



TESTING LABORATORY  
CERTIFICATE#4323.01



# FCC PART 22H, PART 27 TEST REPORT

For

## Shanghai Rising Digital Co.,Ltd.

No 318, Chuanda Road, Pudong New District, Shanghai, China

**FCC ID: 2AJONSEED7I0A55**

<b>Report Type:</b> Original Report	<b>Product Type:</b> 5.5 Generation Intelligent Screen
<b>Test Engineer:</b>	Winnie Yang <i>Winnie Yang</i>
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<b>Reviewed By:</b>	Oscar Ye EMC Manager <i>Oscar Ye</i>
<b>Prepared By:</b>	Bay Area Compliance Laboratories Corp. (Kunshan) No.248 Chenghu Road, Kunshan, Jiangsu province, China Tel: +86-0512-86175000 Fax: +86-0512-88934268 <a href="http://www.baclcorp.com.cn">www.baclcorp.com.cn</a>

## TABLE OF CONTENTS

<b>GENERAL INFORMATION</b> .....	<b>3</b>
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....	3
OBJECTIVE .....	3
RELATED SUBMITTAL(S)/GRANT(S).....	3
TEST METHODOLOGY .....	3
MEASUREMENT UNCERTAINTY.....	4
TEST FACILITY .....	4
<b>SYSTEM TEST CONFIGURATION</b> .....	<b>5</b>
JUSTIFICATION .....	5
CHANNEL LIST .....	5
EQUIPMENT MODIFICATIONS .....	6
SUPPORT EQUIPMENT LIST AND DETAILS .....	6
EXTERNAL I/O CABLE.....	6
BLOCK DIAGRAM OF TEST SETUP .....	7
<b>SUMMARY OF TEST RESULTS</b> .....	<b>9</b>
<b>TEST EQUIPMENT LIST</b> .....	<b>10</b>
<b>FCC §1.1310 &amp; §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)</b> .....	<b>12</b>
APPLICABLE STANDARD .....	12
CALCULATED FORMULARY:.....	12
CALCULATED DATA:.....	13
<b>FCC §2.1047 - MODULATION CHARACTERISTIC</b> .....	<b>14</b>
<b>FCC §2.1046; § 22.913 (A); §27.50 (H) - RF OUTPUT POWER</b> .....	<b>15</b>
APPLICABLE STANDARDS.....	15
TEST PROCEDURE .....	15
TEST DATA .....	16
<b>FCC §2.1049, §22.917, §22.905, §27.53 - OCCUPIED BANDWIDTH</b> .....	<b>28</b>
APPLICABLE STANDARDS.....	28
TEST PROCEDURE .....	28
TEST DATA .....	28
<b>FCC § 2.1051 &amp; § 22.917 (A); §27.53 (M) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS</b> .....	<b>55</b>
APPLICABLE STANDARDS.....	55
TEST PROCEDURE .....	55
TEST DATA .....	55
<b>FCC § 2.1053; § 22.917 (A) &amp; §27.53 (M) - SPURIOUS RADIATED EMISSIONS</b> .....	<b>104</b>
APPLICABLE STANDARDS.....	104
TEST PROCEDURE .....	104
TEST DATA .....	105
<b>FCC § 22.917 (A); FCC§27.53 (M)- BAND EDGES</b> .....	<b>109</b>
APPLICABLE STANDARDS.....	109
TEST PROCEDURE .....	109
TEST DATA .....	109
<b>FCC § 2.1055; § 22.355; FCC §27.54- FREQUENCY STABILITY</b> .....	<b>126</b>
APPLICABLE STANDARDS.....	126
TEST PROCEDURE .....	126
TEST DATA .....	127

## GENERAL INFORMATION

### Product Description for Equipment under Test (EUT)

Applicant	Shanghai Rising Digital Co.,Ltd.
Tested Model	SEED-7I0A-55
Product Type	5.5 Generation Intelligent Screen
Power Supply	DC 12~24V
RF Function	LTE
Operating Band/Frequency	LTE Band 5: 824-849 MHz(TX), 869-894 MHz(RX) LTE Band 41: 2555-2655 MHz(TX/RX)
Modulation Type	QPSK,16QAM
Antenna Type	Monopole antenna
Maximum Antenna Gain	LTE Band5: 0.6 dBi LTE Band41: 3.0 dBi

*\*All measurement and test data in this report was gathered from production sample serial number: 20200724008. (Assigned by the BACL. The EUT supplied by the applicant was received on 2020-07-24)*

### Objective

This type approval report is prepared on behalf of *Shanghai Rising Digital Co.,Ltd.* in accordance with Part 2, Part 22-Subpart H and Part 27 of the Federal Communication Commission's rules.

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

### Related Submittal(s)/Grant(s)

FCC Part 15.247 DTS submittals with FCC ID: 2AJONSEED7I0A55

### 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 27 – Miscellaneous wireless communications services

Applicable Standards: ANSI C63.26-2015.

All radiated and conducted emissions measurements were performed at Bay Area Compliance Laboratories Corp. (Kunshan). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

**Measurement Uncertainty**

Item		Uncertainty
AC Power Lines Conducted Emissions		3.19dB
RF conducted test with spectrum		0.9dB
RF Output Power with Power meter		0.5dB
Radiated emission	30MHz~1GHz	5.91dB
	1GHz~6GHz	4.68dB
	6GHz~18GHz	4.92dB
	18GHz~40GHz	5.21dB
Occupied Bandwidth		0.5kHz
Temperature		1.0°C
Humidity		6%

**Test Facility**

The test site used by Bay Area Compliance Laboratories Corp. (Kunshan) to collect test data is located on the No.248 Chenghu Road, Kunshan, Jiangsu province, China.

