left Band Edge



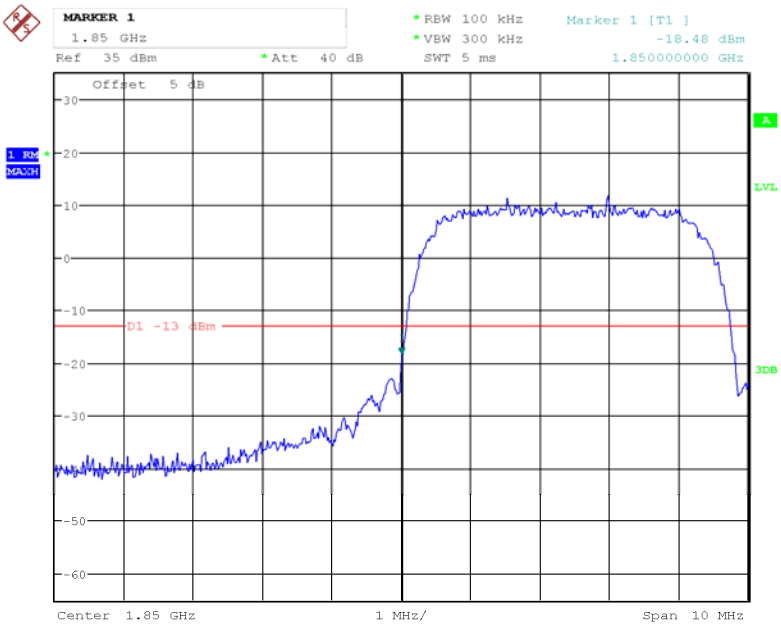
Date: 24.SEP.2018 11:37:23

WCDMA Band II Rel 99, Right Band Edge



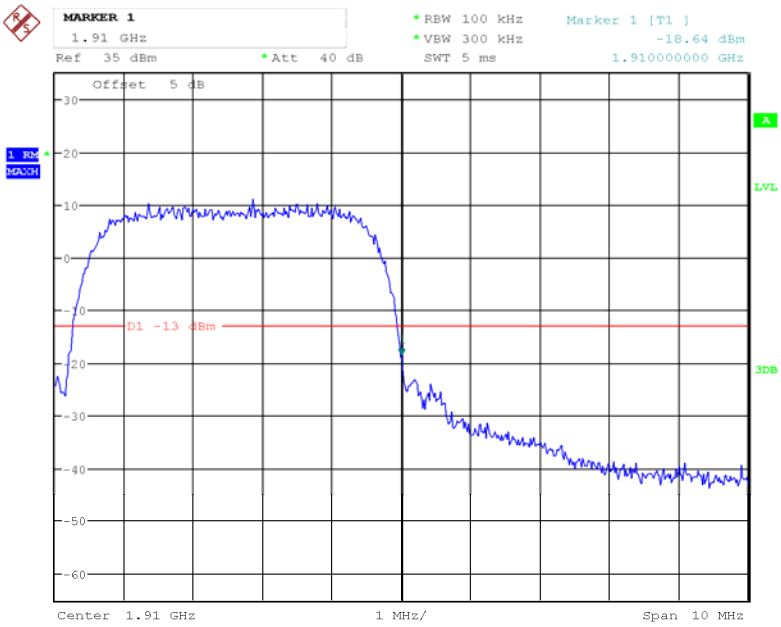
Date: 24.SEP.2018 11:38:01

WCDMA Band II HSUPA, Left Band Edge



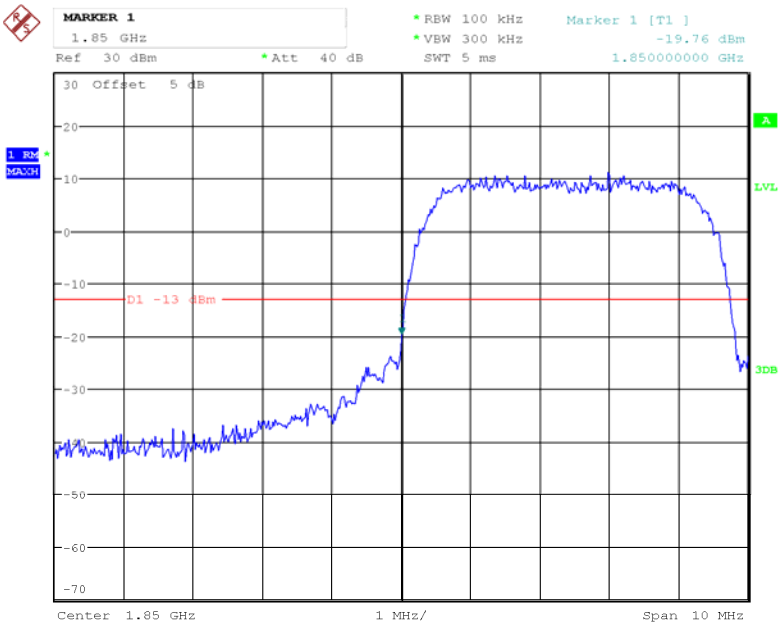
Date: 24.SEP.2018 10:53:18

WCDMA Band II HSUPA, Right Band Edge



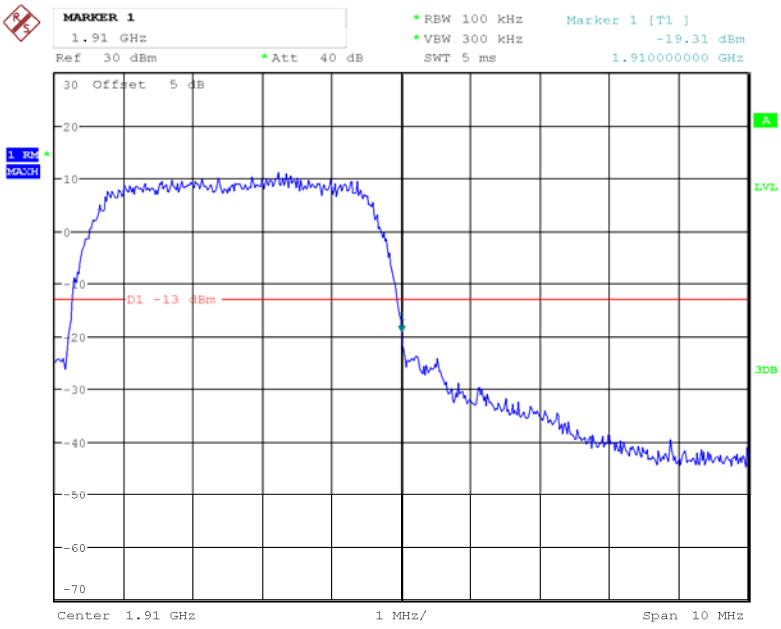
Date: 24.SEP.2018 10:53:57

WCDMA Band II HSDPA, Left Band Edge



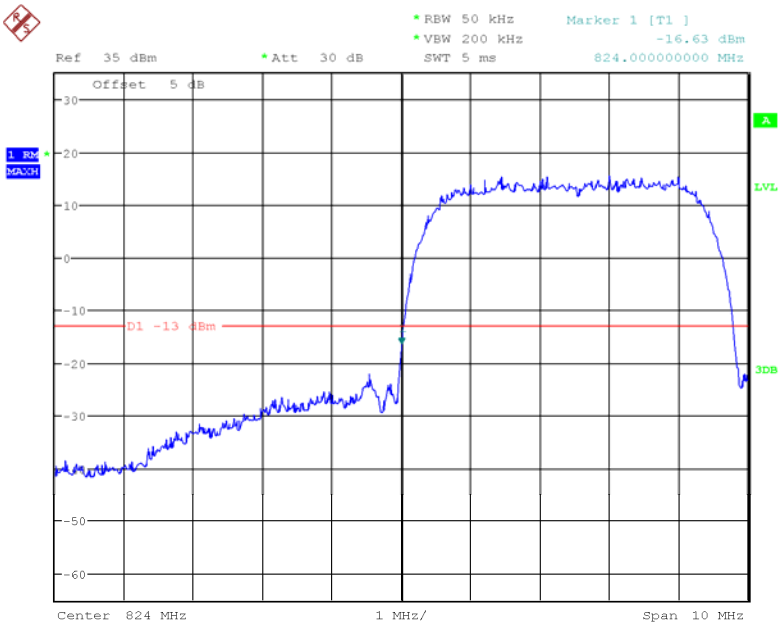
Date: 24.SEP.2018 11:00:45

WCDMA Band II HSDPA, Right Band Edge



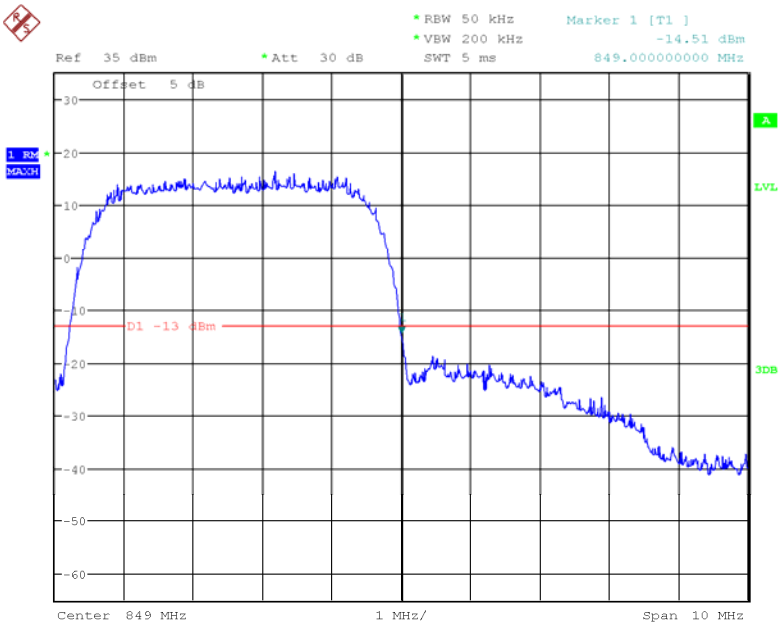
Date: 24.SEP.2018 11:01:14

WCDMA Band V Rel 99, Left Band Edge



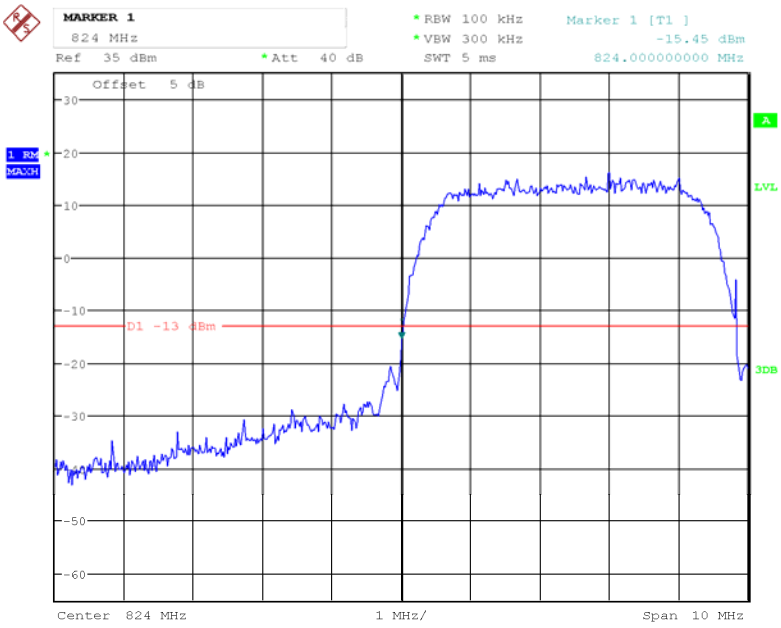
Date: 24.SEP.2018 11:32:33

WCDMA Band V Rel 99, Right Band Edge



Date: 24.SEP.2018 11:35:15

WCDMA Band V HSUPA, Left Band Edge



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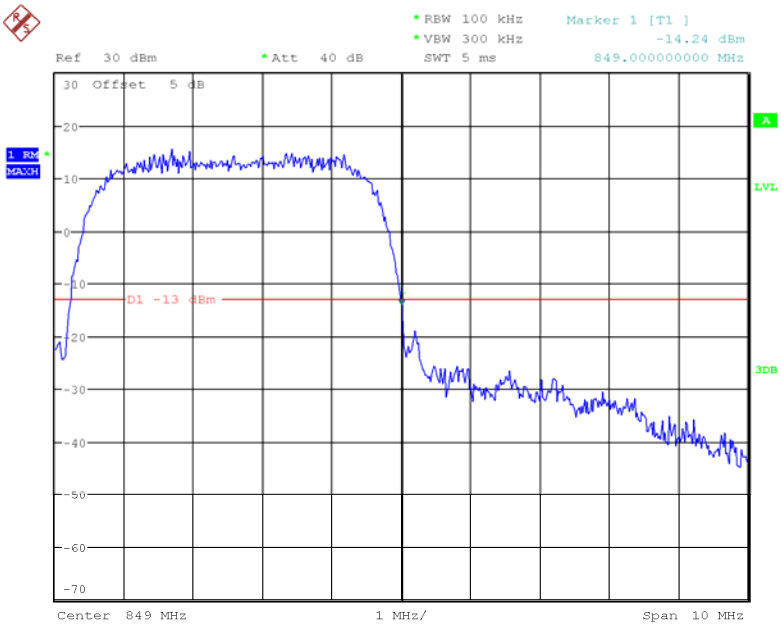
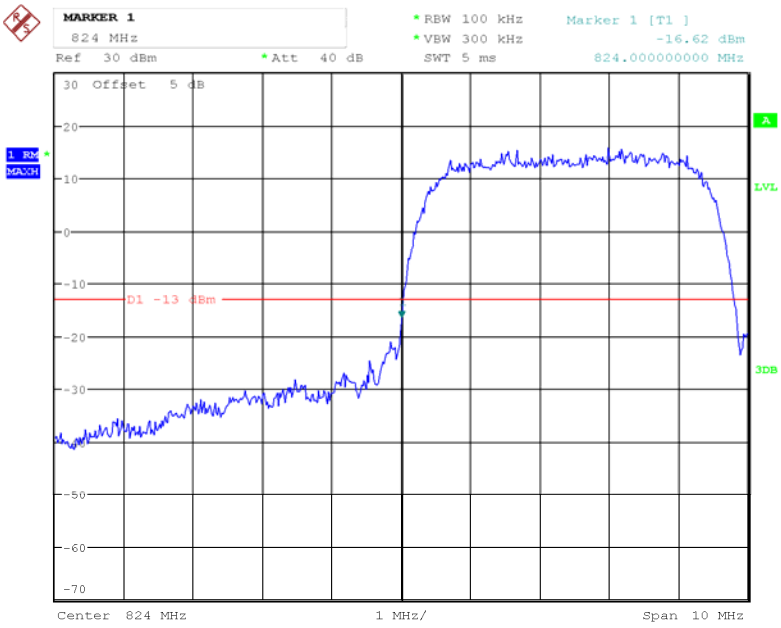
WCDMA Band V HSUPA, Right Band Edge



