



TESTING LABORATORY
CERTIFICATE #4820.01



FCC PART 22H, PART 24E
FCC PART 27
MEASUREMENT AND TEST REPORT

For

Quanzhou YANTON Electronics Co., Ltd.

YANTON Building, Jinxia Road , Xiamei Town, Nan'an, China

FCC ID: SV8T-X8PLUS

Report Type: Original Report	Product Type: POC Radio
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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		POC Radio
EUT Model:		T-X8PLUS
FCC ID:		SV8T-X8PLUS
Rated Input Voltage:		DC 3.7V from battery or DC5V form adapter
Adapter Information 1	Model:	CG-Q0510
	Input:	AC 100-240V, 50/60Hz
	Output:	DC 5V
External Dimension:		98mm(L)*58 mm(W)* 35mm(H)
Serial Number:		180713055
EUT Received Date:		2018.7.15

Objective

This report is prepared on behalf of **Quanzhou YANTON Electronics Co., Ltd.** 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)

N/A

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.

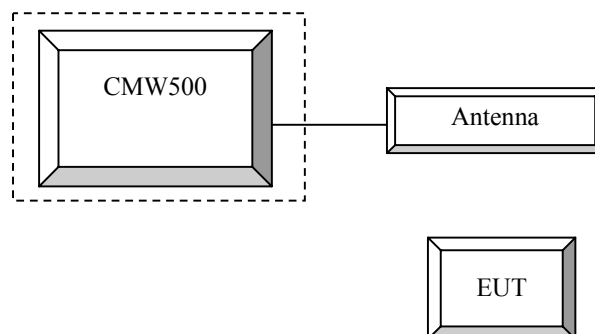
Equipment Modifications

No modification was made to the EUT.

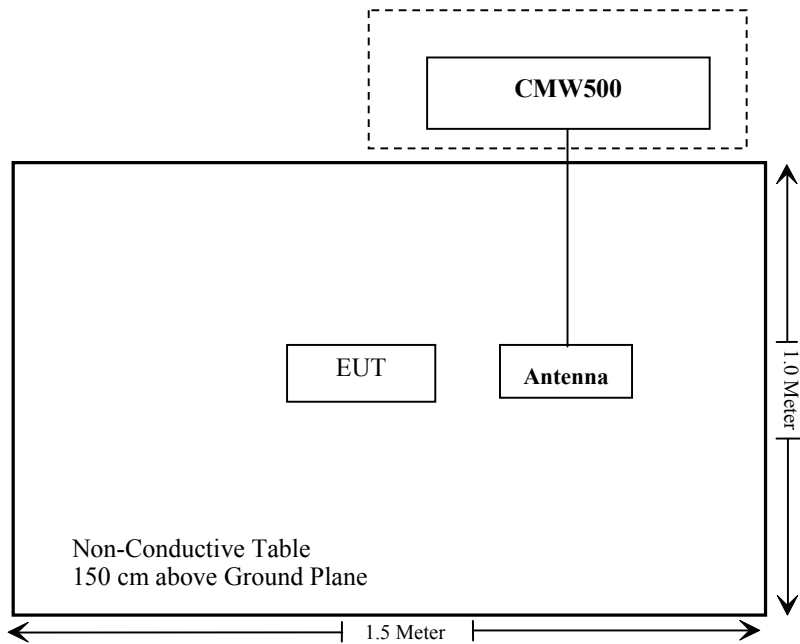
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Wideband Radio Communication Tester	CMW500	149216
N/A	ANTENNA	N/A	N/A

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310, §2.1093	RF Exposure	Compliance
§2.1046; § 22.913 (a); § 24.232 (c); §27.50	RF Output Power	Compliance
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53	Spurious Emissions at Antenna Terminal	Compliance
§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
§ 22.917 (a); § 24.238 (a); §27.53	Out of band emission, Band Edge	Compliance
§ 2.1055 § 22.355; § 24.235; §27.54	Frequency stability vs. temperature Frequency stability vs. voltage	Compliance

FCC §1.1310 & §2.1093- RF EXPOSURE

Applicable Standard

FCC§1.1310 and §2.1093.

Test Result

Compliant, please refer to the SAR report: RXM180713055-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

Applicable Standard

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

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

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

According to §27.50

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

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

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

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

Test Procedure

GSM/GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900

Press Connection control to choose the different menus

Press RESET > choose all the reset all settings

Connection Press Signal Off to turn off the signal and change settings

Network Support > GSM + GPRS or GSM + EGSM

Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off

MS Signal Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850

> 30 dBm for GPRS 1900

> 27 dBm for EGPRS 850

> 26 dBm for EGPRS 1900

BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

BCCH Level > -85 dBm (May need to adjust if link is not stable)

BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off

P0 > 4 dB

Slot Config > Unchanged (if already set under MS signal)

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3

Network Coding Scheme > CS4 (GPRS) and MCS5 (EGPRS)

Bit Stream > 2E9-1 PSR Bit Stream

AF/Rf Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input

Connection Press Signal on to turn on the signal and change settings

WCDMA-Release 99

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

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

WCDMA HSDPA

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c / β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

WCDMA HSUPA

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

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

HSPA+

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

Sub-test	β_c (Note 3)	β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

DC-HSDPA

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

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

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

LTE (FDD):

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

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

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

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

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

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

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

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

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

Radiated method:

ANSI/TIA-603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	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-NJNJ-50	C-0200-02	2017-09-05	2018-09-05
R&S	Wideband Radio Communication Tester	CMW500	149216	2017-12-11	2018-12-11
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
Agilent	Signal Generator	E8247C	MY43321350	2017-12-11	2018-12-11
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2017-09-05	2018-09-05

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

Test Data**Environmental Conditions**

Temperature:	26.7~27.5°C
Relative Humidity:	45~58 %
ATM Pressure:	99.6 kPa

* The testing was performed by Vern Shen & Blake Yang on 2018-08-22.

Conducted Output Power**WCDMA Band II**

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	21.11	3.32	20.91	3.20	21.00	3.08
HSDPA	1	19.86	3.80	19.73	3.72	19.80	4.04
	2	19.76	3.74	19.64	3.68	19.54	4.01
	3	19.59	3.78	19.53	3.66	19.46	4.00
	4	19.22	3.77	19.23	3.71	19.24	3.99
HSUPA	1	19.68	3.68	19.35	3.60	19.32	3.92
	2	19.53	3.65	19.22	3.55	19.14	3.87
	3	19.47	3.61	19.11	3.52	19.03	3.85
	4	19.36	3.62	19.05	3.51	18.96	3.89
	5	19.25	3.64	18.89	3.58	18.85	3.90

WCDMA Band V

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.52	2.76	22.40	2.76	22.45	3.12
HSDPA	1	21.46	3.72	21.22	3.32	21.41	4.24
	2	21.23	3.71	21.14	3.36	21.22	4.21
	3	21.14	3.74	21.05	3.34	21.09	4.19
	4	21.05	3.77	20.95	3.29	20.89	4.23
HSUPA	1	21.40	3.20	21.31	3.24	21.38	3.92
	2	21.23	3.17	21.13	3.21	21.17	3.88
	3	21.07	3.14	20.96	3.19	20.94	3.84
	4	20.96	3.19	20.75	3.14	20.77	3.91
	5	20.83	3.16	20.56	3.16	20.53	3.89

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	20.66	20.61	20.48
		1#3	20.73	20.55	20.59
		1#5	20.77	20.56	20.55
		3#0	20.58	20.60	20.40
		3#3	20.57	20.50	20.25
		6#0	19.70	19.60	19.46
	16QAM	1#0	19.58	19.69	19.53
		1#3	19.92	19.83	19.70
		1#5	19.80	19.66	19.50
		3#0	18.78	18.63	18.57
		3#3	18.68	18.75	18.64
		6#0	18.79	18.61	18.51
3MHz	QPSK	1#0	20.51	20.82	20.54
		1#8	20.65	20.60	20.39
		1#14	20.67	20.64	20.36
		6#0	19.61	19.61	20.86
		6#9	19.66	19.63	19.50
		15#0	19.63	19.60	19.54
	16QAM	1#0	19.96	20.06	20.20
		1#8	19.78	19.94	19.57
		1#14	19.74	19.76	19.74
		6#0	18.65	18.98	18.57
		6#9	18.54	18.93	18.55
		15#0	18.61	18.89	18.72
5MHz	QPSK	1#0	20.60	20.63	20.50
		1#13	20.67	20.58	20.58
		1#24	20.77	20.47	20.50
		15#0	20.67	20.61	20.33
		15#10	20.52	20.43	20.21
		25#0	19.70	19.59	19.46
	16QAM	1#0	19.59	19.74	19.55
		1#13	19.84	19.85	19.62
		1#24	19.79	19.65	19.59
		15#0	18.43	18.57	18.66
		15#10	18.61	18.81	18.55
		25#0	18.77	18.69	18.41

10MHz	QPSK	1#0	20.62	20.67	20.48
		1#25	20.63	20.47	20.68
		1#49	20.78	20.51	20.47
		25#0	20.52	20.56	20.50
		25#25	20.53	20.54	20.16
		50#0	19.68	19.52	19.42
	16QAM	1#0	19.56	19.64	19.58
		1#25	19.87	19.88	19.61
		1#49	19.85	19.64	19.49
		25#0	18.55	18.67	18.50
		25#25	18.49	18.83	18.56
		50#0	18.72	18.67	18.54
15MHz	QPSK	1#0	20.61	20.62	20.44
		1#38	20.68	20.64	20.66
		1#74	20.81	20.47	20.64
		36#0	20.52	20.54	20.48
		36#39	20.62	20.43	20.30
		75#0	19.78	19.61	19.42
	16QAM	1#0	19.53	19.72	19.47
		1#38	19.91	19.78	19.71
		1#74	19.76	19.56	19.57
		36#0	18.51	18.63	18.48
		36#39	18.64	18.70	18.71
		75#0	18.74	18.59	18.52
20MHz	QPSK	1#0	20.71	20.70	20.49
		1#50	20.64	20.53	20.50
		1#99	20.72	20.56	20.52
		50#0	20.58	20.51	20.37
		50#50	20.56	20.50	20.22
		100#0	19.78	19.64	19.41
	16QAM	1#0	19.65	19.66	19.57
		1#50	19.98	19.81	19.66
		1#99	19.87	19.61	19.53
		50#0	18.52	18.57	18.56
		50#50	19.00	18.74	18.59
		100#0	18.79	18.59	18.57

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	21.36	20.98	20.76
		1#3	21.37	20.93	20.74
		1#5	21.36	20.99	20.72
		3#0	21.09	20.89	20.64
		3#3	21.31	20.86	20.61
		6#0	20.17	20.03	19.86
	16QAM	1#0	20.58	20.12	19.92
		1#3	20.46	20.15	19.89
		1#5	20.34	20.10	19.84
		3#0	19.64	19.18	18.89
		3#3	19.48	19.16	18.84
		6#0	19.42	19.09	18.81
3MHz	QPSK	1#0	21.29	20.98	20.83
		1#8	21.39	20.97	20.69
		1#14	21.44	20.99	20.78
		6#0	21.01	20.79	20.56
		6#7	21.39	20.92	20.64
		15#0	20.25	20.04	19.77
	16QAM	1#0	20.59	20.05	19.82
		1#8	20.38	20.24	19.93
		1#14	20.36	20.15	19.75
		6#0	19.70	19.19	18.92
		6#7	19.48	19.21	18.82
		15#0	19.37	19.07	18.85
5MHz	QPSK	1#0	21.37	21.01	20.81
		1#13	21.34	20.88	20.79
		1#24	21.37	20.95	20.66
		15#0	21.08	20.94	20.64
		15#10	21.25	20.87	20.66
		25#0	20.15	20.09	19.89
	16QAM	1#0	20.52	20.10	19.93
		1#13	20.48	20.20	19.95
		1#24	20.38	20.13	19.89
		15#0	19.73	19.23	18.83
		15#10	19.50	19.18	18.87
		25#0	19.41	19.08	18.85

10MHz	QPSK	1#0	21.46	20.92	20.83
		1#24	21.37	20.99	20.68
		1#49	21.28	20.93	20.63
		25#0	21.17	20.83	20.67
		25#25	21.28	20.88	20.67
		50#0	20.22	19.94	19.86
	16QAM	1#0	20.54	20.09	19.89
		1#24	20.42	20.12	19.90
		1#49	20.33	20.11	19.90
		25#0	19.73	19.09	18.88
		25#25	19.43	19.26	18.90
		50#0	19.33	19.14	18.86
15MHz	QPSK	1#0	21.42	21.08	20.69
		1#38	21.44	20.86	20.73
		1#74	21.34	20.97	20.77
		36#0	21.01	20.82	20.58
		36#39	21.26	20.83	20.69
		75#0	20.19	19.95	19.85
	16QAM	1#0	20.48	20.09	19.83
		1#38	20.45	20.10	19.86
		1#74	20.32	20.09	19.89
		36#0	19.67	19.18	18.98
		36#39	19.43	19.10	18.77
		75#0	19.44	19.10	18.74
20MHz	QPSK	1#0	21.31	21.06	20.76
		1#49	21.45	20.98	20.78
		1#99	21.30	20.94	20.81
		50#0	21.18	20.80	20.68
		50#50	21.26	20.81	20.68
		100#0	20.11	20.04	19.78
	16QAM	1#0	20.54	20.06	19.99
		1#49	20.42	20.17	19.86
		1#99	20.36	20.14	19.76
		50#0	19.56	19.25	18.81
		50#50	19.50	19.10	18.93
		100#0	19.36	19.02	18.80

LTE Band 12

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.96	23.12	23.18
		1#3	22.91	23.08	23.15
		1#5	22.89	23.04	23.11
		3#0	22.84	22.99	23.02
		3#3	22.81	22.89	22.94
		6#0	21.99	22.18	22.21
	16QAM	1#0	22.04	22.29	22.32
		1#3	22.06	22.16	22.28
		1#5	21.98	22.14	22.26
		3#0	21.75	22.01	22.18
		3#3	21.79	21.98	22.09
		6#0	21.09	21.26	21.35
3MHz	QPSK	1#0	23.04	23.17	23.13
		1#8	22.90	23.01	23.25
		1#14	22.96	23.08	23.21
		10#0	22.82	22.98	22.93
		10#5	22.85	22.90	23.04
		15#0	22.08	22.25	22.24
	16QAM	1#0	22.02	22.21	22.38
		1#8	22.04	22.17	22.25
		1#14	21.97	22.20	22.25
		10#0	21.85	22.00	22.11
		10#5	21.81	22.05	21.99
		15#0	21.04	21.21	21.29
5MHz	QPSK	1#0	22.96	23.16	23.27
		1#13	22.84	23.06	23.16
		1#24	22.86	23.13	23.05
		10#0	22.75	22.90	23.08
		10#15	22.85	22.85	23.03
		25#0	21.97	22.23	22.20
	16QAM	1#0	22.02	22.33	22.28
		1#13	22.07	22.10	22.37
		1#24	21.89	22.22	22.24
		10#0	21.66	22.08	22.16
		10#15	21.80	22.01	22.00
		25#0	21.06	21.20	21.35
10MHz	QPSK	1#0	23.04	23.21	23.27
		1#25	22.92	23.11	23.14
		1#49	22.93	23.08	23.17
		25#0	22.89	23.00	22.97
		25#25	22.73	22.80	22.89
		50#0	21.96	22.14	22.13
	16QAM	1#0	21.96	22.30	22.32
		1#25	22.02	22.23	22.27
		1#49	21.95	22.24	22.28
		25#0	21.75	22.04	22.24
		25#25	21.83	21.94	22.07
		50#0	21.17	21.29	21.26

PAR, Band 2

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.52	4.13	4.42	13
	100 RB		5.22	5.16	5.29	13
16QAM	1 RB	20 MHz	5.22	4.62	5.32	13
	100 RB		6.15	6.03	6.12	13

PAR, Band 4

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.36	4.39	4.23	13
	100 RB		6.38	6.41	6.38	13
16QAM	1 RB	20 MHz	5.29	5.06	5.26	13
	100 RB		7.15	7.18	7.02	13

PAR, Band 12

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.42	4.20	4.26	13
	50 RB		4.94	4.94	5.71	13
16QAM	1 RB	10 MHz	5.48	4.97	5.13	13
	50 RB		6.12	5.96	6.51	13

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

ERP & EIRP**WCDMA:**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band 2 Middle Channel								
1880.00	H	88.58	15.97	11.66	2.66	24.97	33.00	8.03
1880.00	V	91.46	18.99	11.66	2.66	27.99	33.00	5.01
WCDMA Band 5 Middle Channel								
836.60	H	90.32	15.40	0.00	0.97	14.43	38.45	24.02
836.60	V	95.88	24.09	0.00	0.97	23.12	38.45	15.33

LTE Band 2 Middle Channel (1880 MHz):

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1880.000	1.4	QPSK	H	88.57	16	11.7	2.7	25.0	33.00	8.0
1880.000			V	91.23	18.8	11.7	2.7	27.8	33.00	5.2
1880.000	3		H	88.46	15.9	11.7	2.7	24.9	33.00	8.1
1880.000			V	90.93	18.5	11.7	2.7	27.5	33.00	5.5
1880.000	5		H	88.37	15.8	11.7	2.7	24.8	33.00	8.2
1880.000			V	91.13	18.7	11.7	2.7	27.7	33.00	5.3
1880.000	10		H	89.01	16.4	11.7	2.7	25.4	33.00	7.6
1880.000			V	91.02	18.6	11.7	2.7	27.6	33.00	5.4
1880.000	15		H	87.54	14.9	11.7	2.7	23.9	33.00	9.1
1880.000			V	90.89	18.4	11.7	2.7	27.4	33.00	5.6
1880.000	20		H	88.13	15.5	11.7	2.7	24.5	33.00	8.5
1880.000			V	90.86	18.4	11.7	2.7	27.4	33.00	5.6
1880.000	1.4	16QAM	H	88.31	15.7	11.7	2.7	24.7	33.00	8.3
1880.000			V	91.04	18.6	11.7	2.7	27.6	33.00	5.4
1880.000	3		H	88.27	15.7	11.7	2.7	24.7	33.00	8.3
1880.000			V	90.84	18.4	11.7	2.7	27.4	33.00	5.6
1880.000	5		H	87.91	15.3	11.7	2.7	24.3	33.00	8.7
1880.000			V	90.88	18.4	11.7	2.7	27.4	33.00	5.6
1880.000	10		H	87.73	15.1	11.7	2.7	24.1	33.00	8.9
1880.000			V	90.67	18.2	11.7	2.7	27.2	33.00	5.8
1880.000	15		H	87.61	15	11.7	2.7	24.0	33.00	9.0
1880.000			V	90.54	18.1	11.7	2.7	27.1	33.00	5.9
1880.000	20		H	87.60	15	11.7	2.7	24.0	33.00	9.0
1880.000			V	90.49	18	11.7	2.7	27.0	33.00	6.0

LTE Band 4 Middle Channel (1732.5MHz):

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1732.500	1.4	QPSK	H	88.85	14.8	10.9	2.5	23.2	30.00	6.8
1732.500			V	90.89	16.5	10.9	2.5	24.9	30.00	5.1
1732.500	3		H	88.62	14.6	10.9	2.5	23.0	30.00	7.0
1732.500			V	90.81	16.4	10.9	2.5	24.8	30.00	5.2
1732.500	5		H	88.46	14.4	10.9	2.5	22.8	30.00	7.2
1732.500			V	90.64	16.3	10.9	2.5	24.7	30.00	5.3
1732.500	10		H	88.12	14.1	10.9	2.5	22.5	30.00	7.5
1732.500			V	90.53	16.2	10.9	2.5	24.6	30.00	5.4
1732.500	15		H	87.58	13.5	10.9	2.5	21.9	30.00	8.1
1732.500			V	89.67	15.3	10.9	2.5	23.7	30.00	6.3
1732.500	20		H	87.85	13.8	10.9	2.5	22.2	30.00	7.8
1732.500			V	89.33	15	10.9	2.5	23.4	30.00	6.6
1732.500	1.4	16QAM	H	88.36	14.3	10.9	2.5	22.7	30.00	7.3
1732.500			V	90.51	16.1	10.9	2.5	24.5	30.00	5.5
1732.500	3		H	88.30	14.2	10.9	2.5	22.6	30.00	7.4
1732.500			V	90.44	16.1	10.9	2.5	24.5	30.00	5.5
1732.500	5		H	88.26	14.2	10.9	2.5	22.6	30.00	7.4
1732.500			V	90.32	16	10.9	2.5	24.4	30.00	5.6
1732.500	10		H	88.17	14.1	10.9	2.5	22.5	30.00	7.5
1732.500			V	90.09	15.7	10.9	2.5	24.1	30.00	5.9
1732.500	15		H	87.96	13.9	10.9	2.5	22.3	30.00	7.7
1732.500			V	89.71	15.3	10.9	2.5	23.7	30.00	6.3
1732.500	20		H	87.84	13.8	10.9	2.5	22.2	30.00	7.8
1732.500			V	89.64	15.3	10.9	2.5	23.7	30.00	6.3

LTE Band 12 Middle Channel (707.5MHz):

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
707.500	1.4	QPSK	H	83.54	6.7	0.0	0.9	5.8	34.77	28.97
707.500			V	96.21	21.8	0.0	0.9	20.9	34.77	13.87
707.500	3		H	84.52	7.7	0.0	0.9	6.8	34.77	27.97
707.500			V	96.24	21.8	0.0	0.9	20.9	34.77	13.87
707.500	5		H	82.37	5.5	0.0	0.9	4.6	34.77	30.17
707.500			V	96.19	21.8	0.0	0.9	20.9	34.77	13.87
707.500	10		H	81.90	5	0.0	0.9	4.1	34.77	30.67
707.500			V	94.99	20.6	0.0	0.9	19.7	34.77	15.07
707.500	1.4	16QAM	H	84.85	8	0.0	0.9	7.1	34.77	27.67
707.500			V	96.18	21.8	0.0	0.9	20.9	34.77	13.87
707.500	3		H	84.58	7.7	0.0	0.9	6.8	34.77	27.97
707.500			V	96.25	21.8	0.0	0.9	20.9	34.77	13.87
707.500	5		H	83.10	6.2	0.0	0.9	5.3	34.77	29.47
707.500			V	96.20	21.8	0.0	0.9	20.9	34.77	13.87
707.500	10		H	81.95	5.1	0.0	0.9	4.2	34.77	30.57
707.500			V	95.45	21	0.0	0.9	20.1	34.77	14.67

Note:

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

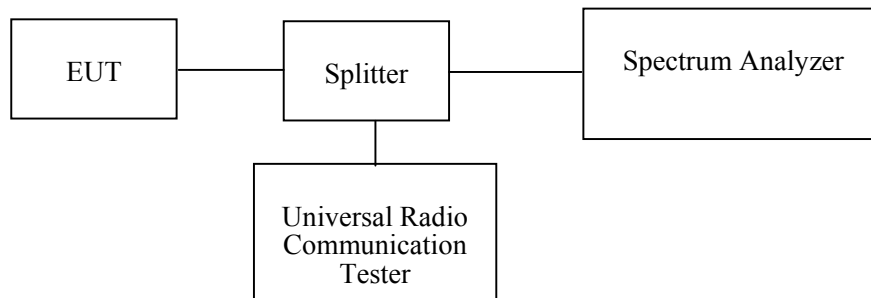
FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53- OCCUPIED BANDWIDTH**Applicable Standard**

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

Test Procedure

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

The 26 dB & 99% bandwidth was recorded.

**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
R&S	Wideband Radio Communication Tester	CMW500	149216	2017-12-11	2018-12-11
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**

Temperature:	26.6~27.1°C
Relative Humidity:	55~58 %
ATM Pressure:	100.4~100.6 kPa

The testing was performed by Nami Quan from 2018-09-13 to 2018-09-15.

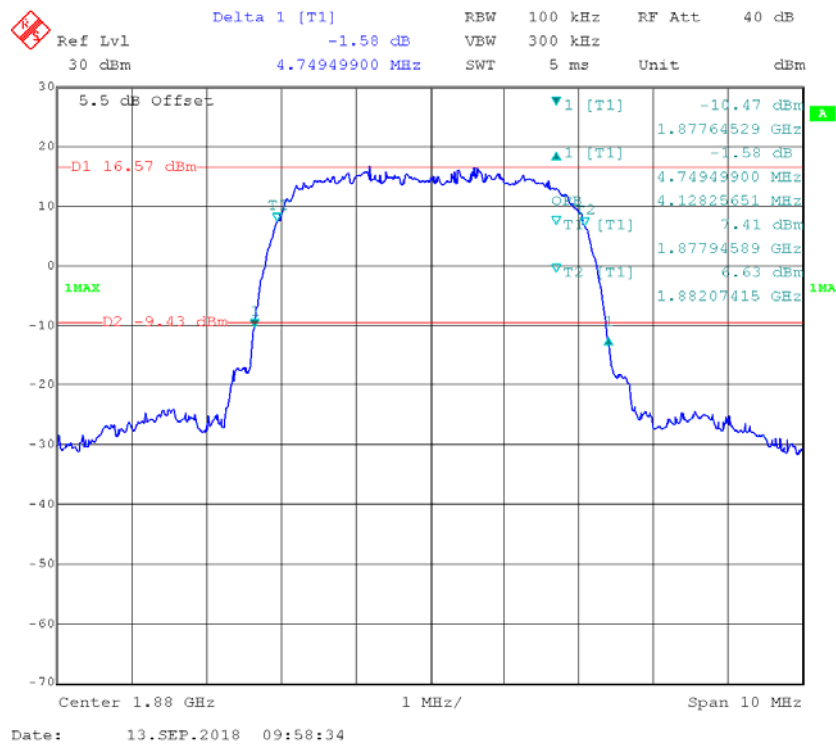
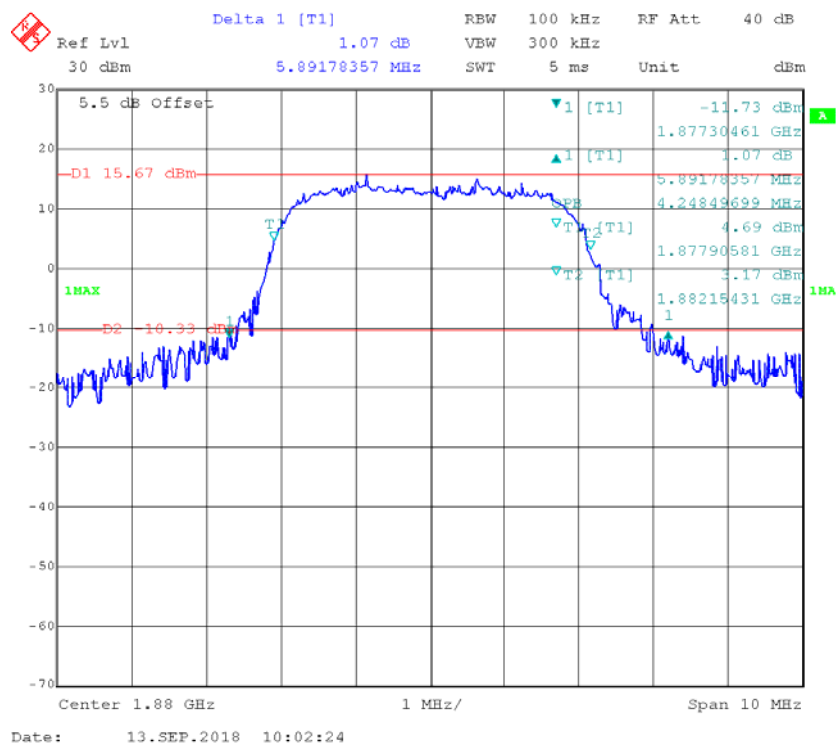
Test Mode: Transmitting

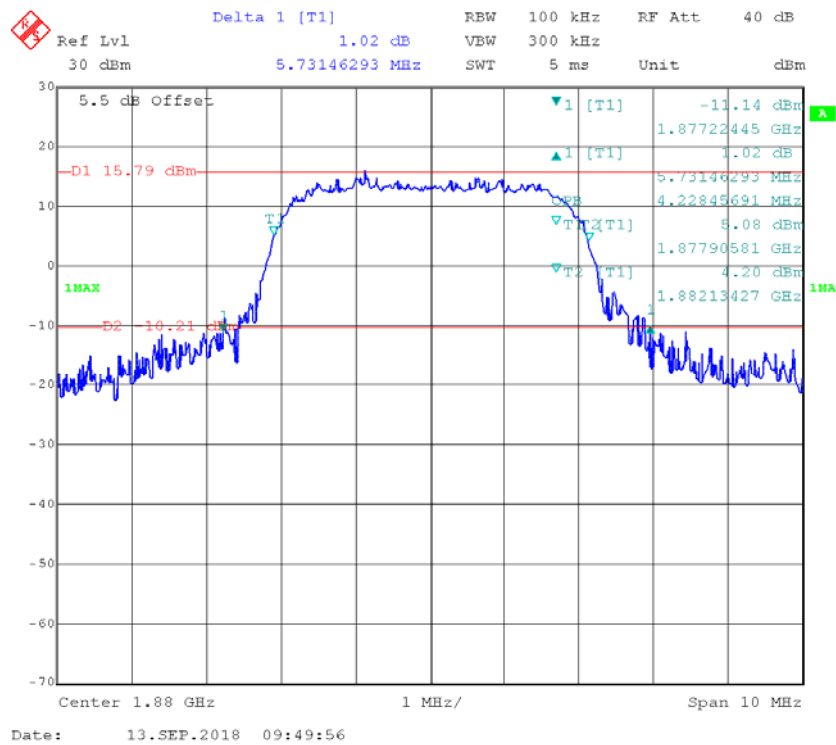
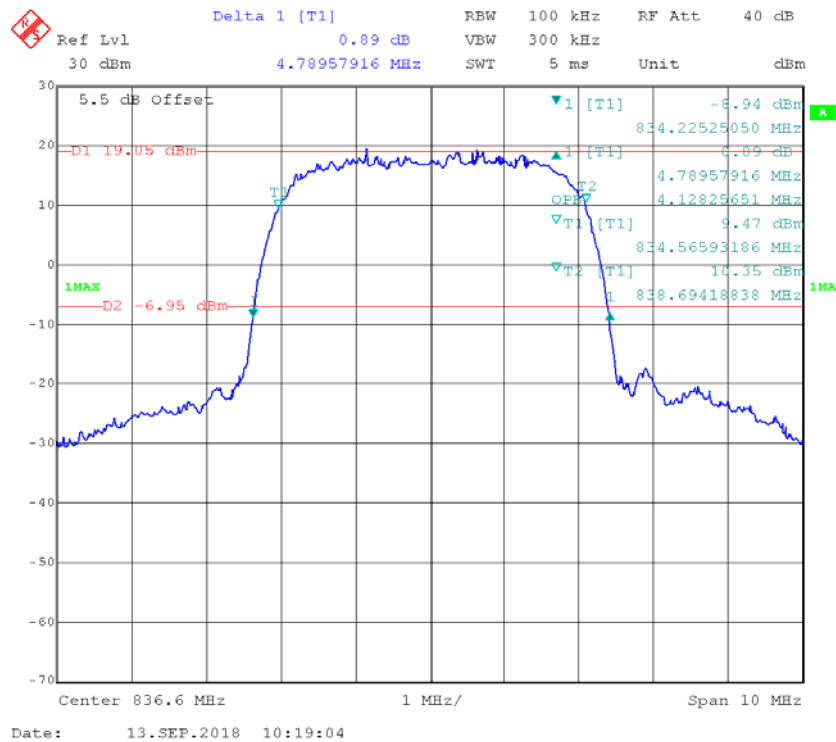
Test Result: Compliant. Please refer to the following table and plots.

