TESTING LABORATORY
CERTIFICATE #4820.01

FCC PART 22H, PART 24E

FCC PART 27

MEASUREMENT AND TEST REPORT

For

MAXWEST INTERNATIONAL LIMITED.

No.1,Longgang Road,Buji, Longgang,Shenzhen,China

FCC ID: 2AEN3GRAVITY5GO

Report Type:	**Product Type:**
Original Report	Mobile Phone

Report Number:	RDG181210001-00D
Report Date:	2018-12-28
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Mobile Phone
EUT Model:		Gravity 5 GO
FCC ID:		2AEN3GRAVITY5GO
Rated Input Voltage:		DC3.8V from Battery or DC5V from adapter
Adapter Information	**Model:**	XCM23-U05100XYF
	Input:	AC 100-240V, 50/60Hz, 0.3A
	Output:	DC5V, 1A
External Dimension:		143mm(L)*71.7mm(W)*8.9mm(H)
Serial Number:		181210001
EUT Received Date:		2018-12-12

Objective

This report is prepared on behalf of ***MAXWEST INTERNATIONAL LIMITED.*** in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E 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: 2AEN3GRAVITY5GO.
FCC Part 15C DSS submissions with FCC ID: 2AEN3GRAVITY5GO.

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

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

SYSTEM TEST CONFIGURATION

Justification

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

The test items were performed with the EUT operating at testing mode. The device supports GSM/GPRS/ EDGE 850/1900 band,WCDMA/HSUPA/HPDPA Band 2 and band 5, LTE band 2, 4, 5, 7,12 and 17.

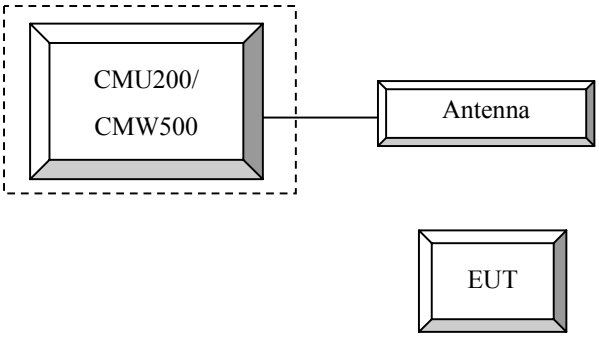
Equipment Modifications

No modification was made to the EUT.

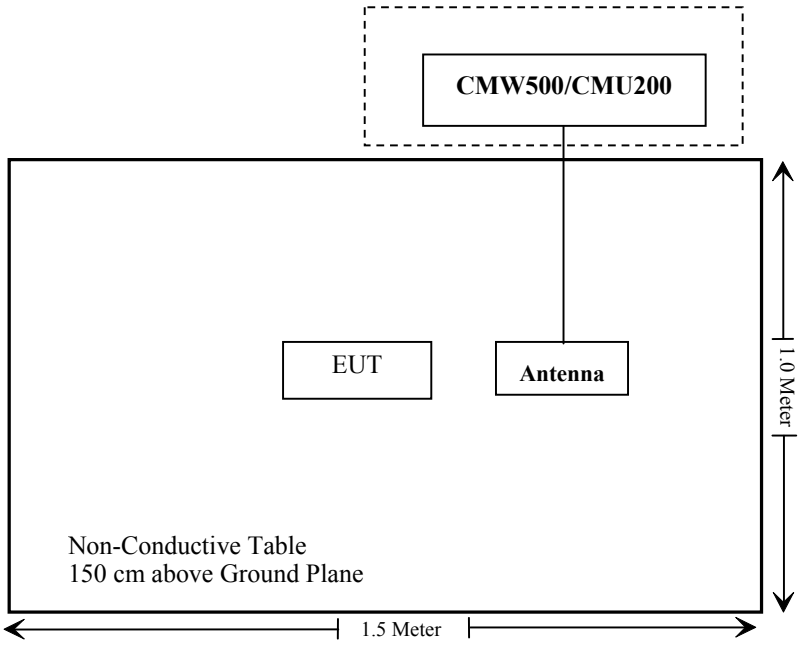
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	110 822
R&S	Wideband Radio Communication Tester	CMW500	147473
Un-known	ANTENNA	/	/

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310, §2.1093	RF Exposure	Compliance
§2.1046; § 22.913 (a); § 24.232 (c); §27.50	RF Output Power	Compliance
§ 2.1047	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

FCC §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RDG181210001-20A.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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_FCls	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	$\beta_{ed}1$: 30/15 $\beta_{ed}2$: 30/15	$\beta_{ed}3$: 24/15 $\beta_{ed}4$: 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	100035	2018-08-03	2019-08-03
Sunol Sciences	Antenna	JB3	A060611-3	2017-07-21	2019-07-21
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2018-09-24	2019-09-24
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
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
MICRO-COAX	Coaxial Cable	UFA147-1-2362-100100	64639 231029-001	2018-02-24	2019-02-28
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
R&S	Universal Radio Communication Tester	CMU200	110 822	2018-12-14	2019-12-14
R&S	Wideband Radio Communication Tester	CMW500	147473	2018-08-03	2019-08-03

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

Test Data

Environmental Conditions

Temperature:	22.3~24.8°C
Relative Humidity:	45~50 %
ATM Pressure:	99.7~100.8 kPa

** The testing was performed by Tyler Pan, Kami Zhou, Andy Huang and Vito Chen on 2018-12-20~2018-12-21.*

Conducted Output Power

Cellular Band & PCS Band

Band	Channel No.	Conducted Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Cellular	128	31.14	31.15	29.63	28.01	25.96	25.76	24.62	22.36	21.45
	190	31.29	31.34	29.74	28.08	26.09	25.82	24.73	22.42	21.57
	251	31.41	31.40	29.78	28.16	26.19	25.89	24.77	22.51	21.55
PCS	512	30.04	29.82	28.32	26.90	25.02	25.15	24.13	22.34	20.83
	661	29.91	29.81	27.84	26.32	24.64	25.16	24.17	22.39	20.91
	810	29.65	29.56	27.30	25.91	24.14	25.19	24.20	22.41	20.89

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	22.31	2.92	22.23	2.84	22.25	2.72
HSDPA	1	21.38	3.72	21.62	3.68	21.18	3.08
	2	21.22	3.73	21.53	3.61	21.06	3.01
	3	21.16	3.66	21.44	3.66	20.95	3.12
	4	21.05	3.75	21.32	3.59	20.86	2.99
HSUPA	1	21.35	3.72	21.68	3.48	21.15	3.52
	2	21.23	3.67	21.53	3.51	21.06	3.57
	3	21.14	3.81	21.42	3.62	20.98	3.63
	4	21.05	3.63	21.33	3.52	20.92	3.41
	5	20.96	3.74	21.17	3.44	20.83	3.33

WCDMA Band V

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.16	3.04	21.90	3.00	21.99	3.08
HSDPA	1	22.01	4.12	21.84	4.00	21.89	3.60
	2	21.93	4.19	21.76	4.06	21.73	3.74
	3	21.84	4.63	21.68	3.97	21.59	3.63
	4	21.77	4.33	21.48	4.11	21.46	3.83
HSUPA	1	22.05	4.08	21.84	4.00	21.88	3.64
	2	21.97	4.14	21.75	3.93	21.73	3.79
	3	21.84	4.23	21.59	3.89	21.66	3.52
	4	21.77	3.99	21.46	4.36	21.53	3.63
	5	21.63	3.91	21.38	4.13	21.41	3.71

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.34	22.45	21.39
		RB1#3	22.46	22.63	21.13
		RB1#5	22.24	22.47	20.66
		RB3#0	22.33	22.56	21.23
		RB3#3	22.33	22.57	20.83
		RB6#0	21.15	21.57	20.05
	16QAM	RB1#0	21.01	21.44	20.38
		RB1#3	21.24	21.65	20.21
		RB1#5	21.05	21.49	19.77
		RB3#0	21.23	21.76	20.25
		RB3#3	21.23	21.79	19.89
		RB6#0	20.18	20.66	19.02
3MHz	QPSK	RB1#0	22.81	22.79	22.52
		RB1#8	22.83	22.89	21.88
		RB1#14	22.64	22.72	20.97
		RB6#0	21.56	21.89	21.37
		RB6#9	21.52	21.89	20.41
		RB15#0	21.54	21.93	20.94
	16QAM	RB1#0	21.38	22.34	21.57
		RB1#8	21.49	22.45	20.98
		RB1#14	21.36	22.28	20.10
		RB6#0	20.52	21.01	20.30
		RB6#9	20.50	21.01	19.38
		RB15#0	20.64	21.05	19.82
5MHz	QPSK	RB1#0	22.05	22.35	22.38
		RB1#13	22.55	22.88	22.38
		RB1#24	21.79	22.21	20.61
		RB15#0	21.23	21.75	21.57
		RB15#10	21.17	21.72	20.88
		RB25#0	21.16	21.71	21.15
	16QAM	RB1#0	20.75	21.62	21.40
		RB1#13	21.29	22.19	21.41
		RB1#24	20.53	21.51	19.66
		RB15#0	20.40	20.79	20.49
		RB15#10	20.33	20.78	19.83
		RB25#0	20.35	20.77	20.14

10MHz	QPSK	RB1#0	22.44	22.22	21.69
		RB1#25	22.53	22.82	22.88
		RB1#49	21.97	22.51	21.42
		RB25#0	21.57	21.74	21.47
		RB25#25	21.26	21.89	21.63
		RB50#0	21.42	21.83	21.56
	16QAM	RB1#0	21.87	21.41	20.63
		RB1#25	22.01	22.02	21.89
		RB1#49	21.51	21.72	20.44
		RB25#0	20.65	20.86	20.46
		RB25#25	20.36	21.00	20.64
		RB50#0	20.49	20.93	20.52
15MHz	QPSK	RB1#0	22.69	22.19	22.18
		RB1#38	22.10	22.81	23.03
		RB1#74	21.55	21.93	21.92
		RB36#0	21.56	21.76	21.38
		RB36#39	20.76	21.60	22.08
		RB75#0	21.18	21.71	21.76
	16QAM	RB1#0	22.18	21.39	21.33
		RB1#38	21.60	22.01	22.25
		RB1#74	21.13	21.15	21.20
		RB36#0	20.63	20.87	20.42
		RB36#39	19.85	20.74	21.14
		RB75#0	20.27	20.84	20.83
20MHz	QPSK	RB1#0	23.41	22.22	23.18
		RB1#50	22.51	22.74	22.39
		RB1#99	23.15	22.33	22.85
		RB50#0	21.88	21.54	21.25
		RB50#50	21.63	21.67	22.29
		RB100#0	21.74	21.62	21.79
	16QAM	RB1#0	22.60	21.50	22.53
		RB1#50	21.68	21.97	21.81
		RB1#99	22.43	21.64	22.36
		RB50#0	20.92	20.65	20.31
		RB50#50	20.68	20.78	21.39
		RB100#0	20.82	20.74	20.96

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	24.82	24.81	24.54
		RB1#3	24.86	24.77	24.57
		RB1#5	24.83	24.81	24.56
		RB3#0	24.81	24.78	24.81
		RB3#3	24.75	24.76	24.82
		RB6#0	23.91	23.89	23.95
	16QAM	RB1#0	23.49	24.51	24.32
		RB1#3	23.43	24.59	24.24
		RB1#5	23.43	24.57	24.35
		RB3#0	23.91	24.05	23.73
		RB3#3	23.88	24.15	23.73
		RB6#0	23.13	23.32	23.16
3MHz	QPSK	RB1#0	24.71	24.66	24.97
		RB1#8	24.71	24.72	24.75
		RB1#14	24.74	24.71	24.78
		RB6#0	23.92	23.94	23.89
		RB6#9	23.88	24.02	23.94
		RB15#0	23.94	23.88	23.94
	16QAM	RB1#0	24.25	24.98	23.68
		RB1#8	24.21	24.99	23.63
		RB1#14	24.32	24.99	23.65
		RB6#0	23.27	23.10	23.16
		RB6#9	23.01	23.13	23.25
		RB15#0	23.18	23.20	23.08
5MHz	QPSK	RB1#0	24.71	24.96	24.58
		RB1#13	24.68	24.88	24.61
		RB1#24	24.71	24.97	24.47
		RB15#0	23.99	23.88	23.90
		RB15#10	23.94	23.95	23.87
		RB25#0	23.91	23.98	23.98
	16QAM	RB1#0	23.32	24.19	24.01
		RB1#13	23.34	24.00	24.02
		RB1#24	23.34	24.08	24.03
		RB15#0	23.21	22.99	22.93
		RB15#10	23.22	23.00	23.03
		RB25#0	23.19	23.02	23.20

10MHz	QPSK	RB1#0	24.71	24.84	24.82
		RB1#25	24.69	24.79	24.75
		RB1#49	24.73	24.86	24.96
		RB25#0	24.01	24.02	23.93
		RB25#25	23.97	24.02	23.96
		RB50#0	23.88	23.98	23.89
	16QAM	RB1#0	24.44	24.16	23.94
		RB1#25	24.44	24.09	23.94
		RB1#49	24.45	24.15	23.92
		RB25#0	23.13	23.22	23.18
		RB25#25	23.19	23.28	23.22
		RB50#0	23.20	23.22	23.17
15MHz	QPSK	RB1#0	24.77	20.68	20.66
		RB1#38	24.74	20.62	20.48
		RB1#74	24.80	20.43	20.68
		RB36#0	23.84	19.97	19.98
		RB36#39	23.96	19.96	20.06
		RB75#0	23.86	20.03	20.06
	16QAM	RB1#0	24.34	20.27	20.35
		RB1#38	24.34	20.43	20.18
		RB1#74	24.37	20.32	20.59
		RB36#0	23.09	19.44	19.05
		RB36#39	23.09	19.43	19.15
		RB75#0	23.11	19.53	23.10
20MHz	QPSK	RB1#0	25.01	24.87	24.80
		RB1#50	24.99	24.82	24.84
		RB1#99	24.94	25.19	24.85
		RB50#0	23.88	23.99	23.82
		RB50#50	23.96	23.89	23.86
		RB100#0	23.96	23.92	23.82
	16QAM	RB1#0	23.95	24.14	24.56
		RB1#50	23.97	24.13	24.55
		RB1#99	24.11	24.20	24.90
		RB50#0	23.23	23.16	23.07
		RB50#50	23.15	23.16	23.07
		RB100#0	23.13	23.07	23.02

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	24.64	24.52	24.46
		RB1#3	24.61	24.46	24.44
		RB1#5	24.61	24.54	24.40
		RB3#0	24.64	24.63	24.62
		RB3#3	24.65	24.62	24.68
		RB6#0	23.54	23.61	23.65
	16QAM	RB1#0	23.13	24.05	24.08
		RB1#3	23.18	24.07	24.05
		RB1#5	23.24	24.04	24.03
		RB3#0	23.36	23.70	23.78
		RB3#3	23.33	23.79	23.74
		RB6#0	22.77	22.90	22.81
3MHz	QPSK	RB1#0	24.55	24.43	24.45
		RB1#8	24.54	24.47	24.54
		RB1#14	24.55	24.46	24.47
		RB6#0	23.52	23.56	23.62
		RB6#9	23.53	23.60	23.71
		RB15#0	23.56	23.62	23.63
	16QAM	RB1#0	23.73	24.31	23.16
		RB1#8	23.71	24.24	23.22
		RB1#14	23.72	24.34	23.22
		RB6#0	22.74	22.65	22.77
		RB6#9	22.76	22.71	22.77
		RB15#0	22.83	22.69	22.76
5MHz	QPSK	RB1#0	24.46	24.59	24.54
		RB1#13	24.40	24.55	24.49
		RB1#24	24.50	24.65	24.47
		RB15#0	23.68	23.67	23.72
		RB15#10	23.65	23.68	23.77
		RB25#0	23.59	23.66	23.75
	16QAM	RB1#0	22.75	23.76	23.58
		RB1#13	22.78	23.75	23.57
		RB1#24	22.85	23.75	23.65
		RB15#0	22.78	22.56	22.59
		RB15#10	22.74	22.59	22.62
		RB25#0	22.74	22.64	22.85
10MHz	QPSK	RB1#0	24.51	24.54	24.49
		RB1#25	24.44	24.57	24.55
		RB1#49	24.53	24.69	24.72
		RB25#0	23.60	23.73	23.61
		RB25#25	23.60	23.55	23.67
		RB50#0	23.56	23.53	23.65
	16QAM	RB1#0	23.99	24.22	23.04
		RB1#25	23.90	23.73	23.15
		RB1#49	23.92	23.77	23.49
		RB25#0	22.67	22.80	22.87
		RB25#25	22.70	22.83	22.93
		RB50#0	22.55	22.78	22.74

LTE Band 7

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	21.15	21.58	21.57
		RB1#13	21.69	22.05	21.71
		RB1#24	21.38	21.52	20.99
		RB15#0	21.27	21.86	21.69
		RB15#10	21.44	21.84	21.46
		RB25#0	21.26	21.79	21.50
	16QAM	RB1#0	20.63	21.81	21.51
		RB1#13	21.38	22.31	21.68
		RB1#24	21.14	21.80	20.99
		RB15#0	21.24	21.14	21.35
		RB15#10	21.44	21.17	21.29
		RB25#0	21.29	21.18	21.20
10MHz	QPSK	RB1#0	20.61	21.79	22.58
		RB1#25	21.56	22.07	22.33
		RB1#49	22.44	22.31	21.83
		RB25#0	21.15	21.79	21.86
		RB25#25	21.96	21.73	21.86
		RB50#0	21.73	21.79	21.85
	16QAM	RB1#0	21.25	21.99	21.61
		RB1#25	22.28	22.29	21.56
		RB1#49	22.99	22.51	21.58
		RB25#0	21.37	21.38	21.31
		RB25#25	21.50	21.31	21.41
		RB50#0	21.54	21.35	21.37
15MHz	QPSK	RB1#0	21.18	22.43	22.94
		RB1#38	22.30	22.20	22.99
		RB1#74	22.70	22.67	23.05
		RB36#0	21.74	21.73	21.69
		RB36#39	21.99	21.70	21.72
		RB75#0	22.02	21.80	21.74
	16QAM	RB1#0	21.72	22.93	22.41
		RB1#38	22.76	22.97	22.57
		RB1#74	22.77	22.90	22.58
		RB36#0	21.52	21.31	21.13
		RB36#39	21.55	21.20	21.24
		RB75#0	21.43	21.21	21.08
20MHz	QPSK	RB1#0	22.63	22.88	22.95
		RB1#50	23.24	22.81	22.95
		RB1#99	23.20	23.00	22.69
		RB50#0	21.86	21.63	21.52
		RB50#50	21.79	21.59	21.69
		RB100#0	21.85	21.74	21.67
	16QAM	RB1#0	22.39	23.13	23.16
		RB1#50	22.28	23.13	23.06
		RB1#99	22.24	23.17	23.22
		RB50#0	21.34	21.34	21.08
		RB50#50	21.28	21.39	21.10
		RB100#0	21.32	21.19	21.24

LTE Band 12

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	22.83	23.12	22.83
		RB1#3	22.89	23.11	22.90
		RB1#5	23.05	23.19	22.84
		RB3#0	22.91	23.00	22.80
		RB3#3	22.95	23.06	22.87
		RB6#0	21.96	22.00	21.99
	16QAM	RB1#0	21.97	22.91	22.42
		RB1#3	22.07	22.91	22.50
		RB1#5	21.94	22.97	22.76
		RB3#0	21.88	22.14	21.70
		RB3#3	21.90	22.17	21.83
		RB6#0	21.21	21.11	20.97
3MHz	QPSK	RB1#0	22.92	23.04	23.04
		RB1#8	22.97	22.97	22.97
		RB1#14	23.03	22.95	23.03
		RB6#0	21.97	22.09	21.93
		RB6#9	21.94	22.06	21.99
		RB15#0	22.07	22.02	21.95
	16QAM	RB1#0	22.06	22.70	21.66
		RB1#8	22.09	22.63	21.59
		RB1#14	22.09	22.70	21.51
		RB6#0	20.97	21.07	21.14
		RB6#9	21.06	21.12	21.12
		RB15#0	21.09	21.14	20.96
5MHz	QPSK	RB1#0	22.76	23.02	22.88
		RB1#13	22.82	23.02	22.84
		RB1#24	22.95	23.00	22.89
		RB15#0	22.10	22.09	21.99
		RB15#10	22.06	22.05	21.96
		RB25#0	22.10	22.02	22.08
	16QAM	RB1#0	21.19	22.01	21.97
		RB1#13	21.19	22.00	21.93
		RB1#24	21.30	22.07	21.95
		RB15#0	21.12	20.85	20.90
		RB15#10	21.19	20.95	20.90
		RB25#0	21.23	21.10	21.06
10MHz	QPSK	RB1#0	22.76	22.86	23.16
		RB1#25	22.89	22.97	23.11
		RB1#49	22.94	22.94	23.12
		RB25#0	21.96	22.03	22.02
		RB25#25	22.22	22.04	22.09
		RB50#0	22.14	22.07	22.09
	16QAM	RB1#0	22.28	22.77	21.60
		RB1#25	22.50	22.78	21.56
		RB1#49	22.55	22.76	21.54
		RB25#0	21.03	21.00	21.11
		RB25#25	21.07	21.19	21.13
		RB50#0	21.07	21.11	21.11

LTE Band 17

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	22.91	23.11	23.02
		RB1#13	23.03	23.08	22.95
		RB1#24	23.10	23.08	23.00
		RB15#0	22.14	22.10	21.95
		RB15#10	21.92	22.06	22.06
		RB25#0	22.06	22.10	21.93
	16QAM	RB1#0	22.60	21.20	21.91
		RB1#13	22.06	21.22	21.93
		RB1#24	21.99	21.26	21.98
		RB15#0	20.85	21.11	20.87
		RB15#10	20.98	21.14	20.85
		RB25#0	20.96	21.17	20.91
10MHz	QPSK	RB1#0	22.78	22.87	23.18
		RB1#25	22.90	23.00	23.13
		RB1#49	22.96	22.93	23.15
		RB25#0	21.96	22.05	22.04
		RB25#25	22.13	22.06	22.08
		RB50#0	22.15	22.00	21.95
	16QAM	RB1#0	22.32	22.25	21.62
		RB1#25	22.53	22.34	21.53
		RB1#49	22.56	22.34	21.55
		RB25#0	21.07	21.09	21.14
		RB25#25	21.03	21.18	21.16
		RB50#0	21.08	21.14	21.12

PAR, Band 2

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	5.20	4.28	3.40	13
	100 RB		6.32	4.56	6.48	13
16QAM	1 RB	20 MHz	5.96	4.72	4.28	13
	100 RB		7.16	6.20	7.12	13

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.40	4.08	4.60	13
	100 RB		6.36	6.20	6.28	13
16QAM	1 RB	20 MHz	5.00	5.32	5.96	13
	100 RB		7.16	7.00	7.12	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	4.92	3.52	13
	50 RB		5.08	5.44	5.12	13
16QAM	1 RB	10 MHz	4.44	5.68	4.12	13
	50 RB		5.96	6.32	6.04	13

PAR, Band 7

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	5.56	4.44	4.00	13
	100 RB		6.32	6.16	6.40	13
16QAM	1 RB	20 MHz	5.48	4.48	4.96	13
	100 RB		7.12	7.00	7.16	13

PAR, Band 12

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.68	4.72	3.88	13
	50 RB		5.72	5.12	5.24	13
16QAM	1 RB	10 MHz	5.60	5.60	4.60	13
	50 RB		6.52	6.20	6.16	13

PAR, Band 17

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.28	3.72	3.96	13
	50 RB		5.04	5.04	5.24	13
16QAM	1 RB	10 MHz	5.48	4.48	4.32	13
	50 RB		6.16	6.16	6.28	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)			
GSM 850 Middle Channel								
836.60	H	95.63	21.40	0.00	0.50	20.90	38.45	17.55
836.60	V	101.54	30.28	0.00	0.50	29.78	38.45	8.67
EDGE 850 Middle Channel								
836.60	H	90.75	16.52	0.00	0.50	16.02	38.45	22.43
836.60	V	96.03	24.77	0.00	0.50	24.27	38.45	14.18
WCDMA Band V Middle Channel								
836.60	H	88.00	13.77	0.00	0.50	13.27	38.45	25.18
836.60	V	93.15	21.89	0.00	0.50	21.39	38.45	17.06

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)			
PCS 1900 Middle Channel								
1880.00	H	94.42	21.81	11.66	2.66	30.81	33.00	2.19
1880.00	V	91.28	18.81	11.66	2.66	27.81	33.00	5.19
EDGE 1900 Middle Channel								
1880.00	H	88.24	15.63	11.66	2.66	24.63	33.00	8.37
1880.00	V	84.54	12.07	11.66	2.66	21.07	33.00	11.93
WCDMA Band II Middle Channel								
1880.00	H	87.56	14.95	11.66	2.66	23.95	33.00	9.05
1880.00	V	84.93	12.46	11.66	2.66	21.46	33.00	11.54

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

LTE Band 2

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1880.00	1.40	QPSK	H	87.24	14.63	11.66	2.66	**23.63**	33.00	9.37
1880.00			V	85.62	13.15	11.66	2.66	22.15	33.00	10.85
1880.00	3.00		H	86.73	14.12	11.66	2.66	23.12	33.00	9.88
1880.00			V	85.63	13.16	11.66	2.66	22.16	33.00	10.84
1880.00	5.00		H	87.13	14.52	11.66	2.66	23.52	33.00	9.48
1880.00			V	85.62	13.15	11.66	2.66	22.15	33.00	10.85
1880.00	10.00		H	86.79	14.18	11.66	2.66	23.18	33.00	9.82
1880.00			V	86.38	13.91	11.66	2.66	22.91	33.00	10.09
1880.00	15.00		H	86.30	13.69	11.66	2.66	22.69	33.00	10.31
1880.00			V	85.43	12.96	11.66	2.66	21.96	33.00	11.04
1880.00	20.00		H	87.64	15.03	11.66	2.66	**24.03**	33.00	8.97
1880.00			V	85.92	13.45	11.66	2.66	22.45	33.00	10.55
1880.00	1.40	16QAM	H	87.61	15.00	11.66	2.66	**24.00**	33.00	9.00
1880.00			V	87.05	14.58	11.66	2.66	23.58	33.00	9.42
1880.00	3.00		H	87.09	14.48	11.66	2.66	23.48	33.00	9.52
1880.00			V	86.62	14.15	11.66	2.66	23.15	33.00	9.85
1880.00	5.00		H	87.53	14.92	11.66	2.66	23.92	33.00	9.08
1880.00			V	87.06	14.59	11.66	2.66	23.59	33.00	9.41
1880.00	10.00		H	86.68	14.07	11.66	2.66	23.07	33.00	9.93
1880.00			V	86.09	13.62	11.66	2.66	22.62	33.00	10.38
1880.00	15.00		H	87.23	14.62	11.66	2.66	23.62	33.00	9.38
1880.00			V	86.27	13.80	11.66	2.66	22.80	33.00	10.20
1880.00	20.00		H	87.42	14.81	11.66	2.66	**23.81**	33.00	9.19
1880.00			V	87.06	14.59	11.66	2.66	23.59	33.00	9.41

LTE Band 4

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1732.50	1.40	QPSK	H	89.89	15.84	10.90	2.51	**24.23**	30.00	5.77
1732.50			V	88.67	14.30	10.90	2.51	22.69	30.00	7.31
1732.50	3.00		H	89.40	15.35	10.90	2.51	23.74	30.00	6.26
1732.50			V	88.58	14.21	10.90	2.51	22.60	30.00	7.40
1732.50	5.00		H	89.19	15.14	10.90	2.51	23.53	30.00	6.47
1732.50			V	88.00	13.63	10.90	2.51	22.02	30.00	7.98
1732.50	10.00		H	89.73	15.68	10.90	2.51	24.07	30.00	5.93
1732.50			V	88.48	14.11	10.90	2.51	22.50	30.00	7.50
1732.50	15.00		H	89.32	15.27	10.90	2.51	23.66	30.00	6.34
1732.50			V	88.42	14.05	10.90	2.51	22.44	30.00	7.56
1732.50	20.00		H	89.29	15.24	10.90	2.51	**23.63**	30.00	6.37
1732.50			V	88.16	13.79	10.90	2.51	22.18	30.00	7.82
1732.50	1.40	16QAM	H	89.67	15.62	10.90	2.51	**24.01**	30.00	5.99
1732.50			V	88.74	14.37	10.90	2.51	22.76	30.00	7.24
1732.50	3.00		H	89.49	15.44	10.90	2.51	23.83	30.00	6.17
1732.50			V	88.86	14.49	10.90	2.51	22.88	30.00	7.12
1732.50	5.00		H	89.23	15.18	10.90	2.51	23.57	30.00	6.43
1732.50			V	88.51	14.14	10.90	2.51	22.53	30.00	7.47
1732.50	10.00		H	89.67	15.62	10.90	2.51	24.01	30.00	5.99
1732.50			V	89.08	14.71	10.90	2.51	23.10	30.00	6.90
1732.50	15.00		H	89.49	15.44	10.90	2.51	23.83	30.00	6.17
1732.50			V	89.00	14.63	10.90	2.51	23.02	30.00	6.98
1732.50	20.00		H	89.35	15.30	10.90	2.51	**23.69**	30.00	6.31
1732.50			V	88.42	14.05	10.90	2.51	22.44	30.00	7.56

LTE Band 5

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
836.50	1.40	QPSK	H	89.82	15.59	0.00	0.50	15.09	38.45	23.36
836.50			V	95.68	24.42	0.00	0.50	**23.92**	38.45	14.53
836.50	3.00		H	92.88	18.65	0.00	0.50	18.15	38.45	20.30
836.50			V	94.86	23.60	0.00	0.50	23.10	38.45	15.35
836.50	5.00		H	88.75	14.52	0.00	0.50	14.02	38.45	24.43
836.50			V	94.54	23.28	0.00	0.50	22.78	38.45	15.67
836.50	10.00		H	84.86	10.63	0.00	0.50	10.13	38.45	28.32
836.50			V	94.67	23.41	0.00	0.50	**22.91**	38.45	15.54
836.50	1.40	16QAM	H	92.67	18.44	0.00	0.50	17.94	38.45	20.51
836.50			V	94.39	23.13	0.00	0.50	**22.63**	38.45	15.82
836.50	3.00		H	89.61	15.38	0.00	0.50	14.88	38.45	23.57
836.50			V	94.25	22.99	0.00	0.50	22.49	38.45	15.96
836.50	5.00		H	88.56	14.33	0.00	0.50	13.83	38.45	24.62
836.50			V	94.25	22.99	0.00	0.50	22.49	38.45	15.96
836.50	10.00		H	88.93	14.70	0.00	0.50	14.20	38.45	24.25
836.50			V	95.64	24.38	0.00	0.50	**23.88**	38.45	14.57

LTE Band 7

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
2535.00	5.00	QPSK	H	85.14	12.53	13.14	3.10	22.57	33.00	10.43
2535.00			V	85.44	14.29	13.14	3.10	**24.33**	33.00	8.67
2535.00	10.00		H	85.35	12.74	13.14	3.10	22.78	33.00	10.22
2535.00			V	84.12	12.97	13.14	3.10	23.01	33.00	9.99
2535.00	15.00		H	85.35	12.74	13.14	3.10	22.78	33.00	10.22
2535.00			V	84.12	12.97	13.14	3.10	23.01	33.00	9.99
2535.00	20.00		H	85.24	12.63	13.14	3.10	22.67	33.00	10.33
2535.00			V	84.17	13.02	13.14	3.10	**23.06**	33.00	9.94
2535.00	5.00	16QAM	H	85.50	12.89	13.14	3.10	22.93	33.00	10.07
2535.00			V	85.28	14.13	13.14	3.10	**24.17**	33.00	8.83
2535.00	10.00		H	85.47	12.86	13.14	3.10	22.90	33.00	10.10
2535.00			V	84.29	13.14	13.14	3.10	23.18	33.00	9.82
2535.00	15.00		H	85.47	12.86	13.14	3.10	22.90	33.00	10.10
2535.00			V	84.29	13.14	13.14	3.10	23.18	33.00	9.82
2535.00	20.00		H	85.31	12.70	13.14	3.10	22.74	33.00	10.26
2535.00			V	84.05	12.90	13.14	3.10	**22.94**	33.00	10.06

LTE Band 12

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
707.50	1.40	QPSK	H	80.18	4.25	0.00	0.39	3.86	34.77	30.91
707.50			V	90.50	17.47	0.00	0.39	**17.08**	34.77	17.69
707.50	3.00		H	80.08	4.15	0.00	0.39	3.76	34.77	31.01
707.50			V	90.46	17.43	0.00	0.39	17.04	34.77	17.73
707.50	5.00		H	82.35	6.42	0.00	0.39	6.03	34.77	28.74
707.50			V	90.71	17.68	0.00	0.39	17.29	34.77	17.48
707.50	10.00		H	82.38	6.45	0.00	0.39	6.06	34.77	28.71
707.50			V	90.86	17.83	0.00	0.39	**17.44**	34.77	17.33
707.50	1.40	16QAM	H	82.99	7.06	0.00	0.39	6.67	34.77	28.10
707.50			V	91.81	18.78	0.00	0.39	**18.39**	34.77	16.38
707.50	3.00		H	81.09	5.16	0.00	0.39	4.77	34.77	30.00
707.50			V	91.65	18.62	0.00	0.39	18.23	34.77	16.54
707.50	5.00		H	82.90	6.97	0.00	0.39	6.58	34.77	28.19
707.50			V	90.95	17.92	0.00	0.39	17.53	34.77	17.24
707.50	10.00		H	80.80	4.87	0.00	0.39	4.48	34.77	30.29
707.50			V	90.65	17.62	0.00	0.39	**17.23**	34.77	17.54

LTE Band 17

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
710.00	5	QPSK	H	82.95	7.05	0.00	0.39	6.66	34.77	28.11
710.00			V	91.11	18.11	0.00	0.39	17.72	34.77	17.05
710.00	10		H	82.16	6.26	0.00	0.39	5.87	34.77	28.9
710.00			V	91.77	18.77	0.00	0.39	**18.38**	34.77	16.39
710.00	5	16QAM	H	82.48	6.58	0.00	0.39	6.19	34.77	28.58
710.00			V	91.06	18.06	0.00	0.39	17.67	34.77	17.1
710.00	10		H	82.35	6.45	0.00	0.39	6.06	34.77	28.71
710.00			V	91.78	18.78	0.00	0.39	**18.39**	34.77	16.38

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

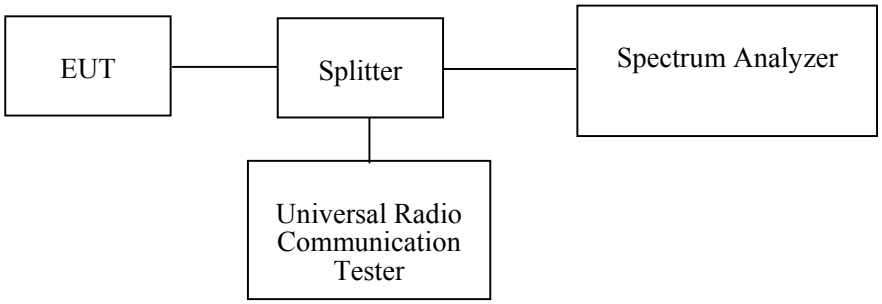
Applicable Standard

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

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

Test Data

Environmental Conditions

Temperature:	23.9~24.2°C
Relative Humidity:	34~36 %
ATM Pressure:	99.7~99.8 kPa

The testing was performed by Andy Huang from 2018-12-17 to 2018-12-18.

Test Mode: Transmitting

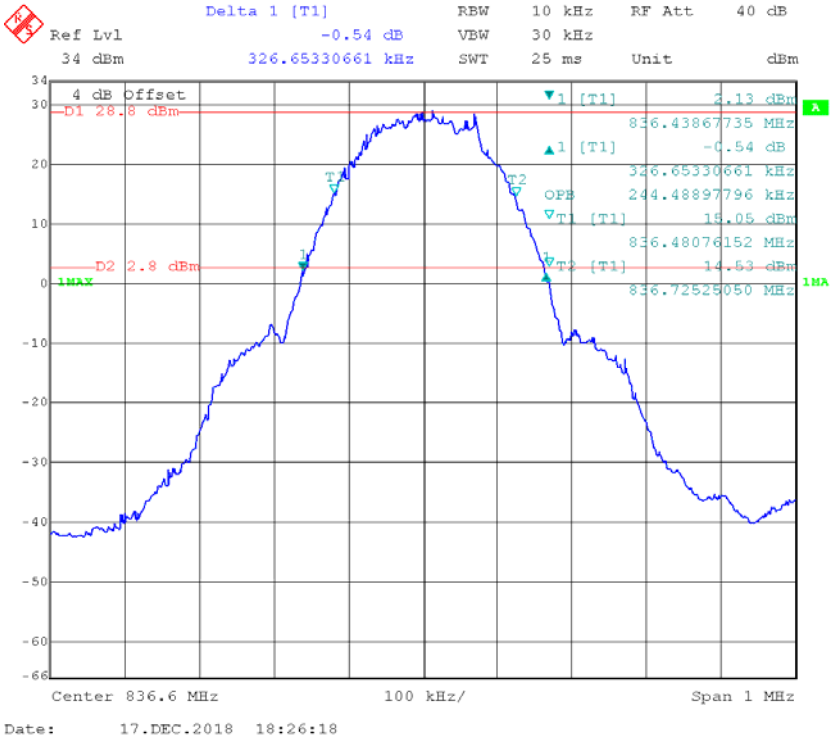
Test Result: Compliant. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.244	0.327
		EDGE	0.251	0.315
PCS		PCS	0.242	0.315
		EDGE	0.244	0.315
WCDMA Band II		Rel 99	4.168	4.709
		HSDPA	4.168	4.729
		HSUPA	4.188	4.709
WCDMA Band V		Rel 99	4.168	4.770
		HSDPA	4.188	4.770
		HSUPA	4.188	4.729

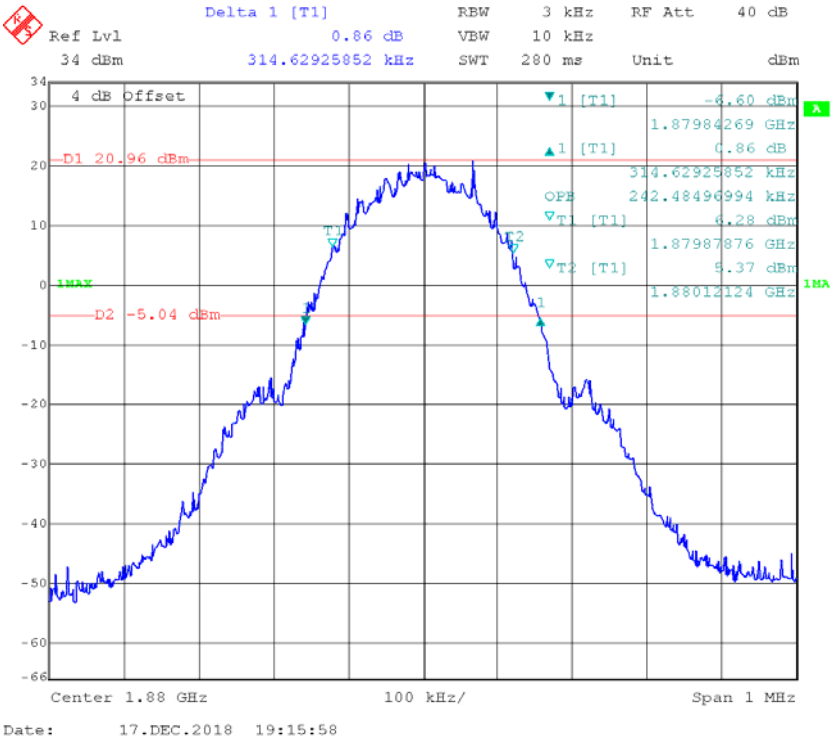
Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.112	1.335
		16QAM	1.112	1.341
	3 MHz	QPSK	2.693	3.030
		16QAM	2.705	3.018
	5 MHz	QPSK	4.569	5.210
		16QAM	4.549	5.291
	10 MHz	QPSK	8.978	9.860
		16QAM	8.938	9.860
	15 MHz	QPSK	13.527	15.210
		16QAM	13.527	14.970
	20 MHz	QPSK	17.956	19.719
		16QAM	18.036	19.800
LTE Band 4	1.4 MHz	QPSK	1.112	1.485
		16QAM	1.118	1.377
	3 MHz	QPSK	2.693	3.042
		16QAM	2.693	3.066
	5 MHz	QPSK	4.549	5.431
		16QAM	4.549	5.251
	10 MHz	QPSK	8.978	9.780
		16QAM	8.978	9.820
	15 MHz	QPSK	13.527	15.451
		16QAM	13.527	15.090
	20 MHz	QPSK	18.036	19.639
		16QAM	17.956	19.719
LTE Band 5	1.4 MHz	QPSK	1.112	1.341
		16QAM	1.118	1.443
	3 MHz	QPSK	2.705	3.102
		16QAM	2.705	3.054
	5 MHz	QPSK	4.569	5.531
		16QAM	4.569	5.331
	10 MHz	QPSK	9.018	9.820
		16QAM	9.018	9.900

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 7	5 MHz	QPSK	4.569	5.391
		16QAM	4.569	5.291
	10 MHz	QPSK	8.978	9.900
		16QAM	8.938	9.820
	15 MHz	QPSK	13.467	15.511
		16QAM	13.527	15.030
	20 MHz	QPSK	17.956	19.639
		16QAM	18.036	19.880
LTE Band 12	1.4 MHz	QPSK	1.100	1.317
		16QAM	1.118	1.323
	3 MHz	QPSK	2.705	3.030
		16QAM	2.681	3.066
	5 MHz	QPSK	4.549	5.130
		16QAM	4.529	5.210
	10 MHz	QPSK	8.938	9.739
		16QAM	8.898	9.699
LTE Band 17	5 MHz	QPSK	4.549	5.251
		16QAM	4.529	5.230
	10 MHz	QPSK	8.938	9.699
		16QAM	8.938	9.739

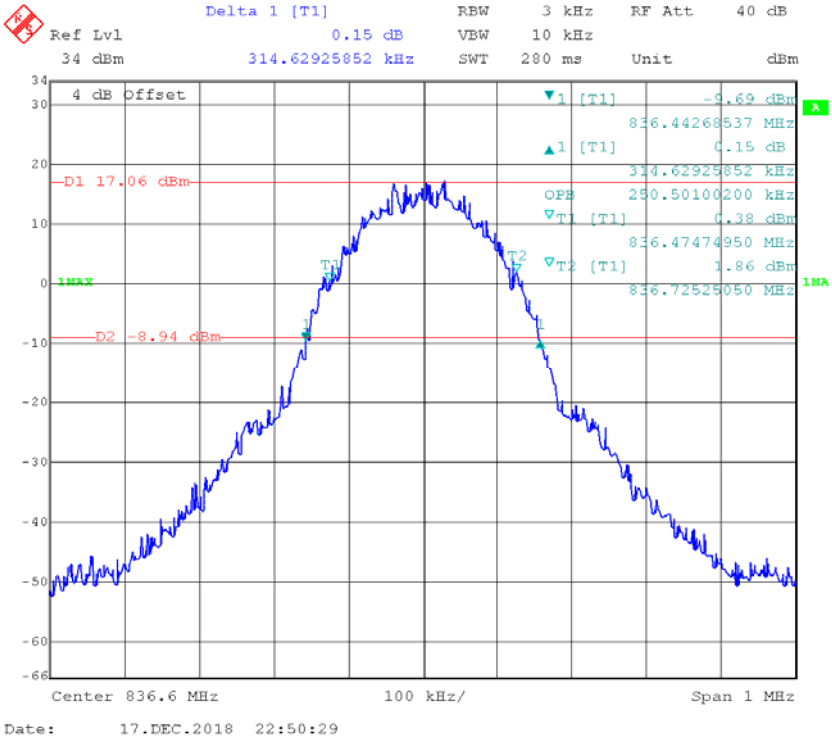
GSM 850 Cellular Band



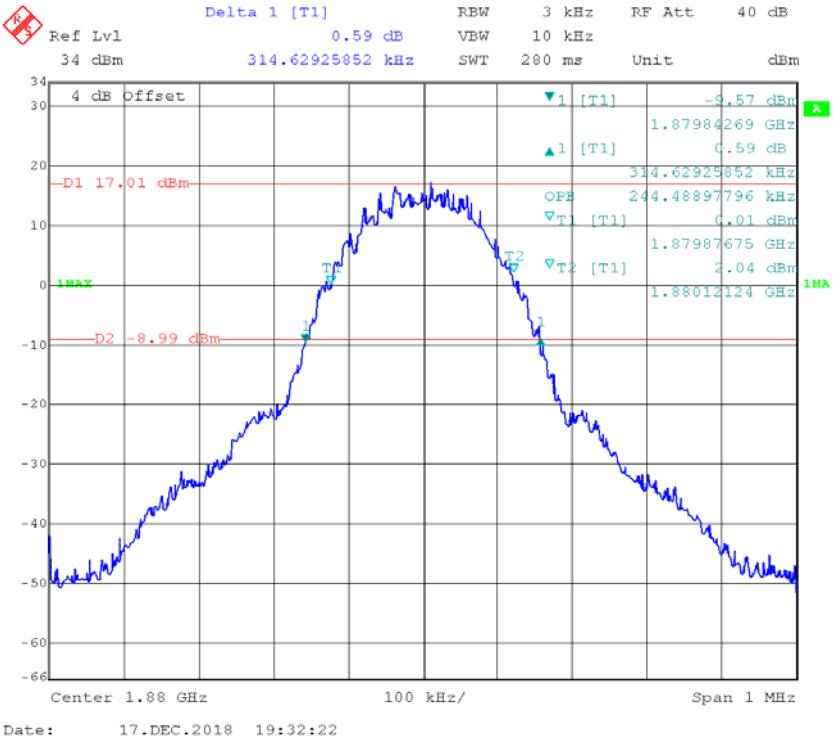
GSM PCS1900 Cellular Band



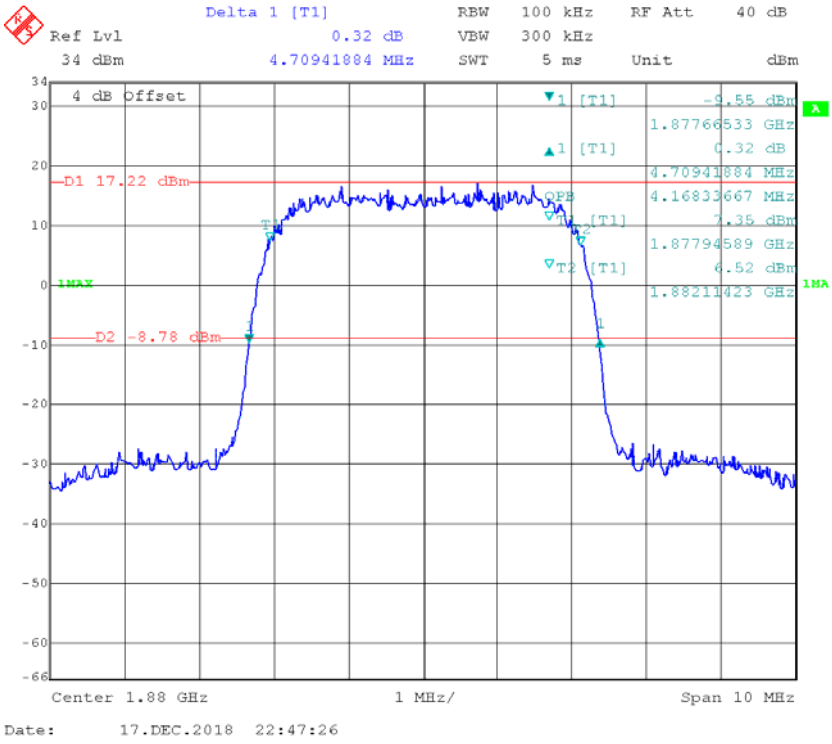
EDGE 850 Cellular Band



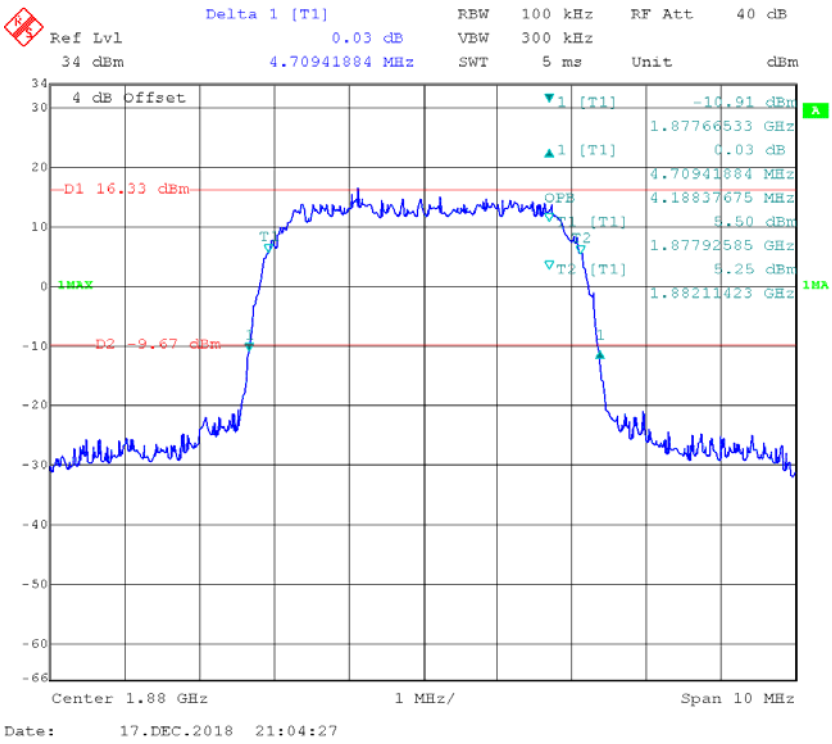
EDGE PCS1900 Cellular Band



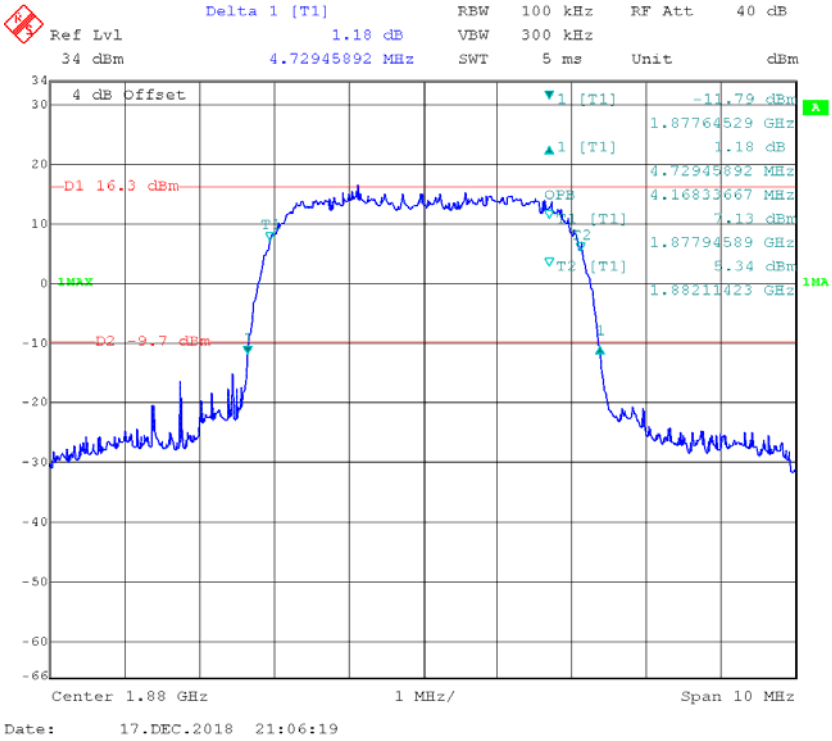
WCDMA Band II, Rel 99



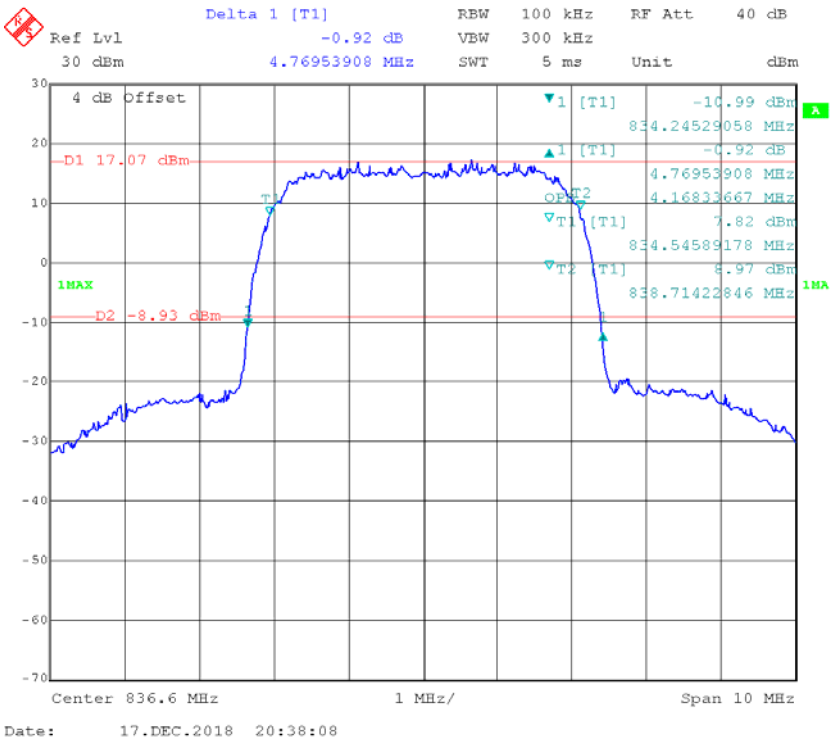
WCDMA Band II, HSUPA



WCDMA Band II, HSDPA



WCDMA Band V, Rel 99



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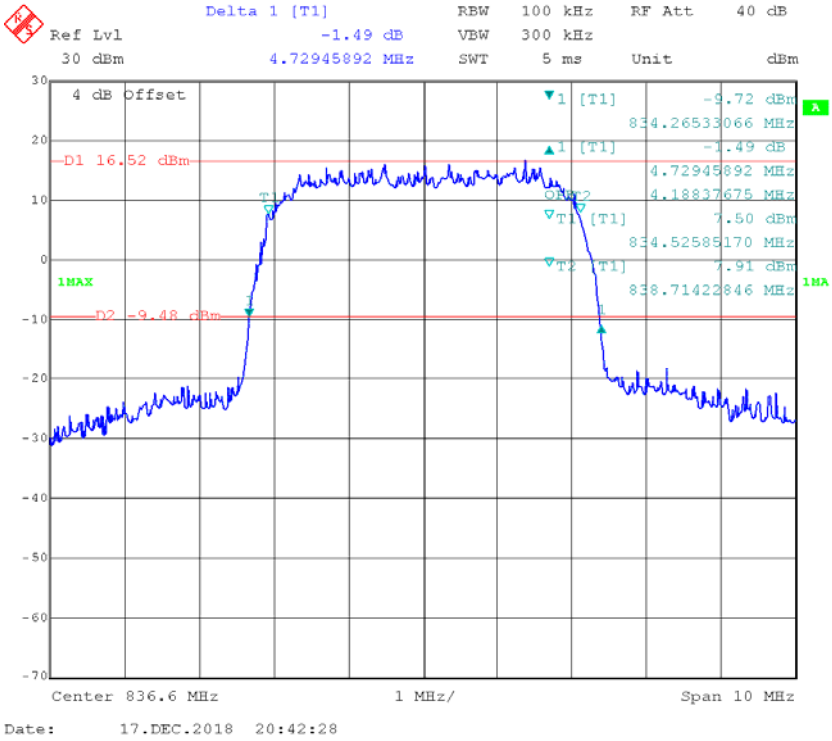
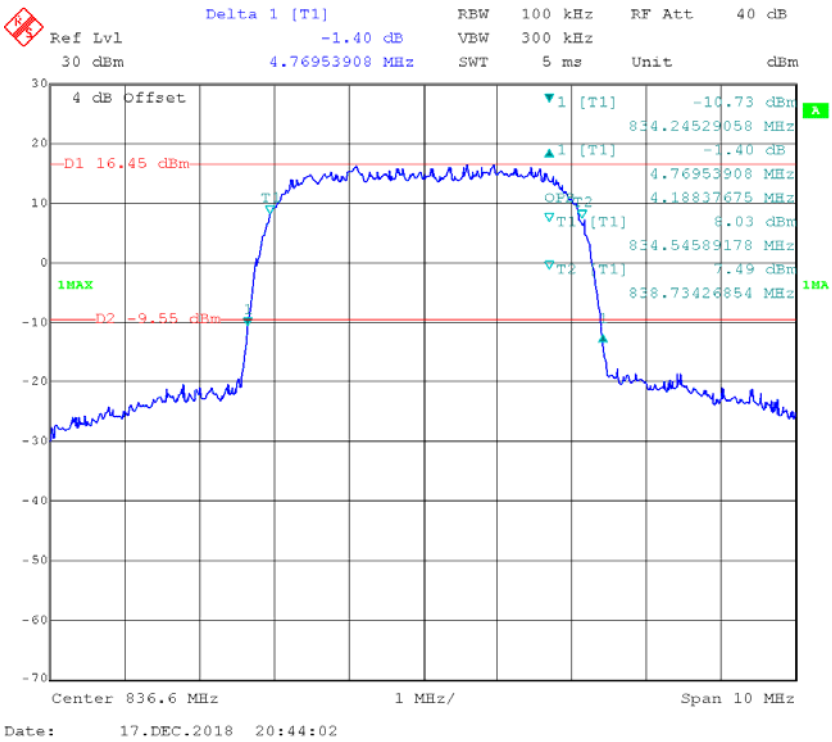
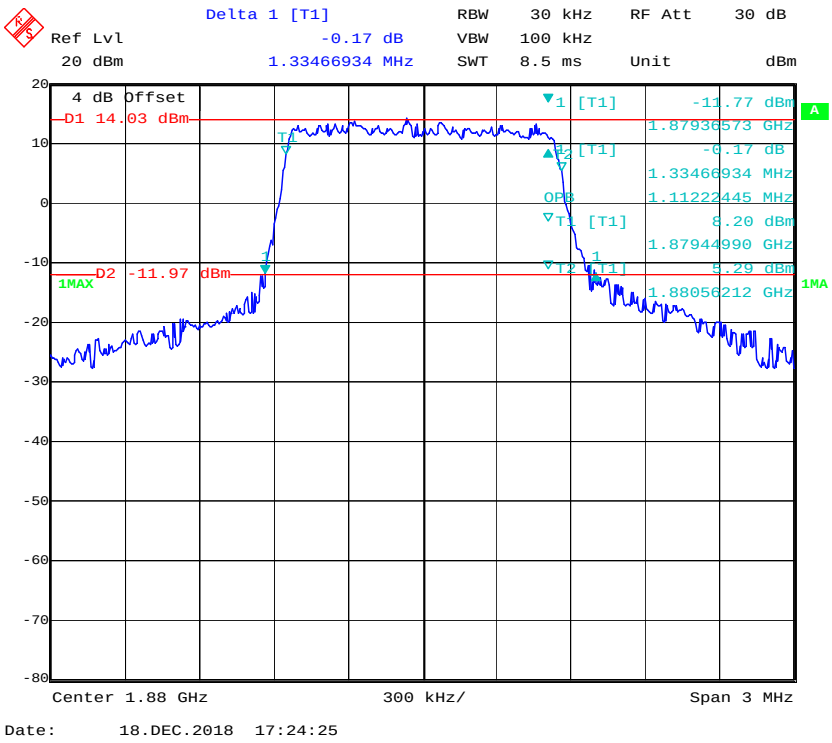


WCDMA Band V, HSDPA

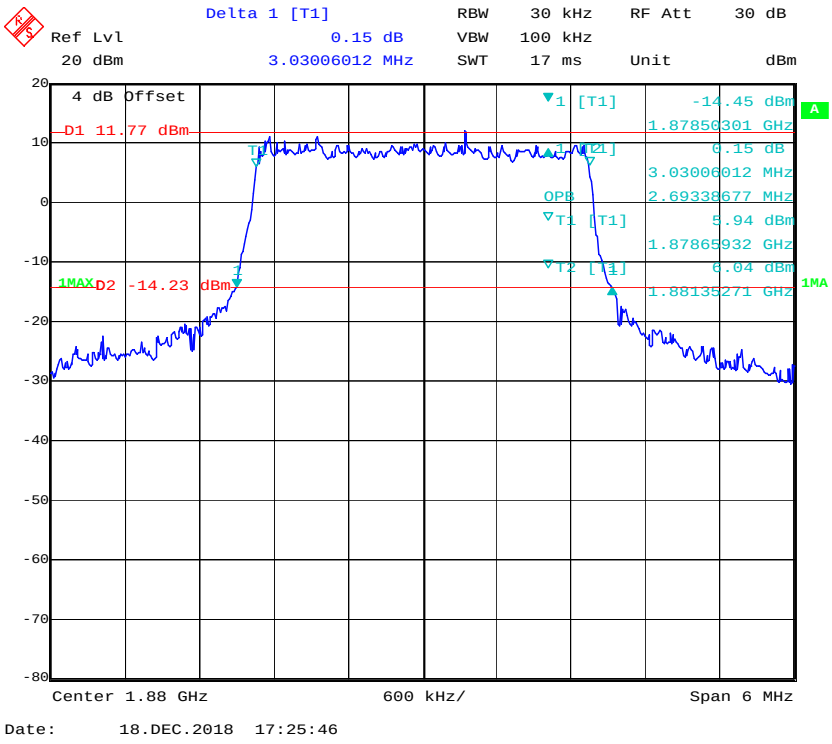


LTE Band 2

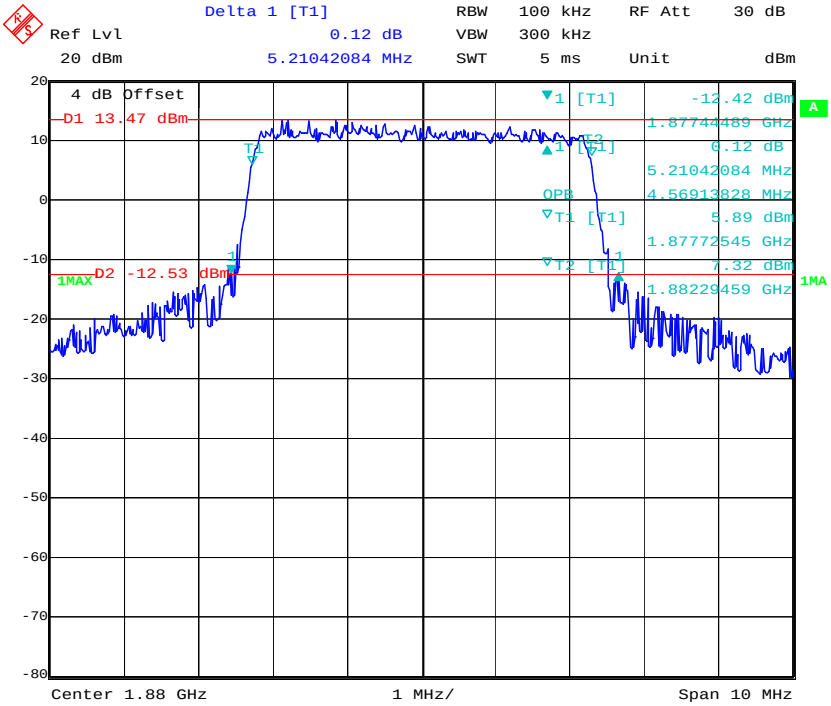
QPSK_1.4 MHz



QPSK_3 MHz



QPSK_5 MHz



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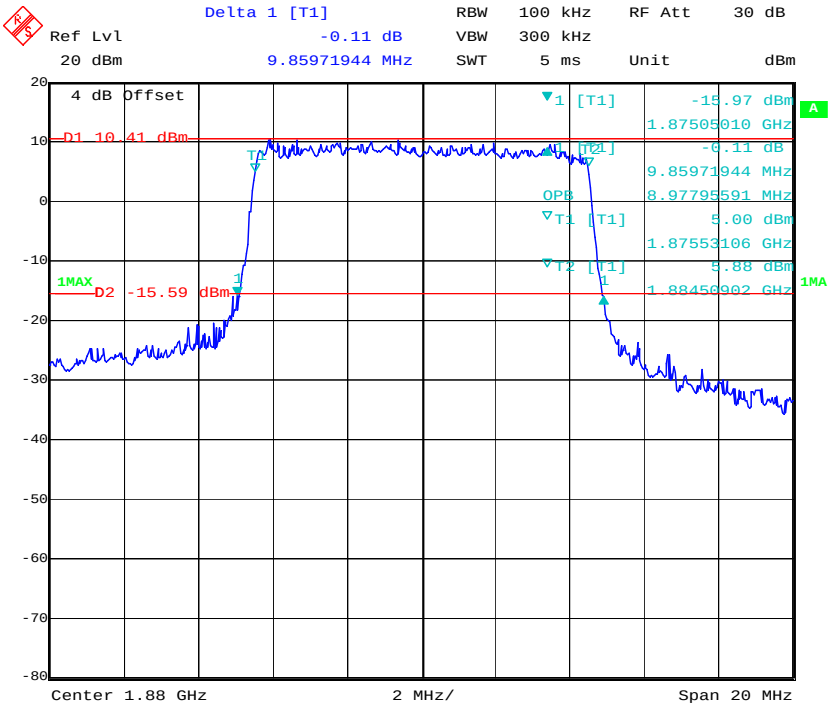
QPSK_10 MHz