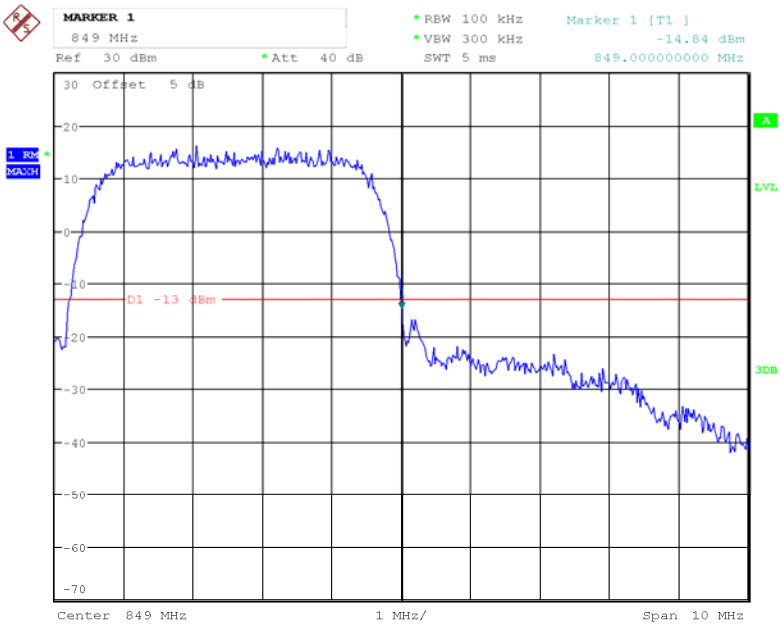
Date: 24.SEP.2018 10:56:27

WCDMA Band V HSDPA, Left Band Edge



Date: 24.SEP.2018 10:59:44

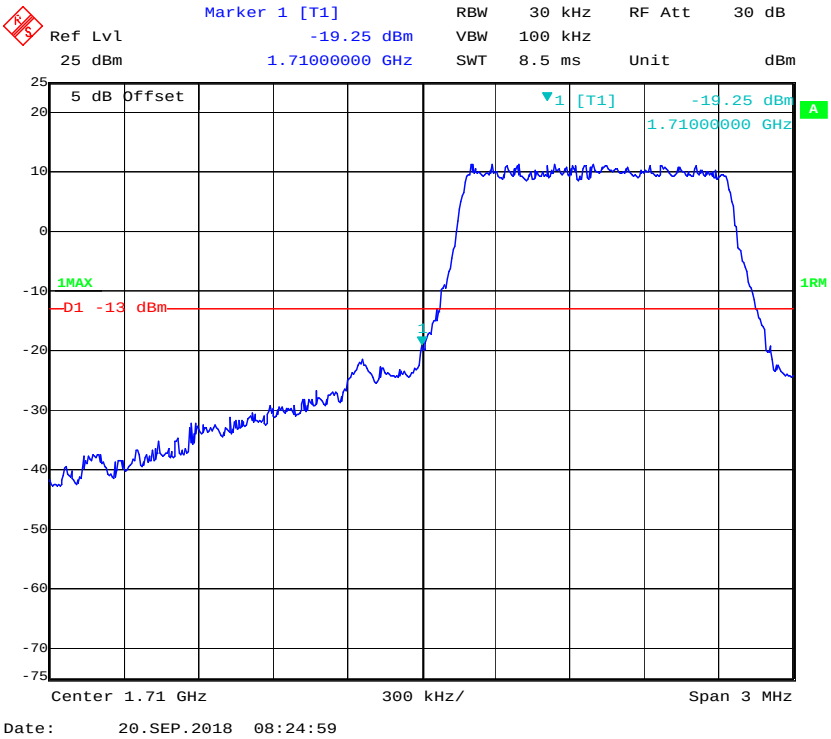
WCDMA Band V HSDPA, Right Band Edge



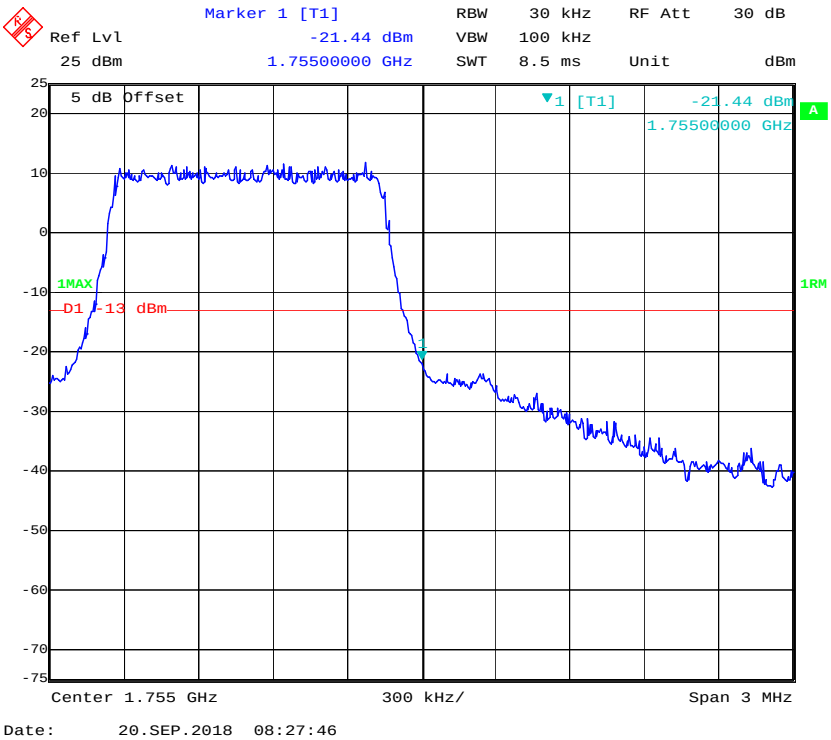
Date: 24.SEP.2018 11:00:08

LTE Band IV

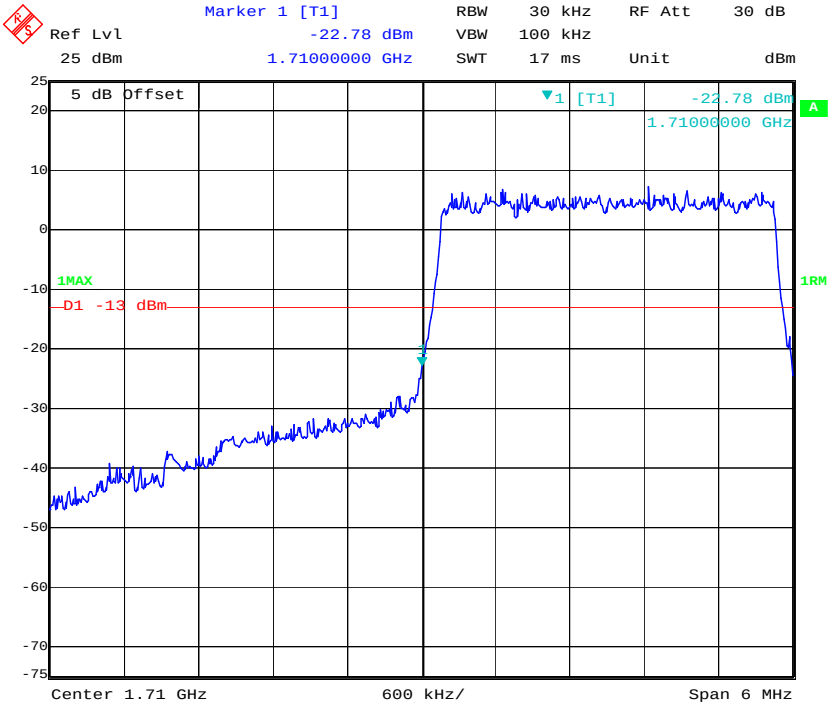
QPSK_1.4MHz_ 6 RB_ Left



QPSK_1.4MHz_ 6 RB_ Right

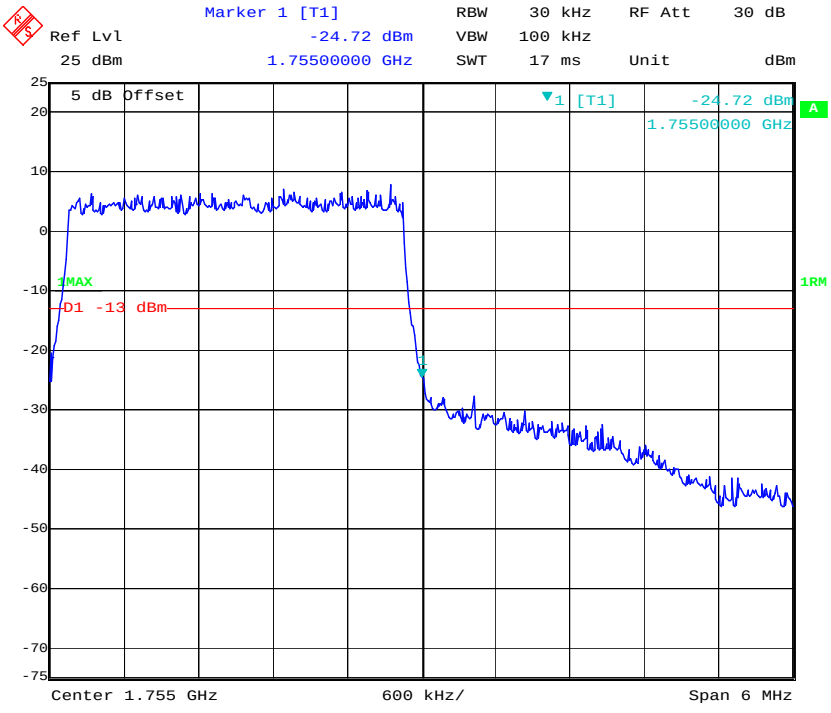


QPSK_3MHz_ 15 RB_ Left



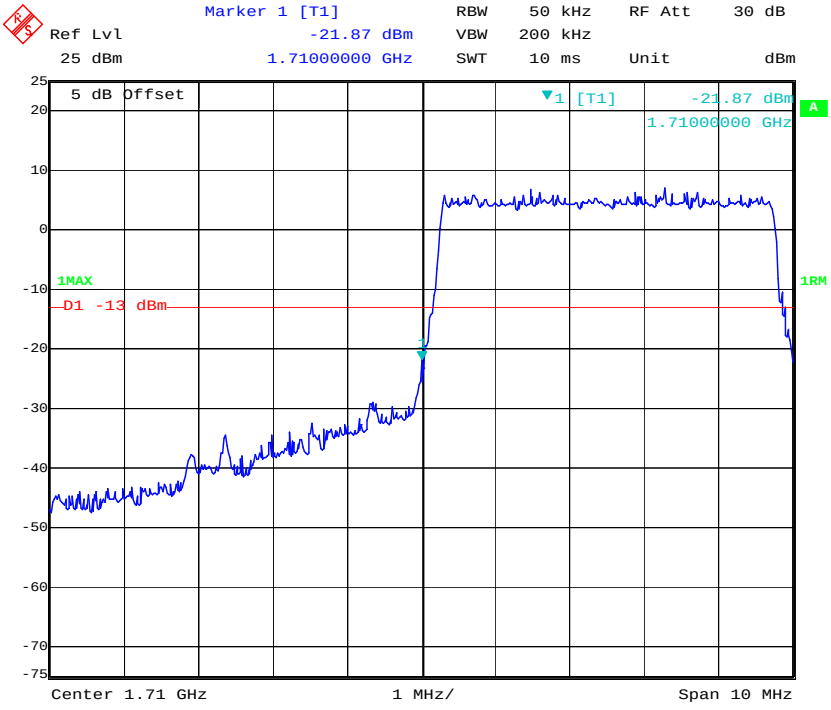
Date: 20.SEP.2018 08:31:08

QPSK_3MHz_ 15 RB_ Right

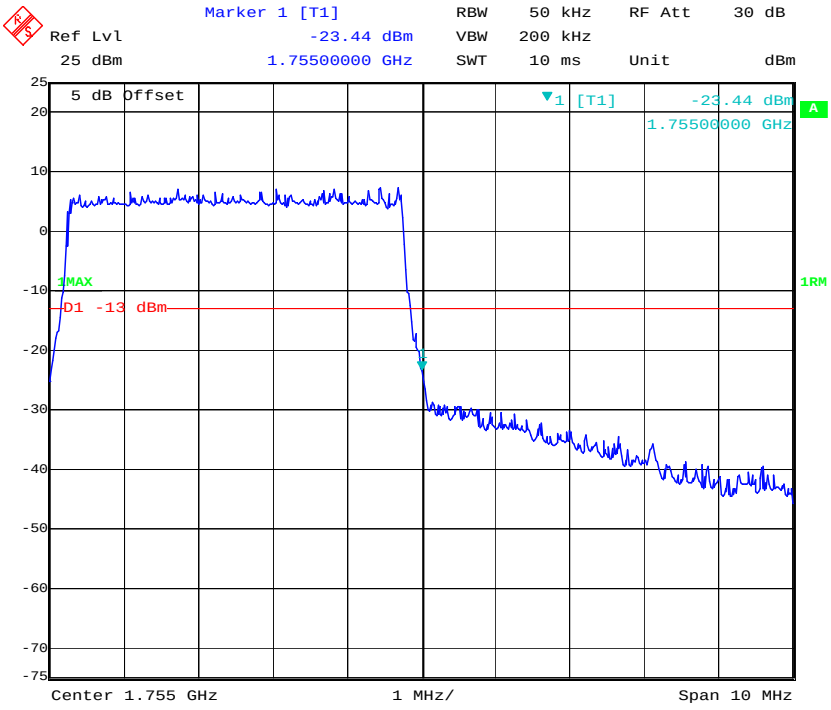


Date: 20.SEP.2018 08:30:14

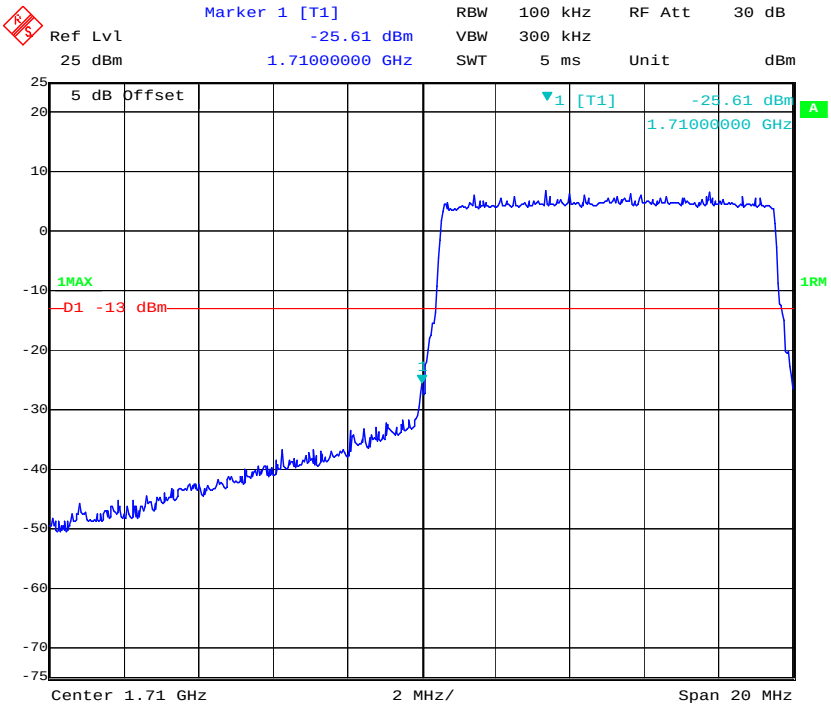
QPSK_5MHz_ 25 RB_ Left



QPSK_5MHz_ 25 RB_ Right



QPSK_10MHz_ 50 RB_ Left



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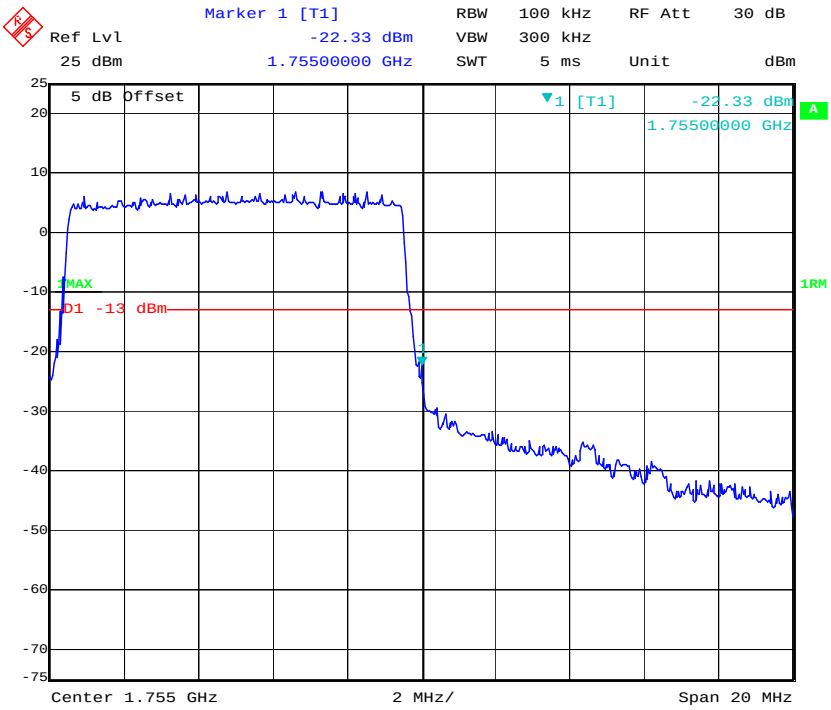
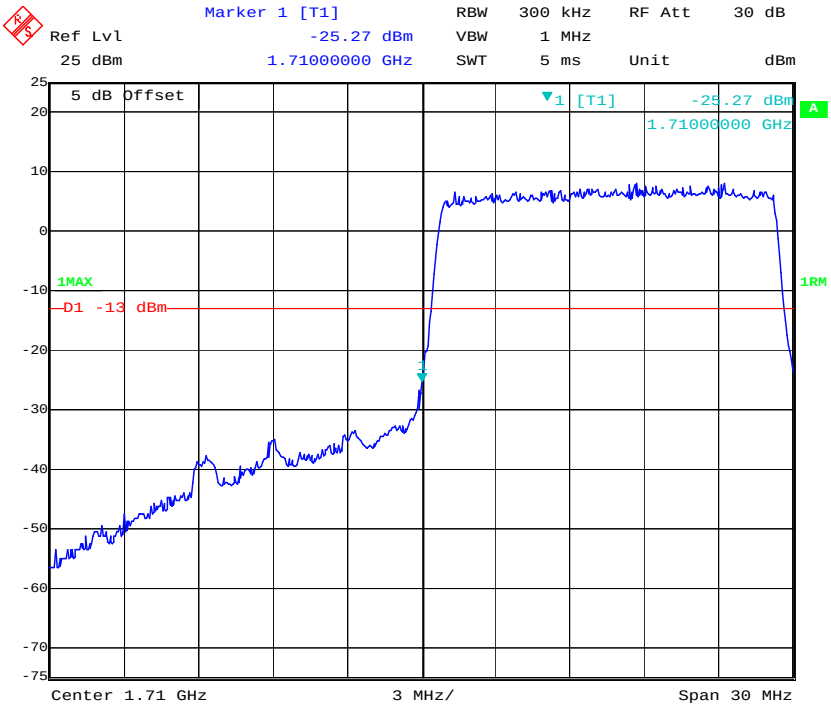
QPSK_10MHz_ 50 RB_ Right