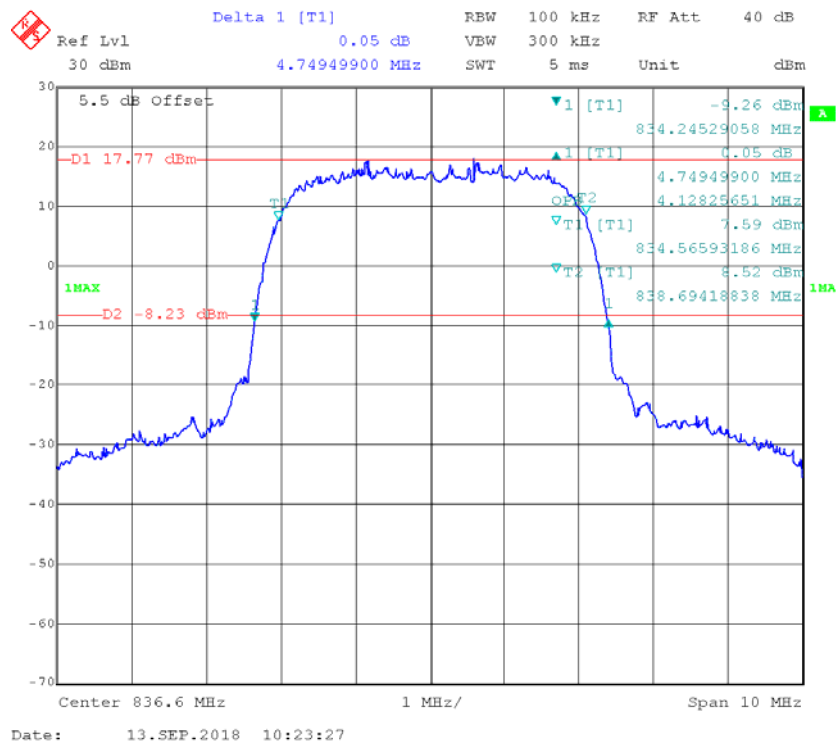
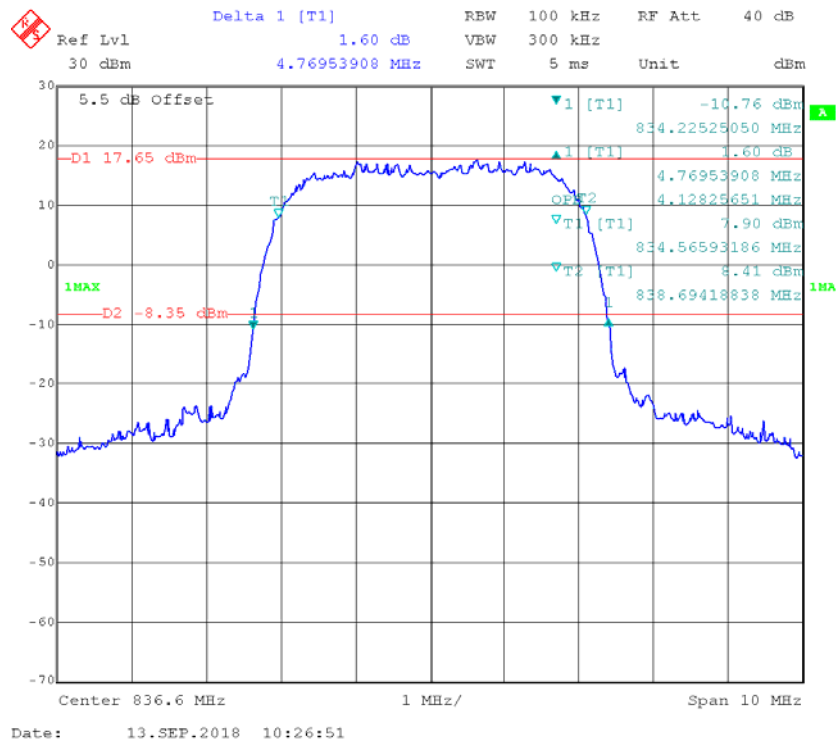
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
WCDMA Band II	M	Rel 99	4.13	4.75
		HSDPA	4.23	5.73
		HSUPA	4.25	5.89
WCDMA Band V		Rel 99	4.13	4.79
		HSDPA	4.13	4.77
		HSUPA	4.13	4.75

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.11	1.31
		16QAM	1.11	1.32
	3 MHz	QPSK	2.74	3.05
		16QAM	2.76	3.08
	5 MHz	QPSK	4.50	4.98
		16QAM	4.52	5.07
	10 MHz	QPSK	8.93	9.81
		16QAM	8.93	9.67
	15 MHz	QPSK	13.50	14.83
		16QAM	13.45	14.86
	20 MHz	QPSK	17.87	19.20
		16QAM	18.00	19.41

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 4	1.4 MHz	QPSK	1.10	1.32
		16QAM	1.11	1.32
	3 MHz	QPSK	2.70	2.94
		16QAM	2.69	2.97
	5 MHz	QPSK	4.52	5.00
		16QAM	4.52	5.08
	10 MHz	QPSK	8.94	9.77
		16QAM	8.94	9.68
	15 MHz	QPSK	13.51	14.87
		16QAM	13.51	14.87
LTE Band 12	1.4 MHz	QPSK	1.10	1.30
		16QAM	1.11	1.31
	3 MHz	QPSK	2.69	2.95
		16QAM	2.69	2.96
	5 MHz	QPSK	4.50	4.96
		16QAM	4.50	5.02
	10 MHz	QPSK	8.94	9.67
		16QAM	8.91	9.61

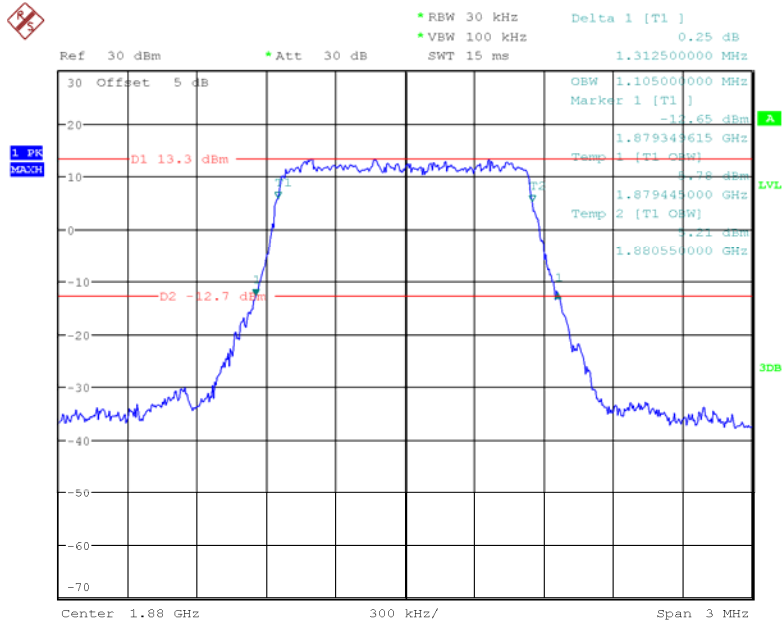
WCDMA Band II, Rel 99**WCDMA Band II, HSUPA**

