



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-BL5000

Report Type: Original Report	Product Type: Mobile phone
Report Number:	<u>RDG170929012-00D</u>
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.(Dongguan).

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Shenzhen KVD Communication Equipment*'s product, model number: **BL5000** (**FCC ID: 2ADTE-BL5000**) (the "EUT") in this report was a **Mobile phone**, which was measured approximately: 15.5 cm (L) x 7.7 cm (W) x 1.1 cm (H), rated input voltage:DC 3.8V from battery or DC 5.0V/7.0V/9.0V/12V from adapter.

Adapter Information:

Model:HJ-FC016K7-US

Input: 100-240V~50/60Hz 0.6A

*Output: DC5.0V, 3000mA/DC7.0V, 3000mA
DC9.0V, 2700mA/DC12V, 2000mA*

**All measurement and test data in this report was gathered from production sample serial number: 170929012
(Assigned by BACL,Dongguan). The EUT was received on 2017-10-10.*

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-BL5000.

FCC Part 15C DSS submissions with FCC ID: 2ADTE-BL5000.

FCC Part 15B JBP submissions with FCC ID: 2ADTE-BL5000.

Test Methodology

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

Part 22 Subpart H - Public Mobile Services

Part 24 Subpart E - Personal Communication Services

Part 27 – Miscellaneous wireless communications services

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

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

Measurement Uncertainty

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

Test Facility

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

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.

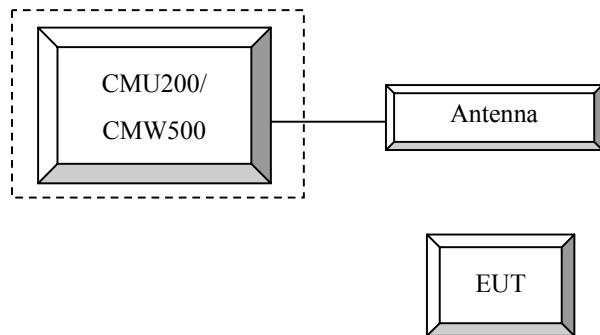
Equipment Modifications

No modification was made to the EUT.

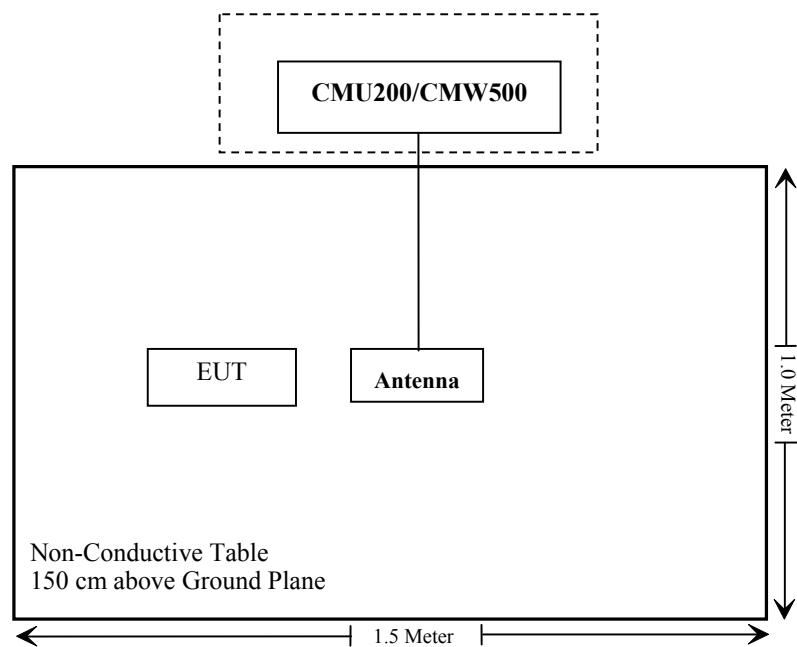
Support Equipment List and Details

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

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

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: RDG170929012-20.

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 Connection Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
 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
	$\beta c / \beta d$	8/15

WCDMA HSDPA

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

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

WCDMA HSUPA

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

	Mode	HSUPA	HSUPA	HSUPA	HSUPA	HSUPA
	Subset	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
HSDPA Specific Settings	β_{hs}	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
	MPR(dB)	0	2	1	2	0
	DACK	8				
	DNAK	8				
	DCQI	8				
HSUPA Specific Settings	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	$A_{hs}=\beta_{hs}/\beta_c$	30/15				
	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
HSUPA Specific Settings	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_FCl	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 PO 4 E-TFCI 67 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 (Note 3)	β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}: 30/15$ $\beta_{ed2}: 30/15$	$\beta_{ed3}: 24/15$ $\beta_{ed4}: 24/15$	3.5	2.5	14	105	105

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

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

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

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

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

DC-HSDPA

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

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

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

LTE (FDD):

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

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

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

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

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

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling 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
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	Chamber A-1	4m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber B-1	0.75m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber A-2	10m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber B-2	8m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	0.1m	C-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:	26.8~27°C
Relative Humidity:	29~66 %
ATM Pressure:	100.1~100.8 kPa

* The testing was performed by Sunny Cen&Steven Zuo&Nami Quan from 2017-10-13 to 2017-10-17.

Conducted Output Power**Cellular Band & PCS Band**

Band	Channel No.	Conducted Peak Output Power (dBm)							
		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	30.10	30.09	29.43	27.85	26.83	24.61	23.75	22.14
	190	30.40	30.27	29.66	28.10	27.09	24.42	23.62	21.92
	251	30.50	30.43	29.86	28.31	27.39	24.5	23.63	22.07
PCS	512	28.90	28.84	28.20	26.70	25.71	24.21	23.28	21.27
	661	28.70	28.62	28.03	26.51	25.53	24.82	23.88	21.97
	810	28.30	28.27	27.64	26.12	25.15	24.92	23.96	22.1

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	22.49	3.01	22.75	2.60	22.67	2.79
HSDPA	1	21.54	3.06	21.76	2.67	21.78	2.77
	2	21.48	3.02	21.74	2.68	21.74	2.85
	3	21.39	3.07	21.63	2.66	21.63	2.83
	4	21.52	2.95	21.75	2.63	21.74	2.75
HSUPA	1	21.56	2.93	21.79	2.58	21.75	2.89
	2	21.49	3.01	21.78	2.64	21.72	2.69
	3	21.59	2.97	21.70	2.69	21.63	2.77
	4	21.57	3.05	21.84	2.71	21.74	2.9
	5	21.52	3.07	21.82	2.55	21.72	2.82
DC-HSDPA	1	22.5	2.99	22.78	2.53	22.67	2.85
	2	22.41	3.07	21.81	2.60	21.77	2.76
	3	21.52	3.05	21.81	2.59	21.64	2.88
	4	21.38	2.96	21.70	2.76	21.58	2.93
HSPA+	1	21.49	3.01	21.81	2.72	21.82	2.67

WCDMA Band IV

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	22.62	3.04	22.59	3.04	22.63	2.95
HSDPA	1	21.70	3	21.62	3.06	21.58	3
	2	21.69	3.12	21.58	2.96	21.43	3.04
	3	21.65	2.94	21.51	3.07	21.55	2.92
	4	21.73	3.12	21.65	3.02	21.56	2.93
	1	21.68	3.04	21.63	3.01	21.57	2.99
HSUPA	2	21.64	3.07	21.59	3.15	21.51	2.99
	3	21.59	3.19	21.66	2.98	21.64	2.98
	4	21.72	3.01	21.64	3.09	21.59	2.85
	5	21.67	3.05	21.59	3.08	21.56	2.98
	1	22.54	3.09	22.59	3.1	22.6	2.91
DC-HSDPA	2	21.61	2.94	21.59	3.00	21.64	2.99
	3	21.61	3.15	21.56	3.04	21.39	3.04
	4	21.72	2.99	21.46	3.05	21.60	2.88
HSPA+	1	21.72	3.15	21.58	2.94	21.52	3.01

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	22.02	2.82	22.13	2.92	22.16	2.79
HSDPA	1	21.02	2.74	21.05	2.97	21.23	2.75
	2	21.06	2.79	20.97	2.94	21.20	2.75
	3	20.99	2.77	20.85	2.9	21.18	2.73
	4	21.08	2.91	21.01	3	21.22	2.74
	1	21.14	2.85	21.12	2.83	21.25	2.78
HSUPA	2	21.13	2.73	21.08	2.97	21.26	2.84
	3	21.09	2.84	20.95	2.99	21.24	2.83
	4	21.13	2.77	21.10	2.82	21.25	2.78
	5	21.11	2.98	21.06	3.06	21.21	2.67
	1	21.95	2.83	22.12	2.91	22.2	2.88
DC-HSDPA	2	20.96	2.80	21.09	2.95	21.22	2.77
	3	21.16	2.79	20.97	2.96	21.19	2.80
	4	20.89	2.80	20.76	2.92	21.10	2.70
HSPA+	1	21.15	2.90	21.08	3.09	21.17	2.66

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	23.61	23.47	23.29
		1#3	23.48	23.14	23.22
		1#5	23.51	23.24	22.92
		3#0	23.32	23.12	23.03
		3#3	23.29	23.12	22.91
		6#0	22.76	22.65	22.26
	16QAM	1#0	22.63	22.54	21.97
		1#3	22.51	22.62	21.99
		1#5	22.38	22.58	21.89
		3#0	22.54	22.67	21.96
		3#3	22.31	22.53	21.83
		6#0	21.78	21.74	21.50
3MHz	QPSK	1#0	23.33	23.51	23.37
		1#8	23.28	23.43	23.24
		1#14	23.16	23.44	23.18
		10#0	22.65	22.94	22.85
		10#5	22.72	22.83	22.78
		15#0	22.50	22.63	22.63
	16QAM	1#0	22.74	22.47	22.23
		1#8	22.22	22.38	22.10
		1#14	22.16	22.26	22.04
		10#0	22.63	22.94	22.1
		10#5	22.76	22.83	22.72
		15#0	21.57	21.57	21.55
5MHz	QPSK	1#0	23.38	23.53	23.49
		1#13	23.28	23.33	23.44
		1#24	23.14	23.20	23.30
		10#0	22.71	22.78	22.93
		10#15	22.65	23.07	22.99
		25#0	22.50	22.62	22.55
	16QAM	1#0	22.51	22.53	22.54
		1#13	22.51	22.64	22.73
		1#24	22.38	22.58	22.57
		10#0	22.73	22.71	22.92
		10#15	22.64	23.27	22.92
		25#0	21.45	21.66	21.60

10MHz	QPSK	1#0	23.34	23.62	23.64
		1#25	23.28	23.60	23.56
		1#49	23.27	23.58	23.55
		25#0	23.15	23.40	23.43
		25#25	23.14	23.45	23.35
		50#0	22.50	22.64	22.63
	16QAM	1#0	22.61	22.84	22.64
		1#25	22.94	22.60	22.43
		1#49	22.34	22.48	22.35
		25#0	23.11	23.42	23.41
		25#25	23.12	23.43	23.32
		50#0	21.65	21.60	21.53
15MHz	QPSK	1#0	23.41	23.40	23.58
		1#38	23.18	23.38	23.60
		1#74	23.28	23.31	23.51
		36#0	22.22	22.38	22.64
		36#39	22.27	22.42	22.65
		75#0	22.52	22.76	22.76
	16QAM	1#0	22.31	22.81	22.86
		1#38	22.23	22.29	22.46
		1#74	22.10	22.18	22.43
		36#0	22.21	22.32	22.65
		36#39	22.24	22.42	22.61
		75#0	21.27	21.36	21.45
20MHz	QPSK	1#0	23.46	23.55	23.76
		1#50	23.45	23.53	23.78
		1#99	23.26	23.42	23.68
		50#0	22.49	22.61	22.82
		50#50	22.56	22.63	22.74
		100#0	22.23	22.47	22.41
	16QAM	1#0	22.44	22.41	22.79
		1#50	22.43	22.39	22.70
		1#99	22.36	22.38	22.68
		50#0	22.42	22.62	22.83
		50#50	22.51	22.62	22.74
		100#0	21.63	21.48	21.74

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	23.50	23.27	23.24
		1#3	23.32	23.07	23.37
		1#5	23.50	23.17	23.08
		3#0	23.40	23.06	23.19
		3#3	23.38	23.05	23.05
		6#0	22.77	22.66	22.71
	16QAM	1#0	22.49	22.25	22.10
		1#3	22.37	22.31	21.89
		1#5	22.36	22.15	21.95
		3#0	23.23	23.12	23.09
		3#3	23.31	23.11	23.25
		6#0	21.45	21.17	21.24
3MHz	QPSK	1#0	23.57	23.54	23.56
		1#8	23.55	23.43	23.48
		1#14	23.15	23.14	23.41
		10#0	22.66	22.75	22.56
		10#5	22.61	22.73	22.64
		15#0	22.60	22.67	22.59
	16QAM	1#0	22.57	22.79	22.46
		1#8	22.49	22.70	22.59
		1#14	22.38	22.72	22.46
		10#0	22.23	22.43	22.12
		10#5	22.31	22.32	22.34
		15#0	21.67	21.60	21.57
5MHz	QPSK	1#0	23.77	23.67	23.59
		1#13	23.73	23.59	23.55
		1#24	23.87	23.30	23.15
		10#0	22.93	22.91	22.66
		10#15	22.83	22.89	22.58
		25#0	22.69	22.63	22.64
	16QAM	1#0	22.83	22.81	22.63
		1#13	22.75	22.31	22.51
		1#24	22.68	22.20	22.39
		10#0	22.32	22.54	22.64
		10#15	22.43	22.46	22.43
		25#0	21.71	21.56	21.70

10MHz	QPSK	1#0	23.51	23.63	23.62
		1#25	23.52	23.52	23.54
		1#49	23.49	23.47	23.52
		25#0	22.41	22.52	22.71
		25#25	22.34	22.50	22.57
		50#0	22.38	22.55	22.58
	16QAM	1#0	22.49	22.30	22.79
		1#25	22.15	22.27	22.76
		1#49	22.05	22.24	22.71
		25#0	22.43	22.32	22.23
		25#25	22.31	22.33	22.32
		50#0	21.77	21.58	21.62
15MHz	QPSK	1#0	23.72	23.53	23.66
		1#38	23.68	23.48	23.61
		1#74	23.64	23.51	23.64
		36#0	22.64	22.59	22.83
		36#39	22.67	22.62	22.84
		75#0	22.60	22.56	22.83
	16QAM	1#0	22.66	22.75	22.65
		1#38	22.68	22.71	22.59
		1#74	22.62	22.75	22.56
		36#0	22.32	22.23	22.35
		36#39	22.62	22.54	22.65
		75#0	21.60	21.59	21.68
20MHz	QPSK	1#0	23.70	23.63	23.80
		1#50	23.66	23.58	23.75
		1#99	23.62	23.61	23.78
		50#0	22.62	22.69	22.97
		50#50	22.65	22.72	22.98
		100#0	22.58	22.66	22.97
	16QAM	1#0	22.64	22.85	22.79
		1#50	22.66	22.81	22.73
		1#99	22.60	22.85	22.70
		50#0	22.45	22.54	22.44
		50#50	22.45	22.76	22.76
		100#0	21.58	21.69	21.82

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	23.81	23.88	23.76
		1#3	23.90	23.81	23.87
		1#5	23.74	23.75	23.80
		3#0	23.85	23.85	23.81
		3#3	23.71	23.80	23.67
		6#0	22.80	22.83	22.70
	16QAM	1#0	22.84	23.08	22.44
		1#3	22.83	23.00	22.36
		1#5	22.78	23.15	22.38
		3#0	23.34	23.45	23.45
		3#3	23.54	23.65	23.33
		6#0	21.80	21.80	21.72
3MHz	QPSK	1#0	23.26	23.48	23.48
		1#8	23.17	23.47	23.43
		1#14	23.19	23.45	23.41
		10#0	22.54	22.60	22.37
		10#5	22.49	22.65	23.31
		15#0	22.29	22.58	22.97
	16QAM	1#0	22.24	22.67	22.67
		1#8	22.19	22.63	22.61
		1#14	22.17	22.58	22.59
		10#0	22.32	22.32	22.34
		10#5	22.34	22.43	23.22
		15#0	21.43	21.60	21.45
5MHz	QPSK	1#0	23.48	23.48	23.42
		1#13	23.55	23.54	23.38
		1#24	23.43	23.48	23.39
		10#0	23.10	22.86	22.73
		10#15	23.05	22.96	22.89
		22.40	22.40	22.52	22.47
	16QAM	22.84	22.84	22.48	22.60
		1#13	22.56	22.46	22.30
		1#24	22.54	22.49	22.71
		10#0	23.00	22.36	22.54
		10#15	23.02	22.46	22.34
		25#0	21.46	21.49	21.70
10MHz	QPSK	1#0	23.40	23.65	23.60
		1#25	23.41	23.66	23.59
		1#49	23.43	23.63	23.51
		25#0	22.90	22.99	22.94
		25#25	22.85	22.95	22.92
		50#0	22.45	22.54	22.41
	16QAM	1#0	22.11	22.63	22.55
		1#25	22.02	22.50	22.49
		1#49	22.05	22.55	22.51
		25#0	22.33	22.23	22.56
		25#25	22.43	22.54	22.43
		50#0	21.70	21.62	21.66

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	22.54	22.53	22.67
		1#13	22.50	22.55	22.61
		1#24	22.56	22.50	22.59
		10#0	21.61	21.66	21.83
		10#15	21.59	21.63	21.72
		25#0	21.63	21.60	21.60
	16QAM	1#0	21.96	21.72	21.71
		1#13	21.85	21.69	21.56
		1#24	21.71	21.52	21.50
		10#0	21.45	21.61	21.35
		10#15	21.43	21.32	21.34
		25#0	21.45	21.41	20.95
10MHz	QPSK	1#0	22.46	22.53	22.41
		1#25	22.33	22.45	22.34
		1#49	22.36	22.52	22.31
		25#0	22.01	22.08	21.59
		25#25	22.09	22.09	21.67
		50#0	21.51	21.59	21.28
	16QAM	1#0	21.50	21.70	21.04
		1#25	21.46	21.64	21.12
		1#49	21.55	21.69	21.15
		25#0	22.23	22.12	21.32
		25#25	22.32	22.32	21.32
		50#0	20.80	20.69	20.61
15MHz	QPSK	1#0	22.53	22.60	22.42
		1#38	22.49	22.62	22.31
		1#74	22.55	22.68	22.41
		36#0	21.82	21.52	21.39
		36#39	21.74	21.73	21.32
		75#0	21.57	21.68	21.22
	16QAM	1#0	21.58	21.56	21.07
		1#38	21.49	21.42	20.99
		1#74	21.56	21.32	21.01
		36#0	21.83	21.45	21.54
		36#39	21.75	21.43	21.43
		75#0	20.80	20.69	20.61
20MHz	QPSK	1#0	22.64	22.77	22.48
		1#50	22.58	22.95	22.50
		1#99	22.67	22.88	22.41
		50#0	21.82	21.82	21.34
		50#50	21.71	21.71	21.28
		100#0	21.50	21.64	21.23
	16QAM	1#0	21.70	21.86	21.43
		1#50	21.68	21.82	21.41
		1#99	21.65	21.88	21.38
		50#0	21.34	21.55	21.54
		50#50	21.34	21.23	21.34
		100#0	20.75	20.59	20.66

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	23.46	23.62	23.65
		1#13	23.40	23.59	23.52
		1#24	23.33	23.45	23.41
		10#0	22.77	23.00	23.11
		10#15	22.71	22.91	22.94
		25#0	22.63	22.79	23.00
	16QAM	1#0	22.62	22.79	23.00
		1#13	22.59	22.76	22.99
		1#24	22.60	22.80	22.93
		10#0	22.32	23.13	23.12
		10#15	22.43	22.33	22.93
		25#0	21.67	21.74	21.81
10MHz	QPSK	1#0	23.41	23.52	23.48
		1#25	23.36	23.47	23.40
		1#49	23.38	23.45	23.50
		25#0	22.53	22.56	22.40
		25#25	22.55	22.51	22.45
		50#0	22.43	22.46	22.36
	16QAM	1#0	22.56	22.73	22.14
		1#25	22.54	22.66	22.17
		1#49	22.51	22.64	22.12
		25#0	22.32	22.23	22.23
		25#25	22.34	22.43	22.43
		50#0	21.63	21.53	21.68

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	4.68	3.59	3.91	13
	100 RB		6.44	6.31	6.47	13
16QAM	1 RB	20 MHz	5.13	4.42	4.71	13
	100 RB		7.18	7.02	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	4.55	4.07	2.85	13
	100 RB		6.41	6.44	6.35	13
16QAM	1 RB	20 MHz	5.64	4.55	4.01	13
	100 RB		7.05	7.15	6.92	13

PAR, Band 5

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	3.56	3.49	3.78	13
	50 RB		5.19	5.22	5.54	13
16QAM	1 RB	10 MHz	4.68	4.46	5.00	13
	50 RB		5.99	6.15	6.31	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	4.10	3.72	3.91	13
	100 RB		5.38	5.42	5.48	13
16QAM	1 RB	20 MHz	4.42	4.62	4.84	13
	100 RB		6.22	6.25	6.28	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	3.91	3.62	3.56	13
	50 RB		5.13	5.10	5.29	13
16QAM	1 RB	10 MHz	4.81	4.49	4.33	13
	50 RB		6.12	6.25	6.19	13

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

ERP & EIRP

Part 22H

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	95.59	20.7	0.0	1	19.7	38.5	18.8
836.600	V	102.72	30.9	0.0	1	29.9	38.5	8.6
EDGE 850 Middle Channel								
836.600	H	92.64	17.7	0.0	1	16.7	38.5	21.8
836.600	V	100.51	28.7	0.0	1	27.7	38.5	10.8
WCDMA Band V Middle Channel								
836.600	H	87.21	12.3	0.0	1	11.3	38.5	27.2
836.600	V	94.18	22.4	0.0	1	21.4	38.5	17.1

Part 24E

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	90.92	18.3	11.7	2.7	27.3	33.0	5.7
1880.000	V	82.73	10.3	11.7	2.7	19.3	33.0	13.7
EGPRS 1900 Middle Channel								
1880.000	H	90.56	18	11.7	2.7	27.0	33.0	6.0
1880.000	V	82.48	10	11.7	2.7	19.0	33.0	14.0
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

Part 27

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band IV Middle Channel								
1732.500	H	89.39	15.3	10.9	2.5	23.7	30.0	6.3
1732.500	V	84.78	10.4	10.9	2.5	18.8	30.0	11.2

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 (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
1880.000	H	87.50	14.9	11.7	2.7	23.9	33.0	9.1
1880.000	V	85.41	12.9	11.7	2.7	21.9	33.0	11.1
QPSK 3 MHz Middle Channel								
1880.000	H	87.34	14.7	11.7	2.7	23.7	33.0	9.3
1880.000	V	85.27	12.8	11.7	2.7	21.8	33.0	11.2
QPSK 5 MHz Middle Channel								
1880.000	H	87.29	14.7	11.7	2.7	23.7	33.0	9.3
1880.000	V	85.77	13.3	11.7	2.7	22.3	33.0	10.7
QPSK 10 MHz Middle Channel								
1880.000	H	86.34	13.7	11.7	2.7	22.7	33.0	10.3
1880.000	V	85.67	13.2	11.7	2.7	22.2	33.0	10.8
QPSK 15 MHz Middle Channel								
1880.000	H	86.70	14.1	11.7	2.7	23.1	33.0	9.9
1880.000	V	85.59	13.1	11.7	2.7	22.1	33.0	10.9
QPSK 20 MHz Middle Channel								
1880.000	H	86.31	13.7	11.7	2.7	22.7	33.0	10.3
1880.000	V	77.69	5.2	11.7	2.7	14.2	33.0	18.8
16QAM 1.4 MHz Middle Channel								
1880.000	H	87.64	15	11.7	2.7	24.0	33.0	9.0
1880.000	V	85.64	13.2	11.7	2.7	22.2	33.0	10.8
16QAM 3 MHz Middle Channel								
1880.000	H	87.80	15.2	11.7	2.7	24.2	33.0	8.8
1880.000	V	85.62	13.2	11.7	2.7	22.2	33.0	10.8
16QAM 5 MHz Middle Channel								
1880.000	H	87.17	14.6	11.7	2.7	23.6	33.0	9.4
1880.000	V	85.52	13.1	11.7	2.7	22.1	33.0	10.9
16QAM 10 MHz Middle Channel								
1880.000	H	88.01	15.4	11.7	2.7	24.4	33.0	8.6
1880.000	V	85.94	13.5	11.7	2.7	22.5	33.0	10.5
16QAM 15 MHz Middle Channel								
1880.000	H	88.13	15.5	11.7	2.7	24.5	33.0	8.5
1880.000	V	86.10	13.6	11.7	2.7	22.6	33.0	10.4
16QAM 20 MHz Middle Channel								
1880.000	H	86.45	13.8	11.7	2.7	22.8	33.0	10.2
1880.000	V	77.66	5.2	11.7	2.7	14.2	33.0	18.8

LTE Band 4

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	88.13	14.1	10.9	2.5	22.5	30.0	7.5
1732.500	V	83.21	8.8	10.9	2.5	17.2	30.0	12.8
QPSK 3 MHz Middle Channel								
1732.500	H	88.06	14	10.9	2.5	22.4	30.0	7.6
1732.500	V	83.72	9.4	10.9	2.5	17.8	30.0	12.2
QPSK 5 MHz Middle Channel								
1732.500	H	87.16	13.1	10.9	2.5	21.5	30.0	8.5
1732.500	V	82.75	8.4	10.9	2.5	16.8	30.0	13.2
QPSK 10 MHz Middle Channel								
1732.500	H	86.98	12.9	10.9	2.5	21.3	30.0	8.7
1732.500	V	83.66	9.3	10.9	2.5	17.7	30.0	12.3
QPSK 15 MHz Middle Channel								
1732.500	H	86.57	12.5	10.9	2.5	20.9	30.0	9.1
1732.500	V	82.14	7.8	10.9	2.5	16.2	30.0	13.8
QPSK 20 MHz Middle Channel								
1732.500	H	85.72	11.7	10.9	2.5	20.1	30.0	9.9
1732.500	V	83.70	9.3	10.9	2.5	17.7	30.0	12.3
16QAM 1.4 MHz Middle Channel								
1732.500	H	88.12	14.1	10.9	2.5	22.5	30.0	7.5
1732.500	V	83.42	9.1	10.9	2.5	17.5	30.0	12.5
16QAM 3 MHz Middle Channel								
1732.500	H	88.09	14	10.9	2.5	22.4	30.0	7.6
1732.500	V	83.77	9.4	10.9	2.5	17.8	30.0	12.2
16QAM 5 MHz Middle Channel								
1732.500	H	87.21	13.2	10.9	2.5	21.6	30.0	8.4
1732.500	V	83.05	8.7	10.9	2.5	17.1	30.0	12.9
16QAM 10 MHz Middle Channel								
1732.500	H	85.34	11.3	10.9	2.5	19.7	30.0	10.3
1732.500	V	83.94	9.6	10.9	2.5	18.0	30.0	12.0
16QAM 15 MHz Middle Channel								
1732.500	H	84.78	10.7	10.9	2.5	19.1	30.0	10.9
1732.500	V	82.33	8	10.9	2.5	16.4	30.0	13.6
16QAM 20 MHz Middle Channel								
1732.500	H	84.59	10.5	10.9	2.5	18.9	30.0	11.1
1732.500	V	82.05	7.7	10.9	2.5	16.1	30.0	13.9

LTE Band 5

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	87.64	12.7	0.0	1	11.7	38.5	26.8
836.500	V	95.63	23.8	0.0	1	22.8	38.5	15.7
QPSK 3 MHz Middle Channel								
836.500	H	85.85	10.9	0.0	1	9.9	38.5	28.6
836.500	V	94.55	22.8	0.0	1	21.8	38.5	16.7
QPSK 5 MHz Middle Channel								
836.500	H	82.24	7.3	0.0	1	6.3	38.5	32.2
836.500	V	94.05	22.3	0.0	1	21.3	38.5	17.2
QPSK 10 MHz Middle Channel								
836.500	H	80.21	5.3	0.0	1	4.3	38.5	34.2
836.500	V	93.34	21.5	0.0	1	20.5	38.5	18.0
16QAM 1.4 MHz Middle Channel								
836.500	H	87.32	12.4	0.0	1	11.4	38.5	27.1
836.500	V	95.71	23.9	0.0	1	22.9	38.5	15.6
16QAM 3 MHz Middle Channel								
836.500	H	85.61	10.7	0.0	1	9.7	38.5	28.8
836.500	V	94.38	22.6	0.0	1	21.6	38.5	16.9
16QAM 5 MHz Middle Channel								
836.500	H	84.94	10	0.0	1	9.0	38.5	29.5
836.500	V	93.71	21.9	0.0	1	20.9	38.5	17.6
16QAM 10 MHz Middle Channel								
836.500	H	84.66	9.7	0.0	1	8.7	38.5	29.8
836.500	V	93.15	21.4	0.0	1	20.4	38.5	18.1

LTE Band 7

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 5 MHz Middle Channel								
2535.000	H	83.63	11	13.1	3.1	21.0	33.0	12.0
2535.000	V	84.21	13.1	13.1	3.1	23.1	33.0	9.9
QPSK 10 MHz Middle Channel								
2535.000	H	83.69	11.1	13.1	3.1	21.1	33.0	11.9
2535.000	V	84.43	13.3	13.1	3.1	23.3	33.0	9.7
QPSK 15 MHz Middle Channel								
2535.000	H	83.80	11.2	13.1	3.1	21.2	33.0	11.8
2535.000	V	84.30	13.1	13.1	3.1	23.1	33.0	9.9
QPSK 20 MHz Middle Channel								
2535.000	H	83.99	11.4	13.1	3.1	21.4	33.0	11.6
2535.000	V	84.82	13.7	13.1	3.1	23.7	33.0	9.3
16QAM 5 MHz Middle Channel								
2535.000	H	83.05	10.4	13.1	3.1	20.4	33.0	12.6
2535.000	V	84.93	13.8	13.1	3.1	23.8	33.0	9.2
16QAM 10 MHz Middle Channel								
2535.000	H	83.15	10.5	13.1	3.1	20.5	33.0	12.5
2535.000	V	84.44	13.3	13.1	3.1	23.3	33.0	9.7
16QAM 15 MHz Middle Channel								
2535.000	H	83.72	11.1	13.1	3.1	21.1	33.0	11.9
2535.000	V	84.75	13.6	13.1	3.1	23.6	33.0	9.4
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	84.75	13.6	13.1	3.1	23.6	33.0	9.4

LTE Band 17

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 5 MHz Middle Channel								
710.000	H	86.18	9.4	0.0	0.9	8.5	34.8	26.3
710.000	V	96.31	22	0.0	0.9	21.1	34.8	13.7
QPSK 10 MHz Middle Channel								
710.000	H	85.75	8.9	0.0	0.9	8.0	34.8	26.8
710.000	V	95.66	21.3	0.0	0.9	20.4	34.8	14.4
16QAM 5 MHz Middle Channel								
710.000	H	86.62	9.8	0.0	0.9	8.9	34.8	25.9
710.000	V	96.57	22.2	0.0	0.9	21.3	34.8	13.5
16QAM 10 MHz Middle Channel								
710.000	H	86.21	9.4	0.0	0.9	8.5	34.8	26.3
710.000	V	95.94	21.6	0.0	0.9	20.7	34.8	14.1

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

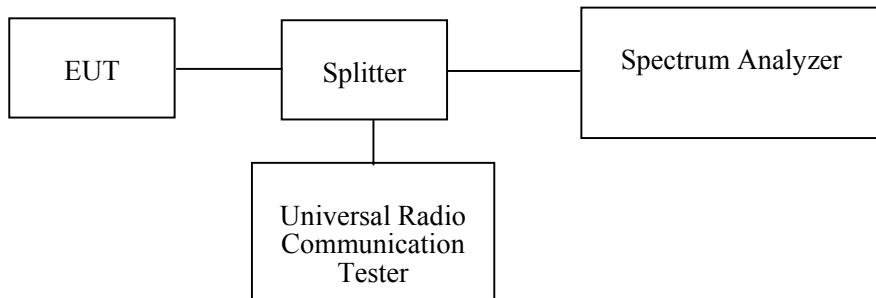
FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53- OCCUPIED BANDWIDTH**Applicable Standard**

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	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:	26.4~26.8°C
Relative Humidity:	63~66 %
ATM Pressure:	99.4~100.8 kPa

The testing was performed by Nami Quan from 2017-10-16 to 2017-10-17.

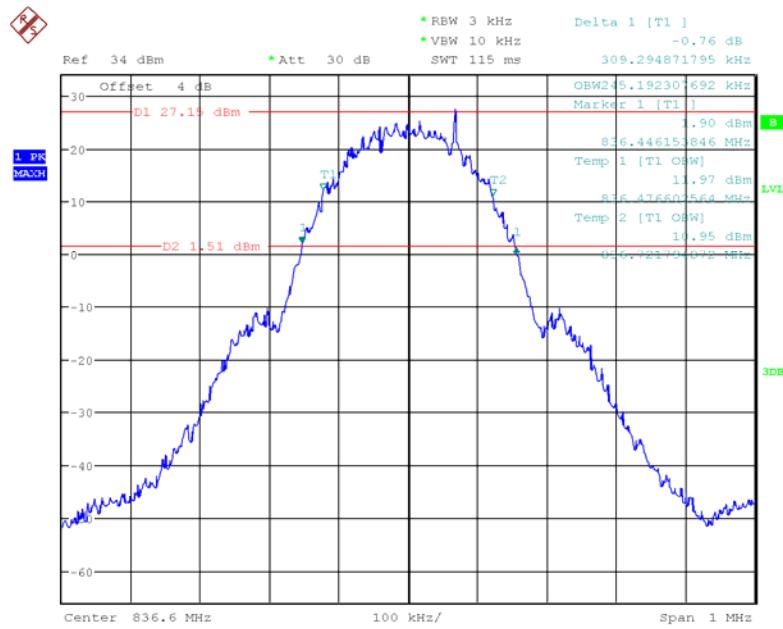
Test Mode: Transmitting

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

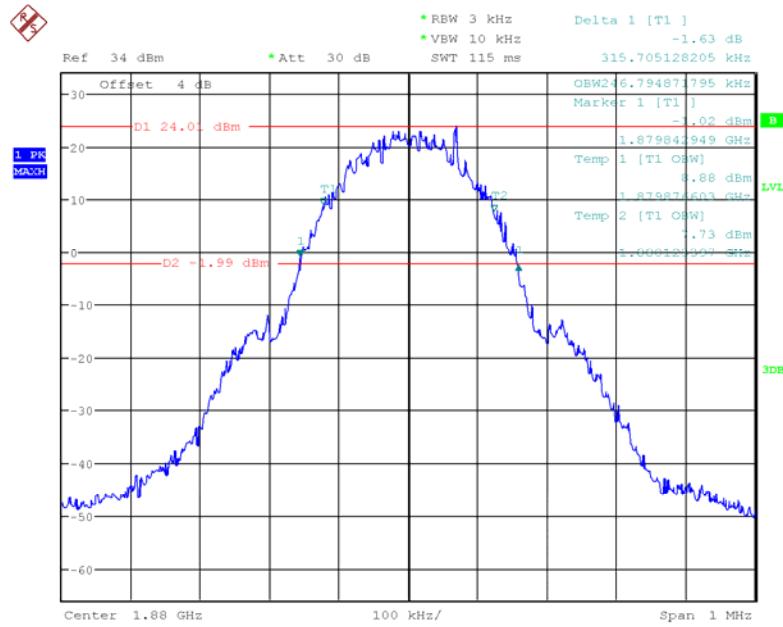
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)	
Cellular	M	GSM	0.245	0.309	
		EDGE	0.255	0.329	
PCS		PCS	0.247	0.316	
		EDGE	0.250	0.321	
WCDMA Band II		Rel 99	4.1827	4.7115	
		HSDPA	4.1827	4.6955	
		HSUPA	4.1667	4.6795	
		Rel 99	4.1667	4.6795	
WCDMA Band IV		HSDPA	4.1667	4.7115	
		HSUPA	4.1667	4.6955	
		Rel 99	4.1667	4.6955	
		HSDPA	4.1667	4.6795	
WCDMA Band V		HSUPA	4.1667	4.6635	

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 2	QPSK	1.4	M	1.104	1.278
		3		2.748	3.060
		5		4.540	5.160
		10		9.080	10.280
		15		13.560	14.940
		20		17.920	19.520
	16QAM	1.4	M	1.104	1.290
		3		2.748	3.048
		5		4.520	5.060
		10		9.080	10.280
		15		13.560	15.000
		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	1.104	1.278
		3		2.736	3.060
		5		4.540	5.080
		10		9.160	10.400
		15		13.560	15.060
		20		18.000	19.520
	16QAM	1.4	M	1.104	1.296
		3		2.760	3.060
		5		4.520	5.044
		10		9.160	10.260
		15		13.620	15.060
		20		18.080	19.780
LTE Band 5	QPSK	1.4	M	1.098	1.278
		3		2.748	3.048
		5		4.540	5.084
		10		9.160	10.320
	16QAM	1.4	M	1.110	1.290
		3		2.748	3.060
		5		4.540	5.024
		10		9.120	10.280
LTE Band 7	QPSK	5	M	4.540	5.120
		10		9.120	10.360
		15		13.620	15.000
		20		18.000	19.560
	16QAM	5	M	4.520	5.060
		10		9.120	10.280
		15		13.560	15.060
		20		18.000	19.560
LTE Band 17	QPSK	5	M	4.500	5.040
		10		9.000	10.240
	16QAM	5	M	4.500	5.040
		10		9.000	10.120

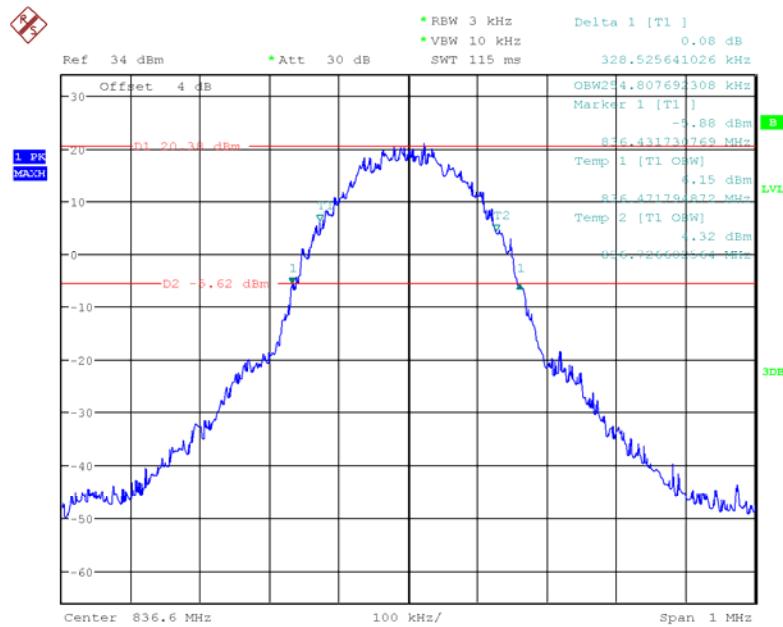
GSM 850 Cellular Band

Date: 16.OCT.2017 23:18:42

GSM PCS1900 Cellular Band

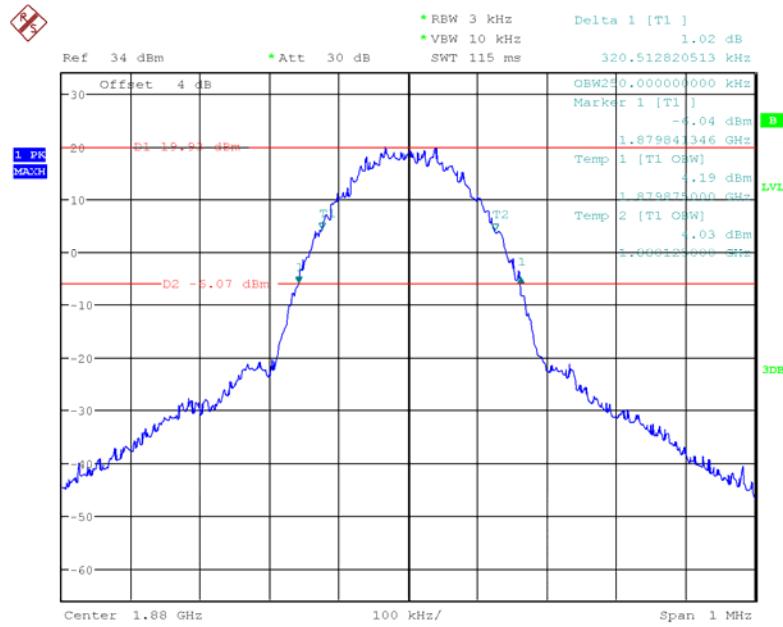
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EDGE 850 Cellular Band



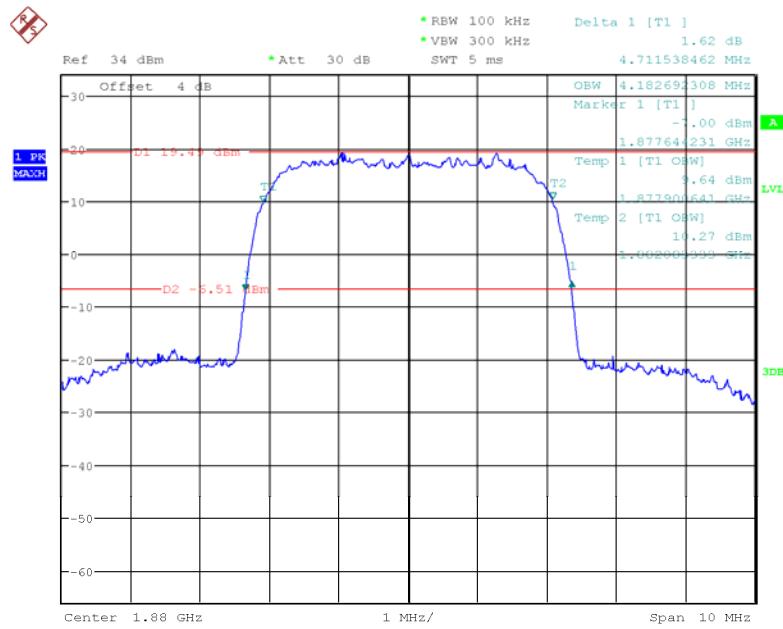
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EDGE PCS1900 Cellular Band



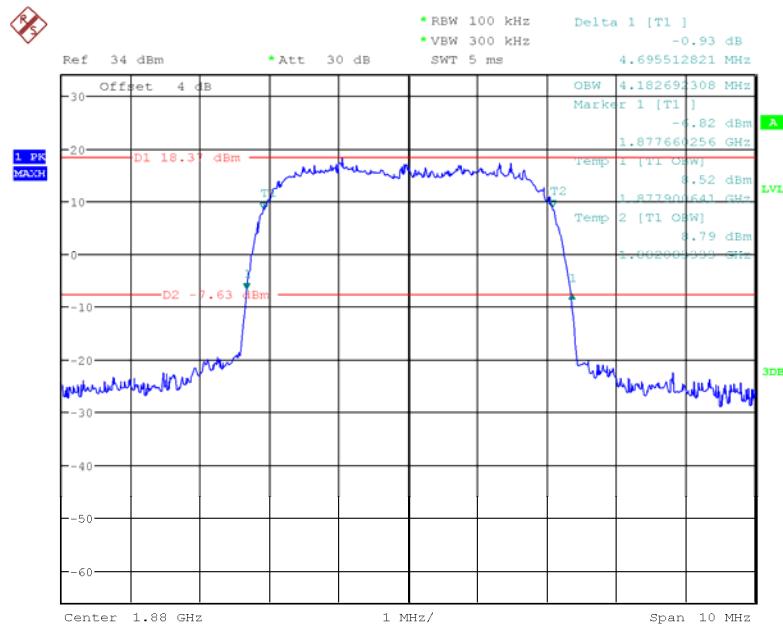
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REL99 Band II

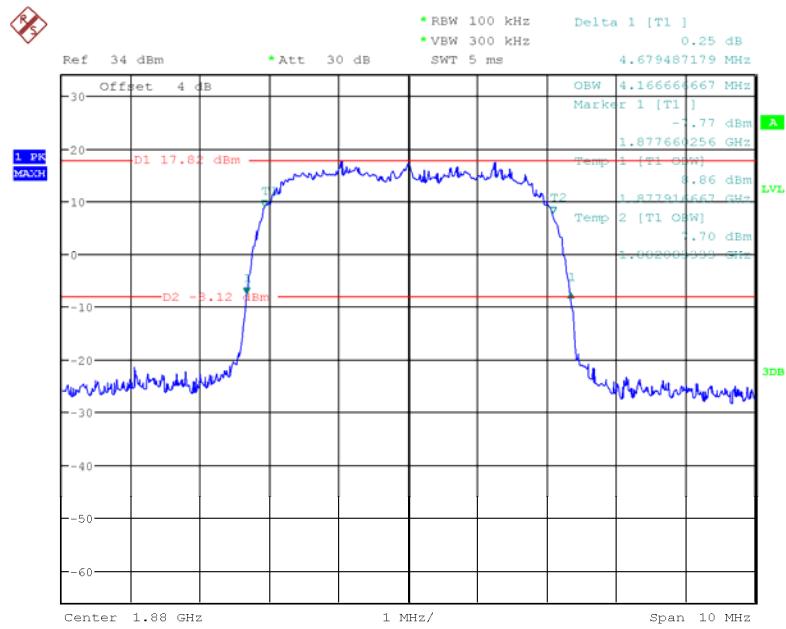


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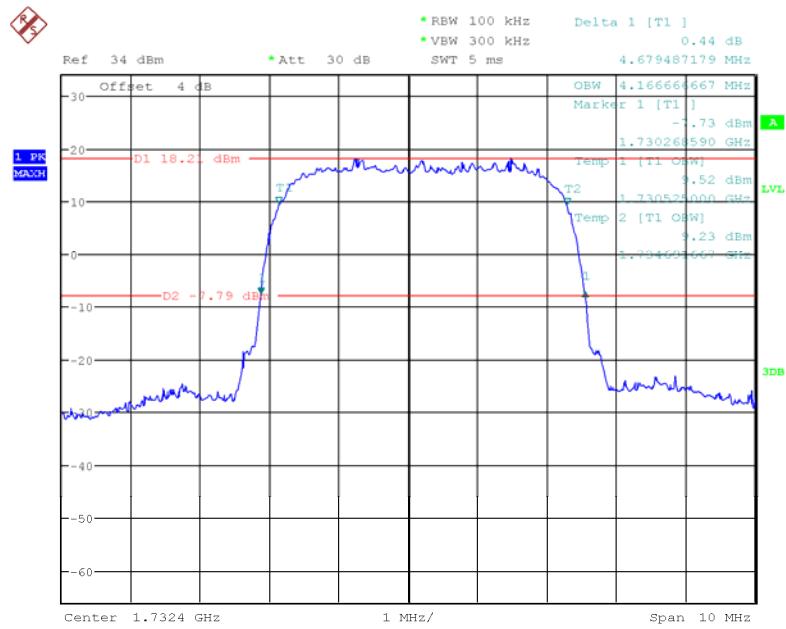
HSDPA Band II



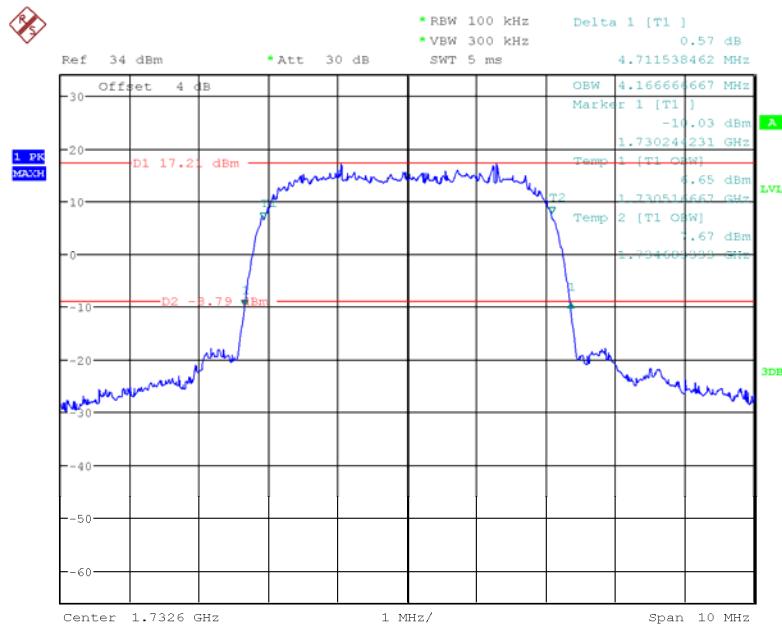
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HSUPA Band II

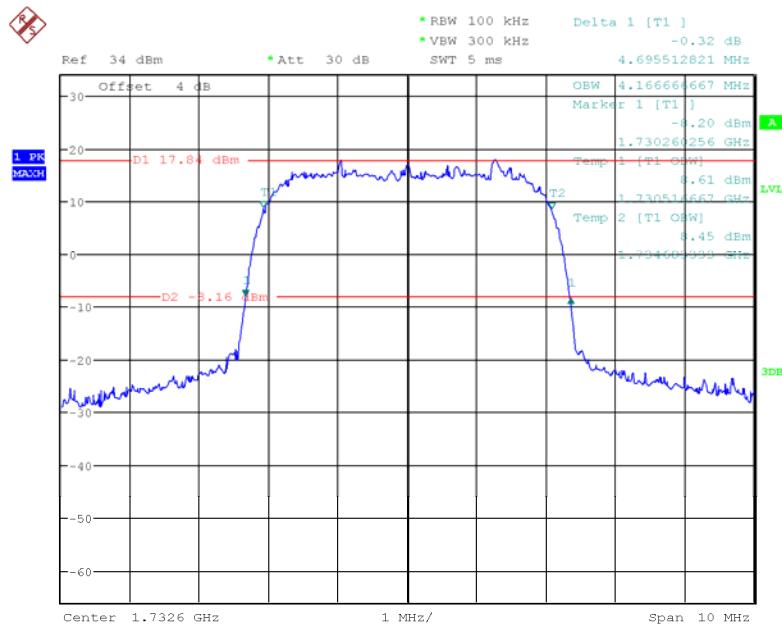
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REL99 Band IV

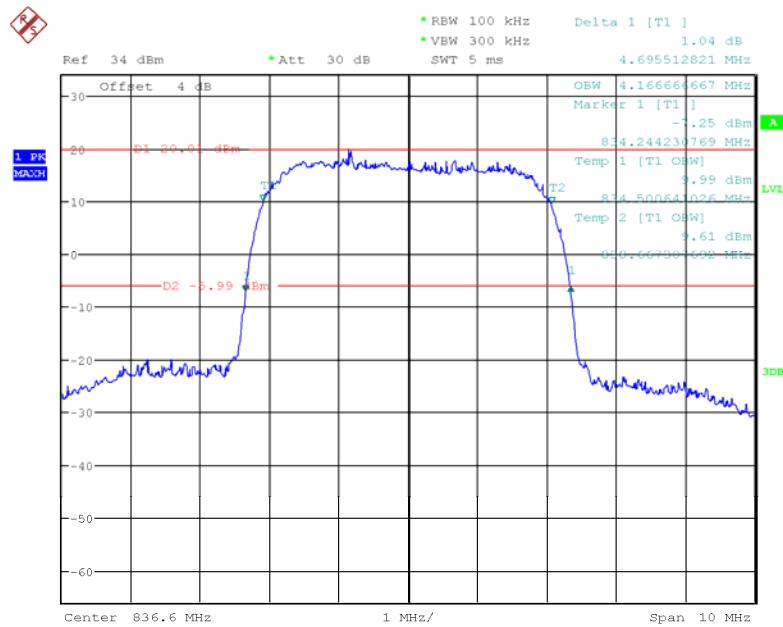
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HSDPA Band IV

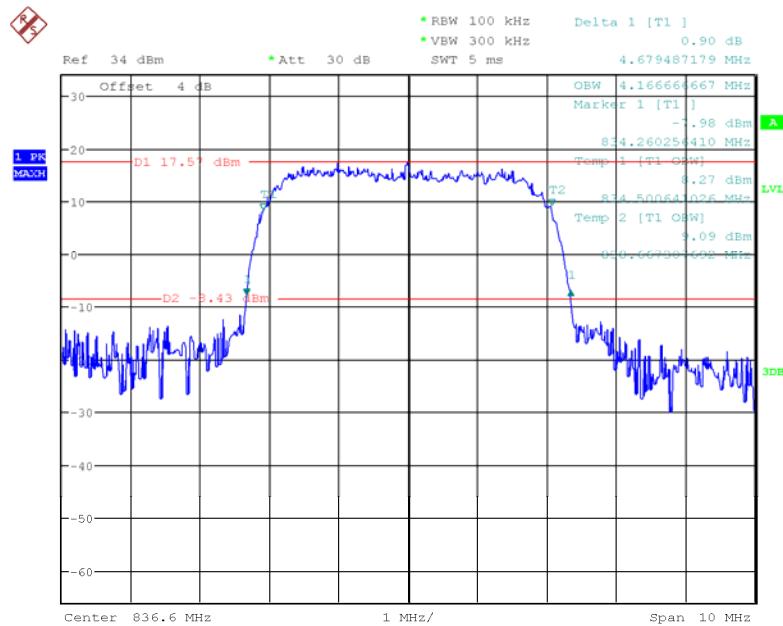
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HSUPA Band IV

