



TESTING LABORATORY
CERTIFICATE #4820.01



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

For

electronics hub llc

3560 NW, 72nd Avenue 33122 miami Florida United States

FCC ID: 2AT5LTRITON

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

EUT Name:		Mobile Phone
EUT Model:		Triton
Operation modes:		GSM Voice, GPRS/EDGE Data, WCDMA(R99 (Voice+Data), HSDPA/HSUPA,HSPA+, DC-HSDPA) FDD-LTE
Operation Frequency:		GSM 850: 824-849 MHz(TX); 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) WCDMA Band 5: 824-849 MHz(TX); 869-894 MHz(RX) LTE Band 2: 1850-1910 MHz(TX); 1930-1990 MHz(RX) LTE Band 4: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) LTE Band 17:704-716MHz(TX) ; 734-746 MHz(RX)
Maximum Output Power: (Conducted)		GSM 850 : 32.19 dBm; PCS 1900:30.05 dBm WCDMA Band 2:23.36 dBm; WCDMA Band 5: 22.96 dBm LTE Band 2: 21.69 dBm; LTE Band 4: 22.03 dBm LTE Band 17:22.96 dBm
Modulation Type:		GMSK, 8PSK, BPSK, QPSK, 16QAM
Rated Input Voltage:		DC 3.8V from battery or DC 5V from adapter
Adapter Information	Model:	HJ-050100B3-US
	Input:	100-240V 50/60Hz 0.15A
	Output:	5Vdc 1000mA
External Dimension:		152mm(L) * 78mm(W) * 12mm(H)
Serial Number:		191011003
EUT Received Date:		2019.10.11
EUT Status:		Good

Objective

This report is prepared on behalf of **electronics hub llc** in accordance with: Part 2-Subpart J, Part 22-Subpart H, and Part 24-Subpart E 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: 2AT5LTRITON
FCC Part 15C DSS submissions with FCC ID: 2AT5LTRITON
FCC Part 15B JBP submissions with FCC ID: 2AT5LTRITON

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%

Note: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

Declarations

BACL is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol “△”. Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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This report may contain data that are not covered by the accreditation scope and shall be marked with an asterisk “★”.

SYSTEM TEST CONFIGURATION

Justification

The EUT was configured for testing according to TIA/EIA-603-D 2010.

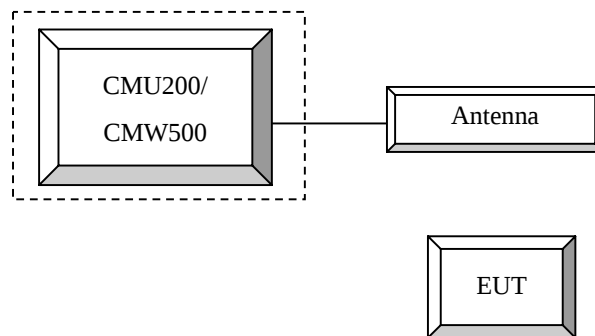
Equipment Modifications

No modification was made to the EUT.

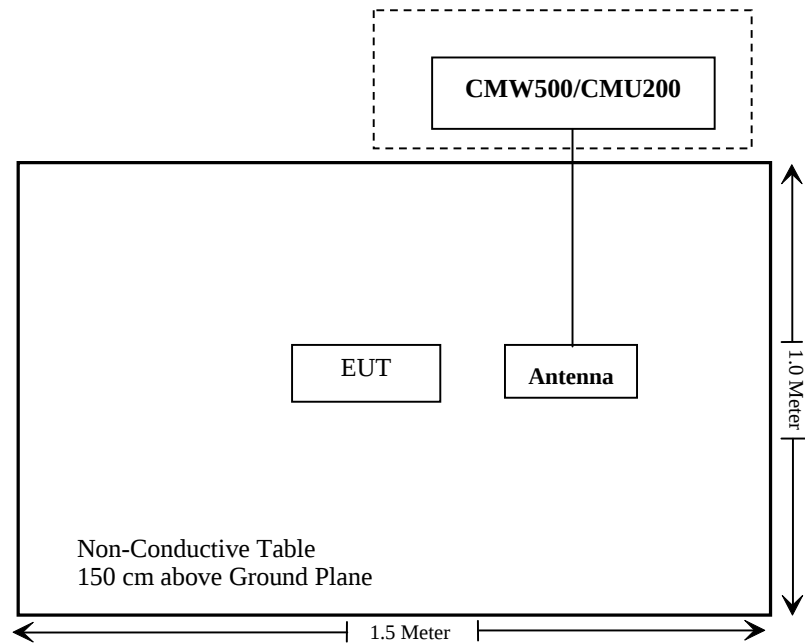
Support Equipment List and Details

Manufacturer	Description	Model	Serial Number
R&S	Universal Radio Communication Tester	CMU200	106 891
R&S	Wideband Radio Communication Tester	CMW500	147473
Un-known	ANTENNA	/	/

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

Rules	Description of Test	Result
FCC§1.1310, §2.1093	RF Exposure	Compliance
FCC§2.1046;§ 22.913 (a); § 24.232 (c);§27.50	RF Output Power	Compliance
FCC§ 2.1047	Modulation Characteristics	Not Applicable
FCC§ 2.1049; § 22.905 § 22.917; § 24.238; §27.53	Occupied Bandwidth	Compliance
FCC§ 2.1051, § 22.917 (a); § 24.238 (a); §27.53;	Spurious Emissions at Antenna Terminal	Compliance
FCC§ 2.1053 § 22.917 (a); § 24.238 (a); §27.53	Field Strength of Spurious Radiation	Compliance
FCC§ 22.917 (a); § 24.238 (a); §27.53;	Out of band emission, Band Edge	Compliance
FCC§ 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: RDG191011003-20.

FCC §2.1047 - MODULATION CHARACTERISTIC

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

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

Applicable Standard

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

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

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

According to §27.50

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

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

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

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

Test Procedure**GSM/GPRS/EGPRS**

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

Press Connection control to choose the different menus

Press RESET > choose all the reset all settings

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

Network Support > GSM + GPRS or GSM + EGSM

Main Service > Packet Data

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

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

> Slot configuration > Uplink/Gamma

> 33 dBm for GPRS 850

> 30 dBm for GPRS 1900

> 27 dBm for EGPRS 850

> 26 dBm for EGPRS 1900

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

Frequency Offset > + 0 Hz

Mode > BCCH and TCH
 BCCH Level > -85 dBm (May need to adjust if link is not stable)
 BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

 Channel Type > Off
 P0 > 4 dB
 Slot Config > Unchanged (if already set under MS signal)
 TCH > choose desired test channel
 Hopping > Off
 Main Timeslot > 3
 Network Coding Scheme > CS4 (GPRS) and MCS5 (EGPRS)

 Bit Stream > 2E9-1 PSR Bit Stream
 AF/RF Connection Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
 Press Signal on to turn on the signal and change settings

WCDMA-Release 99

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

WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	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	ESR3	102453	2019-06-26	2020-06-26
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	/

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

Test Data**Environmental Conditions**

Temperature:	26.4oC
Relative Humidity:	51%*
ATM Pressure:	100.8kPa
Tester:	Lily Xie
Test Date:	2019-10-16

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

Band	Channel No.	Conducted Peak Output Power (dBm)								
		GSM	GPRS 1 TX Slot	GPRS 2 TX Slots	GPRS 3 TX Slots	GPRS 4 TX Slots	EGPRS 1 TX Slot	EGPRS 2 TX Slots	EGPRS 3 TX Slots	EGPRS 4 TX Slots
Cellular	128	32.1	32.16	31.52	28.76	27.76	26.73	25.71	23.91	22.61
	190	32	32.17	31.54	28.74	27.74	26.77	25.87	23.92	22.74
	251	31.9	32.19	31.55	28.65	27.65	26.71	25.75	23.86	22.62
PCS	512	29.5	29.72	28.96	27.12	26.18	26.01	24.91	22.66	21.49
	661	29.7	29.92	29.17	27.32	26.24	25.88	24.75	22.51	21.39
	810	29.9	30.05	29.31	27.47	26.39	26.01	24.85	22.71	21.54

WCDMA Band 2:

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	23.36	3.07	23.29	3.1	23.31	3.04
HSDPA	1	21.26	3.83	22.18	4.09	22.18	3.86
	2	21.06	3.90	21.98	4.01	22.32	3.79
	3	21.13	3.88	22.03	4.01	21.99	3.92
	4	21.23	3.89	22.05	4.06	22.28	3.8
HSUPA	1	22.35	4.09	22.26	3.36	22.32	4.23
	2	22.17	4.04	22.73	3.46	22.58	4.3
	3	22.14	4.09	22.41	3.42	22.47	4.33
	4	22.53	4.06	22.20	3.34	22.32	4.16
	5	22.25	4.07	22.14	3.27	22.56	4.24
DC-HSDPA	1	21.35	4.07	21.27	3.46	21.82	4.22
	2	21.23	4.18	21.53	3.3	21.85	4.2
	3	21.4	4.14	21.59	3.31	21.65	4.3
	4	21.78	4.04	21.39	3.41	21.32	4.22
HSPA+ (16QAM)	1	21.22	4.00	21.33	3.35	21.59	4.13

WCDMA Band 5

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	22.88	2.81	22.83	2.84	22.96	2.32
HSDPA	1	21.62	3.91	21.71	3.22	21.75	2.99
	2	21.88	3.9	21.55	3.41	21.57	3.08
	3	22.00	3.87	21.75	3.21	21.73	3.45
	4	21.83	3.63	21.5	2.81	21.77	3.42
HSUPA	1	21.85	4.17	21.94	4.06	22.05	2.75
	2	21.57	4.11	21.77	4.32	21.87	2.57
	3	21.32	4.47	21.81	3.9	21.65	2.72
	4	21.53	4.09	21.82	4.06	21.95	2.76
	5	21.81	4	21.91	4.48	21.81	2.79
DC-HSDPA	1	21.85	4.59	22.08	3.71	21.99	2.71
	2	21.5	3.98	21.82	4.3	21.62	3.19
	3	21.37	4.59	22.26	4.39	22.31	2.94
	4	21.42	3.97	22.18	3.61	21.38	3.23
HSPA+ (16QAM)	1	21.98	4.48	21.66	4.12	21.83	2.35

LTE Band 2

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	21.40	21.28	21.27
		RB1#3	21.50	21.47	21.47
		RB1#5	21.43	21.30	21.37
		RB3#0	21.50	21.39	21.34
		RB3#3	21.51	21.39	21.34
		RB6#0	20.49	20.36	20.37
	16QAM	RB1#0	20.44	20.45	20.27
		RB1#3	20.63	20.66	20.48
		RB1#5	20.47	20.42	20.30
		RB3#0	20.74	20.38	20.46
		RB3#3	20.77	20.38	20.38
		RB6#0	19.52	19.38	19.28
3MHz	QPSK	RB1#0	21.55	21.35	21.29
		RB1#8	21.50	21.31	21.32
		RB1#14	21.49	21.32	21.45
		RB6#0	20.49	20.28	20.25
		RB6#9	20.48	20.25	20.30
		RB15#0	20.57	20.35	20.37
	16QAM	RB1#0	21.12	20.48	20.36
		RB1#8	21.06	20.48	20.35
		RB1#14	21.02	20.46	20.32
		RB6#0	19.54	19.30	19.24
		RB6#9	19.51	19.30	19.21
		RB15#0	19.60	19.32	19.37
5MHz	QPSK	RB1#0	21.49	21.29	21.22
		RB1#13	21.56	21.36	21.31
		RB1#24	21.46	21.29	21.32
		RB15#0	20.53	20.41	20.42
		RB15#10	20.65	20.37	20.40
		RB25#0	20.57	20.42	20.39
	16QAM	RB1#0	20.40	20.62	20.30
		RB1#13	20.45	20.69	20.38
		RB1#24	20.30	20.62	20.28
		RB15#0	19.58	19.42	19.48
		RB15#10	19.69	19.42	19.45
		RB25#0	19.60	19.41	19.42

10MHz	QPSK	RB1#0	21.52	21.29	21.25
		RB1#25	21.69	21.53	21.46
		RB1#49	21.45	21.36	21.42
		RB25#0	20.45	20.48	20.54
		RB25#25	20.67	20.49	20.38
		RB50#0	20.58	20.50	20.51
	16QAM	RB1#0	21.13	20.52	20.16
		RB1#25	21.06	20.65	20.48
		RB1#49	20.85	20.51	20.36
		RB25#0	19.55	19.54	19.60
		RB25#25	19.66	19.55	19.48
		RB50#0	19.58	19.50	19.49
15MHz	QPSK	RB1#0	21.46	21.23	21.13
		RB1#38	21.52	21.36	21.33
		RB1#74	21.33	21.26	21.34
		RB36#0	20.42	20.47	20.39
		RB36#39	20.51	20.49	20.30
		RB75#0	20.53	20.49	20.38
	16QAM	RB1#0	21.04	20.44	20.43
		RB1#38	20.95	20.55	20.65
		RB1#74	20.68	20.38	20.66
		RB36#0	19.43	19.50	19.34
		RB36#39	19.46	19.50	19.32
		RB75#0	19.43	19.46	19.30
20MHz	QPSK	RB1#0	21.30	21.11	21.03
		RB1#50	21.62	21.50	21.42
		RB1#99	21.15	21.12	21.16
		RB50#0	20.19	20.58	20.12
		RB50#50	20.17	20.57	20.02
		RB100#0	20.19	20.58	20.03
	16QAM	RB1#0	20.64	20.32	20.21
		RB1#50	20.78	20.78	20.55
		RB1#99	20.39	20.31	20.32
		RB50#0	19.17	19.59	19.07
		RB50#50	19.14	19.57	19.03
		RB100#0	19.17	19.52	19.05

LTE Band 4

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4MHz	QPSK	RB1#0	21.76	21.84	21.76
		RB1#3	21.99	22.03	21.95
		RB1#5	21.75	21.83	21.79
		RB3#0	21.87	21.85	21.82
		RB3#3	21.81	21.86	21.85
		RB6#0	20.84	20.88	20.86
	16QAM	RB1#0	20.73	20.90	20.71
		RB1#3	20.84	21.09	20.94
		RB1#5	20.75	20.88	20.76
		RB3#0	21.05	20.81	20.92
		RB3#3	21.03	20.85	20.92
		RB6#0	19.85	19.88	19.69
3MHz	QPSK	RB1#0	21.76	21.88	21.78
		RB1#8	21.80	21.88	21.79
		RB1#14	21.77	21.87	21.75
		RB6#0	20.73	20.80	20.76
		RB6#9	20.78	20.80	21.08
		RB15#0	20.78	20.87	21.12
	16QAM	RB1#0	21.29	20.84	21.17
		RB1#8	20.83	20.83	21.17
		RB1#14	20.95	20.80	21.15
		RB6#0	19.76	19.71	19.64
		RB6#9	19.82	19.69	19.61
		RB15#0	19.77	19.86	19.68
5MHz	QPSK	RB1#0	21.63	21.51	21.46
		RB1#13	21.78	21.66	21.63
		RB1#24	21.67	21.52	21.50
		RB15#0	20.78	20.63	20.61
		RB15#10	20.75	20.68	20.56
		RB25#0	20.71	20.60	20.53
	16QAM	RB1#0	20.52	20.56	20.31
		RB1#13	20.95	20.66	20.42
		RB1#24	20.83	20.55	20.34
		RB15#0	19.58	19.61	19.61
		RB15#10	19.57	19.66	19.58
		RB25#0	19.56	19.61	19.54

10MHz	QPSK	RB1#0	21.55	21.63	21.55
		RB1#25	21.80	21.80	21.72
		RB1#49	21.64	21.64	21.57
		RB25#0	20.68	20.64	20.57
		RB25#25	20.78	20.74	20.55
		RB50#0	20.72	20.73	20.62
	16QAM	RB1#0	21.13	20.74	20.50
		RB1#25	21.34	20.90	20.64
		RB1#49	21.21	20.76	20.52
		RB25#0	19.76	19.63	19.67
		RB25#25	19.81	19.73	19.62
		RB50#0	19.75	19.67	19.58
15MHz	QPSK	RB1#0	21.50	21.56	21.49
		RB1#38	21.63	21.66	21.60
		RB1#74	21.60	21.58	21.53
		RB36#0	20.71	20.61	20.59
		RB36#39	20.76	20.78	20.63
		RB75#0	20.77	20.71	20.60
	16QAM	RB1#0	21.06	20.67	20.79
		RB1#38	21.22	20.73	20.91
		RB1#74	21.21	20.65	20.86
		RB36#0	19.71	19.62	19.56
		RB36#39	19.77	19.73	19.57
		RB75#0	19.74	19.65	19.56
20MHz	QPSK	RB1#0	21.38	21.47	21.28
		RB1#50	21.84	21.83	21.71
		RB1#99	21.48	21.49	21.38
		RB50#0	20.67	20.56	20.54
		RB50#50	20.77	20.73	20.59
		RB100#0	20.73	20.66	20.56
	16QAM	RB1#0	20.66	20.59	20.57
		RB1#50	21.10	20.98	20.78
		RB1#99	20.78	20.62	20.49
		RB50#0	19.67	19.56	19.37
		RB50#50	19.73	19.69	19.64
		RB100#0	19.76	19.64	20.95

LTE Band 17

Channel Bandwidth	Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5MHz	QPSK	RB1#0	22.85	22.71	22.69
		RB1#13	22.87	22.81	22.84
		RB1#24	22.72	22.65	22.70
		RB15#0	21.82	21.77	22.11
		RB15#10	22.14	21.69	21.94
		RB25#0	21.95	21.70	22.02
	16QAM	RB1#0	21.73	22.00	21.82
		RB1#13	21.80	22.06	21.97
		RB1#24	21.62	22.06	21.80
		RB15#0	20.89	20.73	21.17
		RB15#10	21.17	20.69	20.97
		RB25#0	21.02	20.69	21.06
10MHz	QPSK	RB1#0	22.86	22.79	22.83
		RB1#25	22.91	22.92	22.96
		RB1#49	22.78	22.84	22.84
		RB25#0	21.59	21.59	21.78
		RB25#25	21.60	21.59	21.70
		RB50#0	21.67	21.64	21.79
	16QAM	RB1#0	22.46	22.04	21.88
		RB1#25	22.43	22.07	21.96
		RB1#49	22.44	22.03	21.87
		RB25#0	20.64	20.60	20.85
		RB25#25	20.66	20.60	20.83
		RB50#0	20.66	20.60	20.83

PAR, Band 2

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	20 MHz	4.87	4.43	5.16	13
	100 RB		4.84	5.3	6.00	13
16QAM	1 RB	20 MHz	5.25	5.28	4.00	13
	100 RB		5.80	6.23	4.99	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	4.46	4.81	4.70	13
	100 RB		5.33	5.16	5.28	13
16QAM	1 RB	20 MHz	6.12	5.86	5.51	13
	100 RB		6.23	5.36	6.35	13

PAR, Band 17

Test Modulation		Channel Bandwidth	Low Channel PAR (dB)	Middle Channel PAR (dB)	High Channel PAR (dB)	Limit (dB)
QPSK	1 RB	10 MHz	4.23	3.88	3.54	13
	50 RB		4.78	4.90	4.84	13
16QAM	1 RB	10 MHz	5.57	4.96	4.58	13
	50 RB		5.88	5.94	5.97	13

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

ERP & EIRP

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								
836.60	H	89.20	14.97	0.00	0.50	14.47	38.45	23.98
836.60	V	99.11	27.85	0.00	0.50	27.35	38.45	11.10
EGPRS850 Middle Channel								
836.60	H	84.84	10.61	0.00	0.50	10.11	38.45	28.34
836.60	V	93.18	21.92	0.00	0.50	21.42	38.45	17.03
WCDMA Band 5 Middle Channel								
836.60	H	84.56	10.33	0.00	0.50	9.83	38.45	28.62
836.60	V	91.68	20.42	0.00	0.50	19.92	38.45	18.53
PCS 1900 Middle Channel								
1880.00	H	91.53	18.92	11.66	2.66	27.92	33.00	5.08
1880.00	V	87.09	14.62	11.66	2.66	23.62	33.00	9.38
EGPRS1900 Middle Channel								
1880.00	H	87.21	14.60	11.66	2.66	23.60	33.00	9.40
1880.00	V	83.55	11.08	11.66	2.66	20.08	33.00	12.92
WCDMA Band 2 Middle Channel								
1880.00	H	85.53	12.92	11.66	2.66	21.92	33.00	11.08
1880.00	V	82.09	9.62	11.66	2.66	18.62	33.00	14.38

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)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1880.00	1.40	QPSK	H	84.21	11.60	11.66	2.66	20.60	33.00	12.40
1880.00			V	79.02	6.55	11.66	2.66	15.55	33.00	17.45
1880.00	3.00		H	83.99	11.38	11.66	2.66	20.38	33.00	12.62
1880.00			V	78.76	6.29	11.66	2.66	15.29	33.00	17.71
1880.00	5.00		H	83.73	11.12	11.66	2.66	20.12	33.00	12.88
1880.00			V	78.54	6.07	11.66	2.66	15.07	33.00	17.93
1880.00	10.00		H	83.64	11.03	11.66	2.66	20.03	33.00	12.97
1880.00			V	78.86	6.39	11.66	2.66	15.39	33.00	17.61
1880.00	15.00		H	84.62	12.01	11.66	2.66	21.01	33.00	11.99
1880.00			V	79.26	6.79	11.66	2.66	15.79	33.00	17.21
1880.00	20.00		H	83.09	10.48	11.66	2.66	19.48	33.00	13.52
1880.00			V	78.06	5.59	11.66	2.66	14.59	33.00	18.41
1880.00	1.40	16QAM	H	83.16	10.55	11.66	2.66	19.55	33.00	13.45
1880.00			V	77.47	5.00	11.66	2.66	14.00	33.00	19.00
1880.00	3.00		H	82.87	10.26	11.66	2.66	19.26	33.00	13.74
1880.00			V	77.21	4.74	11.66	2.66	13.74	33.00	19.26
1880.00	5.00		H	82.69	10.08	11.66	2.66	19.08	33.00	13.92
1880.00			V	77.00	4.53	11.66	2.66	13.53	33.00	19.47
1880.00	10.00		H	82.37	9.76	11.66	2.66	18.76	33.00	14.24
1880.00			V	76.65	4.18	11.66	2.66	13.18	33.00	19.82
1880.00	15.00		H	82.69	10.08	11.66	2.66	19.08	33.00	13.92
1880.00			V	76.97	4.50	11.66	2.66	13.50	33.00	19.50
1880.00	20.00		H	83.95	11.34	11.66	2.66	20.34	33.00	12.66
1880.00			V	77.58	5.11	11.66	2.66	14.11	33.00	18.89

LTE Band 4

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
1732.50	1.40	QPSK	H	83.33	9.28	10.90	2.51	17.67	30.00	12.33
1732.50			V	79.65	5.28	10.90	2.51	13.67	30.00	16.33
1732.50	3.00		H	82.95	8.90	10.90	2.51	17.29	30.00	12.71
1732.50			V	79.13	4.76	10.90	2.51	13.15	30.00	16.85
1732.50	5.00		H	82.46	8.41	10.90	2.51	16.80	30.00	13.20
1732.50			V	79.26	4.89	10.90	2.51	13.28	30.00	16.72
1732.50	10.00		H	81.72	7.67	10.90	2.51	16.06	30.00	13.94
1732.50			V	78.83	4.46	10.90	2.51	12.85	30.00	17.15
1732.50	15.00		H	81.75	7.70	10.90	2.51	16.09	30.00	13.91
1732.50			V	79.32	4.95	10.90	2.51	13.34	30.00	16.66
1732.50	20.00		H	82.12	8.07	10.90	2.51	16.46	30.00	13.54
1732.50			V	79.59	5.22	10.90	2.51	13.61	30.00	16.39
1732.50	1.40	16QAM	H	82.79	8.74	10.90	2.51	17.13	30.00	12.87
1732.50			V	78.62	4.25	10.90	2.51	12.64	30.00	17.36
1732.50	3.00		H	82.43	8.38	10.90	2.51	16.77	30.00	13.23
1732.50			V	78.30	3.93	10.90	2.51	12.32	30.00	17.68
1732.50	5.00		H	82.09	8.04	10.90	2.51	16.43	30.00	13.57
1732.50			V	78.03	3.66	10.90	2.51	12.05	30.00	17.95
1732.50	10.00		H	82.19	8.14	10.90	2.51	16.53	30.00	13.47
1732.50			V	78.26	3.89	10.90	2.51	12.28	30.00	17.72
1732.50	15.00		H	82.35	8.30	10.90	2.51	16.69	30.00	13.31
1732.50			V	77.94	3.57	10.90	2.51	11.96	30.00	18.04
1732.50	20.00		H	82.67	8.62	10.90	2.51	17.01	30.00	12.99
1732.50			V	78.72	4.35	10.90	2.51	12.74	30.00	17.26

LTE Band 17

Frequency (MHz)	BW (MHz)	Modulation	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
					Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
710.00	5.00	QPSK	H	82.52	6.62	0.00	0.39	6.23	34.77	28.54
710.00			V	94.88	21.88	0.00	0.39	21.49	34.77	13.28
710.00	10.00		H	82.61	6.71	0.00	0.39	6.32	34.77	28.45
710.00			V	94.62	21.62	0.00	0.39	21.23	34.77	13.54
710.00	5.00	16QAM	H	81.76	5.86	0.00	0.39	5.47	34.77	29.30
710.00			V	94.18	21.18	0.00	0.39	20.79	34.77	13.98
710.00	10.00		H	82.42	6.52	0.00	0.39	6.13	34.77	28.64
710.00			V	94.35	21.35	0.00	0.39	20.96	34.77	13.81

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

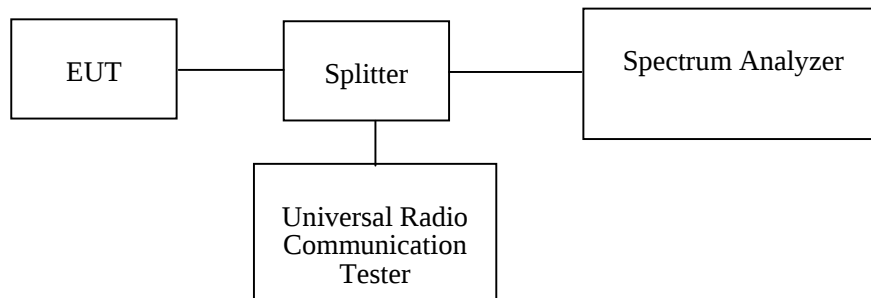
FCC §2.1049, §22.917, §22.905 & §24.238 & §27.53- OCCUPIED BANDWIDTH**Applicable Standard**

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	FSV40	101474	2019-01-09	2020-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	/
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	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:	25.1~27.9°C
Relative Humidity:	46~57%
ATM Pressure:	100.6~101kPa
Test by:	Lily Xie
Test Date:	2019-10-11 & 2019-11-21

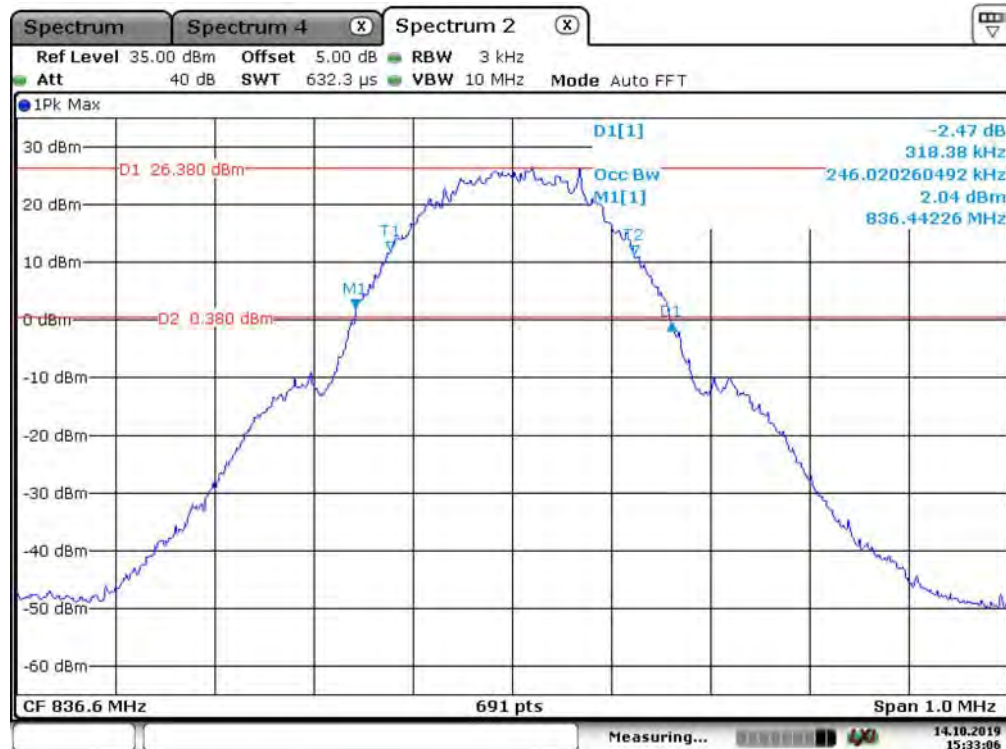
Test Mode: Transmitting

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

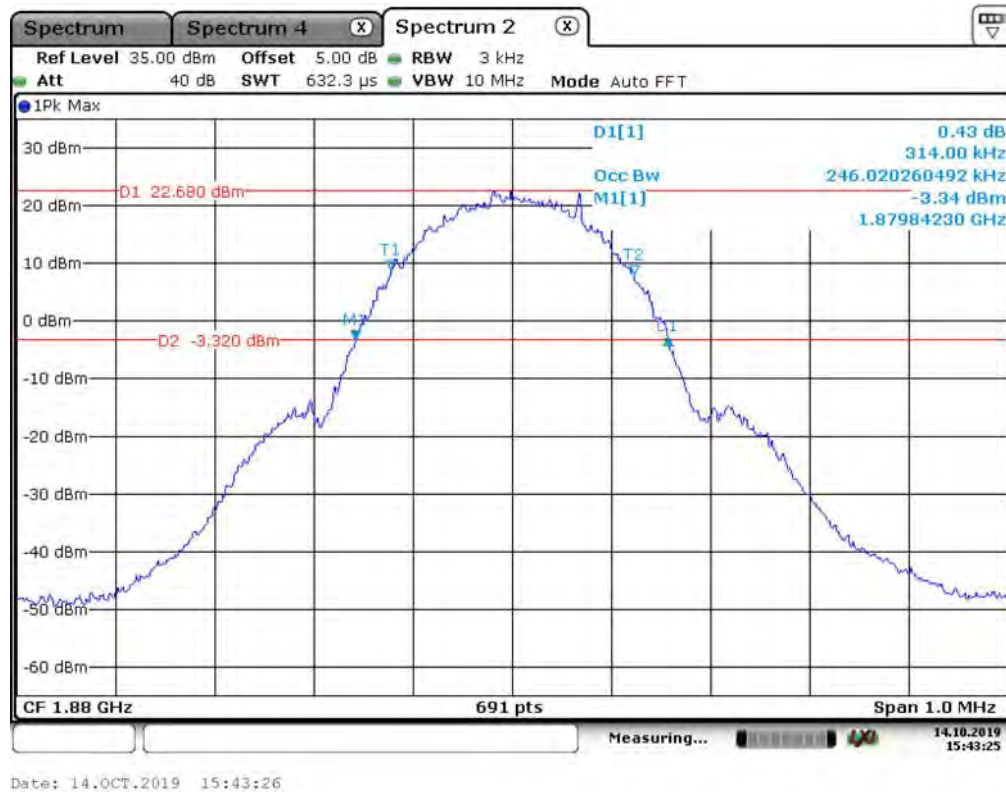
Band	Test Channel	Mode	99% Occupied Bandwidth (MHz)	26 dB Occupied Bandwidth (MHz)
Cellular	M	GSM	0.246	0.318
		EGPRS	0.256	0.329
PCS		GSM	0.246	0.314
		EGPRS	0.247	0.315
WCDMA Band II		Rel 99	4.168	4.703
		HSDPA	4.168	4.732
		HSUPA	4.168	4.718
WCDMA Band V		Rel 99	4.168	4.718
		HSDPA	4.182	4.732
		HSUPA	4.211	4.732

Band	Bandwidth	Modulation	99% occupied bandwidth (MHz)	26 dB bandwidth (MHz)
LTE Band 2	1.4 MHz	QPSK	1.103	1.307
		16QAM	1.094	1.281
	3 MHz	QPSK	2.683	2.848
		16QAM	2.674	2.874
	5 MHz	QPSK	4.486	5.080
		16QAM	4.486	5.051
	10 MHz	QPSK	8.973	10.014
		16QAM	8.973	9.783
	15 MHz	QPSK	13.589	15.282
		16QAM	13.589	15.152
LTE Band 4	1.4 MHz	QPSK	17.945	19.624
		16QAM	18.003	19.74
	1.4 MHz	QPSK	1.096	1.302
		16QAM	1.096	1.314
	3 MHz	QPSK	2.683	2.864
		16QAM	2.683	2.873
	5 MHz	QPSK	4.486	5.051
		16QAM	4.486	4.978
	10 MHz	QPSK	8.973	10.101
		16QAM	8.973	9.783
	15 MHz	QPSK	13.546	15.239
		16QAM	13.502	15.109
LTE Band 17	20 MHz	QPSK	17.945	19.913
		16QAM	17.887	19.624
	5 MHz	QPSK	4.472	4.964
		16QAM	4.472	5.022
	10 MHz	QPSK	8.915	9.812
		16QAM	8.915	9.725