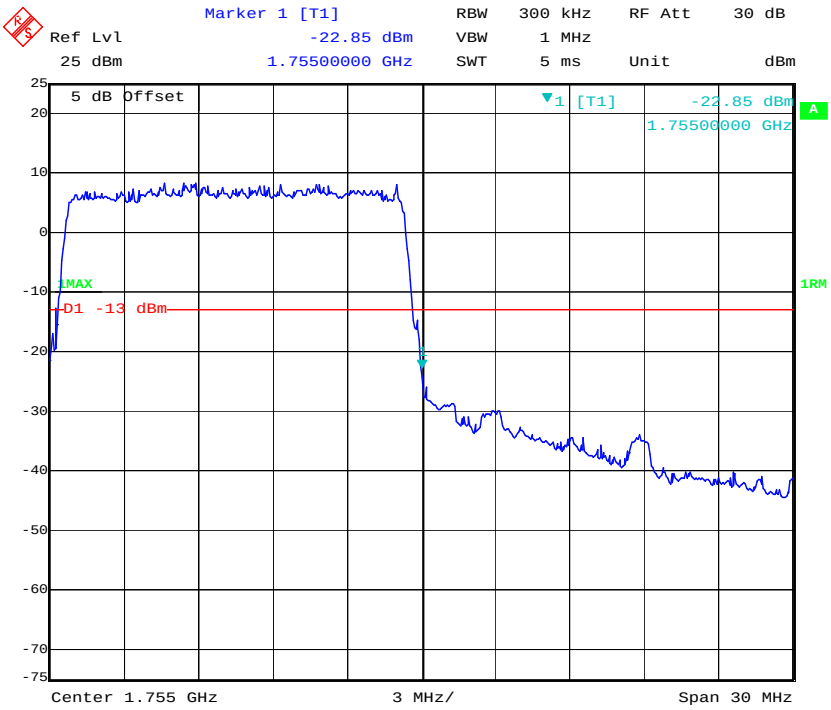
Date: 20.SEP.2018 08:38:05

QPSK_15MHz_ 75 RB_ Left



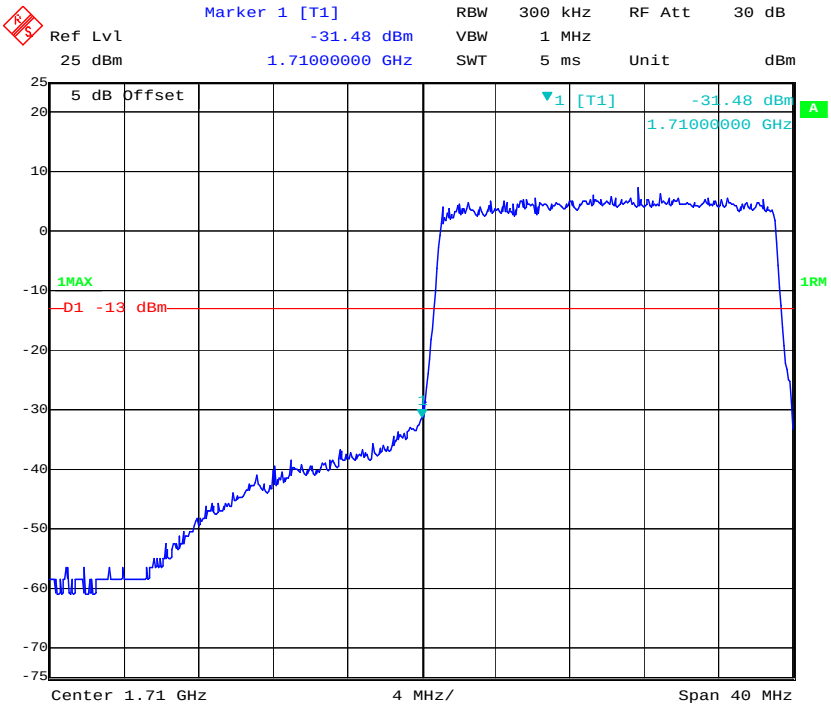
Date: 20.SEP.2018 10:33:12

QPSK_15MHz_ 75 RB_ Right



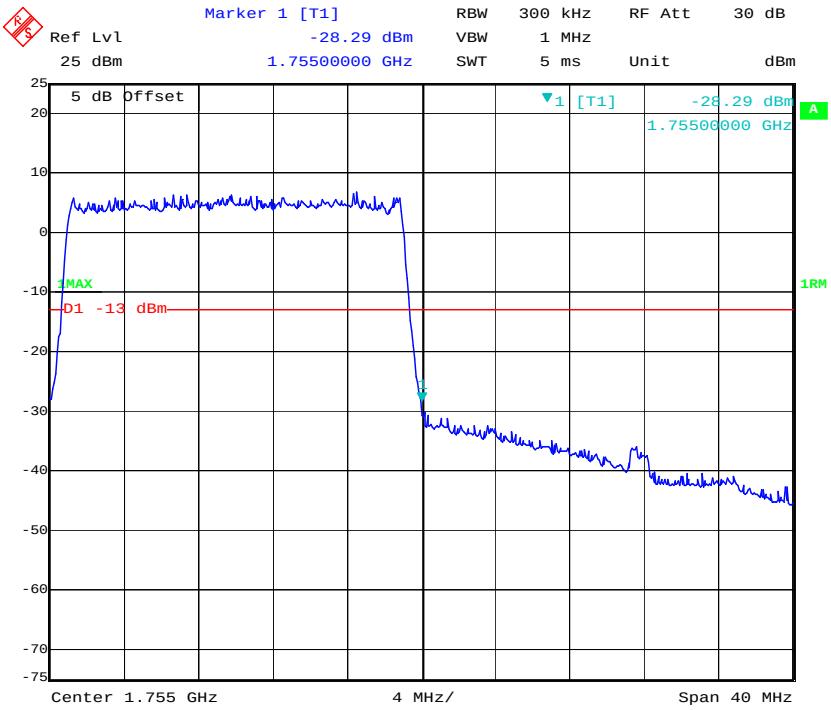
Date: 20.SEP.2018 10:31:34

QPSK_20MHz_ FULL RB_ Left



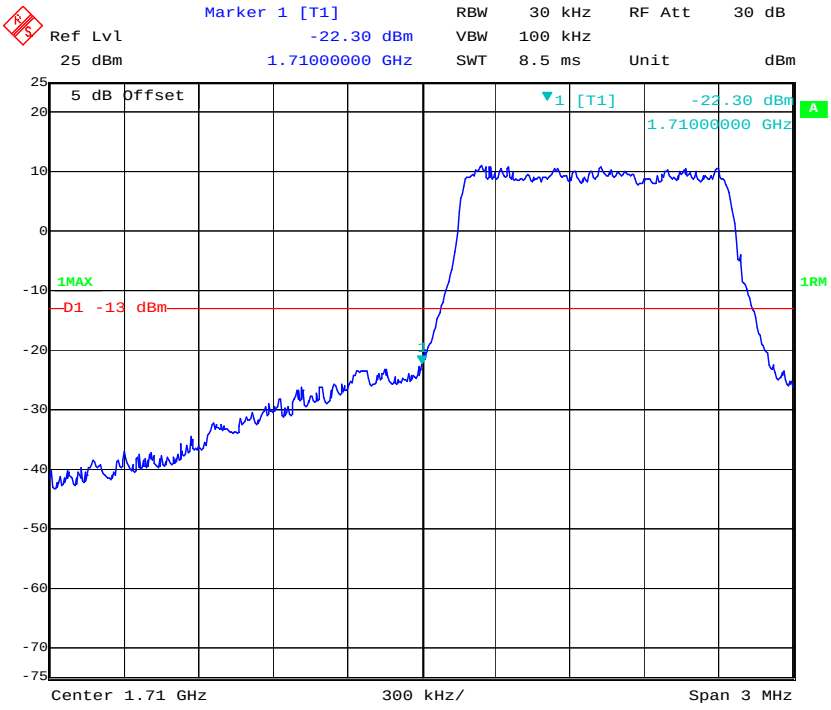
Date: 20.SEP.2018 08:51:37

QPSK_20MHz_ FULL RB_ Right



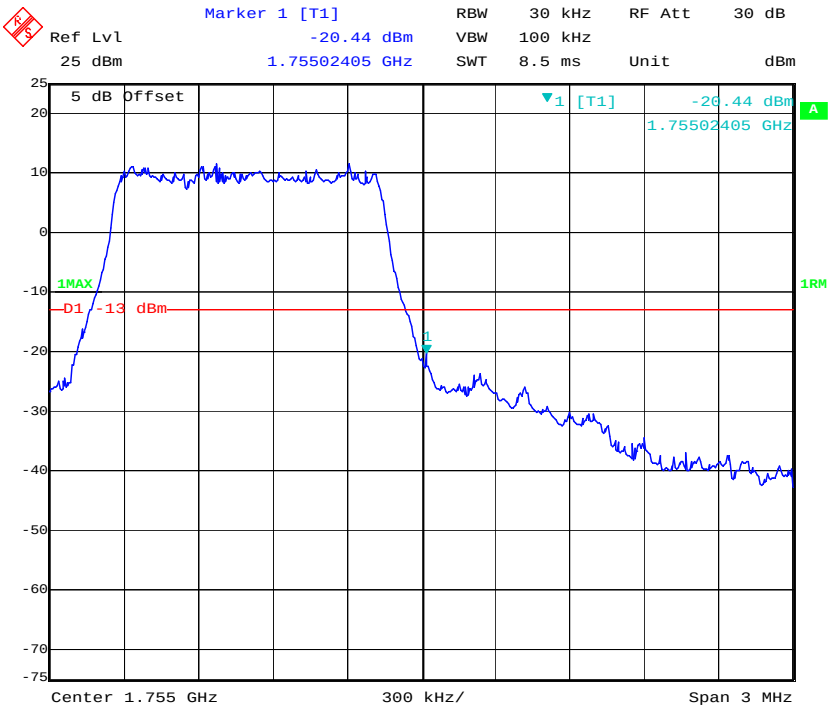
Date: 20.SEP.2018 08:52:18

16QAM_1.4MHz_ 6 RB_ Left



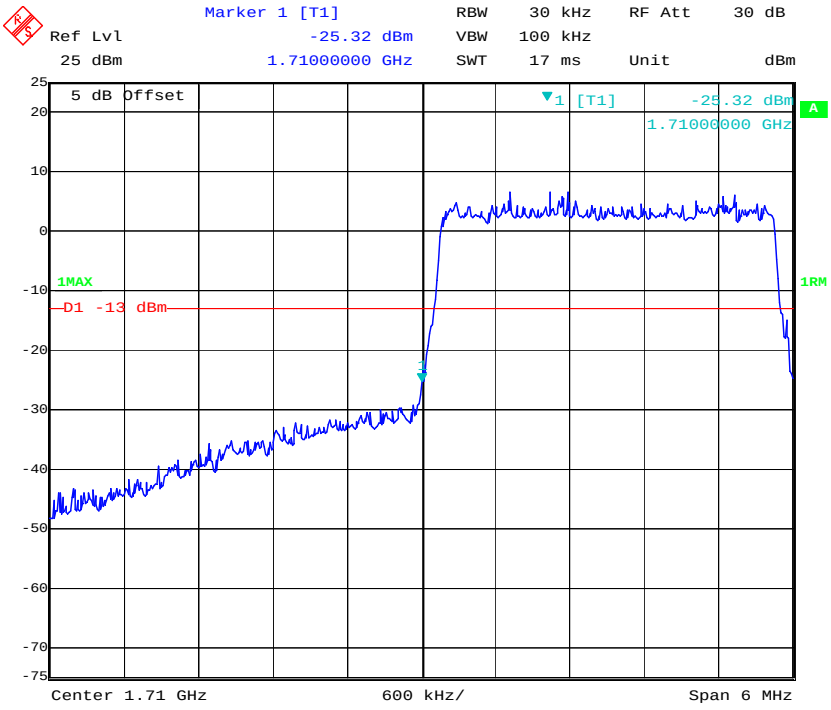
Date: 20.SEP.2018 08:23:42

16QAM_1.4MHz_ 6 RB_ Right



Date: 20.SEP.2018 08:27:08

16QAM_3MHz_ 15 RB_ Left



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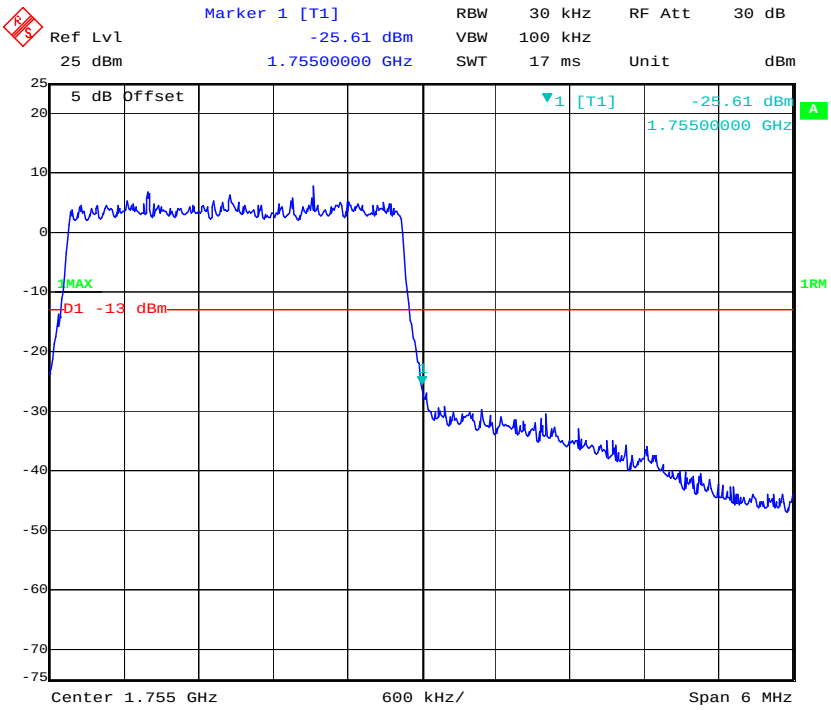
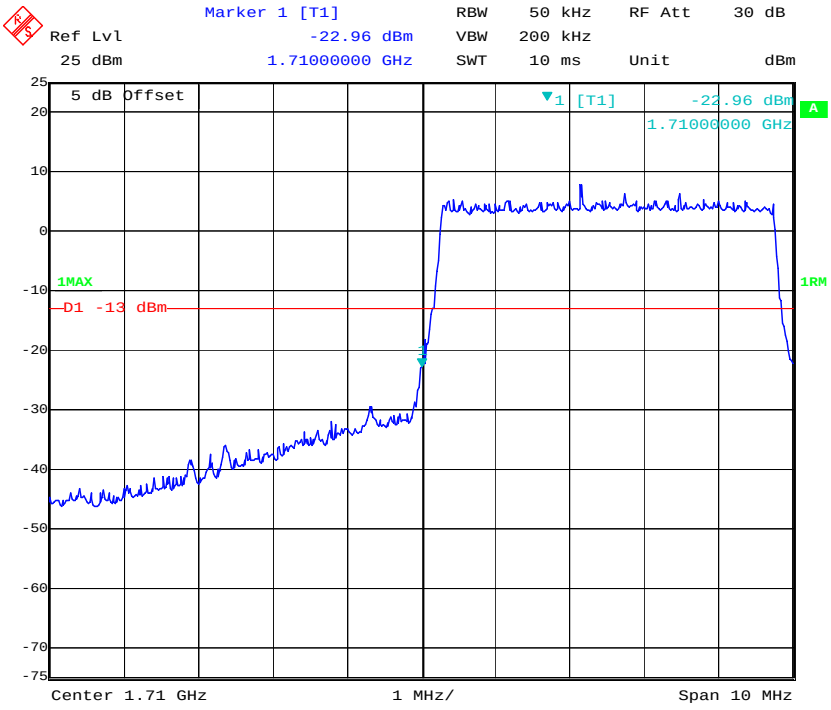
16QAM_3MHz_ 15 RB_ Right



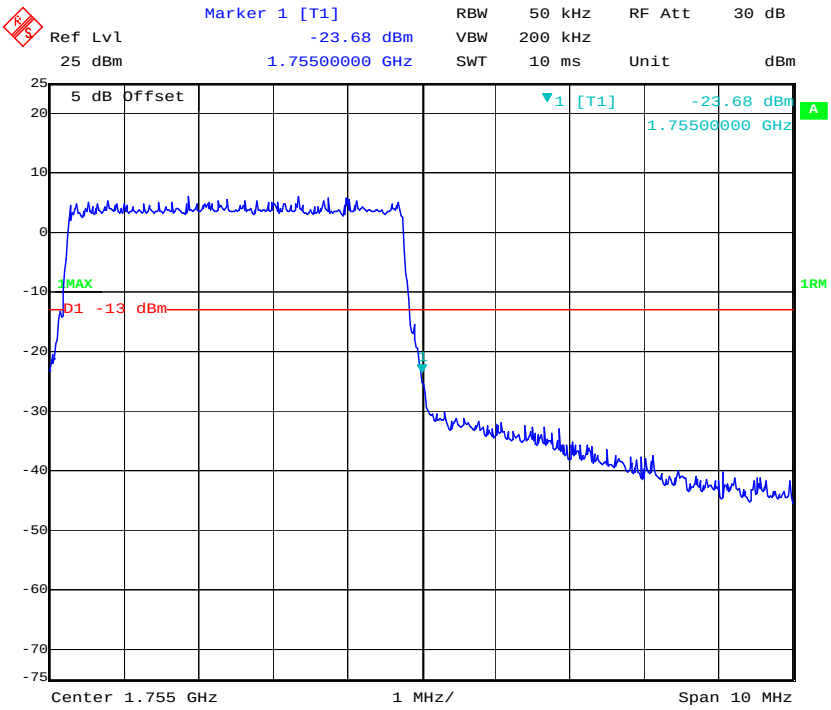
Date: 20.SEP.2018 08:29:50

16QAM_5MHz_ 25 RB_ Left



Date: 20.SEP.2018 08:32:47

16QAM_5MHz_ 25 RB_ Right



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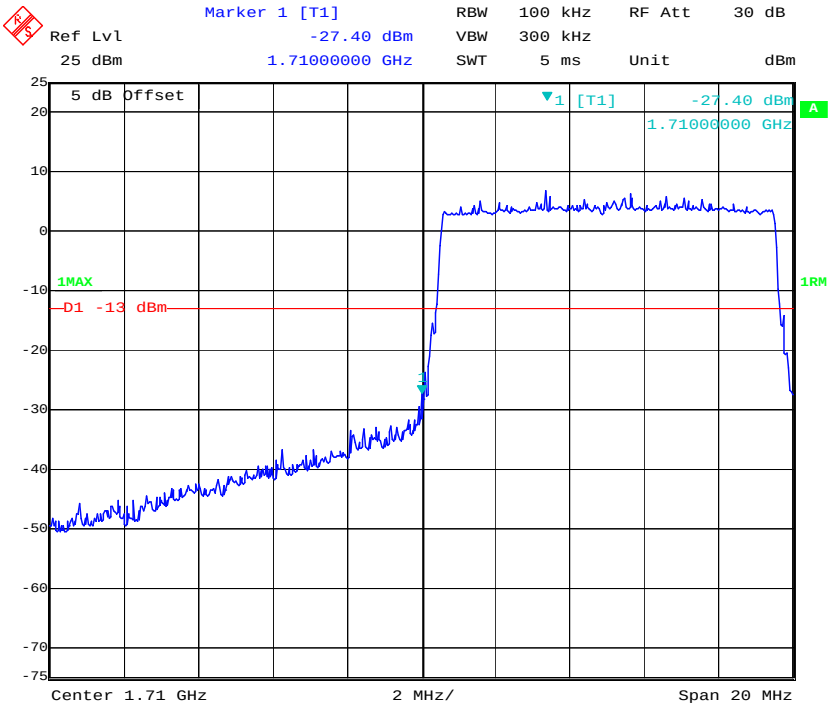
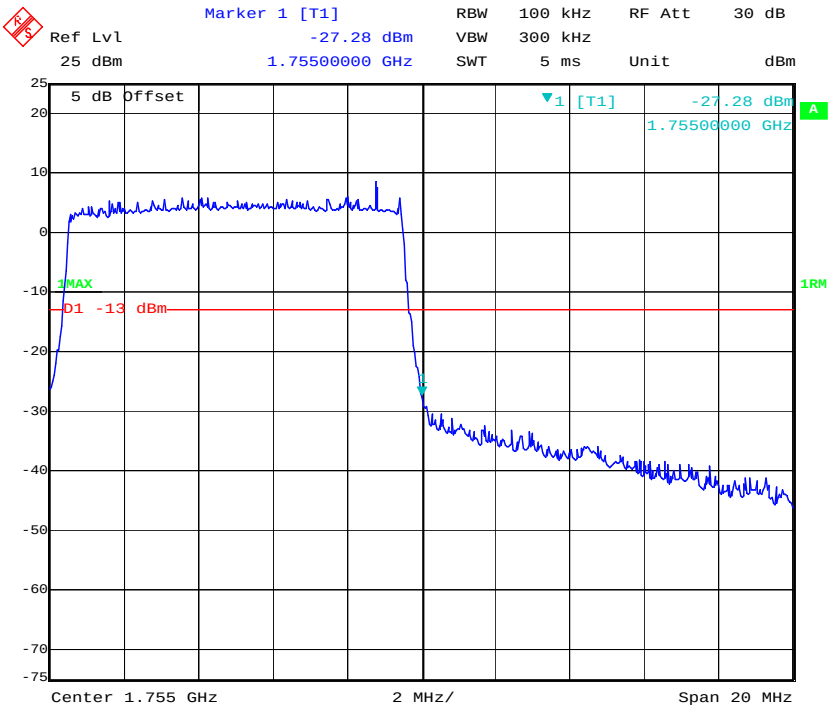
16QAM_10MHz_ 50 RB_ Left



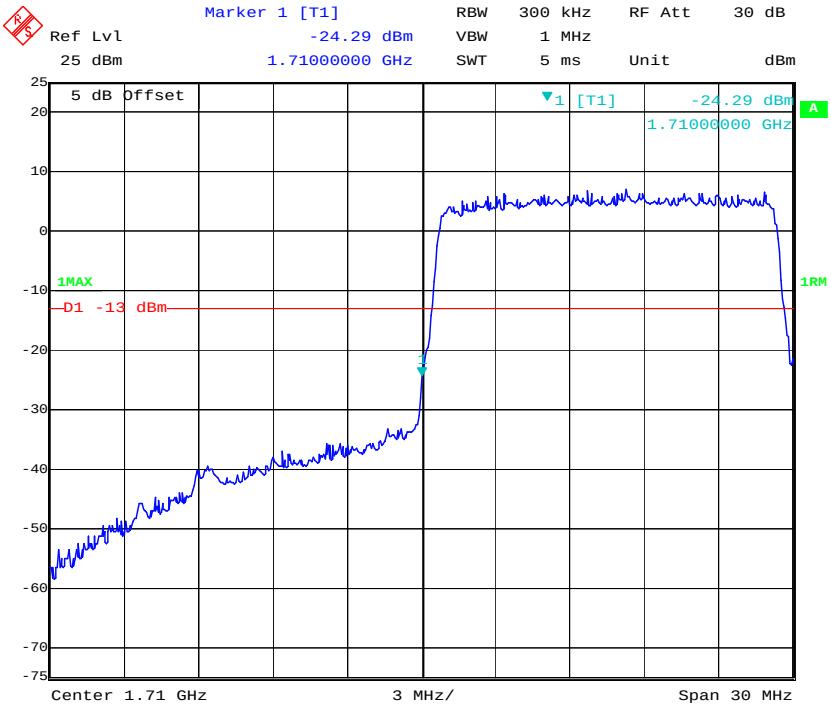
Date: 20.SEP.2018 08:38:50

16QAM_10MHz_ 50 RB_ Right



Date: 20.SEP.2018 08:37:27

16QAM_15MHz_ 75 RB_ Left



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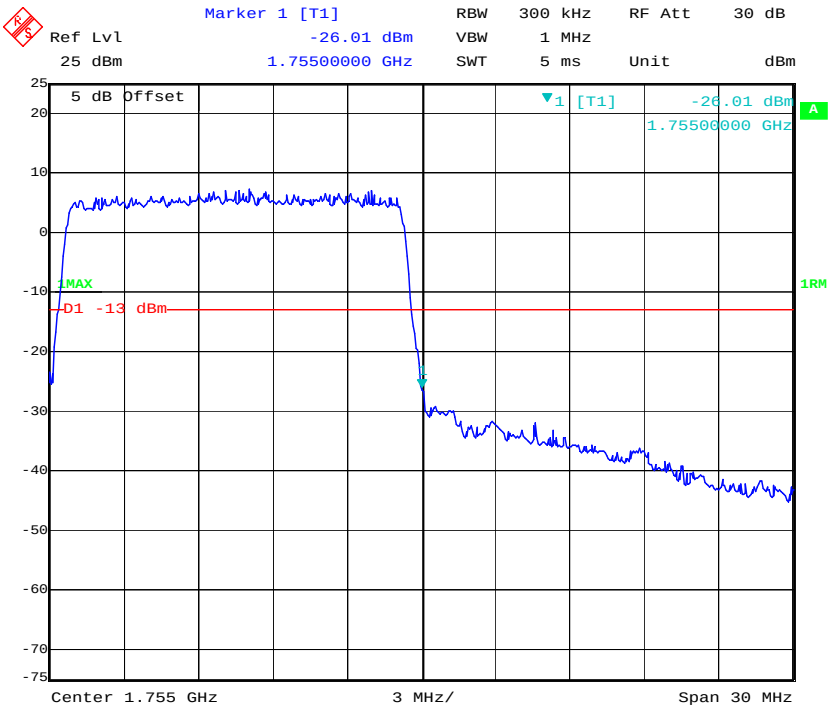
16QAM_15MHz_ 75 RB_ Right



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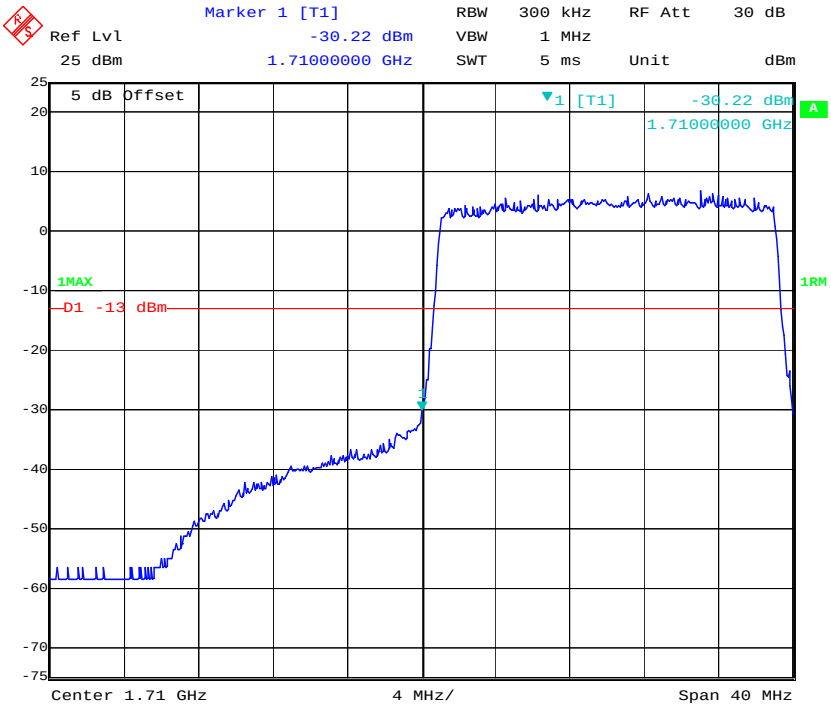
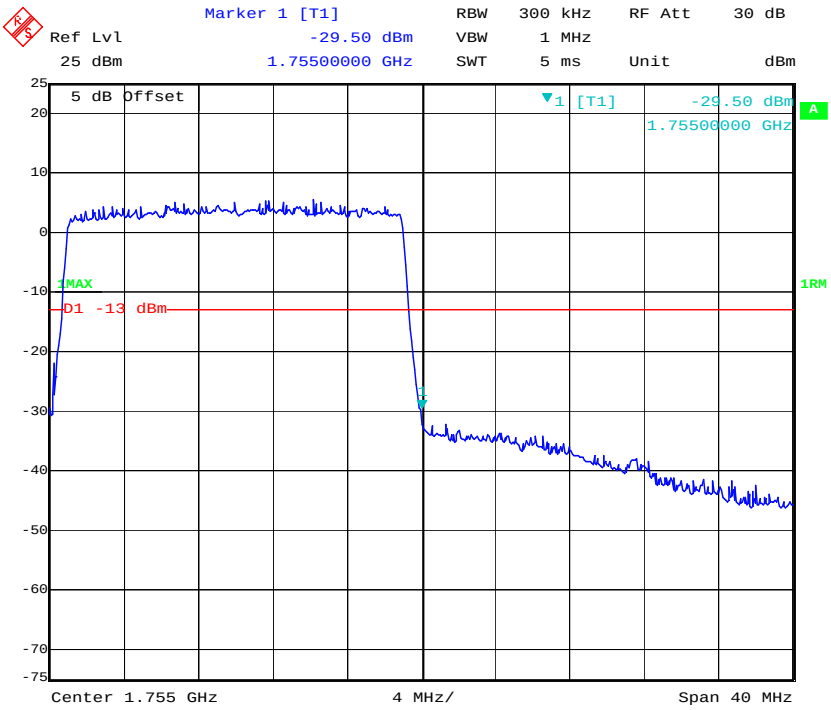
16QAM_20MHz_ FULL RB_ Left



Date: 20.SEP.2018 08:51:17

16QAM_20MHz_ FULL RB_ Right



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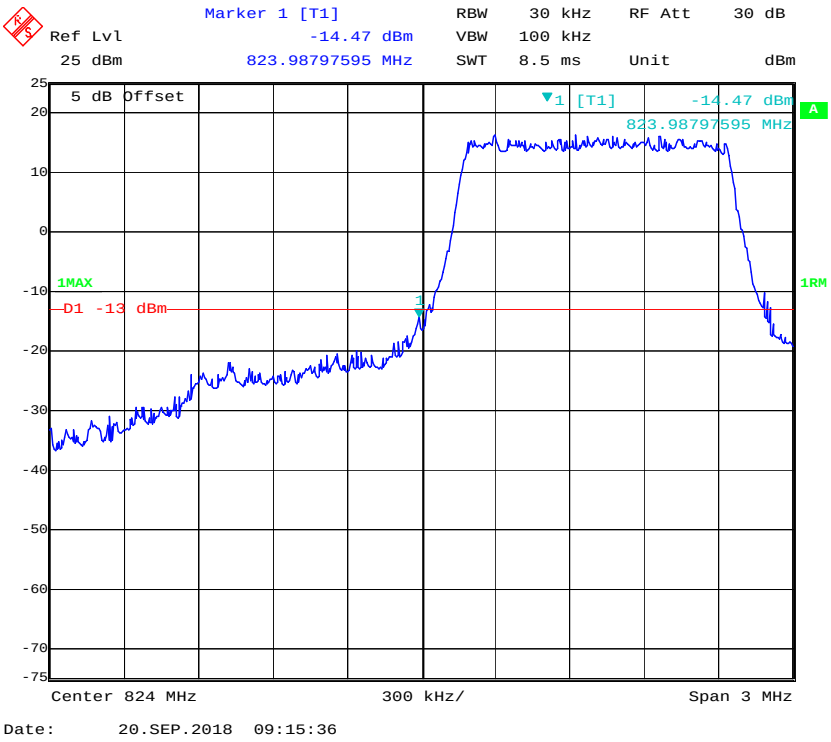
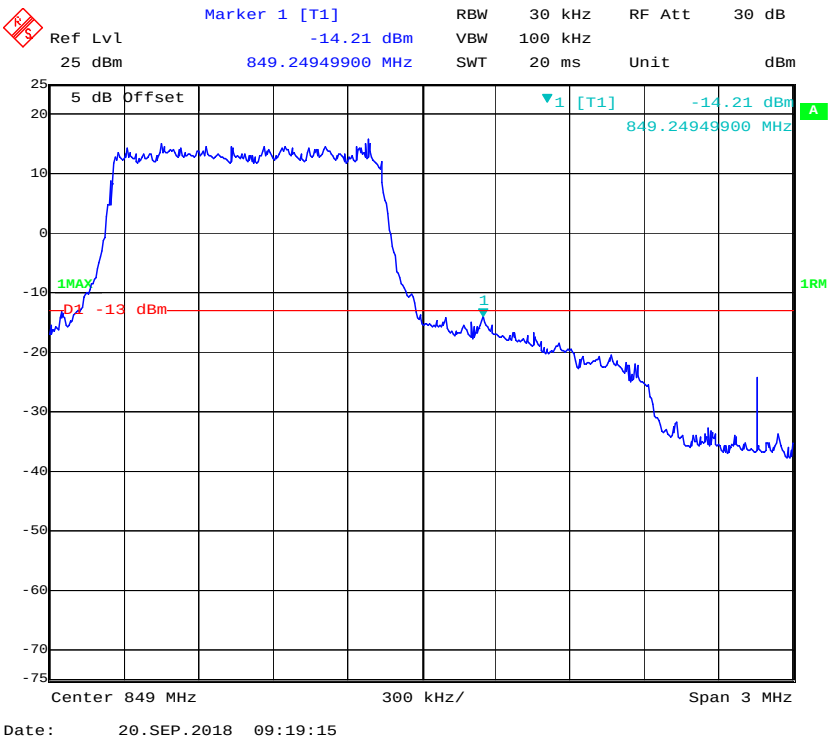
LTE Band V

