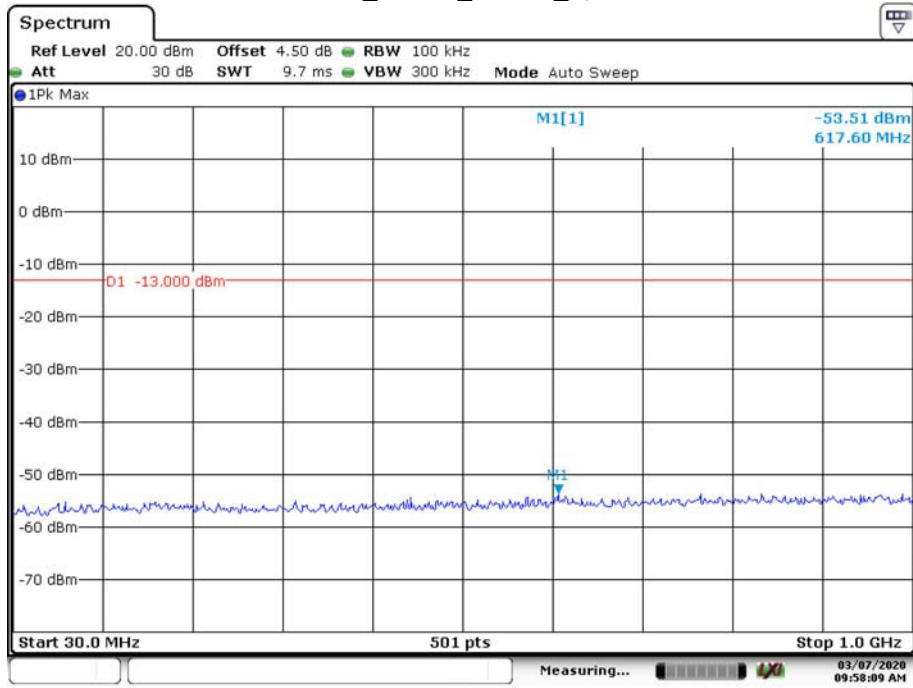
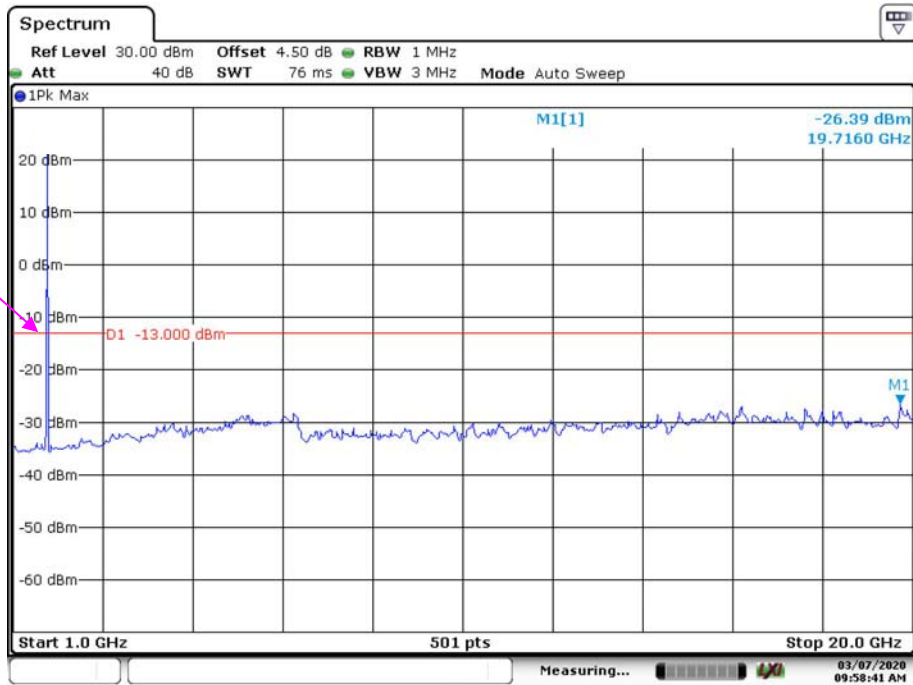
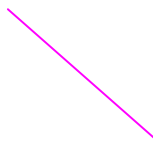


Band 4\_3 MHz\_Middle\_QPSK



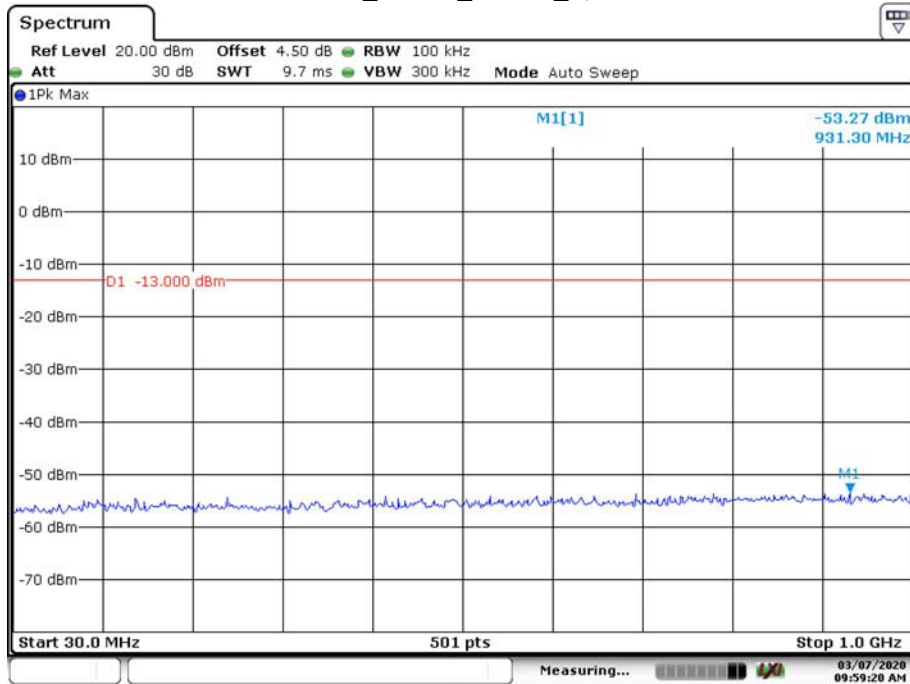
Date: 7.MAR.2020 09:58:09

Fundamental



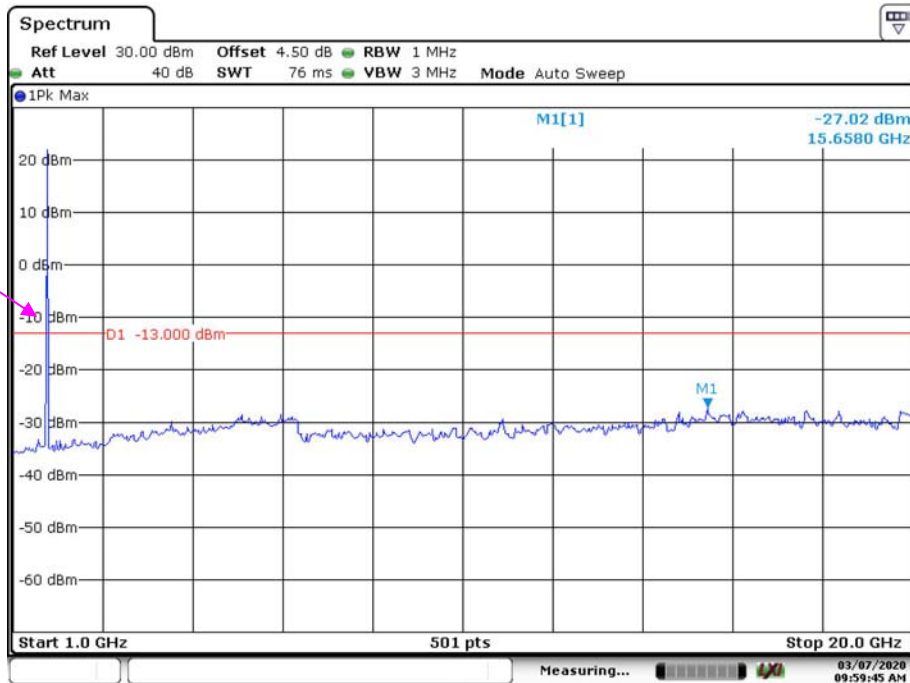
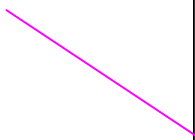
Date: 7.MAR.2020 09:58:41

Band 4\_5 MHz\_Middle\_QPSK



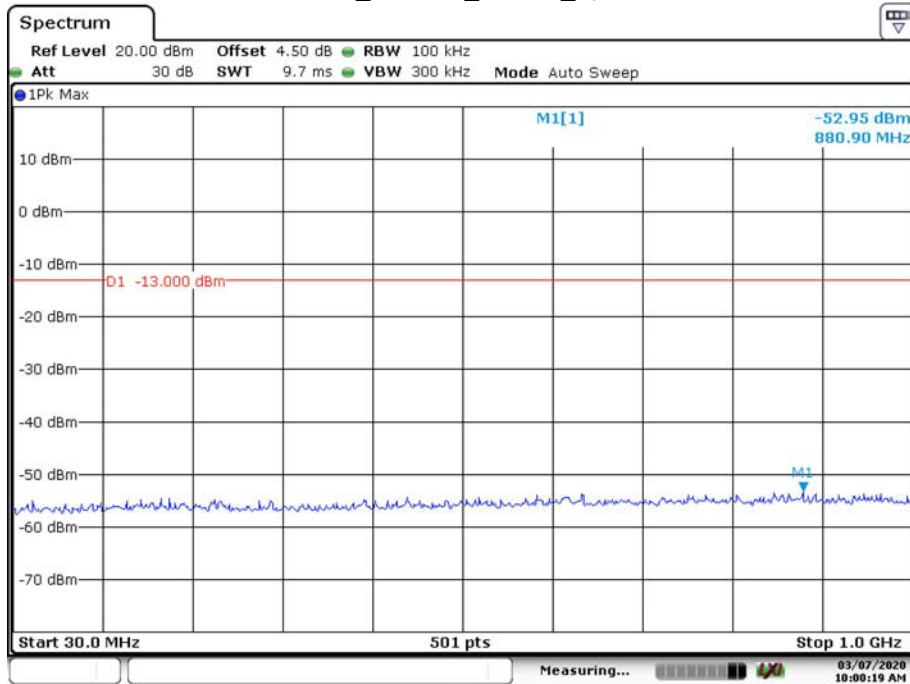
Date: 7.MAR.2020 09:59:20

Fundamental



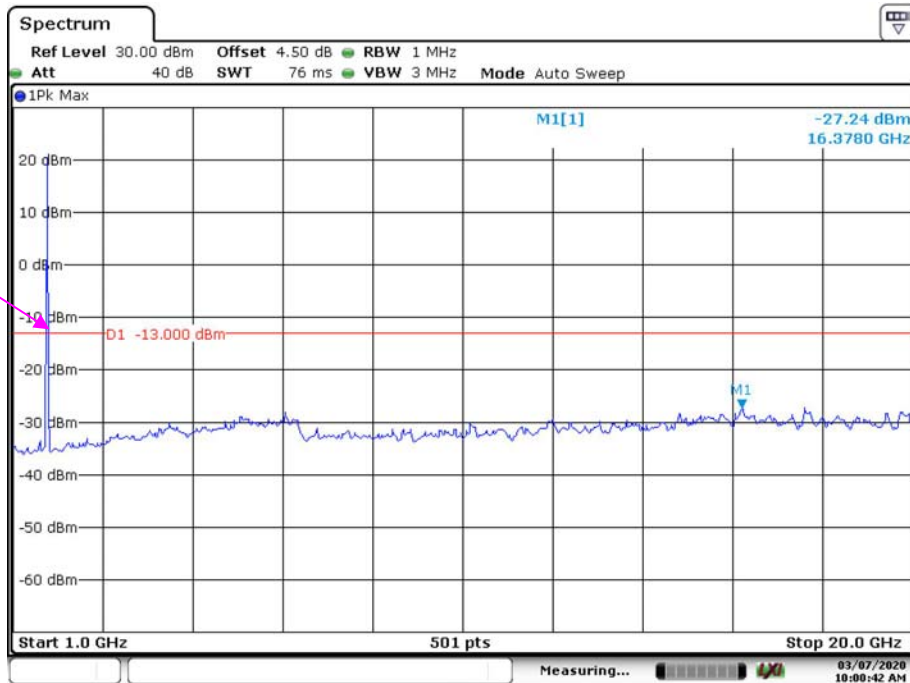
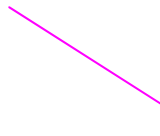
Date: 7.MAR.2020 09:59:45

Band 4\_10 MHz\_Middle\_QPSK



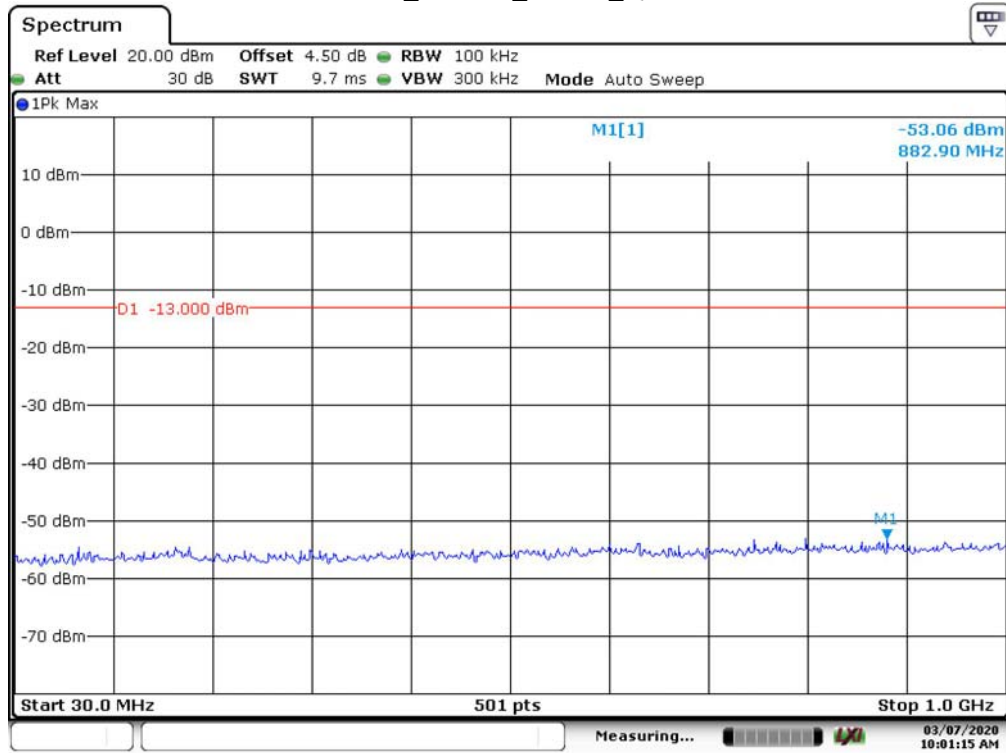
Date: 7.MAR.2020 10:00:19

Fundamental

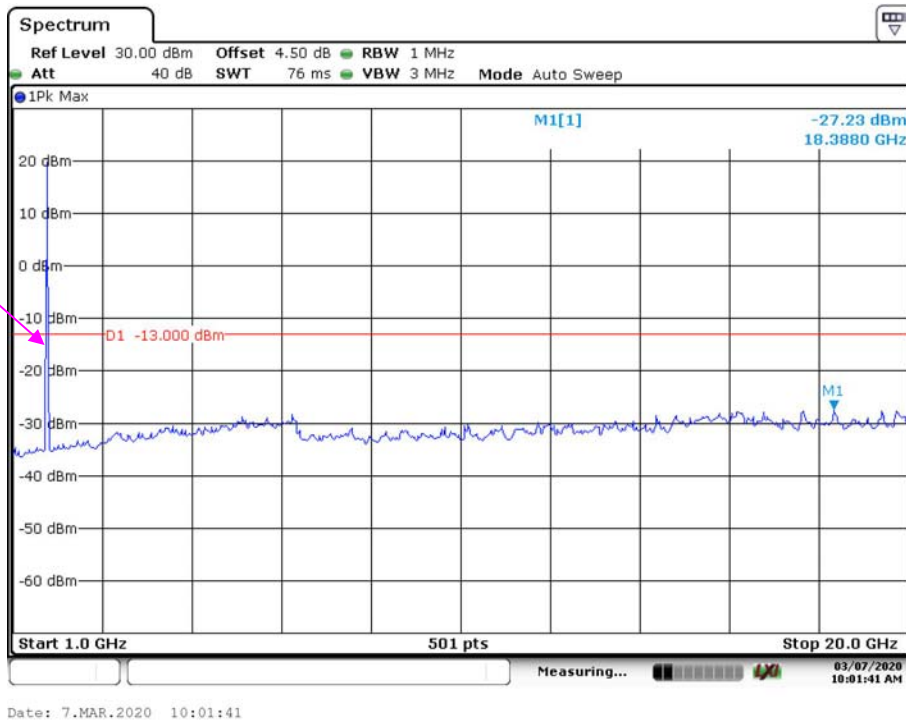


Date: 7.MAR.2020 10:00:42

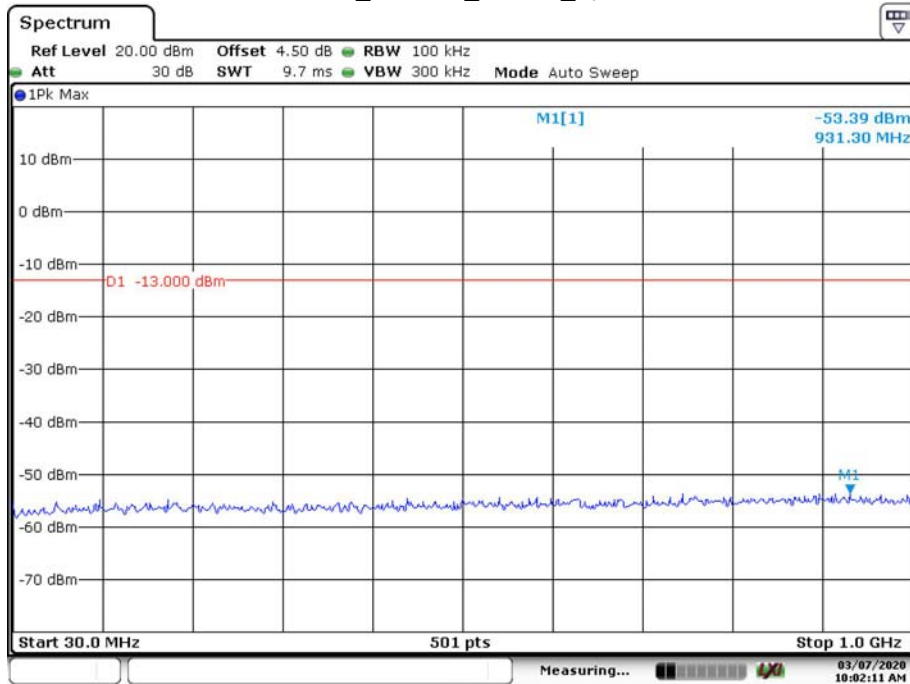
Band 4\_15 MHz\_Middle\_QPSK



Fundamental

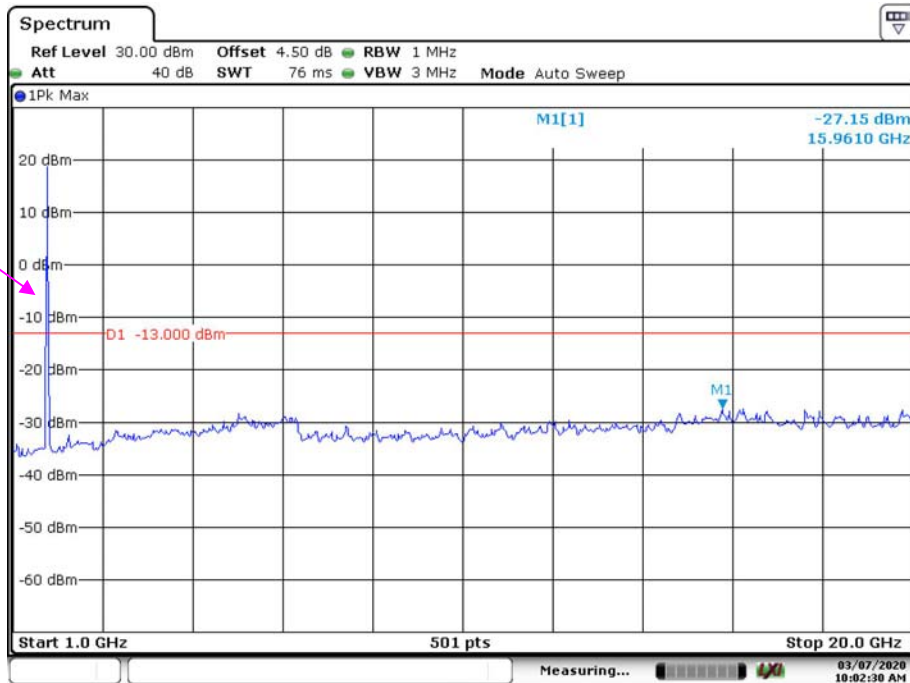
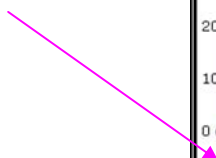


