FCC PART 22H, PART 24E

FCC PART 27

MEASUREMENT AND TEST REPORT

For

Shenzhen KVD Communication Equipment

Lenovo R&D Center 2F-B, South First Road, High-tech Park, Nanshan District, Shenzhen China

FCC ID: 2ADTE-MIX

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

Report Number:	RDG170905003-00D
Report Date:	2017-11-16
Reviewed By:	Jerry Zhang EMC Manager
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industry Area, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The ***Shenzhen KVD Communication Equipment***'s product, model number: ***MIX (FCC ID: 2ADTE-MIX)*** (the "EUT") in this report was a ***Mobile Phone,*** which was measured approximately: 14.4 cm (L) x 7.7 cm (W) x 0.7 cm (H), rated input voltage:DC 3.8V from battery or DC 5.0V from adapter.

Adapter Information:
Model:HJ-0502000W2-US
Input: 100-240V~50/60Hz 036A
Output: 5.0V, 3000mA

**All measurement and test data in this report was gathered from production sample serial number: 170905003 (Assigned by BACL,Dongguan). The EUT was received on 2017-09-05.*

Objective

This report is prepared on behalf of *Shenzhen KVD Communication Equipment* 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: 2ADTE-MIX.
FCC Part 15C DSS submissions with FCC ID: 2ADTE-MIX.
FCC Part 15B JBP submissions with FCC ID: 2ADTE-MIX.

Test Methodology

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

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

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

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

Measurement Uncertainty

Parameter	Measurement Uncertainty
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±0.61dB
Unwanted Emissions, radiated	30MHz ~ 1GHz:5.85 dB 1G~26.5GHz: 5.23 dB
Unwanted Emissions, conducted	±1.5 dB
Temperature	±1℃
Humidity	±5%
DC and low frequency voltages	±0.4%
Duty Cycle	1%

Test Facility

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

Bay Area Compliance Laboratories Corp. (Dongguan) has been accredited to ISO/IEC 17025 by CNAS(Lab code: L5662). And accredited to ISO/IEC 17025 by NVLAP(Test Laboratory Accreditation Certificate Number 500069-0), the FCC Designation No. CN5002 under the KDB 974614 D01.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 273710. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Bay Area Compliance Laboratories Corp. (Dongguan) was 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.

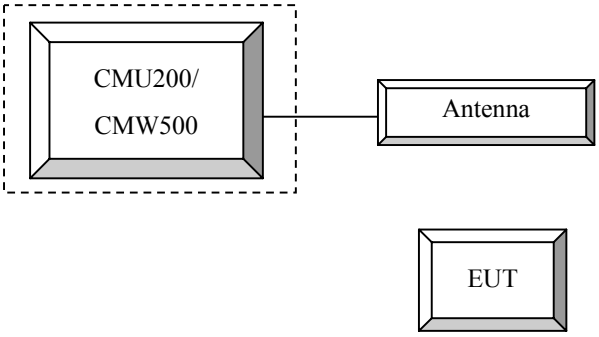
Equipment Modifications

No modification was made to the EUT.

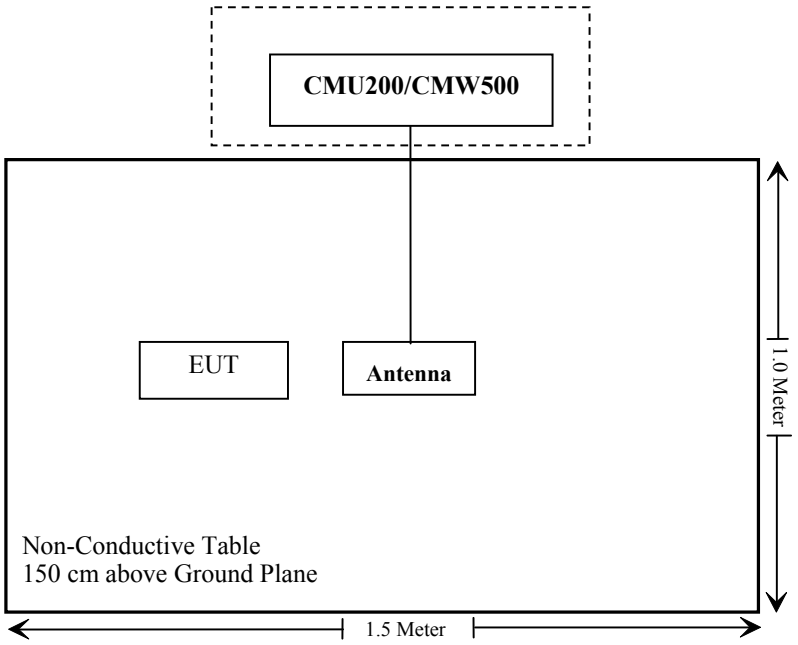
Support Equipment List and Details

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

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Result
§1.1310, §2.1093	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: RDG170905003-20.

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
	βc / βd	8/15

WCDMA HSDPA

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

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/ βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs=βhs/ βc	30/15			

WCDMA HSUPA

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

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

HSPA+

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

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

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .

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

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

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

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

DC-HSDPA

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

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

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.

Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

LTE (FDD):

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

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

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

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

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

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

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

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

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

Radiated method:

ANSI/TIA-603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-05
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
ETS LINDGREN	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
HP	Signal Generator	1026	320408	2016-12-08	2017-12-08
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	C0010/01	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	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

Temperature:	27.9~29°C
Relative Humidity:	48~52 %
ATM Pressure:	100.2~100.4 kPa

** The testing was performed by Swim Lv &Nami Quan from 2017-09-07 to 2017-09-11.*

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	32.20	32.21	31.50	29.87	28.89	25.87	25.89	23.98	22.87
	190	32.25	32.13	31.46	29.82	29.09	25.90	25.91	23.93	22.90
	251	32.21	32.06	31.42	29.78	29.08	26.09	26.10	24.08	23.02
PCS	512	28.20	28.27	27.55	25.85	24.84	25.97	24.85	22.58	21.33
	661	28.10	28.01	27.30	25.69	24.64	25.50	24.24	21.91	20.63
	810	28.10	27.95	27.29	25.59	24.56	24.75	23.46	21.24	19.86

WCDMA Band Ⅱ

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	22.55	3.08	22.46	2.96	22.25	2.84
HSDPA	1	21.16	2.98	21.43	3.08	21.73	2.96
	2	20.63	3.40	22.13	2.84	22.24	2.83
	3	20.60	2.95	22.08	3.32	22.14	2.48
	4	20.63	2.98	22.17	3.08	22.31	2.72
HSUPA	1	21.61	2.85	22.15	3.44	21.72	2.85
	2	21.55	3.50	22.16	2.6	21.52	2.72
	3	21.51	2.86	22.06	2.96	21.55	3.08
	4	21.60	2.98	22.17	3.08	21.59	2.84
	5	21.56	2.87	22.19	2.60	21.62	2.60
DC-HSDPA	1	21.65	2.76	22.05	3.32	21.39	3.32
	2	22.04	2.77	22.19	3.44	21.95	3.08
	3	21.55	2.98	22.56	2.60	22.11	2.60
	4	22.04	3.19	21.96	2.60	21.91	2.48
HSPA+	1	21.43	2.78	21.94	3.44	21.96	3.08

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	22.46	2.96	22.53	2.92	22.55	2.84
HSDPA	1	21.16	2.95	21.43	3.22	21.73	2.84
	2	20.63	2.82	22.13	2.57	22.24	2.71
	3	20.60	2.69	22.08	3.48	22.14	2.71
	4	20.63	2.56	22.17	3.48	22.31	3.10
HSUPA	1	21.63	2.95	22.15	2.70	21.72	2.45
	2	21.55	3.21	22.16	2.96	21.52	2.32
	3	21.51	2.82	22.06	3.09	21.55	3.10
	4	21.60	2.82	22.17	2.44	21.59	2.97
	5	21.56	3.08	22.19	2.96	21.62	2.45
DC-HSDPA	1	21.44	3.21	22.31	2.70	21.23	2.32
	2	22.05	3.08	22.31	3.09	21.23	2.97
	3	21.31	2.69	22.07	2.57	21.10	3.10
	4	21.56	3.08	22.44	2.70	22.14	2.32
HSPA+	1	22.26	3.60	22.41	2.44	22.15	3.36

LTE Band 2 (PART 24)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	23.94	23.87	23.91
		1#3	23.56	23.54	23.84
		1#5	23.84	23.64	23.54
		3#0	23.65	23.52	23.65
		3#3	23.62	23.52	23.53
		6#0	22.92	22.90	22.88
	16QAM	1#0	22.91	23.24	22.59
		1#3	22.84	23.02	22.61
		1#5	22.71	22.98	22.51
		3#0	23.63	23.22	23.34
		3#3	23.32	23.12	23.54
		6#0	21.85	21.95	21.86
3MHz	QPSK	1#0	23.93	23.89	23.94
		1#8	23.88	23.81	23.81
		1#14	23.76	23.82	23.75
		10#0	23.25	23.32	23.42
		10#5	23.32	23.21	23.35
		15#0	22.99	23.04	23.01
	16QAM	1#0	22.95	23.13	22.62
		1#8	22.82	23.10	22.67
		1#14	22.76	23.06	22.81
		10#0	23.14	23.22	23.31
		10#5	23.43	23.23	23.43
		15#0	22.01	22.05	22.05
5MHz	QPSK	1#0	23.88	23.87	23.86
		1#13	23.78	23.67	23.81
		1#24	23.64	23.54	23.67
		10#0	23.21	23.12	23.30
		10#15	23.15	23.41	23.36
		25#0	22.93	22.99	22.89
	16QAM	1#0	23.02	23.05	23.16
		1#13	23.01	22.98	23.10
		1#24	22.99	22.92	22.94
		10#0	23.33	23.14	23.23
		10#15	23.12	23.43	23.34
		25#0	21.90	22.02	21.91

10MHz	QPSK	1#0	24.08	24.03	24.10
		1#25	24.02	24.01	24.02
		1#49	24.01	23.99	24.01
		25#0	23.89	23.81	23.89
		25#25	23.88	23.86	23.81
		50#0	22.96	23.03	22.97
	16QAM	1#0	22.74	23.03	23.02
		1#25	22.62	23.01	22.89
		1#49	22.52	22.89	22.81
		25#0	23.32	23.43	23.55
		25#25	23.43	23.54	23.43
		50#0	21.96	22.01	21.99
15MHz	QPSK	1#0	24.23	24.14	24.13
		1#38	24.00	24.12	24.15
		1#74	24.10	24.05	24.06
		36#0	23.04	23.12	23.19
		36#39	23.09	23.16	23.20
		75#0	23.08	23.15	23.09
	16QAM	1#0	23.11	23.05	23.06
		1#38	23.05	23.03	23.01
		1#74	23.01	22.92	22.98
		36#0	23.32	23.43	23.43
		36#39	23.24	23.345	23.44
		75#0	22.09	22.10	22.00
20MHz	QPSK	1#0	24.22	24.26	24.27
		1#50	24.21	24.24	24.29
		1#99	24.02	24.13	24.19
		50#0	23.25	23.32	23.33
		50#50	23.32	23.34	23.25
		100#0	22.99	23.18	22.92
	16QAM	1#0	23.20	23.12	23.30
		1#50	23.19	23.10	23.21
		1#99	23.12	23.09	23.19
		50#0	23.23	23.35	23.32
		50#50	23.35	23.33	23.21
		100#0	22.05	22.19	21.99

LTE Band 4 (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	23.74	23.74	23.70
		1#3	23.56	23.54	23.83
		1#5	23.74	23.64	23.54
		3#0	23.64	23.53	23.65
		3#3	23.62	23.52	23.51
		6#0	22.72	22.67	22.78
	16QAM	1#0	22.75	22.97	22.46
		1#3	22.61	22.96	22.35
		1#5	22.60	22.95	22.41
		3#0	23.34	23.33	23.32
		3#3	23.54	23.51	23.43
		6#0	21.69	21.64	21.70
3MHz	QPSK	1#0	22.80	23.65	22.86
		1#8	22.78	23.54	22.78
		1#14	22.38	23.25	22.71
		10#0	21.89	22.86	21.86
		10#5	21.84	22.84	21.94
		15#0	21.83	22.78	21.89
	16QAM	1#0	21.80	22.90	21.76
		1#8	21.72	22.81	21.89
		1#14	21.61	22.83	21.76
		10#0	21.44	22.43	21.55
		10#5	21.32	22.34	21.43
		15#0	20.90	21.71	20.87
5MHz	QPSK	1#0	22.75	23.62	22.82
		1#13	22.71	23.54	22.78
		1#24	22.85	23.25	22.38
		10#0	21.91	22.86	21.89
		10#15	21.81	22.84	21.81
		25#0	21.78	22.42	21.84
	16QAM	1#0	21.93	22.36	22.15
		1#13	21.92	22.26	22.10
		1#24	21.88	22.15	22.09
		10#0	21.44	22.42	21.46
		10#15	21.54	22.54	21.54
		25#0	20.81	21.66	20.87

10MHz	QPSK	1#0	23.91	23.85	22.89
		1#25	23.92	23.74	22.81
		1#49	23.89	23.69	22.79
		25#0	22.81	22.74	21.98
		25#25	22.74	22.72	21.84
		50#0	22.49	22.77	21.85
	16QAM	1#0	21.60	22.52	22.06
		1#25	21.56	22.49	22.03
		1#49	21.48	22.46	21.98
		25#0	22.44	22.54	21.93
		25#25	22.56	22.51	21.34
		50#0	21.57	21.80	20.89
15MHz	QPSK	1#0	22.97	22.83	23.96
		1#38	22.93	22.78	23.91
		1#74	22.89	22.81	23.94
		36#0	21.89	21.89	23.13
		36#39	21.92	21.92	23.14
		75#0	21.85	21.86	23.13
	16QAM	1#0	21.91	22.05	22.95
		1#38	21.93	22.01	22.89
		1#74	21.87	22.05	22.86
		36#0	21.45	21.43	23.13
		36#39	21.65	21.55	23.12
		75#0	20.85	20.89	21.98
20MHz	QPSK	1#0	23.06	22.99	22.99
		1#50	23.03	22.95	22.89
		1#99	23.05	23.01	22.81
		50#0	22.16	22.13	21.86
		50#50	22.10	22.09	22.03
		100#0	21.82	21.94	21.99
	16QAM	1#0	22.11	22.91	22.88
		1#50	22.09	22.85	22.71
		1#99	22.08	22.83	22.76
		50#0	22.13	22.13	21.81
		50#50	22.14	22.04	22.23
		100#0	21.76	21.46	21.45

LTE Band 5 (PART 22)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	24.22	24.33	24.21
		1#3	24.31	24.26	24.32
		1#5	24.15	24.20	24.25
		3#0	24.26	24.30	24.26
		3#3	24.12	24.25	24.12
		6#0	23.21	23.28	23.15
	16QAM	1#0	23.25	23.53	22.89
		1#3	23.24	23.45	22.81
		1#5	23.19	23.60	22.83
		3#0	24.34	24.32	24.23
		3#3	24.12	24.22	24.22
		6#0	22.21	22.25	22.17
3MHz	QPSK	1#0	24.28	24.24	23.76
		1#8	24.19	24.23	23.71
		1#14	24.21	24.21	23.69
		10#0	23.56	23.36	22.65
		10#5	23.51	23.41	23.59
		15#0	23.31	23.34	23.25
	16QAM	1#0	23.26	23.43	22.95
		1#8	23.21	23.39	22.89
		1#14	23.19	23.34	22.87
		10#0	23.51	23.41	22.45
		10#5	23.24	23.42	23.41
		15#0	22.35	22.34	22.37
5MHz	QPSK	1#0	24.24	24.23	24.20
		1#13	24.31	24.29	24.16
		1#24	24.19	24.23	24.17
		10#0	23.86	23.61	23.51
		10#15	23.81	23.71	23.67
		25#0	23.28	23.27	23.25
	16QAM	1#0	23.37	23.38	23.52
		1#13	23.35	23.29	23.48
		1#24	23.30	23.24	23.49
		10#0	23.45	23.52	23.47
		10#15	23.75	23.56	23.54
		25#0	22.30	22.32	22.30
10MHz	QPSK	1#0	24.36	24.41	24.30
		1#25	24.37	24.42	24.29
		1#49	24.39	24.39	24.21
		25#0	23.86	23.75	23.64
		25#25	23.81	23.71	23.62
		50#0	23.41	23.30	23.11
	16QAM	1#0	23.07	23.39	23.25
		1#25	22.98	23.26	23.19
		1#49	23.01	23.31	23.21
		25#0	23.32	23.42	23.54
		25#25	23.43	23.14	23.54
		50#0	22.37	22.31	22.15

LTE Band 7 (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	1#0	22.14	22.13	23.27
		1#13	22.10	22.15	23.21
		1#24	22.16	22.10	23.19
		10#0	21.21	21.26	22.43
		10#15	21.19	21.23	22.32
		25#0	21.23	21.20	22.20
	16QAM	1#0	21.56	21.32	22.20
		1#13	21.49	21.29	22.16
		1#24	21.51	21.32	22.10
		10#0	21.323	21.44	22.33
		10#15	21.43	21.12	22.34
		25#0	20.38	20.24	21.19
10MHz	QPSK	1#0	22.23	22.20	22.38
		1#25	22.10	22.12	22.31
		1#49	22.13	22.19	22.28
		25#0	21.78	21.75	21.56
		25#25	21.86	21.76	21.64
		50#0	21.28	21.26	21.25
	16QAM	1#0	21.27	21.37	21.01
		1#25	21.23	21.31	21.09
		1#49	21.32	21.36	21.12
		25#0	21.33	21.22	21.43
		25#25	21.54	21.73	21.24
		50#0	20.24	20.33	20.24
15MHz	QPSK	1#0	22.33	23.08	23.62
		1#38	22.29	23.10	23.51
		1#74	22.35	23.16	23.61
		36#0	21.62	22.00	22.59
		36#39	21.54	22.21	22.52
		75#0	21.37	21.38	22.42
	16QAM	1#0	21.38	21.54	22.27
		1#38	21.29	21.45	22.19
		1#74	21.36	21.52	22.21
		36#0	21.63	22.2	22.53
		36#39	21.54	22.23	22.52
		75#0	20.33	20.37	21.38
20MHz	QPSK	1#0	22.38	22.51	22.49
		1#50	22.32	22.69	22.51
		1#99	22.41	22.62	22.42
		50#0	21.56	21.56	21.35
		50#50	21.45	21.45	21.29
		100#0	21.24	21.38	21.24
	16QAM	1#0	21.44	21.60	21.44
		1#50	21.42	21.56	21.42
		1#99	21.39	21.62	21.35
		50#0	21.34	21.54	21.33
		50#50	21.44	21.43	21.29
		100#0	20.34	20.43	20.34

LTE Band 12 (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	24.10	24.15	24.02
		1#3	24.16	24.31	24.03
		1#5	24.20	24.15	23.98
		3#0	24.10	24.16	23.97
		3#3	24.15	24.12	23.92
		6#0	22.99	23.16	23.26
	16QAM	1#0	22.76	23.19	23.53
		1#3	22.69	23.15	23.45
		1#5	22.65	23.16	23.41
		3#0	24.13	24.13	23.94
		3#3	24.15	24.12	23.94
		6#0	22.02	22.16	22.21
3MHz	QPSK	1#0	23.11	23.46	23.36
		1#8	23.10	23.35	23.41
		1#14	23.21	23.41	23.36
		10#0	22.36	22.56	22.61
		10#5	22.34	22.61	22.51
		15#0	22.21	22.30	22.62
	16QAM	1#0	22.11	22.61	22.08
		1#8	22.12	22.53	22.04
		1#14	22.09	22.49	22.03
		10#0	22.43	22.52	22.65
		10#5	22.34	22.63	22.54
		15#0	21.25	21.47	21.86
5MHz	QPSK	1#0	23.03	23.31	24.11
		1#13	23.01	23.29	24.12
		1#24	22.98	23.16	24.09
		10#0	22.51	22.41	23.62
		10#15	22.34	22.52	23.61
		25#0	22.37	22.54	23.34
	16QAM	1#0	22.24	22.32	23.58
		1#13	22.16	22.31	23.23
		1#24	22.19	22.26	23.34
		10#0	22.33	22.45	23.63
		10#15	22.34	22.55	23.63
		25#0	21.36	21.97	22.08
10MHz	QPSK	1#0	24.15	24.11	24.27
		1#25	24.10	24.06	24.17
		1#49	24.09	24.07	24.21
		25#0	23.56	23.54	23.46
		25#25	23.57	23.42	23.32
		50#0	23.34	23.25	23.16
	16QAM	1#0	23.17	23.35	22.94
		1#25	23.12	23.30	22.89
		1#49	23.21	23.21	22.76
		25#0	23.57	23.54	23.44
		25#25	23.56	23.43	23.32
		50#0	22.38	22.28	22.17

LTE Band 17(PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	1#0	24.11	24.13	24.22
		1#13	24.10	24.12	24.21
		1#24	24.06	24.08	24.16
		10#0	23.42	23.51	23.68
		10#15	23.36	23.42	23.51
		25#0	23.28	23.30	23.57
	16QAM	1#0	23.27	23.30	23.57
		1#13	23.24	23.27	23.56
		1#24	23.25	23.31	23.55
		10#0	23.44	23.56	23.67
		10#15	23.35	23.42	23.51
		25#0	22.32	22.25	22.38
10MHz	QPSK	1#0	24.11	24.17	24.29
		1#25	24.06	24.12	24.21
		1#49	24.08	24.10	24.31
		25#0	23.23	23.21	23.21
		25#25	23.25	23.16	23.26
		50#0	23.13	23.11	23.17
	16QAM	1#0	23.26	23.38	22.95
		1#25	23.24	23.31	22.98
		1#49	23.21	23.29	22.93
		25#0	23.24	23.24	23.22
		25#25	23.26	23.16	23.26
		50#0	22.15	22.15	22.18

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	4.04	4.44	3.24	13
	100 RB		6.56	6.44	6.48	13
16QAM	1 RB	20 MHz	4.92	5.32	4.24	13
	100 RB		7.20	7.20	7.08	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	4.24	4.72	4.20	13
	100 RB		6.48	6.60	6.64	13
16QAM	1 RB	20 MHz	5.00	5.72	5.08	13
	100 RB		7.24	7.24	7.28	13

PAR, Band 5

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.64	4.92	4.68	13
	50 RB		5.36	5.40	4.80	13
16QAM	1 RB	10 MHz	5.60	5.92	5.52	13
	50 RB		6.12	6.28	6.08	13

PAR, Band 7

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.80	3.92	2.84	13
	100 RB		6.40	6.48	6.44	13
16QAM	1 RB	20 MHz	5.60	4.84	4.00	13
	100 RB		7.24	7.08	7.20	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	4.48	4.56	4.20	13
	50 RB		5.52	5.32	5.24	13
16QAM	1 RB	10 MHz	5.28	5.64	5.16	13
	50 RB		6.36	6.32	6.16	13

PAR, Band 17

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.48	4.56	4.20	13
	50 RB		5.52	5.32	5.24	13
16QAM	1 RB	10 MHz	5.28	5.64	5.16	13
	50 RB		6.36	6.32	6.16	13

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

ERP & EIRP

Part 22H

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM 850 Middle Channel								
836.600	H	86.24	11.3	0.0	1	10.3	38.5	28.2
836.600	V	102.38	29.6	0.0	1	28.6	38.5	9.9
EDGE 850 Middle Channel								
836.600	H	84.45	9.5	0.0	1	8.5	38.5	30.0
836.600	V	96.68	24.9	0.0	1	23.9	38.5	14.6
WCDMA Band V Middle Channel								
836.600	H	85.97	11	0.0	1	10.0	38.5	28.5
836.600	V	94.17	22.4	0.0	1	21.4	38.5	17.1

Part 24E

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
PCS 1900 Middle Channel								
1880.000	H	94.32	21.7	11.7	2.7	30.7	33.0	2.3
1880.000	V	90.18	17.7	11.7	2.7	26.7	33.0	6.3
EGPRS 1900 Middle Channel								
1880.000	H	93.14	20.5	11.7	2.7	29.5	33.0	3.5
1880.000	V	89.25	16.8	11.7	2.7	25.8	33.0	7.2
WCDMA Band II Middle Channel								
1880.000	H	84.75	12.1	11.7	2.7	21.1	33.0	11.9
1880.000	V	74.69	2.2	11.7	2.7	11.2	33.0	21.8

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

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	86.51	13.9	11.7	2.7	22.9	33.0	10.1
1880.000	V	80.56	8.1	11.7	2.7	17.1	33.0	15.9
QPSK 3 MHz Middle Channel								
1880.000	H	85.18	12.6	11.7	2.7	21.6	33.0	11.4
1880.000	V	80.20	7.7	11.7	2.7	16.7	33.0	16.3
QPSK 5 MHz Middle Channel								
1880.000	H	84.75	12.1	11.7	2.7	21.1	33.0	11.9
1880.000	V	79.38	6.9	11.7	2.7	15.9	33.0	17.1
QPSK 10 MHz Middle Channel								
1880.000	H	84.54	11.9	11.7	2.7	20.9	33.0	12.1
1880.000	V	79.54	7.1	11.7	2.7	16.1	33.0	16.9
QPSK 15 MHz Middle Channel								
1880.000	H	83.77	11.2	11.7	2.7	20.2	33.0	12.8
1880.000	V	78.64	6.2	11.7	2.7	15.2	33.0	17.8
QPSK 20 MHz Middle Channel								
1880.000	H	83.91	11.3	11.7	2.7	20.3	33.0	12.7
1880.000	V	78.68	6.2	11.7	2.7	15.2	33.0	17.8
16QAM 1.4 MHz Middle Channel								
1880.000	H	86.47	13.9	11.7	2.7	22.9	33.0	10.1
1880.000	V	81.01	8.5	11.7	2.7	17.5	33.0	15.5
16QAM 3 MHz Middle Channel								
1880.000	H	85.05	12.4	11.7	2.7	21.4	33.0	11.6
1880.000	V	80.01	7.5	11.7	2.7	16.5	33.0	16.5
16QAM 5 MHz Middle Channel								
1880.000	H	84.59	12	11.7	2.7	21.0	33.0	12.0
1880.000	V	79.48	7	11.7	2.7	16.0	33.0	17.0
16QAM 10 MHz Middle Channel								
1880.000	H	83.48	10.9	11.7	2.7	19.9	33.0	13.1
1880.000	V	78.81	6.3	11.7	2.7	15.3	33.0	17.7
16QAM 15 MHz Middle Channel								
1880.000	H	83.64	11	11.7	2.7	20.0	33.0	13.0
1880.000	V	78.57	6.1	11.7	2.7	15.1	33.0	17.9
16QAM 20 MHz Middle Channel								
1880.000	H	83.84	11.2	11.7	2.7	20.2	33.0	12.8
1880.000	V	78.59	6.1	11.7	2.7	15.1	33.0	17.9

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	89.44	15.4	10.9	2.5	23.8	30.0	6.2
1732.500	V	87.59	13.2	10.9	2.5	21.6	30.0	8.4
QPSK 3 MHz Middle Channel								
1732.500	H	89.10	15	10.9	2.5	23.4	30.0	6.6
1732.500	V	85.06	10.7	10.9	2.5	19.1	30.0	10.9
QPSK 5 MHz Middle Channel								
1732.500	H	87.52	13.5	10.9	2.5	21.9	30.0	81.1
1732.500	V	83.41	9	10.9	2.5	17.4	30.0	12.6
QPSK 10 MHz Middle Channel								
1732.500	H	86.76	12.7	10.9	2.5	21.1	30.0	8.9
1732.500	V	82.58	8.2	10.9	2.5	16.6	30.0	13.4
QPSK 15 MHz Middle Channel								
1732.500	H	87.49	13.4	10.9	2.5	21.8	30.0	8.2
1732.500	V	83.67	9.3	10.9	2.5	17.7	30.0	12.3
QPSK 20 MHz Middle Channel								
1732.500	H	87.49	13.4	10.9	2.5	21.8	30.0	8.2
1732.500	V	83.28	8.9	10.9	2.5	17.3	30.0	12.7
16QAM 1.4 MHz Middle Channel								
1732.500	H	89.48	15.4	10.9	2.5	23.8	30.0	6.2
1732.500	V	87.57	13.2	10.9	2.5	21.6	30.0	8.4
16QAM 3 MHz Middle Channel								
1732.500	H	88.05	14	10.9	2.5	22.4	30.0	7.6
1732.500	V	83.99	9.6	10.9	2.5	18.0	30.0	12.0
16QAM 5 MHz Middle Channel								
1732.500	H	87.45	13.4	10.9	2.5	21.8	30.0	8.2
1732.500	V	83.32	9	10.9	2.5	17.4	30.0	12.6
16QAM 10 MHz Middle Channel								
1732.500	H	86.59	12.5	10.9	2.5	20.9	30.0	9.1
1732.500	V	82.49	8.1	10.9	2.5	16.5	30.0	13.5
16QAM 15 MHz Middle Channel								
1732.500	H	87.39	13.3	10.9	2.5	21.7	30.0	8.3
1732.500	V	83.54	9.2	10.9	2.5	17.6	30.0	12.4
16QAM 20 MHz Middle Channel								
1732.500	H	87.37	13.3	10.9	2.5	21.7	30.0	8.3
1732.500	V	83.33	9	10.9	2.5	17.4	30.0	12.6

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	88.05	13.1	0.0	1	12.1	38.5	26.4
836.500	V	95.29	23.5	0.0	1	22.5	38.5	16.0
QPSK 3 MHz Middle Channel								
836.500	H	87.64	12.7	0.0	1	11.7	38.5	26.8
836.500	V	94.86	23.1	0.0	1	22.1	38.5	16.4
QPSK 5 MHz Middle Channel								
836.500	H	86.98	12.1	0.0	1	11.1	38.5	27.4
836.500	V	94.12	22.3	0.0	1	21.3	38.5	17.2
QPSK 10 MHz Middle Channel								
836.500	H	86.47	11.5	0.0	1	10.5	38.5	28.0
836.500	V	93.96	22.2	0.0	1	21.2	38.5	17.3
16QAM 1.4 MHz Middle Channel								
836.500	H	87.91	13	0.0	1	12.0	38.5	26.5
836.500	V	95.14	23.3	0.0	1	22.3	38.5	16.2
16QAM 3 MHz Middle Channel								
836.500	H	87.19	12.3	0.0	1	11.3	38.5	27.2
836.500	V	94.55	22.8	0.0	1	21.8	38.5	16.7
16QAM 5 MHz Middle Channel								
836.500	H	86.73	11.8	0.0	1	10.8	38.5	27.7
836.500	V	94.08	22.3	0.0	1	21.3	38.5	17.2
16QAM 10 MHz Middle Channel								
836.500	H	86.35	11.4	0.0	1	10.4	38.5	28.1
836.500	V	93.45	21.7	0.0	1	20.7	38.5	17.8

LTE Band 7

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
2535.000	H	84.58	12	13.1	3.1	22.0	33.0	11.0
2535.000	V	80.67	9.5	13.1	3.1	19.5	33.0	13.5
QPSK 3 MHz Middle Channel								
2535.000	H	83.79	11.2	13.1	3.1	21.2	33.0	11.8
2535.000	V	79.69	8.5	13.1	3.1	18.5	33.0	14.5
QPSK 5 MHz Middle Channel								
2535.000	H	83.46	10.9	13.1	3.1	20.9	33.0	12.1
2535.000	V	79.69	8.5	13.1	3.1	18.5	33.0	14.5
QPSK 10 MHz Middle Channel								
2535.000	H	83.29	10.7	13.1	3.1	20.7	33.0	12.3
2535.000	V	79.66	8.5	13.1	3.1	18.5	33.0	14.5
QPSK 15 MHz Middle Channel								
2535.000	H	83.28	10.7	13.1	3.1	20.7	33.0	12.3
2535.000	V	79.16	8	13.1	3.1	18.0	33.0	15.0
QPSK 20 MHz Middle Channel								
2535.000	H	83.46	10.9	13.1	3.1	20.9	33.0	12.1
2535.000	V	78.37	7.2	13.1	3.1	17.2	33.0	15.8
16QAM 1.4 MHz Middle Channel								
2535.000	H	84.47	11.9	13.1	3.1	21.9	33.0	11.1
2535.000	V	80.58	9.4	13.1	3.1	19.4	33.0	13.6
16QAM 3 MHz Middle Channel								
2535.000	H	83.64	11	13.1	3.1	21.0	33.0	12.0
2535.000	V	79.45	8.3	13.1	3.1	18.3	33.0	14.7
16QAM 5 MHz Middle Channel								
2535.000	H	83.38	10.8	13.1	3.1	20.8	33.0	12.2
2535.000	V	79.44	8.3	13.1	3.1	18.3	33.0	14.7
16QAM 10 MHz Middle Channel								
2535.000	H	83.11	10.5	13.1	3.1	20.5	33.0	12.5
2535.000	V	79.99	8.8	13.1	3.1	18.8	33.0	14.2
16QAM 15 MHz Middle Channel								
2535.000	H	83.13	10.5	13.1	3.1	20.5	33.0	12.5
2535.000	V	78.28	7.1	13.1	3.1	17.1	33.0	15.9
16QAM 20 MHz Middle Channel								
2535.000	H	83.33	10.7	13.1	3.1	20.7	33.0	12.3
2535.000	V	79.18	8	13.1	3.1	18.0	33.0	15.0

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	87.39	10.5	0.0	0.9	9.6	34.8	25.2
707.500	V	96.20	21.8	0.0	0.9	20.9	34.8	13.9
QPSK 3 MHz Middle Channel								
707.500	H	86.79	9.9	0.0	0.9	9.0	34.8	25.8
707.500	V	95.65	21.2	0.0	0.9	20.3	34.8	14.5
QPSK 5 MHz Middle Channel								
707.500	H	86.23	9.4	0.0	0.9	8.5	34.8	26.3
707.500	V	94.87	20.5	0.0	0.9	19.6	34.8	15.2
QPSK 10 MHz Middle Channel								
707.500	H	85.62	8.8	0.0	0.9	7.9	34.8	26.9
707.500	V	94.21	19.8	0.0	0.9	18.9	34.8	15.9
16QAM 1.4 MHz Middle Channel								
707.500	H	87.11	10.3	0.0	0.9	9.4	34.8	25.4
707.500	V	95.87	21.5	0.0	0.9	20.6	34.8	14.2
16QAM 3 MHz Middle Channel								
707.500	H	86.62	9.8	0.0	0.9	8.9	34.8	25.9
707.500	V	95.11	20.7	0.0	0.9	19.8	34.8	15
16QAM 5 MHz Middle Channel								
707.500	H	85.92	9.1	0.0	0.9	8.2	34.8	26.6
707.500	V	94.57	20.2	0.0	0.9	19.3	34.8	15.5
16QAM 10 MHz Middle Channel								
707.500	H	85.13	8.3	0.0	0.9	7.4	34.8	27.4
707.500	V	94.10	19.7	0.0	0.9	18.8	34.8	16

LTE Band 17

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 5 MHz Middle Channel								
710.000	H	86.48	9.7	0.0	0.9	8.8	34.8	26
710.000	V	95.18	20.8	0.0	0.9	19.9	34.8	14.9
QPSK 10 MHz Middle Channel								
710.000	H	85.92	9.1	0.0	0.9	8.2	34.8	26.6
710.000	V	94.88	20.5	0.0	0.9	19.6	34.8	15.2
16QAM 5 MHz Middle Channel								
710.000	H	86.21	9.4	0.0	0.9	8.5	34.8	26.3
710.000	V	95.05	20.7	0.0	0.9	19.8	34.8	15
16QAM 10 MHz Middle Channel								
710.000	H	85.68	8.9	0.0	0.9	8.0	34.8	26.8
710.000	V	94.41	20.1	0.0	0.9	19.2	34.8	15.6

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

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

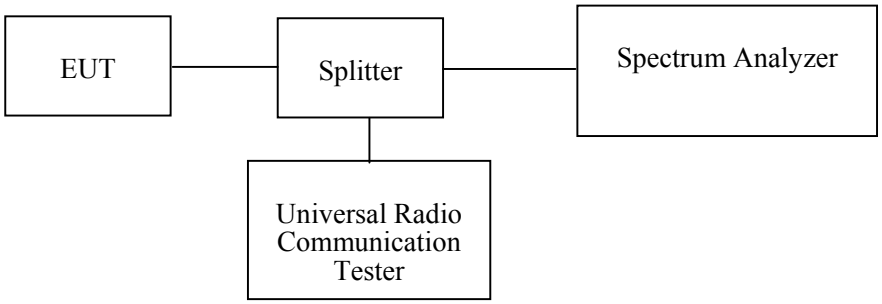
Applicable Standard

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	FSU 26	200256	2016-12-08	2017-12-08
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	RF Attenuator	6dB	6dB-1	Each Time	/
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/

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

Test Data

Environmental Conditions

Temperature:	27.8~27.9°C
Relative Humidity:	48~49 %
ATM Pressure:	100.3~101.8 kPa

The testing was performed by Swim Lv&Nami Quan from 2017-09-08 to 2017-11-23.

Test Mode: Transmitting

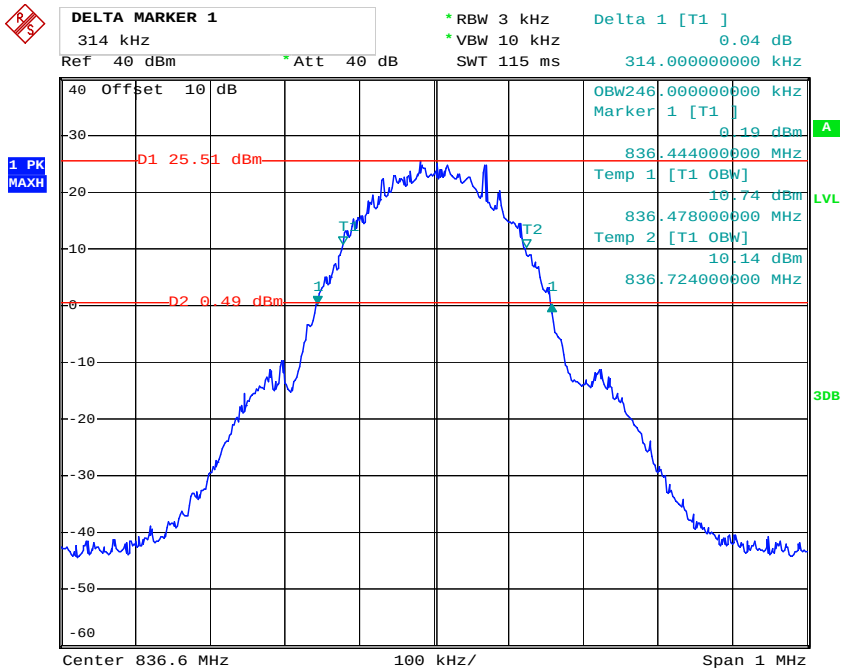
Test Result: Compliant. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.246	0.314
		EDGE	0.248	0.318
PCS		PCS	0.244	0.318
		EDGE	0.250	0.310
WCDMA Band II		Rel 99	4.180	4.700
		HSDPA	4.160	4.740
		HSUPA	4.160	4.700
WCDMA Band V		Rel 99	4.160	4.720
		HSDPA	4.160	4.720
		HSUPA	4.180	4.700

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 2	QPSK	1.4	M	1.098	1.272
		3		2.736	3.060
		5		4.500	5.080
		10		9.160	10.400
		15		13.560	15.060
		20		18.000	19.680
	16QAM	1.4	M	1.092	1.260
		3		2.748	3.060
		5		4.540	5.040
		10		9.120	10.360
		15		13.620	15.060
		20		18.000	19.600

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 4	QPSK	1.4	M	1.092	1.272
		3		2.748	3.036
		5		4.520	5.040
		10		9.000	9.676
		15		13.560	15.040
		20		18.000	19.600
	16QAM	1.4	M	1.092	1.266
		3		2.748	3.060
		5		4.520	5.076
		10		9.000	9.720
		15		13.560	15.000
		20		18.000	19.600
LTE Band 5	QPSK	1.4	M	1.092	1.266
		3		2.736	3.054
		5		4.520	5.060
		10		8.960	9.800
	16QAM	1.4	M	1.092	1.260
		3		2.748	3.054
		5		4.520	5.080
		10		8.960	9.740
LTE Band 7	QPSK	5	M	4.520	5.020
		10		9.000	9.760
		15		13.560	15.060
		20		18.000	19.680
	16QAM	5	M	4.540	5.040
		10		8.960	9.800
		15		13.560	15.060
		20		17.760	19.760
LTE Band 12	QPSK	1.4	M	1.098	1.272
		3		2.748	3.048
		5		4.540	5.020
		10		8.960	9.724
	16QAM	1.4	M	1.098	1.266
		3		2.736	3.048
		5		4.520	5.020
		10		8.960	9.644
LTE Band 17	QPSK	5	M	4.500	5.020
		10		8.960	9.680
	16QAM	5	M	4.500	5.040
		10		8.960	9.624

GSM 850 Cellular Band



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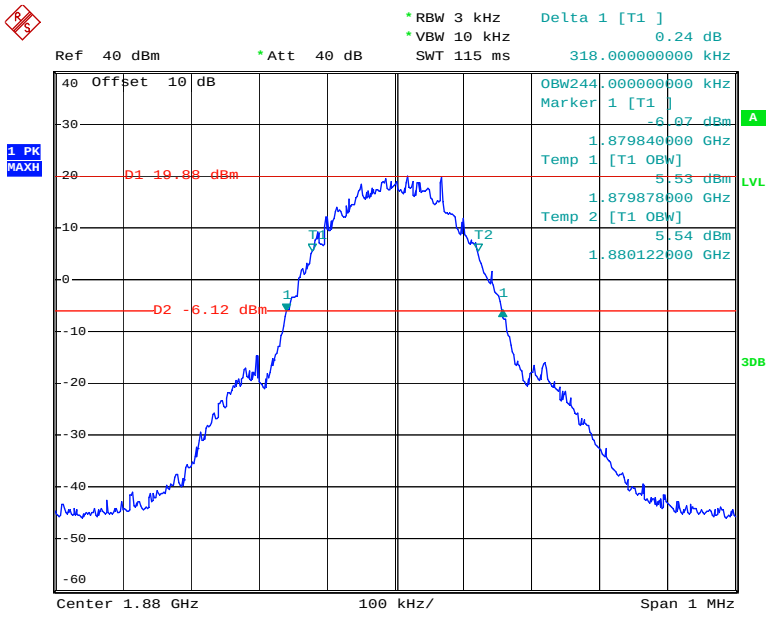
GSM PCS1900 Cellular Band



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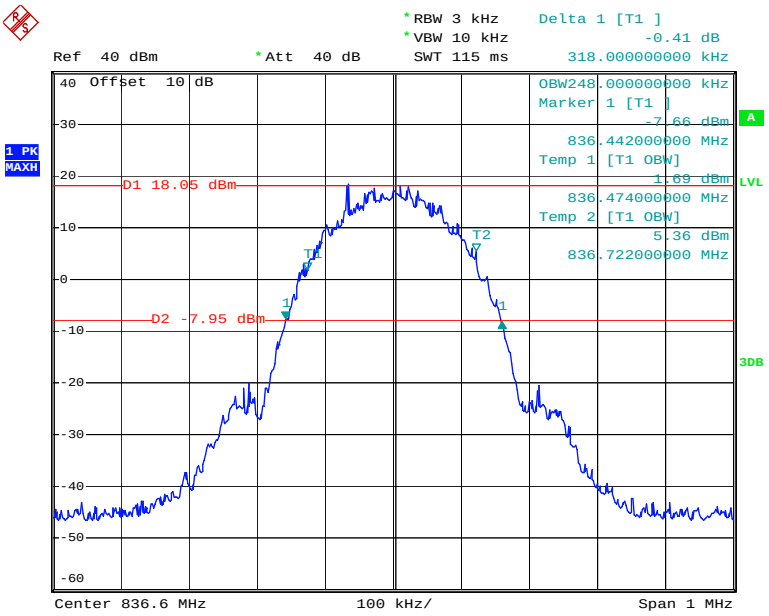
EDGE 850 Cellular Band



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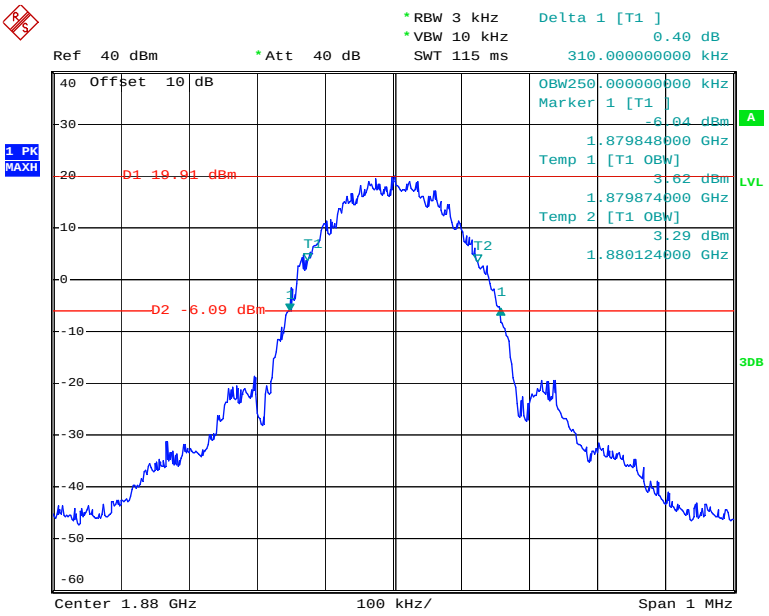
EDGE PCS1900 Cellular Band



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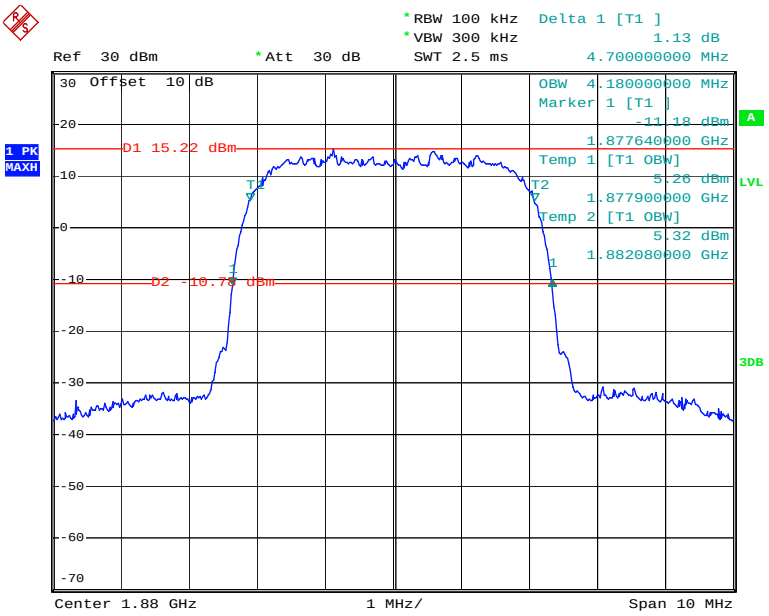
REL99 Band II



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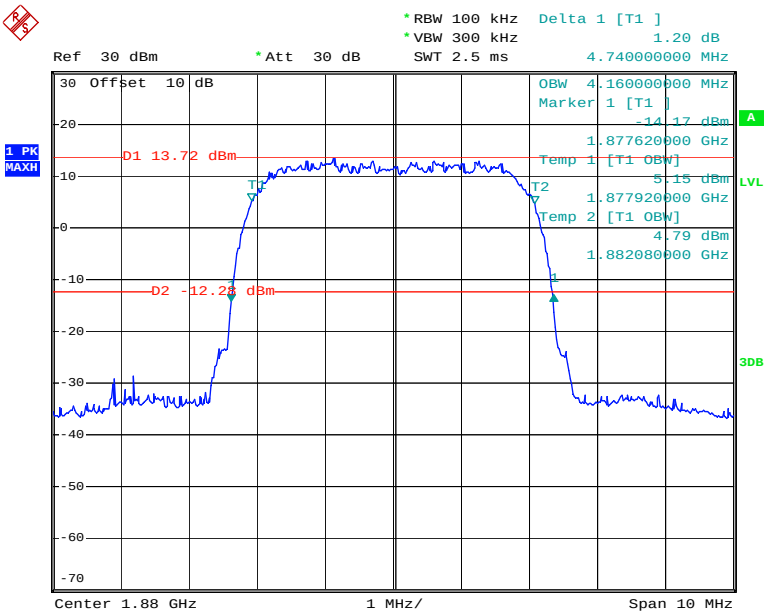
HSDPA Band II



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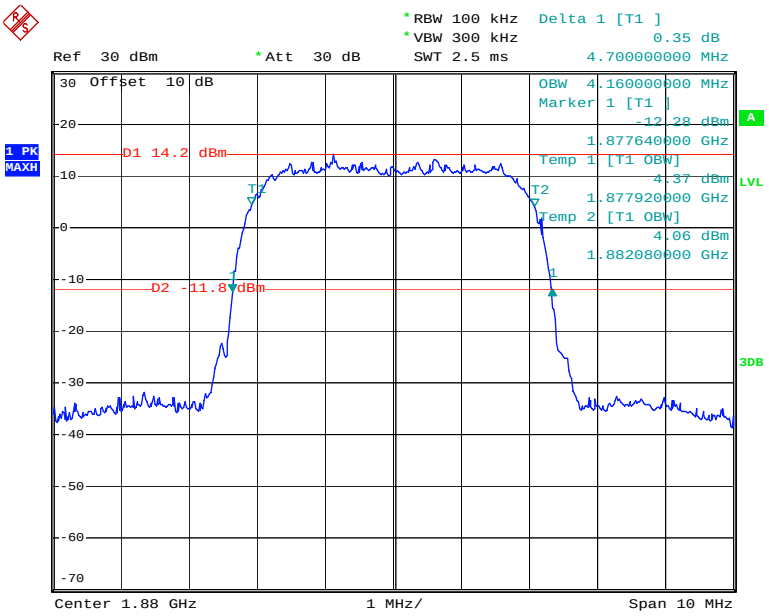
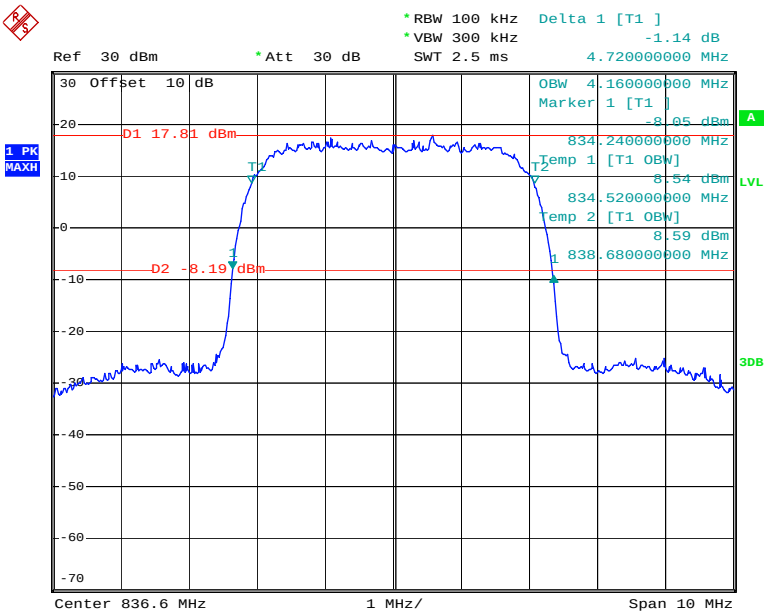
HSUPA Band II



REL99 Band V



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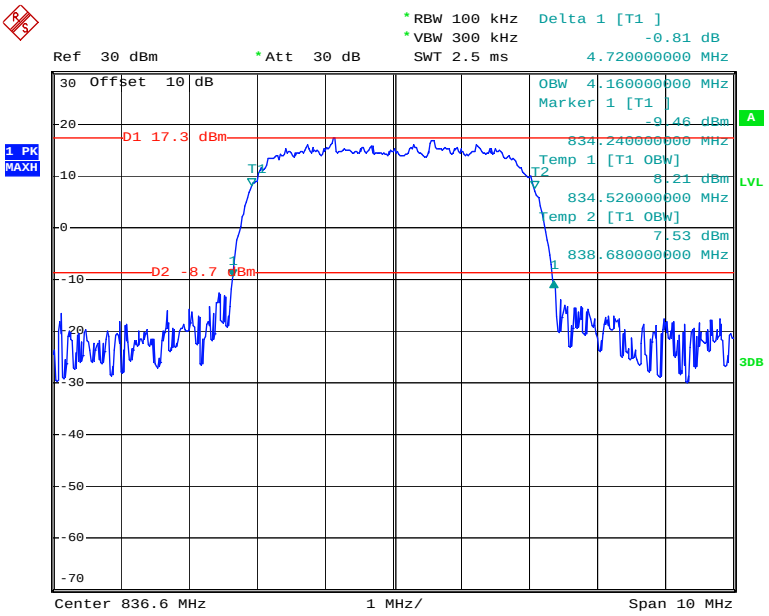

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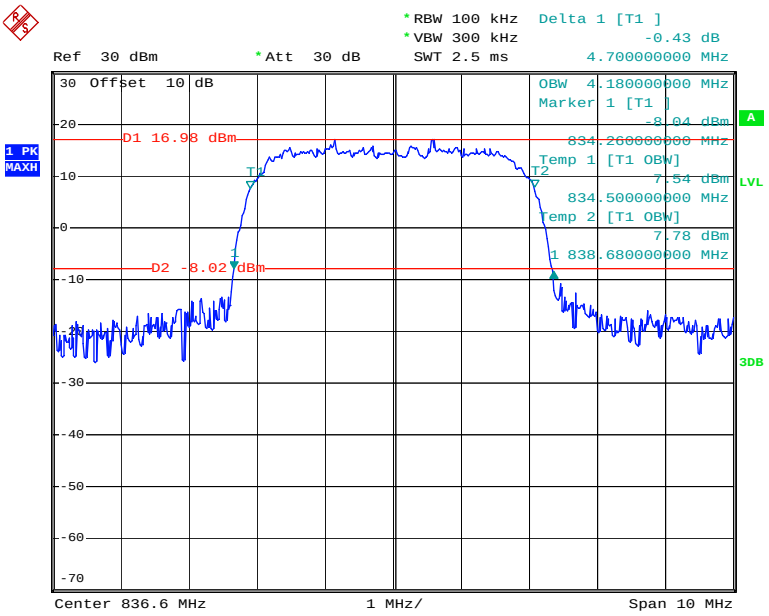
HSUPA Band V



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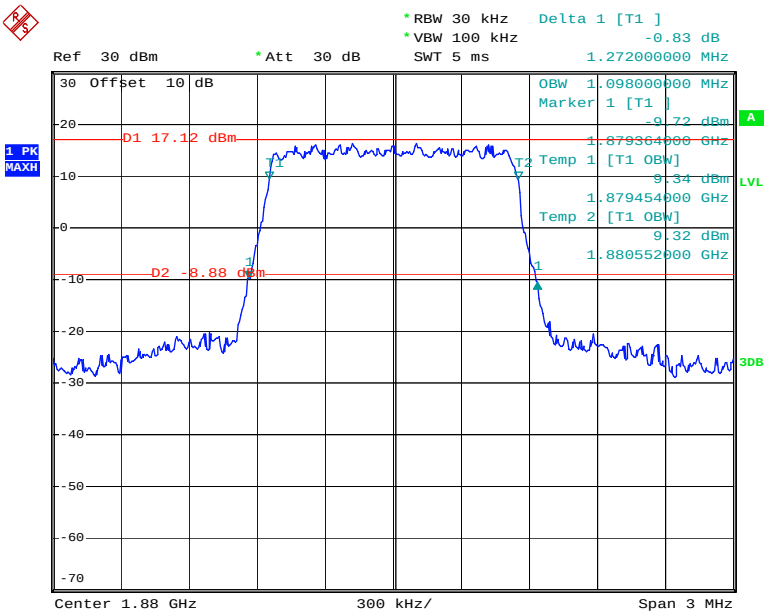
LTE Band 2

QPSK_1.4 MHz



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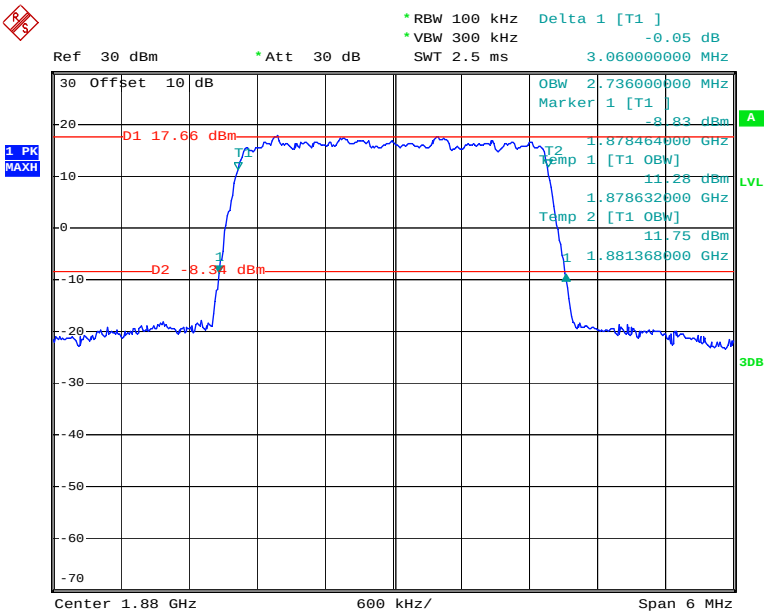
QPSK_3 MHz



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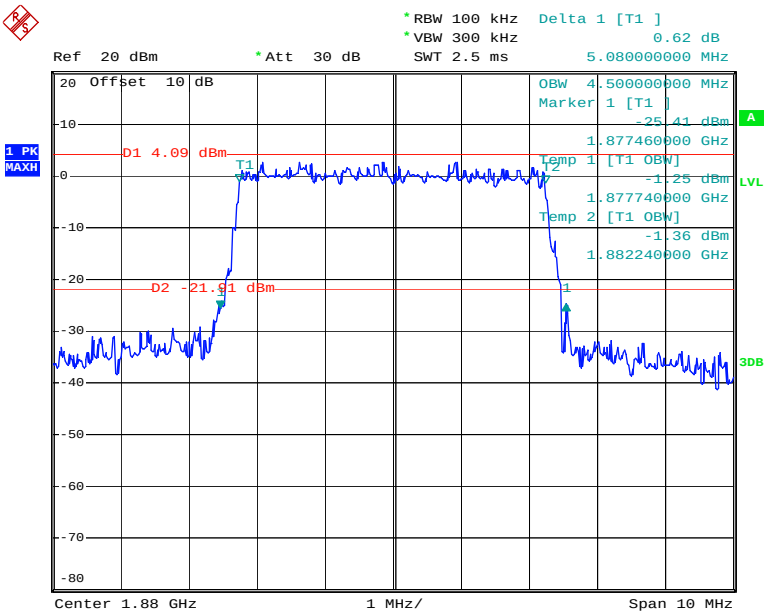
QPSK_5 MHz



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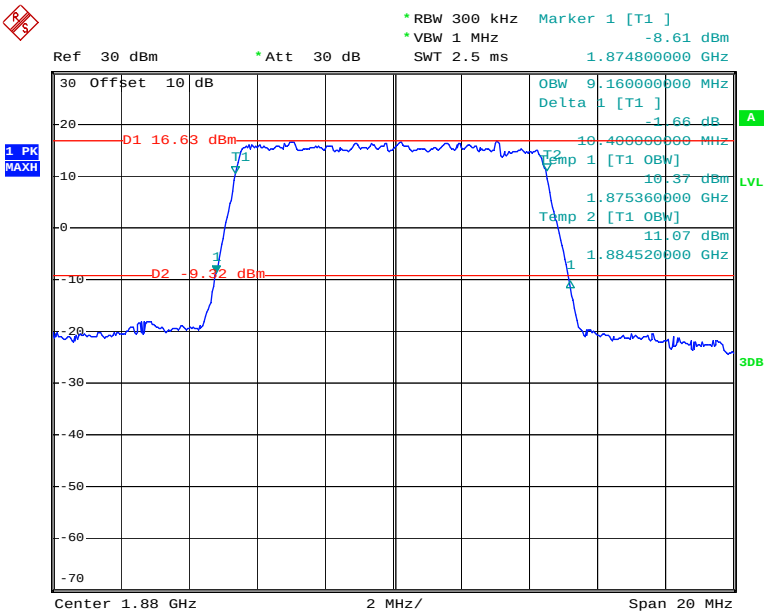
QPSK_10 MHz