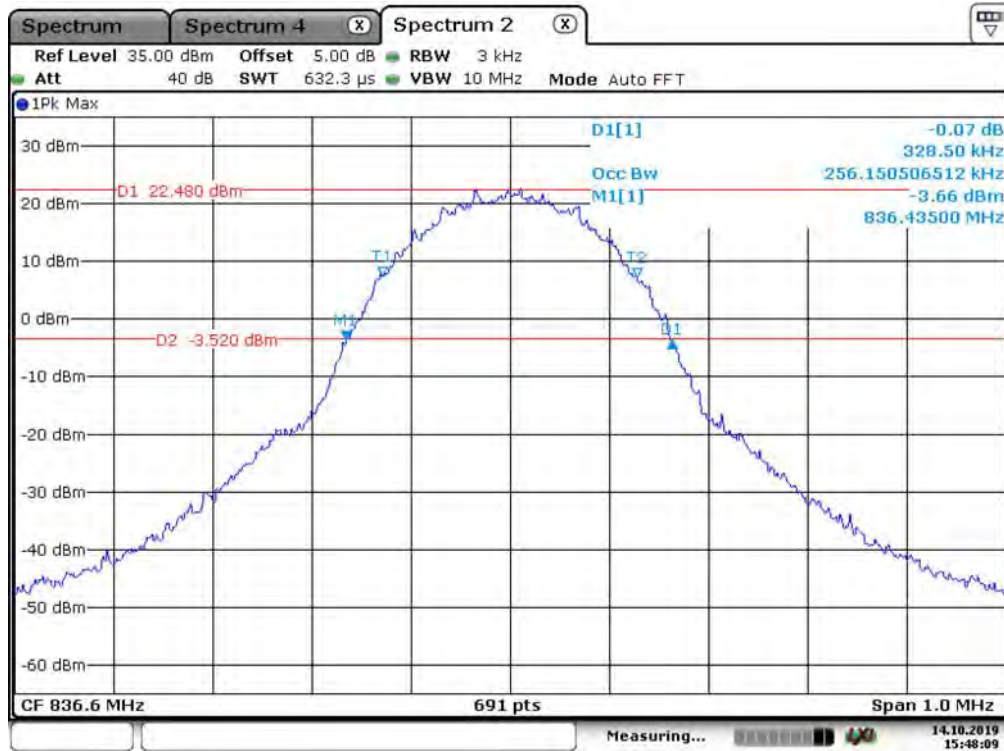
GSM Cellular 850



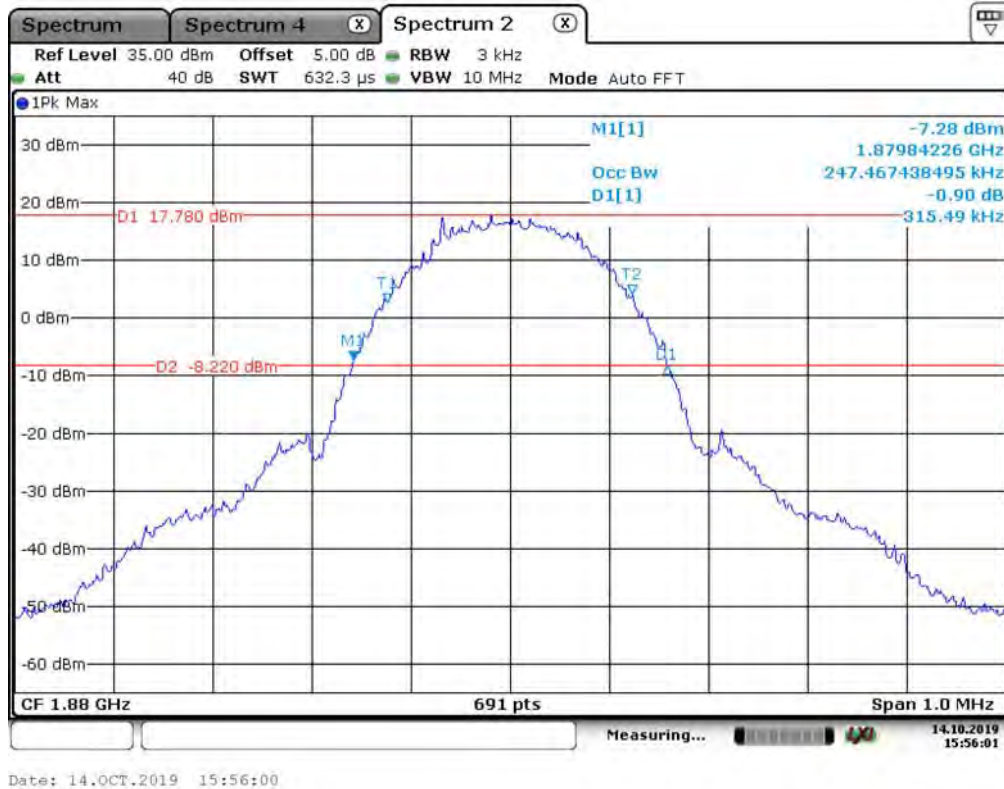
GSM PCS1900



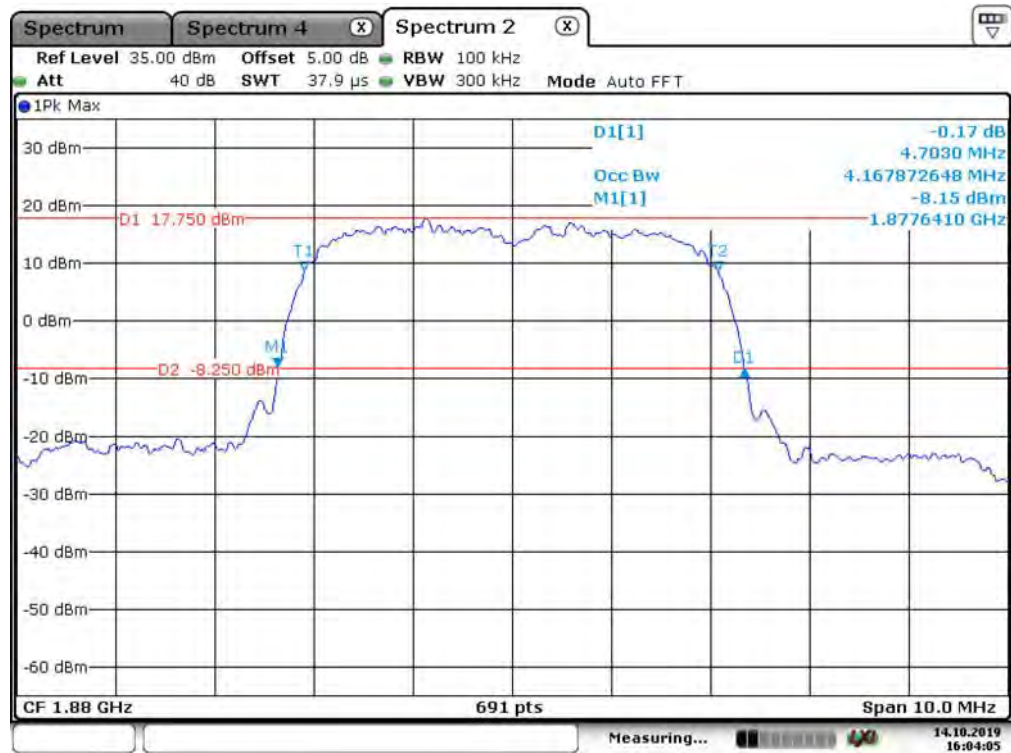
EGPRS Cellular 850



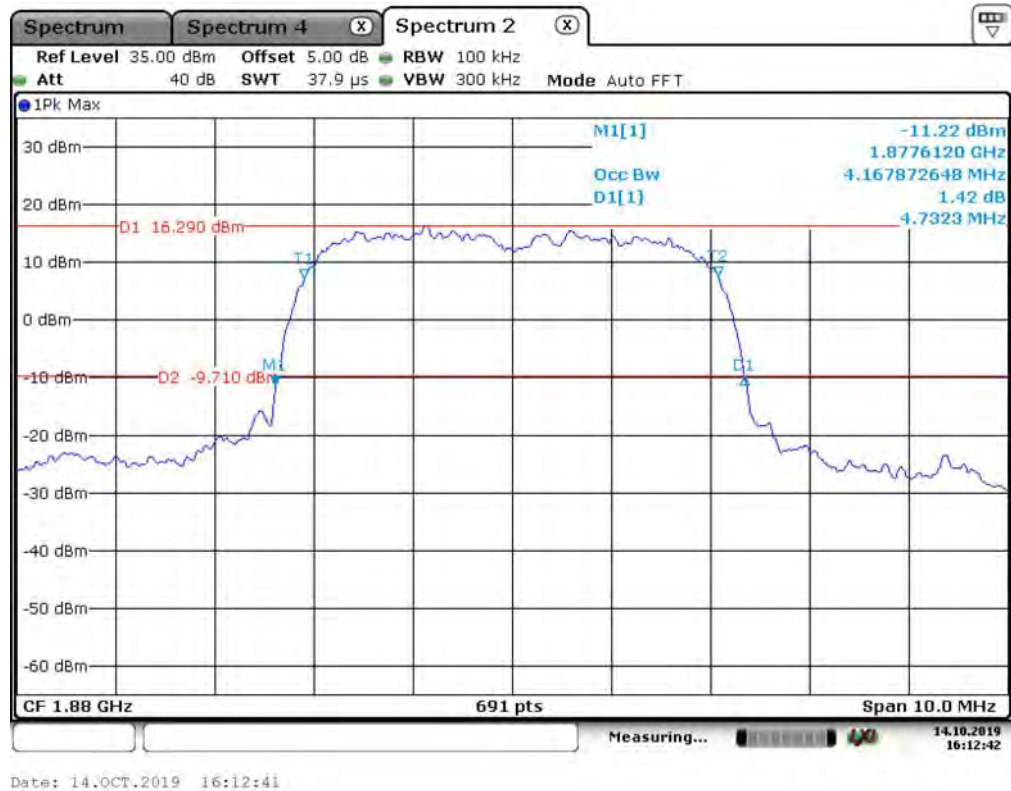
EGPRS PCS1900



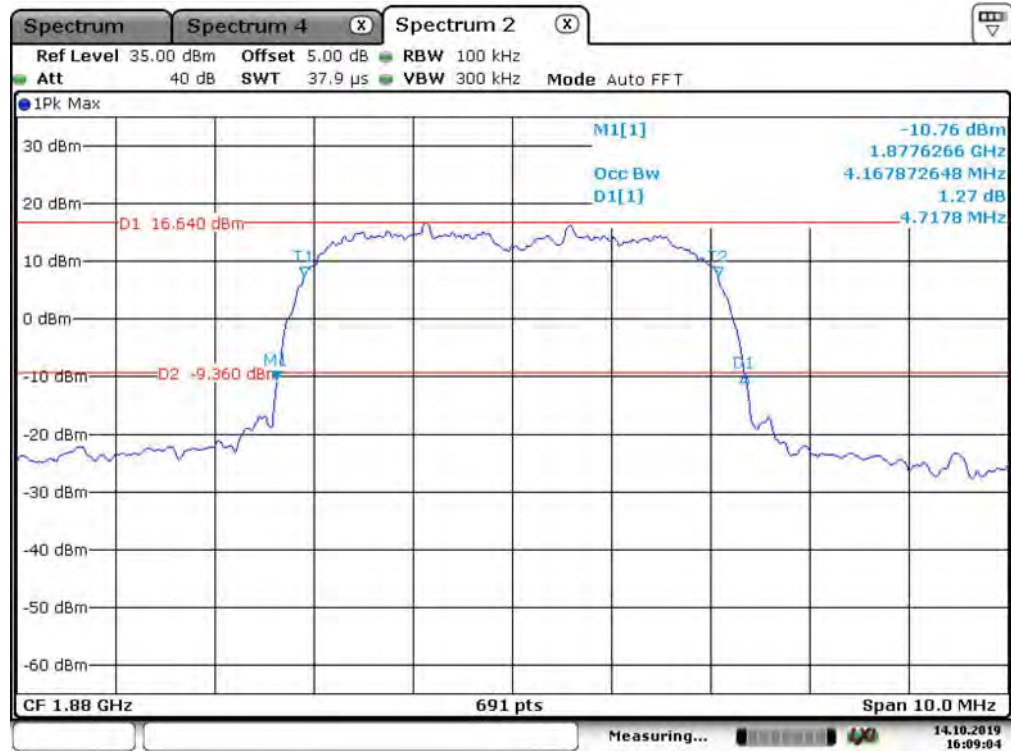
WCDMA Band2 Rel 99



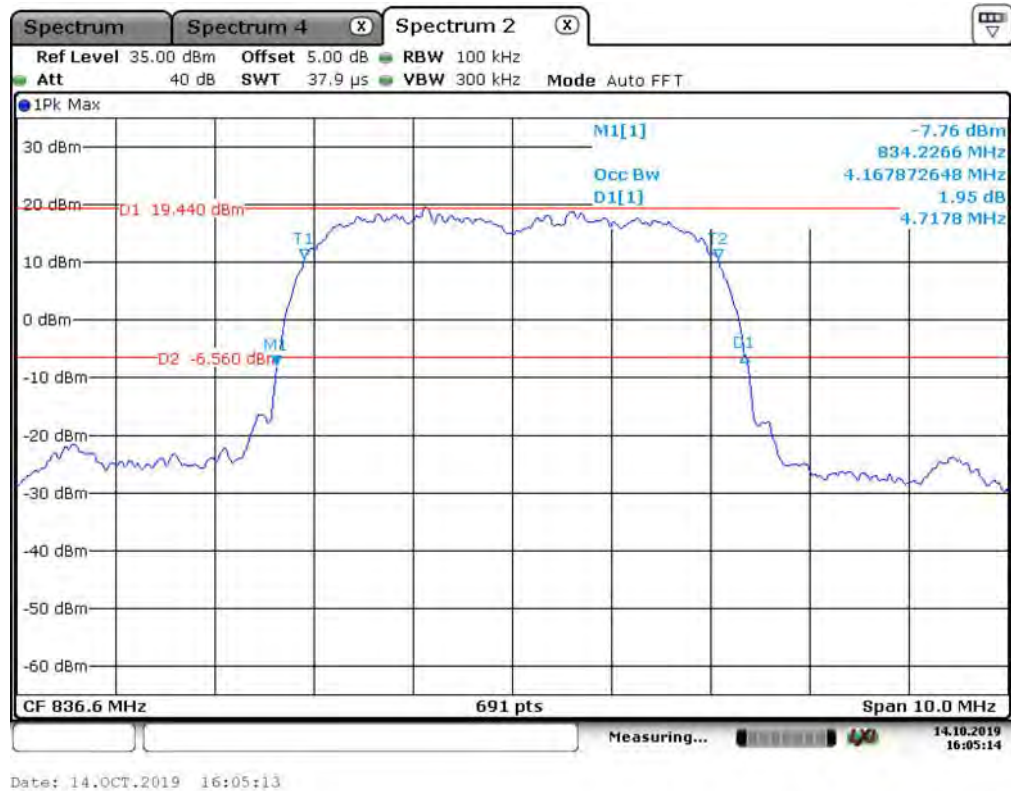
WCDMA Band2 HSDPA



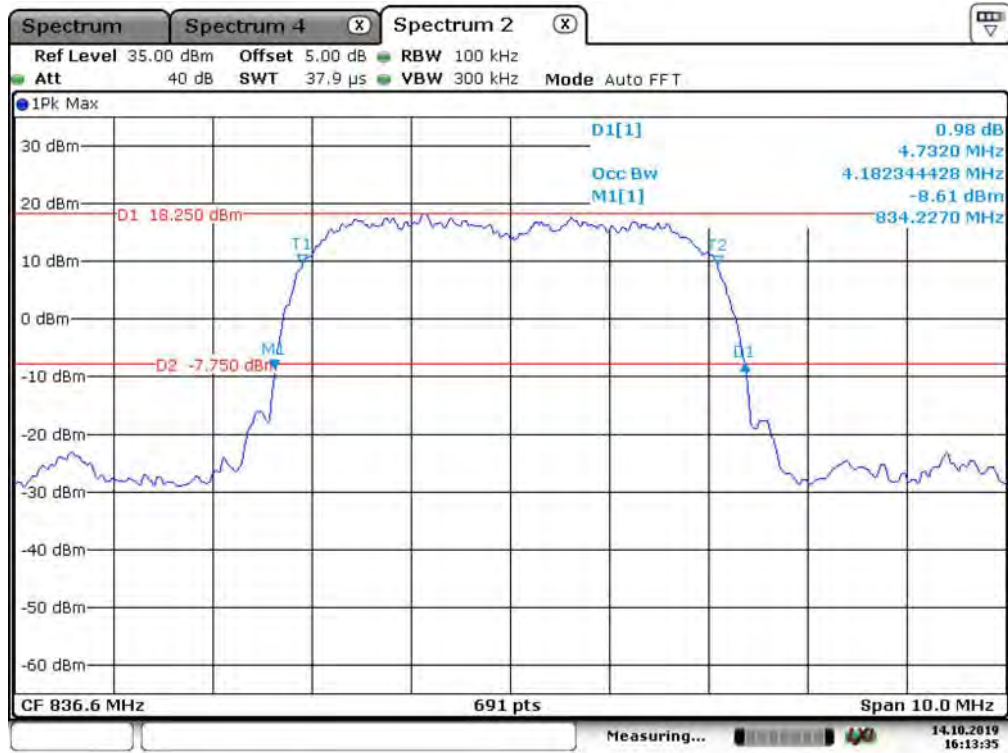
WCDMA Band 2 HSUPA



WCDMA Band 5 Rel 99

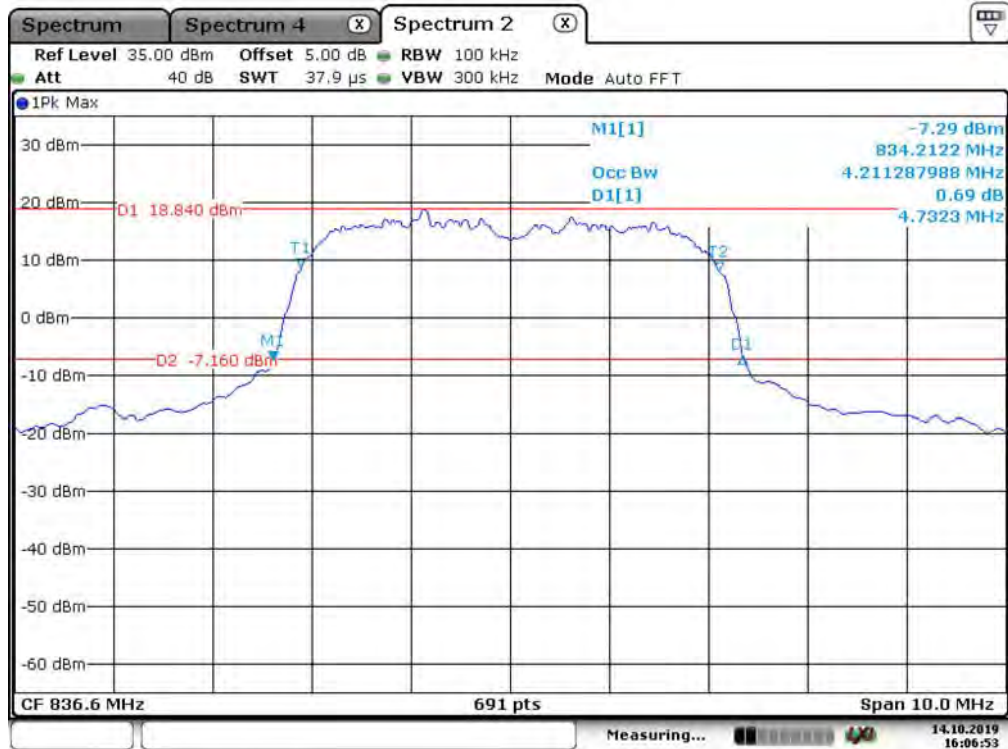


WCDMA Band5 HSDPA



Date: 14.OCT.2019 16:13:35

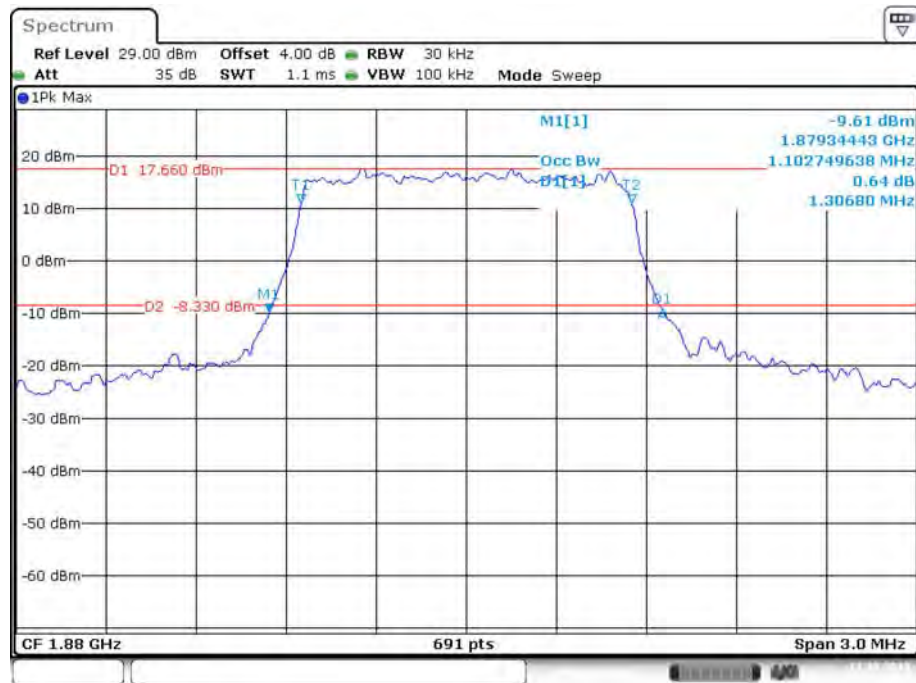
WCDMA Band5 HSUPA



Date: 14.OCT.2019 16:06:53

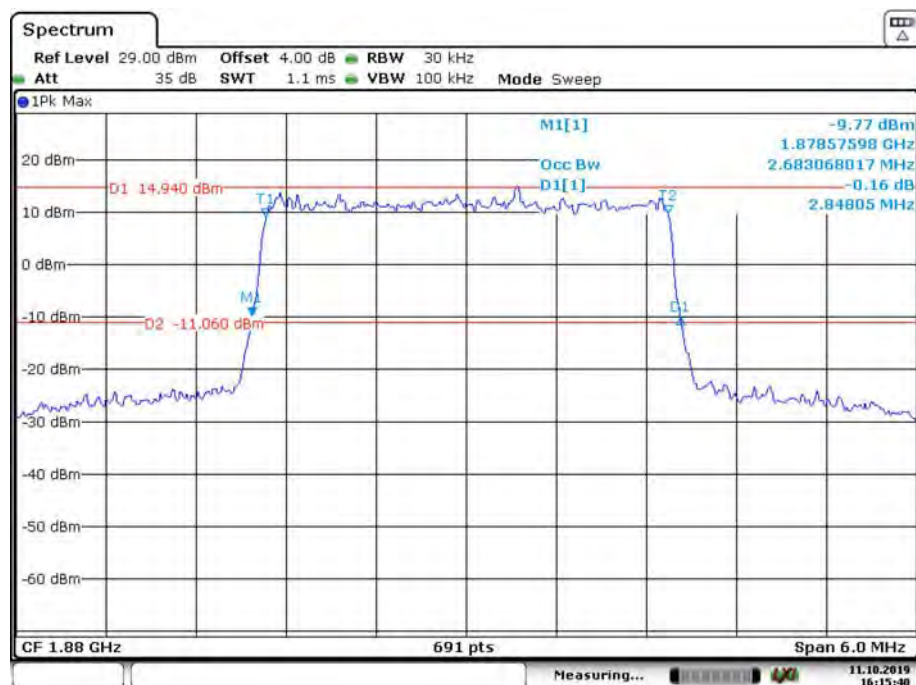
LTE Band 2

QPSK_1.4 MHz



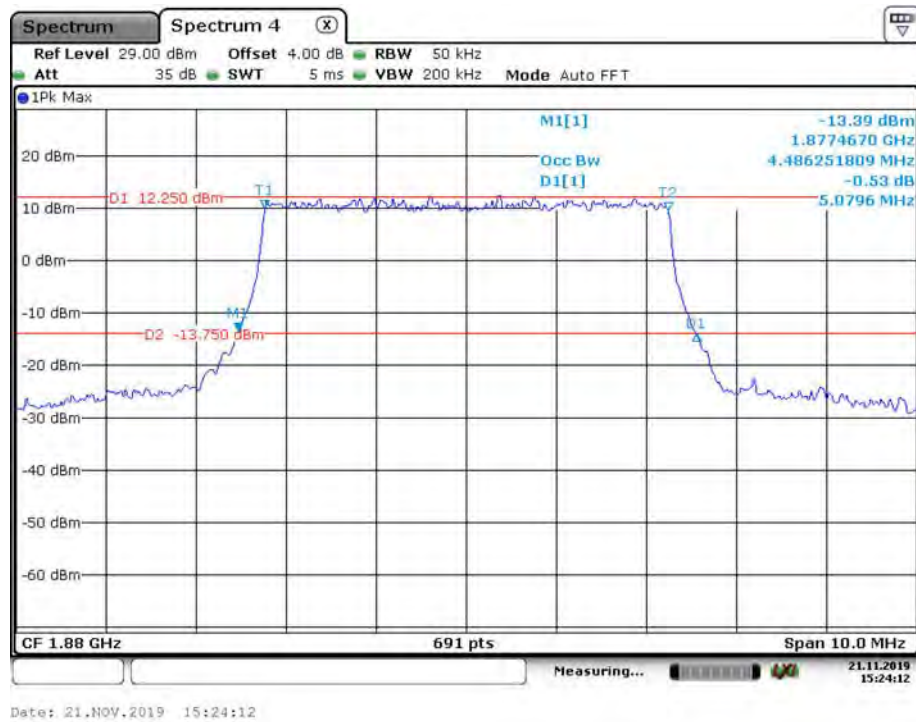
Date: 11.OCT.2019 16:09:50

QPSK_3 MHz

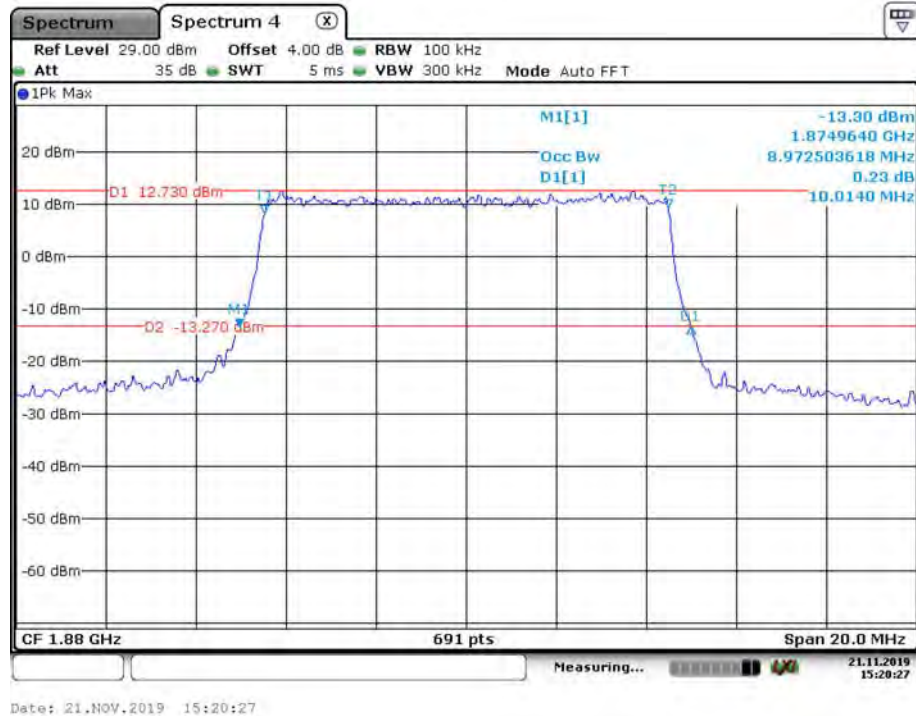


Date: 11.OCT.2019 16:15:40

QPSK_5 MHz



QPSK_10 MHz



Spectrum **Spectrum 4** (X)

Ref Level 29.00 dBm Offset 4.00 dB RBW 300 kHz
 Att 35 dB SWT 5 ms VBW 1 MHz Mode Auto Sweep

1Pk Max

20 dBm
 10 dBm
 0 dBm
 -10 dBm
 -20 dBm
 -30 dBm
 -40 dBm
 -50 dBm
 -60 dBm

M1[1]
 Occ BW
 -9.38 dBm
 1.8724020 GHz
 13.589001447 MHz
 -0.58 dB
 15.2822 MHz

D1 16.090 dBm
 D2 -9.910 dBm

CF 1.88 GHz 691 pts Span 30.0 MHz

Measuring... 21.11.2019 15:29:37

Date: 21.NOV.2019 15:29:37

Spectrum **Spectrum 4** (X)

Ref Level 29.00 dBm Offset 4.00 dB RBW 300 kHz
 Att 35 dB SWT 3.3 ms VBW 1 MHz Mode Auto Sweep

1Pk Max

M1[1] -11.02 dBm
 1.8701590 GHz
 17.945007236 MHz
 0.38 dB
 19.6237 MHz

Occ BW
 D1[1]