Bay Area Compliance Laboratories Corp. (Kunshan) Lab is accredited to ISO/IEC 17025 by A2LA (Lab code: 4323.01) and the FCC designation No. CN1185 under the FCC KDB 974614 D01 and CAB identifier CN0004 under the ISED requirement. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2014.

## SYSTEM TEST CONFIGURATION

### Justification

The EUT was configured for testing according to ANSI C63.26-2015.

The final qualification test was performed with the EUT operating at normal mode.

### Channel List

Mode		Channel		Frequency (MHz)
LTE Band 5	1.4M	Low	20407	824.7
		Middle	20525	836.5
		High	20643	848.3
	3M	Low	20415	825.5
		Middle	20525	836.5
		High	20635	847.5
	5M	Low	20425	826.5
		Middle	20525	836.5
		High	20625	846.5
	10M	Low	20450	829.0
		Middle	20525	836.5
		High	20600	844.0
LTE Band 41	5M	Low	40265	2557.5
		Middle	40620	2593.0
		High	41215	2652.5
	10M	Low	40290	2560.0
		Middle	40620	2593.0
		High	41190	2650.0
	15M	Low	40315	2562.5
		Middle	40620	2593.0
		High	41165	2647.5
	20M	Low	40340	2565.0
		Middle	40620	2593.0
		High	41140	2645.0

## Equipment Modifications

No modifications were made to the EUT.

## Support Equipment List and Details

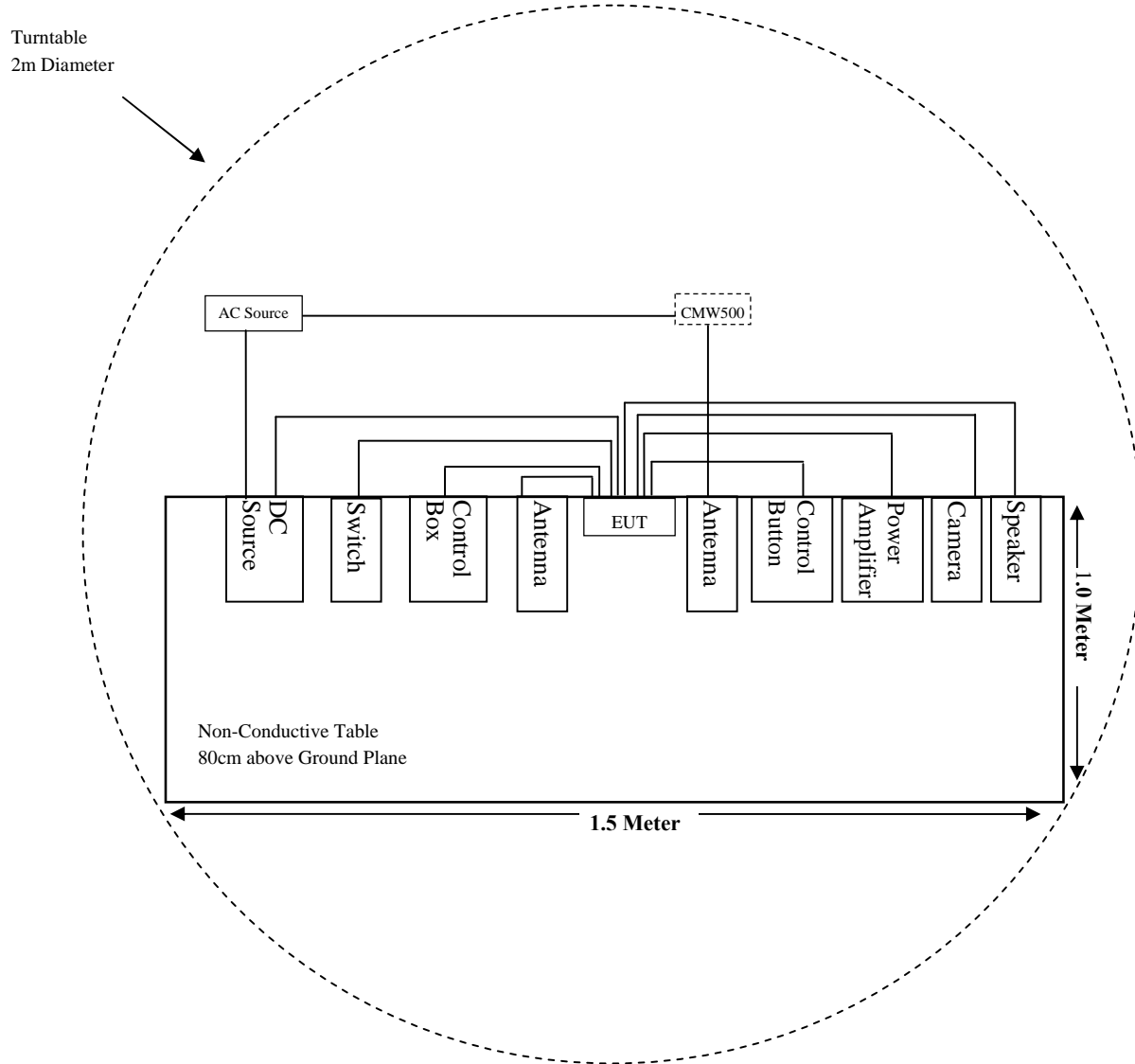
Manufacturer	Description	Model	Serial Number
Waylens Inc.	Antenna	/	/
R & S	Wideband Radio Communication Tester	CMW500	104478
MCH	DC Source	MCH-303D-II	14070562
Shanghai Rising Digital Co.,Ltd.	Speaker	/	/
Shanghai Rising Digital Co.,Ltd.	Power Amplifier	/	/
Shanghai Rising Digital Co.,Ltd.	Control Button	/	/
Shanghai Rising Digital Co.,Ltd.	Control Box	/	/
Shanghai Rising Digital Co.,Ltd.	Switch	/	/