Band 4\_20 MHz\_Middle\_QPSK



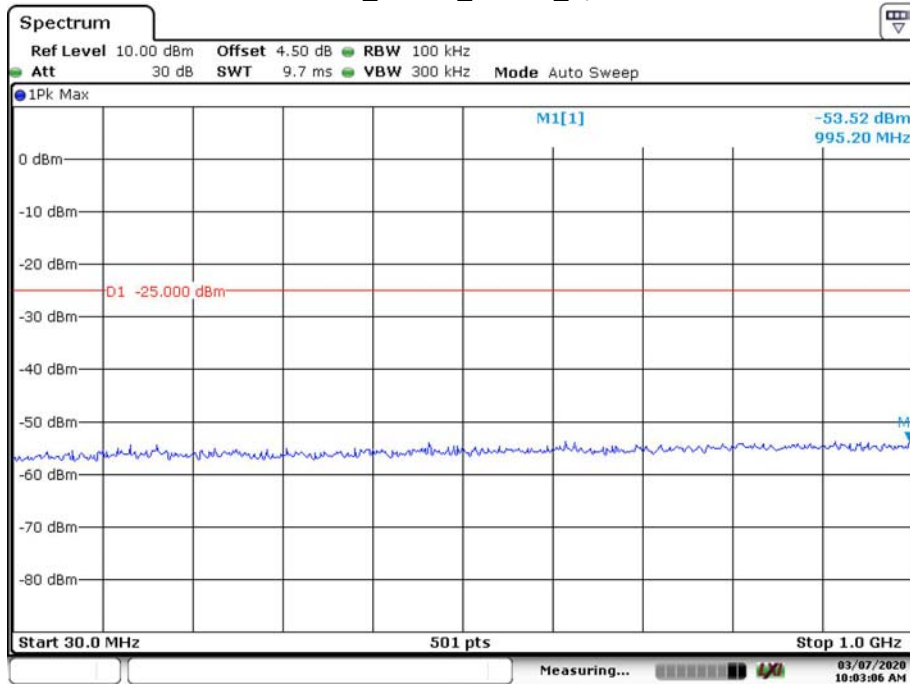
Date: 7.MAR.2020 10:02:11

Fundamental



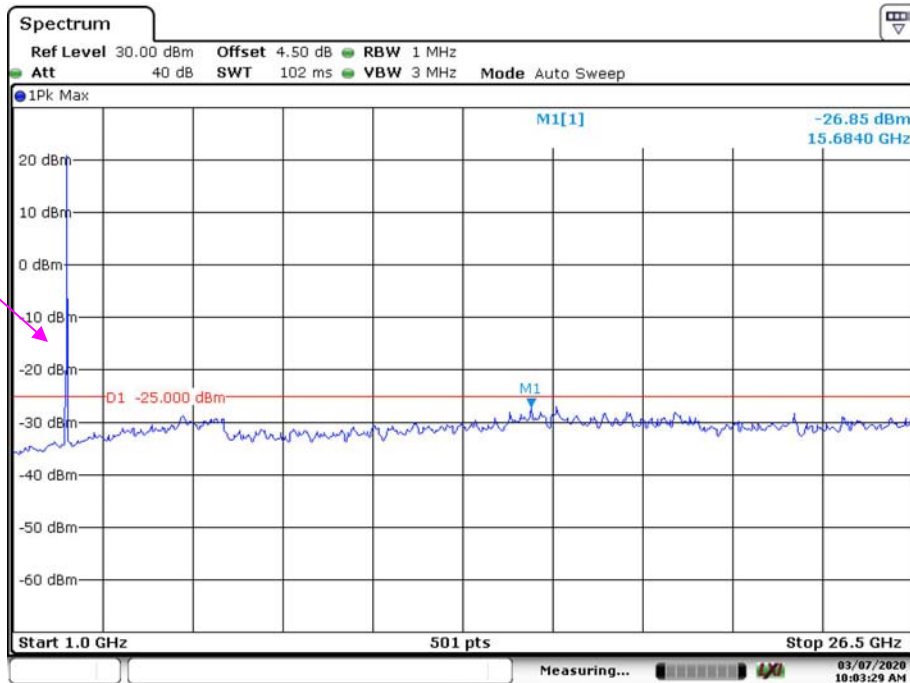
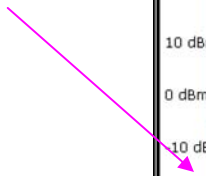
Date: 7.MAR.2020 10:02:30

Band 7\_5 MHz\_Middle\_QPSK



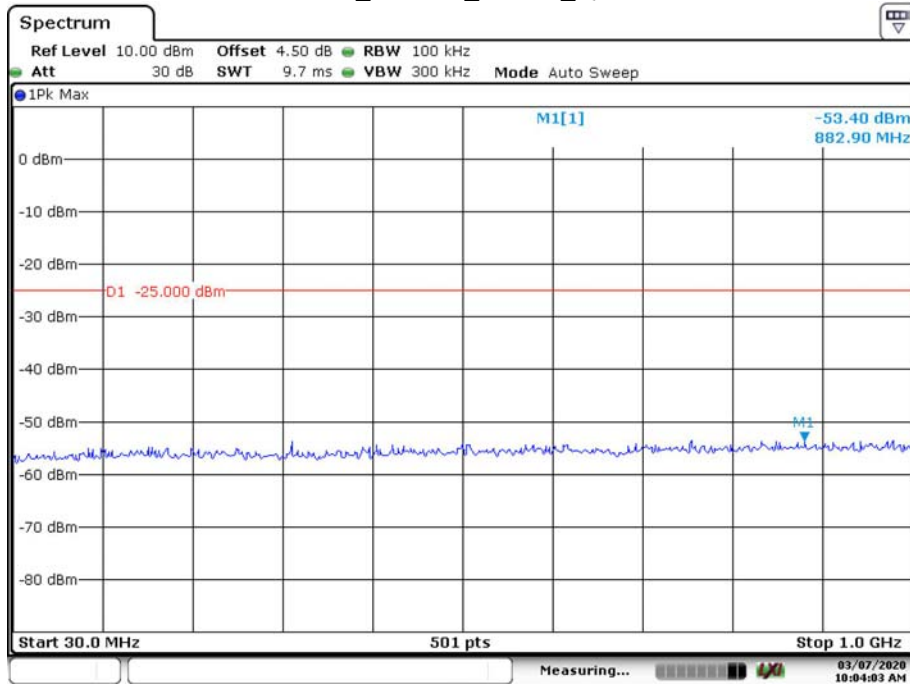
Date: 7.MAR.2020 10:03:06

Fundamental



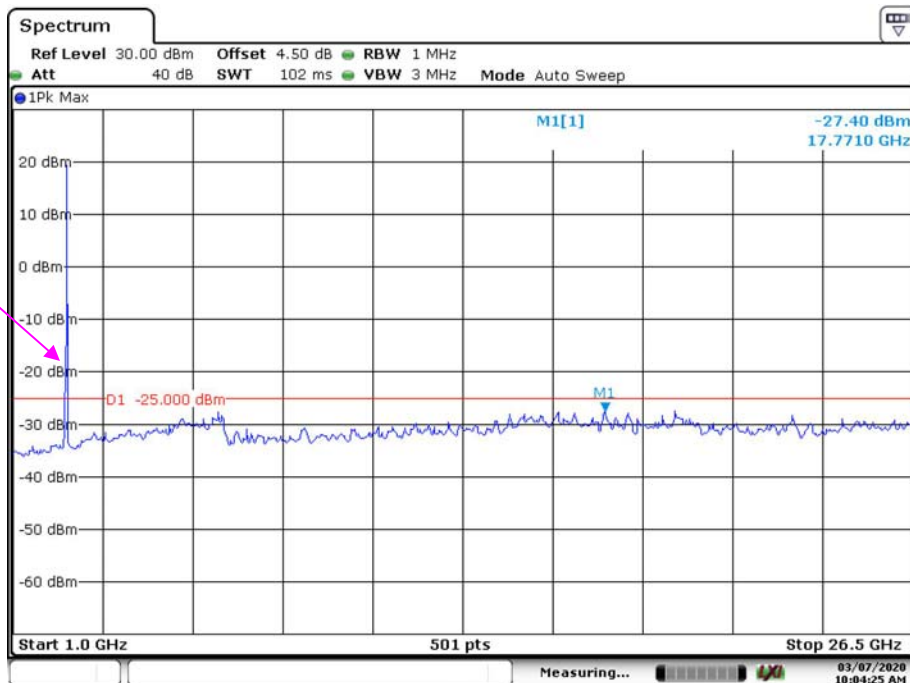
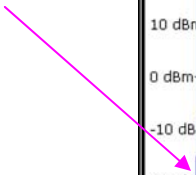
Date: 7.MAR.2020 10:03:28

Band 7\_10 MHz\_Middle\_QPSK



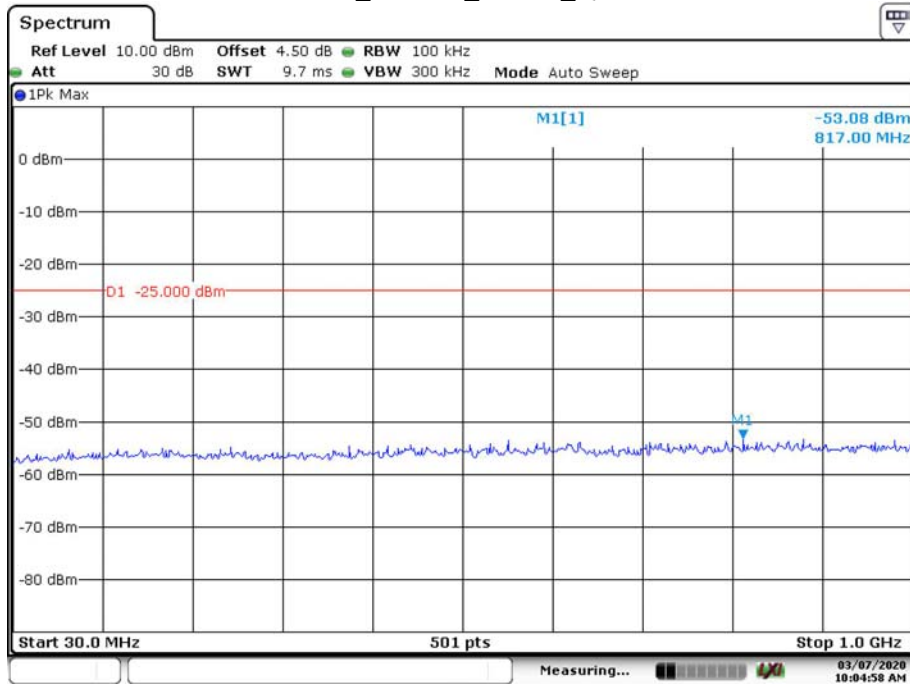
Date: 7.MAR.2020 10:04:03

Fundamental



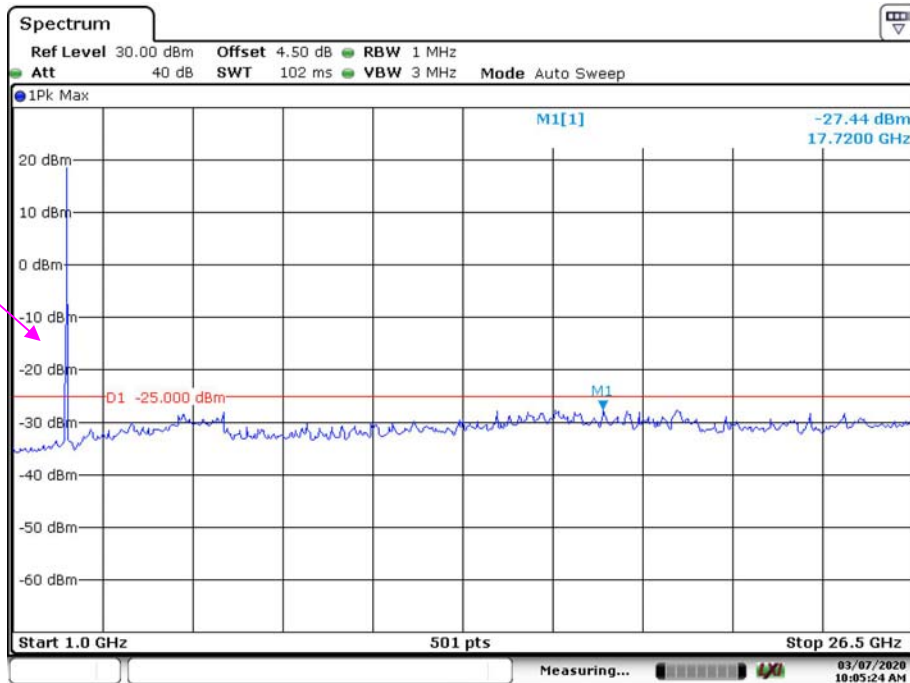
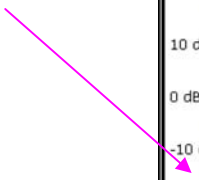
Date: 7.MAR.2020 10:04:25

Band 7\_15 MHz\_Middle\_QPSK



Date: 7.MAR.2020 10:04:58

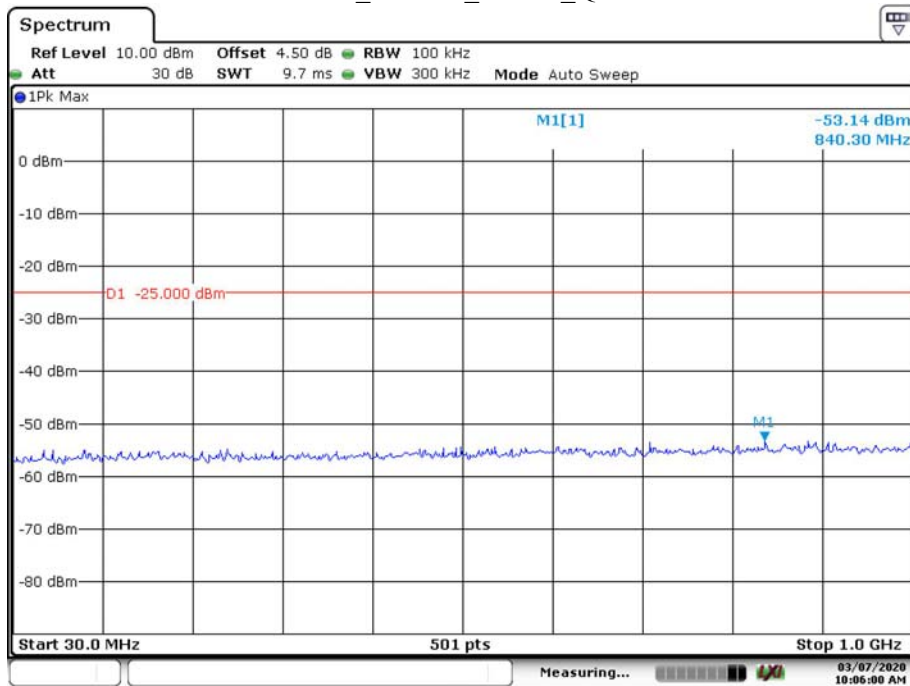
Fundamental



Date: 7.MAR.2020 10:05:24

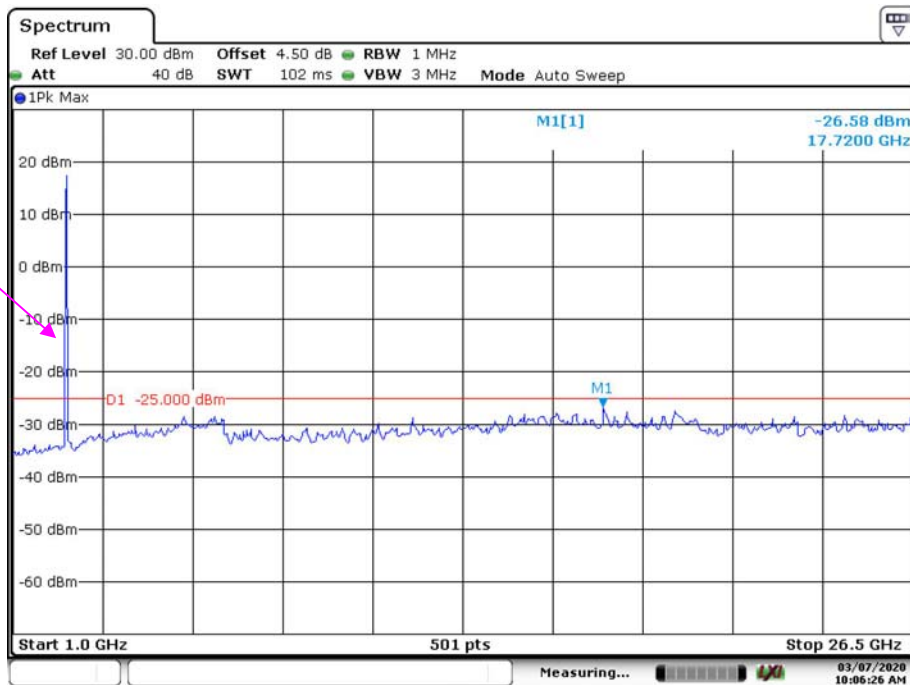
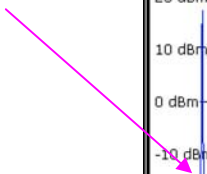


Band 7\_20 MHz\_Middle\_QPSK



Date: 7.MAR.2020 10:06:00

Fundamental



Date: 7.MAR.2020 10:06:25

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

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### **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	2019-05-06	2020-05-06
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	Signal Generator	E8247C	MY43321350	2019-12-10	2020-12-10
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	BSF1710-1785MN-0383-003	0383003	2019-06-16	2020-06-16
Sinoscite	Band-stop filter	BSF1850-1910MS-0935V2	0935V2	2019-06-16	2020-06-16
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-01 1304	2017-12-06	2020-12-05
Ducommun Technologies	Horn Antenna	ARH-4223-02	1007726-02 1304	2017-12-06	2020-12-05
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**

Test Items	Radiation Below 1GHz	Radiation Above 1GHz
Temperature:	23.8 °C	23.3°C
Relative Humidity:	63%	45 %
ATM Pressure:	101.9 kPa	101.3kPa
Tester:	Felix Wang	Vern Shen
Test Date:	2020-03-01	2020-03-11

Test Result: Compliance.

*EUT Operation Mode: Transmitting***Cellular Band (PART 22H)****30 MHz-10 GHz:**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	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	54.95	-48.99	10.6	0.73	-39.1	-13.0	26.1
1673.200	V	53.93	-50.61	10.6	0.73	-40.7	-13.0	27.7
2509.800	H	56.84	-46.07	13.1	1.25	-34.2	-13.0	21.2
2509.800	V	56.96	-45.98	13.1	1.25	-34.1	-13.0	21.1
3346.400	H	41.65	-58.03	13.8	1.61	-45.8	-13.0	32.8
3346.400	V	40.66	-59.06	13.8	1.61	-46.8	-13.0	33.8
176.700	H	44.91	-64.42	0.0	0.44	-64.9	-13.0	51.9
88.300	V	42.38	-71.39	0.0	0.36	-71.8	-13.0	58.8
WCDMA Band V, Frequency:836.600 MHz								
1673.200	H	39.48	-64.46	10.6	0.73	-54.6	-13.0	41.6
1673.200	V	38.00	-66.54	10.6	0.73	-56.7	-13.0	43.7
2509.800	H	37.54	-65.37	13.1	1.25	-53.5	-13.0	40.5
2509.800	V	39.25	-63.69	13.1	1.25	-51.8	-13.0	38.8
3346.400	H	37.21	-62.47	13.8	1.61	-50.3	-13.0	37.3
3346.400	V	37.08	-62.64	13.8	1.61	-50.4	-13.0	37.4
712.900	H	36.87	-64.2	0.0	0.94	-65.1	-13.0	52.1
712.900	V	36.83	-66.88	0.0	0.94	-67.8	-13.0	54.8

**PCS Band (PART 24E)**

**30 MHz-20 GHz:**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
GSM1900, Frequency:1880.000 MHz								
3760.000	H	53.28	-44.36	13.8	1.63	-32.2	-13.0	19.2
3760.000	V	51.05	-46.45	13.8	1.63	-34.3	-13.0	21.3
5640.000	H	51.14	-42.45	14.0	1.31	-29.7	-13.0	16.7
5640.000	V	50.45	-43.03	14.0	1.31	-30.3	-13.0	17.3
251.100	H	39.84	-69.39	0.0	0.51	-69.9	-13.0	56.9
53.200	V	44.40	-58.91	-13.4	0.22	-72.6	-13.0	59.6
WCDMA Band II, Frequency:1880.000 MHz								
3760.000	H	44.71	-52.93	13.8	1.63	-40.8	-13.0	27.8
3760.000	V	42.27	-55.23	13.8	1.63	-43.1	-13.0	30.1
5640.000	H	40.19	-53.4	14.0	1.31	-40.7	-13.0	27.7
5640.000	V	40.39	-53.09	14.0	1.31	-40.4	-13.0	27.4
89.700	H	38.67	-72.03	0.0	0.36	-72.4	-13.0	59.4
40.500	V	45.89	-41.78	-25.7	0.21	-67.7	-13.0	54.7

**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	42.43	-55.21	13.76	1.63	-43.08	-13.00	30.08
3760.00	V	39.98	-57.52	13.76	1.63	-45.39	-13.00	32.39
5640.00	H	36.71	-56.88	14.02	1.31	-44.17	-13.00	31.17
5640.00	V	40.36	-53.12	14.02	1.31	-40.41	-13.00	27.41
362.00	H	38.70	-67.57	0.00	0.58	-68.15	-13.00	55.15
374.60	V	43.85	-64.78	0.00	0.59	-65.37	-13.00	52.37

**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	40.82	-58.37	13.91	1.62	-46.08	-13.00	33.08
3465.00	V	37.95	-61.27	13.91	1.62	-48.98	-13.00	35.98
5197.50	H	36.01	-58.68	14.00	1.52	-46.20	-13.00	33.20
5197.50	V	37.15	-57.61	14.00	1.52	-45.13	-13.00	32.13
376.50	H	41.80	-63.91	0.00	0.59	-64.50	-13.00	51.50
374.60	V	42.10	-66.53	0.00	0.59	-67.12	-13.00	54.12

**LTE Band 7 (30MHz-26.5GHz):**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Substituted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
QPSK, Frequency: 2535.000 MHz								
5070.00	H	38.72	-56.39	13.93	1.34	-43.80	-25.00	18.80
5070.00	V	41.53	-53.39	13.93	1.34	-40.80	-25.00	15.80
7605.00	H	42.75	-46.13	13.21	1.40	-34.32	-25.00	9.32
7605.00	V	41.95	-47.33	13.21	1.40	-35.52	-25.00	10.52
399.90	H	40.68	-64.13	0.00	0.61	-64.74	-25.00	39.74
374.60	V	42.80	-65.83	0.00	0.59	-66.42	-25.00	41.42

