



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: 2AEN3NITRO4SLTE**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Mobile Phone
<b>Report Number:</b>	RDG180601001-00C
<b>Report Date:</b>	2018-07-19
<b>Reviewed By:</b>	Jerry Zhang EMC Manager <i>Jerry Zhang</i>
<b>Test Laboratory:</b>	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>

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## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

<b>EUT Name:</b>		Mobile Phone
<b>EUT Model:</b>		Nitro 4S LTE
<b>FCC ID:</b>		2AEN3NITRO4SLTE
<b>Rated Input Voltage:</b>		DC3.7V from Li-ion Rechargeable Battery or DC5V from adapter
<b>Adapter Information</b>	<b>Model Name:</b>	Nitro 4S LTE
	<b>Input:</b>	AC100-240V, 50/60Hz 0.2A
	<b>Output:</b>	DC5.0V, 0.5A
<b>External Dimension:</b>		Length (126 mm)*Width (66 mm)*High (10 mm)
<b>Serial Number:</b>		180601001
<b>EUT Received Date:</b>		2018.06.01

### 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 of the Federal Communications Commission's rules. Part 2, Part 27 of the Federal Communication Commissions rules.

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

### Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2AEN3NITRO4SLTE.  
 FCC Part 15C DSS submissions with FCC ID: 2AEN3NITRO4SLTE.  
 FCC Part 15B JBP submissions with FCC ID: 2AEN3NITRO4SLTE.

### 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 °C
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

**Test Facility**

The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China.

The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 897218, the FCC Designation No. : CN1220.

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

## SYSTEM TEST CONFIGURATION

### Justification

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

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

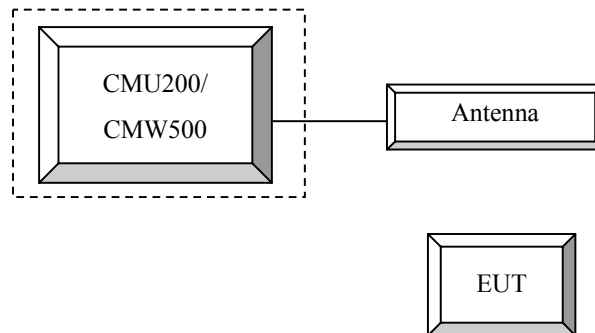
### Equipment Modifications

No modification was made to the EUT.

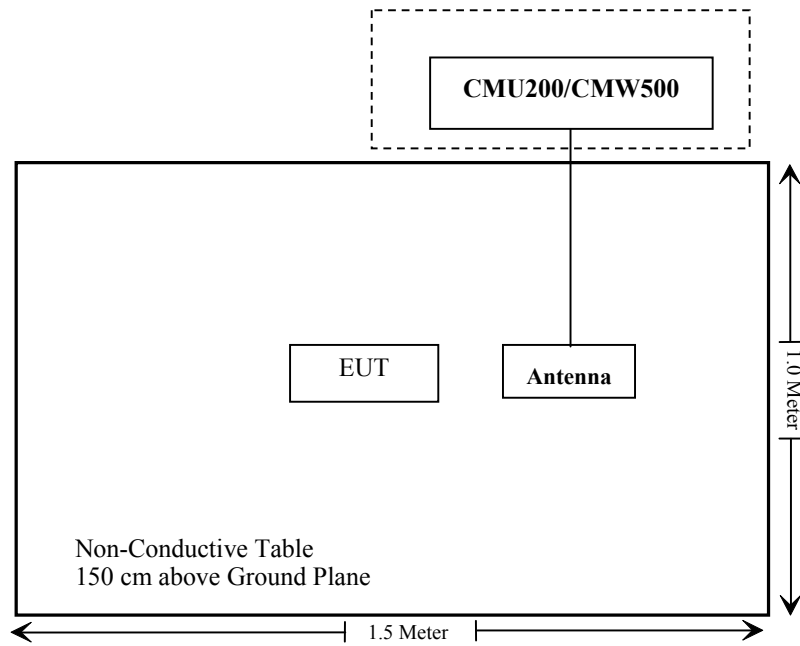
### Support Equipment List and Details

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

### Configuration of Test Setup



**Block Diagram of Test Setup**



**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§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



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## **FCC §1.1310 & §2.1093- RF EXPOSURE**

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### **Applicable Standard**

FCC§1.1310 and §2.1093.

### **Test Result**

Compliant, please refer to the SAR report: RDG180601001-20.

## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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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.

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

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**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).

<b>WCDMA General Settings</b>	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	<b>βc / βd</b>	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			
	$\beta_c$	2/15	12/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	$\beta_d$ (SF)	64			
	$\beta_c / \beta_d$	2/15	12/15	15/8	15/4
	$\beta_{hs}$	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

**WCDMA HSUPA**

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

	<b>Mode</b>	<b>HSUPA</b>	<b>HSUPA</b>	<b>HSUPA</b>	<b>HSUPA</b>	<b>HSUPA</b>
	<b>Subset</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>WCDMA General Settings</b>	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	-
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
MPR(dB)	0	2	1	2	0	
<b>HSDPA Specific Settings</b>	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	$A_{hs}=\beta_{hs}/\beta_c$	30/15				
<b>HSUPA Specific Settings</b>	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_FCI	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	

**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	$\beta_c$ (Note3)	$\beta_d$	$\beta_{HS}$ (Note1)	$\beta_{ec}$	$\beta_{ed}$ (2xSF2) (Note 4)	$\beta_{ed}$ (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	$\beta_{ed1}$ : 30/15 $\beta_{ed2}$ : 30/15	$\beta_{ed3}$ : 24/15 $\beta_{ed4}$ : 24/15	3.5	2.5	14	105	105

- Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ .
- Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
- Note 3: DPDCH is not configured, therefore the  $\beta_c$  is set to 1 and  $\beta_d = 0$  by default.
- Note 4:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.
- Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

**DC-HSDPA**

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

**Table C.8.1.12: Fixed Reference Channel H-Set 12**

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload ( $N_{INF}$ )	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
<p>Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.</p> <p>Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.</p>		

**LTE (FDD):**

The following tests were conducted according to the test requirements in 3GPP TS36.101

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

UE Power Class: 3 (23 +/- 2dBm). The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3**

Modulation	Channel bandwidth / Transmission bandwidth (RB)						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of "NS\_01".

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

Network Signalling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N <sub>RB</sub> )	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	NA
NS_03	6.6.2.2.1	2, 4, 10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
NS_04	6.6.2.2.2	41	20	>10	≤ 1
			5	>6	≤ 1
NS_05	6.6.3.3.1	1	10, 15, 20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	n/a
NS_07	6.6.2.2.3	13	10	Table 6.2.4-2	Table 6.2.4-2
	6.6.3.3.2				
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 <sup>1</sup>	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region.

*Radiated method:*

ANSI/TIA-603-D section 2.2.17



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	Spectrum Analyzer	FSU 26	200256	2017-01-04	2018-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
HP	Signal Generator	1026	320408	2017-12-08	2018-12-08
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each Time	/
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.2°C
<b>Relative Humidity:</b>	45 %
<b>ATM Pressure:</b>	99.7 kPa

\* *The testing was performed by Blake Yang & Vern Shen on 2018-07-07*

**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	31.60	31.78	31.02	29.27	28.03	26.44	25.62	23.74	22.56
	190	31.70	31.92	31.11	29.44	28.21	26.47	25.58	23.71	22.53
	251	31.90	31.89	31.08	29.45	28.17	26.53	25.64	23.83	22.71
PCS	512	27.60	27.54	27.02	25.58	24.41	26.63	25.82	24.01	22.96
	661	27.30	27.21	26.74	25.29	24.04	26.44	25.51	23.77	22.79
	810	27.00	26.95	26.44	24.98	23.82	26.12	25.34	23.54	22.59

**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	20.63	2.52	20.34	2.68	20.33	2.76
HSDPA	1	19.53	3.72	19.34	3.00	19.16	3.52
	2	19.44	3.91	19.38	3.97	19.12	3.90
	3	19.37	3.86	19.32	3.92	19.09	3.90
	4	19.99	4.01	19.28	4.00	19.17	3.96
HSUPA	1	19.51	3.60	19.33	3.76	19.15	3.96
	2	19.33	3.96	20.23	3.92	19.11	3.93
	3	19.42	4.01	20.07	4.01	19.19	3.91
	4	19.45	4.00	20.14	3.89	19.21	3.91
	5	19.36	3.90	19.94	3.90	19.08	3.96

## 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	21.33	3.12	21.81	2.96	21.76	3.00
HSDPA	1	20.29	3.28	20.76	3.32	20.71	4.40
	2	20.46	3.97	20.53	3.96	20.50	3.92
	3	20.21	3.88	20.27	3.86	20.31	3.98
	4	20.00	3.92	20.04	3.87	20.06	3.90
HSUPA	1	20.45	3.68	20.43	3.52	20.55	3.92
	2	20.20	4.01	20.20	3.89	20.25	3.97
	3	20.09	3.87	20.20	3.92	20.06	4.00
	4	20.04	3.93	20.19	3.99	20.09	3.93
	5	19.94	3.88	19.97	3.88	20.00	3.91

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	21.60	21.75	21.51
		1#3	21.40	21.61	21.24
		1#5	21.51	21.75	21.25
		3#0	21.32	21.73	21.40
		3#3	21.35	21.73	21.31
		6#0	20.40	20.79	20.54
	16QAM	1#0	20.25	20.67	20.61
		1#3	20.31	20.64	20.40
		#5	20.49	20.77	20.46
		3#0	20.32	20.94	20.43
		3#3	20.88	21.01	20.37
		6#0	19.85	19.91	19.65
3MHz	QPSK	1#0	21.43	21.44	21.29
		1#8	21.49	21.41	21.22
		1#14	21.63	21.49	21.12
		6#0	20.70	20.60	20.42
		6#9	20.86	20.75	20.38
		15#0	20.78	20.68	20.41
	16QAM	1#0	20.95	20.65	20.23
		1#8	21.03	20.72	20.24
		1#14	21.17	20.86	20.22
		6#0	19.79	19.70	19.37
		6#9	19.95	19.87	19.44
		15#0	19.88	19.72	19.50
5MHz	QPSK	1#0	21.49	21.34	20.99
		1#13	21.19	21.01	20.75
		1#24	21.50	21.40	20.95
		15#0	20.40	20.14	19.82
		15#10	20.51	20.23	19.93
		25#0	20.43	20.20	19.83
	16QAM	1#0	20.37	20.64	19.95
		1#13	20.13	20.35	19.82
		1#24	20.52	20.77	20.11
		15#0	19.44	19.16	18.83
		15#10	19.58	19.27	19.03
		25#0	19.56	19.26	18.94

10MHz	QPSK	1#0	20.99	20.68	20.21
		1#25	21.12	20.95	20.39
		1#49	20.69	21.03	20.52
		25#0	20.40	20.00	19.24
		25#25	20.23	20.23	19.72
	16QAM	50#0	20.37	20.15	19.49
		1#0	20.48	19.86	19.12
		1#25	20.69	20.20	19.41
		1#49	20.24	20.31	19.68
		25#0	19.46	19.06	18.39
15MHz	QPSK	25#25	19.30	19.31	18.91
		50#0	19.45	19.21	18.60
		1#0	21.04	20.52	20.40
		1#38	20.80	20.80	19.87
		1#74	20.22	21.02	20.49
		36#0	20.27	19.68	19.05
	16QAM	36#39	19.73	20.13	19.34
		75#0	20.00	19.91	19.15
		1#0	20.52	19.64	19.60
		1#38	20.44	20.02	19.28
		1#74	19.82	20.30	19.88
		36#0	19.34	18.74	18.09
		36#39	18.82	19.18	14.81
		75#0	19.12	19.00	14.53
20MHz	QPSK	1#0	21.30	21.41	21.04
		1#50	21.17	21.22	19.95
		1#99	21.39	21.44	21.33
		50#0	20.97	20.13	19.87
		50#50	19.71	21.40	19.21
	16QAM	100#0	20.39	20.72	19.52
		1#0	20.60	20.08	21.01
		1#50	20.60	20.85	20.76
		1#99	19.29	21.09	20.58
		50#0	20.05	19.38	20.95
	50#50	18.79	20.25	20.55	
	100#0	19.51	19.66	20.62	

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	21.91	20.39	22.18
		1#3	21.67	19.98	22.19
		1#5	21.76	20.04	22.12
		3#0	21.55	20.11	21.98
		3#3	21.54	19.94	21.99
	16QAM	6#0	20.55	19.06	21.07
		1#0	20.55	19.45	20.95
		1#3	20.49	19.14	21.01
		1#5	20.66	19.25	20.95
		3#0	20.63	19.17	20.97
3MHz	QPSK	3#3	20.73	19.03	20.96
		6#0	19.50	18.15	19.91
		1#0	21.52	20.41	22.08
		1#8	21.37	19.76	22.12
		1#14	21.60	19.79	22.11
	16QAM	6#0	20.39	19.16	21.07
		6#7	20.57	18.84	21.09
		15#0	20.46	18.99	21.04
		1#0	20.89	19.57	20.98
		1#8	20.90	19.01	20.97
5MHz	QPSK	1#14	21.12	19.05	20.93
		6#0	19.44	18.29	19.96
		6#7	19.66	17.96	19.95
		15#0	19.53	18.02	20.07
		1#0	21.30	20.52	22.13
	16QAM	1#13	21.10	19.50	21.87
		1#24	21.77	19.80	22.13
		15#0	20.00	18.74	20.97
		15#10	20.35	18.52	21.11
		25#0	20.18	18.69	21.08
		1#0	20.17	19.81	21.16
		1#13	20.07	18.89	21.01
		1#24	20.79	19.22	21.06
		15#0	19.04	17.82	20.00
		15#10	19.39	17.60	20.13
		25#0	19.27	17.80	20.12

10MHz	QPSK	1#0	20.89	20.38	20.54
		1#24	21.58	19.57	21.58
		1#49	21.35	19.00	21.64
		25#0	20.25	19.01	20.02
		25#25	20.66	18.41	20.85
	50#0	20.50	18.75	20.45	
	16QAM	1#0	20.35	19.51	19.39
		1#24	21.13	18.80	20.57
		1#49	20.92	18.24	20.68
		25#0	19.29	18.13	19.08
25#25		19.74	17.51	19.93	
50#0	19.51	17.85	19.49		
15MHz	QPSK	1#0	21.14	20.89	19.88
		1#38	21.58	19.33	20.99
		1#74	20.85	19.08	21.86
		36#0	20.36	19.06	19.28
		36#39	20.34	18.11	20.70
		75#0	20.34	18.60	19.99
	16QAM	1#0	20.55	19.99	19.25
		1#38	21.12	18.50	20.44
		1#74	20.45	18.34	21.27
		36#0	19.35	18.24	18.33
		36#39	19.39	17.33	19.77
		75#0	19.40	17.87	19.11
20MHz	QPSK	1#0	21.50	21.86	19.95
		1#49	21.75	19.85	20.52
		1#99	20.20	19.74	21.94
		50#0	20.79	19.76	18.91
		50#50	20.13	18.55	20.52
		100#0	20.50	19.24	19.76
	16QAM	1#0	20.74	21.07	19.46
		1#49	21.16	19.12	20.12
		1#99	19.61	19.04	21.57
		50#0	19.83	18.83	17.97
		50#50	19.22	17.64	19.54
		100#0	19.61	18.31	18.8

LTE Band 5

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.32	22.22	22.44
		1#3	22.39	22.26	22.37
		1#5	22.32	22.25	22.45
		3#0	22.41	22.32	22.41
		3#3	22.42	22.30	22.41
		6#0	21.30	21.27	21.47
	16QAM	1#0	21.30	21.24	21.58
		1#3	21.38	21.30	21.54
		1#5	21.31	21.30	21.56
		3#0	21.43	21.50	21.45
3MHz	QPSK	1#0	22.28	22.22	22.48
		1#8	22.24	22.27	22.48
		1#14	22.18	22.28	22.44
		6#0	21.27	21.25	21.47
		6#9	21.23	21.26	21.46
		15#0	21.29	21.29	21.50
	16QAM	1#0	21.80	21.37	21.47
		1#8	21.75	21.41	21.47
		1#14	21.67	21.40	21.47
		6#0	20.33	20.27	20.37
5MHz	QPSK	1#0	22.86	22.66	22.44
		1#13	22.28	22.17	22.10
		1#24	22.28	22.35	22.38
		15#0	21.33	21.26	21.39
		15#0	21.28	21.34	21.10
		25#0	21.26	21.29	21.20
	16QAM	1#0	21.22	21.63	21.52
		1#13	21.14	21.53	21.10
		1#24	21.17	21.65	21.44
		15#0	20.38	20.28	20.37
10MHz	QPSK	1#0	22.35	22.26	22.37
		1#25	22.29	21.88	22.30
		1#49	21.92	22.42	22.07
		25#0	21.23	21.11	21.38
		25#25	21.12	21.34	21.20
		50#0	21.28	21.26	21.41
	16QAM	1#0	21.83	21.40	21.40
		1#25	21.82	21.10	21.37
		1#49	21.50	21.55	21.08
		25#0	20.31	20.24	20.44
		25#25	20.17	20.37	20.31
		50#0	20.3	20.32	20.41



LTE Band 12

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.15	21.80	21.92
		1#3	22.11	21.83	21.80
		1#5	22.04	21.81	21.81
		3#0	21.95	21.86	21.72
		3#3	21.95	21.85	21.80
		6#0	21.00	20.81	20.96
	16QAM	1#0	20.86	20.94	20.90
		1#3	20.91	20.93	20.87
		1#5	20.87	20.90	20.94
		3#0	21.05	20.83	20.88
3#3		21.11	20.81	20.99	
3MHz	QPSK	1#0	22.05	21.79	21.96
		1#8	22.07	21.81	22.05
		1#14	21.91	21.79	22.09
		10#0	21.01	20.80	20.94
		10#5	20.98	20.80	20.99
		15#0	20.99	20.84	21.00
	16QAM	1#0	21.29	20.95	20.89
		1#8	21.38	20.91	20.97
		1#14	21.38	20.85	20.97
		10#0	19.95	19.79	19.86
10#5		19.96	19.77	19.88	
5MHz	QPSK	1#0	22.06	21.86	21.97
		1#13	21.95	21.87	21.96
		1#24	21.90	21.94	22.03
		10#0	21.01	20.87	20.98
		10#15	21.01	20.81	21.02
		25#0	20.95	20.82	20.90
	16QAM	1#0	20.78	21.17	20.89
		1#13	20.83	21.09	20.97
		1#24	20.84	21.05	21.02
		10#0	19.98	19.82	19.97
10#15		20.00	19.74	20.03	
10MHz	QPSK	1#0	22.62	21.92	21.83
		1#25	21.93	21.84	22.02
		1#49	21.87	22.03	21.79
		25#0	20.94	20.90	20.78
		25#25	20.90	20.84	20.93
		50#0	20.93	20.89	20.87
	16QAM	1#0	21.36	21.09	20.83
		1#25	21.45	20.94	20.83
		1#49	21.32	21.03	20.97
		25#0	19.98	19.89	19.85
25#25		19.91	19.90	20.03	
		50#0	19.92	19.87	19.93

**LTE Band 17**

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	1#0	22.42	21.88	22.30
		1#12	21.91	21.87	22.04
		1#24	21.89	22.01	22.08
		15#0	20.92	20.87	21.02
		15#10	20.90	20.90	21.05
		25#0	20.87	20.88	20.94
	16QAM	1#0	20.81	21.10	21.11
		1#12	20.77	21.11	21.24
		1#24	20.71	21.15	21.20
		15#0	19.93	19.85	20.20
15#10		19.92	19.88	20.50	
25#0	19.89	20.20	20.42		
10MHz	QPSK	1#0	22.36	21.80	21.84
		1#24	21.92	21.90	22.02
		1#49	21.93	21.79	21.66
		25#0	20.83	20.82	20.80
		25#25	20.87	20.90	20.95
		50#0	20.89	20.86	20.86
	16QAM	1#0	21.37	20.92	20.85
		1#24	21.30	20.95	20.92
		1#49	21.39	21.07	20.77
		25#0	19.85	19.82	19.91
		25#25	19.93	19.93	20.04
50#0	19.94	19.89	19.91		

**PAR, Band 2**

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	3.52	3.88	5.04	13
	100 RB		6.28	6.48	6.56	13
16QAM	1 RB	20 MHz	4.56	4.76	5.92	13
	100 RB		7.12	7.12	7.24	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	4.08	4.56	4.72	13
	100 RB		3.76	6.44	6.56	13
16QAM	1 RB	20 MHz	4.76	5.16	5.84	13
	100 RB		4.88	7.12	7.24	13

**PAR, Band 5**

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	3.76	4.52	3.68	13
	50 RB		5.40	5.36	5.56	13
16QAM	1 RB	10 MHz	4.68	5.36	4.56	13
	50 RB		6.24	6.12	6.44	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	2.40	4.04	4.24	13
	50 RB		5.12	5.40	5.12	13
16QAM	1 RB	10 MHz	3.40	4.80	5.00	13
	50 RB		6.04	6.20	6.00	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	4.52	4.28	3.60	13
	50 RB		5.36	5.20	5.08	13
16QAM	1 RB	10 MHz	5.40	5.12	4.76	13
	50 RB		6.08	6.00	5.92	13

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

## ERP &amp; EIRP

**Part 22H**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
<b>GSM 850 Middle Channel</b>								
836.600	H	95.48	20.6	0.0	1	19.6	38.45	18.9
836.600	V	104.38	32.6	0.0	1	31.6	38.45	6.9
<b>EDGE 850 Middle Channel</b>								
836.600	H	90.75	15.8	0.0	1	14.8	38.45	23.7
836.600	V	100.16	28.4	0.0	1	27.4	38.45	11.1
<b>WCDMA Band V Middle Channel</b>								
836.600	H	86.66	11.7	0.0	1	10.7	38.45	27.8
836.600	V	94.85	23.1	0.0	1	22.1	38.45	16.4

**Part 24E**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
<b>PCS 1900 Middle Channel</b>								
1880.000	H	92.15	19.5	11.7	2.7	28.5	33.00	4.5
1880.000	V	93.28	20.8	11.7	2.7	29.8	33.00	3.2
<b>EDGE 1900 Middle Channel</b>								
1880.000	H	89.85	17.2	11.7	2.7	26.2	33.00	6.8
1880.000	V	90.91	18.4	11.7	2.7	27.4	33.00	5.6
<b>WCDMA Band II Middle Channel</b>								
1880.000	H	85.37	12.8	11.7	2.7	21.8	33.00	11.2
1880.000	V	86.82	14.4	11.7	2.7	23.4	33.00	9.6

## 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)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
1880.000	H	87.43	14.8	11.7	2.7	23.8	33.00	9.2
1880.000	V	85.12	12.7	11.7	2.7	21.7	33.00	11.3
16QAM 1.4 MHz Middle Channel								
1880.000	H	86.87	14.3	11.7	2.7	23.3	33.00	9.7
1880.000	V	84.65	12.2	11.7	2.7	21.2	33.00	11.8
QPSK 3 MHz Middle Channel								
1880.000	H	86.94	14.3	11.7	2.7	23.3	33.00	9.7
1880.000	V	84.05	11.6	11.7	2.7	20.6	33.00	12.4
16QAM 3 MHz Middle Channel								
1880.000	H	86.03	13.4	11.7	2.7	22.4	33.00	10.6
1880.000	V	83.73	11.3	11.7	2.7	20.3	33.00	12.7
QPSK 5 MHz Middle Channel								
1880.000	H	85.48	12.9	11.7	2.7	21.9	33.00	11.1
1880.000	V	82.38	9.9	11.7	2.7	18.9	33.00	14.1
16QAM 5 MHz Middle Channel								
1880.000	H	84.95	12.3	11.7	2.7	21.3	33.00	11.7
1880.000	V	82.24	9.8	11.7	2.7	18.8	33.00	14.2
QPSK 10 MHz Middle Channel								
1880.000	H	83.75	11.1	11.7	2.7	20.1	33.00	12.9
1880.000	V	81.69	9.2	11.7	2.7	18.2	33.00	14.8
16QAM 10 MHz Middle Channel								
1880.000	H	83.46	10.9	11.7	2.7	19.9	33.00	13.1
1880.000	V	81.31	8.8	11.7	2.7	17.8	33.00	15.2
QPSK 15 MHz Middle Channel								
1880.000	H	83.60	11	11.7	2.7	20.0	33.00	13.0
1880.000	V	80.53	8.1	11.7	2.7	17.1	33.00	15.9
16QAM 15 MHz Middle Channel								
1880.000	H	82.96	10.4	11.7	2.7	19.4	33.00	13.6
1880.000	V	80.23	7.8	11.7	2.7	16.8	33.00	16.2
QPSK 20 MHz Middle Channel								
1880.000	H	86.21	13.6	11.7	2.7	22.6	33.00	10.4
1880.000	V	82.43	10	11.7	2.7	19.0	33.00	14.0
16QAM 20 MHz Middle Channel								
1880.000	H	85.35	12.7	11.7	2.7	21.7	33.00	11.3
1880.000	V	81.58	9.1	11.7	2.7	18.1	33.00	14.9

**LTE Band 4**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
1732.500	H	87.95	13.9	10.9	2.5	22.3	30.00	7.7
1732.500	V	87.20	12.8	10.9	2.5	21.2	30.00	8.8
16QAM 1.4 MHz Middle Channel								
1732.500	H	87.42	13.4	10.9	2.5	21.8	30.00	8.2
1732.500	V	86.57	12.2	10.9	2.5	20.6	30.00	9.4
QPSK 3 MHz Middle Channel								
1732.500	H	86.39	12.3	10.9	2.5	20.7	30.00	9.3
1732.500	V	85.40	11	10.9	2.5	19.4	30.00	10.6
16QAM 3 MHz Middle Channel								
1732.500	H	85.86	11.8	10.9	2.5	20.2	30.00	9.8
1732.500	V	84.93	10.6	10.9	2.5	19.0	30.00	11.0
QPSK 5 MHz Middle Channel								
1732.500	H	85.83	11.8	10.9	2.5	20.2	30.00	9.8
1732.500	V	84.95	10.6	10.9	2.5	19.0	30.00	11.0
16QAM 5 MHz Middle Channel								
1732.500	H	85.14	11.1	10.9	2.5	19.5	30.00	10.5
1732.500	V	83.75	9.4	10.9	2.5	17.8	30.00	12.2
QPSK 10 MHz Middle Channel								
1732.500	H	85.29	11.2	10.9	2.5	19.6	30.00	10.4
1732.500	V	83.54	9.2	10.9	2.5	17.6	30.00	12.4
16QAM 10 MHz Middle Channel								
1732.500	H	84.93	10.9	10.9	2.5	19.3	30.00	10.7
1732.500	V	82.95	8.6	10.9	2.5	17.0	30.00	13.0
QPSK 15 MHz Middle Channel								
1732.500	H	86.12	12.1	10.9	2.5	20.5	30.00	9.5
1732.500	V	85.17	10.8	10.9	2.5	19.2	30.00	10.8
16QAM 15 MHz Middle Channel								
1732.500	H	85.65	11.6	10.9	2.5	20.0	30.00	10.0
1732.500	V	84.71	10.3	10.9	2.5	18.7	30.00	11.3
QPSK 20 MHz Middle Channel								
1732.500	H	85.53	11.5	10.9	2.5	19.9	30.00	10.1
1732.500	V	83.96	9.6	10.9	2.5	18.0	30.00	12.0
16QAM 20 MHz Middle Channel								
1732.500	H	84.68	10.6	10.9	2.5	19.0	30.00	11.0
1732.500	V	82.82	8.5	10.9	2.5	16.9	30.00	13.1

**LTE Band 5**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
836.500	H	88.78	13.9	0.0	1	12.9	38.45	25.6
836.500	V	96.85	25.1	0.0	1	24.1	38.45	14.4
16QAM 1.4 MHz Middle Channel								
836.500	H	87.65	12.7	0.0	1	11.7	38.45	26.8
836.500	V	96.54	24.7	0.0	1	23.7	38.45	14.8
QPSK 3 MHz Middle Channel								
836.500	H	88.62	13.7	0.0	1	12.7	38.45	25.8
836.500	V	96.81	25	0.0	1	24.0	38.45	14.5
16QAM 3 MHz Middle Channel								
836.500	H	87.64	12.7	0.0	1	11.7	38.45	26.8
836.500	V	96.12	24.3	0.0	1	23.3	38.45	15.2
QPSK 5 MHz Middle Channel								
836.500	H	87.89	13	0.0	1	12.0	38.45	26.5
836.500	V	96.75	25	0.0	1	24.0	38.45	14.5
16QAM 5 MHz Middle Channel								
836.500	H	87.38	12.5	0.0	1	11.5	38.45	27.0
836.500	V	96.04	24.2	0.0	1	23.2	38.45	15.3
QPSK 10 MHz Middle Channel								
836.500	H	88.58	13.7	0.0	1	12.7	38.45	25.8
836.500	V	96.58	24.8	0.0	1	23.8	38.45	14.7
16QAM 10 MHz Middle Channel								
836.500	H	87.25	12.3	0.0	1	11.3	38.45	27.2
836.500	V	96.05	24.3	0.0	1	23.3	38.45	15.2

**LTE Band 12**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
707.500	H	83.98	7.1	0.0	0.9	6.2	34.77	28.6
707.500	V	93.32	18.9	0.0	0.9	18.0	34.77	16.8
16QAM 1.4 MHz Middle Channel								
707.500	H	83.51	6.7	0.0	0.9	5.8	34.77	29.0
707.500	V	93.21	18.8	0.0	0.9	17.9	34.77	16.9
QPSK 3 MHz Middle Channel								
707.500	H	83.71	6.9	0.0	0.9	6.0	34.77	28.8
707.500	V	93.04	18.6	0.0	0.9	17.7	34.77	17.1
16QAM 3 MHz Middle Channel								
707.500	H	83.15	6.3	0.0	0.9	5.4	34.77	29.4
707.500	V	92.64	18.2	0.0	0.9	17.3	34.77	17.5
QPSK 5 MHz Middle Channel								
707.500	H	83.42	6.6	0.0	0.9	5.7	34.77	29.1
707.500	V	92.92	18.5	0.0	0.9	17.6	34.77	17.2
16QAM 5 MHz Middle Channel								
707.500	H	82.62	5.8	0.0	0.9	4.9	34.77	29.9
707.500	V	92.44	18	0.0	0.9	17.1	34.77	17.7
QPSK 10 MHz Middle Channel								
707.500	H	82.64	5.8	0.0	0.9	4.9	34.77	29.9
707.500	V	92.51	18.1	0.0	0.9	17.2	34.77	17.6
16QAM 10 MHz Middle Channel								
707.500	H	82.35	5.5	0.0	0.9	4.6	34.77	30.2
707.500	V	92.42	18	0.0	0.9	17.1	34.77	17.7



**LTE Band 17**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 5 MHz Middle Channel								
710.000	H	82.21	5.4	0.0	0.9	4.5	34.77	30.3
710.000	V	92.98	18.6	0.0	0.9	17.7	34.77	17.1
16QAM 5 MHz Middle Channel								
710.000	H	81.45	4.6	0.0	0.9	3.7	34.77	31.1
710.000	V	92.35	18	0.0	0.9	17.1	34.77	17.7
QPSK 10 MHz Middle Channel								
710.000	H	82.14	5.3	0.0	0.9	4.4	34.77	30.4
710.000	V	92.56	18.2	0.0	0.9	17.3	34.77	17.5
16QAM 10 MHz Middle Channel								
710.000	H	91.11	14.3	0.0	0.9	13.4	34.77	21.4
710.000	V	92.34	18	0.0	0.9	17.1	34.77	17.7

Note:

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

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

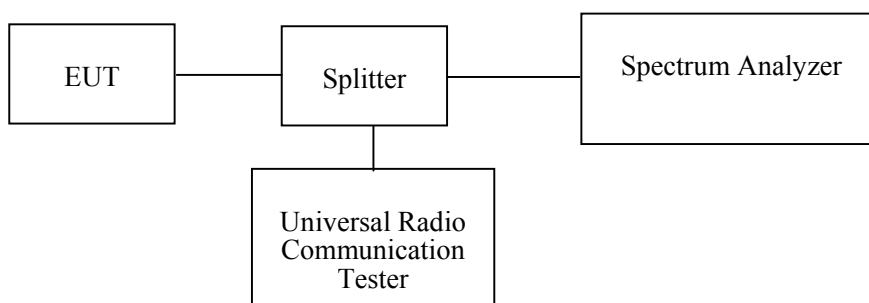
**Applicable Standard**

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

**Test Procedure**

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

The 26 dB & 99% bandwidth was recorded.



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
narda	Attenuator	6dB	6dB-1	Each time	N/A
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each Time	/

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	25.8~25.9°C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	100.8~101.1 kPa

The testing was performed by Kami Zhou & Tiago Huang on 2018-06-06 & 2018-07-19.

Test Mode: Transmitting

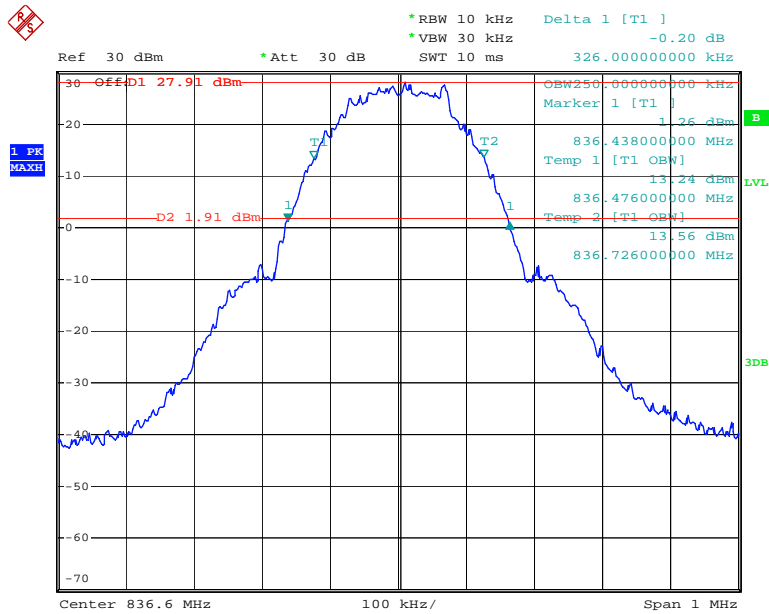
Test Result: Compliant. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.250	0.326
		EDGE	0.252	0.312
PCS		PCS	0.244	0.322
		EDGE	0.248	0.318
WCDMA Band II		Rel 99	4.22	4.94
		HSDPA	4.22	4.90
		HSUPA	4.22	4.90
WCDMA Band V		Rel 99	4.20	4.88
		HSDPA	4.22	4.90
		HSUPA	4.20	4.88

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.104	1.284
		16QAM	1.104	1.296
	3 MHz	QPSK	2.700	2.928
		16QAM	2.688	2.952
	5 MHz	QPSK	4.560	5.052
		16QAM	4.540	5.052
	10 MHz	QPSK	9.000	9.772
		16QAM	8.960	9.652
	15 MHz	QPSK	13.560	15.052
		16QAM	13.560	15.052
20 MHz	QPSK	18.000	19.532	
	16QAM	18.080	19.760	

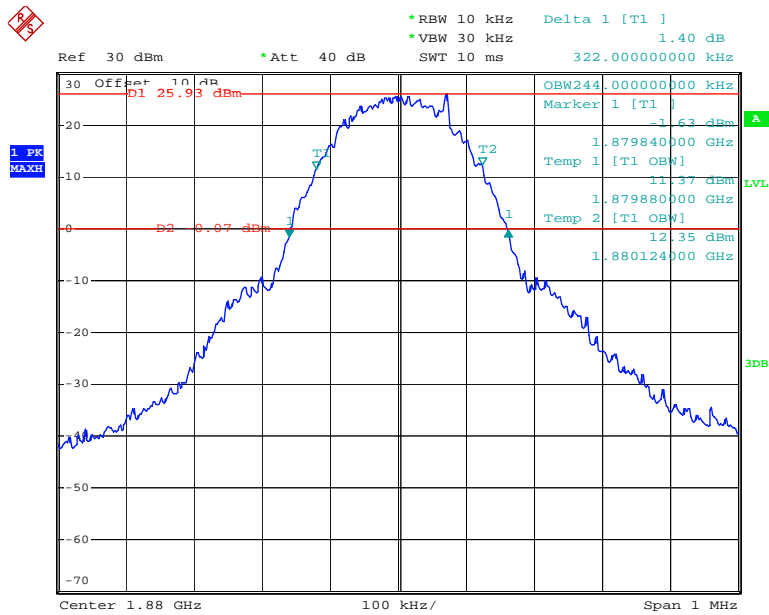
Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 4	1.4 MHz	QPSK	1.104	1.290
		16QAM	1.104	1.296
	3 MHz	QPSK	2.700	2.932
		16QAM	2.700	2.930
	5 MHz	QPSK	4.560	5.100
		16QAM	4.520	5.080
	10 MHz	QPSK	8.960	9.800
		16QAM	8.960	9.720
	15 MHz	QPSK	13.620	15.030
		16QAM	13.620	15.090
	20 MHz	QPSK	18.080	19.650
		16QAM	18.08	19.81
LTE Band 5	1.4 MHz	QPSK	1.098	1.278
		16QAM	1.104	1.284
	3 MHz	QPSK	2.700	2.916
		16QAM	2.688	2.964
	5 MHz	QPSK	4.540	5.080
		16QAM	4.520	5.040
	10 MHz	QPSK	8.960	9.800
		16QAM	8.960	9.720
LTE Band 12	1.4 MHz	QPSK	1.116	1.314
		16QAM	1.104	1.284
	3 MHz	QPSK	2.700	2.964
		16QAM	2.700	2.952
	5 MHz	QPSK	4.560	5.120
		16QAM	4.580	5.112
	10 MHz	QPSK	9.040	9.920
		16QAM	9.040	9.800
LTE Band 17	5 MHz	QPSK	4.540	5.020
		16QAM	4.540	5.040
	10 MHz	QPSK	9.000	10.280
		16QAM	8.960	9.720