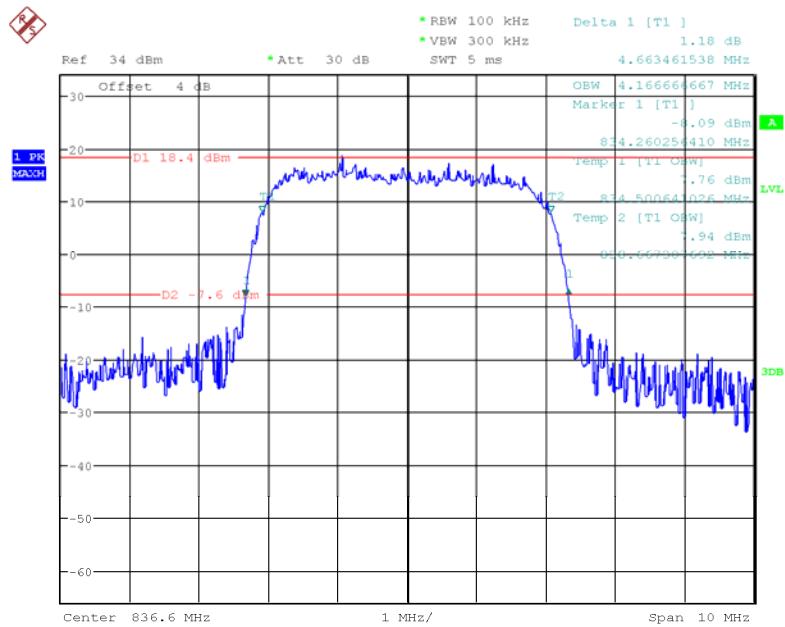
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REL99 Band V

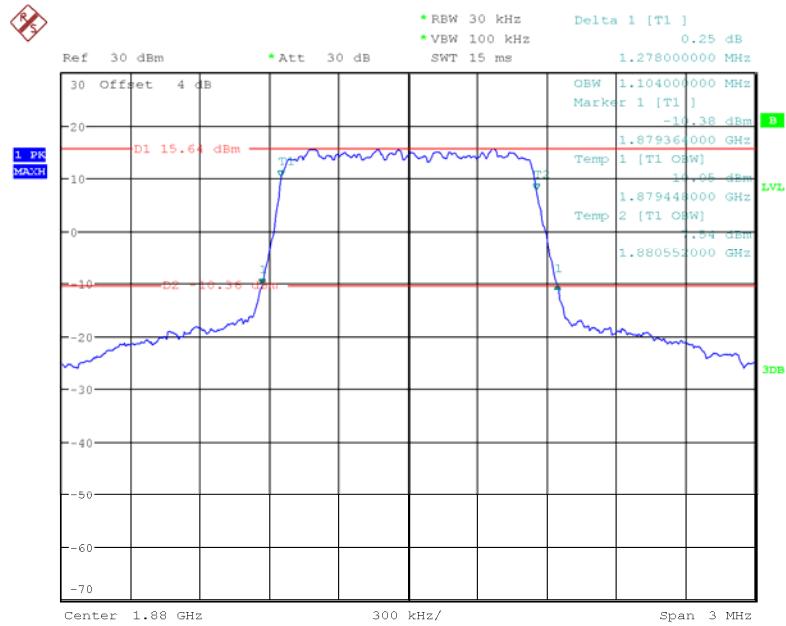
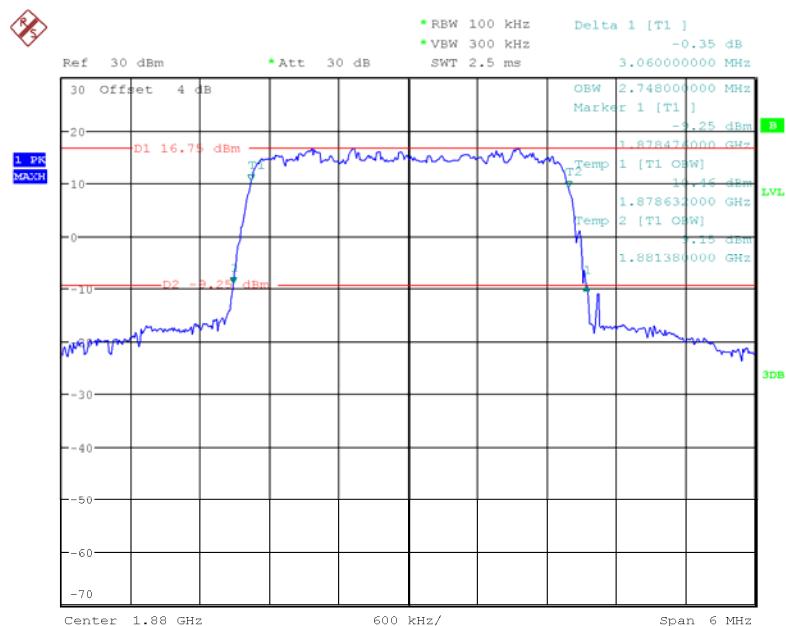
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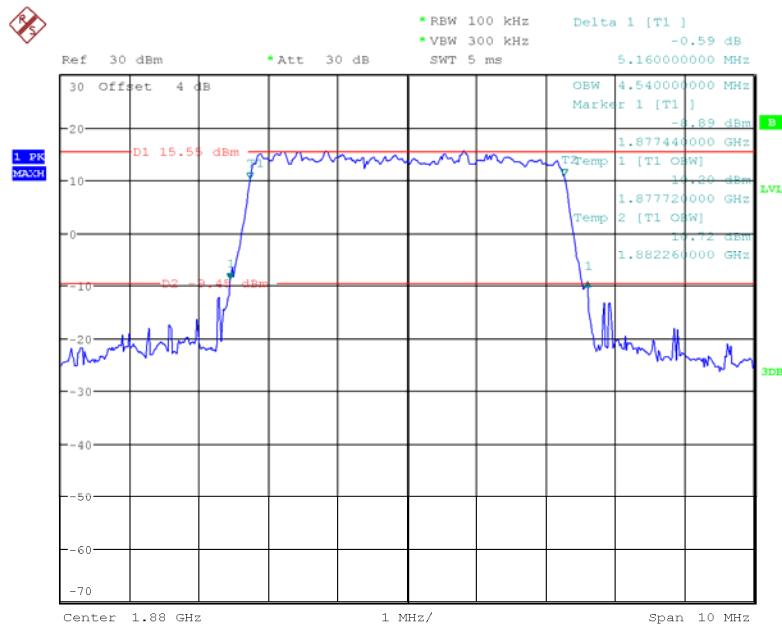
HSDPA Band V

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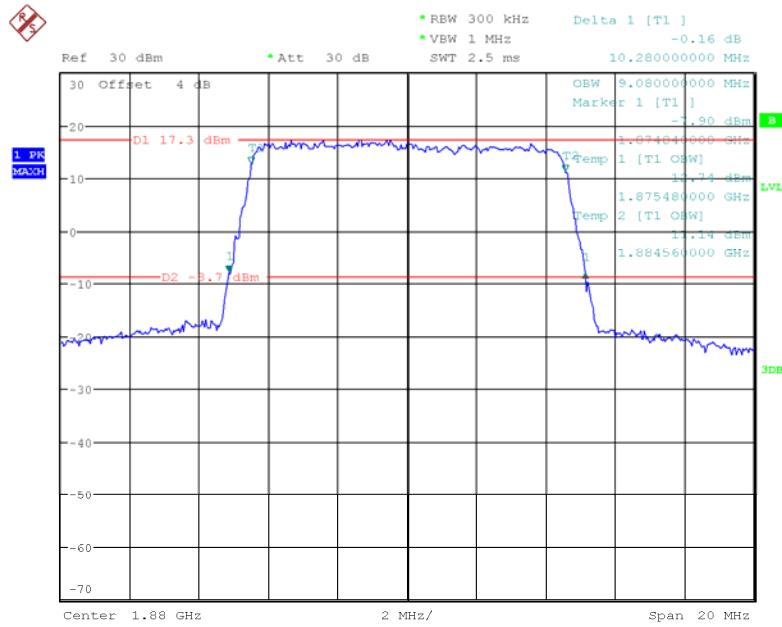
HSUPA Band V

Date: 17.OCT.2017 22:12:22

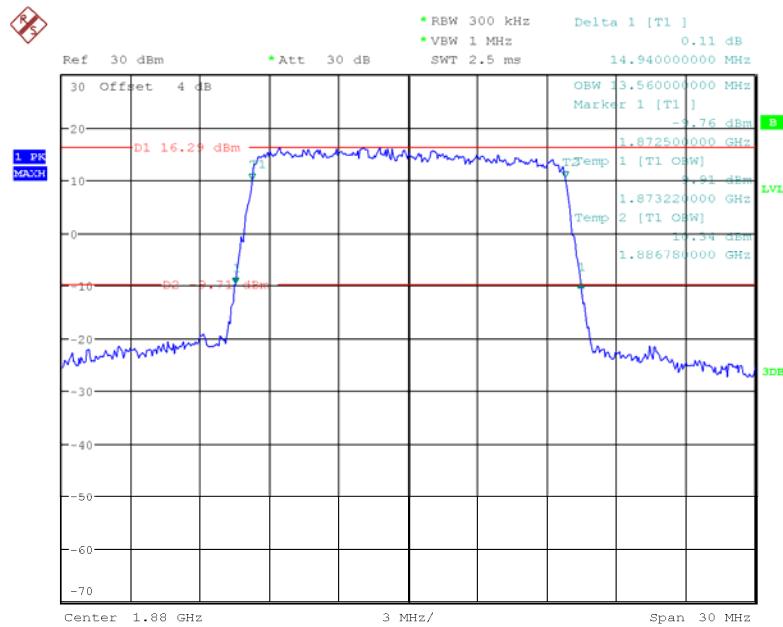
LTE Band 2**QPSK_1.4 MHz****QPSK_3 MHz**

QPSK_5 MHz

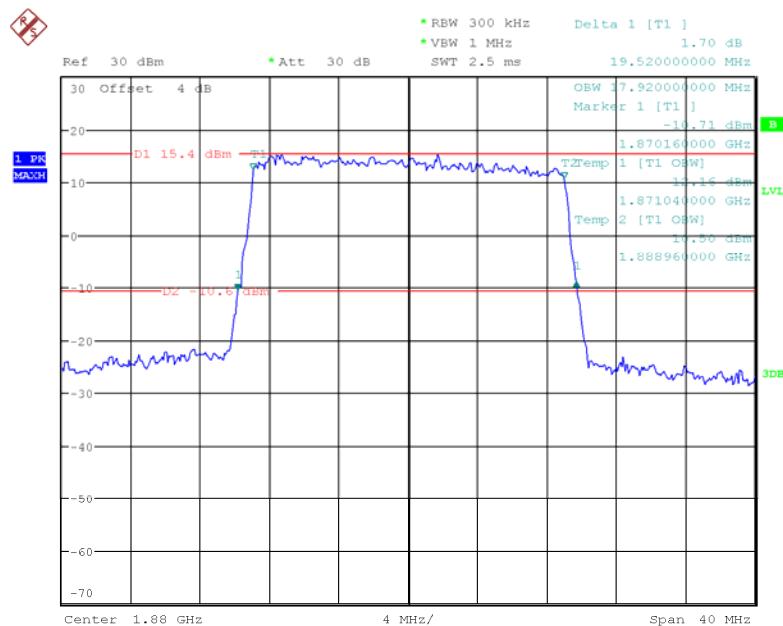
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QPSK_10 MHz

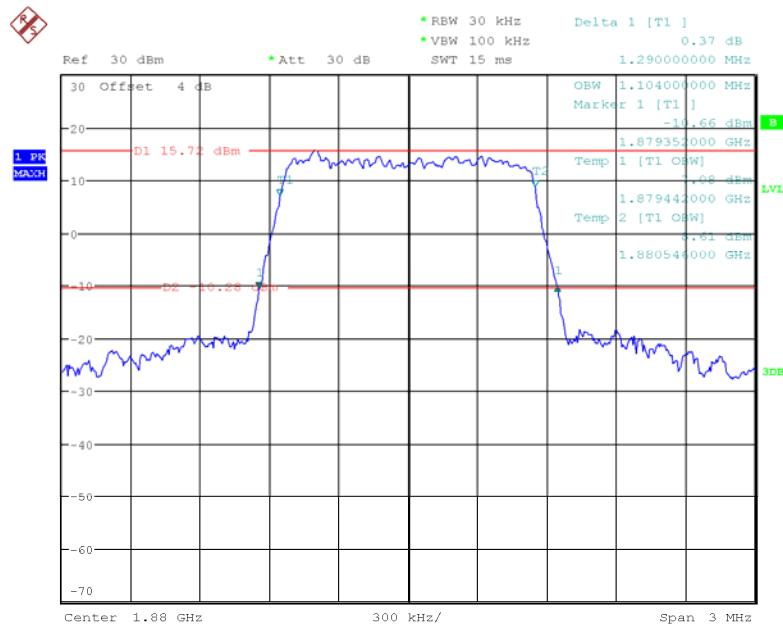
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QPSK_15 MHz

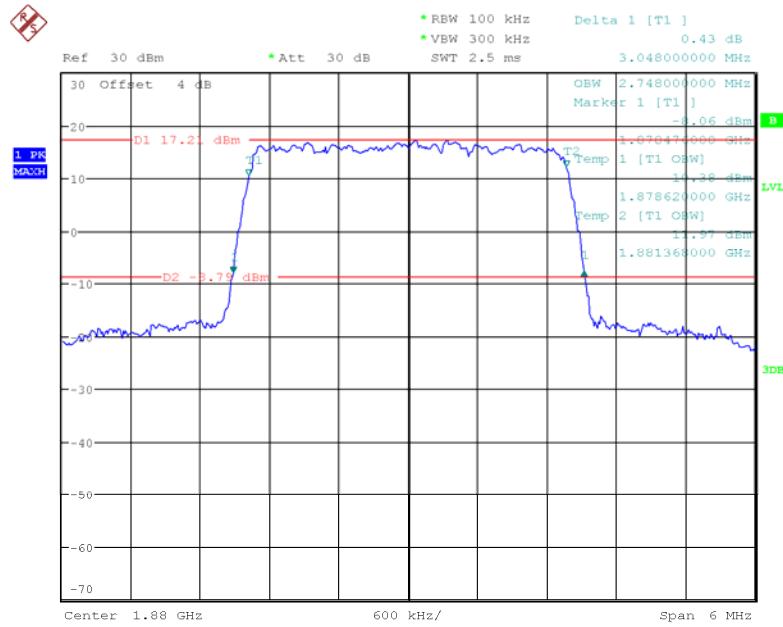
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QPSK_20 MHz

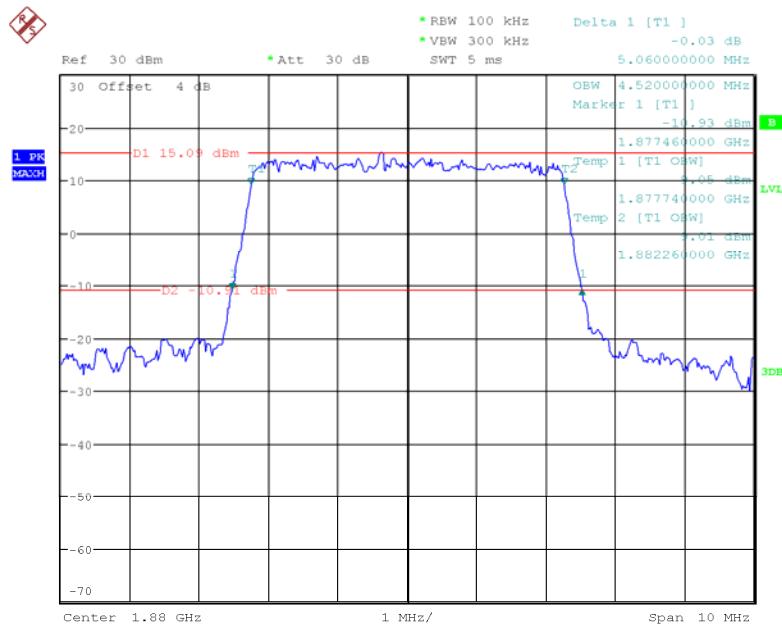
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16QAM_1.4 MHz

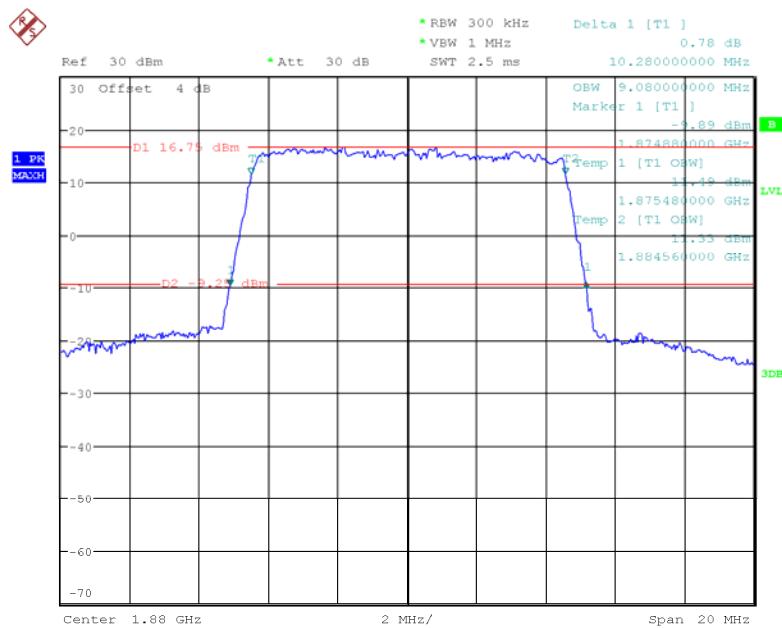
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16QAM_3 MHz

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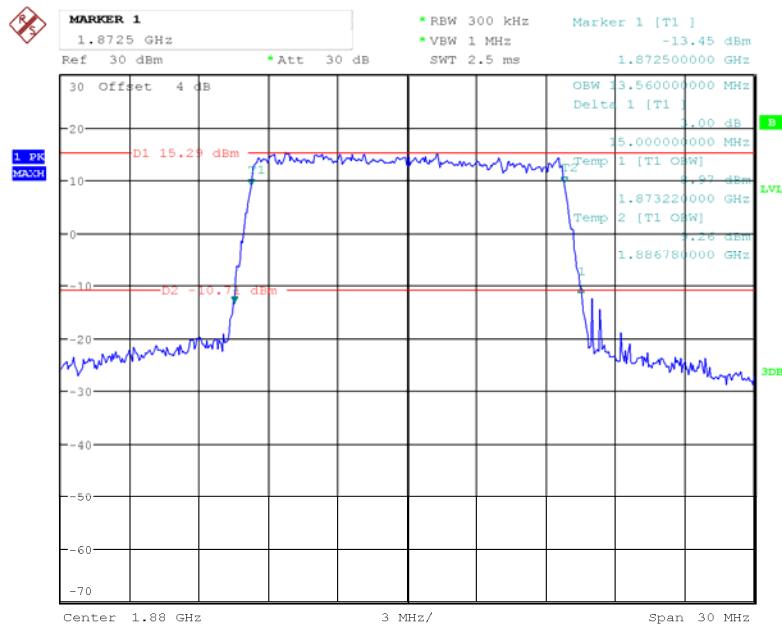
16QAM_5 MHz

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16QAM_10 MHz

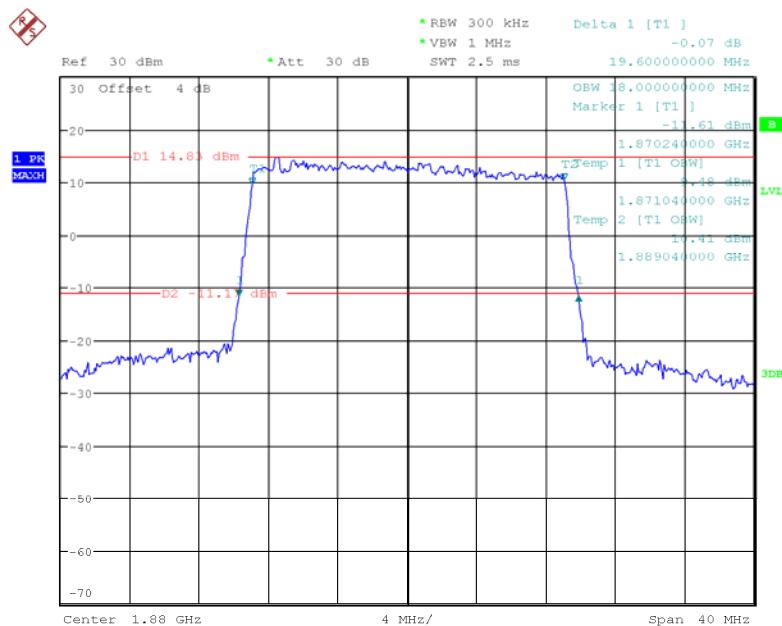
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16QAM_15 MHz

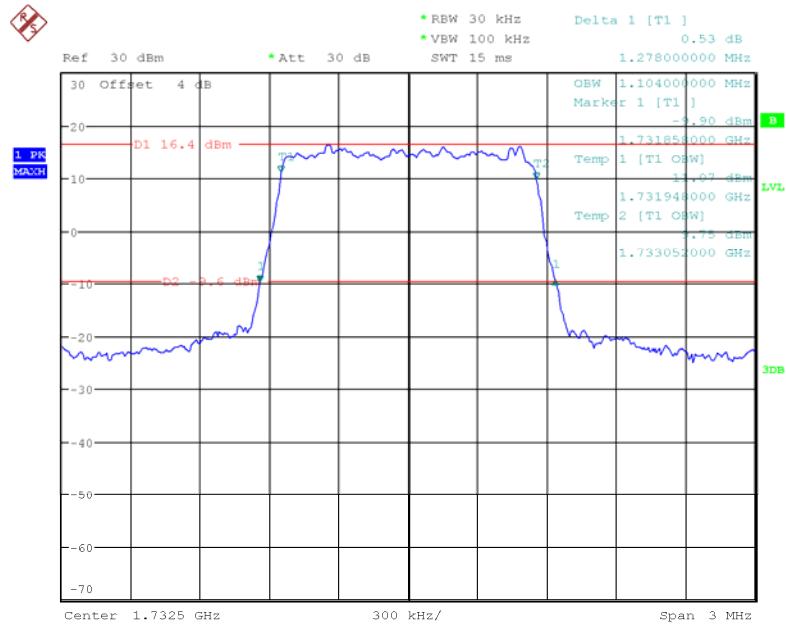


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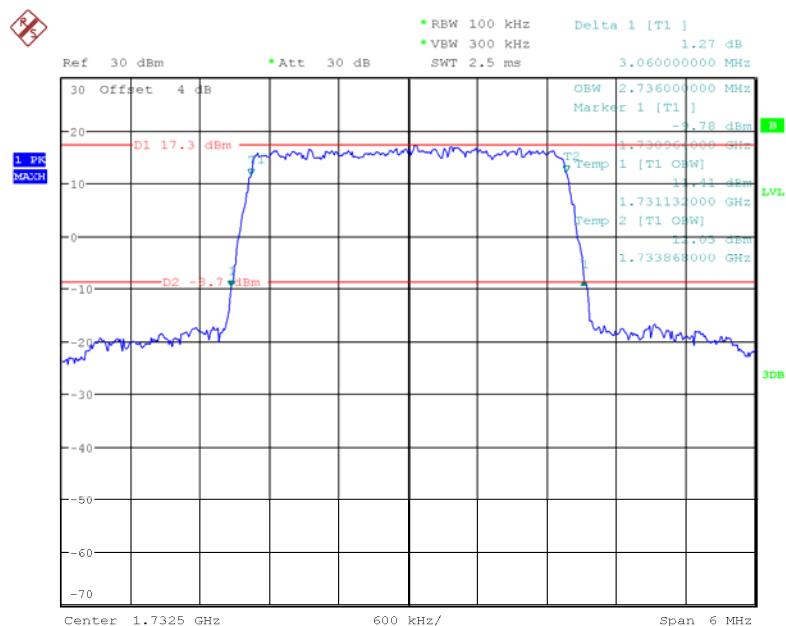
16QAM_20 MHz



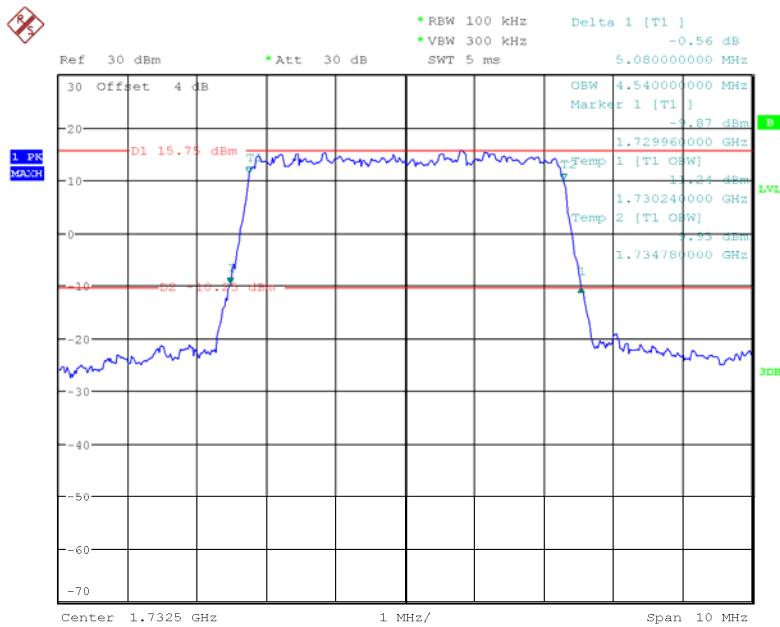
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LTE Band 4:**QPSK_1.4 MHz**

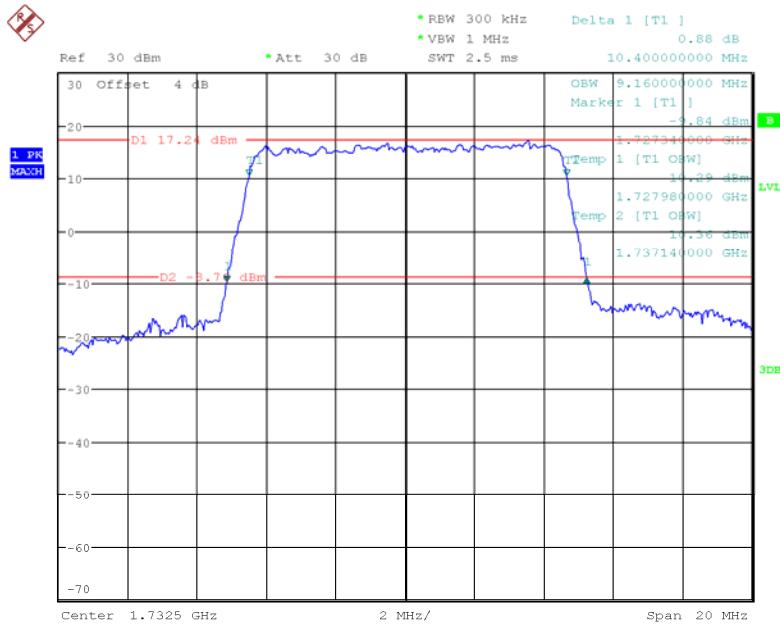
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QPSK_3 MHz