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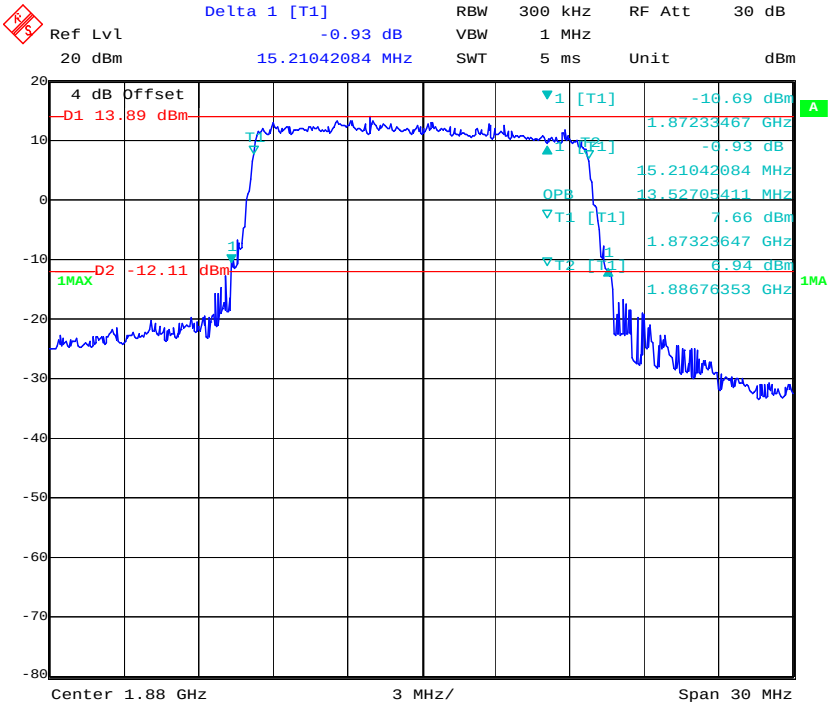
QPSK_15 MHz



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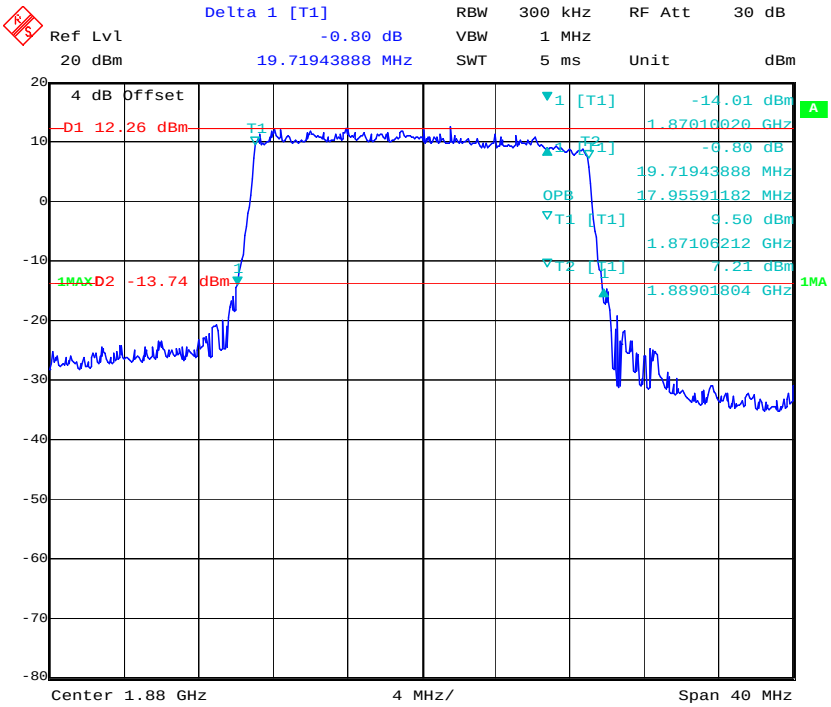
QPSK_20 MHz



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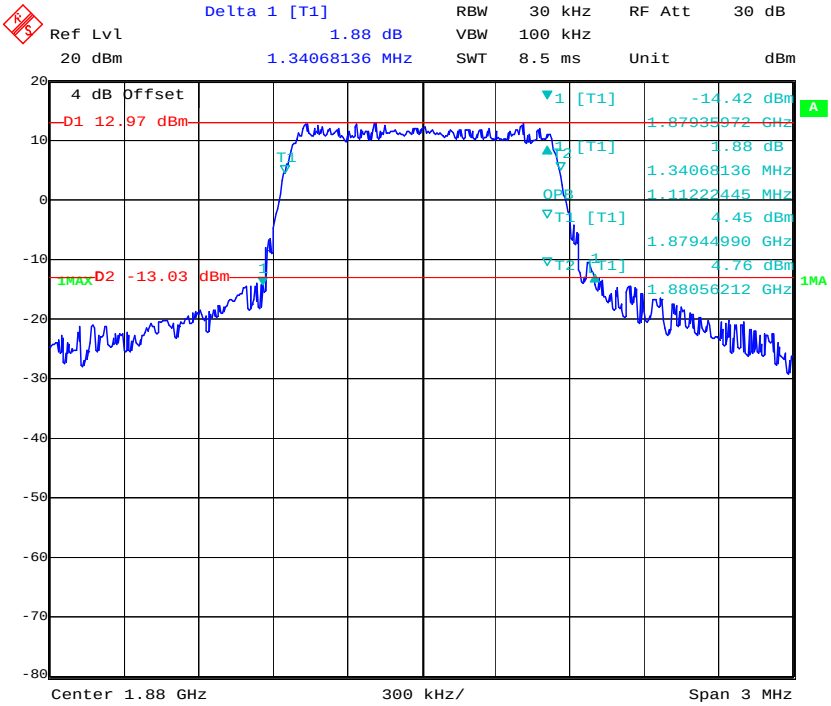
16QAM_1.4 MHz



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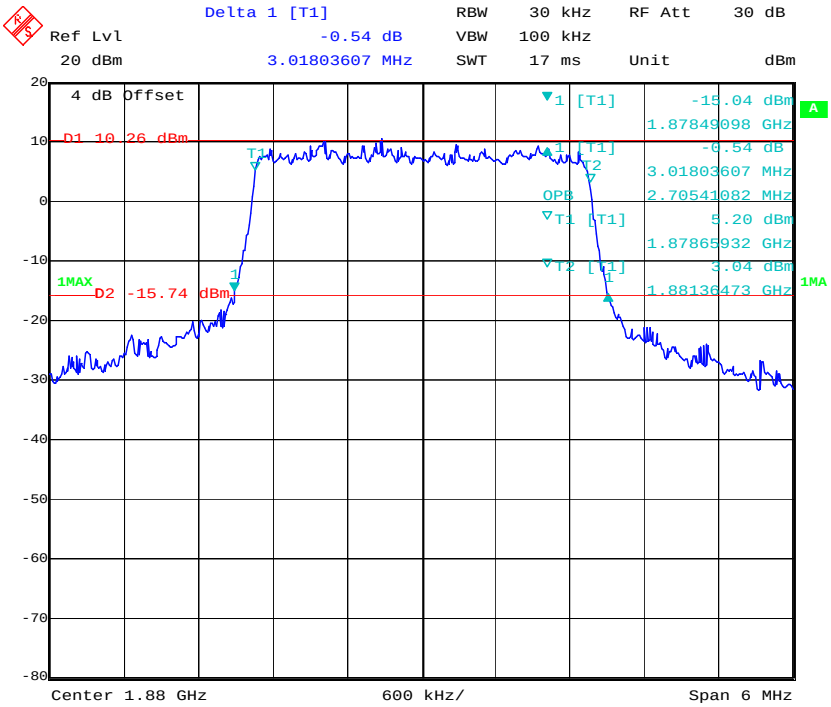
16QAM_3 MHz



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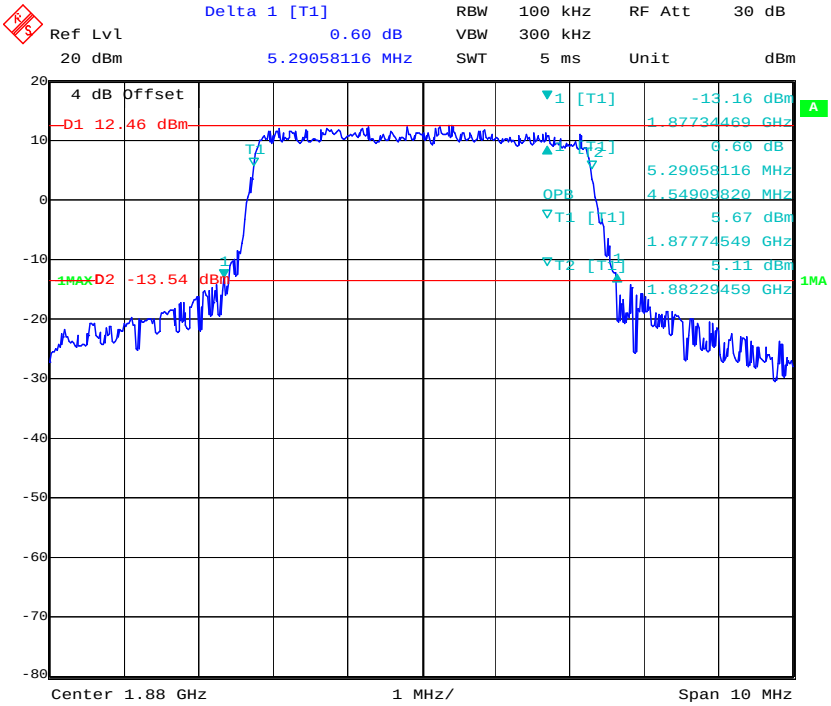
16QAM_5 MHz



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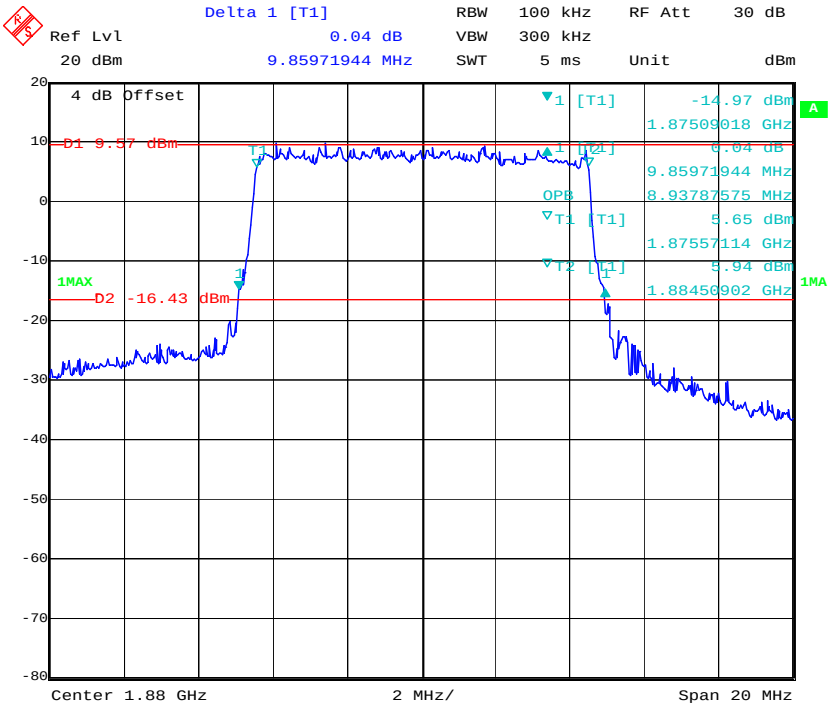
16QAM_10 MHz



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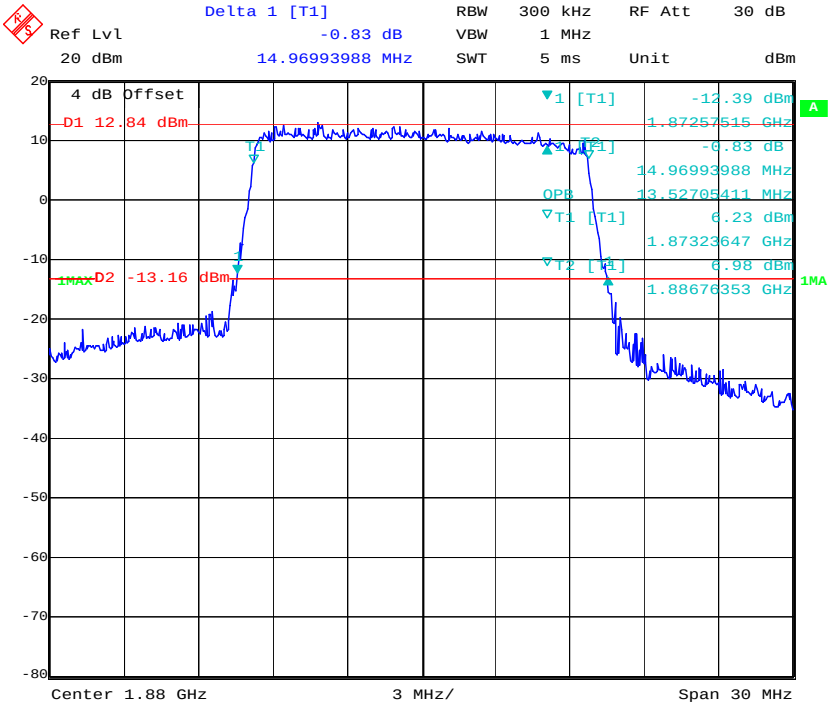
16QAM_15 MHz



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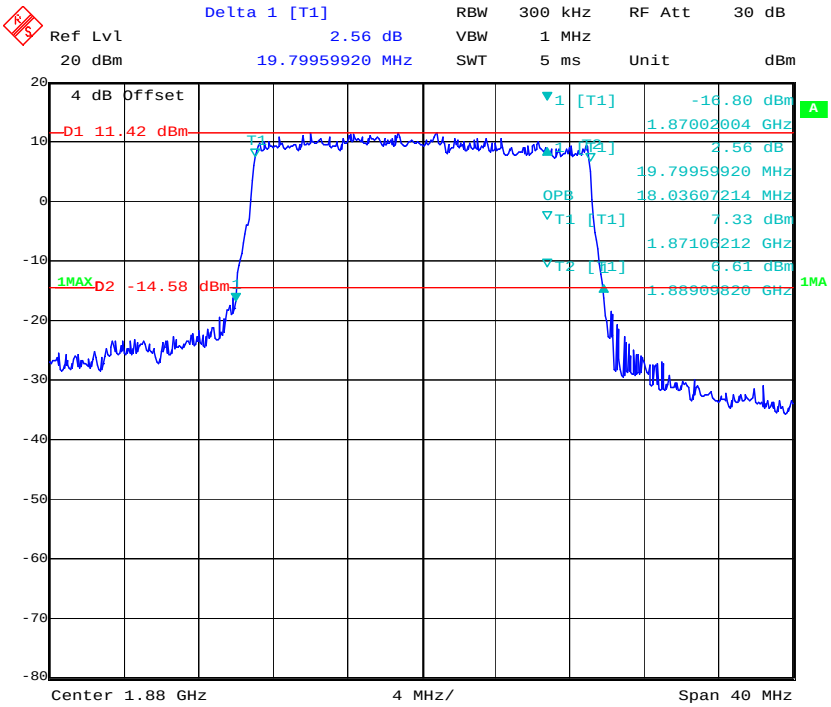
16QAM_20 MHz



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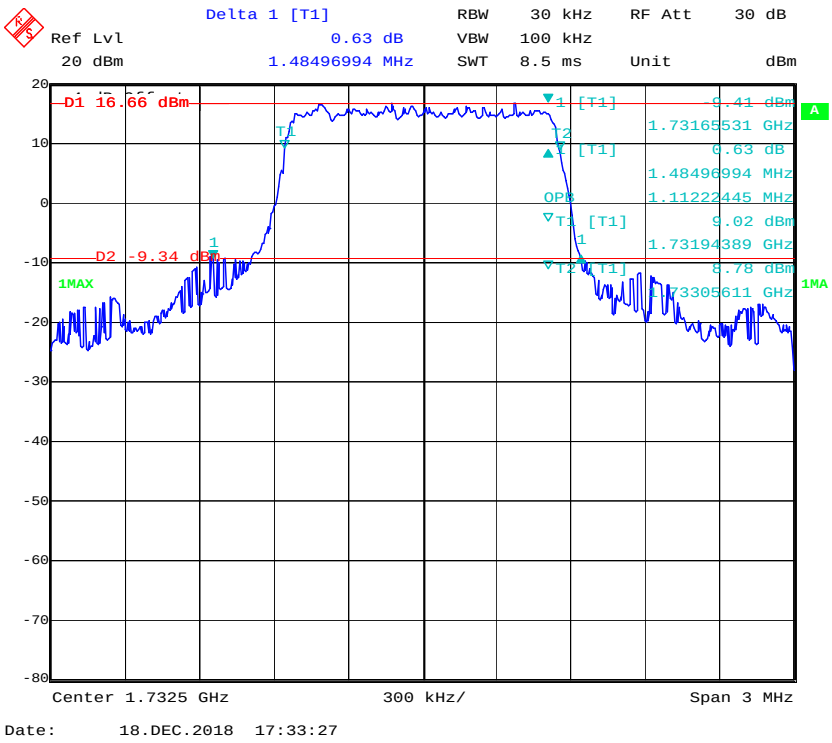
LTE Band 4

QPSK_1.4 MHz



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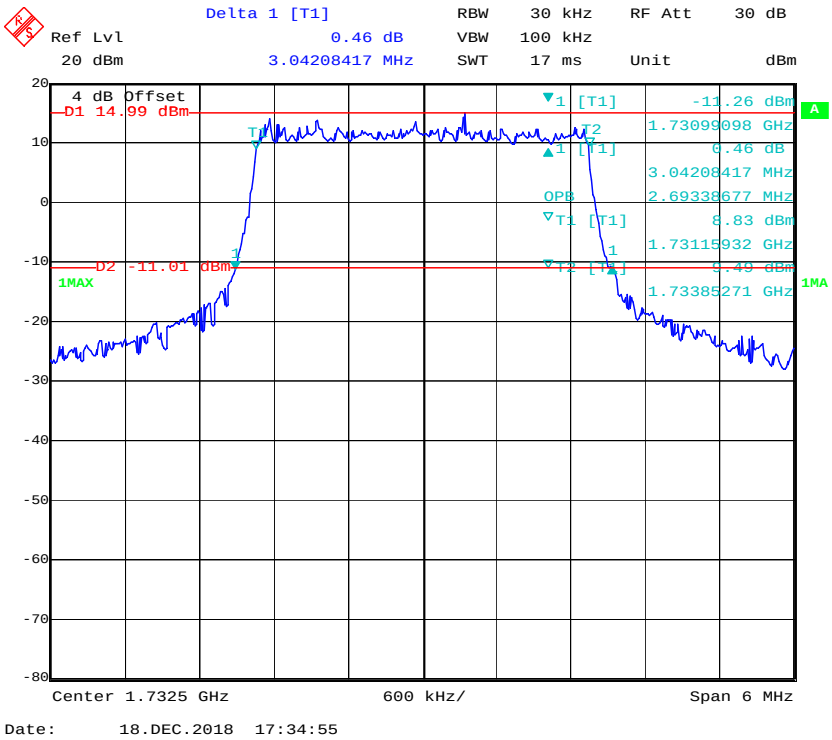
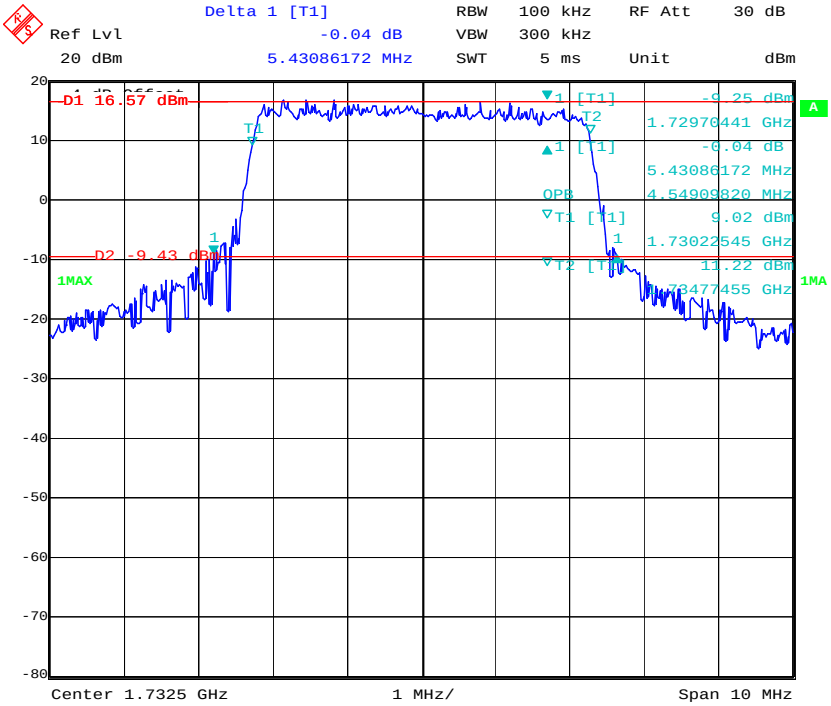
QPSK_3 MHz



Date: 18.DEC.2018 17:34:55

QPSK_5 MHz



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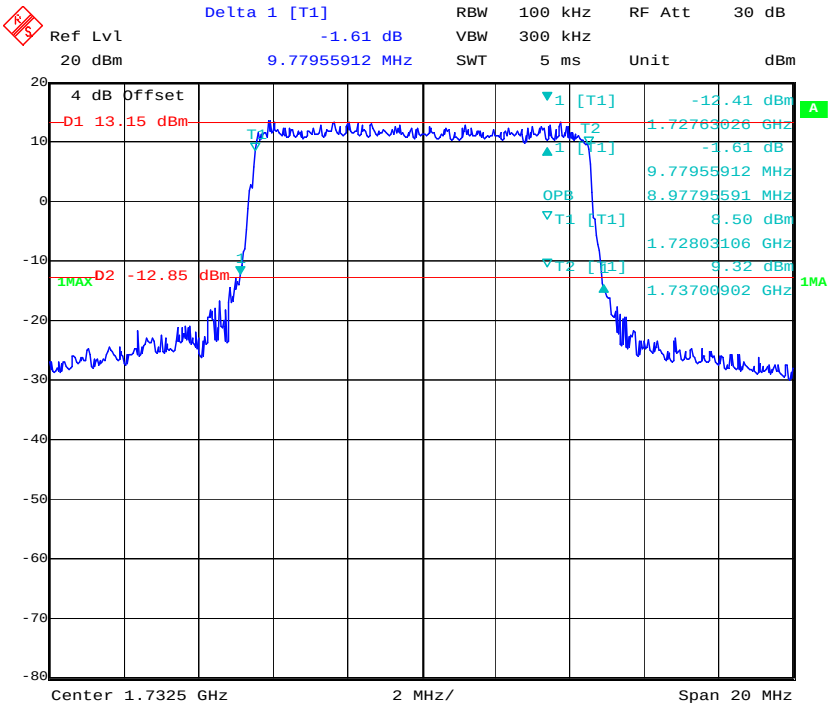
QPSK_10 MHz



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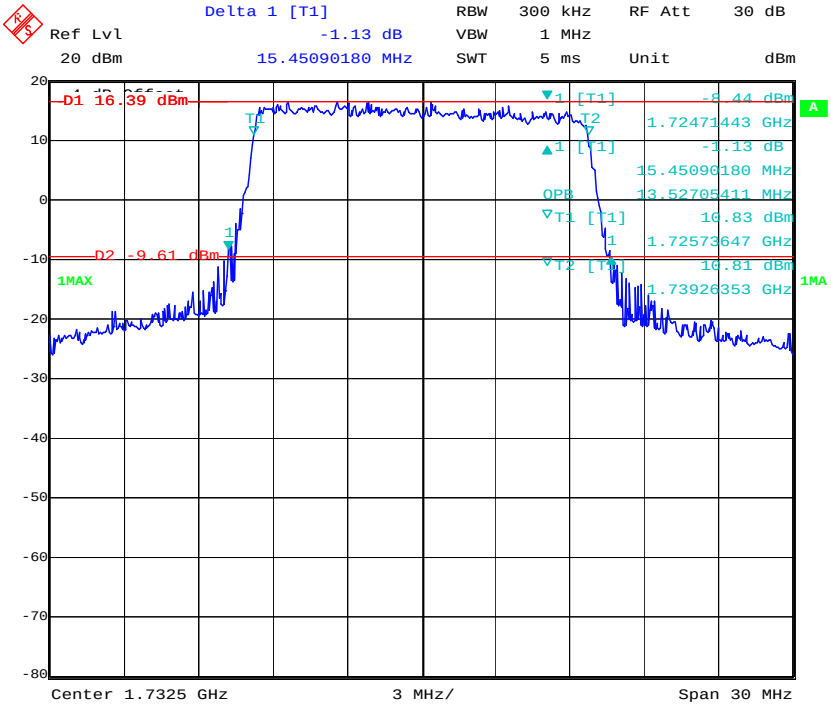
QPSK_15 MHz



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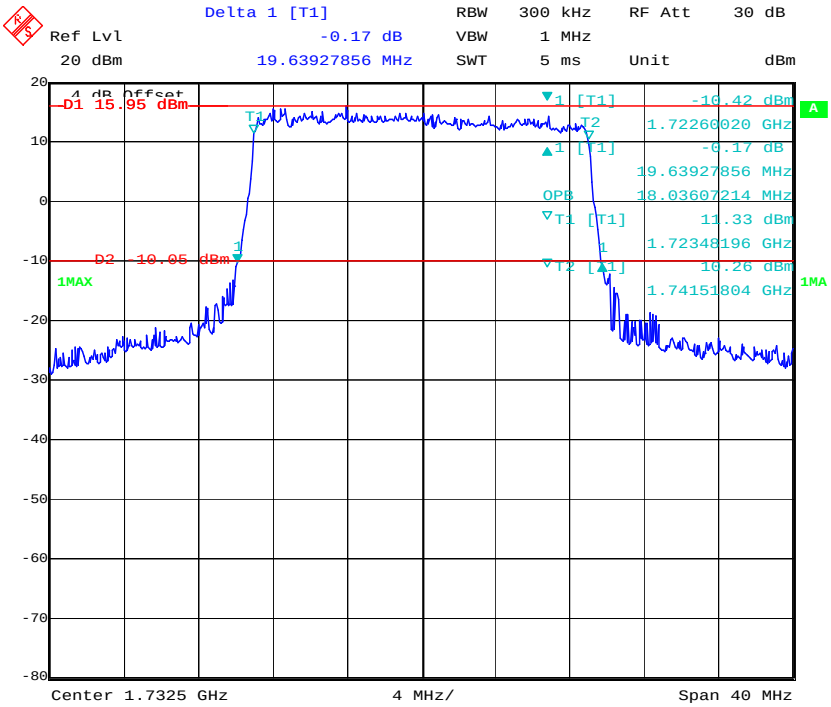
QPSK_20 MHz



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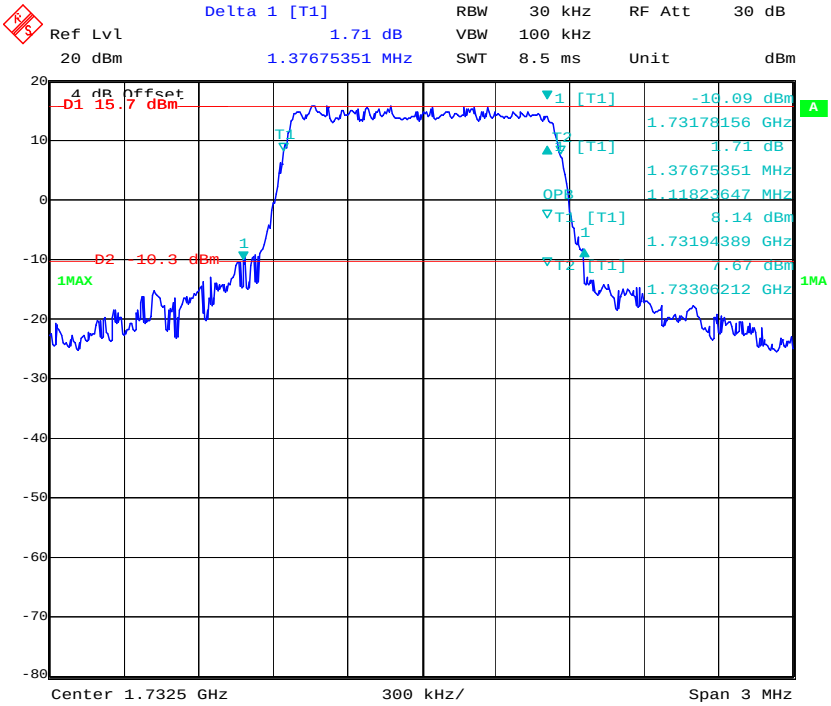
16QAM_1.4 MHz



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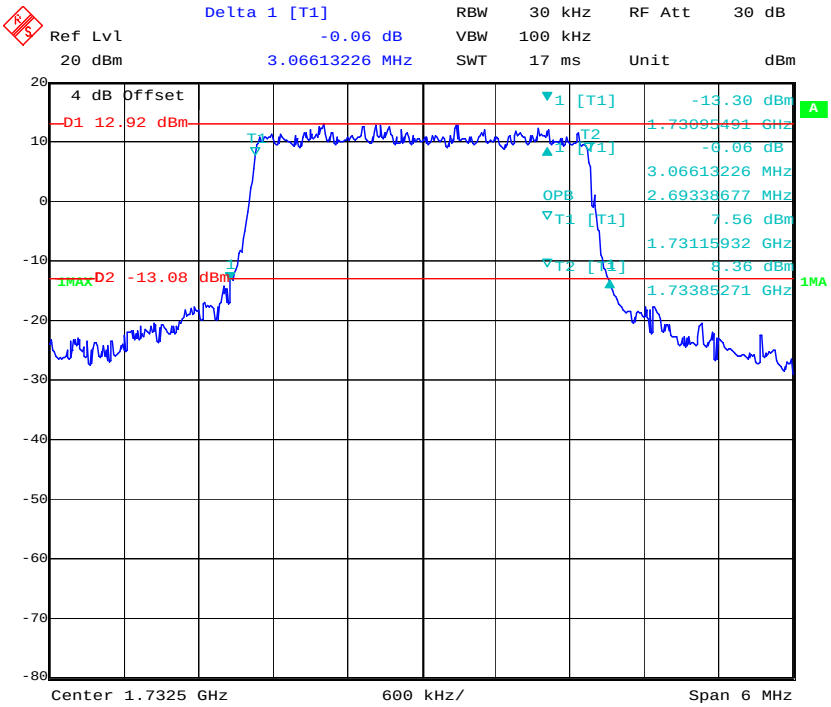
16QAM_3 MHz



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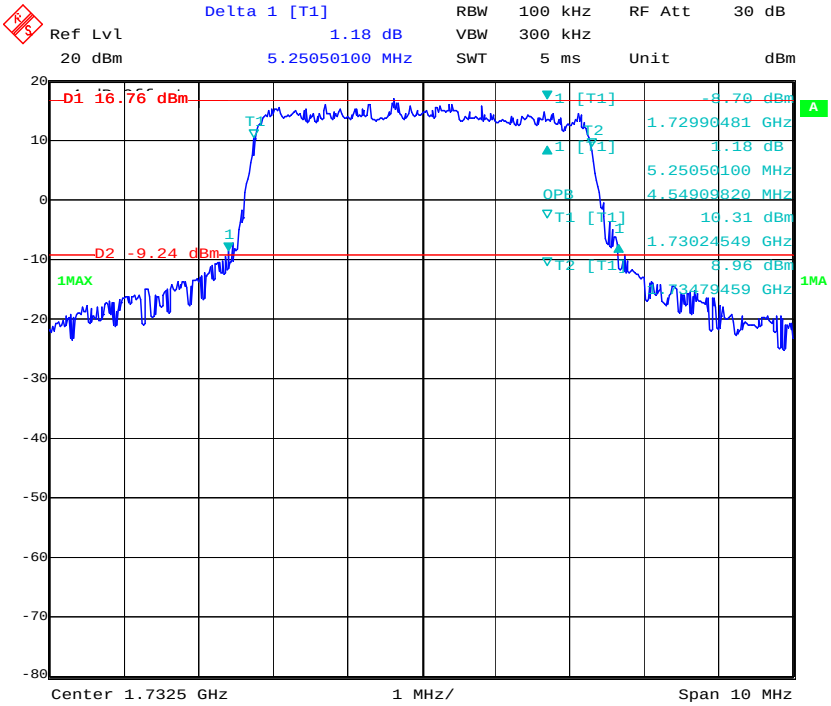
16QAM_5 MHz



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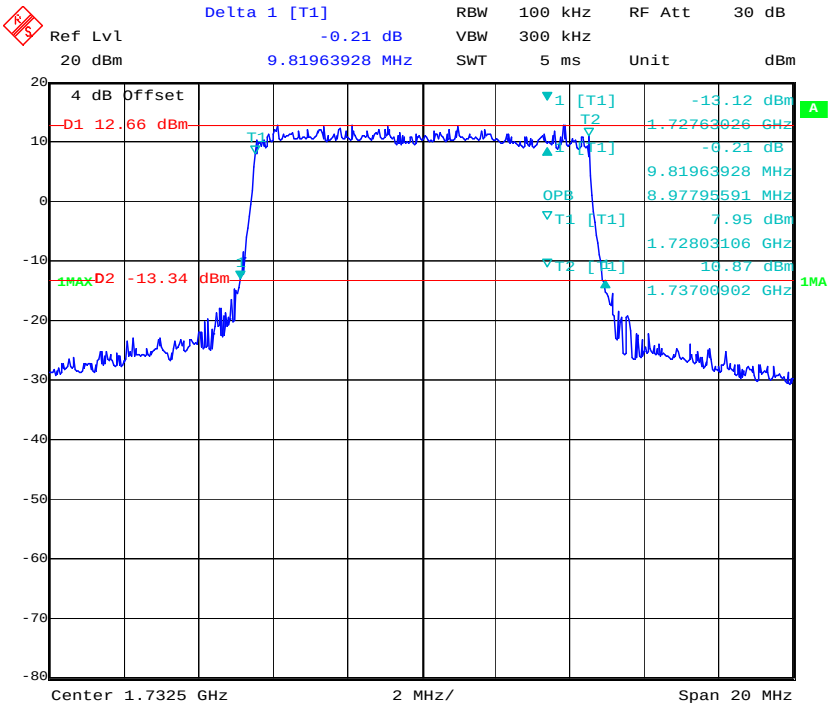
16QAM_10 MHz



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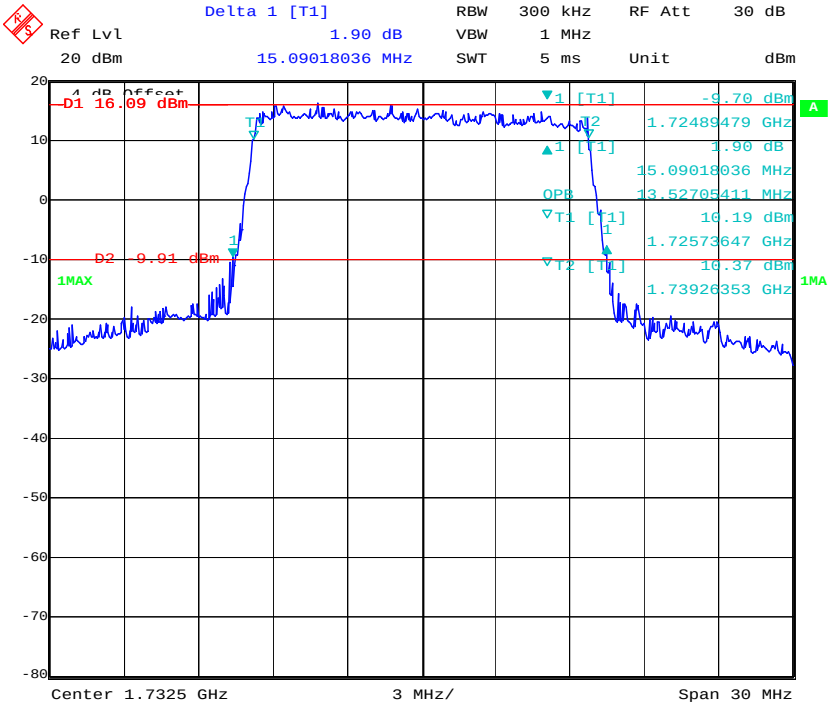
16QAM_15 MHz



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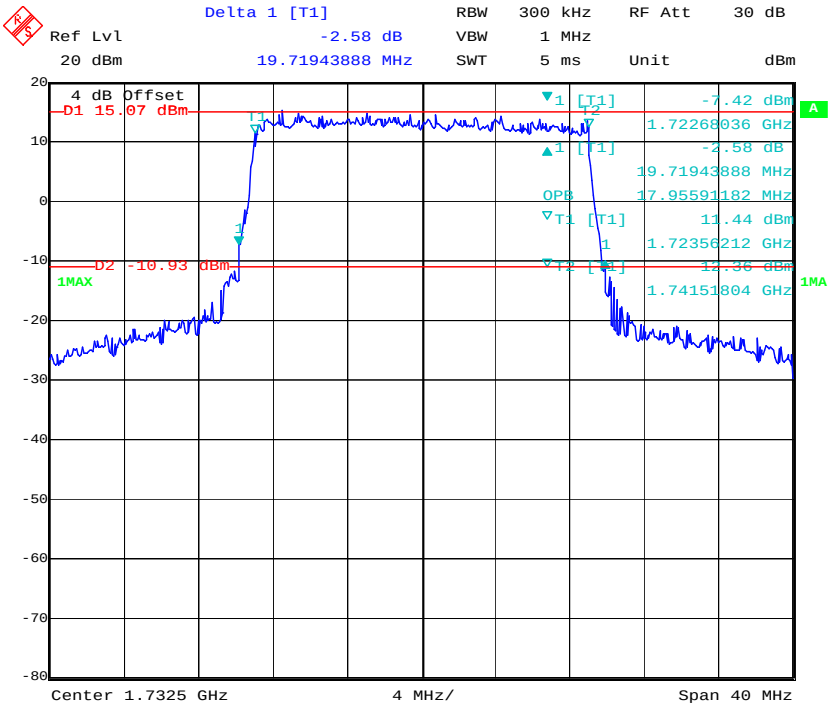
16QAM_20 MHz



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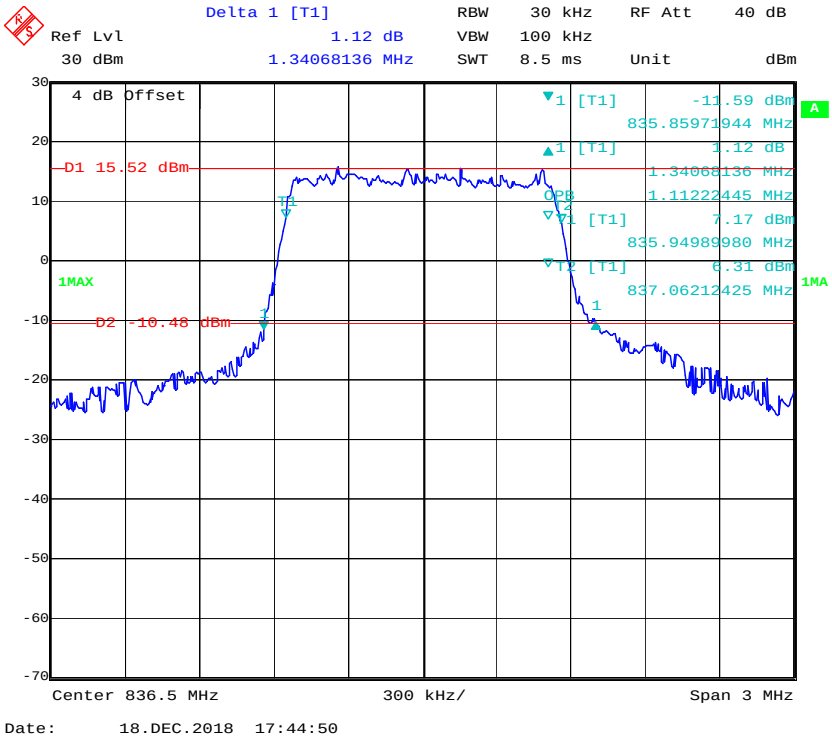
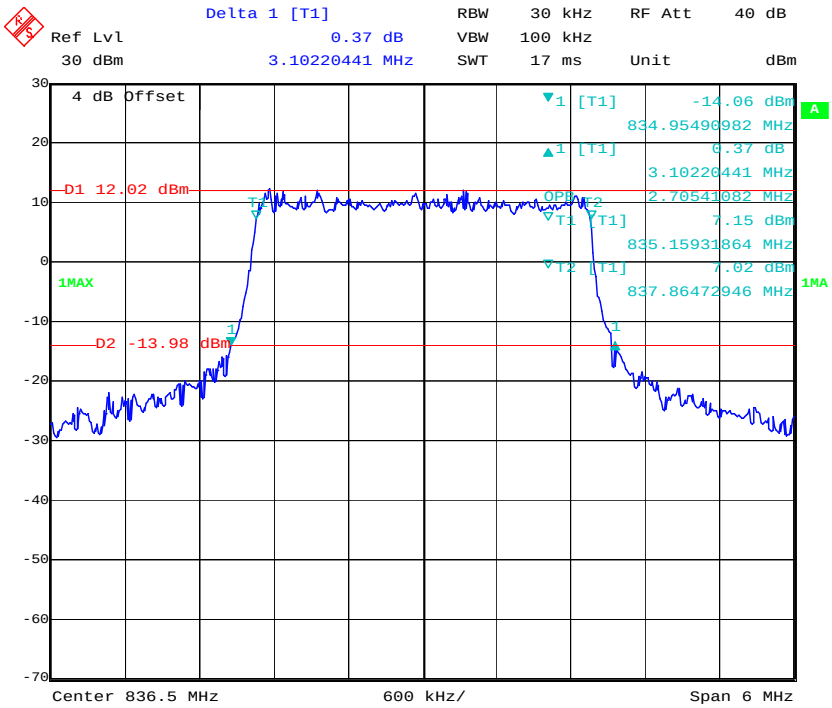
LTE Band 5:

QPSK_1.4 MHz



Date: 18.DEC.2018 17:44:50

QPSK_3 MHz



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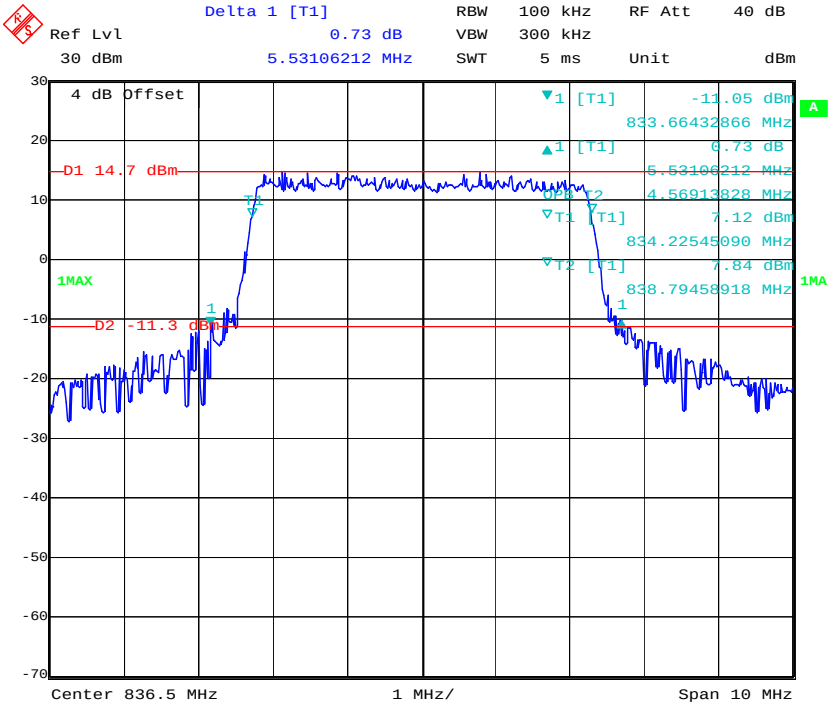
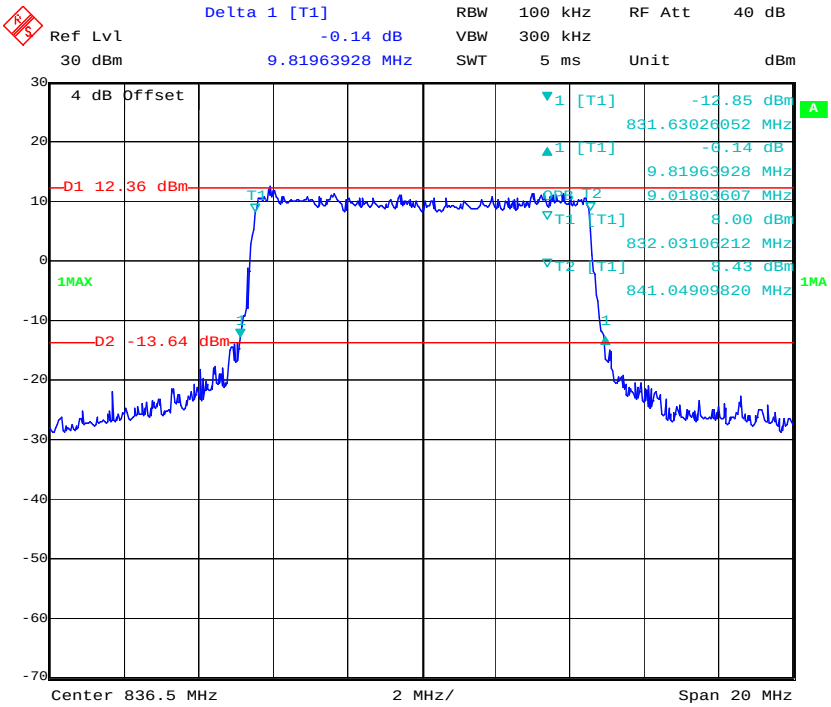
QPSK_5 MHz



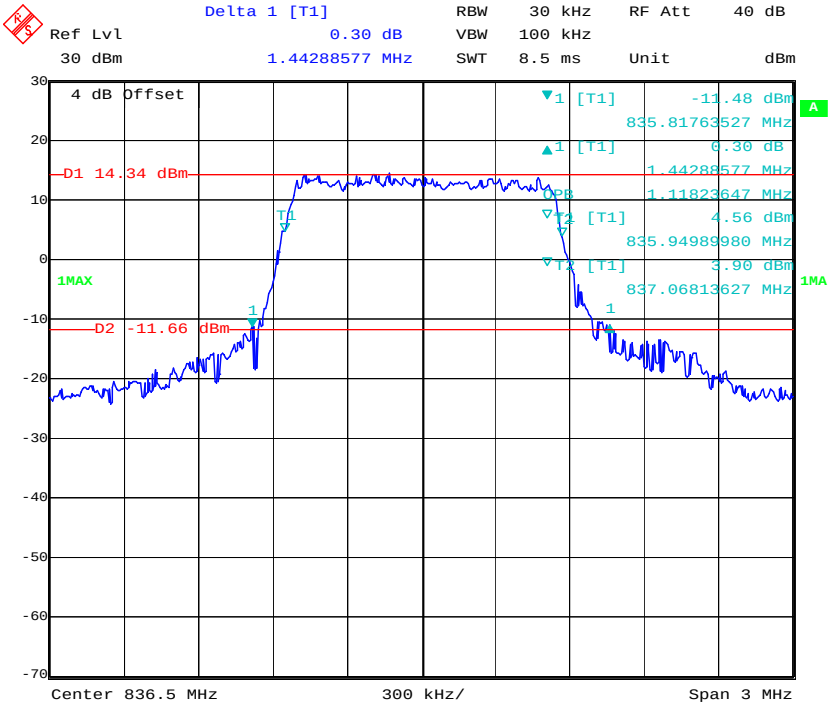
Date: 18.DEC.2018 17:47:58

QPSK_10 MHz



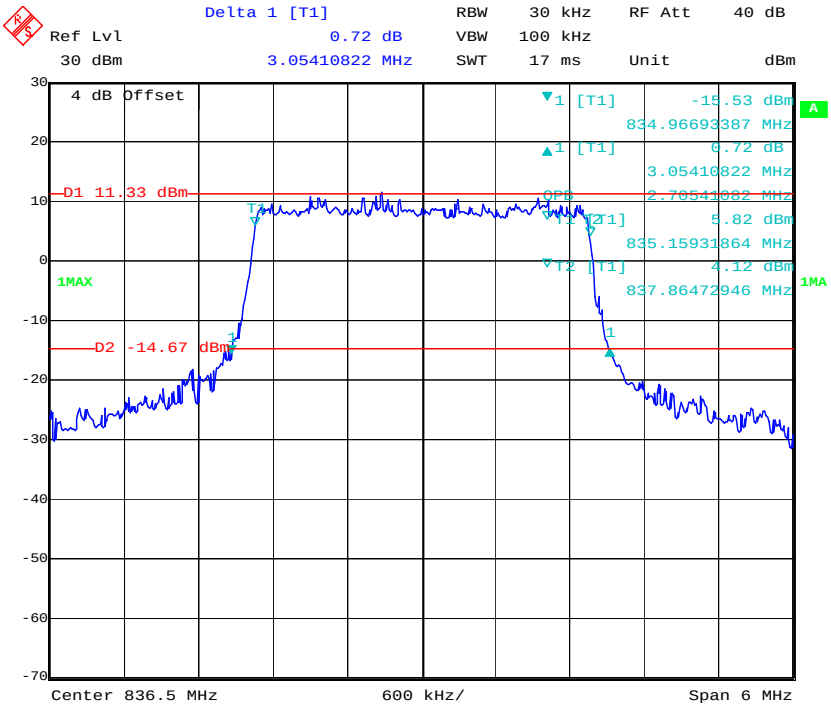
Date: 18.DEC.2018 17:49:41

16QAM_1.4 MHz



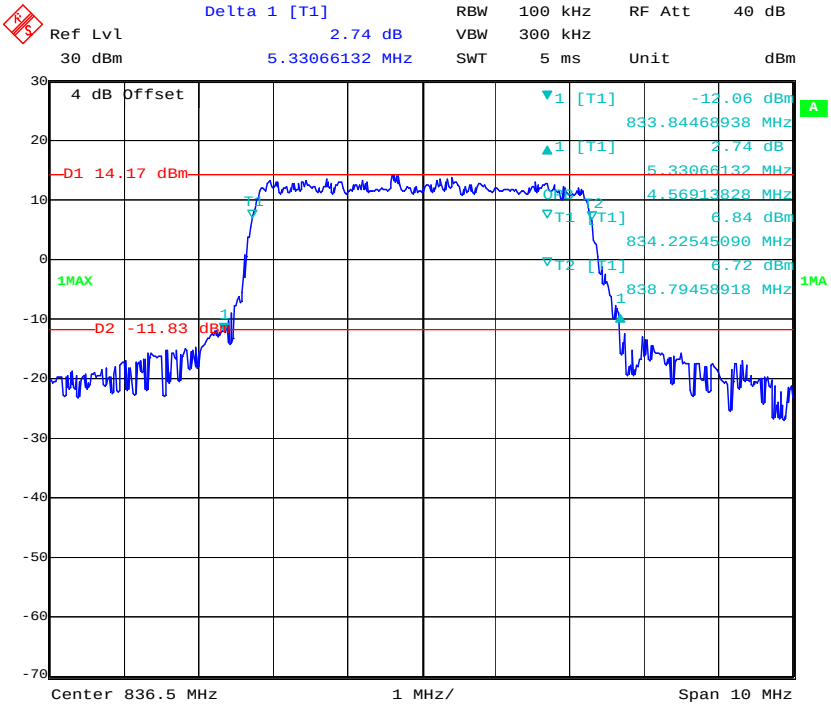
Date: 18.DEC.2018 17:45:45

16QAM_3 MHz



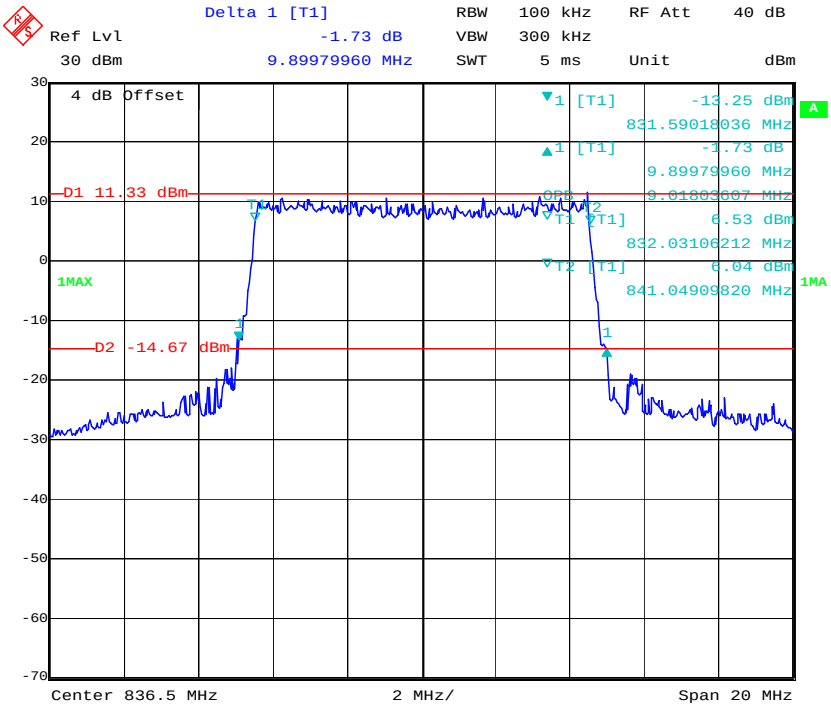
Date: 18.DEC.2018 17:47:09

16QAM_5 MHz



Date: 18.DEC.2018 17:48:52

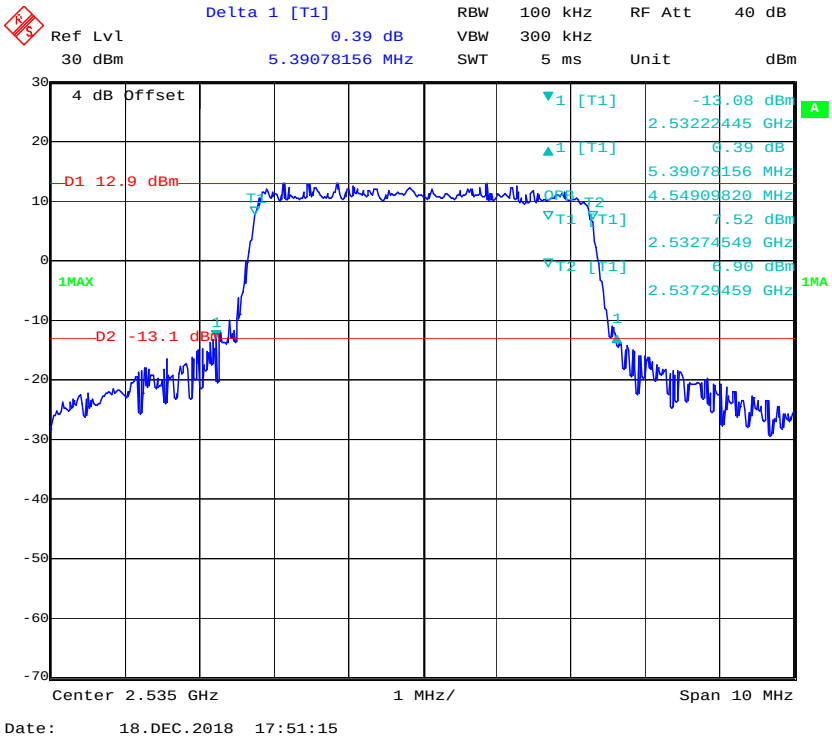
16QAM_10 MHz



Date: 18.DEC.2018 17:50:17

LTE Band 7:

QPSK_5 MHz



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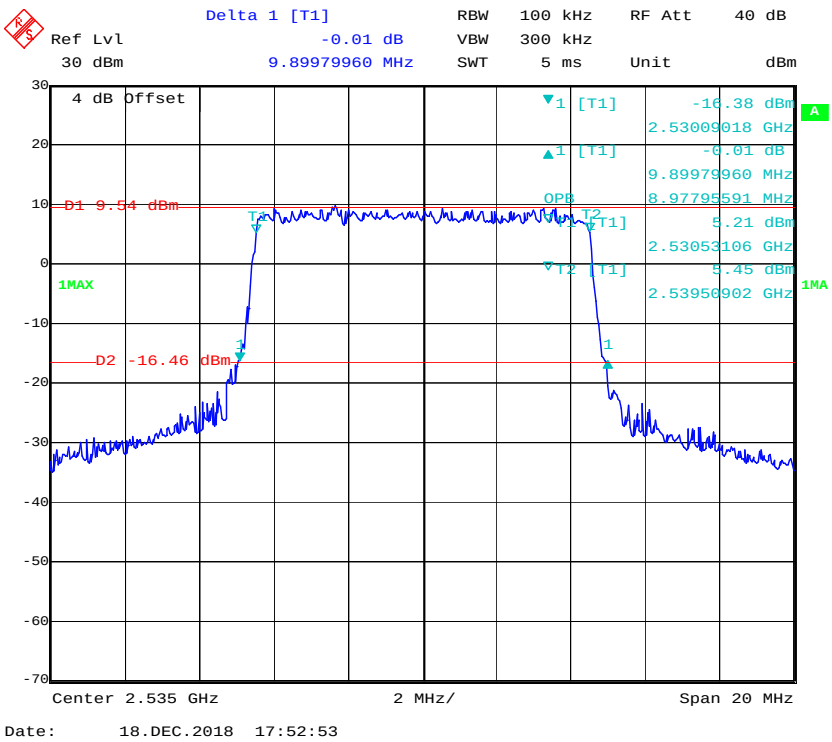
QPSK_10 MHz



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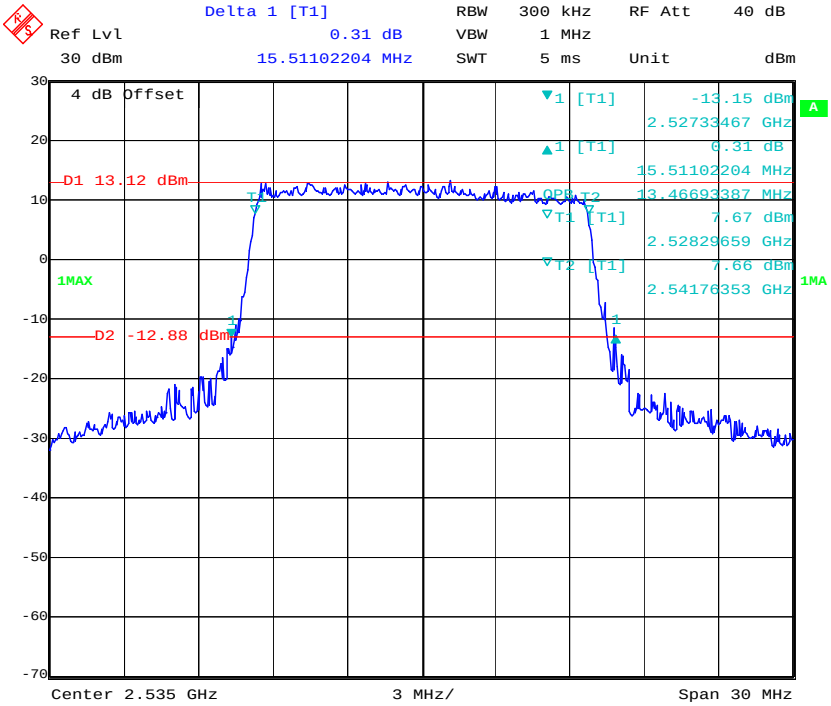
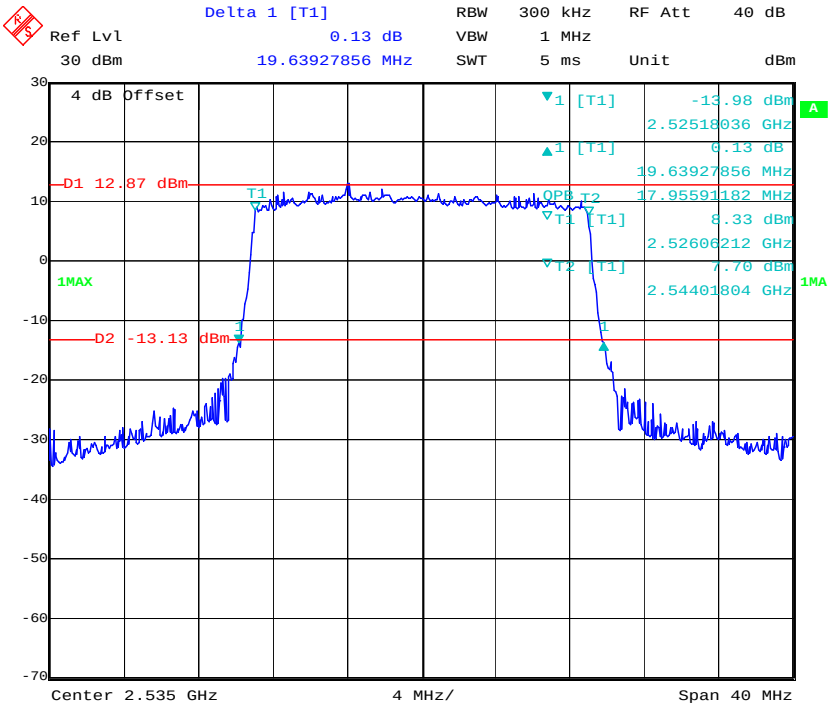
QPSK_15 MHz



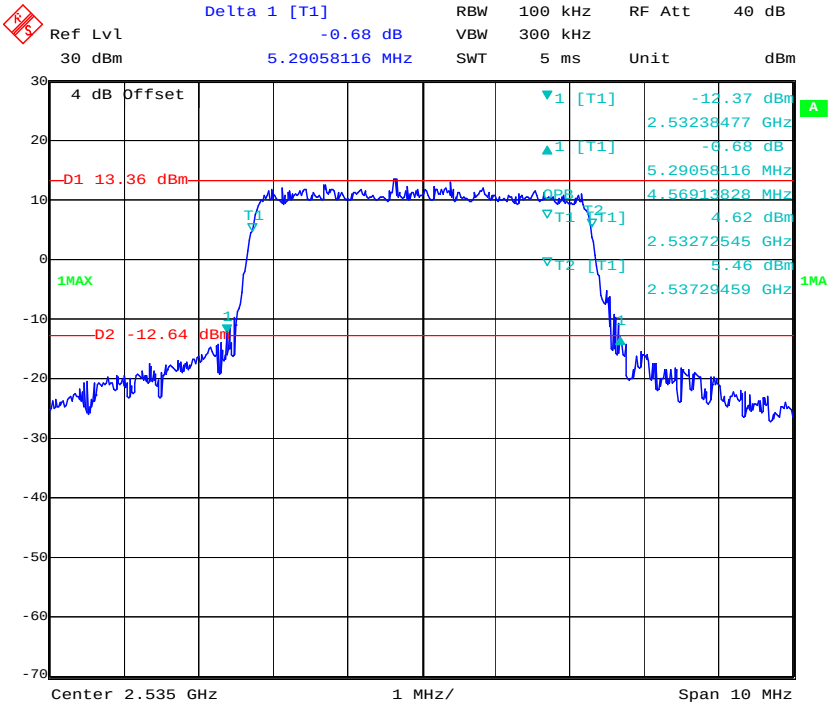
Date: 18.DEC.2018 22:04:39

QPSK_20 MHz



Date: 18.DEC.2018 17:56:05

16QAM_5 MHz



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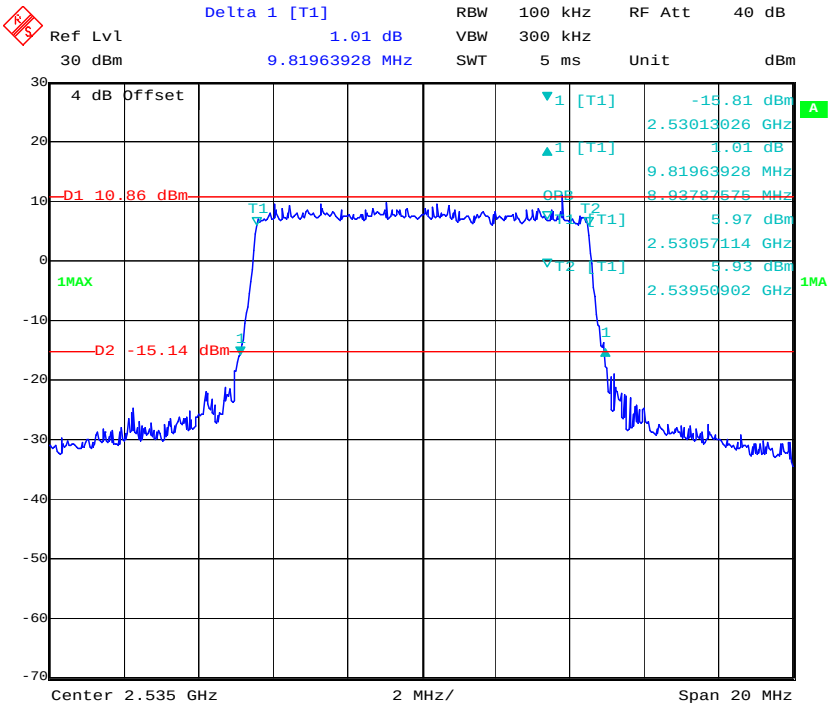
16QAM_10 MHz