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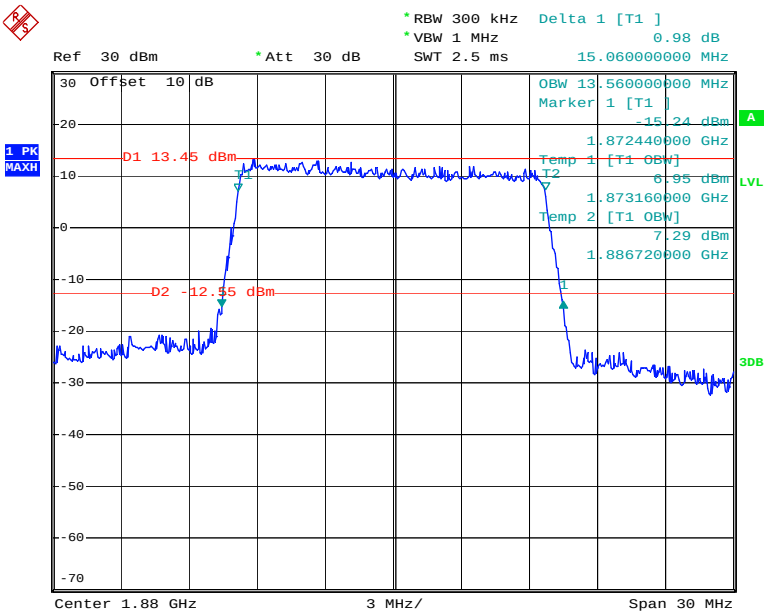
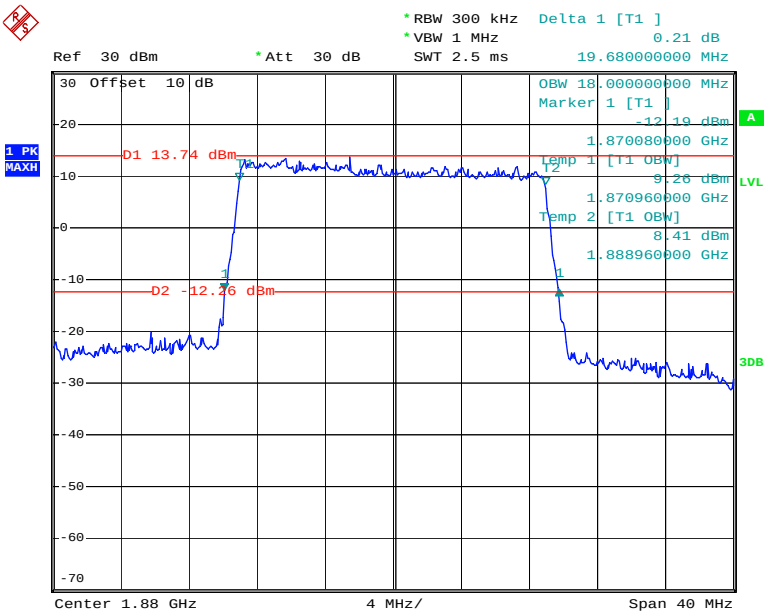
QPSK_15 MHz



Date: 9.SEP.2017 10:37:32

QPSK_20 MHz



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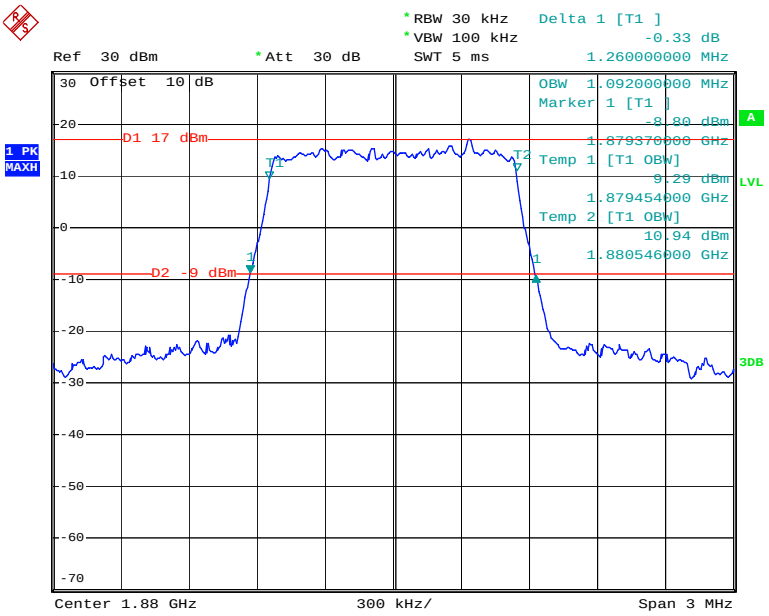
16QAM_1.4 MHz



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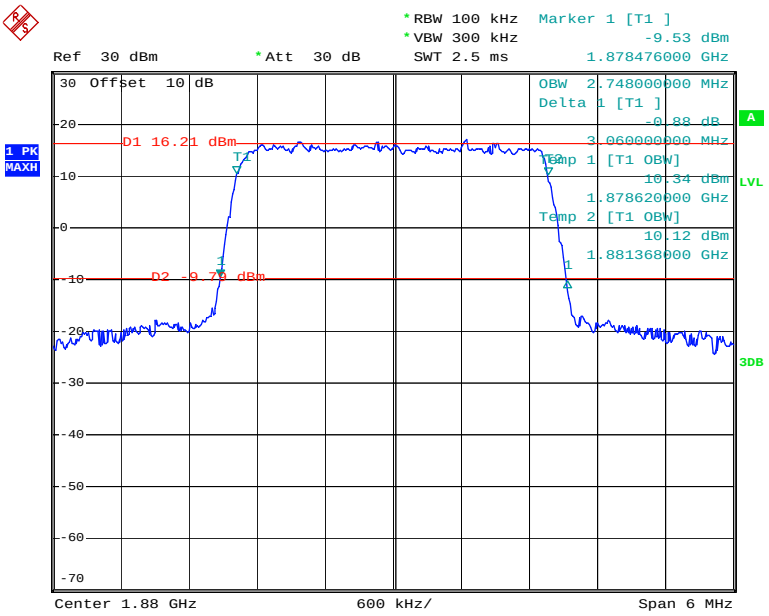
16QAM_3 MHz



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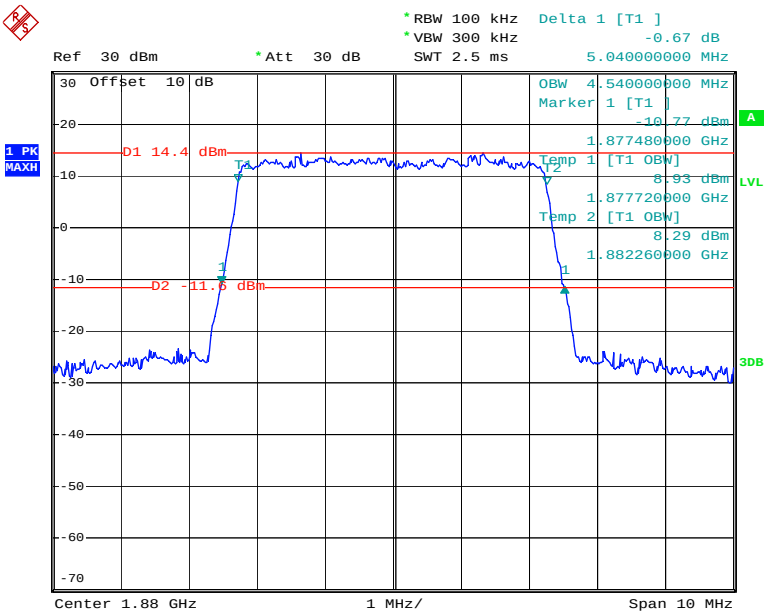
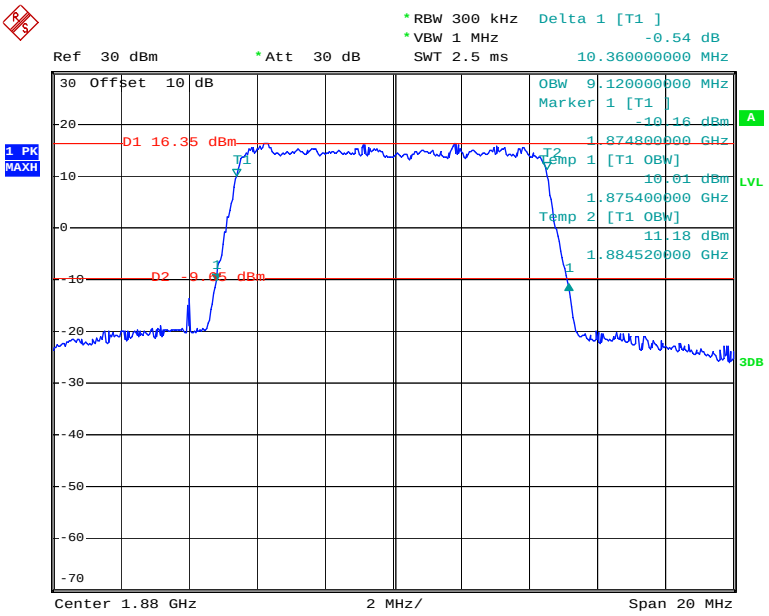
16QAM_5 MHz



Date: 9.SEP.2017 14:41:45

16QAM_10 MHz



Date: 9.SEP.2017 14:58:50

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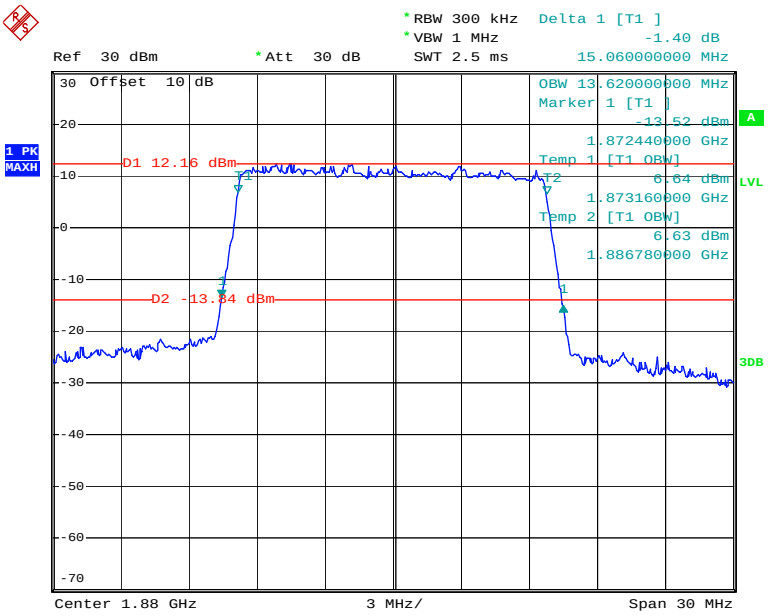

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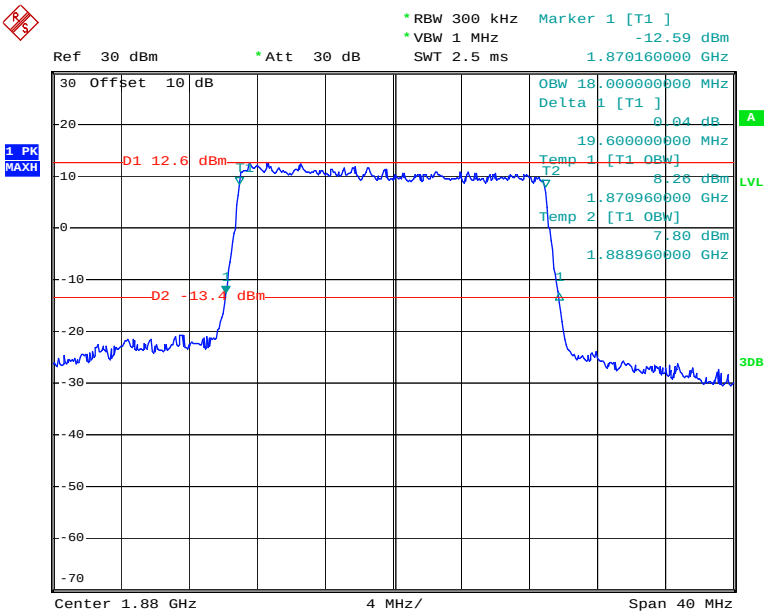
16QAM_20 MHz



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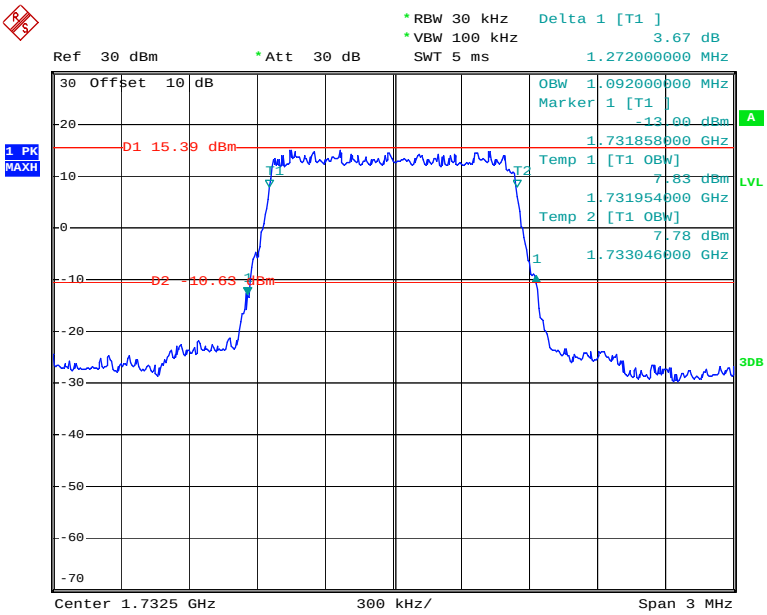
LTE Band 4:

QPSK_1.4 MHz



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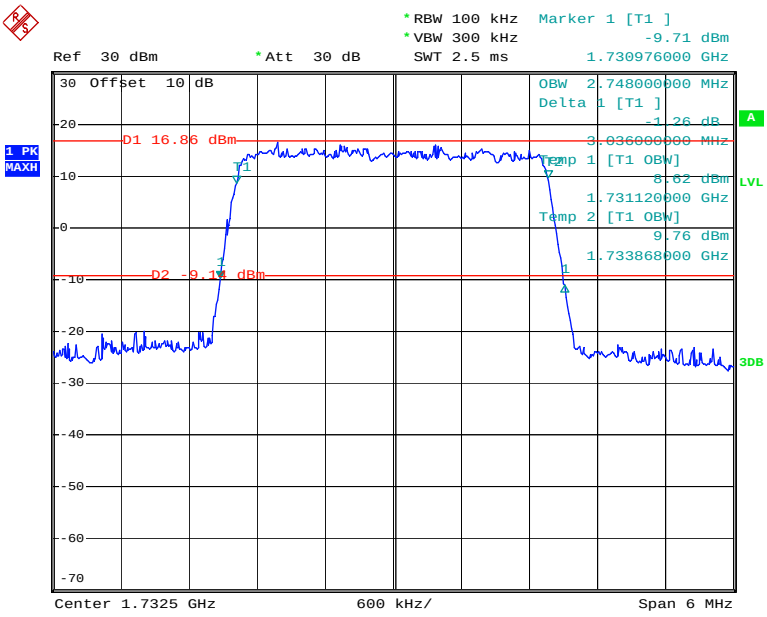
QPSK_3 MHz



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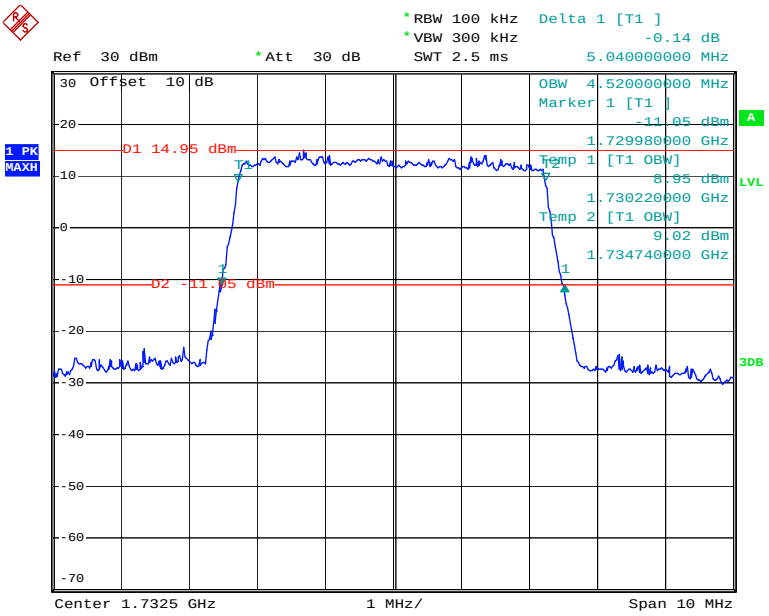
QPSK_5 MHz



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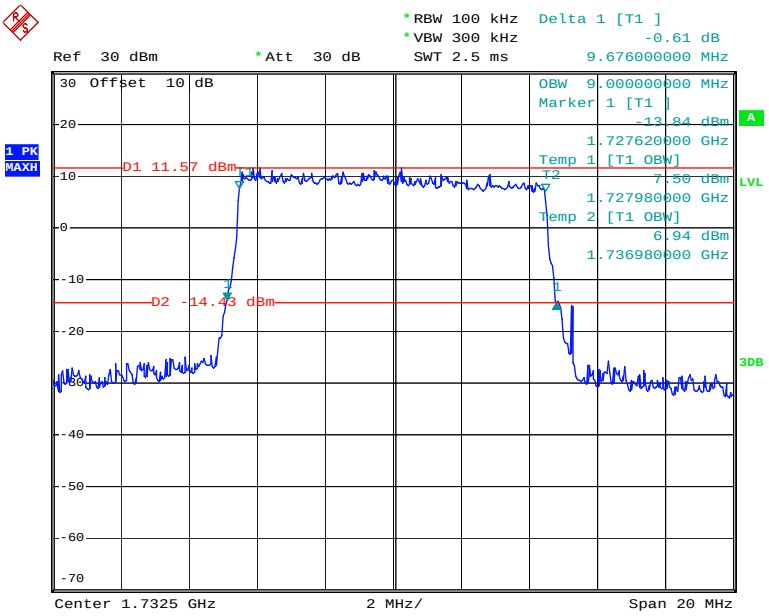
QPSK_10 MHz



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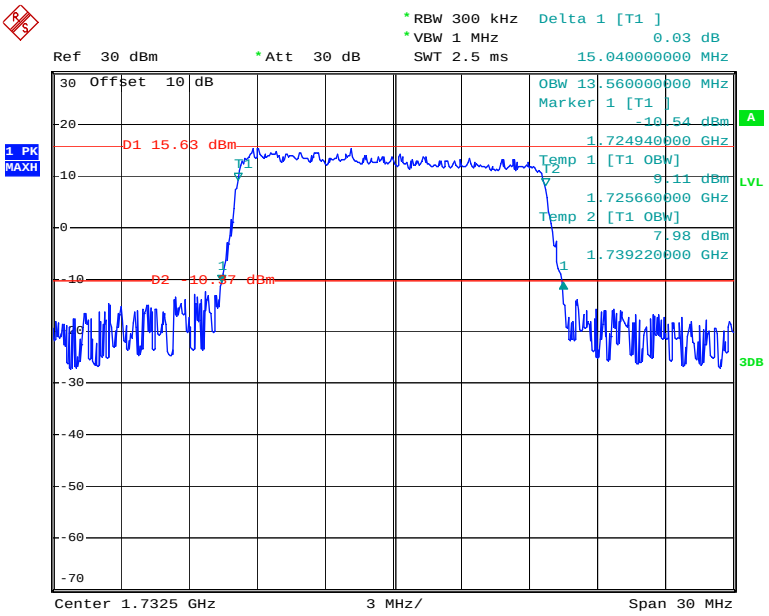

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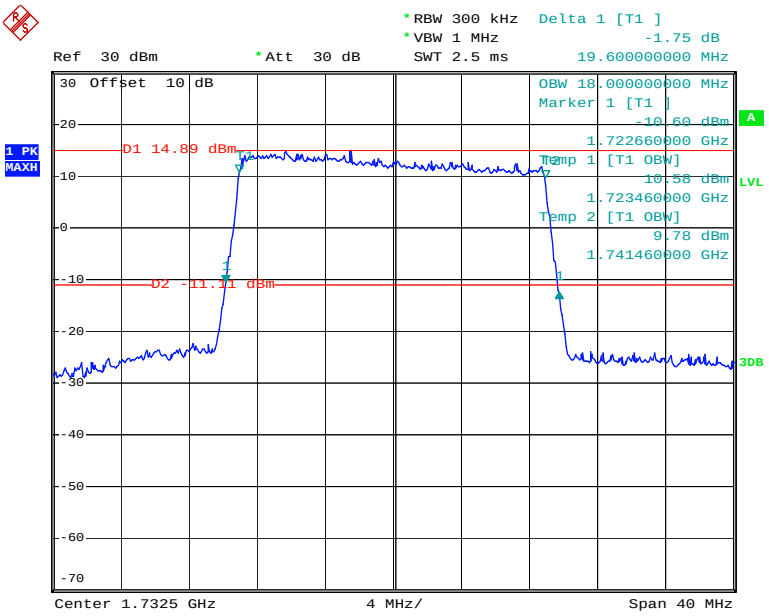
QPSK_20 MHz



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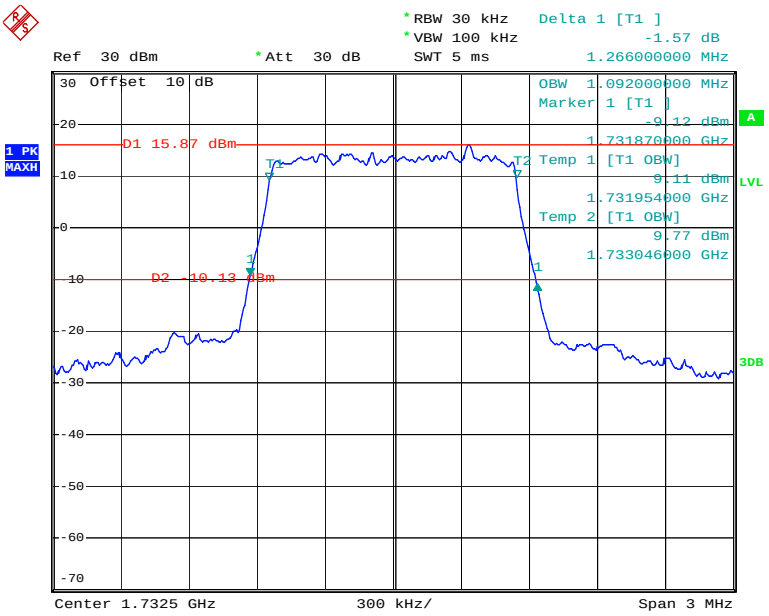
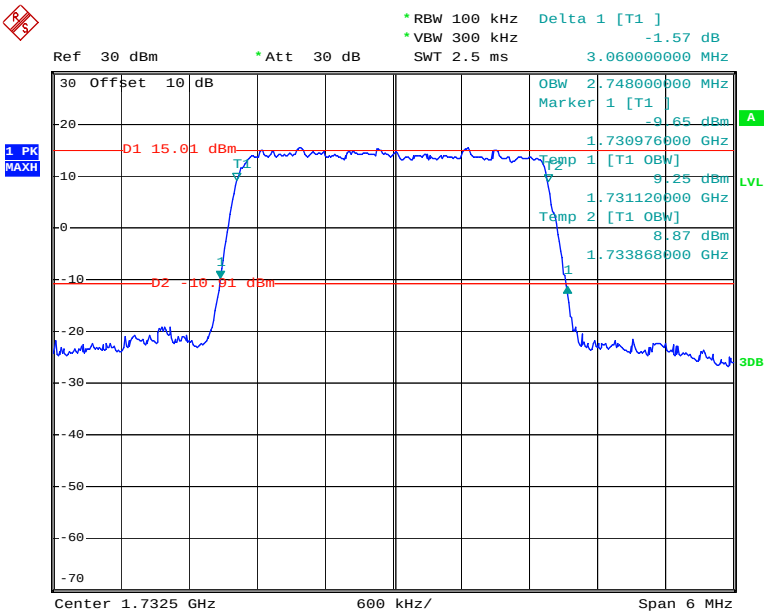
16QAM_1.4 MHz



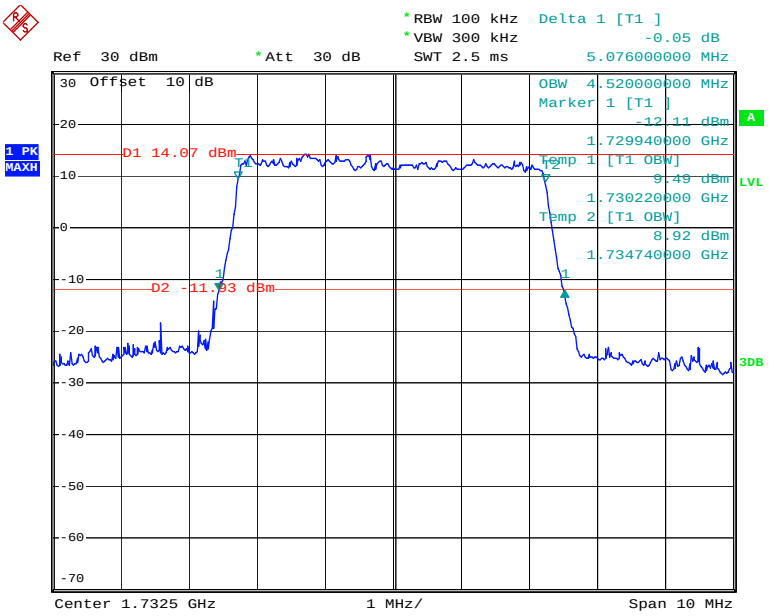
Date: 9.SEP.2017 11:00:29

16QAM_3 MHz



Date: 9.SEP.2017 11:09:29

16QAM_5 MHz



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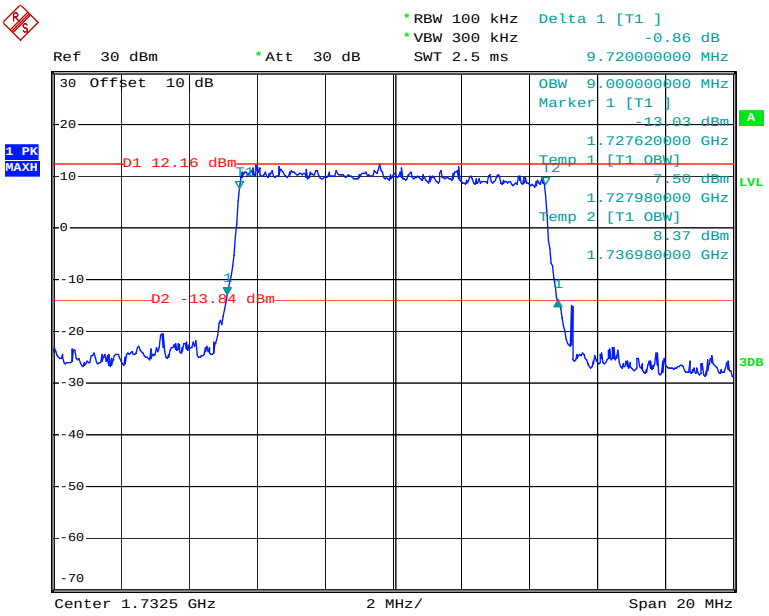
16QAM_10 MHz



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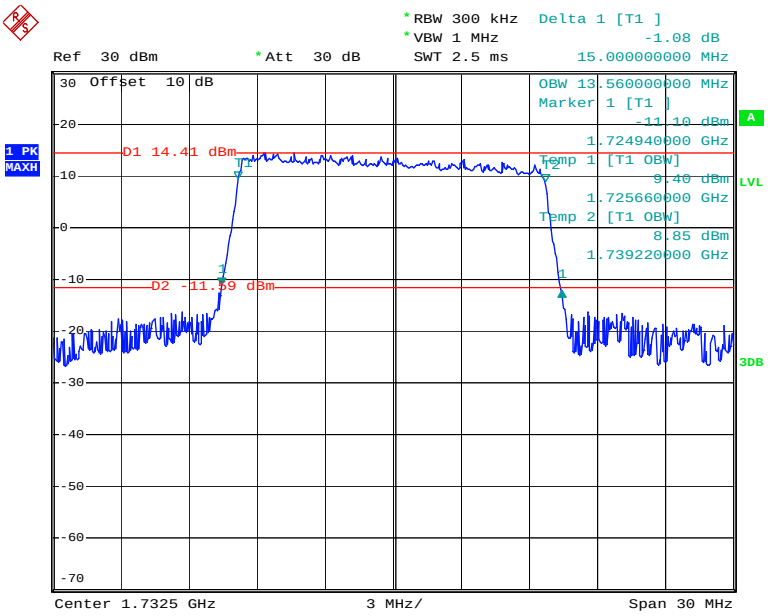
16QAM_15 MHz



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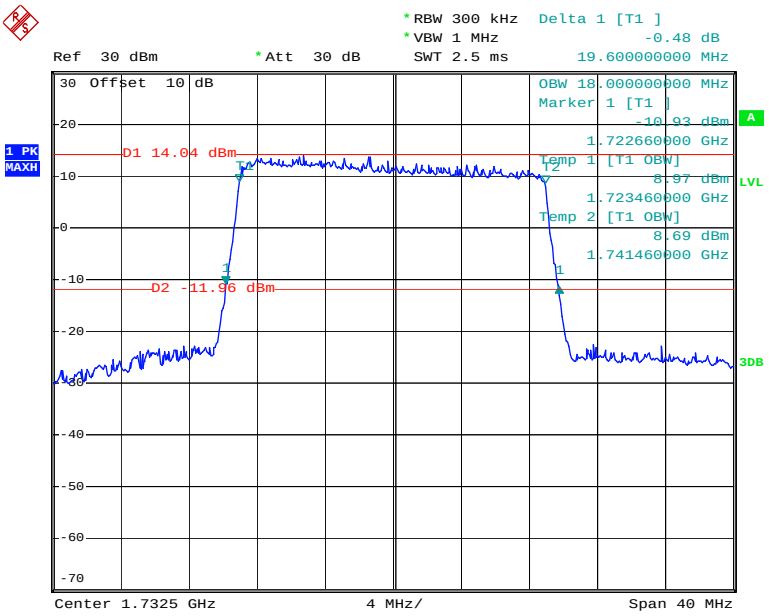
16QAM_20 MHz



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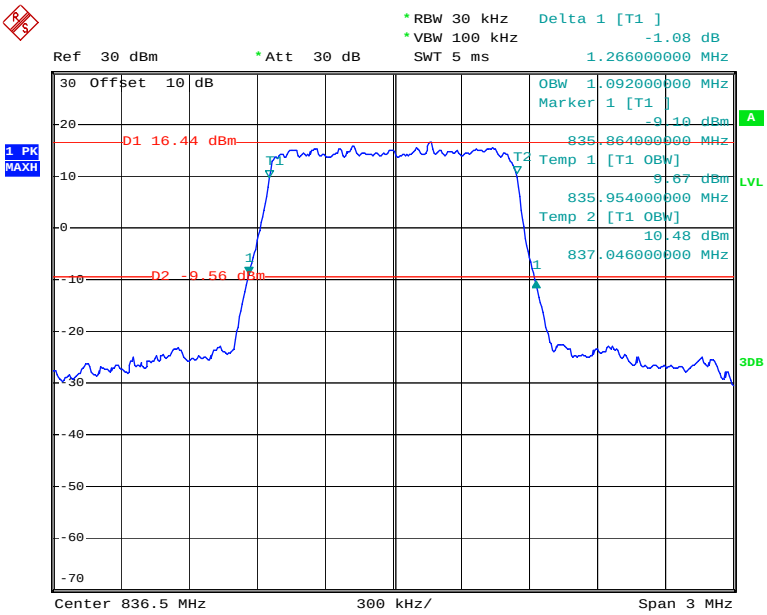
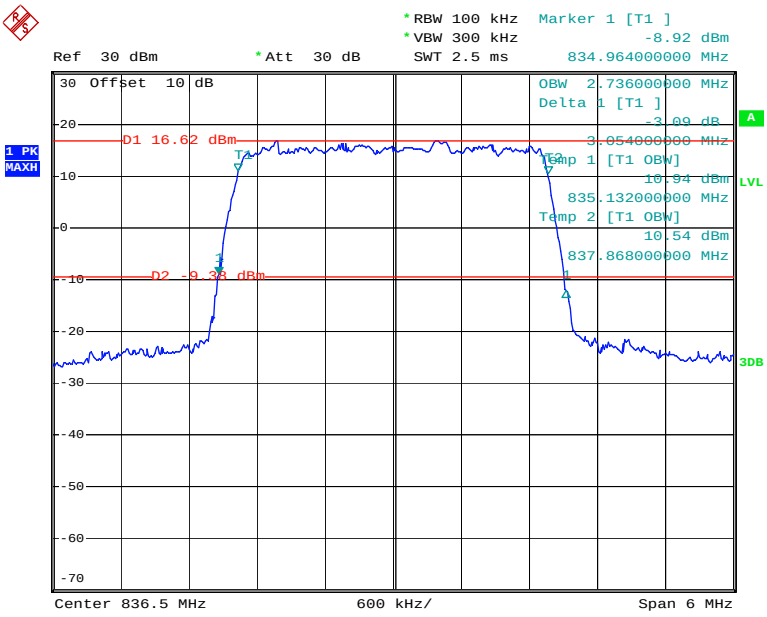
LTE Band 5:

QPSK_1.4 MHz



Date: 9.SEP.2017 15:02:47

QPSK_3 MHz



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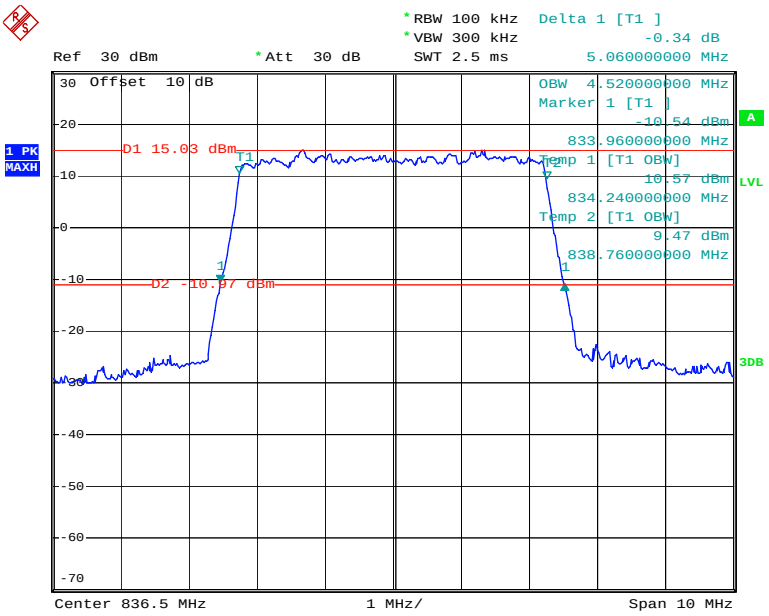
QPSK_5 MHz



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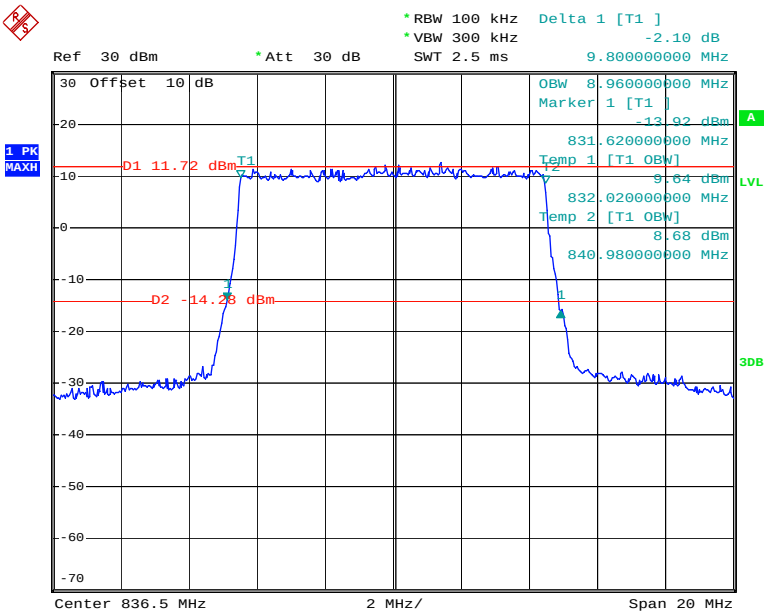
QPSK_10 MHz



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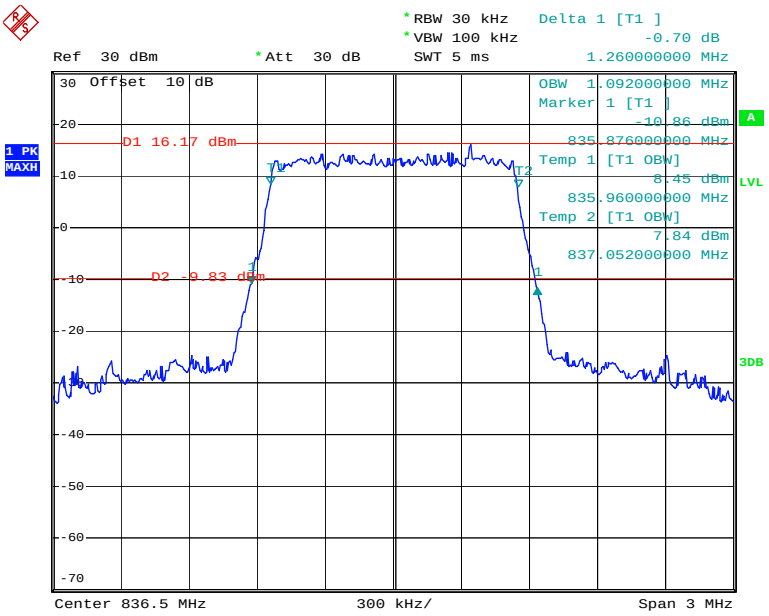
16QAM_1.4 MHz



Date: 9.SEP.2017 12:00:26

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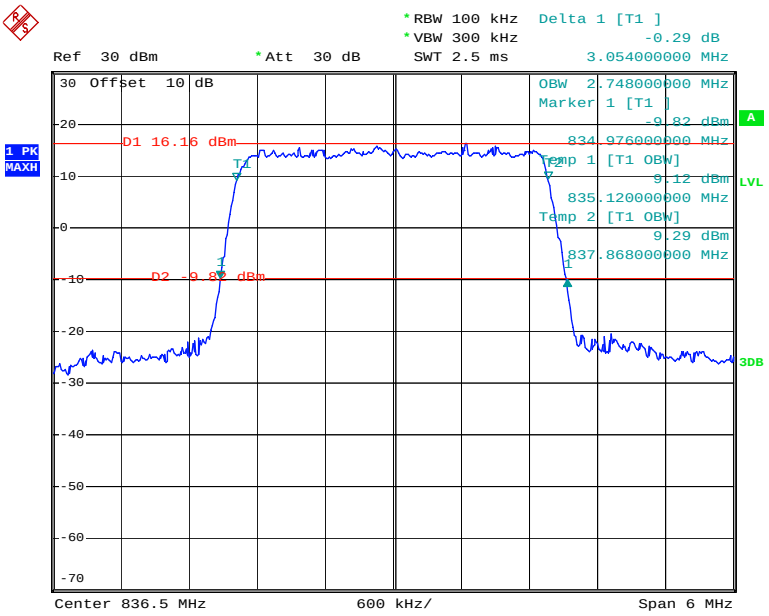

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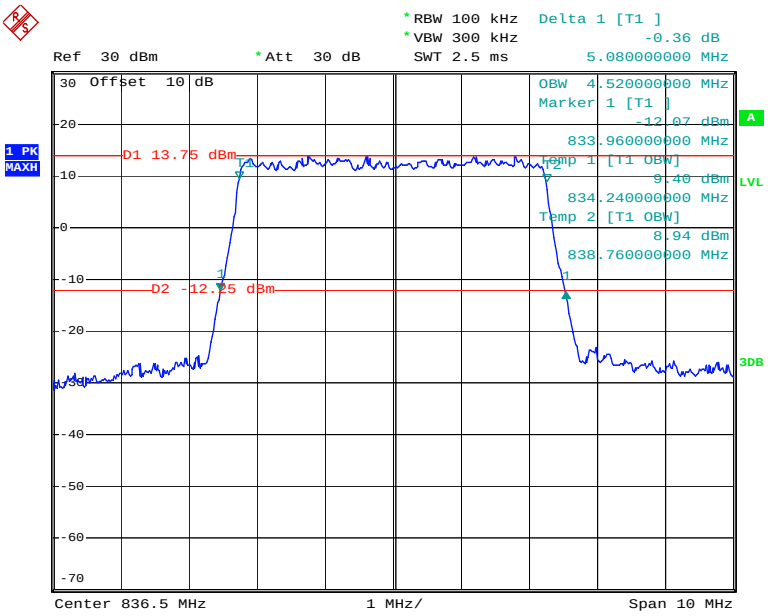
16QAM_5 MHz



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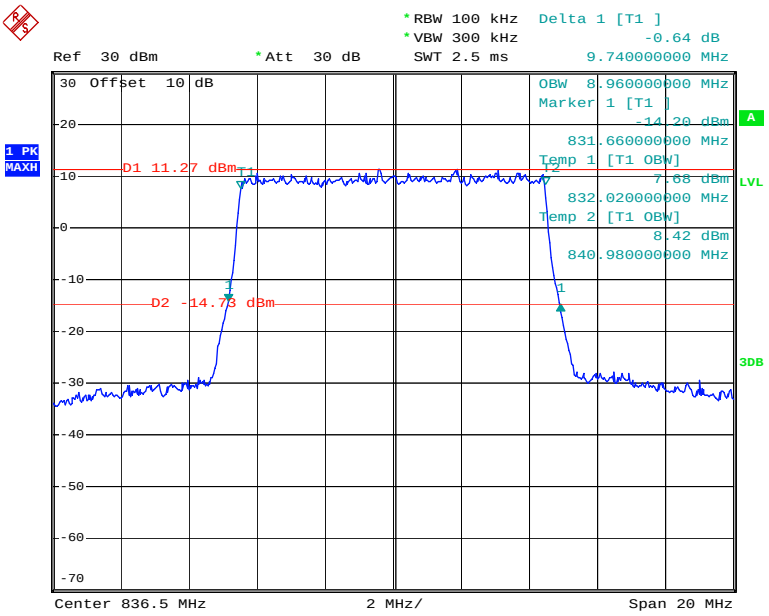
16QAM_10 MHz



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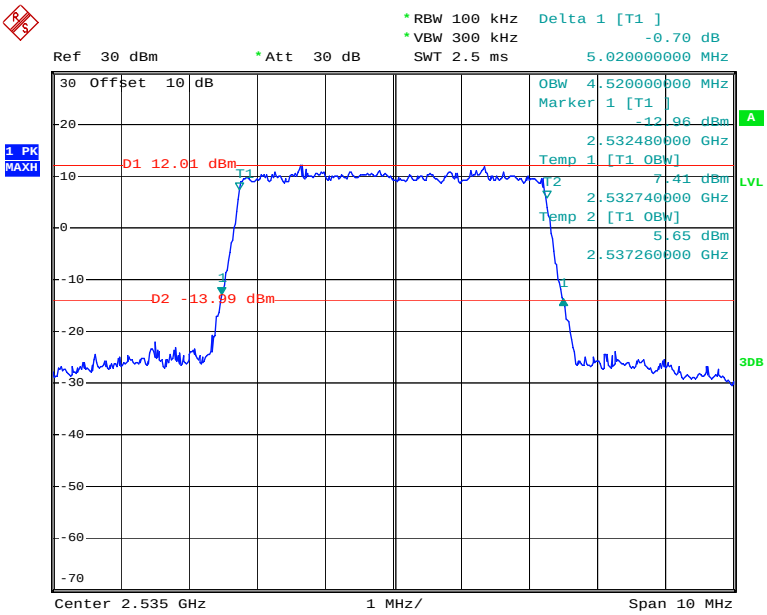
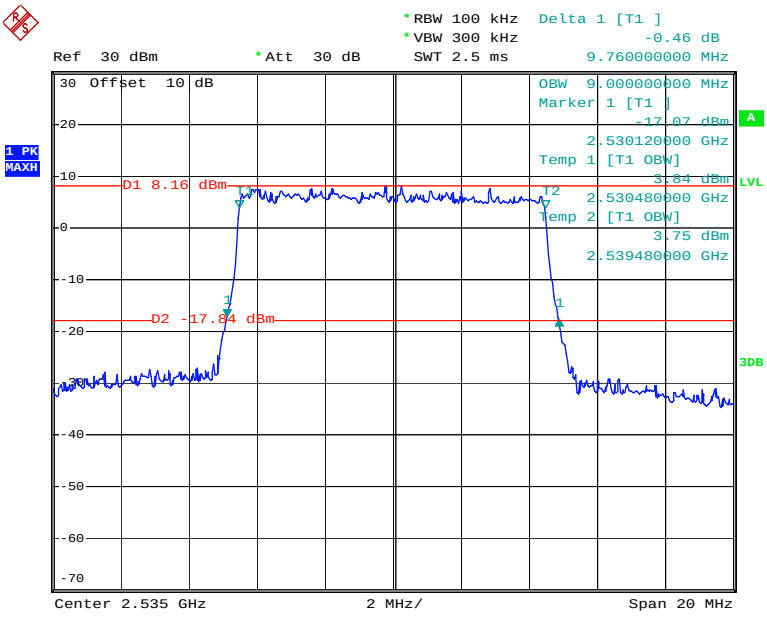
LTE Band 7:

QPSK_5 MHz



Date: 9.SEP.2017 13:42:19

QPSK_10 MHz



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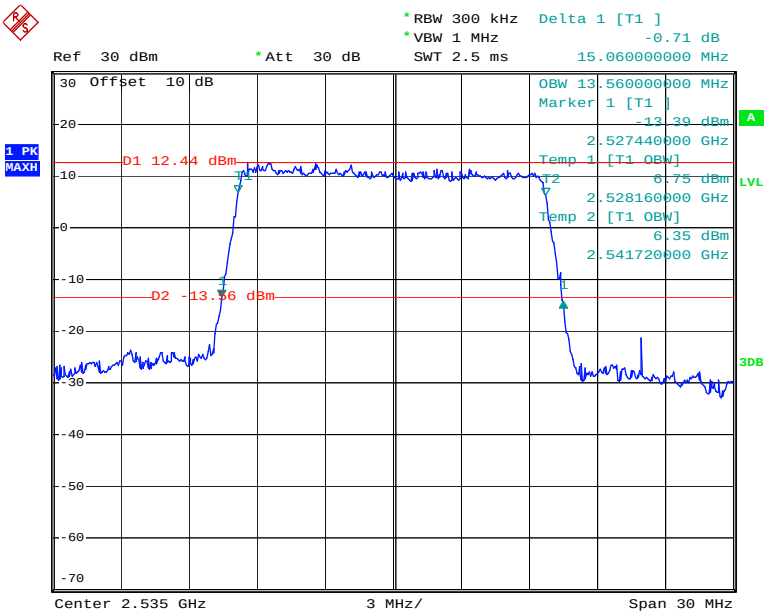
QPSK_15 MHz



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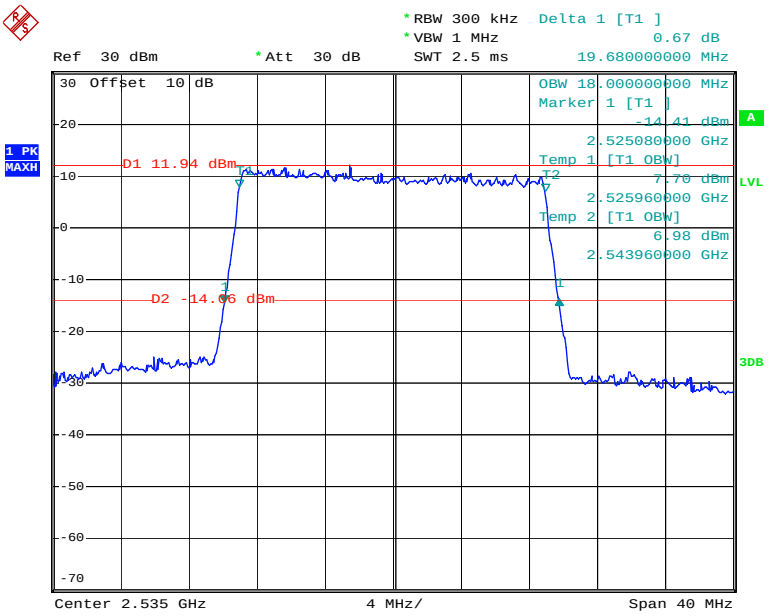
QPSK_20 MHz



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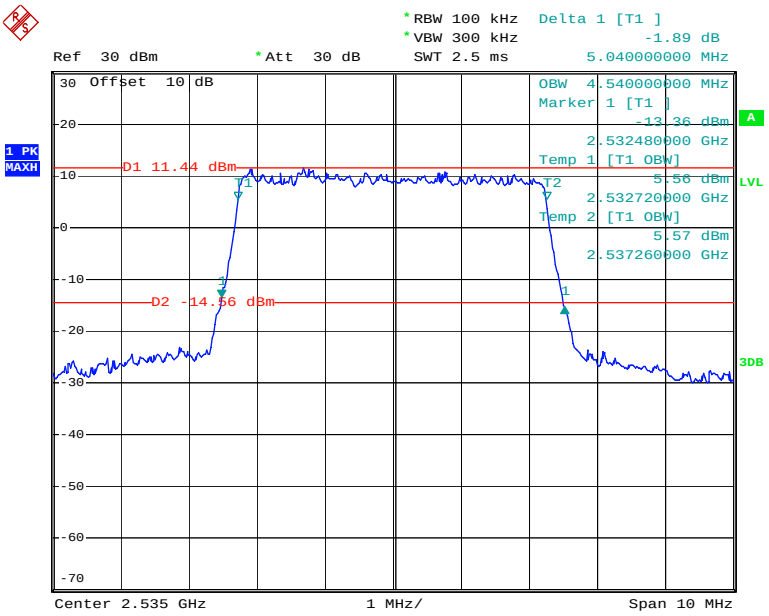
16QAM_5 MHz



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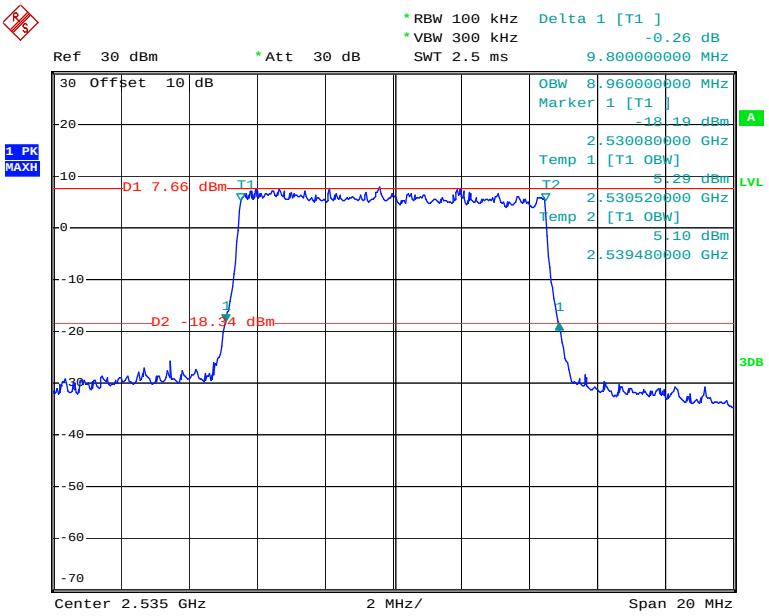
16QAM_10 MHz



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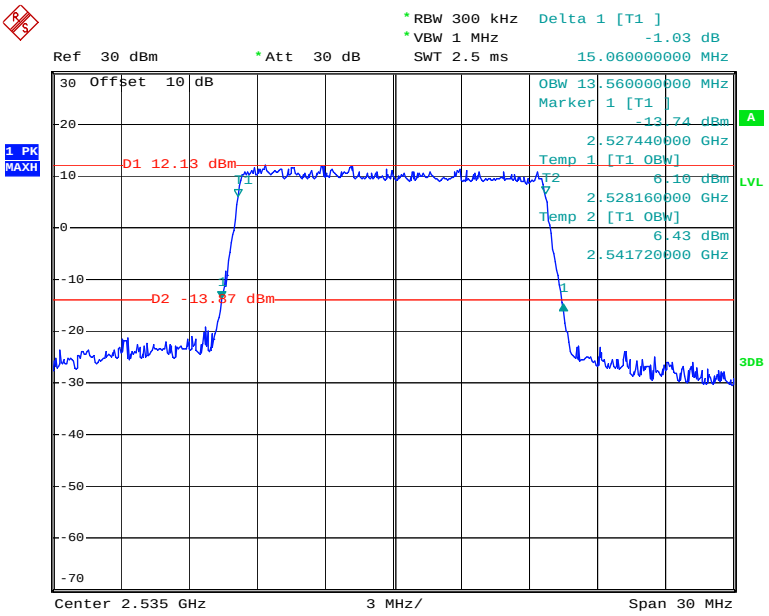
16QAM_15 MHz



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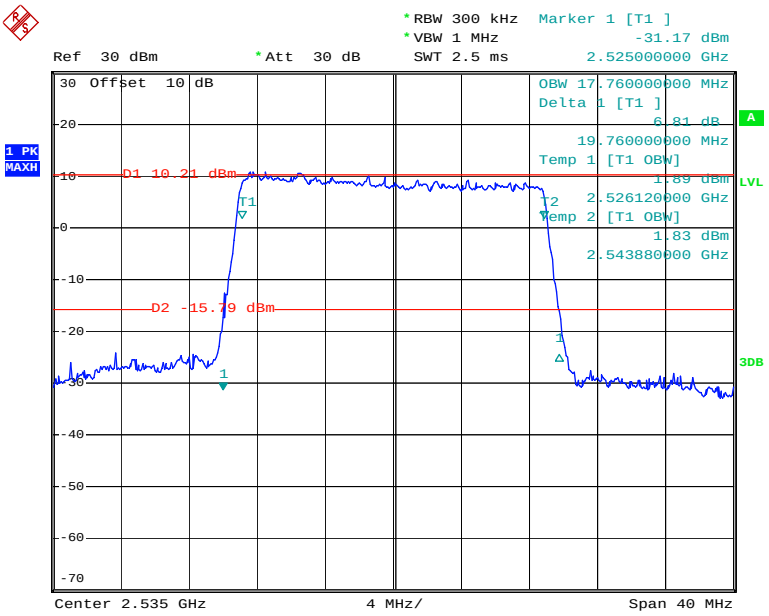
16QAM_20 MHz



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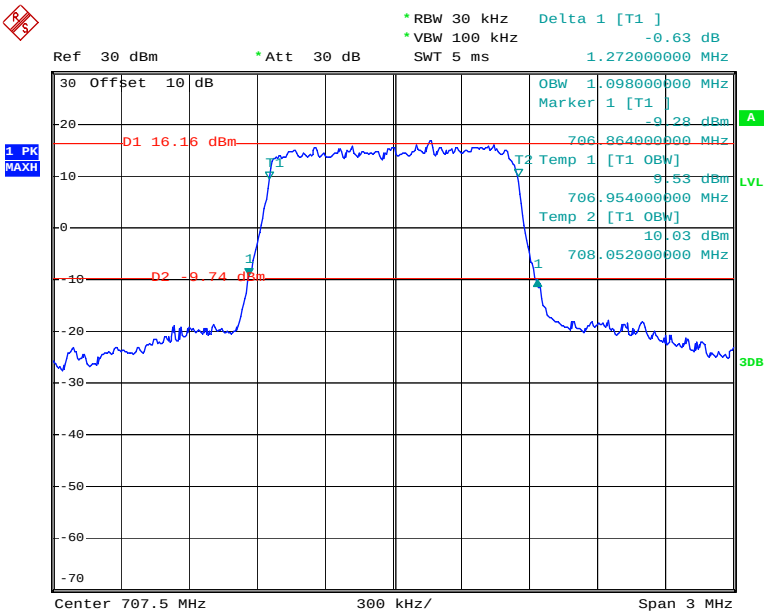
LTE Band 12:

QPSK_1.4 MHz



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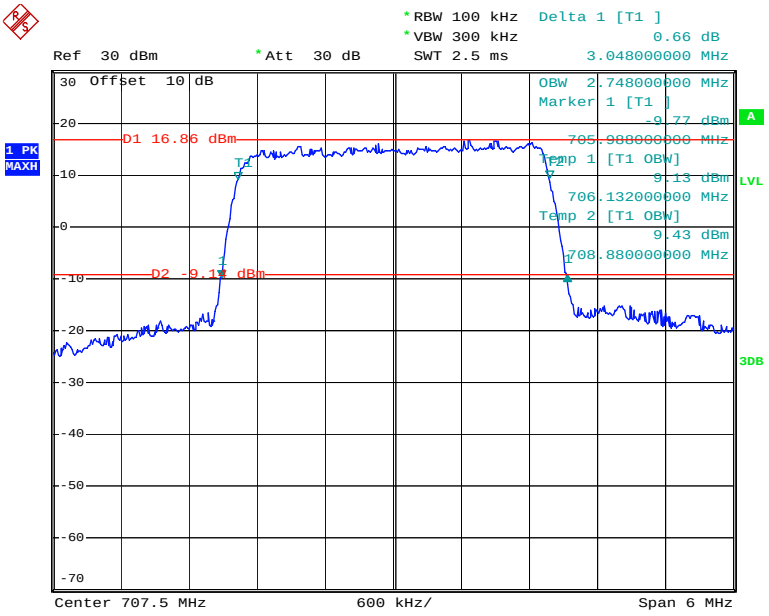
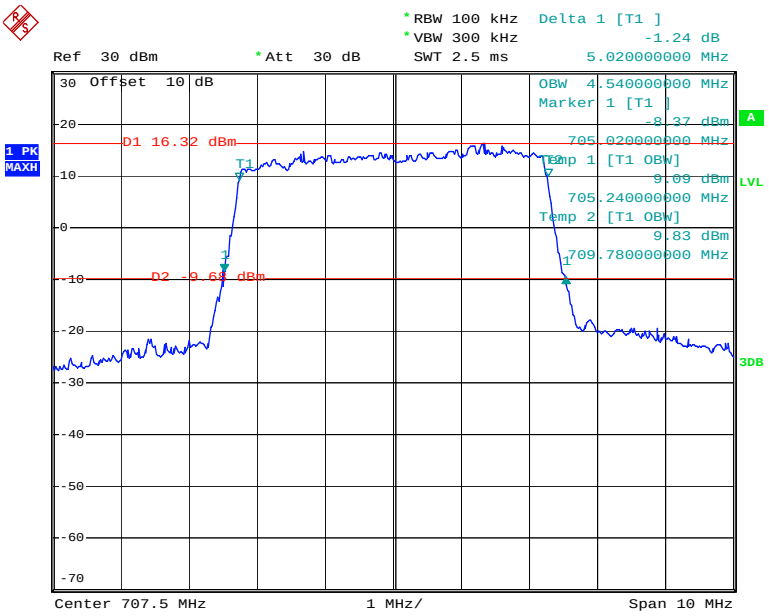
QPSK_3 MHz