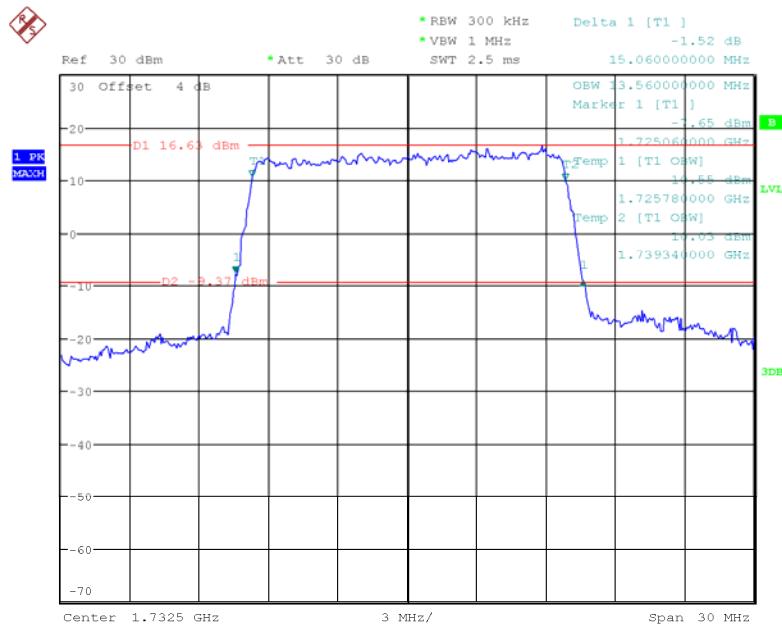
Date: 17.OCT.2017 14:55:37

QPSK_5 MHz

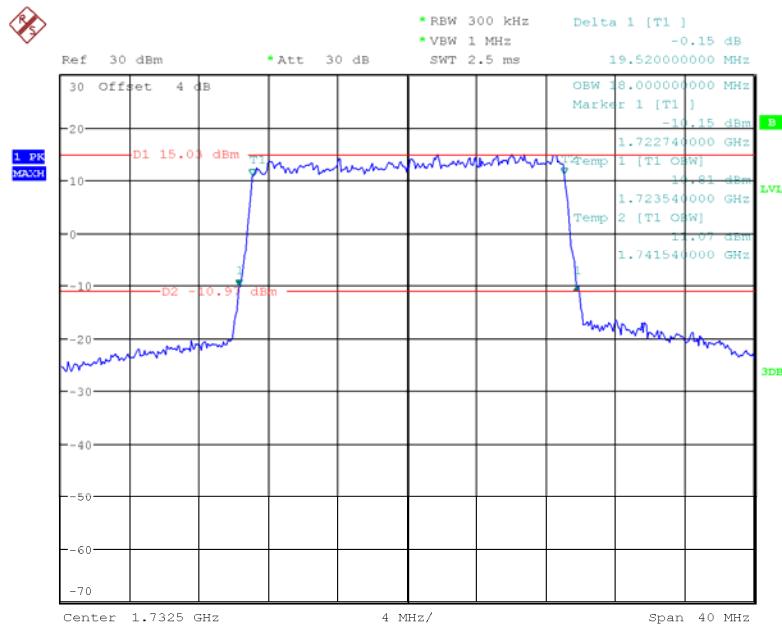
Date: 17.OCT.2017 14:59:32

QPSK_10 MHz

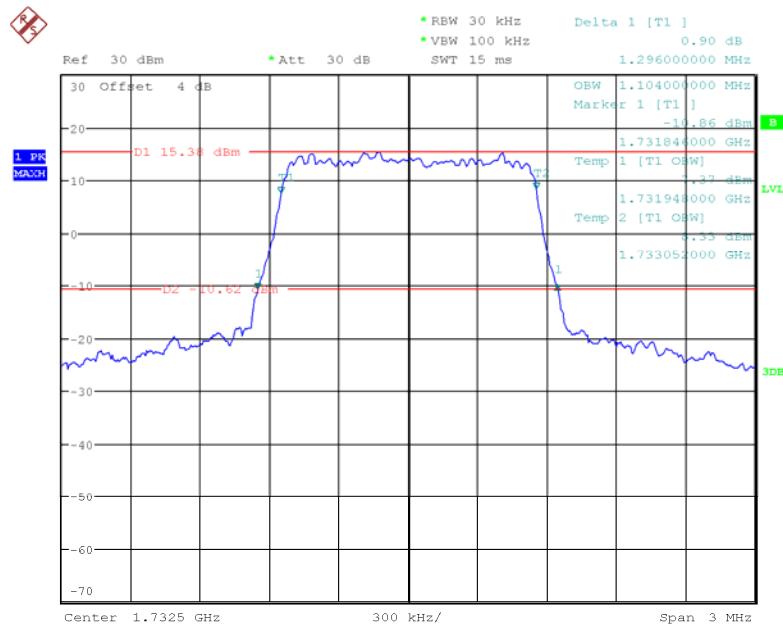
Date: 17.OCT.2017 15:13:53

QPSK_15 MHz

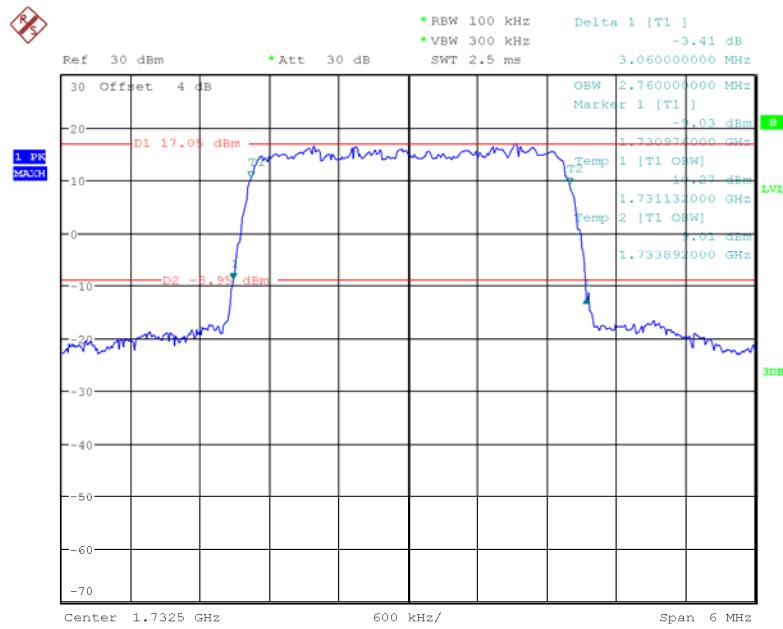
Date: 17.OCT.2017 15:17:21

QPSK_20 MHz

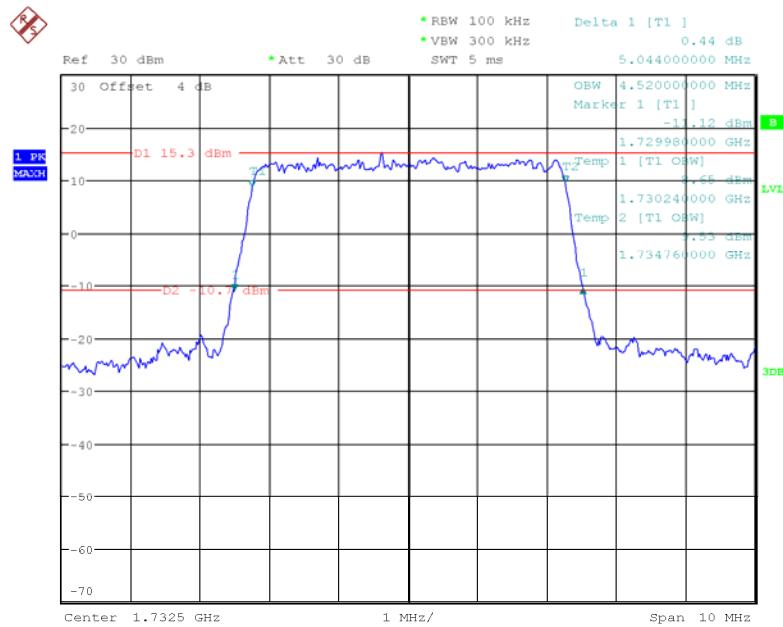
Date: 17.OCT.2017 15:20:11

16QAM_1.4 MHz

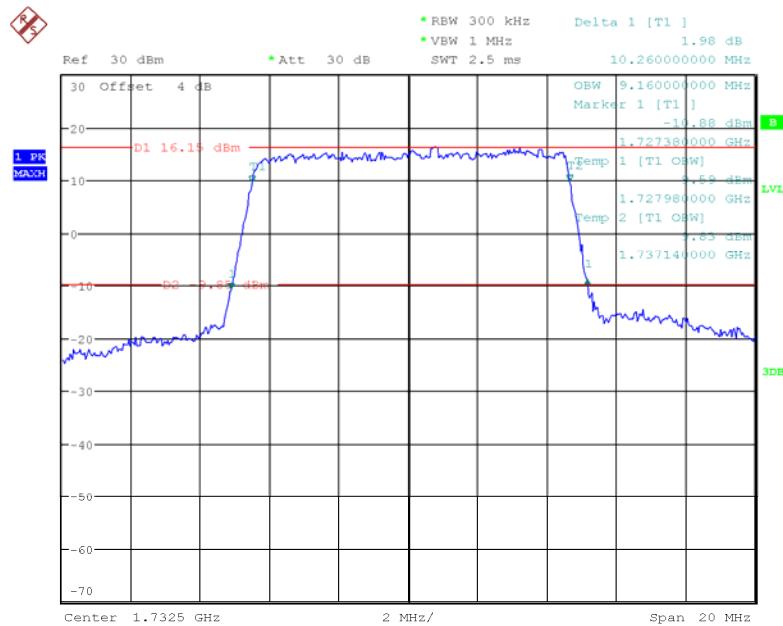
Date: 17.OCT.2017 14:49:45

16QAM_3 MHz

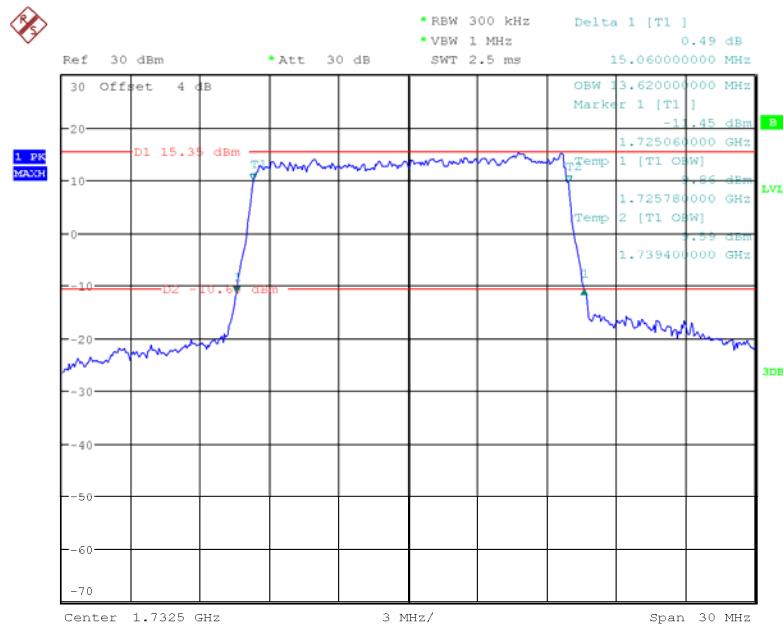
Date: 17.OCT.2017 14:54:33

16QAM_5 MHz

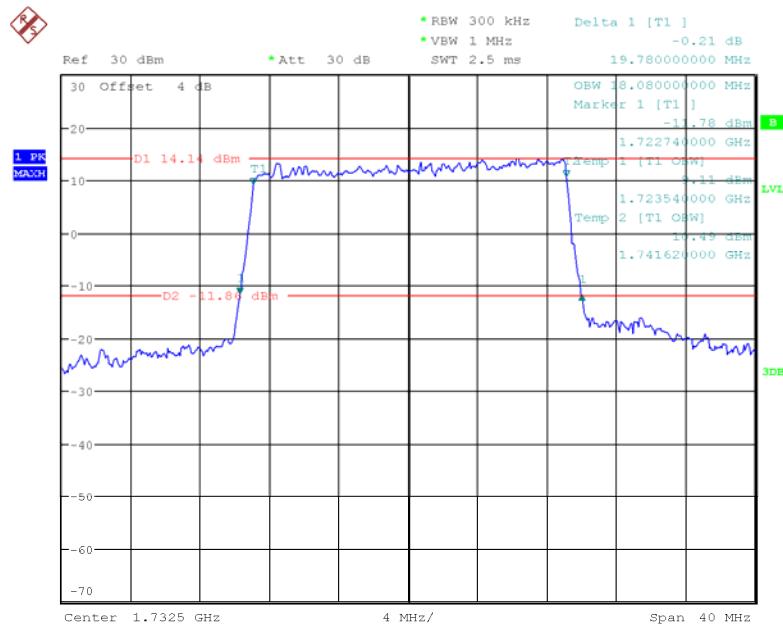
Date: 17.OCT.2017 14:58:31

16QAM_10 MHz

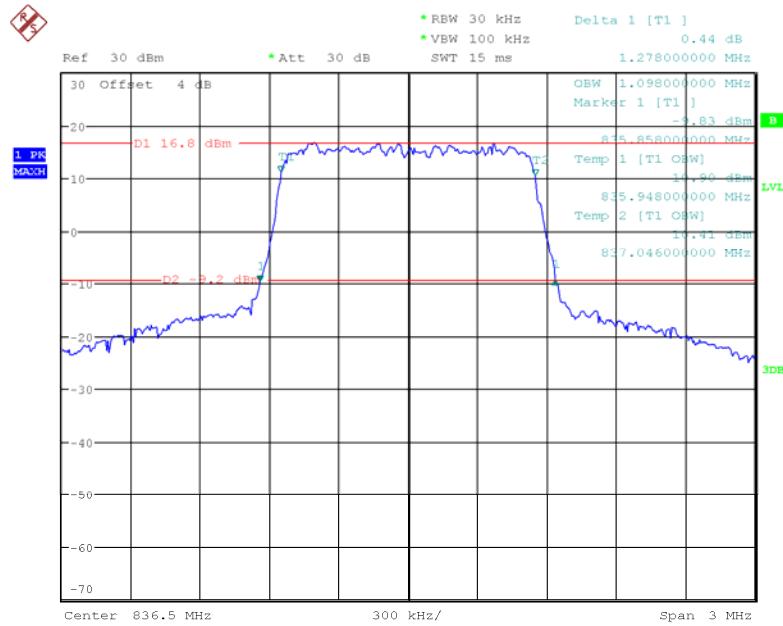
Date: 17.OCT.2017 15:07:54

16QAM_15 MHz

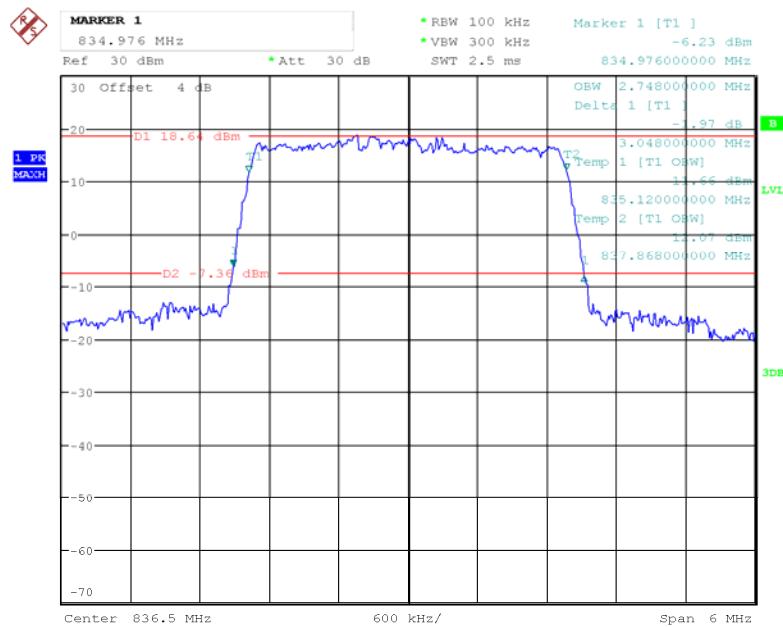
Date: 17.OCT.2017 15:16:33

16QAM_20 MHz

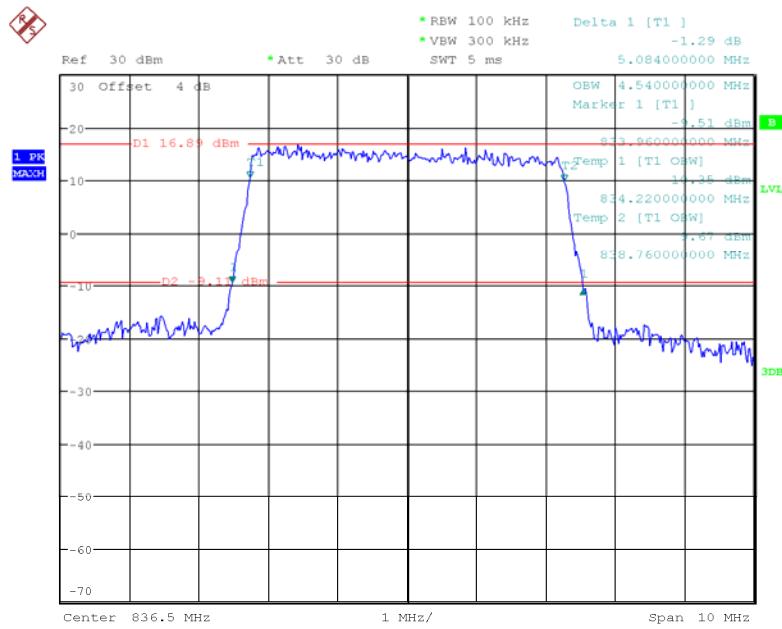
Date: 17.OCT.2017 15:19:08

LTE Band 5:**QPSK_1.4 MHz**

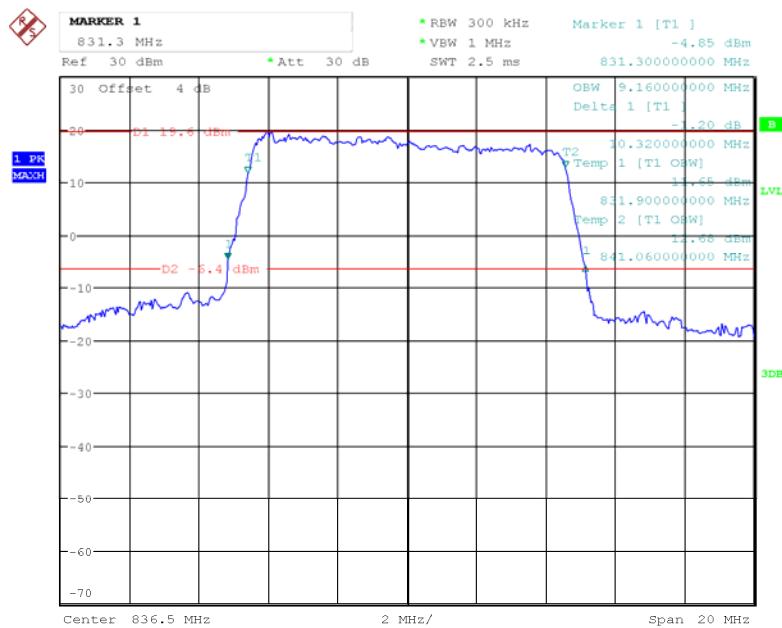
Date: 17.OCT.2017 15:26:55

QPSK_3 MHz

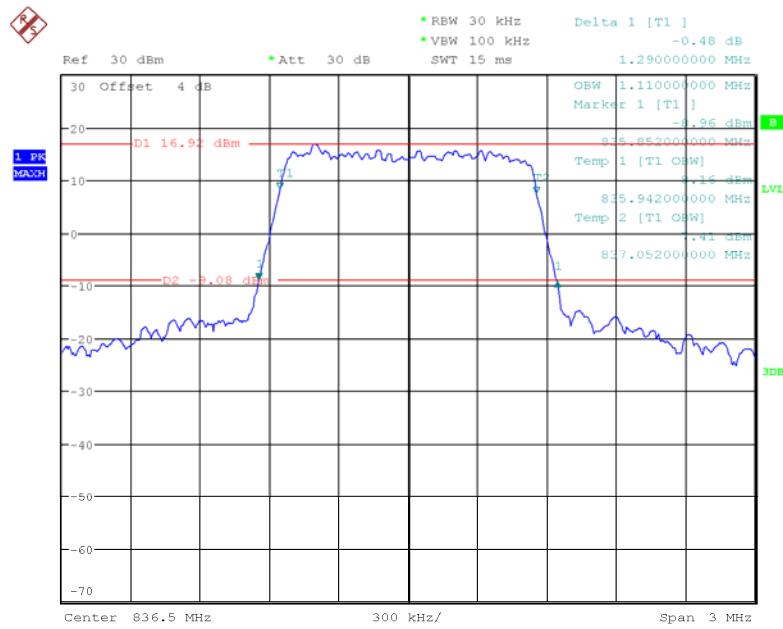
Date: 17.OCT.2017 15:36:19

QPSK_5 MHz

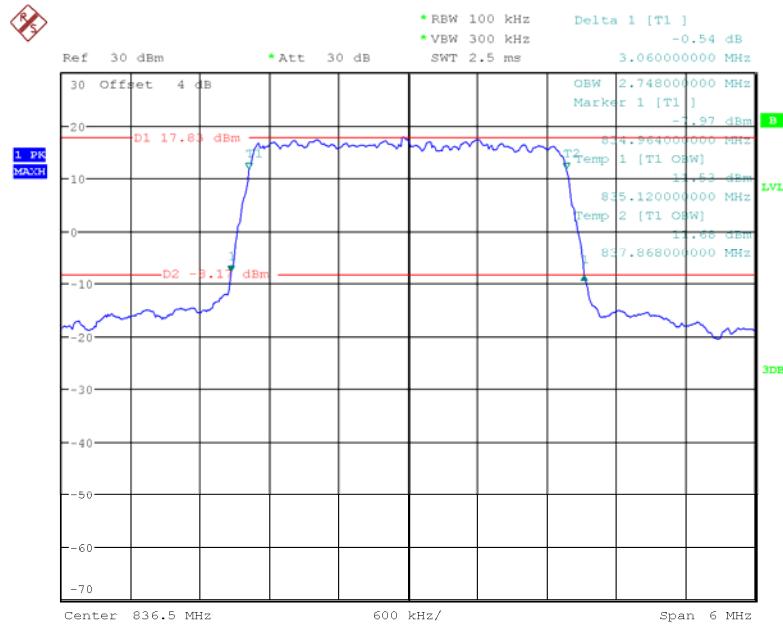
Date: 17.OCT.2017 15:38:51

QPSK_10 MHz

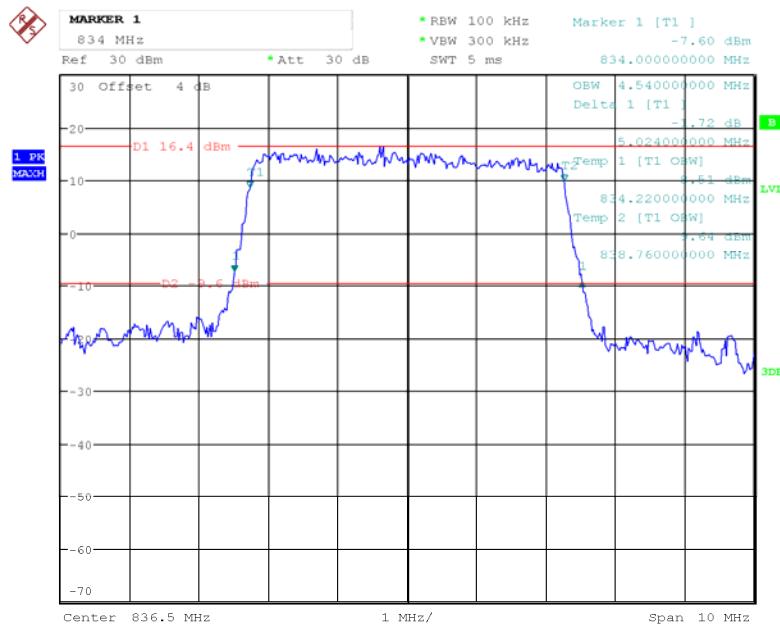
Date: 17.OCT.2017 15:44:04

16QAM_1.4 MHz

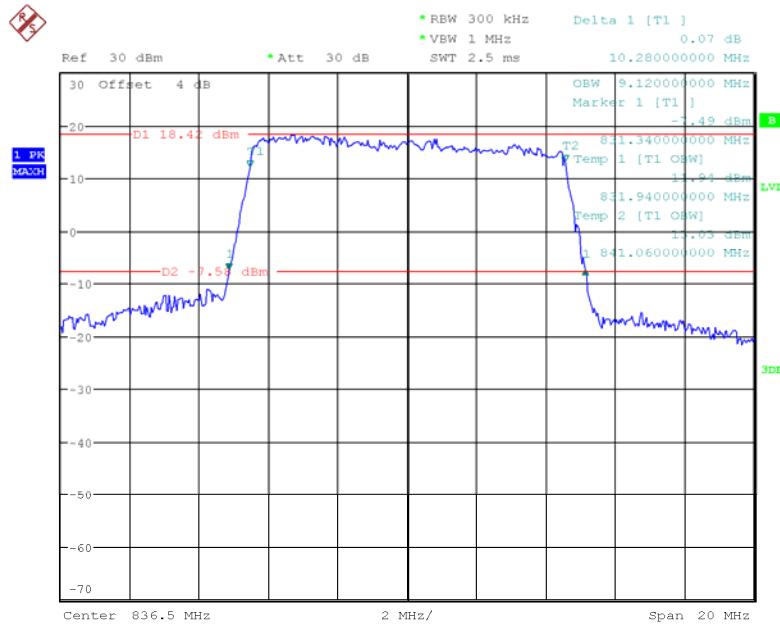
Date: 17.OCT.2017 15:26:08

16QAM_3 MHz

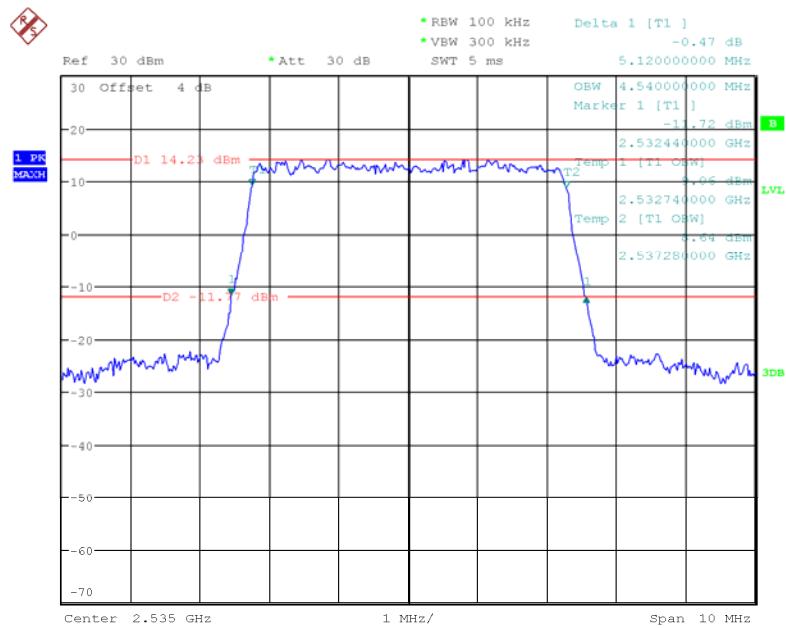
Date: 17.OCT.2017 15:35:28

16QAM_5 MHz

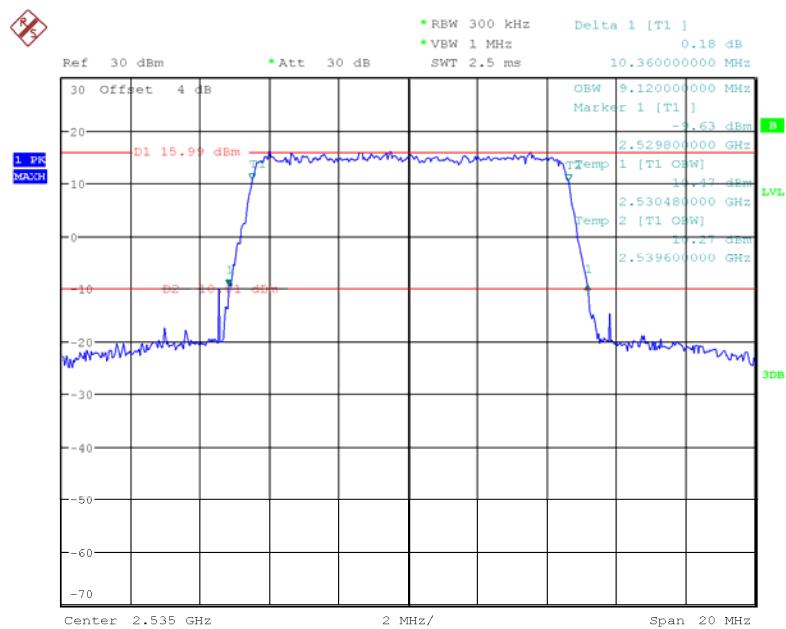
Date: 17.OCT.2017 15:38:14

16QAM_10 MHz

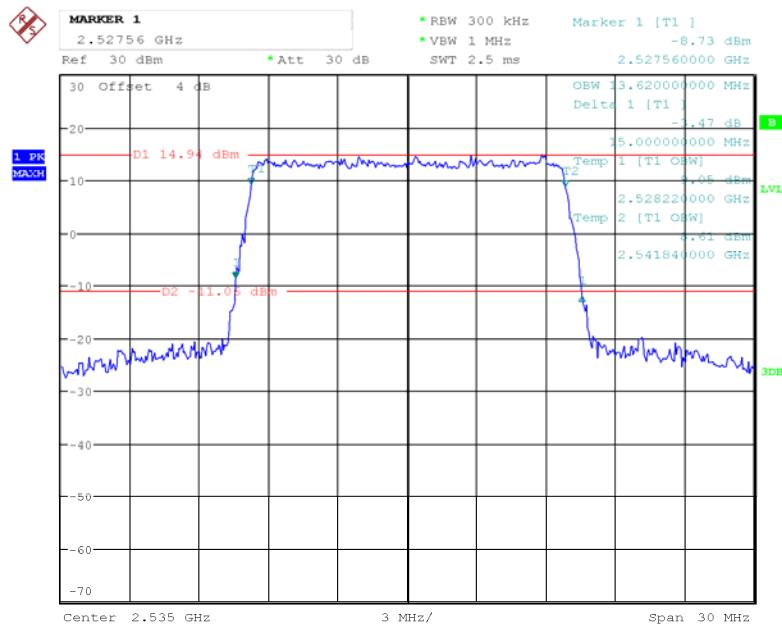
Date: 17.OCT.2017 15:42:53

LTE Band 7:**QPSK_5 MHz**

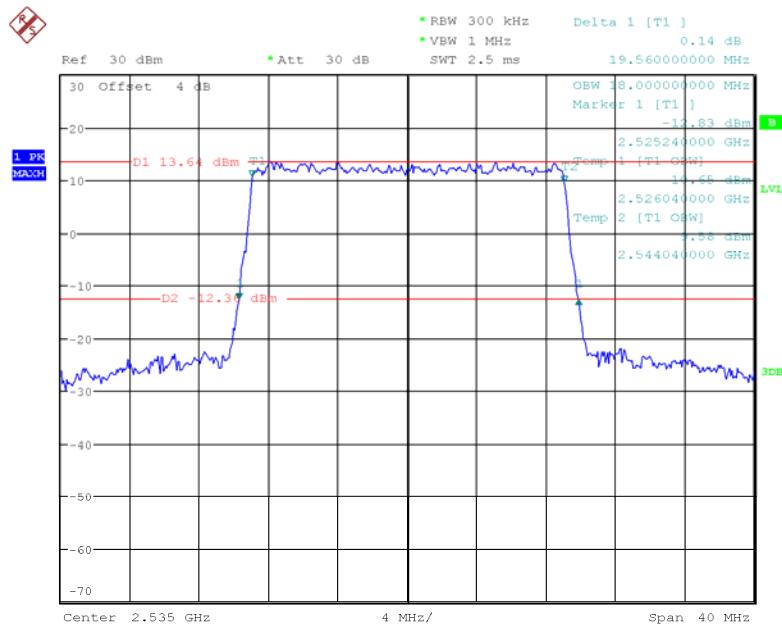
Date: 17.OCT.2017 15:48:38

QPSK_10 MHz

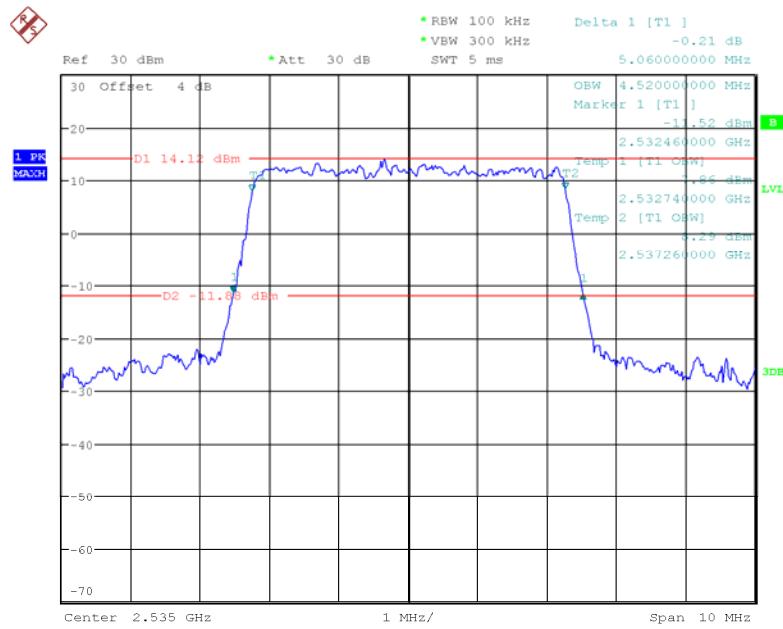
Date: 17.OCT.2017 15:53:44

QPSK_15 MHz

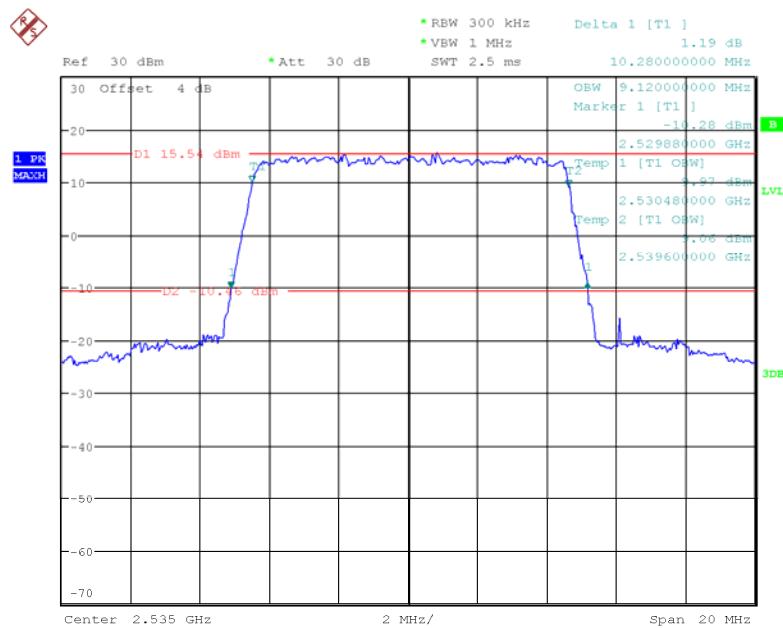
Date: 17.OCT.2017 15:56:40

QPSK_20 MHz

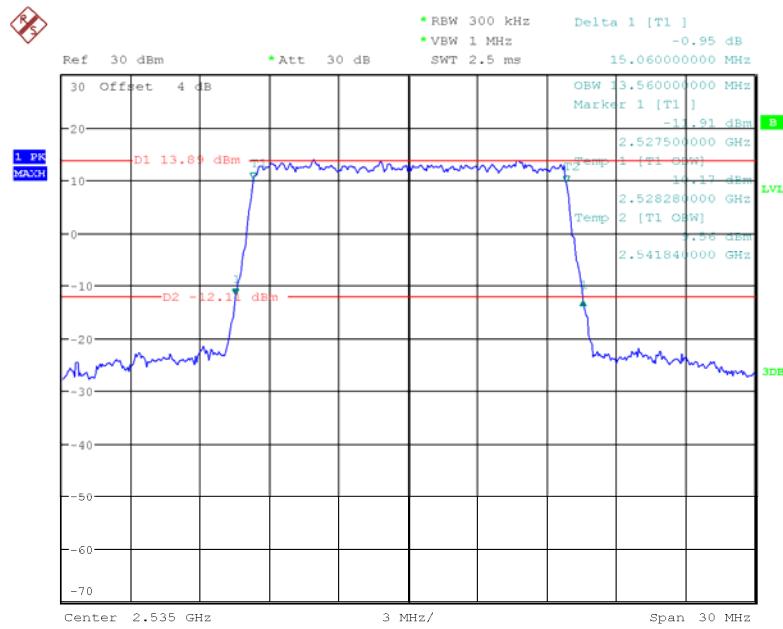
Date: 17.OCT.2017 15:59:07

16QAM_5 MHz

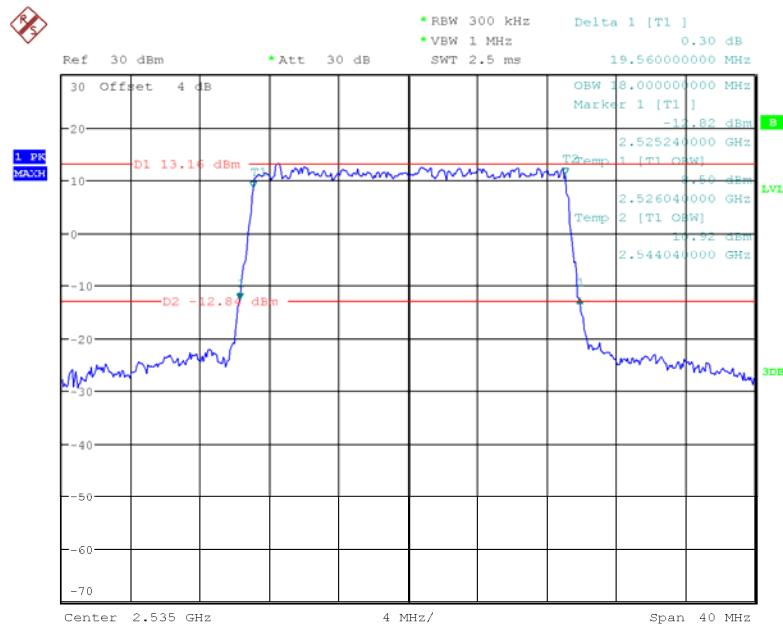
Date: 17.OCT.2017 15:47:41

16QAM_10 MHz

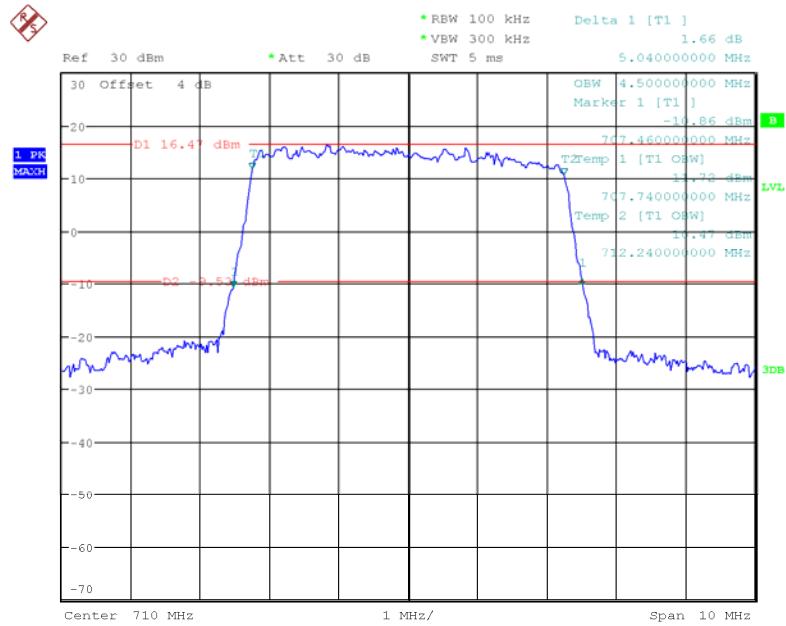
Date: 17.OCT.2017 15:52:59

16QAM_15 MHz

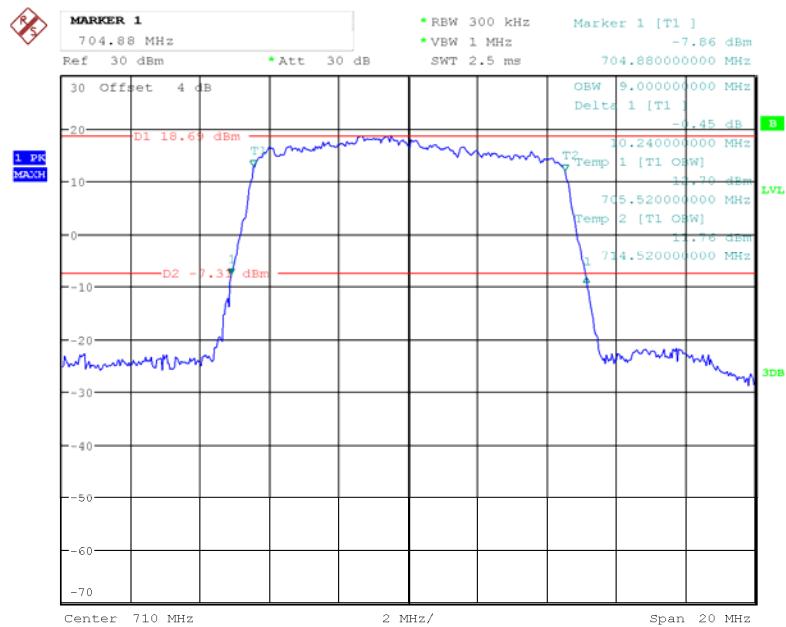
Date: 17.OCT.2017 15:56:00

16QAM_20 MHz

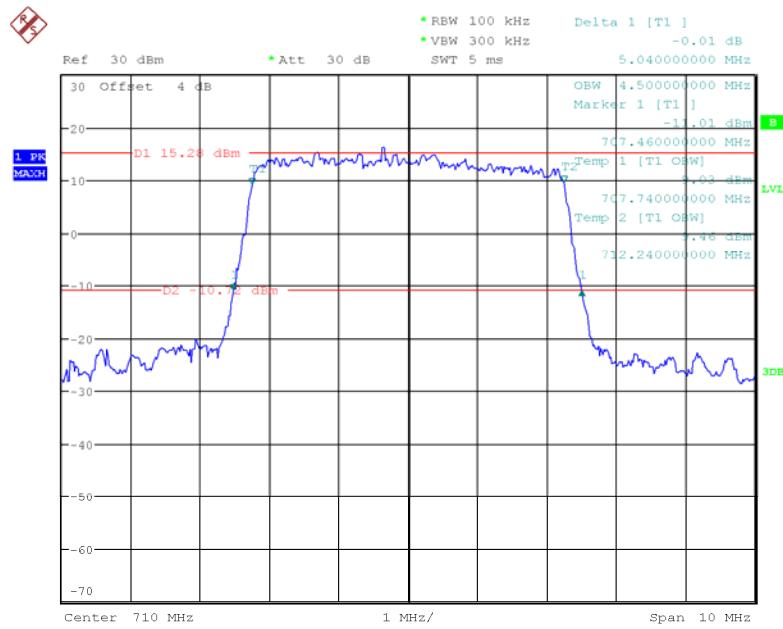
Date: 17.OCT.2017 15:58:09

LTE Band 17:**QPSK_5 MHz**

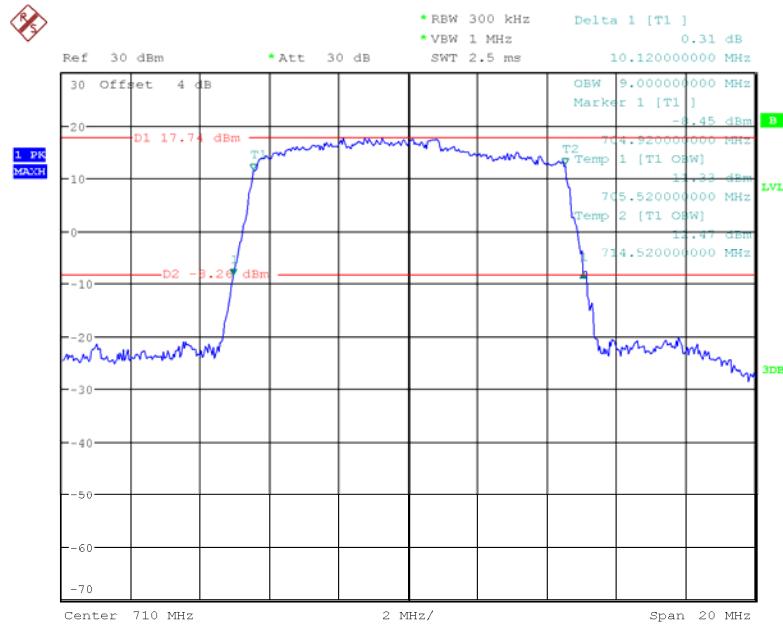
Date: 17.OCT.2017 16:06:22

QPSK_10 MHz

Date: 17.OCT.2017 16:10:47

16QAM_5 MHz

Date: 17.OCT.2017 16:05:21

16QAM_10 MHz

Date: 17.OCT.2017 16:09:53

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

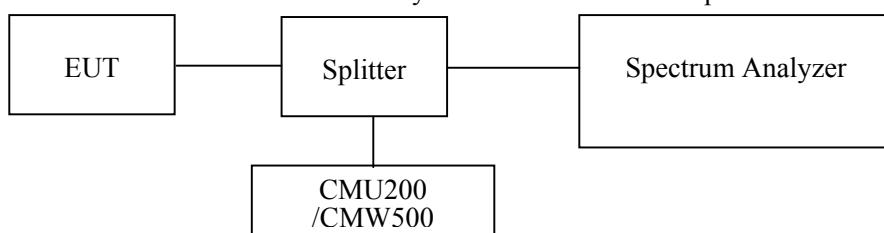
Applicable Standard

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	149216	2017-10-08	2018-10-08
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	/
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

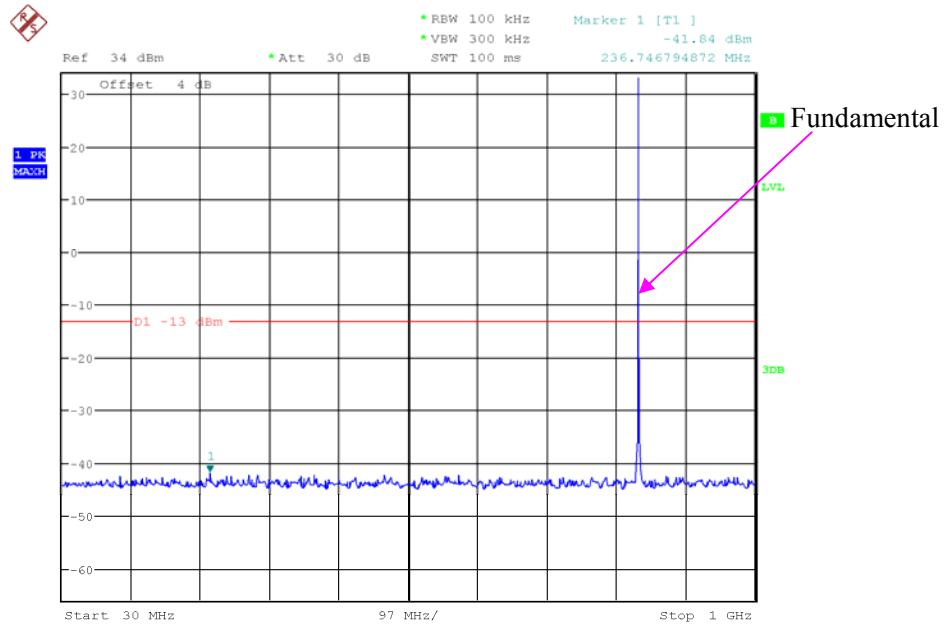
Environmental Conditions

Temperature:	26.4~26.8°C
Relative Humidity:	63~66 %
ATM Pressure:	99.4~100.8 kPa

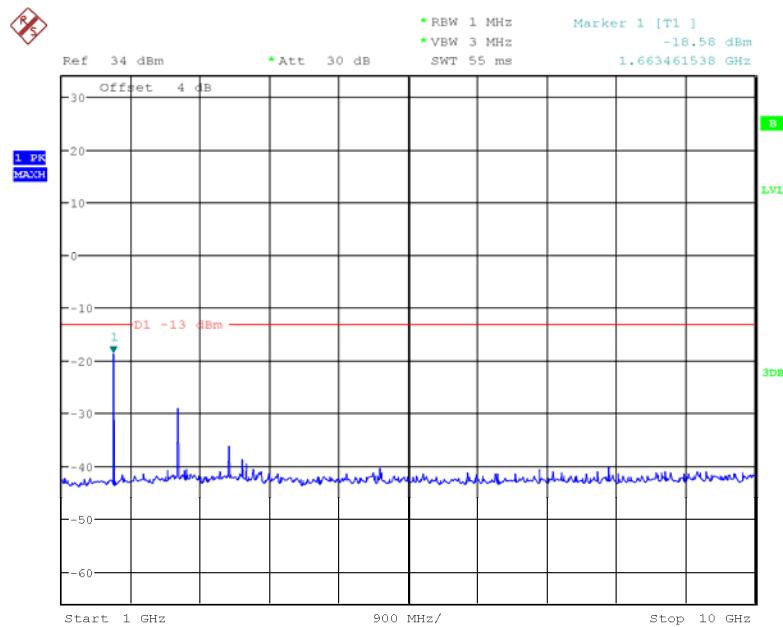
The testing was performed by Nami Quan from 2017-10-16 to 2017-10-17.

Please refer to the following plots.