QPSK_1.4MHz_ 6 RB_ Left



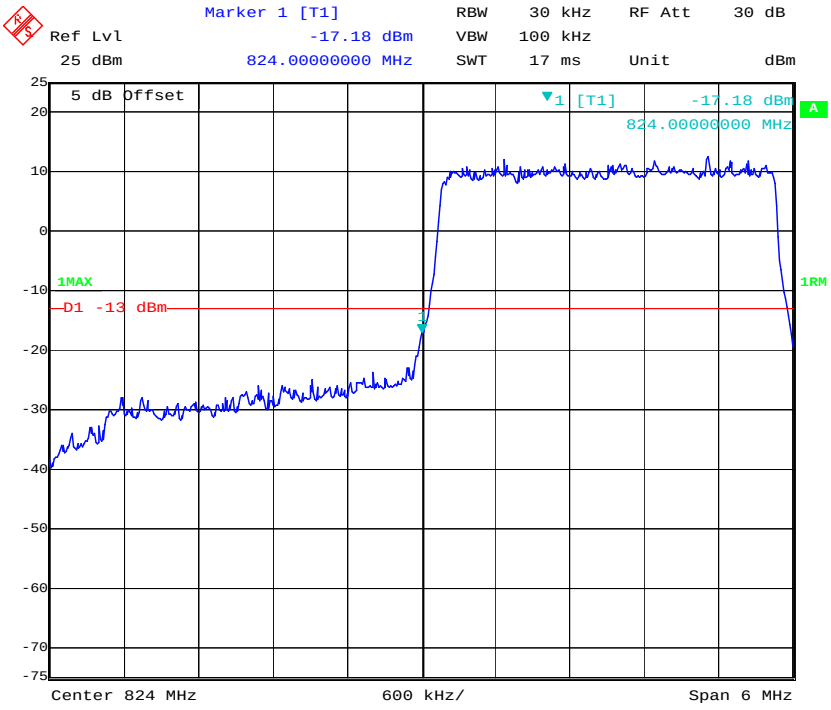
Date: 20.SEP.2018 09:15:36

QPSK_1.4MHz_ 6 RB_ Right



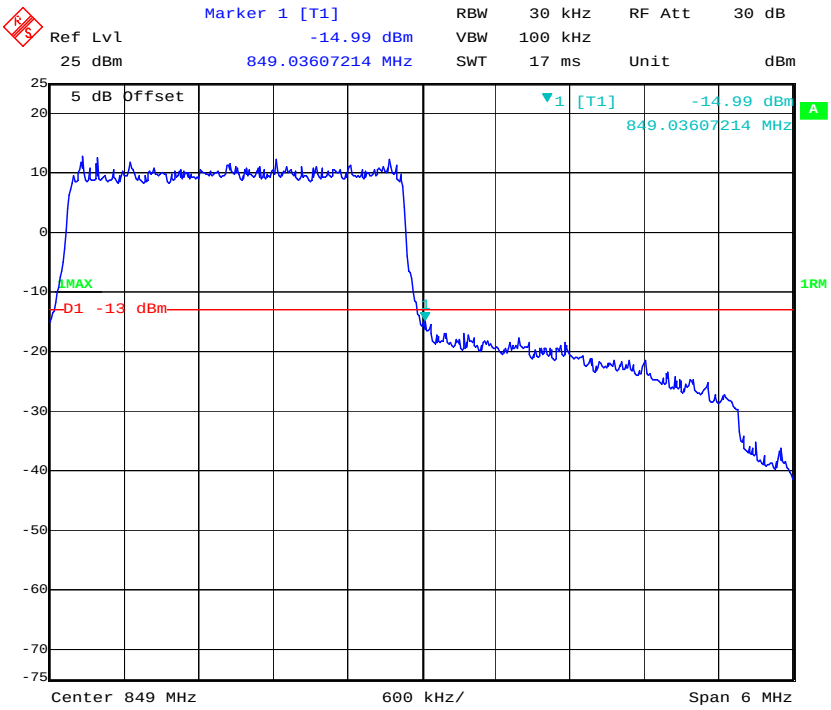
Date: 20.SEP.2018 09:19:15

QPSK_3MHz_ 15 RB_ Left



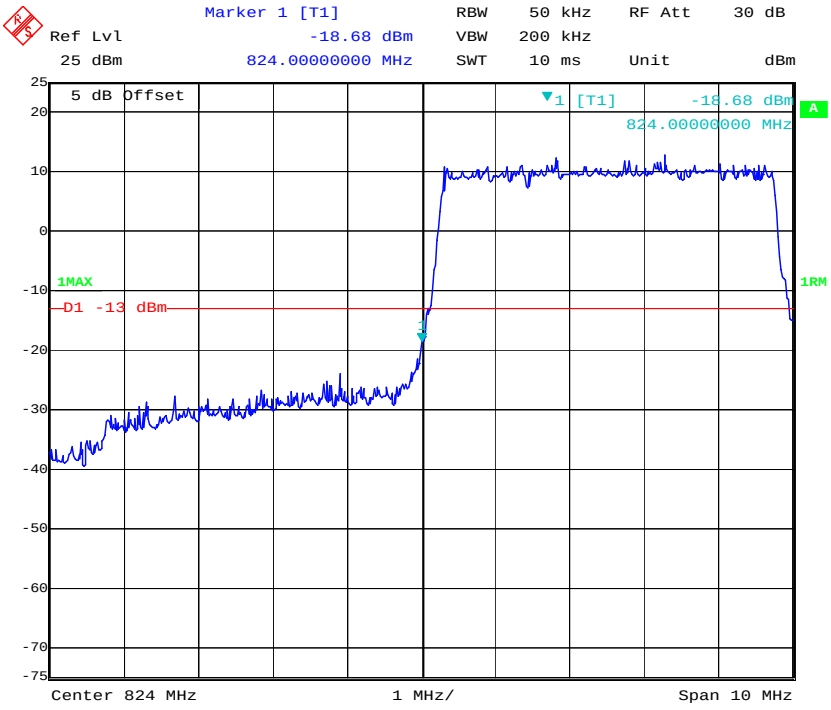
Date: 20.SEP.2018 09:24:46

QPSK_3MHz_ 15 RB_ Right



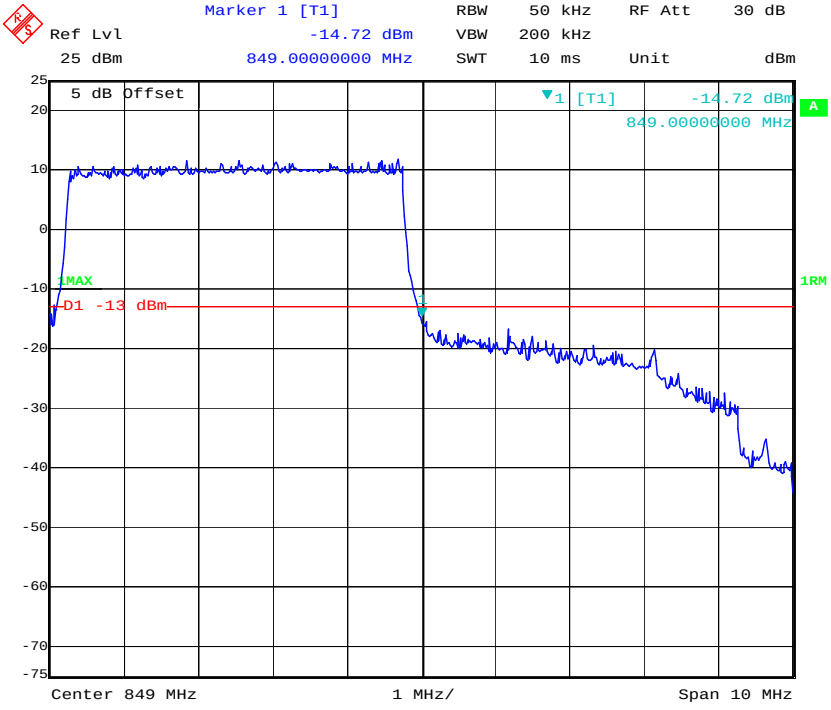
Date: 20.SEP.2018 09:23:28

QPSK_5MHz_ 25 RB_ Left



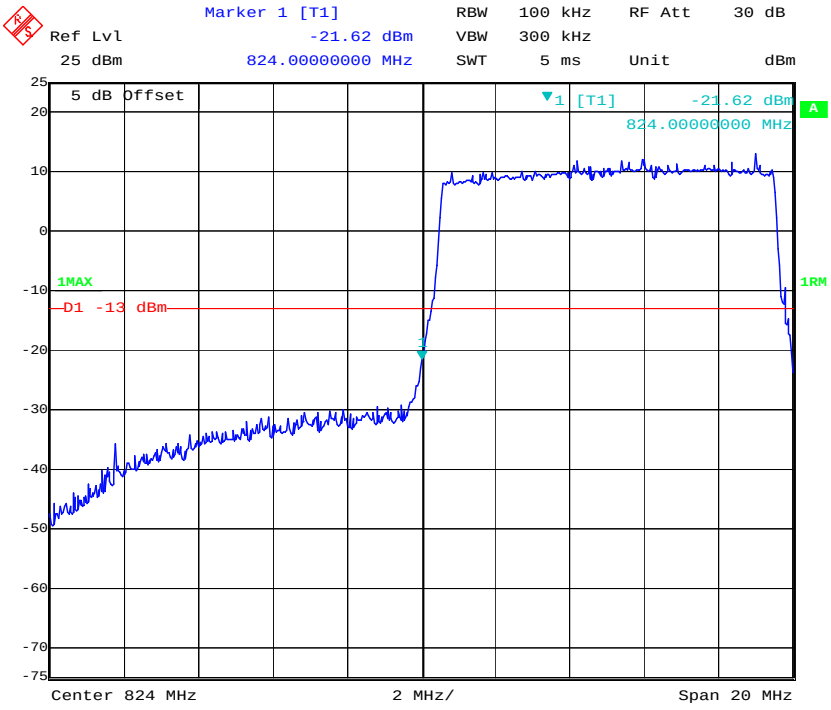
Date: 20.SEP.2018 09:26:21

QPSK_5MHz_ 25 RB_ Right



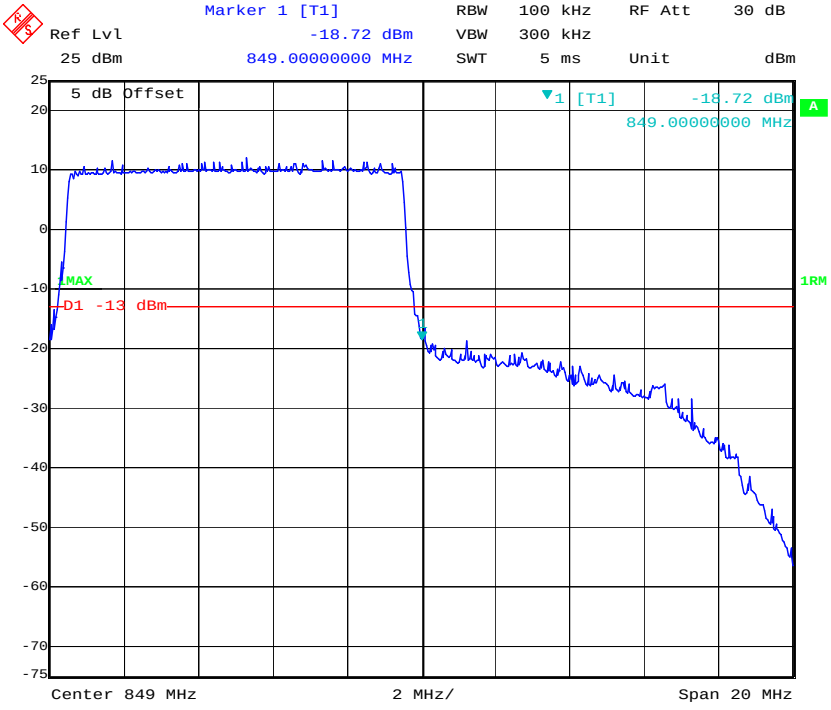
Date: 20.SEP.2018 09:27:00

QPSK_10MHz_ 50 RB_ Left



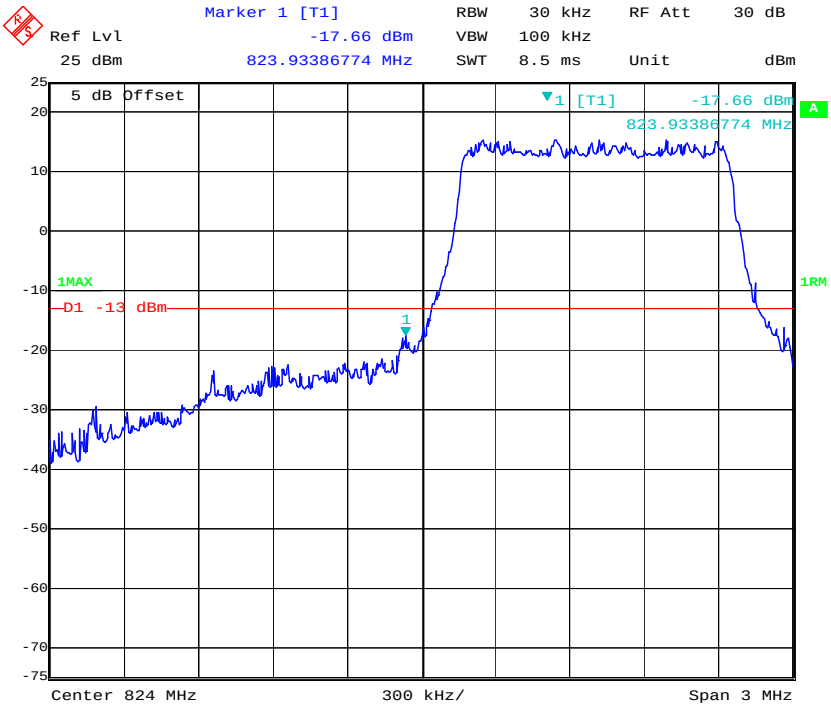
Date: 20.SEP.2018 09:30:52

QPSK_10MHz_ 50 RB_ Right



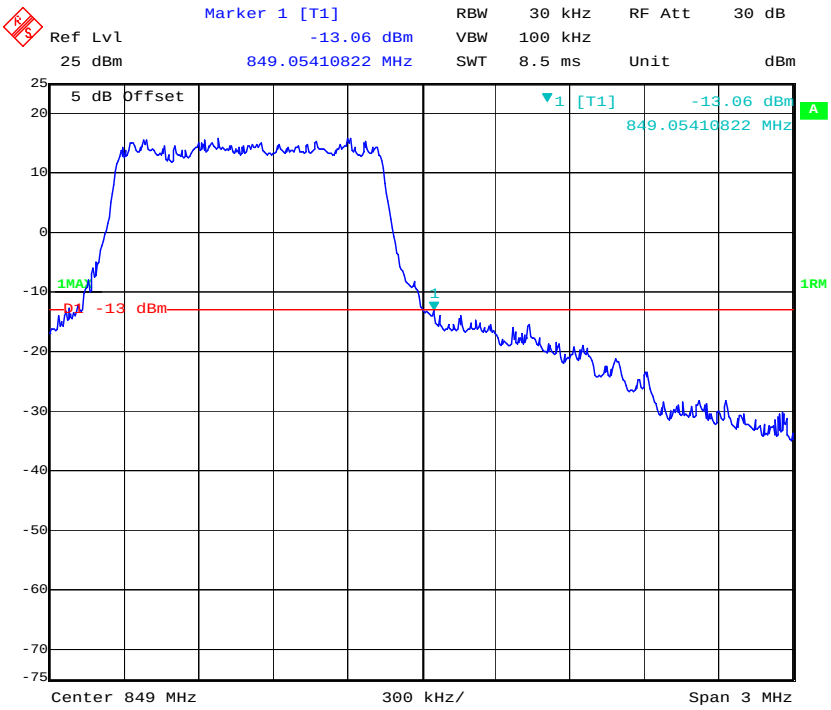
Date: 20.SEP.2018 09:28:38

16QAM_1.4MHz_ 6 RB_ Left



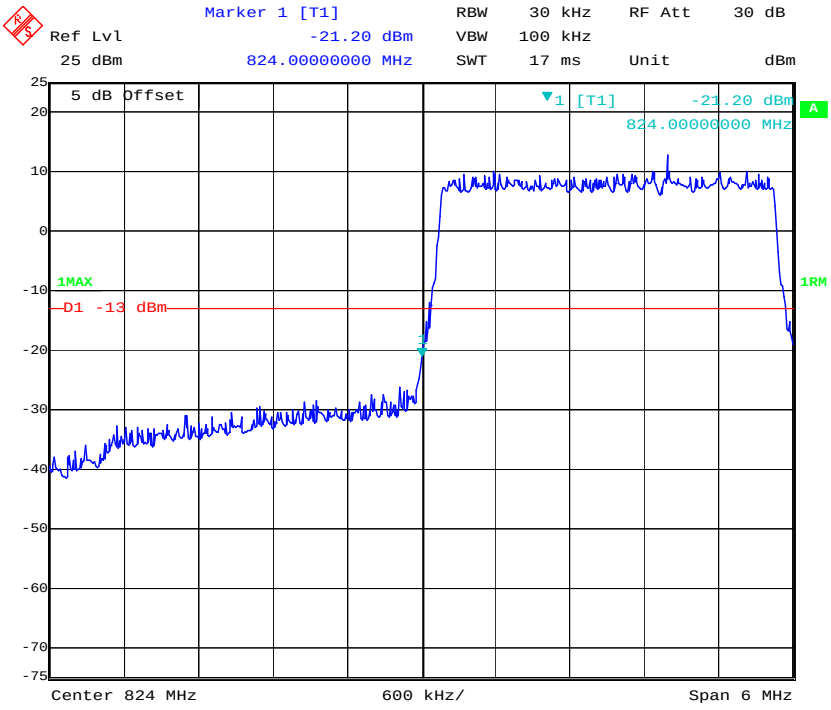
Date: 20.SEP.2018 09:14:46

16QAM_1.4MHz_ 6 RB_ Right



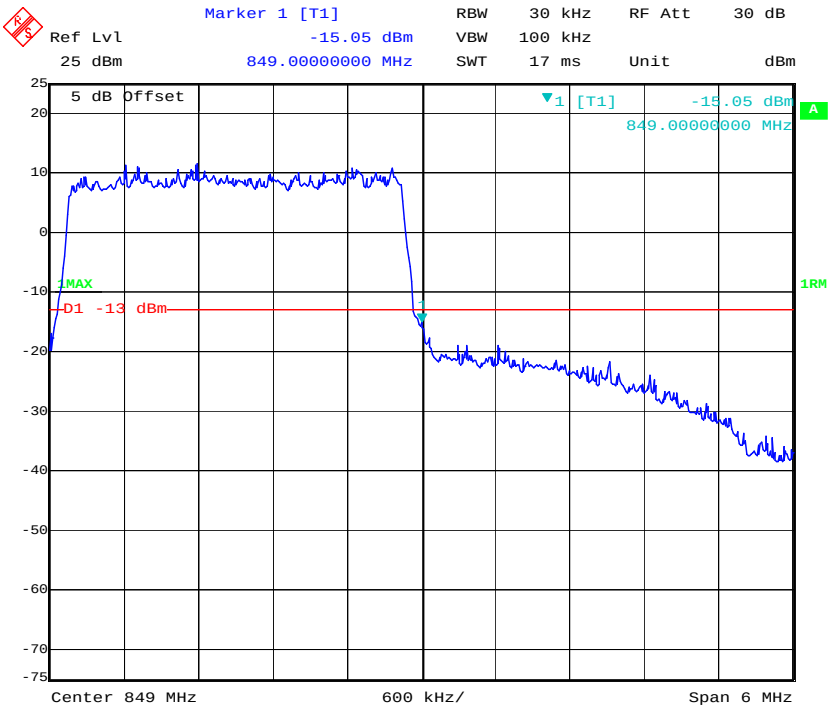
Date: 20.SEP.2018 09:20:37

16QAM_3MHz_ 15 RB_ Left



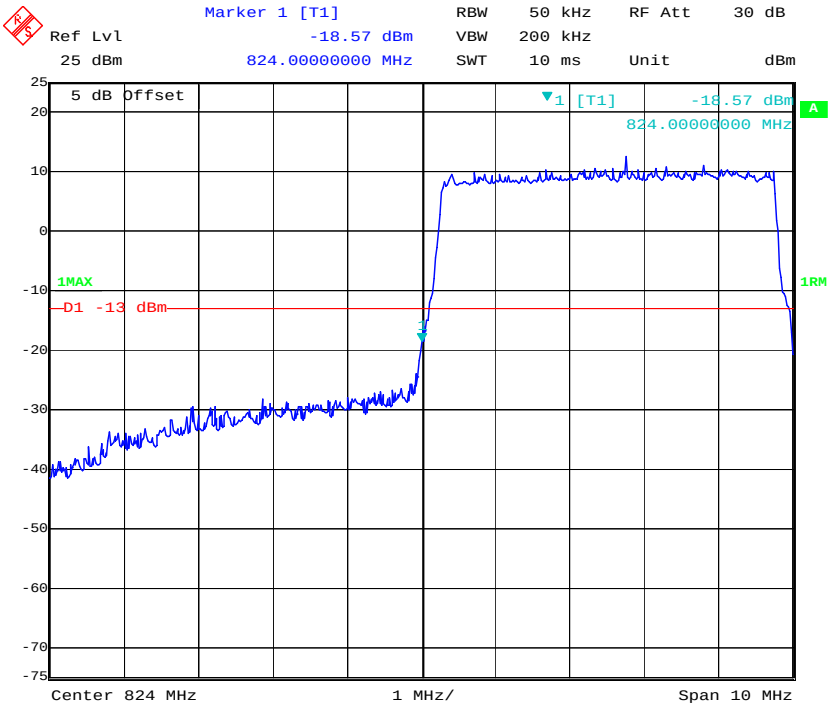
Date: 20.SEP.2018 09:25:03

16QAM_3MHz_ 15 RB_ Right



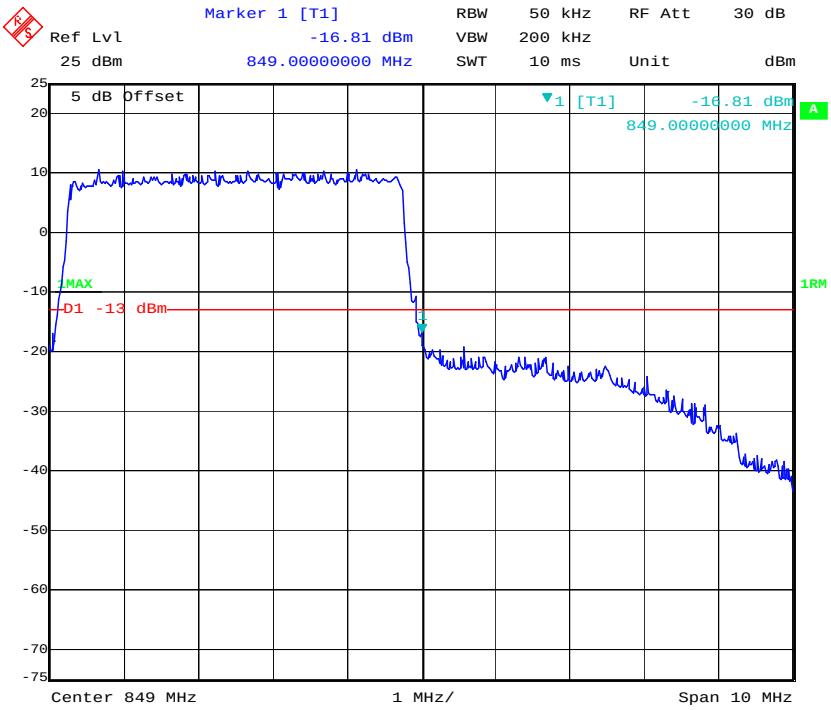
Date: 20.SEP.2018 09:22:20

16QAM_5MHz_ 25 RB_ Left



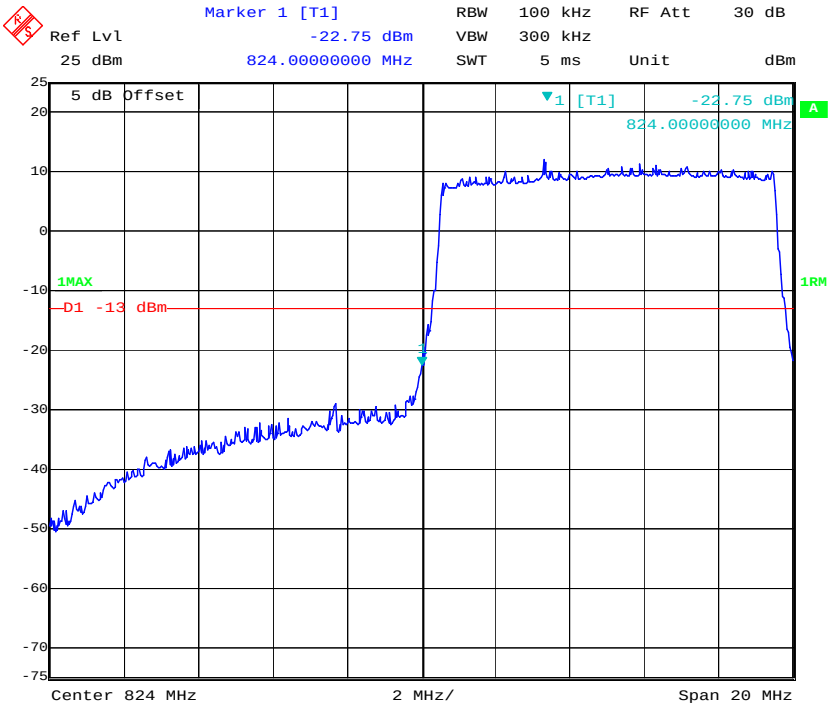
Date: 20.SEP.2018 09:25:59

16QAM_5MHz_ 25 RB_ Right



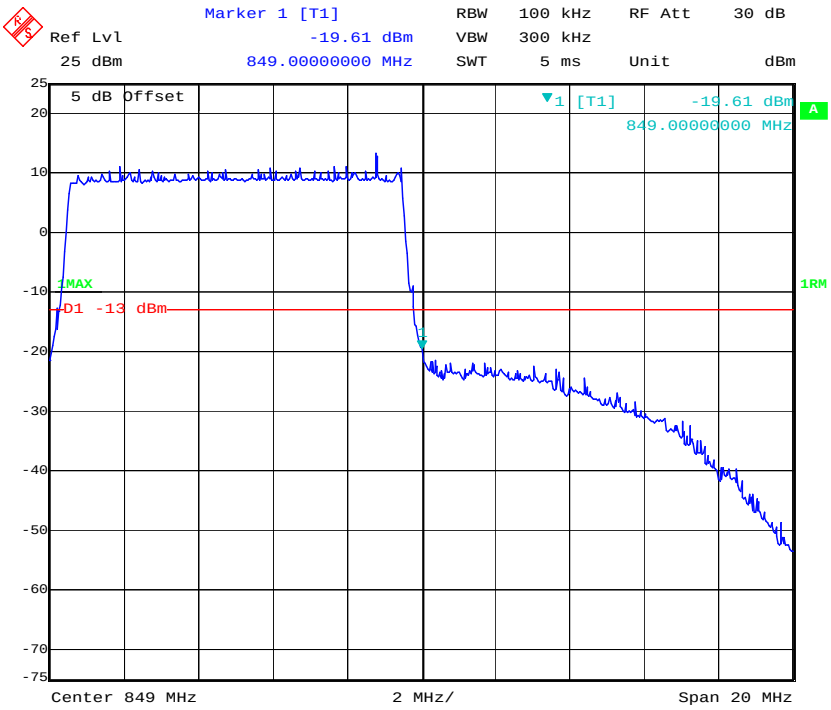
Date: 20.SEP.2018 09:27:29

16QAM_10MHz_ 50 RB_ Left



Date: 20.SEP.2018 09:30:26

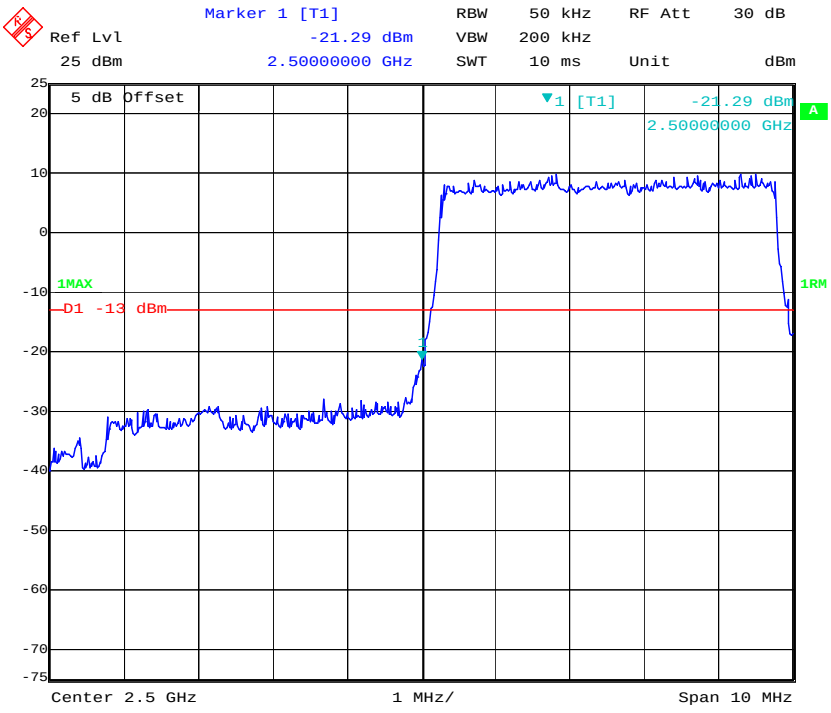
16QAM_10MHz_ 50 RB_ Right



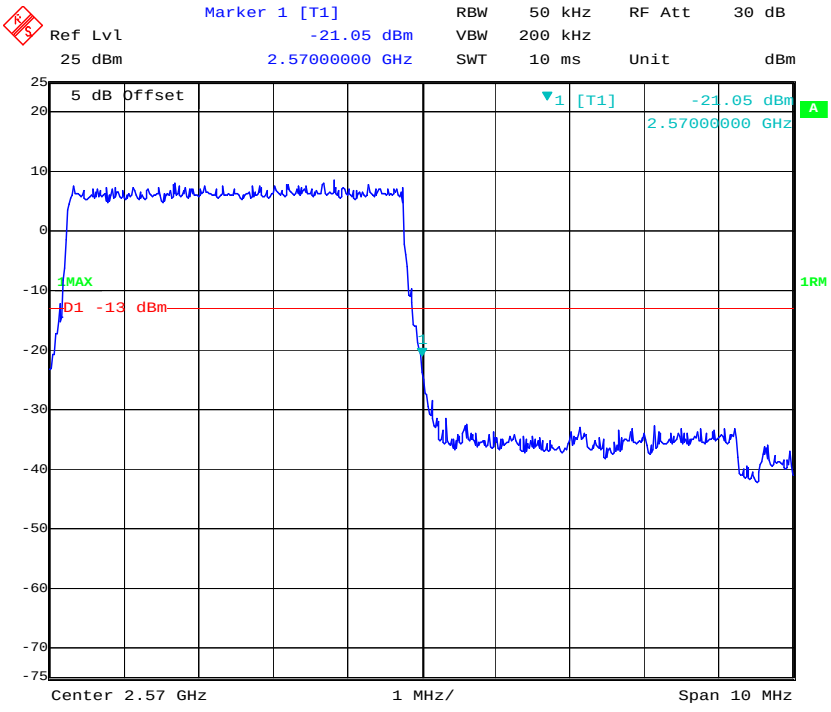
Date: 20.SEP.2018 09:29:22

LTE Band 7

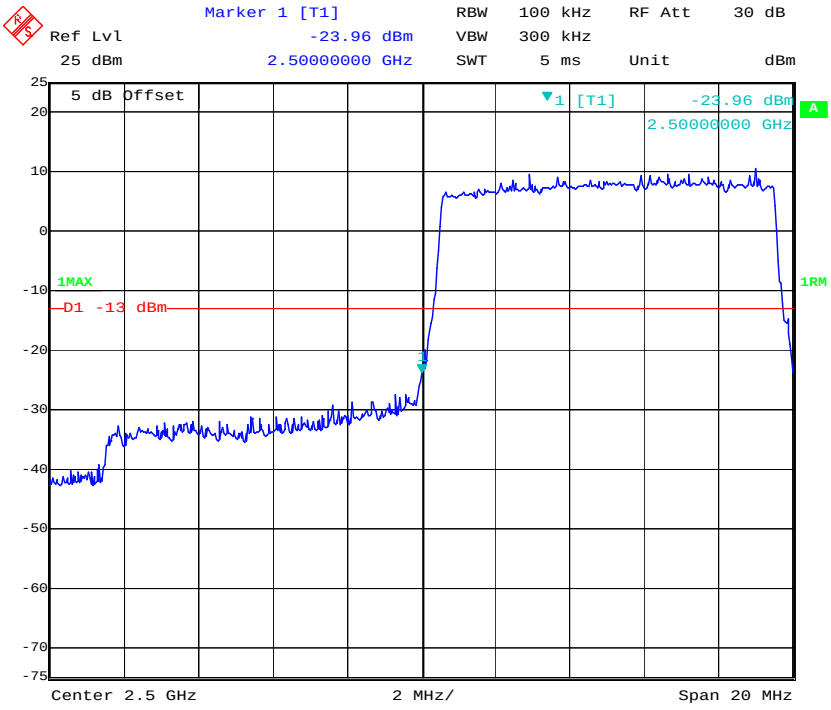
QPSK_5MHz_ 25 RB_ Left



QPSK_5MHz_ 25 RB_ Right

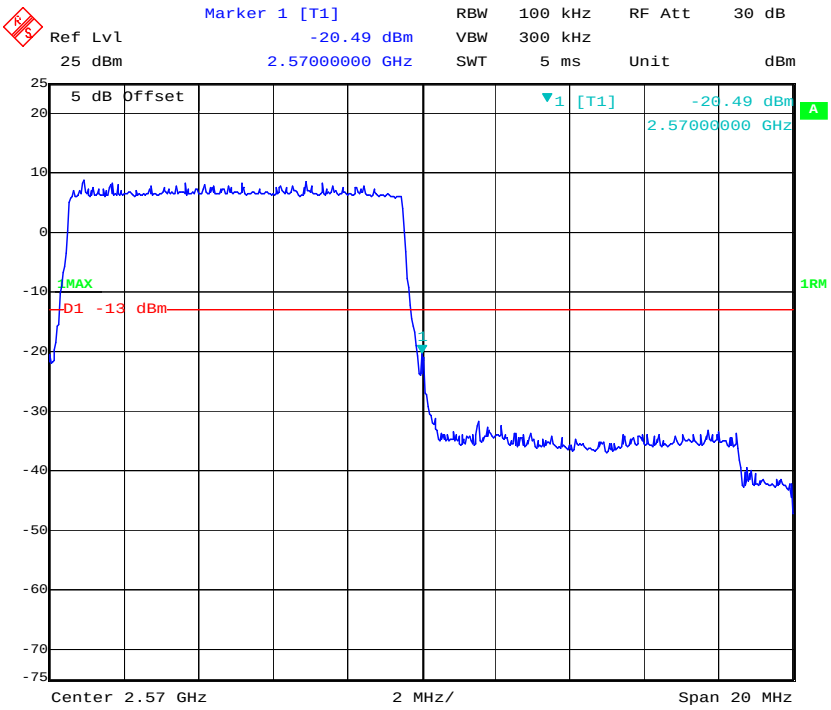


QPSK_10MHz_ 50 RB_ Left



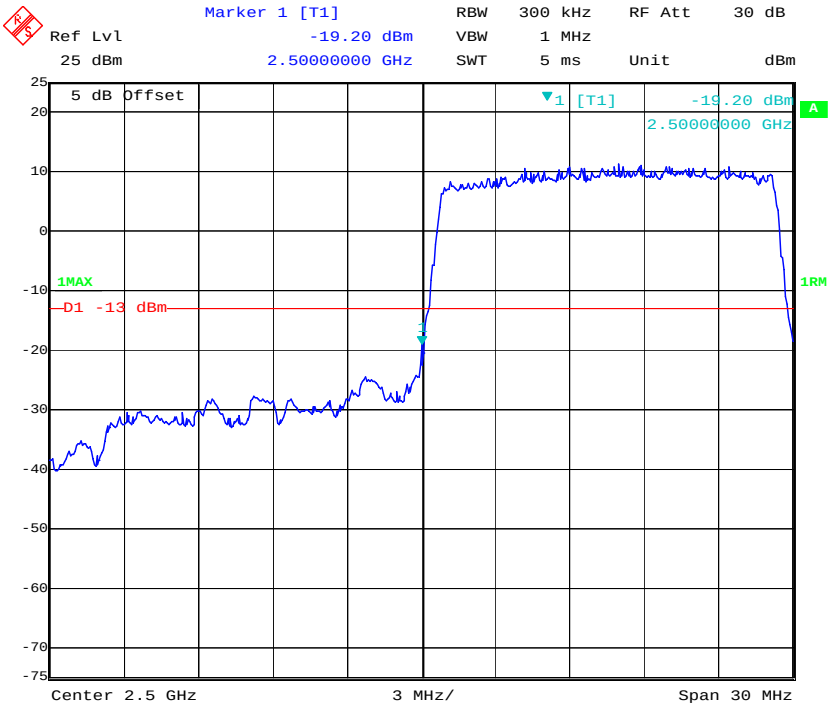
Date: 20.SEP.2018 09:39:03

QPSK_10MHz_ 50 RB_ Right



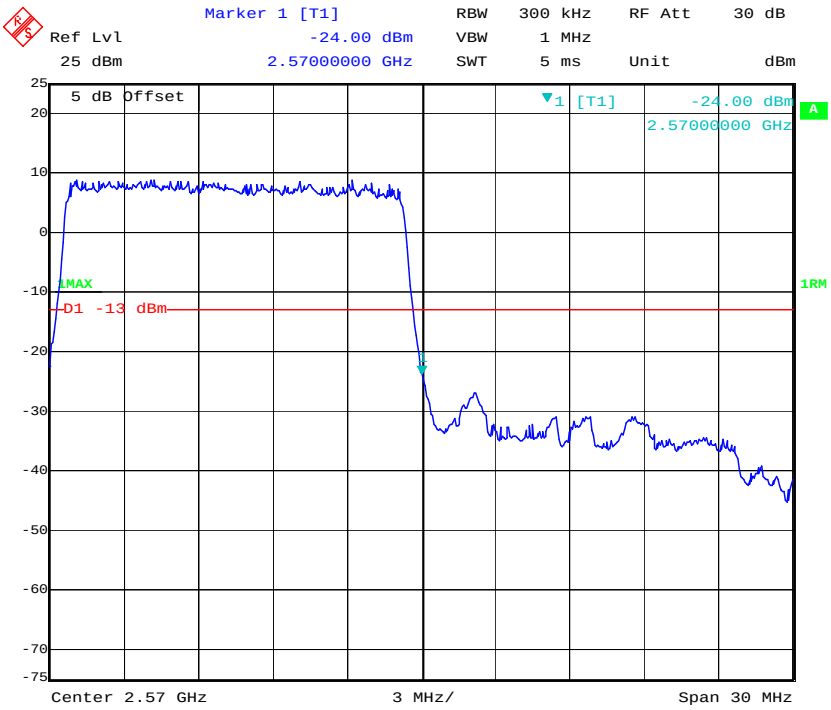
Date: 20.SEP.2018 09:36:42

QPSK_15MHz_ 75 RB_ Left



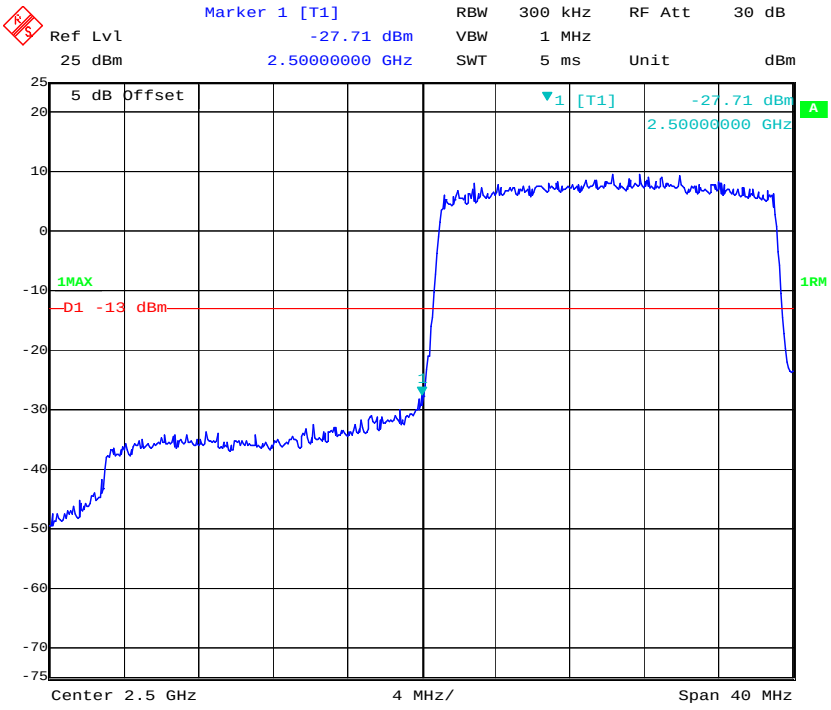
Date: 20.SEP.2018 10:35:09

QPSK_15MHz_ 75 RB_ Right

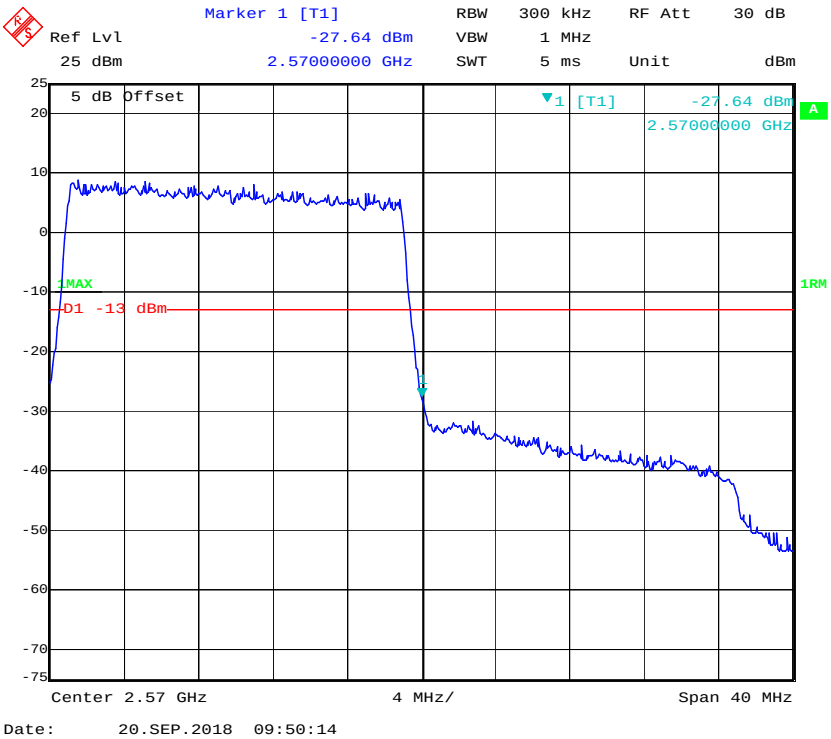