Date: 9.SEP.2017 14:07:49

QPSK_5 MHz



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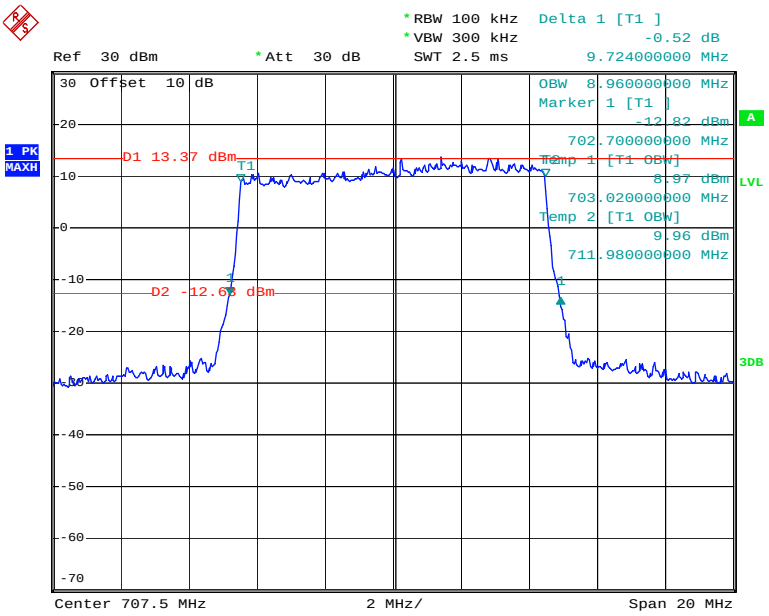
QPSK_10 MHz



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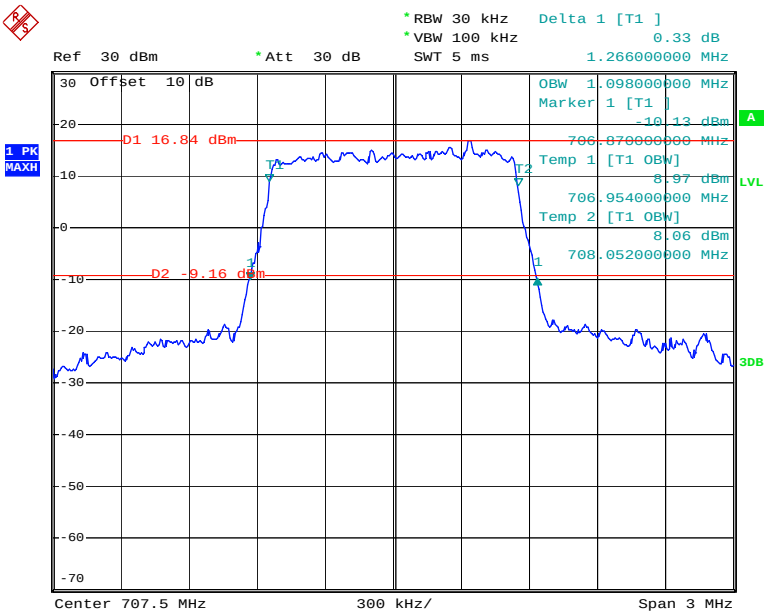
16QAM_1.4 MHz



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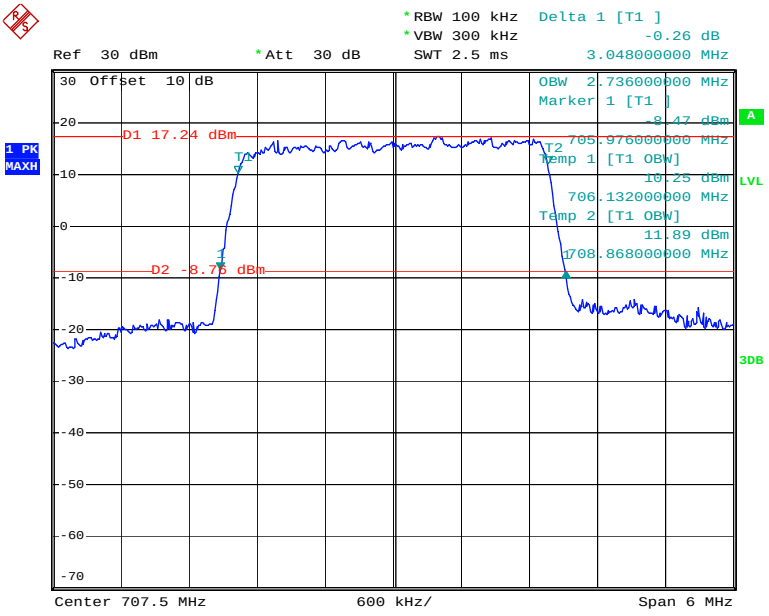
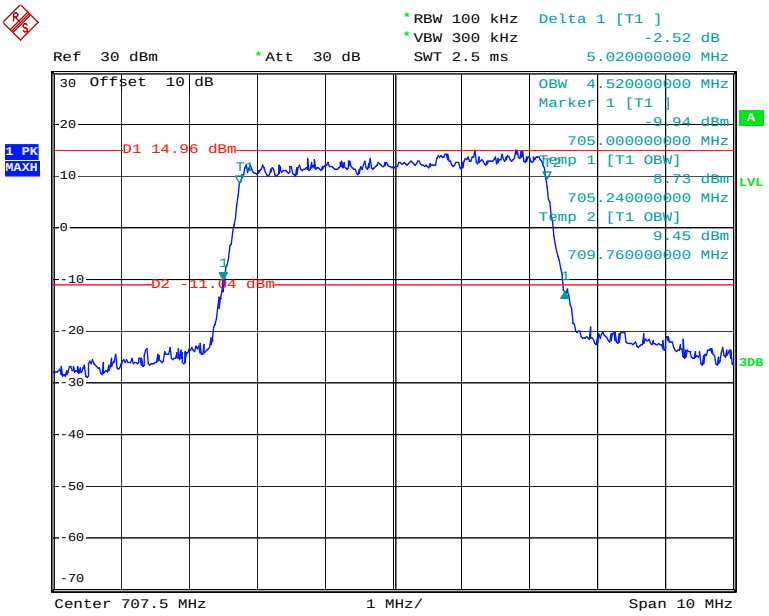
16QAM_3 MHz



Date: 9.SEP.2017 14:09:02

16QAM_5 MHz



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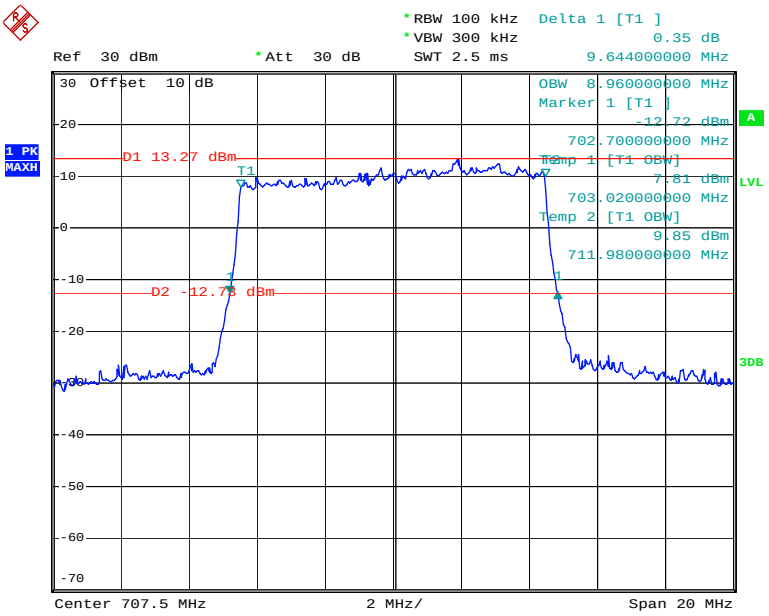
16QAM_10 MHz



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LTE Band 17:

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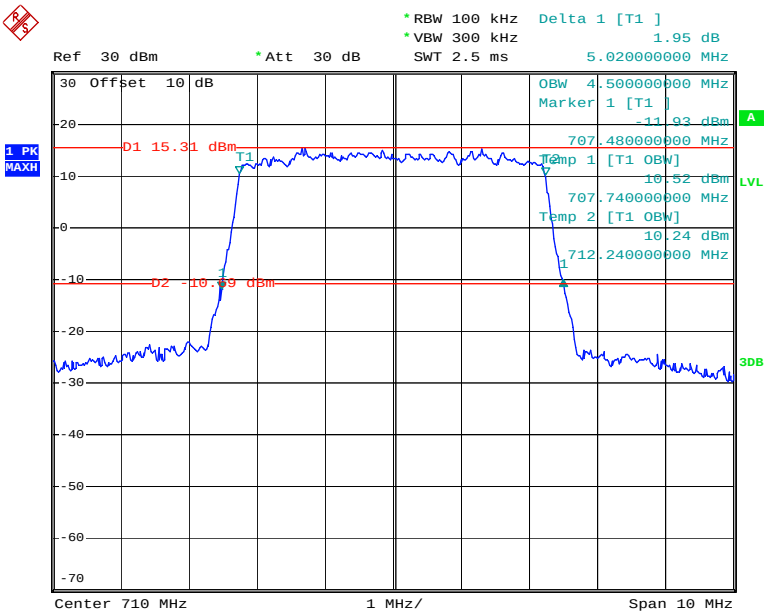

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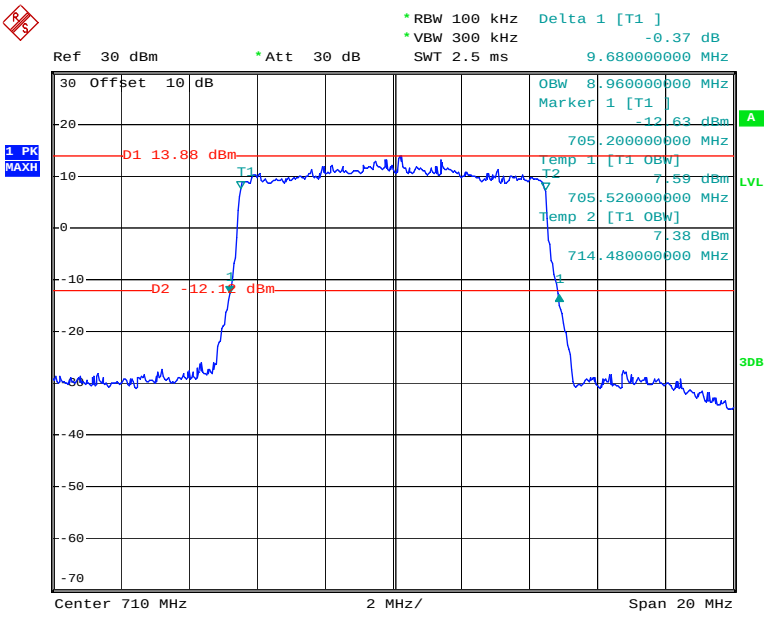
QPSK_10 MHz



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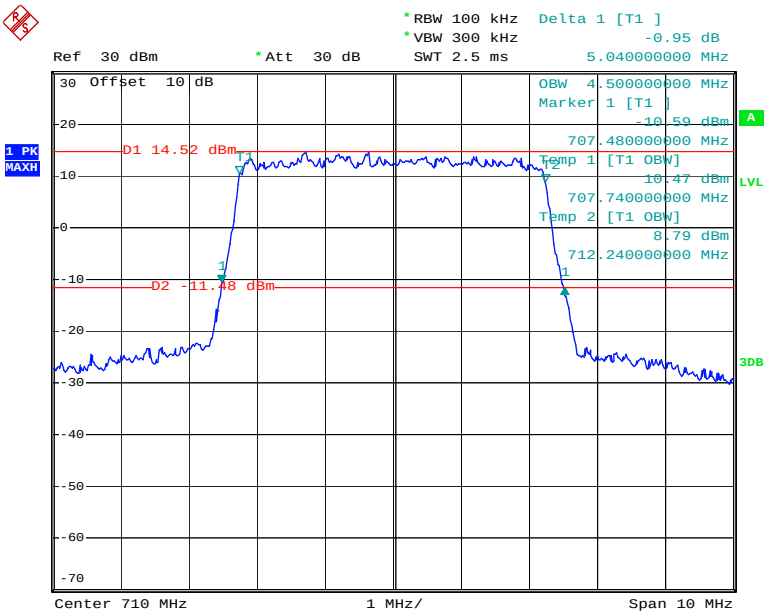
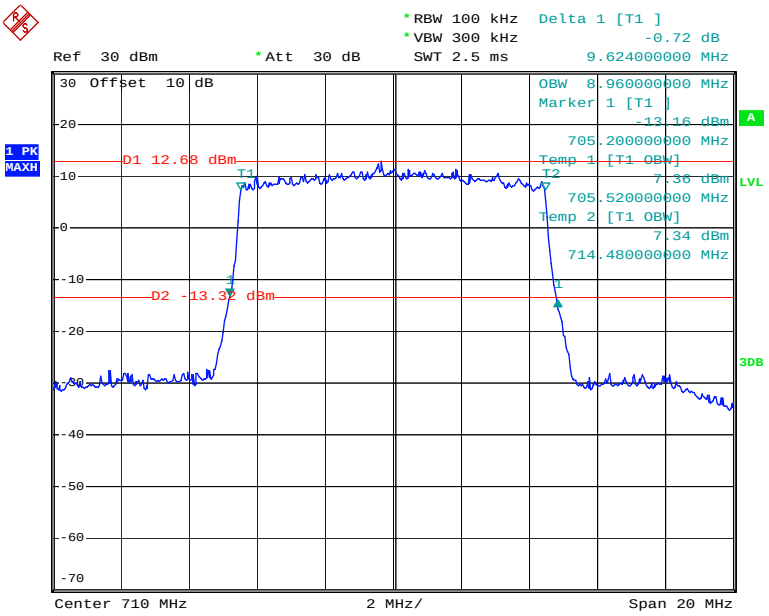
16QAM_5 MHz



Date: 9.SEP.2017 14:38:32

16QAM_10 MHz



Date: 9.SEP.2017 14:17:08

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

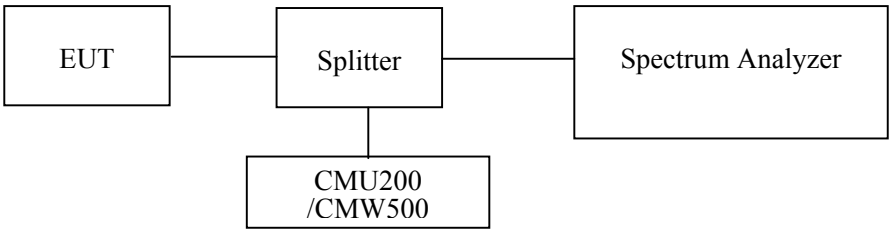
Applicable Standard

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

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

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Universal Radio Communication Tester	CMU200	109 038	2017-07-18	2018-07-18
R&S	Wideband Radio Communication Tester	CMW500	147473	2017-08-31	2018-08-31
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08

*** 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

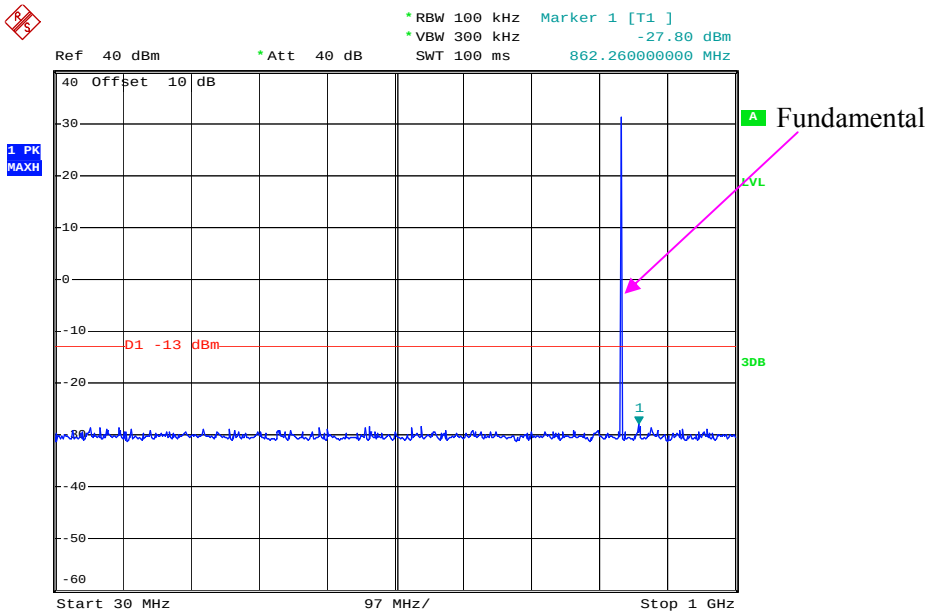
Environmental Conditions

Temperature:	29°C
Relative Humidity:	52 %
ATM Pressure:	100.4 kPa

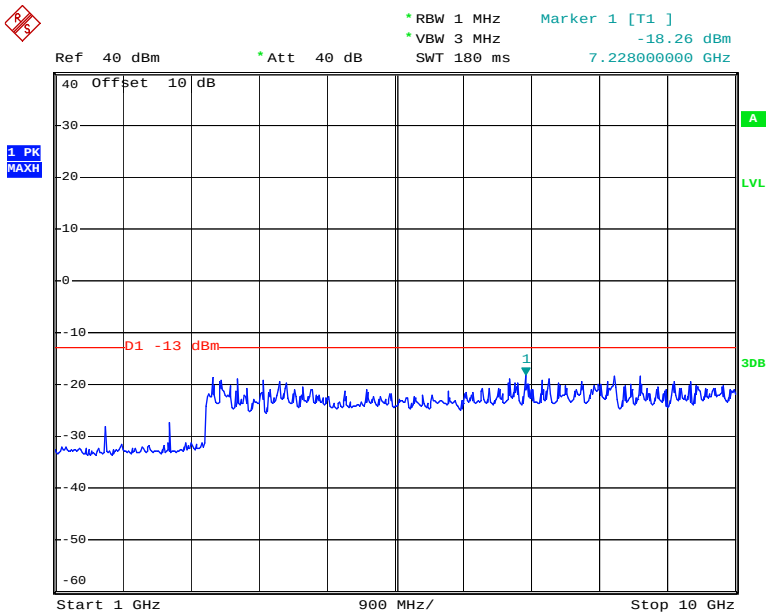
The testing was performed by Swim Lv&Nami Quan on 2017-09-11.

Please refer to the following plots.

GSM850_Middle Channel

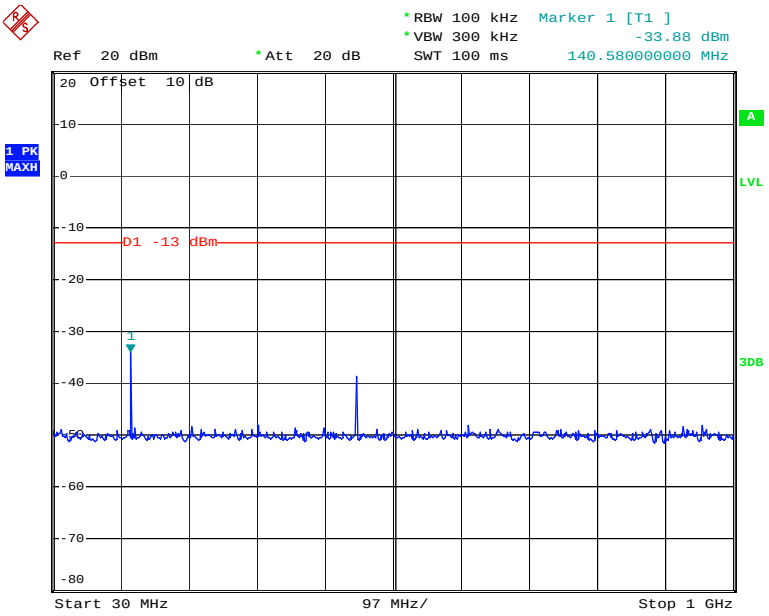


Date: 11.SEP.2017 20:41:56

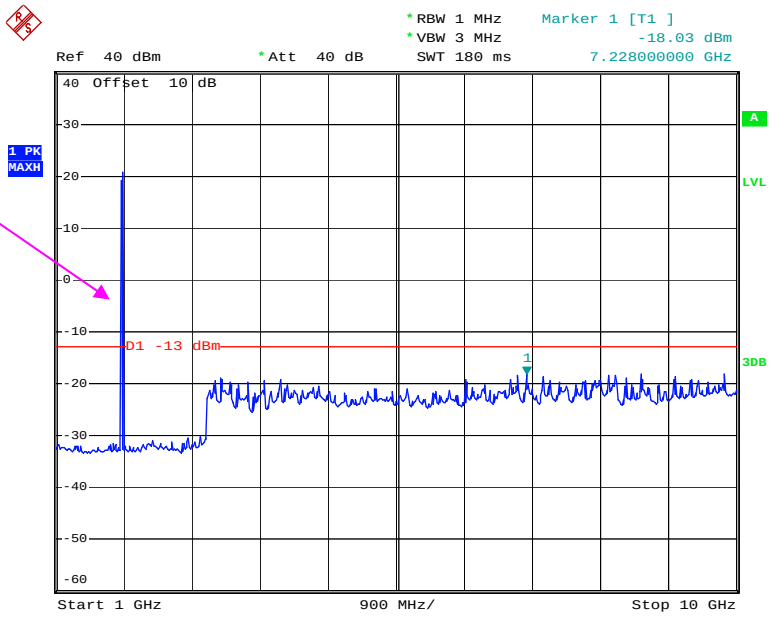


Date: 11.SEP.2017 20:42:42

PCS 1900_ Middle Channel

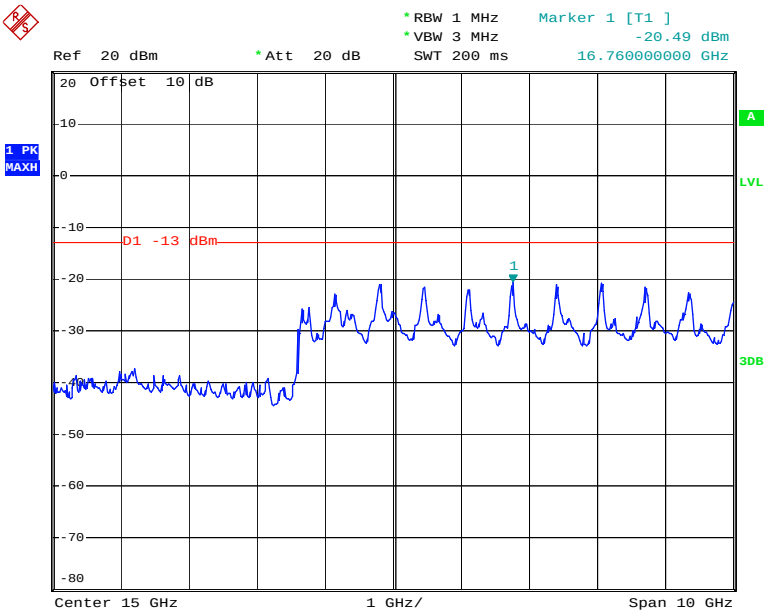


Date: 11.SEP.2017 21:09:28



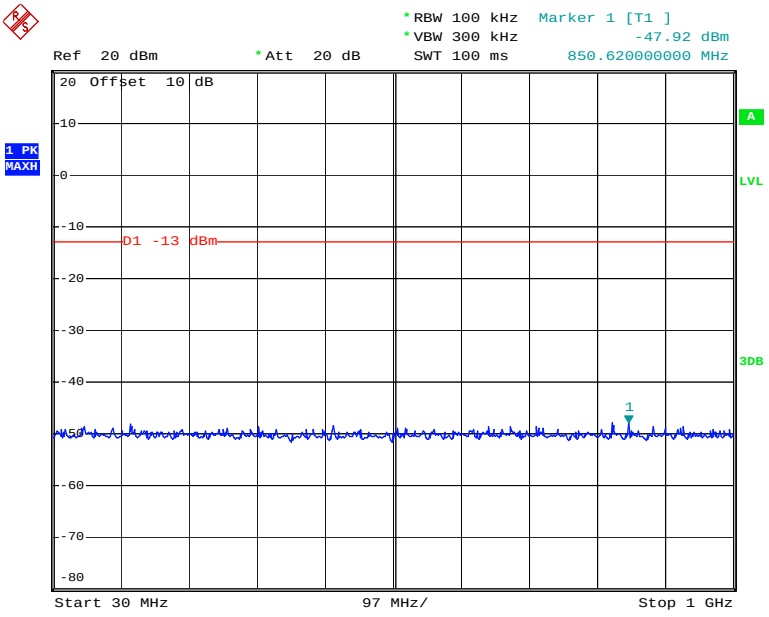
Fundamental

Date: 11.SEP.2017 20:57:25

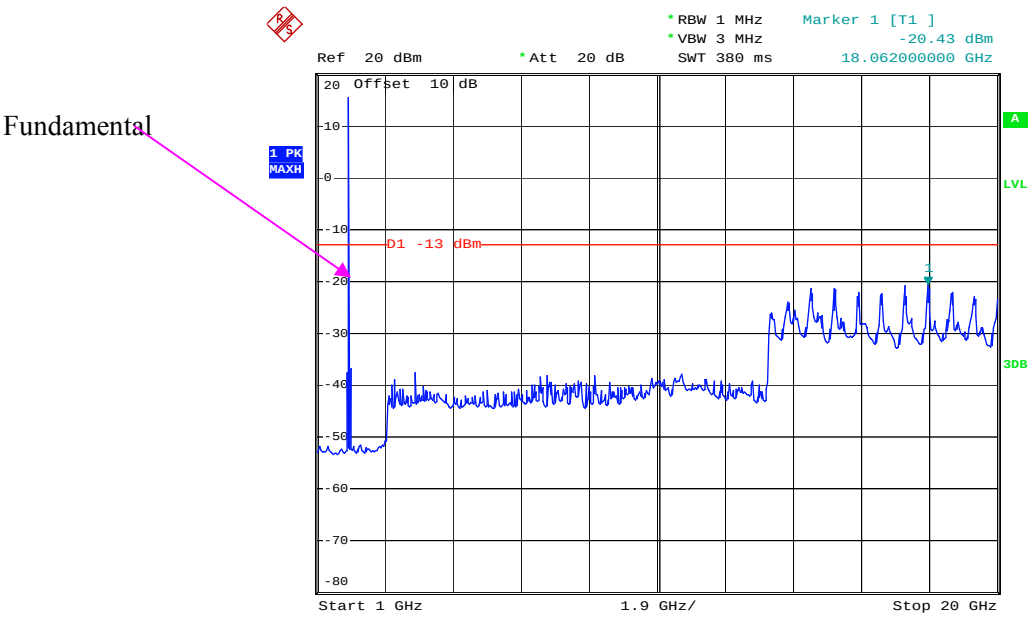


Date: 11.SEP.2017 20:58:16

REL99 Band II_ Middle Channel

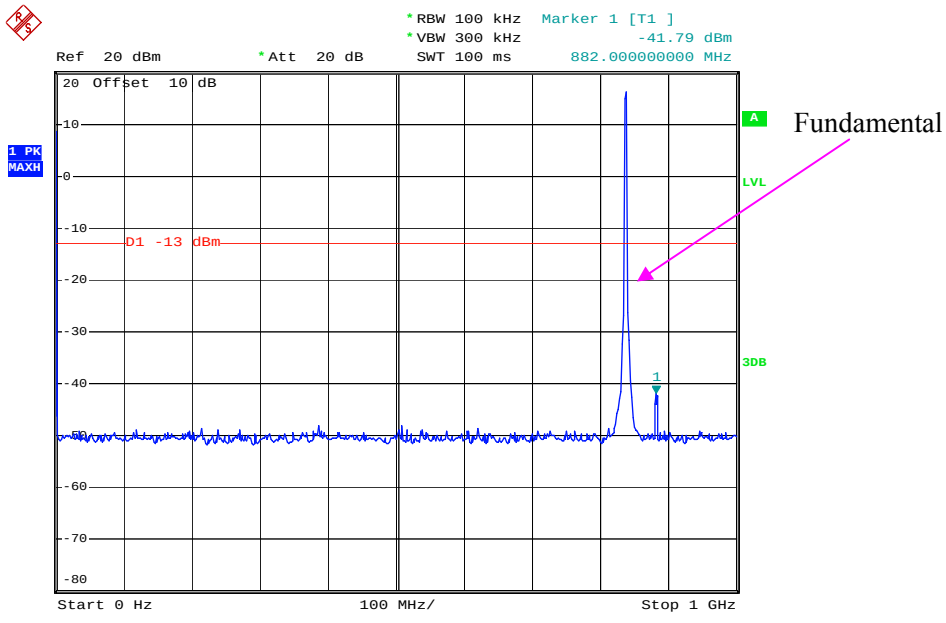


Date: 11.SEP.2017 20:18:04

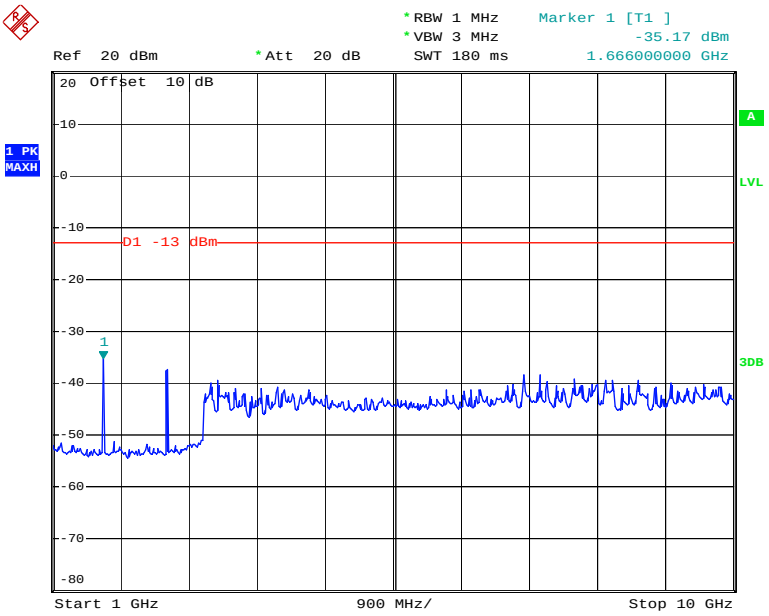


Date: 11.SEP.2017 20:16:50

Rel 99 Band Ⅴ_ Middle Channel



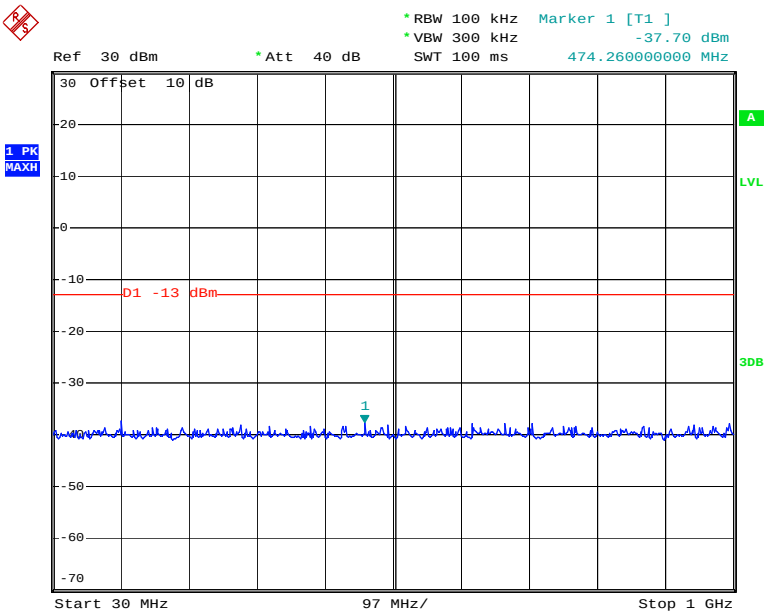
Date: 11.SEP.2017 20:30:39



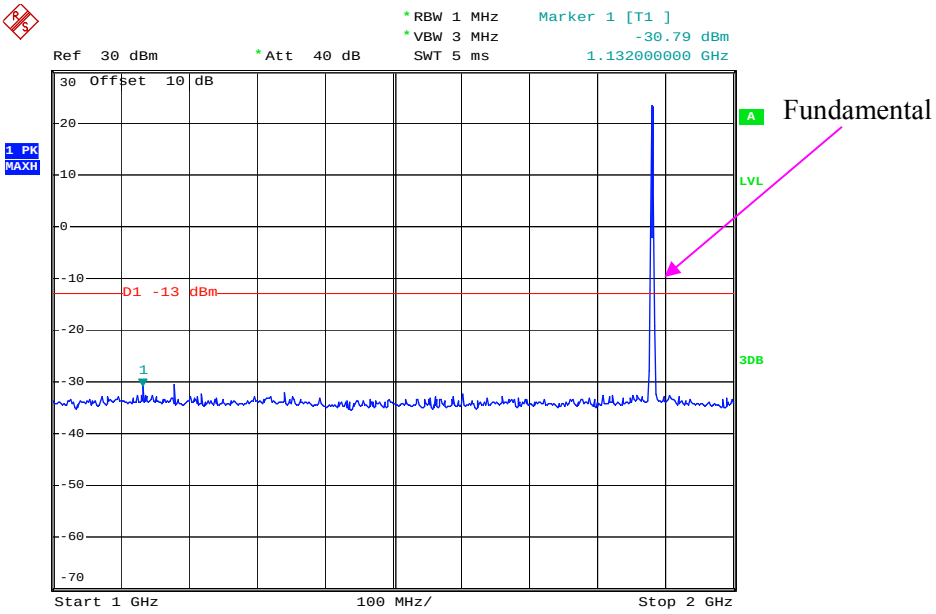
Date: 11.SEP.2017 20:29:36

LTE Band 2 (Middle Channel)

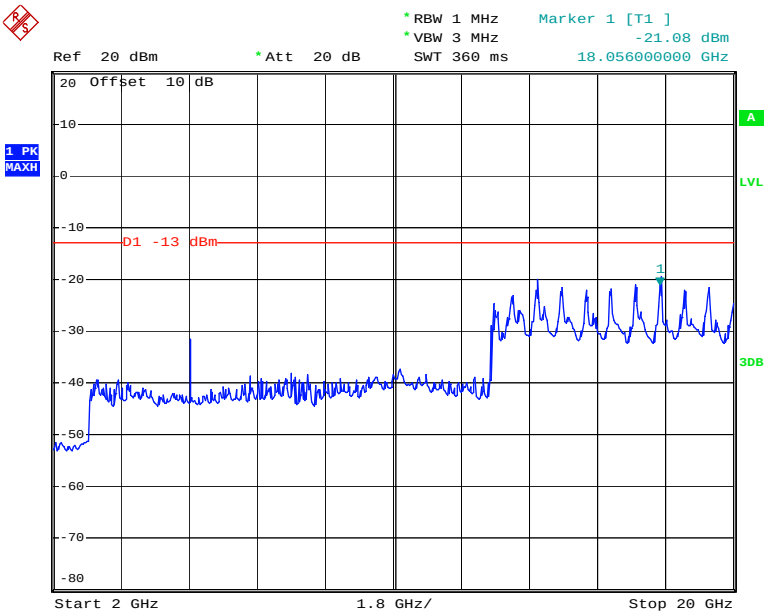
QPSK_1.4 MHz



Date: 11.SEP.2017 09:09:00

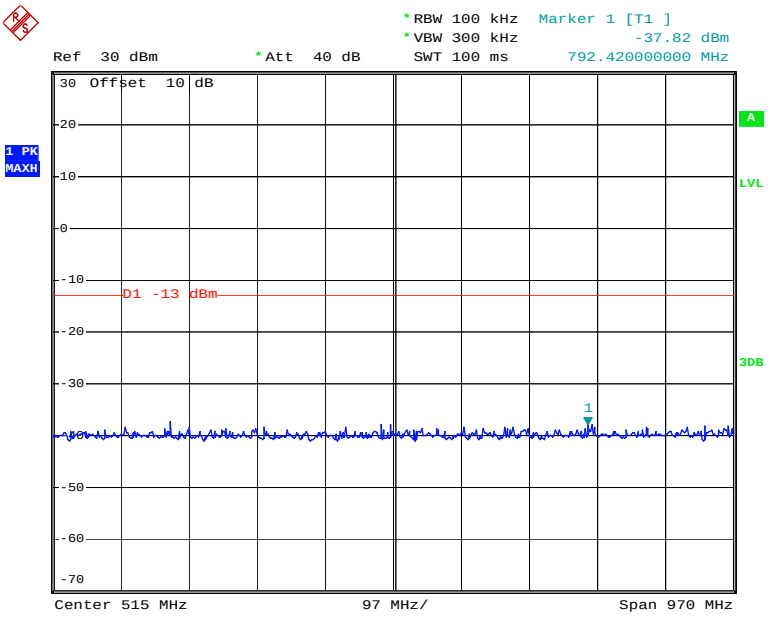


Date: 11.SEP.2017 09:16:38

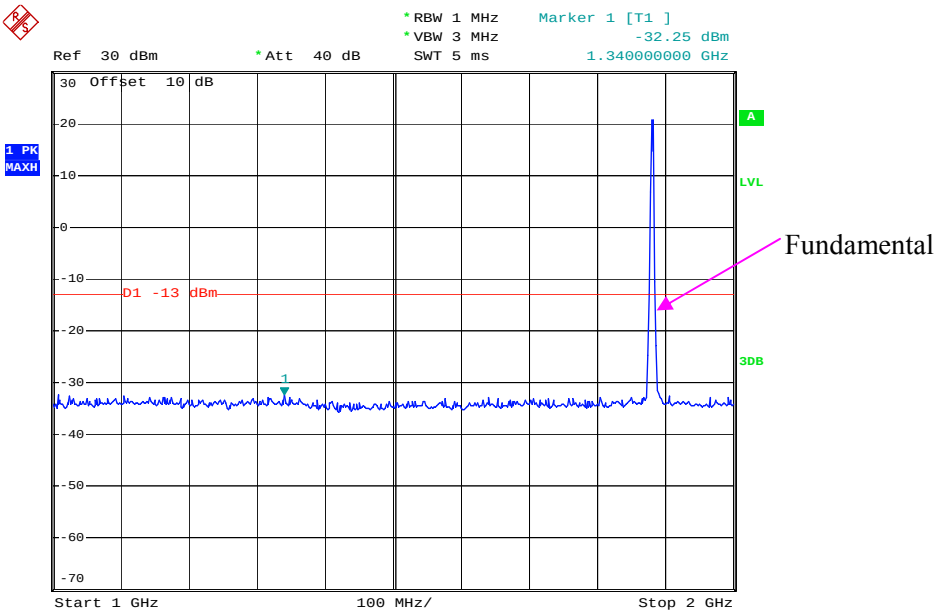


Date: 11.SEP.2017 09:20:25

QPSK_3 MHz



Date: 11.SEP.2017 09:10:23



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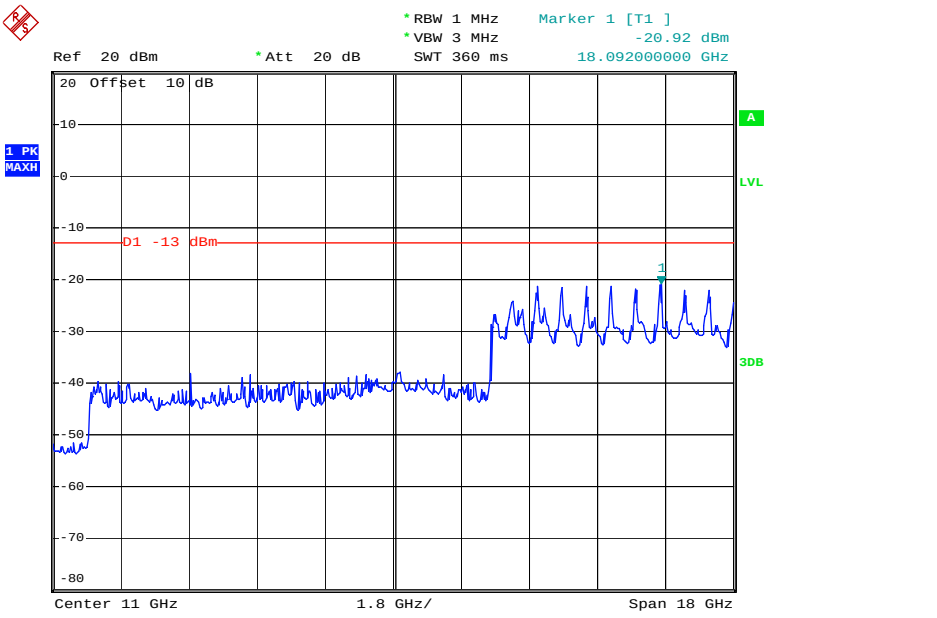

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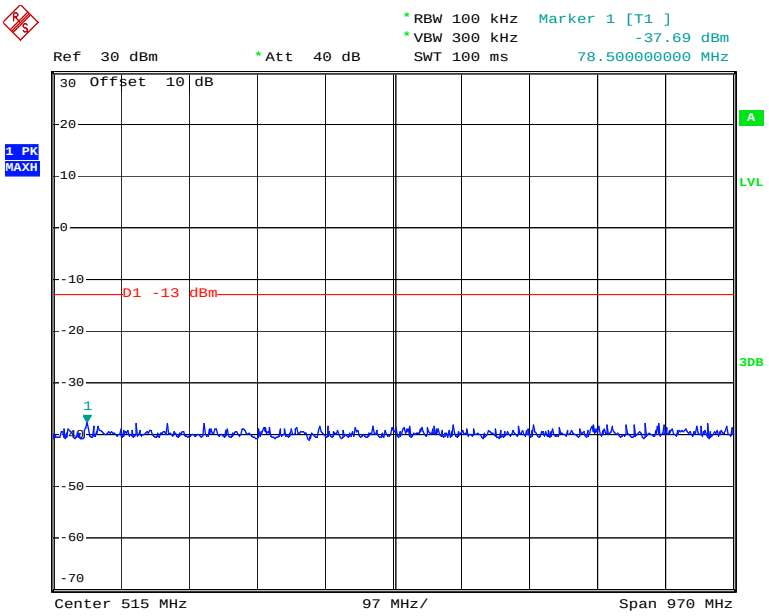
QPSK_5 MHz



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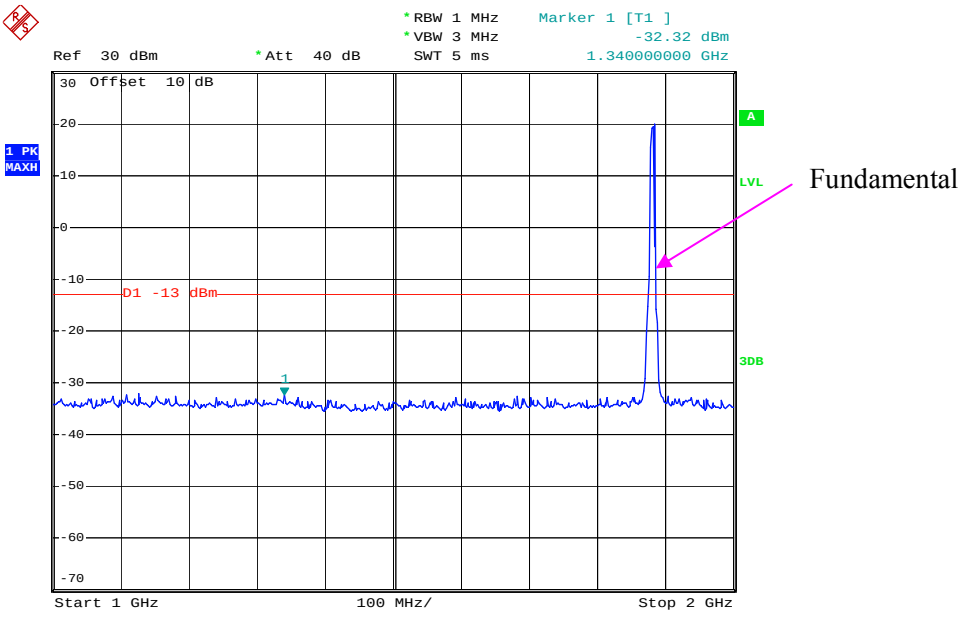

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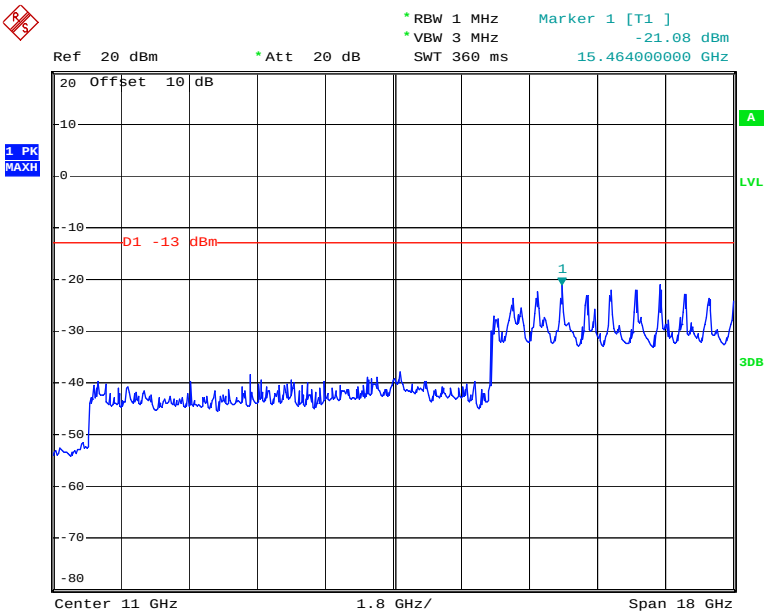
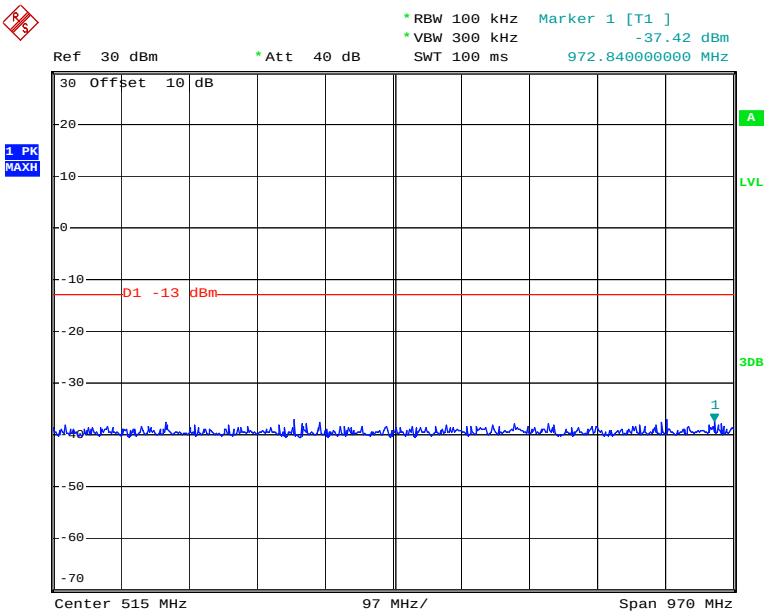


Date: 11.SEP.2017 09:22:20

QPSK_10 MHz



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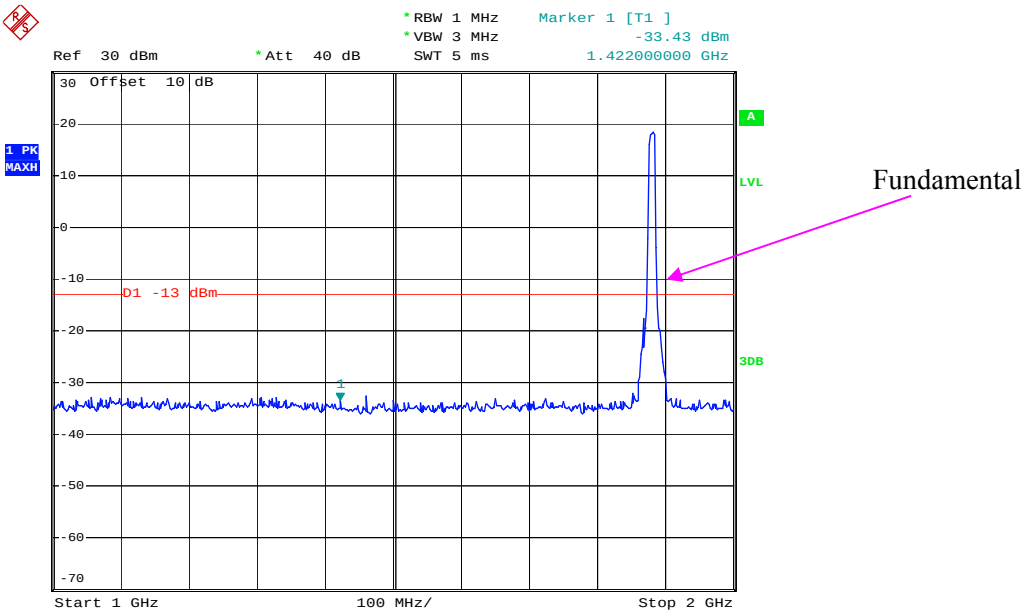

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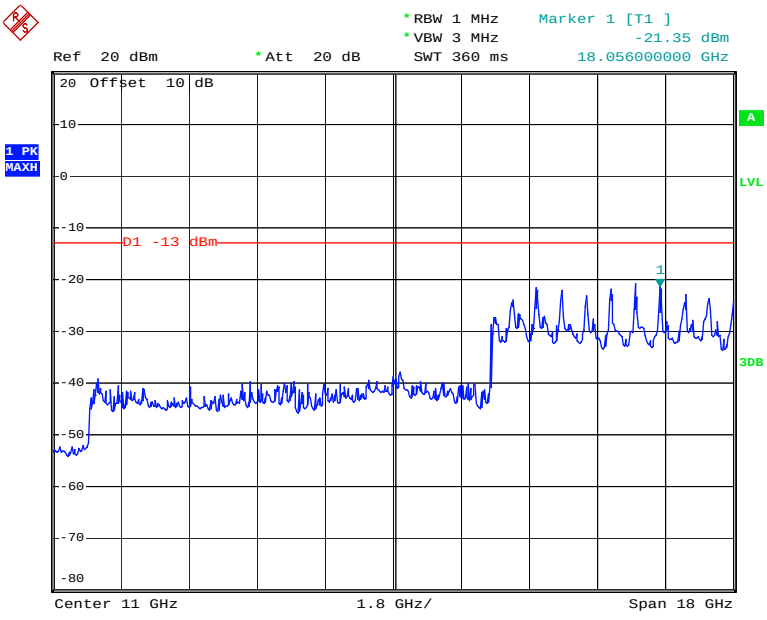

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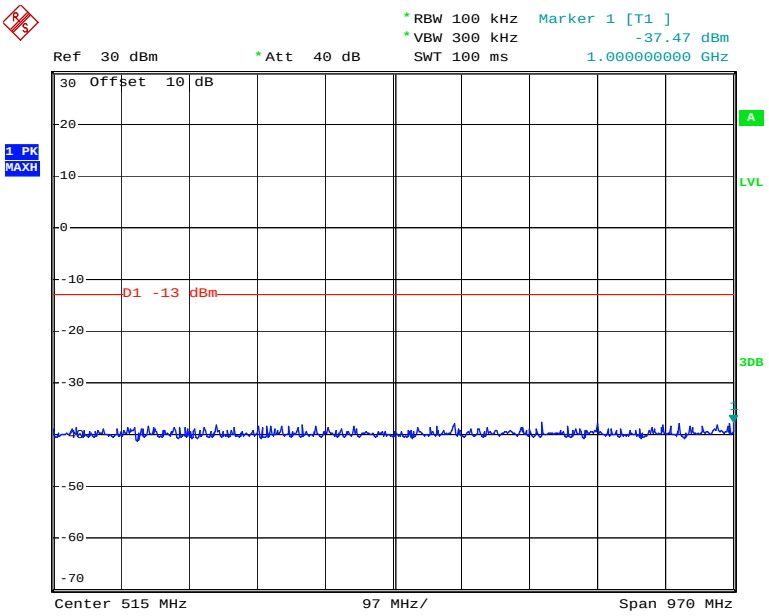
QPSK_15 MHz



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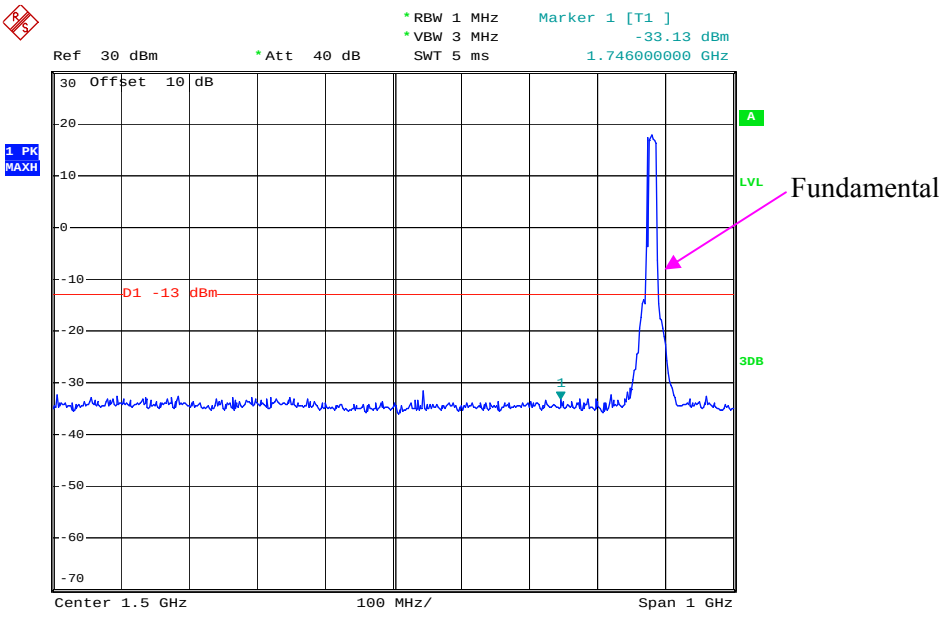

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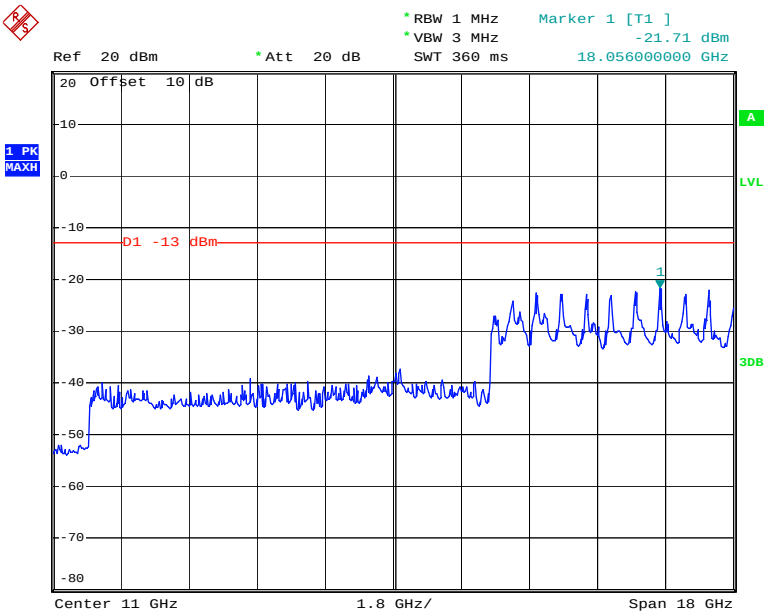

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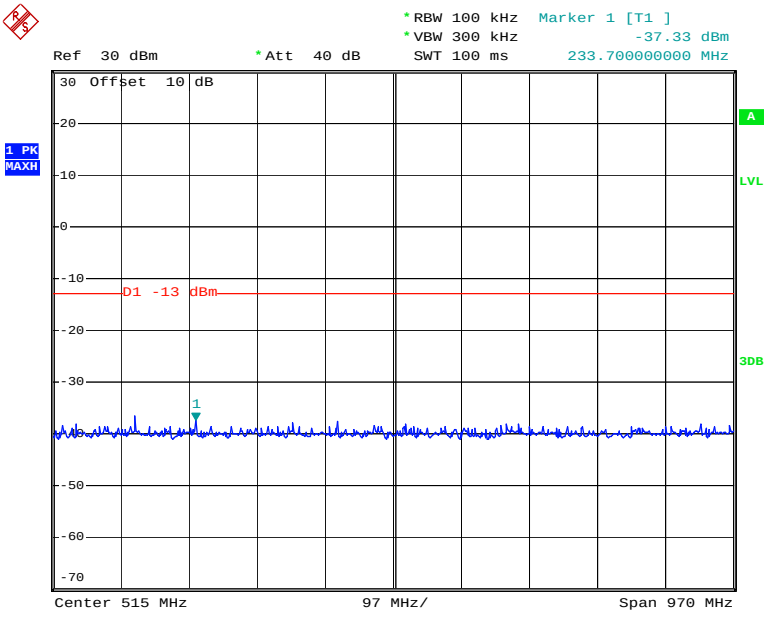
QPSK_20 MHz



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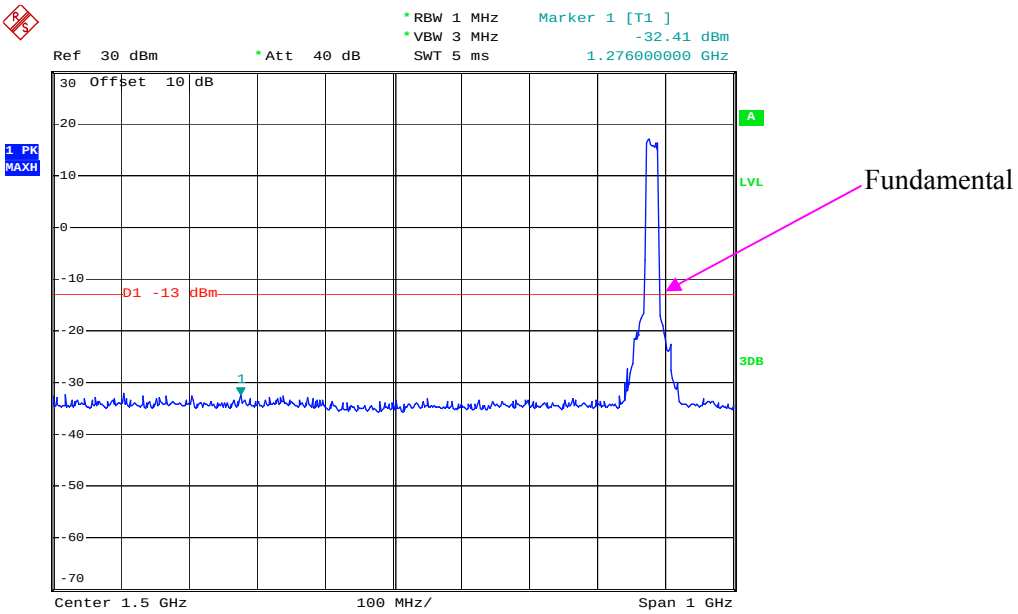