## 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

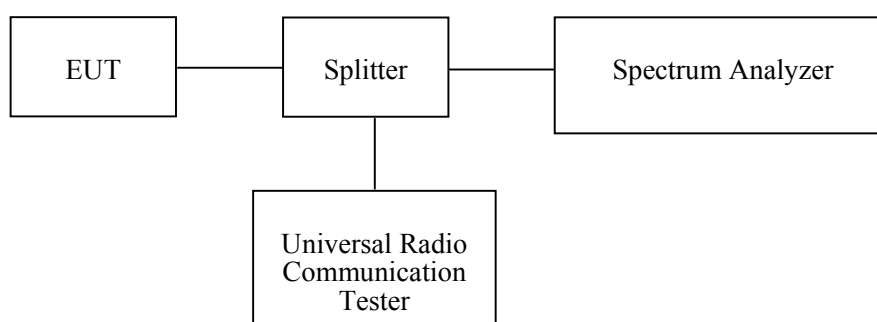
### Applicable Standard

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	2020-01-09	2021-01-09
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	Each time	/
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005011	Each time	/
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	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

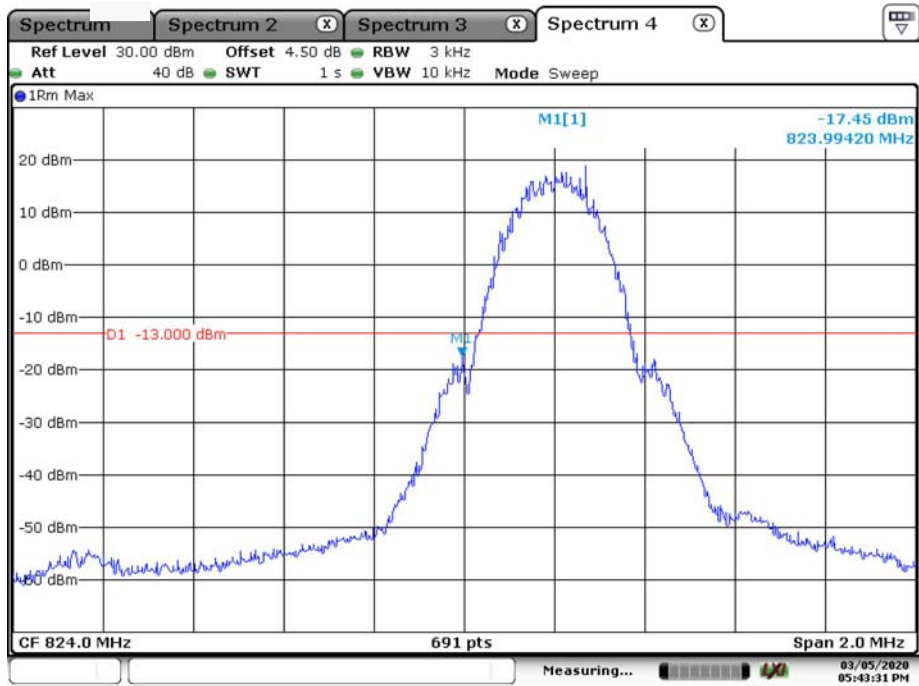
#### Environmental Conditions

<b>Temperature:</b>	23.1~23.5 °C
<b>Relative Humidity:</b>	57~66 %
<b>ATM Pressure:</b>	100.8~102.5kPa
<b>Tester:</b>	Fay Hu
<b>Test Date:</b>	2020-03-05~2020-03-07

*Test Mode: Transmitting*

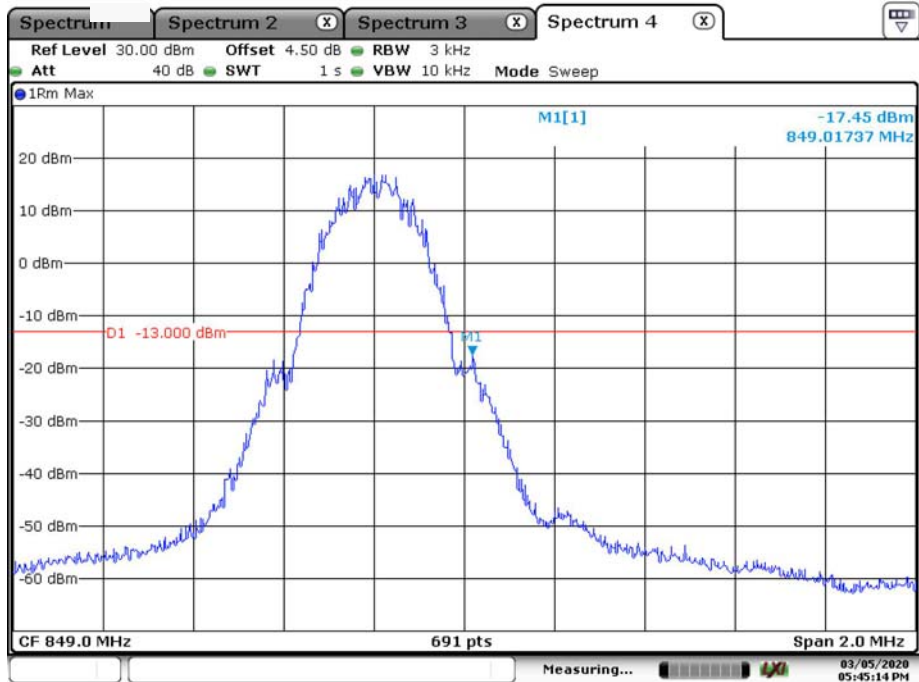
*Test Result: Compliance. Please refer to the following plots.*