WCDMA Band II, HSDPA**WCDMA Band V, Rel 99**

WCDMA Band V, HSUPA**WCDMA Band V, HSDPA**

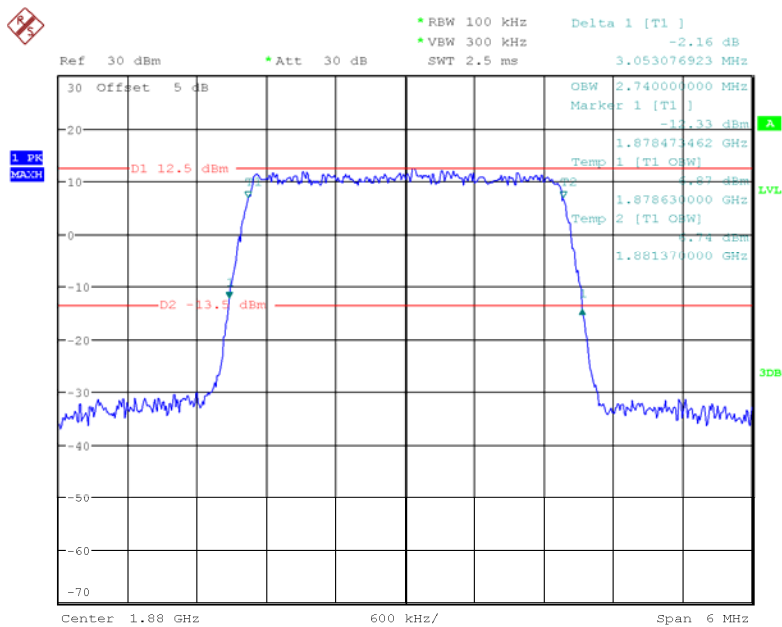
LTE Band 2

QPSK_1.4 MHz



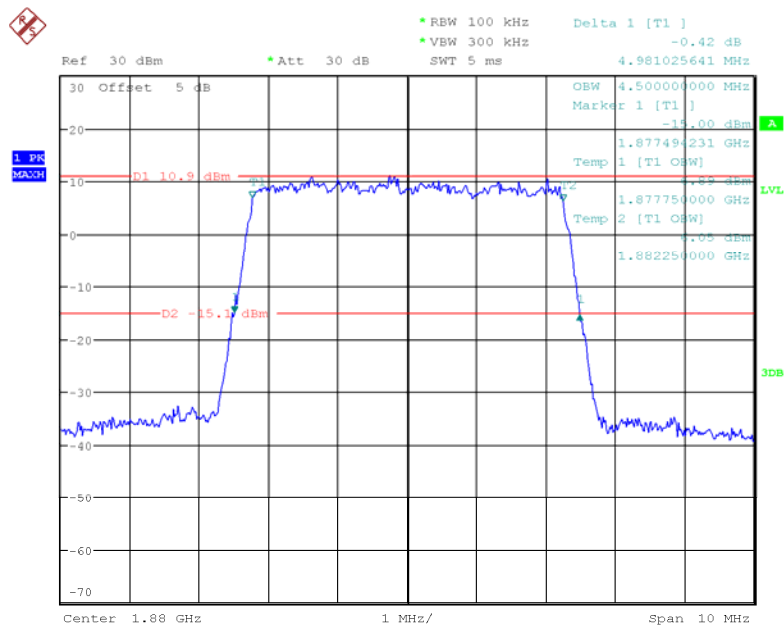
Date: 15.SEP.2018 17:00:02

QPSK_3 MHz



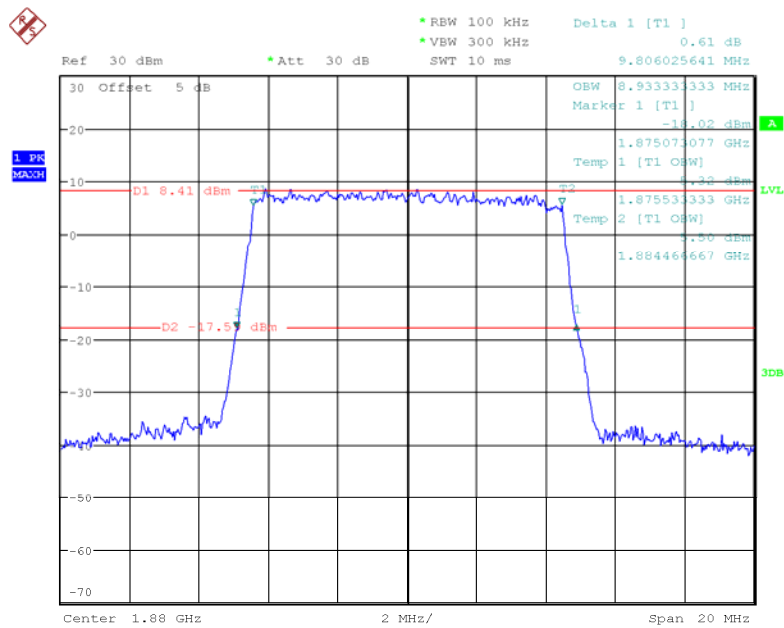
Date: 15.SEP.2018 17:04:50

QPSK_5 MHz



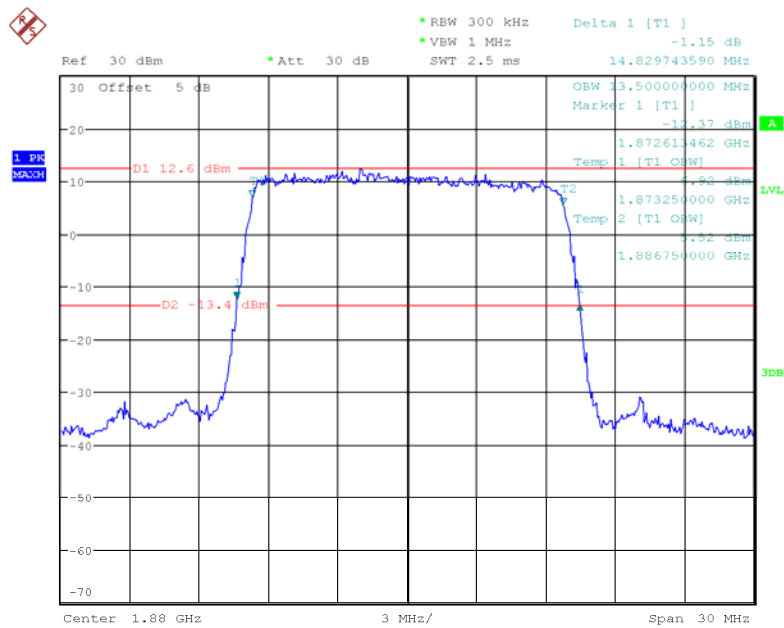
Date: 15.SEP.2018 17:05:48

QPSK_10 MHz



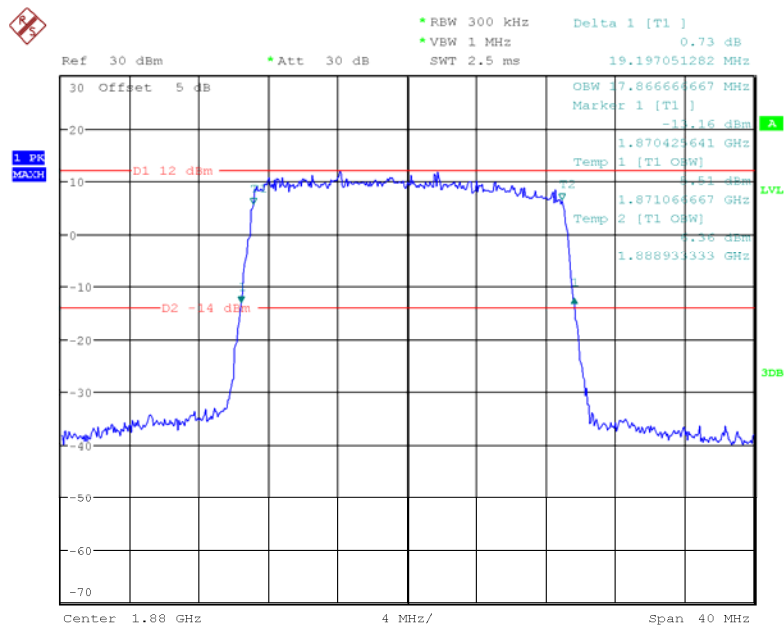
Date: 15.SEP.2018 17:08:18

QPSK_15 MHz



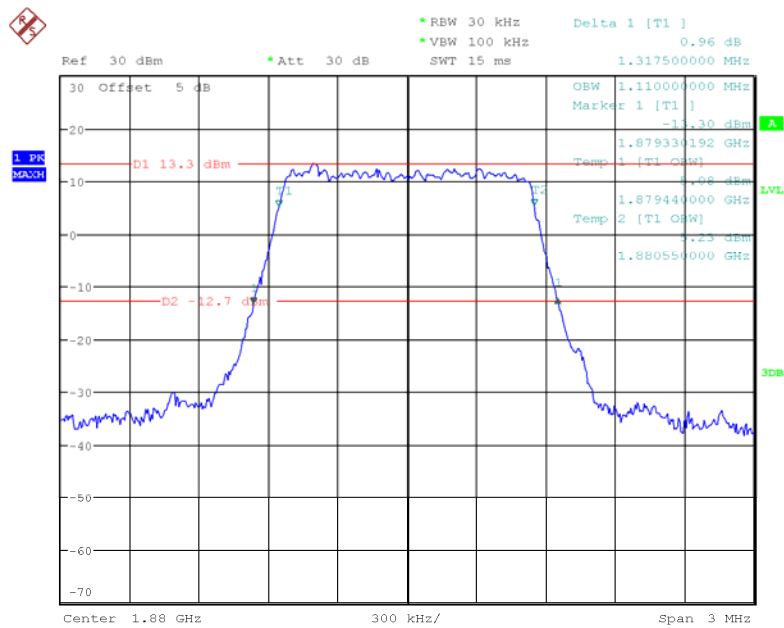
Date: 15.SEP.2018 17:10:02

QPSK_20 MHz



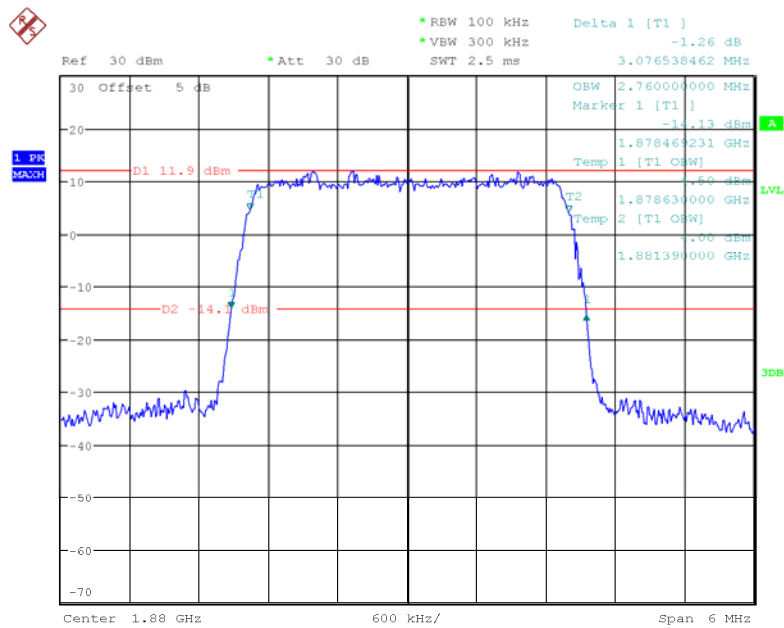
Date: 15.SEP.2018 17:11:31

16QAM_1.4 MHz

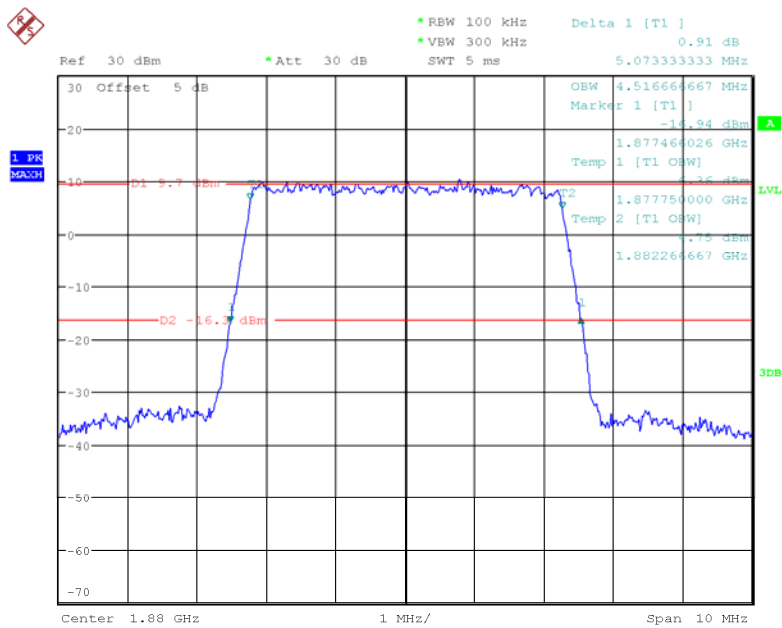


Date: 15.SEP.2018 17:00:51

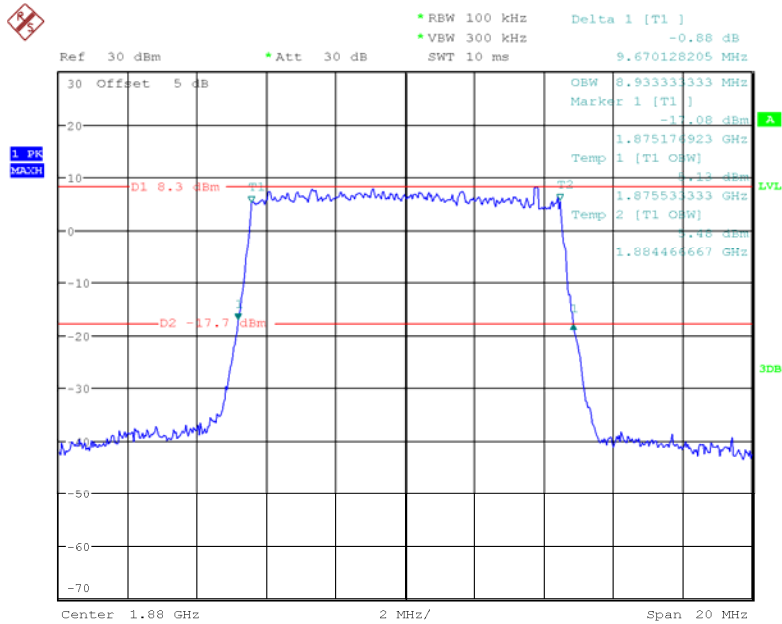
16QAM_3 MHz



Date: 15.SEP.2018 17:05:14

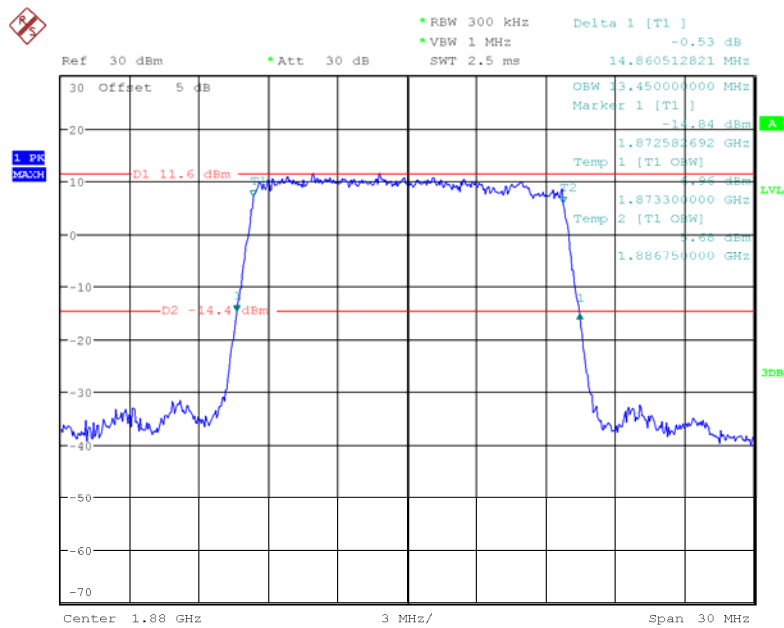
16QAM_5 MHz

Date: 15.SEP.2018 17:06:47

16QAM_10 MHz

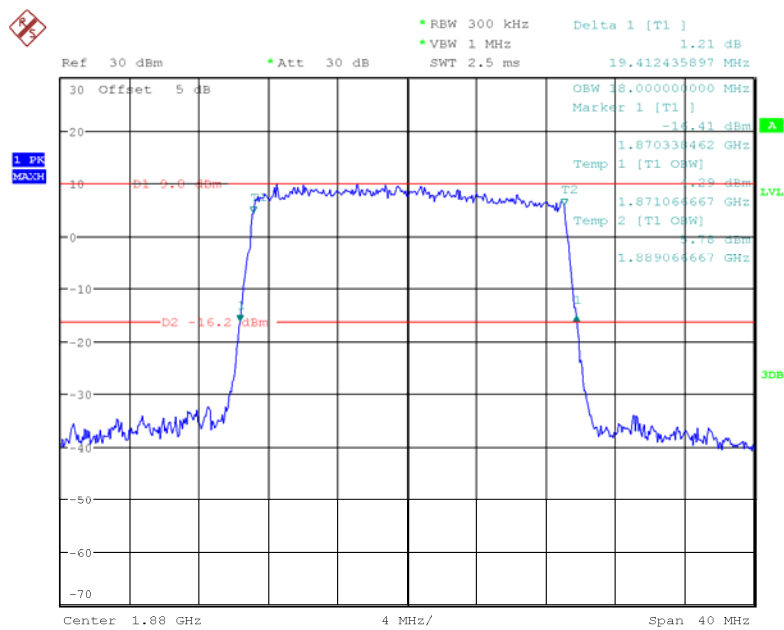
Date: 15.SEP.2018 17:09:18

16QAM_15 MHz

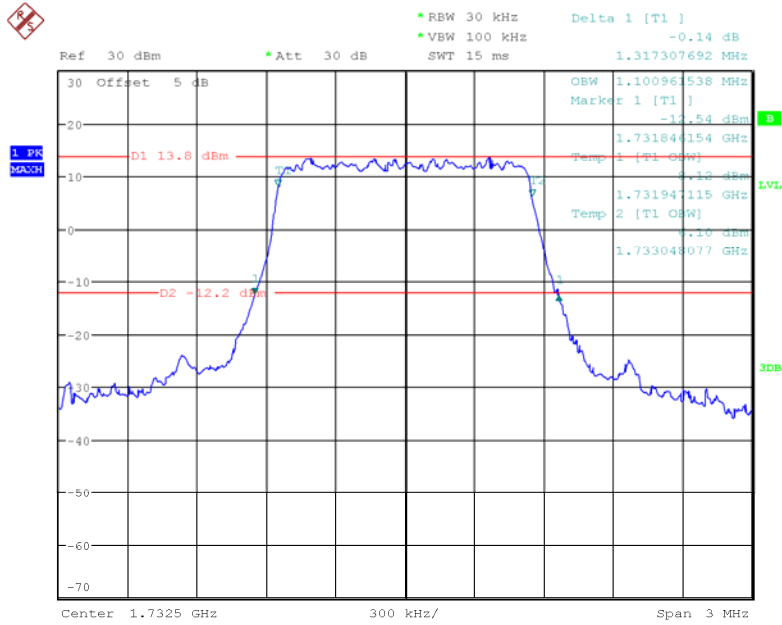


Date: 15.SEP.2018 17:10:33

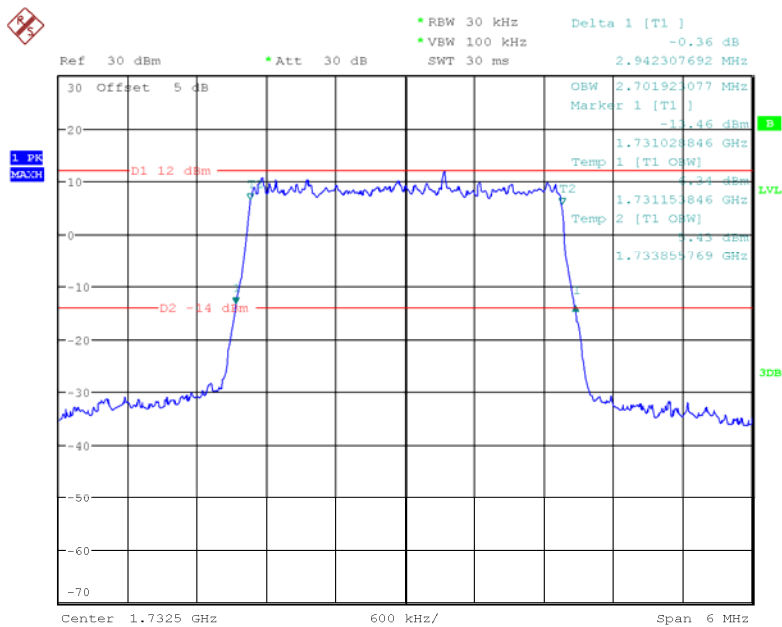
16QAM_20 MHz



Date: 15.SEP.2018 17:13:15

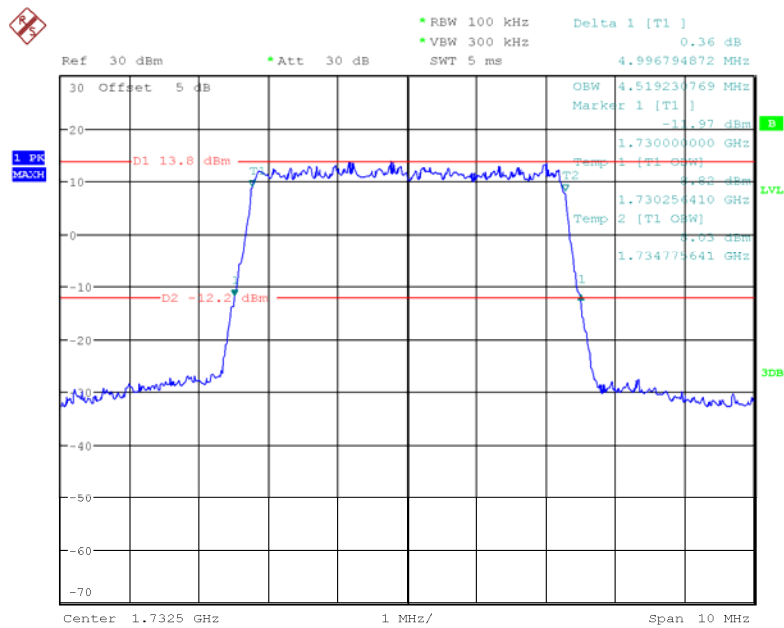
LTE Band 4:**QPSK_1.4 MHz**

Date: 15.SEP.2018 14:25:24

QPSK_3 MHz

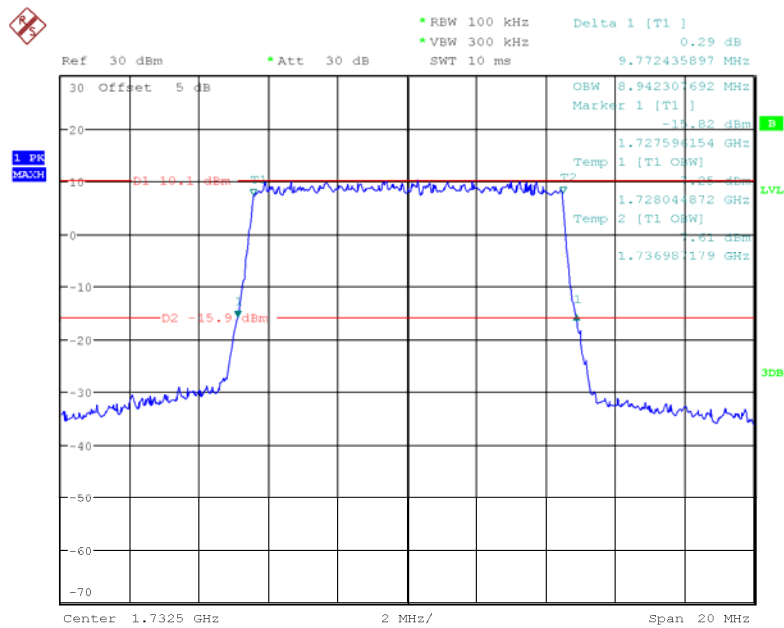
Date: 15.SEP.2018 14:26:59

QPSK_5 MHz



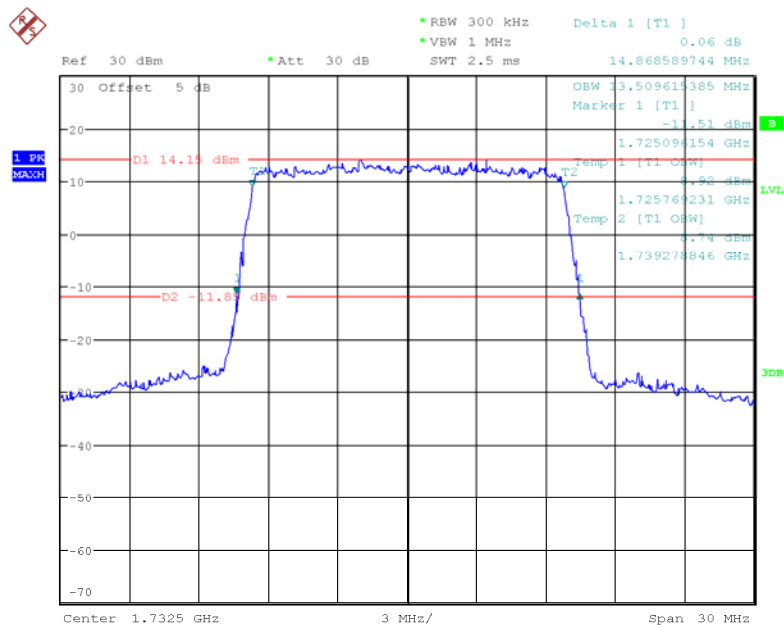
Date: 15.SEP.2018 14:28:23

QPSK_10 MHz



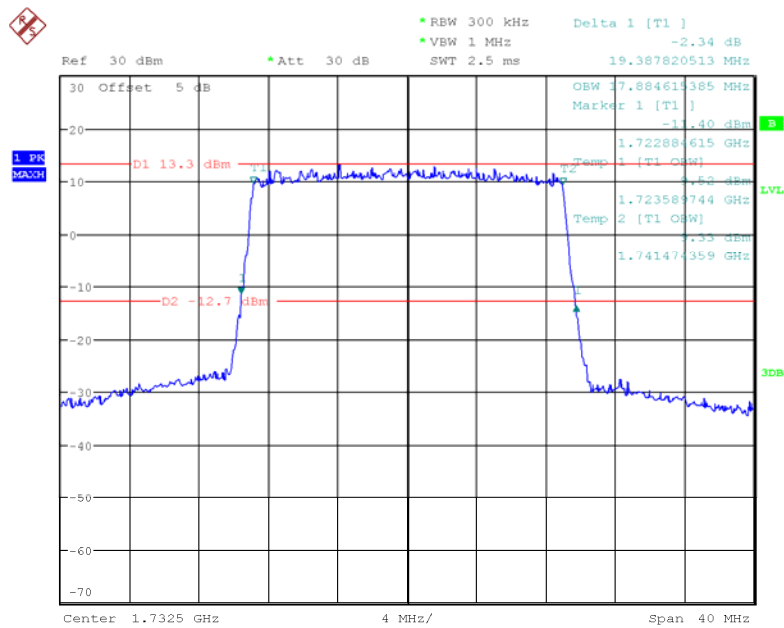
Date: 15.SEP.2018 14:30:19

QPSK_15 MHz

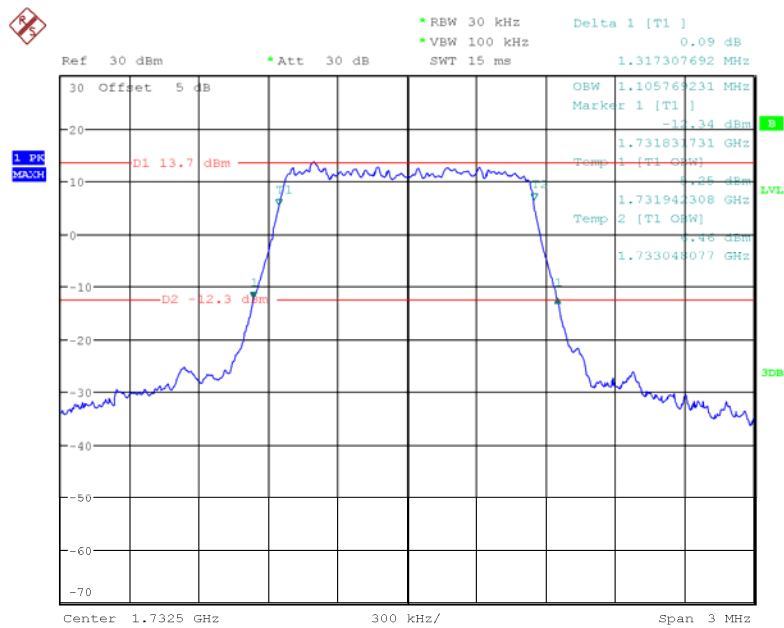


Date: 15.SEP.2018 14:31:46

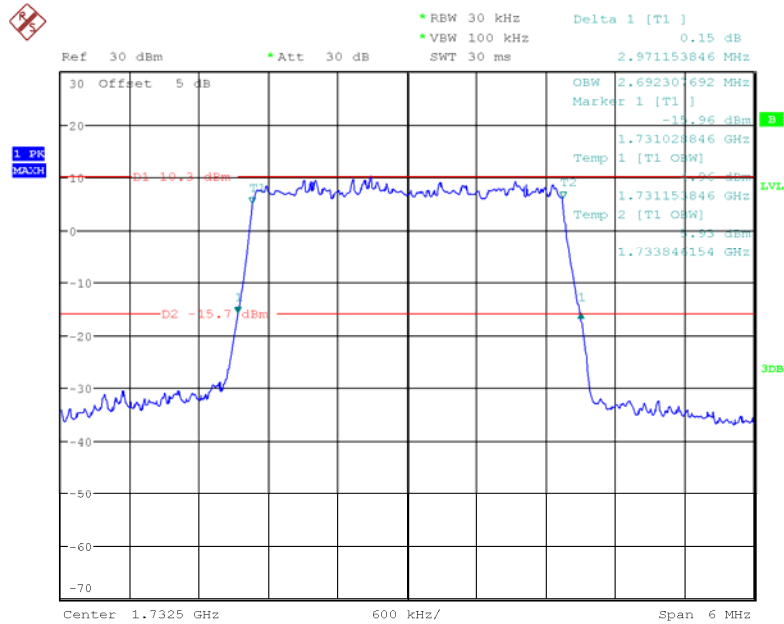
QPSK_20 MHz



Date: 15.SEP.2018 14:33:12

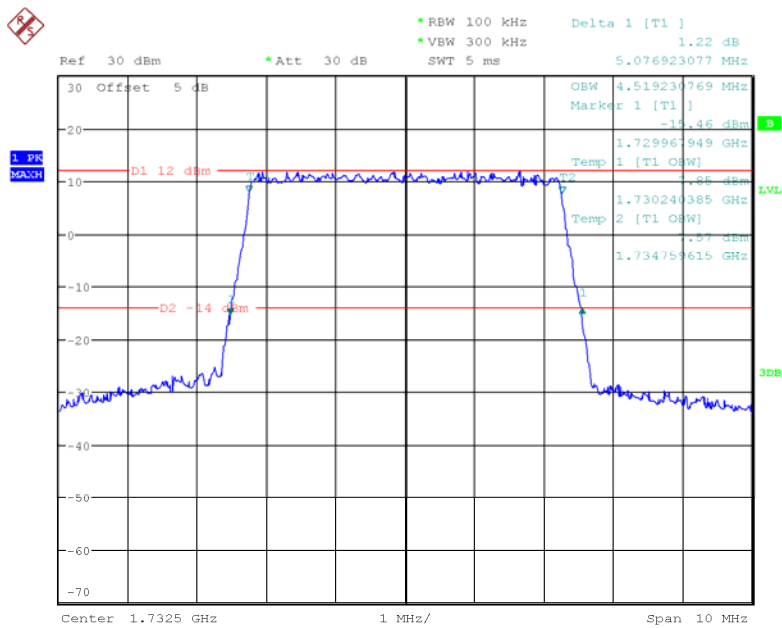
16QAM_1.4 MHz

Date: 15.SEP.2018 14:24:41

16QAM_3 MHz

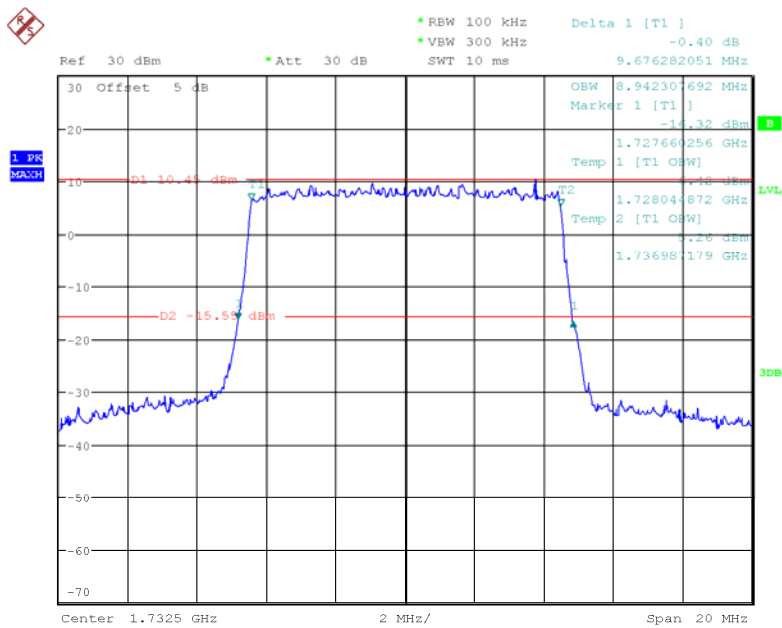
Date: 15.SEP.2018 14:26:13

16QAM_5 MHz



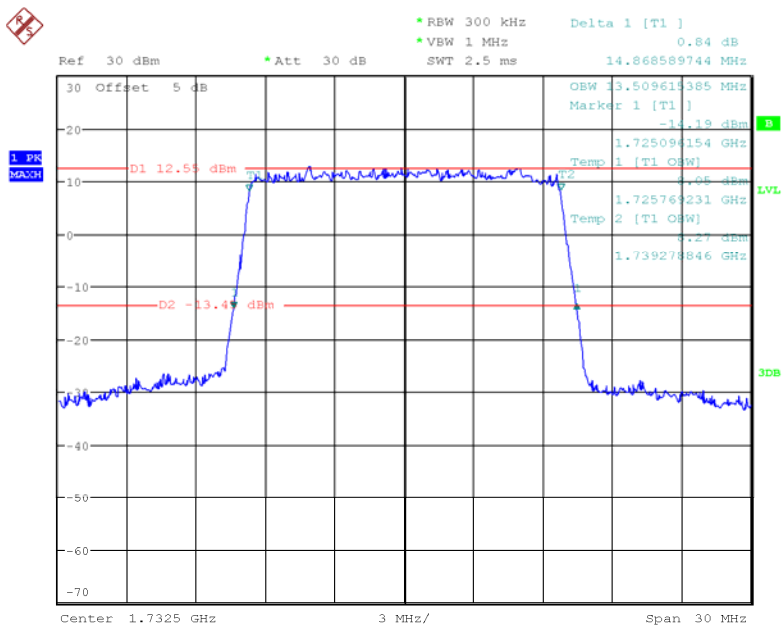
Date: 15.SEP.2018 14:27:52

16QAM_10 MHz



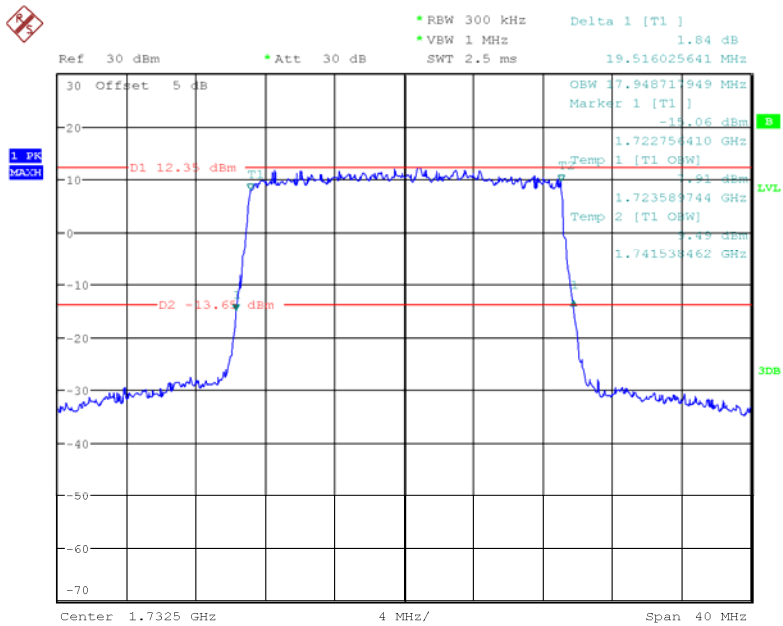
Date: 15.SEP.2018 14:29:42

16QAM_15 MHz

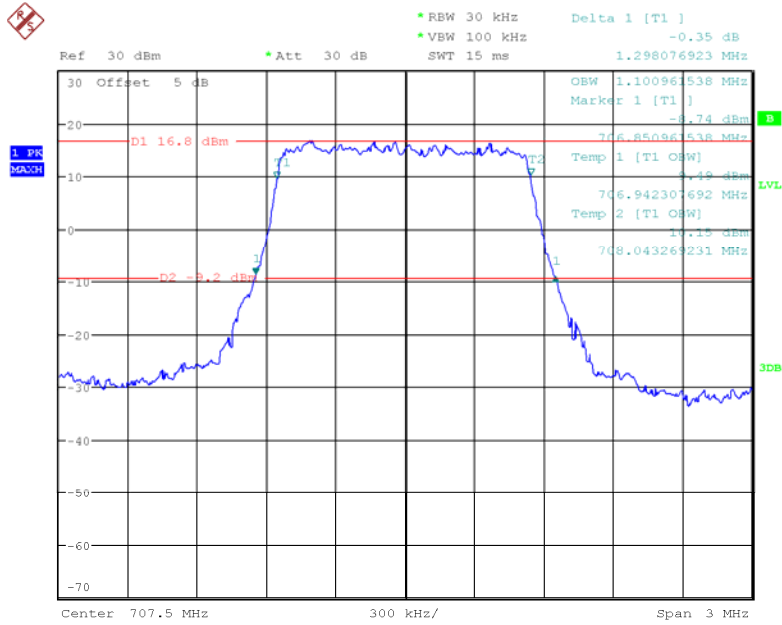


Date: 15.SEP.2018 14:31:09

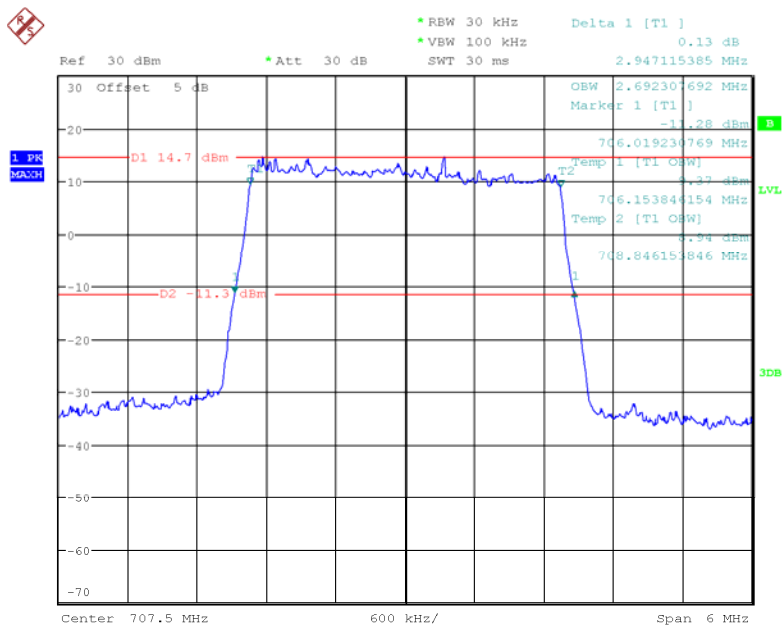
16QAM_20 MHz



Date: 15.SEP.2018 14:32:36

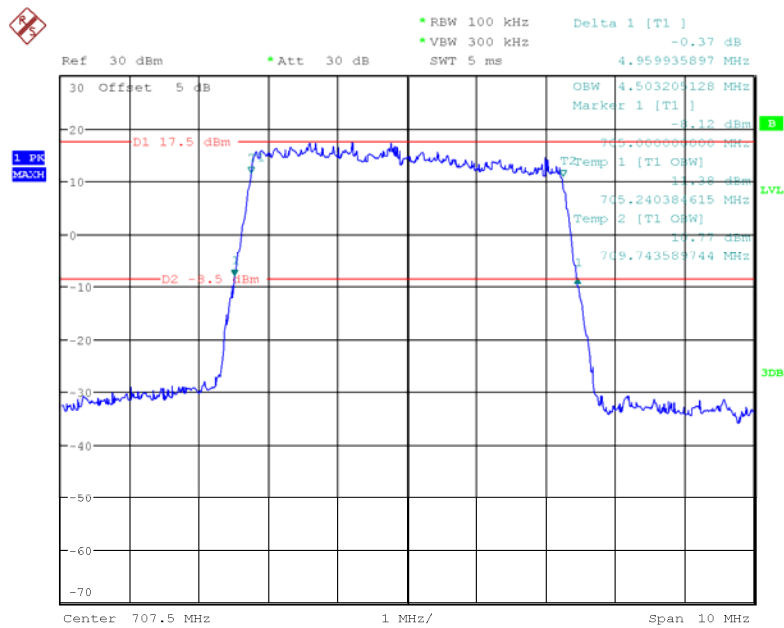
LTE Band 12:**QPSK_1.4 MHz**

Date: 15.SEP.2018 14:38:29

QPSK_3 MHz

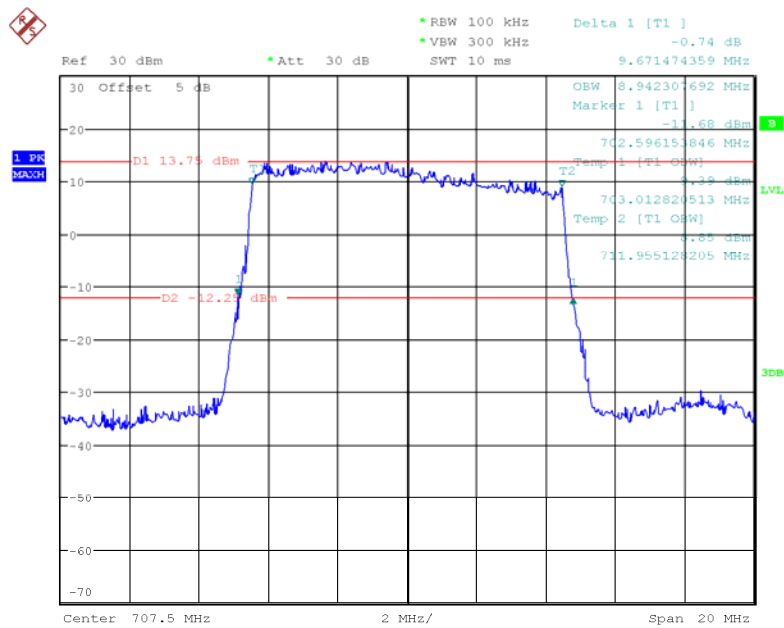
Date: 15.SEP.2018 14:40:09

QPSK_5 MHz



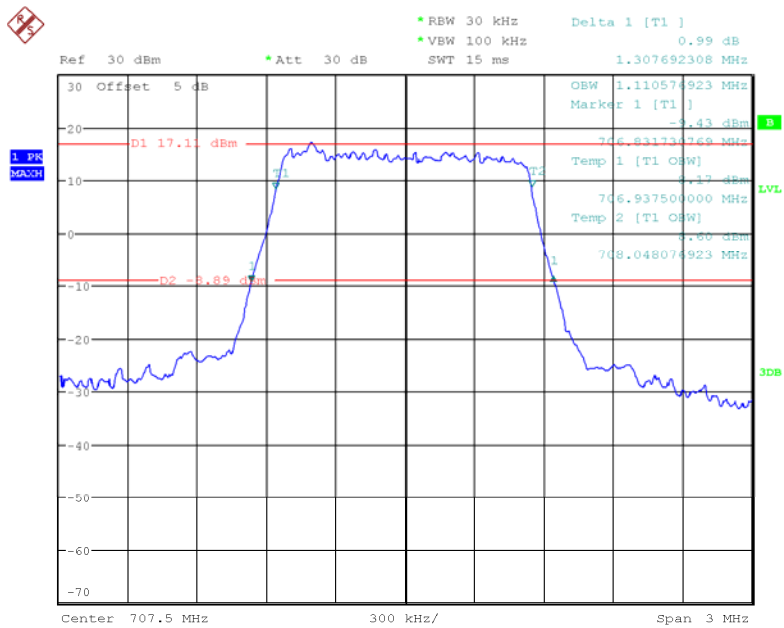
Date: 15.SEP.2018 14:41:52

QPSK_10 MHz



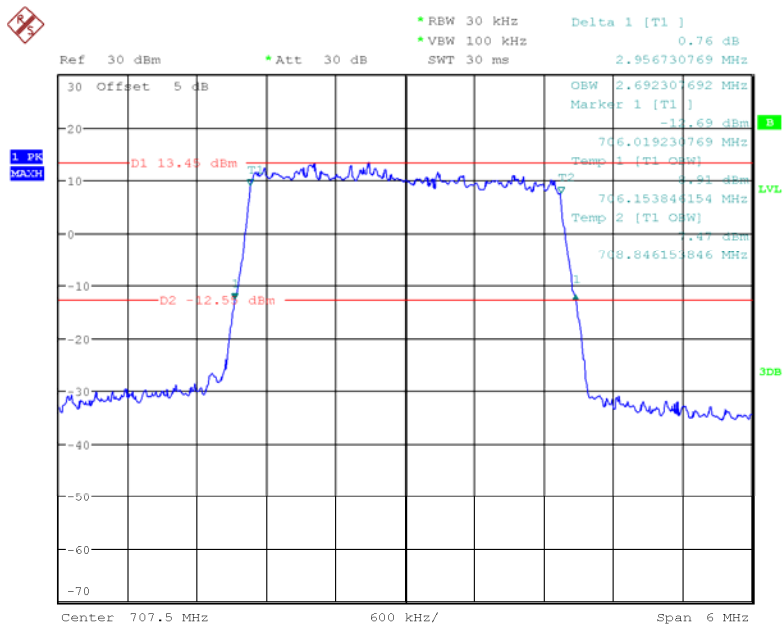
Date: 15.SEP.2018 14:43:37

16QAM_1.4 MHz



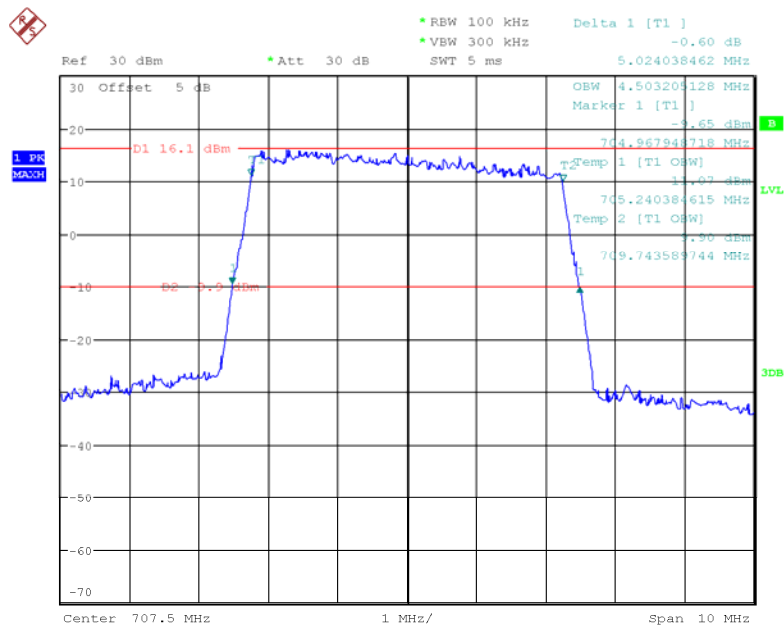
Date: 15.SEP.2018 14:37:29

16QAM_3 MHz



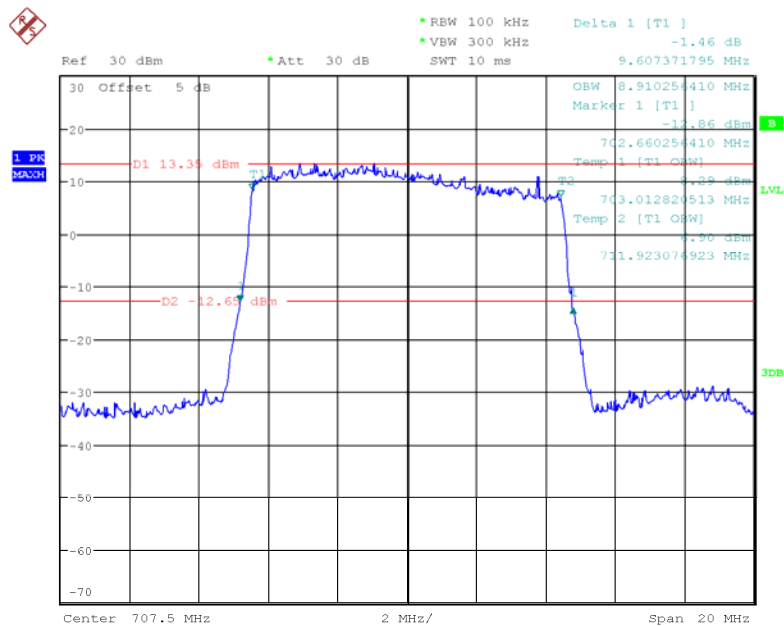
Date: 15.SEP.2018 14:39:24

16QAM_5 MHz



Date: 15.SEP.2018 14:41:17

16QAM_10 MHz



Date: 15.SEP.2018 14:43:03

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

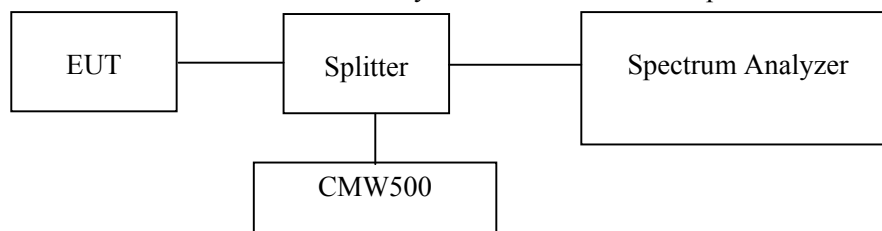
Applicable Standard

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

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

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
R&S	Spectrum Analyzer	FSU 26	200256	2018-1-4	2019-1-4
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
R&S	Wideband Radio Communication Tester	CMW500	149216	2017-12-11	2018-12-11
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

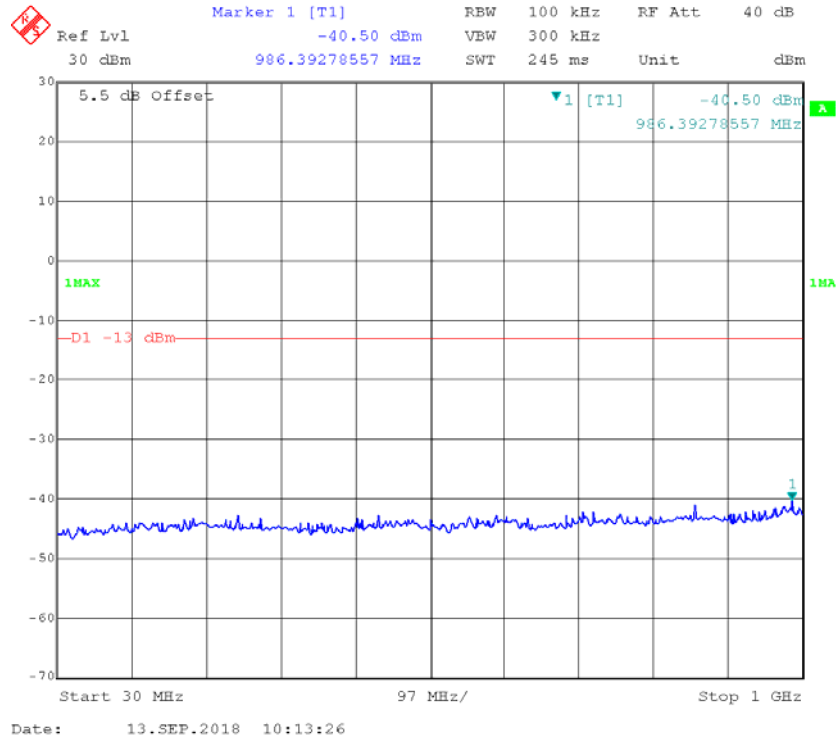
Environmental Conditions

Temperature:	26.6~27.1°C
Relative Humidity:	55~58 %
ATM Pressure:	100.4~100.6 kPa

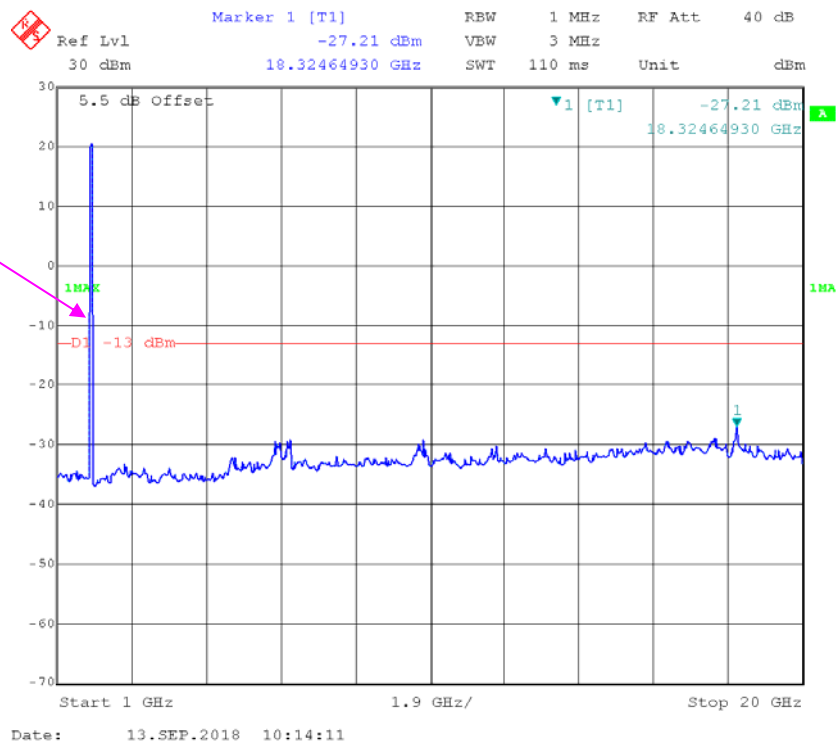
The testing was performed by Nami Quan from 2018-09-13 to 2018-09-15.

Please refer to the following plots.

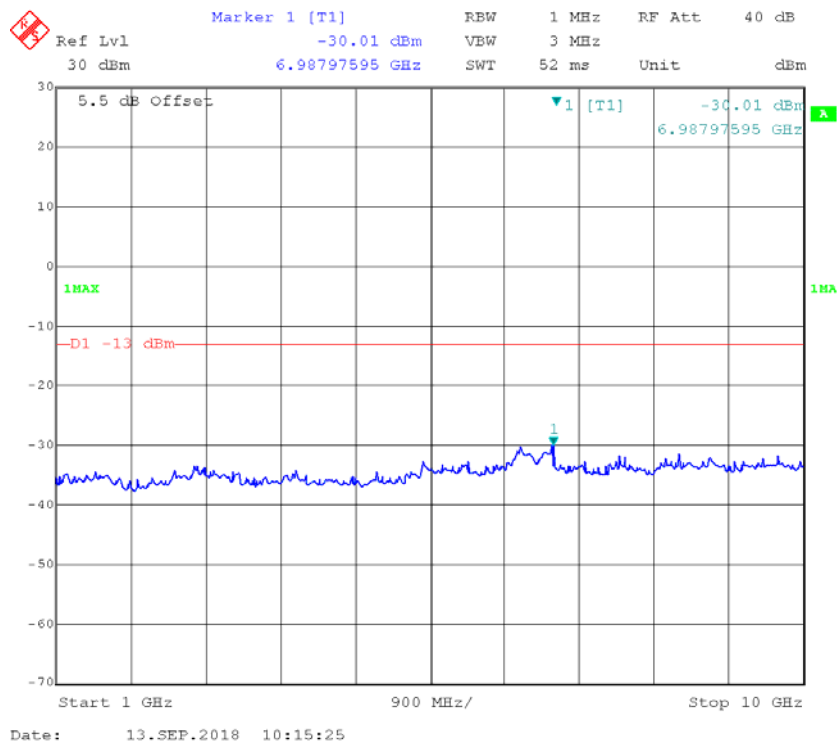
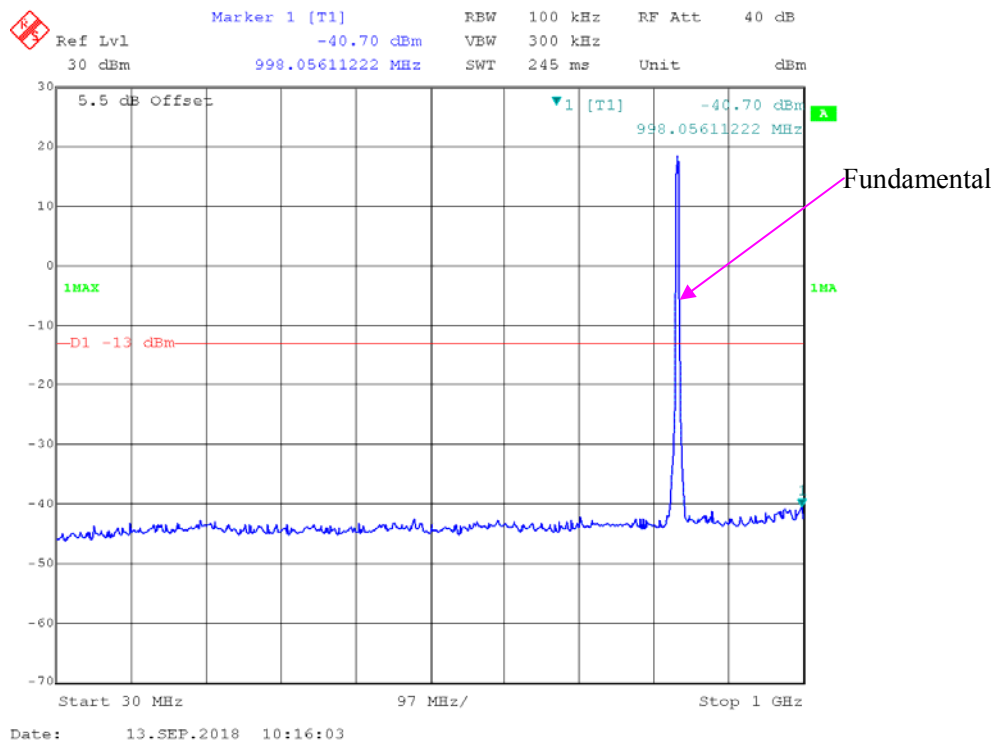
WCDMA Band II, Rel99



Fundamental

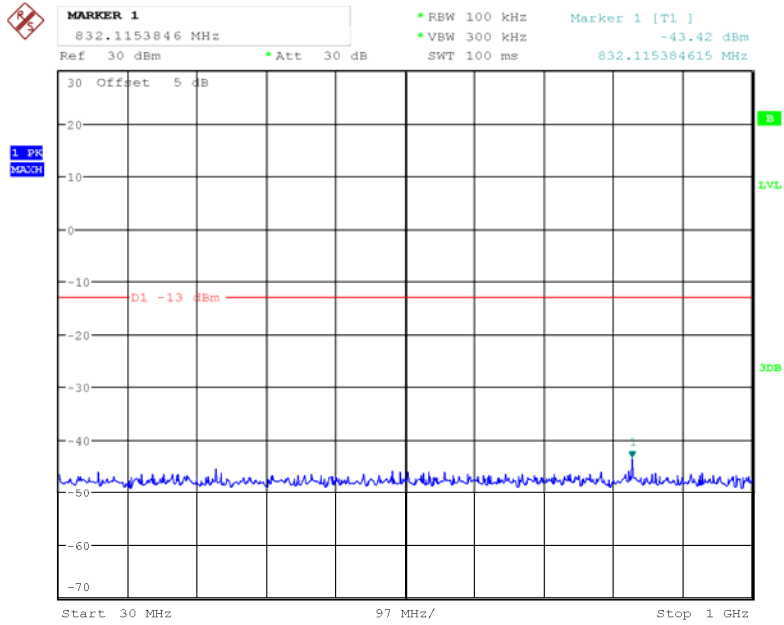


WCDMA Band V, Rel99



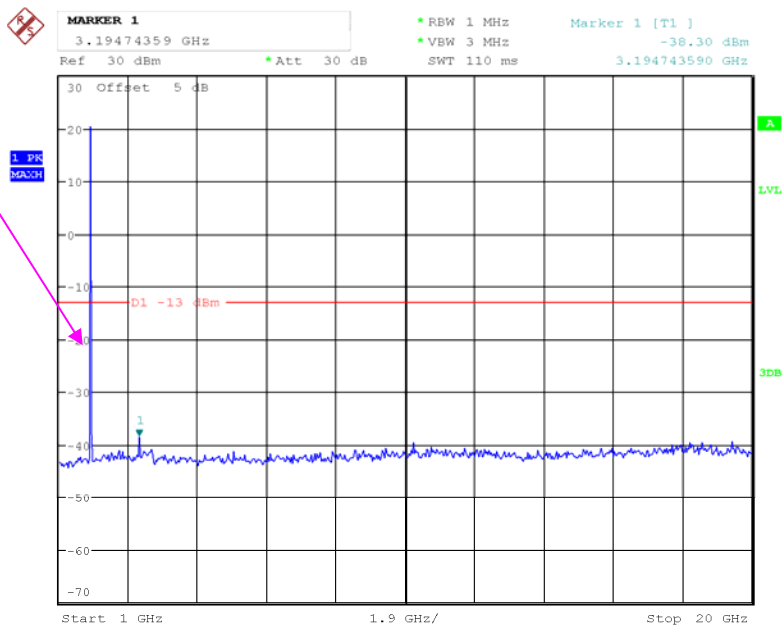
LTE Band 2 (Middle Channel)