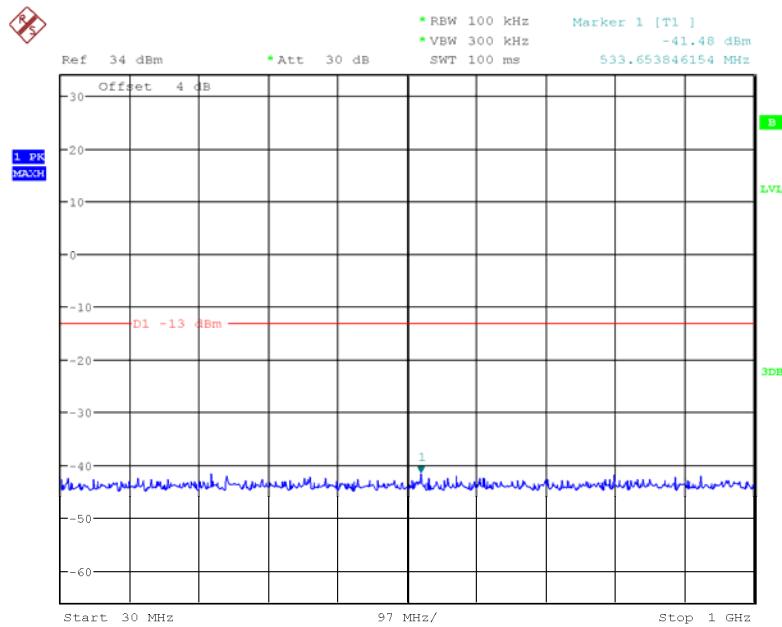
GSM850_Middle Channel



Date: 16.OCT.2017 23:21:26

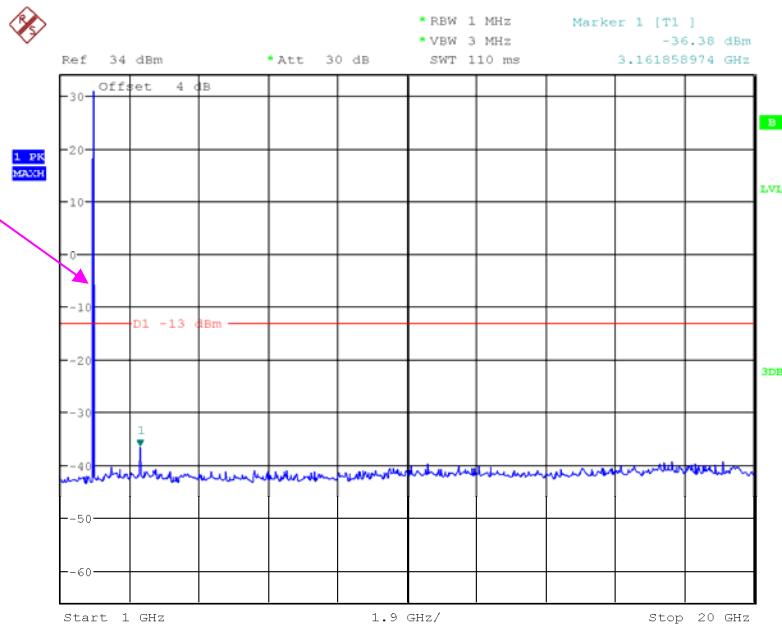


Date: 16.OCT.2017 23:21:50

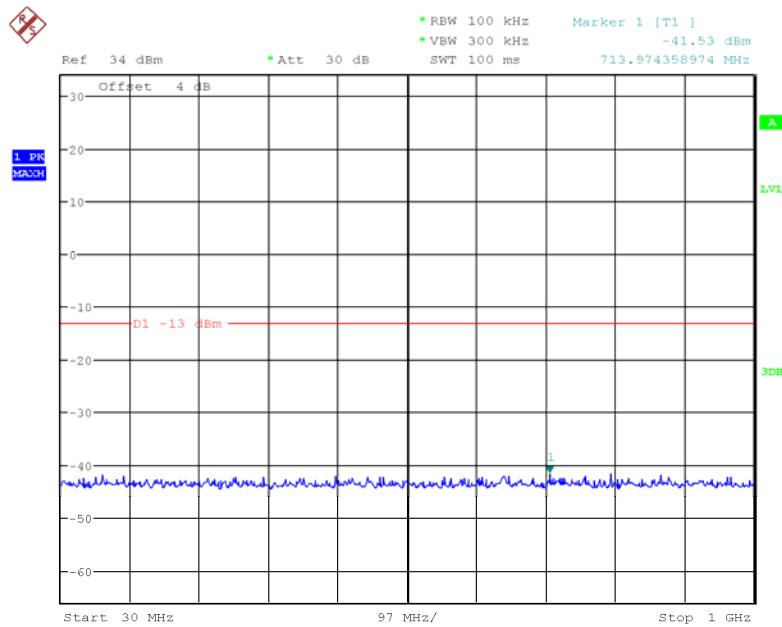
PCS 1900_Middle Channel

Date: 16.OCT.2017 22:44:19

Fundamental

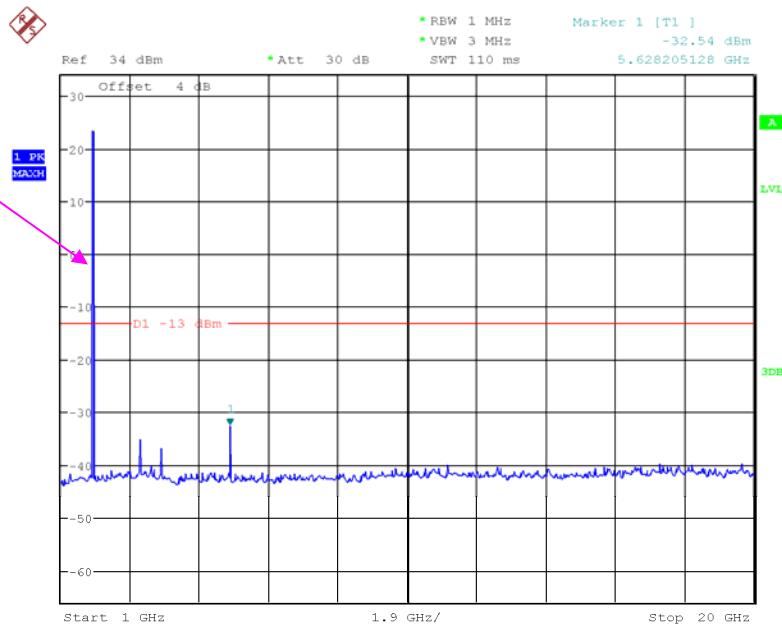


Date: 16.OCT.2017 22:43:40

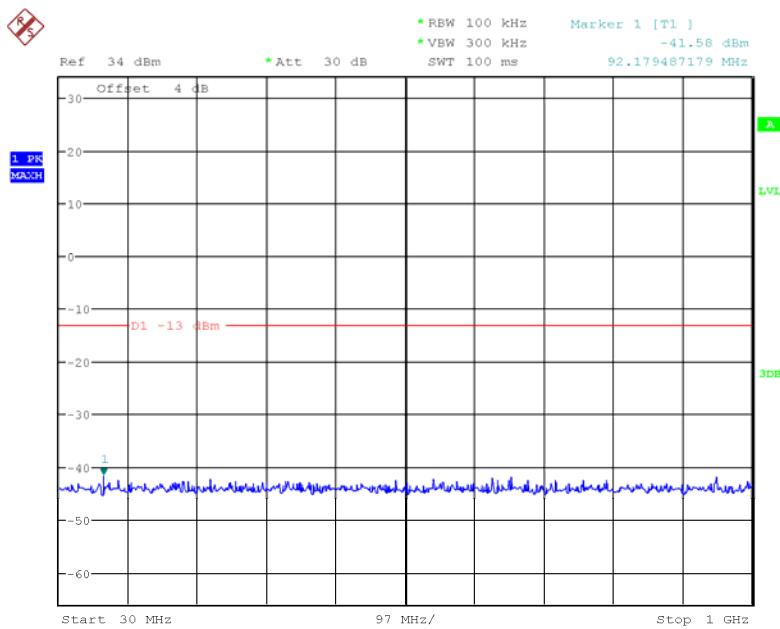
REL99 Band II_ Middle Channel

Date: 17.OCT.2017 21:15:01

Fundamental

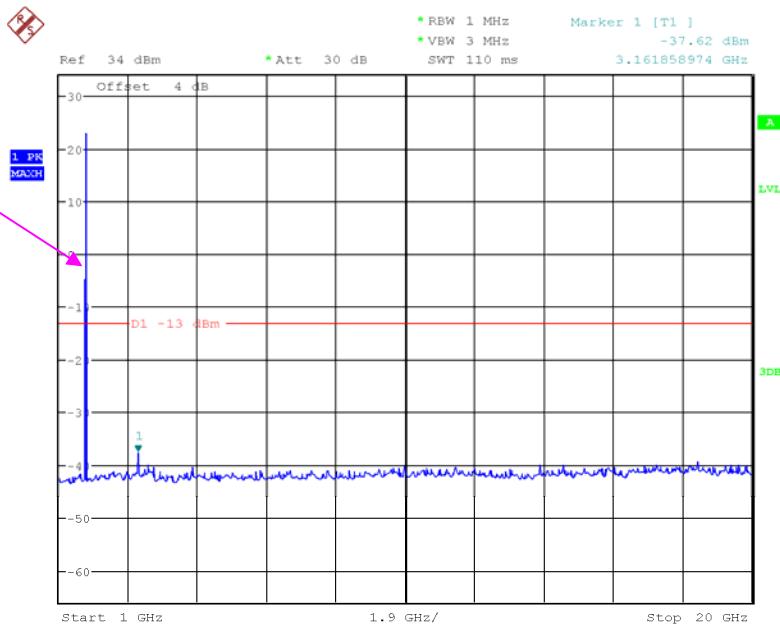


Date: 17.OCT.2017 21:15:21

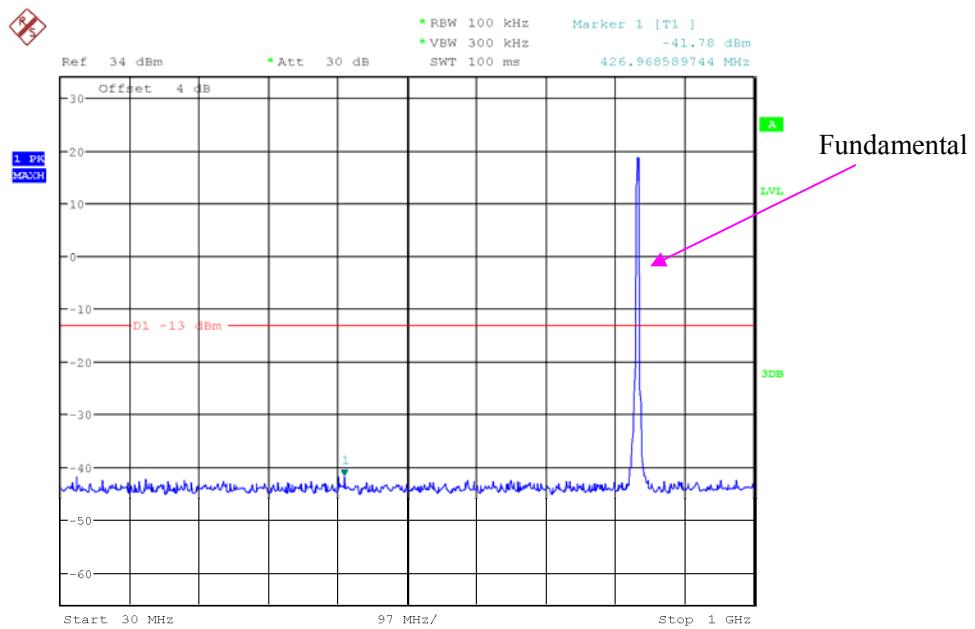
Rel 99 Band IV_ Middle Channel

Date: 17.OCT.2017 21:45:25

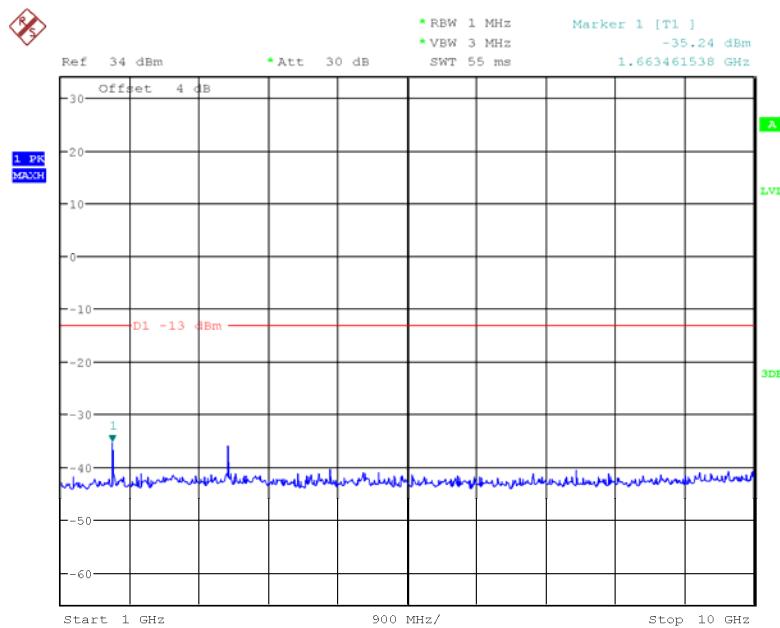
Fundamental



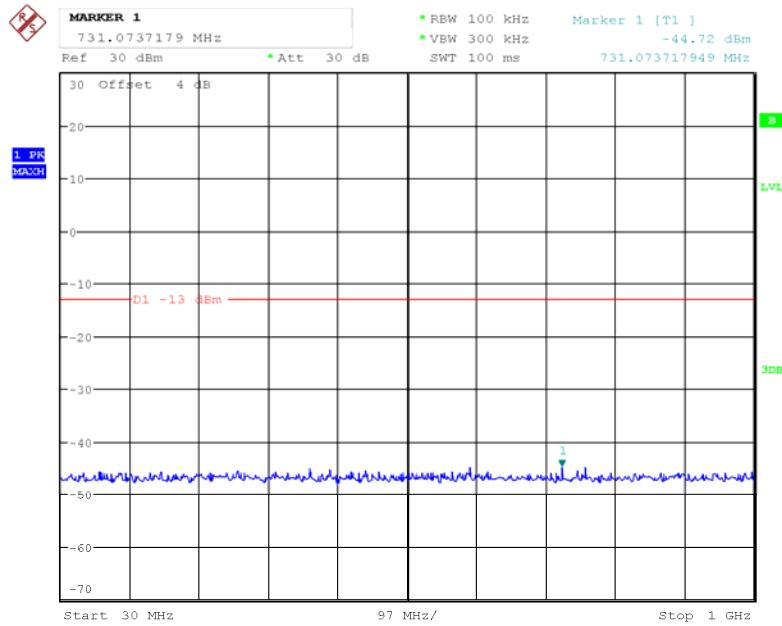
Date: 17.OCT.2017 21:45:51

Rel 99 Band V_Middle Channel

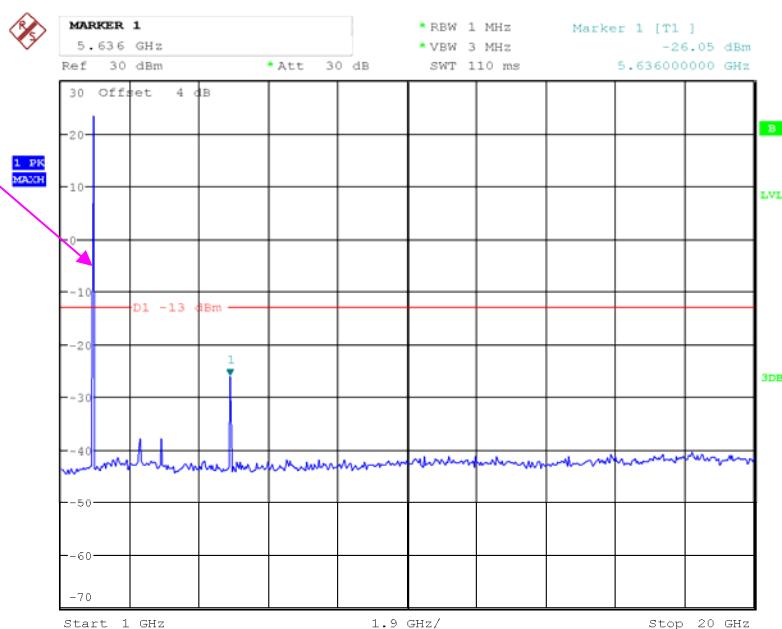
Date: 17.OCT.2017 22:29:19



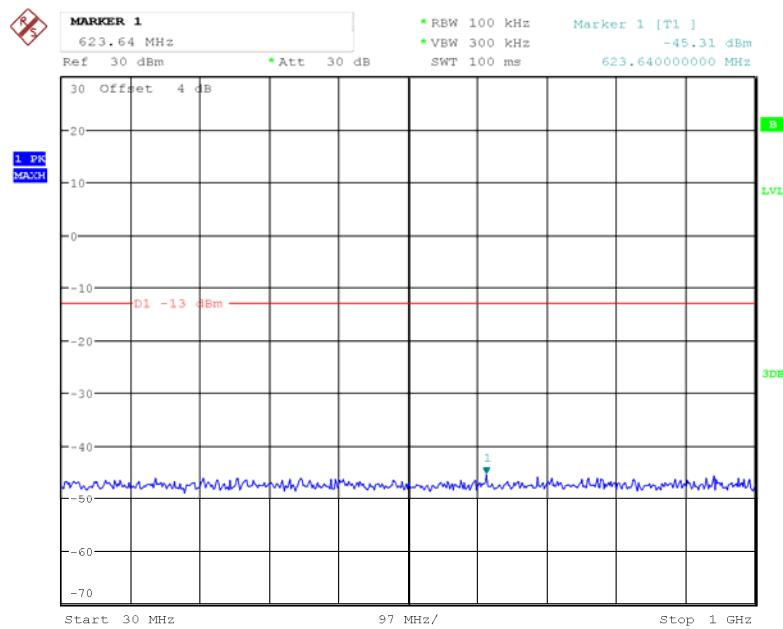
Date: 17.OCT.2017 22:29:34

LTE Band 2 (Middle Channel)**QPSK_1.4 MHz**

Date: 17.OCT.2017 13:24:44

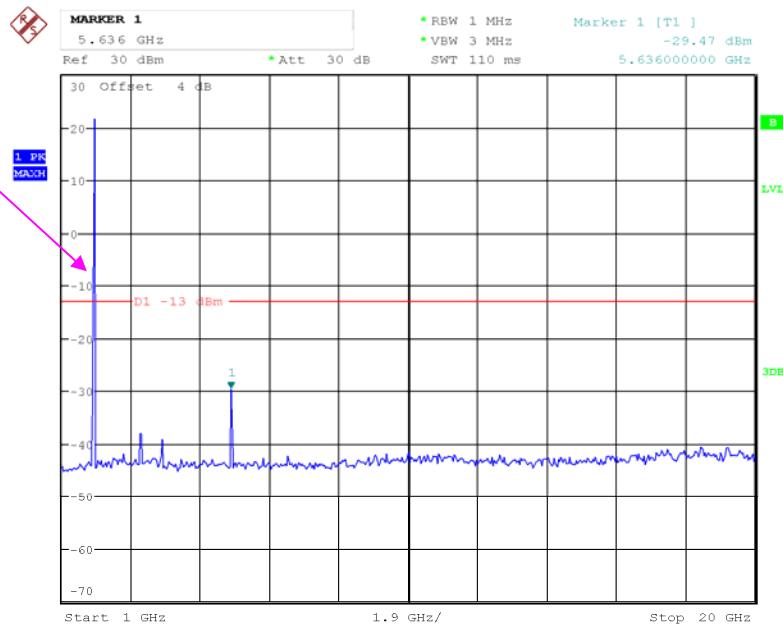
Fundamental

Date: 17.OCT.2017 13:37:09

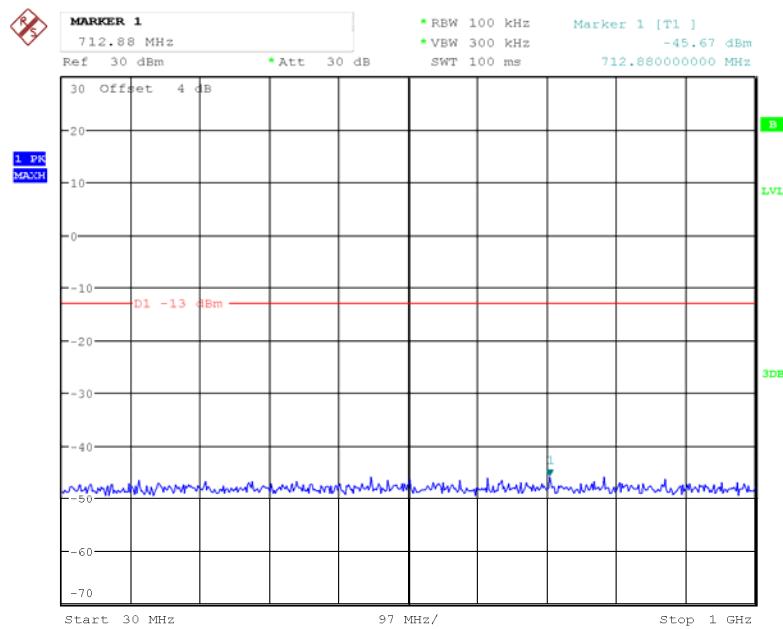
QPSK_3 MHz

Date: 17.OCT.2017 13:27:04

Fundamental

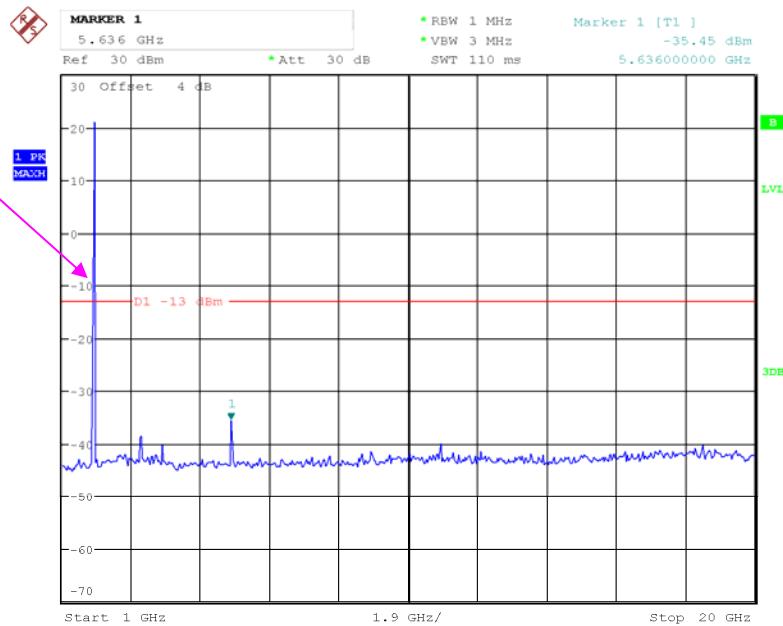


Date: 17.OCT.2017 13:37:34

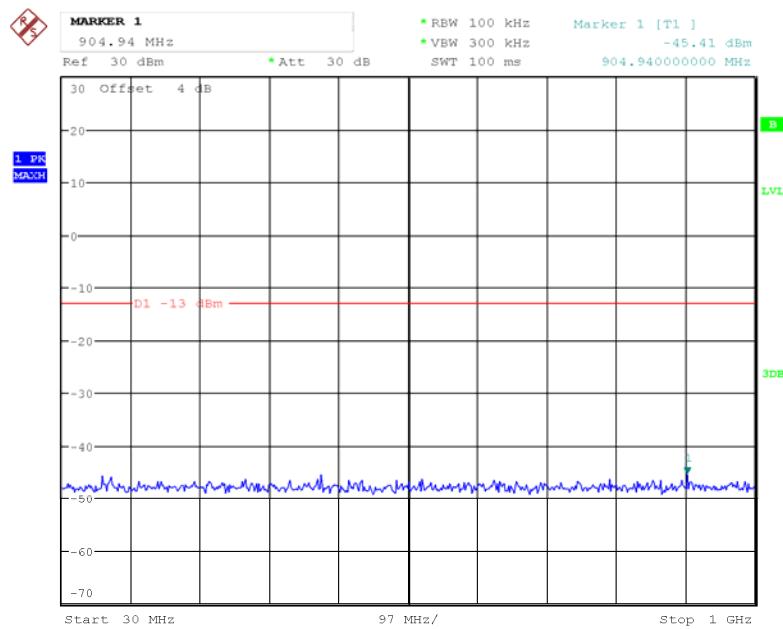
QPSK_5 MHz

Date: 17.OCT.2017 13:28:26

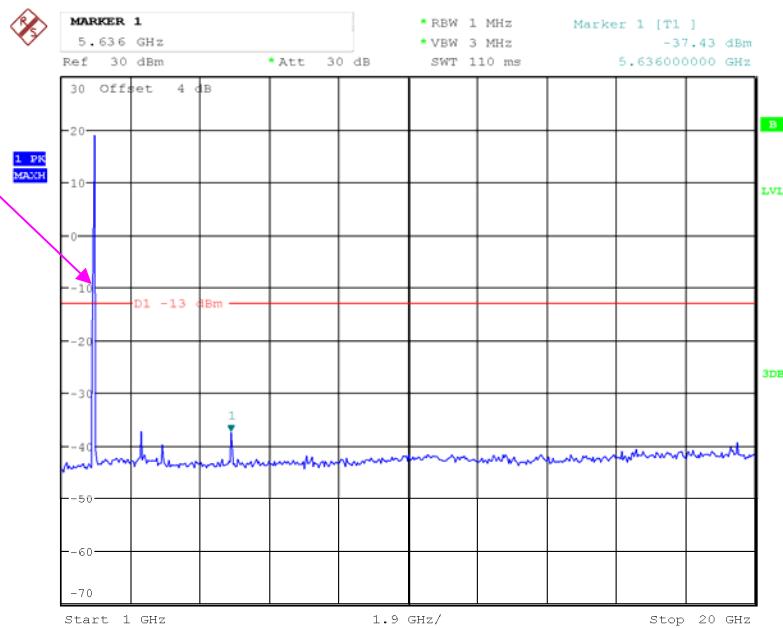
Fundamental



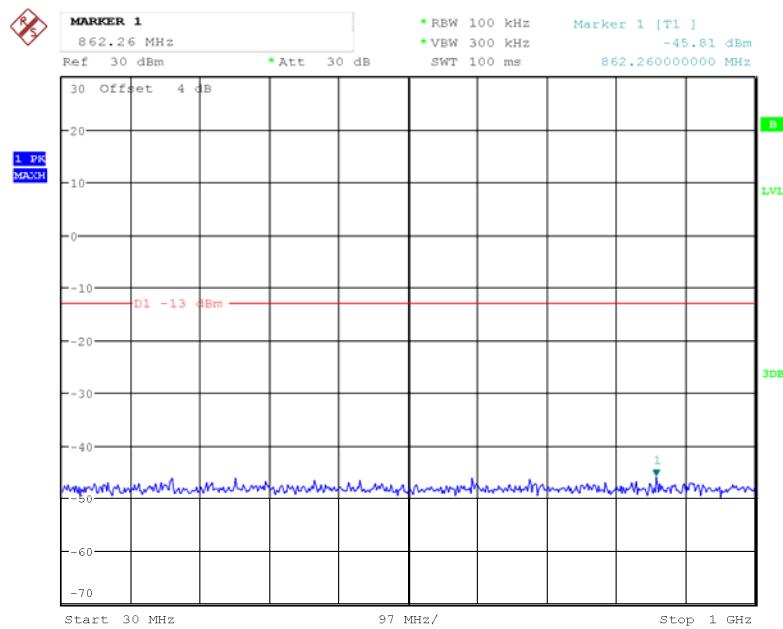
Date: 17.OCT.2017 13:39:43

QPSK_10 MHz

Date: 17.OCT.2017 13:31:56

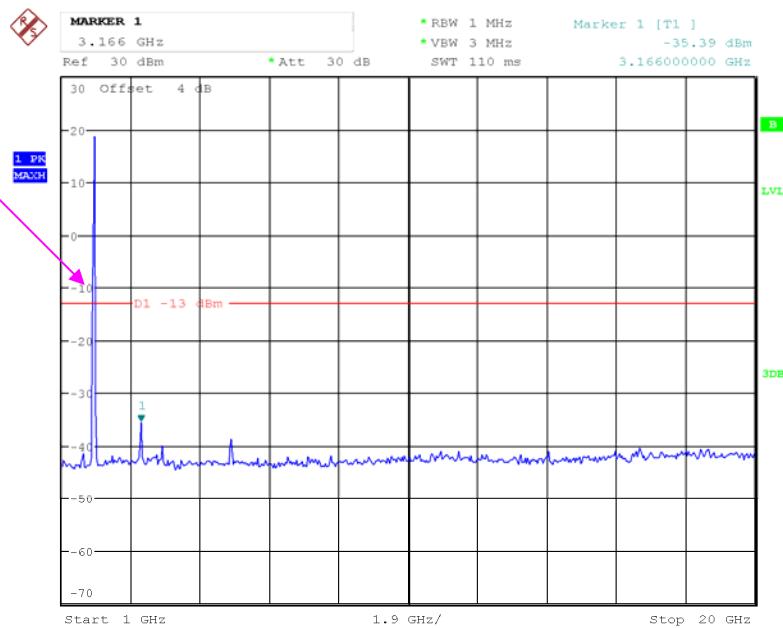
Fundamental

Date: 17.OCT.2017 13:32:46

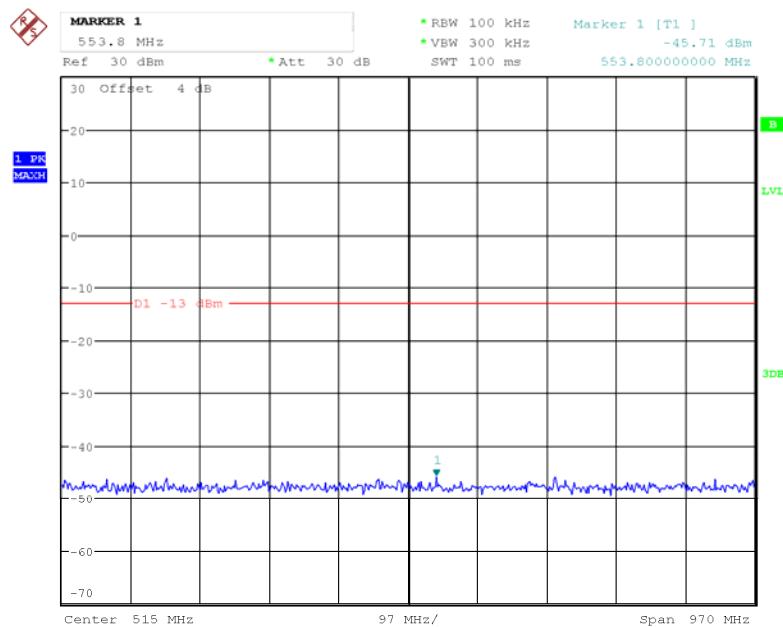
QPSK_15 MHz

Date: 17.OCT.2017 13:34:47

Fundamental

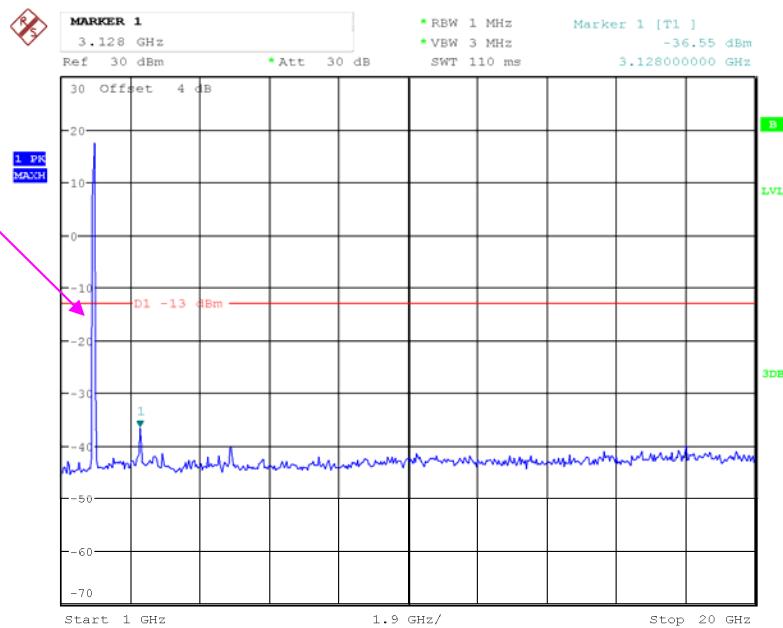


Date: 17.OCT.2017 13:34:28

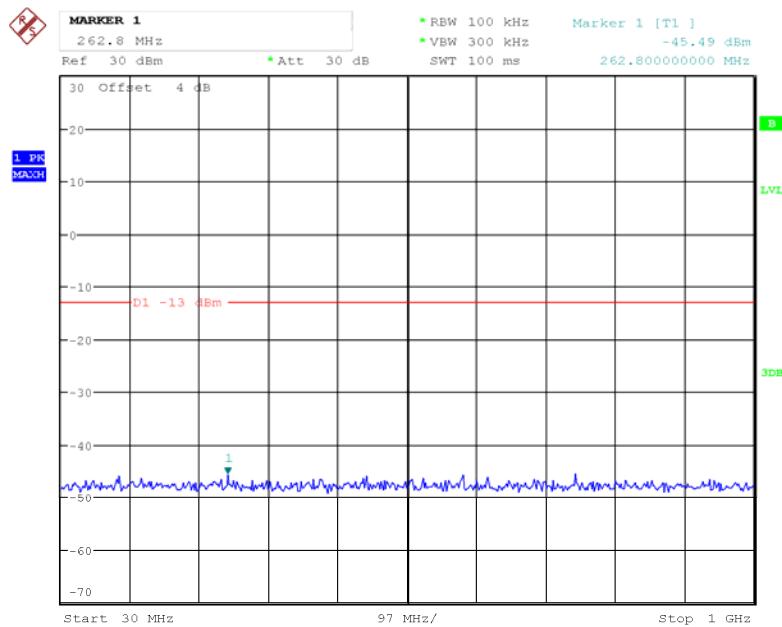
QPSK_20 MHz

Date: 17.OCT.2017 13:35:54

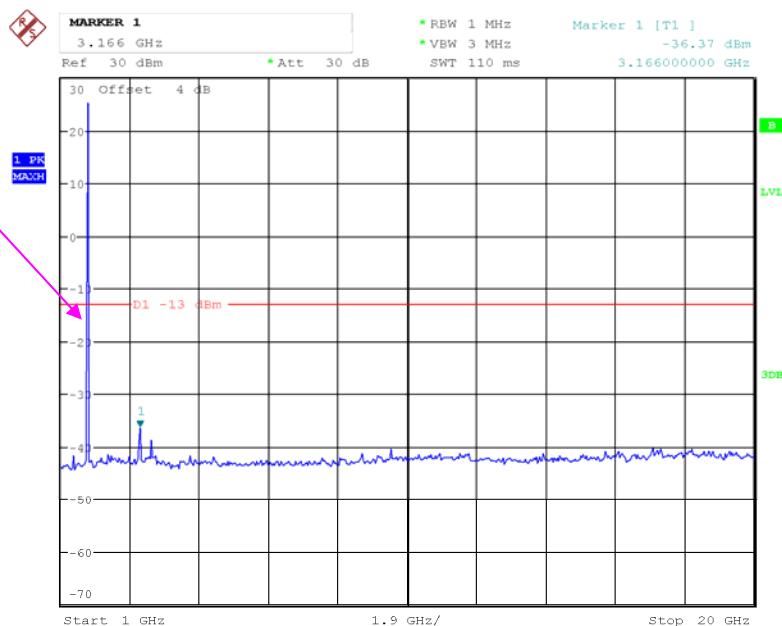
Fundamental



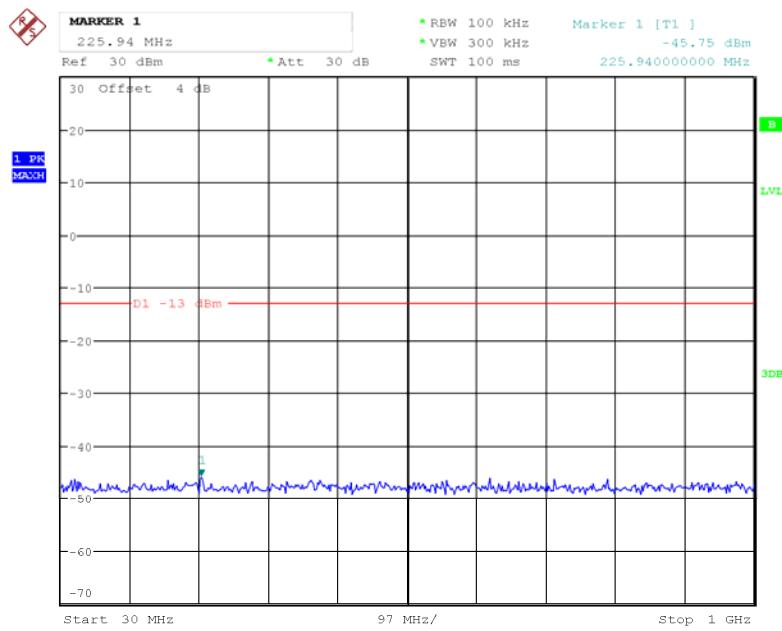
Date: 17.OCT.2017 13:36:11

LTE Band 4 (Middle Channel)**QPSK_1.4 MHz**

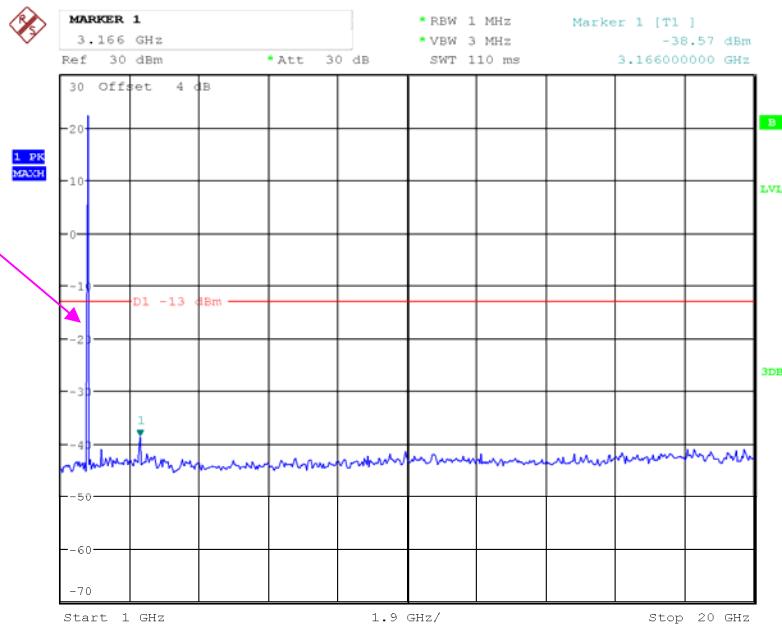
Date: 17.OCT.2017 13:41:07

Fundamental

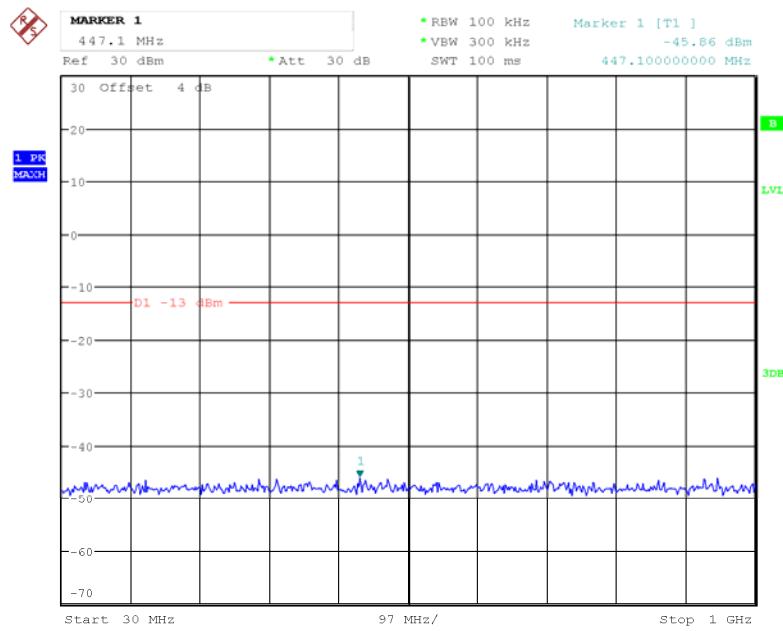
Date: 17.OCT.2017 13:43:01

QPSK_3 MHz

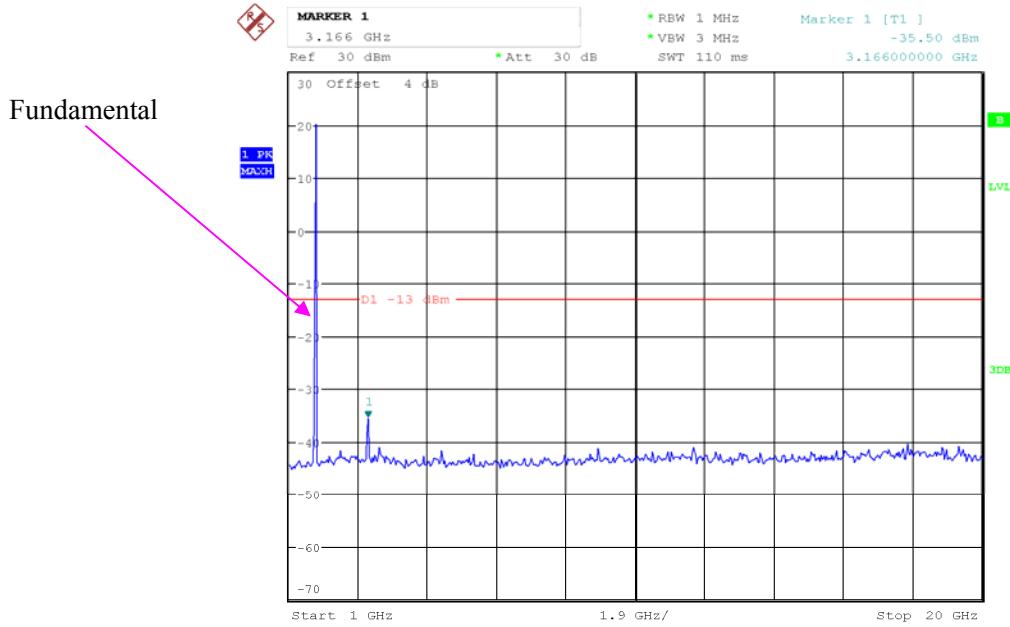
Date: 17.OCT.2017 13:44:10



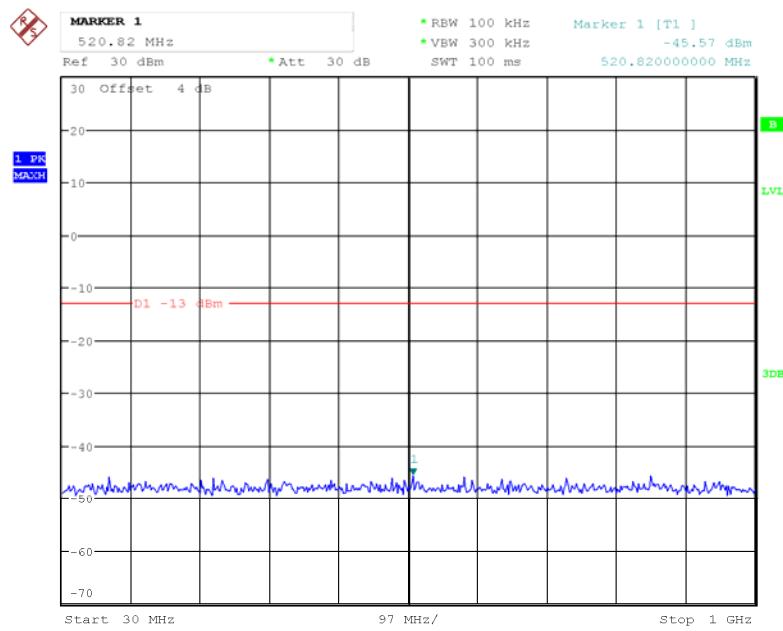
Date: 17.OCT.2017 13:43:31

QPSK_5 MHz

Date: 17.OCT.2017 13:48:29

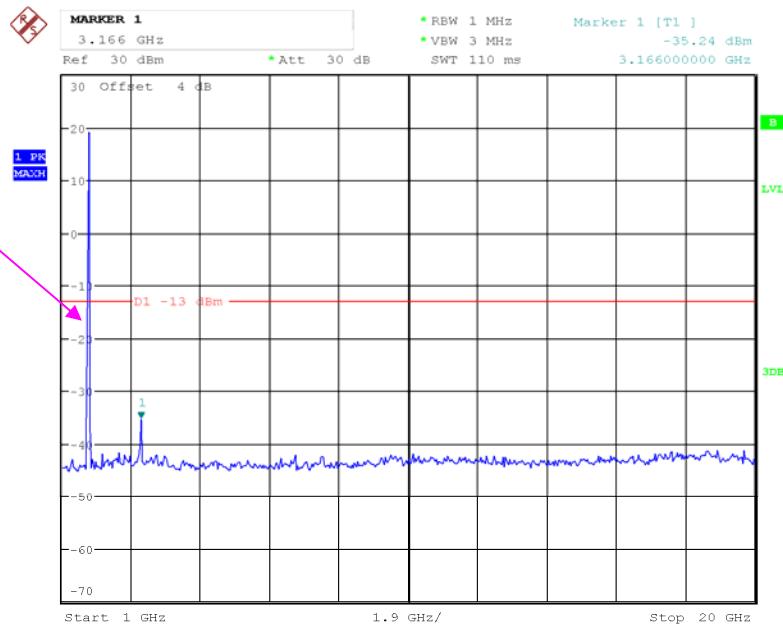


Date: 17.OCT.2017 13:48:43

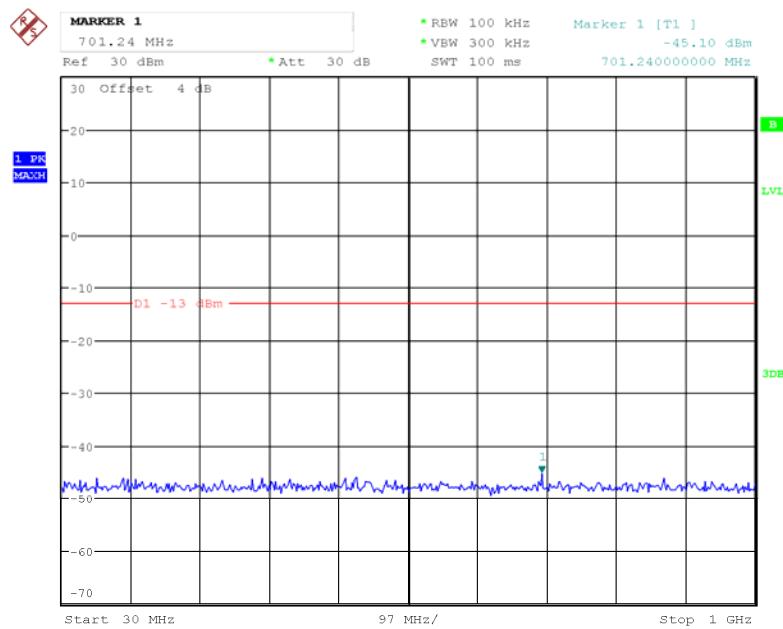
QPSK_10 MHz

Date: 17.OCT.2017 13:49:26

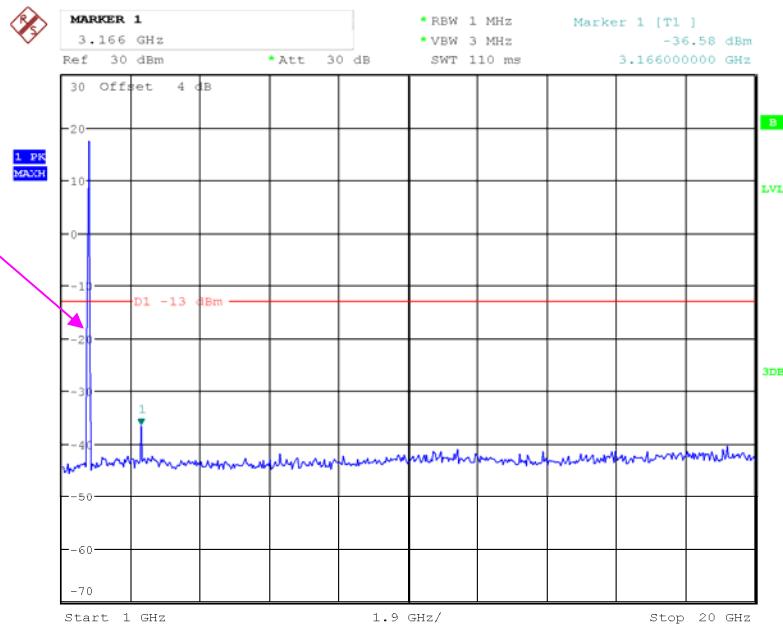
Fundamental



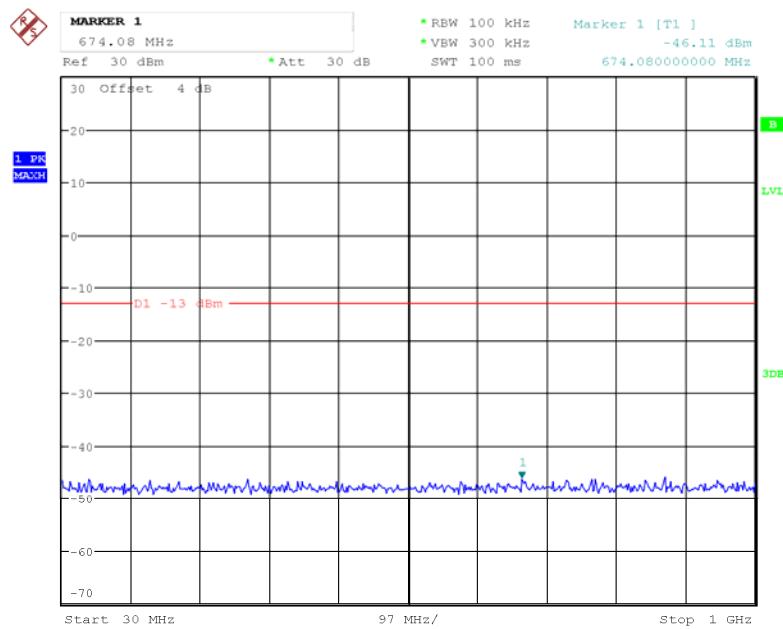
Date: 17.OCT.2017 13:49:10

QPSK_15 MHz

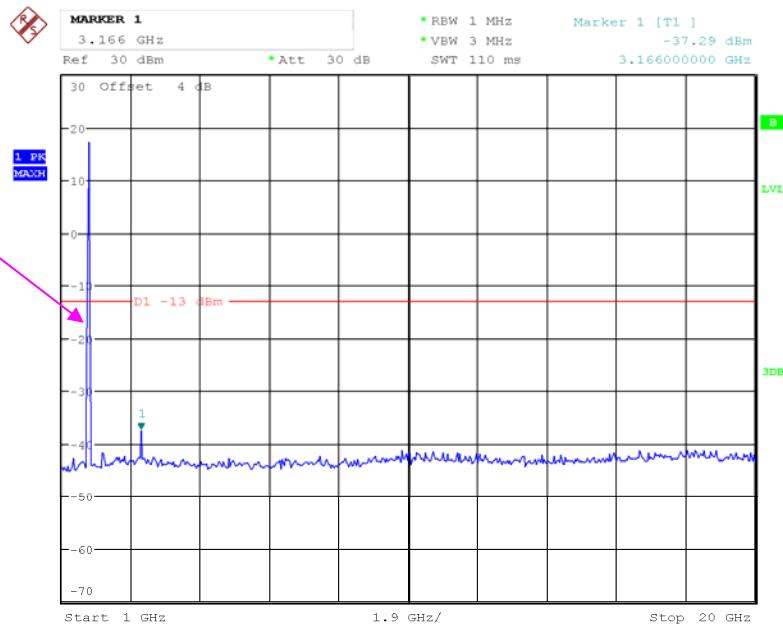
Date: 17.OCT.2017 13:50:16



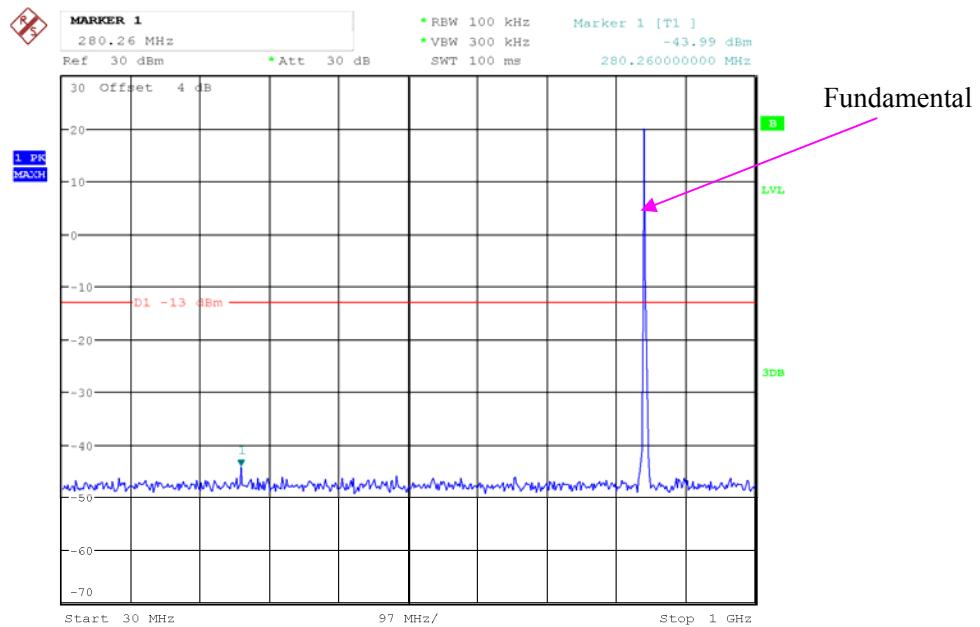
Date: 17.OCT.2017 13:50:51

QPSK_20 MHz

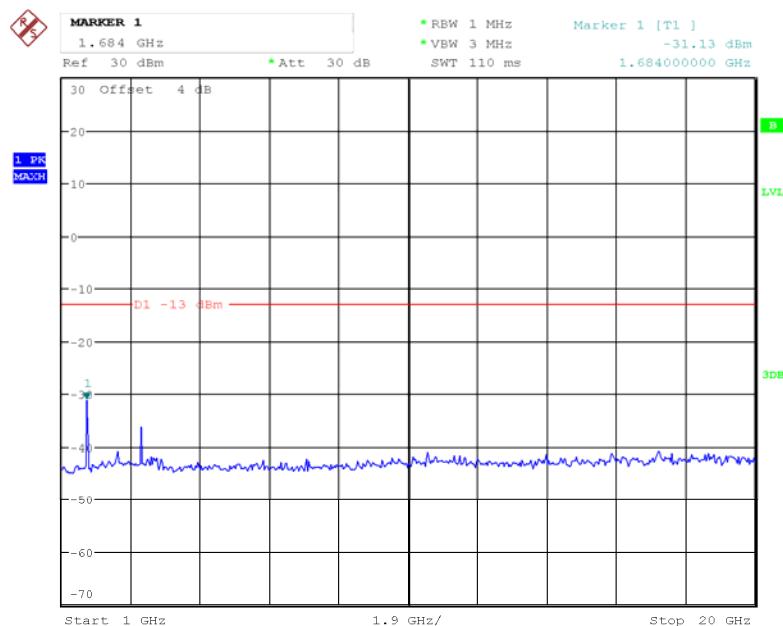
Date: 17.OCT.2017 13:52:02



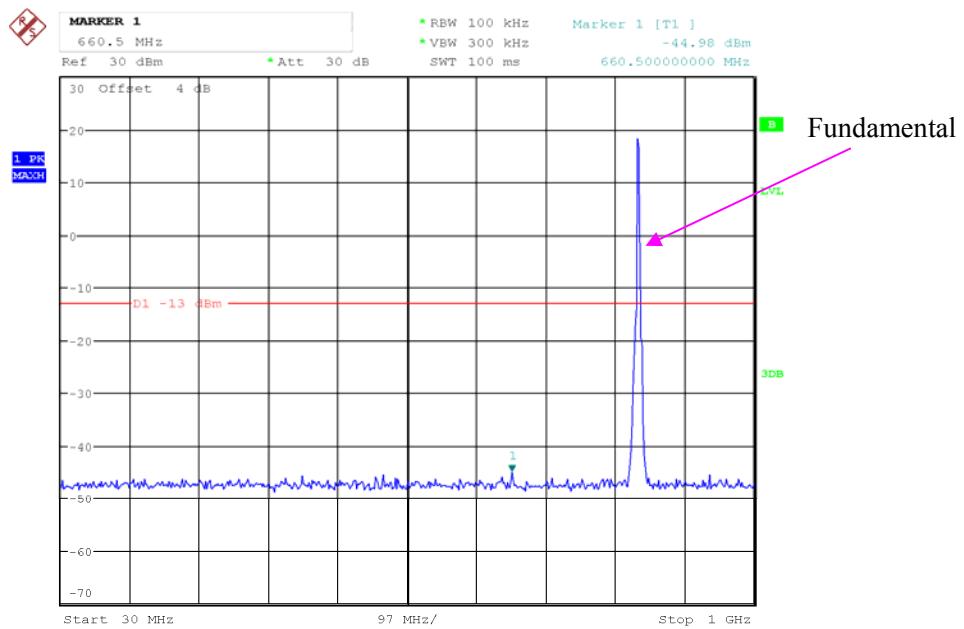
Date: 17.OCT.2017 13:51:45

LTE Band 5 (Middle Channel)**QPSK_1.4 MHz**

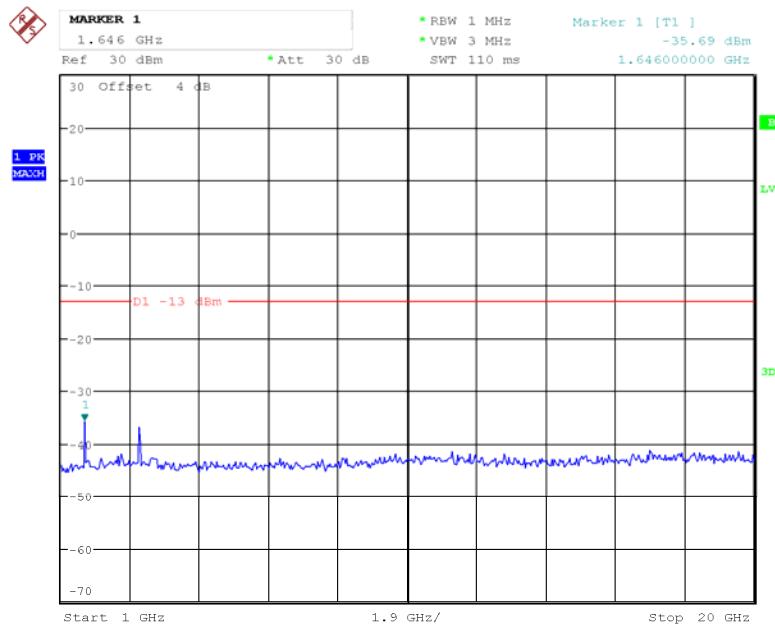
Date: 17.OCT.2017 13:56:31



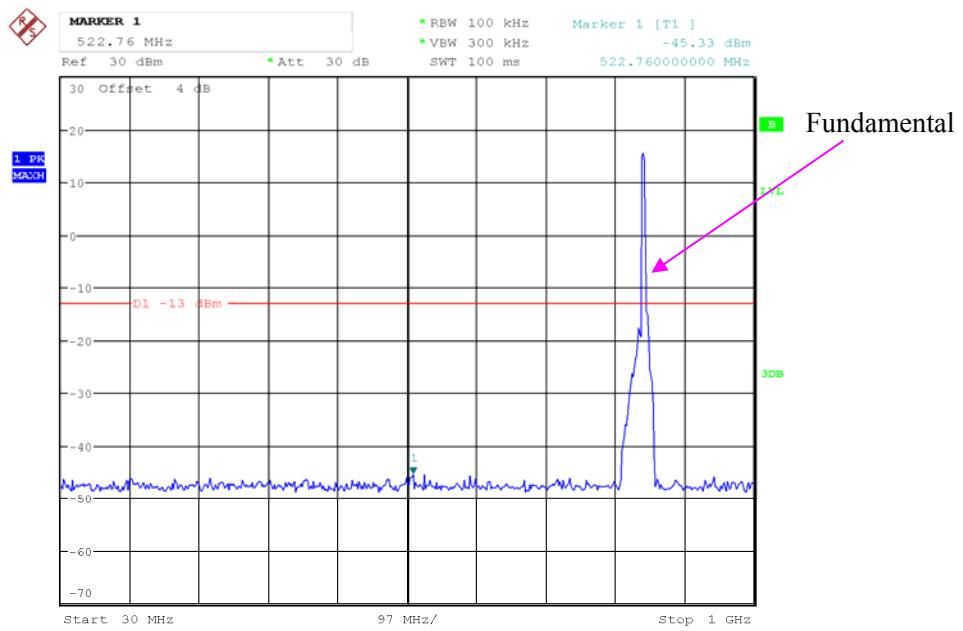
Date: 17.OCT.2017 13:56:11

QPSK_3 MHz

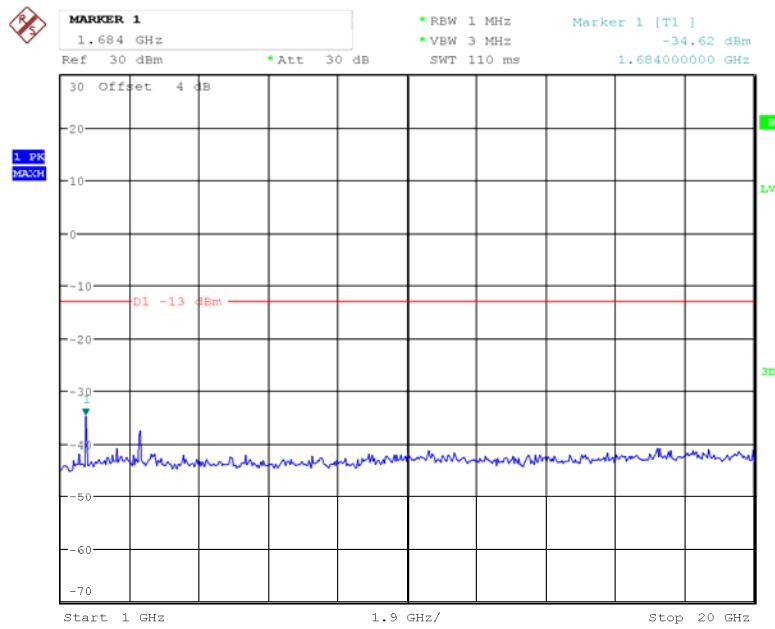
Date: 17.OCT.2017 13:58:21



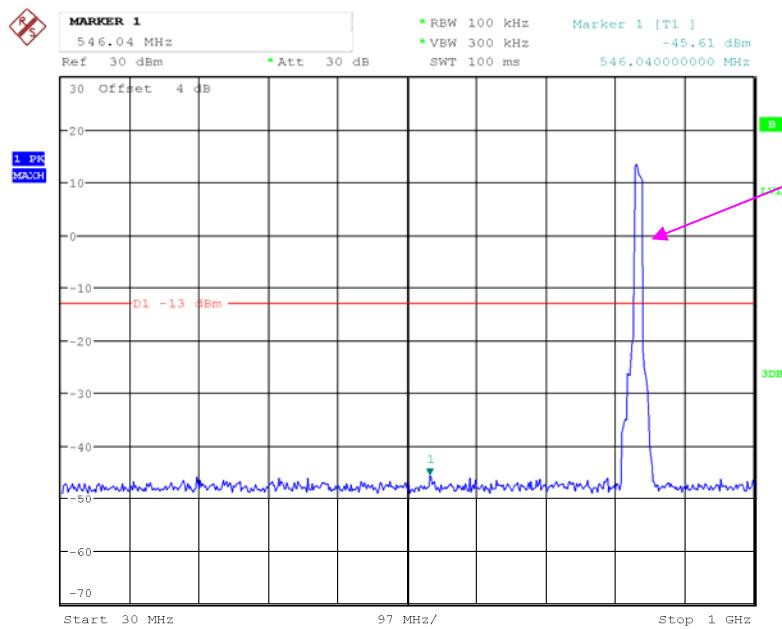
Date: 17.OCT.2017 13:58:33

QPSK_5 MHz

Date: 17.OCT.2017 13:54:44

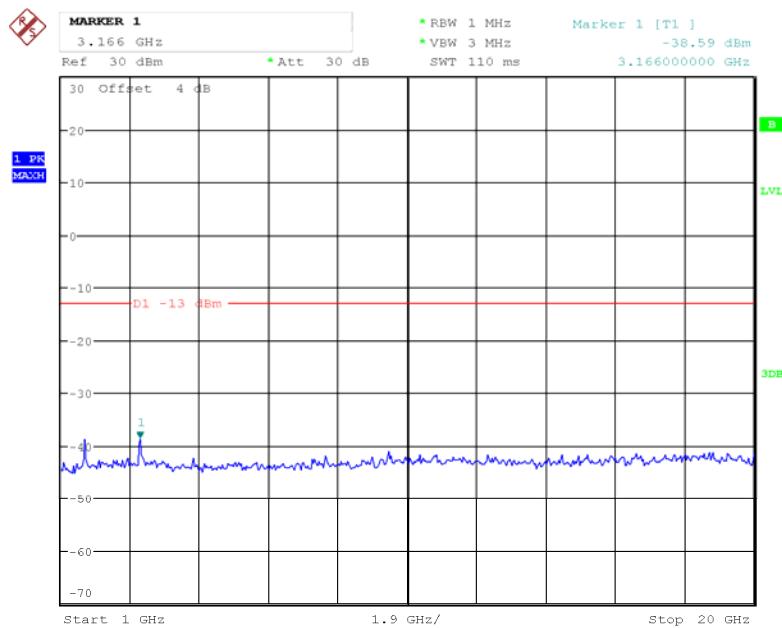


Date: 17.OCT.2017 13:55:03

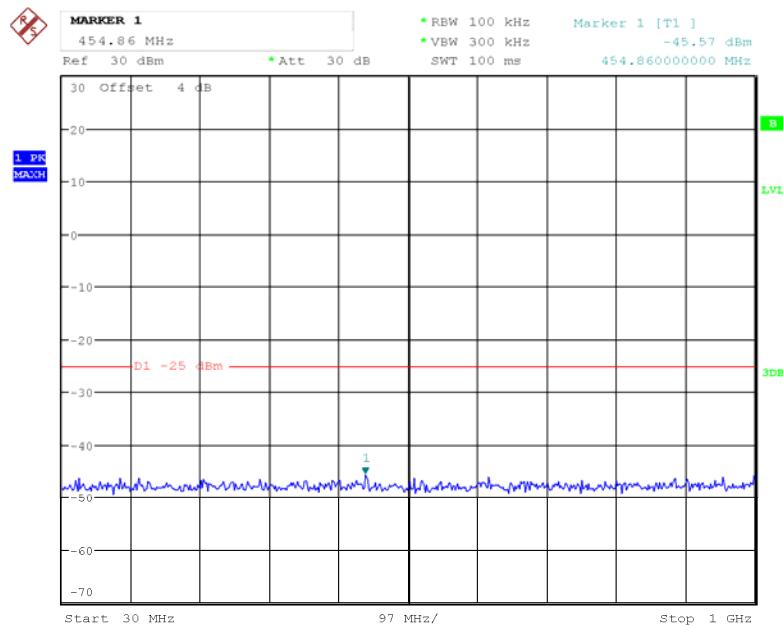
QPSK_10 MHz

Fundamental

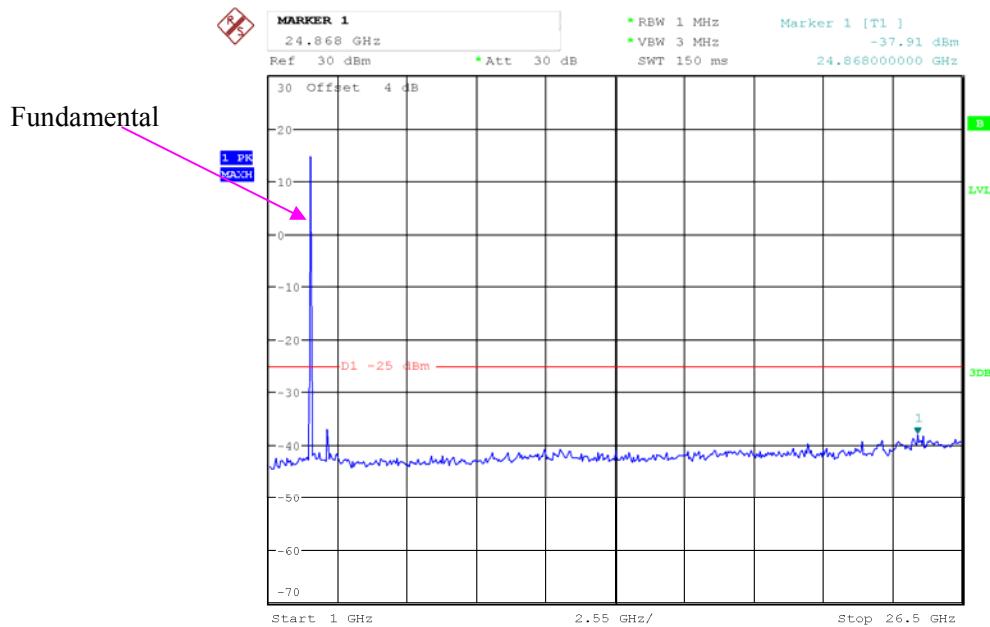
Date: 17.OCT.2017 14:00:36



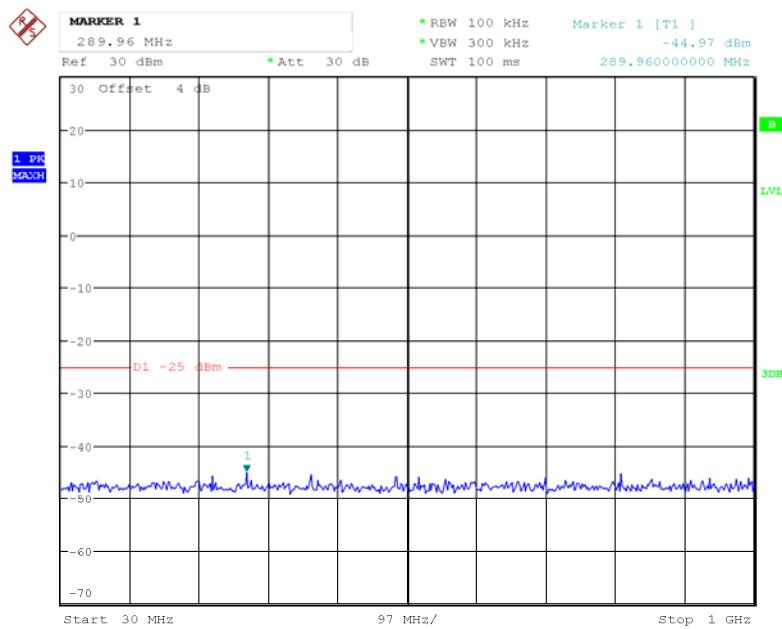
Date: 17.OCT.2017 14:00:16

LTE Band 7 (Middle Channel)**QPSK_5 MHz**

Date: 17.OCT.2017 14:05:08

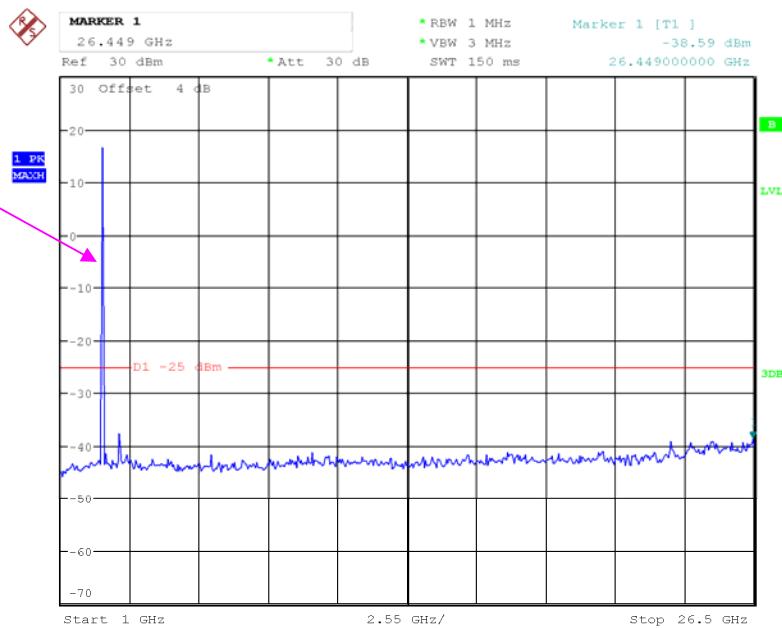


Date: 17.OCT.2017 14:05:49

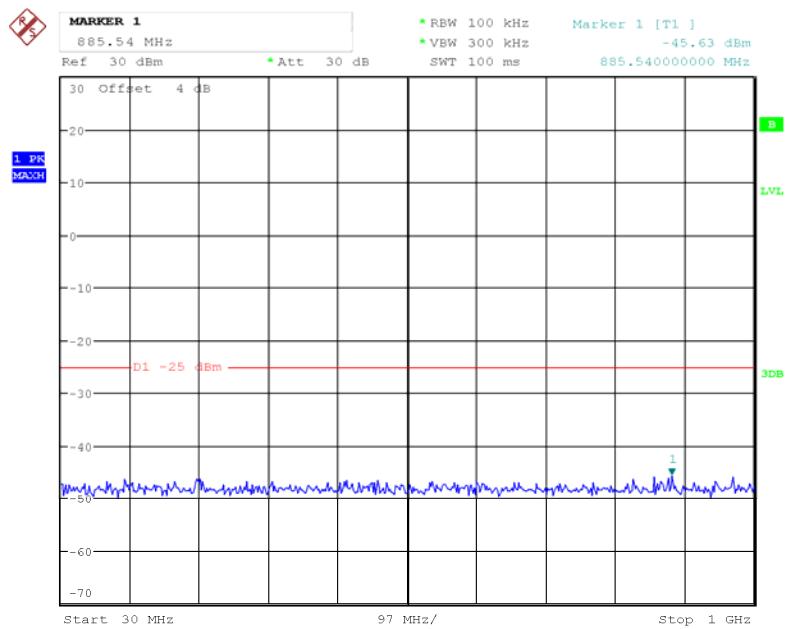
QPSK_10 MHz

Date: 17.OCT.2017 14:09:00

Fundamental

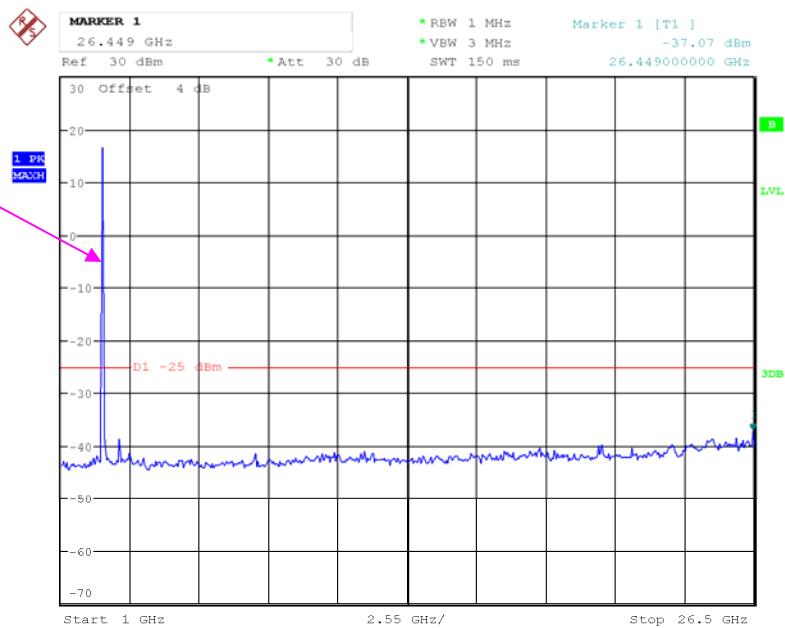


Date: 17.OCT.2017 14:08:31

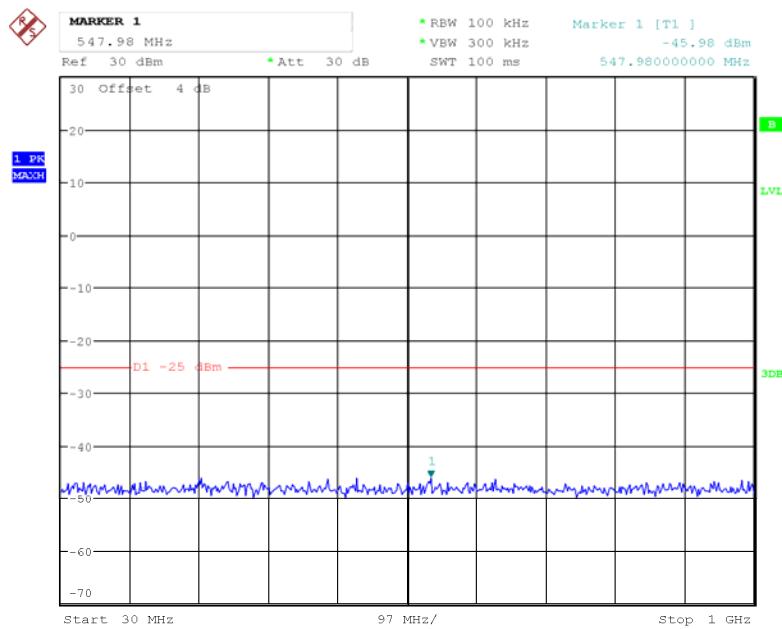
QPSK_15 MHz

Date: 17.OCT.2017 14:09:20

Fundamental

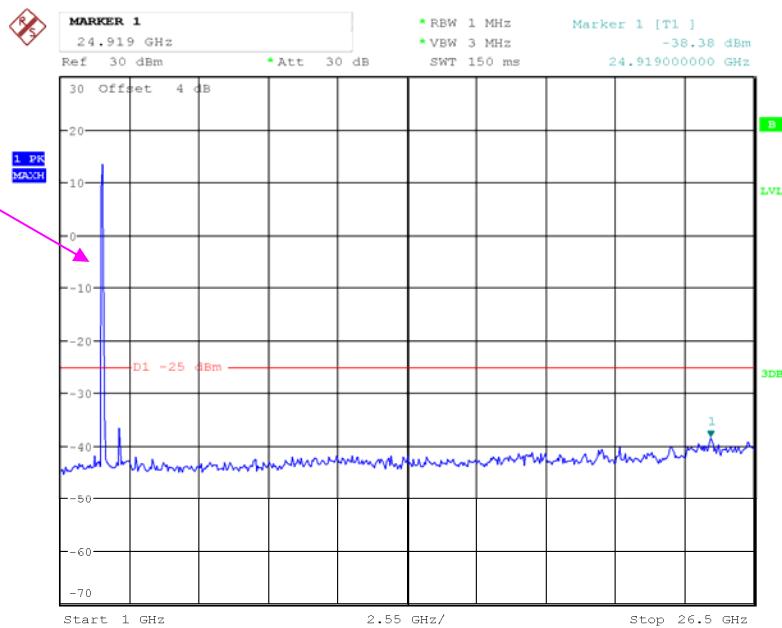


Date: 17.OCT.2017 14:09:51

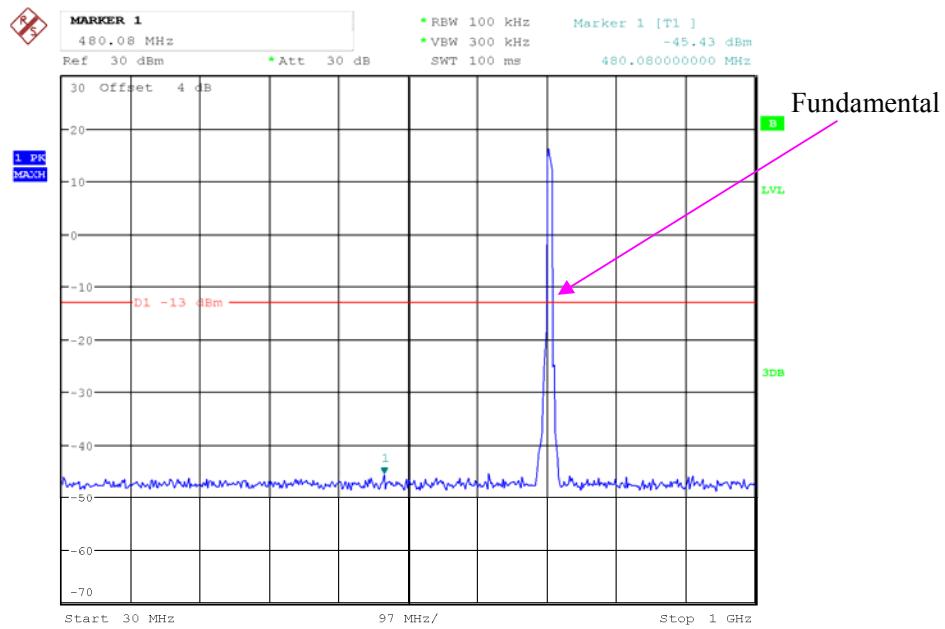
QPSK_20 MHz

Date: 17.OCT.2017 14:13:59

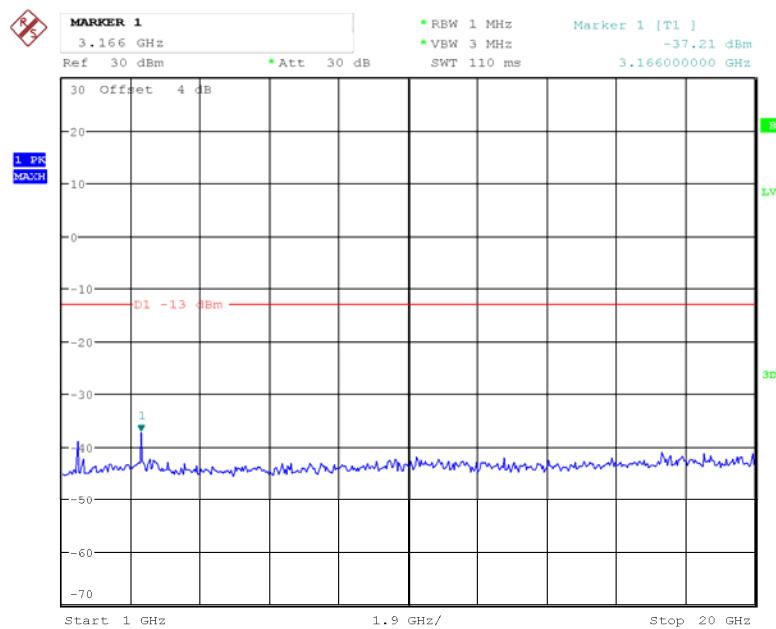
Fundamental



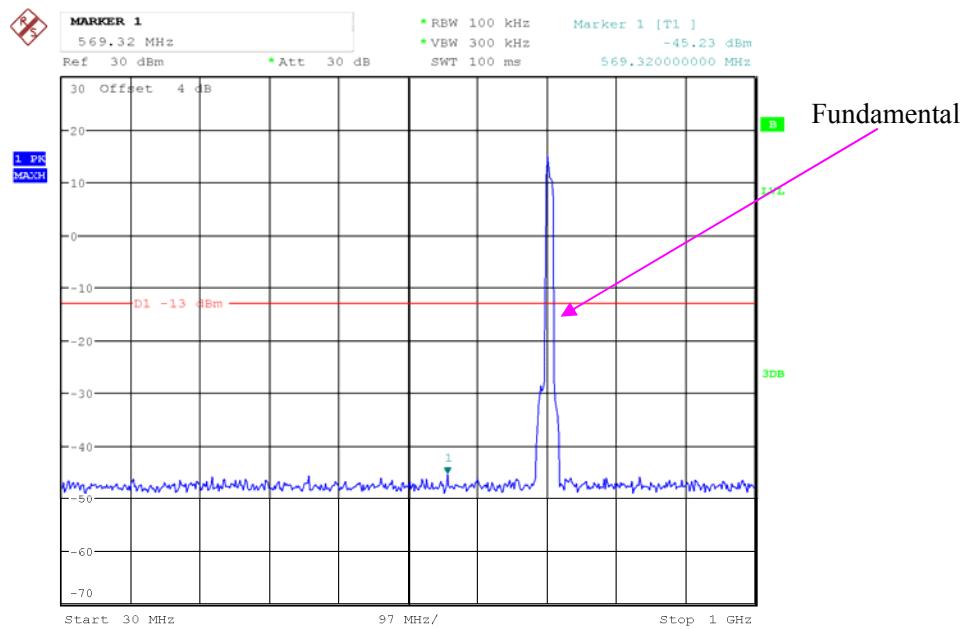
Date: 17.OCT.2017 14:13:43

LTE Band 17 (Middle Channel)**QPSK_5 MHz**

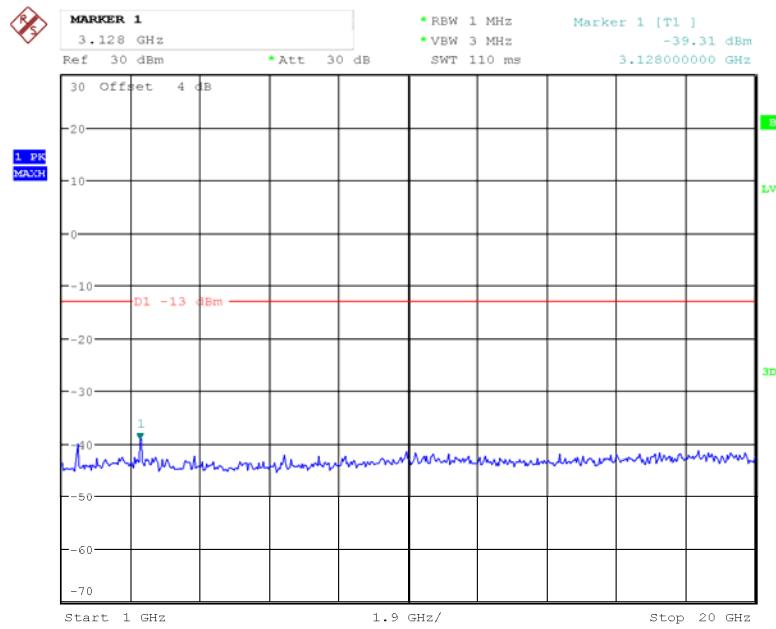
Date: 17.OCT.2017 14:02:59



Date: 17.OCT.2017 14:02:30

QPSK_10 MHz

Date: 17.OCT.2017 14:01:48



Date: 17.OCT.2017 14:02:02

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

Applicable Standard

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

Test Procedure

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

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

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

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	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 Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-06-16	2020-06-15
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Unknown	Coaxial Cable	Chamber A-1	4m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber B-1	0.75m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber A-2	10m	2017-09-05	2018-09-05
Unknown	Coaxial Cable	Chamber B-2	8m	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:	27°C
Relative Humidity:	29~36 %
ATM Pressure:	100.1~100.6 kPa

* The testing was performed by Sunny Cen&Steven Zuo from 2017-10-13 to 2017-10-14.