Date: 20.SEP.2018 10:36:32

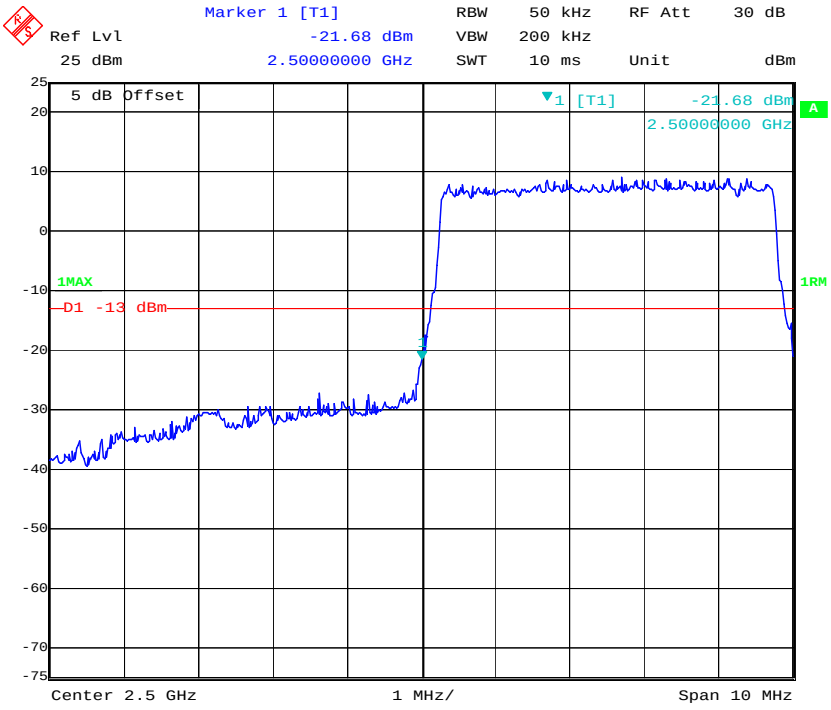
QPSK_20MHz_ FULL RB_ Left



QPSK_20MHz_ FULL RB_ Right

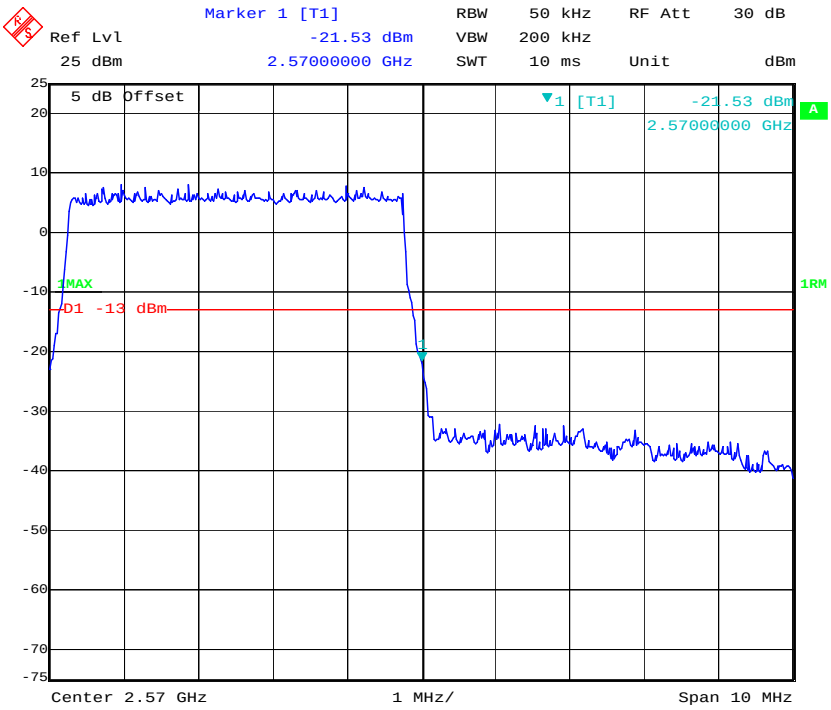


16QAM_5MHz_ 25 RB_ Left



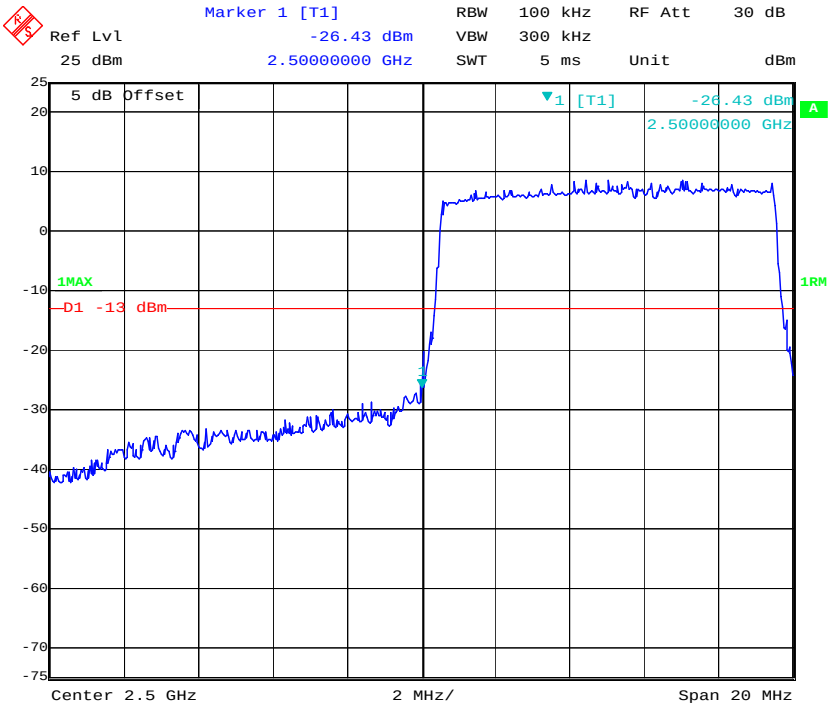
Date: 20.SEP.2018 09:33:45

16QAM_5MHz_ 25 RB_ Right



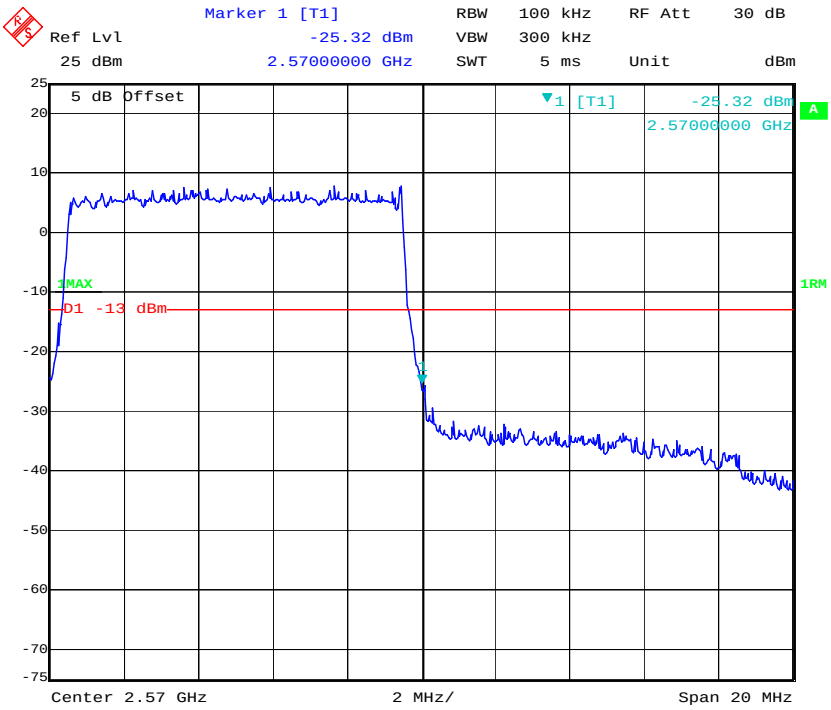
Date: 20.SEP.2018 09:35:02

16QAM_10MHz_ 50 RB_ Left



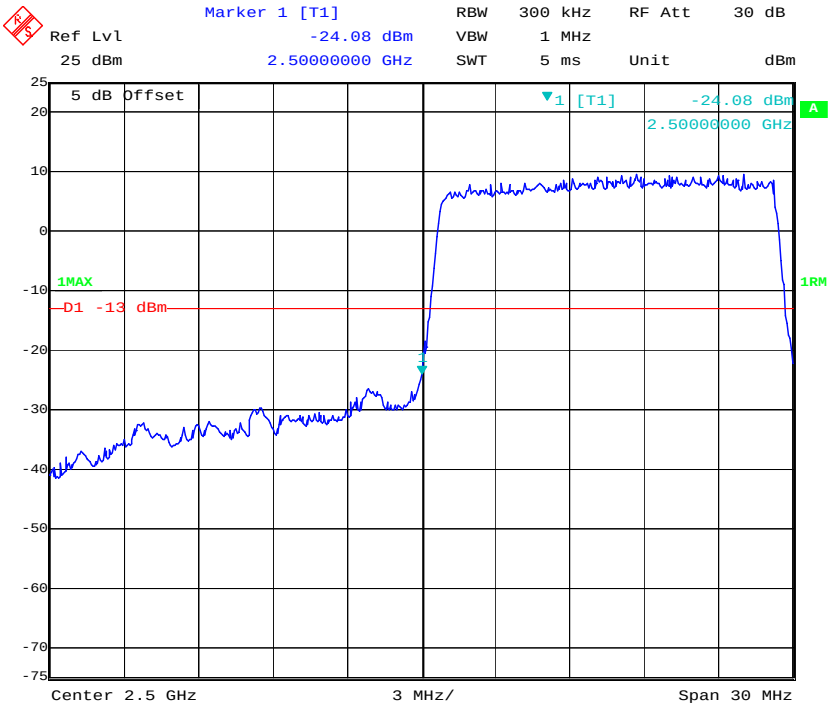
Date: 20.SEP.2018 09:38:31

16QAM_10MHz_ 50 RB_ Right



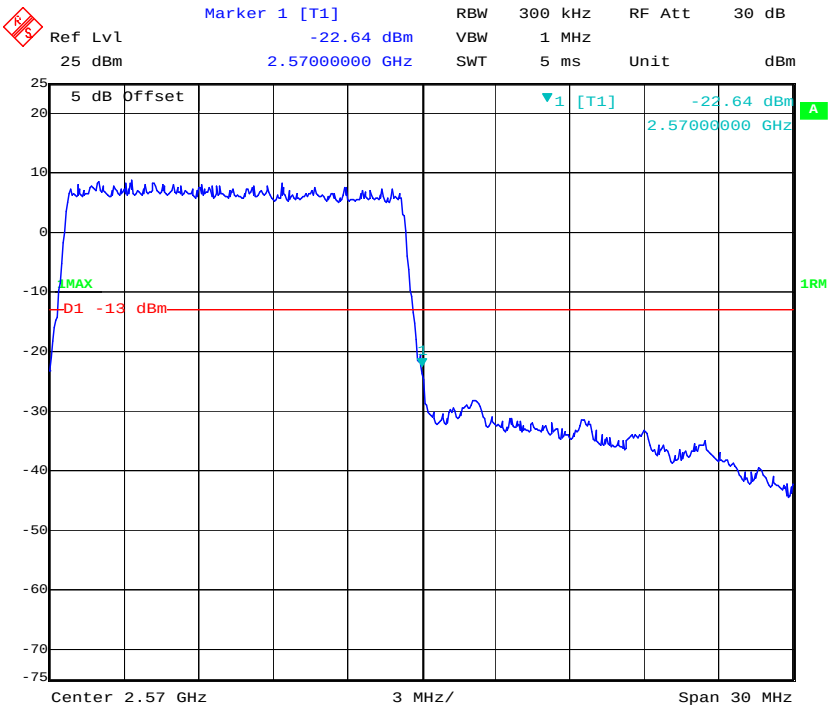
Date: 20.SEP.2018 09:37:11

16QAM_15MHz_ 75 RB_ Left



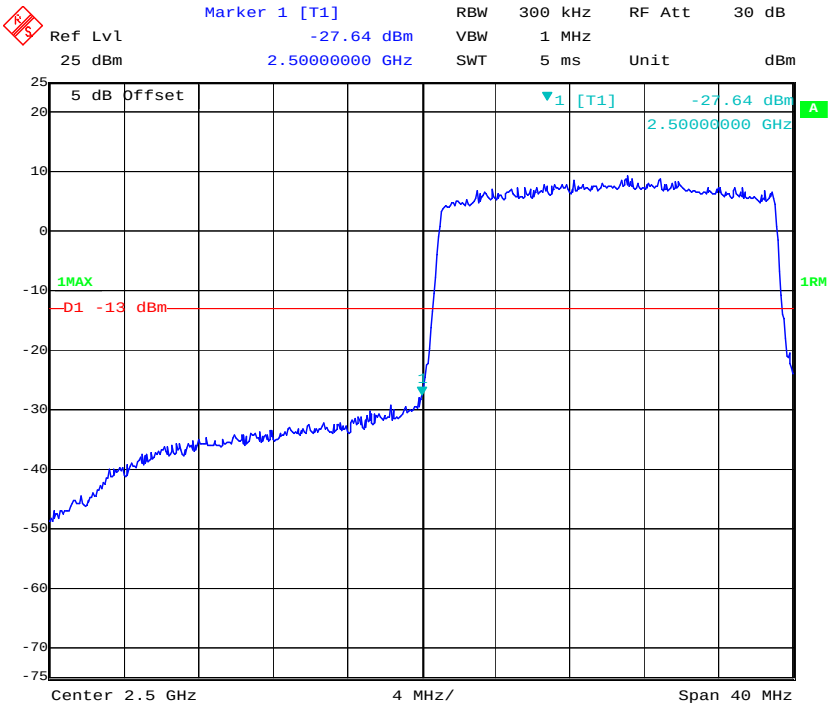
Date: 20.SEP.2018 10:35:30

16QAM_15MHz_ 75 RB_ Right



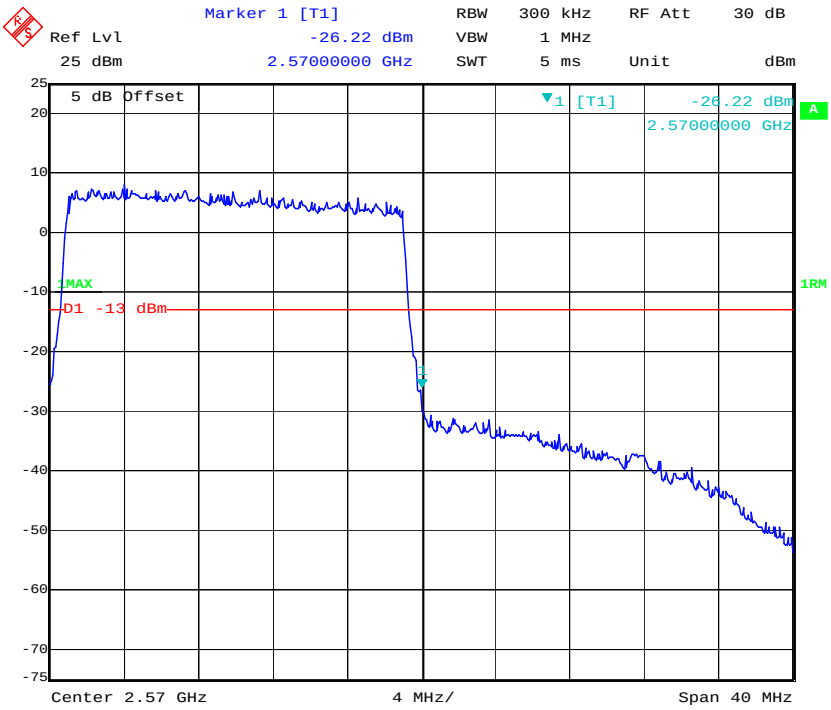
Date: 20.SEP.2018 10:36:08

16QAM_20MHz_ FULL RB_ Left



Date: 20.SEP.2018 09:49:08

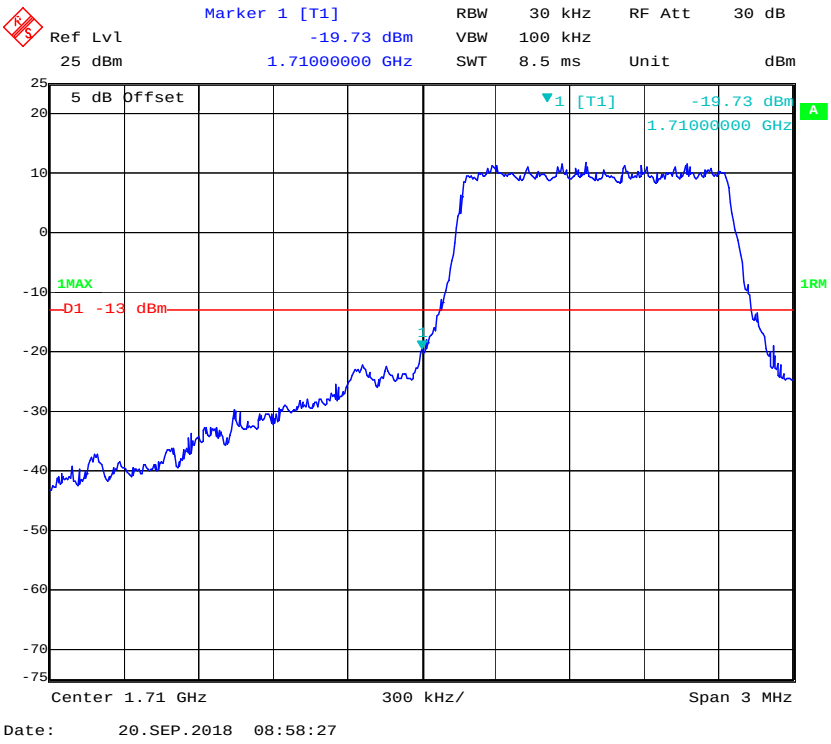
16QAM_20MHz_ FULL RB_ Right



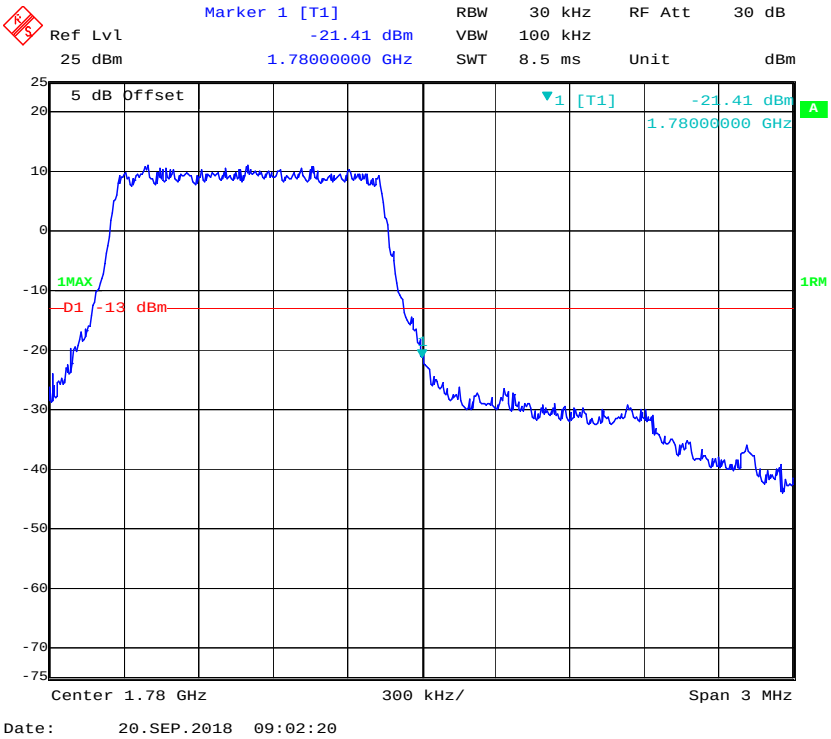
Date: 20.SEP.2018 09:50:37

LTE Band 66

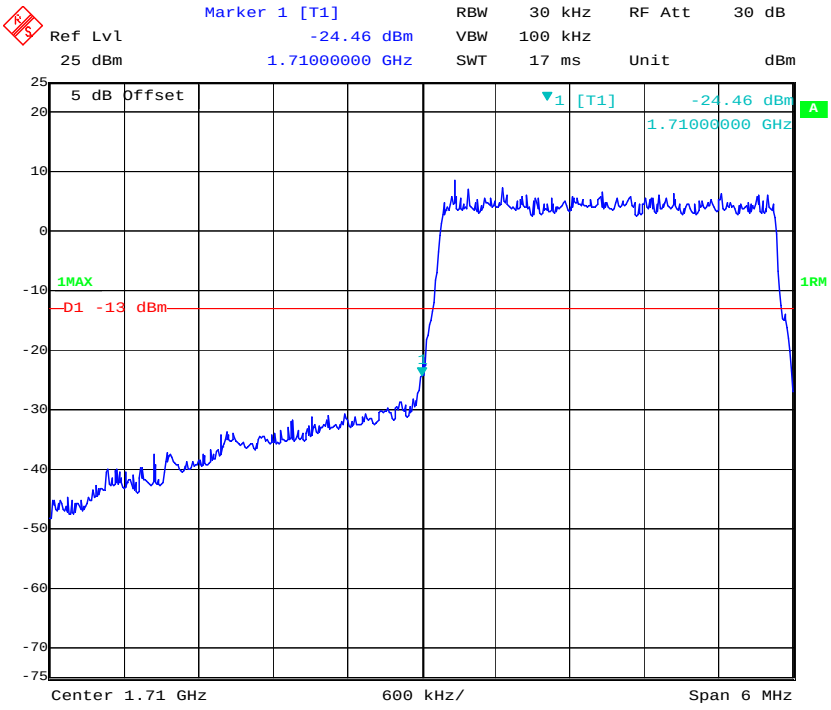
QPSK_1.4MHz_ 6 RB_ Left



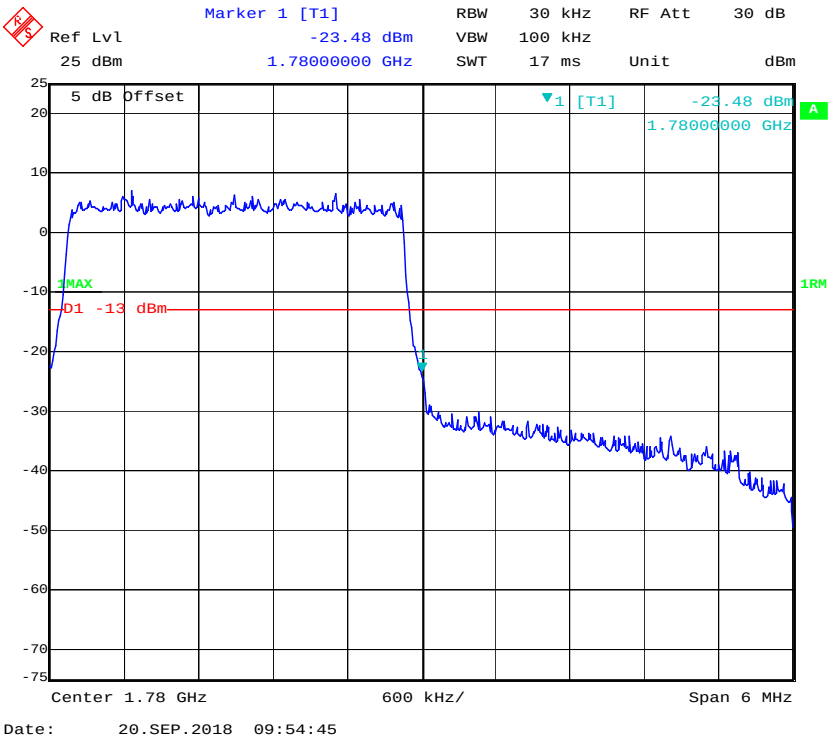
QPSK_1.4MHz_ 6 RB_ Right



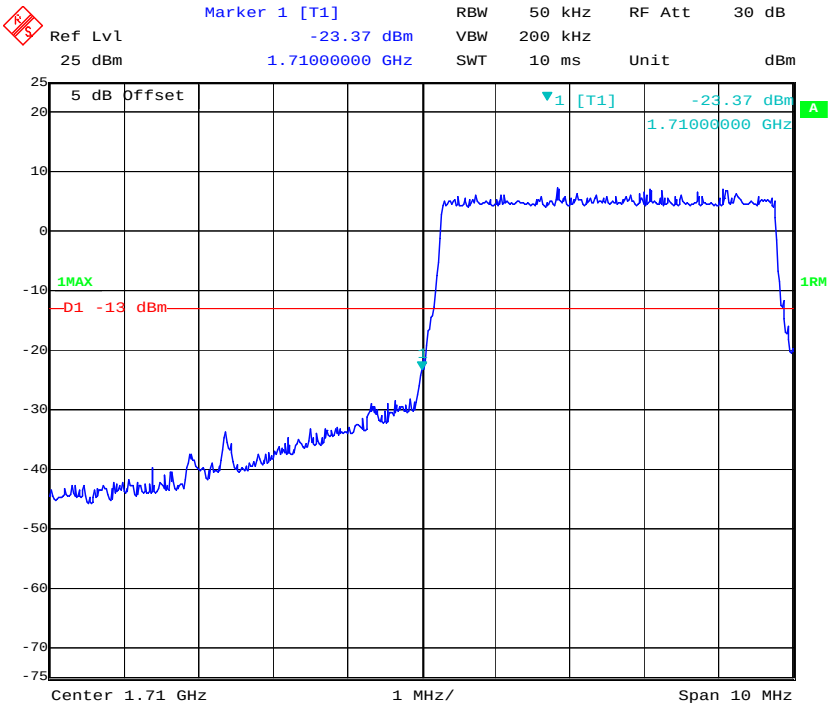
QPSK_3MHz_ 15 RB_ Left



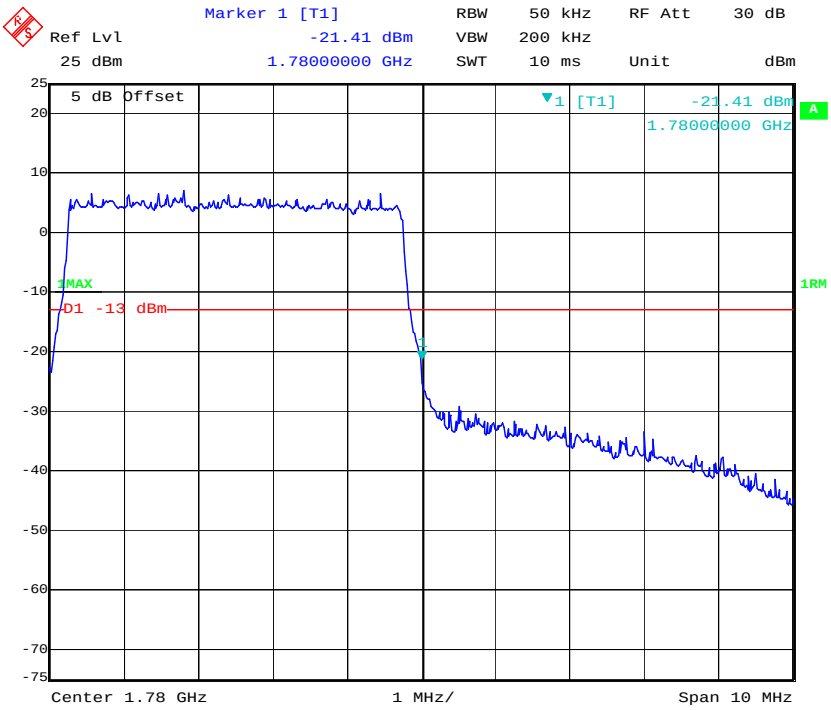
QPSK_3MHz_ 15 RB_ Right



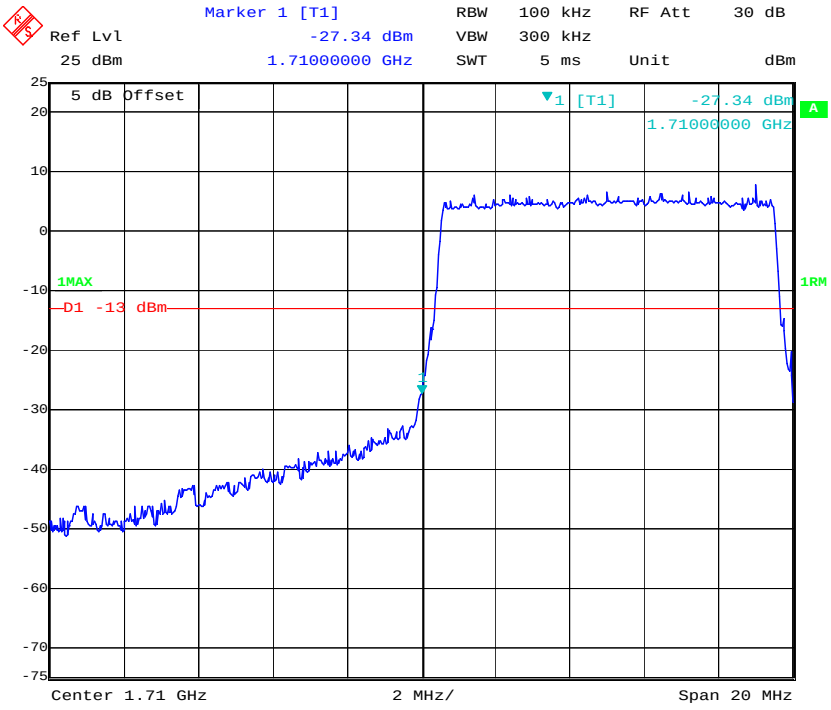
QPSK_5MHz_ 25 RB_ Left



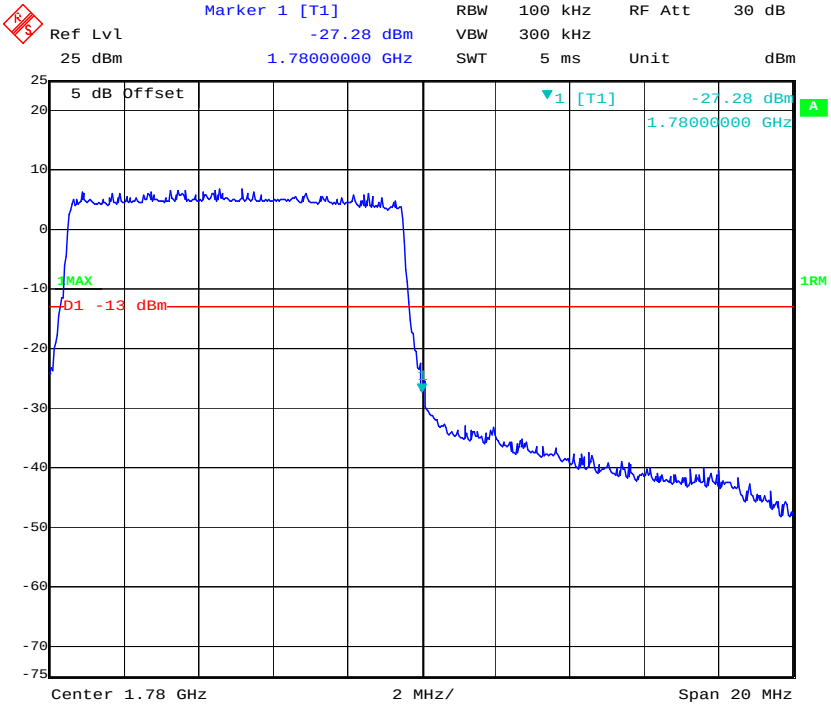
QPSK_5MHz_ 25 RB_ Right



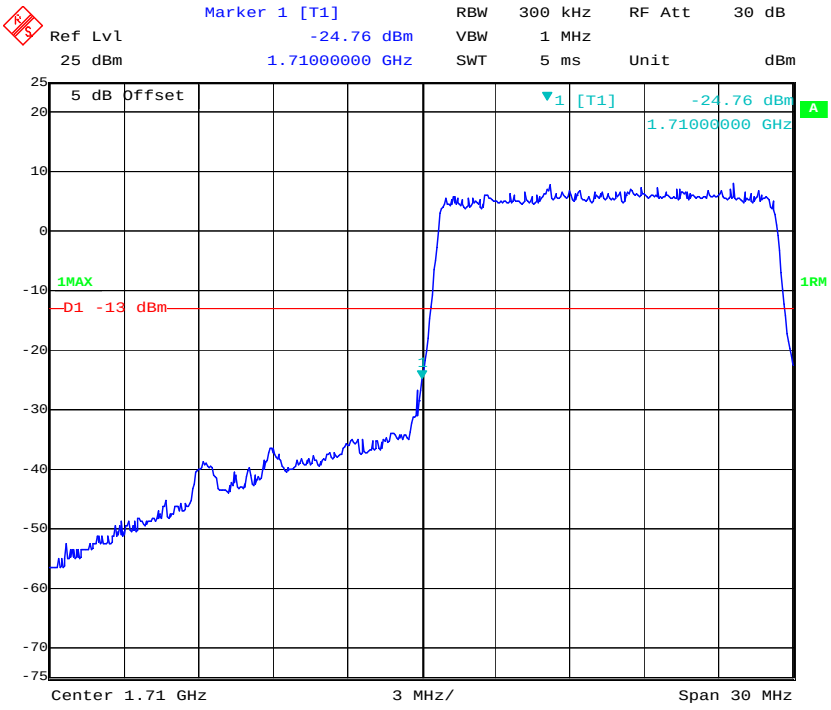
QPSK_10MHz_ 50 RB_ Left



QPSK_10MHz_ 50 RB_ Right

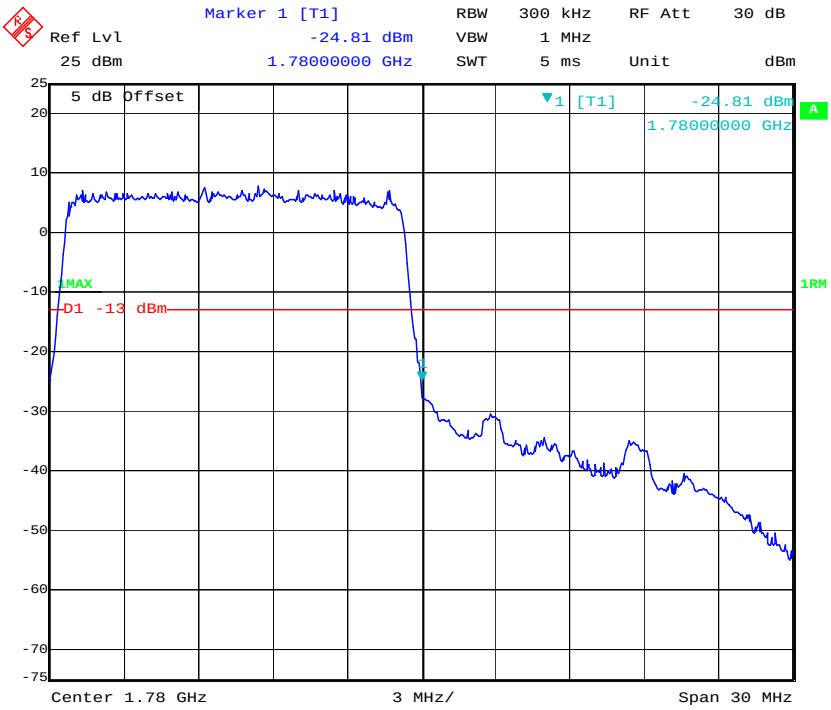


QPSK_15MHz_ 75 RB_ Left



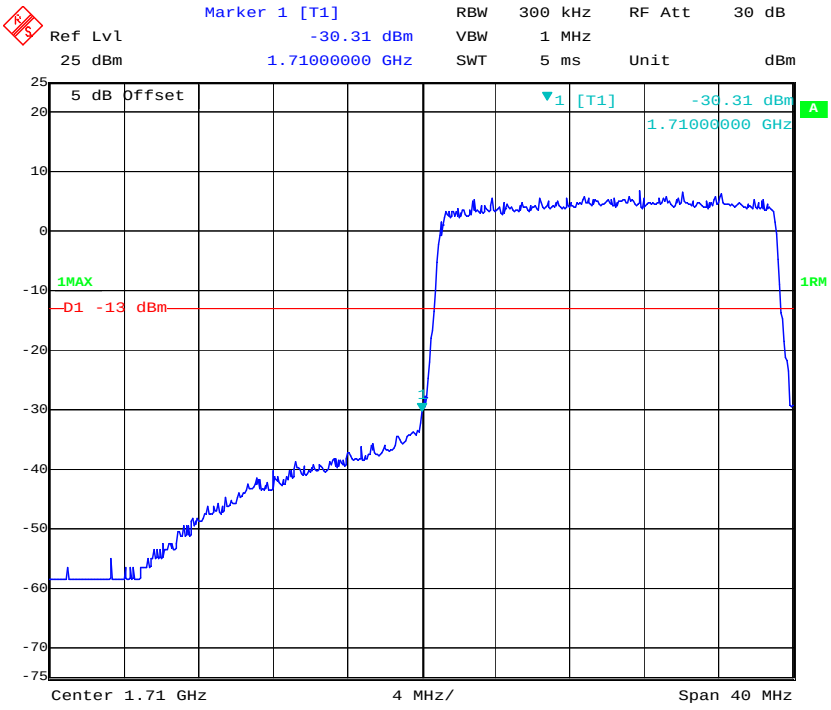
Date: 20.SEP.2018 10:10:18

QPSK_15MHz_ 75 RB_ Right



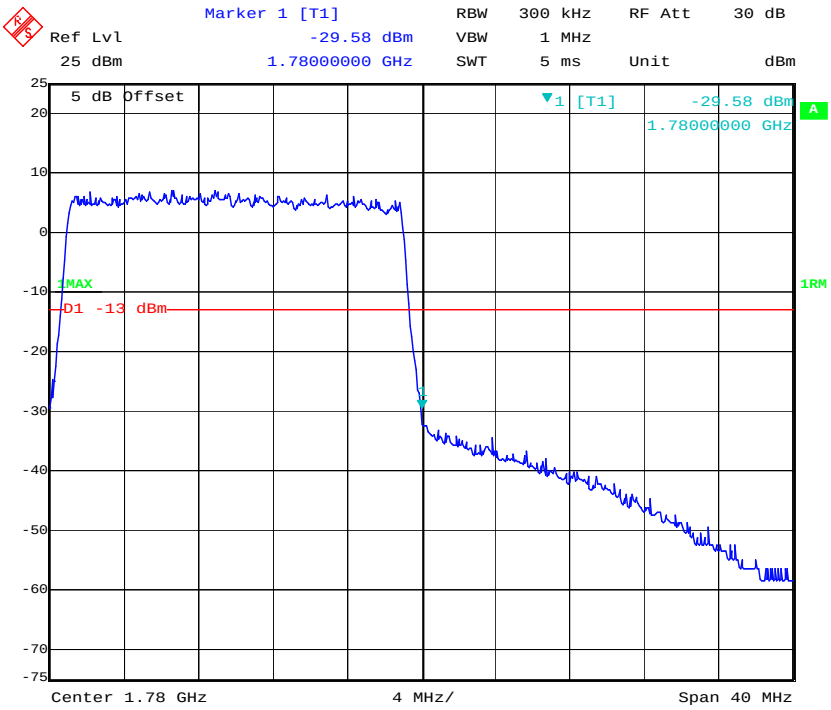
Date: 20.SEP.2018 10:07:28

QPSK_20MHz_ FULL RB_ Left



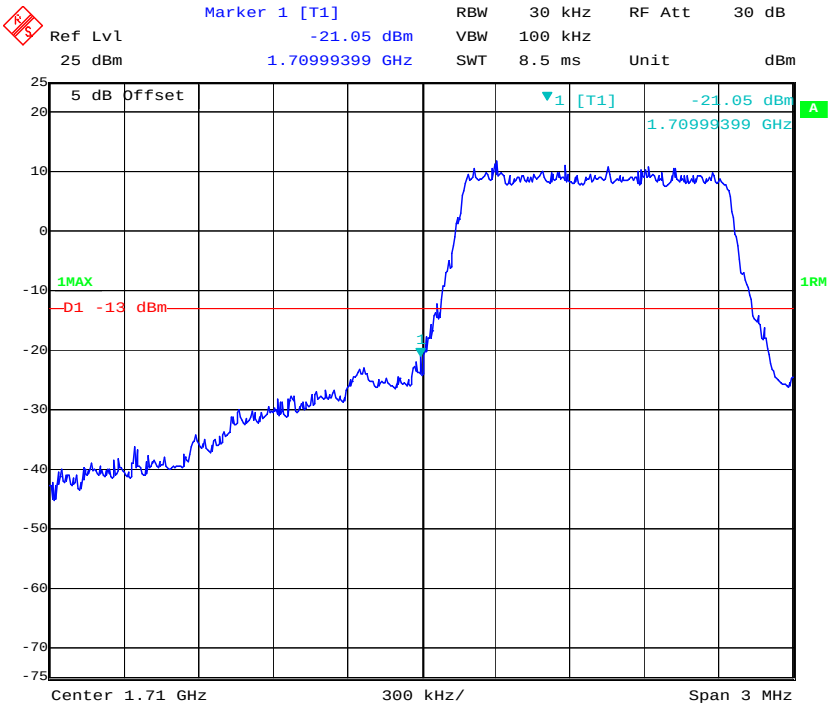
Date: 20.SEP.2018 10:12:35

QPSK_20MHz_ FULL RB_ Right

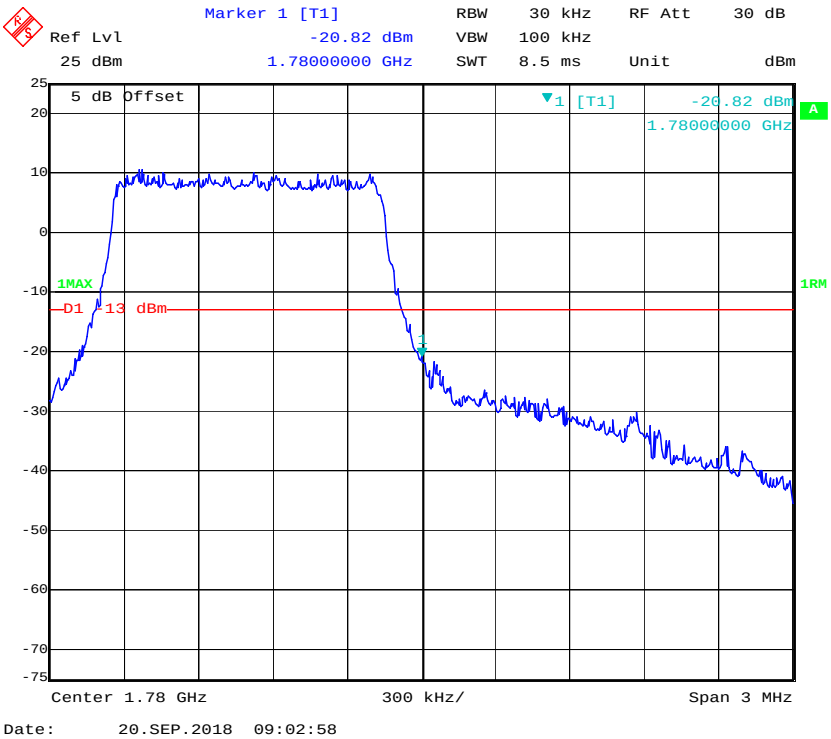


Date: 20.SEP.2018 10:13:15

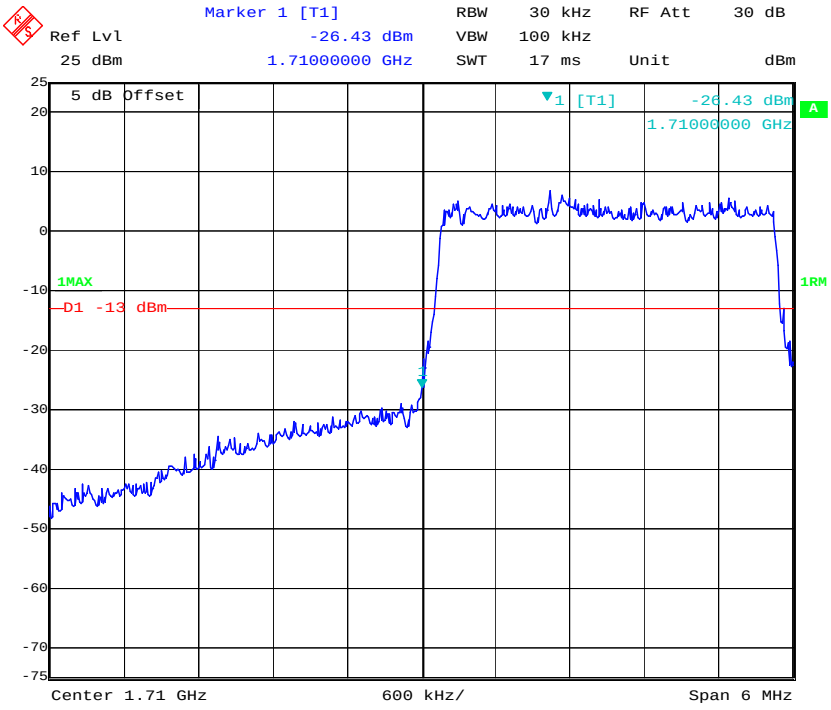
16QAM_1.4MHz_ 6 RB_ Left



16QAM_1.4MHz_ 6 RB_ Right

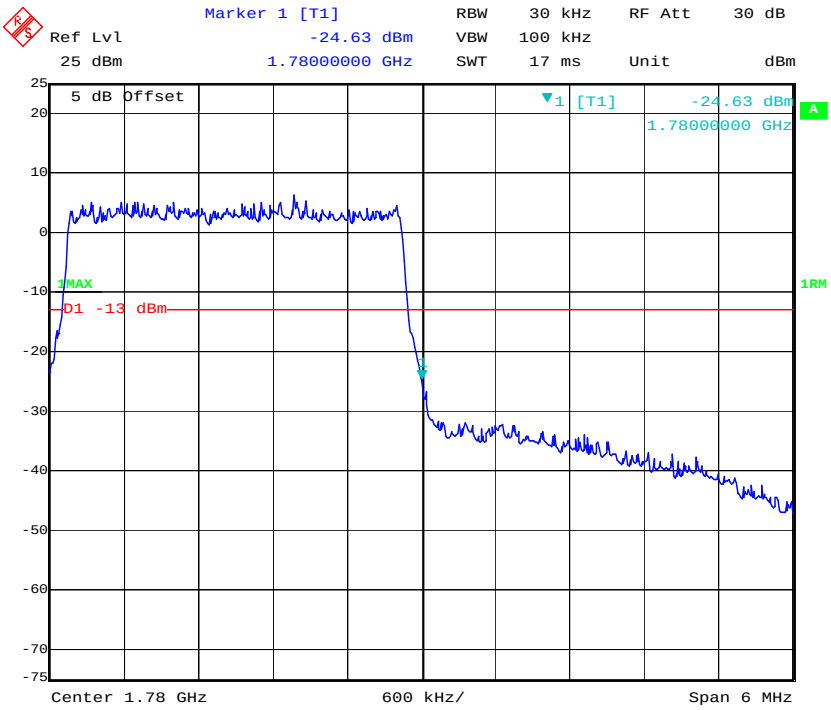