QPSK_1.4 MHz



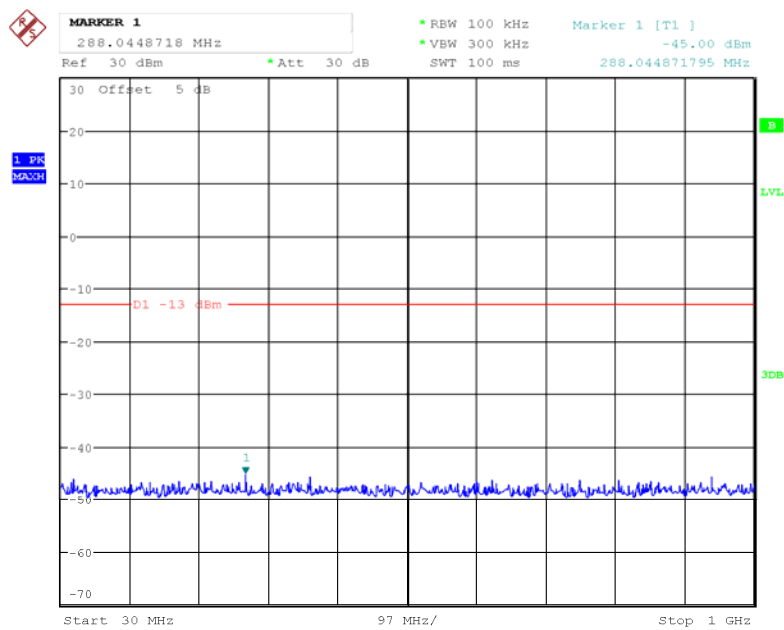
Date: 15.SEP.2018 16:10:03

Fundamental

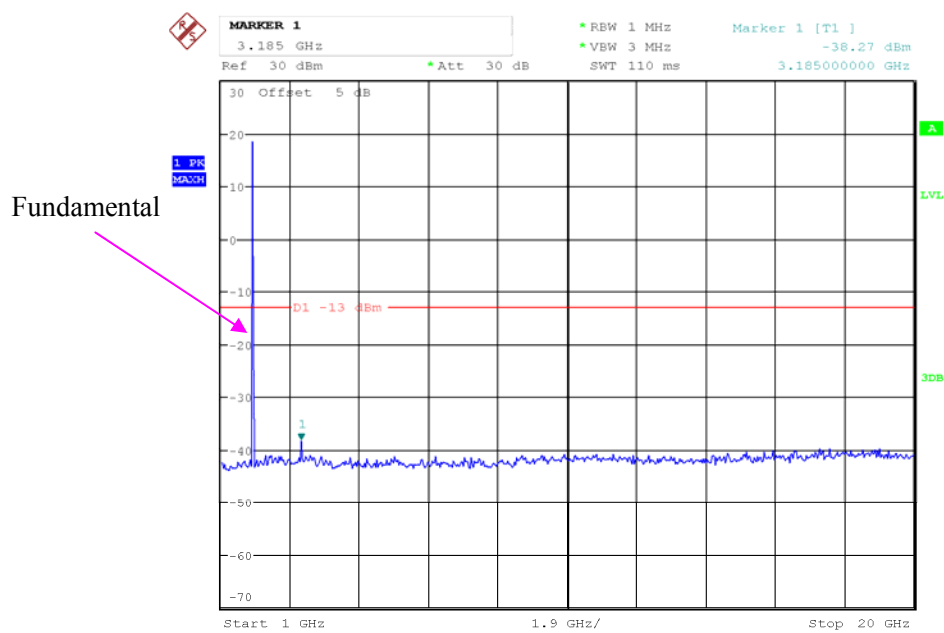


Date: 15.SEP.2018 16:12:36

QPSK_3 MHz



Date: 15.SEP.2018 16:10:21



Date: 15.SEP.2018 16:13:02

MARKER 1
914.5032051 MHz

914.5032051 MHz -44.95 dBm

Ref 30 dBm * Att 30 dB

SWT 100 ms

914.503205128 MHz

30 Offset 5 dB

1 PK
MAX

D1 -13 dBm

1

Start 30 MHz 97 MHz/ Stop 1 GHz

MARKER 1
3.185 GHz
-39.19 dBm

Ref 30 dBm * Att 30 dB
RBW 1 MHz
VBW 3 MHz
SWT 110 ms
3.185000000 GHz

30 Offset 5 dB

1 PK
MAX

D1 -13 dBm

1

Start 1 GHz 1.9 GHz/ Stop 20 GHz

Page 55 of 119

MARKER 1
749.7275641 MHz

• RBW 100 kHz
• VBW 300 kHz
SWT 100 ms

Marker 1 [T1]
-45.32 dBm
749.727564103 MHz

Ref 30 dBm
• Att 30 dB

30 Offset 5 dB

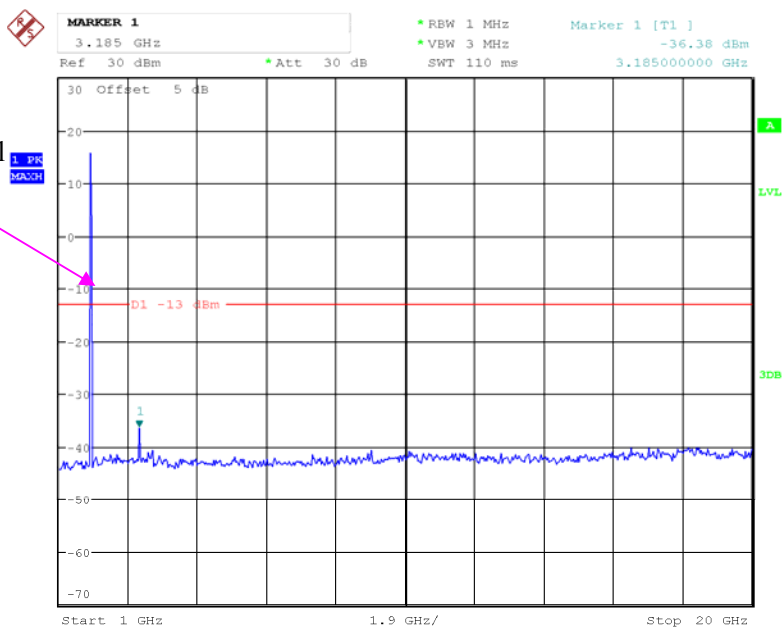
1 PR
MAGN

D1 -13 dBm

1

Start 30 MHz
97 MHz/
Stop 1 GHz

Fundamental



Page 56 of 119

MARKER 1
384.4230769 MHz

Ref 30 dBm * Att 30 dB

* RBW 100 kHz * VBW 300 kHz
SWT 100 ms

Marker 1 [T1]
-45.01 dBm
384.423076923 MHz

30 Offset 5 dB

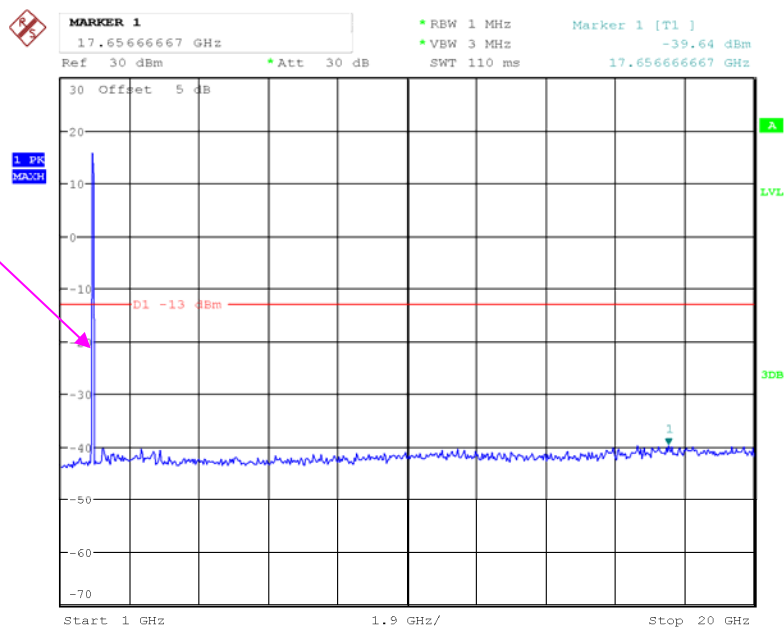
1 PK
MAX

D1 -13 dBm

1

Start 30 MHz 97 MHz/
Stop 1 GHz

Fundamental



Page 57 of 119

MARKER 1
539.8717949 MHz

Ref 30 dBm * Att 30 dB

* RBW 100 kHz
* VBW 300 kHz
SWT 100 ms

Marker 1 [T1]
-44.95 dBm
539.871794872 MHz

30 Offset 5 dB

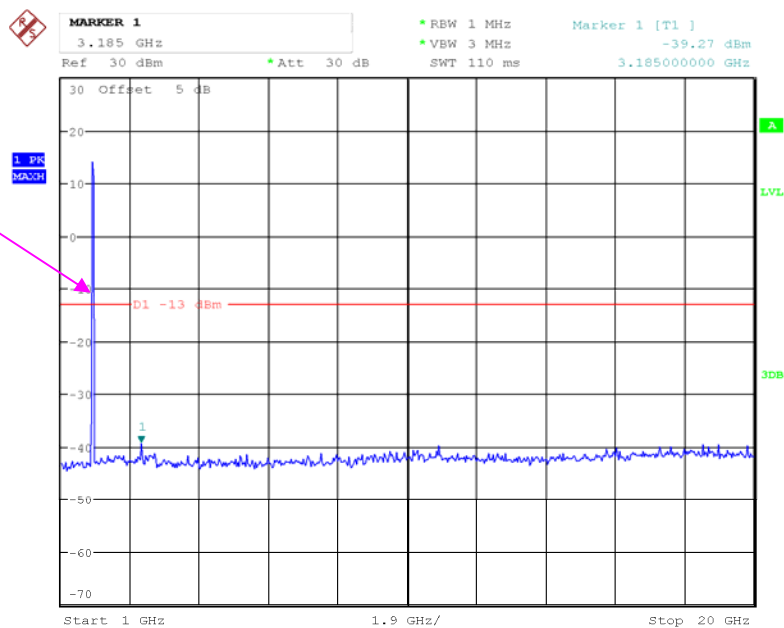
1 PK
MAGN

D1 -13 dBm

1

Start 30 MHz 97 MHz/ Stop 1 GHz

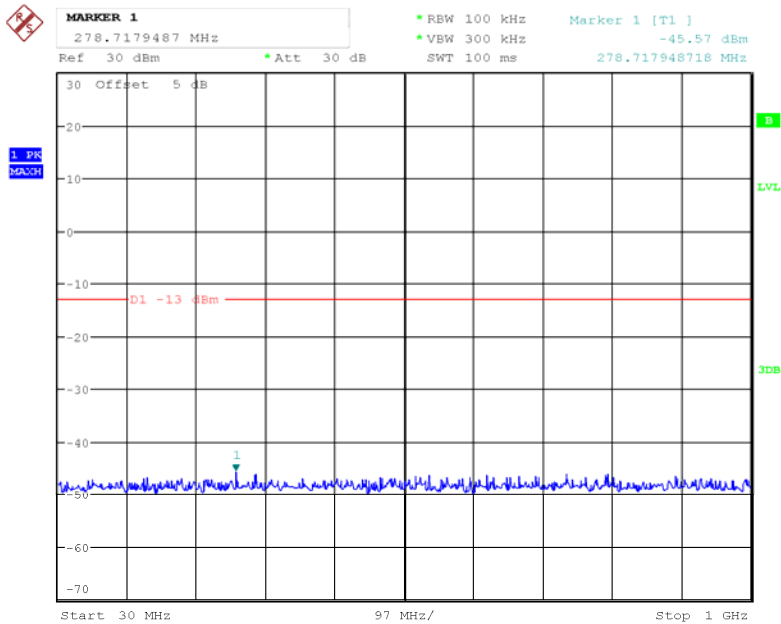
Fundamental



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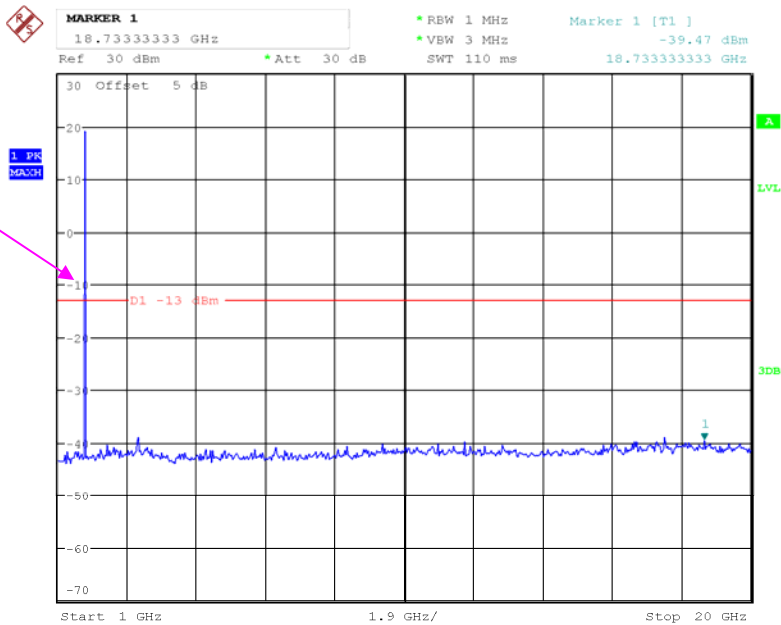
LTE Band 4 (Middle Channel)

QPSK_1.4 MHz



Date: 15.SEP.2018 16:16:11

Fundamental



Date: 15.SEP.2018 16:17:42

MARKER 1
975.1282051 MHz

Ref 30 dBm Att 30 dB

* RBW 100 kHz
* VBW 300 kHz
SWT 100 ms

Marker 1 [T1]
-45.08 dBm
975.128205128 MHz

30 Offset 5 dB

1 PK
MAGN

D1 -13 dBm

1

Start 30 MHz Stop 1 GHz

97 MHz/

MARKER 1
18.63833333 GHz

Ref 30 dBm * Att 30 dB

* RBW 1 MHz
* VBW 3 MHz
SWT 110 ms

Marker 1 [T1]
-39.43 dBm
18.63833333 GHz

30 Offset 5 dB

1 PK
MAGN

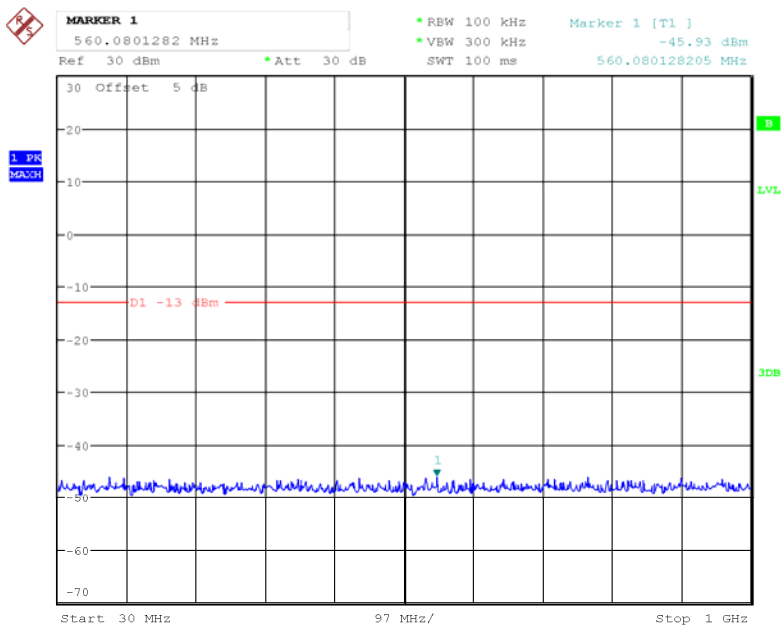
D1 -13 dBm

1

Start 1 GHz 1.9 GHz/ Stop 20 GHz

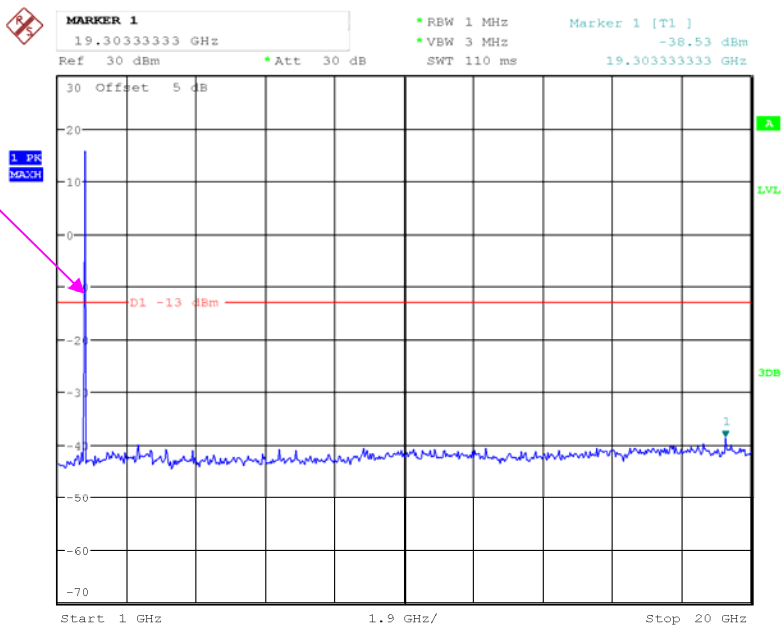
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QPSK_5 MHz



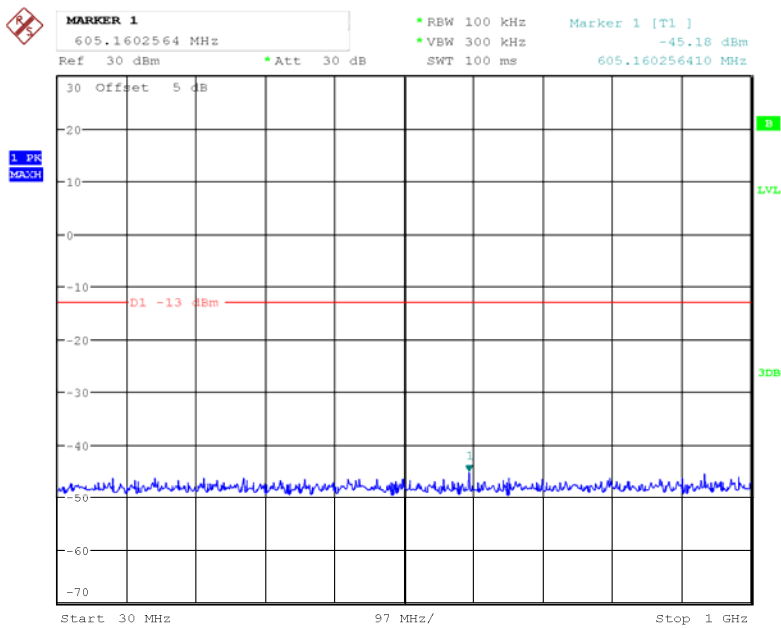
Date: 15.SEP.2018 16:16:30

Fundamental



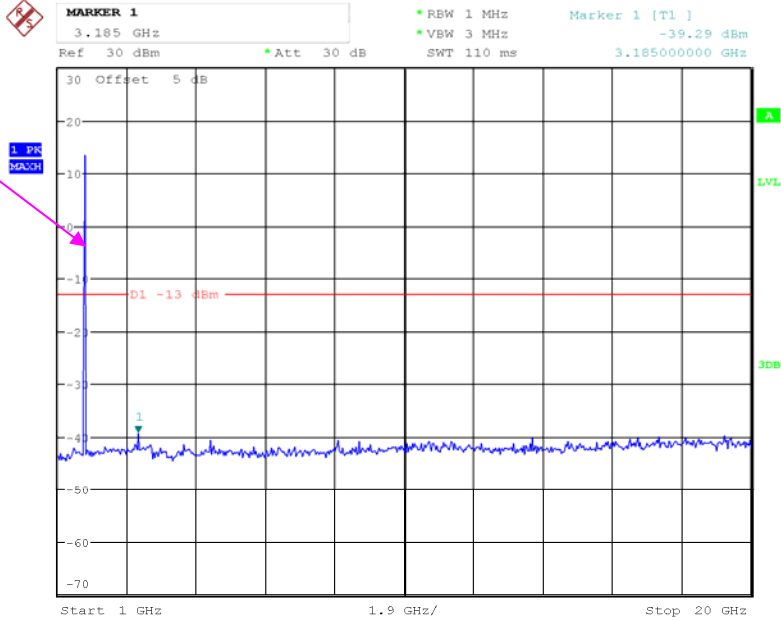
Date: 15.SEP.2018 16:18:12

QPSK_10 MHz



Date: 15.SEP.2018 16:16:40

Fundamental



Date: 15.SEP.2018 16:18:30

MARKER 1
542.9807692 MHz

Ref 30 dBm Att 30 dB

RBW 100 kHz VBW 300 kHz SWT 100 ms

Marker 1 [T1]
-45.33 dBm
542.980769231 MHz

30 Offset 5 dB

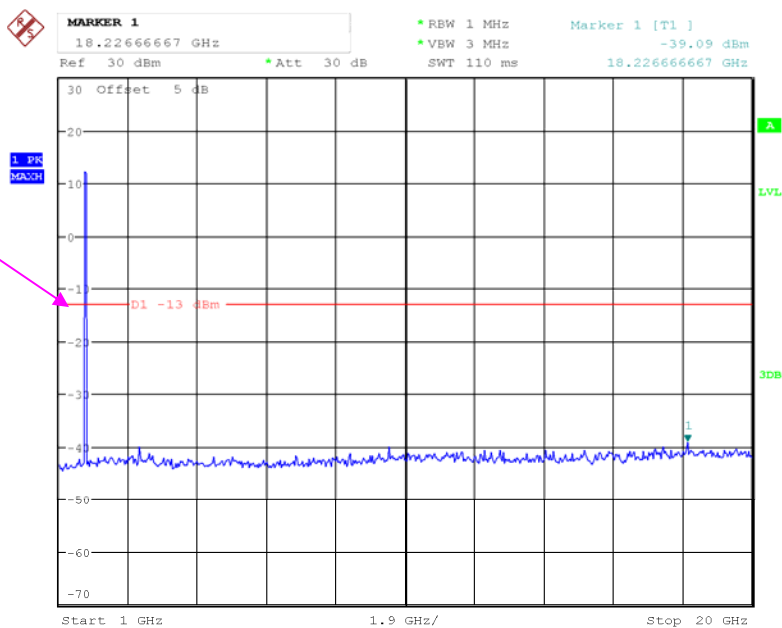
1. PK
HOLD

D1 -13 dBm

1

Start 30 MHz 97 MHz/ Stop 1 GHz

Fundamental



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MARKER 1
670.4487179 MHz

* RBW 100 kHz
* VBW 300 kHz
SWT 100 ms

Marker 1 [T1]
-45.89 dBm
670.448717949 MHz

Ref 30 dBm * Att 30 dB

30 Offset 5 dB

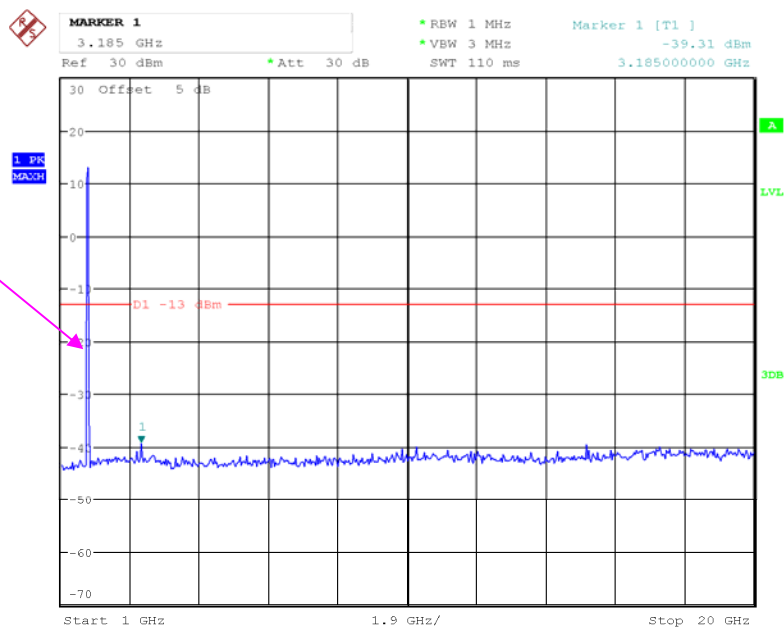
1 PK
MAX

D1 -13 dBm

1

Start 30 MHz 97 MHz/ Stop 1 GHz

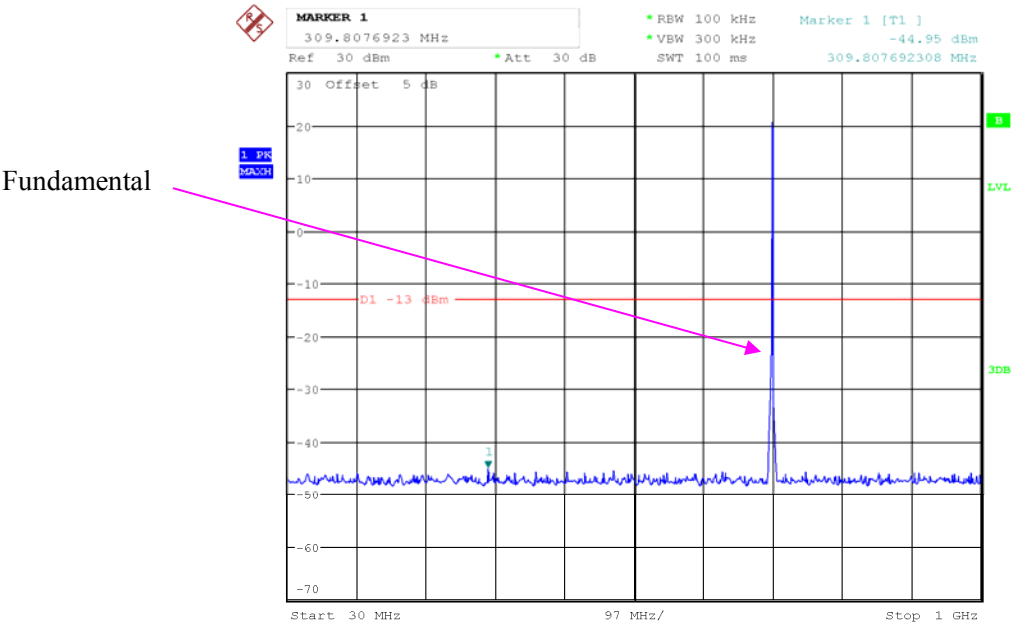
Fundamental



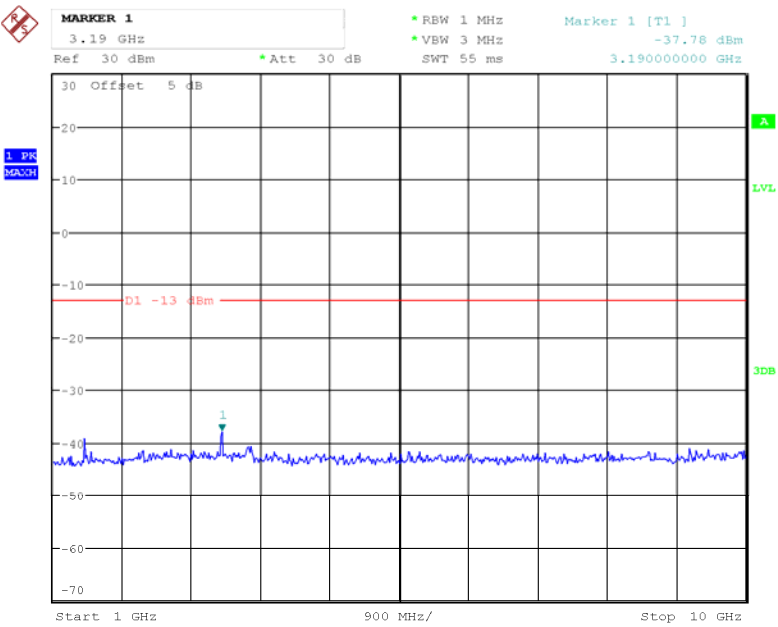
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LTE Band 12 (Middle Channel)

QPSK_1.4 MHz

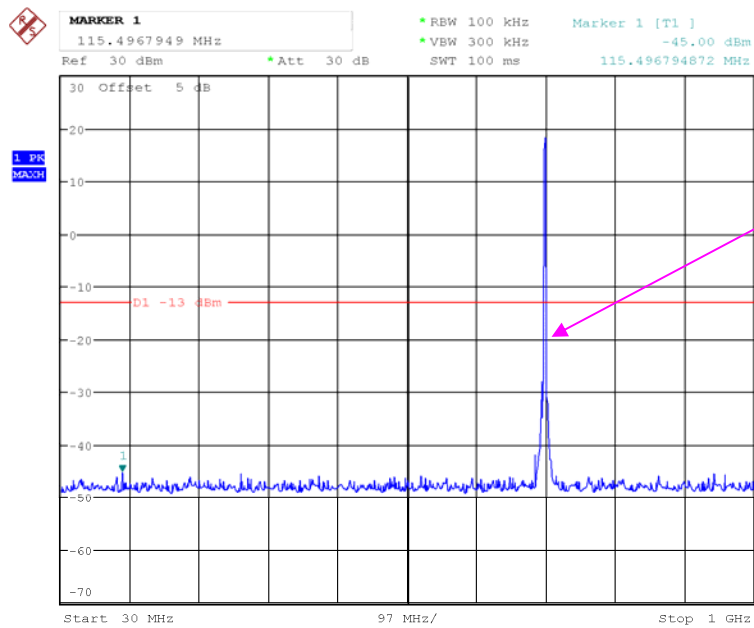


Date: 15.SEP.2018 16:21:17

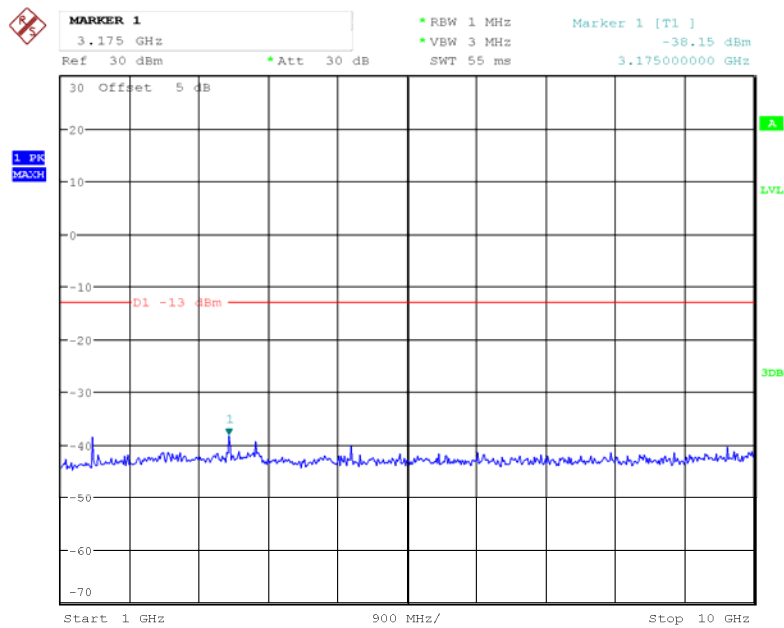


Date: 15.SEP.2018 16:22:23

QPSK_3 MHz

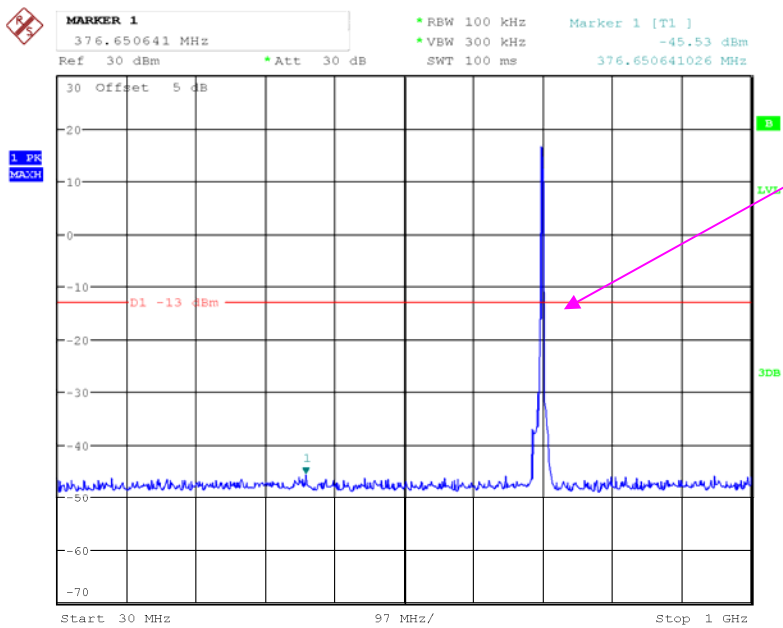


Date: 15.SEP.2018 16:21:34

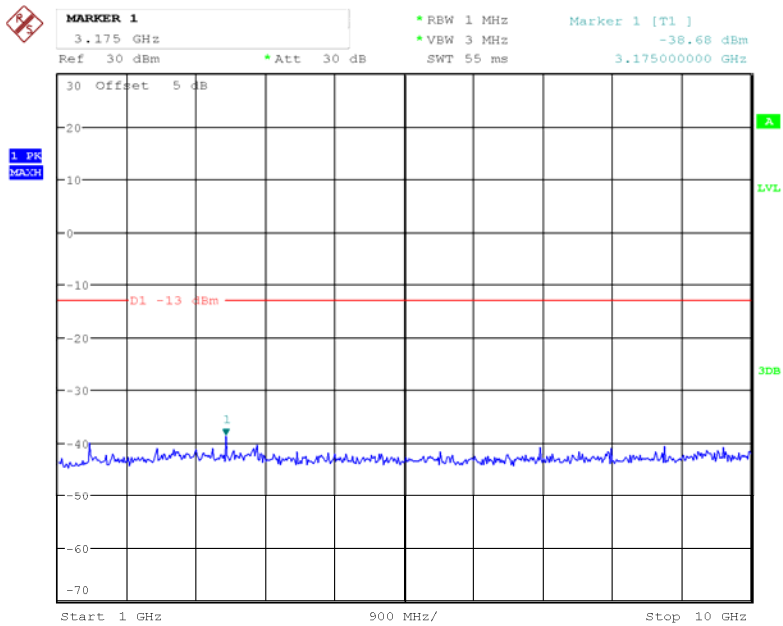


Date: 15.SEP.2018 16:22:34

QPSK_5 MHz

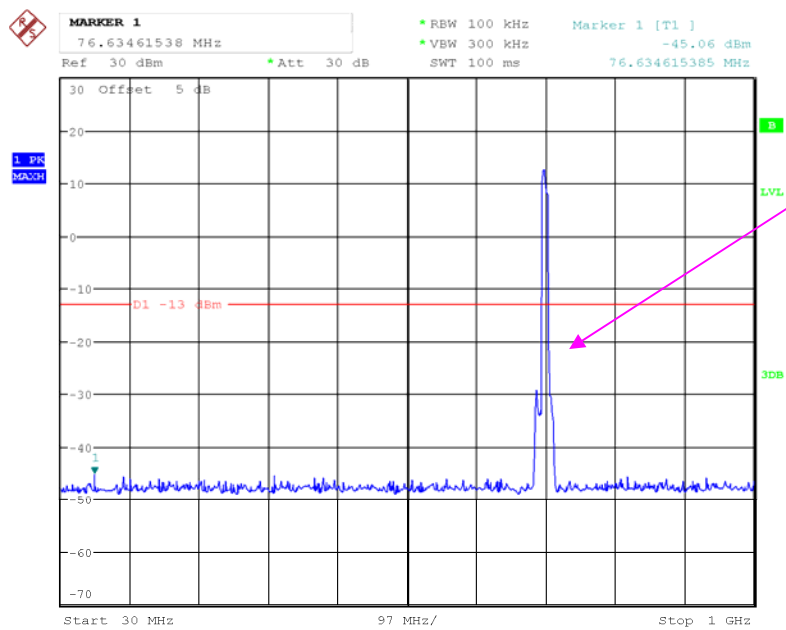


Date: 15.SEP.2018 16:21:49

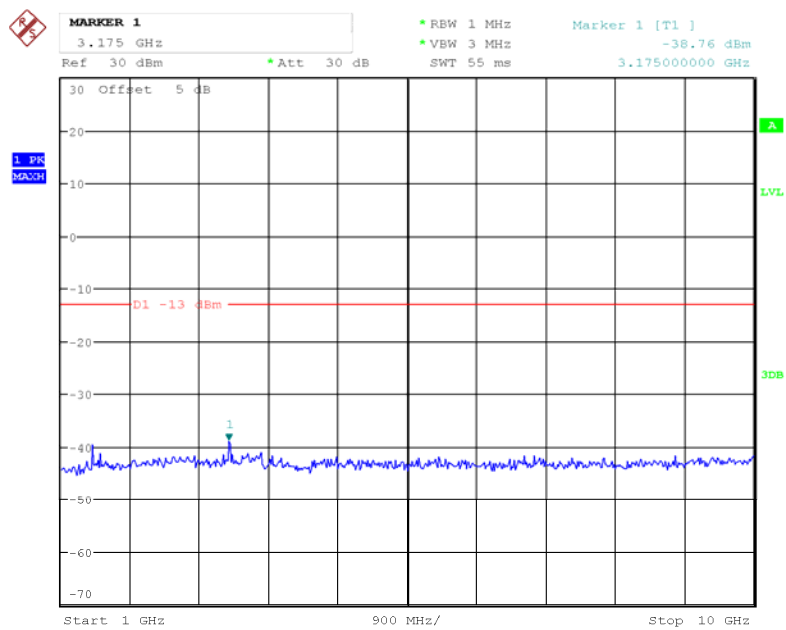


Date: 15.SEP.2018 16:22:44

QPSK_10 MHz



Date: 15.SEP.2018 16:22:07



Date: 15.SEP.2018 16:22:52

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 = $10 \lg (\text{TXpwr in Watts}/0.001)$ – the absolute level

Spurious attenuation limit in dB = $43 + 10 \text{Log}_{10} (\text{power out in Watts})$

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-12-11	2018-12-11
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	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-NJNJ-50	C-0200-02	2017-09-05	2018-09-05
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
R&S	Wideband Radio Communication Tester	CMW500	149216	2017-12-11	2018-12-11
Agilent	Signal Generator	E8247C	MY43321350	2017-12-11	2018-12-11
Agilent	Spectrum Analyzer	E4440A	SG43360054	2018-01-04	2019-01-04
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
ETS-Lindgren	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2017-09-05	2018-09-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05

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

Test Data**Environmental Conditions**

Temperature:	26.7~27.5°C
Relative Humidity:	45~58 %
ATM Pressure:	99.6 kPa

* The testing was performed by Vern Shen & Blake Yang on 2018-08-22.