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	52.49	-61.7	10.6	0.7	-51.8	-13.0	38.8
1673.200	V	50.87	-63.9	10.6	0.7	-54.0	-13.0	41.0
2509.800	H	57.16	-55.9	13.1	1.2	-44.0	-13.0	31.0
2509.800	V	55.46	-57.6	13.1	1.2	-45.7	-13.0	32.7
3346.400	H	51.84	-58.8	13.8	1.6	-46.6	-13.0	33.6
3346.400	V	50.18	-60.5	13.8	1.6	-48.3	-13.0	35.3
2134.000	H	46.87	-65.9	11.2	1.1	-55.8	-13.0	42.8
2134.000	V	47.24	-65.5	11.2	1.1	-55.4	-13.0	42.4
741.000	H	45.00	-55.3	0.0	0.9	-56.2	-13.0	43.2
741.000	V	48.62	-54.7	0.0	0.9	-55.6	-13.0	42.6

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	52.64	-61.6	10.6	0.7	-51.7	-13.0	38.7
1673.200	V	51.76	-63.1	10.6	0.7	-53.2	-13.0	40.2
2509.800	H	50.87	-62.1	13.1	1.2	-50.2	-13.0	37.2
2509.800	V	50.39	-62.7	13.1	1.2	-50.8	-13.0	37.8
3346.400	H	49.52	-61.1	13.8	1.6	-48.9	-13.0	35.9
3346.400	V	48.59	-62.1	13.8	1.6	-49.9	-13.0	36.9
2145.000	H	46.75	-65.9	11.1	1.1	-55.9	-13.0	42.9
2145.000	V	47.23	-65.4	11.1	1.1	-55.4	-13.0	42.4
458.000	H	43.31	-61.2	0.0	0.7	-61.9	-13.0	48.9
458.000	V	47.68	-60	0.0	0.7	-60.7	-13.0	47.7

PCS Band (PART 24E)**30 MHz-20 GHz:**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	47.85	-61	13.8	1.6	-48.8	-13.0	35.8
3760.000	V	47.49	-61.2	13.8	1.6	-49.0	-13.0	36.0
5640.000	H	46.53	-59.5	14.0	1.3	-46.8	-13.0	33.8
5640.000	V	45.96	-60	14.0	1.3	-47.3	-13.0	34.3
5166.000	H	45.37	-61	13.9	1.5	-48.6	-13.0	35.6
5166.000	V	46.24	-60.2	13.9	1.5	-47.8	-13.0	34.8
518.000	H	42.66	-61.2	0.0	0.7	-61.9	-13.0	48.9
518.000	V	45.00	-61.9	0.0	0.7	-62.6	-13.0	49.6
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	47.75	-61.1	13.8	1.6	-48.9	-13.0	35.9
3760.000	V	47.54	-61.1	13.8	1.6	-48.9	-13.0	35.9
5640.000	H	46.37	-59.7	14.0	1.3	-47.0	-13.0	34.0
5640.000	V	45.85	-60.1	14.0	1.3	-47.4	-13.0	34.4
5135.000	H	45.07	-61.3	13.9	1.4	-48.8	-13.0	35.8
5135.000	V	46.12	-60.2	13.9	1.4	-47.7	-13.0	34.7
354.000	H	43.67	-62.9	0.0	0.6	-63.5	-13.0	50.5
354.000	V	46.72	-62.3	0.0	0.6	-62.9	-13.0	49.9

AWS Band (PART 27)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
WCDMA Band IV, R99, Frequency:1732.5 MHz								
3465.000	H	51.49	-58.8	13.9	1.6	-46.5	-13.0	33.5
3465.000	V	48.54	-61.7	13.9	1.6	-49.4	-13.0	36.4
5197.500	H	47.46	-59	14.0	1.5	-46.5	-13.0	33.5
5197.500	V	46.89	-59.6	14.0	1.5	-47.1	-13.0	34.1
4985.000	H	45.34	-62.4	14.0	1.4	-49.8	-13.0	36.8
4985.000	V	46.52	-60.9	14.0	1.4	-48.3	-13.0	35.3
435.000	H	42.16	-62.4	0.0	0.6	-63.0	-13.0	50.0
435.000	V	45.37	-62.5	0.0	0.6	-63.1	-13.0	50.1

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	64.83	-44	13.8	1.6	-31.8	-13.0	18.8
3760.000	V	57.46	-51.2	13.8	1.6	-39.0	-13.0	26.0
5640.000	H	70.59	-35.4	14.0	1.3	-22.7	-13.0	9.7
5640.000	V	66.24	-39.7	14.0	1.3	-27.0	-13.0	14.0
4126.000	H	45.87	-63.2	13.8	1.4	-50.8	-13.0	37.8
4126.000	V	45.59	-63.6	13.8	1.4	-51.2	-13.0	38.2
545.000	H	43.88	-59.4	0.0	0.7	-60.1	-13.0	47.1
545.000	V	49.58	-56.8	0.0	0.7	-57.5	-13.0	44.5

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	64.01	-46.2	13.9	1.6	-33.9	-13.0	20.9
3465.000	V	57.51	-52.8	13.9	1.6	-40.5	-13.0	27.5
5197.500	H	69.58	-36.8	14.0	1.5	-24.3	-13.0	11.3
5197.500	V	66.16	-40.3	14.0	1.5	-27.8	-13.0	14.8
4155.000	H	47.54	-61.5	13.9	1.5	-49.1	-13.0	36.1
4155.000	V	47.38	-61.7	13.9	1.5	-49.3	-13.0	36.3
225.000	H	47.34	-61.6	0.0	0.5	-62.1	-13.0	49.1
225.000	V	52.21	-59.4	0.0	0.5	-59.9	-13.0	46.9

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	55.75	-58.5	10.6	0.7	-48.6	-13.0	35.6
1673.000	V	50.74	-64.1	10.6	0.7	-54.2	-13.0	41.2
2509.500	H	51.88	-61.1	13.1	1.2	-49.2	-13.0	36.2
2509.500	V	50.49	-62.6	13.1	1.2	-50.7	-13.0	37.7
3346.000	H	52.47	-58.2	13.8	1.6	-46.0	-13.0	33.0
3346.000	V	49.27	-61.4	13.8	1.6	-49.2	-13.0	36.2
2144.000	H	45.62	-67.1	11.1	1.1	-57.1	-13.0	44.1
2144.000	V	44.76	-67.9	11.1	1.1	-57.9	-13.0	44.9
583.000	H	48.75	-53.7	0.0	0.8	-54.5	-13.0	41.5
583.000	V	51.54	-54.2	0.0	0.8	-55.0	-13.0	42.0

LTE Band 7 (30MHz-26GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	H	53.92	-52.9	13.9	1.3	-40.3	-25	15.3
5070	V	50.39	-56.2	13.9	1.3	-43.6	-25	18.6
7605	H	52.44	-47.9	13.2	1.4	-36.1	-25	11.1
7605	V	49.22	-51.5	13.2	1.4	-39.7	-25	14.7
4655	H	45.72	-62.8	14.3	1.8	-50.3	-25	25.3
4655	V	44.79	-63.8	14.3	1.8	-51.3	-25	26.3
665	H	48.65	-53	0	0.9	-53.9	-25	28.9
665	V	49.62	-54.8	0	0.9	-55.7	-25	30.7

LTE Band 17 (30MHz-10GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB μ V)	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	56.67	-56.9	9.1	1.2	-49.0	-13.0	36.0
1420.000	V	51.64	-62.5	9.1	1.2	-54.6	-13.0	41.6
2130.000	H	51.91	-60.8	11.2	1.1	-50.7	-13.0	37.7
2130.000	V	50.39	-62.3	11.2	1.1	-52.2	-13.0	39.2
2840.000	H	52.37	-59.7	13.4	1.4	-47.7	-13.0	34.7
2840.000	V	49.35	-62.9	13.4	1.4	-50.9	-13.0	37.9
3550.000	H	48.58	-61.6	14.0	1.6	-49.2	-13.0	36.2
3550.000	V	47.78	-62.4	14.0	1.6	-50.0	-13.0	37.0
2765.000	H	44.73	-67.5	13.1	1.3	-55.7	-13.0	42.7
2765.000	V	44.56	-67.8	13.1	1.3	-56.0	-13.0	43.0
541.000	H	48.66	-54.7	0.0	0.7	-55.4	-13.0	42.4
541.000	V	54.67	-51.8	0.0	0.7	-52.5	-13.0	39.5

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

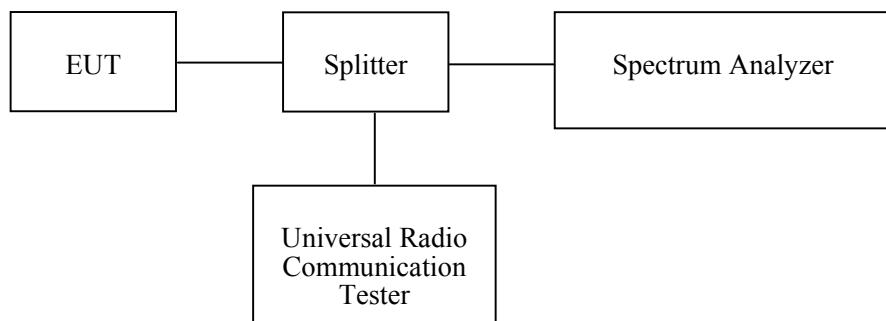
FCC §22.917(a) & §24.238(a) & §27.53 - BAND EDGES**Applicable Standard**

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	/
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

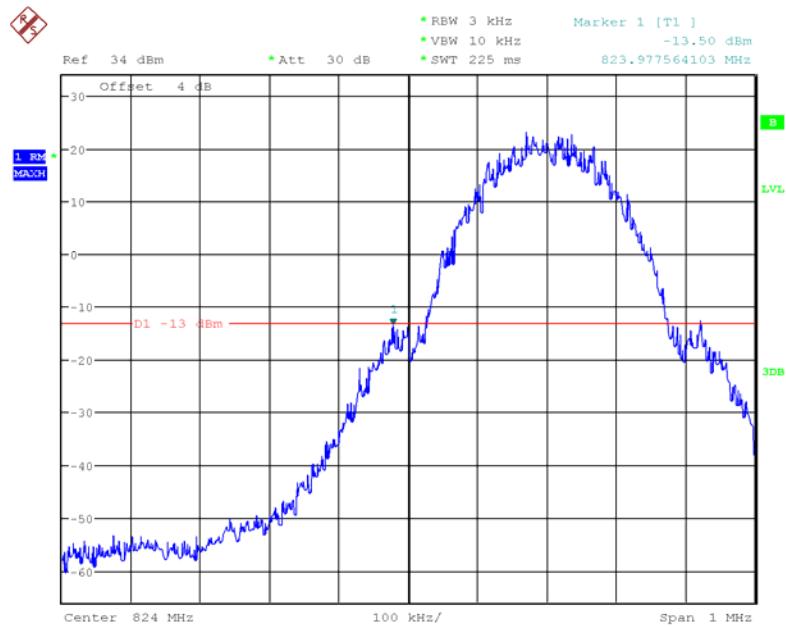
Environmental Conditions

Temperature:	26.4~26.8°C
Relative Humidity:	44~64 %
ATM Pressure:	99.4~100.8 kPa

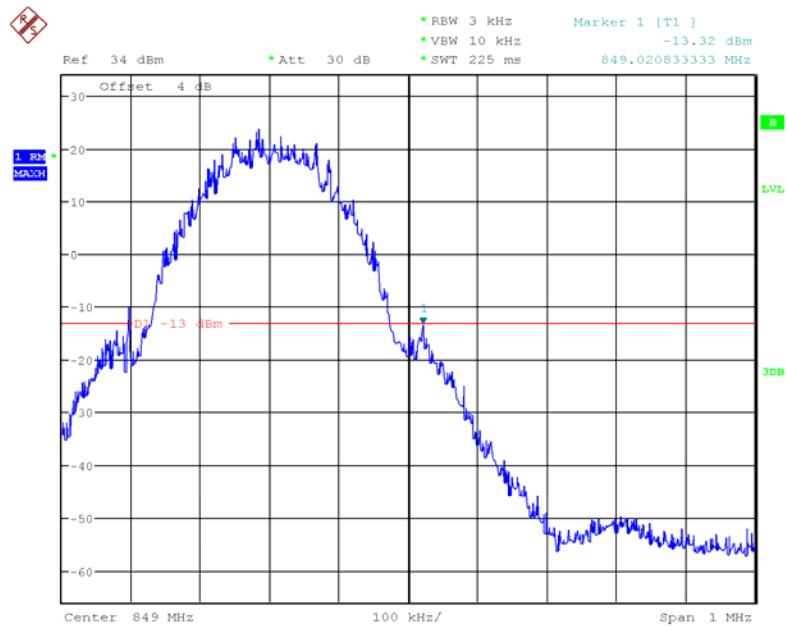
The testing was performed by Nami Quan from 2017-10-16 to 2017-10-18.

Test Mode: Transmitting

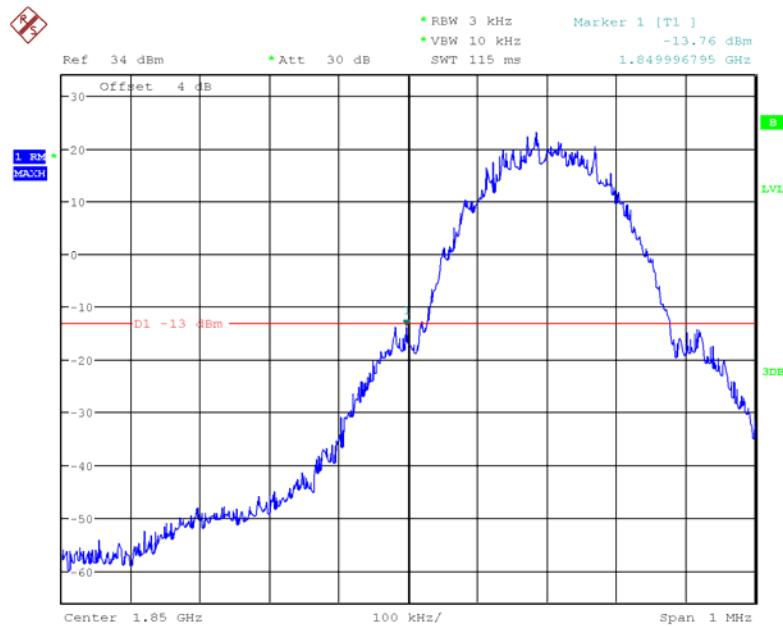
Test Result: Compliant. Please refer to the following plots.

GSM 850, Left Band Edge

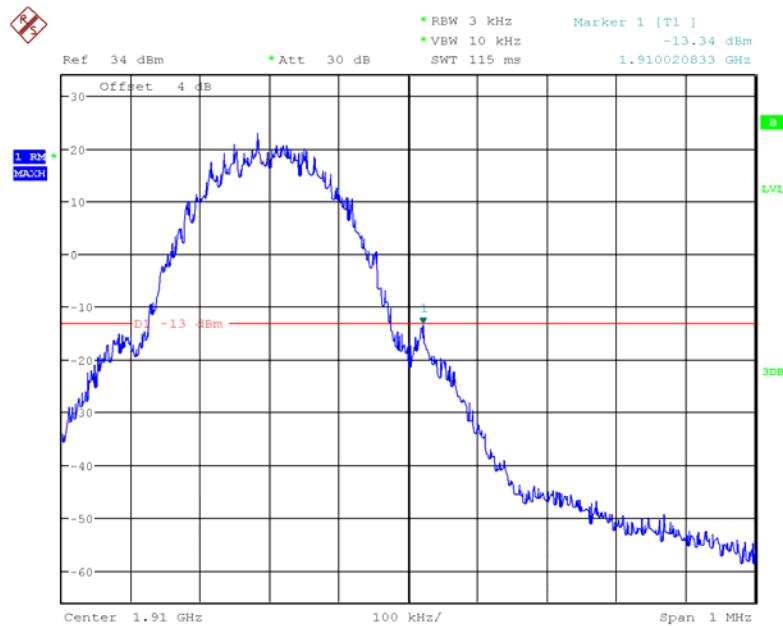
Date: 16.OCT.2017 23:15:58

GSM 850, Right Band Edge

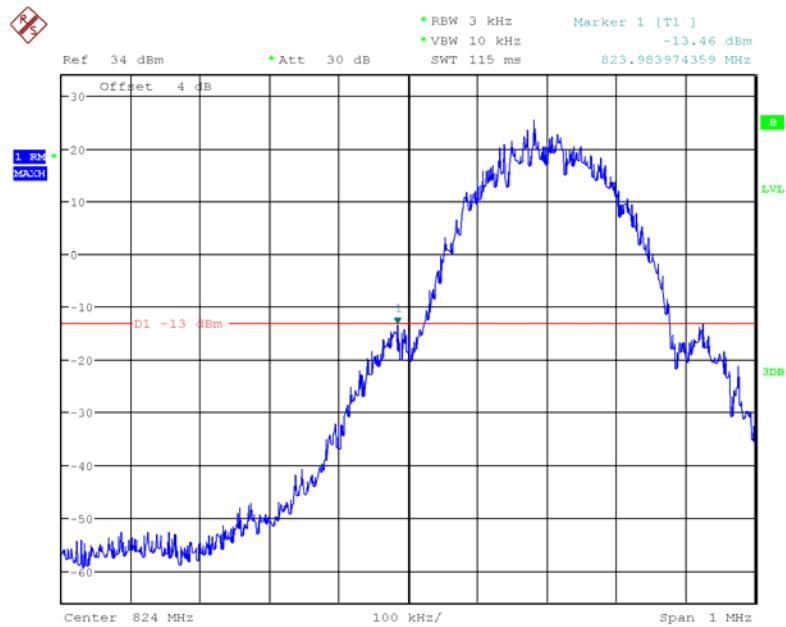
Date: 16.OCT.2017 23:14:16

GSM 1900, Left Band Edge

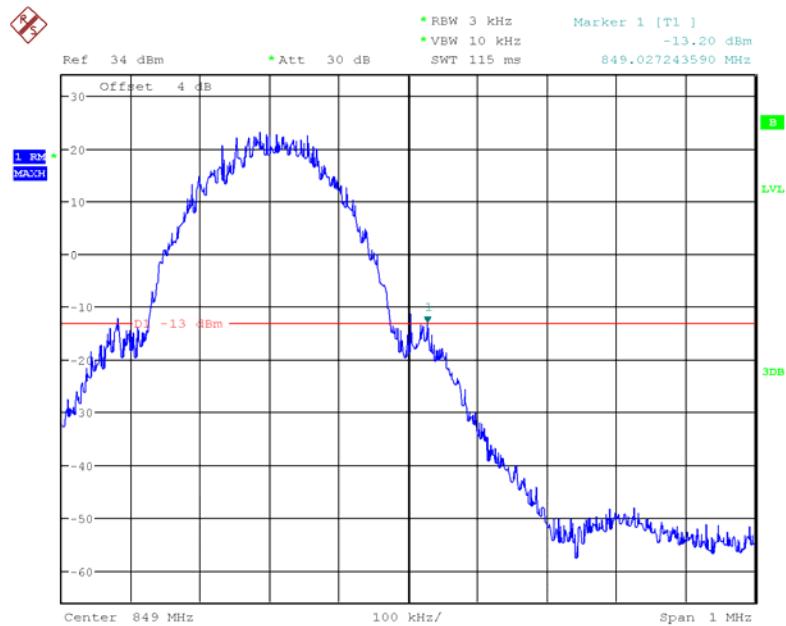
Date: 16.OCT.2017 22:47:14

GSM 1900, Right Band Edge

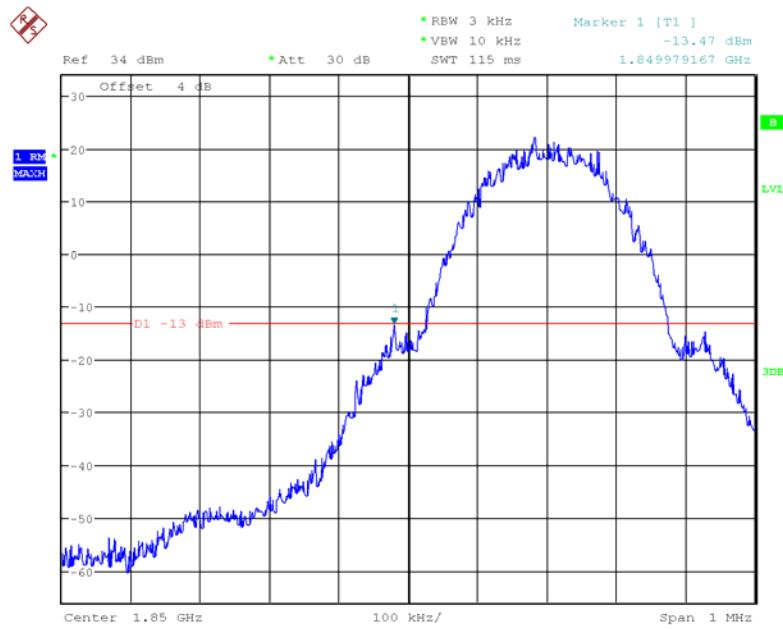
Date: 16.OCT.2017 22:48:05

GPRS 850, Left Band Edge

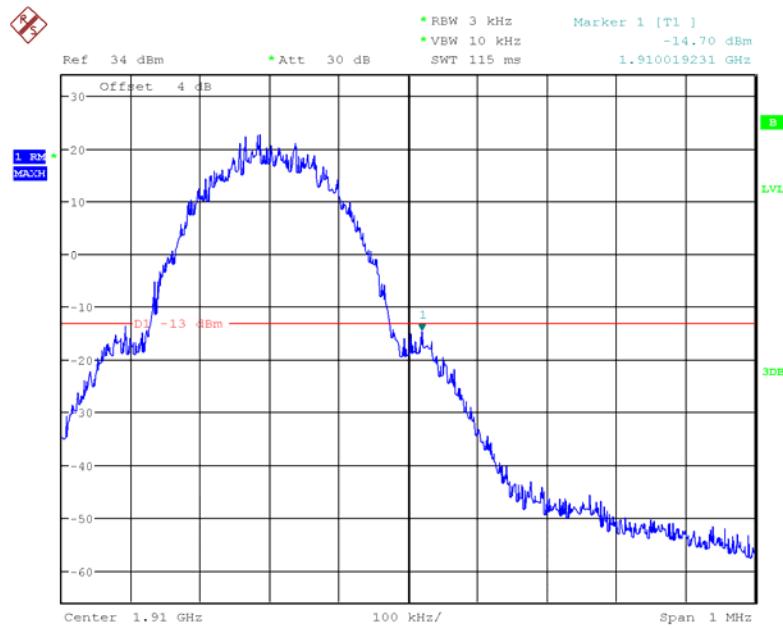
Date: 16.OCT.2017 23:04:54

GPRS 850, Right Band Edge

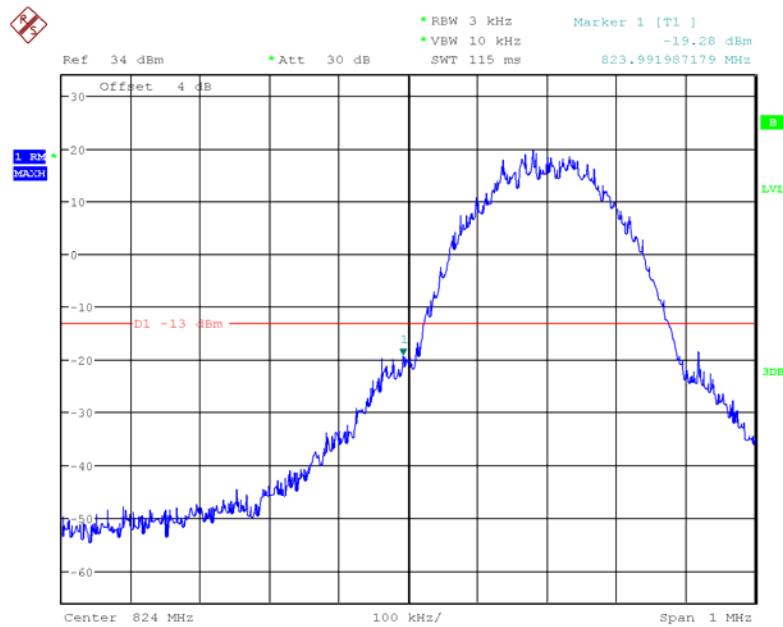
Date: 16.OCT.2017 23:07:35

GPRS 1900, Left Band Edge

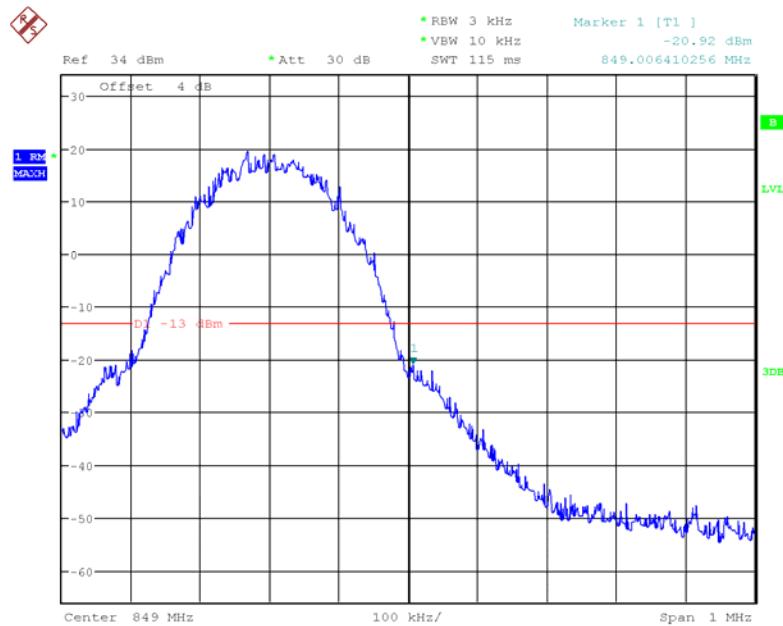
Date: 16.OCT.2017 22:38:15

GPRS 1900, Right Band Edge

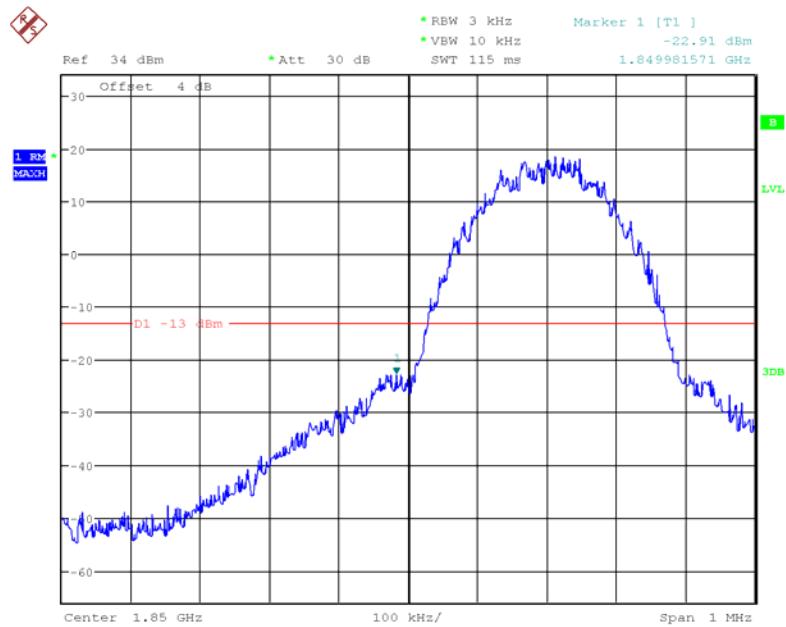
Date: 16.OCT.2017 22:37:25

EDGE 850, Left Band Edge

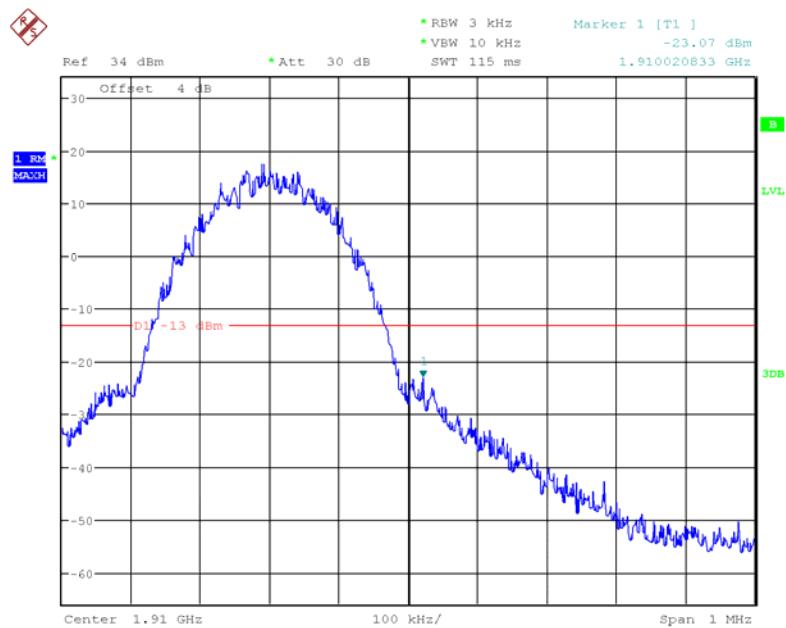
Date: 16.OCT.2017 22:51:11

EDGE 850, Right Band Edge

Date: 16.OCT.2017 22:52:54

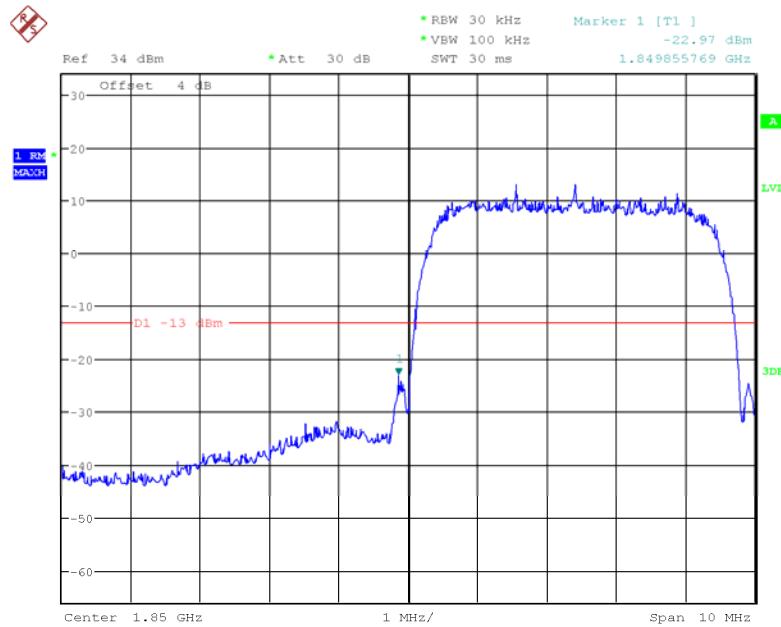
EDGE 1900, Left Band Edge

Date: 16.OCT.2017 22:34:09

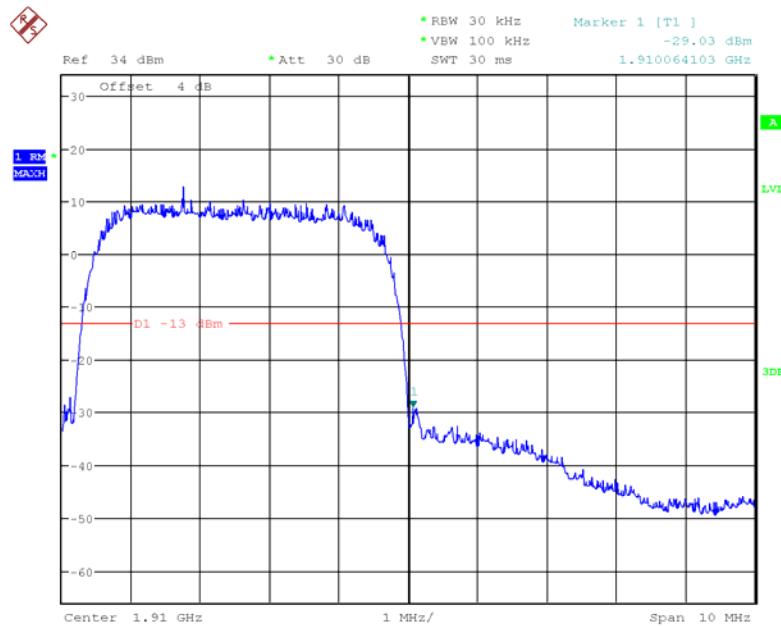
EDGE 1900, Right Band Edge

Date: 16.OCT.2017 22:34:59

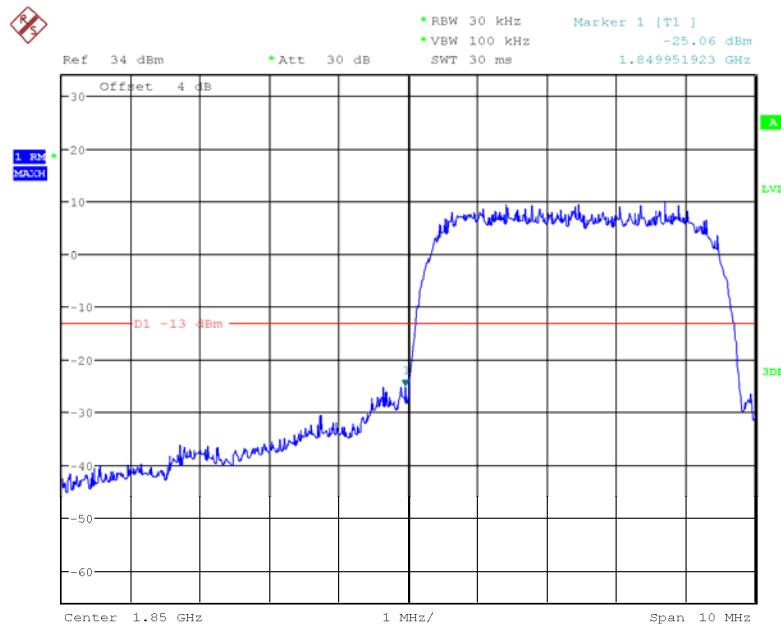
WCDMA Band II:

REL99 Band II, Left Band Edge

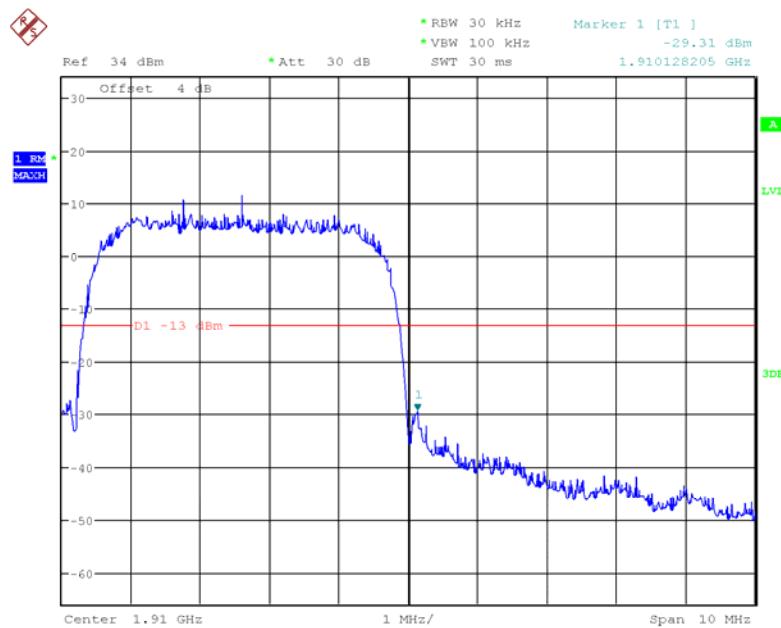
Date: 17.OCT.2017 21:18:14

REL99 Band II, Right Band Edge

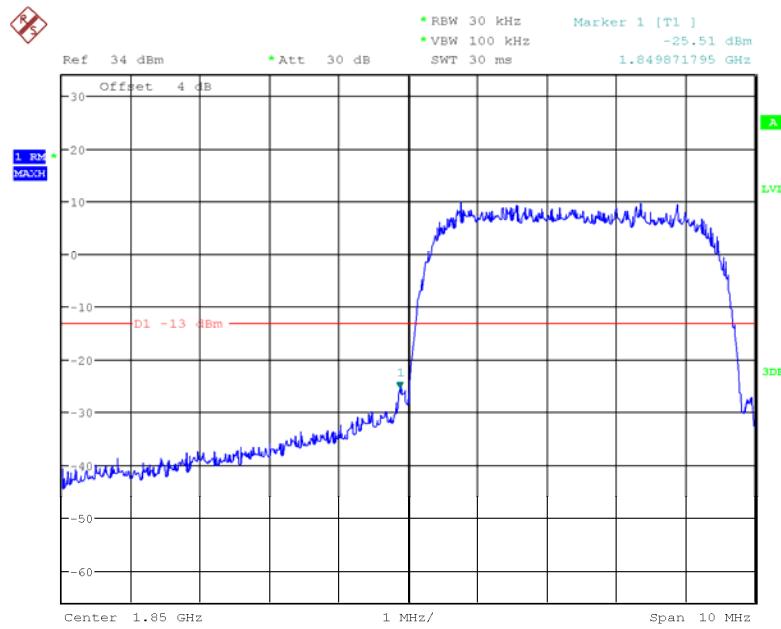
Date: 17.OCT.2017 21:19:10

HSDPA Band II, Left Band Edge

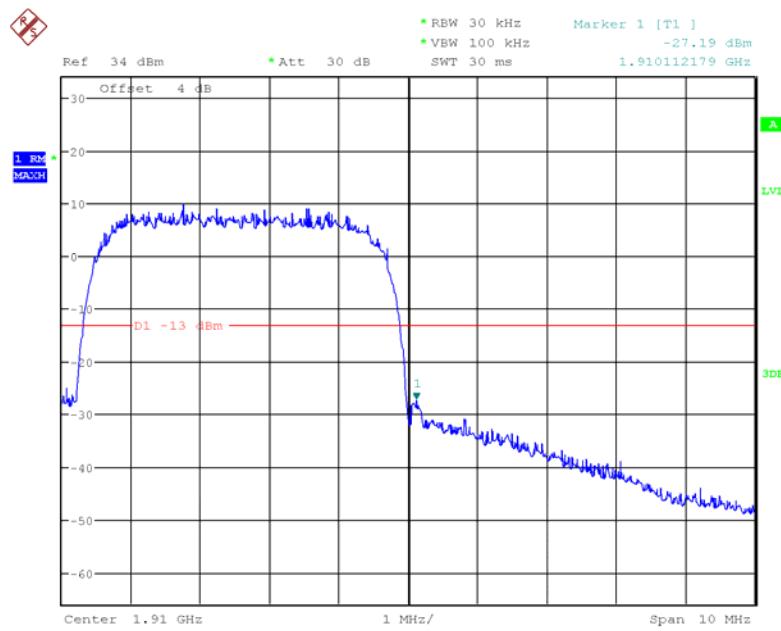
Date: 17.OCT.2017 21:24:58

HSDPA Band II, Right Band Edge

Date: 17.OCT.2017 21:25:44

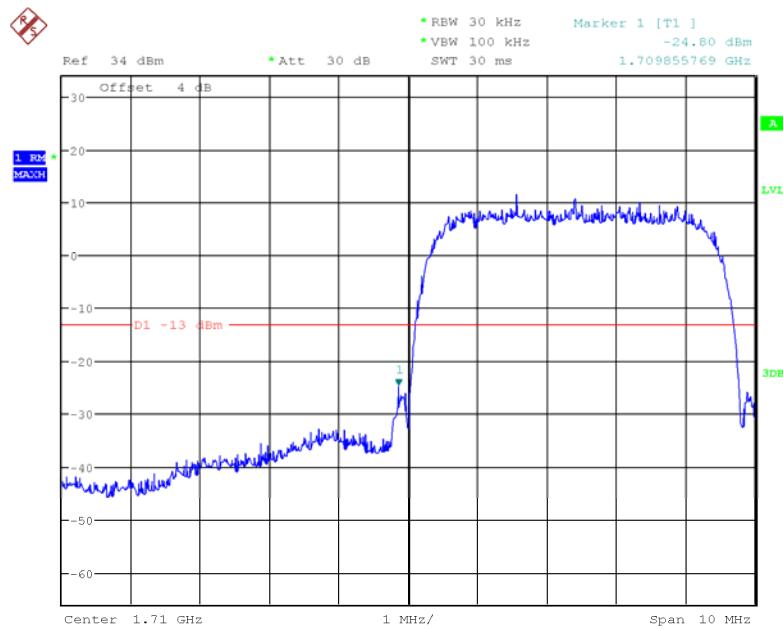
HSUPA Band II, Left Band Edge

Date: 17.OCT.2017 21:34:17

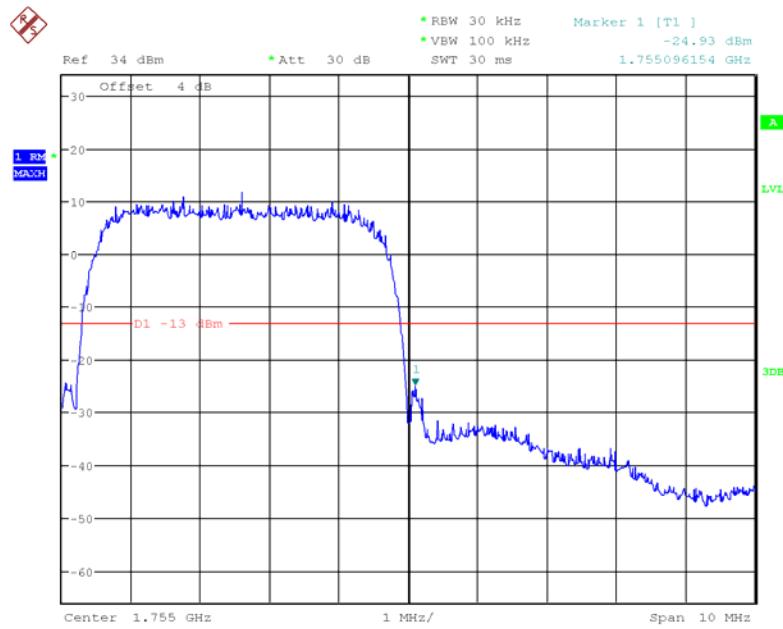
HSUPA Band II, Right Band Edge

Date: 17.OCT.2017 21:28:08

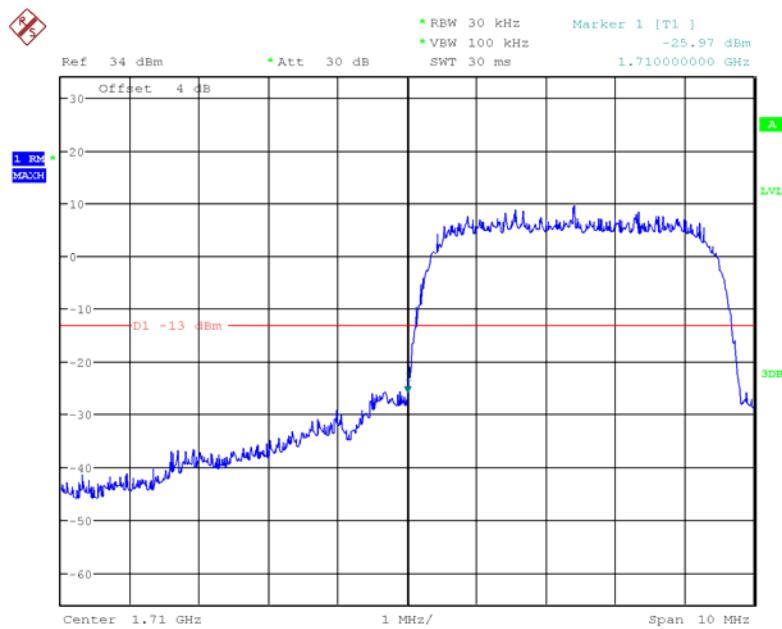
WCDMA Band IV:

REL99 Band IV, Left Band Edge

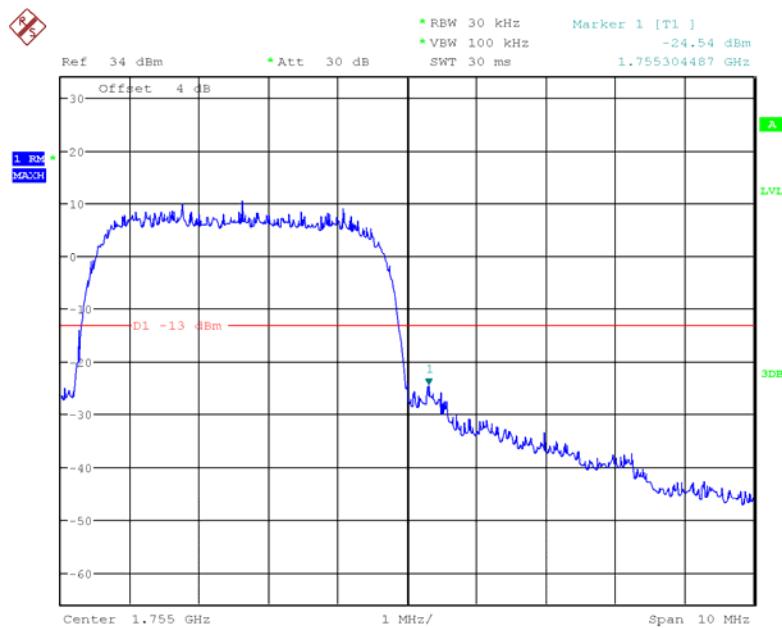
Date: 17.OCT.2017 21:47:11

REL99 Band IV, Right Band Edge

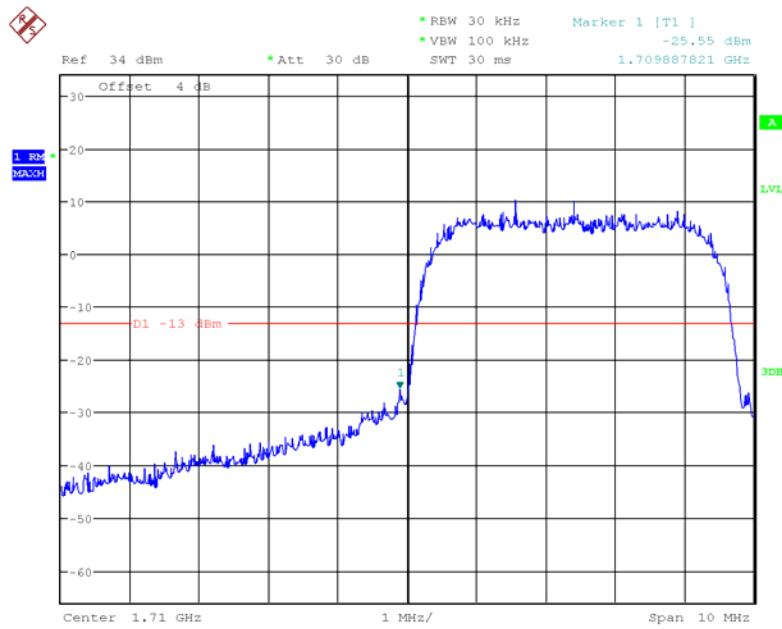
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HSDPA Band IV, Left Band Edge

