



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

For

Solnik S.A.

Dr. Emilio Ravignani 1724 C.A.B.A. –Republic Argentina

FCC ID: 2AFRUHY3-3911

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The **Solnik S.A.** 's product, model number: **HY3-3911 (FCC ID: 2AFRUHY3-3911)** (the "EUT") in this report was a **Mobile Phone**, which was measured approximately: 14.43 cm (L) × 7.24 cm (W) × 1.09 cm (H), rated input voltage: DC3.8V battery or DC5V Charging from adapter.

Adapter#1 Information:

Model: DCC-0012

Input: 100-240V~50/60Hz 0.15A

Output: DC5.0V, 1A

Adapter#2 Information:

Model: DCC-0010

Input: 100-240V~50/60Hz 0.25A

Output: DC5.0V, 1.55A

**All measurement and test data in this report was gathered from final production sample, serial number: 170428003 (assigned by the BACL, Chengdu). It may have deviation from any other sample. The EUT supplied by the applicant was received on 2017-04-28, and EUT conformed to test requirement.*

Objective

This report is prepared on behalf of **Solnik S.A.** in accordance with: Part 2-Subpart J, Part 22-Subpart H, Part 24-Subpart E and part 27 of the Federal Communications Commission's 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 15B JBP submissions with FCC ID: 2AFRUHY3-3911.

FCC Part 15C DTS submissions with FCC ID: 2AFRUHY3-3911.

FCC Part 15C DSS submissions with FCC ID: 2AFRUHY3-3911.

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, Part 22 Subpart H, Part 24 Subpart E and Part 27.

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

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Chengdu).

Test Facility

The test site used by BACL to collect test data is located in the No.5040, Huilongwan Plaza, No.1, Shawan Road, Jinniu District, Chengdu, Sichuan, China.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on April 24, 2015. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 560332. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

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.

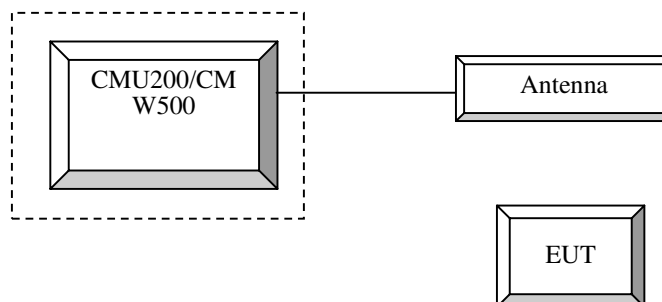
Equipment Modifications

No modification was made to the EUT.

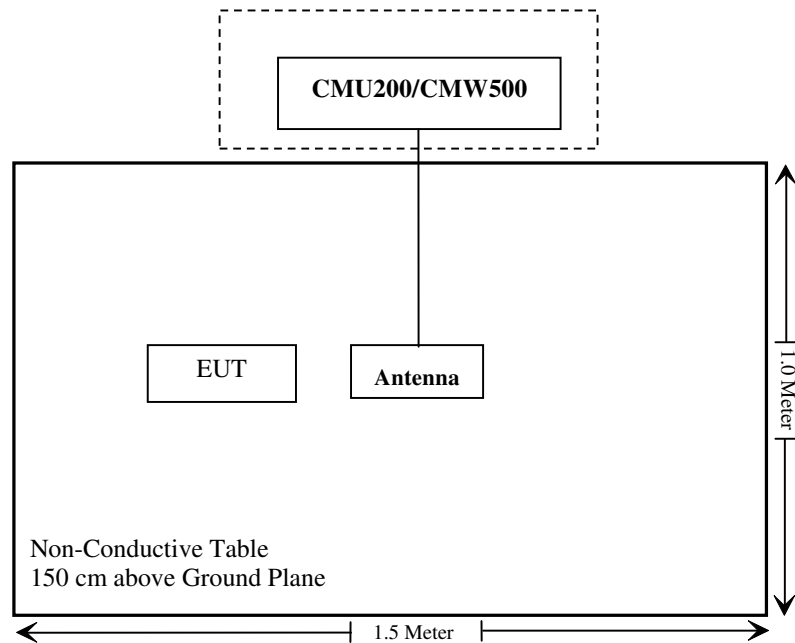
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	11-9435686-111
R&S	Wideband Radio Communication Tester	CMW500	106891
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	Spurious Radiation Emissions	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: RDG170428003-20A.

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 FCC §2.1046 and §27.50 (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.

According to FCC §2.1046 and §27.50 (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.

According to FCC §2.1046 and §27.50 (h)(2) Mobile and other user stations. Mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

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.

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 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 6.6.3.3.2	13	10	Table 6.2.4-2	Table 6.2.4-2
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	Table 6.2.4-3
NS_11	6.6.2.2.1	23 ¹	1.4, 3, 5, 10	Table 6.2.4-5	Table 6.2.4-5
..					
NS_32	-	-	-	-	-

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

Radiated method:

ANSI/TIA 603-D section 2.2.17

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A121808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
EMCO	Adjustable Dipole Antenna	3121C	9109-258	N/A	N/A
HP	Signal Generator	8648C	3623A04150	2017-05-23	2018-05-22
WILTRON	SWEPT FREQUENCY SYNTHESIZER	6737	213001	2017-05-23	2018-05-22
EMCT	Semi-Anechoic Chamber	966	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (above 1GHz)	Unknown	NO.2	2016-11-10	2017-11-09
R&S	Universal Radio Communication Tester	CMU200	11-9435686-111	2016-07-28	2017-07-27
R&S	Wideband Radio Communication Tester	CMW500	106891	2016-11-23	2017-11-23

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	24.9 °C
Relative Humidity:	54.2 %
ATM Pressure:	100.6 kPa

The testing was performed by Kevin Hu on 2017-06-01.

Conducted Power

Cellular Band (Part 22H) & PCS Band (Part 24E)

Band	Channel No.	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	31.49	31.43	30.56	29.61	28.70	26.83	25.86	24.91	23.83
	190	31.67	31.59	30.61	29.73	28.81	26.79	25.81	24.90	23.91
	251	31.61	31.57	30.66	29.74	28.83	26.88	25.91	24.86	23.99
PCS	512	28.36	28.33	27.46	26.55	25.60	26.41	25.56	24.33	23.41
	661	28.41	28.36	27.41	26.49	25.59	26.34	25.44	24.39	23.40
	810	28.34	28.30	27.35	26.44	25.56	26.42	25.49	24.41	23.39

WCDMA Band II

Mode	3GPP Sub Test	Average Output Power (dBm)					
		Low Channel (Ave. Power)	Low Channel (PAR)	Middle Channel (Ave. Power)	Middle Channel (PAR)	High Channel (Ave. Power)	High Channel (PAR)
Rel 99 (QPSK)	1	23.31	2.72	23.40	2.88	23.42	2.80
HSDPA (QPSK)	1	22.46	3.01	22.51	2.93	22.55	2.85
	2	22.42	3.07	22.46	2.91	22.51	2.86
	3	22.41	3.12	22.49	2.94	22.52	2.84
	4	22.43	3.16	22.50	2.93	22.53	2.86
HSUPA (QPSK)	1	22.39	3.20	22.46	2.98	22.49	2.88
	2	22.36	3.21	22.49	3.01	22.45	2.91
	3	22.39	3.19	22.47	3.06	22.50	2.90
	4	22.41	3.22	22.52	3.10	22.51	2.89
	5	22.39	3.21	22.45	3.05	22.43	2.92
DC-HSDPA (QPSK)	1	22.12	3.26	22.43	3.13	22.41	2.94
	2	22.14	3.27	22.41	3.14	22.42	2.95
	3	22.11	3.25	22.42	3.10	22.39	2.97
	4	22.13	3.23	22.43	3.09	22.38	2.96
HSPA+ (16QAM)	1	22.01	3.70	22.39	3.14	22.36	3.03

WCDMA Band V

Mode	3GPP Sub Test	Average Output Power (dBm)					
		Low Channel (Ave. Power)	Low Channel (PAR)	Middle Channel (Ave. Power)	Middle Channel (PAR)	High Channel (Ave. Power)	High Channel (PAR)
Rel 99 (QPSK)	1	23.44	2.36	23.41	2.36	23.39	2.88
HSDPA (QPSK)	1	22.54	2.41	22.49	2.37	22.46	2.86
	2	22.52	2.42	22.48	2.39	22.41	2.83
	3	22.53	2.38	22.49	2.42	22.45	2.89
	4	22.51	2.44	22.47	2.44	22.39	2.91
HSUPA (QPSK)	1	22.49	2.45	22.47	2.25	22.38	2.93
	2	22.48	2.44	22.49	2.41	22.41	2.91
	3	22.51	2.43	22.46	2.39	22.40	2.90
	4	22.52	2.47	22.45	2.46	22.41	2.94
	5	22.53	2.41	22.47	2.44	22.43	2.91
DC-HSDPA (QPSK)	1	22.48	2.49	22.43	2.5	22.39	2.96
	2	22.47	2.51	22.43	2.48	22.35	2.97
	3	22.46	2.53	22.42	2.51	22.38	3.00
	4	22.47	2.48	22.41	2.52	22.37	3.01
HSPA+ (16QAM)	1	22.45	2.57	22.40	2.55	22.40	3.05

LTE Band II (PART 24E)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.48	22.69	22.39
		1#3	22.33	22.68	22.22
		1#5	22.38	22.79	22.80
		3#0	22.69	22.47	22.41
		3#1	22.24	22.54	22.21
		3#3	22.79	22.26	22.44
		6#0	22.63	22.23	22.26
	16QAM	1#0	22.97	22.99	22.78
		1#3	22.93	22.97	22.89
		1#5	22.78	22.76	22.69
		3#0	22.85	22.89	22.86
		3#1	22.81	22.71	22.94
		3#3	22.7	22.69	22.95
		6#0	22.83	22.98	22.93
3 MHz	QPSK	1#0	22.71	22.36	22.34
		1#7	22.34	22.31	22.33
		1#14	22.45	22.38	22.80
		8#0	22.72	22.41	22.36
		8#4	22.31	22.45	22.77
		8#7	22.72	22.66	22.66
		15#0	22.74	22.16	22.48
	16QAM	1#0	22.97	22.99	22.78
		1#7	22.93	22.97	22.89
		1#14	22.78	22.76	22.69
		8#0	22.85	22.89	22.86
		8#4	22.81	22.71	22.94
		8#7	22.7	22.69	22.95
		15#0	22.83	22.98	22.93
5 MHz	QPSK	1#0	22.57	22.58	22.61
		1#12	22.71	22.36	22.22
		1#24	22.20	22.57	22.36
		12#0	22.46	22.72	22.38
		12#6	22.61	22.27	22.62
		12#11	22.33	22.28	22.65
		25#0	22.50	22.26	22.29
	16QAM	1#0	22.97	22.99	22.78
		1#12	22.93	22.97	22.89
		1#24	22.78	22.76	22.69
		12#0	22.85	22.89	22.86
		12#6	22.81	22.71	22.94
		12#11	22.7	22.69	22.95
		25#0	22.83	22.98	22.93

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
10 MHz	QPSK	1#0	22.80	22.42	22.67
		1#24	22.37	22.66	22.53
		1#49	22.62	22.17	22.22
		25#0	22.56	22.40	22.26
		25#12	22.29	22.32	22.15
		25#24	22.33	22.66	22.53
		50#0	22.80	22.79	22.25
	16QAM	1#0	22.97	22.99	22.78
		1#24	22.93	22.97	22.89
		1#49	22.78	22.76	22.69
		25#0	22.85	22.89	22.86
		25#12	22.81	22.71	22.94
		25#24	22.7	22.69	22.95
		50#0	22.83	22.98	22.93
15 MHz	QPSK	1#0	22.66	22.29	22.22
		1#37	22.63	22.33	22.70
		1#74	22.48	22.25	22.15
		36#0	22.75	22.79	22.71
		36#17	22.44	22.78	22.15
		36#35	22.34	22.20	22.47
		75#0	22.58	22.23	22.39
	16QAM	1#0	22.97	22.99	22.78
		1#37	22.93	22.97	22.89
		1#74	22.78	22.76	22.69
		36#0	22.85	22.89	22.86
		36#17	22.81	22.71	22.94
		36#35	22.7	22.69	22.95
		75#0	22.83	22.98	22.93
20 MHz	QPSK	1#0	22.40	22.56	22.42
		1#49	22.20	22.43	22.15
		1#99	22.48	22.60	22.56
		50#0	22.24	22.19	22.66
		50#24	22.21	22.22	22.49
		50#49	22.71	22.36	22.34
		100#0	22.28	22.39	22.39
	16QAM	1#0	22.97	22.99	22.78
		1#49	22.93	22.97	22.89
		1#99	22.78	22.76	22.69
		50#0	22.85	22.89	22.86
		50#24	22.81	22.71	22.94
		50#49	22.7	22.69	22.95
		100#0	22.83	22.98	22.93

LTE Band IV (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	1#0	22.98	22.90	23.00
		1#3	23.01	22.76	22.77
		1#5	22.68	22.75	22.98
		3#0	22.73	22.98	22.73
		3#1	22.91	22.79	22.94
		3#3	23.07	22.76	23.09
		6#0	22.95	22.83	22.69
	16QAM	1#0	23.34	23.3	23.04
		1#3	23.18	23.41	23.13
		1#5	23.32	23.1	23.31
		3#0	23.16	23.18	23.11
		3#1	23.28	23.43	23.04
		3#3	23.41	23.35	23.44
		6#0	23.35	23.33	23.44
3 MHz	QPSK	1#0	22.99	23.04	23.00
		1#7	22.67	22.76	22.72
		1#14	23.02	22.85	23.12
		8#0	22.99	22.69	23.05
		8#4	23.00	23.11	22.76
		8#7	22.77	23.05	23.03
		15#0	22.82	22.66	22.74
	16QAM	1#0	23.3	23.26	23.39
		1#7	23.25	23.19	23.18
		1#14	23.24	23.18	23.21
		8#0	23.05	23.25	23.07
		8#4	23.14	23.02	23.22
		8#7	23.04	23.13	23.31
		15#0	23.27	23.28	23.41
5 MHz	QPSK	1#0	23.03	22.76	22.88
		1#12	23.00	22.76	22.77
		1#24	23.08	22.89	22.84
		12#0	22.89	23.03	22.95
		12#6	22.73	22.79	22.80
		12#11	22.93	22.91	22.98
		25#0	22.87	22.80	23.05
	16QAM	1#0	23.25	23.33	23.12
		1#12	23.08	23.31	23.43
		1#24	23.11	23.31	23.26
		12#0	23.32	23.11	23.19
		12#6	23.02	23.39	23.37
		12#11	23.44	23.4	23.11
		25#0	23.05	23.04	23.3

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
10 MHz	QPSK	1#0	22.80	23.10	22.92
		1#24	22.82	22.67	22.88
		1#49	22.81	22.93	23.08
		25#0	23.11	22.83	22.86
		25#12	22.78	22.97	23.07
		25#24	23.12	23.12	22.94
		50#0	22.89	23.03	22.86
	16QAM	1#0	23.05	23.08	23.02
		1#24	23.17	23.03	23.3
		1#49	23.12	23.14	23.31
		25#0	23.46	23.38	23.23
		25#12	23.38	23.23	23.43
		25#24	23.25	23.05	23.3
		50#0	23.03	23.34	23.29
15 MHz	QPSK	1#0	23.11	22.82	22.86
		1#37	23.00	23.11	23.02
		1#74	22.69	23.00	22.96
		36#0	22.79	23.06	22.75
		36#17	22.73	23.03	22.67
		36#35	22.89	22.77	22.75
		75#0	22.94	22.68	22.70
	16QAM	1#0	23.12	23.03	23.22
		1#37	23.02	23.09	23.33
		1#74	23.44	23.32	23.21
		36#0	23.08	23.42	23.07
		36#17	23.12	23.26	23.16
		36#35	23.28	23.4	23.35
		75#0	23.19	23.01	23.22
20 MHz	QPSK	1#0	23.01	23.15	23.26
		1#49	23.25	23.51	23.31
		1#99	23.10	23.46	23.21
		50#0	22.68	22.69	22.72
		50#24	22.99	22.98	22.84
		50#49	23.03	23.01	22.87
		100#0	22.88	22.78	22.83
	16QAM	1#0	23.46	23.07	23.06
		1#49	23.02	23.25	23.37
		1#99	23.39	23.3	23.12
		50#0	23.41	23.43	23.02
		50#24	23.04	23.23	23.23
		50#49	23.44	23.19	23.15
		100#0	23.41	23.21	23.05

LTE Band VII (PART 27)

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.64	22.1	22.21
		1#12	22.08	22.64	22.59
		1#24	22.44	22.53	22.36
		12#0	22.47	22.29	22.34
		12#6	22.49	22.17	22.11
		12#11	22.52	22.2	22.29
		25#0	22.23	22.48	22.05
	16QAM	1#0	21.56	21.73	21.46
		1#12	21.91	21.92	21.82
		1#24	21.64	21.77	21.65
		12#0	21.78	21.57	21.54
		12#6	21.59	21.98	21.82
		12#11	21.88	21.75	21.60
		25#0	21.55	22.00	21.59
10 MHz	QPSK	1#0	22.49	22.2	22.5
		1#24	22.55	22.4	22.17
		1#49	22.28	22.43	22.53
		25#0	22.22	22.42	22.12
		25#12	22.32	22.17	22.26
		25#24	22.58	22.45	22.34
		50#0	22.38	22.48	22.1
	16QAM	1#0	21.48	21.74	21.46
		1#24	21.72	21.85	21.77
		1#49	21.86	21.65	21.90
		25#0	21.51	21.54	21.67
		25#12	21.64	21.57	21.92
		25#24	21.78	21.66	21.99
		50#0	21.50	21.49	21.77
15 MHz	QPSK	1#0	22.15	22.48	22.2
		1#37	22.49	22.04	22.23
		1#74	22.07	22.28	22.23
		36#0	22.4	22.59	22.47
		36#17	22.37	22.37	22.32
		36#35	22.41	22.05	22.15
		75#0	22.32	22.54	22.4
	16QAM	1#0	21.54	21.97	21.60
		1#37	21.74	21.81	21.74
		1#74	22.01	21.70	21.83
		36#0	21.48	21.64	21.97
		36#17	21.83	21.57	21.50
		36#35	21.96	21.91	21.94
		75#0	21.74	21.55	21.88

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
20 MHz	QPSK	1#0	22.44	22.18	22.08
		1#49	22.13	22.27	22.58
		1#99	22.41	22.11	22.54
		50#0	22.46	22.25	22.36
		50#24	22.07	22.25	22.05
		50#49	22.06	22.28	22.36
		100#0	22.35	22.33	22.14
	16QAM	1#0	21.94	21.68	21.46
		1#49	21.98	21.98	21.46
		1#99	21.87	21.87	21.45
		50#0	22.01	21.83	21.82
		50#24	21.84	21.90	22.00
		50#49	21.58	21.90	21.99
		100#0	21.61	21.78	21.76

PAR, Band II

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	3.88	4.52	4.92	13
	100 RB		6.32	6.40	6.20	13
16QAM	1 RB	20 MHz	4.60	5.32	5.64	13
	100 RB		7.04	7.08	7.00	13

PAR, Band IV

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.28	3.32	5.00	13
	100 RB		6.52	6.24	6.28	13
16QAM	1 RB	20 MHz	4.72	4.04	6.00	13
	100 RB		7.20	7.04	7.12	13

PAR, Band VII

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.72	4.88	4.32	13
	100 RB		6.28	6.20	6.32	13
16QAM	1 RB	20 MHz	5.48	5.60	4.96	13
	100 RB		7.08	7.08	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	98.41	23.5	0.0	1	22.5	38.5	16.0
836.600	V	103.09	31.3	0.0	1	30.3	38.5	8.2
EDGE 850_Middle Channel								
836.600	H	93.72	18.8	0.0	1	17.8	38.5	20.7
836.600	V	98.65	26.9	0.0	1	25.9	38.5	12.6
WCDMA Band V Middle Channel								
836.600	H	88.69	13.8	0.0	1	12.8	38.5	25.7
836.600	V	93.36	21.6	0.0	1	20.6	38.5	17.9

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	95.87	23.3	11.7	2.7	32.3	33.0	0.7
1880.000	V	92.76	20.3	11.7	2.7	29.3	33.0	3.7
EDGE 1900_Middle Channel								
1880.000	H	89.63	17	11.7	2.7	26.0	33.0	7.0
1880.000	V	88.19	15.7	11.7	2.7	24.7	33.0	8.3
WCDMA Band II Middle Channel								
1880.000	H	88.26	15.7	11.7	2.7	24.7	33.0	8.3
1880.000	V	85.93	13.5	11.7	2.7	22.5	33.0	10.5

LTE Band II

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	89.54	16.9	11.7	2.7	25.9	33.00	7.1
1880.000	V	88.45	16	11.7	2.7	25.0	33.00	8.0
QPSK 3 MHz Middle Channel								
1880.000	H	89.27	16.7	11.7	2.7	25.7	33.00	7.3
1880.000	V	88.66	16.2	11.7	2.7	25.2	33.00	7.8
QPSK 5 MHz Middle Channel								
1880.000	H	89.82	17.2	11.7	2.7	26.2	33.00	6.8
1880.000	V	88.13	15.7	11.7	2.7	24.7	33.00	8.3
QPSK 10 MHz Middle Channel								
1880.000	H	88.13	15.5	11.7	2.7	24.5	33.00	8.5
1880.000	V	86.22	13.8	11.7	2.7	22.8	33.00	10.2
QPSK 15 MHz Middle Channel								
1880.000	H	88.38	15.8	11.7	2.7	24.8	33.00	8.2
1880.000	V	87.08	14.6	11.7	2.7	23.6	33.00	9.4
QPSK 20 MHz Middle Channel								
1880.000	H	88.32	15.7	11.7	2.7	24.7	33.00	8.3
1880.000	V	87.54	14.1	11.7	2.7	24.1	33.00	8.9
16QAM 1.4 MHz Middle Channel								
1880.000	H	89.07	16.5	11.7	2.7	25.5	33.00	7.5
1880.000	V	88.32	15.9	11.7	2.7	24.9	33.00	8.1
16QAM 3 MHz Middle Channel								
1880.000	H	89.57	17	11.7	2.7	26.0	33.00	7.0
1880.000	V	87.68	15.2	11.7	2.7	24.2	33.00	8.8
16QAM 5 MHz Middle Channel								
1880.000	H	89.07	16.5	11.7	2.7	25.5	33.00	7.5
1880.000	V	86.22	13.8	11.7	2.7	22.8	33.00	10.2
16QAM 10 MHz Middle Channel								
1880.000	H	88.32	15.7	11.7	2.7	24.7	33.00	8.3
1880.000	V	86.22	13.8	11.7	2.7	22.8	33.00	10.2
16QAM 15 MHz Middle Channel								
1880.000	H	89.82	17.2	11.7	2.7	26.2	33.00	6.8
1880.000	V	88.13	15.7	11.7	2.7	24.7	33.00	8.3
16QAM 20 MHz Middle Channel								
1880.000	H	88.38	15.8	11.7	2.7	24.8	33.00	8.2
1880.000	V	87.54	14.1	11.7	2.7	24.1	33.00	8.9

LTE Band IV

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 1732.500 MHz								
1732.500	H	89.68	15.6	10.9	2.5	24.0	30.00	6.0
1732.500	V	87.03	12.7	10.9	2.5	21.1	30.00	8.9
16QAM 1.4M BW Middle Channel 1732.500 MHz								
1732.500	H	88.35	14.3	10.9	2.5	22.7	30.00	7.3
1732.500	V	86.07	11.7	10.9	2.5	20.1	30.00	9.9
QPSK 3M BW Middle Channel 1732.500 MHz								
1732.500	H	88.68	14.6	10.9	2.5	23.0	30.00	7.0
1732.500	V	86.77	12.4	10.9	2.5	20.8	30.00	9.2
16QAM 3M BW Middle Channel 1732.500 MHz								
1732.500	H	88.87	14.8	10.9	2.5	23.2	30.00	6.8
1732.500	V	86.49	12.1	10.9	2.5	20.5	30.00	9.5
QPSK 5M BW Middle Channel 1732.500 MHz								
1732.500	H	88.63	14.6	10.9	2.5	23.0	30.00	7.0
1732.500	V	86.57	12.2	10.9	2.5	20.6	30.00	9.4
16QAM 5M BW Middle Channel 1732.500 MHz								
1732.500	H	88.53	14.5	10.9	2.5	22.9	30.00	7.1
1732.500	V	86.87	12.5	10.9	2.5	20.9	30.00	9.1
QPSK 10M BW Middle Channel 1732.500 MHz								
1732.500	H	88.84	14.8	10.9	2.5	23.2	30.00	6.8
1732.500	V	86.37	12	10.9	2.5	20.4	30.00	9.6
16QAM 10M BW Middle Channel 1732.500 MHz								
1732.500	H	88.33	14.3	10.9	2.5	22.7	30.00	7.3
1732.500	V	86.95	12.6	10.9	2.5	21.0	30.00	9.0
QPSK 15M BW Middle Channel 1732.500 MHz								
1732.500	H	87.14	13.1	10.9	2.5	21.5	30.00	8.5
1732.500	V	85.33	11	10.9	2.5	19.4	30.00	10.6
16QAM 15M BW Middle Channel 1732.500 MHz								
1732.500	H	87.49	13.4	10.9	2.5	21.8	30.00	8.2
1732.500	V	85.56	11.2	10.9	2.5	19.6	30.00	10.4
QPSK 20M BW Middle Channel 1732.500 MHz								
1732.500	H	87.37	13.3	10.9	2.5	21.7	30.00	8.3
1732.500	V	85.95	11.6	10.9	2.5	20.0	30.00	10.0
16QAM 20M BW Middle Channel 1732.500 MHz								
1732.500	H	87.78	13.7	10.9	2.5	22.1	30.00	7.9
1732.500	V	85.73	11.4	10.9	2.5	19.8	30.00	10.2

LTE Band VII

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	86.35	13.7	13.1	3.1	23.7	33.00	9.3
2535.000	V	87.39	16.2	13.1	3.1	26.2	33.00	6.8
QPSK 10 MHz Middle Channel								
2535.000	H	86.53	13.9	13.1	3.1	23.9	33.00	9.1
2535.000	V	87.24	16.1	13.1	3.1	26.1	33.00	6.9
QPSK 15 MHz Middle Channel								
2535.000	H	85.36	12.8	13.1	3.1	22.8	33.00	10.2
2535.000	V	86.89	15.7	13.1	3.1	25.7	33.00	7.3
QPSK 20 MHz Middle Channel								
2535.000	H	85.61	13	13.1	3.1	23.0	33.00	10.0
2535.000	V	87.08	15.9	13.1	3.1	25.9	33.00	7.1
16QAM 5 MHz Middle Channel								
2535.000	H	86.05	13.4	13.1	3.1	23.4	33.00	9.6
2535.000	V	87.71	16.6	13.1	3.1	26.6	33.00	6.4
16QAM 10 MHz Middle Channel								
2535.000	H	86.19	13.6	13.1	3.1	23.6	33.00	9.4
2535.000	V	86.73	15.6	13.1	3.1	25.6	33.00	7.4
16QAM 15 MHz Middle Channel								
2535.000	H	85.22	12.6	13.1	3.1	22.6	33.00	10.4
2535.000	V	87.31	16.2	13.1	3.1	26.2	33.00	6.8
16QAM 20 MHz Middle Channel								
2535.000	H	85.89	13.3	13.1	3.1	23.3	33.00	9.7
2535.000	V	87.31	16.2	13.1	3.1	26.2	33.00	6.8

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

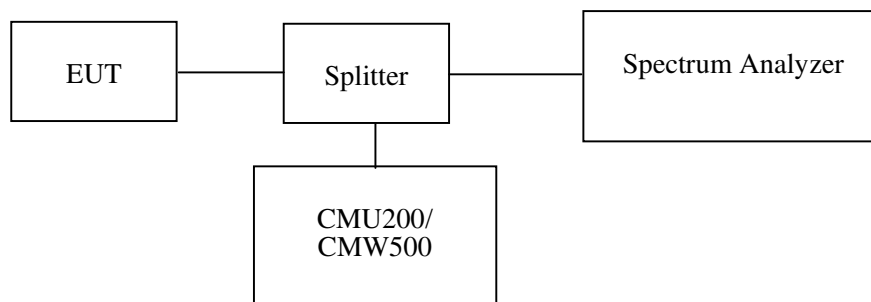
Applicable Standard

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

Test Procedure

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

The 26 dB & 99% bandwidth was recorded.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	NO.3	Each Time	/
Unknown	Two-way Splitter	Unknown	OE0120121	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	21.9~27.3°C
Relative Humidity:	49.5~50.1 %
ATM Pressure:	100.3~100.5kPa

The testing was performed by Kevin Hu from 2017-05-18 to 2017-05-23.

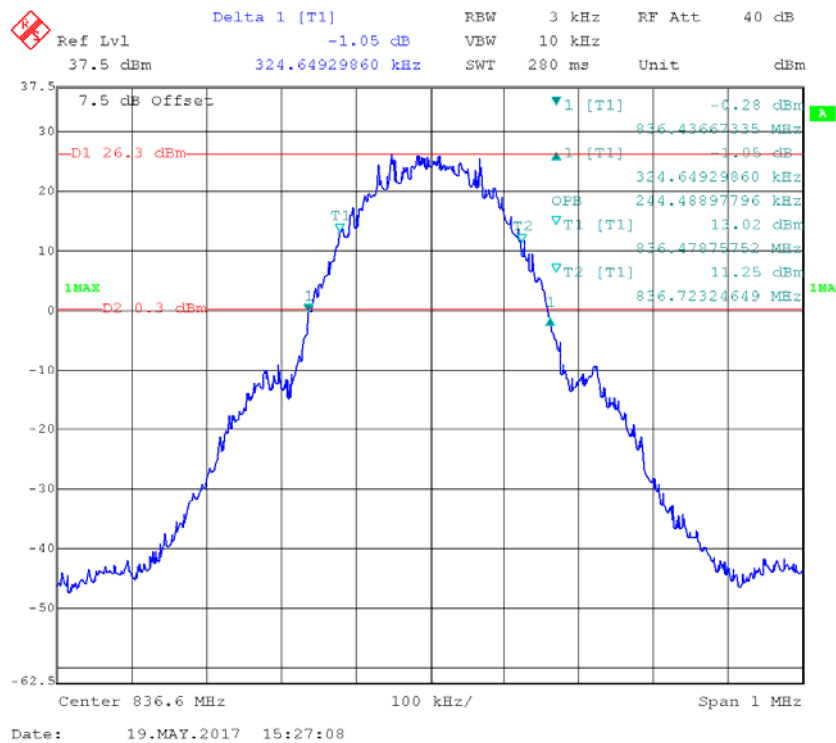
Test Mode: Transmitting

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

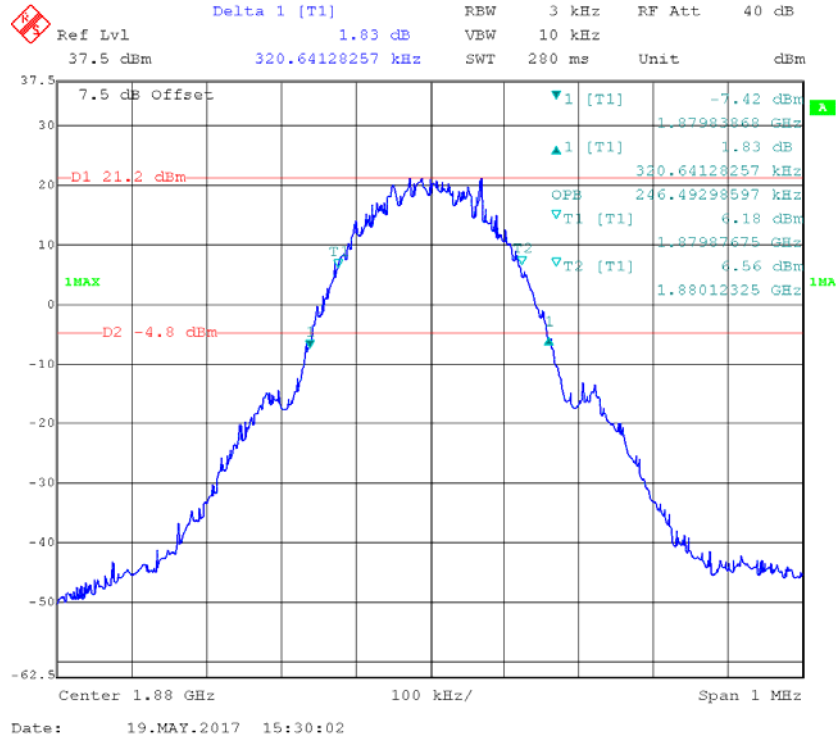
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.244	0.324
		EDGE	0.252	0.326
PCS		PCS	0.246	0.320
		EDGE	0.248	0.320
WCDMA Band II		Rel 99	4.208	4.929
		HSDPA	4.208	4.929
		HSUPA	4.208	4.929
WCDMA Band V		Rel 99	4.228	4.969
		HSDPA	4.228	4.969
		HSUPA	4.208	4.929

Band	Test Modulation	Test Bandwidth (MHz)	Test Channel	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
LTE Band II	QPSK	1.4	M	1.100	1.128
		3		2.753	3.099
		5		4.549	5.110
		10		9.058	10.300
		15		13.587	15.460
		20		18.116	20.040
	16QAM	1.4	M	1.112	1.295
		3		2.765	3.075
		5		4.529	5.130
		10		9.058	10.260
		15		13.527	15.280
		20		18.196	20.440
LTE Band IV	QPSK	1.4	M	1.106	1.286
		3		2.765	3.129
		5		4.549	5.117
		10		9.018	10.117
		15		13.527	15.077
		20		17.875	19.596
	16QAM	1.4	M	1.112	1.310
		3		2.753	3.069
		5		4.549	5.117
		10		9.018	10.157
		15		13.527	15.372
		20		18.036	19.836
LTE Band VII	QPSK	5M	M	4.549	5.130
		10M		9.018	10.230
		15M		13.527	15.330
		20M		18.116	20.070
	16QAM	5M		4.549	5.090
		10M		9.180	10.150
		15M		13.587	15.270
		20M		18.196	20.310

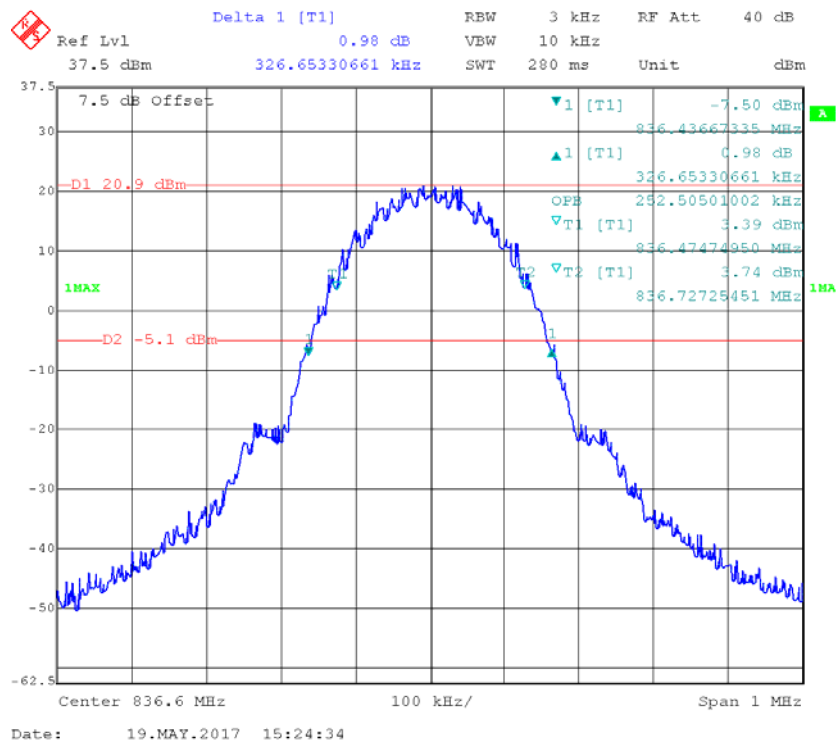
GMSK 850 Cellular Band



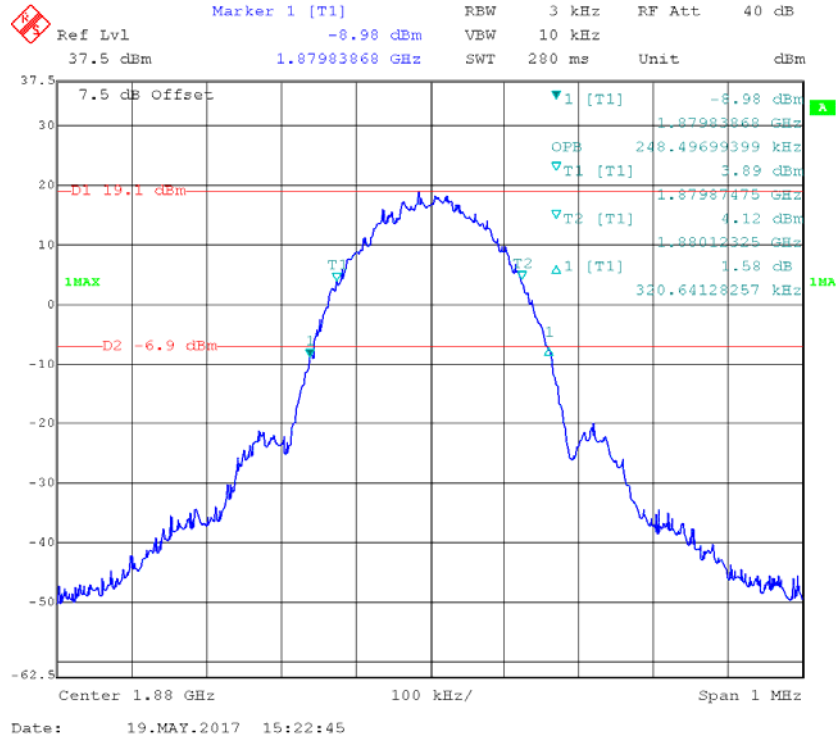
GMSK PCS Band



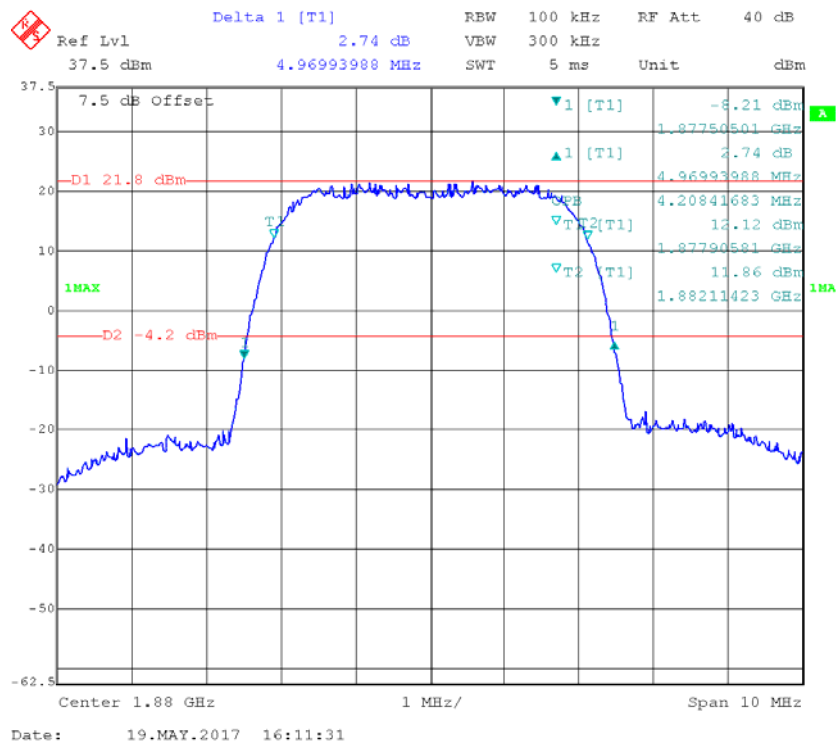
EDGE 850 Cellular Band



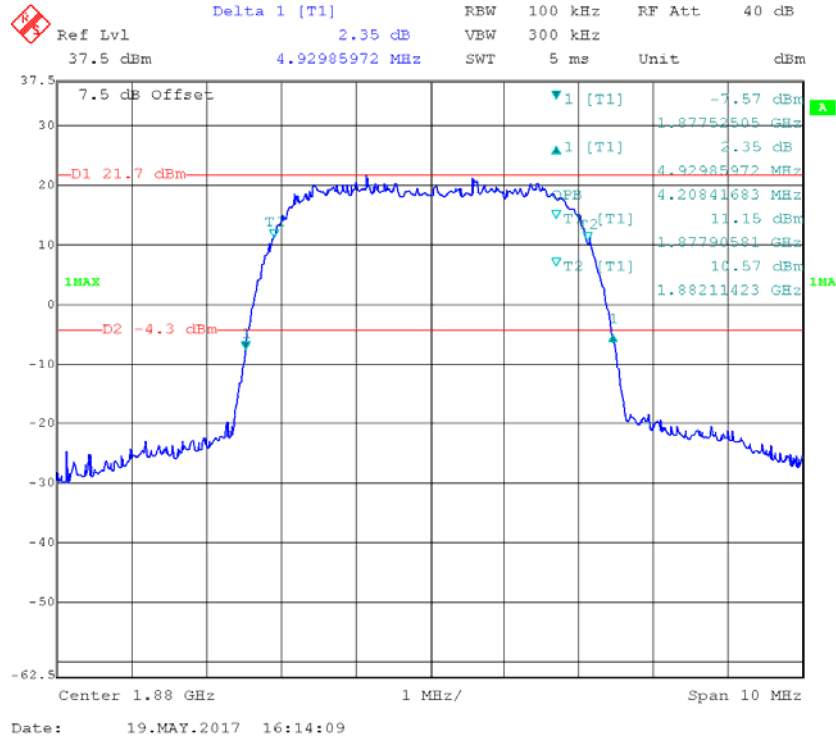
EDGE PCS Band



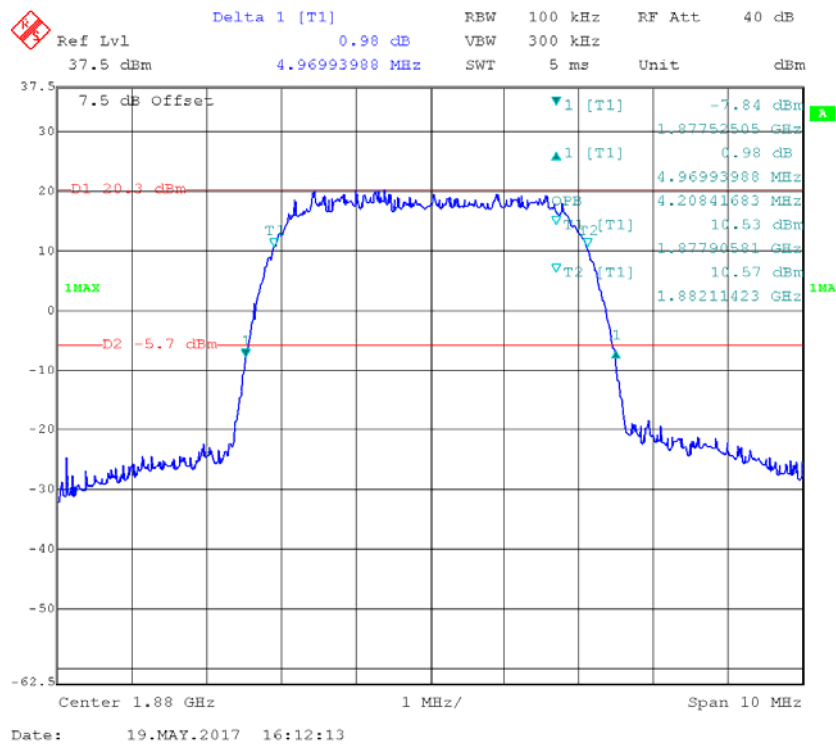
REL99 Band II



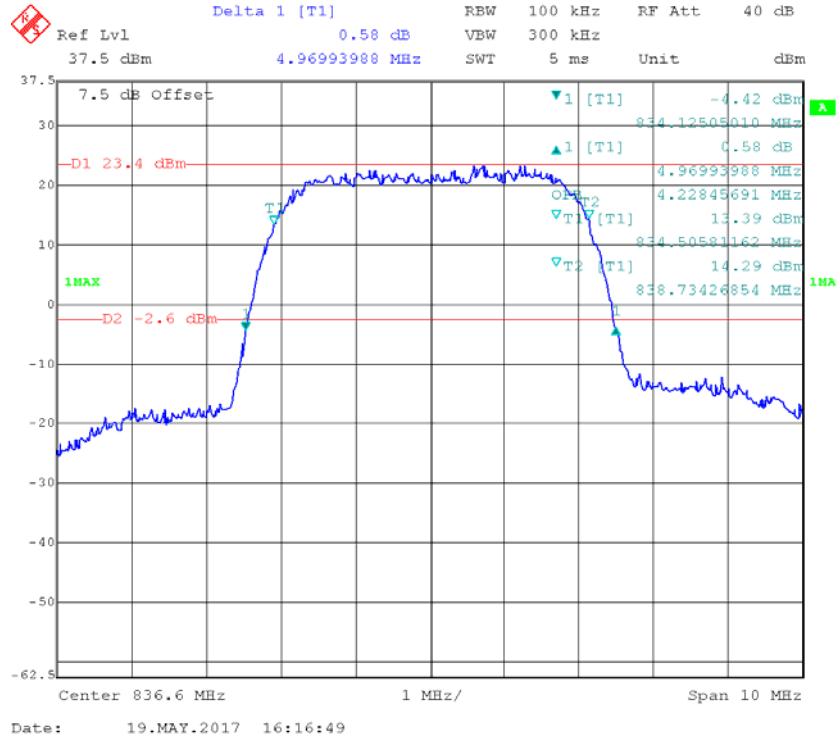
HSDPA Band II



HSUPA Band II

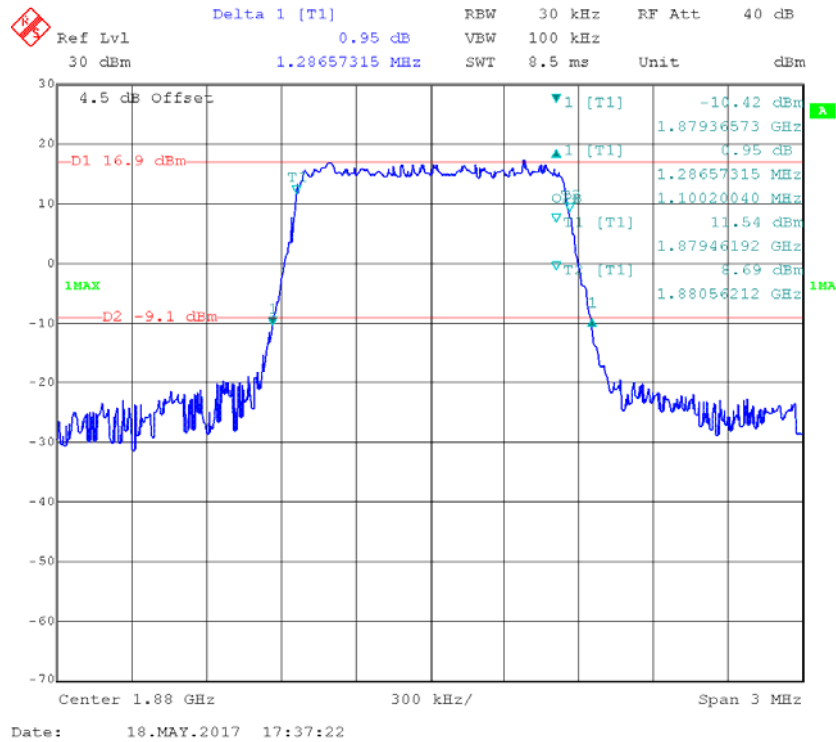


REL99 Band V

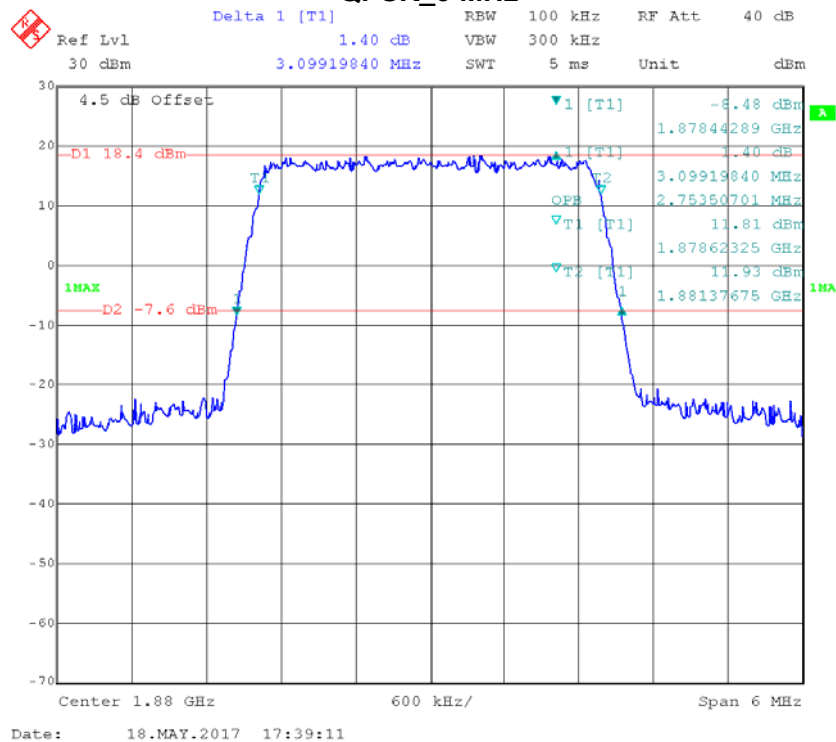


LTE Band II:

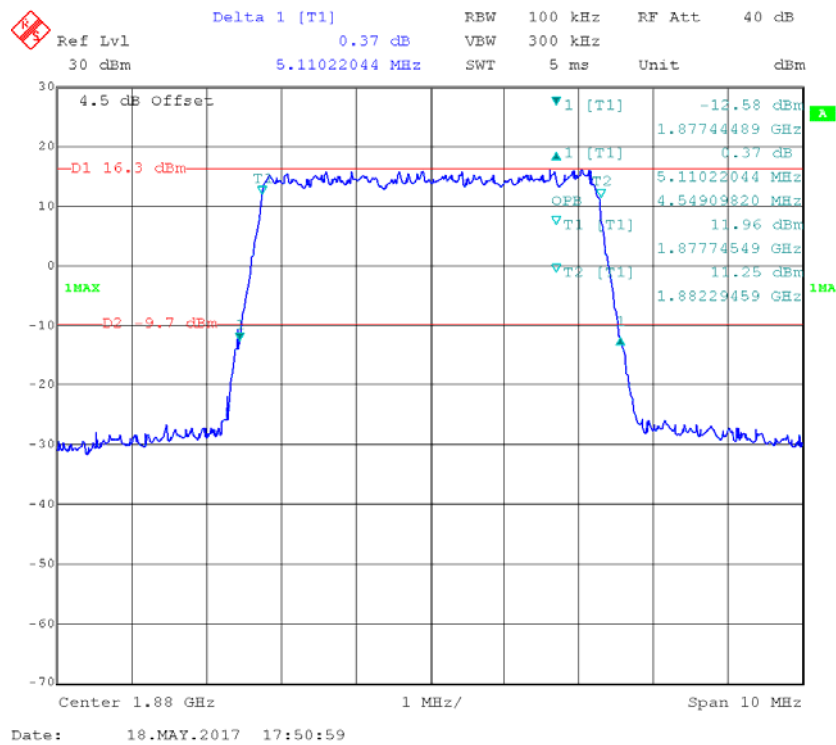
QPSK_1.4 MHz



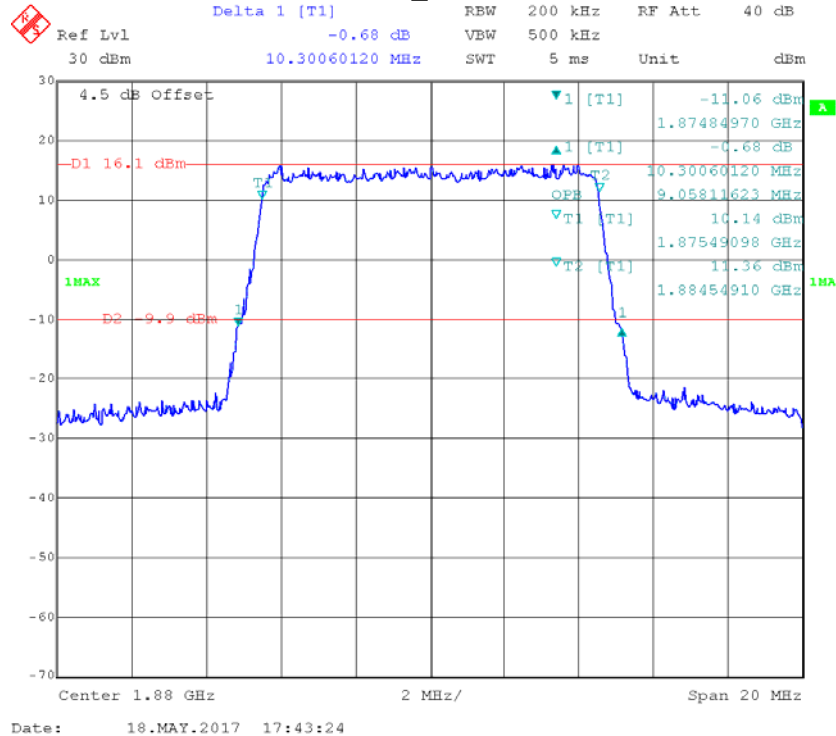
QPSK_3 MHz



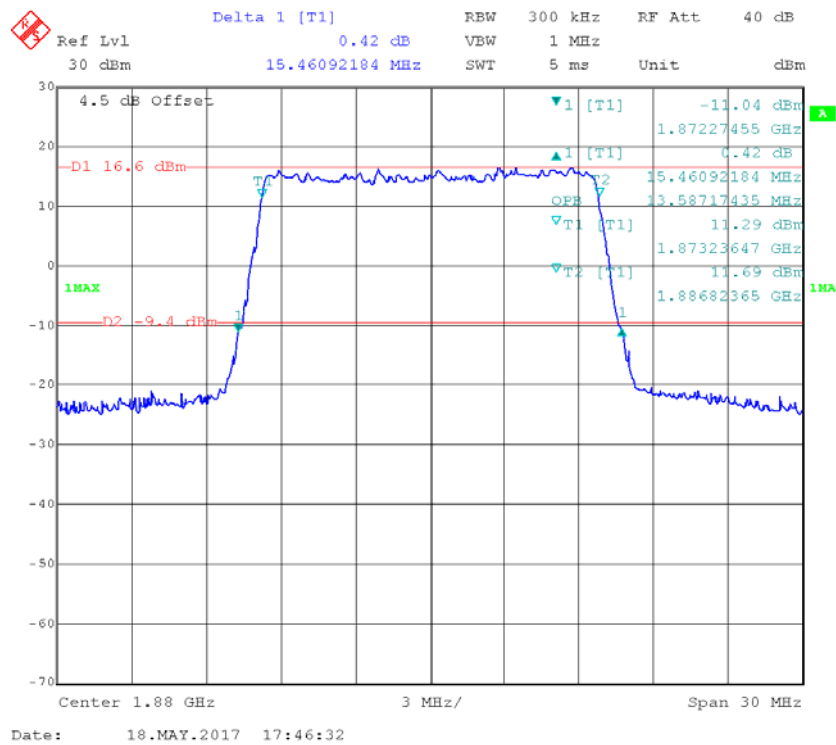
QPSK_5 MHz



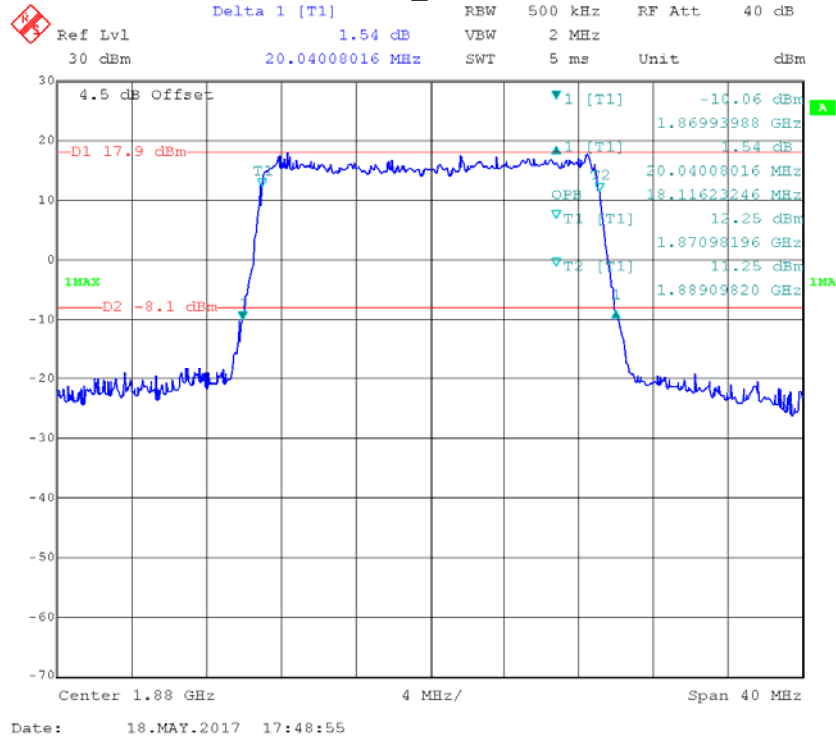
QPSK_10 MHz



QPSK_15 MHz



QPSK_20 MHz



Ref Lvl 30 dBm

Marker 1 [T1] -9.52 dBm

RBW 30 kHz

VBW 100 kHz

RF Att 40 dB

SWT 0.5 ms

Unit dBm

4.5 dB Offset

-D1 17.8 dBm

-D2 -8.2 dBm

1MAX

2MAX

Center 1.88 GHz

300 kHz/

Span 3 MHz

Date: 18.MAY.2017 17:36:35

Delta 1 [T1] 5.51 dB

Ref Lvl 30 dBm

RBW 100 kHz

VBW 300 kHz

SWT 5 ms

RF Att 40 dB

Unit dBm

4.5 dB Offset

D1 18 dBm

D2 -8 dBm

1MAX

1MAX

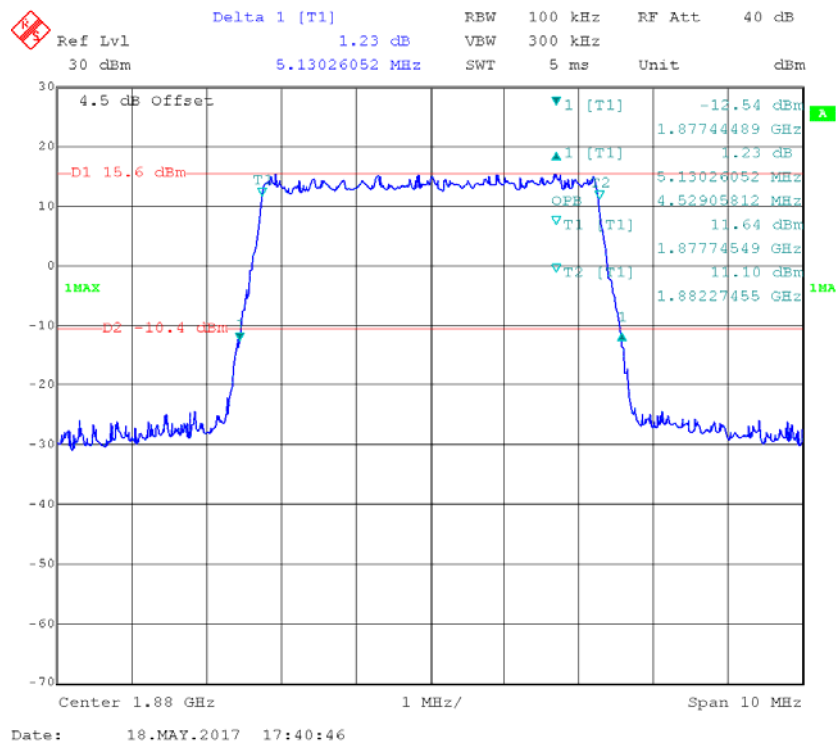
Center 1.88 GHz

600 kHz/

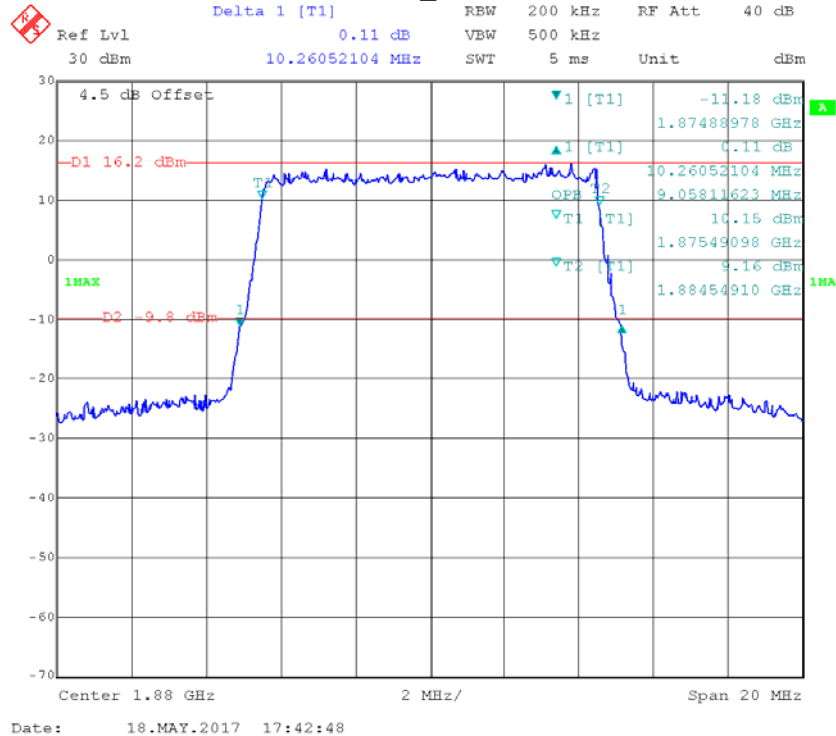
Span 6 MHz

Date: 18.MAY.2017 17:38:22

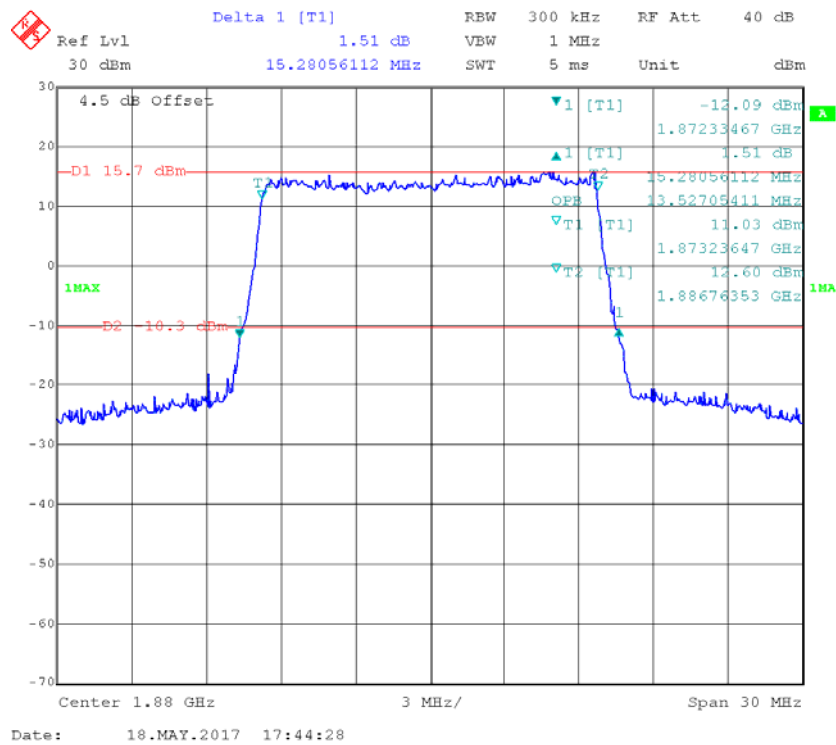
16QAM_5 MHz



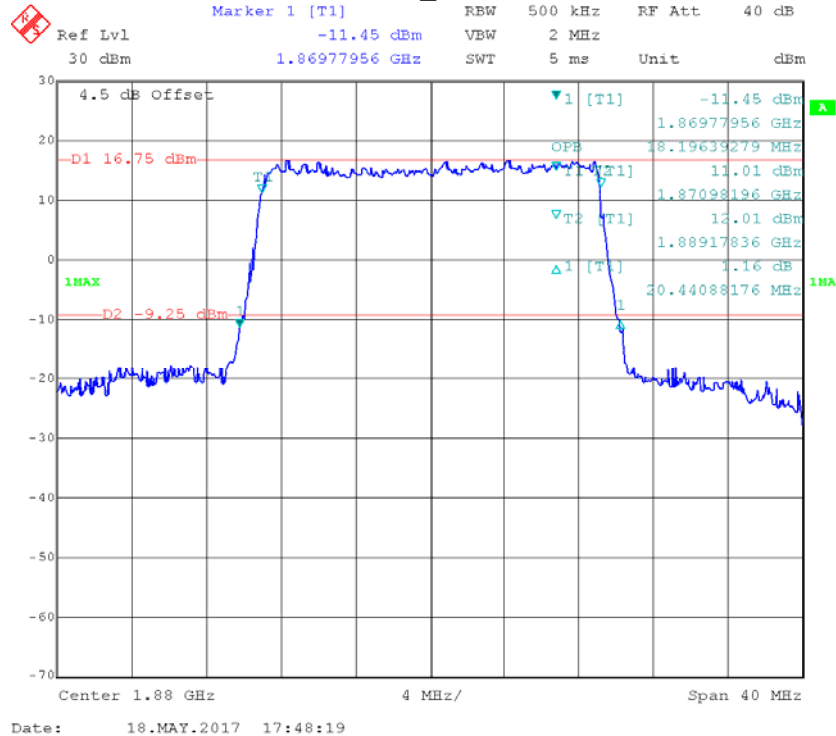
16QAM_10 MHz



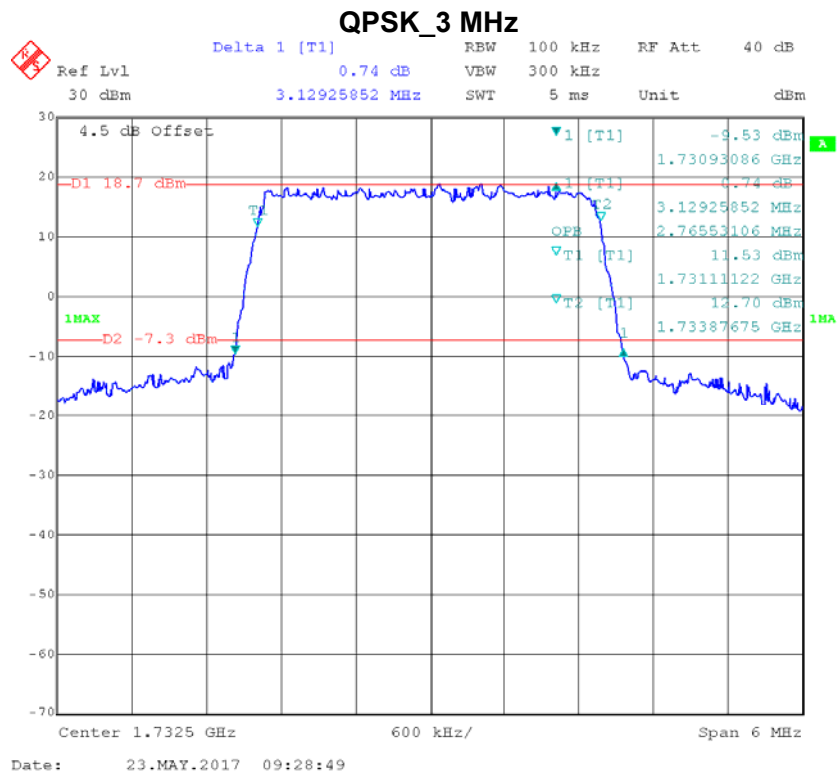
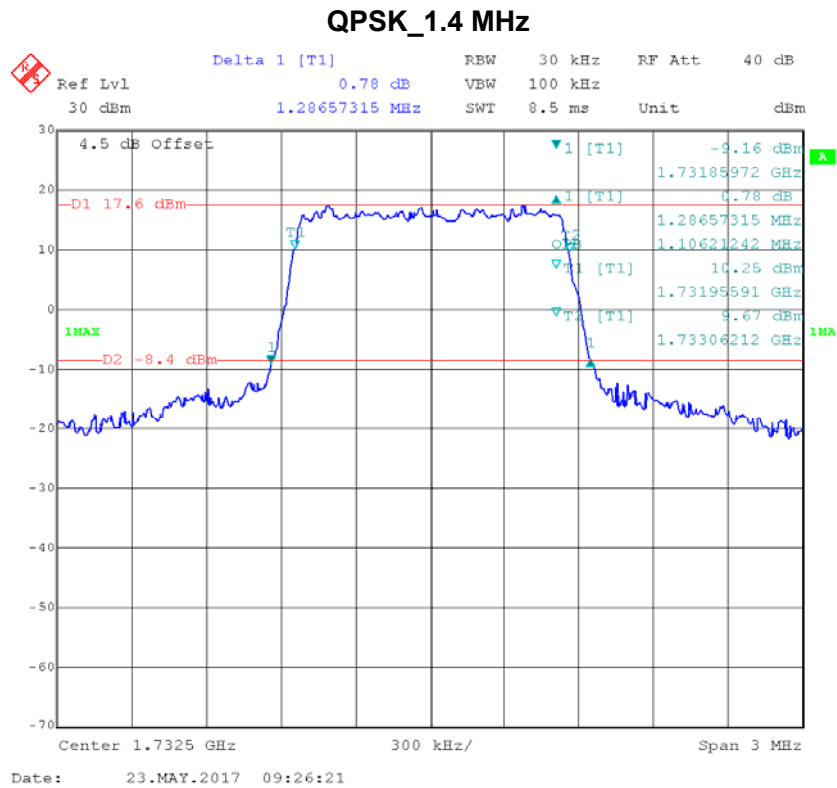
16QAM_15 MHz



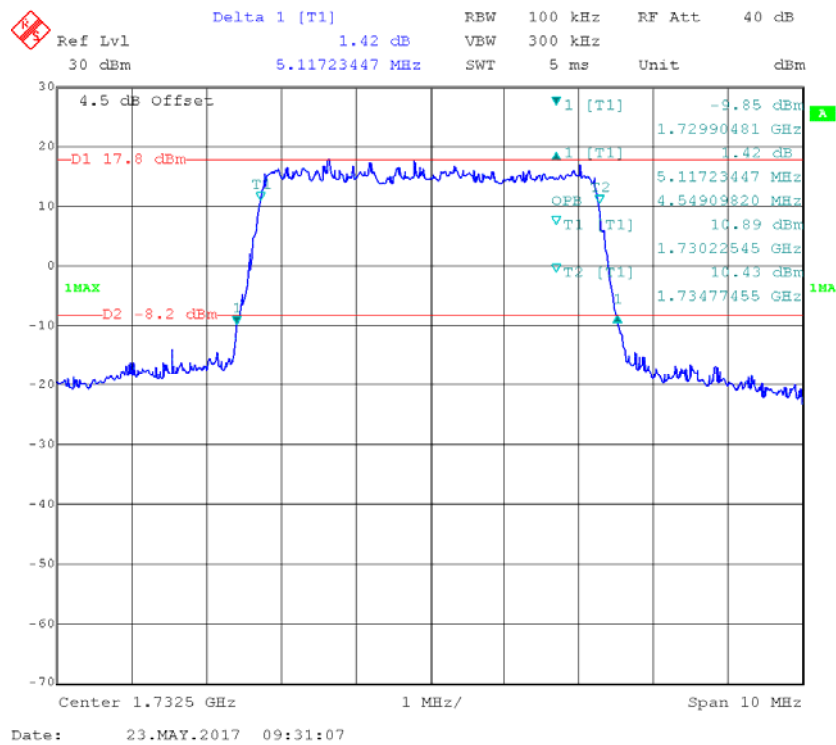
16QAM_20 MHz



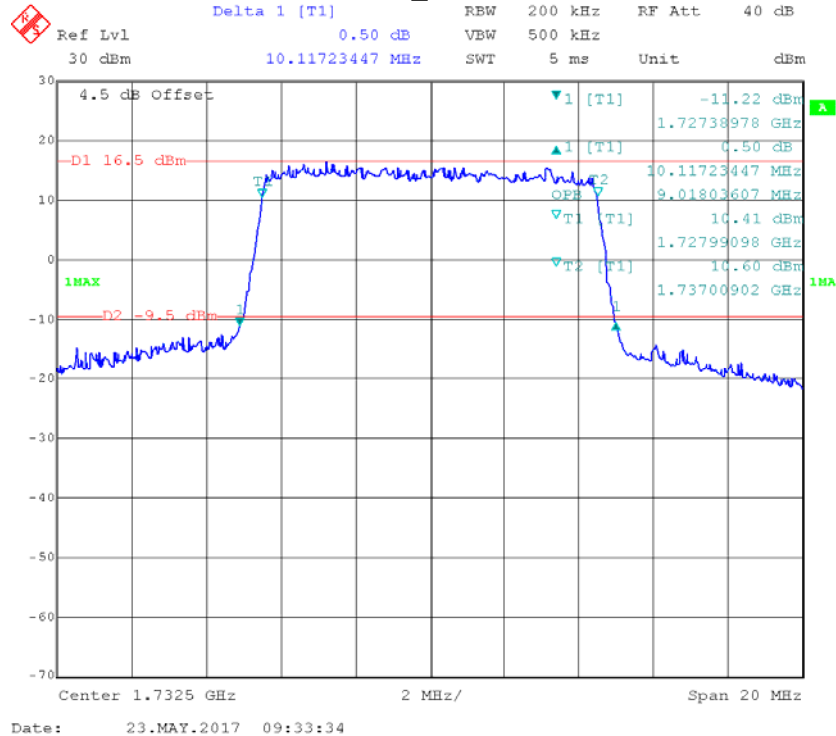
LTE Band IV:



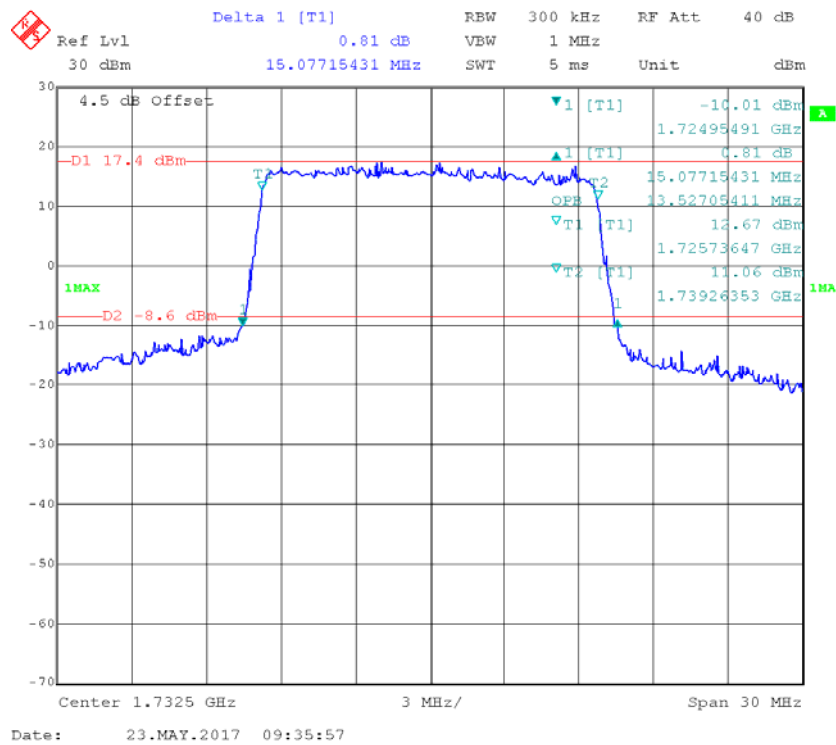
QPSK_5 MHz



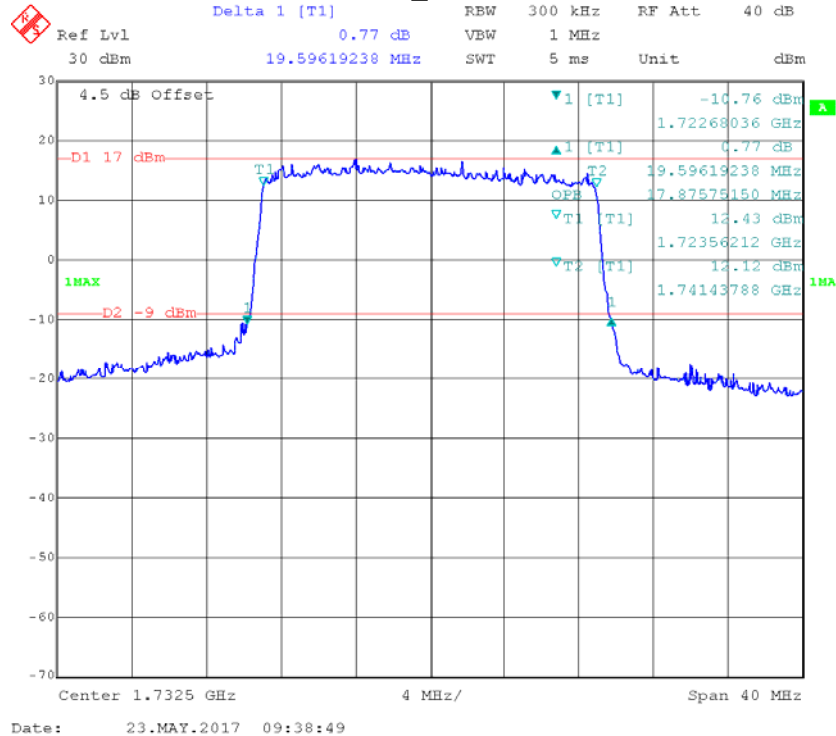
QPSK_10 MHz



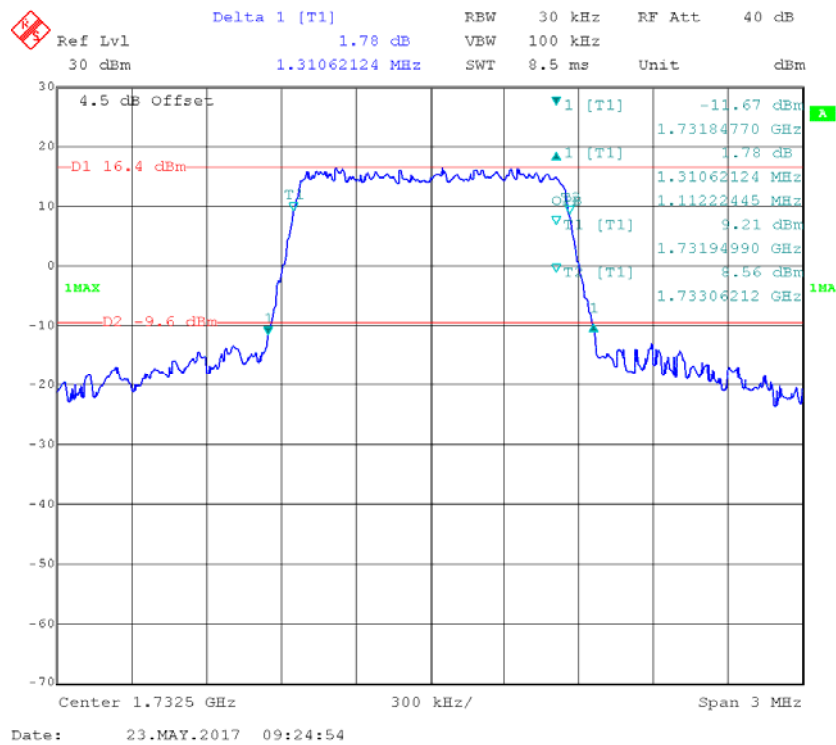
QPSK_15 MHz



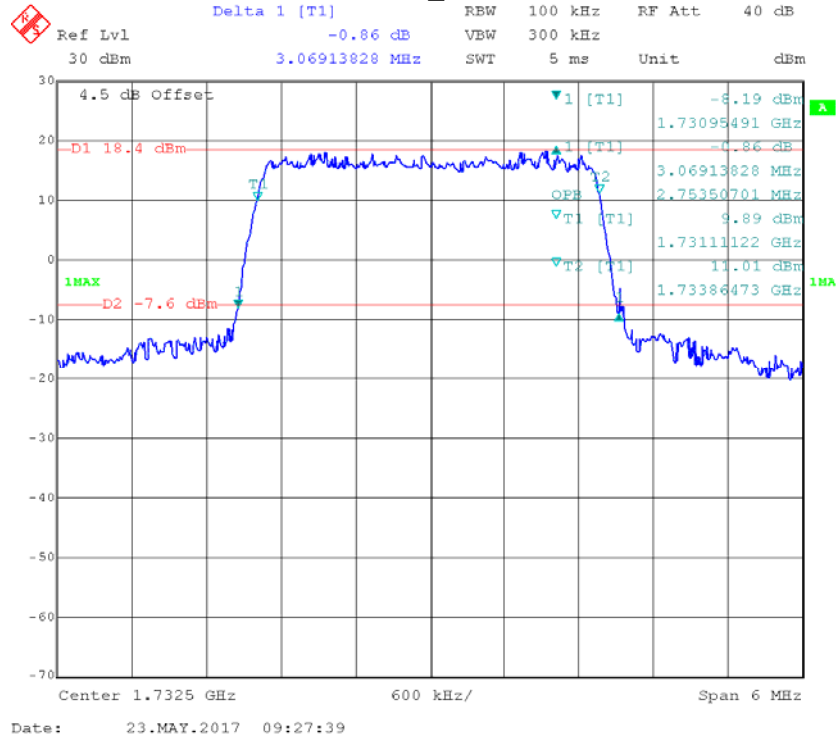
QPSK_20 MHz



16QAM_1.4 MHz



16QAM_3 MHz



[illegible]

Delta 1 [T1] 0.49 dB

Ref Lvl 30 dBm

RBW 200 kHz

VBW 500 kHz

SWT 5 ms

RF Att 40 dB

Unit dBm

4.5 dB Offset

D1 17 dBm

D2 -9 dBm

1MAX

1MA

Center 1.7325 GHz

2 MHz/

Span 20 MHz

1 [T1] -10.76 dBm

1.72738978 GHz

0.49 dB

10.15731463 MHz

9.01803607 MHz

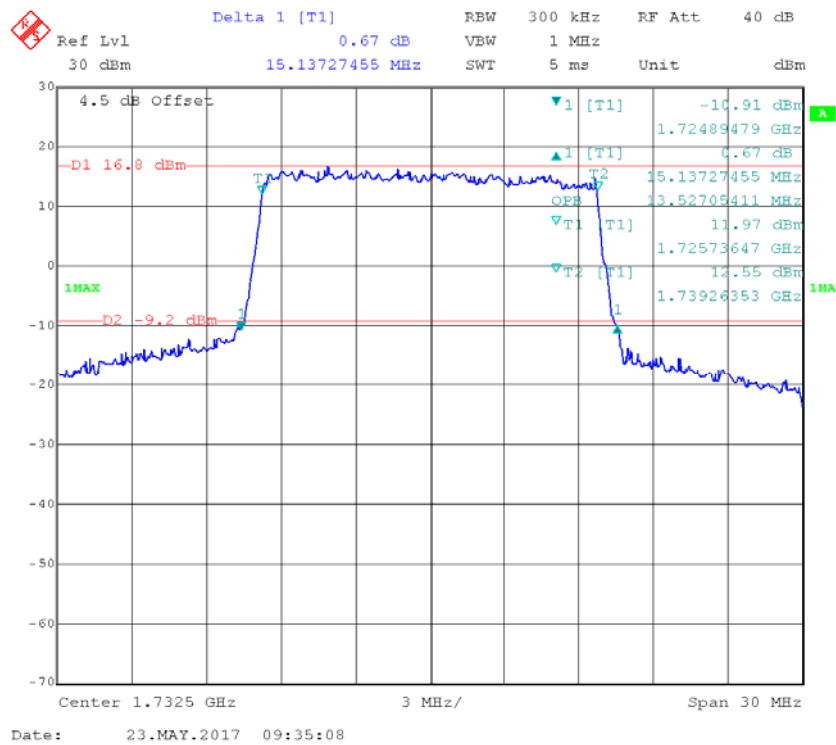
11.37 dBm

1.72799098 GHz

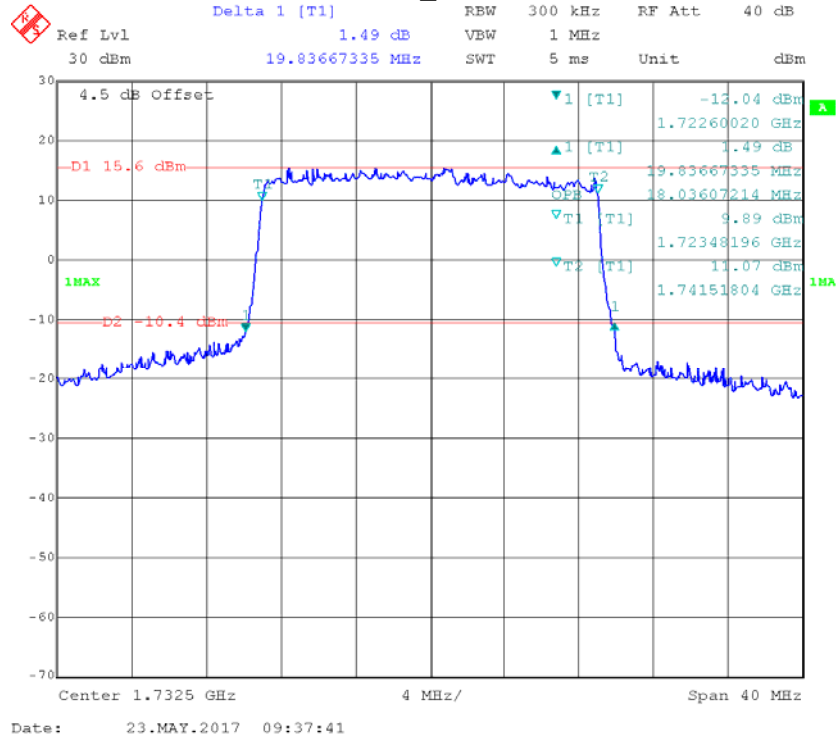
11.74 dBm

1.73700902 GHz

16QAM_15 MHz

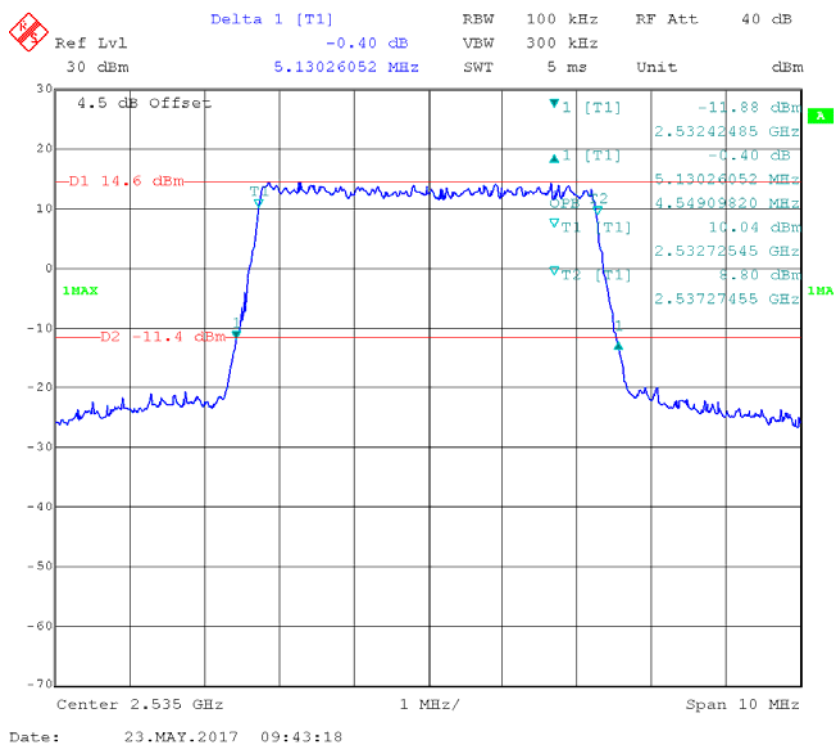


16QAM_20 MHz

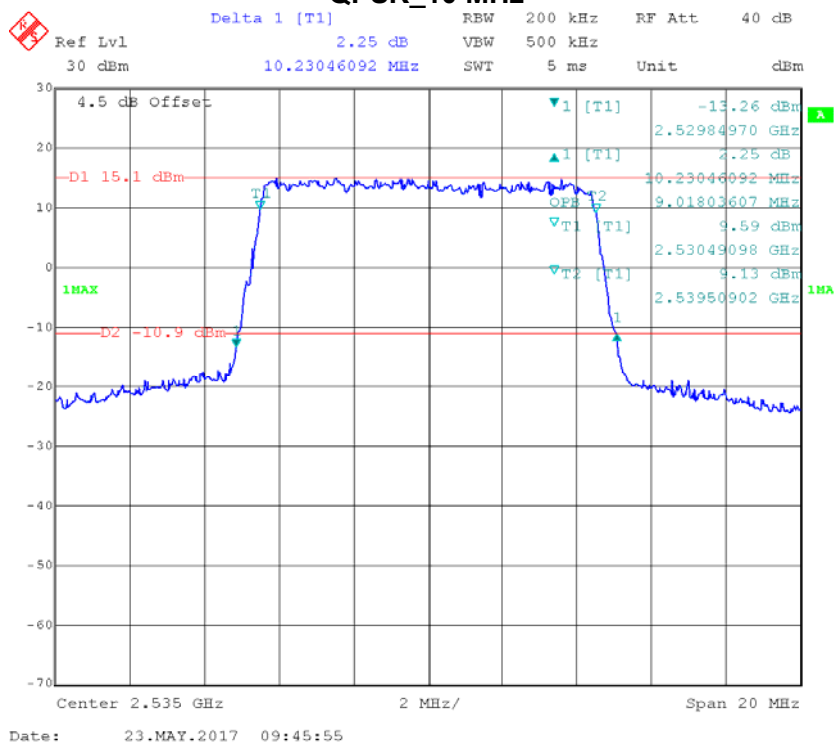


LTE Band VII:

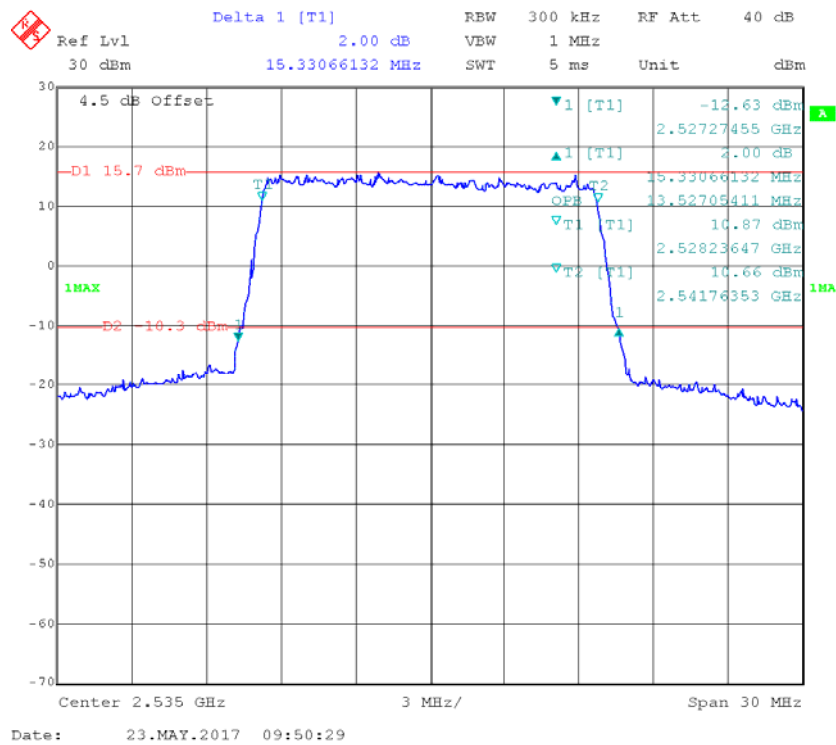
QPSK_5 MHz



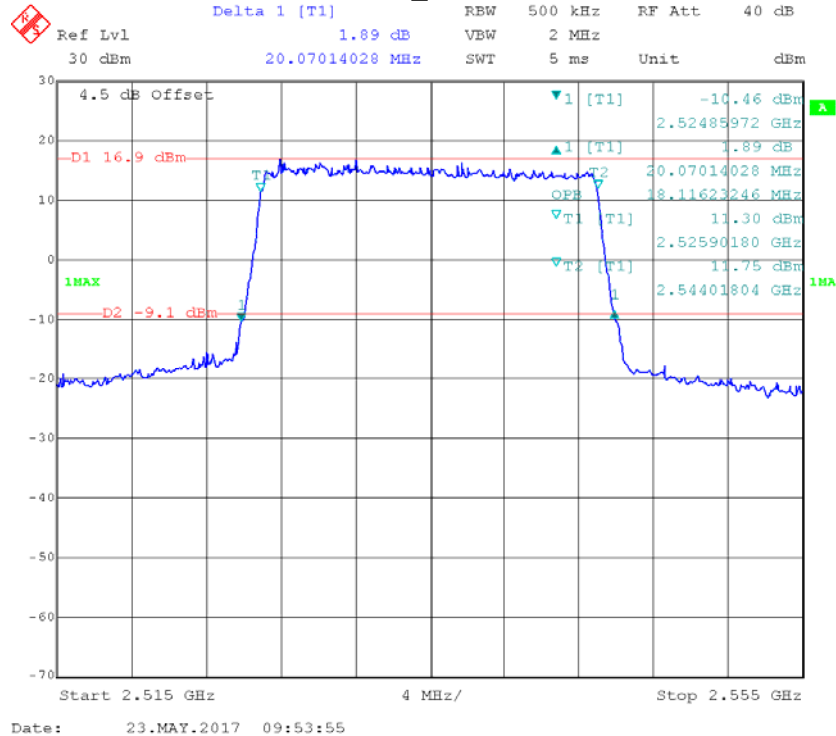
QPSK_10 MHz



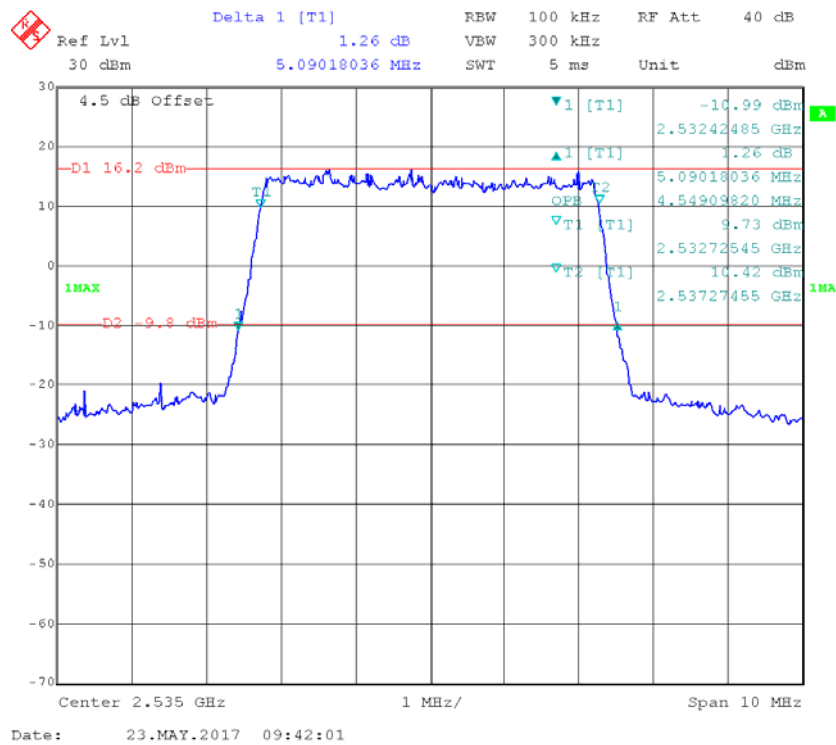
QPSK_15 MHz



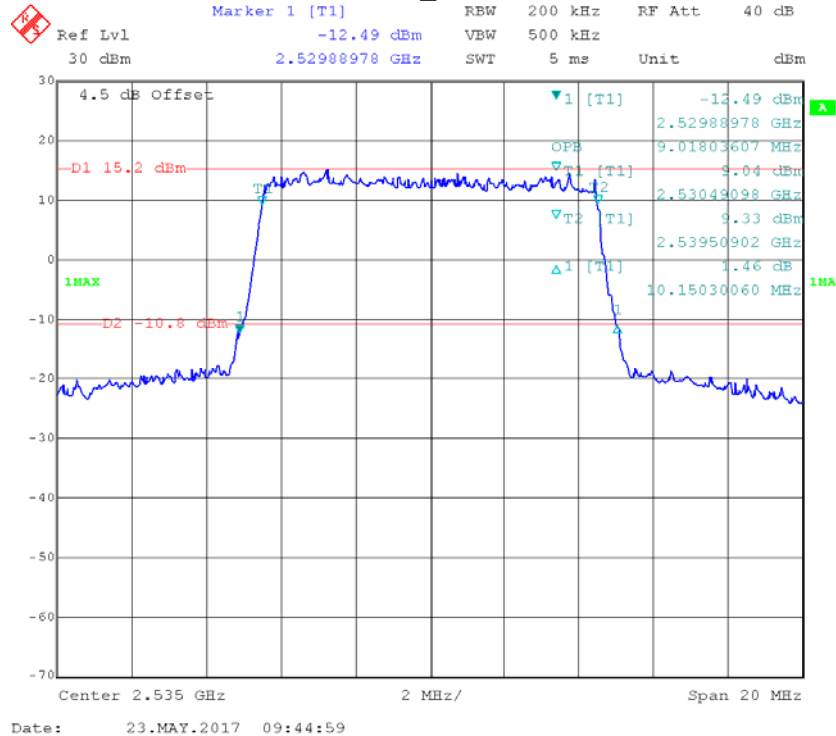
QPSK_20 MHz



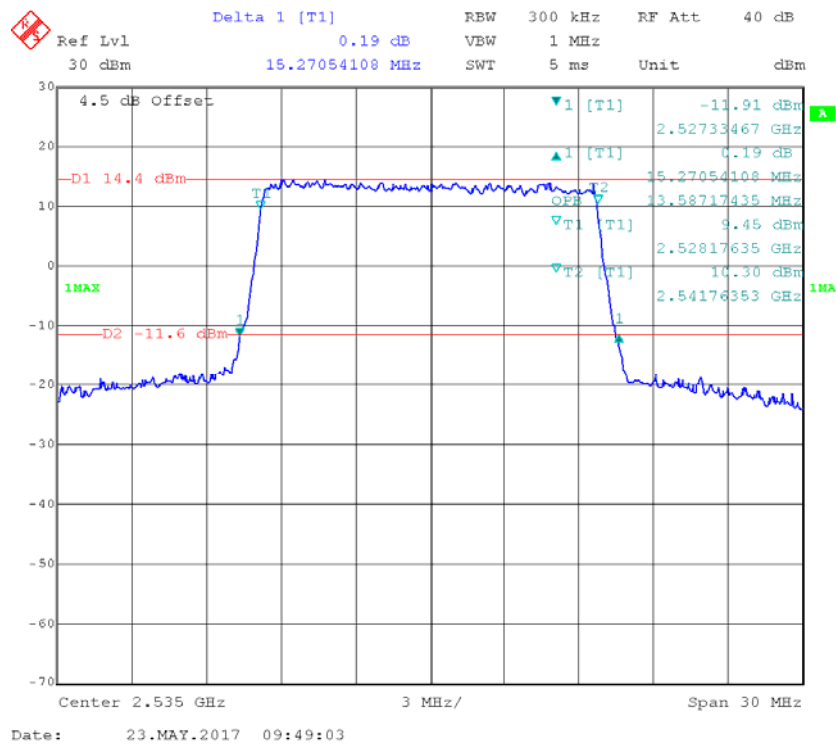
16QAM_5 MHz



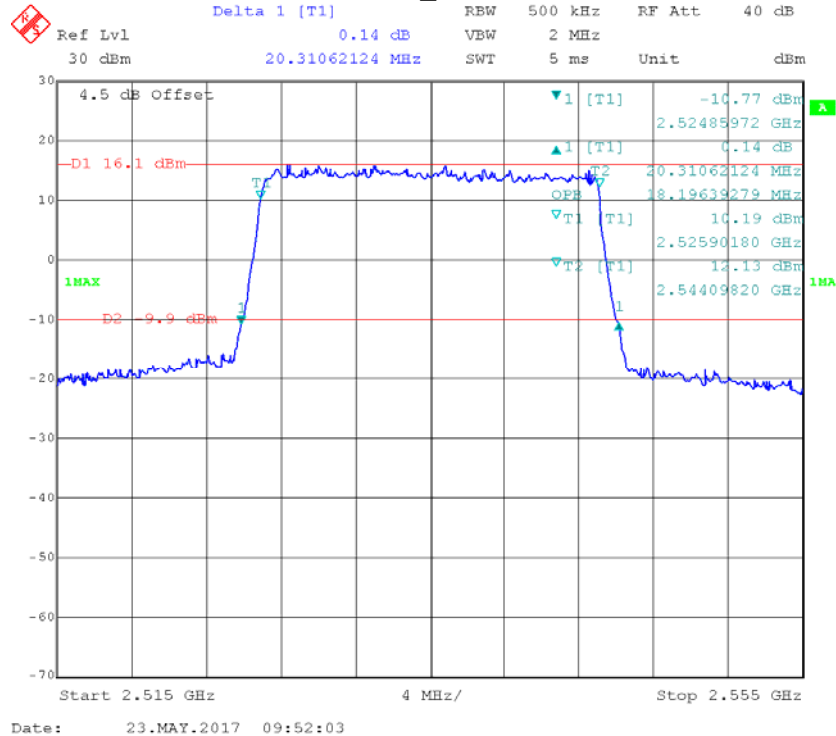
16QAM_10 MHz



16QAM_15 MHz



16QAM_20 MHz



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

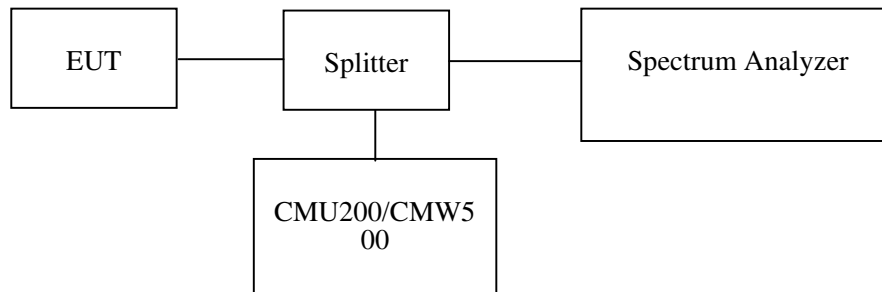
Applicable Standard

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

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

Test Procedure

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	NO.3	Each Time	/
Unknown	Two-way Splitter	Unknown	OE0120121	Each Time	/

*** Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

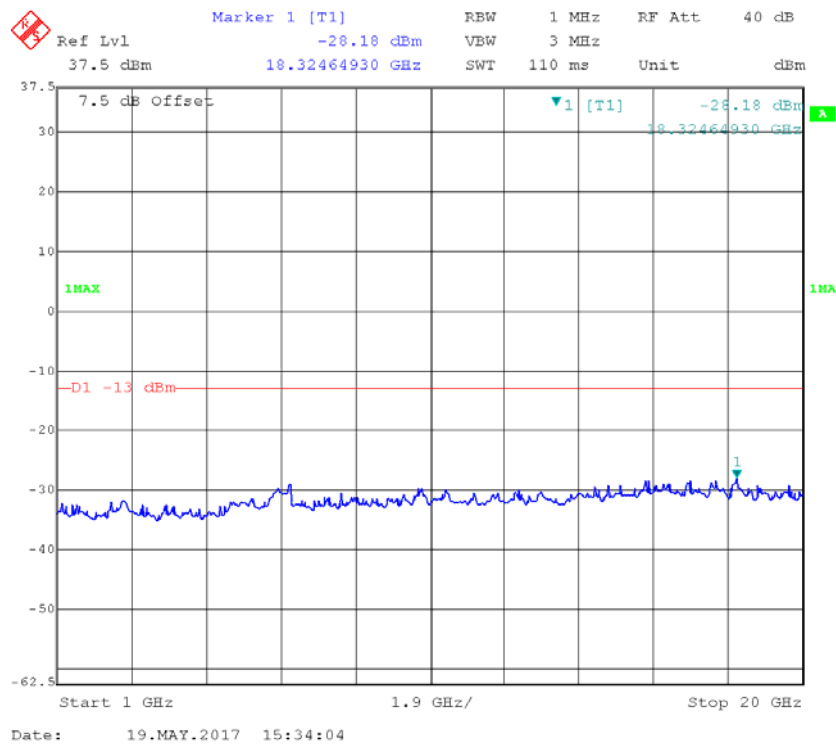
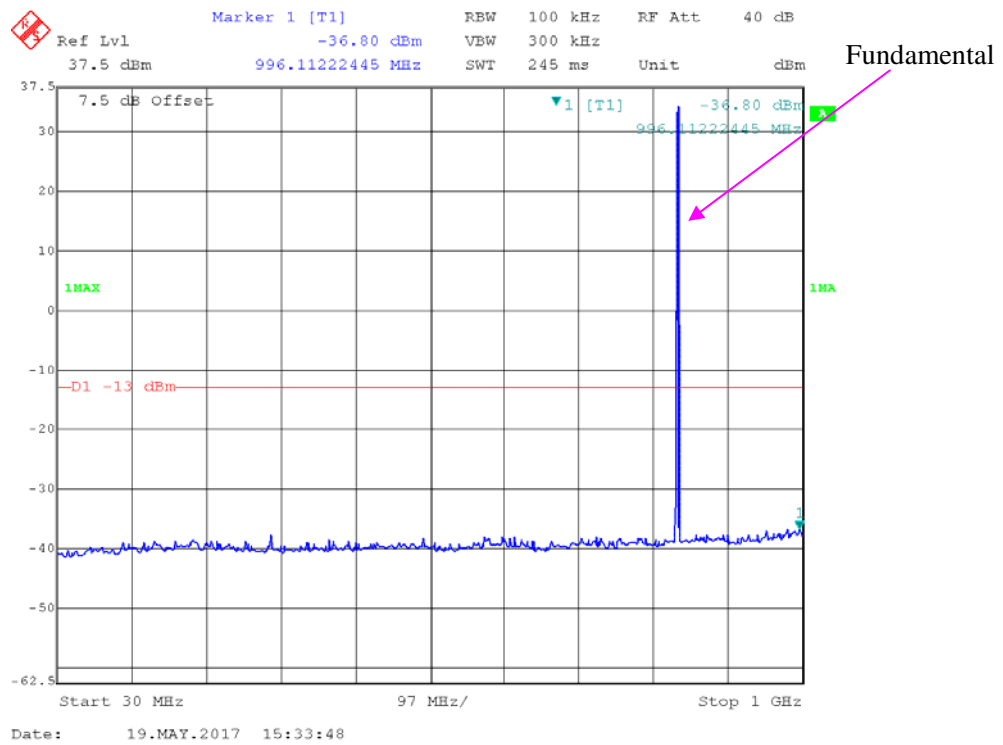
Environmental Conditions

Temperature:	21.9~27.3°C
Relative Humidity:	49.5~50.1 %
ATM Pressure:	100.3~100.5kPa

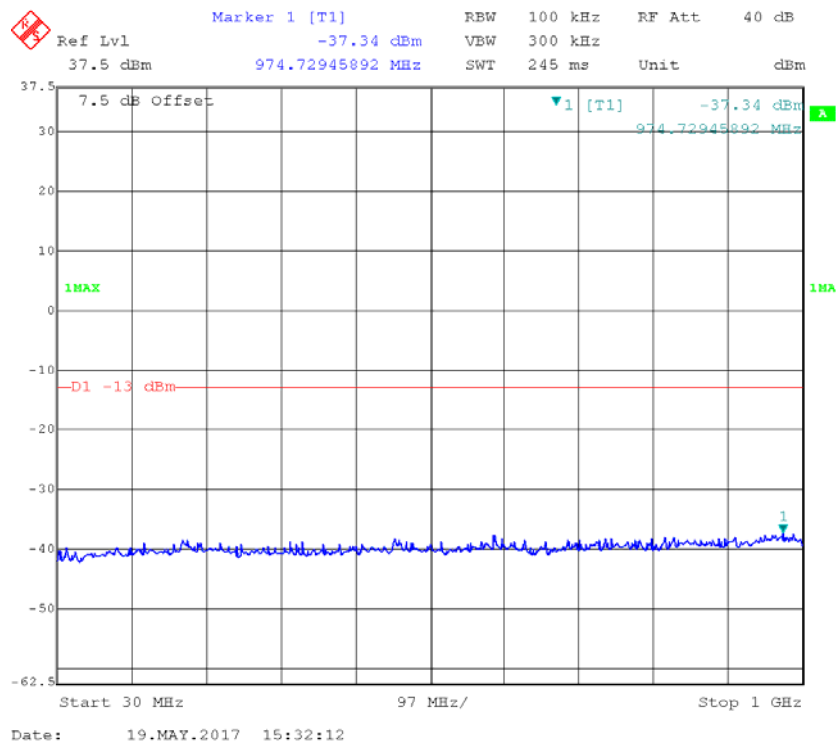
The testing was performed by Kevin Hu from 2017-05-18 to 2017-06-12.

Please refer to the following plots.

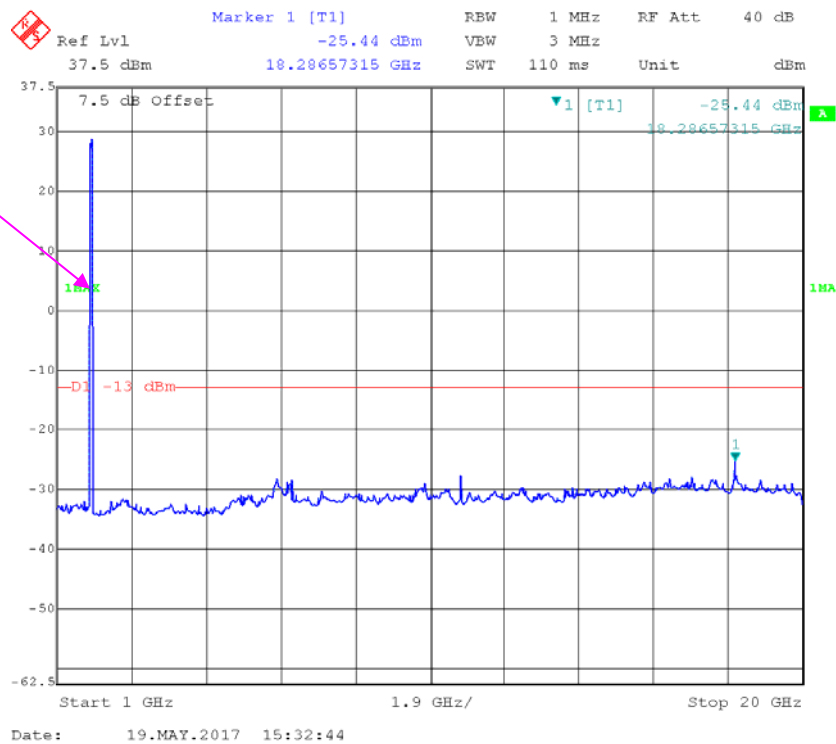
GSM850_Middle Channel



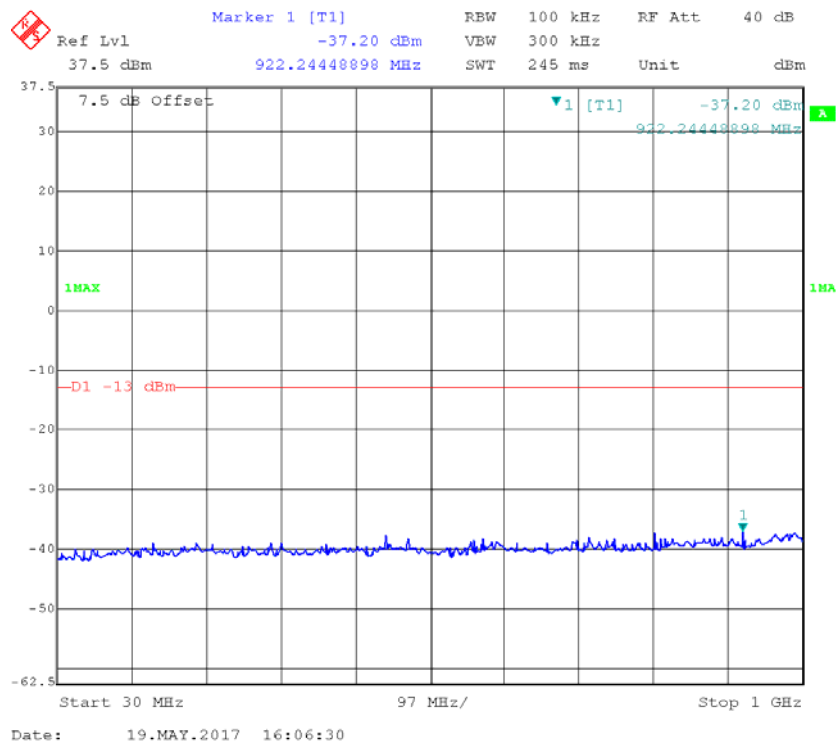
PCS 1900_ High Channel



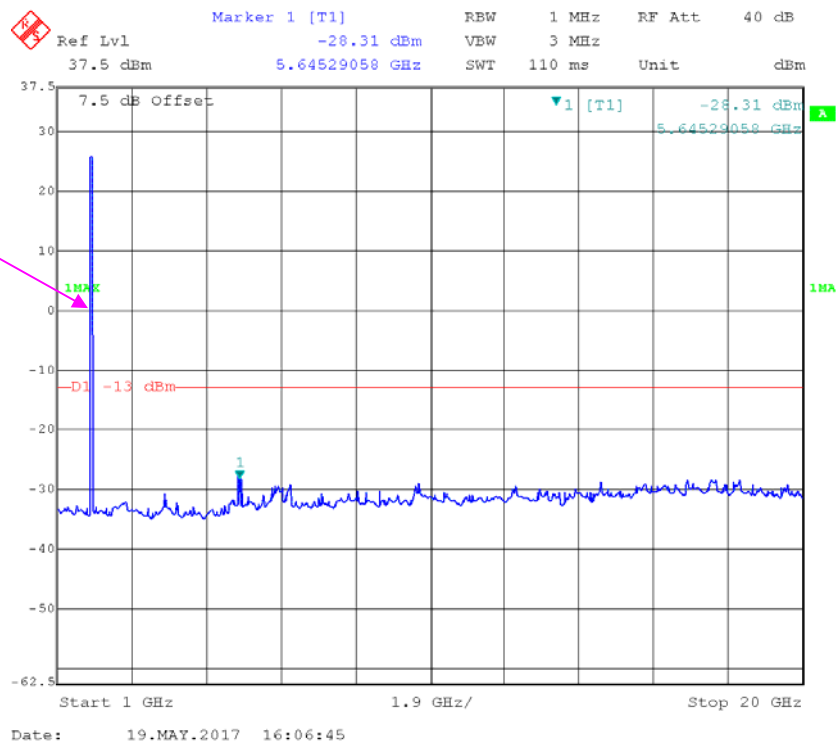
Fundamental



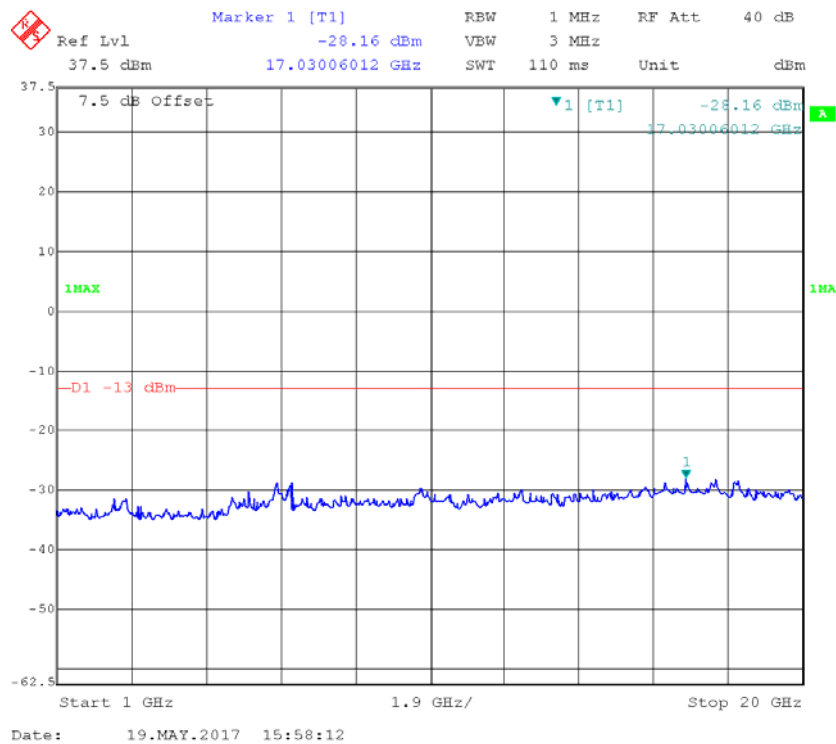
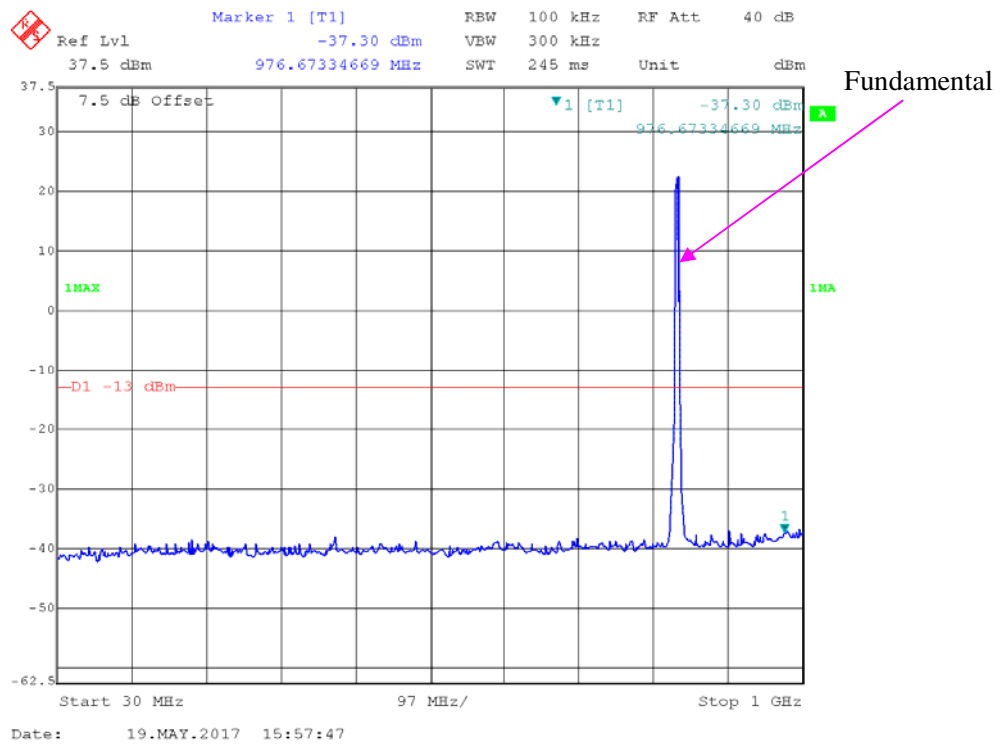
REL99 Band II_ Middle Channel



Fundamental

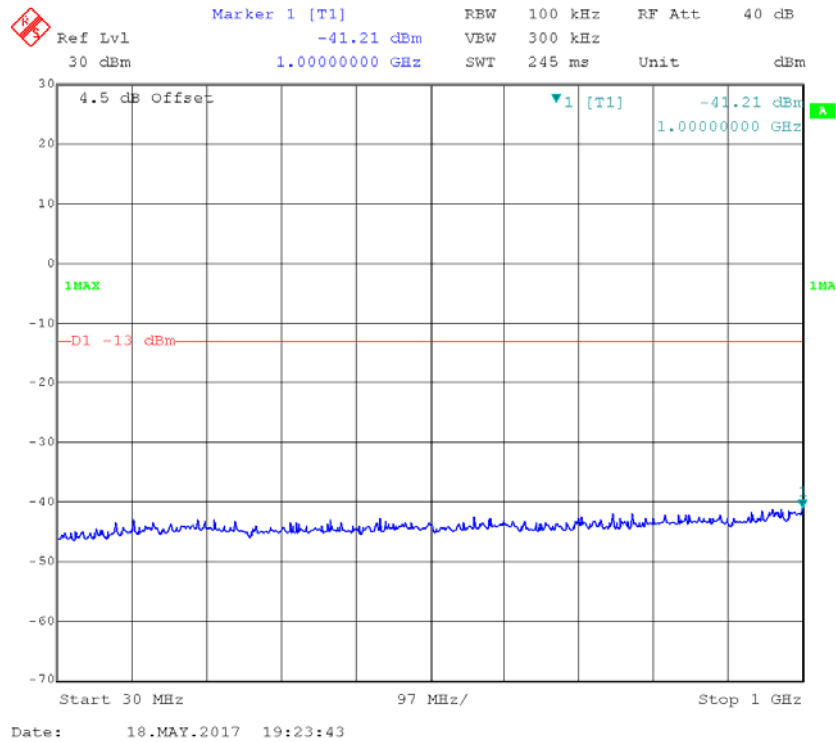


REL99 Band V_ Middle Channel

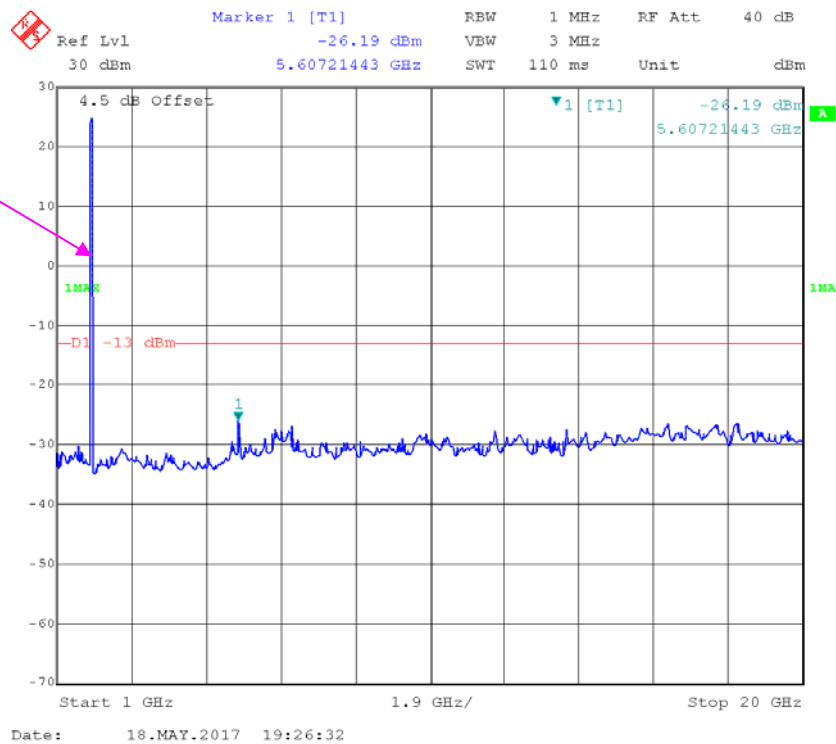


LTE Band II (Middle Channel)