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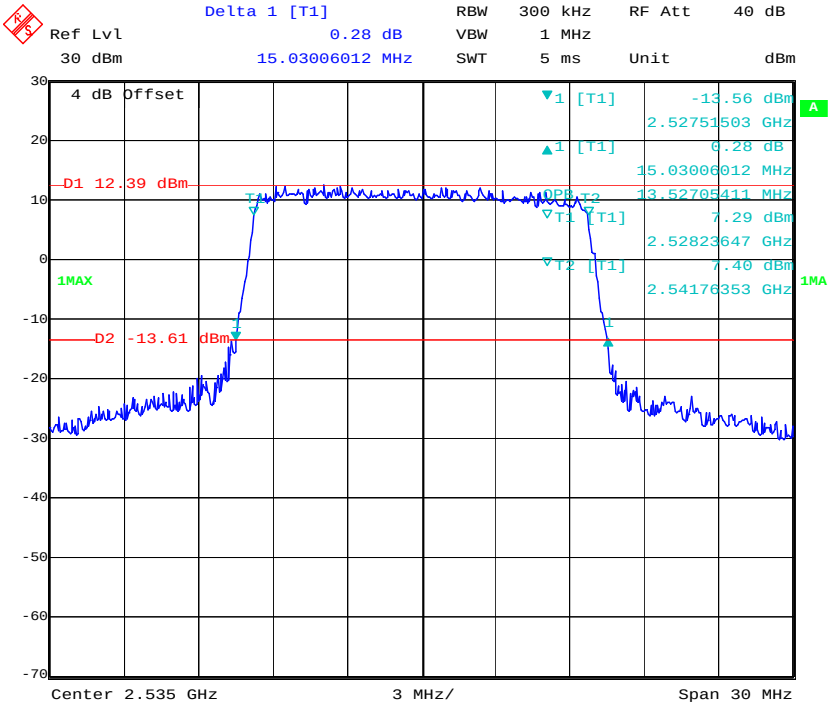
16QAM_15 MHz



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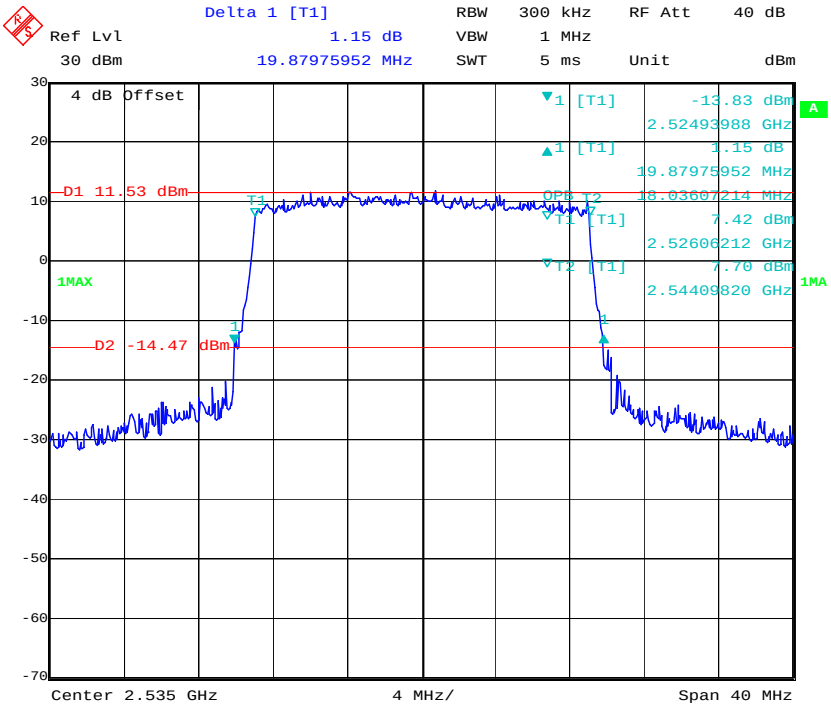
16QAM_20 MHz



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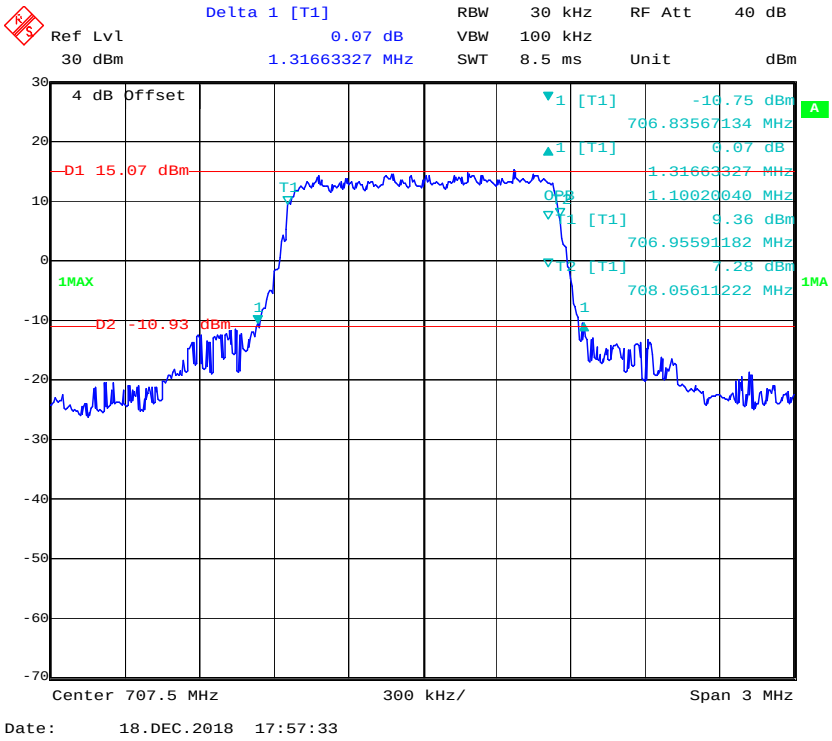
LTE Band 12:

QPSK_1.4 MHz



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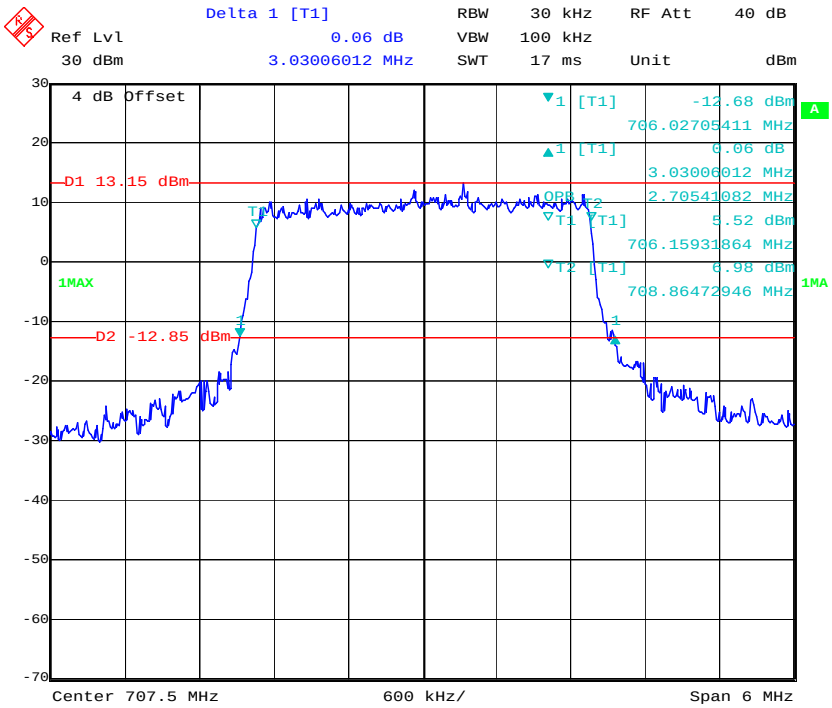
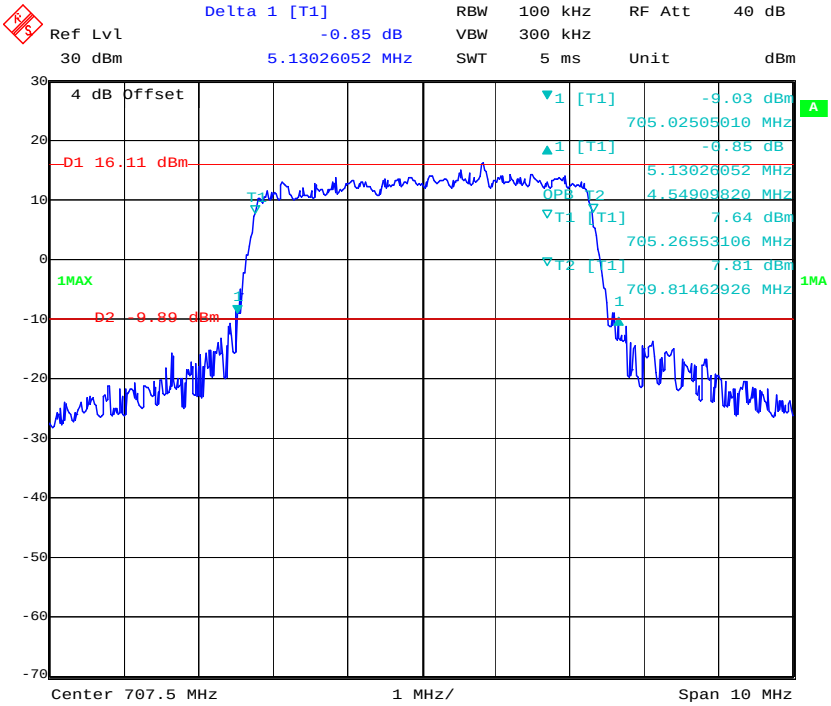
QPSK_3 MHz



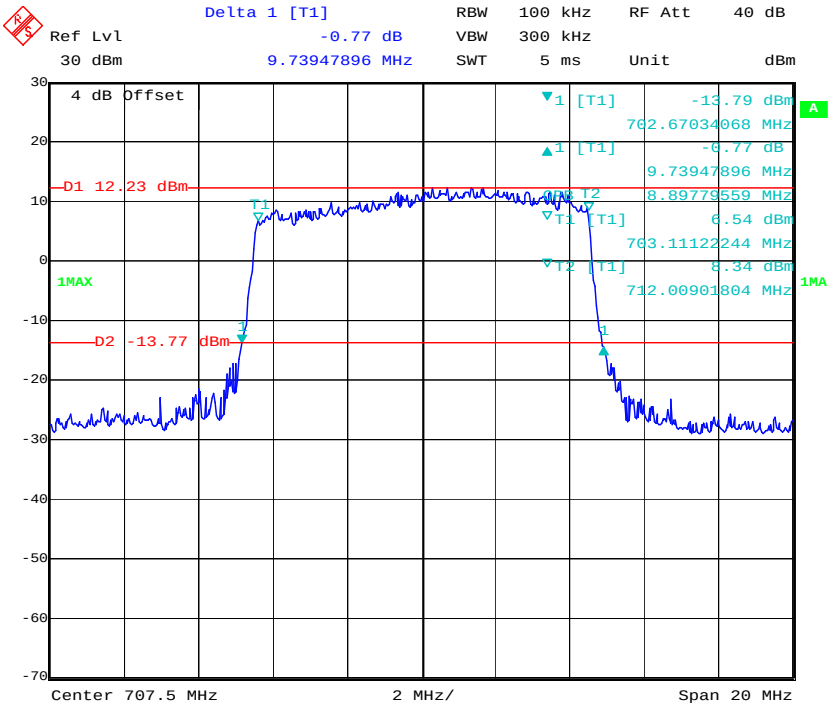
Date: 18.DEC.2018 17:58:49

QPSK_5 MHz



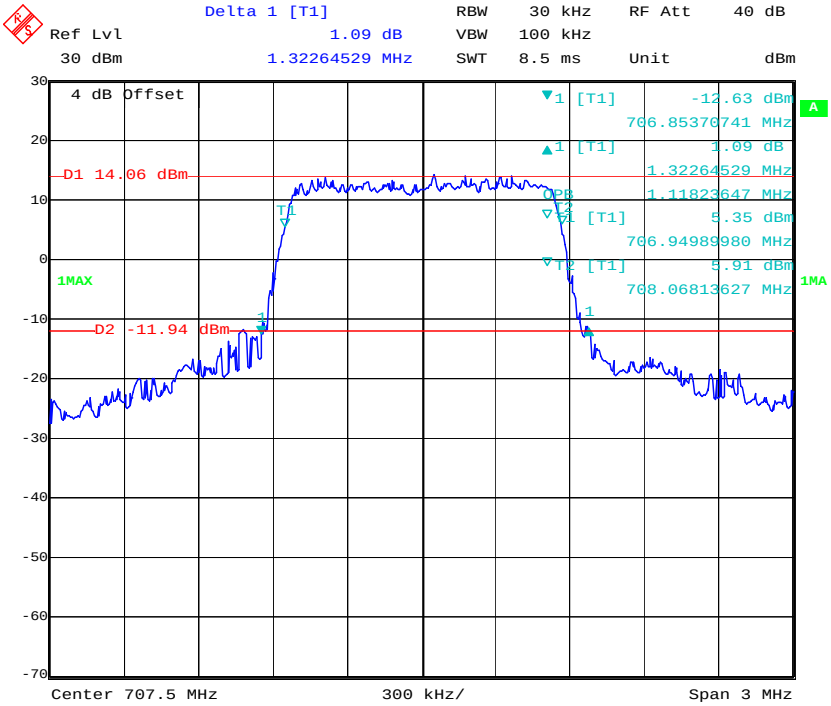
Date: 18.DEC.2018 18:00:31

QPSK_10 MHz



Date: 18.DEC.2018 18:02:09

16QAM_1.4 MHz



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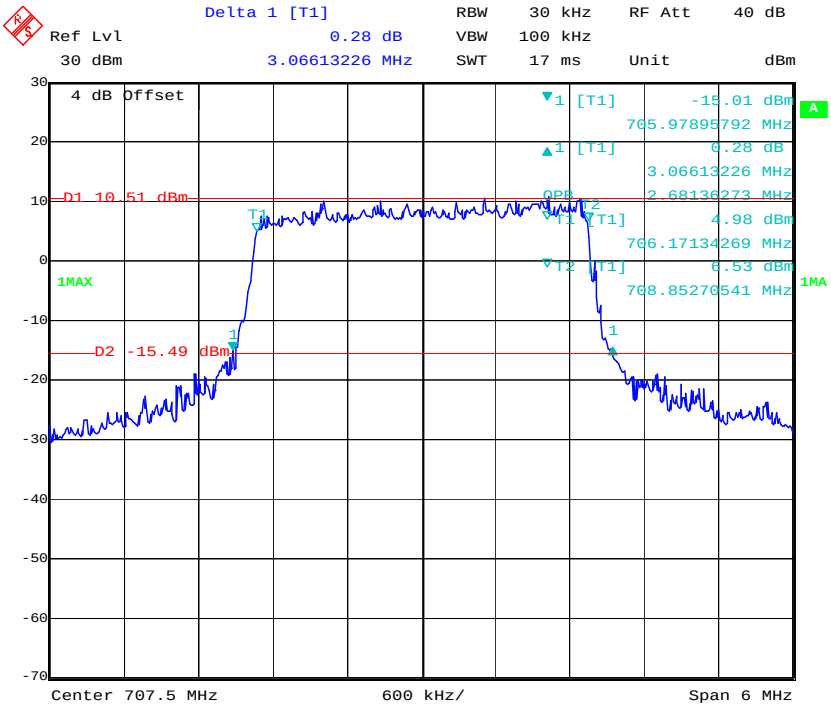
16QAM_3 MHz



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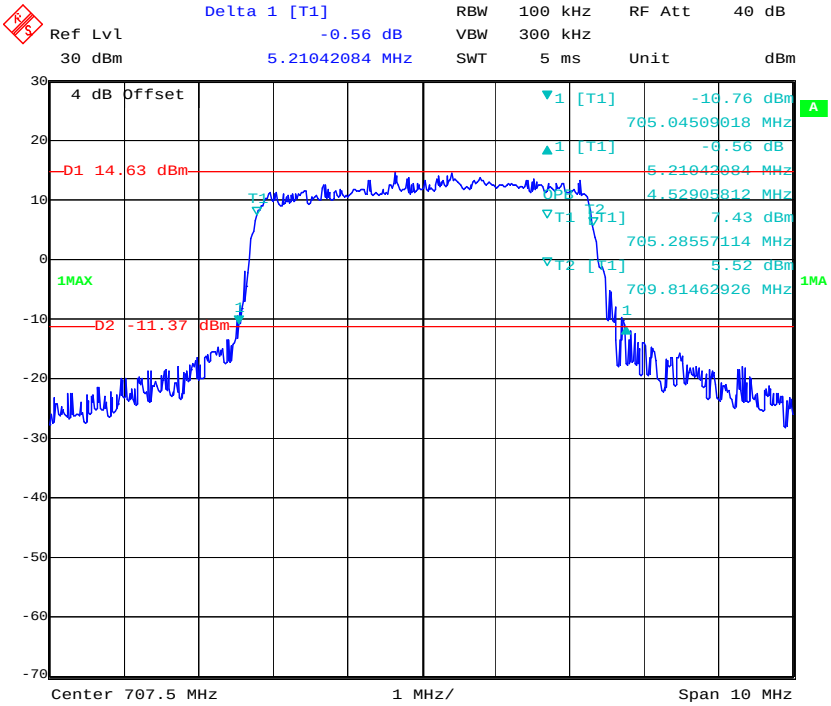
16QAM_5 MHz



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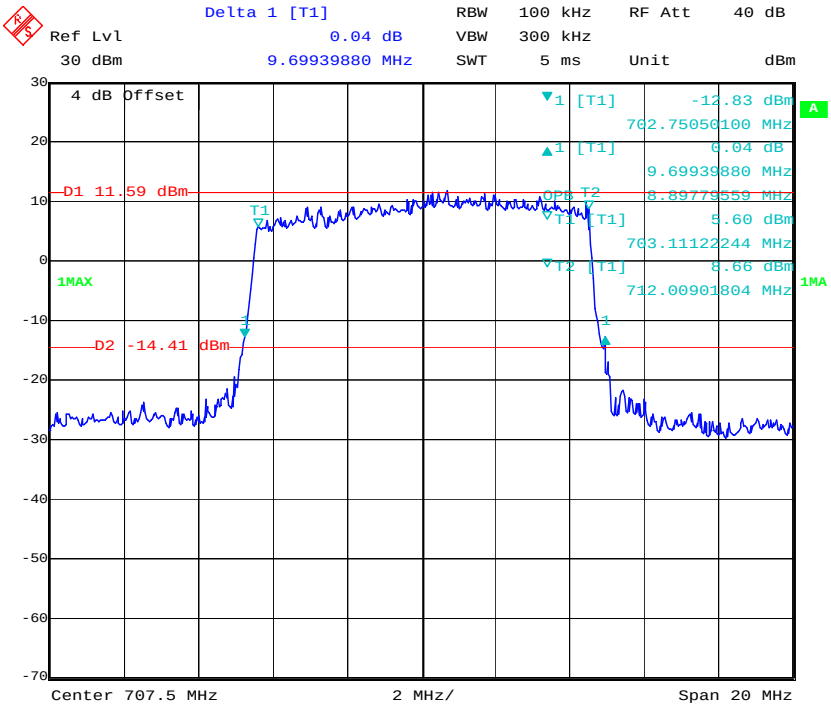
16QAM_10 MHz



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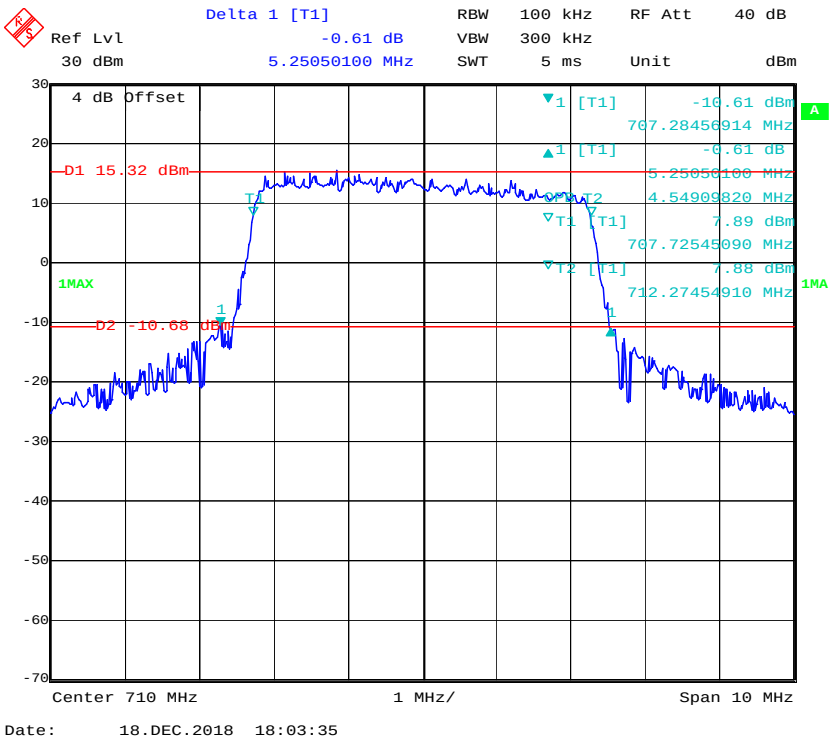
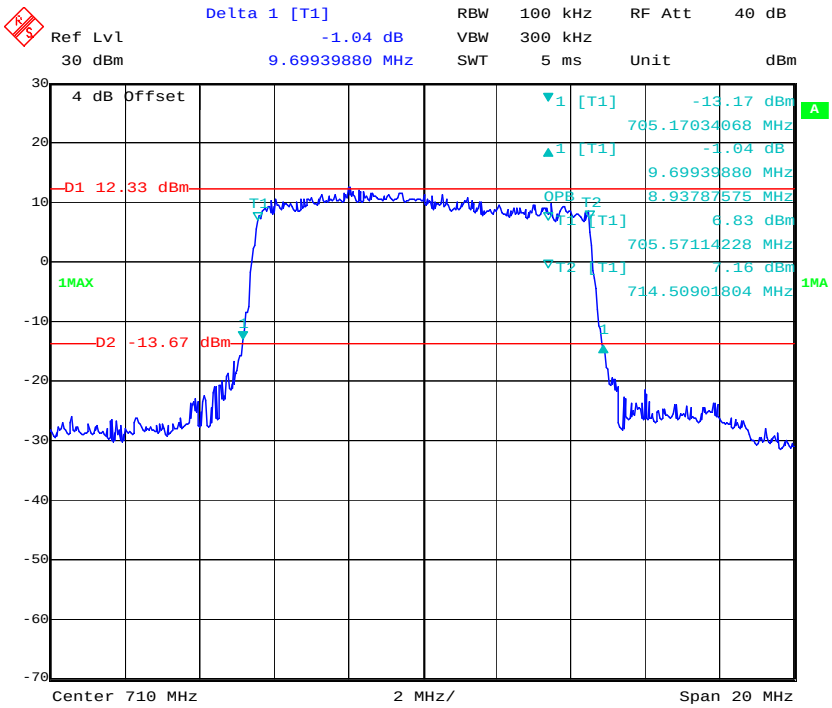
LTE Band 17:

QPSK_5 MHz



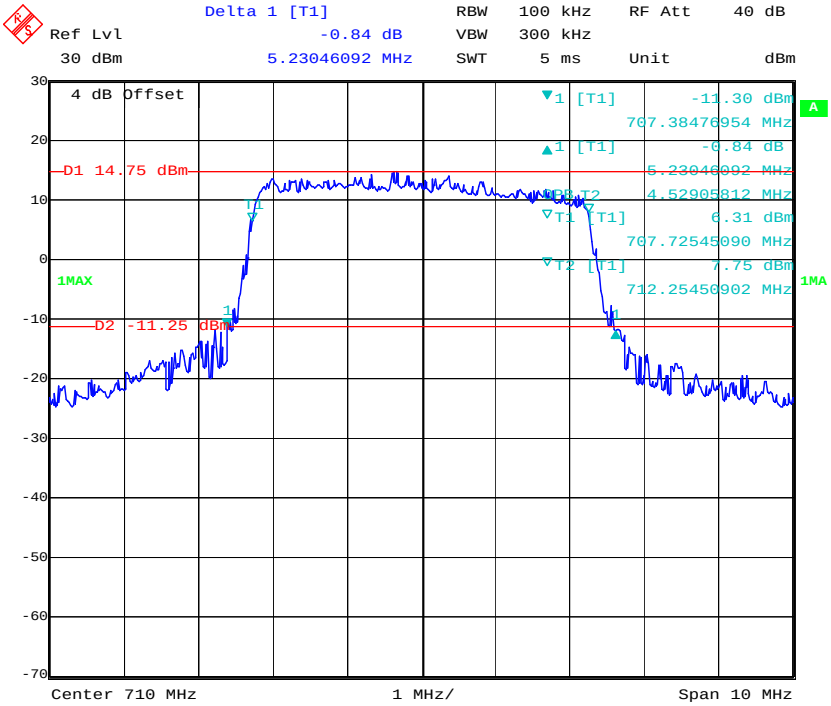
Date: 18.DEC.2018 18:03:35

QPSK_10 MHz



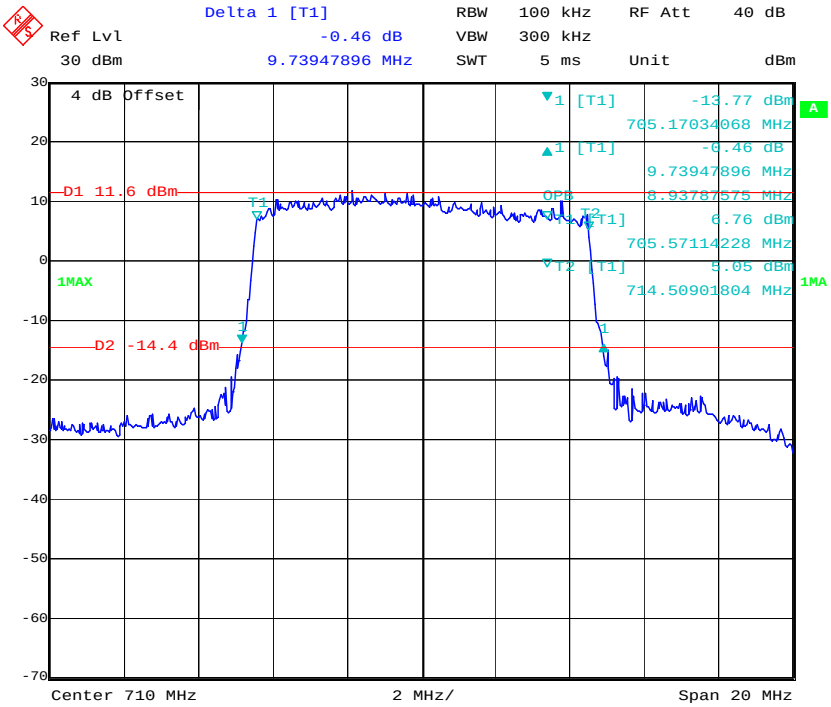
Date: 18.DEC.2018 18:05:03

16QAM_5 MHz



Date: 18.DEC.2018 18:04:20

16QAM_10 MHz



Date: 18.DEC.2018 18:05:46

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

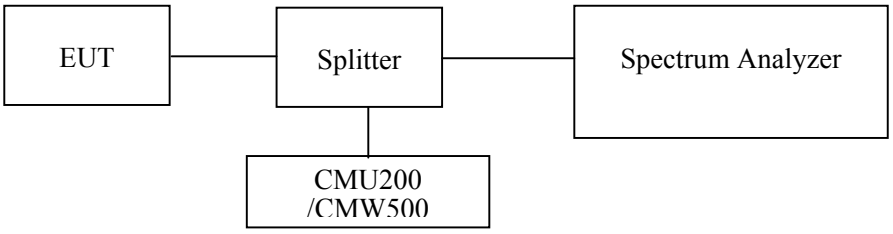
Applicable Standard

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
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005012	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each time	N/A

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

Test Data

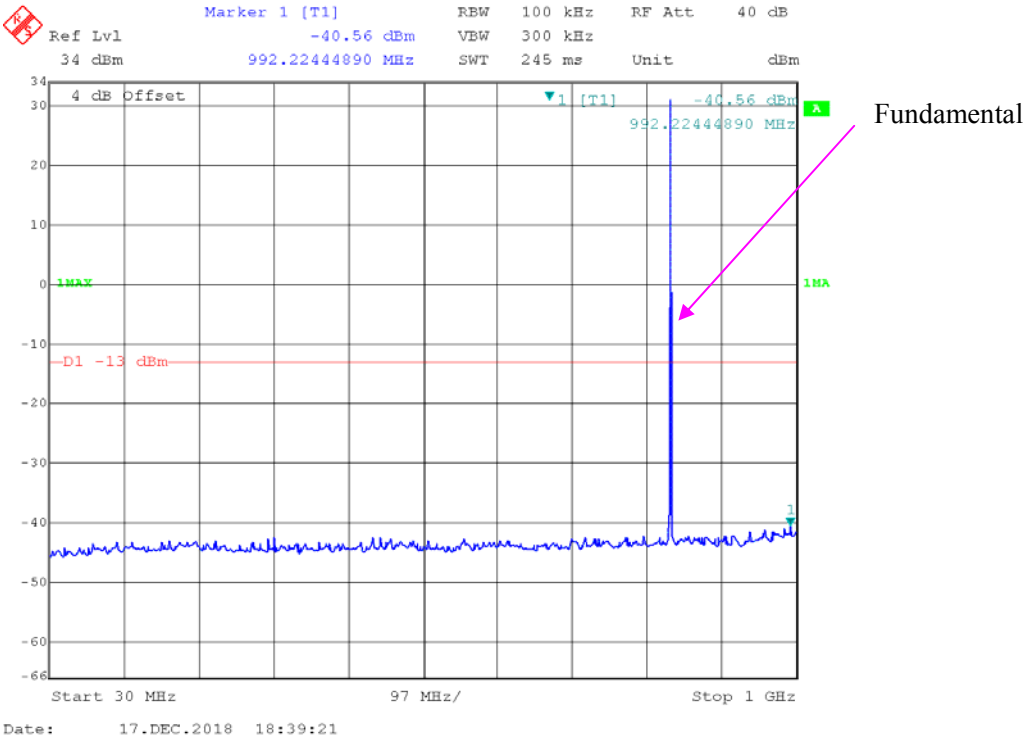
Environmental Conditions

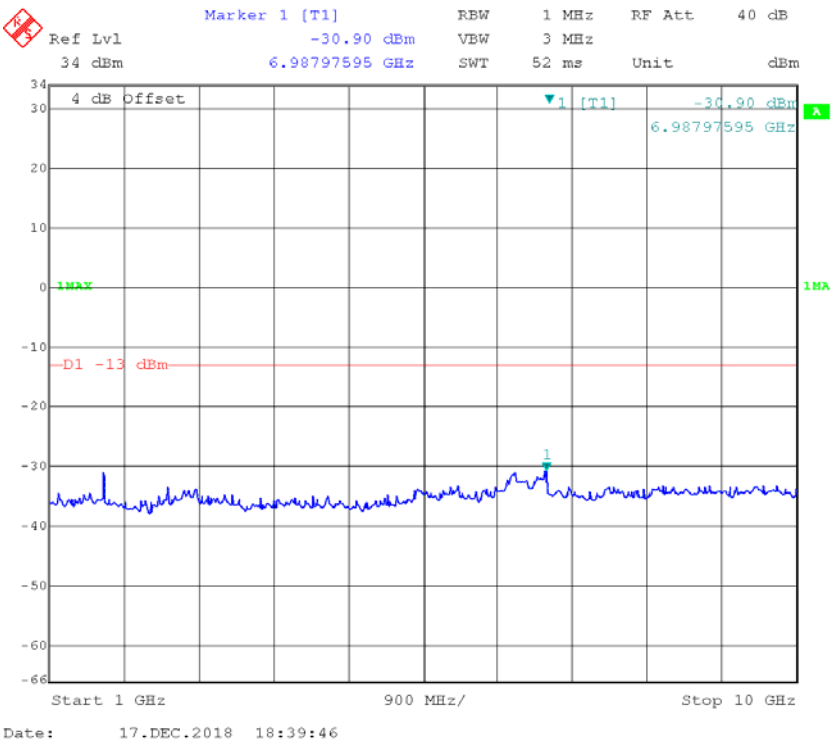
Temperature:	23.9~24.2°C
Relative Humidity:	34~36 %
ATM Pressure:	99.7~99.8 kPa

The testing was performed by Andy Huang from 2018-12-17 to 2018-12-18.

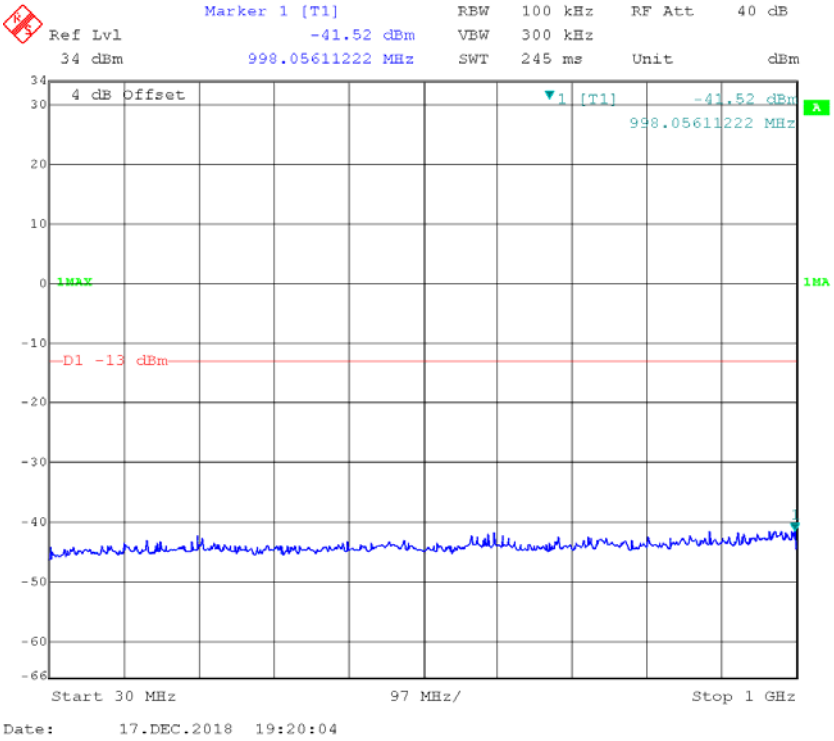
Please refer to the following plots.

GSM850_Middle Channel

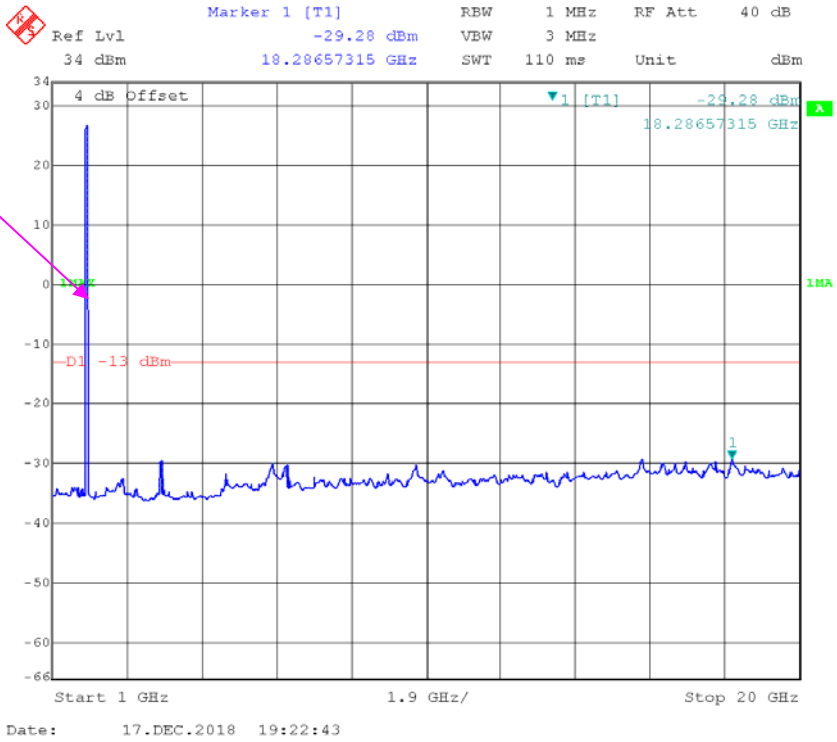




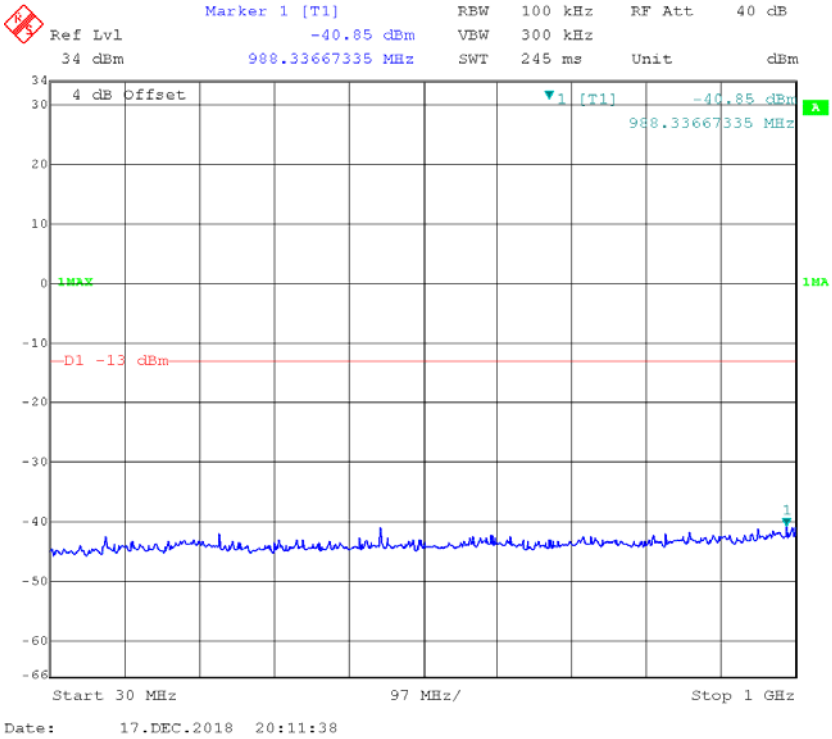
PCS 1900_ Middle Channel



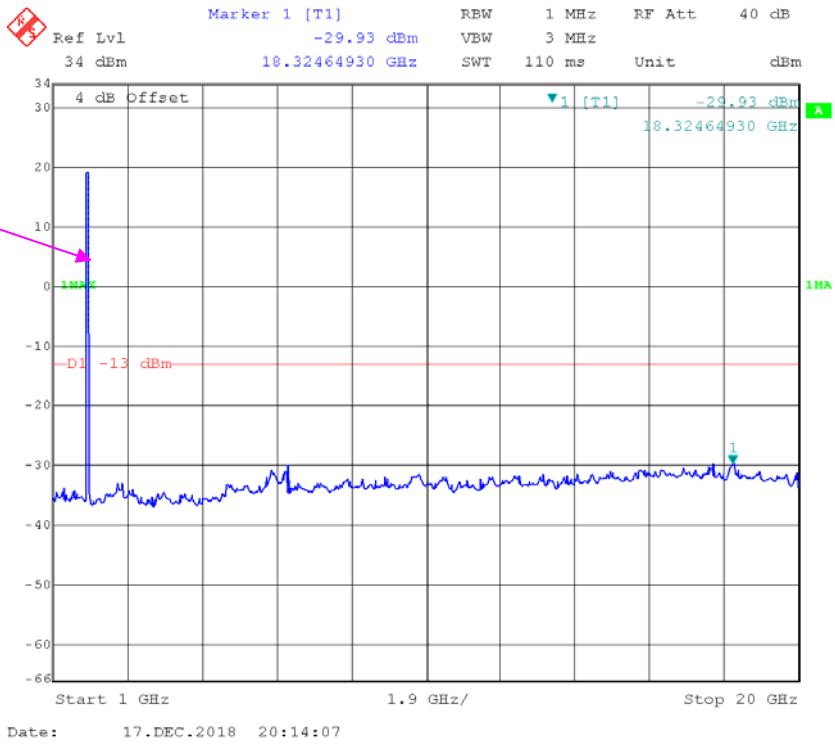
Fundamental



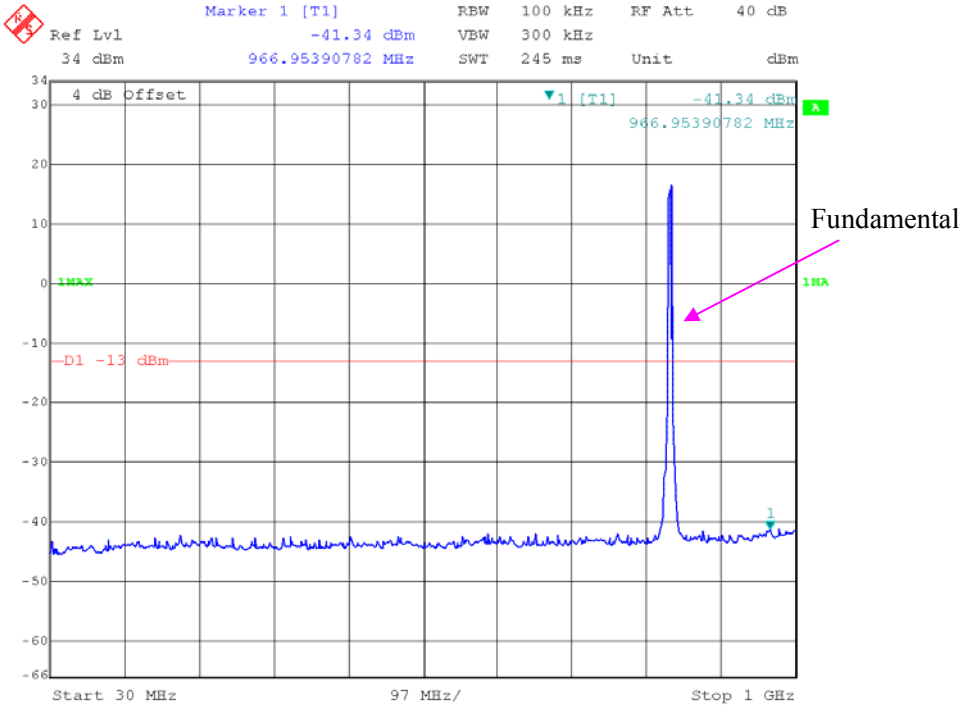
WCDMA Band II,Rel99



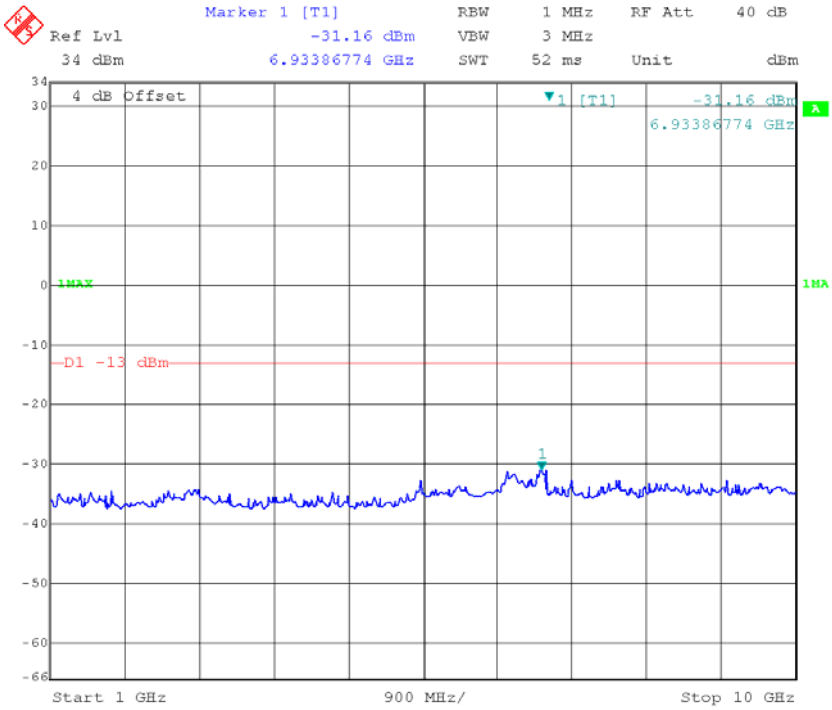
Fundamental



WCDMA Band V,Rel99



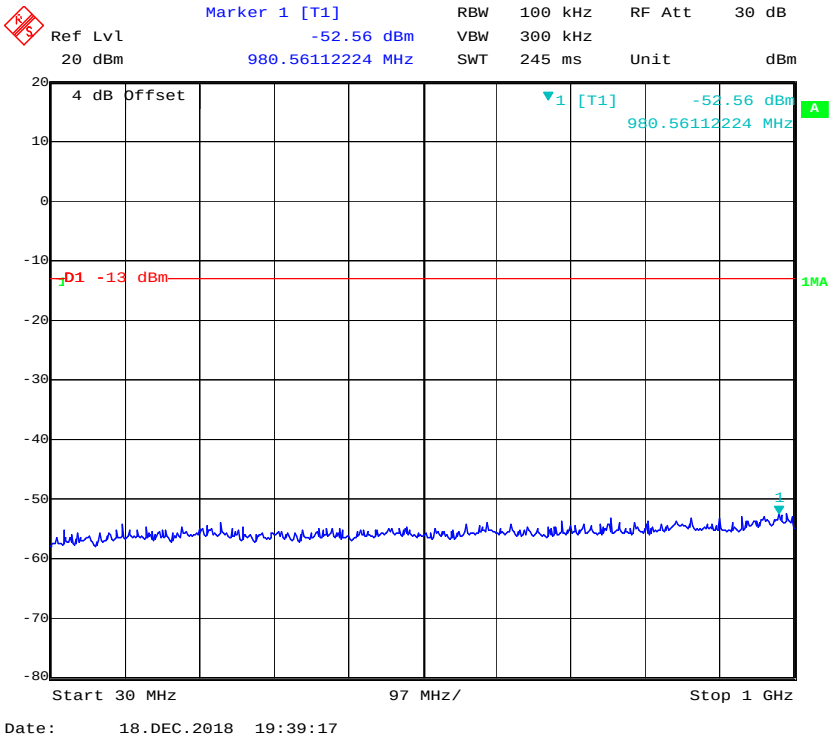
Date: 17.DEC.2018 20:52:20

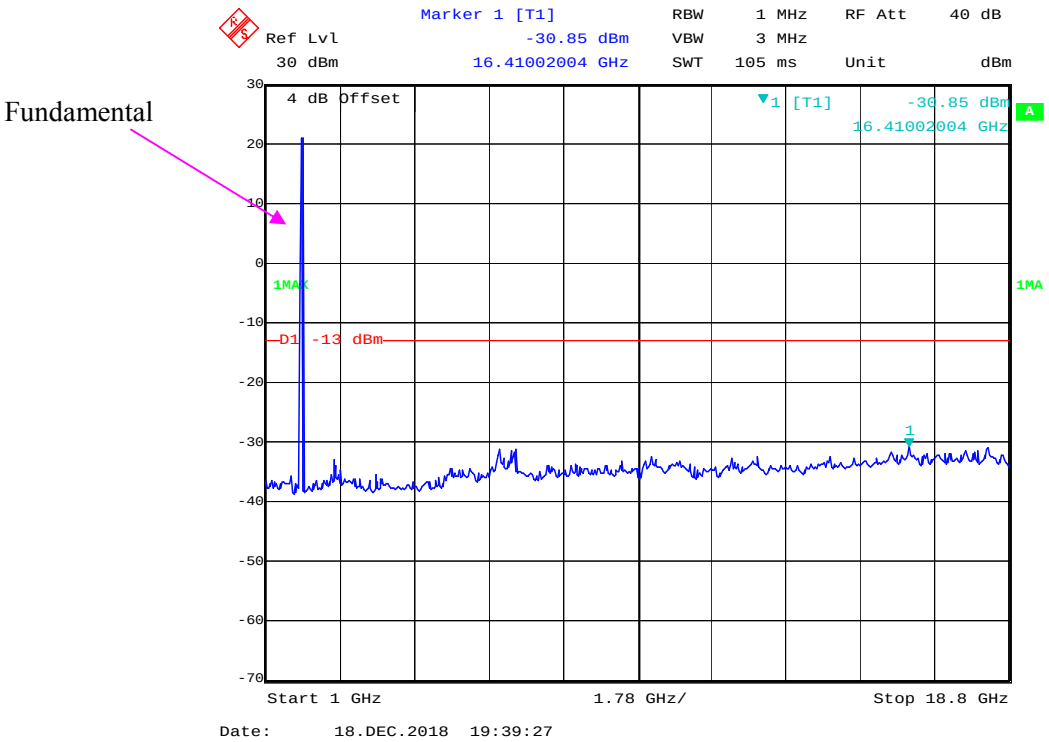


Date: 17.DEC.2018 20:52:43

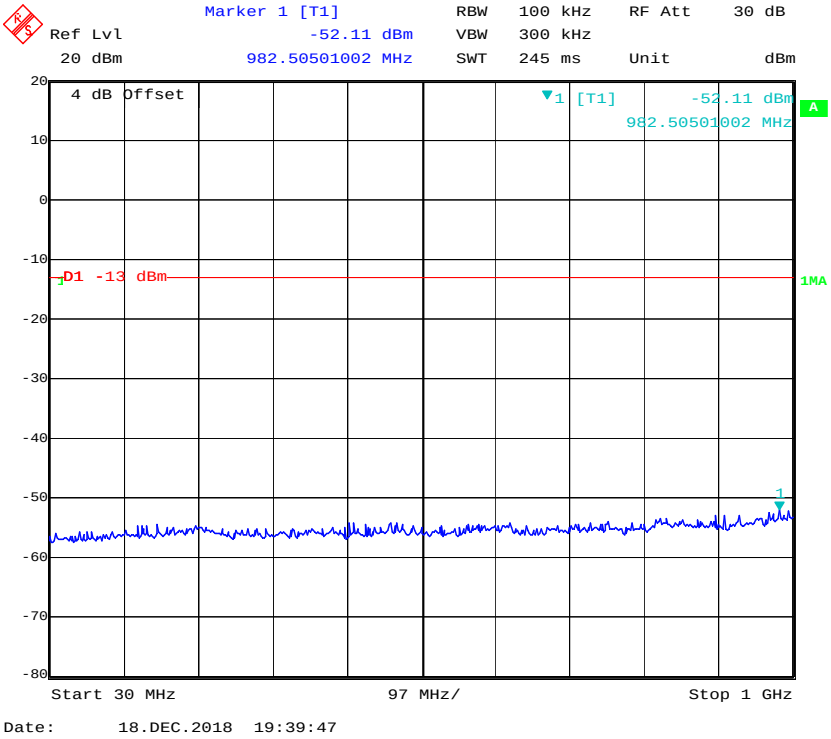
LTE Band 2 (Middle Channel)

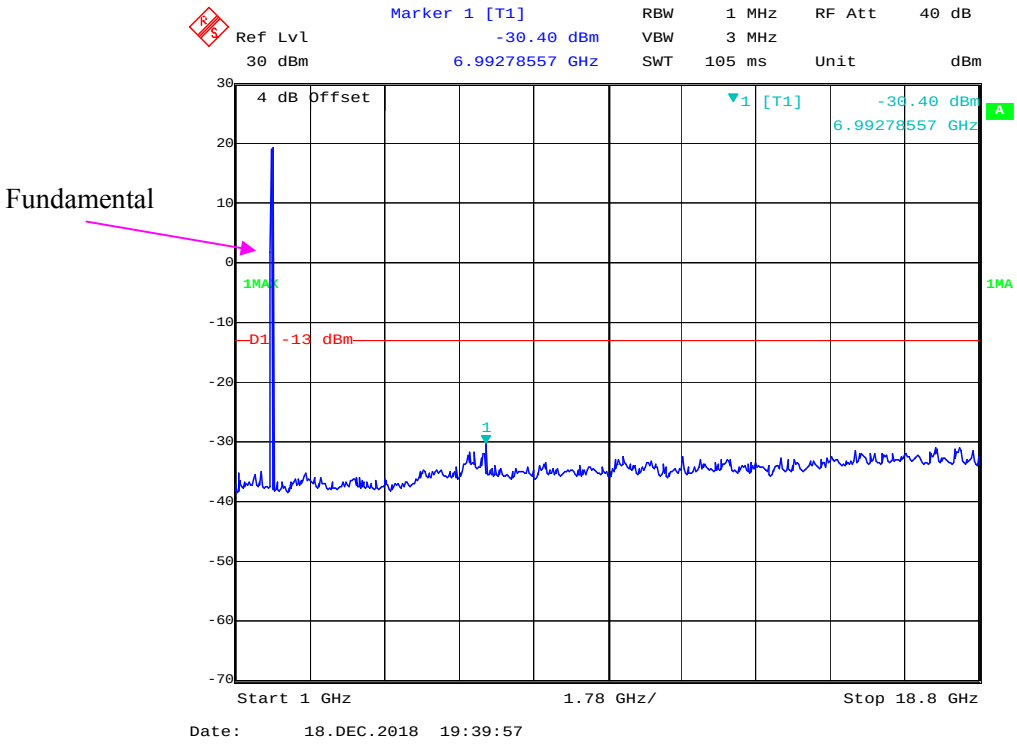
QPSK_1.4 MHz



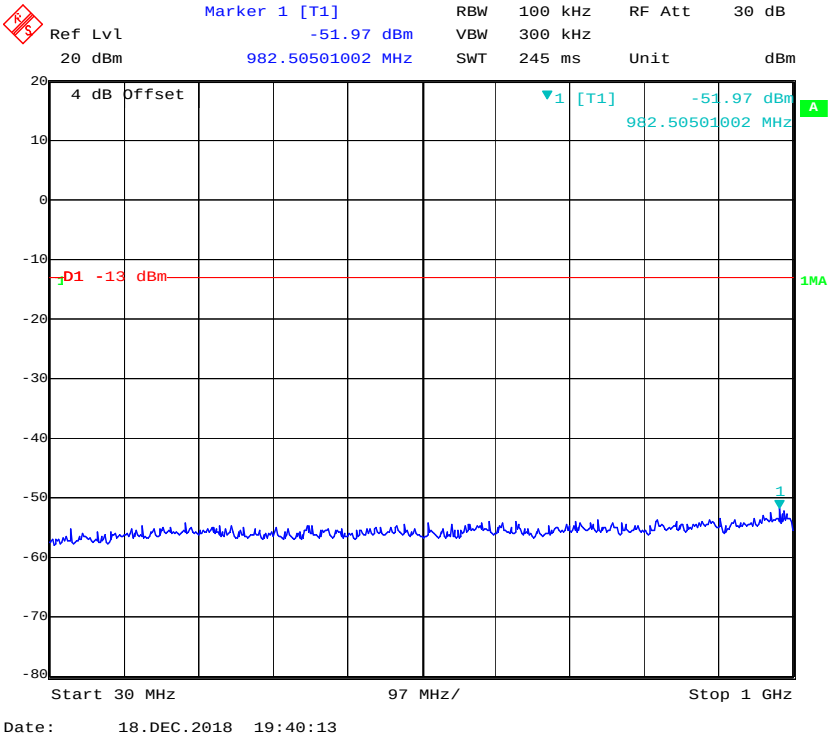


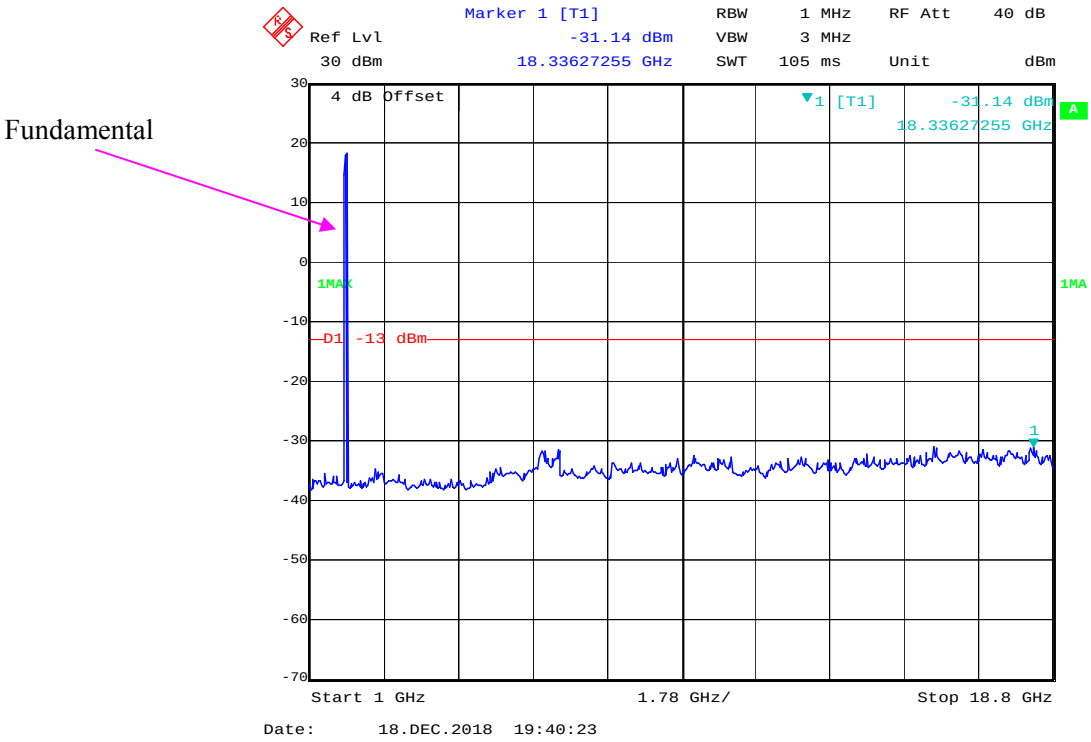
QPSK_3 MHz


Marker 1 [T1]
-52.11 dBm
982.50501002 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
4 dB Offset
▼1 [T1] -52.11 dBm
982.50501002 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:39:47

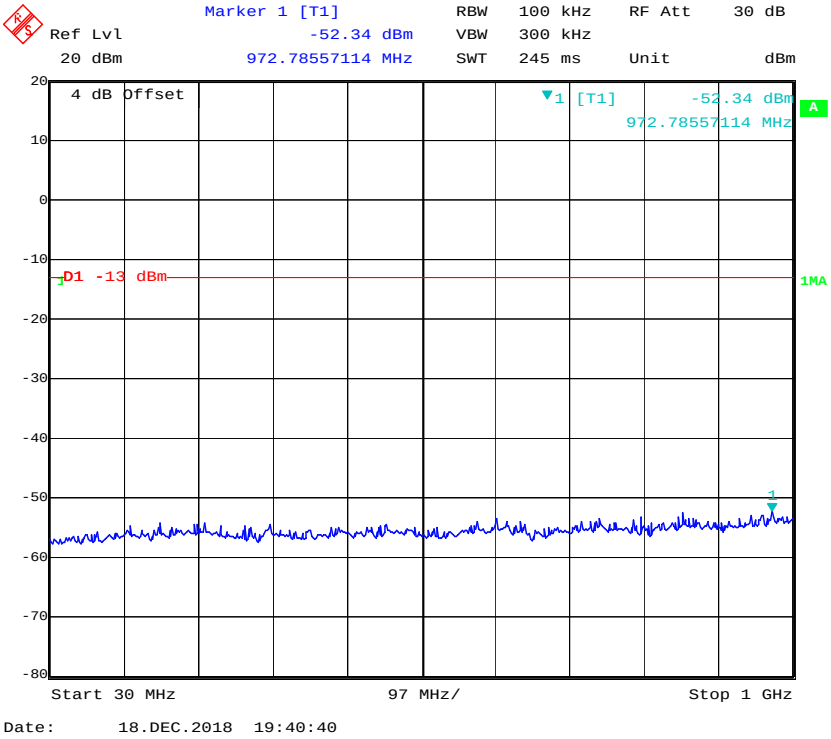

Fundamental
Marker 1 [T1]
-30.40 dBm
6.99278557 GHz
RBW 1 MHz
VBW 3 MHz
SWT 105 ms
RF Att 40 dB
Unit dBm
Ref Lvl
30 dBm
4 dB Offset
▼1 [T1] -30.40 dBm
6.99278557 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.78 GHz/
Stop 18.8 GHz
Date: 18.DEC.2018 19:39:57

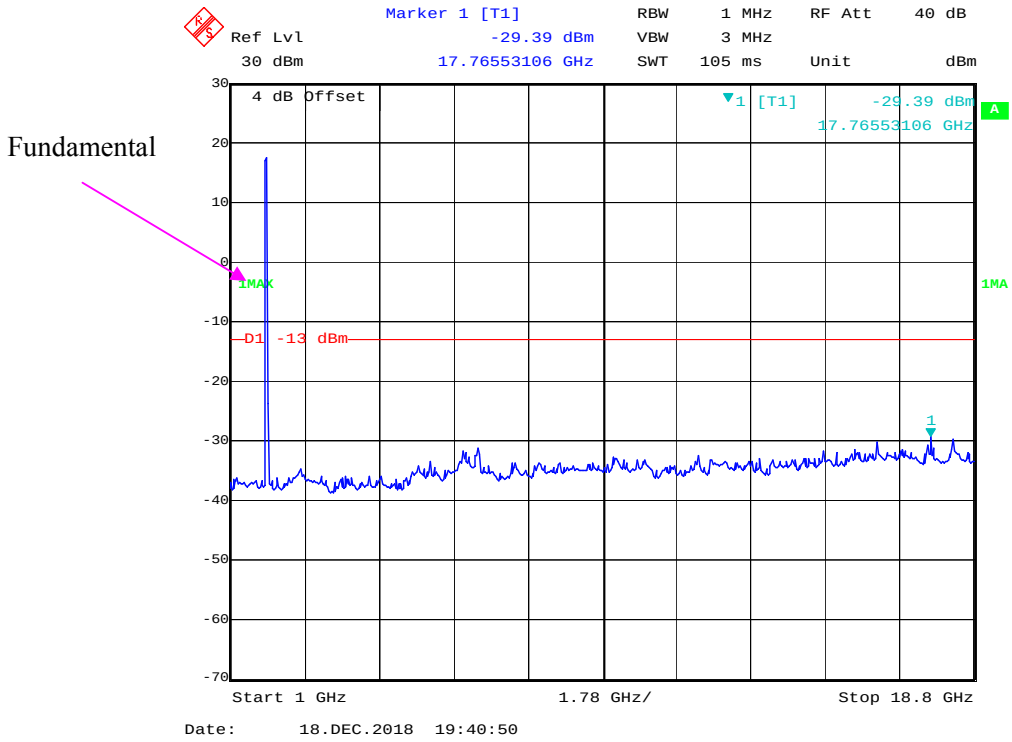
QPSK_5 MHz


Marker 1 [T1]
-51.97 dBm
982.50501002 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
4 dB Offset
▼1 [T1] -51.97 dBm
982.50501002 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:40:13

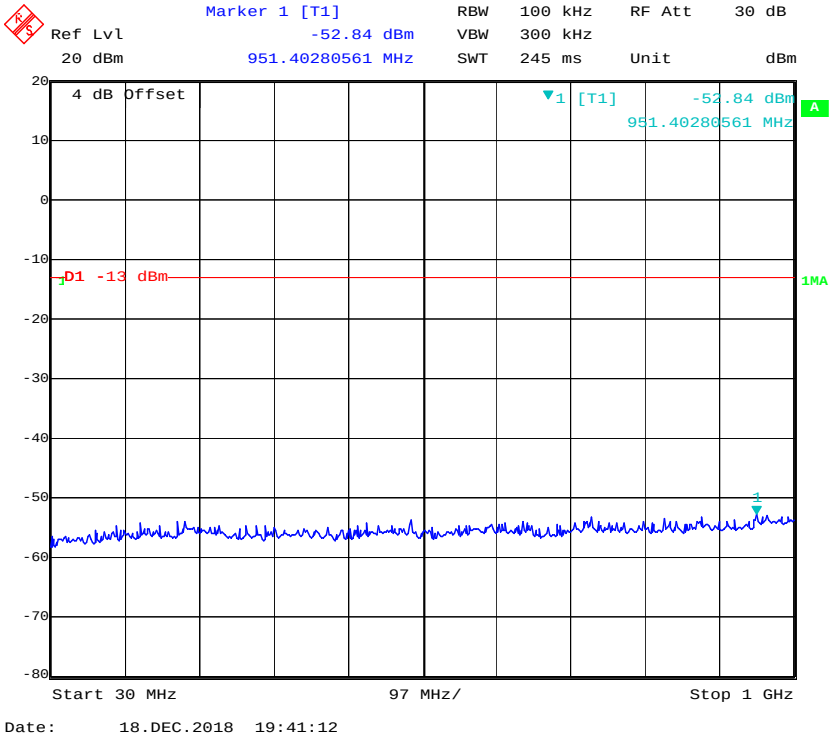

Fundamental
Marker 1 [T1]
-31.14 dBm
18.33627255 GHz
RBW 1 MHz
VBW 3 MHz
SWT 105 ms
RF Att 40 dB
Unit dBm
Ref Lvl
30 dBm
4 dB Offset
▼1 [T1] -31.14 dBm
18.33627255 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.78 GHz/
Stop 18.8 GHz
Date: 18.DEC.2018 19:40:23

