

FCC PART 22H, PART 24E
FCC PART 27
MEASUREMENT AND TEST REPORT
For
MAXWEST INTERNATIONAL LIMITED.

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

FCC ID: 2AEN3ASTRO55NLTE

Report Type: Original Report	Product Type: Mobile Phone
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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 **MAXWEST INTERNATIONAL LIMITED.**'s product, model number: **Astro 55N LTE (FCC ID: 2AEN3ASTRO55NLTE)** (the "EUT") in this report was a **Mobile Phone**, which was measured approximately: 15.5 cm (L) x 7.8 cm (W) x 0.9 cm (H), rated input voltage: DC3.8V from Battery or DC 5V from adapter.

Adapter Information:

INPUT: AC 100-240V 50/60Hz

OUTPUT: DC 5V±5%,1000mA

**All measurement and test data in this report was gathered from production sample serial number: 171128007 (Assigned by BACL,Dongguan). The EUT was received on 2017-10-31.*

Objective

This report is prepared on behalf of **MAXWEST INTERNATIONAL LIMITED.** in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E of the Federal Communications Commission's rules. Part 2, Part 27 of the Federal Communication Commissions rules.

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

Related Submittal(s)/Grant(s)

FCC Part 15C DTS submissions with FCC ID: 2AEN3ASTRO55NLTE.

FCC Part 15C DSS submissions with FCC ID: 2AEN3ASTRO55NLTE.

FCC Part 15B JBP submissions with FCC ID: 2AEN3ASTRO55NLTE.

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.

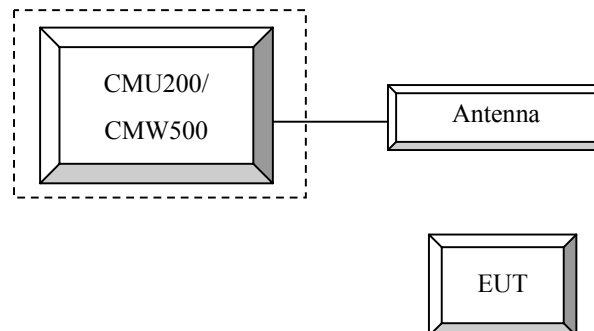
Equipment Modifications

No modification was made to the EUT.

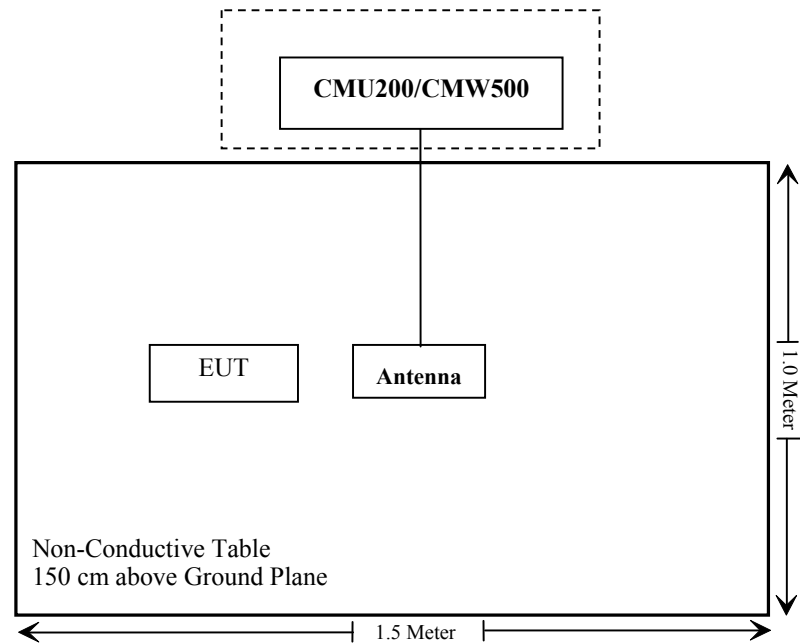
Support Equipment List and Details

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: RDG171128007-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

Applicable Standard

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

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

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

According to §27.50

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

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

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

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

Test Procedure

GSM/GPRS/EGPRS

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

Press Connection control to choose the different menus

Press RESET > choose all the reset all settings

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

Network Support > GSM + GPRS or GSM + EGSM

Main Service > Packet Data

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

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

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850

> 30 dBm for GPRS 1900

> 27 dBm for EGPRS 850

> 26 dBm for EGPRS 1900

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

Frequency Offset > + 0 Hz

Mode > BCCH and TCH

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

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

Channel Type > Off

P0 > 4 dB

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

TCH > choose desired test channel

Hopping > Off

Main Timeslot > 3

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

Bit Stream > 2E9-1 PSR Bit Stream

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

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

WCDMA-Release 99

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

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

WCDMA HSDPA

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

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

WCDMA HSUPA

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

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

HSPA+

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

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

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

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

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

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

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

DC-HSDPA

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

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

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

LTE (FDD):

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

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

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

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

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

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

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

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

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

Radiated method:

ANSI/TIA-603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESCI	100224	2017-09-01	2018-09-01
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-06	2020-11-05
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:	26.8~28.5°C
Relative Humidity:	27.8~28.8 %
ATM Pressure:	101~101.4 kPa

* The testing was performed by Blake Yang from 2017-11-29 to 2017-12-04.

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

Band	Channel No.	Conducted Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
Cellular	128	31.64	31.68	30.99	29.36	28.49	25.79	25.22	22.61	21.41
	190	31.89	31.91	31.24	29.60	28.78	25.98	24.95	22.84	21.54
	251	31.97	32.01	31.35	29.72	28.94	26.20	25.21	23.08	21.75
PCS	512	29.08	29.06	28.41	26.84	25.81	25.71	24.76	22.88	21.58
	661	29.10	29.09	28.52	26.89	25.87	25.61	24.71	22.81	21.48
	810	29.14	29.13	28.57	26.91	25.89	25.58	24.68	22.73	21.63

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	22.18	2.20	22.17	2.60	22.13	2.40
HSDPA	1	22.14	2.6	22.16	3.76	22.08	2.68
	2	22.39	2.50	22.34	3.91	22.31	2.78
	3	22.09	2.80	22.33	3.68	22.25	2.38
	4	22.34	2.78	22.02	3.85	22.21	2.93
HSUPA	1	22.06	2.60	22.15	2.88	22.06	3.60
	2	22.23	2.75	22.42	2.97	21.8	3.54
	3	22.15	2.42	21.87	3.11	22.19	3.79
	4	22.15	2.56	22.31	2.61	21.90	3.72
	5	22.11	2.35	22.38	2.78	22.21	3.53
DC-HSDPA	1	22.07	2.58	22.17	2.63	22.06	3.58
	2	21.86	2.36	22.27	2.67	21.83	3.85
	3	22.17	2.43	22.18	2.72	22.25	3.48
	4	22.26	2.80	22.45	2.93	21.92	3.89
HSPA+	1	21.99	2.57	22.26	3.02	21.92	3.39

WCDMA Band V

Mode	3GPP Sub Test	Low Channel		Middle Channel		High Channel	
		Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)	Ave. Power (dBm)	PAR (dB)
Rel 99	1	21.78	2.76	21.73	2.80	22.02	2.84
HSDPA	1	21.72	3.88	21.64	3.80	21.81	4.00
	2	21.50	4.04	21.80	3.67	21.75	4.29
	3	21.89	3.84	21.34	3.92	22.10	4.14
	4	21.84	3.77	21.41	4.06	21.97	3.96
HSUPA	1	21.74	3.76	21.63	3.8	21.83	3.92
	2	21.60	3.78	21.38	3.79	21.56	3.70
	3	21.49	3.73	21.37	3.73	21.63	3.79
	4	21.57	3.82	21.37	3.76	21.75	3.83
	5	21.93	3.76	21.40	3.81	22.12	4.19
DC-HSDPA	1	21.95	3.84	21.56	3.81	21.6	3.88
	2	21.98	3.83	21.71	3.76	21.83	4.08
	3	21.58	3.79	21.55	3.80	21.95	4.11
	4	21.81	4.03	21.35	3.90	22.00	4.01
HSPA+	1	21.83	3.50	21.52	3.74	22.00	4.03

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	24.70	24.93	24.60
		1#3	24.77	25.05	24.56
		1#5	24.72	24.92	24.58
		3#0	24.56	24.78	24.48
		3#3	23.87	23.72	23.53
		6#0	23.72	23.92	23.57
	16QAM	1#0	23.78	23.86	23.62
		1#3	24.05	23.70	23.89
		1#5	23.76	23.87	23.57
		3#0	23.50	23.88	23.39
		3#3	22.97	22.91	22.31
		6#0	22.71	22.88	22.50
3MHz	QPSK	1#0	24.54	24.90	24.60
		1#8	24.32	25.03	24.81
		1#14	24.57	24.82	24.50
		10#0	24.79	24.57	24.58
		10#5	23.73	24.10	23.57
		15#0	23.62	23.86	23.52
	16QAM	1#0	23.63	24.16	23.48
		1#8	23.92	24.00	23.63
		1#14	23.63	24.16	23.36
		10#0	23.59	24.33	23.30
		10#5	22.79	23.02	22.45
		15#0	22.54	22.88	22.58
5MHz	QPSK	1#0	24.74	25.03	23.23
		1#13	24.80	25.11	23.28
		1#24	24.68	24.86	23.05
		10#0	24.82	24.75	23.25
		10#15	23.65	23.80	21.84
		25#0	23.57	23.86	21.91
	16QAM	1#0	23.84	23.81	22.07
		1#13	23.97	23.55	21.83
		1#24	23.82	23.76	22.02
		10#0	23.75	23.78	22.27
		10#15	22.56	22.81	22.55
		25#0	22.53	22.87	22.83

10MHz	QPSK	1#0	24.89	24.96	25.04
		1#25	25.06	24.90	25.26
		1#49	24.83	24.98	23.65
		25#0	24.69	24.66	25.33
		25#25	23.81	23.98	23.99
		50#0	23.71	23.95	23.71
	16QAM	1#0	23.78	24.02	23.81
		1#25	23.92	23.93	23.79
		1#49	23.69	24.06	23.01
		25#0	23.92	24.15	23.65
		25#25	22.80	23.14	22.53
		50#0	22.73	22.96	22.65
15MHz	QPSK	1#0	24.87	24.9	24.95
		1#38	25.1	24.77	24.78
		1#74	24.88	24.98	24.73
		36#0	24.99	25.18	24.7
		36#39	23.69	24.22	23.68
		75#0	23.88	24.08	23.86
	16QAM	1#0	23.89	22.21	24
		1#38	24.02	22.47	23.92
		1#74	23.97	22.92	23.94
		36#0	23.62	22	24.07
		36#39	22.58	21.74	23.19
		75#0	22.86	21.62	22.93
20MHz	QPSK	1#0	24.85	24.91	25.03
		1#50	24.97	25.13	24.95
		1#99	24.92	25.05	24.88
		50#0	24.05	24.15	23.98
		50#50	24	23.93	23.91
		100#0	23.73	24.02	23.87
	16QAM	1#0	24.1	24.12	24.12
		1#50	24.38	24.18	23.98
		1#99	24.11	24.15	23.94
		50#0	24.05	23.99	23.93
		50#50	22.81	22.84	22.74
		100#0	22.85	23.01	22.85

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	23.91	23.85	23.96
		1#3	23.76	23.76	23.98
		1#5	23.93	23.86	23.99
		3#0	24.16	24.15	23.95
		3#3	22.97	23.09	23.11
		6#0	22.90	22.81	22.96
	16QAM	1#0	23.05	22.86	22.98
		1#3	23.16	22.90	22.94
		1#5	23.05	22.87	23.01
		3#0	22.81	22.77	23.00
		3#3	21.98	21.66	21.96
		6#0	21.93	21.84	21.91
3MHz	QPSK	1#0	23.85	23.78	23.88
		1#8	23.84	23.79	23.68
		1#14	23.86	23.78	23.92
		10#0	23.96	23.64	23.63
		10#5	22.75	23.03	22.72
		15#0	22.92	22.88	22.98
	16QAM	1#0	23.00	23.38	22.91
		1#8	23.21	23.25	23.15
		1#14	23.01	23.34	22.93
		10#0	23.30	23.56	22.81
		10#5	21.84	21.75	22.34
		15#0	21.94	21.97	22.04
5MHz	QPSK	1#0	23.99	23.90	23.96
		1#13	24.11	24.07	24.02
		1#24	23.95	23.89	24.02
		10#0	24.02	23.82	24.15
		10#15	22.72	22.72	22.72
		25#0	22.91	22.87	22.96
	16QAM	1#0	23.29	22.91	23.15
		1#13	23.38	23.11	23.38
		1#24	23.27	22.86	23.16
		10#0	23.55	23.01	23.16
		10#15	22.13	22.14	21.67
		25#0	21.90	21.99	21.95

10MHz	QPSK	1#0	23.91	23.91	23.91
		1#25	24.08	23.63	24.09
		1#49	23.88	23.88	24.03
		25#0	23.90	23.99	23.62
		25#25	22.72	23.04	22.99
		50#0	22.94	22.91	22.97
	16QAM	1#0	23.01	23.50	23.50
		1#25	23.29	23.20	23.60
		1#49	23.09	23.40	23.55
		25#0	22.77	23.33	23.59
		25#25	21.85	21.98	21.74
		50#0	21.96	21.93	22.01
15MHz	QPSK	1#0	23.88	23.90	23.91
		1#38	23.96	24.15	24.00
		1#74	23.94	23.86	24.19
		36#0	24.05	24.03	23.97
		36#39	22.98	22.71	22.99
		75#0	23.01	22.99	23.10
	16QAM	1#0	22.98	23.49	23.29
		1#38	23.01	23.61	23.39
		1#74	23.10	23.41	23.48
		36#0	22.84	23.65	23.20
		36#39	22.17	22.01	21.84
		75#0	21.98	21.97	22.05
20MHz	QPSK	1#0	23.99	24.06	23.96
		1#50	23.61	23.83	23.82
		1#99	24.07	23.92	24.30
		50#0	22.82	22.82	22.85
		50#50	23.04	22.63	23.27
		100#0	22.95	22.91	23.03
	16QAM	1#0	23.08	23.32	23.42
		1#50	23.22	23.19	23.45
		1#99	23.25	23.22	23.69
		50#0	23.26	23.38	23.18
		50#50	21.71	21.70	22.11
		100#0	21.97	21.94	22.04

LTE Band 5 (PART 22)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	24.63	24.48	24.40
		1#3	24.62	24.28	24.30
		1#5	24.66	24.50	24.43
		3#0	24.85	24.31	24.65
		3#3	23.06	23.49	23.24
		6#0	23.63	22.94	23.43
	16QAM	1#0	23.65	23.61	23.40
		1#3	23.64	23.85	23.43
		1#5	23.68	23.62	23.43
		3#0	23.56	23.52	23.48
		3#3	23.05	22.96	22.81
		6#0	22.57	22.94	22.45
3MHz	QPSK	1#0	24.59	24.47	24.41
		1#8	24.42	24.34	24.69
		1#14	24.63	24.43	24.47
		10#0	24.78	24.16	24.63
		10#5	24.51	24.45	24.37
		15#0	23.68	23.54	23.46
	16QAM	1#0	23.72	23.61	23.43
		1#8	23.62	23.83	23.25
		1#14	23.74	23.60	23.45
		10#0	23.84	23.72	23.57
		10#5	22.93	22.52	22.72
		15#0	22.65	22.64	22.53
5MHz	QPSK	1#0	24.71	24.58	24.52
		1#13	24.84	24.65	24.44
		1#24	24.72	24.49	24.56
		10#0	24.60	24.68	24.38
		10#15	23.86	23.41	23.53
		22.40	23.73	23.51	23.45
	16QAM	22.84	24.00	23.58	23.68
		1#13	24.17	23.46	23.95
		1#24	23.97	23.57	23.63
		10#0	23.76	23.29	23.78
		10#15	22.90	22.74	22.20
		25#0	22.65	22.65	22.49
10MHz	QPSK	1#0	24.54	24.60	24.51
		1#25	24.72	24.77	24.43
		1#49	24.68	24.52	24.81
		25#0	23.82	23.86	23.93
		25#25	23.75	23.29	23.21
		50#0	23.64	23.57	23.51
	16QAM	1#0	23.52	23.70	24.09
		1#25	23.82	23.90	24.19
		1#49	23.64	23.69	24.07
		25#0	23.79	23.94	24.13
		25#25	22.95	22.43	22.67
		50#0	22.69	22.61	22.53

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	23.57	23.66	23.68
		1#13	23.28	23.43	23.55
		1#24	23.59	23.64	23.74
		10#0	23.57	23.50	23.71
		10#15	22.76	22.78	22.84
		25#0	22.56	22.60	22.60
	16QAM	1#0	22.58	22.77	22.93
		1#13	22.37	22.67	23.13
		1#24	22.58	22.78	22.95
		10#0	22.88	22.75	22.76
		10#15	21.56	21.59	21.40
		25#0	21.63	21.56	21.58
10MHz	QPSK	1#0	23.59	23.65	23.62
		1#25	23.30	23.95	23.70
		1#49	23.63	23.62	23.40
		25#0	23.39	23.87	23.34
		25#25	22.37	22.59	22.91
		50#0	22.61	22.83	22.64
	16QAM	1#0	23.07	22.61	22.70
		1#25	22.81	22.52	22.52
		1#49	23.15	22.57	22.75
		25#0	23.28	22.50	22.97
		25#25	21.33	21.75	21.68
		50#0	21.62	21.65	21.64
15MHz	QPSK	1#0	23.66	23.68	23.56
		1#38	23.74	23.90	23.84
		1#74	23.64	23.64	23.72
		36#0	23.86	23.62	23.40
		36#39	23.04	22.98	22.47
		75#0	22.78	22.72	22.70
	16QAM	1#0	23.16	22.96	22.70
		1#38	22.86	22.67	22.75
		1#74	23.13	22.87	22.91
		36#0	23.45	23.19	22.78
		36#39	21.72	21.61	21.61
		75#0	21.75	21.63	21.71
20MHz	QPSK	1#0	23.58	23.98	23.82
		1#50	23.80	23.87	23.64
		1#99	23.77	23.68	23.73
		50#0	23.12	23.13	23.00
		50#50	22.90	22.84	22.70
		100#0	22.72	22.59	22.63
	16QAM	1#0	22.83	22.91	23.07
		1#50	22.69	22.75	23.36
		1#99	22.84	22.95	23.19
		50#0	22.83	23.02	22.83
		50#50	21.74	21.71	21.36
		100#0	21.67	21.66	21.62

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	2.92	2.68	1.52	13
	100 RB		6.36	6.52	6.32	13
16QAM	1 RB	20 MHz	3.80	3.92	2.80	13
	100 RB		7.04	7.20	6.92	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	4.88	4.16	4.44	13
	100 RB		6.40	6.44	6.28	13
16QAM	1 RB	20 MHz	5.32	4.76	4.96	13
	100 RB		7.28	7.24	7.08	13

PAR, Band 5

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.40	4.46	5.04	13
	50 RB		5.28	5.52	5.60	13
16QAM	1 RB	10 MHz	5.28	5.76	5.72	13
	50 RB		6.12	6.36	6.40	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	3.80	3.44	2.52	13
	100 RB		6.32	6.40	6.40	13
16QAM	1 RB	20 MHz	4.80	4.00	3.52	13
	100 RB		7.16	7.12	7.08	13

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

ERP & EIRP

Part 22H

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM 850 Middle Channel								
836.600	H	96.29	21.4	0.0	1	20.4	38.5	18.1
836.600	V	104.56	32.8	0.0	1	31.8	38.5	6.7
EDGE 850 Middle Channel								
836.600	H	92.26	17.3	0.0	1	16.3	38.5	22.2
836.600	V	97.83	26	0.0	1	25.0	38.5	13.5
WCDMA Band V Middle Channel								
836.600	H	88.31	13.4	0.0	1	12.4	38.5	26.1
836.600	V	93.19	21.4	0.0	1	20.4	38.5	18.1

Part 24E

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
PCS 1900 Middle Channel								
1880.000	H	95.04	22.4	11.7	2.7	31.4	33.0	1.6
1880.000	V	92.07	19.6	11.7	2.7	28.6	33.0	4.4
EGPRS 1900 Middle Channel								
1880.000	H	92.26	19.7	11.7	2.7	28.7	33.0	4.3
1880.000	V	88.45	16	11.7	2.7	25.0	33.0	8.0
WCDMA Band II Middle Channel								
1880.000	H	88.51	16.9	11.7	2.7	24.9	33.0	8.1
1880.000	V	85.10	12.6	11.7	2.7	21.6	33.0	11.4

Note:

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

LTE Band 2

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
1880.000	H	88.16	15.6	11.7	2.7	24.6	33.0	8.4
1880.000	V	86.88	14.4	11.7	2.7	23.4	33.0	9.6
QPSK 3 MHz Middle Channel								
1880.000	H	88.13	15.5	11.7	2.7	24.5	33.0	8.5
1880.000	V	86.54	14.1	11.7	2.7	23.1	33.0	9.9
QPSK 5 MHz Middle Channel								
1880.000	H	88.92	15.3	11.7	2.7	24.3	33.0	8.7
1880.000	V	86.98	14.5	11.7	2.7	23.5	33.0	9.5
QPSK 10 MHz Middle Channel								
1880.000	H	87.92	15.3	11.7	2.7	24.3	33.0	8.7
1880.000	V	86.98	14.5	11.7	2.7	23.5	33.0	9.5
QPSK 15 MHz Middle Channel								
1880.000	H	87.73	15.1	11.7	2.7	24.1	33.0	8.9
1880.000	V	84.29	11.8	11.7	2.7	20.8	33.0	12.2
QPSK 20 MHz Middle Channel								
1880.000	H	88.18	15.6	11.7	2.7	24.6	33.0	8.4
1880.000	V	83.73	11.3	11.7	2.7	20.3	33.0	12.7
16QAM 1.4 MHz Middle Channel								
1880.000	H	88.03	15.4	11.7	2.7	24.4	33.0	8.6
1880.000	V	86.36	13.9	11.7	2.7	22.9	33.0	10.1
16QAM 3 MHz Middle Channel								
1880.000	H	87.62	15	11.7	2.7	24.0	33.0	9.0
1880.000	V	86.75	14.3	11.7	2.7	23.3	33.0	9.7
16QAM 5 MHz Middle Channel								
1880.000	H	87.79	15.2	11.7	2.7	24.2	33.0	8.8
1880.000	V	86.57	14.1	11.7	2.7	23.1	33.0	9.9
16QAM 10 MHz Middle Channel								
1880.000	H	87.05	14.4	11.7	2.7	23.4	33.0	9.6
1880.000	V	84.36	11.9	11.7	2.7	20.9	33.0	12.1
16QAM 15 MHz Middle Channel								
1880.000	H	87.59	15	11.7	2.7	24.0	33.0	9.0
1880.000	V	84.16	11.7	11.7	2.7	20.7	33.0	12.3
16QAM 20 MHz Middle Channel								
1880.000	H	88.02	15.4	11.7	2.7	24.4	33.0	8.6
1880.000	V	83.64	11.2	11.7	2.7	20.2	33.0	12.8

LTE Band 4

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			S.G. Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4M BW Middle Channel 1732.5 MHz								
1732.500	H	88.86	14.8	10.9	2.5	23.2	30.0	6.8
1732.500	V	84.65	10.3	10.9	2.5	18.7	30.0	11.3
16QAM 1.4M BW Middle Channel 1732.5 MHz								
1732.500	H	88.17	14.1	10.9	2.5	22.5	30.0	7.5
1732.500	V	84.62	10.3	10.9	2.5	18.7	30.0	11.3
QPSK 3M BW Middle Channel 1732.5 MHz								
1732.500	H	88.74	14.7	10.9	2.5	23.1	30.0	6.9
1732.500	V	83.67	9.3	10.9	2.5	17.7	30.0	12.3
16QAM 3M BW Middle Channel 1732.5 MHz								
1732.500	H	88.28	14.2	10.9	2.5	22.6	30.0	7.4
1732.500	V	83.49	9.1	10.9	2.5	17.5	30.0	12.5
QPSK 5M BW Middle Channel 1732.5 MHz								
1732.500	H	88.22	14.2	10.9	2.5	22.6	30.0	7.4
1732.500	V	83.34	9	10.9	2.5	17.4	30.0	12.6
16QAM 5M BW Middle Channel 1732.5 MHz								
1732.500	H	88.75	14.7	10.9	2.5	23.1	30.0	6.9
1732.500	V	83.97	9.6	10.9	2.5	18.0	30.0	12.0
QPSK 10M BW Middle Channel 1732.5 MHz								
1732.500	H	87.38	13.3	10.9	2.5	21.7	30.0	8.3
1732.500	V	82.96	8.6	10.9	2.5	17.0	30.0	13.0
16QAM 10M BW Middle Channel 1732.5 MHz								
1732.500	H	87.09	13	10.9	2.5	21.4	30.0	8.6
1732.500	V	82.34	8	10.9	2.5	16.4	30.0	13.6
QPSK 15M BW Middle Channel 1732.5 MHz								
1732.500	H	87.92	13.9	10.9	2.5	22.3	30.0	7.7
1732.500	V	82.87	8.5	10.9	2.5	16.9	30.0	13.1
16QAM 15M BW Middle Channel 1732.5 MHz								
1732.500	H	87.64	13.6	10.9	2.5	22.0	30.0	8.0
1732.500	V	82.34	8	10.9	2.5	16.4	30.0	13.6
QPSK 20M BW Middle Channel 1732.5 MHz								
1732.500	H	86.67	12.6	10.9	2.5	21.0	30.0	9.0
1732.500	V	81.58	7.2	10.9	2.5	15.6	30.0	14.4
16QAM 20M BW Middle Channel 1732.5 MHz								
1732.500	H	85.85	11.8	10.9	2.5	20.2	30.0	9.8
1732.500	V	81.49	7.1	10.9	2.5	15.5	30.0	14.5

LTE Band 5

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 1.4 MHz Middle Channel								
836.500	H	89.26	14.3	0.0	1	13.3	38.5	25.2
836.500	V	96.27	24.5	0.0	1	23.5	38.5	15.0
QPSK 3 MHz Middle Channel								
836.500	H	87.73	12.8	0.0	1	11.8	38.5	26.7
836.500	V	95.74	23.9	0.0	1	22.9	38.5	15.6
QPSK 5 MHz Middle Channel								
836.500	H	87.16	12.2	0.0	1	11.2	38.5	27.3
836.500	V	95.14	23.3	0.0	1	22.3	38.5	16.2
QPSK 10 MHz Middle Channel								
836.500	H	86.74	11.8	0.0	1	10.8	38.5	27.7
836.500	V	94.75	23	0.0	1	22.0	38.5	16.5
16QAM 1.4 MHz Middle Channel								
836.500	H	88.59	13.7	0.0	1	12.7	38.5	25.8
836.500	V	96.06	24.3	0.0	1	23.3	38.5	15.2
16QAM 3 MHz Middle Channel								
836.500	H	87.47	12.5	0.0	1	11.5	38.5	27.0
836.500	V	95.35	23.6	0.0	1	22.6	38.5	15.9
16QAM 5 MHz Middle Channel								
836.500	H	86.87	11.9	0.0	1	10.9	38.5	27.6
836.500	V	94.96	23.2	0.0	1	22.2	38.5	16.3
16QAM 10 MHz Middle Channel								
836.500	H	86.51	11.6	0.0	1	10.6	38.5	27.9
836.500	V	94.43	22.6	0.0	1	21.6	38.5	16.9

LTE Band 7

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK 5 MHz Middle Channel								
2535.000	H	87.92	15.3	13.1	3.1	25.3	33	7.7
2535.000	V	84.48	13.3	13.1	3.1	23.3	33	9.7
QPSK 10 MHz Middle Channel								
2535.000	H	87.18	14.6	13.1	3.1	24.6	33	8.4
2535.000	V	83.72	12.6	13.1	3.1	22.6	33	10.4
QPSK 15 MHz Middle Channel								
2535.000	H	86.84	14.2	13.1	3.1	24.2	33	8.8
2535.000	V	82.49	11.3	13.1	3.1	21.3	33	11.7
QPSK 20 MHz Middle Channel								
2535.000	H	84.68	12.1	13.1	3.1	22.1	33	10.9
2535.000	V	81.73	10.6	13.1	3.1	20.6	33	12.4
16QAM 5 MHz Middle Channel								
2535.000	H	87.49	14.9	13.1	3.1	24.9	33	8.1
2535.000	V	84.37	13.2	13.1	3.1	23.2	33	9.8
16QAM 10 MHz Middle Channel								
2535.000	H	87.05	14.4	13.1	3.1	24.4	33	8.6
2535.000	V	83.34	12.2	13.1	3.1	22.2	33	10.8
16QAM 15 MHz Middle Channel								
2535.000	H	86.65	14	13.1	3.1	24.0	33	9
2535.000	V	82.17	11	13.1	3.1	21.0	33	12
16QAM 20 MHz Middle Channel								
2535.000	H	84.32	11.7	13.1	3.1	21.7	33	11.3
2535.000	V	81.36	10.2	13.1	3.1	20.2	33	12.8

Note:

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

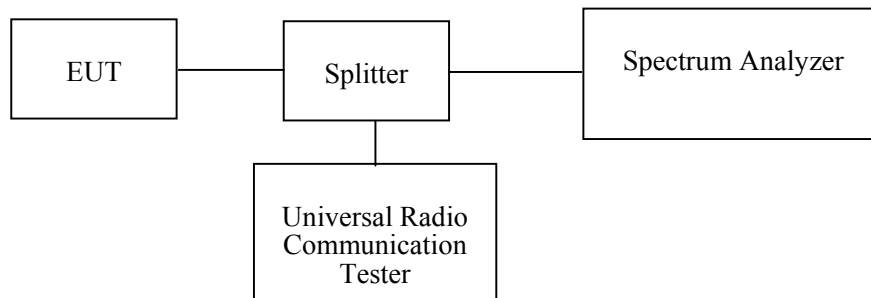
FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53- OCCUPIED BANDWIDTH**Applicable Standard**

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 Splitter	ODP-1-6-2S	OE0120142	Each Time	/

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

Test Data**Environmental Conditions**

Temperature:	25.4~26.2°C
Relative Humidity:	43~57 %
ATM Pressure:	101~101.6 kPa

The testing was performed by Kami Zhou from 2017-11-29 to 2017-12-05.

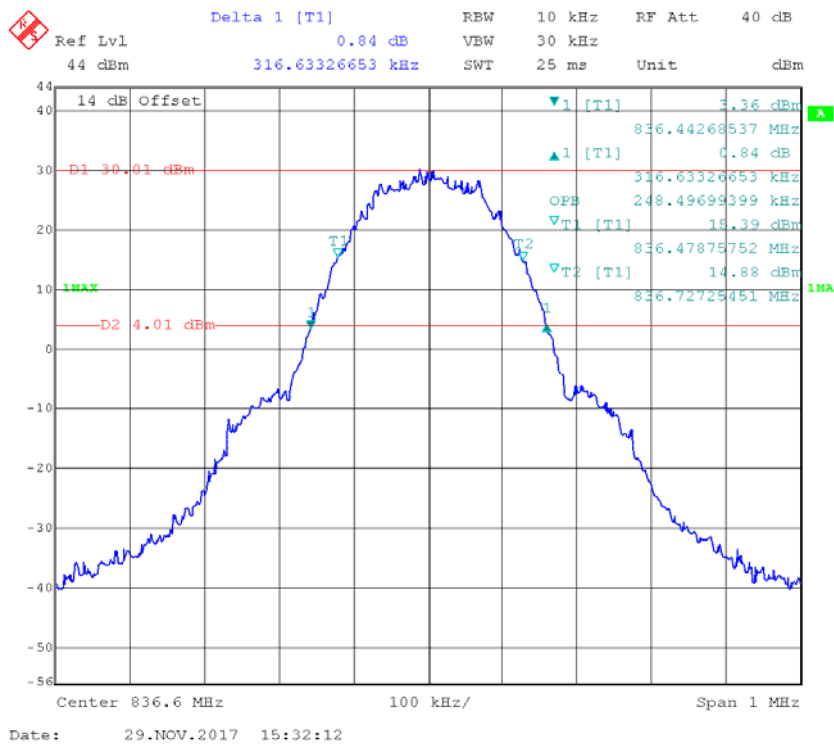
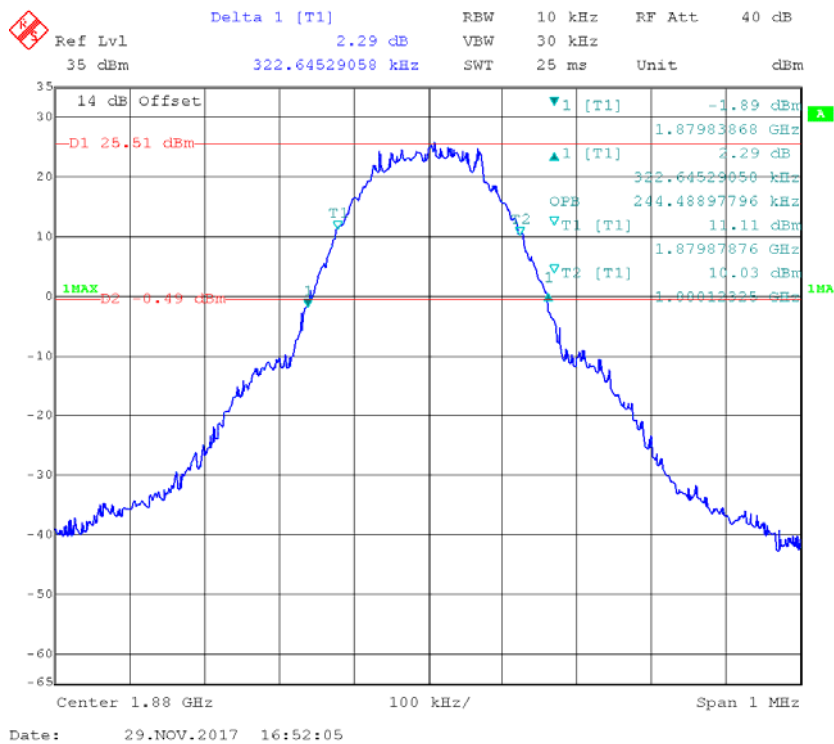
Test Mode: Transmitting

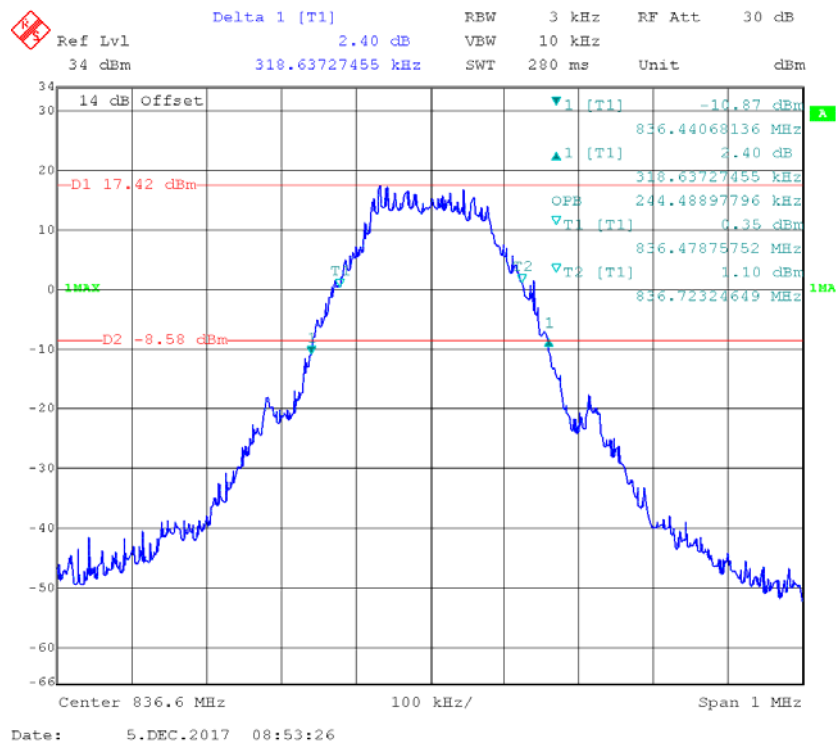
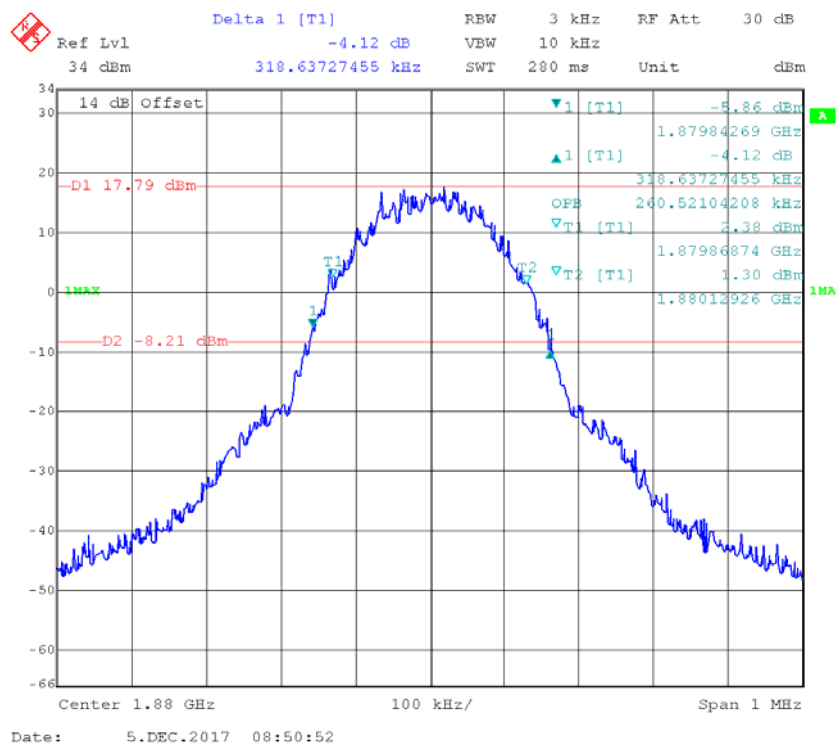
Test Result: Compliant. Please refer to the following table and plots.

Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.248	0.317
		EDGE	0.244	0.319
PCS		PCS	0.244	0.323
		EDGE	0.261	0.319
WCDMA Band II		Rel 99	4.228	4.889
		HSDPA	4.208	4.930
		HSUPA	4.228	4.910
WCDMA Band V		Rel 99	4.208	4.890
		HSDPA	4.208	4.910
		HSUPA	4.228	4.890

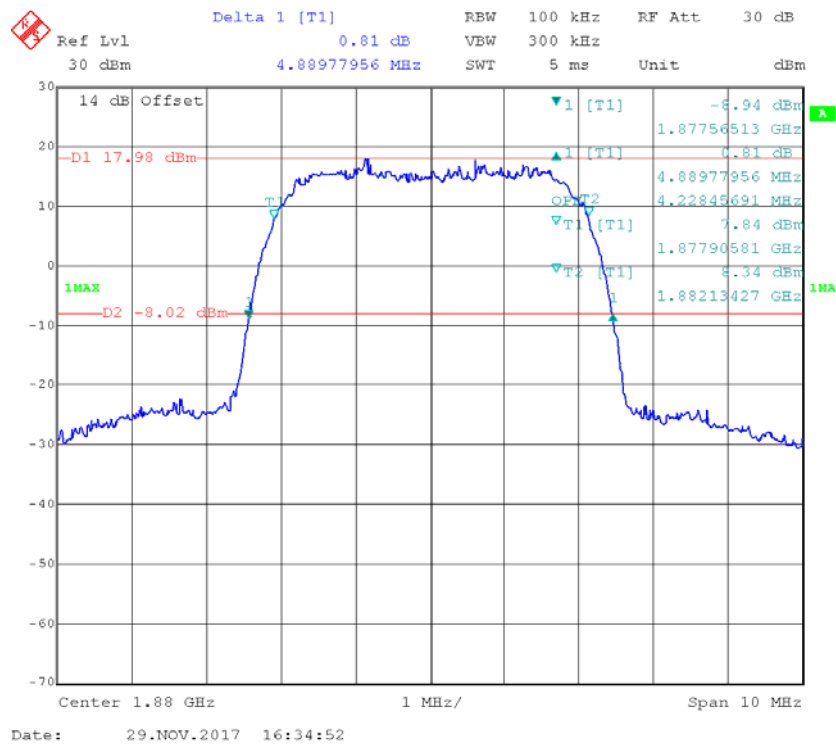
Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 2	QPSK	1.4	M	1.112	1.305
		3		2.754	3.122
		5		4.529	5.090
		10		9.138	10.321
		15		13.587	14.940
		20		18.036	19.719
	16QAM	1.4	M	1.100	1.299
		3		2.766	3.110
		5		4.549	5.110
		10		9.058	10.240
		15		13.587	14.940
		20		17.956	19.639

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band 4	QPSK	1.4	M	1.100	1.287
		3		2.693	2.961
		5		4.509	4.970
		10		8.978	9.890
		15		13.587	15.110
		20		18.036	19.709
	16QAM	1.4	M	1.112	1.275
		3		2.693	2.949
		5		4.489	4.985
		10		8.938	9.850
		15		13.587	15.110
		20		18.036	19.709
LTE Band 5	QPSK	1.4	M	1.106	1.293
		3		2.754	3.123
		5		4.569	5.091
		10		9.138	10.332
	16QAM	1.4	M	1.100	1.275
		3		2.741	3.099
		5		4.529	5.071
		10		9.098	10.292
LTE Band 7	QPSK	5	M	4.529	5.083
		10		9.138	10.311
		15		13.587	15.150
		20		17.956	19.614
	16QAM	5	M	4.549	5.110
		10		9.098	10.351
		15		13.527	15.090
		20		18.036	19.534

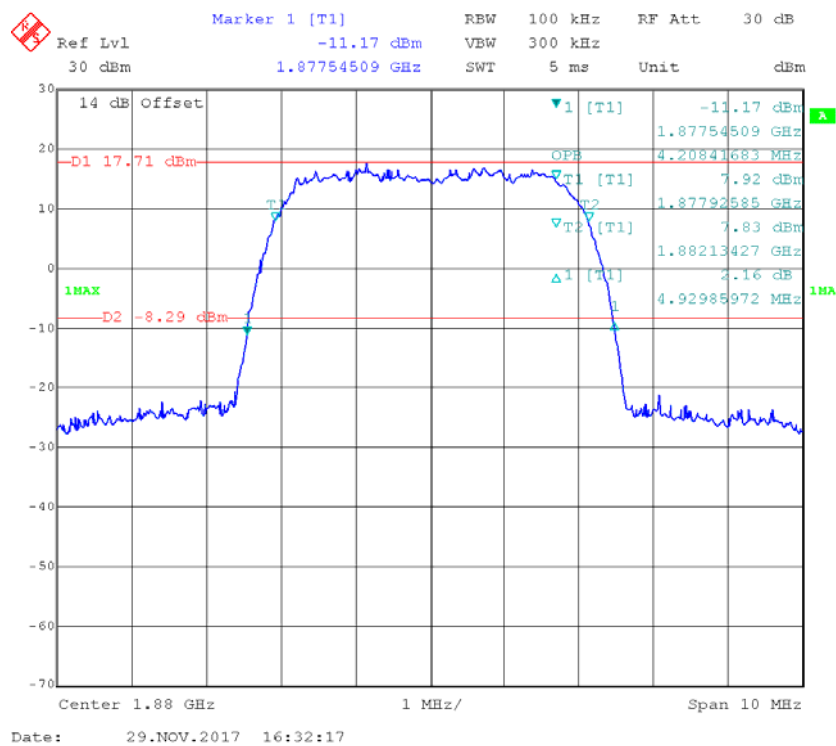
GSM 850 Cellular Band**GSM PCS1900 Cellular Band**