16QAM_3MHz_ 15 RB_ Left



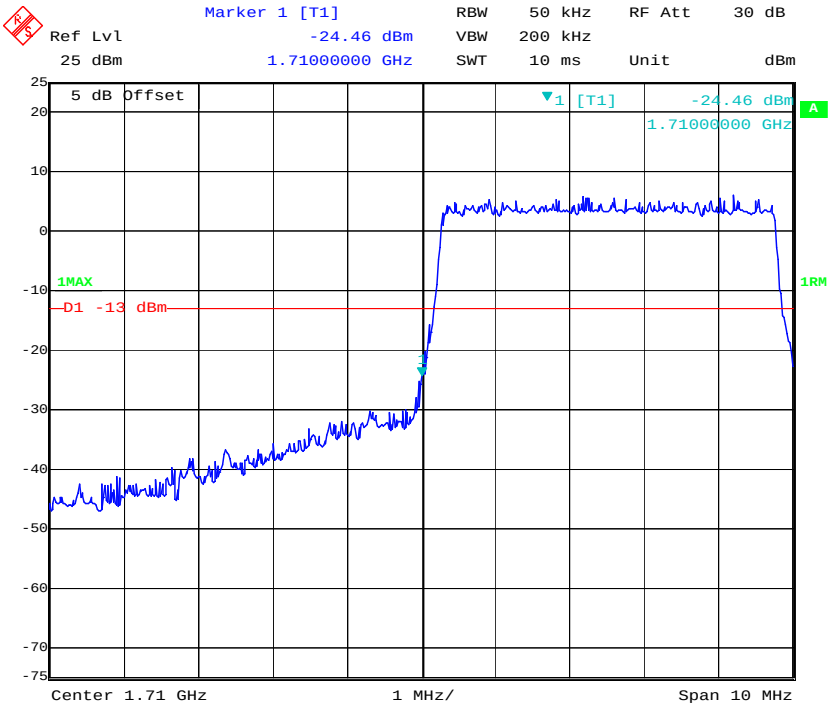
Date: 20.SEP.2018 09:53:20

16QAM_3MHz_ 15 RB_ Right



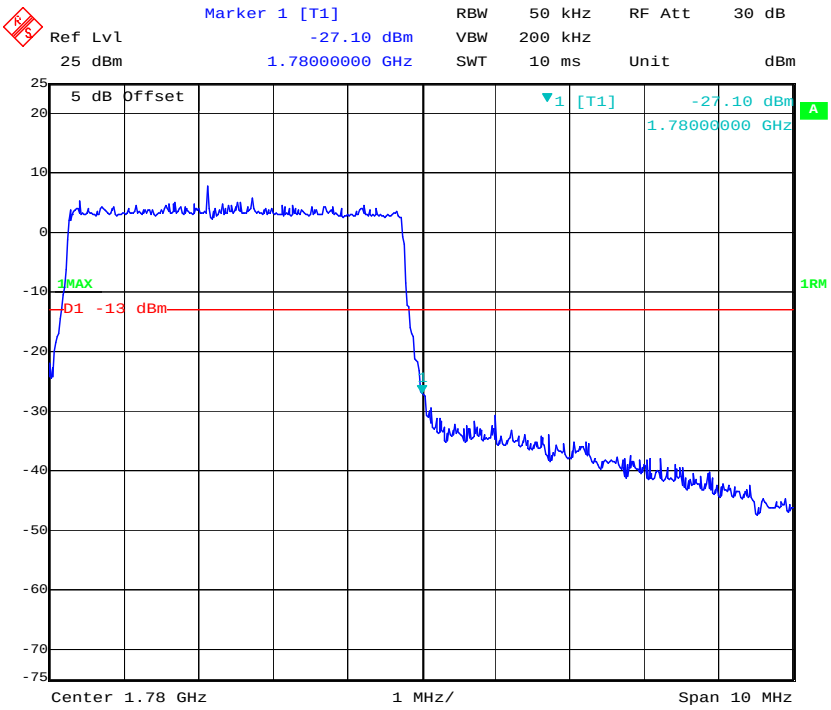
Date: 20.SEP.2018 09:55:29

16QAM_5MHz_ 25 RB_ Left



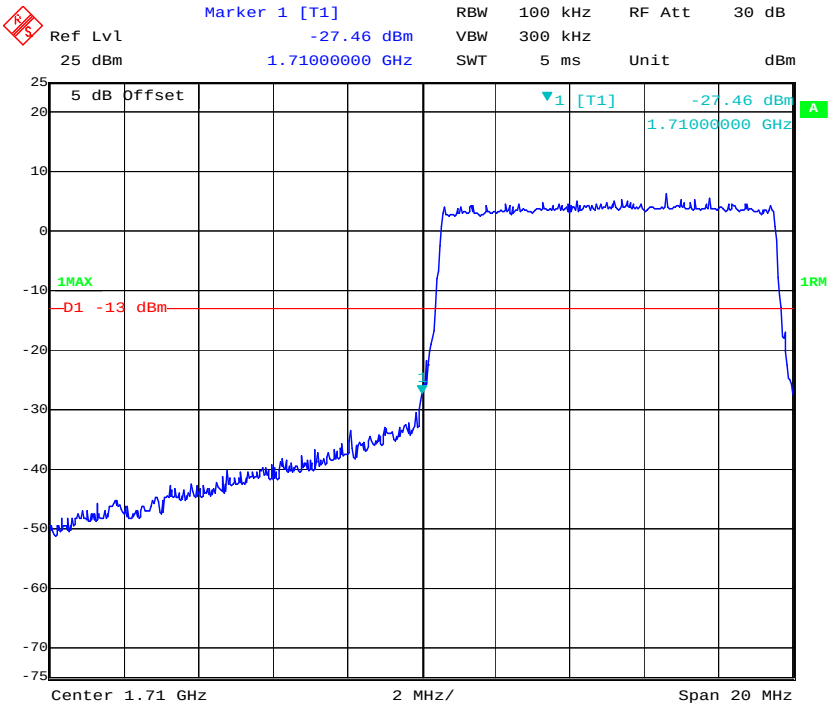
Date: 20.SEP.2018 09:57:49

16QAM_5MHz_ 25 RB_ Right



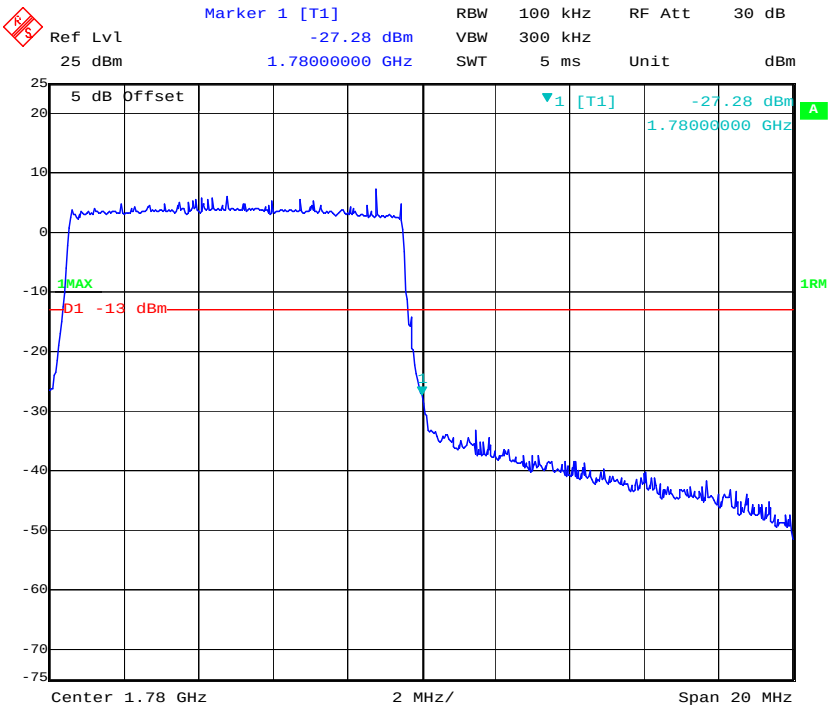
Date: 20.SEP.2018 09:58:31

16QAM_10MHz_ 50 RB_ Left



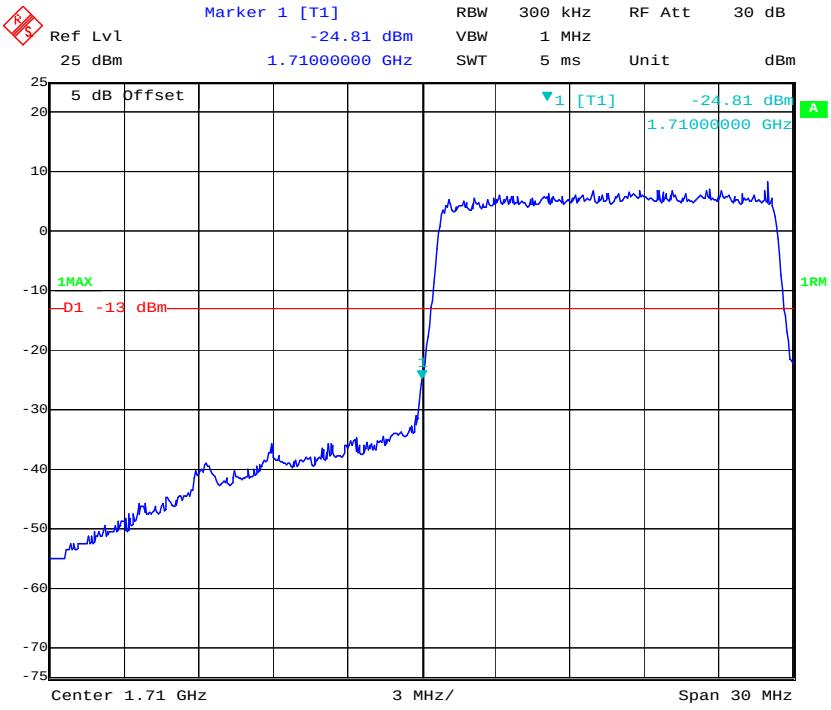
Date: 20.SEP.2018 10:02:17

16QAM_10MHz_ 50 RB_ Right



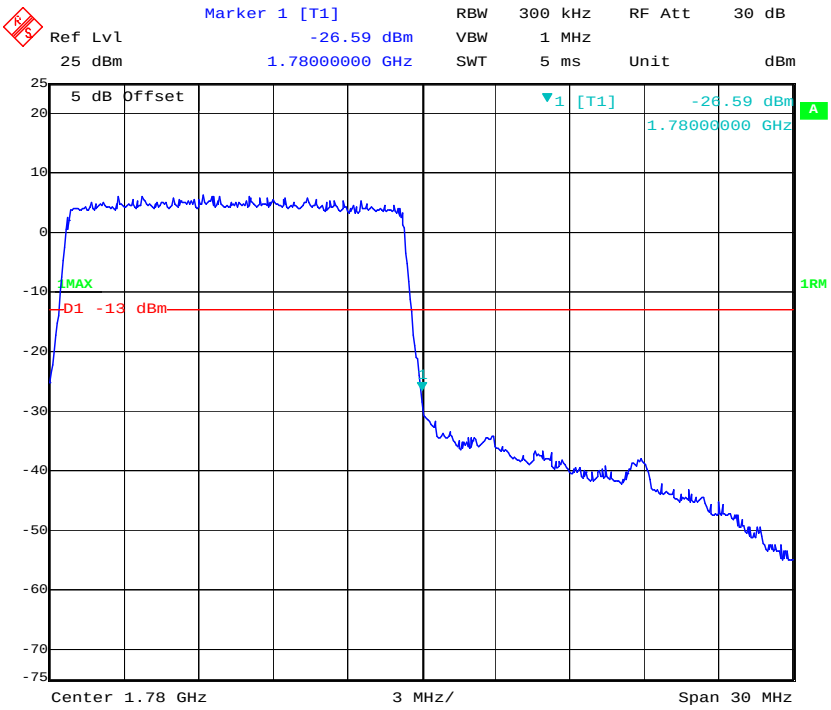
Date: 20.SEP.2018 10:00:44

16QAM_15MHz_ 75 RB_ Left



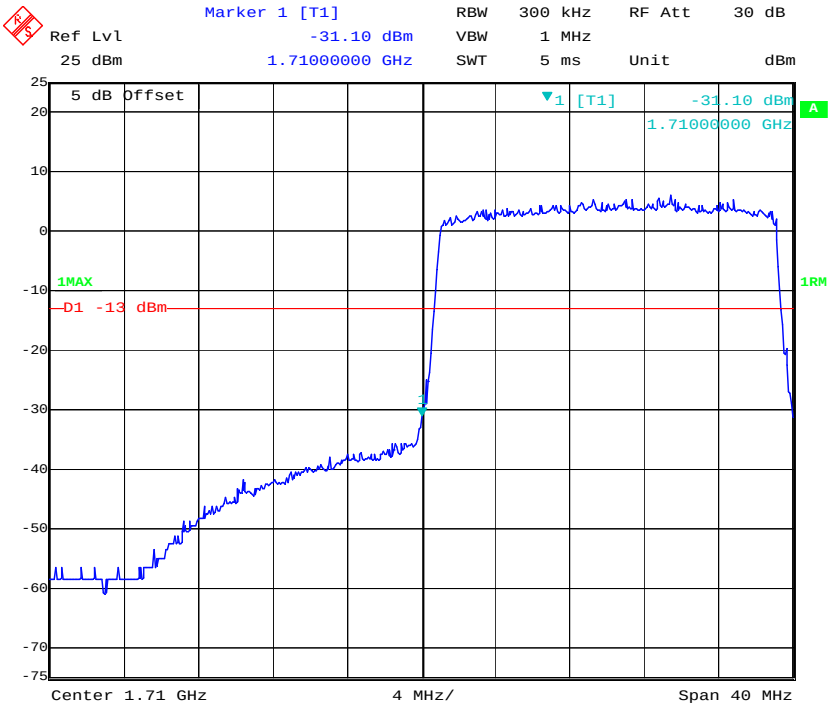
Date: 20.SEP.2018 10:10:01

16QAM_15MHz_ 75 RB_ Right



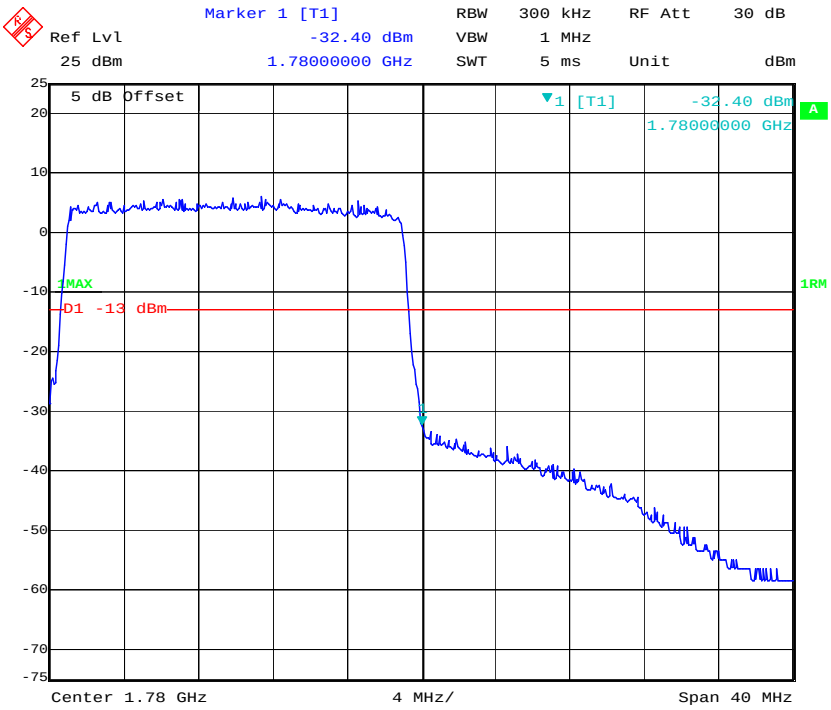
Date: 20.SEP.2018 10:05:54

16QAM_20MHz_ FULL RB_ Left



Date: 20.SEP.2018 10:12:04

16QAM_20MHz_ FULL RB_ Right



Date: 20.SEP.2018 10:13:40

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

Applicable Standard

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

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

Frequency Tolerance for Transmitters in the Public Mobile Services

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

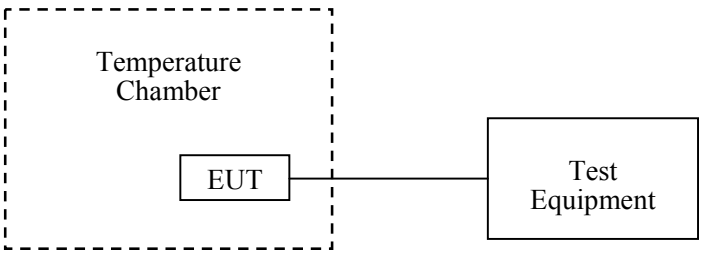
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

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

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

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2018-08-28	2019-08-28
R&S	Universal Radio Communication Tester	CMU200	109 038	2018-07-18	2019-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-31	2019-08-31
UNI-T	Multimeter	UT39A	M130199938	2018-04-02	2019-04-02
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
AOFN	AC Transformer	TDGC2-0.5	AC-01	2018-05-09	2019-05-09

*** 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:	27.6 °C
Relative Humidity:	56 %
ATM Pressure:	100.2 kPa

The testing was performed by Elena Lei on 2018-09-24.

WCDMA Band II: R99

Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{AC}**	**Hz**	**ppm**	