*EUT Operation Mode: Transmitting***30 MHz-10 GHz:**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	59.63	-54.58	10.6	0.73	-44.7	-13.0	31.7
1673.200	V	60.51	-54.3	10.6	0.73	-44.4	-13.0	31.4
2509.800	H	53.82	-59.2	13.1	1.25	-47.3	-13.0	34.3
2509.800	V	54.51	-58.54	13.1	1.25	-46.7	-13.0	33.7
3346.400	H	51.22	-59.44	13.8	1.61	-47.2	-13.0	34.2
3346.400	V	52.08	-58.63	13.8	1.61	-46.4	-13.0	33.4
800.180	H	46.87	-51.78	0.0	0.93	-52.7	-13.0	39.7
499.480	V	47.79	-59.47	0.0	0.71	-60.2	-13.0	47.2

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	59.96	-48.84	13.8	1.63	-36.7	-13.0	23.7
3760.000	V	60.92	-47.75	13.8	1.63	-35.6	-13.0	22.6
5640.000	H	55.97	-50.06	14.0	1.31	-37.4	-13.0	24.4
5640.000	V	56.48	-49.43	14.0	1.31	-36.7	-13.0	23.7
800.180	H	45.54	-53.11	0.0	0.93	-54.0	-13.0	41.0
433.520	V	45.18	-62.68	0.0	0.64	-63.3	-13.0	50.3

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	57.71	-51.1	13.8	1.6	-38.9	-13.0	25.90
3760.000	V	57.92	-50.7	13.8	1.6	-38.5	-13.0	25.50
5640.000	H	53.07	-53	14.0	1.3	-40.3	-13.0	27.30
5640.000	V	59.21	-46.7	14.0	1.3	-34.0	-13.0	21.00
7520.000	H	64.64	-35.7	13.2	1.3	-23.8	-13.0	10.80
7520.000	V	66.38	-34.4	13.2	1.3	-22.5	-13.0	9.50
9400.000	H	54.33	-44.6	13.3	1.9	-33.2	-13.0	20.20
9400.000	V	56.25	-43.3	13.3	1.9	-31.9	-13.0	18.90
800.180	H	47.33	-51.3	0.0	0.9	-52.2	-13.0	39.20
299.660	V	49.43	-60.6	0.0	0.5	-61.1	-13.0	48.10

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	65.11	-45.1	13.9	1.6	-32.8	-13.0	19.80
3465.000	V	65.87	-44.4	13.9	1.6	-32.1	-13.0	19.10
5197.500	H	50.26	-56.2	14.0	1.5	-43.7	-13.0	30.70
5197.500	V	53.99	-52.5	14.0	1.5	-40.0	-13.0	27.00
6930.000	H	61.96	-40.3	13.6	1.8	-28.5	-13.0	15.50
6930.000	V	67.13	-35	13.6	1.8	-23.2	-13.0	10.20
8662.500	H	56.12	-43.8	13.7	1.9	-32.0	-13.0	19.00
8662.500	V	59.48	-40.8	13.7	1.9	-29.0	-13.0	16.00
800.180	H	48.39	-50.3	0.0	0.9	-51.2	-13.0	38.2
499.448	V	47.78	-59.5	0.0	0.7	-60.2	-13.0	47.2

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:707.5MHz								
1415.000	H	57.47	-56	9.1	1.2	-48.1	-13.0	35.10
1415.000	V	59.79	-54.2	9.1	1.2	-46.3	-13.0	33.30
2122.500	H	50.56	-62.2	11.3	1.1	-52.0	-13.0	39.00
2122.500	V	53.55	-59.2	11.3	1.1	-49.0	-13.0	36.00
2830.000	H	47.76	-64.3	13.3	1.4	-52.4	-13.0	39.40
2830.000	V	48.59	-63.7	13.3	1.4	-51.8	-13.0	38.80
800.180	H	49.14	-49.5	0.0	0.9	-50.4	-13.0	37.4
800.180	V	45.21	-57.2	0.0	0.9	-58.1	-13.0	45.1

Note:

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

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

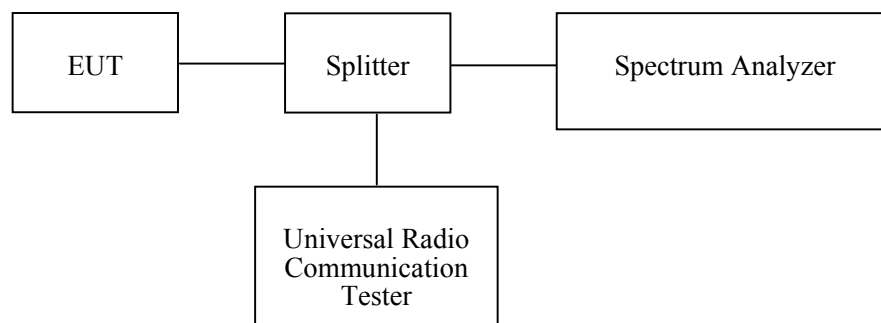
Applicable Standard

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

Test Procedure

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

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2018-08-03	2019-08-03
R&S	Spectrum Analyzer	FSU 26	200256	2018-1-4	2019-1-4
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
R&S	Wideband Radio Communication Tester	CMW500	149216	2017-12-11	2018-12-11
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**

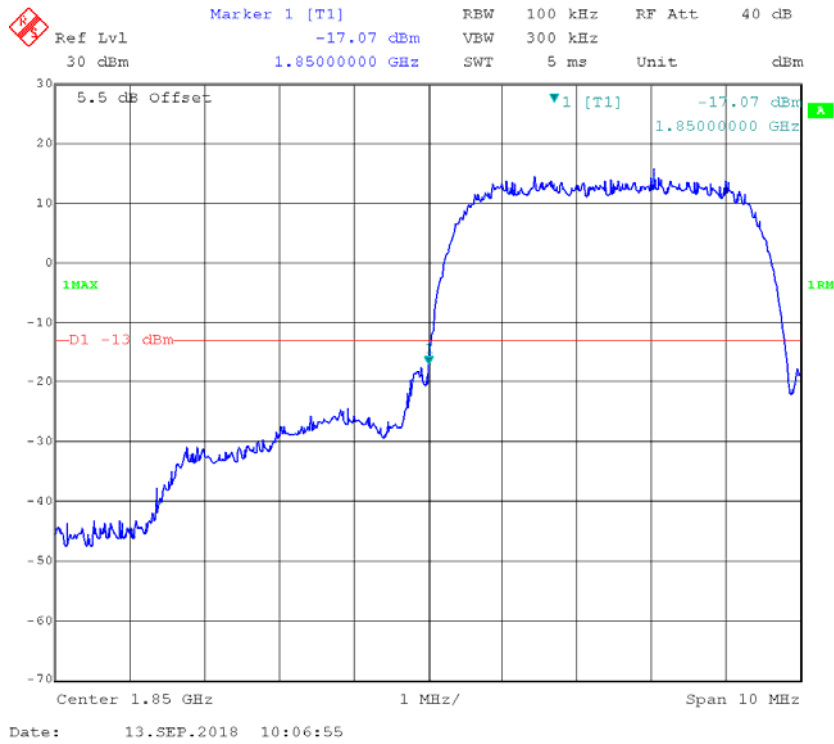
Temperature:	26.6~27.1°C
Relative Humidity:	55~58 %
ATM Pressure:	100.4~100.6 kPa

The testing was performed by Nami Quan from 2018-09-13 to 2018-09-15.

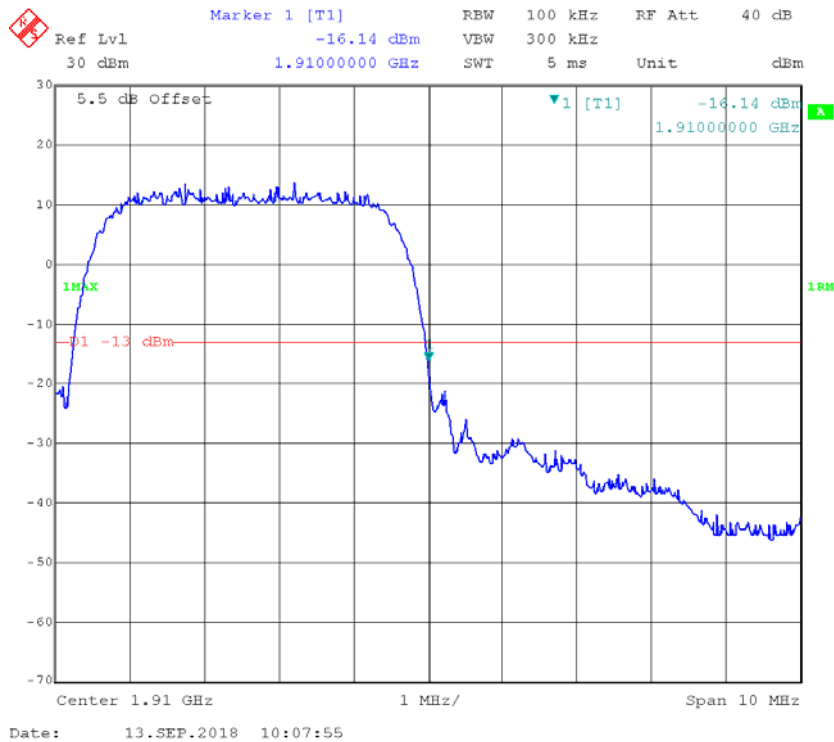
Test Mode: Transmitting

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

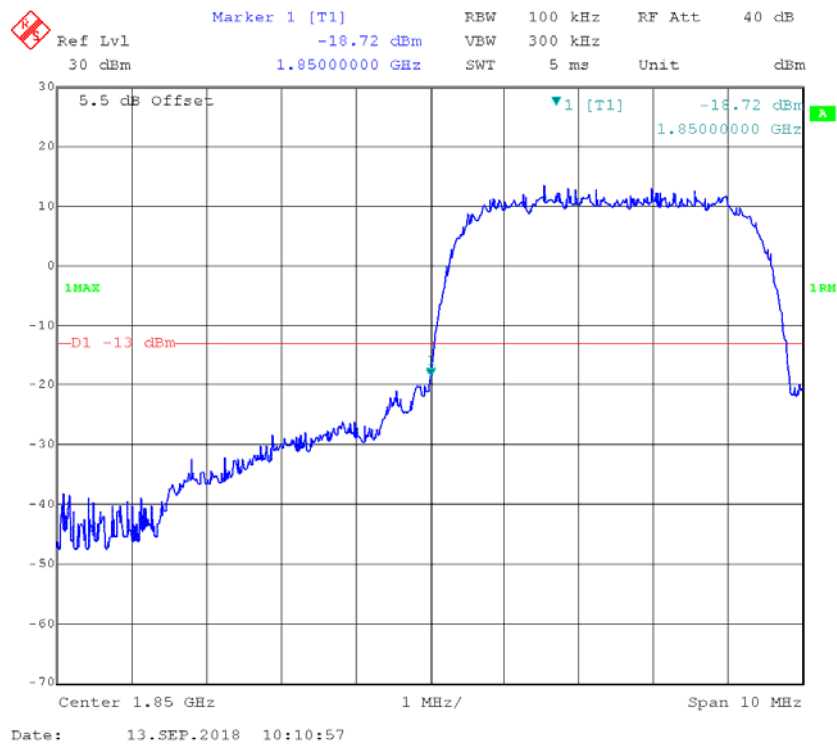
WCDMA Band II Rel 99, Left Band Edge



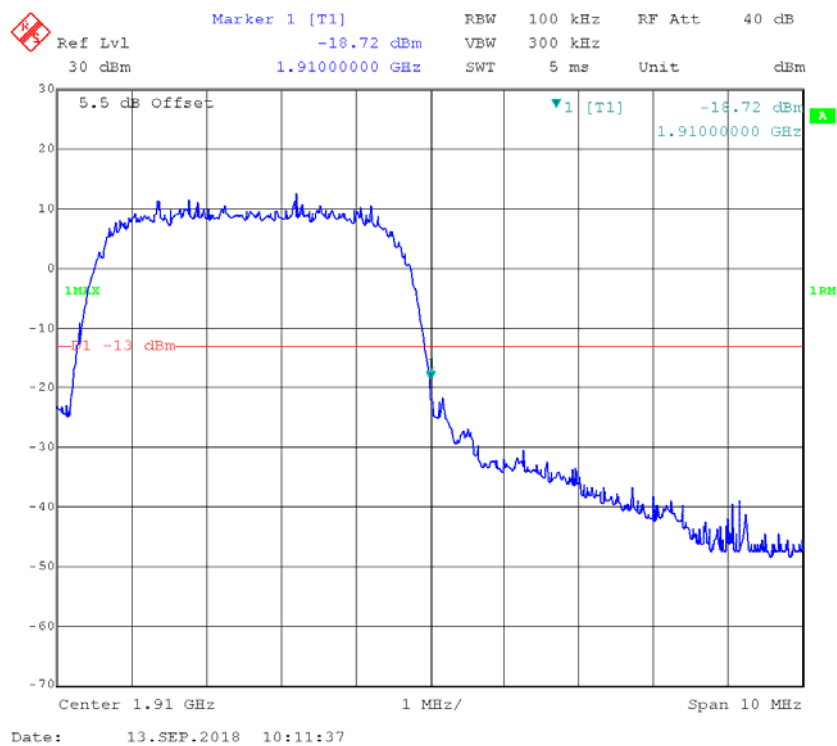
WCDMA Band II Rel 99, Right Band Edge

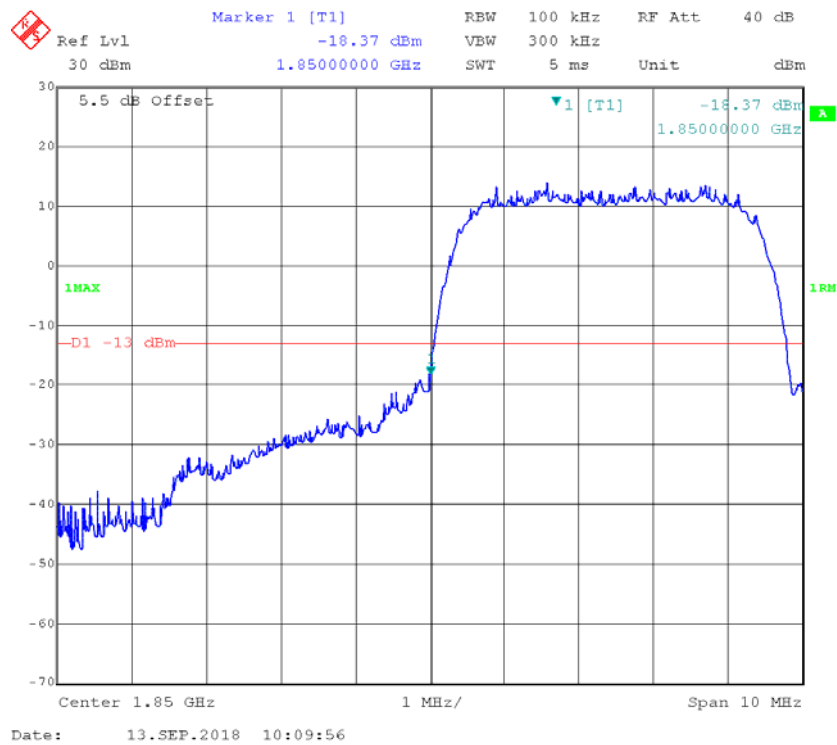
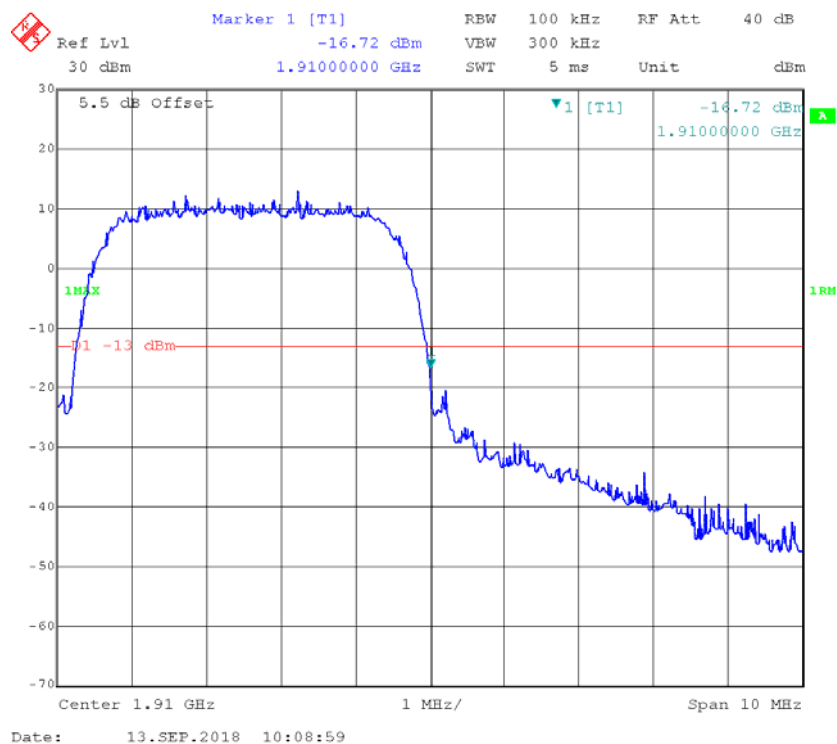


WCDMA Band II HSUPA, Left Band Edge

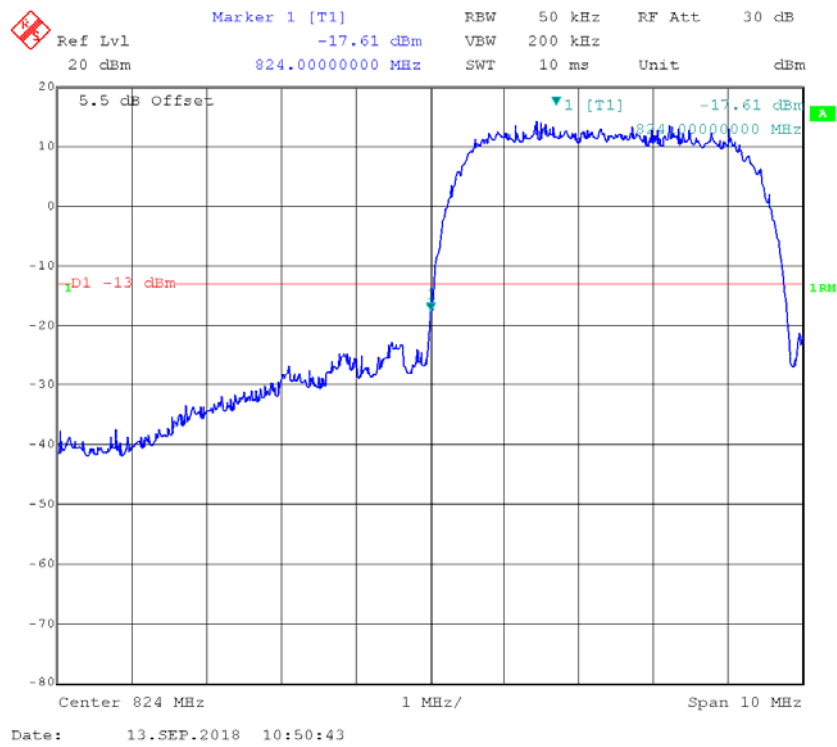


WCDMA Band II HSUPA, Right Band Edge

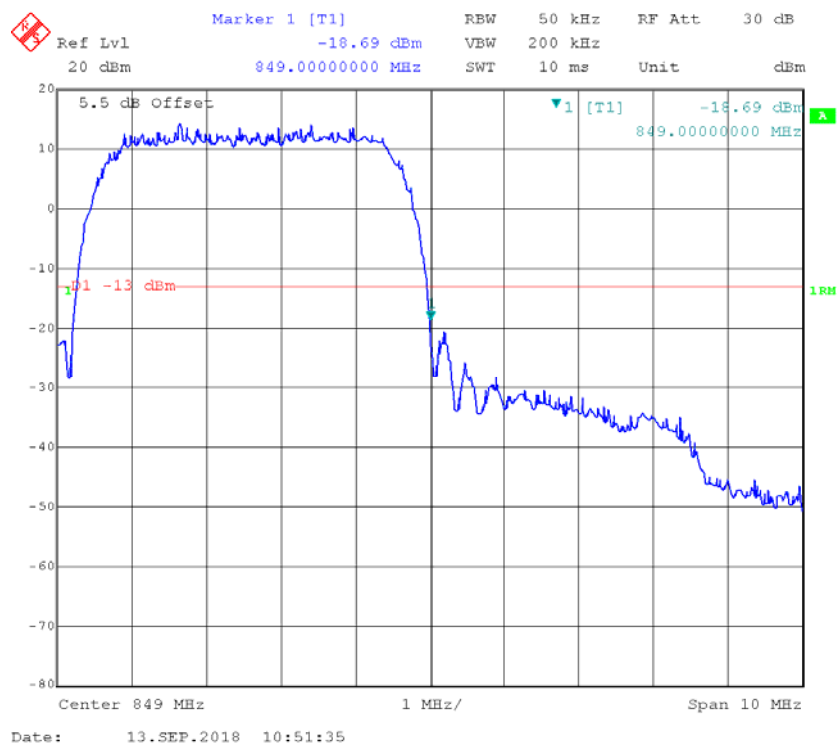


WCDMA Band II HSDPA, Left Band Edge**WCDMA Band II HSDPA, Right Band Edge**

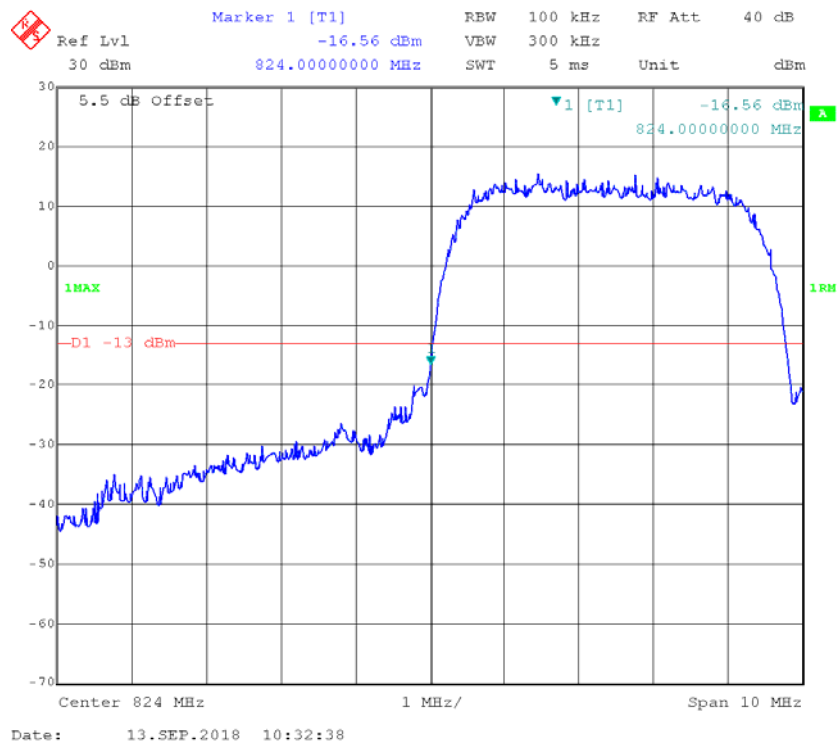
WCDMA Band V Rel 99, Left Band Edge



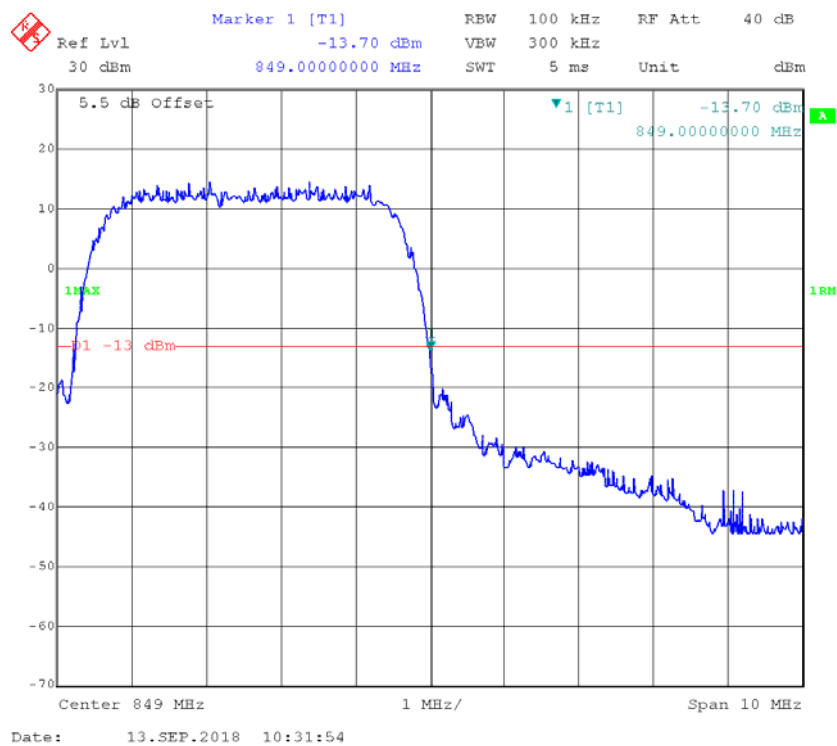
WCDMA Band V Rel 99, Right Band Edge

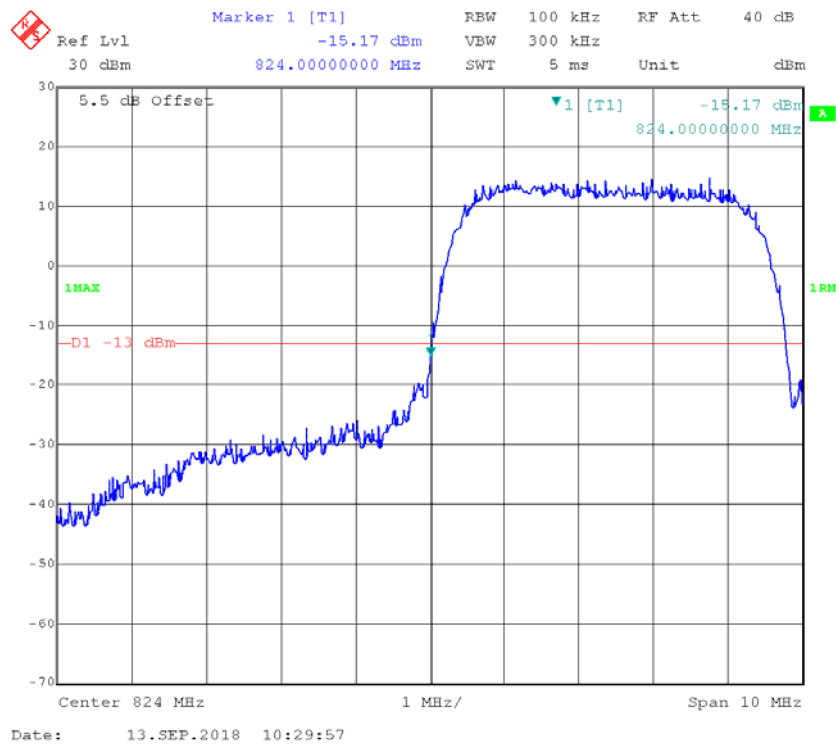
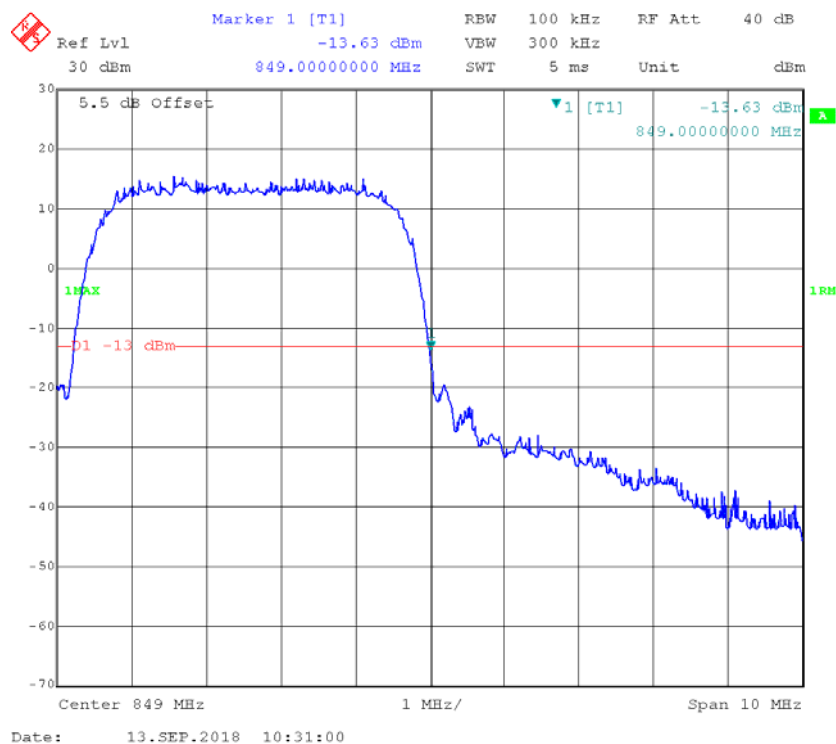


WCDMA Band V HSUPA, Left Band Edge



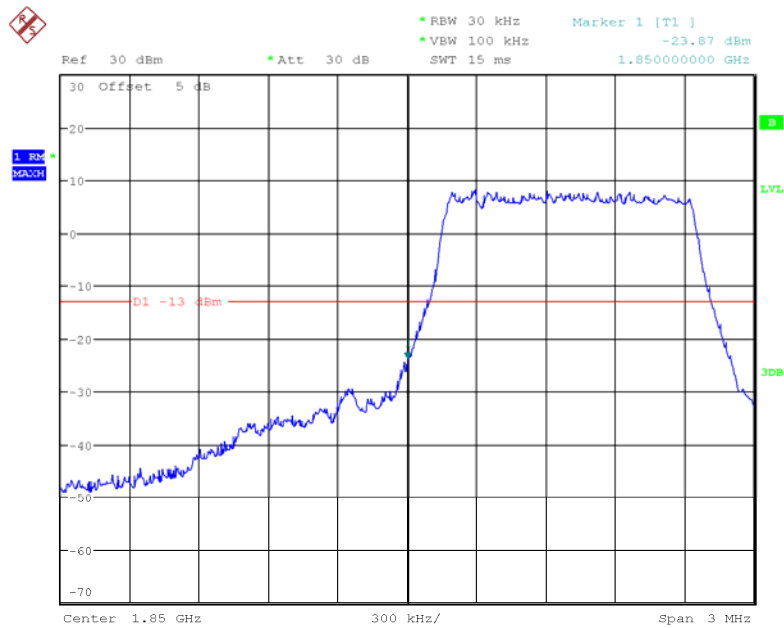
WCDMA Band V HSUPA, Right Band Edge



WCDMA Band V HSDPA, Left Band Edge**WCDMA Band V HSDPA, Right Band Edge**

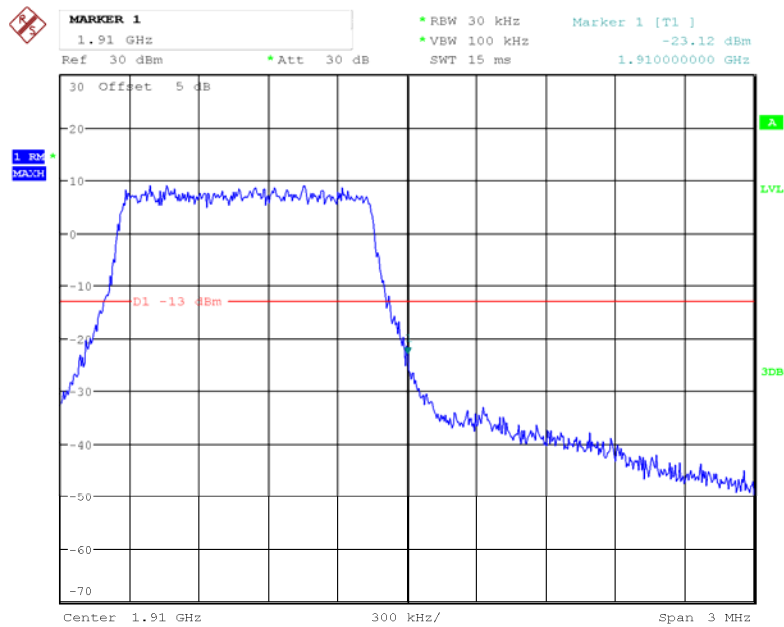
LTE Band II

QPSK_1.4MHz_6 RB_ Left



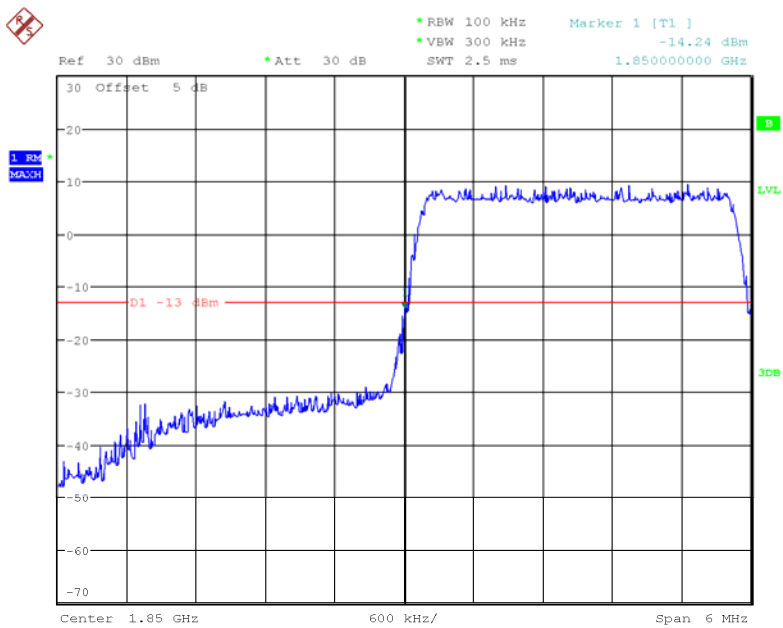
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QPSK_1.4MHz_6 RB_ Right