EDGE 850 Cellular Band**EDGE PCS1900 Cellular Band**

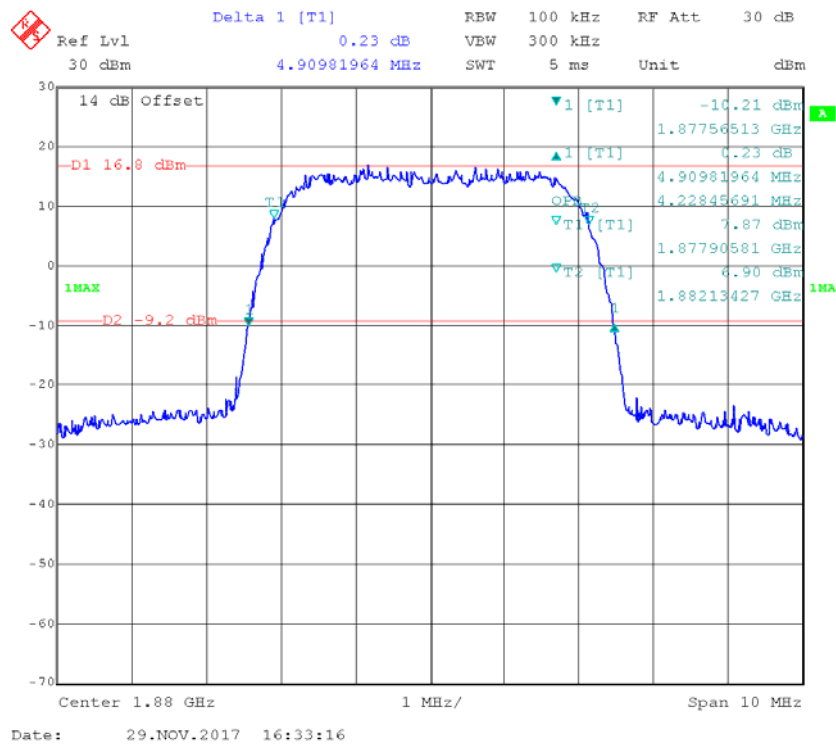
REL99 Band II



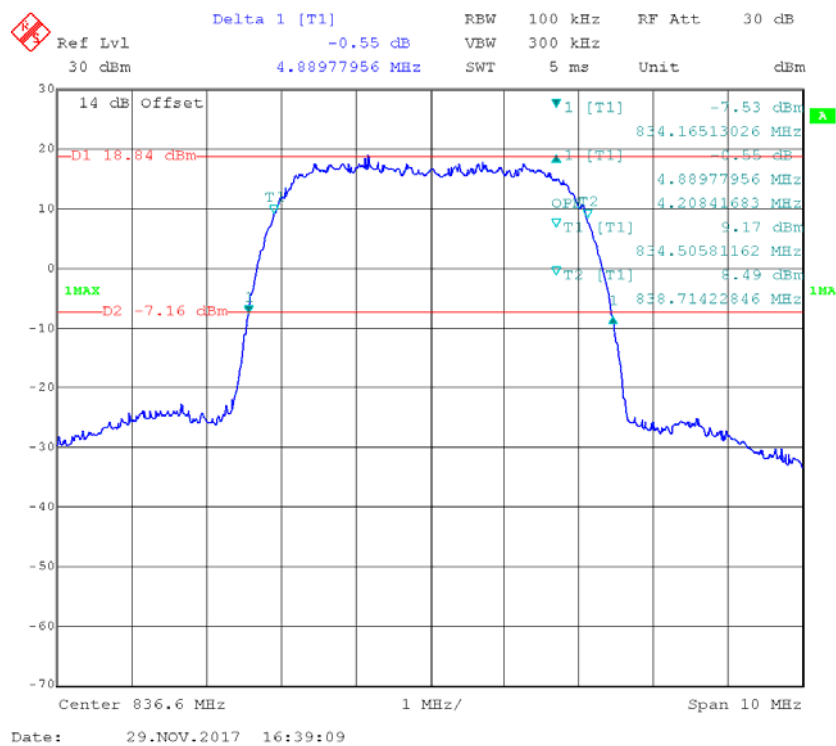
HSDPA Band II



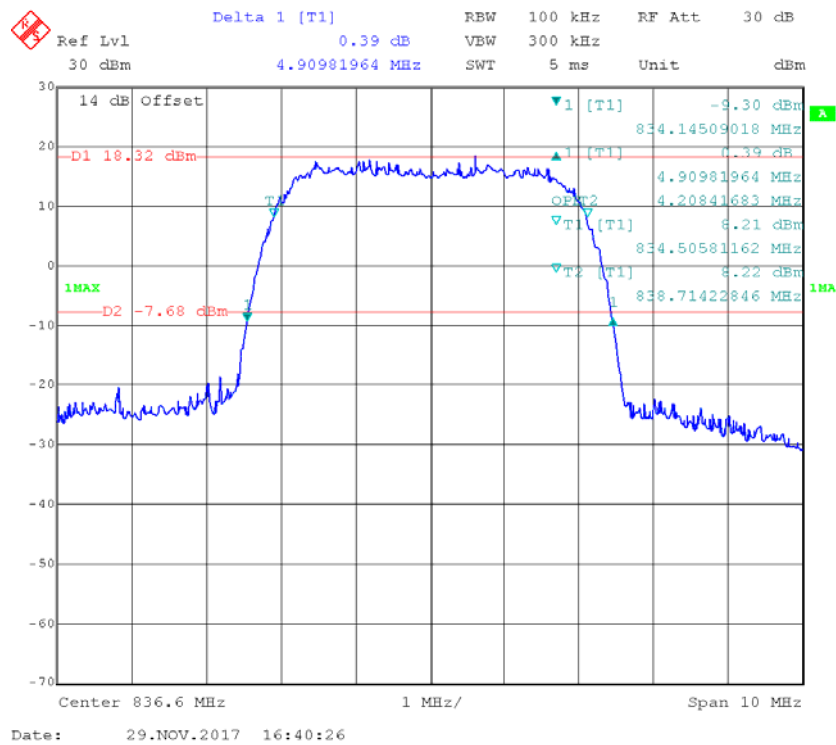
HSUPA Band II



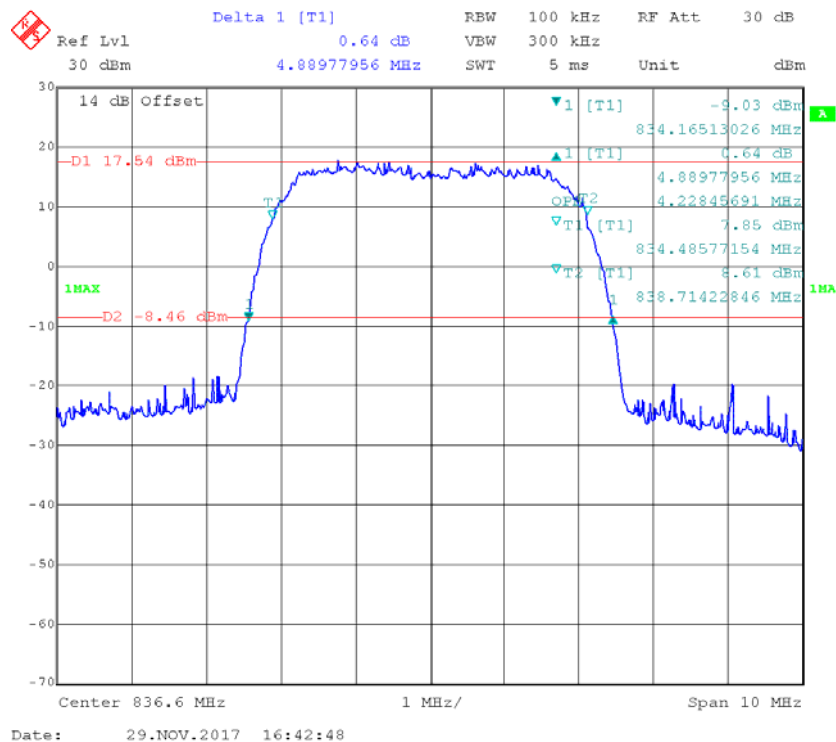
REL99 Band V



HSDPA Band V

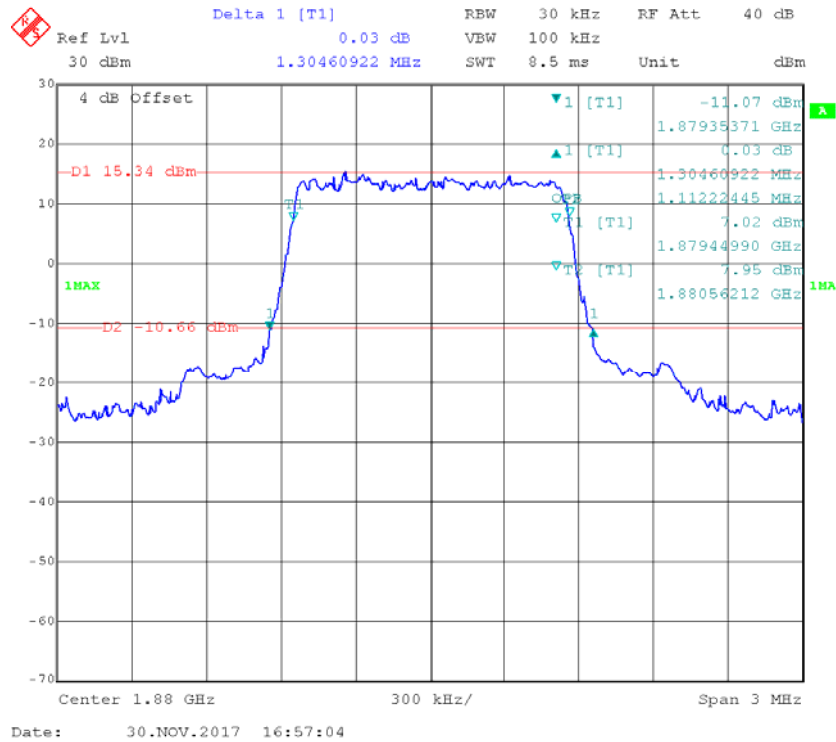


HSUPA Band V

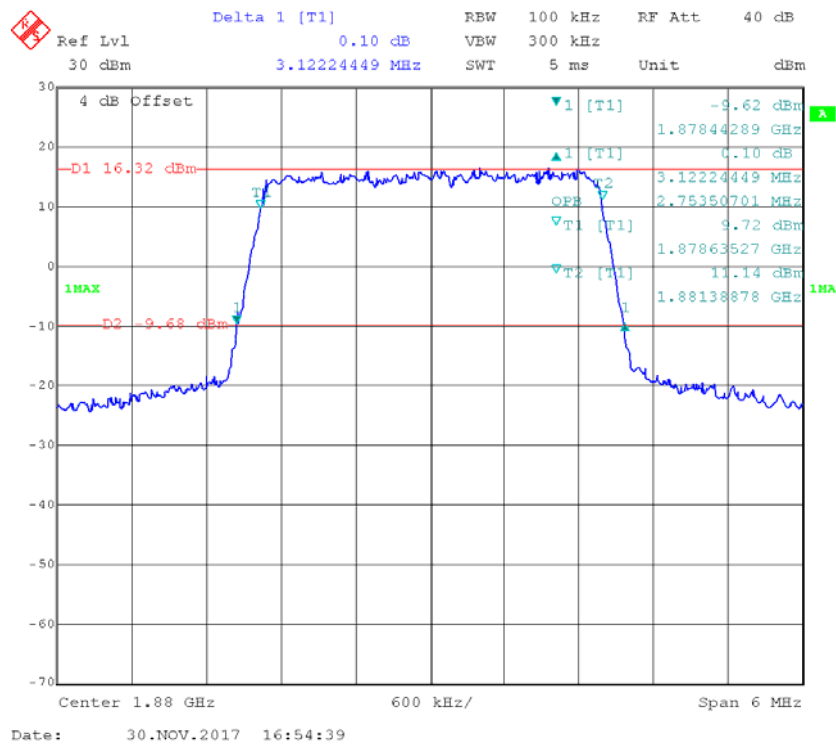


LTE Band 2

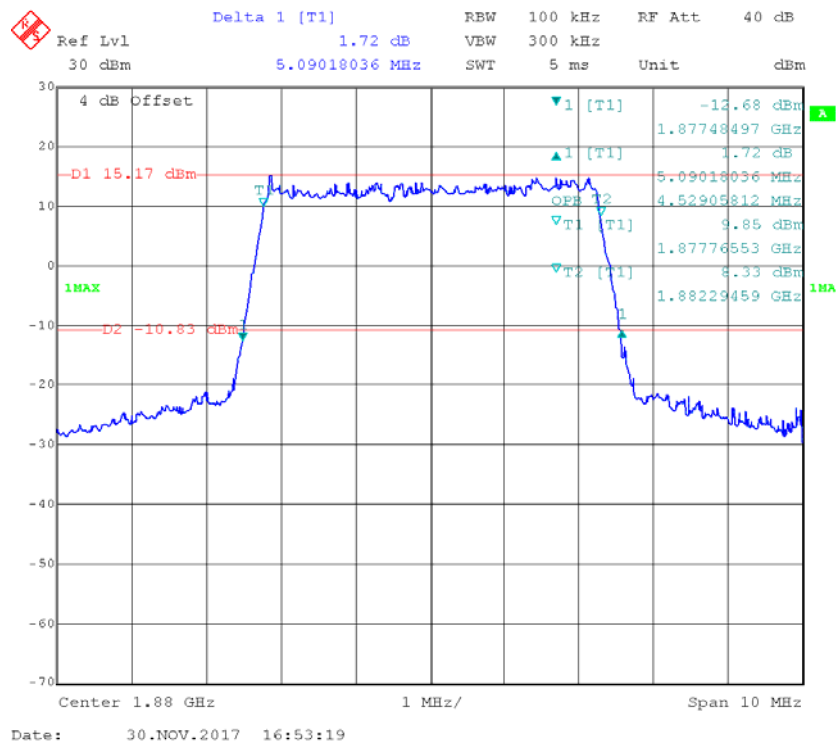
QPSK_1.4 MHz



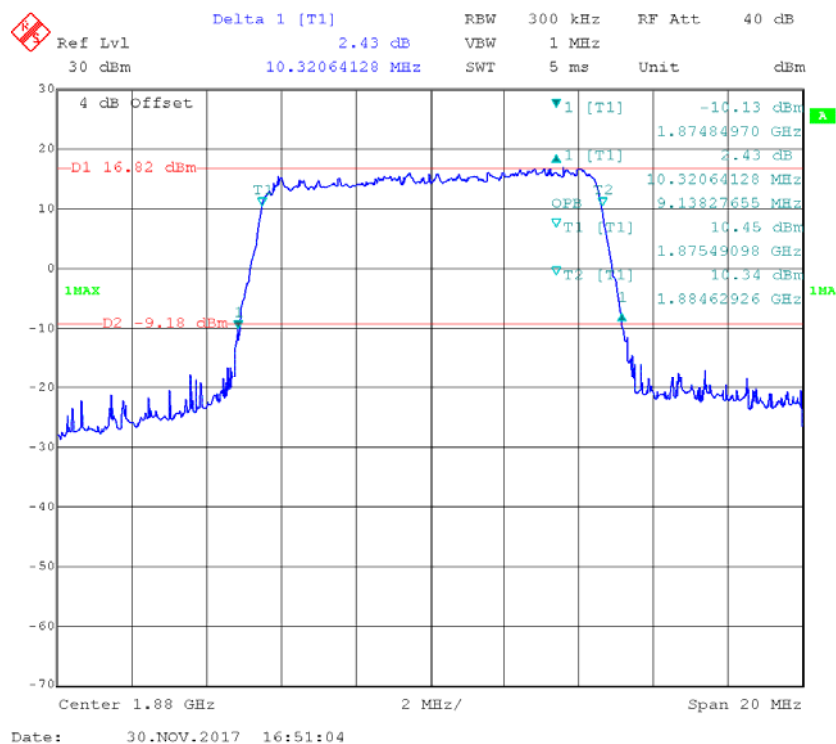
QPSK_3 MHz



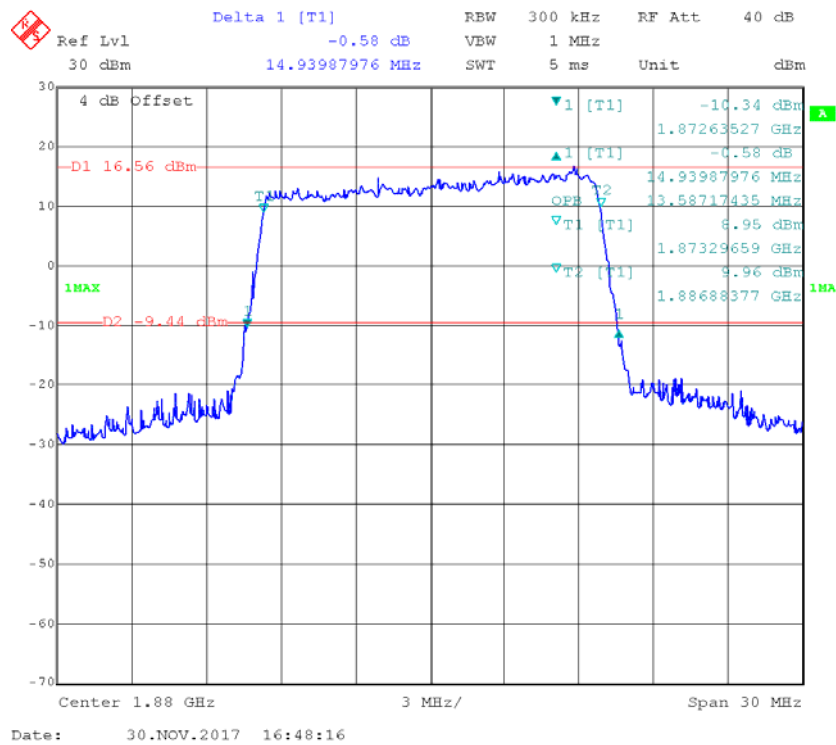
QPSK_5 MHz



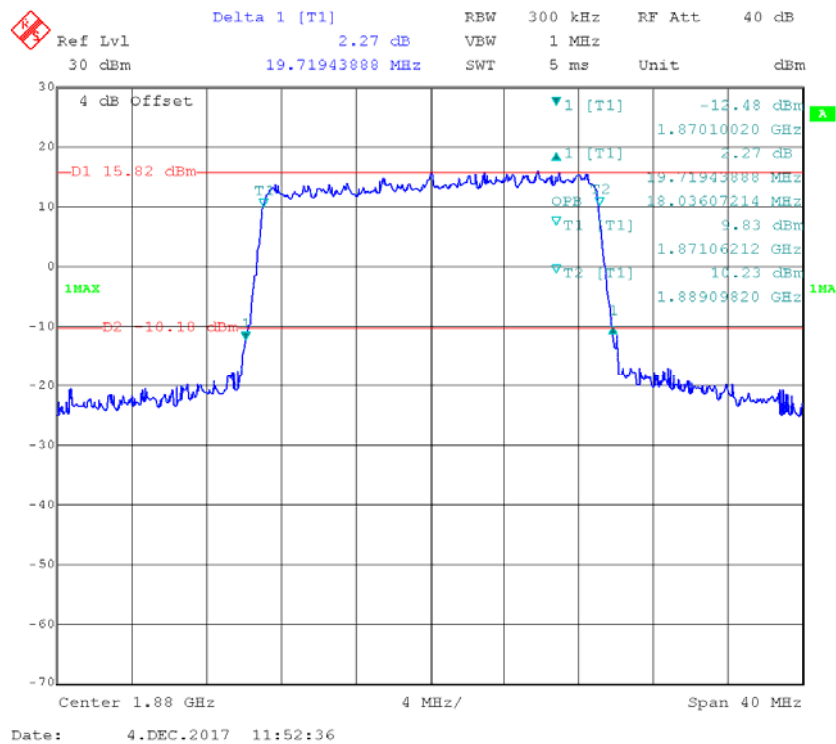
QPSK_10 MHz

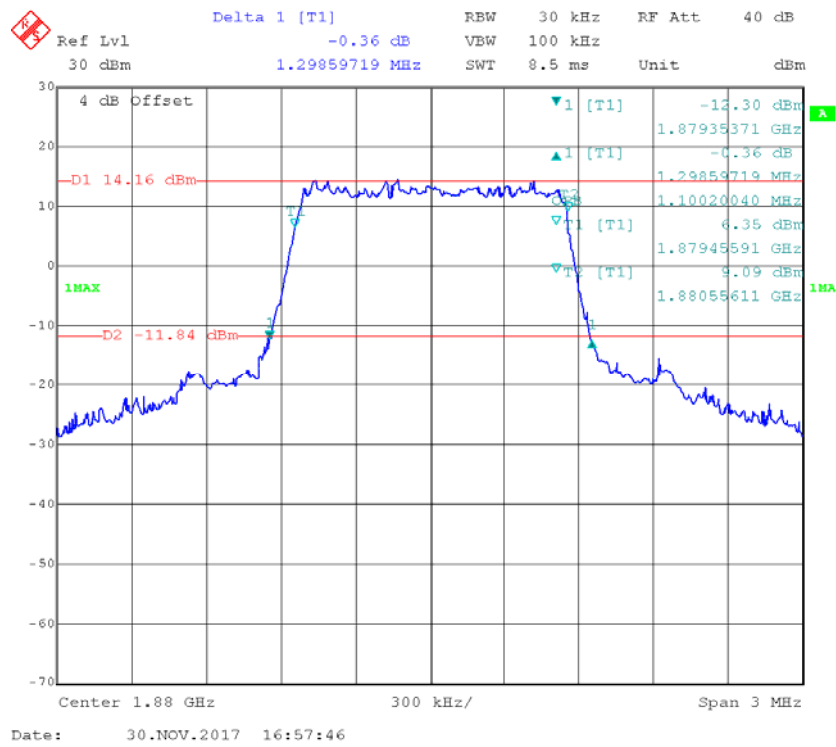
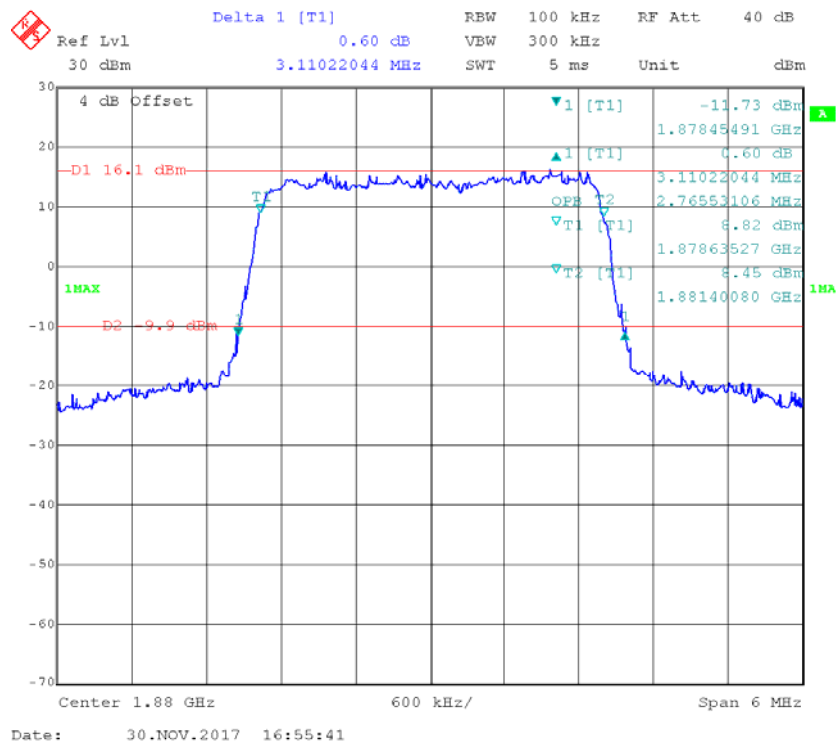


QPSK_15 MHz



QPSK_20 MHz



16QAM_1.4 MHz**16QAM_3 MHz**

Ref Lvl 30 dBm Delta 1 [T1] 1.86 dB RBW 100 kHz RF Att 40 dB

30 dBm 5.11022044 MHz SWT 5 ms Unit dBm

4 dB Offset

-D1 13.66 dBm

1 [T1] -13.73 dBm

1.87746493 GHz

1.86 dB

5.11022044 MHz

4.54909820 MHz

9.65 dBm

1.87776553 GHz

6.97 dBm

1.88231463 GHz

1MAX

D2 -12.34 dBm

Center 1.88 GHz

1 MHz/

Span 10 MHz

Date: 30.NOV.2017 16:52:22

Delta 1 [T1] 1.46 dB
 Ref Lvl 30 dBm
 RBW 300 kHz
 VBW 1 MHz
 RF Att 40 dB
 Unit dBm
 10.24048096 MHz
 SWT 5 ms

4 dB Offset
 D1 16.2 dBm
 D2 9.9 dBm
 1MAX
 1MA

Marker	Type	Value
1	[T1]	-11.63 dBm
2	[T1]	1.87492986 GHz
3	[T1]	1.46 dB
4	[T1]	10.24048096 MHz
5	[T1]	9.05811623 MHz
6	[T1]	6.95 dBm
7	[T1]	1.87553106 GHz
8	[T1]	12.45 dBm
9	[T1]	1.88458918 GHz

Center 1.88 GHz
 2 MHz/
 Span 20 MHz

Date: 30.NOV.2017 16:49:41

[illegible]

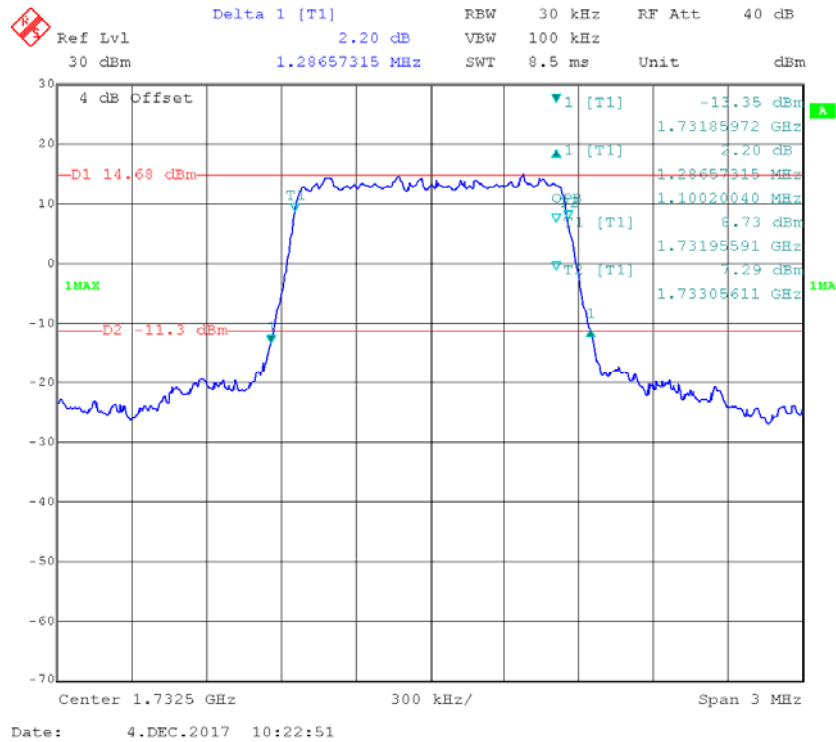
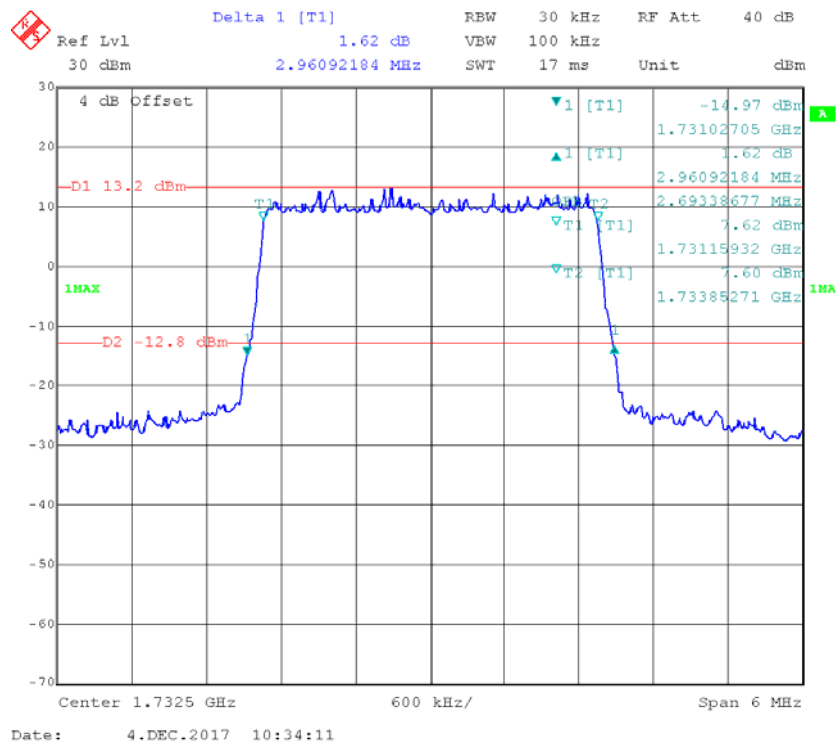
Delta 1 [T1] RBW 300 kHz RF Att 40 dB
 Ref Lvl 2.79 dB VBW 1 MHz
 30 dBm 19.63927856 MHz SWT 5 ms Unit dBm

4 dB Offset
 -D1 15.33 dBm
 -D2 -10.67 dBm
 1MAX

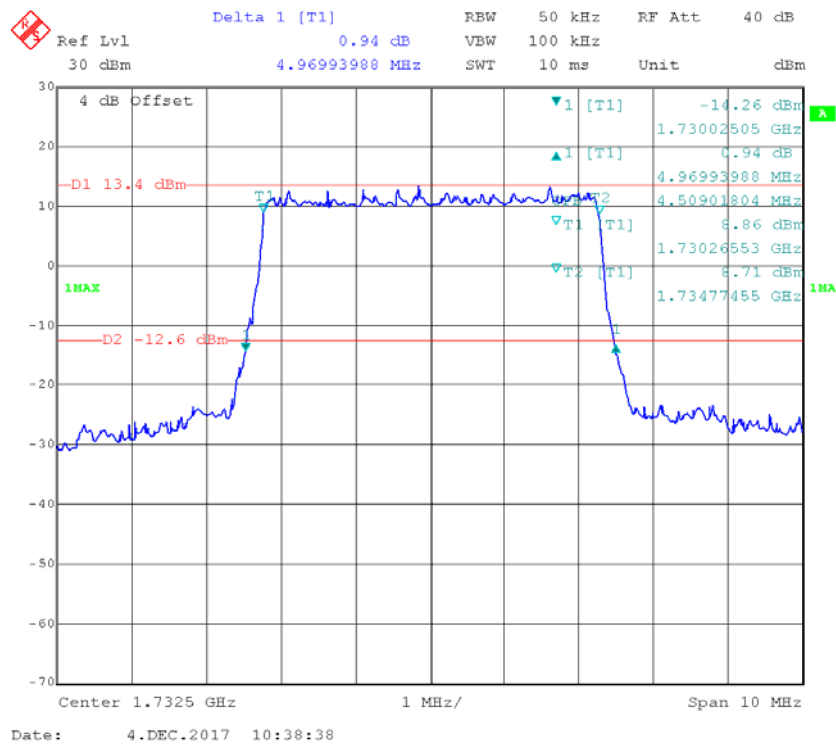
Marker	Type	Frequency [MHz]	Power [dBm]
1	T1	19.63927856	15.33
2	T2	17.95591182	-10.67
T1	T1	19.63927856	10.22
T2	T1	19.63927856	10.06
T1	T1	19.63927856	1.87114228
T2	T1	19.63927856	1.88909820

Center 1.88 GHz 4 MHz/ Span 40 MHz

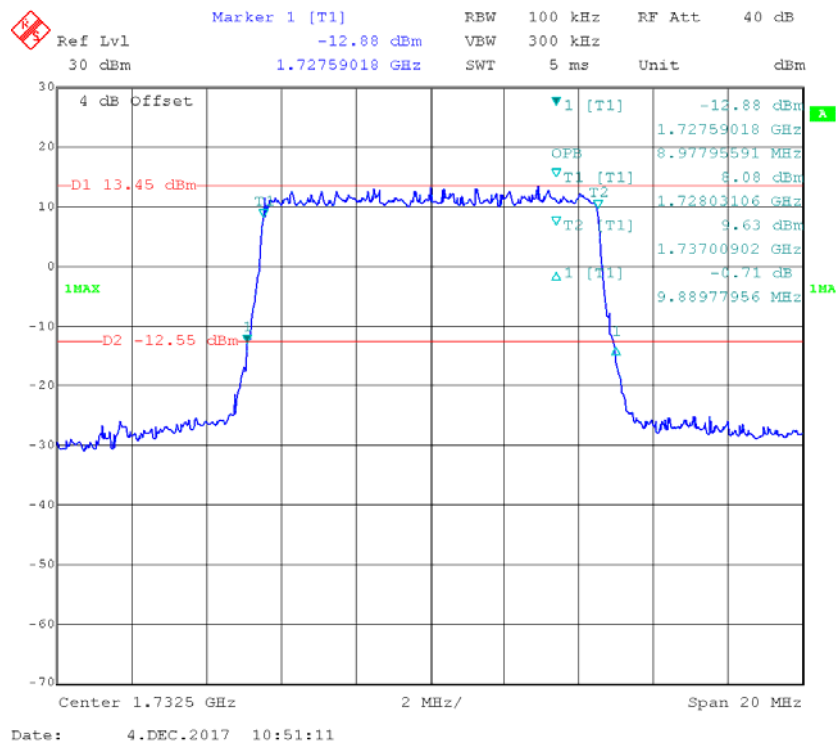
Date: 4.DEC.2017 11:53:48

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

QPSK_5 MHz



QPSK_10 MHz



Delta 1 [T1] 0.75 dB
 Ref Lvl 30 dBm 15.11022044 MHz
 RBW 300 kHz RF Att 40 dB
 VBW 1 MHz
 SWT 5 ms Unit dBm

4 dB Offset
 D1 16.12 dBm
 D2 -9.88 dBm
 1MAX
 1MA

T1 [T1] -10.30 dBm
 T2 [T1] 1.72499491 GHz
 OFF 13.58717435 MHz
 T1 [T1] 10.42 dBm
 T2 [T1] 1.72573647 GHz
 T1 [T1] 12.47 dBm
 T2 [T1] 1.73932365 GHz

Center 1.7325 GHz 3 MHz/
 Span 30 MHz

Date: 4.DEC.2017 10:55:25

Ref Lvl 30 dBm Delta 1 [T1] 0.93 dB RBW 300 kHz RF Att 40 dB VBW 1 MHz SWT 5 ms Unit dBm

4 dB Offset

D1 15.19 dBm

D2 -10.61 dBm

1MAX

1MA

▼1 [T1] -12.28 dBm
1.72268036 GHz
▲1 [T1] 0.93 dB
19.70941884 MHz
OFF 18.03607214 MHz
▼T1 [T1] 10.70 dBm
1.72348196 GHz
▼T2 [T1] 11.96 dBm
1.74151804 GHz

Center 1.7325 GHz 4 MHz/ Span 40 MHz

Date: 4.DEC.2017 10:58:31

Delta 1 [T1] 0.98 dB RBW 30 kHz RF Att 40 dB

Ref Lvl 30 dBm 1.27454910 MHz SWT 0.5 ms Unit dBm

4 dB Offset

D1 14.68 dBm

D2 -11.42 dBm

1MAX

1 [T1] -12.45 dBm 1.73187174 GHz

1 [T1] 0.98 dB 1.27454910 MHz

1 [T1] 1.11222445 MHz

1 [T1] 8.88 dBm 1.73194990 GHz

1 [T1] 8.51 dBm 1.73306212 GHz

Center 1.7325 GHz 300 kHz/ Span 3 MHz

Date: 4.DEC.2017 10:24:28

Delta 1 [T1] 2.22 dB

Ref Lvl 30 dBm

RBW 30 kHz

VBW 100 kHz

RF Att 40 dB

SWT 17 ms

Unit dBm

4 dB Offset

D1 13.96 dBm

D2 -12.04 dBm

1MAX

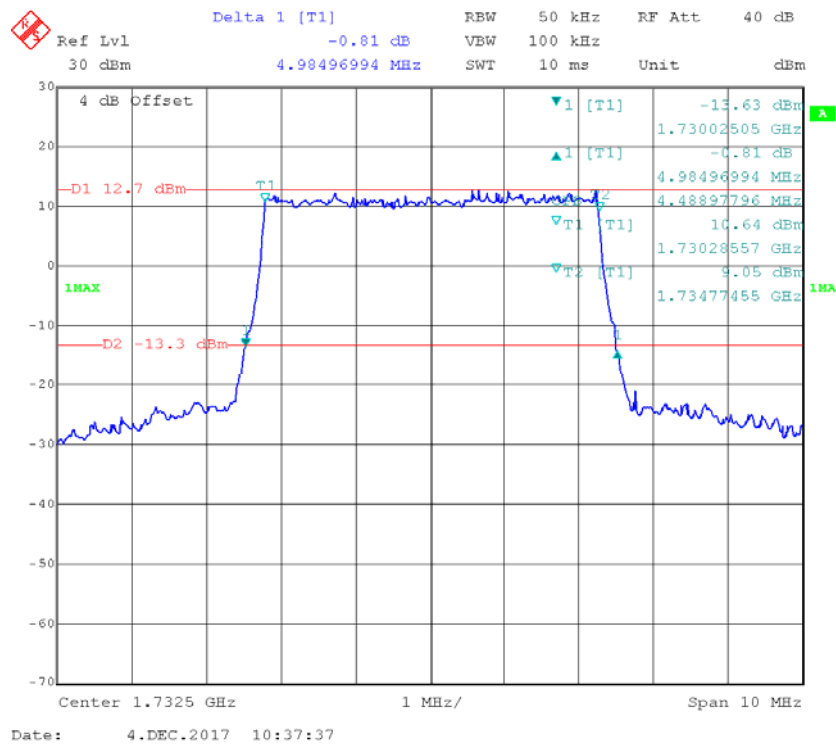
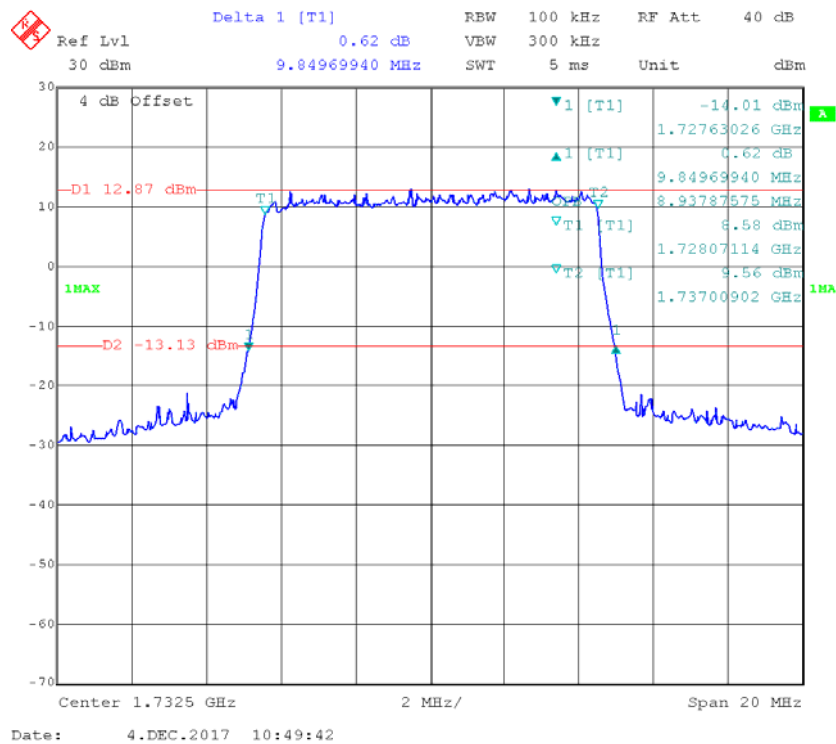
1MA

Center 1.7325 GHz

600 kHz/

Span 6 MHz

Date: 4.DEC.2017 10:32:00

16QAM_5 MHz**16QAM_10 MHz**

Delta 1 [T1] 2.42 dB RBW 300 kHz RF Att 40 dB

Ref Lvl 30 dBm 15.11022044 MHz SWT 5 ms Unit dBm

4 dB Offset

D1 16.34 dBm

D2 -9.66 dBm

1MAX

1 [T1] -12.14 dBm

2 [T1] 2.42 dBm

15.11022044 MHz

13.58717435 MHz

10.81 dBm

10.49 dBm

1.72573647 GHz

1.73932365 GHz

1MAX

Center 1.7325 GHz 3 MHz/ Span 30 MHz

Date: 4.DEC.2017 10:56:31

Delta 1 [T1] 0.60 dB RBW 300 kHz RF Att 40 dB

Ref Lvl 30 dBm Unit dBm

SWT 5 ms

4 dB Offset

D1 14.6 dBm

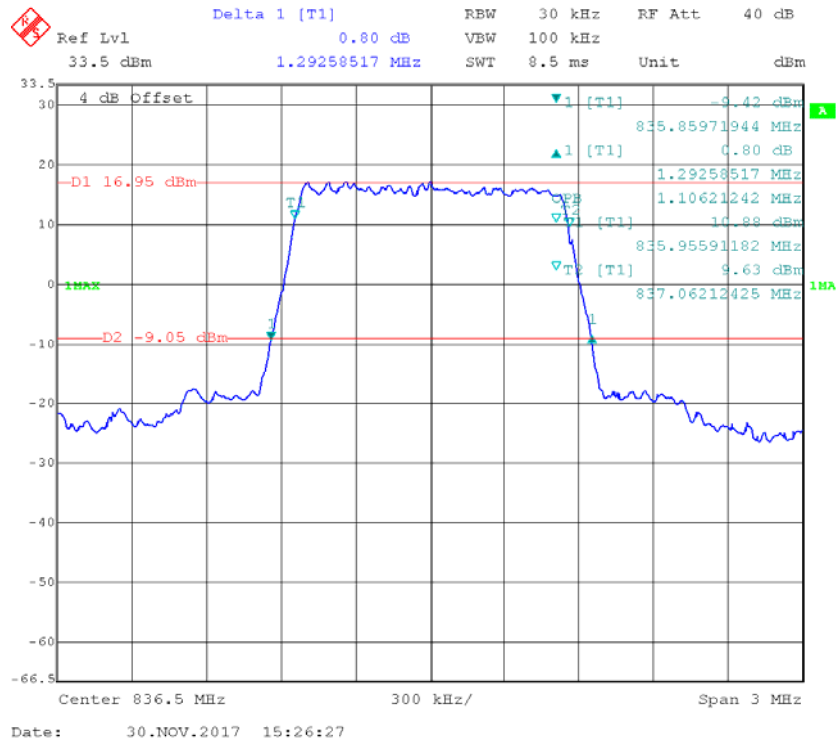
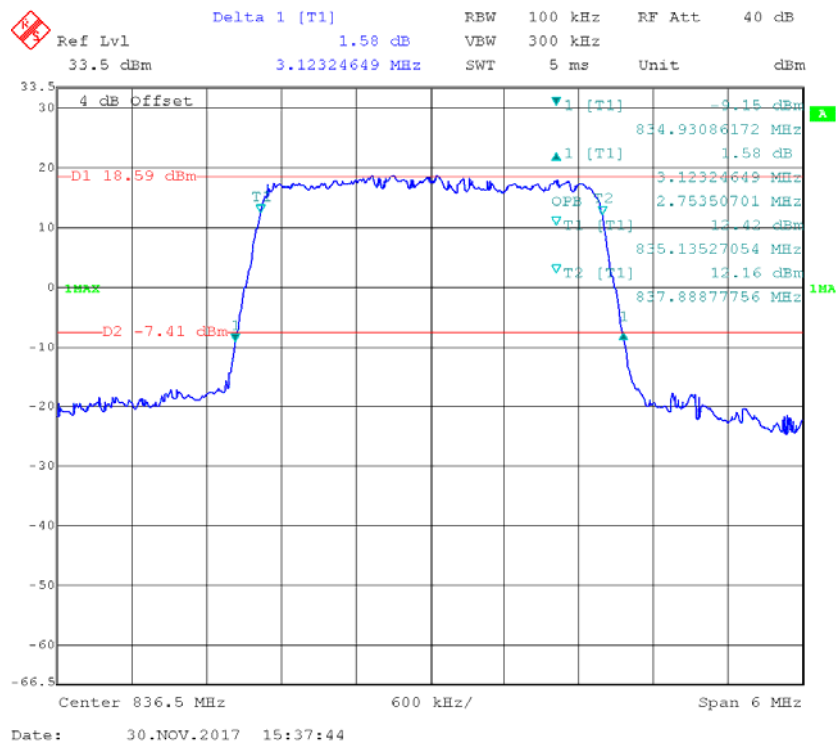
D2 -11.4 dBm

1MAX

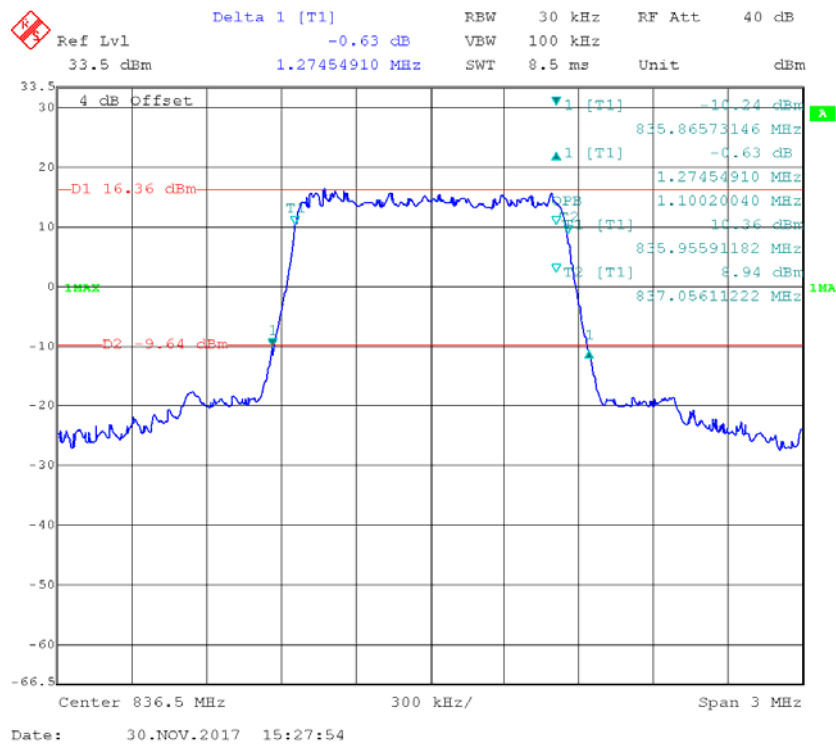
1MA

Center 1.7325 GHz 4 MHz/ Span 40 MHz

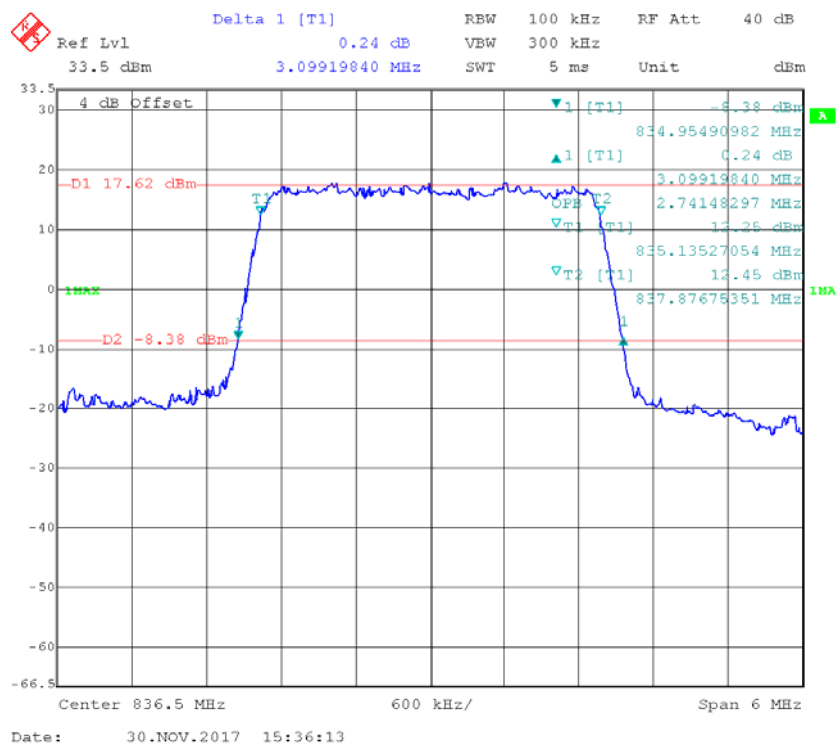
Date: 4.DEC.2017 11:00:17

LTE Band 5:**QPSK_1.4 MHz****QPSK_3 MHz**

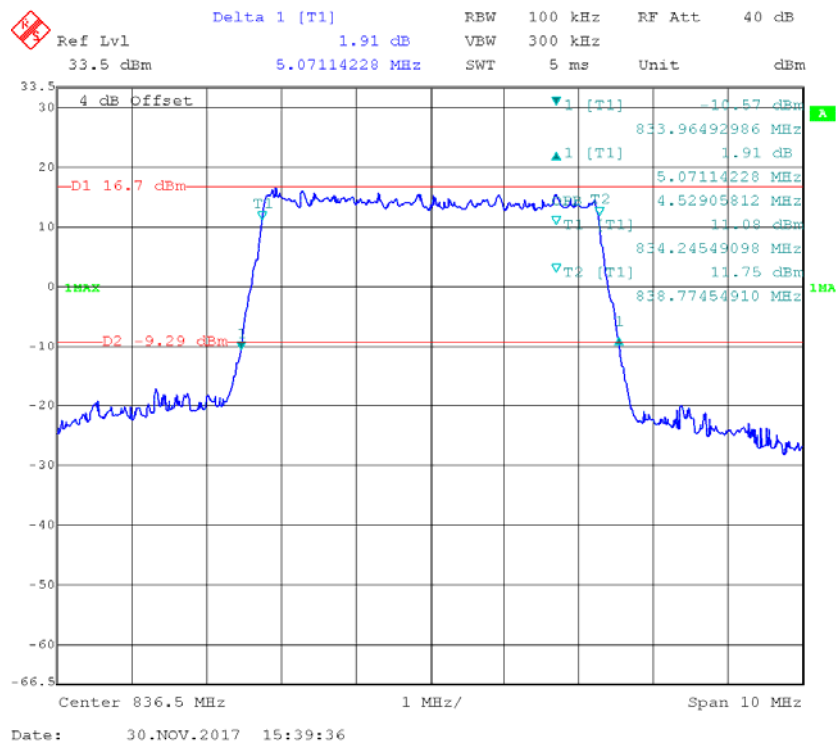
16QAM_1.4 MHz



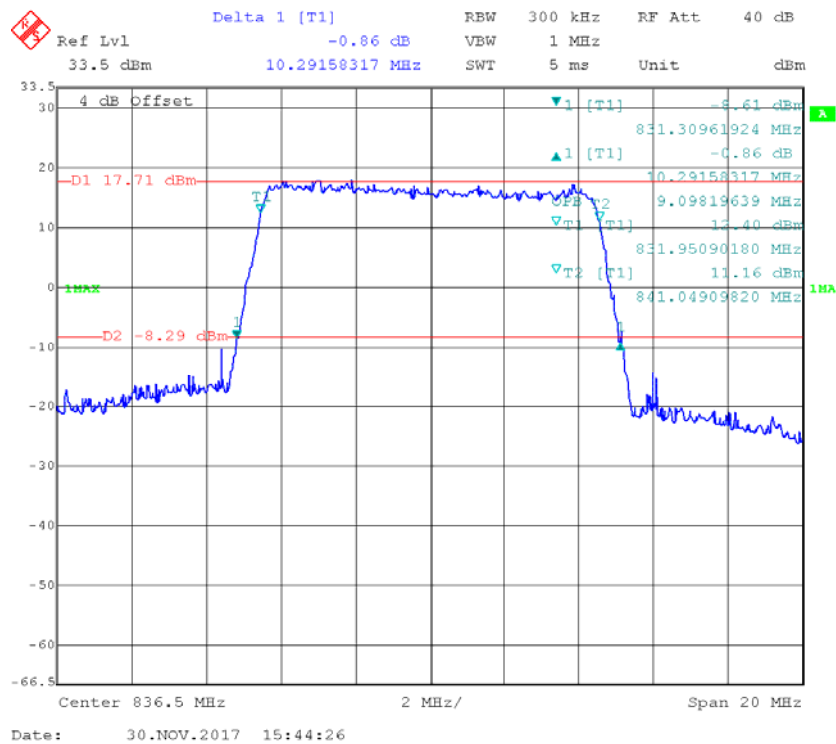
16QAM_3 MHz



16QAM_5 MHz

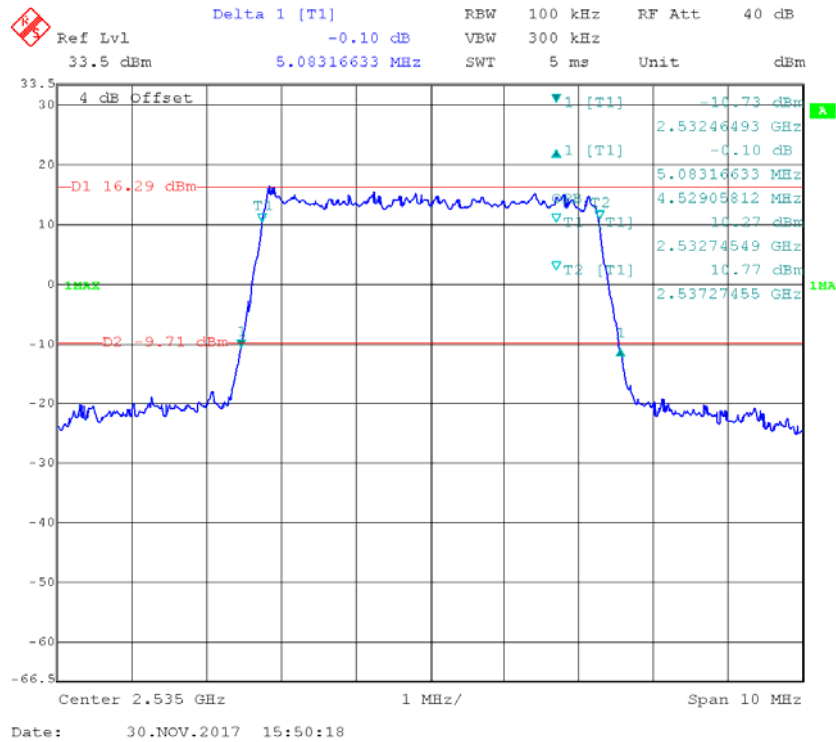


16QAM_10 MHz

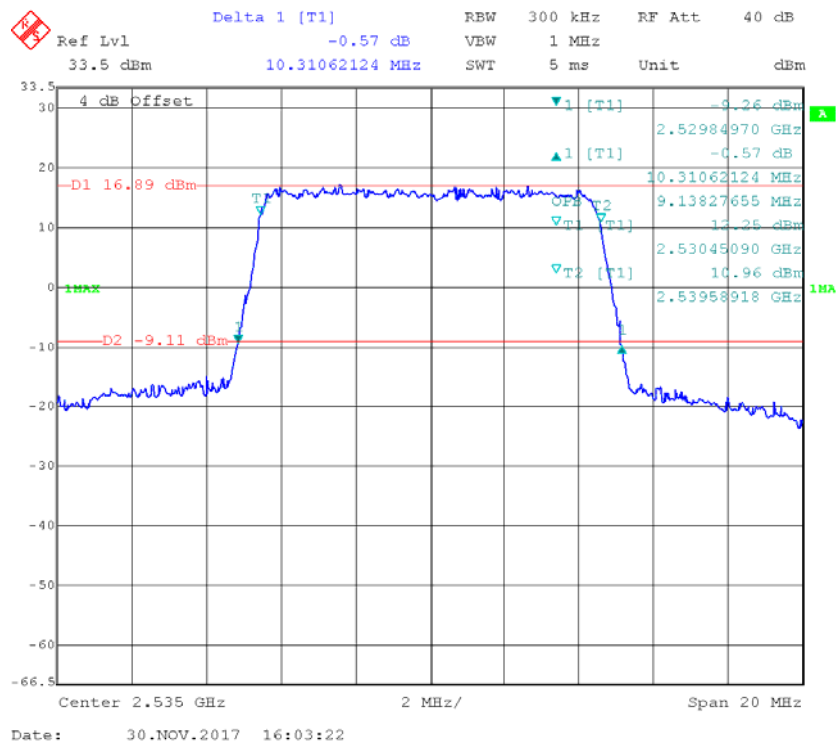


LTE Band 7:

QPSK_5 MHz



QPSK_10 MHz



Delta 1 [T1]

Ref Lvl 1.33 dB

33.5 dBm 15.15030060 MHz

RBW 300 kHz RF Att 40 dB

VBW 1 MHz

SWT 5 ms Unit dBm

4 dB Offset

D1 15.89 dBm

D2 -10.11 dBm

1MAX

1MA

Center 2.535 GHz

3 MHz/

Span 30 MHz

Date: 30.NOV.2017 16:05:46

Delta 1 [T1]

Ref Lvl 1.21 dB

RBW 300 kHz

RF Att 40 dB

33.5 dBm

19.61419840 MHz

VBW 1 MHz

SWT 5 ms

Unit dBm

4 dB Offset

D1 15.39 dBm

D2 -10.61 dBm

1 [T1]

2 [T1]

3 [T1]

4 [T1]

5 [T1]

6 [T1]

7 [T1]

8 [T1]

9 [T1]

10 [T1]

11 [T1]

12 [T1]

13 [T1]

14 [T1]

15 [T1]

16 [T1]

17 [T1]

18 [T1]

19 [T1]

20 [T1]

21 [T1]

22 [T1]

23 [T1]

24 [T1]

25 [T1]

26 [T1]

27 [T1]

28 [T1]

29 [T1]

30 [T1]

31 [T1]

32 [T1]

33 [T1]

34 [T1]

35 [T1]

36 [T1]

37 [T1]

38 [T1]

39 [T1]

40 [T1]

41 [T1]

42 [T1]

43 [T1]

44 [T1]

45 [T1]

46 [T1]

47 [T1]

48 [T1]

49 [T1]

50 [T1]

51 [T1]

52 [T1]

53 [T1]

54 [T1]

55 [T1]

56 [T1]

57 [T1]

58 [T1]

59 [T1]

60 [T1]

61 [T1]

62 [T1]

63 [T1]

64 [T1]

65 [T1]

66 [T1]

67 [T1]

68 [T1]

69 [T1]

70 [T1]

71 [T1]

72 [T1]

73 [T1]

74 [T1]

75 [T1]

76 [T1]

77 [T1]

78 [T1]

79 [T1]

80 [T1]

81 [T1]

82 [T1]

83 [T1]

84 [T1]

85 [T1]

86 [T1]

87 [T1]

88 [T1]

89 [T1]

90 [T1]

91 [T1]

92 [T1]

93 [T1]

94 [T1]

95 [T1]

96 [T1]

97 [T1]

98 [T1]

99 [T1]

100 [T1]

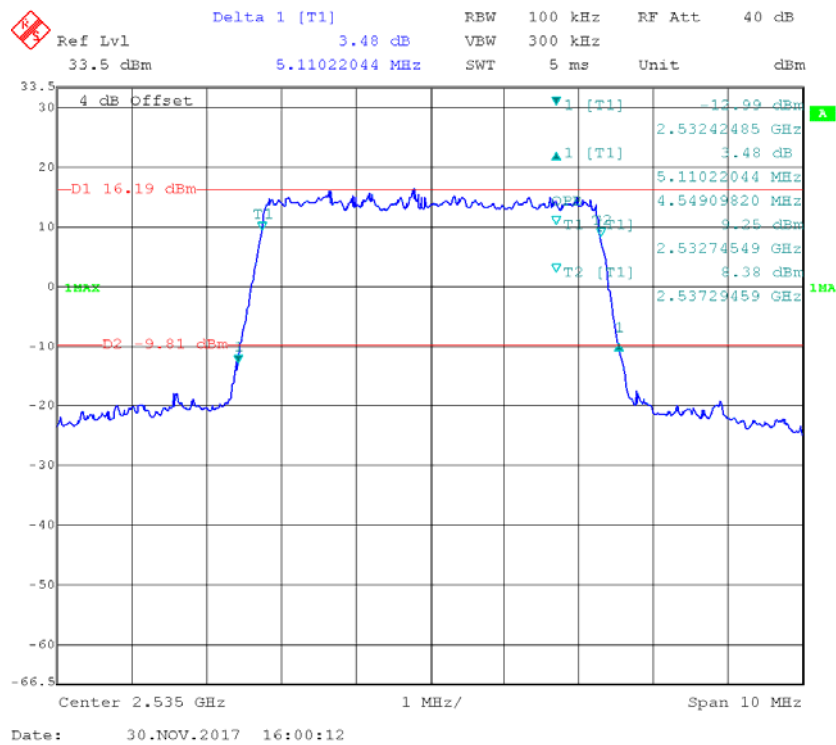
Center 2.535 GHz

4 MHz/

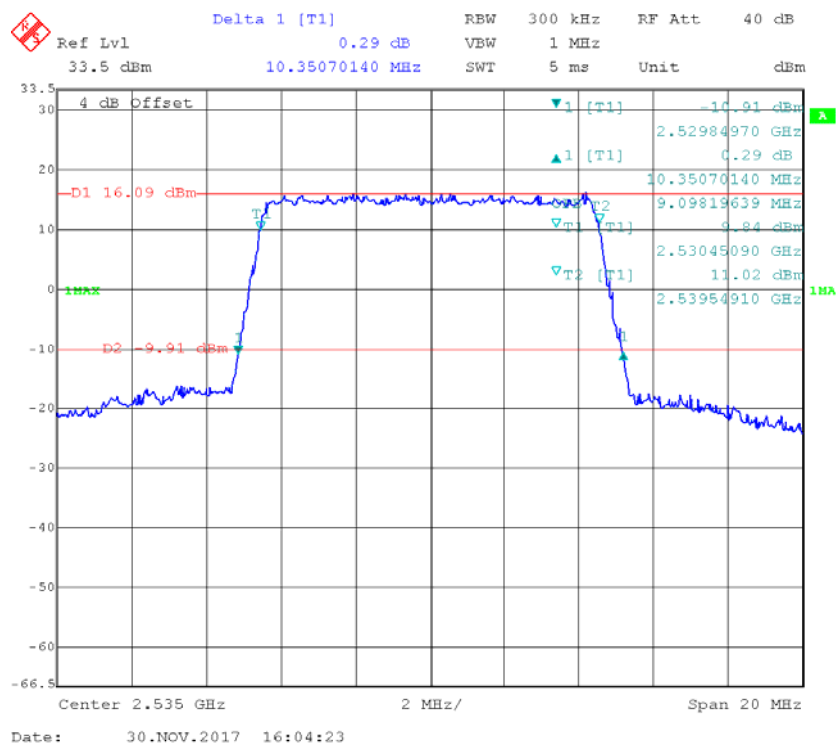
Span 40 MHz

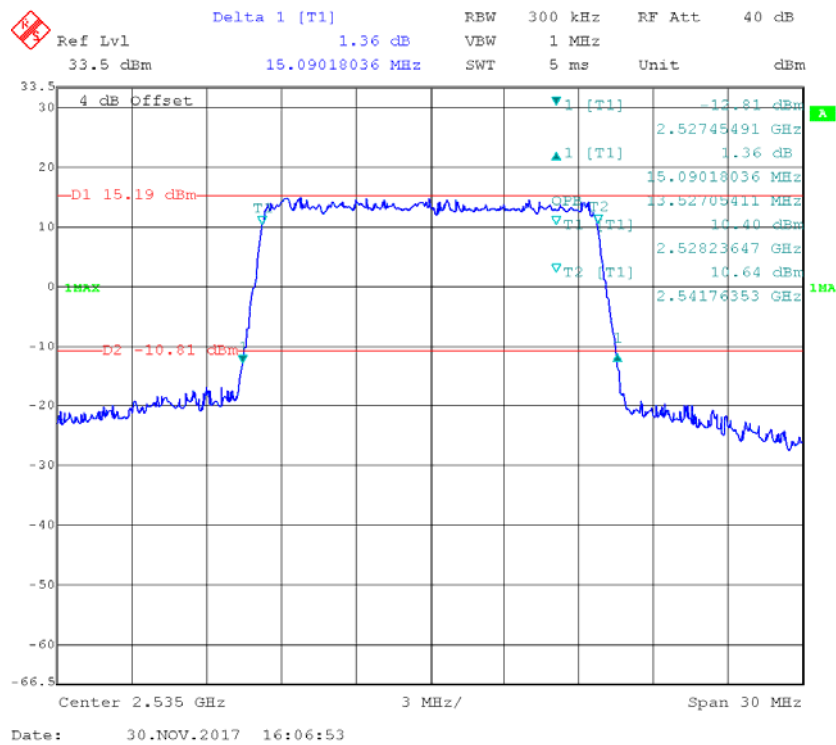
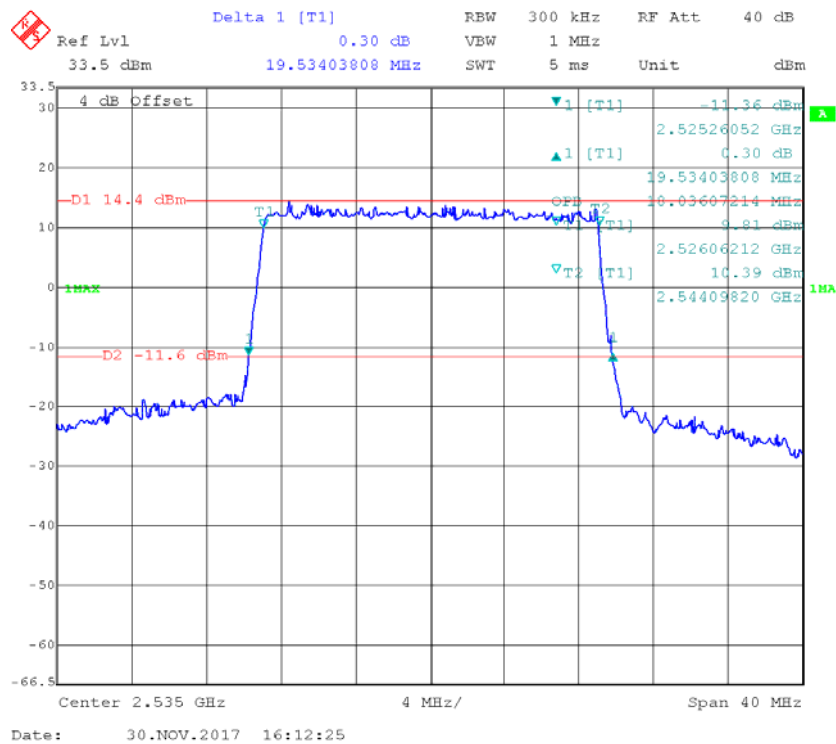
Date: 30.NOV.2017 16:10:49

16QAM_5 MHz



16QAM_10 MHz



16QAM_15 MHz**16QAM_20 MHz**

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

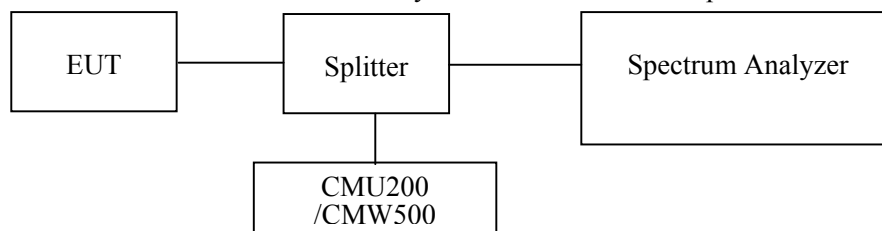
Applicable Standard

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 Splitter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
R&S	Spectrum Analyzer	FSU 26	200256	2017-12-08	2018-12-08

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

Test Data

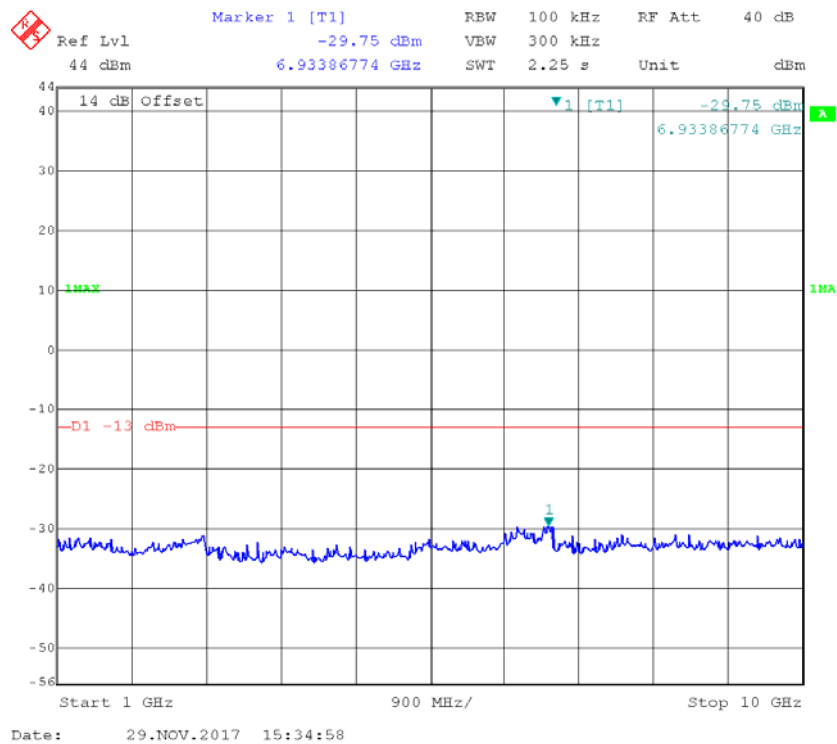
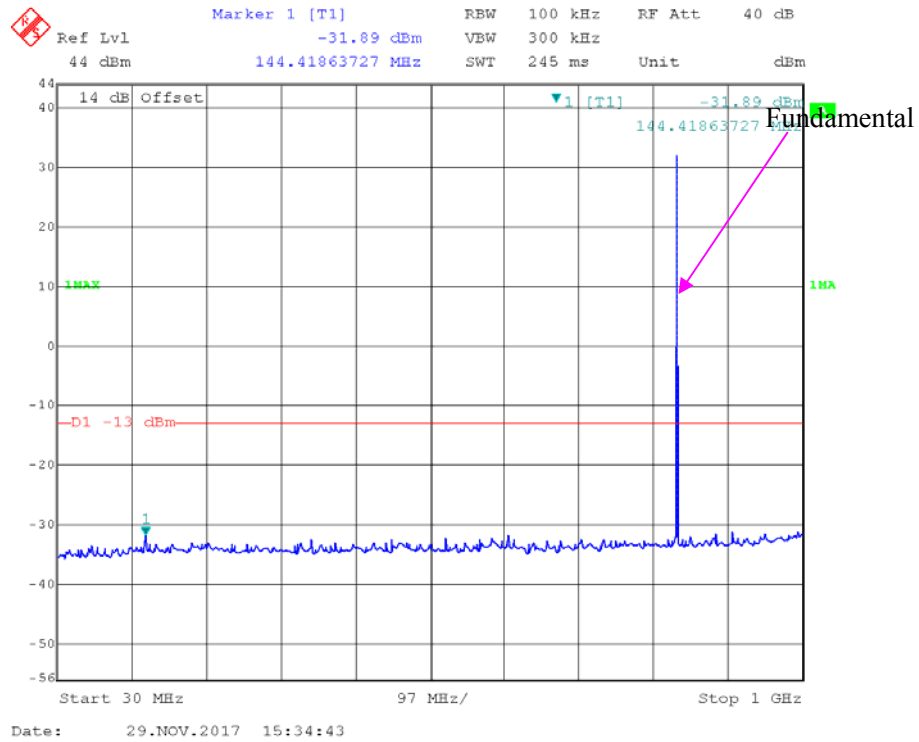
Environmental Conditions

Temperature:	24.5~27.5°C
Relative Humidity:	39 ~ 64 %
ATM Pressure:	100.8~102.1 kPa

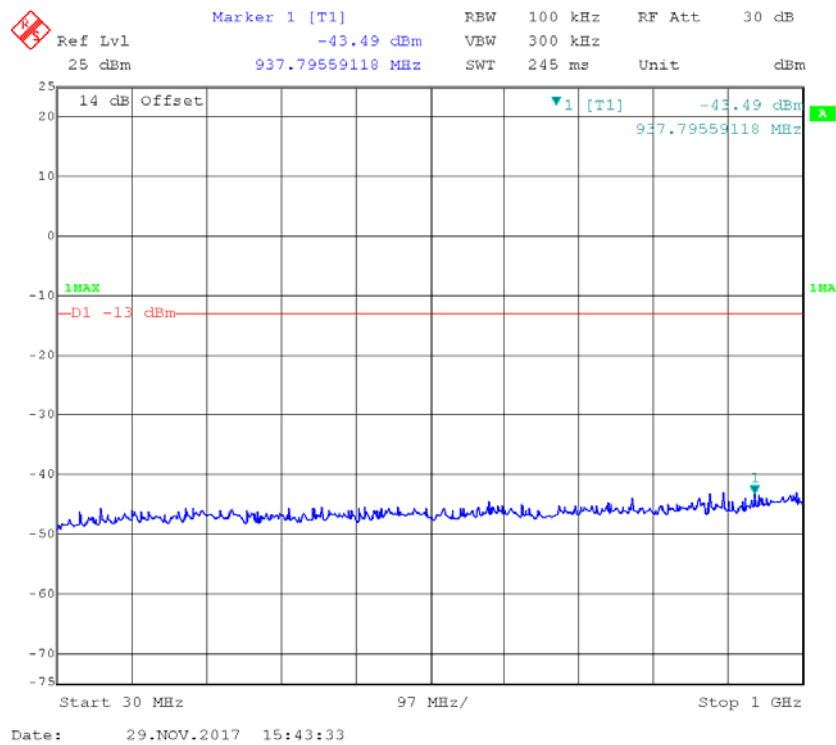
The testing was performed by Kami Zhou from 2017-10-31 to 2017-12-09.

Please refer to the following plots.

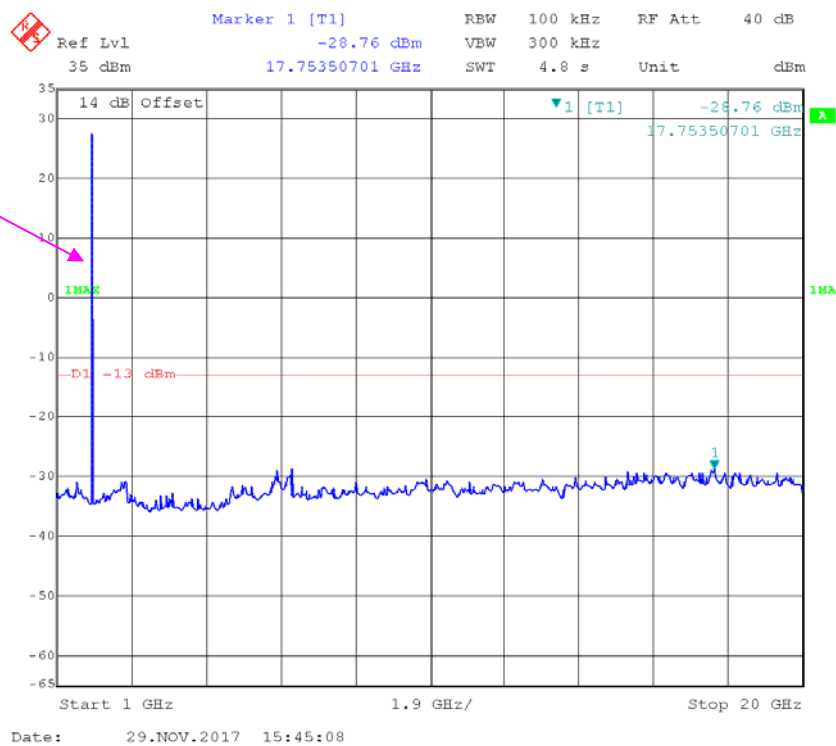
GSM850_Middle Channel



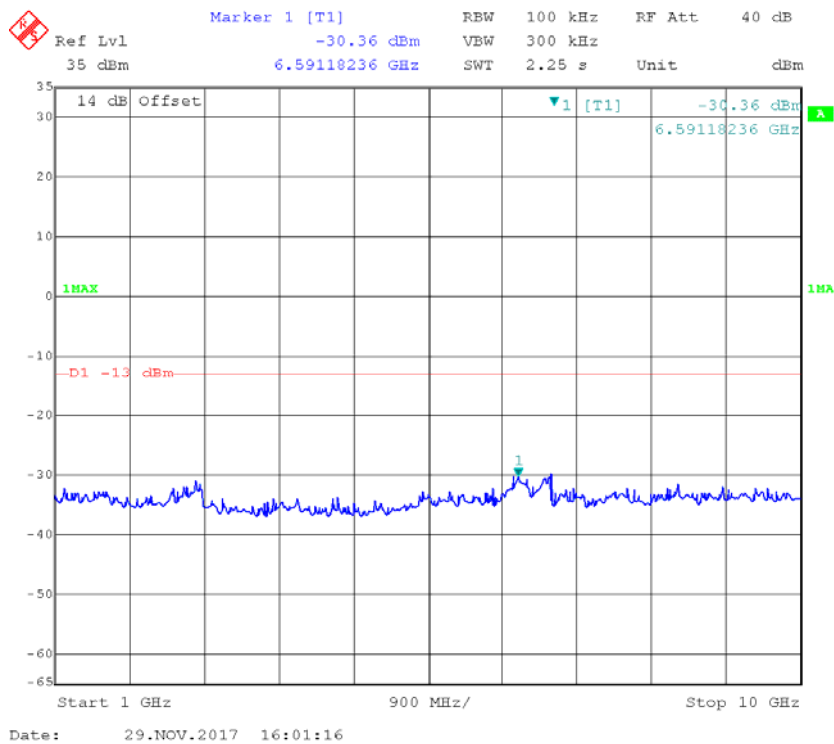
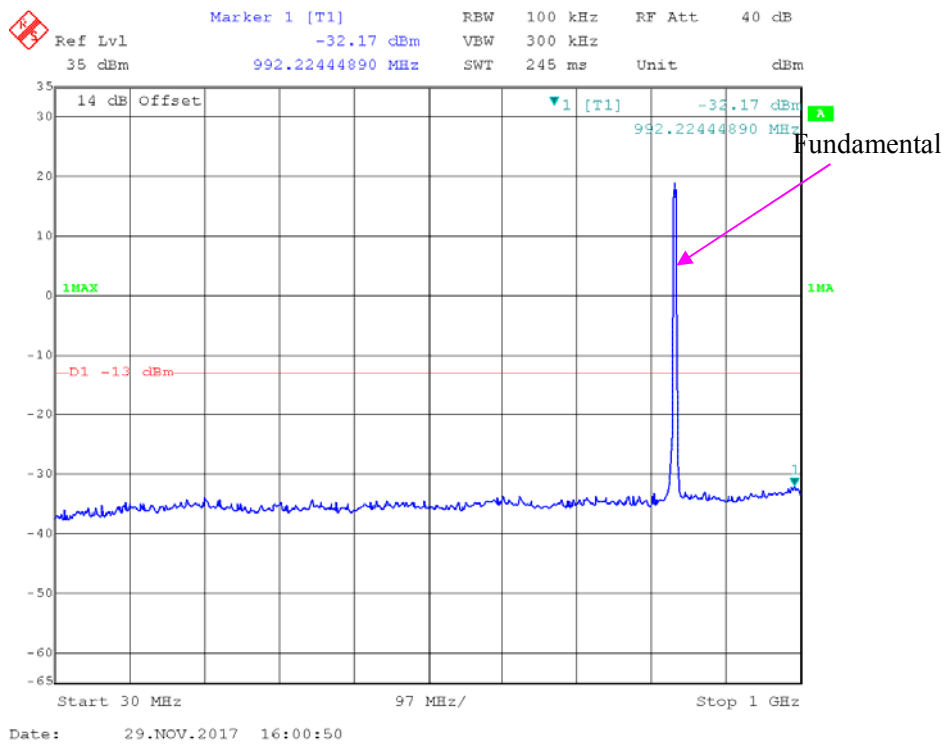
PCS 1900_ Middle Channel



Fundamental

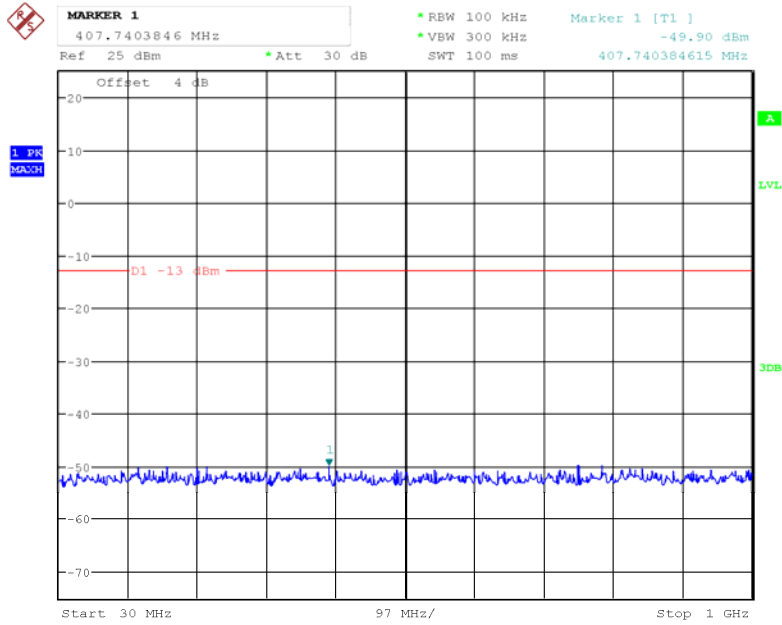


Rel 99 Band V_ Middle Channel



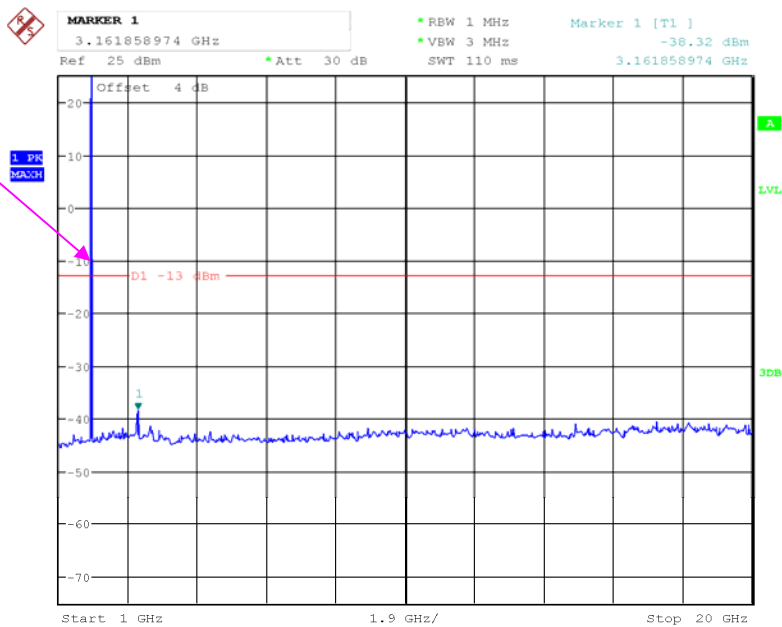
LTE Band 2 (Middle Channel)

QPSK_1.4 MHz



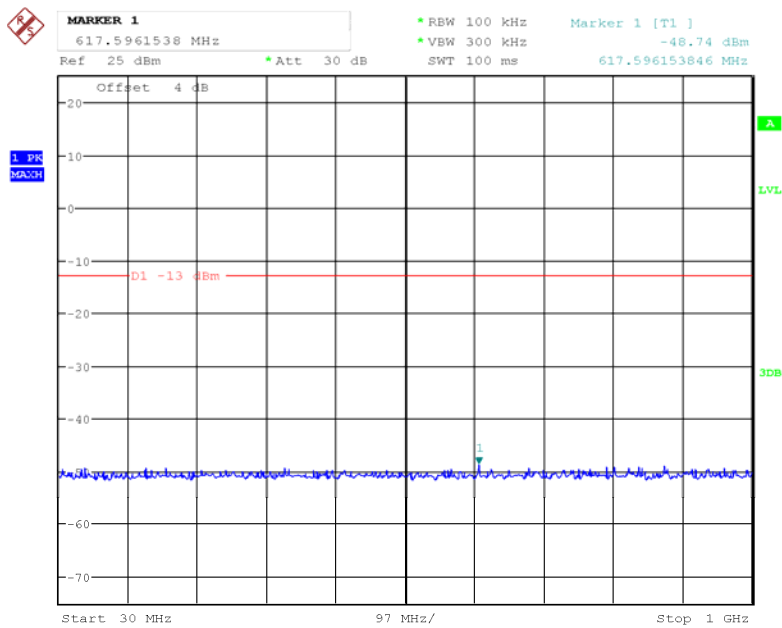
Date: 31.OCT.2017 15:46:50

Fundamental



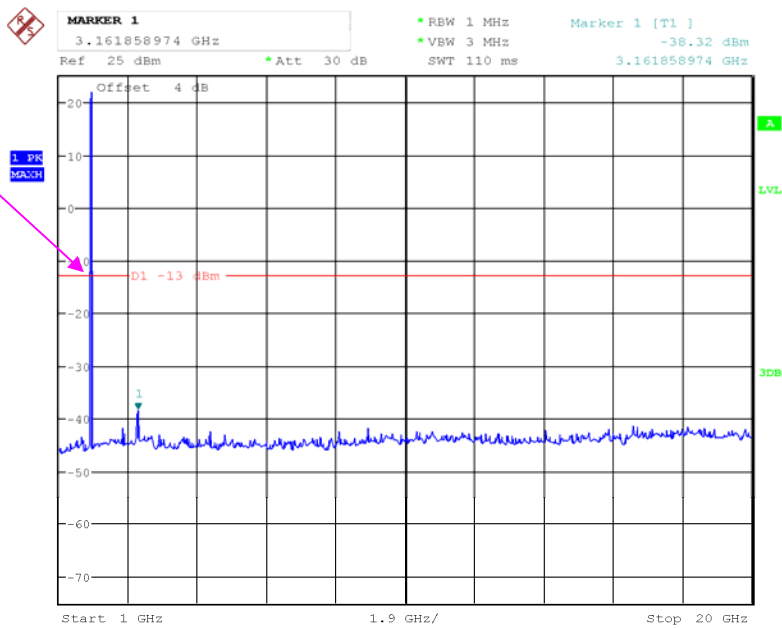
Date: 31.OCT.2017 15:46:35

QPSK_3 MHz



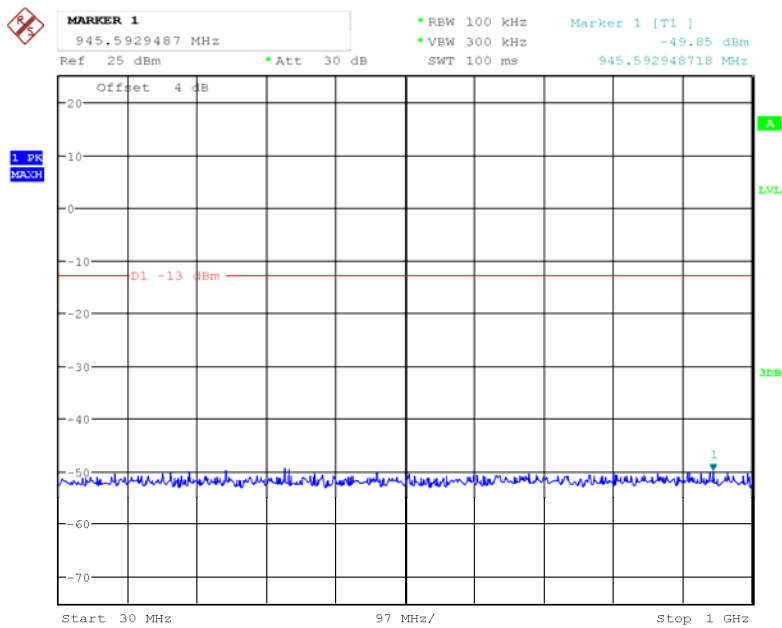
Date: 31.OCT.2017 15:45:30

Fundamental



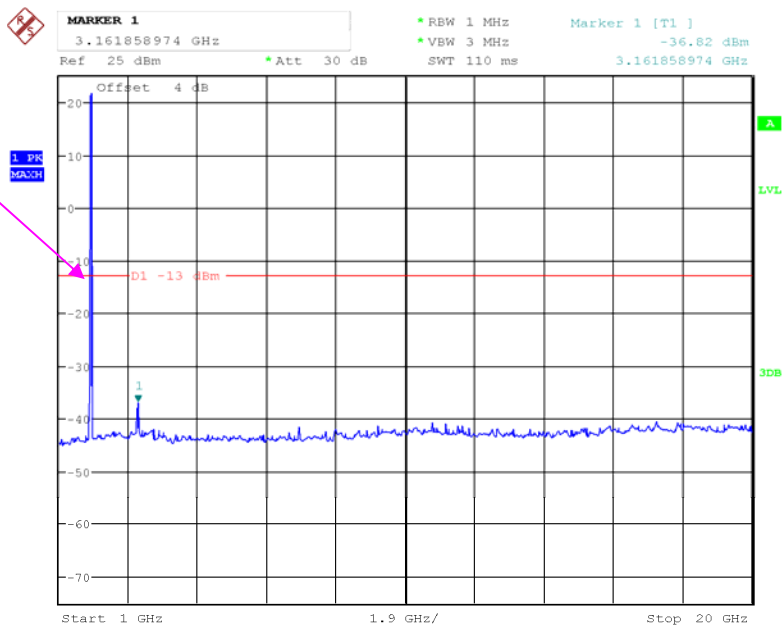
Date: 31.OCT.2017 15:45:45

QPSK_5 MHz



Date: 31.OCT.2017 15:44:10

Fundamental

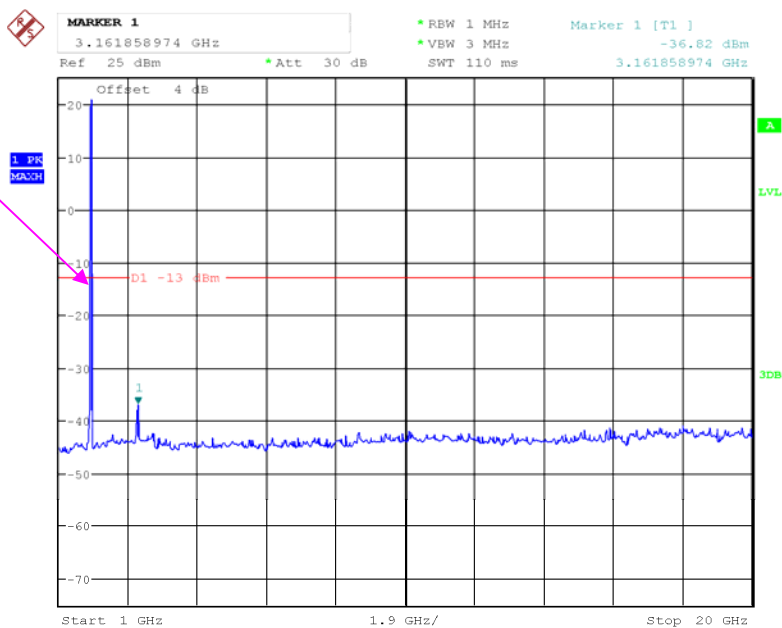


Date: 31.OCT.2017 15:42:56

The screenshot shows a Spectrum Analyzer interface with the following details:

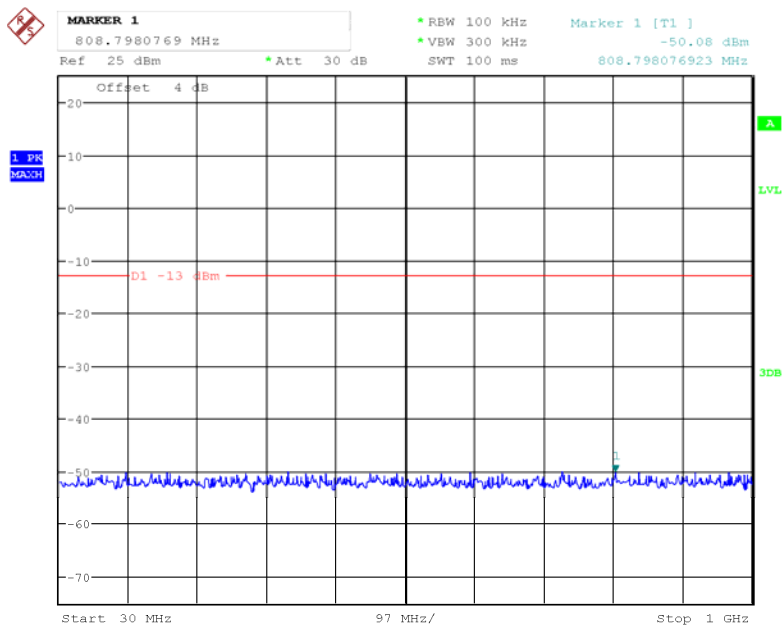
- Marker 1:** 575.625 MHz
- Ref:** 25 dBm
- Att:** 30 dB
- RBW:** 100 kHz
- VBW:** 300 kHz
- SWT:** 100 ms
- Marker 1 [T1]:** -47.93 dBm
- Frequency:** 575.62500000 MHz
- Offset:** 4 dB
- Trace:** A blue trace shows a signal level around -50 dBm. A red horizontal line is drawn at -13 dBm, labeled "D1 -13 dBm".
- Grid:** The grid is divided into 10 vertical and 10 horizontal sections.
- Buttons:** On the left, there are buttons for "1 PR" and "MAGN".
- Axis Labels:** The vertical axis is labeled "dBm" and ranges from -70 to 20. The horizontal axis is labeled "MHz" and ranges from 30 MHz to 1 GHz.