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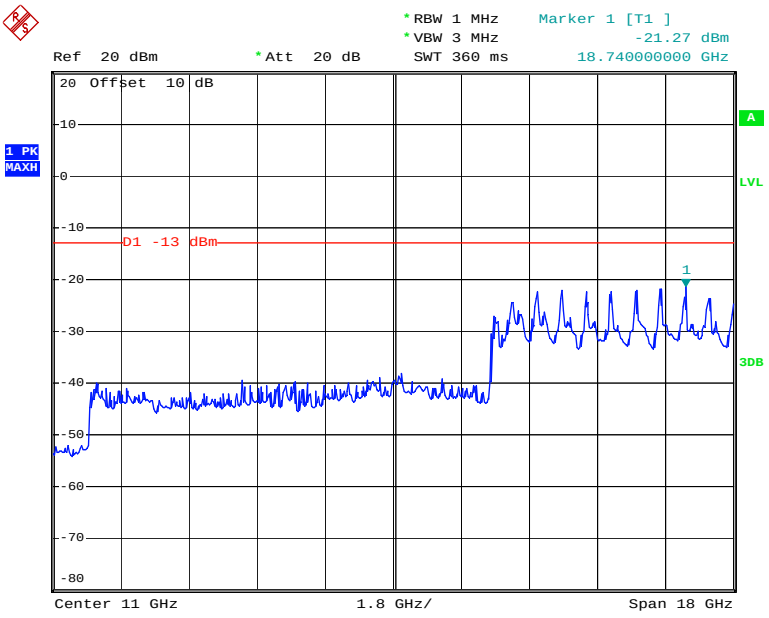

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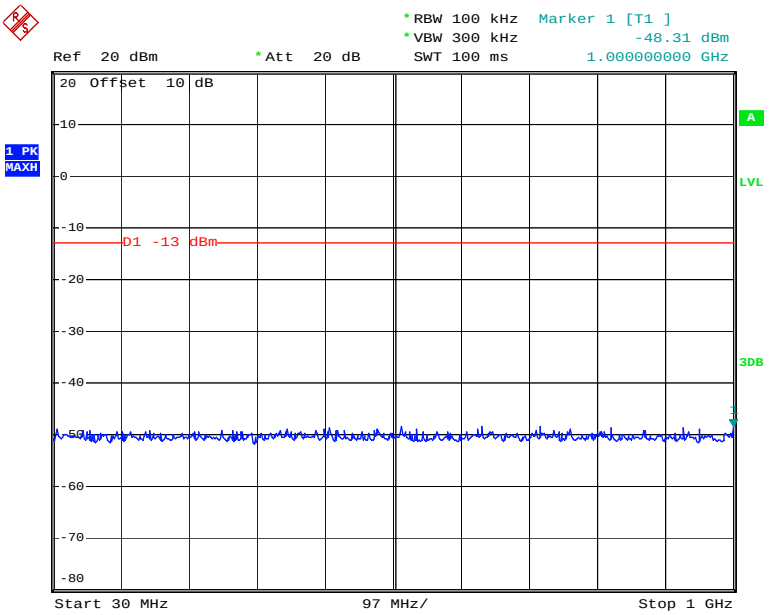
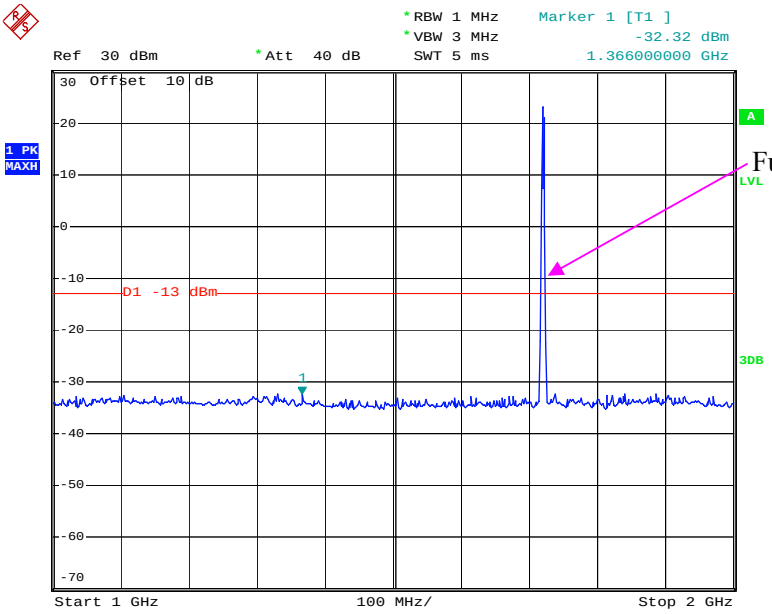
LTE Band 4 (Middle Channel)

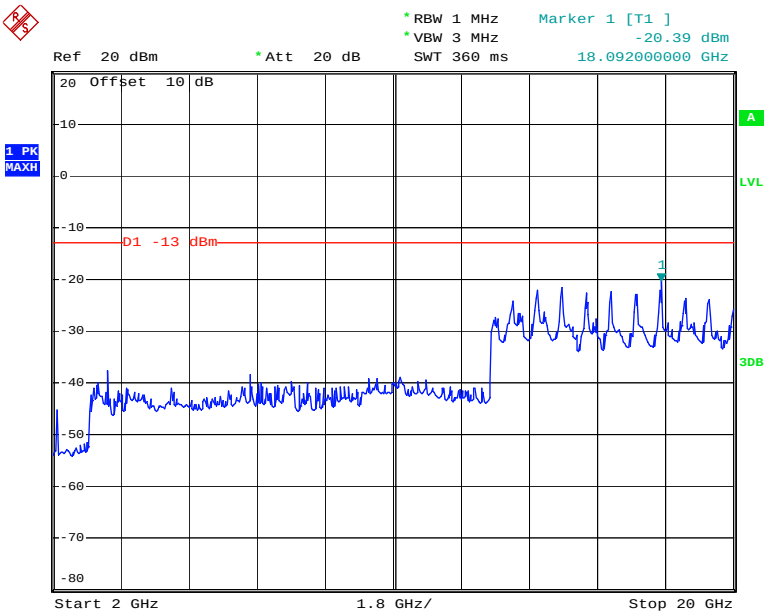
QPSK_1.4 MHz



Date: 11.SEP.2017 09:53:00

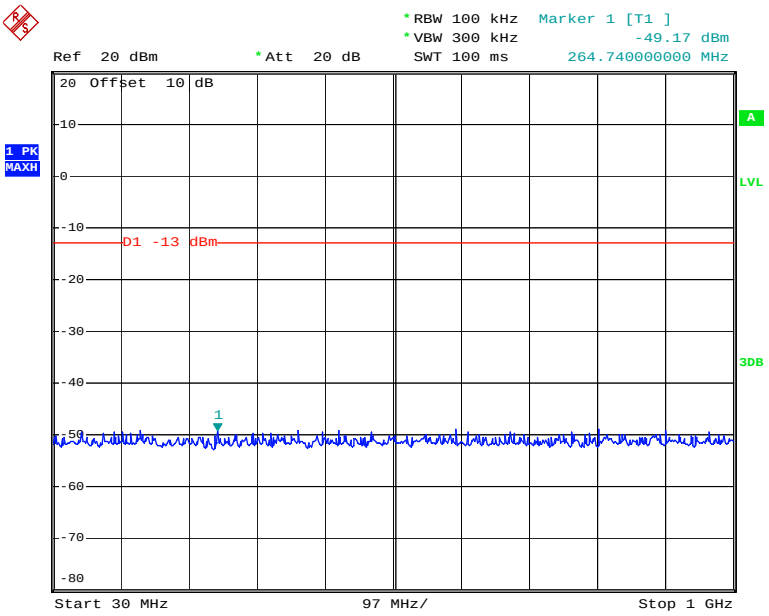


Date: 11.SEP.2017 09:37:35

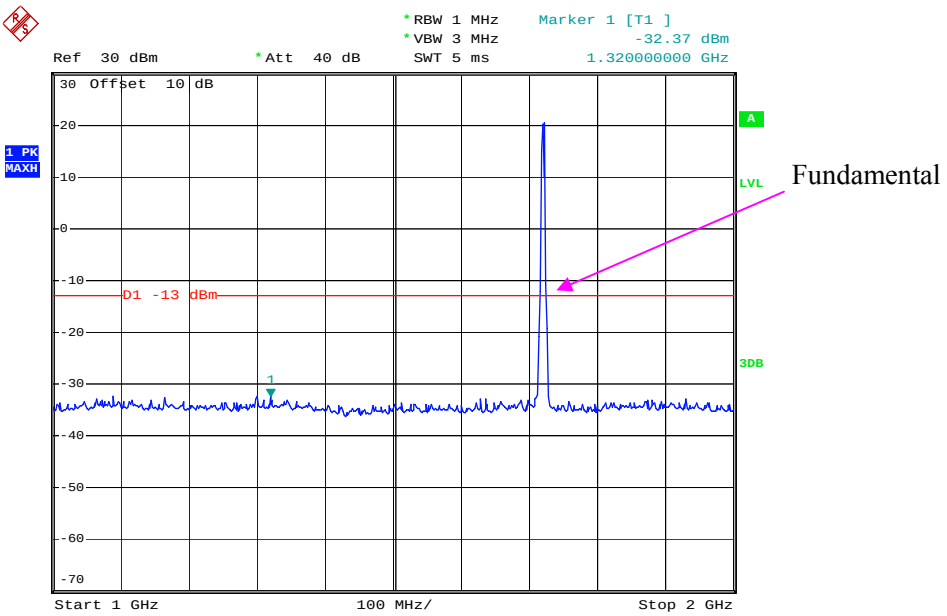


Date: 11.SEP.2017 09:48:09

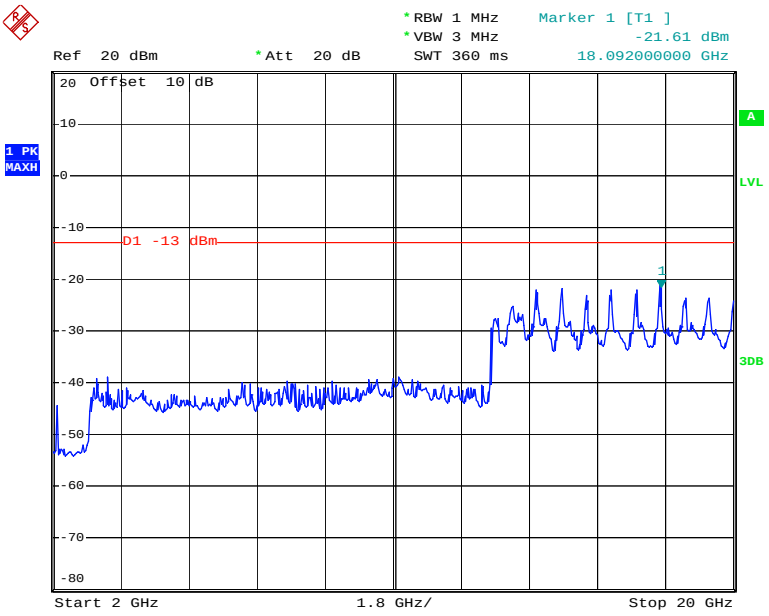
QPSK_3 MHz



Date: 11.SEP.2017 09:53:27

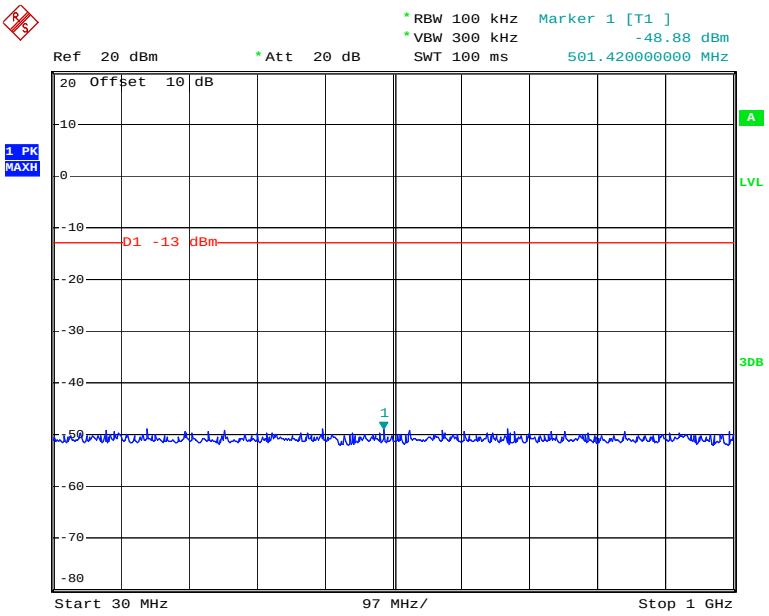


Date: 11.SEP.2017 09:38:30

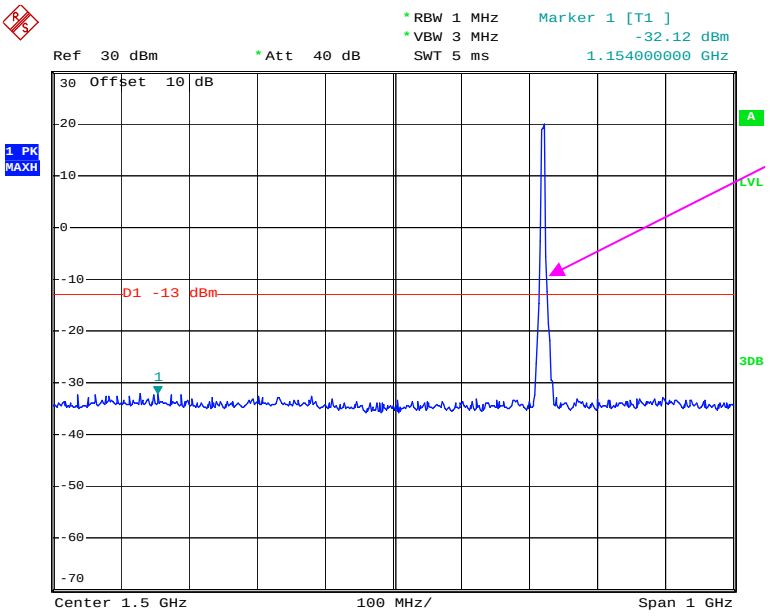


Date: 11.SEP.2017 09:47:42

QPSK_5 MHz



Date: 11.SEP.2017 09:54:04



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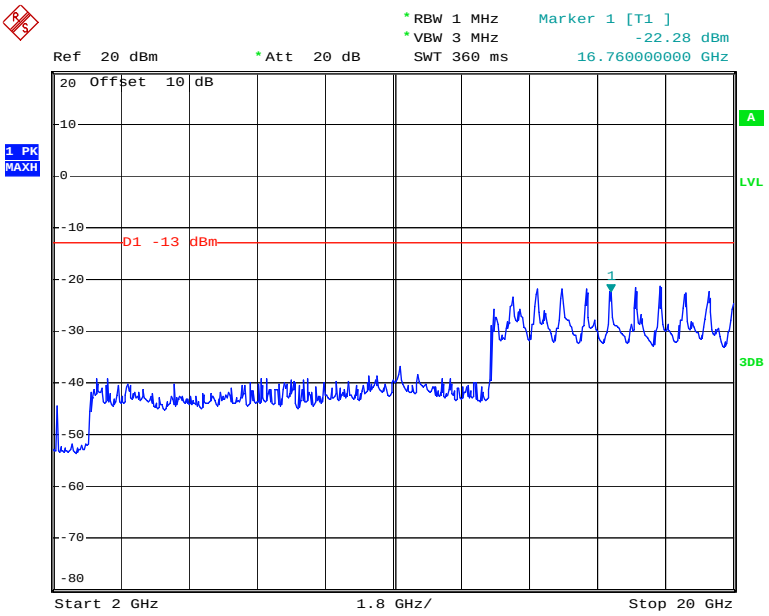

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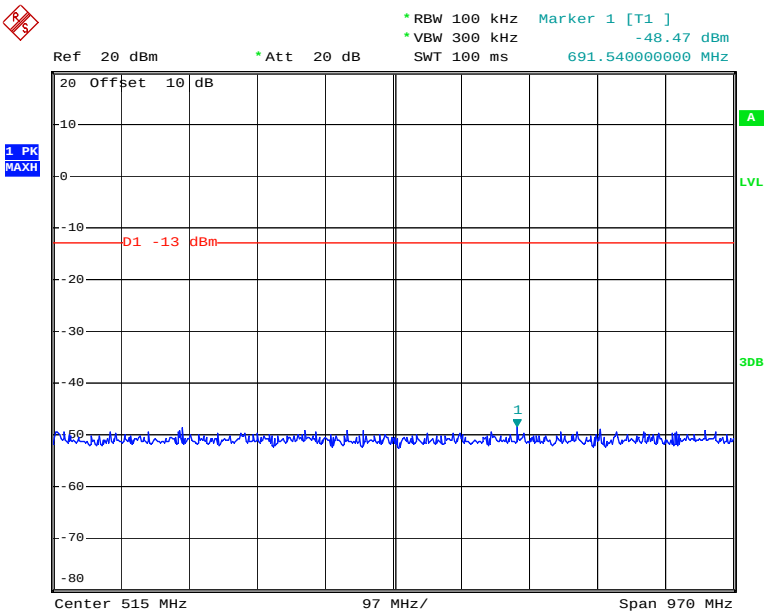
QPSK_10 MHz



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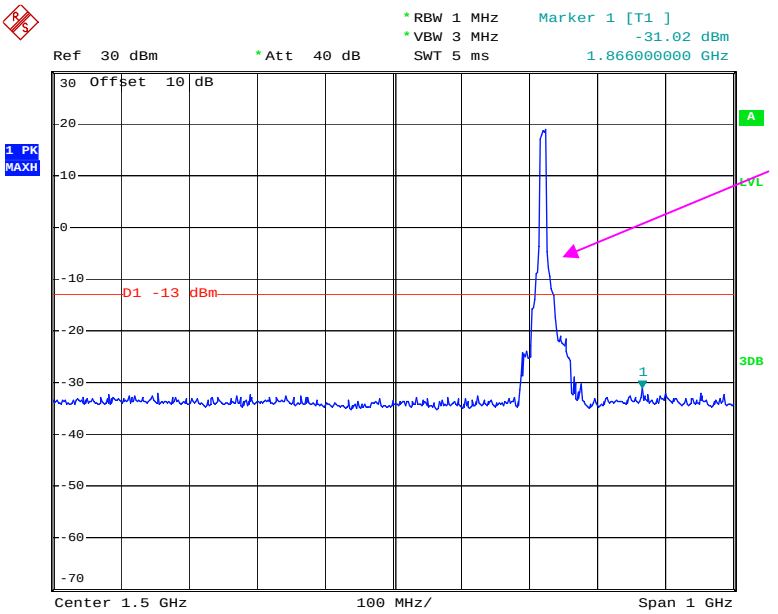

Fundamental

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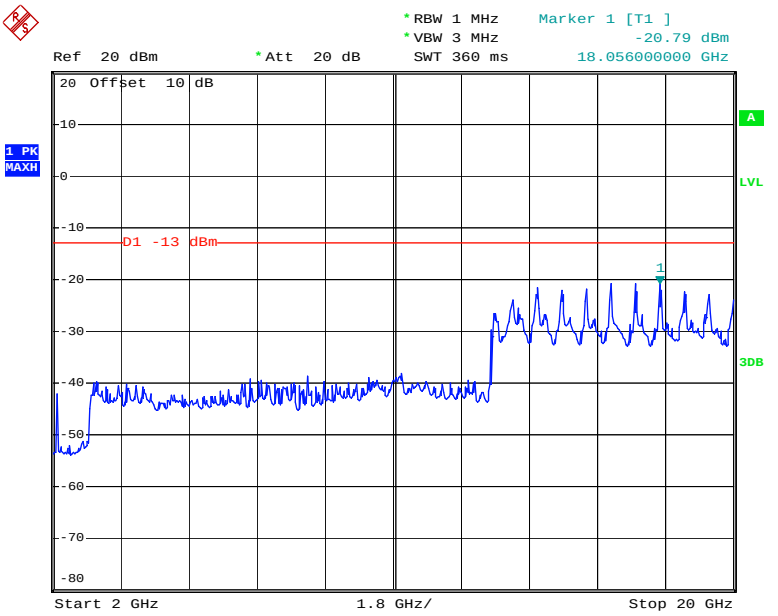
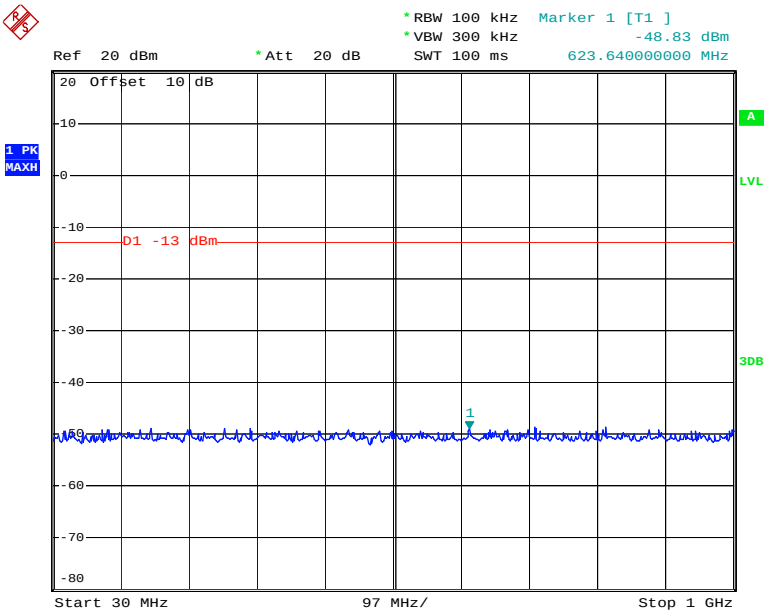


Date: 11.SEP.2017 09:46:31

QPSK_15 MHz



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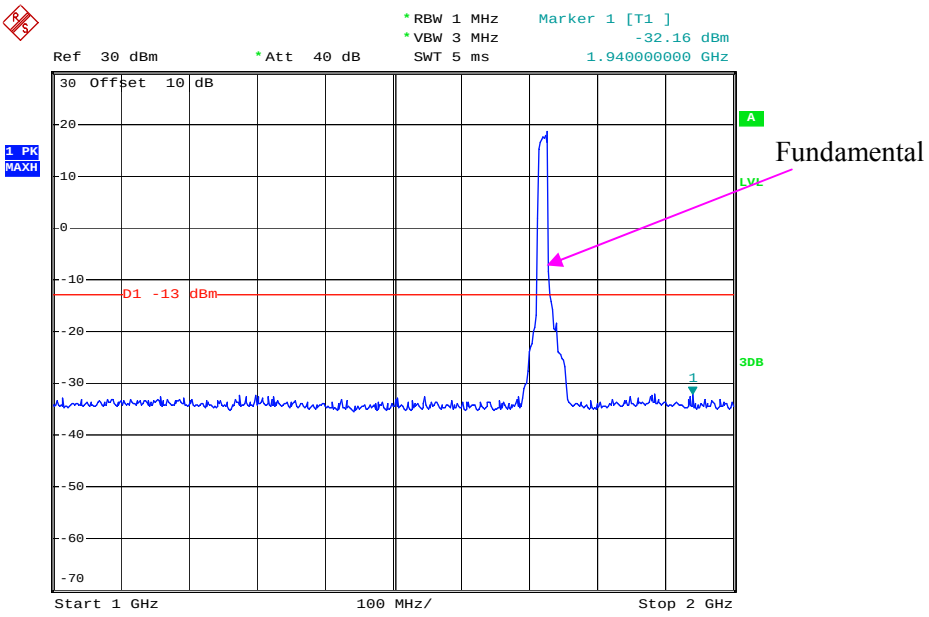
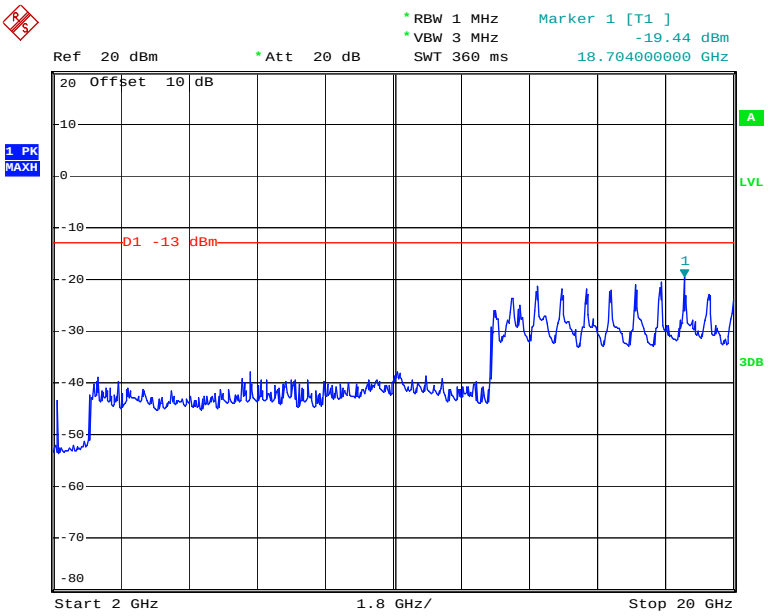


Date: 11.SEP.2017 09:43:08



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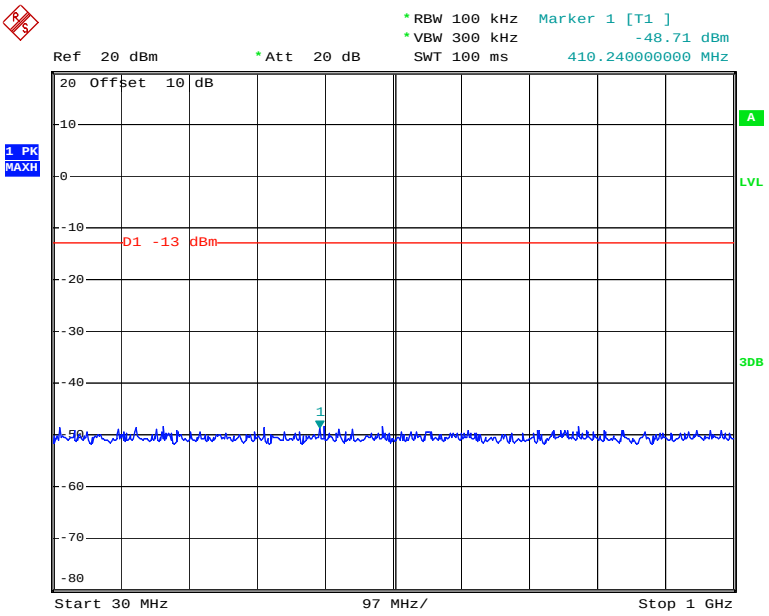
QPSK_20 MHz



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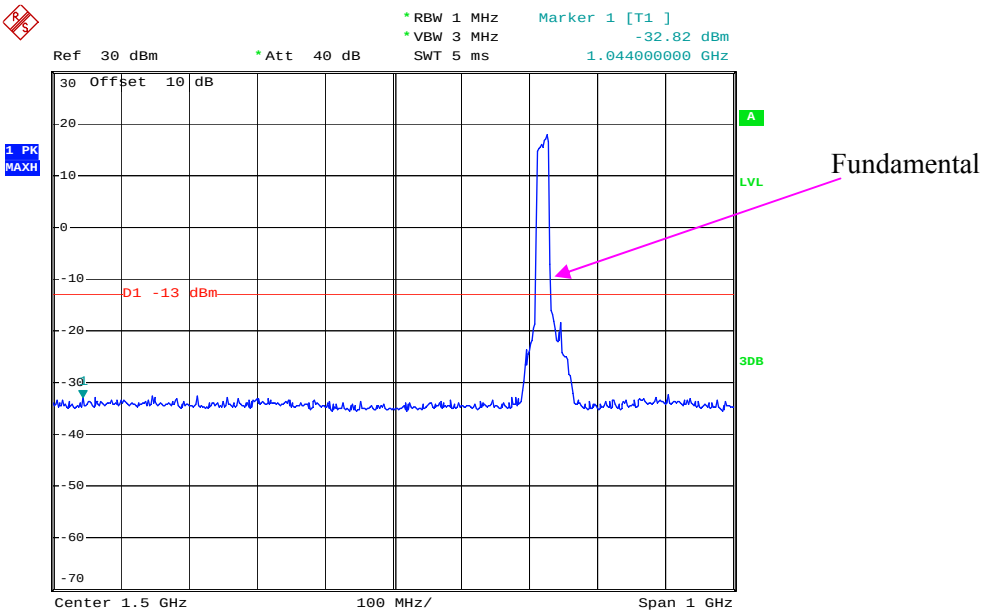

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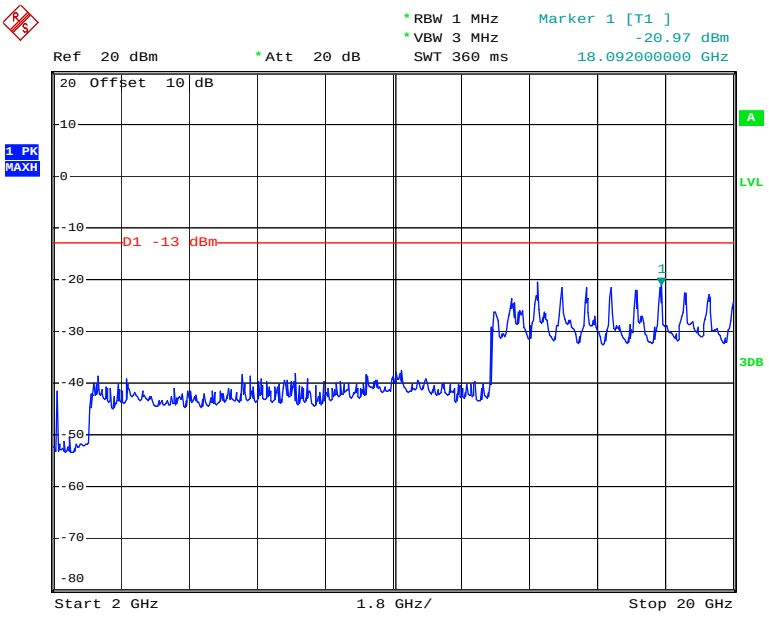
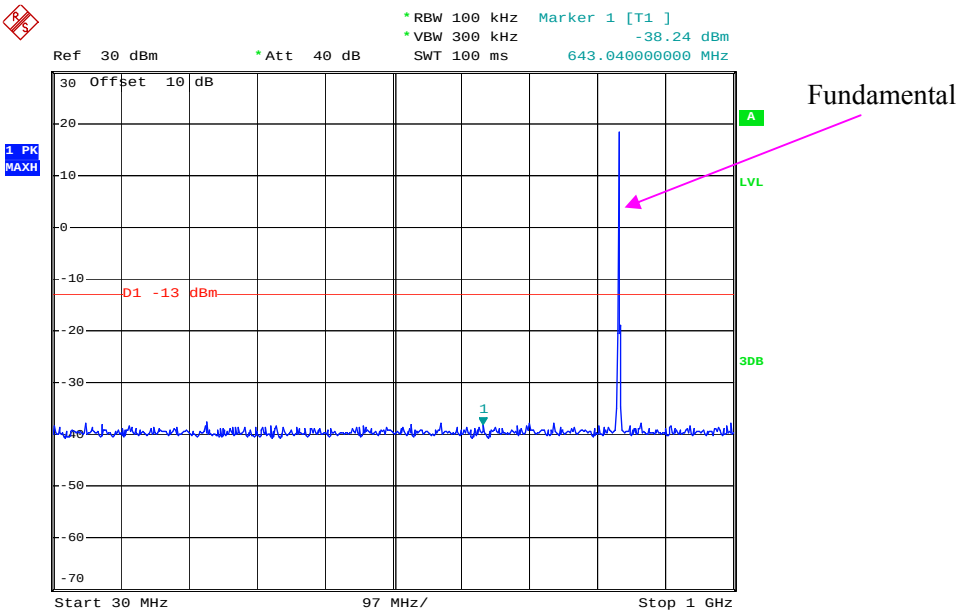


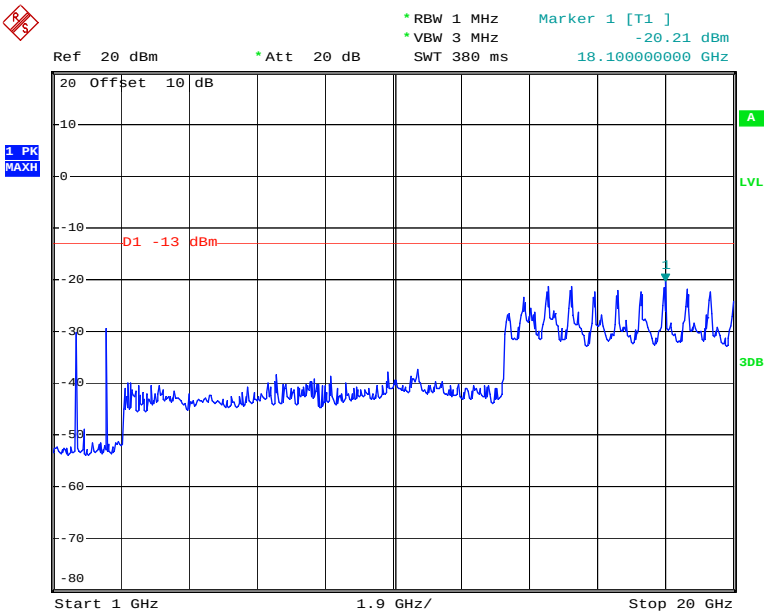
Date: 11.SEP.2017 09:45:32

LTE Band 5 (Middle Channel)

QPSK_1.4 MHz

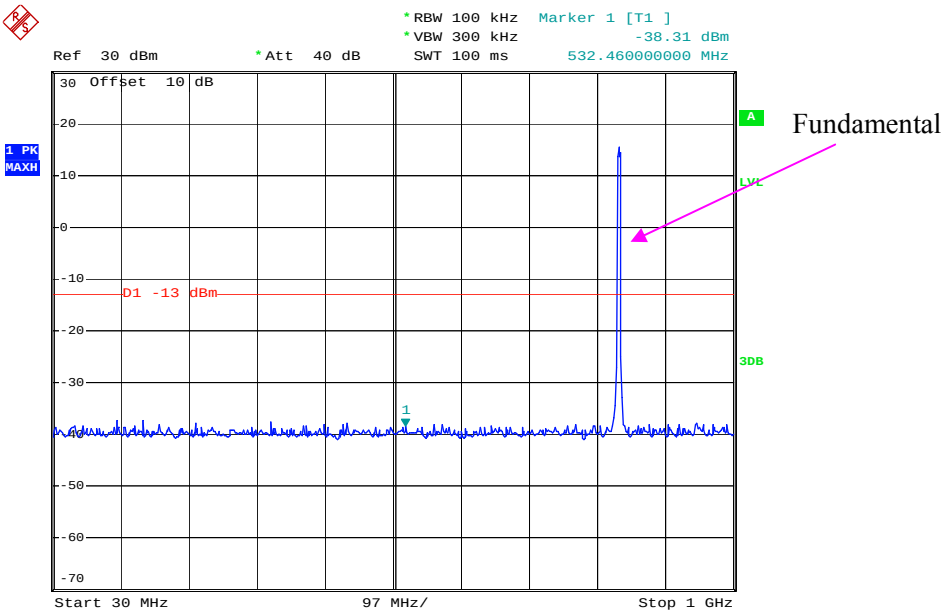


Date: 11.SEP.2017 10:00:45

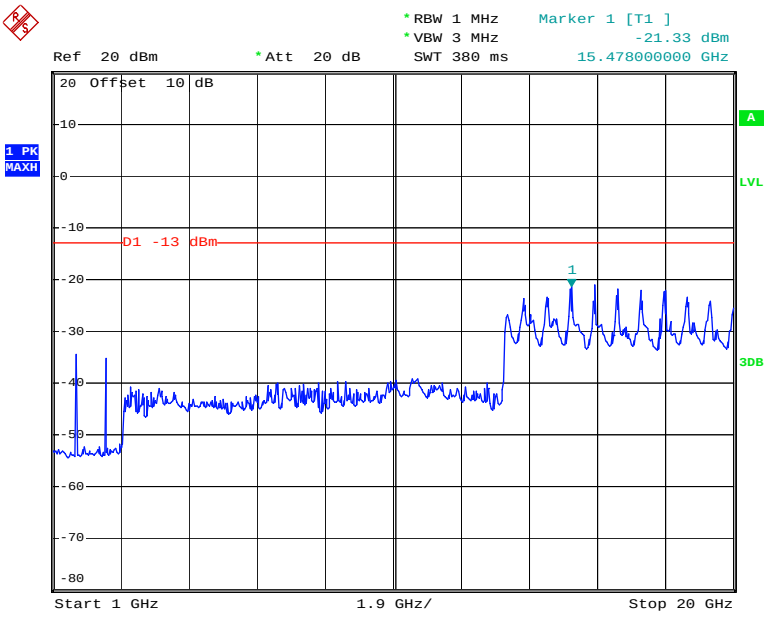


Date: 11.SEP.2017 10:15:38

QPSK_3 MHz

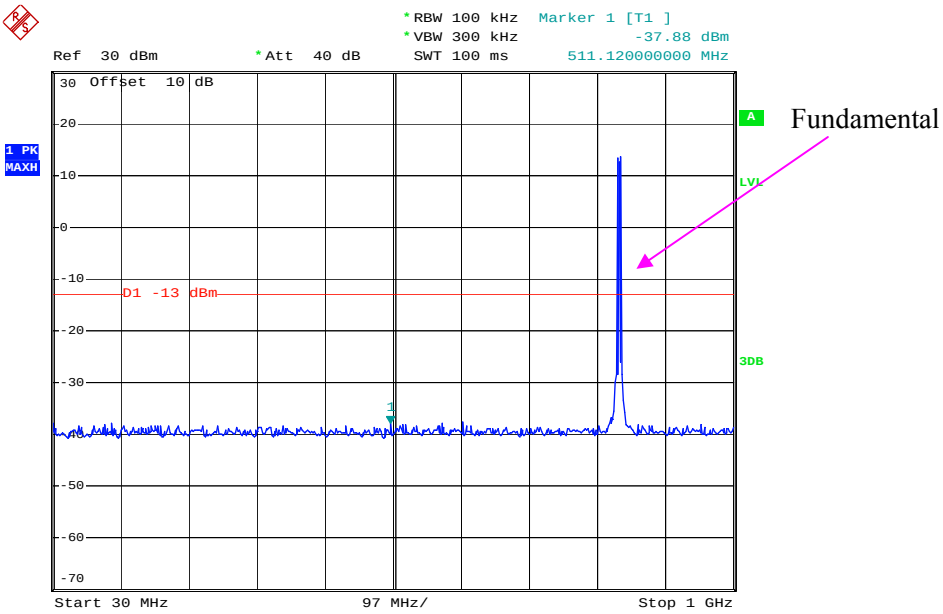


Date: 11.SEP.2017 10:01:22

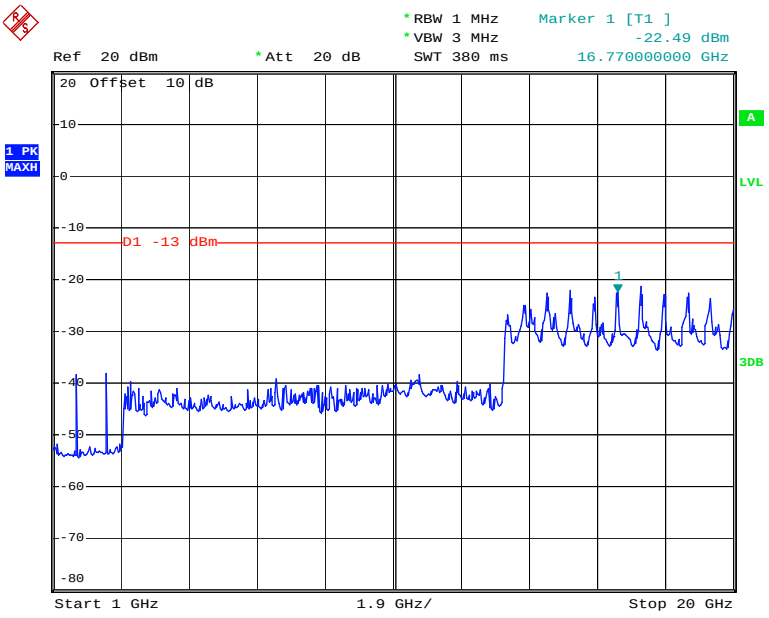


Date: 11.SEP.2017 10:15:59

QPSK_5 MHz

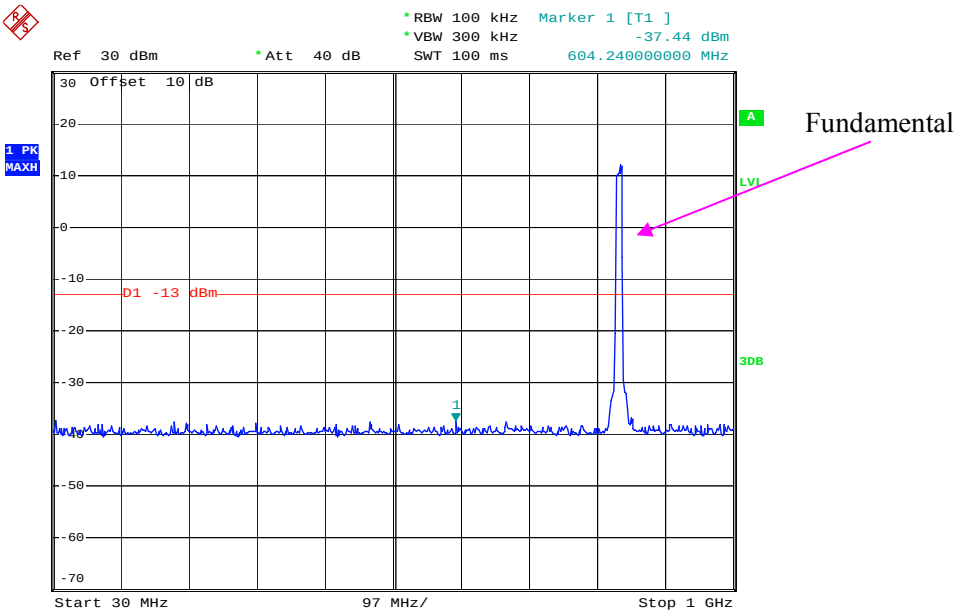


Date: 11.SEP.2017 10:02:35

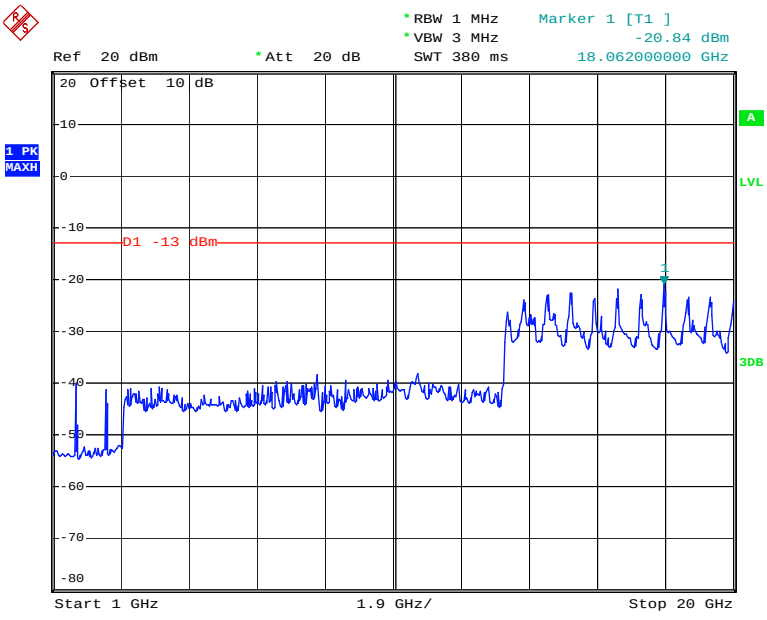


Date: 11.SEP.2017 10:16:47

QPSK_10 MHz



Date: 11.SEP.2017 10:03:28



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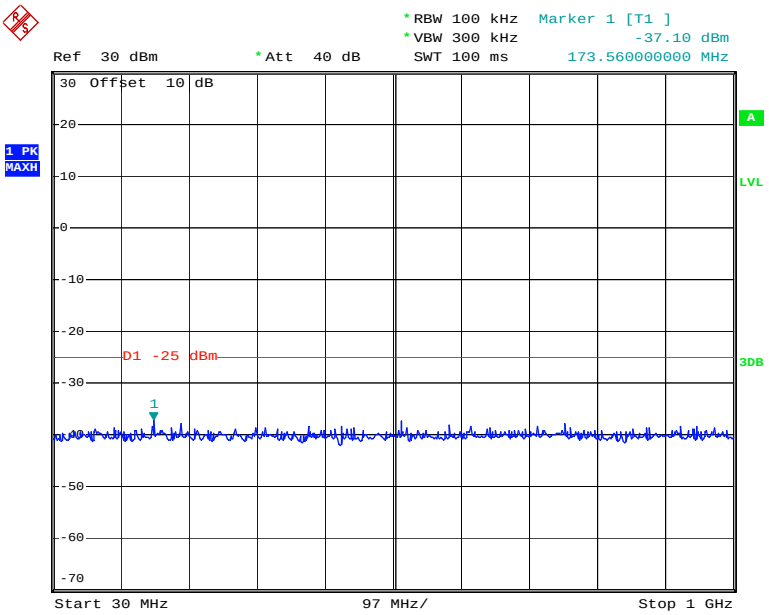
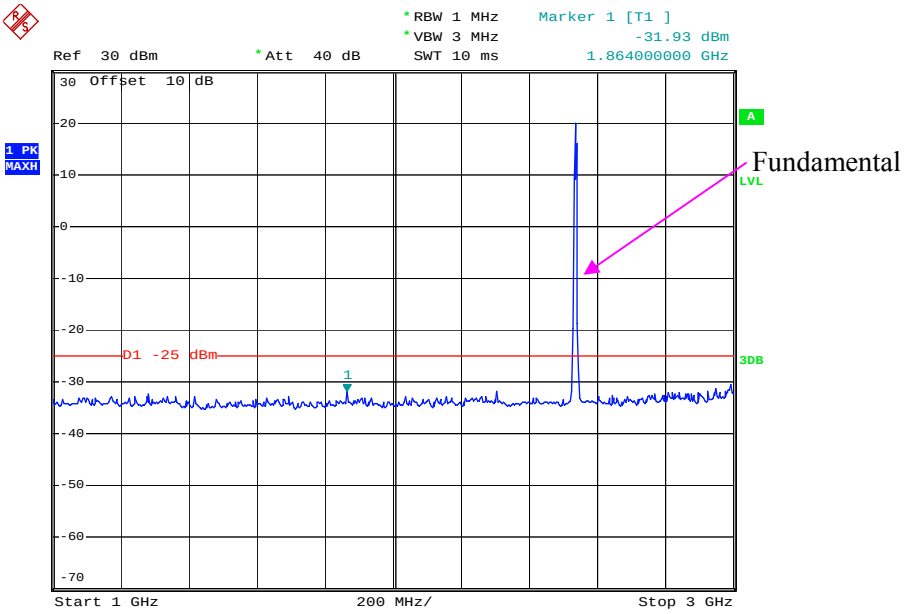
LTE Band 7 (Middle Channel)

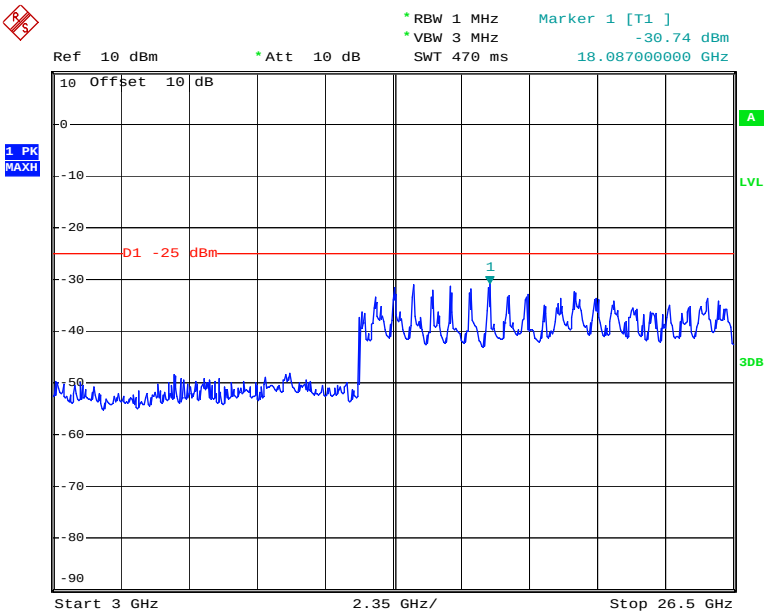
QPSK_5 MHz



Date: 12.SEP.2017 18:07:50

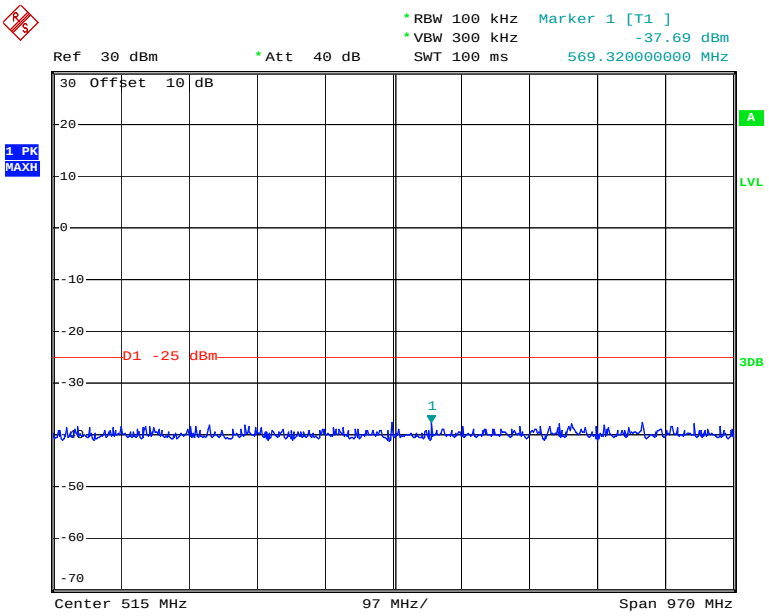


Date: 12.SEP.2017 18:10:28



Date: 12.SEP.2017 18:24:37

QPSK_10 MHz



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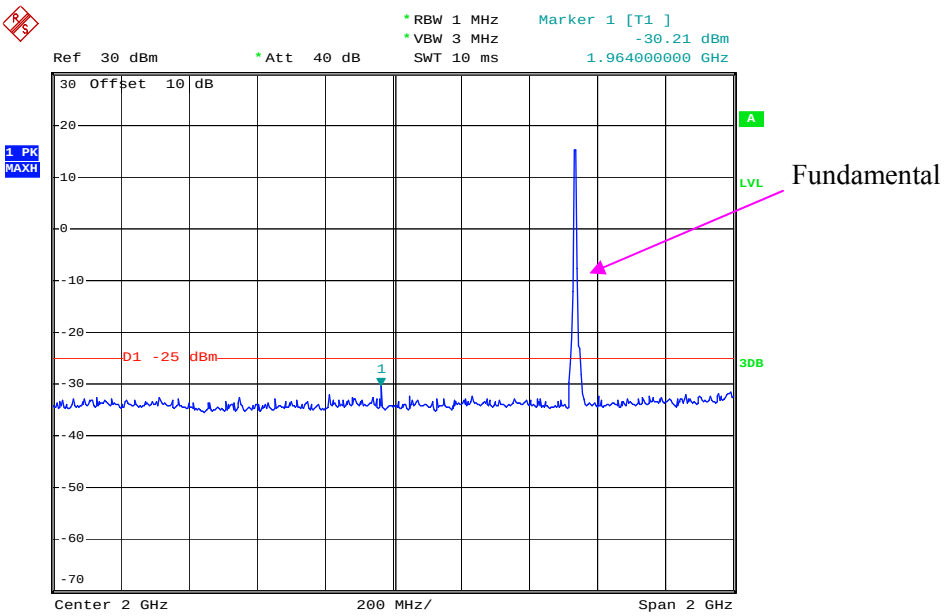
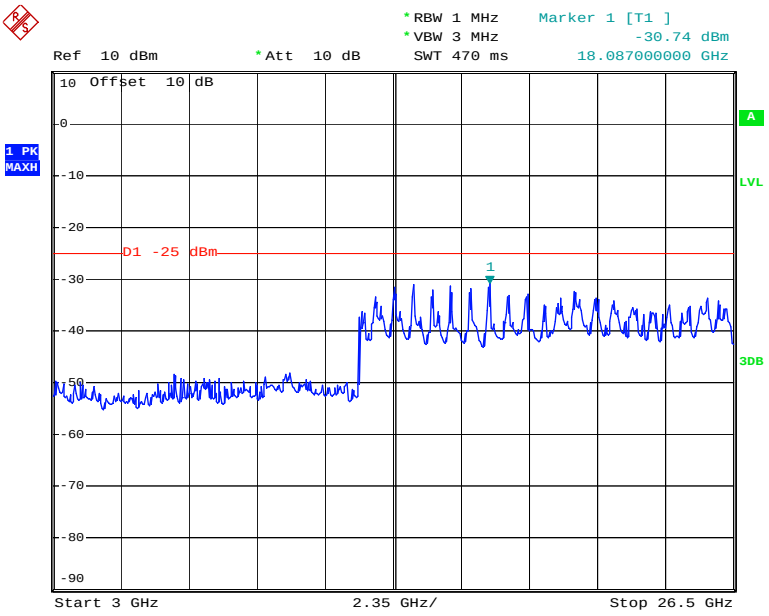
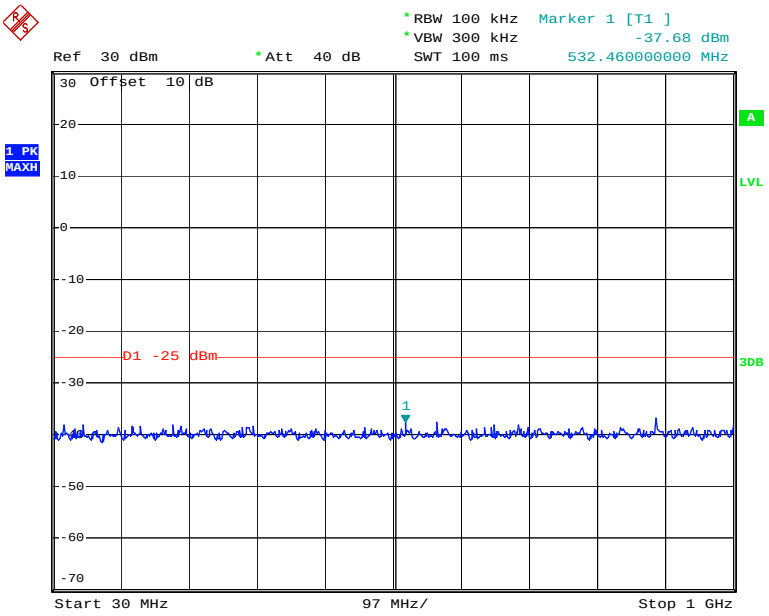


Date: 12.SEP.2017 18:18:27

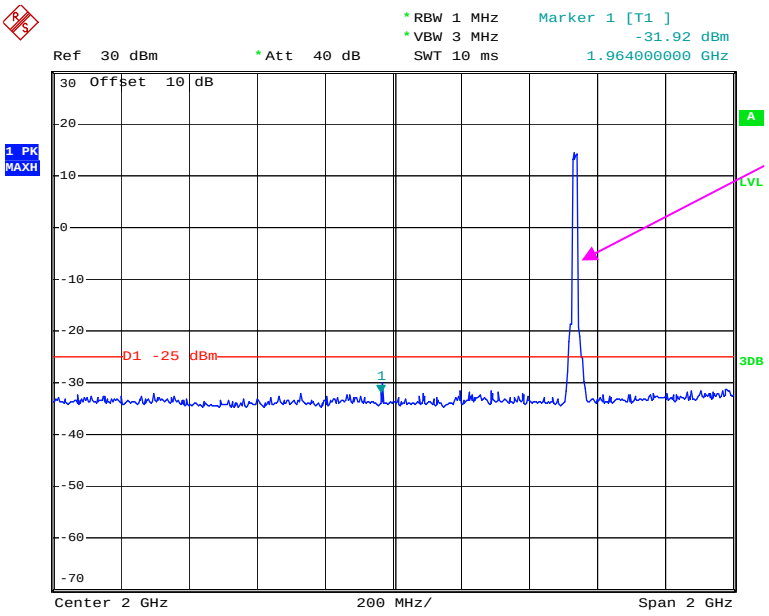


Date: 12.SEP.2017 18:24:37

QPSK_15 MHz

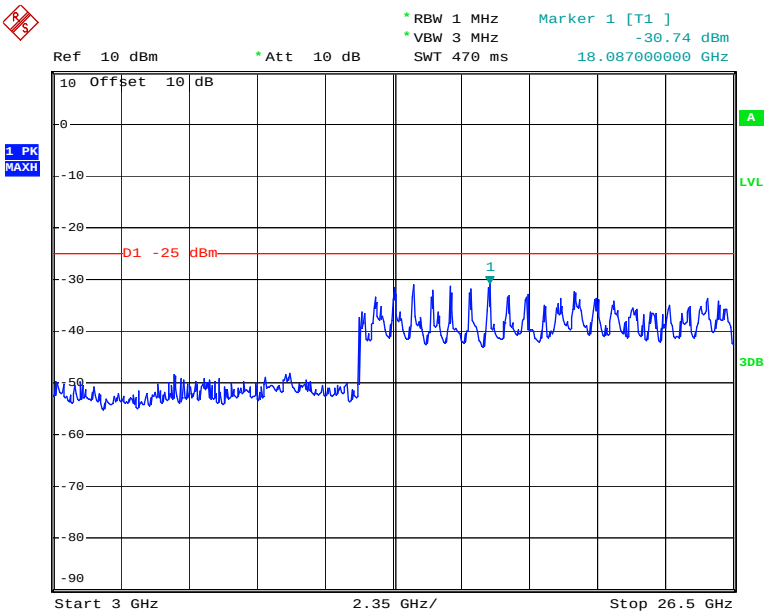


Date: 12.SEP.2017 18:21:29



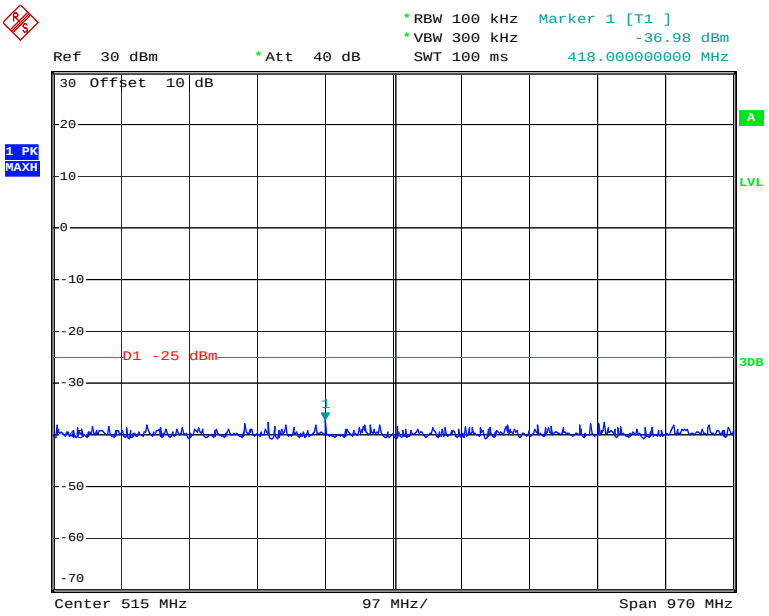
Fundamental

Date: 12.SEP.2017 18:20:27



Date: 12.SEP.2017 18:24:37

QPSK_20 MHz



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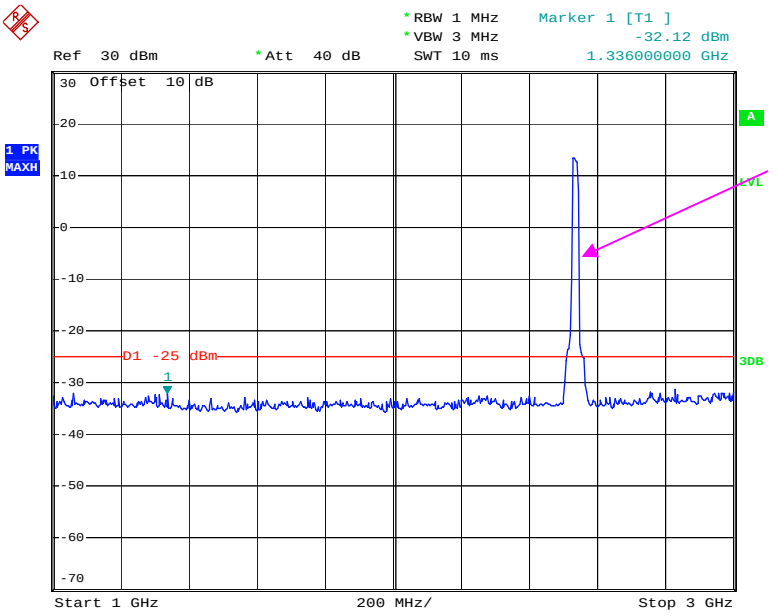
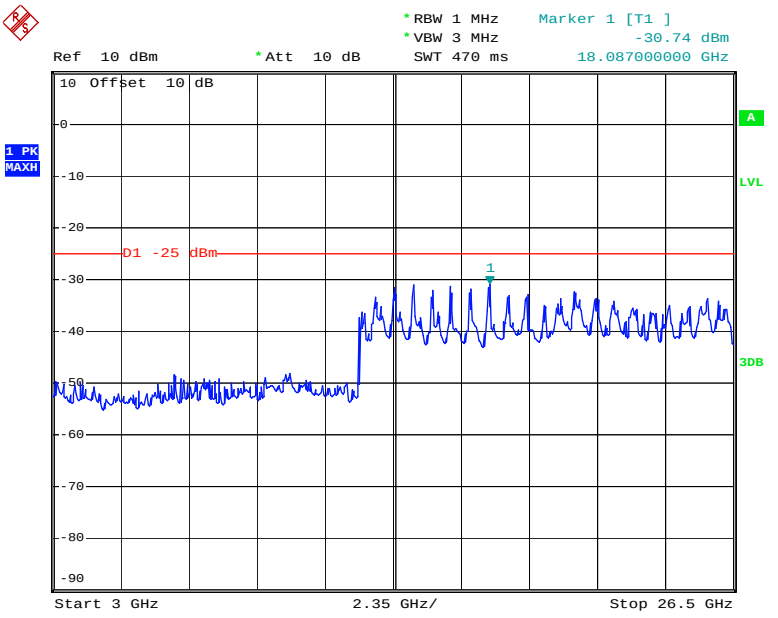