## External I/O Cable

Cable Description	Length (m)	From Port	To
Power Cable	1.5	EUT	DC Source
Signal Cable	2.5	EUT	Speaker
Signal Cable	2.6	EUT	Power Amplifier
Signal Cable	2.4	EUT	Control Button
Signal Cable	2.8	EUT	Control Box
Signal Cable	2.6	EUT	Switch
Ethernet Cable	2.8	EUT	Antenna

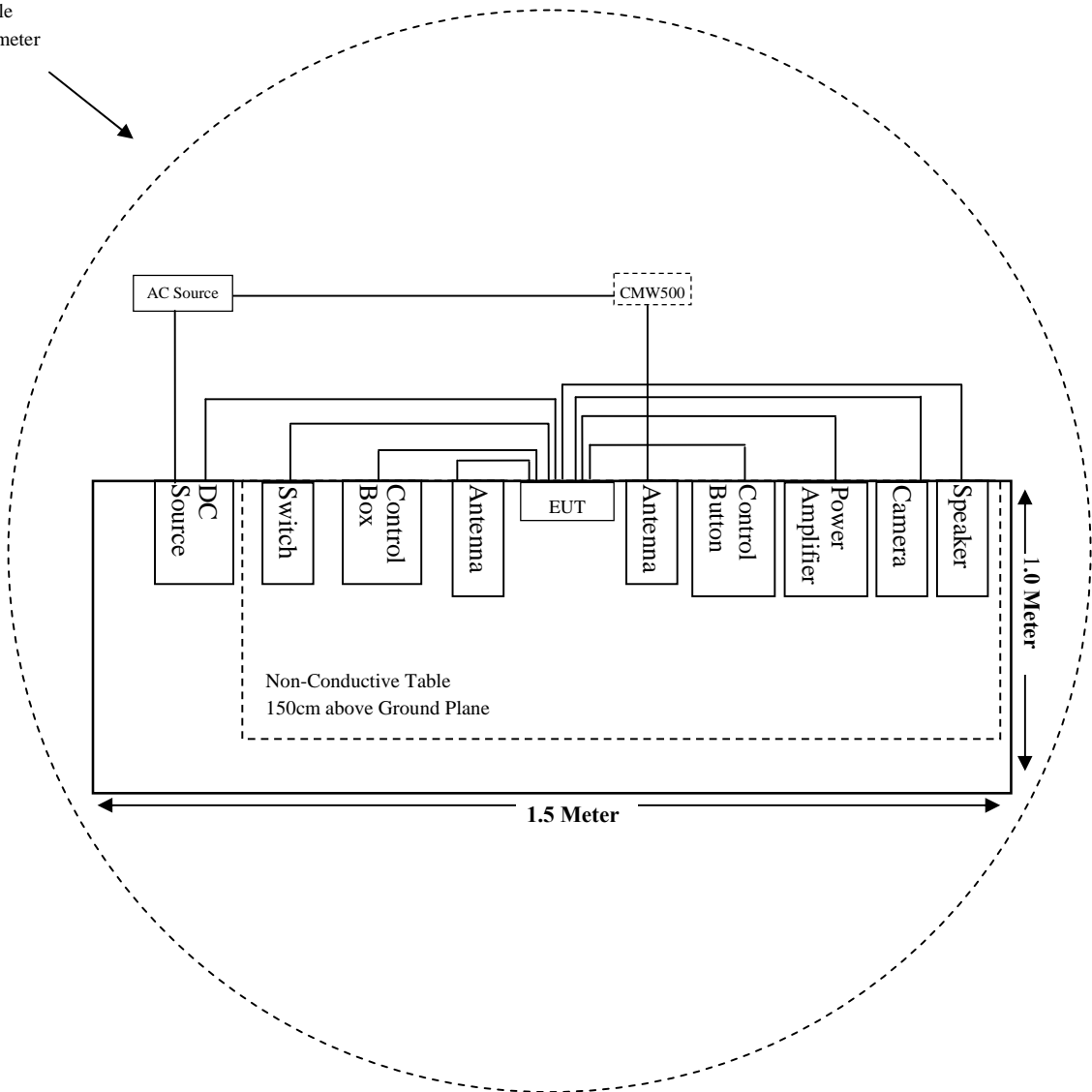
### Block Diagram of Test Setup

For Radiated Emissions (Below 1GHz):



For Radiated Emissions (Above 1GHz):