### GSM 850, Left Band Edge



Date: 5.MAR.2020 17:43:31

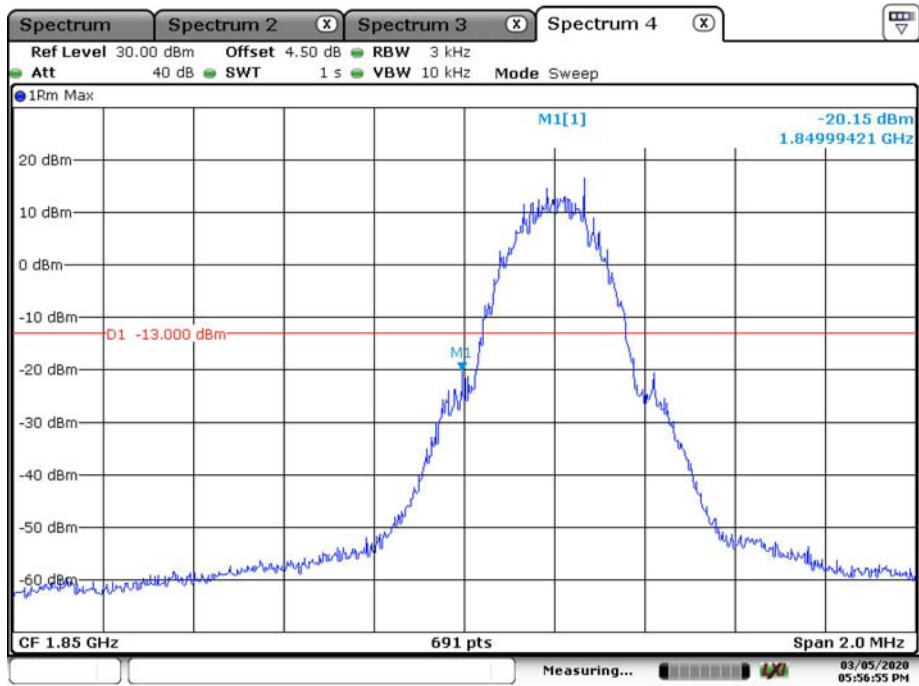
### GSM 850, Right Band Edge



Date: 5.MAR.2020 17:45:14

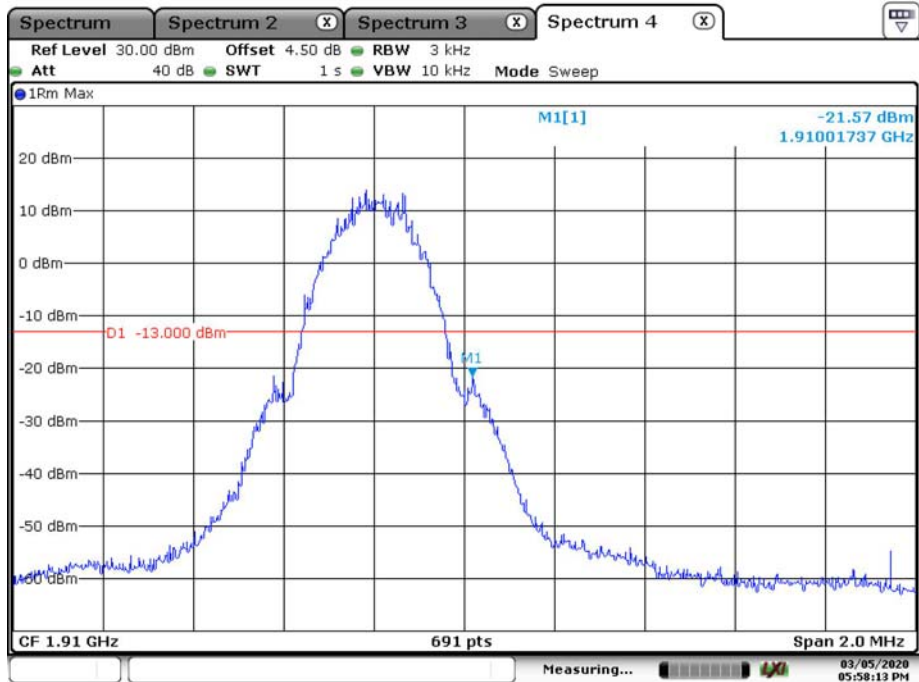


### GSM 1900, Left Band Edge



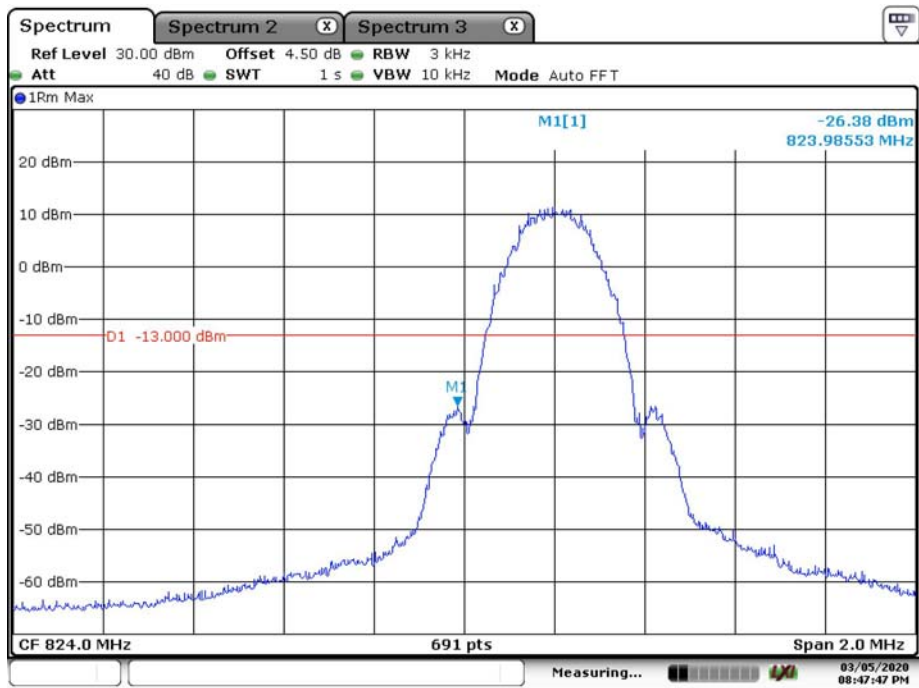
Date: 5.MAR.2020 17:56:55

### GSM 1900, Right Band Edge



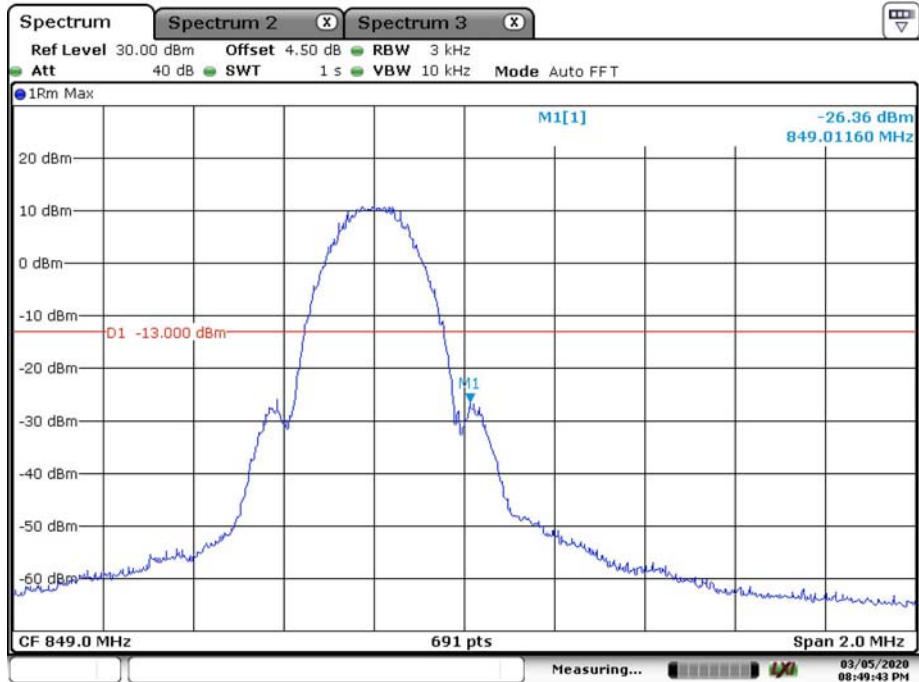
Date: 5.MAR.2020 17:58:14

### EDGE 850, Left Band Edge



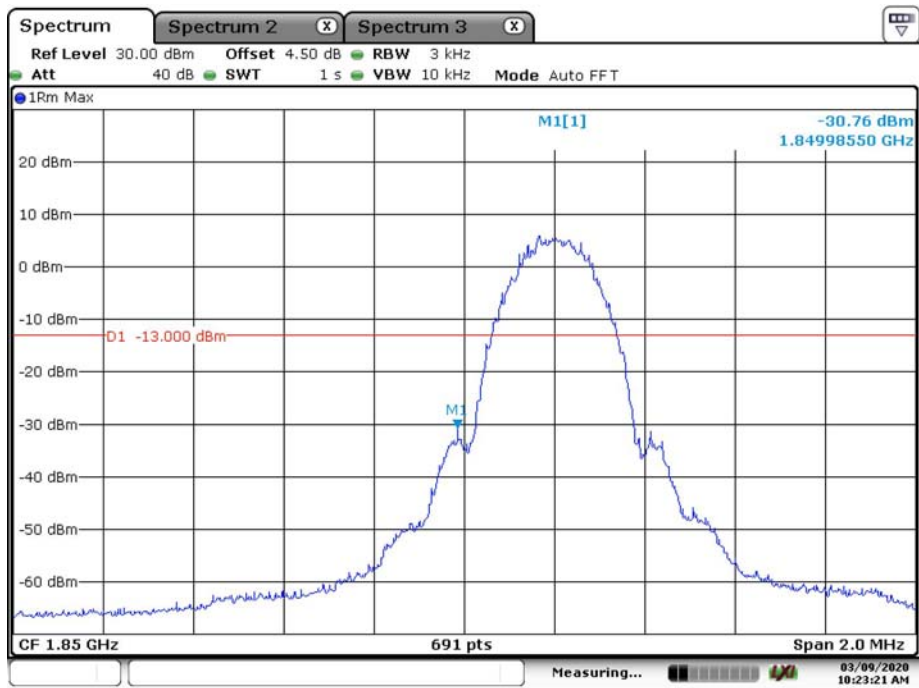
Date: 5.MAR.2020 20:47:47

### EDGE 850, Right Band Edge



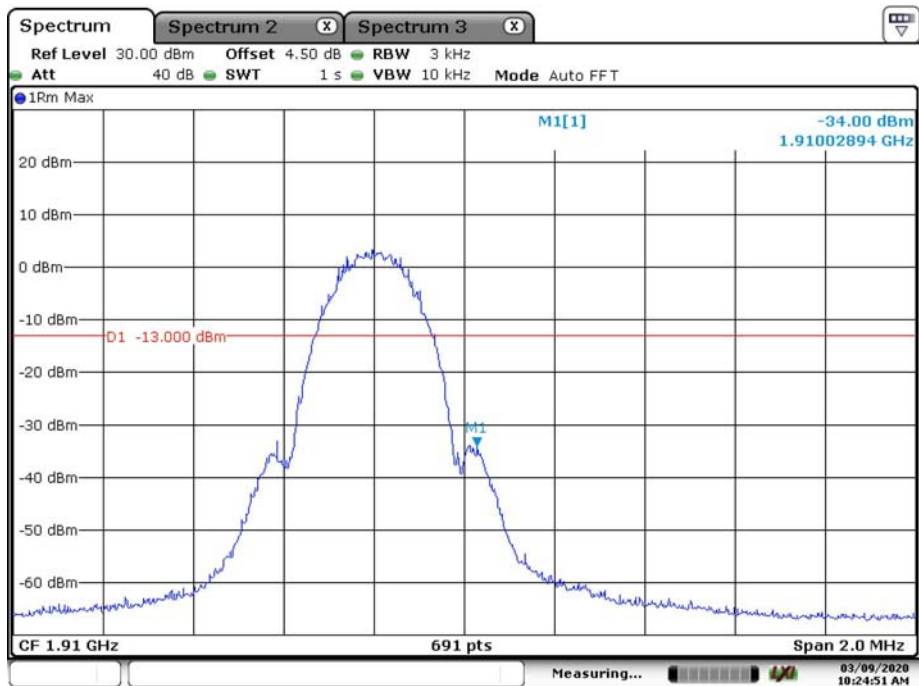
Date: 5.MAR.2020 20:49:43

### EDGE 1900, Left Band Edge



Date: 9.MAR.2020 10:23:21

### EDGE 1900, Right Band Edge



Date: 9.MAR.2020 10:24:51

### WCDMA Band 2 Rel 99, Left Band Edge



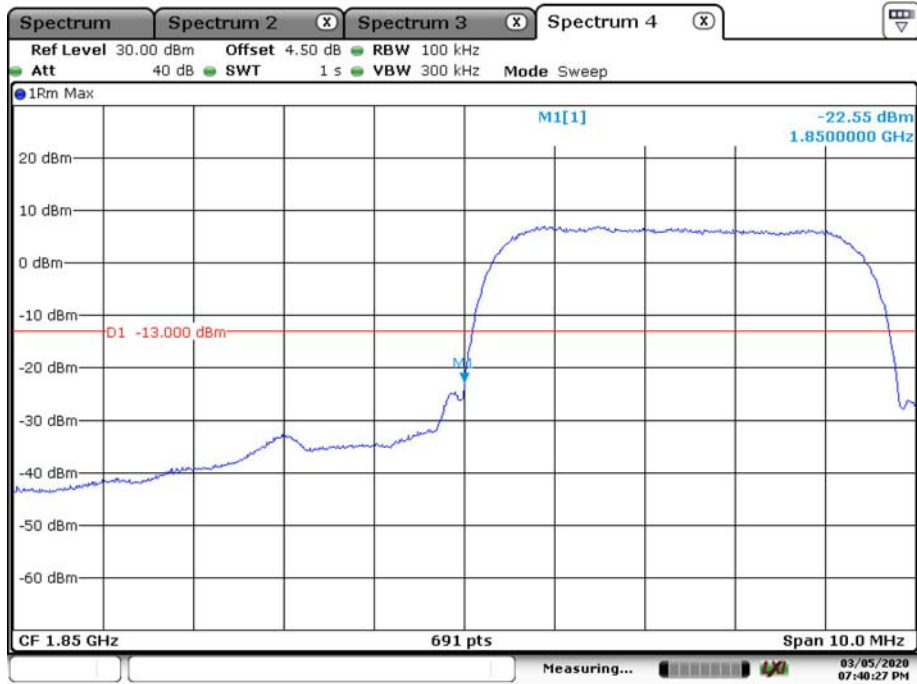
Date: 5.MAR.2020 19:10:25

### WCDMA Band 2 Rel 99, Right Band Edge



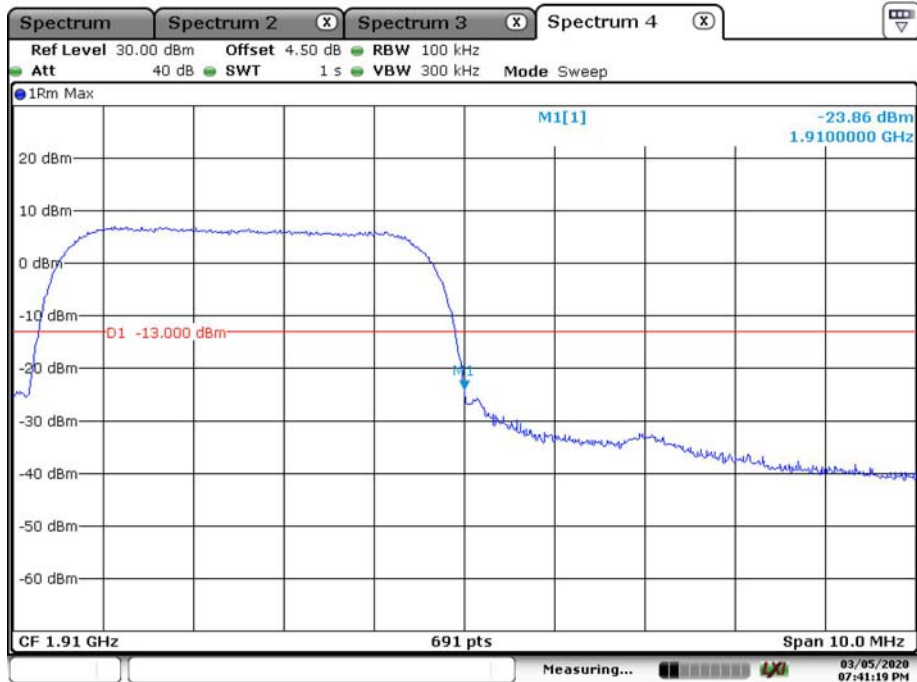
Date: 5.MAR.2020 19:11:11

### WCDMA Band 2 HSDPA, Left Band Edge



Date: 5.MAR.2020 19:40:26

### WCDMA Band 2 HSDPA, Right Band Edge



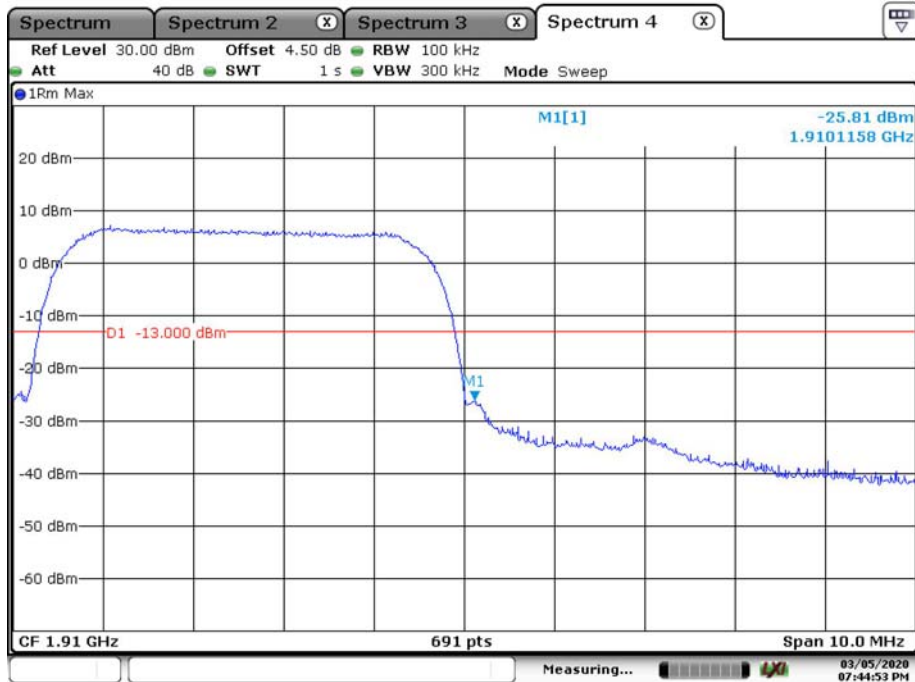
Date: 5.MAR.2020 19:41:18

### WCDMA Band 2 HSUPA, Left Band Edge



Date: 5.MAR.2020 19:45:48

### WCDMA Band 2 HSUPA, Right Band Edge



Date: 5.MAR.2020 19:44:52

### WCDMA Band 5 Rel 99, Left Band Edge



### WCDMA Band 5 Rel 99, Right Band Edge





### WCDMA Band 5 HSDPA, Left Band Edge



Date: 5.MAR.2020 19:35:07

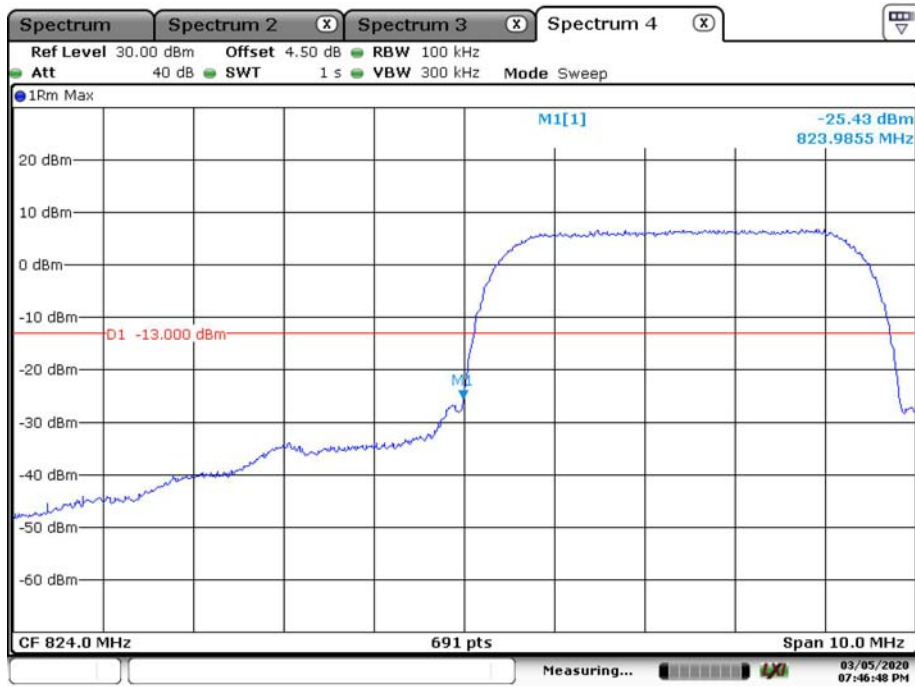