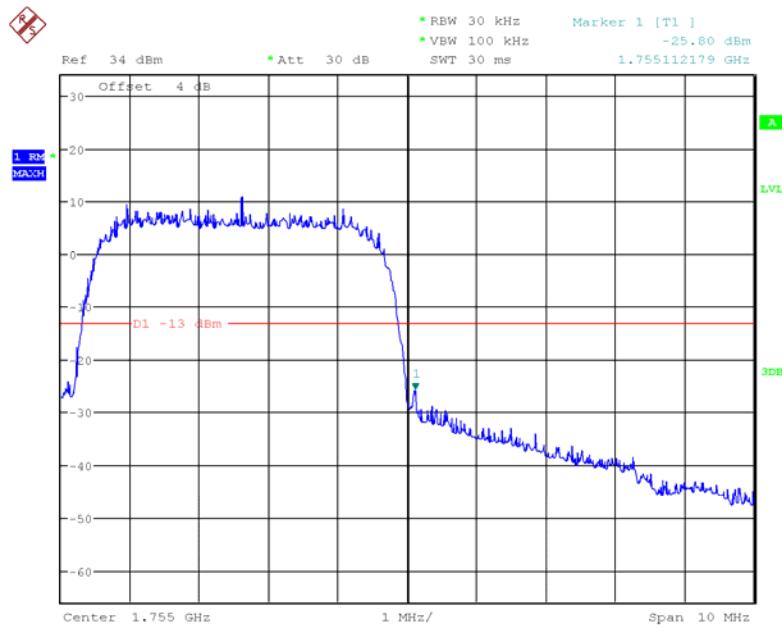
Date: 17.OCT.2017 21:50:37

HSDPA Band IV, Right Band Edge

Date: 17.OCT.2017 21:49:44

HSUPA Band IV, Left Band Edge

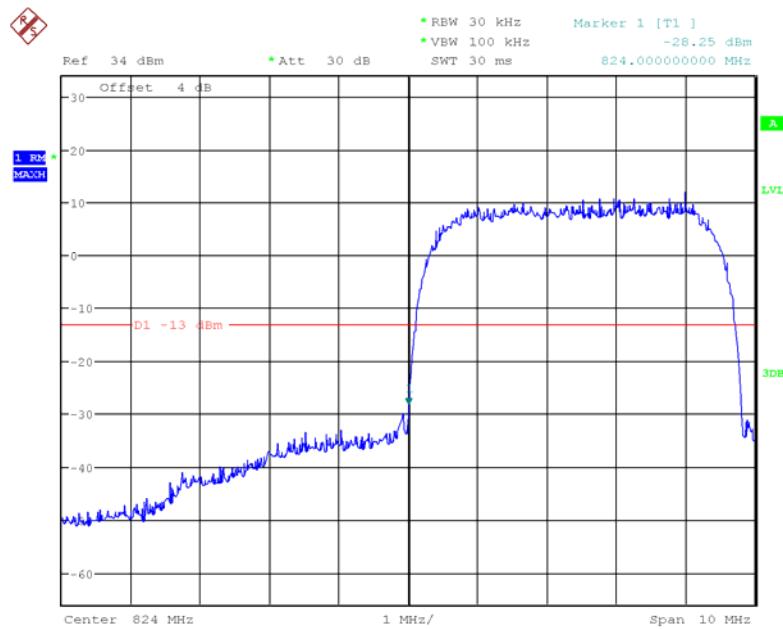
Date: 17.OCT.2017 22:03:42

HSUPA Band IV, Right Band Edge

Date: 17.OCT.2017 22:04:53

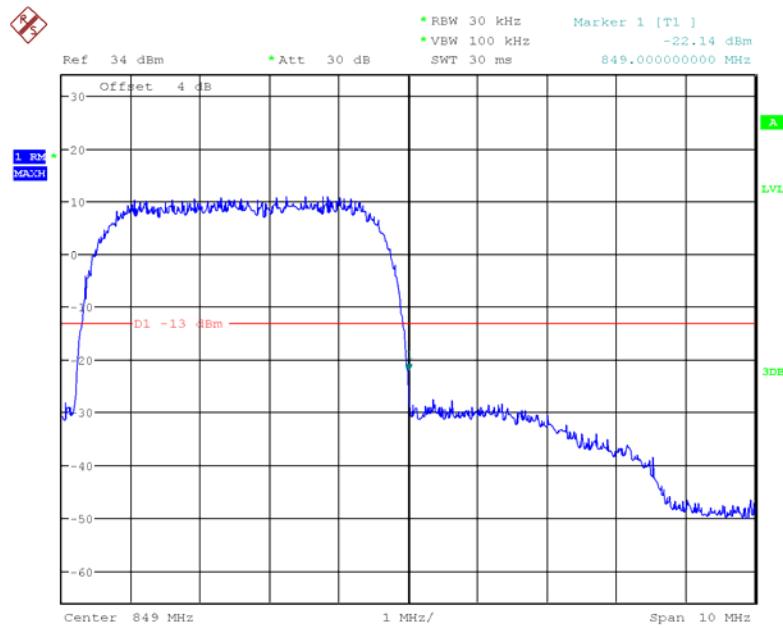
WCDMA Band V

REL99 Band V, Left Band Edge

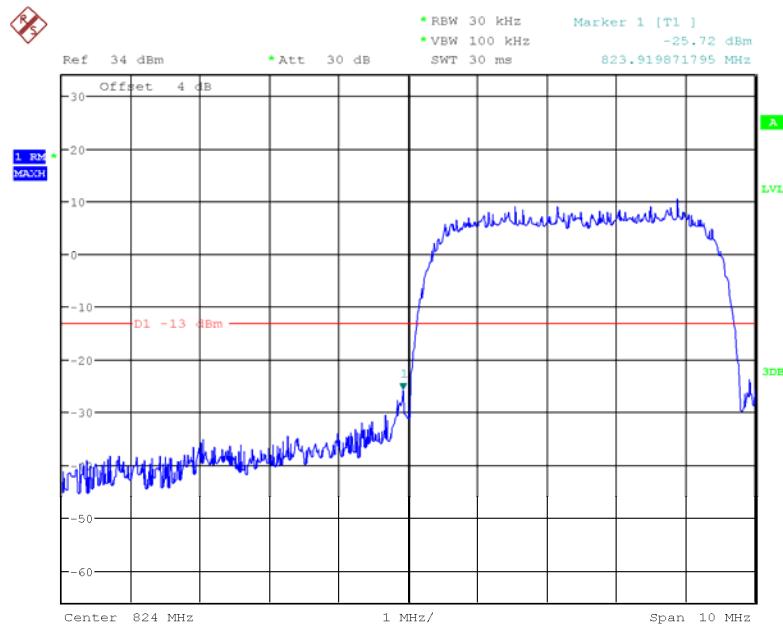


Date: 17.OCT.2017 22:27:32

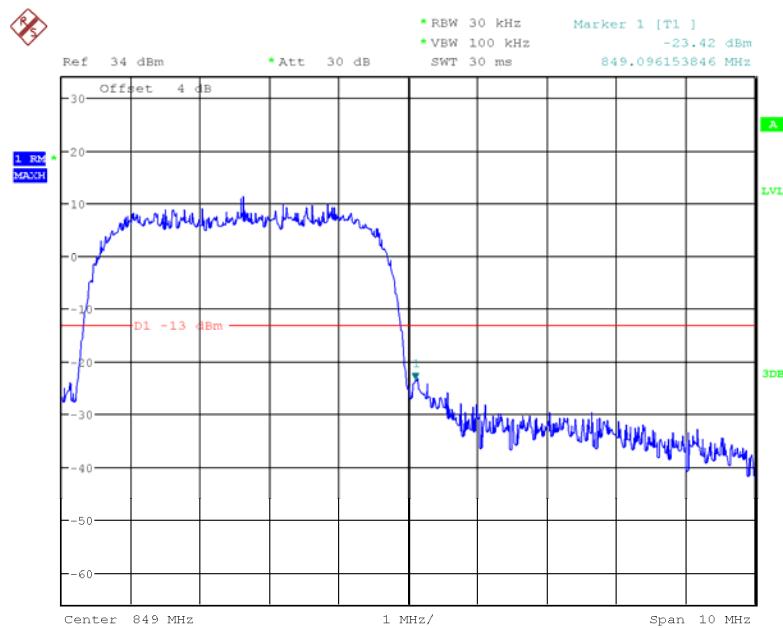
REL99 Band V Right Band Edge



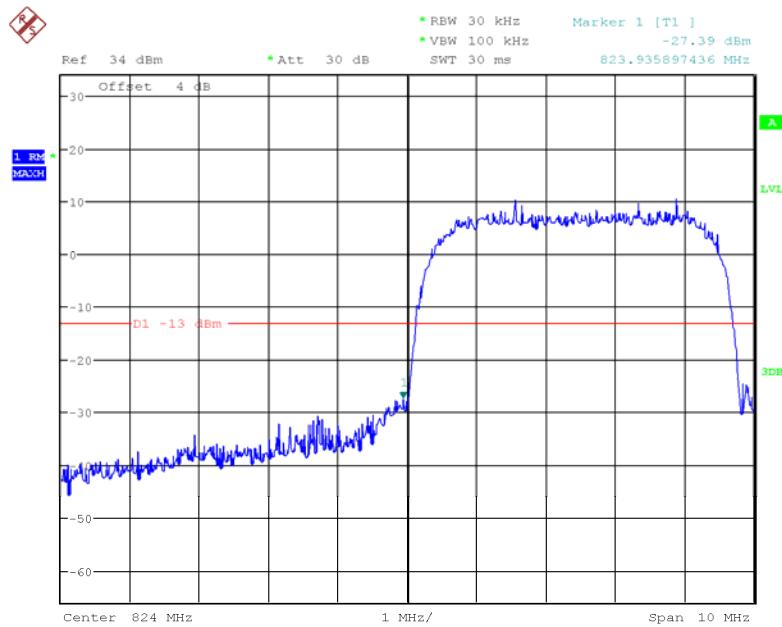
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HSDPA Band V, Left Band Edge

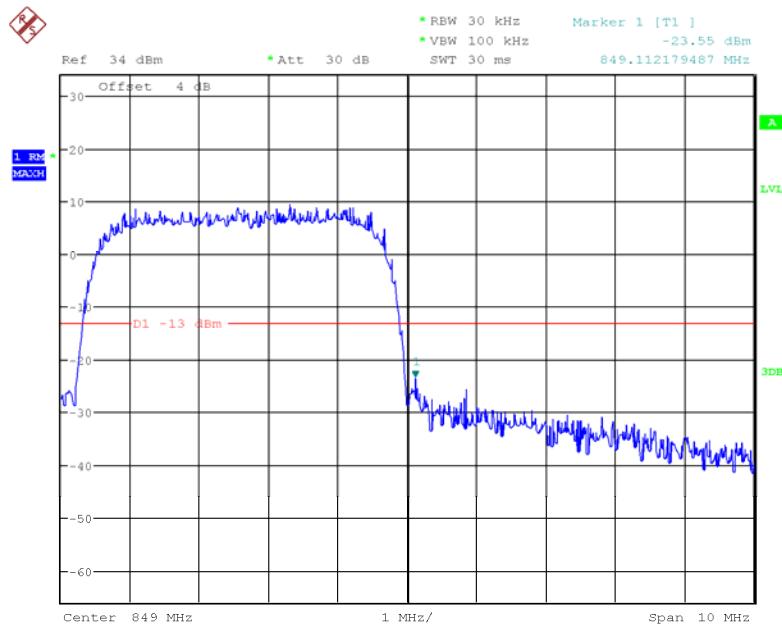
Date: 17.OCT.2017 22:24:17

HSDPA Band V, Right Band Edge

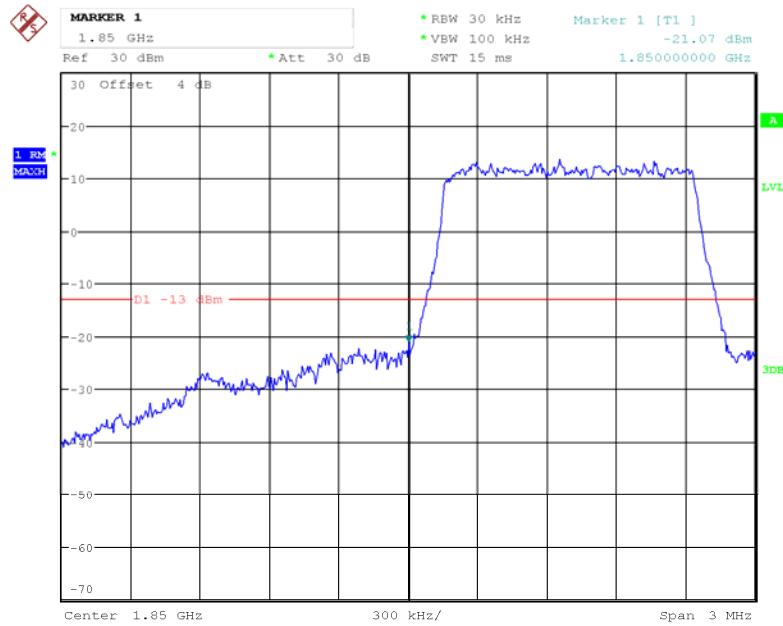
Date: 17.OCT.2017 22:24:57

HSUPA Band V, Left Band Edge

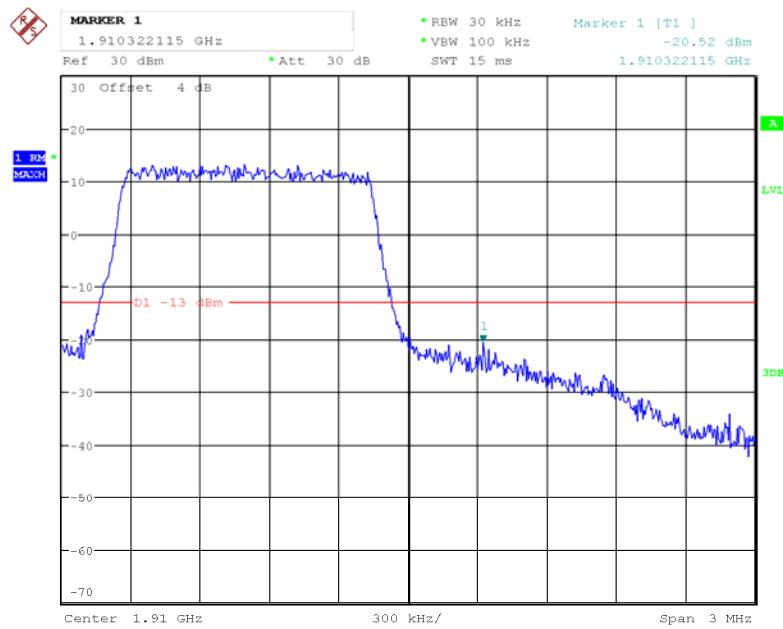
Date: 17.OCT.2017 22:09:17

HSUPA Band V, Right Band Edge

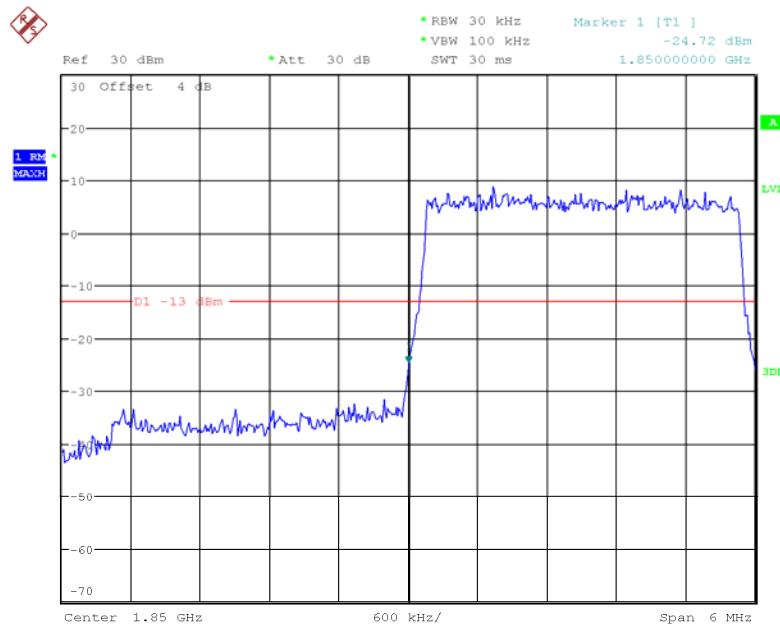
Date: 17.OCT.2017 22:07:29

LTE Band II**QPSK_1.4MHz_6 RB_Left**

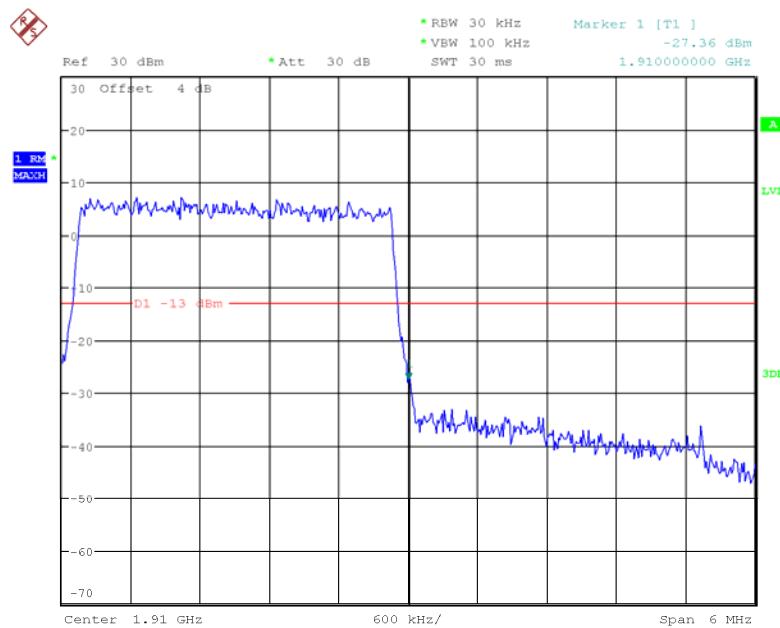
Date: 18.OCT.2017 09:32:59

QPSK_1.4MHz_6 RB_Right

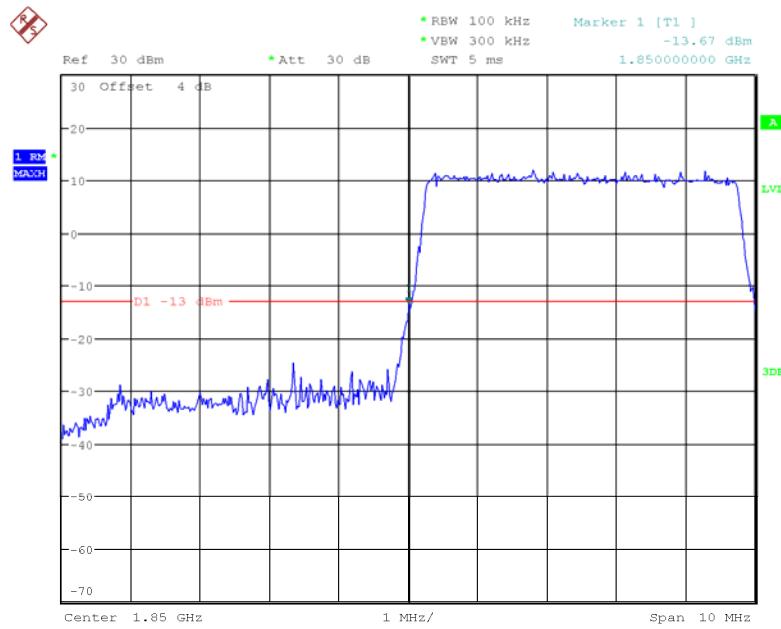
Date: 18.OCT.2017 09:23:53

QPSK_3MHz_15 RB_Left

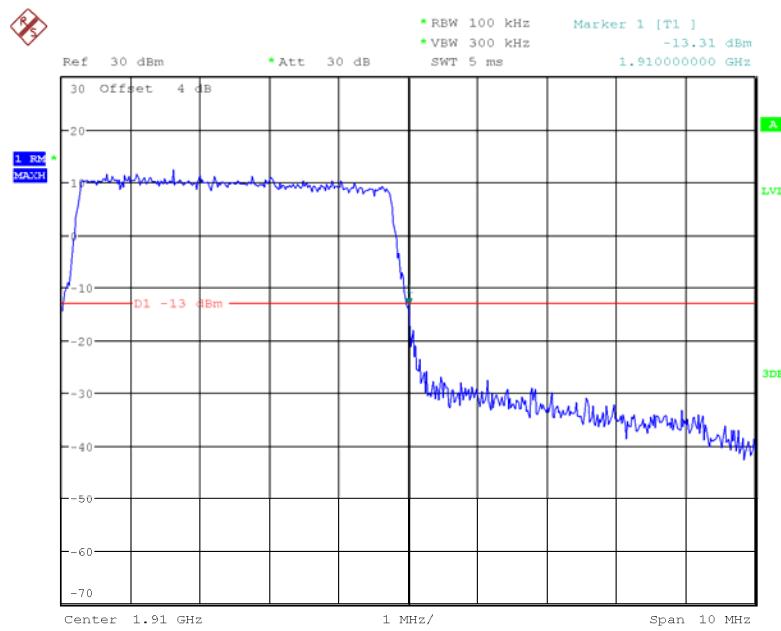
Date: 18.OCT.2017 09:35:28

QPSK_3MHz_15 RB_Right

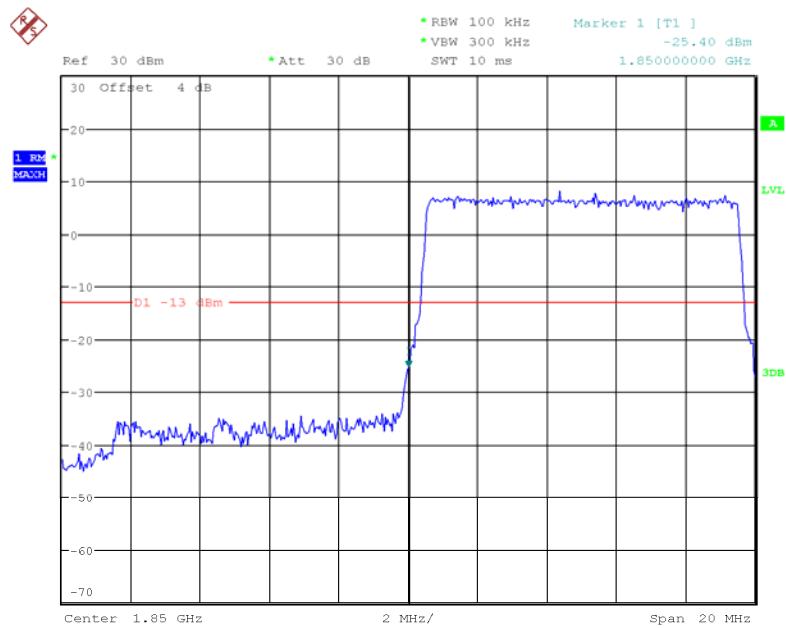
Date: 18.OCT.2017 09:34:18

QPSK_5MHz_25 RB_Left

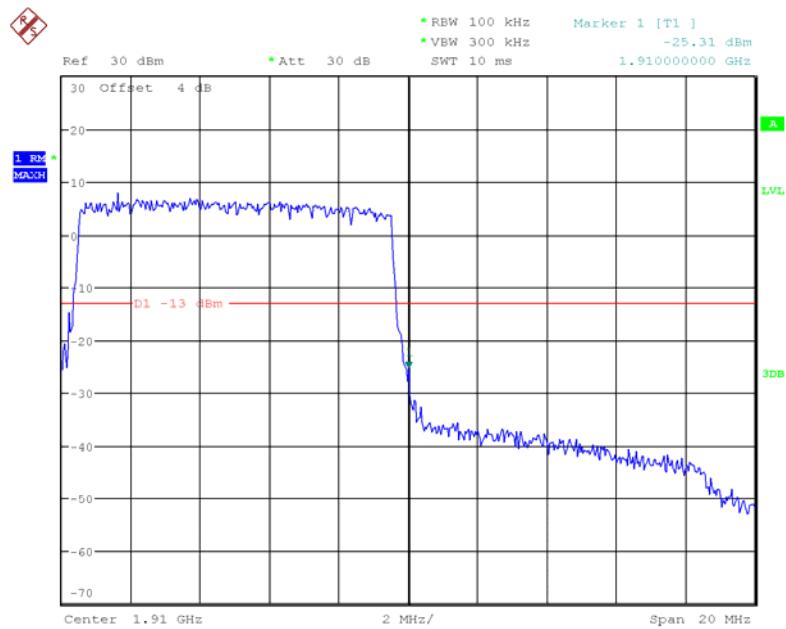
Date: 18.OCT.2017 09:39:34

QPSK_5MHz_25 RB_Right

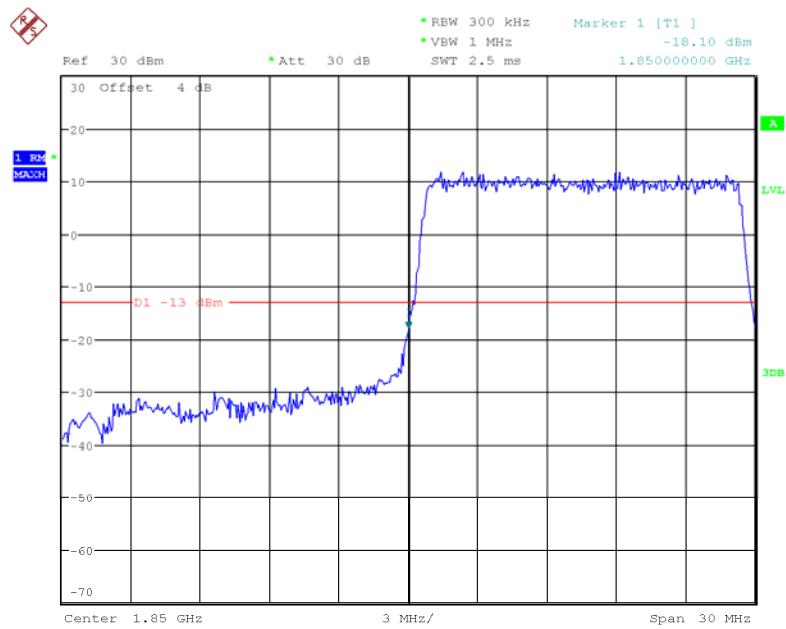
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QPSK_10MHz_50 RB_Left

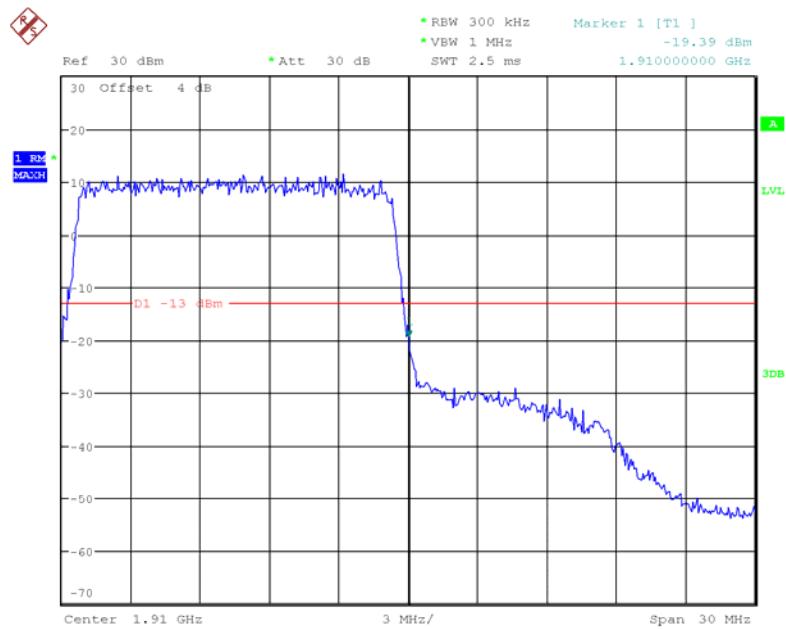
Date: 18.OCT.2017 09:42:25

QPSK_10MHz_50 RB_Right

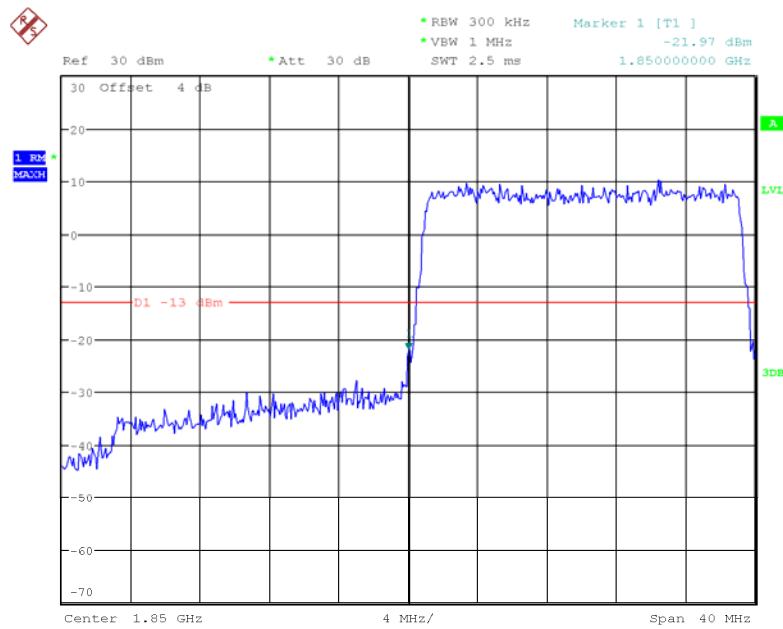
Date: 18.OCT.2017 09:41:42

QPSK_15MHz_75 RB_Left

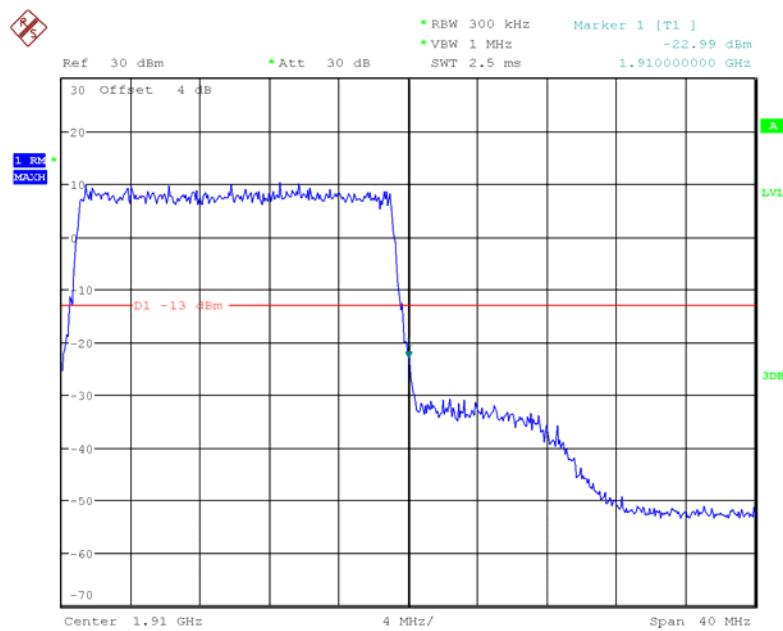
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QPSK_15MHz_75 RB_Right

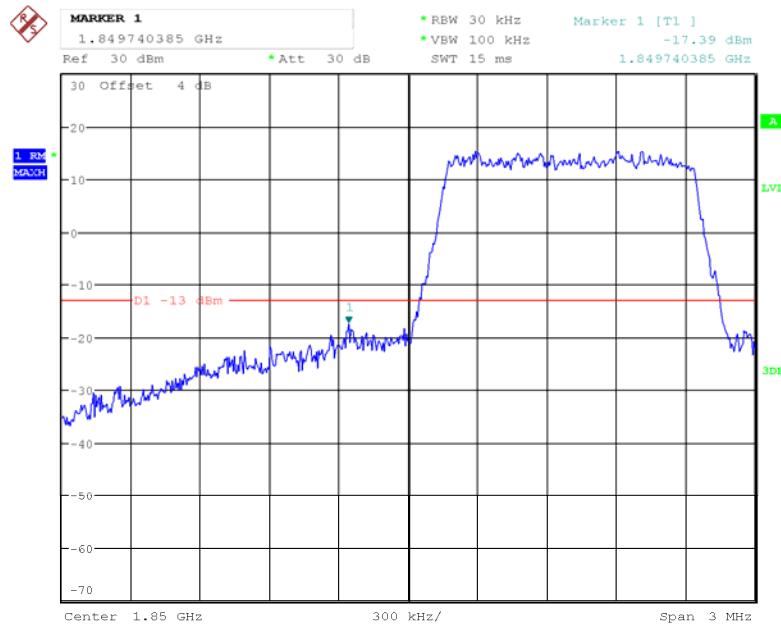
Date: 18.OCT.2017 09:44:01

QPSK_20MHz_FULL RB_Left

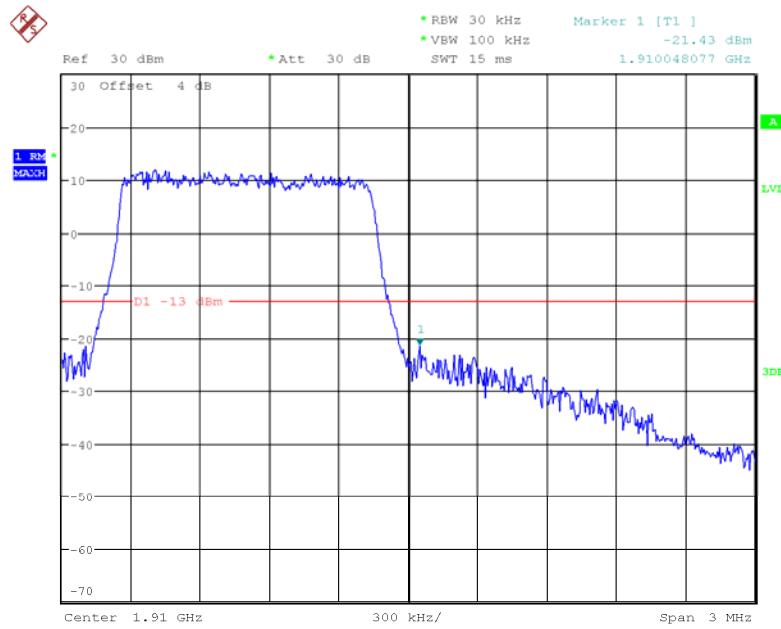
Date: 18.OCT.2017 10:29:19

QPSK_20MHz_FULL RB_Right

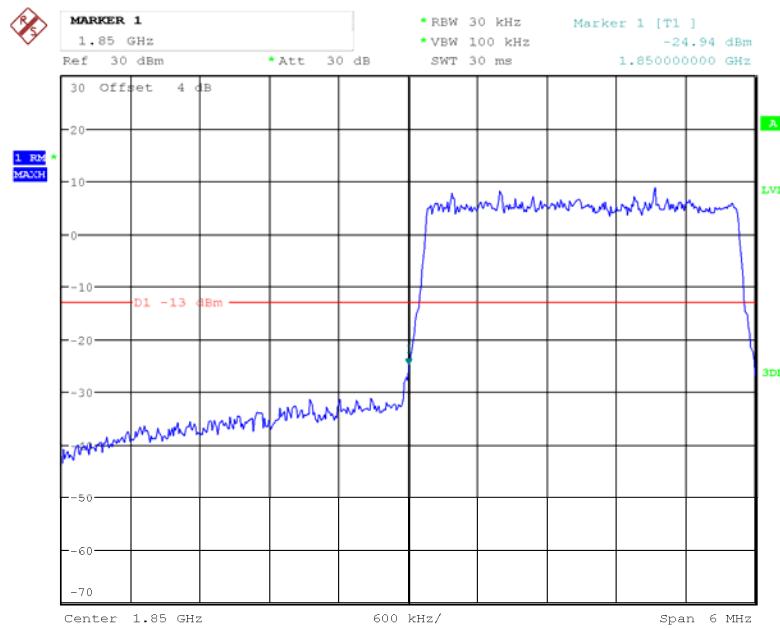
Date: 18.OCT.2017 10:28:30

16QAM_1.4MHz_6 RB_Left

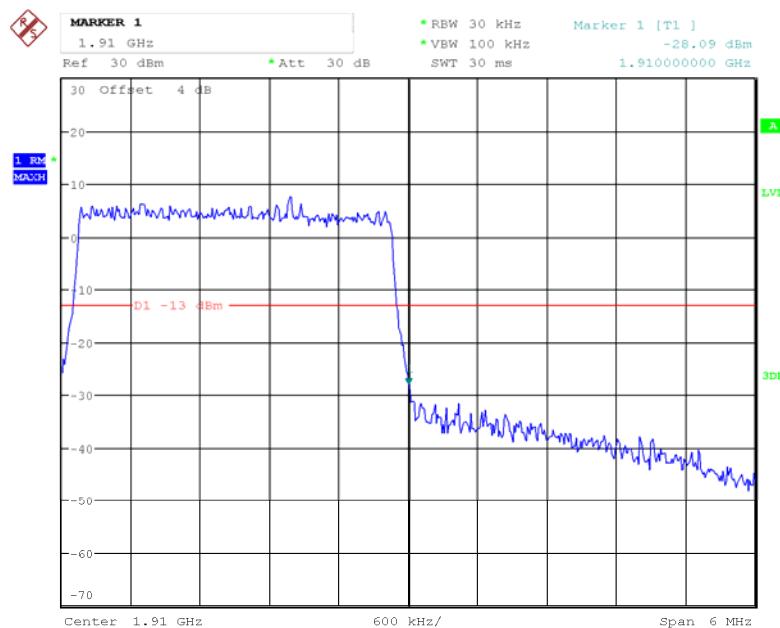
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16QAM_1.4MHz_6 RB_Right

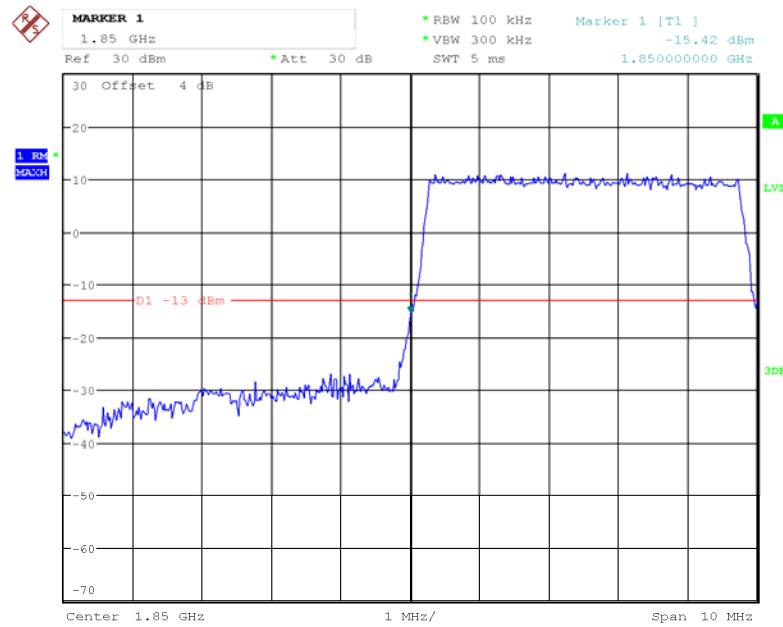
Date: 18.OCT.2017 09:23:24

16QAM_3MHz_15 RB_Left

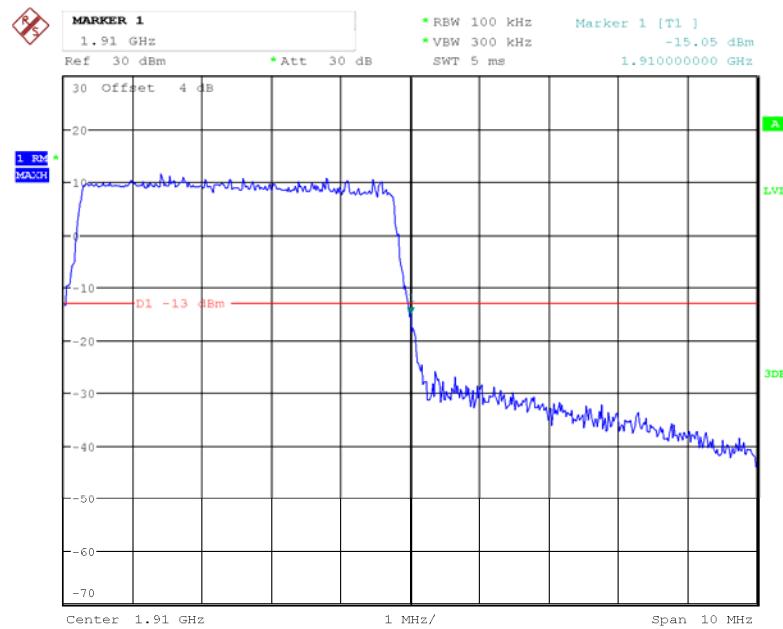
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16QAM_3MHz_15 RB_Right

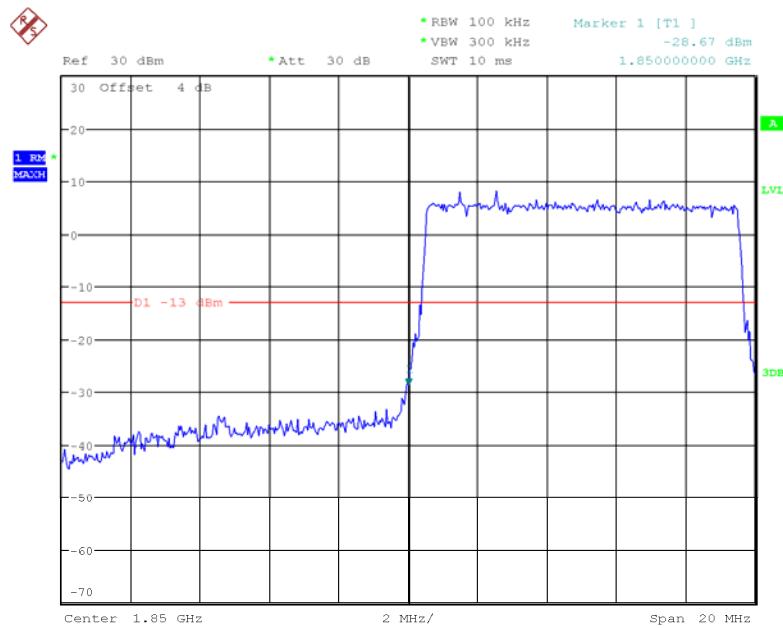
Date: 18.OCT.2017 09:33:58

16QAM_5MHz_25 RB_Left

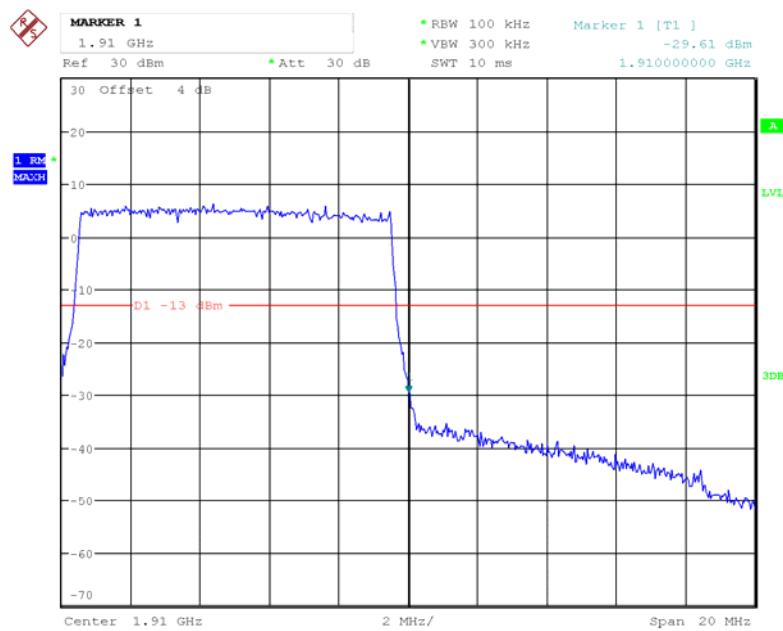
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16QAM_5MHz_25 RB_Right

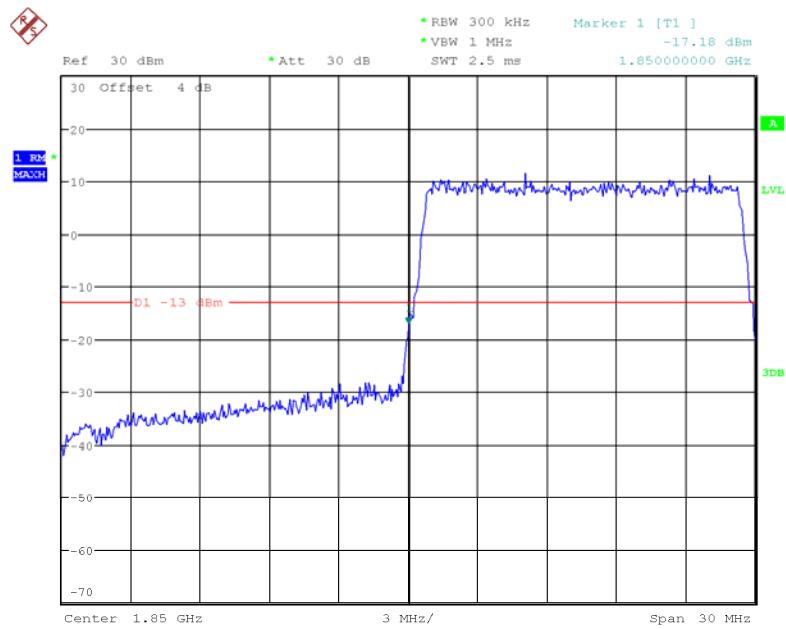
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16QAM_10MHz_50 RB_Left

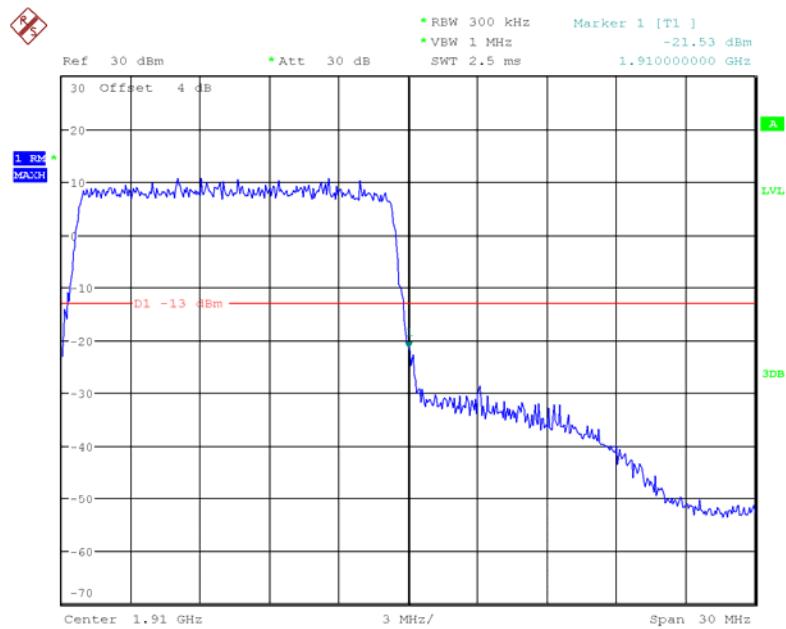
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16QAM_10MHz_50 RB_Right

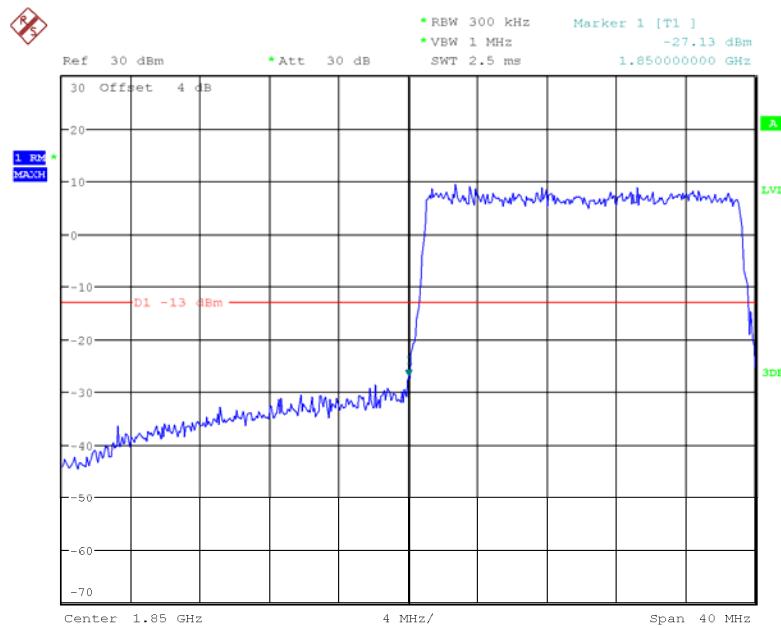
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16QAM_15MHz_75 RB_Left

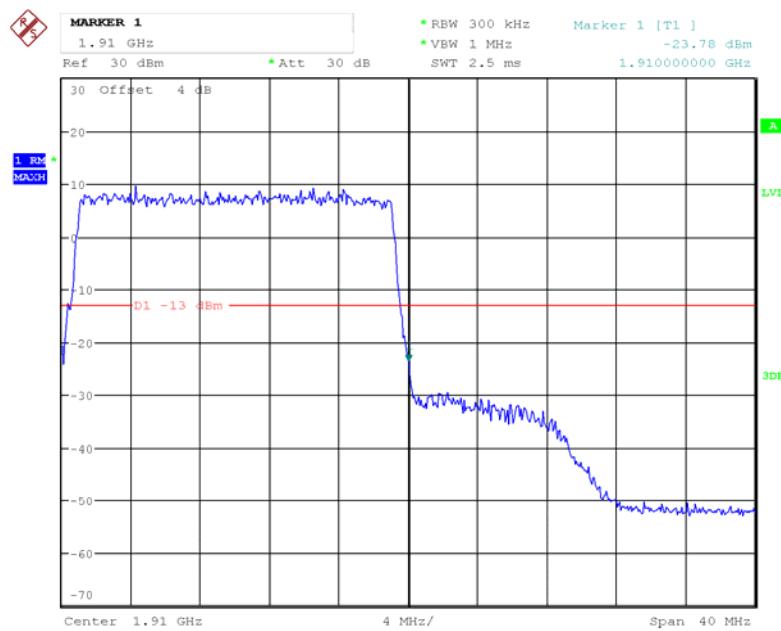
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16QAM_15MHz_75 RB_Right

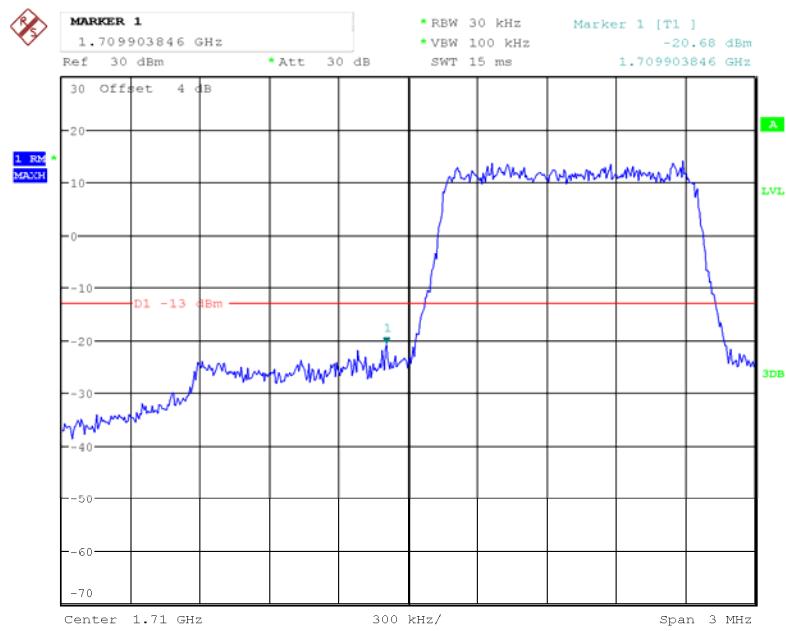
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16QAM_20MHz_FULL RB_Left

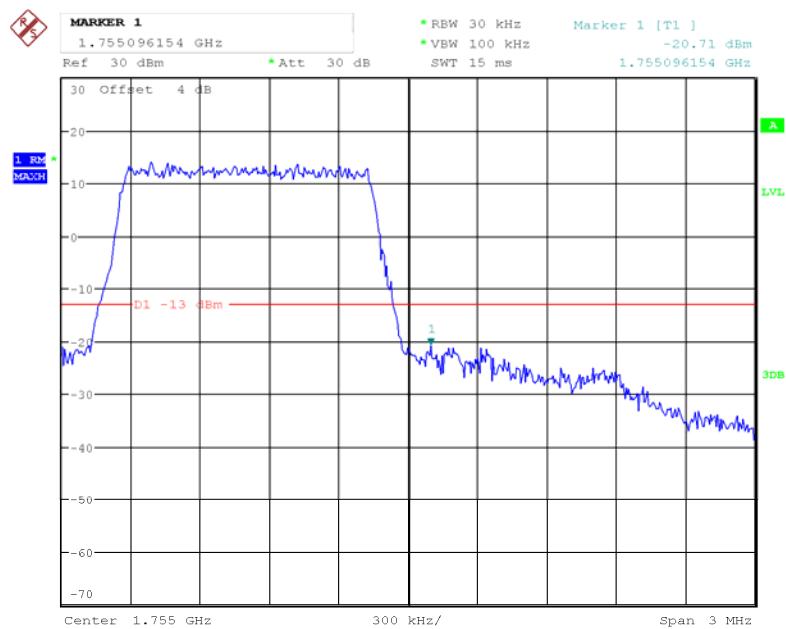
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16QAM_20MHz_FULL RB_Right

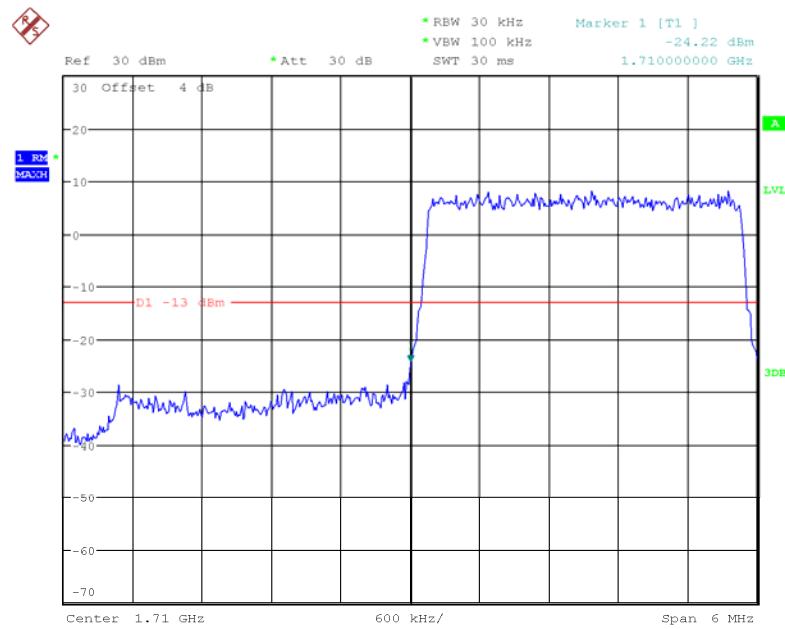
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LTE Band IV**QPSK_1.4MHz_6 RB_Left**