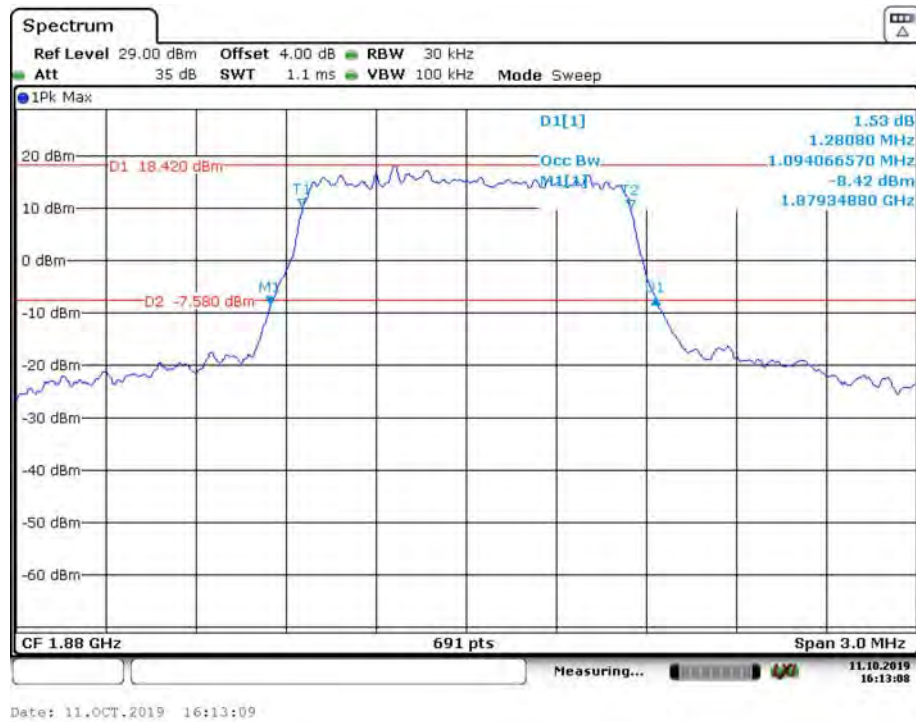
D1 14.790 dBm T1
 D2 -11.210 dBm M2
 T2

CF 1.88 GHz 691 pts Span 40.0 MHz

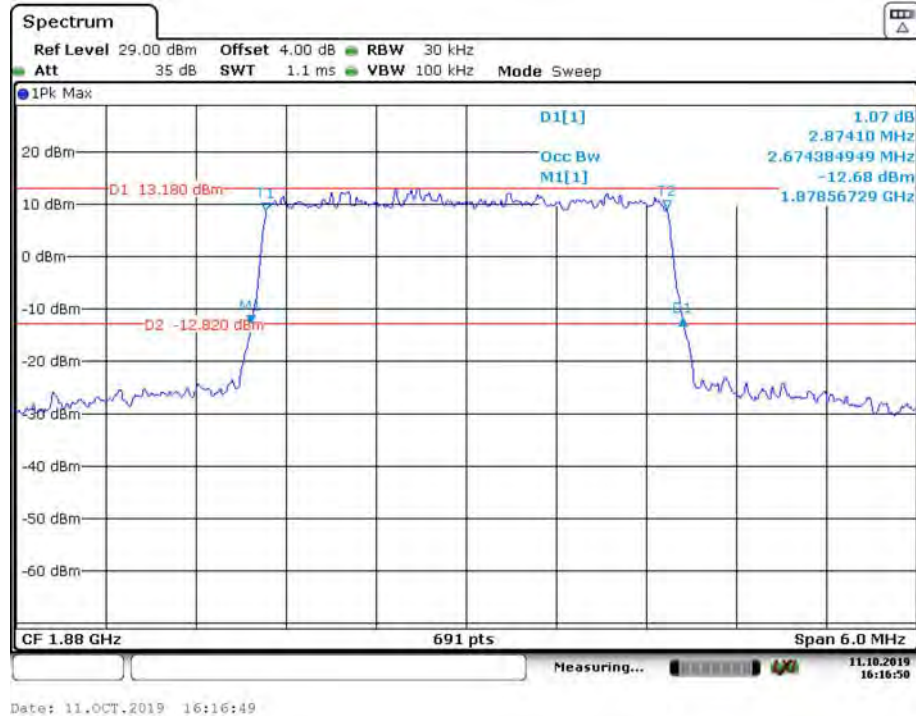
Measuring... 21.11.2019 15:33:20

Date: 21.NOV.2019 15:33:20

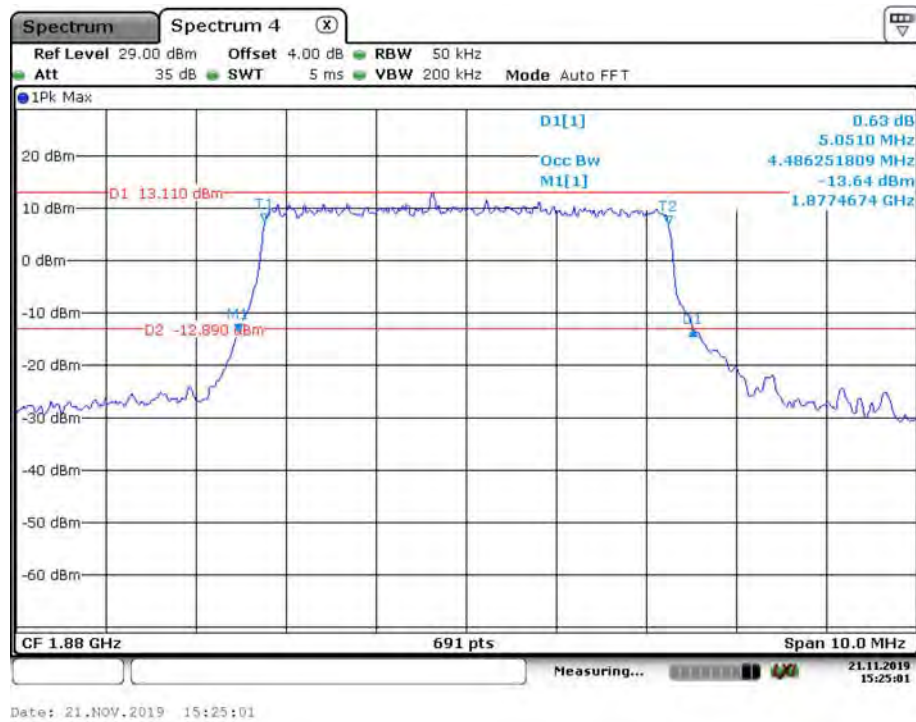
16QAM_1.4 MHz



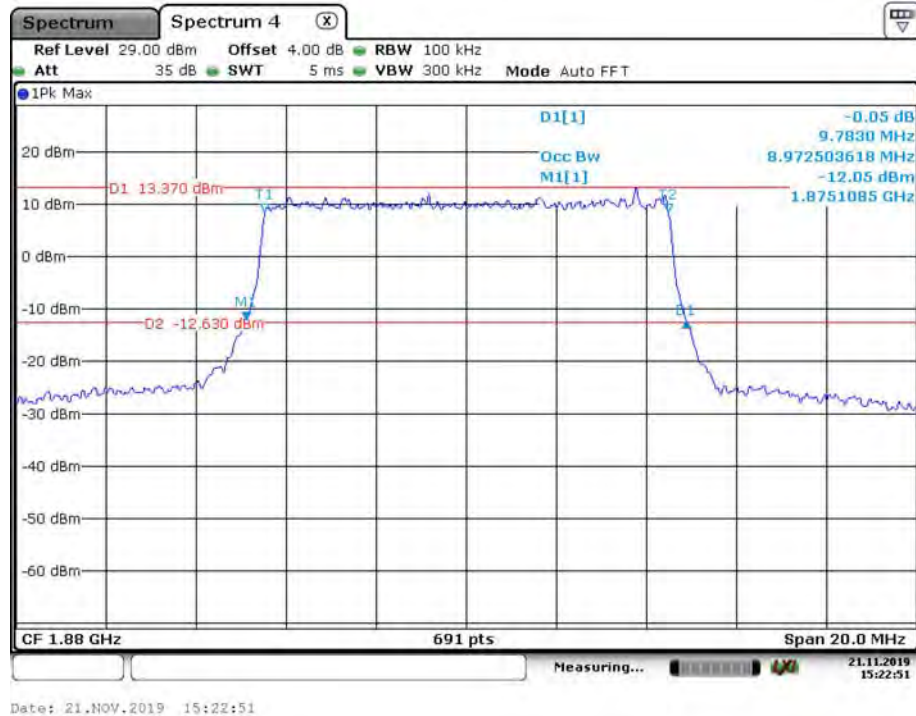
16QAM_3 MHz



16QAM_5 MHz



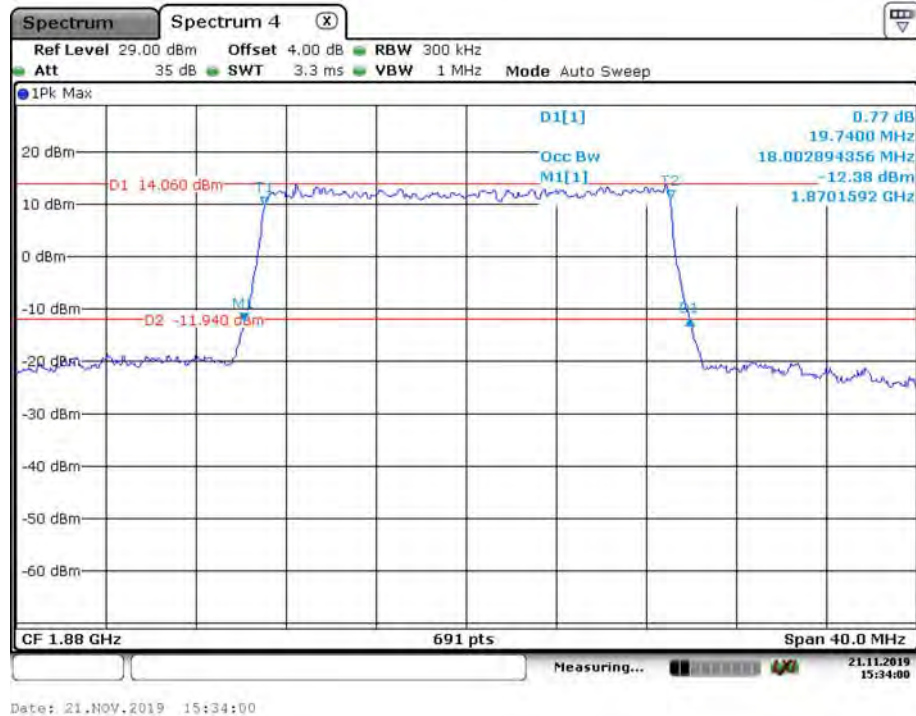
16QAM_10 MHz



16QAM_15 MHz

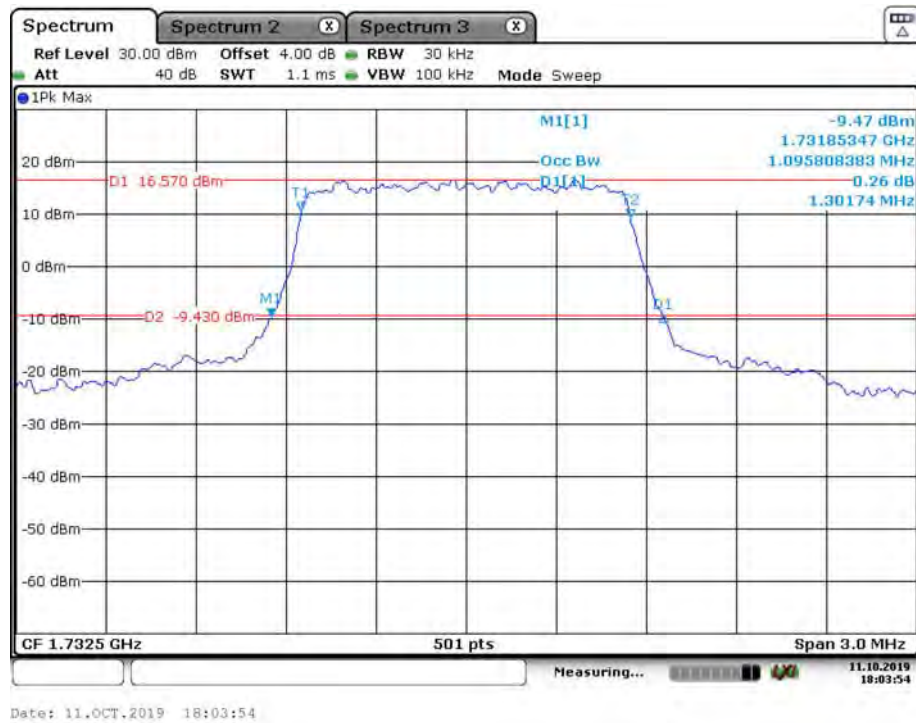


16QAM_20 MHz

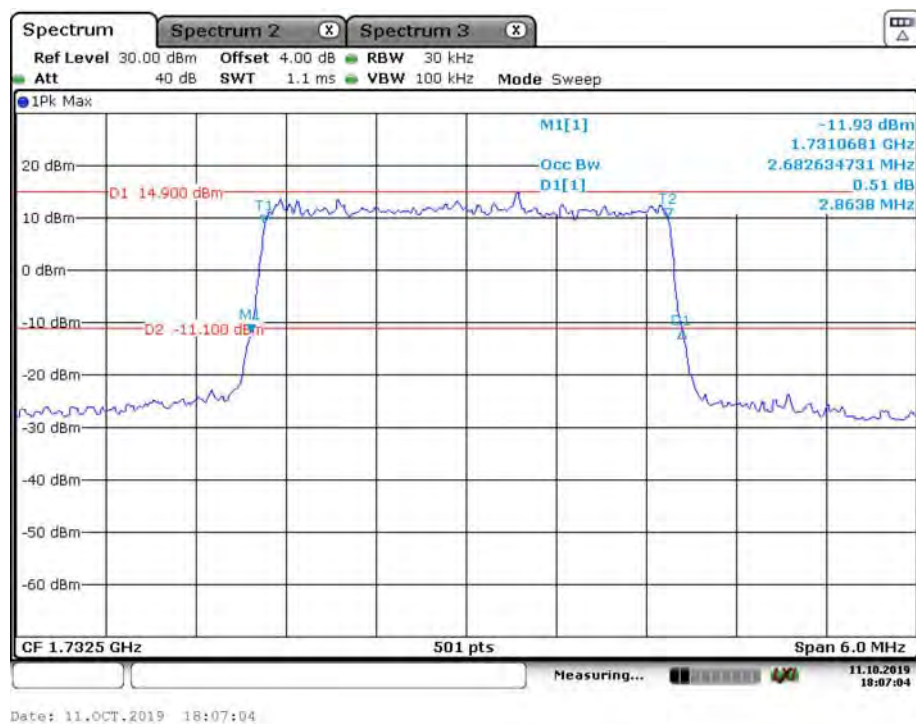


LTE Band 4

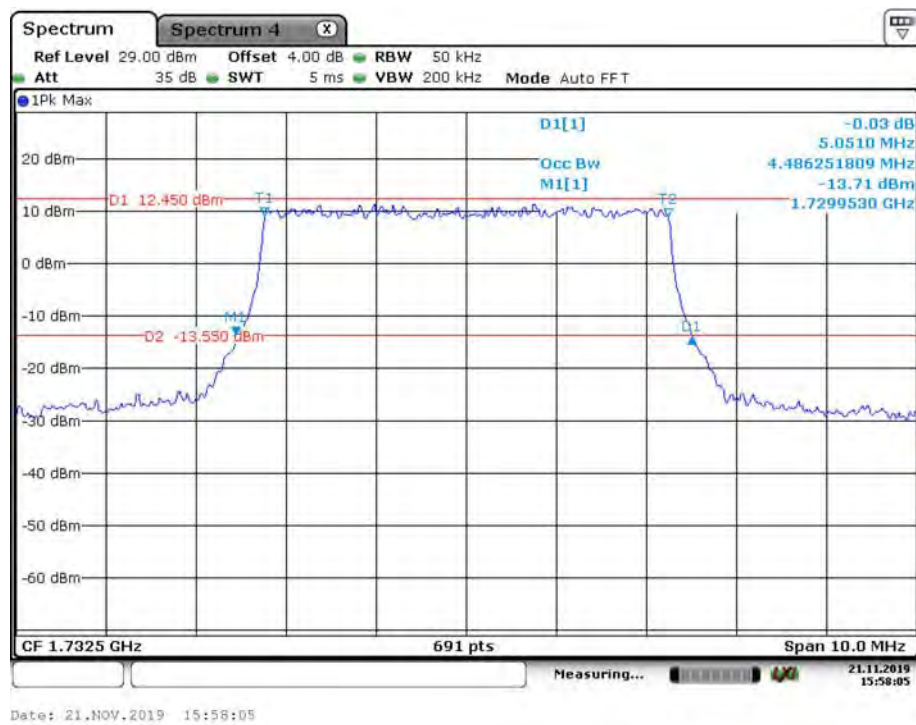
QPSK_1.4 MHz



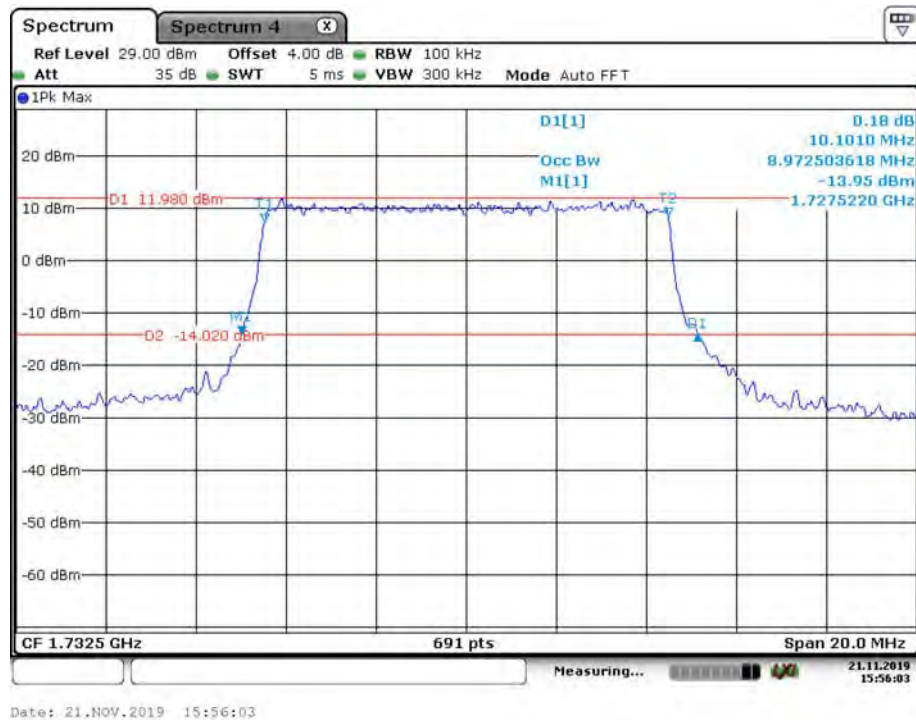
QPSK_3 MHz



QPSK_5 MHz



QPSK_10 MHz



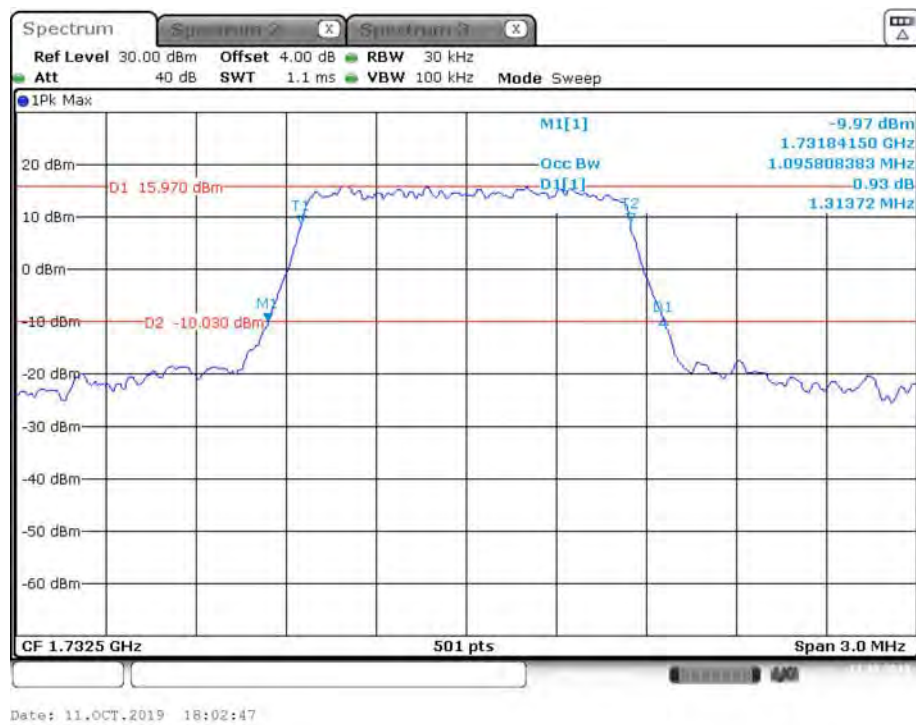
QPSK_15 MHz



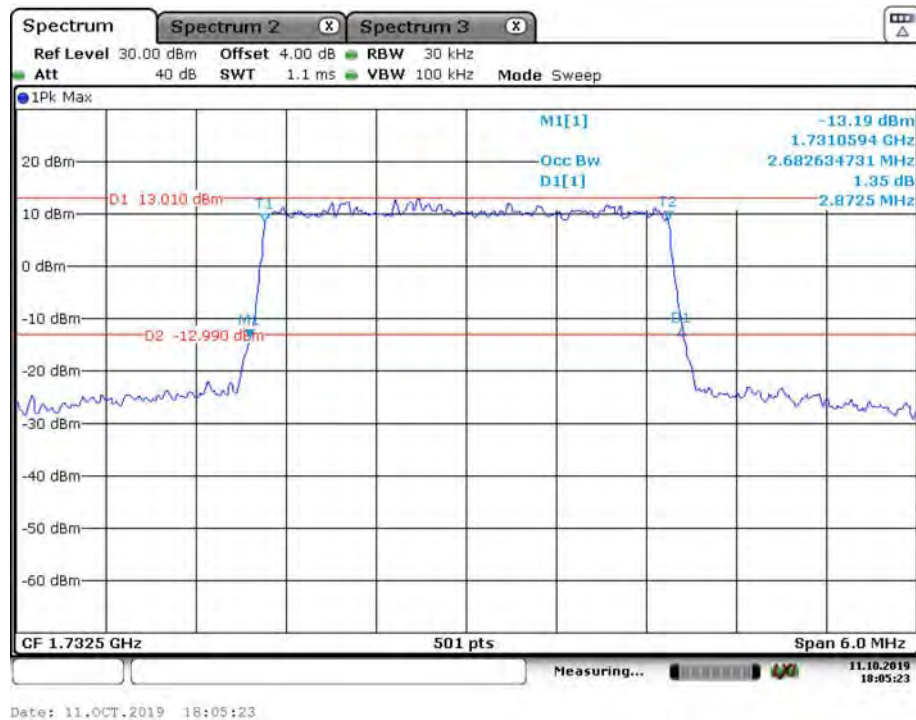
QPSK_20 MHz



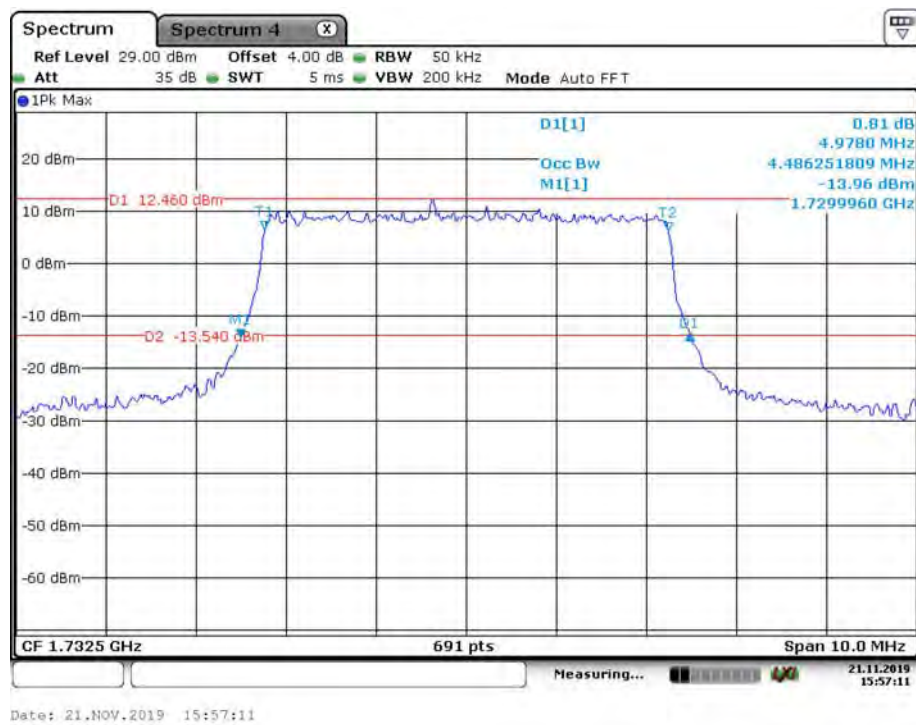
16QAM_1.4 MHz



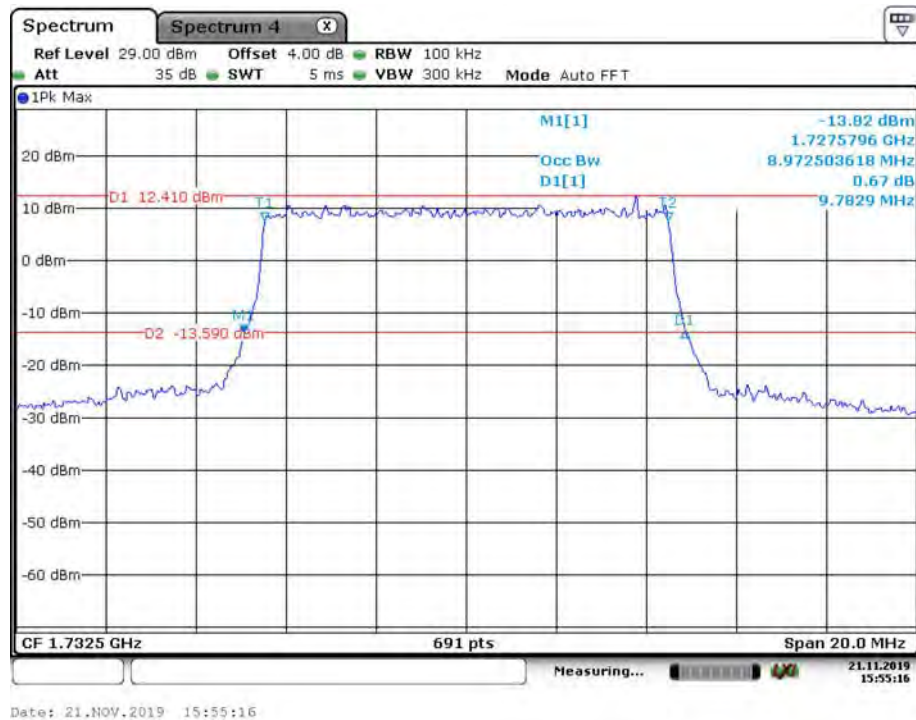
16QAM_3 MHz



16QAM_5 MHz



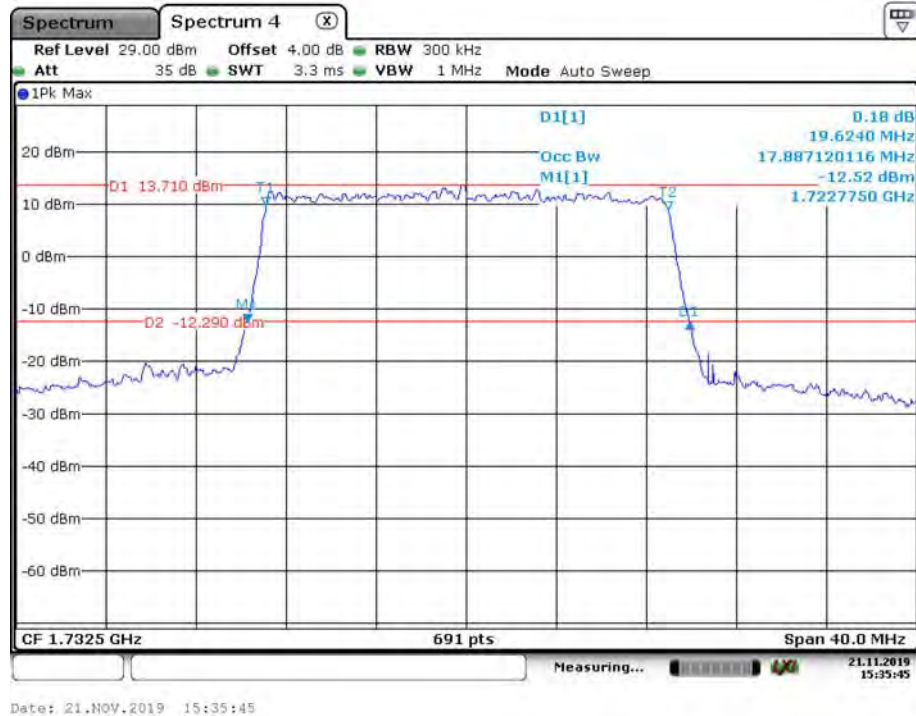
16QAM_10 MHz

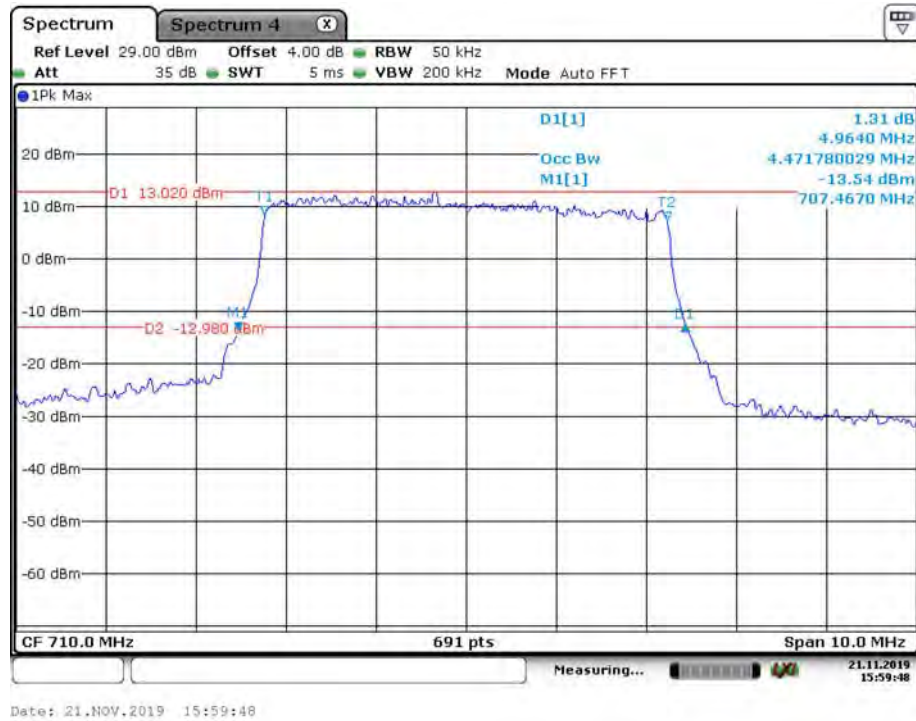


16QAM_15 MHz

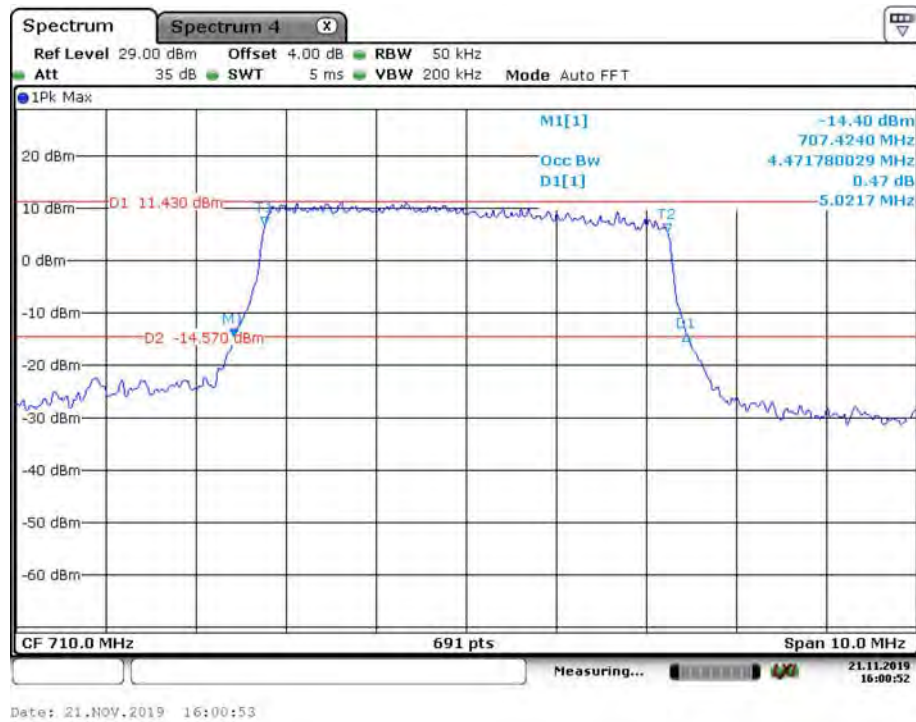


16QAM_20 MHz

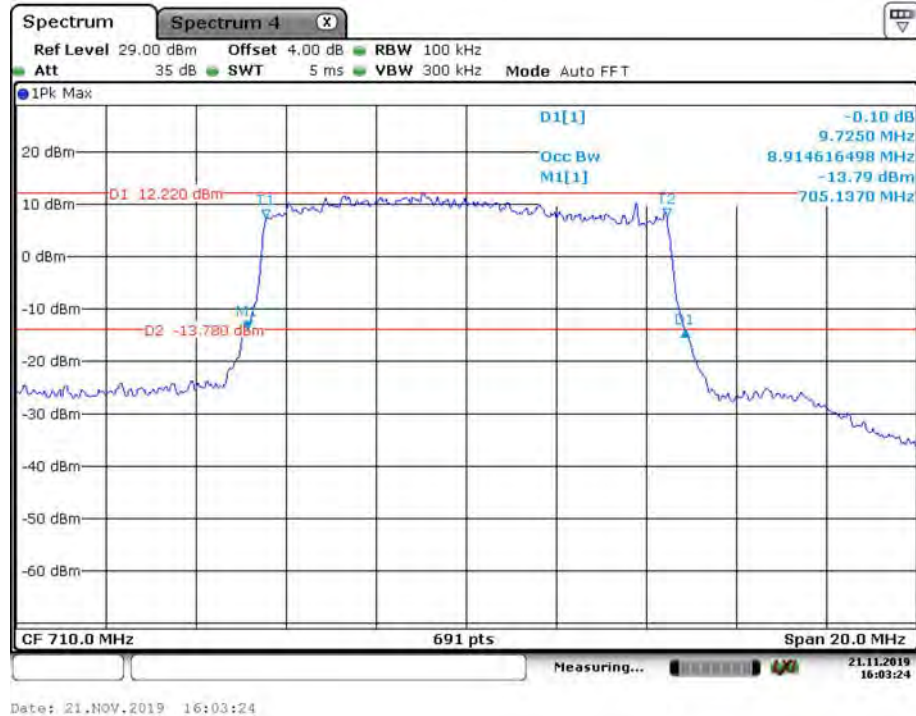


LTE Band 17:**QPSK_5 MHz****QPSK_10 MHz**

16QAM_5 MHz



16QAM_10 MHz



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

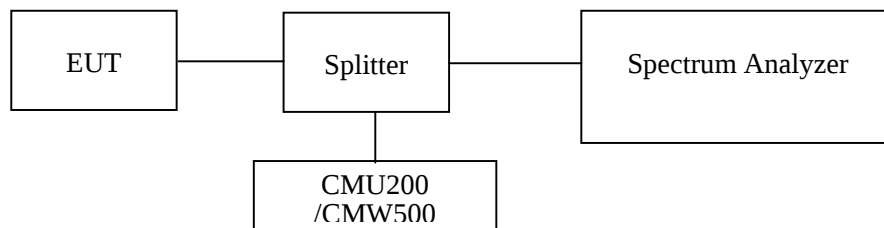
Applicable Standard

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	Spectrum Analyzer	FSV40	101474	2019-01-09	2020-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	/
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	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).

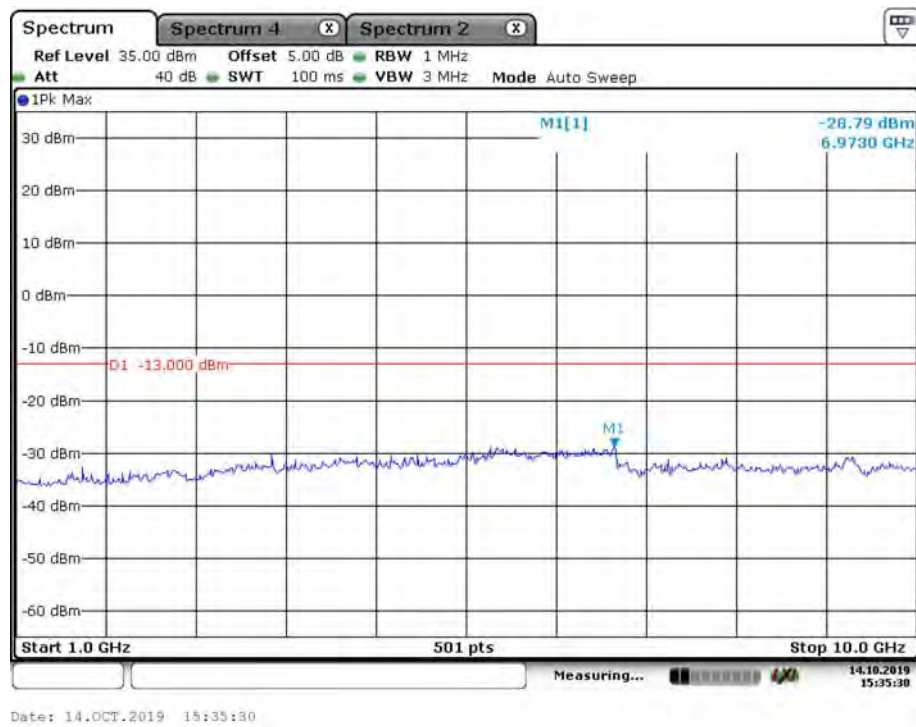
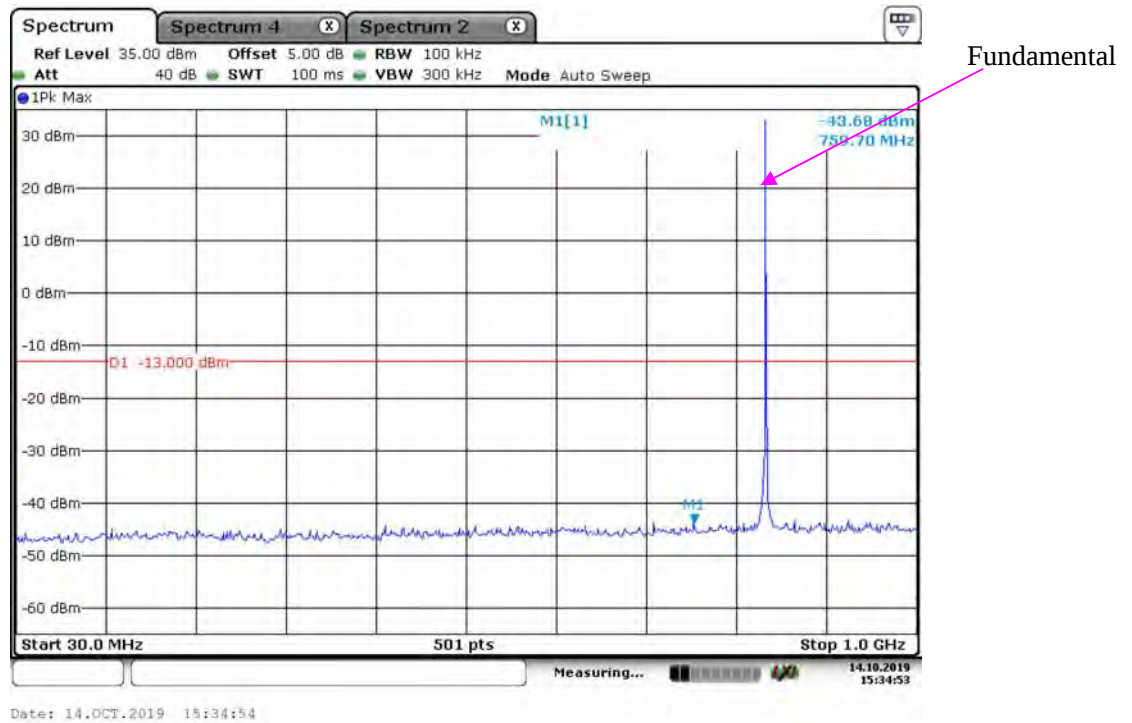
Test Data

Environmental Conditions

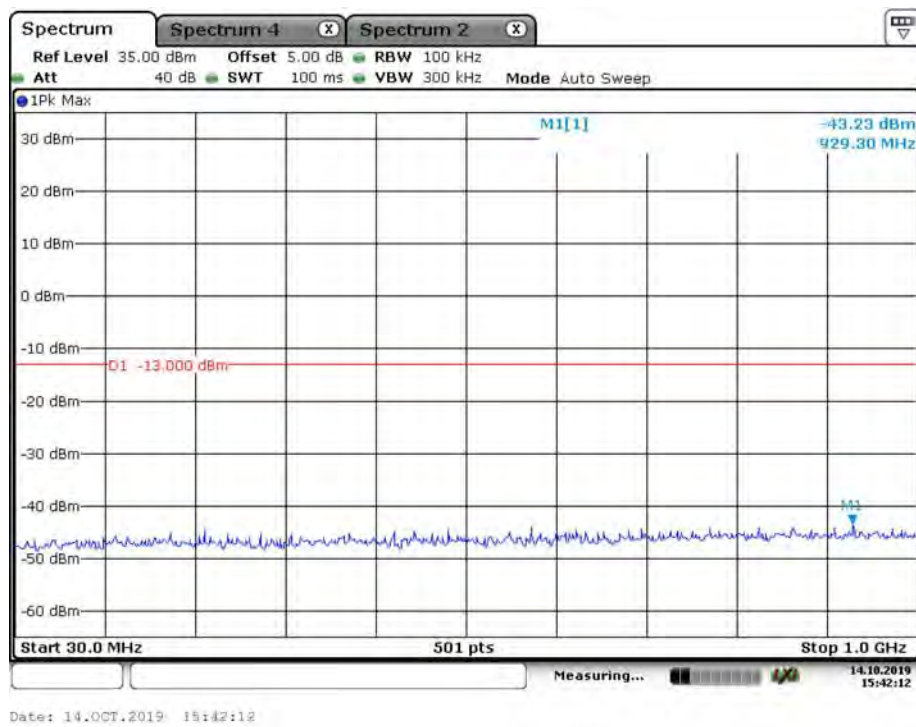
Temperature:	27.8~27.9°C
Relative Humidity:	57~63 %
ATM Pressure:	100.2~100.8kPa
Test by:	Lily Xie
Test Date:	2019-10-11 to 2019-10-14

Please refer to the following plots.

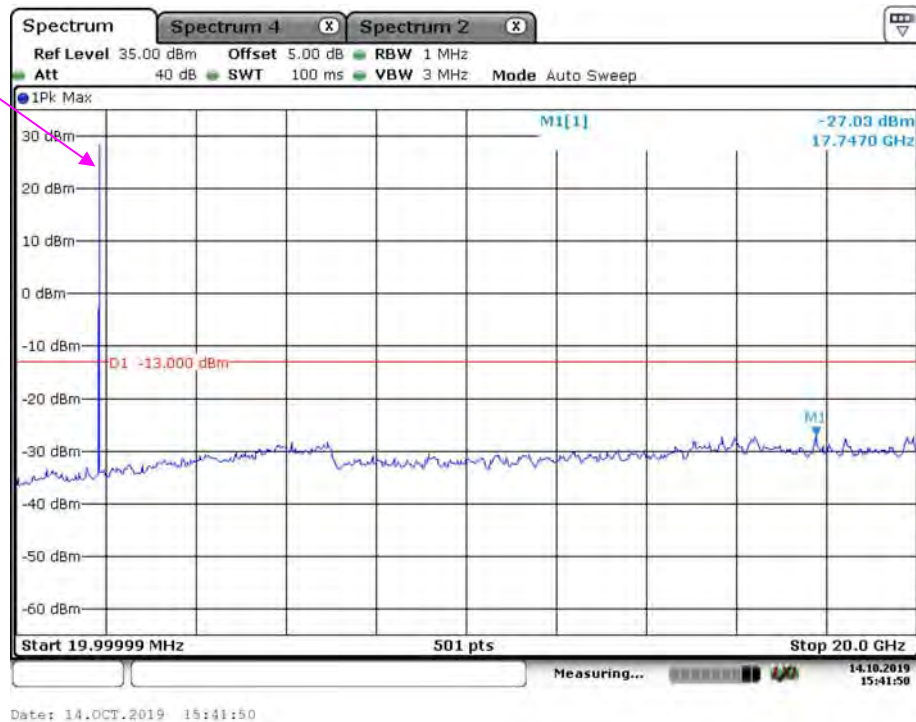
GSM850_Middle Channel



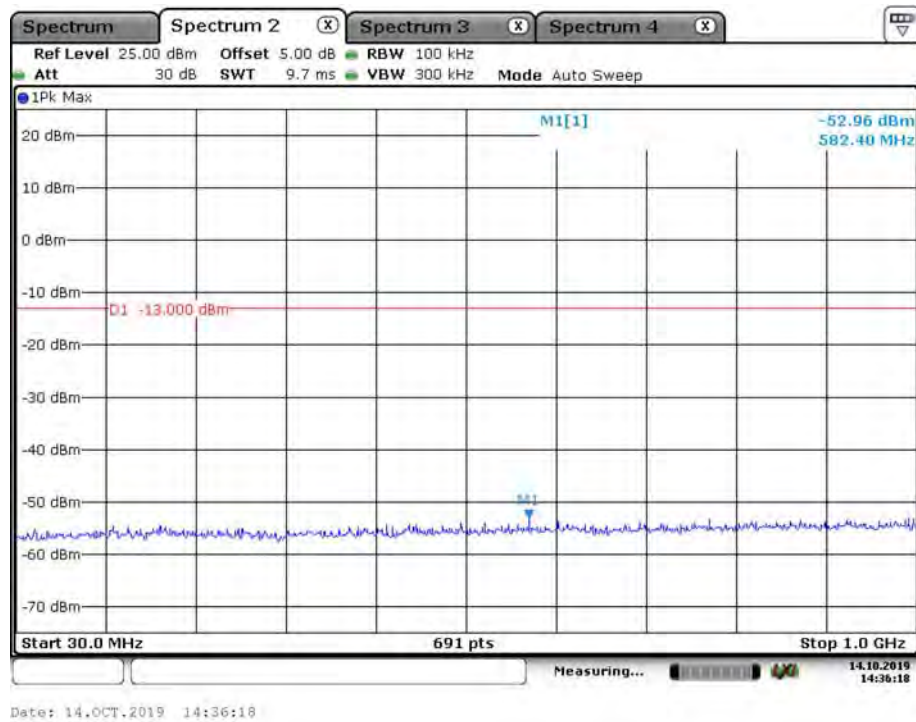
GSM 1900_ Middle Channel



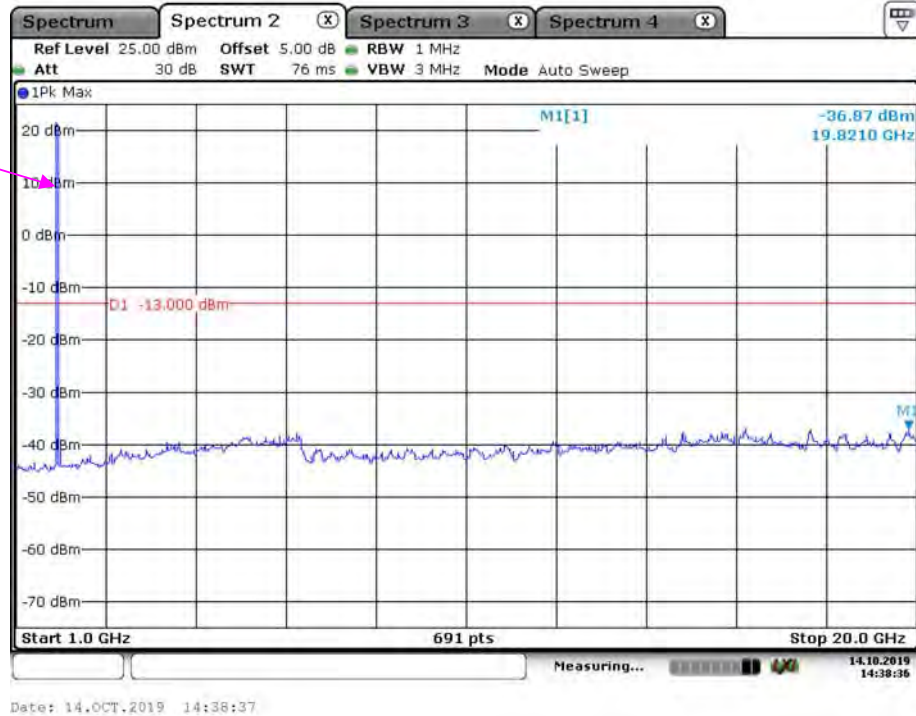
Fundamental



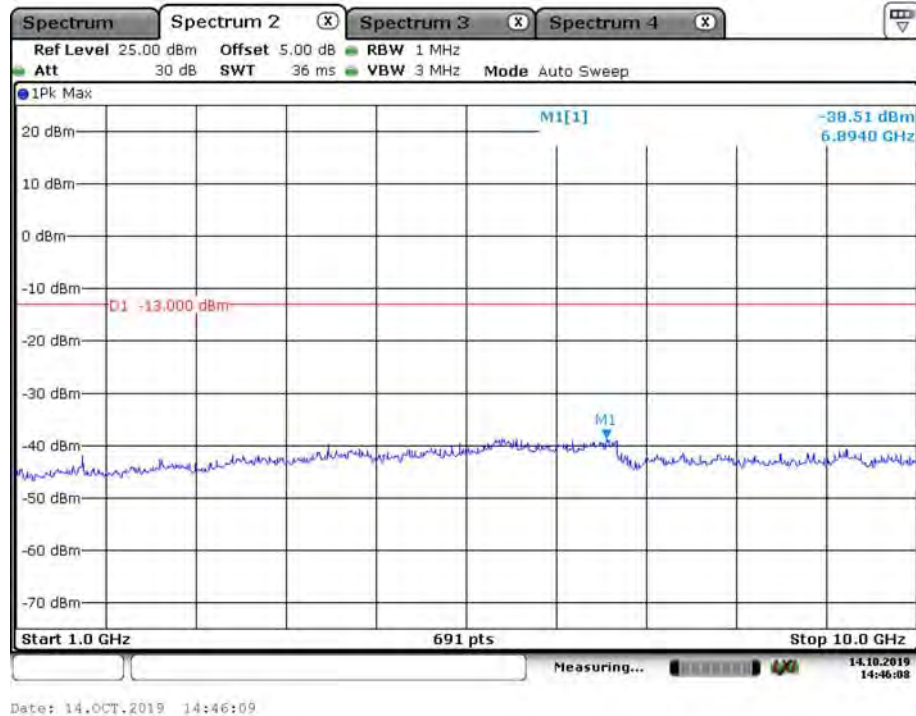
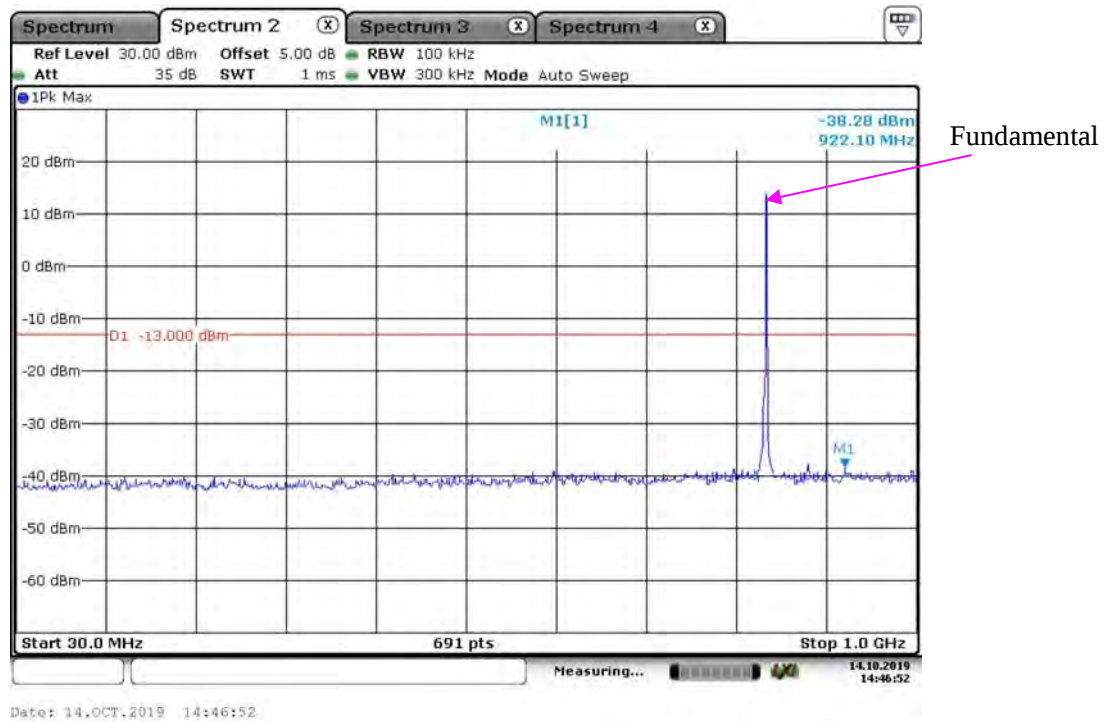
WCDMA Band II, Rel99



Fundamental

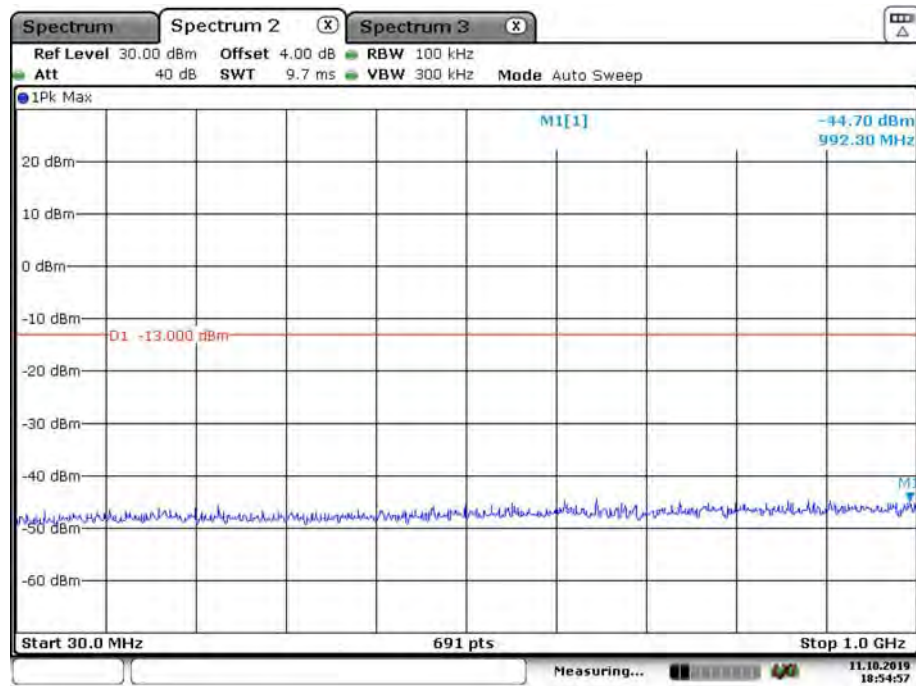


WCDMA Band V, Rel99



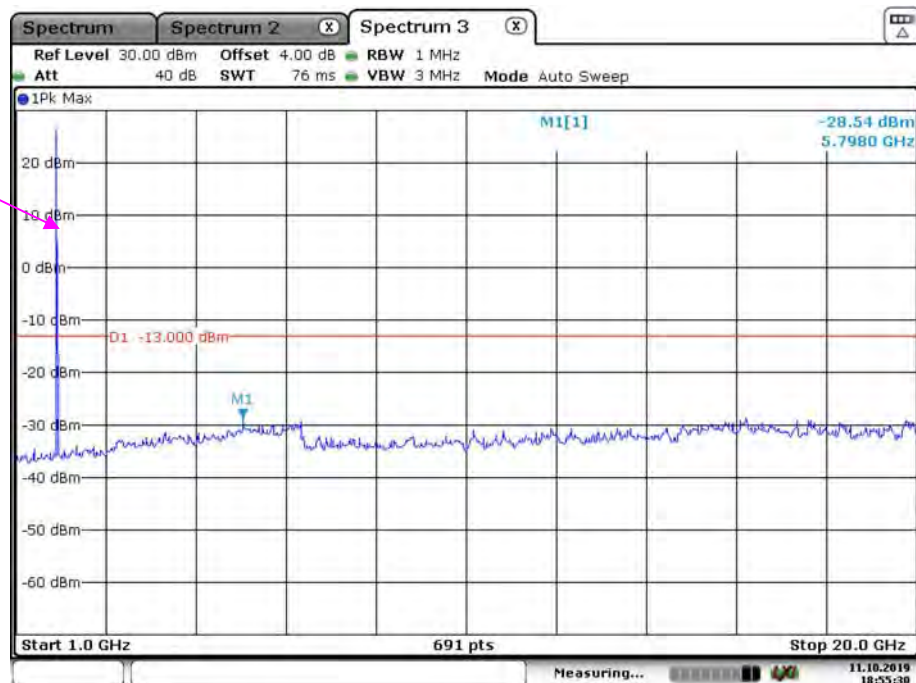
LTE Band 2 (Middle Channel)