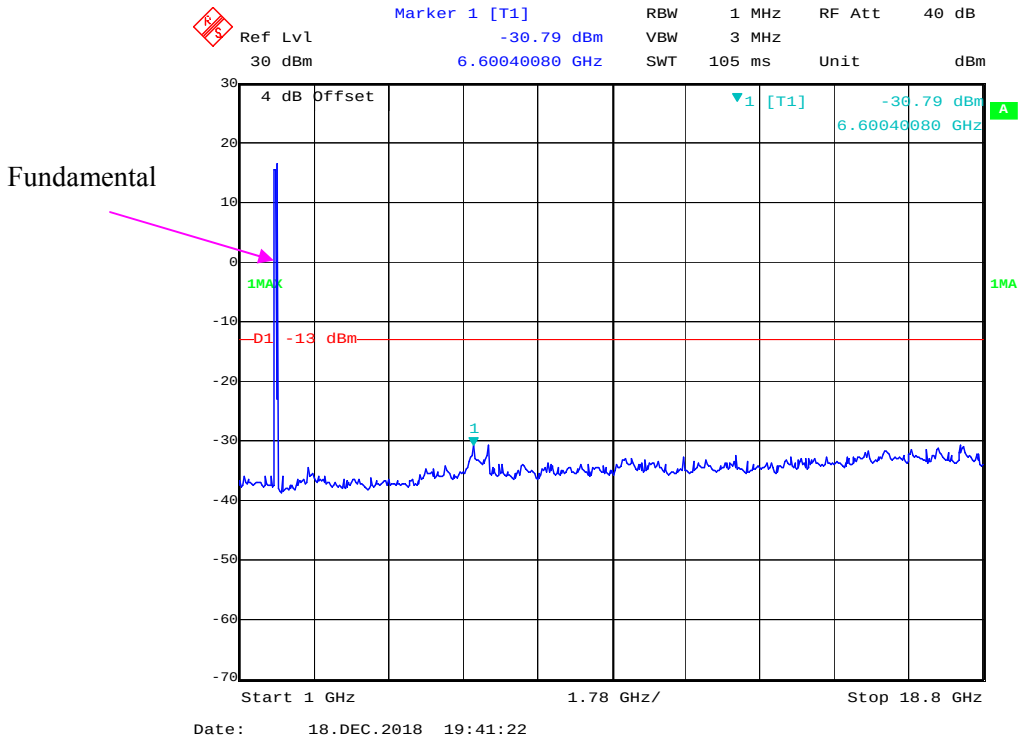
QPSK_10 MHz


Marker 1 [T1]
Ref Lvl
20 dBm
-52.34 dBm
972.78557114 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -52.34 dBm
972.78557114 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:40:40

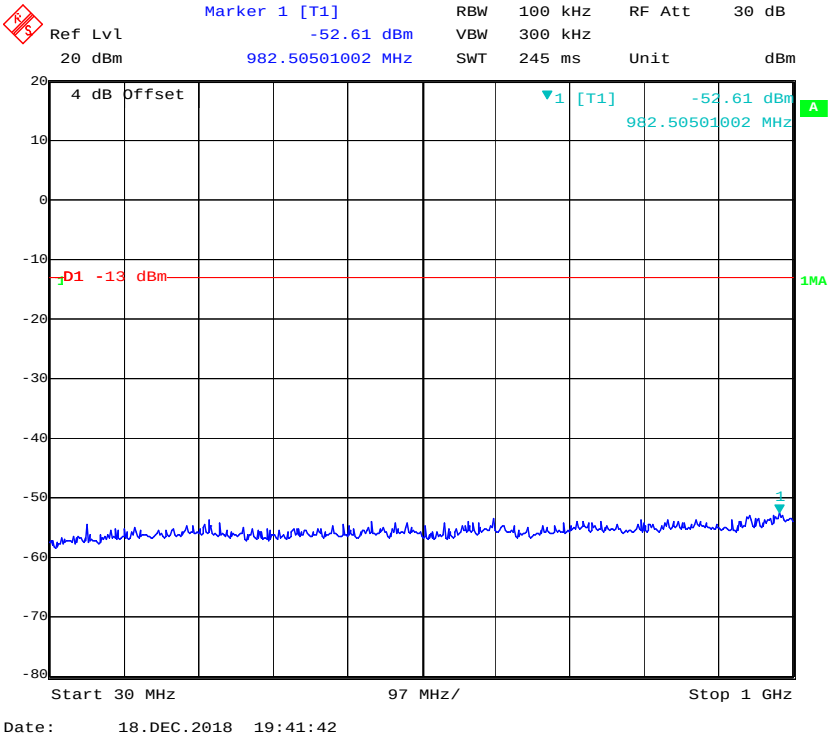

Fundamental
Marker 1 [T1]
Ref Lvl
30 dBm
-29.39 dBm
17.76553106 GHz
RBW 1 MHz
VBW 3 MHz
SWT 105 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -29.39 dBm
17.76553106 GHz
1MAX
D1 -13 dBm
1MA
Start 1 GHz
1.78 GHz/
Stop 18.8 GHz
Date: 18.DEC.2018 19:40:50

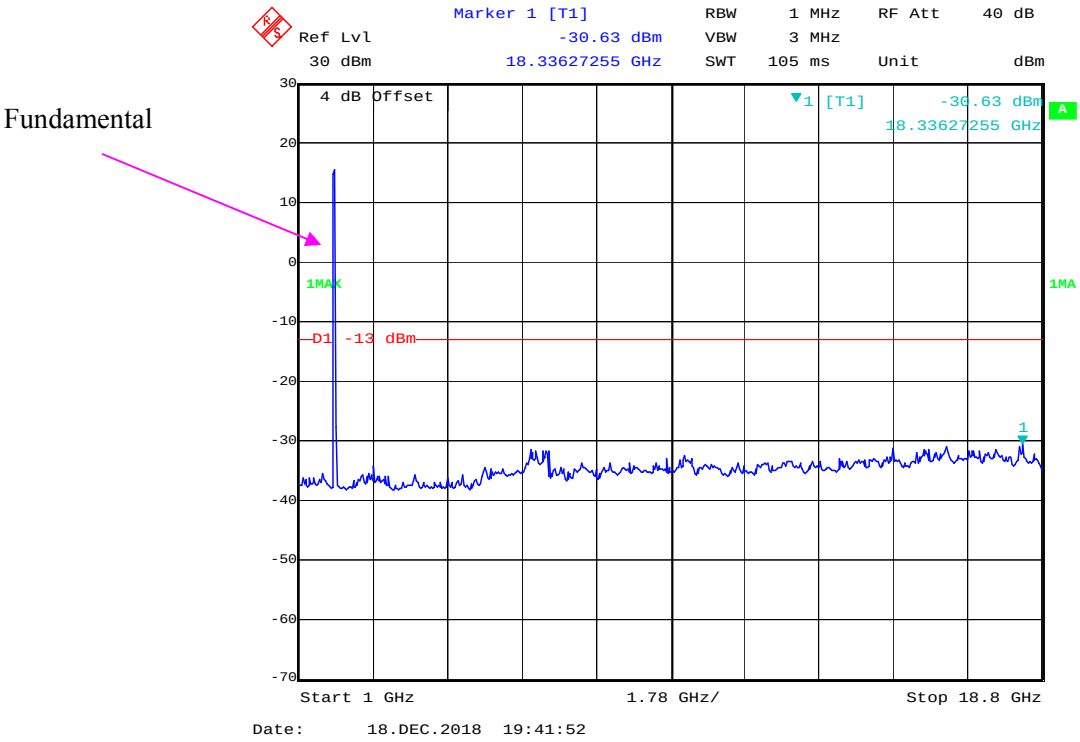
QPSK_15 MHz


Marker 1 [T1]
Ref Lvl
20 dBm
-52.84 dBm
951.40280561 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -52.84 dBm
951.40280561 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:41:12


Fundamental
Marker 1 [T1]
Ref Lvl
30 dBm
-30.79 dBm
6.60040080 GHz
RBW 1 MHz
VBW 3 MHz
SWT 105 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -30.79 dBm
6.60040080 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.78 GHz/
Stop 18.8 GHz
Date: 18.DEC.2018 19:41:22

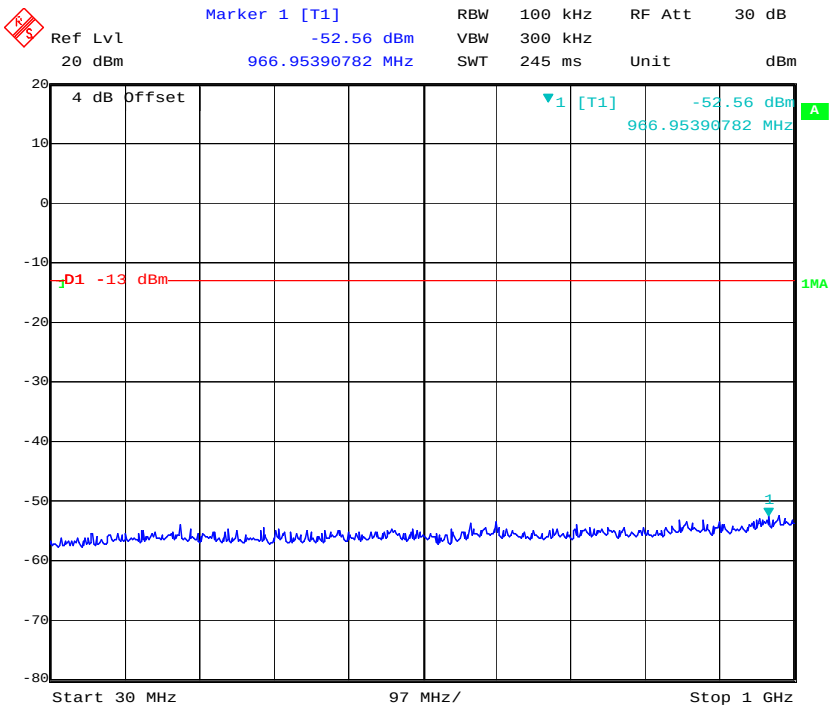
QPSK_20 MHz


Marker 1 [T1]
-52.61 dBm
982.50501002 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
4 dB Offset
▼1 [T1] -52.61 dBm
982.50501002 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:41:42

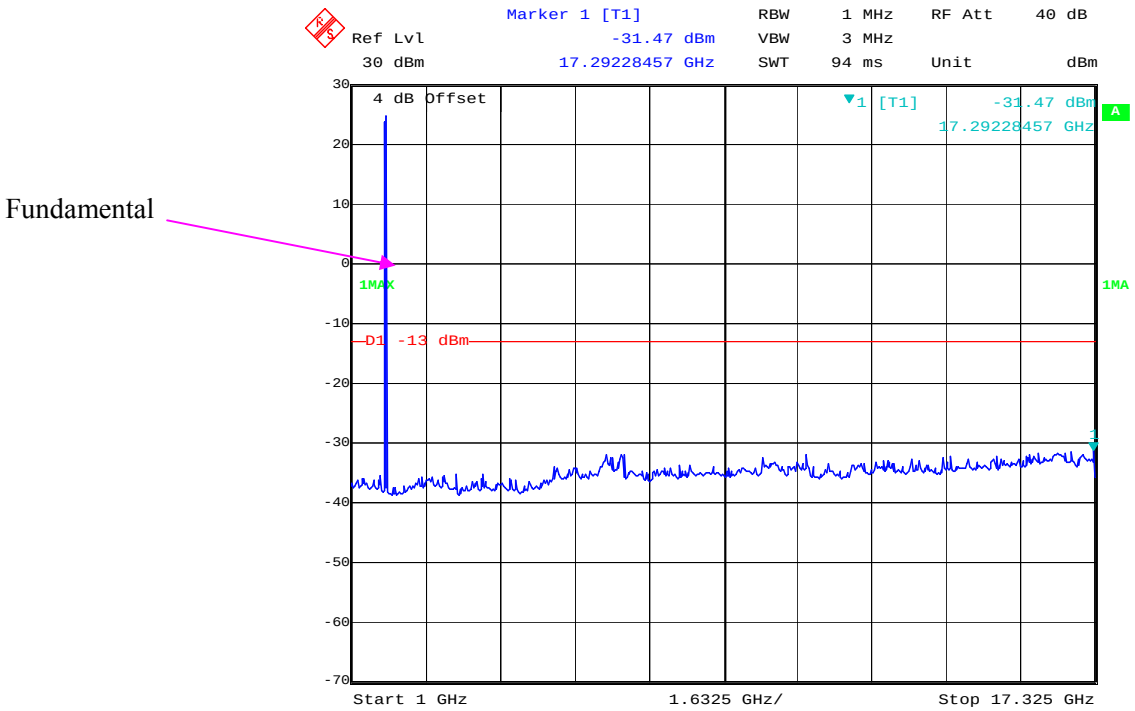

Fundamental
Marker 1 [T1]
-30.63 dBm
18.33627255 GHz
RBW 1 MHz
VBW 3 MHz
SWT 105 ms
RF Att 40 dB
Unit dBm
Ref Lvl
30 dBm
4 dB Offset
▼1 [T1] -30.63 dBm
18.33627255 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.78 GHz/
Stop 18.8 GHz
Date: 18.DEC.2018 19:41:52

LTE Band 4 (Middle Channel)

QPSK_1.4 MHz

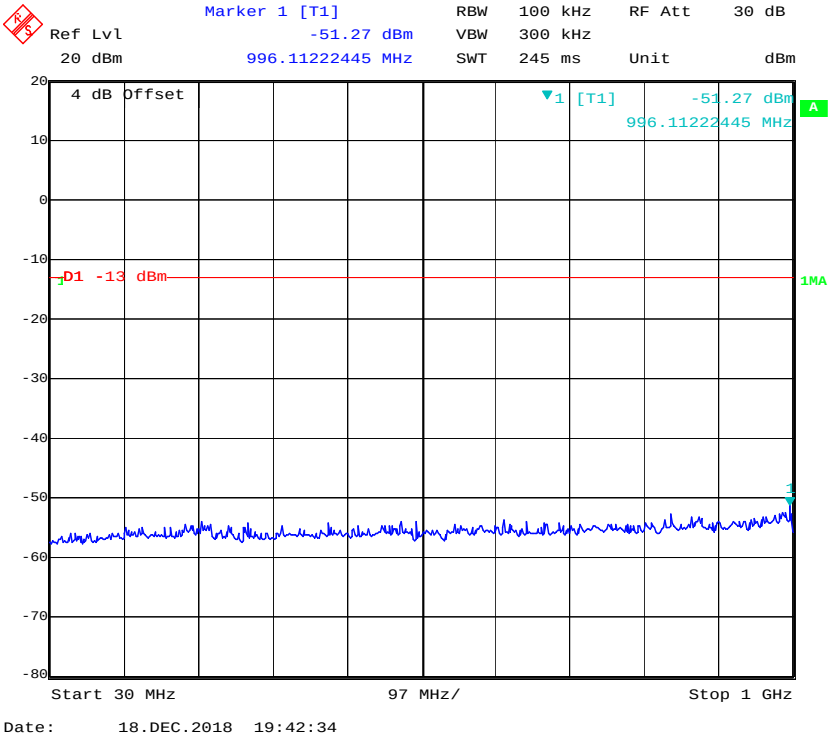


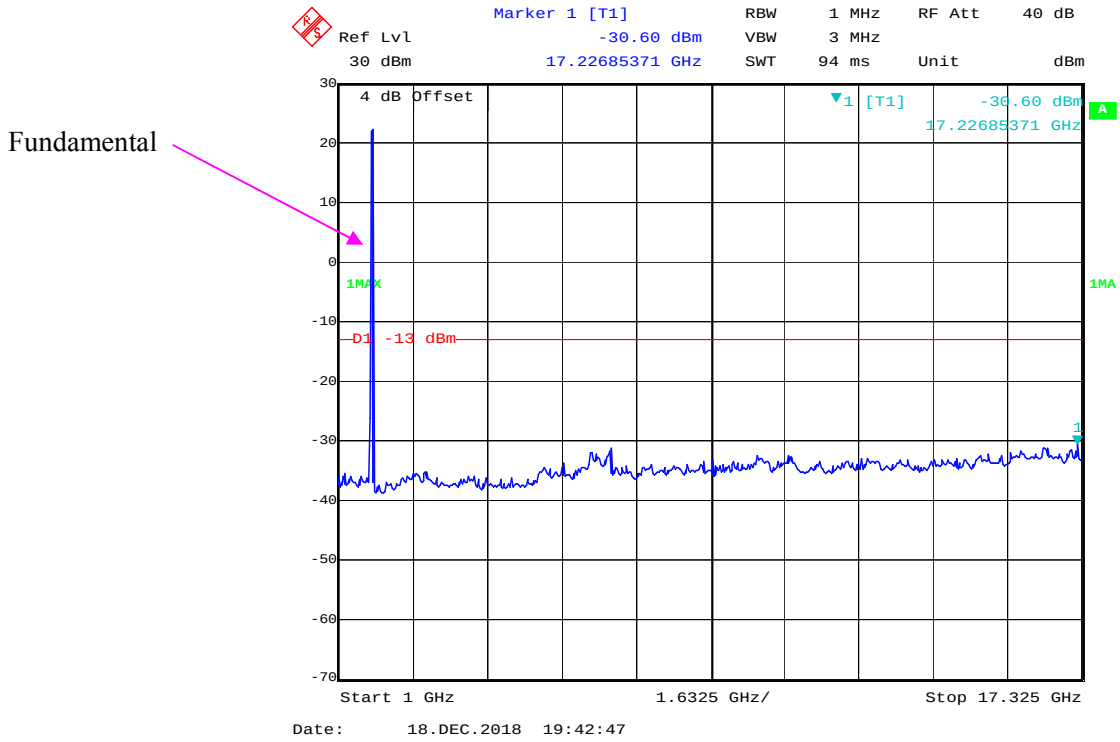
Date: 18.DEC.2018 19:42:08



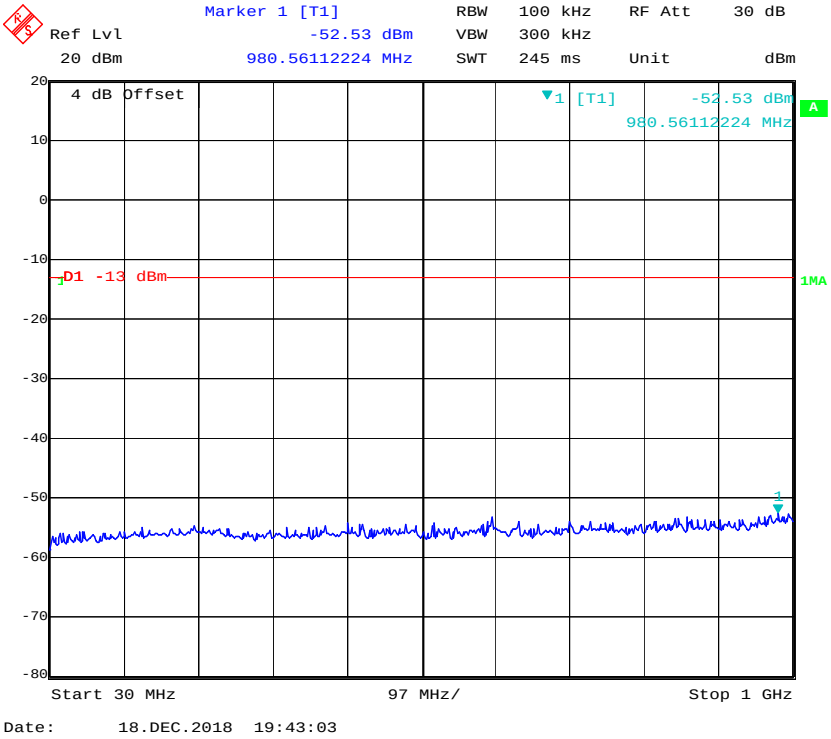
Date: 18.DEC.2018 19:42:18

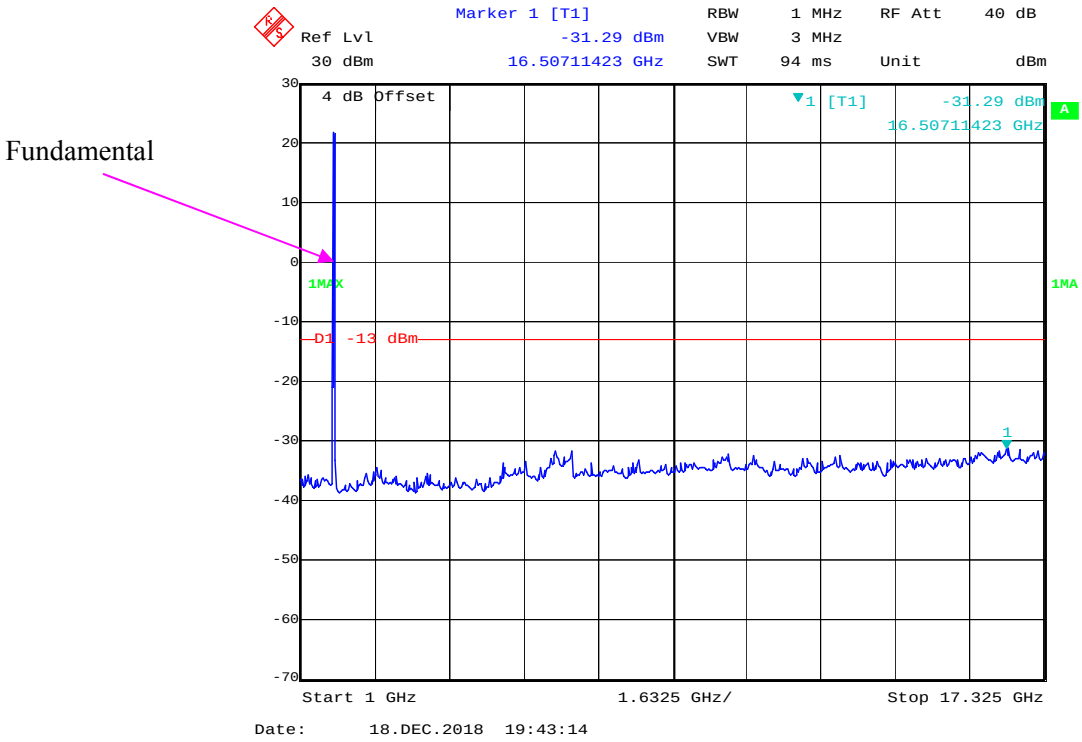
QPSK_3 MHz


Marker 1 [T1]
Ref Lvl
20 dBm
-51.27 dBm
996.11222445 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -51.27 dBm
996.11222445 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:42:34

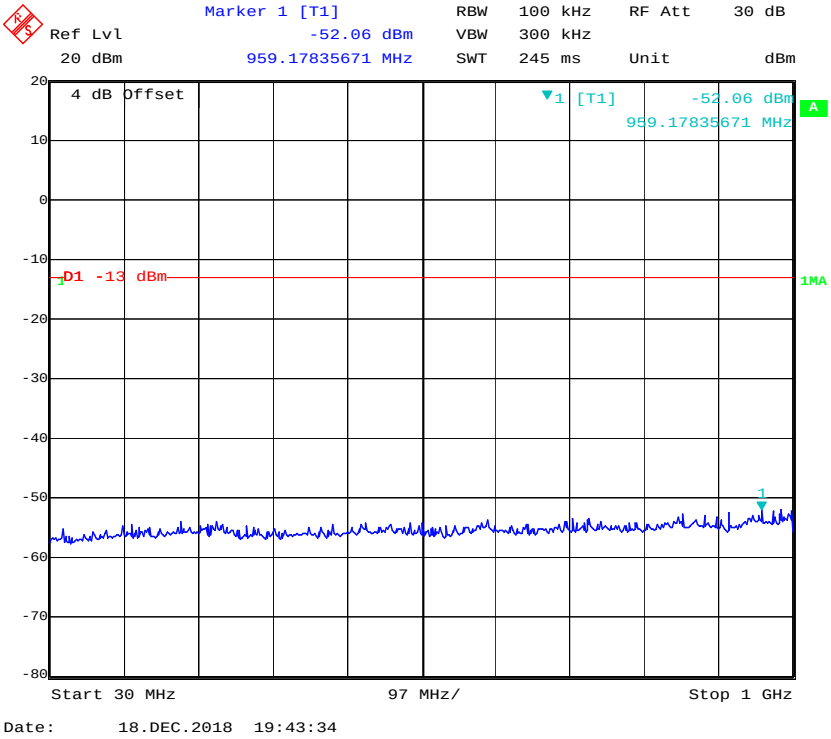

Fundamental
Marker 1 [T1]
Ref Lvl
30 dBm
-30.60 dBm
17.22685371 GHz
RBW 1 MHz
VBW 3 MHz
SWT 94 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -30.60 dBm
17.22685371 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.6325 GHz/
Stop 17.325 GHz
Date: 18.DEC.2018 19:42:47

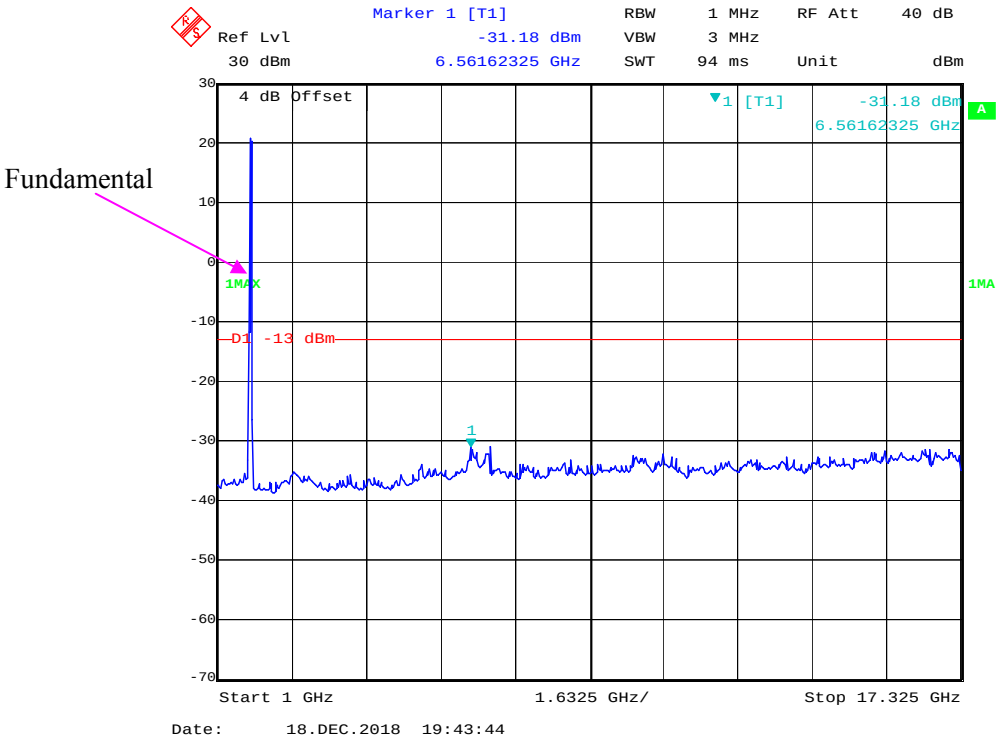
QPSK_5 MHz


Marker 1 [T1]
Ref Lvl
20 dBm
-52.53 dBm
980.56112224 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -52.53 dBm
980.56112224 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:43:03

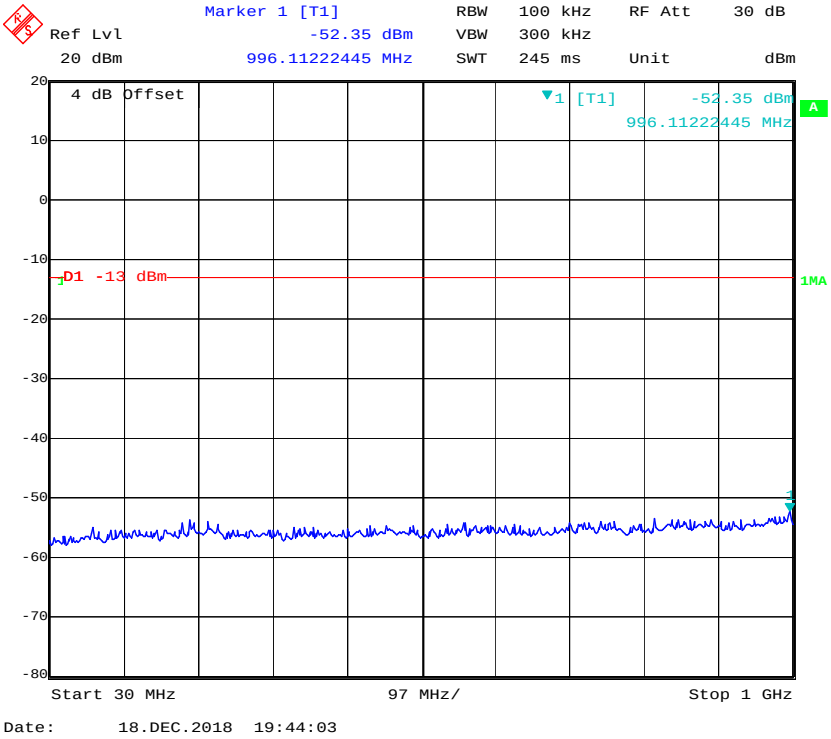

Fundamental
Marker 1 [T1]
Ref Lvl
30 dBm
-31.29 dBm
16.50711423 GHz
RBW 1 MHz
VBW 3 MHz
SWT 94 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -31.29 dBm
16.50711423 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.6325 GHz/
Stop 17.325 GHz
Date: 18.DEC.2018 19:43:14

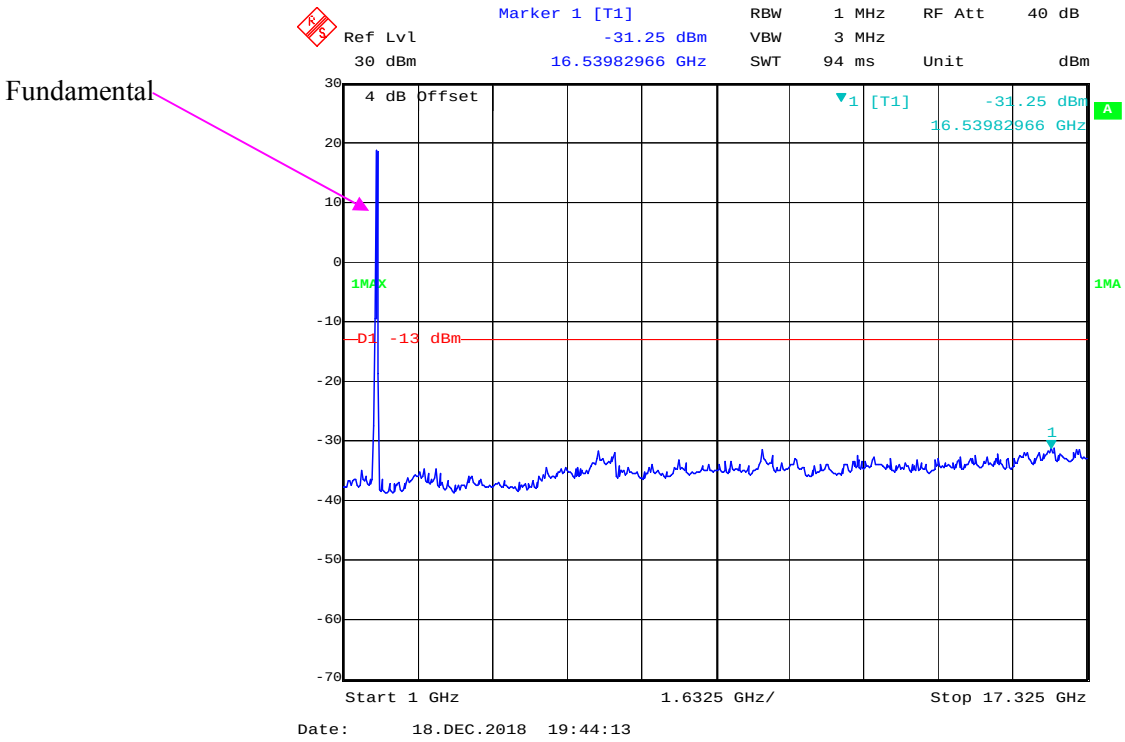
QPSK_10 MHz


Marker 1 [T1]
Ref Lvl
20 dBm
-52.06 dBm
959.17835671 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -52.06 dBm
959.17835671 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:43:34

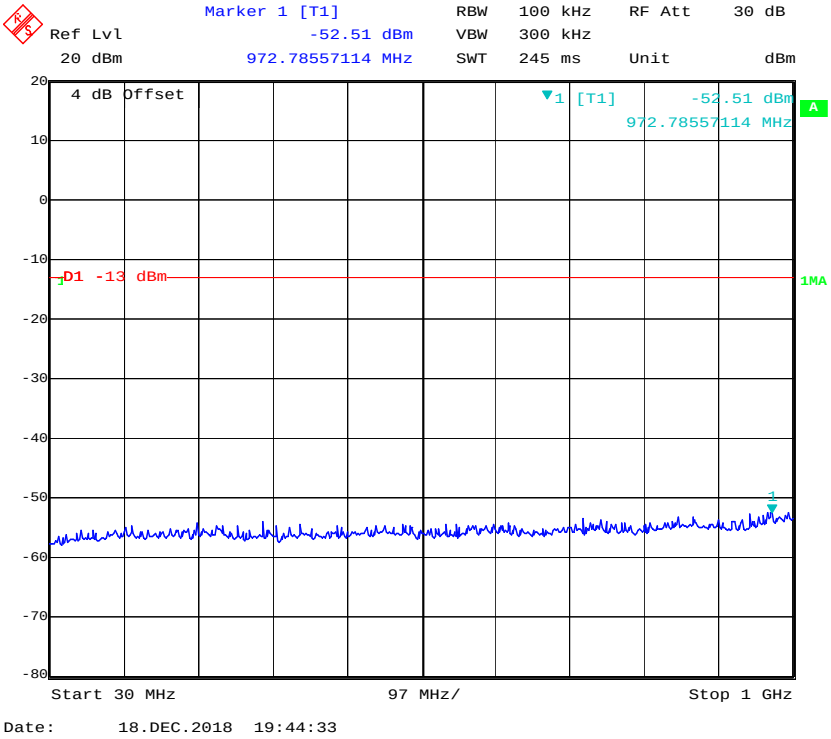

Fundamental
Marker 1 [T1]
Ref Lvl
30 dBm
-31.18 dBm
6.56162325 GHz
RBW 1 MHz
VBW 3 MHz
SWT 94 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -31.18 dBm
6.56162325 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.6325 GHz/
Stop 17.325 GHz
Date: 18.DEC.2018 19:43:44

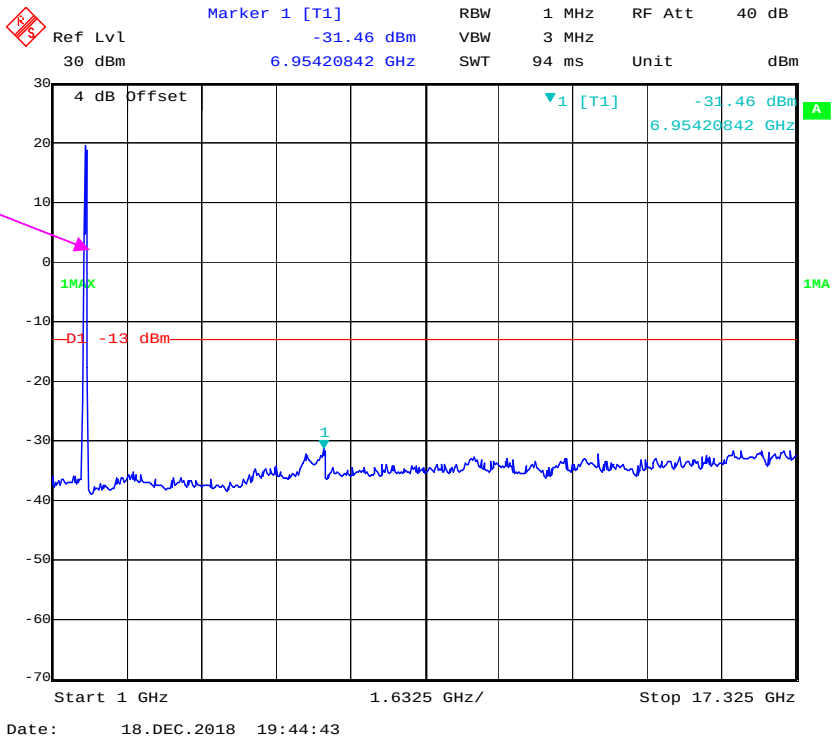
QPSK_15 MHz


Marker 1 [T1]
-52.35 dBm
996.11222445 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
4 dB Offset
▼1 [T1] -52.35 dBm
996.11222445 MHz
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:44:03


Fundamental
Marker 1 [T1]
-31.25 dBm
16.53982966 GHz
RBW 1 MHz
VBW 3 MHz
SWT 94 ms
RF Att 40 dB
Unit dBm
Ref Lvl
30 dBm
4 dB Offset
▼1 [T1] -31.25 dBm
16.53982966 GHz
1MAX
1MA
D1 -13 dBm
Start 1 GHz
1.6325 GHz/
Stop 17.325 GHz
Date: 18.DEC.2018 19:44:13

QPSK_20 MHz

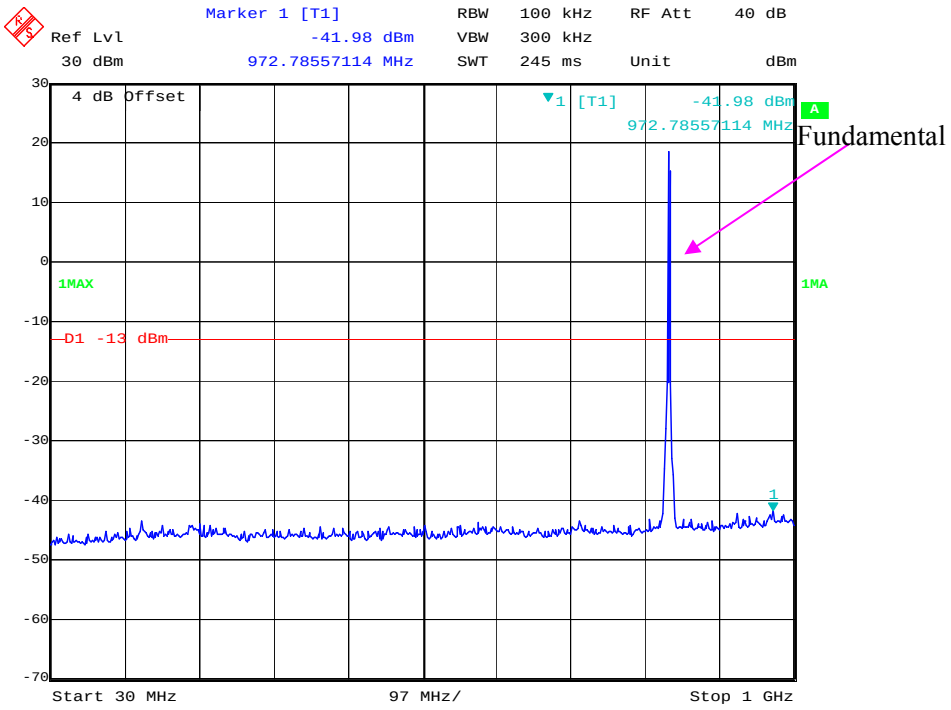


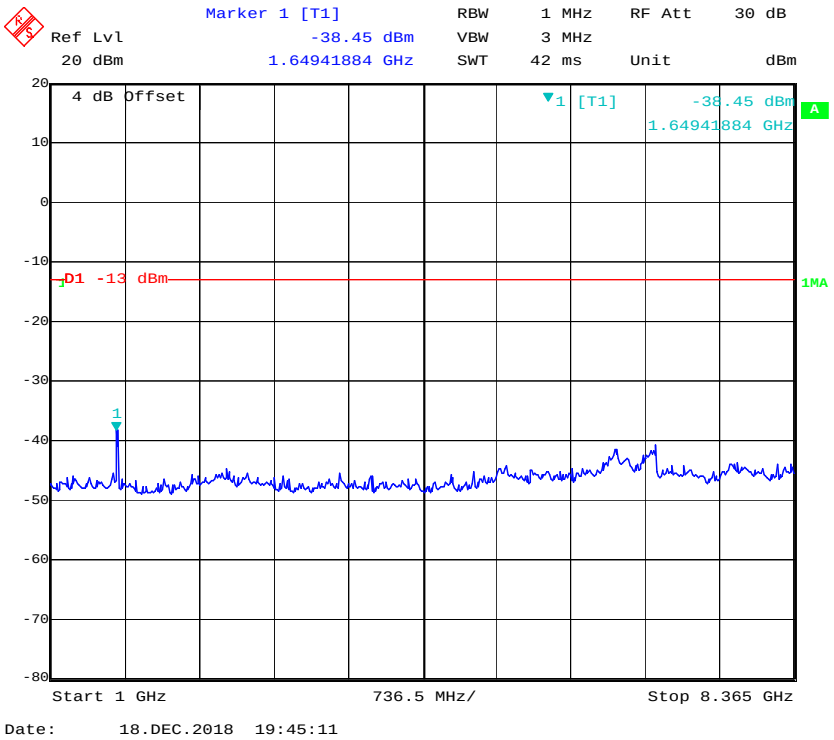


Fundamental

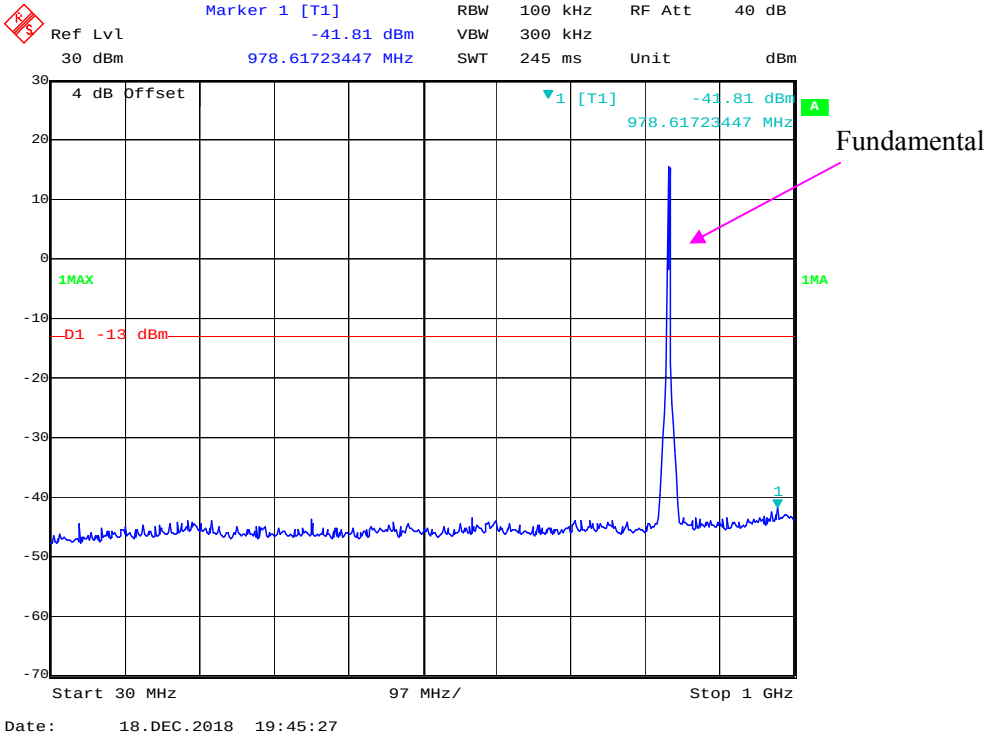
LTE Band 5 (Middle Channel)

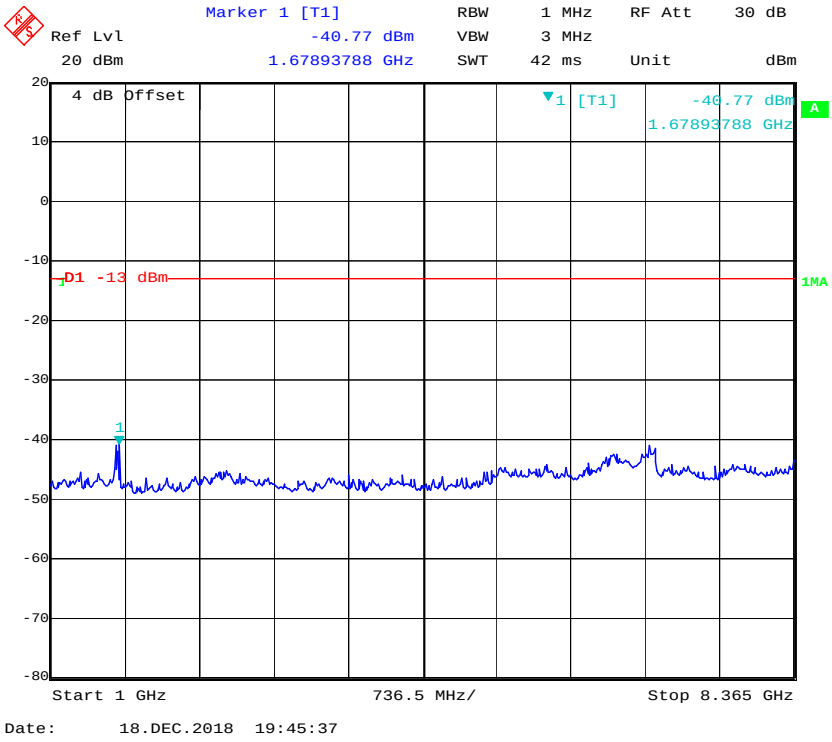
QPSK_1.4 MHz



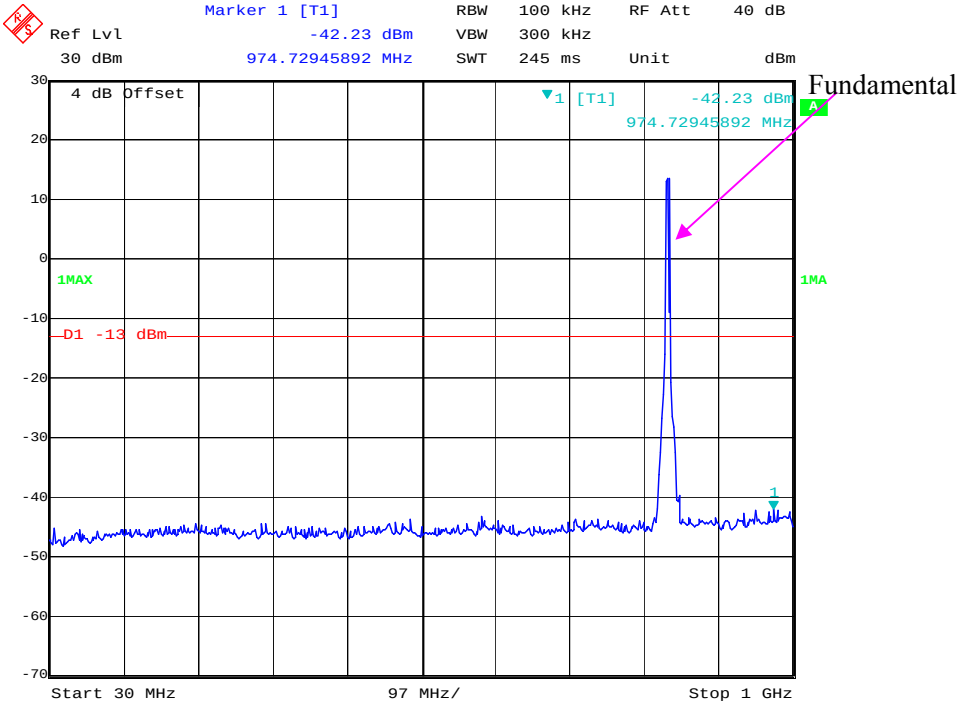


QPSK_3 MHz

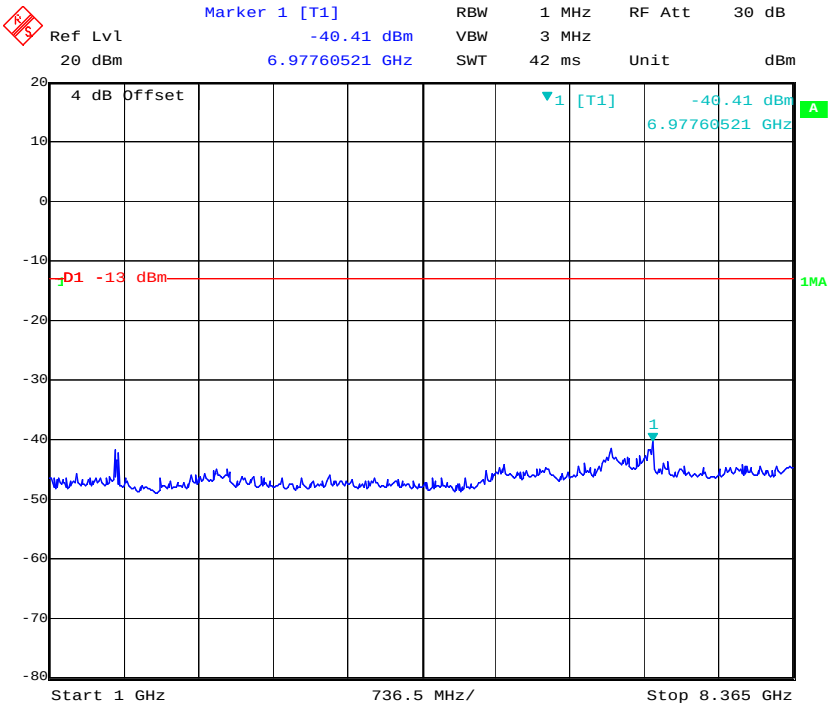

Marker 1 [T1]
Ref Lvl
30 dBm
-41.81 dBm
978.61723447 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -41.81 dBm
978.61723447 MHz
Fundamental
1MAX
1MA
D1 -13 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:45:27


Marker 1 [T1]
Ref Lvl
20 dBm
-40.77 dBm
1.67893788 GHz
RBW 1 MHz
VBW 3 MHz
SWT 42 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -40.77 dBm
1.67893788 GHz
D1 -13 dBm
1MA
Start 1 GHz
736.5 MHz/
Stop 8.365 GHz
Date: 18.DEC.2018 19:45:37

QPSK_5 MHz

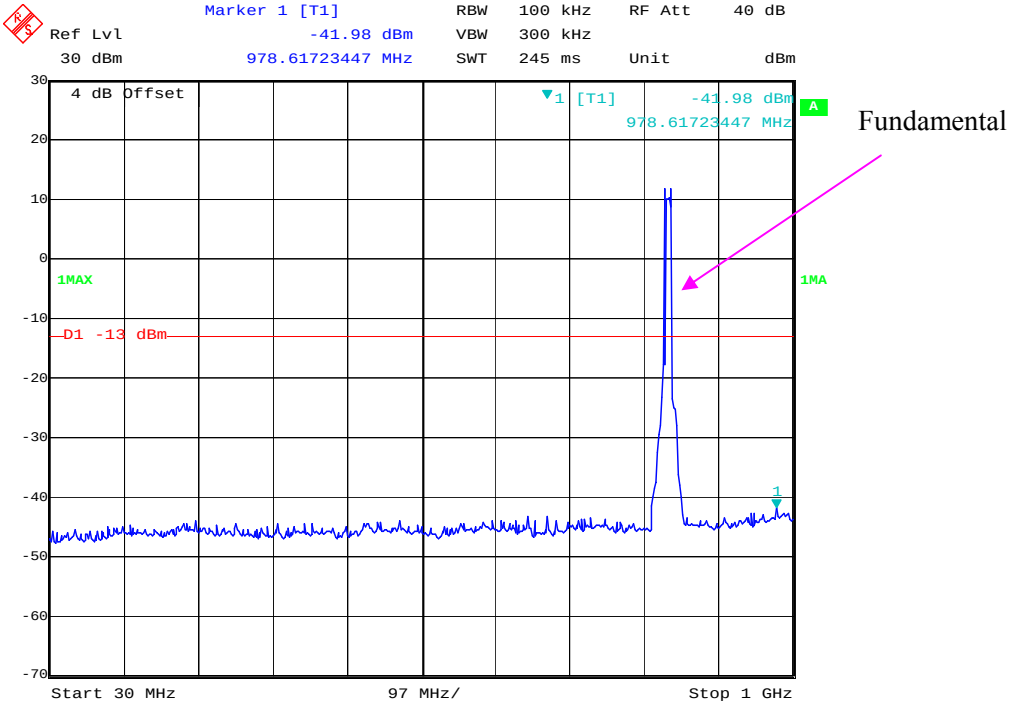


Date: 18.DEC.2018 19:45:52

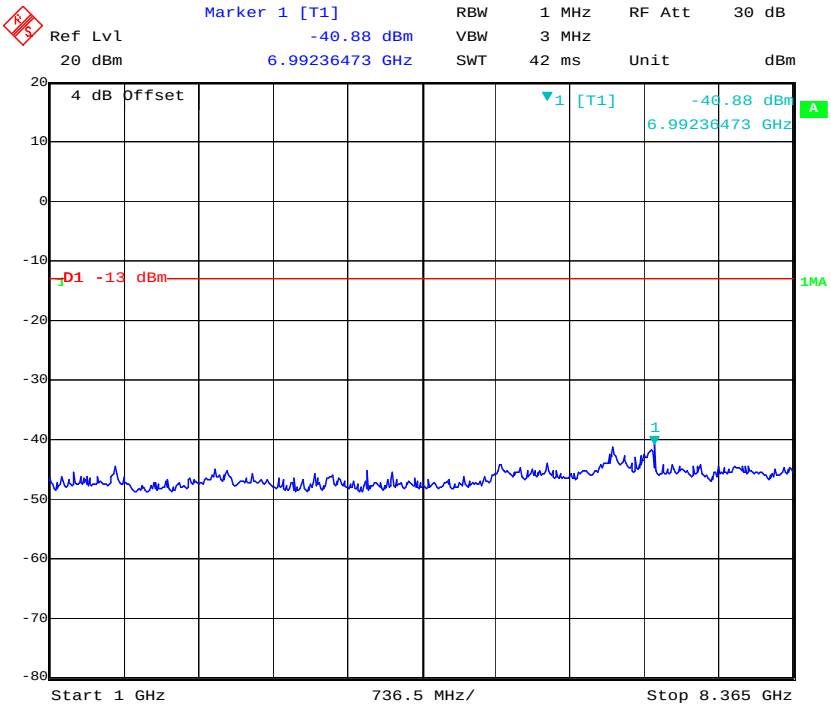


Date: 18.DEC.2018 19:46:02

QPSK_10 MHz



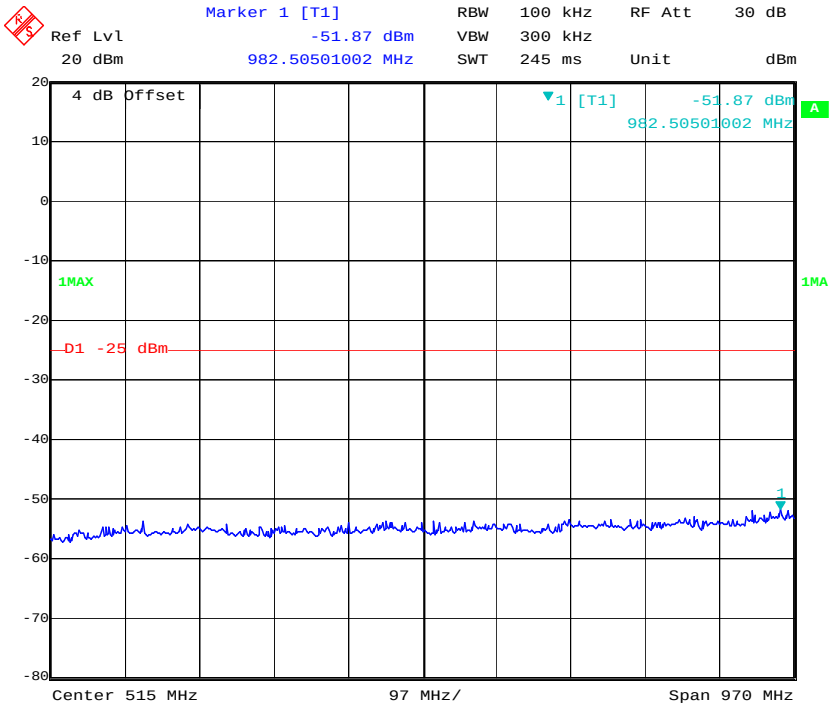
Date: 18.DEC.2018 19:46:20

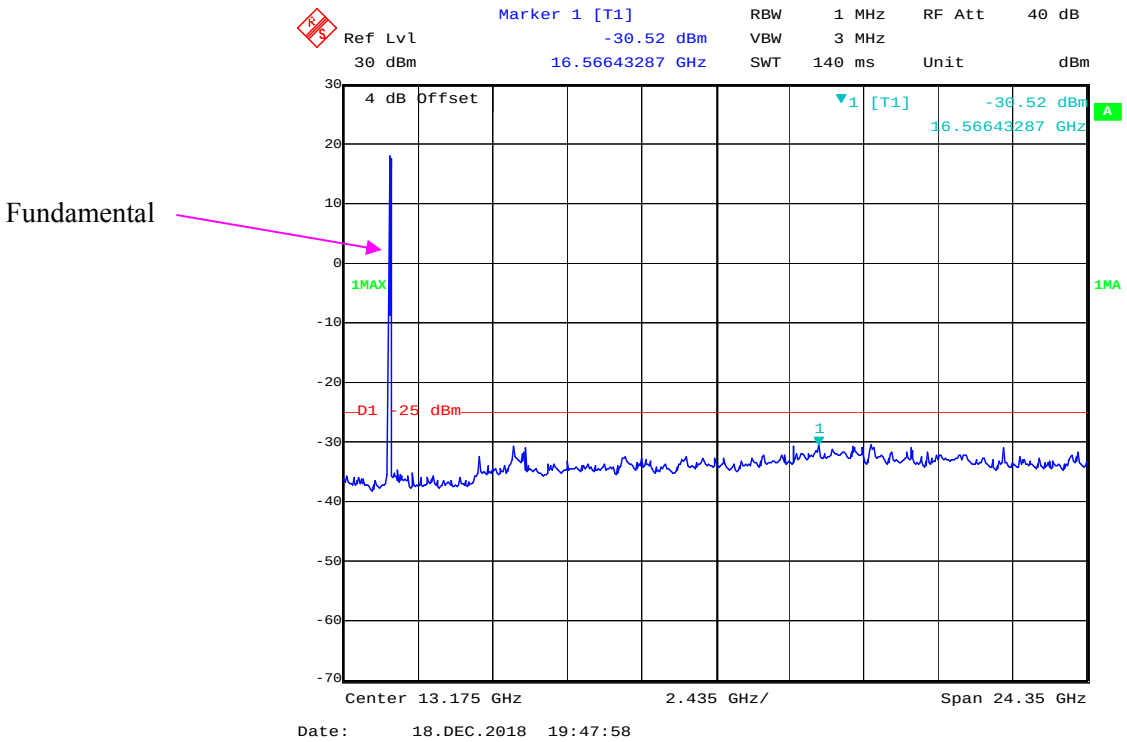


Date: 18.DEC.2018 19:46:30

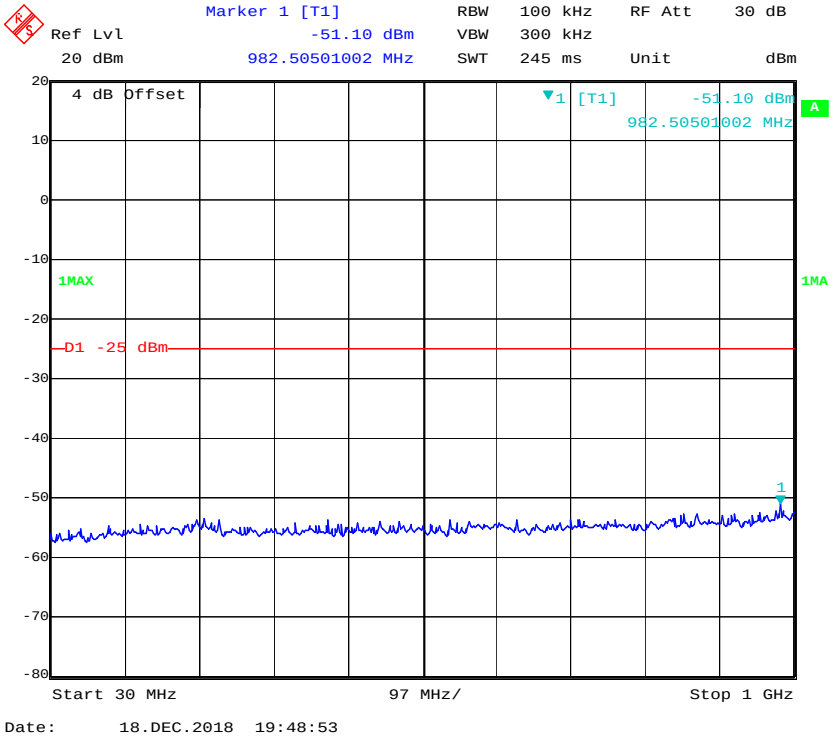
LTE Band 7 (Middle Channel)