### WCDMA Band 5 HSDPA, Right Band Edge



Date: 5.MAR.2020 19:34:14

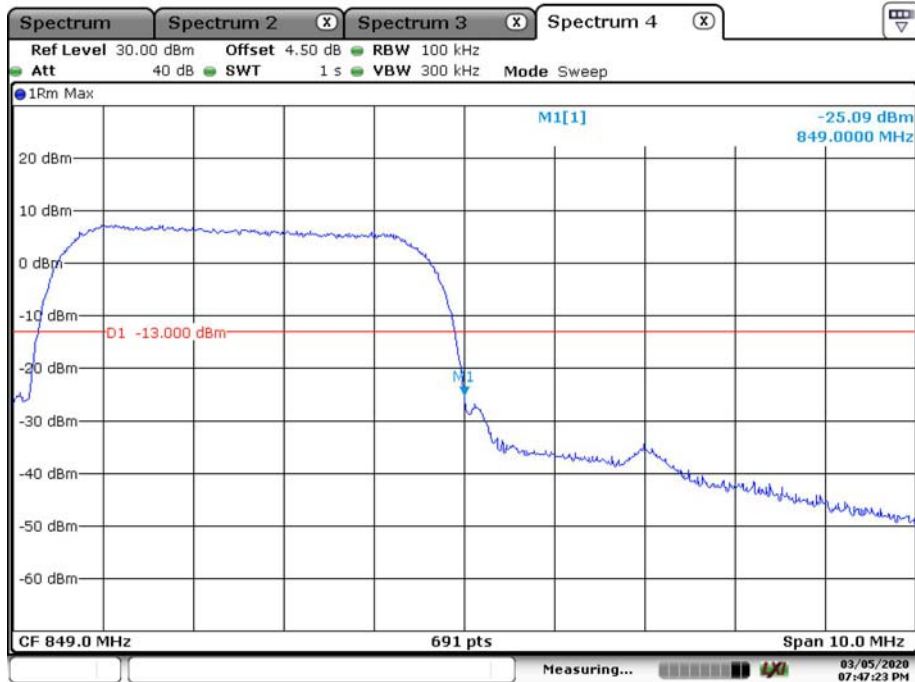


### WCDMA Band 5 HSUPA, Left Band Edge



Date: 5.MAR.2020 19:46:48

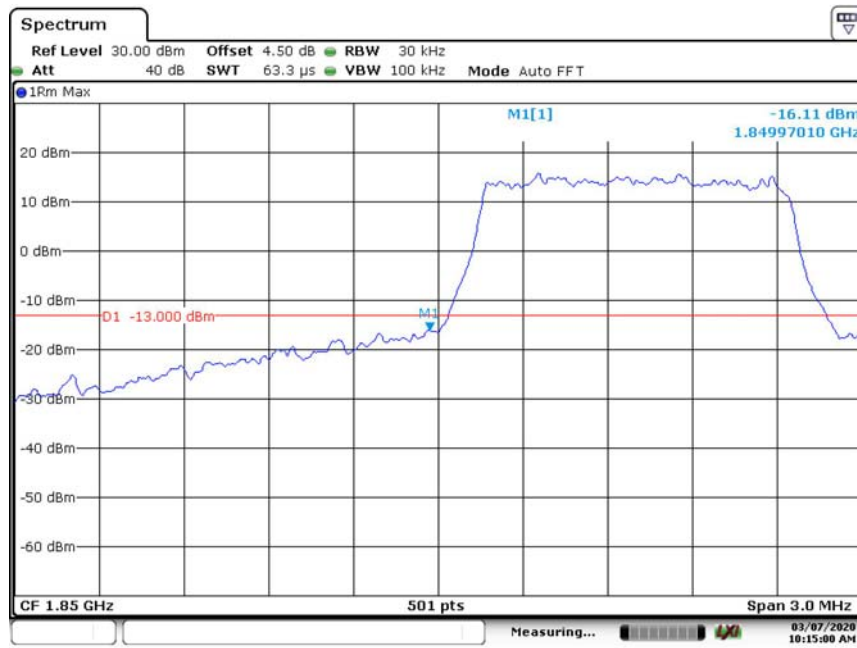
### WCDMA Band 5 HSUPA, Right Band Edge



Date: 5.MAR.2020 19:47:22

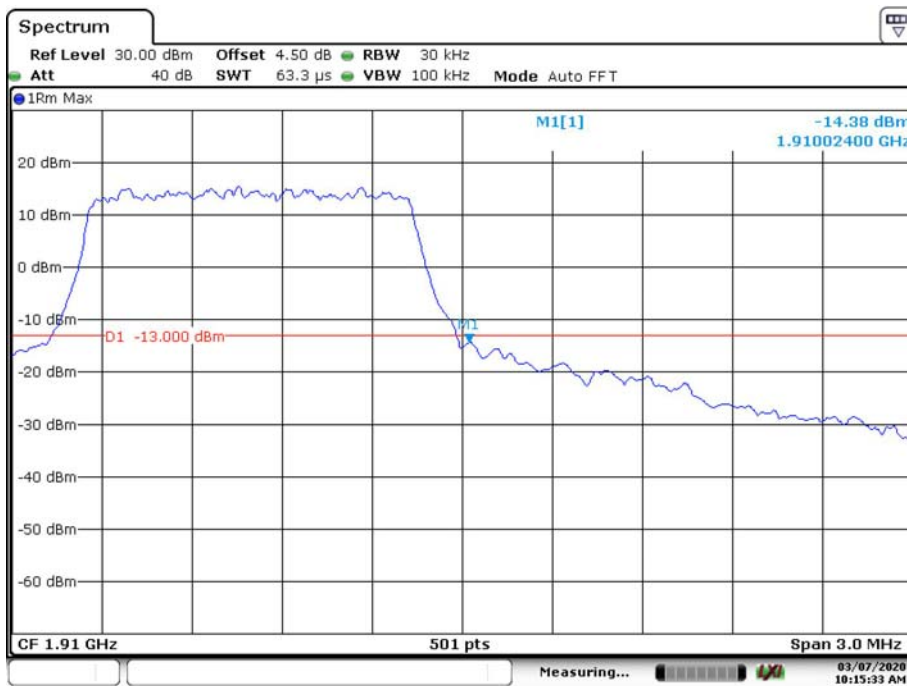
LTE Band 2

QPSK\_1.4MHz\_6 RB\_Left



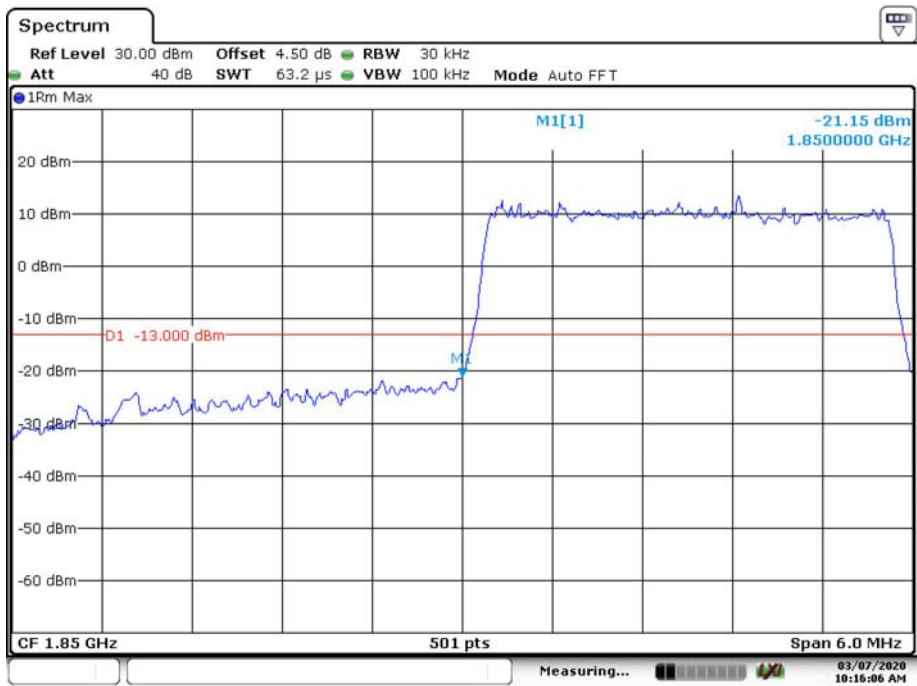
Date: 7.MAR.2020 10:15:00

QPSK\_1.4MHz\_6 RB\_Right



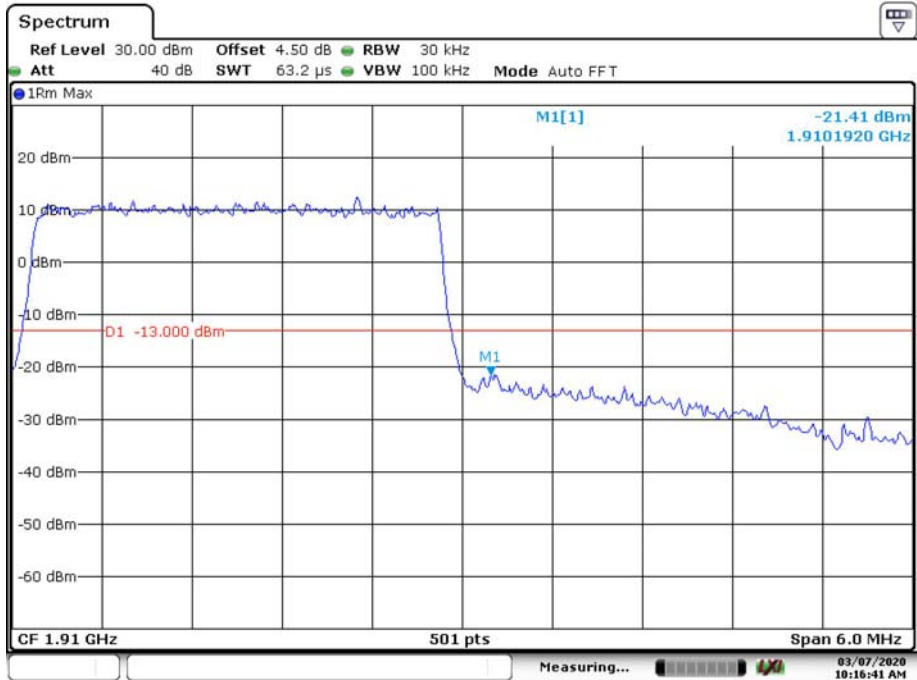
Date: 7.MAR.2020 10:15:32

### QPSK\_3MHz\_15 RB\_ Left



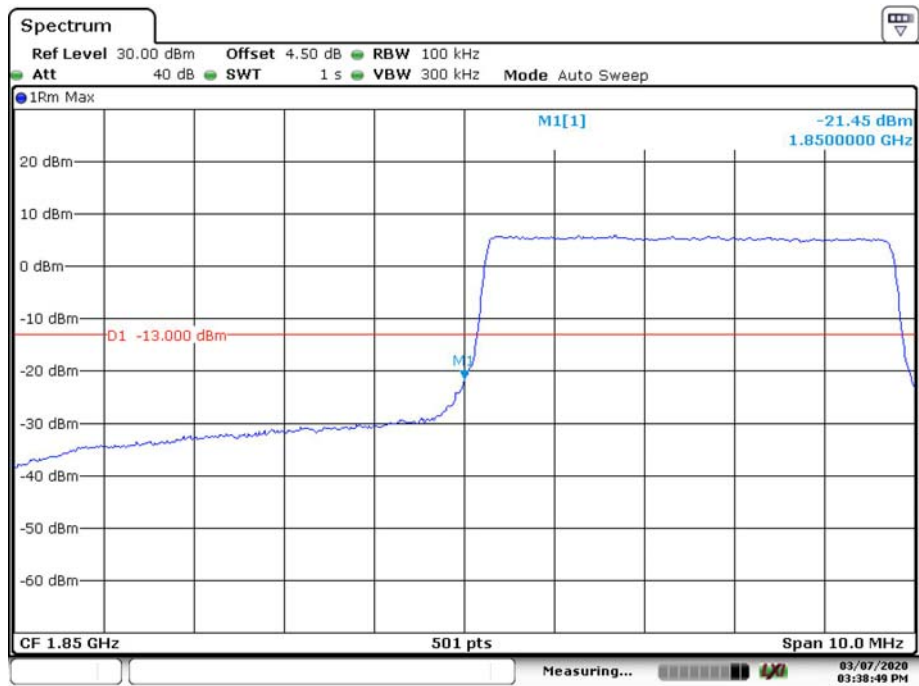
Date: 7.MAR.2020 10:16:06

### QPSK\_3MHz\_15 RB\_ Right



Date: 7.MAR.2020 10:16:41

### QPSK\_5MHz\_25 RB\_Left



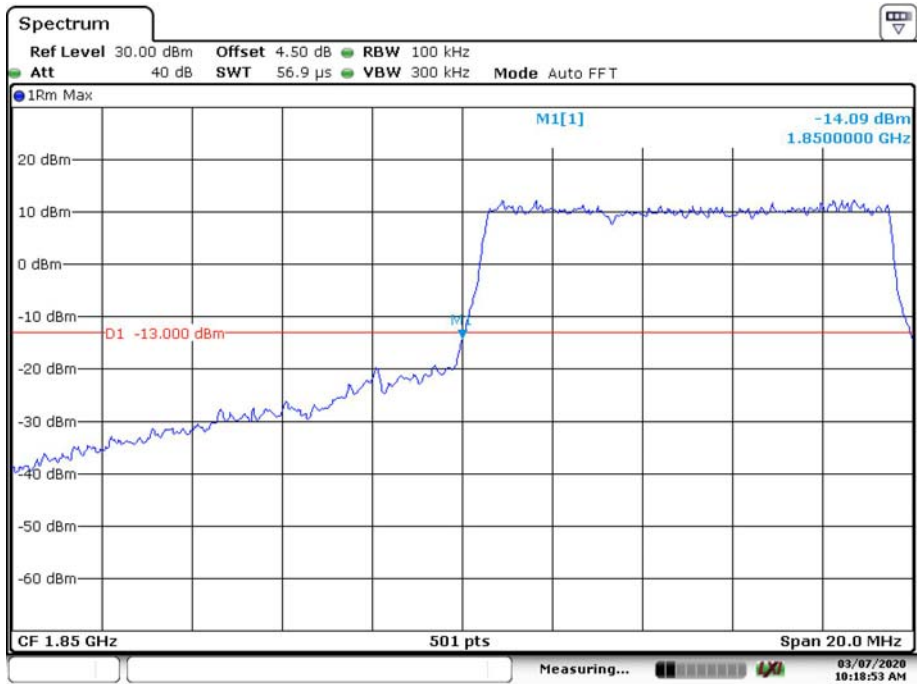
Date: 7.MAR.2020 15:38:50

### QPSK\_5MHz\_25 RB\_Right



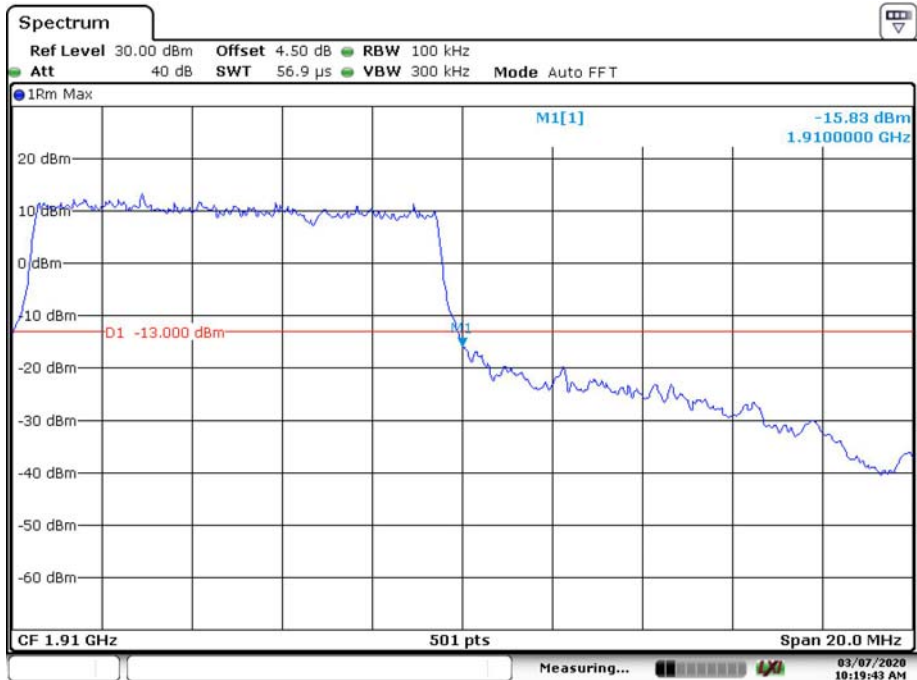
Date: 7.MAR.2020 15:39:47

### QPSK\_10MHz\_50 RB\_Left



Date: 7.MAR.2020 10:18:52

### QPSK\_10MHz\_50 RB\_Right



Date: 7.MAR.2020 10:19:43

### QPSK\_15MHz\_75 RB\_Left



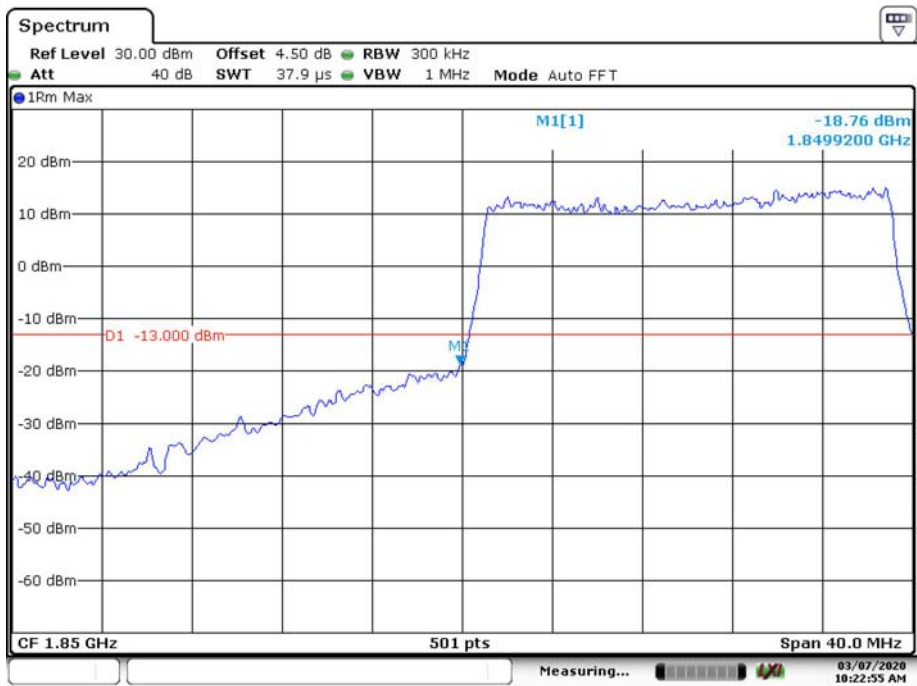
Date: 7.MAR.2020 16:29:08

### QPSK\_15MHz\_75 RB\_Right



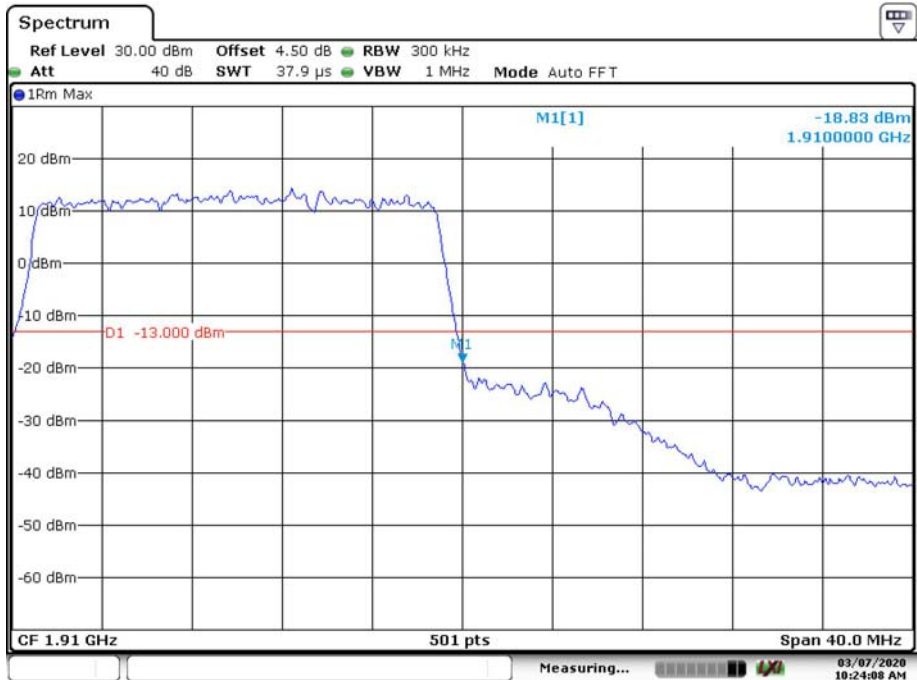
Date: 7.MAR.2020 10:21:40

### QPSK\_20MHz\_FULL RB\_Left



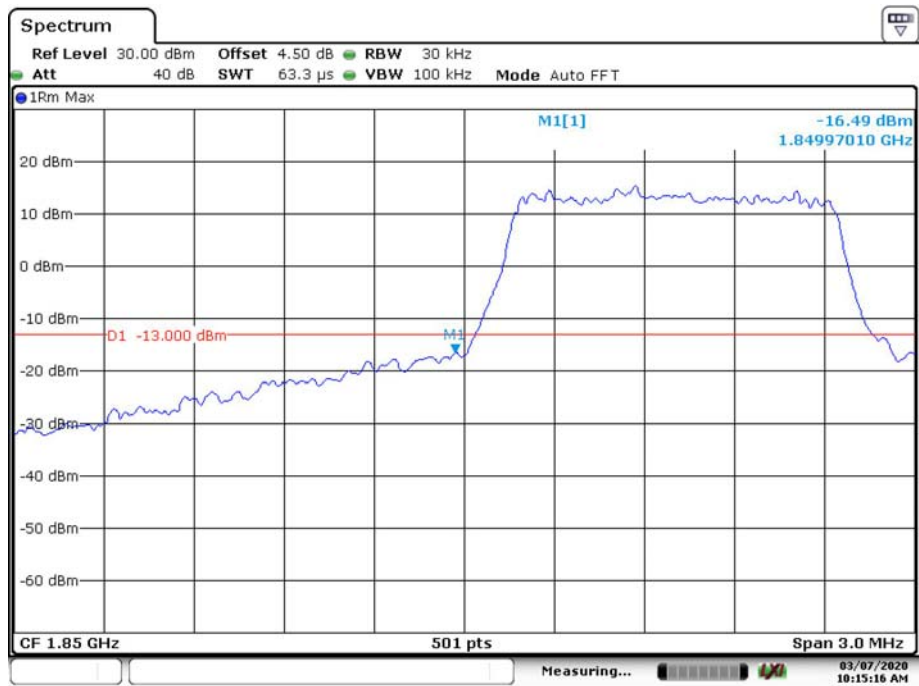
Date: 7.MAR.2020 10:22:55

### QPSK\_20MHz\_FULL RB\_Right



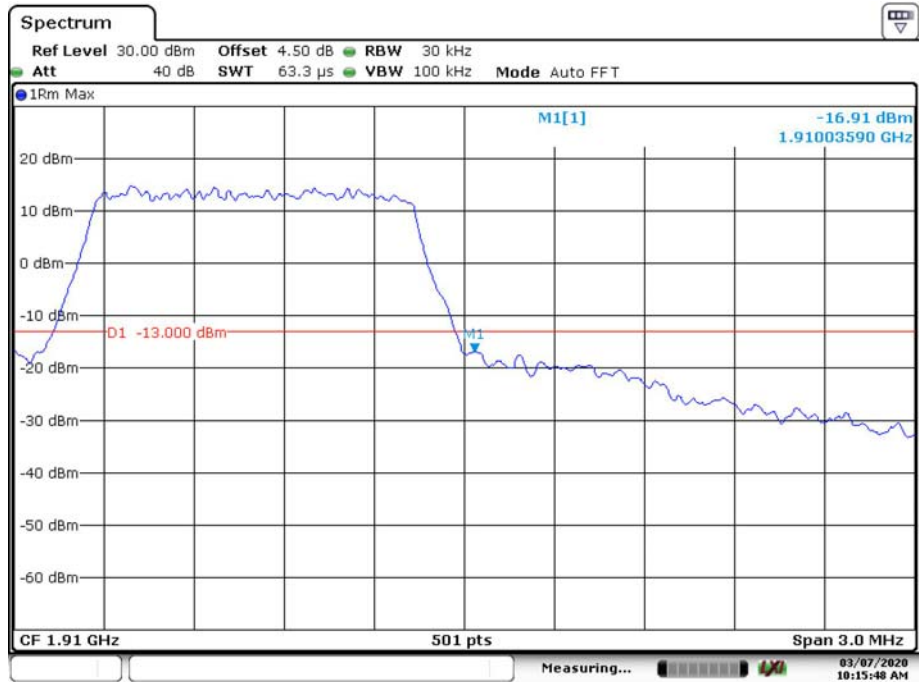
Date: 7.MAR.2020 10:24:08