Turntable  
2m Diameter





**SUMMARY OF TEST RESULTS**

<b>FCC Rules</b>	<b>Description of Test</b>	<b>Result</b>
§1.1310 & §2.1091	Maximum Permissible Exposure(MPE)	Compliant
§2.1046; § 22.913 (a);§ 27.50 (h);	RF Output Power	Compliant
§ 2.1047	Modulation Characteristics	Not Applicable
§ 2.1049; § 22.905; § 22.917;§27.53;	Occupied Bandwidth	Compliant
§ 2.1051; § 22.917 (a); §27.53 (m)	Spurious Emissions at Antenna Terminal	Compliant
§ 2.1053; § 22.917 (a);§27.53 (m)	Spurious Radiated Emissions	Compliant
§ 22.917 (a);§27.53 (m)	Band Edge	Compliant
§ 2.1055; § 22.355;§27.54;	Frequency Stability	Compliant

**TEST EQUIPMENT LIST**

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>Radiated Emission Test (Chamber 1#)</b>					
Rohde & Schwarz	EMI Test Receiver	ESCI	100195	2019-12-14	2020-12-13
HP	Signal Generator	HP 8341B	2624A00116	2019-11-30	2020-11-29
Sunol Sciences	Broadband Antenna	JB3	A090413-1	2019-12-26	2022-12-25
Sonoma Instrument	Pre-amplifier	310N	171205	2020-08-14	2021-08-13
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-12-12	2020-12-11
MICRO-COAX	Coaxial Cable	Cable-8	008	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-9	009	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-10	010	2020-08-15	2021-08-14
R & S	Wideband Radio Communication Tester	CMW500	104478	2020-08-05	2021-08-04
<b>Radiated Emission Test (Chamber 2#)</b>					
HP	Signal Generator	HP 8341B	2624A00116	2019-11-30	2020-11-29
Rohde & Schwarz	EMI Test Receiver	ESU40	100207	2020-04-01	2021-03-31
ETS-LINDGREN	Horn Antenna	3115	9207-3900	2020-07-15	2023-07-14
ETS-LINDGREN	Horn Antenna	3116	00084159	2019-12-12	2022-12-11
ETS-LINDGREN	Horn Antenna	3116	2516	2020-01-17	2023-01-16
A.H.Systems,inc	Amplifier	PAM-0118P	512	2020-02-20	2021-02-19
EM Electronics Corporation	Amplifier	EM18G40G	060726	2020-03-22	2021-03-21
Rohde & Schwarz	Auto test Software	EMC32	100361	/	/
MICRO-COAX	Coaxial Cable	Cable-6	006	2019-12-12	2020-12-11
MICRO-COAX	Coaxial Cable	Cable-11	011	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-12	012	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-13	013	2020-08-15	2021-08-14
MICRO-COAX	Coaxial Cable	Cable-16	016	2020-08-15	2021-08-14
R & S	Wideband Radio Communication Tester	CMW500	104478	2020-08-05	2021-08-04

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
<b>RF Conducted Test</b>					
Rohde & Schwarz	Signal Analyzer	FSIQ26	836131/009	2019-12-14	2020-12-13
R & S	Wideband Radio Communication Tester	CMW500	104478	2020-08-05	2021-08-04
Mini-Circuits	Power splitter	ZFRSC-14-S+	SF019411452	2019-11-10	2020-11-09
BACL	Temperature & Humidity Chamber	BTH-150	30023	2019-12-20	2020-12-19
Shanghai Rising Digital Co.,Ltd.	RF Cable	Shanghai Rising Digital Co.,Ltd. C01	C01	Each Time	/

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

**FCC §1.1310 & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)**

**Applicable Standard**

According to subpart 1.1310, 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/		f/1500	30
1500-100,000	/		1.0	30

f = frequency in MHz; \* = Plane-wave equivalent power density

**Calculated Formulary:**

Predication of MPE limit at a given distance

S = PG/4 π R<sup>2</sup> = power density (in appropriate units, e.g. mW/cm<sup>2</sup>);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

**Calculated Data:**

Mode	Frequency Range (MHz)	Antenna Gain		Tune-up Output Power		Evaluation Distance (cm)	Power Density (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
		(dBi)	(numeric)	(dBm)	(mW)			
BLE	2402-2480	1.0	1.26	5.50	3.55	20	0.0009	1.00
LTE Band 5	824.0-849.0	0.6	1.15	23.50	223.87	20	0.0511	0.55
LTE Band 41	2555.0-2655.0	3.0	2.00	24.00	251.19	20	0.0997	1.00

**Note:** LTE and BLE can transmit simultaneously; the worst condition is below:

$$\sum_i \frac{S_i}{S_{Limit,i}} = 0.0009/1.00 + 0.0997/1.00 = 0.1006 < 1.0$$

**Result:** The device meet FCC MPE at 20 cm distance.

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## **FCC §2.1047 - MODULATION CHARACTERISTIC**

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

## **FCC §2.1046; § 22.913 (a); §27.50 (h) - RF OUTPUT POWER**

### **Applicable Standards**

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts (38.45dBm).