### GSM 850 Cellular Band



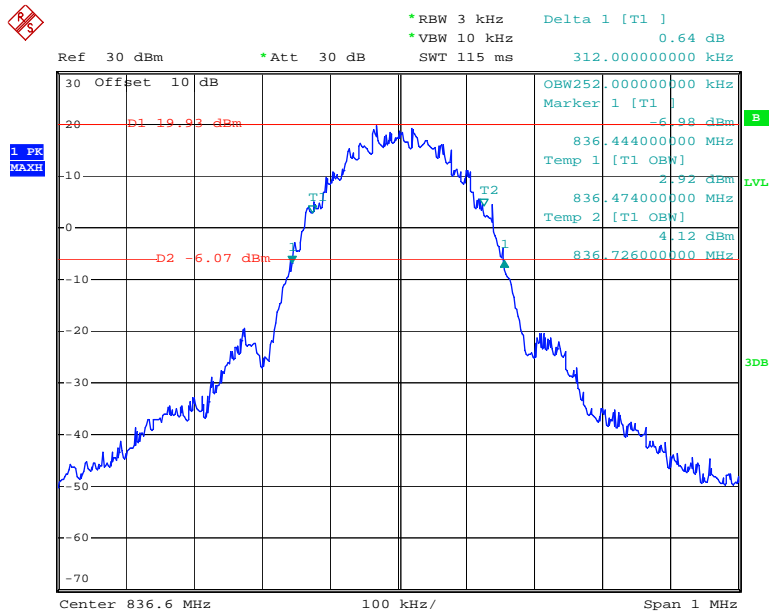
Date: 7.JUN.2018 23:49:09

### GSM PCS1900 Cellular Band



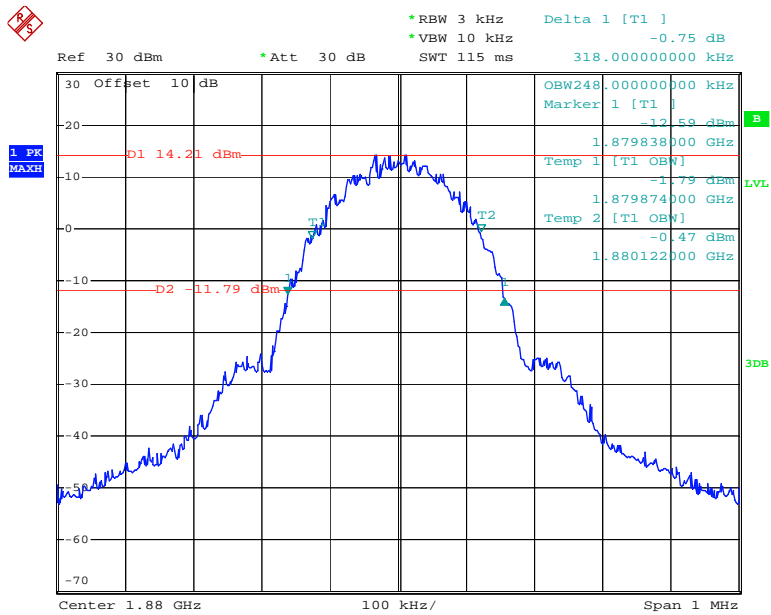
Date: 8.JUN.2018 00:01:19

### EDGE 850 Cellular Band



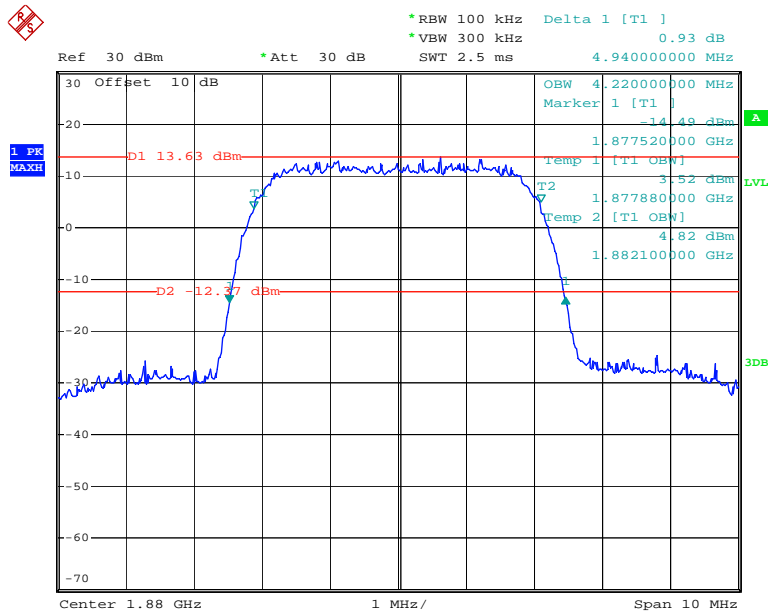
Date: 22.JUN.2018 01:04:41

### EDGE PCS1900 Cellular Band



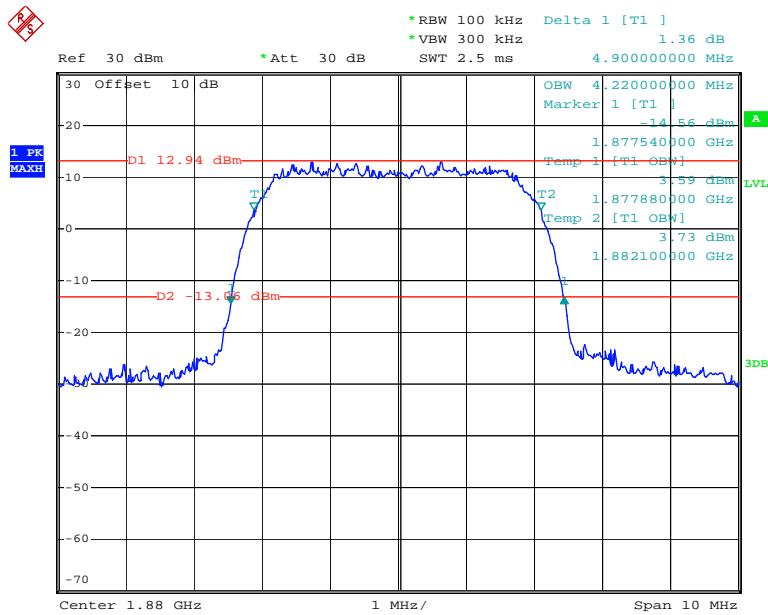
Date: 22.JUN.2018 01:13:49

### WCDMA Band II, Rel 99



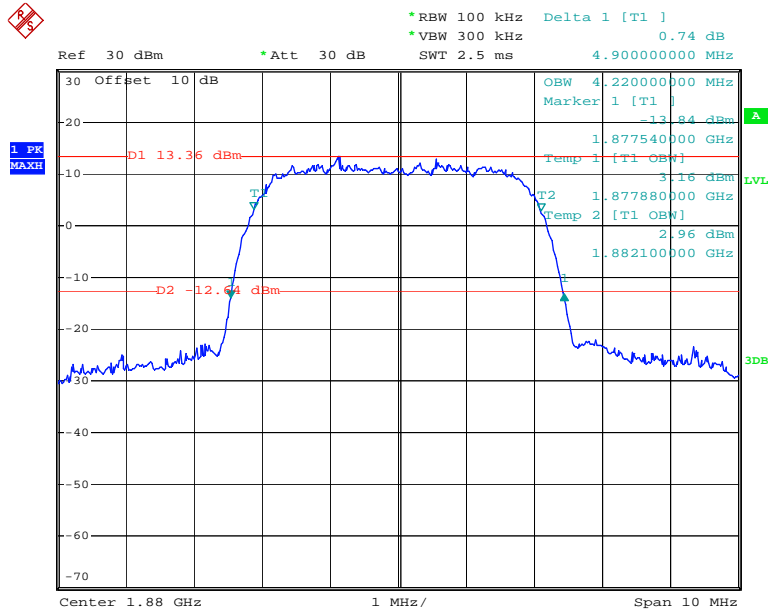
Date: 8.JUN.2018 19:48:46

### WCDMA Band II, HSUPA



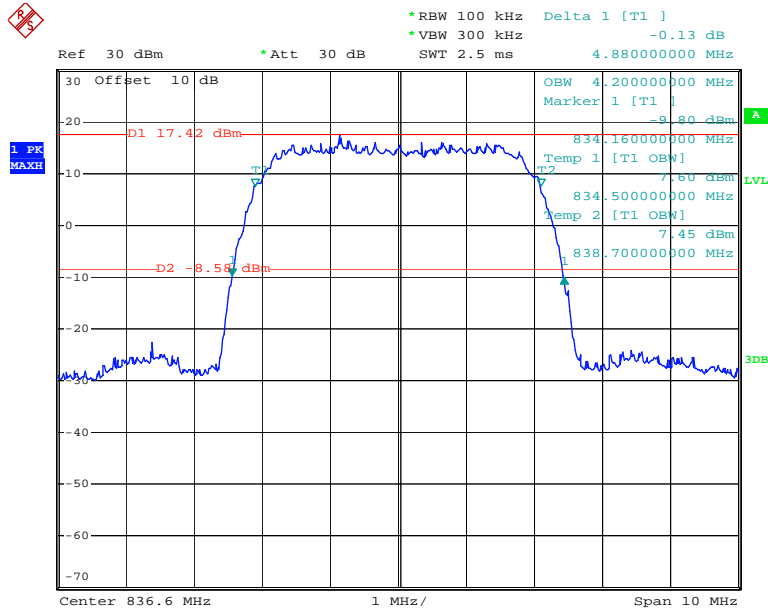
Date: 8.JUN.2018 20:52:50

### WCDMA Band II, HSDPA



Date: 8.JUN.2018 20:42:16

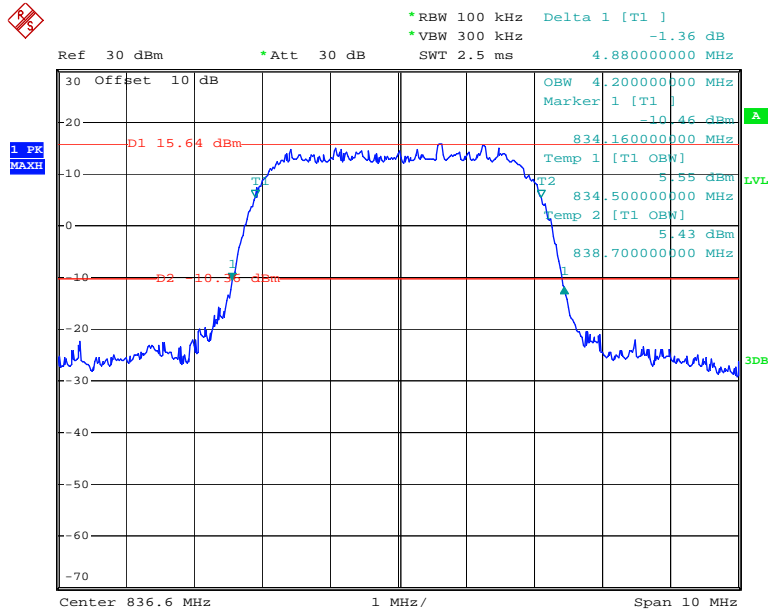
### WCDMA Band V, Rel 99



Date: 8.JUN.2018 20:46:49

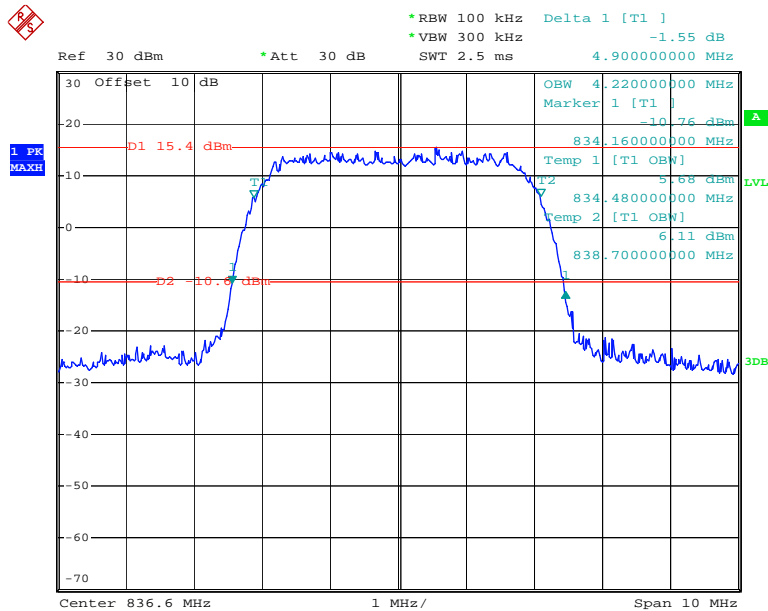


### WCDMA Band V, HSUPA



Date: 8.JUN.2018 20:50:42

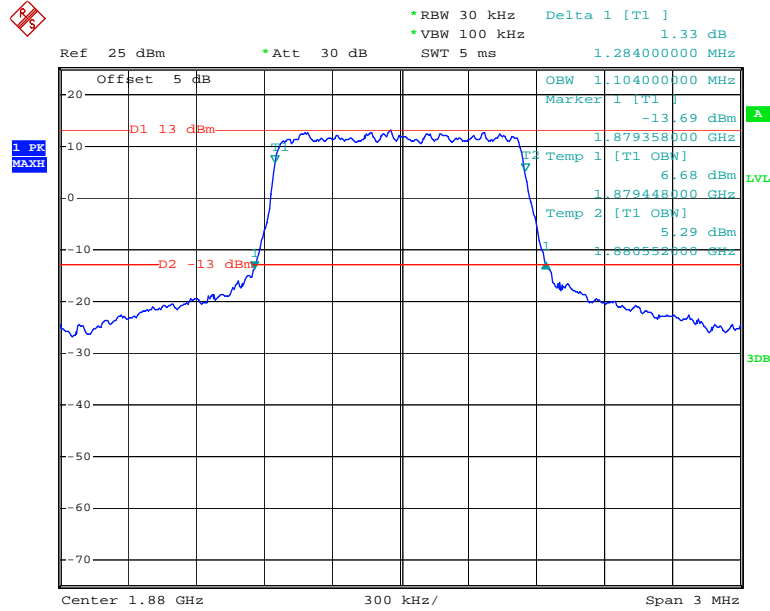
### WCDMA Band V, HSDPA



Date: 8.JUN.2018 20:08:51

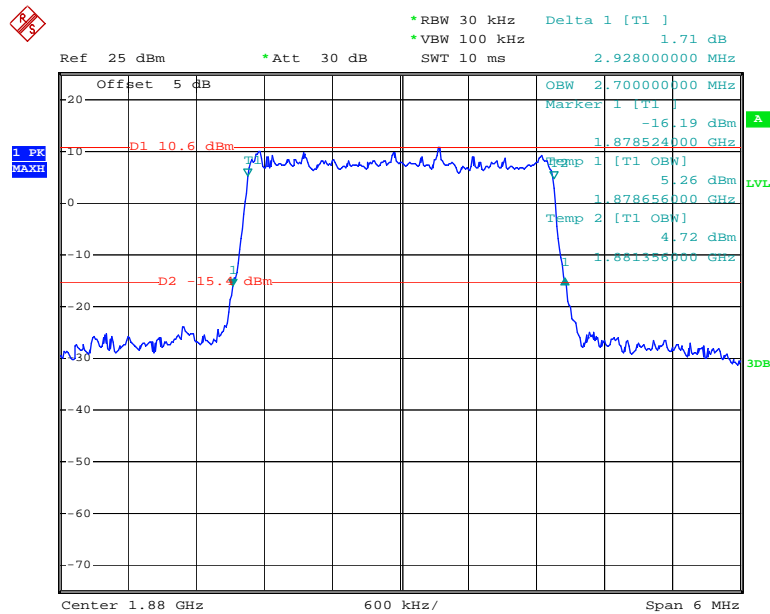
LTE Band 2

QPSK\_1.4 MHz



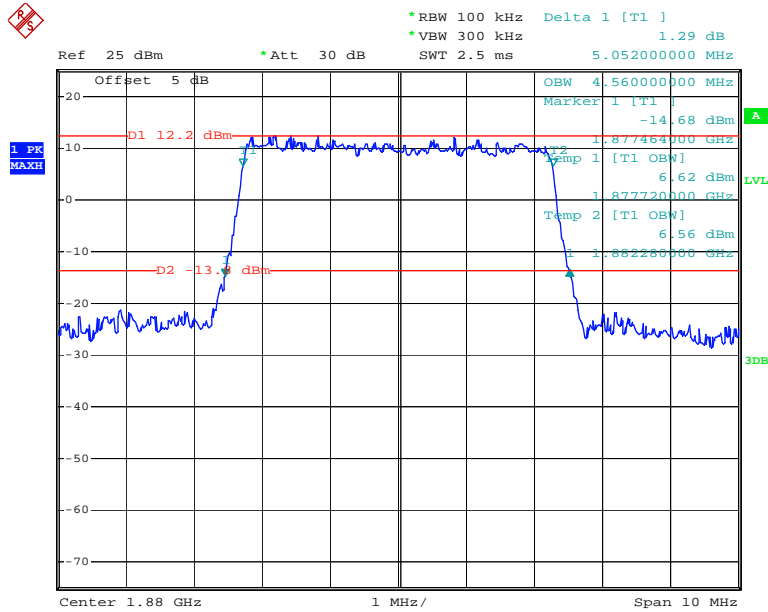
Date: 19.JUL.2018 19:35:33

QPSK\_3 MHz



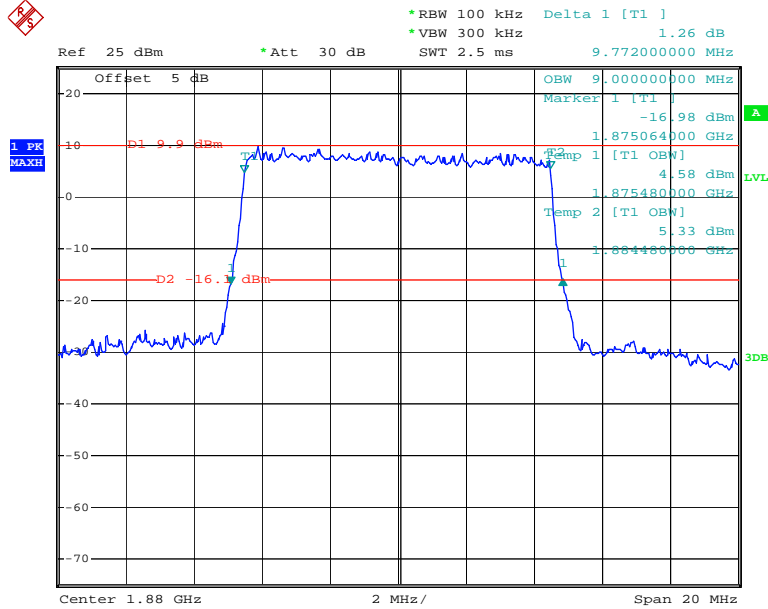
Date: 19.JUL.2018 19:38:13

### QPSK\_5 MHz



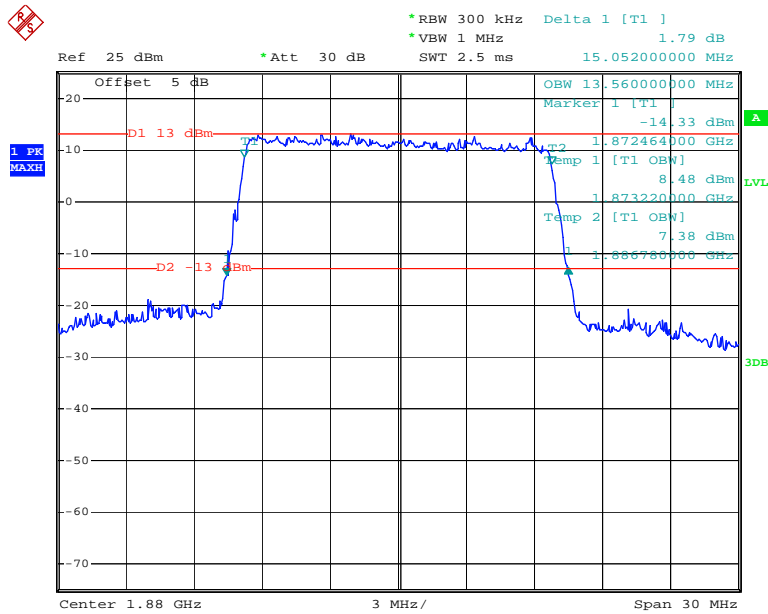
Date: 19.JUL.2018 19:41:54

### QPSK\_10 MHz



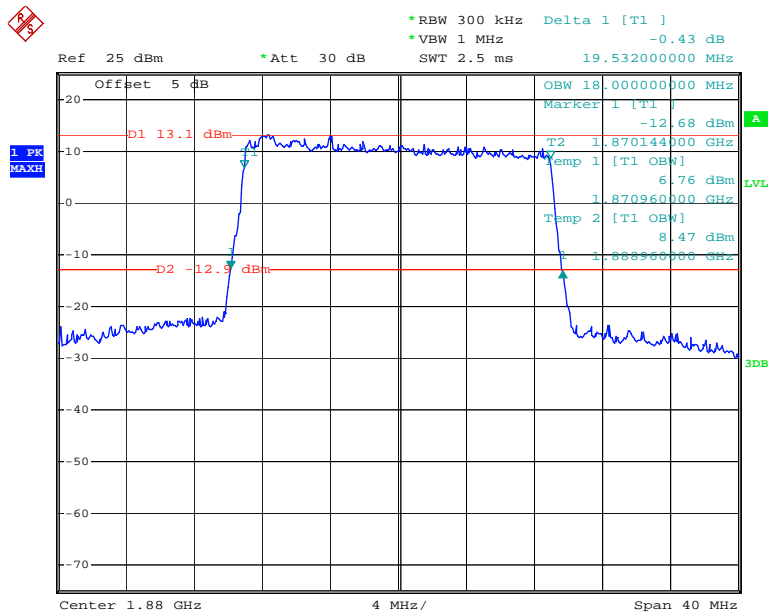
Date: 19.JUL.2018 19:43:03

### QPSK\_15 MHz



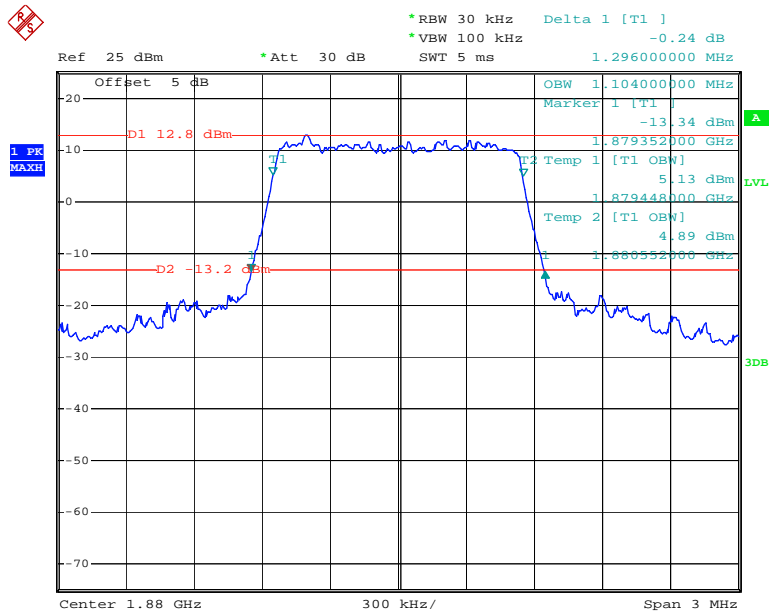
Date: 19.JUL.2018 19:44:50

### QPSK\_20 MHz



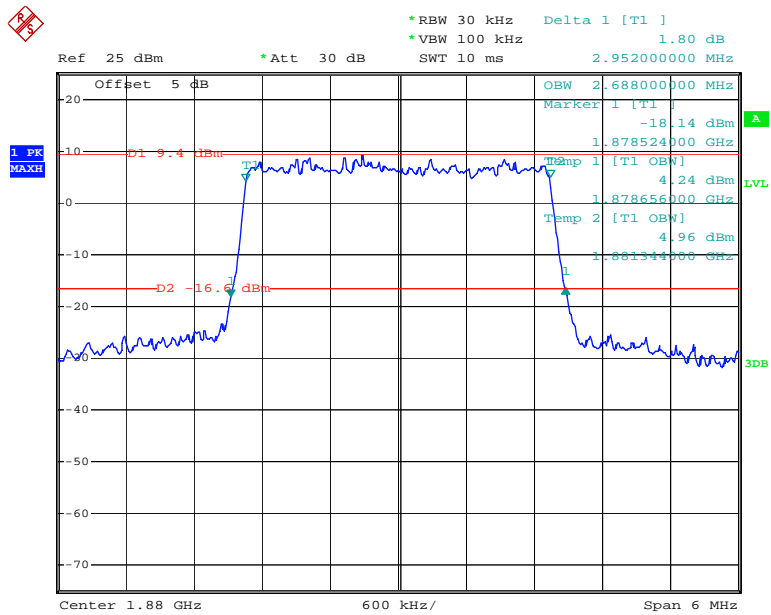
Date: 19.JUL.2018 19:46:37

### 16QAM\_1.4 MHz



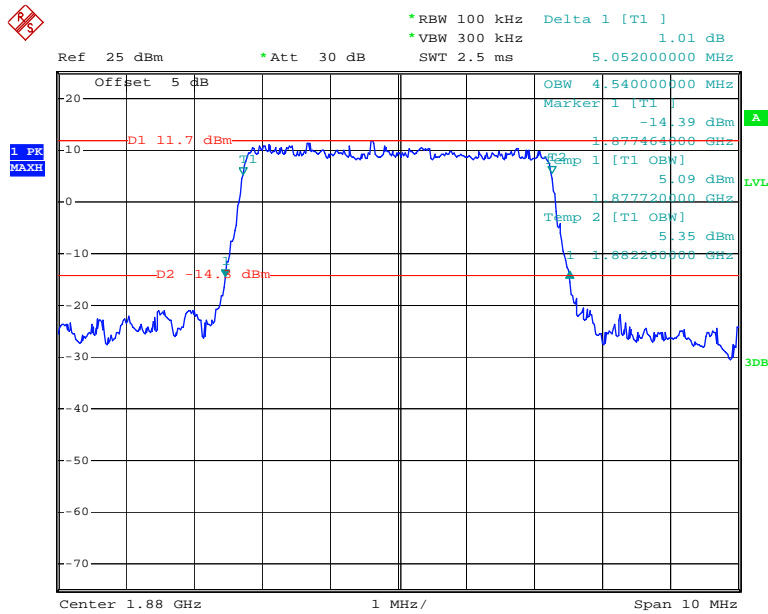
Date: 19.JUL.2018 19:36:52

### 16QAM\_3 MHz



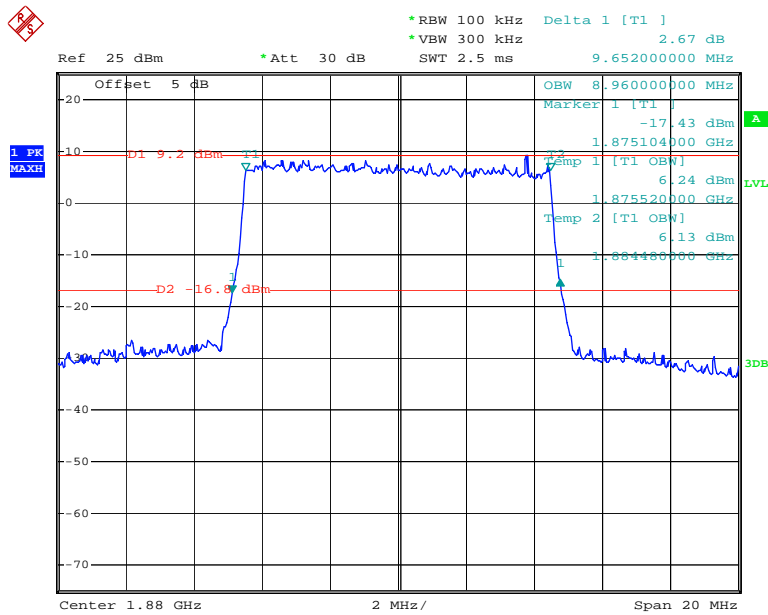
Date: 19.JUL.2018 19:39:42

### 16QAM\_5 MHz



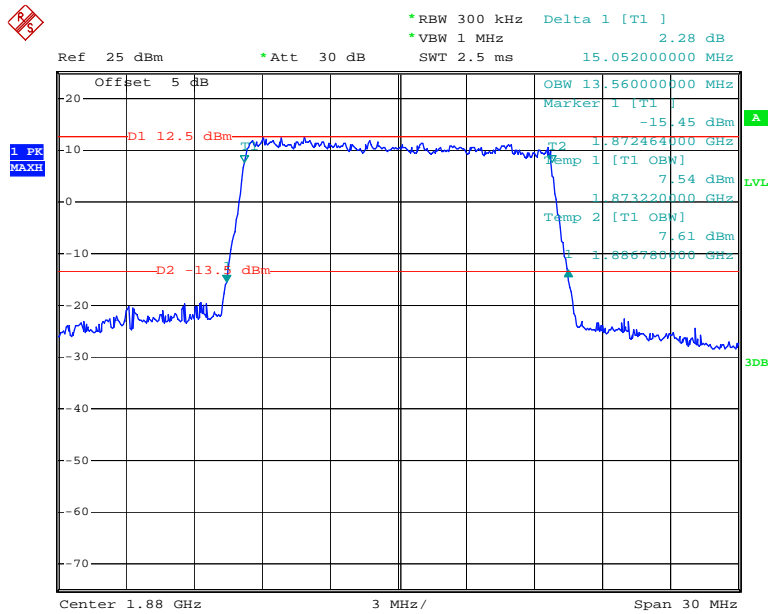
Date: 19.JUL.2018 19:41:16

### 16QAM\_10 MHz



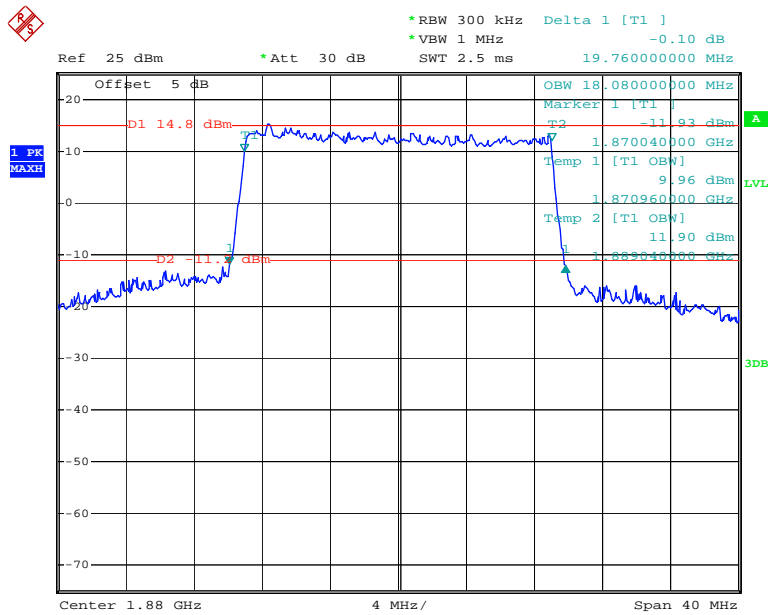
Date: 19.JUL.2018 19:43:56

### 16QAM\_15 MHz



Date: 19.JUL.2018 19:45:30

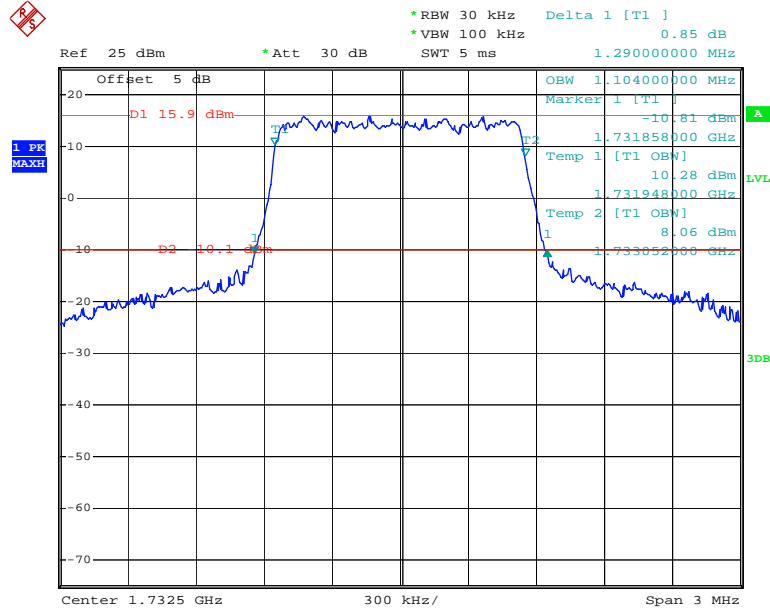
### 16QAM\_20 MHz



Date: 19.JUL.2018 21:23:15

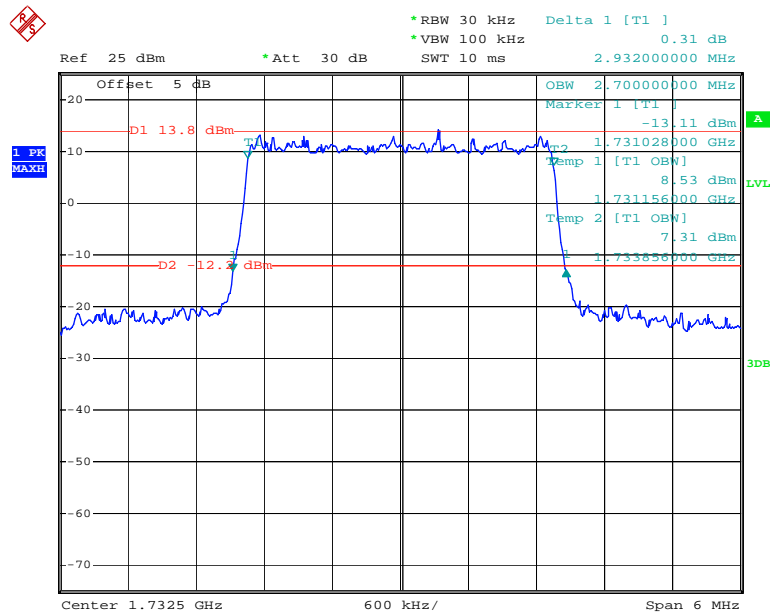
**LTE Band 4:**

**QPSK\_1.4 MHz**



Date: 19.JUL.2018 20:04:15

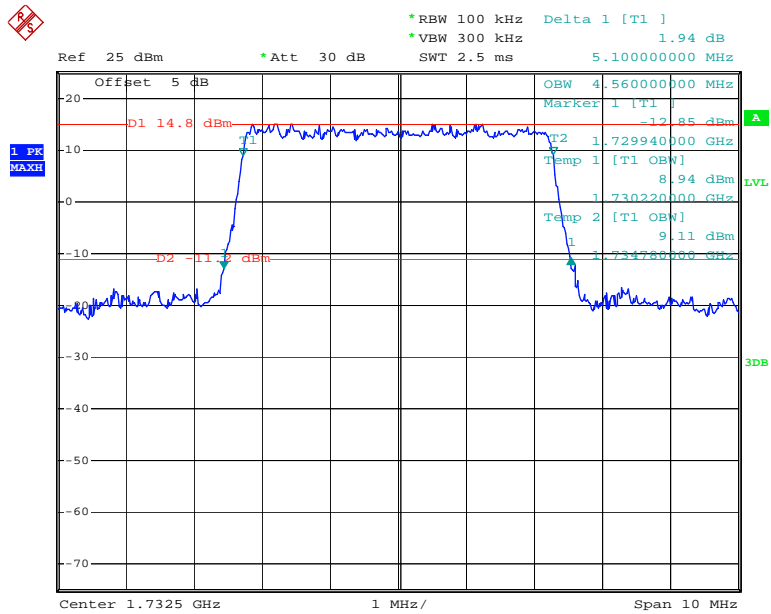
**QPSK\_3 MHz**



Date: 19.JUL.2018 20:02:31

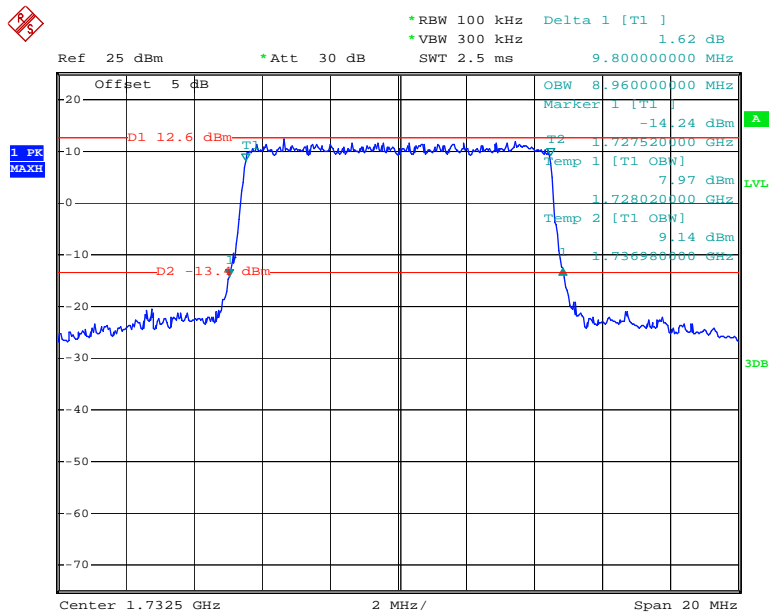


### QPSK\_5 MHz



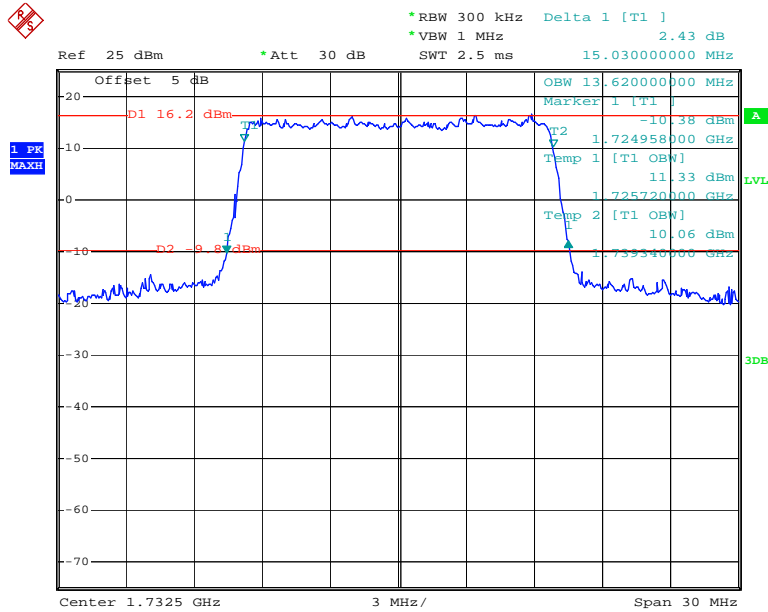
Date: 19.JUL.2018 19:59:42

### QPSK\_10 MHz



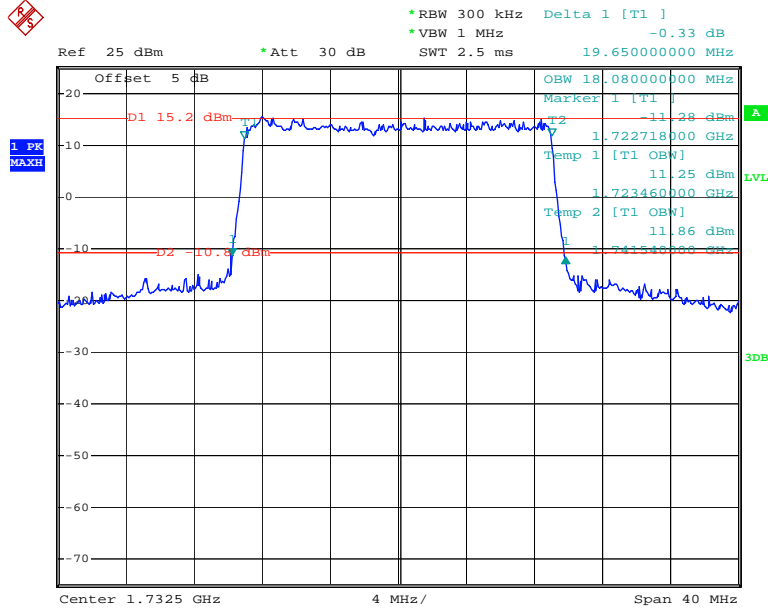
Date: 19.JUL.2018 19:58:42

### QPSK\_15 MHz



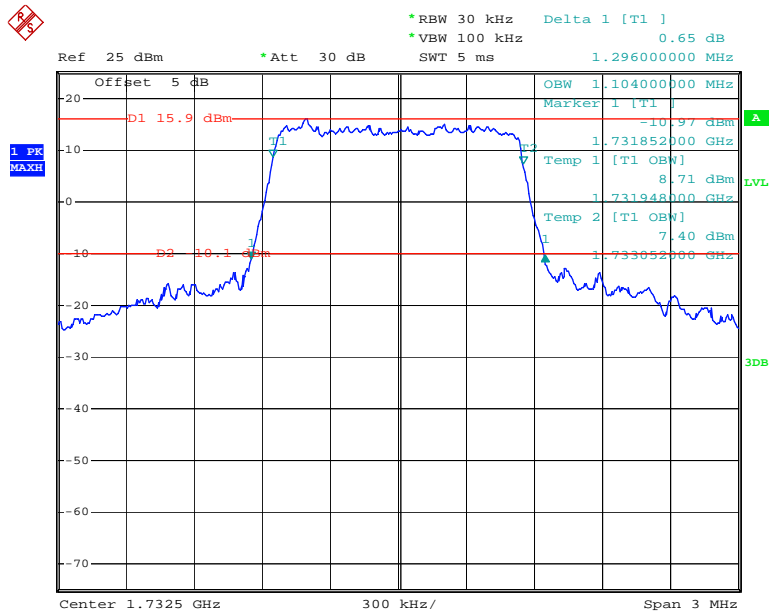
Date: 19.JUL.2018 20:05:19

### QPSK\_20 MHz



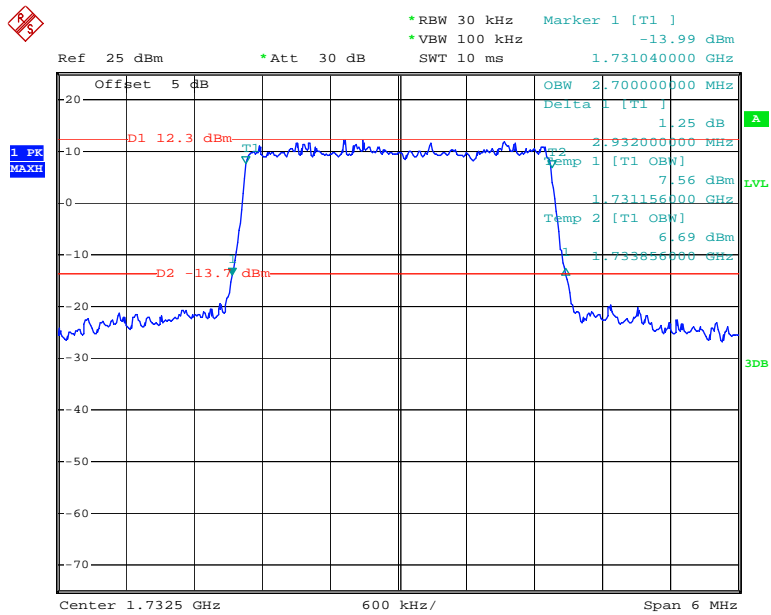
Date: 19.JUL.2018 20:06:46

### 16QAM\_1.4 MHz



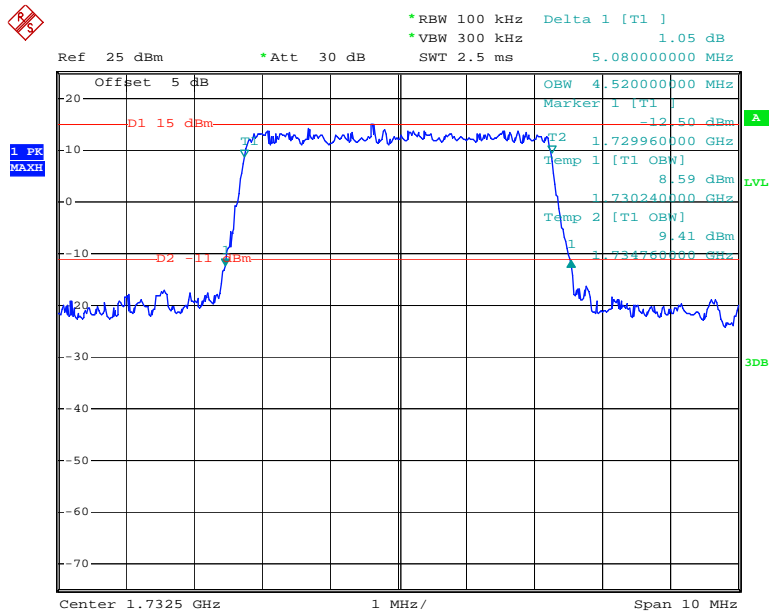
Date: 19.JUL.2018 20:03:51

### 16QAM\_3 MHz



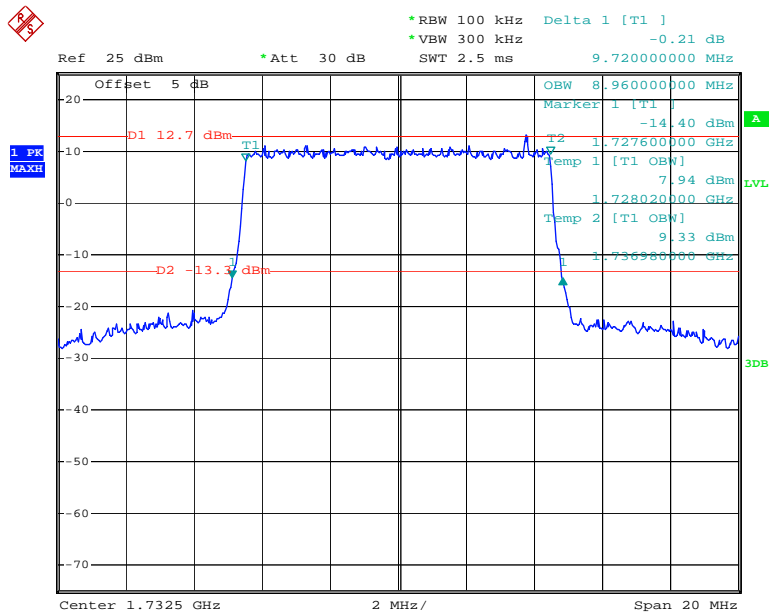
Date: 19.JUL.2018 20:01:41

### 16QAM\_5 MHz



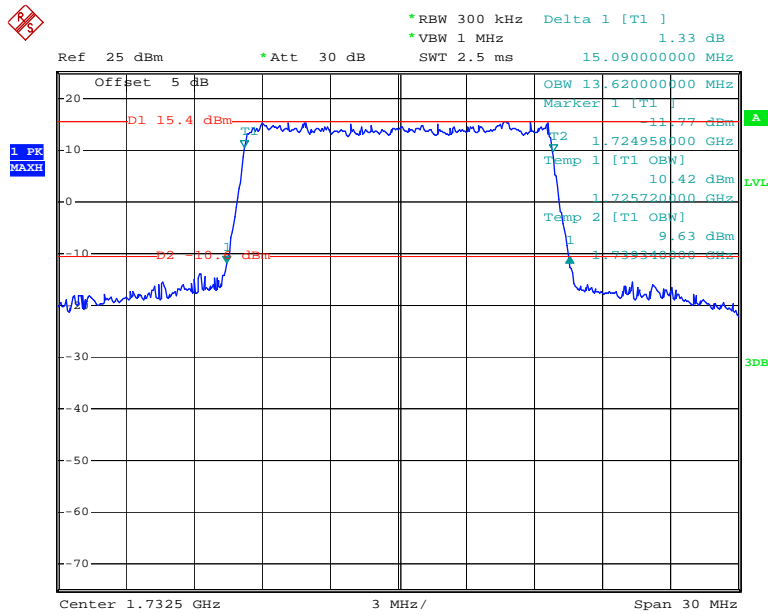
Date: 19.JUL.2018 20:00:21

### 16QAM\_10 MHz



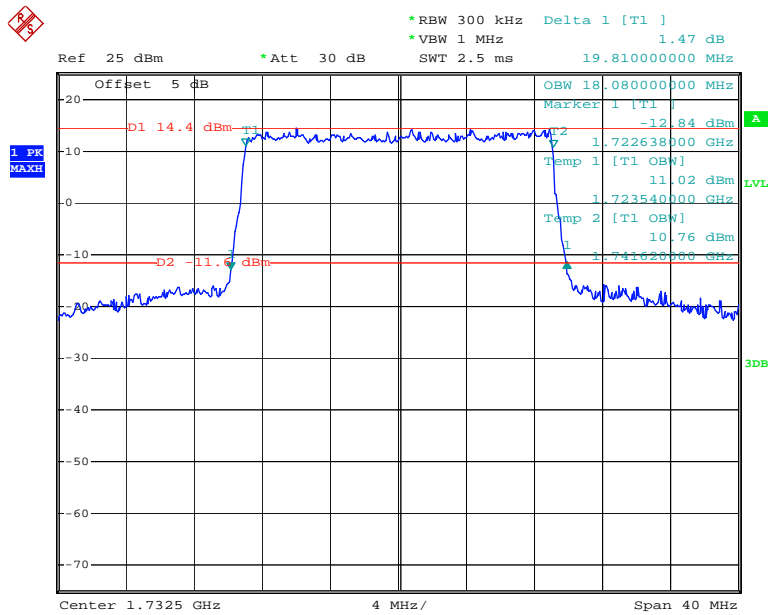
Date: 19.JUL.2018 19:58:01

### 16QAM\_15 MHz



Date: 19.JUL.2018 20:06:01

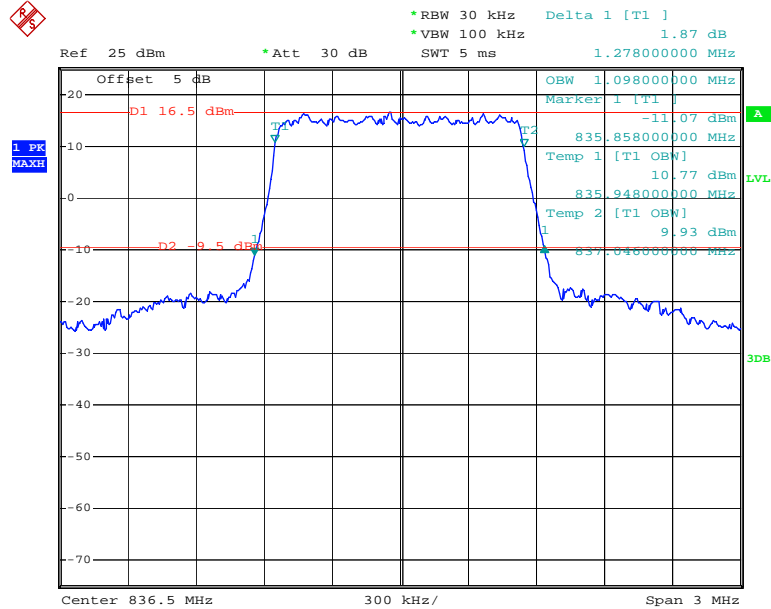
### 16QAM\_20 MHz



Date: 19.JUL.2018 20:07:21

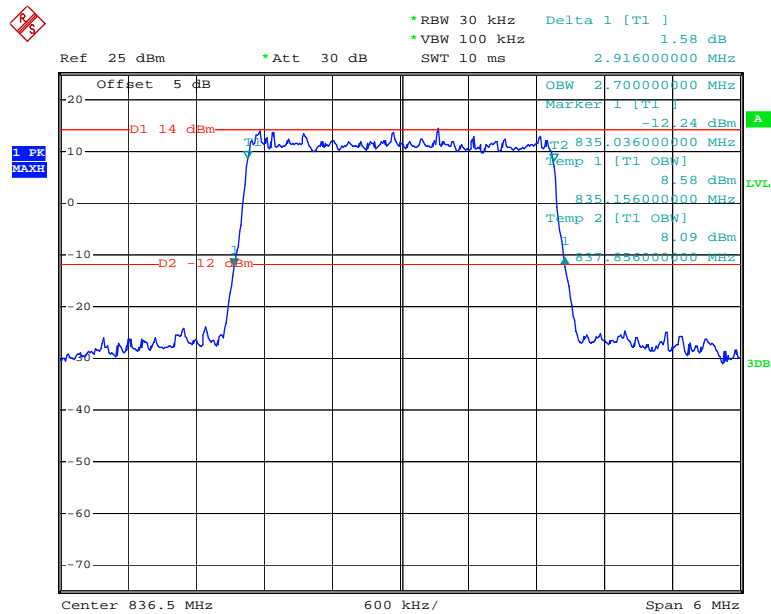
**LTE Band 5:**

**QPSK\_1.4 MHz**



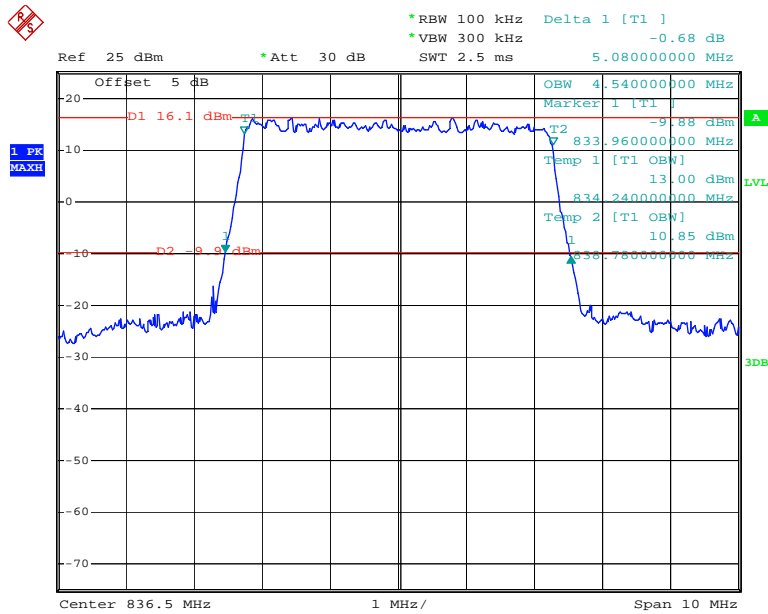