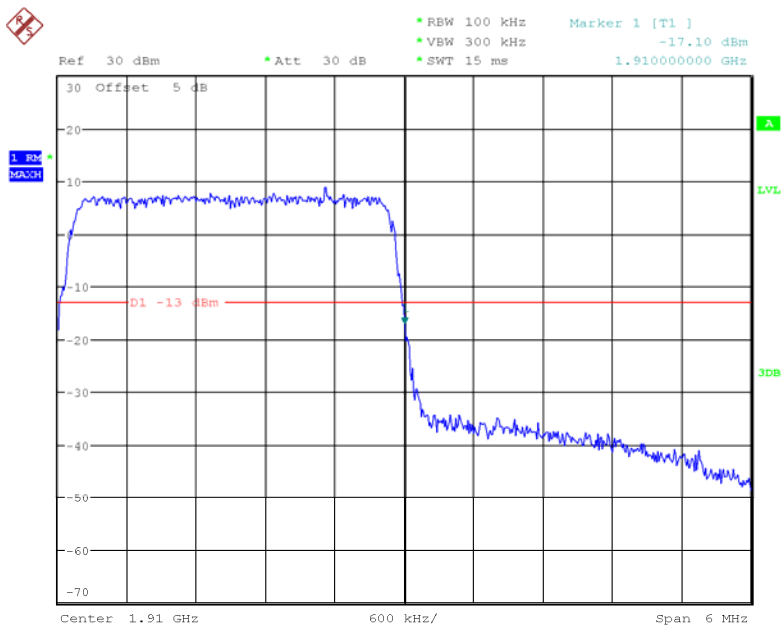
Date: 15.SEP.2018 17:23:31

QPSK_3MHz_15 RB_ Left



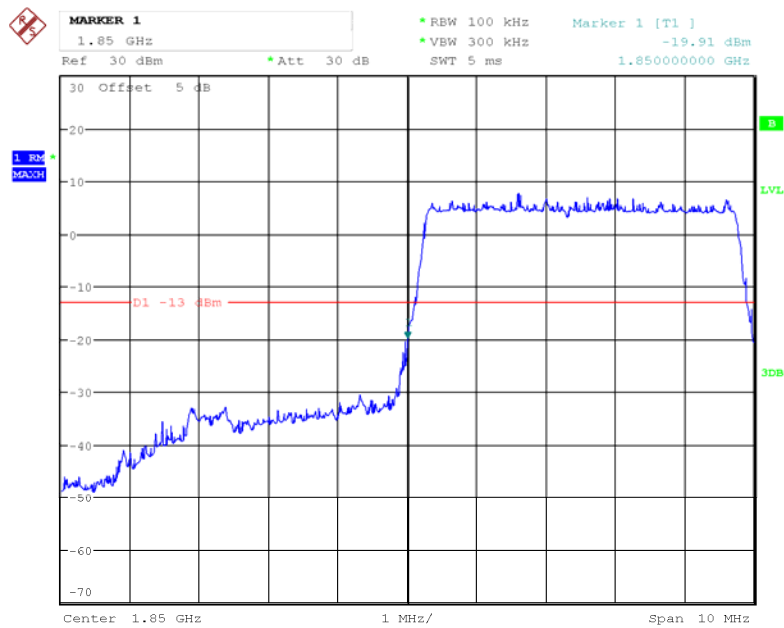
Date: 15.SEP.2018 15:04:02

QPSK_3MHz_15 RB_ Right



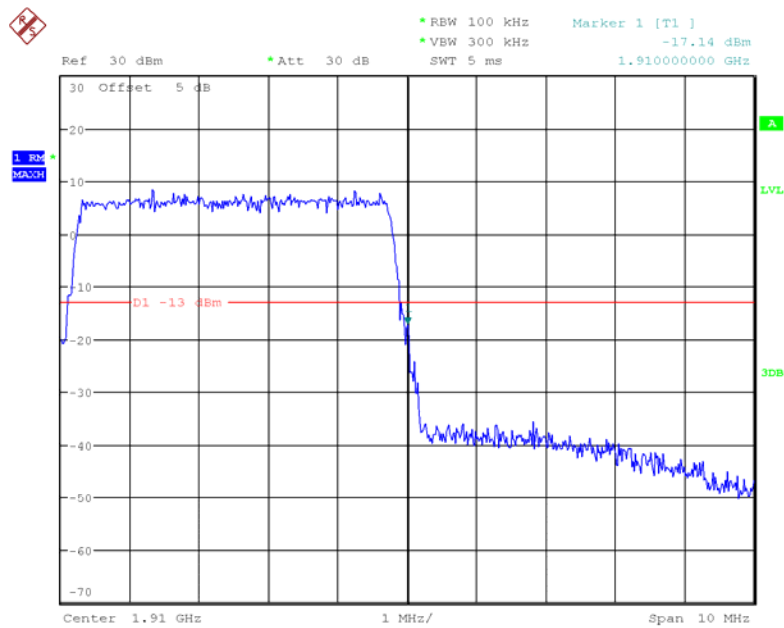
Date: 15.SEP.2018 17:25:25

QPSK_5MHz_25 RB_ Left



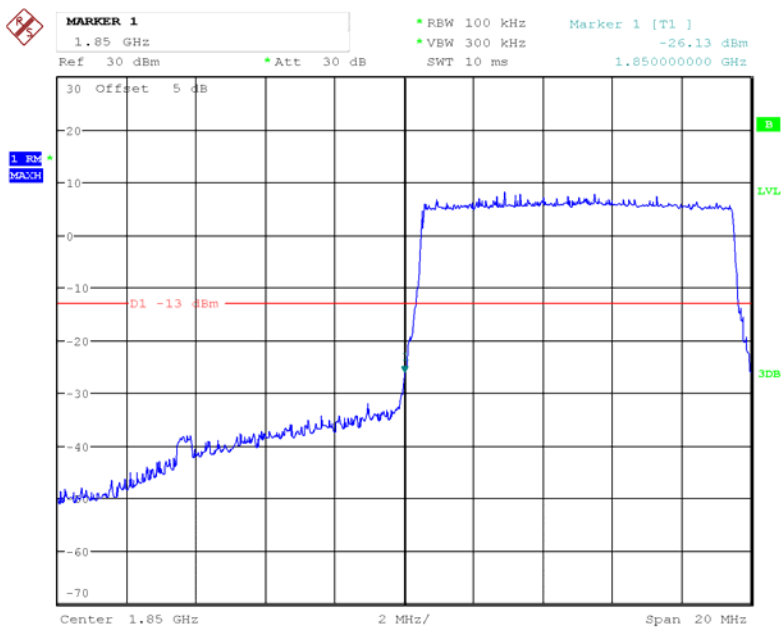
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QPSK_5MHz_25 RB_ Right



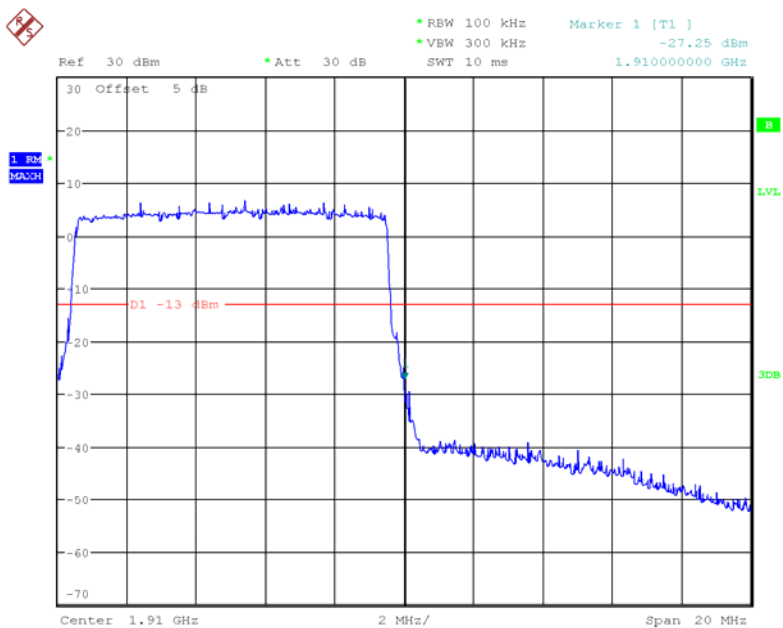
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QPSK_10MHz_50 RB_ Left



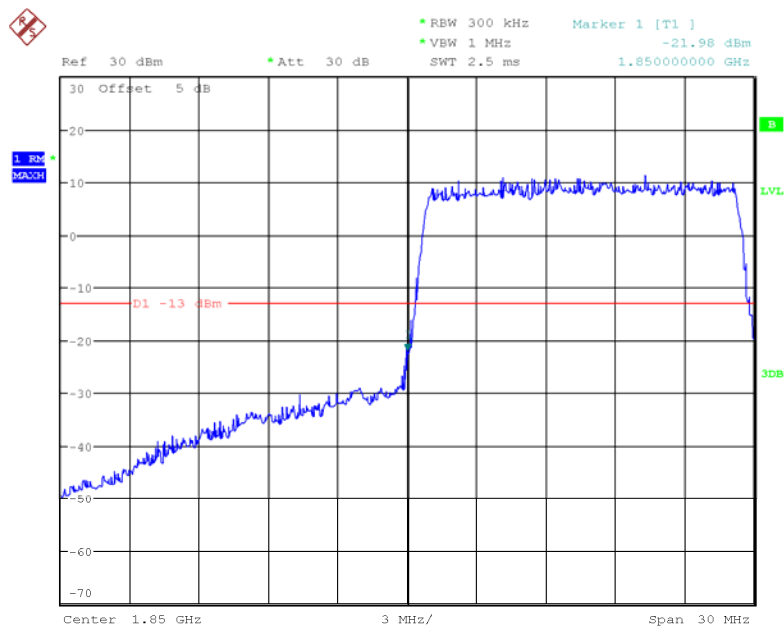
Date: 15.SEP.2018 15:10:46

QPSK_10MHz_50 RB_ Right



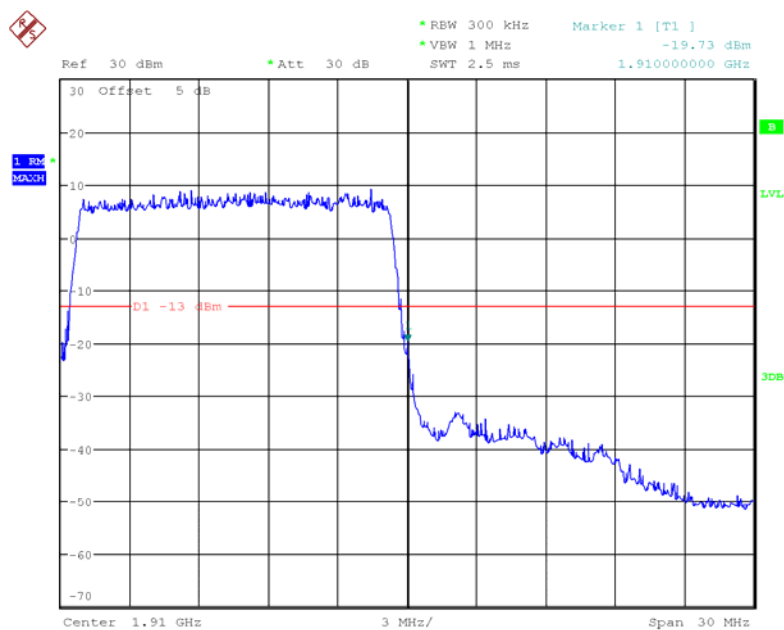
Date: 15.SEP.2018 15:09:39

QPSK_15MHz_75 RB_ Left



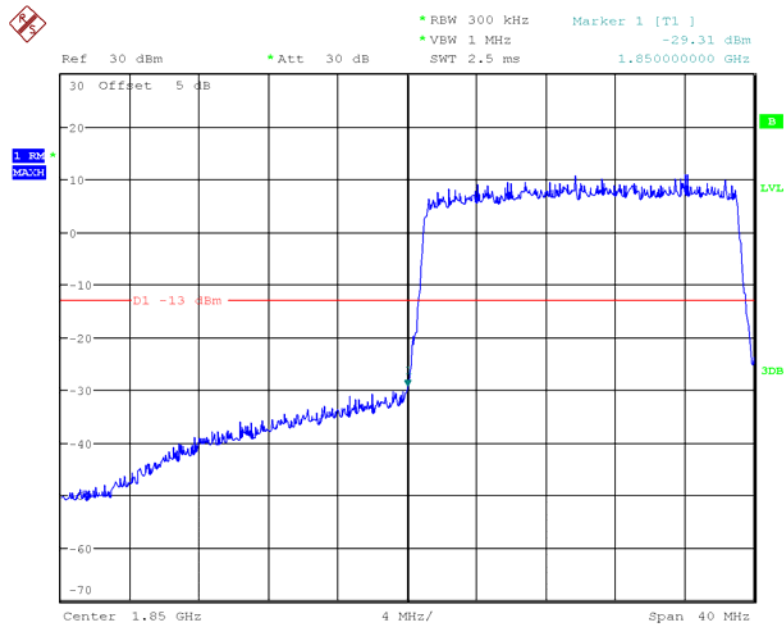
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QPSK_15MHz_75 RB_ Right



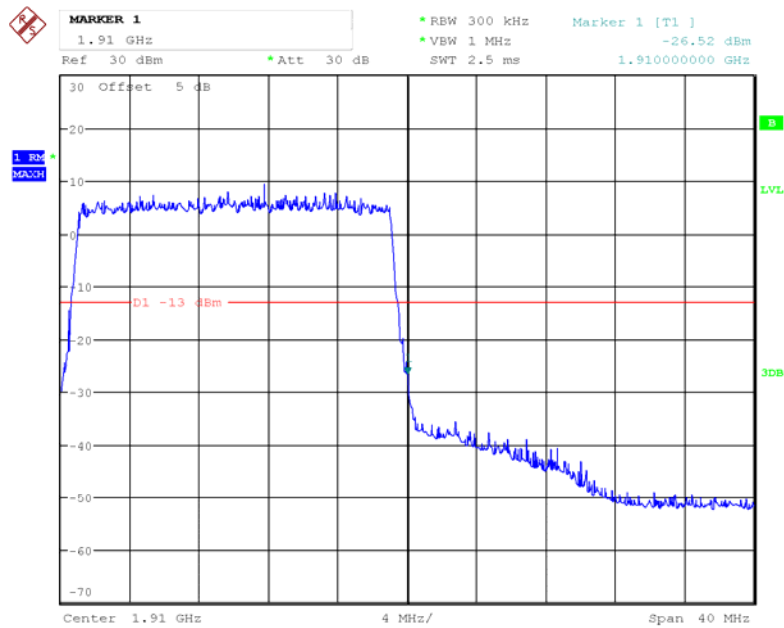
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QPSK_20MHz_FULL RB_Left



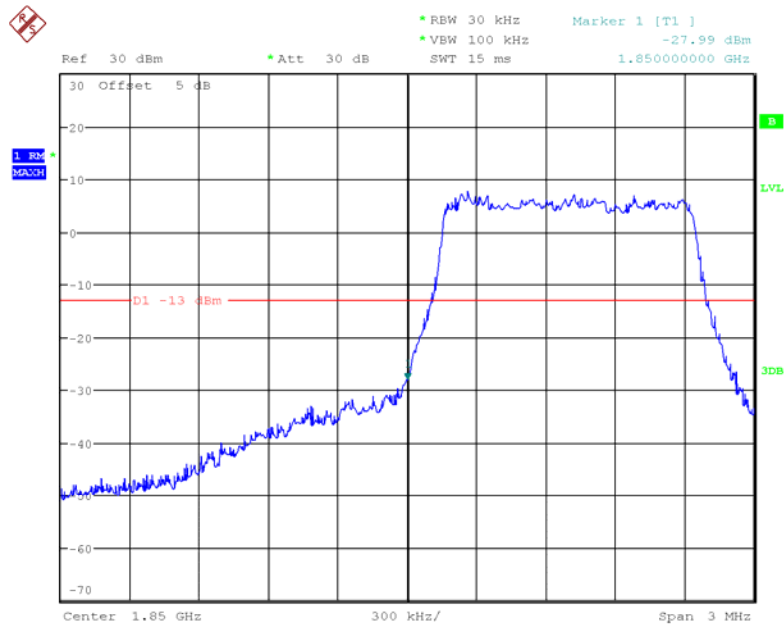
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QPSK_20MHz_FULL RB_Right



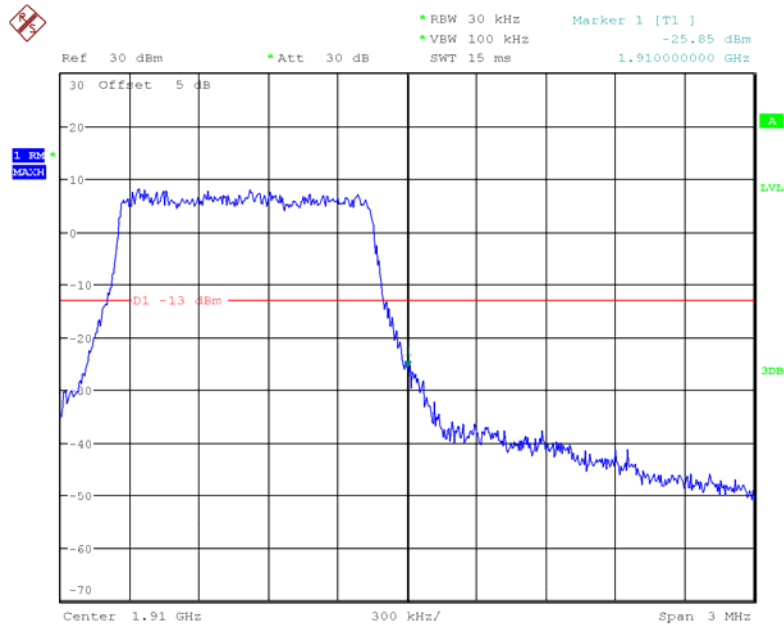
Date: 15.SEP.2018 15:20:38

16QAM_1.4MHz_6 RB_ Left



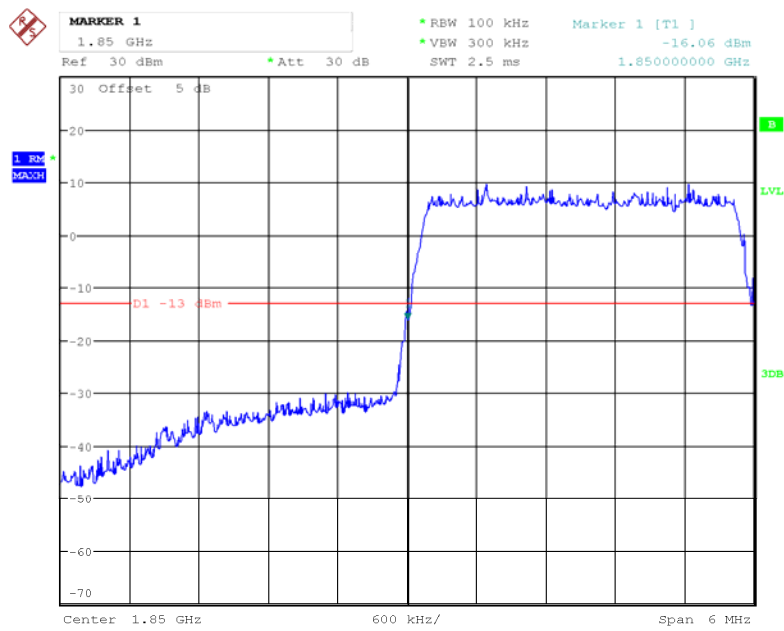
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16QAM_1.4MHz_6 RB_ Right



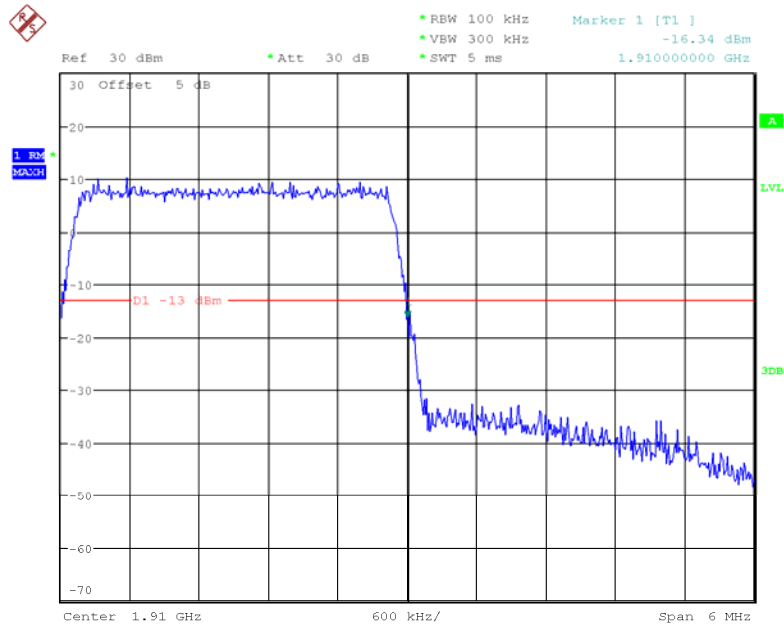
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16QAM_3MHz_15 RB_ Left



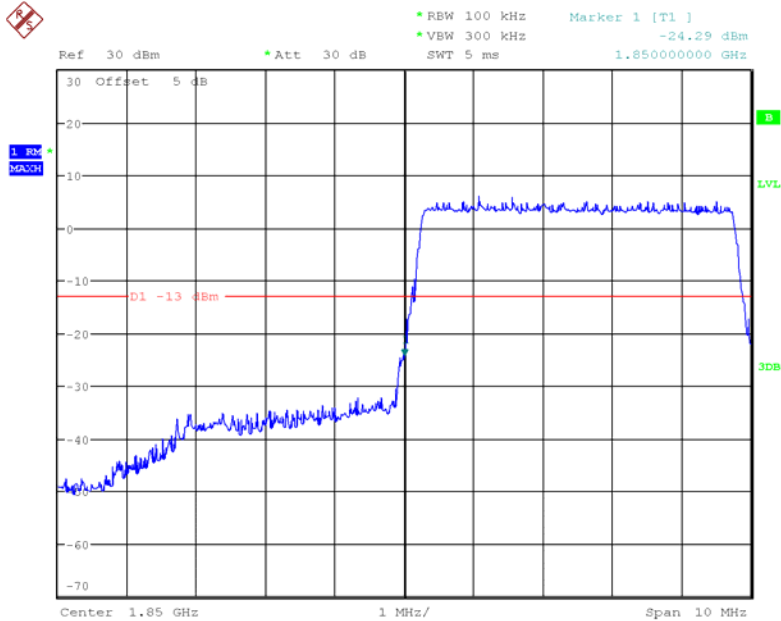
Date: 15.SEP.2018 15:03:49

16QAM_3MHz_15 RB_ Right



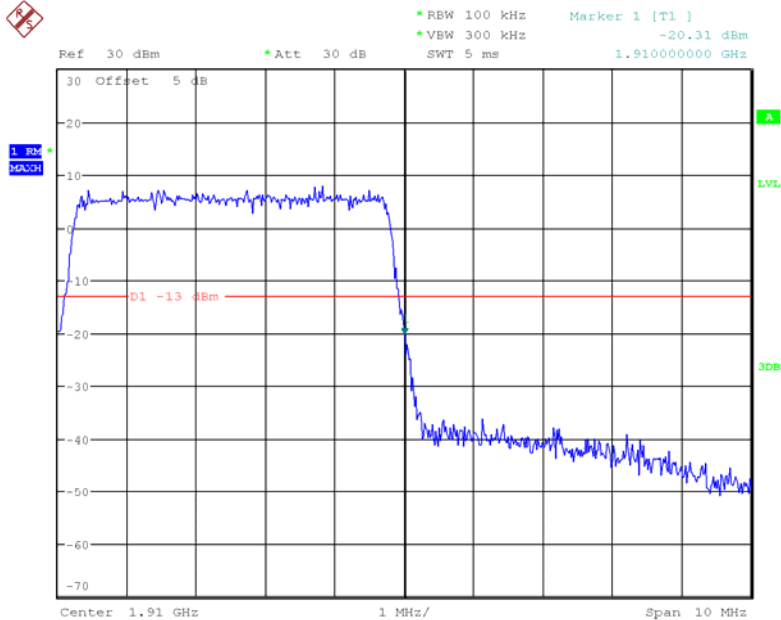
Date: 15.SEP.2018 17:25:04

16QAM_5MHz_25 RB_ Left



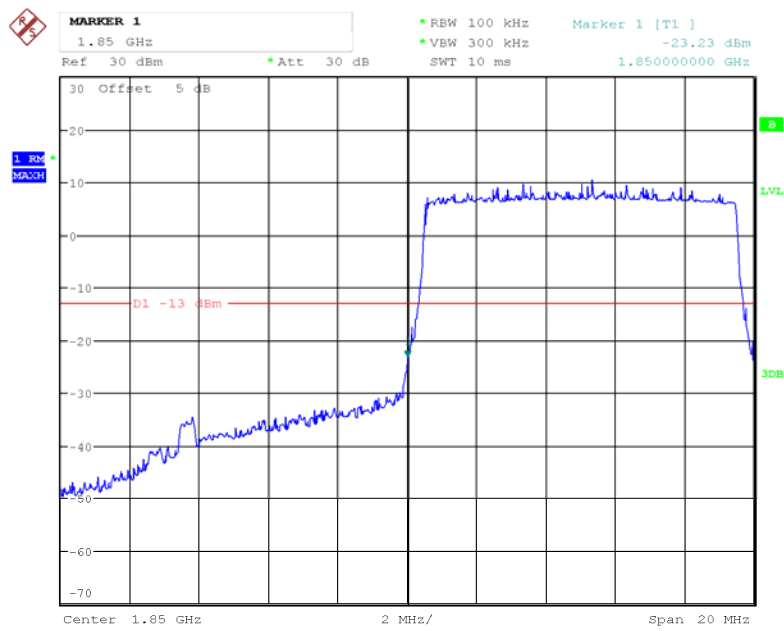
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16QAM_5MHz_25 RB_ Right



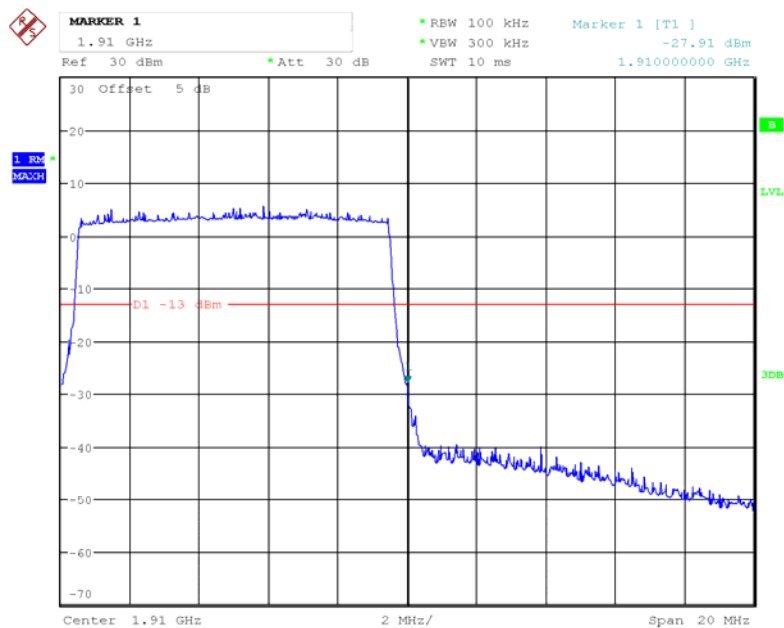
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16QAM_10MHz_50 RB_Left

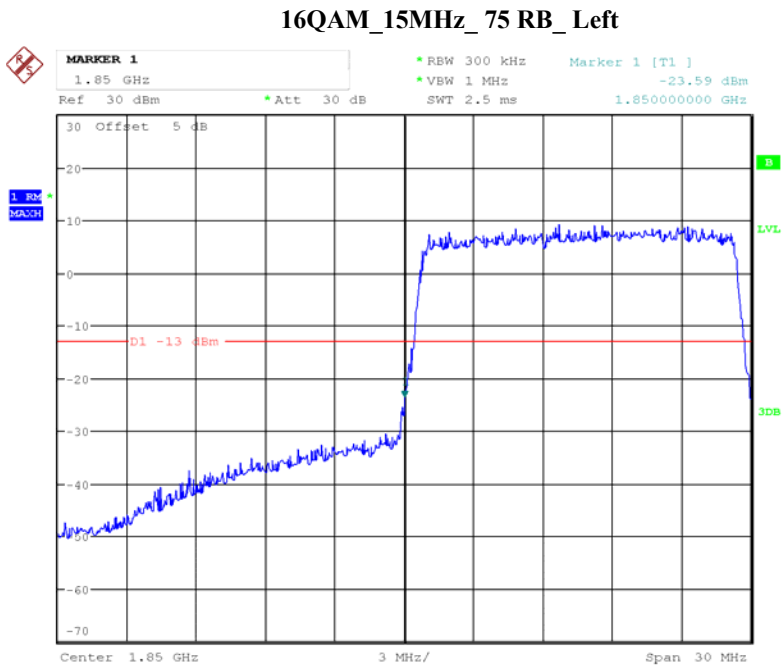


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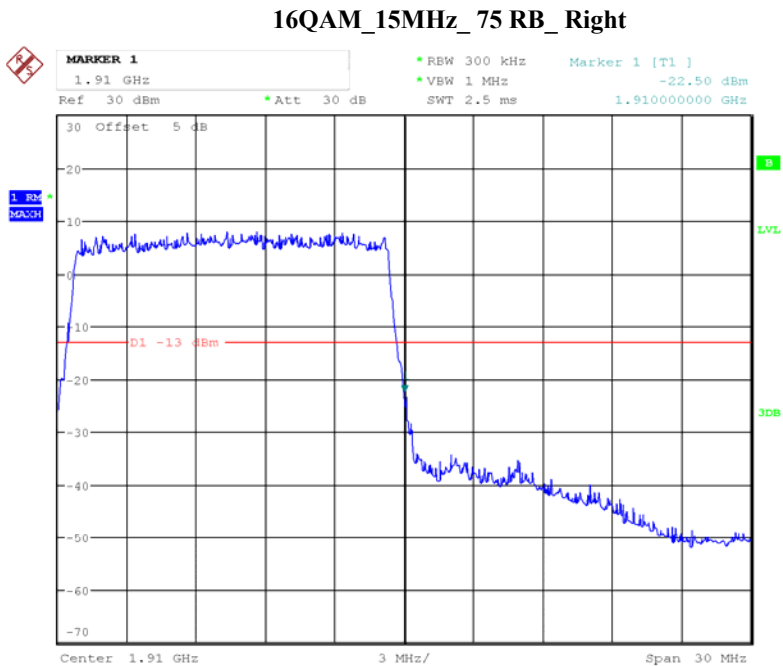
16QAM_10MHz_50 RB_Right



Date: 15.SEP.2018 15:09:22

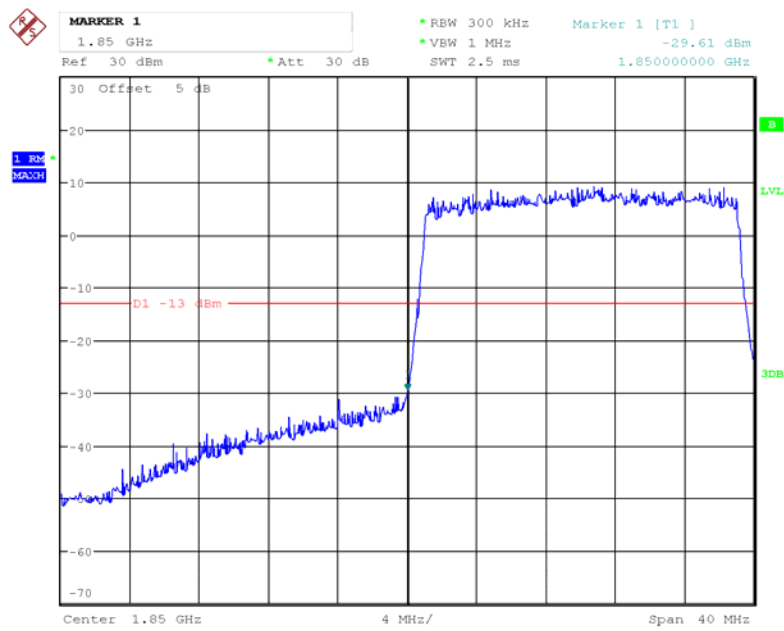


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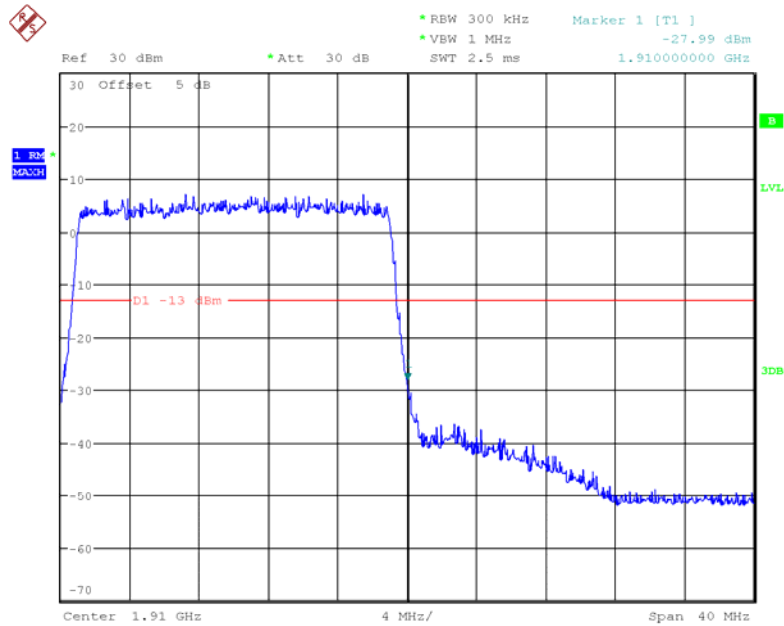
Date: 15.SEP.2018 15:16:00