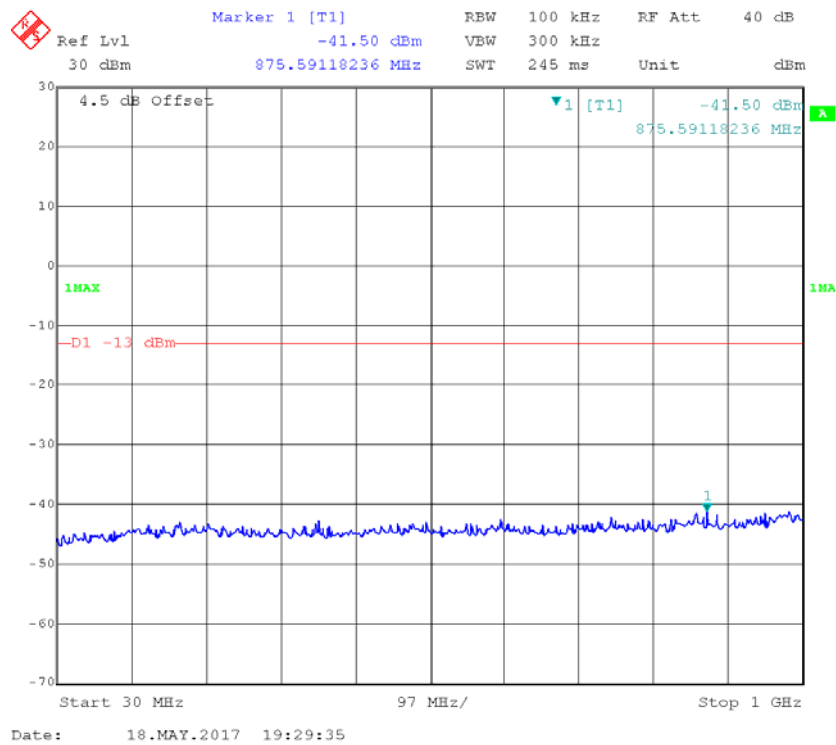
QPSK_1.4 MHz



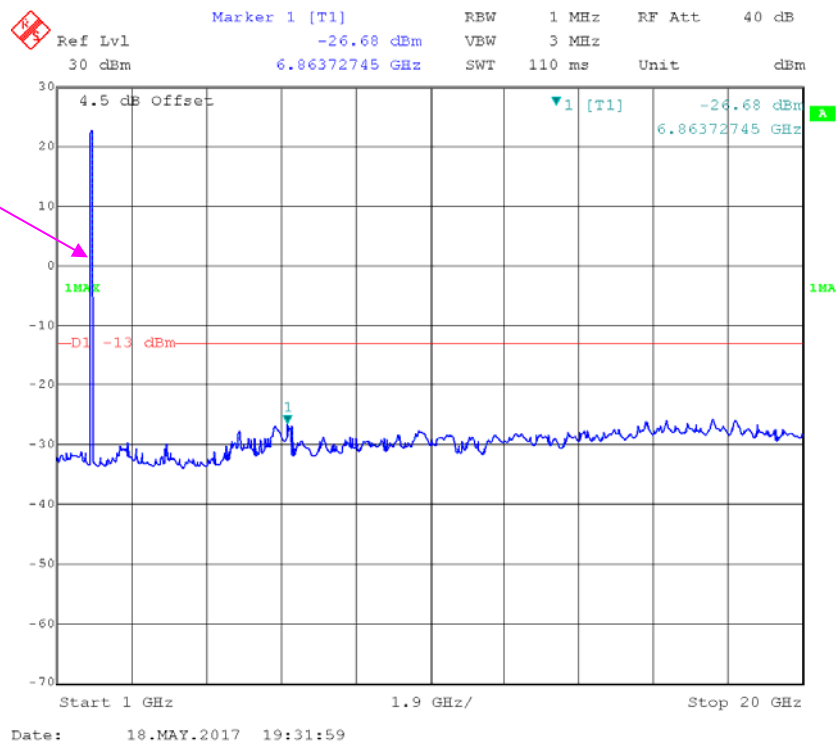
Fundamental



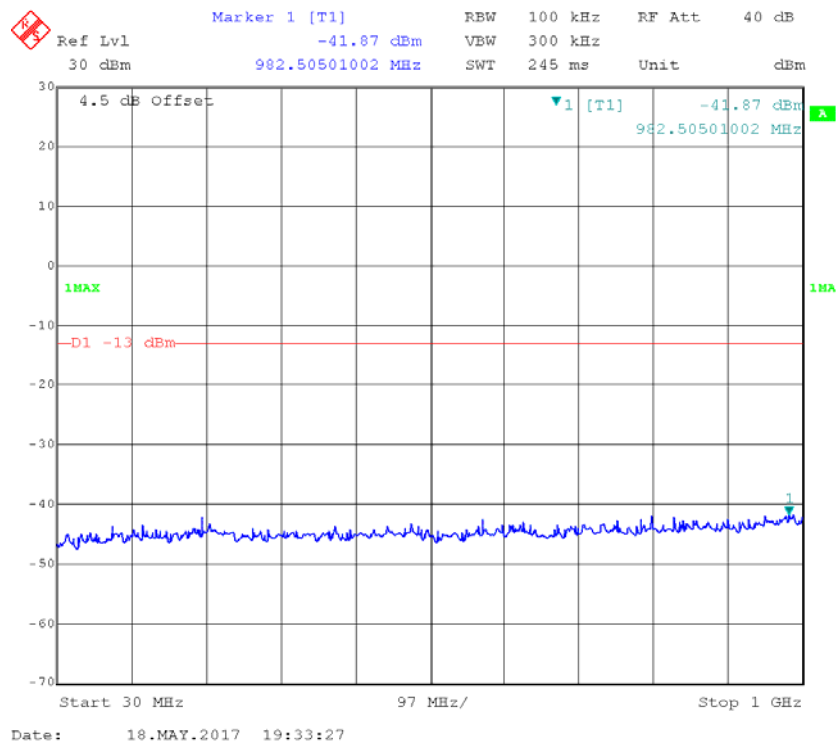
QPSK_3 MHz



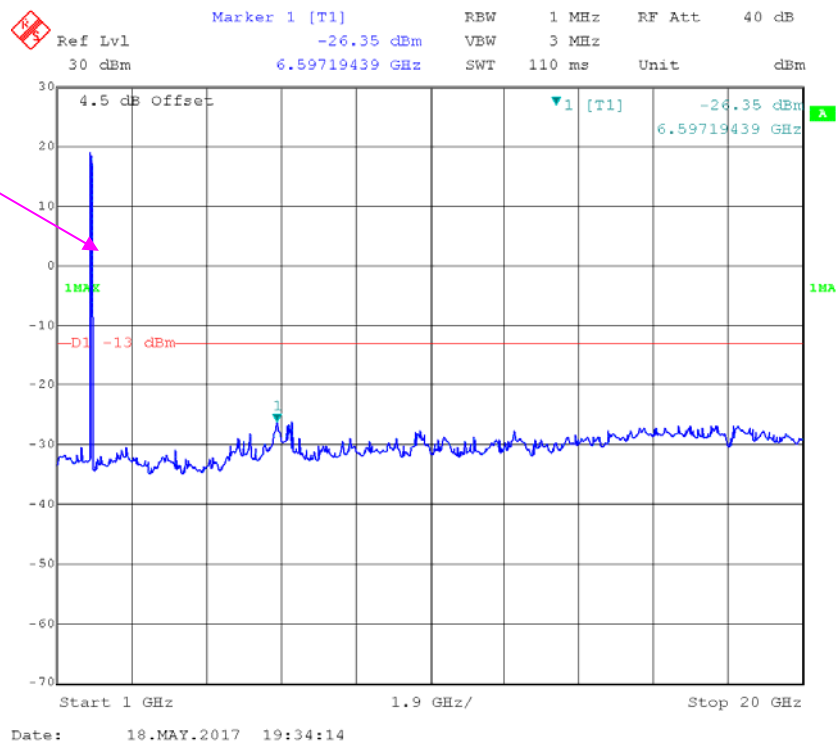
Fundamental



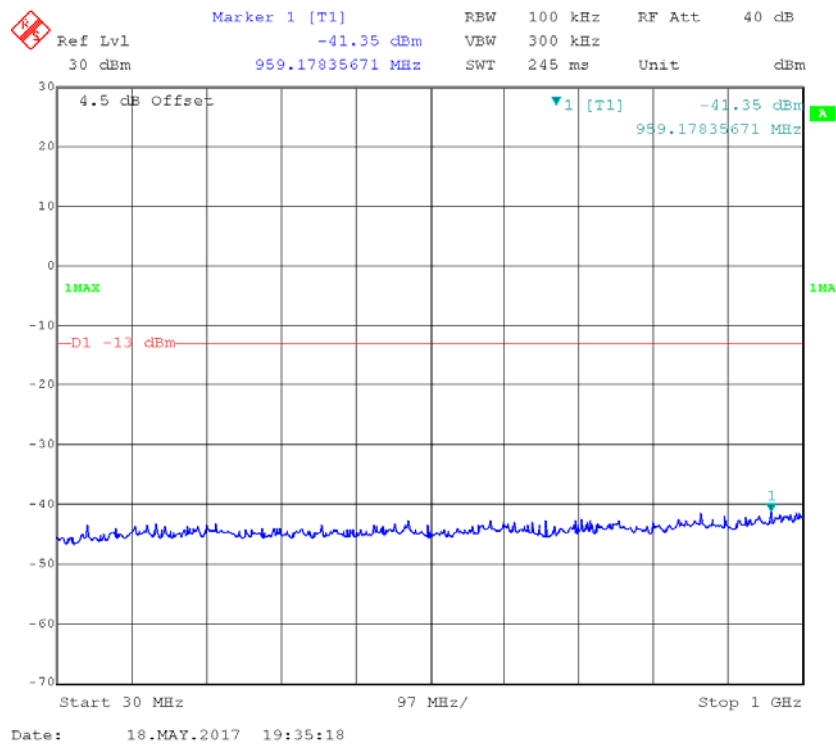
QPSK_5 MHz



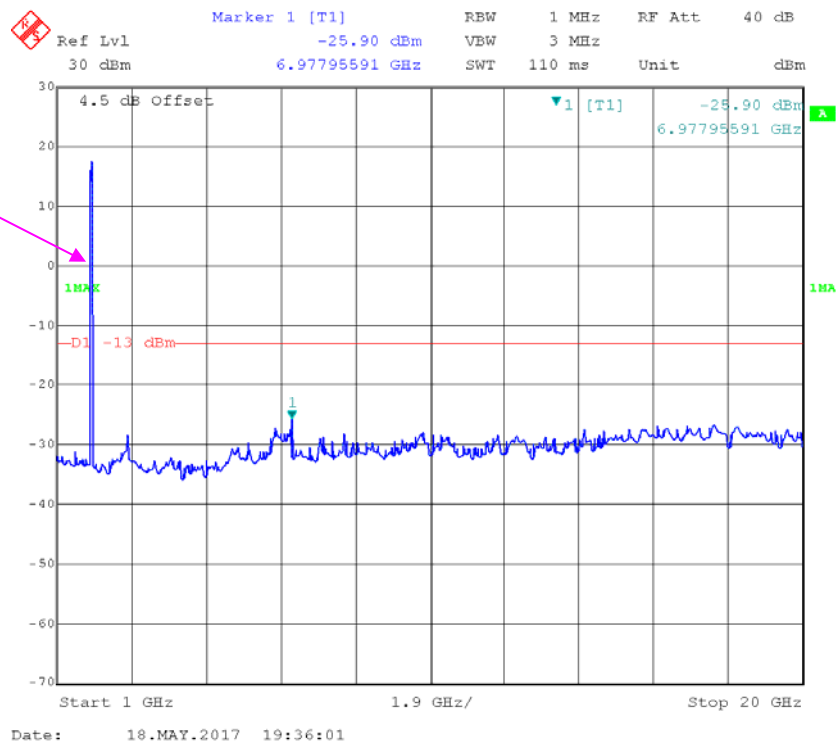
Fundamental



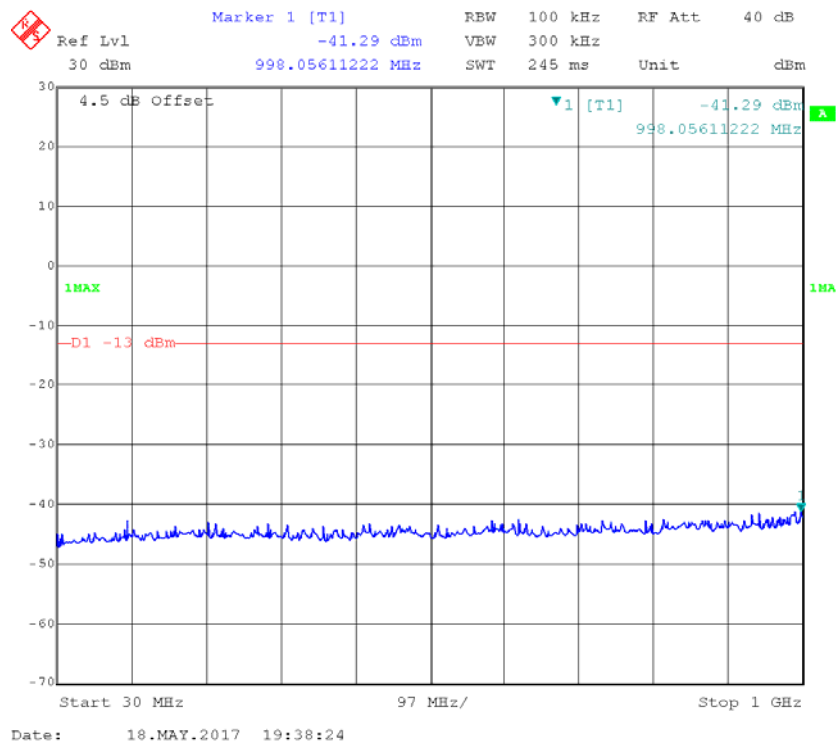
QPSK_10 MHz



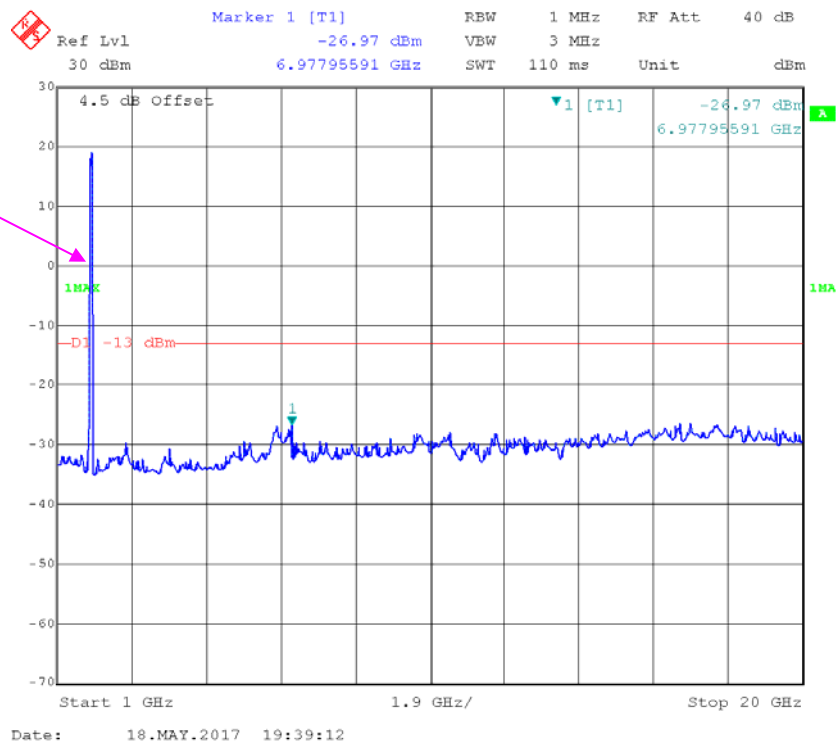
Fundamental



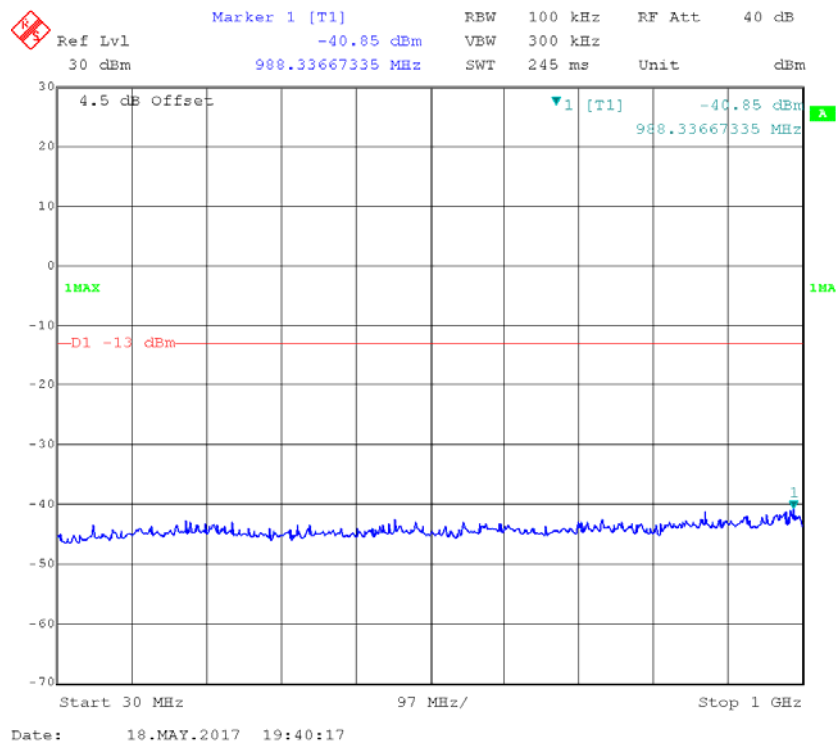
QPSK_15 MHz



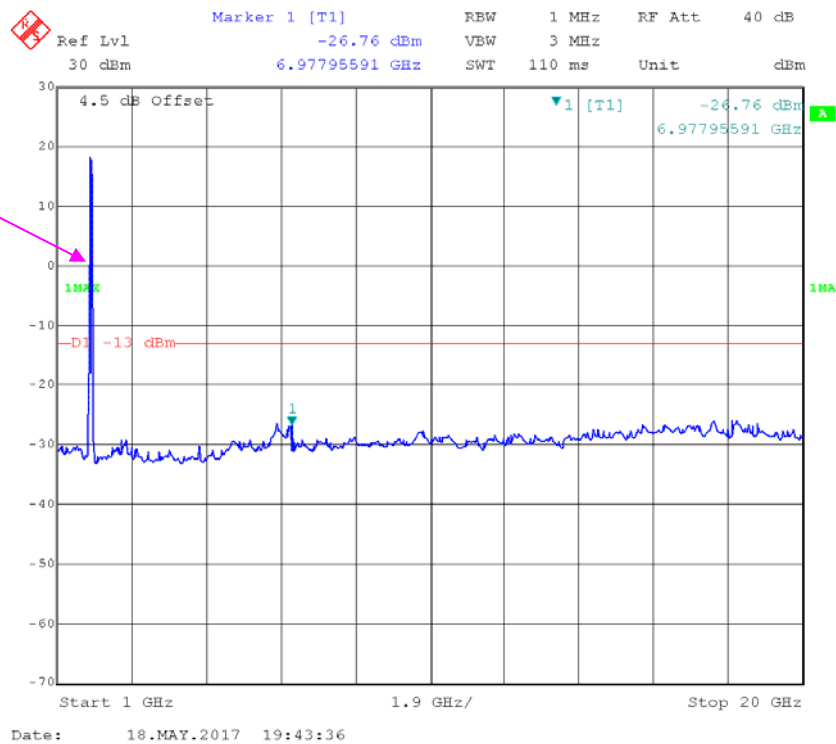
Fundamental



QPSK_20 MHz

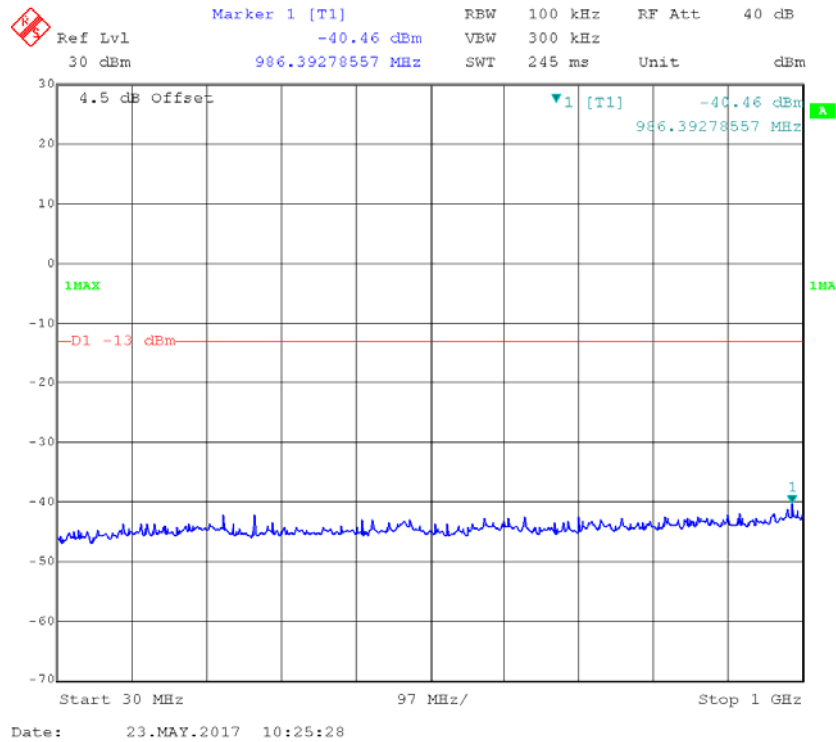


Fundamental

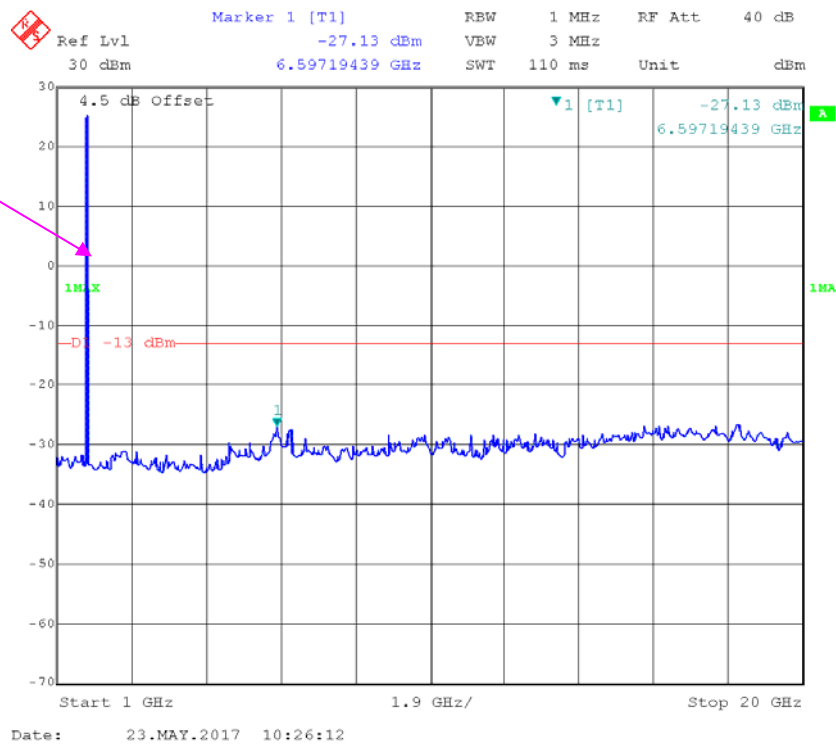


LTE Band IV (Middle Channel)

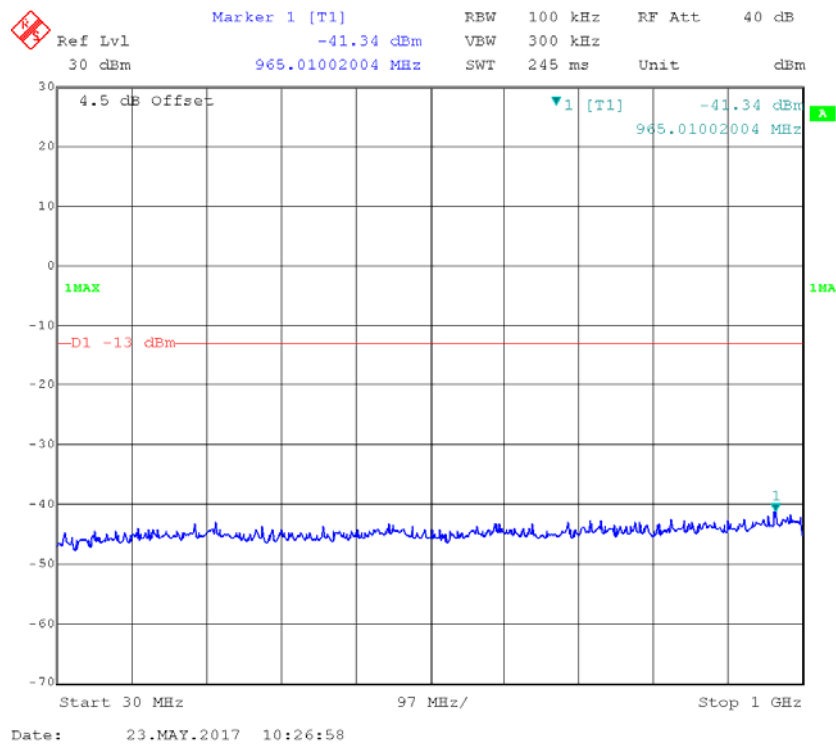
QPSK_1.4 MHz



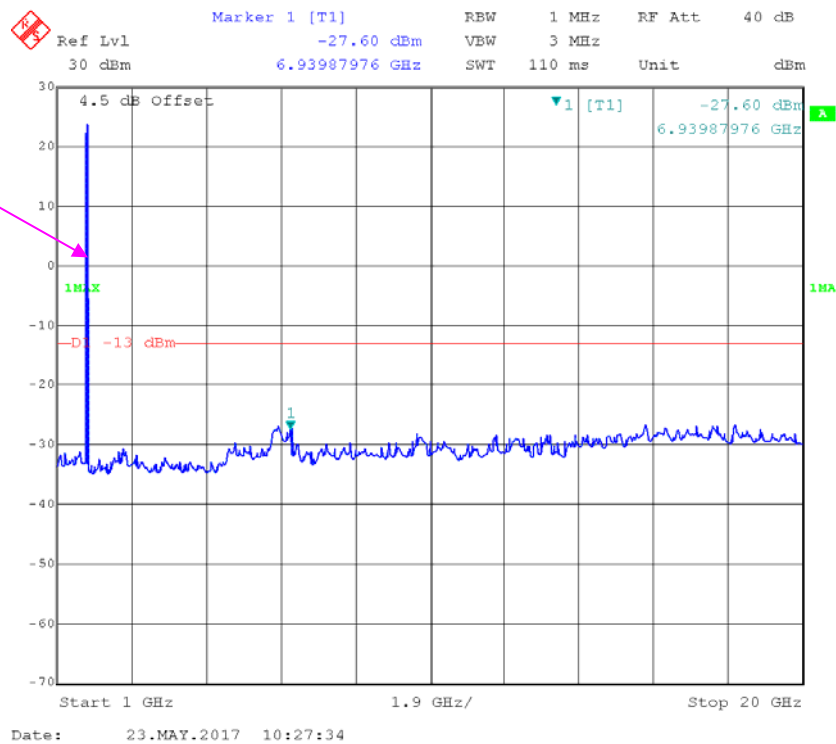
Fundamental



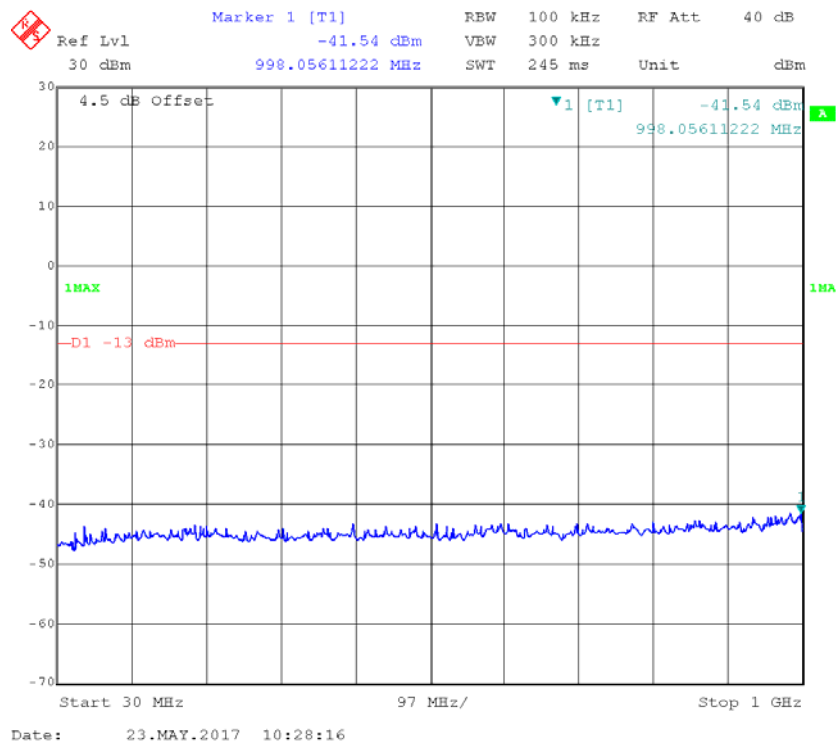
QPSK_3 MHz



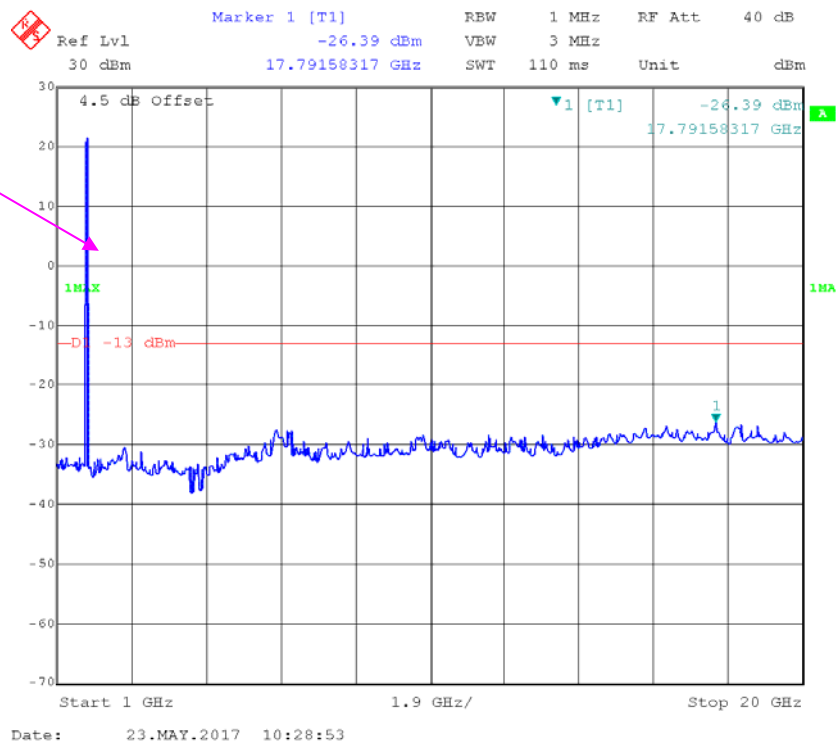
Fundamental



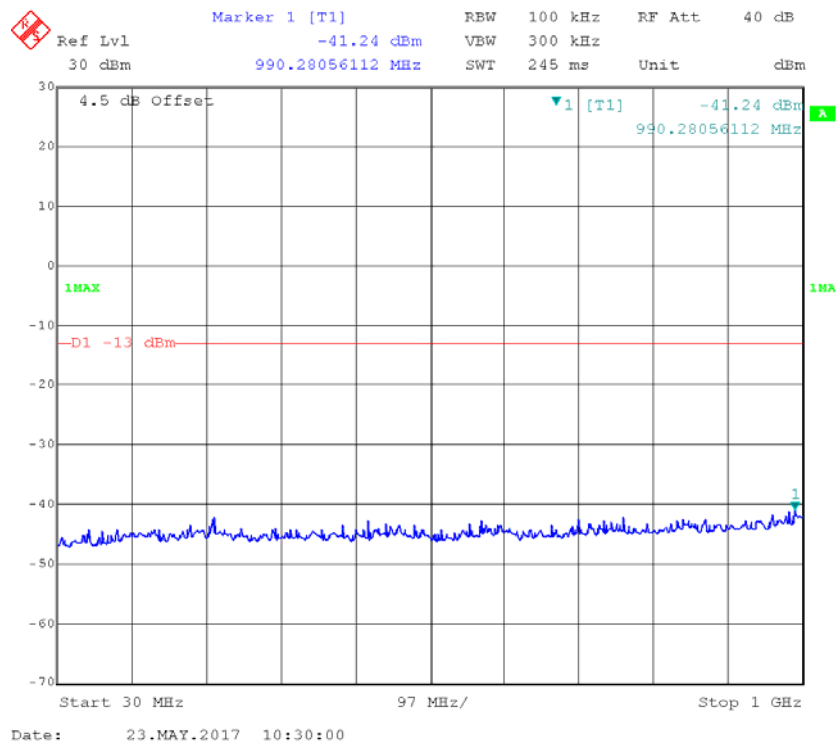
QPSK_5 MHz



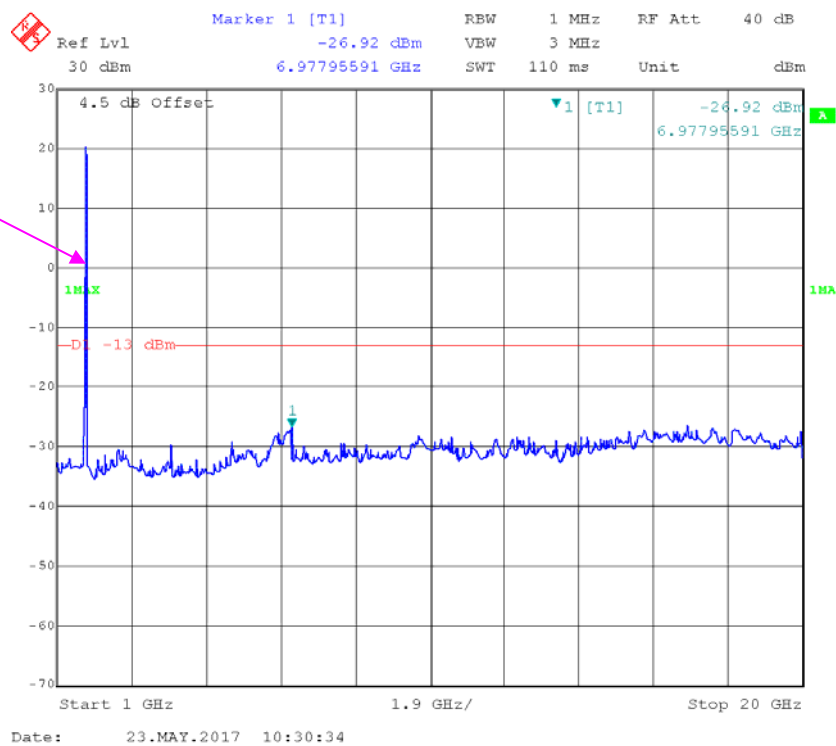
Fundamental



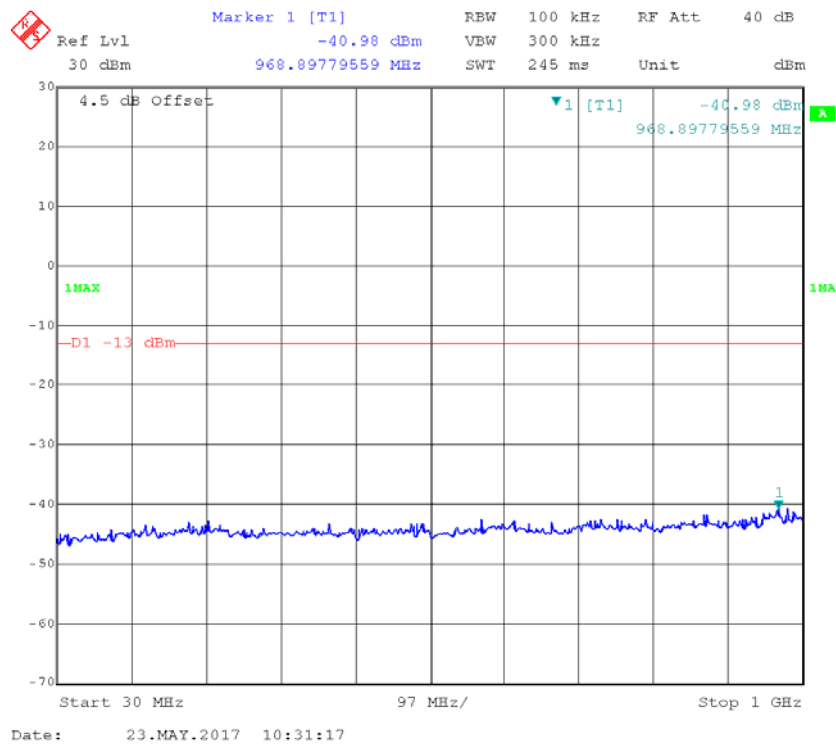
QPSK_10 MHz



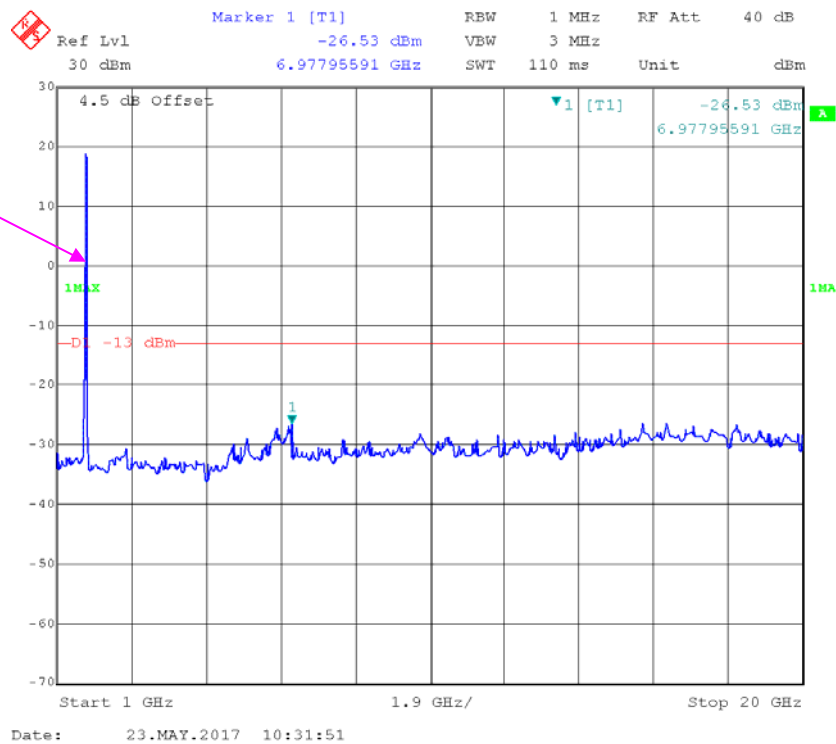
Fundamental



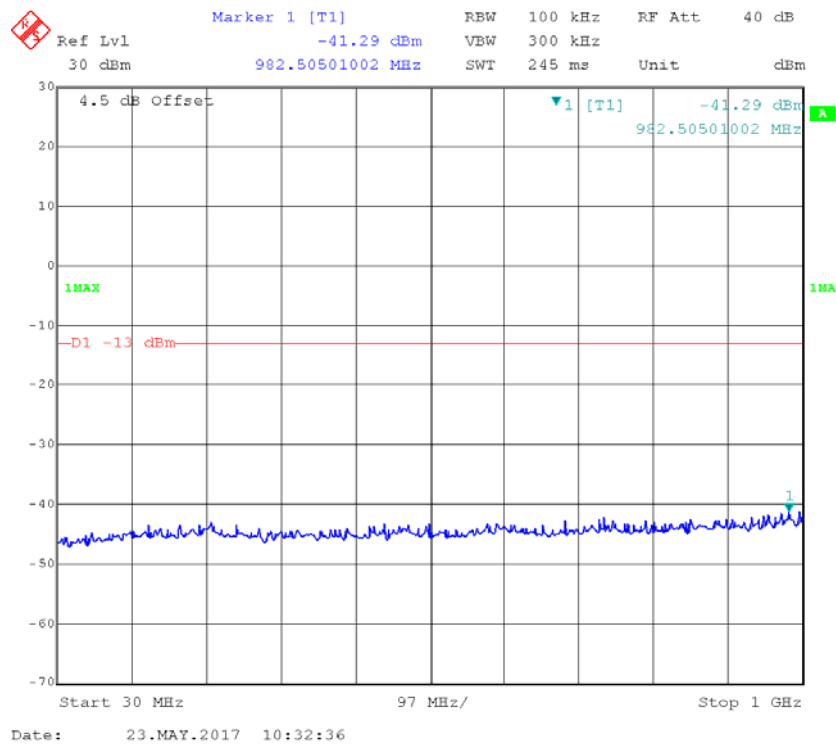
QPSK_15 MHz



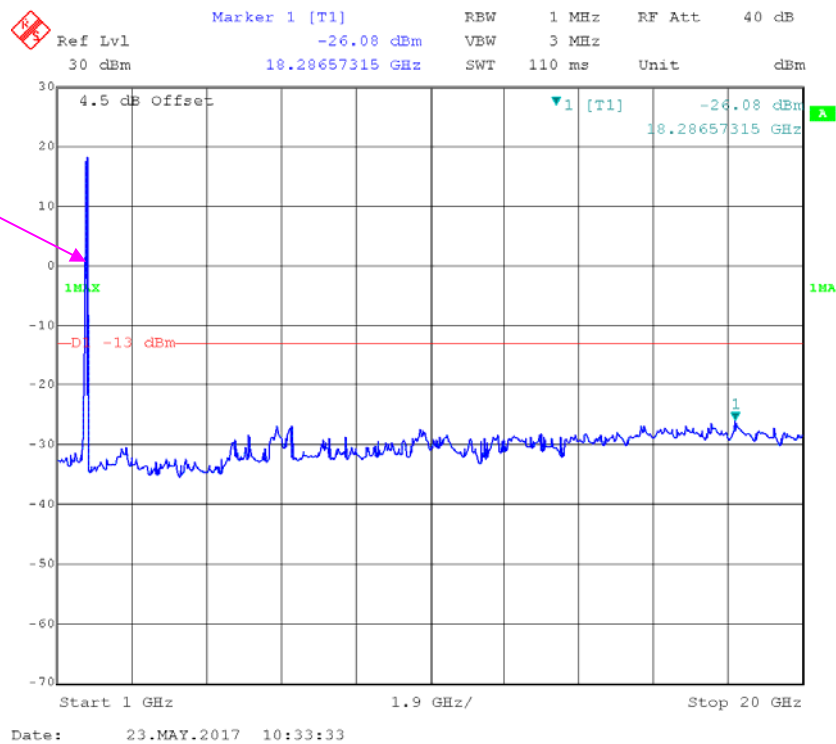
Fundamental



QPSK_20 MHz

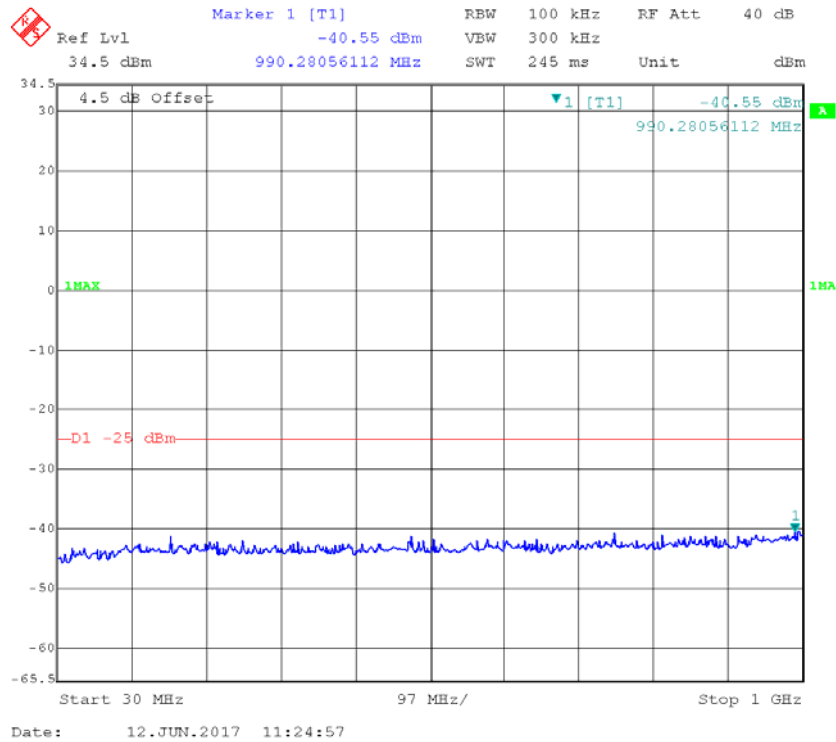


Fundamental

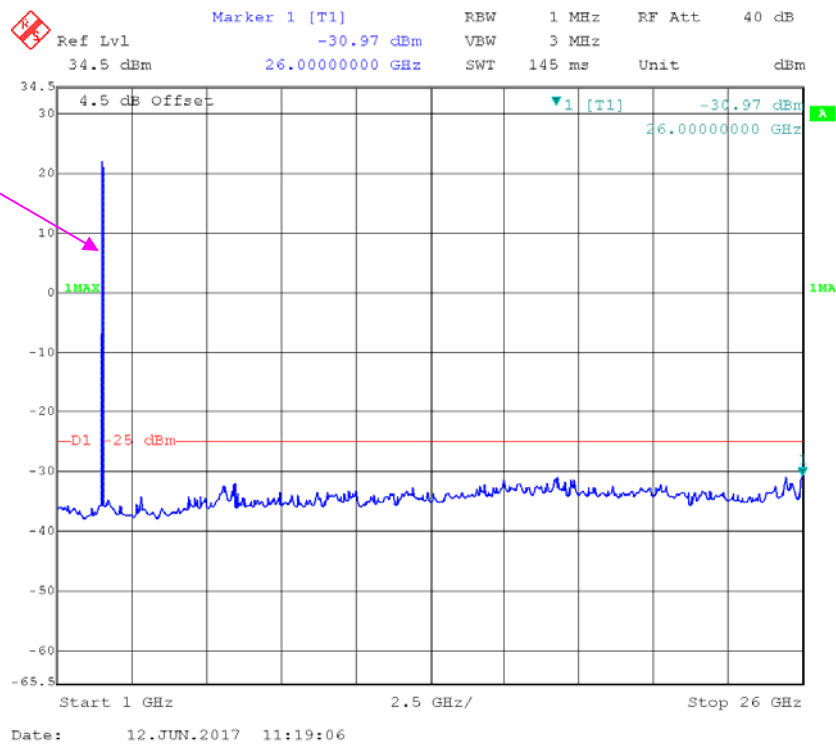


LTE Band VII

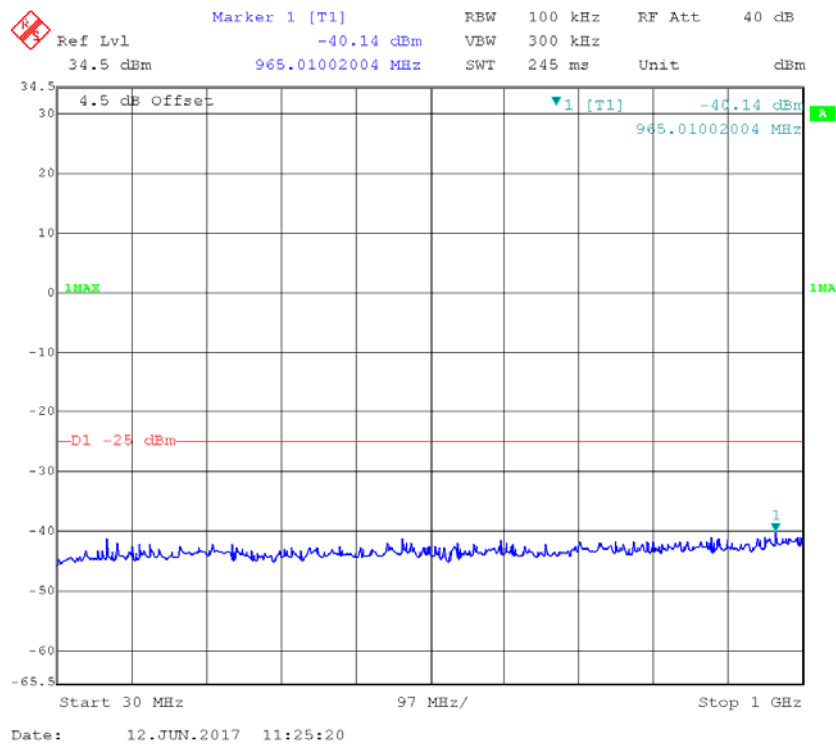
QPSK_5 MHz



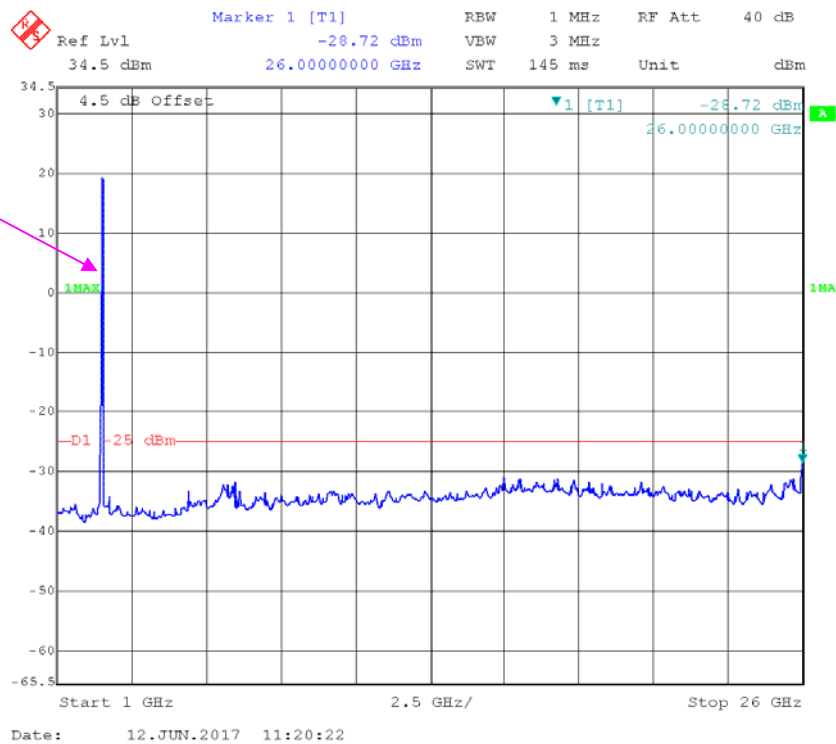
Fundamental



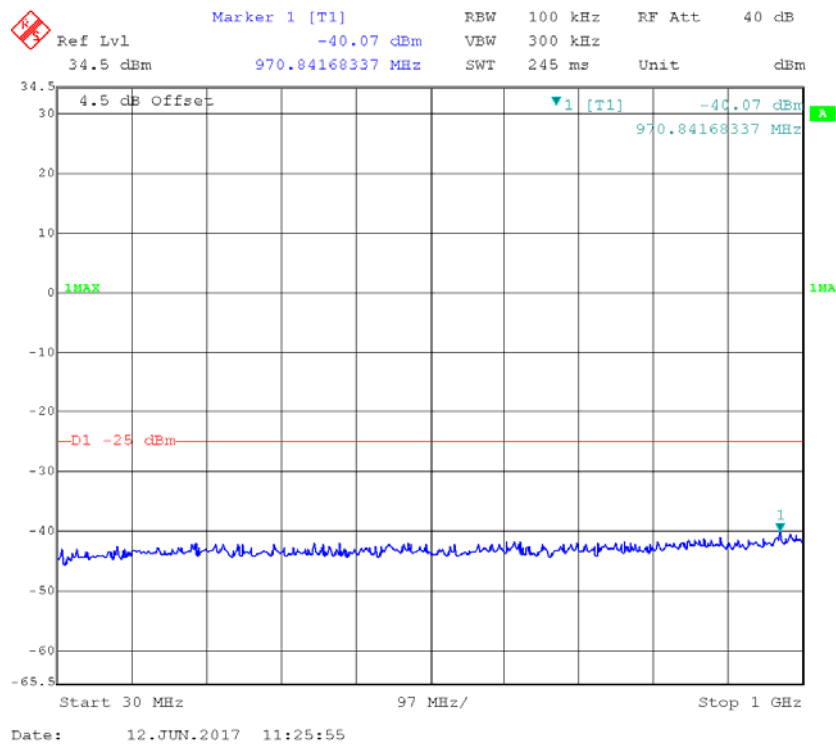
QPSK_10 MHz



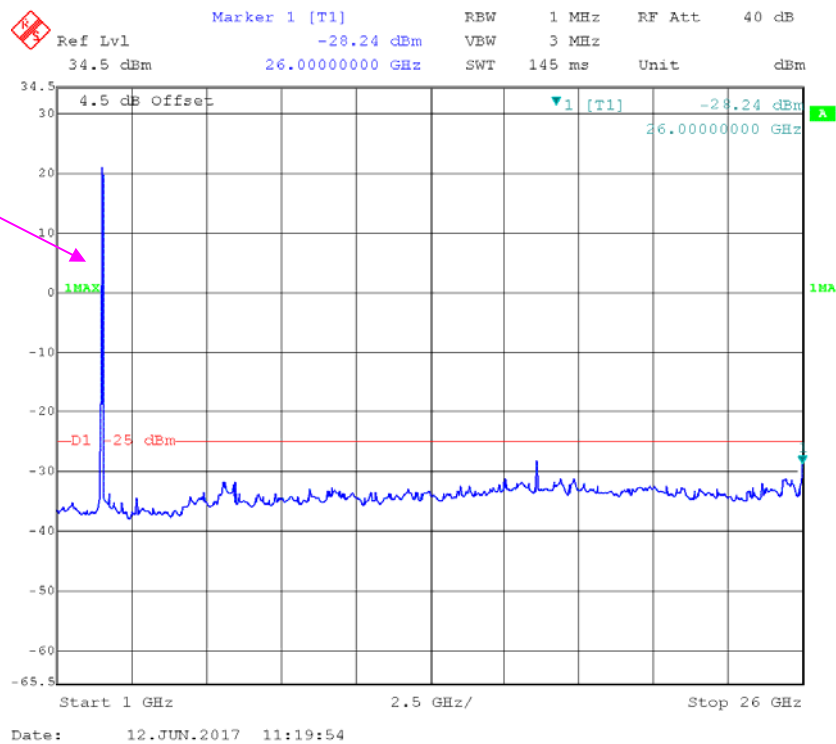
Fundamental



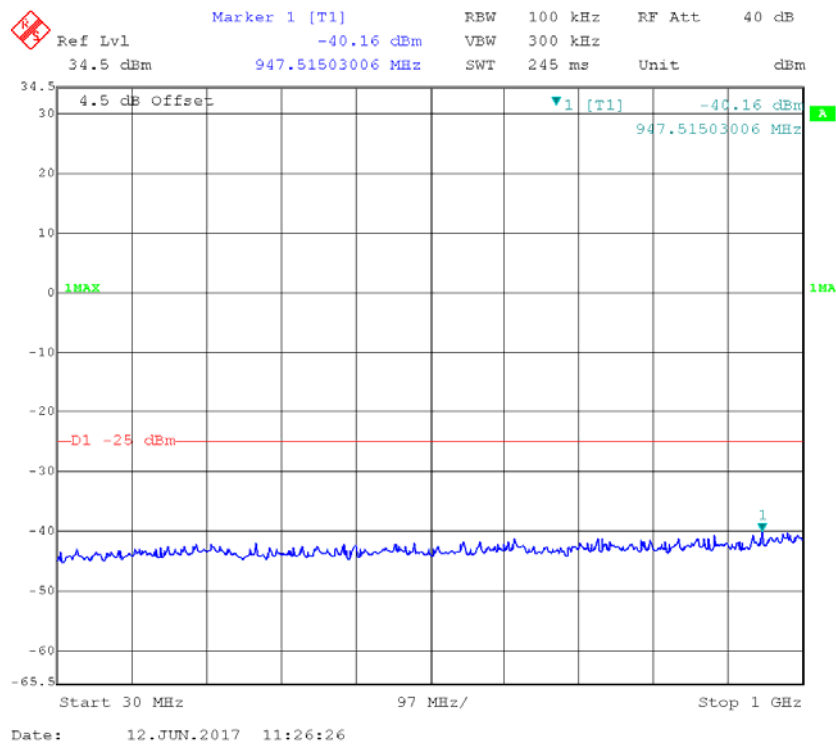
QPSK_15 MHz



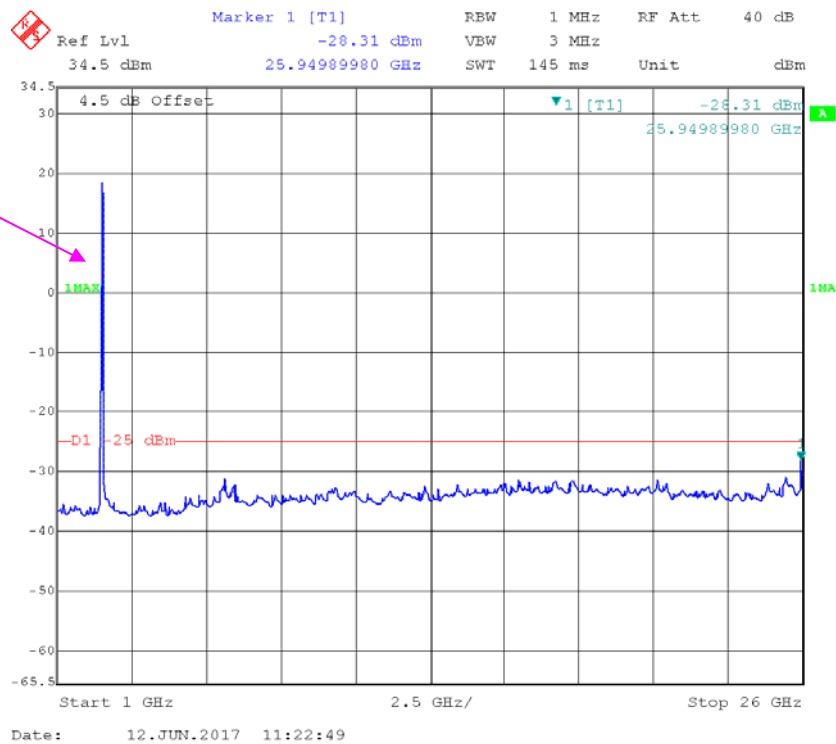
Fundamental



QPSK_20 MHz



Fundamental



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

Applicable Standard

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

Test Procedure

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

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

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

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model Number	Serial Number	Calibration Date	Calibration Due Date
Agilent	Amplifier	8447D	2944A10442	2016-12-02	2017-12-01
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2016-12-02	2017-12-01
Sunol Sciences	Broadband Antenna	JB3	A121808	2016-04-10	2019-04-09
Rohde & Schwarz	Spectrum Analyzer	FSEM30	100018	2016-12-02	2017-12-01
ETS	Horn Antenna	3115	003-6076	2016-12-02	2017-12-01
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-0113024	2014-06-16	2017-06-15
EMCO	Adjustable Dipole Antenna	3121C	9109-258	N/A	N/A
HP	Signal Generator	8648C	3623A04150	2016-05-23	2017-05-22
WILTRON	SWEPT FREQUENCY SYNTHESIZER	6737	213001	2016-05-23	2017-05-22
Mini-circuits	Amplifier	ZVA-183-S+	771001215	2017-05-20	2018-05-19
HP	Amplifier	8449B	3008A00277	2016-12-02	2017-12-01
EMCT	Semi-Anechoic Chamber	966	966-1	2015-04-24	2018-04-23
Unknown	RF Cable (below 1GHz)	Unknown	NO.1	2016-11-10	2017-11-09
Unknown	RF Cable (below 1GHz)	Unknown	NO.4	2016-11-10	2017-11-09
Unknown	RF Cable (above 1GHz)	Unknown	NO.2	2016-11-10	2017-11-09
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-011315	2016-08-18	2017-08-18
Ducommun Technologies	Horn Antenna	ARH-2823-02	1007726-011312	2016-08-18	2017-08-18

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	24.2 °C
Relative Humidity:	56.4 %
ATM Pressure:	100.1 kPa

* The testing was performed by Kevin Hu on 2017-06-02.