### 16QAM\_1.4MHz\_6 RB\_ Left



Date: 7.MAR.2020 10:15:15

### 16QAM\_1.4MHz\_6 RB\_ Right

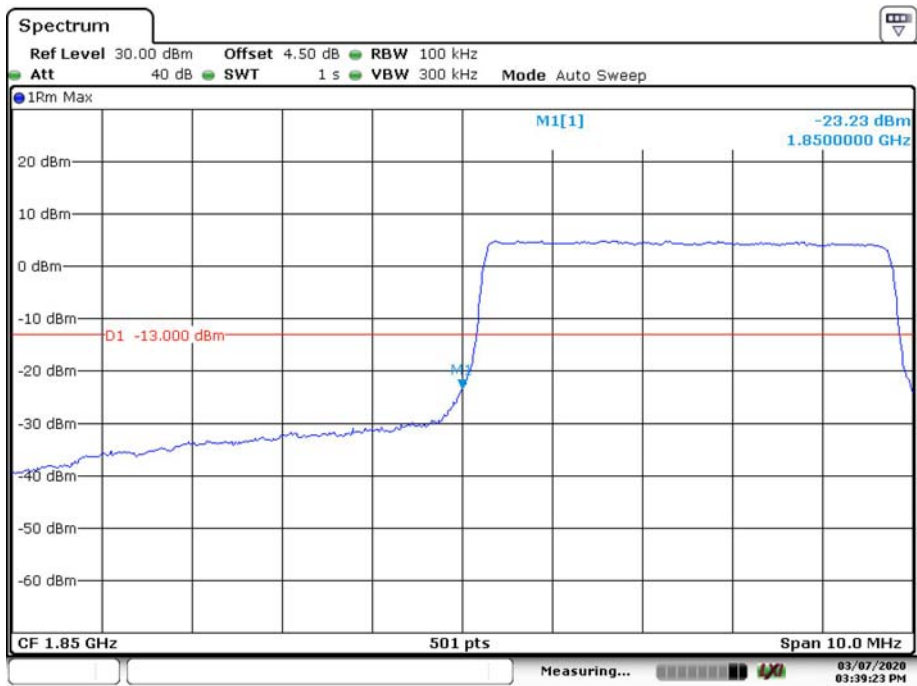


Date: 7.MAR.2020 10:15:48





16QAM\_5MHz\_25 RB\_Left



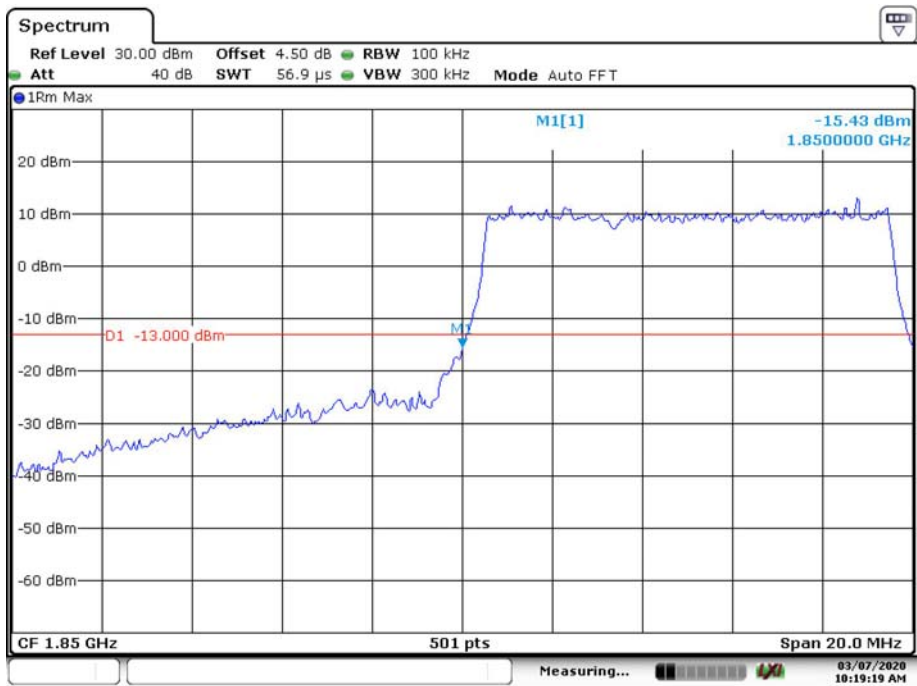
Date: 7.MAR.2020 15:39:23

16QAM\_5MHz\_25 RB\_Right



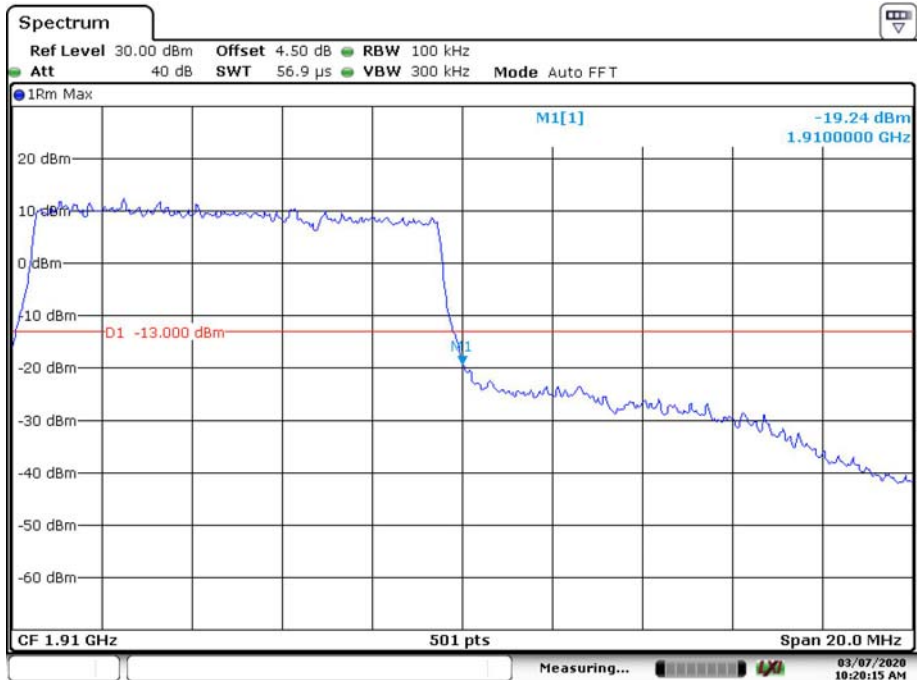
Date: 7.MAR.2020 15:40:15

### 16QAM\_10MHz\_50 RB\_Left



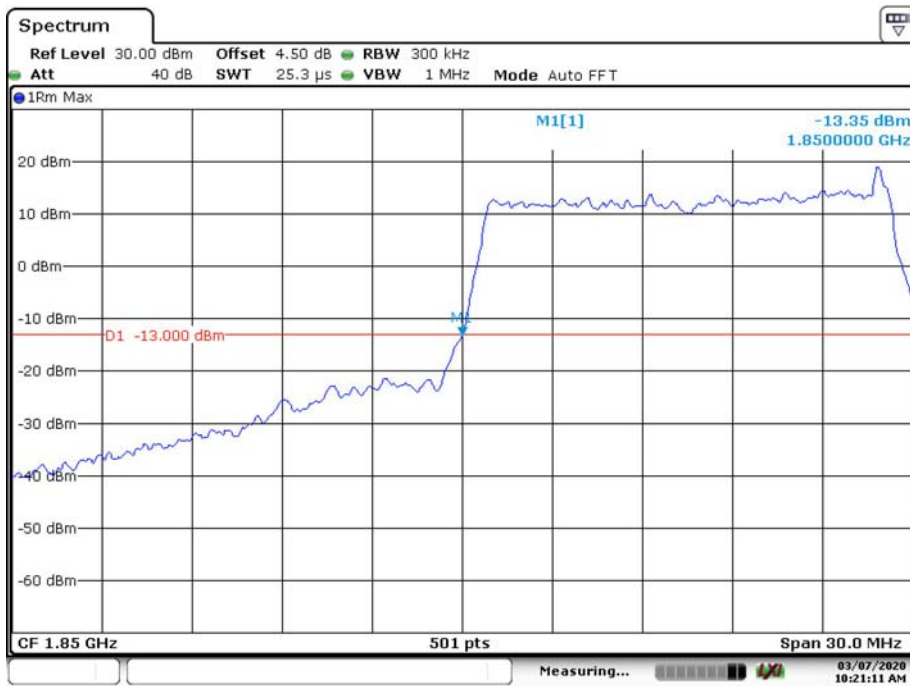
Date: 7.MAR.2020 10:19:19

### 16QAM\_10MHz\_50 RB\_Right



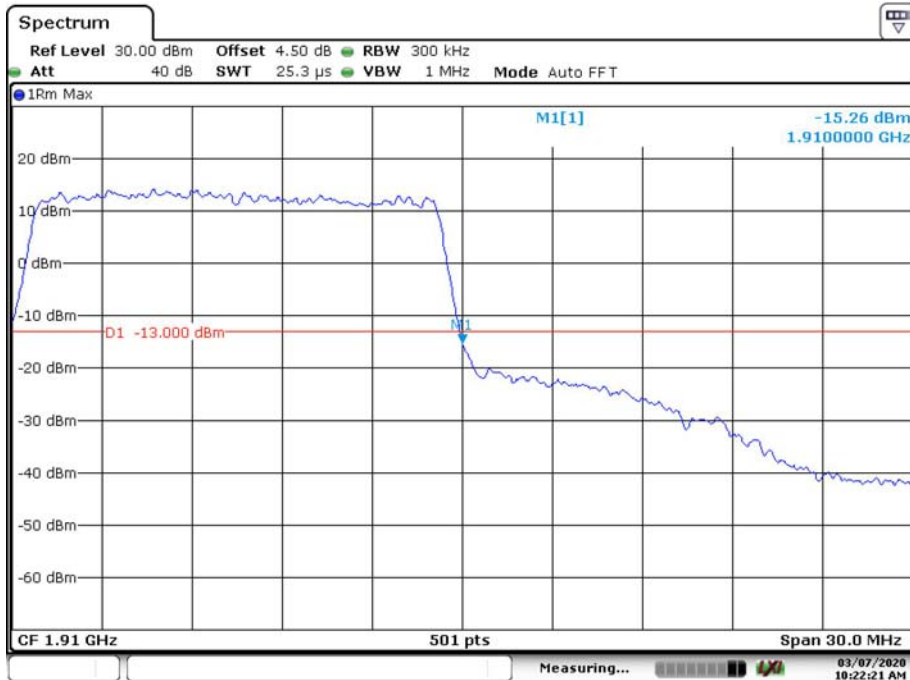
Date: 7.MAR.2020 10:20:15

### 16QAM\_15MHz\_75 RB\_Left



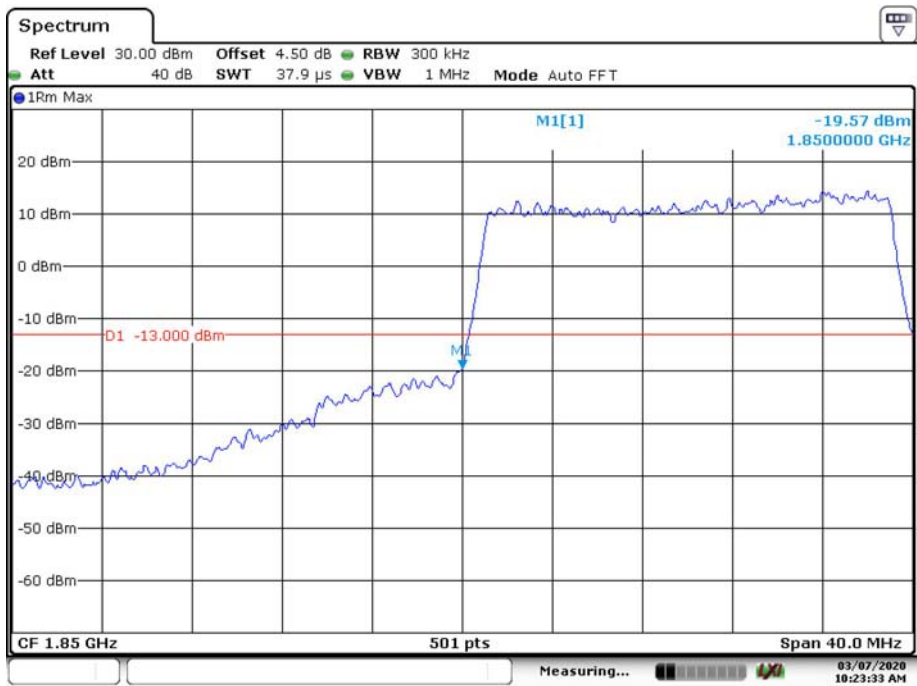
Date: 7.MAR.2020 10:21:11

### 16QAM\_15MHz\_75 RB\_Right



Date: 7.MAR.2020 10:22:21

### 16QAM\_20MHz\_FULL RB\_Left



Date: 7.MAR.2020 10:23:33

### 16QAM\_20MHz\_FULL RB\_Right



Date: 7.MAR.2020 10:24:52

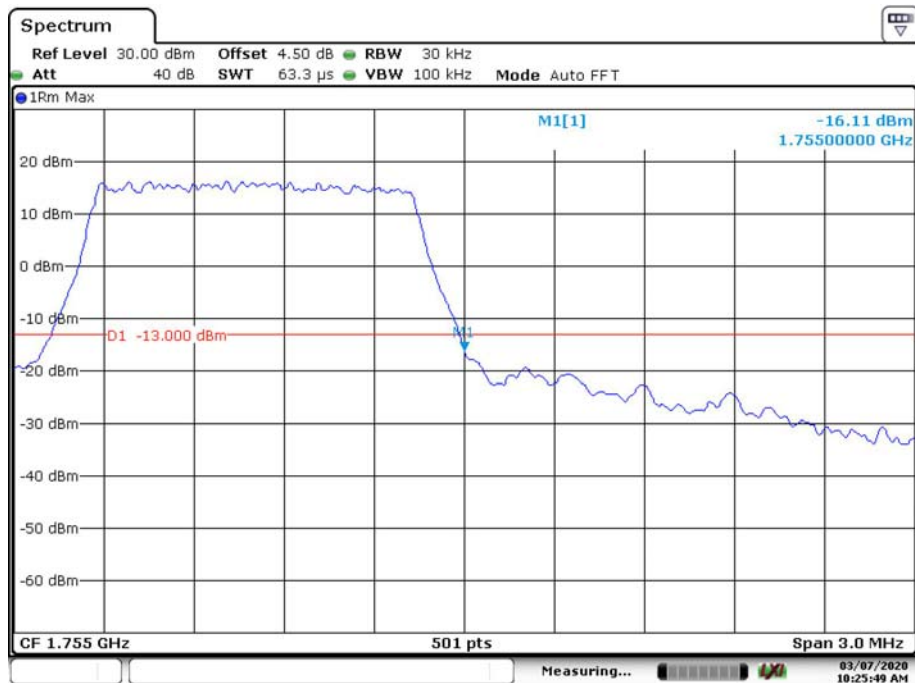
LTE Band 4

QPSK\_1.4MHz\_6 RB\_Left



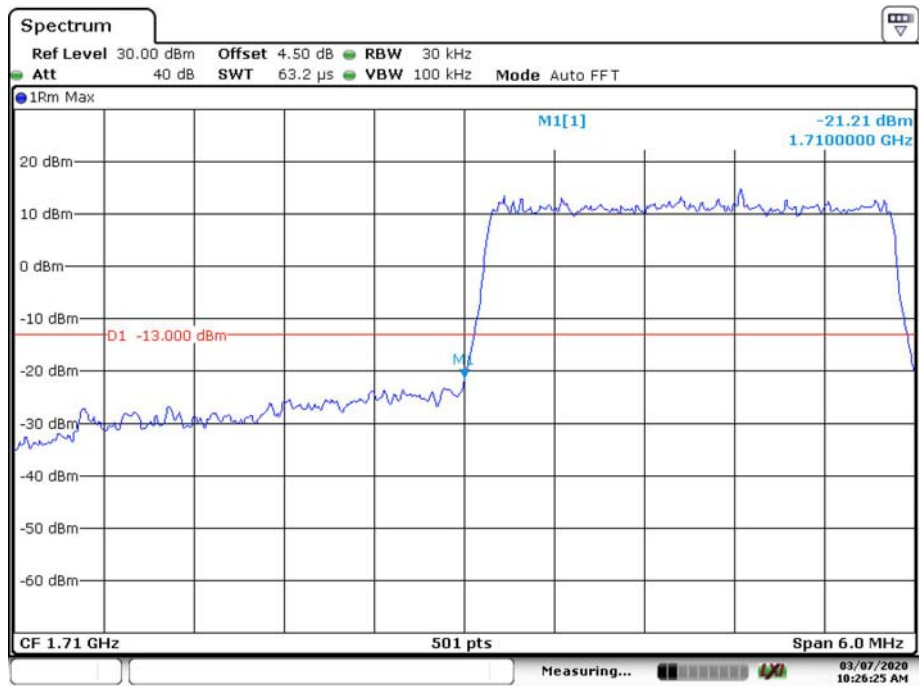
Date: 7.MAR.2020 10:25:10

QPSK\_1.4MHz\_6 RB\_Right



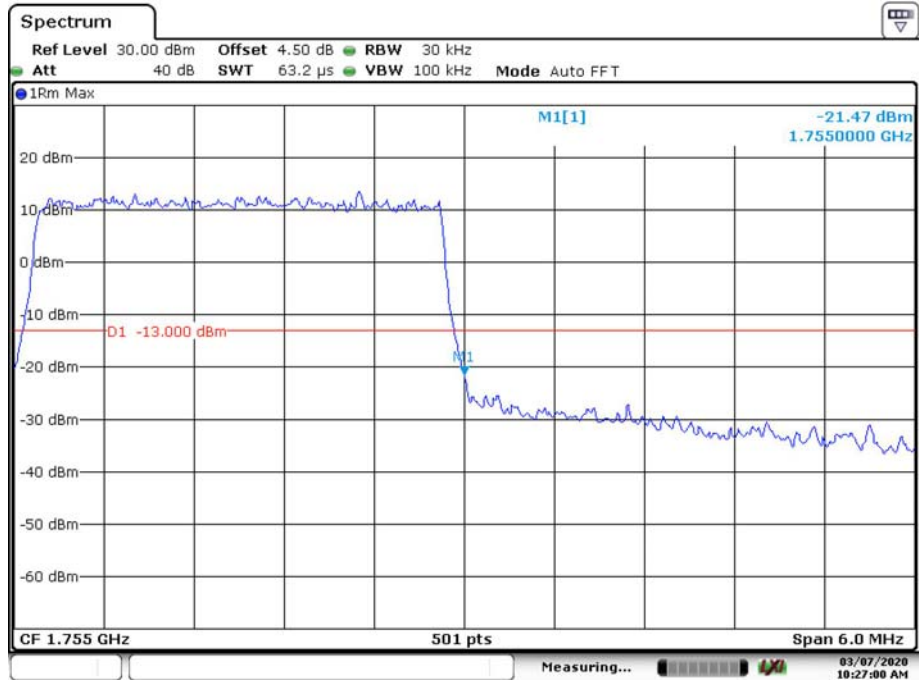
Date: 7.MAR.2020 10:25:49

### QPSK\_3MHz\_15 RB\_ Left



Date: 7.MAR.2020 10:26:25

### QPSK\_3MHz\_15 RB\_ Right



Date: 7.MAR.2020 10:27:00

### QPSK\_5MHz\_25 RB\_Left



Date: 7.MAR.2020 16:27:08

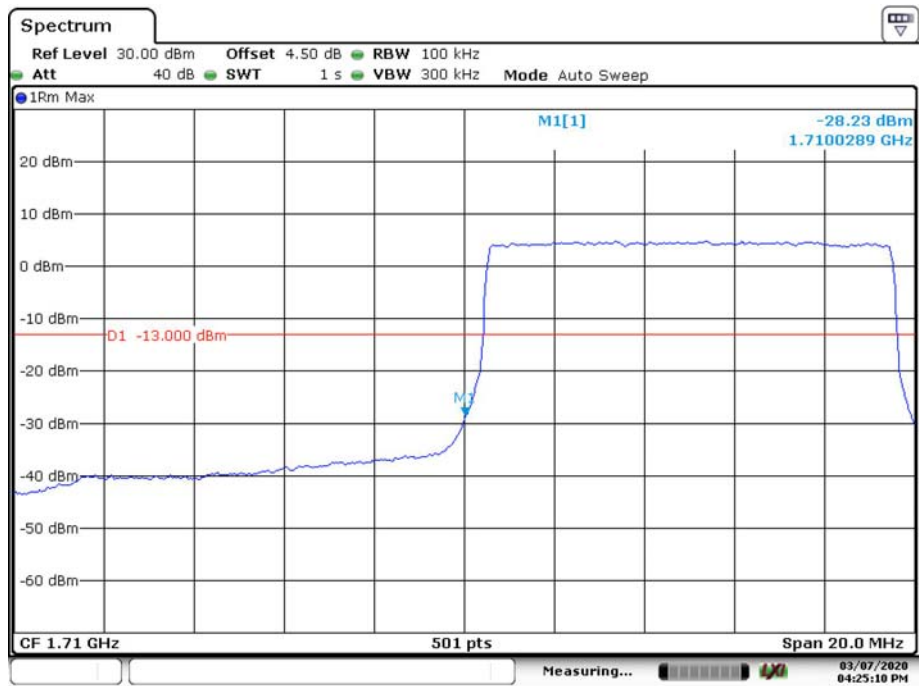
### QPSK\_5MHz\_25 RB\_Right



Date: 7.MAR.2020 10:29:03

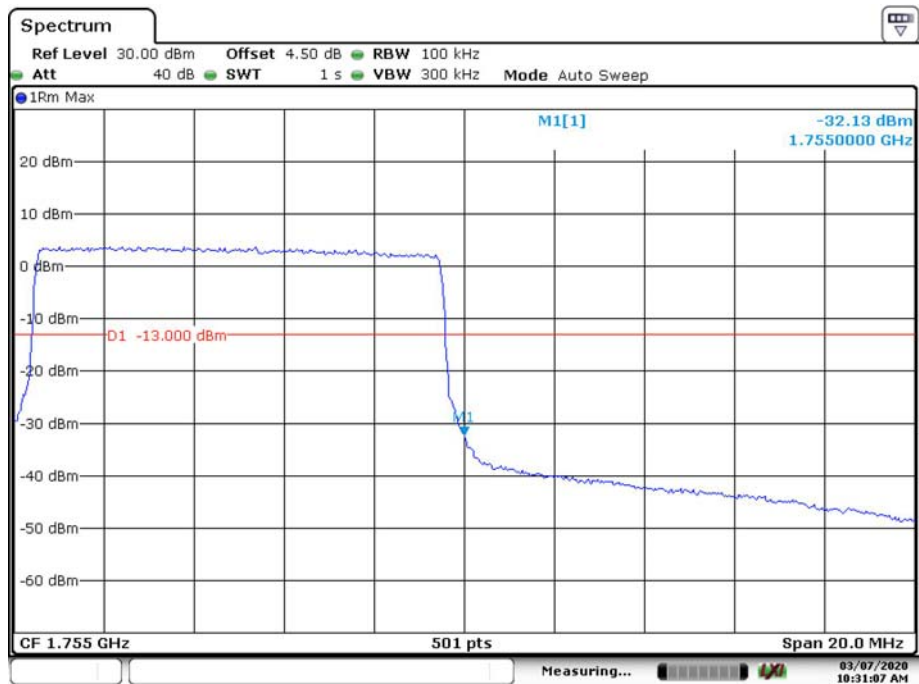


### QPSK\_10MHz\_50 RB\_Left



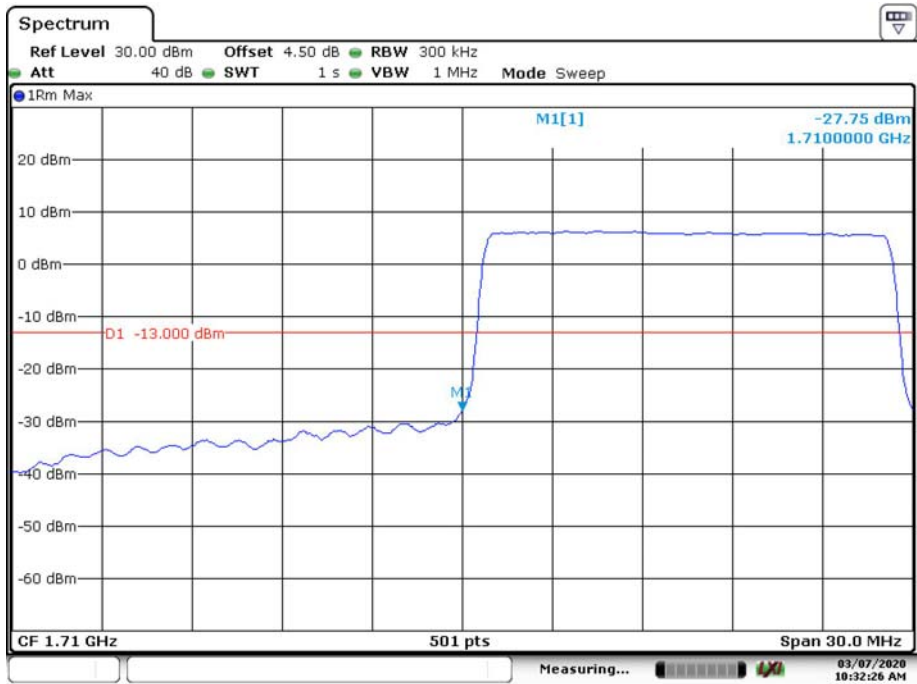