16QAM_20MHz_FULL RB_Left



Date: 15.SEP.2018 15:18:44

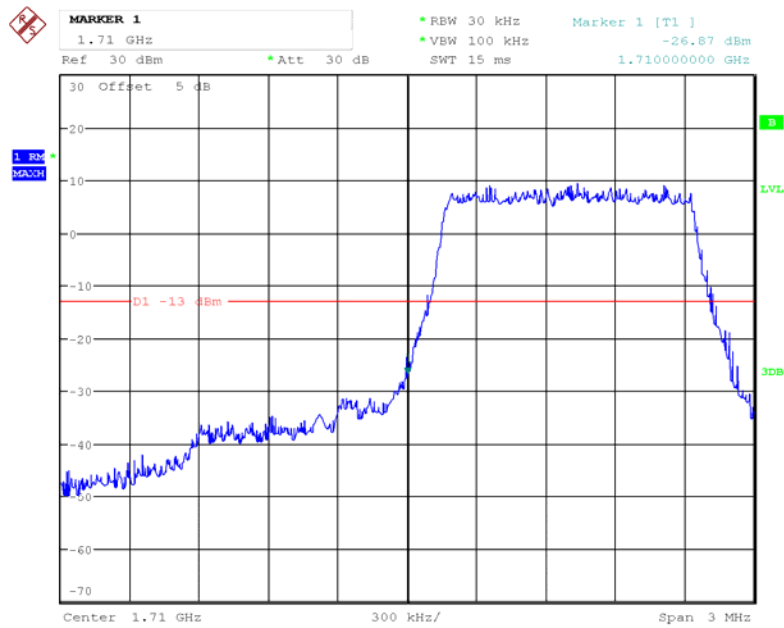
16QAM_20MHz_FULL RB_Right



Date: 15.SEP.2018 15:18:01

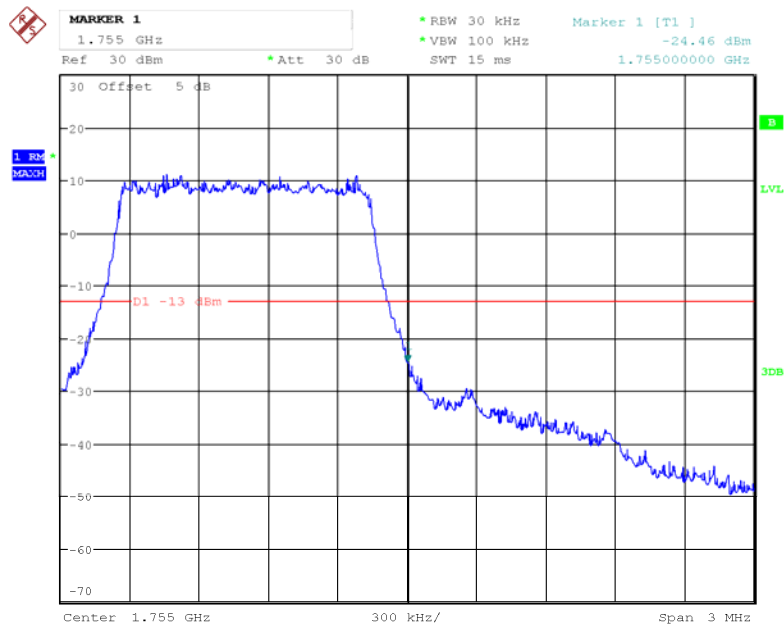
LTE Band IV

QPSK_1.4MHz_6 RB_ Left



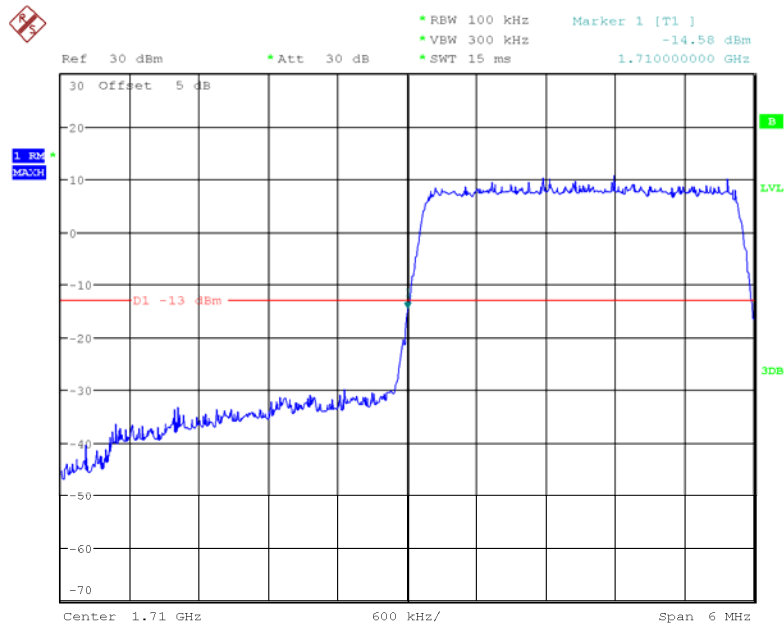
Date: 15.SEP.2018 15:27:30

QPSK_1.4MHz_6 RB_ Right



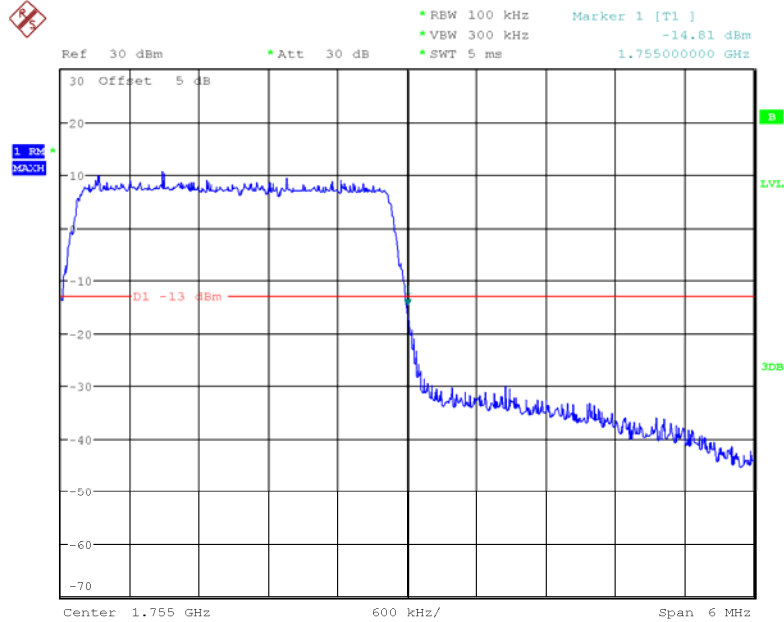
Date: 15.SEP.2018 15:28:44

QPSK_3MHz_15 RB_Left



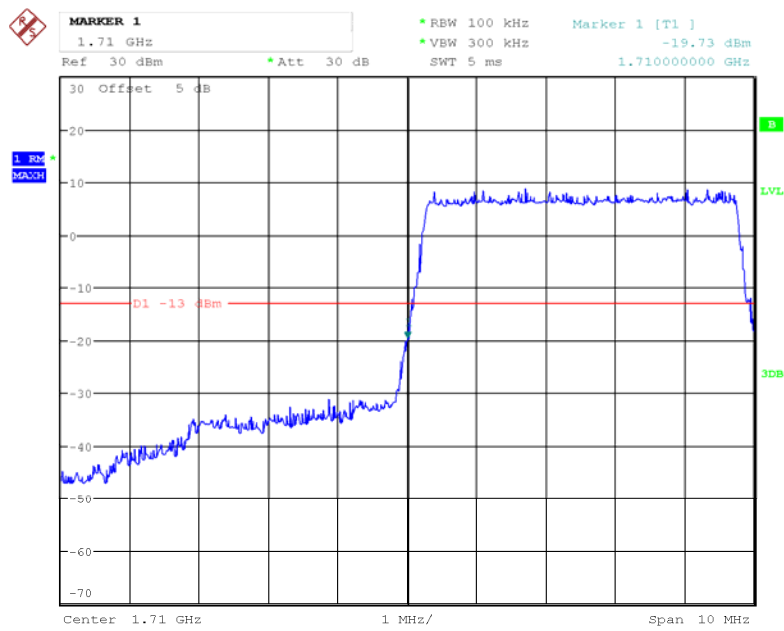
Date: 15.SEP.2018 15:30:58

QPSK_3MHz_15 RB_Right



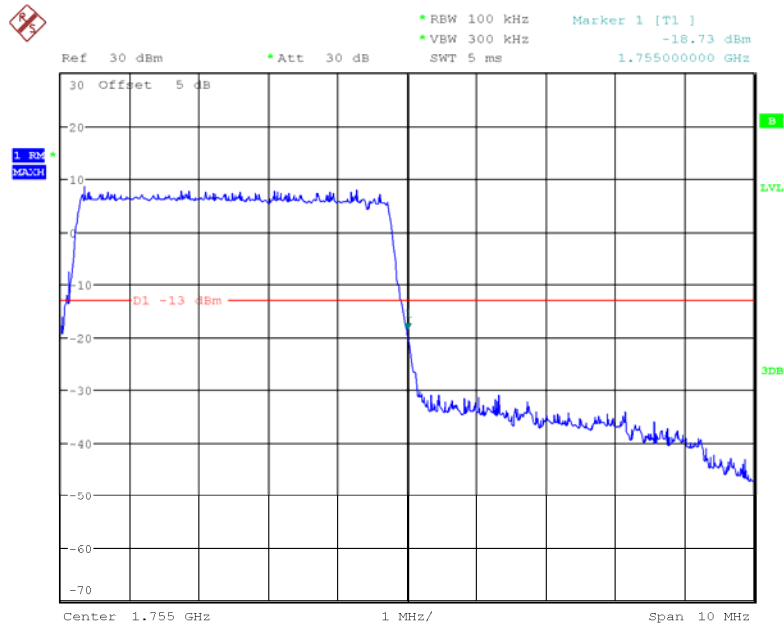
Date: 15.SEP.2018 15:30:07

QPSK_5MHz_25 RB_ Left



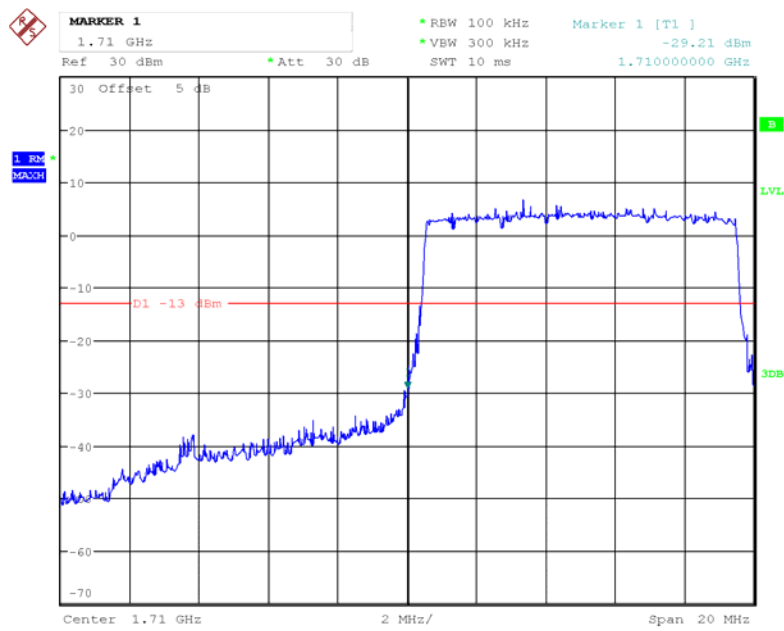
Date: 15.SEP.2018 15:32:03

QPSK_5MHz_25 RB_ Right



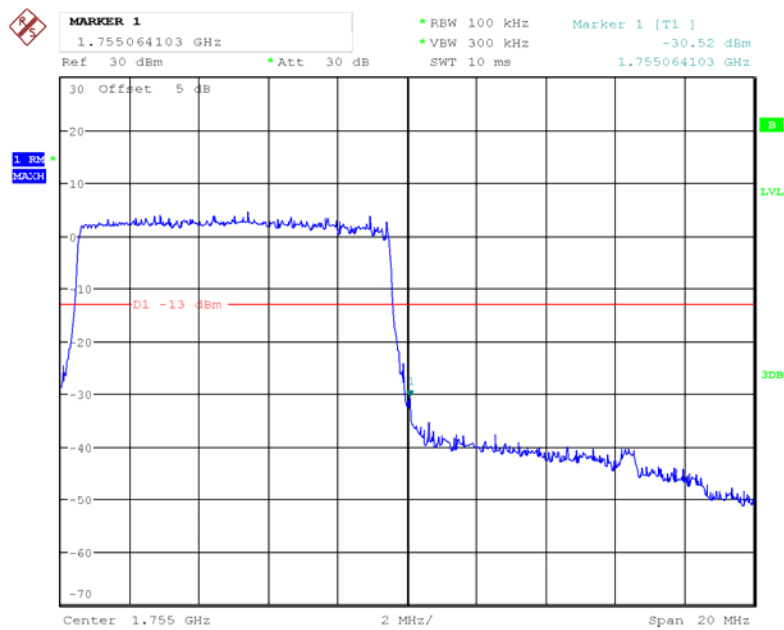
Date: 15.SEP.2018 15:32:51

QPSK_10MHz_50 RB_ Left



Date: 15.SEP.2018 15:34:55

QPSK_10MHz_50 RB_ Right



Date: 15.SEP.2018 15:34:06

MARKER 1
1.71 GHz

Ref 30 dBm * Att 30 dB * RBW 300 kHz Marker 1 [T1]
* VEW 1 MHz -23.65 dBm
SWT 2.5 ms 1.710000000 GHz

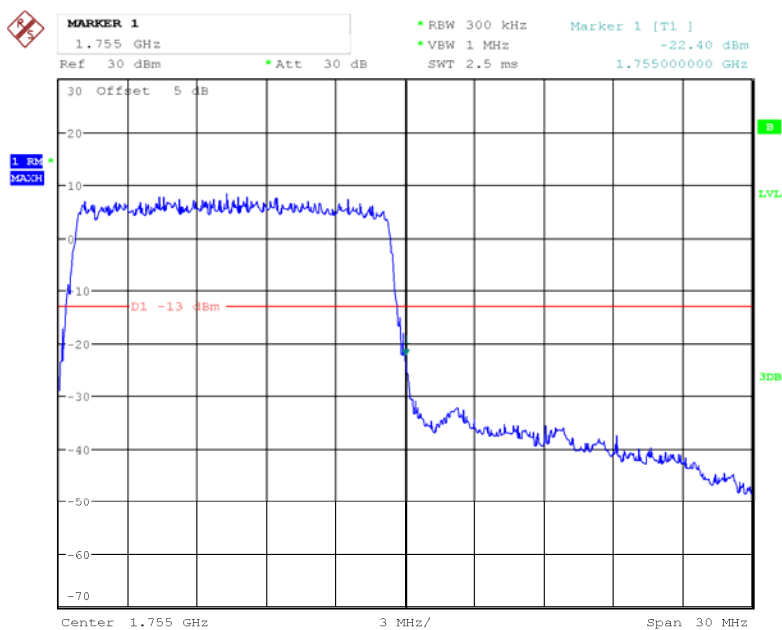
30 Offset 5 dB

1. RBW
HATCH

D1 -13 dBm

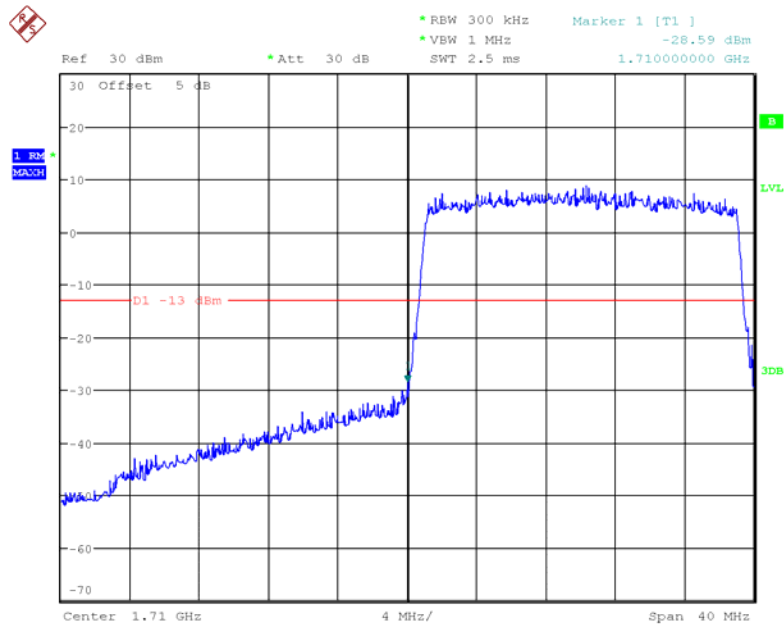
Center 1.71 GHz 3 MHz/ Span 30 MHz

QPSK_15MHz_75 RB_Right



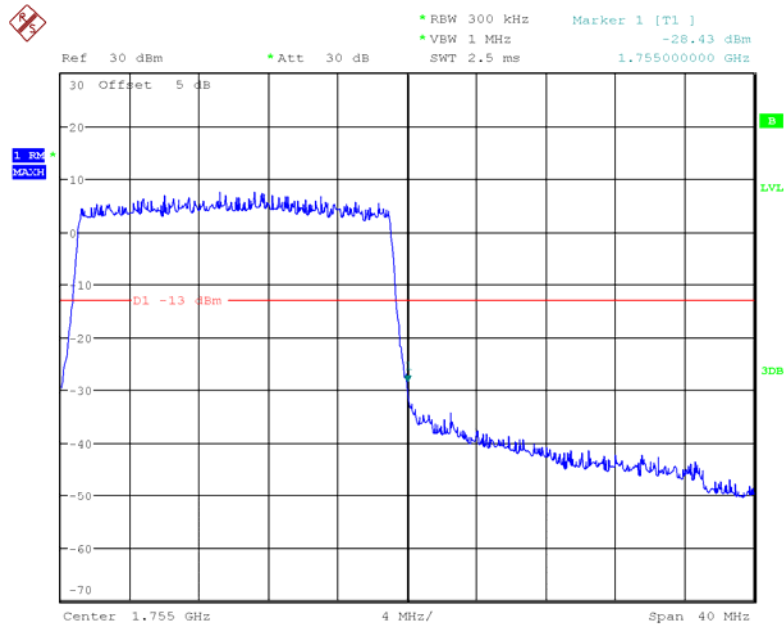
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QPSK_20MHz_FULL RB_Left



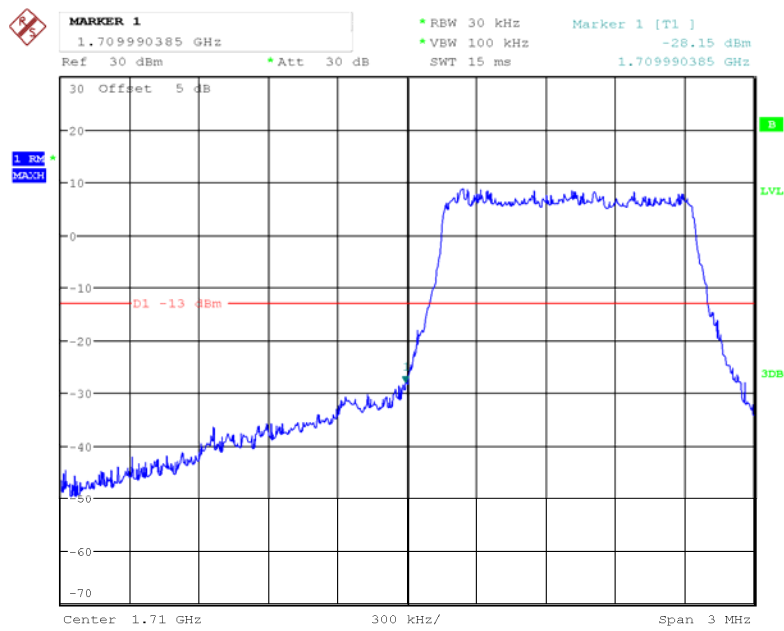
Date: 15.SEP.2018 15:42:25

QPSK_20MHz_FULL RB_Right



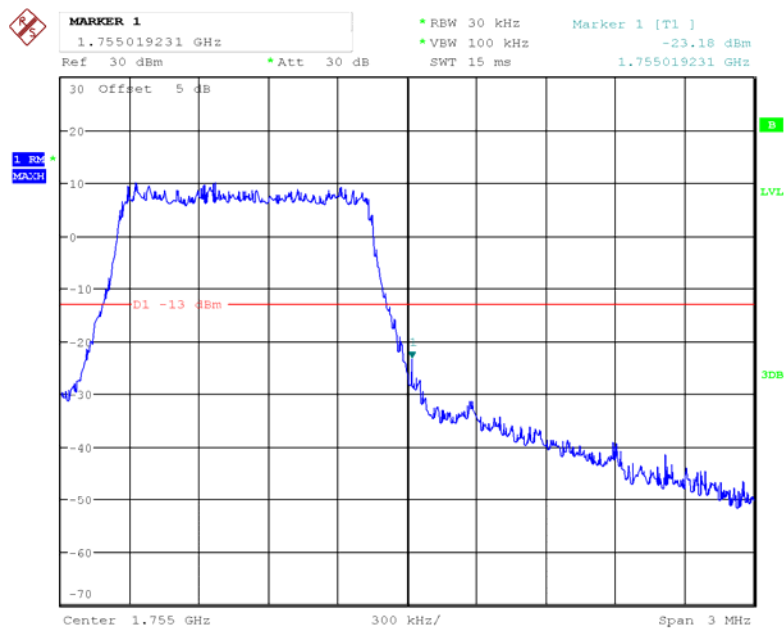
Date: 15.SEP.2018 15:41:07

16QAM_1.4MHz_6 RB_ Left



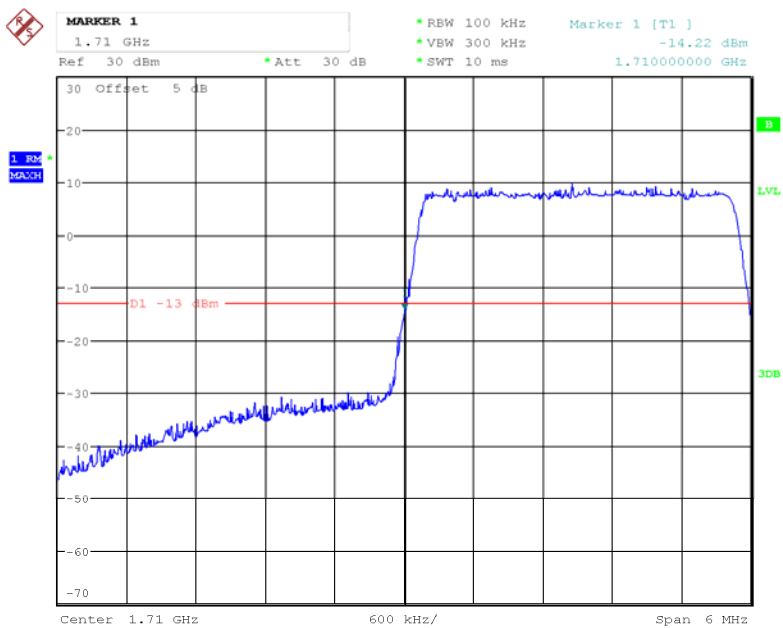
Date: 15.SEP.2018 15:27:15

16QAM_1.4MHz_6 RB_ Right



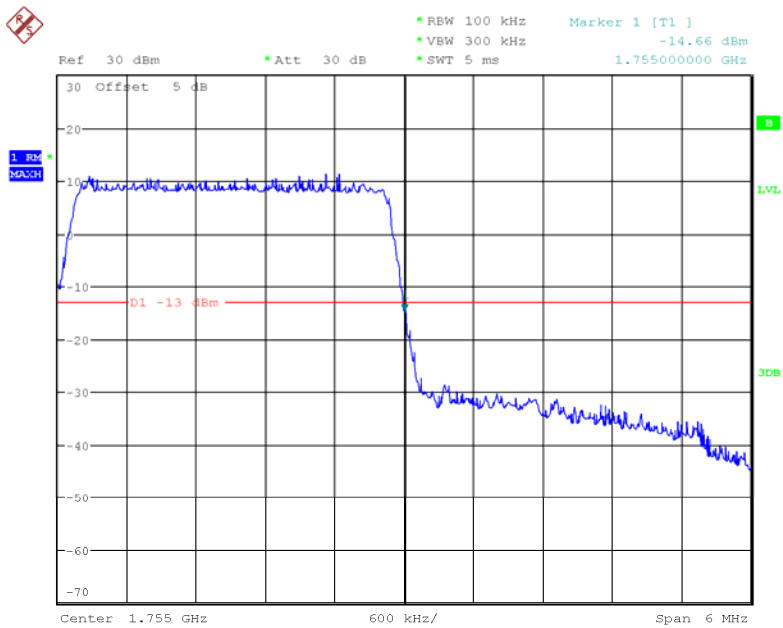
Date: 15.SEP.2018 15:28:24

16QAM_3MHz_15 RB_Left



Date: 15.SEP.2018 15:30:42

16QAM_3MHz_15 RB_Right



Date: 15.SEP.2018 15:29:53

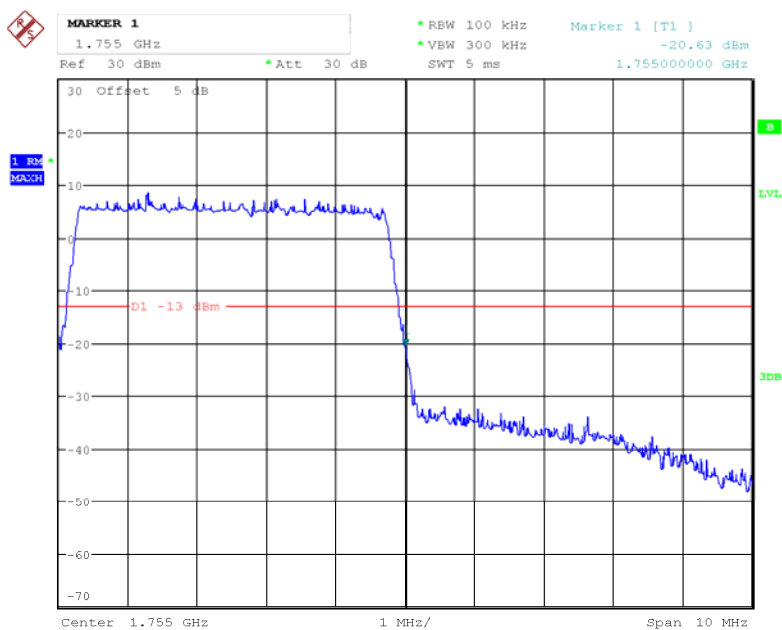
MARKER 1
 1.71 GHz
 Ref 30 dBm
 Att 30 dB
 RBW 100 kHz
 VBW 300 kHz
 SWT 5 ms
 Marker 1 [T1]
 -16.58 dBm
 1.710000000 GHz

30 Offset 5 dB
 20
 10
 0
 -10
 -20
 -30
 -40
 -50
 -60
 -70

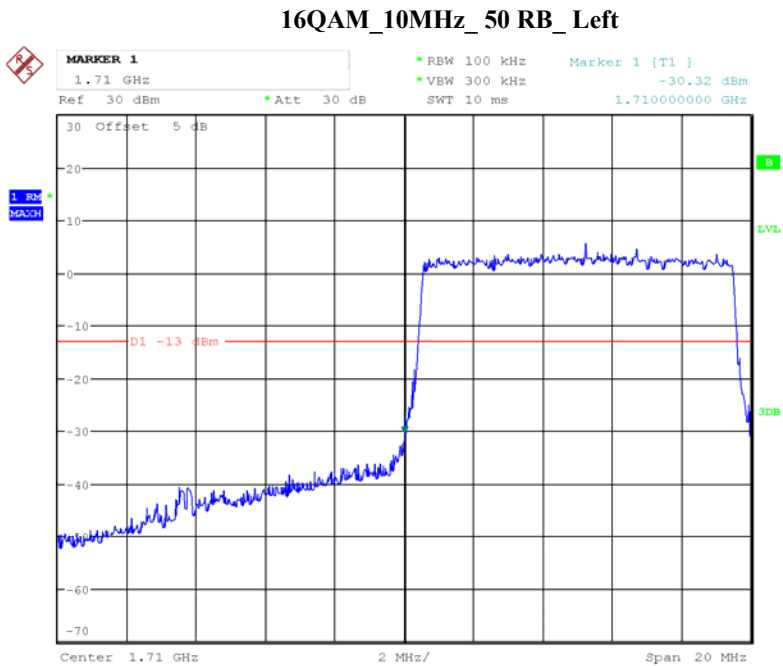
1.71 MHz
 1.71 GHz
 1 MHz/
 Span 10 MHz

D1 -13 dBm

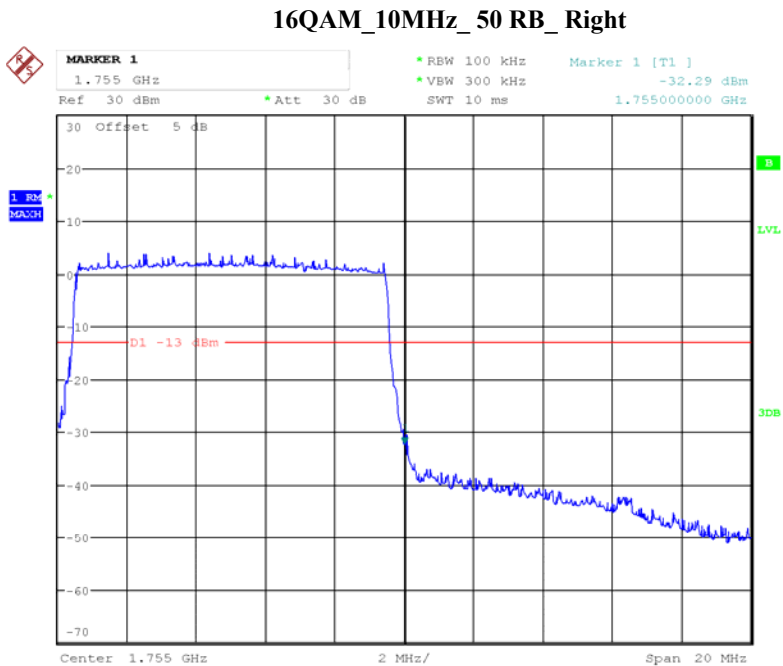
16QAM_5MHz_25 RB_Right



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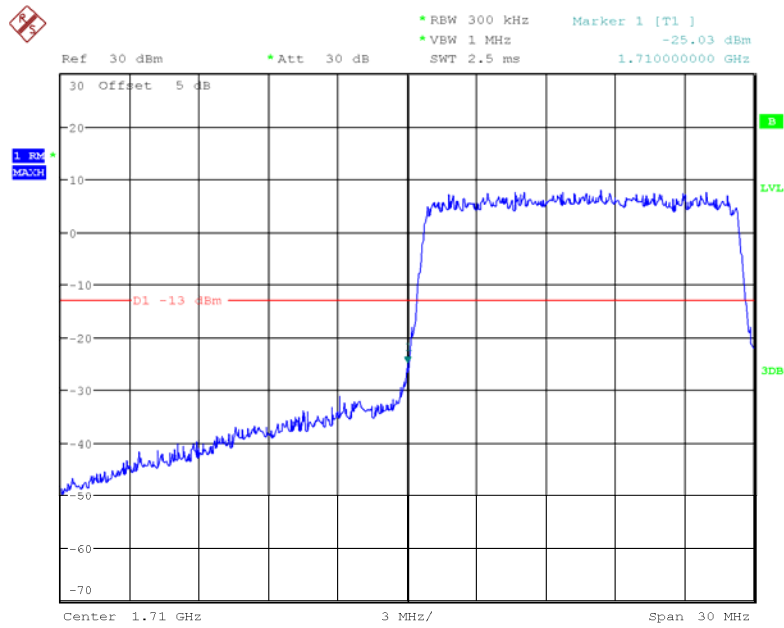