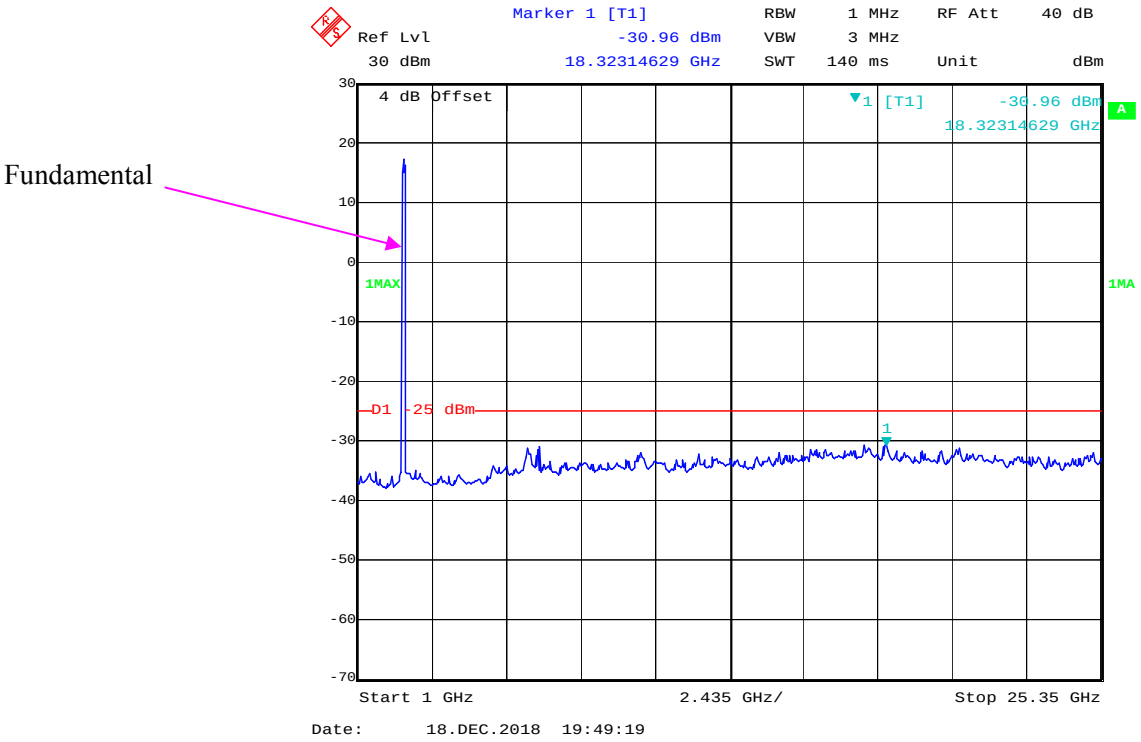
QPSK_5 MHz



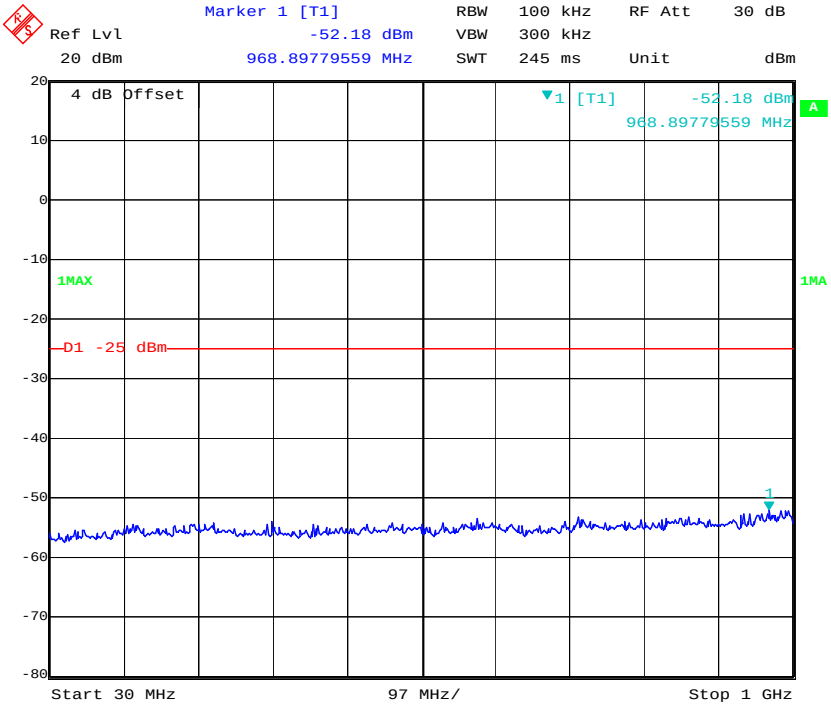


QPSK_10 MHz

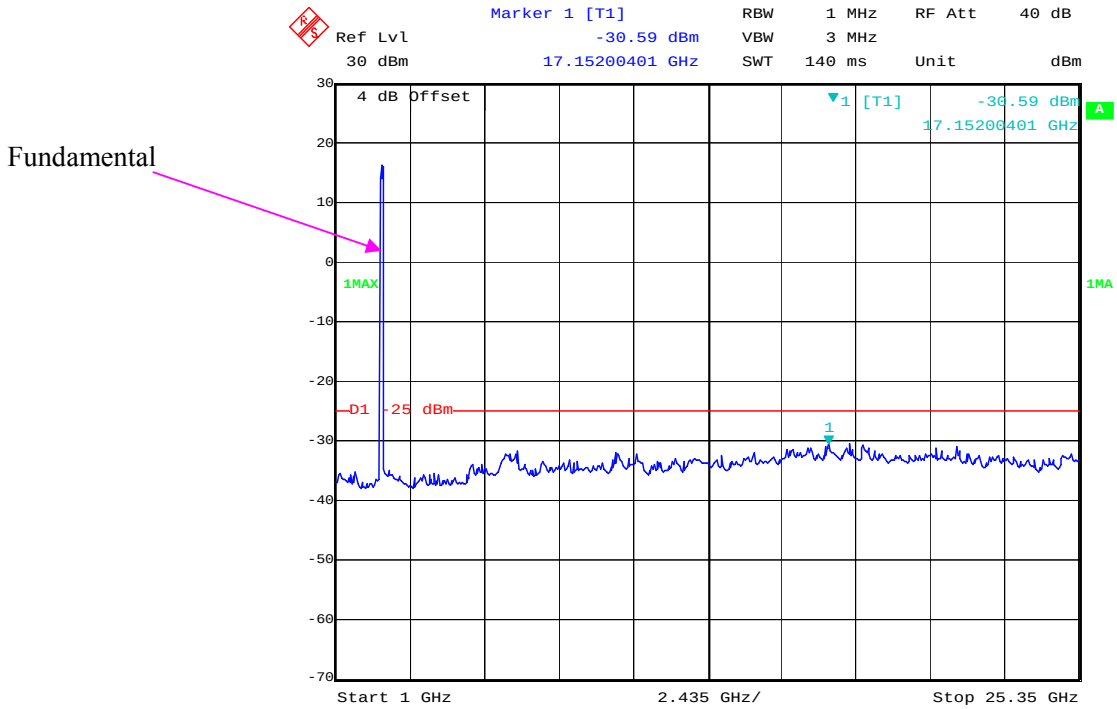

Marker 1 [T1]
Ref Lvl
20 dBm
-51.10 dBm
982.50501002 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 30 dB
Unit dBm
4 dB Offset
1 [T1] -51.10 dBm
982.50501002 MHz
1MAX
1MA
D1 -25 dBm
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:48:53


Fundamental
Marker 1 [T1]
Ref Lvl
30 dBm
-30.96 dBm
18.32314629 GHz
RBW 1 MHz
VBW 3 MHz
SWT 140 ms
RF Att 40 dB
Unit dBm
4 dB Offset
1 [T1] -30.96 dBm
18.32314629 GHz
1MAX
1MA
D1 -25 dBm
Start 1 GHz
2.435 GHz/
Stop 25.35 GHz
Date: 18.DEC.2018 19:49:19

QPSK_15 MHz

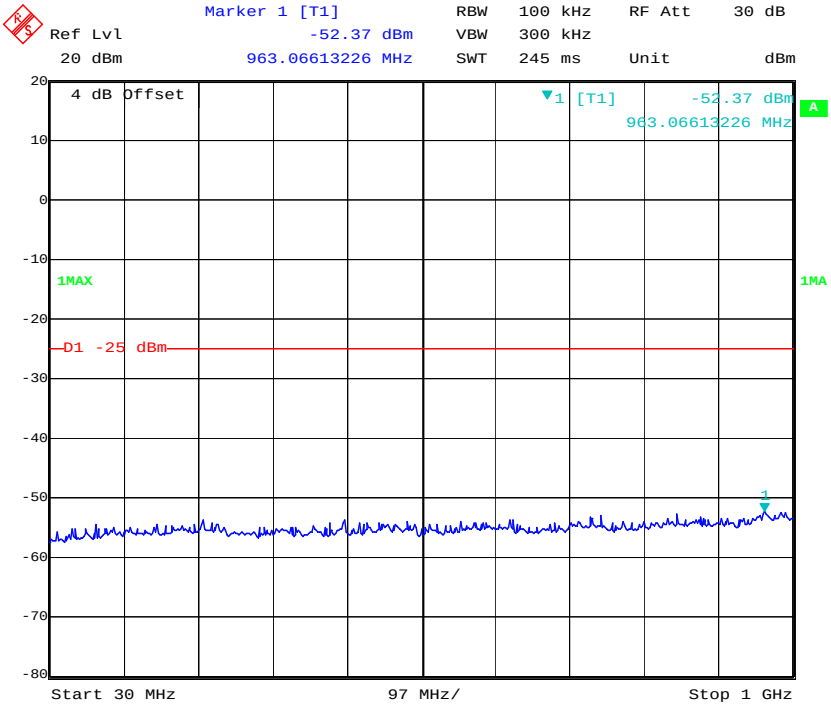


Date: 18.DEC.2018 19:49:50

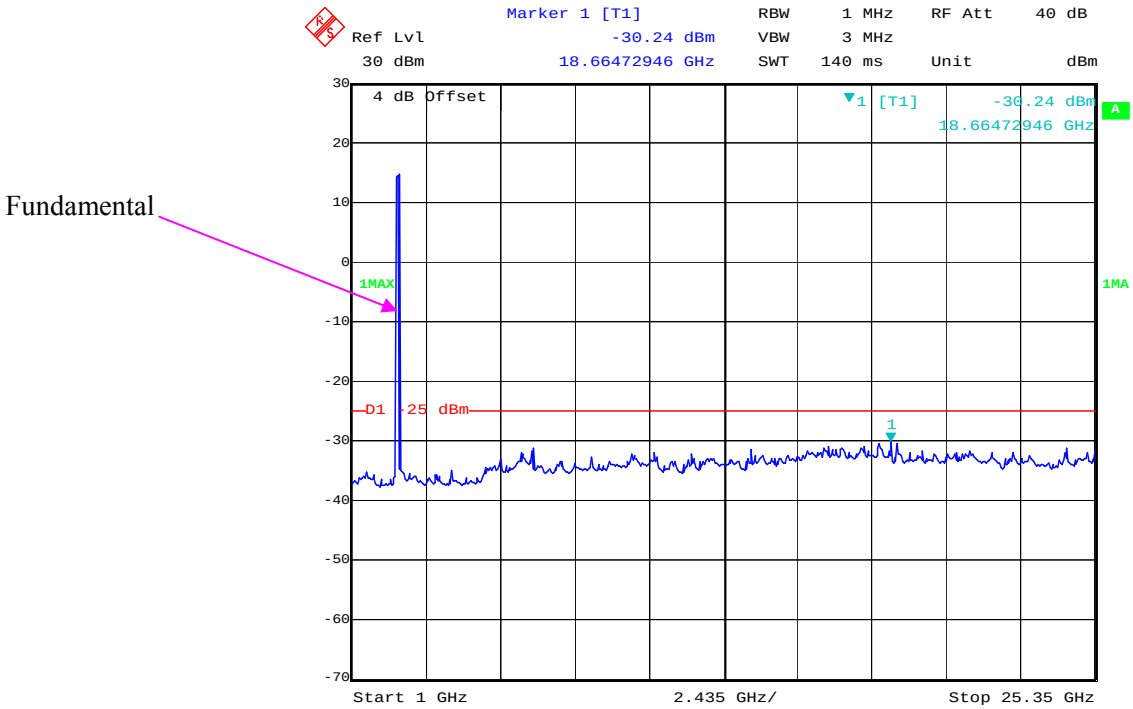


Date: 18.DEC.2018 19:50:11

QPSK_20 MHz



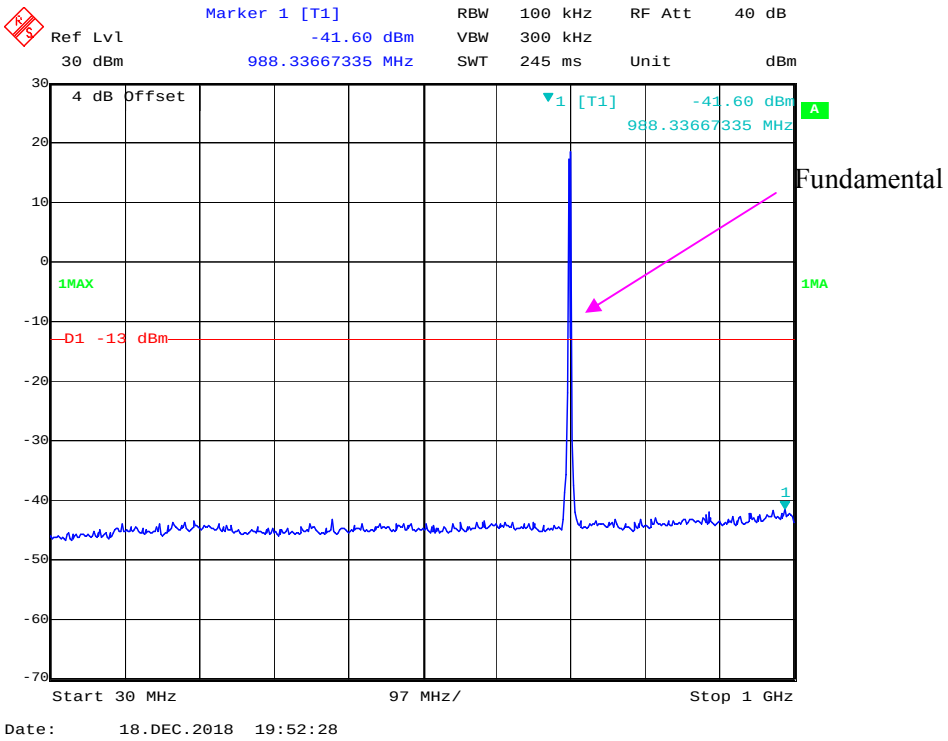
Date: 18.DEC.2018 19:50:43

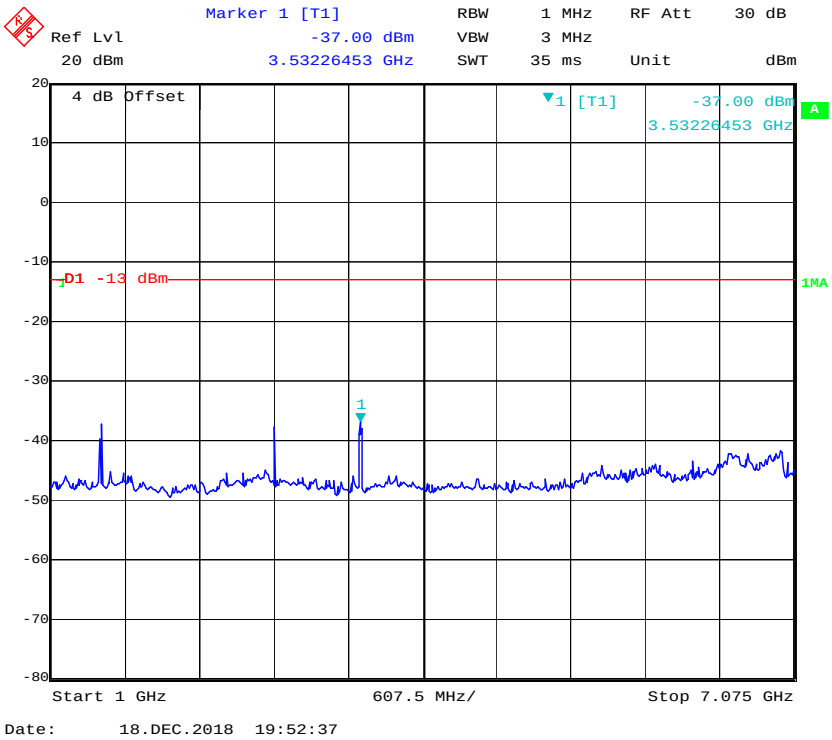


Date: 18.DEC.2018 19:51:13

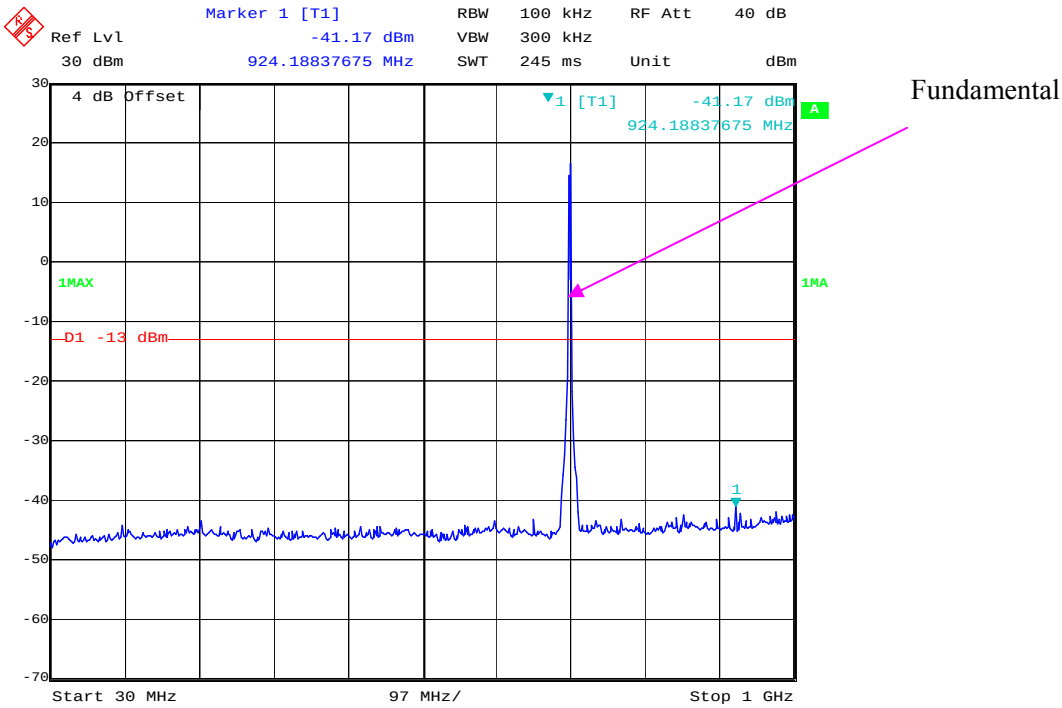
LTE Band 12 (Middle Channel)

QPSK_1.4 MHz

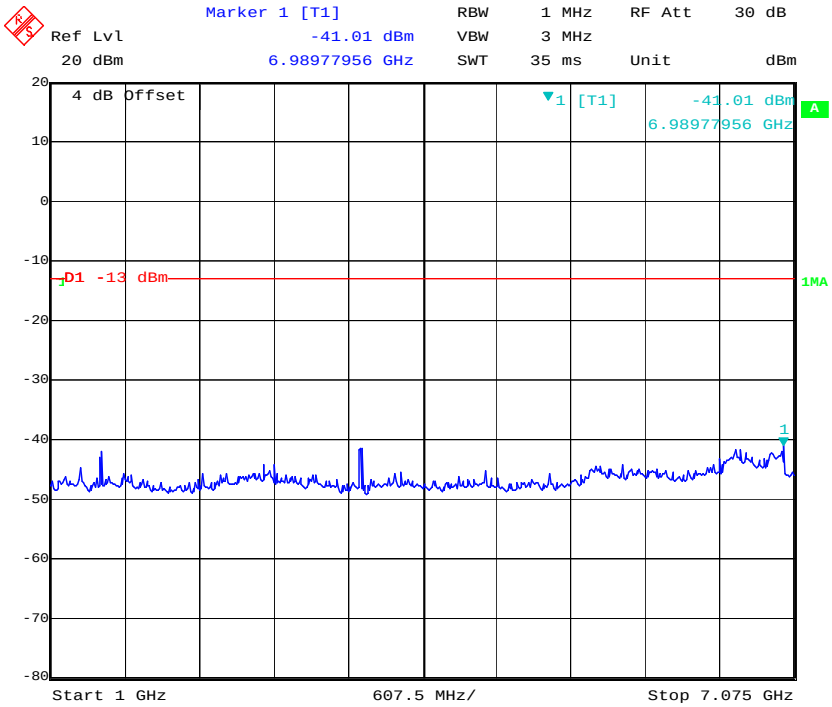




QPSK_3 MHz

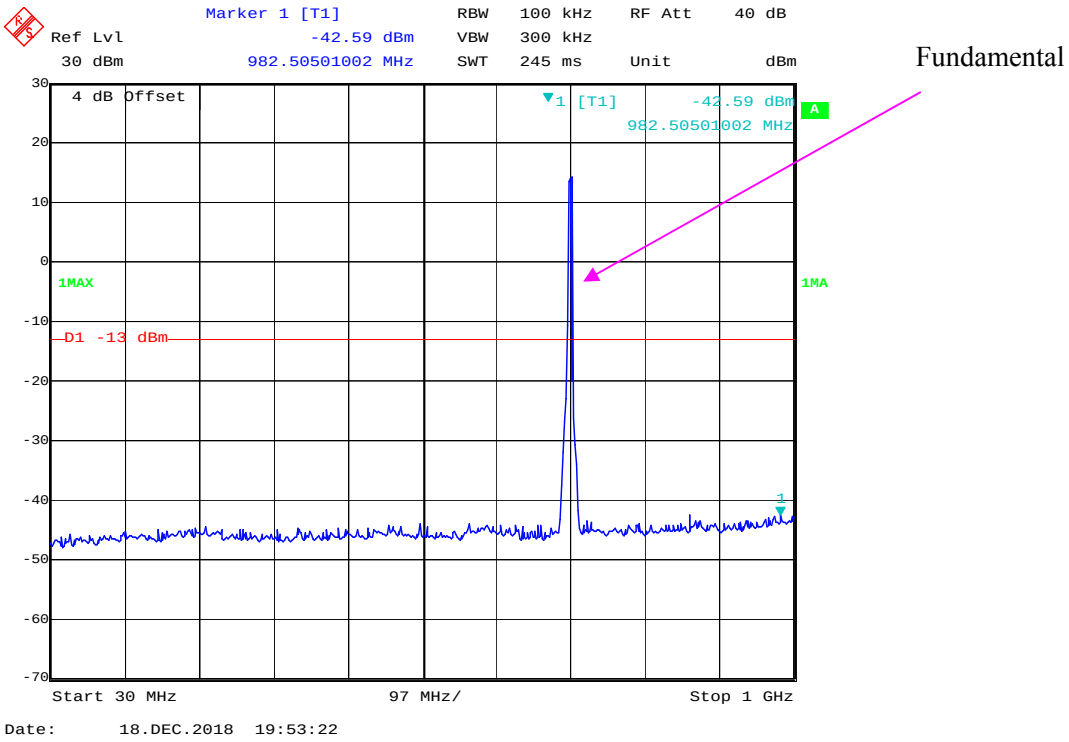


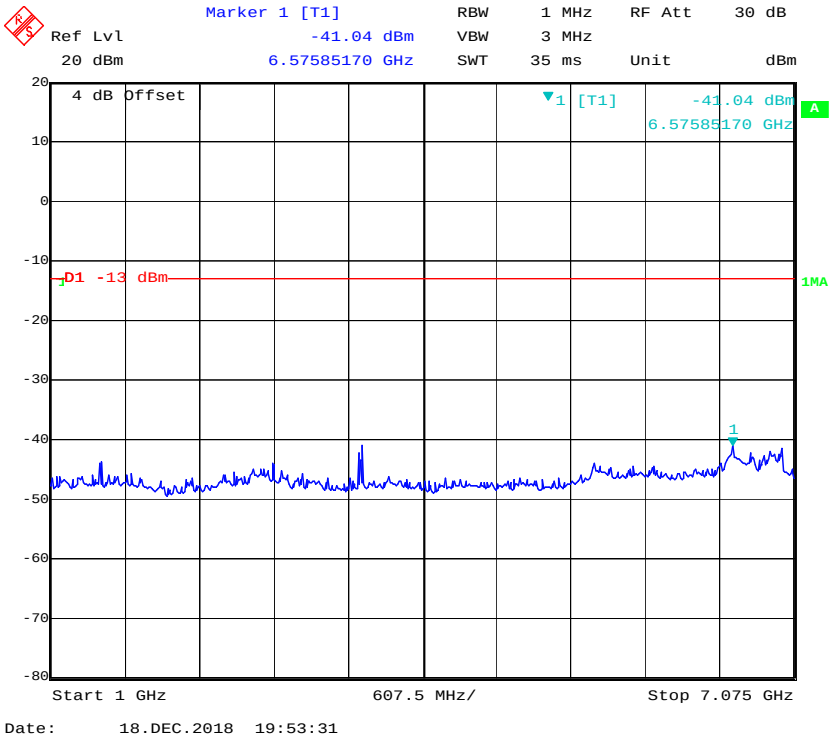
Date: 18.DEC.2018 19:52:56



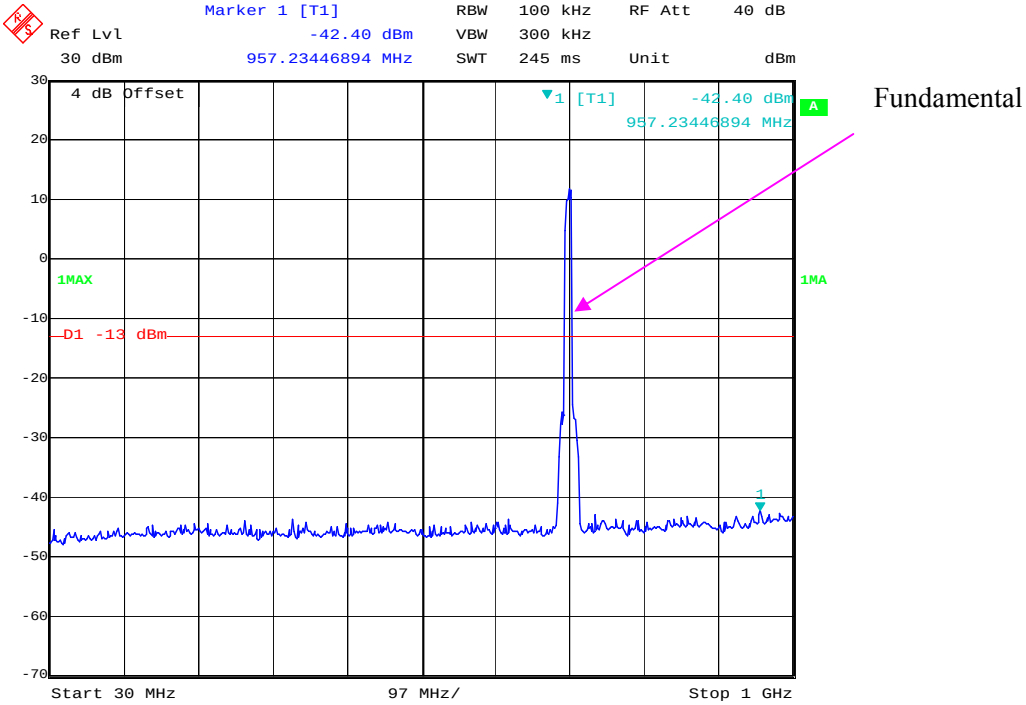
Date: 18.DEC.2018 19:53:06

QPSK_5 MHz

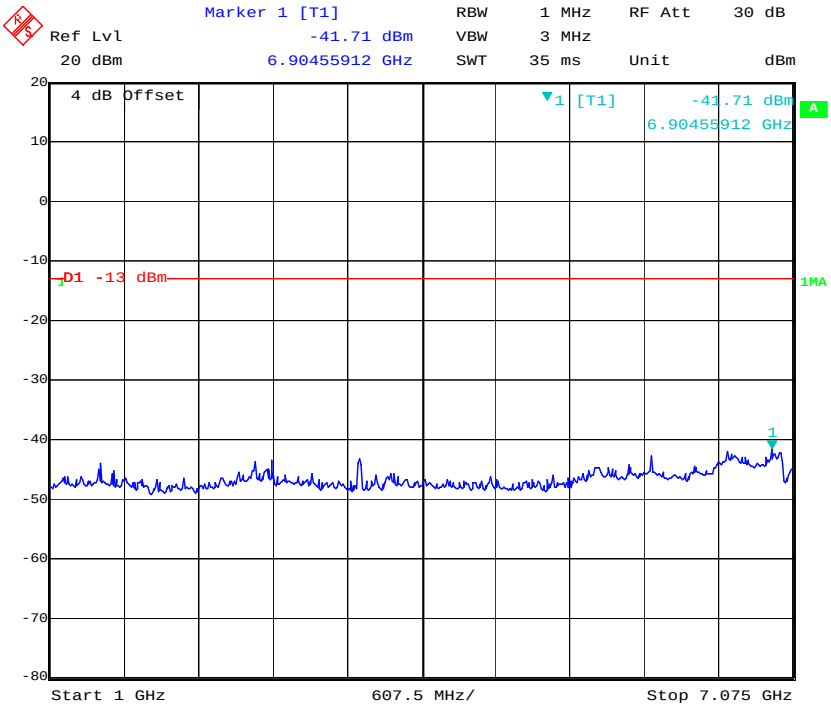

Marker 1 [T1]
-42.59 dBm
982.50501002 MHz
RBW 100 kHz
VBW 300 kHz
SWT 245 ms
RF Att 40 dB
Unit dBm
Ref Lvl
30 dBm
4 dB Offset
1 [T1] -42.59 dBm
982.50501002 MHz
1MAX
D1 -13 dBm
1MA
Start 30 MHz
97 MHz/
Stop 1 GHz
Date: 18.DEC.2018 19:53:22
Fundamental


Marker 1 [T1]
-41.04 dBm
6.57585170 GHz
RBW 1 MHz
VBW 3 MHz
SWT 35 ms
RF Att 30 dB
Unit dBm
Ref Lvl
20 dBm
4 dB Offset
1 [T1] -41.04 dBm
6.57585170 GHz
D1 -13 dBm
1MA
Start 1 GHz
607.5 MHz/
Stop 7.075 GHz
Date: 18.DEC.2018 19:53:31

QPSK_10 MHz



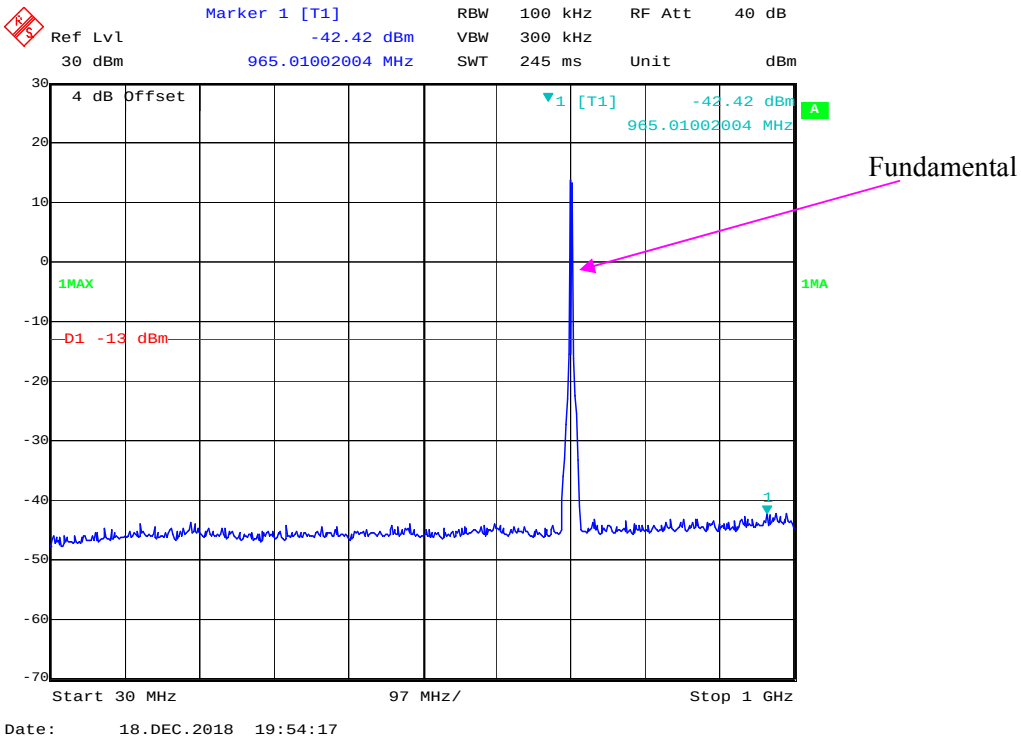
Date: 18.DEC.2018 19:53:48

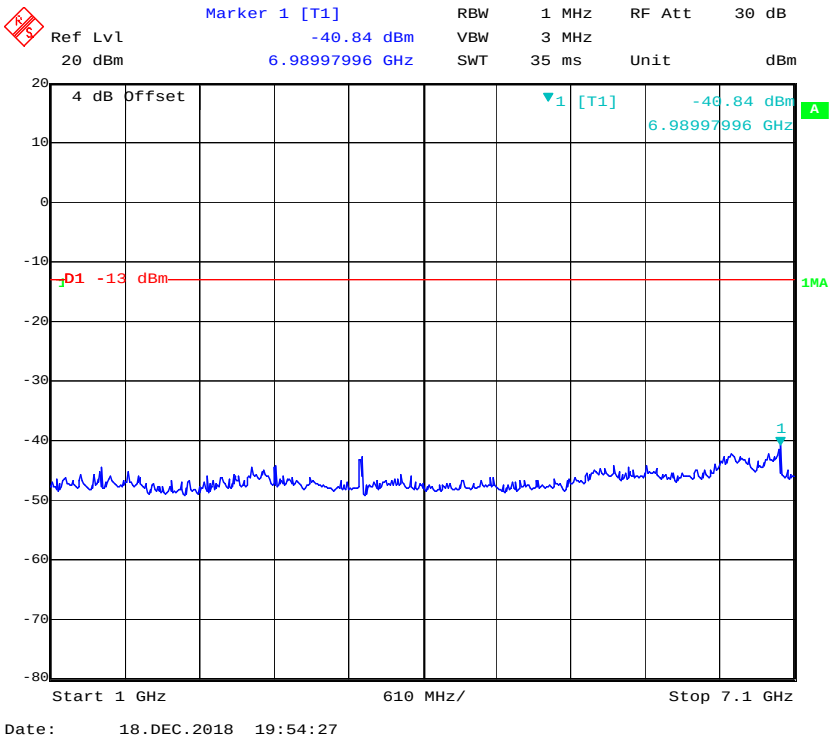


Date: 18.DEC.2018 19:53:57

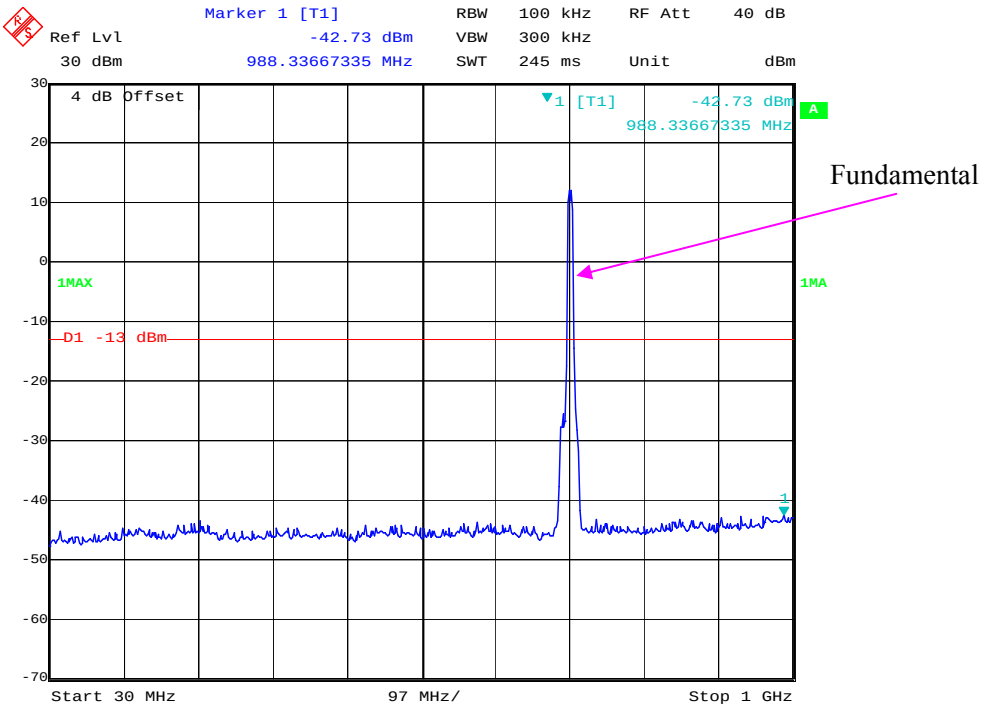
LTE Band 17 (Middle Channel)

QPSK_5 MHz

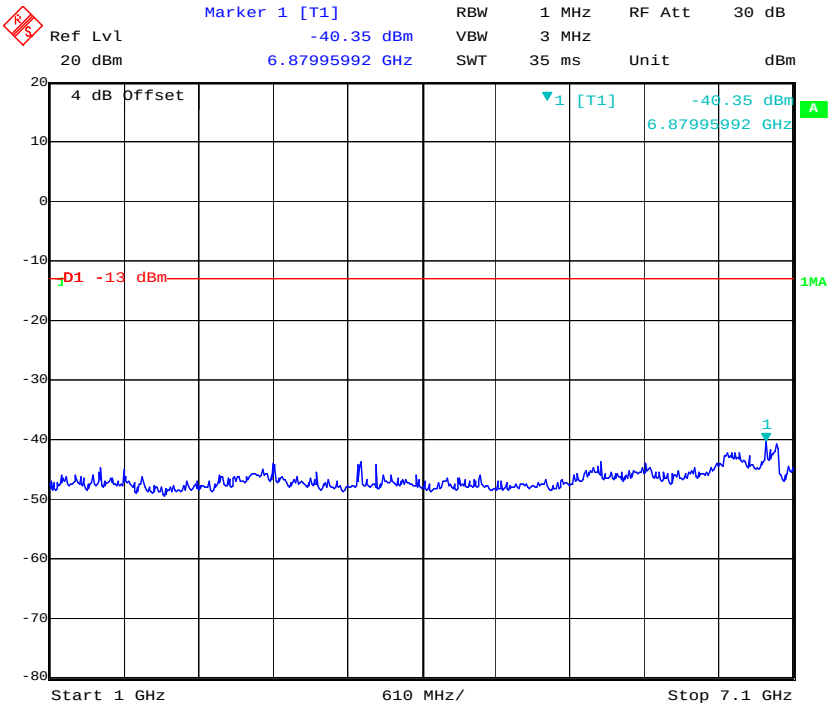




QPSK_10 MHz



Date: 18.DEC.2018 19:54:47



Date: 18.DEC.2018 19:54:57

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
R&S	EMI Test Receiver	ESCI	100035	2018-08-03	2019-08-03
Sunol Sciences	Antenna	JB3	A060611-3	2017-07-21	2019-07-21
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-02	2018-09-05	2019-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0530-01	2018-09-24	2019-09-24
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2018-09-05	2019-09-05
Sonoma	Amplifier	310N	185914	2018-10-13	2019-10-13
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
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2018-06-27	2019-06-27
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Sinoscite	Band-stop filter	BSF1850-1910MS-0935V2	0935V2	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF1710-1785MN-0383-003	0383003	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2018-06-16	2019-06-16
Sinoscite	Band-stop filter	BSF2500-2750MS-1439-001	1437001	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:	22.3~24.8°C
Relative Humidity:	45~50 %
ATM Pressure:	99.8~100.8 kPa

** The testing was performed by Tyler Pan, Kami Zhou and Vito Chen on 2018-12-20~2018-12-21.*

EUT Operation Mode: Transmitting

Cellular Band (PART 22H)

30 MHz-10 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM850, Frequency:836.600 MHz								
1673.200	H	60.43	-53.78	10.6	0.73	-43.9	-13.0	30.9
1673.200	V	58.45	-56.36	10.6	0.73	-46.5	-13.0	33.5
2509.800	H	54.88	-58.14	13.1	1.25	-46.3	-13.0	33.3
2509.800	V	54.02	-59.03	13.1	1.25	-47.2	-13.0	34.2
3346.400	H	52.10	-58.56	13.8	1.61	-46.3	-13.0	33.3
3346.400	V	50.58	-60.13	13.8	1.61	-47.9	-13.0	34.9
701.240	H	43.89	-56.98	0.0	0.38	-57.4	-13.0	44.4
934.040	V	40.30	-50.94	0.0	0.51	-51.5	-13.0	38.5
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	47.71	-66.5	10.6	0.73	-56.6	-13.0	43.6
1673.200	V	50.61	-64.2	10.6	0.73	-54.3	-13.0	41.3
2509.800	H	44.79	-68.23	13.1	1.25	-56.4	-13.0	43.4
2509.800	V	45.61	-67.44	13.1	1.25	-55.6	-13.0	42.6
3346.400	H	45.27	-65.39	13.8	1.61	-53.2	-13.0	40.2
3346.400	V	45.94	-64.77	13.8	1.61	-52.6	-13.0	39.6
881.660	H	66.97	-29.17	0.0	0.51	-29.7	-13.0	16.7
881.660	V	61.41	-31.41	0.0	0.51	-31.9	-13.0	18.9

PCS Band (PART 24E)

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	53.54	-55.26	13.8	1.63	-43.1	-13.0	30.1
3760.000	V	48.70	-59.97	13.8	1.63	-47.8	-13.0	34.8
5640.000	H	48.77	-57.26	14.0	1.31	-44.6	-13.0	31.6
5640.000	V	46.03	-59.88	14.0	1.31	-47.2	-13.0	34.2
914.640	H	39.97	-55.11	0.0	0.51	-55.6	-13.0	42.6
701.240	V	43.59	-53.91	0.0	0.38	-54.3	-13.0	41.3
WCDMA Band II R99,Frequency: 1880.000 MHz								
3760.000	H	49.46	-59.34	13.8	1.63	-47.2	-13.0	34.2
3760.000	V	48.09	-60.58	13.8	1.63	-48.5	-13.0	35.5
5640.000	H	47.18	-58.85	14.0	1.31	-46.1	-13.0	33.1
5640.000	V	46.59	-59.32	14.0	1.31	-46.6	-13.0	33.6
823.460	H	41.42	-56.42	0.0	0.49	-56.9	-13.0	43.9
738.100	V	42.63	-54.13	0.0	0.42	-54.6	-13.0	41.6

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1880.000 MHz								
3760.00	H	47.63	-61.17	13.76	1.63	-49.04	-13.00	36.04
3760.00	V	46.85	-61.82	13.76	1.63	-49.69	-13.00	36.69
5640.00	H	46.59	-59.44	14.02	1.31	-46.73	-13.00	33.73
5640.00	V	46.23	-59.68	14.02	1.31	-46.97	-13.00	33.97
299.66	H	46.89	-61.76	0.00	0.31	-62.07	-13.00	49.07
866.14	V	39.77	-53.56	0.00	0.50	-54.06	-13.00	41.06

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1732.500 MHz								
3465.00	H	46.55	-63.69	13.91	1.62	-51.40	-13.00	38.40
3465.00	V	46.38	-63.90	13.91	1.62	-51.61	-13.00	38.61
5197.50	H	45.67	-60.75	14.00	1.52	-48.27	-13.00	35.27
5197.50	V	45.91	-60.58	14.00	1.52	-48.10	-13.00	35.10
774.96	H	39.54	-59.58	0.00	0.46	-60.04	-13.00	47.04
935.98	V	38.16	-53.03	0.00	0.51	-53.54	-13.00	40.54

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:836.500 MHz								
1673.00	H	58.82	-55.40	10.61	0.73	-45.52	-13.00	32.52
1673.00	V	58.19	-56.63	10.61	0.73	-46.75	-13.00	33.75
2509.50	H	48.26	-64.76	13.11	1.25	-52.90	-13.00	39.90
2509.50	V	50.08	-62.97	13.11	1.25	-51.11	-13.00	38.11
3346.00	H	45.68	-64.98	13.83	1.61	-52.76	-13.00	39.76
3346.00	V	45.16	-65.55	13.83	1.61	-53.33	-13.00	40.33
819.58	H	52.89	-45.07	0.00	0.49	-45.56	-13.00	32.56
885.54	V	56.13	-36.56	0.00	0.51	-37.07	-13.00	24.07

LTE Band 7 (30MHz-26.5GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency: 2535.000 MHz								
5070.00	H	59.14	-47.66	13.93	1.34	-35.07	-25.00	10.07
5070.00	V	60.48	-46.13	13.93	1.34	-33.54	-25.00	8.54
7605.00	H	58.79	-41.57	13.21	1.40	-29.76	-25.00	4.76
7605.00	V	63.27	-37.49	13.21	1.40	-25.68	-25.00	0.68
802.12	H	38.89	-59.58	0.00	0.49	-60.07	-25.00	35.07
854.50	V	36.23	-57.48	0.00	0.50	-57.98	-25.00	32.98

LTE Band 12 (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:707.500 MHz								
1415.00	H	54.01	-59.49	9.08	1.22	-51.63	-13.00	38.63
1415.00	V	53.36	-60.67	9.08	1.22	-52.81	-13.00	39.81
2122.50	H	48.08	-64.71	11.27	1.11	-54.55	-13.00	41.55
2122.50	V	48.24	-64.53	11.27	1.11	-54.37	-13.00	41.37
2830.00	H	55.94	-56.14	13.34	1.36	-44.16	-13.00	31.16
2830.00	V	54.38	-57.93	13.34	1.36	-45.95	-13.00	32.95
897.18	H	30.33	-42.94	0.00	0.51	-43.45	-13.00	30.45
769.14	V	31.07	-41.25	0.00	0.46	-41.71	-13.00	28.71

LTE Band 17 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:710.000 MHz								
1420.00	H	54.65	-58.95	9.10	1.23	-51.08	-13.00	38.08
1420.00	V	55.79	-58.31	9.10	1.23	-50.44	-13.00	37.44
2130.00	H	46.52	-66.23	11.22	1.11	-56.12	-13.00	43.12
2130.00	V	45.78	-66.94	11.22	1.11	-56.83	-13.00	43.83
2840.00	H	56.14	-55.90	13.42	1.36	-43.84	-13.00	30.84
2840.00	V	55.84	-56.44	13.42	1.36	-44.38	-13.00	31.38
879.72	H	31.00	-42.55	0.00	0.51	-43.06	-13.00	30.06
835.10	V	29.50	-41.79	0.00	0.50	-42.29	-13.00	29.29

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

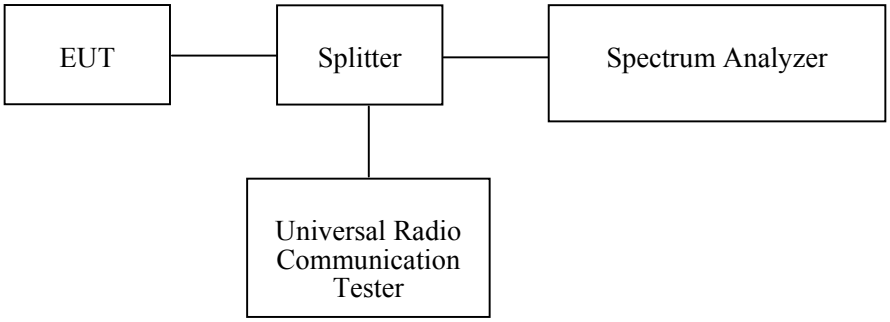
Applicable Standard

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

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

Test Data

Environmental Conditions

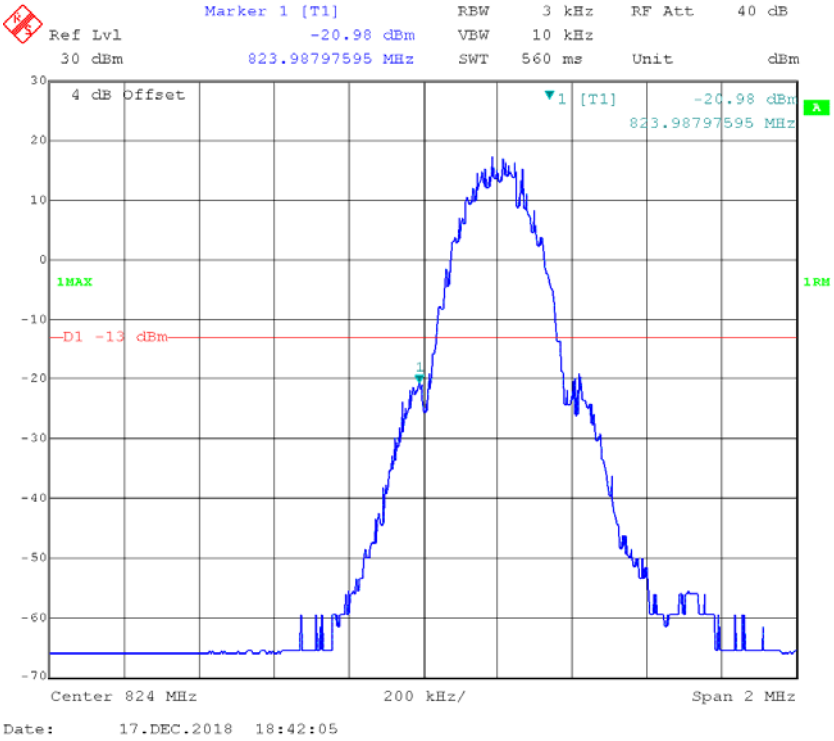
Temperature:	23.9~24.2°C
Relative Humidity:	34~36 %
ATM Pressure:	99.7~99.8 kPa

The testing was performed by Andy Huang from 2018-12-17 to 2018-12-18.