QPSK_1.4 MHz



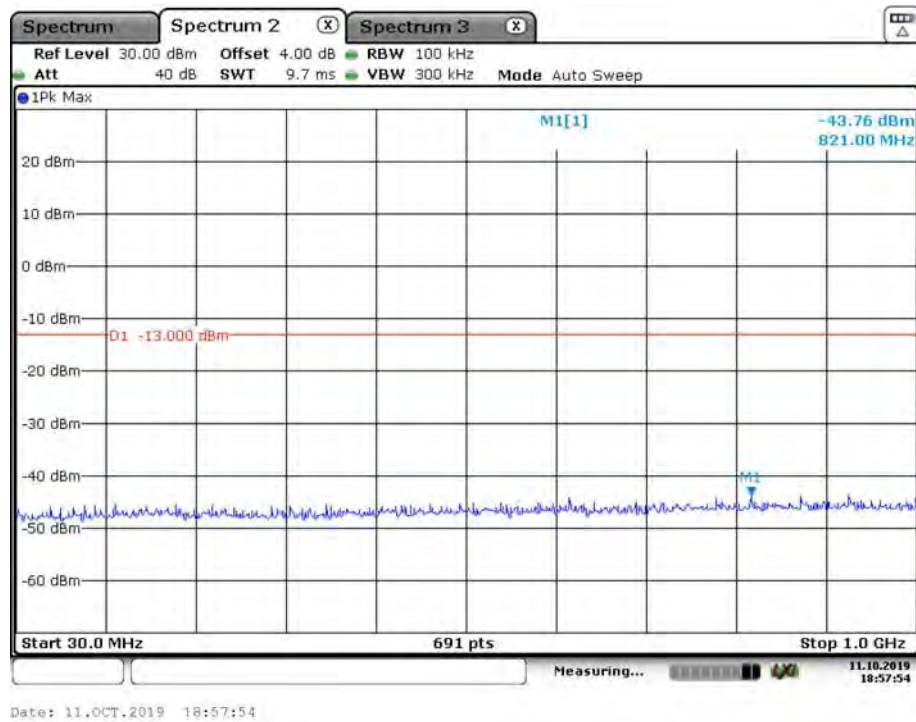
Date: 11.OCT.2019 18:54:58

Fundamental

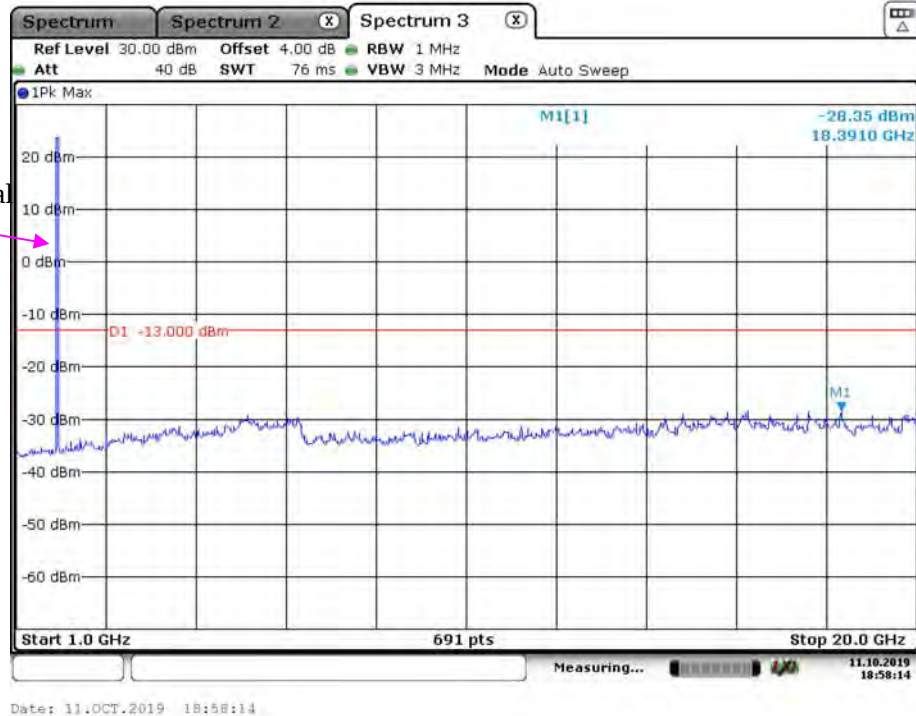


Date: 11.OCT.2019 18:55:30

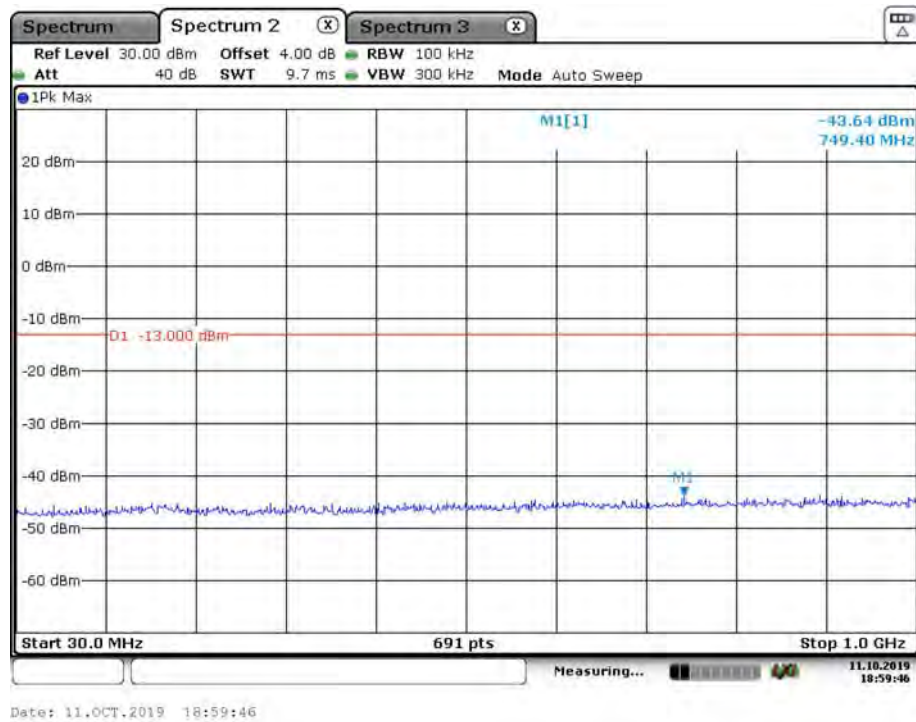
QPSK_3 MHz



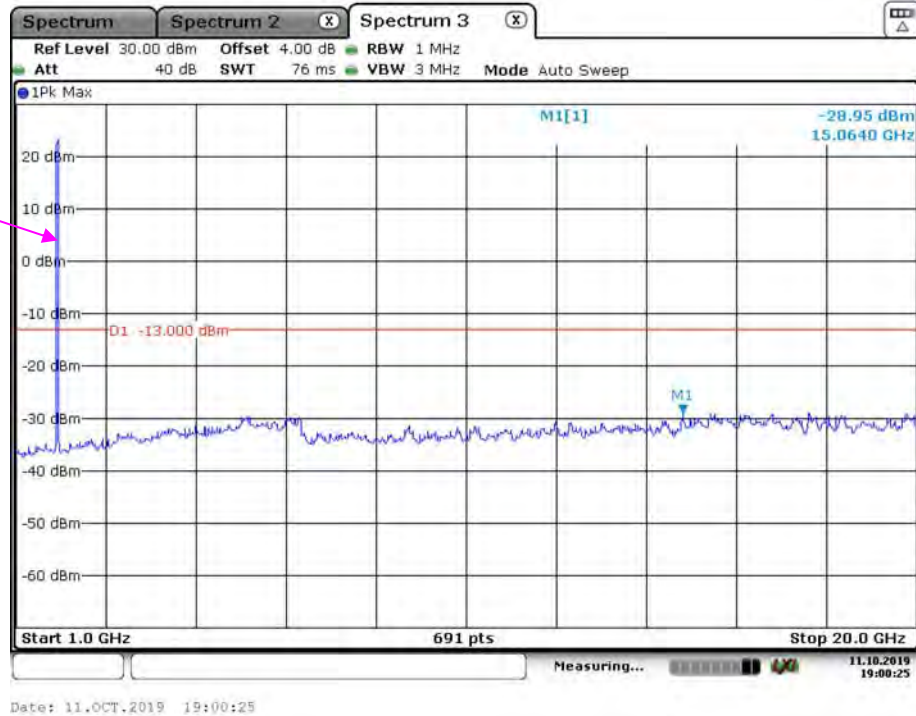
Fundamental



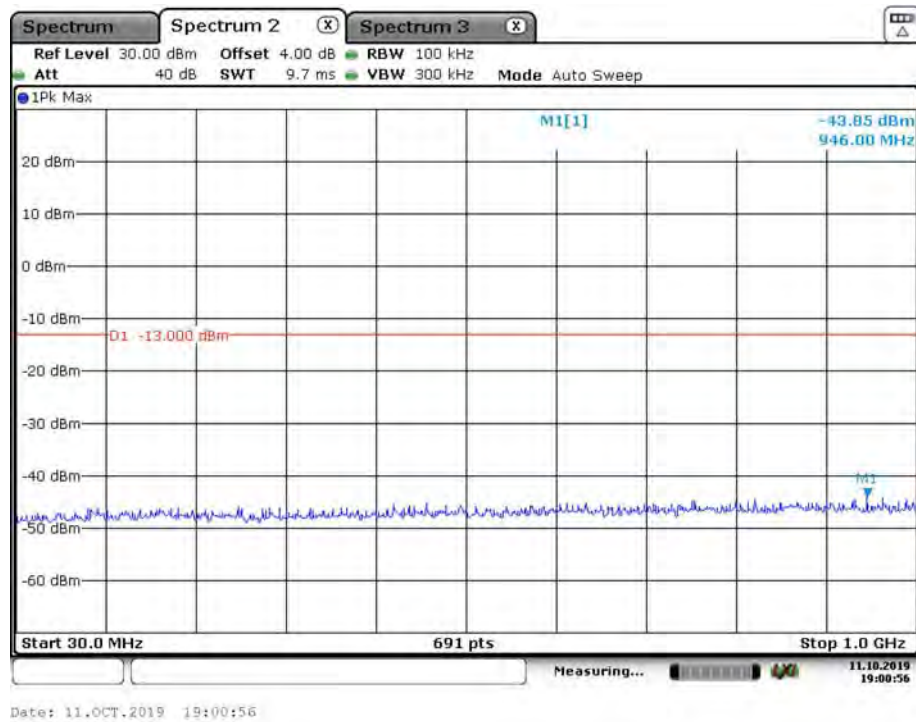
QPSK_5 MHz



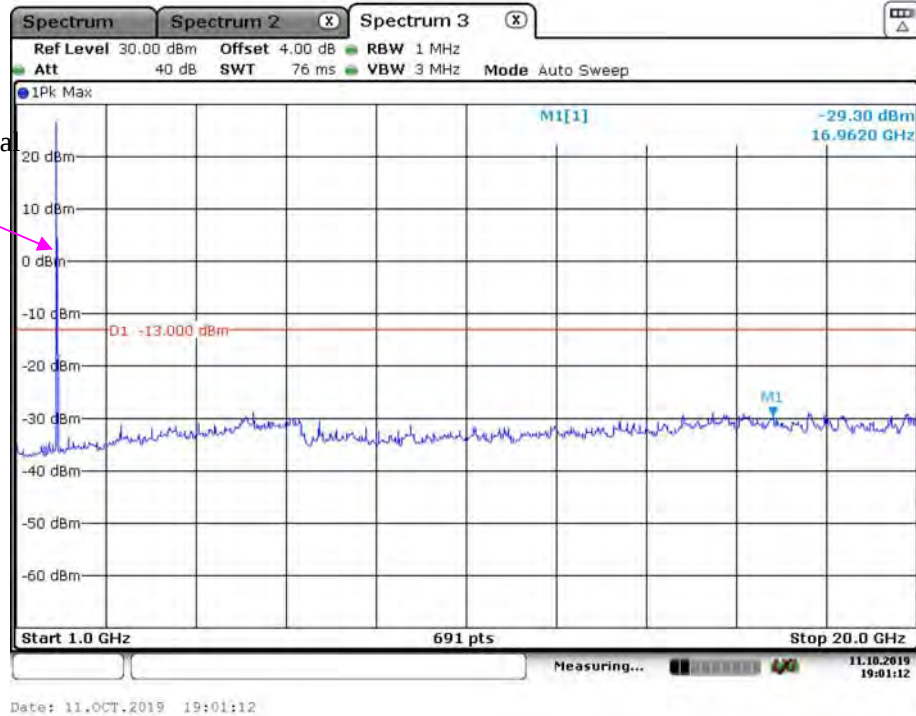
Fundamental



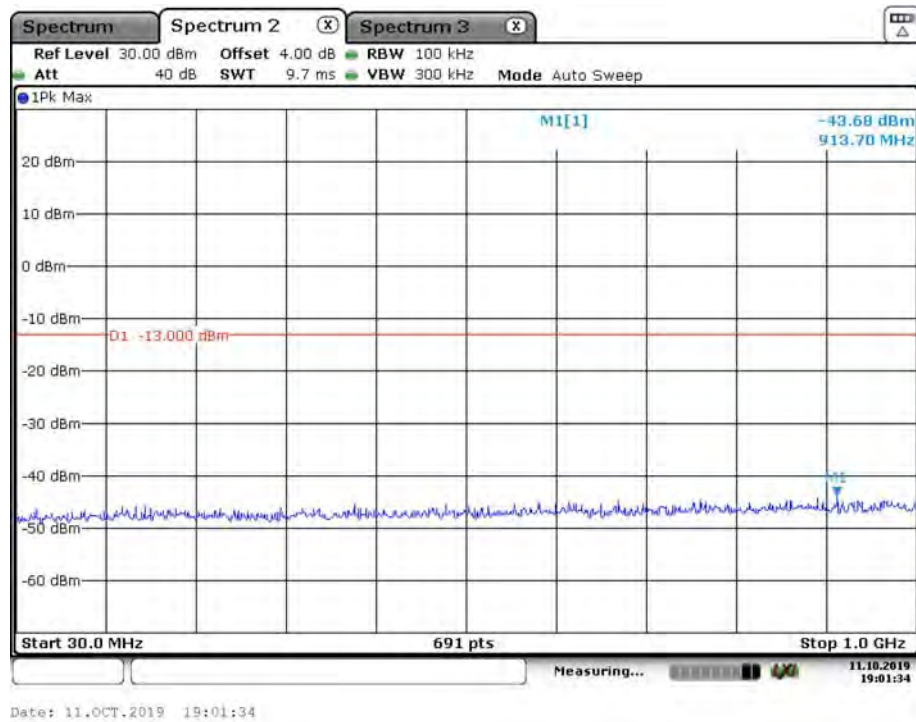
QPSK_10 MHz



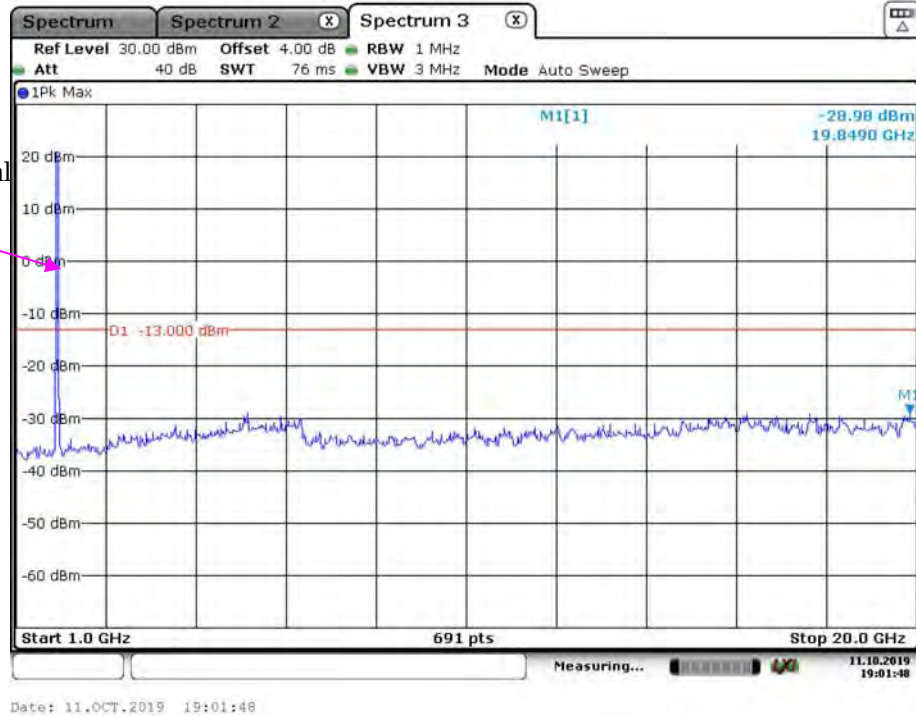
Fundamenta



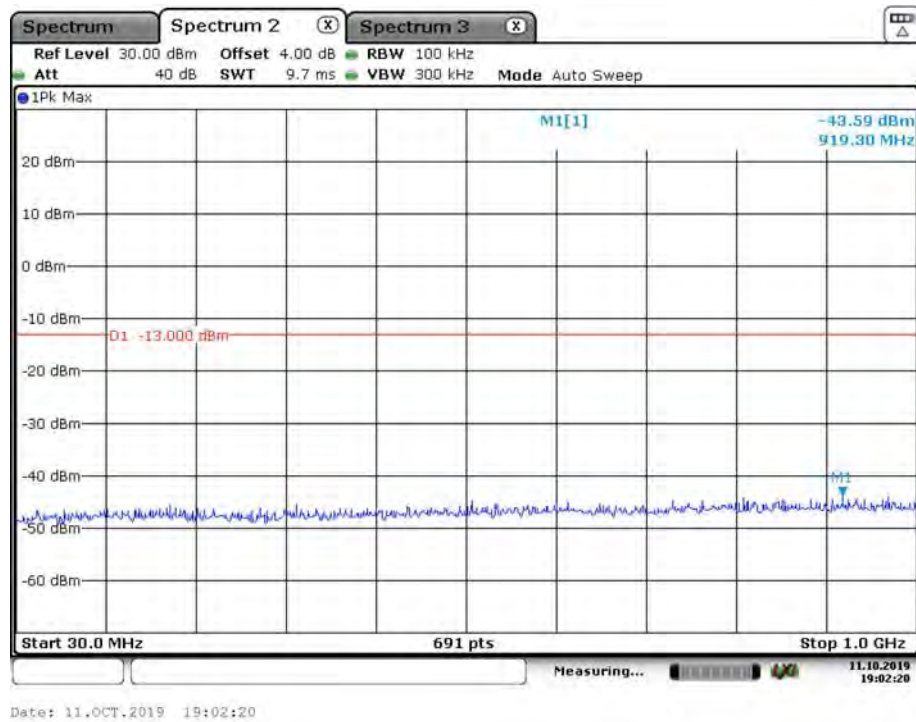
QPSK_15 MHz



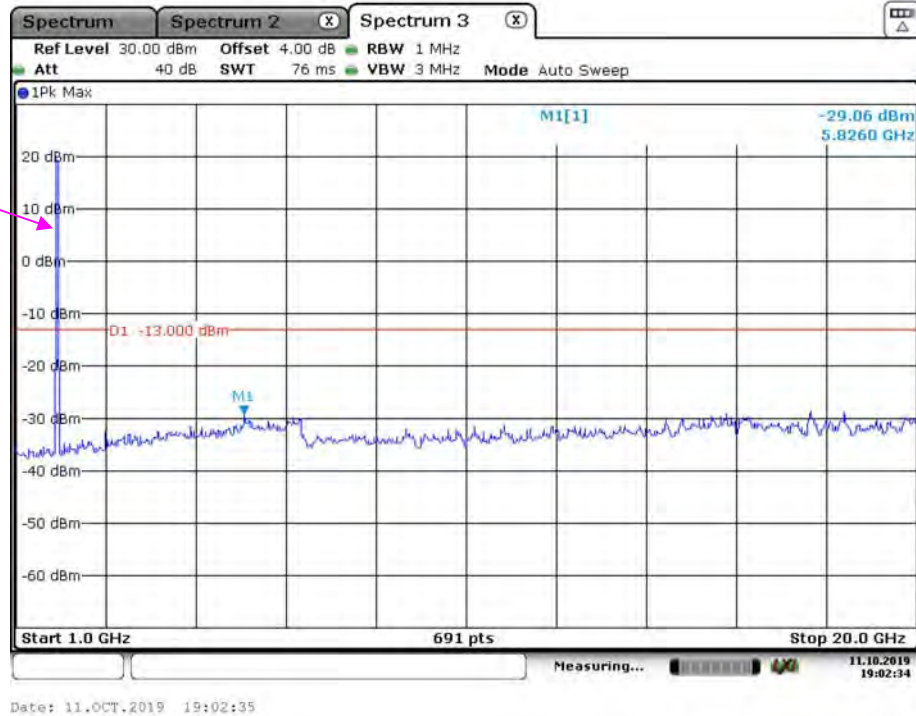
Fundamental

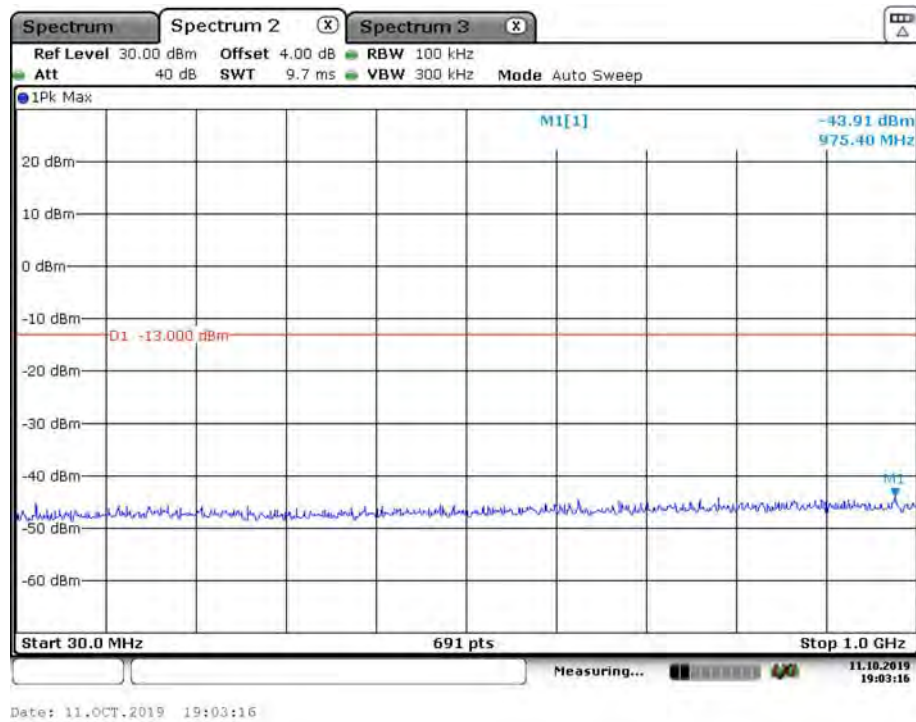


QPSK_20 MHz

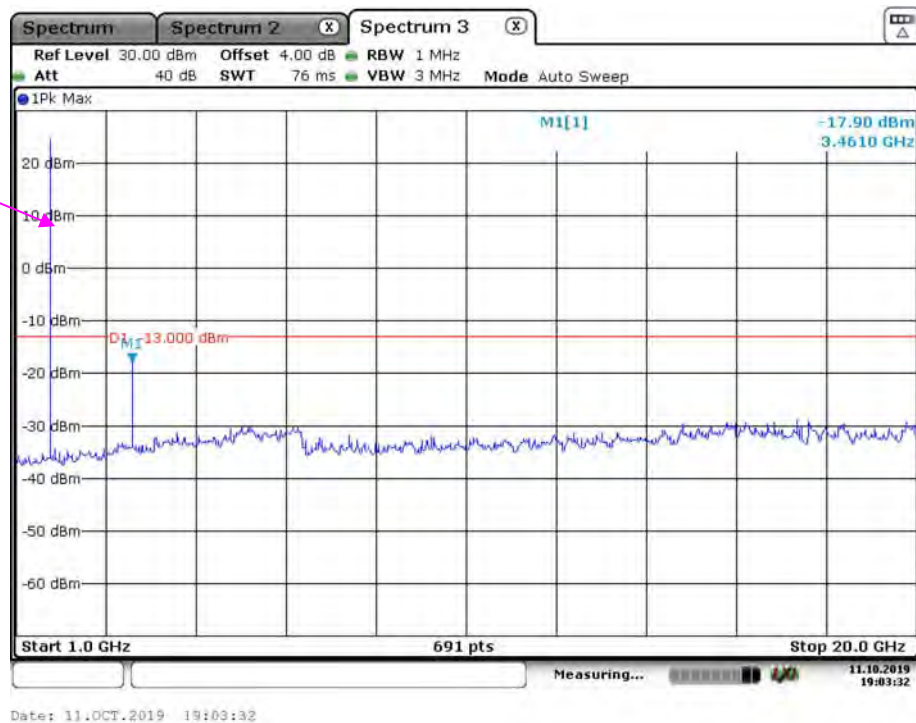


Fundamental

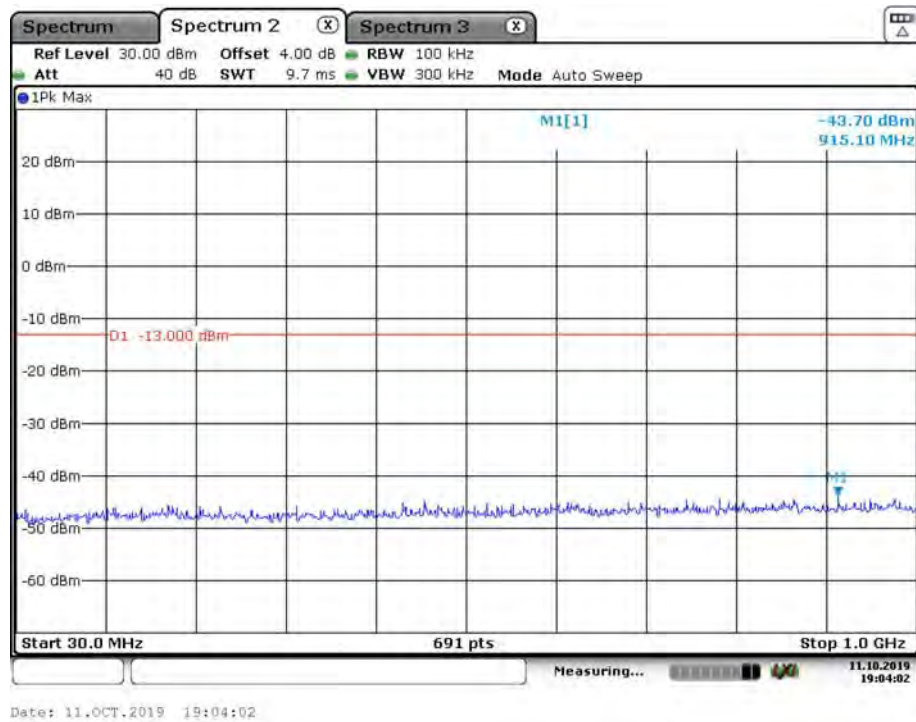


LTE Band 4 (Middle Channel)**QPSK_1.4 MHz**

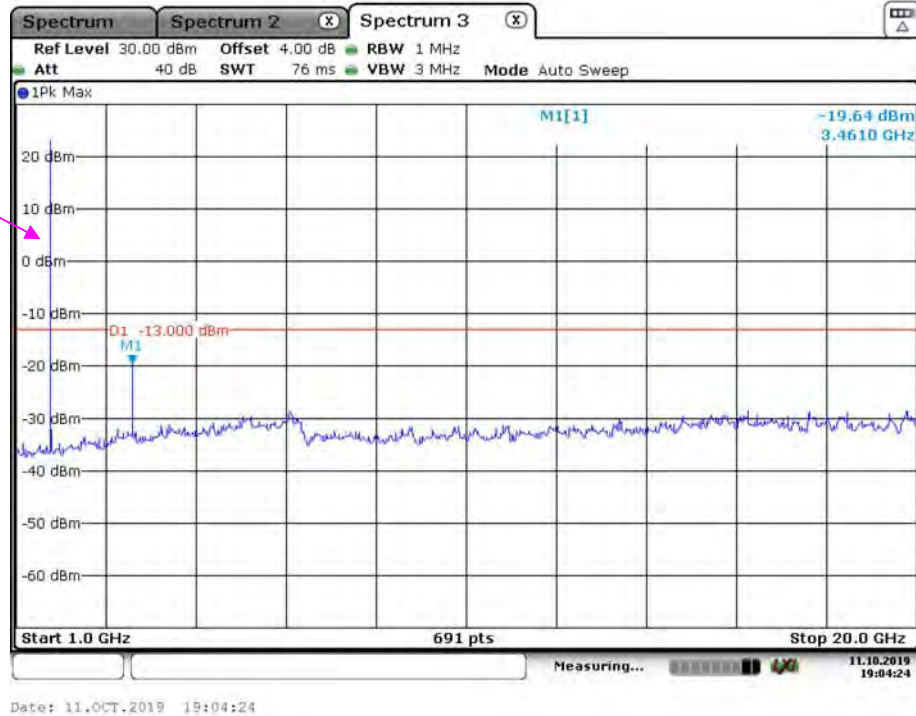
Fundamental



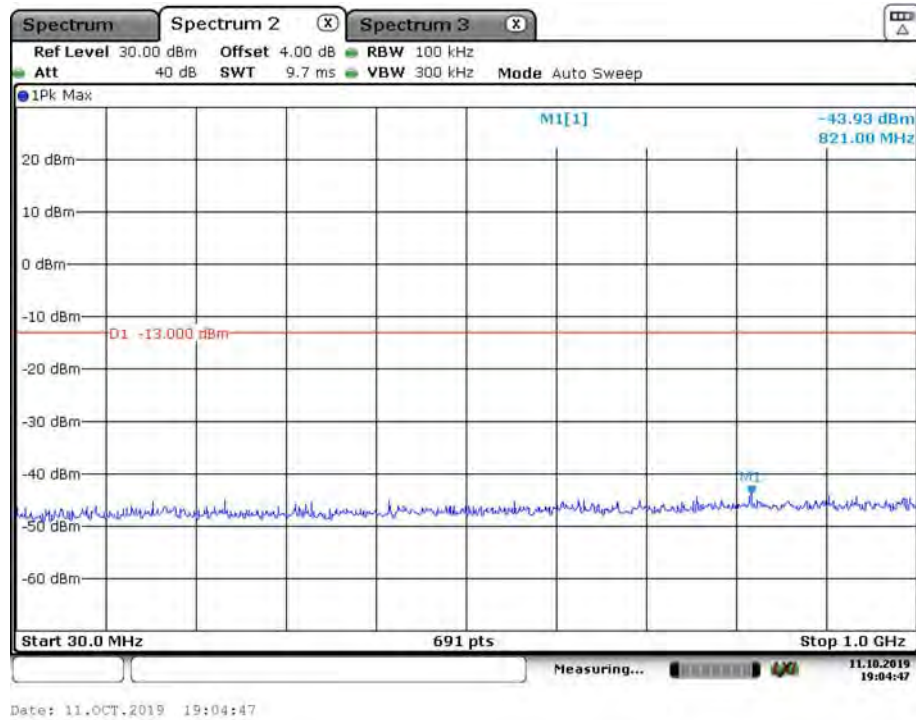
QPSK_3 MHz



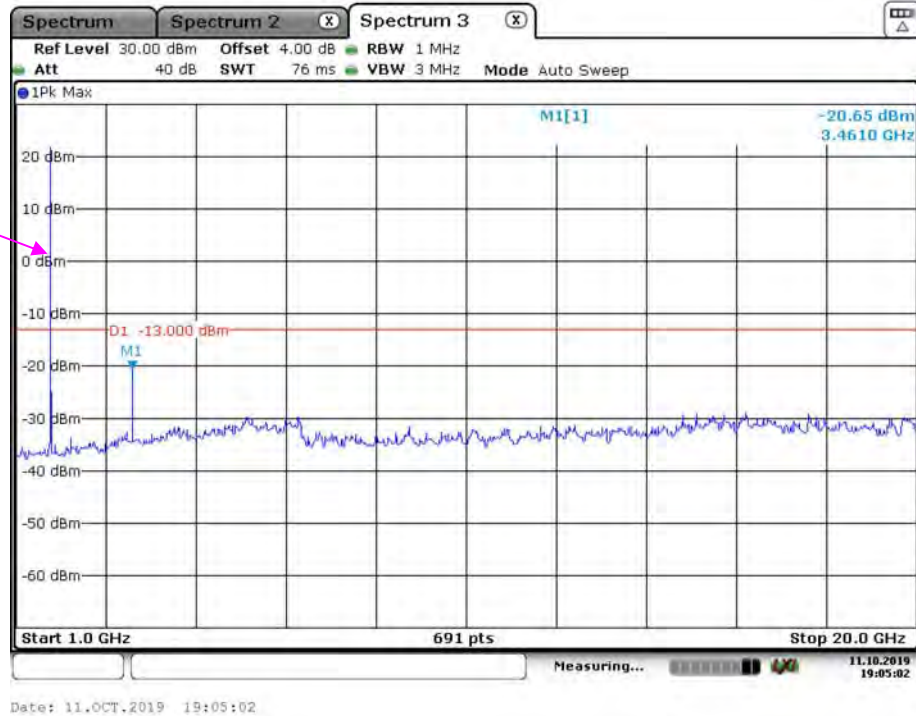
Fundamental



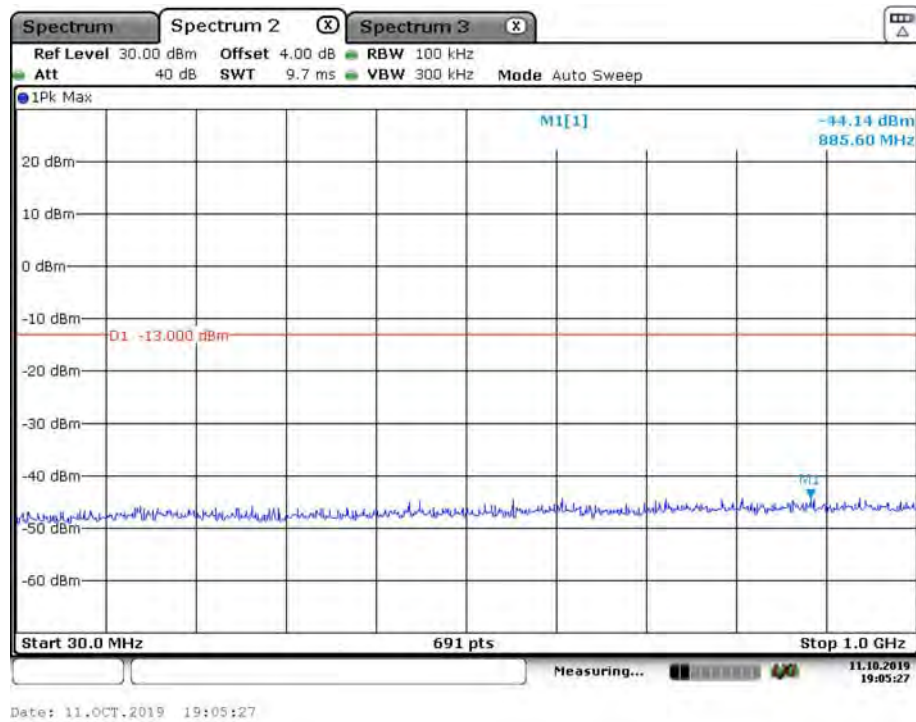
QPSK_5 MHz



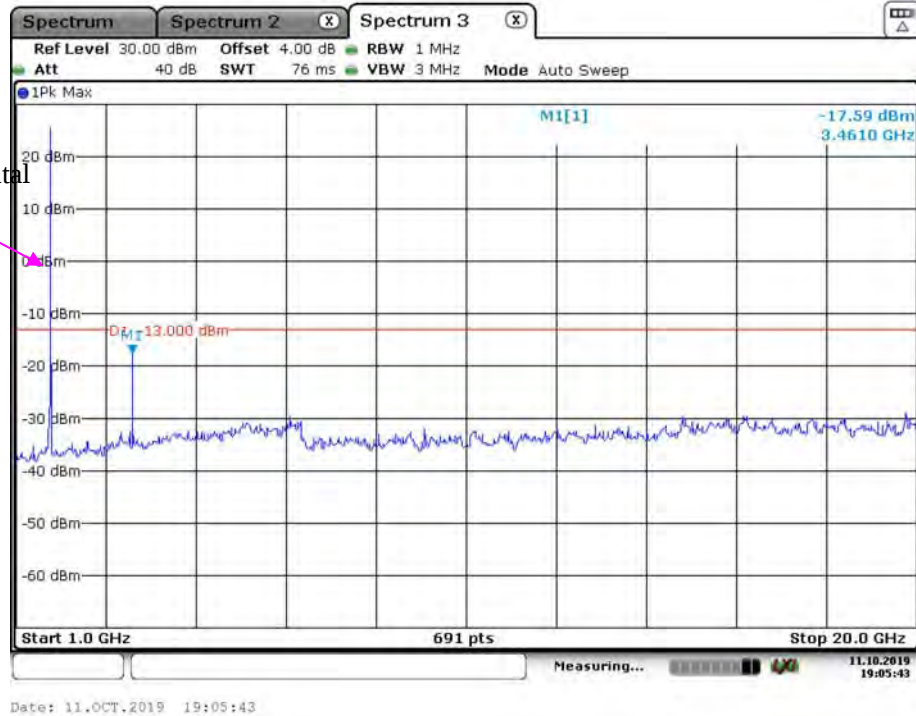
Fundamental



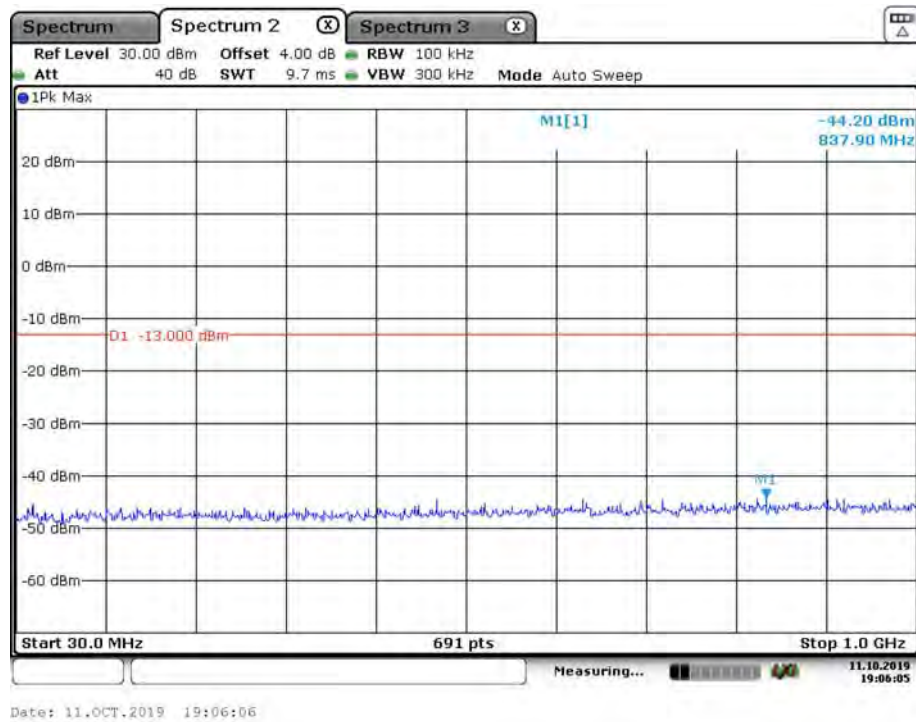
QPSK_10 MHz



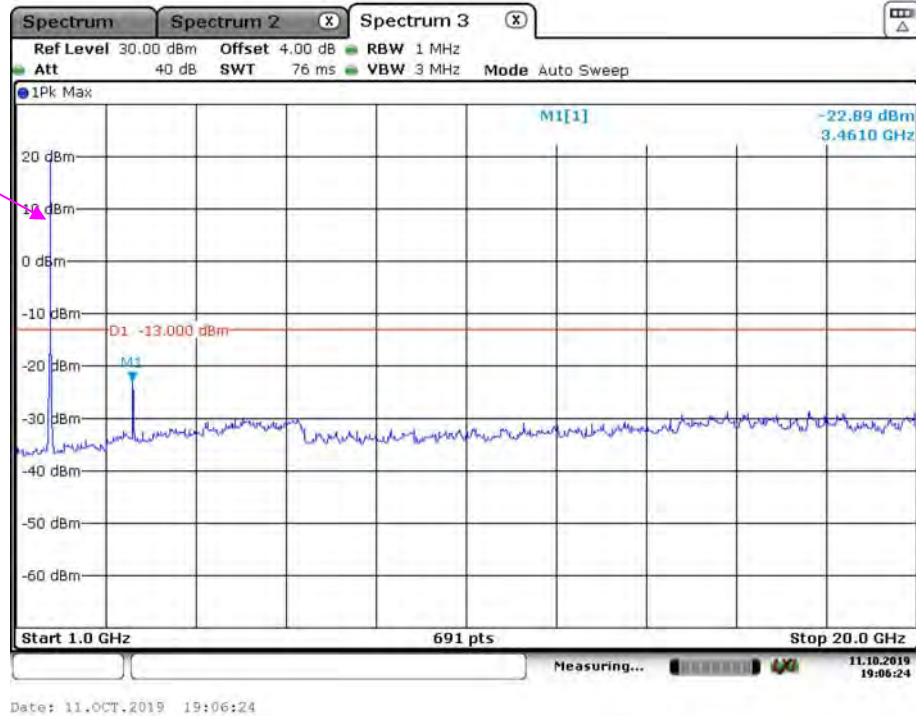
Fundamental



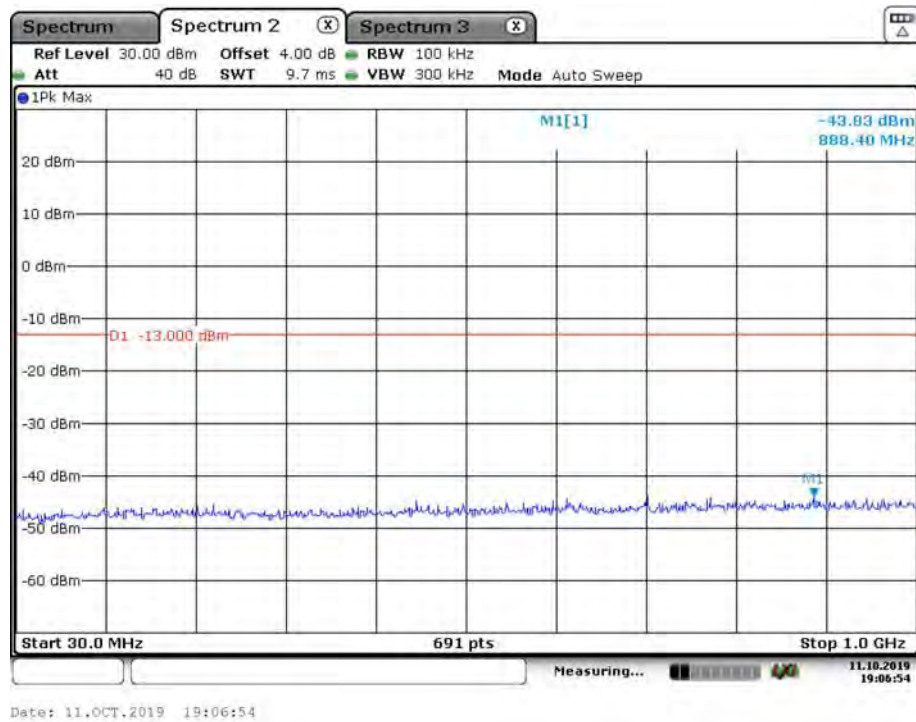
QPSK_15 MHz



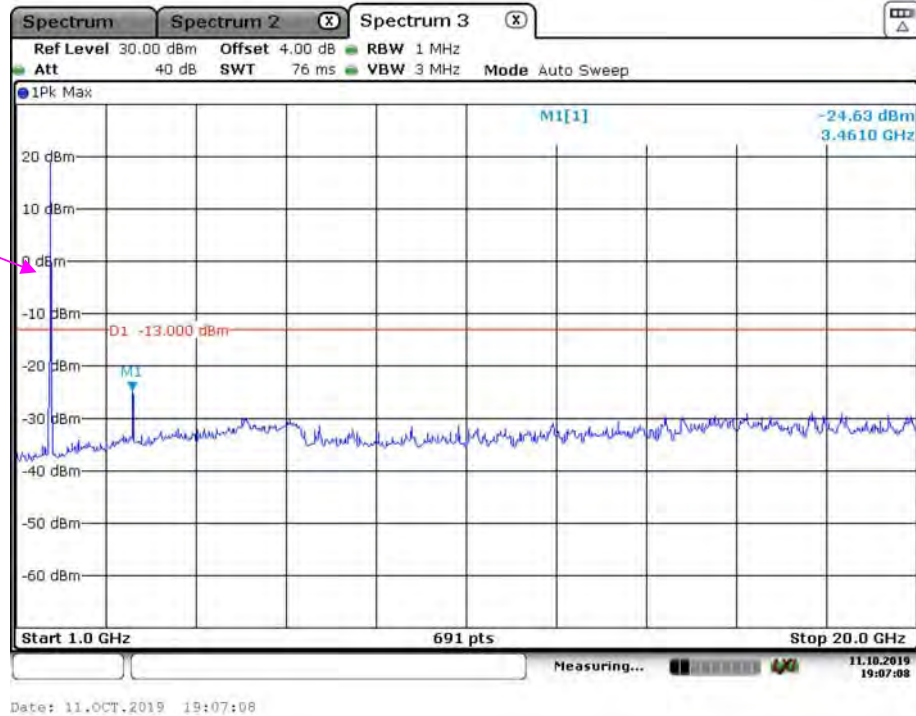
Fundamental

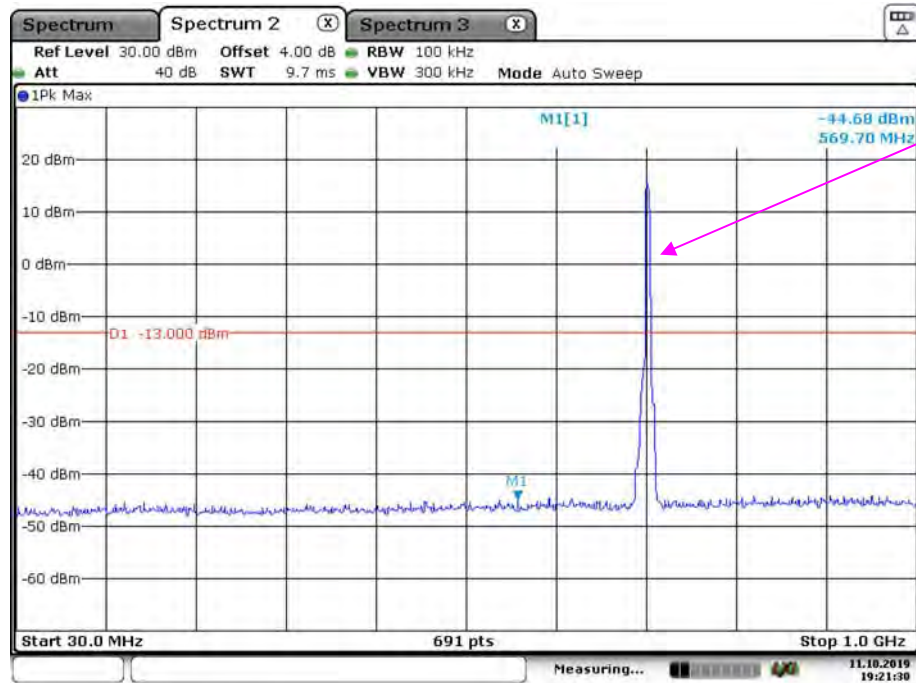


QPSK_20 MHz

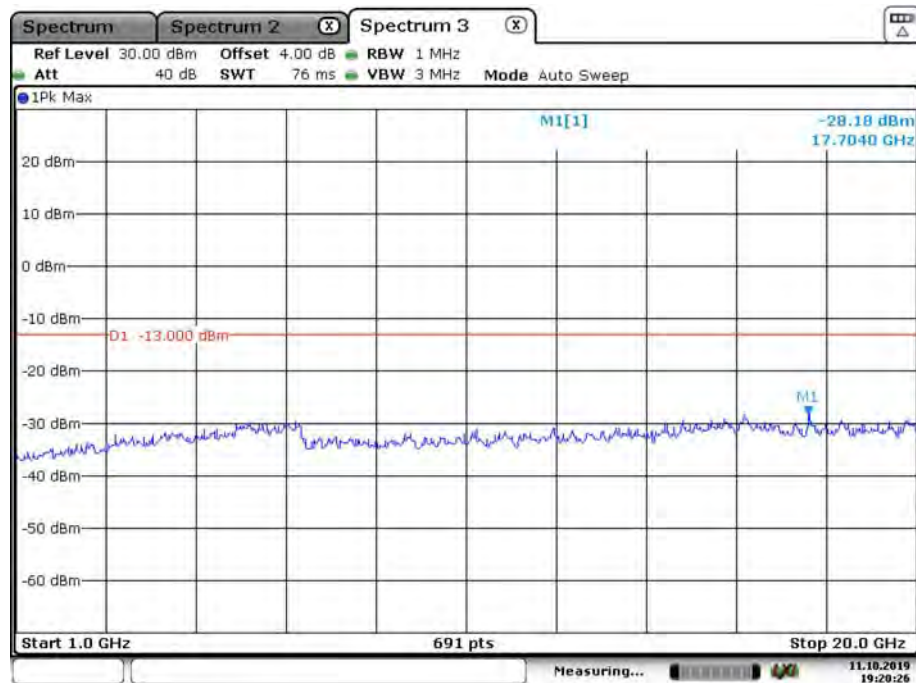


Fundamental



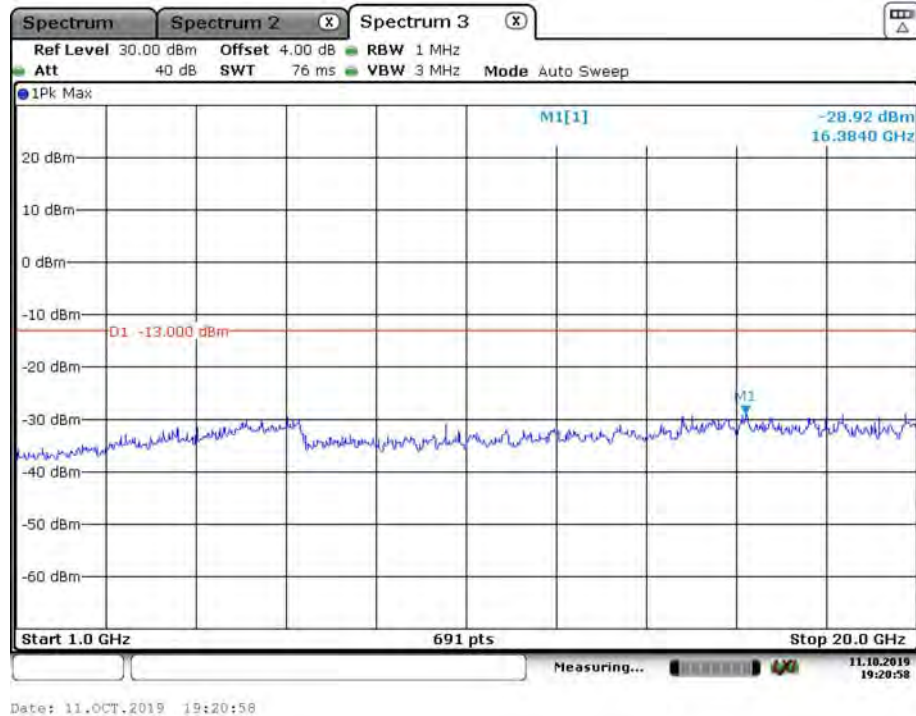
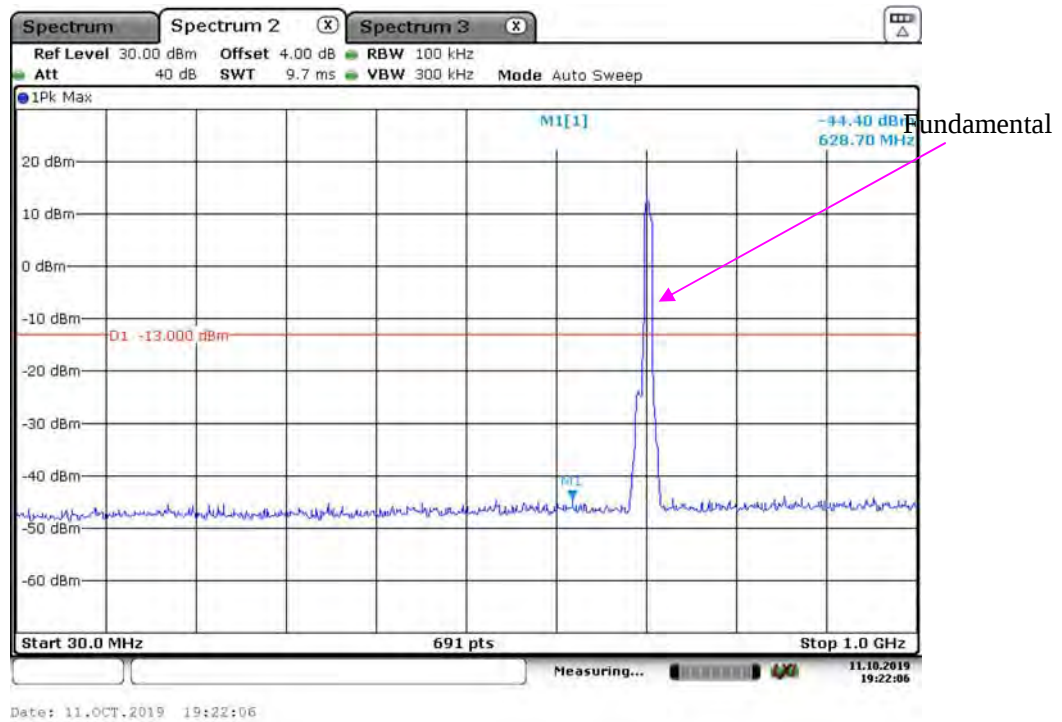
LTE Band 17 (Middle Channel)**QPSK_5 MHz**