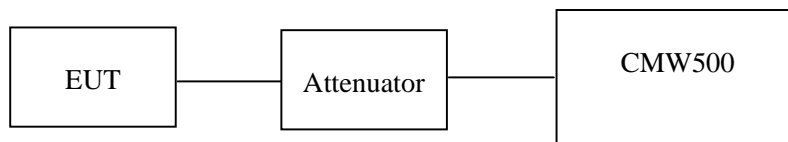
According to §27.50(h), the maximum transmitter output power not exceed 2Watts (33dBm)

The peak-to-average power ratio (PAPR) of the transmitter output power must not exceed 13 dB.

### **Test Procedure**

#### ***Conducted method:***

The RF output of the transmitter was connected to the CMW500 through sufficient attenuation.



#### ***Radiated Output Power:***

The measurements procedures specified in ANSI C63.26-2015 were applied.

- a) Connect the equipment as illustrated. Mount the equipment with the manufacturer specified antenna in a vertical orientation on a manufacturer specified mounting surface located on a non-conducting rotating platform of a RF anechoic chamber (preferred) or a standard radiation site.
- b) Key the transmitter, then rotate the EUT 360o azimuthally and record spectrum analyzer power level (LVL) measurements at angular increments that are sufficiently small to permit resolution of all peaks. If a standard radiation test site is used, raise and lower the test antenna to obtain a maximum reading at each angular increment. (Note: several batteries may be needed to offset the effect of battery voltage droop, which should not exceed 5% of the manufactured specified battery voltage during transmission).
- c) Replace the transmitter under test with a vertically polarized half-wave dipole (or an antenna whose gain is known relative to an ideal half-wave dipole). The center of the antenna should be at the same location as the center of the antenna under test.
- d) Connect the antenna to a signal generator with a known output power and record the path loss (in dB) as LOSS. If a standard radiation test site is used,raise and lower the test antenna to obtain a maximum reading.  
 $LOSS = \text{Generator Output Power (dBm)} - \text{Analyzer reading (dBm)}$

e) Determine the effective radiated output power at each angular position from the readings in steps b) and d) using the following equation:

$$\text{ERP (dBm)} = \text{LVL (dBm)} + \text{LOSS (dB)}$$

f) The maximum ERP is the maximum value determined in the preceding step.

(Note: Effective Isotropic Radiated Power (EIRP) can be computed using the following:

$$\text{EIRP (dBm)} = \text{ERP (dBm)} + 2.15 \text{ (dB)}$$

## Test Data

### Environmental Conditions

<b>Temperature:</b>	23.2 °C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.3 kPa

*The testing was performed by Winnie Yang on 2020-09-02.*



**Maximum Output Power:**

**LTE Band 5**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.17	21.89	21.91
		1#3	22.91	22.81	22.34
		1#5	22.83	22.42	22.89
		3#0	22.48	22.41	22.25
		3#1	22.51	22.41	22.16
		3#3	22.86	22.48	22.36
		6#0	22.97	22.76	22.70
	16-QAM	1#0	22.21	22.42	21.93
		1#3	22.98	22.78	22.58
		1#5	22.34	22.24	22.55
		3#0	22.87	22.50	22.24
		3#1	22.41	22.31	22.29
		3#3	23.01	22.45	22.58
		6#0	22.94	22.21	22.39
3M	QPSK	1#0	23.01	22.35	22.35
		1#7	22.43	22.22	22.90
		1#14	22.36	22.55	22.45
		8#0	22.79	22.37	22.46
		8#4	22.40	22.16	21.93
		8#7	22.90	22.52	22.36
		15#0	22.48	22.88	22.79
	16-QAM	1#0	22.17	22.12	22.58
		1#7	22.52	22.69	22.73
		1#14	22.80	22.58	22.49
		8#0	22.40	22.74	22.89
		8#4	23.01	22.56	22.73
		8#7	22.26	22.28	22.67
		15#0	22.38	22.08	22.05

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.13	21.78	21.87
		1#12	22.45	22.35	22.49
		1#24	22.45	22.66	22.35
		12#0	22.87	22.57	22.49
		12#6	22.45	22.65	22.00
		12#11	22.18	22.66	22.40
		25#0	23.01	22.64	22.33
	16-QAM	1#0	22.45	22.07	22.40
		1#12	22.46	22.73	22.13
		1#24	23.06	22.87	22.50
		12#0	22.47	22.15	22.38
		12#6	22.49	22.00	22.06
		12#11	23.00	22.31	22.08
		25#0	22.90	22.81	22.04
10M	QPSK	1#0	22.88	22.27	22.15
		1#24	22.39	22.75	22.46
		1#49	23.10	22.07	22.06
		25#0	23.13	22.55	22.28
		25#12	22.67	22.06	22.48
		25#24	22.78	22.15	22.83
		50#0	22.42	22.58	22.44
	16-QAM	1#0	22.99	22.38	22.34
		1#24	22.87	22.48	22.51
		1#49	23.12	22.09	22.48
		25#0	22.73	22.16	21.92
		25#12	22.65	22.30	22.59
		25#24	22.69	22.62	22.54
		50#0	22.64	22.01	22.58