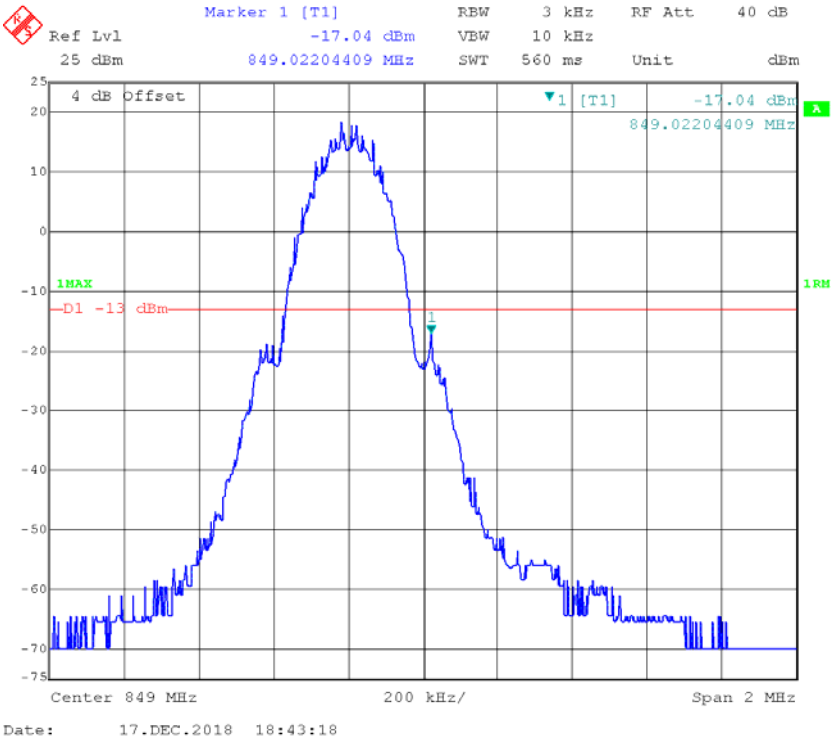
Test Mode: Transmitting

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

GSM 850, Left Band Edge

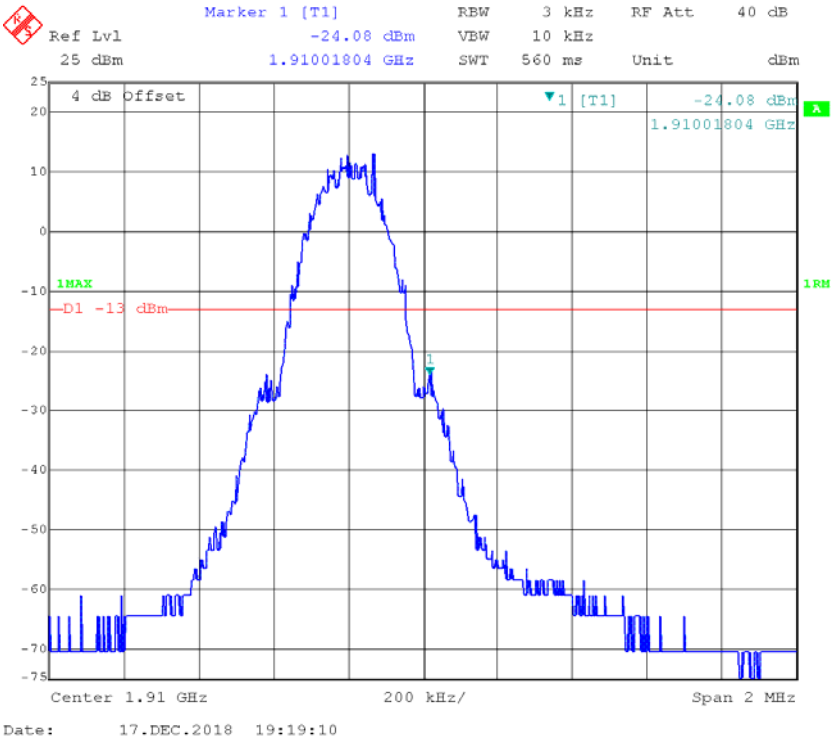


GSM 850, Right Band Edge

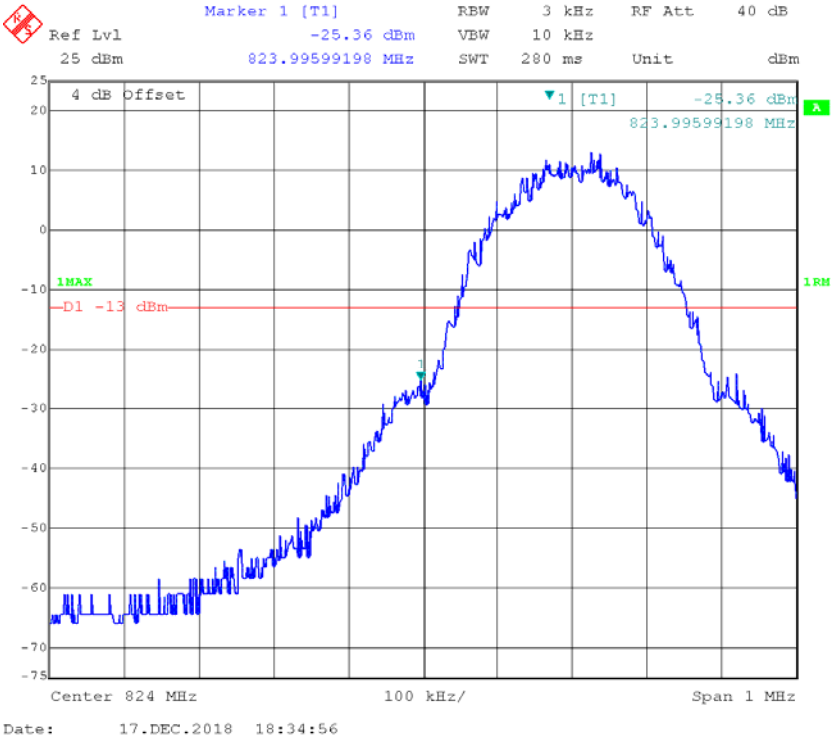


GSM 1900, Left Band Edge

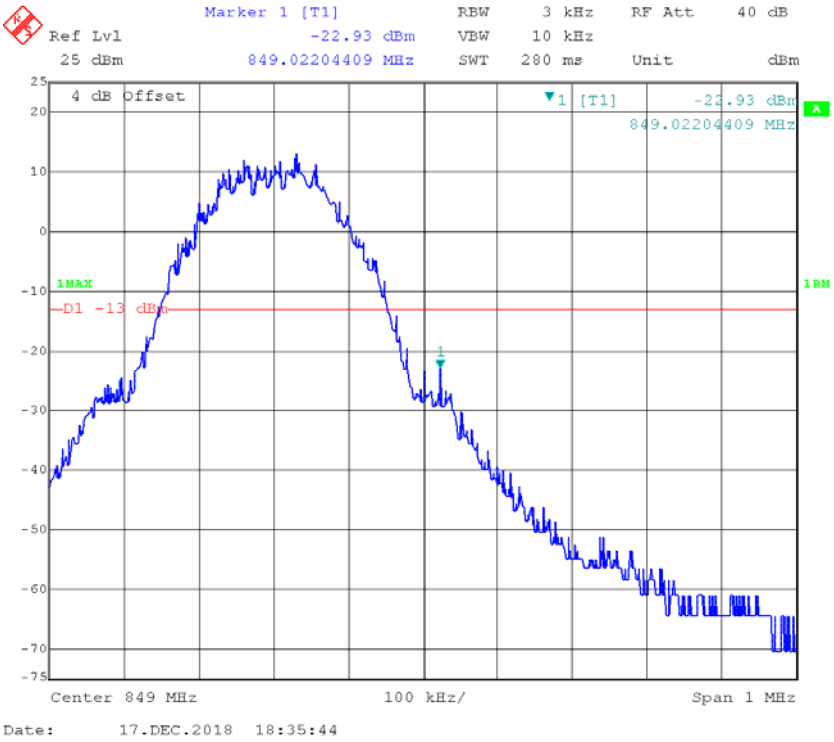
GSM 1900, Right Band Edge



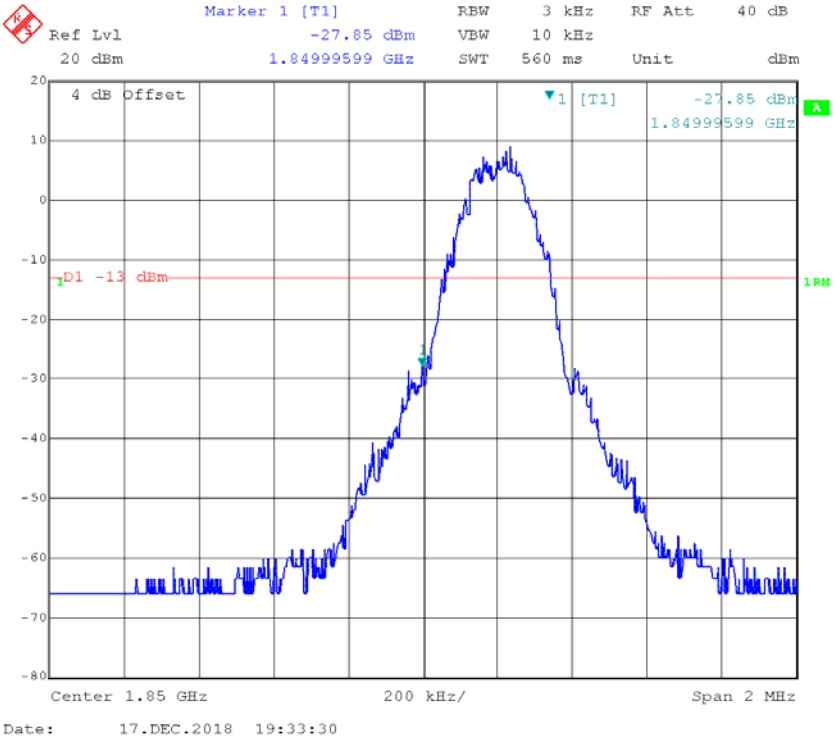
EDGE 850, Left Band Edge



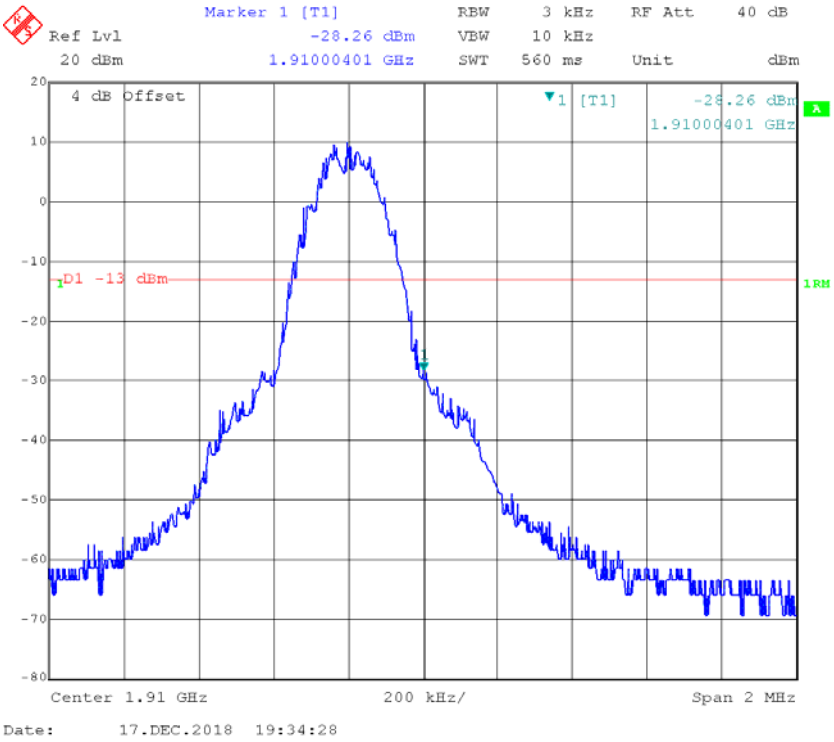
EDGE 850, Right Band Edge



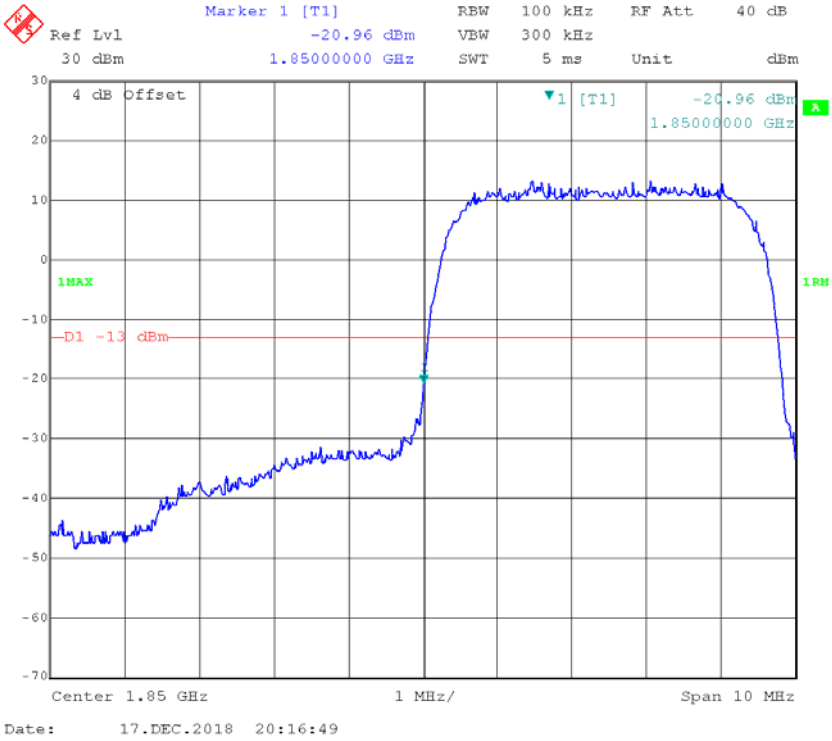
EDGE 1900, Left Band Edge



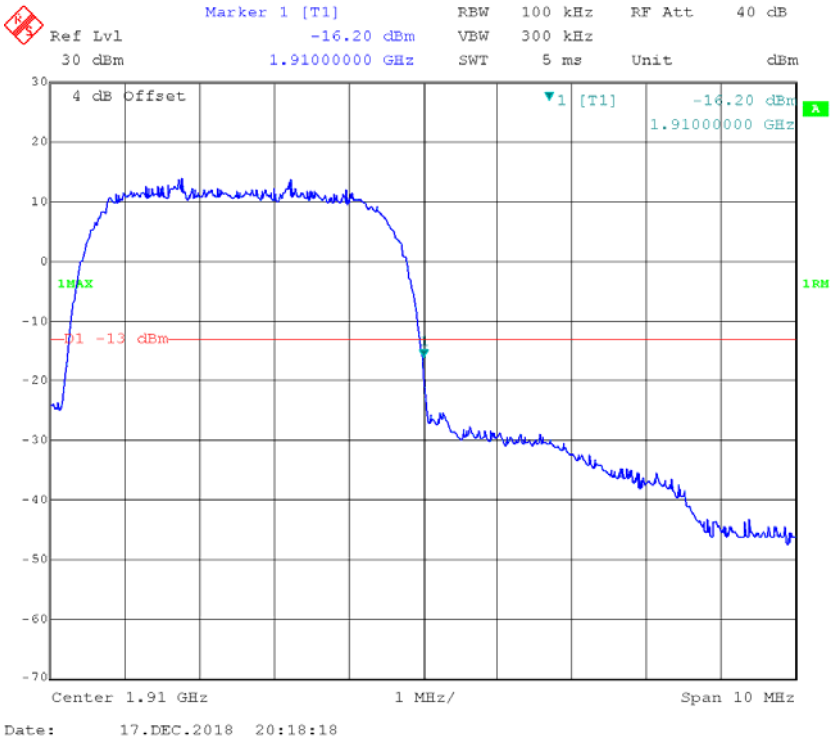
EDGE 1900, Right Band Edge



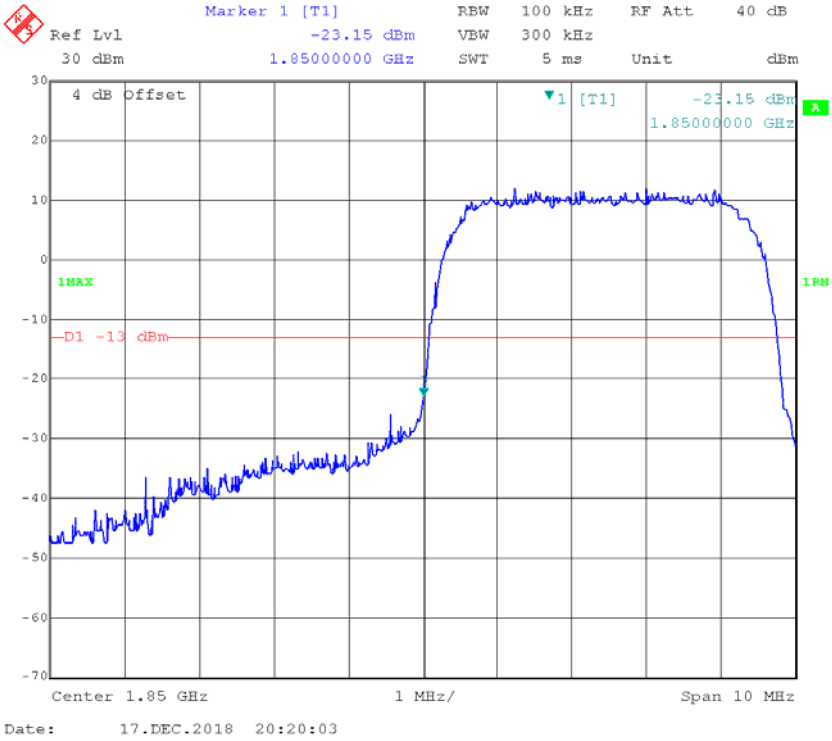
WCDMA Band II Rel 99, Left Band Edge



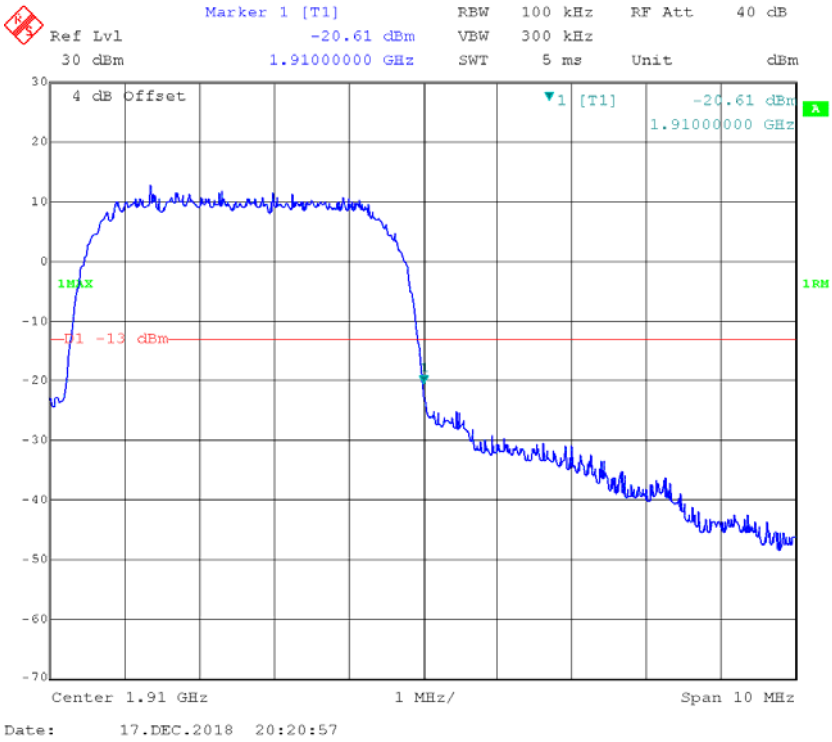
WCDMA Band II Rel 99, Right Band Edge



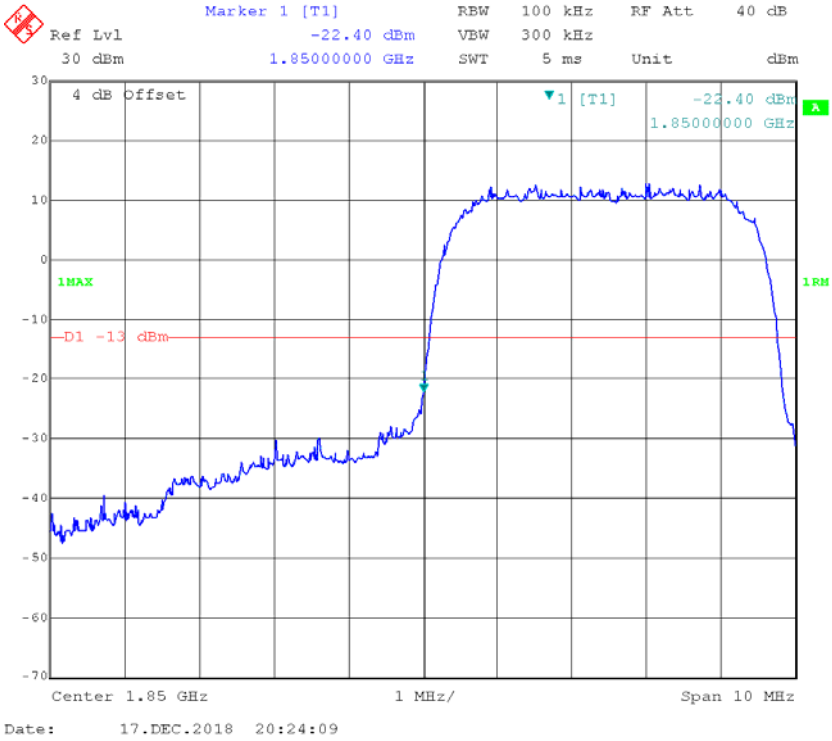
WCDMA Band II HSDPA, Left Band Edge



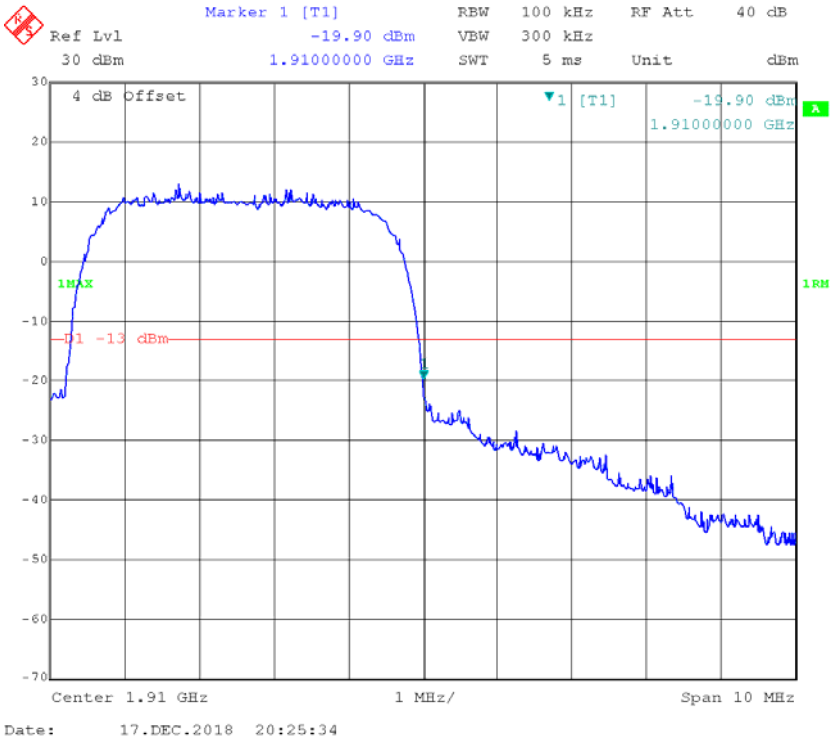
WCDMA Band II HSDPA, Right Band Edge



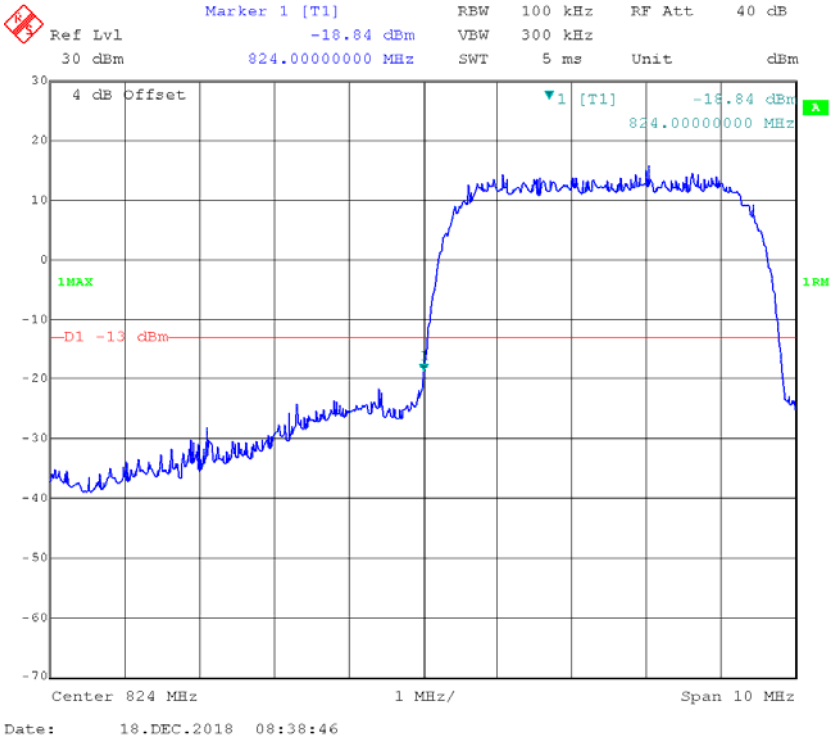
WCDMA Band II HSUPA, Left Band Edge



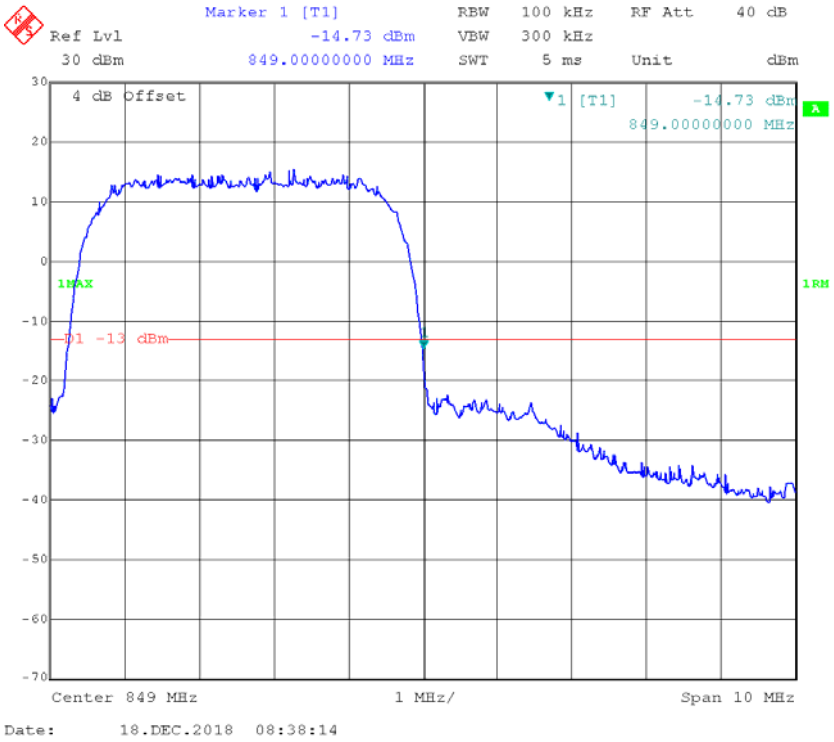
WCDMA Band II HSUPA, Right Band Edge



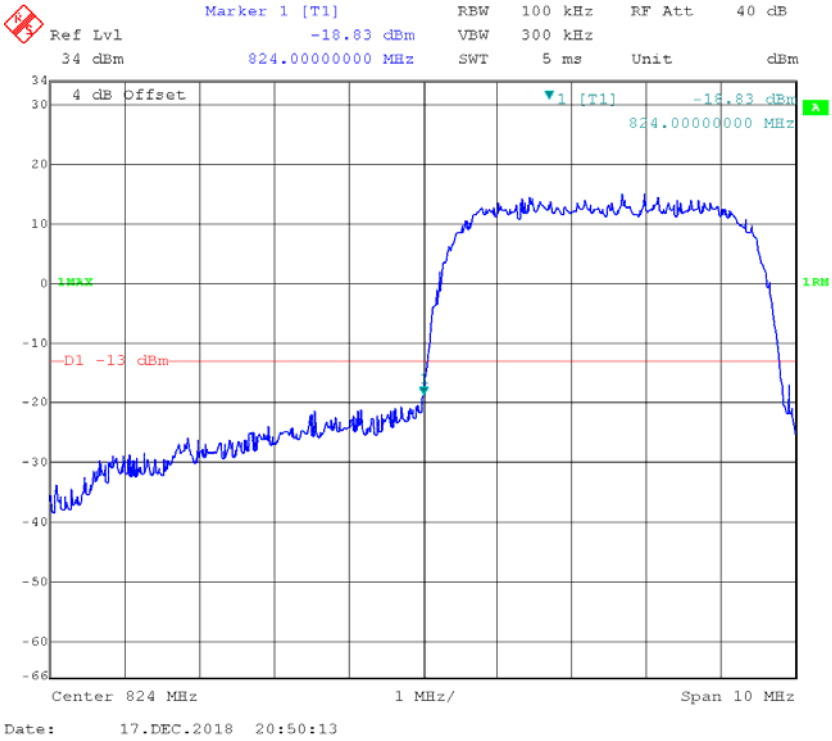
WCDMA Band V Rel 99, Left Band Edge



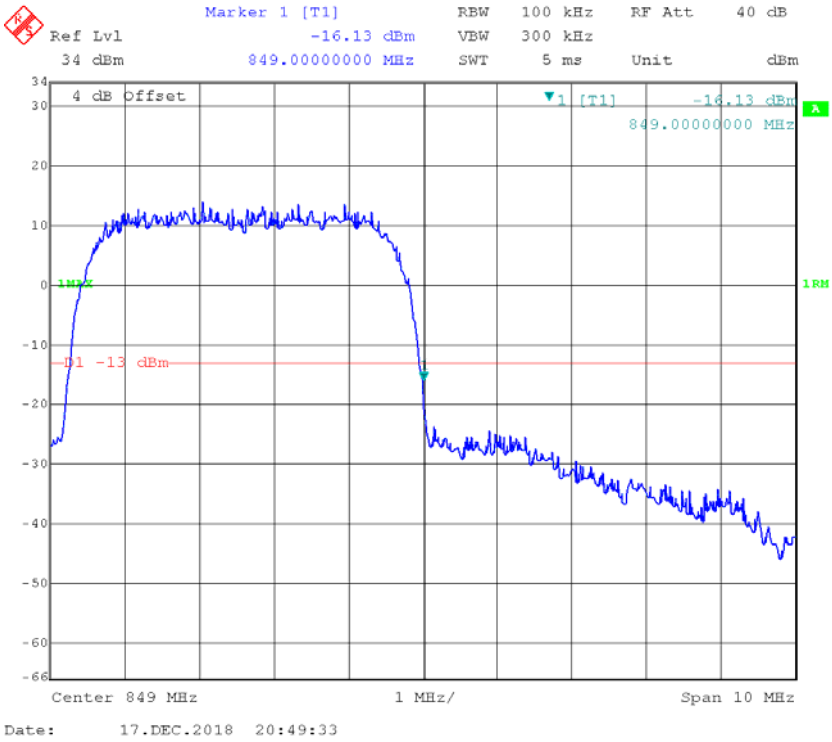
WCDMA Band V Rel 99, Right Band Edge



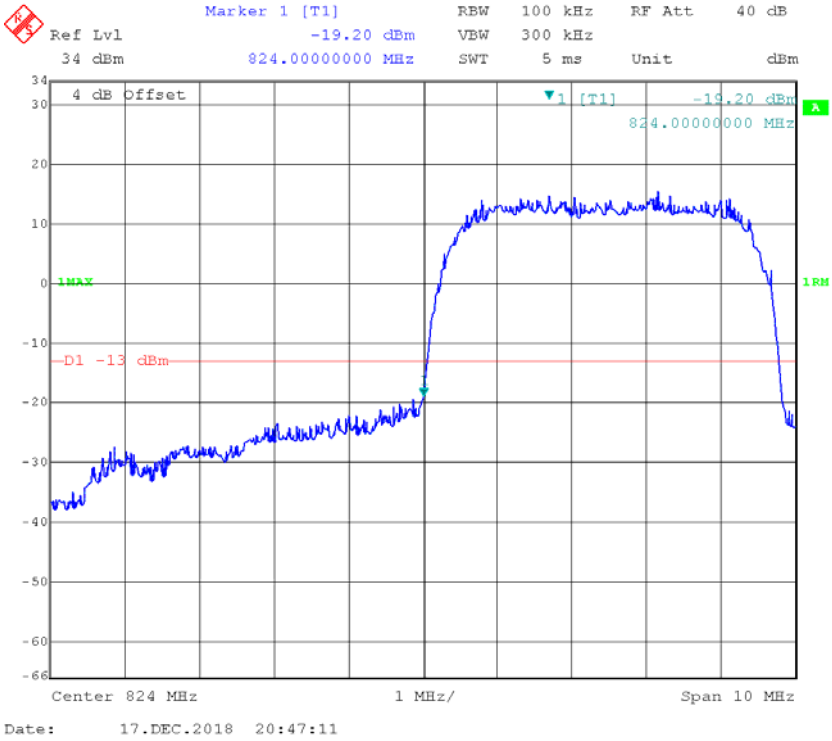
WCDMA Band V HSDPA, Left Band Edge



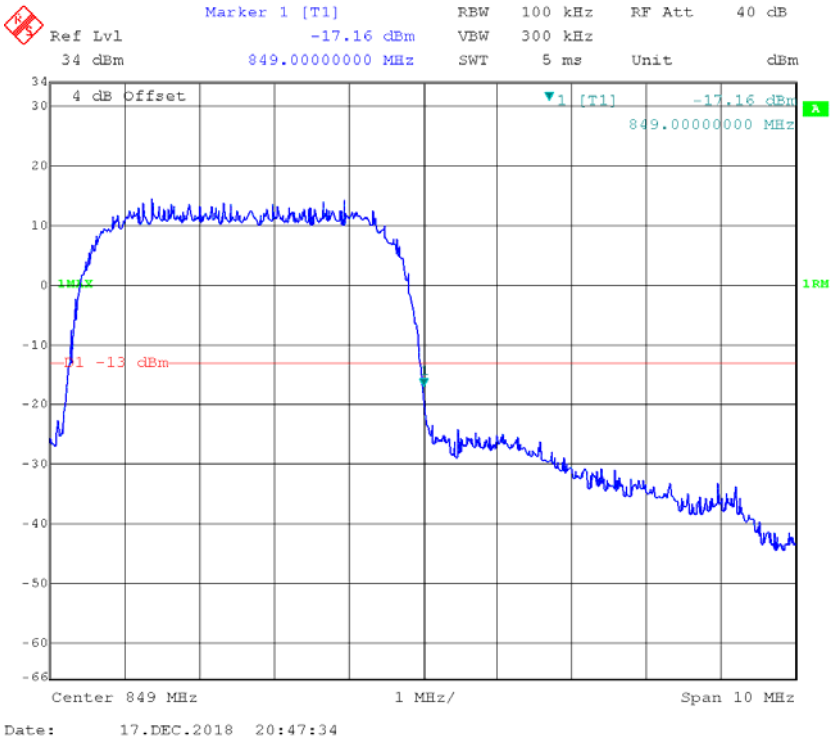
WCDMA Band V HSDPA, Right Band Edge



WCDMA Band V HSUPA, Left Band Edge

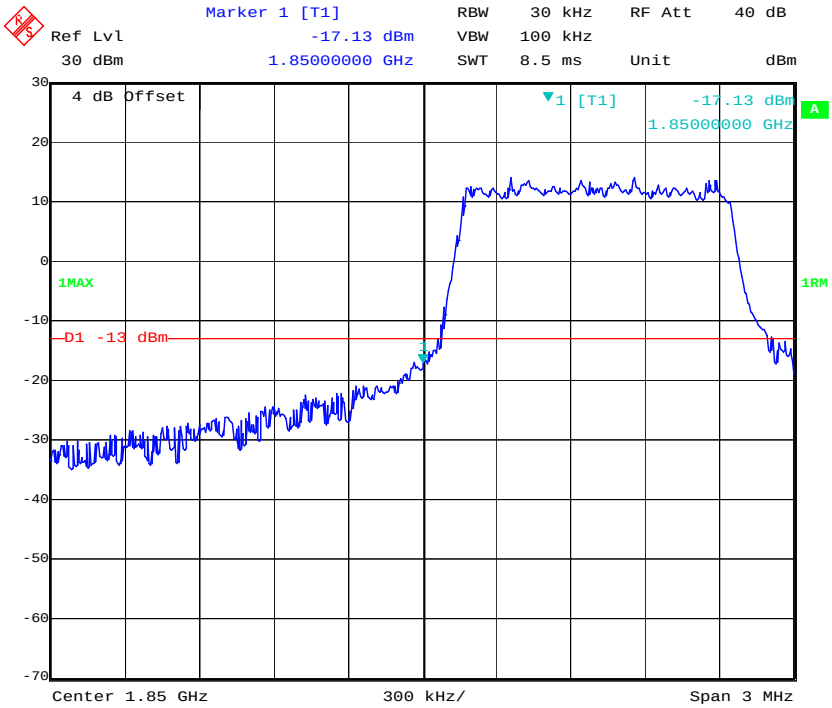


WCDMA Band V HSUPA, Right Band Edge



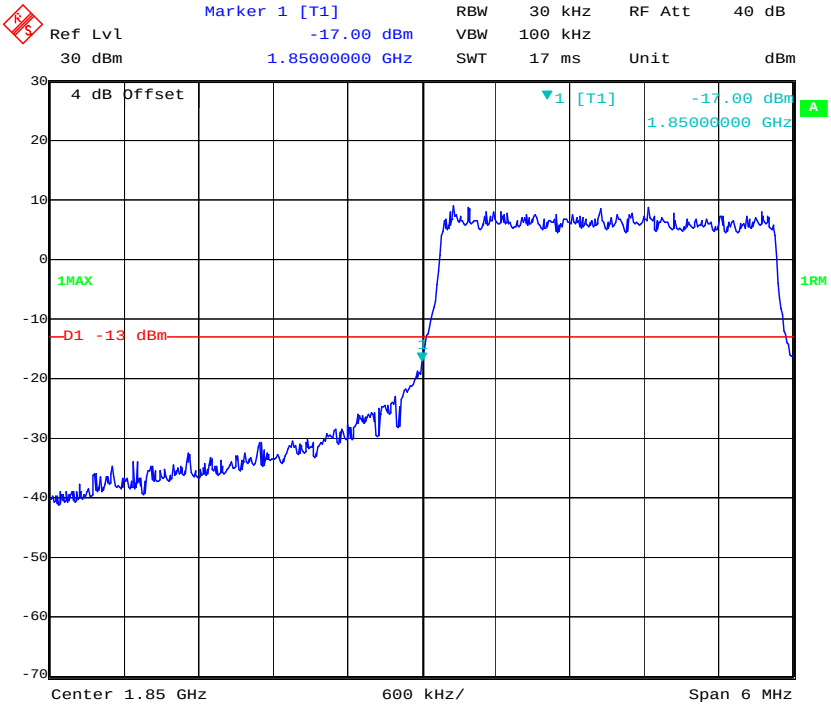
LTE Band 2

QPSK_1.4MHz_ 6 RB_ Left



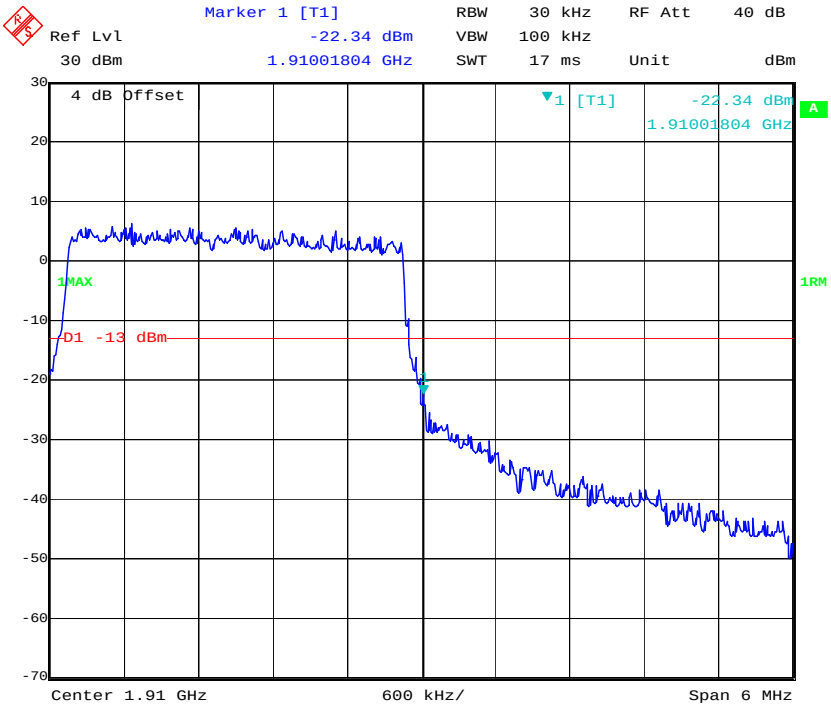
QPSK_1.4MHz_ 6 RB_ Right

QPSK_3MHz_ 15 RB_ Left



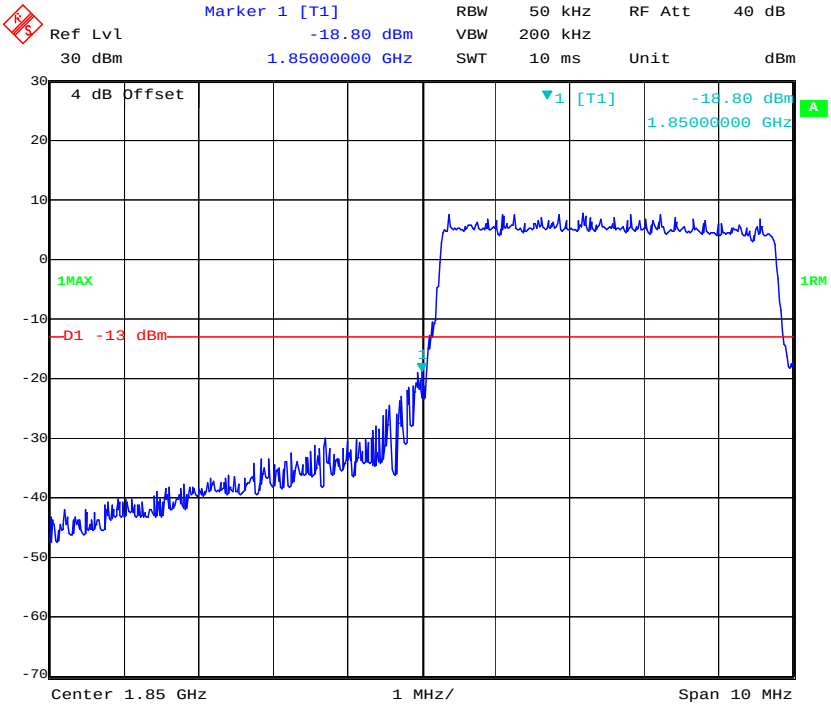
Date: 18.DEC.2018 18:11:37

QPSK_3MHz_ 15 RB_ Right



Date: 18.DEC.2018 18:12:48

QPSK_5MHz_ 25 RB_ Left



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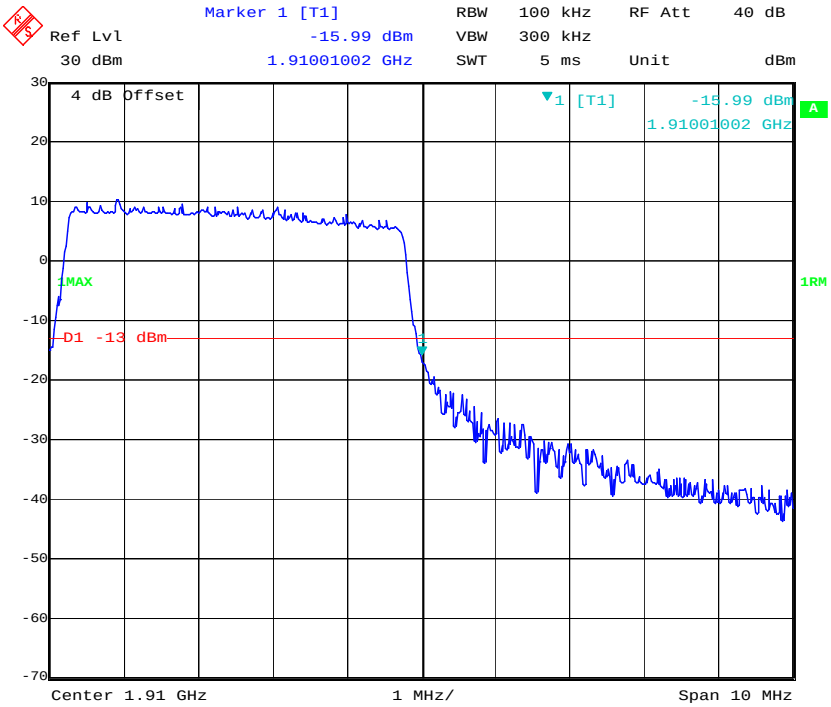
QPSK_5MHz_ 25 RB_ Right



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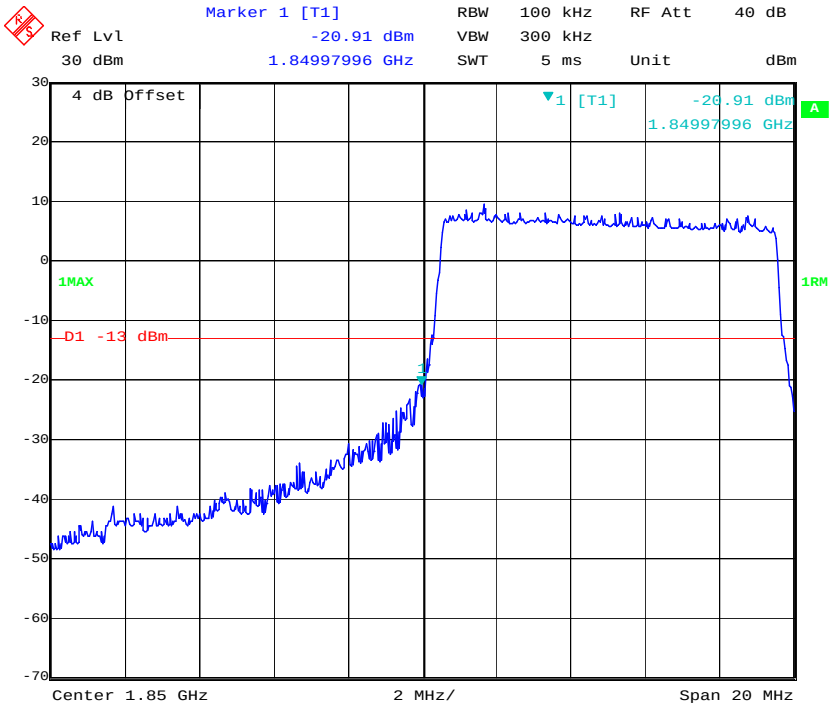
QPSK_10MHz_ 50 RB_ Left



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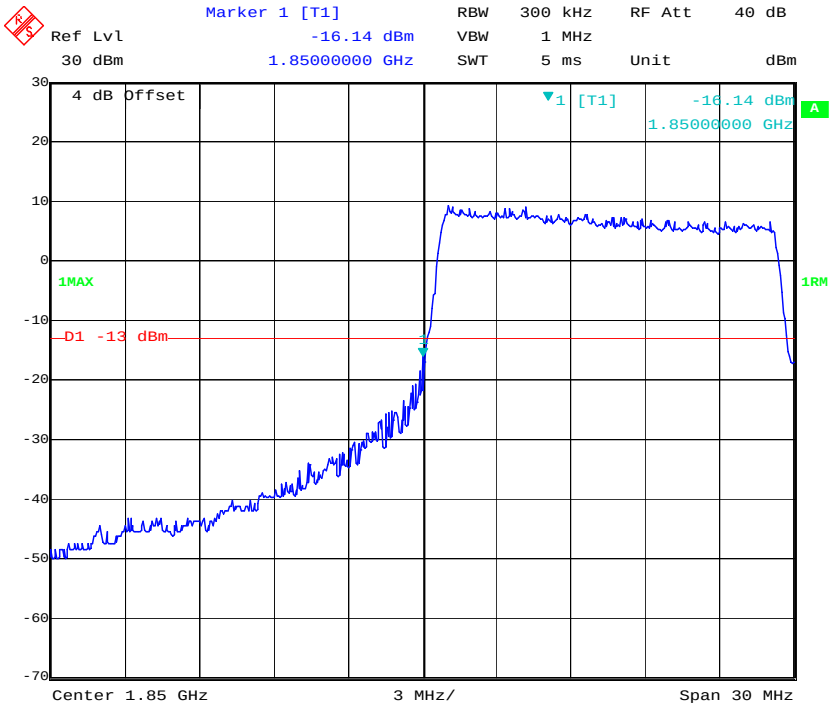
QPSK_10MHz_ 50 RB_ Right

Date: 18.DEC.2018 18:19:18

QPSK_15MHz_ 75 RB_ Left

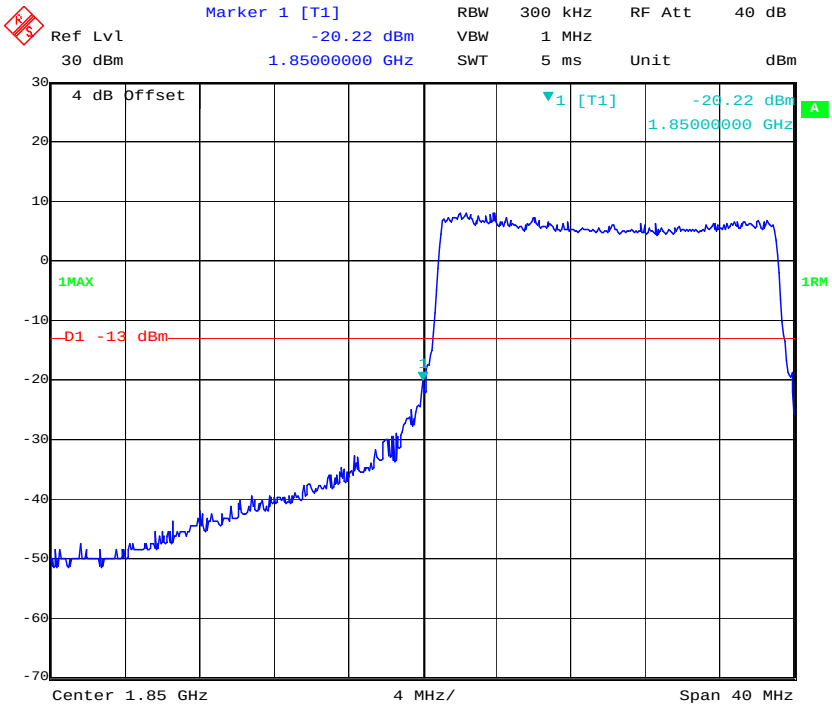


Date: 18.DEC.2018 18:20:47

QPSK_15MHz_ 75 RB_ Right

Date: 18.DEC.2018 18:21:53

QPSK_20MHz_ FULL RB_ Left



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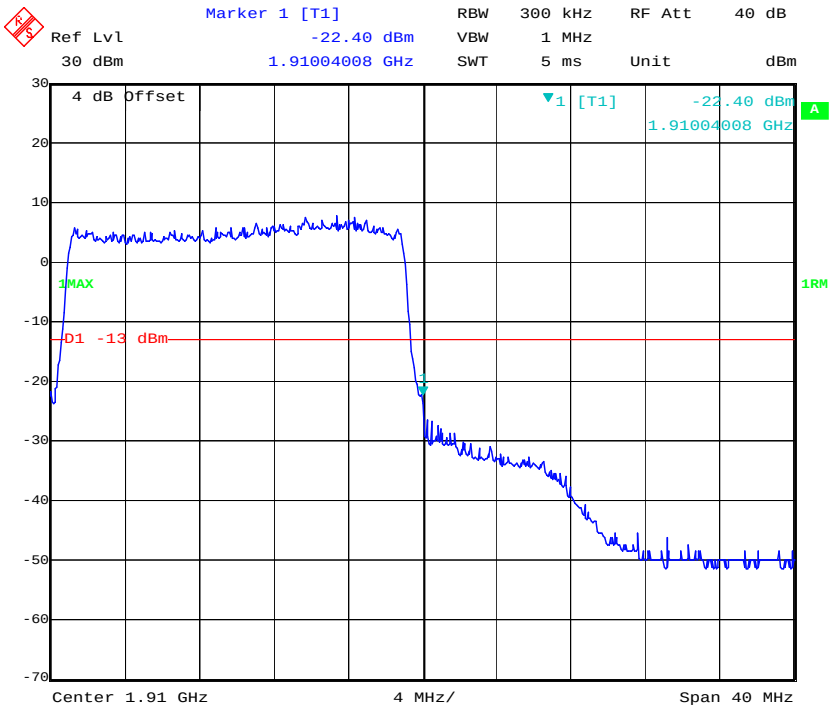
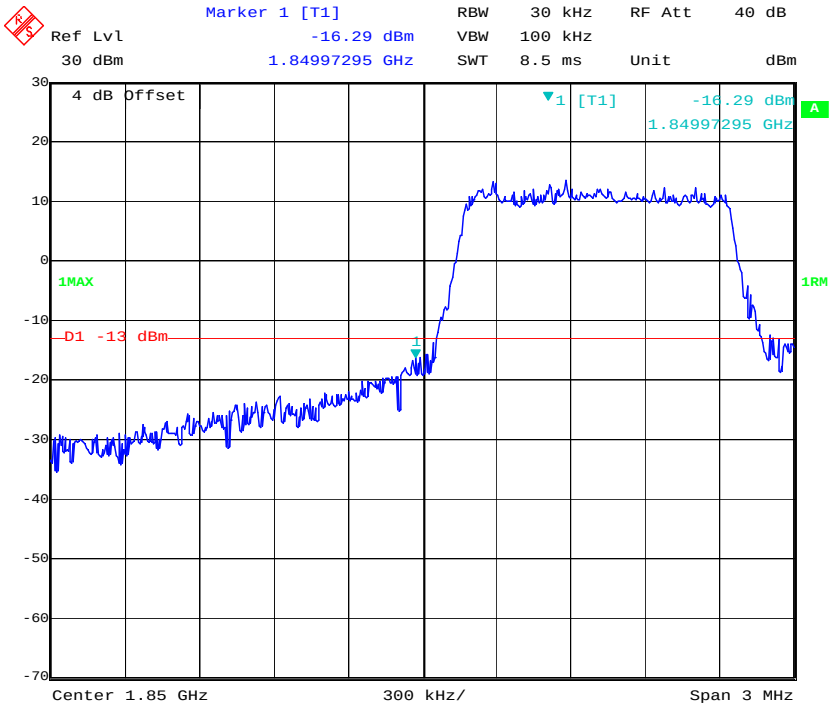
QPSK_20MHz_ FULL RB_ Right



Date: 18.DEC.2018 18:24:36

16QAM_1.4MHz_ 6 RB_ Left

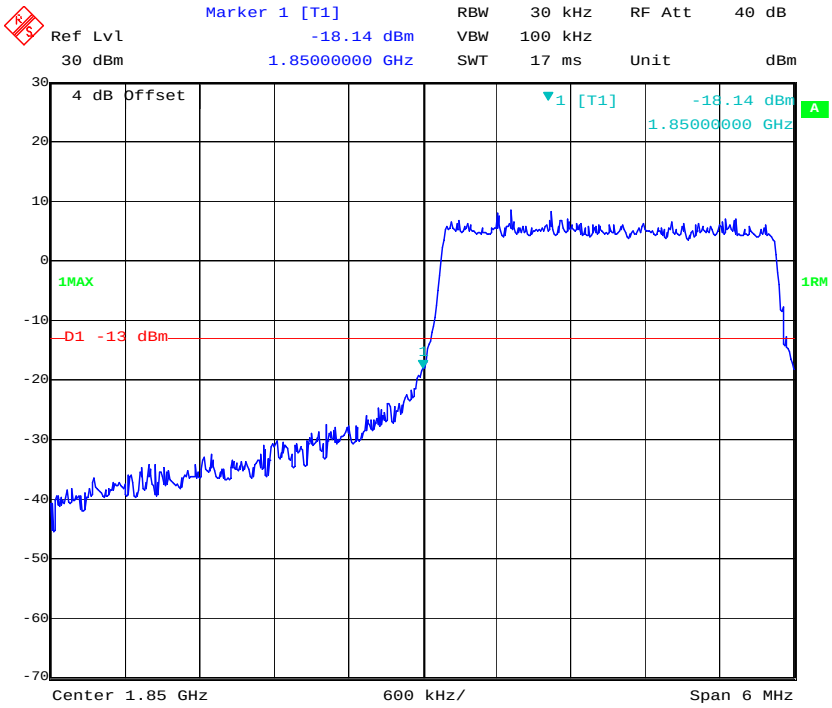


Date: 18.DEC.2018 18:09:30

16QAM_1.4MHz_ 6 RB_ Right

Date: 18.DEC.2018 18:10:58

16QAM_3MHz_ 15 RB_ Left



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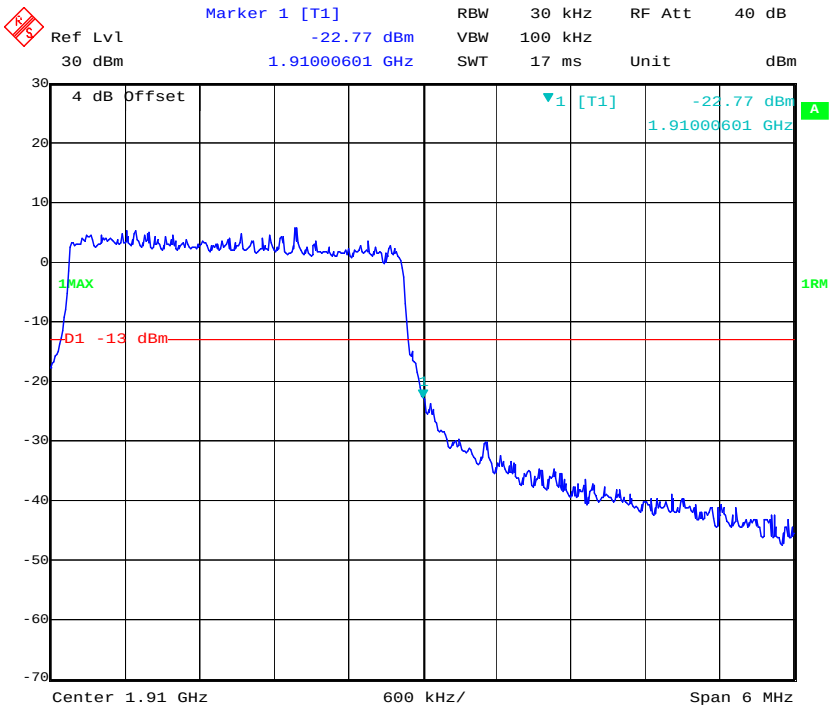
16QAM_3MHz_ 15 RB_ Right



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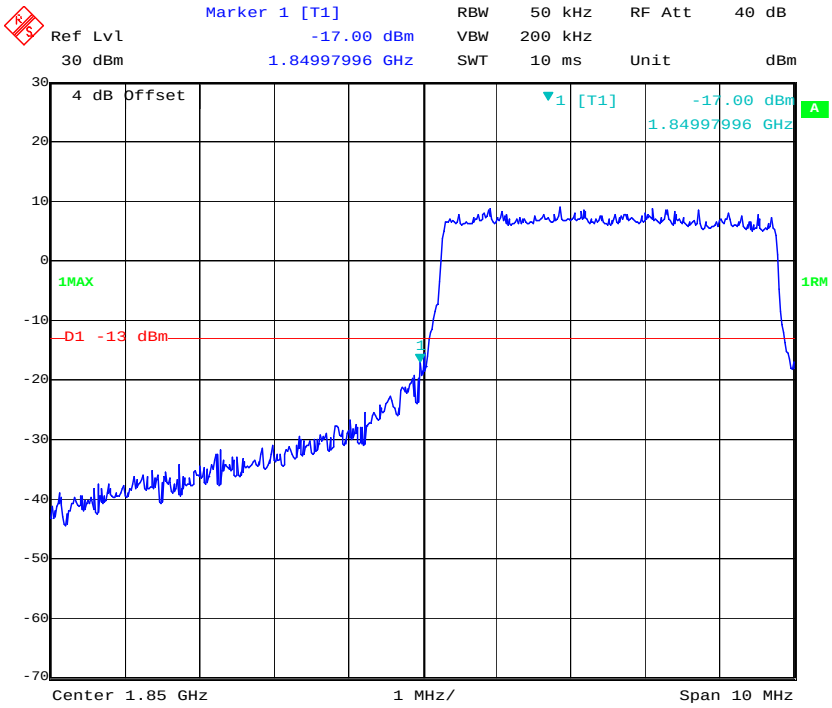
16QAM_5MHz_ 25 RB_ Left



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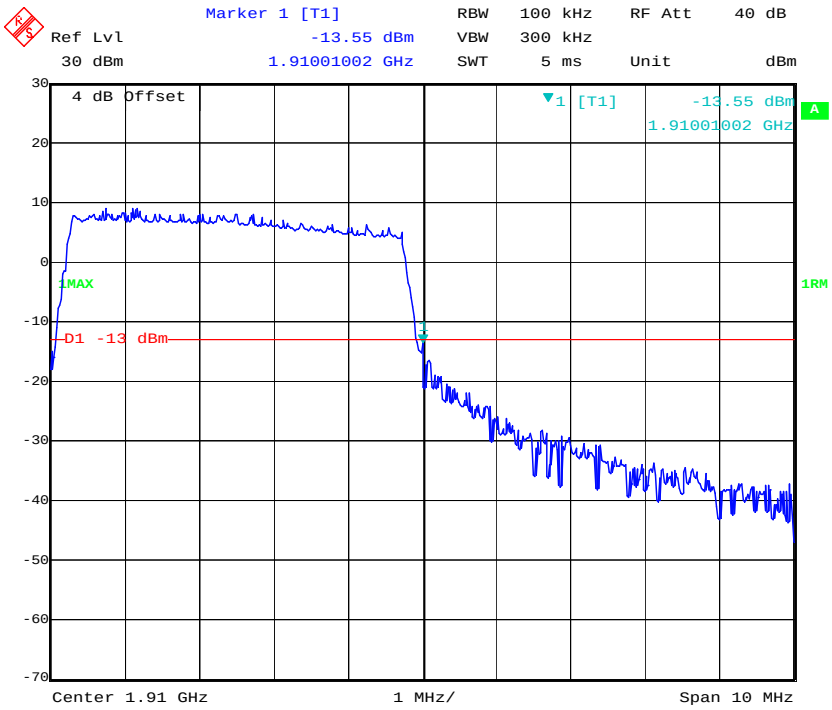
16QAM_5MHz_ 25 RB_ Right



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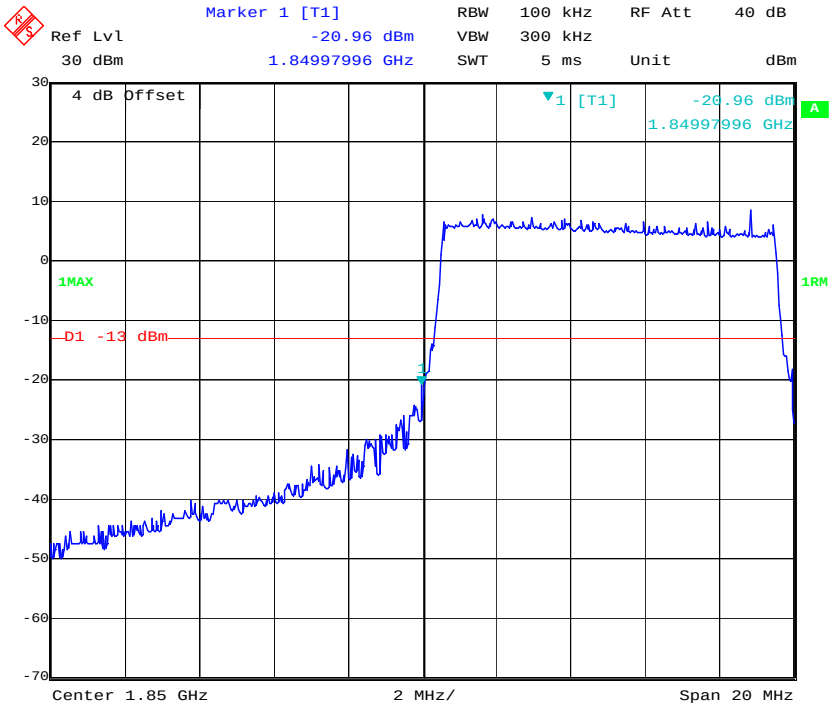
16QAM_10MHz_ 50 RB_ Left



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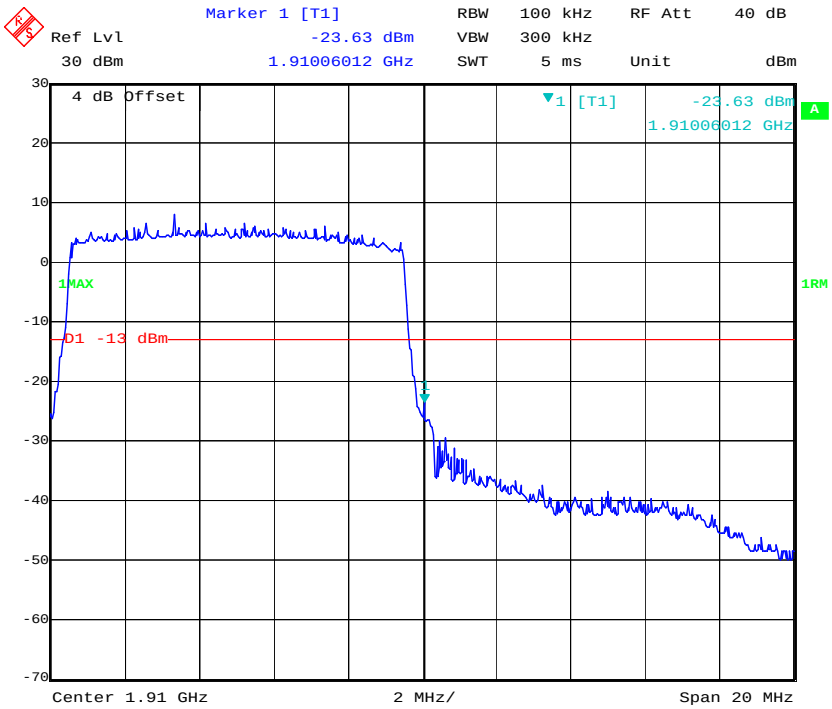
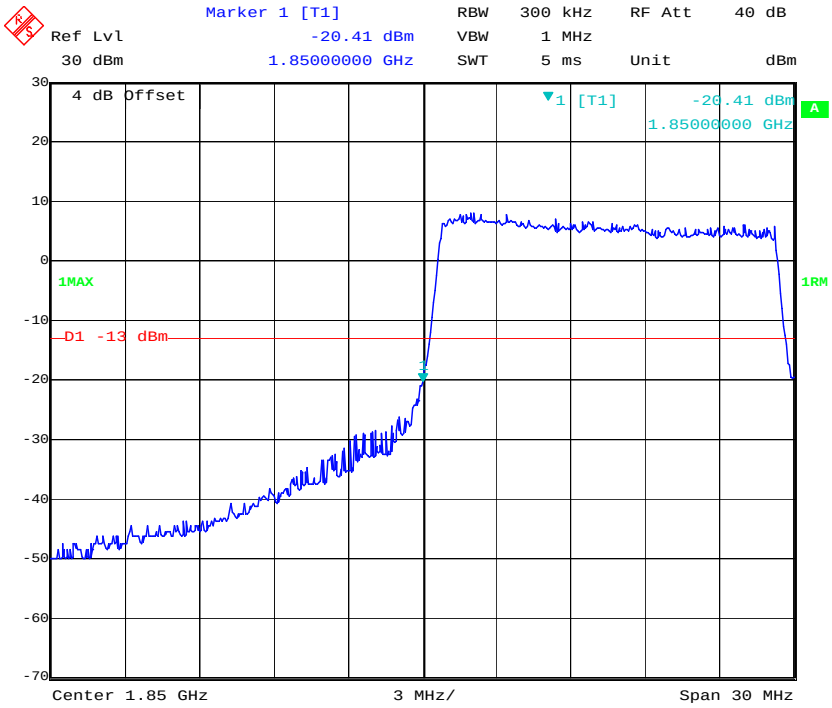
16QAM_10MHz_ 50 RB_ Right



Date: 18.DEC.2018 18:20:01

16QAM_15MHz_ 75 RB_ Left

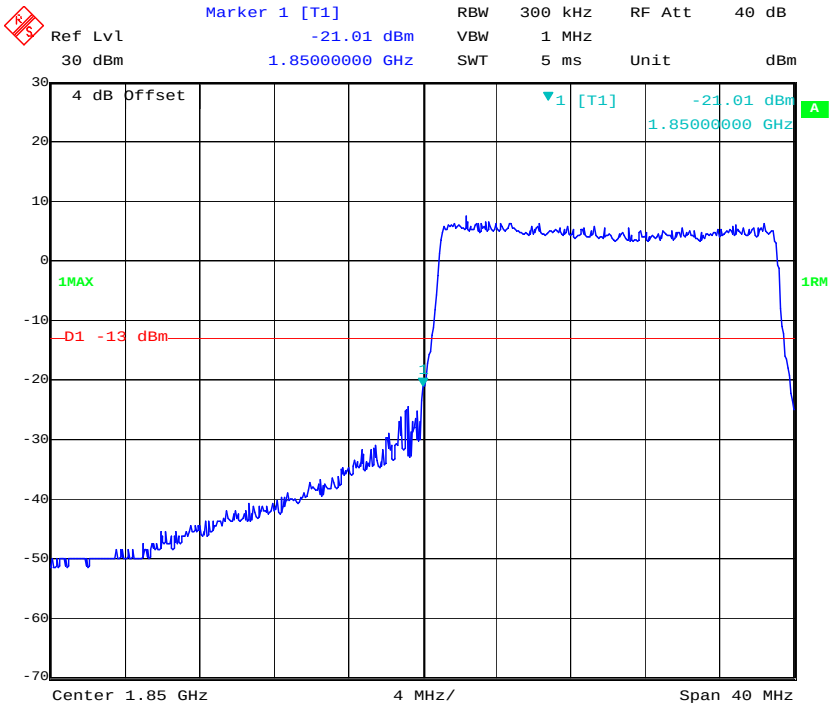


Date: 18.DEC.2018 18:21:26

16QAM_15MHz_ 75 RB_ Right

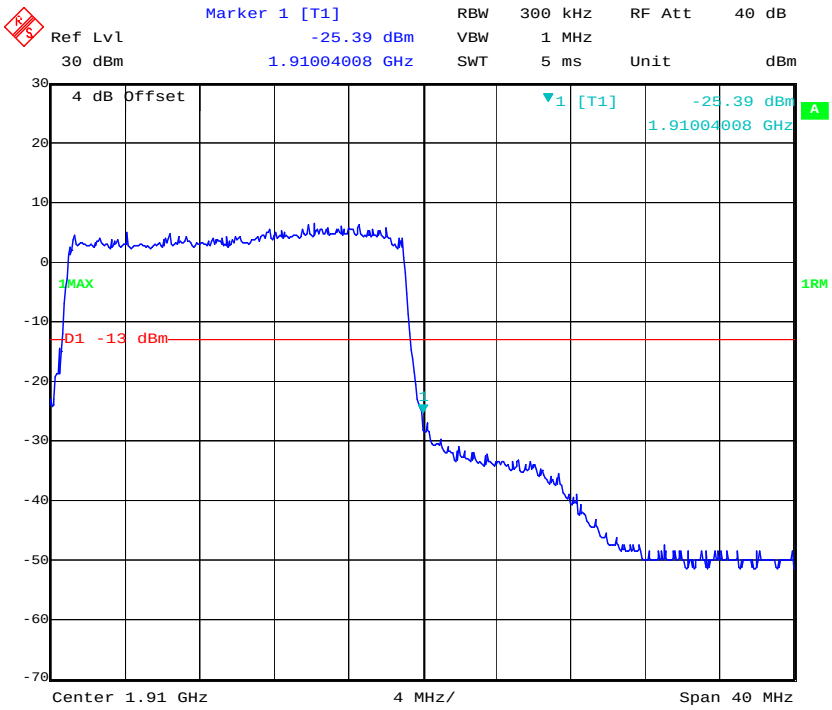
Date: 18.DEC.2018 18:22:29

16QAM_20MHz_ FULL RB_ Left



Date: 18.DEC.2018 18:23:56

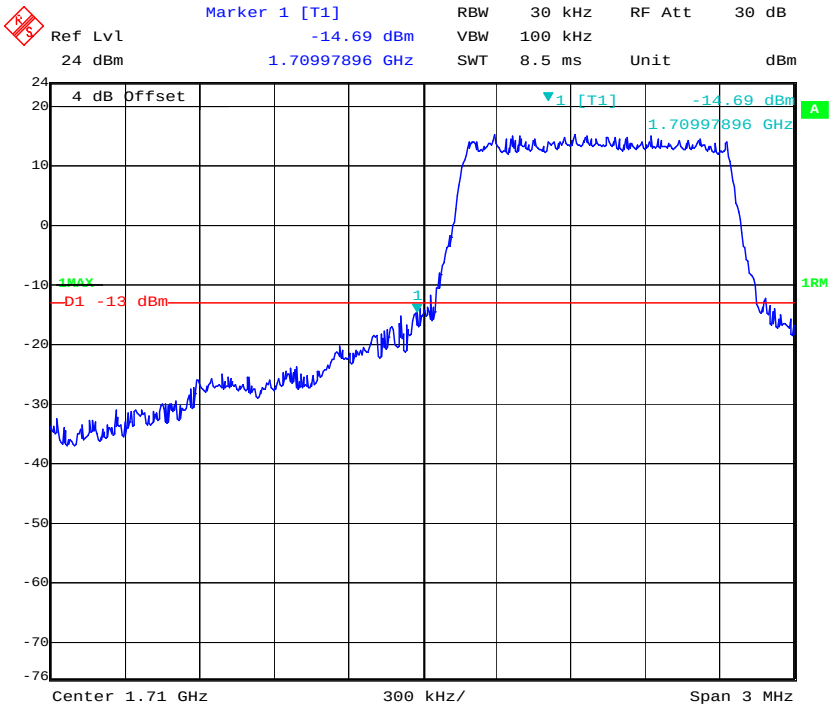
16QAM_20MHz_ FULL RB_ Right



Date: 18.DEC.2018 18:25:18

LTE Band 4

QPSK_1.4MHz_ 6 RB_ Left

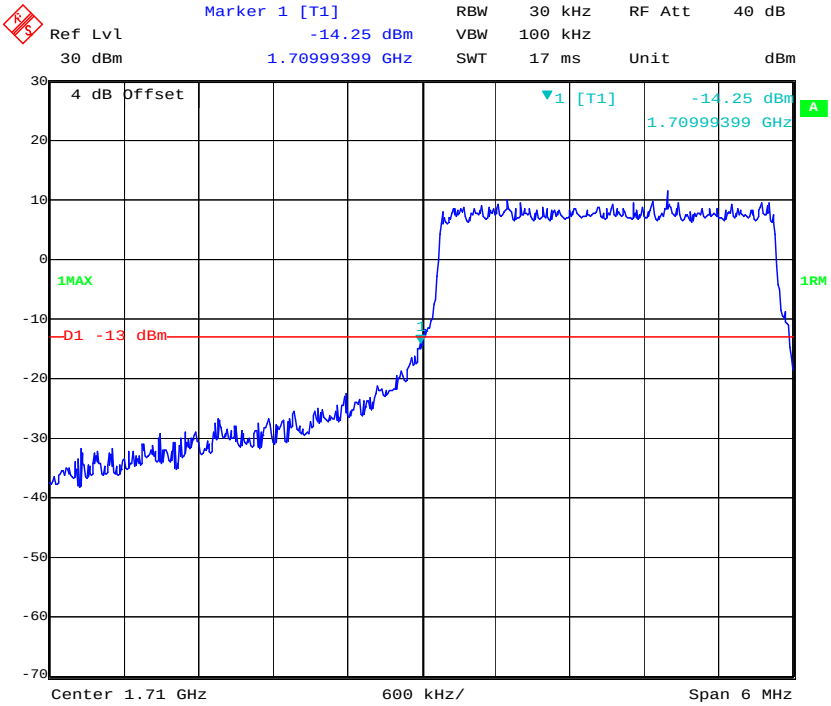


Date: 18.DEC.2018 20:20:11

QPSK_1.4MHz_ 6 RB_ Right

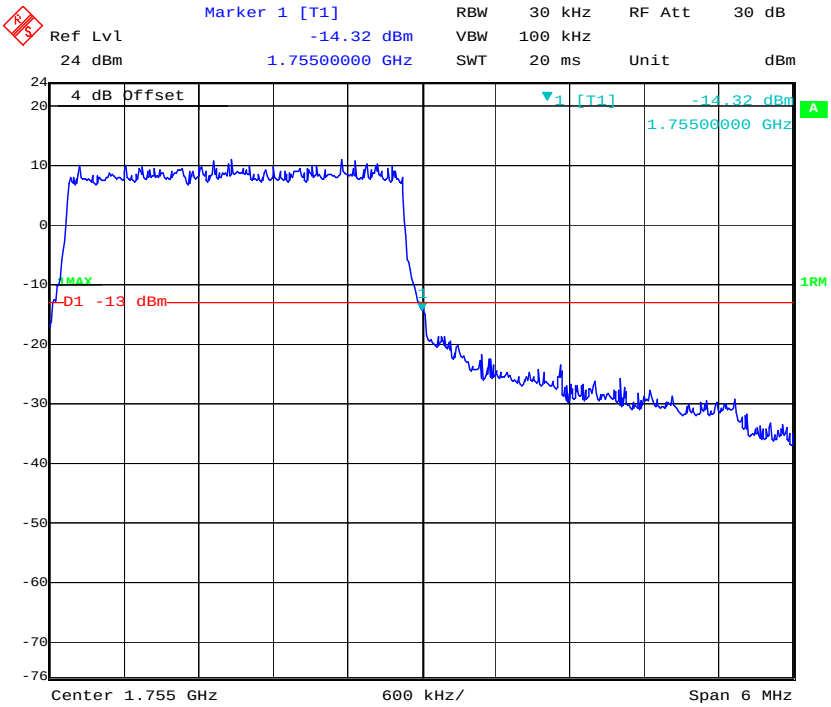
Date: 18.DEC.2018 18:29:12

QPSK_3MHz_ 15 RB_ Left



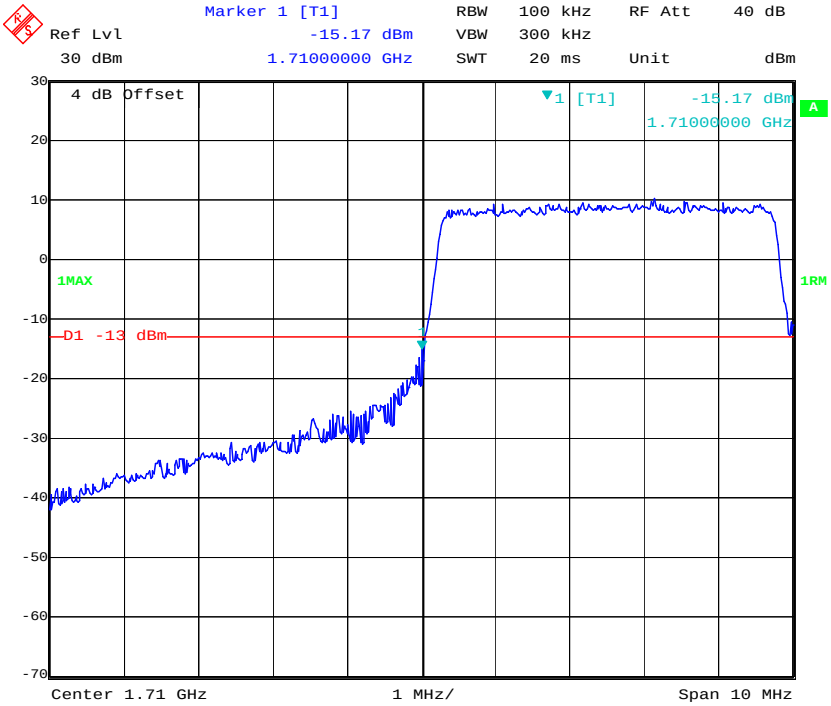
Date: 18.DEC.2018 18:33:27

QPSK_3MHz_ 15 RB_ Right



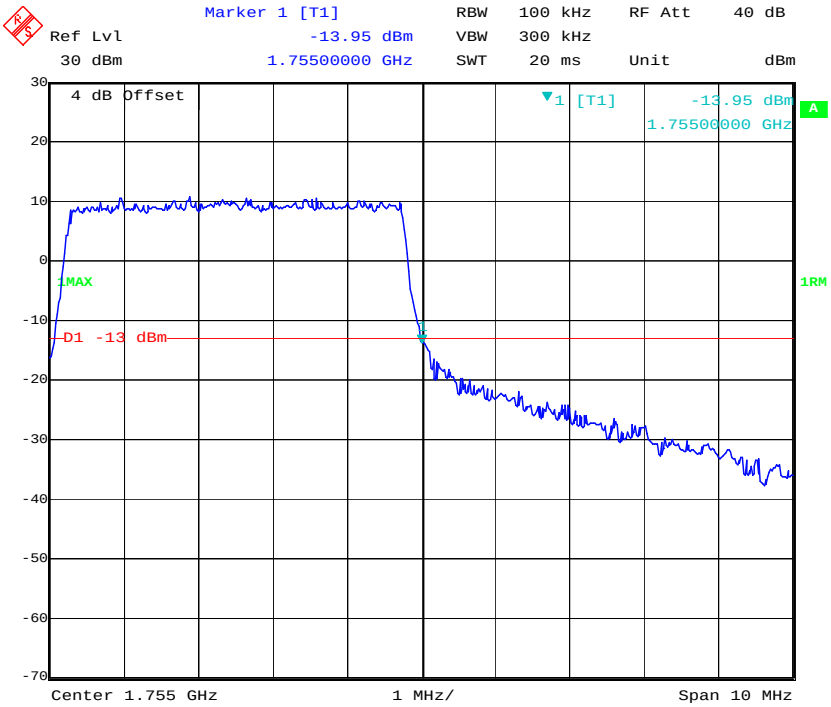
Date: 18.DEC.2018 20:23:12

QPSK_5MHz_ 25 RB_ Left



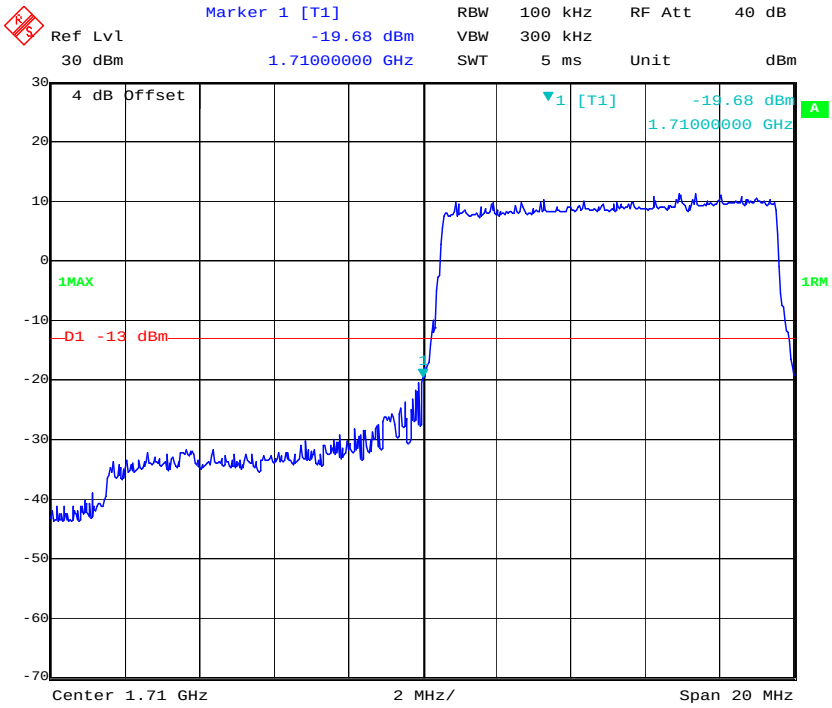
Date: 18.DEC.2018 20:30:36

QPSK_5MHz_ 25 RB_ Right



Date: 18.DEC.2018 20:27:55

QPSK_10MHz_ 50 RB_ Left



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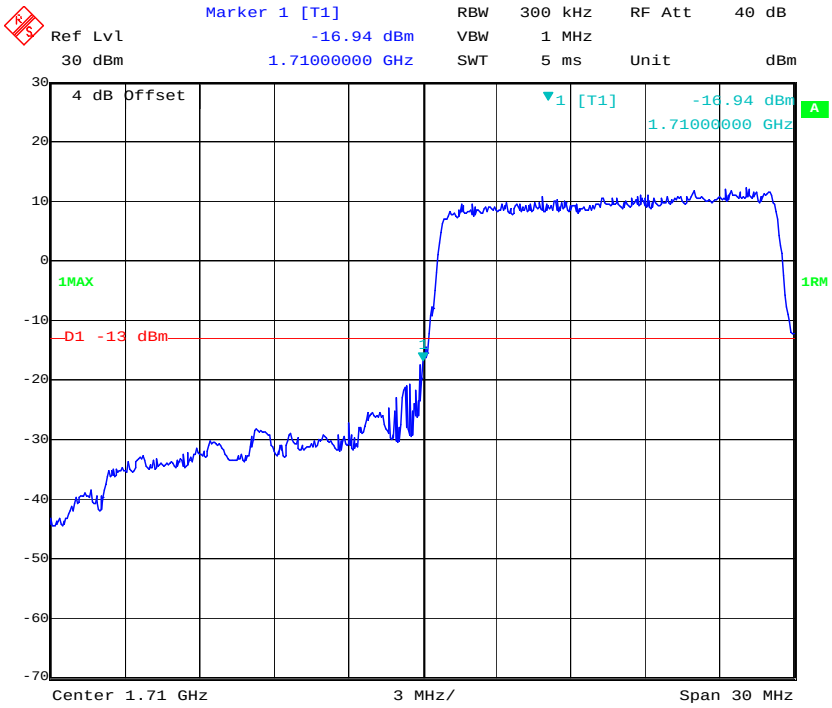
QPSK_10MHz_ 50 RB_ Right