Date: 11.OCT.2019 19:21:31



Date: 11.OCT.2019 19:20:26

QPSK_10 MHz



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

Applicable Standard

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

Test Procedure

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

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

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

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

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

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	EMI Test Receiver	ESR3	102453	2019-06-26	2020-06-26
Sunol Sciences	Antenna	JB3	A060611-1	2017-11-10	2020-11-10
EMCO	Adjustable Dipole Antenna	3121C	9109-753	N/A	N/A
Unknown	Coaxial Cable	C-NJNJ-50	C-0400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0075-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-1400-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
HP	Amplifier	8447D	2727A05902	2019-09-05	2020-09-05
Sinoscite	Band-stop filter	BSF824-862MS-1438-001	1438001	2019-06-16	2020-06-16
Agilent	Spectrum Analyzer	E4440A	SG43360054	2019-05-09	2020-05-09
TDK RF	Horn Antenna	HRN-0118	130 084	2018-10-12	2021-10-12
ETS-Lindgren	Horn Antenna	3115	000 527 35	2018-10-12	2021-10-12
Unknown	Coaxial Cable	C-SJSJ-50	C-0800-01	2019-09-05	2020-09-05
Unknown	Coaxial Cable	C-NJNJ-50	C-0200-02	2019-09-05	2020-09-05
MITEQ	Amplifier	AFS42-00101800-25-S-42	2001271	2019-09-05	2020-09-05
Sinoscite	Band-stop filter	BSF1850-1910MS-0935V2	0935V2	2019-06-16	2020-06-16
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
Agilent	Signal Generator	E8247C	MY43321350	2018-12-10	2019-12-10
Sinoscite	Band-stop filter	BSF1710-1785MN-0383-003	0383003	2019-06-16	2020-06-16
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2016-11-18	2019-11-18
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2016-11-18	2019-11-18
Quinstar	Amplifier	QLW-18405536-JO	15964001001	2019-06-27	2020-06-27

*** 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:	28.3°C
Relative Humidity:	47 %
ATM Pressure:	101.1 kPa

The testing was performed by Lucy Lu on 2019-10-17

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

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM850, Frequency:836.600 MHz								
1673.200	H	55.07	-59.14	10.6	0.73	-49.3	-13.0	36.3
1673.200	V	54.13	-60.68	10.6	0.73	-50.8	-13.0	37.8
2509.800	H	70.34	-42.68	13.1	1.25	-30.8	-13.0	17.8
2509.800	V	58.92	-54.13	13.1	1.25	-42.3	-13.0	29.3
3346.400	H	62.02	-48.64	13.8	1.61	-36.4	-13.0	23.4
3346.400	V	56.19	-54.52	13.8	1.61	-42.3	-13.0	29.3
4183.000	H	51.32	-57.68	14.0	1.56	-45.3	-13.0	32.3
4183.000	V	53.40	-55.59	14.0	1.56	-43.2	-13.0	30.2
175.500	H	42.10	-69.03	0.0	0.24	-69.3	-13.0	56.3
74.620	V	43.04	-62.81	-2.7	0.18	-65.7	-13.0	52.7
WCDMA Band 5 R99, Frequency:836.600 MHz								
1673.200	H	60.46	-53.75	10.6	0.73	-43.9	-13.0	30.9
1673.200	V	52.71	-62.1	10.6	0.73	-52.2	-13.0	39.2
2509.800	H	54.19	-58.83	13.1	1.25	-47.0	-13.0	34.0
2509.800	V	53.20	-59.85	13.1	1.25	-48.0	-13.0	35.0
3346.400	H	57.02	-53.64	13.8	1.61	-41.4	-13.0	28.4
3346.400	V	50.75	-59.96	13.8	1.61	-47.7	-13.0	34.7
375.320	H	37.25	-70	0.0	0.36	-70.4	-13.0	57.4
35.820	V	44.61	-36.86	-24.4	0.1	-61.4	-13.0	48.4

30 MHz-20 GHz:

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	66.73	-42.07	13.8	1.63	-29.9	-13.0	16.9
3760.000	V	58.13	-50.54	13.8	1.63	-38.4	-13.0	25.4
5640.000	H	63.15	-42.88	14.0	1.31	-30.2	-13.0	17.2
5640.000	V	66.24	-39.67	14.0	1.31	-27.0	-13.0	14.0
7520.000	H	54.10	-46.22	13.2	1.33	-34.4	-13.0	21.4
7520.000	V	51.09	-49.7	13.2	1.33	-37.8	-13.0	24.8
175.500	H	42.96	-68.17	0.0	0.24	-68.4	-13.0	55.4
88.200	V	43.73	-63.05	0.0	0.19	-63.2	-13.0	50.2
WCDMA Band 2 R99,Frequency: 1880.000 MHz								
3760.000	H	70.36	-38.44	13.8	1.63	-26.3	-13.0	13.3
3760.000	V	68.12	-40.55	13.8	1.63	-28.4	-13.0	15.4
5640.000	H	68.33	-37.7	14.0	1.31	-25.0	-13.0	12.0
5640.000	V	66.60	-39.31	14.0	1.31	-26.6	-13.0	13.6
175.500	H	43.10	-68.03	0.0	0.24	-68.3	-13.0	55.3
74.620	V	40.85	-65	-2.7	0.18	-67.9	-13.0	54.9

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								
3760.00	H	73.29	-35.51	13.76	1.63	-23.38	-13.00	10.38
3760.00	V	66.11	-42.56	13.76	1.63	-30.43	-13.00	17.43
5640.00	H	72.13	-33.90	14.02	1.31	-21.19	-13.00	8.19
5640.00	V	70.50	-35.41	14.02	1.31	-22.70	-13.00	9.70
7520.00	H	61.14	-39.18	13.20	1.33	-27.31	-13.00	14.31
7520.00	V	57.26	-43.53	13.20	1.33	-31.66	-13.00	18.66
375.32	H	36.91	-70.34	0.00	0.36	-70.70	-13.00	57.70
35.82	V	45.84	-35.63	-24.39	0.10	-60.12	-13.00	47.12

LTE Band 4 (30MHz-20GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:1732.500 MHz								
3465.00	H	78.40	-31.84	13.91	1.62	-19.55	-13.00	6.55
3465.00	V	72.16	-38.12	13.91	1.62	-25.83	-13.00	12.83
5197.50	H	62.94	-43.48	14.00	1.52	-31.00	-13.00	18.00
5197.50	V	60.29	-46.20	14.00	1.52	-33.72	-13.00	20.72
375.32	H	38.32	-68.93	0.00	0.36	-69.29	-13.00	56.29
35.82	V	45.89	-35.58	-24.39	0.10	-60.07	-13.00	47.07

LTE Band 17 (30MHz-10GHz):

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK,Frequency:710.000 MHz								
1420.00	H	63.82	-49.78	9.10	1.23	-41.91	-13.00	28.91
1420.00	V	60.26	-53.84	9.10	1.23	-45.97	-13.00	32.97
2130.00	H	59.93	-52.82	11.22	1.11	-42.71	-13.00	29.71
2130.00	V	58.46	-54.26	11.22	1.11	-44.15	-13.00	31.15
2840.00	H	56.20	-55.84	13.42	1.36	-43.78	-13.00	30.78
2840.00	V	52.61	-59.67	13.42	1.36	-47.61	-13.00	34.61
3550.00	H	65.58	-44.57	13.95	1.56	-32.18	-13.00	19.18
3550.00	V	59.73	-50.42	13.95	1.56	-38.03	-13.00	25.03
4260.00	H	63.81	-45.19	13.94	1.08	-32.33	-13.00	19.33
4260.00	V	56.73	-52.29	13.94	1.08	-39.43	-13.00	26.43
375.32	H	38.01	-69.24	0.00	0.36	-69.60	-13.00	56.60
35.82	V	45.90	-35.57	-24.39	0.10	-60.06	-13.00	47.06

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

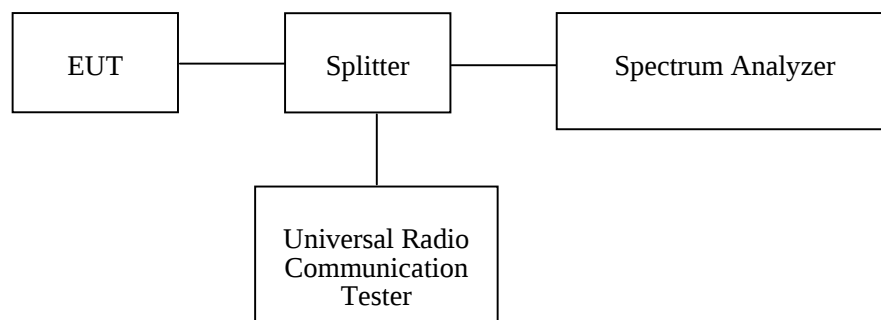
Applicable Standard

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	Spectrum Analyzer	FSV40	101474	2019-01-09	2020-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/02	Each time	/
E-Microwave	Coaxial Attenuators	EMCA10-5RN-6	OE01203239	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

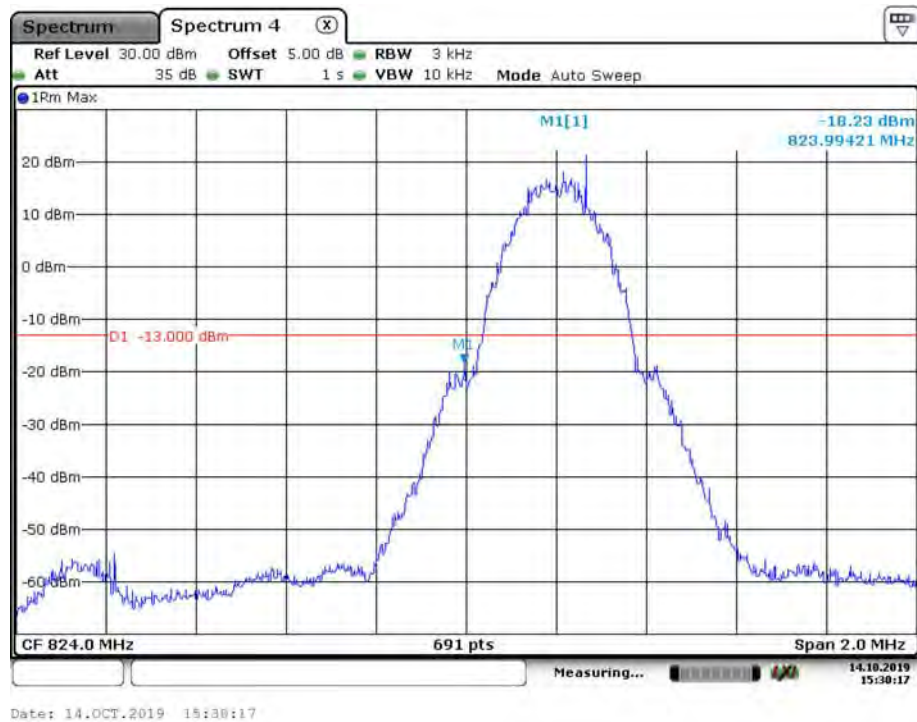
Environmental Conditions

Temperature:	27.8~27.9°C
Relative Humidity:	57~63 %
ATM Pressure:	100.2~100.8kPa
Test by:	Lily Xie
Test Date:	2019-10-11 to 2019-10-14