**LTE Band 41**

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	23.10	23.05	22.99
		1#12	23.52	23.63	23.14
		1#24	23.15	23.57	23.24
		12#0	22.95	23.15	23.53
		12#6	23.48	23.85	23.76
		12#11	22.95	23.07	23.24
		25#0	23.07	23.03	23.42
	16-QAM	1#0	23.26	23.39	23.71
		1#12	22.80	23.98	23.45
		1#24	23.59	23.87	23.13
		12#0	23.09	23.80	23.38
		12#6	23.59	23.35	23.11
		12#11	22.75	23.02	23.77
		25#0	23.62	23.78	23.50
10M	QPSK	1#0	23.39	23.86	23.56
		1#24	23.16	23.47	23.31
		1#49	22.94	23.54	23.07
		25#0	23.13	23.40	23.04
		25#12	23.22	23.54	23.50
		25#24	23.53	23.23	23.78
		50#0	22.73	23.94	23.70
	16-QAM	1#0	23.22	23.44	22.90
		1#24	23.71	23.23	23.68
		1#49	23.13	23.93	23.11
		25#0	23.18	23.53	23.09
		25#12	23.55	23.42	23.49
		25#24	23.73	23.93	22.95
		50#0	23.33	23.29	23.25

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
15M	QPSK	1#0	22.85	23.41	23.69
		1#37	23.08	23.71	22.89
		1#74	23.27	23.36	23.16
		36#0	23.18	23.28	23.53
		36#17	22.90	23.54	23.05
		36#35	23.69	23.52	22.95
		75#0	22.94	23.23	23.02
	16-QAM	1#0	23.60	23.31	23.60
		1#37	22.84	23.09	23.34
		1#74	23.46	23.63	23.28
		36#0	22.86	23.34	23.41
		36#17	23.73	23.49	23.75
		36#35	23.29	23.59	22.90
		75#0	22.79	23.89	23.59
20M	QPSK	1#0	23.28	23.93	23.80
		1#49	23.13	23.41	23.67
		1#99	23.60	23.99	23.73
		50#0	23.18	23.47	23.31
		50#24	23.47	23.27	23.63
		50#49	22.88	23.79	23.46
		100#0	22.91	23.18	23.24
	16-QAM	1#0	23.07	23.84	23.08
		1#49	22.89	23.73	23.59
		1#99	23.41	23.13	23.64
		50#0	23.13	23.51	23.38
		50#24	22.87	23.19	23.11
		50#49	22.94	23.65	23.54
		100#0	23.39	23.74	23.53

**Peak-to-average ratio (PAR):**

**LTE Band 5**

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	10M	3.33	3.49	3.81	13
	50 RB		5.26	5.47	5.84	13
16-QAM	1 RB	10M	4.22	4.54	4.77	13
	50 RB		6.22	6.6	6.76	13

**LTE Band 41**

Test Modulation		Test Bandwidth	Low Channel (dB)	Middle Channel (dB)	High Channel (dB)	Limit(dB)
QPSK	1 RB	20M	3.14	3.36	3.77	13
	100 RB		5.2	5.44	5.69	13
16-QAM	1 RB	20M	4.43	4.86	4.95	13
	100 RB		6.52	6.94	6.89	13

**ERP:**

**LTE Band 5**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
<b>QPSK 1.4M BW Low Channel</b>								
824.70	H	90.48	26.61	0.62	-1.18	24.81	38.45	8.19
824.70	V	88.21	24.34	0.62	-1.18	22.54	38.45	10.46
<b>16-QAM 1.4M BW Low Channel</b>								
824.70	H	90.37	26.5	0.62	-1.18	24.7	38.45	8.30
824.70	V	88.05	24.18	0.62	-1.18	22.38	38.45	10.62
<b>QPSK 3M BW Low Channel</b>								
825.50	H	90.33	26.46	0.63	-1.17	24.66	38.45	8.34
825.50	V	88.88	25.01	0.63	-1.17	23.21	38.45	9.79
<b>16-QAM 3M BW Low Channel</b>								
825.50	H	90.04	26.17	0.63	-1.17	24.37	38.45	8.63
825.50	V	88.34	24.47	0.63	-1.17	22.67	38.45	10.33
<b>QPSK 5M BW Low Channel</b>								
826.50	H	90.06	26.19	0.63	-1.17	24.39	38.45	8.61
826.50	V	88.22	24.35	0.63	-1.17	22.55	38.45	10.45
<b>16-QAM 5M BW Low Channel</b>								
826.50	H	90.66	26.79	0.63	-1.17	24.99	38.45	8.01
826.50	V	88.55	24.68	0.63	-1.17	22.88	38.45	10.12
<b>QPSK 10M BW Low Channel</b>								
829.00	H	90.07	26.2	0.63	-1.16	24.41	38.45	8.59
829.00	V	88.38	24.51	0.63	-1.16	22.72	38.45	10.28
<b>16-QAM 10M BW Low Channel</b>								
829.00	H	90.70	26.83	0.63	-1.16	25.04	38.45	7.96
829.00	V	88.65	24.78	0.63	-1.16	22.99	38.45	10.01