Date: 19.JUL.2018 21:05:00

**QPSK\_3 MHz**



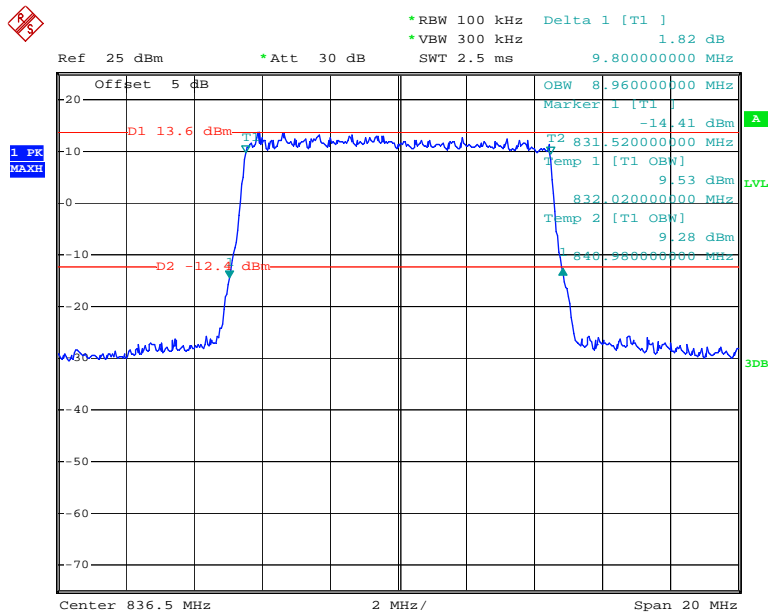
Date: 19.JUL.2018 21:03:06

### QPSK\_5 MHz



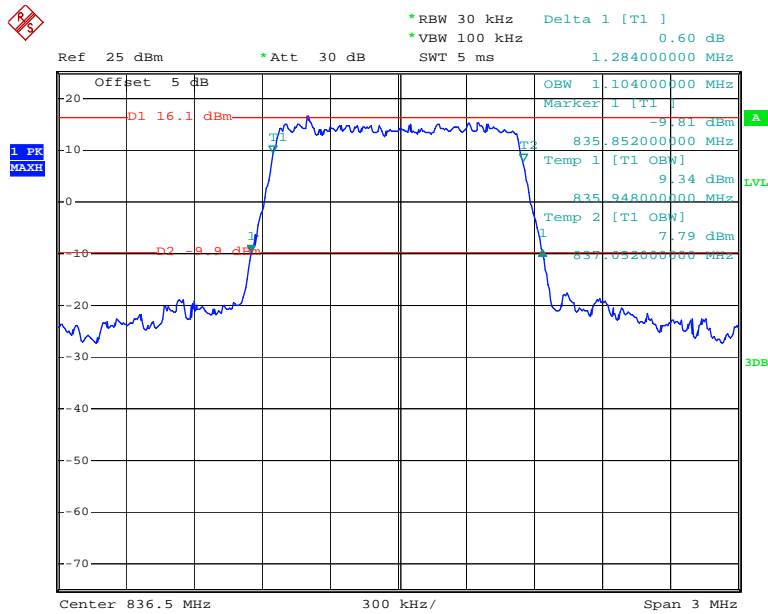
Date: 19.JUL.2018 20:58:15

### QPSK\_10 MHz



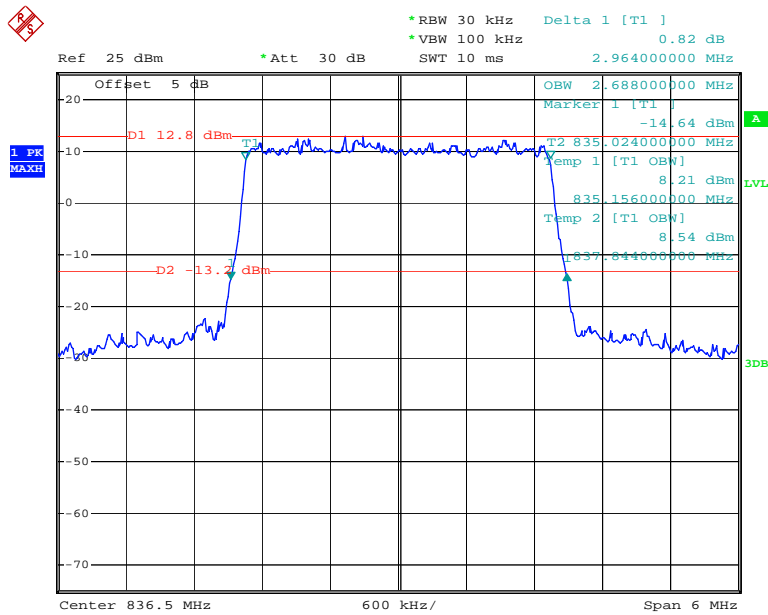
Date: 19.JUL.2018 20:59:50

### 16QAM\_1.4 MHz



Date: 19.JUL.2018 21:05:30

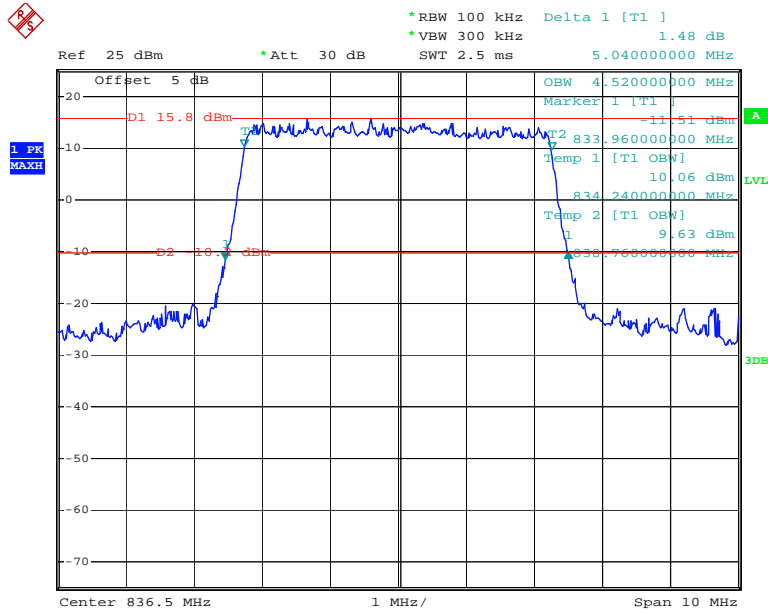
### 16QAM\_3 MHz



Date: 19.JUL.2018 21:03:56

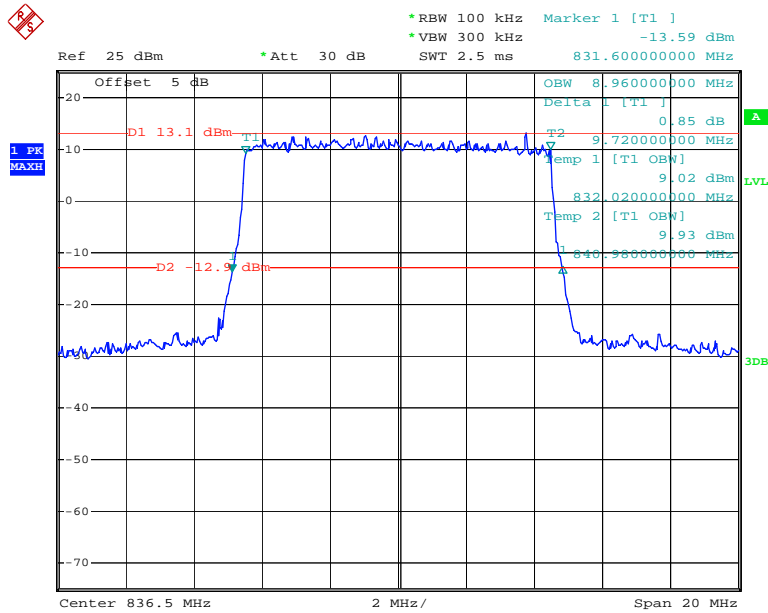


### 16QAM\_5 MHz



Date: 19.JUL.2018 20:58:48

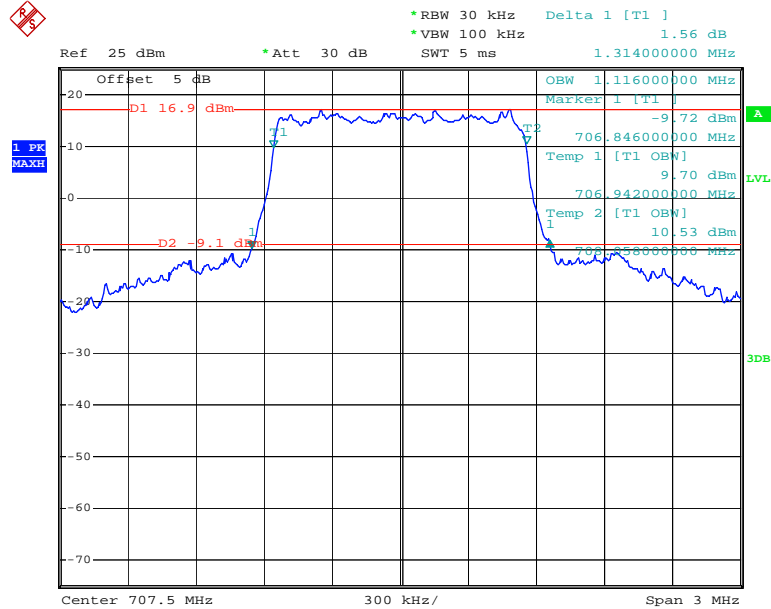
### 16QAM\_10 MHz



Date: 19.JUL.2018 21:01:16

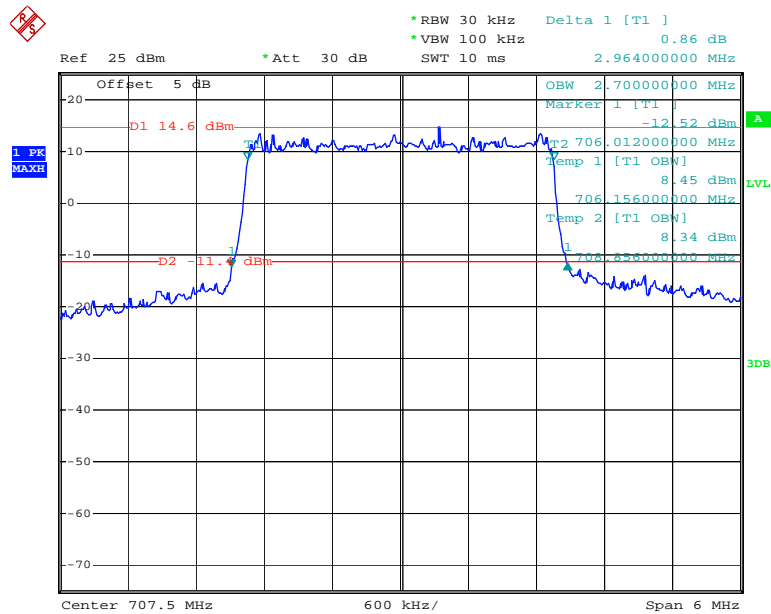
**LTE Band 12:**

**QPSK\_1.4 MHz**



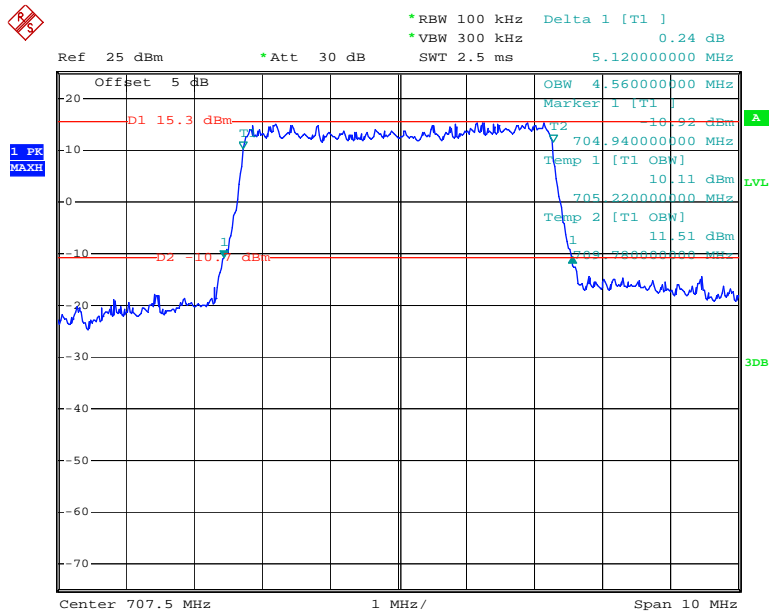
Date: 19.JUL.2018 20:09:50

**QPSK\_3 MHz**



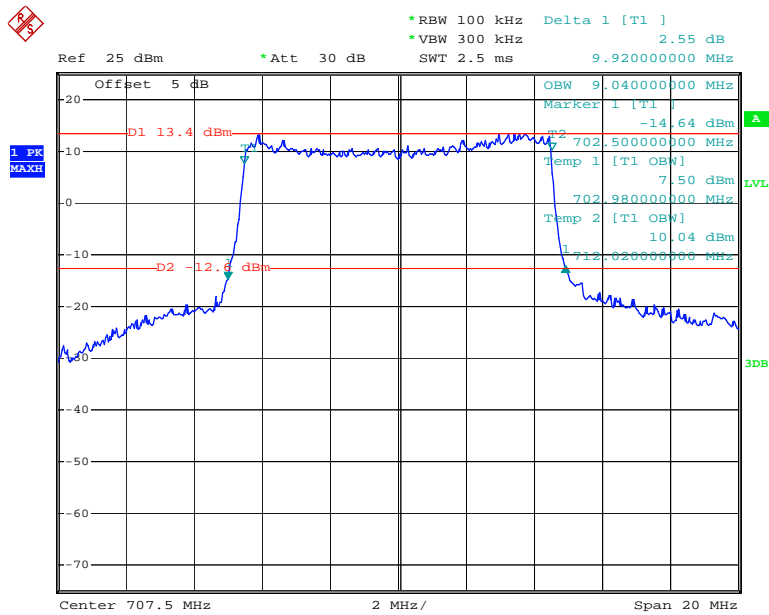
Date: 19.JUL.2018 20:12:00

### QPSK\_5 MHz



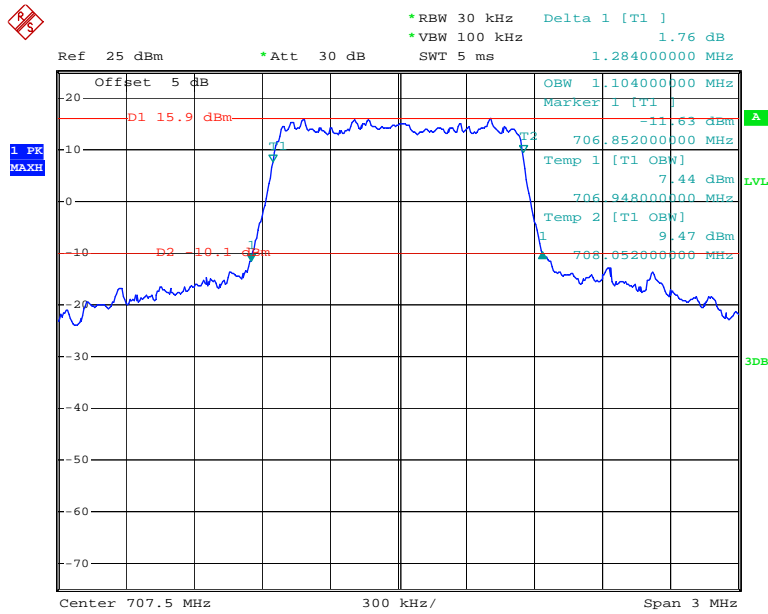
Date: 19.JUL.2018 21:20:17

### QPSK\_10 MHz



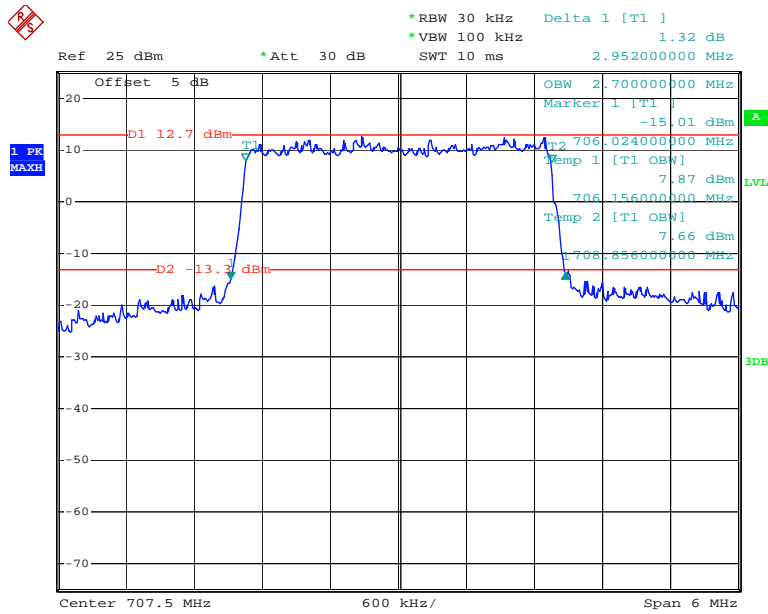
Date: 19.JUL.2018 21:17:56

### 16QAM\_1.4 MHz



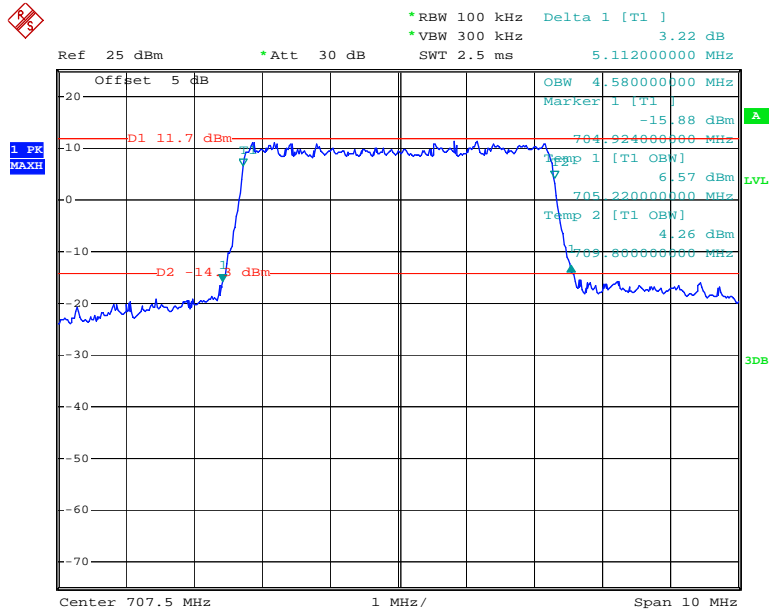
Date: 19.JUL.2018 20:10:44

### 16QAM\_3 MHz



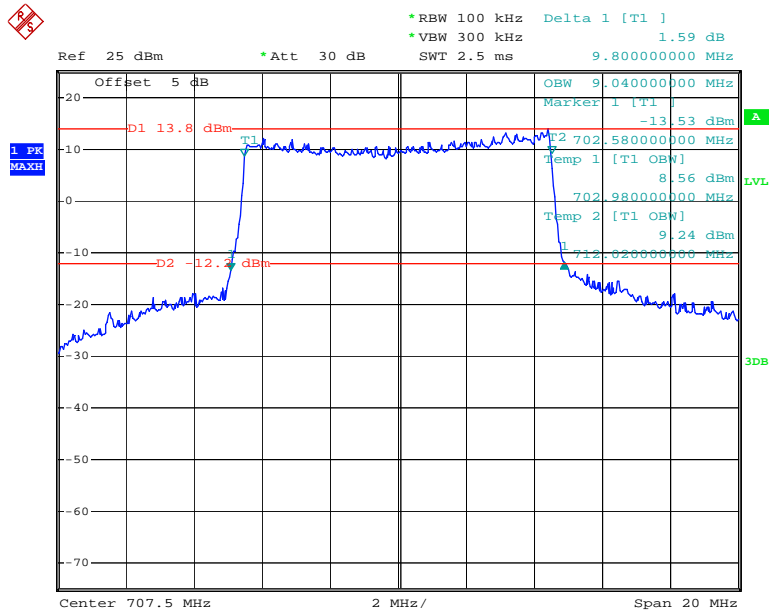
Date: 19.JUL.2018 20:12:49

### 16QAM\_5 MHz



Date: 19.JUL.2018 20:22:04

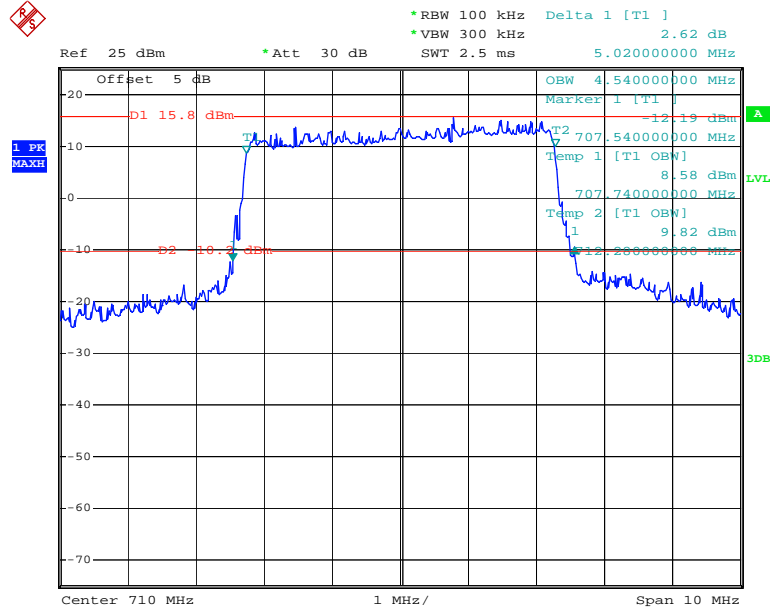
### 16QAM\_10 MHz



Date: 19.JUL.2018 21:19:17

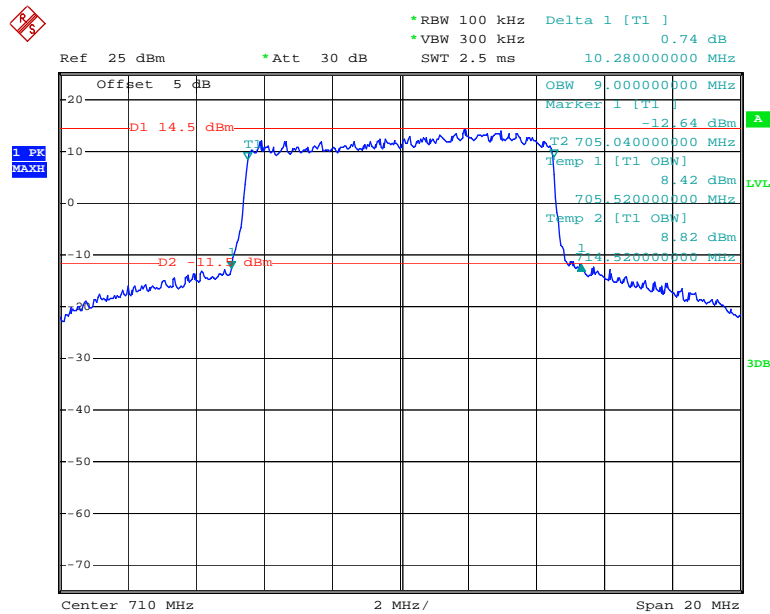
**LTE Band 17:**

**QPSK\_5 MHz**



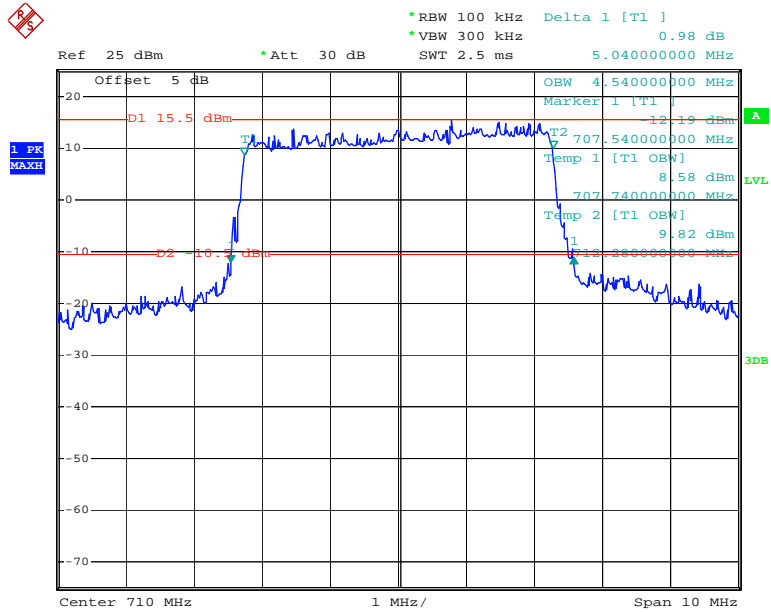
Date: 19.JUL.2018 21:14:13

**QPSK\_10 MHz**



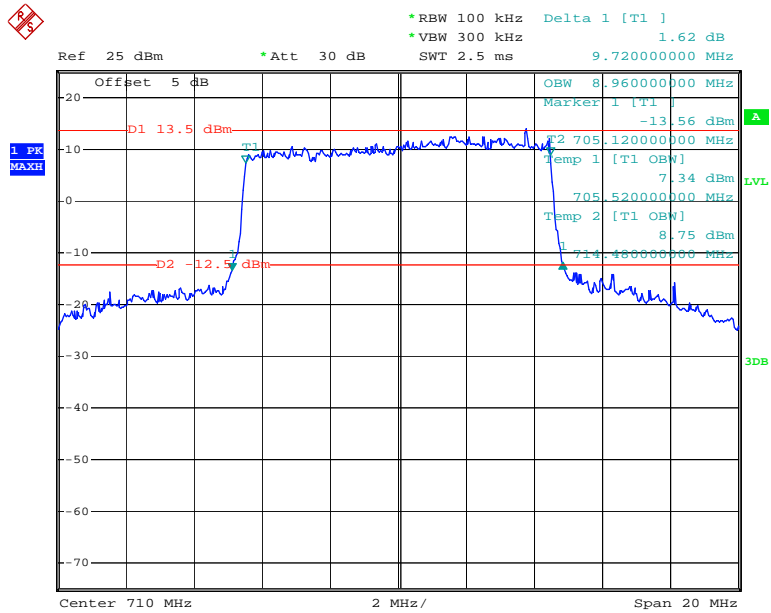
Date: 19.JUL.2018 20:46:16

### 16QAM\_5 MHz



Date: 19.JUL.2018 21:14:56

### 16QAM\_10 MHz



Date: 19.JUL.2018 20:34:48

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

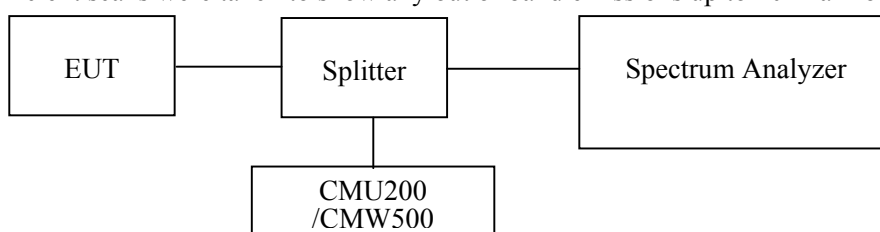
### Applicable Standard

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 10<sup>th</sup> harmonic.



### Test Equipment List and Details

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

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

### Test Data

#### Environmental Conditions

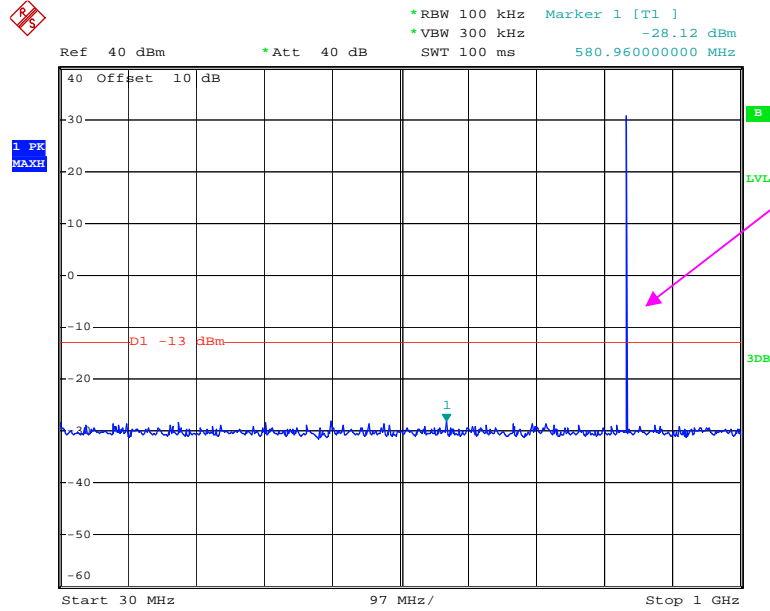
Temperature:	26.5~27.1°C
Relative Humidity:	54 ~61 %
ATM Pressure:	101.2~101.9 kPa

The testing was performed by Kami Zhou & Tiago Huang from 2018-06-06 to 2018-06-10.



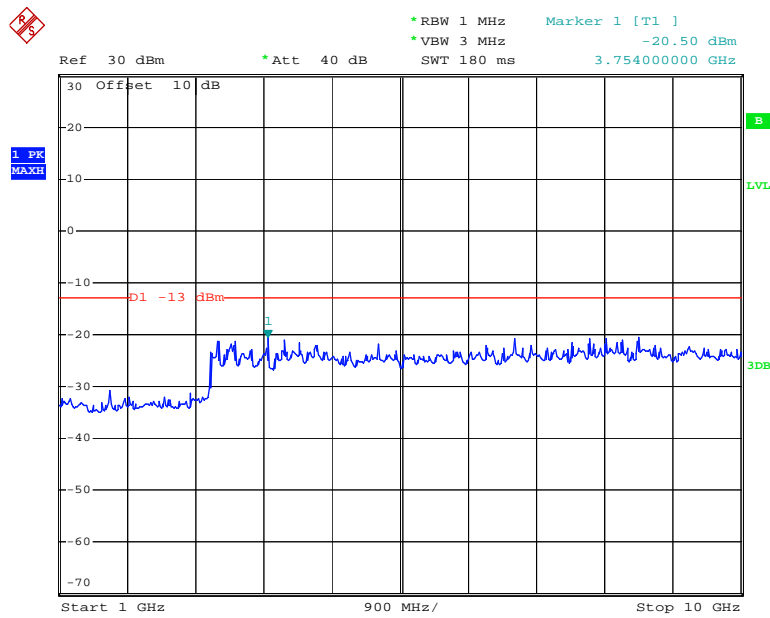
Please refer to the following plots.

### GSM850\_Middle Channel



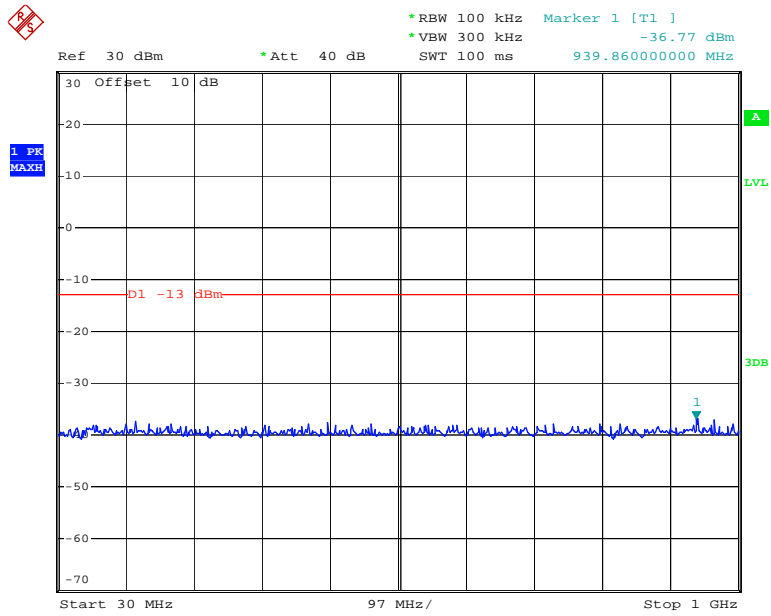
Fundamental

Date: 7.JUN.2018 23:51:44

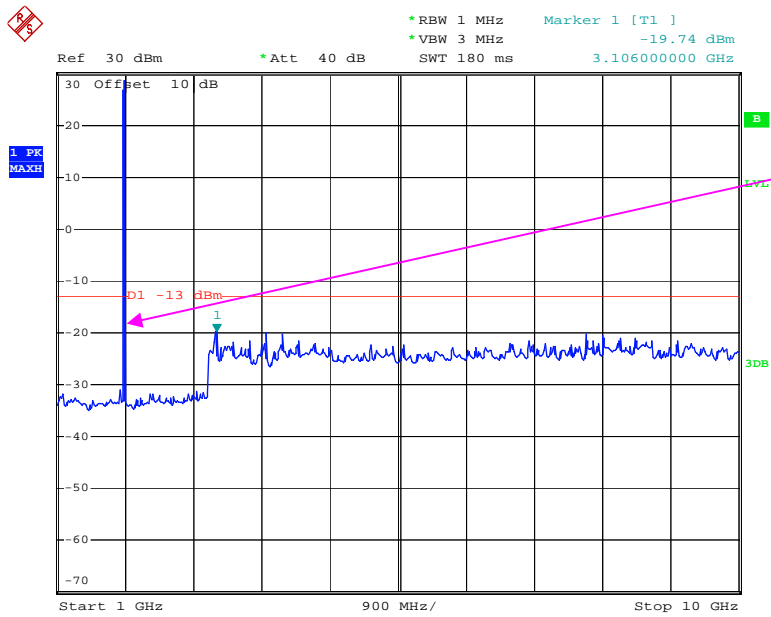


Date: 7.JUN.2018 23:52:45

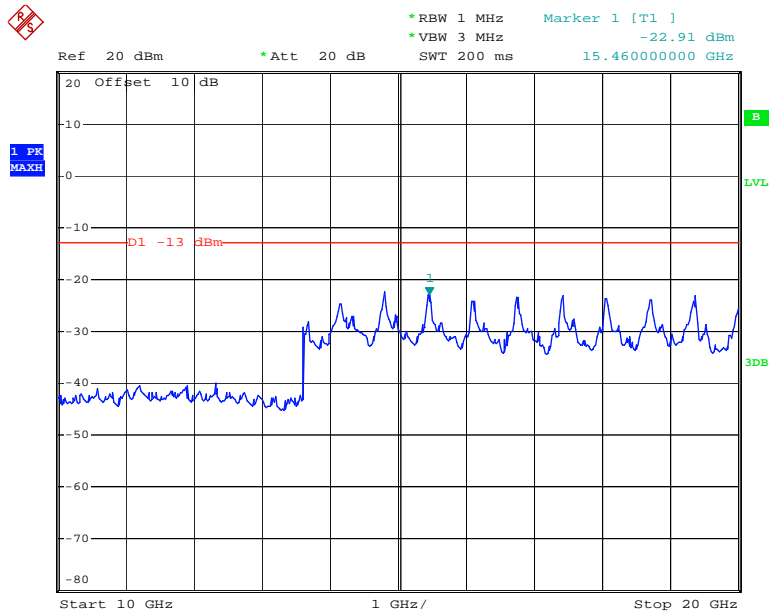
### PCS 1900\_ Middle Channel



Date: 7.JUN.2018 23:55:39

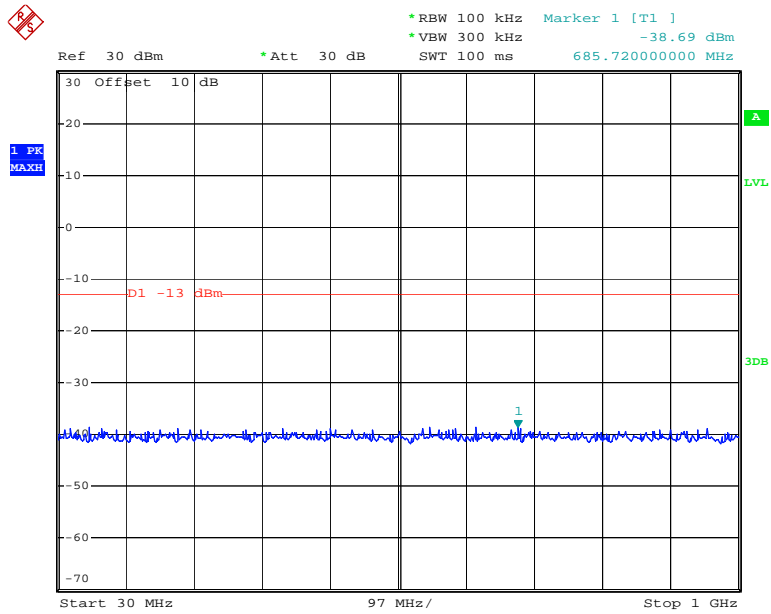


Date: 7.JUN.2018 23:57:27

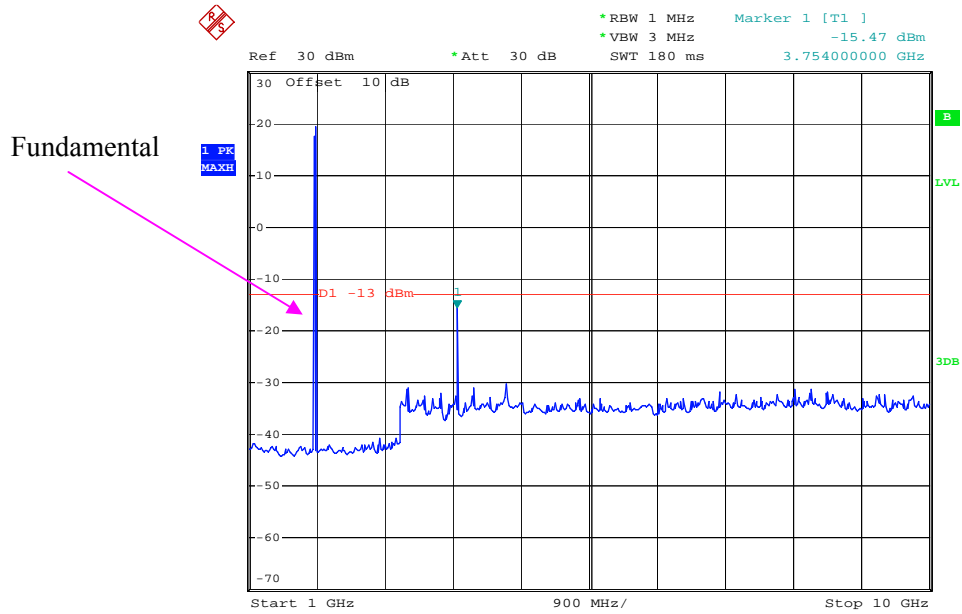


Date: 7.JUN.2018 23:58:01

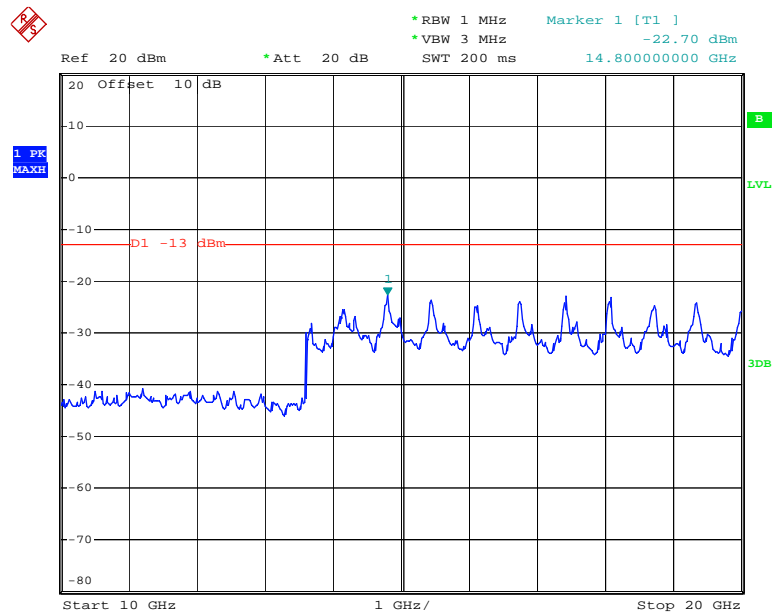
### WCDMA Band II, Rel99



Date: 10.JUN.2018 21:32:53

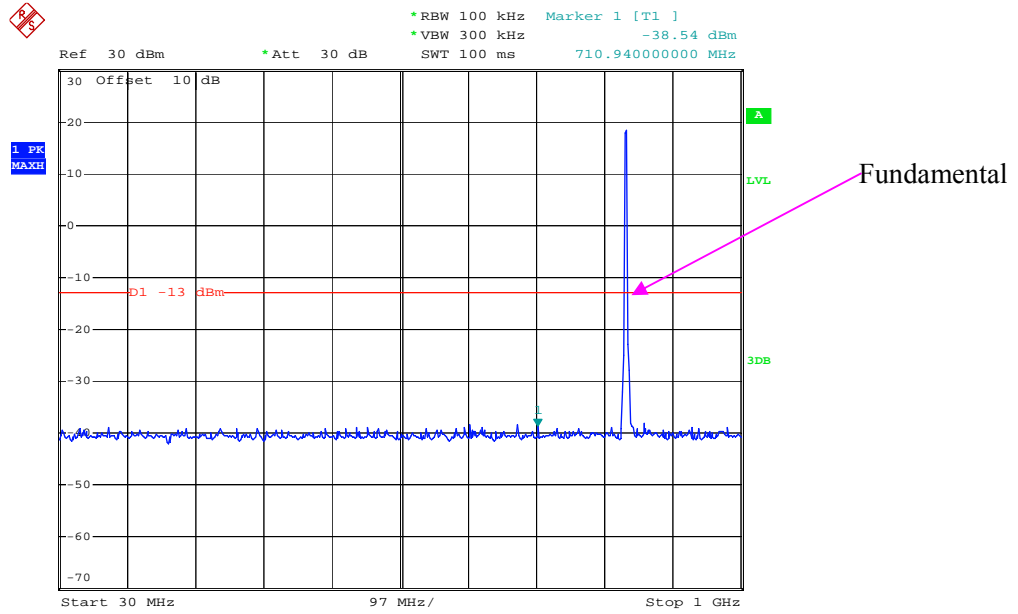


Date: 10.JUN.2018 21:33:09

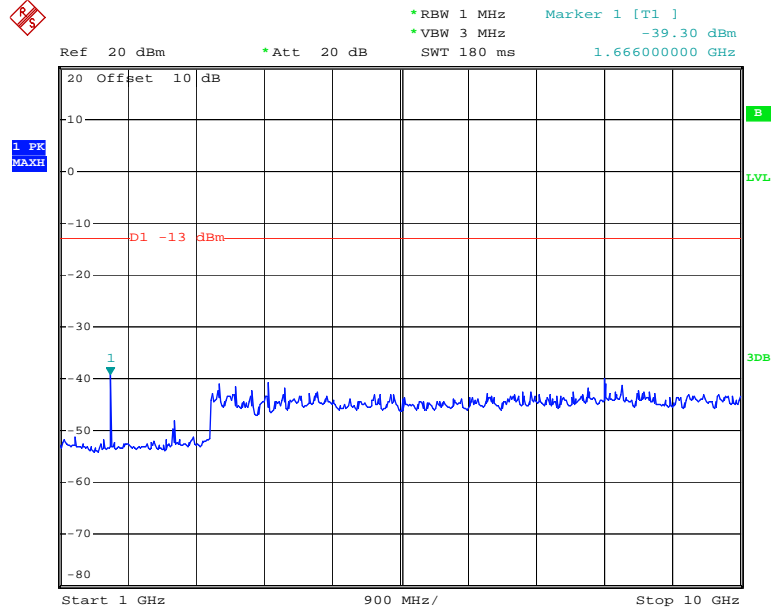


Date: 10.JUN.2018 21:33:35

### WCDMA Band V, Rel99



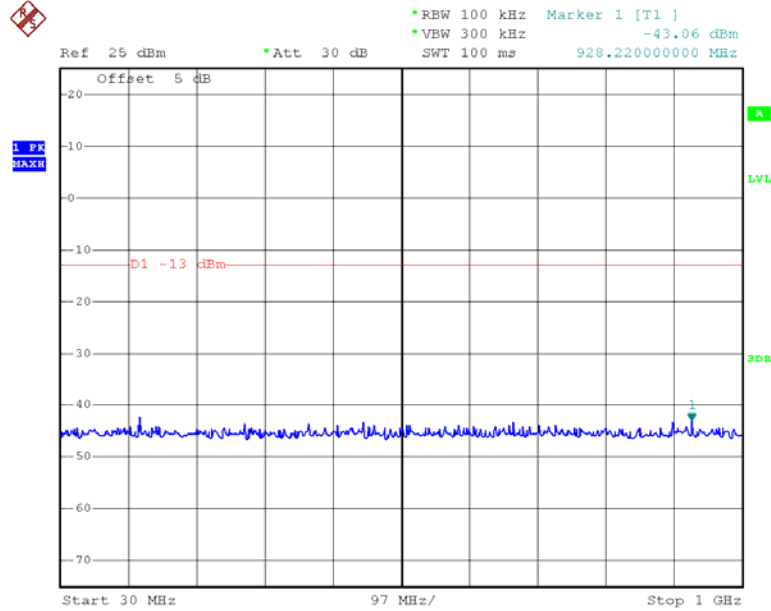
Date: 10.JUN.2018 21:36:26



Date: 10.JUN.2018 21:37:01

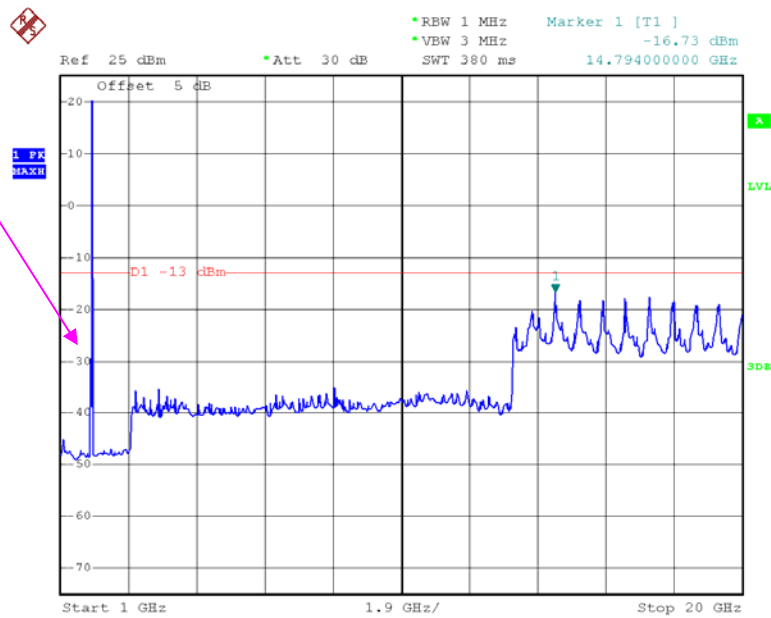
### LTE Band 2 (Middle Channel)