EUT Operation Mode: Transmitting

Cellular Band

30MHz-10 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM850, Frequency:836.600 MHz								
1673.200	H	53.64	-48.4	10.6	2.5	-40.3	-13.0	27.3
1673.200	V	51.49	-50.9	10.6	2.5	-42.8	-13.0	29.8
2509.800	H	49.21	-50.2	13.1	3.1	-40.2	-13.0	27.2
2509.800	V	46.87	-51.6	13.1	3.1	-41.6	-13.0	28.6
3346.400	H	43.65	-55.3	13.8	3.6	-45.1	-13.0	32.1
3346.400	V	40.52	-58.1	13.8	3.6	-47.9	-13.0	34.9
382.000	H	46.29	-54.7	0.0	0.6	-55.3	-13.0	42.3
583.000	V	48.27	-52.5	0.0	0.8	-53.3	-13.0	40.3
WCDMA Band V R99,Frequency:836.600 MHz								
1673.200	H	37.56	-64.5	10.6	2.5	-56.4	-13.0	43.4
1673.200	V	35.21	-67.1	10.6	2.5	-59.0	-13.0	46.0
2509.800	H	48.52	-50.9	13.1	3.1	-40.9	-13.0	27.9
2509.800	V	42.68	-55.8	13.1	3.1	-45.8	-13.0	32.8
427.000	H	43.85	-56.1	0.0	0.6	-56.7	-13.0	43.7
254.000	V	45.16	-62.9	0.0	0.5	-63.4	-13.0	50.4

PCS Band

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)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	35.87	-60	13.8	3.8	-50.0	-13.0	37.0
3760.000	V	38.94	-55.7	13.8	3.8	-45.7	-13.0	32.7
5640.000	H	40.97	-53.4	14.0	4.6	-44.0	-13.0	31.0
5640.000	V	42.35	-52	14.0	4.6	-42.6	-13.0	29.6
7520.000	H	46.86	-43.9	13.2	5.6	-36.3	-13.0	23.3
7520.000	V	48.38	-42.2	13.2	5.6	-34.6	-13.0	21.6
264.000	H	42.28	-62.4	0.0	0.5	-62.9	-13.0	49.9
318.000	V	48.45	-57	0.0	0.5	-57.5	-13.0	44.5
WCDMA Band II, R99, Frequency:1880.000 MHz								
3760.000	H	40.26	-55.6	13.8	3.8	-45.6	-13.0	32.6
3760.000	V	42.18	-52.5	13.8	3.8	-42.5	-13.0	29.5
5640.000	H	36.54	-57.8	14.0	4.6	-48.4	-13.0	35.4
5640.000	V	38.31	-56	14.0	4.6	-46.6	-13.0	33.6
502.000	H	43.18	-56.2	0.0	0.7	-56.9	-13.0	43.9
458.000	V	48.57	-54.3	0.0	0.7	-55.0	-13.0	42.0

LTE Band II (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								
475.000	H	44.84	-54.8	0.0	0.7	-55.5	-13.0	42.5
557.000	V	47.56	-53.8	0.0	0.7	-54.5	-13.0	41.5
5640.000	H	36.74	-57.6	14.0	4.6	-48.2	-13.0	35.2
5640.000	V	33.65	-60.7	14.0	4.6	-51.3	-13.0	38.3
160.400	H	32.81	-76.1	0.0	0.4	-76.5	-13.0	63.5
266.700	V	30.71	-74.8	0.0	0.5	-75.3	-13.0	62.3

LTE Band IV (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1732.500 MHz								
3465.000	H	36.11	-62.4	13.9	3.6	-52.1	-13.0	39.1
3465.000	V	34.92	-62.8	13.9	3.6	-52.5	-13.0	39.5
5197.500	H	35.22	-58.2	14.0	4.8	-49.0	-13.0	36.0
5197.500	V	34.06	-60.9	14.0	4.8	-51.7	-13.0	38.7
245.000	H	43.17	-61.5	0.0	0.5	-62.0	-13.0	49.0
546.000	V	45.84	-55.7	0.0	0.7	-56.4	-13.0	43.4

LTE Band VII (30MHz-26GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:2535.000 MHz								
5070.000	H	35.26	-58.1	13.9	4.5	-48.7	-25.0	23.7
5070.000	V	34.17	-60	13.9	4.5	-50.6	-25.0	25.6
7605.000	H	34.64	-56.2	13.2	5.7	-48.7	-25.0	23.7
7605.000	V	33.55	-57.3	13.2	5.7	-49.8	-25.0	24.8
284.000	H	43.74	-60.9	0.0	0.5	-61.4	-25.0	36.4
458.000	V	46.22	-56.7	0.0	0.7	-57.4	-25.0	32.4

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 = SG Level - Cable loss + Antenna Gain
- 3) Margin = Limit-Absolute Level

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

Applicable Standard

According to § 22.917(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

According to §24.238(a), the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB.

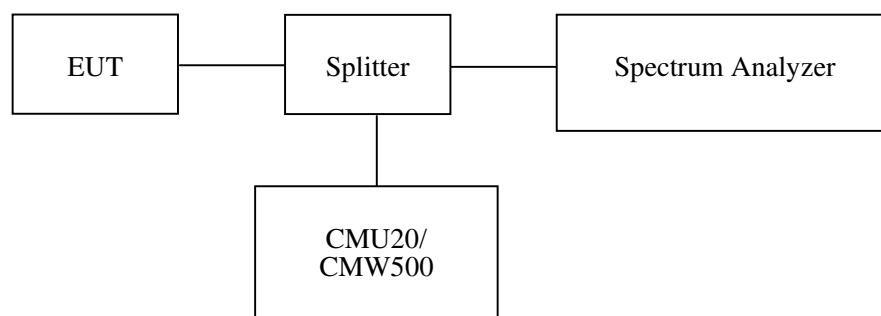
According to §27.53 (h), AWS emission limits—(1) General protection levels. Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

According to §27.53 (m), (4) For mobile digital stations, the attenuation factor shall be not less than $40 + 10 \log(P)$ dB on all frequencies between the channel edge and 5 megahertz from the channel edge, $43 + 10 \log(P)$ dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and $55 + 10 \log(P)$ dB on all frequencies more than X megahertz from the channel edge, where X is the greater of 6 megahertz or the actual emission bandwidth as defined in paragraph (m)(6) of this section. In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

Test Procedure

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

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



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Signal Analyzer	FSIQ26	831929/005	2016-09-21	2017-09-20
Unknown	RF Cable	Unknown	NO.3	Each Time	/
Unknown	Two-way Splitter	Unknown	OE0120121	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

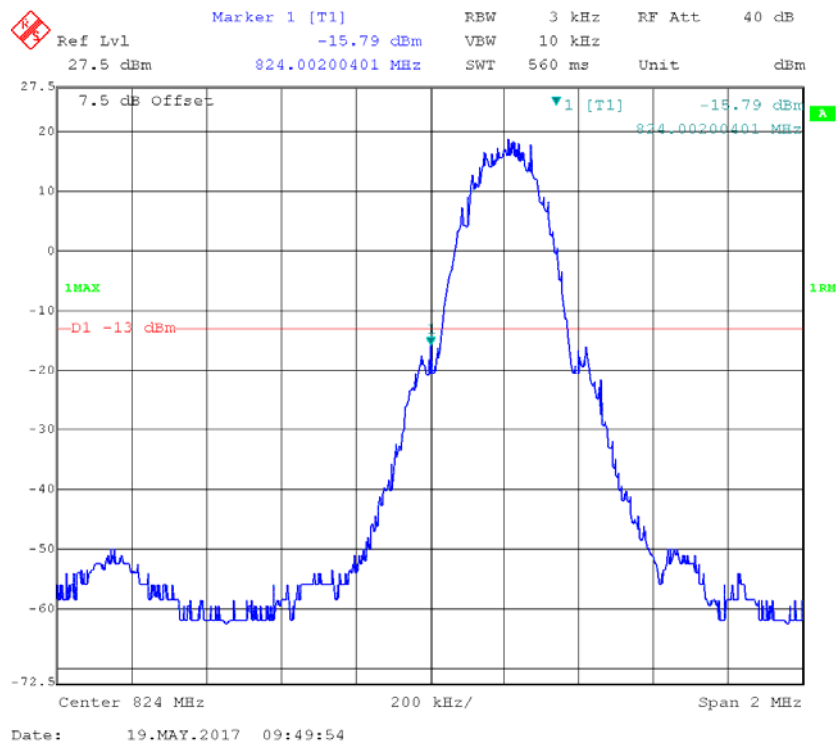
Temperature:	21.4~27.6°C
Relative Humidity:	49.2~50.5 %
ATM Pressure:	97.6~100.1kPa

The testing was performed by Kevin Hu from 2017-05-19 to 2017-05-27.