## LTE Band 5

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
<b>QPSK 1.4M BW Middle Channel</b>								
836.50	H	90.33	24.86	0.63	-1.14	23.09	38.45	15.36
836.50	V	91.84	26.37	0.63	-1.14	24.60	38.45	13.85
<b>16-QAM 1.4M BW Middle Channel</b>								
836.50	H	90.24	24.77	0.63	-1.14	23.00	38.45	15.45
836.50	V	91.77	26.30	0.63	-1.14	24.53	38.45	13.92
<b>QPSK 3M BW Middle Channel</b>								
836.50	H	90.00	24.53	0.63	-1.14	22.76	38.45	15.69
836.50	V	91.36	25.89	0.63	-1.14	24.12	38.45	14.33
<b>16-QAM 3M BW Middle Channel</b>								
836.50	H	89.97	24.50	0.63	-1.14	22.73	38.45	15.72
836.50	V	91.02	25.55	0.63	-1.14	23.78	38.45	14.67
<b>QPSK 5M BW Middle Channel</b>								
836.50	H	89.86	24.39	0.63	-1.14	22.62	38.45	15.83
836.50	V	90.13	24.66	0.63	-1.14	22.89	38.45	15.56
<b>16-QAM 5M BW Middle Channel</b>								
836.50	H	88.98	23.51	0.63	-1.14	21.74	38.45	16.71
836.50	V	90.11	24.64	0.63	-1.14	22.87	38.45	15.58
<b>QPSK 10M BW Middle Channel</b>								
836.50	H	88.42	22.95	0.63	-1.14	21.18	38.45	17.27
836.50	V	89.67	24.20	0.63	-1.14	22.43	38.45	16.02
<b>16-QAM 10M BW Middle Channel</b>								
836.50	H	88.33	22.86	0.63	-1.14	21.09	38.45	17.36
836.50	V	89.75	24.28	0.63	-1.14	22.51	38.45	15.94

**LTE Band 5**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Antenna Gain (dBd/dBi)	Cable Loss (dB)			
<b>QPSK 1.4M BW High Channel</b>								
848.30	H	90.69	25.22	0.63	-1.14	23.45	38.45	15.00
848.30	V	91.49	26.02	0.63	-1.14	24.25	38.45	14.20
<b>16-QAM 1.4M BW High Channel</b>								
848.30	H	90.25	24.78	0.63	-1.14	23.01	38.45	15.44
848.30	V	91.56	26.09	0.63	-1.14	24.32	38.45	14.13
<b>QPSK 3M BW High Channel</b>								
847.50	H	90.15	24.68	0.63	-1.14	22.91	38.45	15.54
847.50	V	92.01	26.54	0.63	-1.14	24.77	38.45	13.68
<b>16-QAM 3M BW High Channel</b>								
847.50	H	91.16	25.69	0.63	-1.14	23.92	38.45	14.53
847.50	V	90.22	24.75	0.63	-1.14	22.98	38.45	15.47
<b>QPSK 5M BW High Channel</b>								
846.50	H	89.16	23.69	0.63	-1.14	21.92	38.45	16.53
846.50	V	90.36	24.89	0.63	-1.14	23.12	38.45	15.33
<b>16-QAM 5M BW High Channel</b>								
846.50	H	88.46	22.99	0.63	-1.14	21.22	38.45	17.23
846.50	V	90.13	24.66	0.63	-1.14	22.89	38.45	15.56
<b>QPSK 10M BW High Channel</b>								
844.00	H	89.02	23.55	0.63	-1.14	21.78	38.45	16.67
844.00	V	89.79	24.32	0.63	-1.14	22.55	38.45	15.90
<b>16-QAM 10M BW High Channel</b>								
844.00	H	88.46	22.99	0.63	-1.14	21.22	38.45	17.23
844.00	V	89.36	23.89	0.63	-1.14	22.12	38.45	16.33



**EIRP:**

**LTE Band 41**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBμV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
<b>QPSK 5M BW Low Channel</b>								
2557.50	H	85.38	12.39	0.89	10.02	21.52	33.00	11.48
2557.50	V	84.40	11.41	0.89	10.02	20.54	33.00	12.46
<b>16-QAM 5M BW Low Channel</b>								
2557.50	H	85.65	12.66	0.89	10.02	21.79	33.00	11.21
2557.50	V	84.52	11.53	0.89	10.02	20.66	33.00	12.34
<b>QPSK 10M BW Low Channel</b>								
2560.00	H	85.36	12.37	0.89	10.02	21.50	33.00	11.50
2560.00	V	84.74	11.75	0.89	10.02	20.88	33.00	12.12
<b>16-QAM 10M BW Low Channel</b>								
2560.00	H	85.88	12.89	0.89	10.02	22.02	33.00	10.98
2560.00	V	84.75	11.76	0.89	10.02	20.89	33.00	12.11
<b>QPSK 15M BW Low Channel</b>								
2562.50	H	85.79	12.80	0.89	10.01	21.92	33.00	11.08
2562.50	V	84.51	11.52	0.89	10.01	20.64	33.00	12.36
<b>16-QAM 15M BW Low Channel</b>								
2562.50	H	85.52	12.53	0.89	10.01	21.65	33.00	11.35
2562.50	V	84.35	11.36	0.89	10.01	20.48	33.00	12.52
<b>QPSK 20M BW Low Channel</b>								
2565.00	H	85.50	12.51	0.89	10.01	21.63	33.00	11.37
2565.00	V	84.15	11.16	0.89	10.01	20.28	33.00	12.72
<b>16-QAM 20M BW Low Channel</b>								
2565.00	H	85.39	12.40	0.89	10.01	21.52	33.00	11.48
2565.00	V	84.55	11.56	0.89	10.01	20.68	33.00	12.32