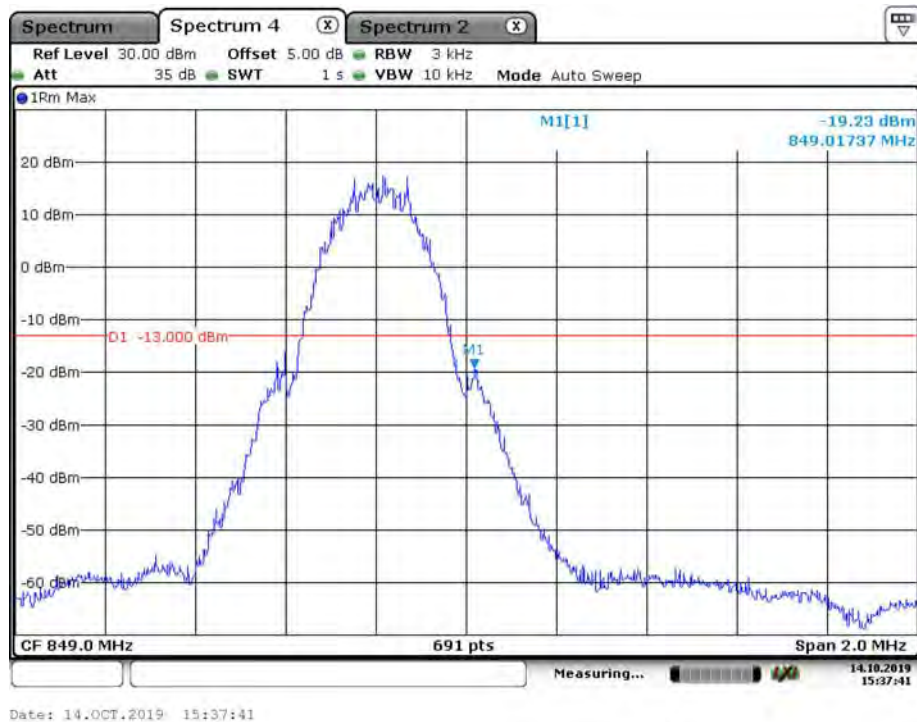
Test Mode: Transmitting

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

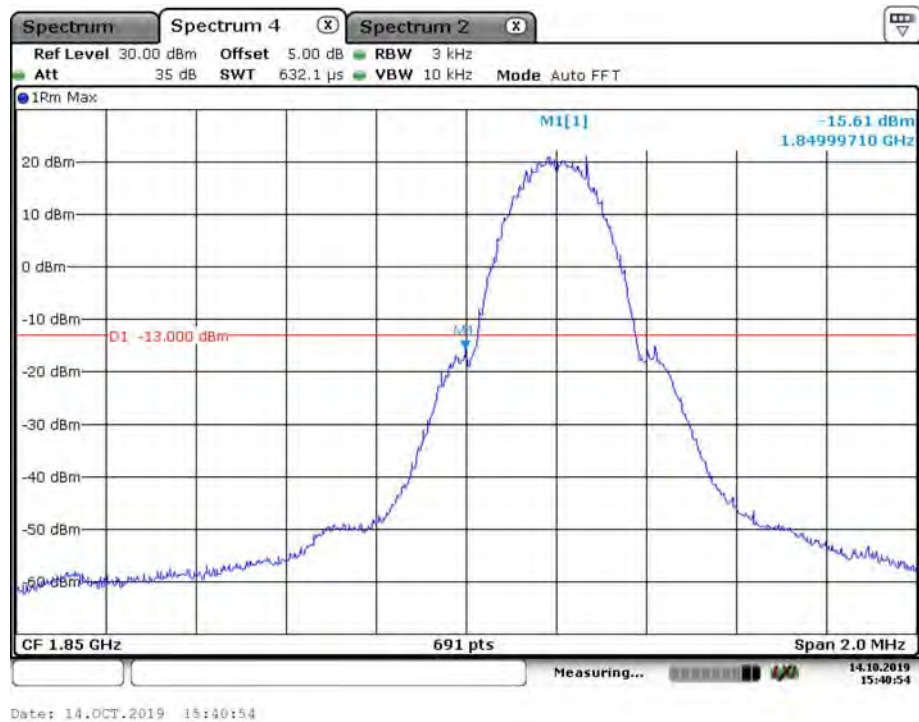
GSM 850, Left Band Edge



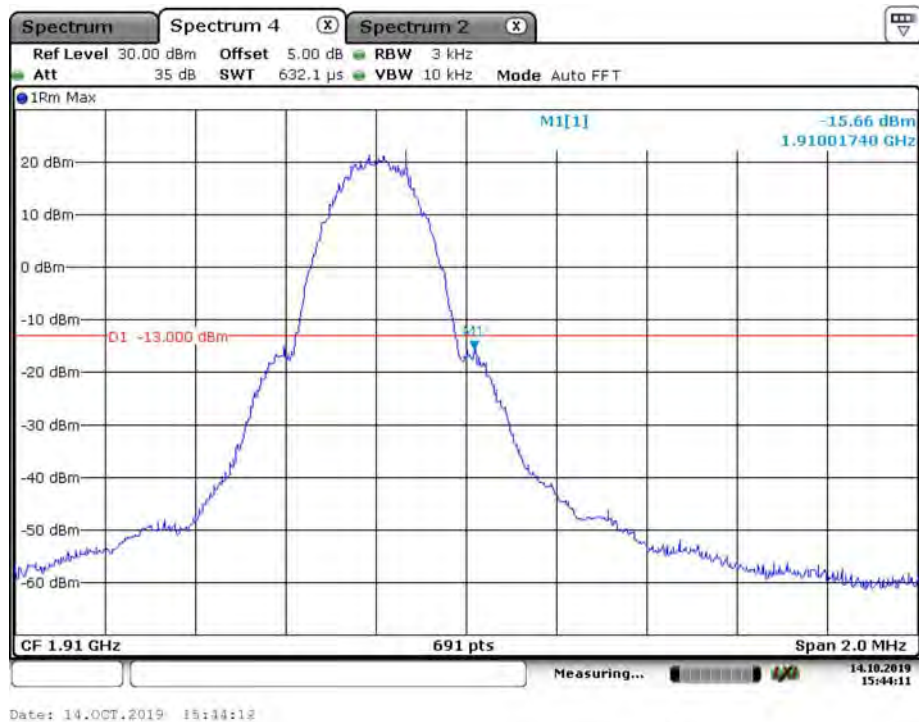
GSM 850, Right Band Edge



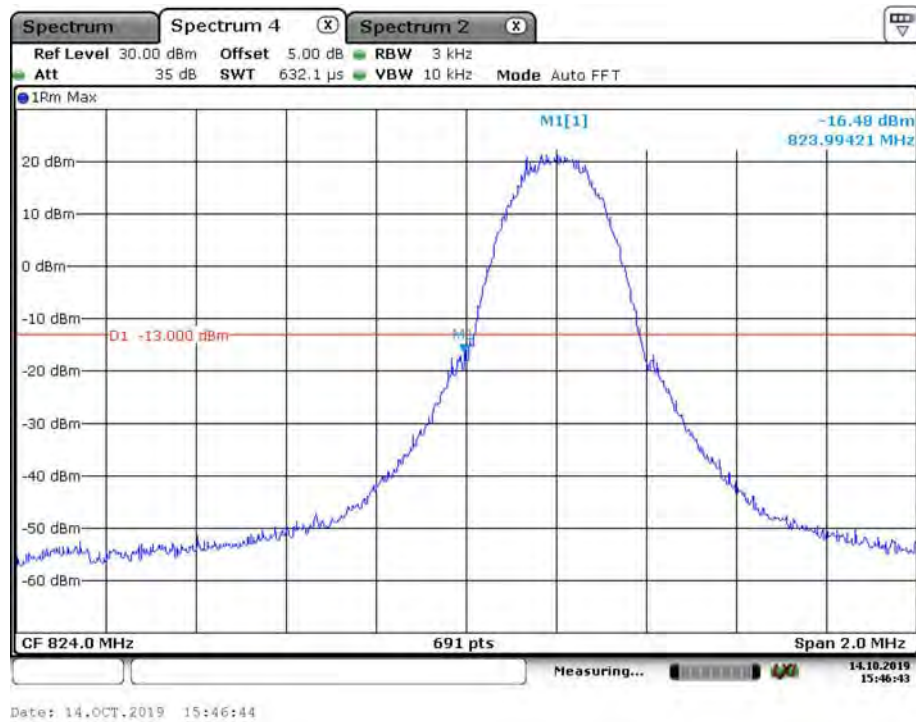
GSM 1900, Left Band Edge



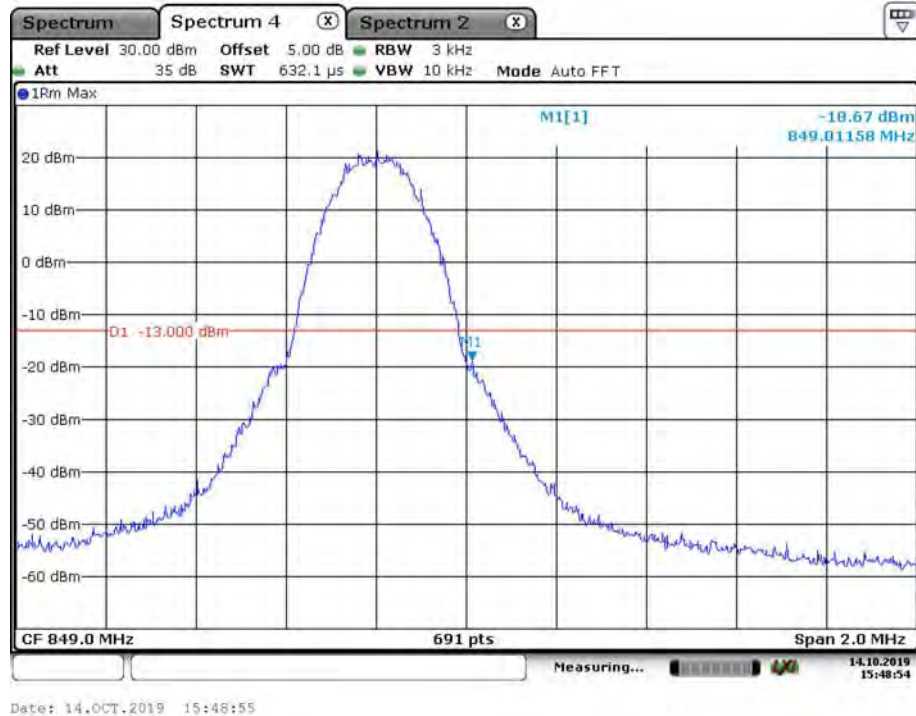
GSM 1900, Right Band Edge



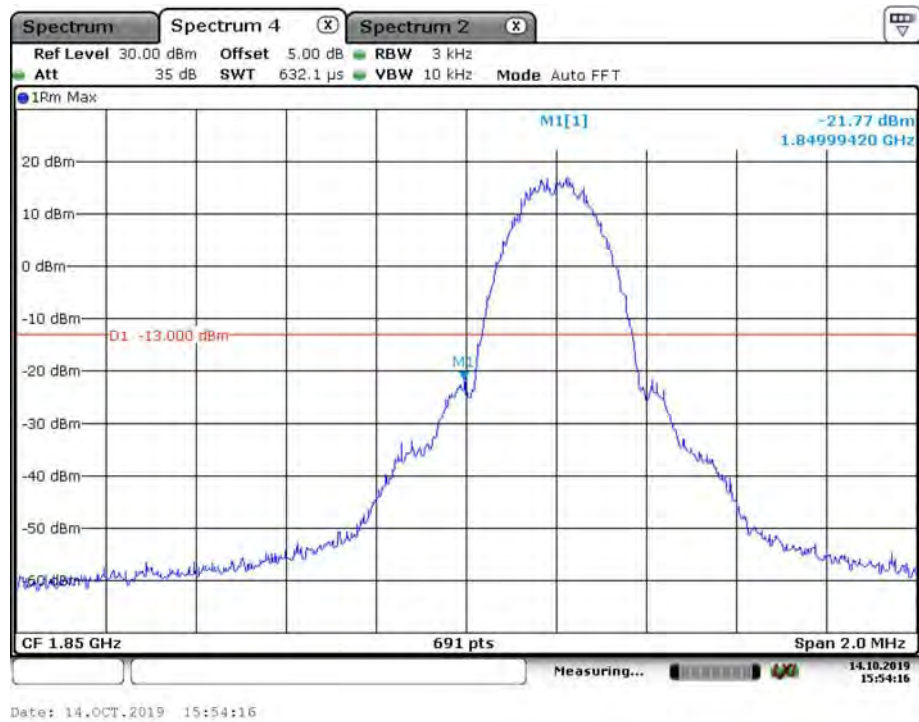
EDGE850, Left Band Edge



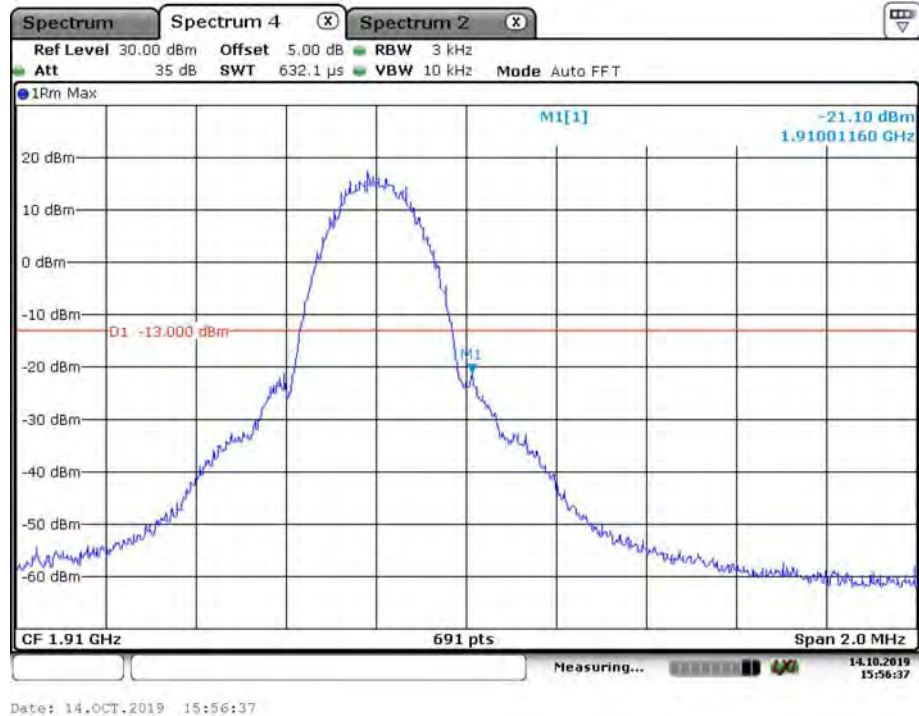
EDGE850, Right Band Edge



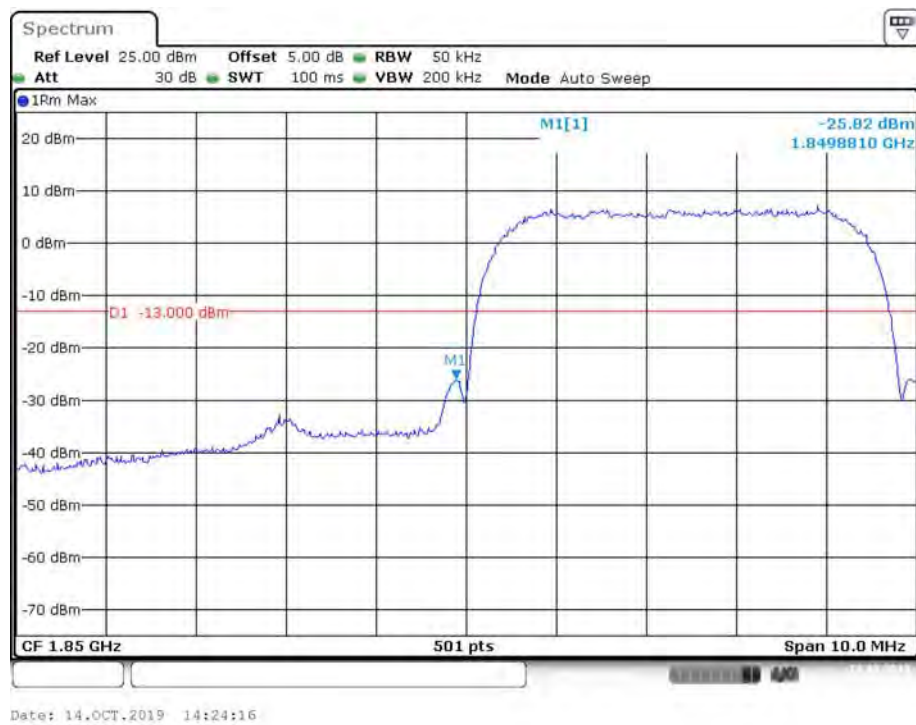
EDGE1900, Left Band Edge



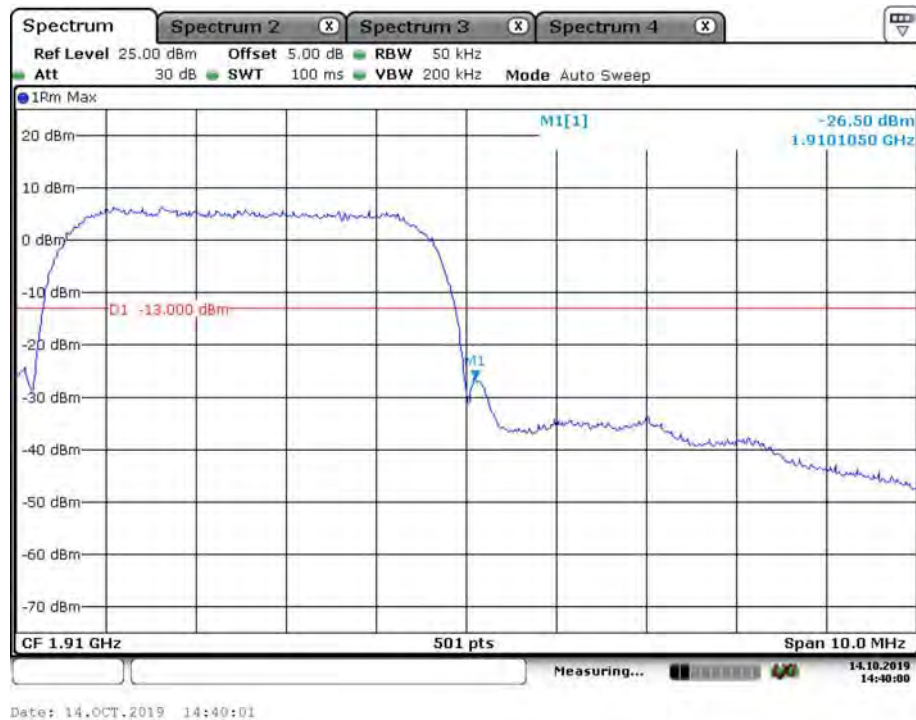
EDGE1900, Right Band Edge



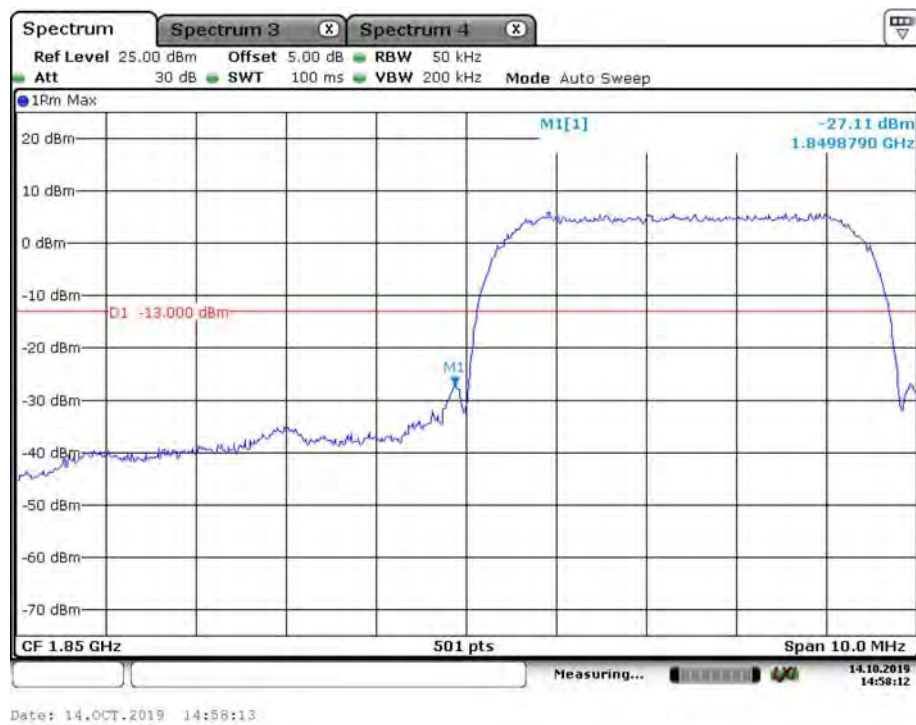
WCDMA Band II Rel 99, Left Band Edge



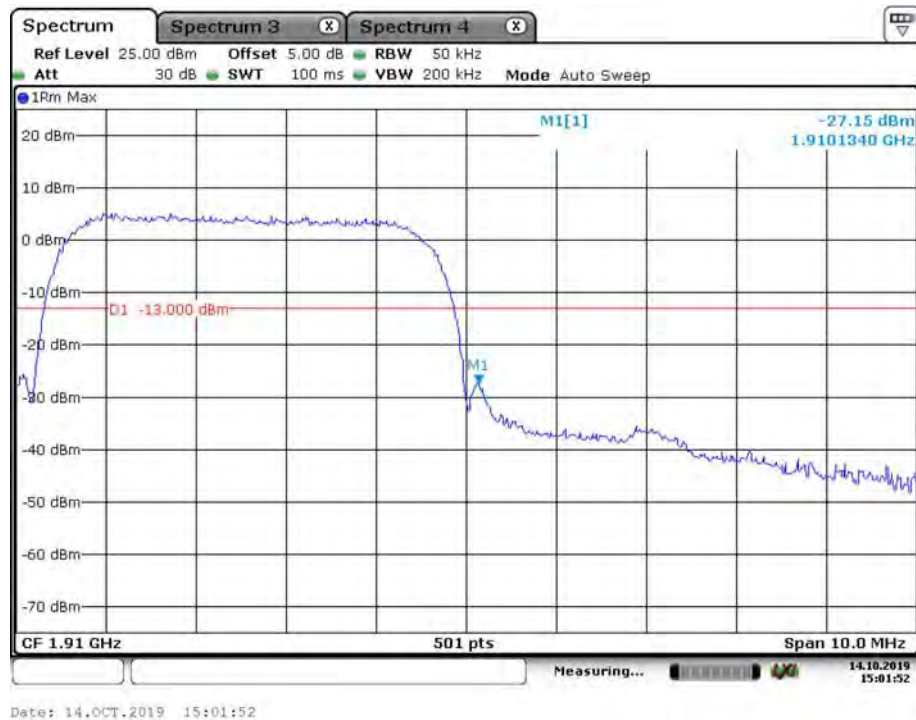
WCDMA Band II Rel 99, Right Band Edge



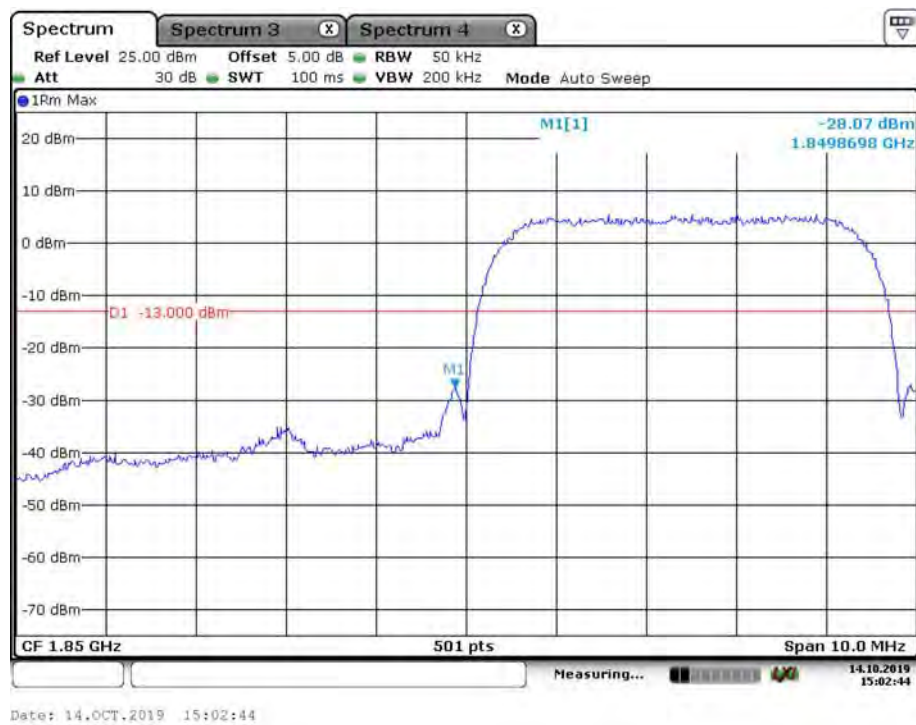
WCDMA Band II HSDPA, Left Band Edge



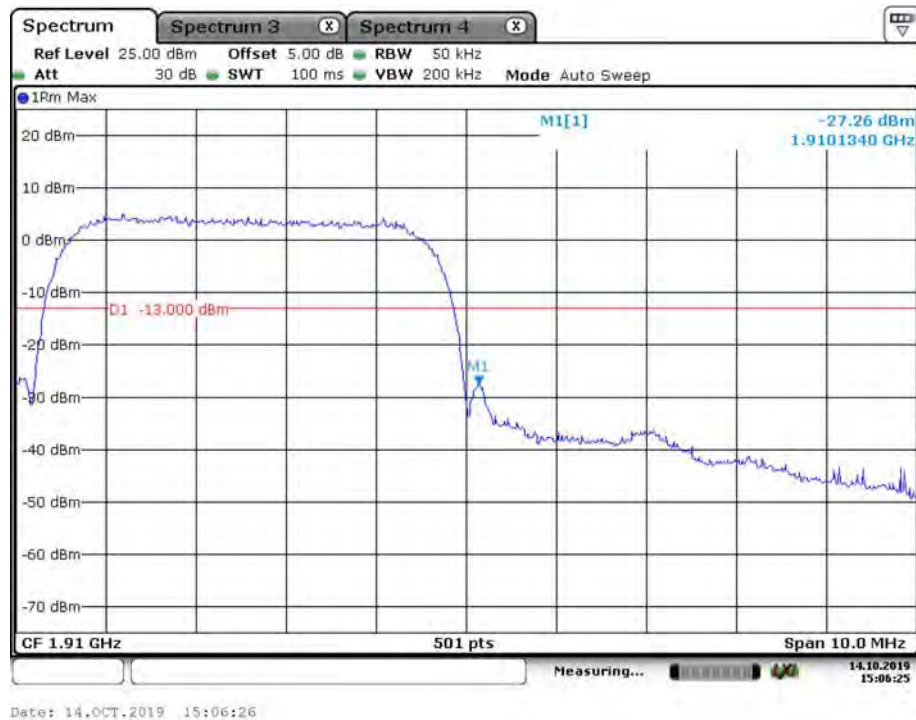
WCDMA Band II HSDPA, Right Band Edge



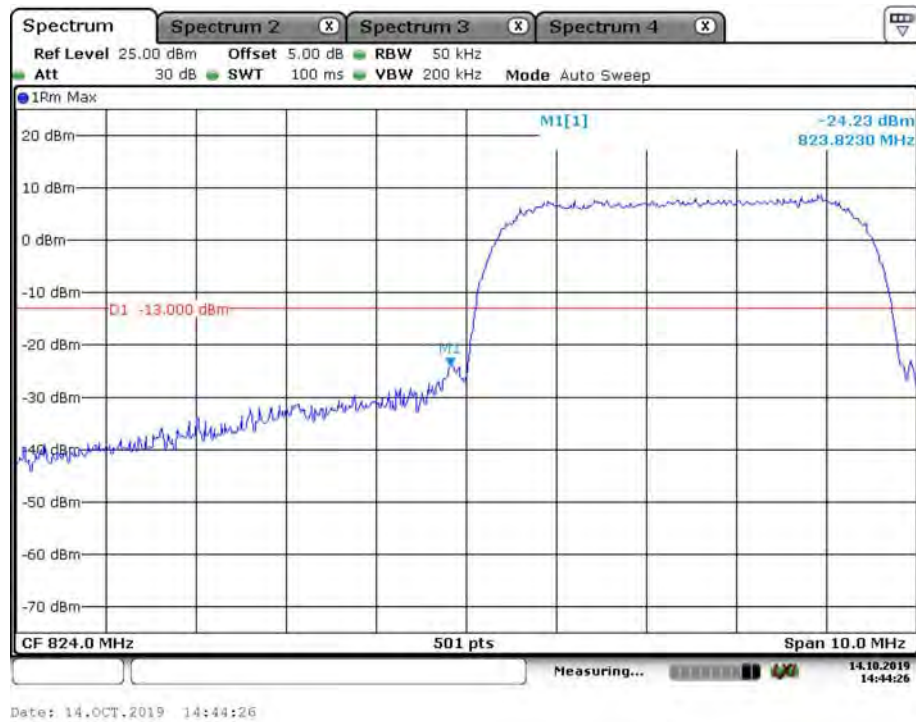
WCDMA Band II HSUPA, Left Band Edge



WCDMA Band II HSUPA, Right Band Edge



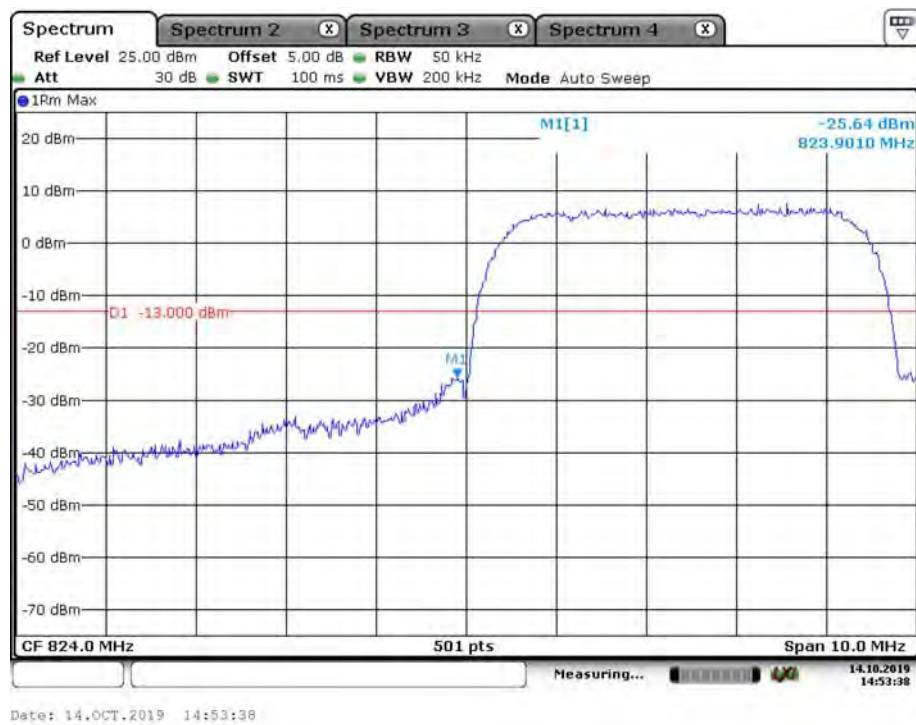
WCDMA Band V Rel 99, Left Band Edge



WCDMA Band V Rel 99, Right Band Edge



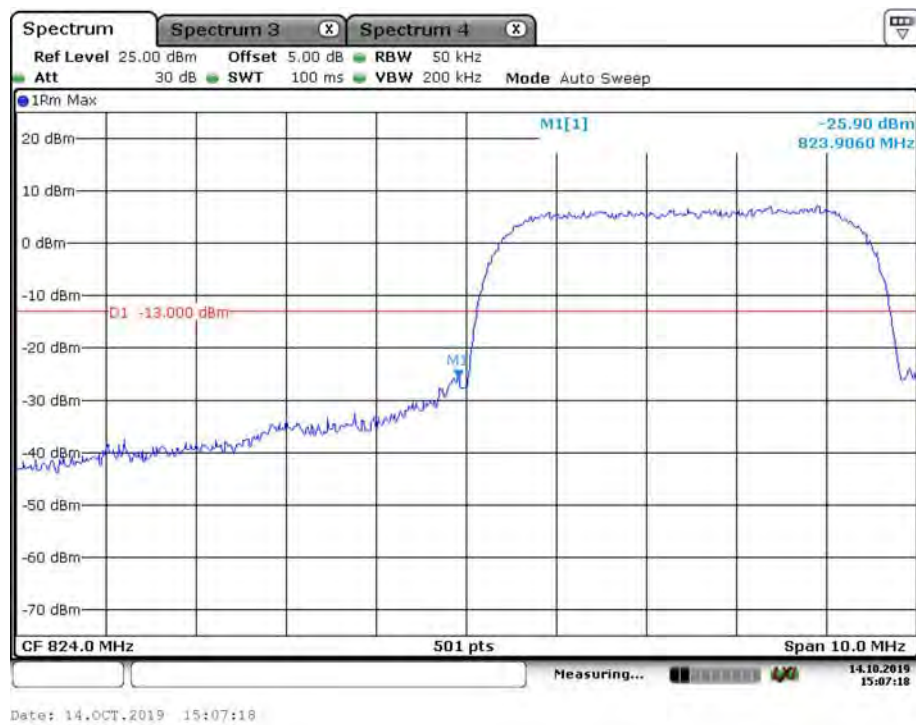
WCDMA Band V HSDPA, Left Band Edge



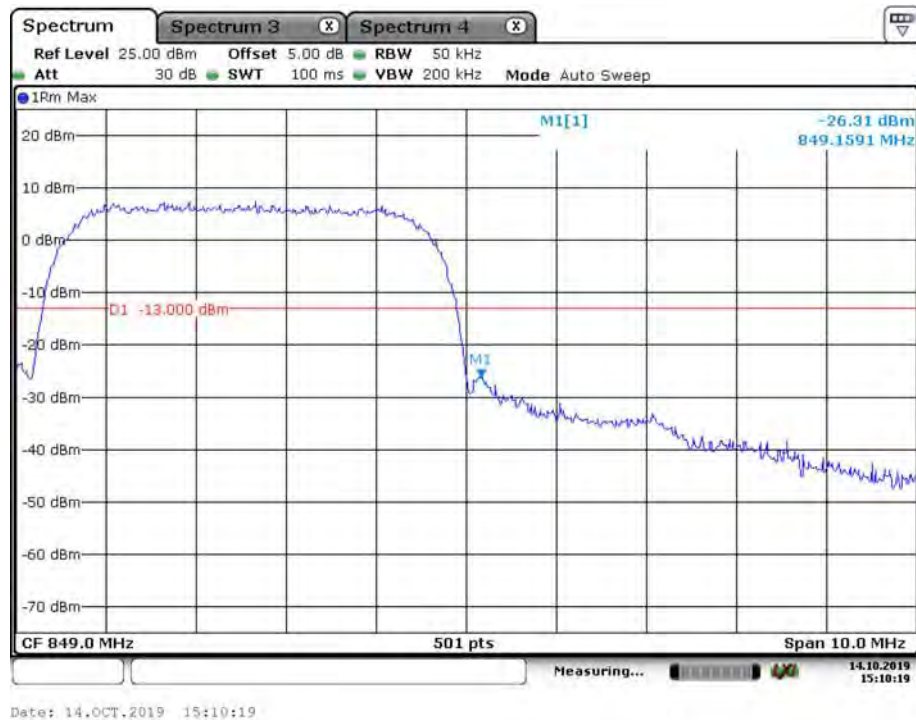
WCDMA Band V HSDPA, Right Band Edge



WCDMA Band V HSUPA, Left Band Edge

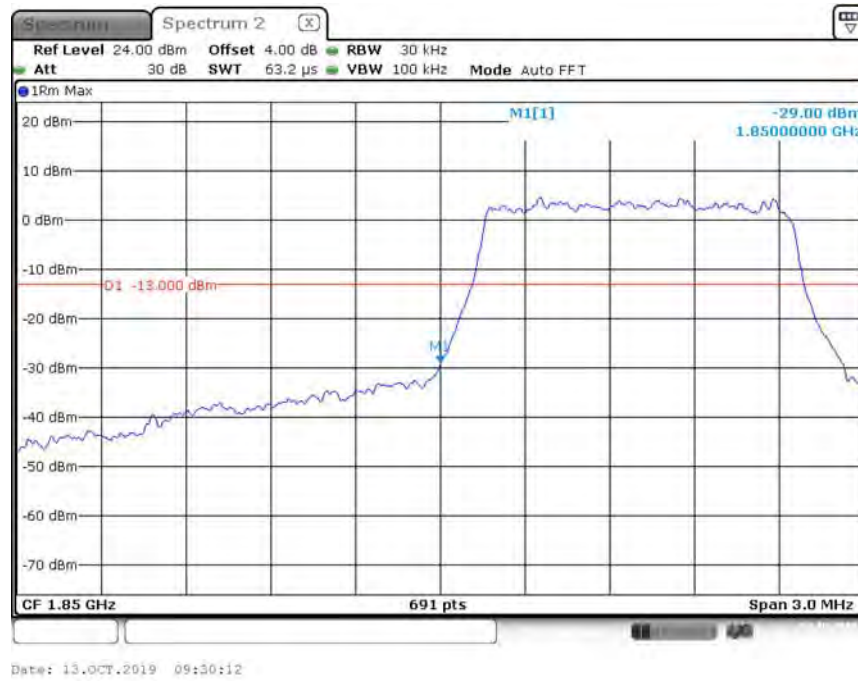


WCDMA Band V HSUPA, Right Band Edge

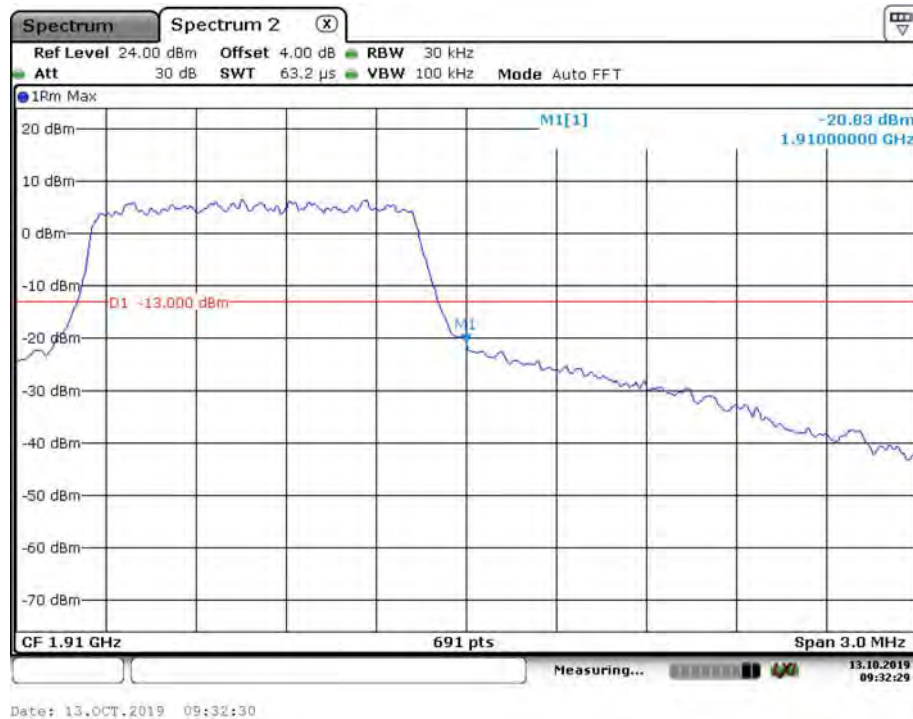


LTE Band 2

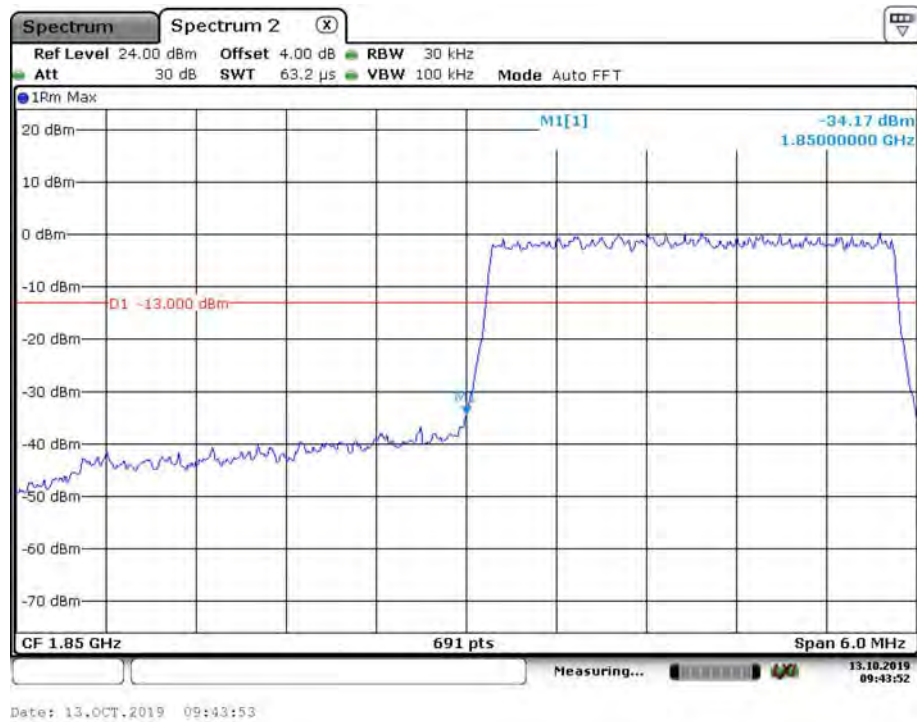
QPSK_1.4MHz_6 RB_ Left



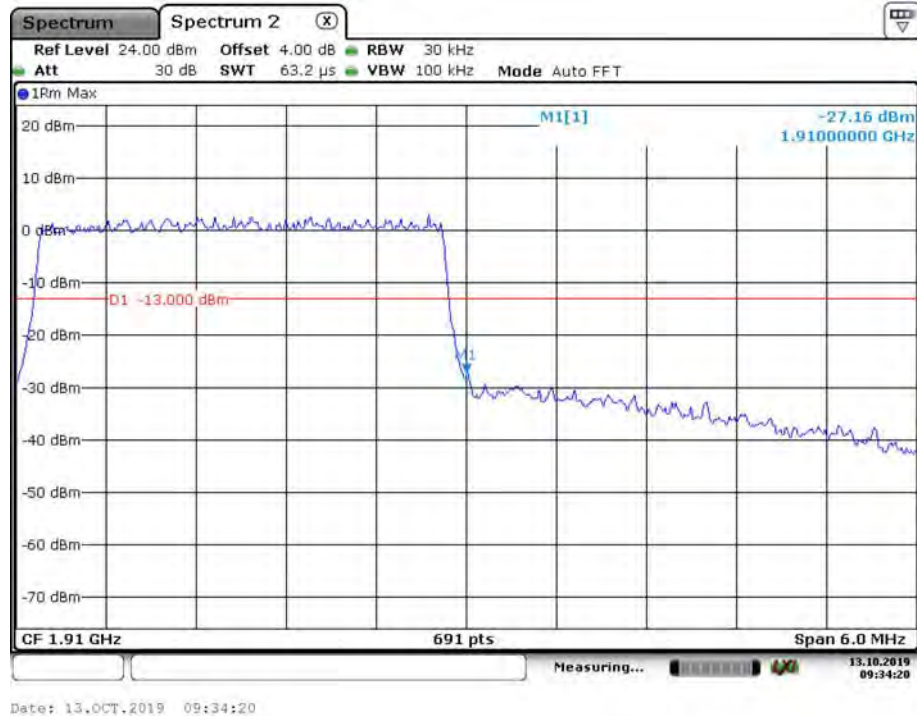
QPSK_1.4MHz_6 RB_ Right



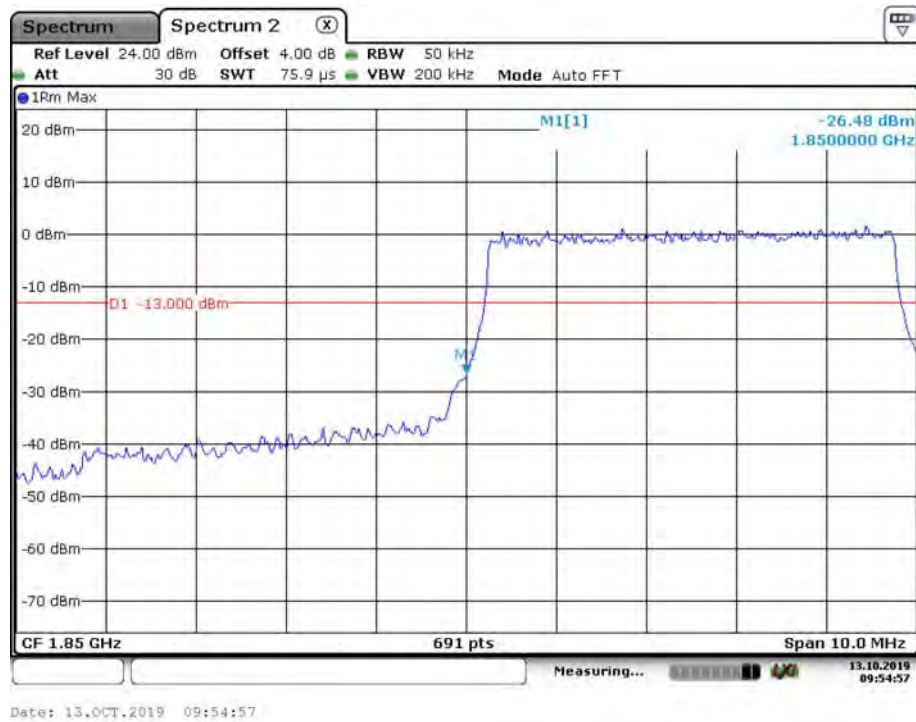
QPSK_3MHz_15 RB_ Left



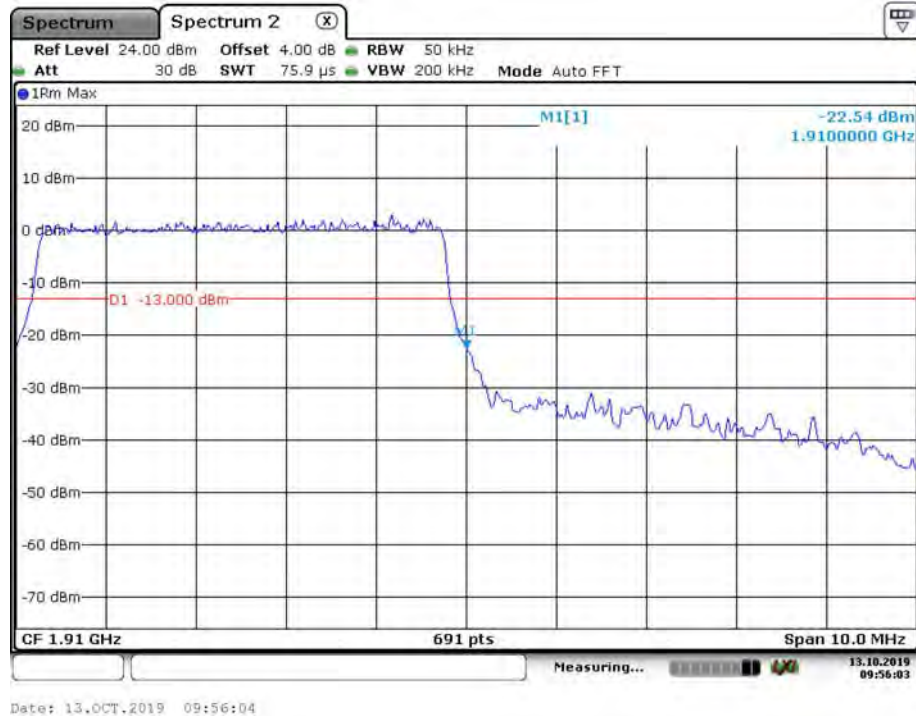
QPSK_3MHz_15 RB_ Right