Fundamental

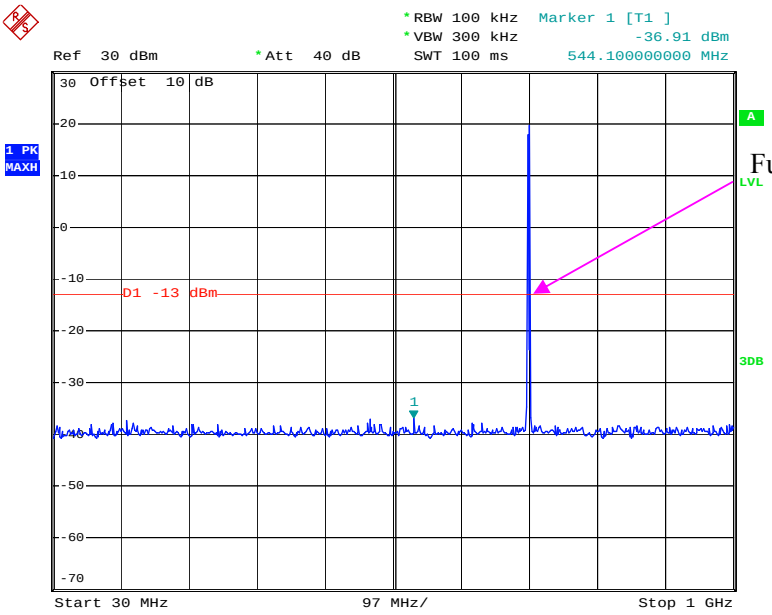
Date: 12.SEP.2017 18:16:53



Date: 12.SEP.2017 18:24:37

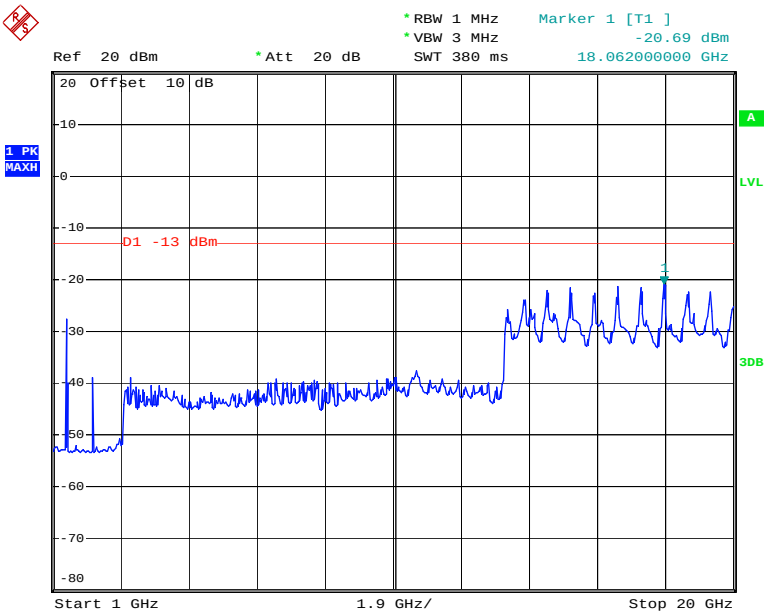
LTE Band 12 (Middle Channel)

QPSK_1.4 MHz



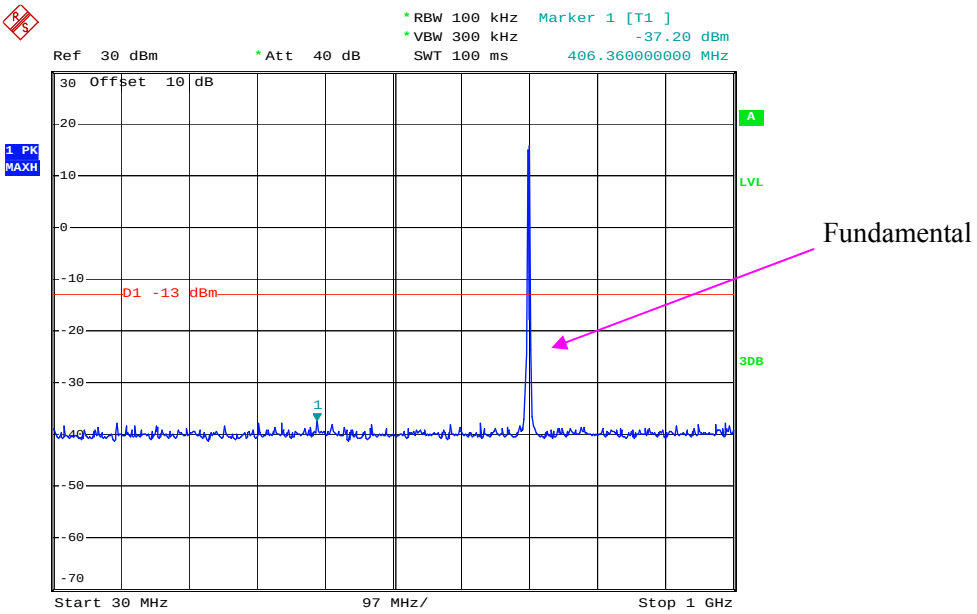
Fundamental

Date: 11.SEP.2017 10:37:27

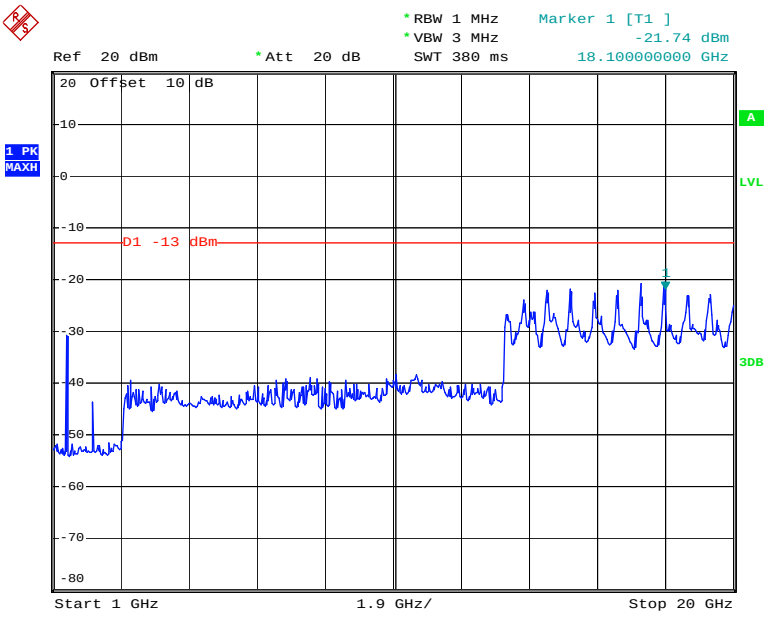


Date: 11.SEP.2017 10:38:18

QPSK_3 MHz

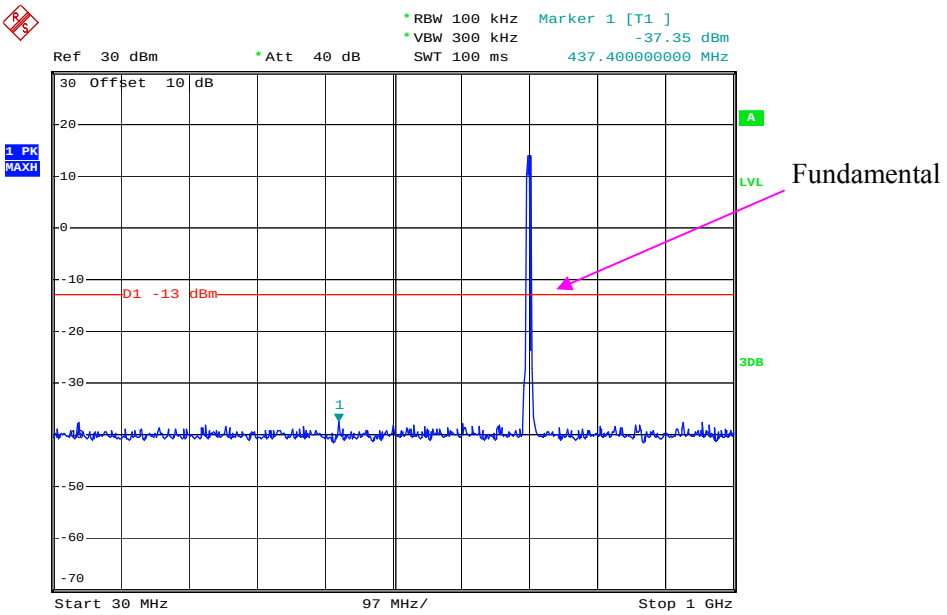


Date: 11.SEP.2017 10:36:39



Date: 11.SEP.2017 10:38:43

QPSK_5 MHz



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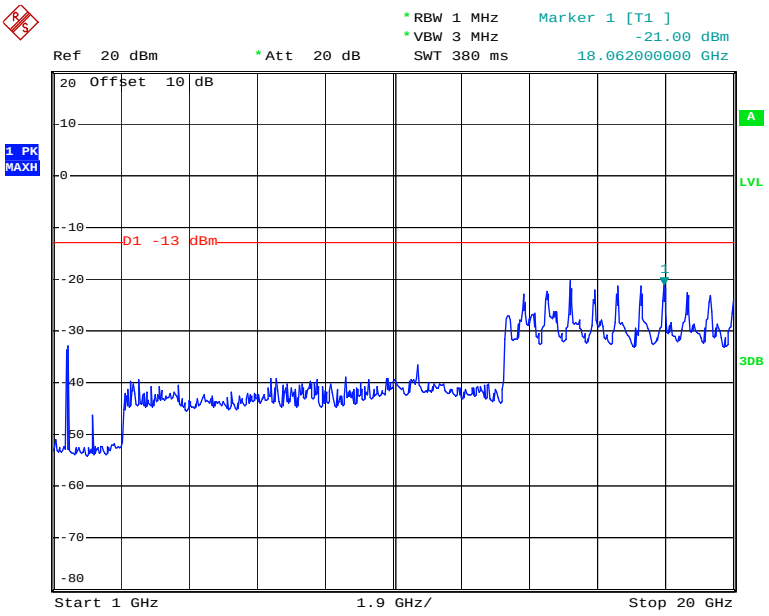
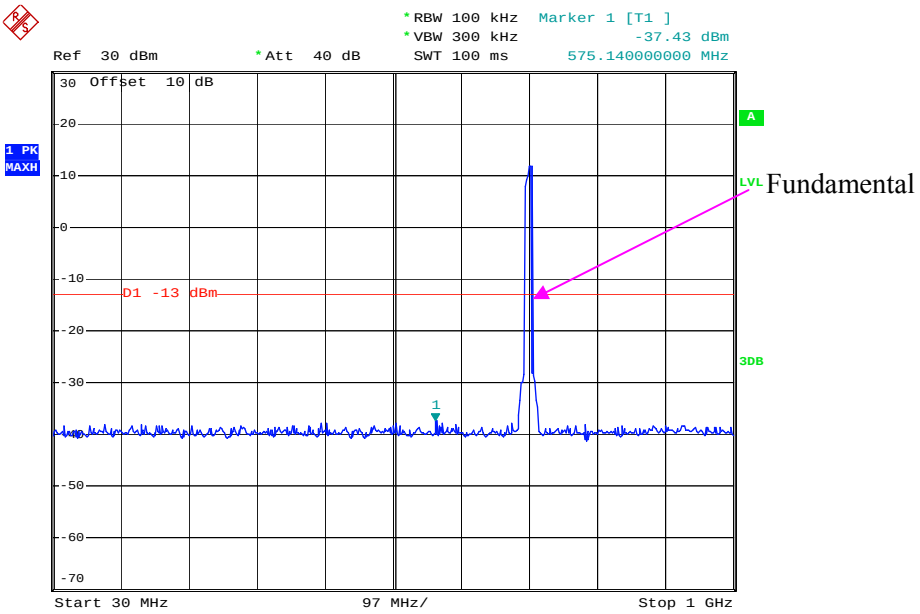
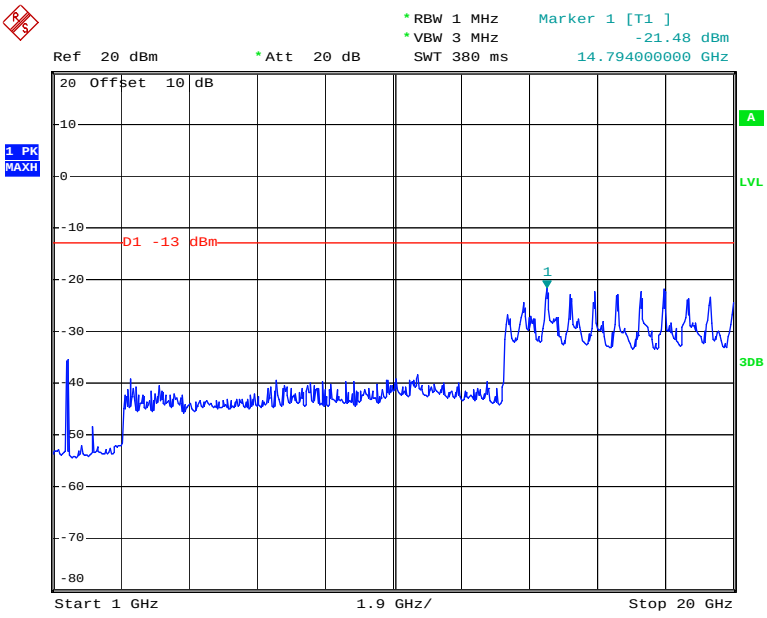


Date: 11.SEP.2017 10:39:04

QPSK_10 MHz



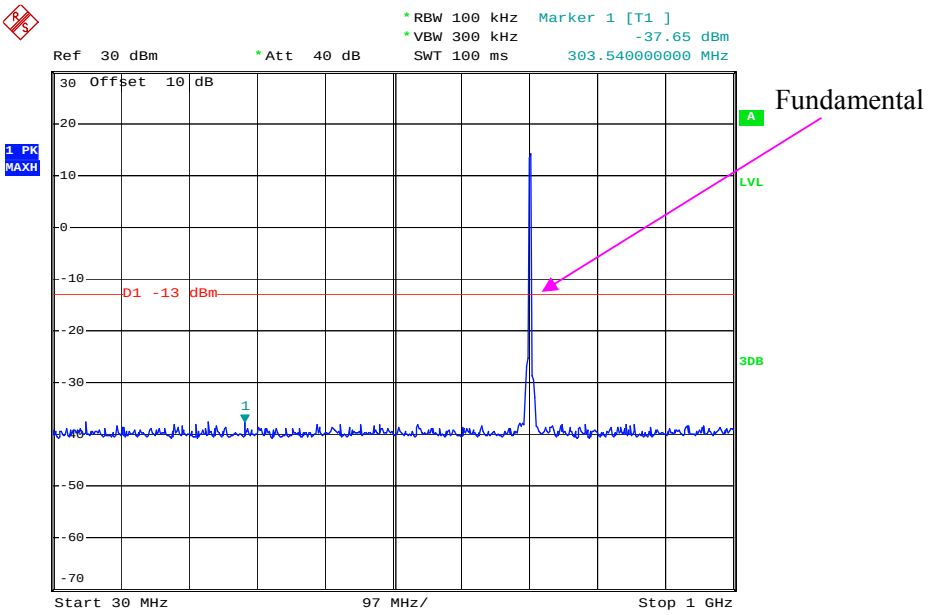
Date: 11.SEP.2017 10:35:33



Date: 11.SEP.2017 10:39:30

LTE Band 17 (Middle Channel)

QPSK_5 MHz



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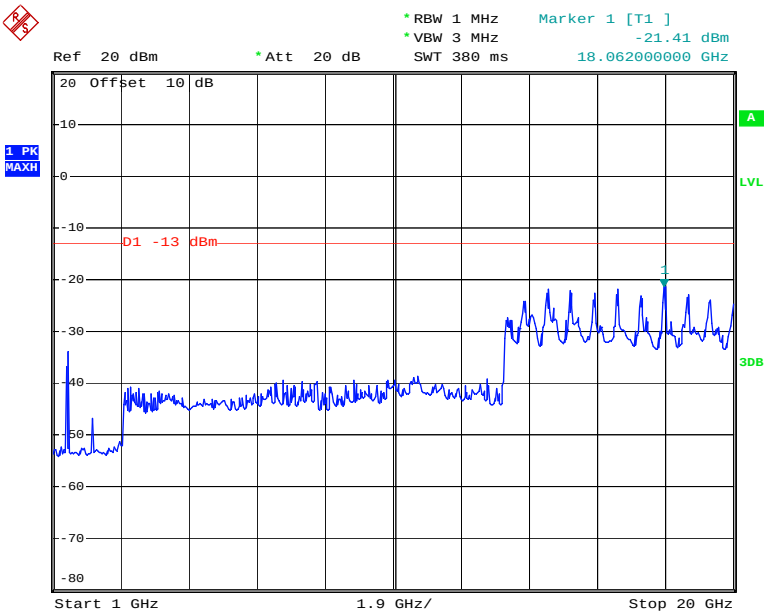
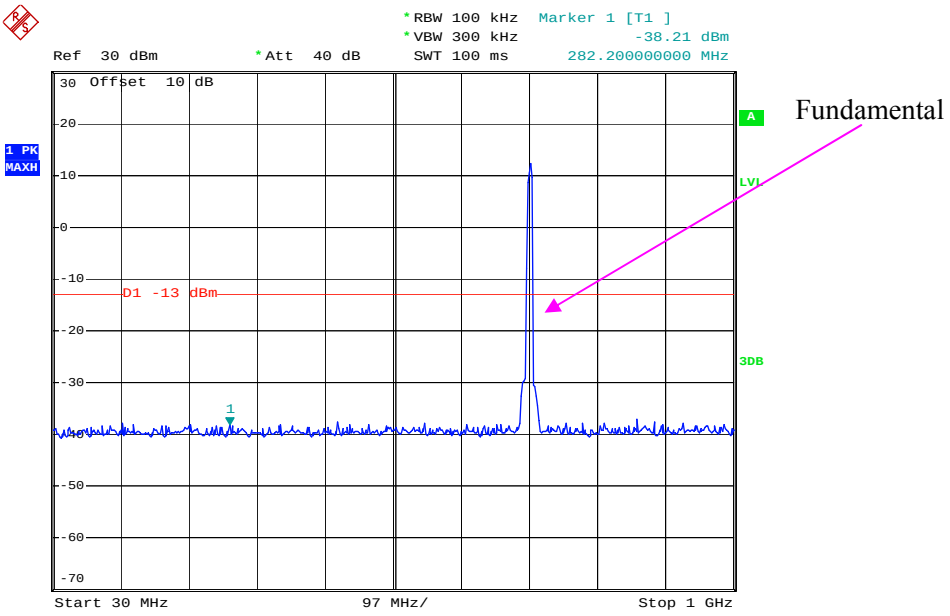
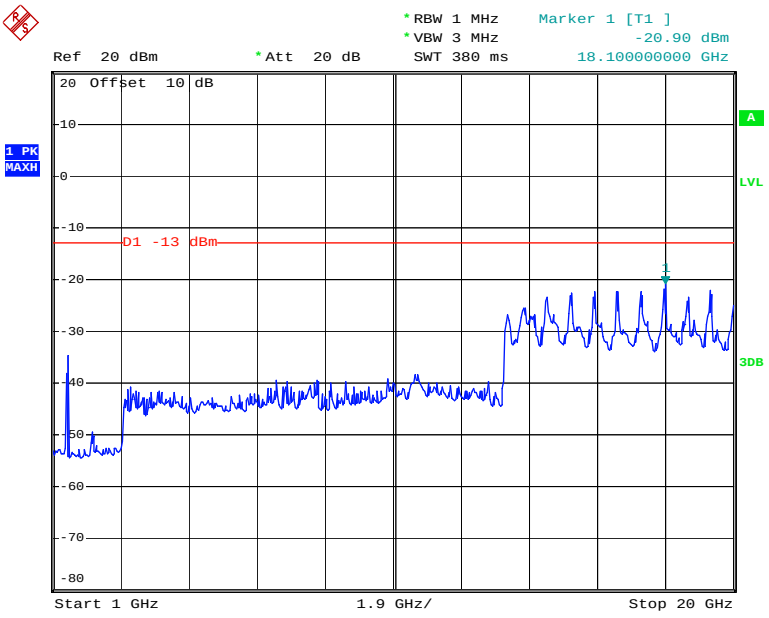


Date: 11.SEP.2017 10:43:27

QPSK_10 MHz



Date: 11.SEP.2017 10:45:21



Date: 11.SEP.2017 10:42:40

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

Applicable Standard

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

Test Procedure

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

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

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

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

Spurious emissions in dB = 10 lg (TXpwr in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2014-11-06	2017-11-05
HP	Amplifier	8447D	2727A05902	2017-09-05	2018-09-05
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
ETS LINDGREN	Horn Antenna	3115	000 527 35	2016-01-05	2019-01-04
Mini-Circuit	Amplifier	AFS42-00101800-25-S-42	2001271	2017-09-05	2018-09-05
HP	Signal Generator	1026	320408	2016-12-08	2017-12-08
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
TDK RF	Horn Antenna	HRN-0118	130 084	2016-01-05	2019-01-04
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Ducommun Technolagies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1000-01	2017-09-05	2018-09-05
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2017-09-05	2018-09-05

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

Test Data

Environmental Conditions

Temperature:	26.1~27.7°C
Relative Humidity:	44~53 %
ATM Pressure:	100.2~100.4 kPa

** The testing was performed by Sunny Cen&Steven Zuo from 2017-09-69 to 2017-09-12.*

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	57.63	-56.6	10.6	0.7	-46.7	-13.0	33.7
1673.200	V	56.44	-58.4	10.6	0.7	-48.5	-13.0	35.5
2509.800	H	57.19	-55.8	13.1	1.2	-43.9	-13.0	30.9
2509.800	V	56.83	-56.2	13.1	1.2	-44.3	-13.0	31.3
3346.400	H	49.58	-61.1	13.8	1.6	-48.9	-13.0	35.9
3346.400	V	49.39	-61.3	13.8	1.6	-49.1	-13.0	36.1
2908.000	H	55.27	-56.4	13.9	1.4	-43.9	-13.0	30.9
2908.000	V	53.61	-58.4	13.9	1.4	-45.9	-13.0	32.9
483.000	H	46.87	-57.5	0.0	0.7	-58.2	-13.0	45.2
364.000	V	48.62	-60.2	0.0	0.6	-60.8	-13.0	47.8

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	53.61	-60.6	10.6	0.7	-50.7	-13.0	37.7
1673.200	V	50.38	-64.4	10.6	0.7	-54.5	-13.0	41.5
2509.800	H	48.27	-64.7	13.1	1.2	-52.8	-13.0	39.8
2509.800	V	47.81	-65.2	13.1	1.2	-53.3	-13.0	40.3
3346.400	H	47.59	-63.1	13.8	1.6	-50.9	-13.0	37.9
3346.400	V	47.06	-63.6	13.8	1.6	-51.4	-13.0	38.4
2096.000	H	50.24	-62.7	11.4	1.1	-52.4	-13.0	39.4
2096.000	V	49.72	-63.2	11.4	1.1	-52.9	-13.0	39.9
342.000	H	45.67	-61.4	0.0	0.6	-62.0	-13.0	49.0
578.000	V	54.16	-51.6	0.0	0.7	-52.3	-13.0	39.3

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	50.28	-58.5	13.8	1.6	-46.3	-13.0	33.3
3760.000	V	51.82	-56.8	13.8	1.6	-44.6	-13.0	31.6
5640.000	H	50.37	-55.7	14.0	1.3	-43.0	-13.0	30.0
5640.000	V	51.64	-54.3	14.0	1.3	-41.6	-13.0	28.6
5816.000	H	53.49	-52.4	14.1	1.3	-39.6	-13.0	26.6
5816.000	V	54.67	-51.3	14.1	1.3	-38.5	-13.0	25.5
158.000	H	47.62	-59.4	0.0	0.4	-59.8	-13.0	46.8
624.000	V	52.43	-52.6	0.0	0.8	-53.4	-13.0	40.4
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	48.62	-60.2	13.8	1.6	-48.0	-13.0	35.0
3760.000	V	49.38	-59.3	13.8	1.6	-47.1	-13.0	34.1
5640.000	H	53.51	-52.5	14.0	1.3	-39.8	-13.0	26.8
5640.000	V	55.17	-50.7	14.0	1.3	-38.0	-13.0	25.0
4696.000	H	48.53	-60.1	14.4	1.7	-47.4	-13.0	34.4
4696.000	V	49.06	-59.6	14.4	1.7	-46.9	-13.0	33.9
237.000	H	43.67	-65.4	0.0	0.5	-65.9	-13.0	52.9
584.000	V	48.94	-56.7	0.0	0.8	-57.5	-13.0	44.5

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	48.98	-59.8	13.8	1.6	-47.6	-13.0	34.6
3760.000	V	49.86	-58.8	13.8	1.6	-46.6	-13.0	33.6
5640.000	H	54.32	-51.7	14.0	1.3	-39.0	-13.0	26.0
5640.000	V	56.49	-49.4	14.0	1.3	-36.7	-13.0	23.7
4695.000	H	46.57	-62	14.4	1.7	-49.3	-13.0	36.3
4695.000	V	47.31	-61.4	14.4	1.7	-48.7	-13.0	35.7
322.000	H	47.22	-60.6	0.0	0.5	-61.1	-13.0	48.1
275.000	V	52.74	-58.6	0.0	0.5	-59.1	-13.0	46.1

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	48.75	-61.5	13.9	1.6	-49.2	-13.0	36.2
3465.000	V	48.93	-61.3	13.9	1.6	-49.0	-13.0	36.0
5197.500	H	47.64	-58.8	14.0	1.5	-46.3	-13.0	33.3
5197.500	V	47.81	-58.7	14.0	1.5	-46.2	-13.0	33.2
4365.000	H	46.25	-62.6	13.9	1.5	-50.2	-13.0	37.2
4365.000	V	46.44	-62.3	13.9	1.5	-49.9	-13.0	36.9
274.000	H	47.24	-61.7	0.0	0.5	-62.2	-13.0	49.2
584.000	V	51.67	-54	0.0	0.8	-54.8	-13.0	41.8

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency: 836.500 MHz								
1673.000	H	48.76	-65.5	10.6	0.7	-55.6	-13.0	42.6
1673.000	V	47.38	-67.4	10.6	0.7	-57.5	-13.0	44.5
2509.500	H	57.89	-55.1	13.1	1.2	-43.2	-13.0	30.2
2509.500	V	49.51	-63.5	13.1	1.2	-51.6	-13.0	38.6
3346.000	H	46.49	-64.2	13.8	1.6	-52.0	-13.0	39.0
3346.000	V	45.36	-65.3	13.8	1.6	-53.1	-13.0	40.1
2125.000	H	45.62	-67.2	11.2	1.1	-57.1	-13.0	44.1
2125.000	V	44.83	-67.9	11.2	1.1	-57.8	-13.0	44.8
422.000	H	44.61	-60.1	0.0	0.6	-60.7	-13.0	47.7
357.000	V	55.64	-53.3	0.0	0.6	-53.9	-13.0	40.9

LTE Band 7 (30MHz-26GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:2535.000 MHz								
5070.000	H	50.57	-56.2	13.9	1.3	-43.6	-25.0	18.6
5070.000	V	49.86	-56.8	13.9	1.3	-44.2	-25.0	19.2
7605.000	H	48.39	-52	13.2	1.4	-40.2	-25.0	15.2
7605.000	V	47.76	-53	13.2	1.4	-41.2	-25.0	16.2
5865.000	H	46.51	-58.9	14.0	1.6	-46.5	-25.0	21.5
5865.000	V	45.89	-59.6	14.0	1.6	-47.2	-25.0	22.2
247.000	H	47.67	-61.5	0.0	0.5	-62.0	-25.0	37
726.000	V	54.26	-49.3	0.0	0.9	-50.2	-25.0	25.2

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	57.45	-56.1	9.0	1.2	-48.3	-13.0	35.3
1415.000	V	54.79	-59.2	9.0	1.2	-51.4	-13.0	38.4
2122.500	H	48.76	-64	11.2	1.1	-53.9	-13.0	40.9
2122.500	V	47.34	-65.4	11.2	1.1	-55.3	-13.0	42.3
2830.000	H	47.53	-64.6	13.4	1.4	-52.6	-13.0	39.6
2830.000	V	46.48	-65.8	13.4	1.4	-53.8	-13.0	40.8
3537.500	H	46.34	-63.8	13.9	1.6	-51.5	-13.0	38.5
3537.500	V	46.16	-64	13.9	1.6	-51.7	-13.0	38.7
2765.000	H	45.22	-67	13.1	1.3	-55.2	-13.0	42.2
2765.000	V	45.05	-67.4	13.1	1.3	-55.6	-13.0	42.6
347.000	H	45.67	-61.2	0.0	0.6	-61.8	-13.0	48.8
334.000	V	53.77	-55.6	0.0	0.6	-56.2	-13.0	43.2

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	57.98	-55.6	9.1	1.2	-47.7	-13.0	34.7
1420.000	V	56.56	-57.5	9.1	1.2	-49.6	-13.0	36.6
2130.000	H	50.15	-62.6	11.2	1.1	-52.5	-13.0	39.5
2130.000	V	49.73	-63	11.2	1.1	-52.9	-13.0	39.9
2840.000	H	47.36	-64.7	13.4	1.4	-52.7	-13.0	39.7
2840.000	V	46.79	-65.5	13.4	1.4	-53.5	-13.0	40.5
3550.000	H	46.42	-63.7	14.0	1.6	-51.3	-13.0	38.3
3550.000	V	45.68	-64.5	14.0	1.6	-52.1	-13.0	39.1
2765.000	H	45.35	-66.9	13.1	1.3	-55.1	-13.0	42.1
2765.000	V	44.89	-67.5	13.1	1.3	-55.7	-13.0	42.7
473.000	H	45.64	-58.7	0.0	0.7	-59.4	-13.0	46.4
355.000	V	58.53	-50.5	0.0	0.6	-51.1	-13.0	38.1

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

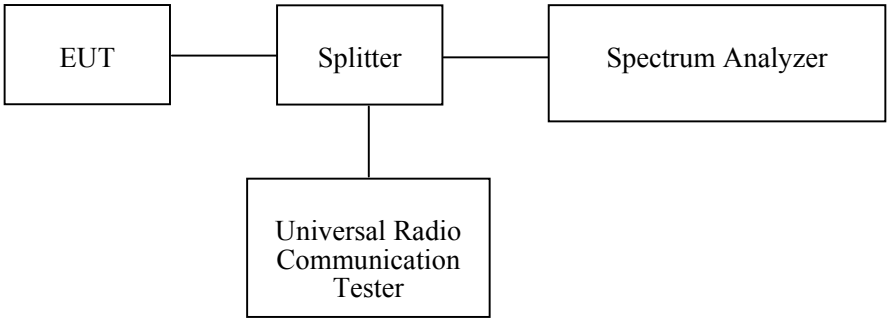
Applicable Standard

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
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	0.1m	C-1	Each Time	/
Pasternack	RF Coaxial Cable	0.5m	C-5	Each Time	/
E-Microwave	Two-way Spliter	ODP-1-6-2S	OE0120142	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08

*** 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

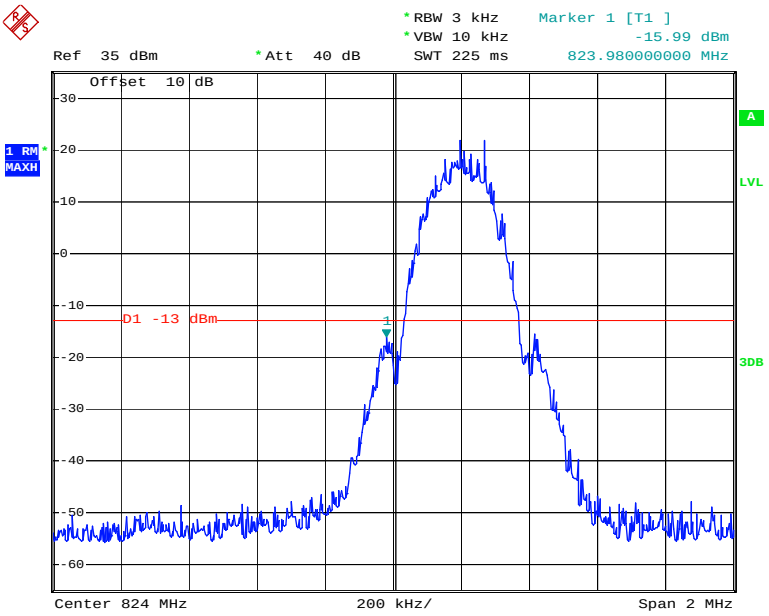
Temperature:	29°C
Relative Humidity:	52 %
ATM Pressure:	100.4 kPa

The testing was performed by Swim Lv&Nami Quan from 2017-09-11.

Test Mode: Transmitting

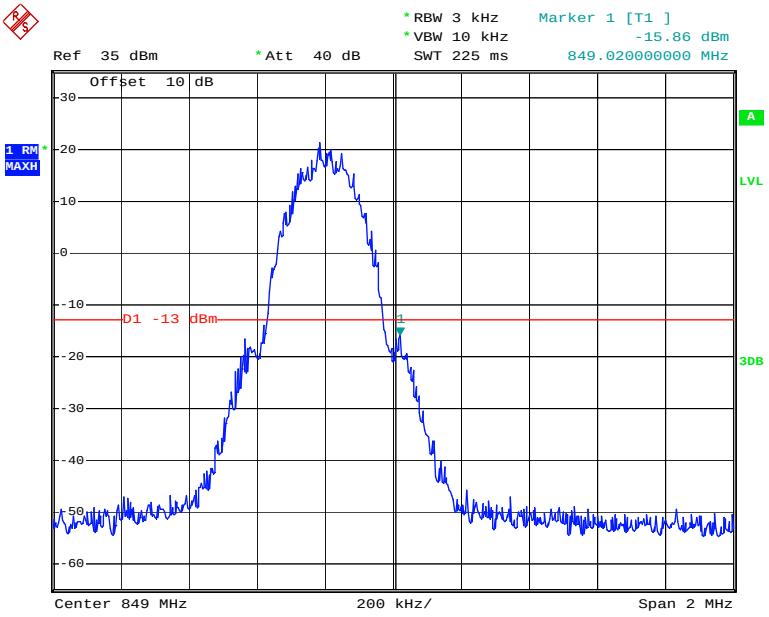
Test Result: Compliant. Please refer to the following plots.

GSM 850, Left Band Edge



Date: 10.SEP.2017 12:49:25

GSM 850, Right Band Edge



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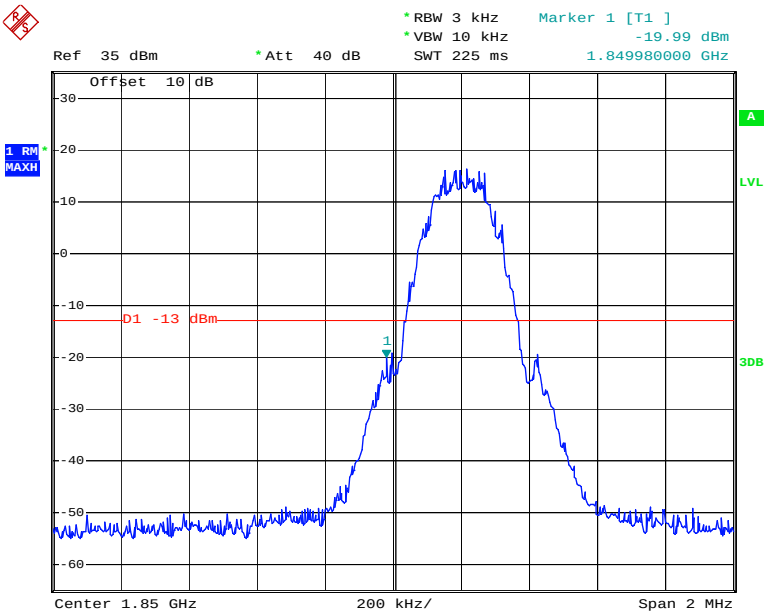
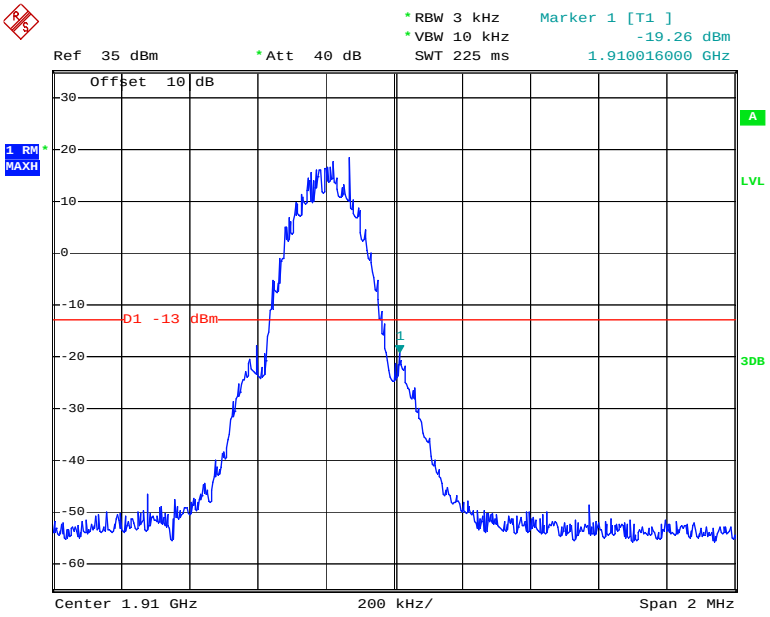
GSM 1900, Left Band Edge



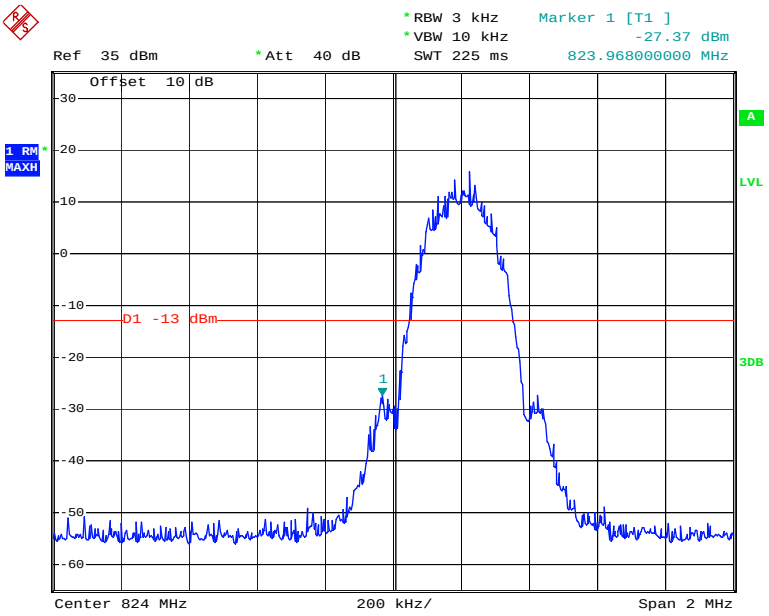
Date: 10.SEP.2017 12:21:00

GSM 1900, Right Band Edge



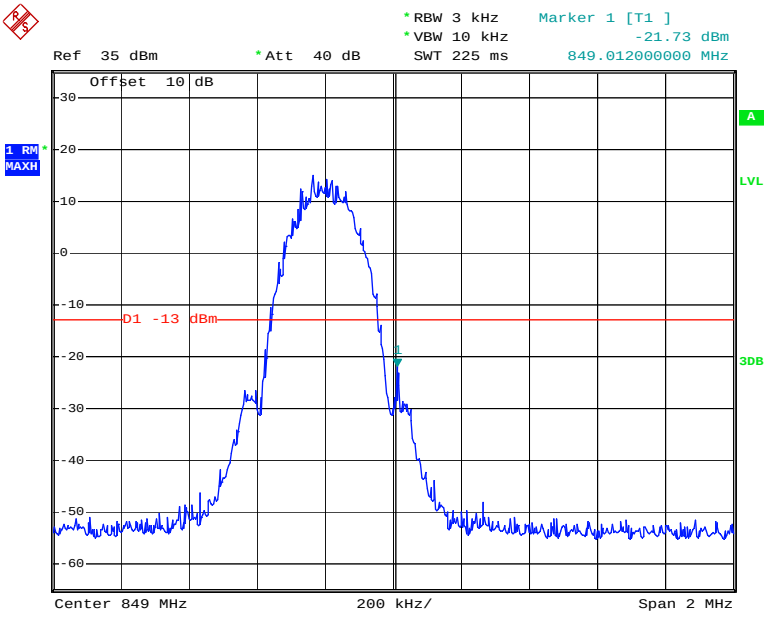
Date: 10.SEP.2017 12:22:28

EDGE 850, Left Band Edge



Date: 10.SEP.2017 12:46:01

EDGE 850, Right Band Edge



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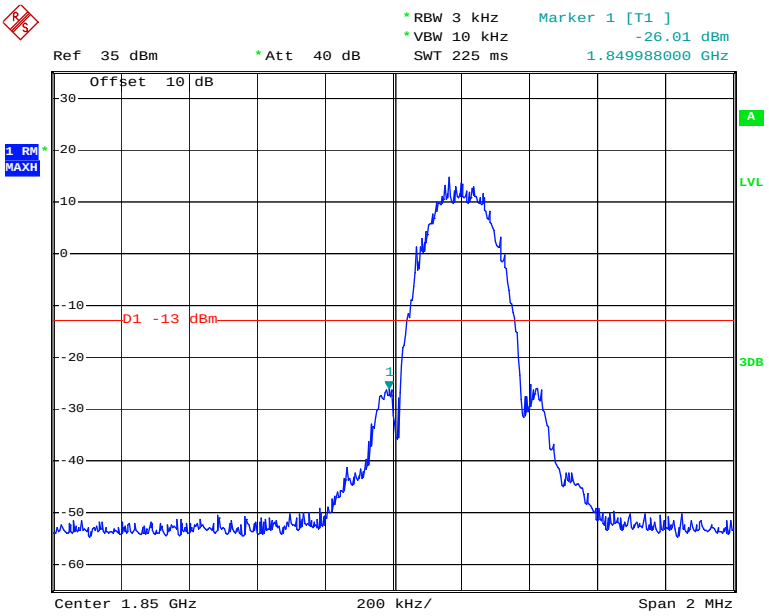
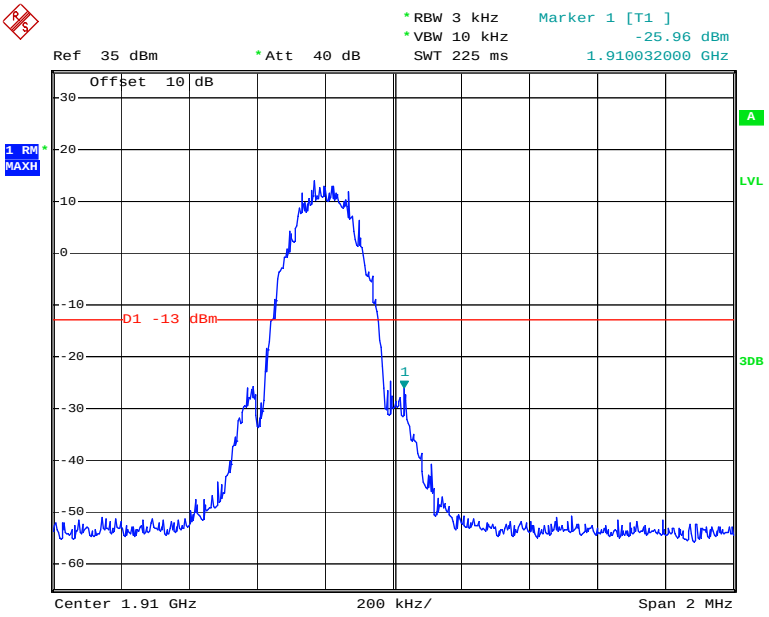
EDGE 1900, Left Band Edge



Date: 10.SEP.2017 12:30:23

EDGE 1900, Right Band Edge



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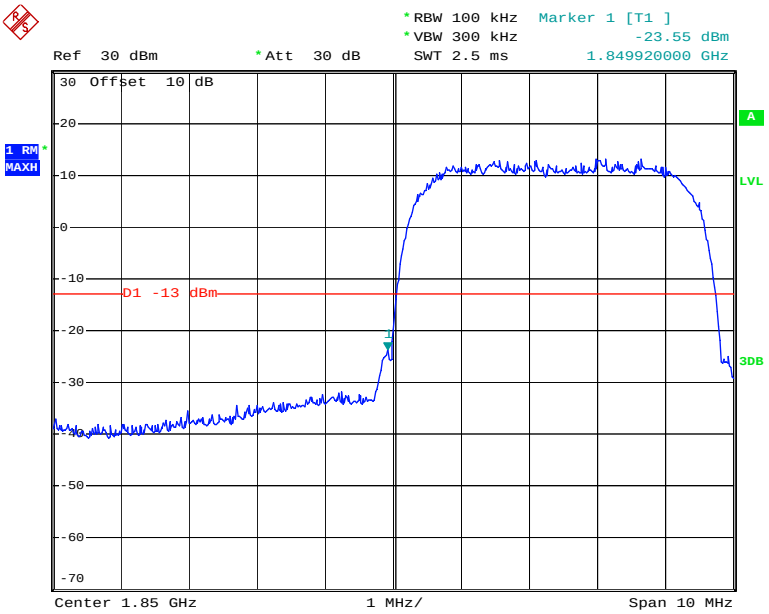
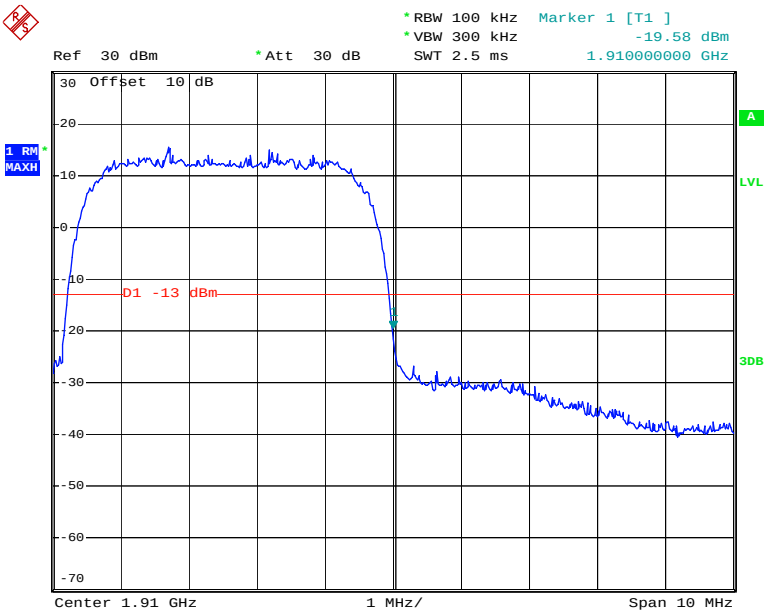
WCDMA Band II:

REL99 Band II, Left Band Edge



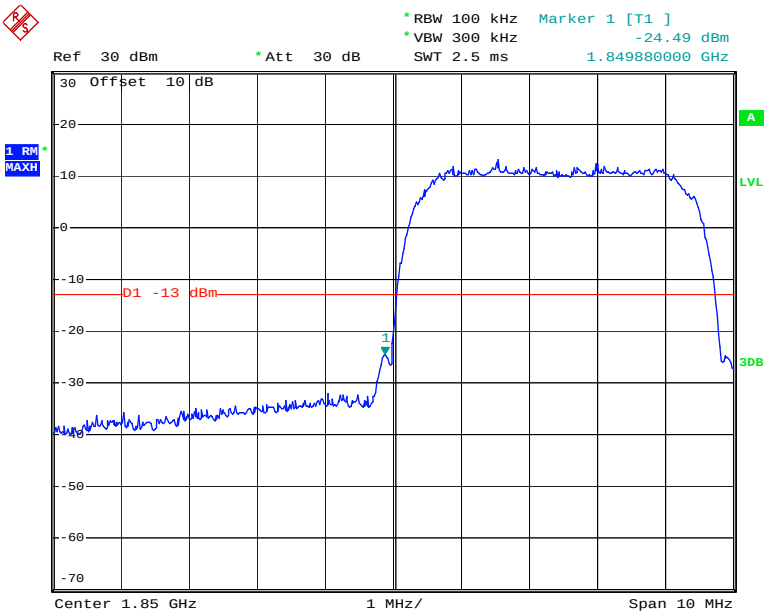
Date: 8.SEP.2017 19:42:50

REL99 Band II, Right Band Edge



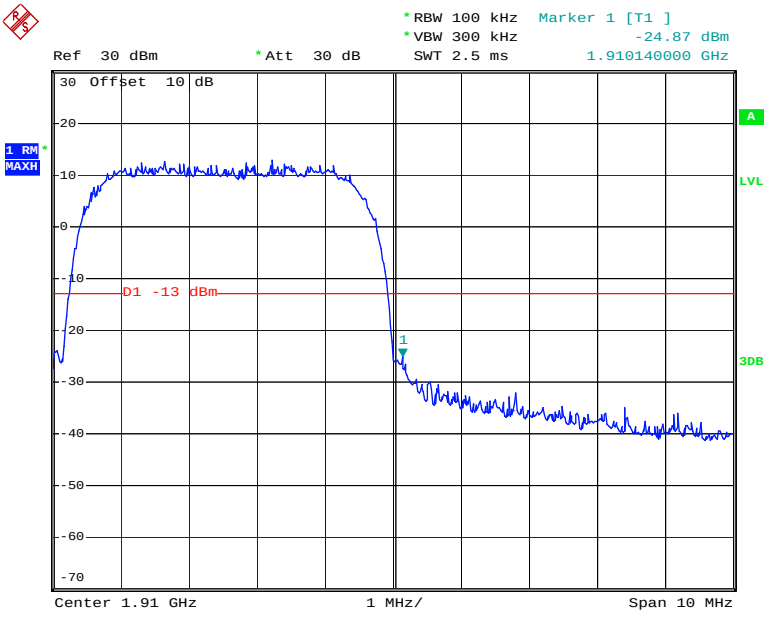
Date: 8.SEP.2017 20:02:13

HSDPA Band II, Left Band Edge



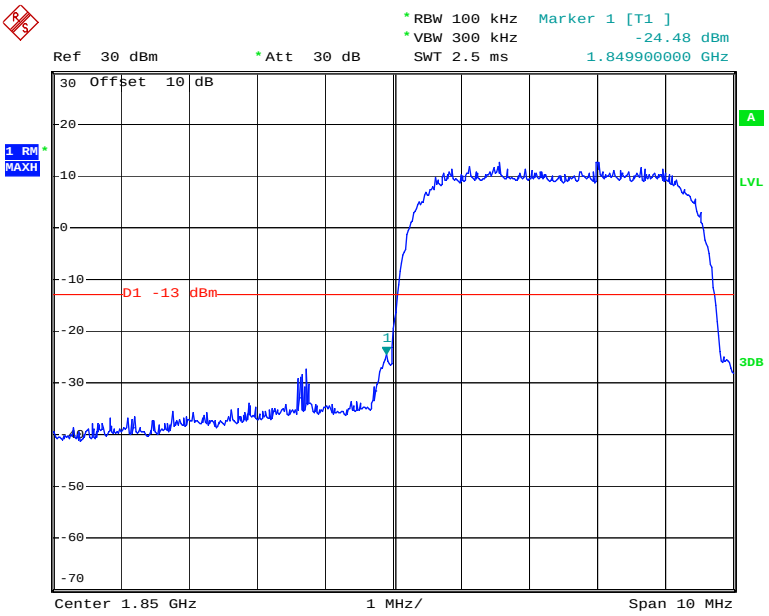
Date: 8.SEP.2017 19:40:40

HSDPA Band II, Right Band Edge



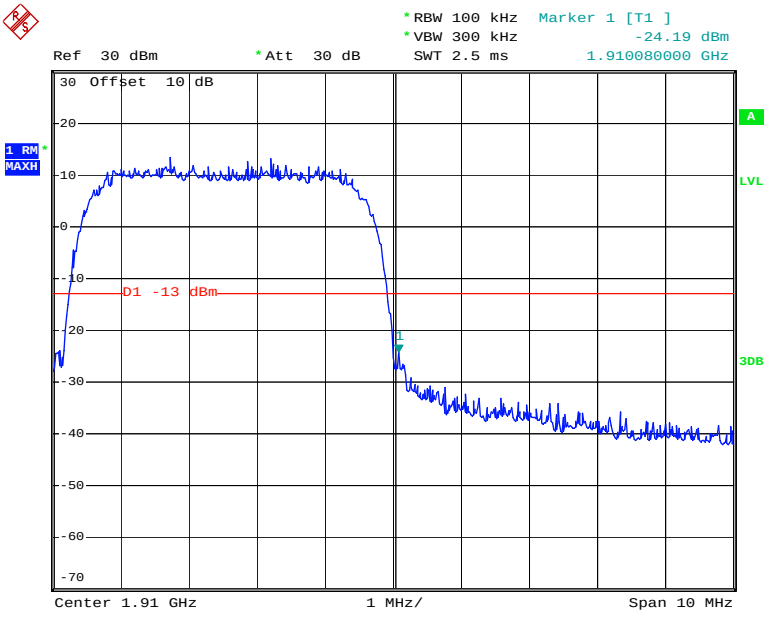
Date: 8.SEP.2017 19:59:20

HSUPA Band II, Left Band Edge



Date: 8.SEP.2017 19:41:53

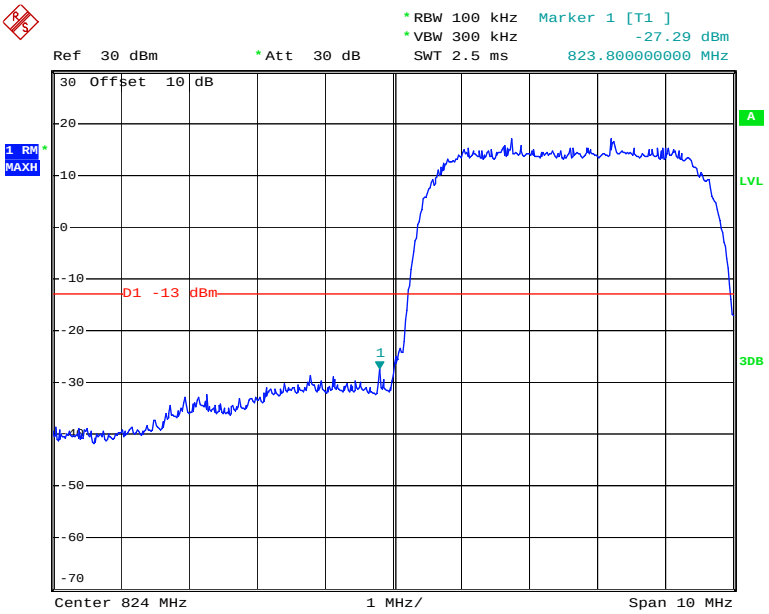
HSUPA Band II, Right Band Edge



Date: 8.SEP.2017 19:58:07

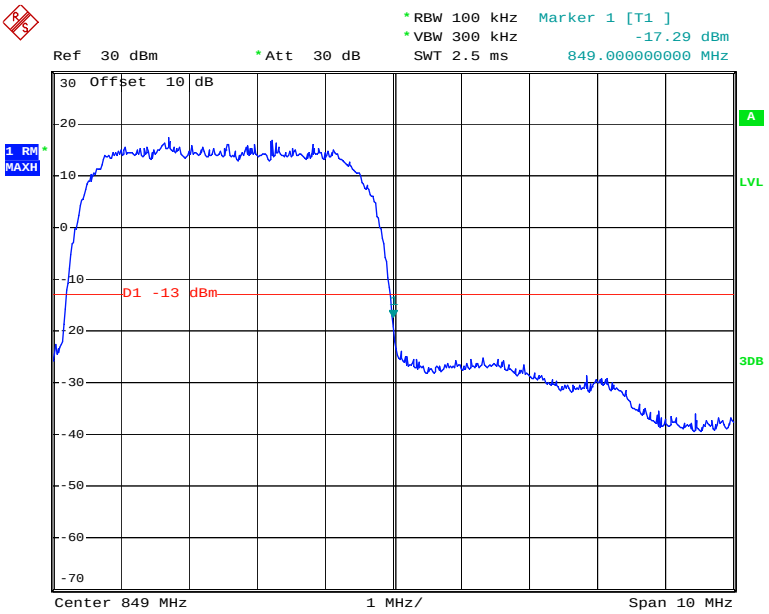
WCDMA Band Ⅴ:

REL99 Band Ⅴ, Left Band Edge



Date: 8.SEP.2017 20:06:23

REL99 Band Ⅴ, Right Band Edge



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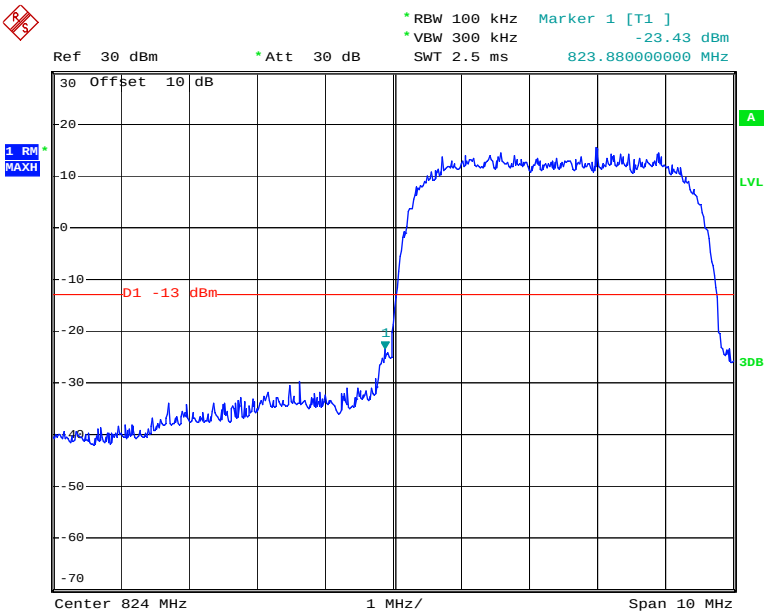
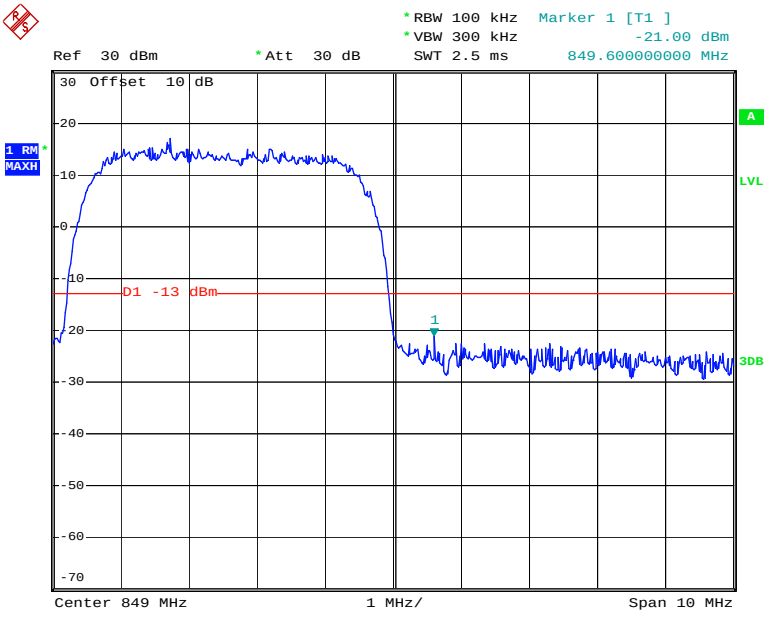


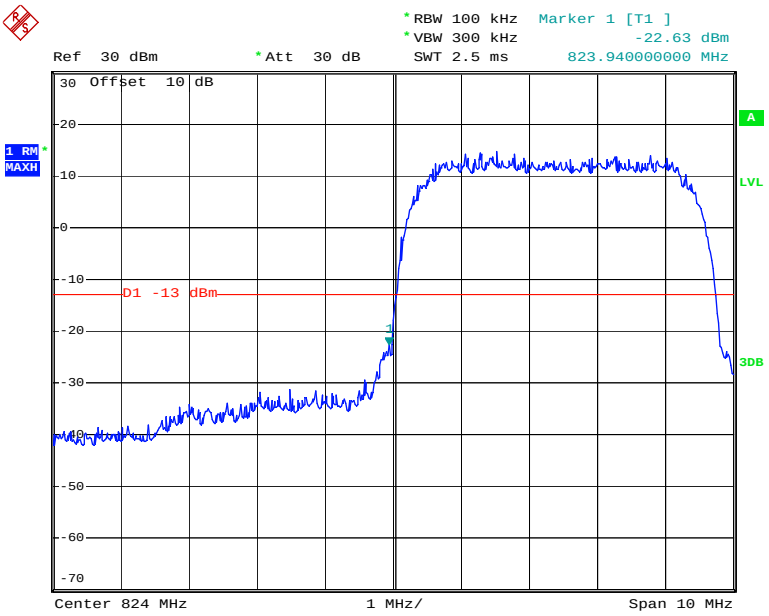
Date: 8.SEP.2017 19:51:26

HSDPA Band Ⅴ, Right Band Edge



Date: 8.SEP.2017 19:50:40

HSUPA Band Ⅴ, Left Band Edge



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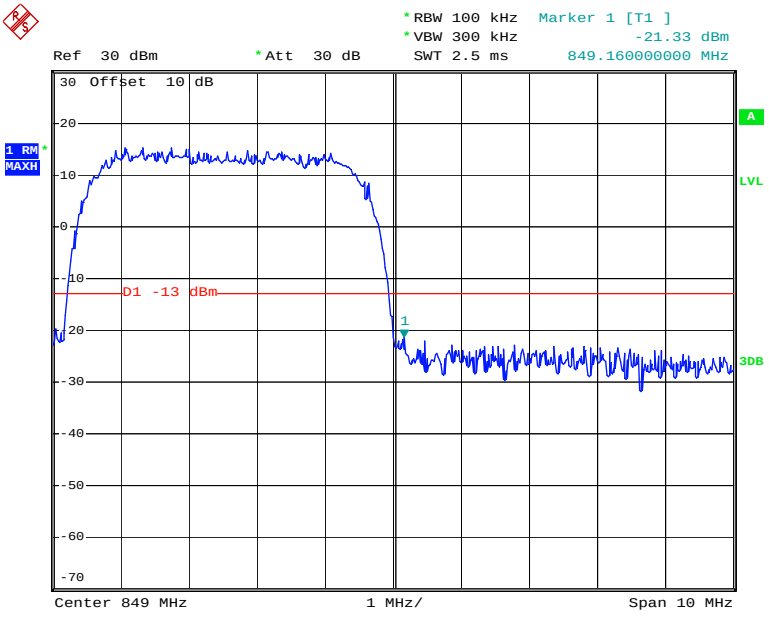
HSUPA Band Ⅴ, Right Band Edge



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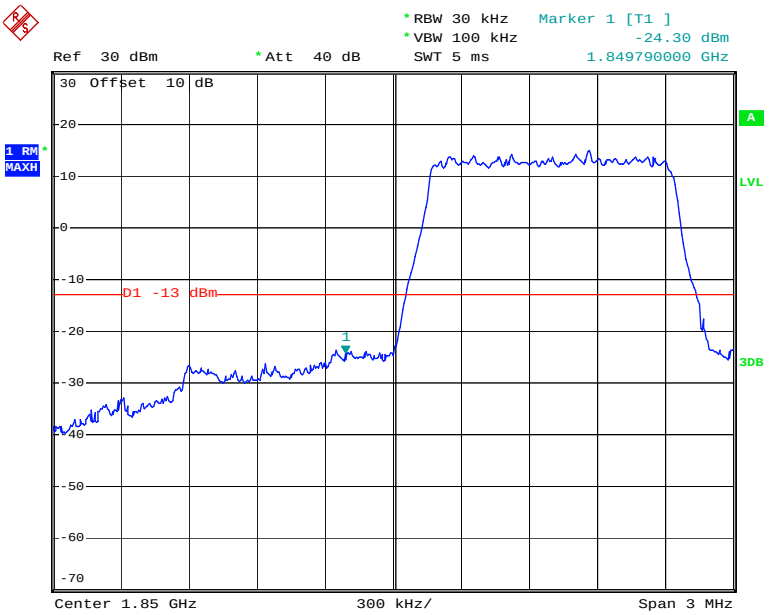
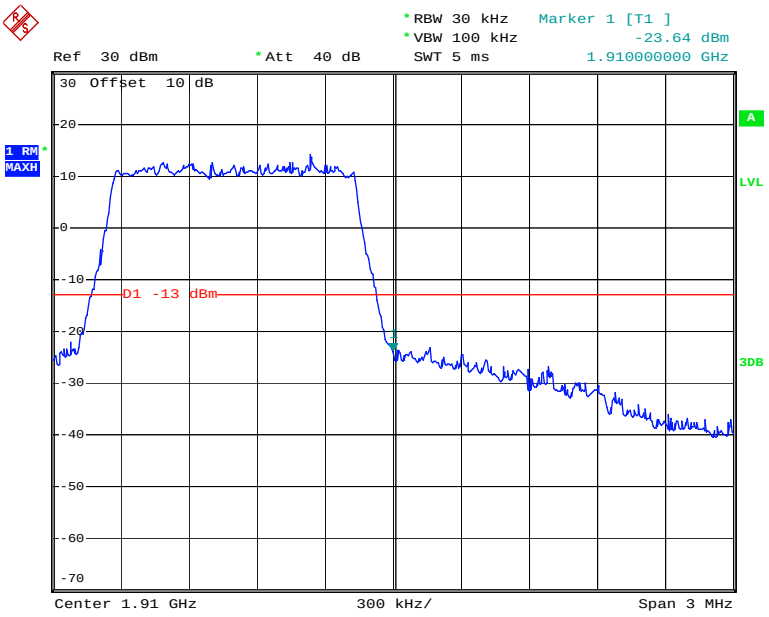
LTE Band II

QPSK_1.4MHz_ 6 RB_ Left



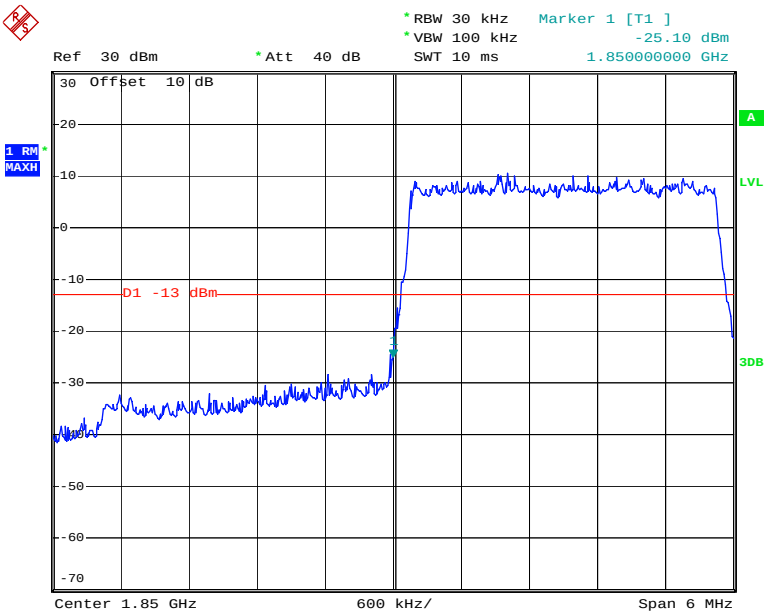
Date: 11.SEP.2017 15:20:32

QPSK_1.4MHz_ 6 RB_ Right



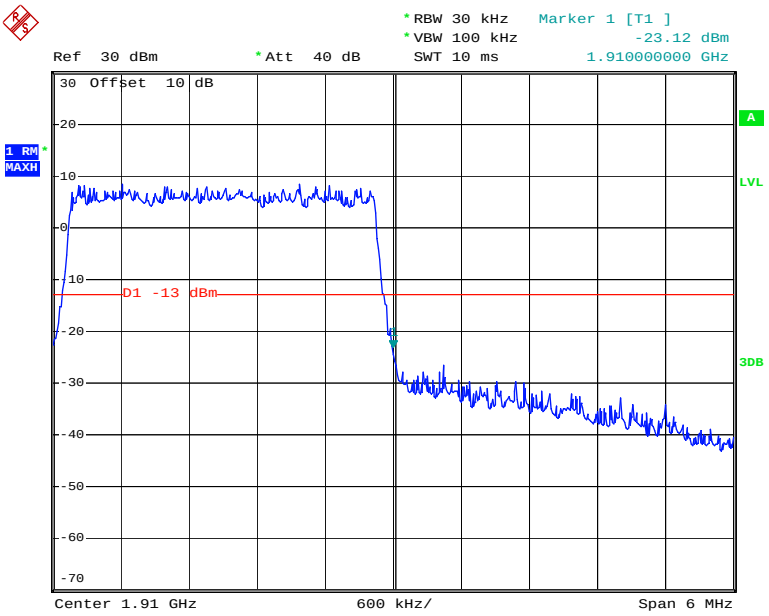
Date: 11.SEP.2017 15:23:12

QPSK_3MHz_ 15 RB_ Left



Date: 11.SEP.2017 15:26:41

QPSK_3MHz_ 15 RB_ Right



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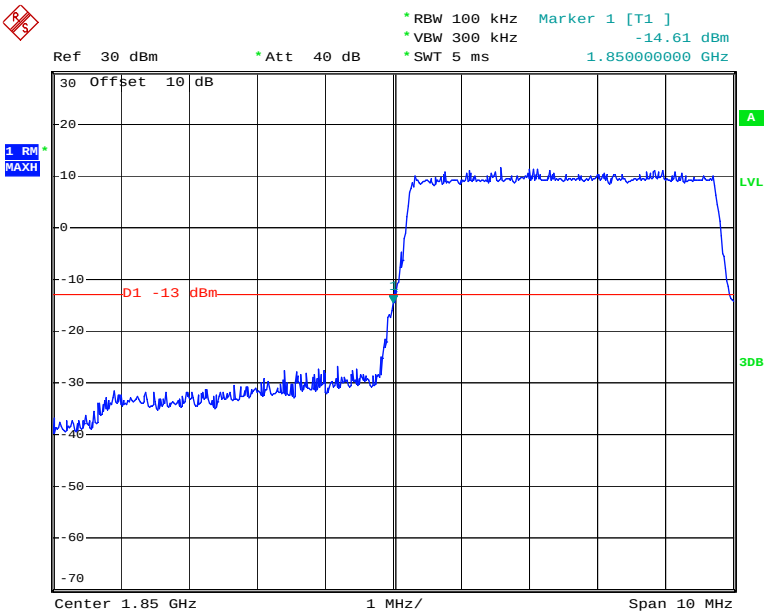
QPSK_5MHz_ 25 RB_ Left



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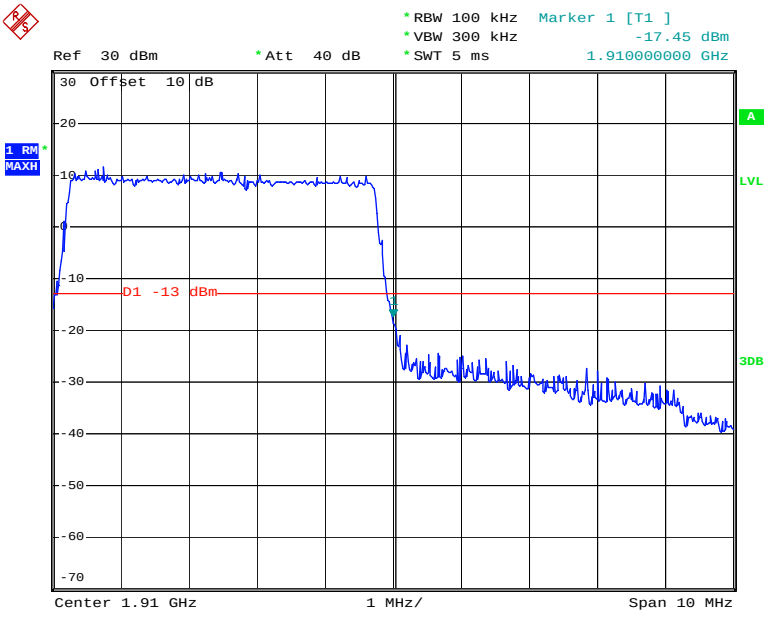
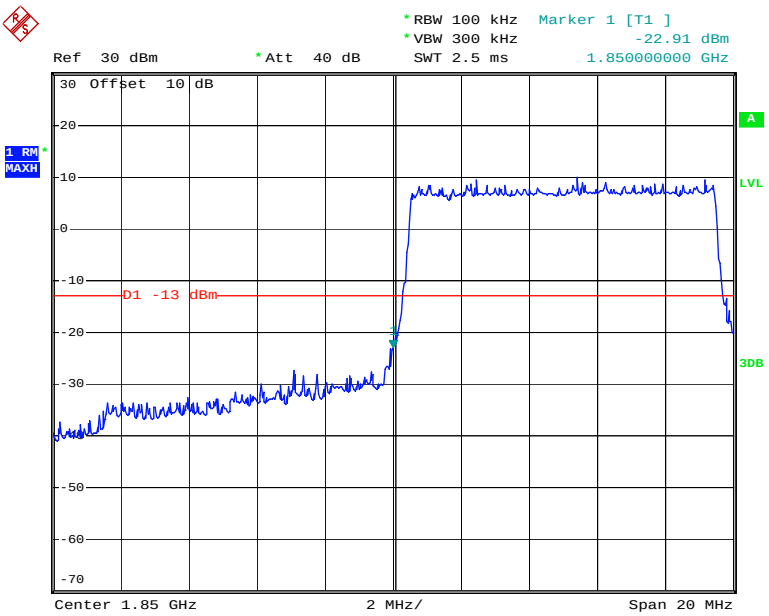
QPSK_5MHz_ 25 RB_ Right



Date: 11.SEP.2017 15:05:45

QPSK_10MHz_ 50 RB_ Left



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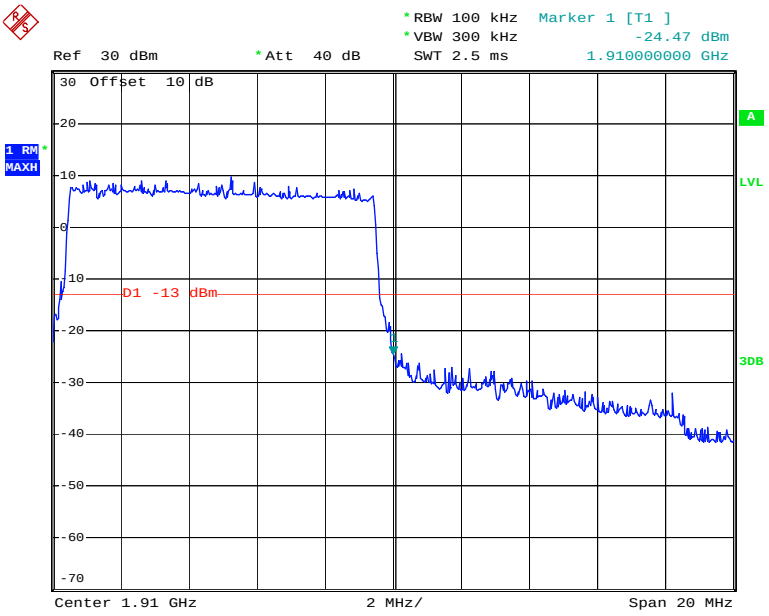
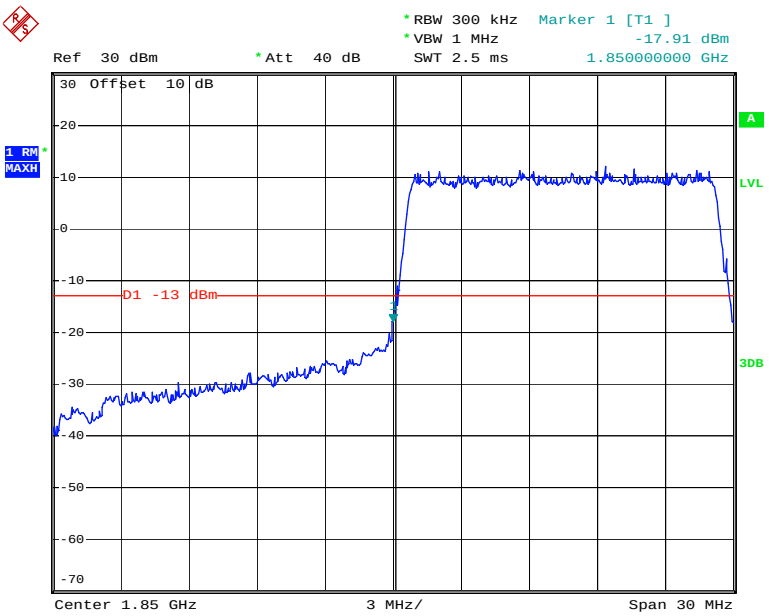
QPSK_10MHz_ 50 RB_ Right



Date: 11.SEP.2017 15:07:52

QPSK_15MHz_ 75 RB_ Left



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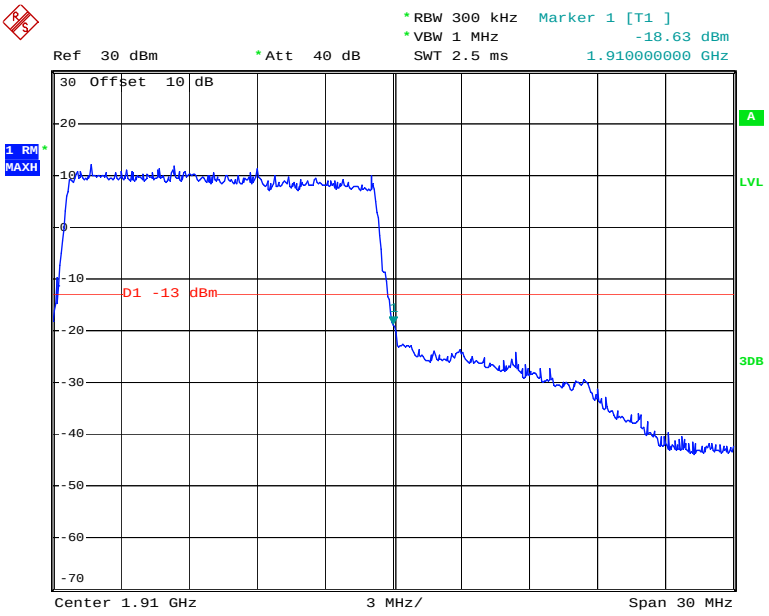
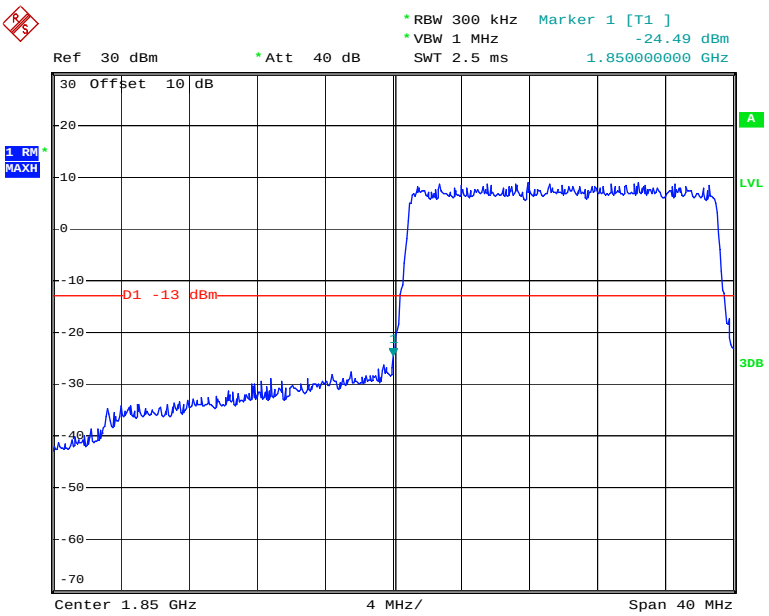
QPSK_15MHz_ 75 RB_ Right



Date: 11.SEP.2017 15:13:17

QPSK_20MHz_ FULL RB_ Left



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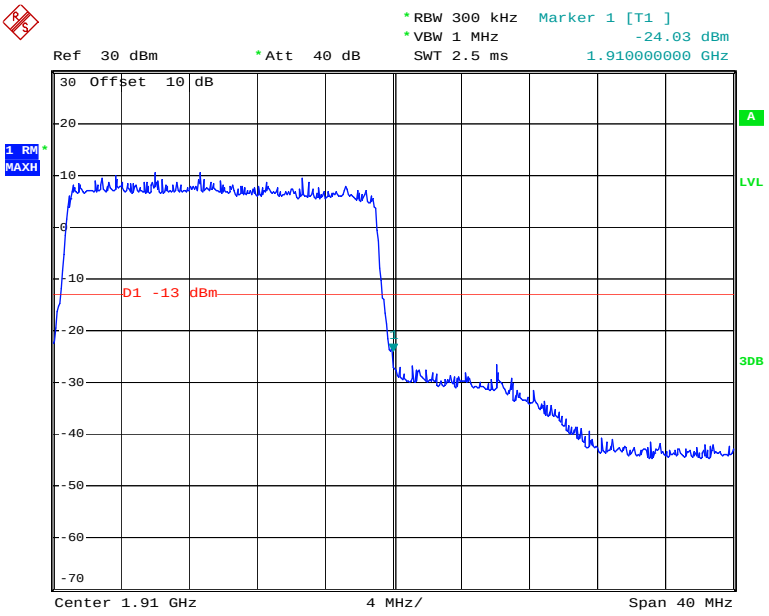
QPSK_20MHz_ FULL RB_ Right



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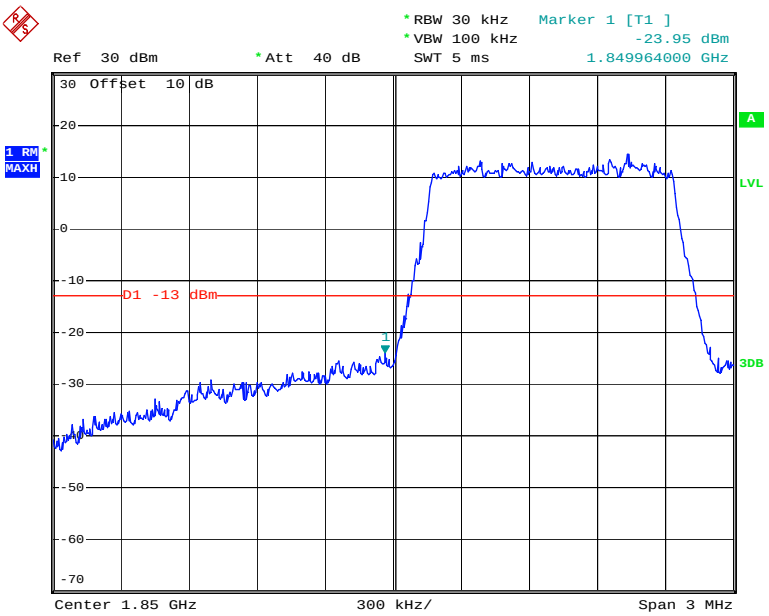
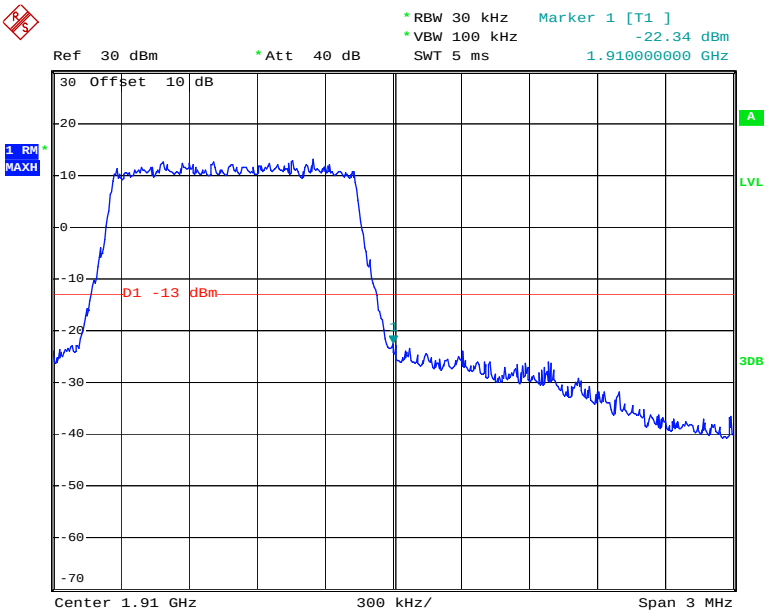
16QAM_1.4MHz_ 6 RB_ Left



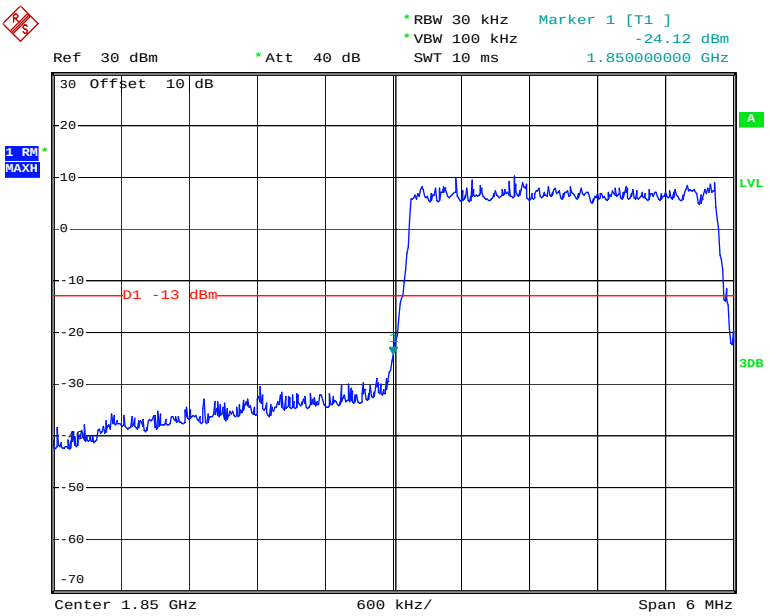
Date: 11.SEP.2017 15:20:56

16QAM_1.4MHz_ 6 RB_ Right



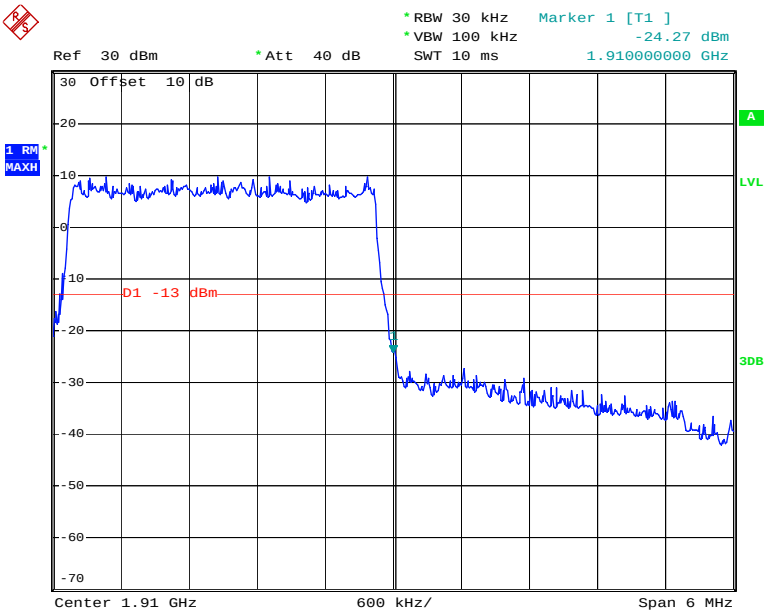
Date: 11.SEP.2017 15:22:51

16QAM_3MHz_ 15 RB_ Left



Date: 11.SEP.2017 15:26:11

16QAM_3MHz_ 15 RB_ Right



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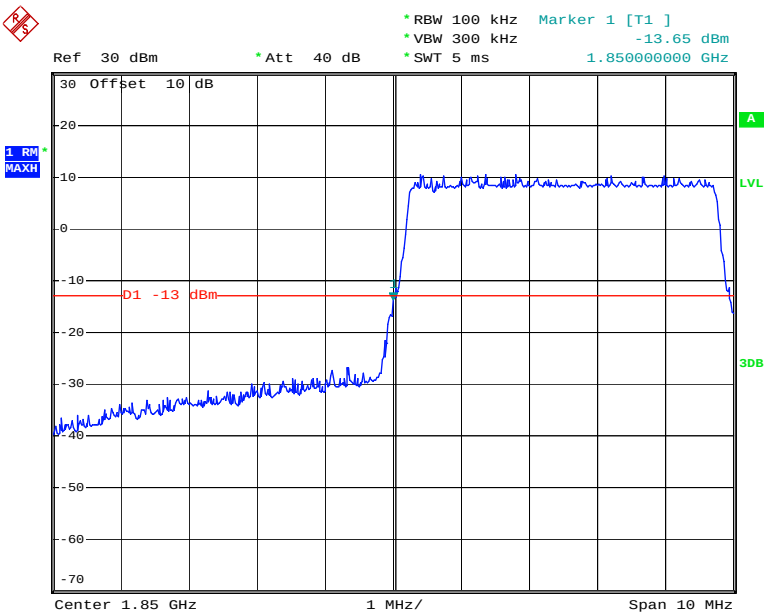
16QAM_5MHz_ 25 RB_ Left



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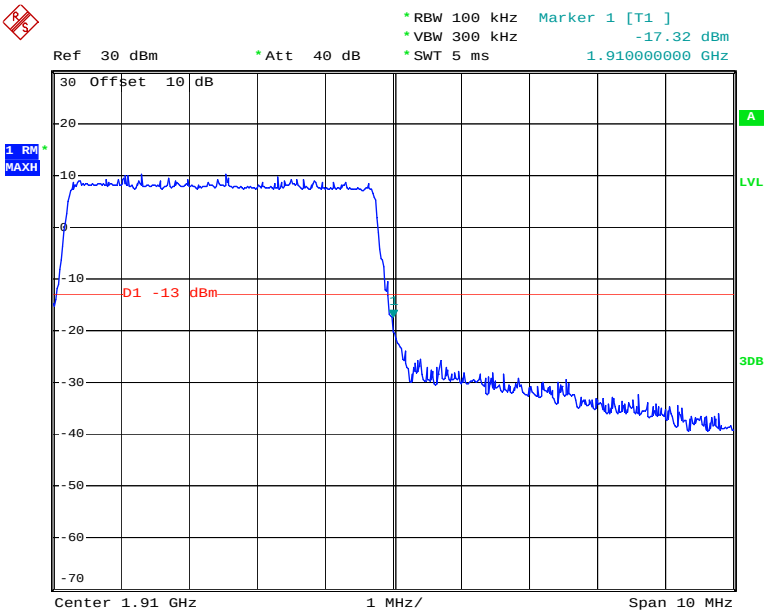
16QAM_5MHz_ 25 RB_ Right



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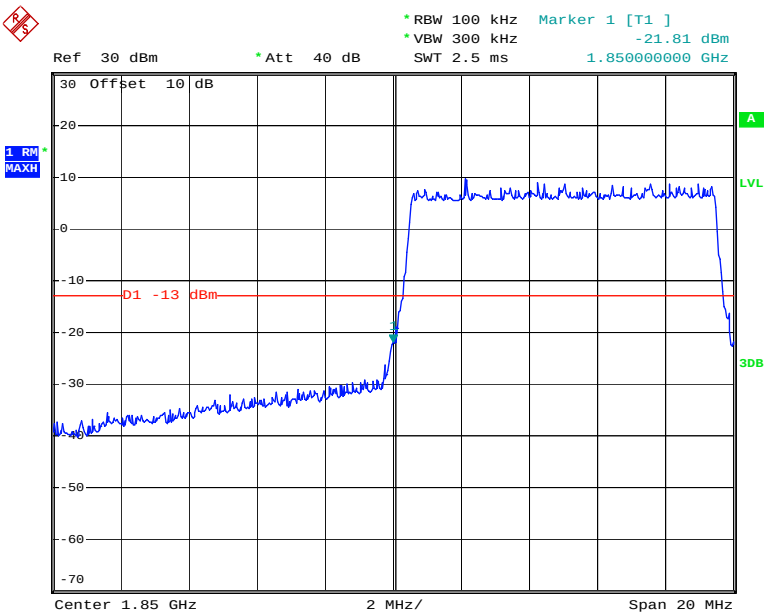
16QAM_10MHz_ 50 RB_ Left



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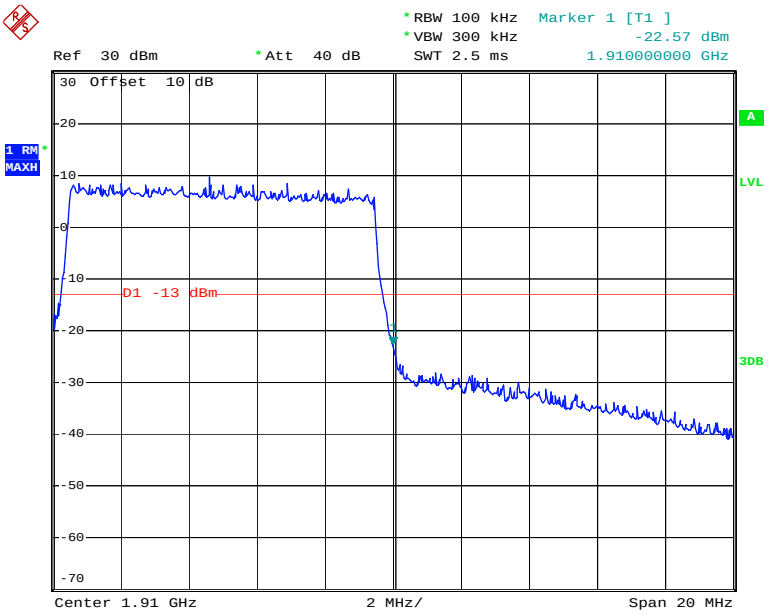
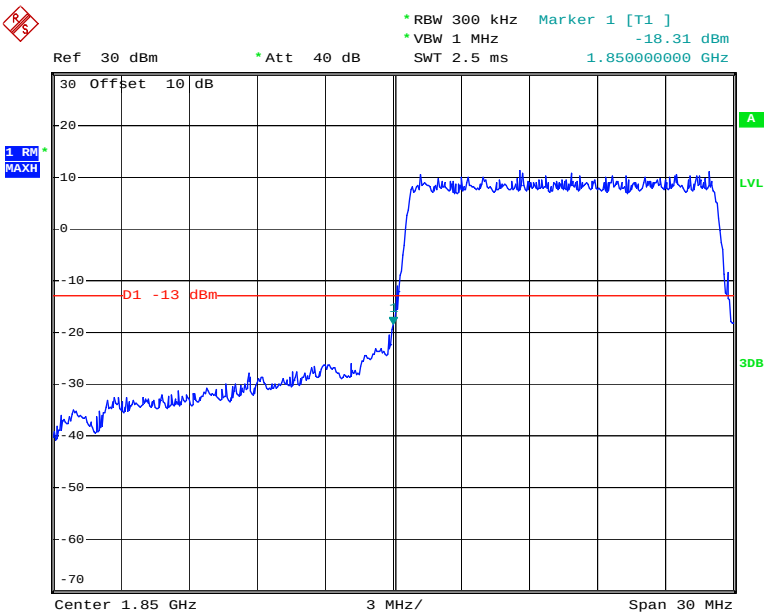
16QAM_10MHz_ 50 RB_ Right