#### QPSK\_1.4 MHz



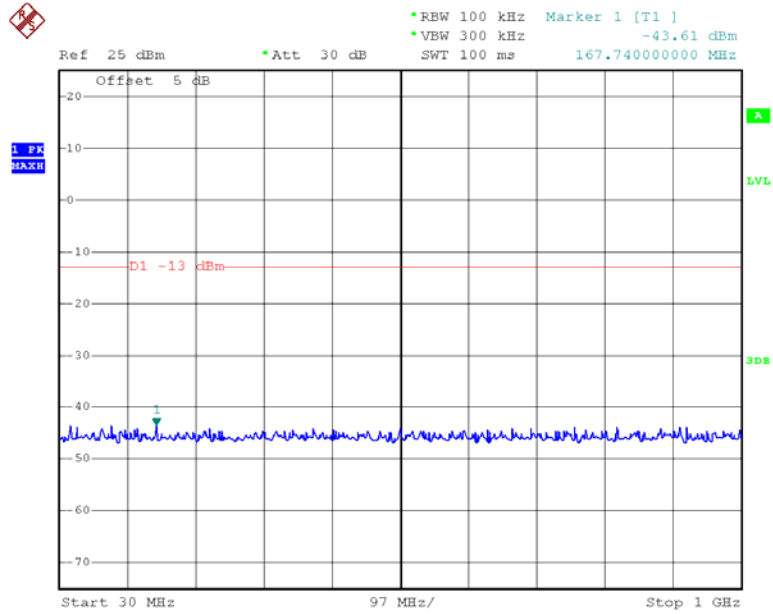
Date: 6.JUN.2018 14:07:29

Fundamental

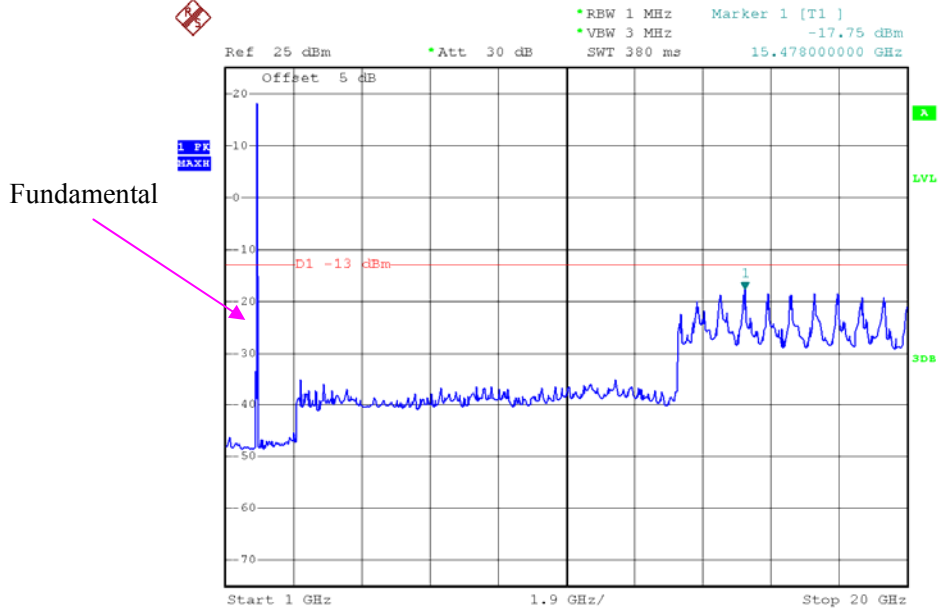


Date: 6.JUN.2018 14:08:03

### QPSK\_3 MHz

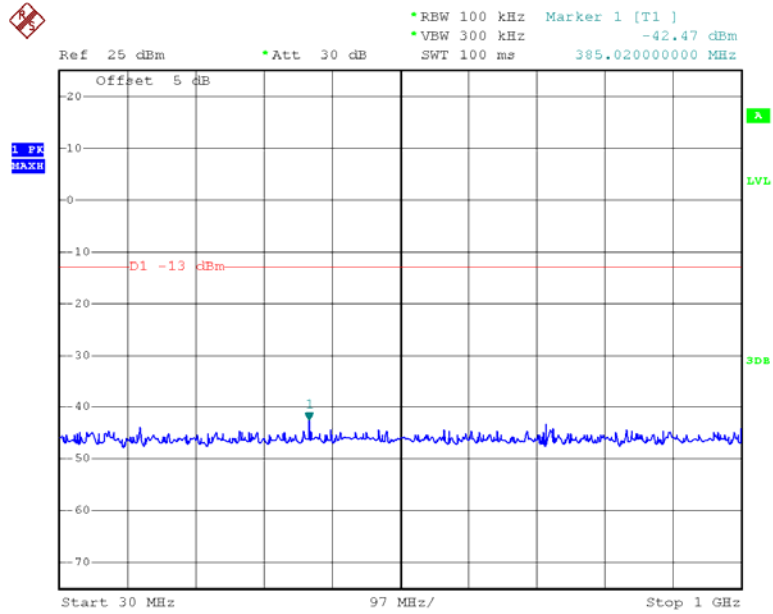


Date: 6.JUN.2018 14:08:45



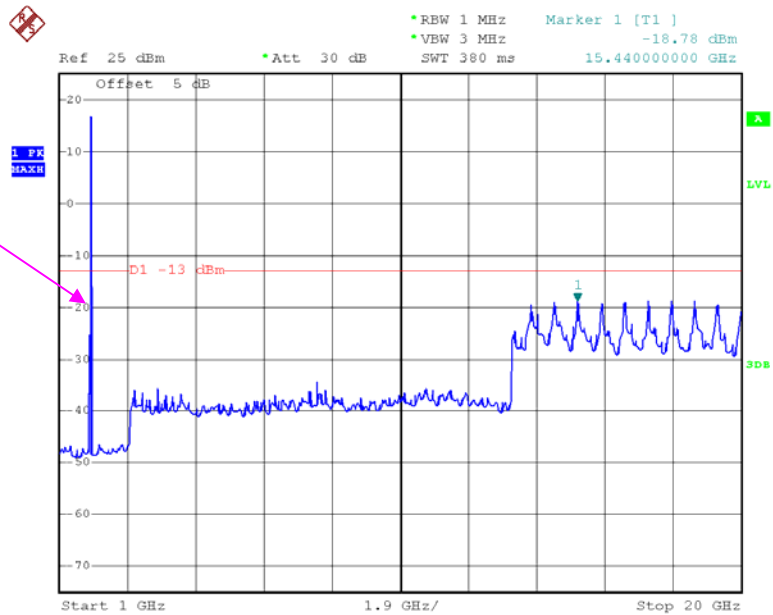
Date: 6.JUN.2018 14:08:26

### QPSK\_5 MHz



Date: 6.JUN.2018 14:09:00

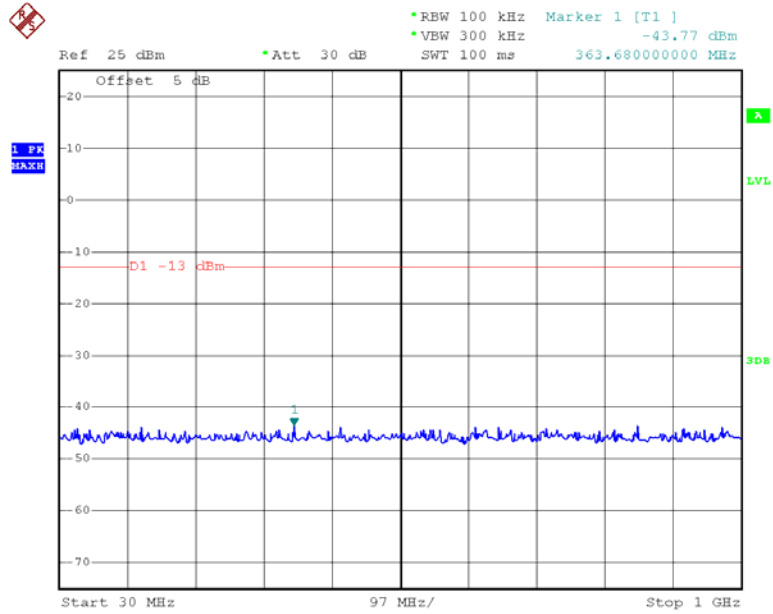
Fundamental



Date: 6.JUN.2018 14:09:19

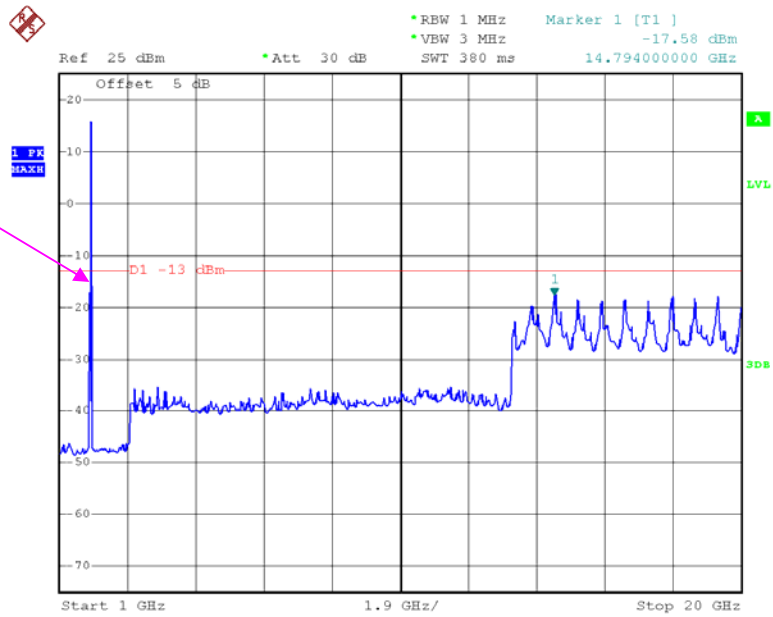


### QPSK\_10 MHz



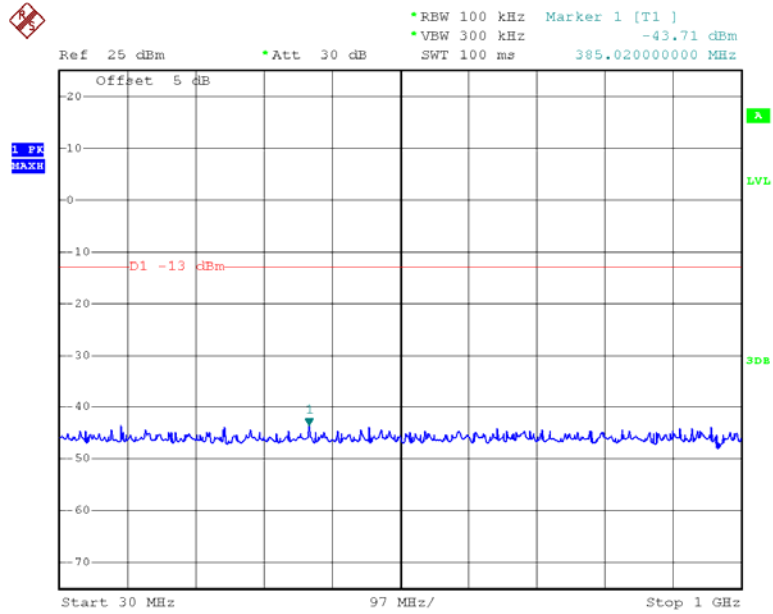
Date: 6.JUN.2018 14:10:13

Fundamental



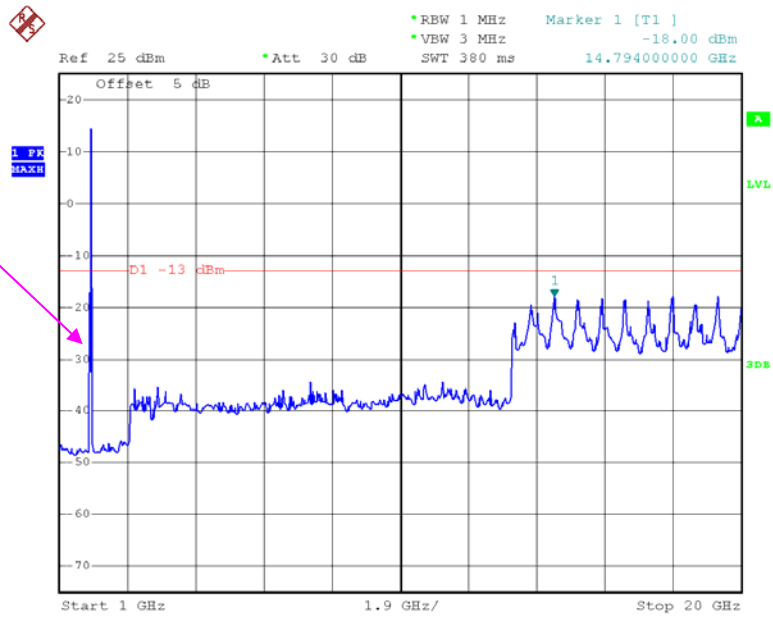
Date: 6.JUN.2018 14:09:53

### QPSK\_15 MHz



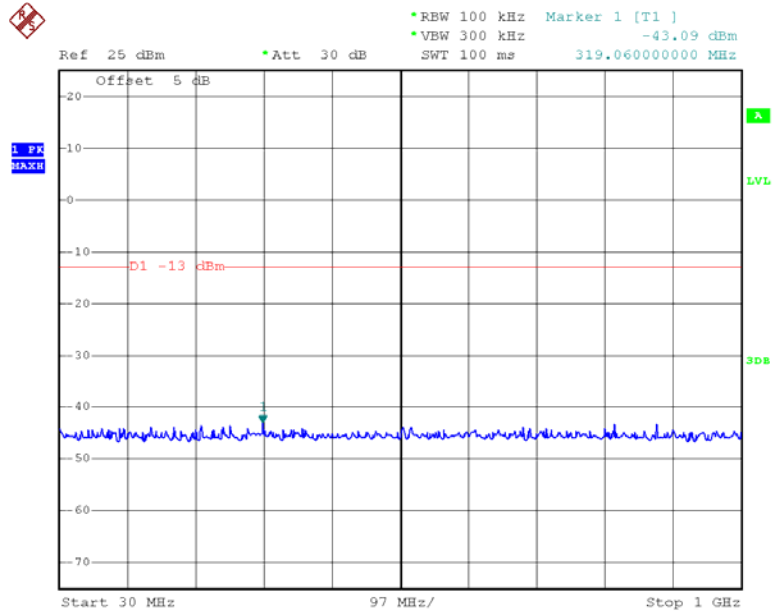
Date: 6.JUN.2018 14:10:28

Fundamental



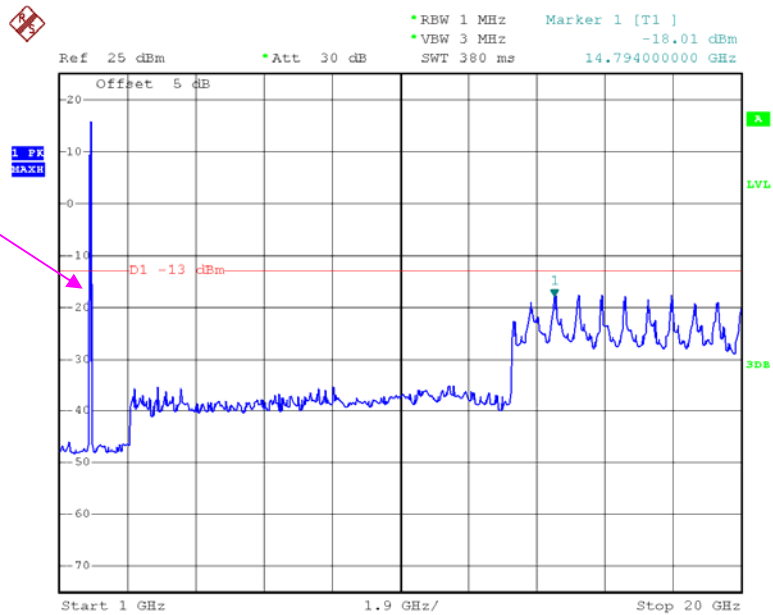
Date: 6.JUN.2018 14:11:04

### QPSK\_20 MHz



Date: 6.JUN.2018 14:19:05

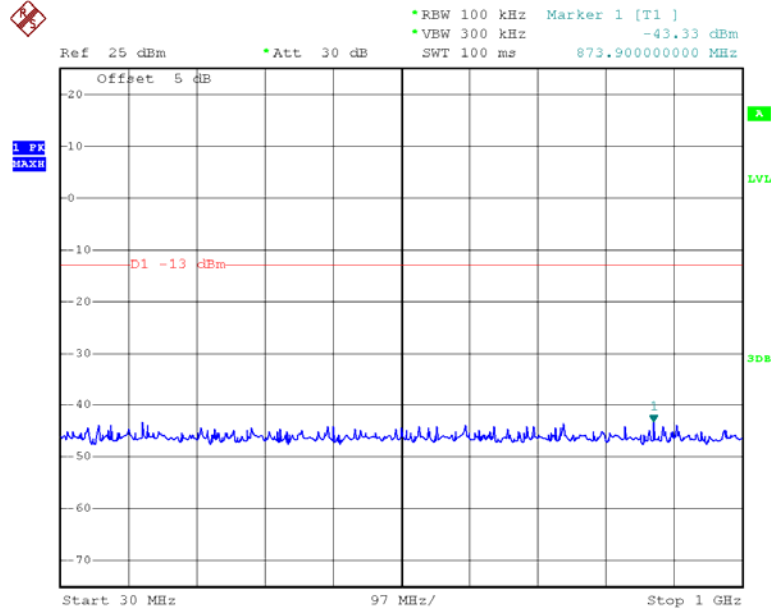
Fundamental



Date: 6.JUN.2018 14:12:23

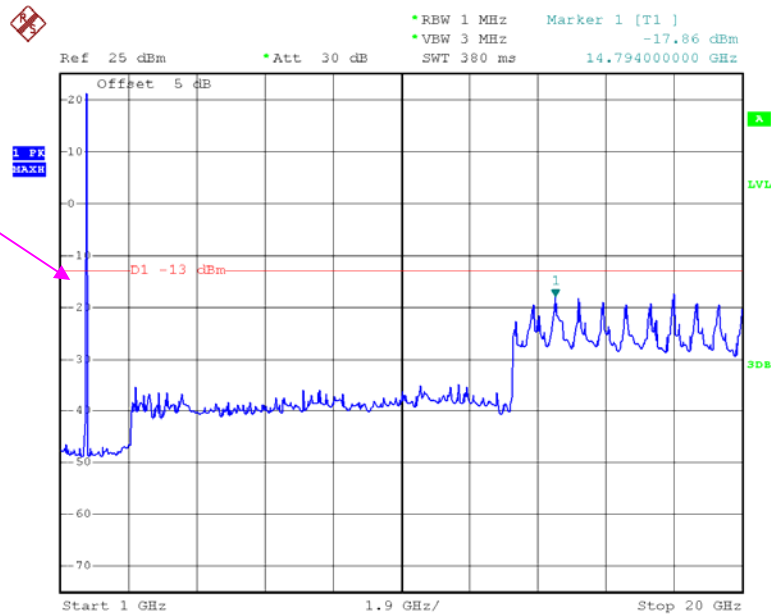
**LTE Band 4 (Middle Channel)**

**QPSK\_1.4 MHz**



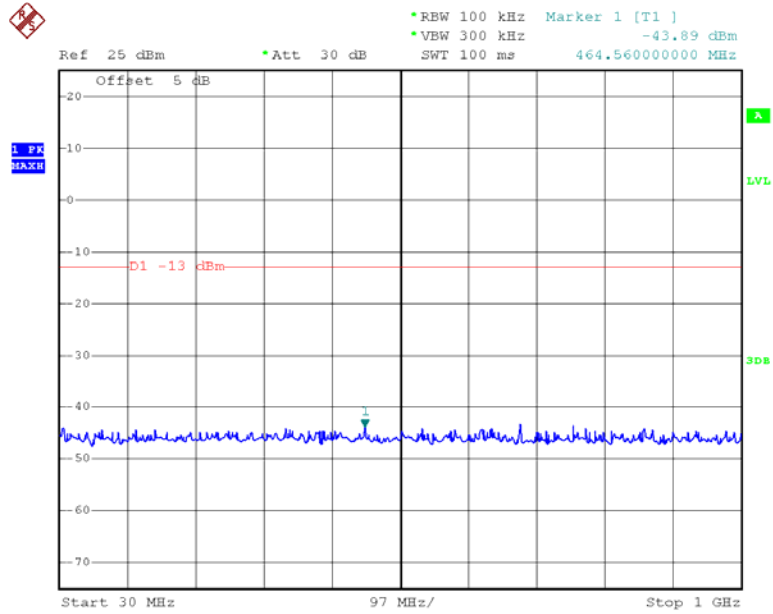
Date: 6.JUN.2018 14:24:07

Fundamental



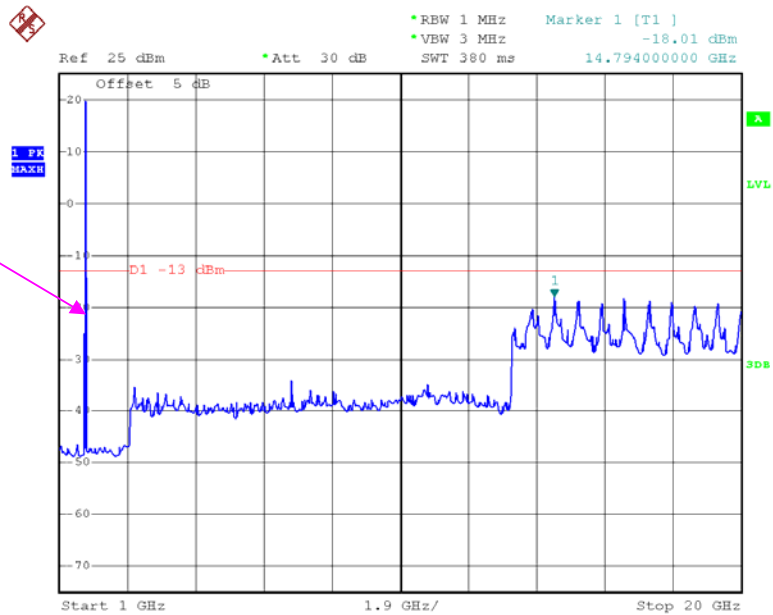
Date: 6.JUN.2018 14:23:49

### QPSK\_3 MHz



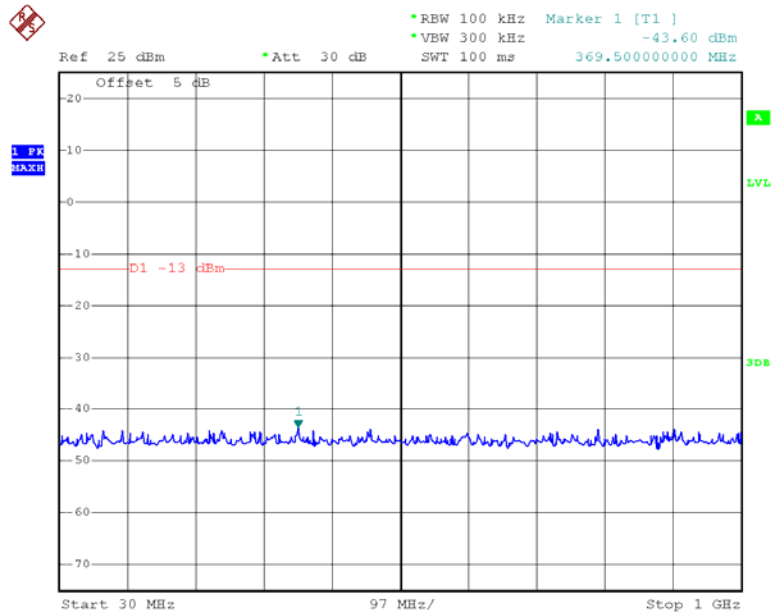
Date: 6.JUN.2018 14:23:11

Fundamental



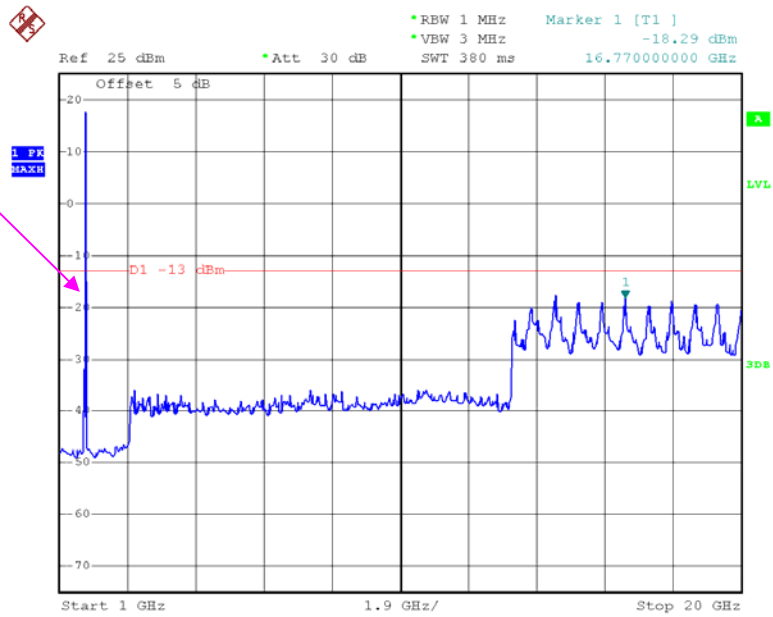
Date: 6.JUN.2018 14:23:33

### QPSK\_5 MHz



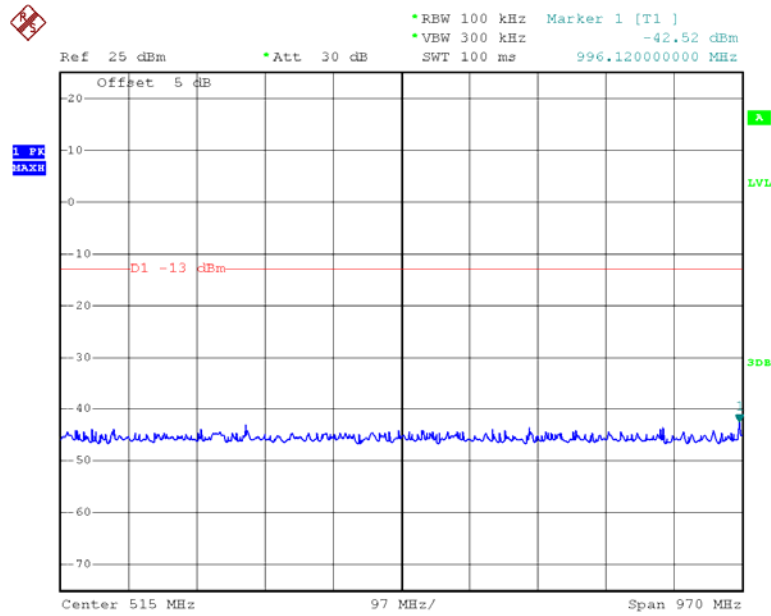
Date: 6.JUN.2018 14:22:55

Fundamental



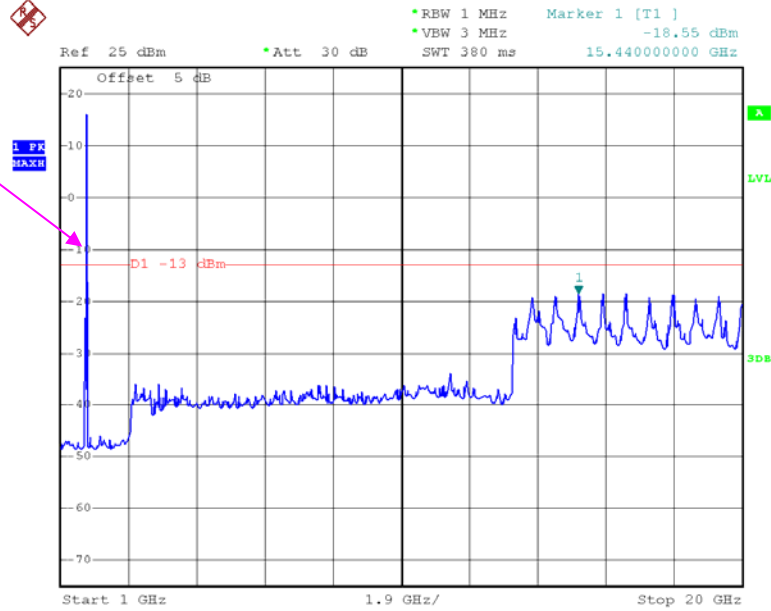
Date: 6.JUN.2018 14:22:42

### QPSK\_10 MHz



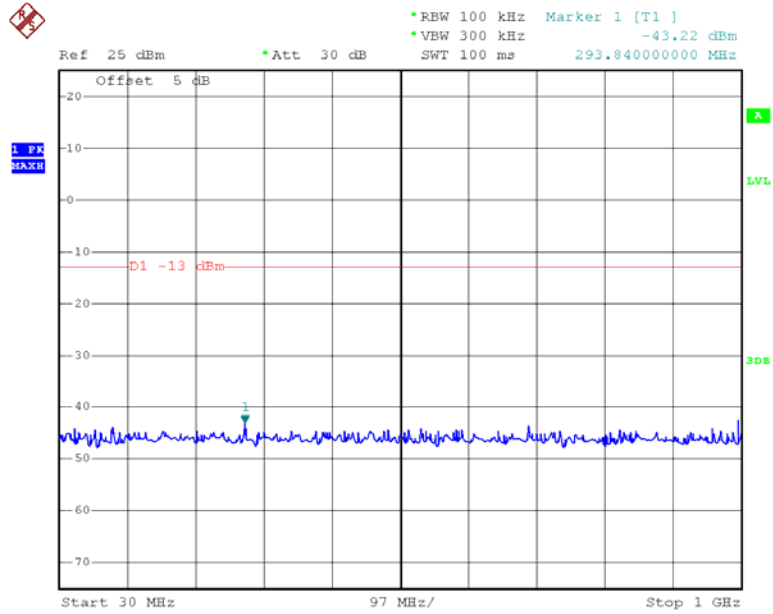
Date: 6.JUN.2018 14:21:39

Fundamental



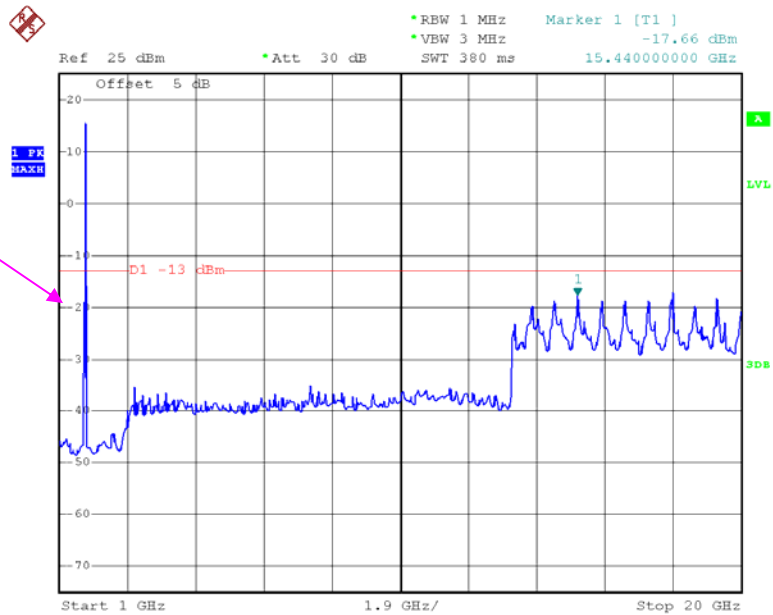
Date: 6.JUN.2018 14:22:17

### QPSK\_15 MHz



Date: 6.JUN.2018 14:21:29

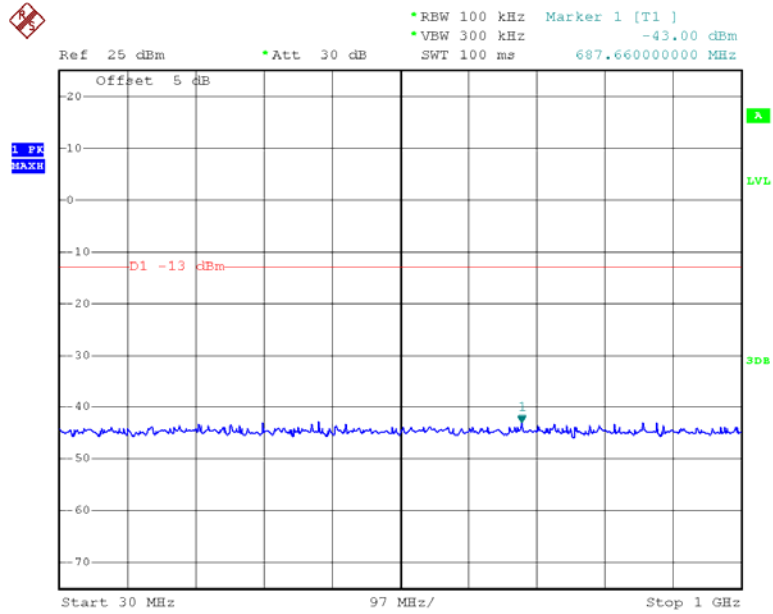
Fundamental



Date: 6.JUN.2018 14:21:13

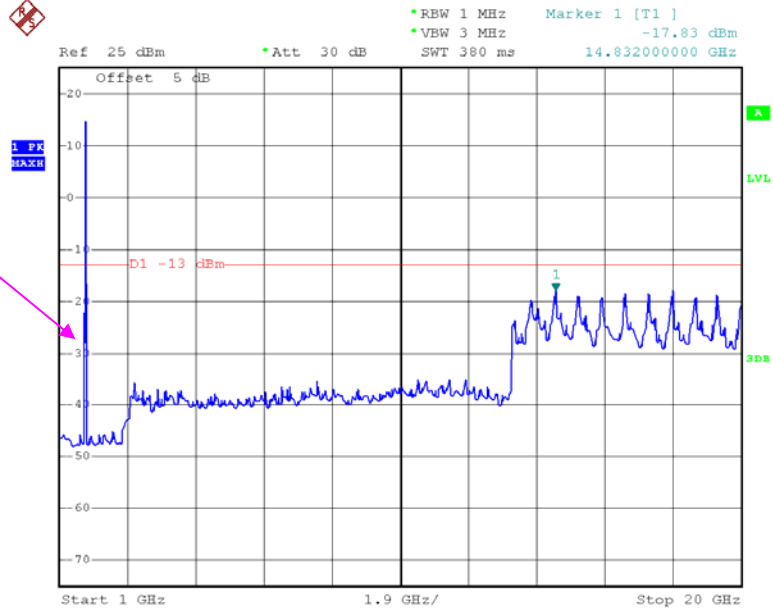
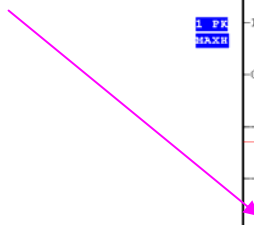


### QPSK\_20 MHz



Date: 6.JUN.2018 14:20:14

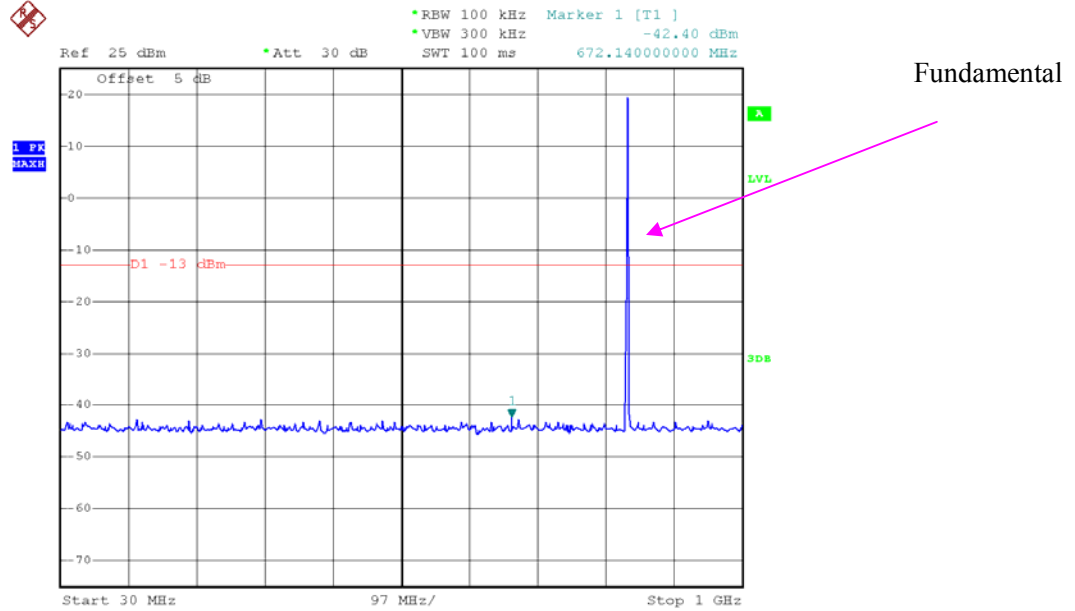
Fundamental



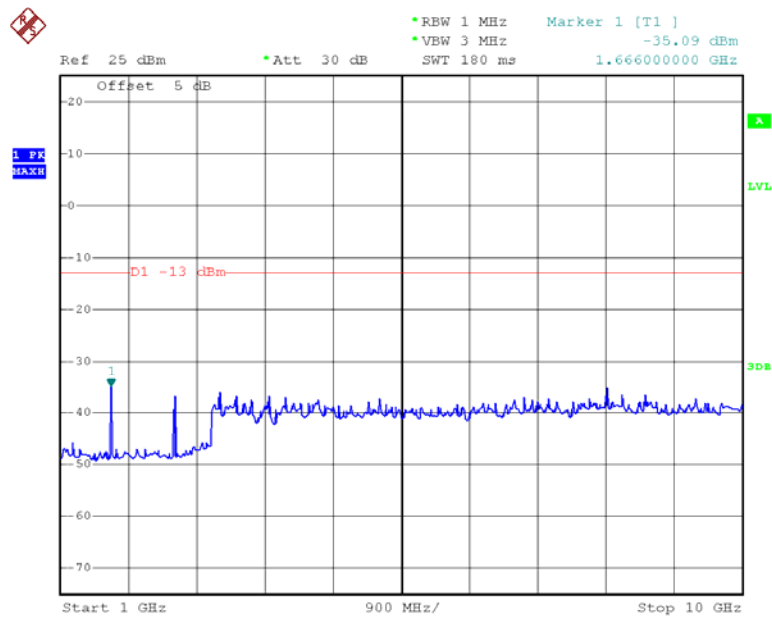
Date: 6.JUN.2018 14:20:42

### LTE Band 5 (Middle Channel)

#### QPSK\_1.4 MHz

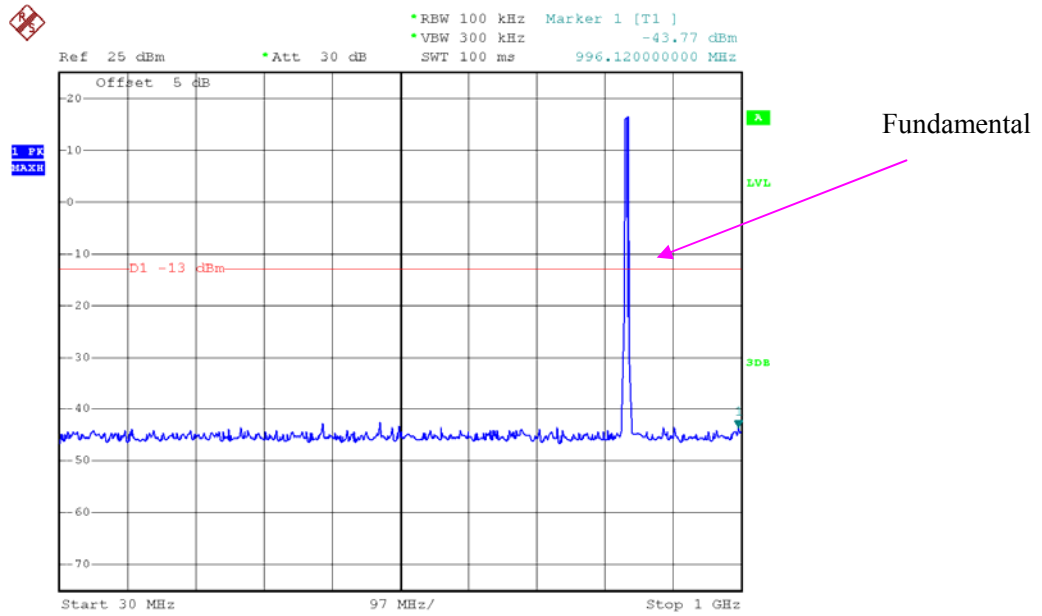


Date: 6.JUN.2018 14:26:25

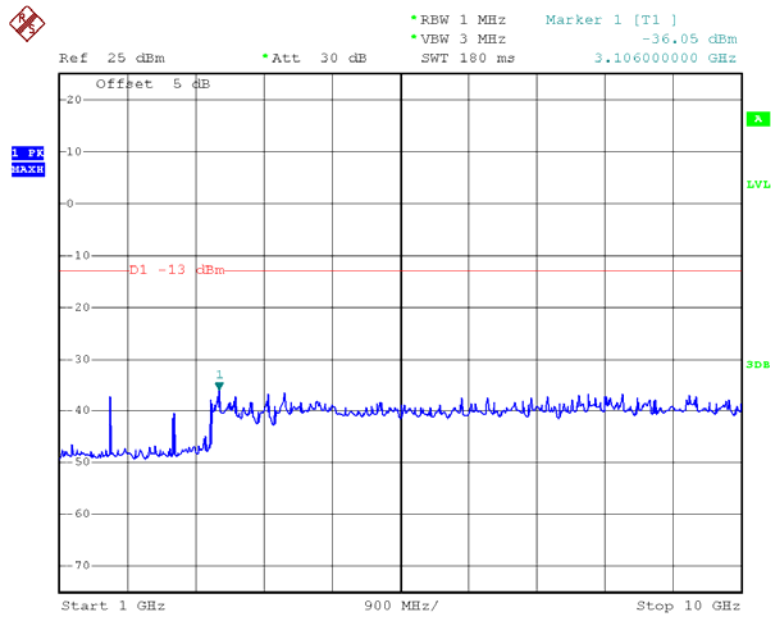


Date: 6.JUN.2018 14:26:44

### QPSK\_3 MHz

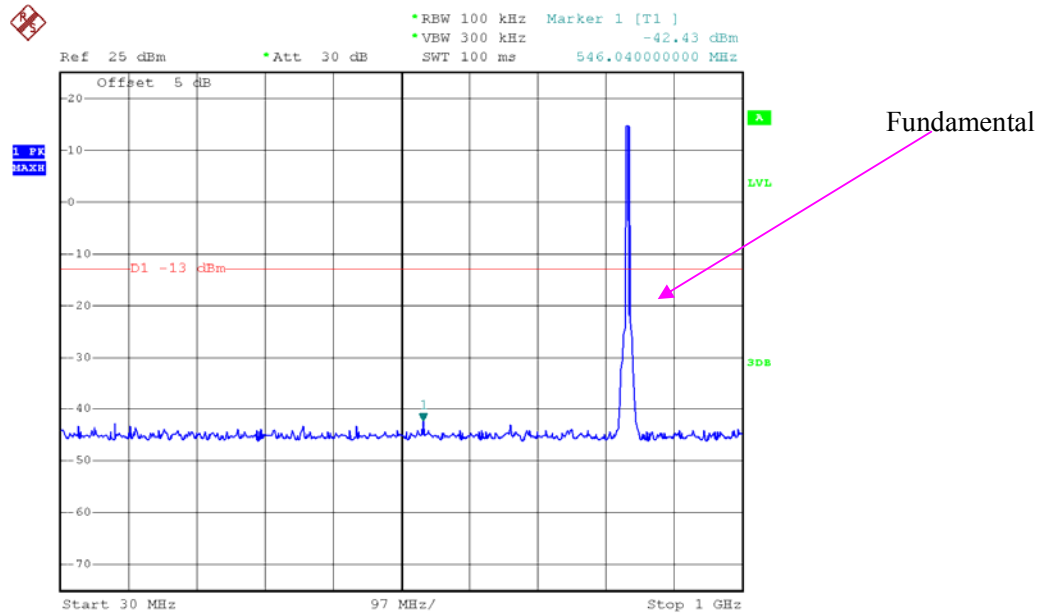


Date: 6.JUN.2018 14:28:32

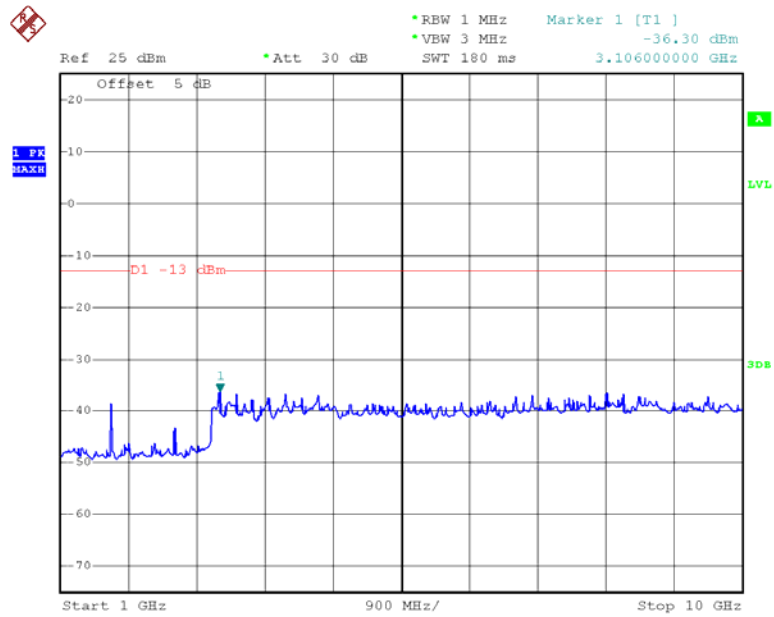


Date: 6.JUN.2018 14:27:58

### QPSK\_5 MHz

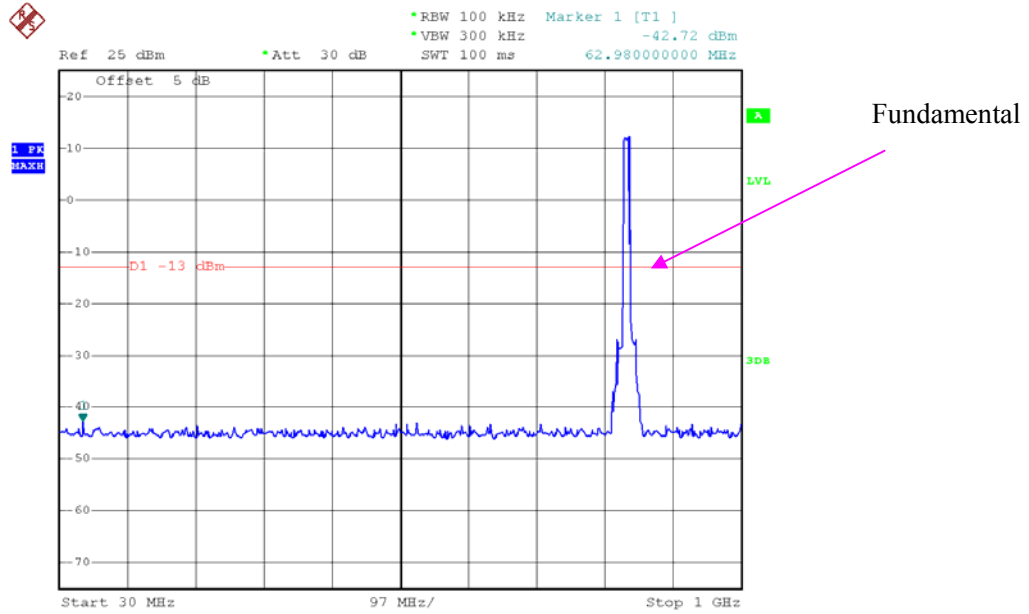


Date: 6.JUN.2018 14:29:22

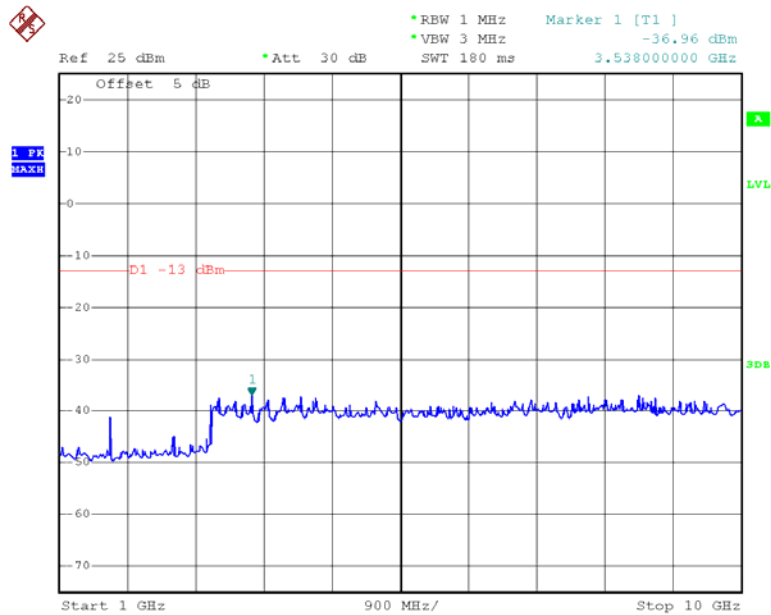


Date: 6.JUN.2018 14:29:48

### QPSK\_10 MHz



Date: 6.JUN.2018 14:30:53

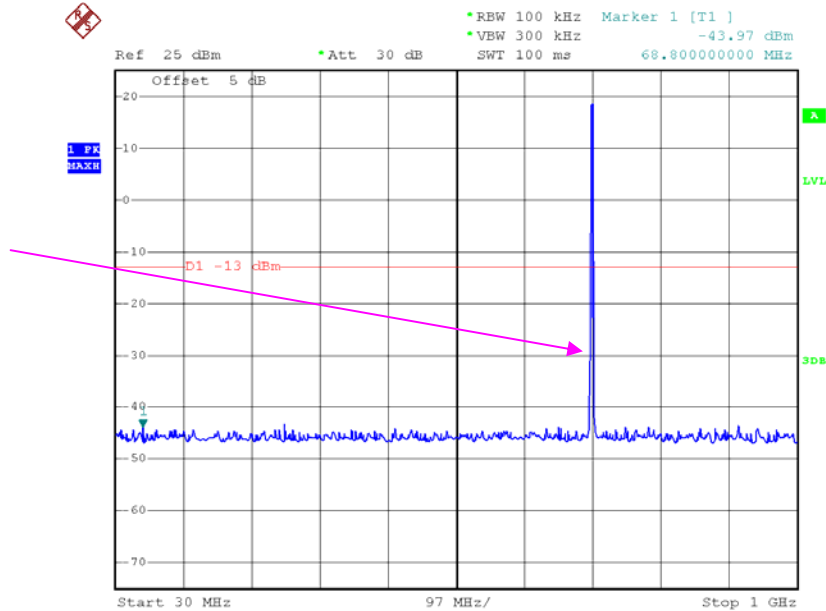


Date: 6.JUN.2018 14:30:03

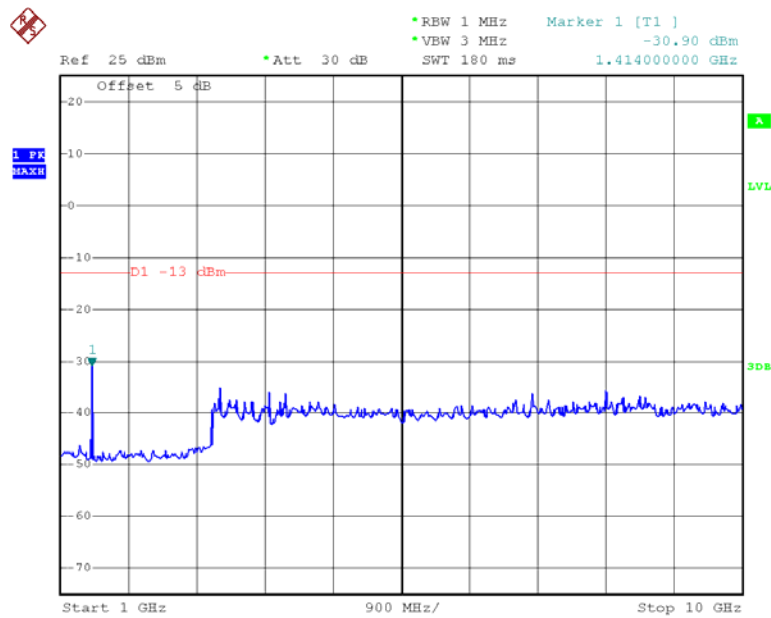
LTE Band 12 (Middle Channel)