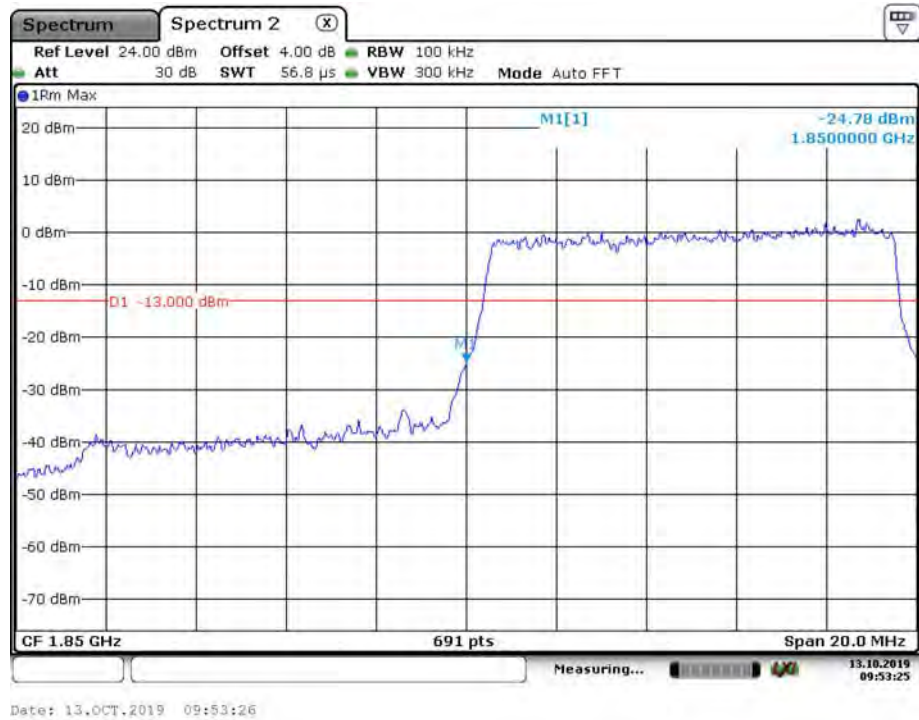
QPSK_5MHz_ 25 RB_ Left



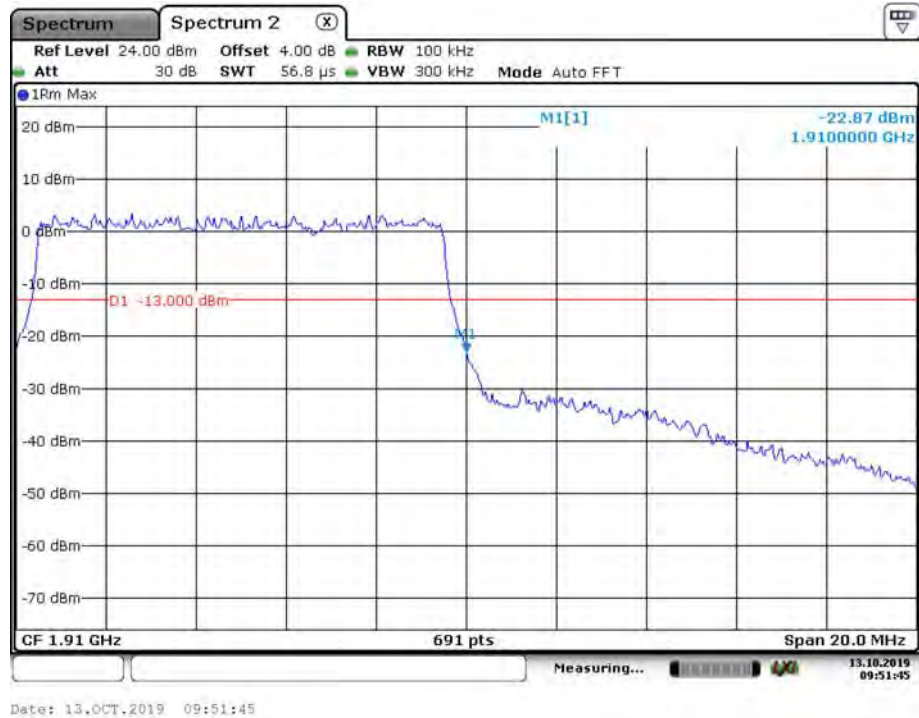
QPSK_5MHz_ 25 RB_ Right



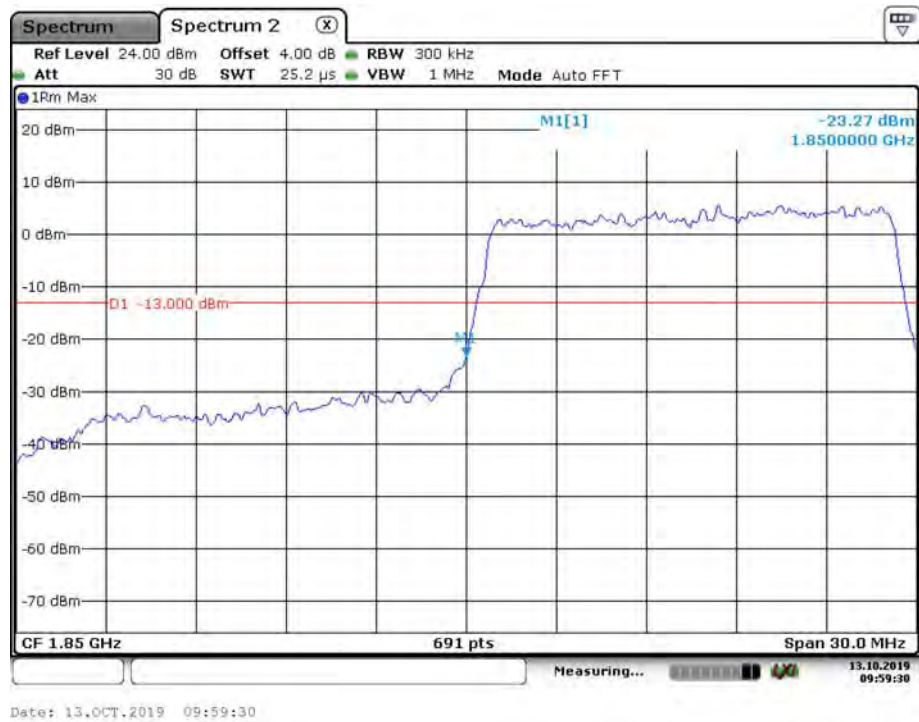
QPSK_10MHz_ 50 RB_ Left



QPSK_10MHz_ 50 RB_ Right



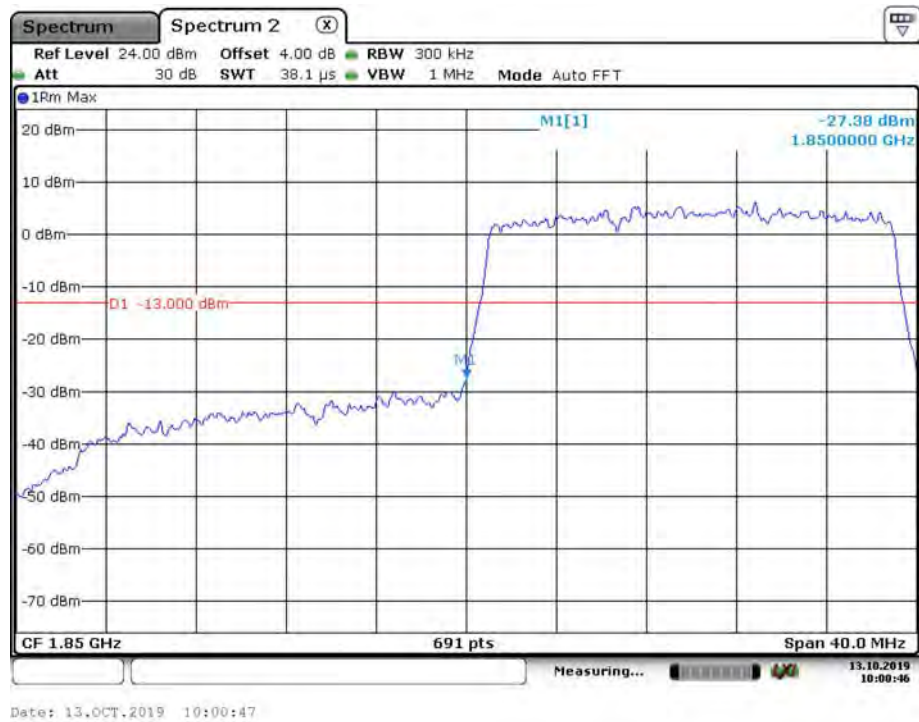
QPSK_15MHz_ 75 RB_ Left



QPSK_15MHz_ 75 RB_ Right



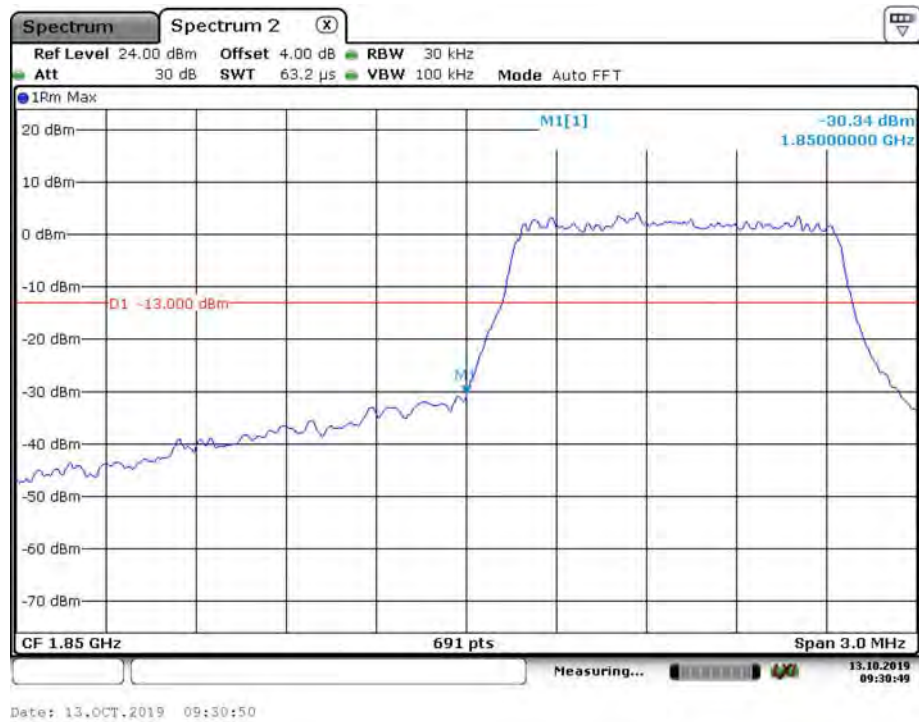
QPSK_20MHz_FULL RB_Left



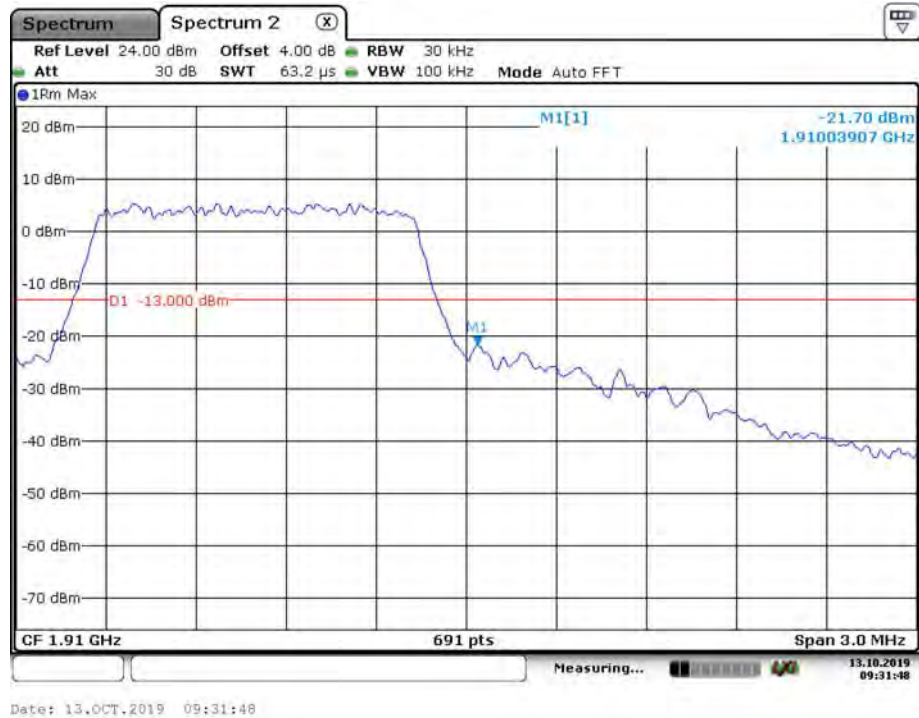
QPSK_20MHz_FULL RB_Right



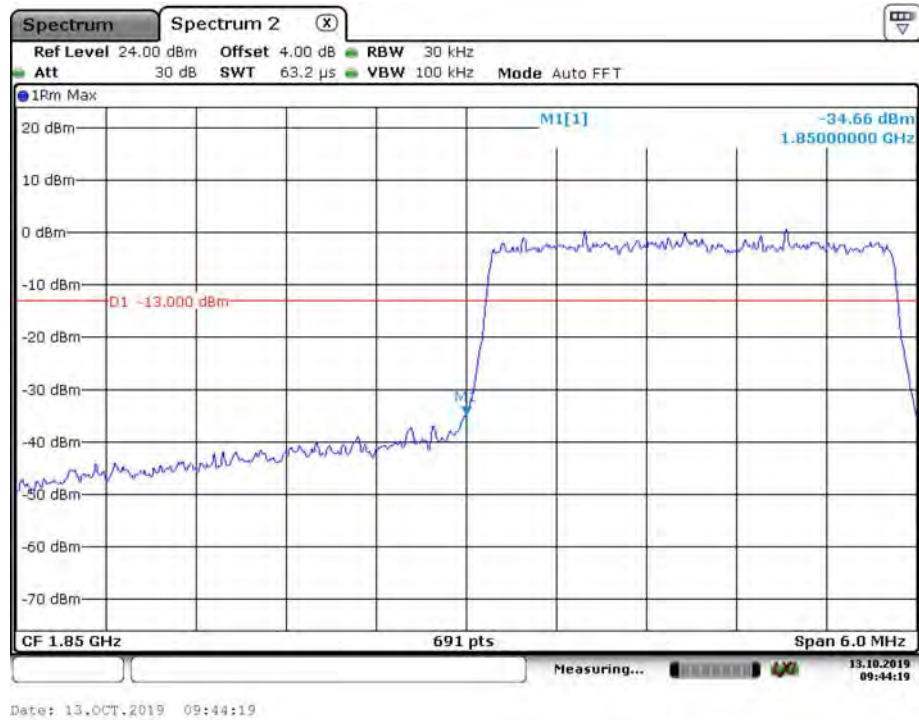
16QAM_1.4MHz_6 RB_ Left



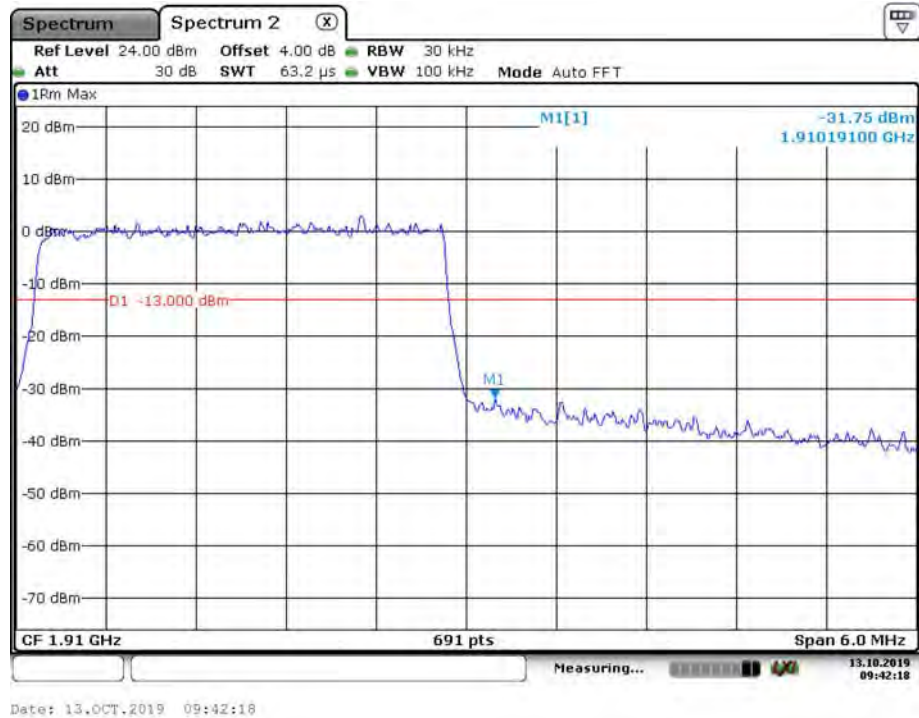
16QAM_1.4MHz_6 RB_ Right



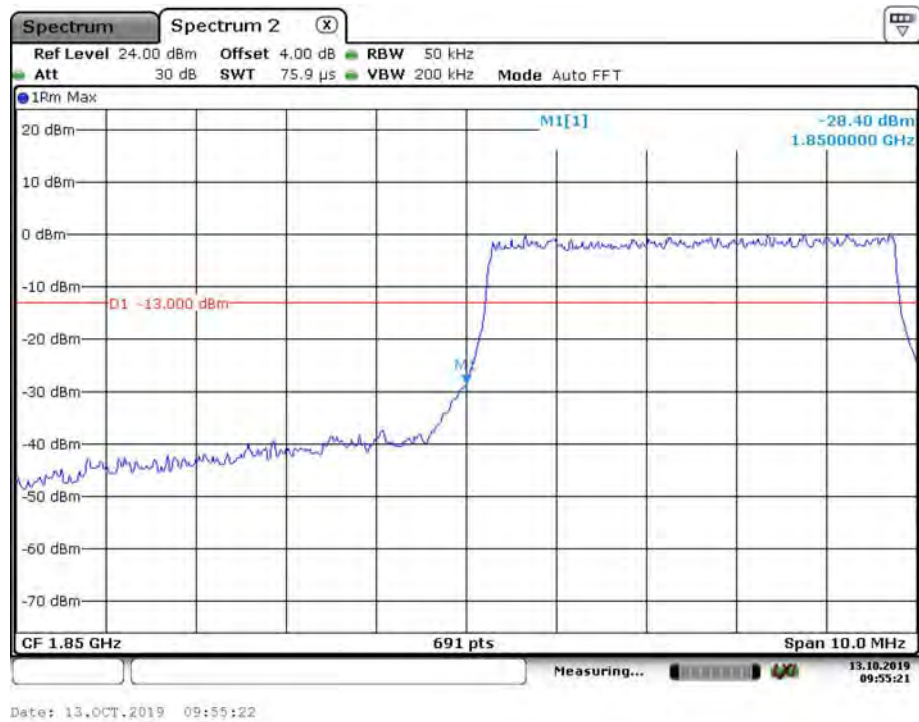
16QAM_3MHz_ 15 RB_ Left



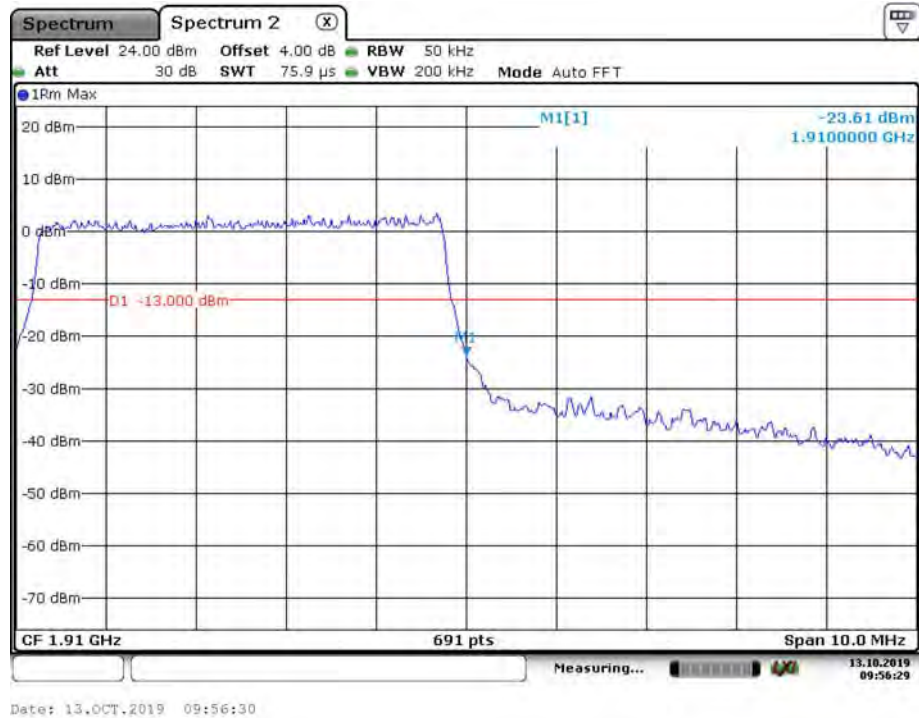
16QAM_3MHz_ 15 RB_ Right



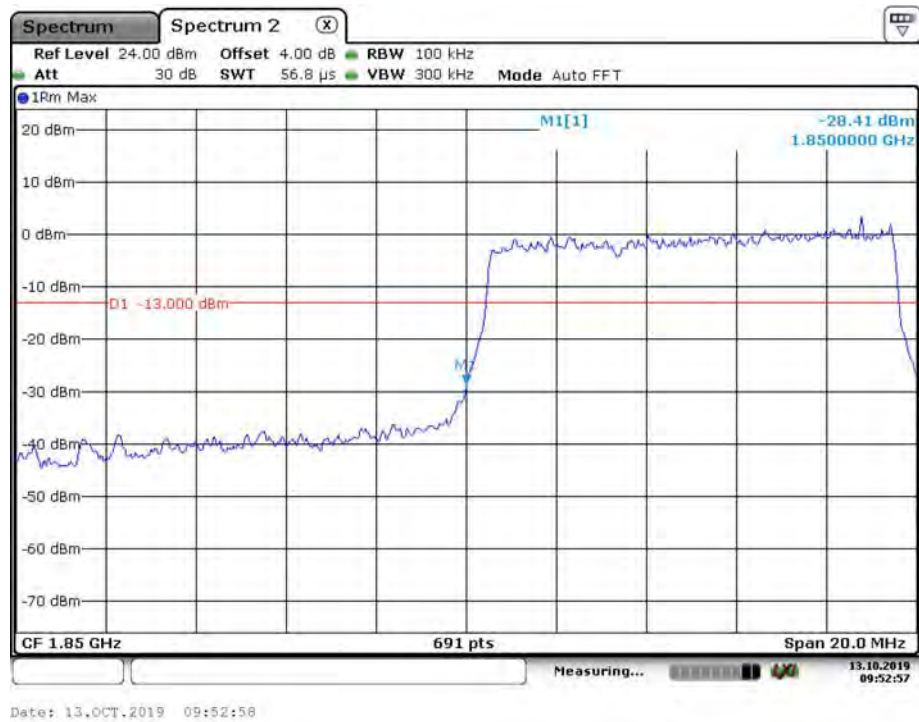
16QAM_5MHz_25 RB_ Left



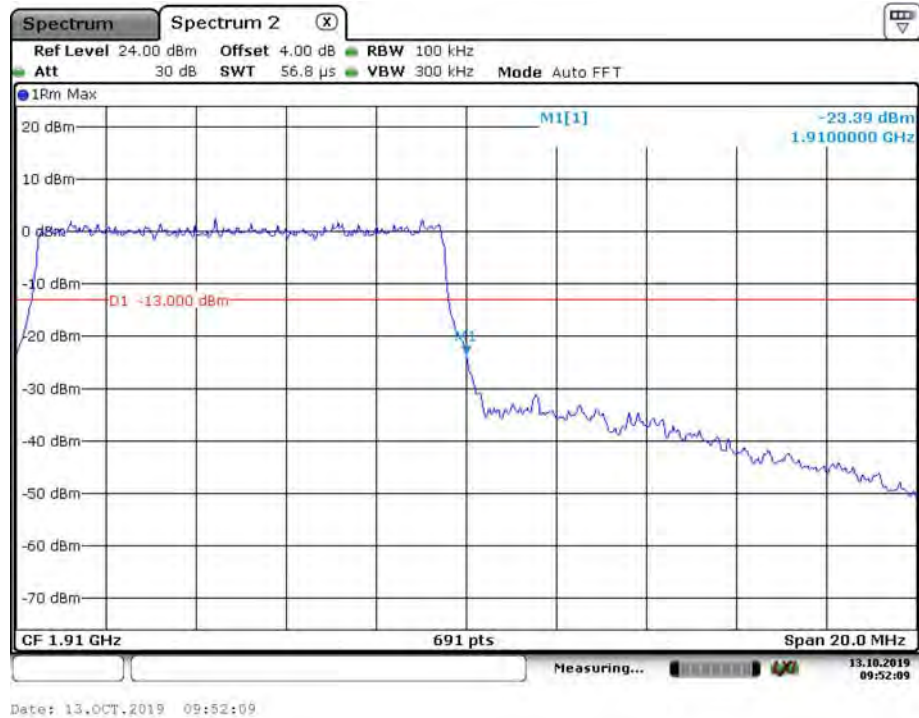
16QAM_5MHz_25 RB_ Right



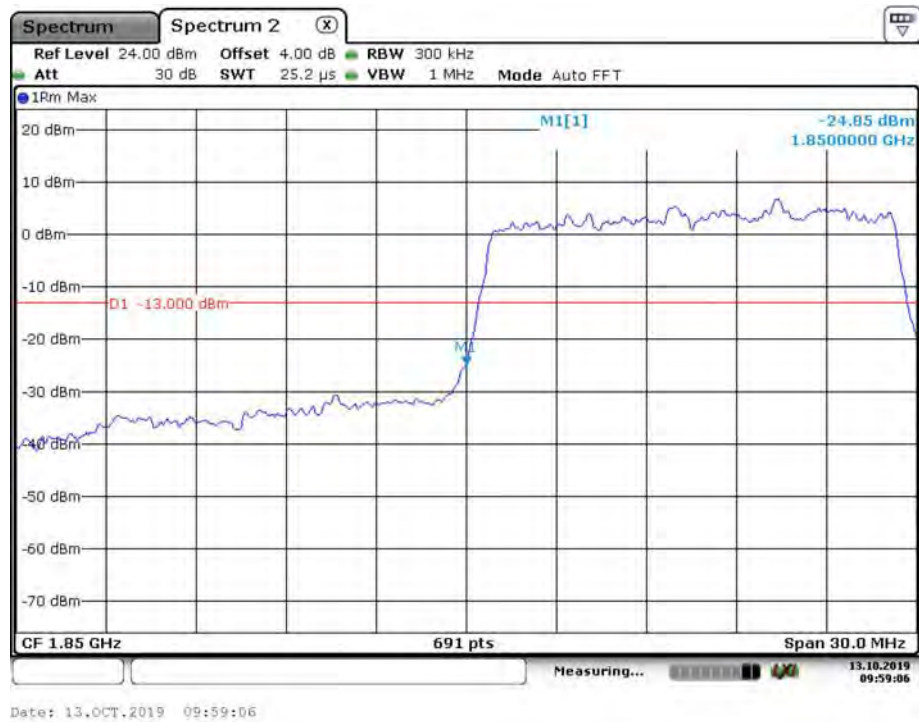
16QAM_10MHz_ 50 RB_ Left



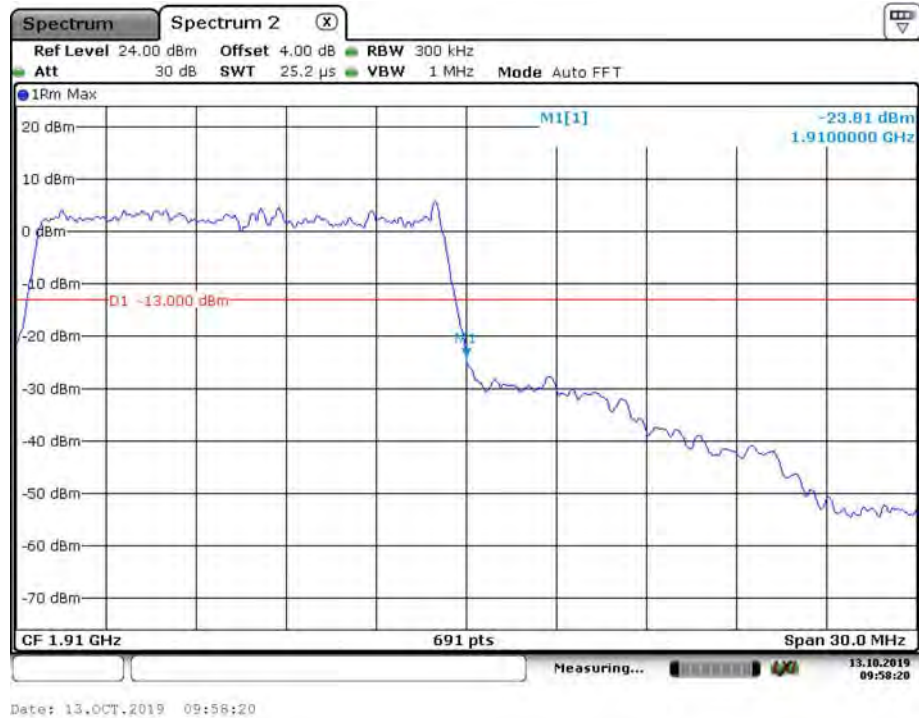
16QAM_10MHz_ 50 RB_ Right



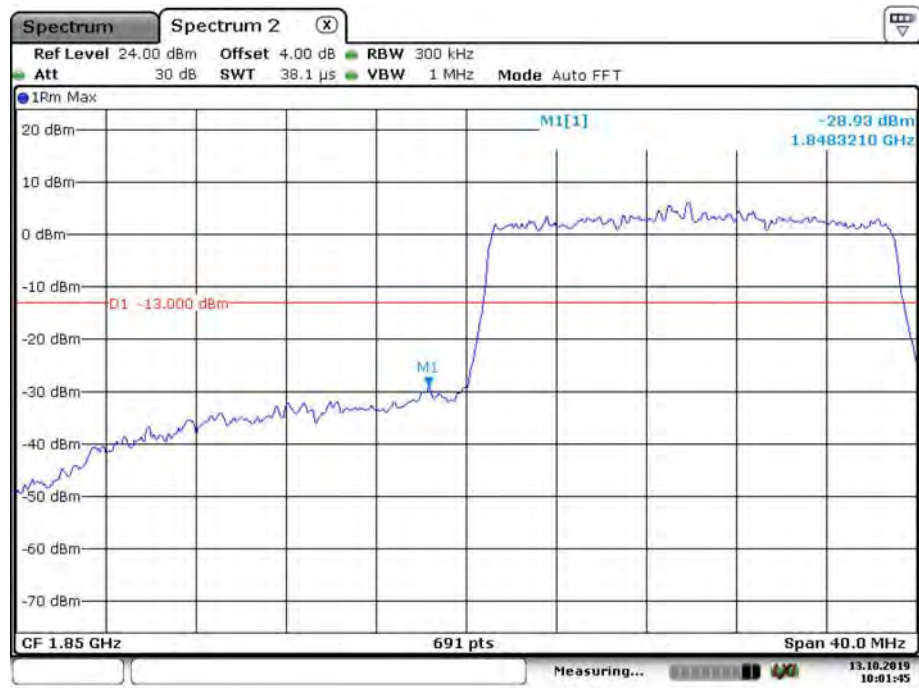
16QAM_15MHz_ 75 RB_ Left



16QAM_15MHz_ 75 RB_ Right

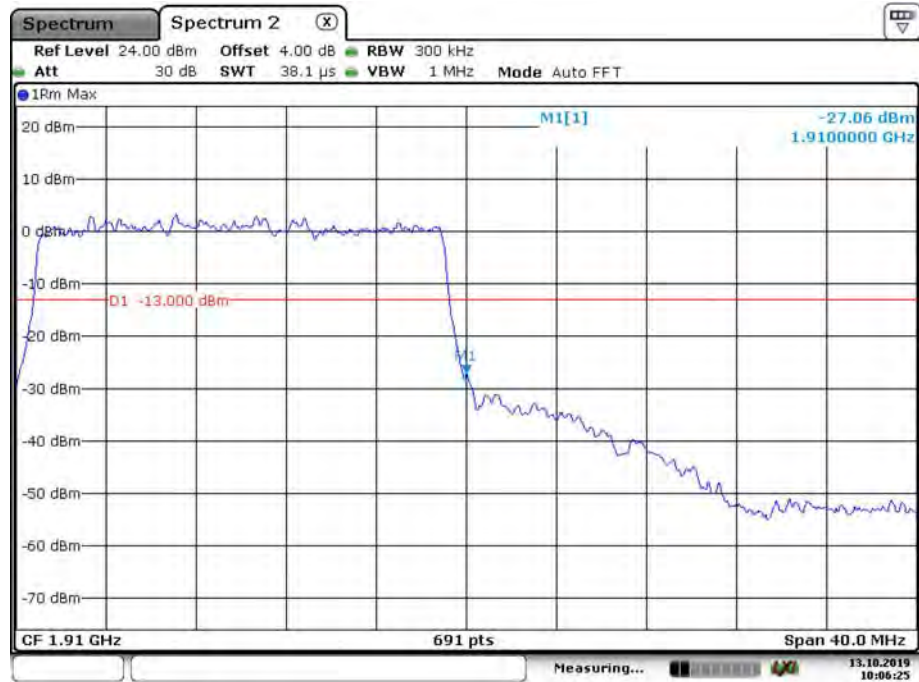


16QAM_20MHz_ FULL RB_ Left



Date: 13.OCT.2019 10:01:45

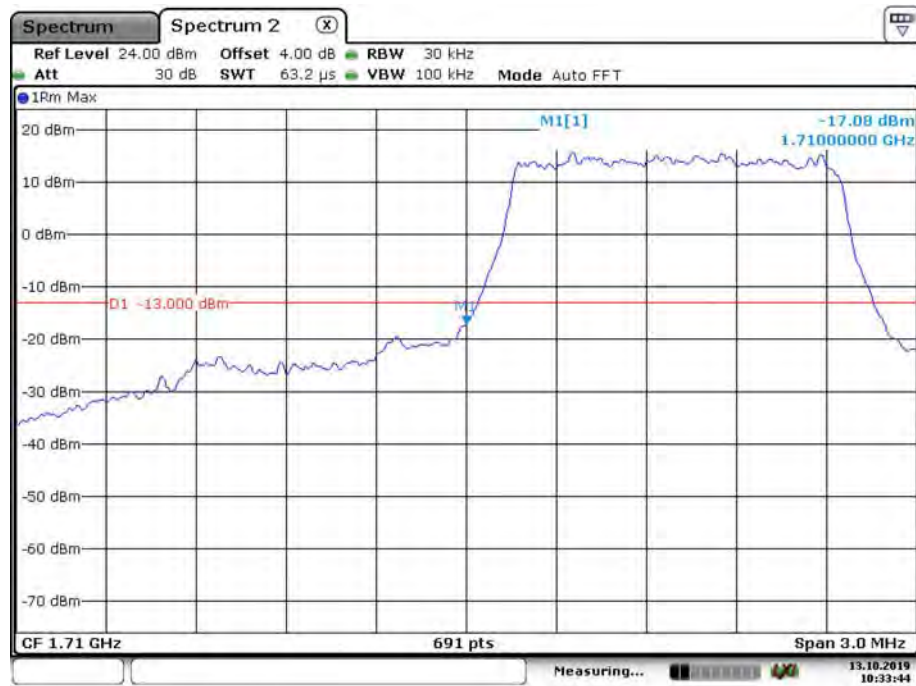
16QAM_20MHz_ FULL RB_ Right



Date: 13.OCT.2019 10:06:25

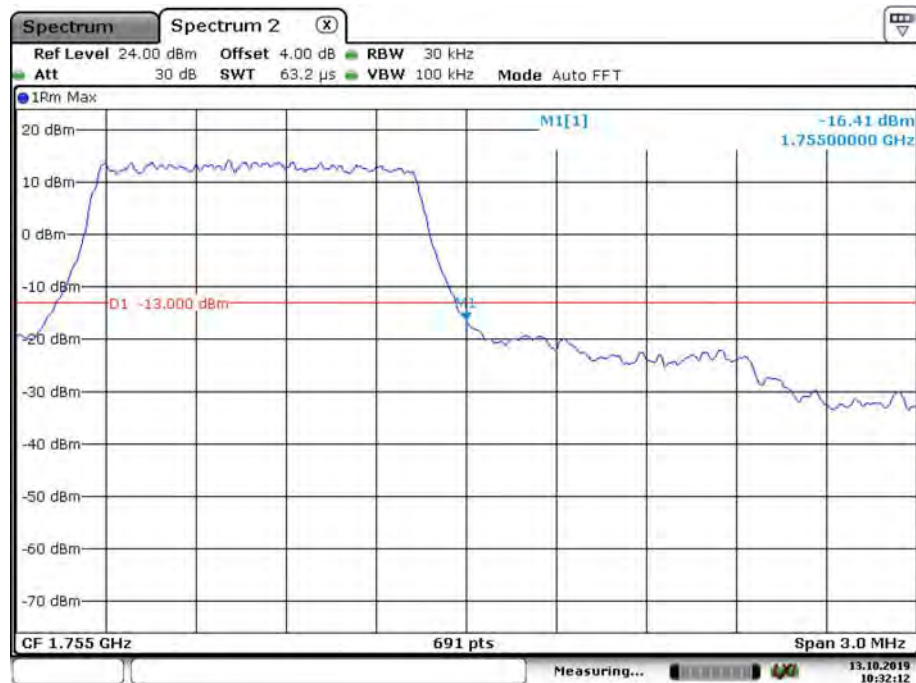
LTE Band 4

QPSK_1.4MHz_6 RB_Left



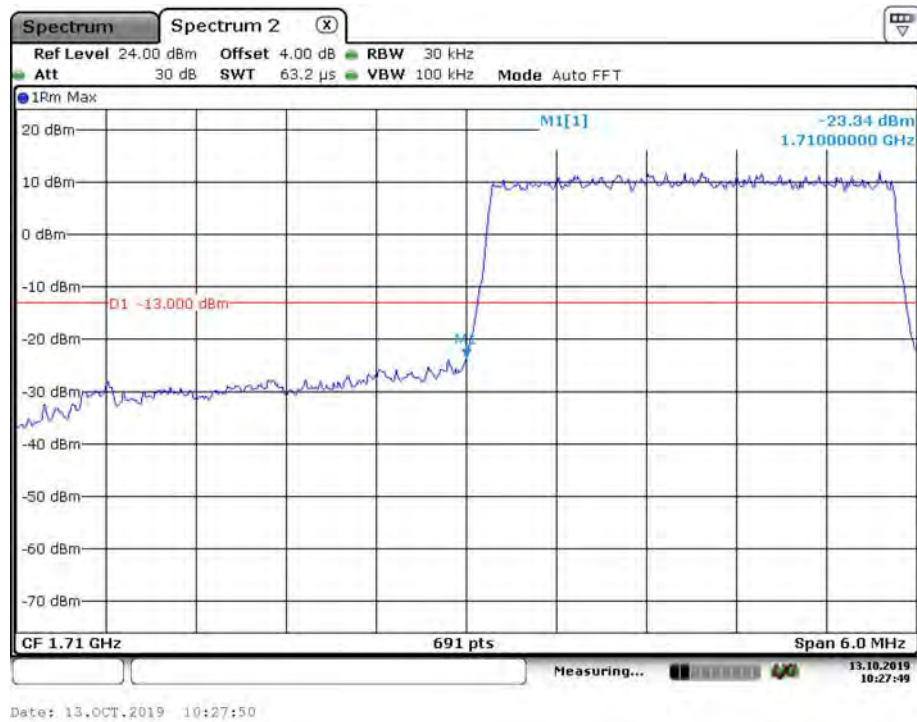
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QPSK_1.4MHz_6 RB_Right

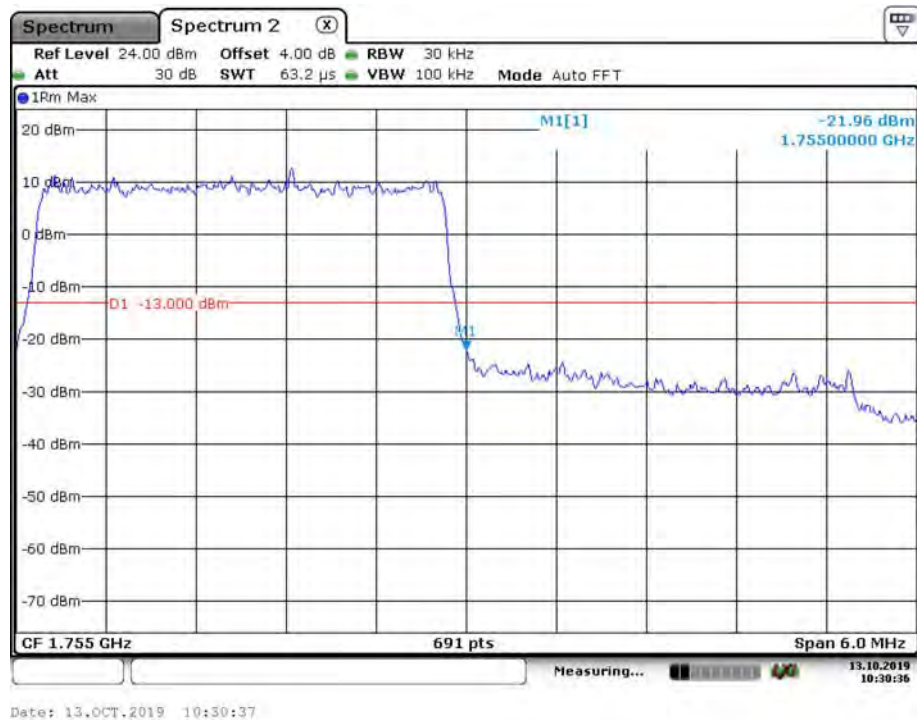


Date: 13.OCT.2019 10:32:13

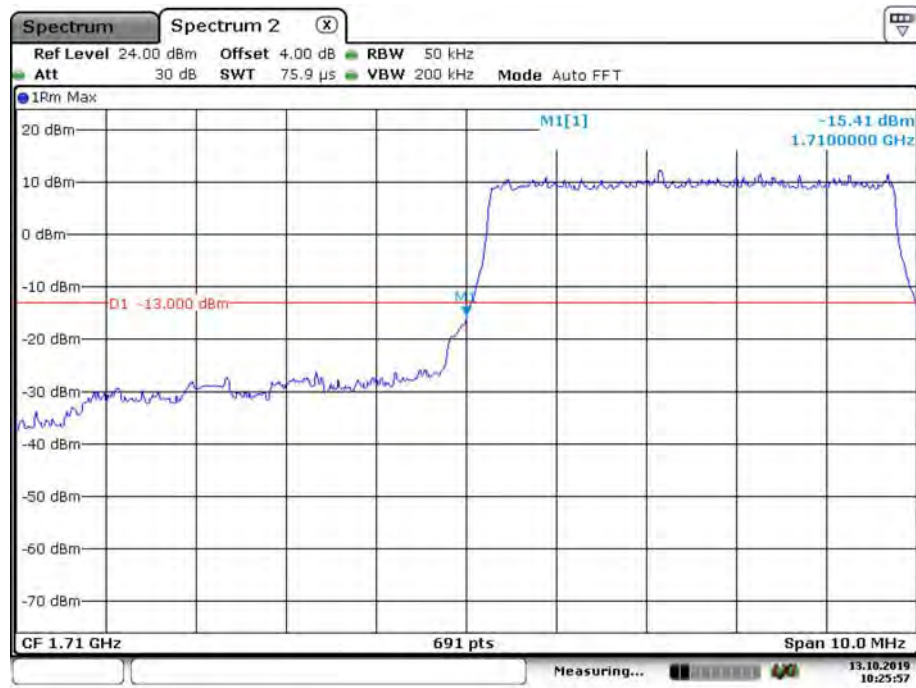
QPSK_3MHz_15 RB_ Left



QPSK_3MHz_15 RB_ Right

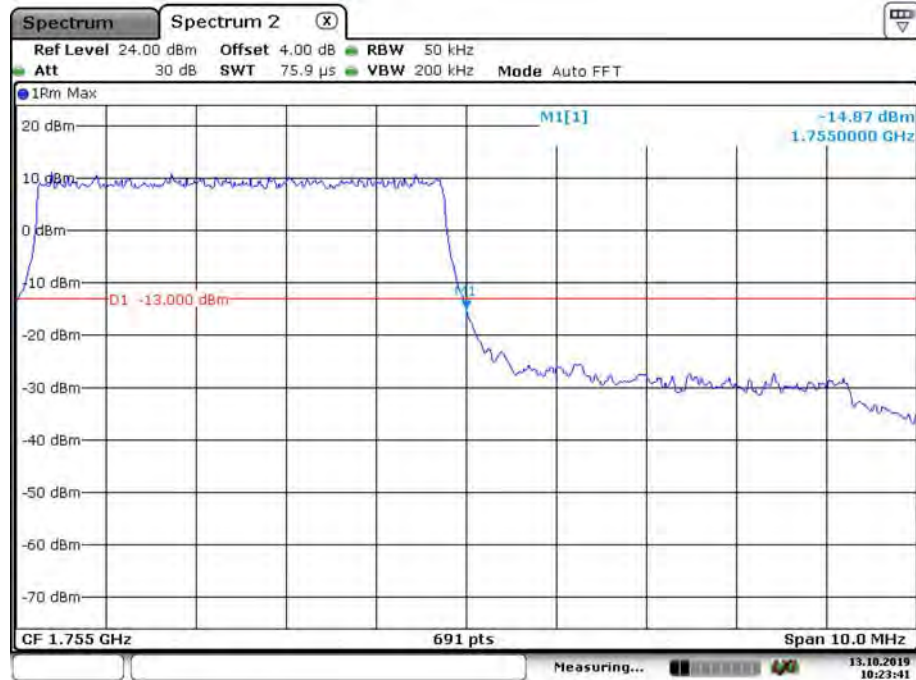


QPSK_5MHz_25 RB_ Left



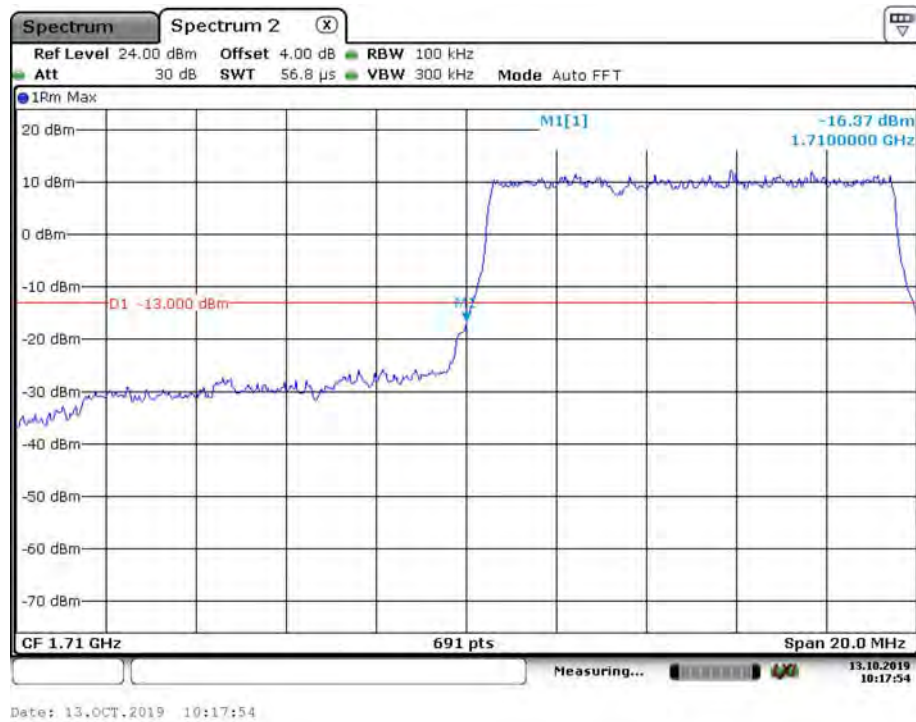
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QPSK_5MHz_25 RB_ Right