Fundamental



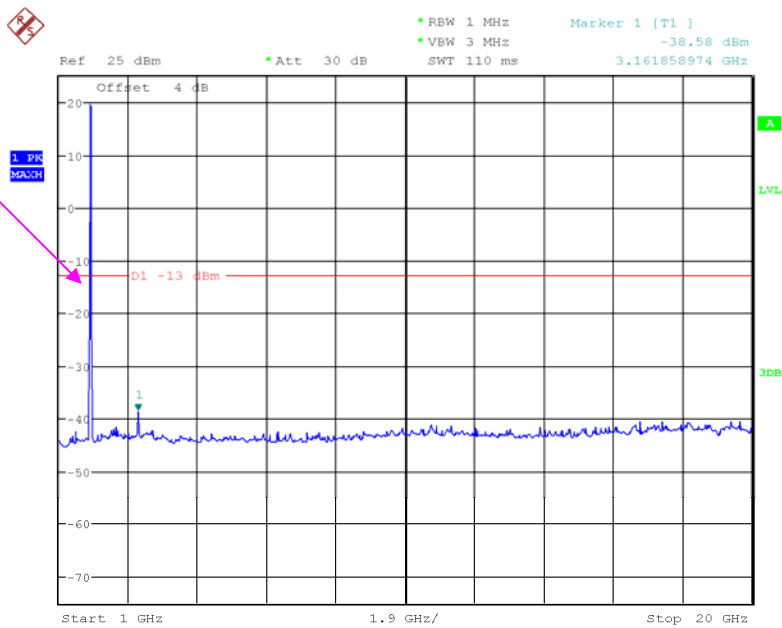
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QPSK_15 MHz



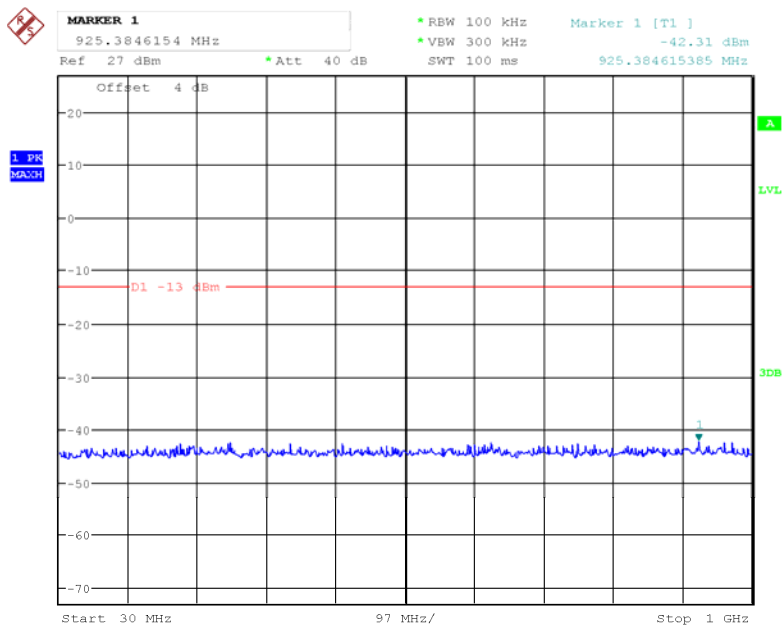
Date: 31.OCT.2017 15:39:38

Fundamental



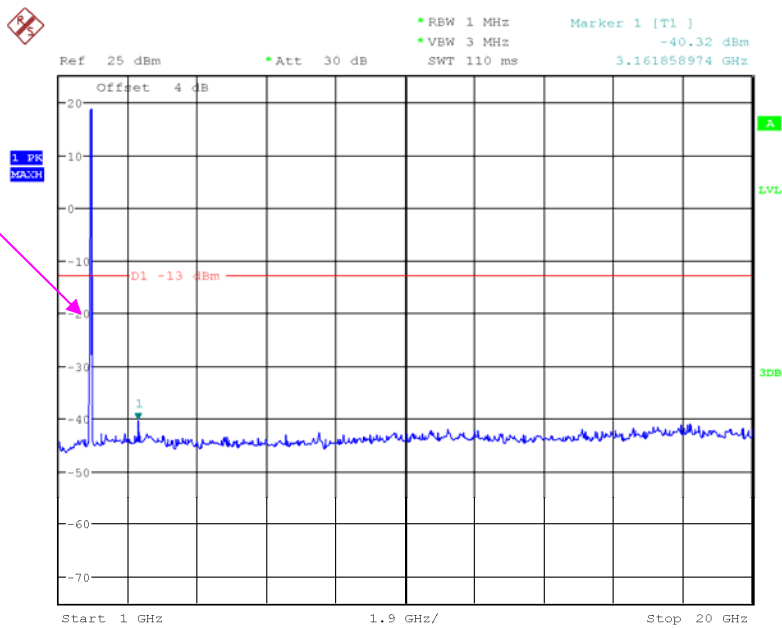
Date: 31.OCT.2017 15:39:18

QPSK_20 MHz



Date: 31.OCT.2017 15:34:18

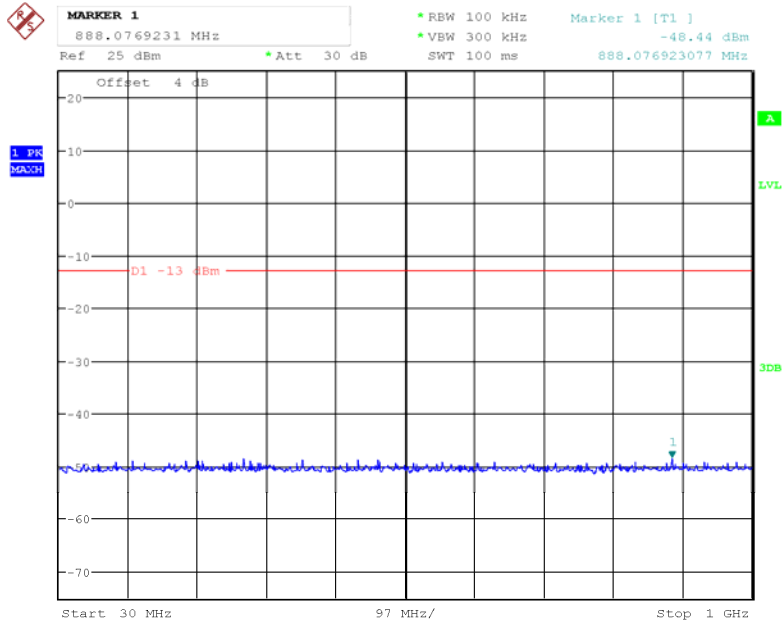
Fundamental



Date: 31.OCT.2017 15:38:27

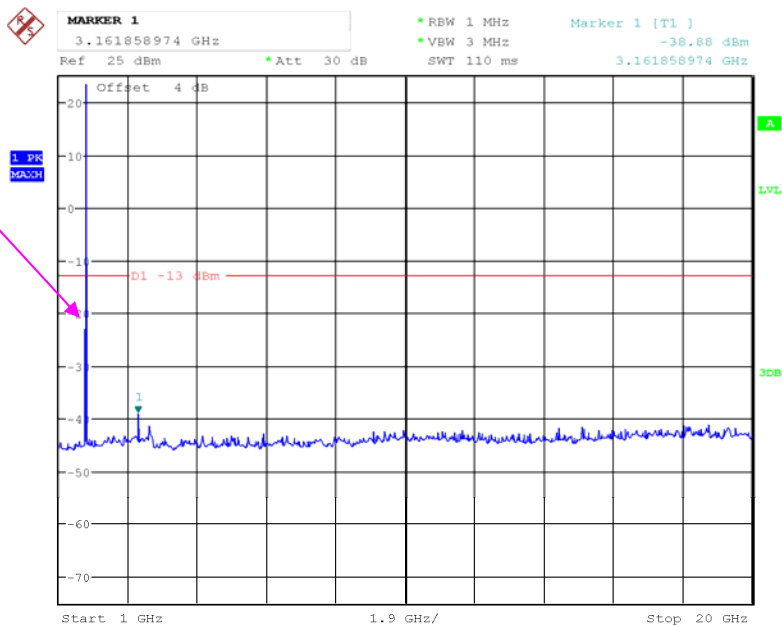
LTE Band 4 (Middle Channel)

QPSK_1.4 MHz



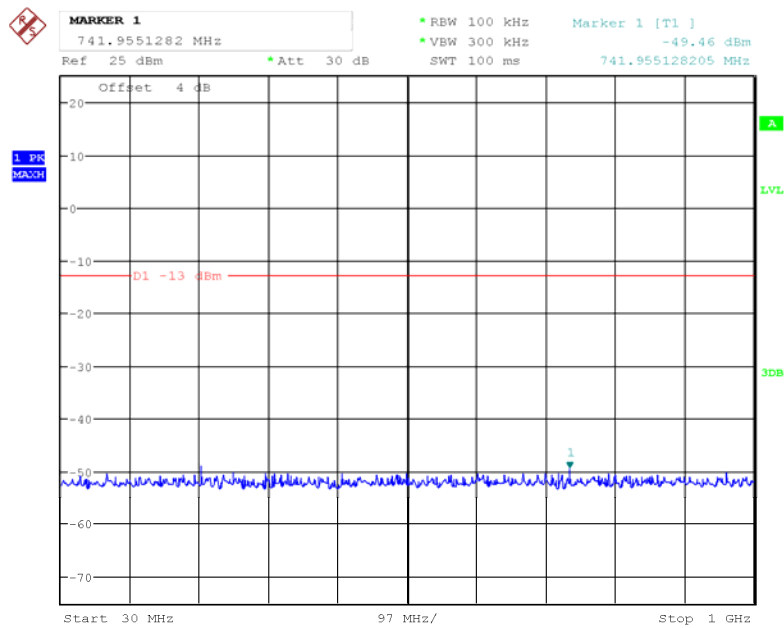
Date: 31.OCT.2017 15:50:17

Fundamental



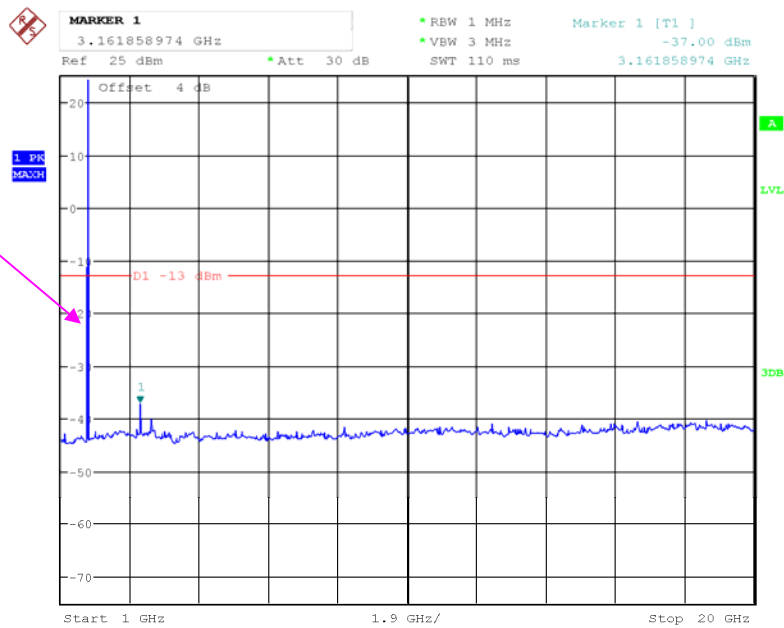
Date: 31.OCT.2017 15:50:55

QPSK_3 MHz



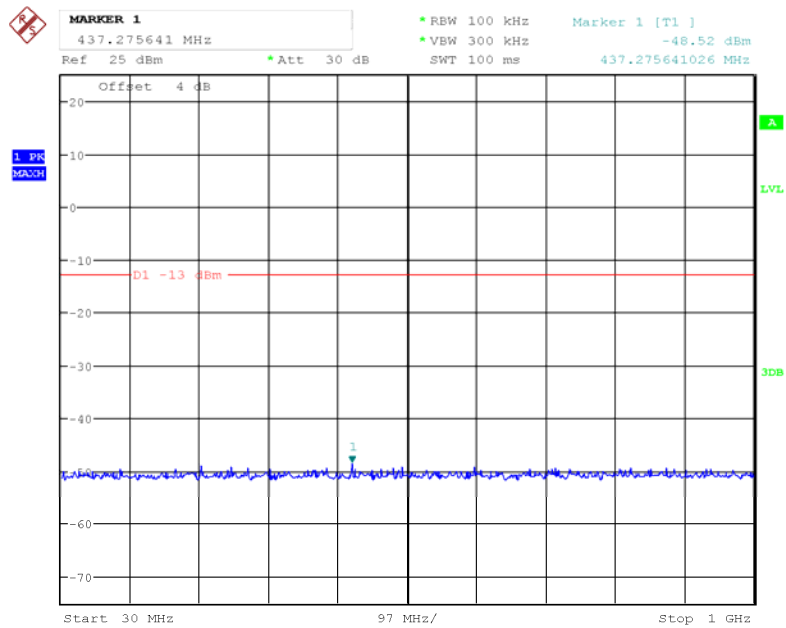
Date: 31.OCT.2017 15:53:52

Fundamental



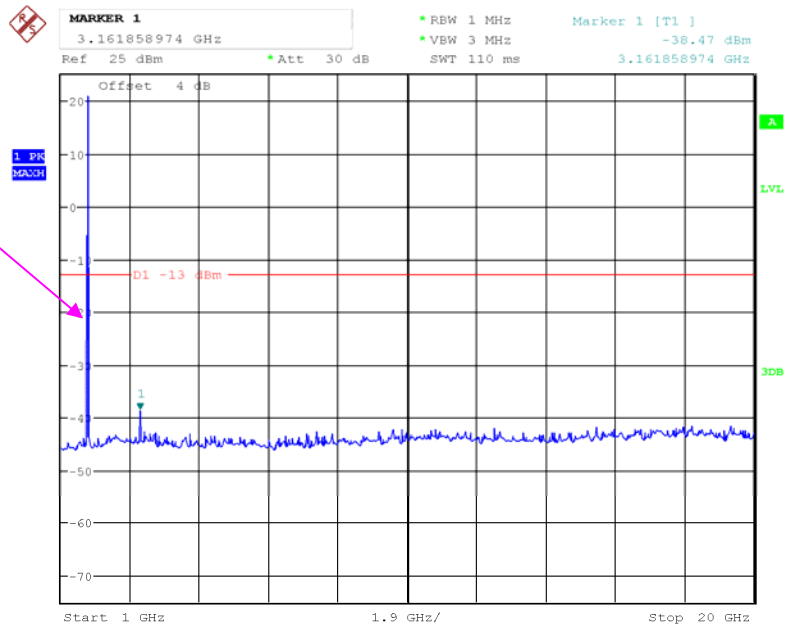
Date: 31.OCT.2017 15:53:34

QPSK_5 MHz



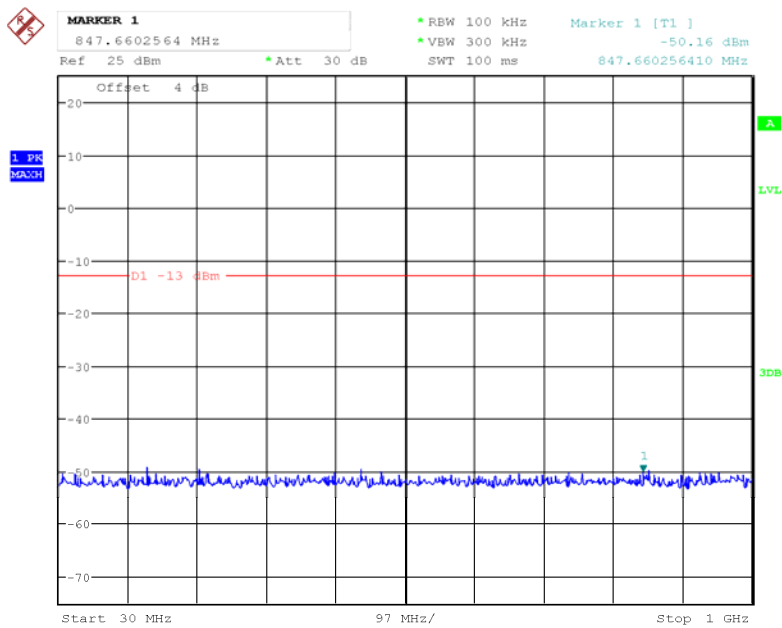
Date: 31.OCT.2017 15:55:12

Fundamental



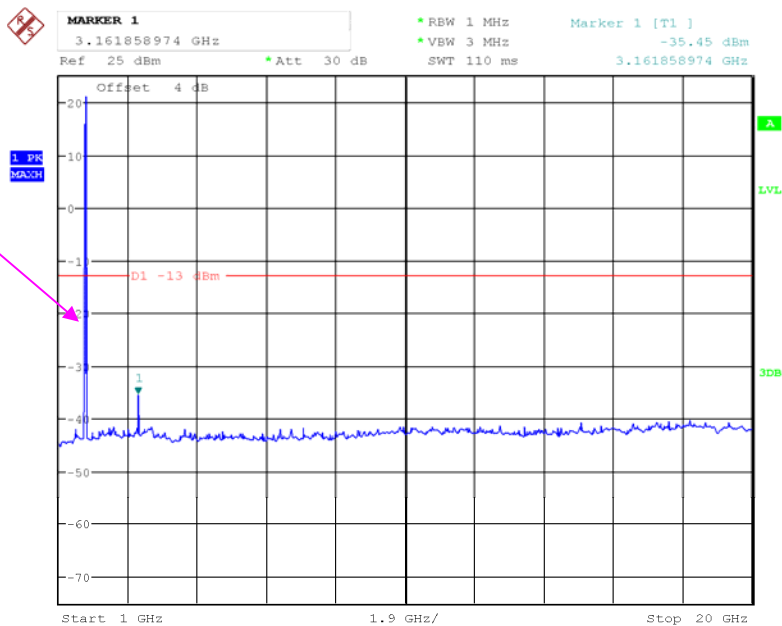
Date: 31.OCT.2017 15:55:26

QPSK_10 MHz



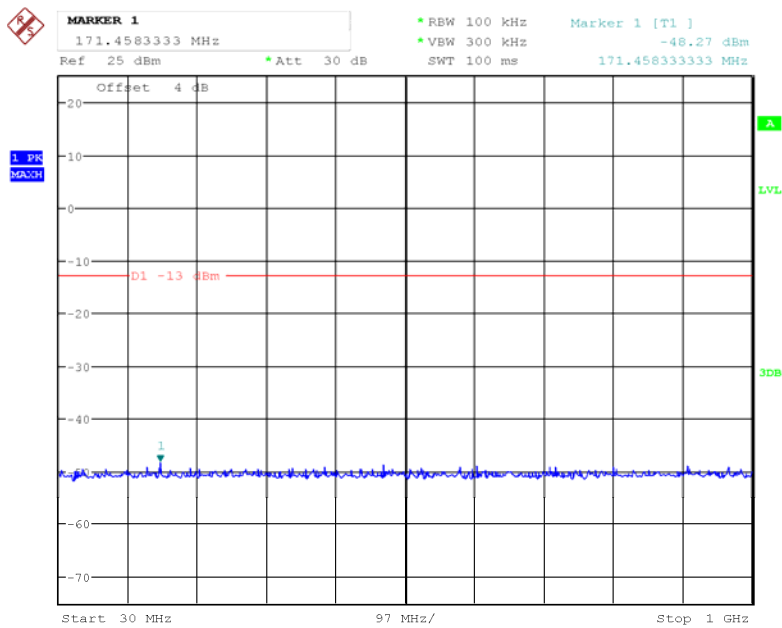
Date: 31.OCT.2017 15:58:26

Fundamental



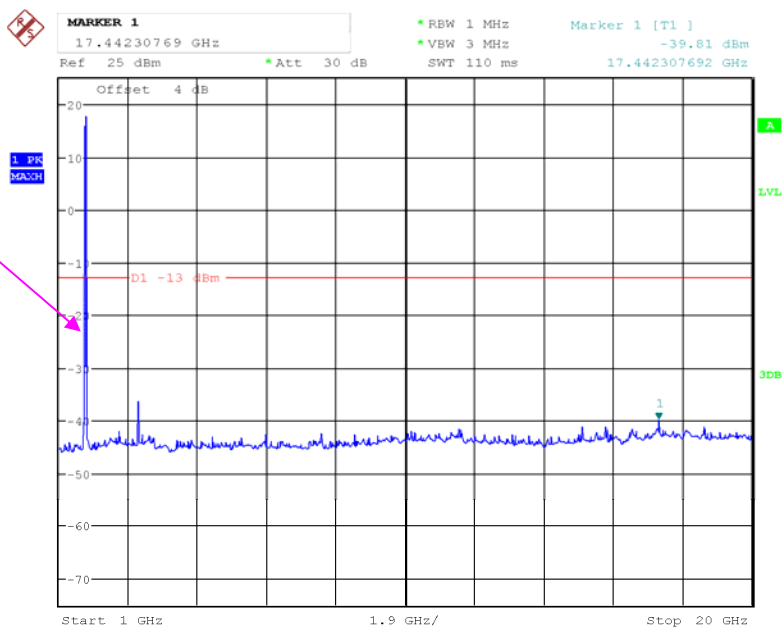
Date: 31.OCT.2017 15:58:06

QPSK_15 MHz



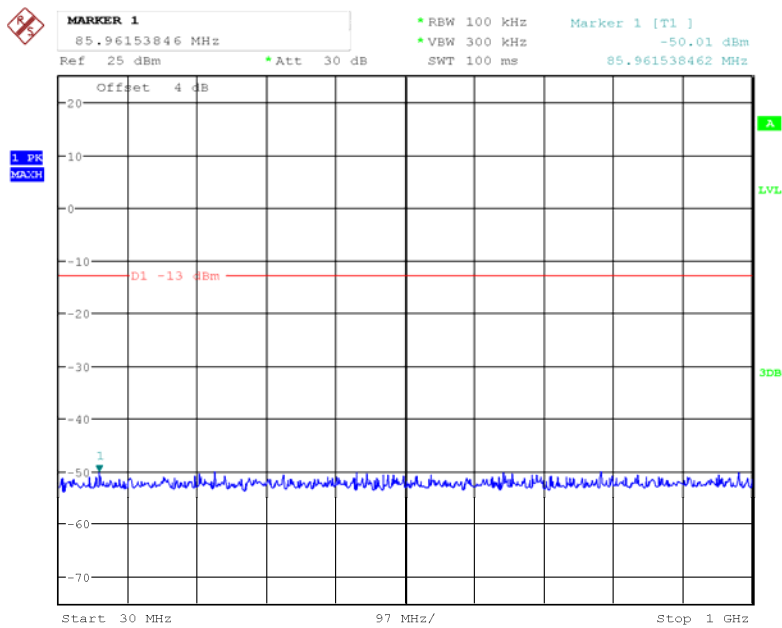
Date: 31.OCT.2017 16:00:17

Fundamental



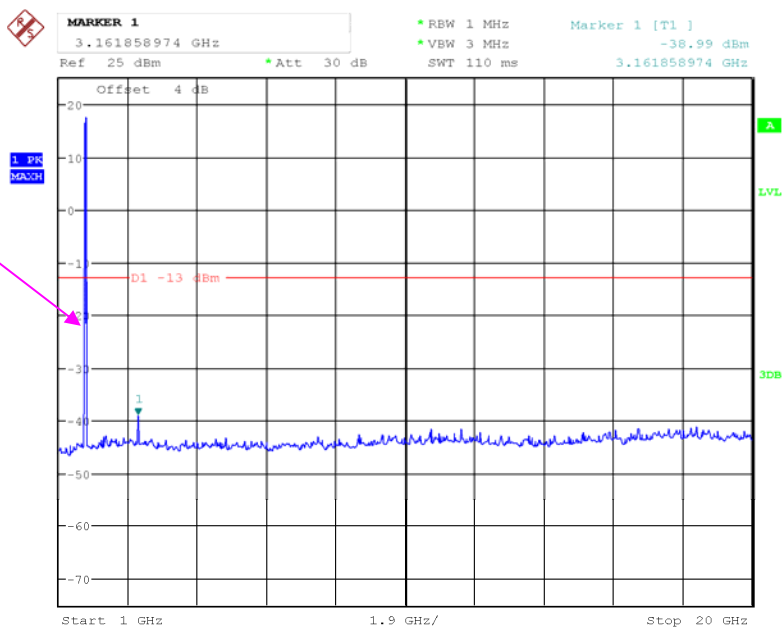
Date: 31.OCT.2017 16:00:33

QPSK_20 MHz



Date: 31.OCT.2017 16:01:34

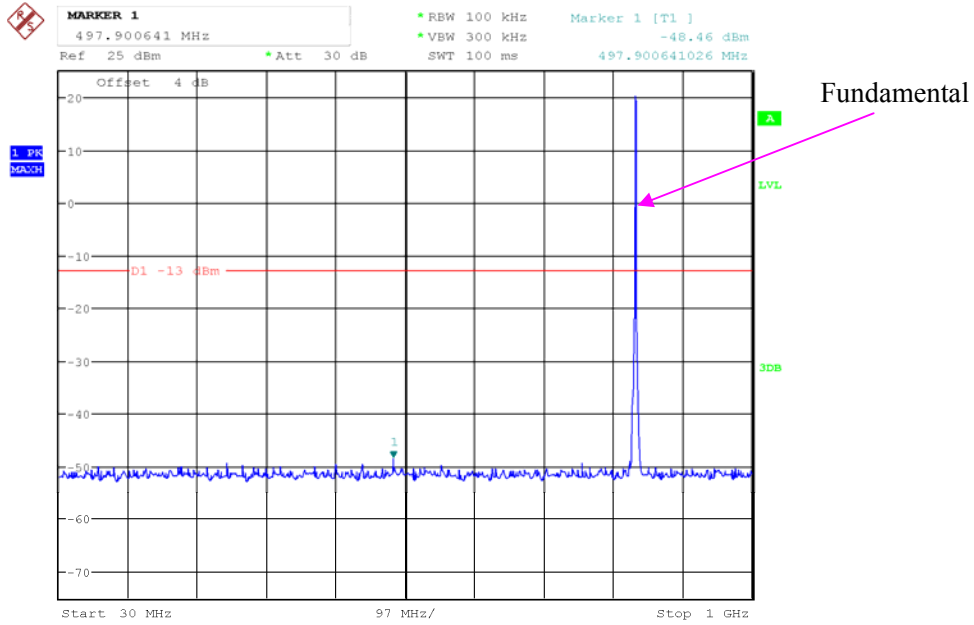
Fundamental



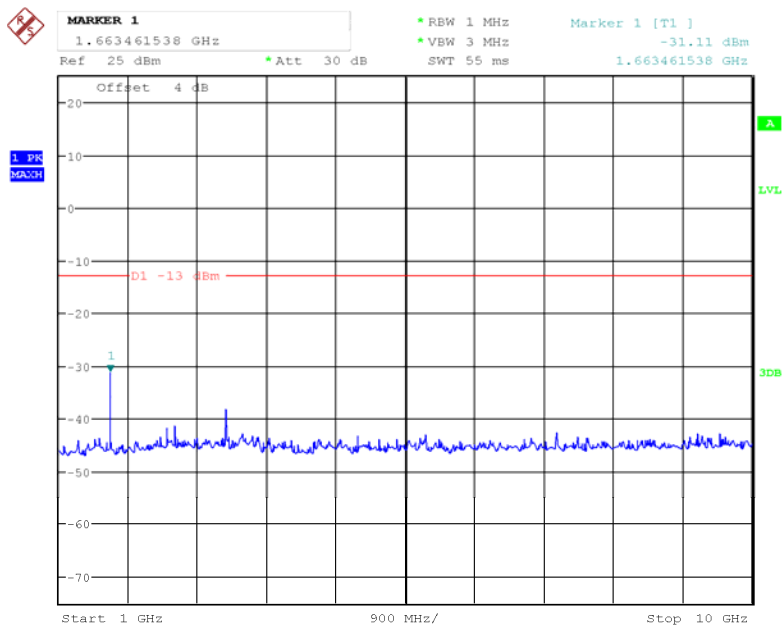
Date: 31.OCT.2017 16:01:19

LTE Band 5 (Middle Channel)

QPSK_1.4 MHz

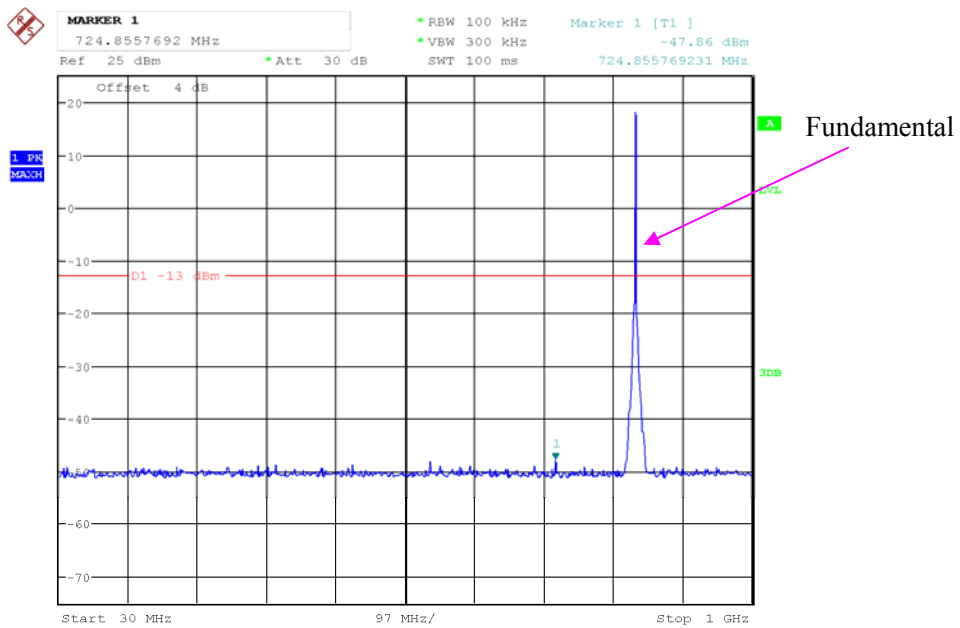


Date: 31.OCT.2017 16:03:30

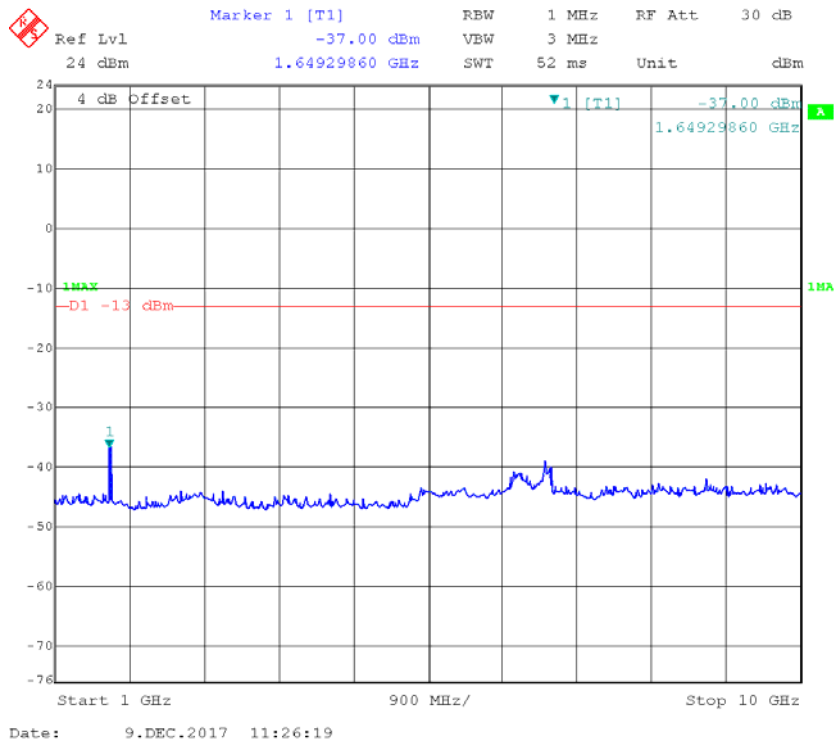


Date: 31.OCT.2017 16:03:55

QPSK_3 MHz

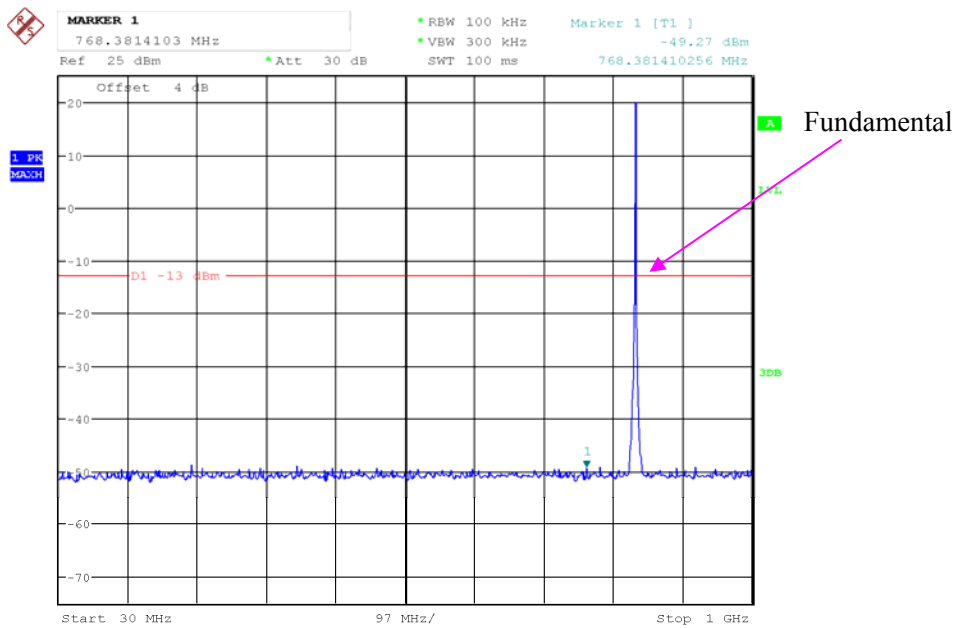


Date: 31.OCT.2017 16:08:04

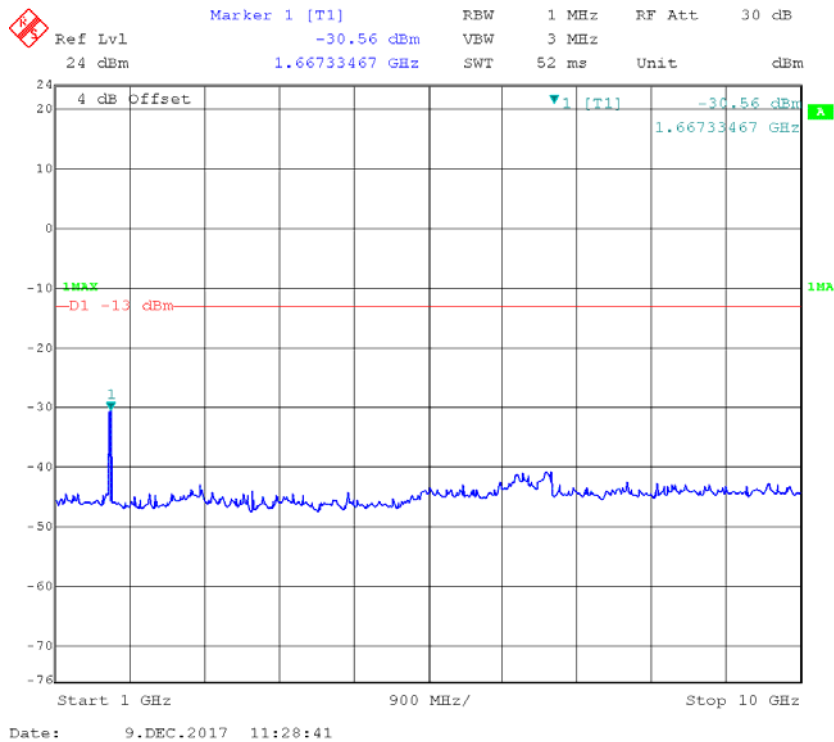


Date: 9.DEC.2017 11:26:19

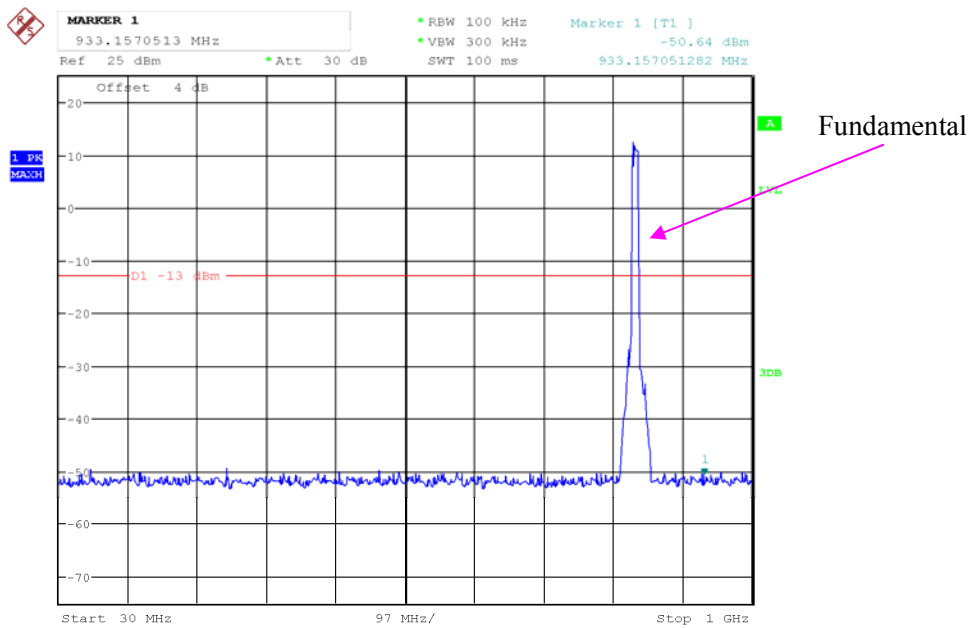
QPSK_5 MHz



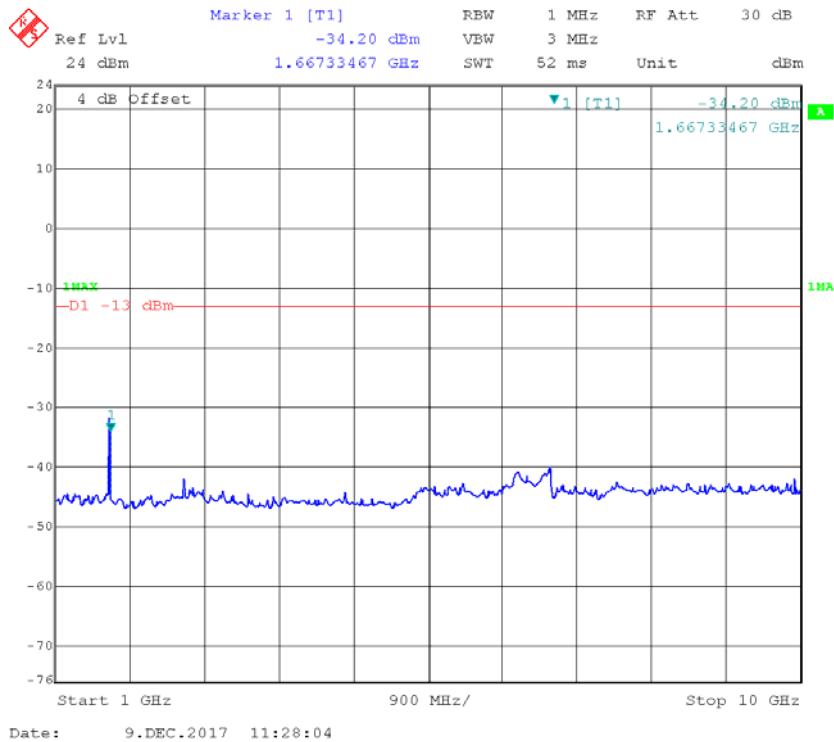
Date: 31.OCT.2017 16:12:07



QPSK_10 MHz



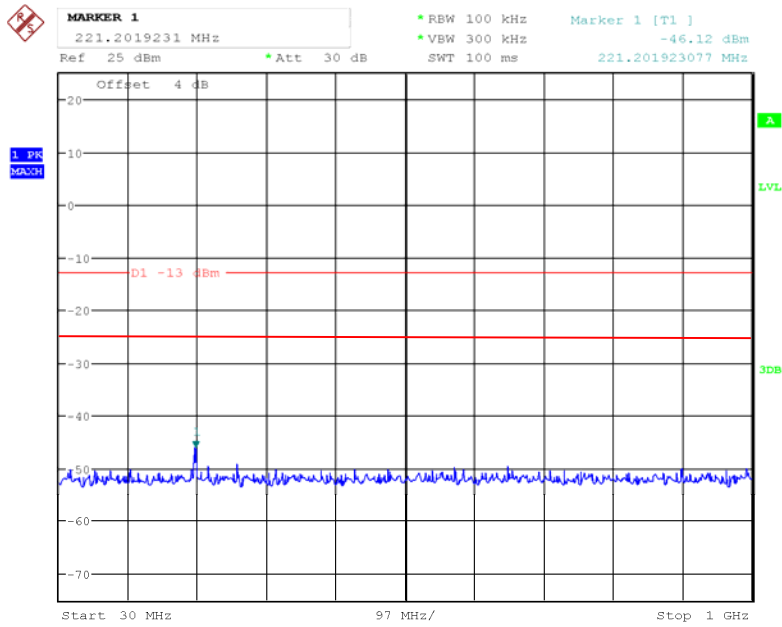
Date: 31.OCT.2017 16:17:52



Date: 9.DEC.2017 11:28:04

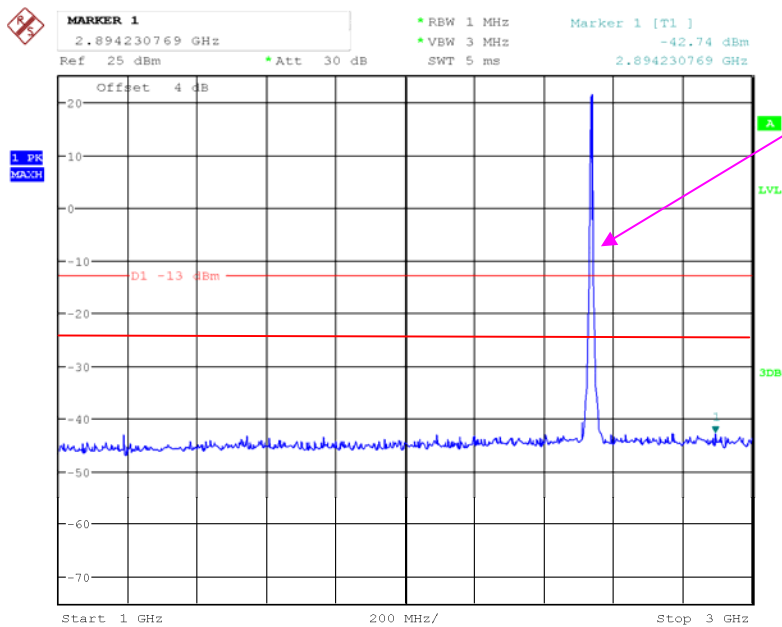
LTE Band 7 (Middle Channel, all emission under limit -25dBm)