-30	120	-1	-0.00053191	Pass
-20		-2	-0.00106383	
-10		-5	-0.00265957	
0		-4	-0.00212766	
10		-5	-0.00265957	
20		-1	-0.00053191	
30		-2	-0.00106383	
40		-4	-0.00212766	
50		1	0.00053191	
25	102	3	0.00159574	
25	138	-6	-0.00319149	

WCDMA Band Ⅴ: R99

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{AC}**	**Hz**	**ppm**	**ppm**
-30	120	-1	-0.00119531	2.5
-20		-5	-0.00597657	
-10		3	0.00358594	
0		1	0.00119531	
10		-2	-0.00239063	
20		1	0.00119531	
30		-4	-0.00478126	
40		2	0.00239063	
50		-3	-0.00358594	
25	102	1	0.00119531	
25	138	2	0.00239063	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	**Voltage**	**Test Result (MHz)**		**Limit (MHz)**	
℃	V_{AC}	F_L	F_H	F_L	F_H
-30	120	1710.32	1754.68	1710	1755
-20		1710.43	1754.56	1710	1755
-10		1710.65	1754.85	1710	1755
0		1710.71	1754.33	1710	1755
10		1710.62	1754.76	1710	1755
20		1710.52	1754.52	1710	1755
30		1710.47	1754.43	1710	1755
40		1710.12	1754.45	1710	1755
50		1710.17	1754.89	1710	1755
25	102	1710.27	1754.86	1710	1755
25	138	1710.68	1754.64	1710	1755

16QAM, Channel Bandwidth:10MHz					
Temperature	**Voltage**	**Test Result (MHz)**		**Limit (MHz)**	
℃	V_{AC}	F_L	F_H	F_L	F_H
-30	120	1710.43	1754.27	1710	1755
-20		1710.71	1754.58	1710	1755
-10		1710.31	1754.84	1710	1755
0		1710.58	1754.67	1710	1755
10		1710.22	1754.33	1710	1755
20		1710.52	1754.52	1710	1755
30		1710.24	1754.38	1710	1755
40		1710.32	1754.89	1710	1755
50		1710.80	1754.53	1710	1755
25	102	1710.27	1754.55	1710	1755
25	138	1710.18	1754.29	1710	1755

LTE Band 5:

Middle Channel, f_c = 836.5 MHz, Channel Bandwidth:10MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{AC}**	**Hz**	**ppm**	**ppm**
-30	120	-14	-0.0167	2.5
-20		-15	-0.0179	
-10		-17	-0.0203	
0		-19	-0.0227	
10		-11	-0.0132	
20		-15	-0.0179	
30		-17	-0.0203	
40		-14	-0.0167	
50		-11	-0.0132	
25	102	-15	-0.0179	
25	138	-18	-0.0215	

Middle Channel, f_c = 836.5 MHz, Channel Bandwidth:10MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{AC}**	**Hz**	**ppm**	**ppm**
-30	120	-17	-0.0203	2.5