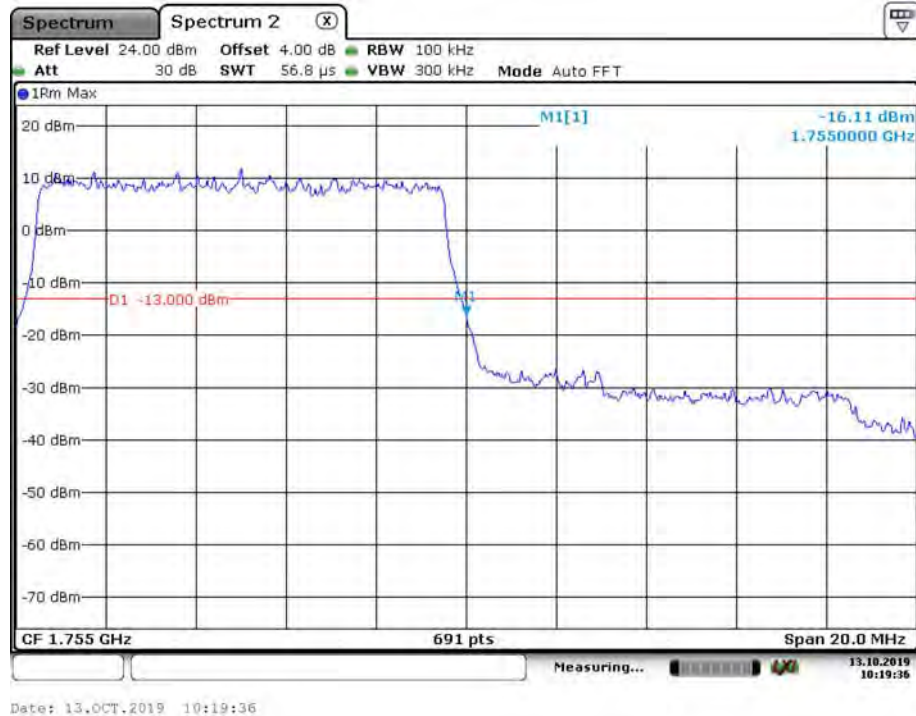


Date: 13.OCT.2019 10:23:42

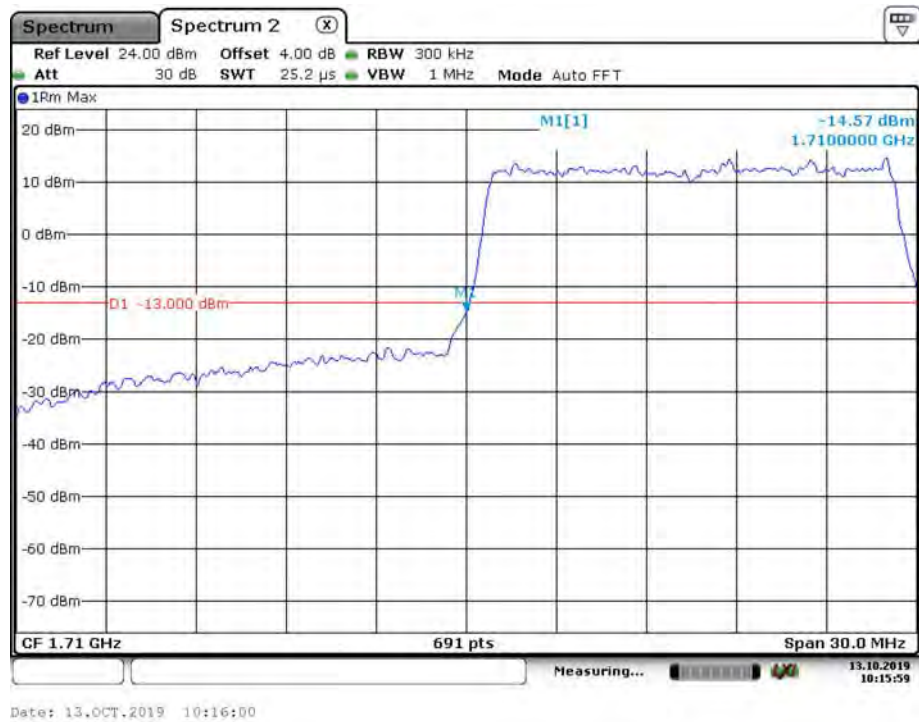
QPSK_10MHz_ 50 RB_ Left



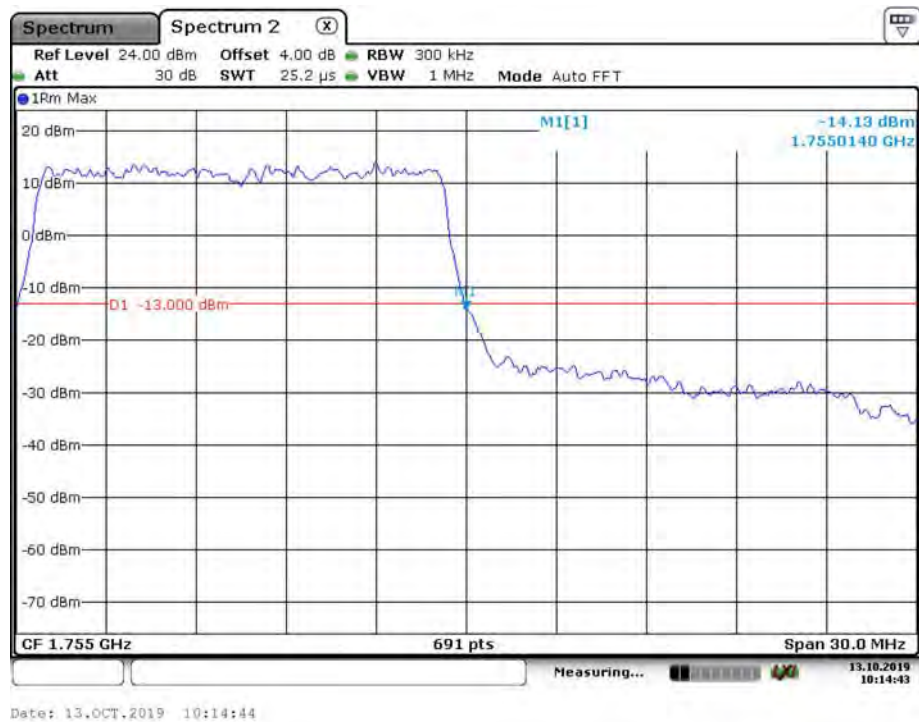
QPSK_10MHz_ 50 RB_ Right



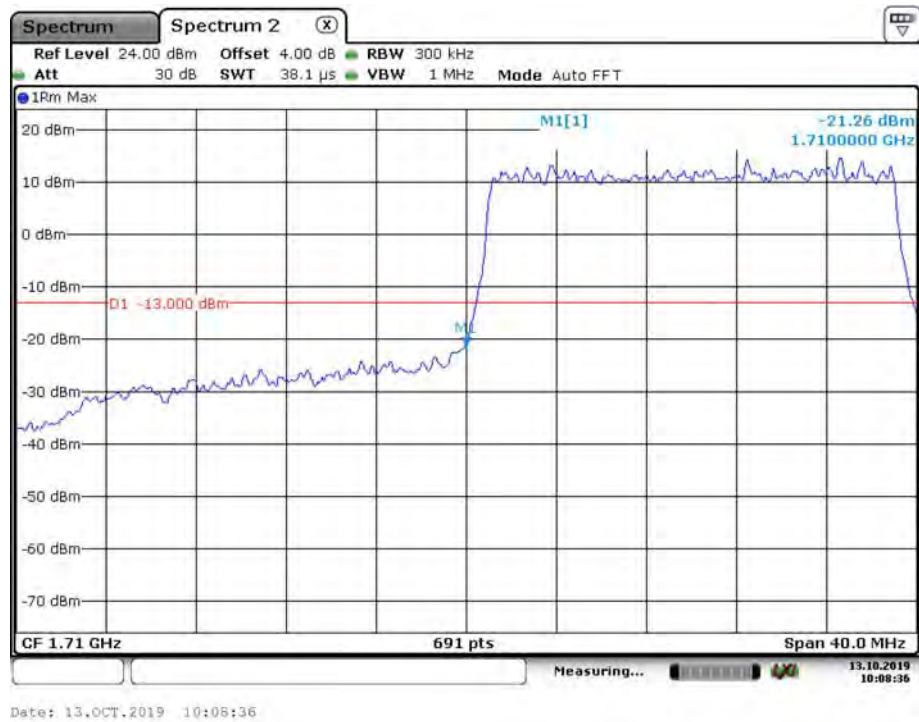
QPSK_15MHz_ 75 RB_ Left



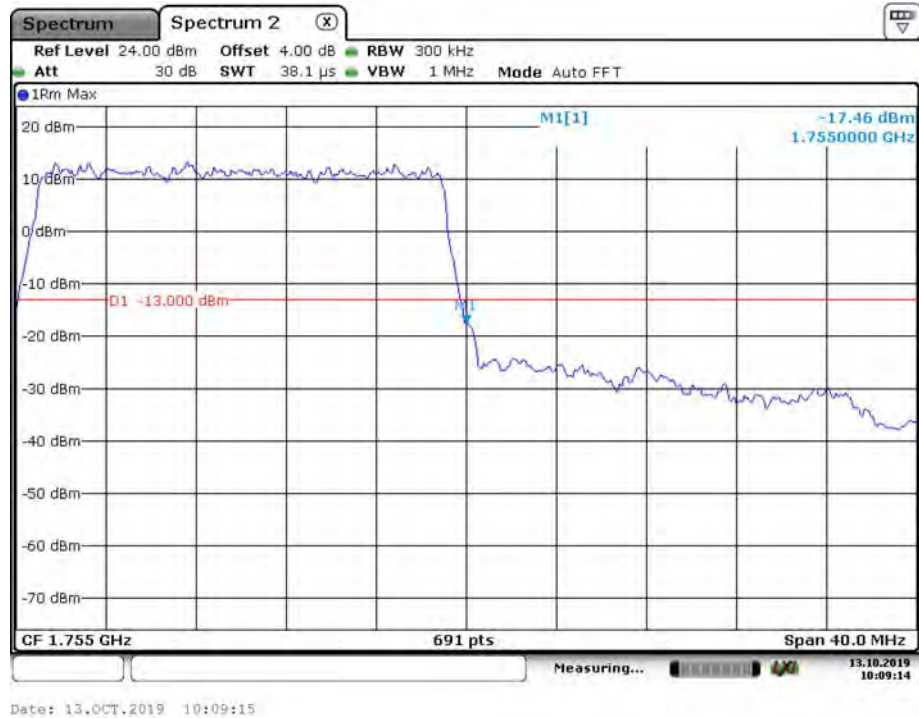
QPSK_15MHz_ 75 RB_ Right



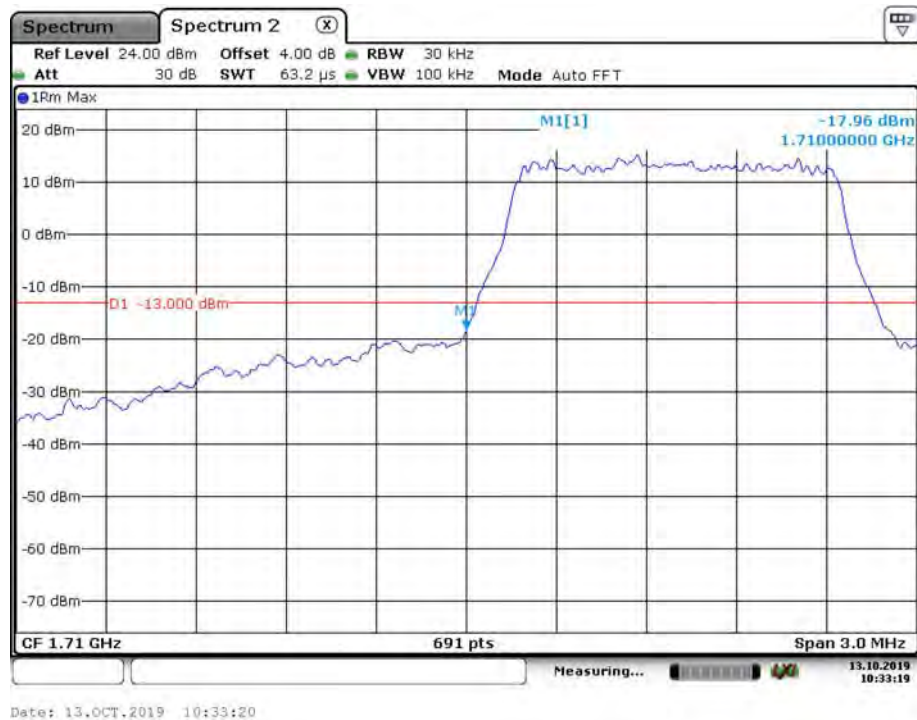
QPSK_20MHz_FULL RB_Left



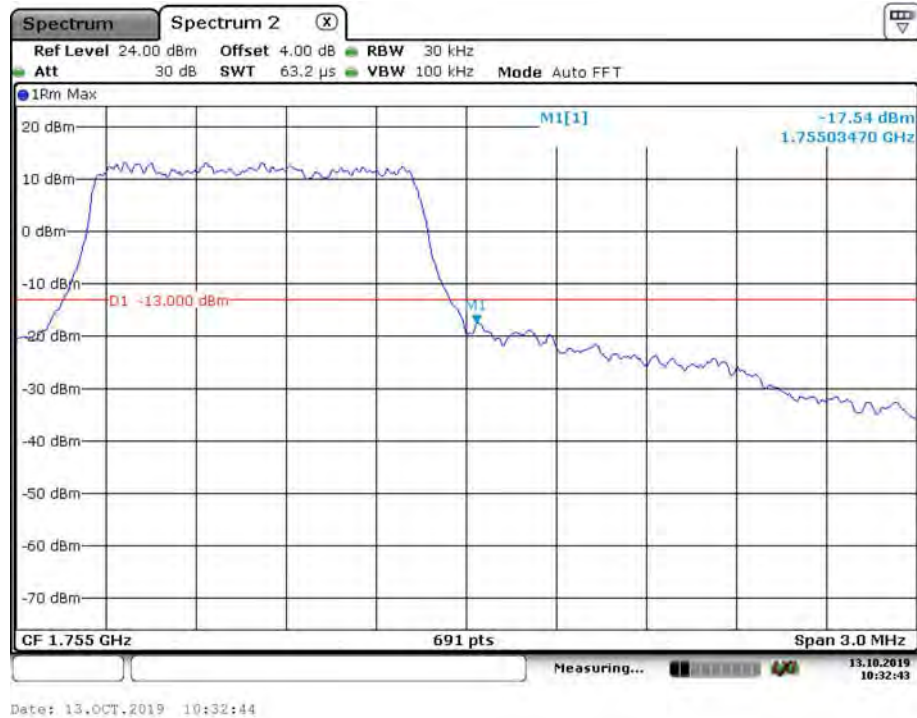
QPSK_20MHz_FULL RB_Right



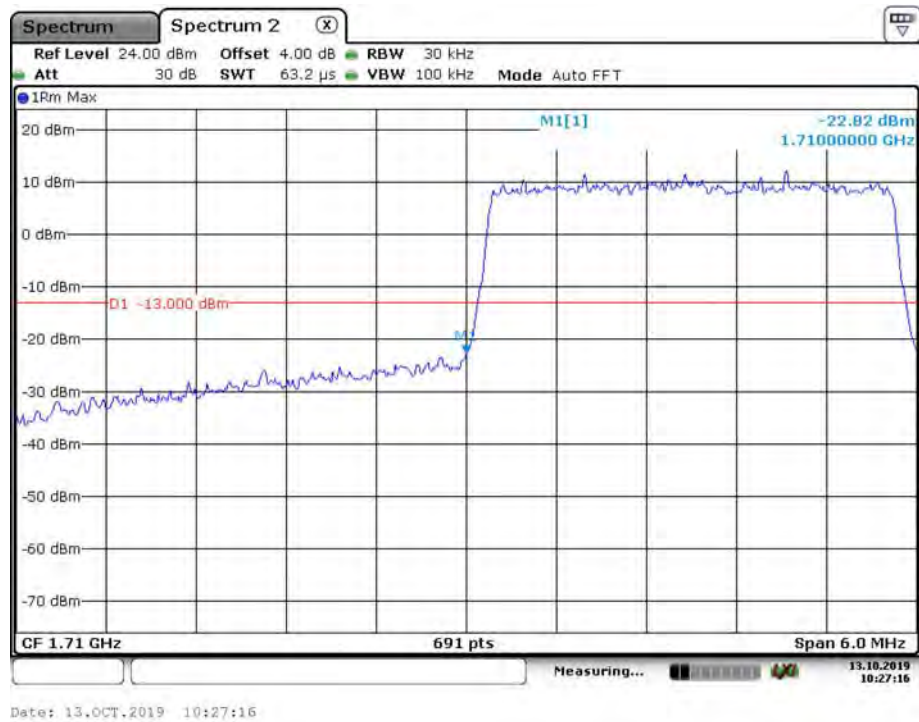
16QAM_1.4MHz_6 RB_ Left



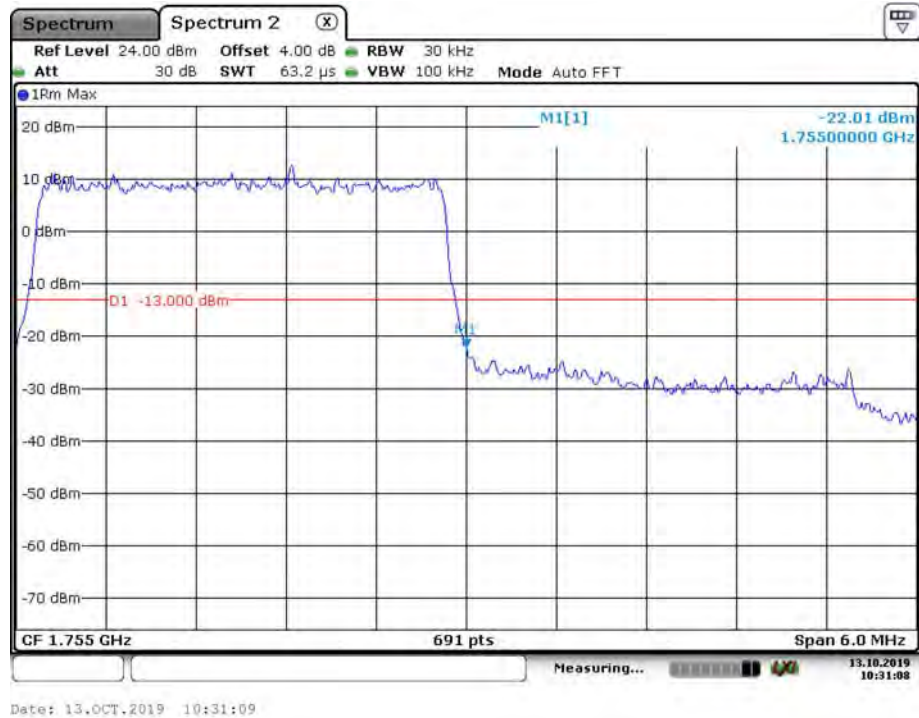
16QAM_1.4MHz_6 RB_ Right



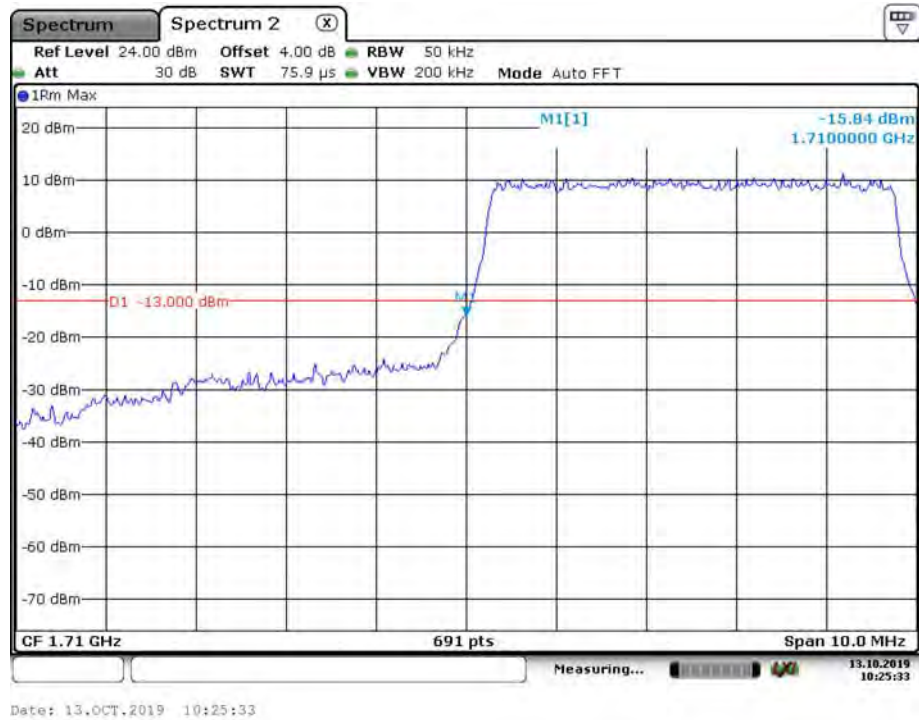
16QAM_3MHz_ 15 RB_ Left



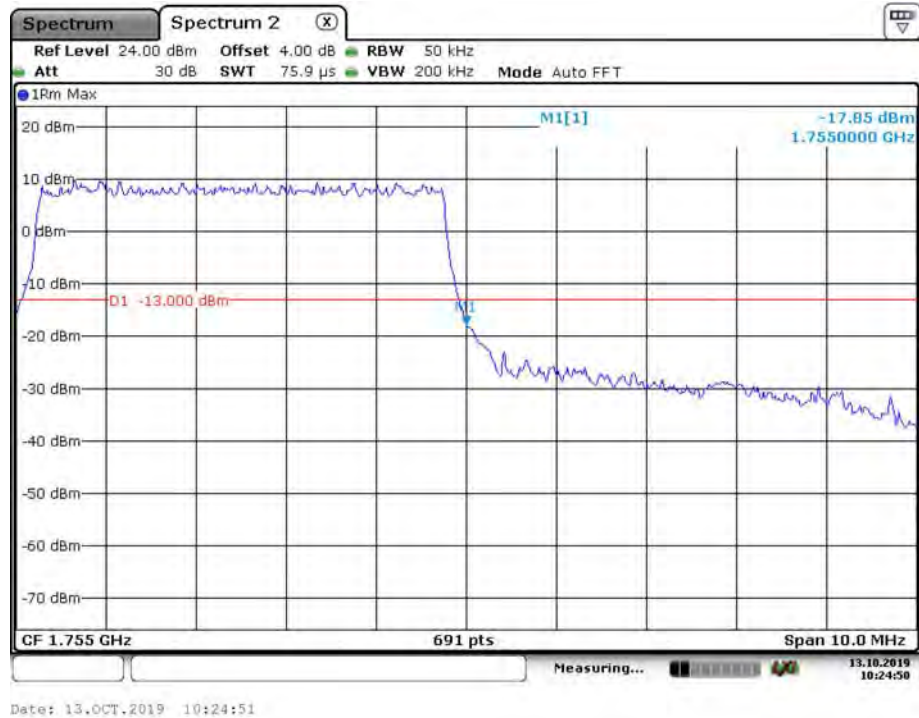
16QAM_3MHz_ 15 RB_ Right



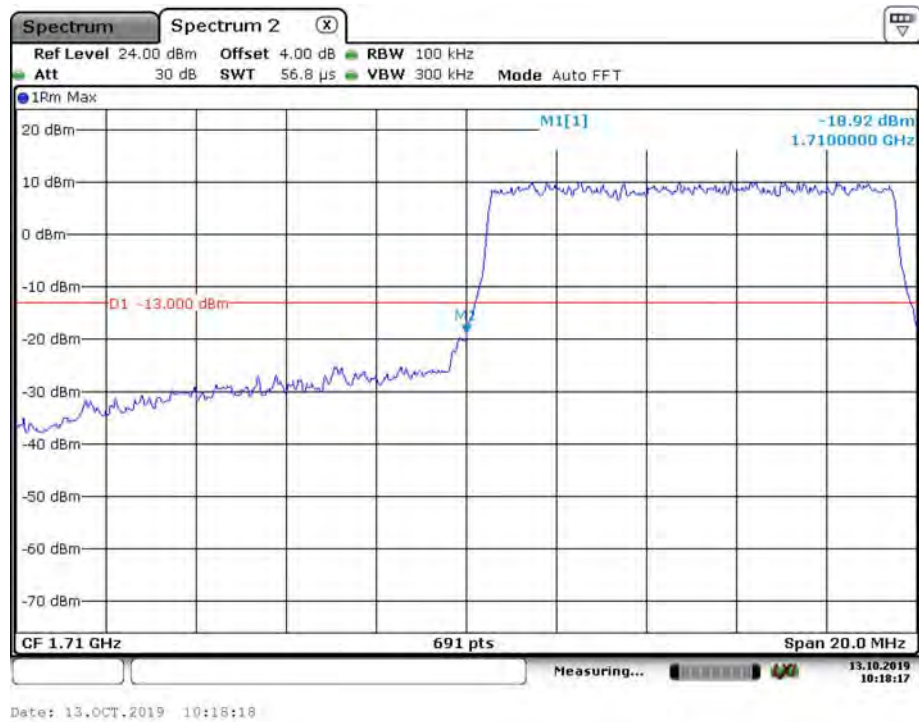
16QAM_5MHz_ 25 RB_ Left



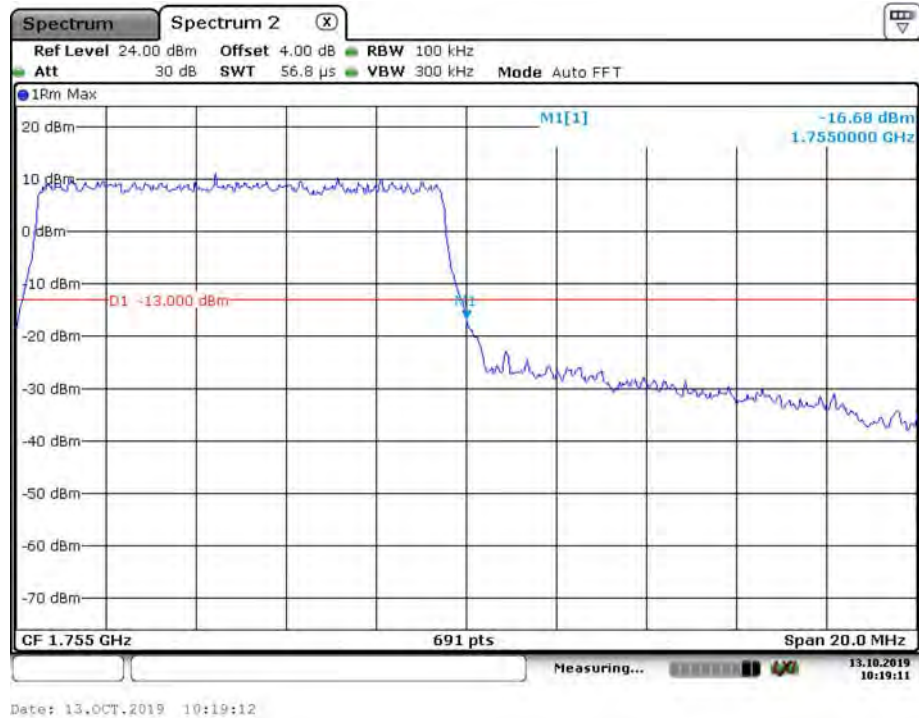
16QAM_5MHz_ 25 RB_ Right



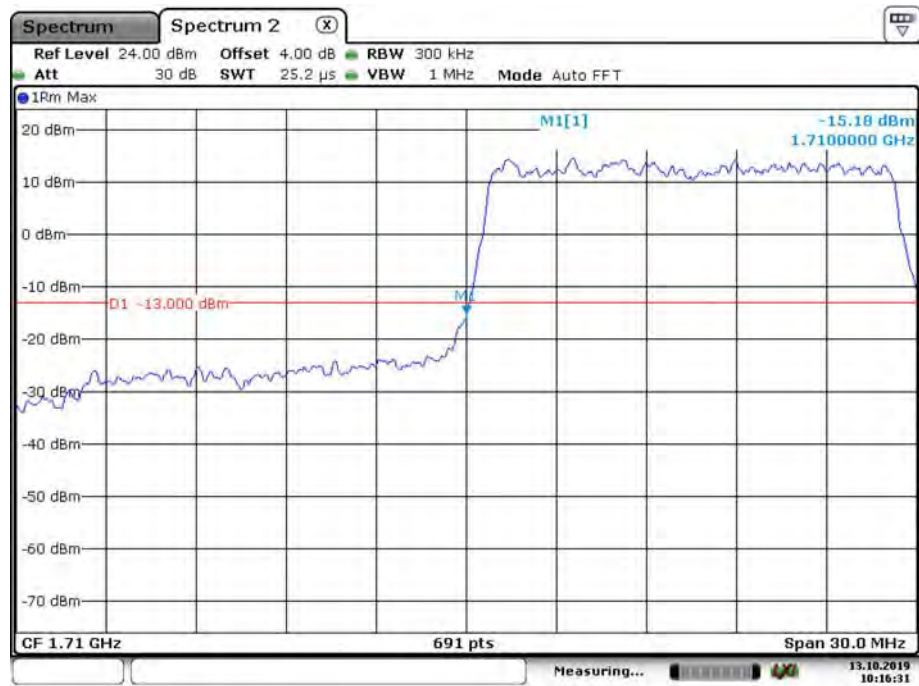
16QAM_10MHz_ 50 RB_ Left



16QAM_10MHz_ 50 RB_ Right

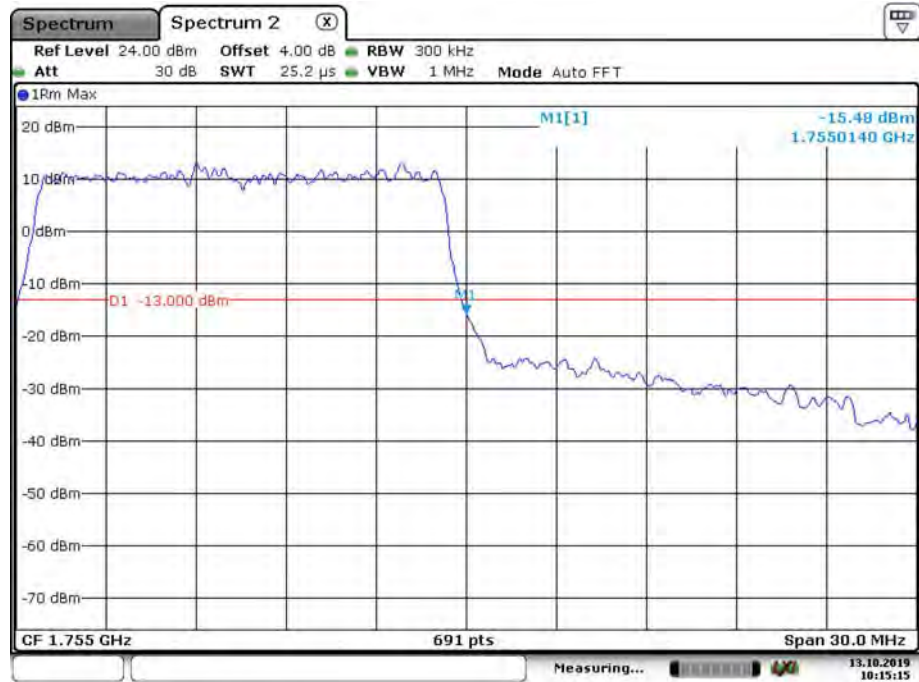


16QAM_15MHz_ 75 RB_ Left



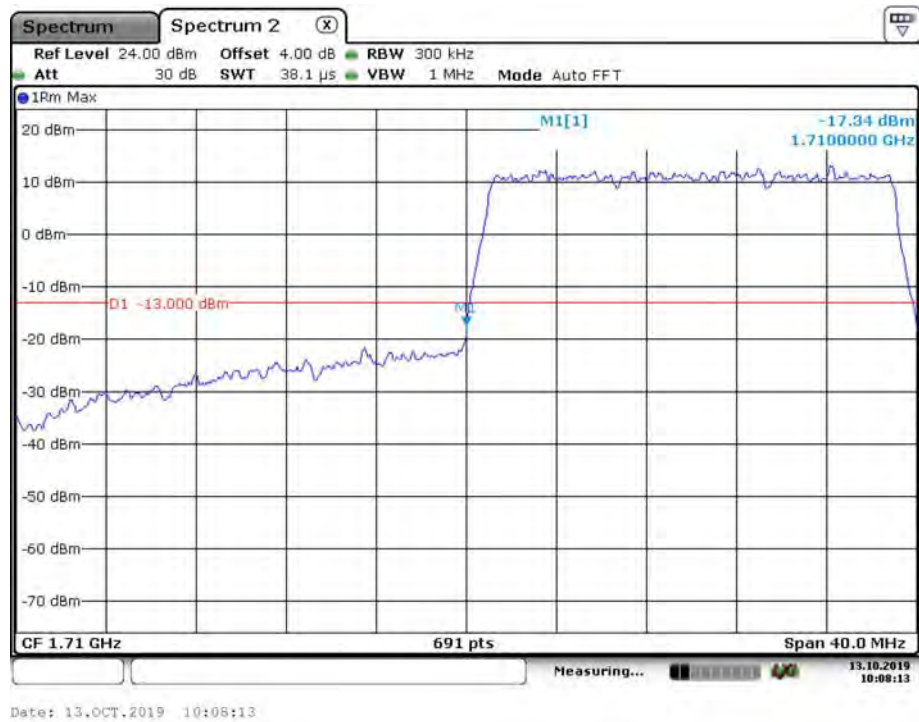
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16QAM_15MHz_ 75 RB_ Right

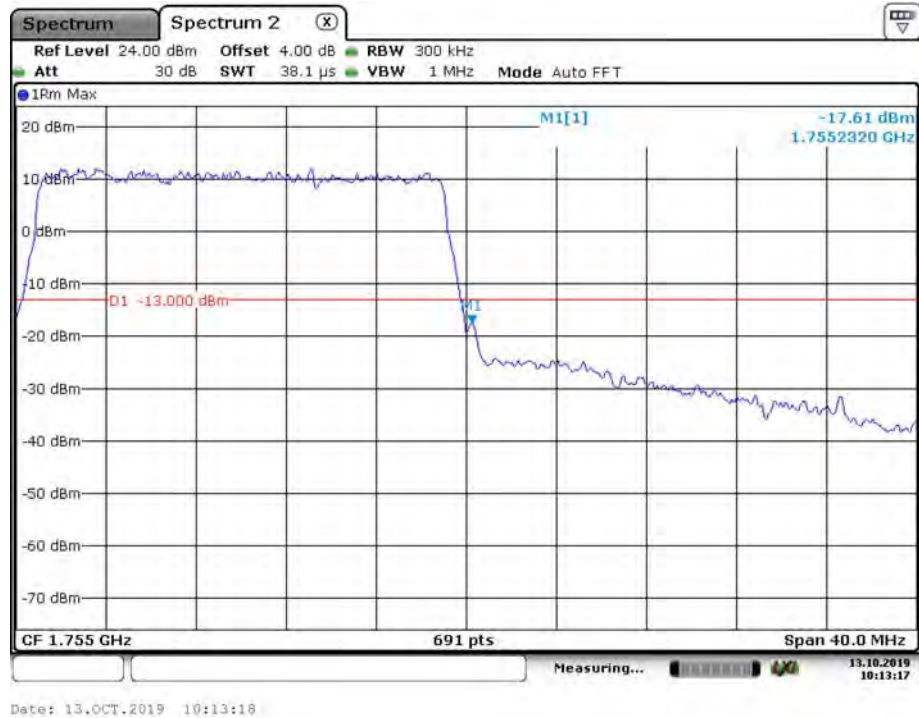


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16QAM_20MHz_FULL RB_ Left

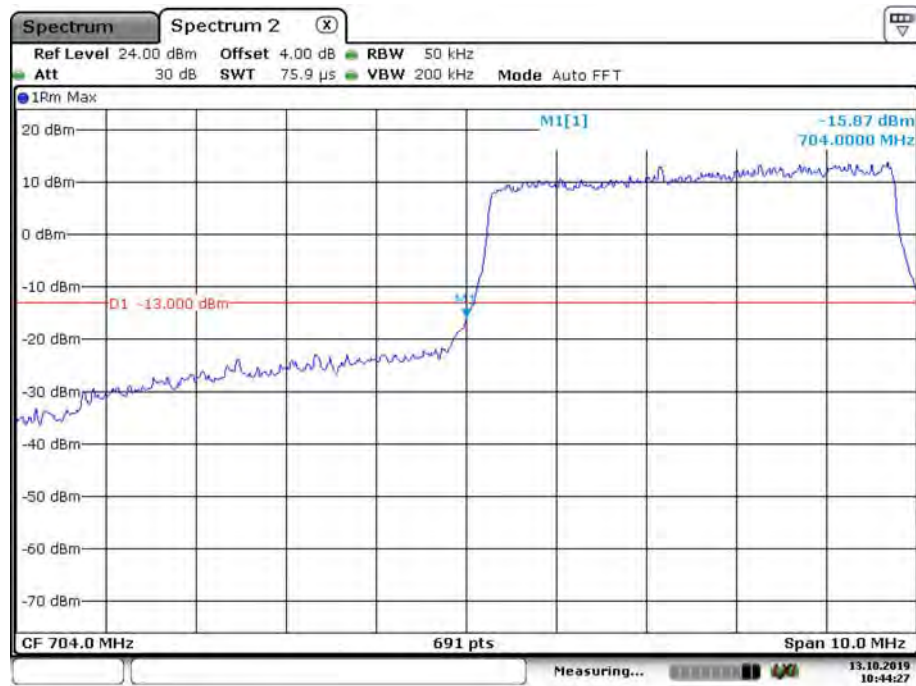


16QAM_20MHz_FULL RB_ Right



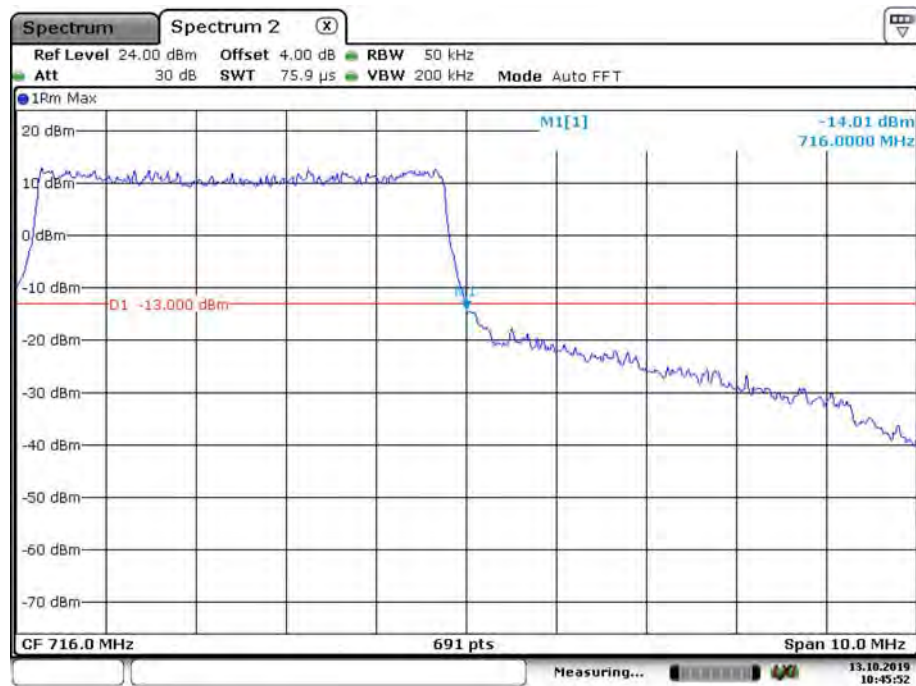
LTE Band 17

QPSK_5MHz_25 RB_ Left



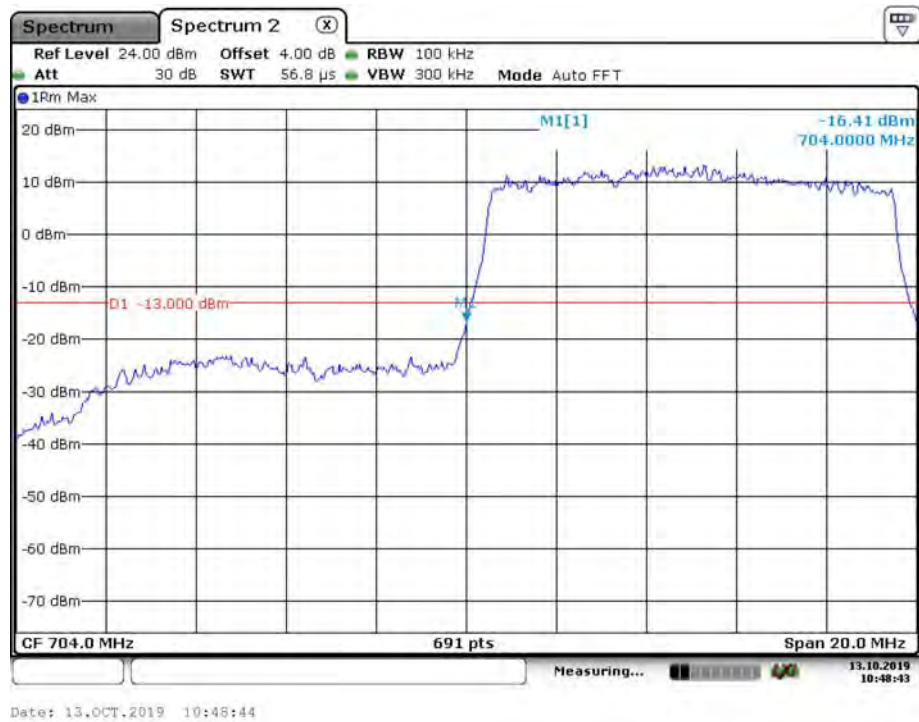
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QPSK_5MHz_25 RB_ Right

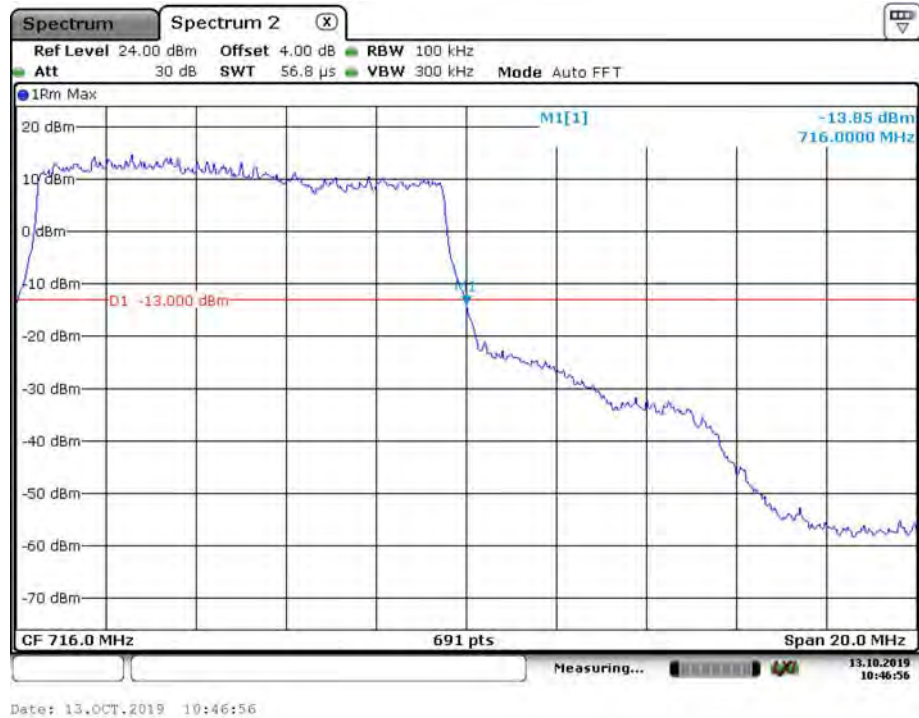


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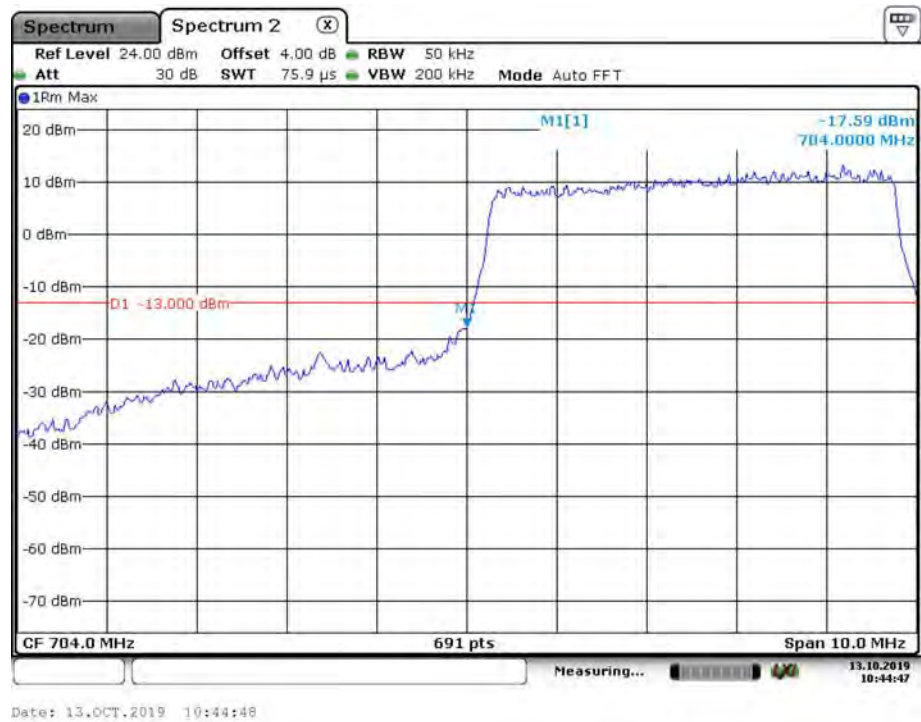
QPSK_10MHz_ 50 RB_ Left



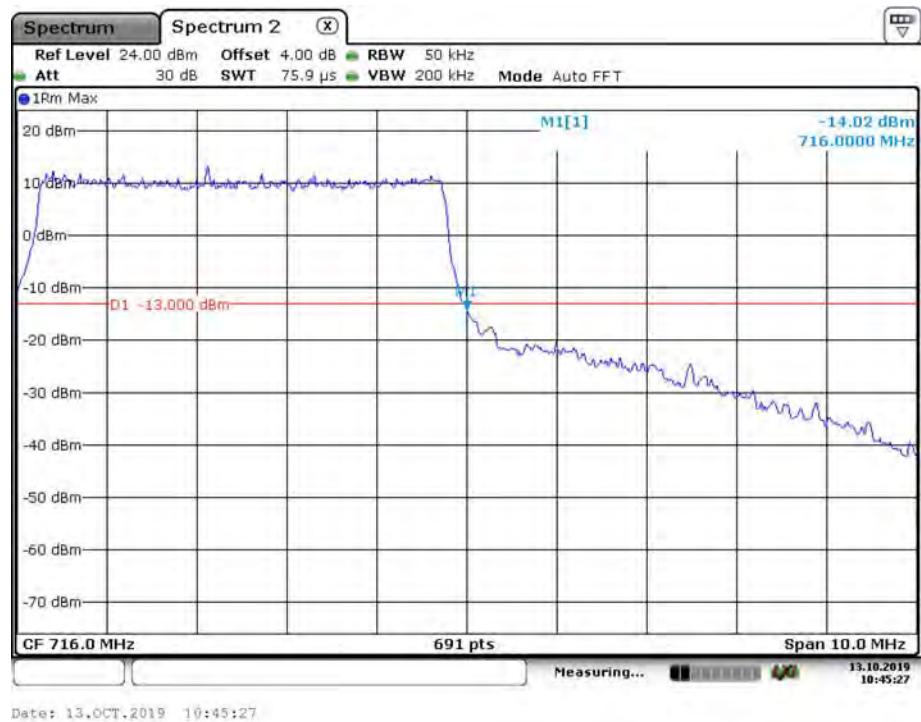
QPSK_10MHz_ 50 RB_ Right



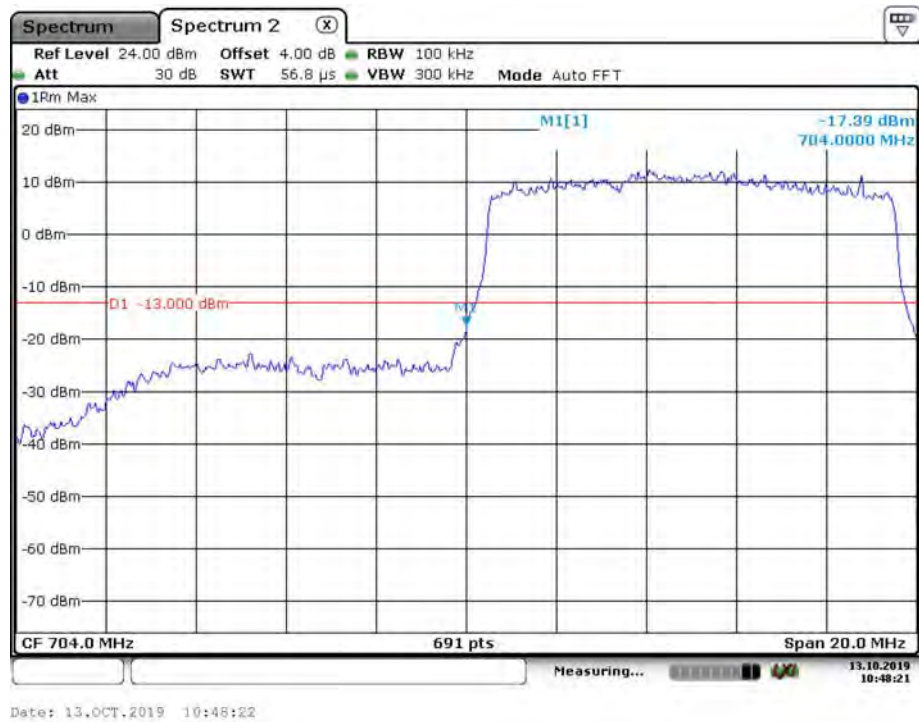
16QAM_5MHz_ 25 RB_ Left



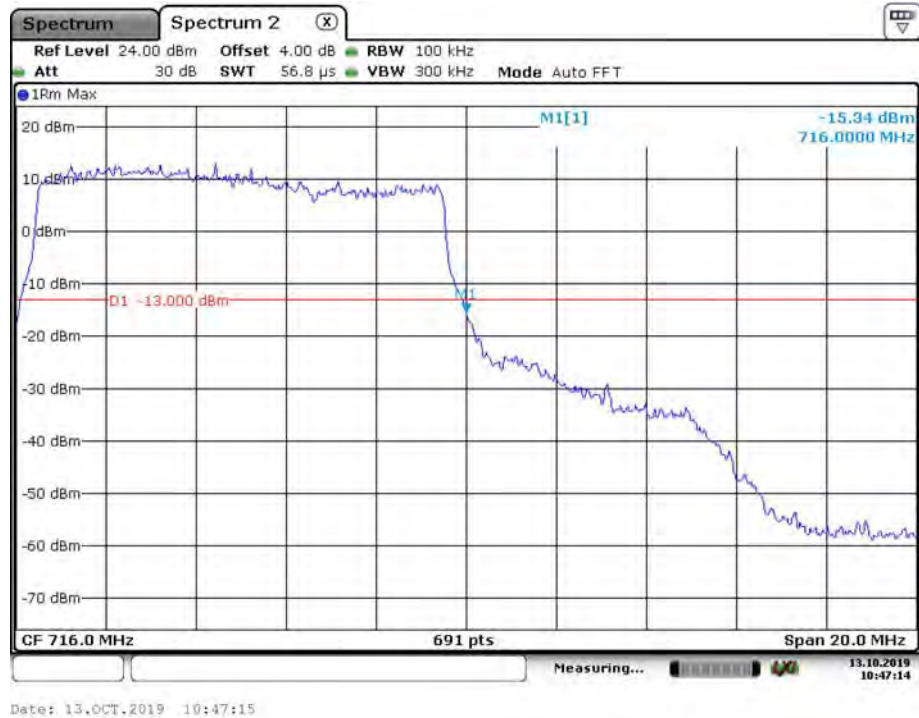
16QAM_5MHz_ 25 RB_ Right



16QAM_10MHz_ 50 RB_ Left



16QAM_10MHz_ 50 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

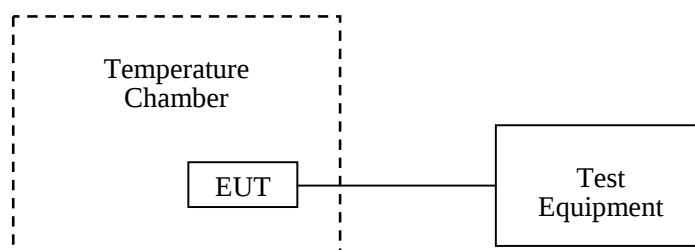
According to §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external AC 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 AC 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 AC power supply was connected to the battery terminals of the equipment under test. The voltage was set from 85% to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.



Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2019-01-09	2020-01-09
Unknown	Coaxial Cable	C-SJ00-0010	C0010/01	Each time	N/A
E-Microwave	Blocking Control	EMDCB-00036	0E01201047	2019-05-06	2020-05-06
Unknown	Attenuator	UNAT-3+	15529	2019-09-06	2020-09-06
R&S	Universal Radio Communication Tester	CMU200	106 891	2018-12-14	2019-12-14
R&S	Wideband Radio Communication Tester	CMW500	147473	2019-08-03	2020-08-03
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2019-03-26	2020-03-26

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

Test Data**Environmental Conditions**

Temperature:	27.9 °C
Relative Humidity:	57 %
ATM Pressure:	100.8 kPa

The testing was performed by Lily Xie on 2019-10-13

Cellular Band (Part 22H)

GSM850, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	3	0.00359	2.5
-20		2	0.00239	
-10		1	0.00120	
0		0	0.00000	
10		-1	-0.00120	
20		-2	-0.00239	
30		0	0.00000	
40		1	0.00120	
50		2	0.00239	
20	4.3	3	0.00359	
20	3.6	4	0.00478	

EGPRS850, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V _{DC}	Hz	ppm	ppm
-30	3.8	3	0.00359	2.5
-20		2	0.00239	
-10		0	0.00000	
0		-1	-0.00120	
10		-2	-0.00239	
20		-4	-0.00478	
30		-3	-0.00359	
40		-1	-0.00120	
50		1	0.00120	
20	4.3	3	0.00359	
20	3.6	4	0.00478	

PCS Band (Part 24E)

PCS1900, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	5	0.00266	Pass
-20		3	0.00160	
-10		2	0.00106	
0		0	0.00000	
10		-1	-0.00053	
20		-3	-0.00160	
30		0	0.00000	
40		2	0.00106	
50		3	0.00160	
20	4.3	5	0.00266	
20	3.6	6	0.00319	

EGPRS1900, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	6	0.00319	Pass
-20		5	0.00266	
-10		3	0.00160	
0		2	0.00106	
10		0	0.00000	
20		-1	-0.00053	
30		1	0.00053	
40		2	0.00106	
50		4	0.00213	
20	4.3	5	0.00266	
20	3.6	6	0.00319	

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	3	0.00359	2.5
-20		1	0.00120	
-10		0	0.00000	
0		-3	-0.00359	
10		-4	-0.00478	
20		-6	-0.00717	
30		-5	-0.00598	
40		-2	-0.00239	
50		0	0.00000	
20	4.3	2	0.00239	
20	3.6	4	0.00478	

WCDMA Band II: R99

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V _{DC}	Hz	ppm	
-30	3.8	4	0.00213	Pass
-20		2	0.00106	
-10		1	0.00053	
0		-2	-0.00106	
10		-3	-0.00160	
20		-5	-0.00266	
30		-4	-0.00213	
40		-1	-0.00053	
50		0	0.00000	
20	4.3	2	0.00106	
20	3.6	3	0.00160	

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	-9.33	-0.005	Pass
-20		-9.16	-0.0049	
-10		-9.09	-0.0048	
0		-9.15	-0.0049	
10		-9.10	-0.0048	
20		-9.17	-0.0049	
30		-9.10	-0.0048	
40		-9.24	-0.0049	
50		-9.16	-0.0049	
20	4.3	-9.08	-0.0048	
20	3.6	-9.29	-0.0049	

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	-7.75	-0.0041	Pass
-20		-7.68	-0.0041	
-10		-7.69	-0.0041	
0		-7.64	-0.0041	
10		-7.60	-0.004	
20		-7.46	-0.004	
30		-7.50	-0.004	
40		-7.61	-0.004	
50		-7.51	-0.004	
20	4.3	-7.55	-0.004	
20	3.6	-7.62	-0.0041	

LTE Band 4:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	1710.52	1754.47	1710	1755
-20		1710.51	1754.46	1710	1755
-10		1710.55	1754.48	1710	1755
0		1710.50	1754.46	1710	1755
10		1710.51	1754.47	1710	1755
20		1710.54	1754.52	1710	1755
30		1710.49	1754.48	1710	1755
40		1710.50	1754.46	1710	1755
50		1710.49	1754.45	1710	1755
20	4.3	1710.51	1754.48	1710	1755
20	3.6	1710.50	1754.46	1710	1755

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
℃	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	1710.51	1754.44	1710	1755
-20		1710.54	1754.45	1710	1755
-10		1710.55	1754.46	1710	1755
0		1710.50	1754.47	1710	1755
10		1710.49	1754.48	1710	1755
20		1710.51	1754.43	1710	1755
30		1710.49	1754.44	1710	1755
40		1710.50	1754.45	1710	1755
50		1710.52	1754.46	1710	1755
20	4.3	1710.51	1754.47	1710	1755
20	3.6	1710.50	1754.48	1710	1755

LTE Band 17:

QPSK, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	704.5711	715.5087	704	716
-20		704.5714	715.5094	704	716
-10		704.5713	715.5088	704	716
0		704.5713	715.5089	704	716
10		704.5716	715.5090	704	716
20		704.5711	715.5090	704	716
30		704.5712	715.5091	704	716
40		704.5712	715.5088	704	716
50		704.5713	715.5094	704	716
20	4.3	704.5716	715.5094	704	716
20	3.6	704.5716	715.5089	704	716

16QAM, Channel Bandwidth:10MHz					
Temperature	Voltage	Test Result (MHz)		Limit (MHz)	
°C	V_{DC}	F_L	F_H	F_L	F_H
-30	3.8	704.5712	715.5088	704	716
-20		704.5713	715.5094	704	716
-10		704.5713	715.5088	704	716
0		704.5711	715.5087	704	716
10		704.5714	715.5094	704	716
20		704.5711	715.5090	704	716
30		704.5712	715.5091	704	716
40		704.5713	715.5089	704	716
50		704.5716	715.5090	704	716
20	4.3	704.5716	715.5094	704	716
20	3.6	704.5716	715.5089	704	716

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

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