QPSK\_1.4 MHz

Fundamental

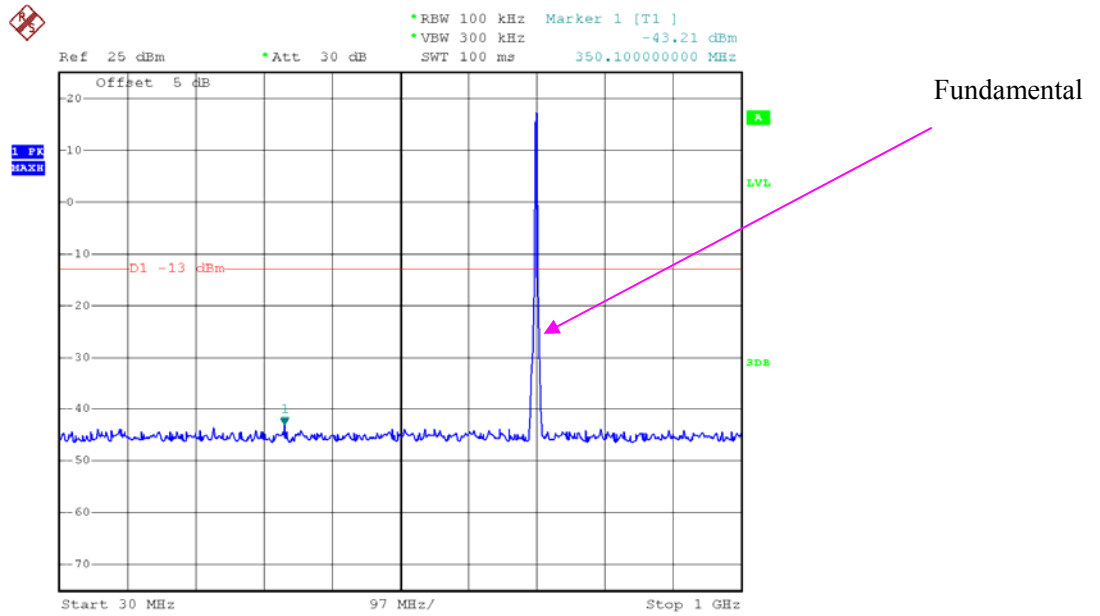


Date: 6.JUN.2018 14:35:38

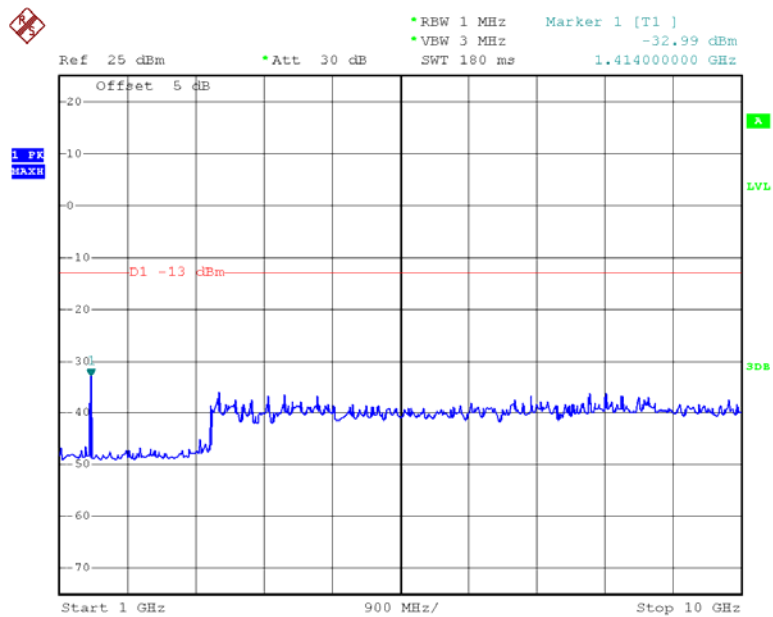


Date: 6.JUN.2018 14:35:19

### QPSK\_3 MHz

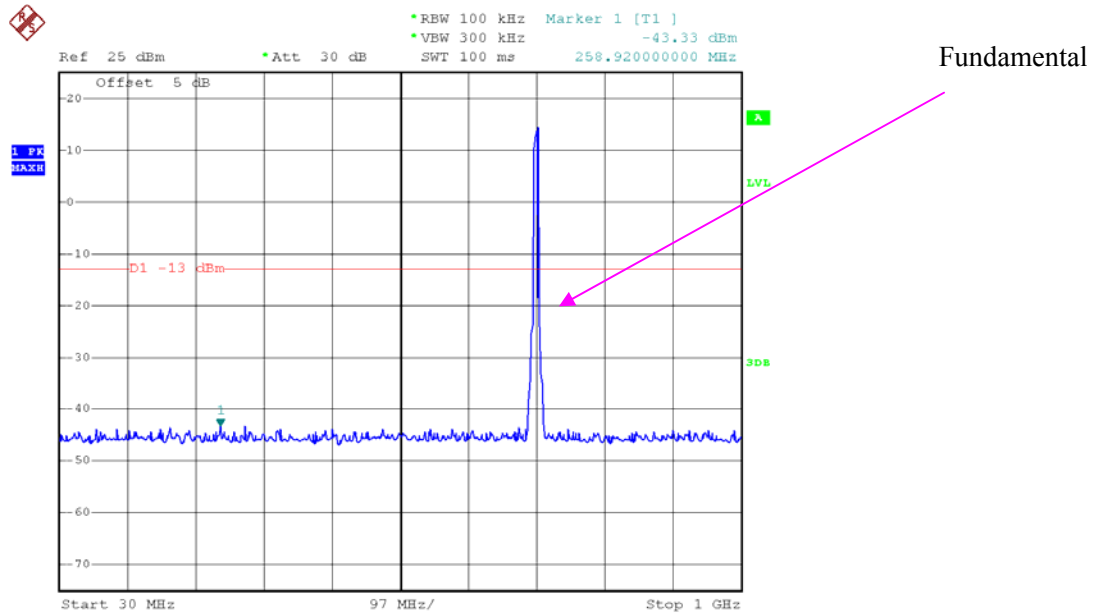


Date: 6.JUN.2018 14:34:42

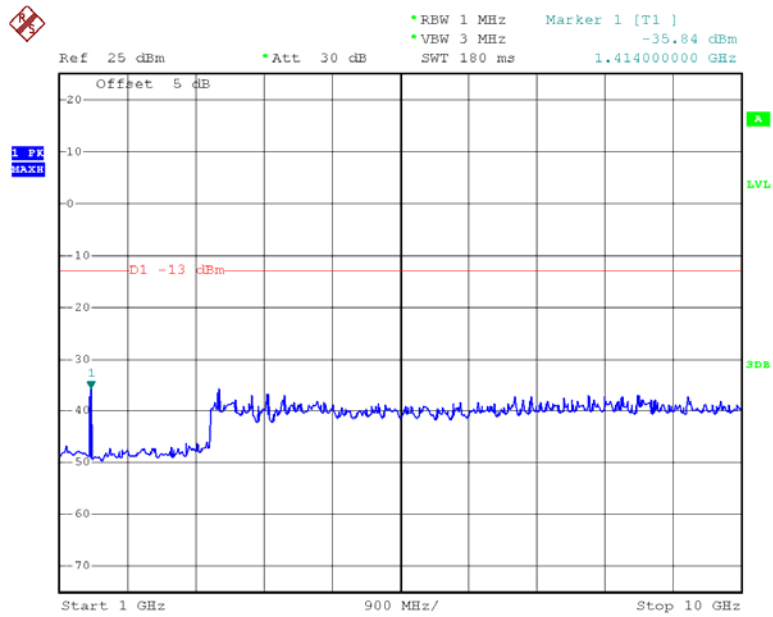


Date: 6.JUN.2018 14:35:06

### QPSK\_5 MHz



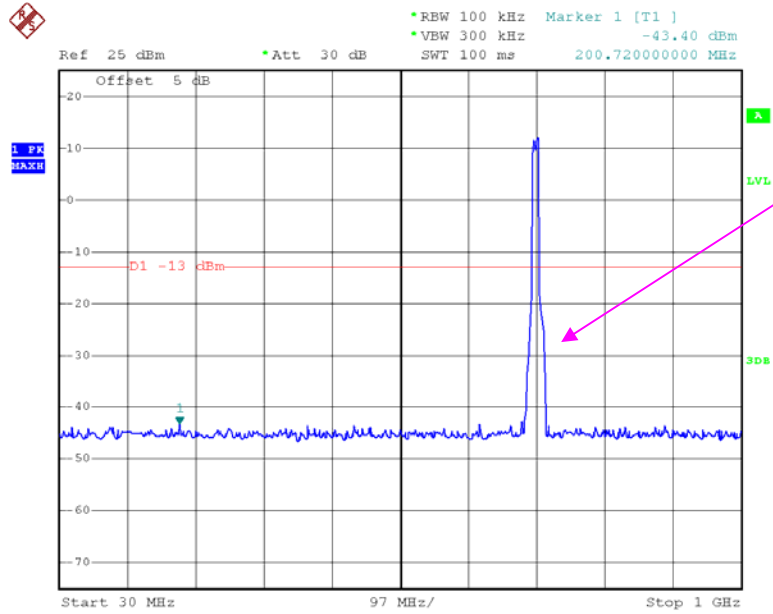
Date: 6.JUN.2018 14:34:13



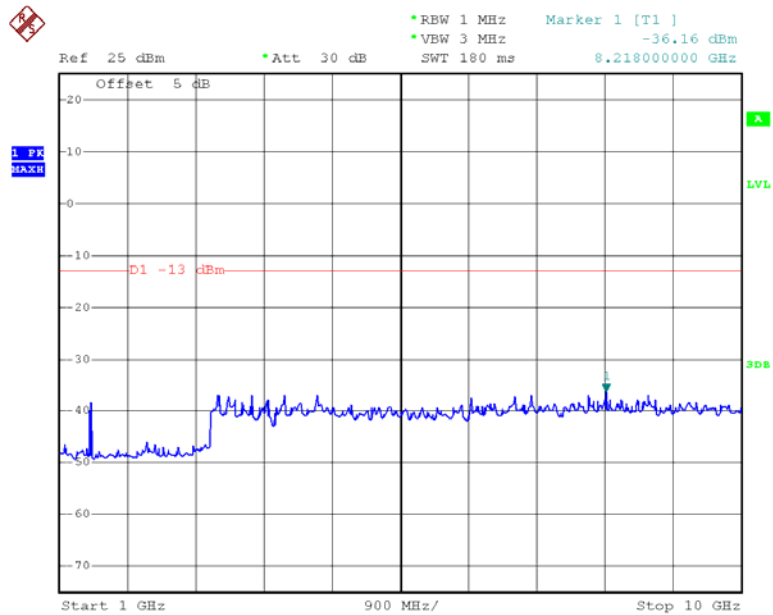
Date: 6.JUN.2018 14:33:49



### QPSK\_10 MHz



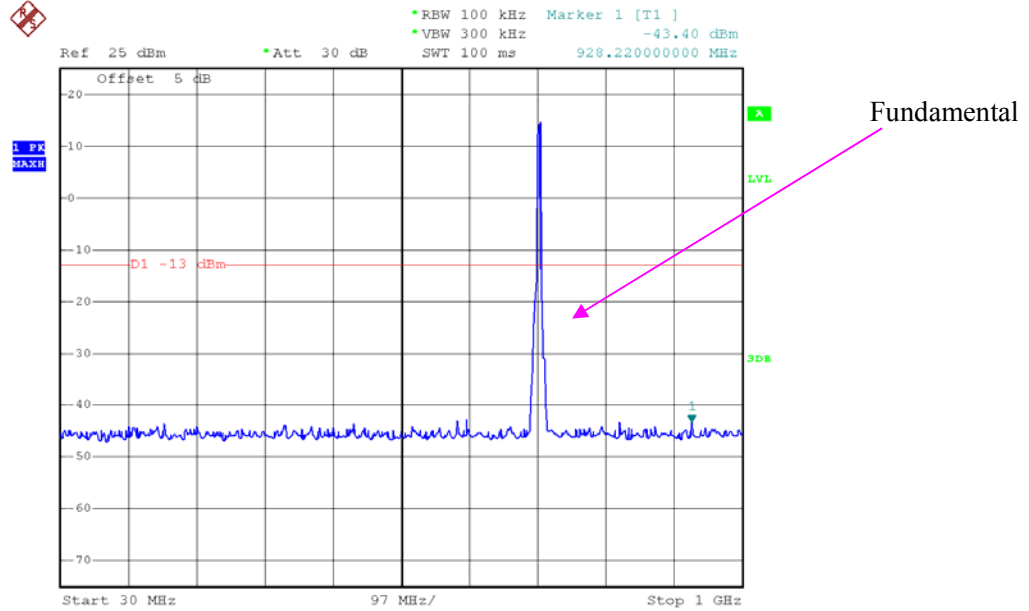
Date: 6.JUN.2018 14:33:20



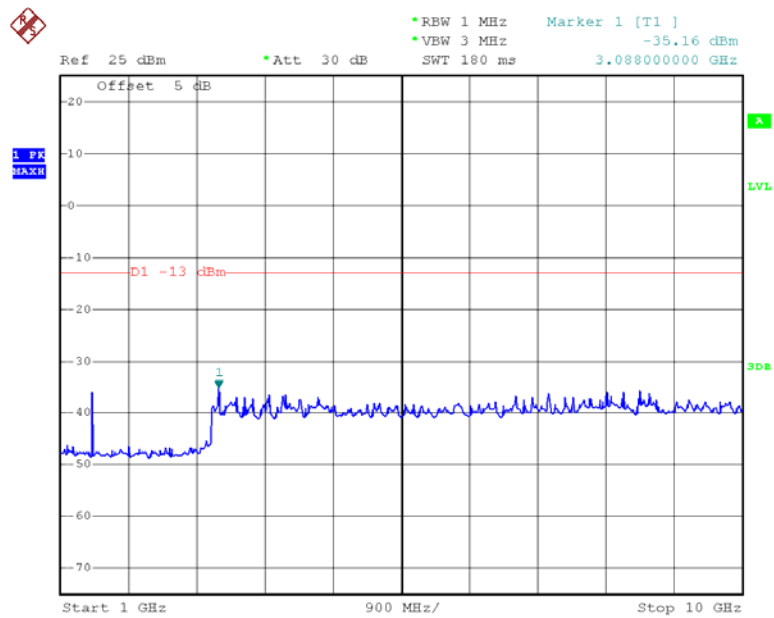
Date: 6.JUN.2018 14:33:34

**LTE Band 17 (Middle Channel)**

**QPSK\_5 MHz**

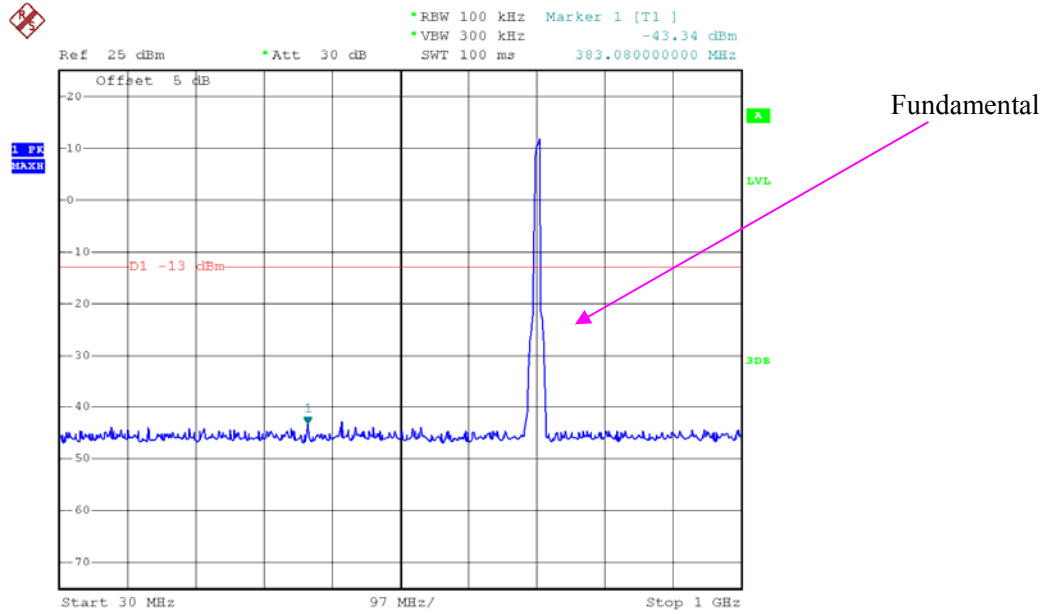


Date: 6.JUN.2018 14:39:35

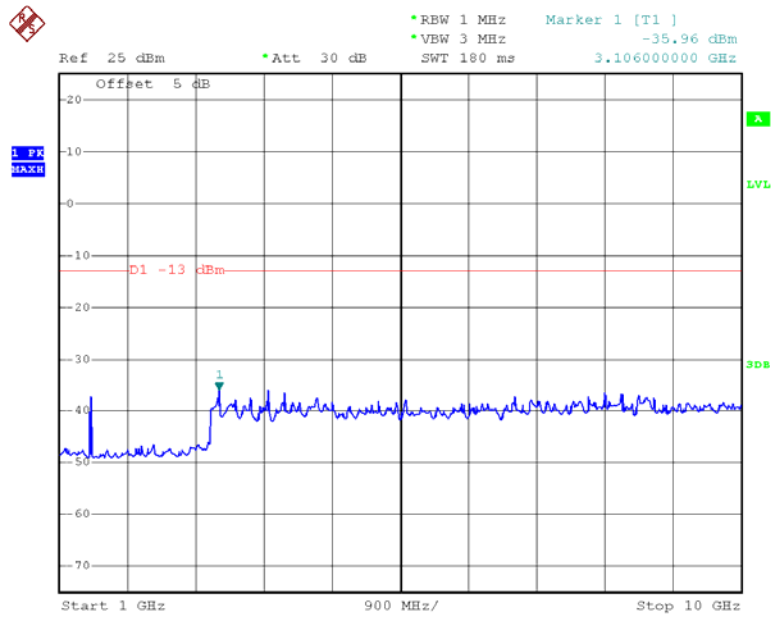


Date: 6.JUN.2018 14:39:15

### QPSK\_10 MHz



Date: 6.JUN.2018 14:40:01



Date: 6.JUN.2018 14:40:49

## 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<sub>10</sub> (power out in Watts)

### Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
HP	Signal Generator	1026	320408	2017-12-08	2018-12-08
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05

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

**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.2 °C
<b>Relative Humidity:</b>	45 %
<b>ATM Pressure:</b>	99.7 kPa

\* The testing was performed by Blake Yang & Vern Shen on 2018-07-07

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	59.35	-54.9	10.6	0.7	-45.0	-13.0	32.0
1673.200	V	63.07	-51.7	10.6	0.7	-41.8	-13.0	28.8
2509.800	H	59.82	-53.2	13.1	1.2	-41.3	-13.0	28.3
2509.800	V	63.54	-49.5	13.1	1.2	-37.6	-13.0	24.6
3346.400	H	59.13	-51.5	13.8	1.6	-39.3	-13.0	26.3
3346.400	V	63.32	-47.4	13.8	1.6	-35.2	-13.0	22.2
347.000	H	43.53	-63.3	0.0	0.6	-63.9	-13.0	50.9
347.000	V	45.88	-63.2	0.0	0.6	-63.8	-13.0	50.8

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band V R99, Frequency:836.600 MHz								
1673.200	H	50.72	-63.5	10.6	0.7	-53.6	-13.0	40.6
1673.200	V	58.15	-56.7	10.6	0.7	-46.8	-13.0	33.8
2509.800	H	49.63	-63.4	13.1	1.2	-51.5	-13.0	38.5
2509.800	V	52.46	-60.6	13.1	1.2	-48.7	-13.0	35.7
3346.400	H	48.63	-62	13.8	1.6	-49.8	-13.0	36.8
3346.400	V	50.54	-60.2	13.8	1.6	-48.0	-13.0	35.0
597.000	H	43.68	-58.5	0.0	0.8	-59.3	-13.0	46.3
597.000	V	48.87	-56.6	0.0	0.8	-57.4	-13.0	44.4

**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	58.87	-49.9	13.8	1.6	-37.7	-13.0	24.7
3760.000	V	62.53	-46.1	13.8	1.6	-33.9	-13.0	20.9
5640.000	H	59.02	-47	14.0	1.3	-34.3	-13.0	21.3
5640.000	V	63.45	-42.5	14.0	1.3	-29.8	-13.0	16.8
516.000	H	46.57	-57.3	0.0	0.7	-58.0	-13.0	45.0
516.000	V	48.24	-58.7	0.0	0.7	-59.4	-13.0	46.4
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	62.03	-46.8	13.8	1.6	-34.6	-13.0	21.6
3760.000	V	68.32	-40.3	13.8	1.6	-28.1	-13.0	15.1
5640.000	H	50.35	-55.7	14.0	1.3	-43.0	-13.0	30.0
5640.000	V	53.42	-52.5	14.0	1.3	-39.8	-13.0	26.8
664.000	H	45.75	-55.9	0.0	0.9	-56.8	-13.0	43.8
664.000	V	48.97	-55.5	0.0	0.9	-56.4	-13.0	43.4

**LTE Band 2 (30MHz-20GHz):**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 1880.000 MHz								
3760.000	H	68.54	-40.3	13.8	1.6	-28.1	-13.0	15.1
3760.000	V	72.74	-35.9	13.8	1.6	-23.7	-13.0	10.7
5640.000	H	49.86	-56.2	14.0	1.3	-43.5	-13.0	30.5
5640.000	V	52.63	-53.3	14.0	1.3	-40.6	-13.0	27.6
299.660	H	55.70	-52.9	0.0	0.5	-53.4	-13.0	40.4
299.660	V	54.11	-55.9	0.0	0.5	-56.4	-13.0	43.4

**LTE Band 4 (30MHz-20GHz):**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 1732.500 MHz								
3465.000	H	63.42	-46.8	13.9	1.6	-34.5	-13.0	21.5
3465.000	V	65.87	-44.4	13.9	1.6	-32.1	-13.0	19.1
5197.500	H	49.65	-56.8	14.0	1.5	-44.3	-13.0	31.3
5197.500	V	50.21	-56.3	14.0	1.5	-43.8	-13.0	30.8
299.660	H	54.27	-54.4	0.0	0.5	-54.9	-13.0	41.9
299.660	V	54.32	-55.7	0.0	0.5	-56.2	-13.0	43.2

**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								
1673.200	H	50.84	-63.4	10.6	0.7	-53.5	-13.0	40.5
1673.200	V	53.72	-61.1	10.6	0.7	-51.2	-13.0	38.2
2509.800	H	58.45	-54.6	13.1	1.2	-42.7	-13.0	29.7
2509.800	V	60.38	-52.7	13.1	1.2	-40.8	-13.0	27.8
3346.400	H	45.63	-65	13.8	1.6	-52.8	-13.0	39.8
3346.400	V	46.82	-63.9	13.8	1.6	-51.7	-13.0	38.7
800.180	H	46.37	-52.3	0.0	0.9	-53.2	-13.0	40.2
299.660	V	56.11	-53.9	0.0	0.5	-54.4	-13.0	41.4

**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								
1415.000	H	53.87	-59.6	9.1	1.2	-51.7	-13.0	38.7
1415.000	V	55.68	-58.3	9.1	1.2	-50.4	-13.0	37.4
2122.500	H	46.25	-66.5	11.3	1.1	-56.3	-13.0	43.3
2122.500	V	48.93	-63.8	11.3	1.1	-53.6	-13.0	40.6
2830.000	H	45.28	-66.8	13.3	1.4	-54.9	-13.0	41.9
2830.000	V	47.25	-65.1	13.3	1.4	-53.2	-13.0	40.2
800.180	H	46.13	-52.5	0.0	0.9	-53.4	-13.0	40.4
299.660	V	55.00	-55	0.0	0.5	-55.5	-13.0	42.5

**LTE Band 17 (30MHz-10GHz)**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 710.000 MHz								
1420.000	H	64.25	-49.4	9.1	1.2	-41.5	-13.0	28.5
1420.000	V	65.83	-48.3	9.1	1.2	-40.4	-13.0	27.4
2130.000	H	61.02	-51.7	11.2	1.1	-41.6	-13.0	28.6
2130.000	V	62.14	-50.6	11.2	1.1	-40.5	-13.0	27.5
2840.000	H	47.53	-64.5	13.4	1.4	-52.5	-13.0	39.5
2840.000	V	48.72	-63.6	13.4	1.4	-51.6	-13.0	38.6
800.180	H	54.92	-43.7	0.0	0.9	-44.6	-13.0	31.6
299.660	V	56.14	-53.9	0.0	0.5	-54.4	-13.0	41.4

Note:

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



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

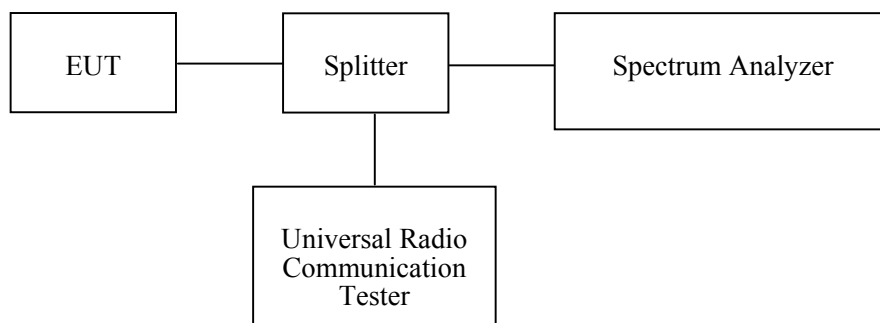
**Applicable Standard**

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

**Test Procedure**

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

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



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2018-01-04	2019-01-04
R&S	Spectrum Analyzer	FSP 38	100478	2017-12-08	2018-12-08

\* **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**

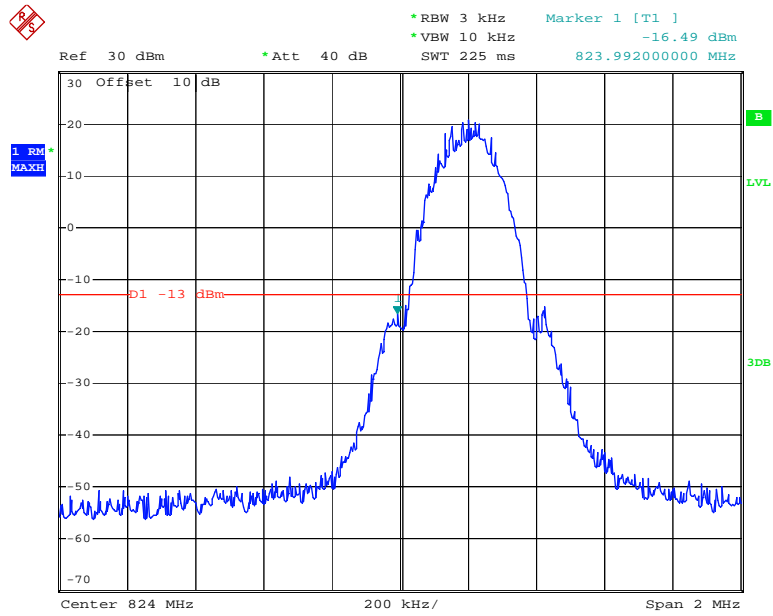
<b>Temperature:</b>	26.5~28.7°C
<b>Relative Humidity:</b>	49 ~ 61 %
<b>ATM Pressure:</b>	101~101.9 kPa

*The testing was performed by Kami Zhou & Tiago Huang on 2018-06-06 on 2018-06-30.*

*Test Mode: Transmitting*

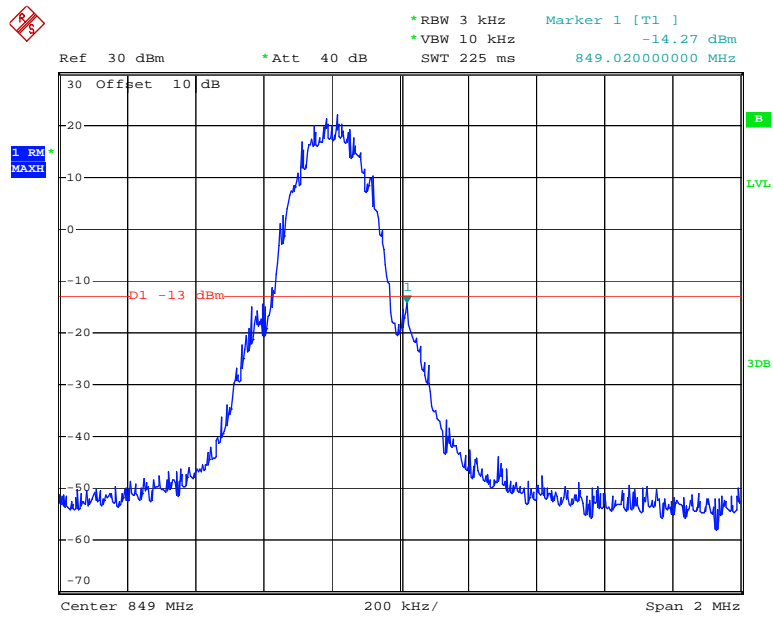
*Test Result: Compliant. Please refer to the following plots.*

### GSM 850, Left Band Edge



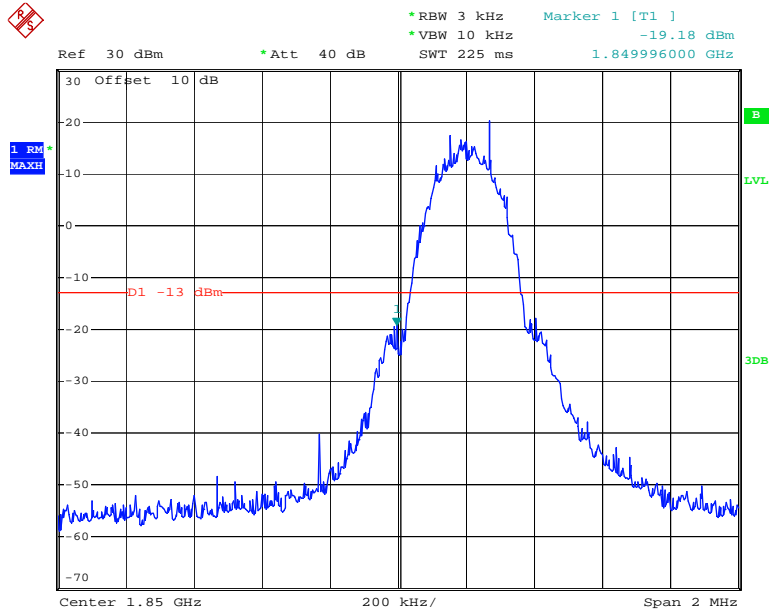
Date: 24.JUN.2018 15:01:19

### GSM 850, Right Band Edge



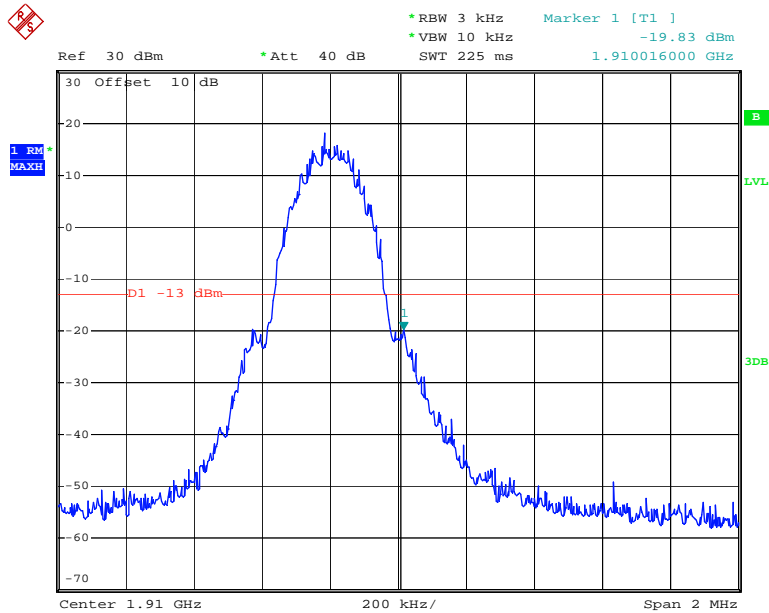
Date: 24.JUN.2018 15:02:08

### GSM 1900, Left Band Edge



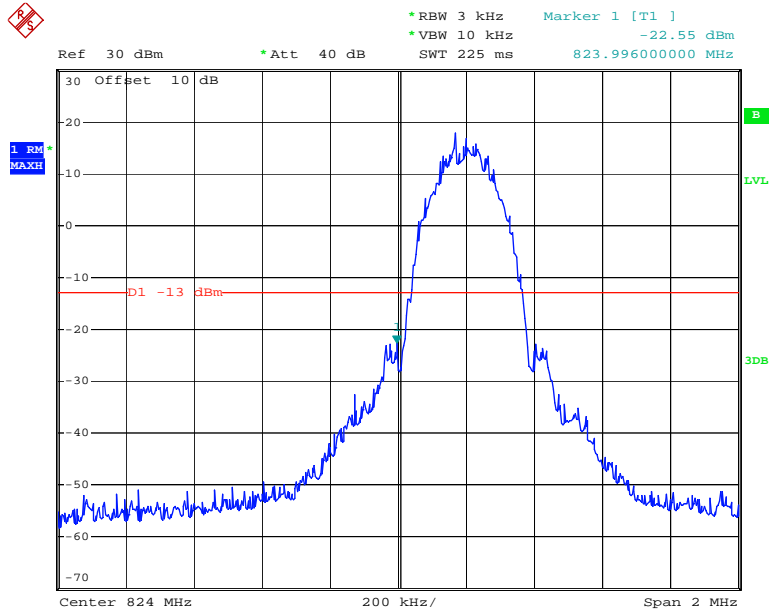
Date: 24.JUN.2018 15:18:45

### GSM 1900, Right Band Edge



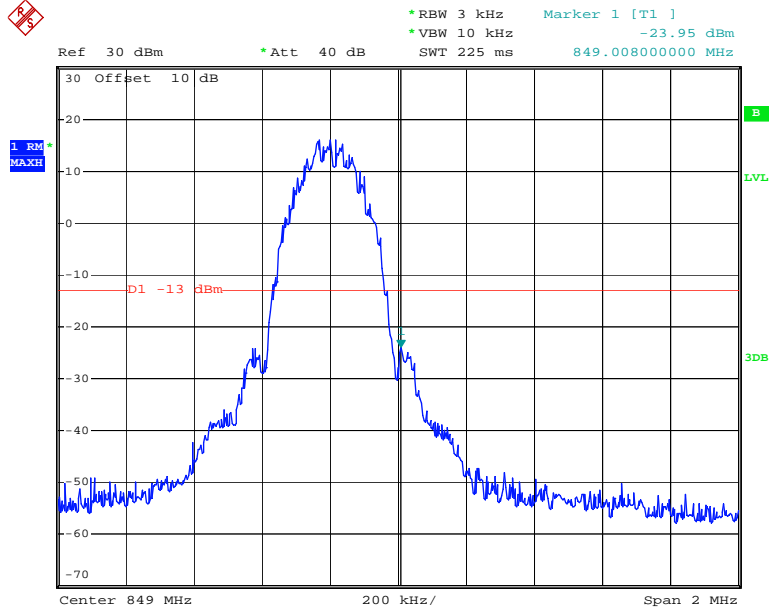
Date: 24.JUN.2018 15:22:02

### EDGE 850, Left Band Edge



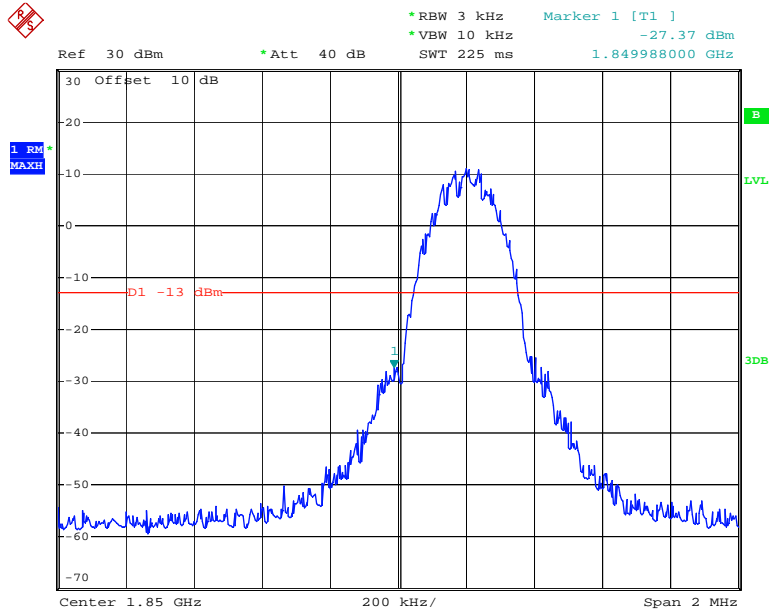
Date: 24.JUN.2018 15:04:17

### EDGE 850, Right Band Edge



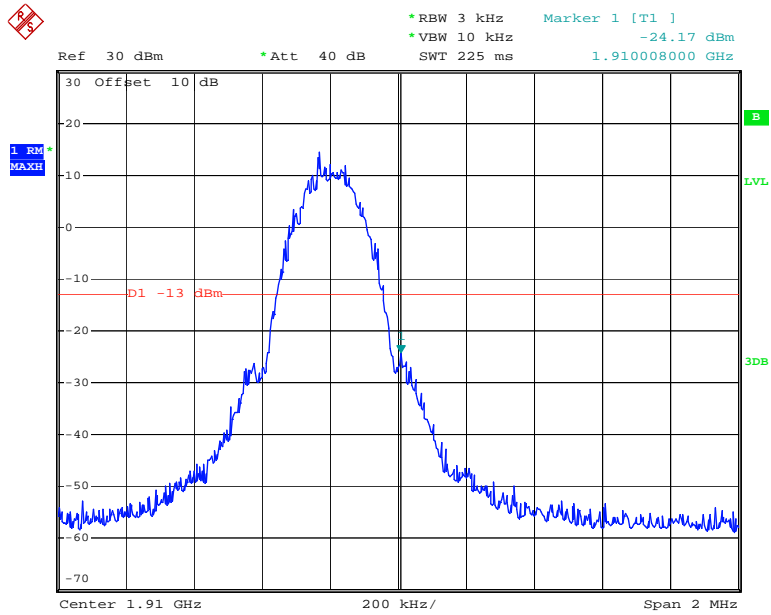
Date: 24.JUN.2018 15:05:15

### EDGE 1900, Left Band Edge



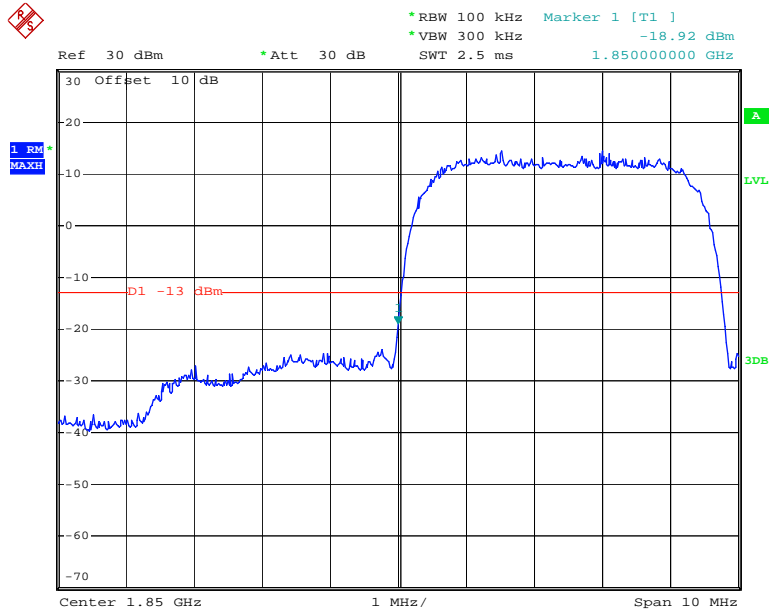
Date: 24.JUN.2018 15:15:57

### EDGE 1900, Right Band Edge



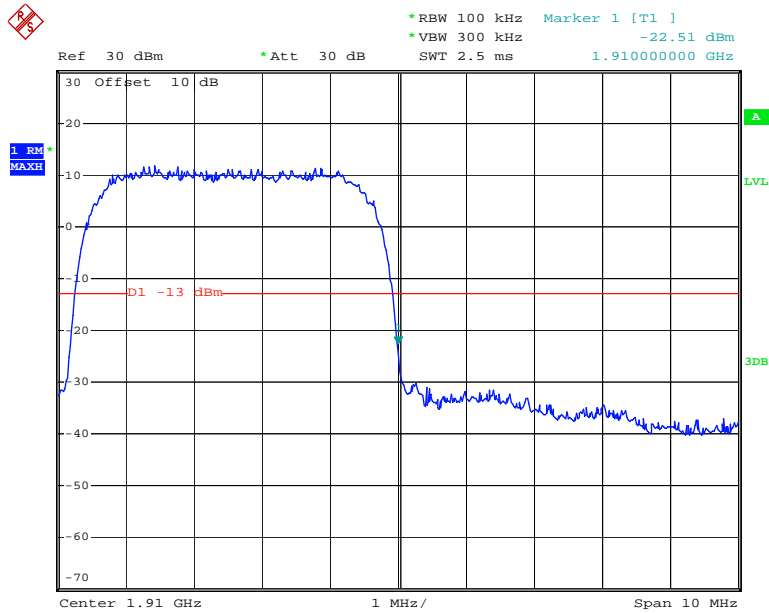
Date: 24.JUN.2018 15:14:40

### WCDMA Band II Rel 99, Left Band Edge



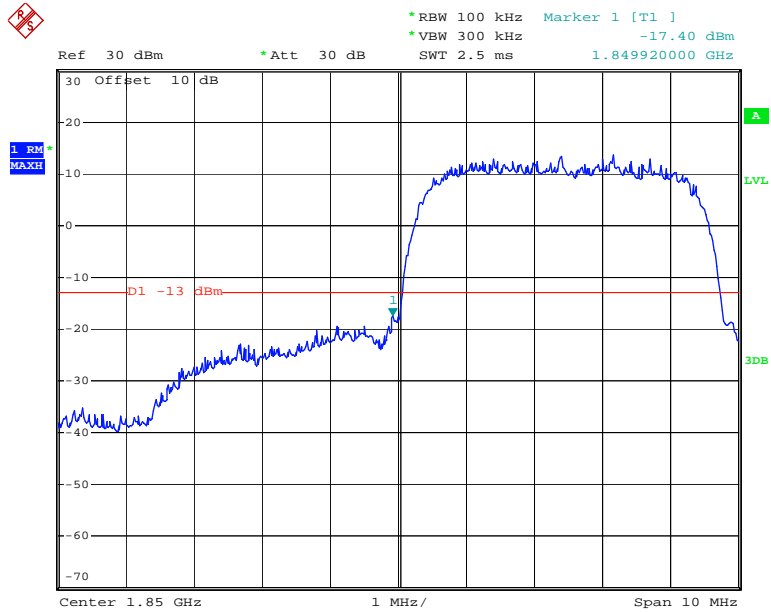
Date: 30.JUN.2018 00:28:32

### WCDMA Band II Rel 99, Right Band Edge



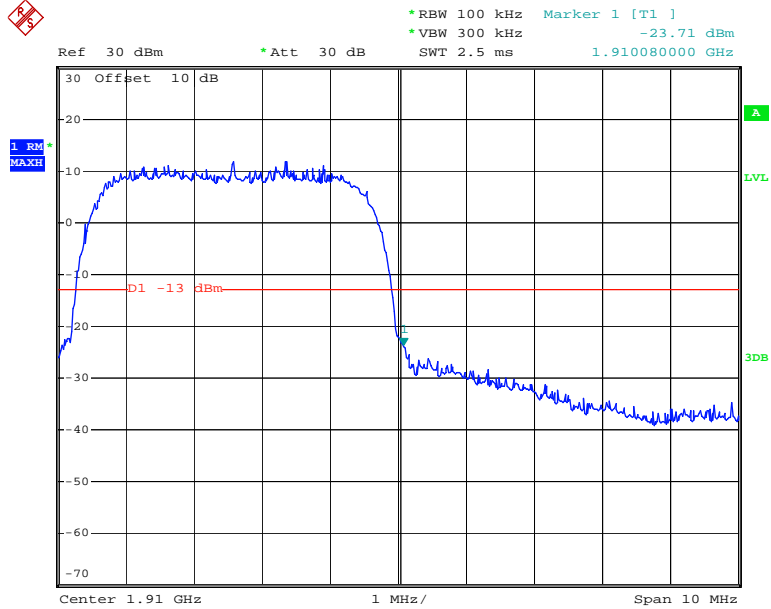
Date: 30.JUN.2018 00:29:18

**WCDMA Band II HSUPA, Left Band Edge**



Date: 30.JUN.2018 00:38:53

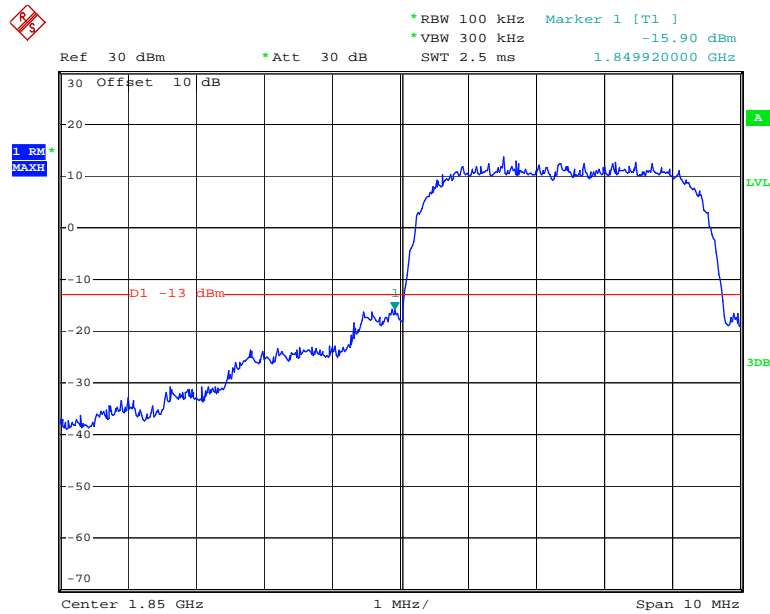
**WCDMA Band II HSUPA, Right Band Edge**