QPSK_5 MHz

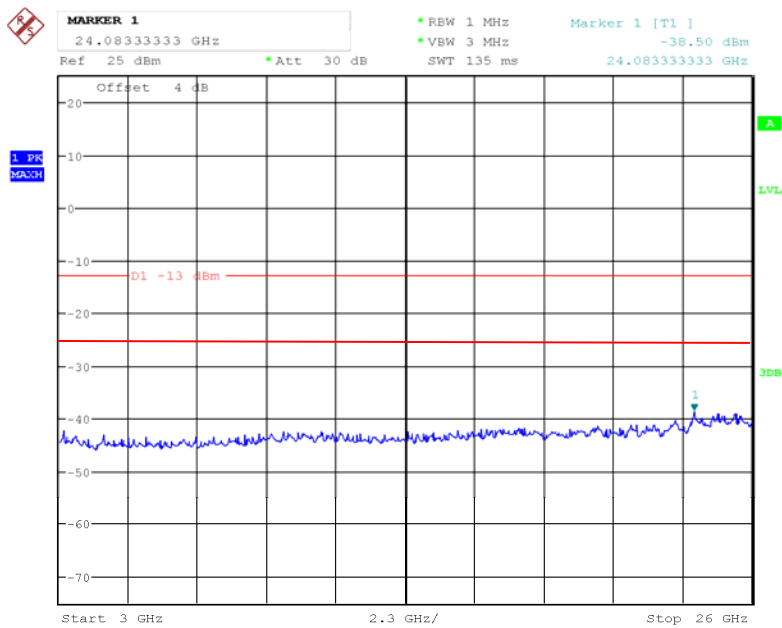


Date: 31.OCT.2017 16:21:59

Fundamental

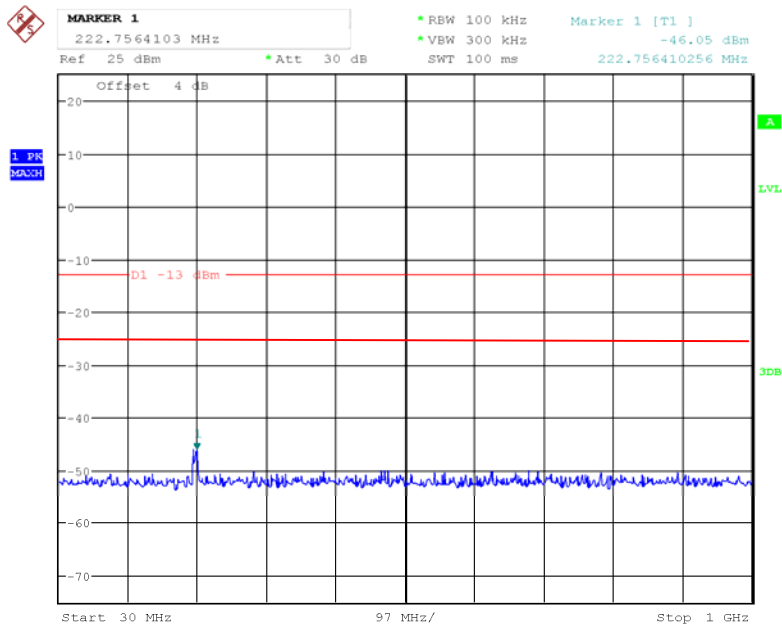


Date: 31.OCT.2017 16:21:18

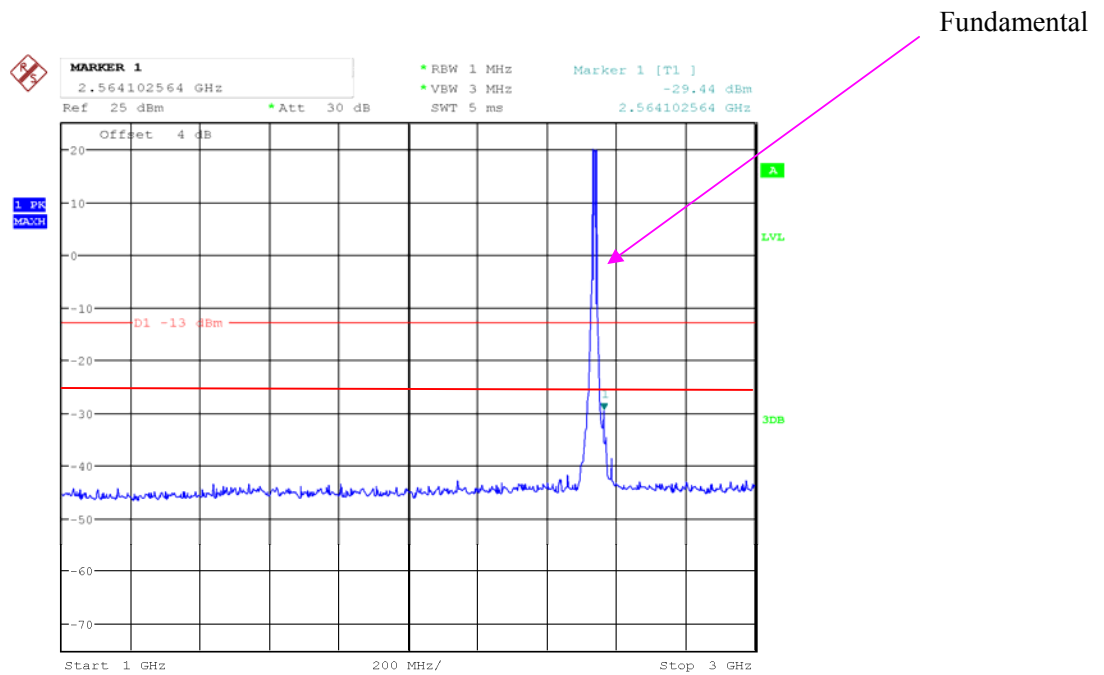


Date: 31.OCT.2017 16:21:40

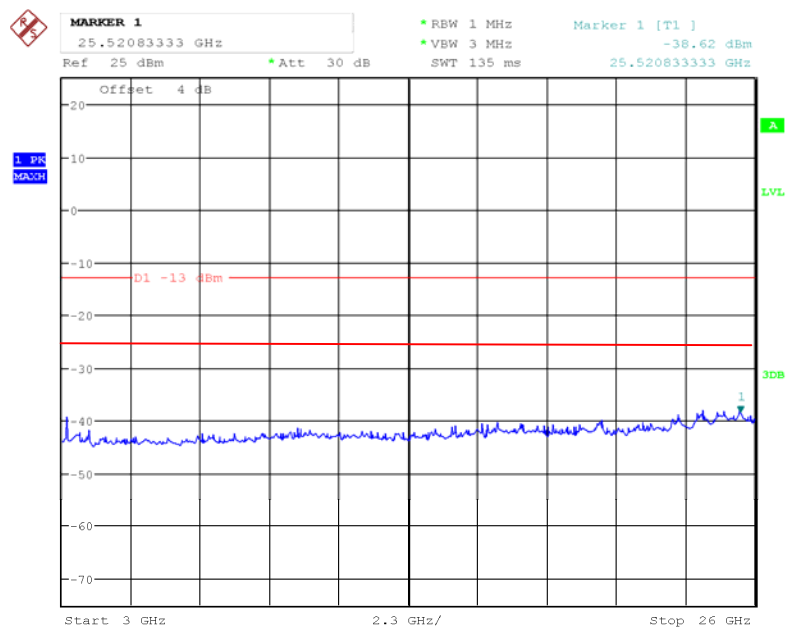
QPSK_10 MHz



Date: 31.OCT.2017 16:23:11

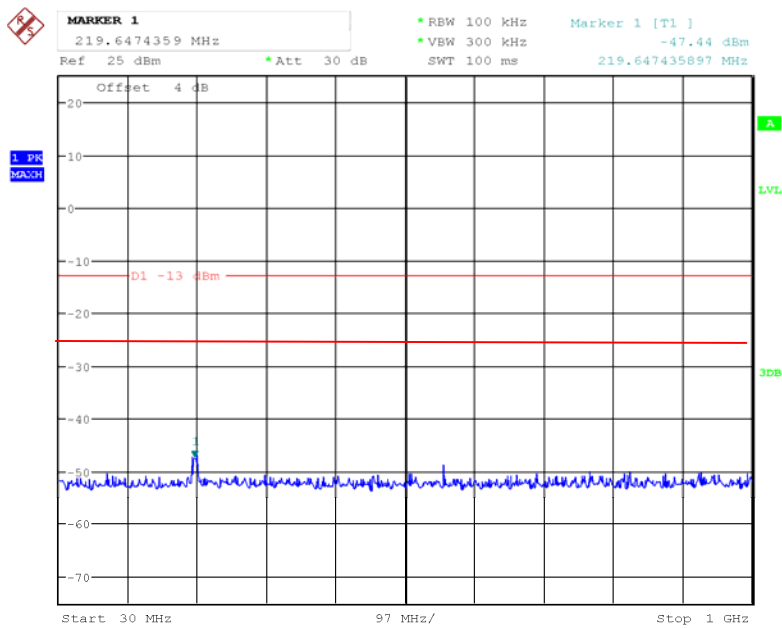


Date: 31.OCT.2017 16:23:37



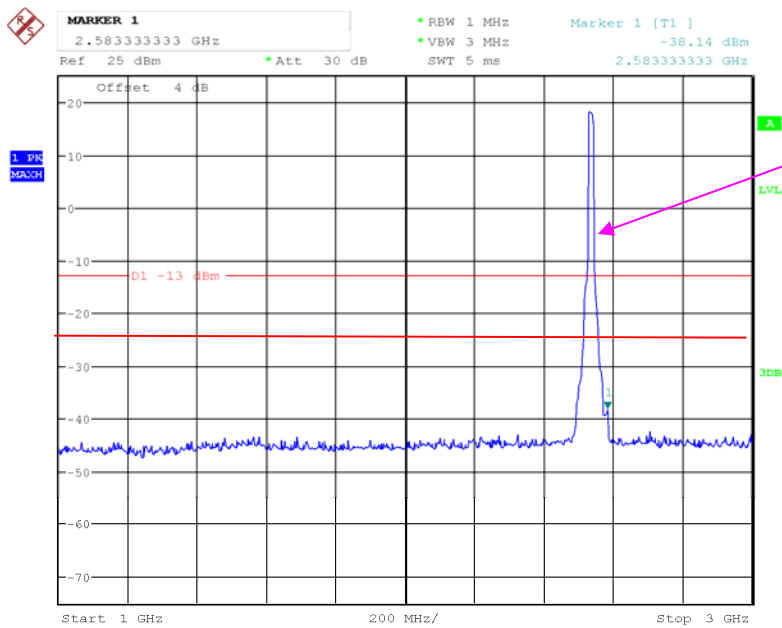
Date: 31.OCT.2017 16:24:32

QPSK_15 MHz

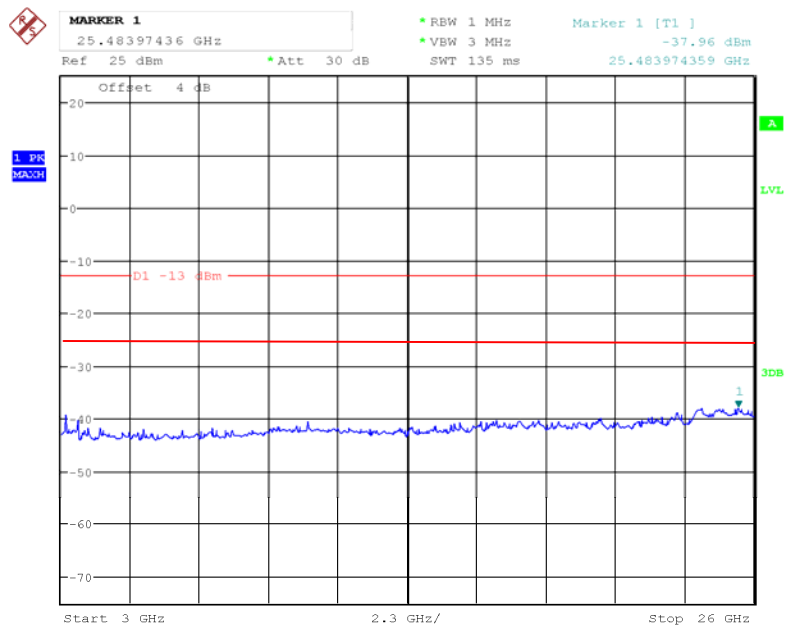


Date: 31.OCT.2017 16:28:20

Fundamental

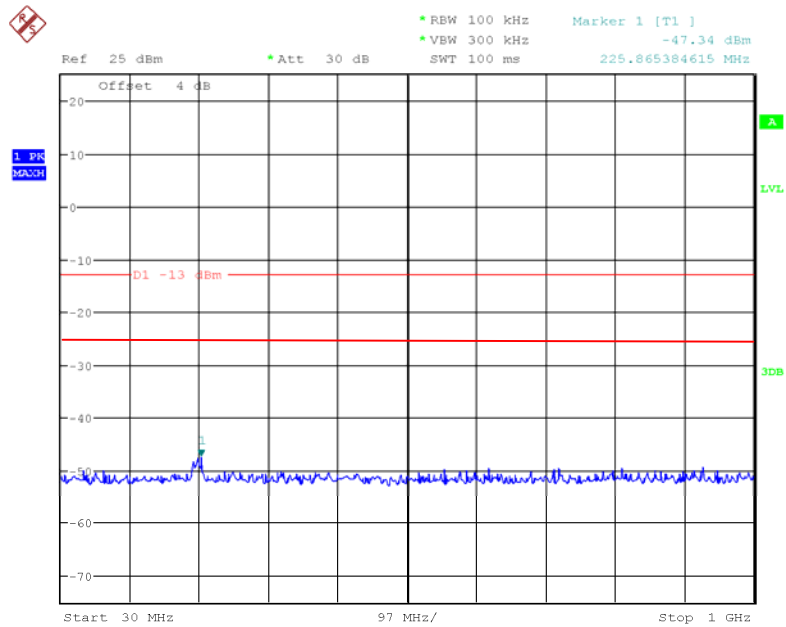


Date: 31.OCT.2017 16:28:04



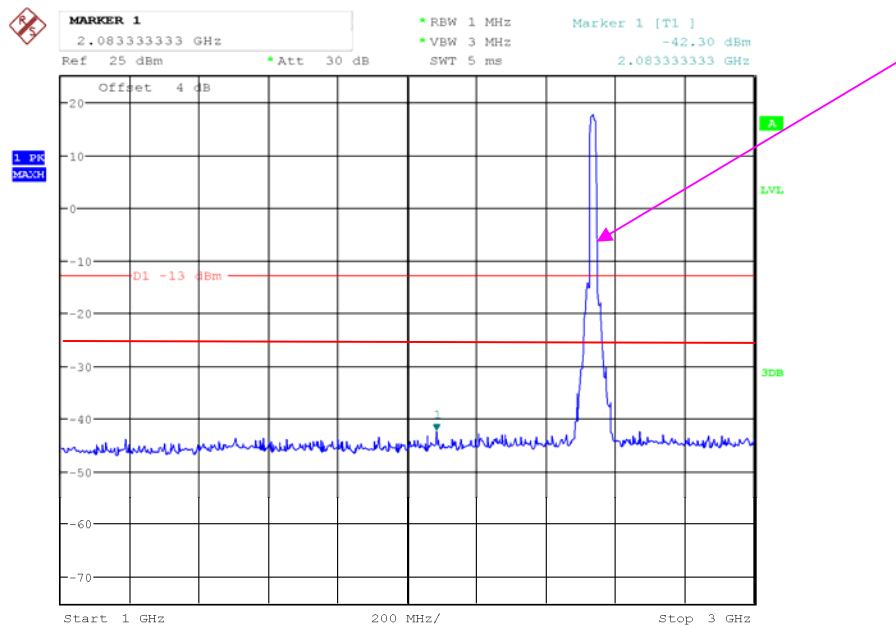
Date: 31.OCT.2017 16:27:47

QPSK_20 MHz

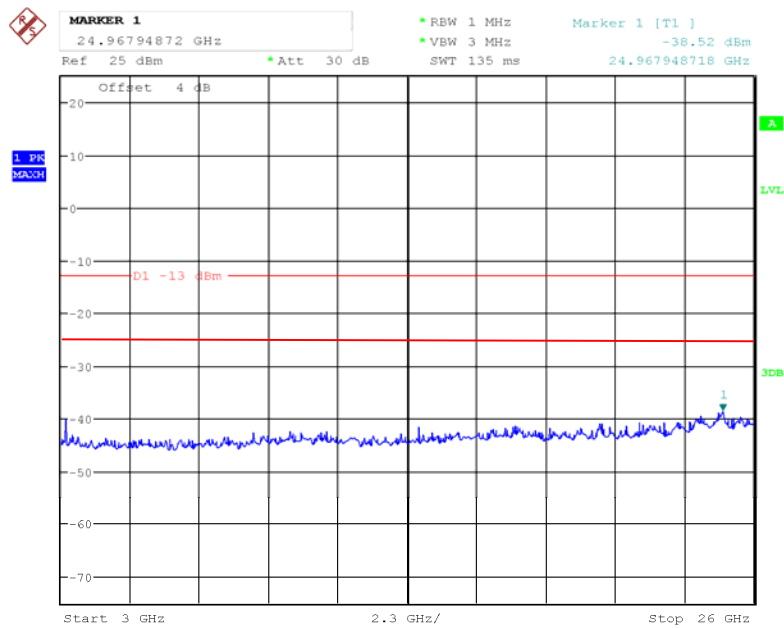


Date: 31.OCT.2017 16:36:11

Fundamental



Date: 31.OCT.2017 16:36:30



Date: 31.OCT.2017 16:36:40

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

Applicable Standard

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

Test Procedure

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

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

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

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

Spurious emissions in dB = $10 \lg(\text{TXpwr in Watts}/0.001)$ – 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	2017-11-06	2020-11-05
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:	27.5°C
Relative Humidity:	28.6 %
ATM Pressure:	101.1 kPa

* The testing was performed by Blake Yang on 2017-11-29.

EUT Operation Mode: Transmitting

Cellular Band (PART 22H)**30 MHz-10 GHz:**

50 MHz To 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								
543.000	H	44.86	-58.5	0.0	0.7	-59.2	-13.0	46.2
543.000	V	45.67	-60.8	0.0	0.7	-61.5	-13.0	48.5
1673.200	H	52.26	-62	10.6	0.7	-52.1	-13.0	39.1
1673.200	V	54.12	-60.7	10.6	0.7	-50.8	-13.0	37.8
2509.800	H	62.14	-50.9	13.1	1.2	-39.0	-13.0	26.0
2509.800	V	60.31	-52.7	13.1	1.2	-40.8	-13.0	27.8
3346.400	H	49.31	-61.4	13.8	1.6	-49.2	-13.0	36.2
3346.400	V	48.16	-62.5	13.8	1.6	-50.3	-13.0	37.3
1234.000	H	48.69	-64.3	7.7	1.1	-57.7	-13.0	44.7
1234.000	V	62.62	-51.4	7.7	1.1	-44.8	-13.0	31.8
WCDMA Band V R99,Frequency:836.600 MHz								
473.000	H	46.52	-57.9	0.0	0.7	-58.6	-13.0	45.6
473.000	V	47.16	-60.3	0.0	0.7	-61.0	-13.0	48.0
1673.200	H	44.26	-70	10.6	0.7	-60.1	-13.0	47.1
1673.200	V	45.31	-69.5	10.6	0.7	-59.6	-13.0	46.6
2509.800	H	60.41	-52.6	13.1	1.2	-40.7	-13.0	27.7
2509.800	V	58.37	-54.7	13.1	1.2	-42.8	-13.0	29.8
3346.400	H	44.39	-66.3	13.8	1.6	-54.1	-13.0	41.1
3346.400	V	44.61	-66.1	13.8	1.6	-53.9	-13.0	40.9
2094.000	H	45.97	-67	11.4	1.1	-56.7	-13.0	43.7
2094.000	V	46.99	-66	11.4	1.1	-55.7	-13.0	42.7

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

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
298.000	H	45.61	-63.1	0.0	0.5	-63.6	-13.0	50.6
298.000	V	47.04	-63	0.0	0.5	-63.5	-13.0	50.5
3760.000	H	52.14	-56.7	13.8	1.6	-44.5	-13.0	31.5
3760.000	V	53.26	-55.4	13.8	1.6	-43.2	-13.0	30.2
5640.000	H	58.36	-47.7	14.0	1.3	-35.0	-13.0	22.0
5640.000	V	54.49	-51.4	14.0	1.3	-38.7	-13.0	25.7
4566.000	H	47.21	-61.3	14.2	1.7	-48.8	-13.0	35.8
4566.000	V	47.29	-61.3	14.2	1.7	-48.8	-13.0	35.8
WCDMA Band II, R99, Frequency:1880.000 MHz								
417.000	H	44.83	-59.9	0.0	0.6	-60.5	-13.0	47.5
417.000	V	45.64	-62.4	0.0	0.6	-63.0	-13.0	50.0
3760.000	H	54.31	-54.5	13.8	1.6	-42.3	-13.0	29.3
3760.000	V	52.37	-56.3	13.8	1.6	-44.1	-13.0	31.1
5640.000	H	52.19	-53.8	14.0	1.3	-41.1	-13.0	28.1
5640.000	V	49.26	-56.7	14.0	1.3	-44.0	-13.0	31.0
7520.000	H	62.22	-38.1	13.2	1.3	-26.2	-13.0	13.2
7520.000	V	59.14	-41.7	13.2	1.3	-29.8	-13.0	16.8
5813.000	H	53.17	-52.8	14.1	1.3	-40.0	-13.0	27.0
5813.000	V	52.32	-53.7	14.1	1.3	-40.9	-13.0	27.9

LTE Band 2 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1880.000 MHz								
472.000	H	45.34	-59.1	0.0	0.7	-59.8	-13.0	46.8
472.000	V	46.68	-60.8	0.0	0.7	-61.5	-13.0	48.5
3760.000	H	61.89	-46.9	13.8	1.6	-34.7	-13.0	21.7
3760.000	V	59.73	-48.9	13.8	1.6	-36.7	-13.0	23.7
5640.000	H	59.64	-46.4	14.0	1.3	-33.7	-13.0	20.7
5640.000	V	57.33	-48.6	14.0	1.3	-35.9	-13.0	22.9
4236.000	H	45.98	-63	13.9	1.3	-50.4	-13.0	37.4
4236.000	V	45.45	-63.5	13.9	1.3	-50.9	-13.0	37.9

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 1732.500 MHz								
385.000	H	45.83	-59.6	0.0	0.6	-60.2	-13.0	47.2
385.000	V	46.27	-62.2	0.0	0.6	-62.8	-13.0	49.8
3465.000	H	62.79	-47.5	13.9	1.6	-35.2	-13.0	22.2
3465.000	V	60.49	-49.8	13.9	1.6	-37.5	-13.0	24.5
5197.500	H	59.74	-46.7	14.0	1.5	-34.2	-13.0	21.2
5197.500	V	57.19	-49.3	14.0	1.5	-36.8	-13.0	23.8
4155.000	H	45.84	-63.2	13.9	1.5	-50.8	-13.0	37.8
4155.000	V	45.49	-63.6	13.9	1.5	-51.2	-13.0	38.2

LTE Band 5 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 836.500 MHz								
482.000	H	45.27	-59.1	0.0	0.7	-59.8	-13.0	46.8
482.000	V	47.13	-60.3	0.0	0.7	-61.0	-13.0	48.0
1673.000	H	52.96	-61.3	10.6	0.7	-51.4	-13.0	38.4
1673.000	V	50.64	-64.2	10.6	0.7	-54.3	-13.0	41.3
2509.500	H	55.48	-57.5	13.1	1.2	-45.6	-13.0	32.6
2509.500	V	53.48	-59.6	13.1	1.2	-47.7	-13.0	34.7
3346.000	H	51.62	-59	13.8	1.6	-46.8	-13.0	33.8
3346.000	V	49.33	-61.4	13.8	1.6	-49.2	-13.0	36.2
2144.000	H	45.43	-67.3	11.1	1.1	-57.3	-13.0	44.3
2144.000	V	45.48	-67.2	11.1	1.1	-57.2	-13.0	44.2

LTE Band 7 (30MHz-26GHz)

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:2535.000 MHz								
501.000	H	45.17	-59	0.0	0.7	-59.7	-25	34.7
501.000	V	46.23	-61	0.0	0.7	-61.7	-25	36.7
5070.000	H	62.07	-44.7	13.9	1.3	-32.1	-25	7.1
5070.000	V	59.55	-47.1	13.9	1.3	-34.5	-25	9.5
7605.000	H	59.71	-40.6	13.2	1.4	-28.8	-25	3.8
7605.000	V	57.18	-43.6	13.2	1.4	-31.8	-25	6.8
4655.000	H	46.12	-62.4	14.3	1.8	-49.9	-25	24.9
4655.000	V	45.46	-63.1	14.3	1.8	-50.6	-25	25.6

Note:

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

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

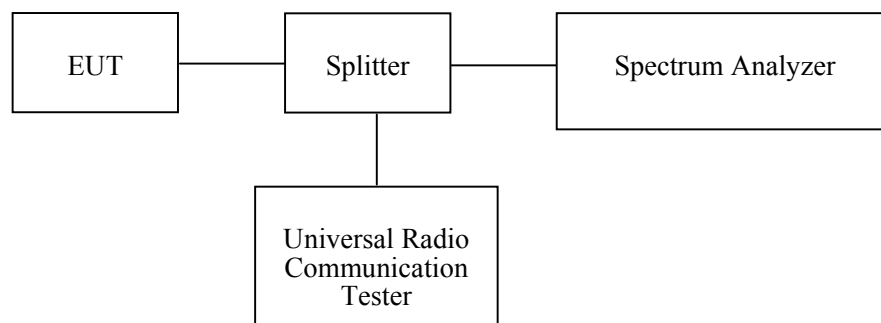
Applicable Standard

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 Splitter	ODP-1-6-2S	OE0120142	Each Time	/
R&S	Spectrum Analyzer	FSU 26	200256	2016-12-08	2017-12-08
R&S	Spectrum Analyzer	FSU 26	200256	2017-12-08	2018-12-08

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

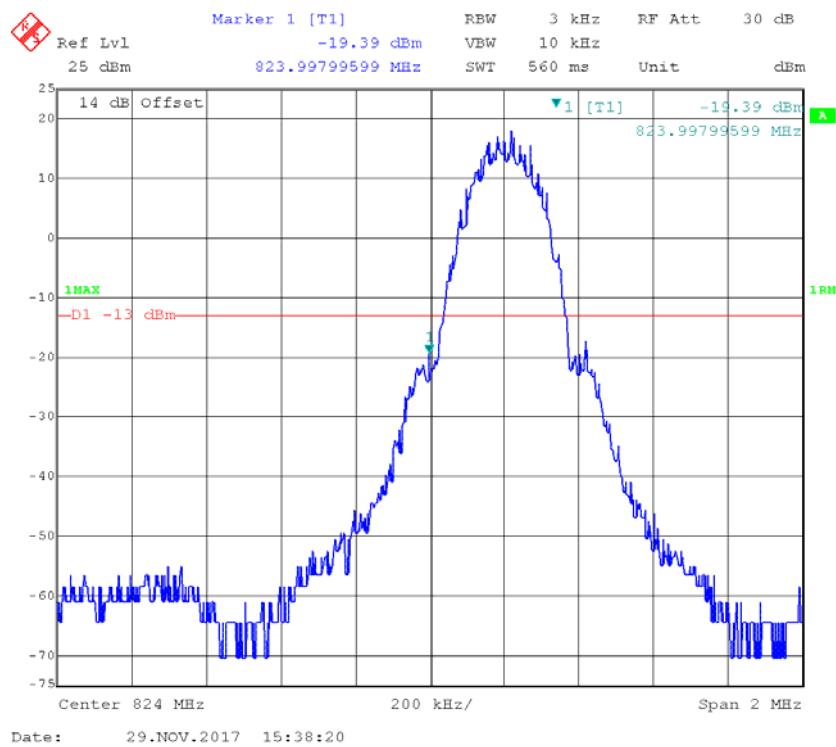
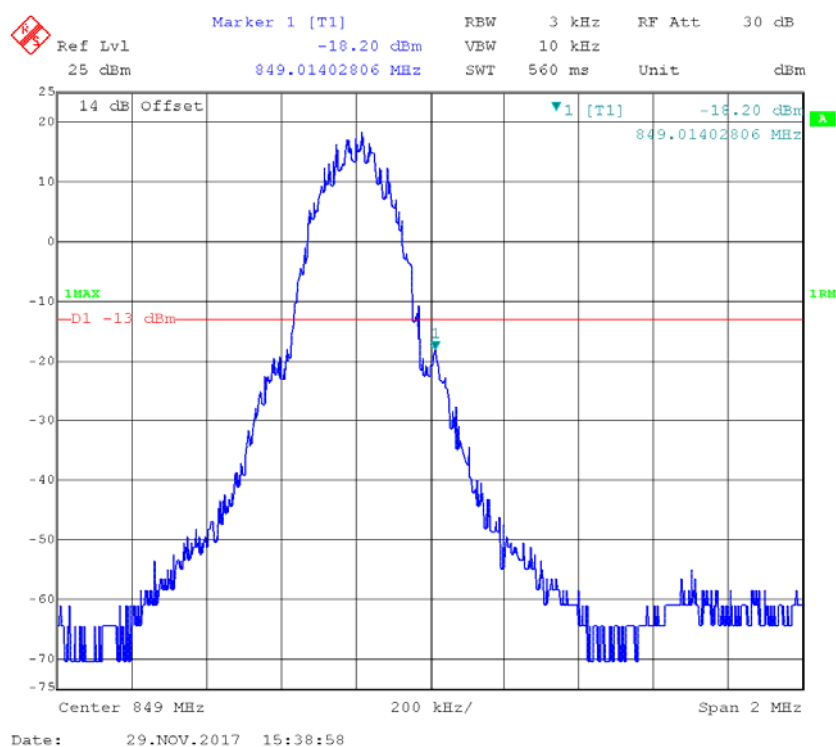
Test Data**Environmental Conditions**

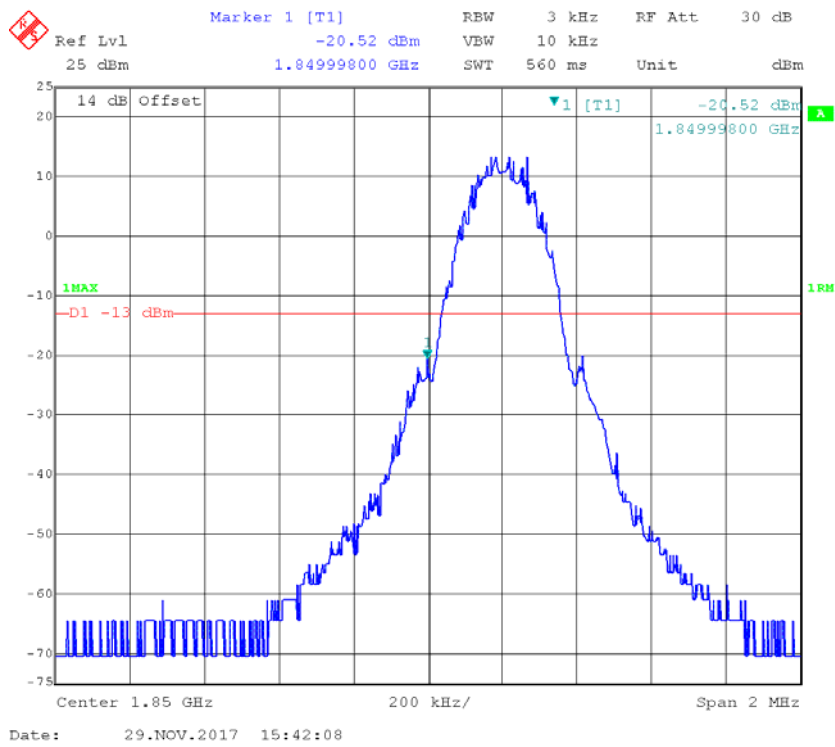
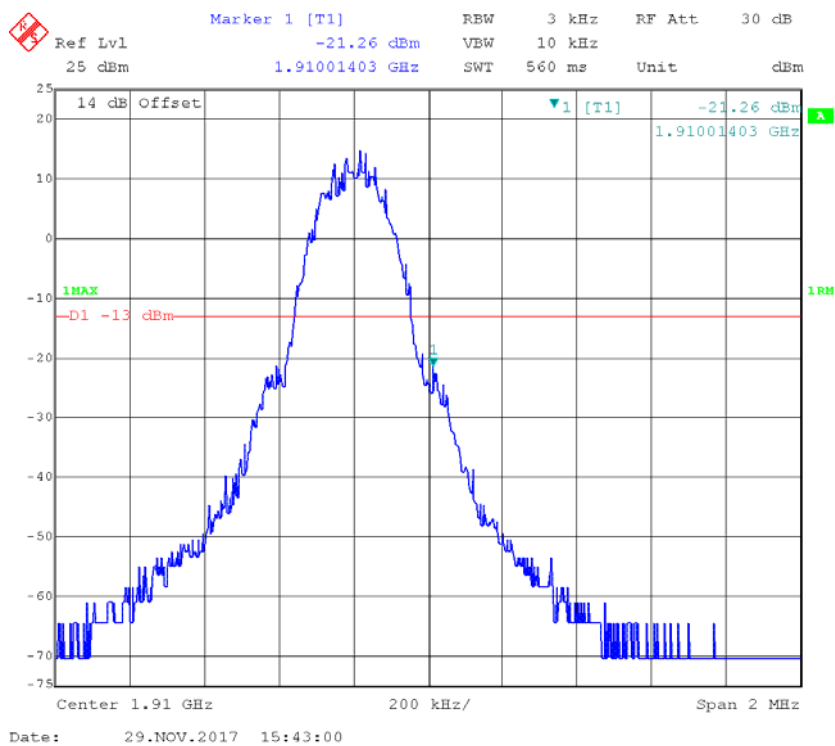
Temperature:	24.5 ~27.5°C
Relative Humidity:	39~64 %
ATM Pressure:	100.8~102.1 kPa

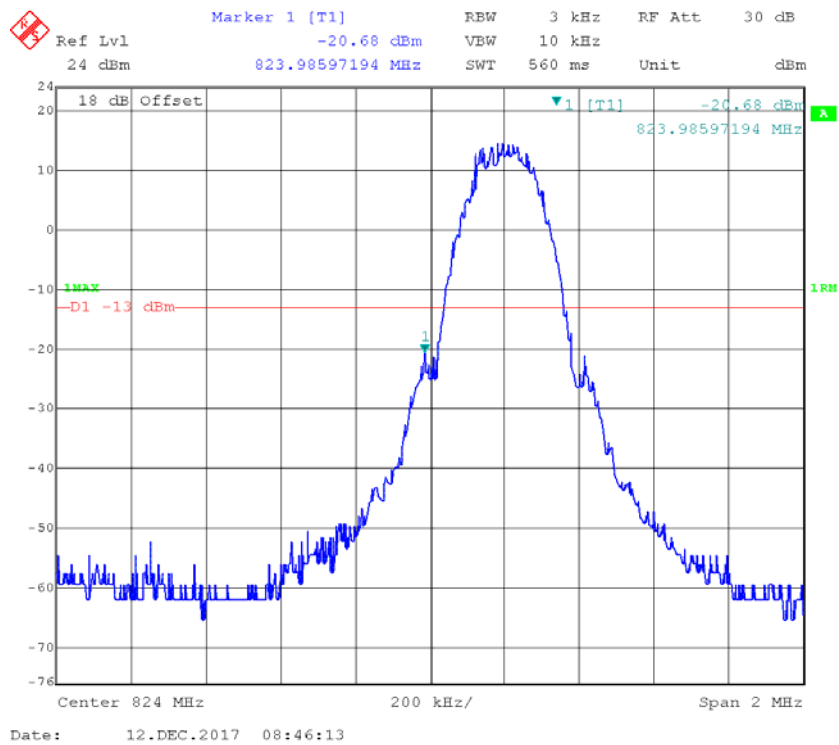
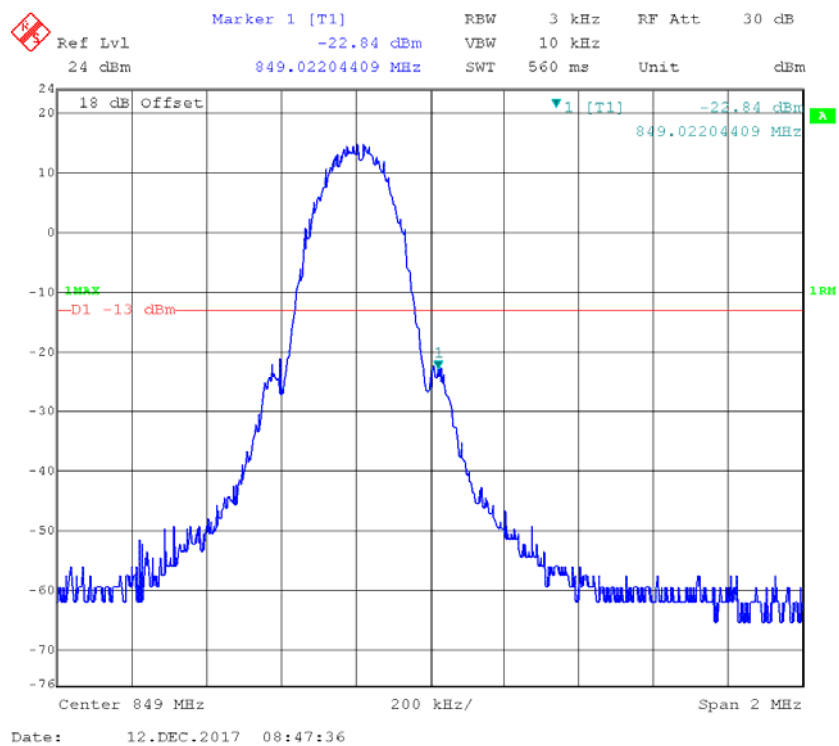
The testing was performed by Kami Zhou from 2017-10-31 to 2017-12-12.

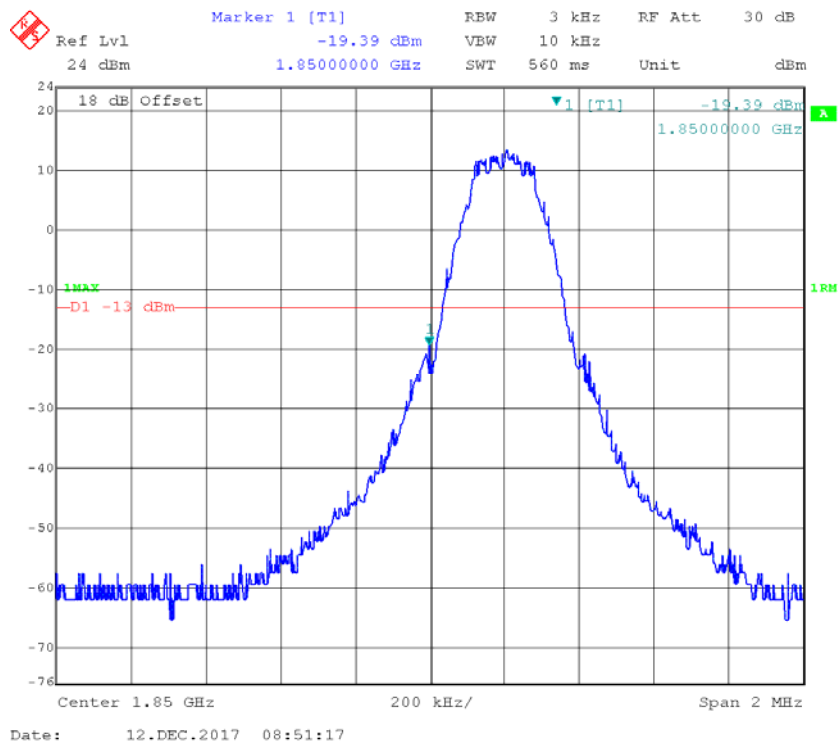
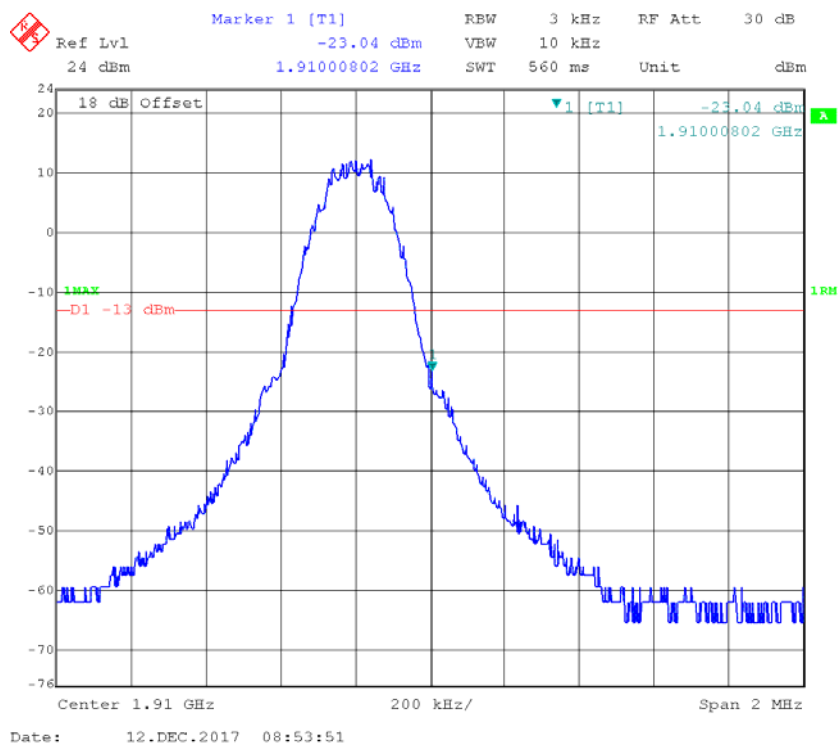
Test Mode: Transmitting

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

GSM 850, Left Band Edge**GSM 850, Right Band Edge**

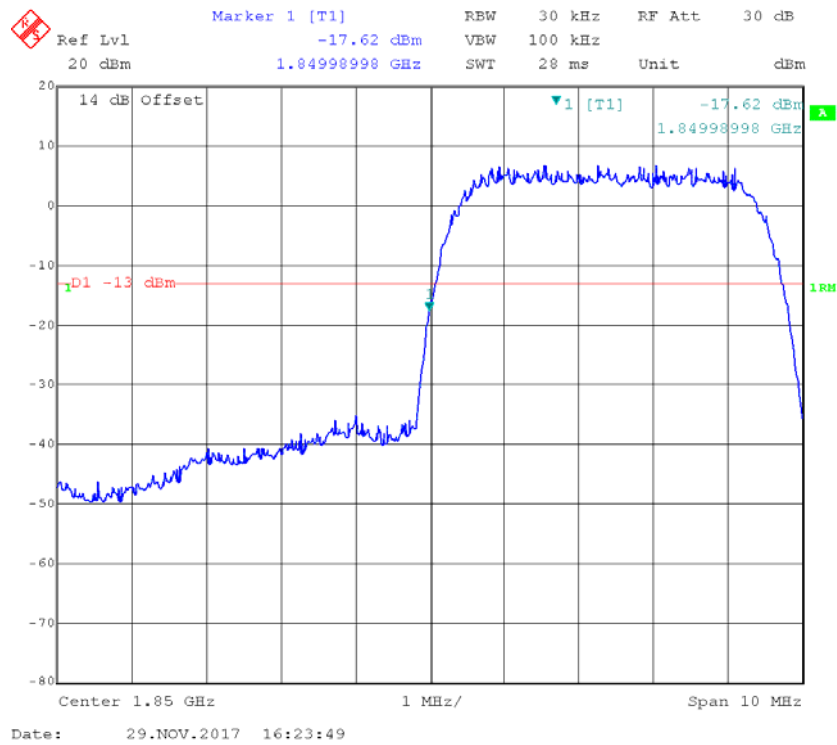
GSM 1900, Left Band Edge**GSM 1900, Right Band Edge**

EDGE 850, Left Band Edge**EDGE 850, Right Band Edge**

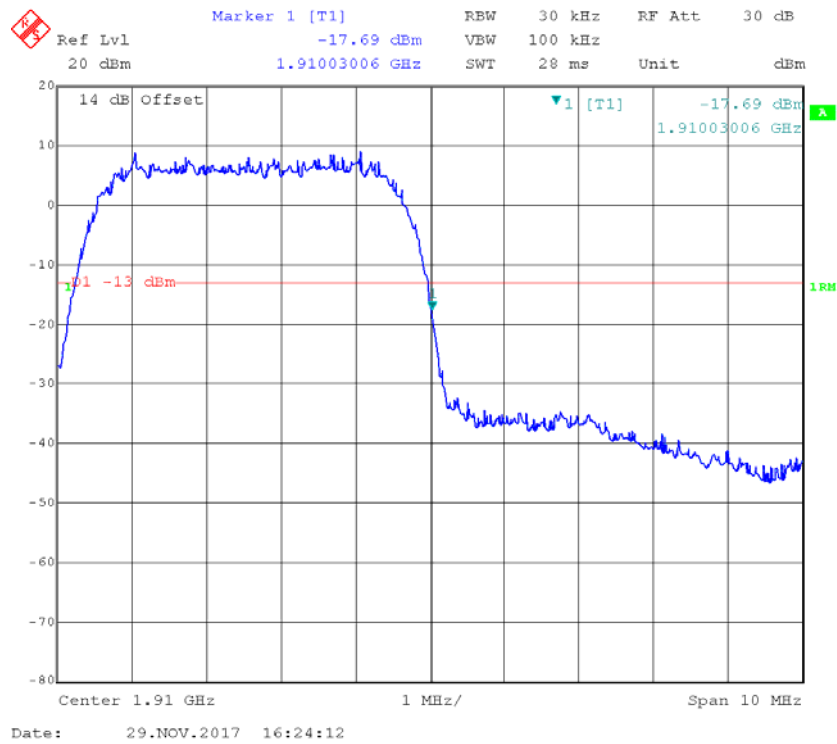
EDGE 1900, Left Band Edge**EDGE 1900, Right Band Edge**

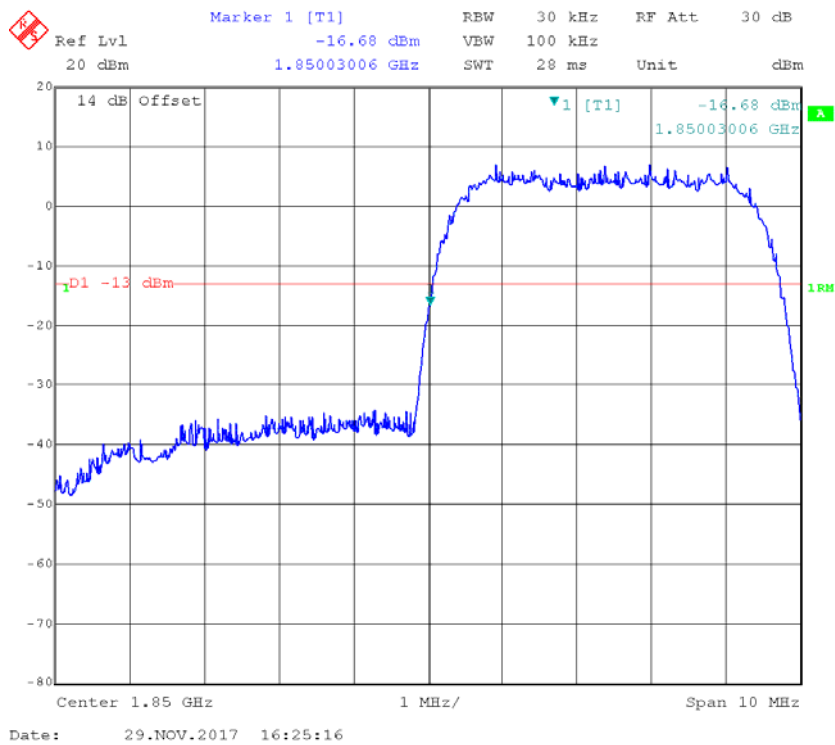
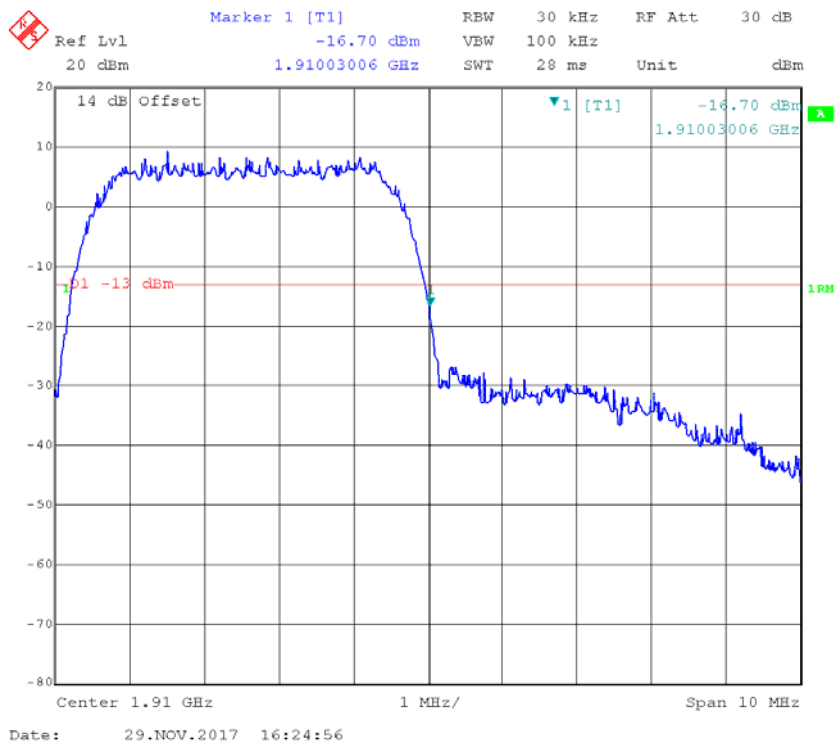
WCDMA Band II:

REL99 Band II, Left Band Edge

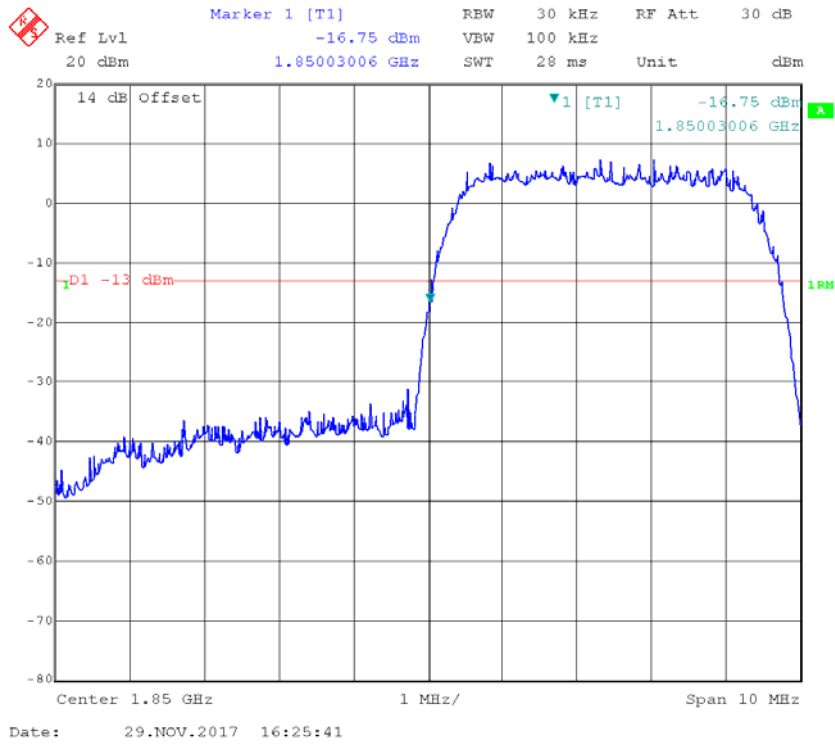


REL99 Band II, Right Band Edge

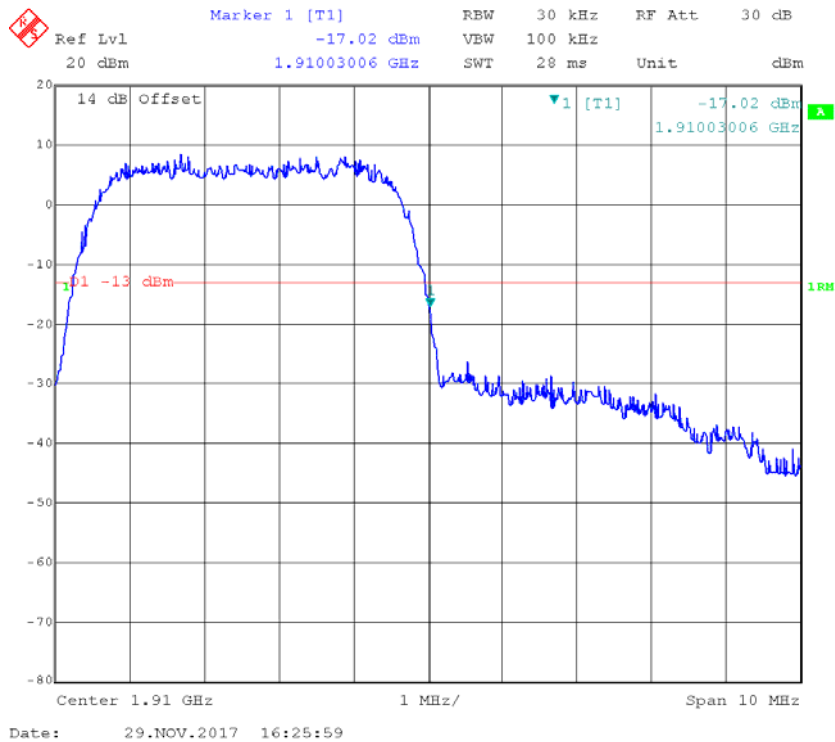


HSDPA Band II, Left Band Edge**HSDPA Band II, Right Band Edge**

HSUPA Band II, Left Band Edge

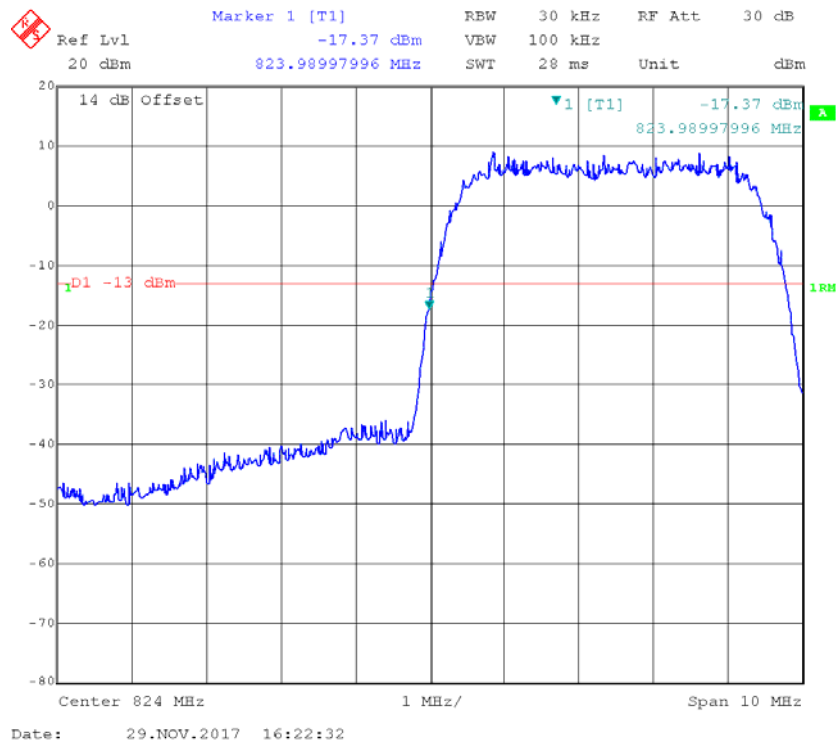


HSUPA Band II, Right Band Edge

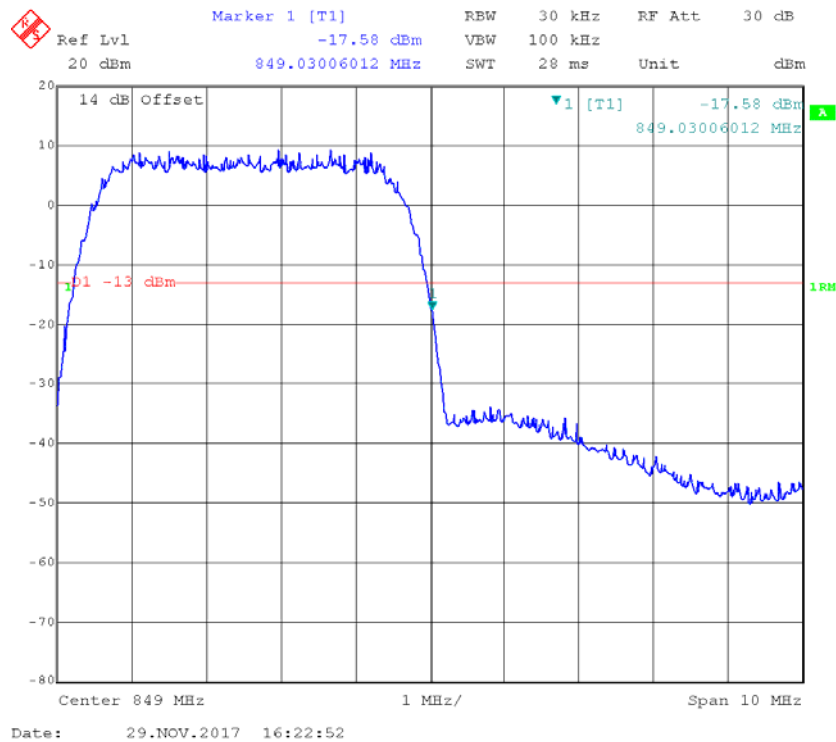


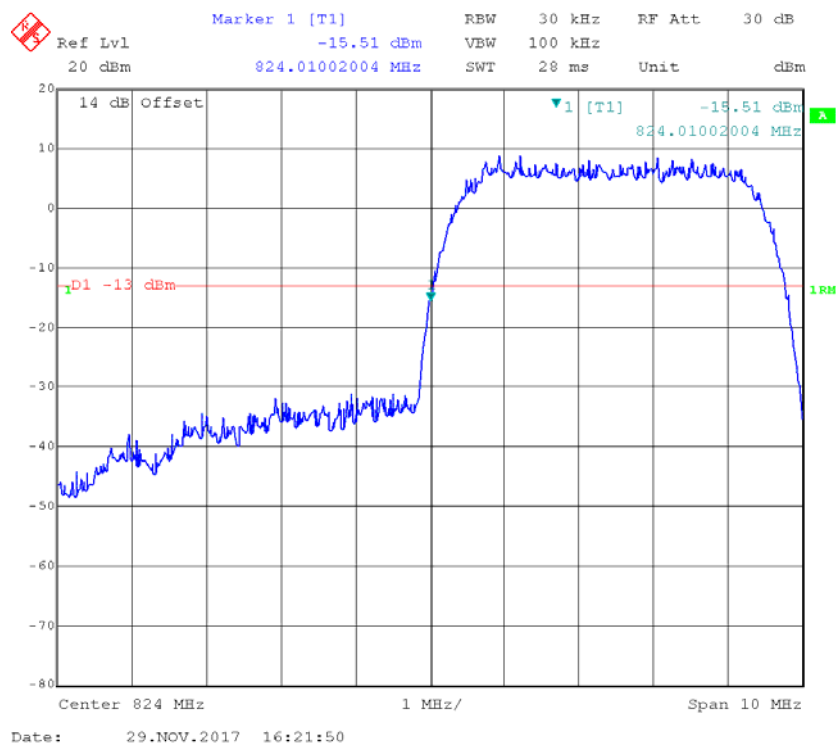
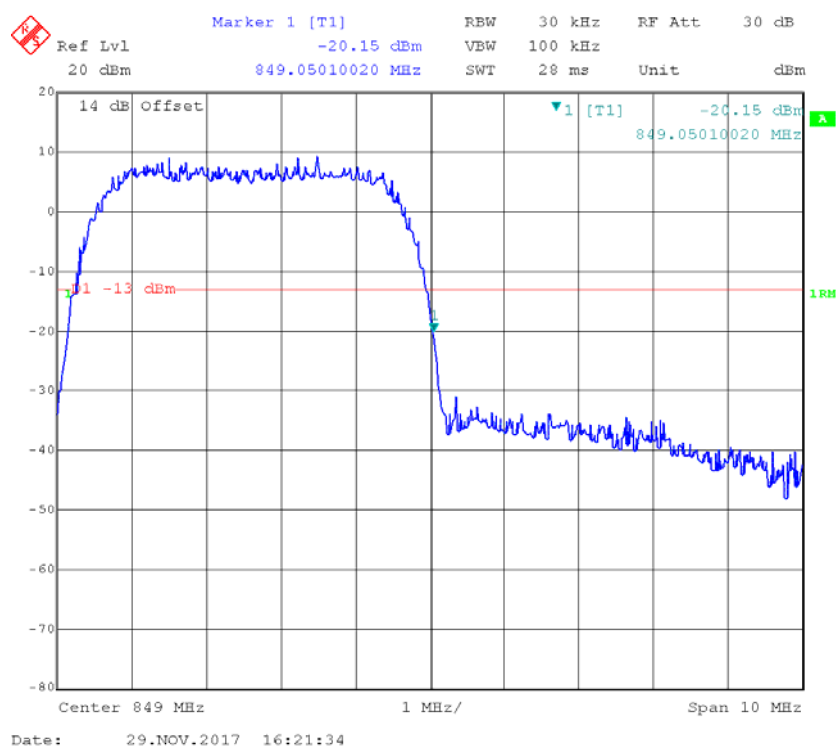
WCDMA Band V