Date: 15.SEP.2018 15:34:38



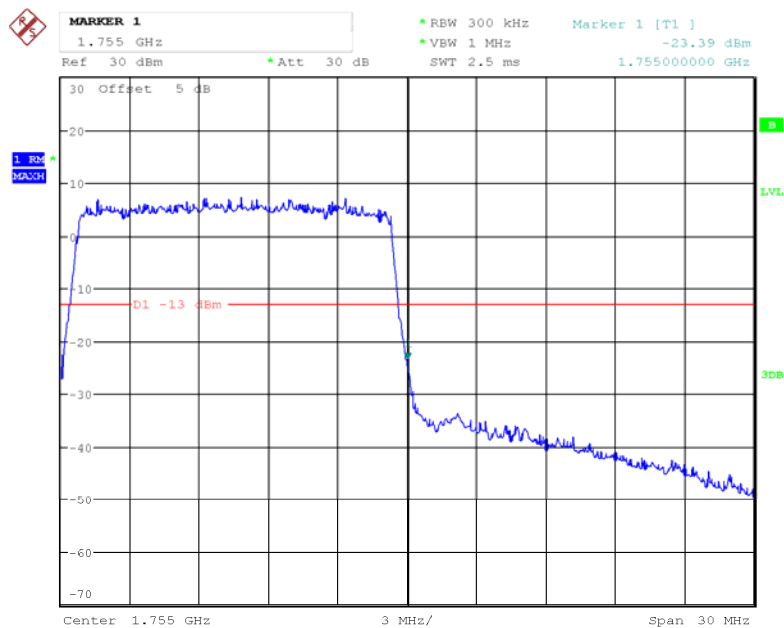
Date: 15.SEP.2018 15:33:48

16QAM_15MHz_ 75 RB_ Left



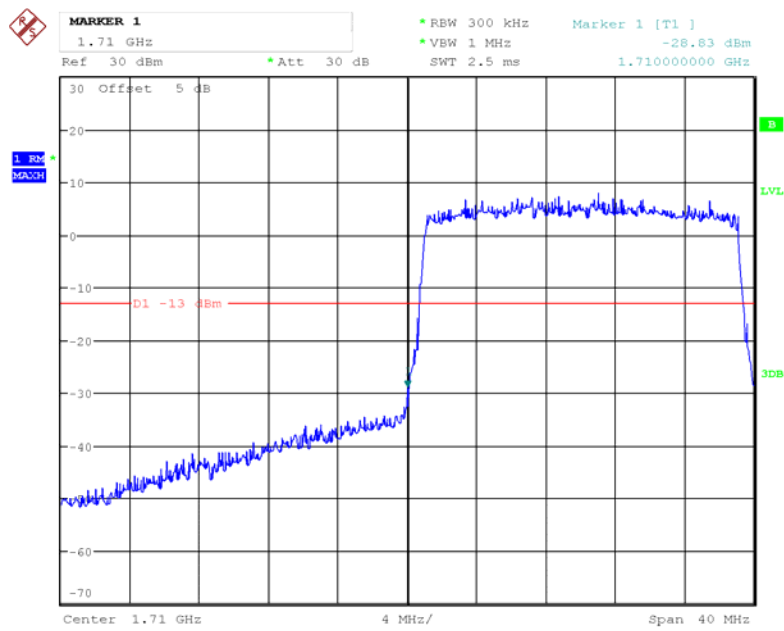
Date: 15.SEP.2018 15:36:06

16QAM_15MHz_ 75 RB_ Right



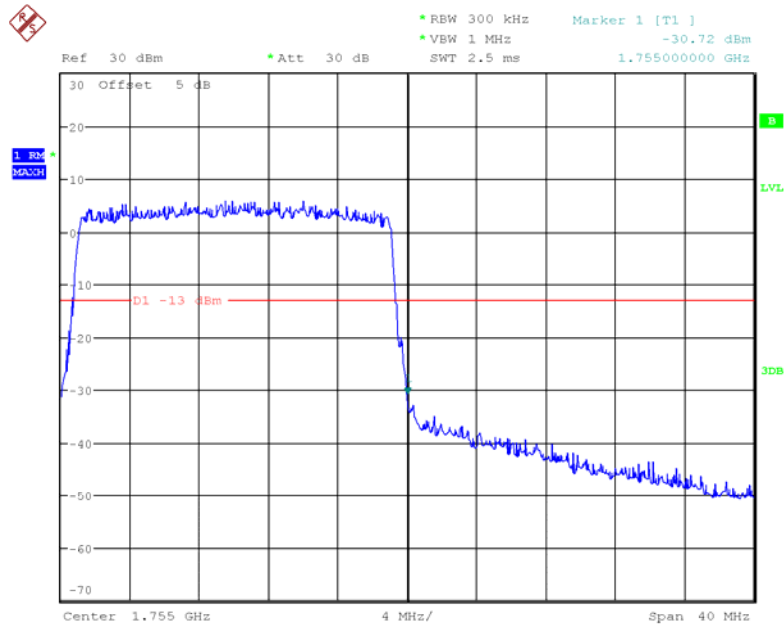
Date: 15.SEP.2018 15:38:50

16QAM_20MHz_FULL RB_Left



Date: 15.SEP.2018 15:41:48

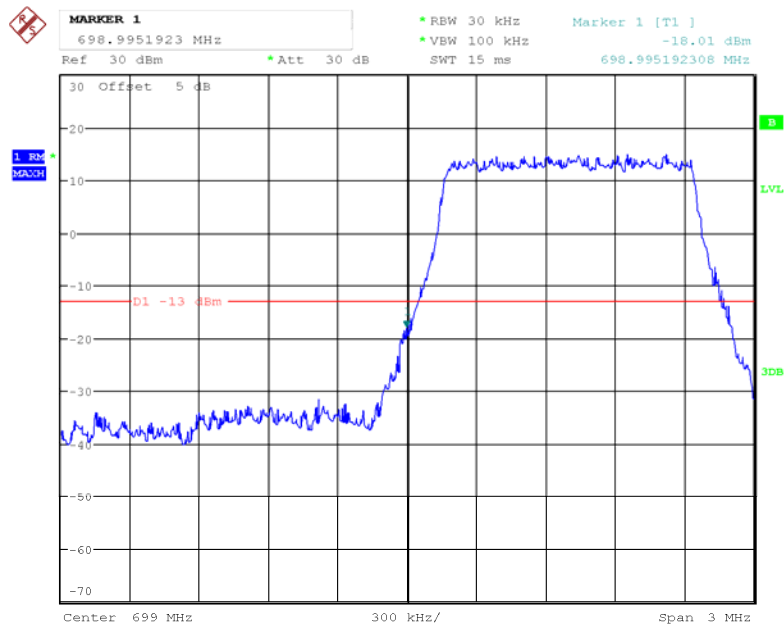
16QAM_20MHz_FULL RB_Right



Date: 15.SEP.2018 15:40:31

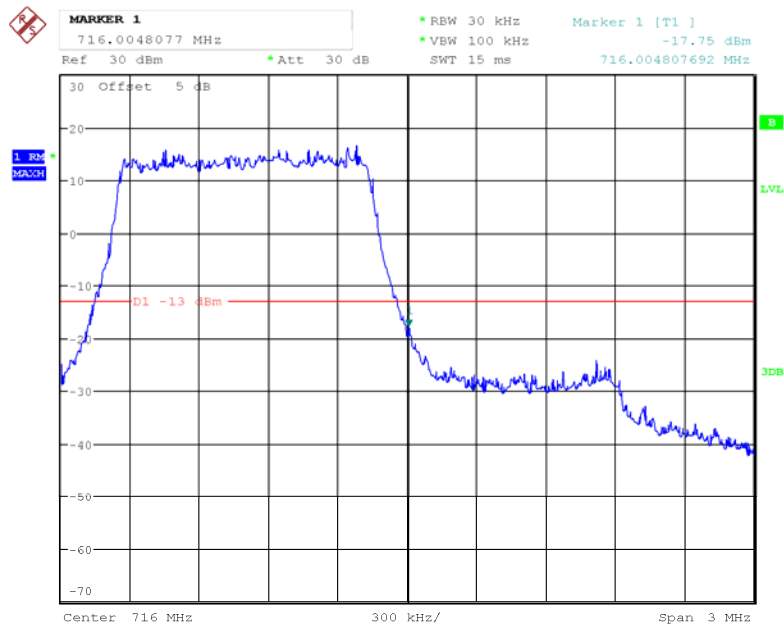
LTE Band 12

QPSK_1.4MHz_6 RB_ Left



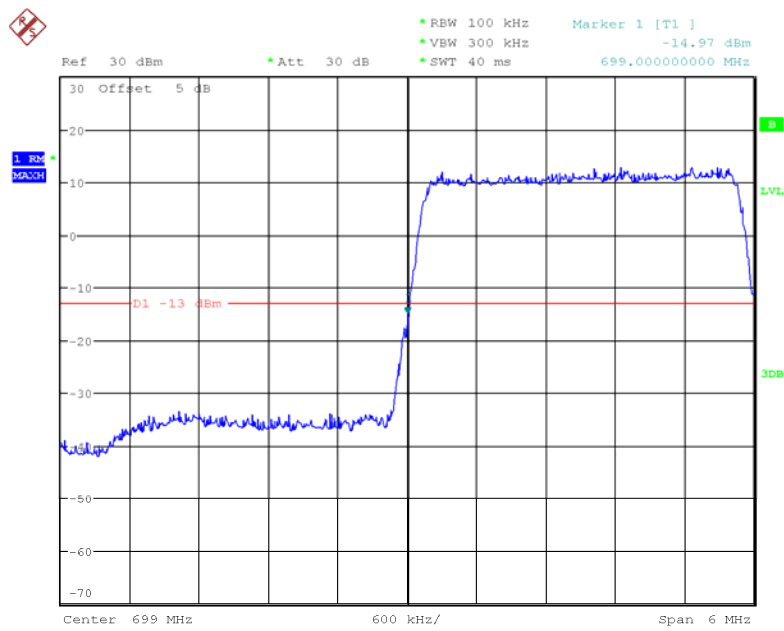
Date: 15.SEP.2018 15:55:42

QPSK_1.4MHz_6 RB_ Right



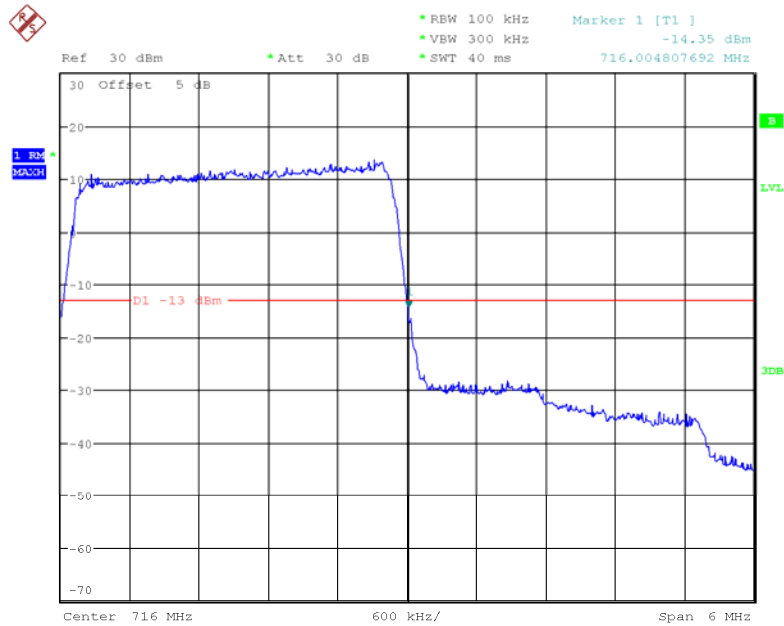
Date: 15.SEP.2018 15:56:25

QPSK_3MHz_15 RB_ Left



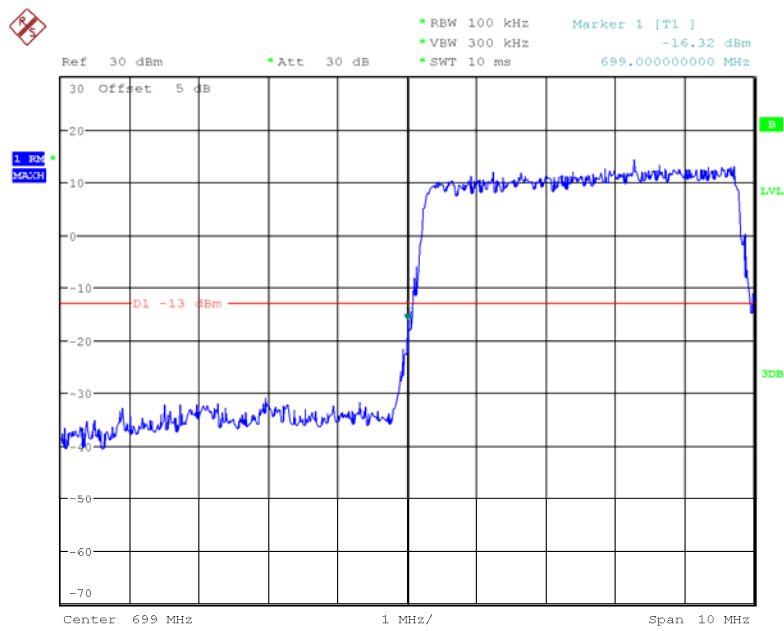
Date: 15.SEP.2018 15:58:31

QPSK_3MHz_15 RB_ Right



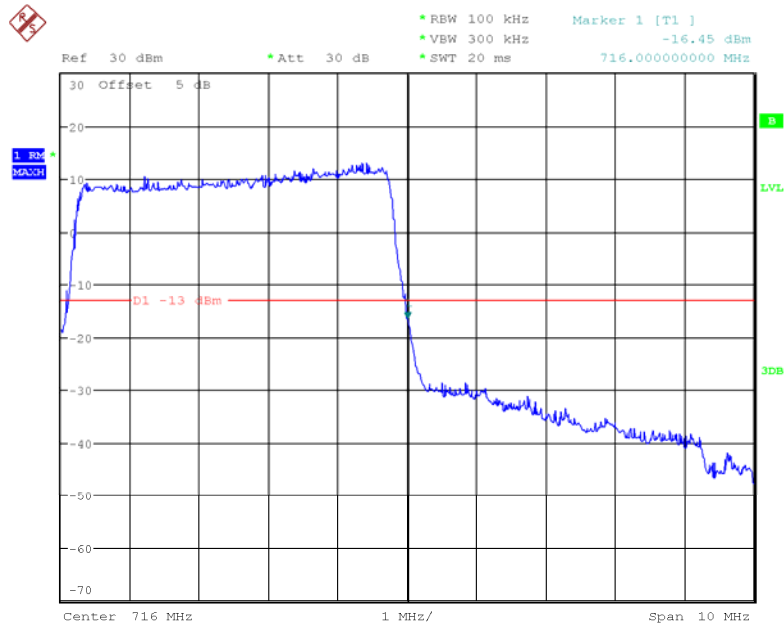
Date: 15.SEP.2018 15:57:43

QPSK_5MHz_25 RB_Left



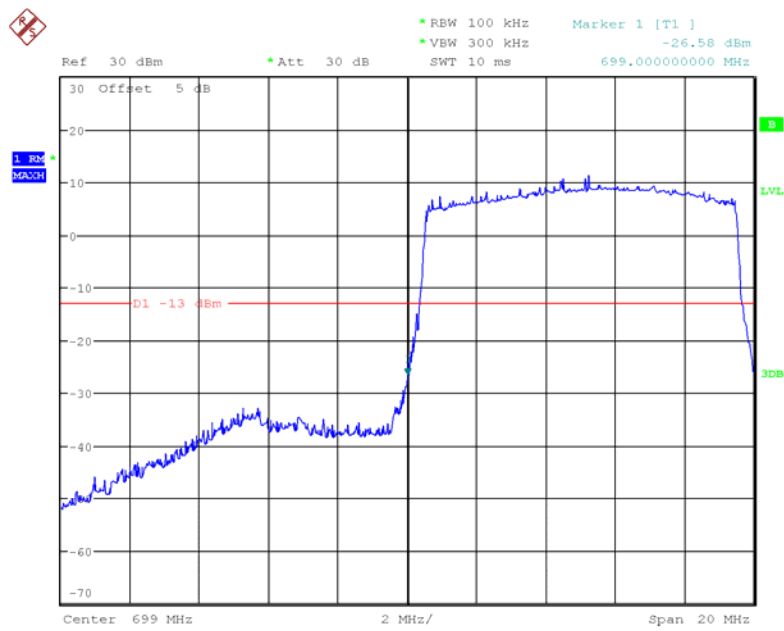
Date: 15.SEP.2018 15:59:37

QPSK_5MHz_25 RB_Right



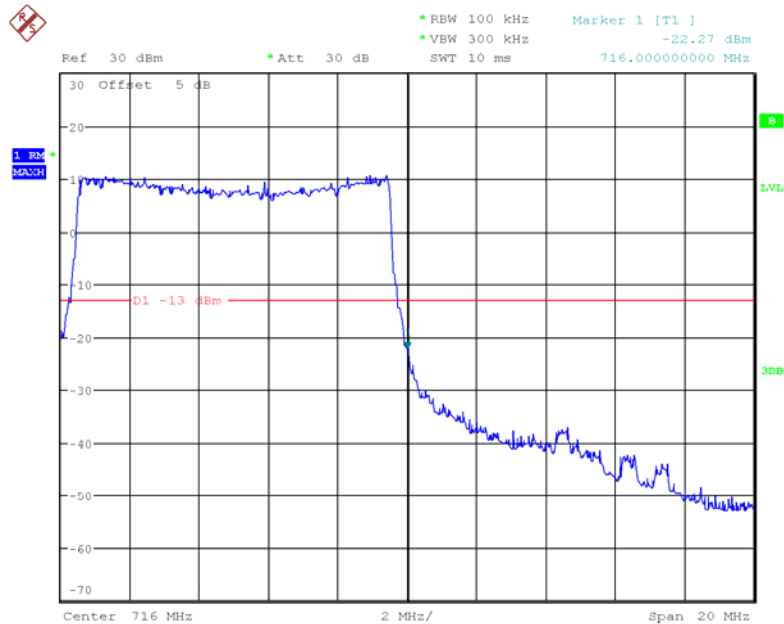
Date: 15.SEP.2018 16:00:24

QPSK_10MHz_50 RB_ Left



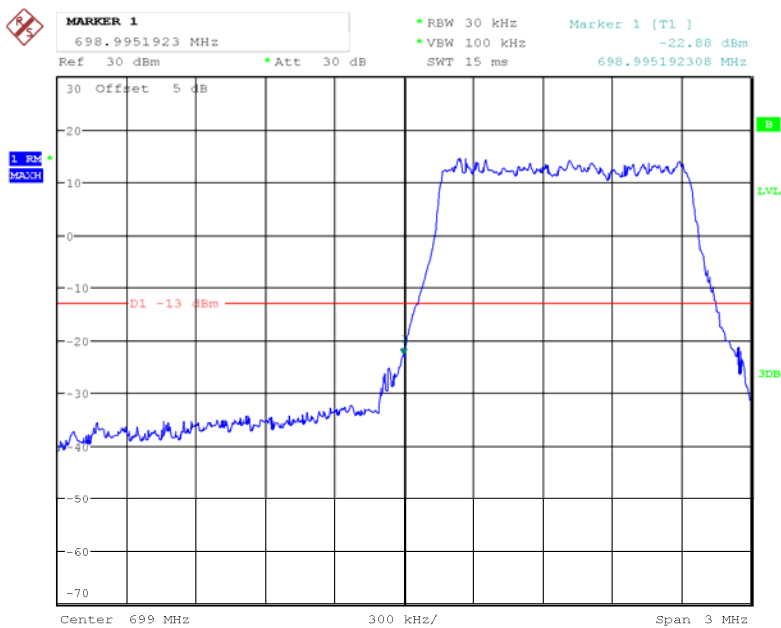
Date: 15.SEP.2018 16:02:13

QPSK_10MHz_50 RB_ Right



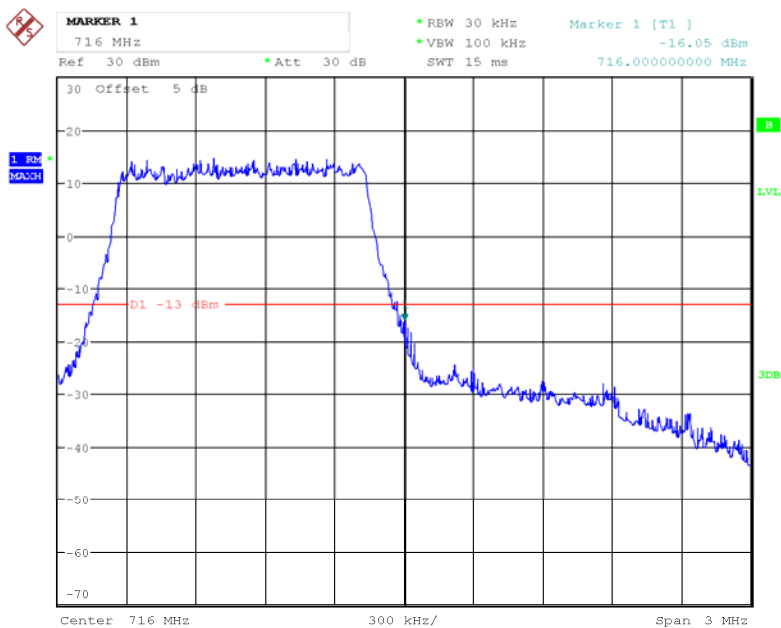
Date: 15.SEP.2018 16:01:19

16QAM_1.4MHz_6 RB_ Left



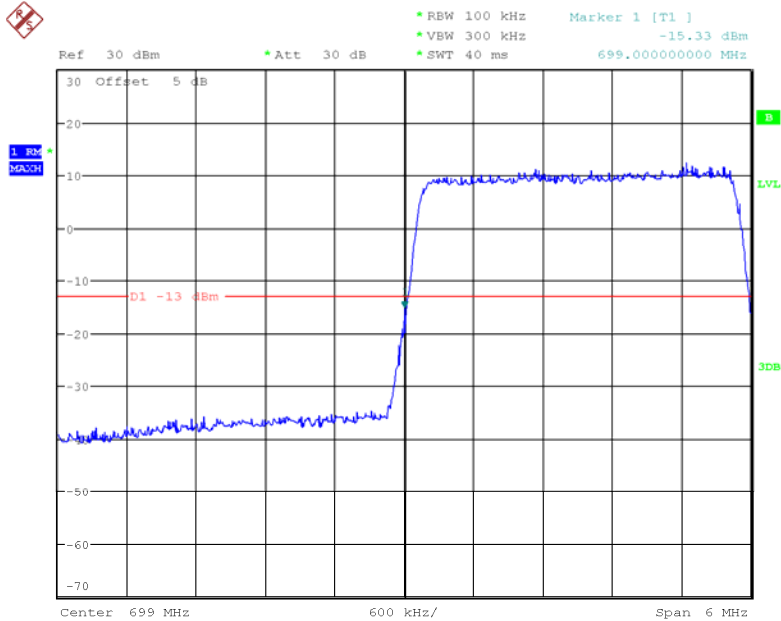
Date: 15.SEP.2018 15:55:25

16QAM_1.4MHz_6 RB_ Right



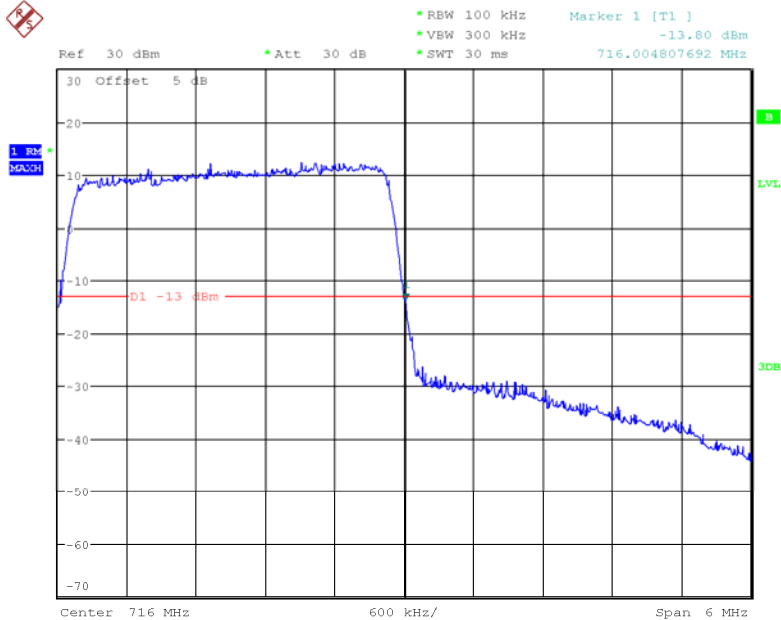
Date: 15.SEP.2018 15:56:09

16QAM_3MHz_15 RB_ Left



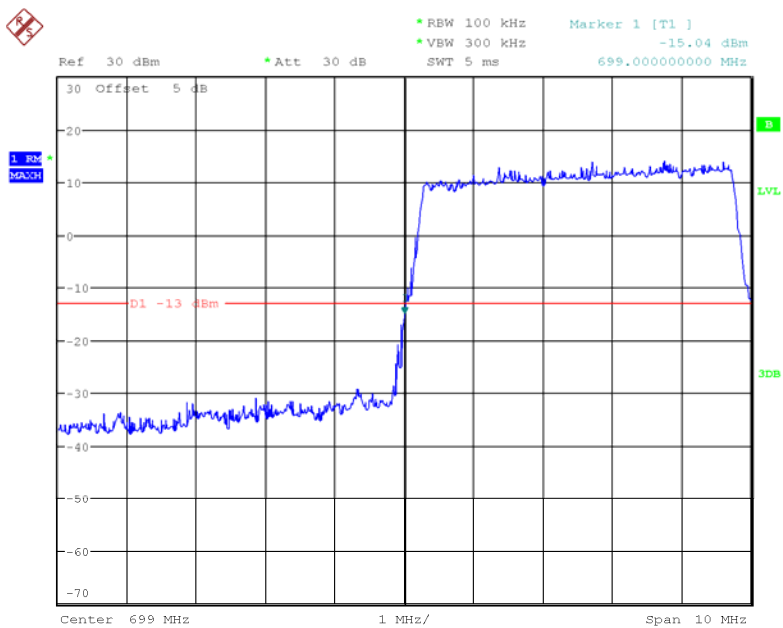
Date: 15.SEP.2018 15:58:23

16QAM_3MHz_15 RB_ Right



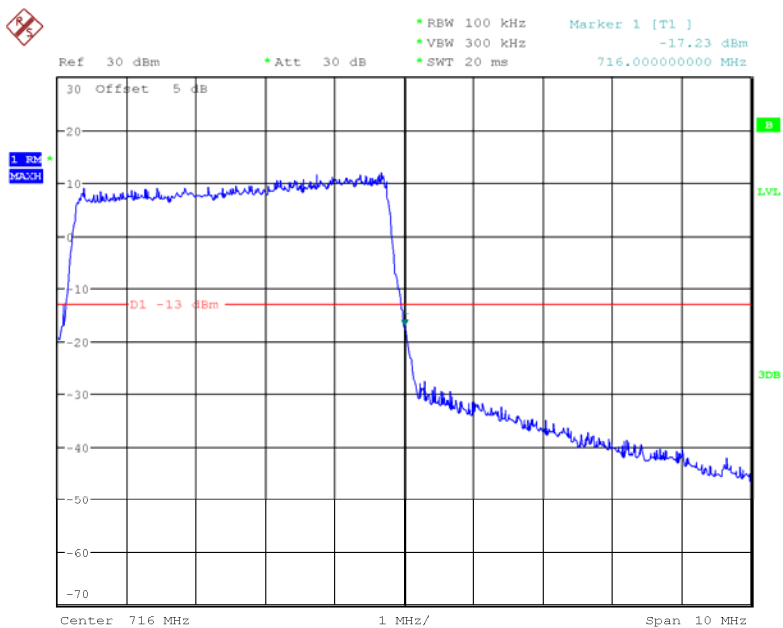
Date: 15.SEP.2018 15:57:26

16QAM_5MHz_25 RB_ Left



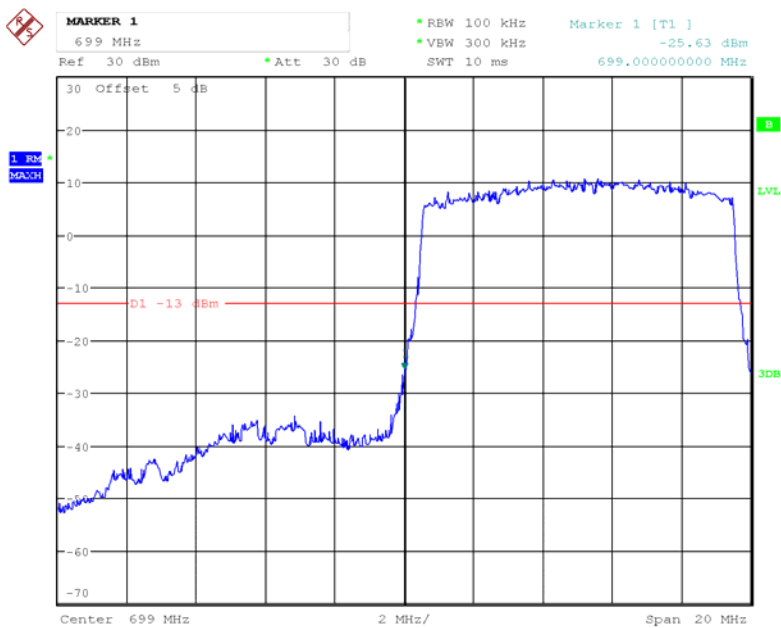
Date: 15.SEP.2018 15:59:17

16QAM_5MHz_25 RB_ Right



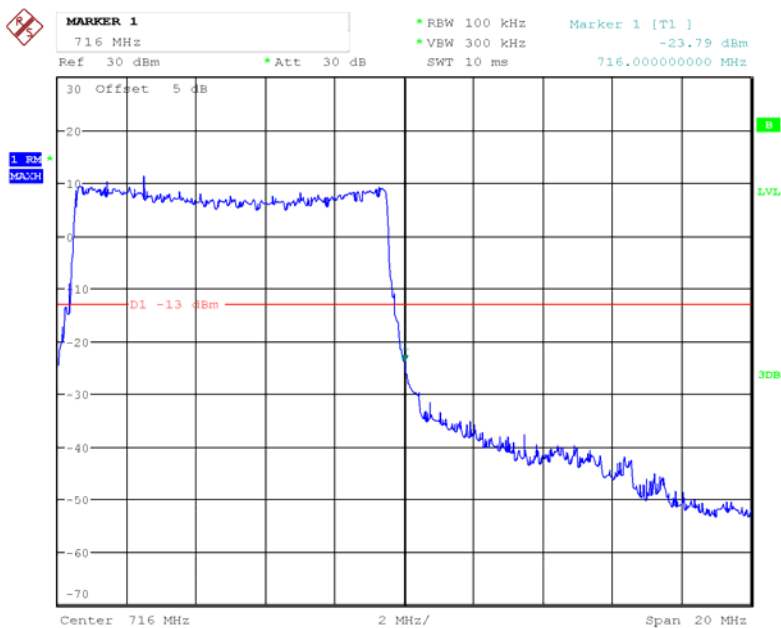
Date: 15.SEP.2018 16:00:15

16QAM_10MHz_50 RB_Left



Date: 15.SEP.2018 16:01:44

16QAM_10MHz_50 RB_Right



Date: 15.SEP.2018 16:01:08

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

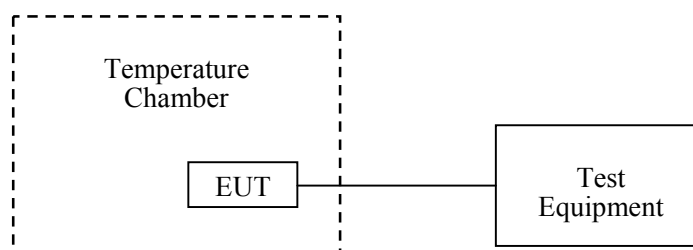
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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
R&S	Wideband Radio Communication Tester	CMW500	149216	2017-12-11	2018-12-11
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
Dongzhixu	High Temperature Test Chamber	DP1000	201105083-4	2018-08-25	2019-08-25
UNI-T	Multimeter	UT39A	M130199938	2018-05-09	2019-05-09
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

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

Test Data**Environmental Conditions**

Temperature:	26.6~27.1°C
Relative Humidity:	55~58 %
ATM Pressure:	100.4~100.6 kPa

The testing was performed by Nami Quan from 2018-09-13 to 2018-09-15.

WCDMA Band II: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.7	-1	-0.001	Pass
-20		-2	-0.001	
-10		2	0.001	
0		1	0.001	
10		-3	-0.002	
20		-2	-0.001	
30		1	0.001	
40		-2	-0.001	
50		3	0.002	
25	3.4	-1	-0.001	
25	4.2	-5	-0.003	

WCDMA Band V: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.7	-4	-0.005	2.5
-20		-1	-0.001	
-10		0	0.000	
0		-3	-0.004	
10		5	0.006	
20		-1	-0.001	
30		2	0.002	
40		1	0.001	
50		4	0.005	
25	3.4	2	0.002	
25	4.2	-2	-0.002	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V_{DC}	Hz	ppm	
-30	3.7	-3.44	-0.0018	Pass
-20		-2.99	-0.0016	
-10		-3.64	-0.0019	
0		-3.00	-0.0016	
10		-2.94	-0.0016	
20		-3.06	-0.0016	
30		-3.66	-0.0019	
40		-3.38	-0.0018	
50		-3.08	-0.0016	
25	3.4	-3.59	-0.0019	
25	4.2	-3.10	-0.0016	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V_{DC}	Hz	ppm	
-30	3.7	-5.11	-0.0027	Pass
-20		-4.64	-0.0025	
-10		-4.82	-0.0026	
0		-5.34	-0.0028	
10		-5.32	-0.0028	
20		-4.52	-0.0024	
30		-5.06	-0.0027	
40		-4.38	-0.0023	
50		-5.03	-0.0027	
25	3.4	-4.51	-0.0024	
25	4.2	-4.80	-0.0026	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.7	1710.5466	1754.4884	1710	1755
-20		1710.5430	1754.4866	1710	1755
-10		1710.5451	1754.4873	1710	1755
0		1710.5466	1754.4869	1710	1755
10		1710.5467	1754.4874	1710	1755
20		1710.5449	1754.4872	1710	1755
30		1710.5454	1754.4890	1710	1755
40		1710.5444	1754.4875	1710	1755
50		1710.5449	1754.4876	1710	1755
25	3.4	1710.5434	1754.4878	1710	1755
25	4.2	1710.5451	1754.4855	1710	1755

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.7	1710.5451	1754.4652	1710	1755
-20		1710.5438	1754.4665	1710	1755
-10		1710.5440	1754.4639	1710	1755
0		1710.5443	1754.4643	1710	1755
10		1710.5457	1754.4656	1710	1755
20		1710.5449	1754.4651	1710	1755
30		1710.5441	1754.4636	1710	1755
40		1710.5441	1754.4650	1710	1755
50		1710.5466	1754.4639	1710	1755
25	3.4	1710.5463	1754.4640	1710	1755
25	4.2	1710.5446	1754.4636	1710	1755

LTE Band 12:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V_{DC}	F_L	F_H	F_L	F_H
-30	3.7	699.5785	715.4881	699	716
-20		699.5781	715.4857	699	716
-10		699.5762	715.4860	699	716
0		699.5756	715.4871	699	716
10		699.5778	715.4867	699	716
20		699.5769	715.4872	699	716
30		699.5756	715.4882	699	716
40		699.5753	715.4887	699	716
50		699.5785	715.4866	699	716
25	3.4	699.5762	715.4889	699	716
25	4.2	699.5788	715.4870	699	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V_{DC}	F_L	F_H	F_L	F_H
-30	3.7	699.5787	715.4891	699	716
-20		699.5750	715.4865	699	716
-10		699.5771	715.4853	699	716
0		699.5750	715.4860	699	716
10		699.5755	715.4884	699	716
20		699.5769	715.4872	699	716
30		699.5753	715.4856	699	716
40		699.5761	715.4891	699	716
50		699.5761	715.4876	699	716
25	3.4	699.5758	715.4878	699	716
25	4.2	699.5749	715.4872	699	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 *******