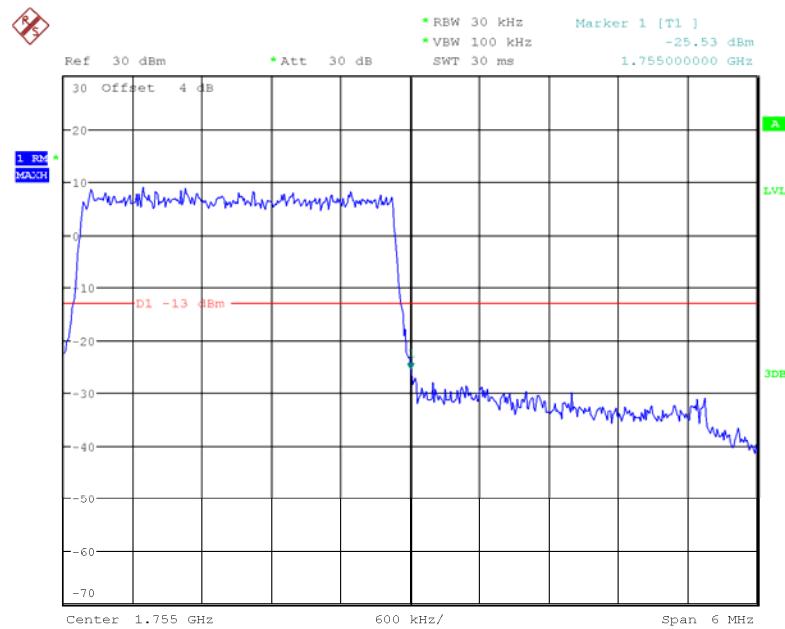
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QPSK_1.4MHz_6 RB_Right

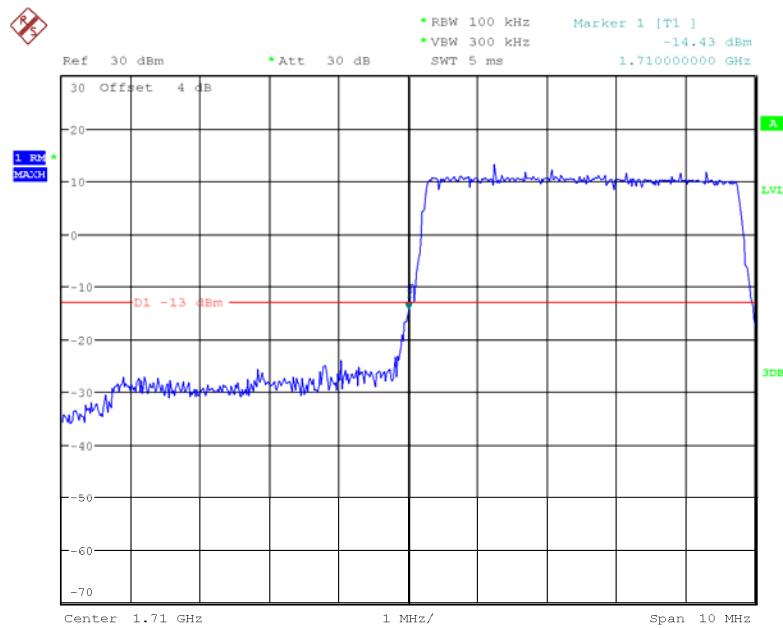
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QPSK_3MHz_15 RB_Left

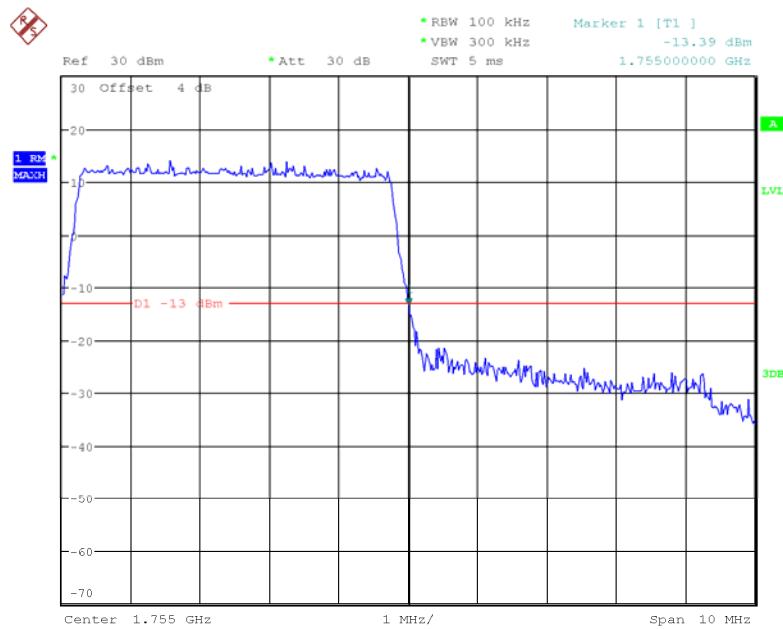
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QPSK_3MHz_15 RB_Right

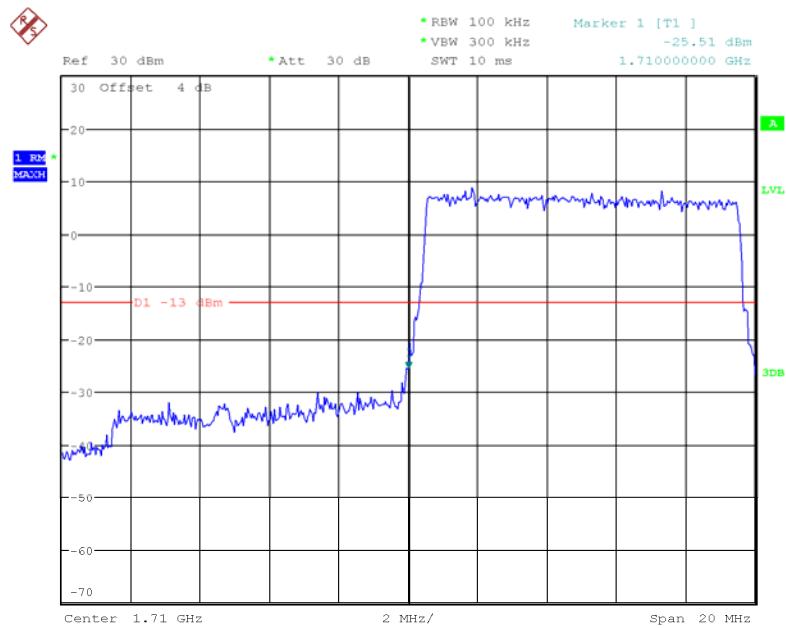
Date: 18.OCT.2017 10:35:30

QPSK_5MHz_25 RB_Left

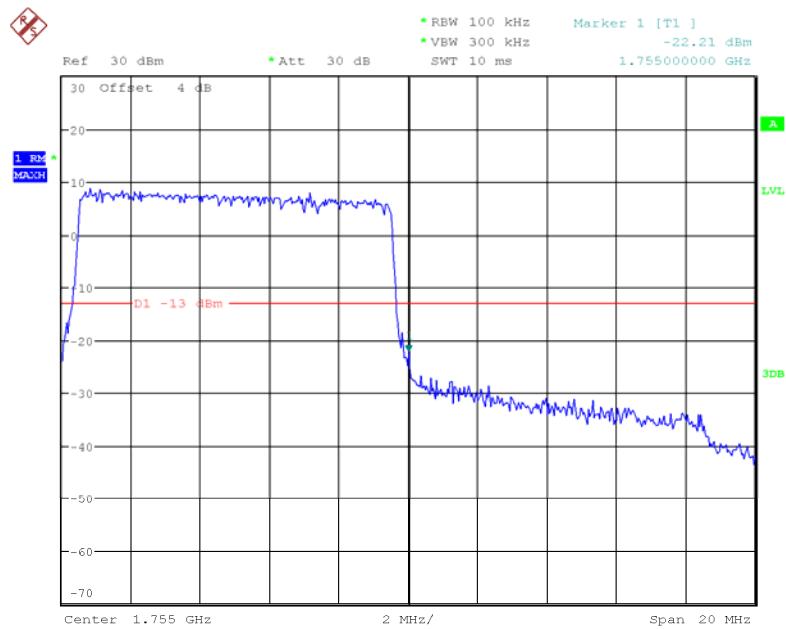
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QPSK_5MHz_25 RB_Right

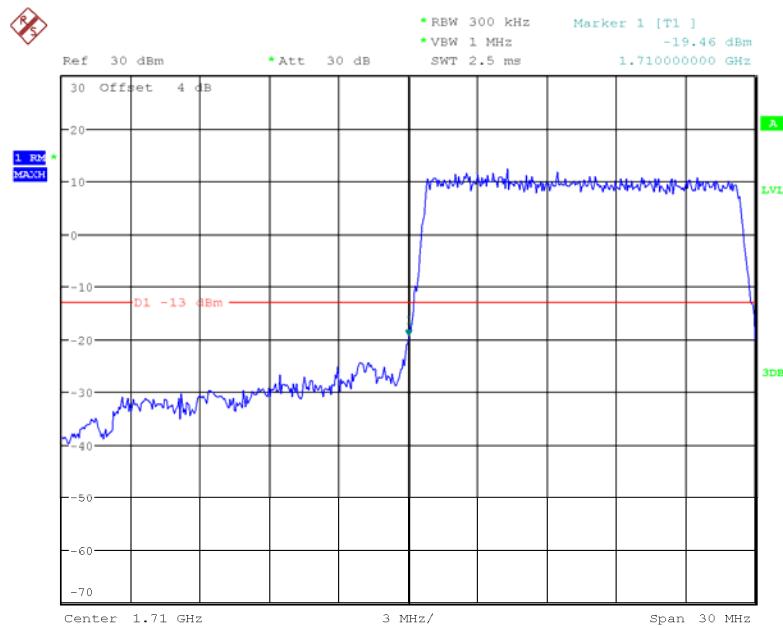
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QPSK_10MHz_50 RB_Left

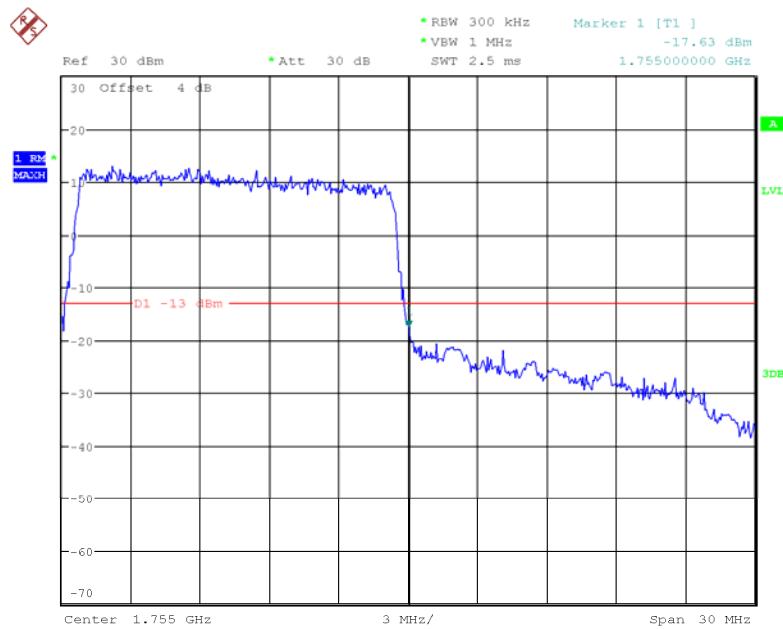
Date: 18.OCT.2017 10:46:29

QPSK_10MHz_50 RB_Right

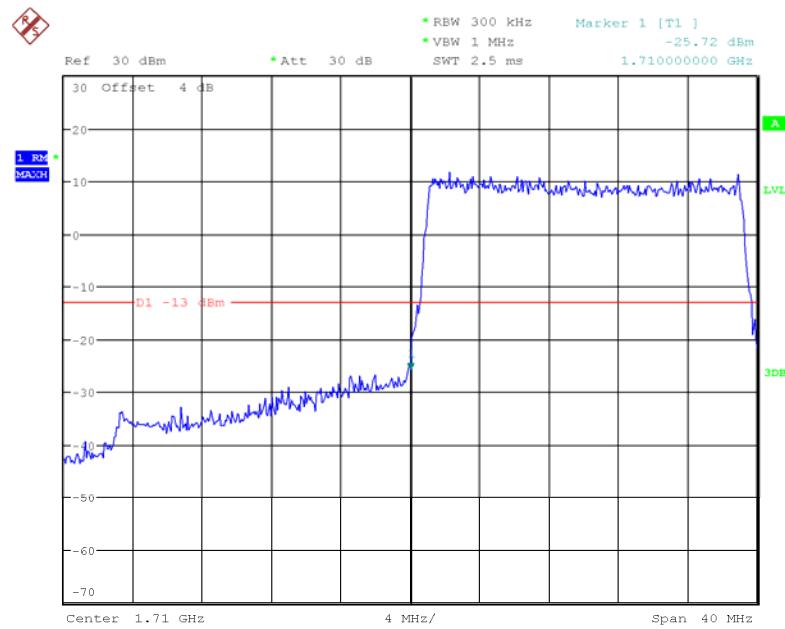
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QPSK_15MHz_75 RB_Left

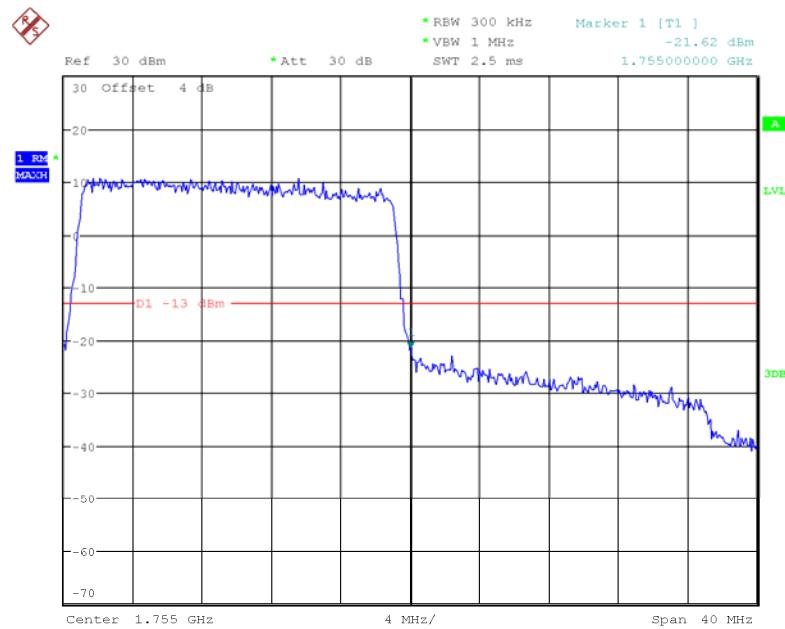
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QPSK_15MHz_75 RB_Right

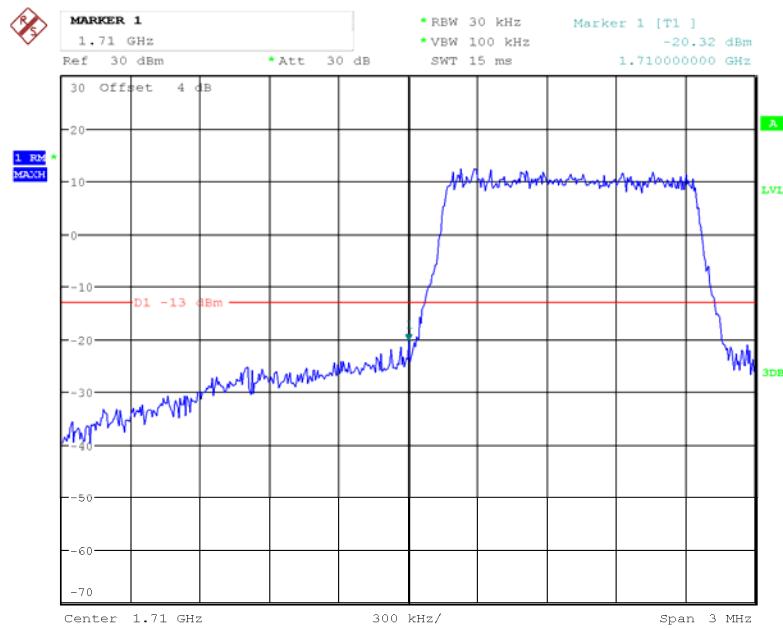
Date: 18.OCT.2017 10:49:48

QPSK_20MHz_FULL RB_Left

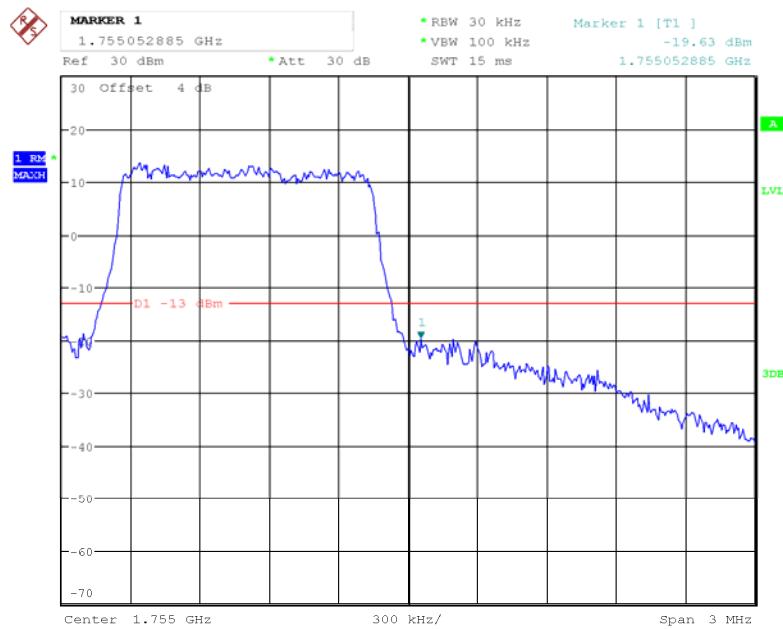
Date: 18.OCT.2017 10:52:10

QPSK_20MHz_FULL RB_Right

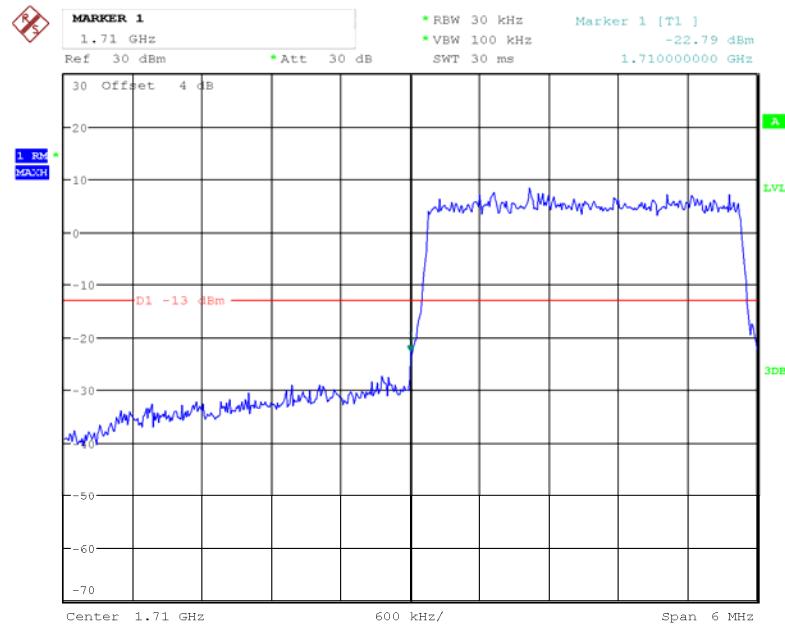
Date: 18.OCT.2017 10:52:52

16QAM_1.4MHz_6 RB_Left

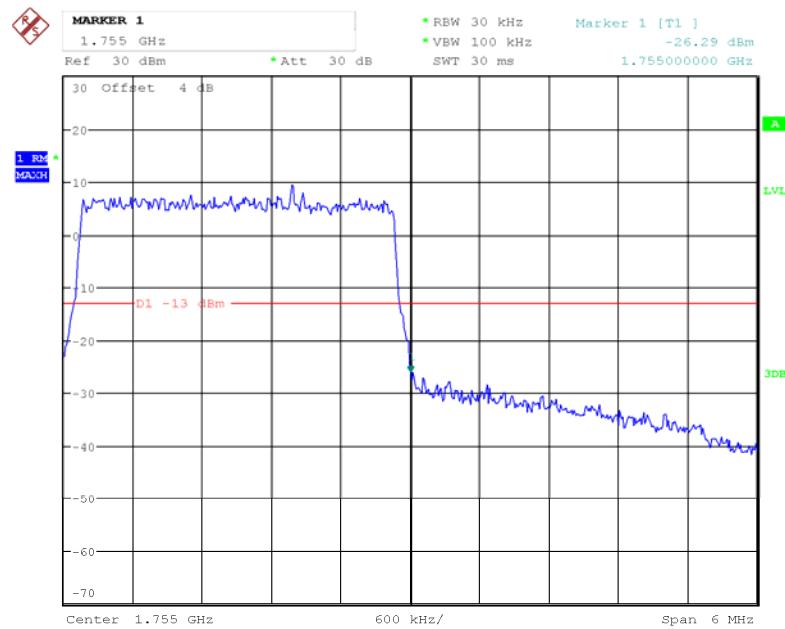
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16QAM_1.4MHz_6 RB_Right

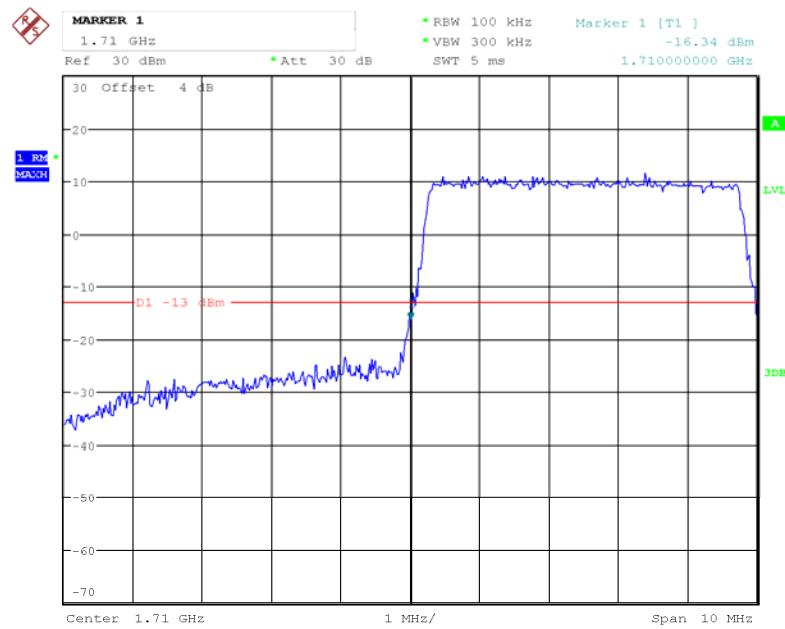
Date: 18.OCT.2017 10:32:03

16QAM_3MHz_15 RB_Left

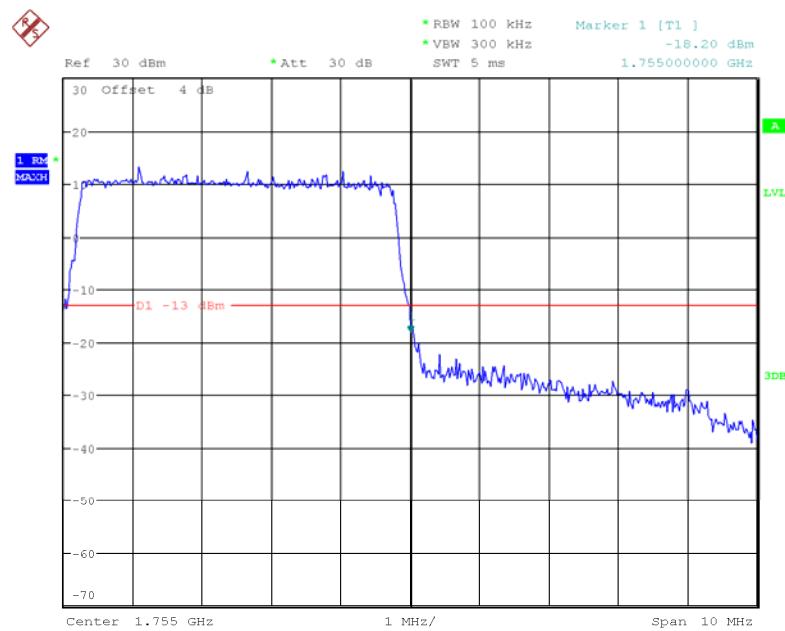
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16QAM_3MHz_15 RB_Right

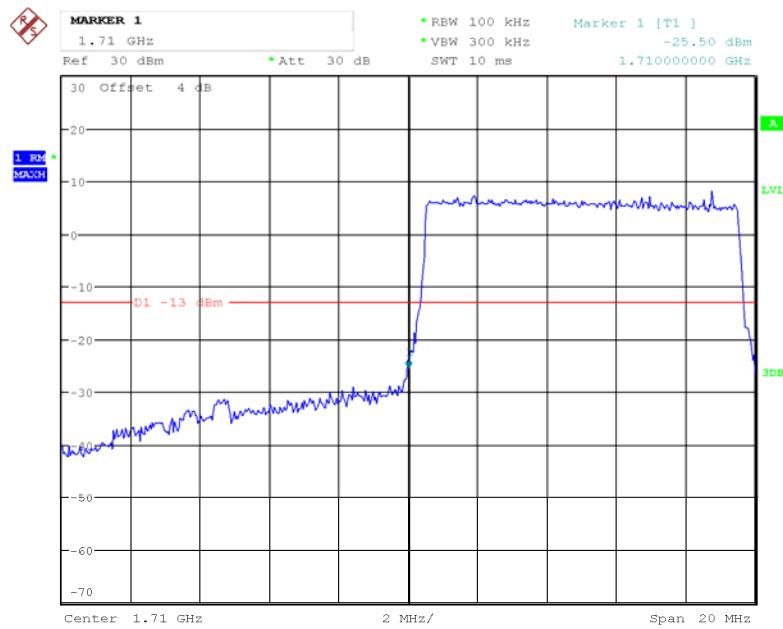
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16QAM_5MHz_25 RB_Left

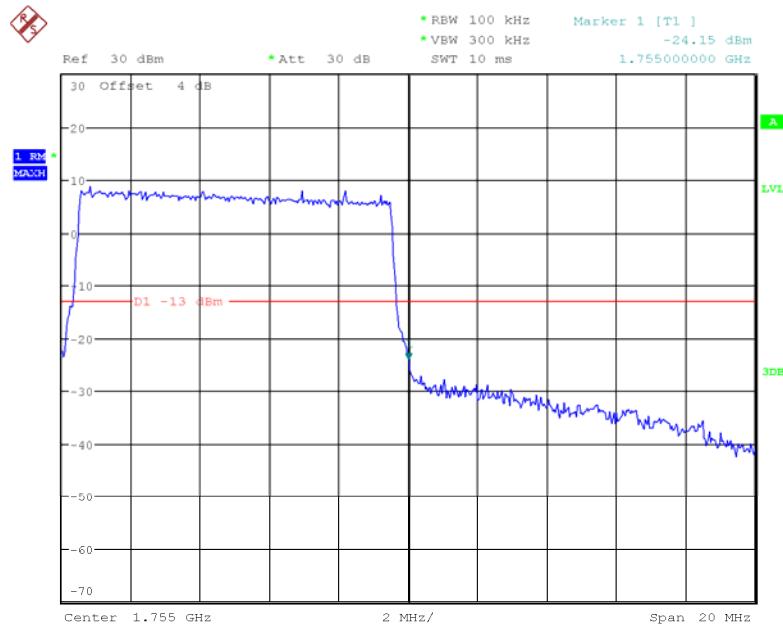
Date: 18.OCT.2017 10:42:53

16QAM_5MHz_25 RB_Right

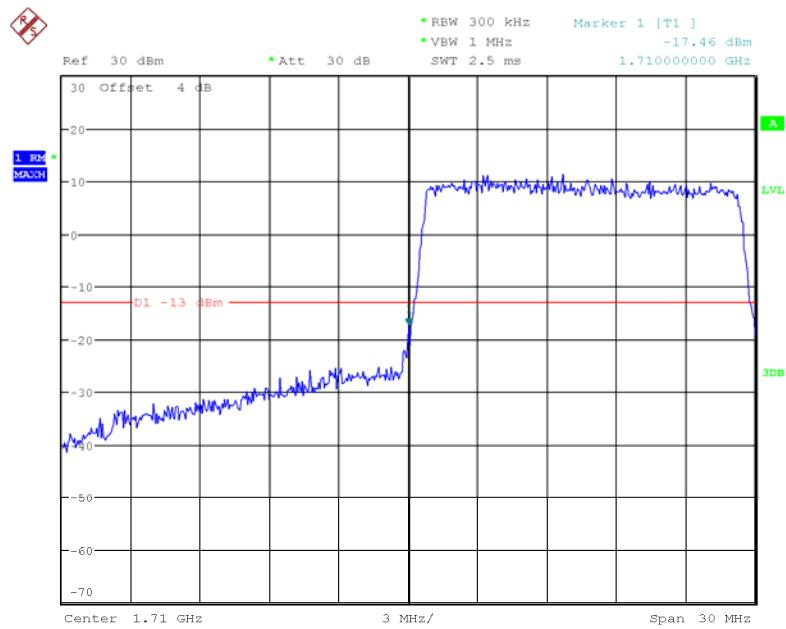
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16QAM_10MHz_50 RB_Left

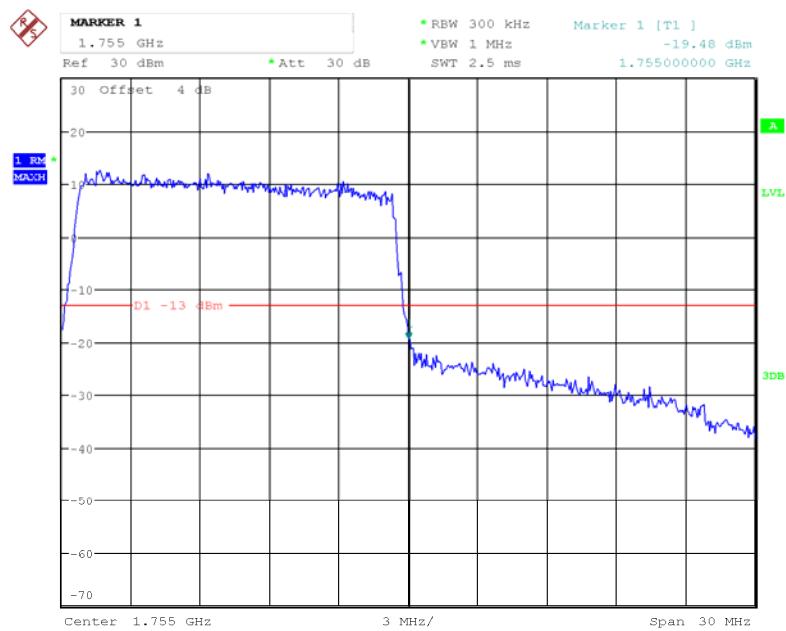
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16QAM_10MHz_50 RB_Right

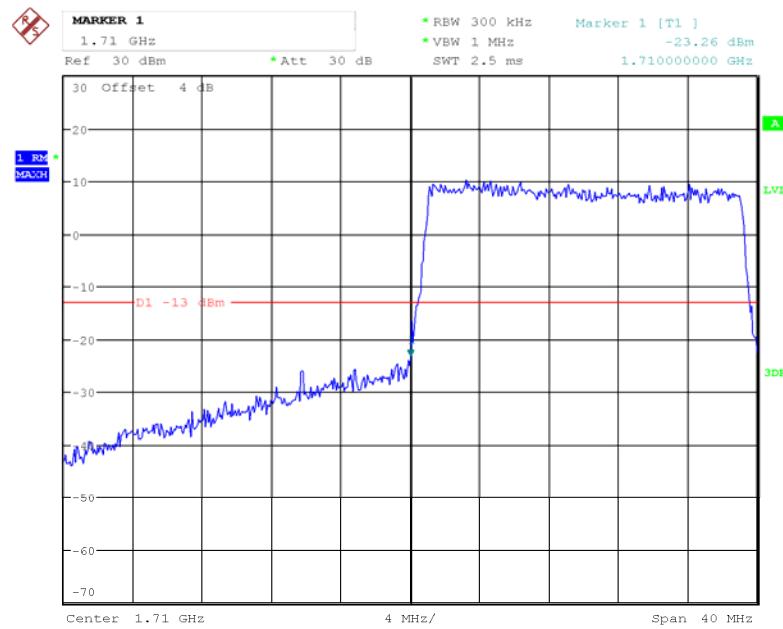
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16QAM_15MHz_75 RB_Left

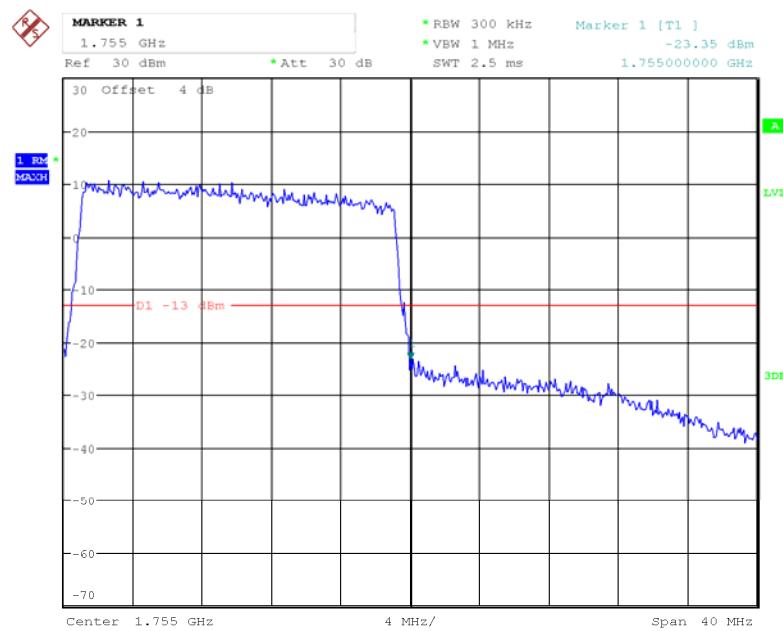
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16QAM_15MHz_75 RB_Right

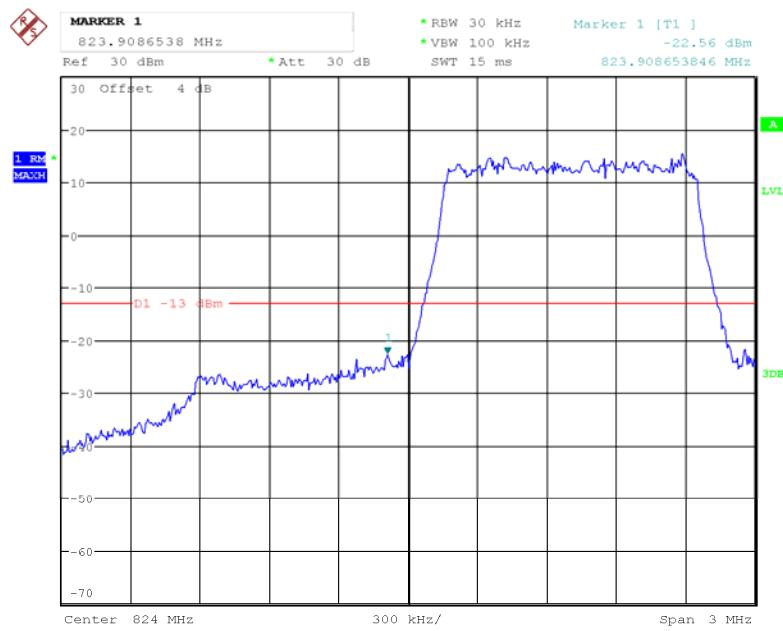
Date: 18.OCT.2017 10:49:22

16QAM_20MHz_FULL RB_Left

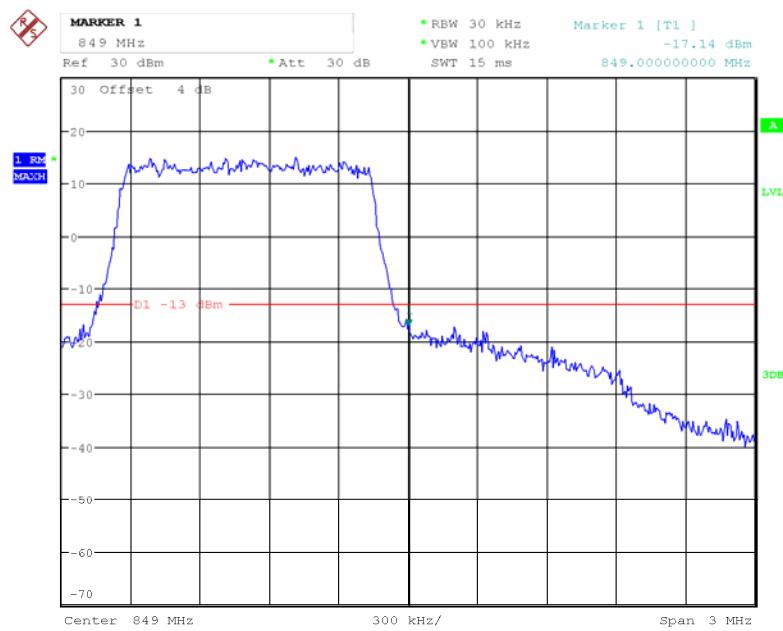
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16QAM_20MHz_FULL RB_Right

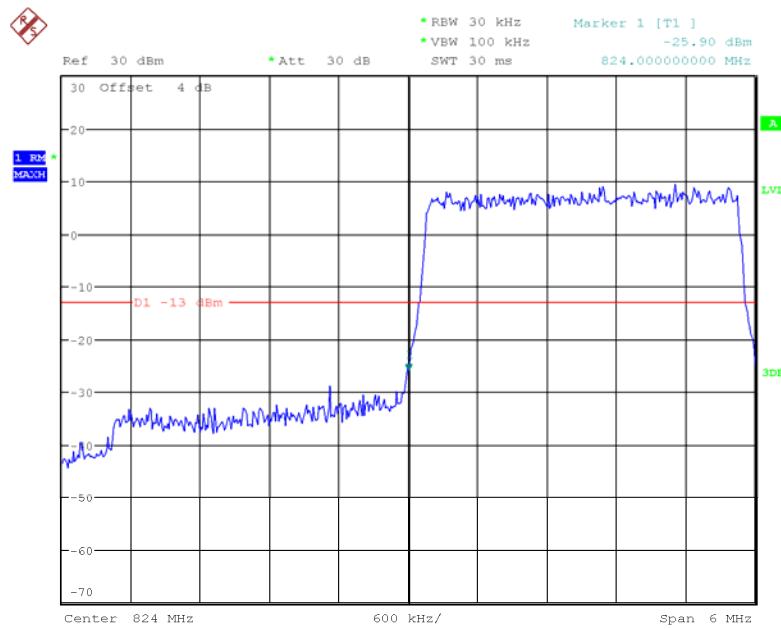
Date: 18.OCT.2017 10:52:42

LTE Band V**QPSK_1.4MHz_6 RB_Left**

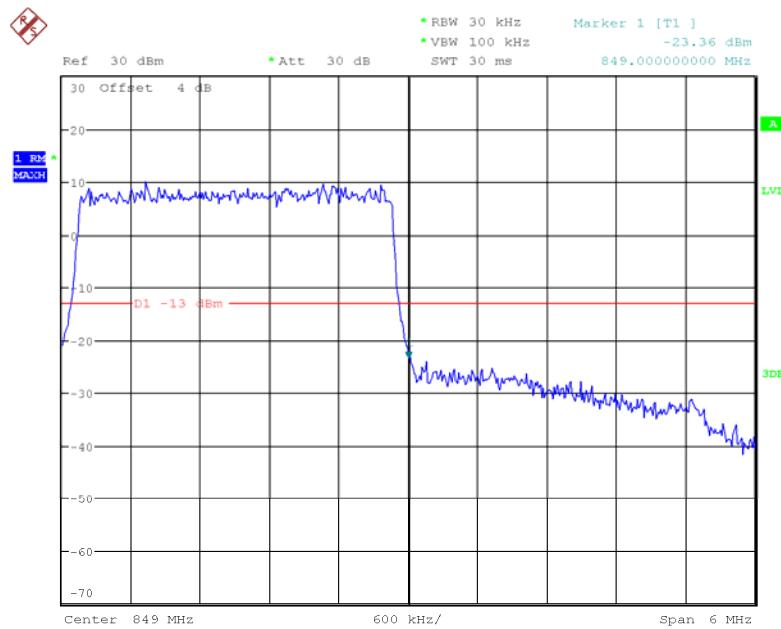
Date: 18.OCT.2017 10:59:20

QPSK_1.4MHz_6 RB_Right

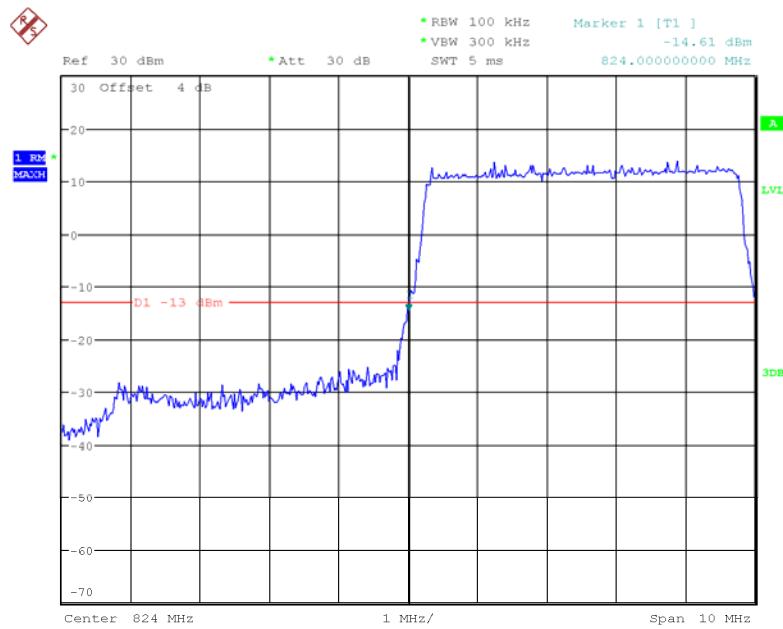
Date: 18.OCT.2017 10:58:14

QPSK_3MHz_15 RB_Left

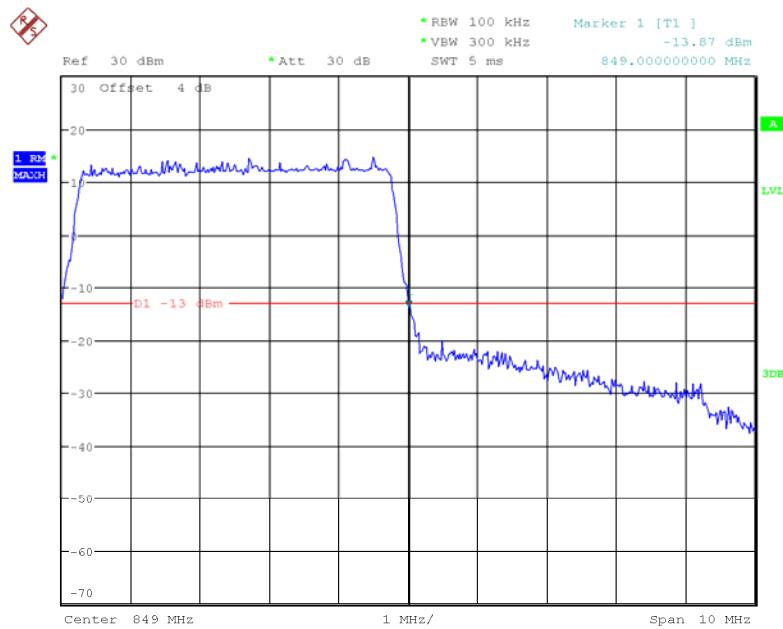
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QPSK_3MHz_15 RB_Right

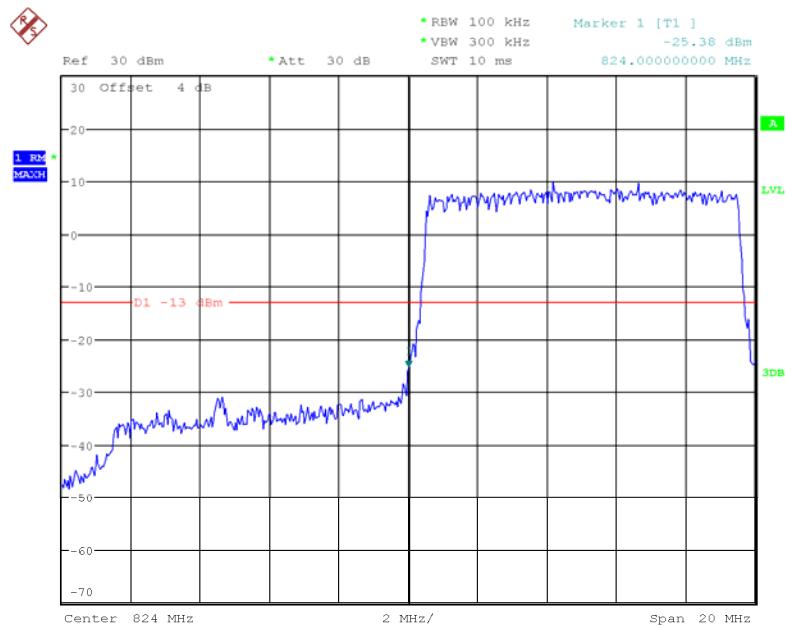
Date: 18.OCT.2017 11:01:37

QPSK_5MHz_25 RB_Left

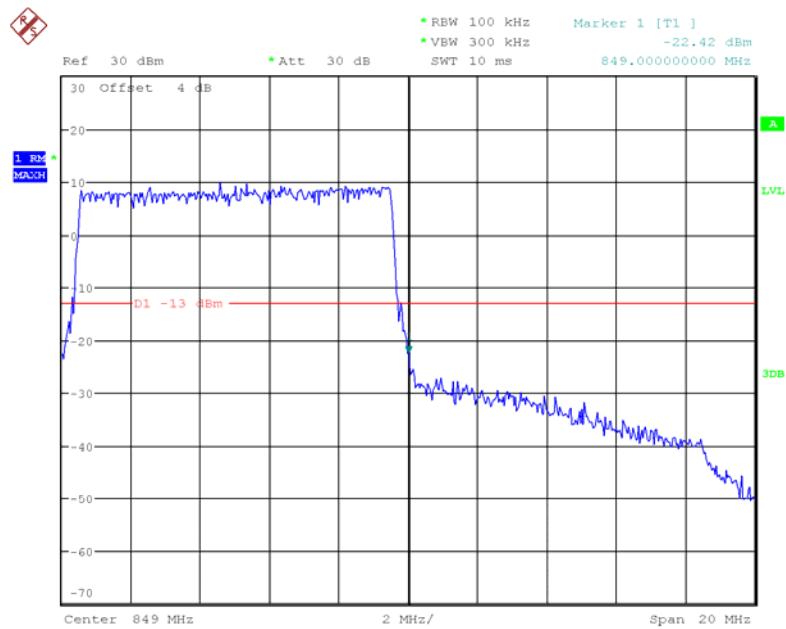
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QPSK_5MHz_25 RB_Right

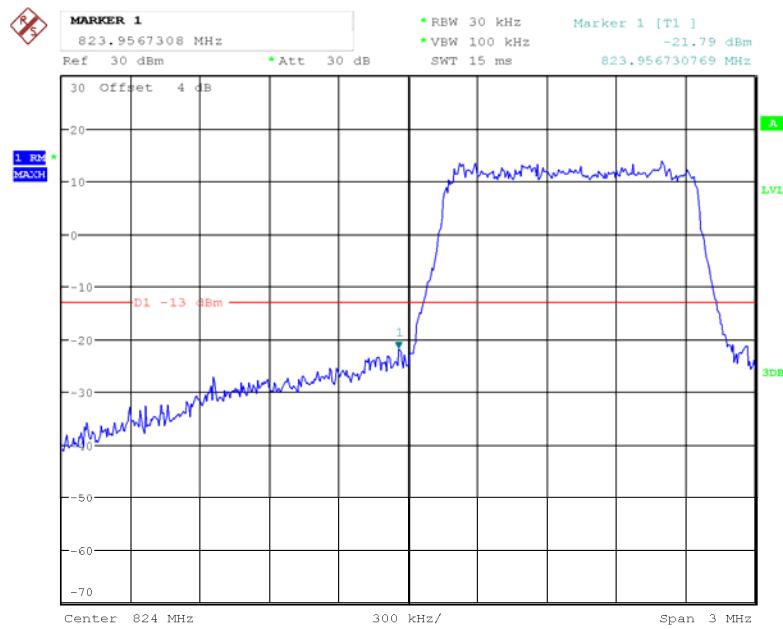
Date: 18.OCT.2017 11:56:00

QPSK_10MHz_50 RB_Left

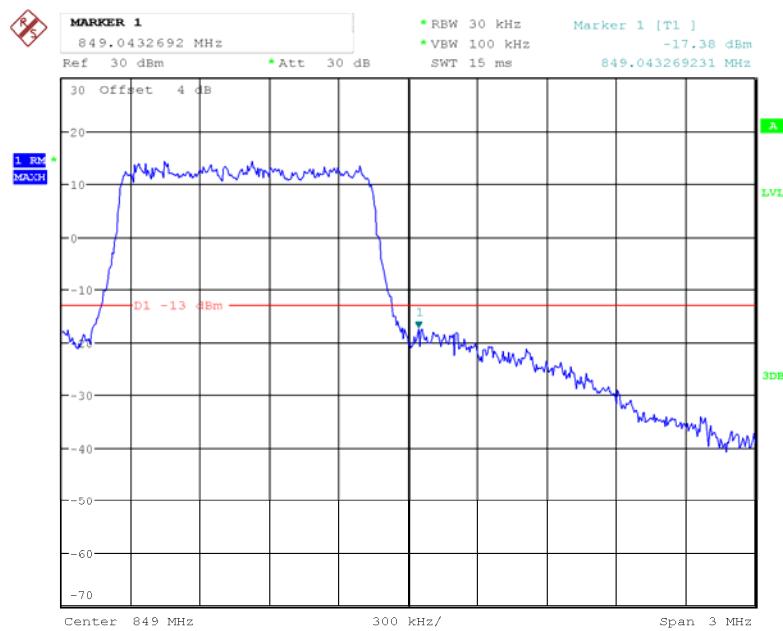
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QPSK_10MHz_50 RB_Right

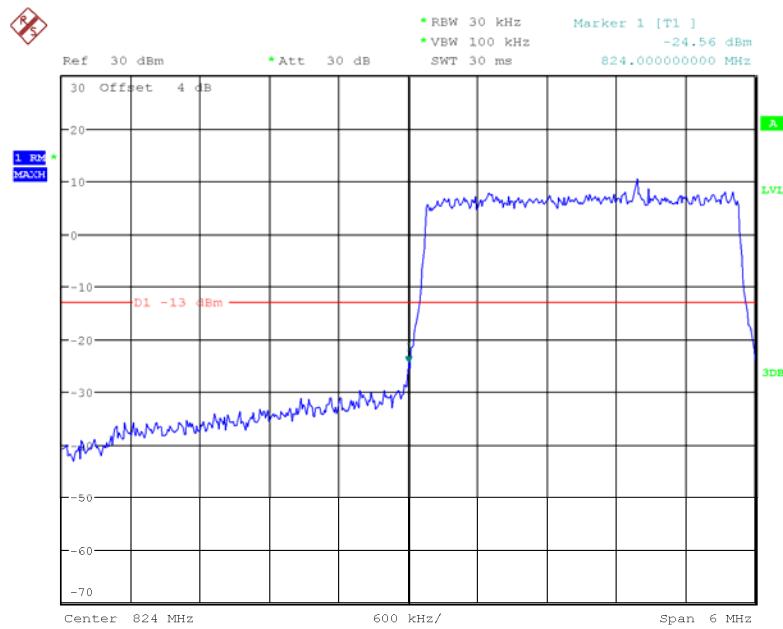
Date: 18.OCT.2017 11:10:43

16QAM_1.4MHz_6 RB_Left

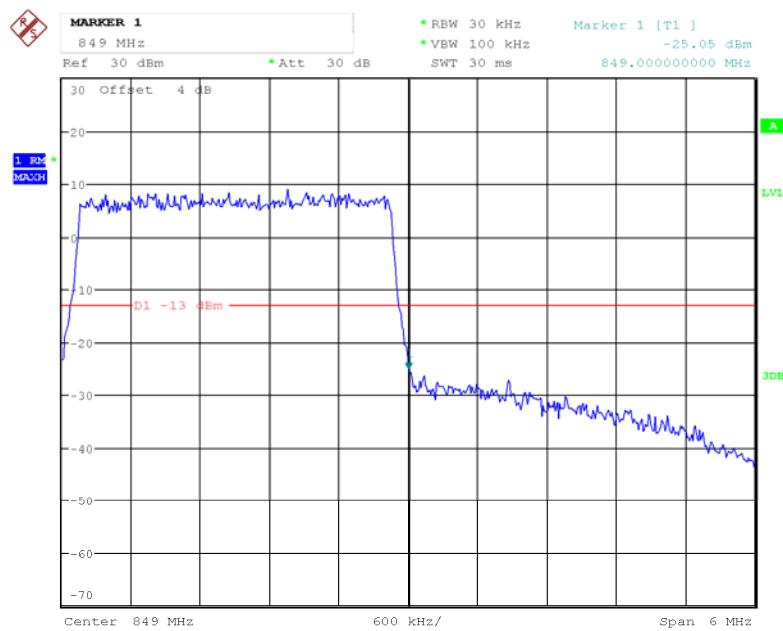
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16QAM_1.4MHz_6 RB_Right