Date: 30.JUN.2018 00:39:22

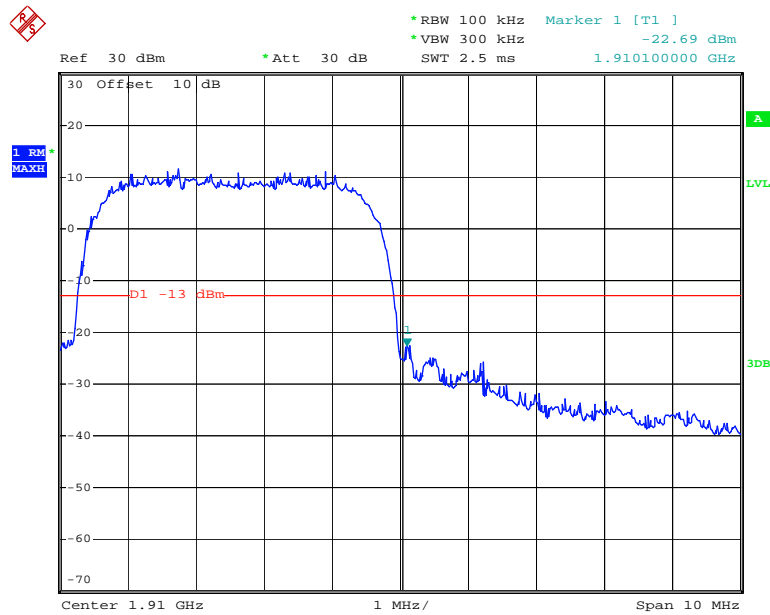


### WCDMA Band II HSDPA, Left Band Edge



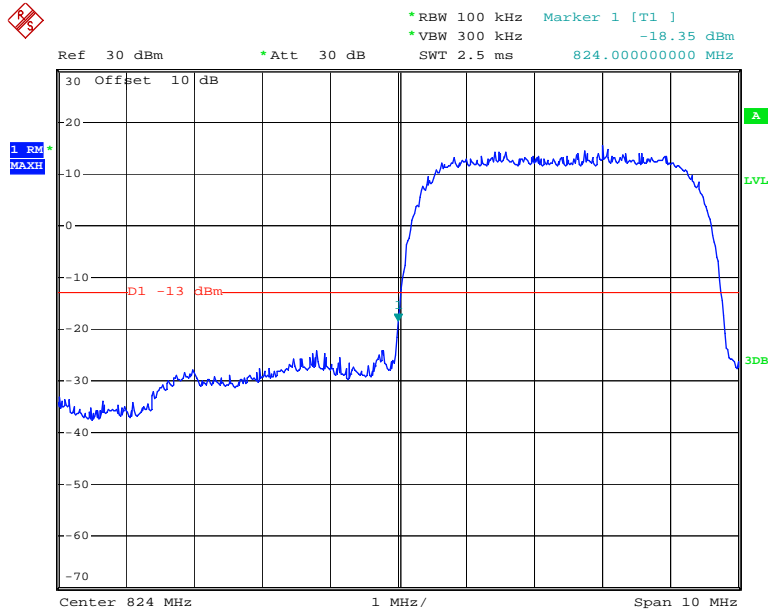
Date: 30.JUN.2018 00:35:26

### WCDMA Band II HSDPA, Right Band Edge



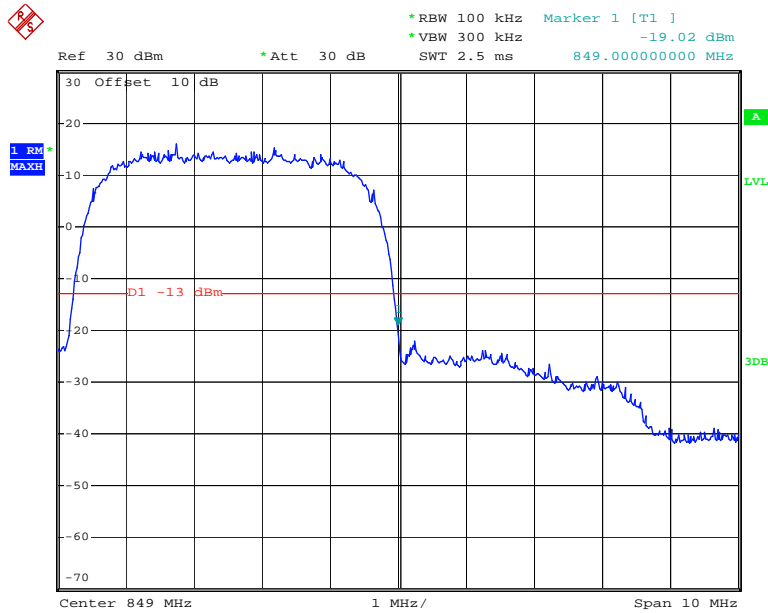
Date: 30.JUN.2018 00:36:06

### WCDMA Band V Rel 99, Left Band Edge



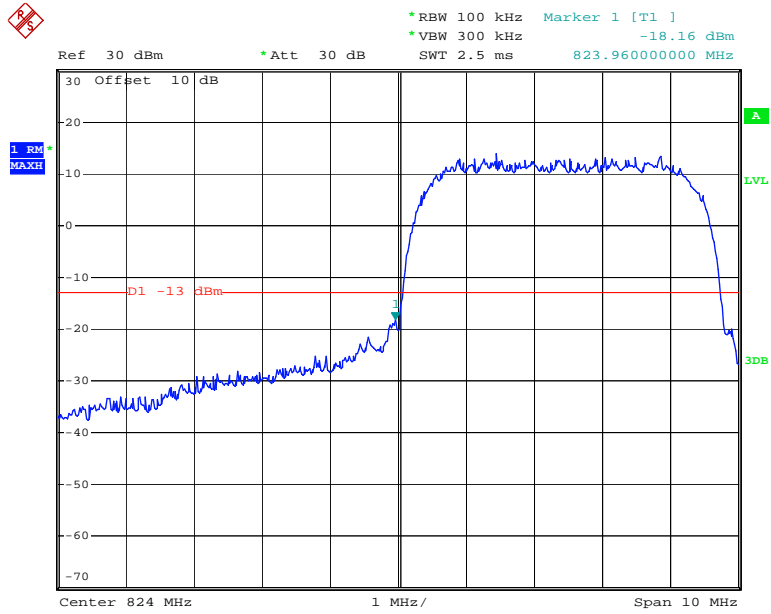
Date: 30.JUN.2018 00:30:29

### WCDMA Band V Rel 99, Right Band Edge



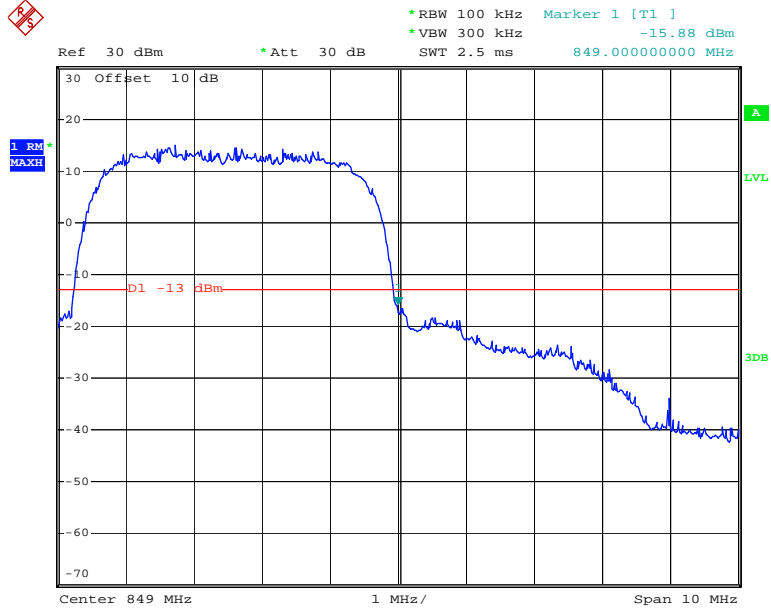
Date: 30.JUN.2018 00:31:28

### WCDMA Band V HSUPA, Left Band Edge



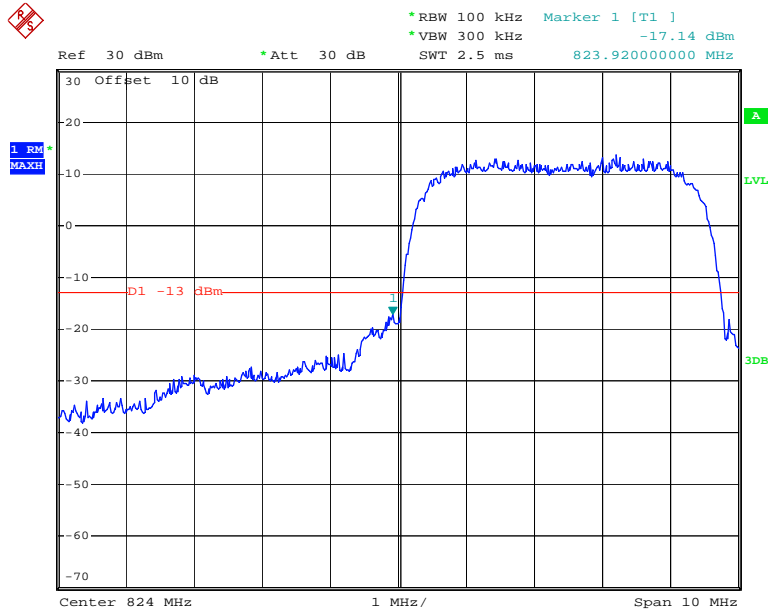
Date: 30.JUN.2018 00:40:12

### WCDMA Band V HSUPA, Right Band Edge



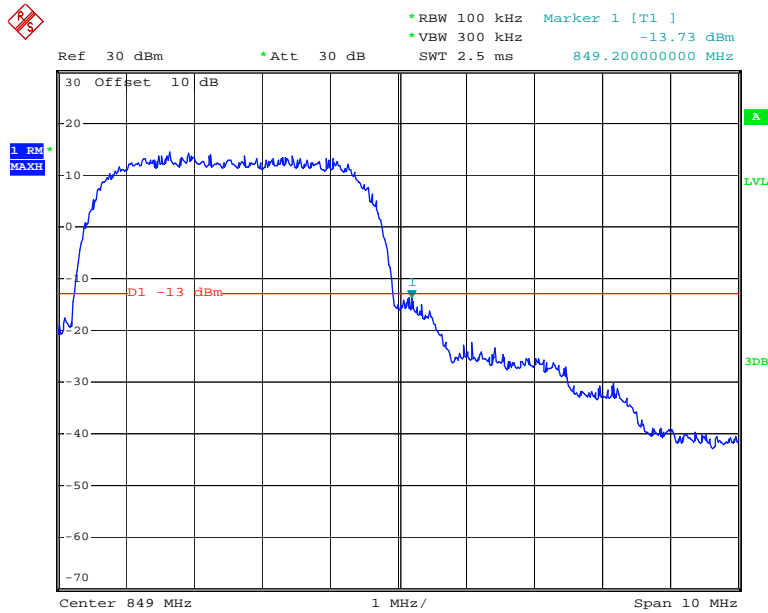
Date: 30.JUN.2018 00:41:22

### WCDMA Band V HSDPA, Left Band Edge



Date: 30.JUN.2018 00:34:27

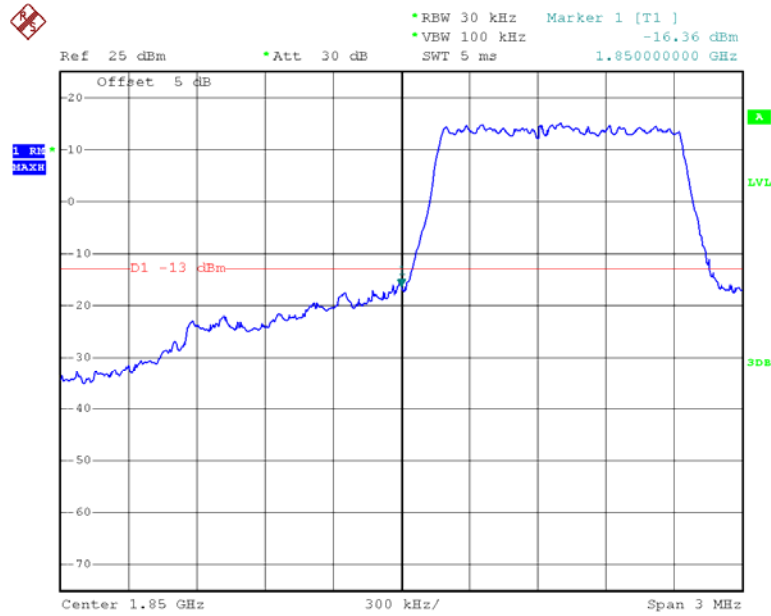
### WCDMA Band V HSDPA, Right Band Edge



Date: 30.JUN.2018 00:33:35

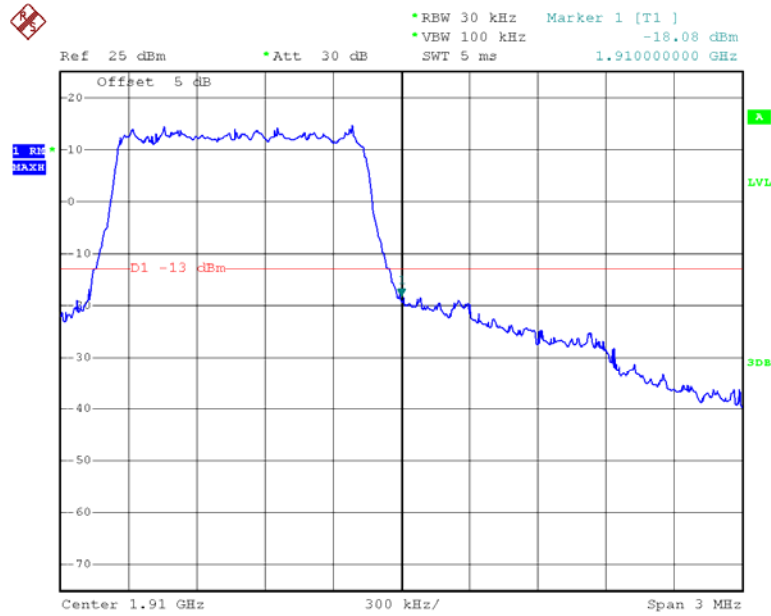
LTE Band II

QPSK\_1.4MHz\_6 RB\_Left



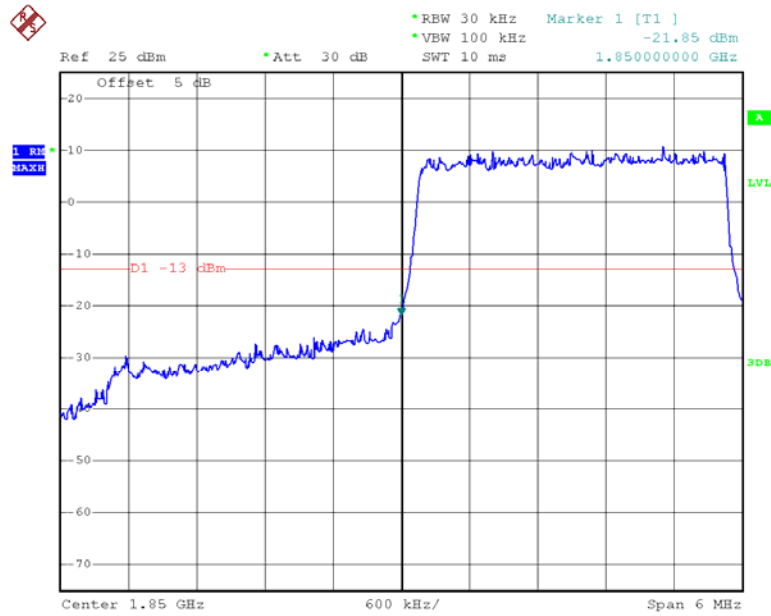
Date: 6.JUN.2018 09:30:23

QPSK\_1.4MHz\_6 RB\_Right



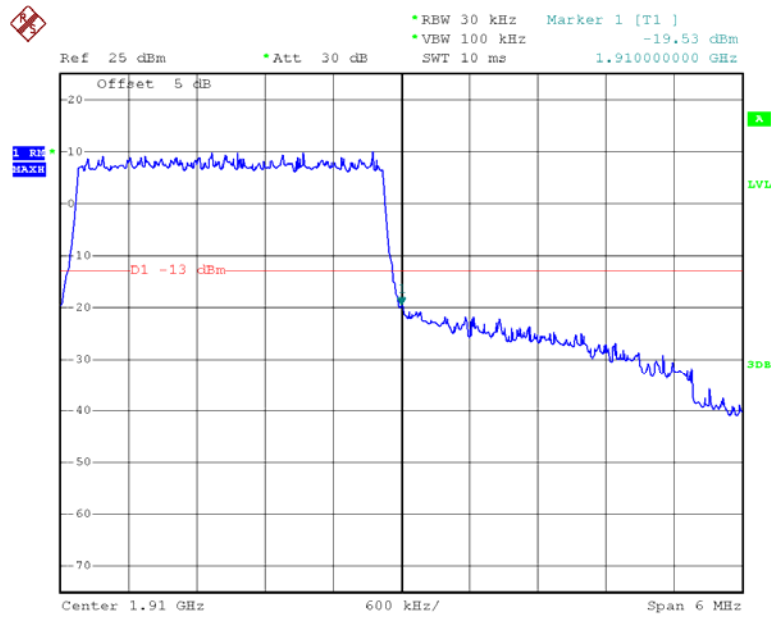
Date: 6.JUN.2018 09:35:05

### QPSK\_3MHz\_15 RB\_Left



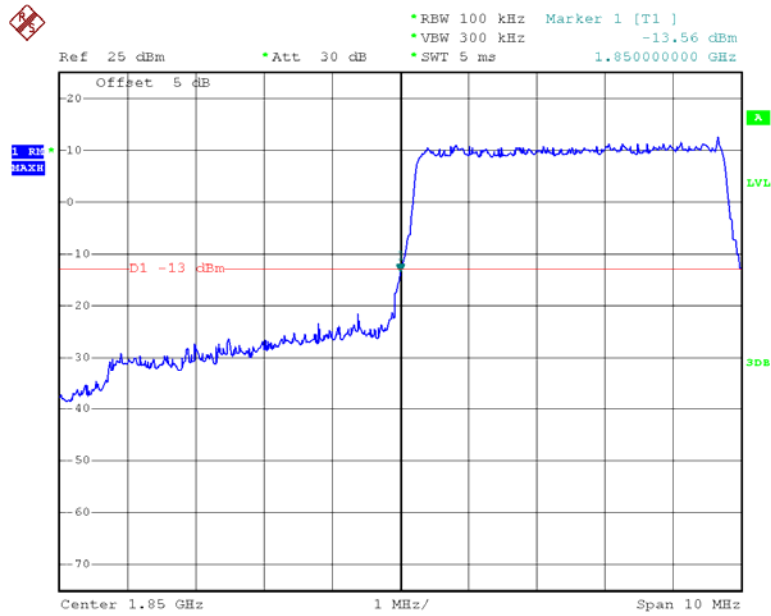
Date: 6.JUN.2018 09:51:04

### QPSK\_3MHz\_15 RB\_Right



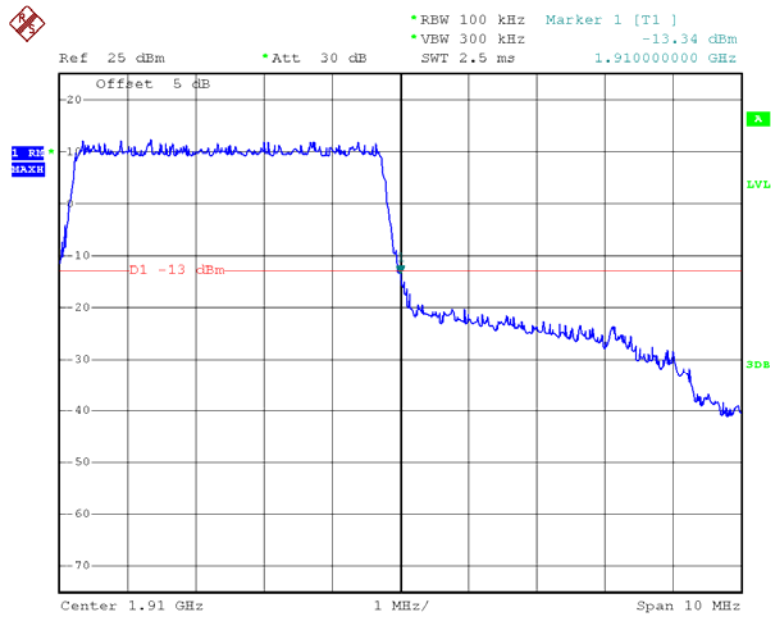
Date: 6.JUN.2018 09:53:01

### QPSK\_5MHz\_25 RB\_Left



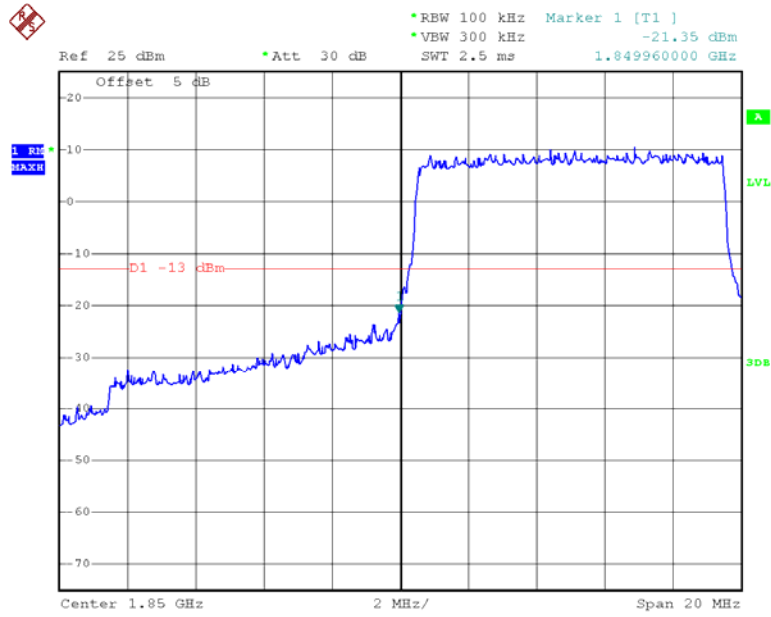
Date: 6.JUN.2018 09:59:07

### QPSK\_5MHz\_25 RB\_Right



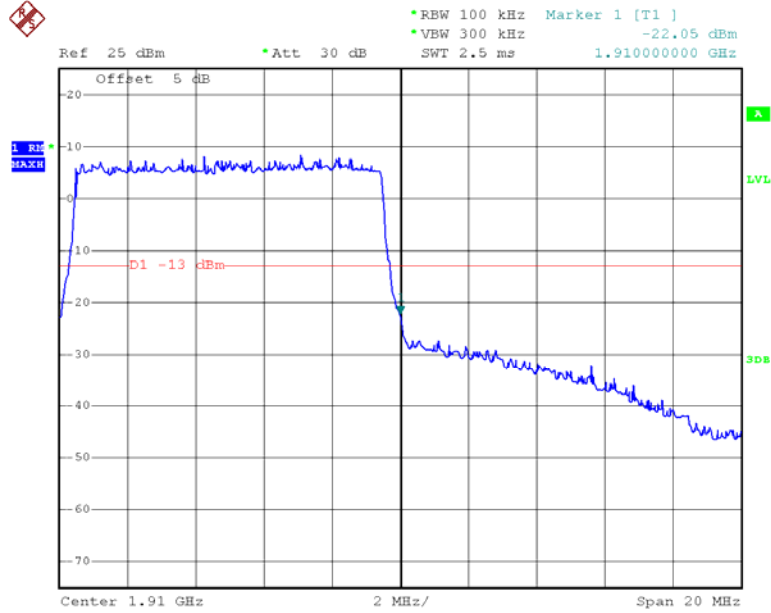
Date: 6.JUN.2018 09:54:36

### QPSK\_10MHz\_50 RB\_Left



Date: 6.JUN.2018 10:03:31

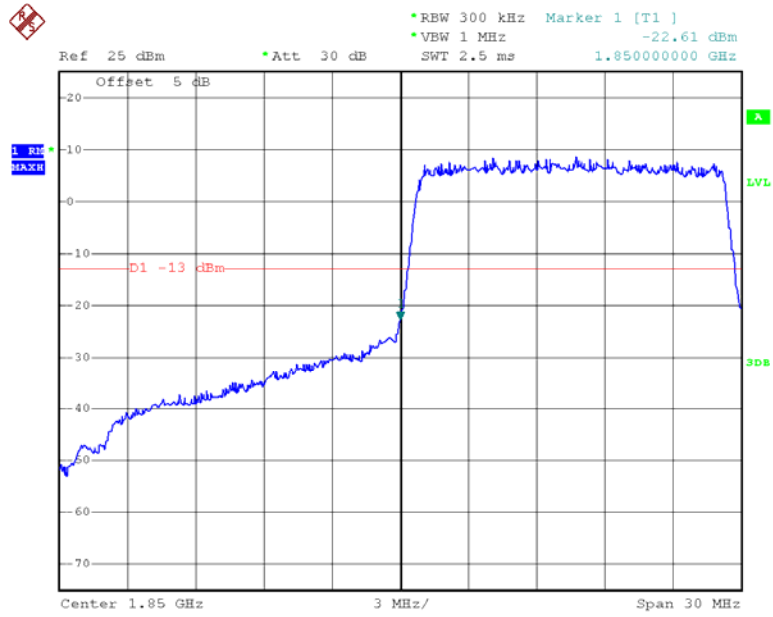
### QPSK\_10MHz\_50 RB\_Right



Date: 6.JUN.2018 10:07:42

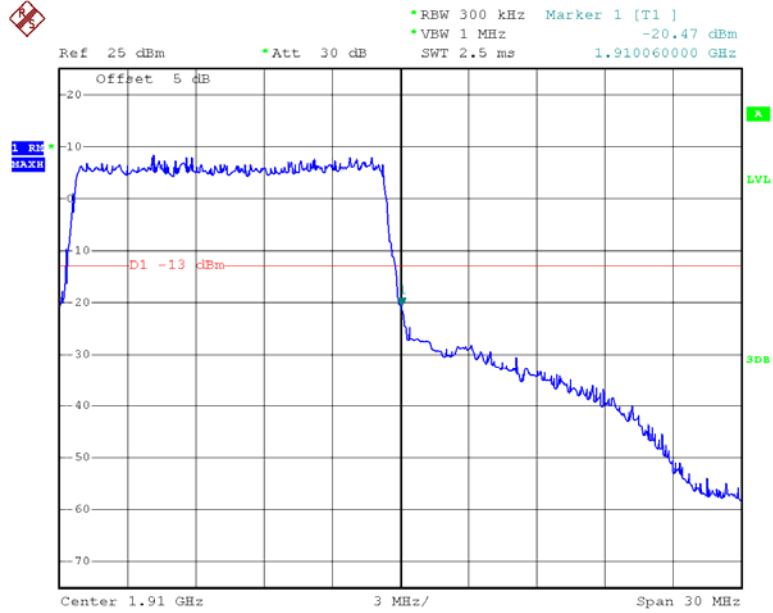


### QPSK\_15MHz\_75 RB\_Left



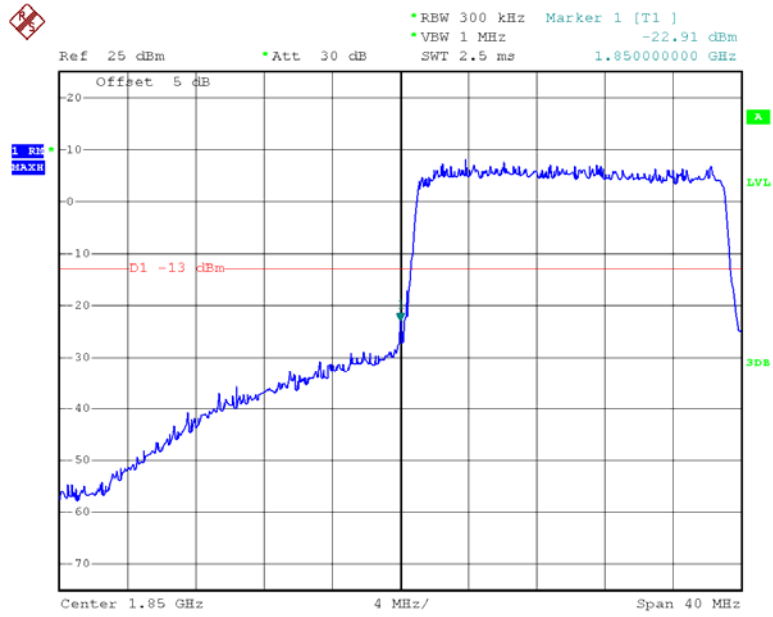
Date: 6.JUN.2018 10:10:58

### QPSK\_15MHz\_75 RB\_Right



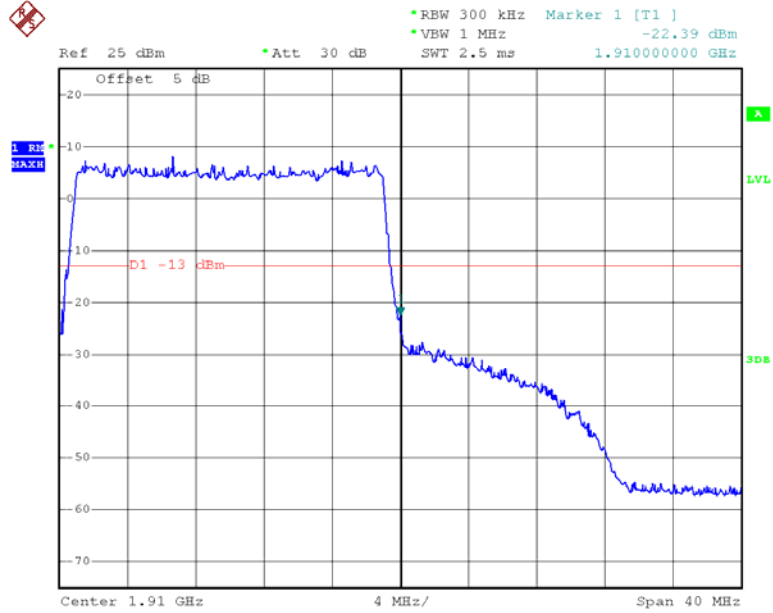
Date: 6.JUN.2018 10:09:27

### QPSK\_20MHz\_FULL RB\_Left



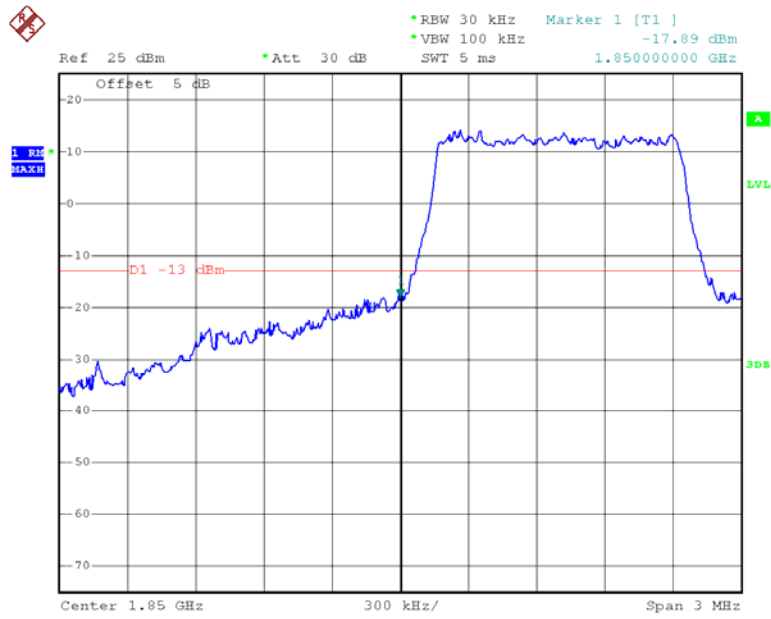
Date: 6.JUN.2018 10:12:38

### QPSK\_20MHz\_FULL RB\_Right



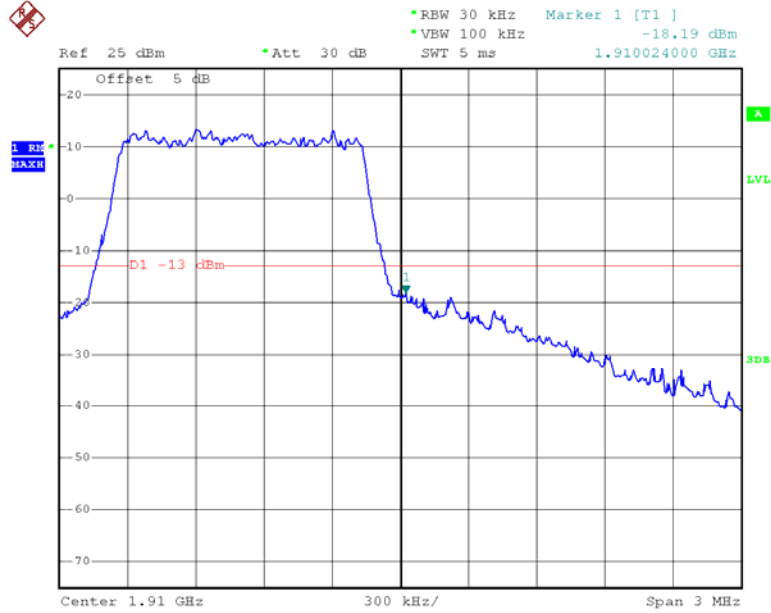
Date: 6.JUN.2018 10:14:04

### 16QAM\_1.4MHz\_6 RB\_Left



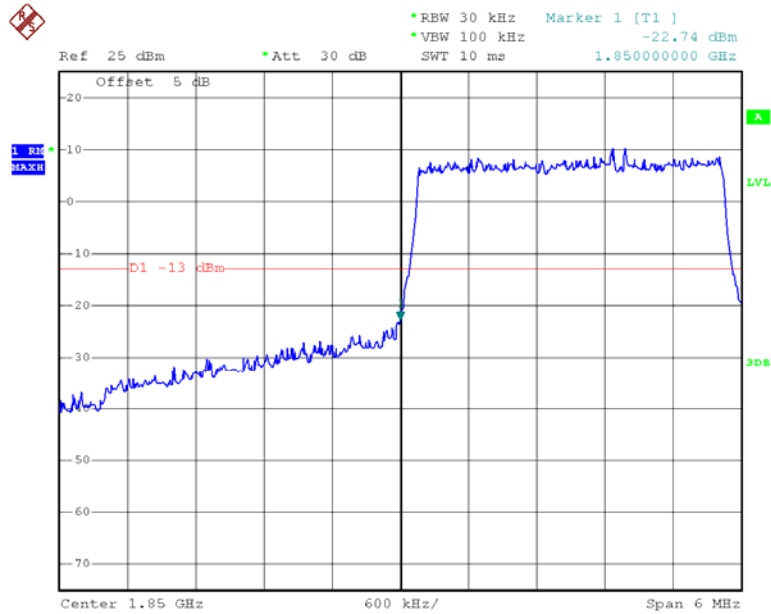
Date: 6.JUN.2018 09:31:59

### 16QAM\_1.4MHz\_6 RB\_Right



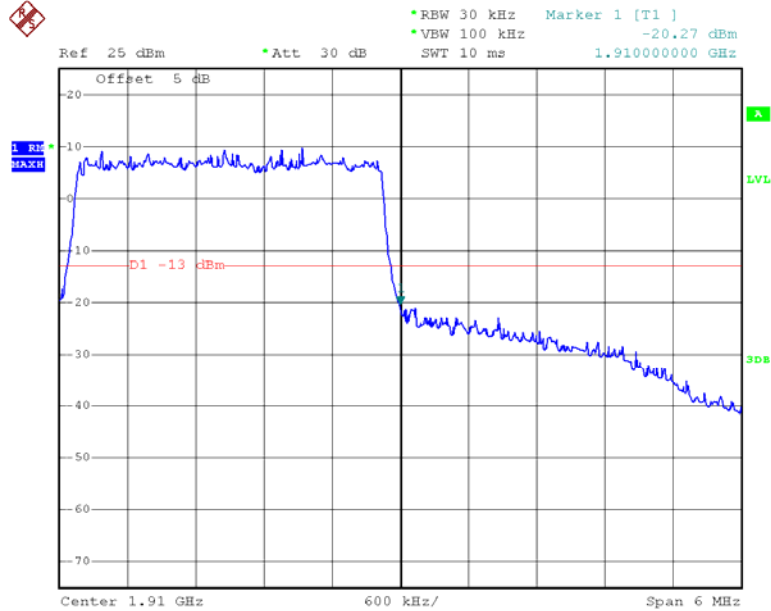
Date: 6.JUN.2018 09:33:37

### 16QAM\_3MHz\_15 RB\_Left



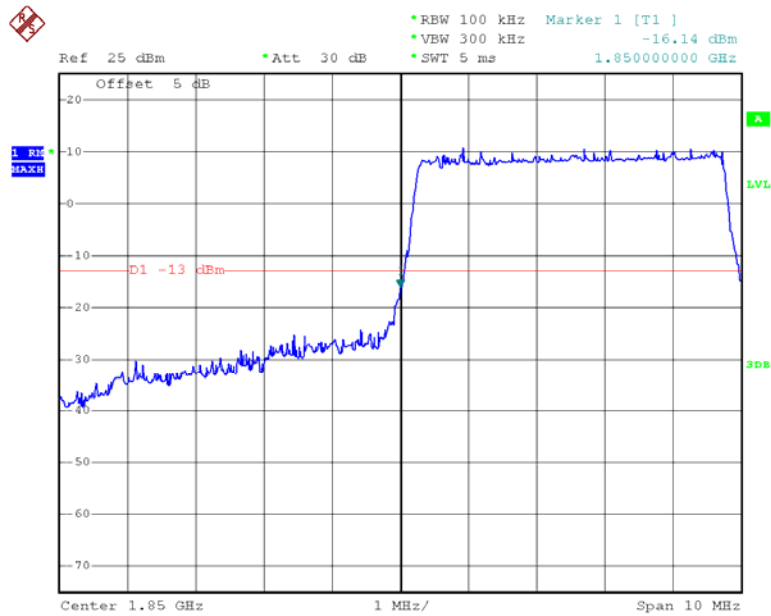
Date: 6.JUN.2018 09:51:51

### 16QAM\_3MHz\_15 RB\_Right



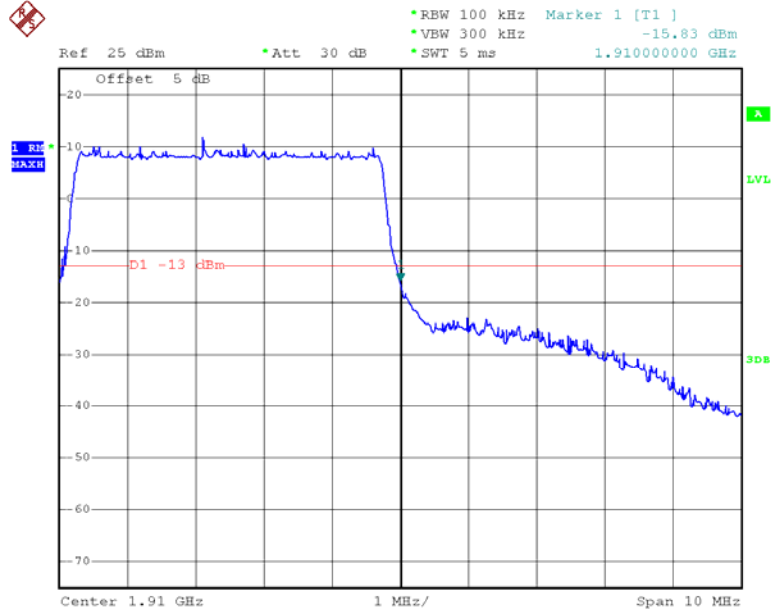
Date: 6.JUN.2018 09:52:38

### 16QAM\_5MHz\_25 RB\_Left



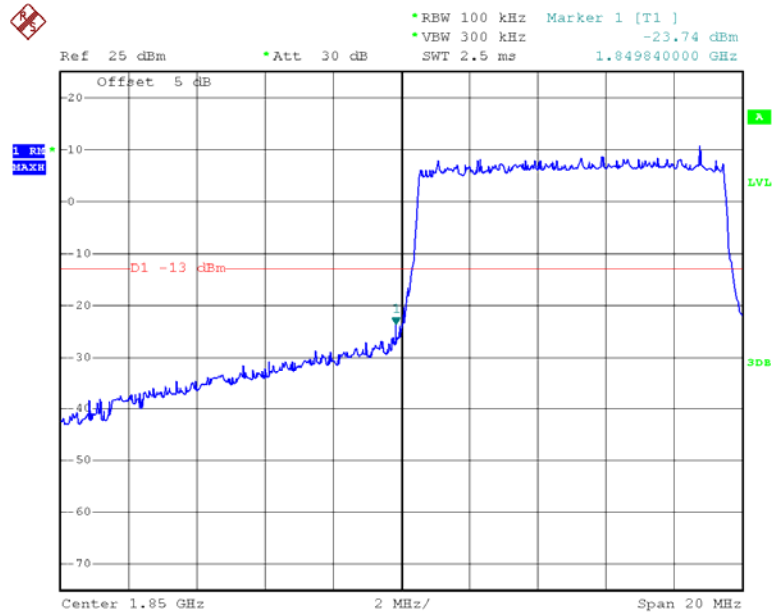
Date: 6.JUN.2018 09:56:28

### 16QAM\_5MHz\_25 RB\_Right



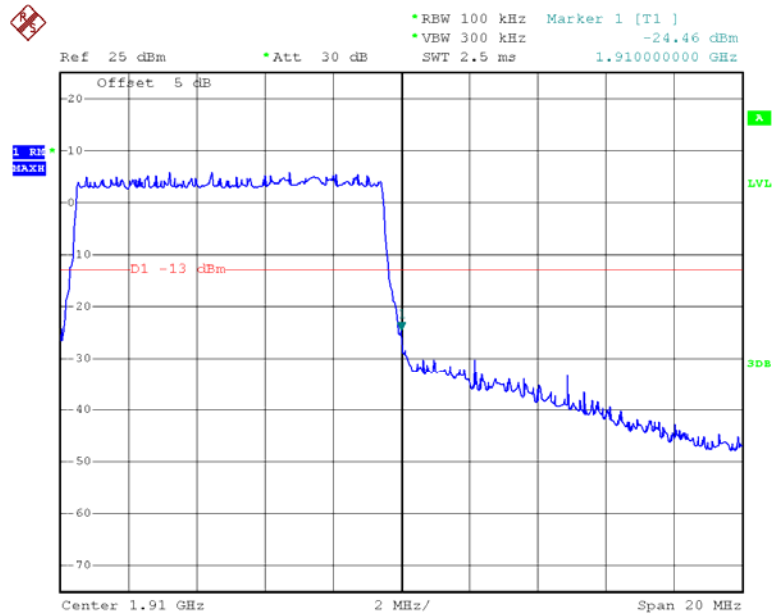
Date: 6.JUN.2018 09:55:16

### 16QAM\_10MHz\_50 RB\_Left



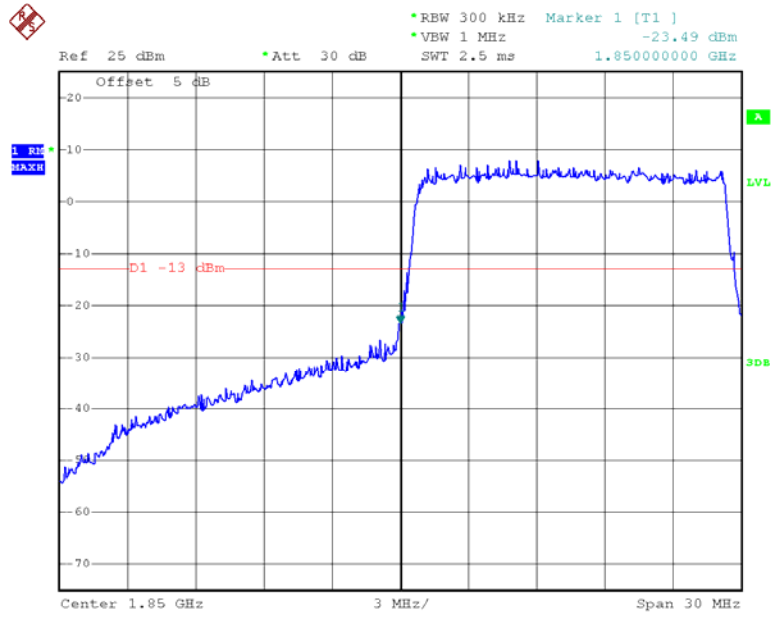
Date: 6.JUN.2018 10:04:07

### 16QAM\_10MHz\_50 RB\_Right



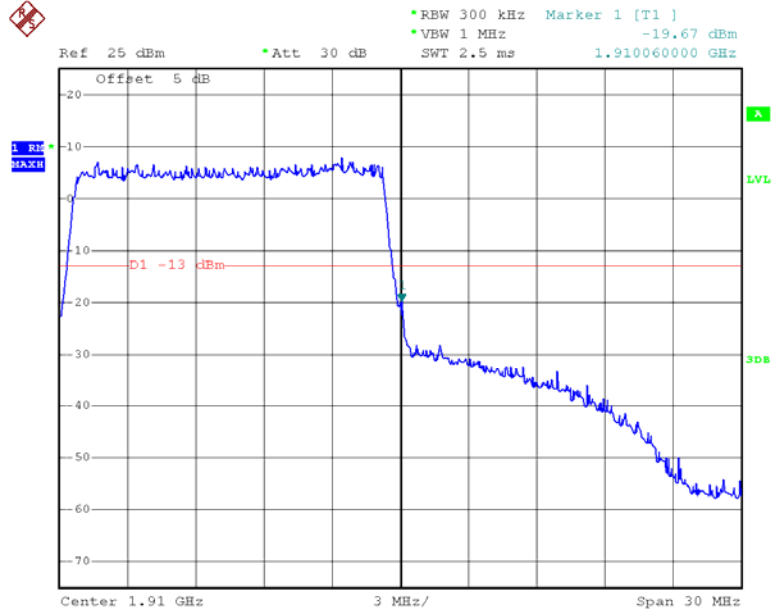
Date: 6.JUN.2018 10:06:44

### 16QAM\_15MHz\_75 RB\_Left



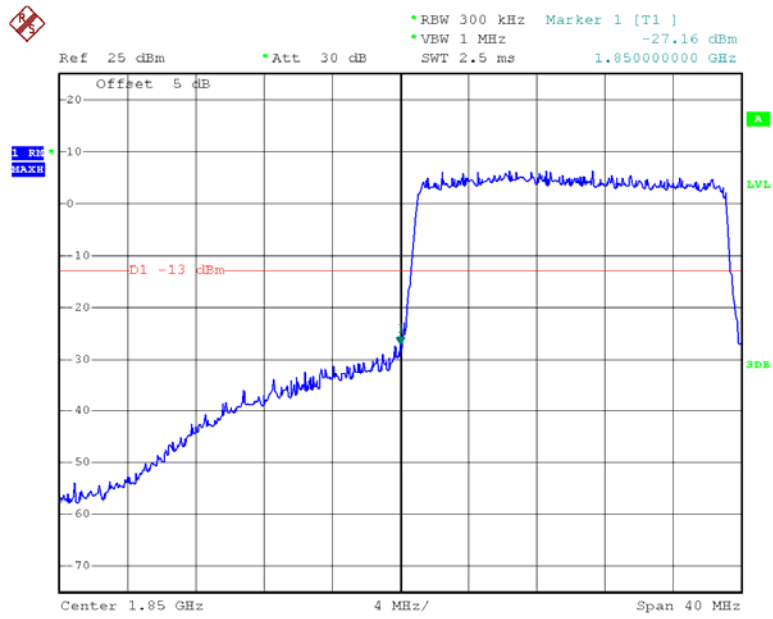
Date: 6.JUN.2018 10:10:28

### 16QAM\_15MHz\_75 RB\_Right



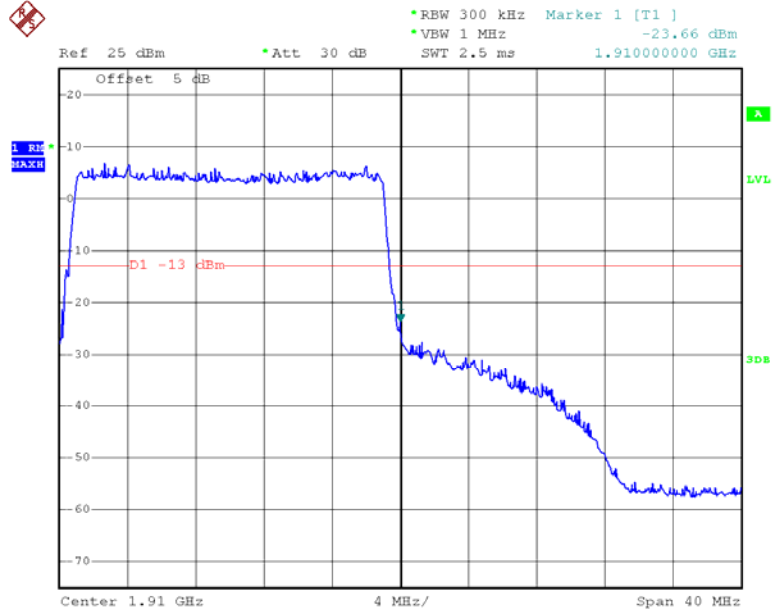
Date: 6.JUN.2018 10:09:55

### 16QAM\_20MHz\_FULL RB\_Left



Date: 6.JUN.2018 10:13:00

### 16QAM\_20MHz\_FULL RB\_Right

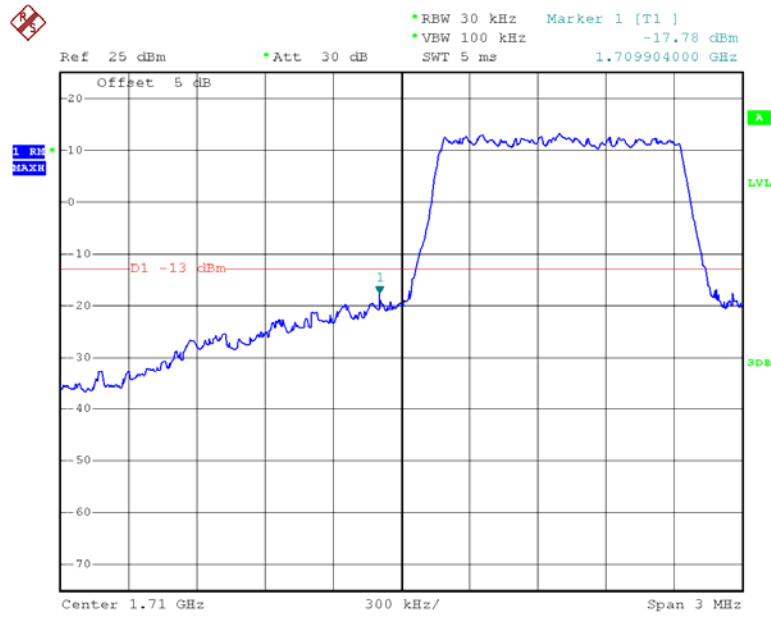


Date: 6.JUN.2018 10:13:44



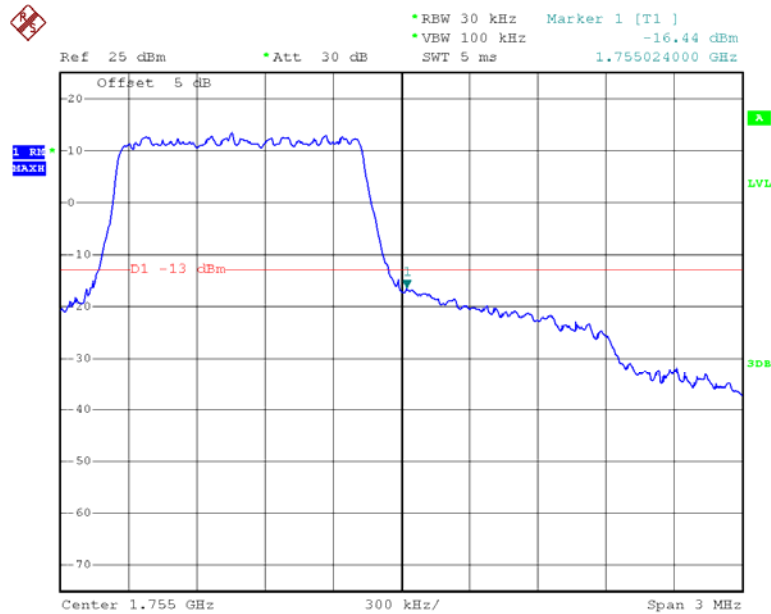
LTE Band IV

QPSK\_1.4MHz\_6 RB\_ Left



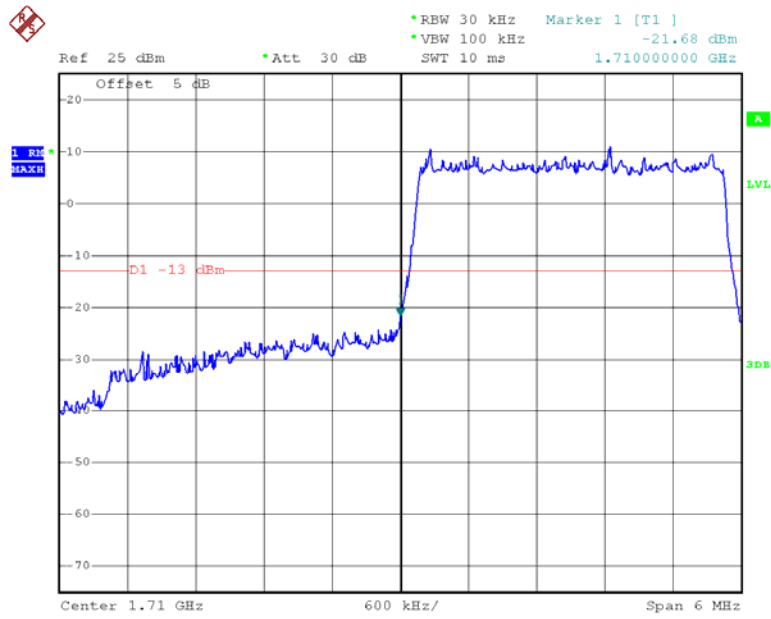
Date: 6.JUN.2018 10:23:51

QPSK\_1.4MHz\_6 RB\_ Right



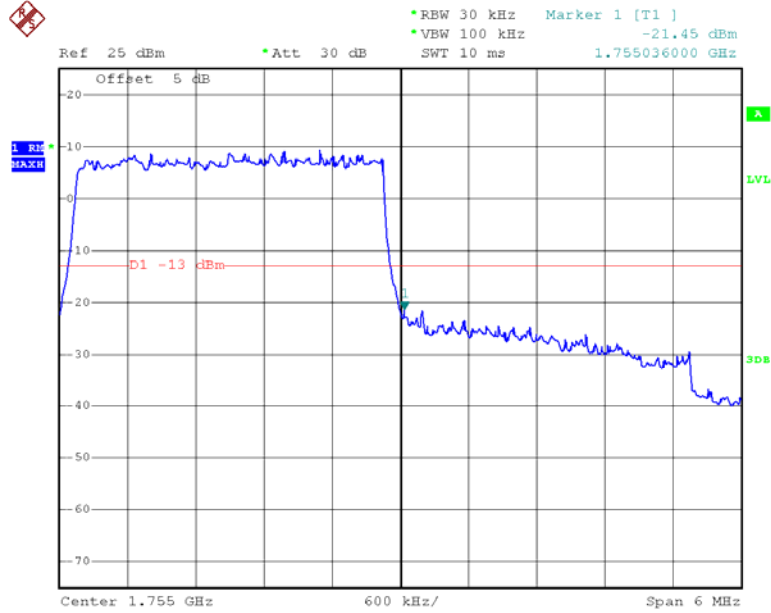
Date: 6.JUN.2018 10:20:32

### QPSK\_3MHz\_15 RB\_Left



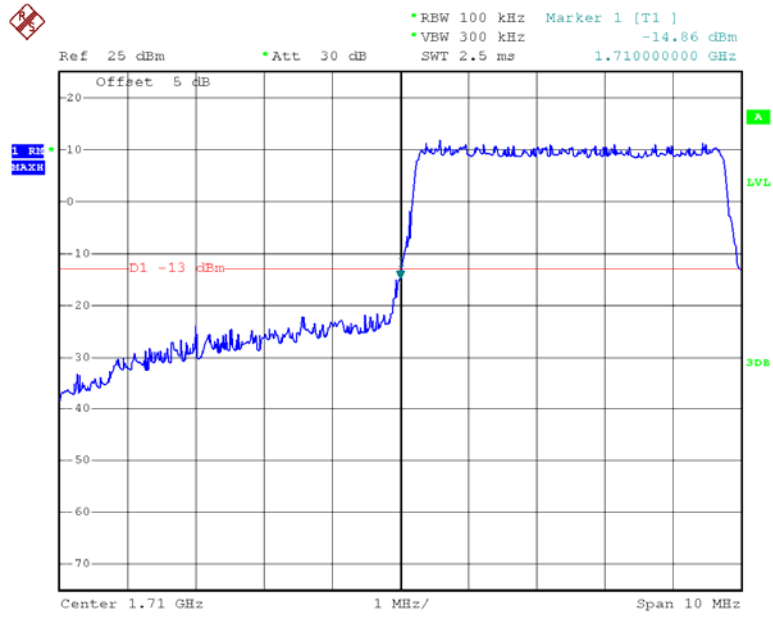
Date: 6.JUN.2018 10:26:28

### QPSK\_3MHz\_15 RB\_Right



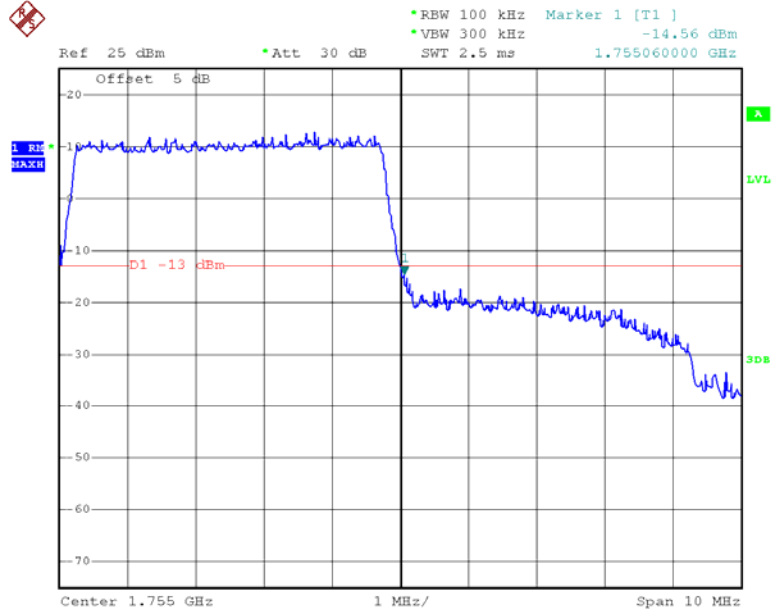
Date: 6.JUN.2018 10:28:14

### QPSK\_5MHz\_25 RB\_Left



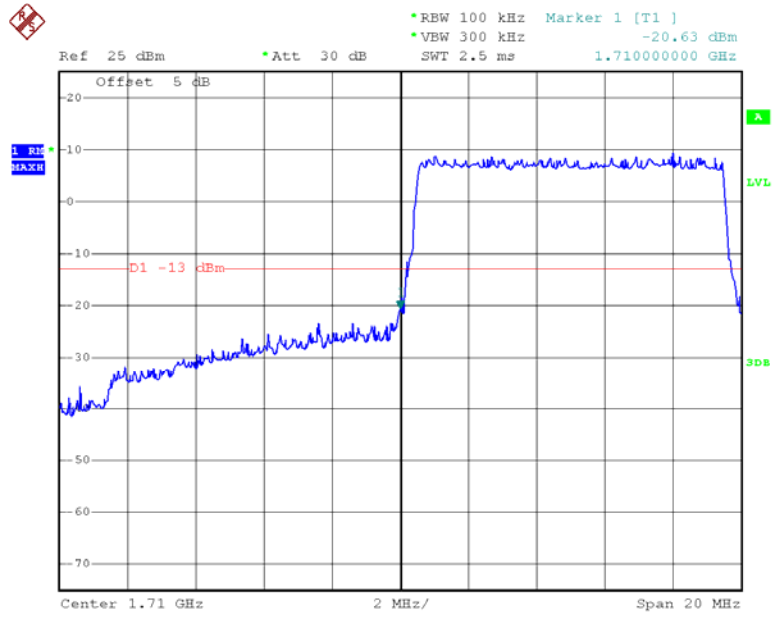
Date: 6.JUN.2018 10:31:10

### QPSK\_5MHz\_25 RB\_Right



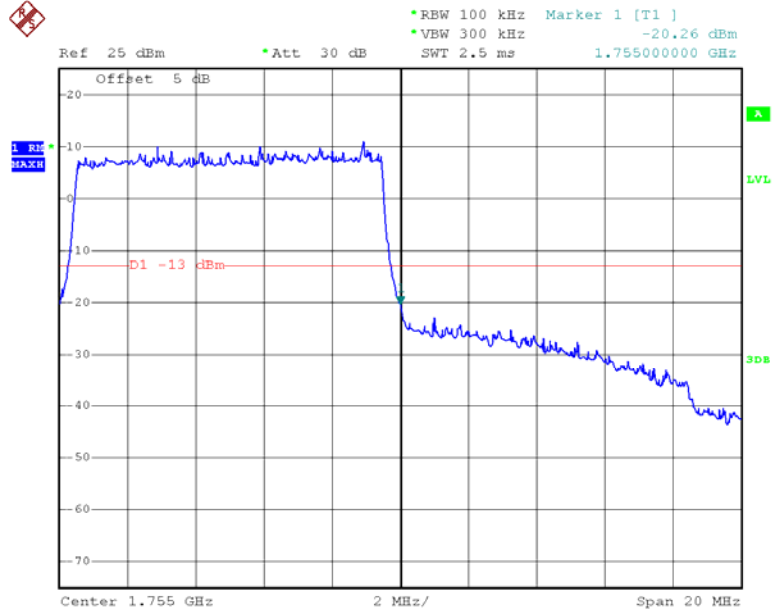
Date: 6.JUN.2018 10:29:15

### QPSK\_10MHz\_50 RB\_Left



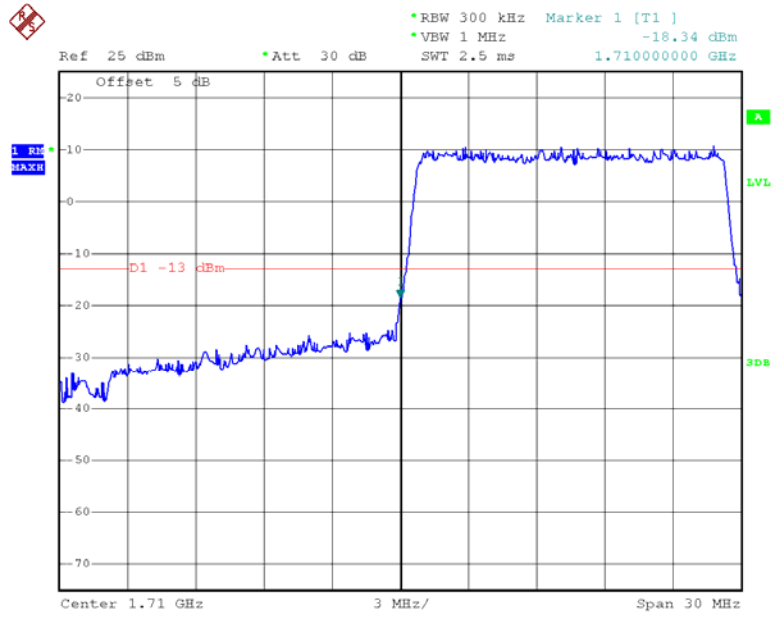
Date: 6.JUN.2018 10:33:47

### QPSK\_10MHz\_50 RB\_Right



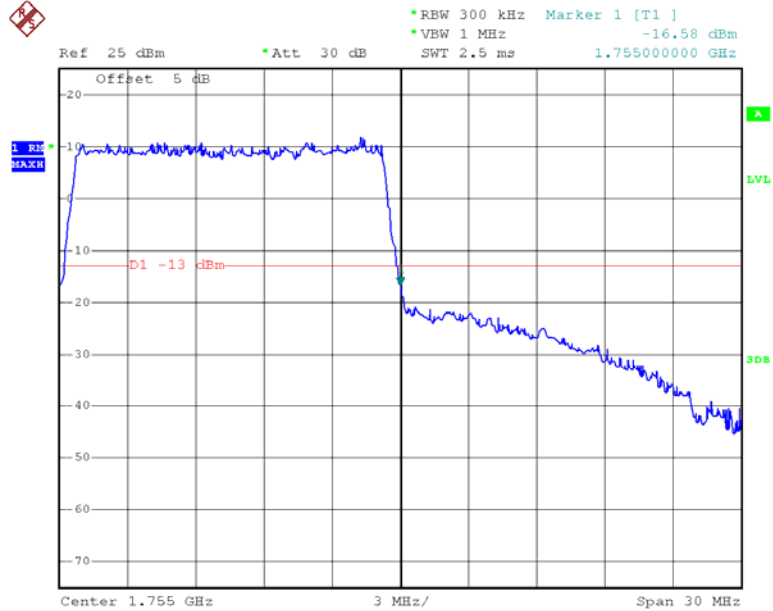
Date: 6.JUN.2018 10:36:39

### QPSK\_15MHz\_75 RB\_Left



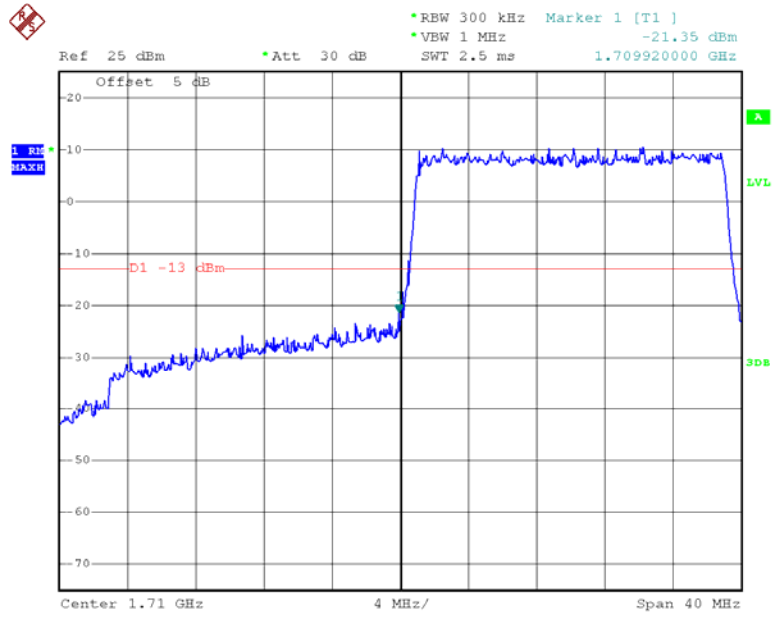
Date: 6.JUN.2018 10:40:05

### QPSK\_15MHz\_75 RB\_Right



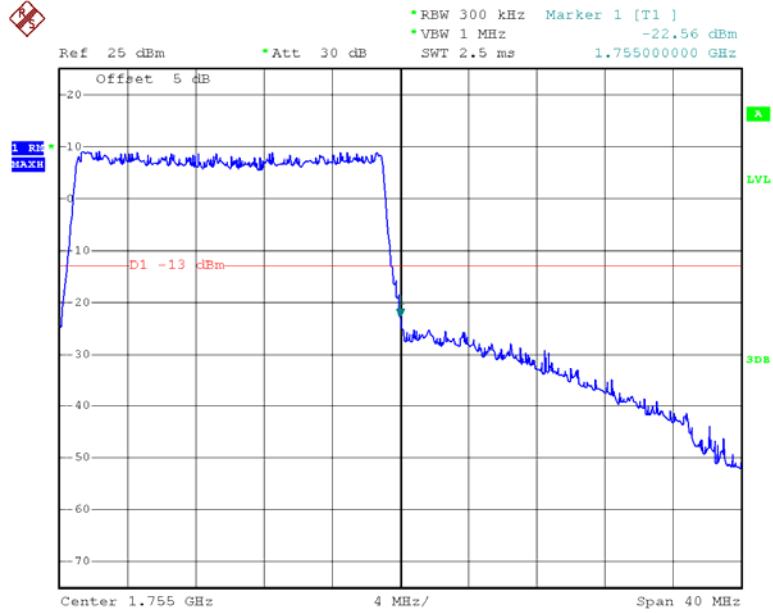
Date: 6.JUN.2018 10:38:14

### QPSK\_20MHz\_FULL RB\_Left



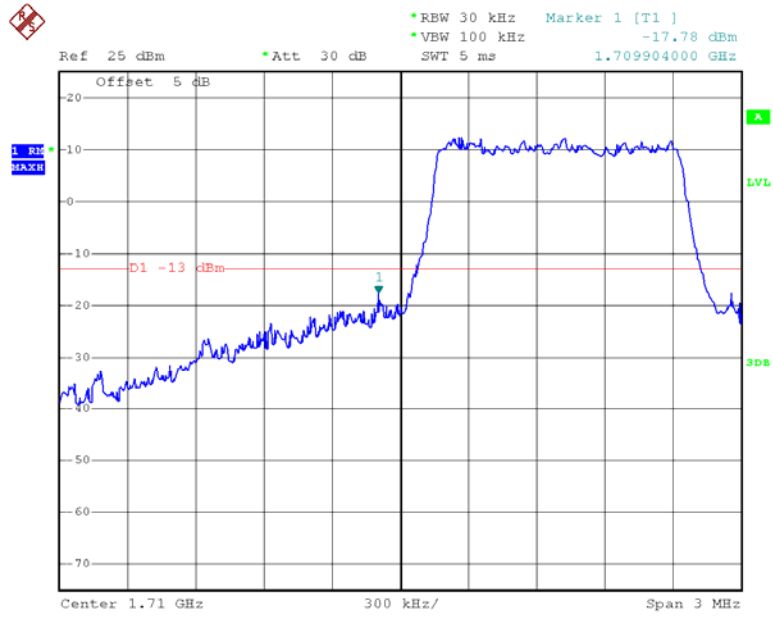
Date: 6.JUN.2018 10:41:05

### QPSK\_20MHz\_FULL RB\_Right



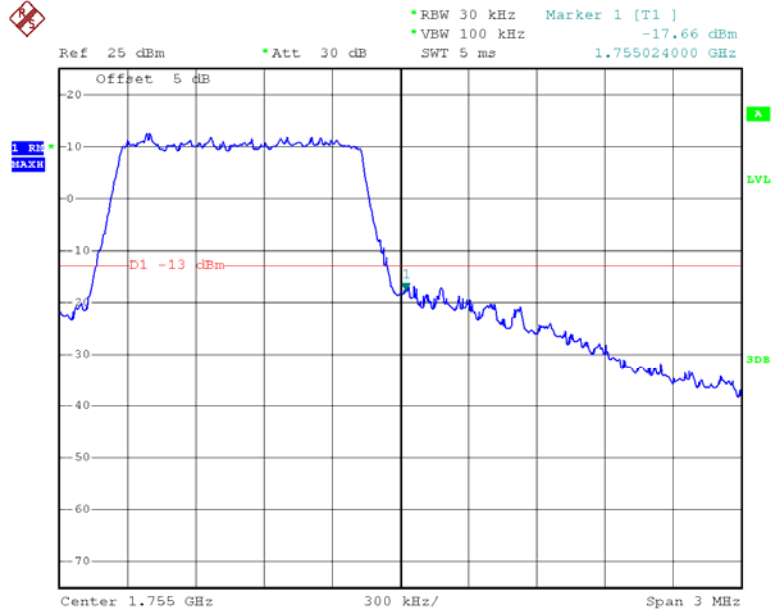
Date: 6.JUN.2018 10:42:51

### 16QAM\_1.4MHz\_6 RB\_ Left



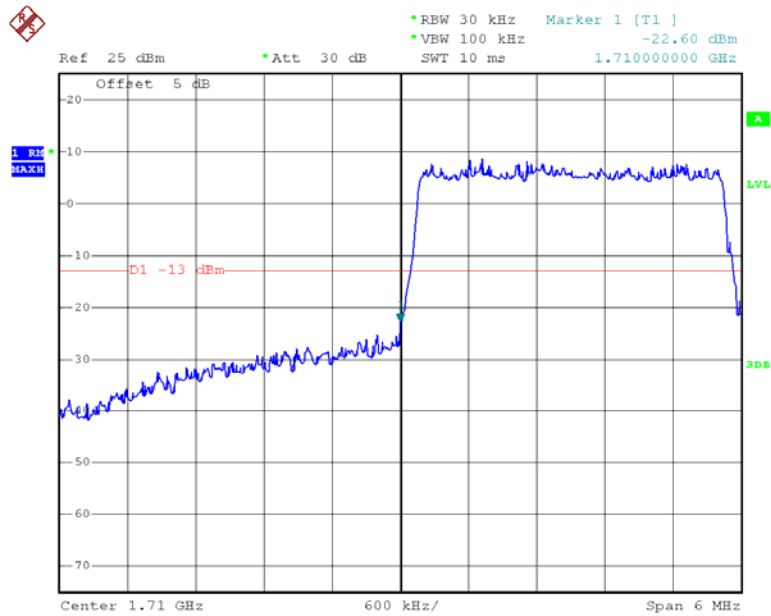
Date: 6.JUN.2018 10:22:54

### 16QAM\_1.4MHz\_6 RB\_ Right



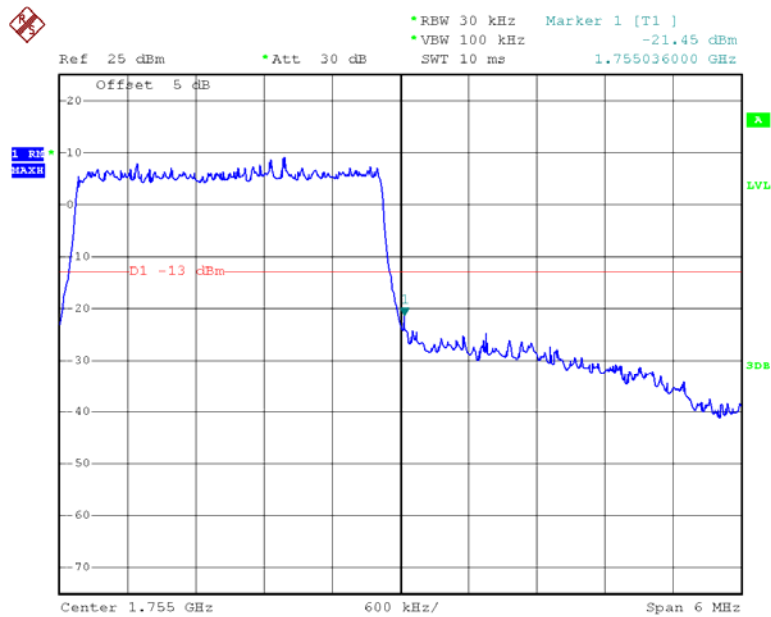
Date: 6.JUN.2018 10:22:18

### 16QAM\_3MHz\_15 RB\_Left



Date: 6.JUN.2018 10:26:49

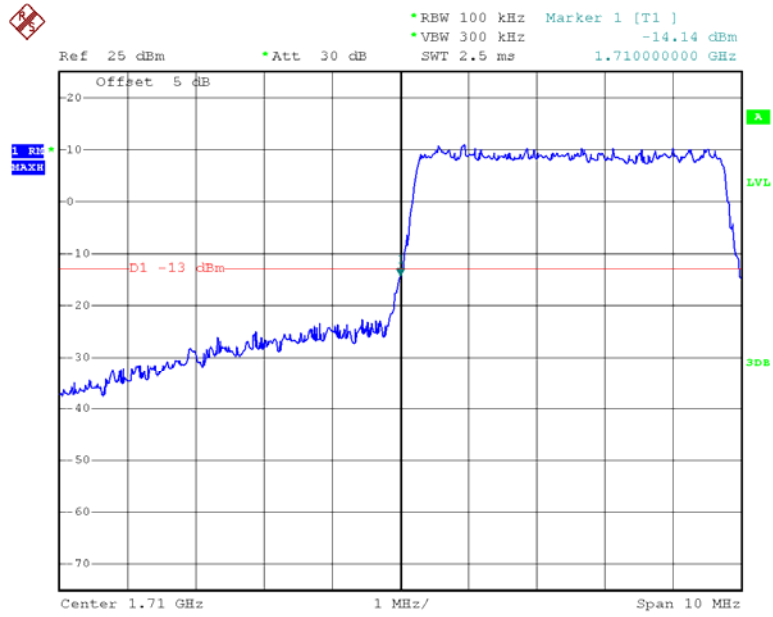
### 16QAM\_3MHz\_15 RB\_Right



Date: 6.JUN.2018 10:27:34

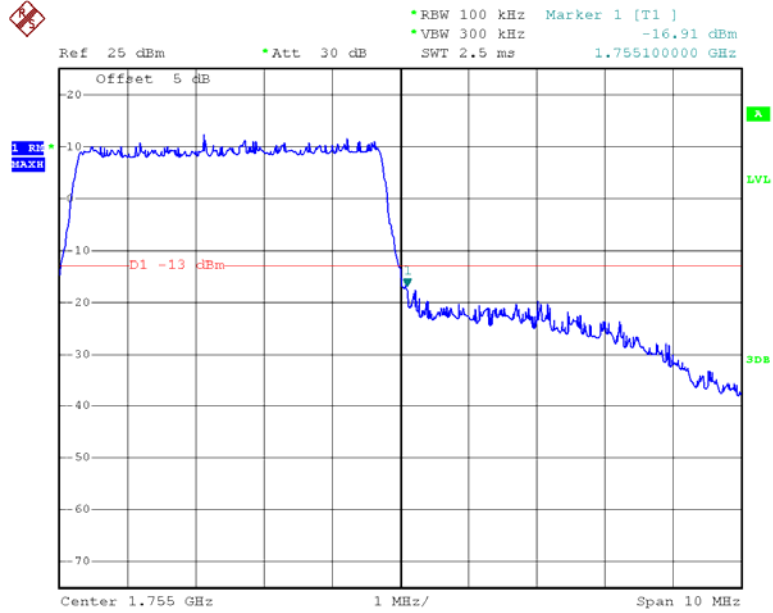


### 16QAM\_5MHz\_25 RB\_Left



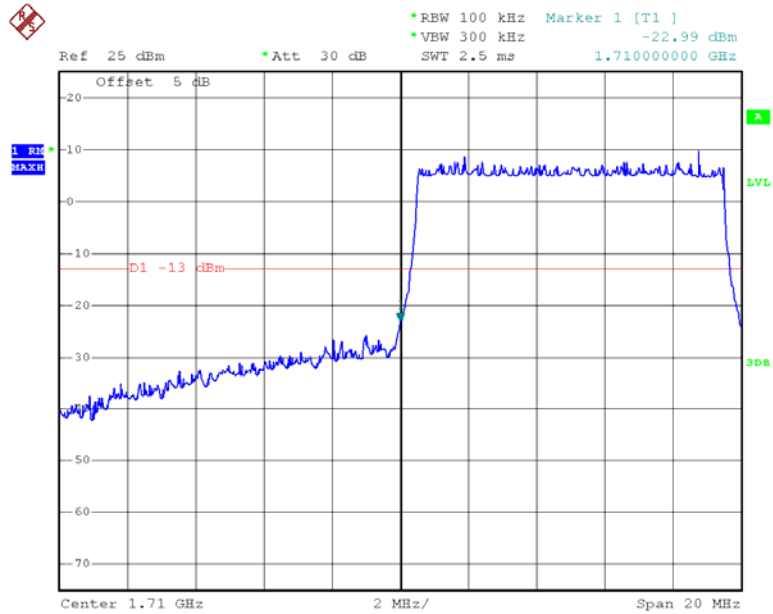
Date: 6.JUN.2018 10:32:15

### 16QAM\_5MHz\_25 RB\_Right



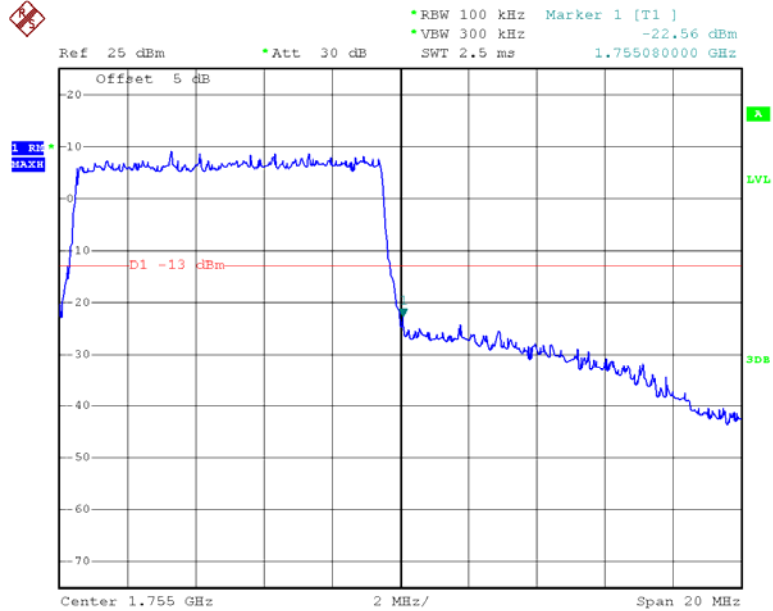
Date: 6.JUN.2018 10:29:47

### 16QAM\_10MHz\_50 RB\_Left



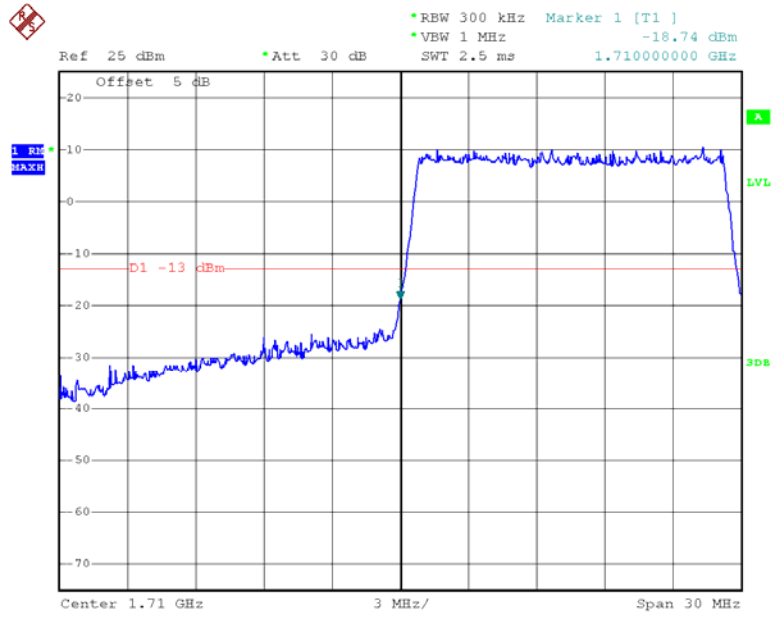
Date: 6.JUN.2018 10:34:06

### 16QAM\_10MHz\_50 RB\_Right



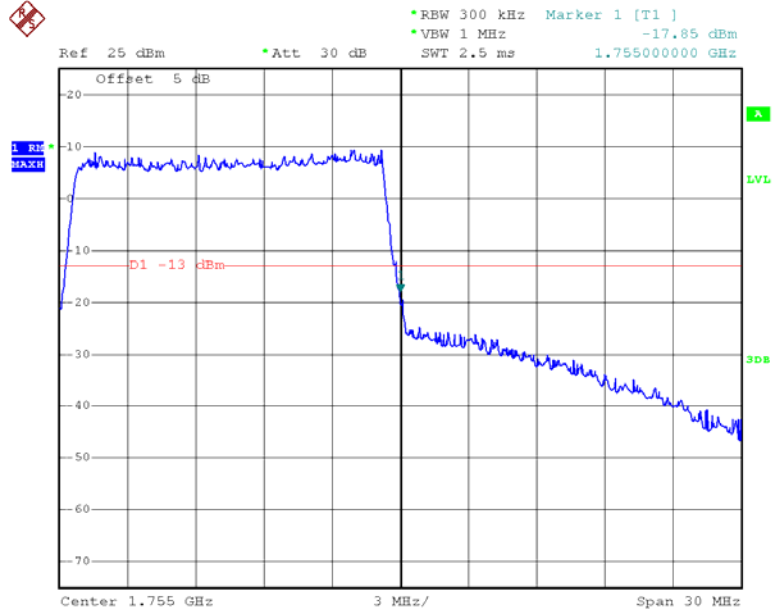
Date: 6.JUN.2018 10:35:50

### 16QAM\_15MHz\_75 RB\_Left



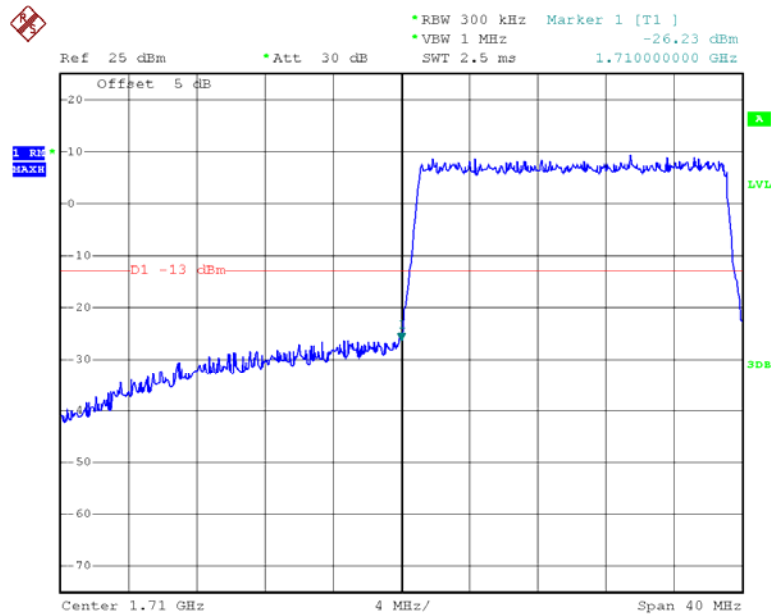
Date: 6.JUN.2018 10:39:30

### 16QAM\_15MHz\_75 RB\_Right



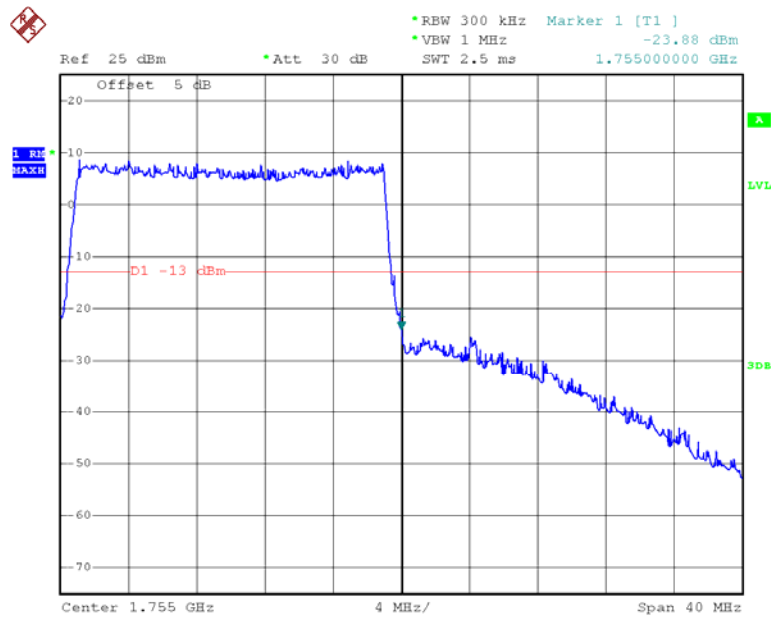
Date: 6.JUN.2018 10:38:43

### 16QAM\_20MHz\_FULL RB\_Left



Date: 6.JUN.2018 10:41:32

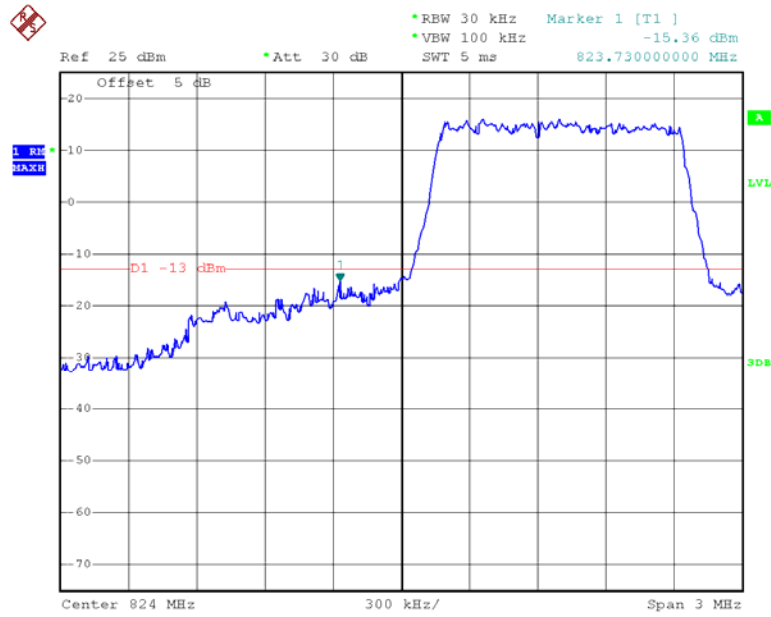
### 16QAM\_20MHz\_FULL RB\_Right



Date: 6.JUN.2018 10:42:18

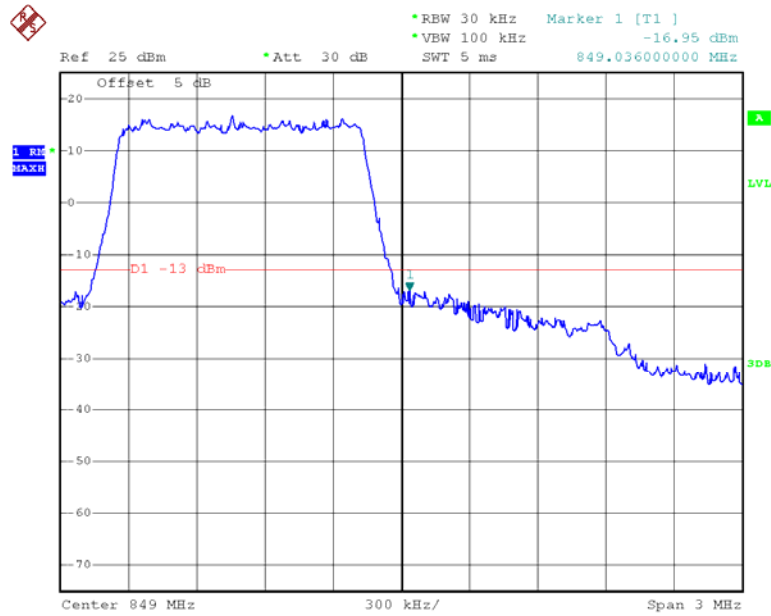
LTE Band V