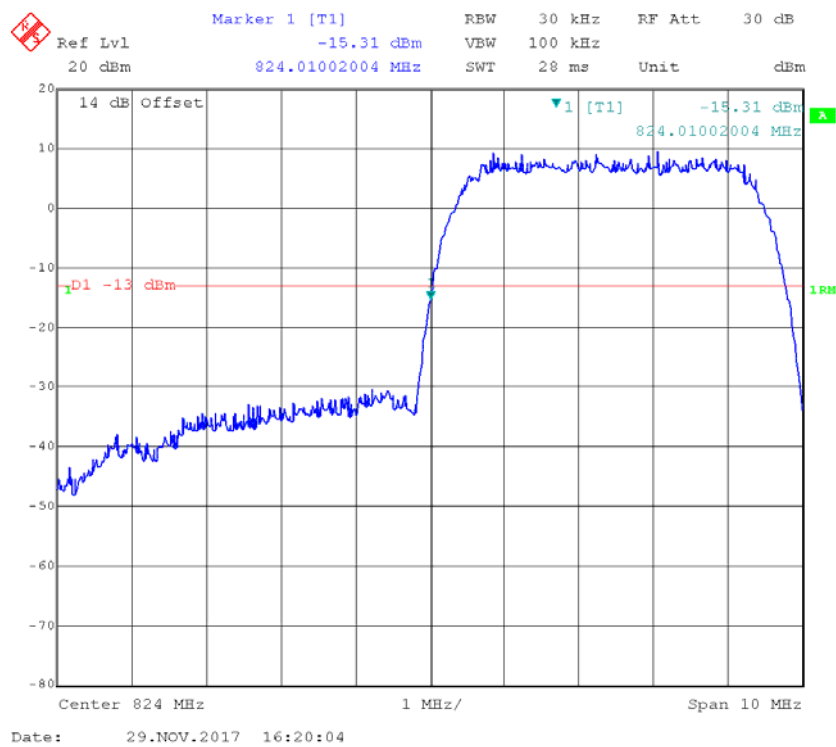
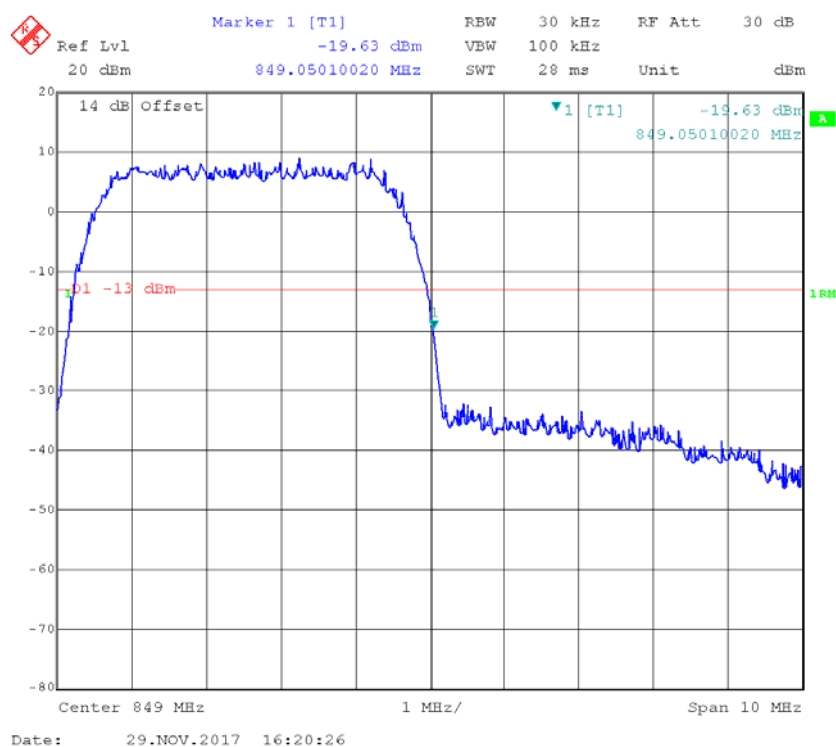
REL99 Band V, Left Band Edge

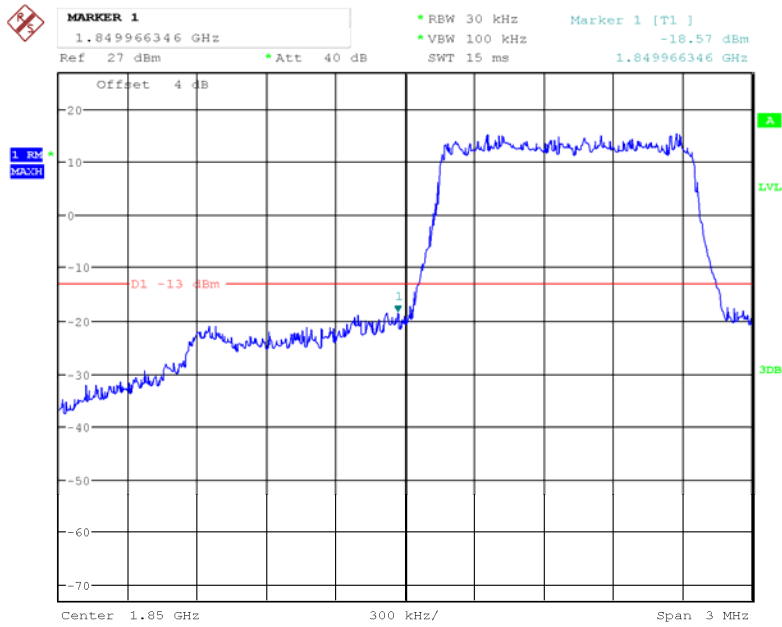


REL99 Band V Right Band Edge

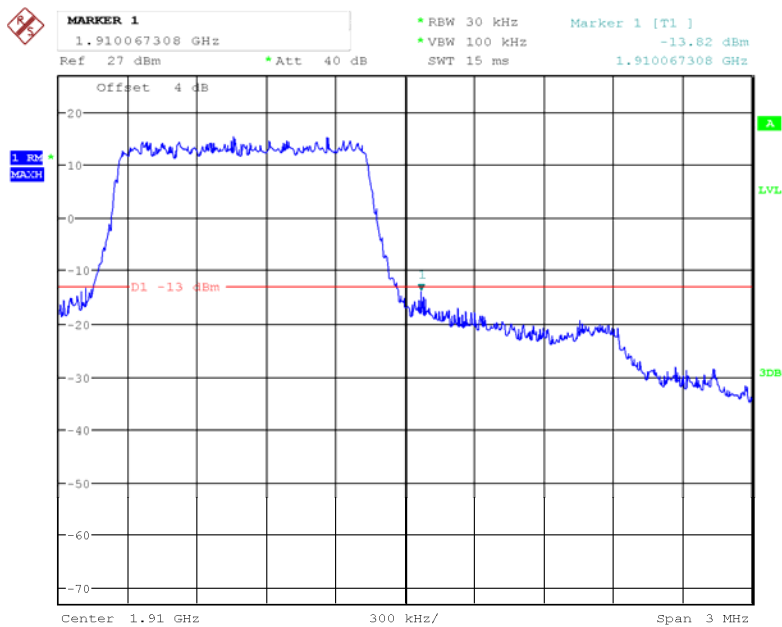


HSDPA Band V, Left Band Edge**HSDPA Band V, Right Band Edge**

HSUPA Band V, Left Band Edge**HSUPA Band V, Right Band Edge**

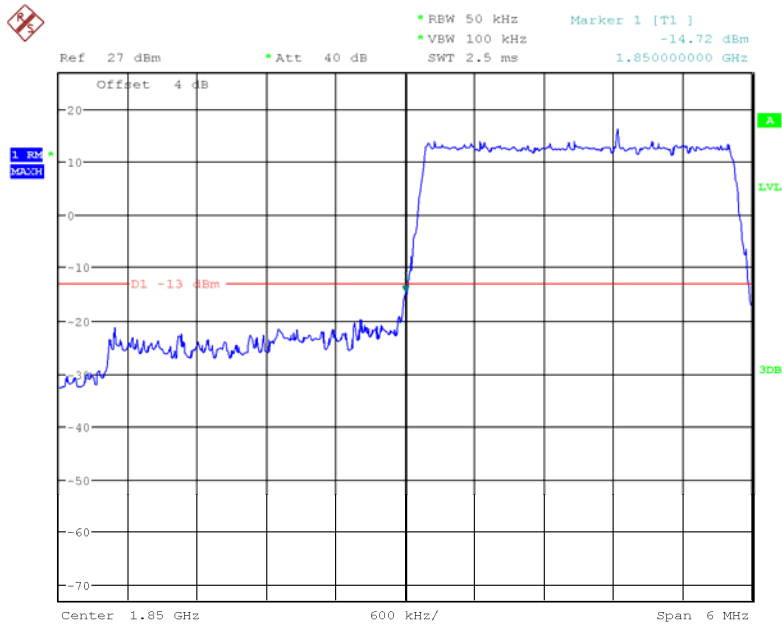
LTE Band II**QPSK_1.4MHz_6 RB_ Left**

Date: 31.OCT.2017 14:21:49

QPSK_1.4MHz_6 RB_ Right

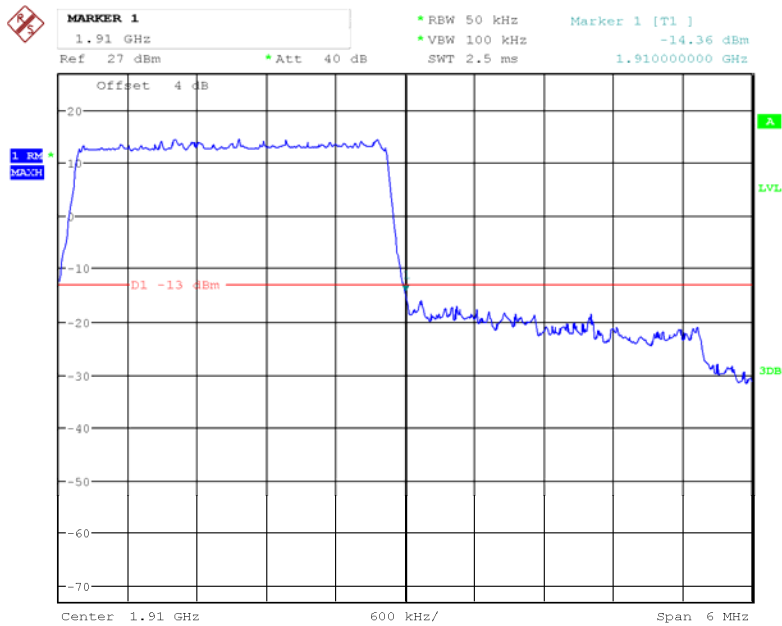
Date: 31.OCT.2017 14:23:41

QPSK_3MHz_15 RB_Left



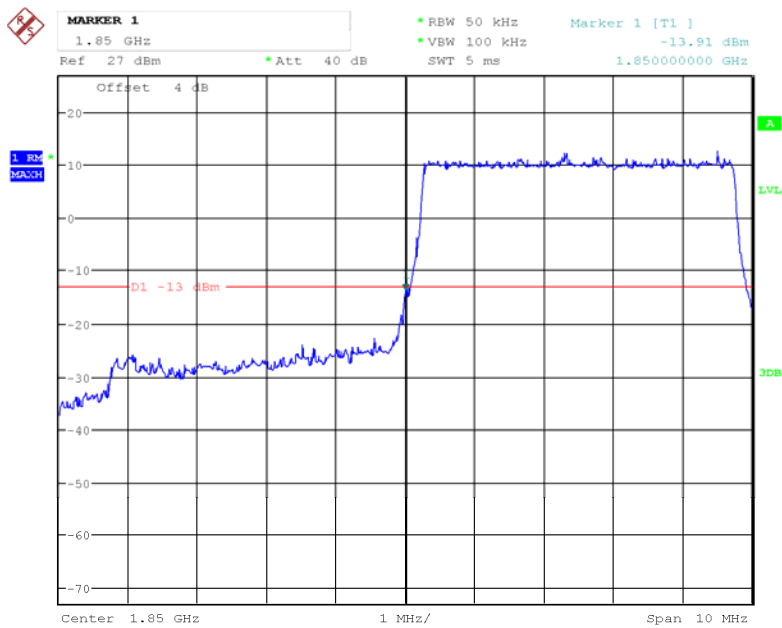
Date: 31.OCT.2017 14:14:38

QPSK_3MHz_15 RB_Right



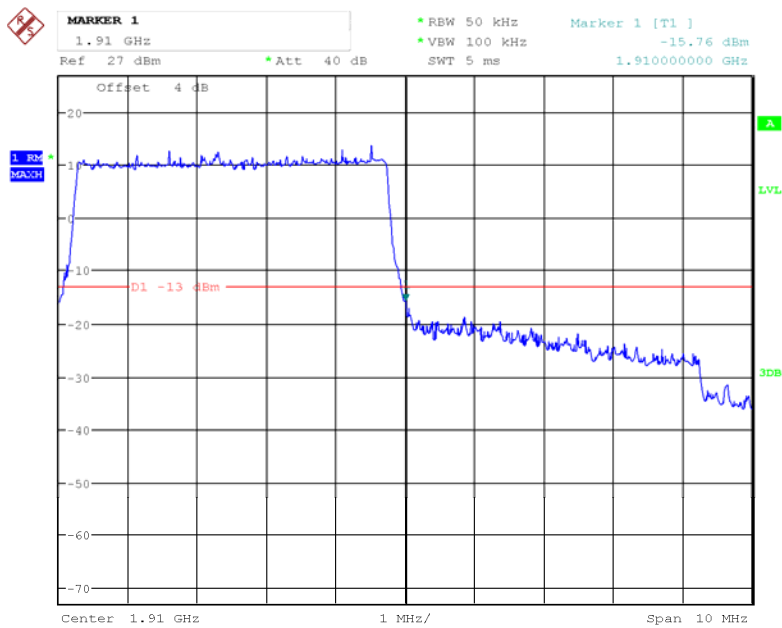
Date: 31.OCT.2017 14:09:40

QPSK_5MHz_25 RB_ Left



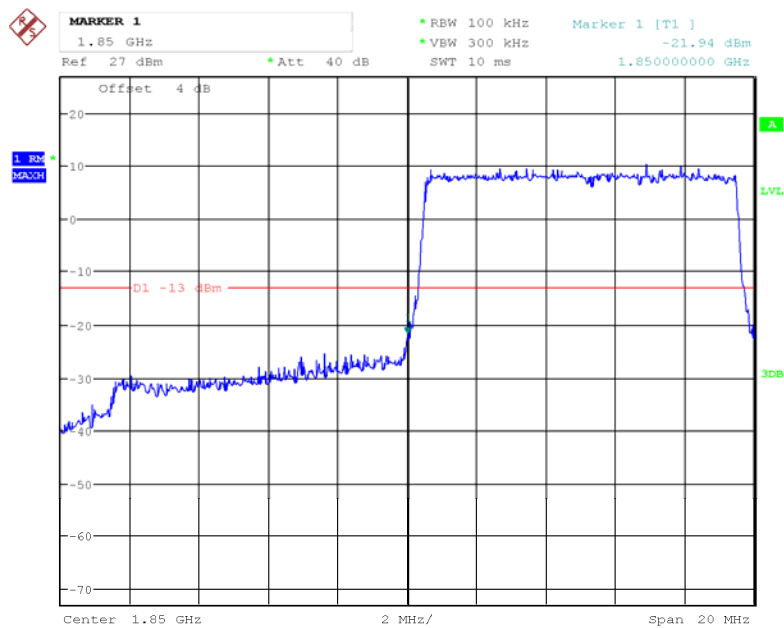
Date: 31.OCT.2017 14:03:32

QPSK_5MHz_25 RB_ Right



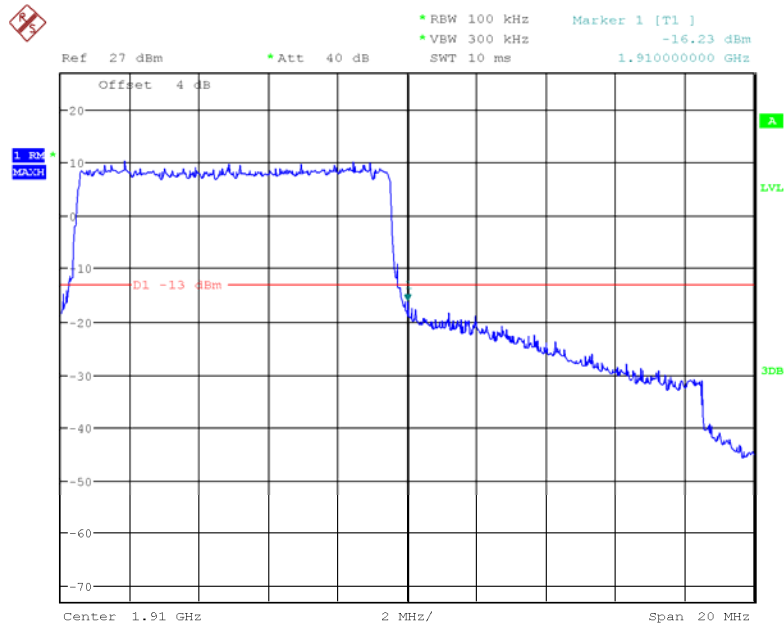
Date: 31.OCT.2017 14:05:37

QPSK_10MHz_50 RB_ Left



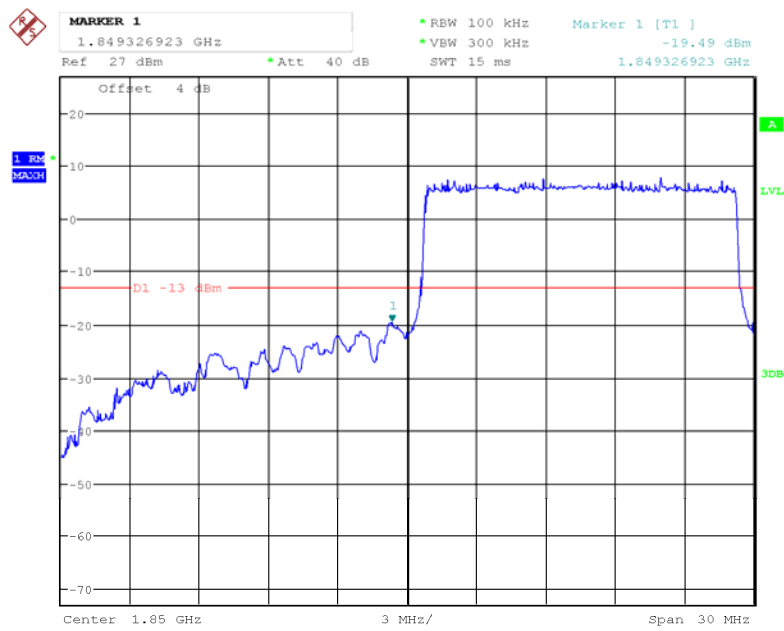
Date: 31.OCT.2017 14:45:11

QPSK_10MHz_50 RB_ Right



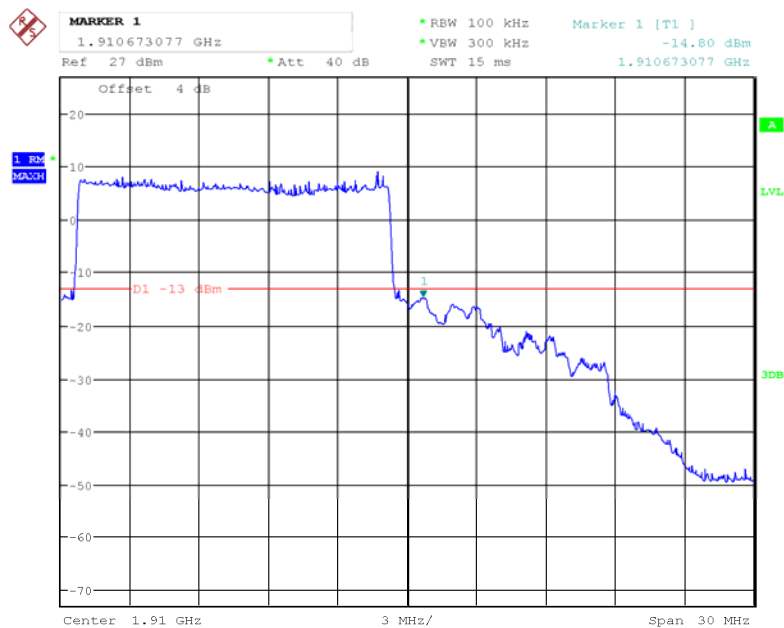
Date: 31.OCT.2017 14:49:03

QPSK_15MHz_75 RB_ Left



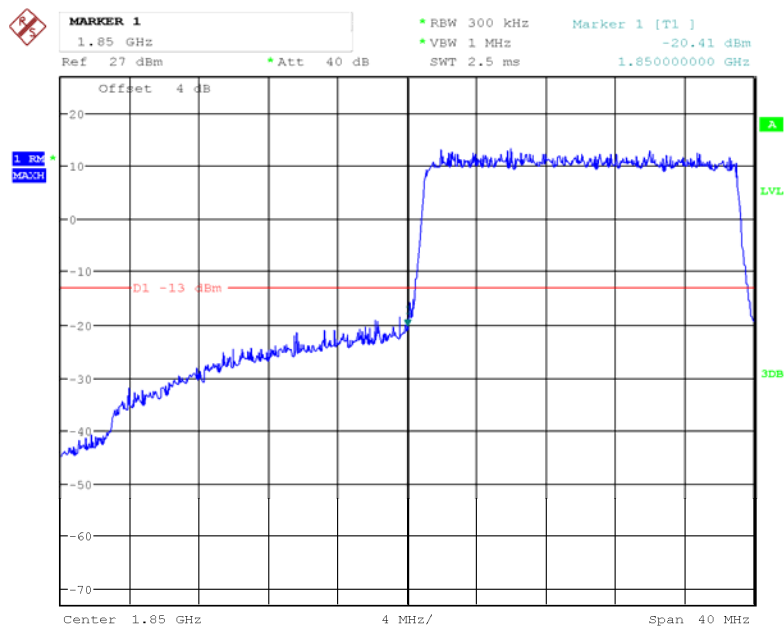
Date: 31.OCT.2017 14:42:58

QPSK_15MHz_75 RB_ Right



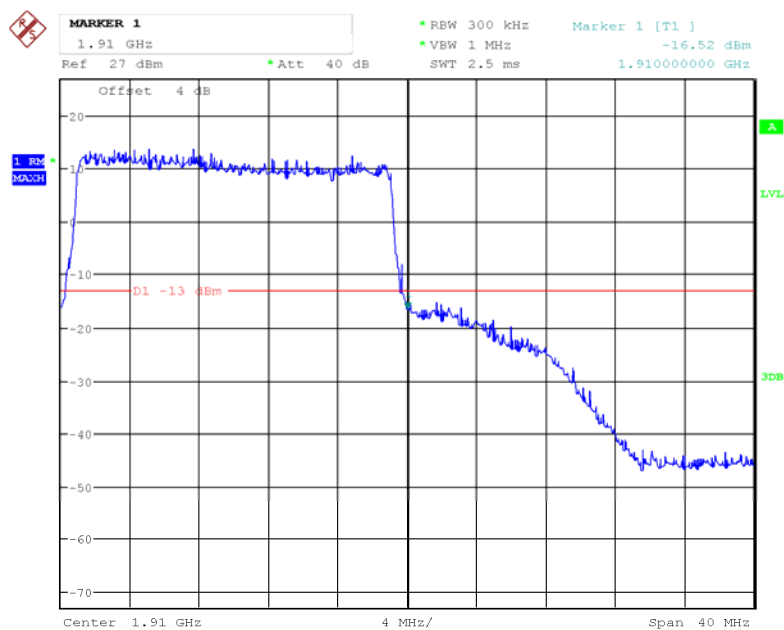
Date: 31.OCT.2017 14:40:09

QPSK_20MHz_FULL RB_Left



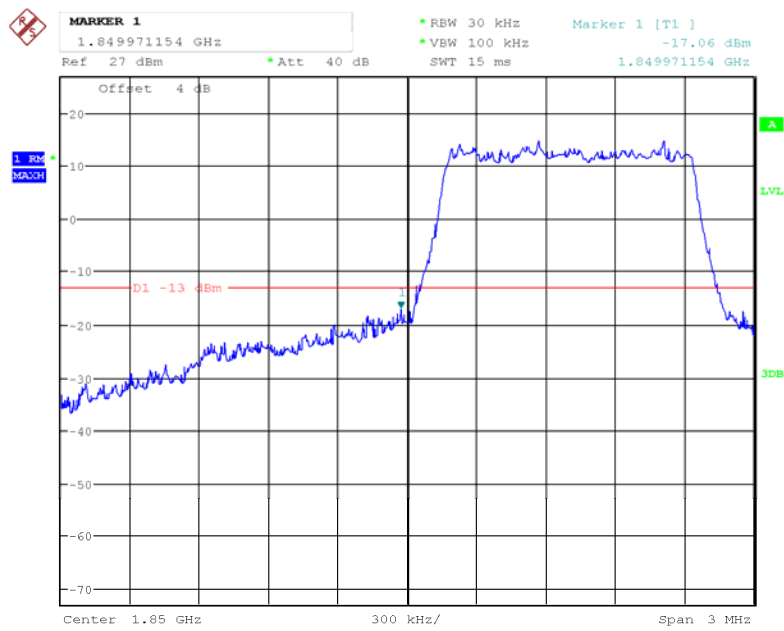
Date: 31.OCT.2017 14:57:56

QPSK_20MHz_FULL RB_Right



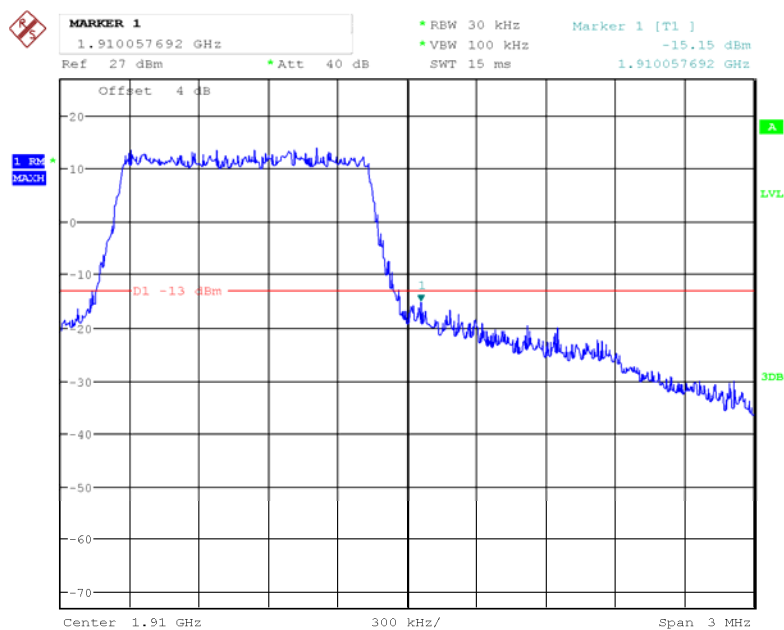
Date: 31.OCT.2017 14:51:27

16QAM_1.4MHz_6 RB_ Left



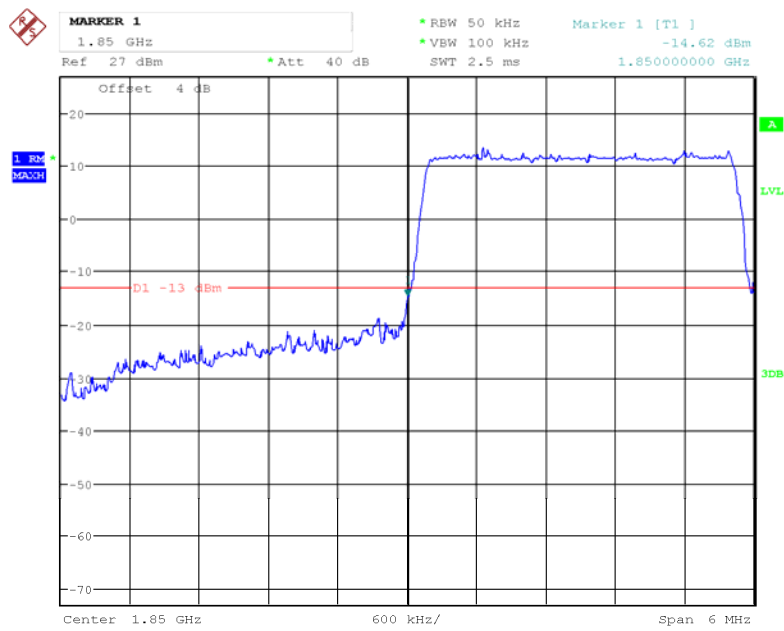
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16QAM_1.4MHz_6 RB_ Right



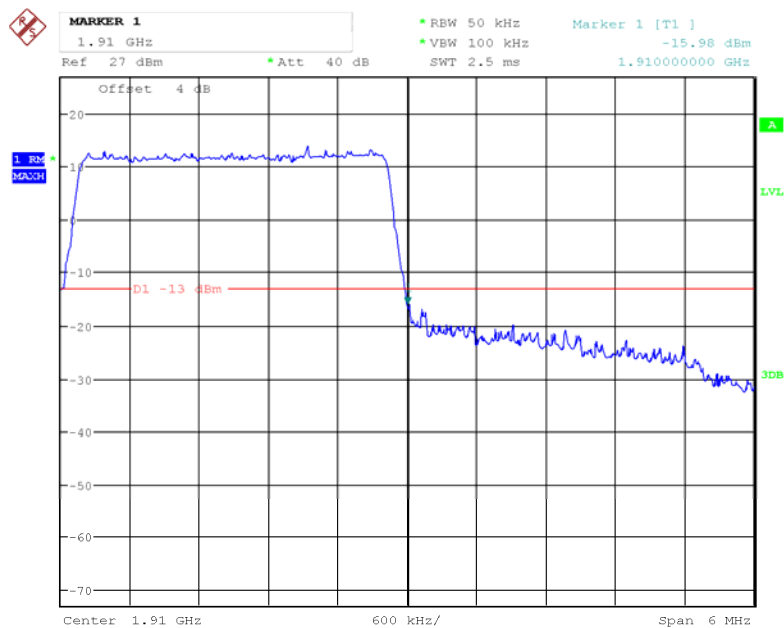
Date: 31.OCT.2017 14:24:14

16QAM_3MHz_15 RB_Left



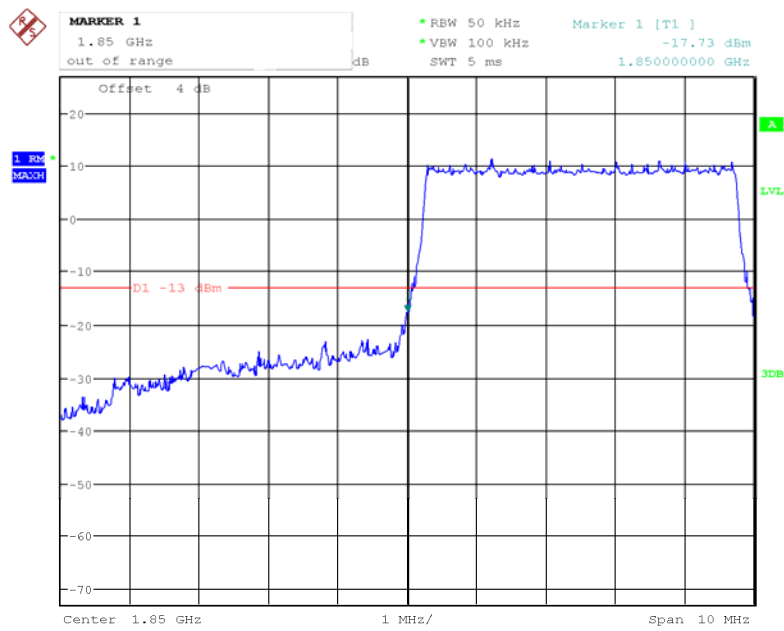
Date: 31.OCT.2017 14:14:06

16QAM_3MHz_15 RB_Right



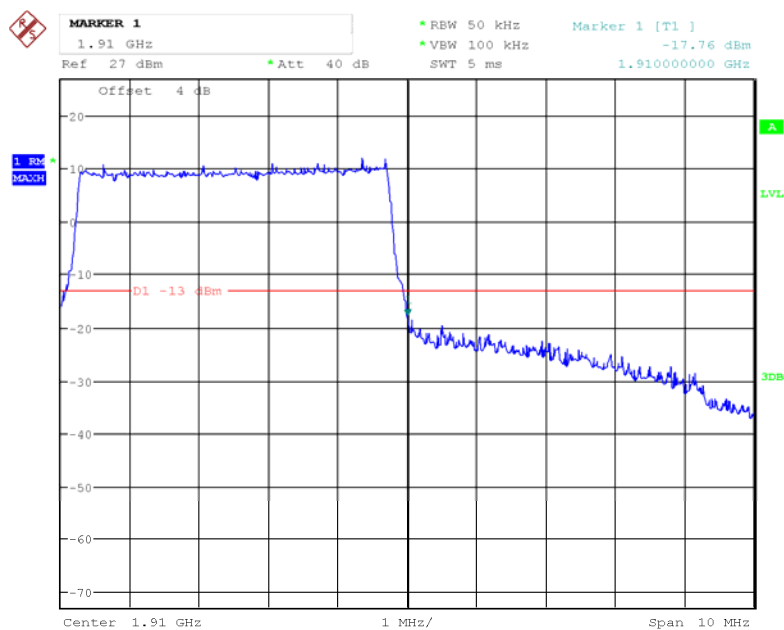
Date: 31.OCT.2017 14:11:09

16QAM_5MHz_25 RB_ Left



Date: 31.OCT.2017 14:01:17

16QAM_5MHz_25 RB_ Right



Date: 31.OCT.2017 14:06:31

Ref 27 dBm * Att 40 dB * RBW 100 kHz Marker 1 [T1] -23.92 dBm
 * VBW 300 kHz SWT 10 ms 1.850000000 GHz

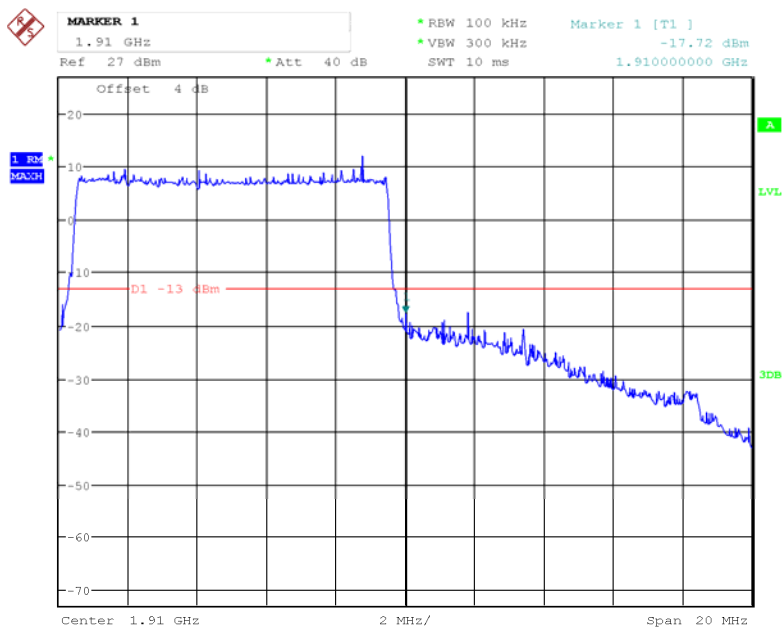
Offset 4 dB

1.85 GHz

D1 -13 dBm

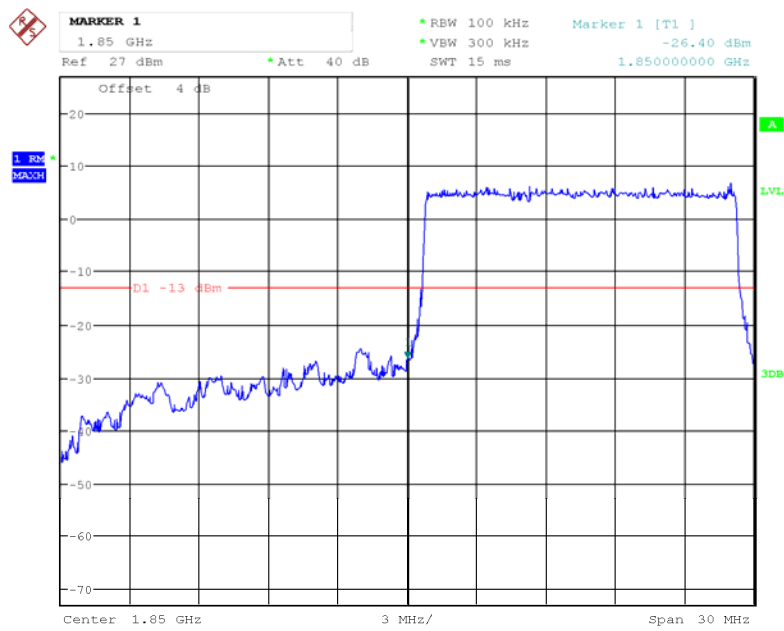
Center 1.85 GHz 2 MHz/ Span 20 MHz

16QAM_10MHz_50 RB_Right



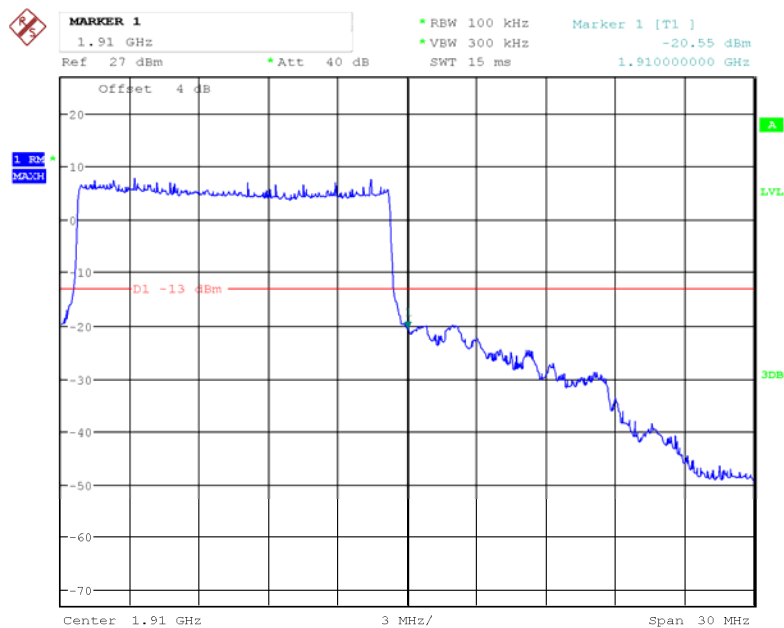
Page 112 of 151

16QAM_15MHz_75 RB_Left



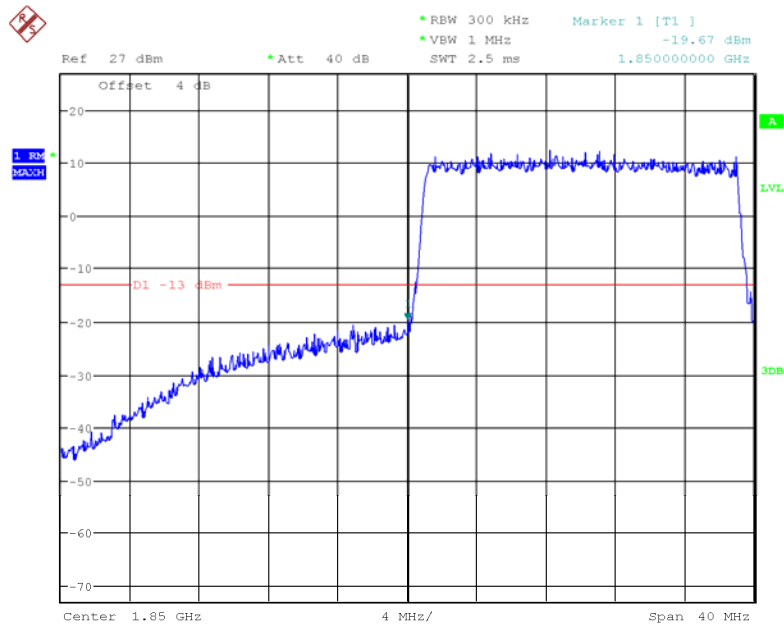
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16QAM_15MHz_75 RB_Right