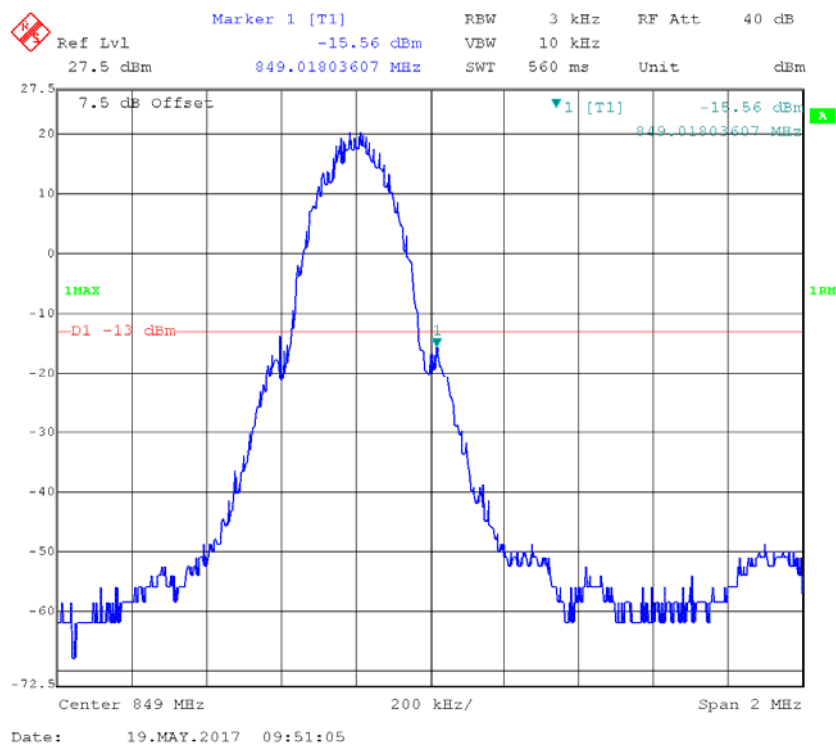
Test Mode: Transmitting

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

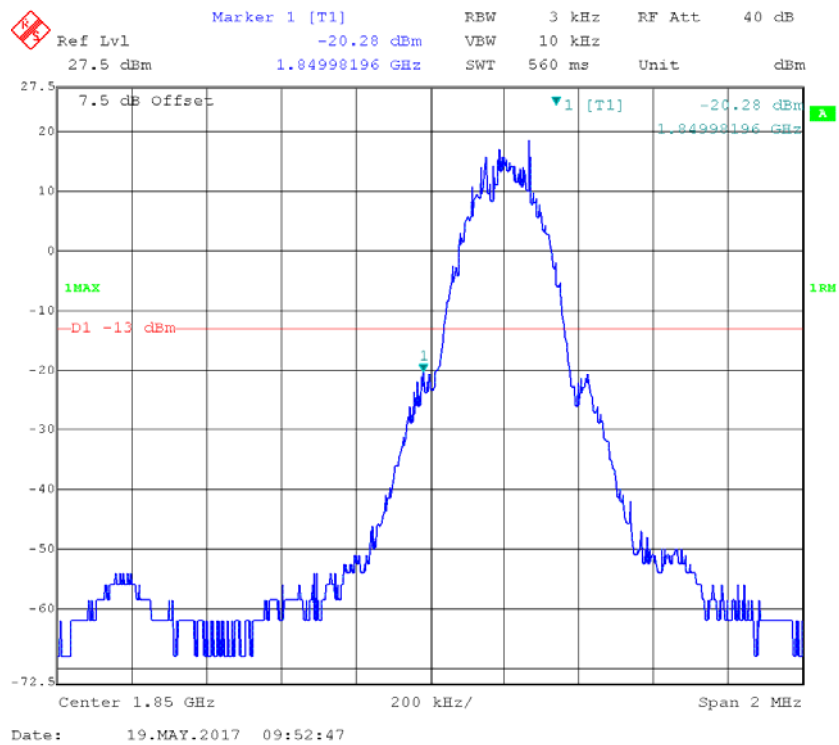
GSM 850, Left Band Edge



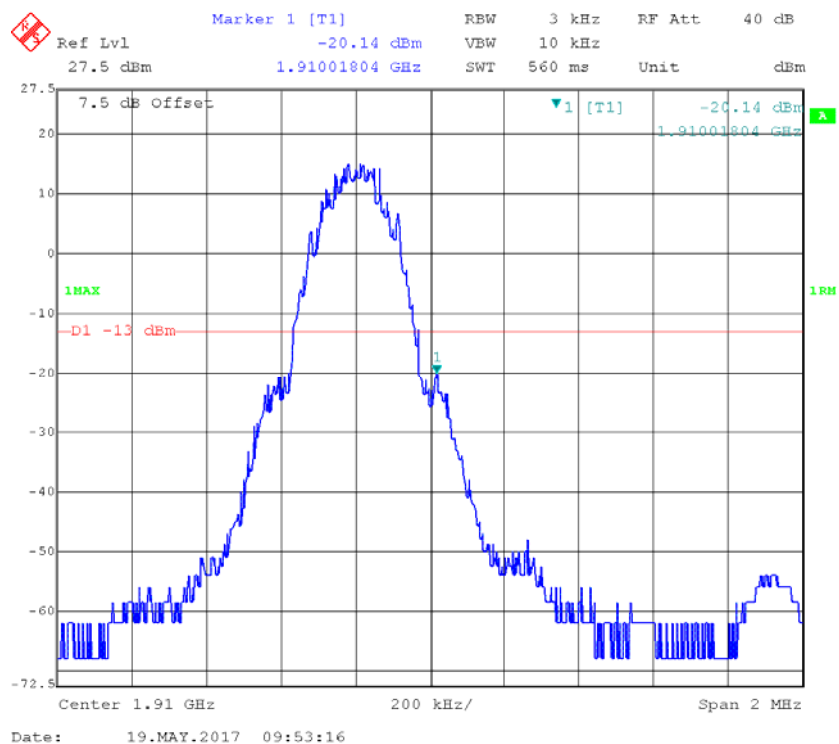
GSM 850, Right Band Edge



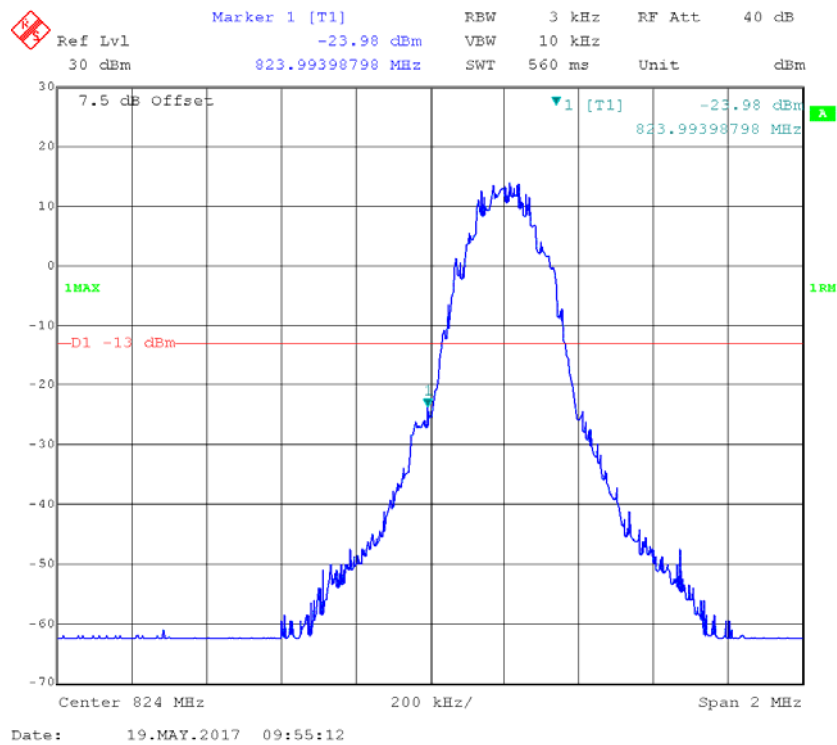
GSM 1900, Left Band Edge



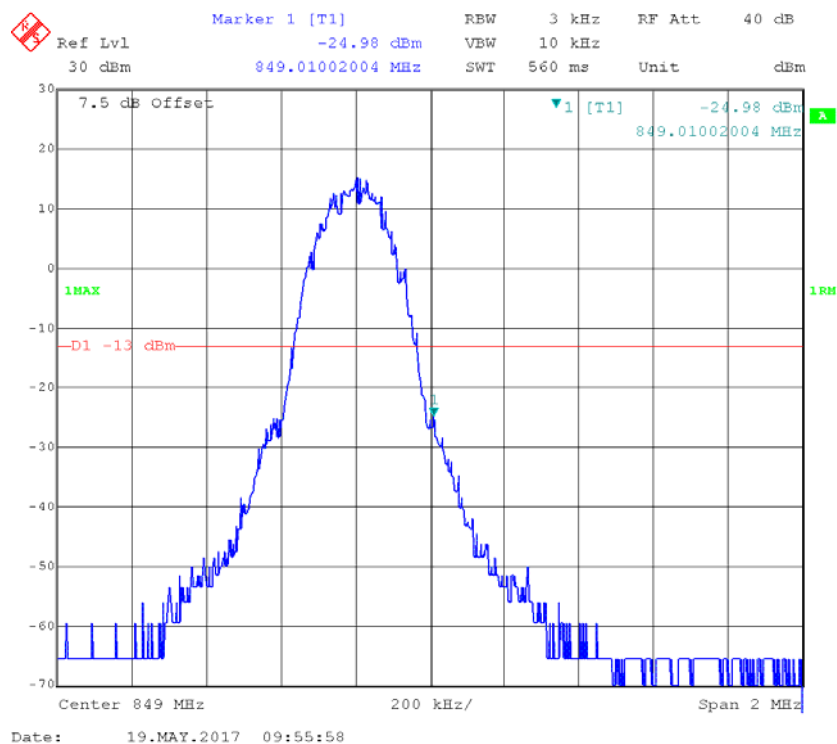
GSM 1900, Right Band Edge



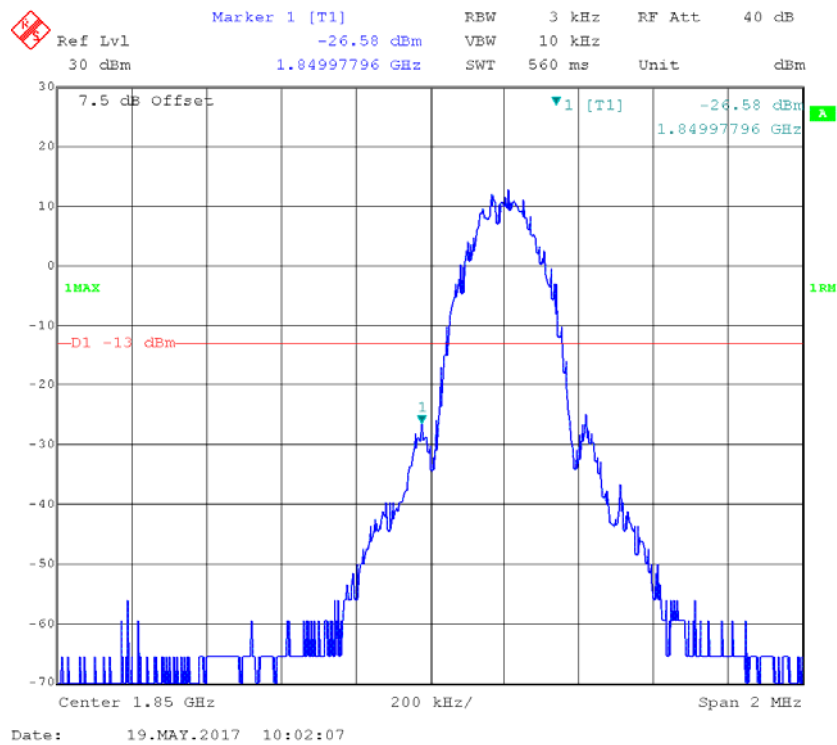
EDGE 850, Left Band Edge



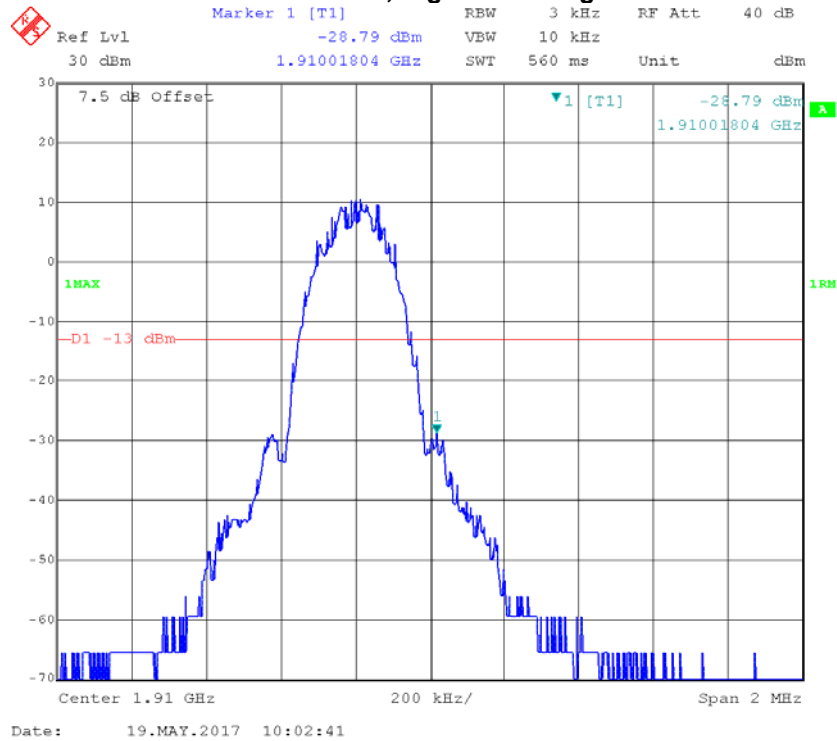
EDGE 850, Right Band Edge



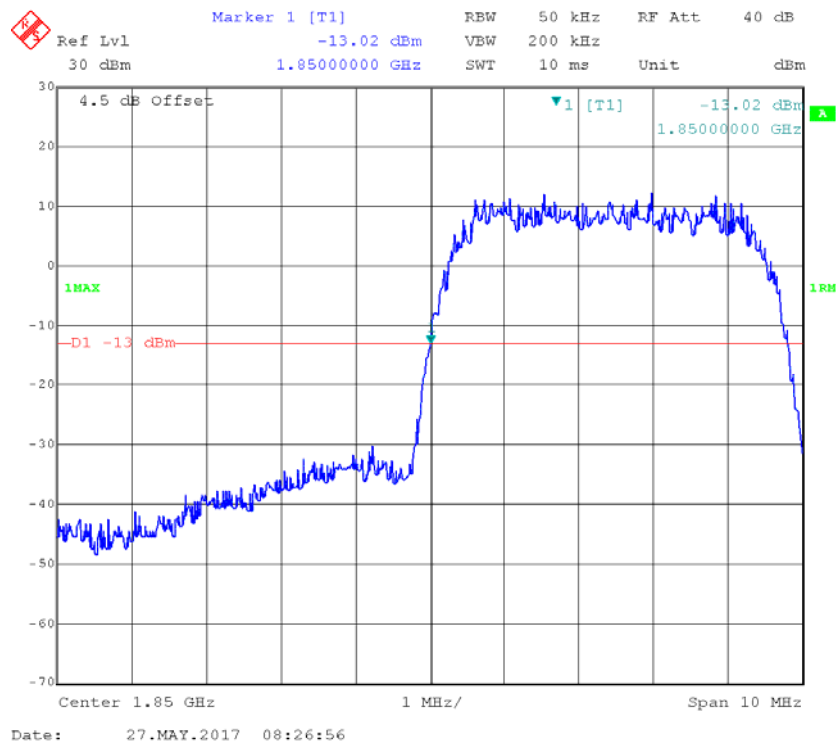
EDGE 1900, Left Band Edge



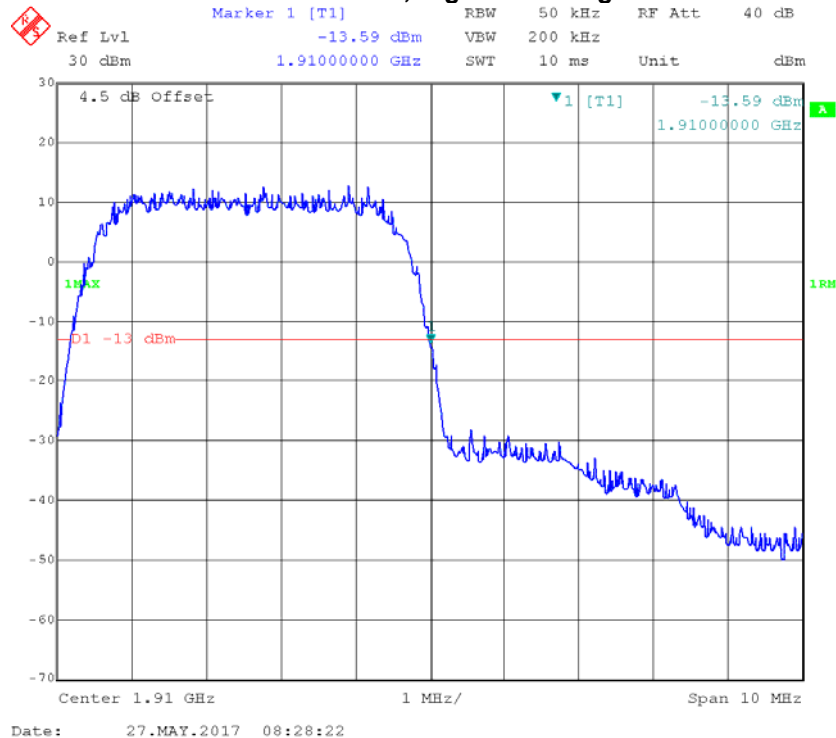
EDGE 1900, Right Band Edge



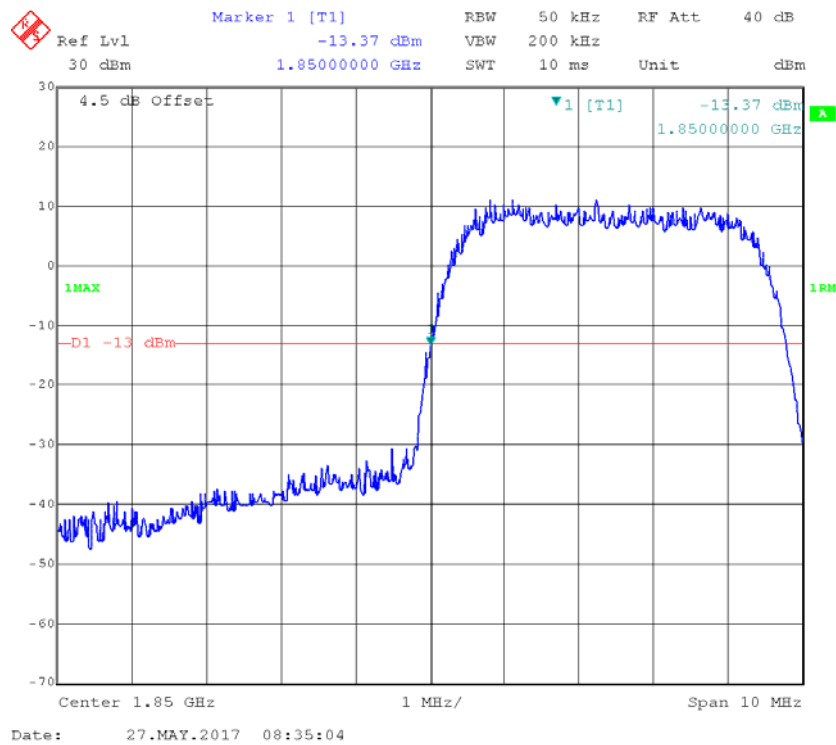
REL99 Band II, Left Band Edge



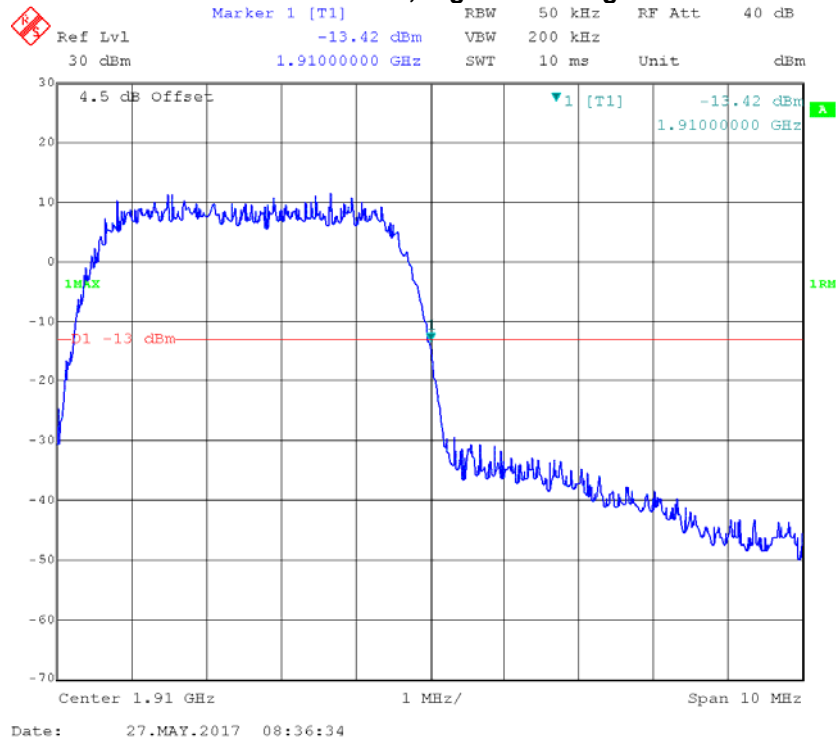
REL99 Band II, Right Band Edge



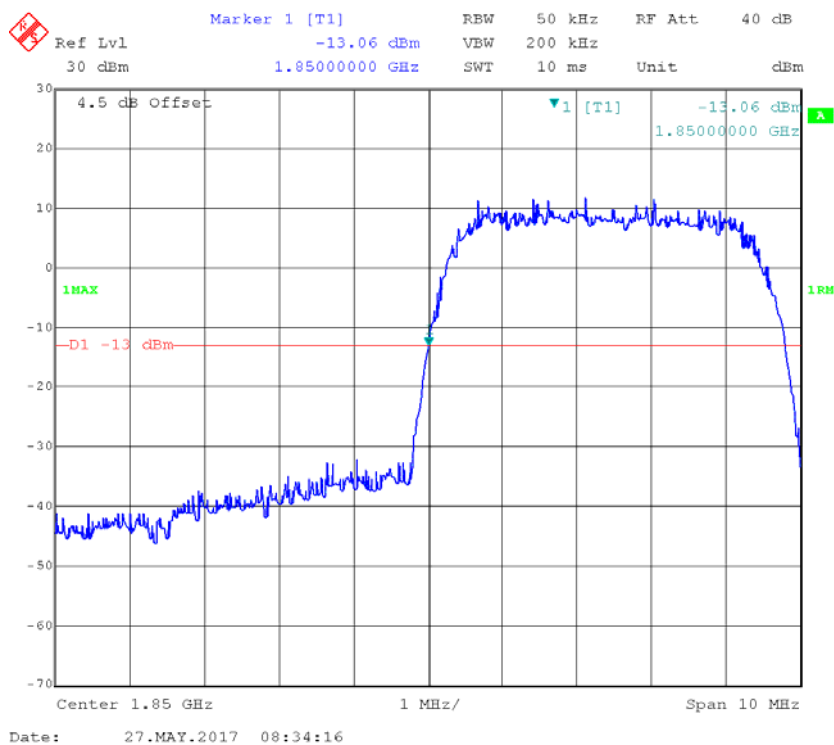
HSDPA Band II, Left Band Edge



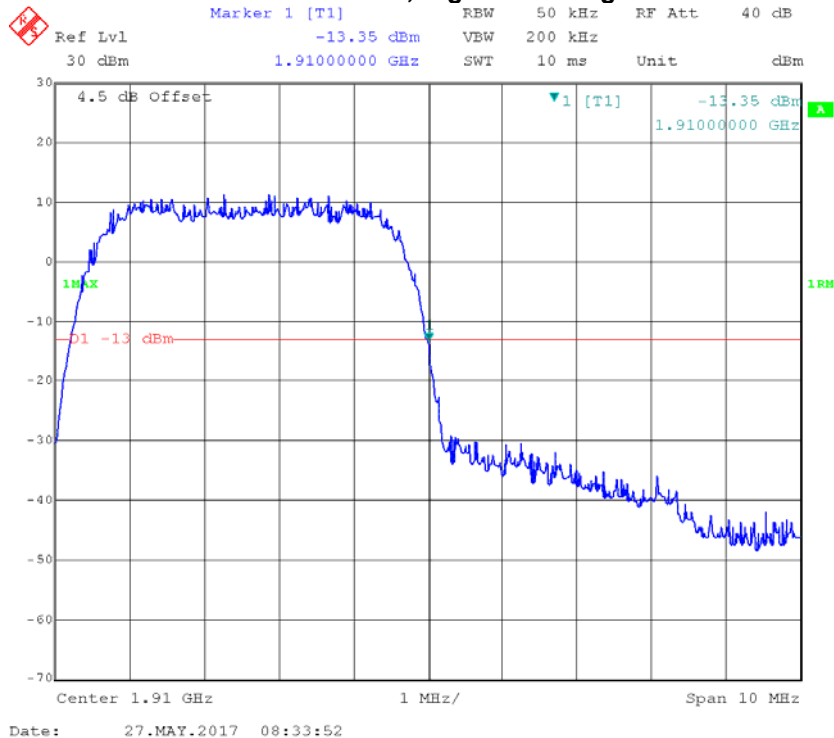
HSDPA Band II, Right Band Edge



HSUPA Band II, Left Band Edge

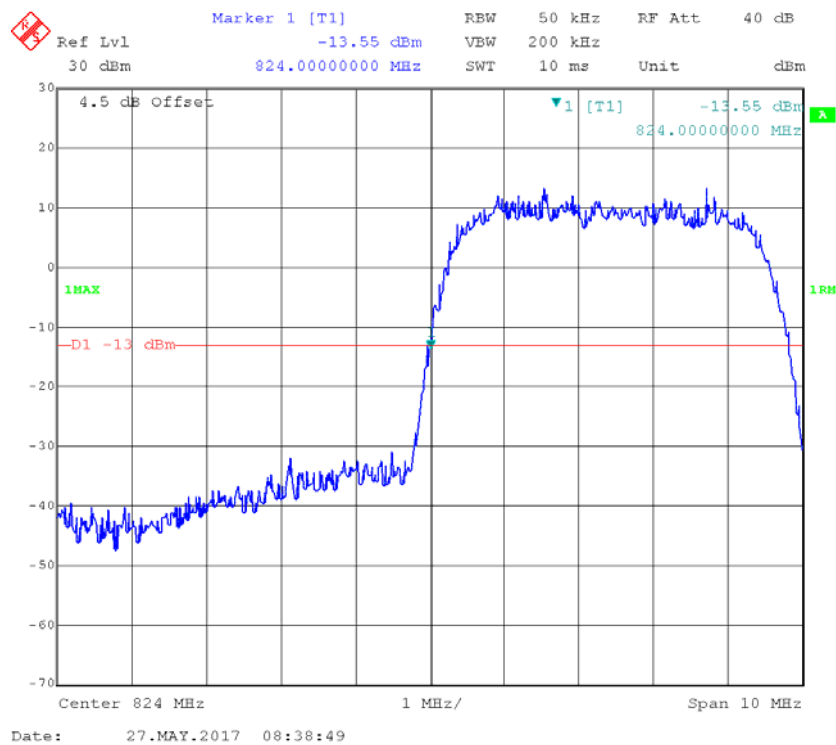


HSUPA Band II, Right Band Edge

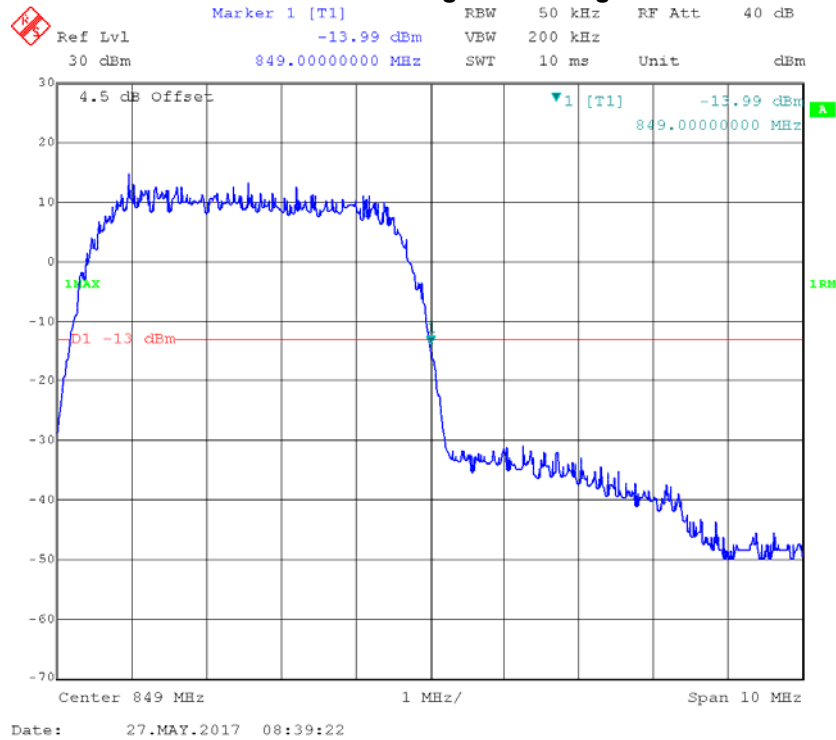


WCDMA Band V

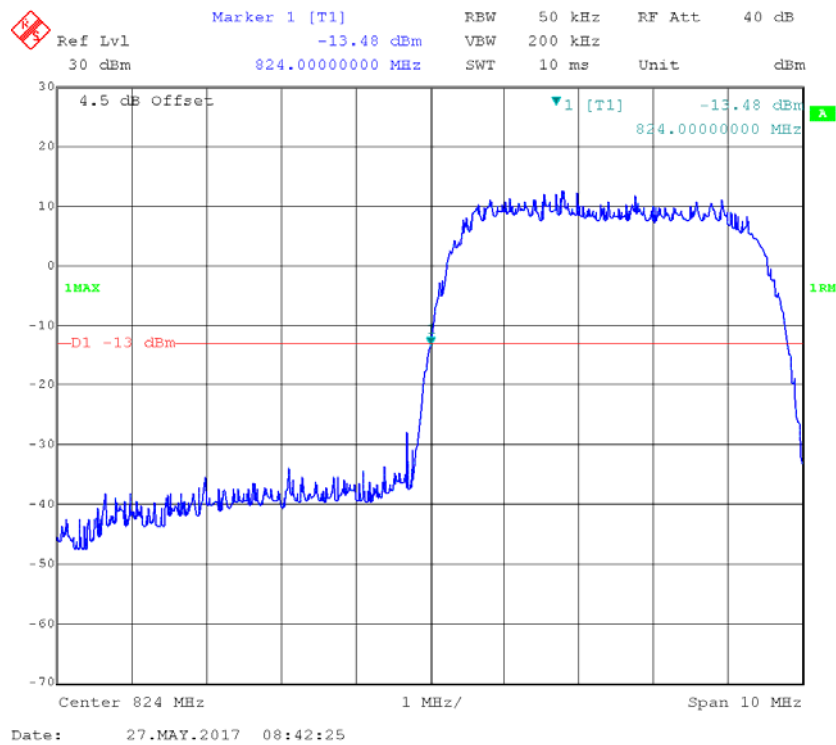
REL99 Band V, Left Band Edge



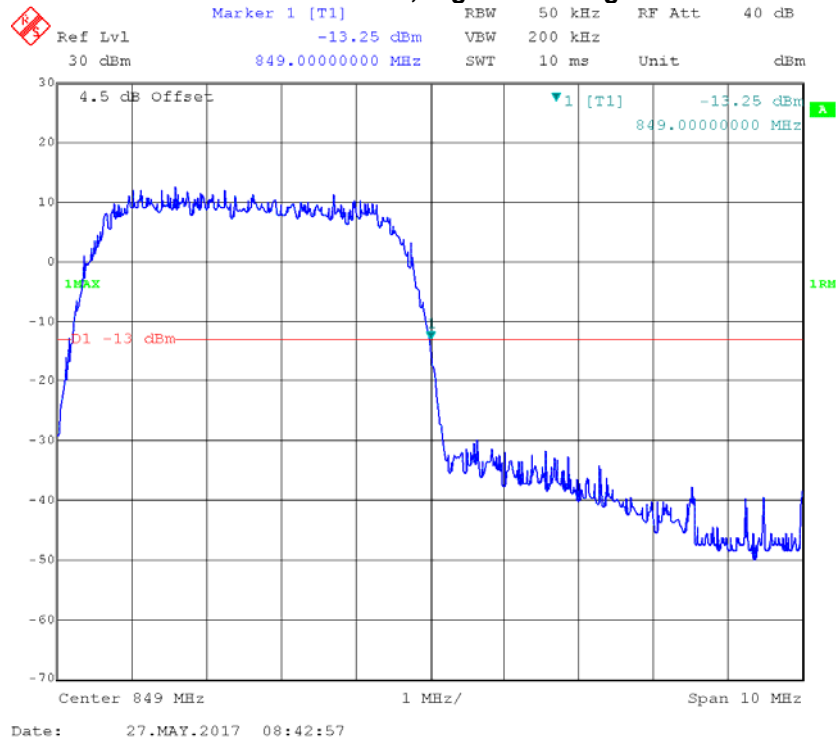
REL99 Band V Right Band Edge



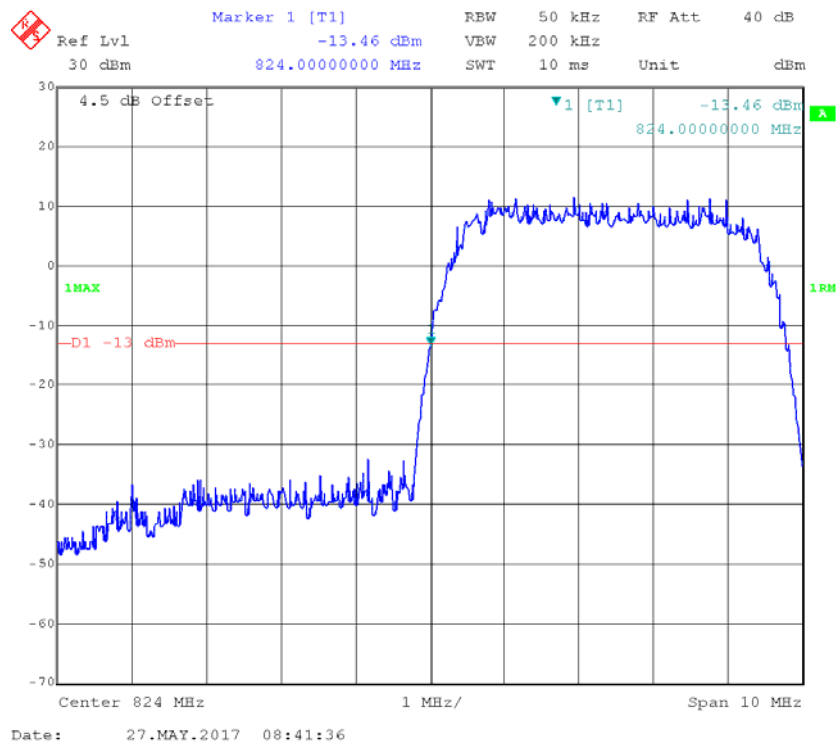
HSDPA Band V, Left Band Edge



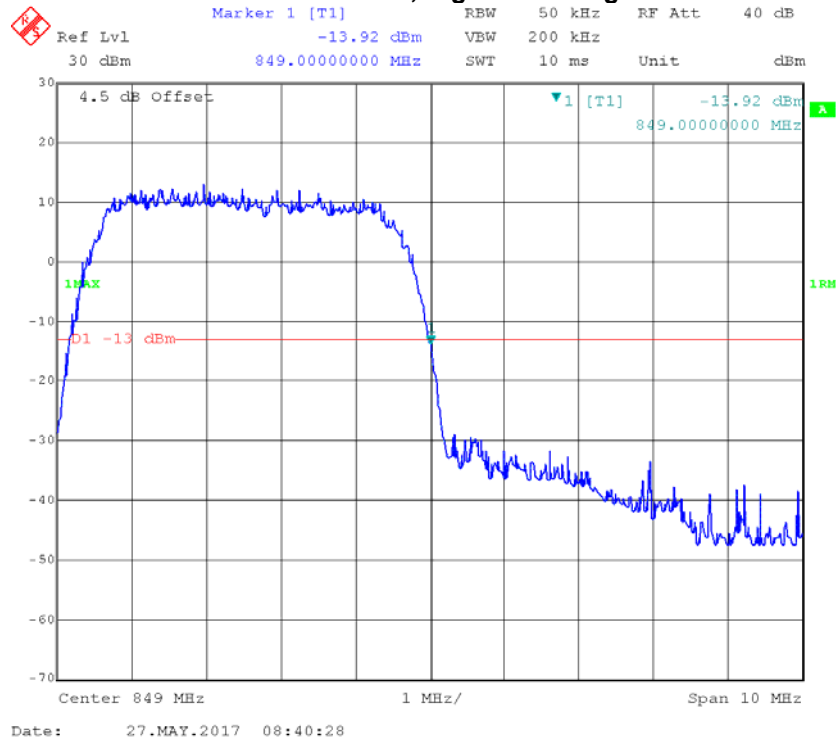
HSDPA Band V, Right Band Edge



HSUPA Band V, Left Band Edge

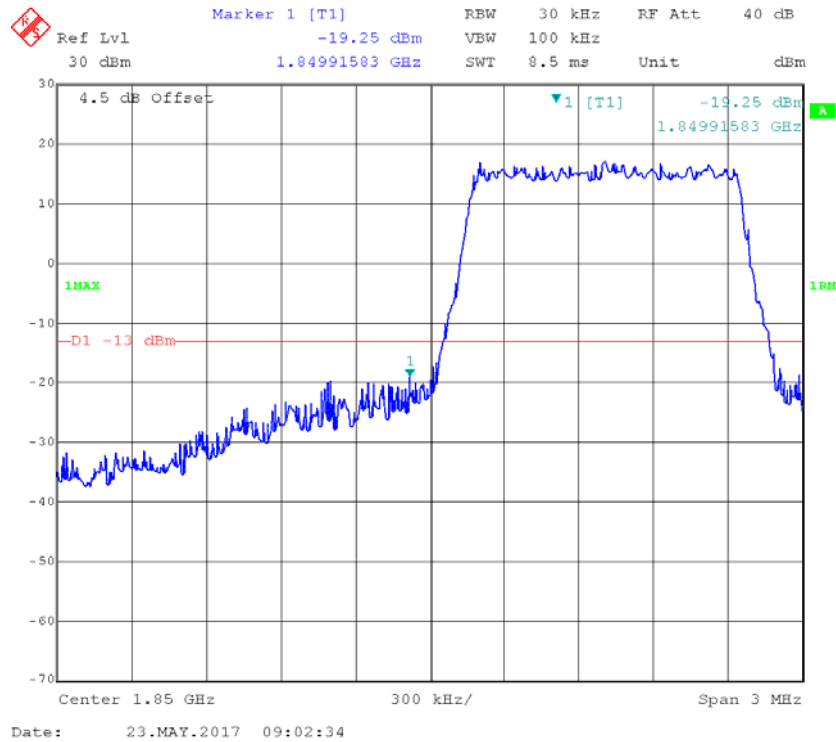


HSUPA Band V, Right Band Edge

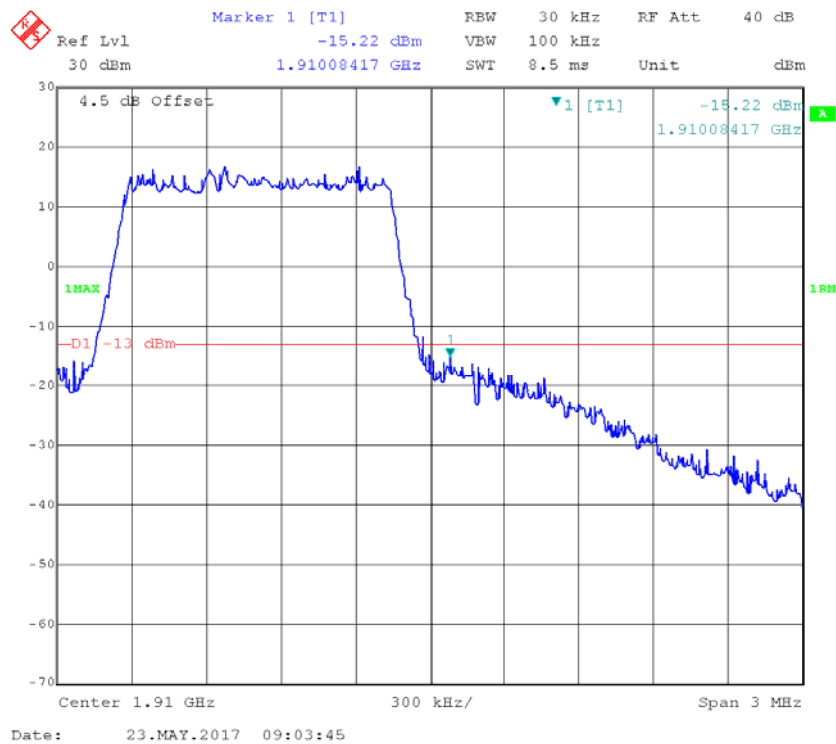


LTE Band II

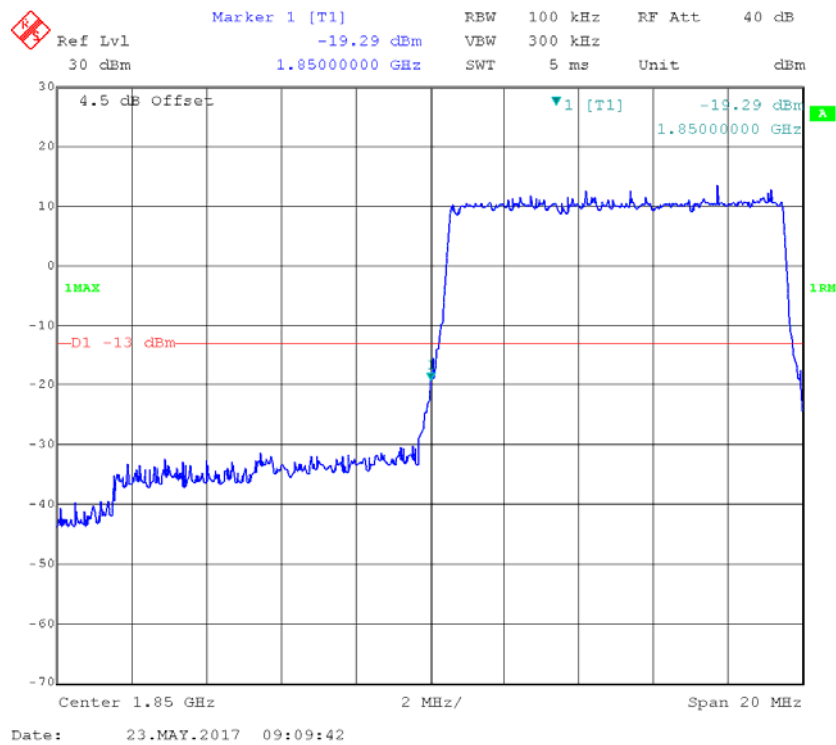
QPSK_1.4MHz_6 RB_Left



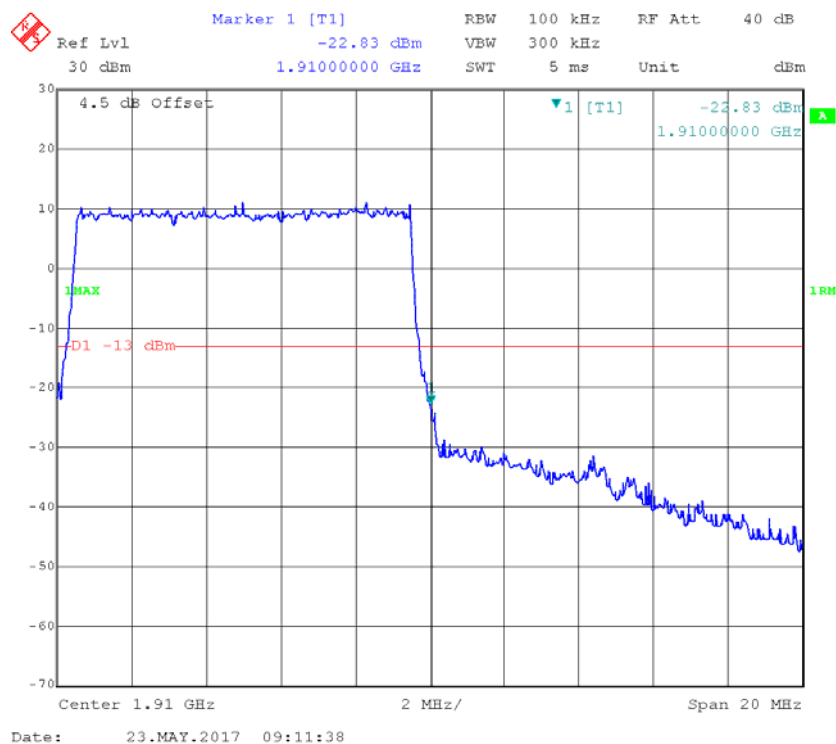
QPSK_1.4MHz_6 RB_Right



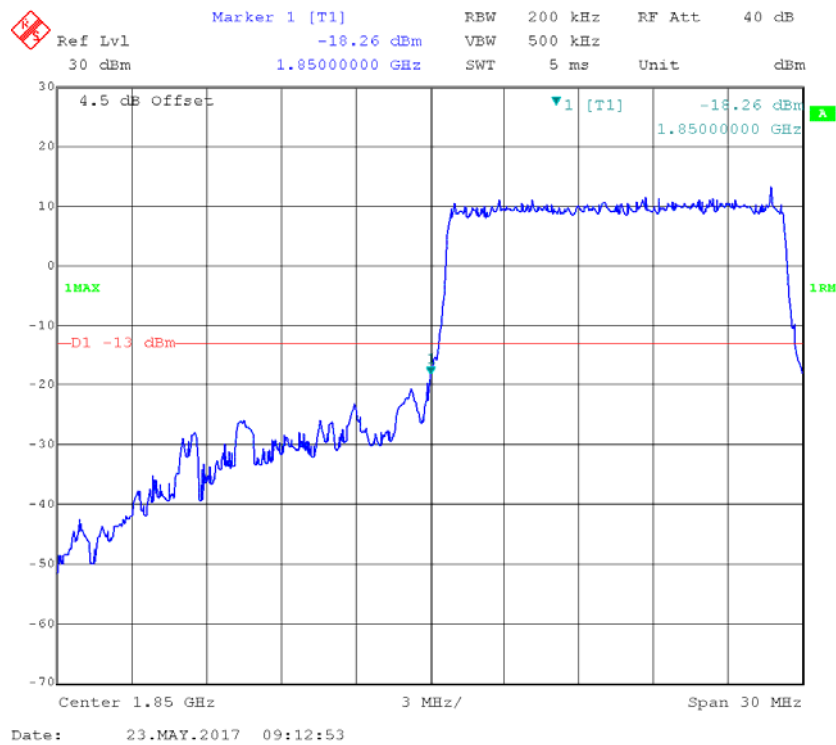
QPSK_3MHz_ 15 RB_ Left



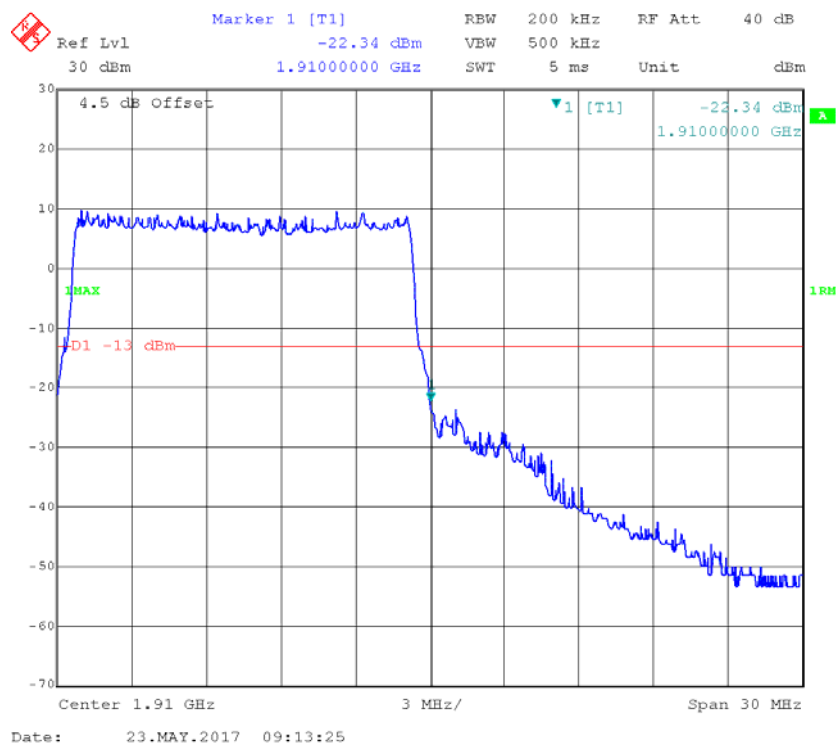
QPSK_3MHz_ 15 RB_ Right



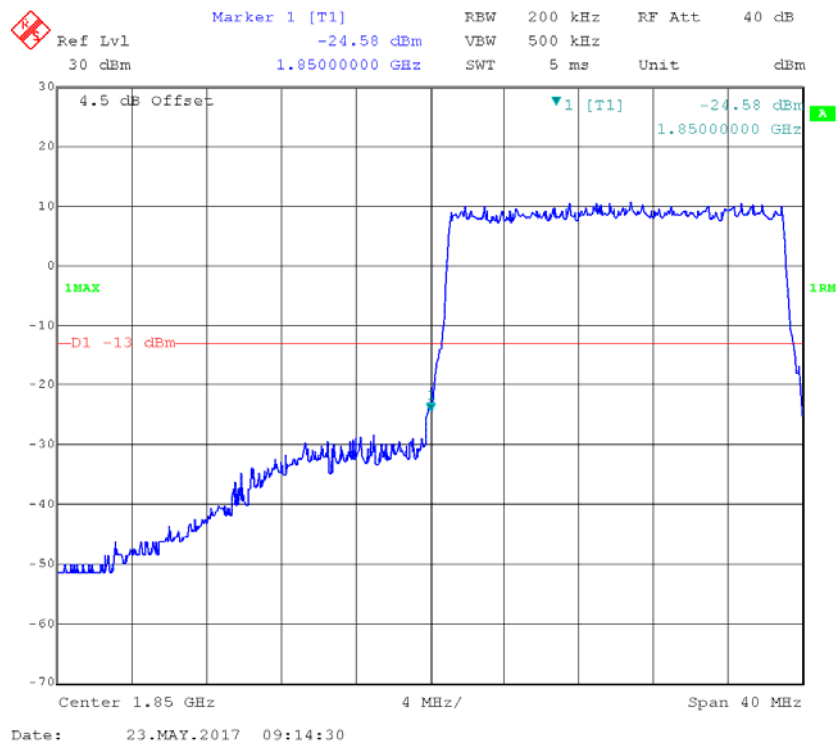
QPSK_5MHz_25 RB_ Left



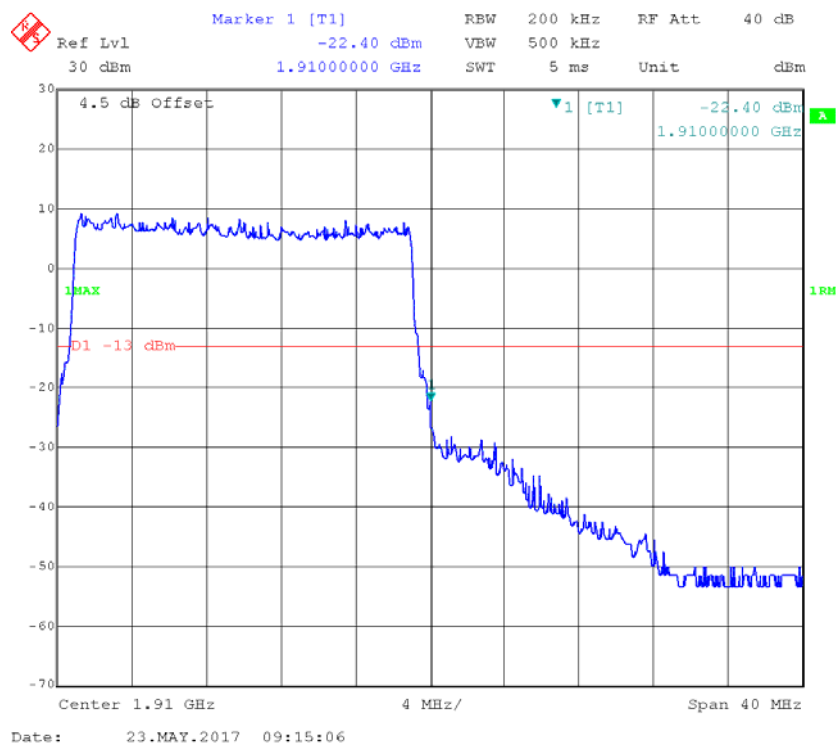
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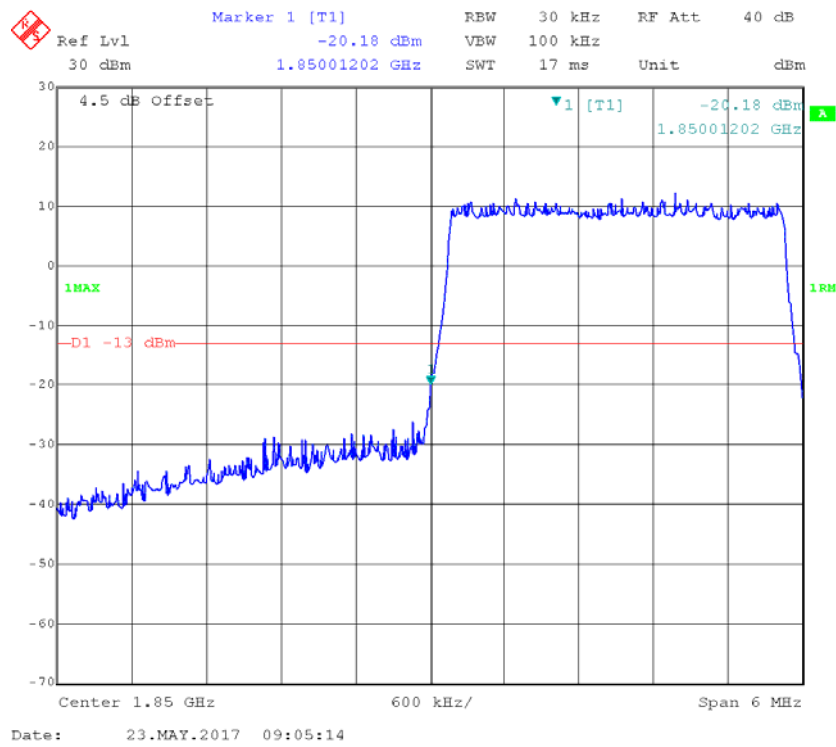
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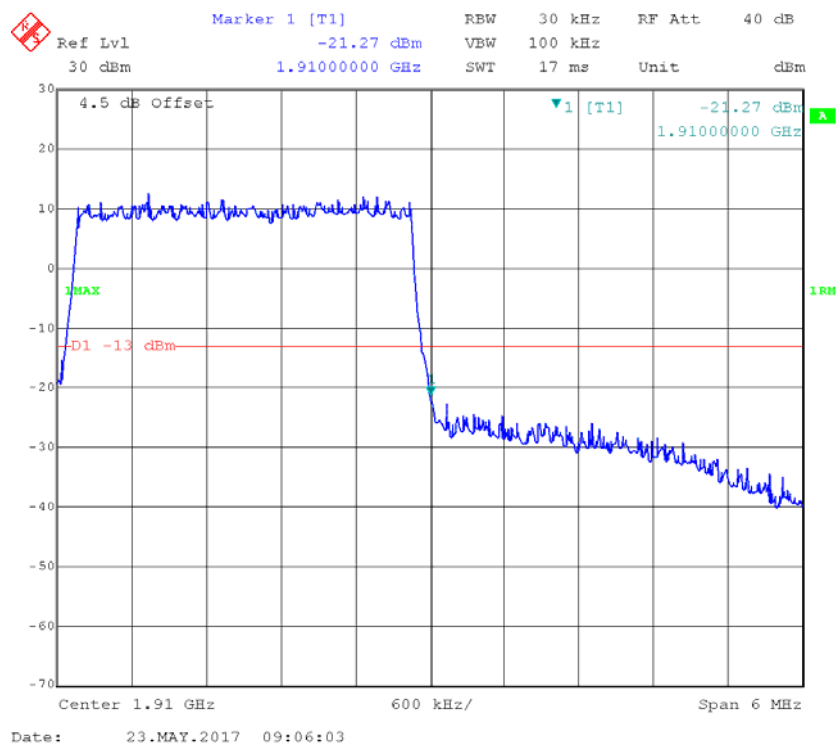
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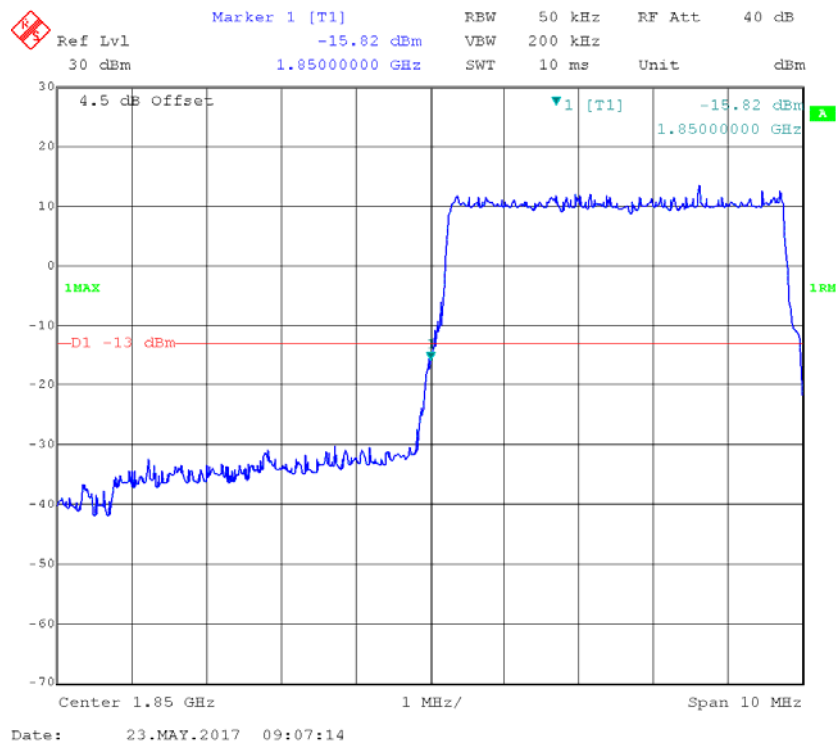
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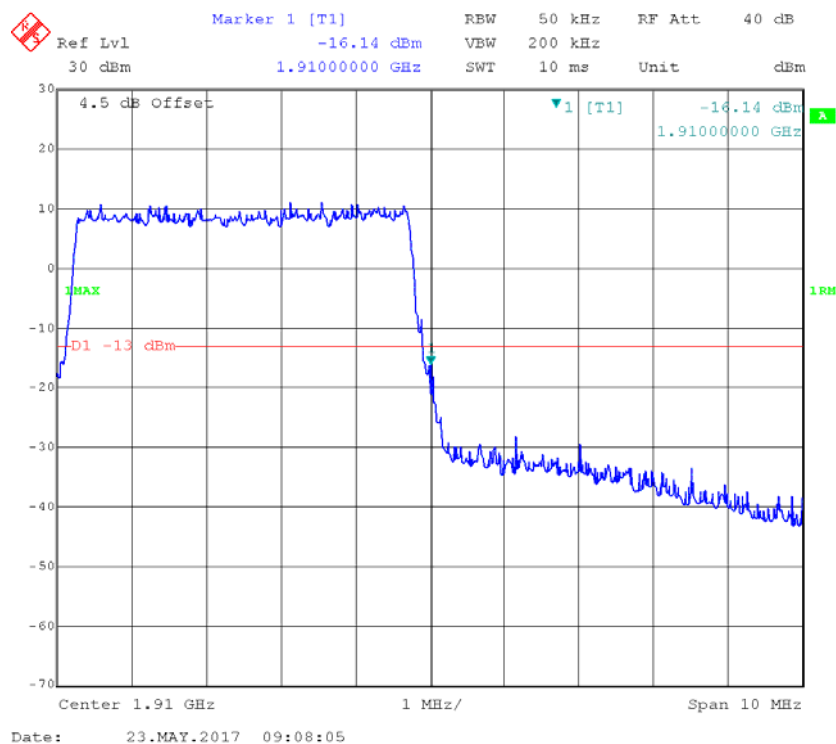
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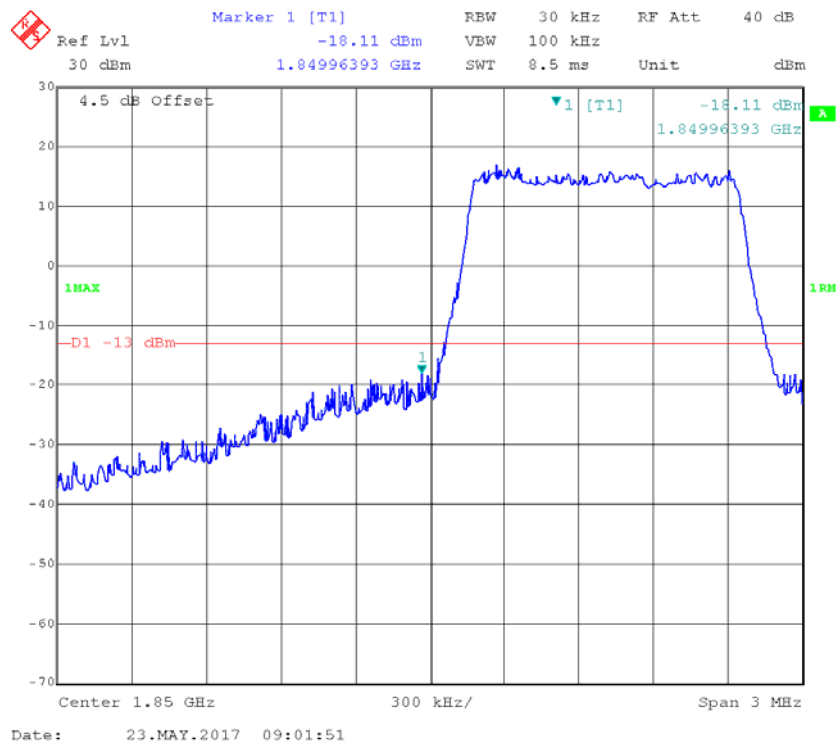
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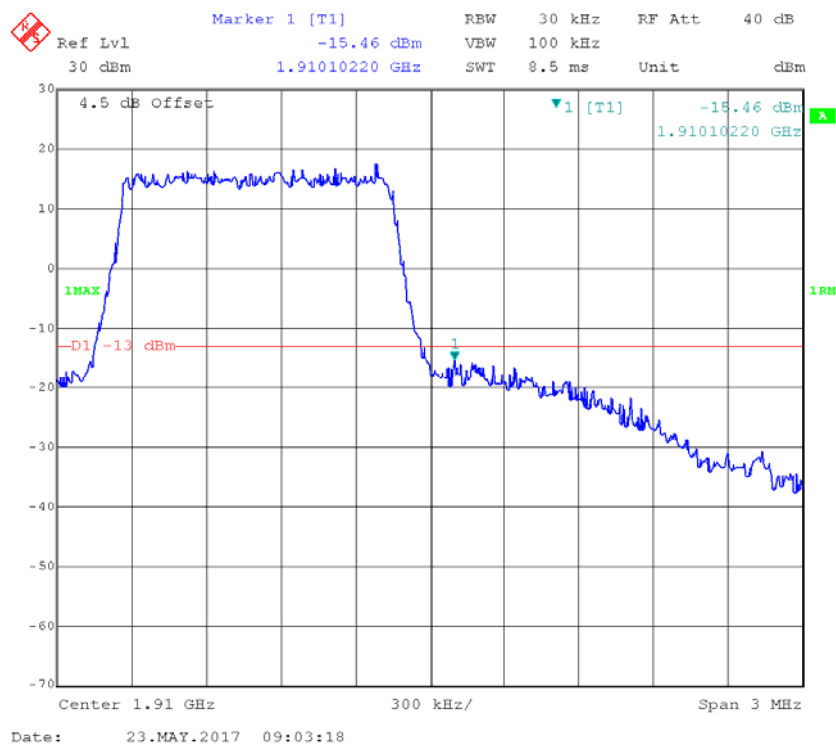
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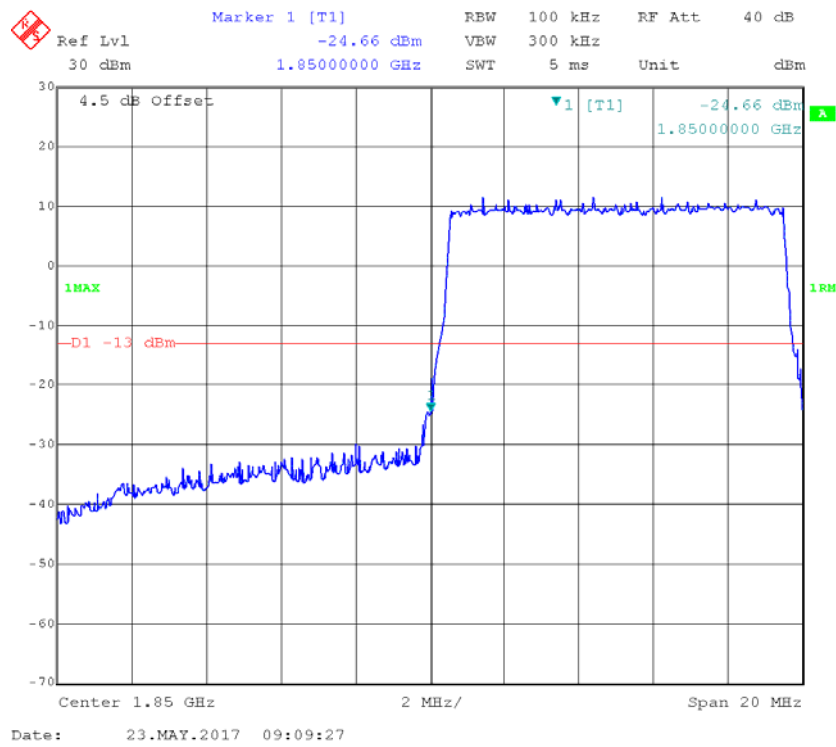
16QAM_1.4MHz_6 RB_Left



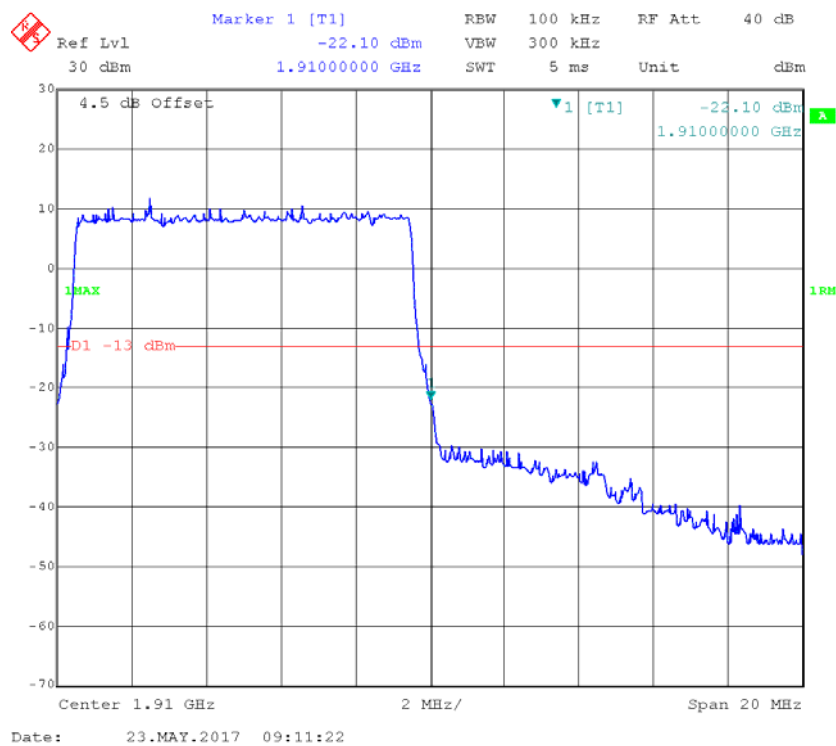
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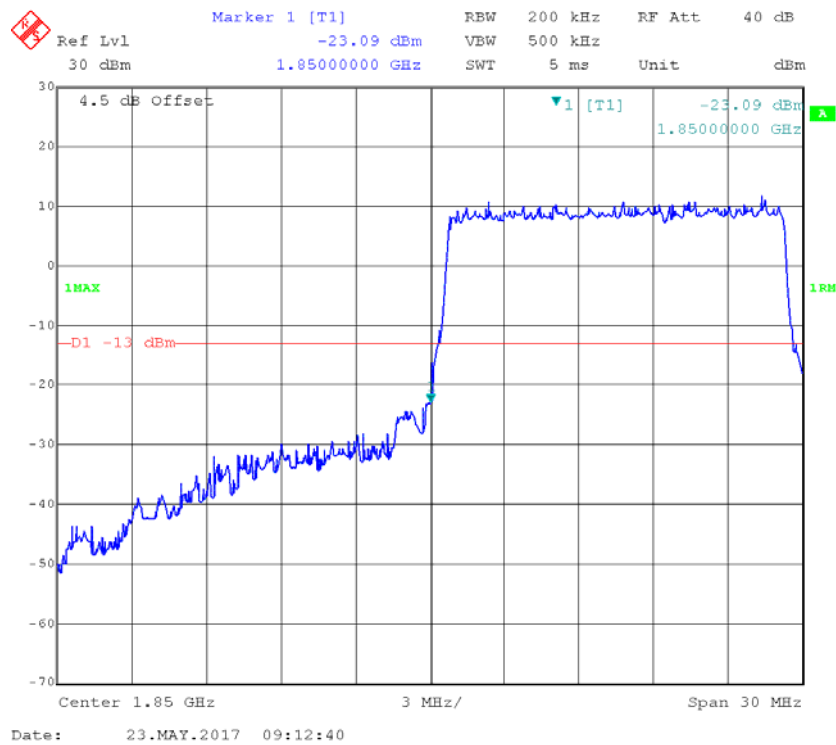
16QAM_3MHz_ 15 RB_ Left



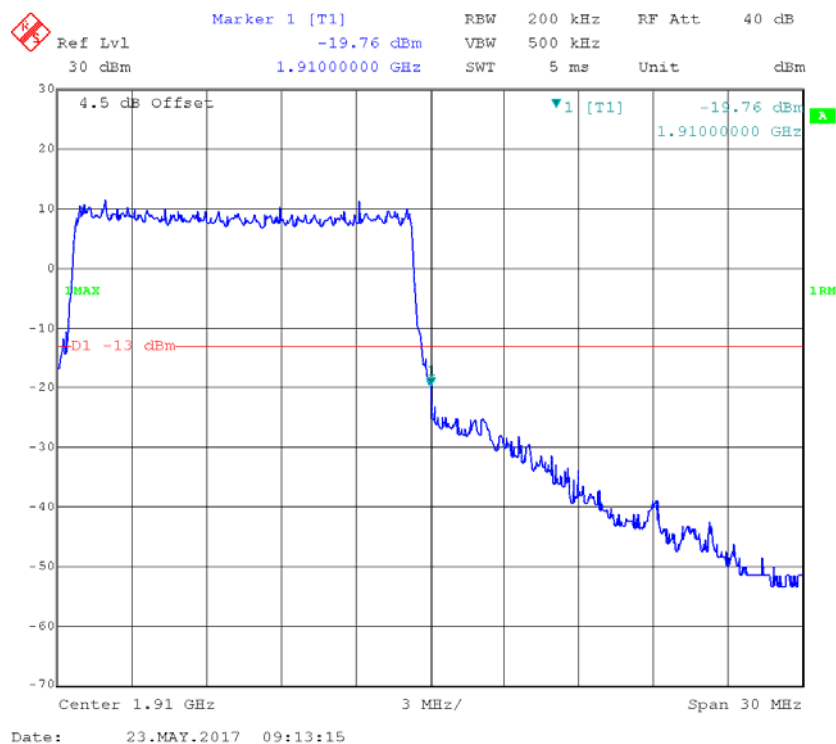
16QAM_3MHz_ 15 RB_ Right



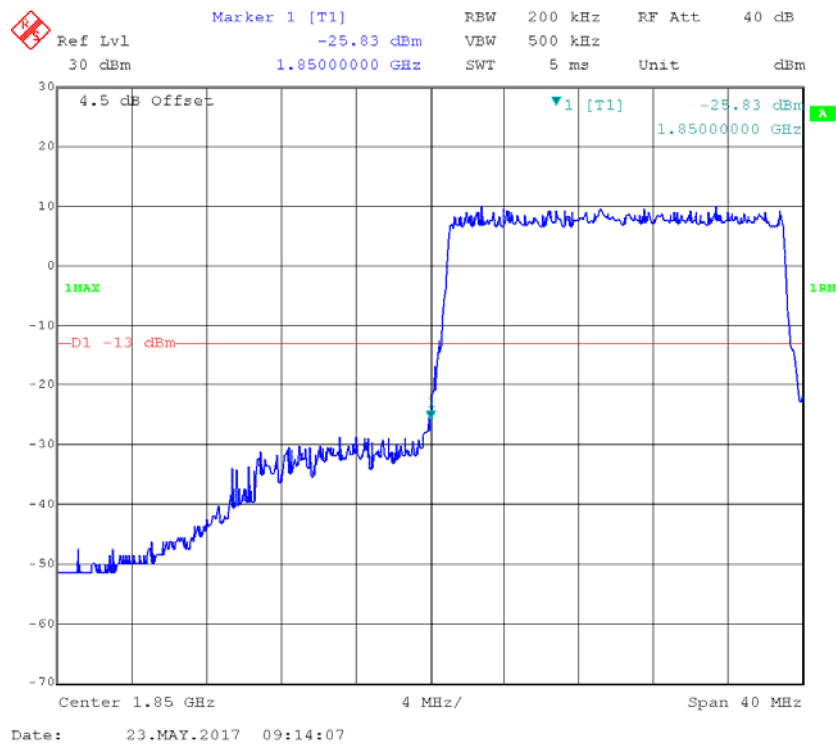
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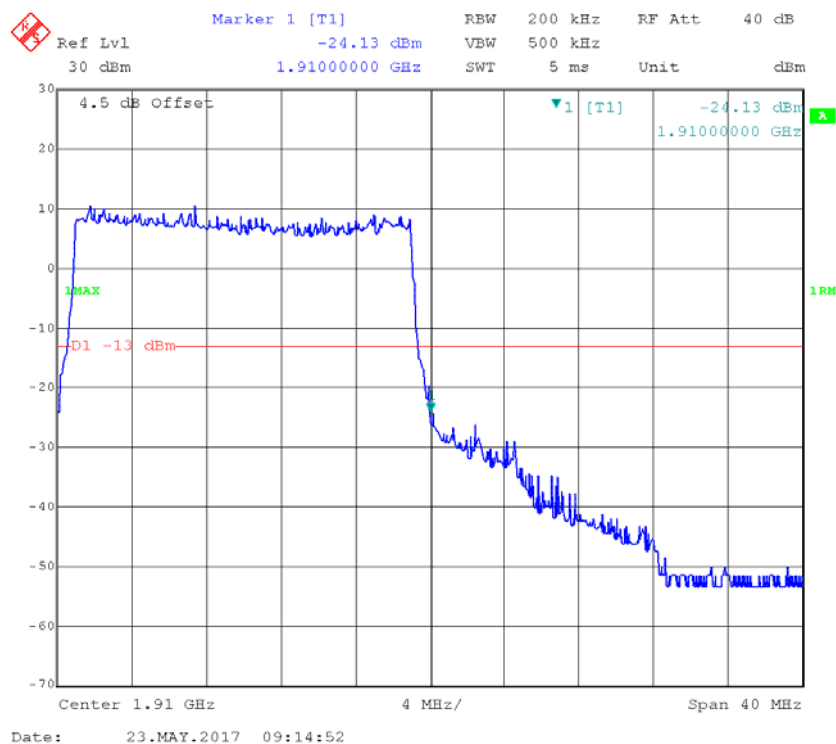
16QAM_5MHz_25 RB_ Right