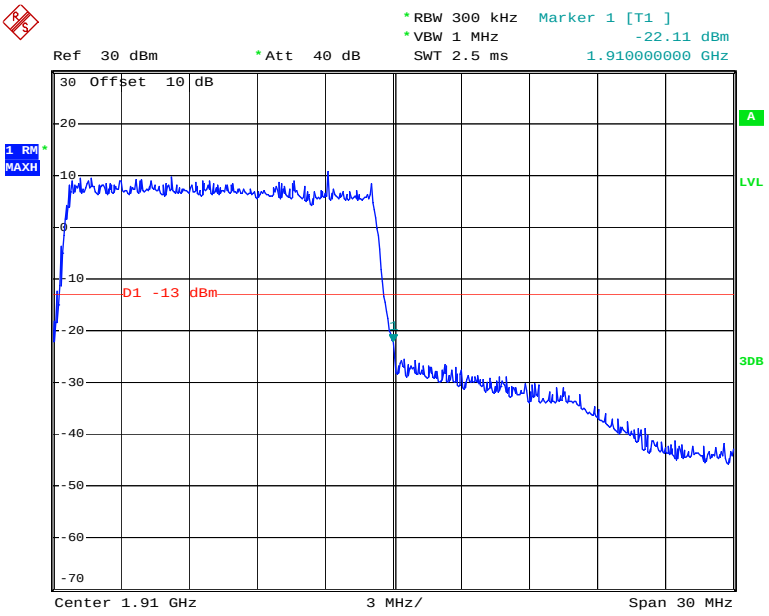
Date: 11.SEP.2017 15:07:03

16QAM_15MHz_ 75 RB_ Left



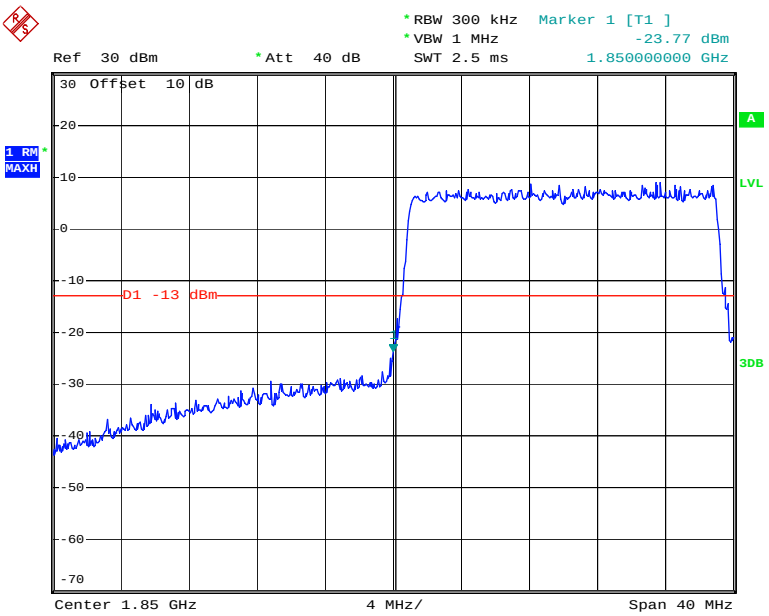
Date: 11.SEP.2017 15:11:40

16QAM_15MHz_ 75 RB_ Right



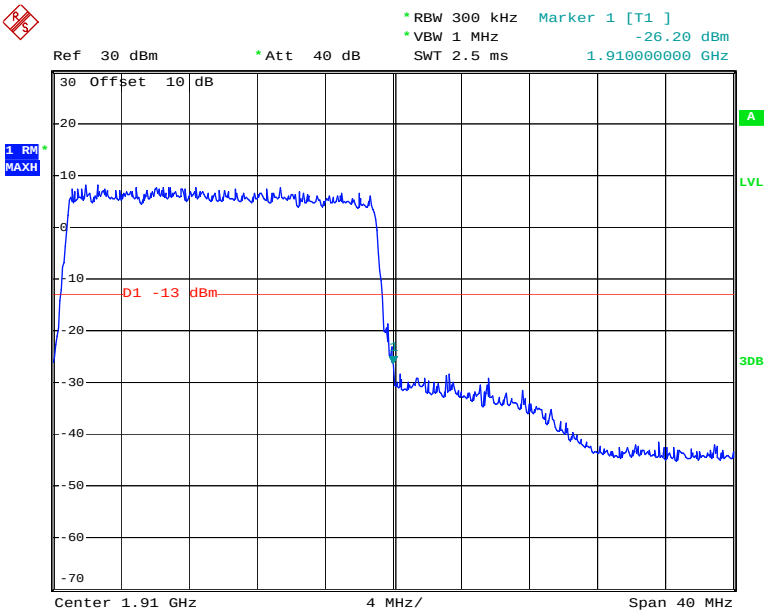
Date: 11.SEP.2017 15:13:40

16QAM_20MHz_ FULL RB_ Left



Date: 11.SEP.2017 15:16:38

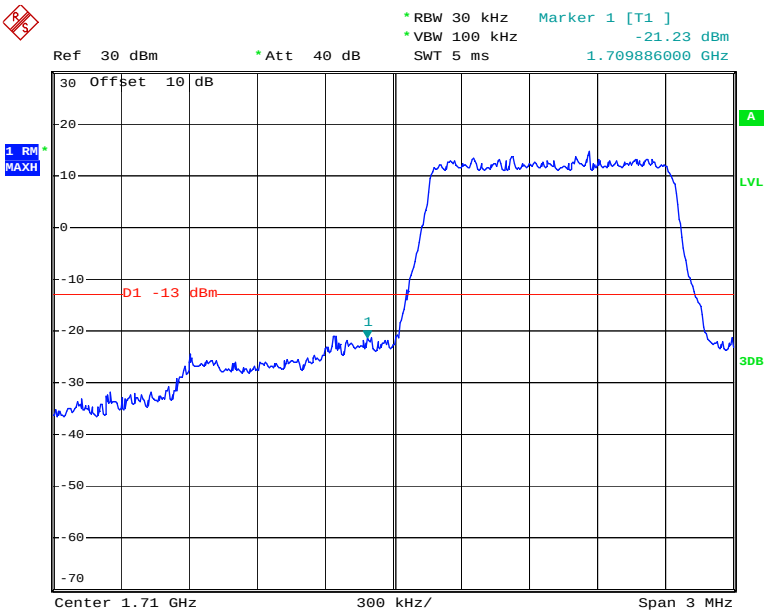
16QAM_20MHz_ FULL RB_ Right



Date: 11.SEP.2017 15:15:37

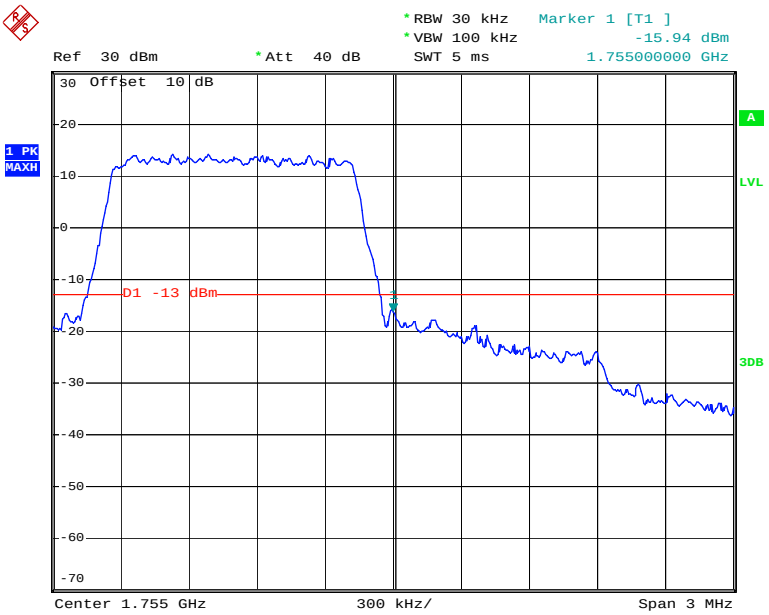
LTE Band IV

QPSK_1.4MHz_ 6 RB_ Left



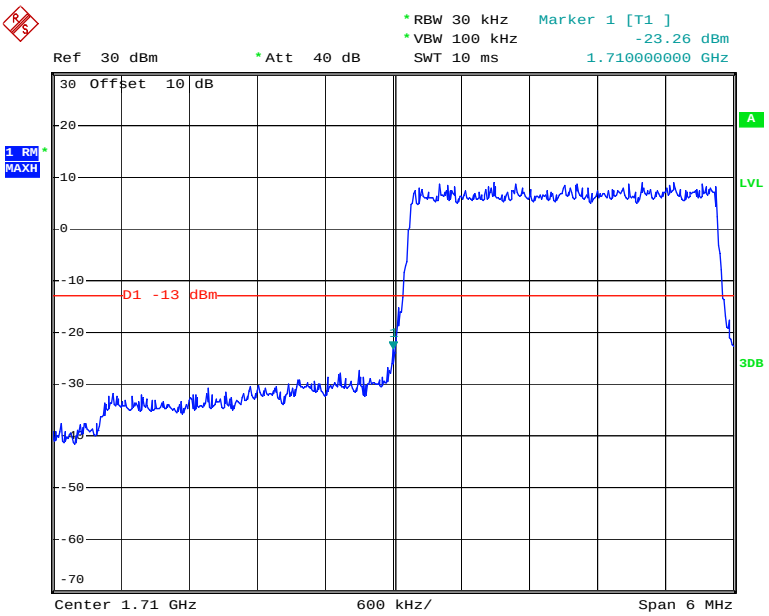
Date: 11.SEP.2017 15:32:08

QPSK_1.4MHz_ 6 RB_ Right



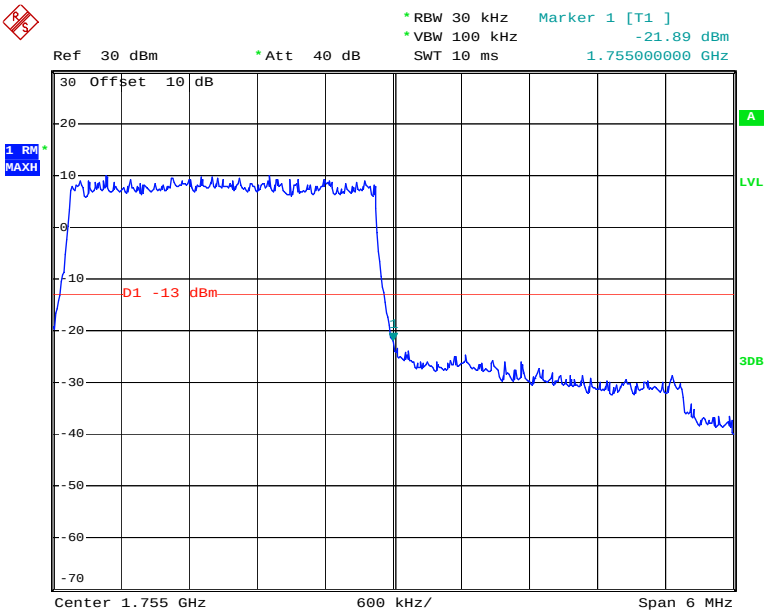
Date: 11.SEP.2017 13:40:33

QPSK_3MHz_ 15 RB_ Left



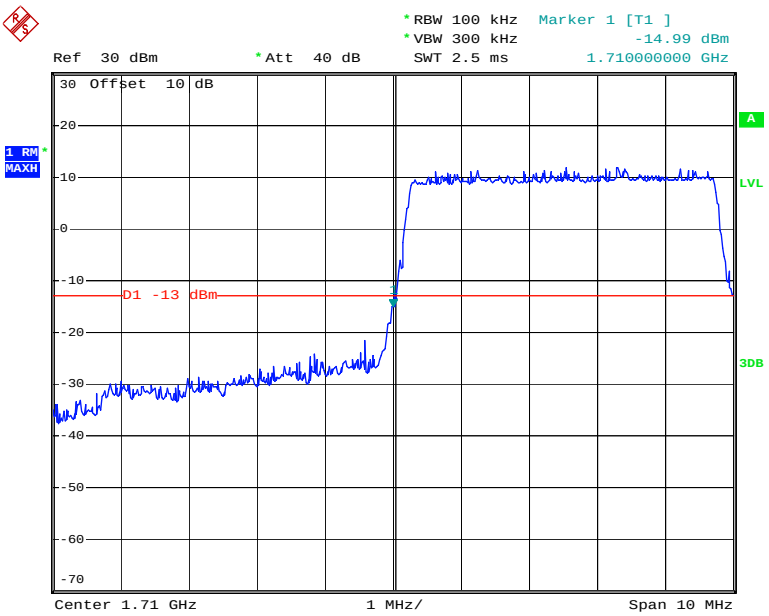
Date: 11.SEP.2017 15:37:00

QPSK_3MHz_ 15 RB_ Right



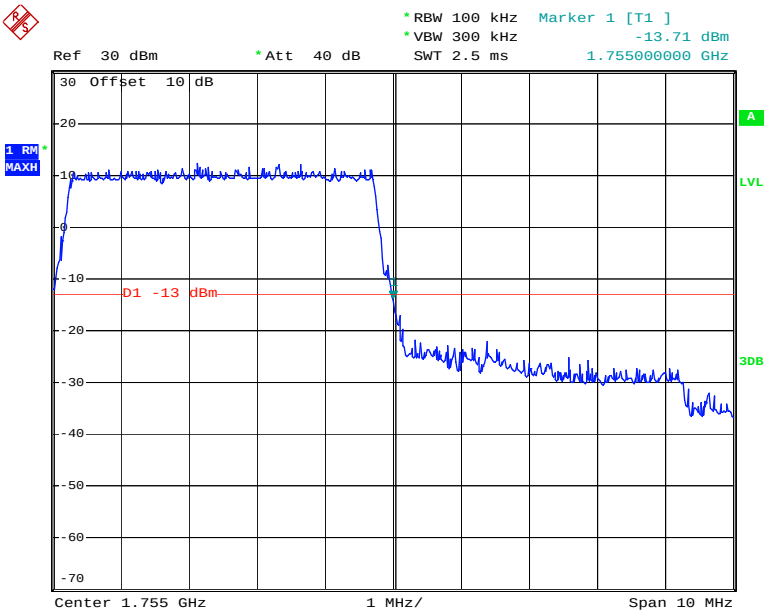
Date: 11.SEP.2017 15:37:44

QPSK_5MHz_ 25 RB_ Left



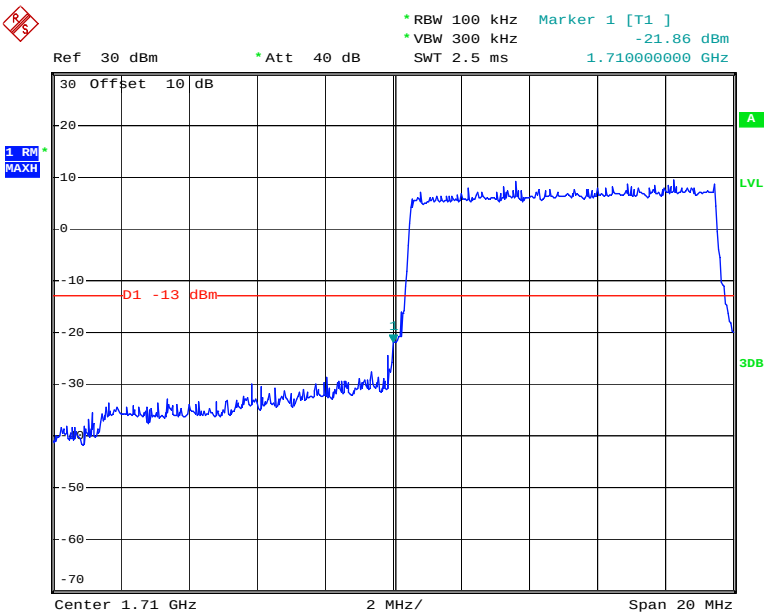
Date: 11.SEP.2017 15:45:13

QPSK_5MHz_ 25 RB_ Right



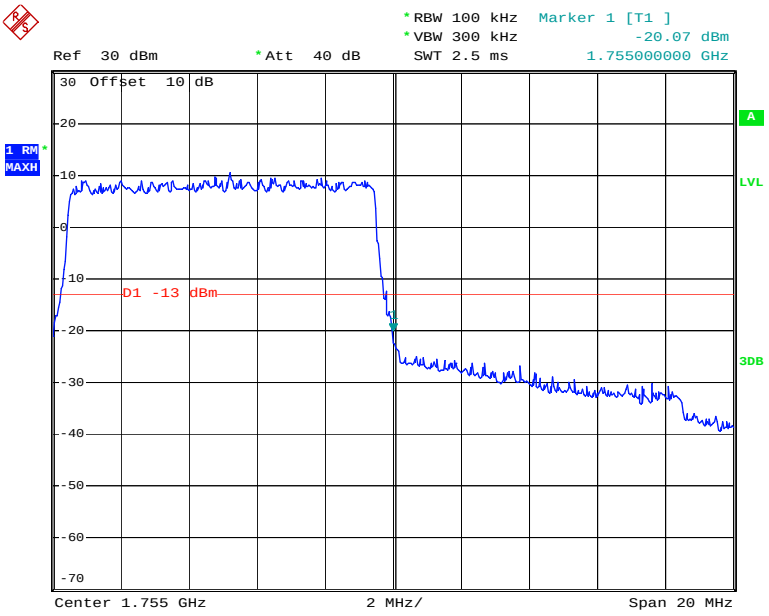
Date: 11.SEP.2017 15:44:20

QPSK_10MHz_ 50 RB_ Left



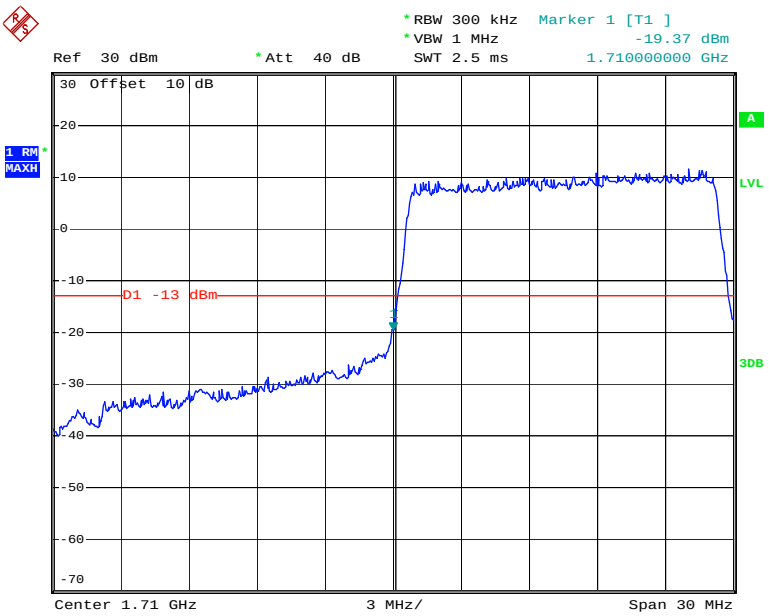
Date: 11.SEP.2017 15:51:17

QPSK_10MHz_ 50 RB_ Right



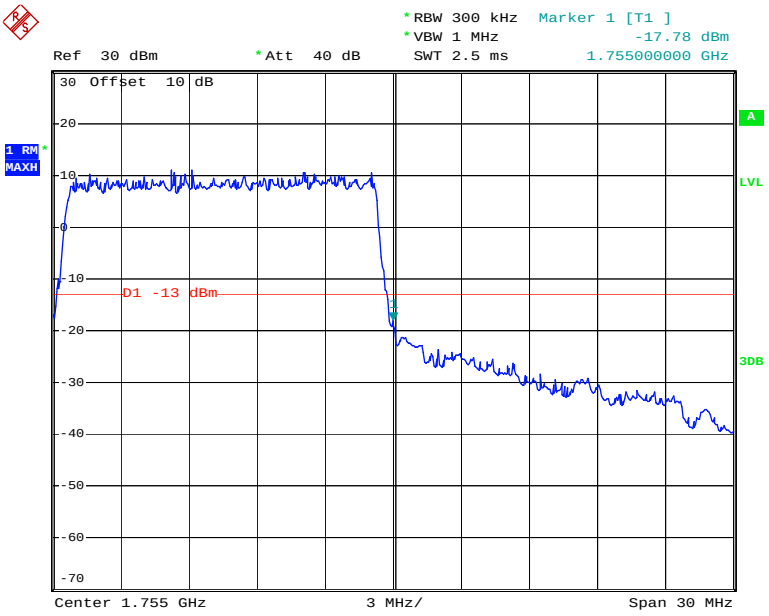
Date: 11.SEP.2017 15:48:46

QPSK_15MHz_ 75 RB_ Left



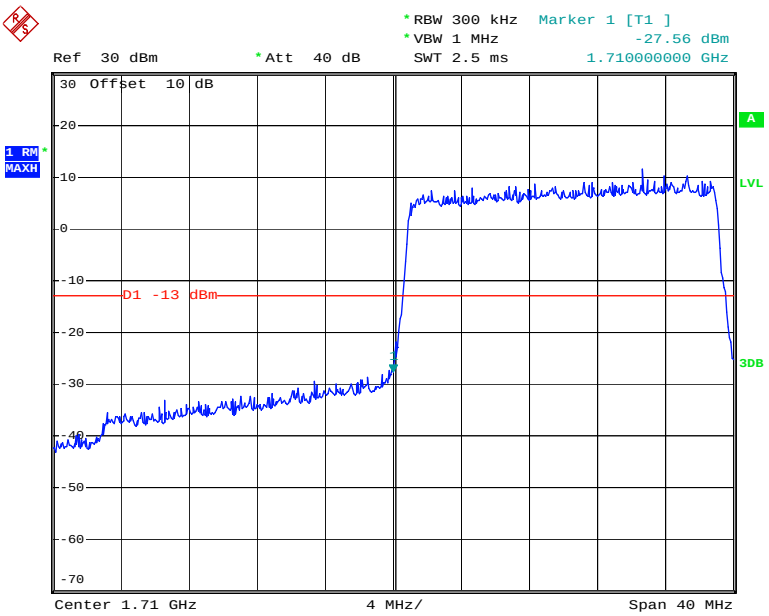
Date: 11.SEP.2017 15:56:36

QPSK_15MHz_ 75 RB_ Right



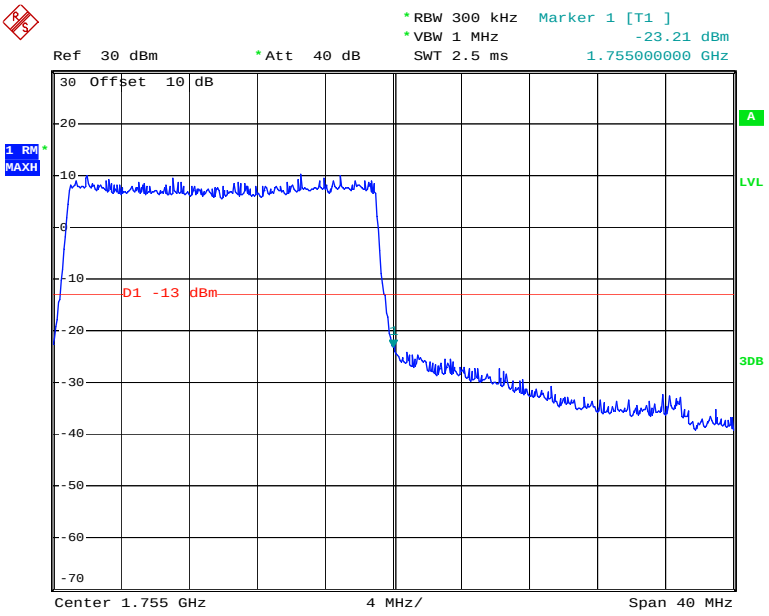
Date: 11.SEP.2017 15:57:53

QPSK_20MHz_ FULL RB_ Left



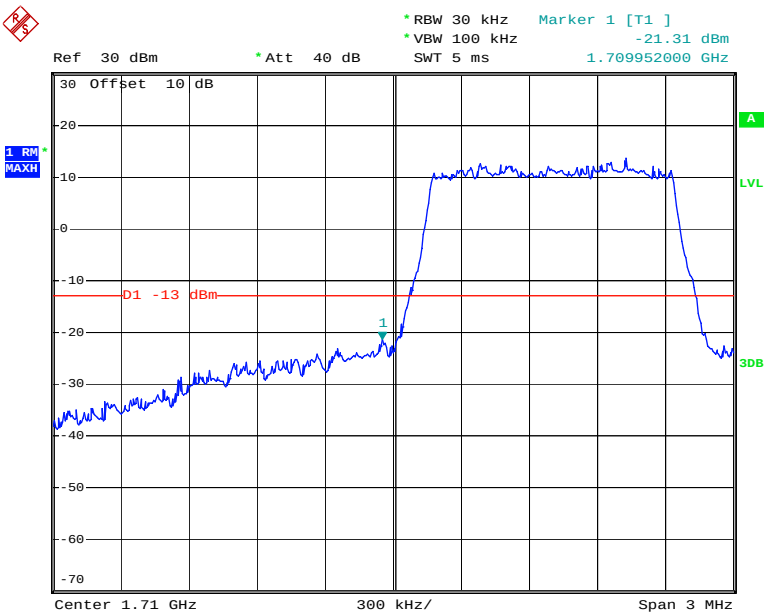
Date: 11.SEP.2017 16:08:53

QPSK_20MHz_ FULL RB_ Right



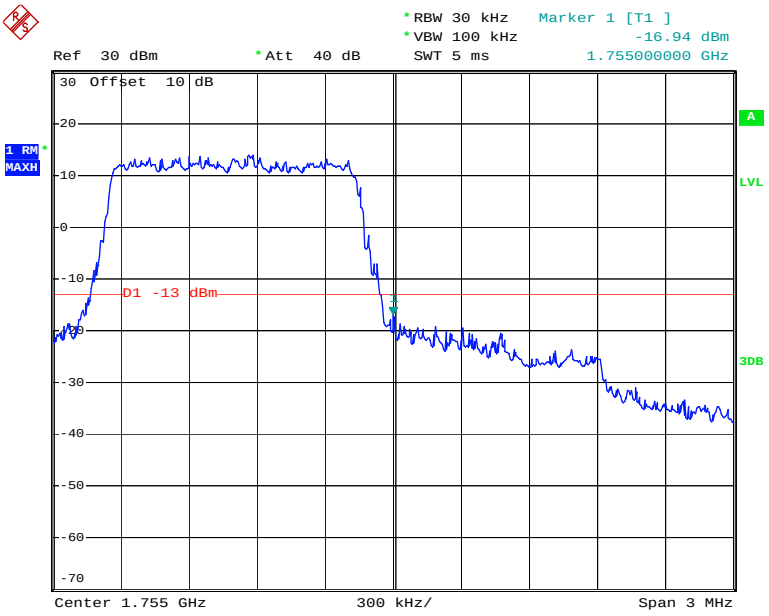
Date: 11.SEP.2017 15:59:44

16QAM_1.4MHz_ 6 RB_ Left



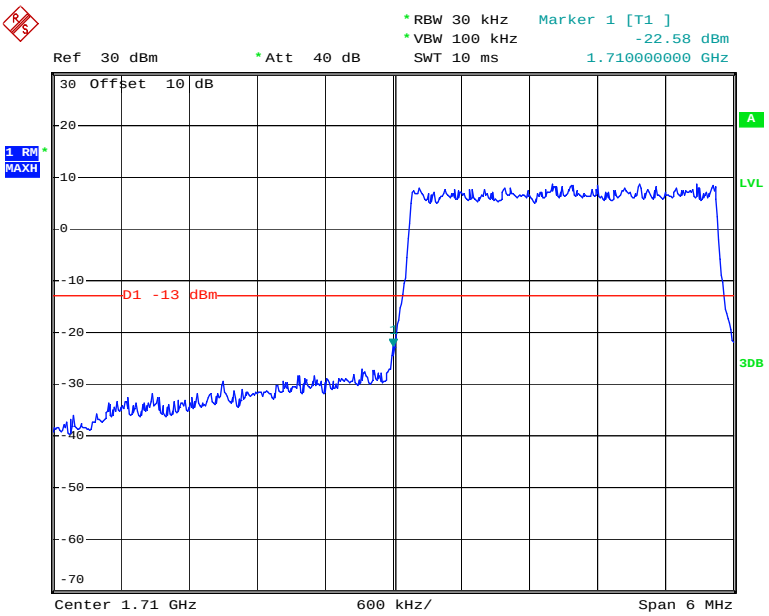
Date: 11.SEP.2017 15:32:52

16QAM_1.4MHz_ 6 RB_ Right



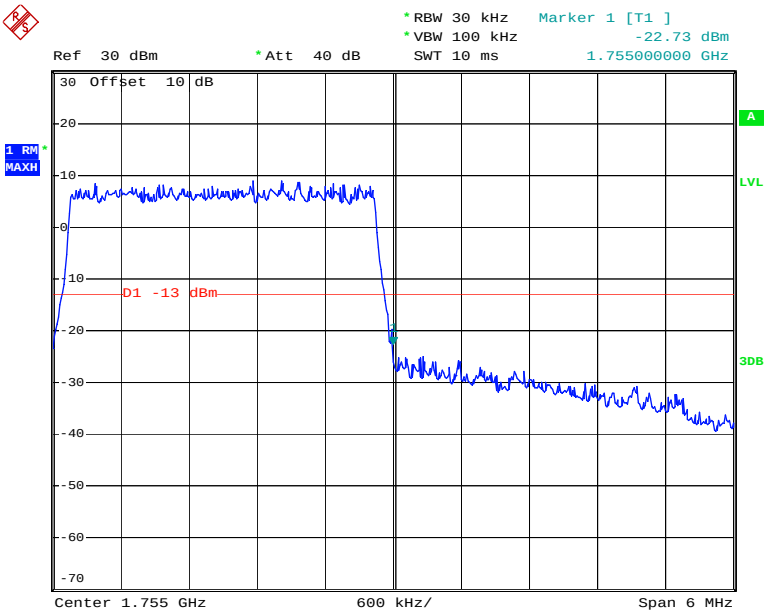
Date: 11.SEP.2017 15:30:54

16QAM_3MHz_ 15 RB_ Left



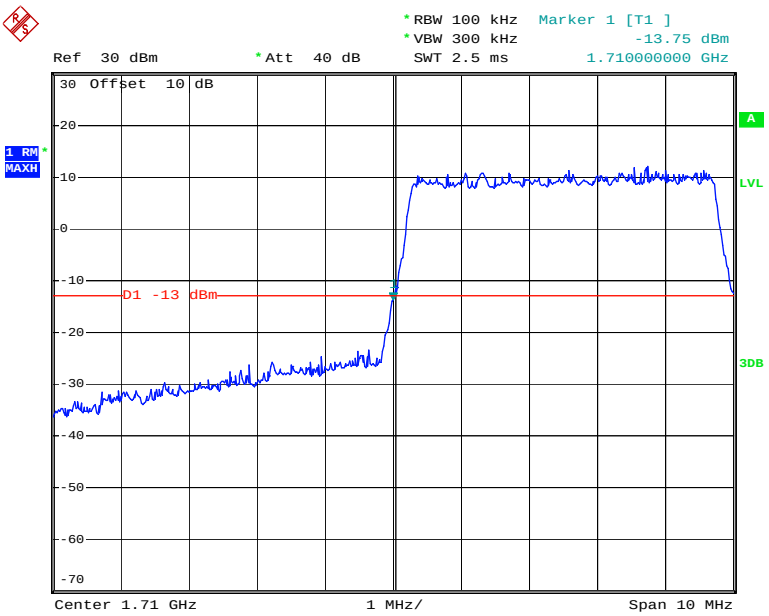
Date: 11.SEP.2017 15:36:35

16QAM_3MHz_ 15 RB_ Right



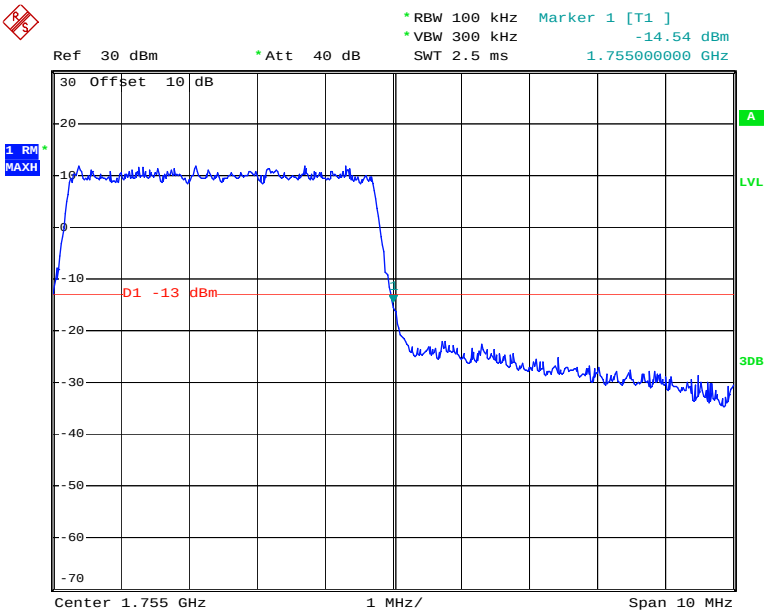
Date: 11.SEP.2017 15:38:13

16QAM_5MHz_ 25 RB_ Left



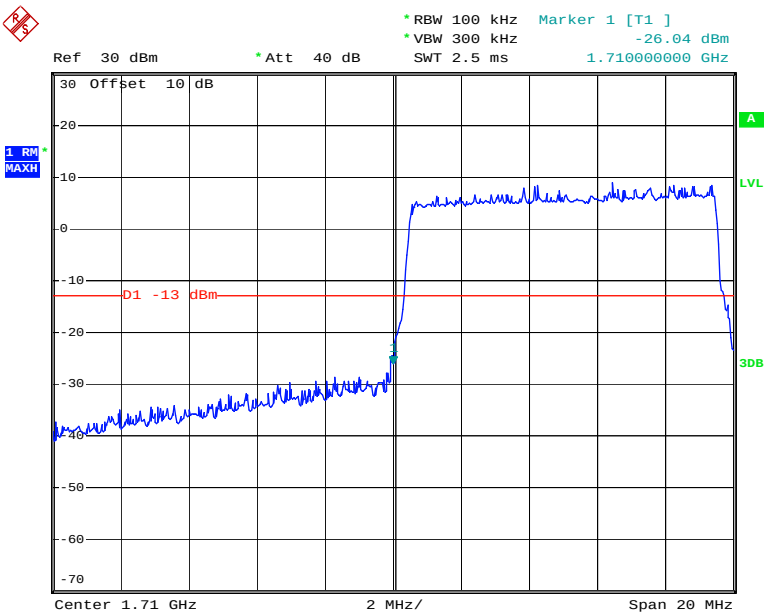
Date: 11.SEP.2017 15:46:05

16QAM_5MHz_ 25 RB_ Right



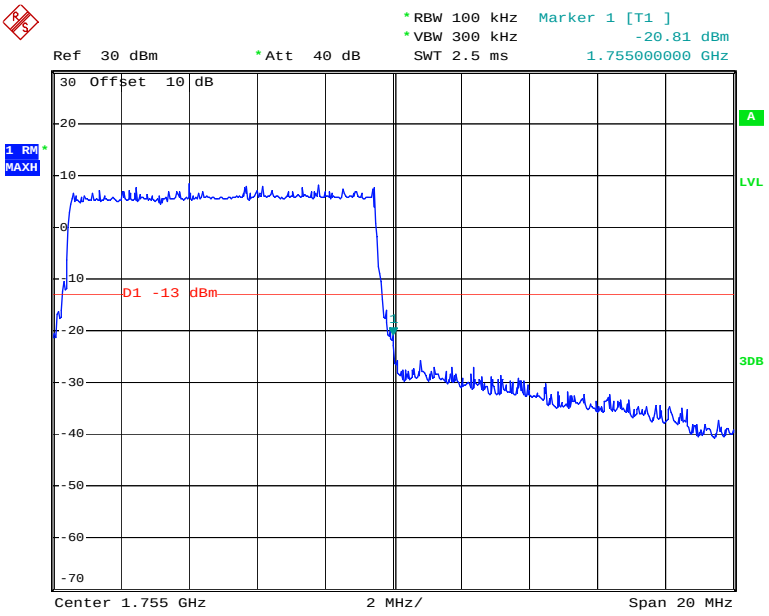
Date: 11.SEP.2017 15:43:41

16QAM_10MHz_ 50 RB_ Left



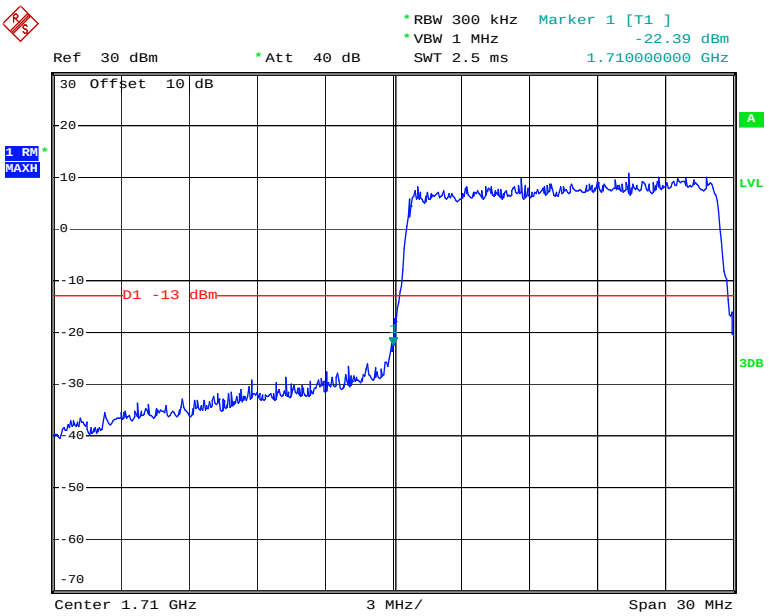
Date: 11.SEP.2017 15:51:58

16QAM_10MHz_ 50 RB_ Right



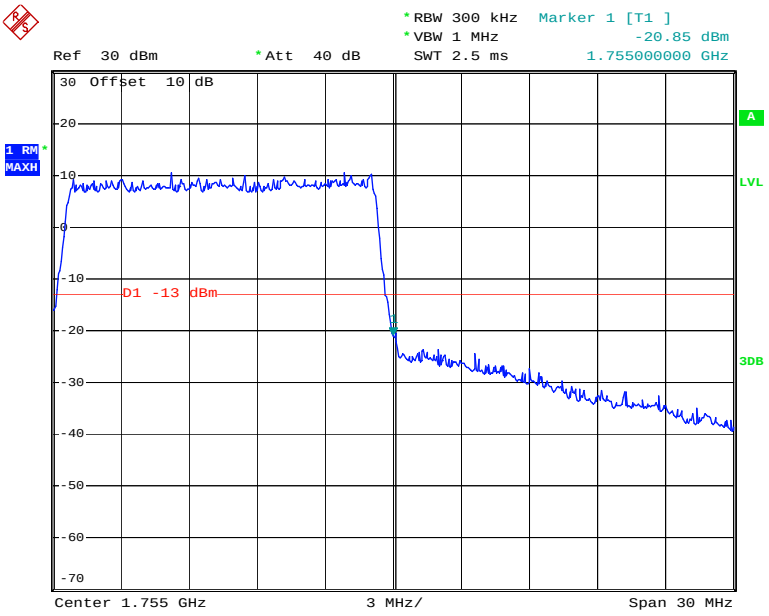
Date: 11.SEP.2017 15:49:16

16QAM_15MHz_ 75 RB_ Left



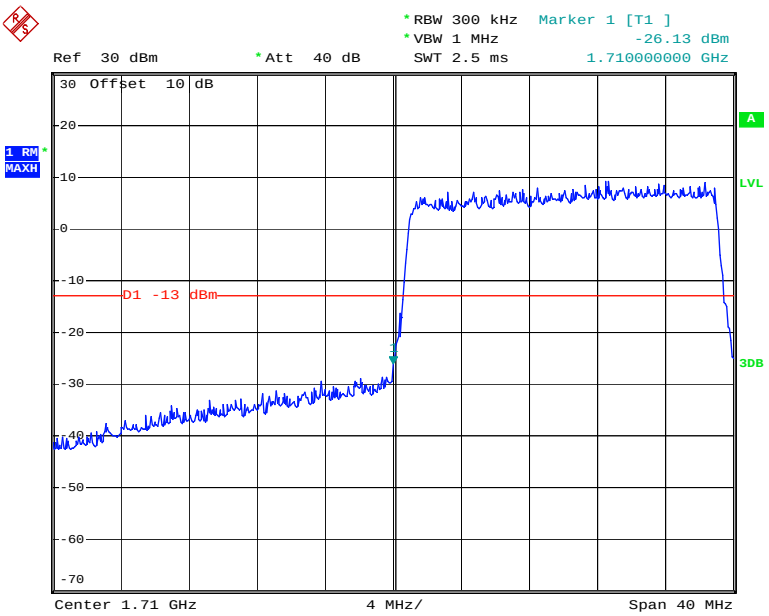
Date: 11.SEP.2017 15:55:53

16QAM_15MHz_ 75 RB_ Right



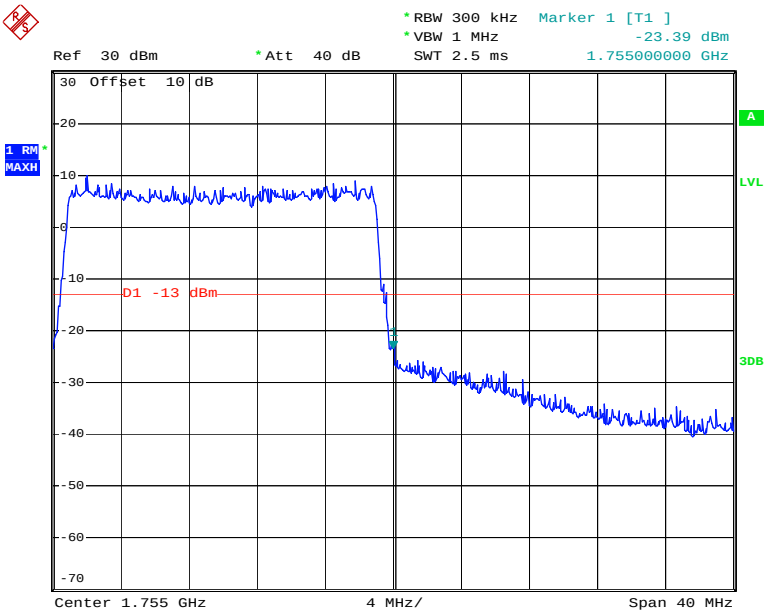
Date: 11.SEP.2017 15:57:26

16QAM_20MHz_ FULL RB_ Left



Date: 11.SEP.2017 16:09:23

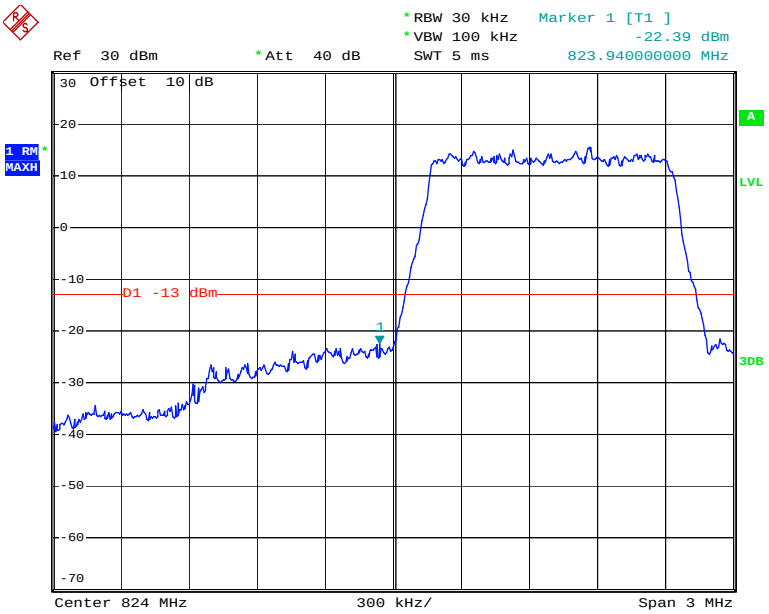
16QAM_20MHz_ FULL RB_ Right



Date: 11.SEP.2017 15:59:14

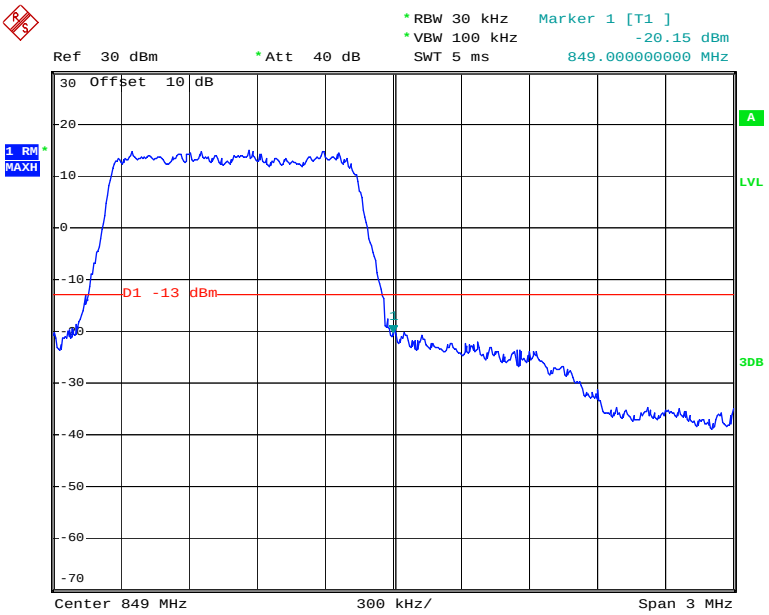
LTE Band V

QPSK_1.4MHz_ 6 RB_ Left



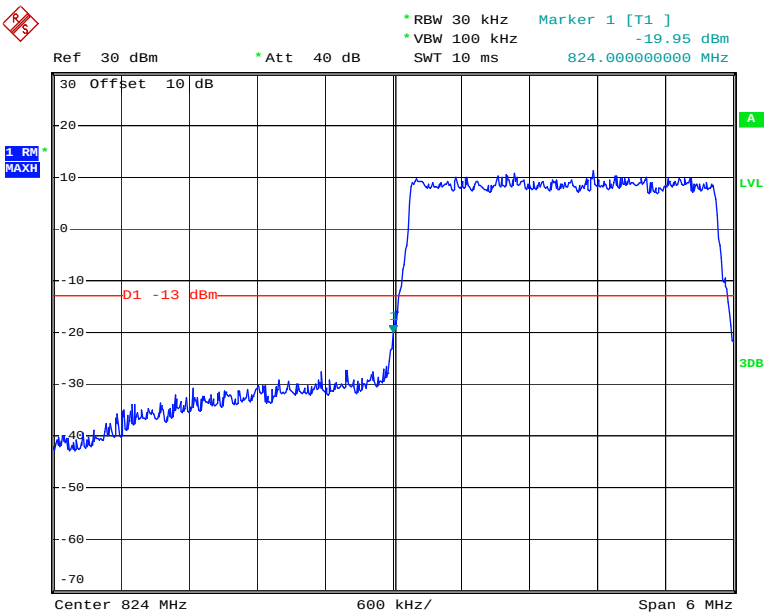
Date: 11.SEP.2017 16:14:39

QPSK_1.4MHz_ 6 RB_ Right



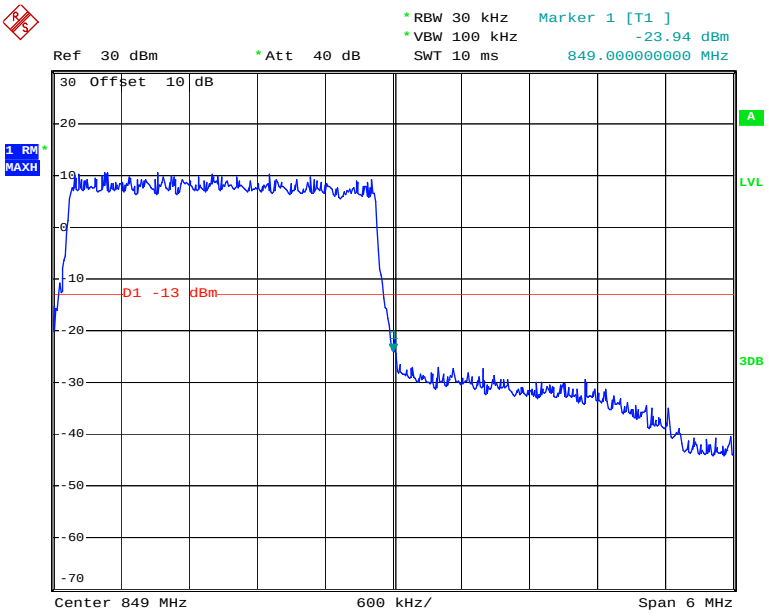
Date: 11.SEP.2017 16:15:53

QPSK_3MHz_ 15 RB_ Left



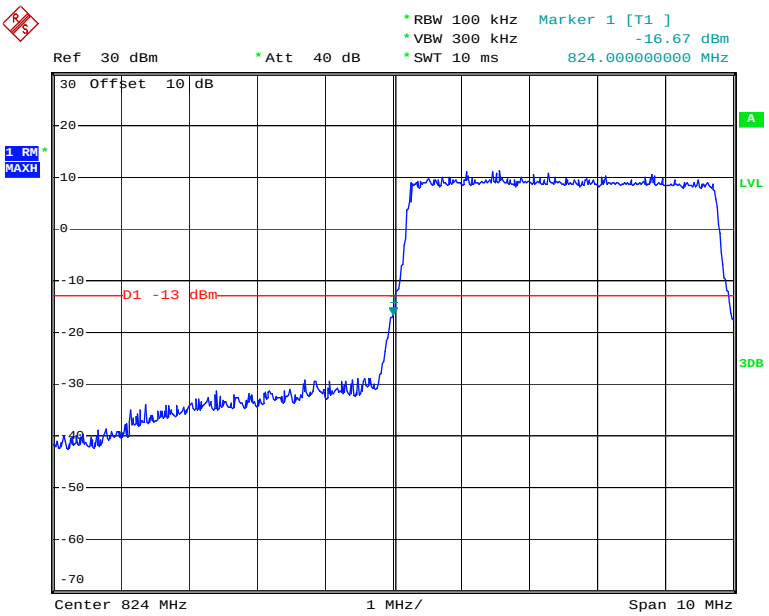
Date: 11.SEP.2017 16:20:25

QPSK_3MHz_ 15 RB_ Right



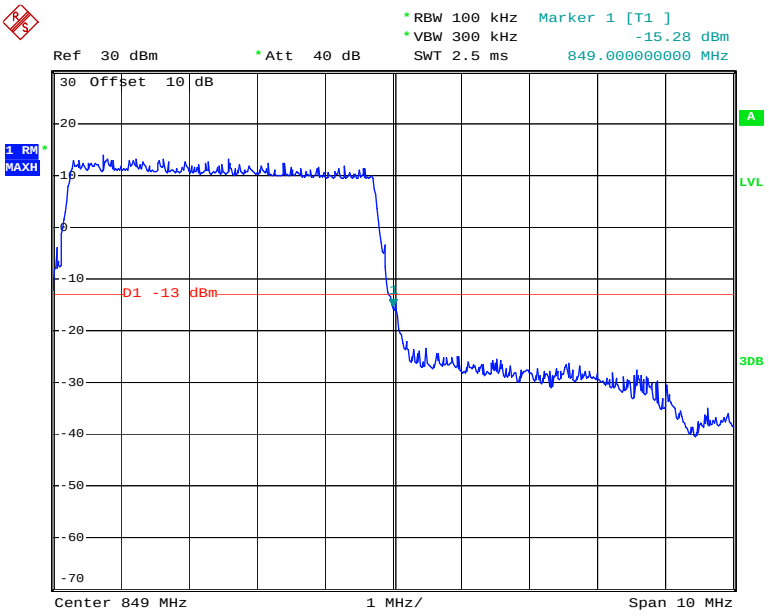
Date: 11.SEP.2017 16:19:20

QPSK_5MHz_ 25 RB_ Left



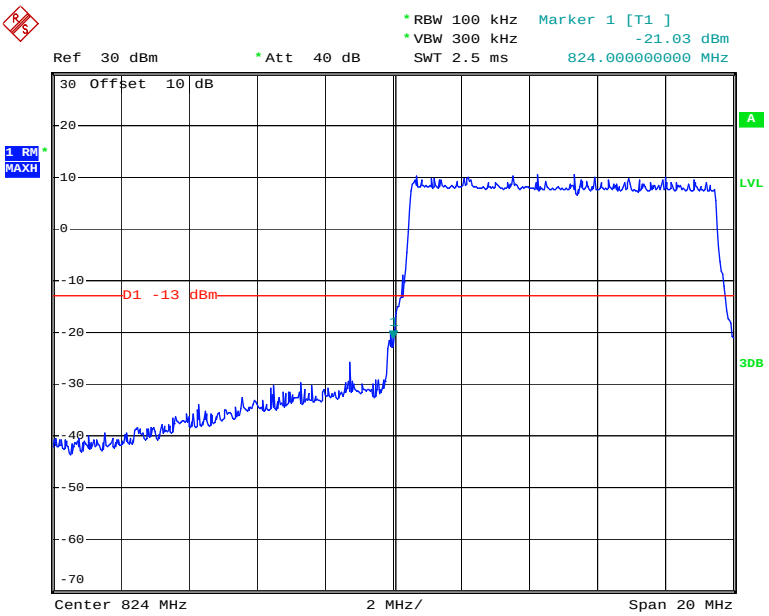
Date: 11.SEP.2017 16:24:10

QPSK_5MHz_ 25 RB_ Right



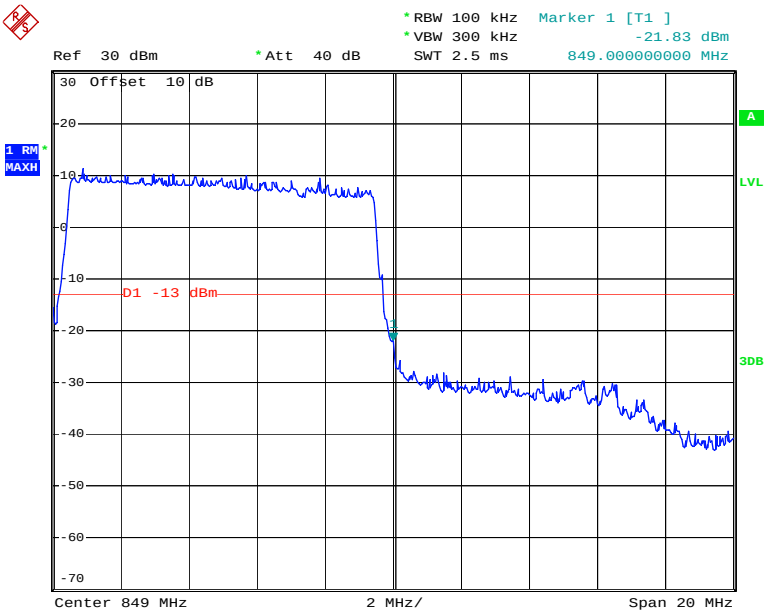
Date: 11.SEP.2017 16:25:31

QPSK_10MHz_ 50 RB_ Left



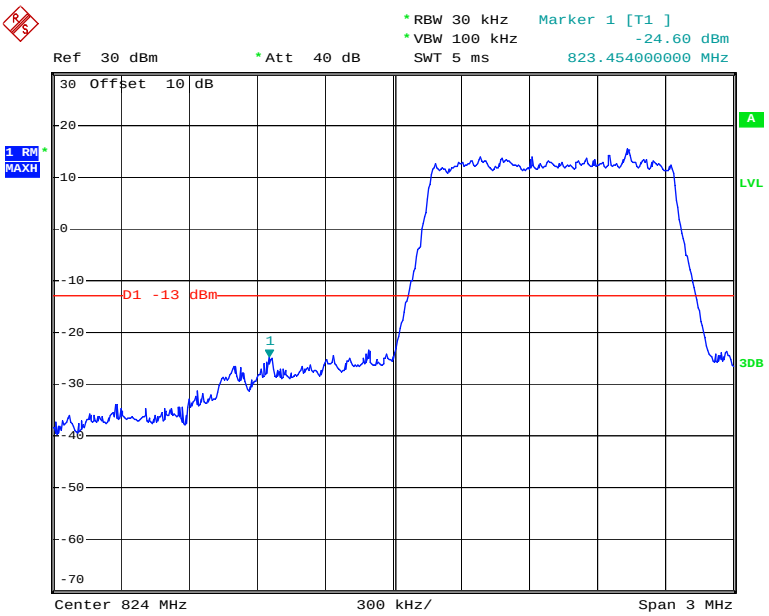
Date: 11.SEP.2017 16:30:41

QPSK_10MHz_ 50 RB_ Right



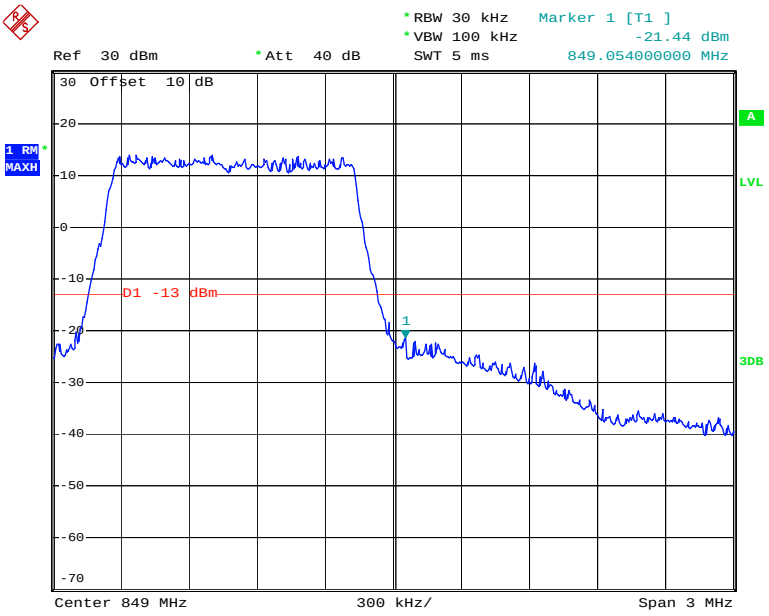
Date: 11.SEP.2017 16:28:37

16QAM_1.4MHz_ 6 RB_ Left



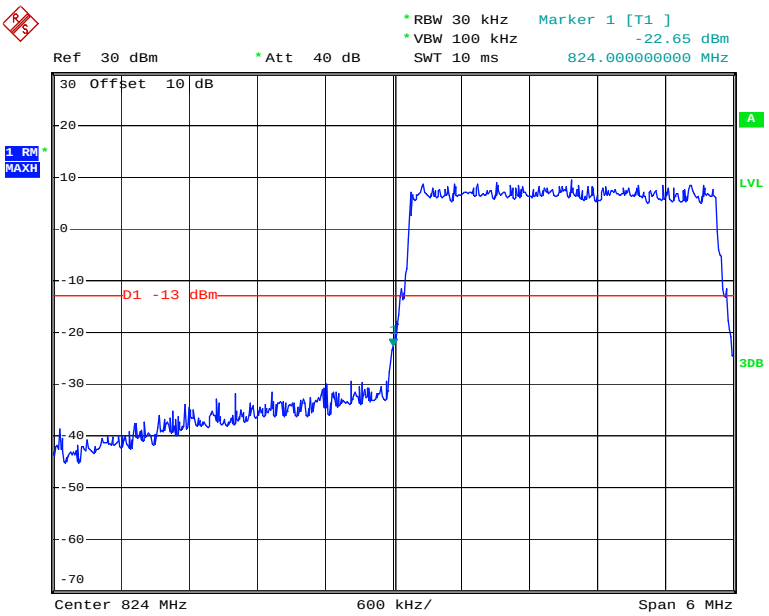
Date: 11.SEP.2017 16:13:49

16QAM_1.4MHz_ 6 RB_ Right



Date: 11.SEP.2017 16:16:58

16QAM_3MHz_ 15 RB_ Left



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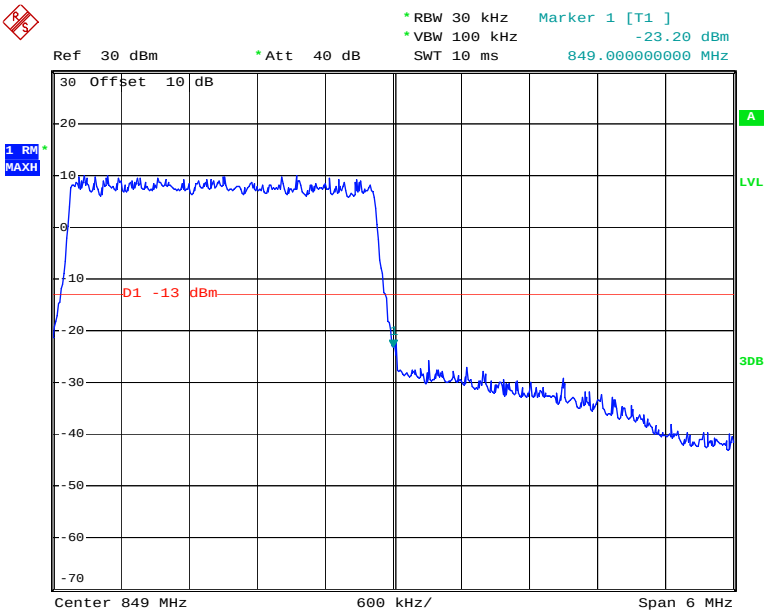
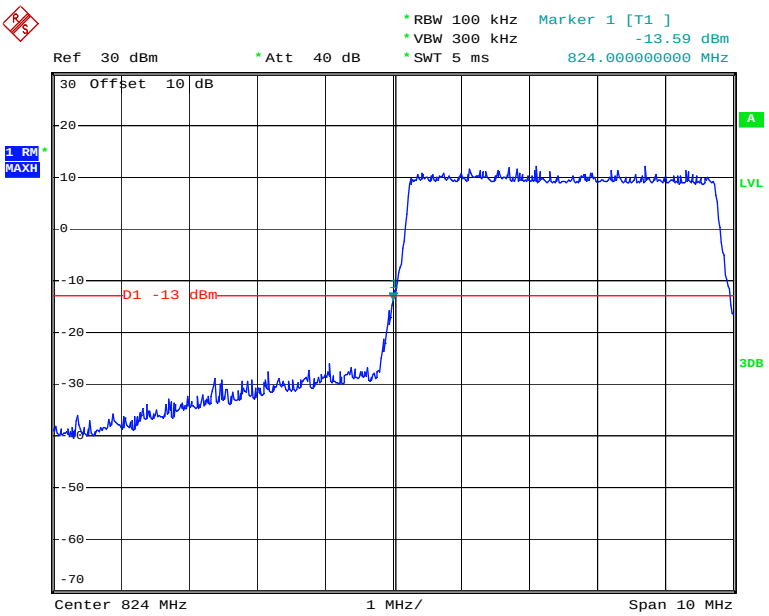
16QAM_3MHz_ 15 RB_ Right



Date: 11.SEP.2017 16:18:54

16QAM_5MHz_ 25 RB_ Left



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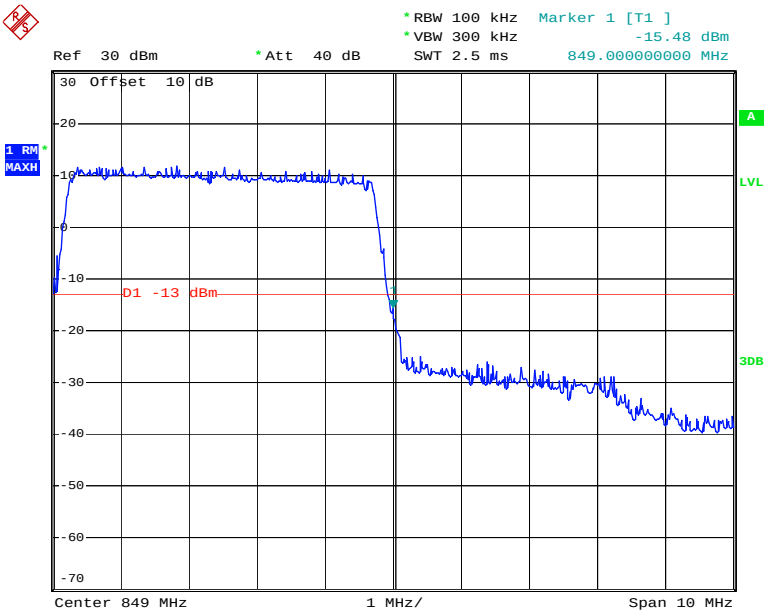
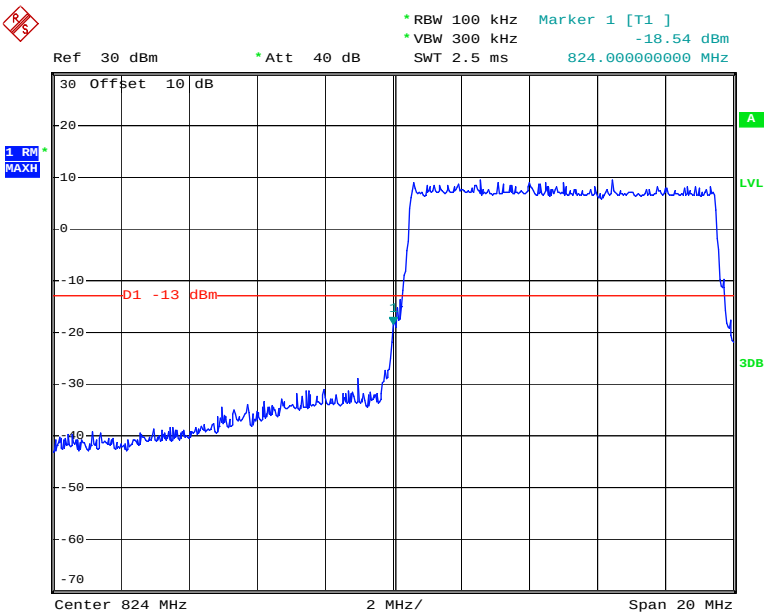
16QAM_5MHz_ 25 RB_ Right



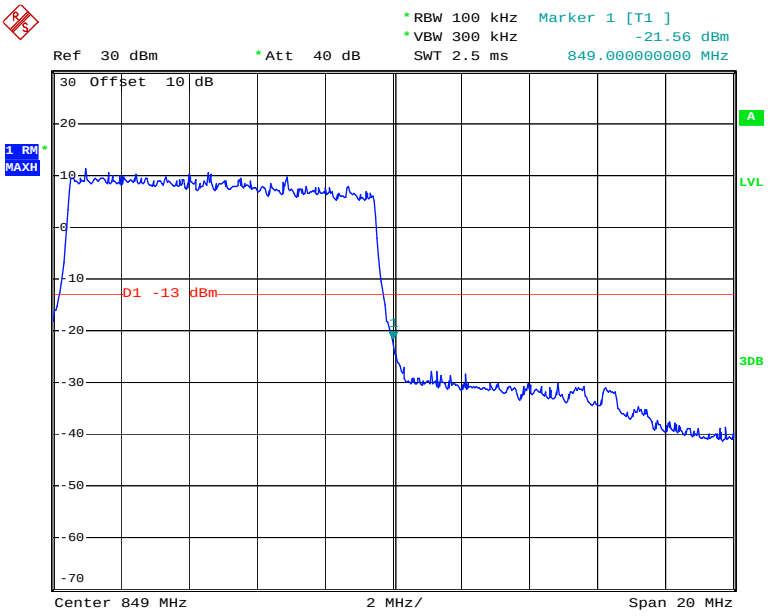
Date: 11.SEP.2017 16:26:08

16QAM_10MHz_ 50 RB_ Left



Date: 11.SEP.2017 16:30:05

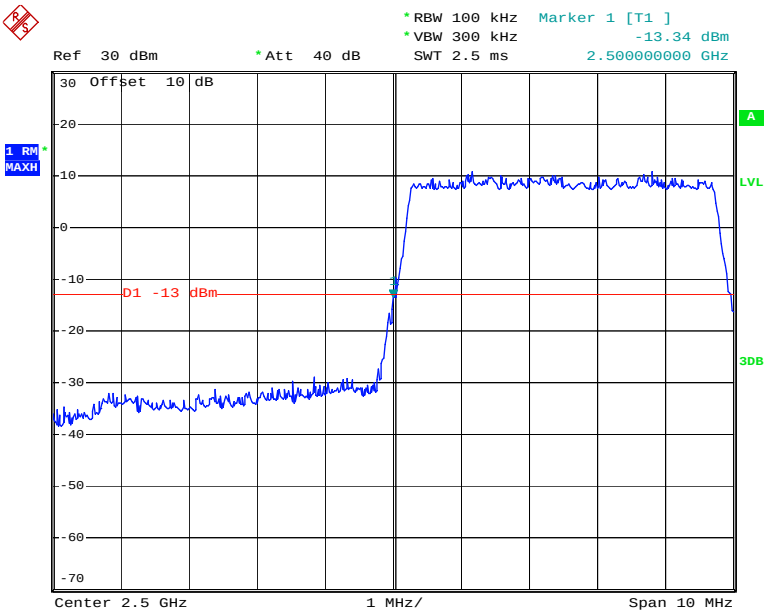
16QAM_10MHz_ 50 RB_ Right



Date: 11.SEP.2017 16:27:39

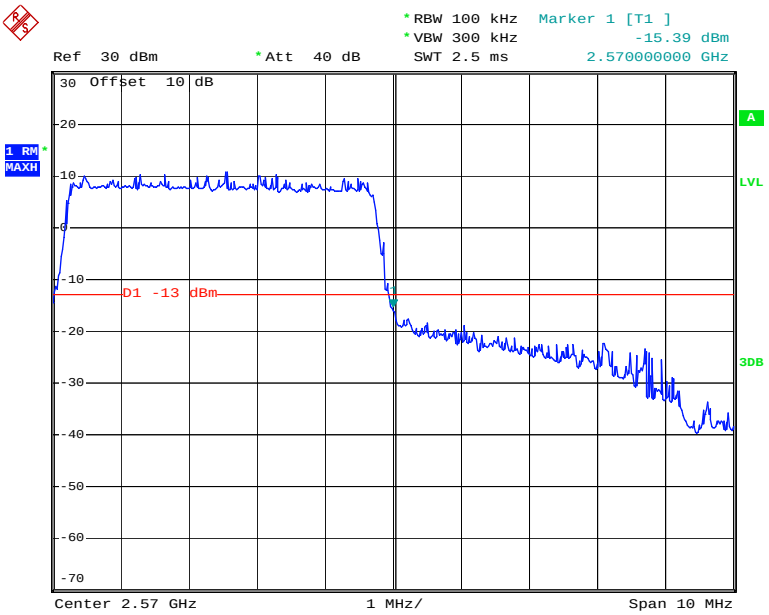
LTE Band VII

QPSK_5MHz_ 25 RB_ Left



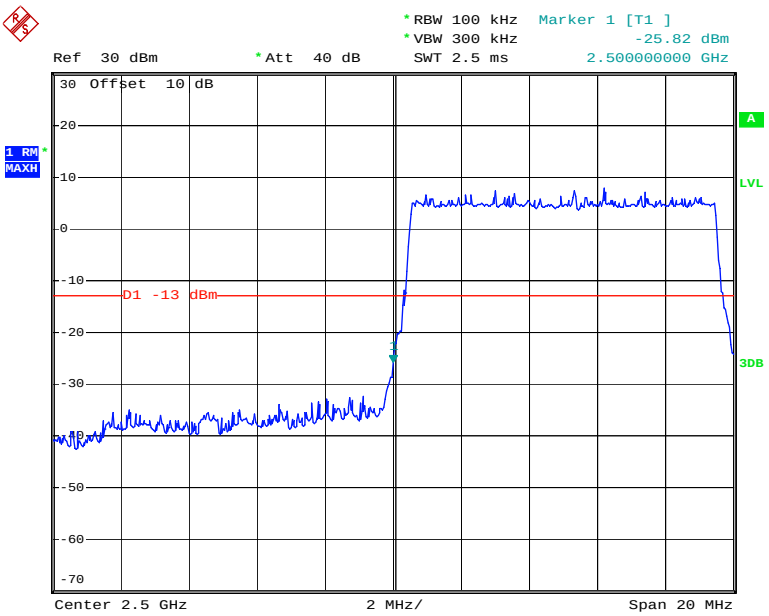
Date: 11.SEP.2017 16:35:44

QPSK_5MHz_ 25 RB_ Right



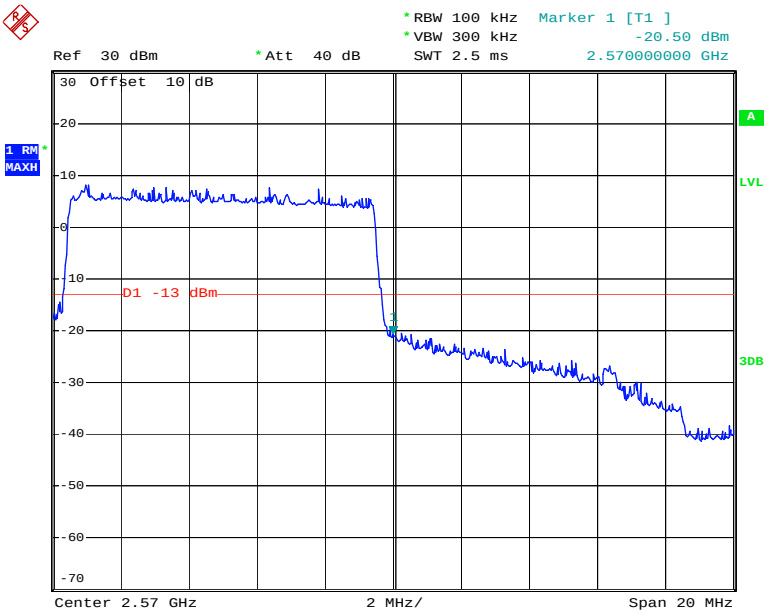
Date: 11.SEP.2017 16:37:26

QPSK_10MHz_ 50 RB_ Left



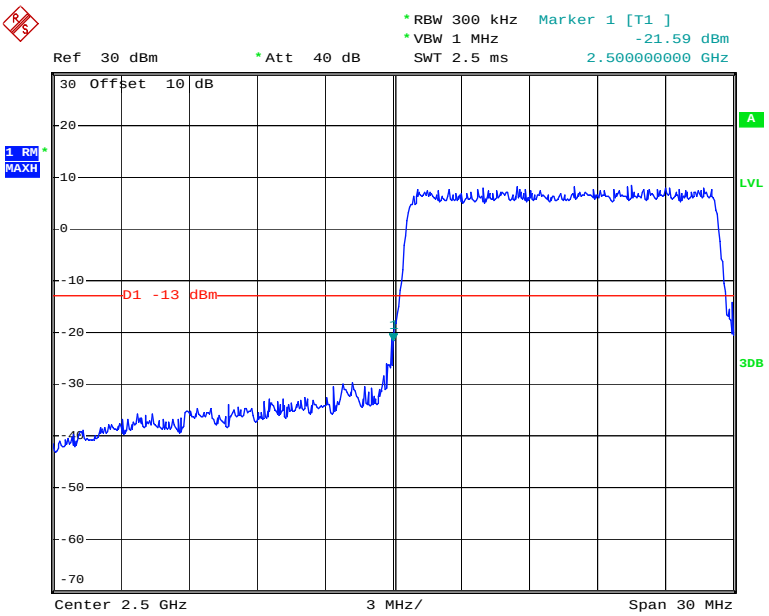
Date: 11.SEP.2017 16:42:22

QPSK_10MHz_ 50 RB_ Right



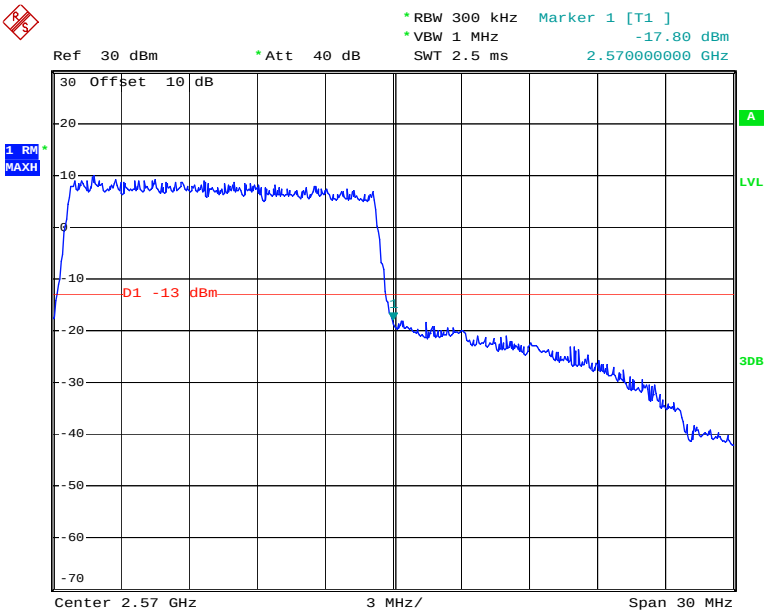
Date: 11.SEP.2017 16:39:30

QPSK_15MHz_ 75 RB_ Left



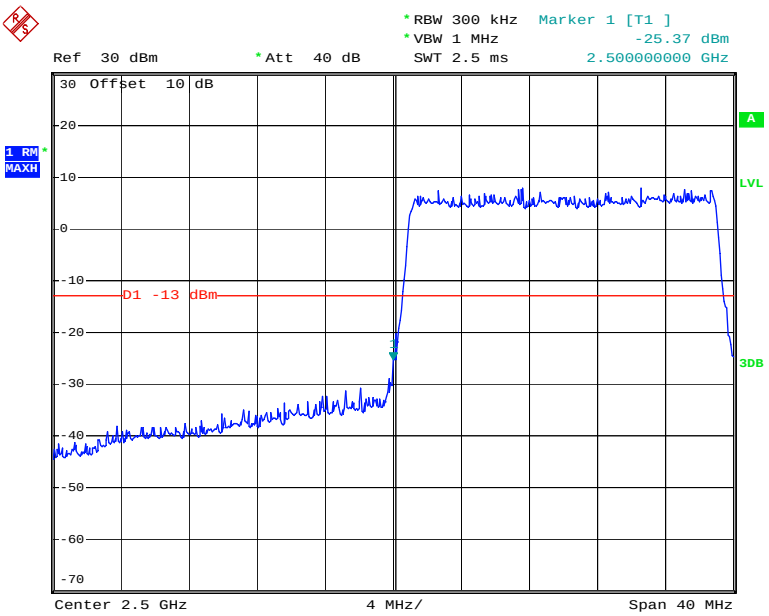
Date: 11.SEP.2017 16:44:47

QPSK_15MHz_ 75 RB_ Right



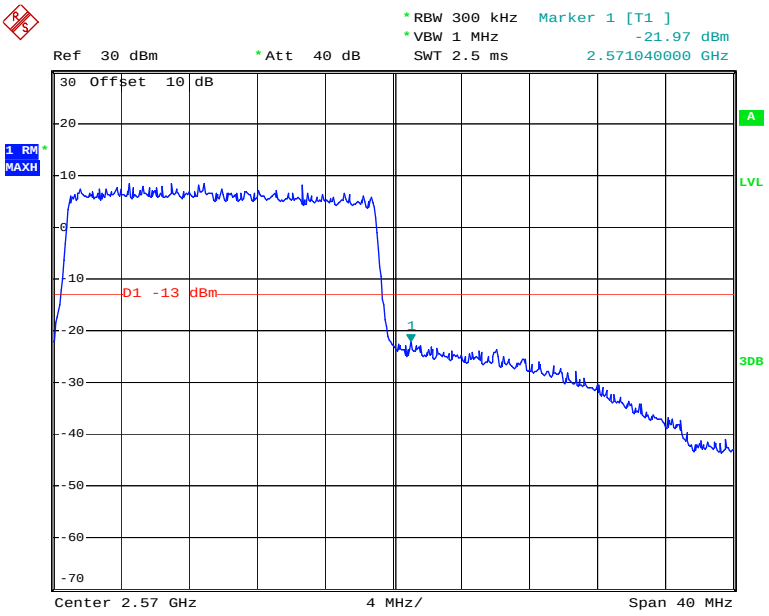
Date: 11.SEP.2017 16:45:38

QPSK_20MHz_ FULL RB_ Left



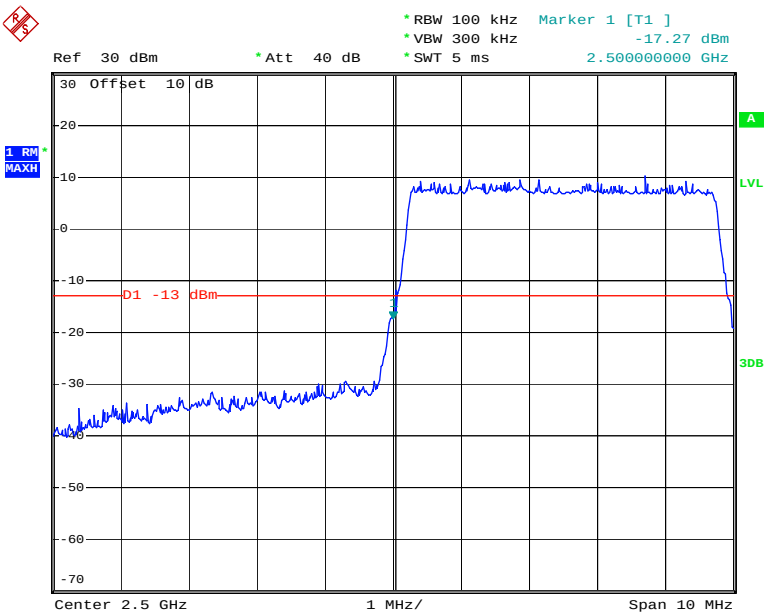
Date: 11.SEP.2017 16:49:59

QPSK_20MHz_ FULL RB_ Right



Date: 11.SEP.2017 16:48:39

16QAM_5MHz_ 25 RB_ Left



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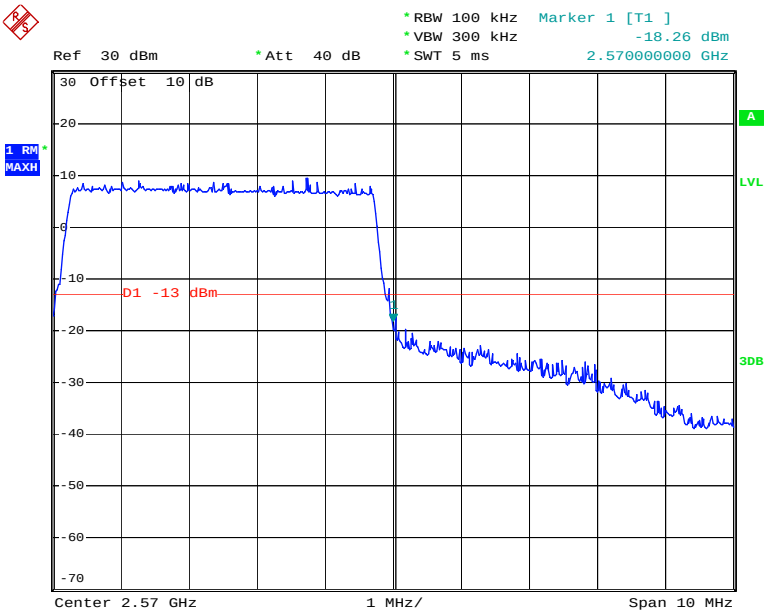
16QAM_5MHz_ 25 RB_ Right