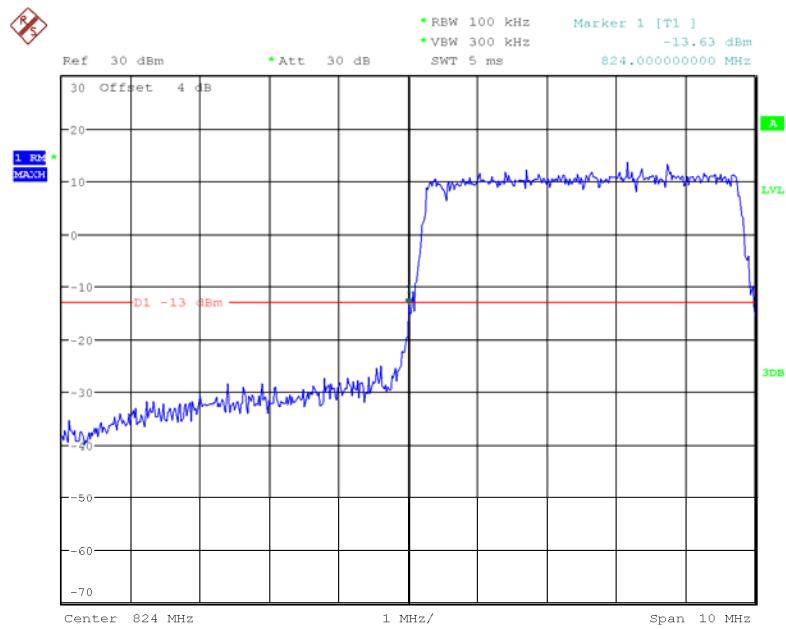
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16QAM_3MHz_15 RB_Left

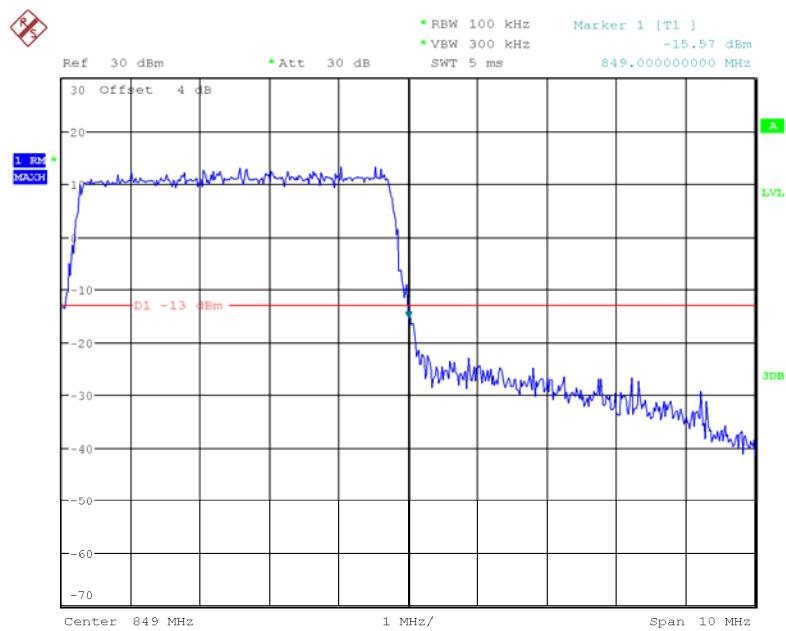
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16QAM_3MHz_15 RB_Right

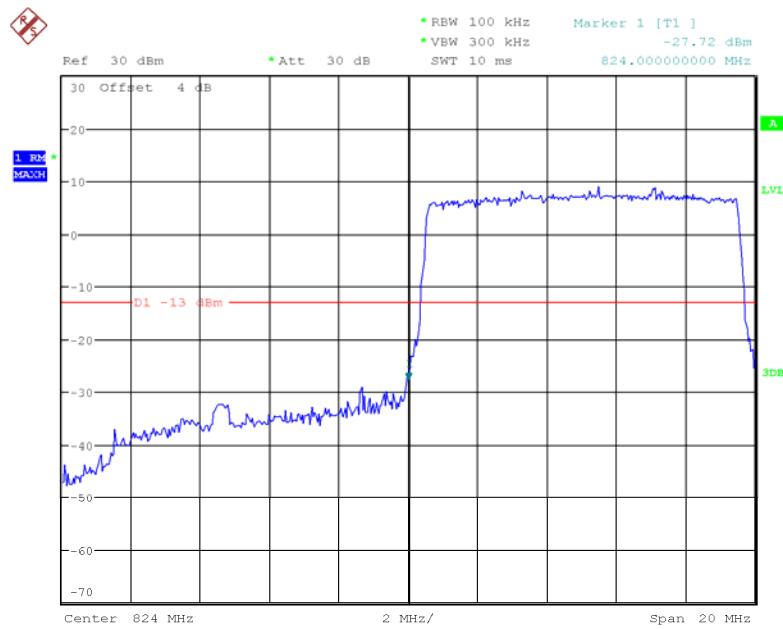
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16QAM_5MHz_25 RB_Left

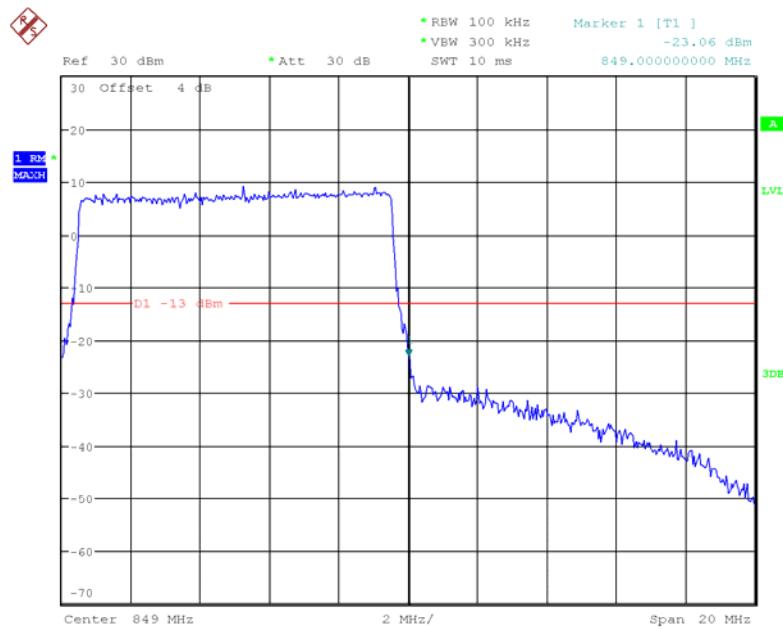
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16QAM_5MHz_25 RB_Right

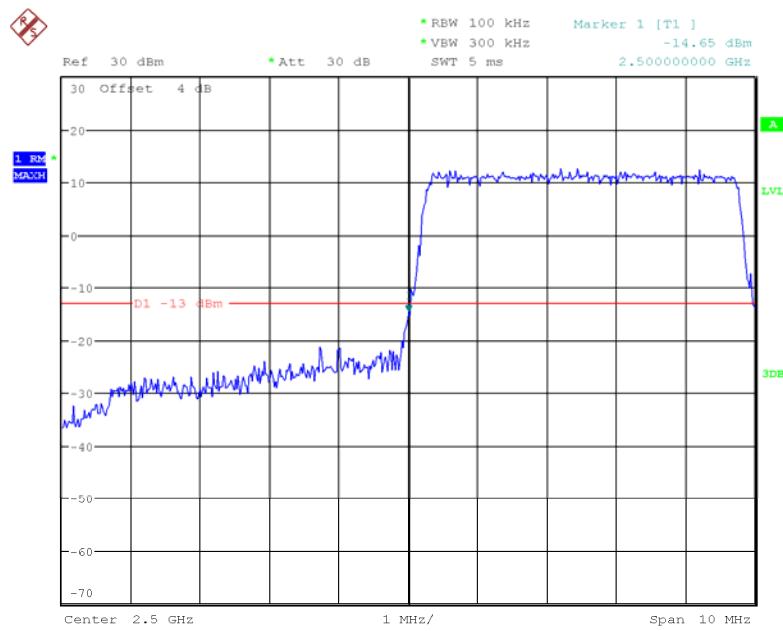
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16QAM_10MHz_50 RB_Left

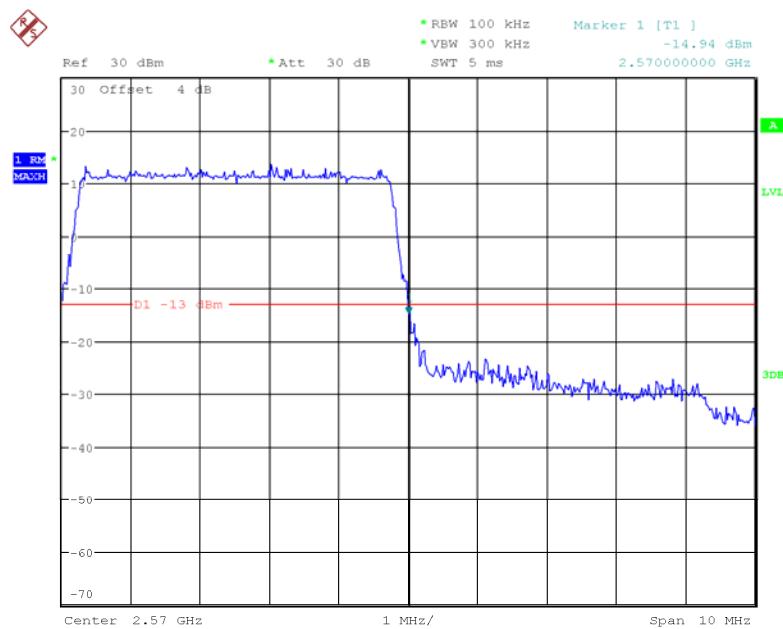
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16QAM_10MHz_50 RB_Right

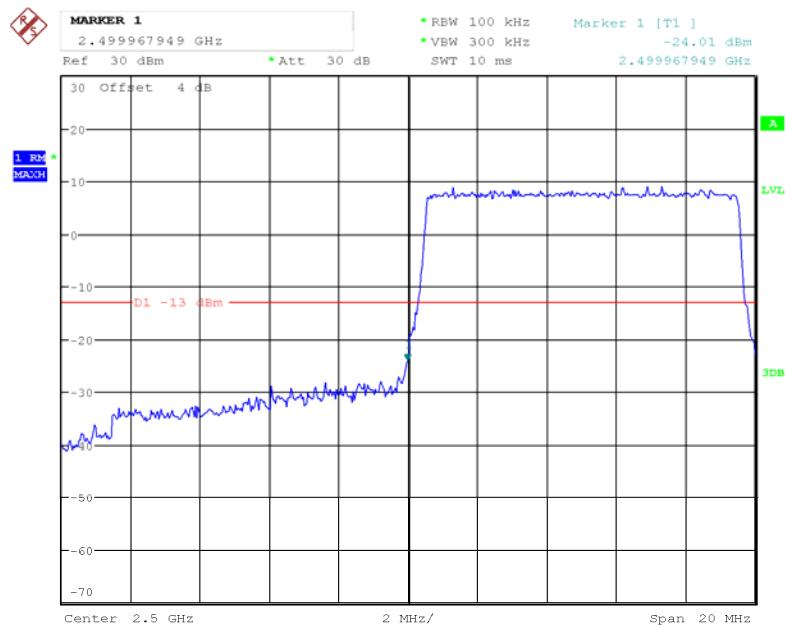
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LTE Band VII**QPSK_5MHz_25 RB_Left**

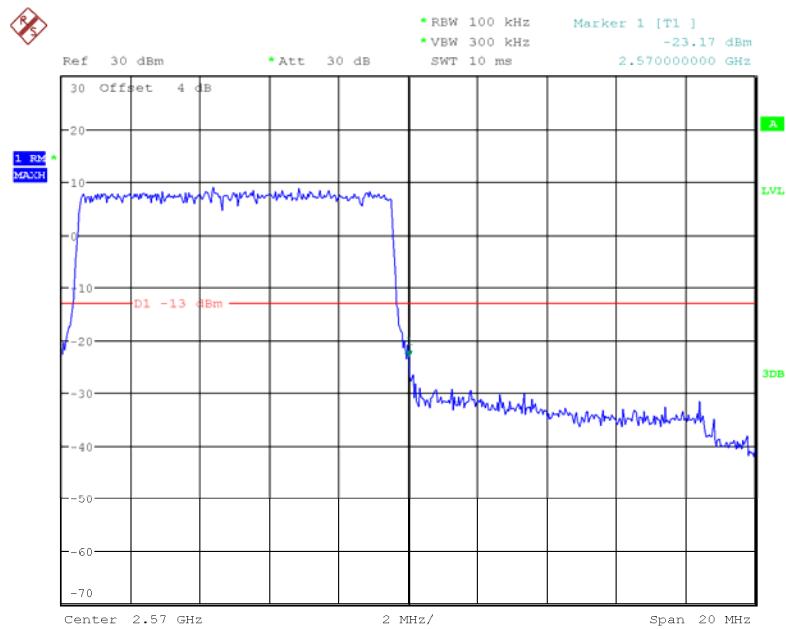
Date: 18.OCT.2017 11:16:26

QPSK_5MHz_25 RB_Right

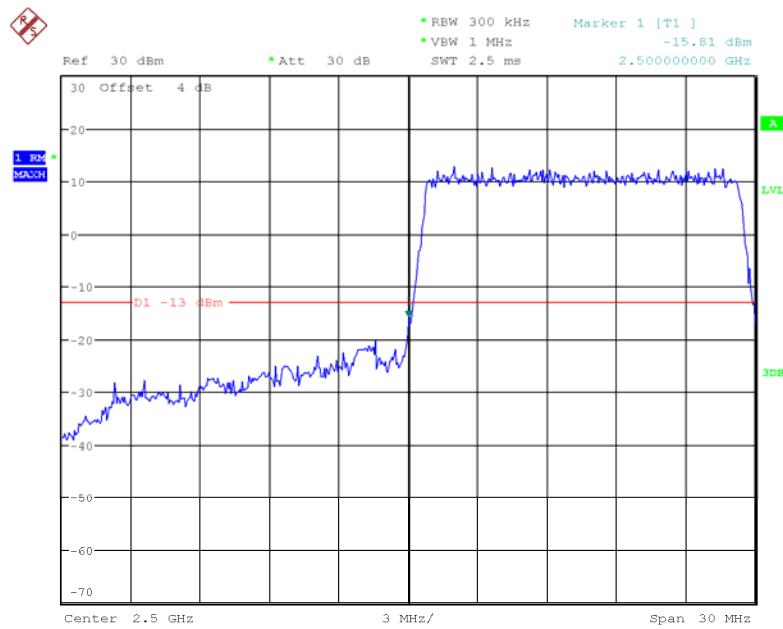
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QPSK_10MHz_50 RB_Left

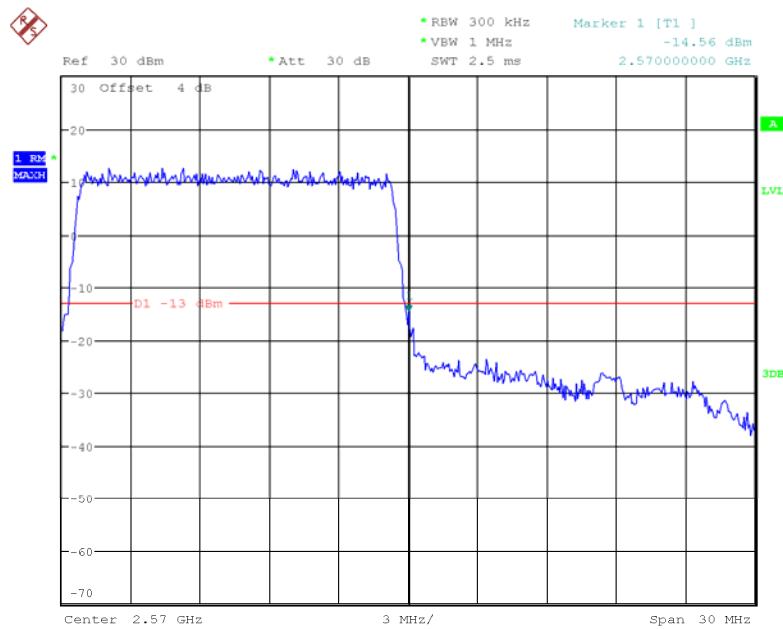
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QPSK_10MHz_50 RB_Right

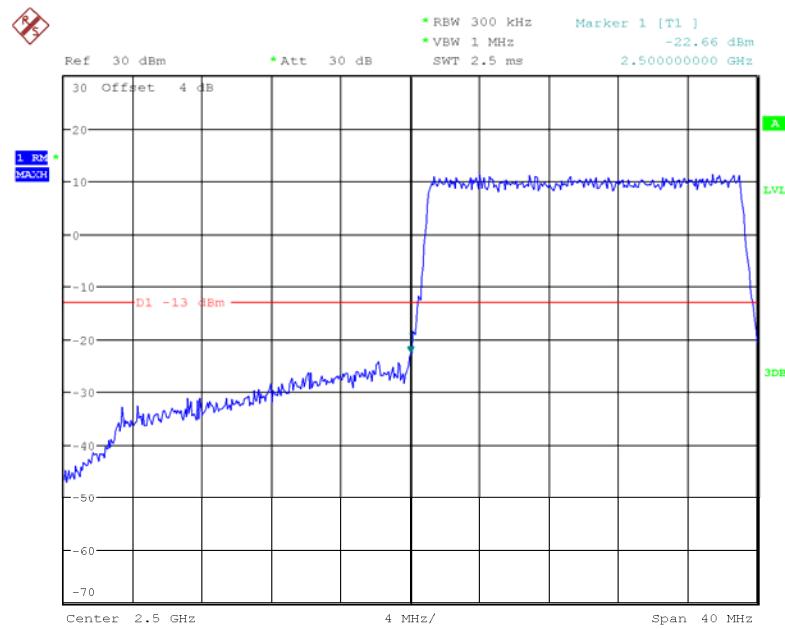
Date: 18.OCT.2017 11:19:28

QPSK_15MHz_75 RB_Left

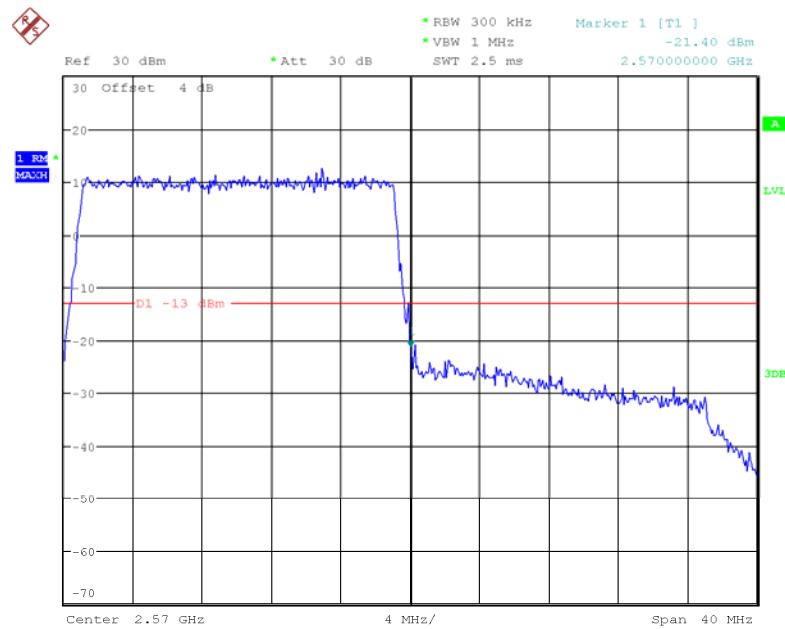
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QPSK_15MHz_75 RB_Right

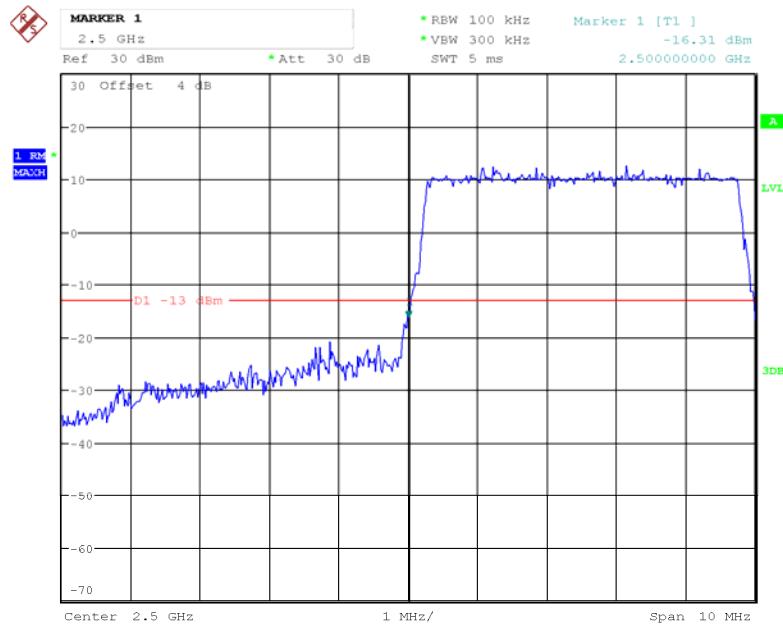
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QPSK_20MHz_FULL RB_Left

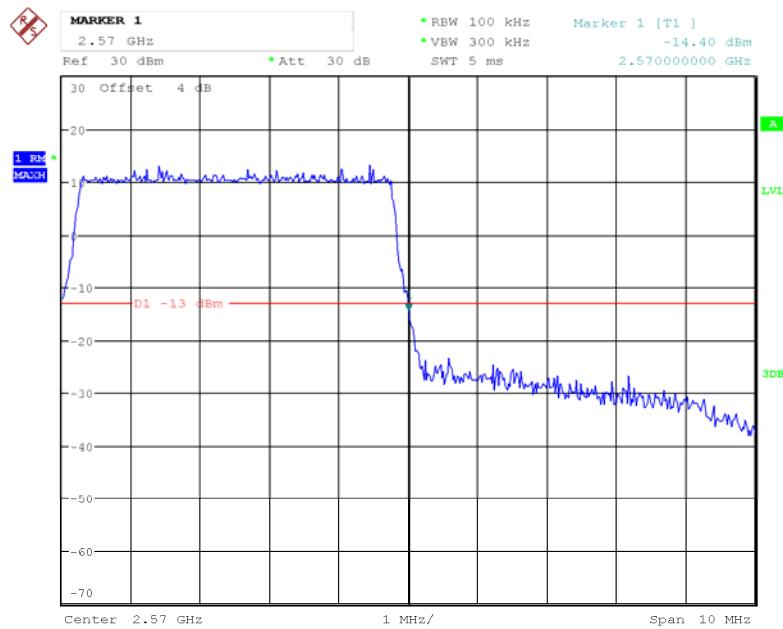
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QPSK_20MHz_FULL RB_Right

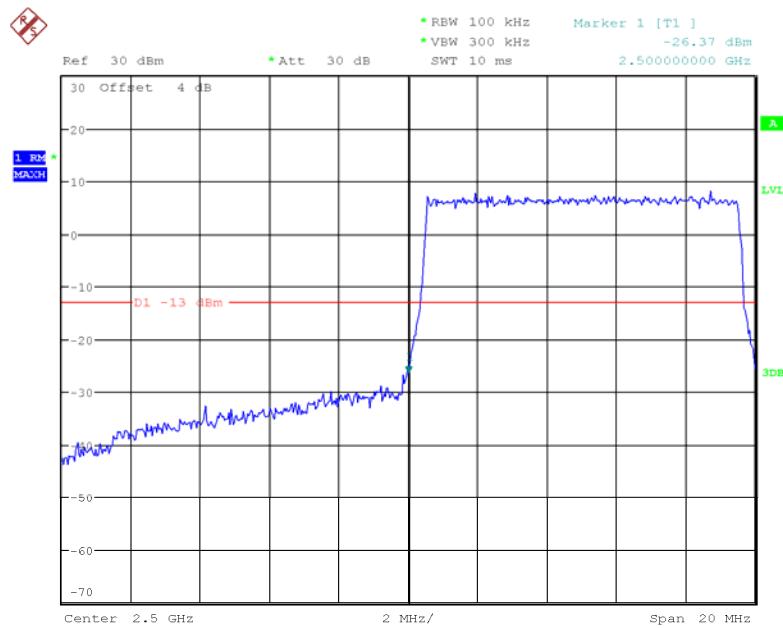
Date: 18.OCT.2017 11:24:09

16QAM_5MHz_25 RB_Left

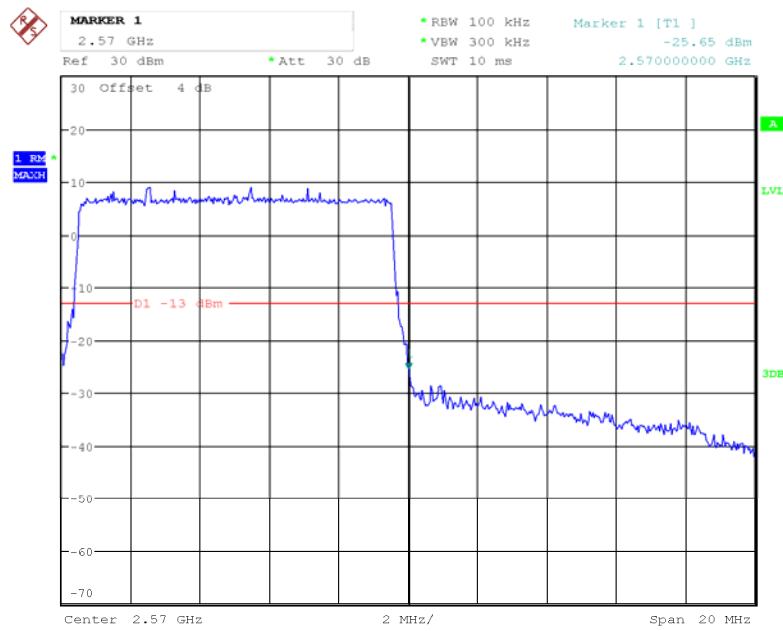
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16QAM_5MHz_25 RB_Right

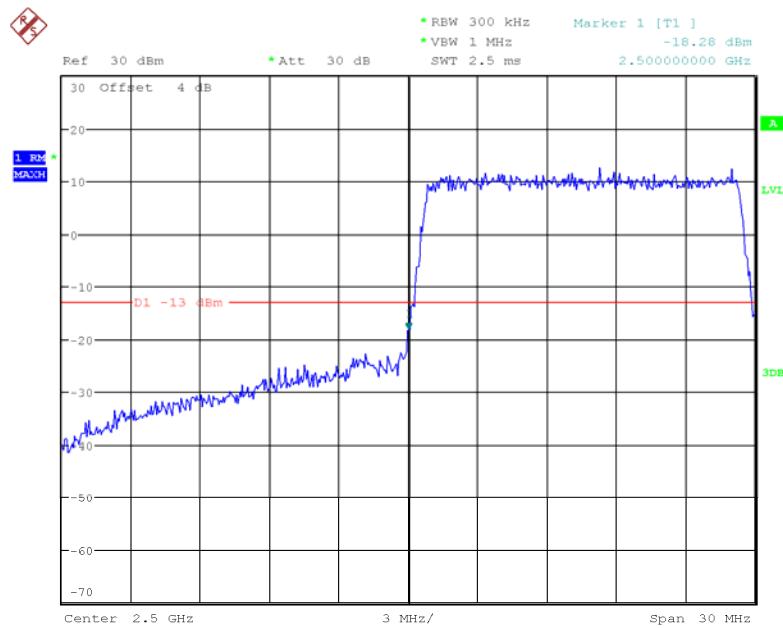
Date: 18.OCT.2017 11:15:20

16QAM_10MHz_50 RB_Left

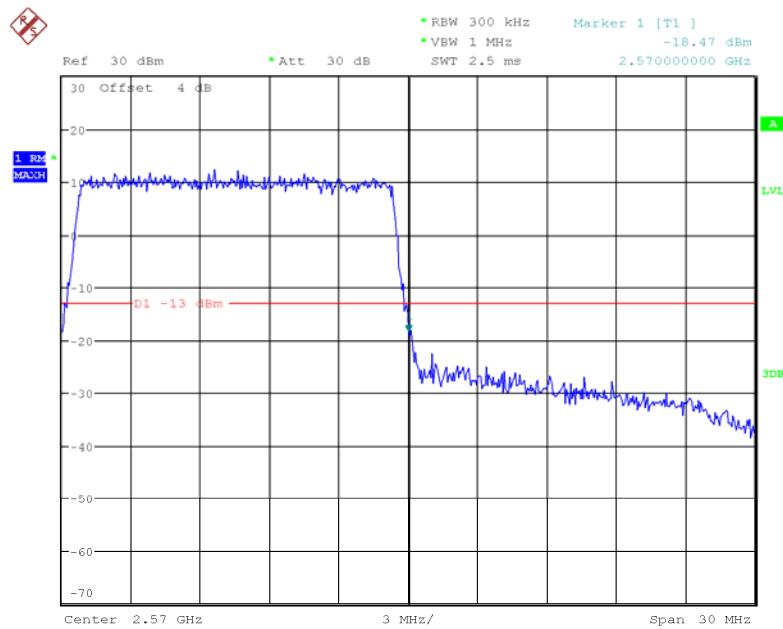
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16QAM_10MHz_50 RB_Right

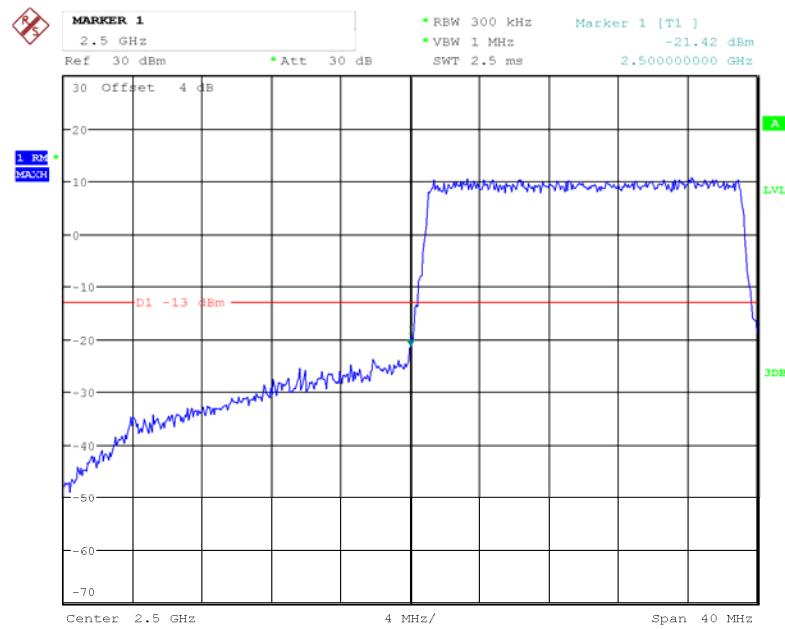
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16QAM_15MHz_75 RB_Left

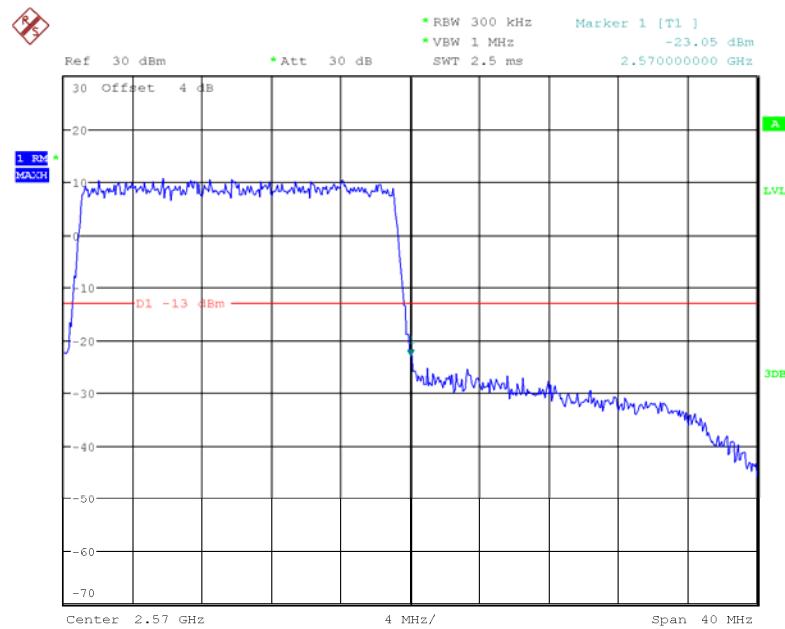
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16QAM_15MHz_75 RB_Right

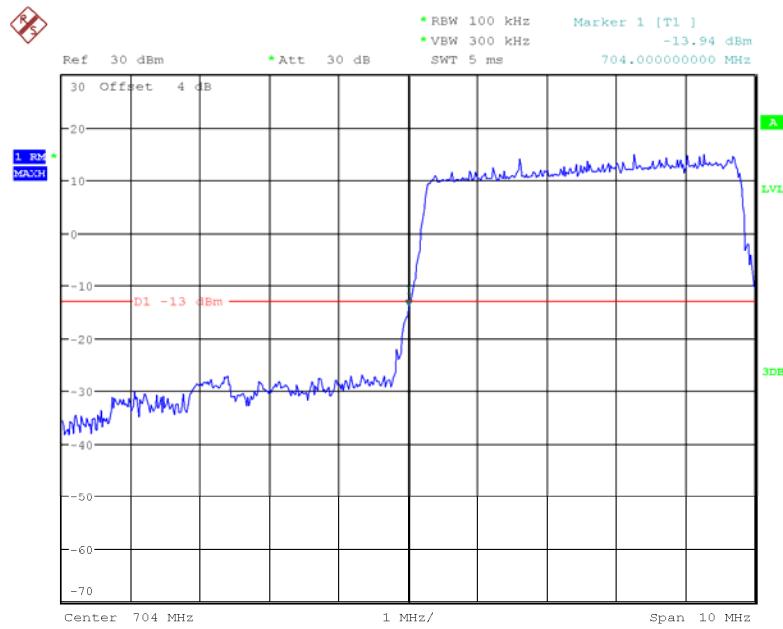
Date: 18.OCT.2017 11:20:19

16QAM_20MHz_FULL RB_Left

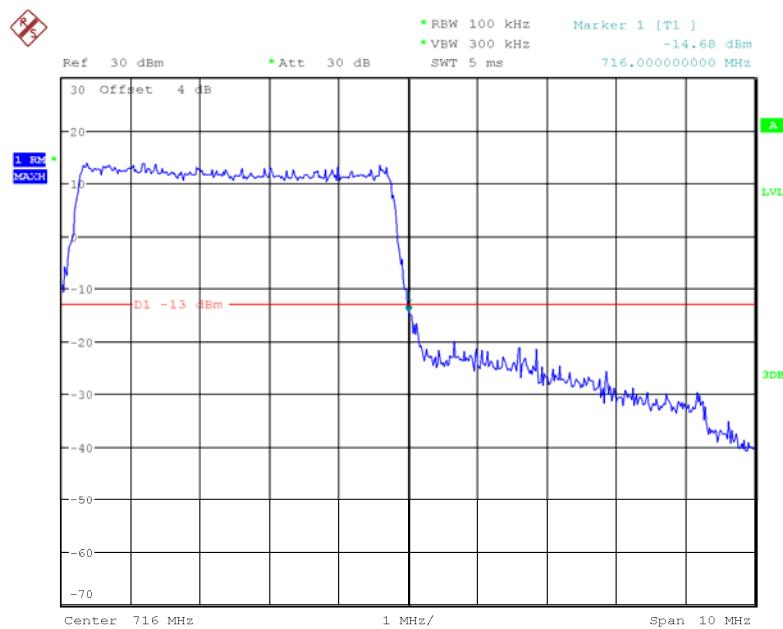
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16QAM_20MHz_FULL RB_Right

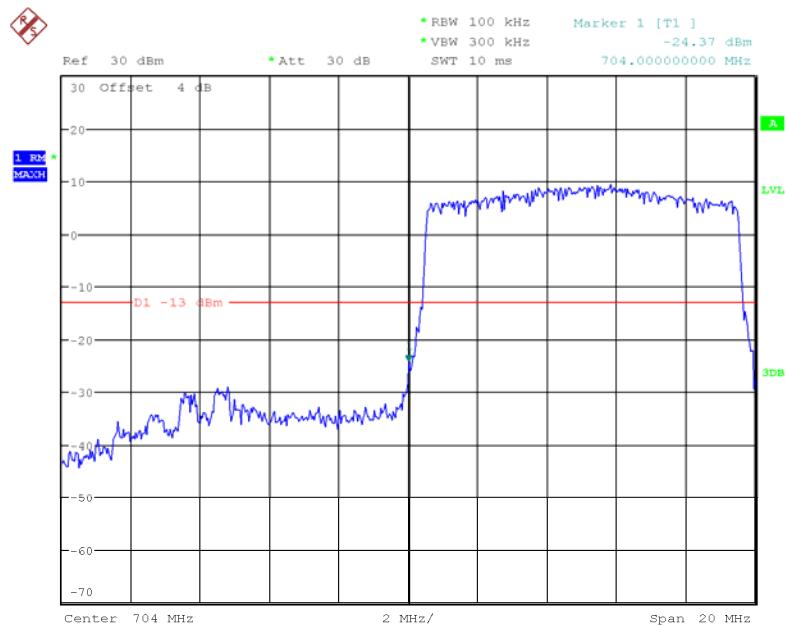
Date: 18.OCT.2017 11:23:55

LTE Band XVII**QPSK_5MHz_25 RB_Left**

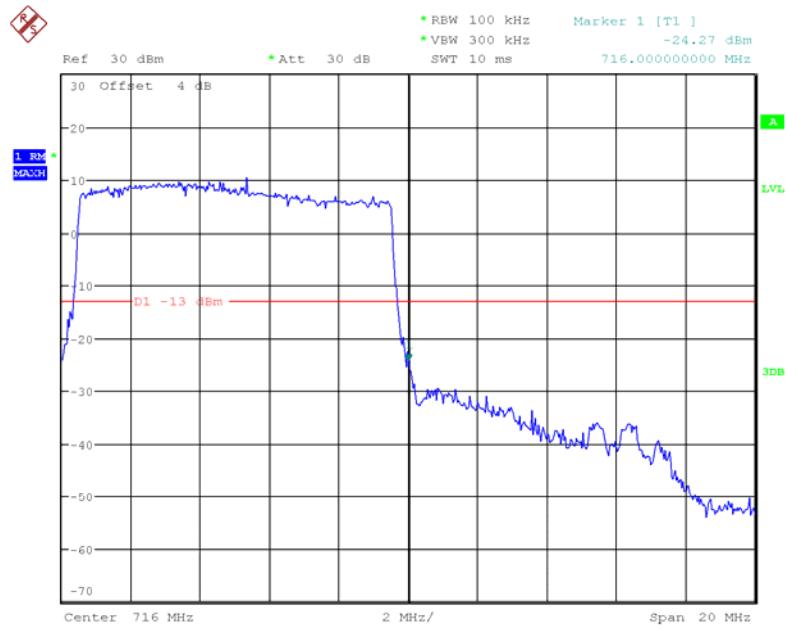
Date: 18.OCT.2017 11:37:42

QPSK_5MHz_25 RB_Right

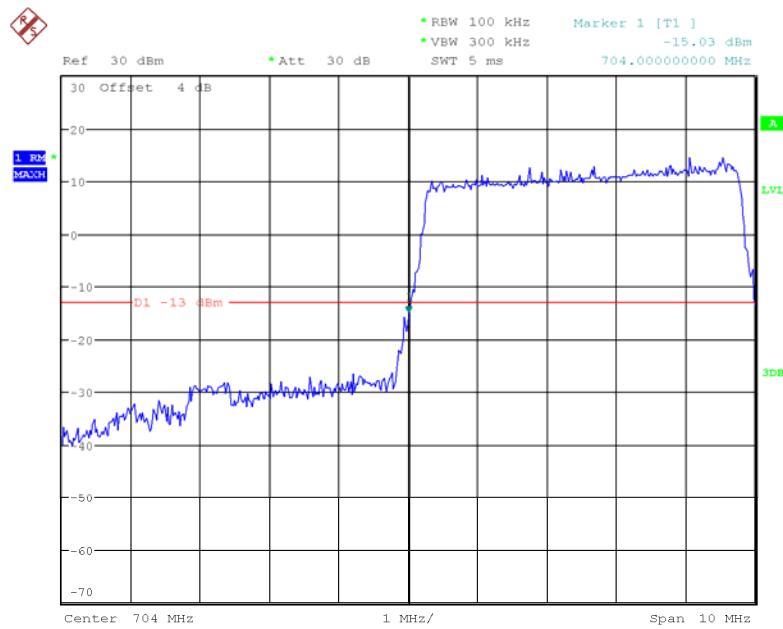
Date: 18.OCT.2017 11:32:05

QPSK_10MHz_50 RB_Left

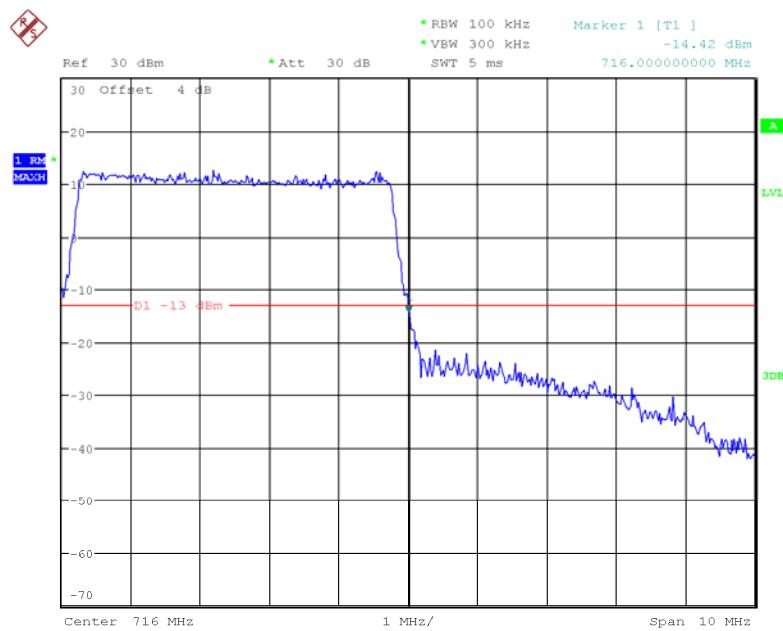
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QPSK_10MHz_50 RB_Right

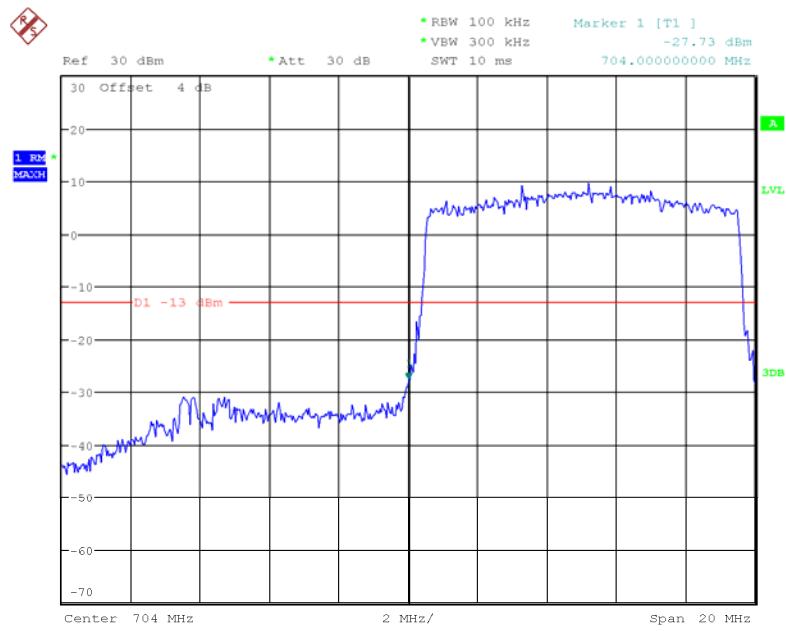
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16QAM_5MHz_25 RB_Left

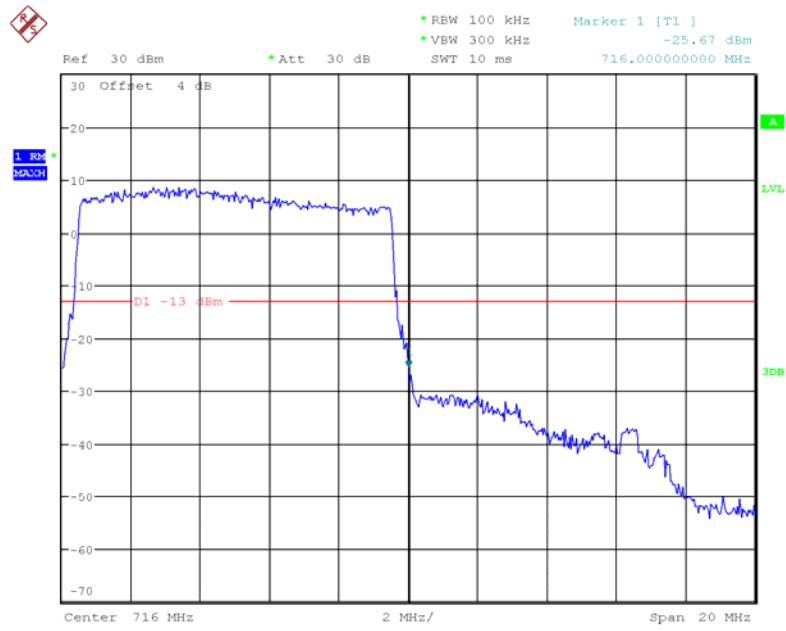
Date: 18.OCT.2017 11:37:24

16QAM_5MHz_25 RB_Right

Date: 18.OCT.2017 11:30:45

16QAM_10MHz_50 RB_Left

Date: 18.OCT.2017 11:35:19

16QAM_10MHz_50 RB_Right

Date: 18.OCT.2017 11:36:16

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

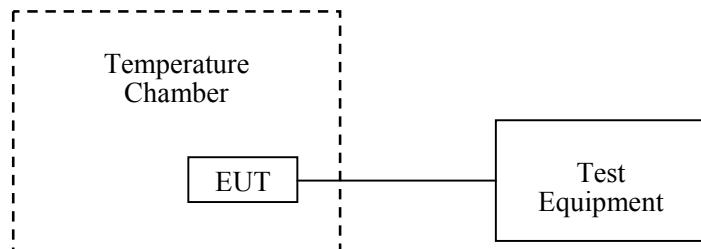
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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	/
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:	26.4 °C
Relative Humidity:	66 %
ATM Pressure:	100.8 kPa

The testing was performed by Nami Quan on 2017-10-17.

Cellular Band (Part 22H)

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	8	0.010	2.5
-20		7	0.008	
-10		9	0.011	
0		8	0.010	
10		6	0.007	
20		5	0.006	
30		12	0.014	
40		10	0.012	
50		8	0.010	
25	3.6	9	0.011	
25	4.35	7	0.008	

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	1	0.001	2.5
-20		0	0.000	
-10		3	0.004	
0		4	0.005	
10		1	0.001	
20		2	0.002	
30		0	0.000	
40		5	0.006	
50		3	0.004	
25		2	0.002	
25	4.35	4	0.005	

PCS Band (Part 24E)

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	36	0.019	Pass
-20		35	0.019	
-10		34	0.018	
0		32	0.017	
10		33	0.018	
20		30	0.016	
30		34	0.018	
40		33	0.018	
50		32	0.017	
25	3.6	32	0.017	
25	4.35	30	0.016	

8PSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	32	0.017	Pass
-20		33	0.018	
-10		32	0.017	
0		33	0.018	
10		35	0.019	
20		36	0.019	
30		37	0.020	
40		40	0.021	
50		32	0.017	
25	3.6	33	0.018	
25	4.35	35	0.019	

WCDMA Band II: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	1	0.001	Pass
-20		2	0.001	
-10		-3	-0.002	
0		-4	-0.002	
10		-2	-0.001	
20		0	0.000	
30		-5	-0.003	
40		-4	-0.002	
50		-2	-0.001	
25	3.6	-1	-0.001	
25	4.35	-3	-0.002	

WCDMA Band IV: R99

Middle Channel, $f_c = 1732.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	-7	-0.004	Pass
-20		-9	-0.005	
-10		-3	-0.002	
0		-4	-0.002	
10		-7	-0.004	
20		-5	-0.003	
30		-6	-0.003	
40		-4	-0.002	
50		-7	-0.004	
25	3.6	-4	-0.002	
25	4.35	-8	-0.005	

WCDMA Band V: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	0	0.000	Pass
-20		-1	-0.001	
-10		-1	-0.001	
0		-2	-0.002	
10		0	0.000	
20		-3	-0.004	
30		0	0.000	
40		-2	-0.002	
50		-4	-0.005	
25	3.6	-5	-0.006	
25	4.35	-3	-0.004	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-0.17	-0.0001	Pass
-20		-0.10	-0.0001	Pass
-10		0.11	0.0001	Pass
0		-0.04	0.0000	Pass
10		-0.09	0.0000	Pass
20		-0.21	-0.0001	Pass
30		0.08	0.0000	Pass
40		-0.37	-0.0002	Pass
50		-0.32	-0.0002	Pass
25	3.6	-0.14	-0.0001	Pass
25	4.35	-0.19	-0.0001	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	0.01	0.0000	Pass
-20		-0.27	-0.0001	Pass
-10		-0.05	0.0000	Pass
0		-0.26	-0.0001	Pass
10		-0.59	-0.0003	Pass
20		-0.26	-0.0001	Pass
30		-0.21	-0.0001	Pass
40		-0.34	-0.0002	Pass
50		-0.49	-0.0003	Pass
25	3.6	0.07	0.0000	Pass
25	4.35	-0.36	-0.0002	Pass

LTE Band 4:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1732.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-0.51	-0.0003	Pass
-20		0.00	0.0000	Pass
-10		-0.20	-0.0001	Pass
0		-0.31	-0.0002	Pass
10		0.09	0.0001	Pass
20		-0.21	-0.0001	Pass
30		-0.54	-0.0003	Pass
40		-0.01	0.0000	Pass
50		-0.41	-0.0002	Pass
25	3.6	0.00	0.0000	Pass
25	4.35	-0.08	0.0000	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 1732.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-0.57	-0.0003	Pass
-20		-0.49	-0.0003	Pass
-10		-0.20	-0.0001	Pass
0		-0.69	-0.0004	Pass
10		-0.22	-0.0001	Pass
20		-0.54	-0.0003	Pass
30		-0.65	-0.0004	Pass
40		-0.36	-0.0002	Pass
50		-0.45	-0.0003	Pass
25	3.6	-0.20	-0.0001	Pass
25	4.35	-0.53	-0.0003	Pass

LTE Band 5:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-2.98	-0.0036	Pass
-20		-3.03	-0.0036	Pass
-10		-3.04	-0.0036	Pass
0		-2.78	-0.0033	Pass
10		-3.13	-0.0037	Pass
20		-2.88	-0.0034	Pass
30		-2.62	-0.0031	Pass
40		-2.60	-0.0031	Pass
50		-2.70	-0.0032	Pass
25	3.6	-2.64	-0.0032	Pass
25	4.35	-2.62	-0.0031	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-0.86	-0.0010	Pass
-20		-1.30	-0.0016	Pass
-10		-1.08	-0.0013	Pass
0		-0.91	-0.0011	Pass
10		-1.49	-0.0018	Pass
20		-1.17	-0.0014	Pass
30		-0.98	-0.0012	Pass
40		-1.31	-0.0016	Pass
50		-1.12	-0.0013	Pass
25	3.6	-0.85	-0.0010	Pass
25	4.35	-1.16	-0.0014	Pass

LTE Band 7:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 2535$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	6.40	0.0025	Pass
-20		6.83	0.0027	Pass
-10		6.88	0.0027	Pass
0		6.35	0.0025	Pass
10		6.39	0.0025	Pass
20		6.69	0.0026	Pass
30		6.51	0.0026	Pass
40		7.01	0.0028	Pass
50		6.71	0.0026	Pass
25		6.53	0.0026	Pass
25	4.35	6.42	0.0025	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 2535$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	5.70	0.0022	Pass
-20		6.30	0.0025	Pass
-10		6.22	0.0025	Pass
0		5.86	0.0023	Pass
10		6.12	0.0024	Pass
20		5.98	0.0024	Pass
30		6.13	0.0024	Pass
40		6.26	0.0025	Pass
50		6.16	0.0024	Pass
25	3.6	6.19	0.0024	Pass
25	4.35	6.33	0.0025	Pass

LTE Band 17:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 710$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-0.87	-0.0012	Pass
-20		-0.94	-0.0013	Pass
-10		-0.80	-0.0011	Pass
0		-0.97	-0.0014	Pass
10		-1.24	-0.0017	Pass
20		-1.13	-0.0016	Pass
30		-1.03	-0.0015	Pass
40		-1.39	-0.0020	Pass
50		-1.18	-0.0017	Pass
25	3.6	-0.79	-0.0011	Pass
25	4.35	-0.99	-0.0014	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 710$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-1.04	-0.0015	Pass
-20		-1.12	-0.0016	Pass
-10		-1.56	-0.0022	Pass
0		-1.47	-0.0021	Pass
10		-1.68	-0.0024	Pass
20		-1.36	-0.0019	Pass
30		-1.43	-0.0020	Pass
40		-1.57	-0.0022	Pass
50		-1.16	-0.0016	Pass
25	3.6	-1.56	-0.0022	Pass
25	4.35	-1.58	-0.0022	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 *******