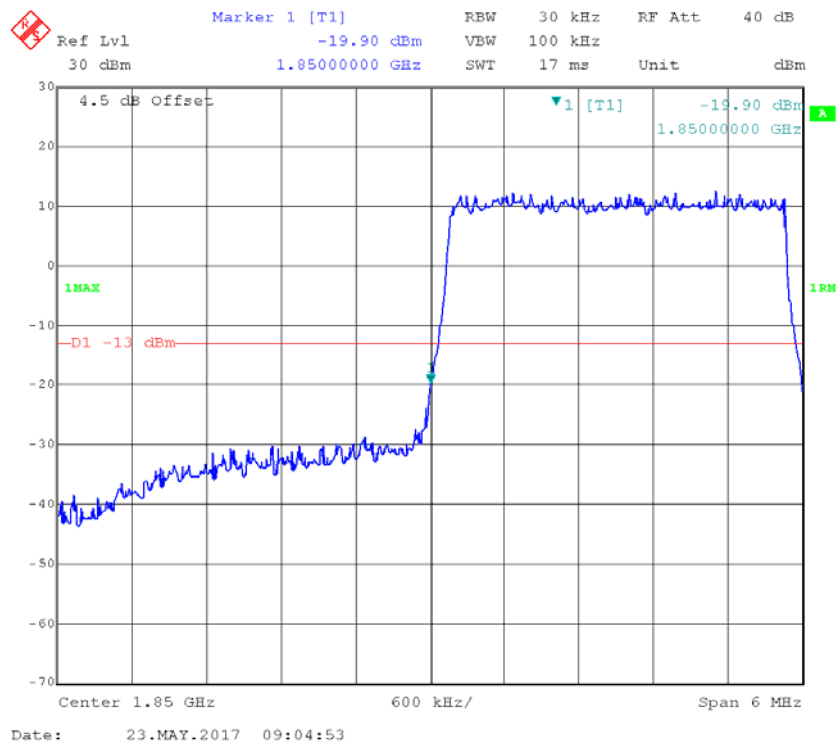
16QAM_10MHz_50 RB_ Left



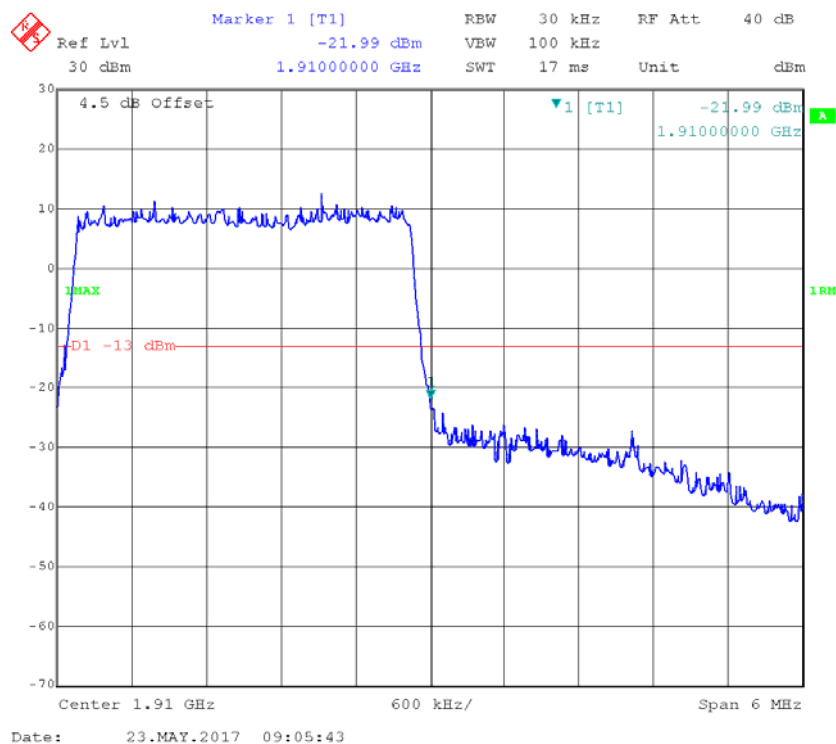
16QAM_10MHz_50 RB_ Right



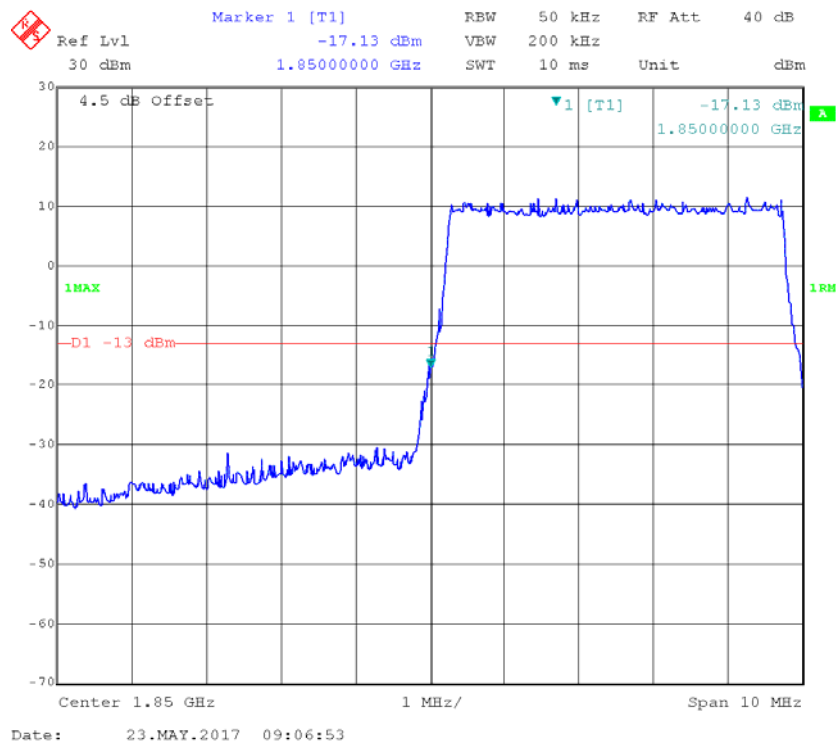
16QAM_15MHz_ 75 RB_ Left



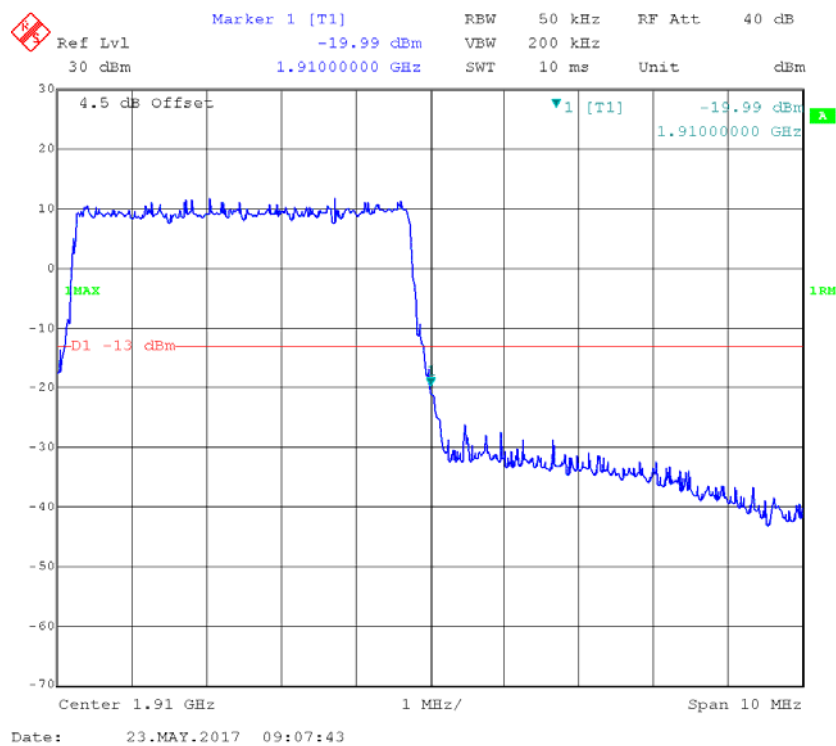
16QAM_15MHz_ 75 RB_ Right



16QAM_20MHz_FULL RB_Left

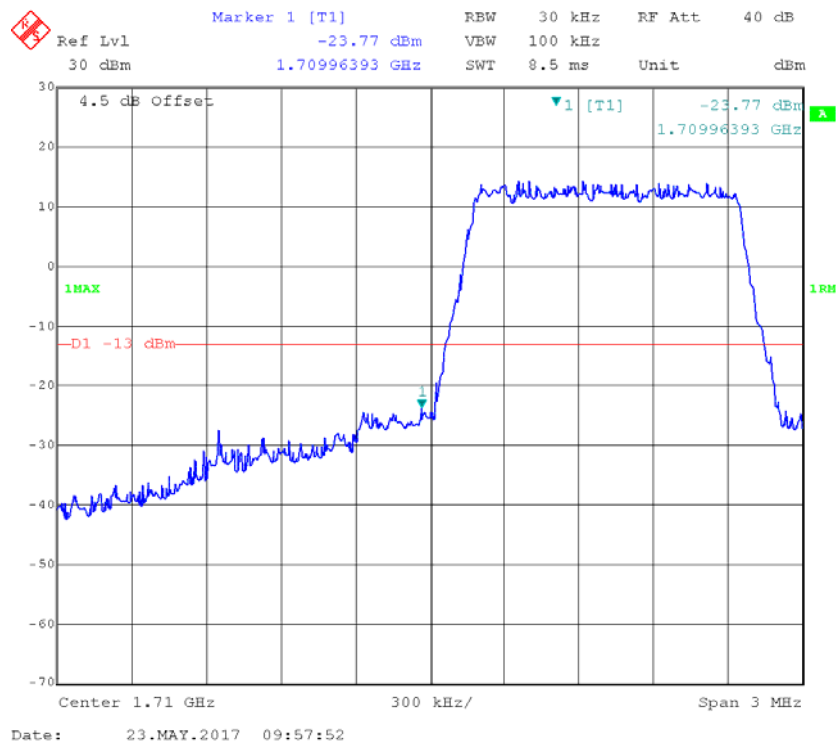


16QAM_20MHz_FULL RB_Right

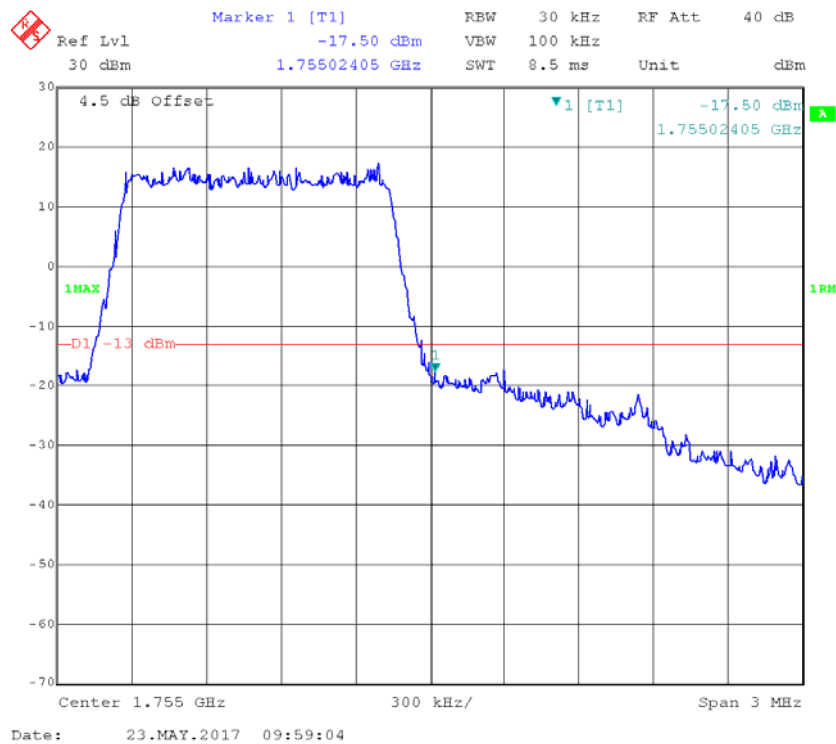


LTE Band IV

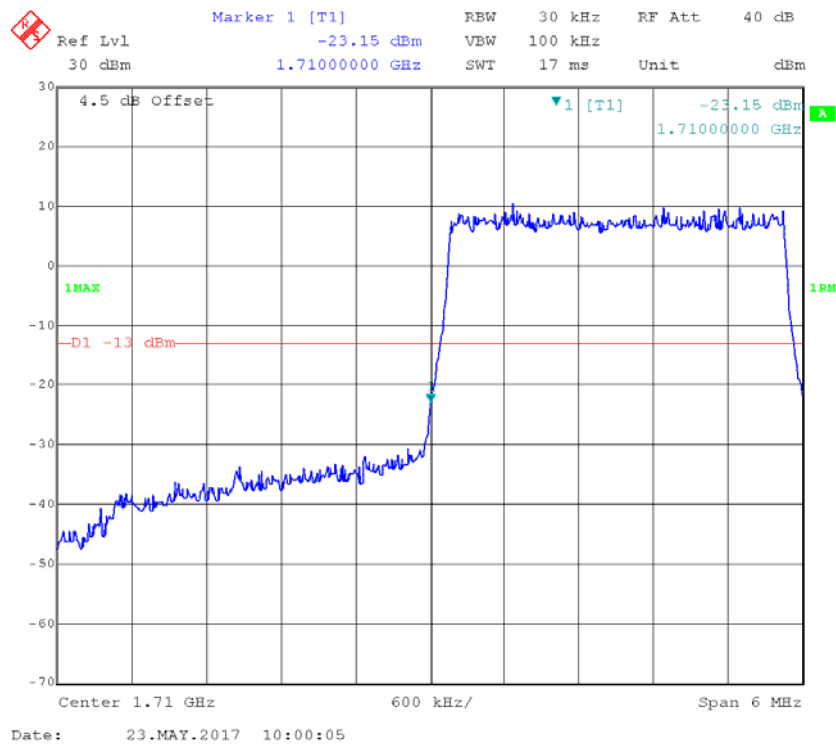
QPSK_1.4MHz_6 RB_Left



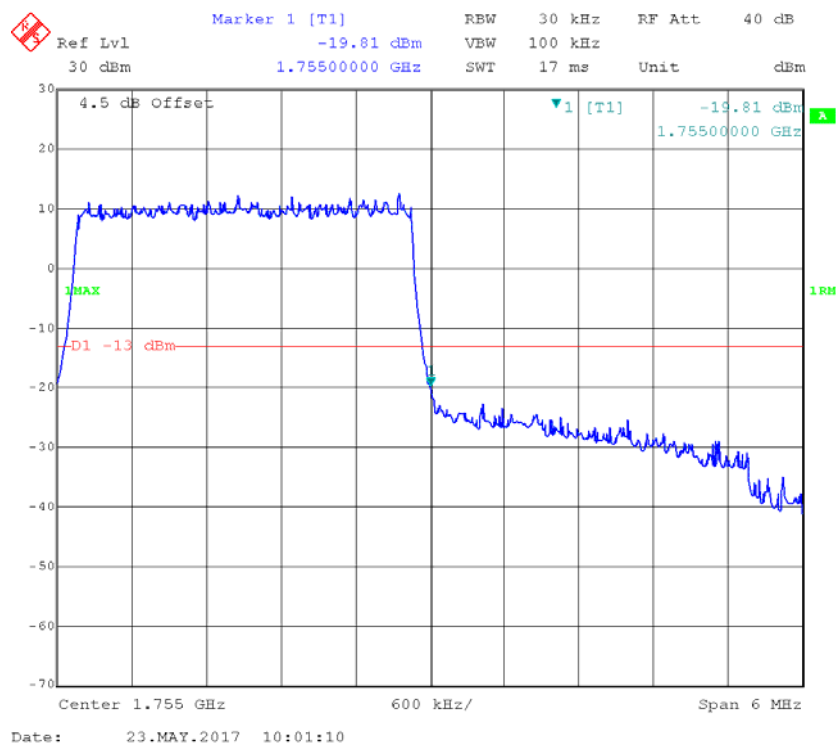
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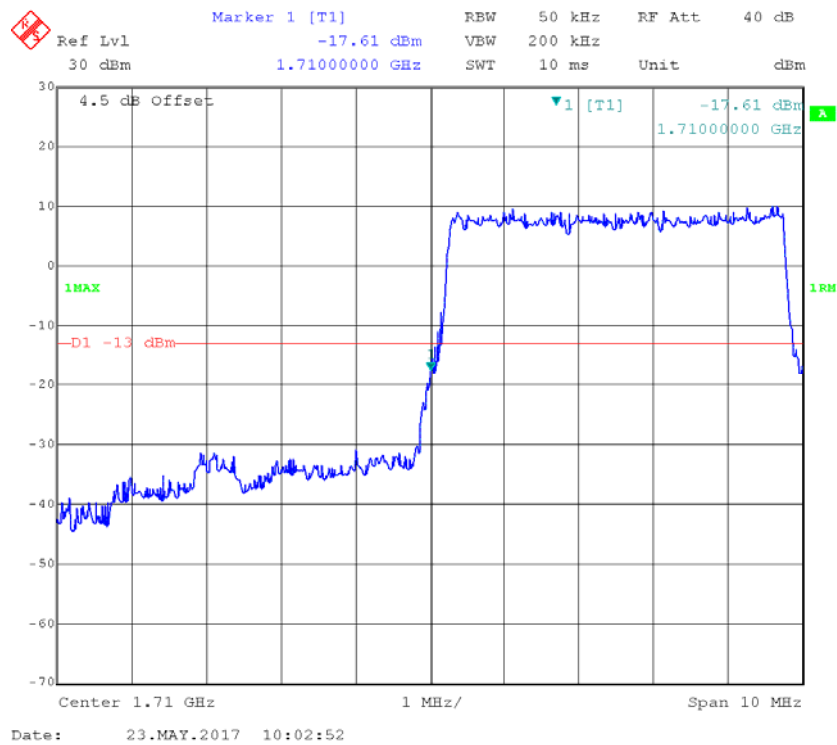
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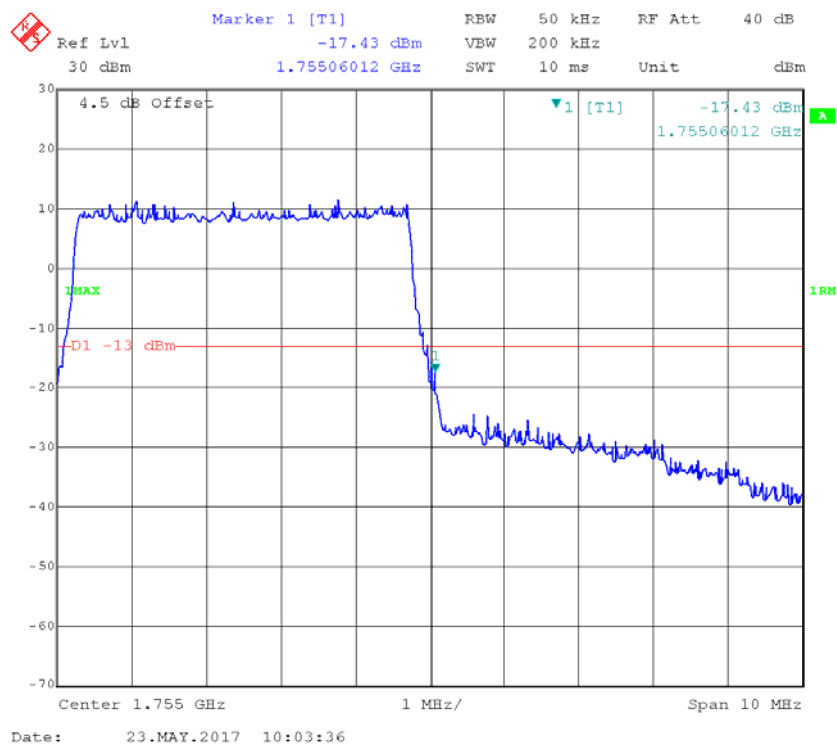
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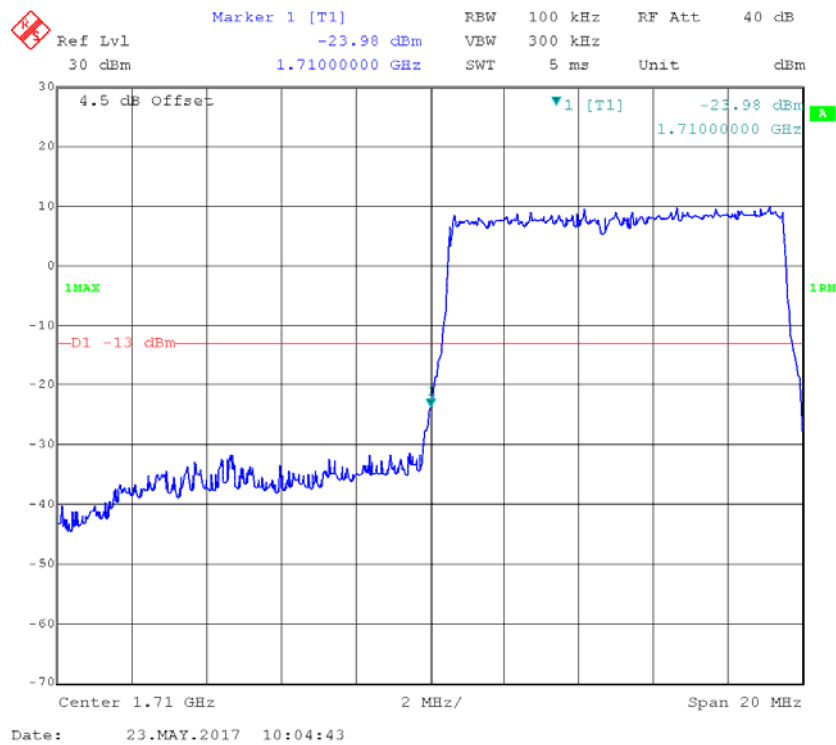
QPSK_5MHz_25 RB_ Left



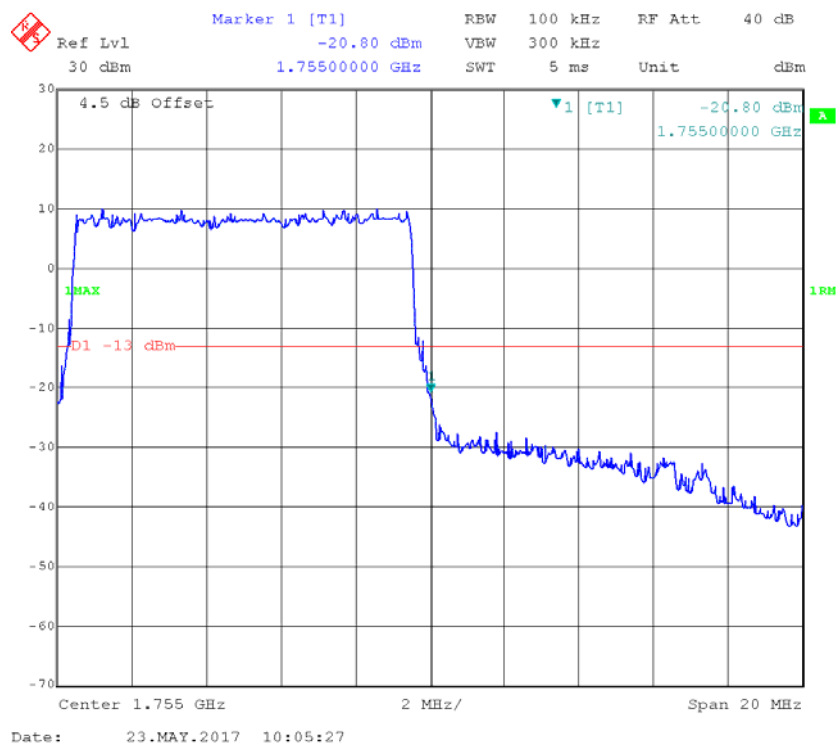
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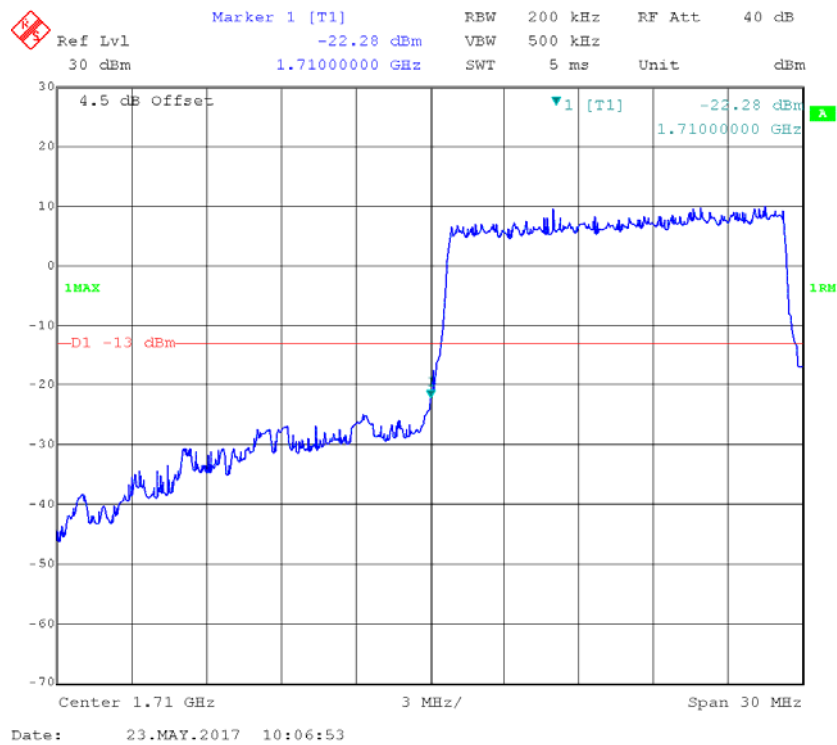
QPSK_10MHz_50 RB_ Left



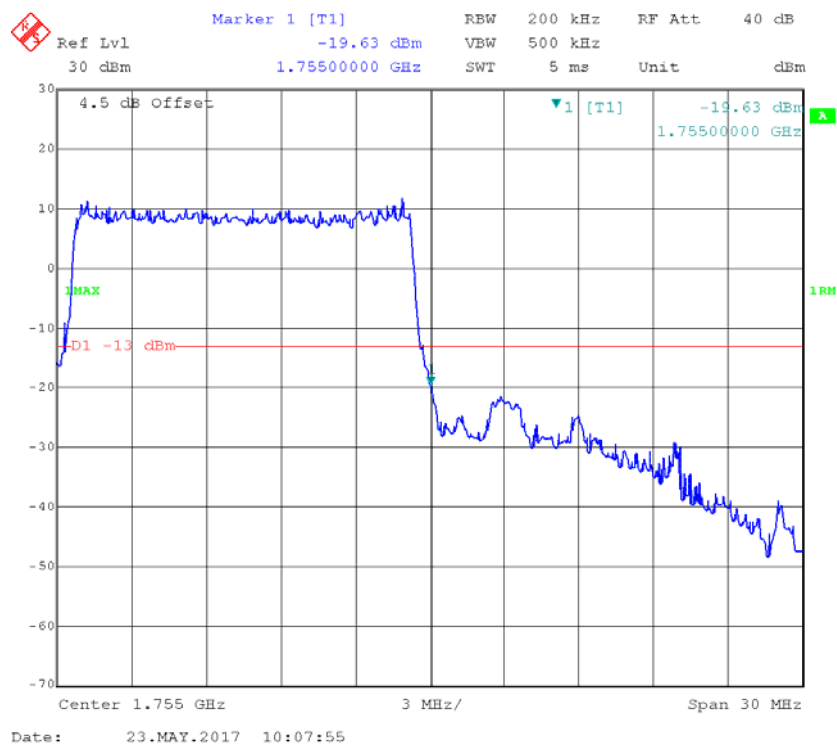
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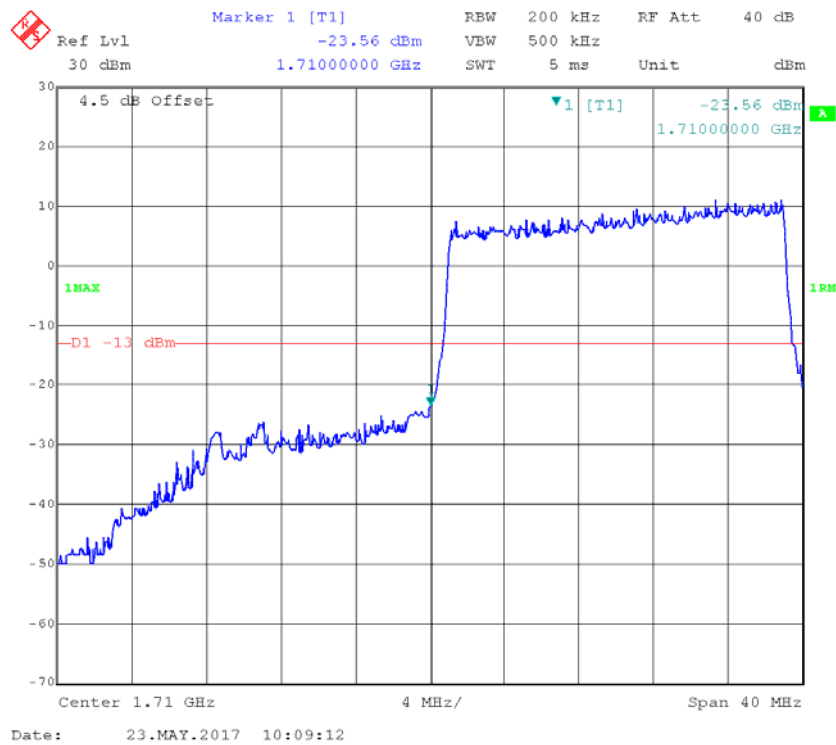
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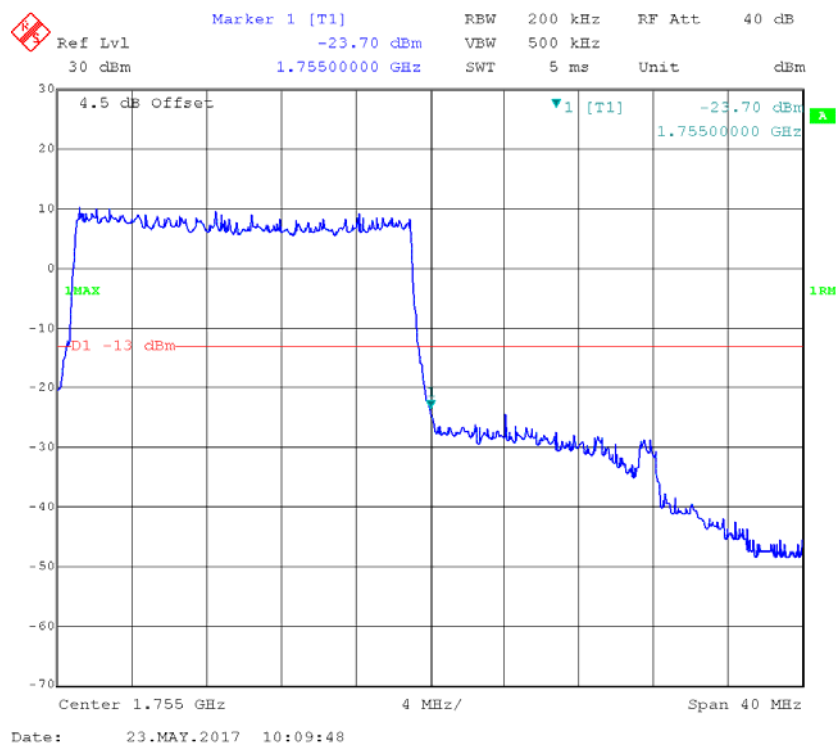
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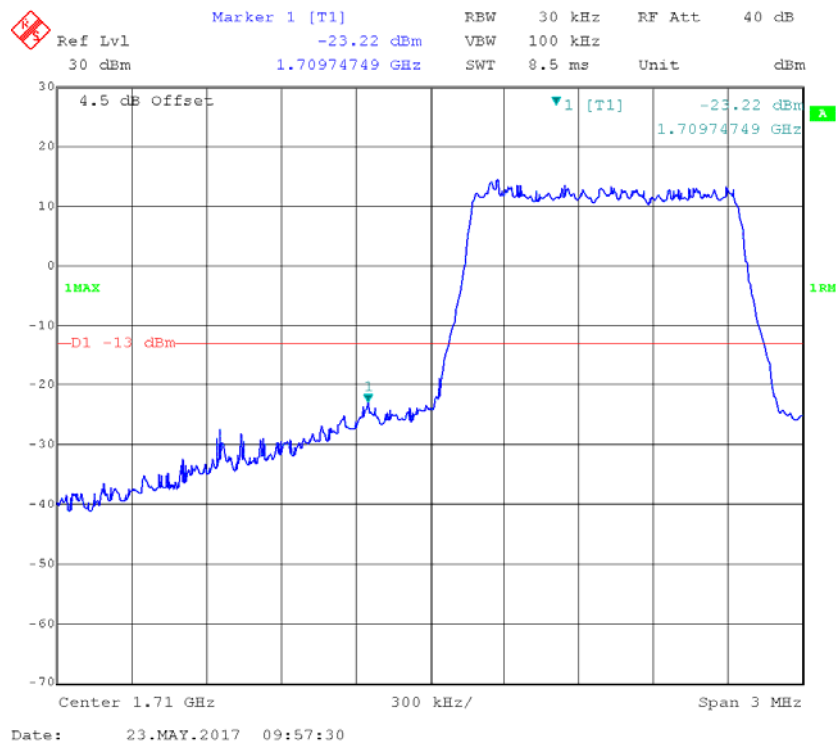
QPSK_20MHz_ FULL RB_ Left



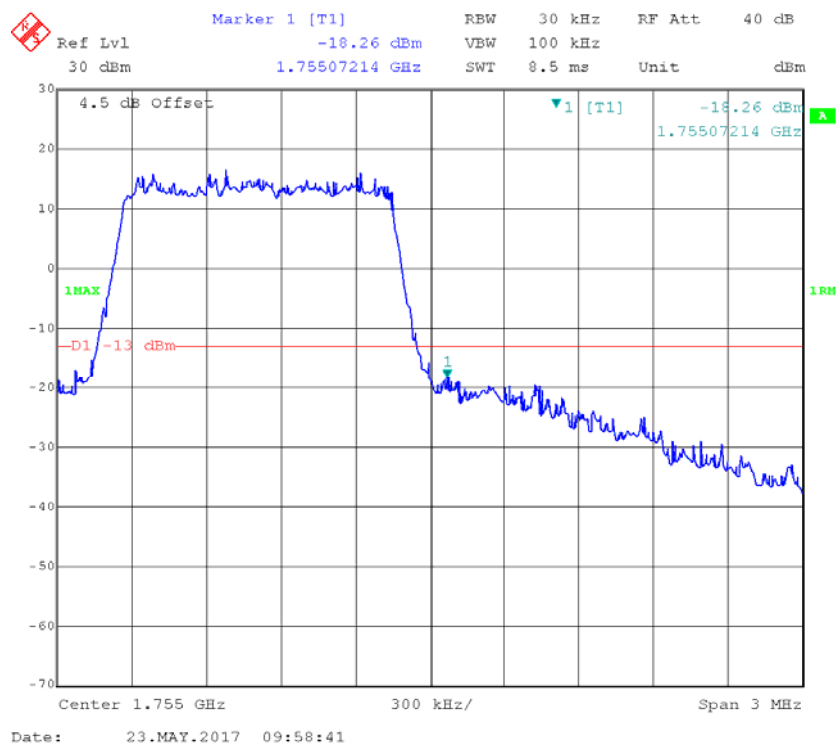
QPSK_20MHz_ FULL RB_ Right



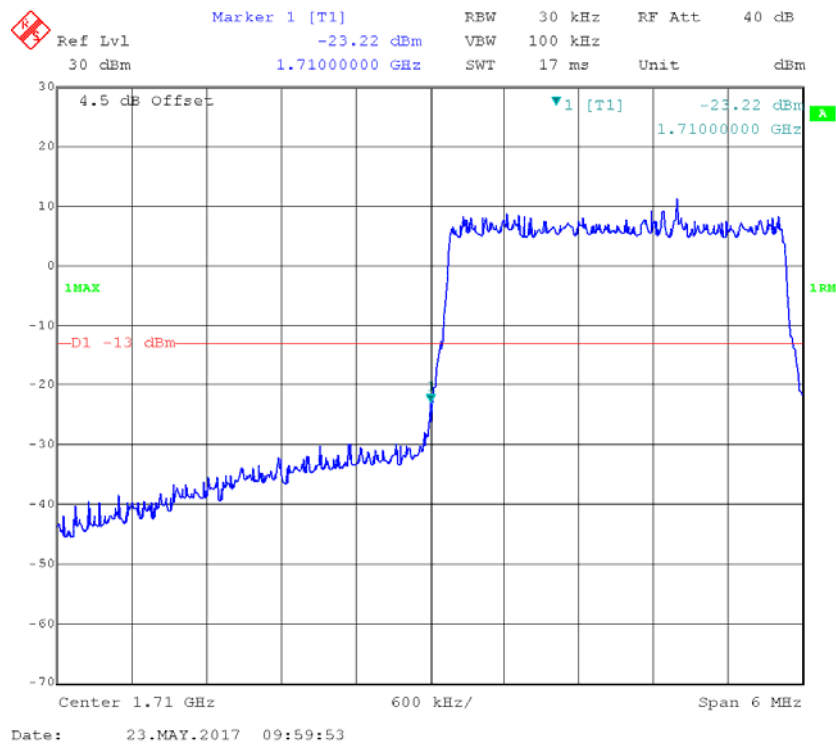
16QAM_1.4MHz_6 RB_Left



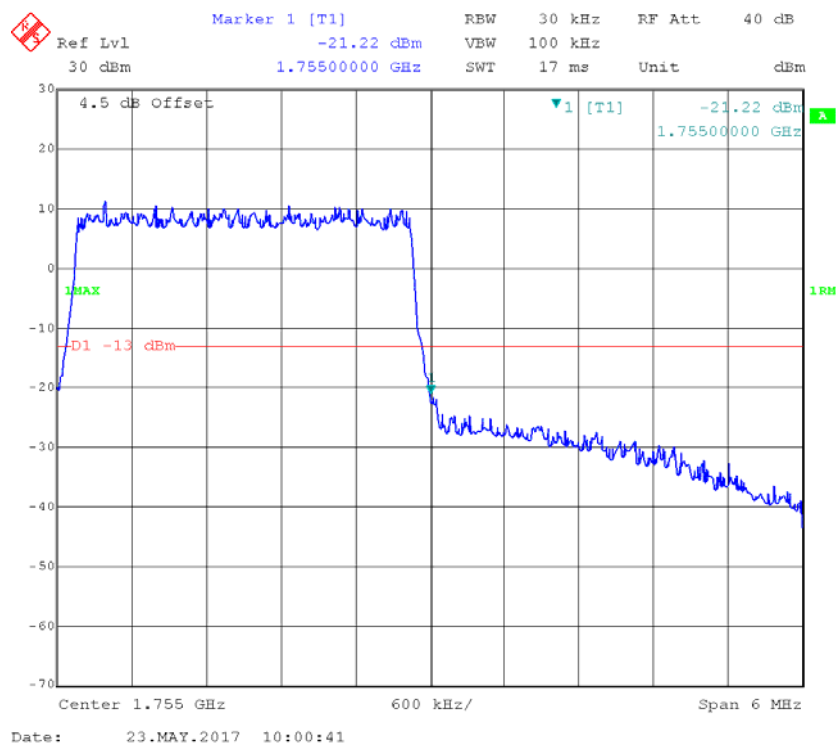
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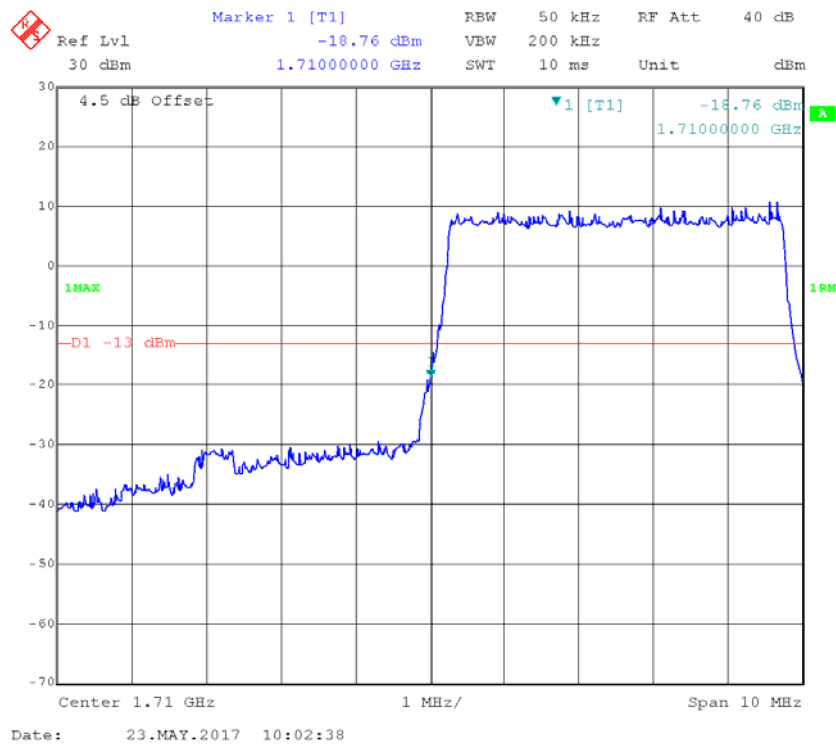
16QAM_3MHz_ 15 RB_ Left



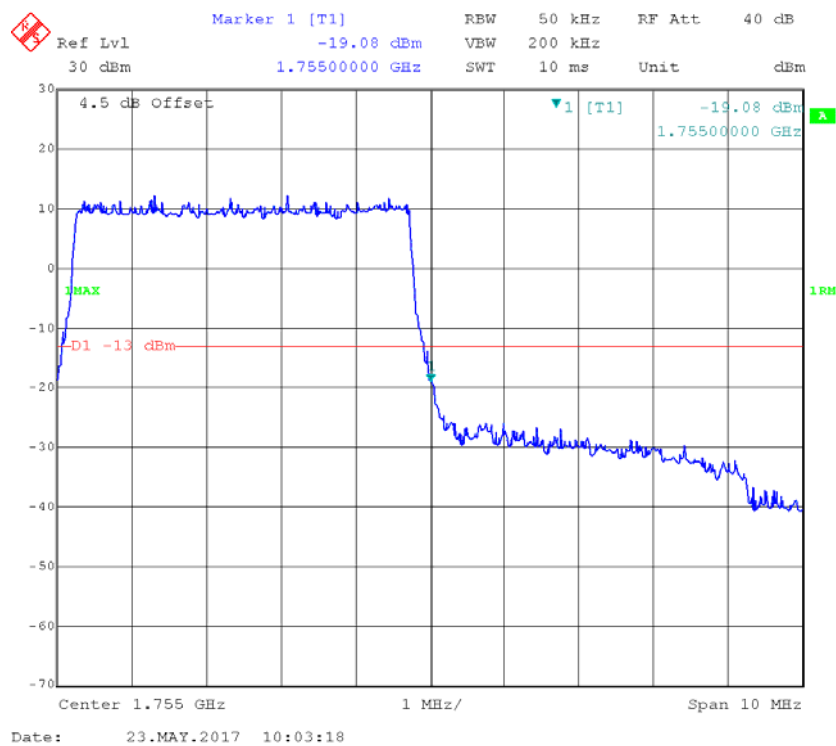
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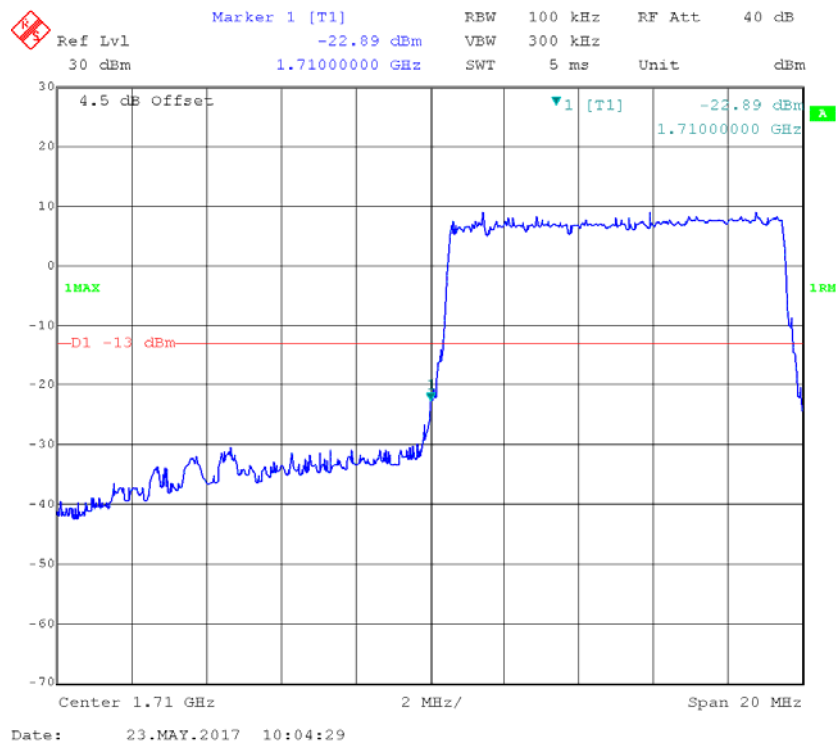
16QAM_5MHz_25 RB_ Left