QPSK\_1.4MHz\_6 RB\_ Left



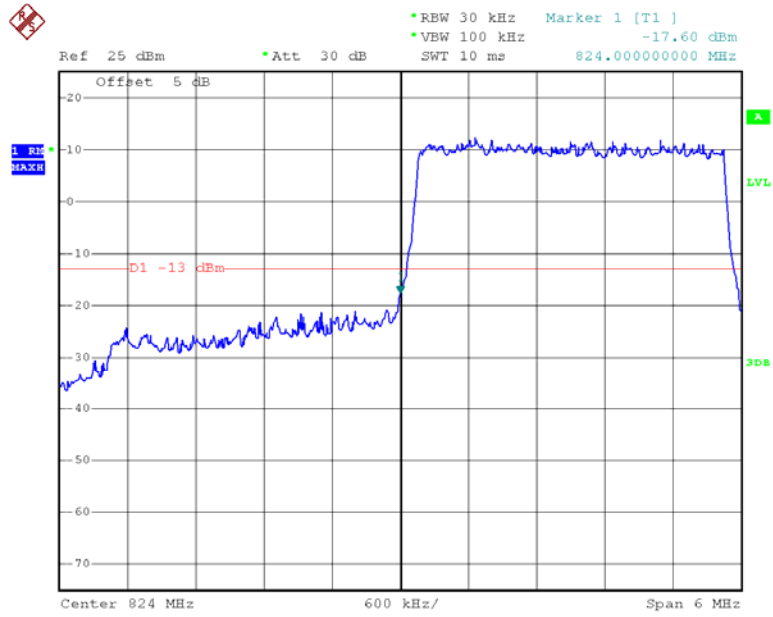
Date: 6.JUN.2018 10:44:23

QPSK\_1.4MHz\_6 RB\_ Right



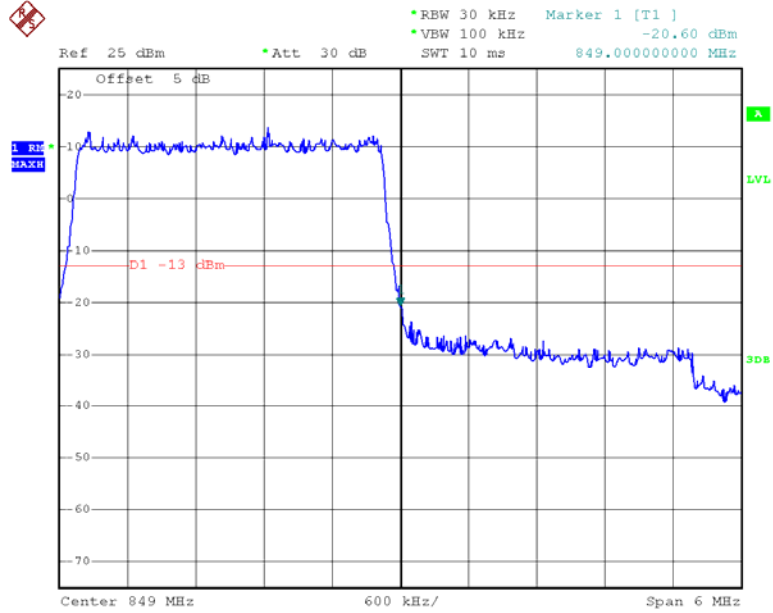
Date: 6.JUN.2018 10:46:54

### QPSK\_3MHz\_15 RB\_Left



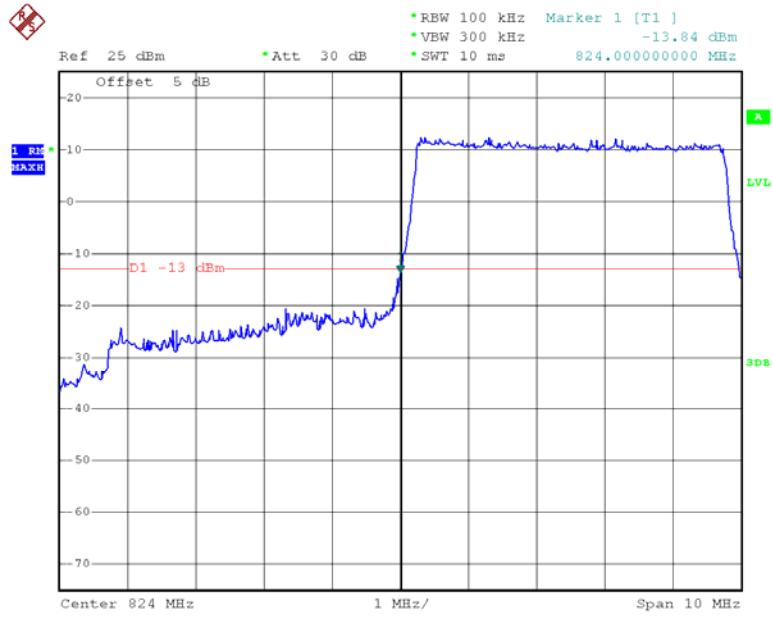
Date: 6.JUN.2018 10:51:28

### QPSK\_3MHz\_15 RB\_Right



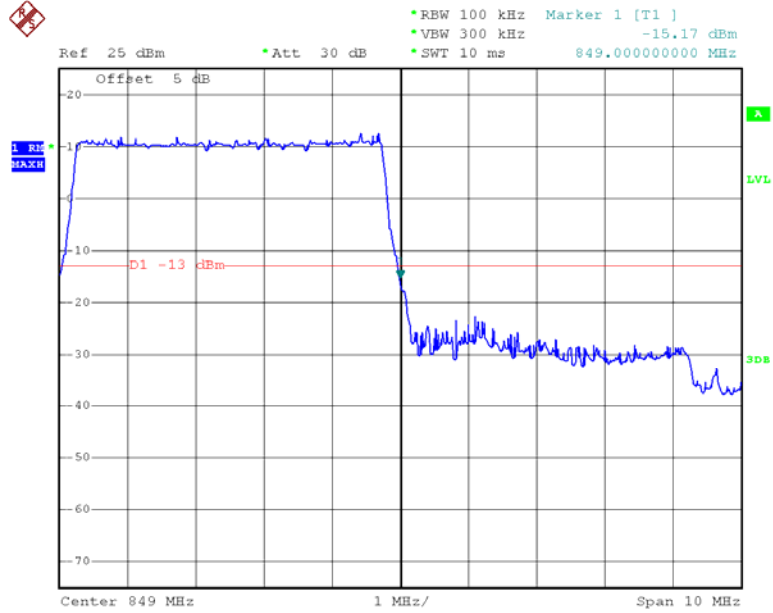
Date: 6.JUN.2018 10:49:28

### QPSK\_5MHz\_25 RB\_Left



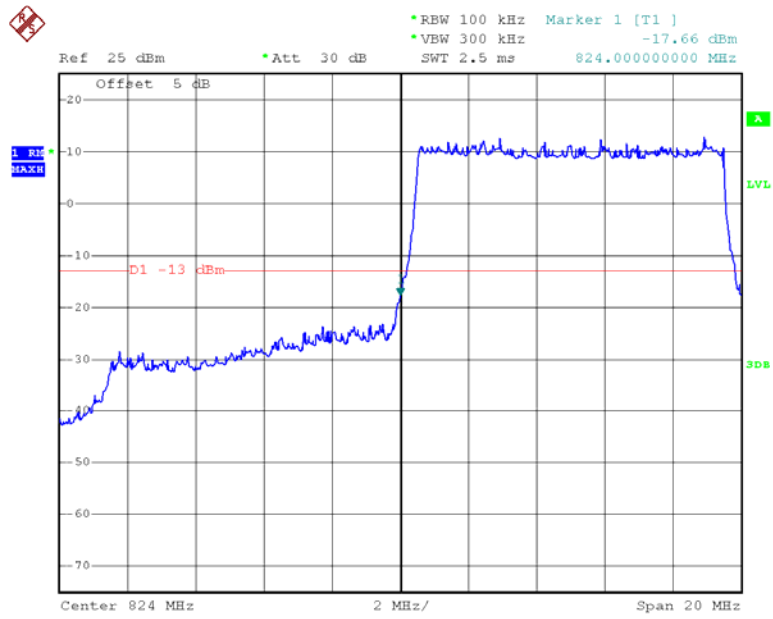
Date: 6.JUN.2018 10:52:59

### QPSK\_5MHz\_25 RB\_Right



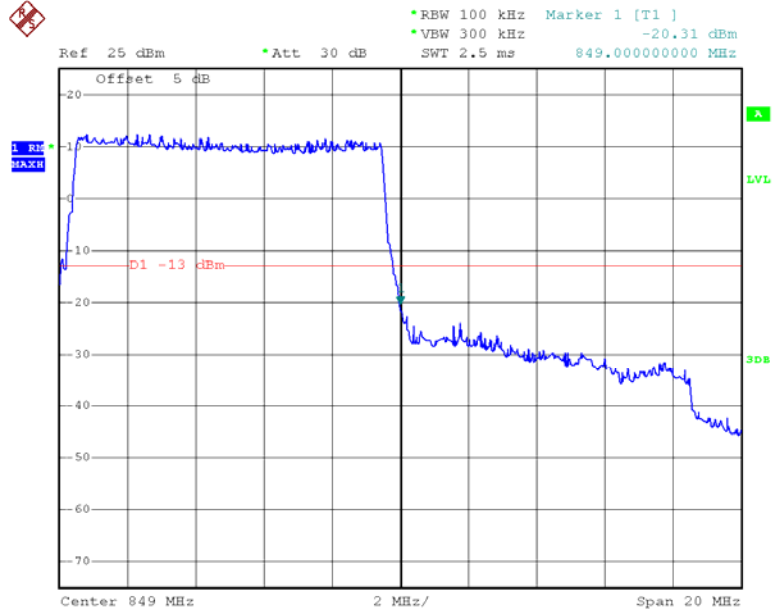
Date: 6.JUN.2018 10:55:31

### QPSK\_10MHz\_50 RB\_Left



Date: 6.JUN.2018 10:58:52

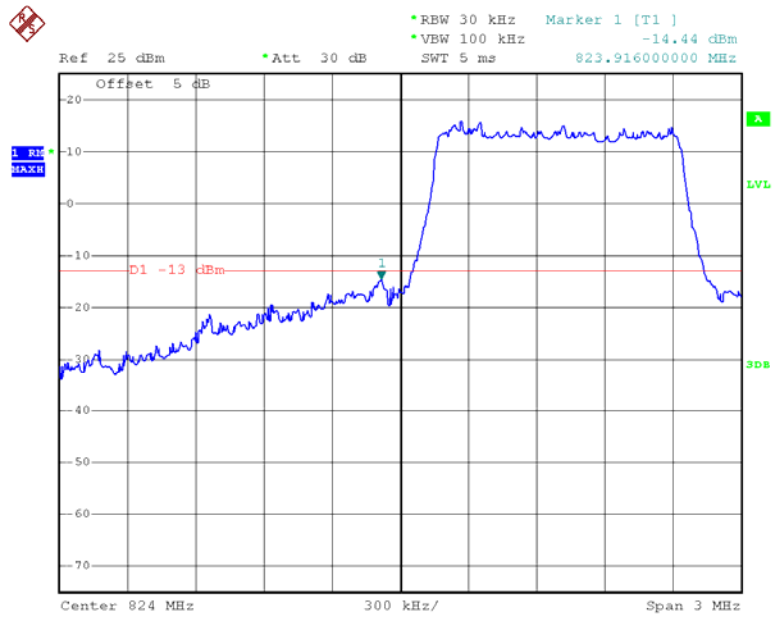
### QPSK\_10MHz\_50 RB\_Right



Date: 6.JUN.2018 10:57:05

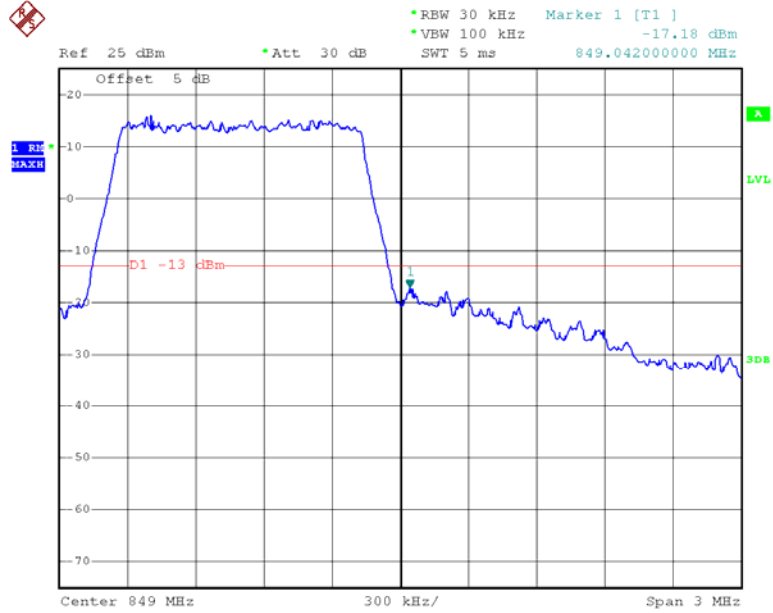


### 16QAM\_1.4MHz\_6 RB\_ Left



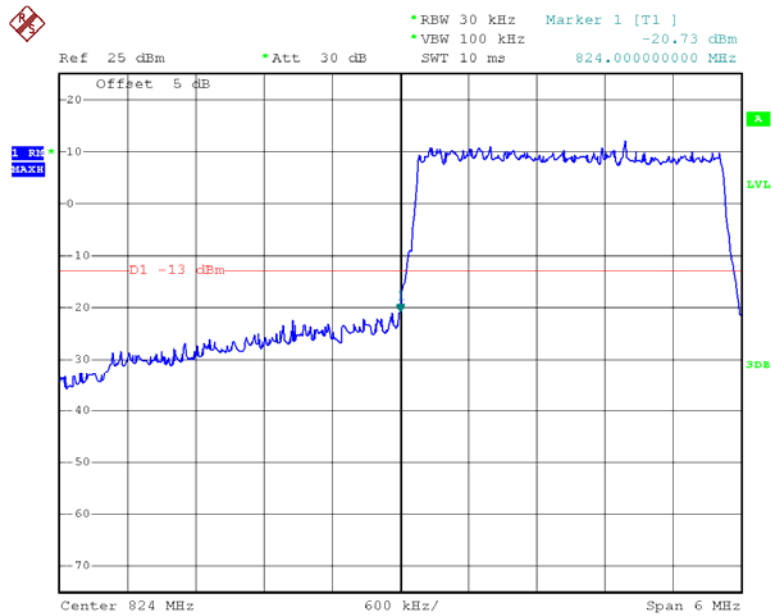
Date: 6.JUN.2018 10:44:48

### 16QAM\_1.4MHz\_6 RB\_ Right



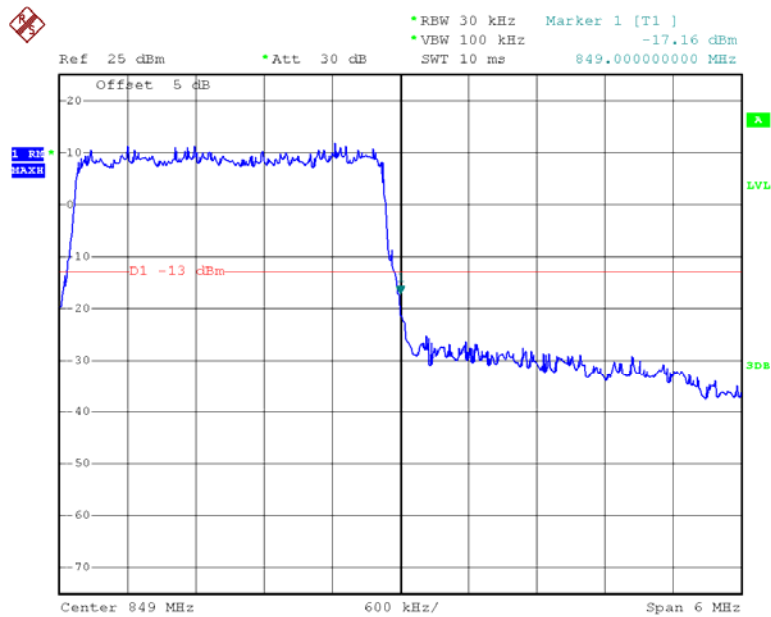
Date: 6.JUN.2018 10:46:23

### 16QAM\_3MHz\_15 RB\_Left



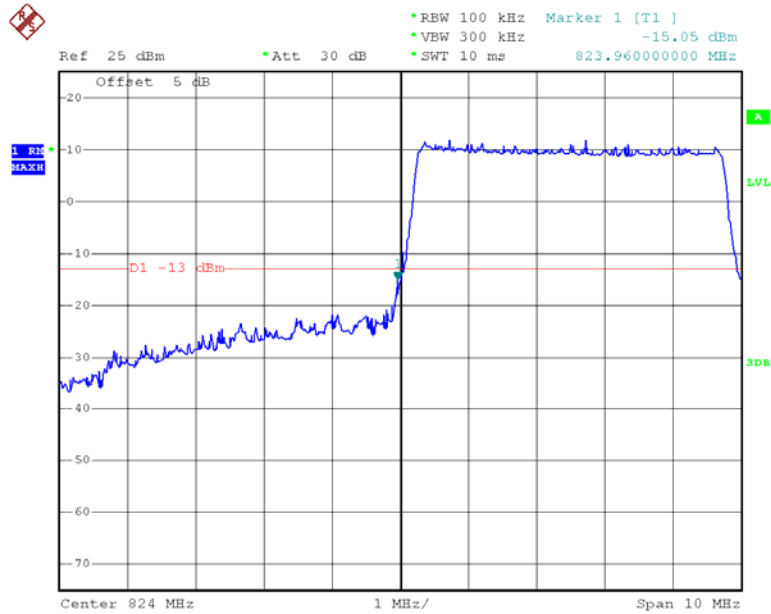
Date: 6.JUN.2018 10:50:44

### 16QAM\_3MHz\_15 RB\_Right



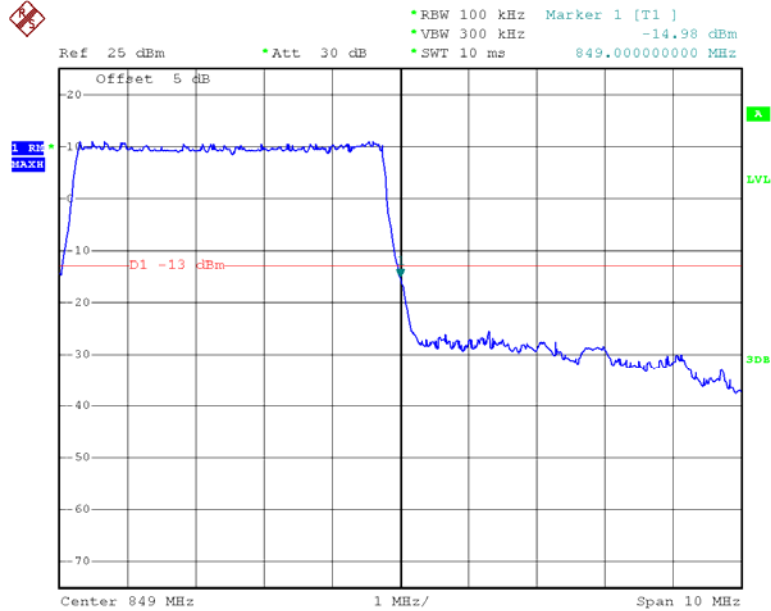
Date: 6.JUN.2018 10:49:48

### 16QAM\_5MHz\_25 RB\_Left



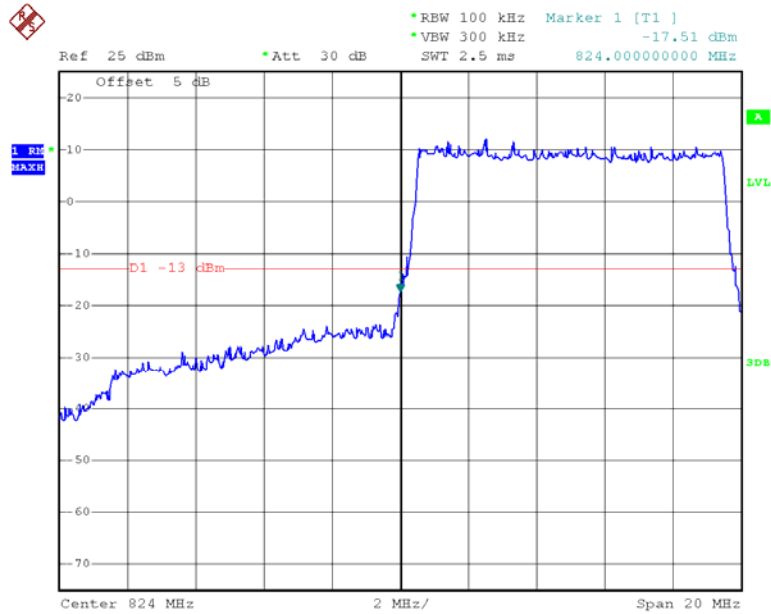
Date: 6.JUN.2018 10:53:25

### 16QAM\_5MHz\_25 RB\_Right



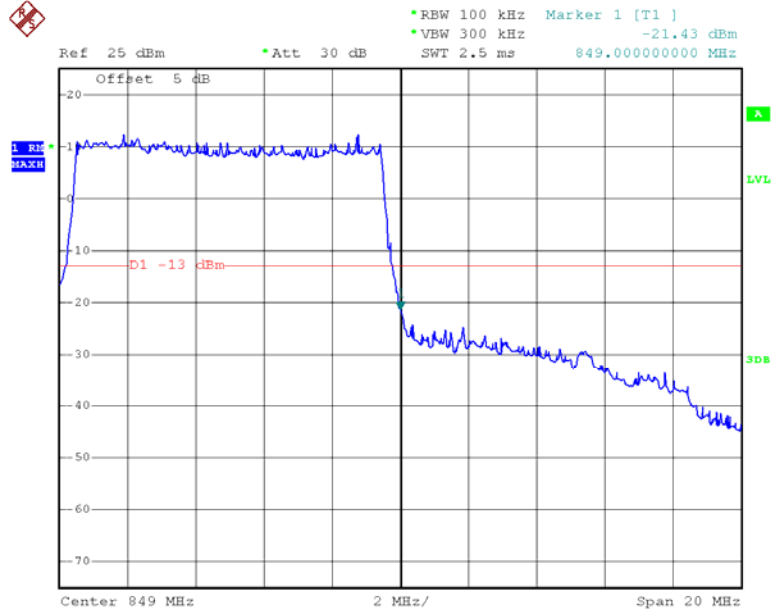
Date: 6.JUN.2018 10:54:05

### 16QAM\_10MHz\_50 RB\_Left



Date: 6.JUN.2018 10:58:14

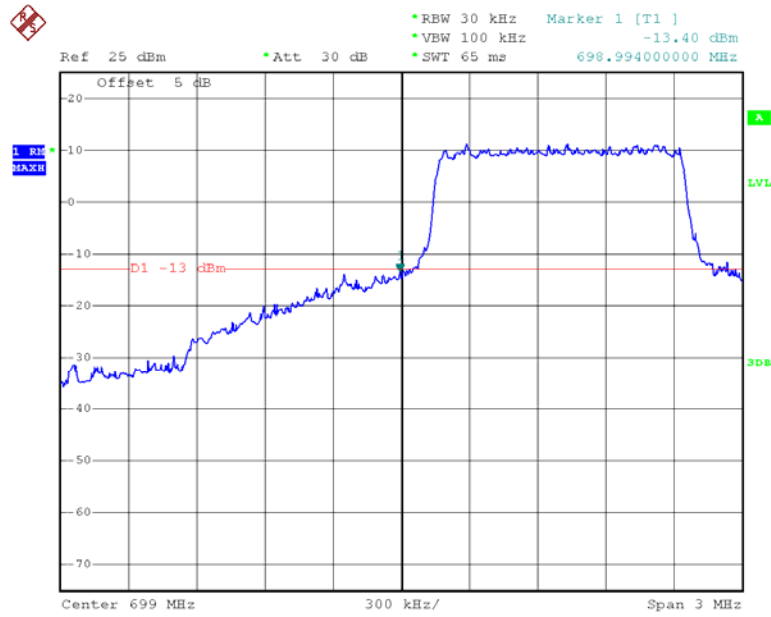
### 16QAM\_10MHz\_50 RB\_Right



Date: 6.JUN.2018 10:57:36

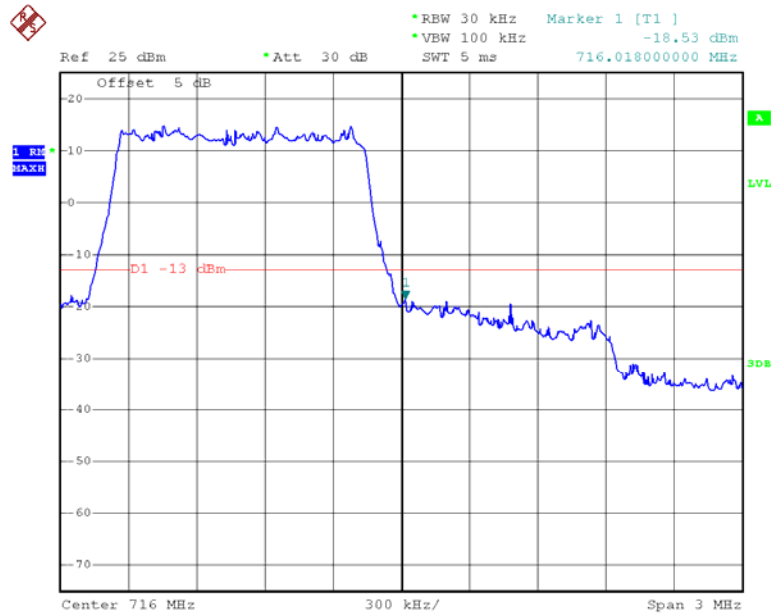
LTE Band 12

QPSK\_1.4MHz\_6 RB\_ Left



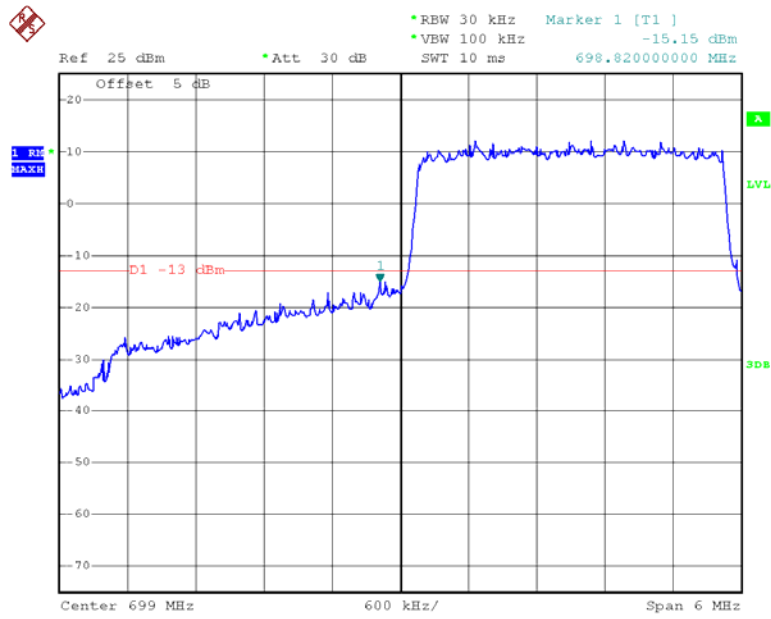
Date: 6.JUN.2018 11:01:14

QPSK\_1.4MHz\_6 RB\_ Right



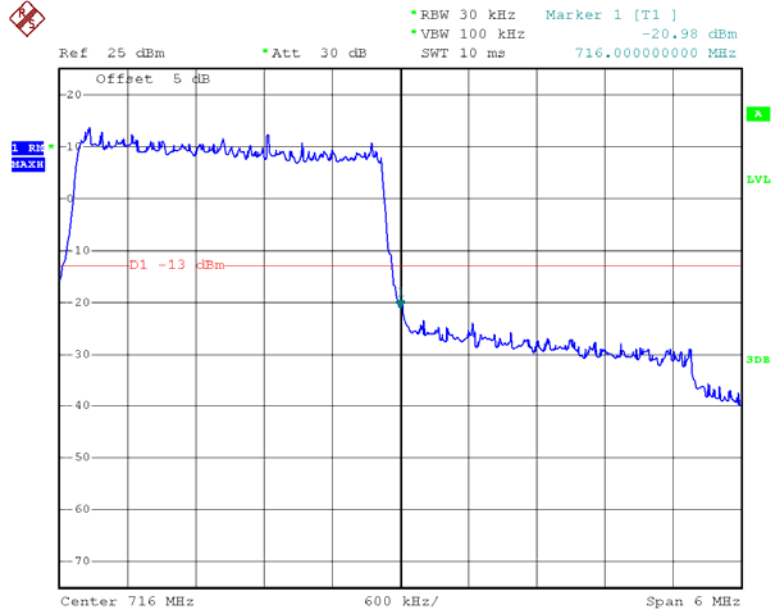
Date: 6.JUN.2018 11:03:13

### QPSK\_3MHz\_15 RB\_Left



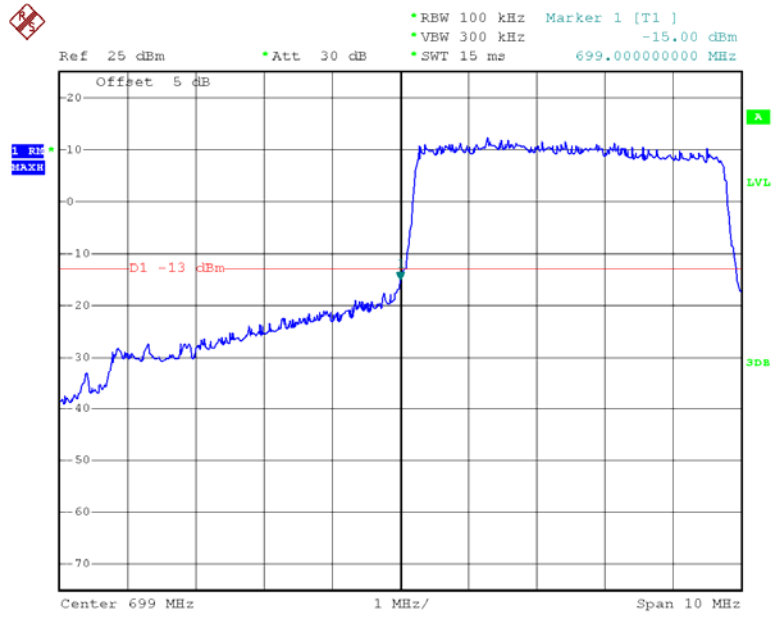
Date: 6.JUN.2018 11:08:30

### QPSK\_3MHz\_15 RB\_Right



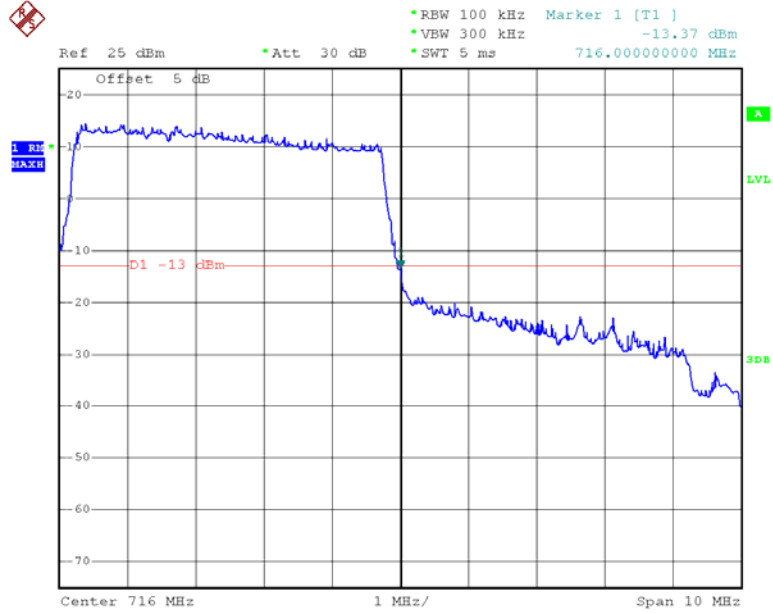
Date: 6.JUN.2018 11:06:28

### QPSK\_5MHz\_25 RB\_Left



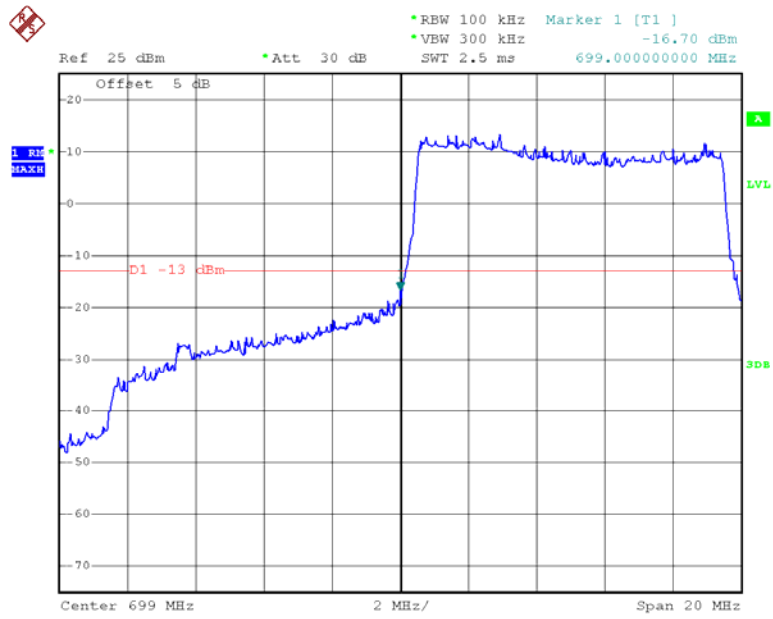
Date: 6.JUN.2018 11:09:37

### QPSK\_5MHz\_25 RB\_Right



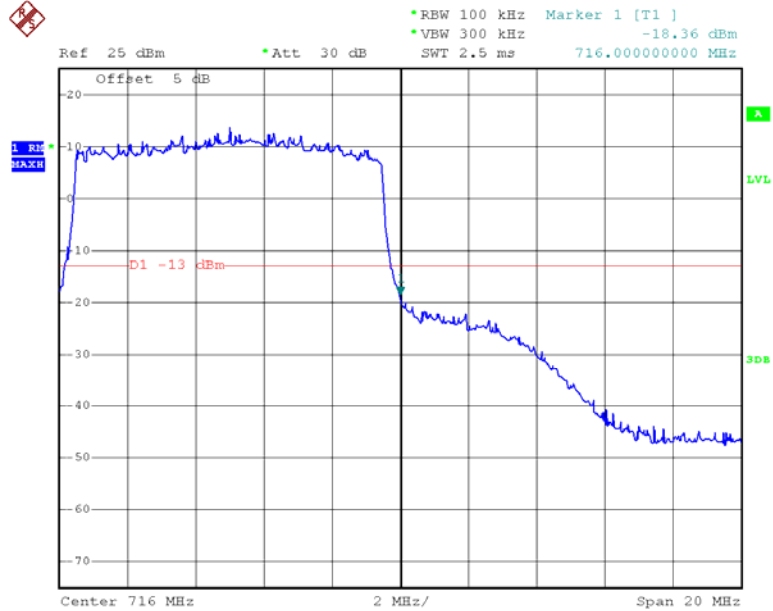
Date: 6.JUN.2018 11:14:03

### QPSK\_10MHz\_50 RB\_Left



Date: 6.JUN.2018 11:18:36

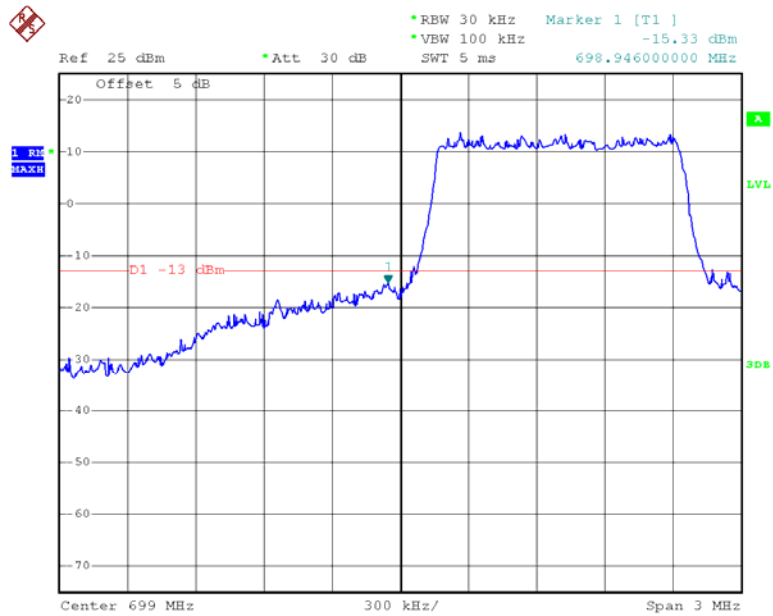
### QPSK\_10MHz\_50 RB\_Right



Date: 6.JUN.2018 11:20:17

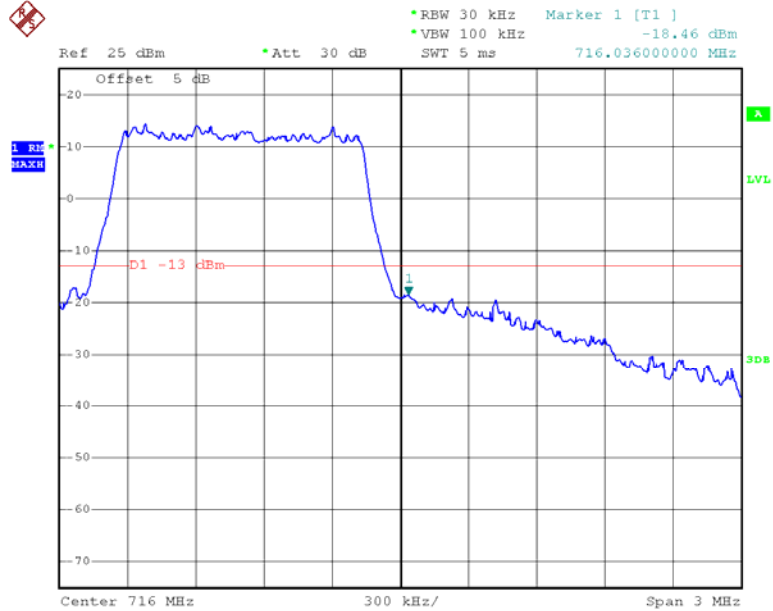


### 16QAM\_1.4MHz\_6 RB\_ Left



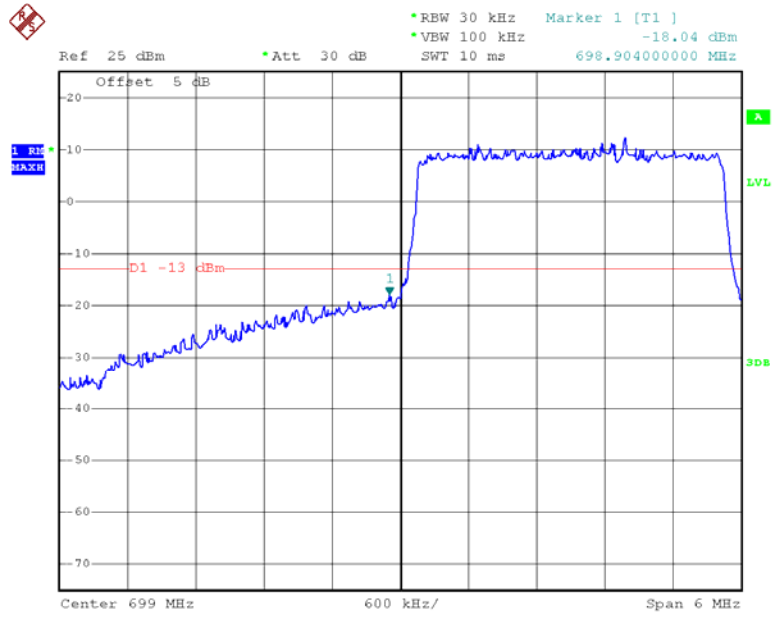
Date: 6.JUN.2018 11:01:40

### 16QAM\_1.4MHz\_6 RB\_ Right



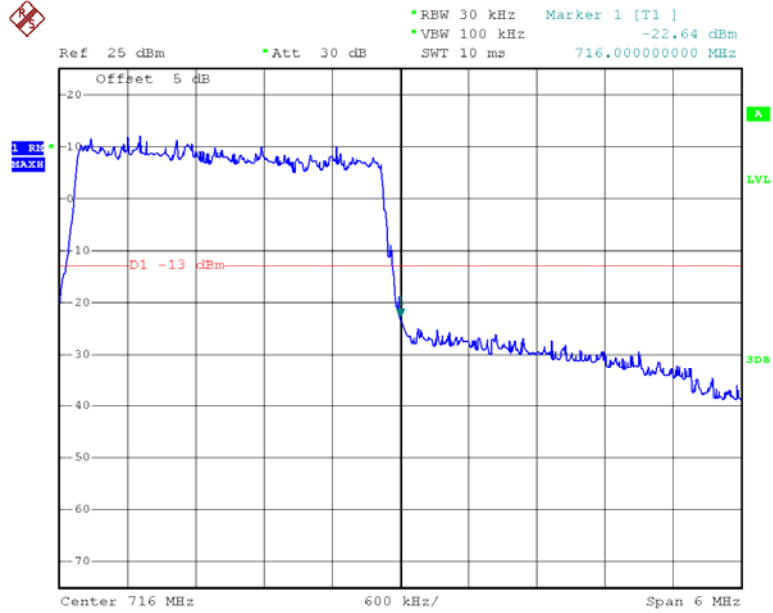
Date: 6.JUN.2018 11:02:45

### 16QAM\_3MHz\_15 RB\_Left



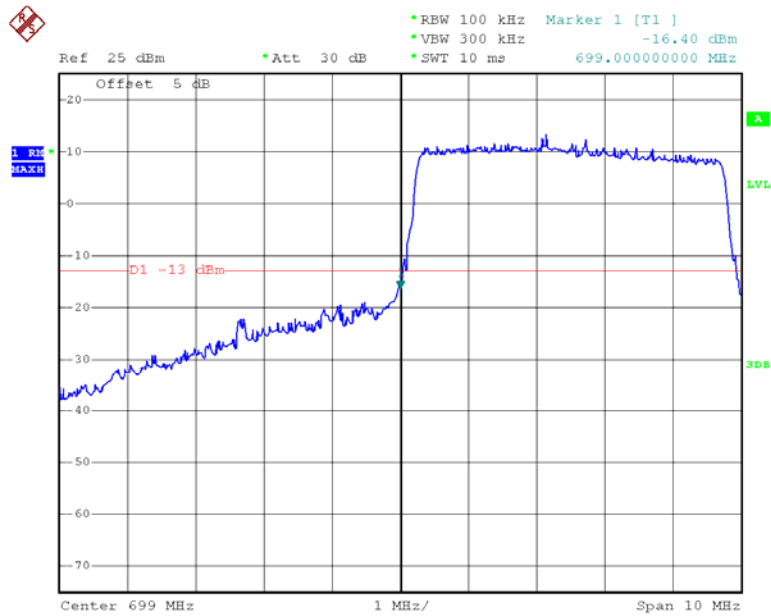
Date: 6.JUN.2018 11:08:04

### 16QAM\_3MHz\_15 RB\_Right



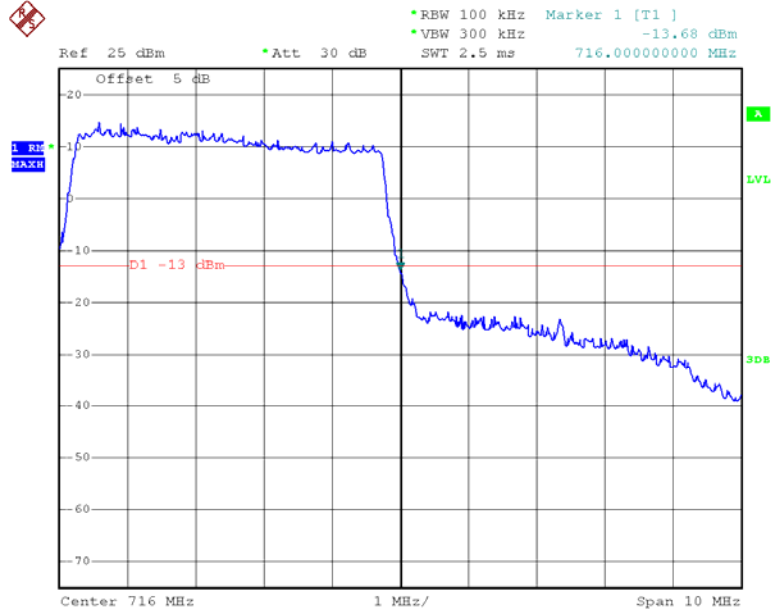
Date: 6.JUN.2018 11:06:47

### 16QAM\_5MHz\_25 RB\_Left



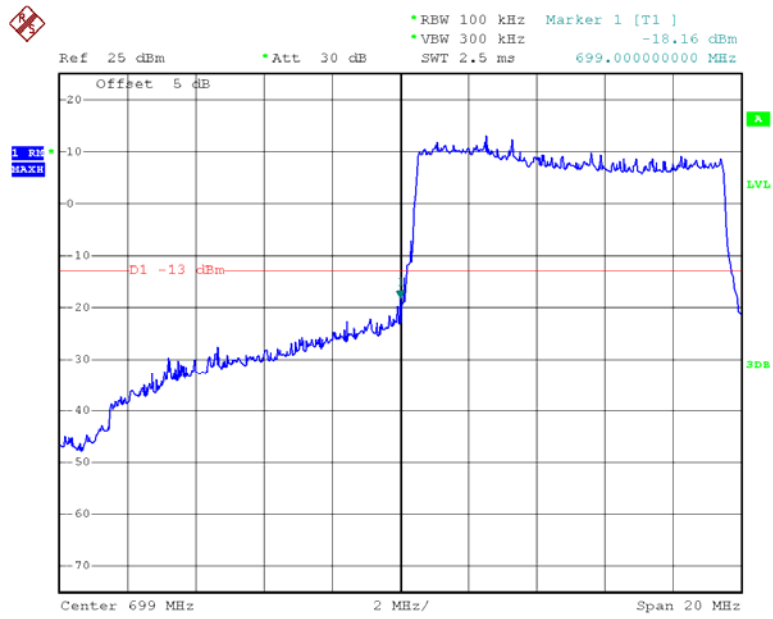
Date: 6.JUN.2018 11:10:20

### 16QAM\_5MHz\_25 RB\_Right



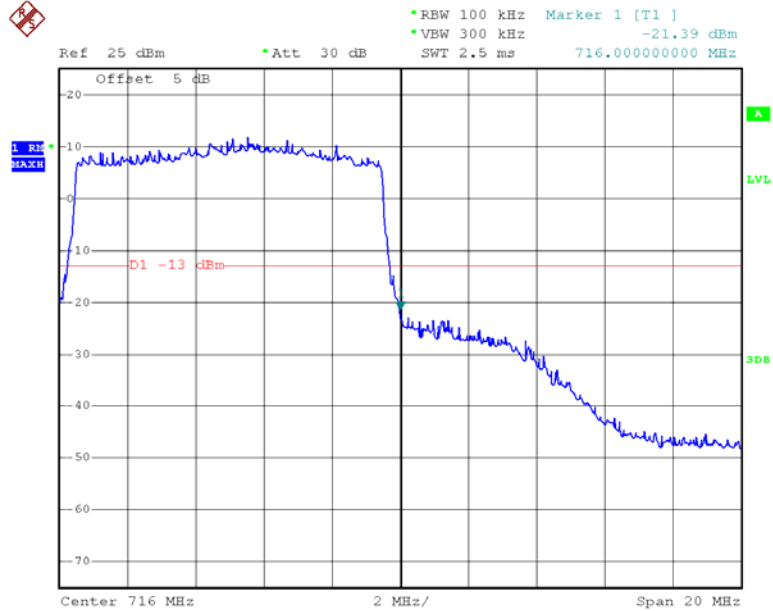
Date: 6.JUN.2018 11:12:28

### 16QAM\_10MHz\_50 RB\_Left



Date: 6.JUN.2018 11:18:59

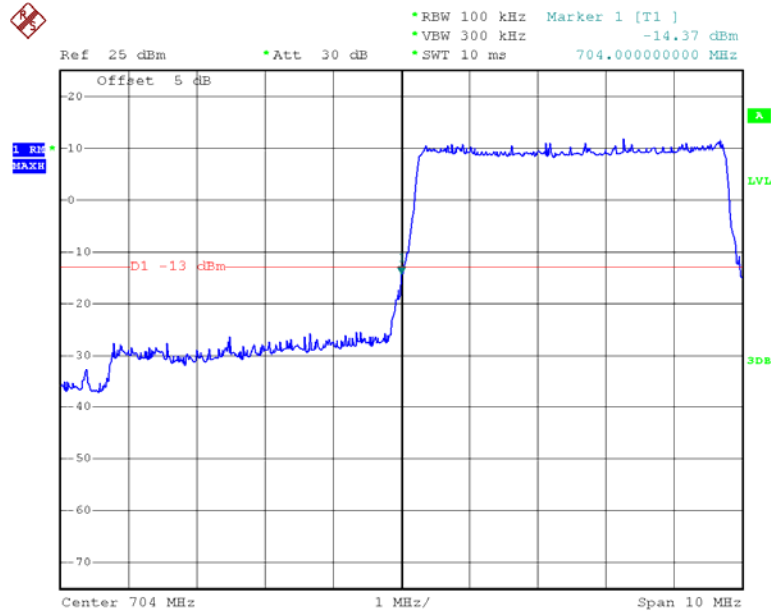
### 16QAM\_10MHz\_50 RB\_Right



Date: 6.JUN.2018 11:19:27

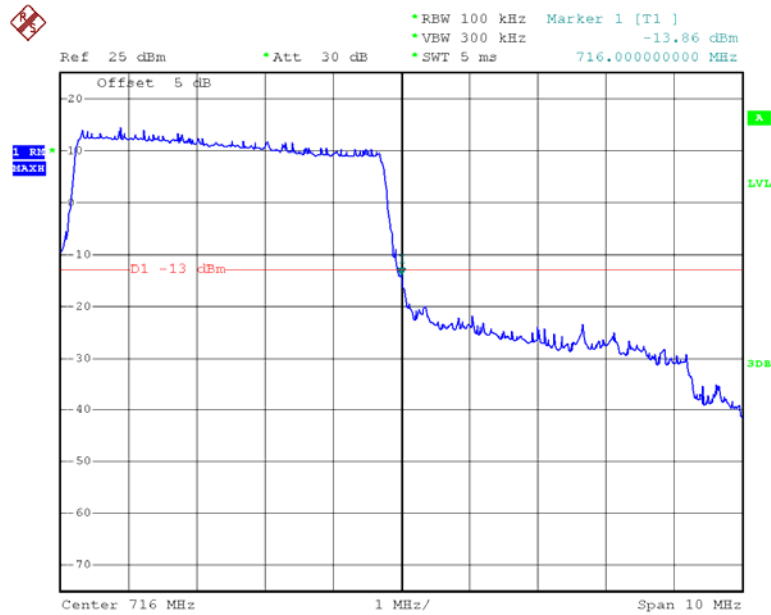
LTE Band 17

QPSK\_5MHz\_25 RB\_Left



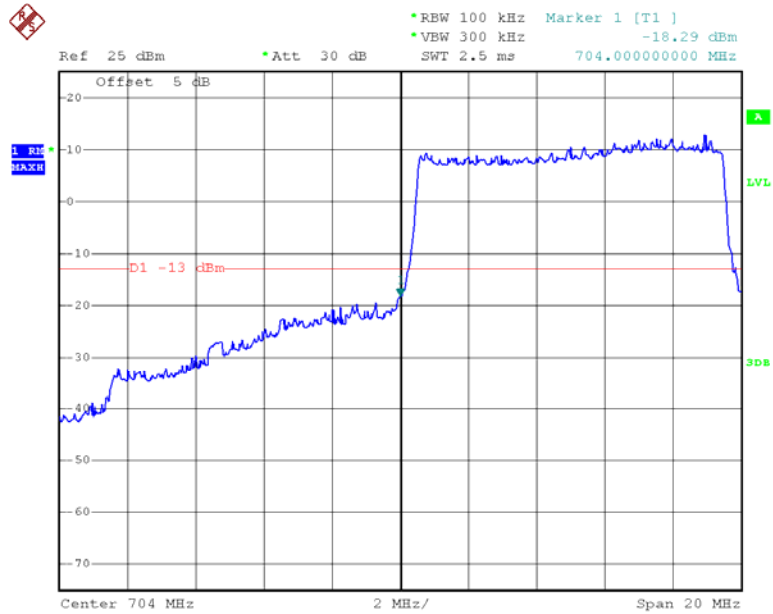
Date: 6.JUN.2018 11:26:18

QPSK\_5MHz\_25 RB\_Right



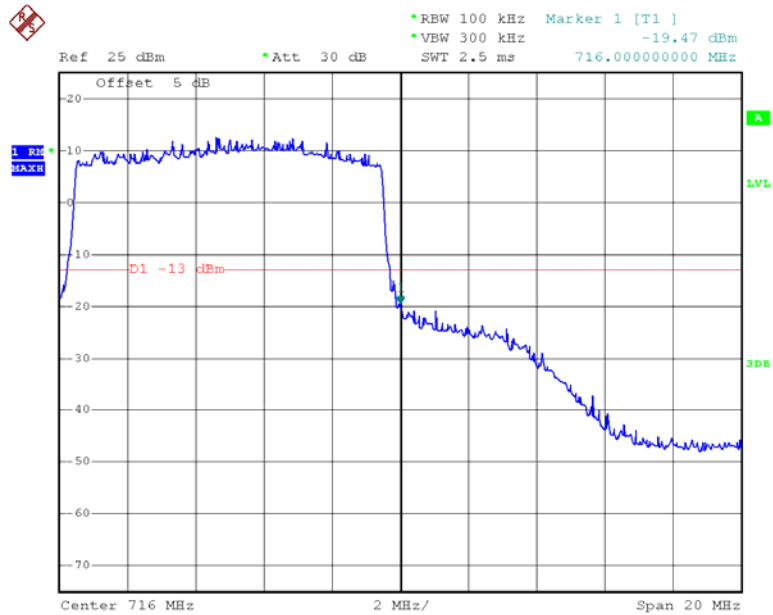
Date: 6.JUN.2018 11:24:04

### QPSK\_10MHz\_50 RB\_Left



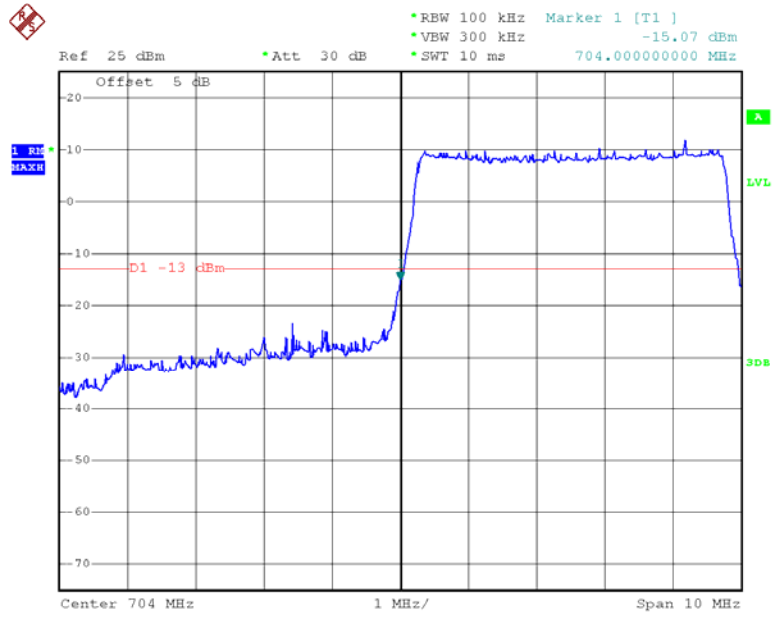
Date: 6.JUN.2018 11:21:35

### QPSK\_10MHz\_50 RB\_Right



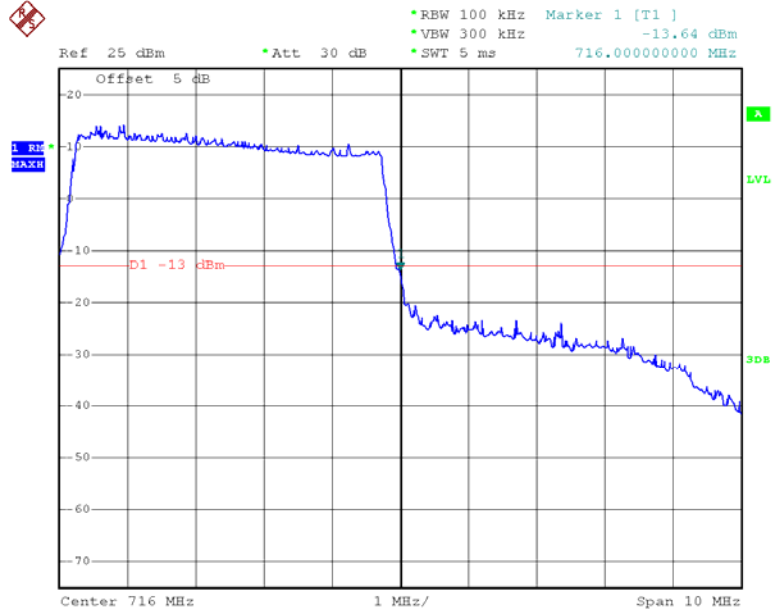
Date: 6.JUN.2018 11:23:08

### 16QAM\_5MHz\_25 RB\_Left



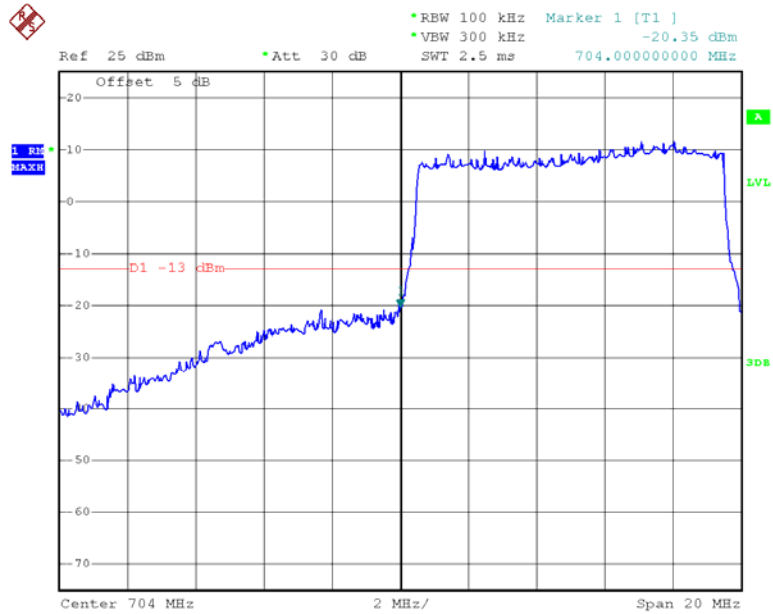
Date: 6.JUN.2018 11:25:56

### 16QAM\_5MHz\_25 RB\_Right



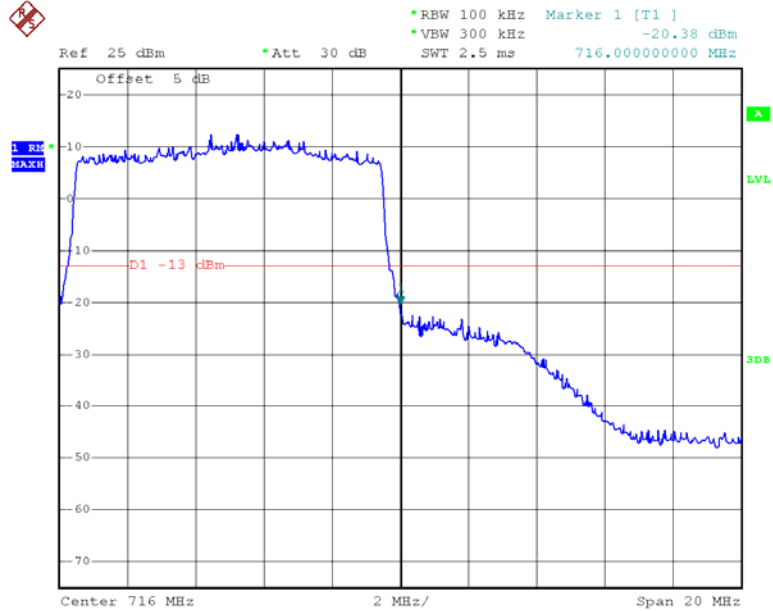
Date: 6.JUN.2018 11:24:40

### 16QAM\_10MHz\_50 RB\_Left



Date: 6.JUN.2018 11:22:00

### 16QAM\_10MHz\_50 RB\_Right



Date: 6.JUN.2018 11:22:43



**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

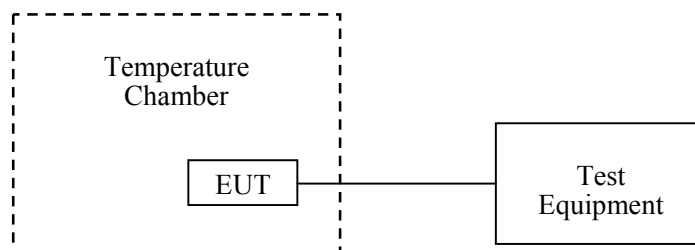
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

**Test Procedure**

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

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

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



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2017-09-10	2018-09-09
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
UNI-T	Multimeter	UT39A	M130199938	2018-04-02	2019-04-02
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pro instrument	DC Power Supply	pps3300	N/A	N/A	N/A

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

**Test Data****Environmental Conditions**

<b>Temperature:</b>	26.5 ~ 28.7 °C
<b>Relative Humidity:</b>	49 ~ 61 %
<b>ATM Pressure:</b>	101 ~ 101.9 kPa

*The testing was performed by Kami Zhou & Tiago Huang from 2018-06-06 to 2018-06-30.*

**Cellular Band (Part 22H)**

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	13	0.016	2.5
-20		-2	-0.002	
-10		10	0.012	
0		7	0.008	
10		5	0.006	
20		4	0.005	
30		6	0.007	
40		7	0.008	
50		14	0.017	
25		3.4	12	
25	4.2	6	0.007	

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	7	0.008	2.5
-20		4	0.005	
-10		4	0.005	
0		-2	-0.002	
10		11	0.013	
20		6	0.007	
30		14	0.017	
40		-2	-0.002	
50		2	0.002	
25		3.4	6	
25	4.2	5	0.006	

**PCS Band (Part 24E)**

<b>GMSK, Middle Channel, <math>f_c = 1880.0</math> MHz</b>				
<b>Temperature</b>	<b>Voltage</b>	<b>Frequency Error</b>	<b>Frequency Error</b>	<b>Results</b>
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>Hz</b>	<b>ppm</b>	
-30	3.7	18	0.010	Pass
-20		14	0.007	
-10		15	0.008	
0		6	0.003	
10		9	0.005	
20		10	0.005	
30		14	0.007	
40		12	0.006	
50		14	0.007	
25		3.4	17	
25	4.2	15	0.008	

<b>8PSK, Middle Channel, <math>f_c = 1880.0</math> MHz</b>				
<b>Temperature</b>	<b>Voltage</b>	<b>Frequency Error</b>	<b>Frequency Error</b>	<b>Results</b>