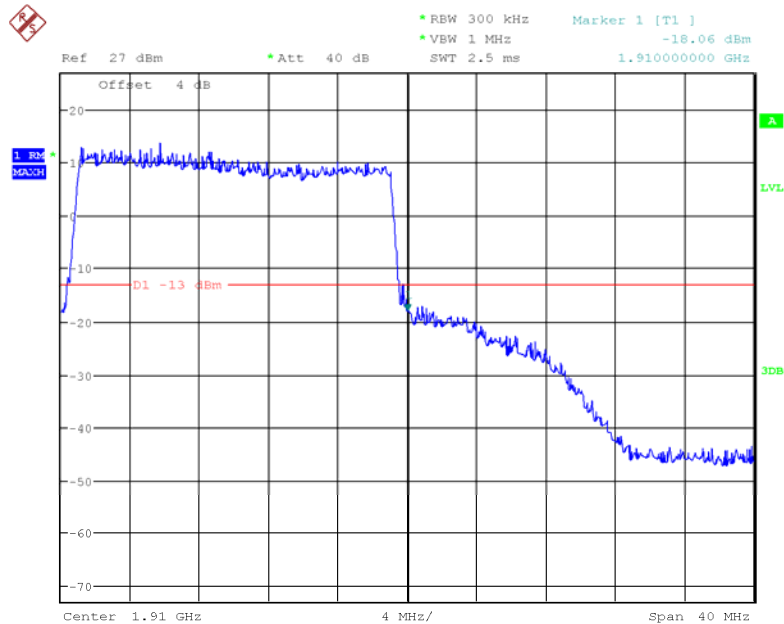
Date: 31.OCT.2017 14:39:10

16QAM_20MHz_FULL RB_Left



Date: 31.OCT.2017 14:58:34

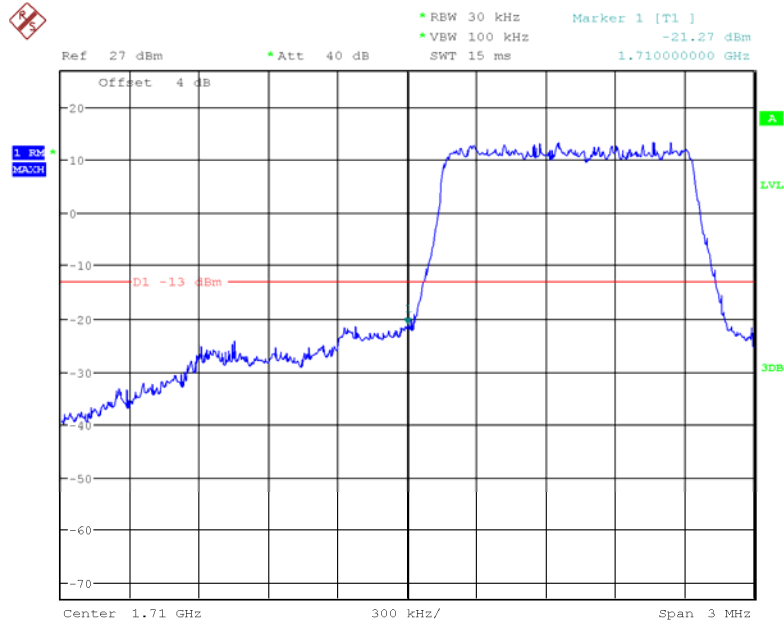
16QAM_20MHz_FULL RB_Right



Date: 31.OCT.2017 14:51:58

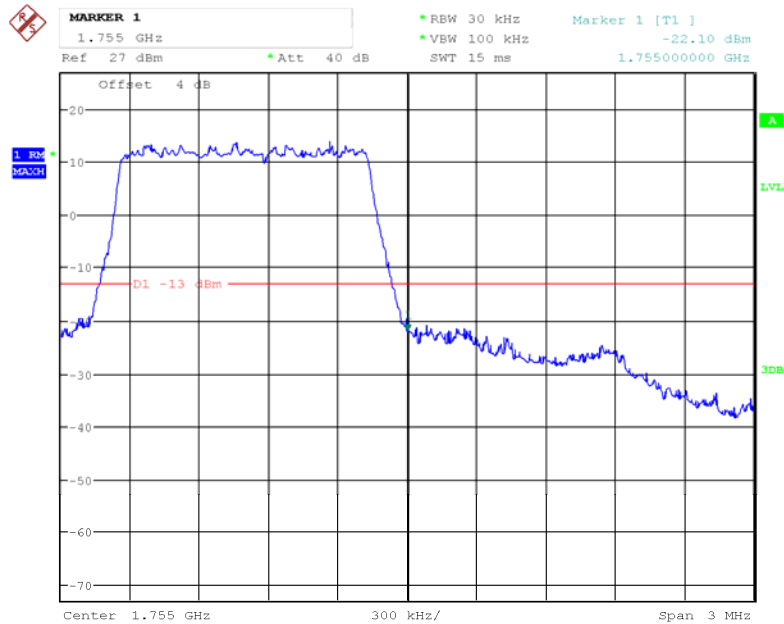
LTE Band IV

QPSK_1.4MHz_6 RB_ Left



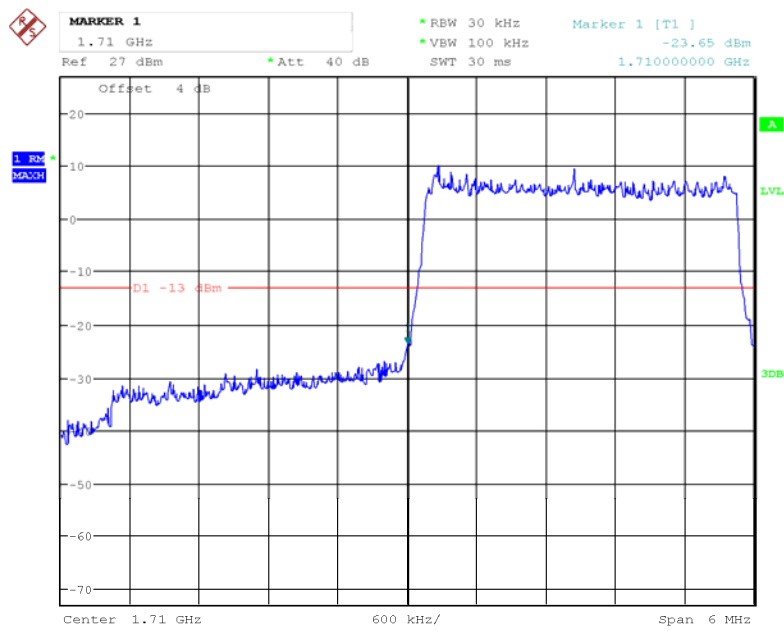
Date: 31.OCT.2017 15:09:14

QPSK_1.4MHz_6 RB_ Right



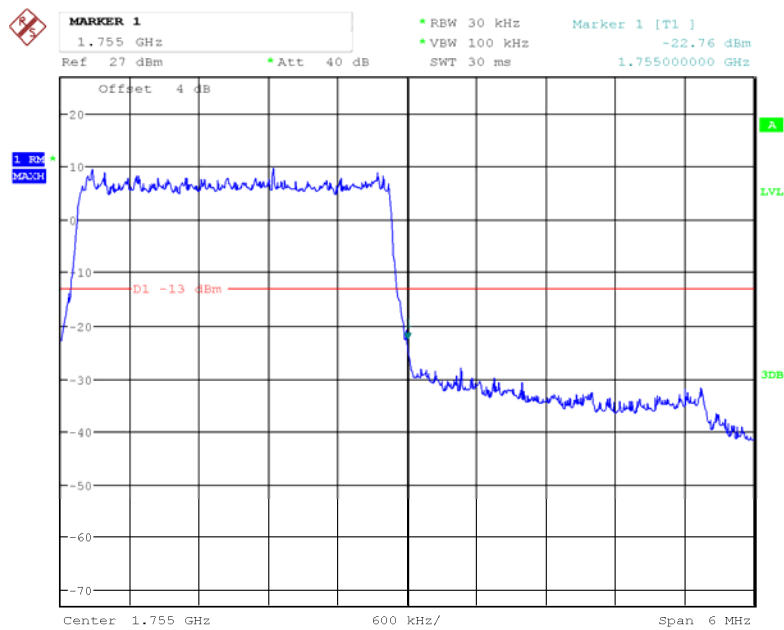
Date: 31.OCT.2017 15:12:38

QPSK_3MHz_15 RB_ Left



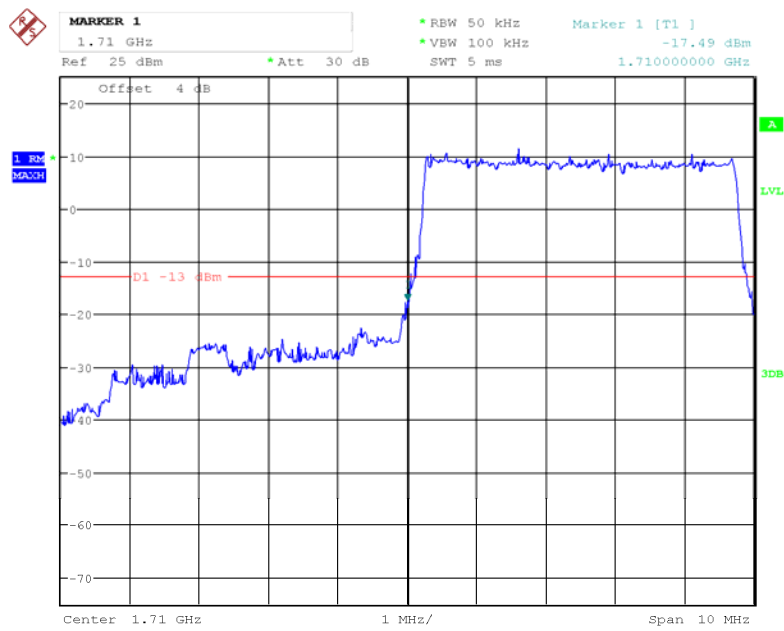
Date: 31.OCT.2017 15:22:04

QPSK_3MHz_15 RB_ Right



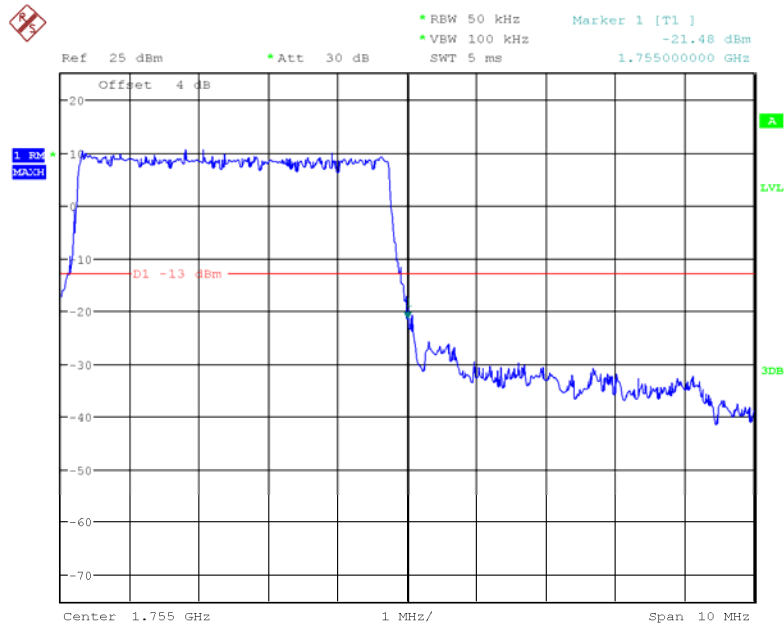
Date: 31.OCT.2017 15:17:08

QPSK_5MHz_25 RB_Left



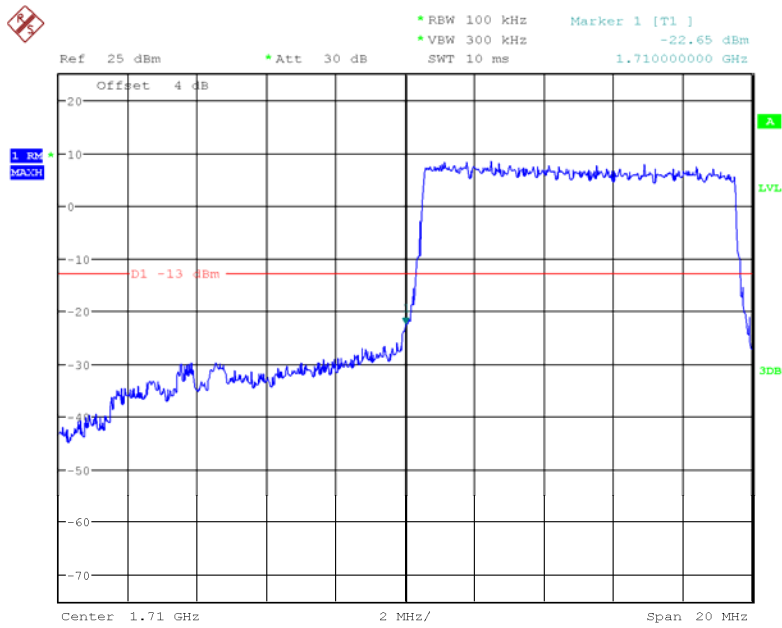
Date: 31.OCT.2017 16:42:34

QPSK_5MHz_25 RB_Right



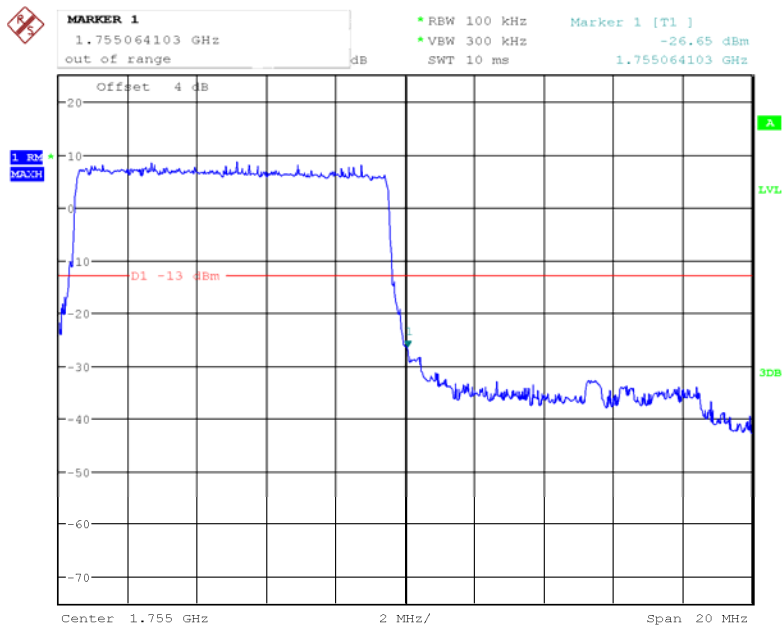
Date: 31.OCT.2017 16:45:25

QPSK_10MHz_50 RB_ Left



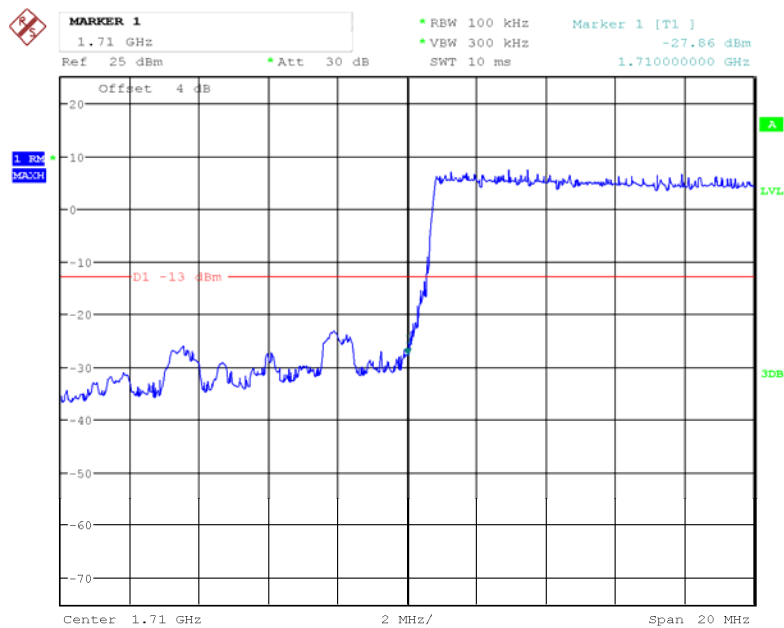
Date: 31.OCT.2017 16:53:33

QPSK_10MHz_50 RB_ Right



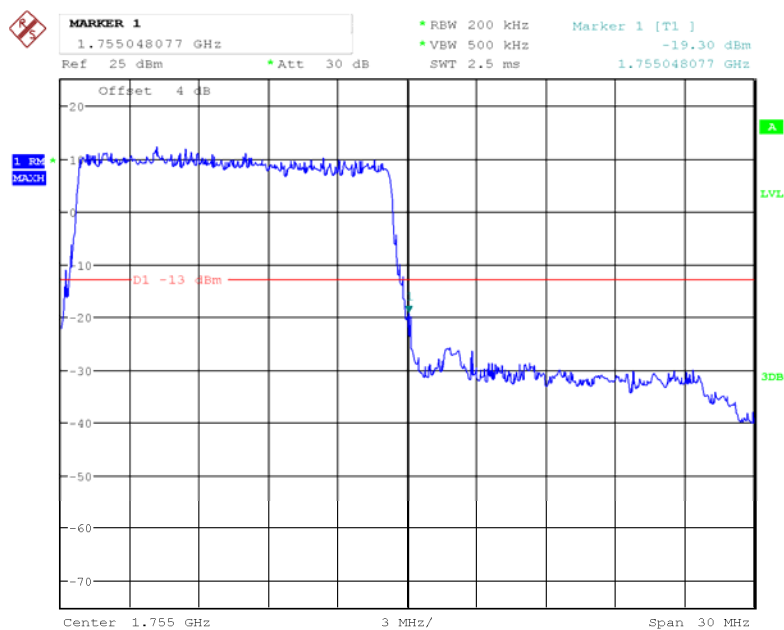
Date: 31.OCT.2017 16:49:09

QPSK_15MHz_75 RB_ Left



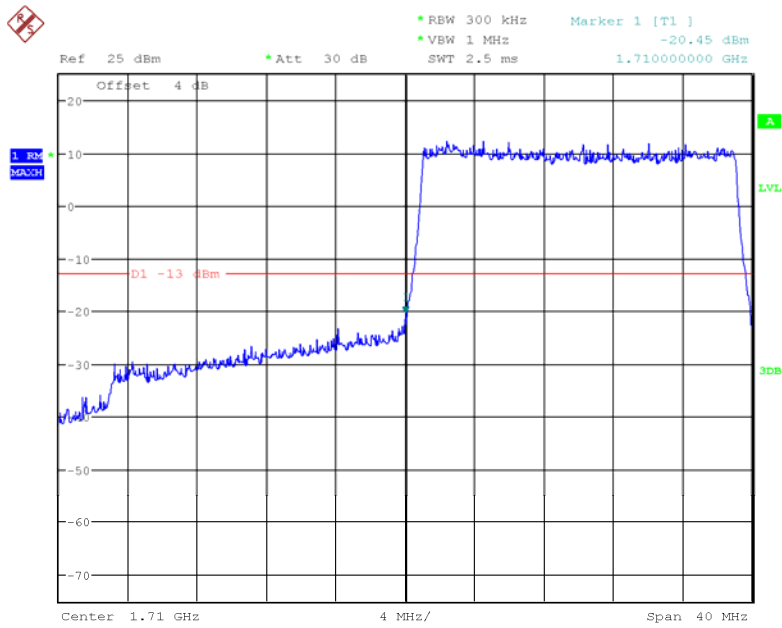
Date: 31.OCT.2017 18:00:52

QPSK_15MHz_75 RB_ Right



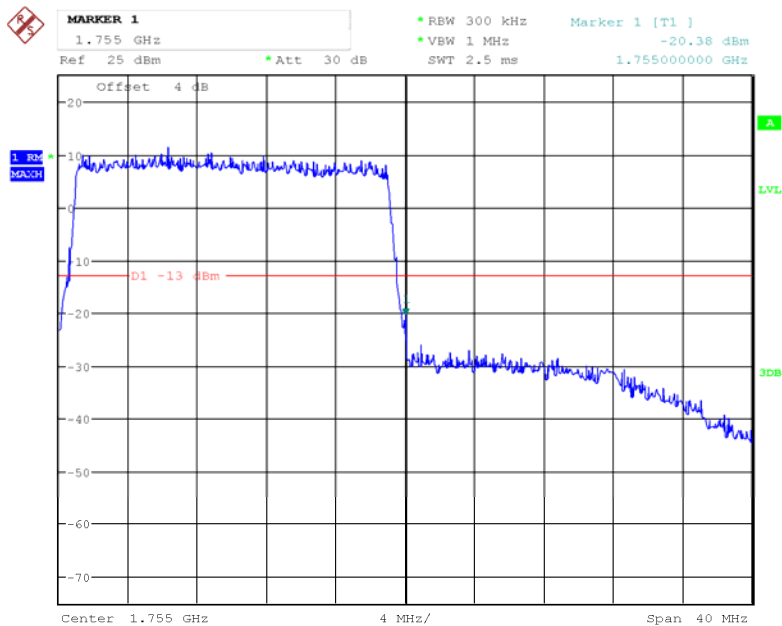
Date: 31.OCT.2017 18:06:11

QPSK_20MHz_FULL RB_Left



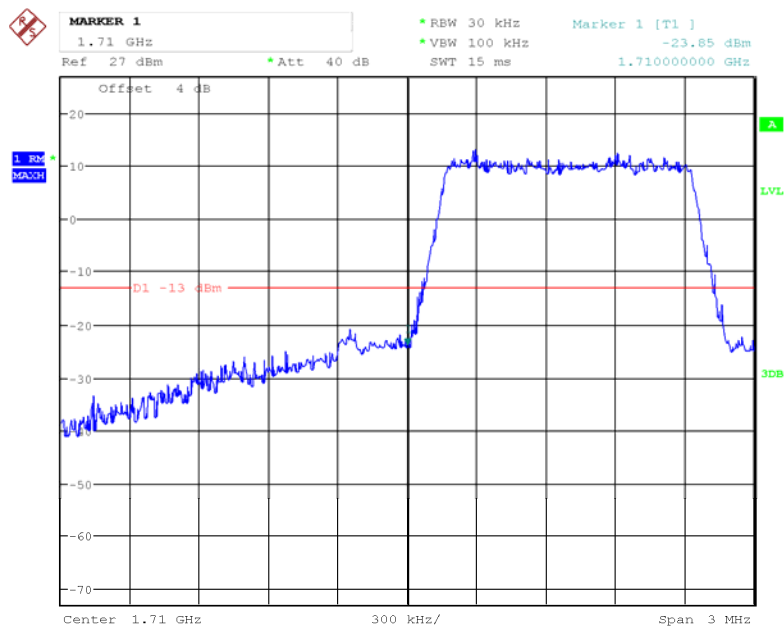
Date: 31.OCT.2017 18:13:20

QPSK_20MHz_FULL RB_Right



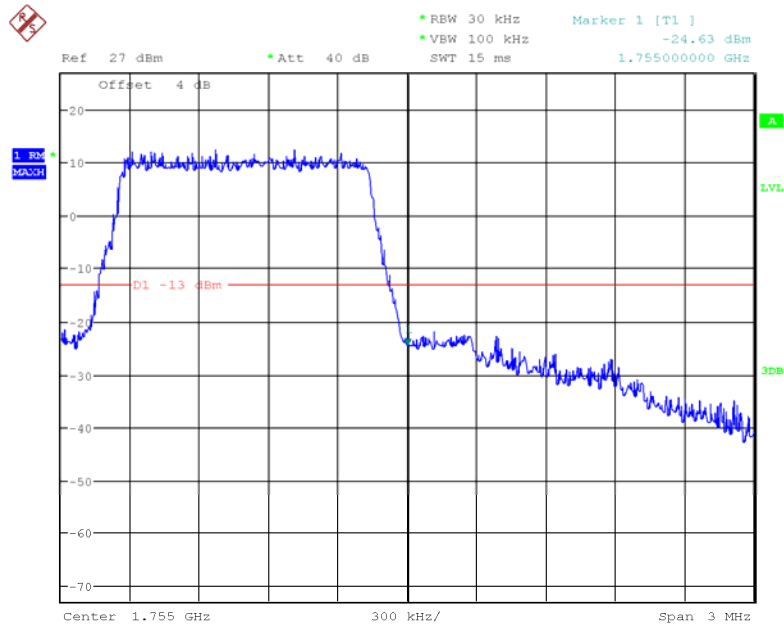
Date: 31.OCT.2017 18:09:50

16QAM_1.4MHz_6 RB_ Left



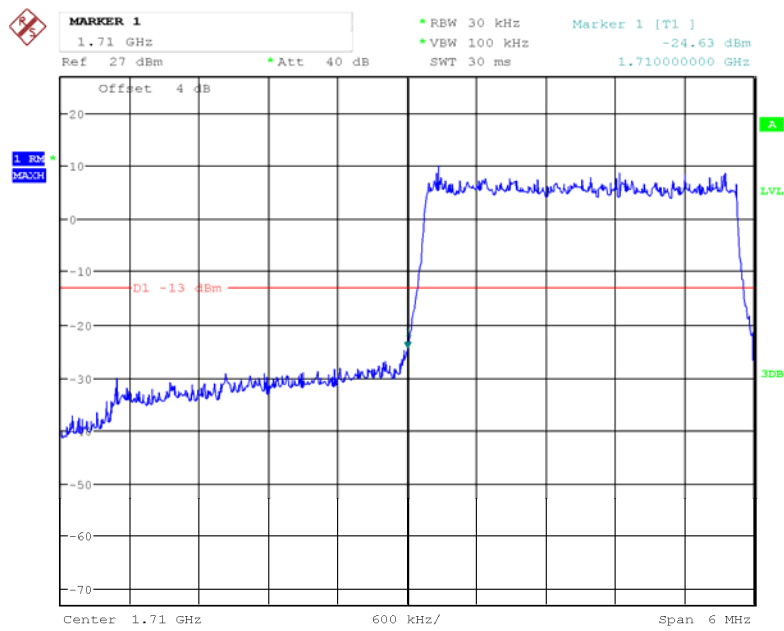
Date: 31.OCT.2017 15:08:39

16QAM_1.4MHz_6 RB_ Right



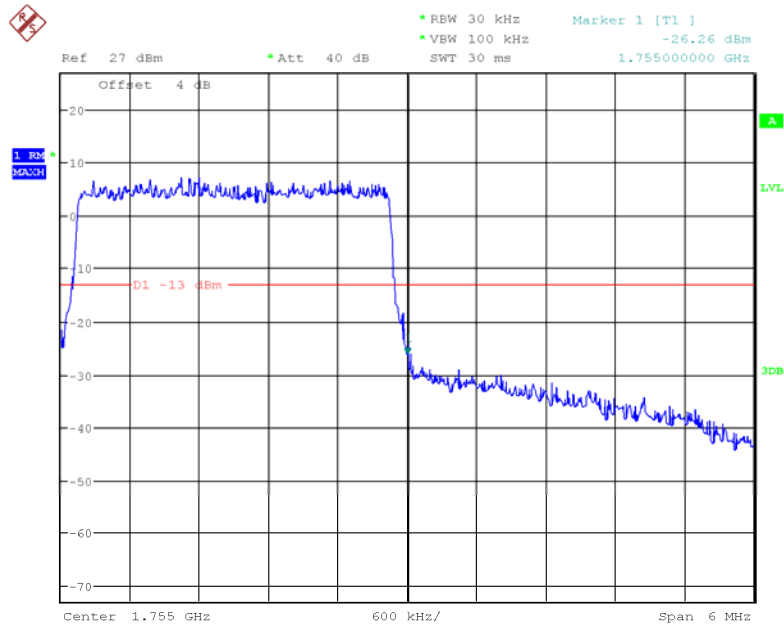
Date: 31.OCT.2017 15:13:05

16QAM_3MHz_15 RB_Left



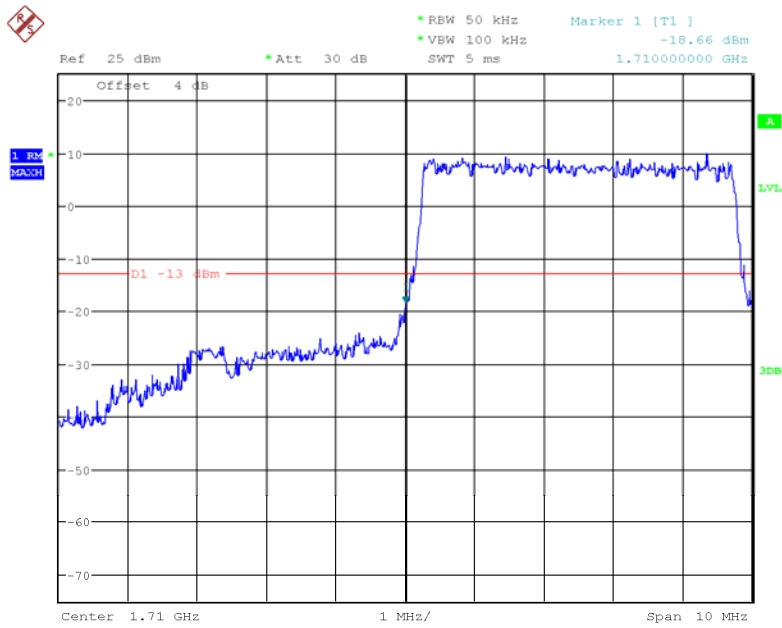
Date: 31.OCT.2017 15:20:55

16QAM_3MHz_15 RB_Right



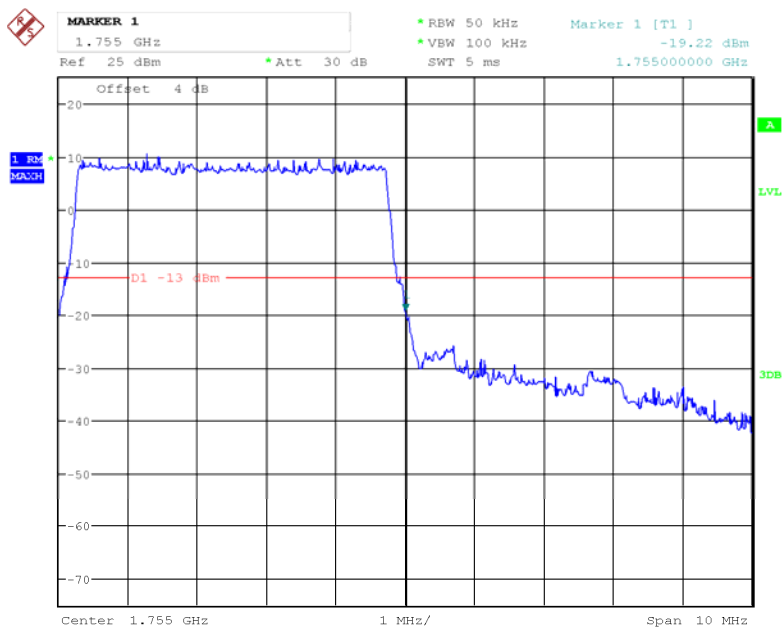
Date: 31.OCT.2017 15:17:36

16QAM_5MHz_25 RB_ Left



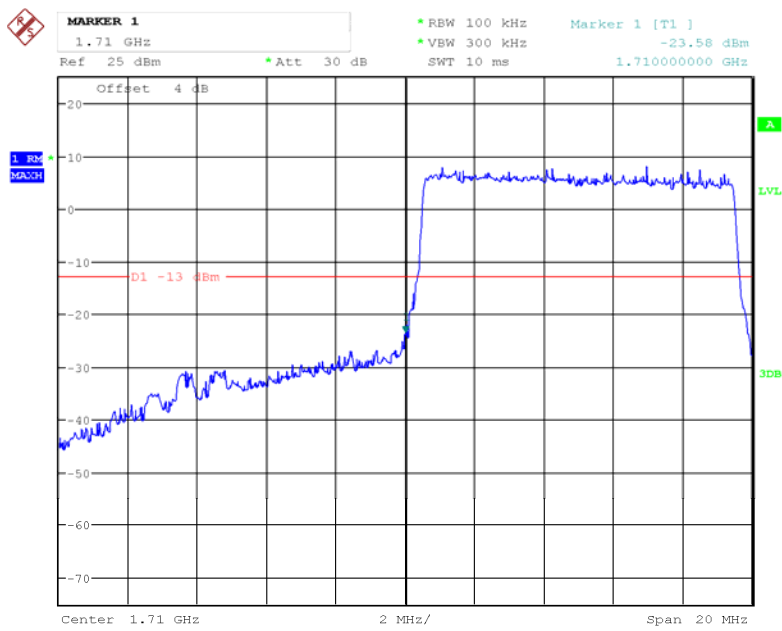
Date: 31.OCT.2017 16:42:48

16QAM_5MHz_25 RB_ Right



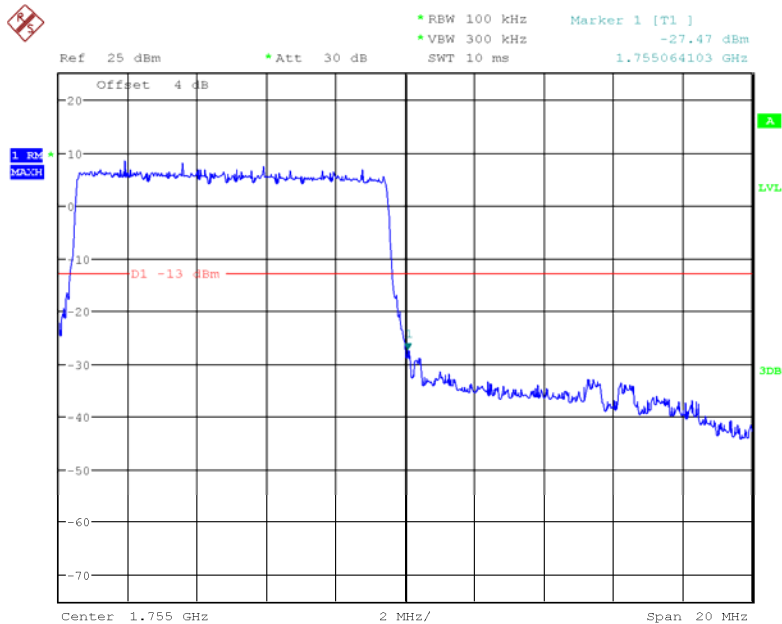
Date: 31.OCT.2017 16:45:04

16QAM_10MHz_ 50 RB_ Left



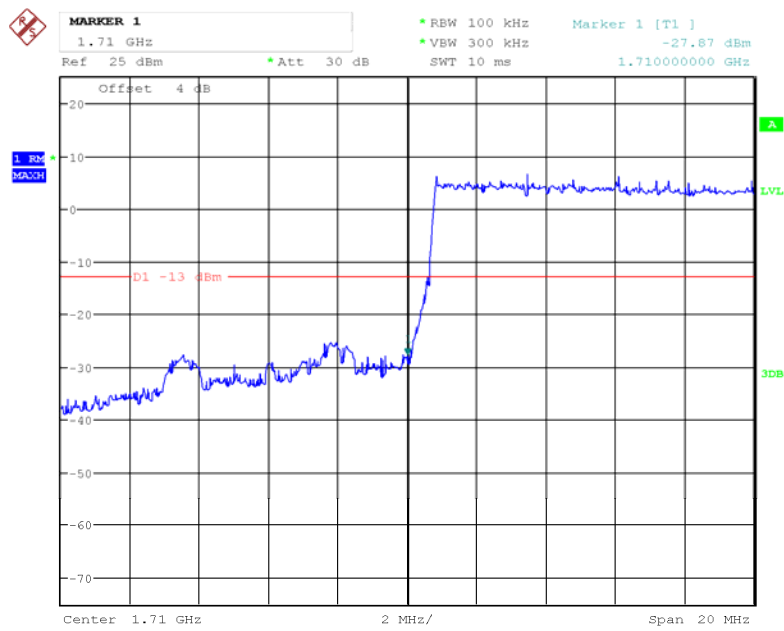
Date: 31.OCT.2017 16:53:19

16QAM_10MHz_ 50 RB_ Right



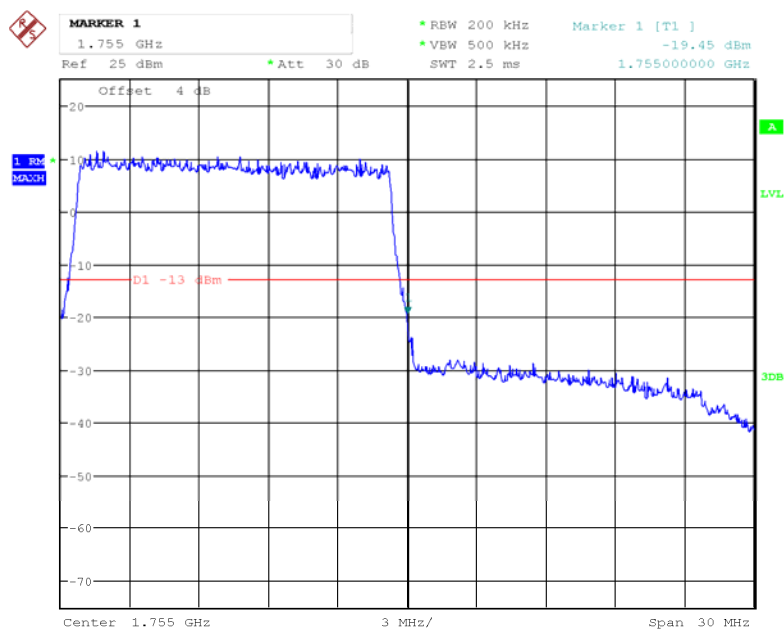
Date: 31.OCT.2017 16:49:31

16QAM_15MHz_ 75 RB_ Left



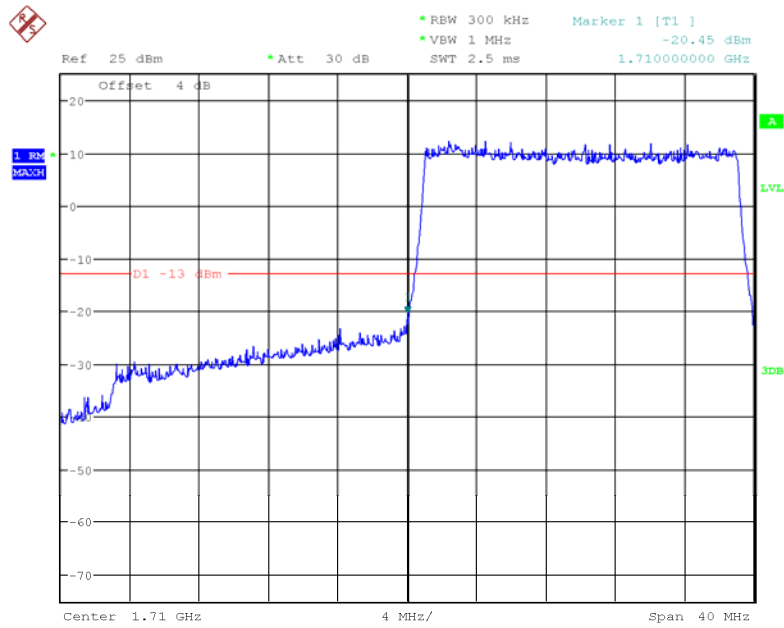
Date: 31.OCT.2017 18:01:11

16QAM_15MHz_ 75 RB_ Right



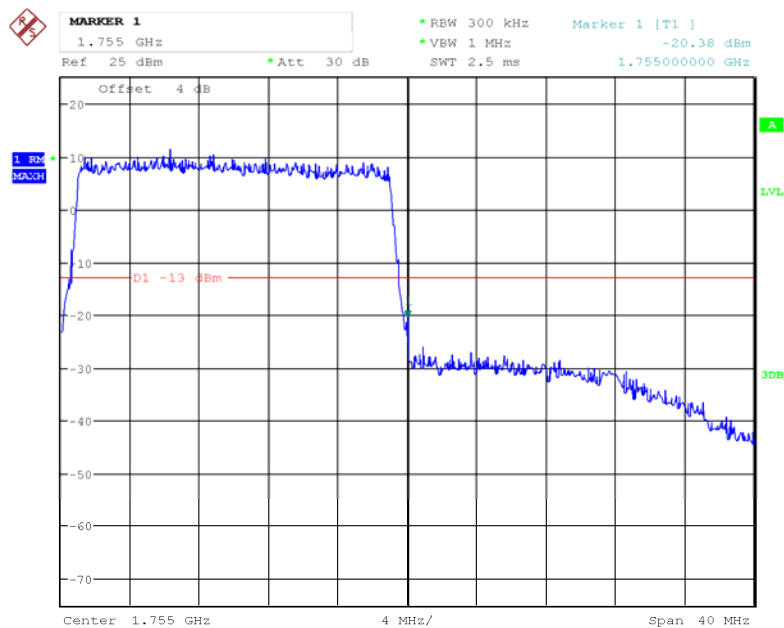
Date: 31.OCT.2017 18:05:43

16QAM_20MHz_FULL RB_Left



Date: 31.OCT.2017 18:13:20

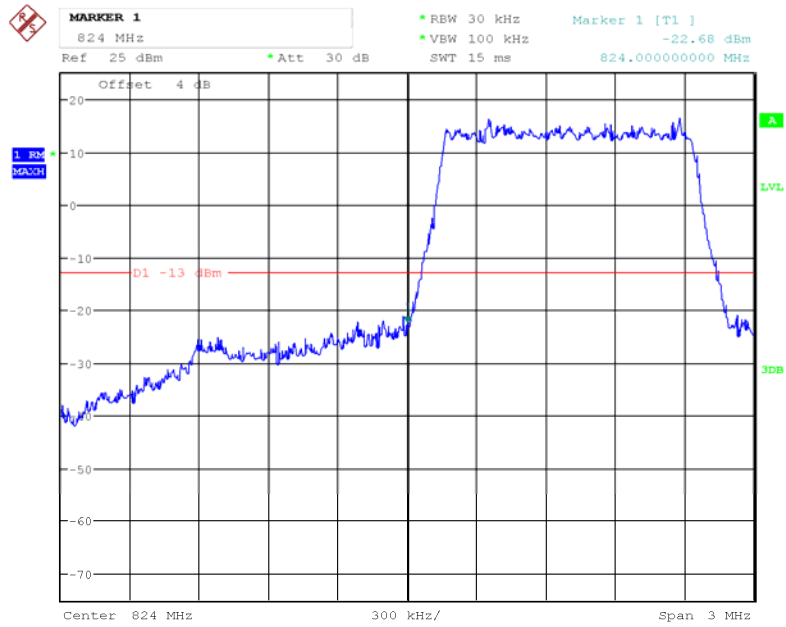
16QAM_20MHz_FULL RB_Right



Date: 31.OCT.2017 18:09:50

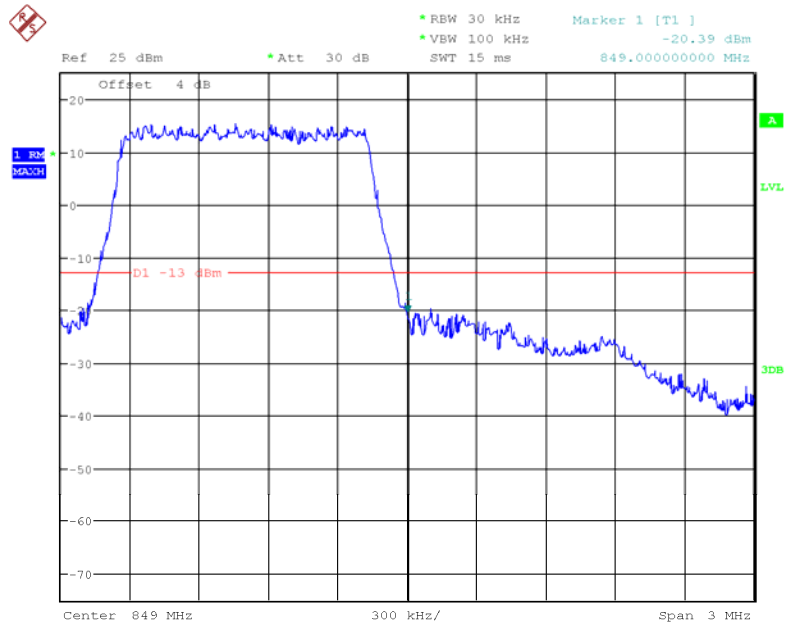
LTE Band V

QPSK_1.4MHz_6 RB_ Left



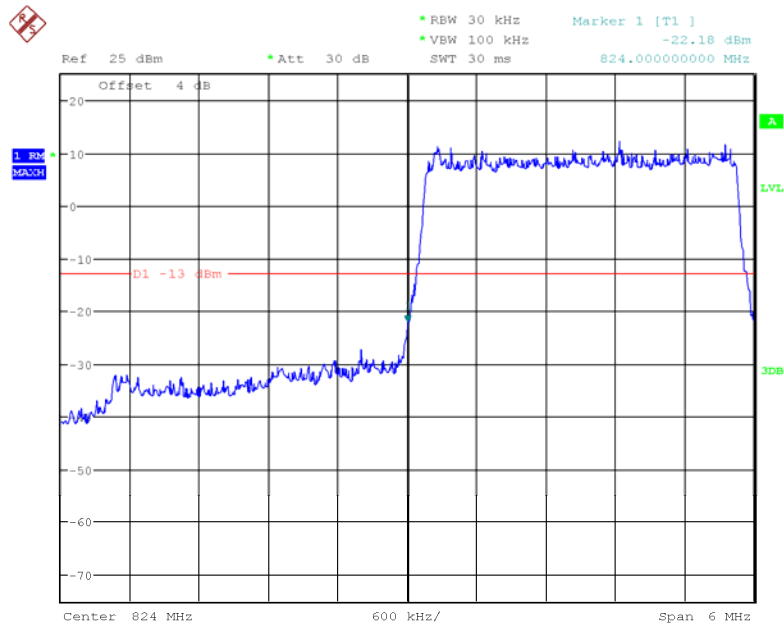
Date: 31.OCT.2017 18:18:03

QPSK_1.4MHz_6 RB_ Right



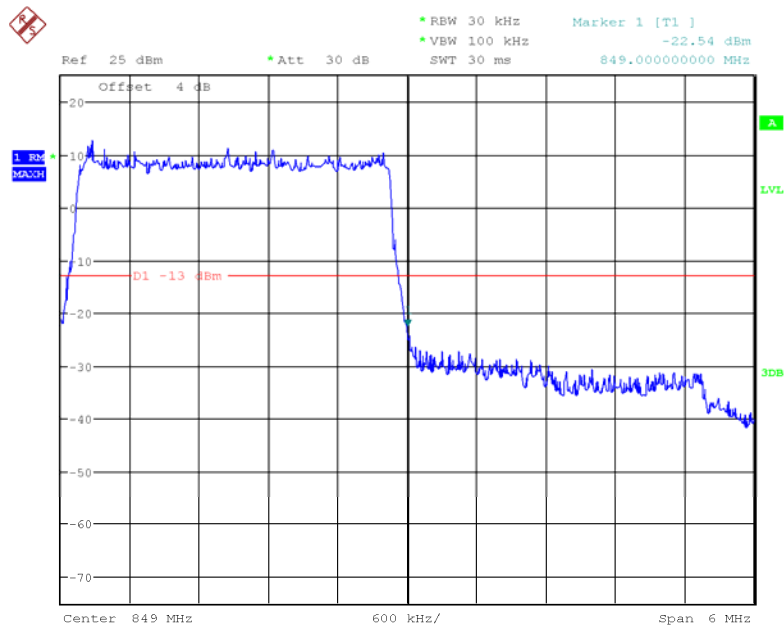
Date: 31.OCT.2017 18:22:10

QPSK_3MHz_15 RB_Left



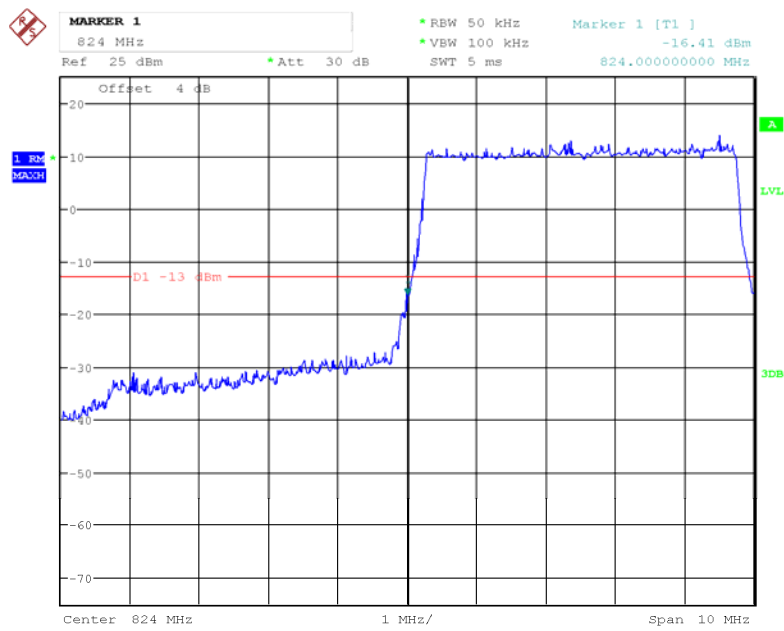
Date: 31.OCT.2017 18:33:16

QPSK_3MHz_15 RB_Right



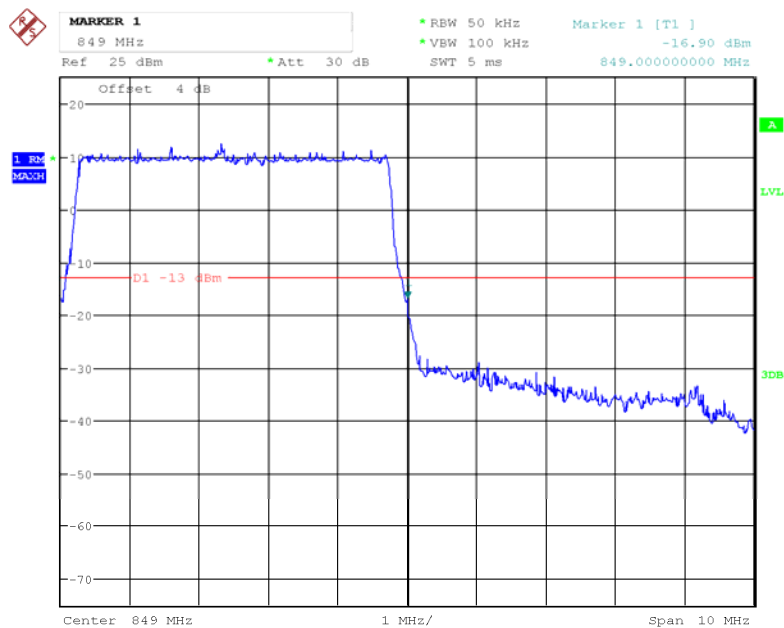
Date: 31.OCT.2017 18:28:31

QPSK_5MHz_25 RB_Left



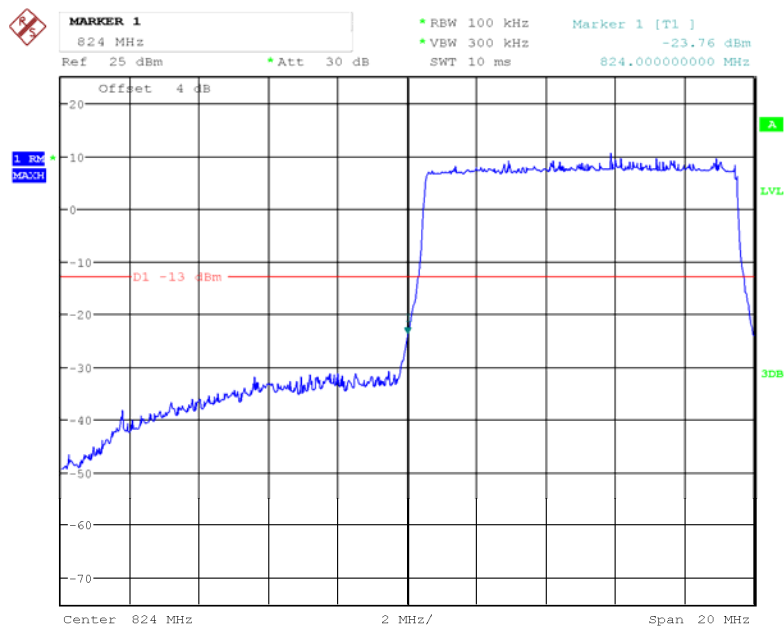
Date: 31.OCT.2017 18:39:09

QPSK_5MHz_25 RB_Right



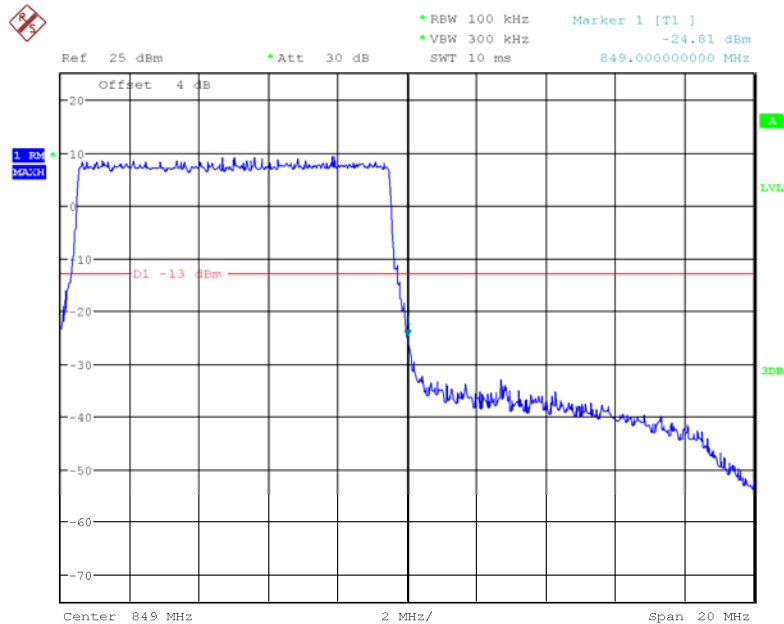
Date: 4.DEC.2017 09:32:23

QPSK_10MHz_50 RB_ Left



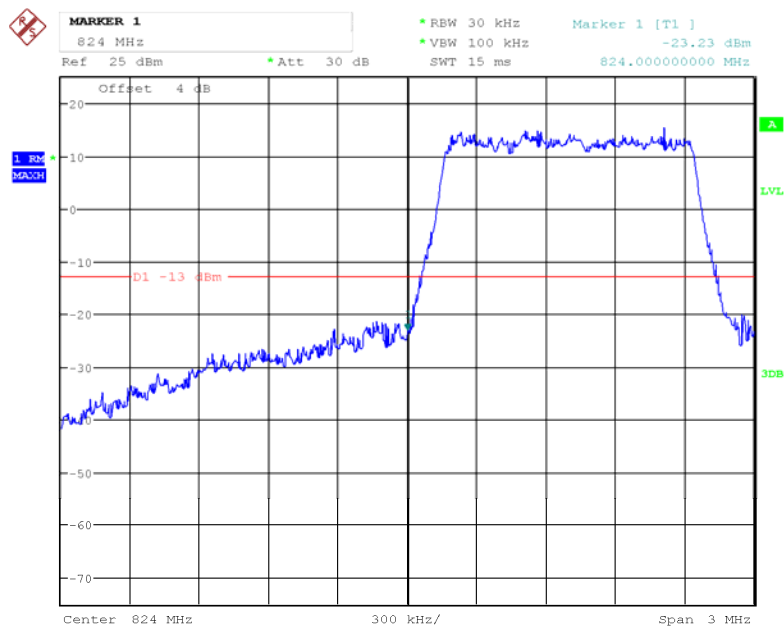
Date: 4.DEC.2017 08:35:18

QPSK_10MHz_50 RB_ Right



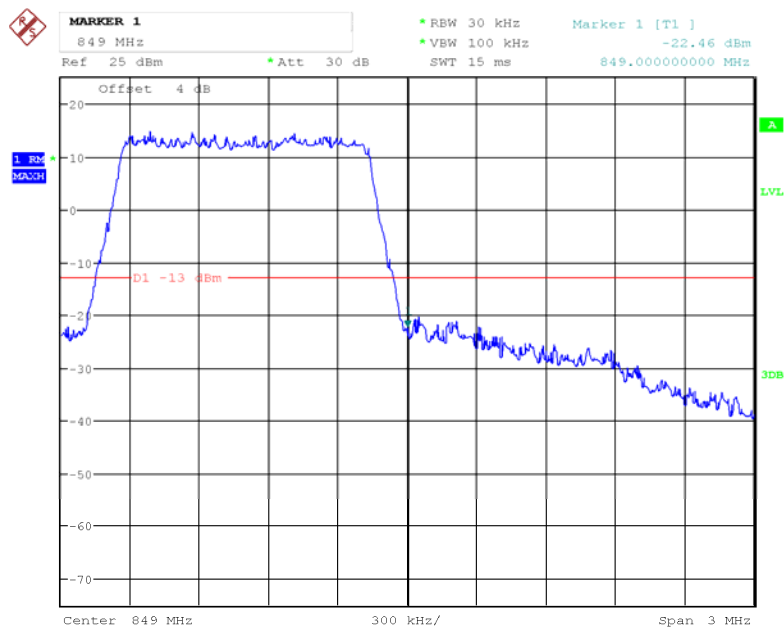
Date: 4.DEC.2017 08:38:57

16QAM_1.4MHz_6 RB_ Left



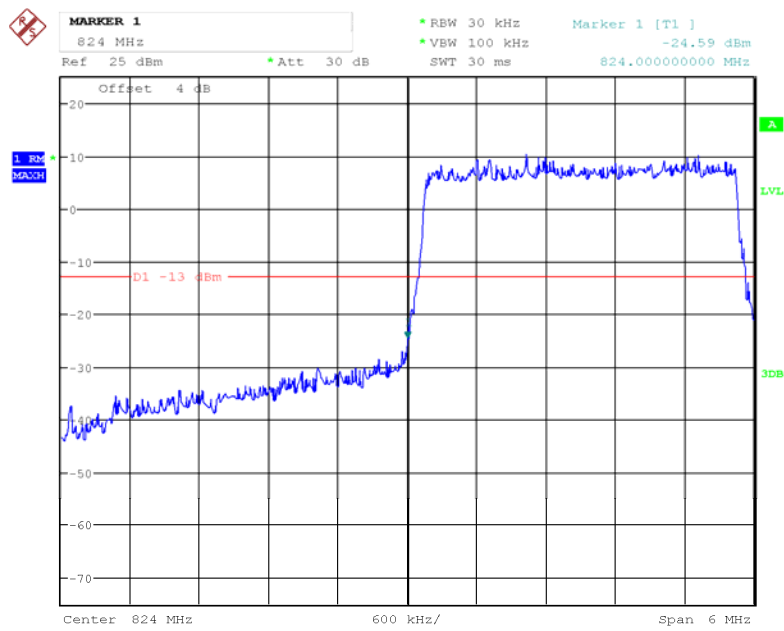
Date: 31.OCT.2017 18:18:33

16QAM_1.4MHz_6 RB_ Right



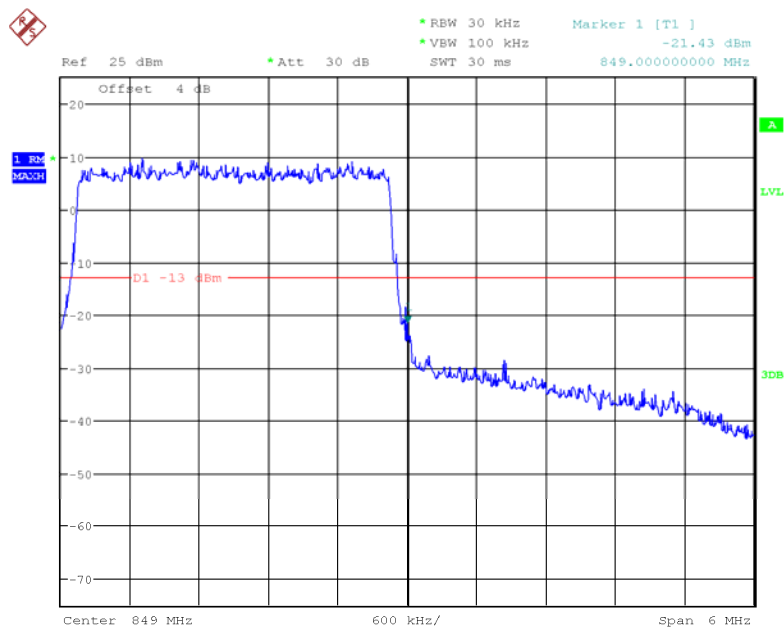
Date: 31.OCT.2017 18:21:45

16QAM_3MHz_15 RB_ Left



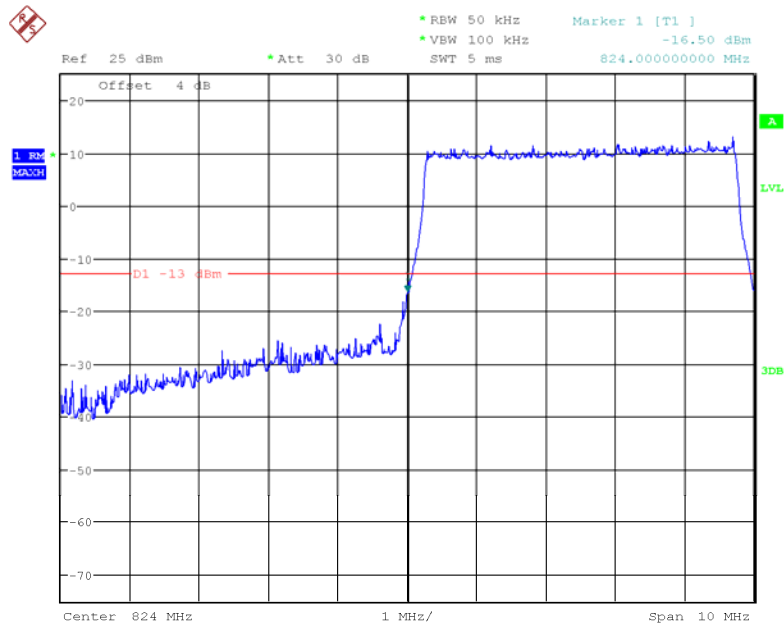
Date: 31.OCT.2017 18:32:45

16QAM_3MHz_15 RB_ Right



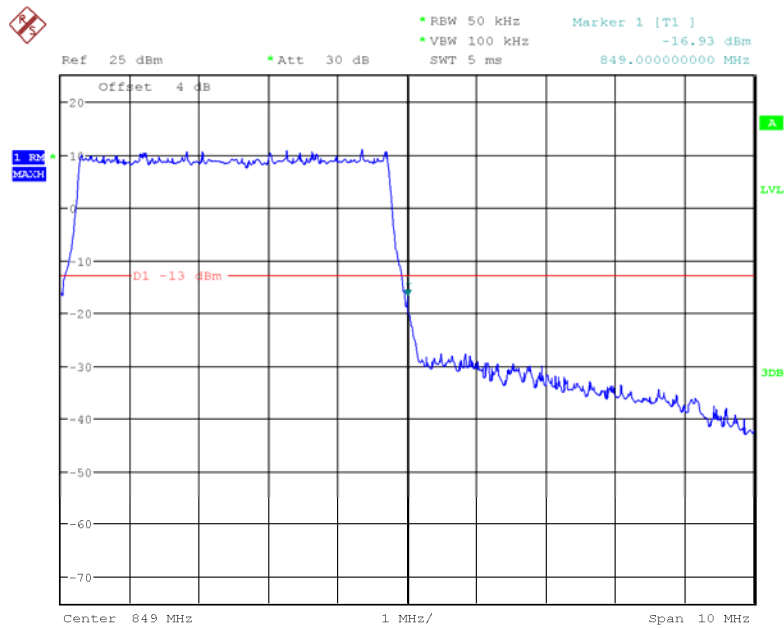
Date: 31.OCT.2017 18:28:49

16QAM_5MHz_25 RB_ Left



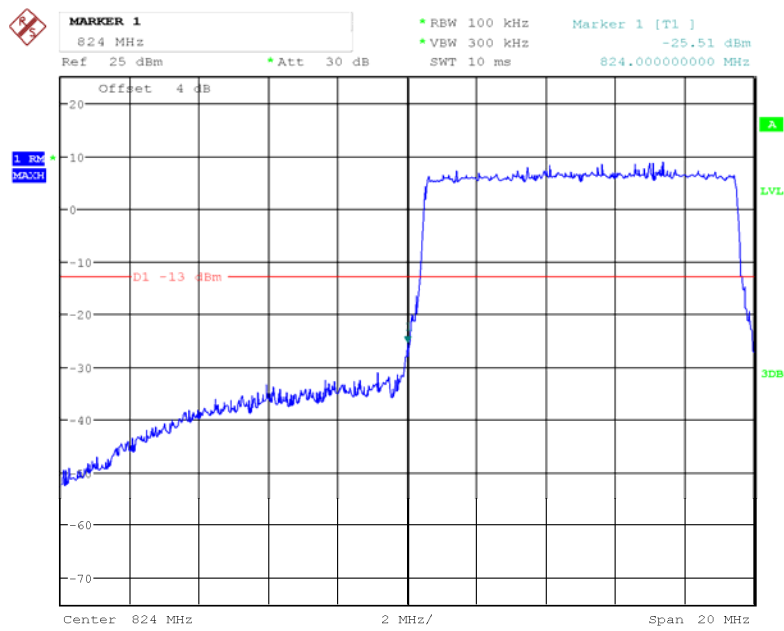
Date: 31.OCT.2017 18:40:07

16QAM_5MHz_25 RB_ Right



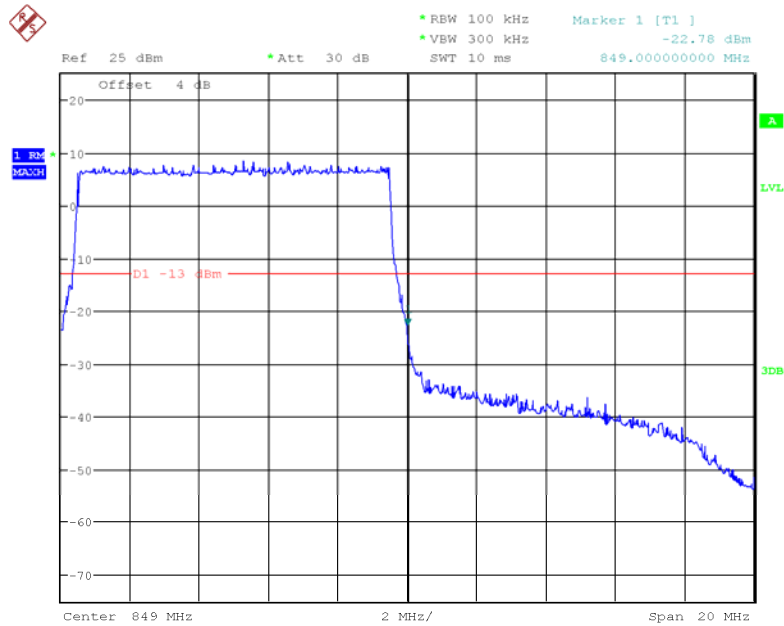
Date: 4.DEC.2017 09:33:21

16QAM_10MHz_ 50 RB_ Left



Date: 4.DEC.2017 08:36:37

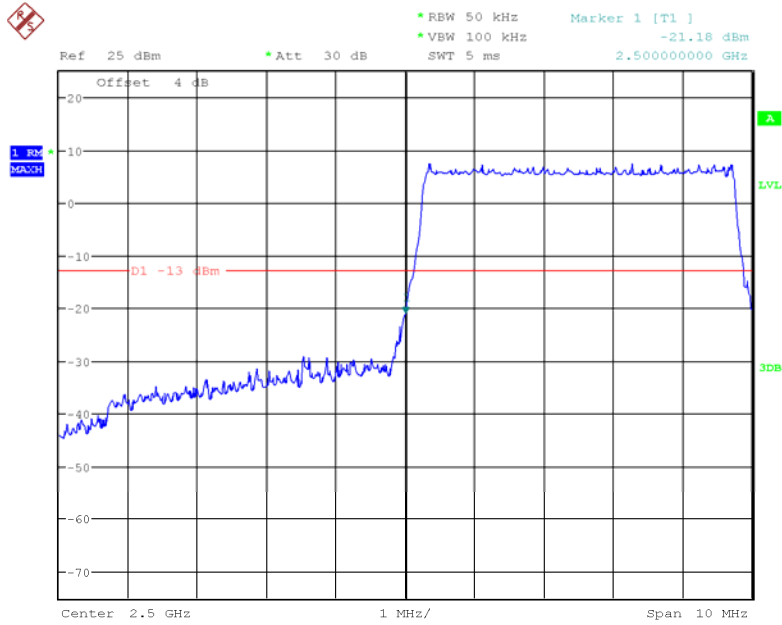
16QAM_10MHz_ 50 RB_ Right



Date: 4.DEC.2017 08:39:28

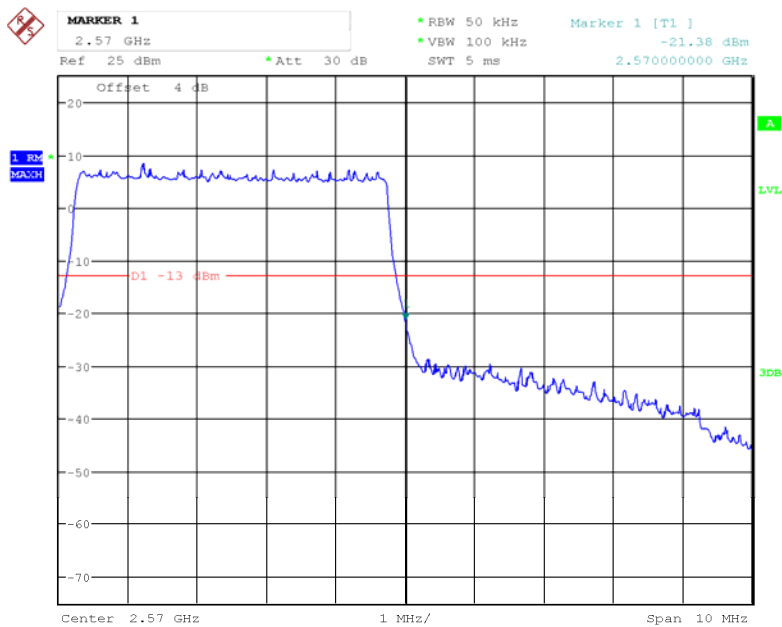
LTE Band VII

QPSK_5MHz_25 RB_ Left



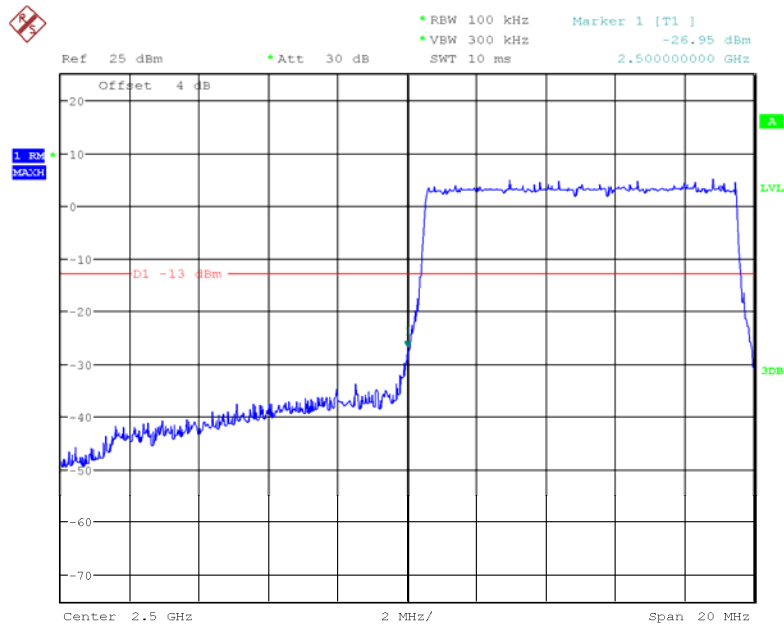
Date: 4.DEC.2017 08:47:55

QPSK_5MHz_25 RB_ Right



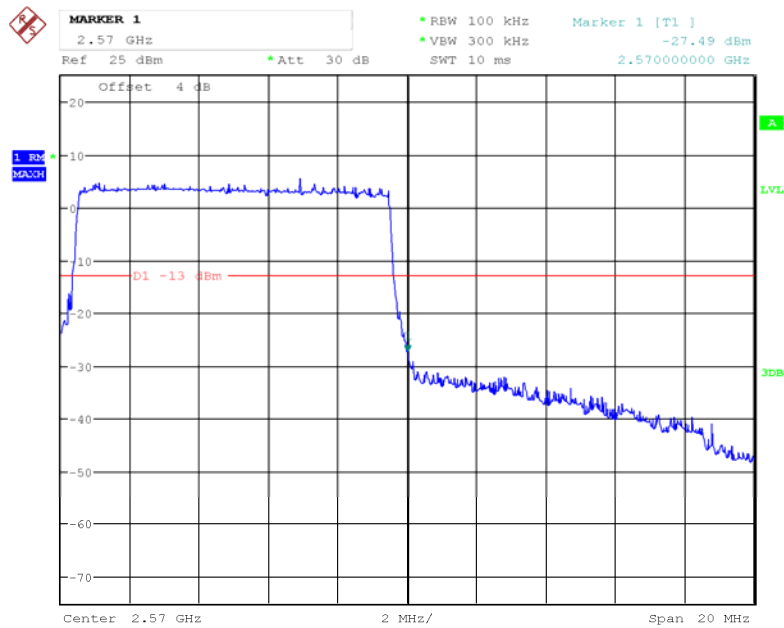
Date: 4.DEC.2017 08:57:57

QPSK_10MHz_50 RB_ Left



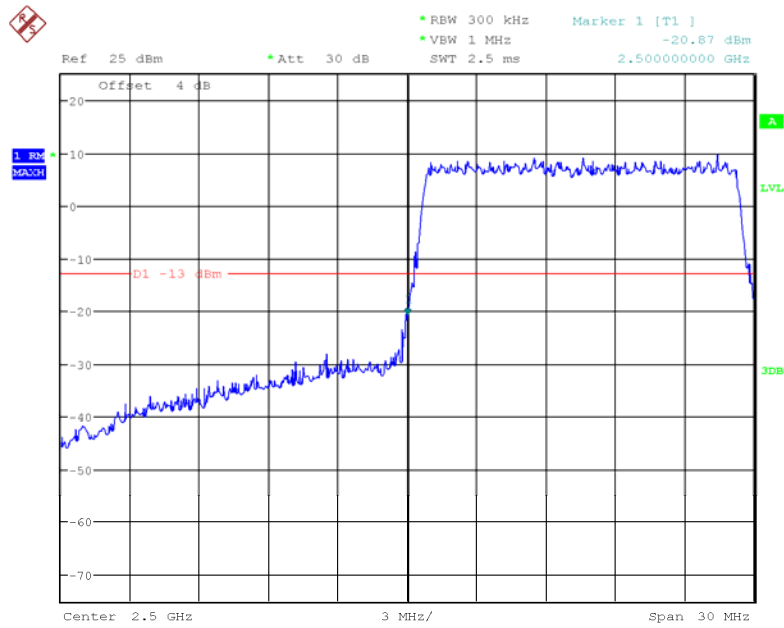
Date: 4.DEC.2017 09:10:26

QPSK_10MHz_50 RB_ Right



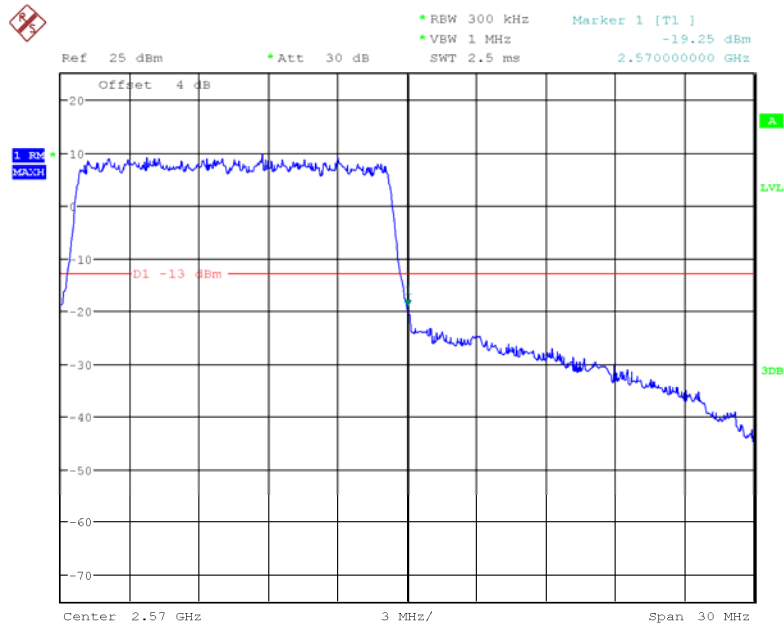
Date: 4.DEC.2017 09:08:16

QPSK_15MHz_75 RB_ Left



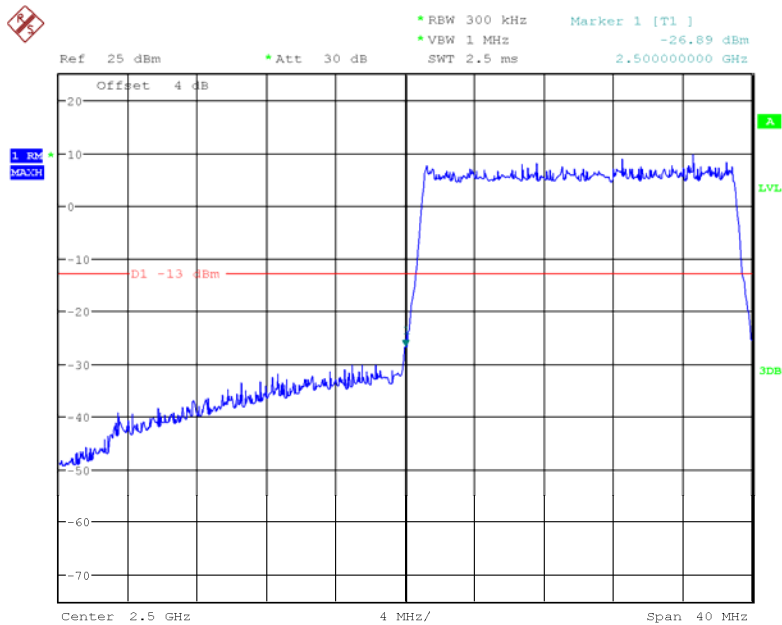
Date: 4.DEC.2017 09:14:26

QPSK_15MHz_75 RB_ Right



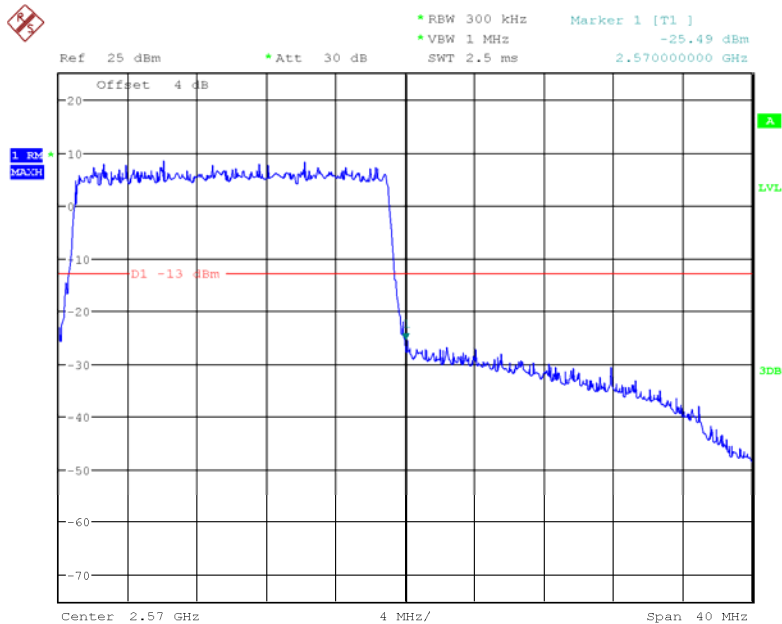
Date: 4.DEC.2017 09:16:32

QPSK_20MHz_FULL RB_Left



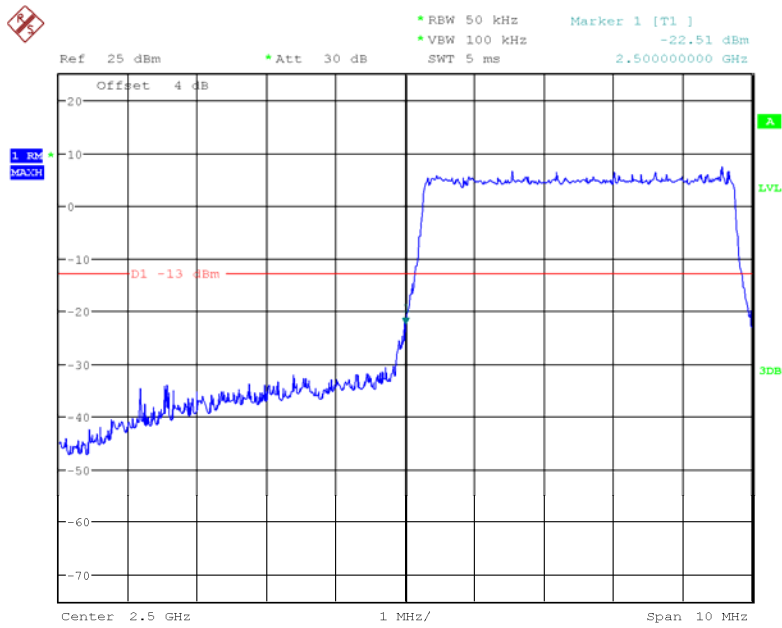
Date: 4.DEC.2017 09:21:57

QPSK_20MHz_FULL RB_Right



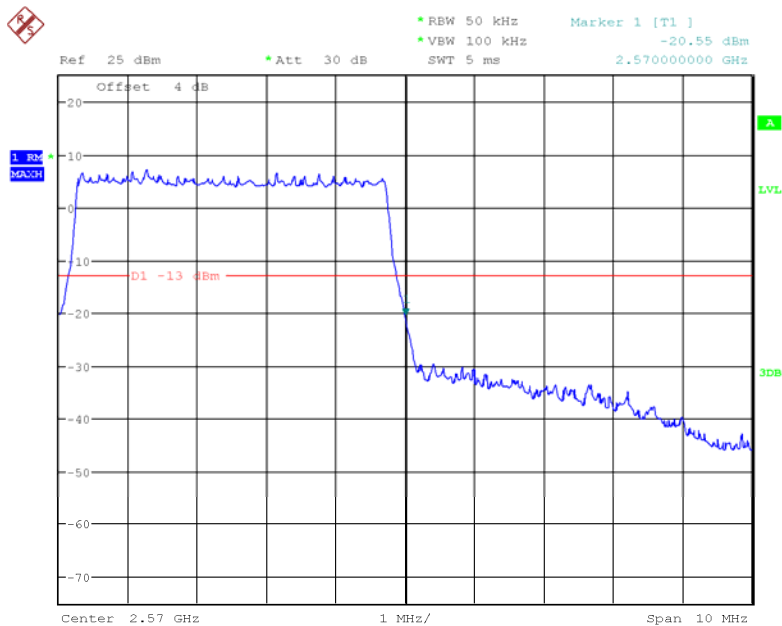
Date: 4.DEC.2017 09:20:05