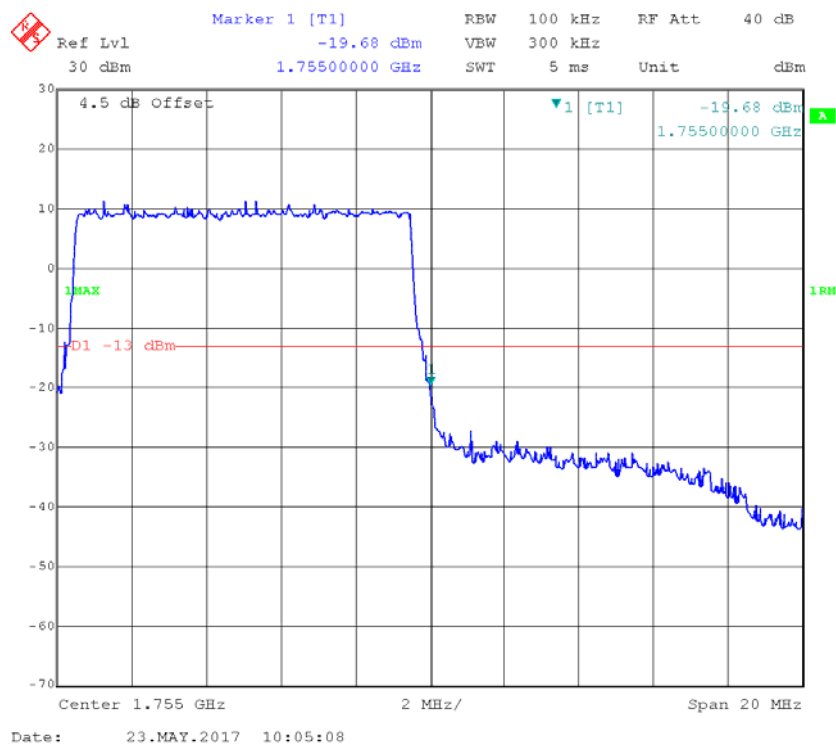
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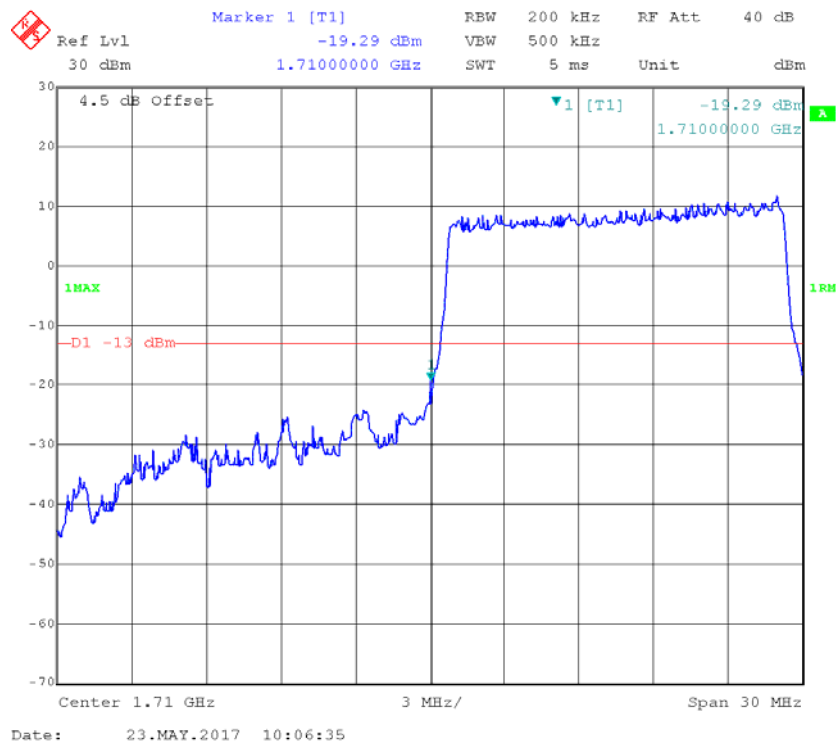
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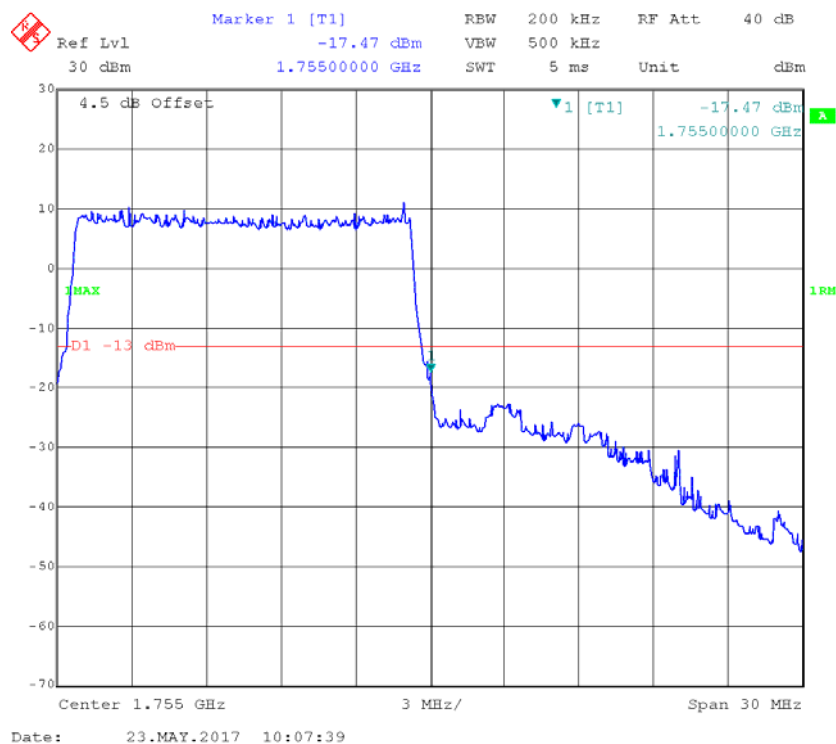
16QAM_10MHz_50 RB_ Right



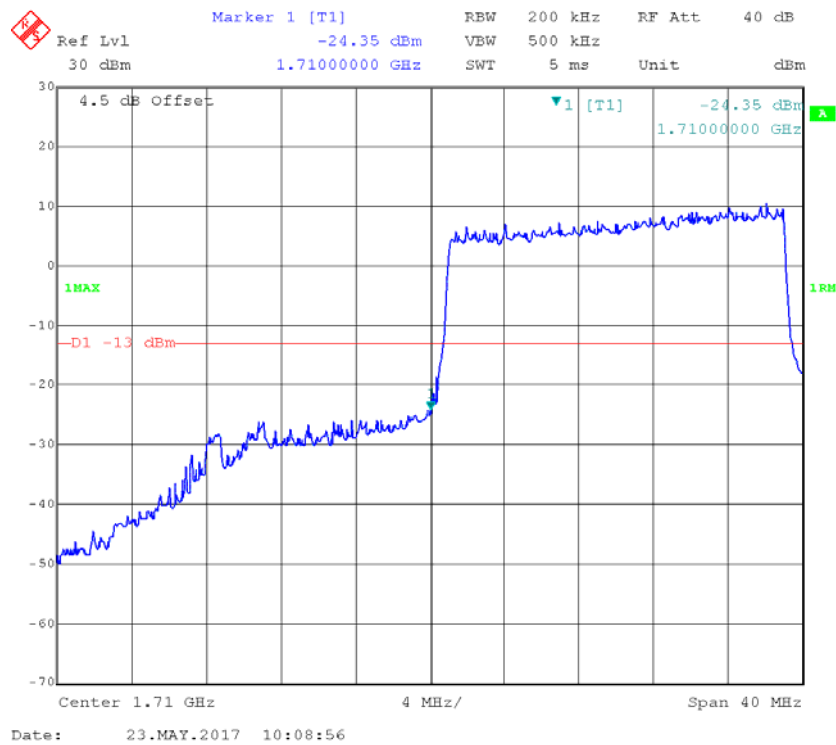
16QAM_15MHz_ 75 RB_ Left



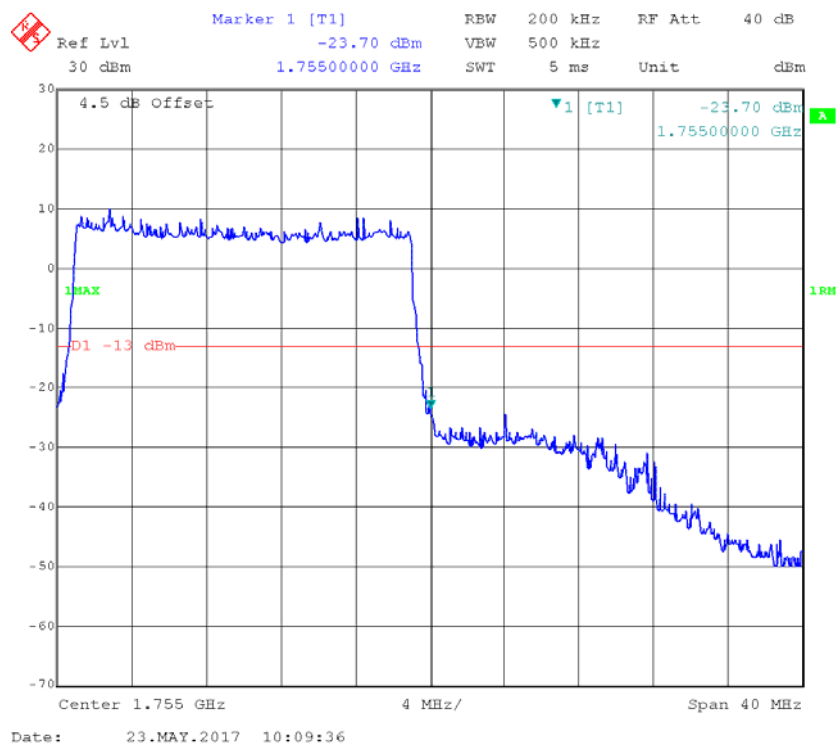
16QAM_15MHz_ 75 RB_ Right



16QAM_20MHz_FULL RB_Left

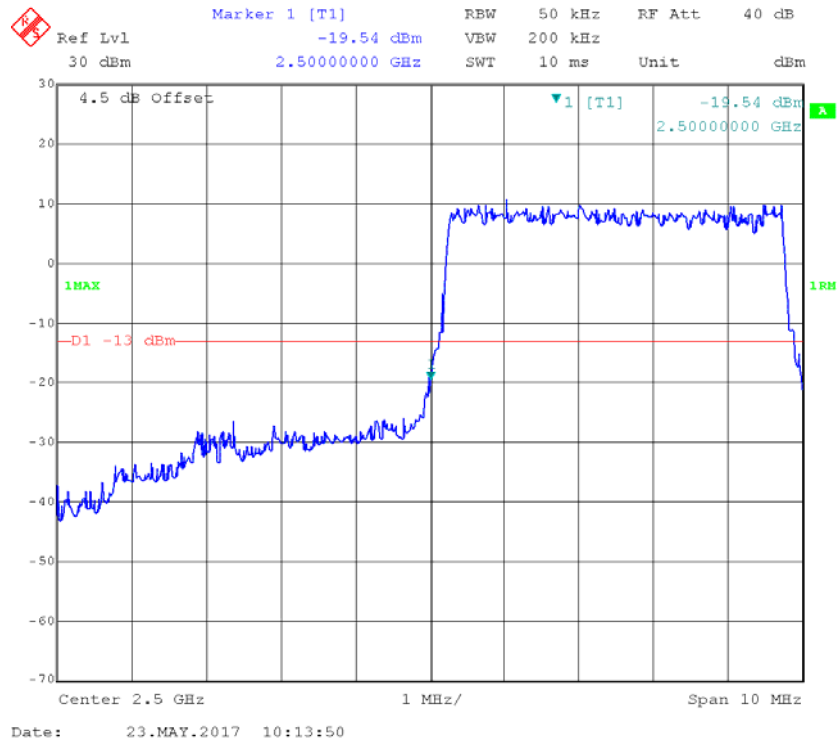


16QAM_20MHz_FULL RB_Right

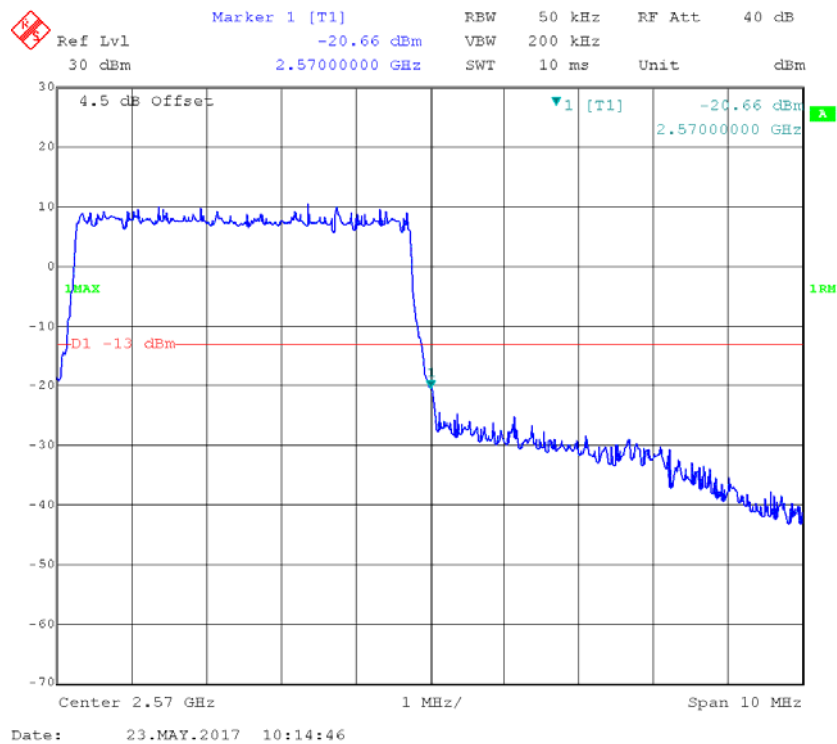


LTE Band VII

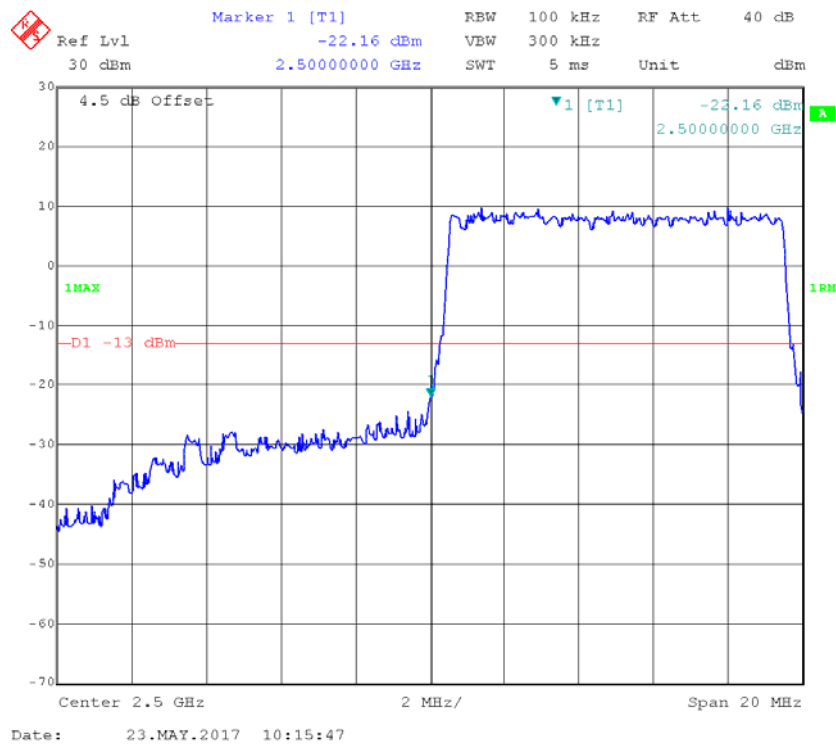
QPSK_5MHz_25 RB_Left



QPSK_5MHz_25 RB_Right



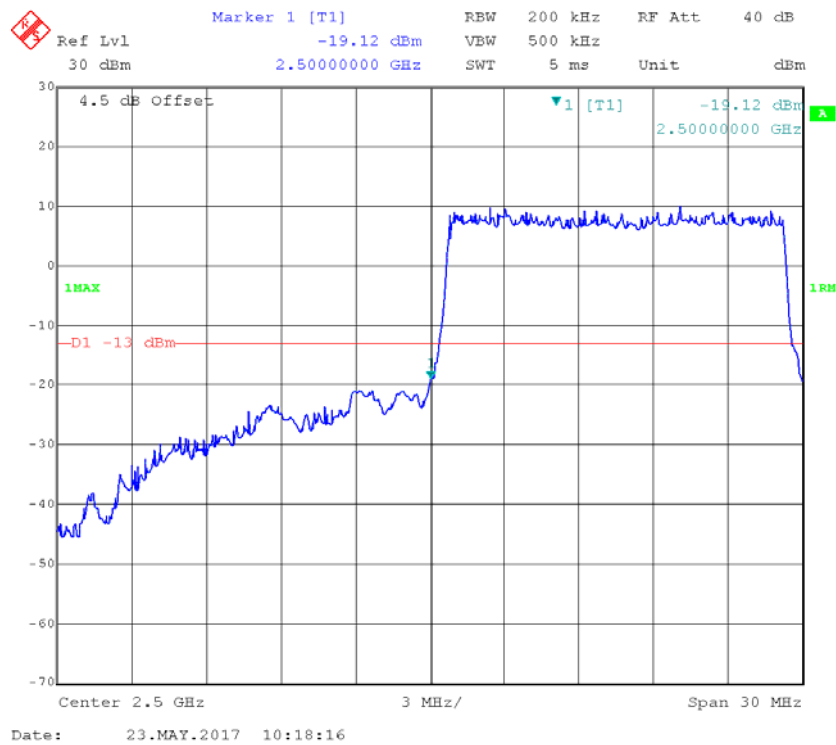
QPSK_10MHz_50 RB_ Left



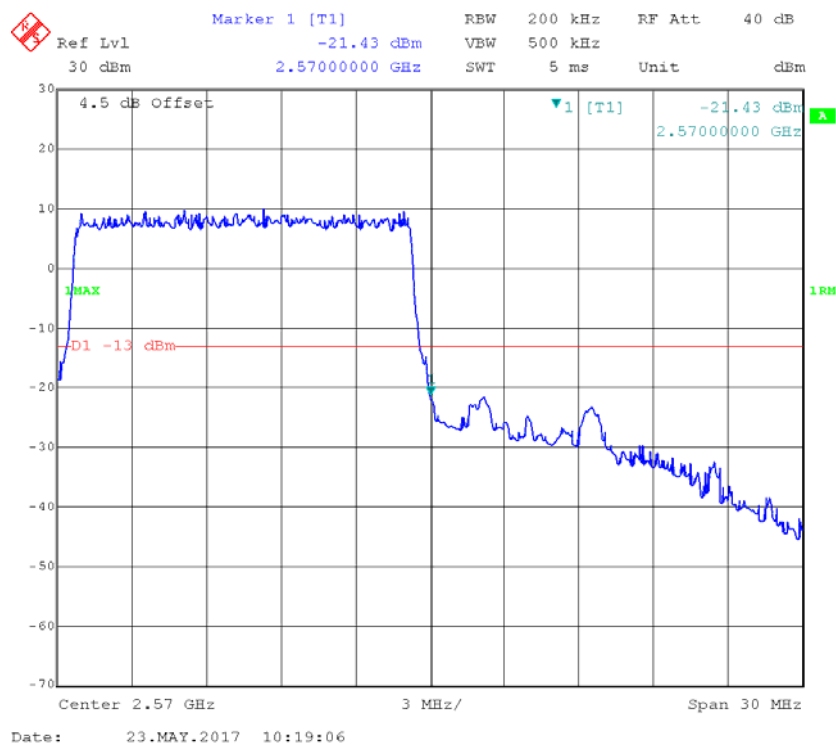
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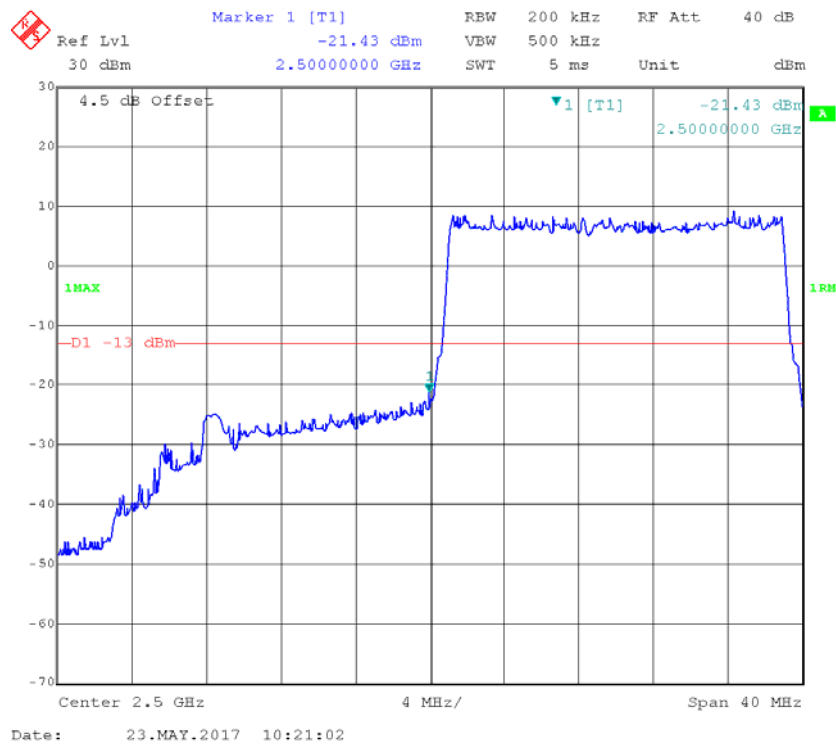
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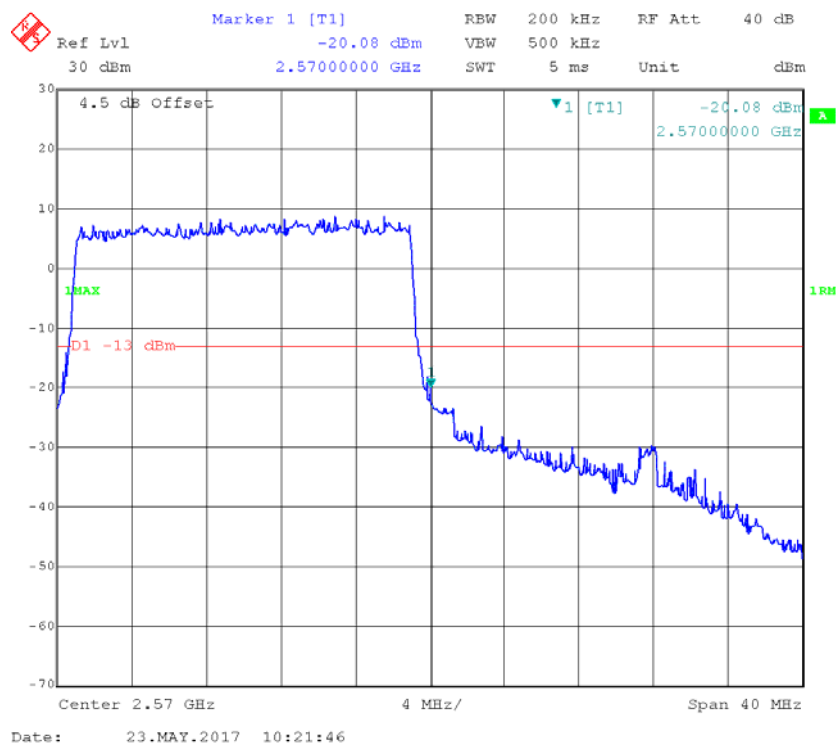
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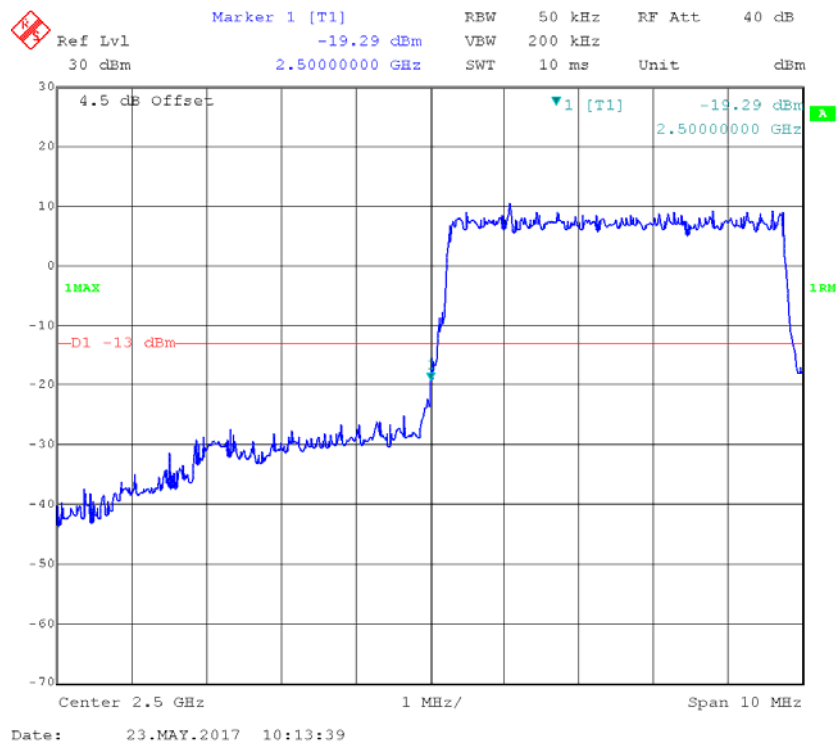
QPSK_20MHz_FULL RB_Left



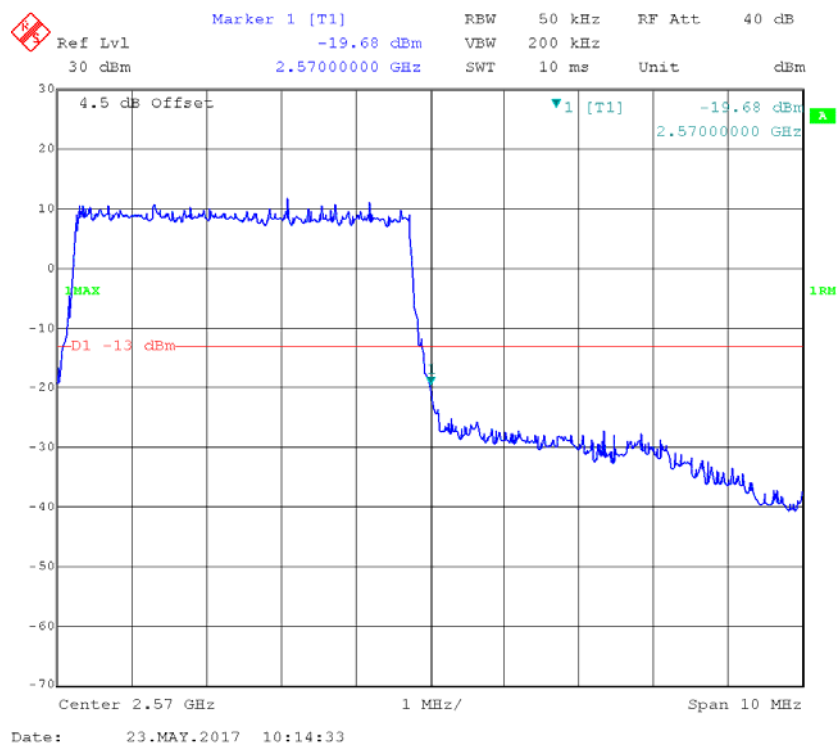
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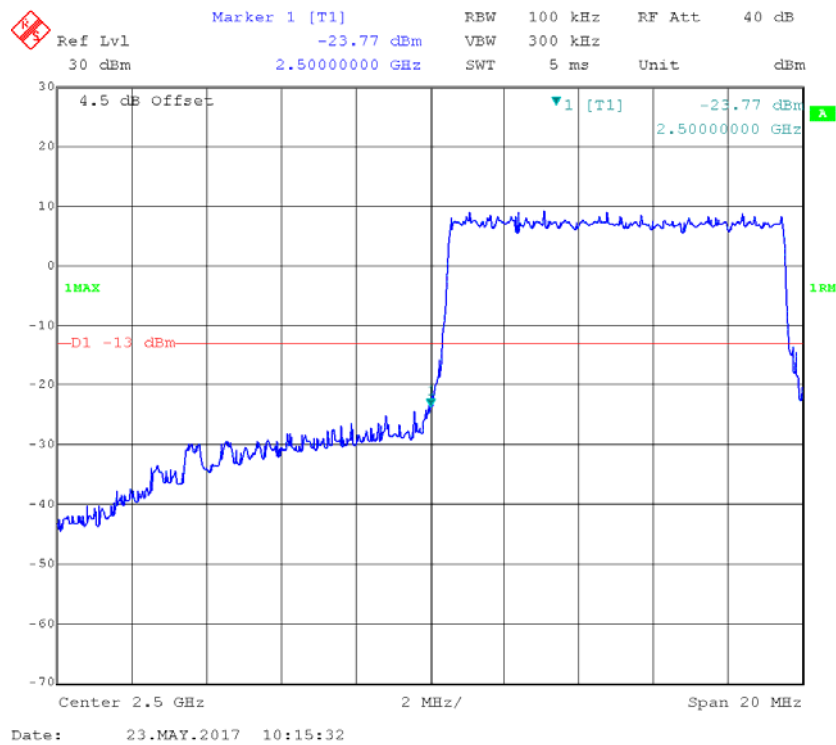
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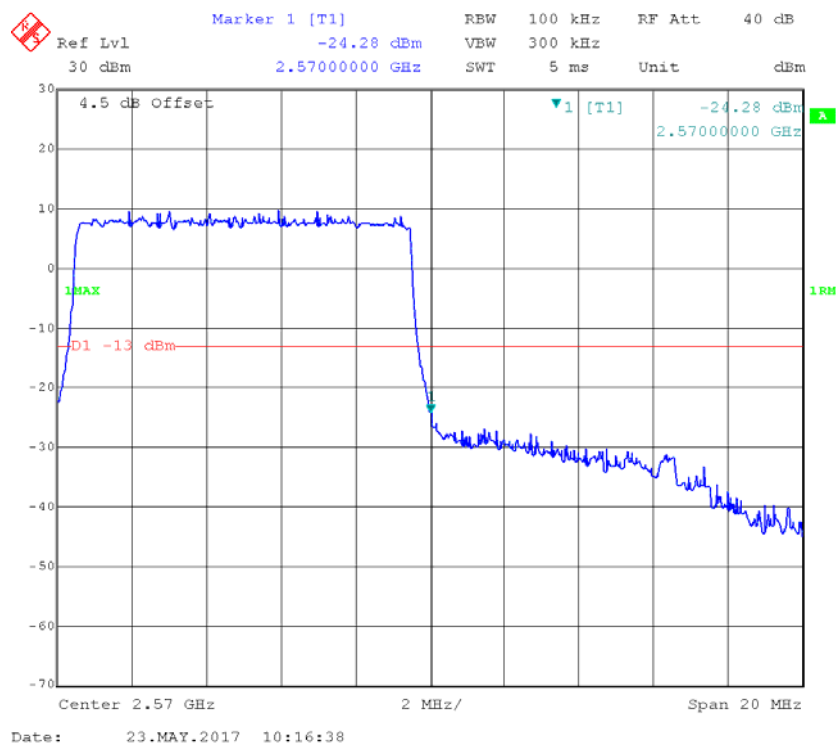
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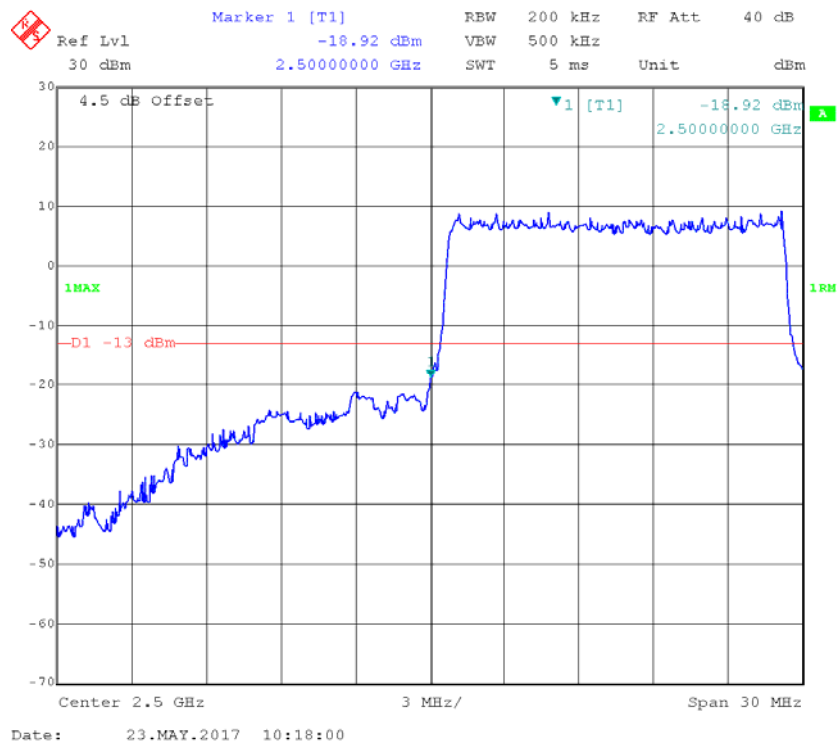
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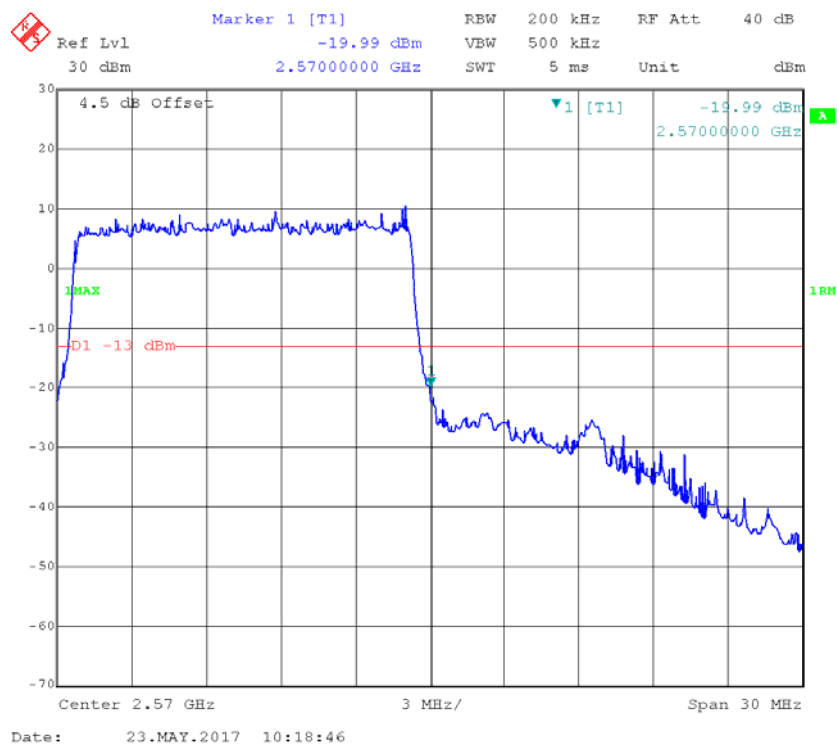
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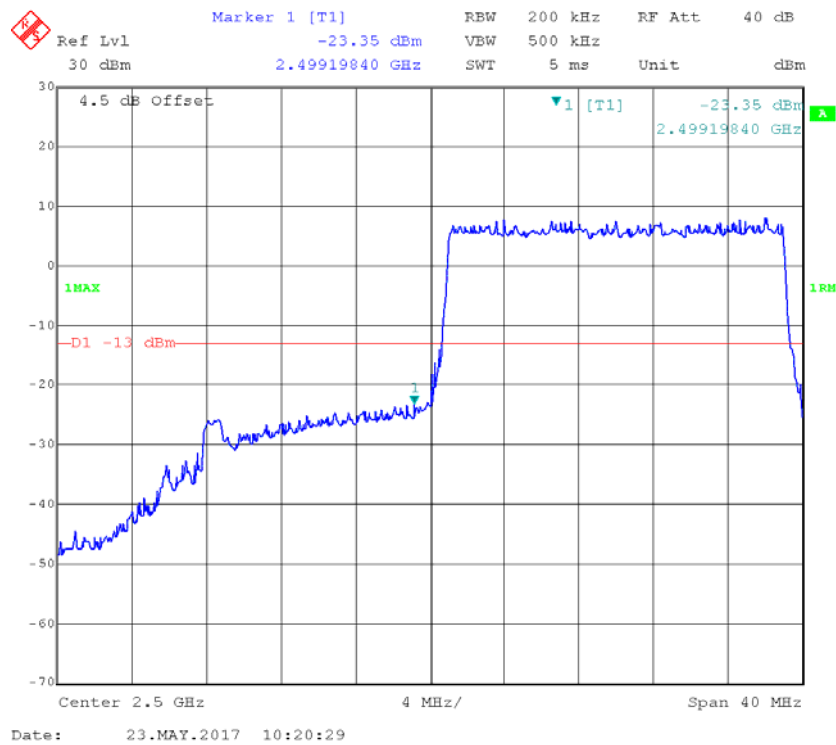
16QAM_15MHz_ 75 RB_ Left



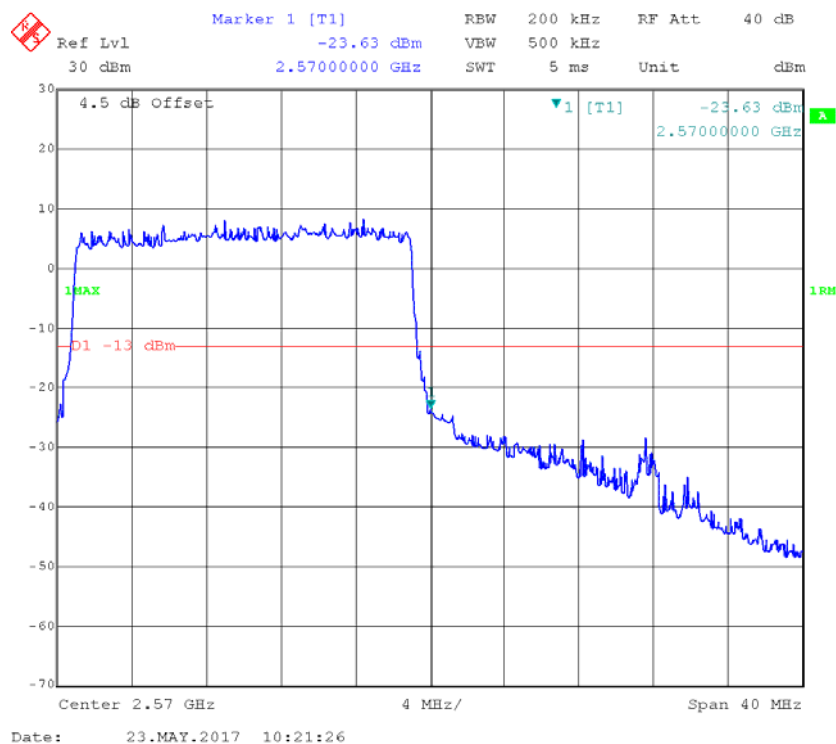
16QAM_15MHz_ 75 RB_ Right



16QAM_20MHz_FULL RB_Left



16QAM_20MHz_FULL RB_Right



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.

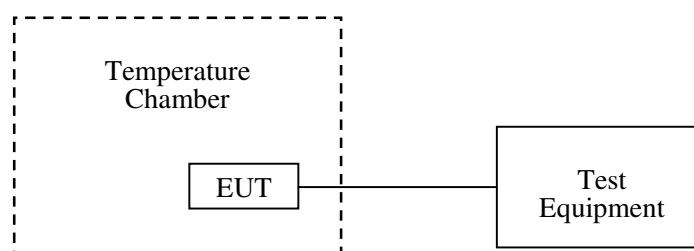
According to §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

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 to 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
BACL	High Temperature Test Chamber	BTH-150	30024	2016-12-02	2017-12-01
FLUKE	Multimeter	1587	27870099	2016-12-30	2017-12-29
R&S	Universal Radio Communication Tester	CMU200	11-9435686-111	2016-07-28	2017-07-27
R&S	Wideband Radio Communication Tester	CMW500	106891	2016-11-23	2017-11-23
Unknown	RF Cable	Unknown	NO.3	Each Time	/

* **Statement of Traceability:** BACL(Chengdu) attests that all of the calibrations on the equipment items listed above were traceable to NIM or to another internationally recognized National Metrology Institute (NMI), and were compliant with the NIST HB 150-2016 Normative Annex B "Implementation of traceability policy in accredited laboratories".

Test Data

Environmental Conditions

Temperature:	21.9~27.3°C
Relative Humidity:	49.5~50.1 %
ATM Pressure:	100.3~100.5kPa

The testing was performed by Kevin Hu from 2017-05-18 to 2017-05-23.

Cellular Band (Part 22H)

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
$^{\circ}\text{C}$	V_{DC}	Hz	ppm	ppm
-30	3.8	-4	-0.005	2.5
-20	3.8	2	0.002	2.5
-10	3.8	0	0.000	2.5
0	3.8	-1	-0.001	2.5
10	3.8	1	0.001	2.5
20	3.8	3	0.004	2.5
30	3.8	6	0.007	2.5
40	3.8	1	0.001	2.5
50	3.8	4	0.005	2.5
25	3.6	0	0.000	2.5
25	4.3	9	0.011	2.5

Cellular Band (Part 22H)

EDGE, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
$^{\circ}\text{C}$	V_{DC}	Hz	ppm	ppm
-30	3.8	1	0.001	2.5
-20	3.8	0	0.000	2.5
-10	3.8	-2	-0.002	2.5
0	3.8	4	0.005	2.5
10	3.8	2	0.002	2.5
20	3.8	0	0.000	2.5
30	3.8	3	0.004	2.5
40	3.8	1	0.001	2.5
50	3.8	-1	-0.001	2.5
25	3.6	4	0.005	2.5
25	4.3	9	0.011	2.5

PCS Band (Part 24E)

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	1	0.001	Pass
-20	3.8	2	0.001	Pass
-10	3.8	7	0.004	Pass
0	3.8	6	0.003	Pass
10	3.8	-3	-0.002	Pass
20	3.8	3	0.002	Pass
30	3.8	6	0.003	Pass
40	3.8	11	0.006	Pass
50	3.8	2	0.001	Pass
25	3.6	4	0.002	Pass
25	4.3	0	0.000	Pass

PCS Band (Part 24E)

EDGE, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	4	0.002	Pass
-20	3.8	0	0.000	Pass
-10	3.8	-1	-0.001	Pass
0	3.8	1	0.001	Pass
10	3.8	-8	-0.004	Pass
20	3.8	-2	-0.001	Pass
30	3.8	6	0.003	Pass
40	3.8	12	0.006	Pass
50	3.8	14	0.007	Pass
25	3.6	6	0.003	Pass
25	4.3	3	0.002	Pass

WCDMA Band V :

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	3.8	3	0.004	2.5
-10	3.8	-4	-0.005	2.5
0	3.8	-12	-0.014	2.5
10	3.8	-7	-0.008	2.5
20	3.8	-3	-0.004	2.5
30	3.8	-6	-0.007	2.5
40	3.8	0	0.000	2.5
50	3.8	1	0.001	2.5
25	3.6	3	0.004	2.5
25	4.3	-1	-0.001	2.5

WCDMA Band II :

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	-2	-0.001	Pass
-20	3.8	4	0.002	Pass
-10	3.8	0	0.000	Pass
0	3.8	-3	-0.002	Pass
10	3.8	-1	-0.001	Pass
20	3.8	3	0.002	Pass
30	3.8	5	0.003	Pass
40	3.8	9	0.005	Pass
50	3.8	9	0.005	Pass
25	3.6	2	0.001	Pass
25	4.3	0	0.000	Pass

LTE Band II:

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	-10	-0.0053	Pass
-20	3.8	-10.3	-0.0055	Pass
-10	3.8	-10.7	-0.0057	Pass
0	3.8	-10.9	-0.0058	Pass
10	3.8	-10.3	-0.0055	Pass
20	3.8	-10.7	-0.0057	Pass
30	3.8	-11.3	-0.0060	Pass
40	3.8	-11	-0.0059	Pass
50	3.8	-10.7	-0.0057	Pass
25	3.6	-10.1	-0.0054	Pass
25	4.3	-10.2	-0.0054	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	-11.8	-0.0063	Pass
-20	3.8	-11.1	-0.0059	Pass
-10	3.8	-11.3	-0.0060	Pass
0	3.8	-11.1	-0.0059	Pass
10	3.8	-10.8	-0.0057	Pass
20	3.8	-11.1	-0.0059	Pass
30	3.8	-11.3	-0.0060	Pass
40	3.8	-10.8	-0.0057	Pass
50	3.8	-10.7	-0.0057	Pass
25	3.6	-10.9	-0.0058	Pass
25	4.3	-10.7	-0.0057	Pass

LTE Band IV:

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	-10.8	-0.0062	Pass
-20	3.8	-11.6	-0.0067	Pass
-10	3.8	-11.2	-0.0065	Pass
0	3.8	-10.8	-0.0062	Pass
10	3.8	-10.9	-0.0063	Pass
20	3.8	-12.3	-0.0071	Pass
30	3.8	-11.1	-0.0064	Pass
40	3.8	-11.2	-0.0065	Pass
50	3.8	-12.4	-0.0071	Pass
25	3.6	-12.9	-0.0074	Pass
25	4.3	-11.6	-0.0067	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	-10.7	-0.0062	Pass
-20	3.8	-11.3	-0.0065	Pass
-10	3.8	-11.3	-0.0065	Pass
0	3.8	-10.3	-0.0059	Pass
10	3.8	-11.1	-0.0064	Pass
20	3.8	-10.3	-0.0059	Pass
30	3.8	-10.5	-0.0061	Pass
40	3.8	-10.6	-0.0061	Pass
50	3.8	-10.1	-0.0058	Pass
25	3.6	-11.4	-0.0066	Pass
25	4.3	-10	-0.0058	Pass

LTE Band VII:

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	-12.1	-0.0048	Pass
-20	3.8	-11.9	-0.0047	Pass
-10	3.8	-11.7	-0.0046	Pass
0	3.8	-11.3	-0.0045	Pass
10	3.8	-11.3	-0.0045	Pass
20	3.8	-10.6	-0.0042	Pass
30	3.8	-10.4	-0.0041	Pass
40	3.8	-10.9	-0.0043	Pass
50	3.8	-11.1	-0.0044	Pass
25	3.6	-11.6	-0.0046	Pass
25	4.3	-10.9	-0.0043	Pass

16QAM, Channel Bandwidth:10MHz Middle Channel, $f_c = 2535$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-15	3.8	-11.6	-0.0046	Pass
-10	3.8	-10.9	-0.0043	Pass
0	3.8	-12.3	-0.0049	Pass
10	3.8	-11.2	-0.0044	Pass
20	3.8	-12.2	-0.0048	Pass
30	3.8	-12.1	-0.0048	Pass
40	3.8	-11.8	-0.0047	Pass
50	3.8	-12.2	-0.0048	Pass
55	3.8	-11.6	-0.0046	Pass
25	3.6	-11.9	-0.0047	Pass
25	4.3	-10.3	-0.0041	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 *******