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>Hz</b>	<b>ppm</b>	
-30	3.7	14	0.007	Pass
-20		-1	-0.001	
-10		8	0.004	
0		14	0.007	
10		7	0.004	
20		14	0.007	
30		4	0.002	
40		2	0.001	
50		11	0.006	
25		3.4	12	
25	4.2	2	0.001	

**WCDMA Band II: R99**

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.7	-1	-0.001	Pass
-20		-10	-0.005	
-10		-9	-0.005	
0		4	0.002	
10		-11	-0.006	
20		-7	-0.004	
30		-1	-0.001	
40		-7	-0.004	
50		-11	-0.006	
25		3.4	-6	
25	4.2	-6	-0.003	

**WCDMA Band V: R99**

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	2	0.002	2.5
-20		2	0.002	
-10		-13	-0.016	
0		2	0.002	
10		-7	-0.008	
20		-13	-0.016	
30		-9	-0.011	
40		-3	-0.004	
50		-7	-0.008	
25		3.4	-10	
25	4.2	-4	-0.005	

**LTE Band 2:**

<b>QPSK, Channel Bandwidth:10MHz Middle Channel, <math>f_c = 1880</math> MHz</b>				
<b>Temperature</b>	<b>Voltage</b>	<b>Frequency Error</b>	<b>Frequency Error</b>	<b>Result</b>
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>Hz</b>	<b>ppm</b>	
-30	3.7	0.48	0.0003	Pass
-20		4.80	0.0026	
-10		3.60	0.0019	
0		-1.01	-0.0005	
10		-2.65	-0.0014	
20		1.32	0.0007	
30		4.10	0.0022	
40		8.25	0.0044	
50	-2.70	-0.0014		
25	3.4	-5.57	-0.0030	
25	4.2	-7.30	-0.0039	

<b>16QAM, Channel Bandwidth:10MHz Middle Channel, <math>f_c = 1880</math> MHz</b>				
<b>Temperature</b>	<b>Voltage</b>	<b>Frequency Error</b>	<b>Frequency Error</b>	<b>Result</b>
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>Hz</b>	<b>ppm</b>	
-30	3.7	2.60	0.0010	Pass
-20		-1.47	-0.0006	
-10		-2.80	-0.0011	
0		-4.40	-0.0017	
10		-6.71	-0.0026	
20		8.03	0.0032	
30		11.36	0.0045	
40		-9.37	-0.0037	
50	-5.29	-0.0021		
25	3.4	10.08	0.0040	
25	4.2	13.76	0.0054	

**LTE Band 4:**

<b>QPSK, Channel Bandwidth:10MHz</b>					
<b>Temperature</b>	<b>Voltage</b>	<b>Test Result (MHz)</b>		<b>Limit (MHz)</b>	
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>
-30	3.7	1710.480000	1754.530000	1710	1755
-20		1710.620000	1754.270000	1710	1755
-10		1710.460000	1754.670000	1710	1755
0		1710.380000	1754.860000	1710	1755
10		1710.520000	1754.520000	1710	1755
20		1710.480000	1754.480000	1710	1755
30		1710.750000	1754.610000	1710	1755
40		1710.250000	1754.380000	1710	1755
50		1710.370000	1754.750000	1710	1755
25		3.4	1710.460000	1754.690000	1710
25	4.2	1710.860000	1754.380000	1710	1755

<b>16QAM, Channel Bandwidth:10MHz</b>					
<b>Temperature</b>	<b>Voltage</b>	<b>Test Result (MHz)</b>		<b>Limit (MHz)</b>	
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>
-30	3.7	1710.380000	1754.680000	1710	1755
-20		1710.150000	1754.280000	1710	1755
-10		1710.340000	1754.760000	1710	1755
0		1710.460000	1754.280000	1710	1755
10		1710.520000	1754.480000	1710	1755
20		1710.380000	1754.870000	1710	1755
30		1710.460000	1754.680000	1710	1755
40		1710.670000	1754.380000	1710	1755
50		1710.380000	1754.760000	1710	1755
25		3.4	1710.470000	1754.670000	1710
25	4.2	1710.670000	1754.810000	1710	1755

**LTE Band 5:**

<b>QPSK, Channel Bandwidth:10MHz Middle Channel, <math>f_c = 836.5</math> MHz</b>				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	6.70	0.0026	2.5
-20		0.76	0.0003	
-10		5.80	0.0023	
0		3.00	0.0012	
10		-5.24	-0.0021	
20		-1.53	-0.0006	
30		1.84	0.0007	
40		-3.59	-0.0014	
50		-3.17	-0.0013	
25		3.4	7.48	
25	4.2	11.23	0.0044	

<b>16QAM, Channel Bandwidth:10MHz Middle Channel, <math>f_c = 836.5</math> MHz</b>				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.7	2.15	0.0008	2.5
-20		10.77	0.0042	
-10		-5.11	-0.0020	
0		-3.56	-0.0014	
10		14.73	0.0058	
20		-3.17	-0.0013	
30		1.37	0.0005	
40		1.86	0.0007	
50		-4.07	-0.0016	
25		3.4	-5.13	
25	4.2	-8.95	-0.0035	



**LTE Band 12:**

<b>QPSK, Channel Bandwidth:10MHz</b>					
<b>Temperature</b>	<b>Voltage</b>	<b>Test Result (MHz)</b>		<b>Limit (MHz)</b>	
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>
-30	3.7	699.580000	715.580000	699	716
-20		699.830000	715.520000	699	716
-10		699.620000	715.480000	699	716
0		699.450000	715.640000	699	716
10		699.520000	715.440000	699	716
20		699.750000	715.380000	699	716
30		699.480000	715.420000	699	716
40		699.750000	715.580000	699	716
50		699.710000	715.470000	699	716
25		3.4	699.580000	715.670000	699
25	4.2	699.460000	715.550000	699	716

<b>16QAM, Channel Bandwidth:10MHz</b>					
<b>Temperature</b>	<b>Voltage</b>	<b>Test Result (MHz)</b>		<b>Limit (MHz)</b>	
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>
-30	3.7	699.630000	715.570000	699	716
-20		699.580000	715.470000	699	716
-10		699.480000	715.620000	699	716
0		699.750000	715.380000	699	716
10		699.520000	715.440000	699	716
20		699.560000	715.680000	699	716
30		699.480000	715.460000	699	716
40		699.380000	715.680000	699	716
50		699.740000	715.280000	699	716
25		3.4	699.840000	715.780000	699
25	4.2	699.610000	715.640000	699	716

**LTE Band 17:**

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V <sub>DC</sub>	F <sub>L</sub>	F <sub>H</sub>	F <sub>L</sub>	F <sub>H</sub>
-30	3.7	704.530000	715.470000	704	716
-20		704.550000	715.410000	704	716
-10		704.560000	715.510000	704	716
0		704.580000	715.550000	704	716
10		704.520000	715.440000	704	716
20		704.640000	715.580000	704	716
30		704.620000	715.540000	704	716
40		704.690000	715.480000	704	716
50		704.570000	715.530000	704	716
25		3.4	704.580000	715.510000	704
25	4.2	704.640000	715.570000	704	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V <sub>DC</sub>	F <sub>L</sub>	F <sub>H</sub>	F <sub>L</sub>	F <sub>H</sub>
-30	3.7	704.550000	715.520000	704	716
-20		704.580000	715.480000	704	716
-10		704.620000	715.420000	704	716
0		704.670000	715.590000	704	716
10		704.520000	715.480000	704	716
20		704.580000	715.630000	704	716
30		704.520000	715.420000	704	716
40		704.640000	715.380000	704	716
50		704.530000	715.450000	704	716
25		3.4	704.680000	715.520000	704
25	4.2	704.620000	715.480000	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 \*\*\*\*\***