Date: 18.DEC.2018 18:40:07

QPSK_15MHz_ 75 RB_ Left

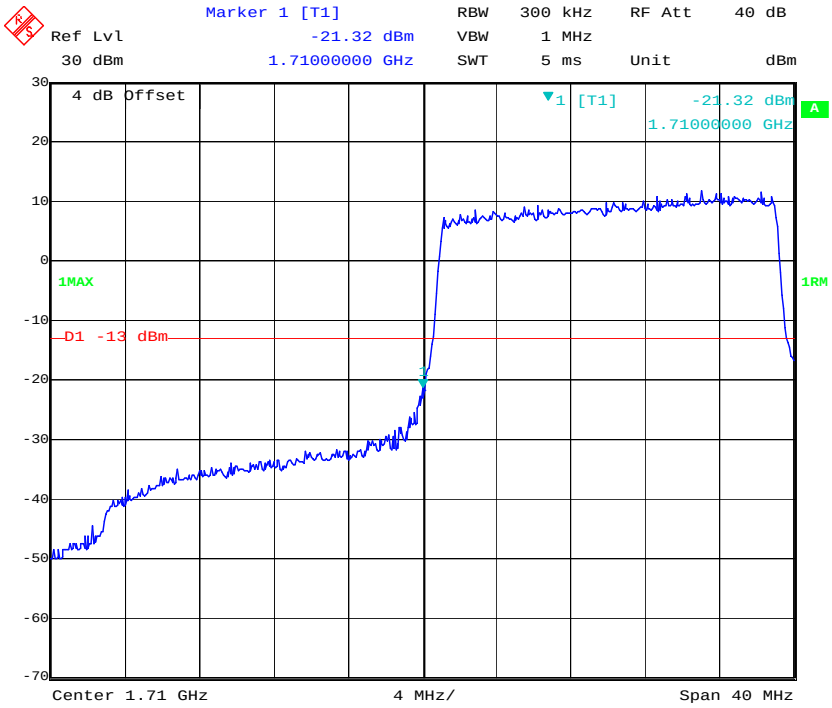


Date: 18.DEC.2018 18:41:15

QPSK_15MHz_ 75 RB_ Right

Date: 18.DEC.2018 18:42:16

QPSK_20MHz_ FULL RB_ Left

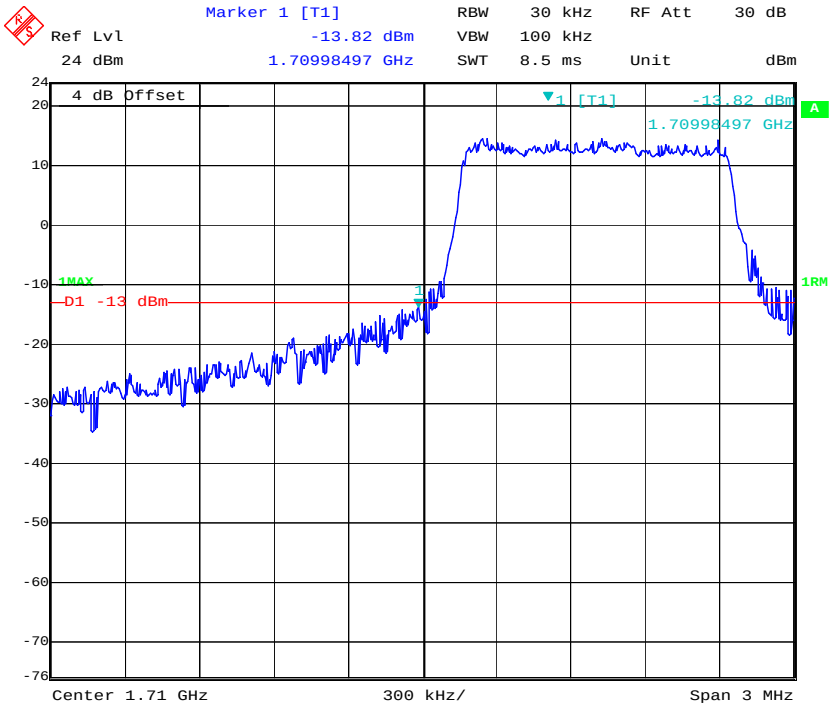


Date: 18.DEC.2018 18:43:35

QPSK_20MHz_ FULL RB_ Right

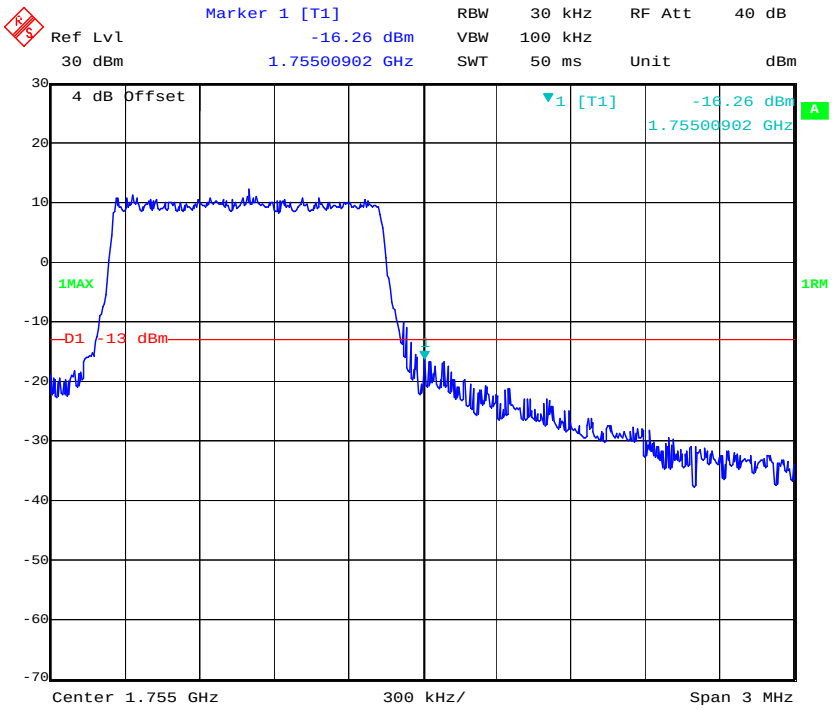
Date: 18.DEC.2018 18:44:56

16QAM_1.4MHz_ 6 RB_ Left



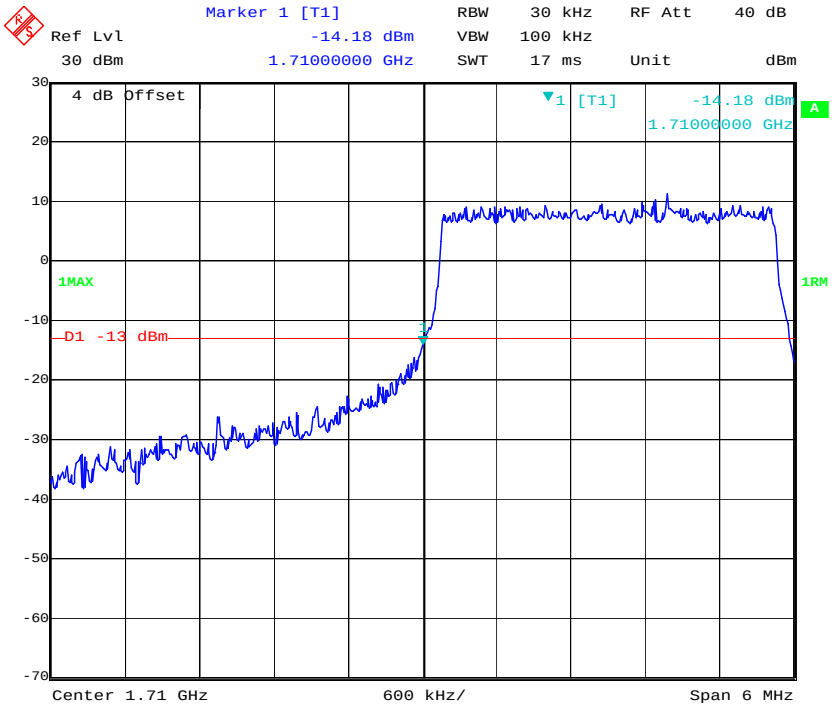
Date: 18.DEC.2018 20:19:18

16QAM_1.4MHz_ 6 RB_ Right



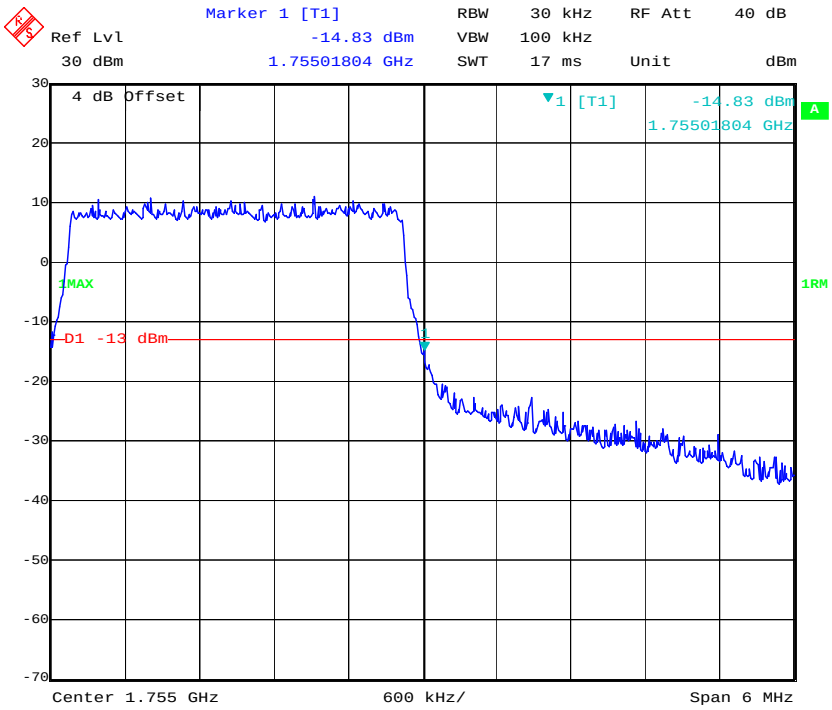
Date: 18.DEC.2018 18:30:28

16QAM_3MHz_ 15 RB_ Left



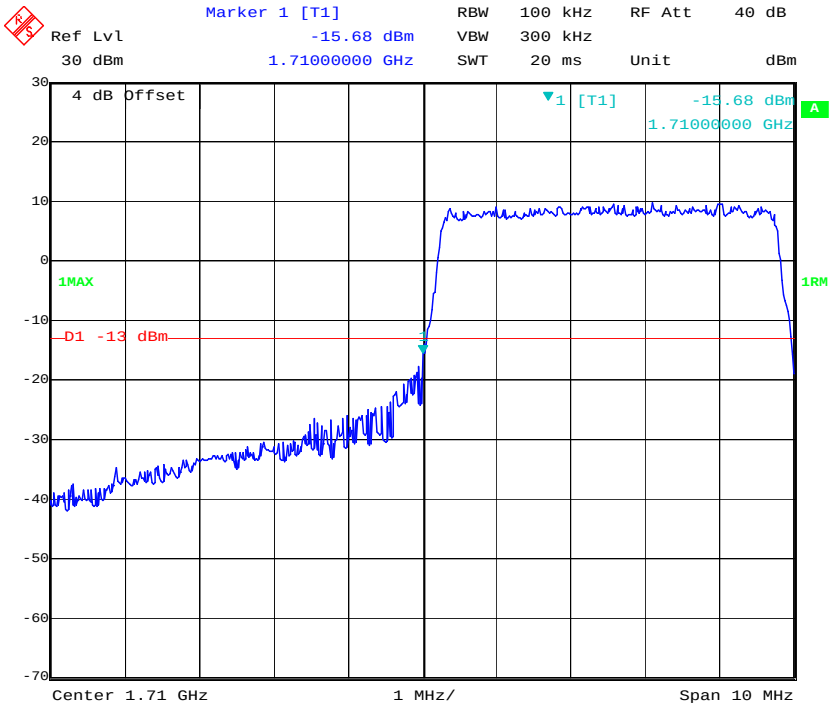
Date: 18.DEC.2018 18:34:04

16QAM_3MHz_ 15 RB_ Right



Date: 18.DEC.2018 18:35:11

16QAM_5MHz_ 25 RB_ Left



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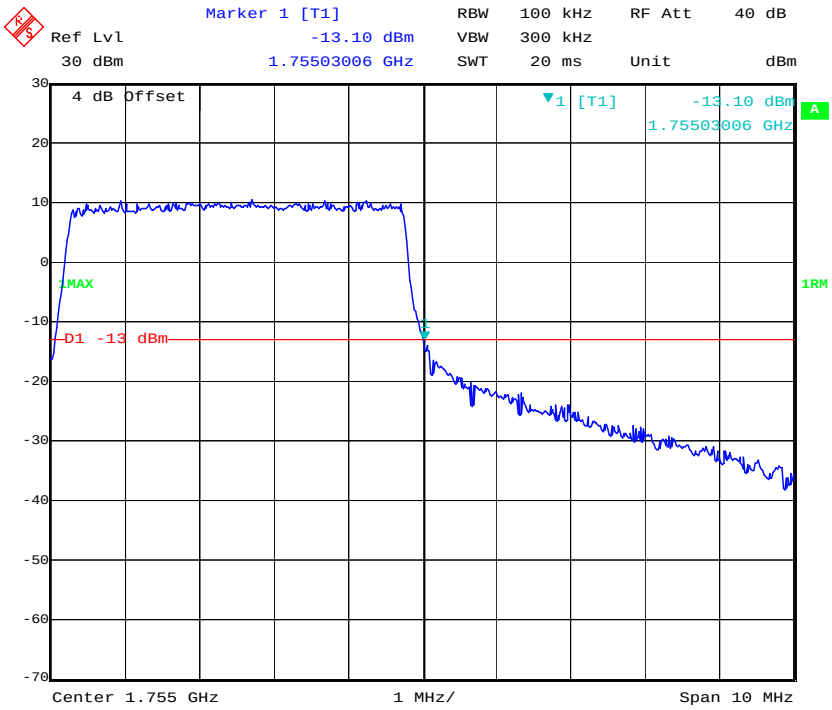
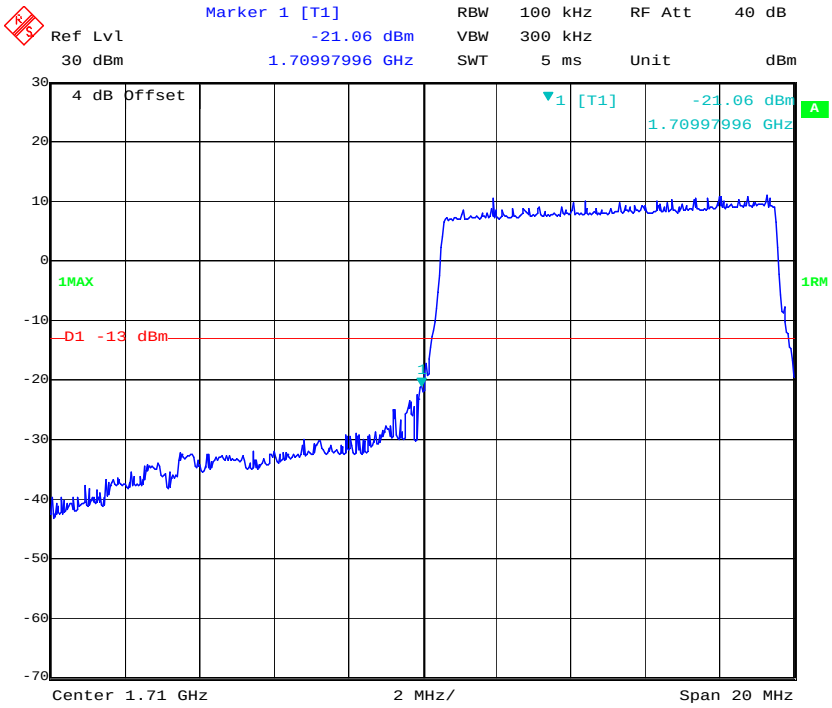
16QAM_5MHz_ 25 RB_ Right



Date: 18.DEC.2018 20:27:03

16QAM_10MHz_ 50 RB_ Left

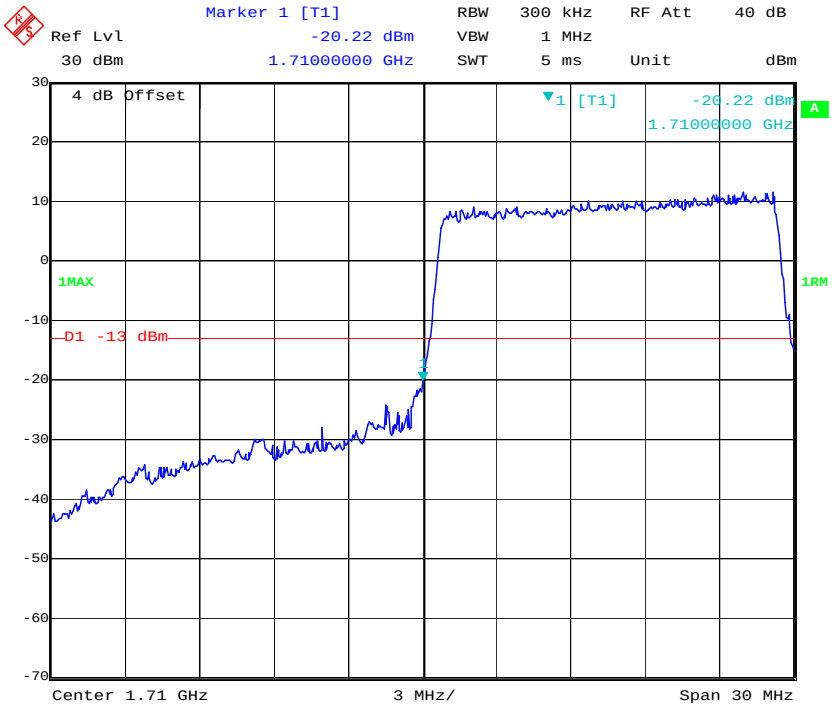


Date: 18.DEC.2018 18:39:08

16QAM_10MHz_ 50 RB_ Right

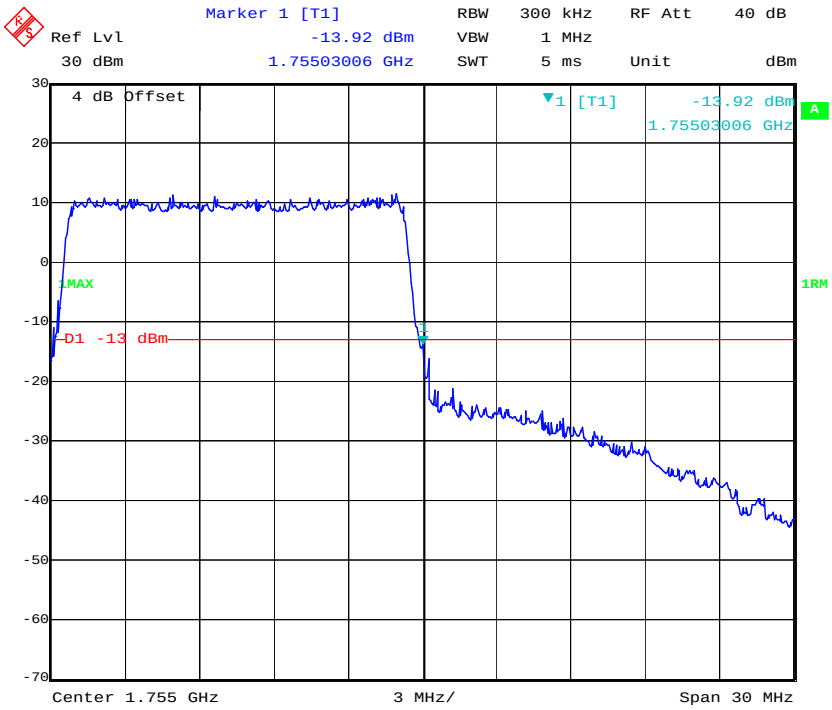
Date: 18.DEC.2018 18:40:45

16QAM_15MHz_ 75 RB_ Left



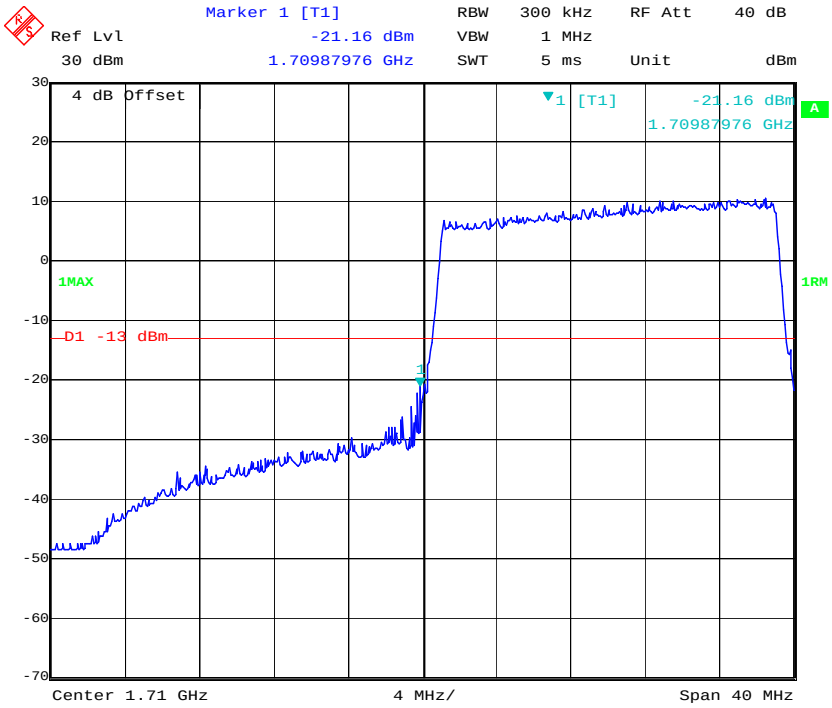
Date: 18.DEC.2018 18:41:52

16QAM_15MHz_ 75 RB_ Right



Date: 18.DEC.2018 18:42:51

16QAM_20MHz_ FULL RB_ Left



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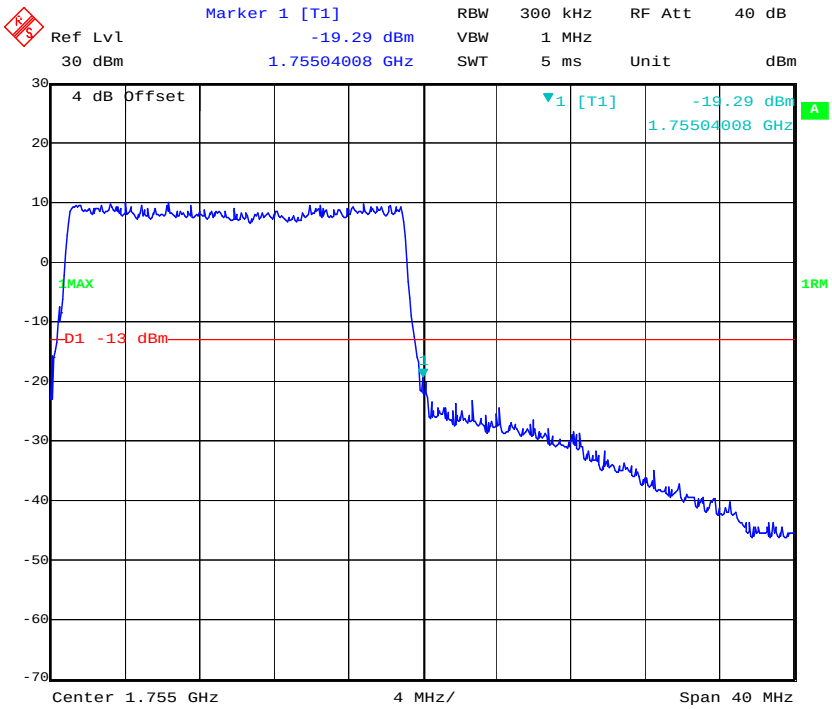
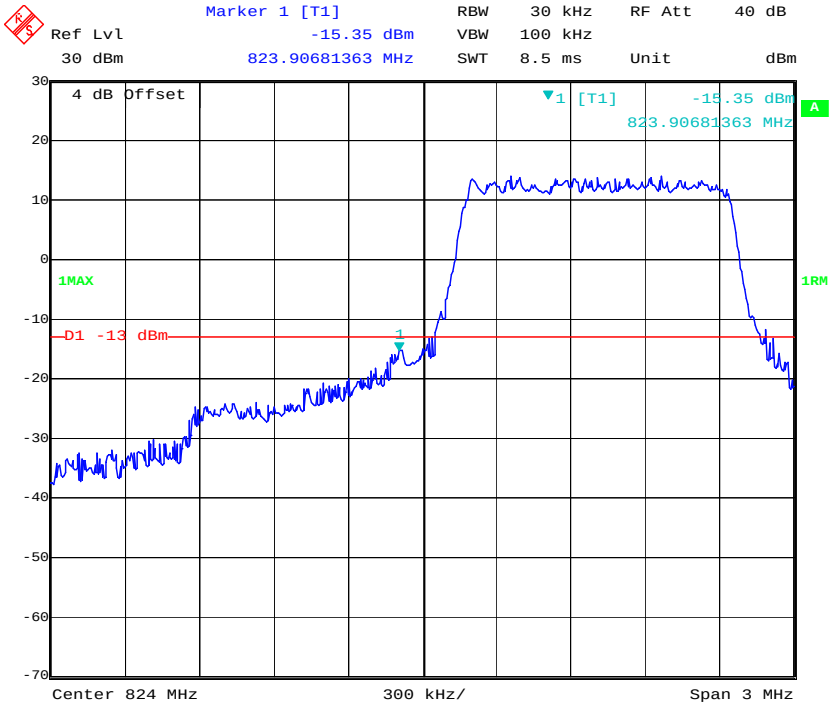
16QAM_20MHz_ FULL RB_ Right



Date: 18.DEC.2018 18:45:30

LTE Band 5

QPSK_1.4MHz_ 6 RB_ Left

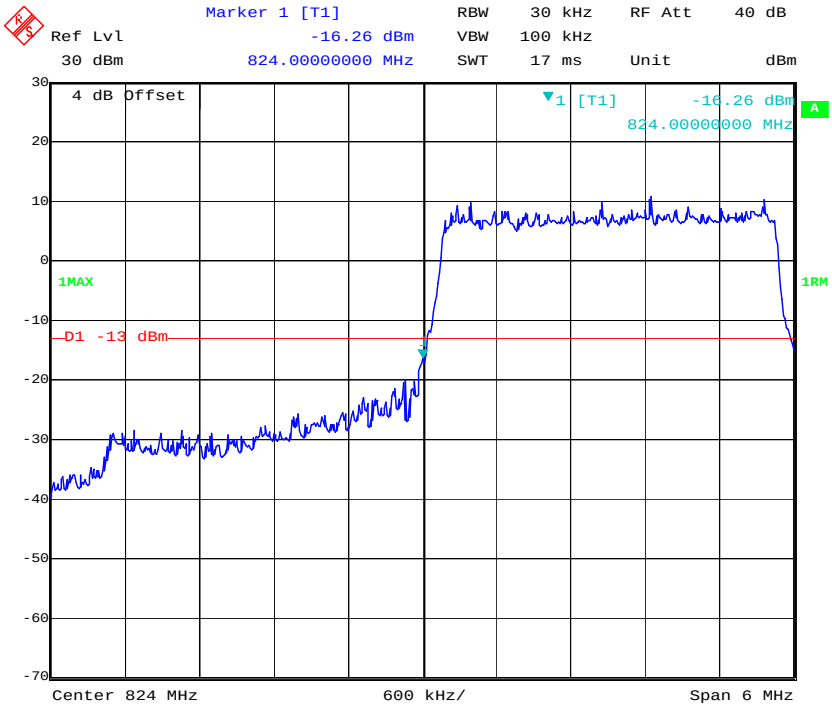


Date: 18.DEC.2018 20:34:36

QPSK_1.4MHz_ 6 RB_ Right

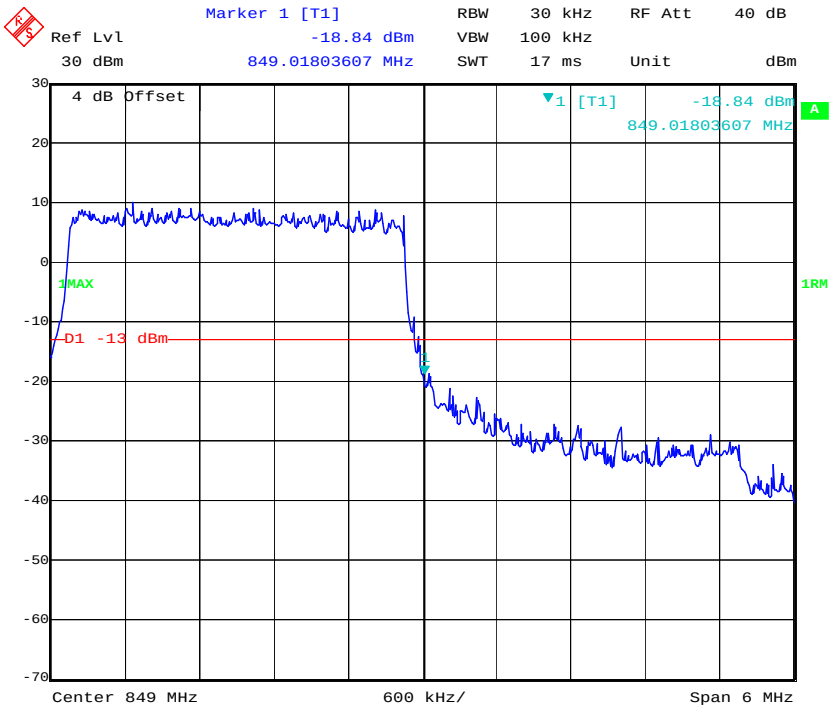
Date: 18.DEC.2018 18:47:40

QPSK_3MHz_ 15 RB_ Left



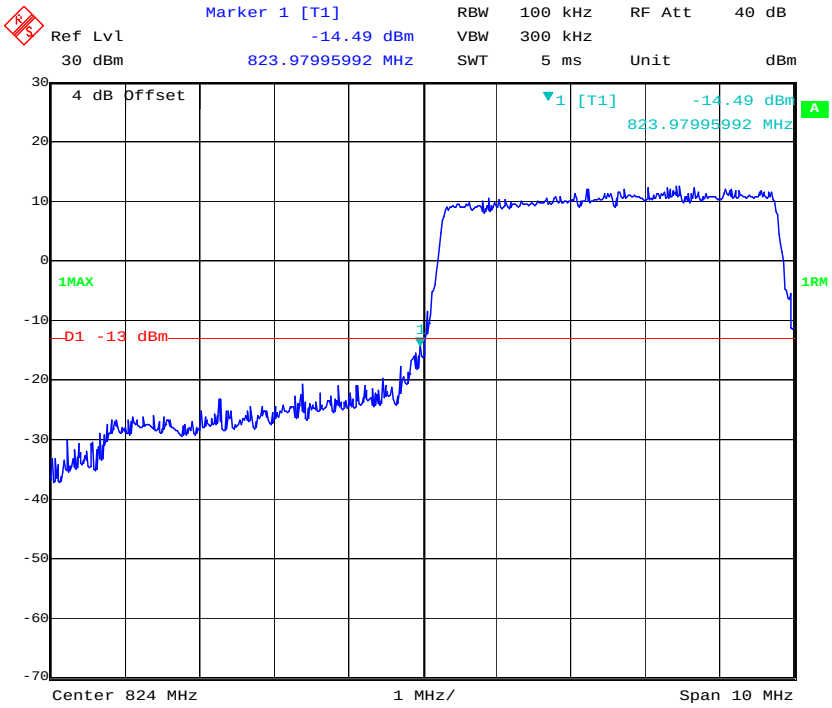
Date: 18.DEC.2018 18:49:09

QPSK_3MHz_ 15 RB_ Right



Date: 18.DEC.2018 18:50:19

QPSK_5MHz_ 25 RB_ Left



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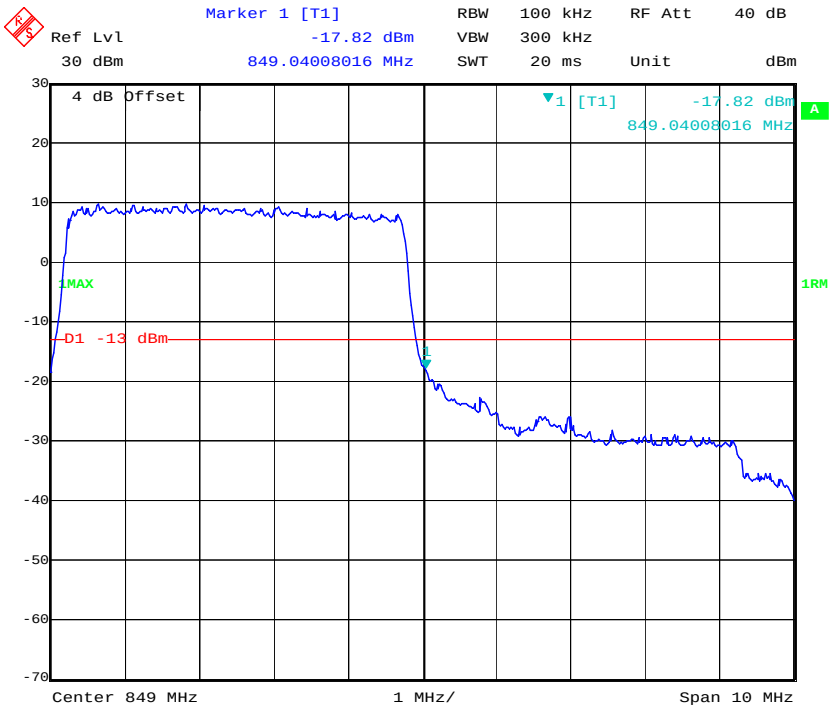
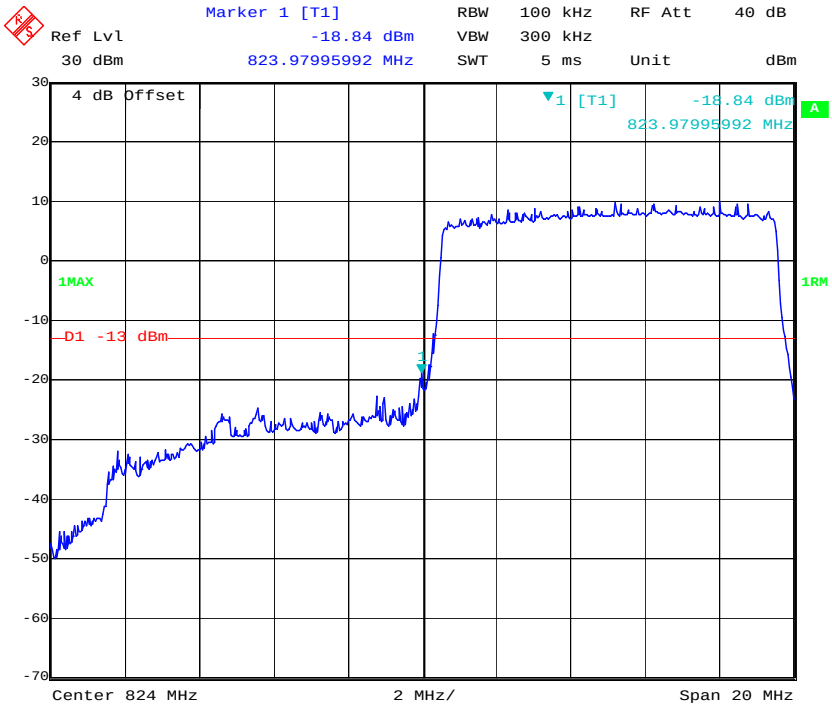
QPSK_5MHz_ 25 RB_ Right



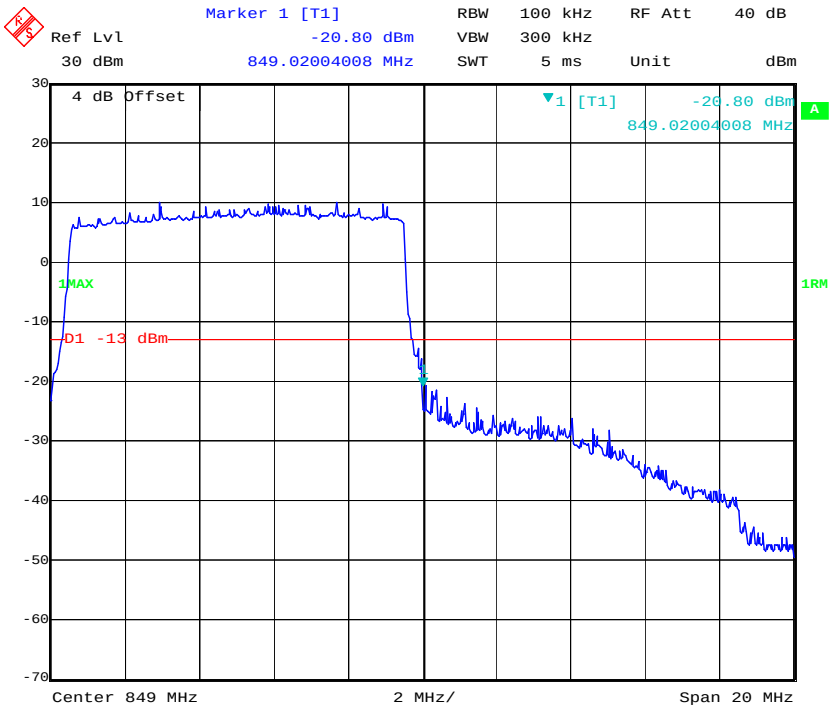
Date: 18.DEC.2018 20:41:58

QPSK_10MHz_ 50 RB_ Left



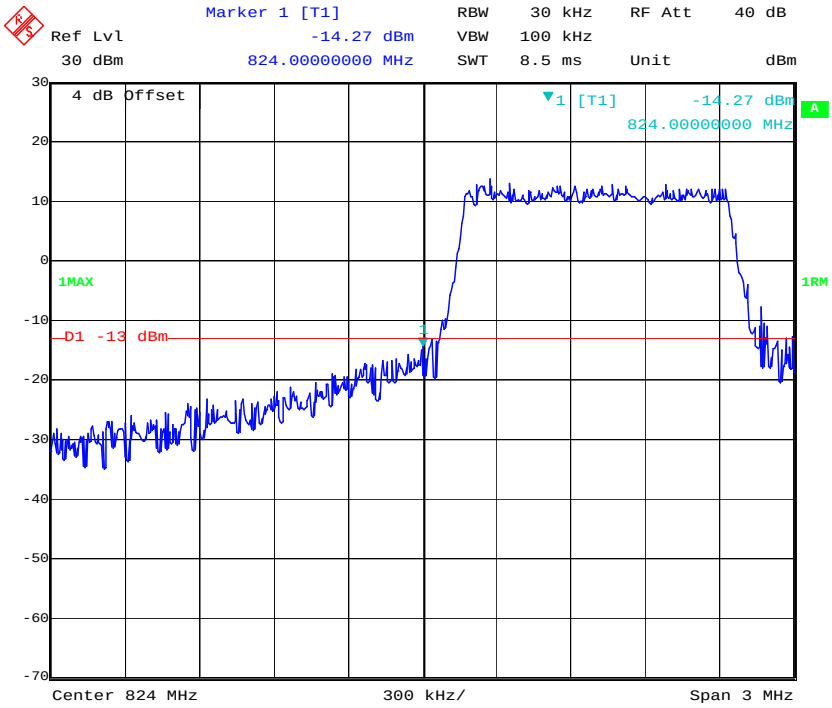
Date: 18.DEC.2018 18:54:10

QPSK_10MHz_ 50 RB_ Right



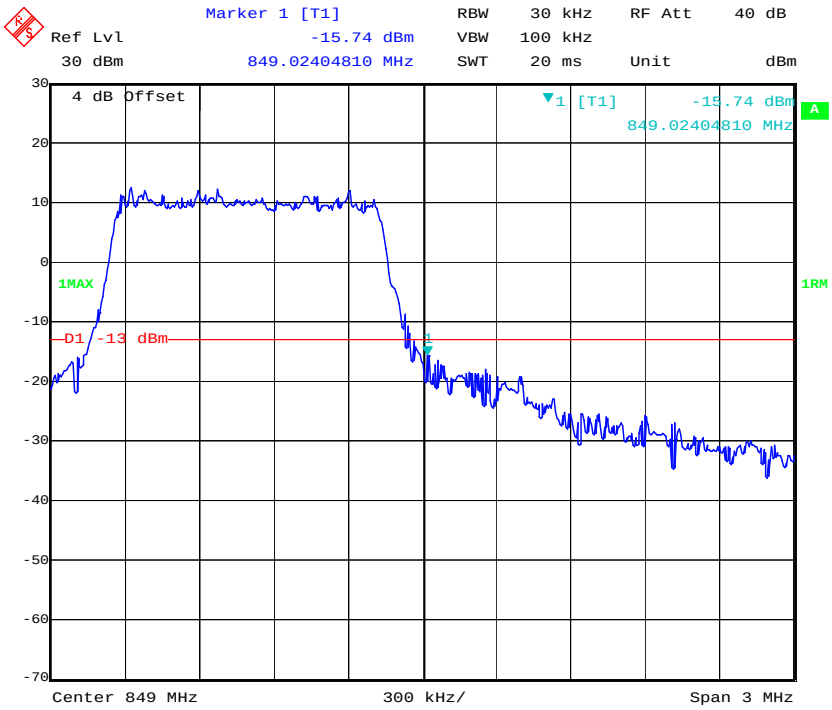
Date: 18.DEC.2018 18:55:03

16QAM_1.4MHz_ 6 RB_ Left



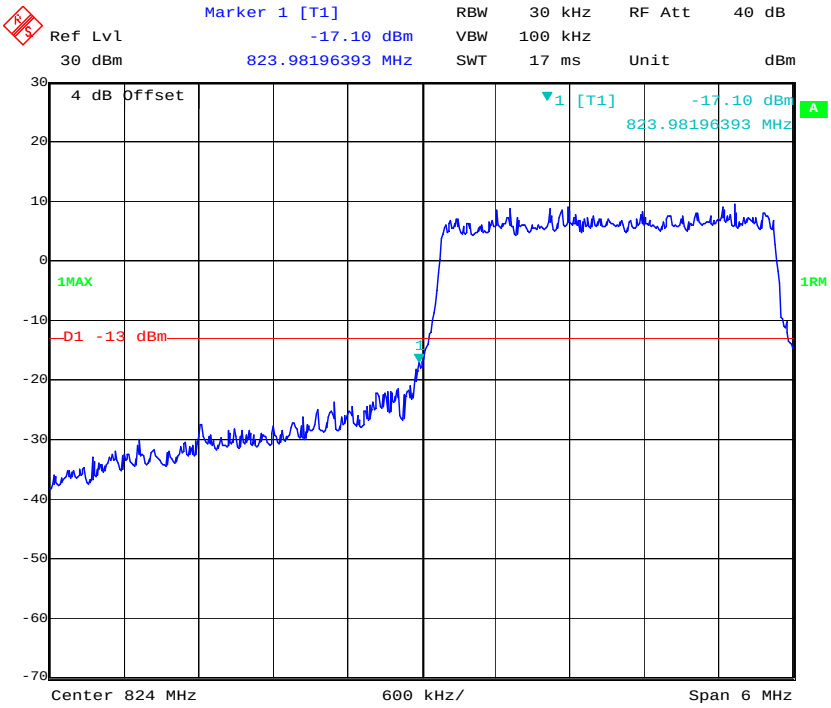
Date: 18.DEC.2018 20:33:42

16QAM_1.4MHz_ 6 RB_ Right



Date: 18.DEC.2018 20:37:47

16QAM_3MHz_ 15 RB_ Left



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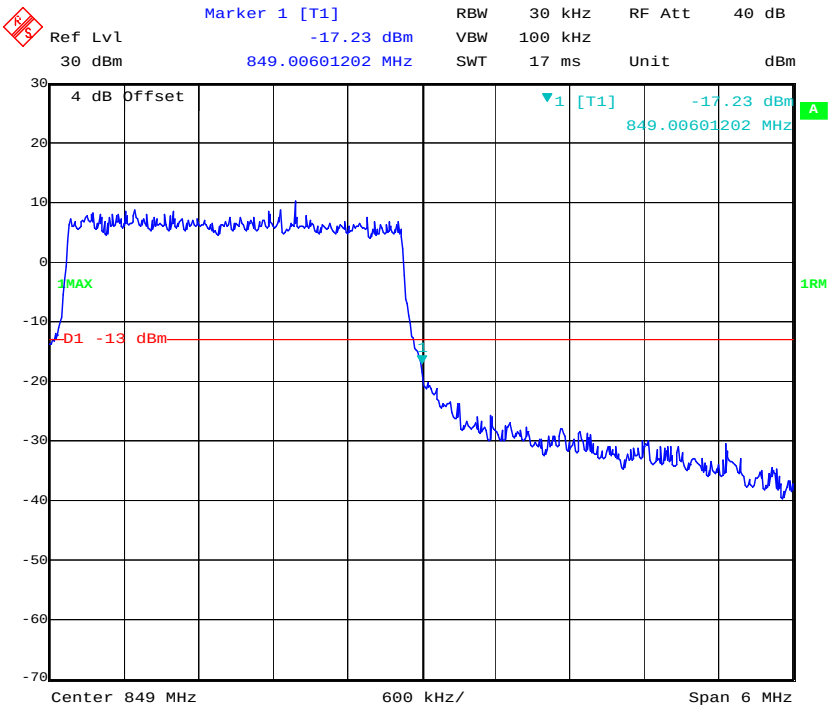
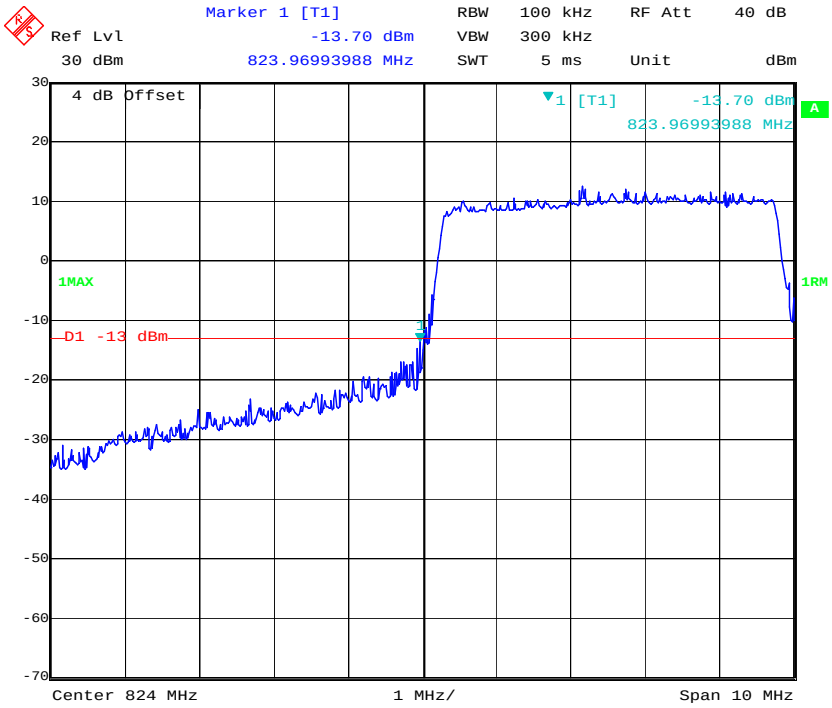
16QAM_3MHz_ 15 RB_ Right



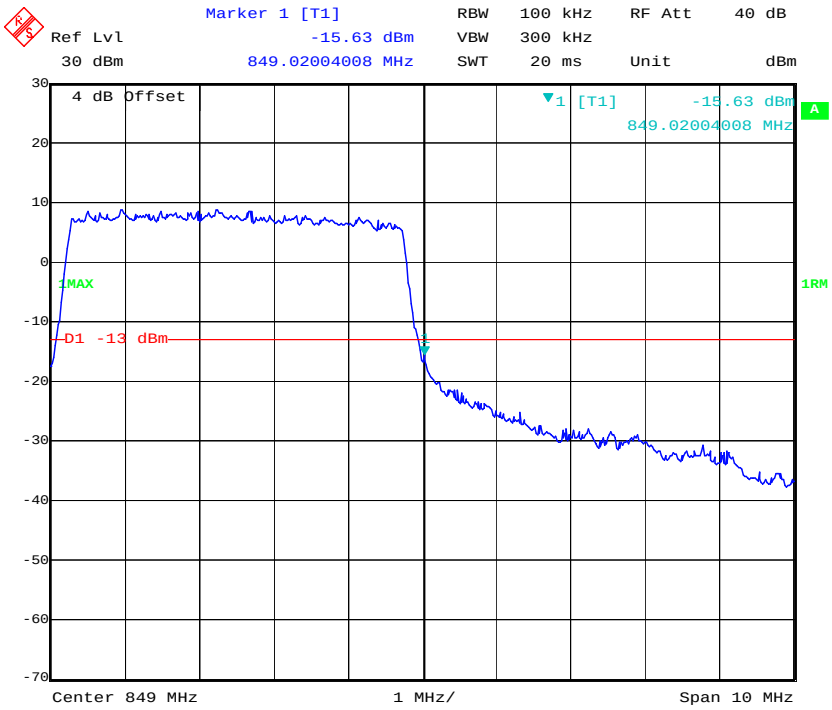
Date: 18.DEC.2018 18:51:00

16QAM_5MHz_ 25 RB_ Left



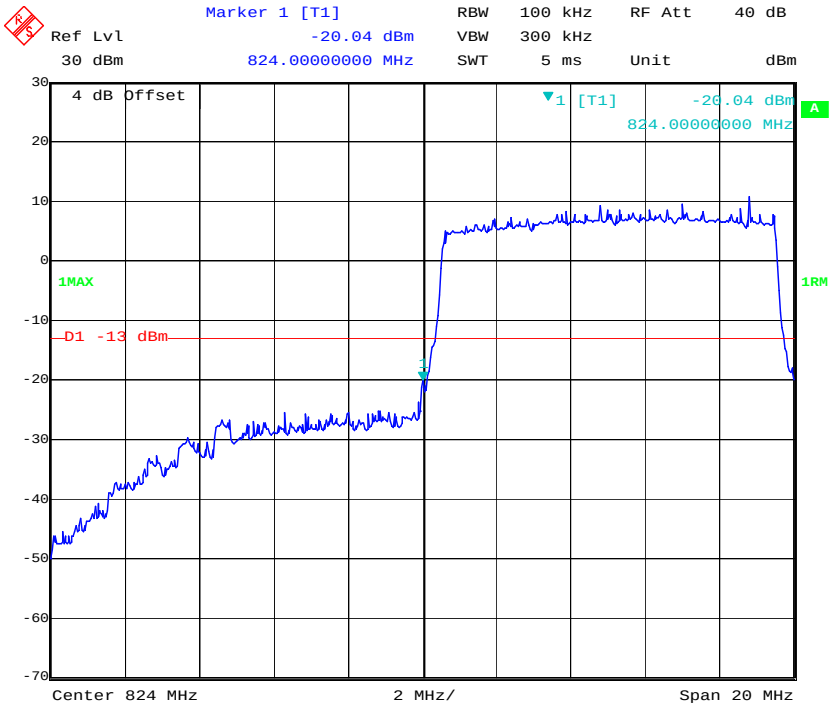
Date: 18.DEC.2018 18:52:20

16QAM_5MHz_ 25 RB_ Right



Date: 18.DEC.2018 20:40:47

16QAM_10MHz_ 50 RB_ Left



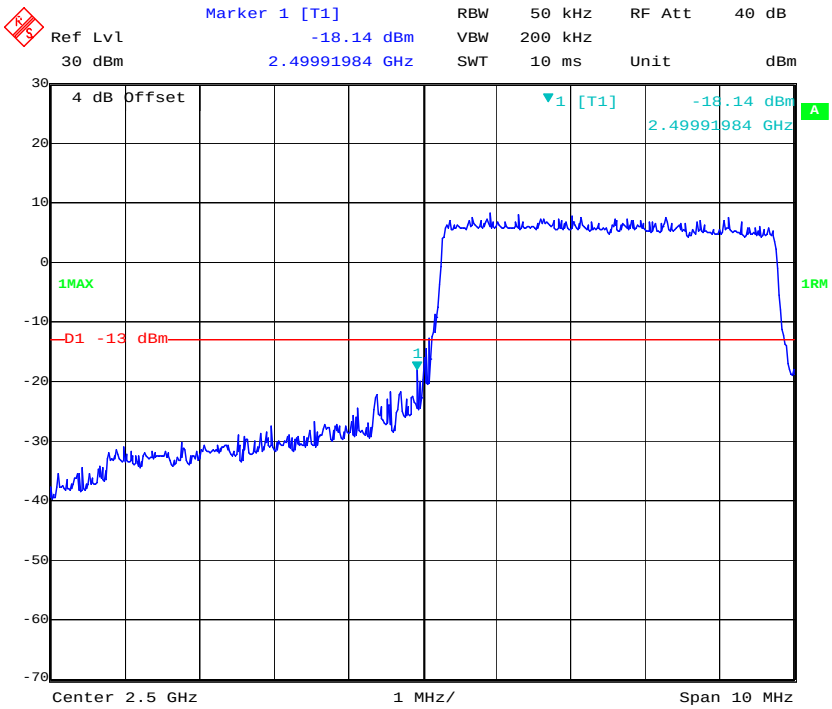
Date: 18.DEC.2018 18:54:33

16QAM_10MHz_ 50 RB_ Right

Date: 18.DEC.2018 18:55:29

LTE Band 7

QPSK_5MHz_ 25 RB_ Left



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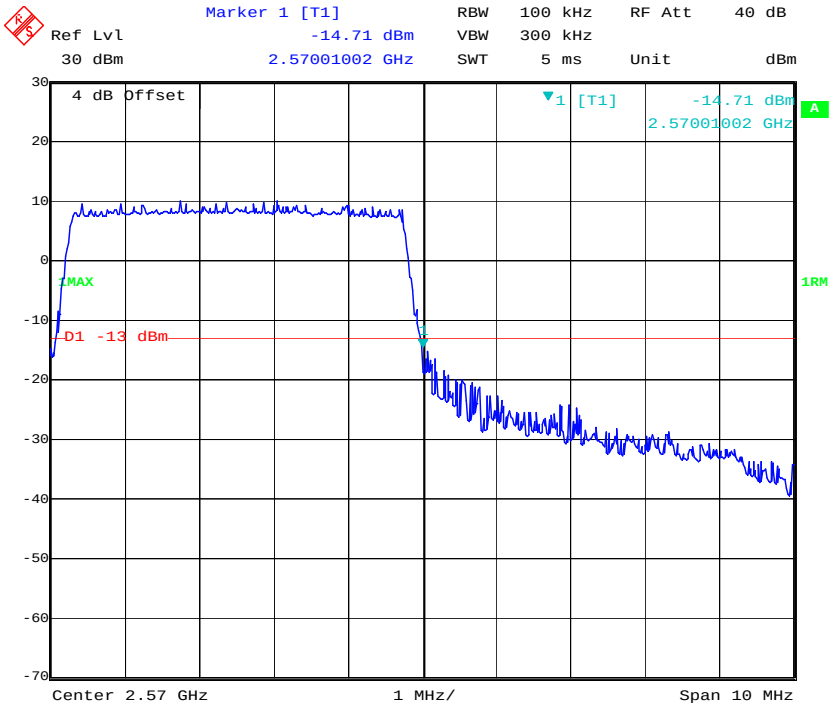
QPSK_5MHz_ 25 RB_ Right



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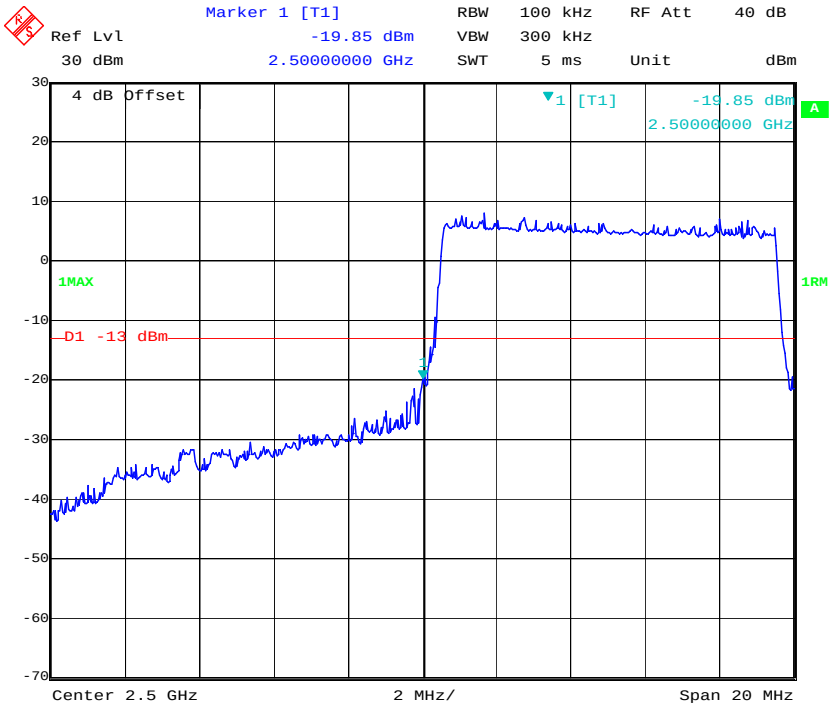
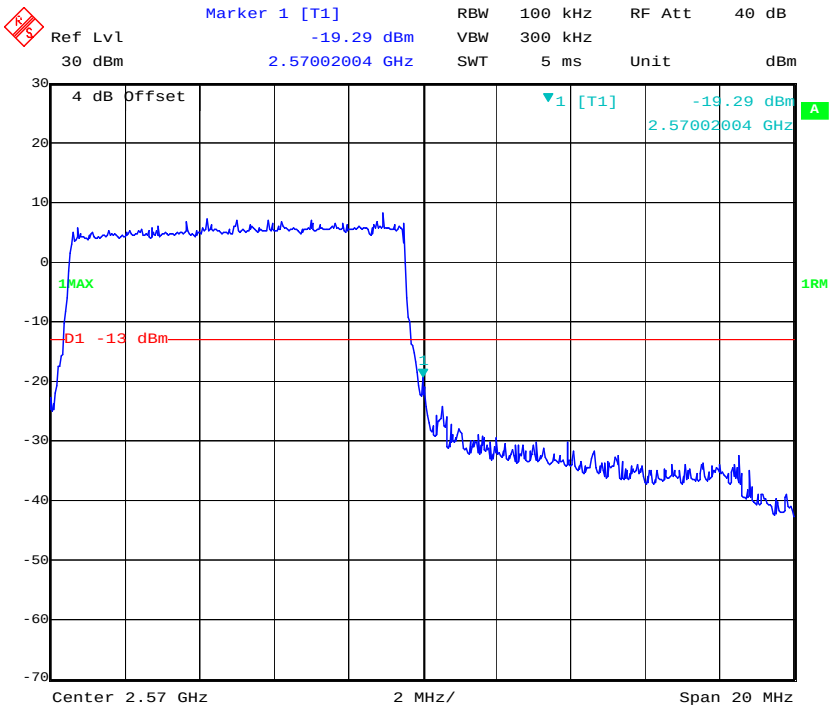
QPSK_10MHz_ 50 RB_ Left