Date: 7.MAR.2020 16:25:11

### QPSK\_10MHz\_50 RB\_Right



Date: 7.MAR.2020 10:31:07

### QPSK\_15MHz\_75 RB\_Left



Date: 7.MAR.2020 10:32:26

### QPSK\_15MHz\_75 RB\_Right



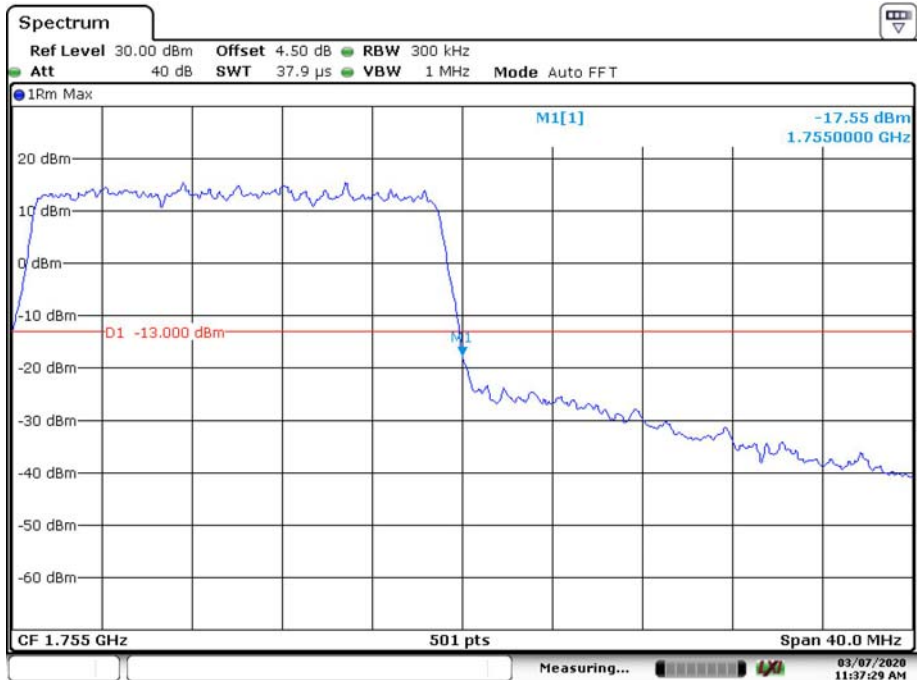
Date: 7.MAR.2020 10:34:03

### QPSK\_20MHz\_FULL RB\_Left



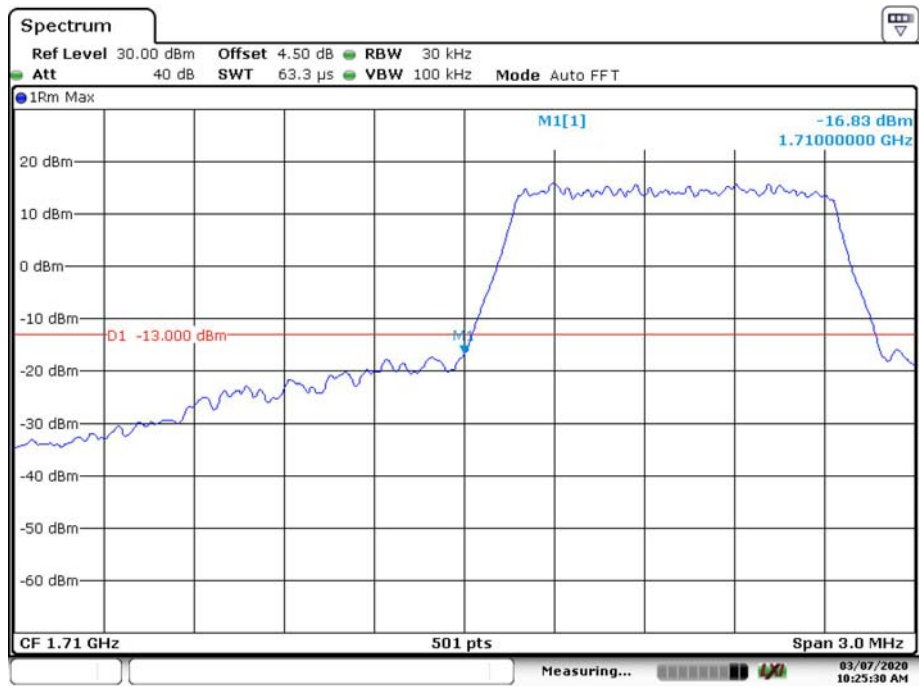
Date: 7.MAR.2020 10:42:05

### QPSK\_20MHz\_FULL RB\_Right



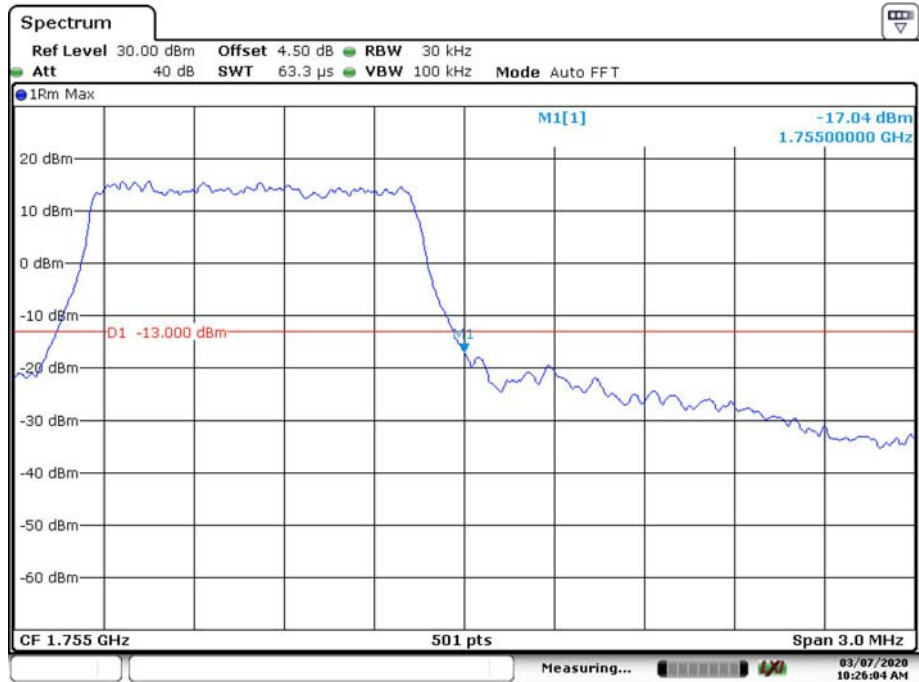
Date: 7.MAR.2020 11:37:29

16QAM\_1.4MHz\_6 RB\_Left



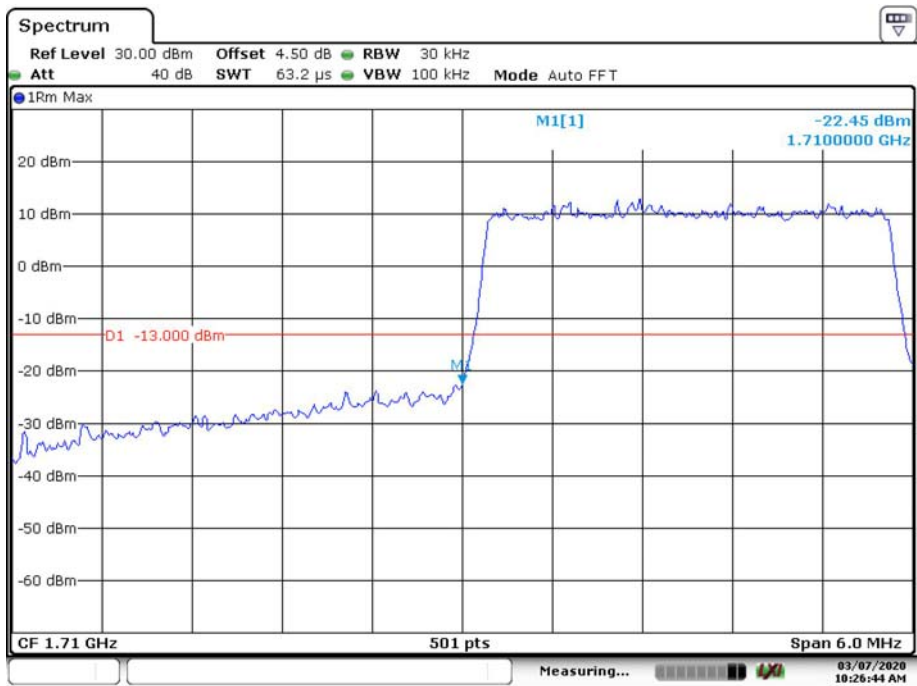
Date: 7.MAR.2020 10:25:29

16QAM\_1.4MHz\_6 RB\_Right



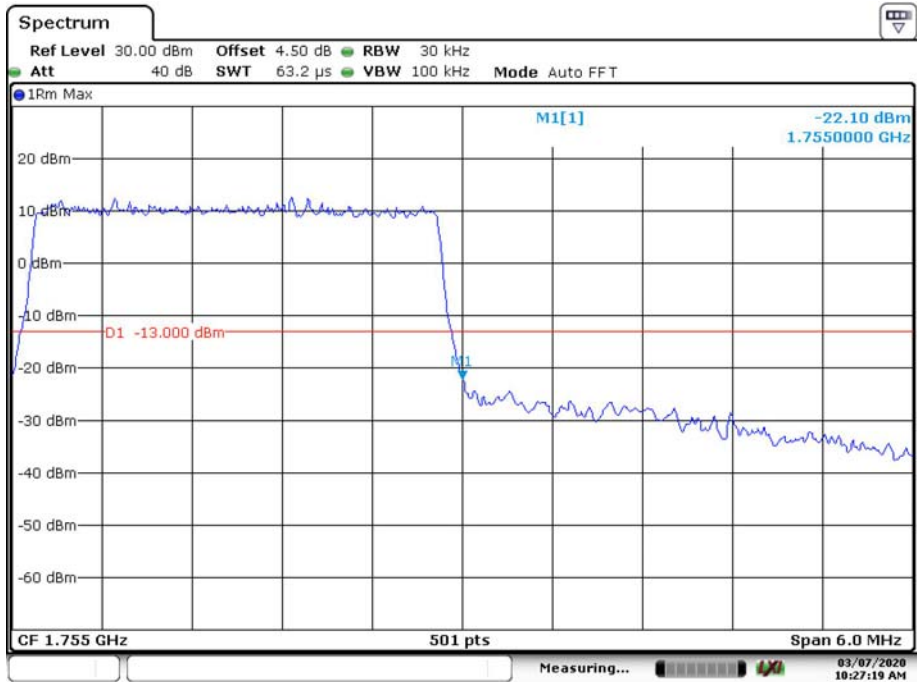
Date: 7.MAR.2020 10:26:04

### 16QAM\_3MHz\_15 RB\_Left



Date: 7.MAR.2020 10:26:44

### 16QAM\_3MHz\_15 RB\_Right



Date: 7.MAR.2020 10:27:18

### 16QAM\_5MHz\_25 RB\_Left



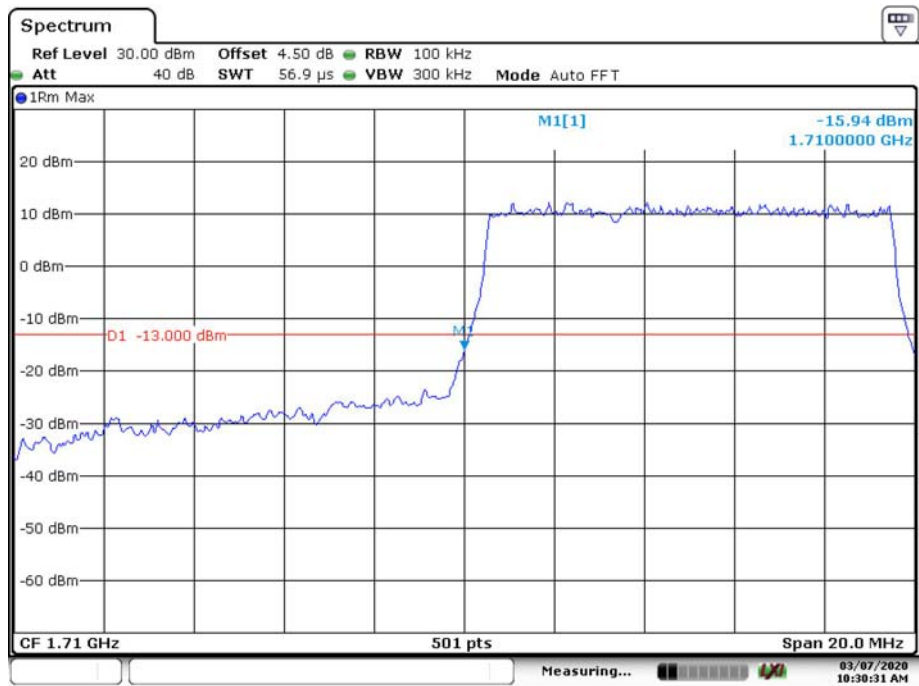
Date: 7.MAR.2020 10:28:36

### 16QAM\_5MHz\_25 RB\_Right



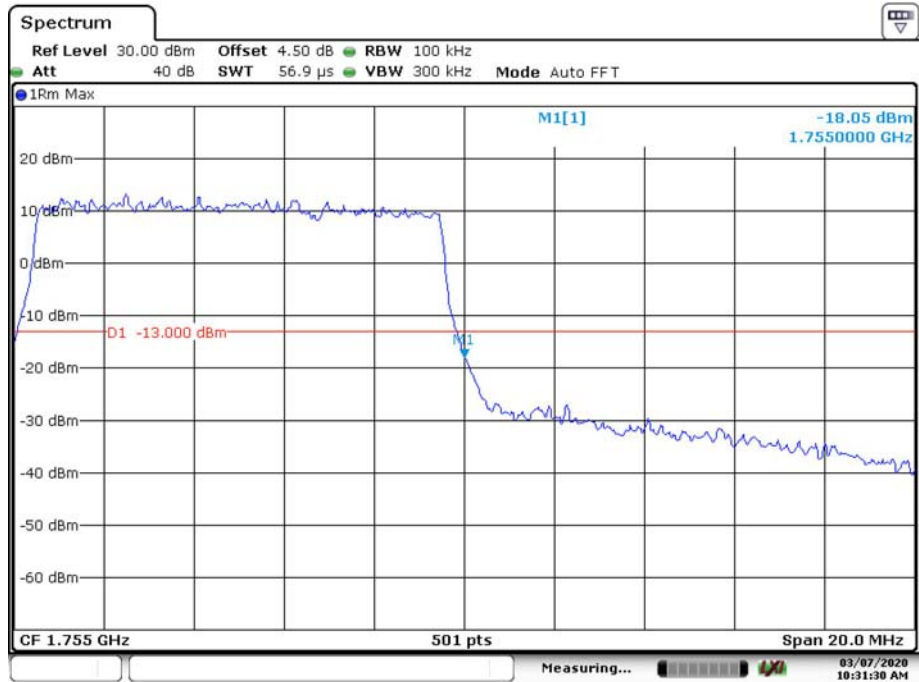
Date: 7.MAR.2020 10:29:33

### 16QAM\_10MHz\_50 RB\_Left



Date: 7.MAR.2020 10:30:31

### 16QAM\_10MHz\_50 RB\_Right



Date: 7.MAR.2020 10:31:30

### 16QAM\_15MHz\_75 RB\_Left

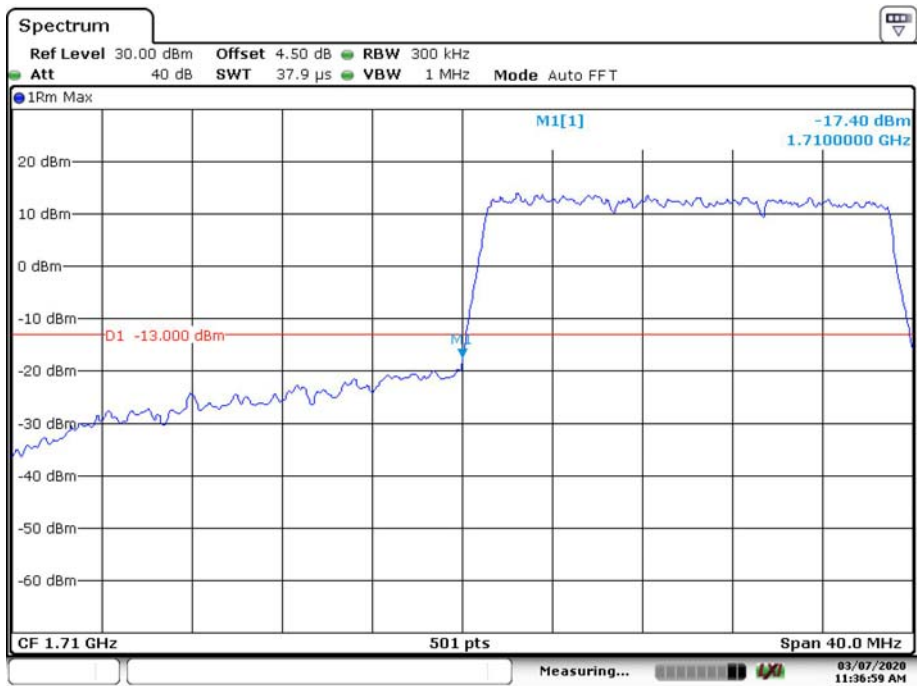


### 16QAM\_15MHz\_75 RB\_Right



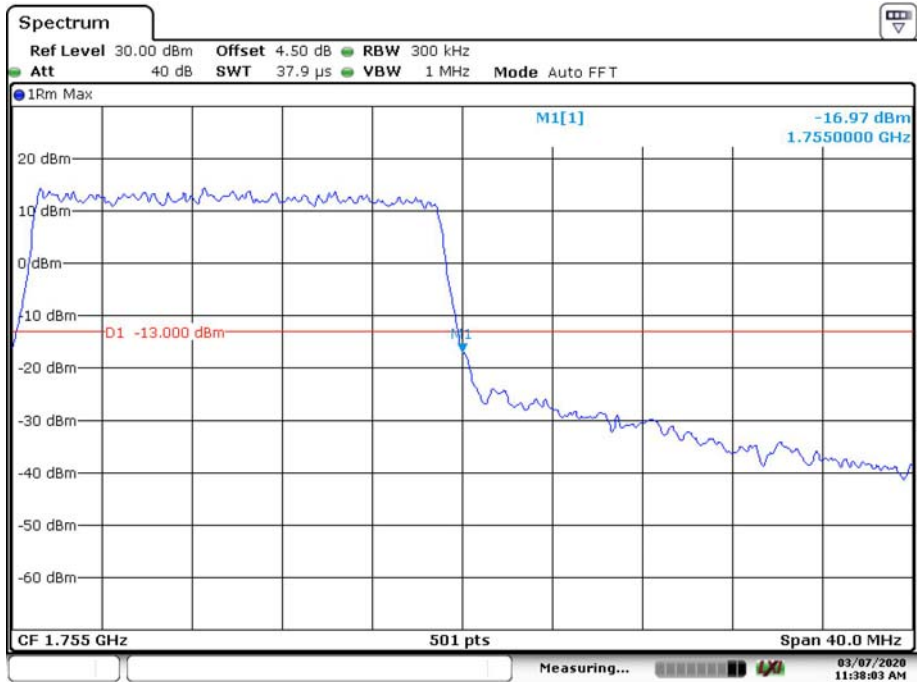


### 16QAM\_20MHz\_FULL RB\_Left



Date: 7.MAR.2020 11:36:59

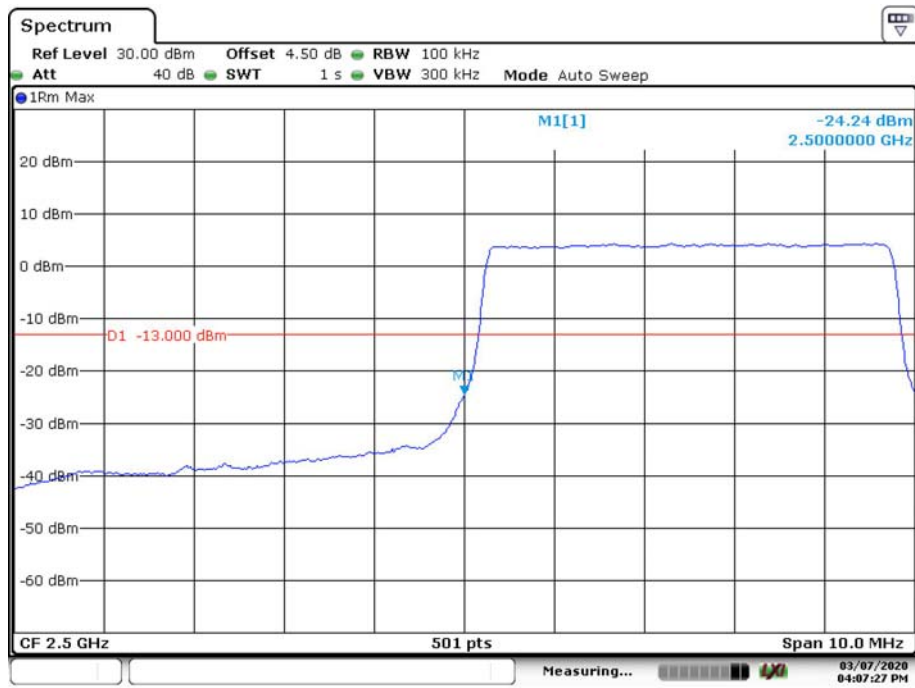
### 16QAM\_20MHz\_FULL RB\_Right



Date: 7.MAR.2020 11:38:03

LTE Band 7:

QPSK\_5MHz\_25 RB\_Left



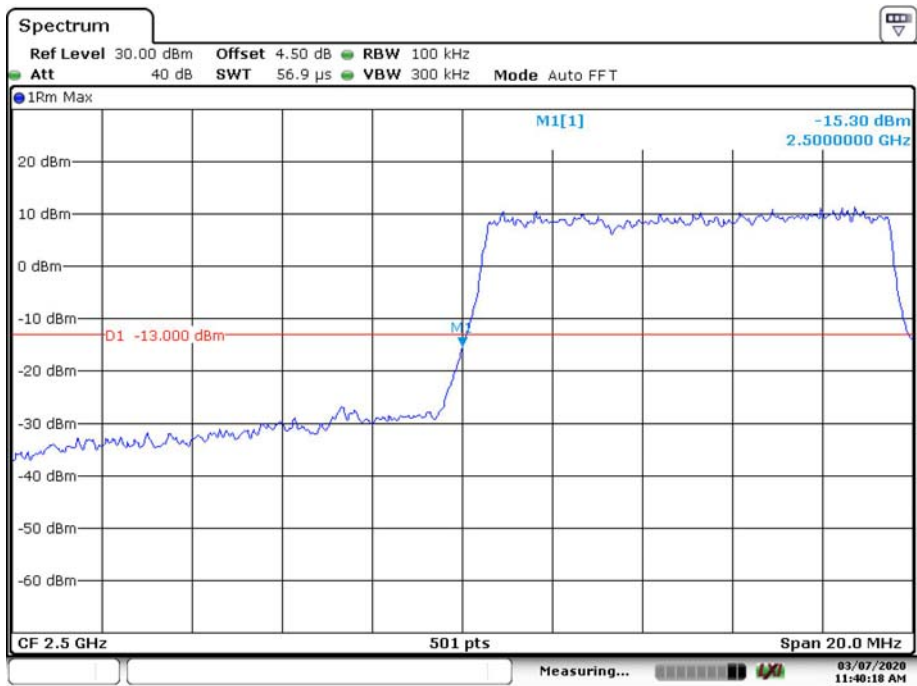
Date: 7.MAR.2020 16:07:28

QPSK\_5MHz\_25 RB\_Right



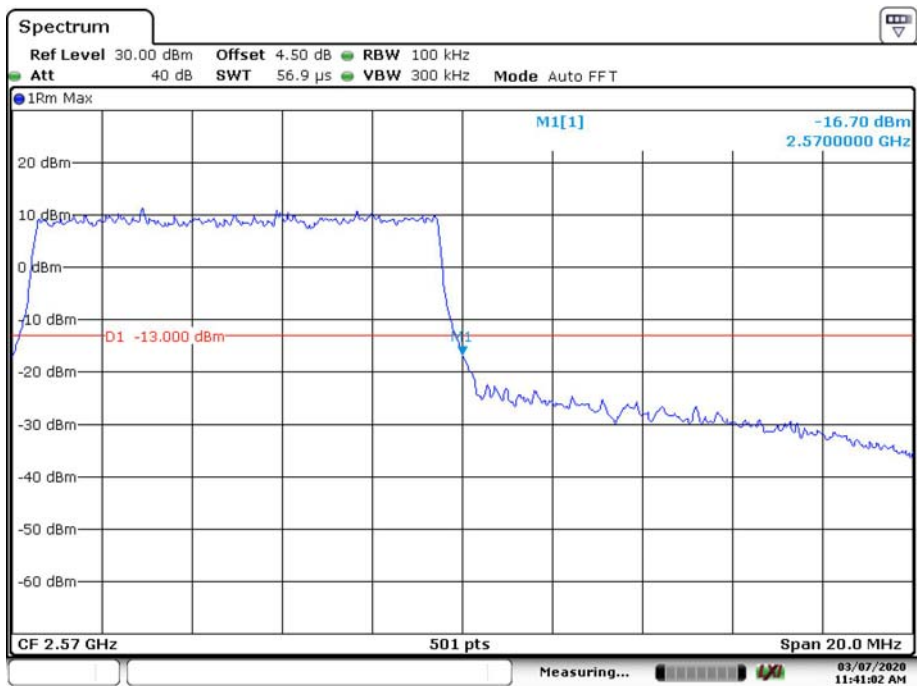
Date: 7.MAR.2020 11:39:16

### QPSK\_10MHz\_50 RB\_Left



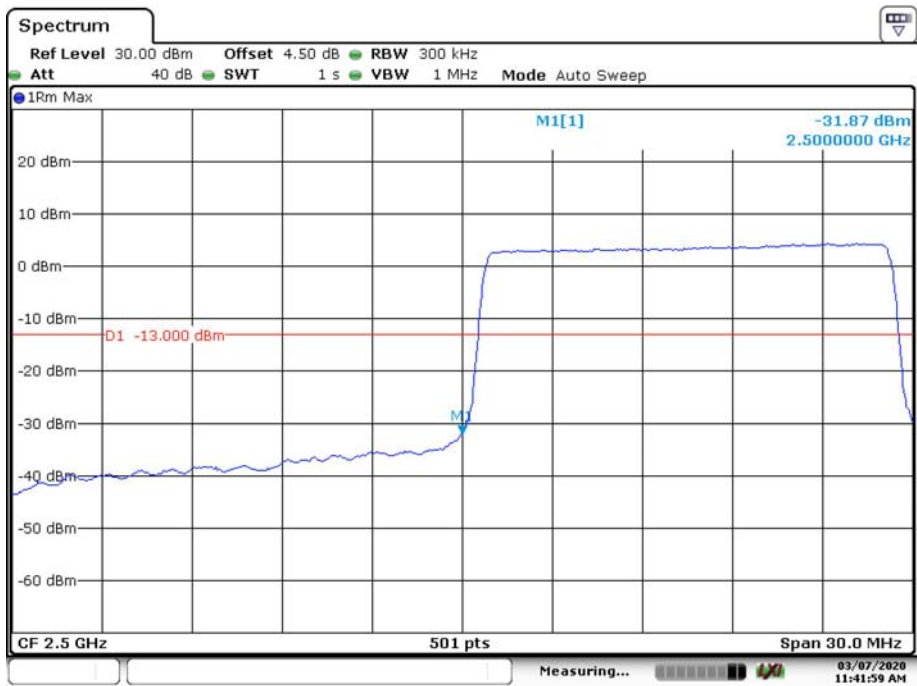
Date: 7.MAR.2020 11:40:18

### QPSK\_10MHz\_50 RB\_Right



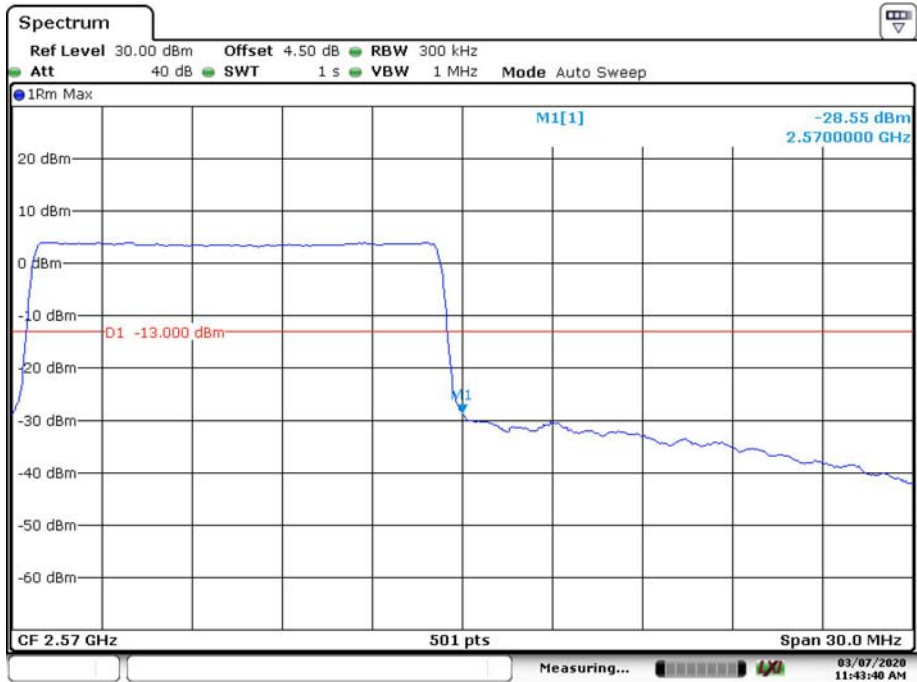
Date: 7.MAR.2020 11:41:02

### QPSK\_15MHz\_75 RB\_Left



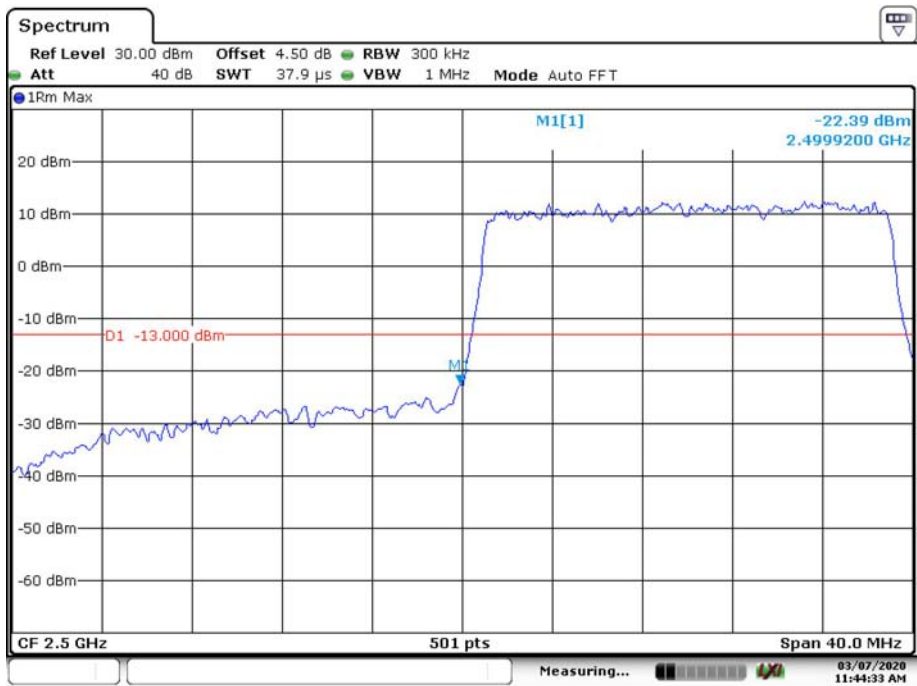
Date: 7.MAR.2020 11:41:59

### QPSK\_15MHz\_75 RB\_Right



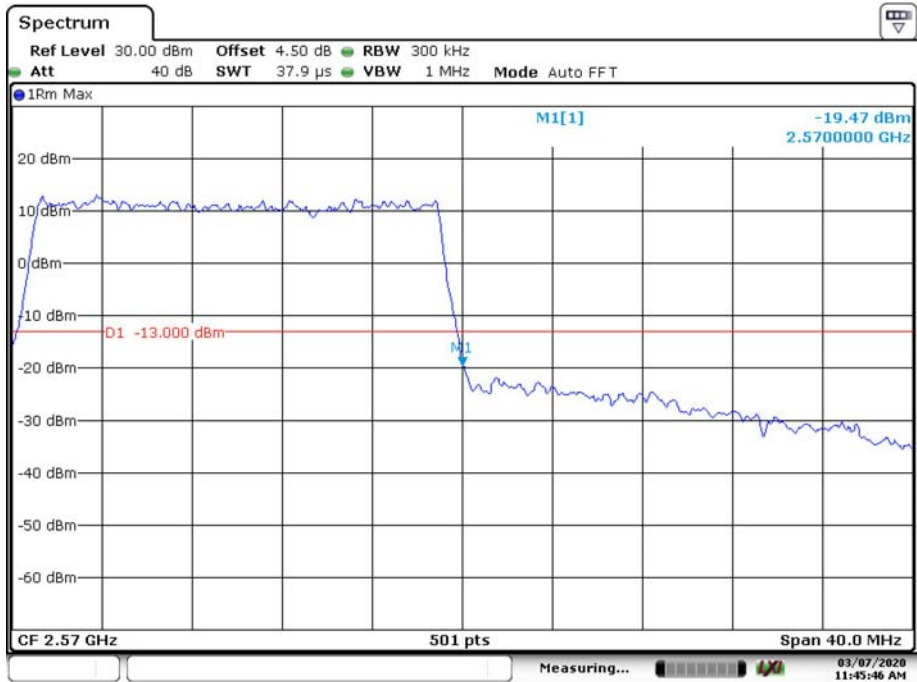
Date: 7.MAR.2020 11:43:40

### QPSK\_20MHz\_FULL RB\_Left



Date: 7.MAR.2020 11:44:33

### QPSK\_20MHz\_FULL RB\_Right



Date: 7.MAR.2020 11:45:46

### 16QAM\_5MHz\_25 RB\_Left



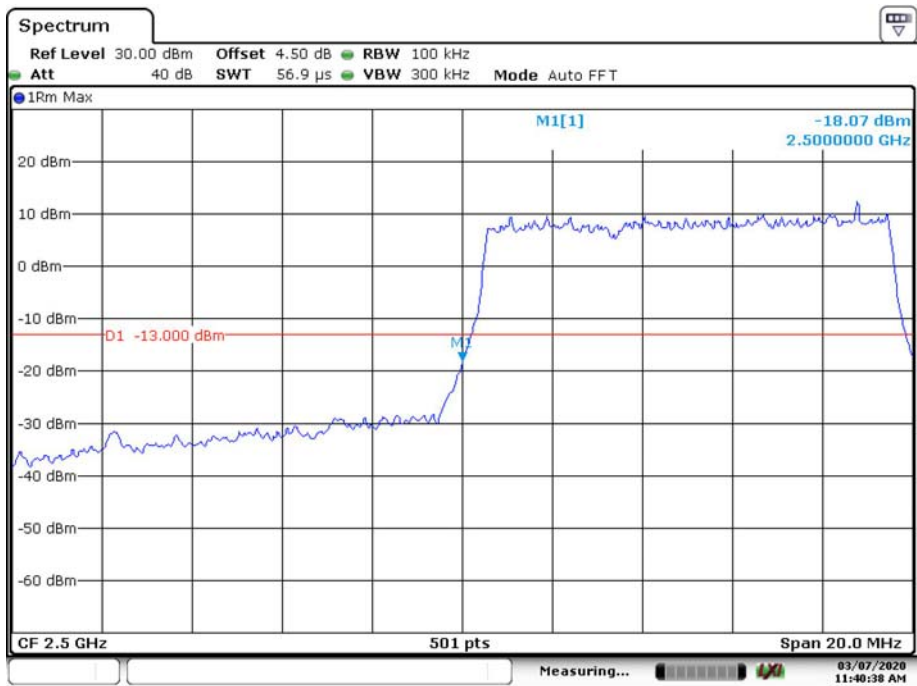
Date: 7.MAR.2020 11:38:49

### 16QAM\_5MHz\_25 RB\_Right



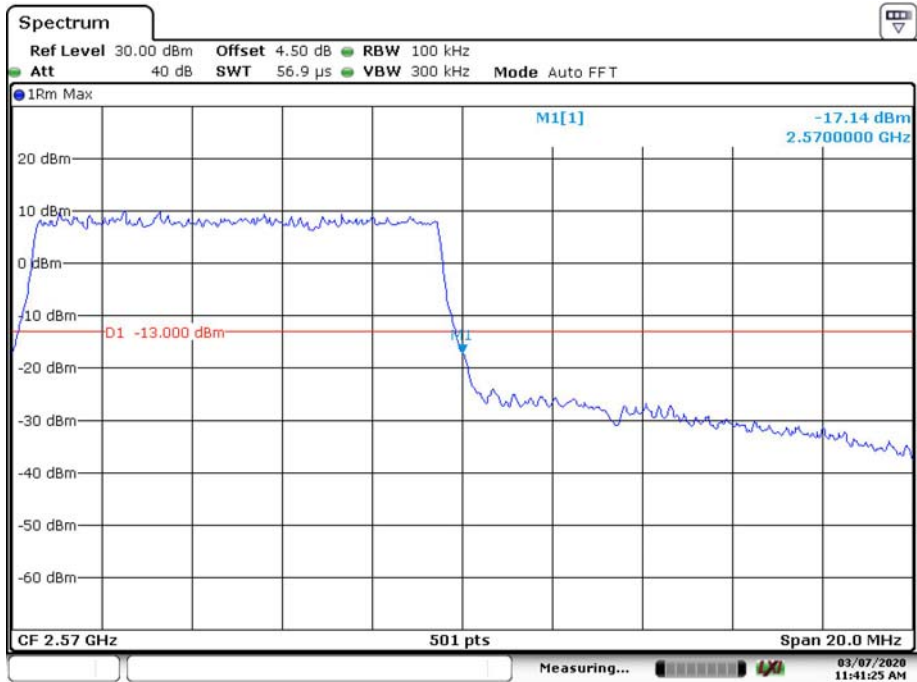
Date: 7.MAR.2020 11:39:46

### 16QAM\_10MHz\_50 RB\_Left



Date: 7.MAR.2020 11:40:38

### 16QAM\_10MHz\_50 RB\_Right



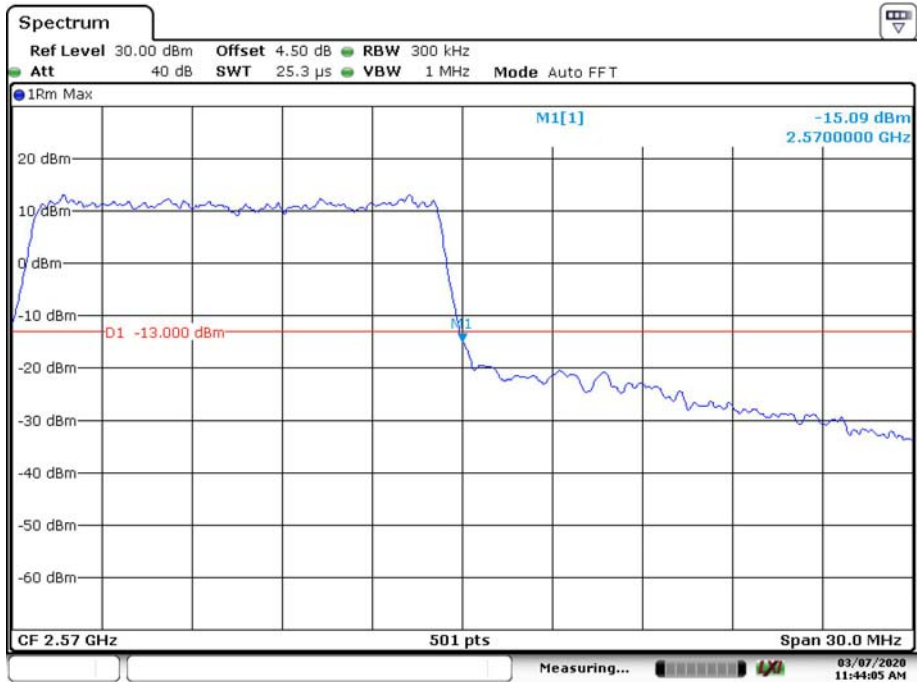
Date: 7.MAR.2020 11:41:25

### 16QAM\_15MHz\_75 RB\_Left



Date: 7.MAR.2020 11:43:05

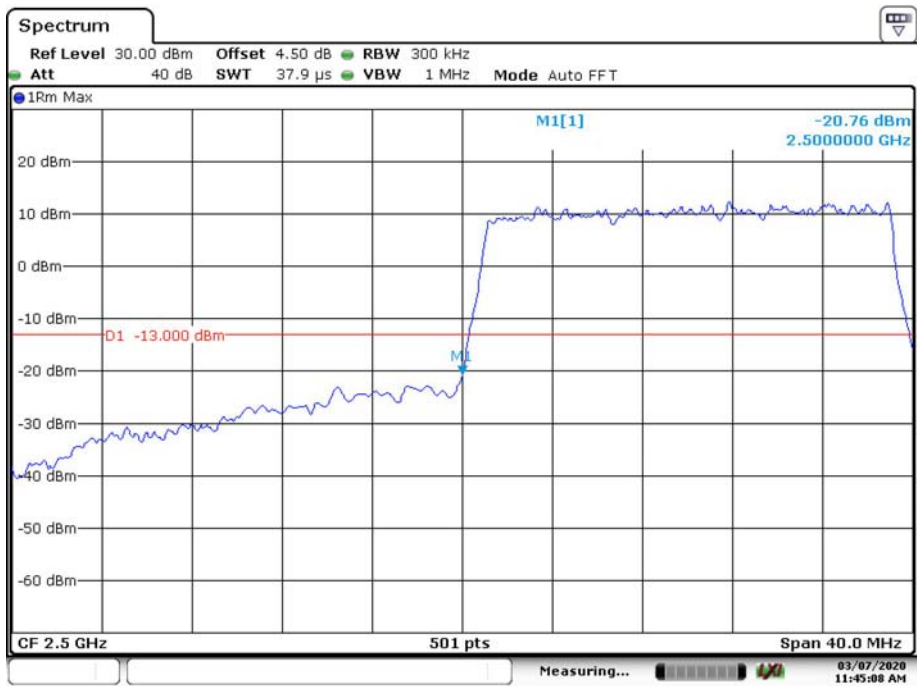
### 16QAM\_15MHz\_75 RB\_Right



Date: 7.MAR.2020 11:44:05

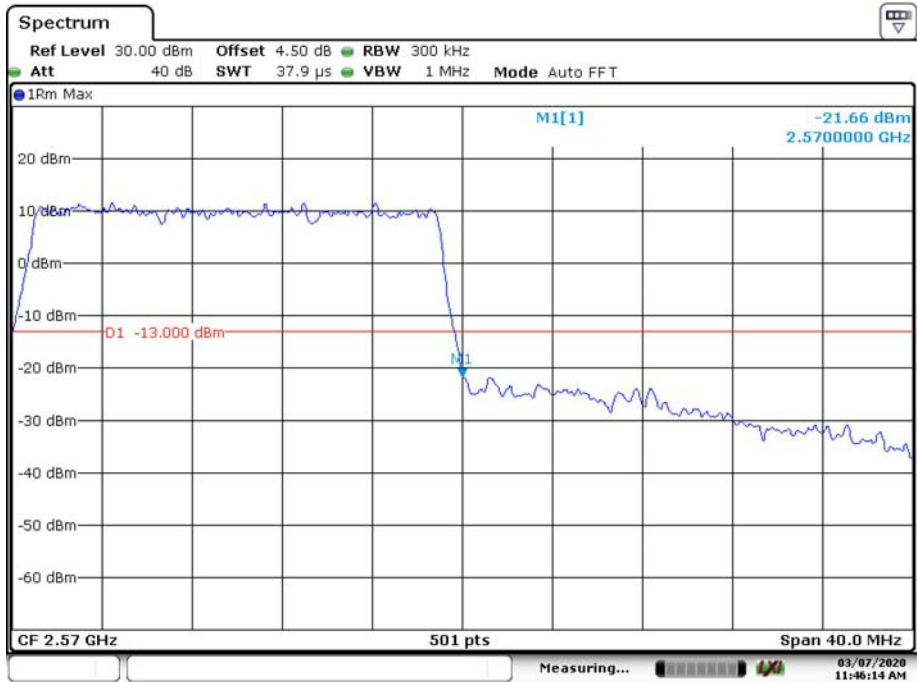


### 16QAM\_20MHz\_FULL RB\_Left



Date: 7.MAR.2020 11:45:08

### 16QAM\_20MHz\_FULL RB\_Right



Date: 7.MAR.2020 11:46:14

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**FCC §2.1055, §22.355 & §24.235 & §27.54 - FREQUENCY STABILITY**

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**Applicable Standard**

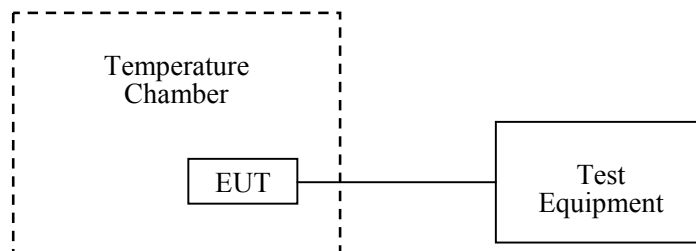
FCC § 2.1055 (a), § 2.1055 (d), §22.355, §24.235, §27.54

**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 leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

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



**Test Equipment List and Details**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
R&S	Spectrum Analyzer	FSV40	101474	2020-01-09	2021-01-09
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41010013	Each time	/
yzjingcheng	Coaxial Cable	KTRFBU-141-50	41005011	Each time	/
Unknown	Coaxial Cable	C-SJ00-0010	C0010/03	Each time	/
E-Microwave	Two-way Splitter	ODP-1-6-2S	OE0120142	Each time	/
R&S	Universal Radio Communication Tester	CMU200	110 822	2019-09-12	2020-09-12
R&S	Wideband Radio Communication Tester	CMW500	149216	2019-09-12	2020-09-12
ESPEC	Constant temperature and humidity Tester	ESX-4CA	018 463	2019-03-26	2020-03-26
UNI-T	Multimeter	UT39A	M130199938	2019-07-24	2020-07-24
Pro instrument	DC Power Supply	pps3300	3300012	N/A	N/A

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

**Test Data****Environmental Conditions**

<b>Temperature:</b>	24.4 °C
<b>Relative Humidity:</b>	62 %
<b>ATM Pressure:</b>	102.4kPa
<b>Tester:</b>	Fay Hu
<b>Test Date:</b>	2020-03-09

*Test Result: Compliance.*

**Cellular Band**

GMSK, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.85	-5	-0.00598	2.5
-20		20	0.02391	
-10		1	0.00120	
0		18	0.02152	
10		11	0.01315	
20		16	0.01913	
30		17	0.02032	
40		20	0.02391	
50		-6	-0.00717	
20		3.6	-5	
20	4.4	10	0.01195	

EGPRS, Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.85	95	0.11355	2.5
-20		11	0.01315	
-10		32	0.03825	
0		40	0.04781	
10		91	0.10877	
20		97	0.11595	
30		-68	-0.08128	
40		17	0.02032	
50		15	0.01793	
20		3.6	26	
20	4.4	9	0.01076	

**PCS Band**

GMSK, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.85	91	0.04840	Pass
-20		94	0.05000	
-10		64	0.03404	
0		-19	-0.01011	
10		-6	-0.00319	
20		97	0.05160	
30		-5	-0.00266	
40		-5	-0.00266	
50		42	0.02234	
20		3.6	55	
20	4.4	-12	-0.00638	

EGPRS, Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Results
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.85	2	0.00106	Pass
-20		56	0.02979	
-10		1	0.00053	
0		62	0.03298	
10		72	0.03830	
20		94	0.05000	
30		44	0.02340	
40		86	0.04574	
50		82	0.04362	
20		3.6	88	
20	4.4	13	0.00691	

**WCDMA Band II: R99**

Middle Channel, $f_c = 1880.0$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Result
°C	V <sub>DC</sub>	Hz	ppm	
-30	3.85	-11	-0.00585	Pass
-20		25	0.01330	
-10		14	0.00745	
0		40	0.02128	
10		-8	-0.00426	
20		-18	-0.00957	
30		-38	-0.02021	
40		50	0.02660	
50		91	0.04840	
20		3.6	-20	
20	4.4	94	0.05000	

**WCDMA Band V: R99**

Middle Channel, $f_c = 836.6$ MHz				
Temperature	Voltage	Frequency Error	Frequency Error	Limit
°C	V <sub>DC</sub>	Hz	ppm	ppm
-30	3.85	39	0.04662	2.5
-20		97	0.11595	
-10		71	0.08487	
0		87	0.10399	
10		-1	-0.00120	
20		-11	-0.01315	
30		-10	-0.01195	
40		30	0.03586	
50		34	0.04064	
20		3.6	-19	
20	4.4	58	0.06933	

**LTE Band 2:**

<b>QPSK, Channel Bandwidth:10MHz Middle Channel, <math>f_c = 1880</math> MHz</b>				
<b>Temperature</b>	<b>Voltage</b>	<b>Frequency Error</b>	<b>Frequency Error</b>	<b>Result</b>
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>Hz</b>	<b>ppm</b>	
-30	3.85	-9	-0.0048	Pass
-20		-7	-0.0037	
-10		-4	-0.0021	
0		-5	-0.0027	
10		-9	-0.0048	
20		-5	-0.0027	
30		-8	-0.0043	
40		-8	-0.0043	
50		-10	-0.0053	
20		3.6	-6	
20	4.4	-6	-0.0032	

<b>16QAM, Channel Bandwidth:10MHz Middle Channel, <math>f_c = 1880</math> MHz</b>				
<b>Temperature</b>	<b>Voltage</b>	<b>Frequency Error</b>	<b>Frequency Error</b>	<b>Result</b>
<b>°C</b>	<b>V<sub>DC</sub></b>	<b>Hz</b>	<b>ppm</b>	
-30	3.85	-5	-0.0027	Pass
-20		-4	-0.0021	
-10		-12	-0.0064	
0		-10	-0.0053	
10		-8	-0.0043	
20		-10	-0.0053	
30		-6	-0.0032	
40		-6	-0.0032	
50		-9	-0.0048	
20		3.6	-4	
20	4.4	-11	-0.0059	

**LTE Band 4**

<b>QPSK, Channel Bandwidth:10MHz</b>					
<b>Power Supplied</b>	<b>Temperature</b>	<b>F<sub>L</sub></b>	<b>Limit</b>	<b>F<sub>H</sub></b>	<b>Limit</b>
<b>Vdc</b>	<b>°C</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>
3.85	-30	1710.571055	1710	1754.549391	1755
	-20	1710.571253		1754.549529	
	-10	1710.570839		1754.549141	
	0	1710.571426		1754.548787	
	10	1710.571225		1754.548874	
	20	1710.571140		1754.549100	
	30	1710.571046		1754.548843	
	40	1710.570841		1754.549566	
	50	1710.571589		1754.548685	
3.6	20	1710.571467		1754.549338	
4.4	20	1710.570977		1754.549063	

<b>16QAM, Channel Bandwidth:10MHz</b>					
<b>Power Supplied</b>	<b>Temperature</b>	<b>F<sub>L</sub></b>	<b>Limit</b>	<b>F<sub>H</sub></b>	<b>Limit</b>
<b>Vdc</b>	<b>°C</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>
3.85	-30	1710.570890	1710	1754.549227	1755
	-20	1710.570713		1754.548888	
	-10	1710.570849		1754.549065	
	0	1710.571329		1754.549431	
	10	1710.571372		1754.549471	
	20	1710.571140		1754.549100	
	30	1710.570785		1754.549538	
	40	1710.570665		1754.549209	
	50	1710.571393		1754.548924	
3.6	20	1710.571396		1754.548752	
4.4	20	1710.571282		1754.549429	

**LTE Band 7**

<b>QPSK, Channel Bandwidth:10MHz</b>					
<b>Power Supplied</b>	<b>Temperature</b>	<b>F<sub>L</sub></b>	<b>Limit</b>	<b>F<sub>H</sub></b>	<b>Limit</b>
<b>Vdc</b>	<b>°C</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>
3.85	-30	2500.571297	2500	2569.509401	2570
	-20	2500.571568		2569.509235	
	-10	2500.571447		2569.509366	
	0	2500.570740		2569.508917	
	10	2500.571279		2569.509143	
	20	2500.571140		2569.509020	
	30	2500.571415		2569.508684	
	40	2500.571210		2569.508601	
	50	2500.571633		2569.508966	
3.6	20	2500.570997		2569.509150	
4.4	20	2500.570980		2569.508966	

<b>16QAM, Channel Bandwidth:10MHz</b>					
<b>Power Supplied</b>	<b>Temperature</b>	<b>F<sub>L</sub></b>	<b>Limit</b>	<b>F<sub>H</sub></b>	<b>Limit</b>
<b>Vdc</b>	<b>°C</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>	<b>MHz</b>
3.85	-30	2500.571454	2500	2569.508869	2570
	-20	2500.571109		2569.509032	
	-10	2500.571381		2569.508769	
	0	2500.570716		2569.508940	
	10	2500.571084		2569.508925	
	20	2500.571140		2569.509020	
	30	2500.571309		2569.508804	
	40	2500.571290		2569.509026	
	50	2500.571316		2569.509172	
3.6	20	2500.570712		2569.509321	
4.4	20	2500.571168		2569.508562	

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 \*\*\*\*\***