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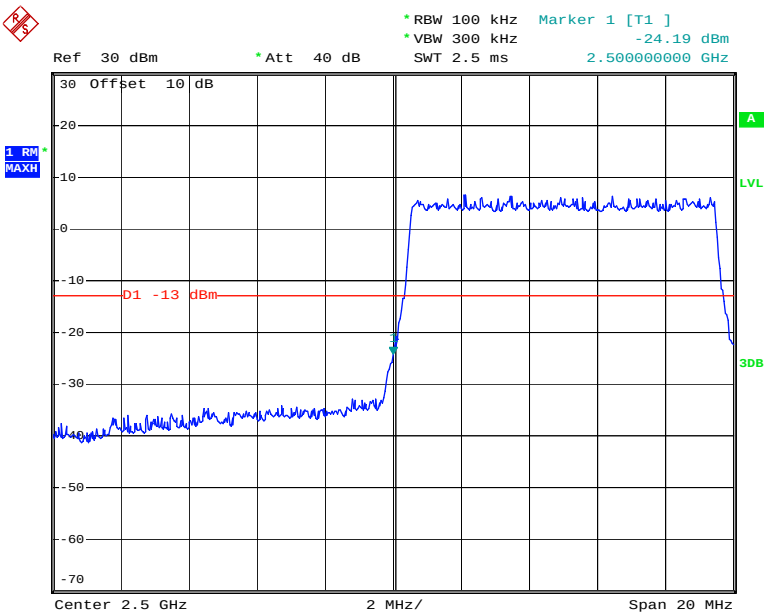
16QAM_10MHz_ 50 RB_ Left



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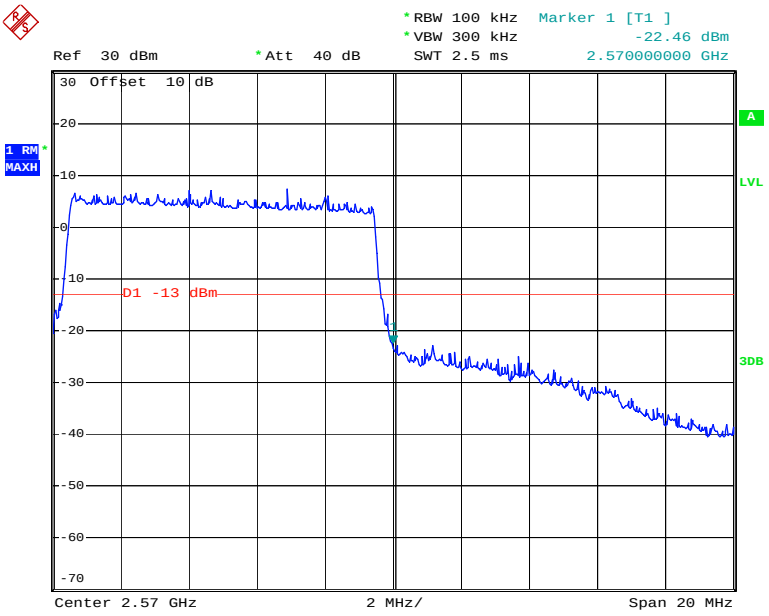
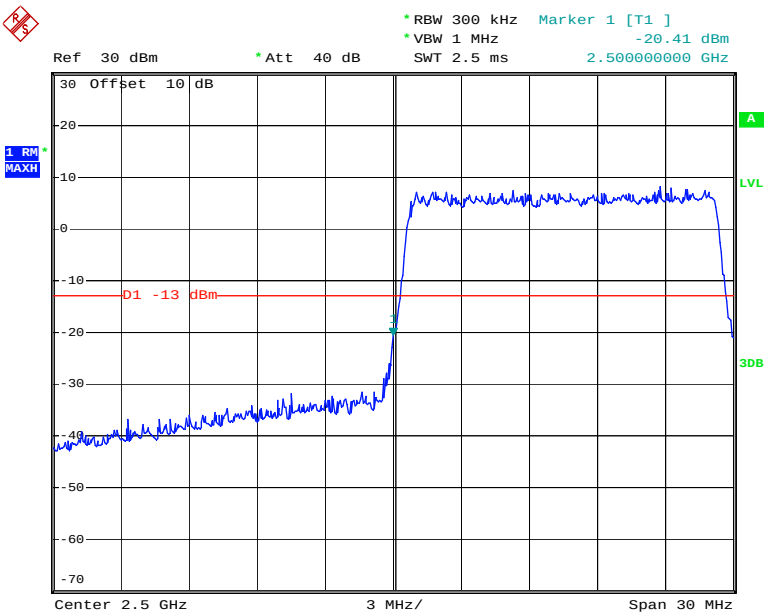
16QAM_10MHz_ 50 RB_ Right



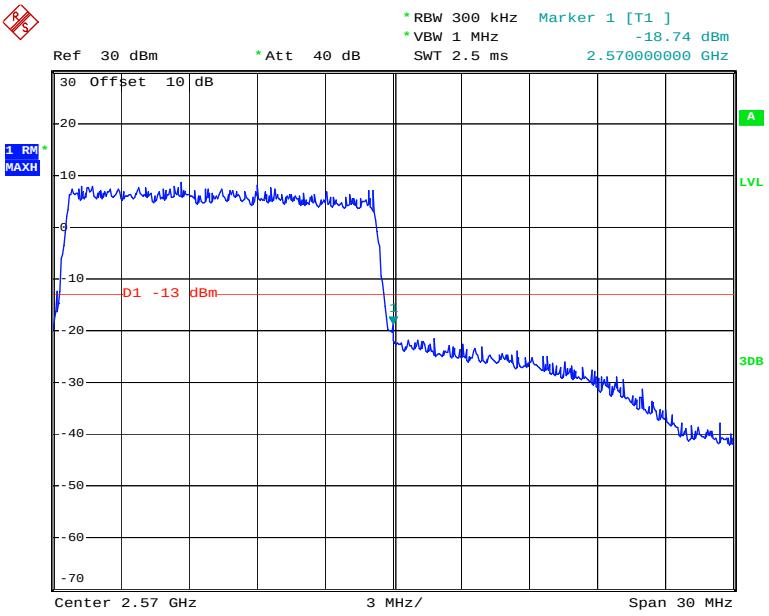
Date: 11.SEP.2017 16:40:16

16QAM_15MHz_ 75 RB_ Left



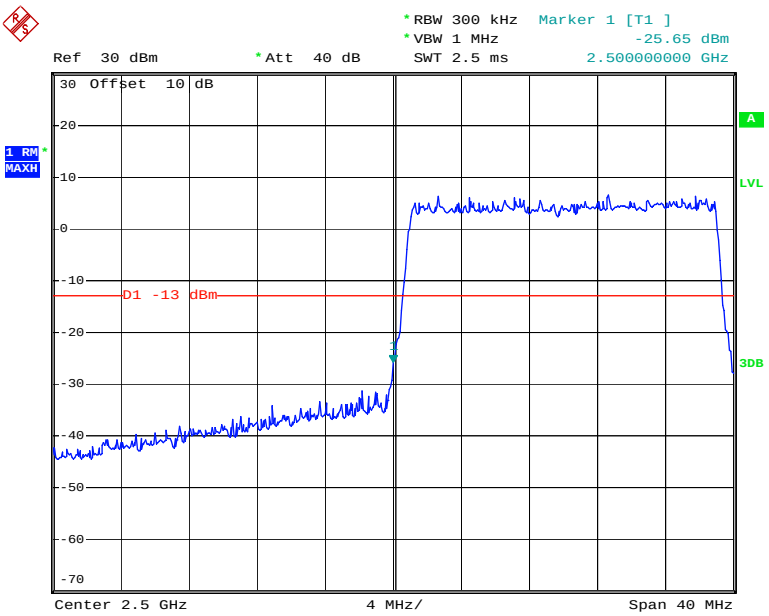
Date: 11.SEP.2017 16:44:17

16QAM_15MHz_ 75 RB_ Right



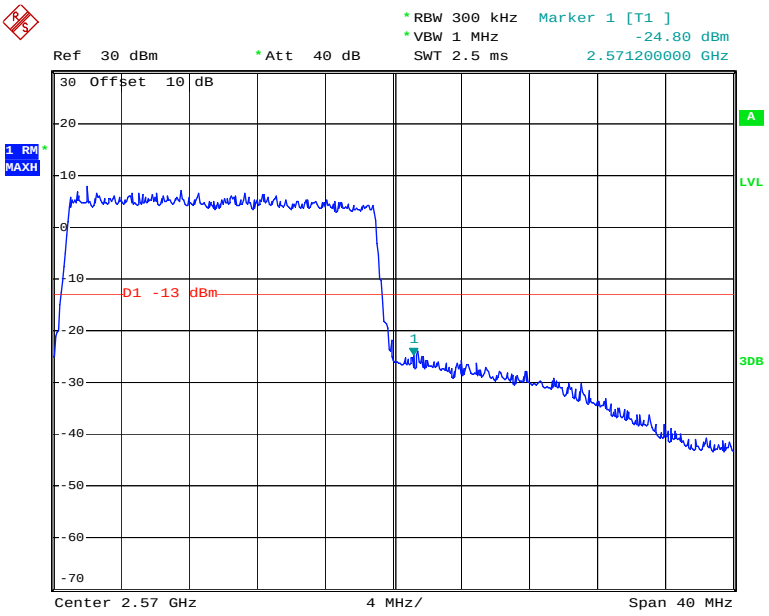
Date: 11.SEP.2017 16:46:18

16QAM_20MHz_ FULL RB_ Left



Date: 11.SEP.2017 16:50:33

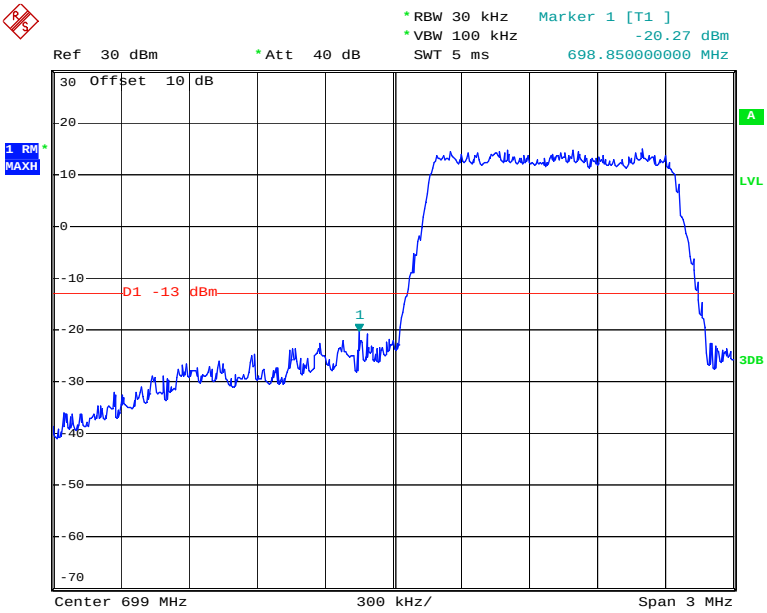
16QAM_20MHz_ FULL RB_ Right



Date: 11.SEP.2017 16:47:54

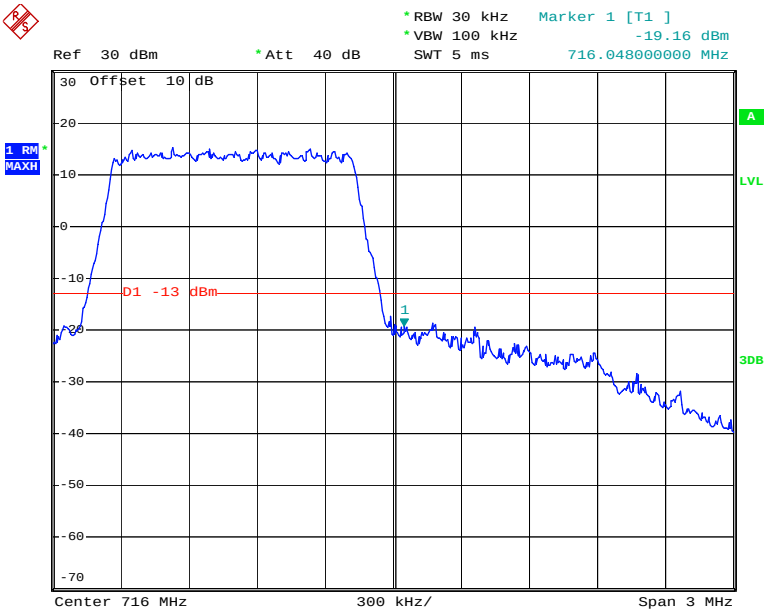
LTE Band XII

QPSK_1.4MHz_ 6 RB_ Left



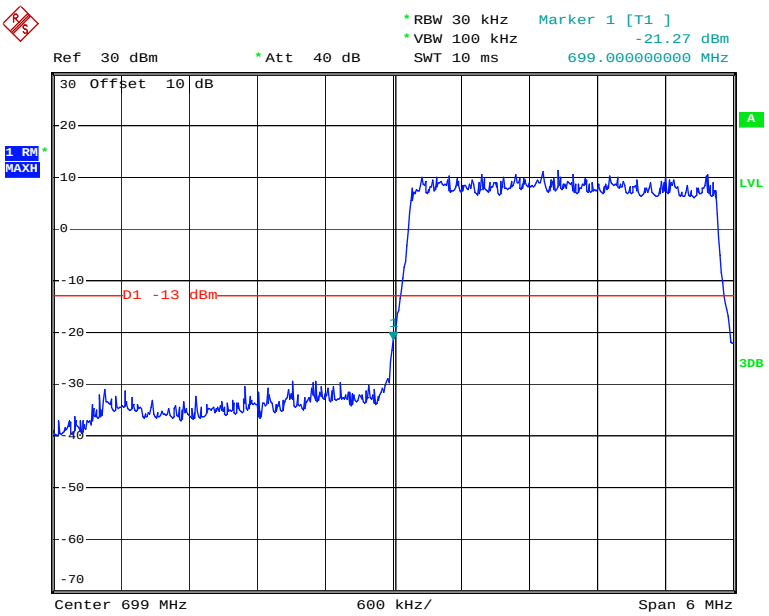
Date: 11.SEP.2017 18:25:22

QPSK_1.4MHz_ 6 RB_ Right



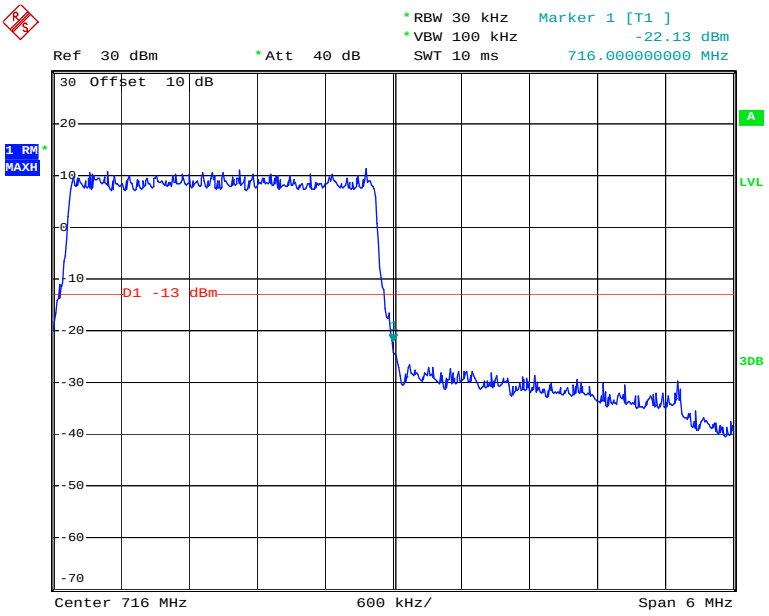
Date: 11.SEP.2017 18:26:54

QPSK_3MHz_ 15 RB_ Left



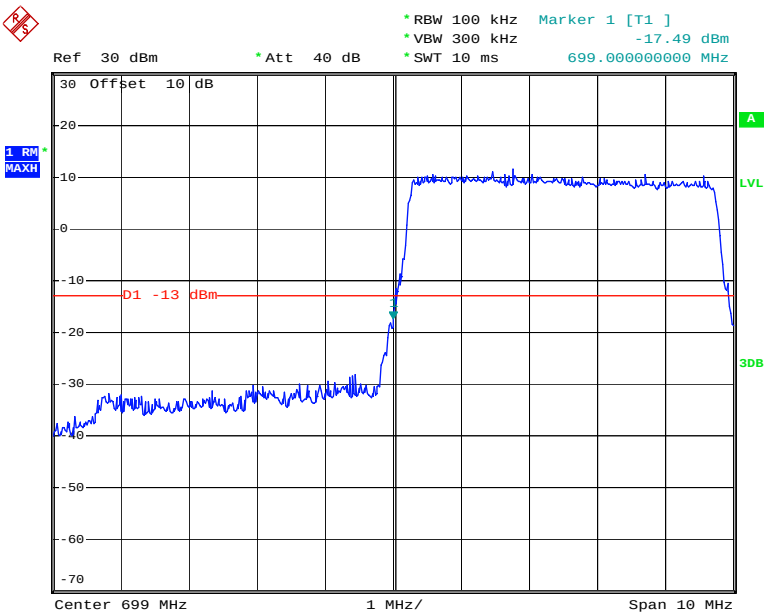
Date: 11.SEP.2017 18:32:10

QPSK_3MHz_ 15 RB_ Right



Date: 11.SEP.2017 18:29:52

QPSK_5MHz_ 25 RB_ Left



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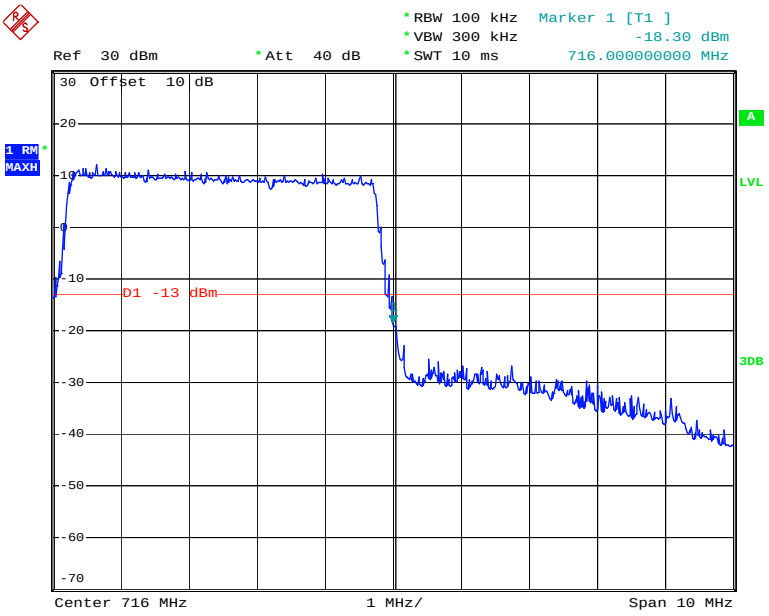
QPSK_5MHz_ 25 RB_ Right



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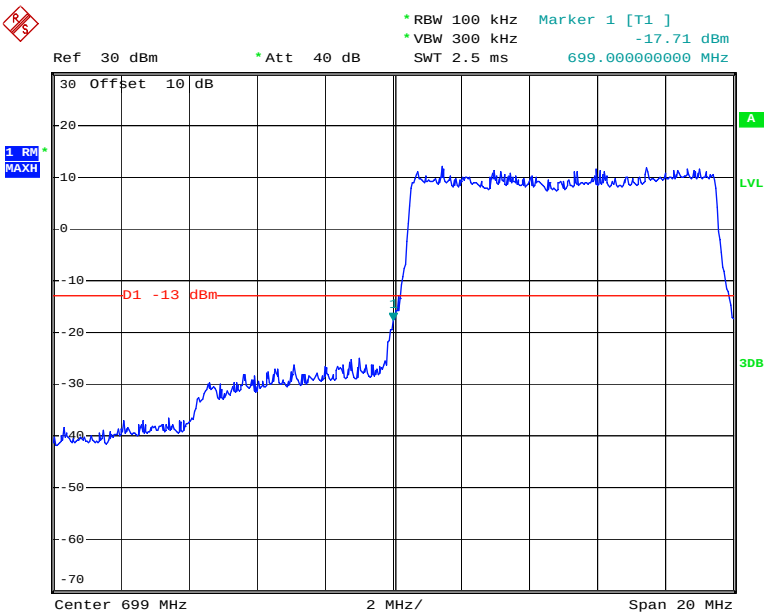
QPSK_10MHz_ 50 RB_ Left



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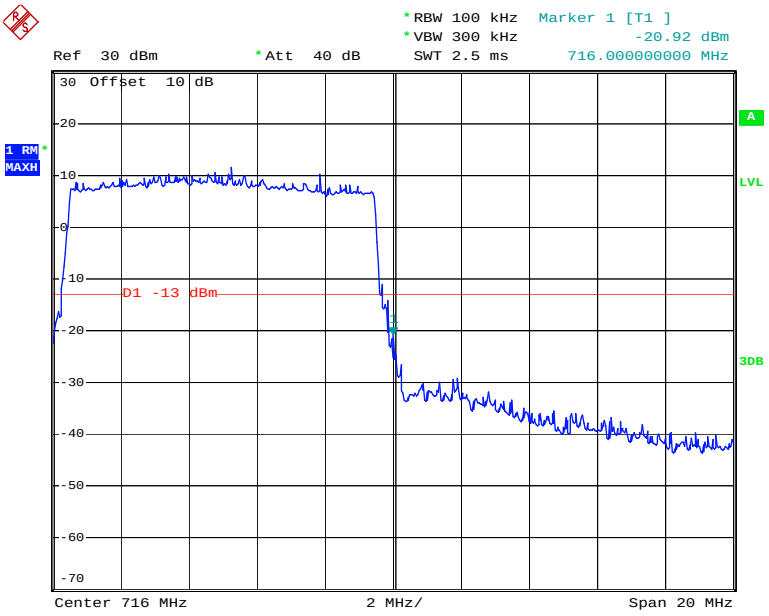
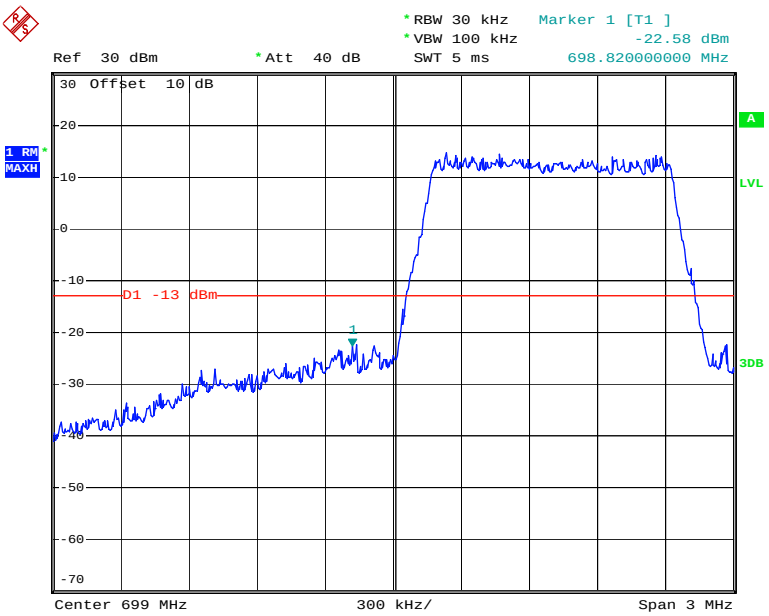
QPSK_10MHz_ 50 RB_ Right



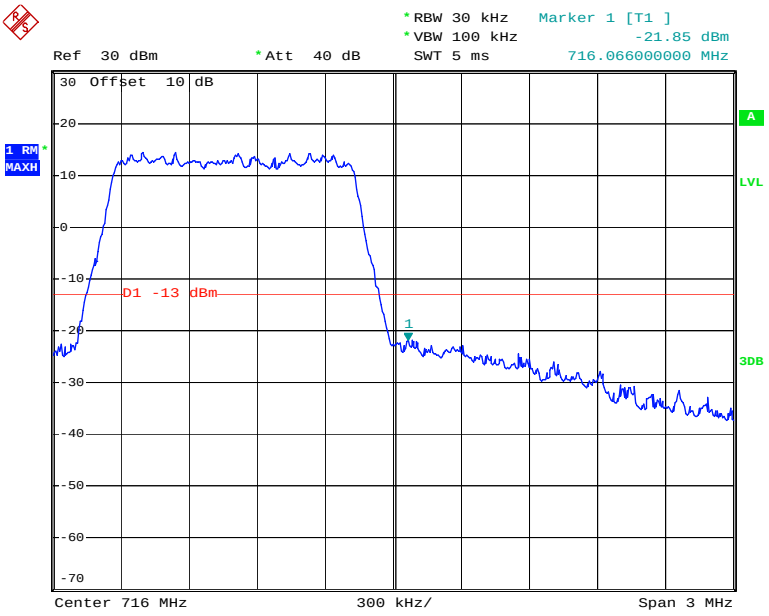
Date: 11.SEP.2017 19:27:33

16QAM_1.4MHz_ 6 RB_ Left



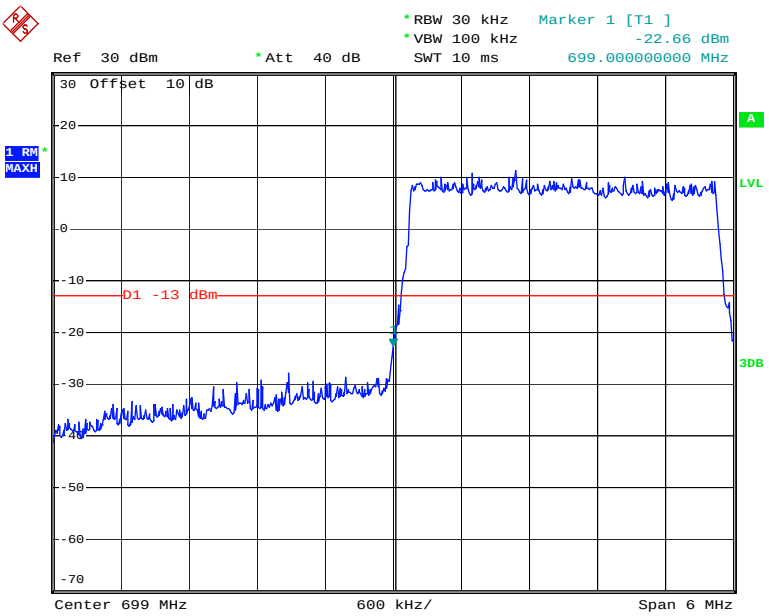
Date: 11.SEP.2017 18:24:54

16QAM_1.4MHz_ 6 RB_ Right



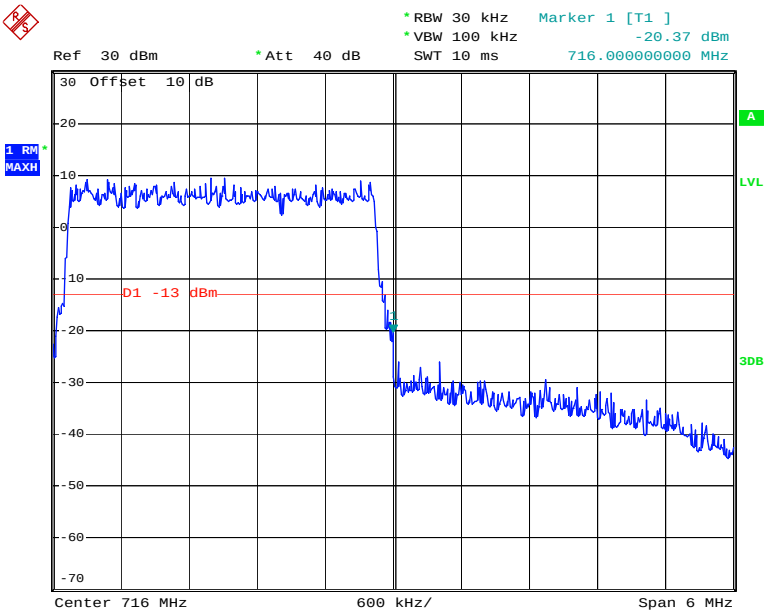
Date: 11.SEP.2017 18:28:00

16QAM_3MHz_ 15 RB_ Left



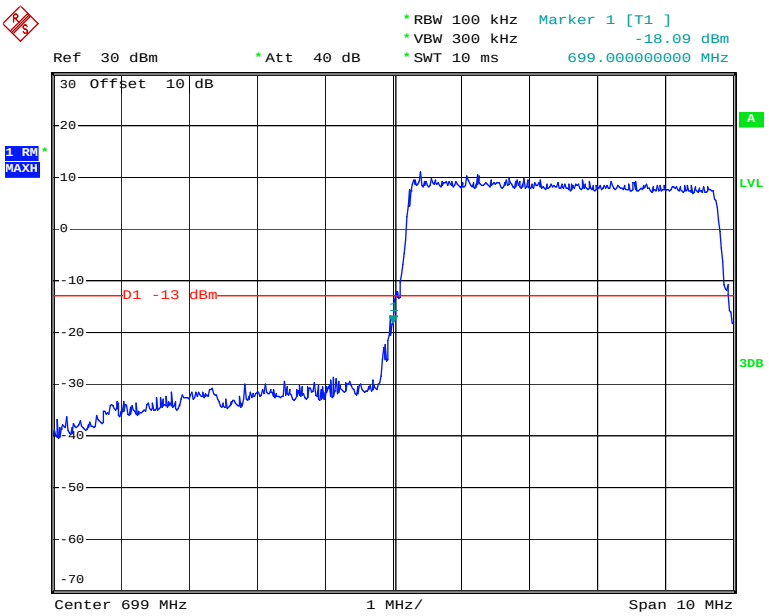
Date: 11.SEP.2017 19:36:10

16QAM_3MHz_ 15 RB_ Right



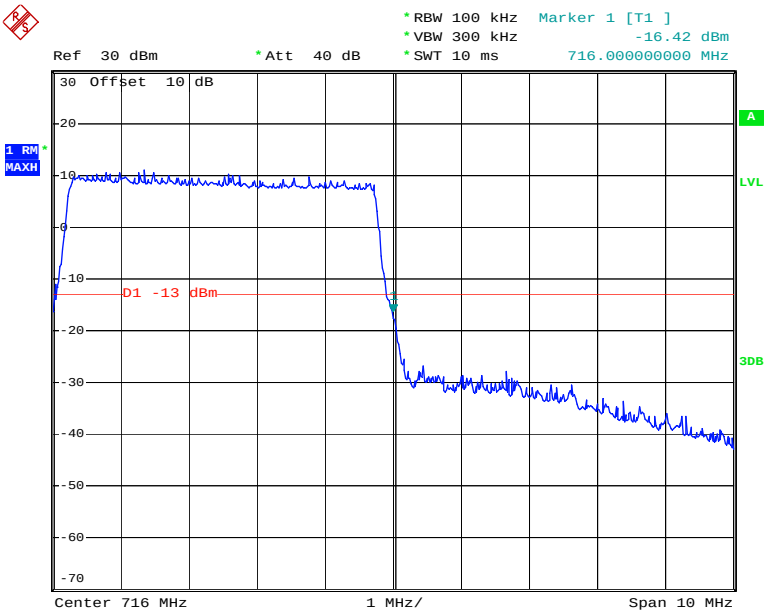
Date: 11.SEP.2017 18:29:15

16QAM_5MHz_ 25 RB_ Left



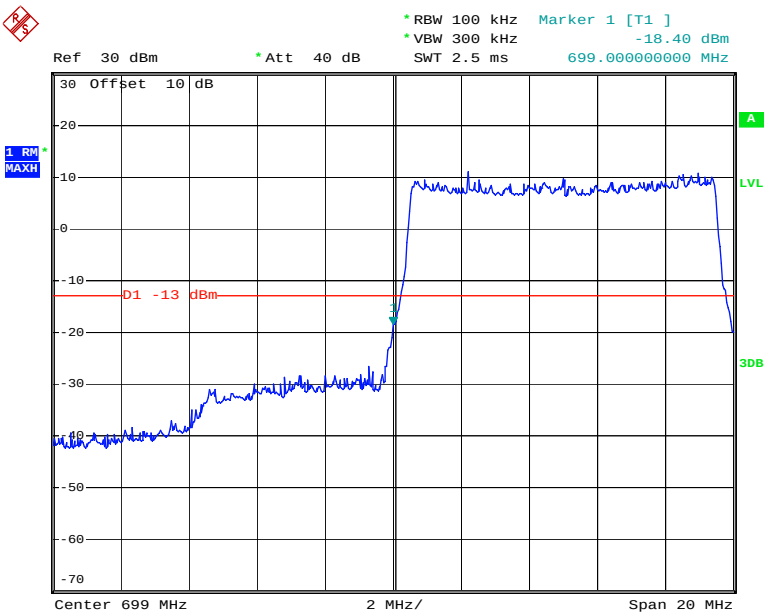
Date: 11.SEP.2017 19:21:03

16QAM_5MHz_ 25 RB_ Right



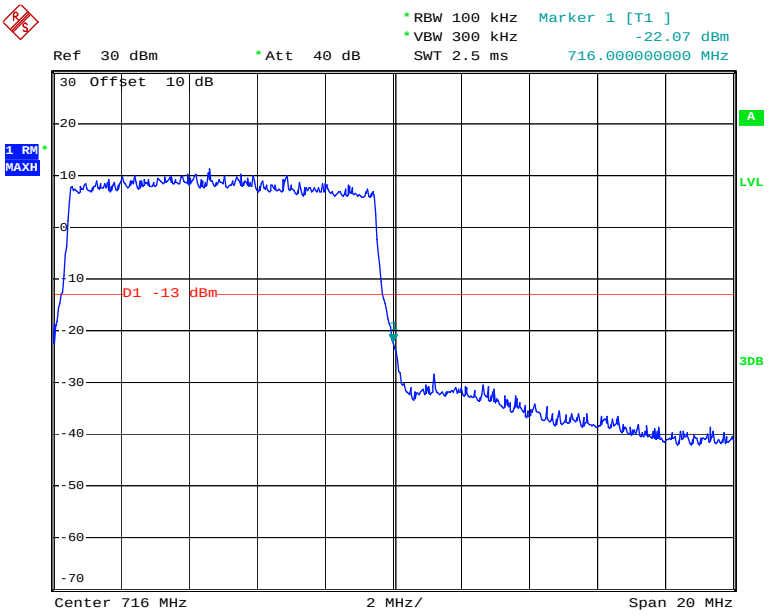
Date: 11.SEP.2017 19:25:35

16QAM_10MHz_ 50 RB_ Left



Date: 11.SEP.2017 19:29:33

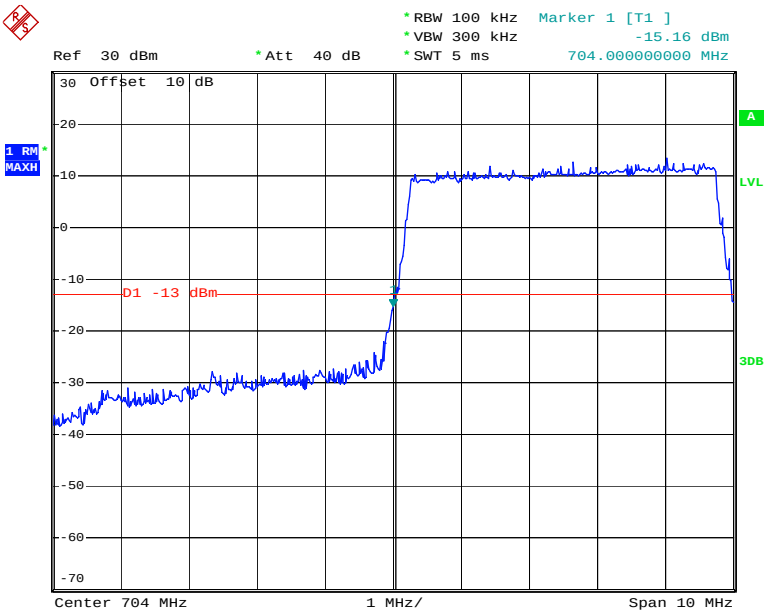
16QAM_10MHz_ 50 RB_ Right



Date: 11.SEP.2017 19:26:52

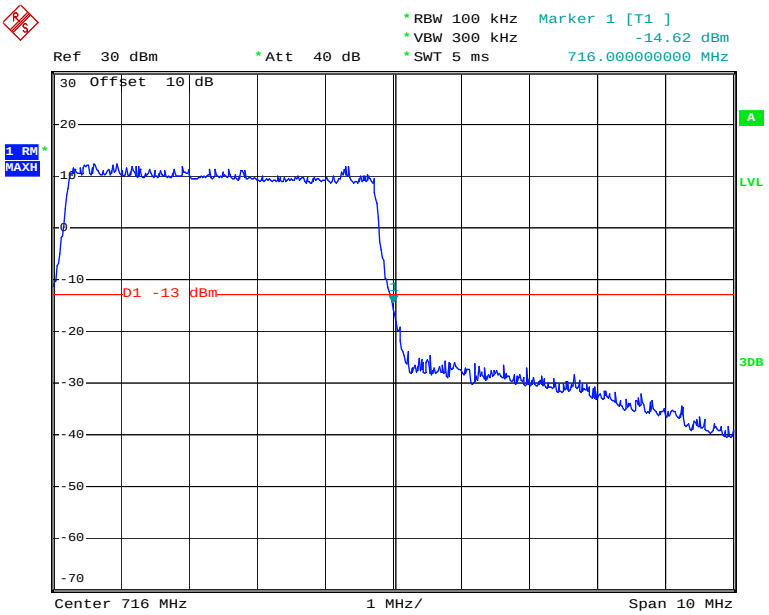
LTE Band XVII

QPSK_5MHz_ 25 RB_ Left



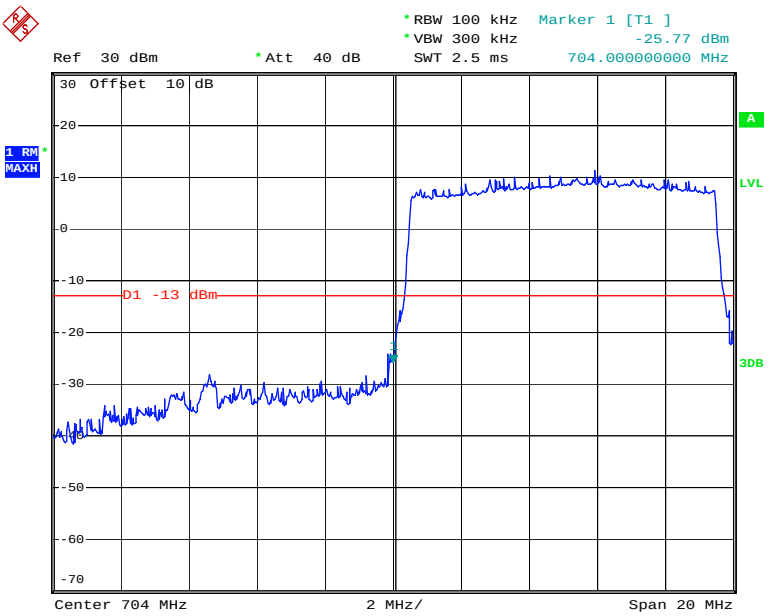
Date: 11.SEP.2017 18:09:05

QPSK_5MHz_ 25 RB_ Right



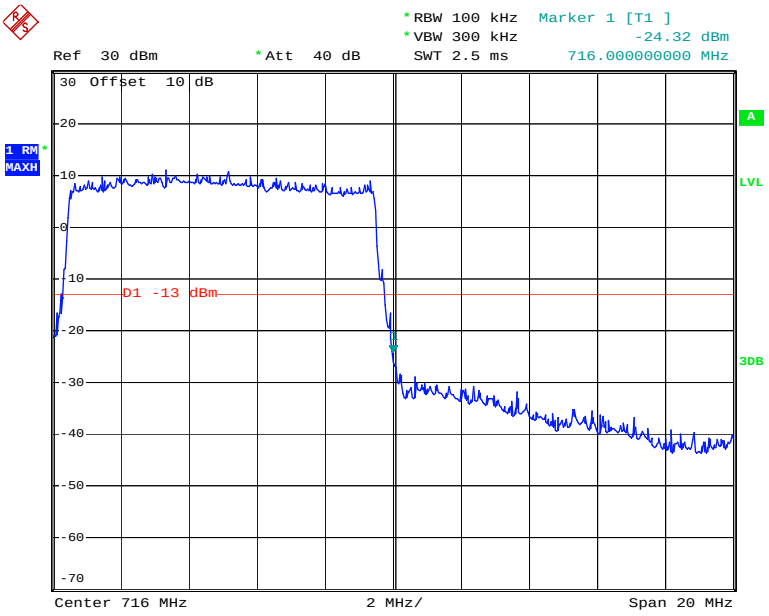
Date: 11.SEP.2017 18:12:23

QPSK_10MHz_ 50 RB_ Left



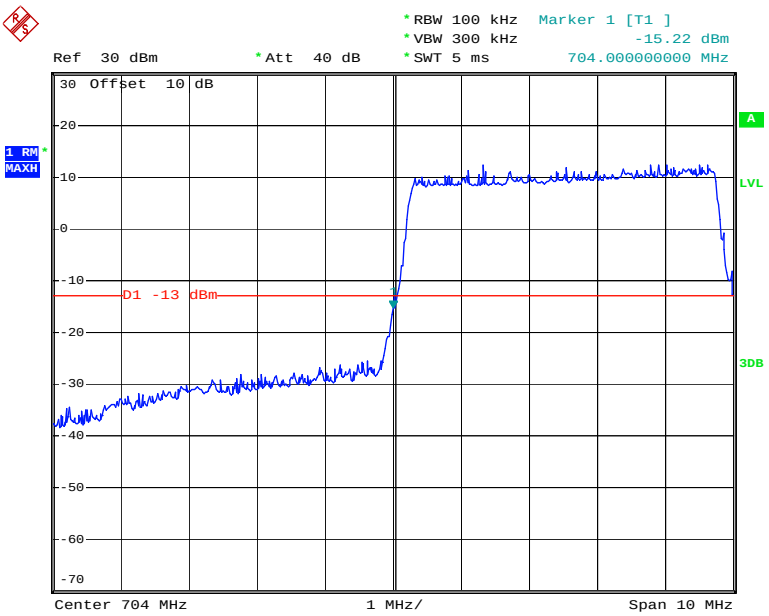
Date: 11.SEP.2017 18:15:56

QPSK_10MHz_ 50 RB_ Right



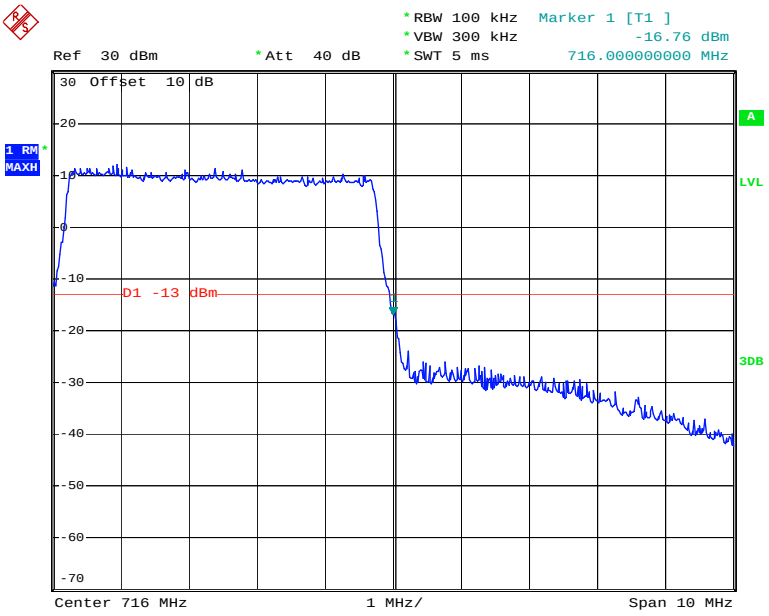
Date: 11.SEP.2017 18:13:17

16QAM_5MHz_ 25 RB_ Left



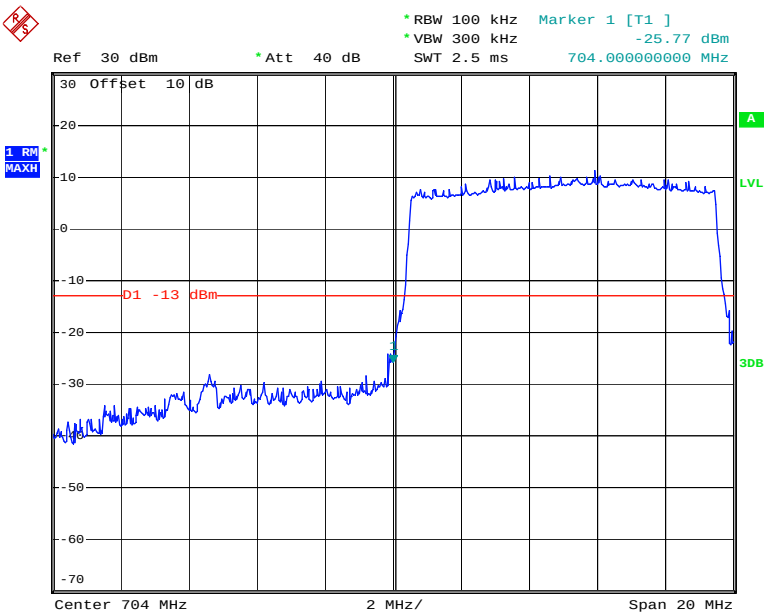
Date: 11.SEP.2017 18:10:34

16QAM_5MHz_ 25 RB_ Right



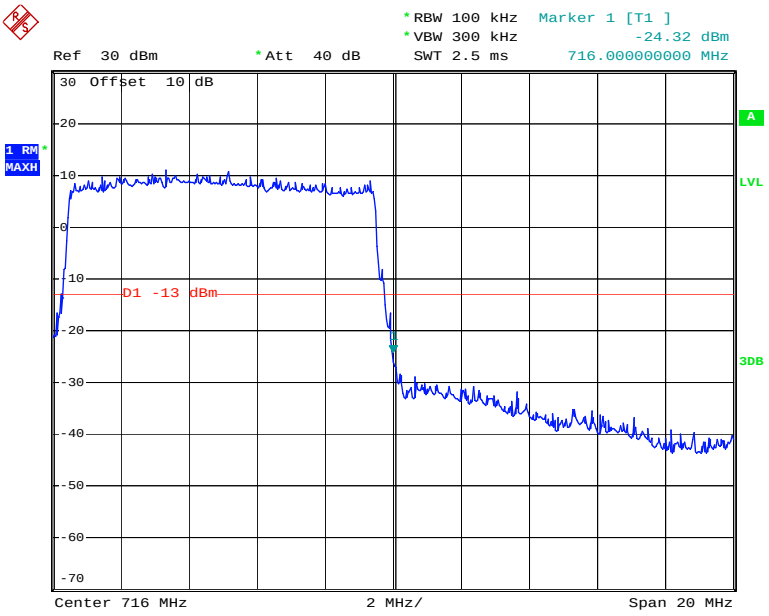
Date: 11.SEP.2017 18:11:59

16QAM_10MHz_ 50 RB_ Left



Date: 11.SEP.2017 18:15:56

16QAM_10MHz_ 50 RB_ Right



Date: 11.SEP.2017 18:13:17

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

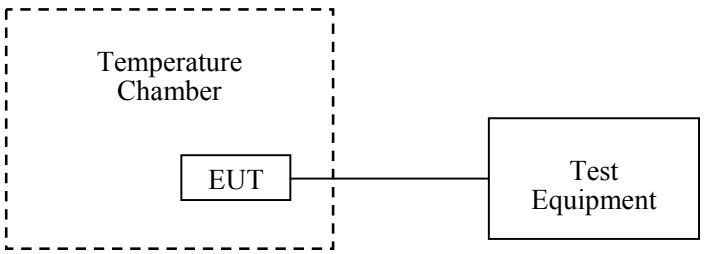
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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	2017-04-02	2018-04-02
Unknown	Coaxial Cable	0.1m	C-1	Each Time	/
Unknown	RF Attenuator	6dB	6dB-1	Each Time	/
Pro instrument	DC Power Supply	pps3300	N/A	N/A	N/A

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

Test Data

Environmental Conditions

Temperature:	29 °C
Relative Humidity:	52 %
ATM Pressure:	100.4 kPa

The testing was performed by Swim Lv & Nami Quan on 2017-09-11.

Cellular Band (Part 22H)

GMSK, Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	30	0.036	2.5
-20		20	0.024	
-10		-8	-0.010	
0		3	0.004	
10		6	0.007	
20		13	0.016	
30		13	0.016	
40		9	0.011	
50		27	0.032	
25	3.6	16	0.019	
25	4.35	11	0.013	

8PSK, Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Limit**
℃	**V_{DC}**	**Hz**	**ppm**	**ppm**
-30	3.8	-6	-0.007	2.5
-20		-11	-0.013	
-10		4	0.005	
0		13	0.016	
10		17	0.020	
20		8	0.010	
30		3	0.004	
40		-9	-0.011	
50		16	0.019	
25	3.6	10	0.012	
25	4.35	14	0.017	

PCS Band (Part 24E)

GMSK, Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	15	0.008	Pass
-20		39	0.021	
-10		34	0.018	
0		25	0.013	
10		20	0.011	
20		18	0.010	
30		31	0.016	
40		40	0.021	
50		44	0.023	
25	3.6	36	0.019	
25	4.35	24	0.013	

8PSK, Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	11	0.006	Pass
-20		48	0.026	
-10		20	0.011	
0		15	0.008	
10		9	0.005	
20		26	0.014	
30		11	0.006	
40		9	0.005	
50		43	0.023	
25	3.6	34	0.018	
25	4.35	29	0.015	

WCDMA Band II: R99

Middle Channel, f_c = 1880.0 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	2	0.001	Pass
-20		-7	-0.004	
-10		-12	-0.006	
0		-5	-0.003	
10		3	0.002	
20		-3	-0.002	
30		4	0.002	
40		5	0.003	
50		8	0.004	
25	3.6	-7	-0.004	
25	4.35	-5	-0.003	

WCDMA Band Ⅴ: R99

Middle Channel, f_c = 836.6 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Results**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	5	0.006	Pass
-20		2	0.002	
-10		-6	-0.007	
0		-4	-0.005	
10		9	0.011	
20		10	0.012	
30		-10	-0.012	
40		-5	-0.006	
50		-6	-0.007	
25	3.6	-5	-0.006	
25	4.35	-8	-0.010	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-5.12	-0.0027	Pass
-20		-5.26	-0.0028	Pass
-10		-6.12	-0.0033	Pass
0		-4.15	-0.0022	Pass
10		-3.12	-0.0017	Pass
20		-6.69	-0.0036	Pass
30		-6.26	-0.0033	Pass
40		-6.41	-0.0034	Pass
50		-6.31	-0.0034	Pass
25	3.6	-5.21	-0.0028	Pass
25	4.35	-5.14	-0.0027	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =1880 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-6.12	-0.0033	Pass
-20		-4.15	-0.0022	Pass
-10		-6.31	-0.0034	Pass
0		-5.21	-0.0028	Pass
10		-5.14	-0.0027	Pass
20		-3.65	-0.0019	Pass
30		-3.02	-0.0016	Pass
40		-4.12	-0.0022	Pass
50		-3.24	-0.0017	Pass
25	3.6	-3.34	-0.0018	Pass
25	4.35	-5.04	-0.0027	Pass

LTE Band 4:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	0.39	0.0002	Pass
-20		0.12	0.0001	Pass
-10		0.45	0.0003	Pass
0		0.62	0.0004	Pass
10		-0.02	0.0000	Pass
20		0.73	0.0004	Pass
30		0.62	0.0004	Pass
40		0.34	0.0002	Pass
50		0.51	0.0003	Pass
25	3.6	-0.03	0.0000	Pass
25	4.35	-0.09	-0.0001	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =1732.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	0.34	0.0002	Pass
-20		0.52	0.0003	Pass
-10		-0.03	0.0000	Pass
0		-0.12	-0.0001	Pass
10		-0.31	-0.0002	Pass
20		0.93	0.0005	Pass
30		0.15	0.0001	Pass
40		0.45	0.0003	Pass
50		0.62	0.0004	Pass
25	3.6	-0.02	0.0000	Pass
25	4.35	0.21	0.0001	Pass

LTE Band 5:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 836.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-1.11	-0.0013	Pass
-20		-1.02	-0.0012	Pass
-10		-1.21	-0.0014	Pass
0		0.21	0.0003	Pass
10		0.12	0.0001	Pass
20		-0.93	-0.0011	Pass
30		-0.86	-0.0010	Pass
40		-0.46	-0.0005	Pass
50		-0.68	-0.0008	Pass
25	3.6	-0.82	-0.0010	Pass
25	4.35	-0.16	-0.0002	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =836.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-1.34	-0.0016	Pass
-20		-1.51	-0.0018	Pass
-10		-0.12	-0.0001	Pass
0		-1.31	-0.0016	Pass
10		-1.01	-0.0012	Pass
20		-1.37	-0.0016	Pass
30		0.52	0.0006	Pass
40		-0.03	0.0000	Pass
50		-0.12	-0.0001	Pass
25	3.6	-0.31	-0.0004	Pass
25	4.35	0.32	0.0004	Pass

LTE Band 7:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 2535 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-3.42	-0.0013	Pass
-20		-2.15	-0.0008	Pass
-10		-3.65	-0.0014	Pass
0		-4.02	-0.0016	Pass
10		-4.12	-0.0016	Pass
20		-3.71	-0.0015	Pass
30		-3.16	-0.0012	Pass
40		-3.02	-0.0012	Pass
50		-4.02	-0.0016	Pass
25	3.6	-2.15	-0.0008	Pass
25	4.35	-3.52	-0.0014	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =2535 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-3.14	-0.0012	Pass
-20		-3.02	-0.0012	Pass
-10		-4.02	-0.0016	Pass
0		-2.16	-0.0009	Pass
10		-2.01	-0.0008	Pass
20		-3.71	-0.0015	Pass
30		-3.01	-0.0012	Pass
40		-2.15	-0.0008	Pass
50		-3.65	-0.0014	Pass
25	3.6	-4.02	-0.0016	Pass
25	4.35	-3.21	-0.0013	Pass

LTE Band 12:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 707.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-0.26	-0.0004	Pass
-20		-1.02	-0.0014	Pass
-10		-1.20	-0.0017	Pass
0		-0.62	-0.0009	Pass
10		-0.72	-0.0010	Pass
20		-0.77	-0.0011	Pass
30		-1.11	-0.0016	Pass
40		-1.15	-0.0016	Pass
50		-1.03	-0.0015	Pass
25	3.6	-1.34	-0.0019	Pass
25	4.35	-1.03	-0.0015	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c =707.5 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-2.12	-0.0030	Pass
-20		-1.03	-0.0015	Pass
-10		-1.34	-0.0019	Pass
0		-0.71	-0.0010	Pass
10		-0.76	-0.0011	Pass
20		-0.82	-0.0012	Pass
30		-0.86	-0.0012	Pass
40		-1.02	-0.0014	Pass
50		-1.22	-0.0017	Pass
25	3.6	-0.62	-0.0009	Pass
25	4.35	-2.31	-0.0033	Pass

LTE Band 17:

QPSK, Channel Bandwidth:10MHz Middle Channel, f_c = 710 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-2.12	-0.0030	Pass
-20		-1.02	-0.0014	Pass
-10		-1.14	-0.0016	Pass
0		-1.24	-0.0017	Pass
10		-1.01	-0.0014	Pass
20		-0.94	-0.0013	Pass
30		-1.03	-0.0015	Pass
40		-1.21	-0.0017	Pass
50		-1.01	-0.0014	Pass
25	3.6	-1.23	-0.0017	Pass
25	4.35	-1.14	-0.0016	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, f_c = 710 MHz				
Temperature	**Voltage**	**Frequency Error**	**Frequency Error**	**Result**
℃	**V_{DC}**	**Hz**	**ppm**	
-30	3.8	-1.24	-0.0017	Pass
-20		-1.43	-0.0020	Pass
-10		-2.10	-0.0030	Pass
0		-1.05	-0.0015	Pass
10		-1.30	-0.0018	Pass
20		-0.86	-0.0012	Pass
30		-0.95	-0.0013	Pass
40		0.52	0.0007	Pass
50		-0.03	0.0000	Pass
25	3.6	-0.12	-0.0002	Pass
25	4.35	-0.31	-0.0004	Pass

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

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