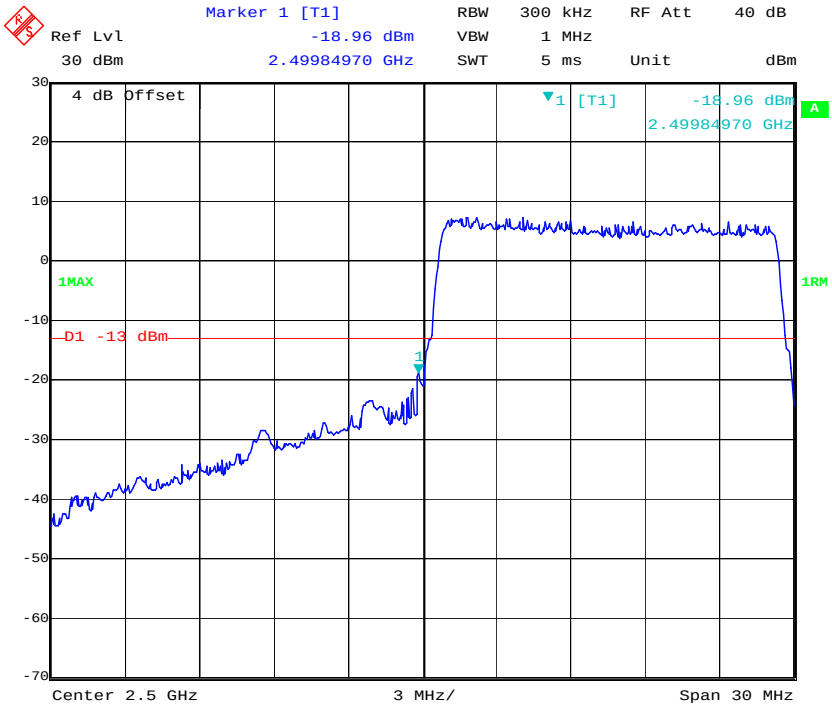
Date: 18.DEC.2018 18:58:53

QPSK_10MHz_ 50 RB_ Right

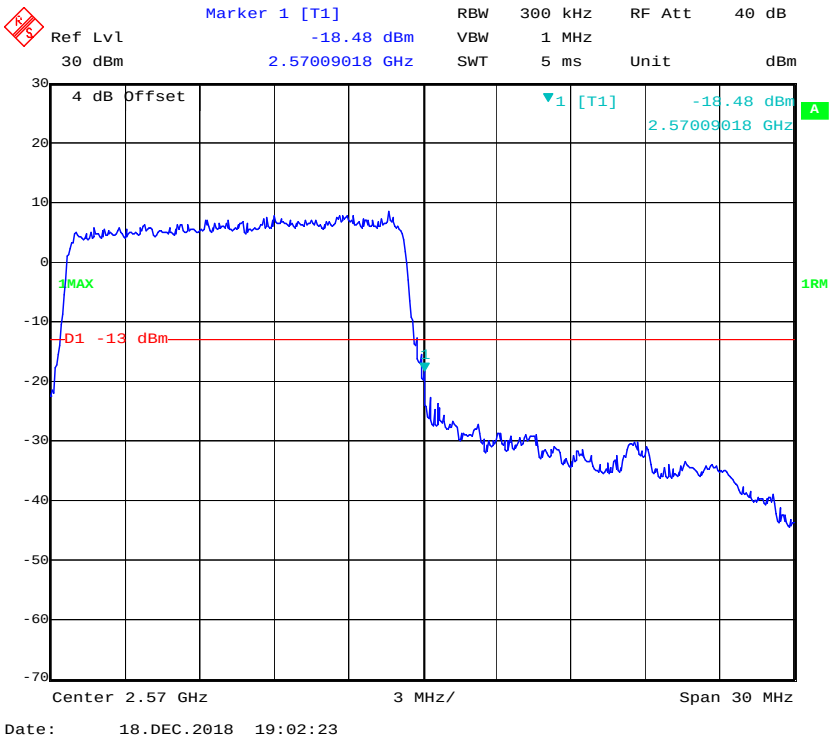


Date: 18.DEC.2018 19:00:02

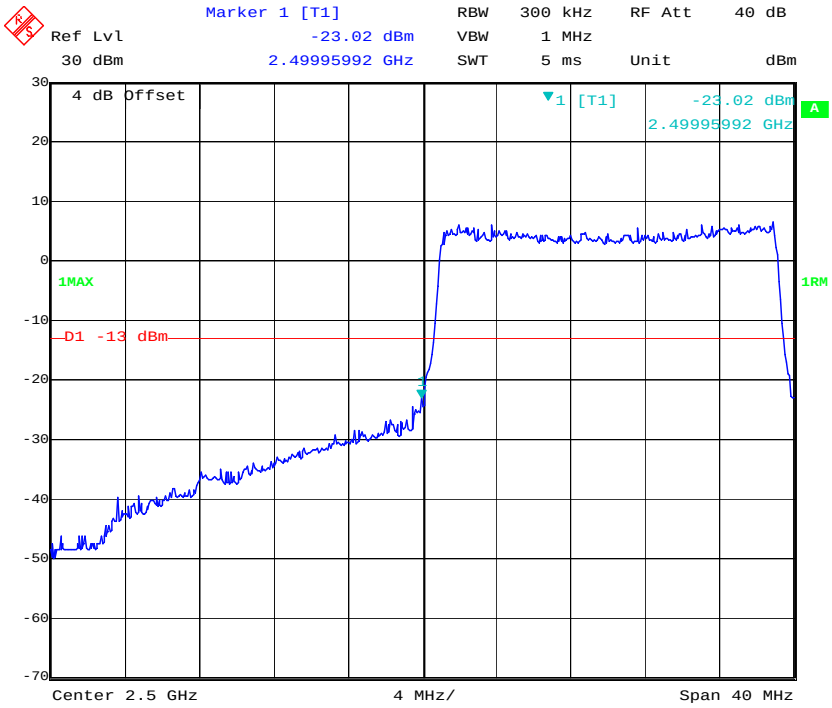
QPSK_15MHz_ 75 RB_ Left



QPSK_15MHz_ 75 RB_ Right

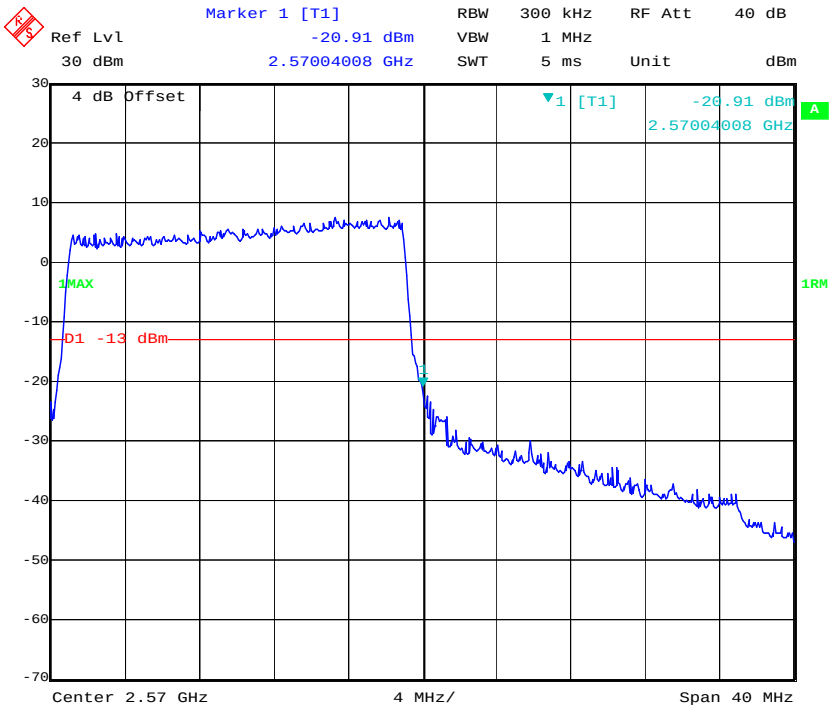


QPSK_20MHz_ FULL RB_ Left



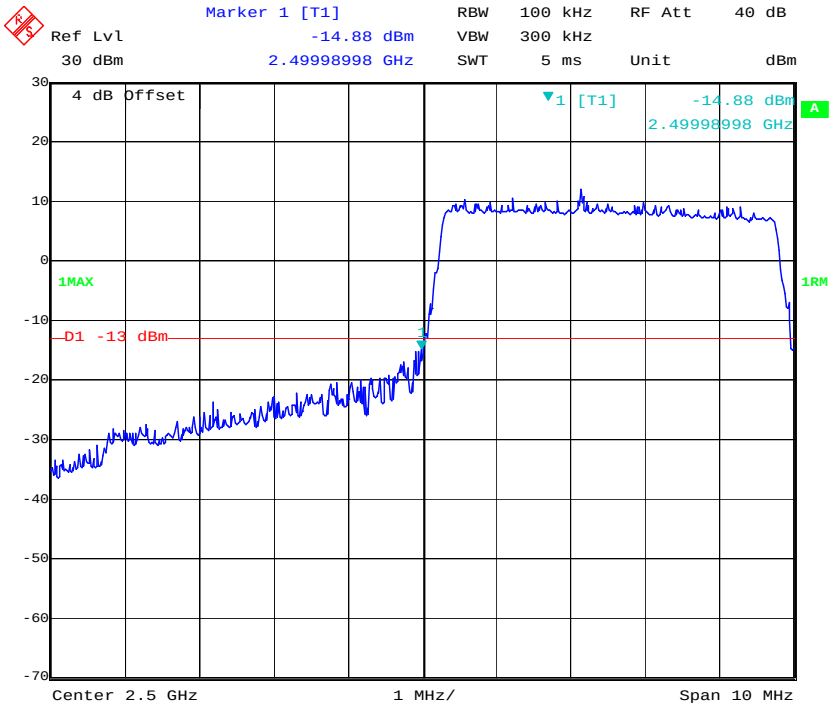
Date: 18.DEC.2018 19:03:36

QPSK_20MHz_ FULL RB_ Right



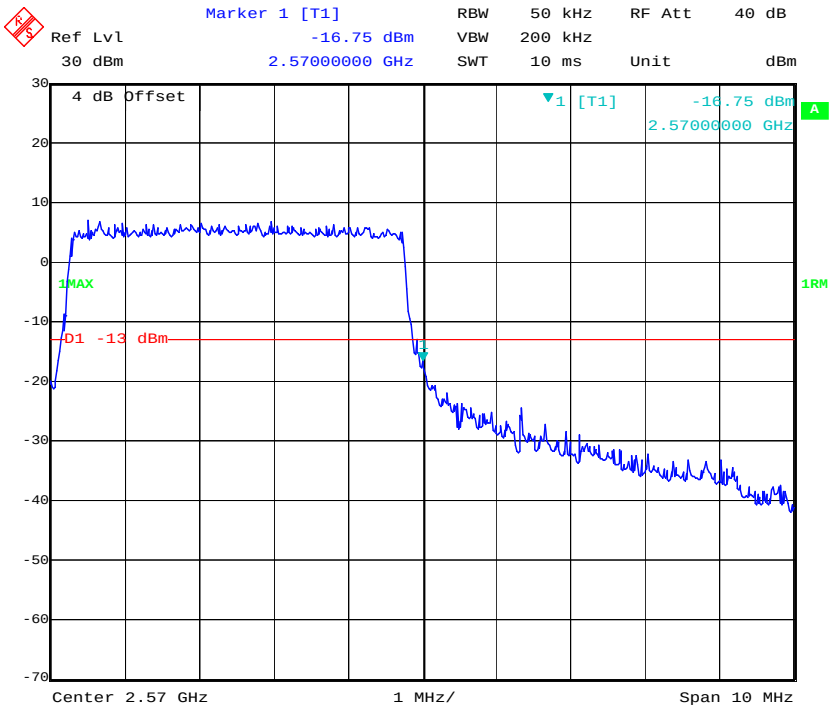
Date: 18.DEC.2018 19:04:50

16QAM_5MHz_ 25 RB_ Left



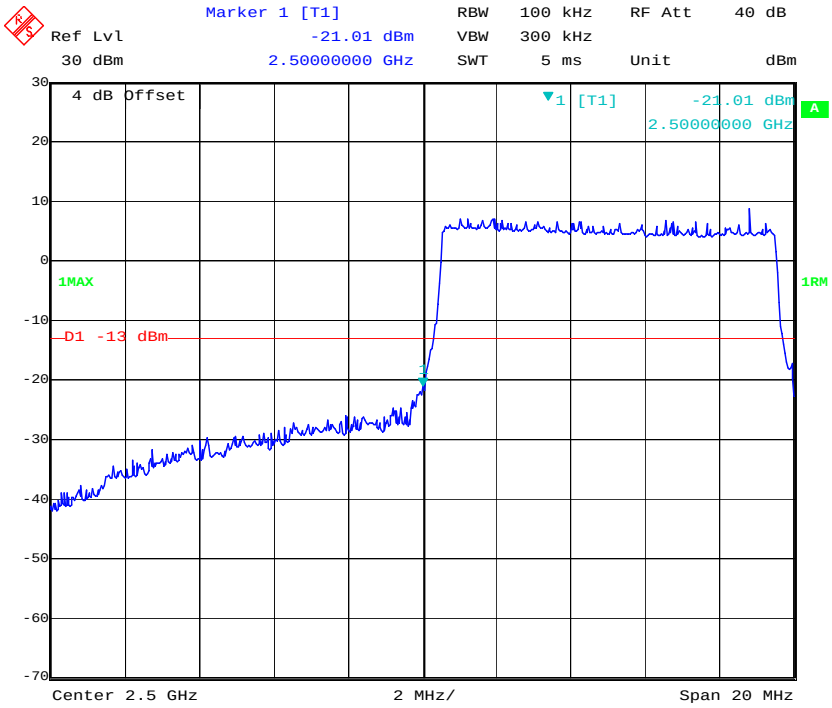
Date: 18.DEC.2018 18:56:55

16QAM_5MHz_ 25 RB_ Right



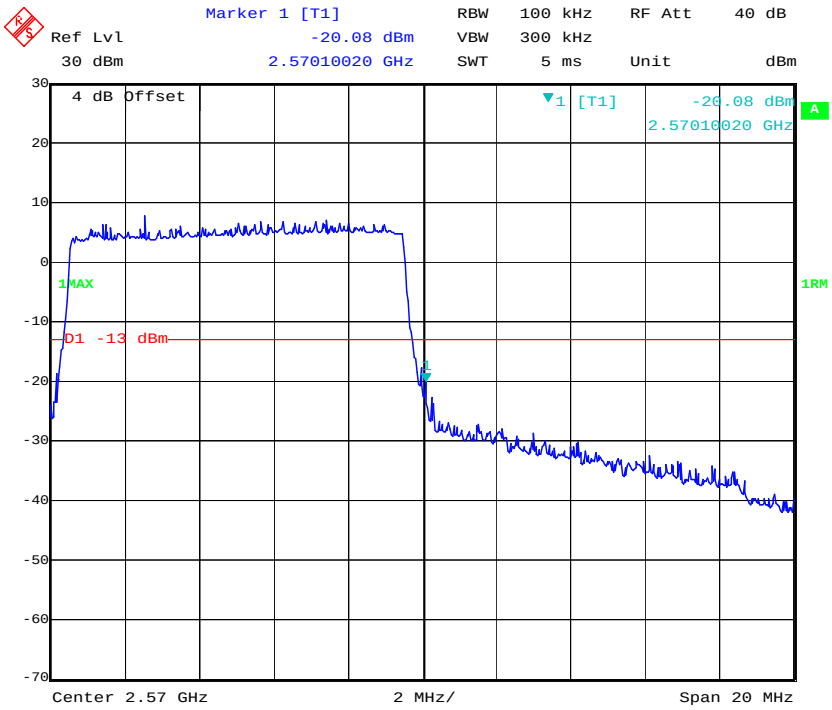
Date: 18.DEC.2018 20:47:01

16QAM_10MHz_ 50 RB_ Left



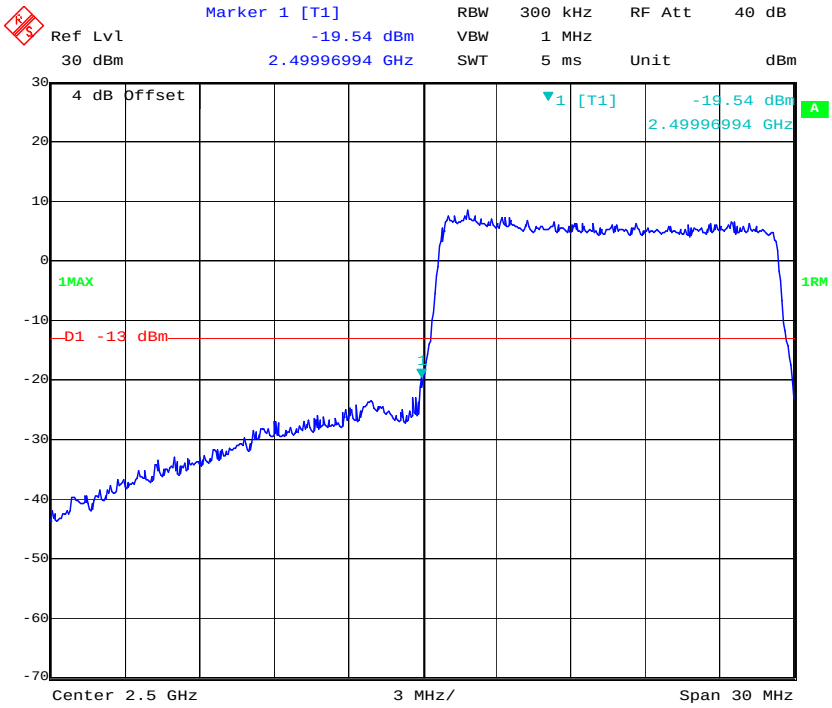
Date: 18.DEC.2018 18:59:29

16QAM_10MHz_ 50 RB_ Right



Date: 18.DEC.2018 19:00:47

16QAM_15MHz_ 75 RB_ Left

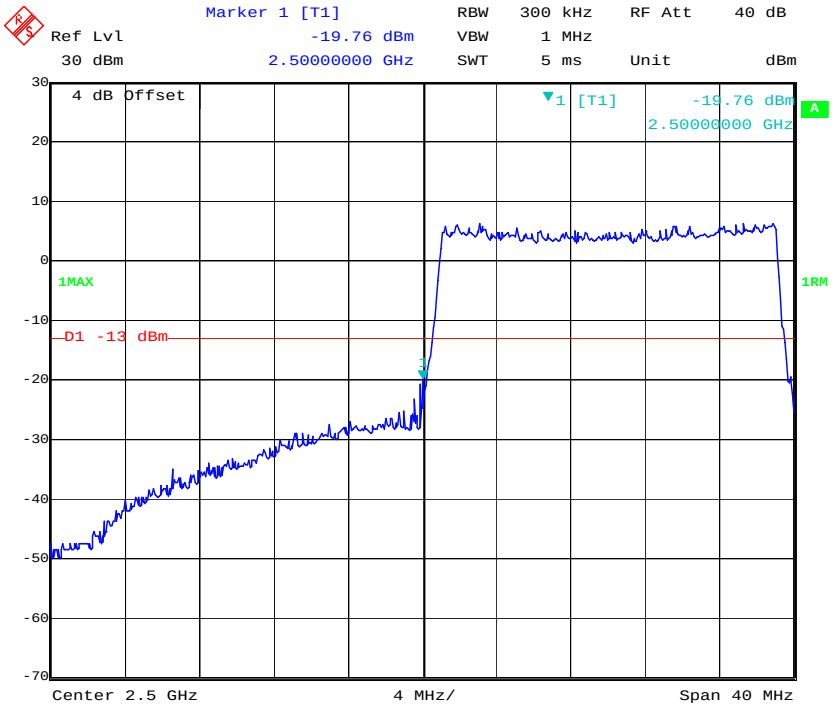


Date: 18.DEC.2018 19:01:54

16QAM_15MHz_ 75 RB_ Right

Date: 18.DEC.2018 19:03:01

16QAM_20MHz_ FULL RB_ Left



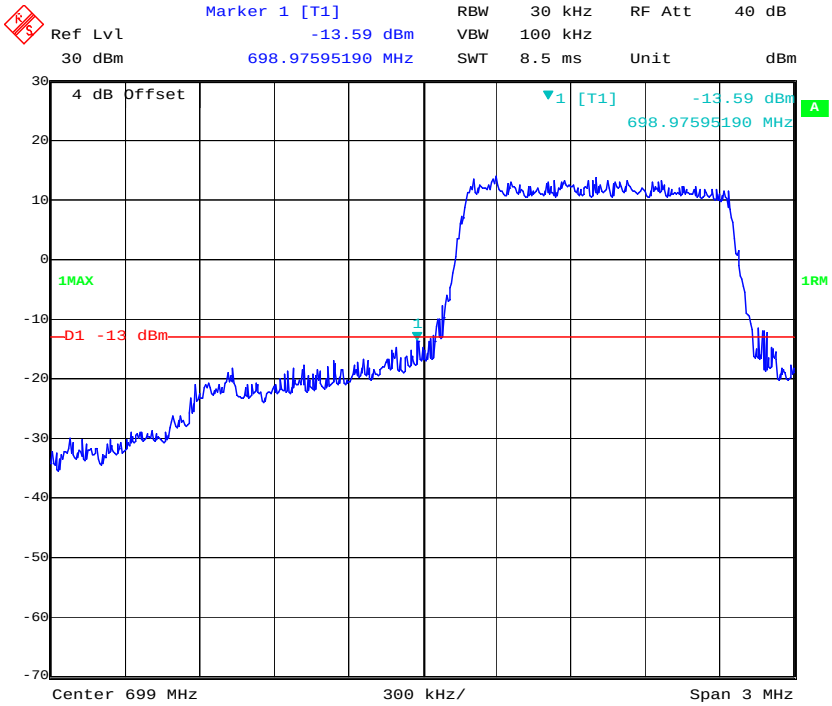
Date: 18.DEC.2018 19:04:14

16QAM_20MHz_ FULL RB_ Right

Date: 18.DEC.2018 19:05:18

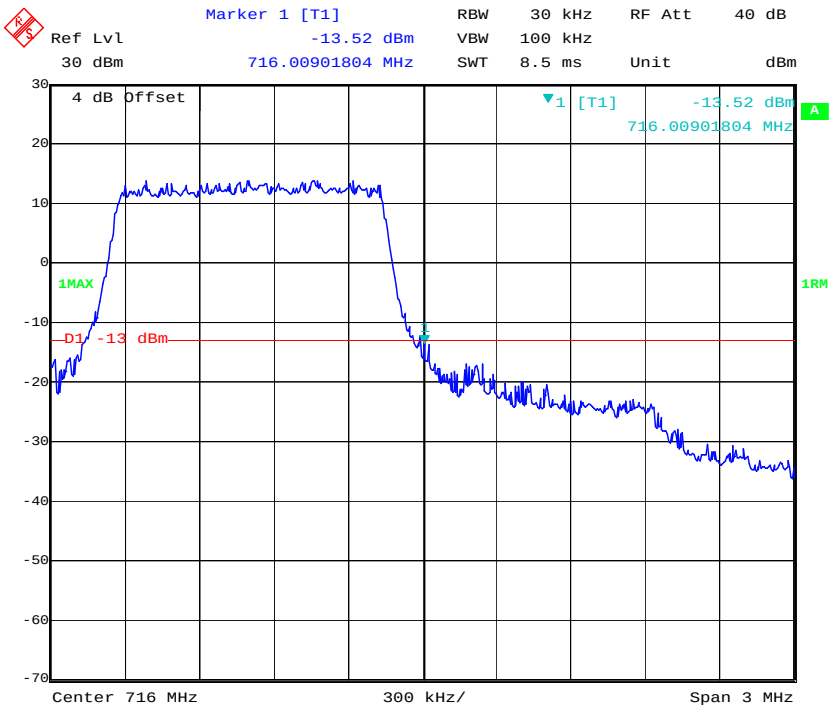
LTE Band 12

QPSK_1.4MHz_ 6 RB_ Left



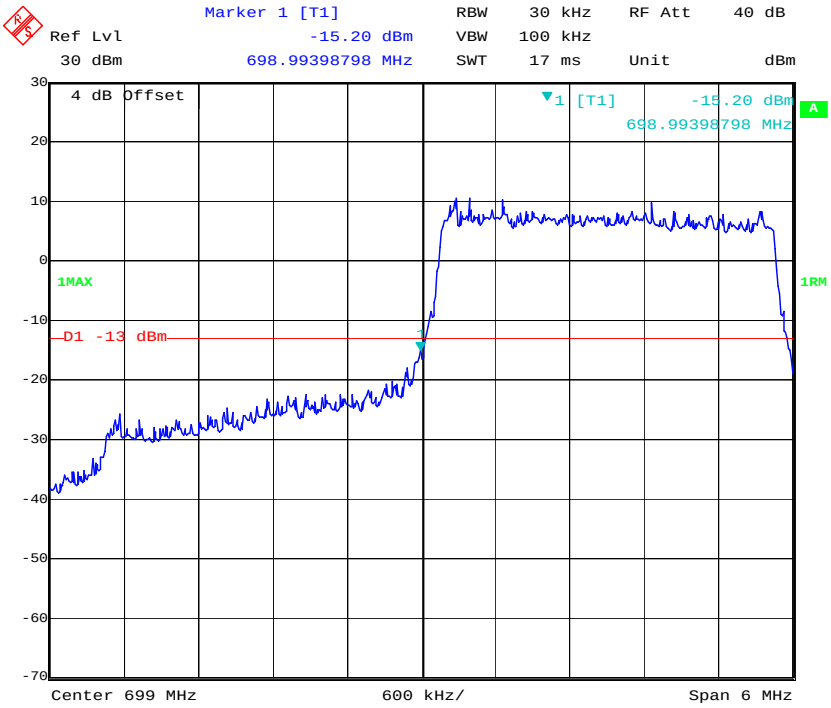
Date: 18.DEC.2018 20:52:27

QPSK_1.4MHz_ 6 RB_ Right



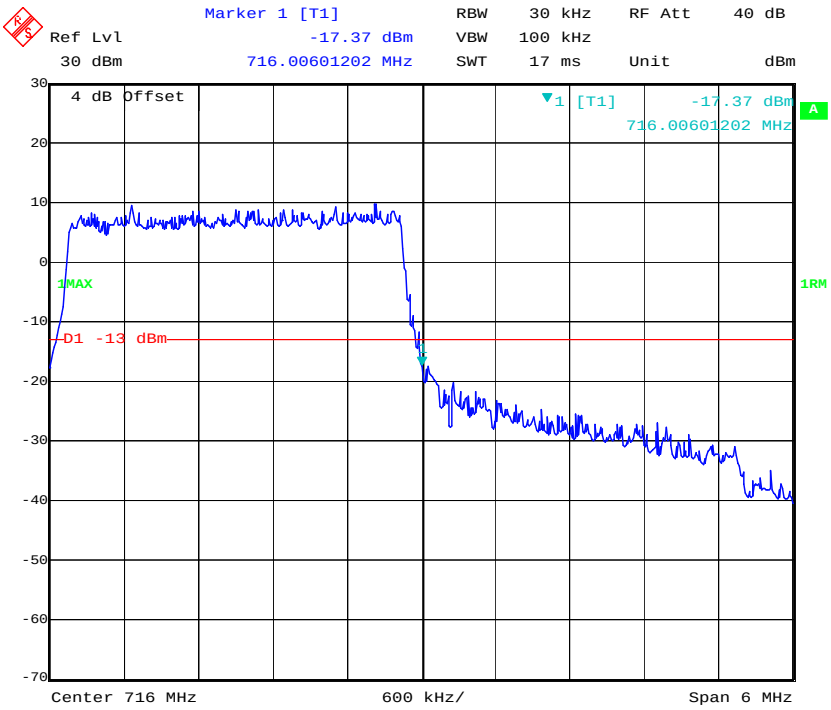
Date: 18.DEC.2018 19:07:16

QPSK_3MHz_ 15 RB_ Left



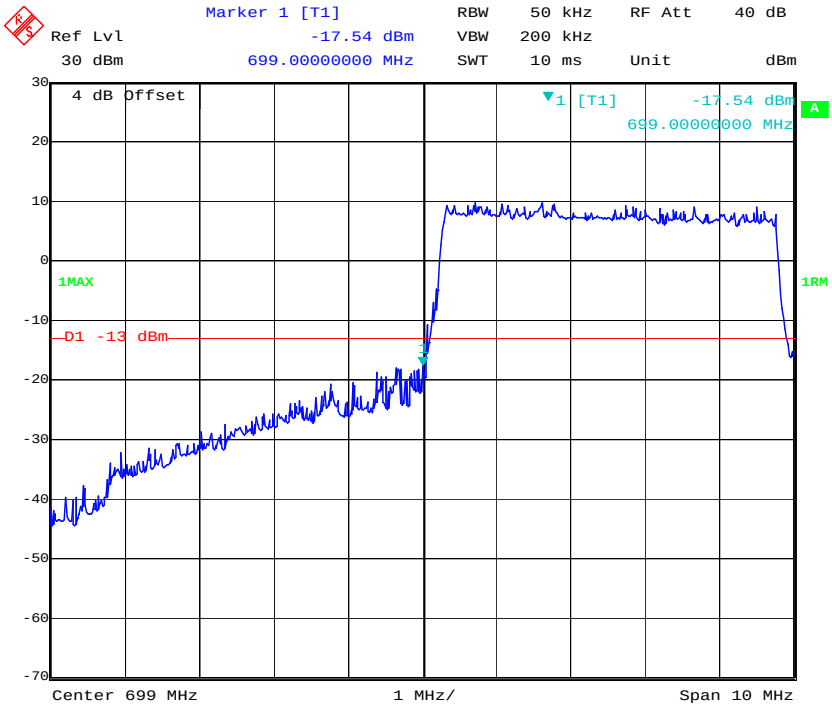
Date: 18.DEC.2018 19:08:34

QPSK_3MHz_ 15 RB_ Right



Date: 18.DEC.2018 19:09:42

QPSK_5MHz_ 25 RB_ Left

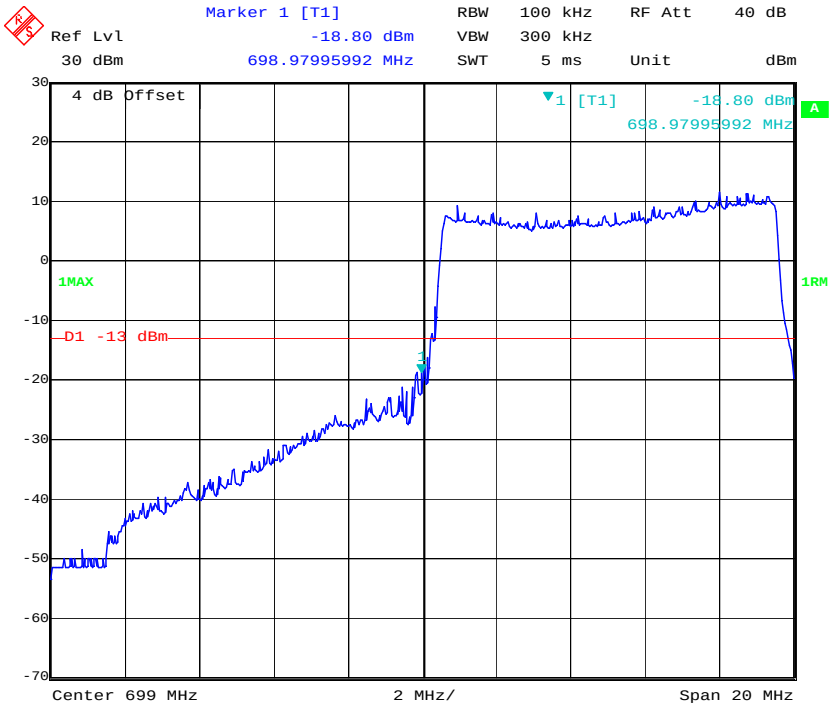


Date: 18.DEC.2018 21:10:04

QPSK_5MHz_ 25 RB_ Right

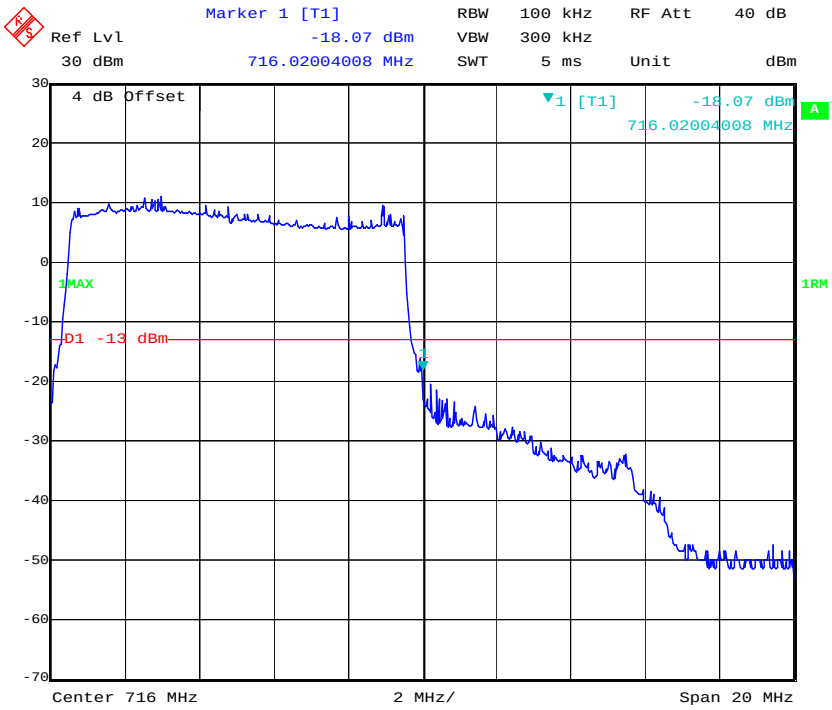
Date: 18.DEC.2018 19:16:53

QPSK_10MHz_ 50 RB_ Left



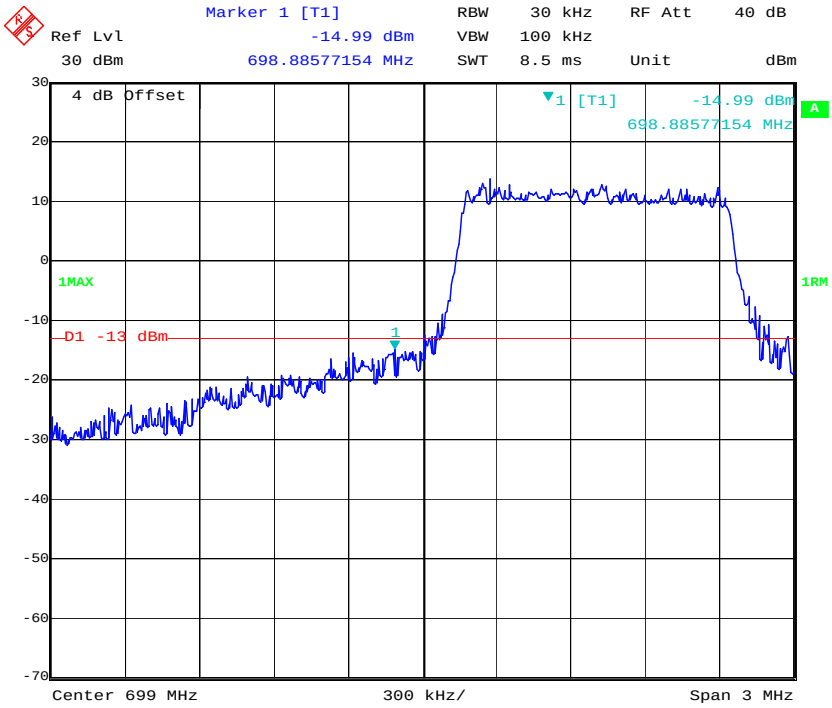
Date: 18.DEC.2018 19:18:40

QPSK_10MHz_ 50 RB_ Right



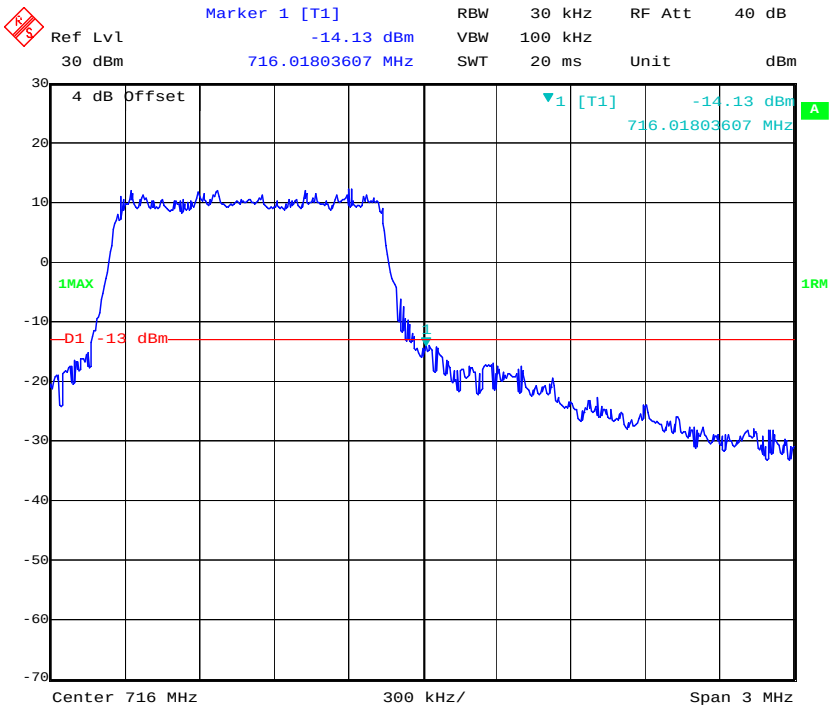
Date: 18.DEC.2018 19:19:58

16QAM_1.4MHz_ 6 RB_ Left



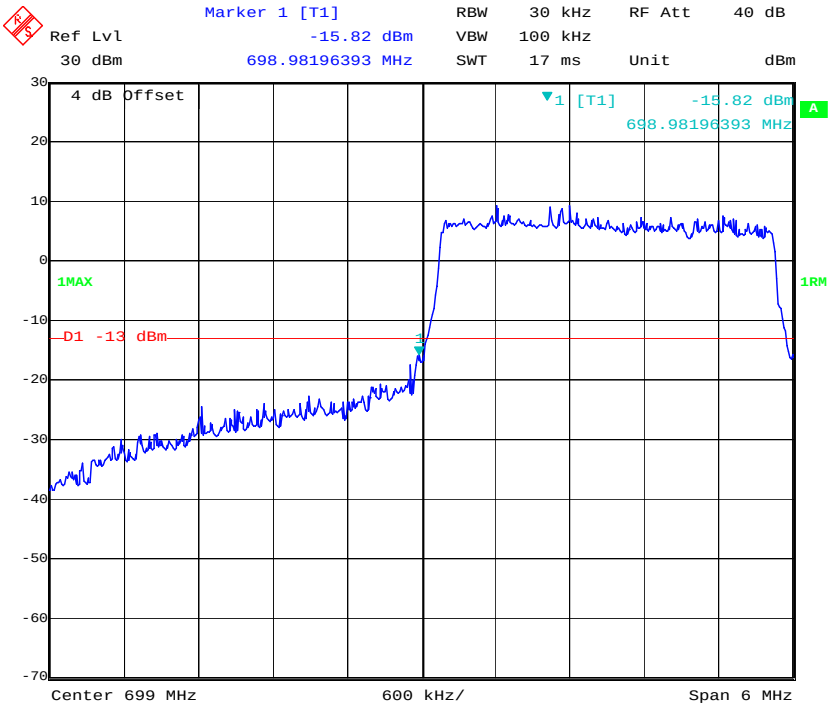
Date: 18.DEC.2018 20:51:45

16QAM_1.4MHz_ 6 RB_ Right



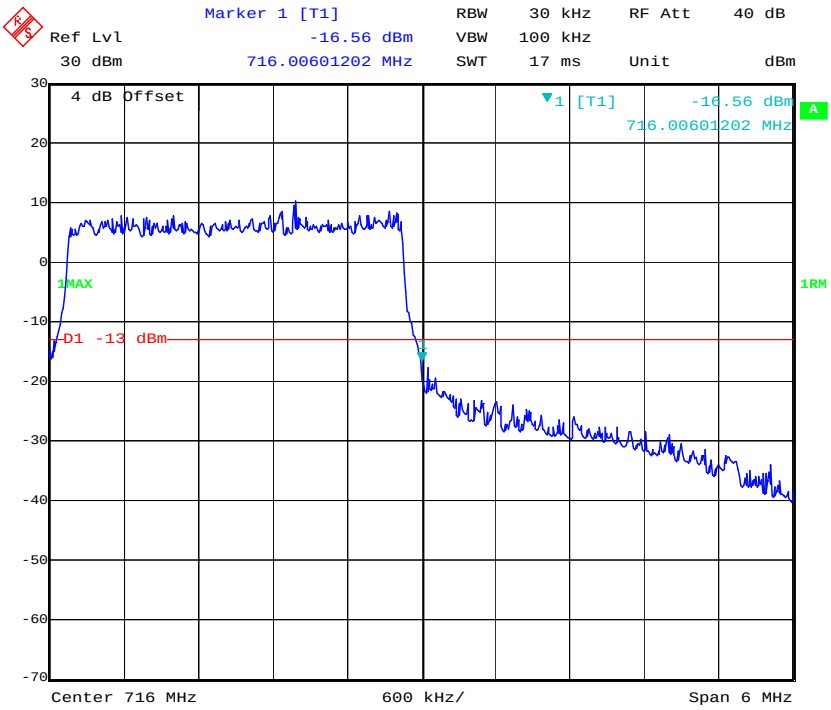
Date: 18.DEC.2018 20:54:30

16QAM_3MHz_ 15 RB_ Left



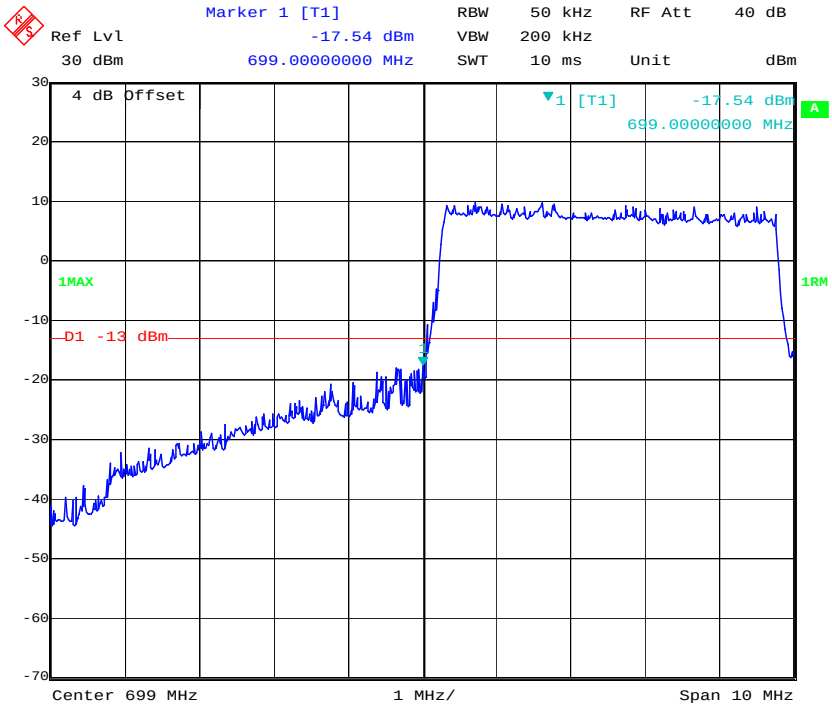
Date: 18.DEC.2018 19:09:12

16QAM_3MHz_ 15 RB_ Right



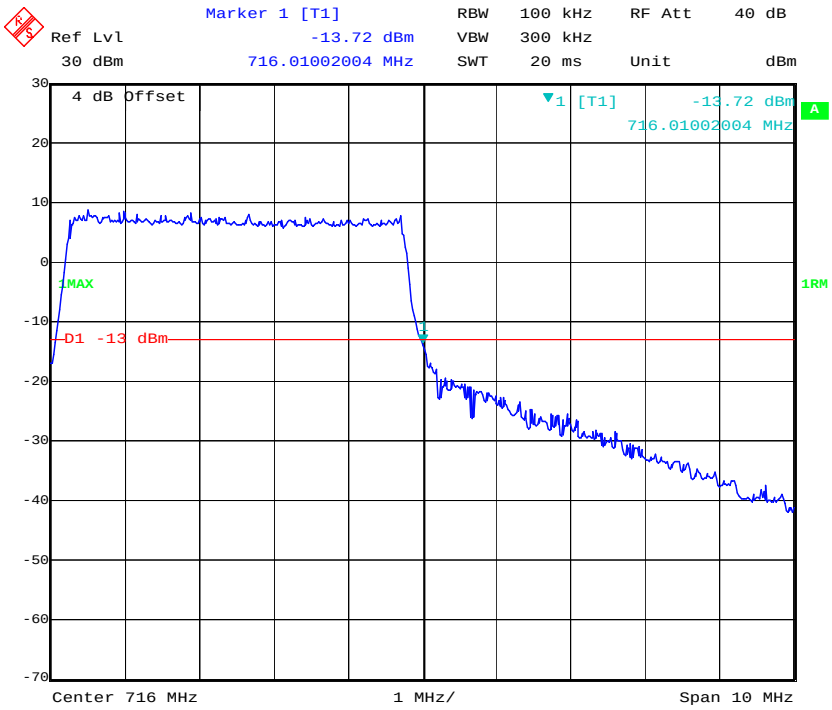
Date: 18.DEC.2018 19:10:13

16QAM_5MHz_ 25 RB_ Left



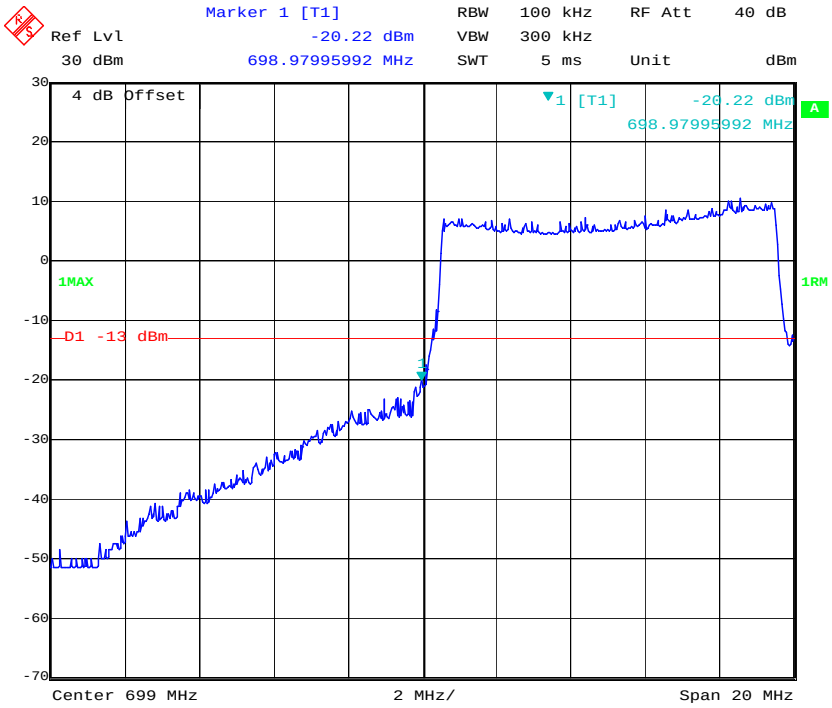
Date: 18.DEC.2018 21:10:04

16QAM_5MHz_ 25 RB_ Right



Date: 18.DEC.2018 19:18:01

16QAM_10MHz_ 50 RB_ Left



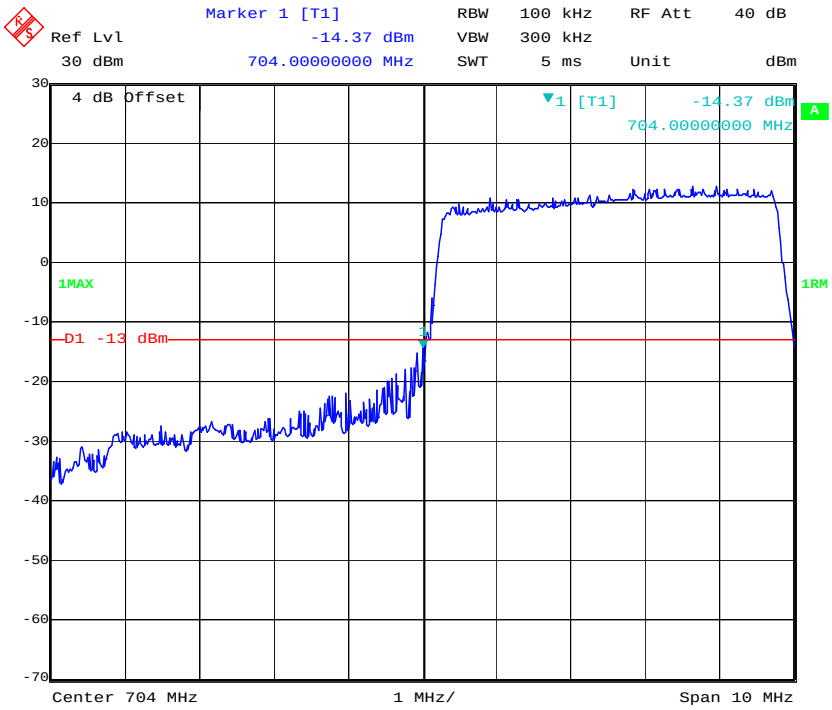
Date: 18.DEC.2018 19:19:19

16QAM_10MHz_ 50 RB_ Right

Date: 18.DEC.2018 21:00:23

LTE Band 17

QPSK_5MHz_ 25 RB_ Left

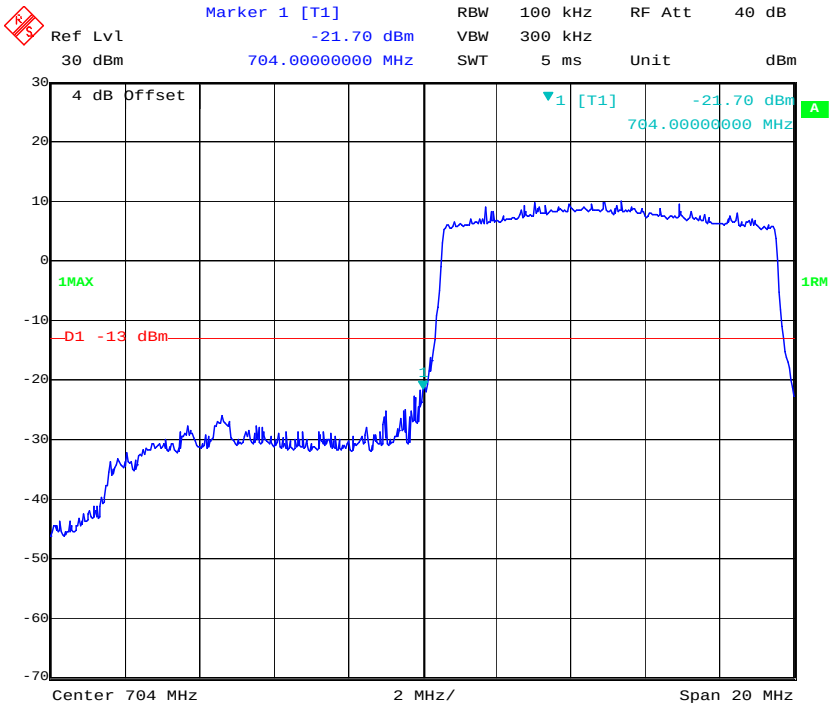


Date: 18.DEC.2018 21:02:26

QPSK_5MHz_ 25 RB_ Right

Date: 18.DEC.2018 19:24:44

QPSK_10MHz_ 50 RB_ Left

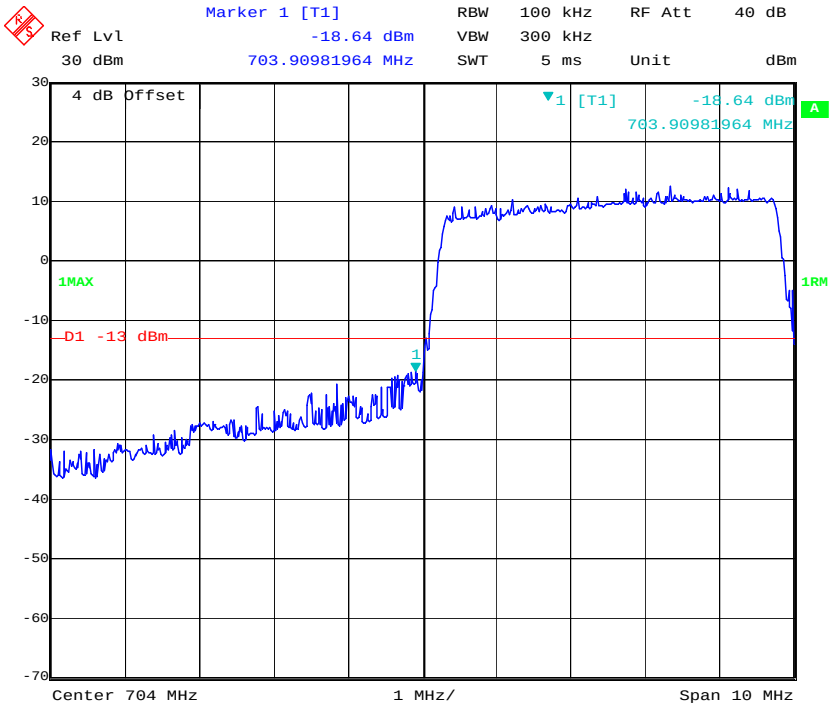


Date: 18.DEC.2018 19:28:40

QPSK_10MHz_ 50 RB_ Right

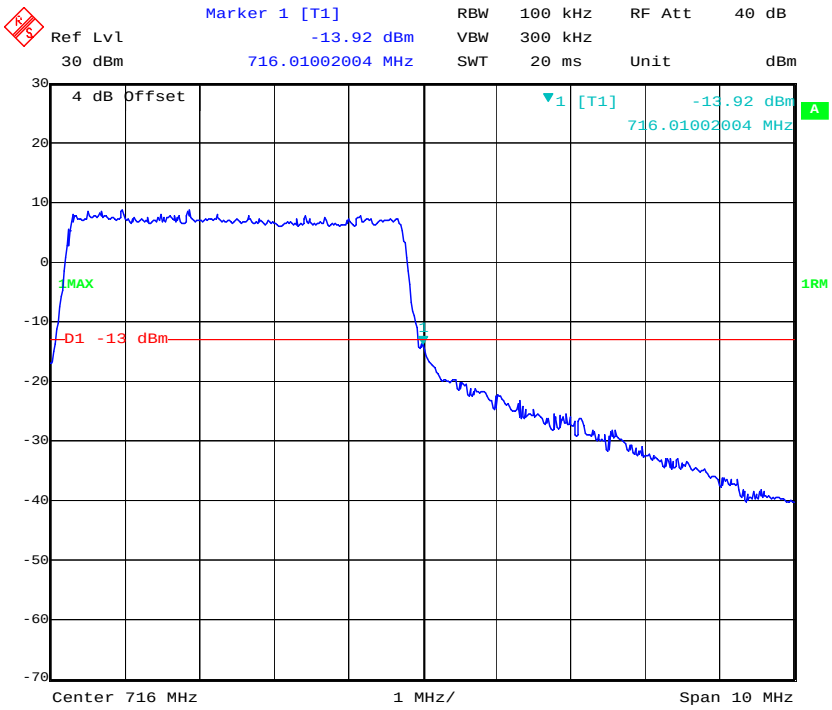
Date: 18.DEC.2018 19:29:46

16QAM_5MHz_ 25 RB_ Left



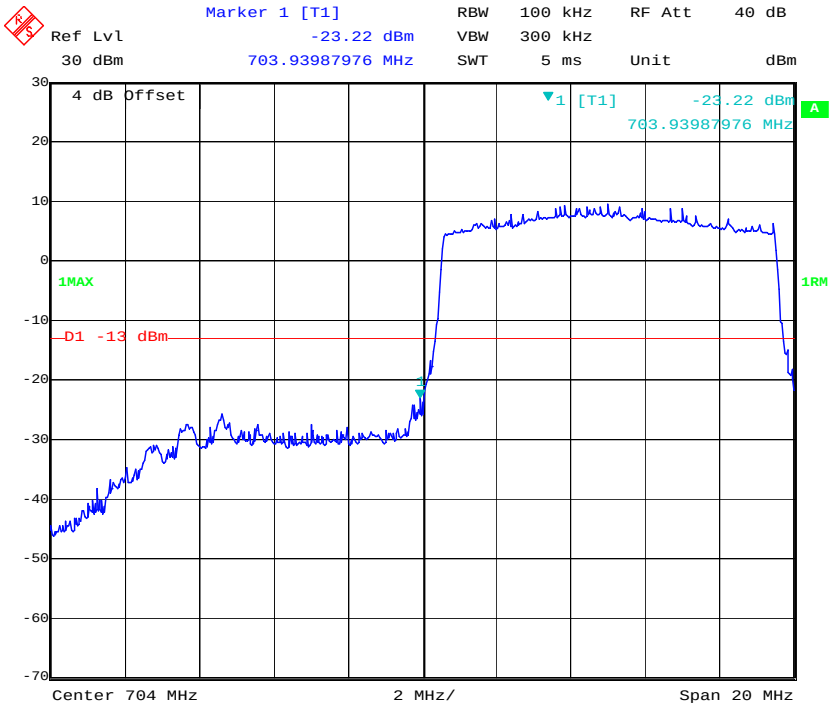
Date: 18.DEC.2018 19:21:53

16QAM_5MHz_ 25 RB_ Right



Date: 18.DEC.2018 19:28:06

16QAM_10MHz_ 50 RB_ Left



Date: 18.DEC.2018 19:29:09

16QAM_10MHz_ 50 RB_ Right

Date: 18.DEC.2018 19:30:28

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

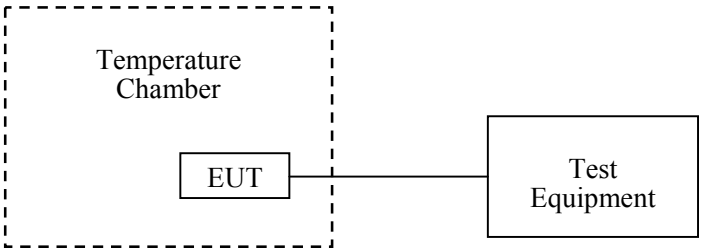
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
R&S	Wideband Radio Communication Tester	CMW500	110479	2018-12-10	2019-12-10
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2018-03-26	2019-03-26
UNI-T	Multimeter	UT39A	M130199938	2018-07-24	2019-07-24
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

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

Test Data

Environmental Conditions

Temperature:	23.9~24.2°C
Relative Humidity:	34~36 %
ATM Pressure:	99.7~99.8 kPa

The testing was performed by Andy Huang from 2018-12-17 to 2018-12-18.

Cellular Band (Part 22H)

GMSK, Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	3	0.00359	2.5
-20		-2	-0.00239	
-10		1	0.00120	
0		4	0.00478	
10		3	0.00359	
20		-4	-0.00478	
30		-1	-0.00120	
40		3	0.00359	
50		2	0.00239	
25	3.6	6	0.00717	
25	4.35	4	0.00478	

8PSK, Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	-1	-0.00120	2.5
-20		0	0.00000	
-10		-3	-0.00359	
0		4	0.00478	
10		1	0.00120	
20		-2	-0.00239	
30		1	0.00120	
40		3	0.00359	
50		0	0.00000	
25	3.6	-2	-0.00239	
25	4.35	3	0.00359	

PCS Band (Part 24E)

GMSK, Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
℃	V_{DC}	Hz	ppm	
-30	3.8	2	0.00106	Pass
-20		-1	-0.00053	
-10		1	0.00053	
0		6	0.00319	
10		-4	-0.00213	
20		3	0.00160	
30		4	0.00213	
40		2	0.00106	
50		1	0.00053	
25	3.6	0	0.00000	
25	4.35	3	0.00160	

8PSK, Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
℃	V_{DC}	Hz	ppm	
-30	3.8	-2	-0.00106	Pass
-20		2	0.00106	
-10		-4	-0.00213	
0		3	0.00160	
10		2	0.00106	
20		3	0.00160	
30		-3	-0.00160	
40		4	0.00213	
50		1	0.00053	
25	3.6	0	0.00000	
25	4.35	5	0.00266	

WCDMA Band II: R99

Middle Channel, f_c = 1880.0 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
℃	V_{DC}	Hz	ppm	
-30	3.8	0	0.00000	Pass
-20		4	0.00213	
-10		5	0.00266	
0		-2	-0.00106	
10		-4	-0.00213	
20		2	0.00106	
30		-4	-0.00213	
40		3	0.00160	
50		-1	-0.00053	
25	3.6	6	0.00319	
25	4.35	3	0.00160	

WCDMA Band Ⅴ: R99

Middle Channel, f_c = 836.6 MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
℃	V_{DC}	Hz	ppm	ppm
-30	3.8	-3	-0.00359	2.5
-20		4	0.00478	
-10		6	0.00717	
0		-1	-0.00120	
10		0	0.00000	
20		-3	-0.00359	
30		-4	-0.00478	
40		3	0.00359	
50		7	0.00837	
25	3.6	2	0.00239	
25	4.35	5	0.00598	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	2.92	0.00155	Pass
-20		-6.50	-0.00346	
-10		1.71	0.00091	
0		-0.70	-0.00037	
10		-11.86	-0.00631	
20		-9.52	-0.00506	
30		0.39	0.00021	
40		0.39	0.00021	
50		-10.36	-0.00551	
25	3.6	-9.27	-0.00493	
25	4.35	9.08	0.00483	

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-9.83	-0.0052	Pass
-20		3.71	0.0020	
-10		-5.83	-0.0031	
0		1.68	0.0009	
10		7.91	0.0042	
20		6.14	0.0033	
30		7.18	0.0038	
40		11.45	0.0061	
50		-2.04	-0.0011	
25	3.6	9.85	0.0052	
25	4.35	10.70	0.0057	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	1710.568440	1754.549100	1710	1755
-20		1710.573640	1754.551500	1710	1755
-10		1710.567940	1754.549800	1710	1755
0		1710.570140	1754.549700	1710	1755
10		1710.567740	1754.547000	1710	1755
20		1710.571140	1754.549100	1710	1755
30		1710.571140	1754.546600	1710	1755
40		1710.570640	1754.548000	1710	1755
50		1710.568540	1754.549400	1710	1755
25	3.6	1710.568940	1754.545900	1710	1755
25	4.35	1710.568140	1754.546600	1710	1755

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	1710.572640	1754.550000	1710	1755
-20		1710.572440	1754.545900	1710	1755
-10		1710.567540	1754.545500	1710	1755
0		1710.571140	1754.548100	1710	1755
10		1710.573140	1754.546900	1710	1755
20		1710.571140	1754.549100	1710	1755
30		1710.569040	1754.547100	1710	1755
40		1710.572240	1754.546300	1710	1755
50		1710.567640	1754.551800	1710	1755
25	3.6	1710.571940	1754.549600	1710	1755
25	4.35	1710.572540	1754.546500	1710	1755

LTE Band 5:

Middle Channel, f_c = 836.5 MHz, Channel Bandwidth:10MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	6.43	0.00769	2.5
-20		-2.42	-0.00289	
-10		7.85	0.00938	
0		1.76	0.00210	
10		-5.78	-0.00691	
20		2.29	0.00274	
30		-10.23	-0.01223	
40		-7.76	-0.00928	
50		-2.17	-0.00259	
25	3.6	-9.39	-0.01123	
25	4.35	10.84	0.01296	

Middle Channel, f_c = 836.5 MHz, Channel Bandwidth:10MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	1.28	0.00153	2.5
-20		1.11	0.00133	
-10		4.72	0.00564	
0		0.84	0.00100	
10		9.00	0.01076	
20		-3.11	-0.00372	
30		-9.32	-0.01114	
40		-5.62	-0.00672	
50		8.44	0.01009	
25	3.6	6.63	0.00793	
25	4.35	-9.57	-0.01144	

LTE Band 7:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	2500.532560	2569.546300	2500	2570
-20		2500.530260	2569.547100	2500	2570
-10		2500.531660	2569.549900	2500	2570
0		2500.529860	2569.549400	2500	2570
10		2500.529860	2569.547900	2500	2570
20		2500.531060	2569.549100	2500	2570
30		2500.531660	2569.546000	2500	2570
40		2500.532760	2569.551200	2500	2570
50		2500.533160	2569.550600	2500	2570
25	3.6	2500.531960	2569.551300	2500	2570
25	4.35	2500.527560	2569.550100	2500	2570

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	2500.533660	2569.546400	2500	2570
-20		2500.528560	2569.547500	2500	2570
-10		2500.531660	2569.545600	2500	2570
0		2500.532960	2569.547200	2500	2570
10		2500.531360	2569.546100	2500	2570
20		2500.531060	2569.549100	2500	2570
30		2500.528060	2569.546000	2500	2570
40		2500.528860	2569.548400	2500	2570
50		2500.531760	2569.545800	2500	2570
25	3.6	2500.529460	2569.550200	2500	2570
25	4.35	2500.533060	2569.548500	2500	2570

LTE Band 12:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	699.532062	715.508518	699	716
-20		699.529562	715.510518	699	716
-10		699.527662	715.508818	699	716
0		699.530062	715.505618	699	716
10		699.533362	715.506418	699	716
20		699.531062	715.509018	699	716
30		699.529362	715.507918	699	716
40		699.531662	715.510218	699	716
50		699.530162	715.509018	699	716
25	3.6	699.529462	715.510518	699	716
25	4.35	699.527762	715.507118	699	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	699.532262	715.511018	699	716
-20		699.529262	715.508318	699	716
-10		699.529262	715.511518	699	716
0		699.528762	715.507318	699	716
10		699.527862	715.509618	699	716
20		699.531062	715.509018	699	716
30		699.529662	715.511118	699	716
40		699.528962	715.505818	699	716
50		699.529262	715.506418	699	716
25	3.6	699.532962	715.511218	699	716
25	4.35	699.532562	715.507818	699	716

LTE Band 17:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	704.571242	715.507518	704	716
-20		704.572842	715.505918	704	716
-10		704.569742	715.506918	704	716
0		704.572742	715.506618	704	716
10		704.568942	715.506618	704	716
20		704.571142	715.509018	704	716
30		704.571742	715.505518	704	716
40		704.572642	715.507018	704	716
50		704.567542	715.507018	704	716
25	3.4	704.568742	715.510418	704	716
25	4.2	704.570942	715.510118	704	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	704.569442	715.509118	704	716
-20		704.571242	715.507118	704	716
-10		704.572842	715.508818	704	716
0		704.570342	715.508618	704	716
10		704.570442	715.510918	704	716
20		704.571142	715.509018	704	716
30		704.571642	715.509318	704	716
40		704.572242	715.509818	704	716
50		704.570242	715.509418	704	716
25	3.4	704.573442	715.511718	704	716
25	4.2	704.571242	715.506118	704	716

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

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