-20		-18	-0.0215	
-10		-11	-0.0132	
0		-9	-0.0108	
10		-7	-0.0084	
20		-18	-0.0215	
30		-15	-0.0179	
40		-17	-0.0203	
50		-14	-0.0167	
25	102	-10	-0.0120	
25	138	-2	-0.0024	

LTE Band 7:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{AC}	F_L	F_H	F_L	F_H
-30	120	2500.36	2569.29	2500	2570
-20		2500.69	2569.68	2500	2570
-10		2500.27	2569.34	2500	2570
0		2500.36	2569.59	2500	2570
10		2500.58	2569.63	2500	2570
20		2500.52	2569.48	2500	2570
30		2500.22	2569.26	2500	2570
40		2500.27	2569.28	2500	2570
50		2500.46	2569.69	2500	2570
25	102	2500.32	2569.37	2500	2570
25	138	2500.26	2569.49	2500	2570

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{AC}	F_L	F_H	F_L	F_H
-30	120	2500.55	2569.46	2500	2570
-20		2500.33	2569.30	2500	2570
-10		2500.41	2569.29	2500	2570
0		2500.57	2569.29	2500	2570
10		2500.67	2569.51	2500	2570
20		2500.52	2569.48	2500	2570
30		2500.60	2569.25	2500	2570
40		2500.57	2569.35	2500	2570
50		2500.28	2569.39	2500	2570
25	102	2500.58	2569.28	2500	2570
25	138	2500.40	2569.66	2500	2570

LTE Band 66:

QPSK, Channel Bandwidth:10MHz					
Temperature	**Voltage**	**Test Result (MHz)**		**Limit (MHz)**	
℃	V_{AC}	F_L	F_H	F_L	F_H
-30	120	1710.84	1779.35	1710	1780
-20		1710.18	1779.18	1710	1780
-10		1710.67	1779.35	1710	1780
0		1710.22	1779.18	1710	1780
10		1710.11	1779.55	1710	1780
20		1710.52	1779.48	1710	1780
30		1710.63	1779.48	1710	1780
40		1710.37	1779.63	1710	1780
50		1710.69	1779.53	1710	1780
25	102	1710.21	1779.34	1710	1780
25	138	1710.51	1779.56	1710	1780

16QAM, Channel Bandwidth:10MHz					
Temperature	**Voltage**	**Test Result (MHz)**		**Limit (MHz)**	
℃	V_{AC}	F_L	F_H	F_L	F_H
-30	120	1710.31	1779.41	1710	1780
-20		1710.18	1779.72	1710	1780
-10		1710.63	1779.21	1710	1780
0		1710.26	1779.54	1710	1780
10		1710.46	1779.66	1710	1780
20		1710.52	1779.48	1710	1780
30		1710.52	1779.32	1710	1780
40		1710.36	1779.43	1710	1780
50		1710.48	1779.73	1710	1780
25	102	1710.85	1779.33	1710	1780
25	138	1710.11	1779.77	1710	1780

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 *******