16QAM_5MHz_25 RB_ Left



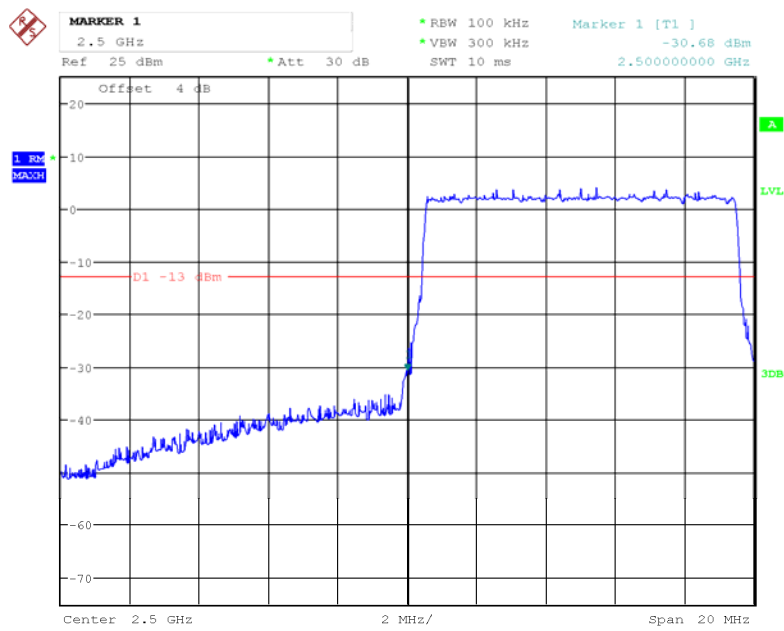
Date: 4.DEC.2017 08:47:03

16QAM_5MHz_25 RB_ Right



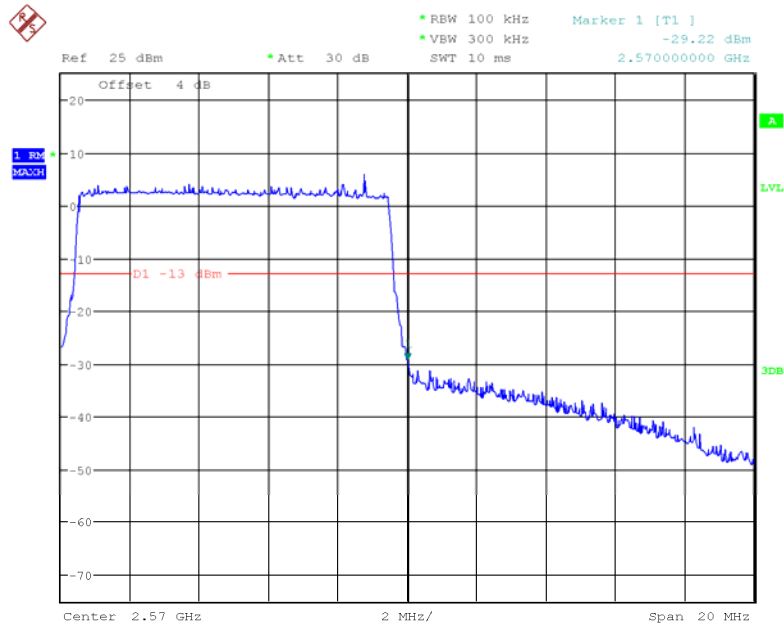
Date: 4.DEC.2017 09:02:47

16QAM_10MHz_ 50 RB_ Left



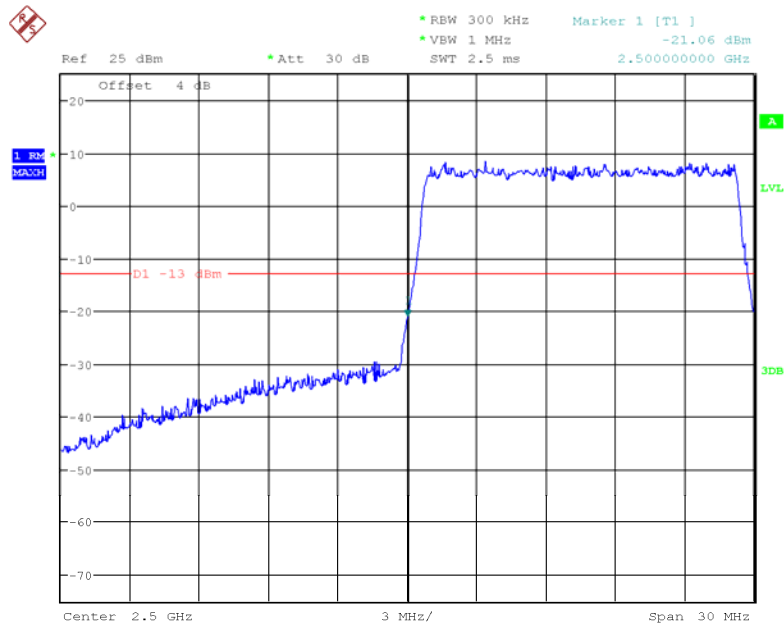
Date: 4.DEC.2017 09:10:06

16QAM_10MHz_ 50 RB_ Right



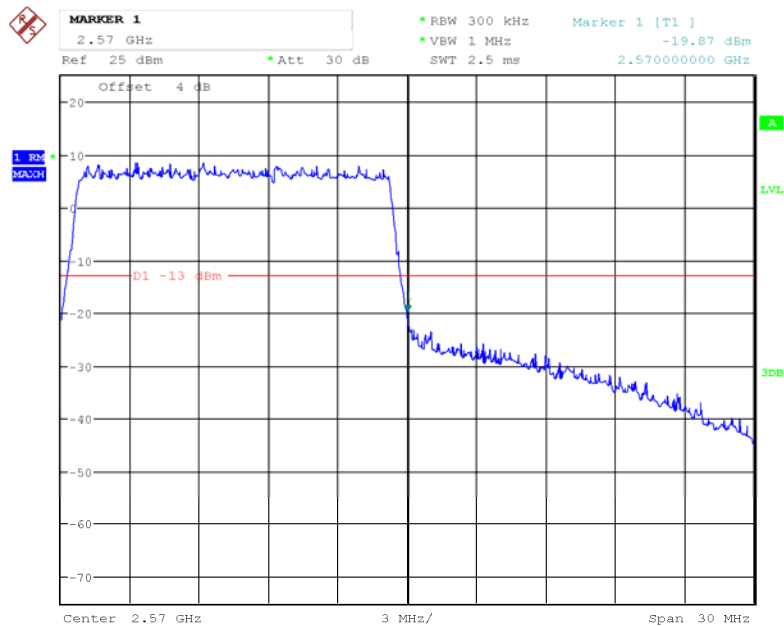
Date: 4.DEC.2017 09:09:05

16QAM_15MHz_ 75 RB_ Left



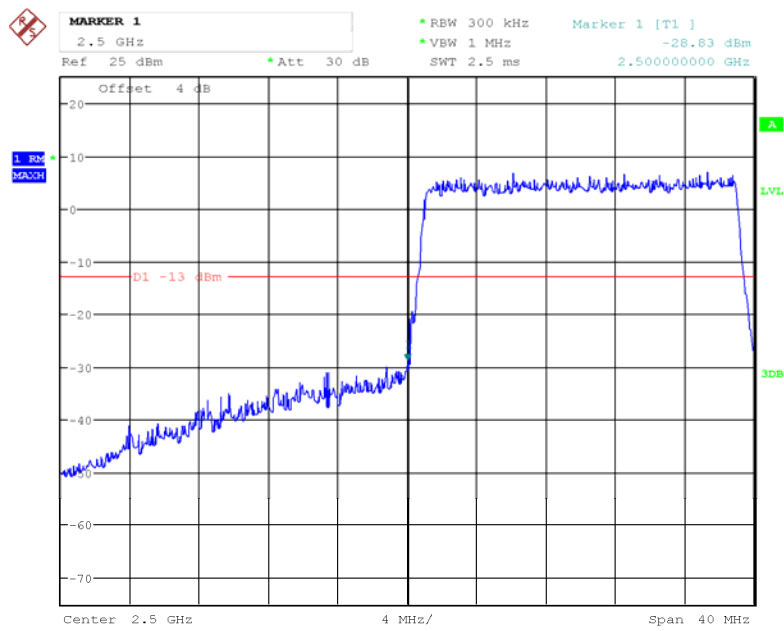
Date: 4.DEC.2017 09:15:05

16QAM_15MHz_ 75 RB_ Right



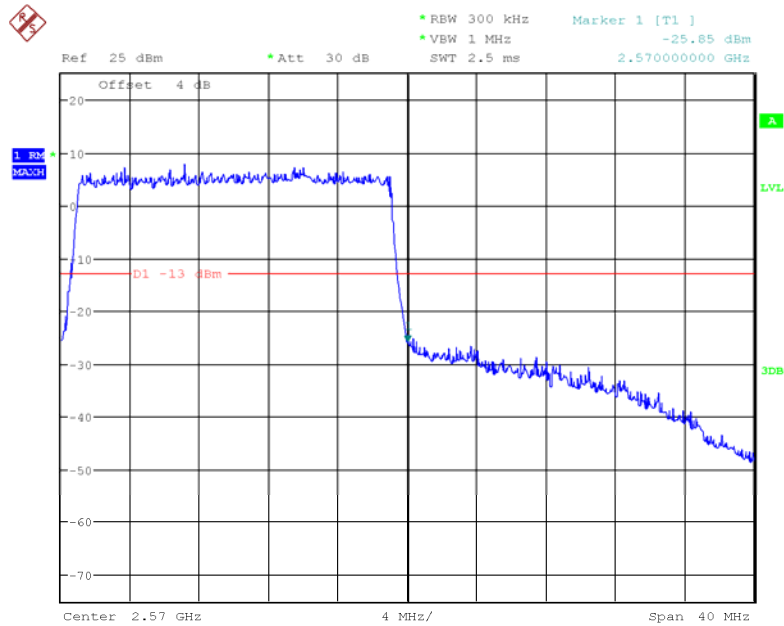
Date: 4.DEC.2017 09:15:58

16QAM_20MHz_ FULL RB_ Left



Date: 4.DEC.2017 09:21:34

16QAM_20MHz_ FULL RB_ Right



Date: 4.DEC.2017 09:20:40

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

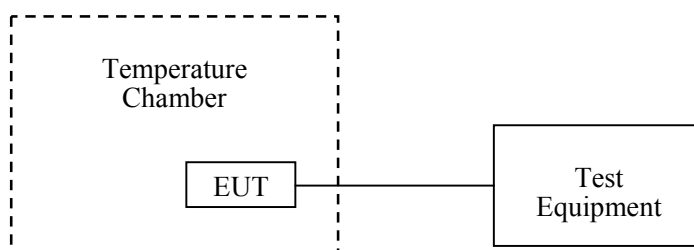
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

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 °C
Relative Humidity:	57 %
ATM Pressure:	101.1 kPa

The testing was performed by Kami Zhou on 2017-11-29.

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	20	0.024	2.5
-20		23	0.027	
-10		21	0.025	
0		25	0.030	
10		20	0.024	
20		23	0.027	
30		24	0.029	
40		20	0.024	
50		19	0.023	
25	4.35	23	0.027	
25	3.6	21	0.025	

8PSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	19	0.023	2.5
-20		17	0.020	
-10		16	0.019	
0		19	0.023	
10		15	0.018	
20		18	0.022	
30		19	0.023	
40		24	0.029	
50		21	0.025	
25	4.35	18	0.022	
25	3.6	22	0.026	

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	20	0.011	Pass
-20		23	0.012	
-10		24	0.013	
0		29	0.015	
10		21	0.011	
20		16	0.009	
30		19	0.010	
40		20	0.011	
50		23	0.012	
25	4.35	20	0.011	
25	3.6	24	0.013	

8PSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V _{DC}	Hz	ppm	
-30	3.8	21	0.011	Pass
-20		20	0.011	
-10		24	0.013	
0		21	0.011	
10		20	0.011	
20		23	0.012	
30		29	0.015	
40		30	0.016	
50		19	0.010	
25	4.35	30	0.016	
25	3.6	20	0.011	

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	2	0.001	Pass
-20		3	0.002	
-10		-2	-0.001	
0		0	0.000	
10		-1	-0.001	
20		3	0.002	
30		-1	-0.001	
40		2	0.001	
50		1	0.001	
25	4.35	-1	-0.001	
25	3.6	2	0.001	

WCDMA Band V: R99

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	-1	-0.001	2.5
-20		-3	-0.004	
-10		-5	-0.006	
0		-4	-0.005	
10		-10	-0.012	
20		-8	-0.010	
30		-5	-0.006	
40		-4	-0.005	
50		0	0.000	
25	4.35	-4	-0.005	
25	3.6	-2	-0.002	

LTE Band 2:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 1880$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-0.07	0.0000	Pass
-20		-0.15	-0.0001	Pass
-10		8.19	0.0044	Pass
0		1.06	0.0006	Pass
10		0.67	0.0004	Pass
20		8.67	0.0046	Pass
30		5.08	0.0027	Pass
40		3.64	0.0019	Pass
50		6.87	0.0037	Pass
25	4.35	8.19	0.0044	Pass
25	3.6	1.32	0.0007	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	2.02	0.0011	Pass
-20		0.83	0.0004	Pass
-10		3.98	0.0021	Pass
0		3.49	0.0019	Pass
10		-0.09	0.0000	Pass
20		0.21	0.0001	Pass
30		1.56	0.0008	Pass
40		2.86	0.0015	Pass
50		5.84	0.0031	Pass
25	4.35	0.21	0.0001	Pass
25	3.6	0.85	0.0005	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	5.87	0.0034	Pass
-20		6.67	0.0038	Pass
-10		4.66	0.0027	Pass
0		0.72	0.0004	Pass
10		8.58	0.0050	Pass
20		8.72	0.0050	Pass
30		1.83	0.0011	Pass
40		0.38	0.0002	Pass
50		0.60	0.0003	Pass
25	4.35	0.38	0.0002	Pass
25	3.6	4.33	0.0025	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	7.48	0.0043	Pass
-20		4.33	0.0025	Pass
-10		5.07	0.0029	Pass
0		2.68	0.0015	Pass
10		4.25	0.0025	Pass
20		1.29	0.0007	Pass
30		2.05	0.0012	Pass
40		3.01	0.0017	Pass
50		4.78	0.0028	Pass
25	4.35	2.05	0.0012	Pass
25	3.6	5.07	0.0029	Pass

LTE Band 5:

QPSK, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	7.60	0.0091	2.5
-20		6.21	0.0074	
-10		0.30	0.0004	
0		0.83	0.0010	
10		3.64	0.0044	
20		3.74	0.0045	
30		6.57	0.0079	
40		8.26	0.0099	
50		8.87	0.0106	
25	4.35	3.74	0.0045	
25	3.6	8.24	0.0099	

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 836.5$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	12.98	0.0155	2.5
-20		9.54	0.0114	
-10		8.60	0.0103	
0		10.46	0.0125	
10		10.20	0.0122	
20		6.97	0.0083	
30		5.03	0.0060	
40		10.79	0.0129	
50		11.39	0.0136	
25	4.35	5.03	0.0060	
25	3.6	12.49	0.0049	

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	10.11	0.0040	Pass
-20		9.21	0.0036	Pass
-10		8.01	0.0032	Pass
0		7.82	0.0031	Pass
10		8.65	0.0034	Pass
20		3.00	0.0012	Pass
30		9.24	0.0036	Pass
40		5.95	0.0023	Pass
50		3.24	0.0013	Pass
25	4.35	5.95	0.0023	Pass
25	3.6	10.40	0.0041	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c=2535$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	4.35	0.78	0.0003	Pass
-20		2.02	0.0008	Pass
-10		-1.25	-0.0005	Pass
0		-0.57	-0.0002	Pass
10		3.18	0.0013	Pass
20		2.02	0.0008	Pass
30		-0.34	-0.0001	Pass
40		-3.42	-0.0013	Pass
50		3.45	0.0014	Pass
25	3.8	-0.34	-0.0001	Pass
25	3.6	2.86	0.0011	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 *******