**LTE Band 41**

Frequency (MHz)	Polar (H/V)	Receiver Reading (dBµV)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
<b>QPSK 5M BW Middle Channel</b>								
2593.00	H	81.31	9.11	0.90	9.97	18.18	33.00	14.82
2593.00	V	81.74	9.54	0.90	9.97	18.61	33.00	14.39
<b>16-QAM 5M BW Middle Channel</b>								
2593.00	H	81.29	9.09	0.90	9.97	18.16	33.00	14.84
2593.00	V	81.86	9.66	0.90	9.97	18.73	33.00	14.27
<b>QPSK 10M BW Middle Channel</b>								
2593.00	H	81.13	8.93	0.90	9.97	18.00	33.00	15.00
2593.00	V	81.63	9.43	0.90	9.97	18.50	33.00	14.50
<b>16-QAM 10M BW Middle Channel</b>								
2593.00	H	81.19	8.99	0.90	9.97	18.06	33.00	14.94
2593.00	V	81.77	9.57	0.90	9.97	18.64	33.00	14.36
<b>QPSK 15M BW Middle Channel</b>								
2593.00	H	81.23	9.03	0.90	9.97	18.10	33.00	14.90
2593.00	V	81.87	9.67	0.90	9.97	18.74	33.00	14.26
<b>16-QAM 15M BW Middle Channel</b>								
2593.00	H	81.13	8.93	0.90	9.97	18.00	33.00	15.00
2593.00	V	81.56	9.36	0.90	9.97	18.43	33.00	14.57
<b>QPSK 20M BW Middle Channel</b>								
2593.00	H	81.52	9.32	0.90	9.97	18.39	33.00	14.61
2593.00	V	82.41	10.21	0.90	9.97	19.28	33.00	13.72
<b>16-QAM 20M BW Middle Channel</b>								
2593.00	H	81.75	9.55	0.90	9.97	18.62	33.00	14.38
2593.00	V	82.53	10.33	0.90	9.97	19.40	33.00	13.60

## LTE Band 41

Frequency (MHz)	Polar (H/V)	Receiver Reading (dB $\mu$ V)	Substituted Method			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Submitted Level (dBm)	Cable loss (dB)	Antenna Gain (dBd/dBi)			
<b>QPSK 5M BW High Channel</b>								
2652.50	H	85.69	12.70	0.90	9.89	21.69	33.00	11.31
2652.50	V	84.59	11.60	0.90	9.89	20.59	33.00	12.41
<b>16-QAM 5M BW High Channel</b>								
2652.50	H	85.28	12.29	0.90	9.89	21.28	33.00	11.72
2652.50	V	84.01	11.02	0.90	9.89	20.01	33.00	12.99
<b>QPSK 10M BW High Channel</b>								
2650.00	H	85.14	12.15	0.90	9.89	21.14	33.00	11.86
2650.00	V	84.07	11.08	0.90	9.89	20.07	33.00	12.93
<b>16-QAM 10M BW High Channel</b>								
2650.00	H	85.9	12.91	0.90	9.89	21.90	33.00	11.1
2650.00	V	84.74	11.75	0.90	9.89	20.74	33.00	12.26
<b>QPSK 15M BW High Channel</b>								
2647.50	H	85.47	12.48	0.90	9.89	21.47	33.00	11.53
2647.50	V	84.83	11.84	0.90	9.89	20.83	33.00	12.17
<b>16-QAM 15M BW High Channel</b>								
2647.50	H	85.36	12.37	0.90	9.89	21.36	33.00	11.64
2647.50	V	84.63	11.64	0.90	9.89	20.63	33.00	12.37
<b>QPSK 20M BW High Channel</b>								
2645.00	H	85.41	12.42	0.90	9.9	21.42	33.00	11.58
2645.00	V	84.9	11.91	0.90	9.9	20.91	33.00	12.09
<b>16-QAM 20M BW High Channel</b>								
2645.00	H	85.33	12.34	0.90	9.90	21.34	33.00	11.66
2645.00	V	84.11	11.12	0.90	9.90	20.12	33.00	12.88

**Note:**

- 1) All above data were tested without amplifier.
- 2) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
- 3) Margin (dB) = Limit (dBm) - Absolute Level (dBm)

**FCC §2.1049, §22.917, §22.905, §27.53 - OCCUPIED BANDWIDTH**

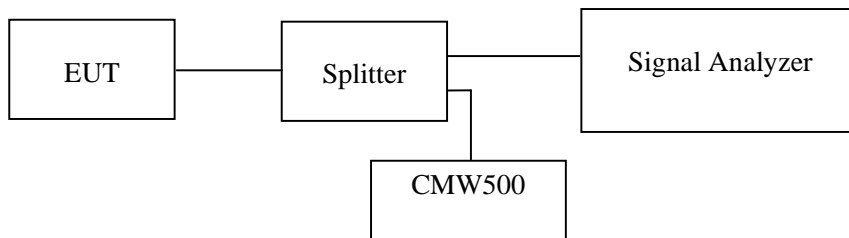
**Applicable Standards**

FCC 47 §2.1049, §22.917, §22.905, §27.53.

**Test Procedure**

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

The resolution bandwidth of the spectrum analyzer was set at 1% to 5% of the anticipated emission bandwidth and the 26 dB & 99% bandwidth was recorded..



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	24.9~25.6 °C
<b>Relative Humidity:</b>	48~50 %
<b>ATM Pressure:</b>	102.7~103.7 kPa

*The testing was performed by Winnie Yang on 2020-08-08 to 2020-09-10.*

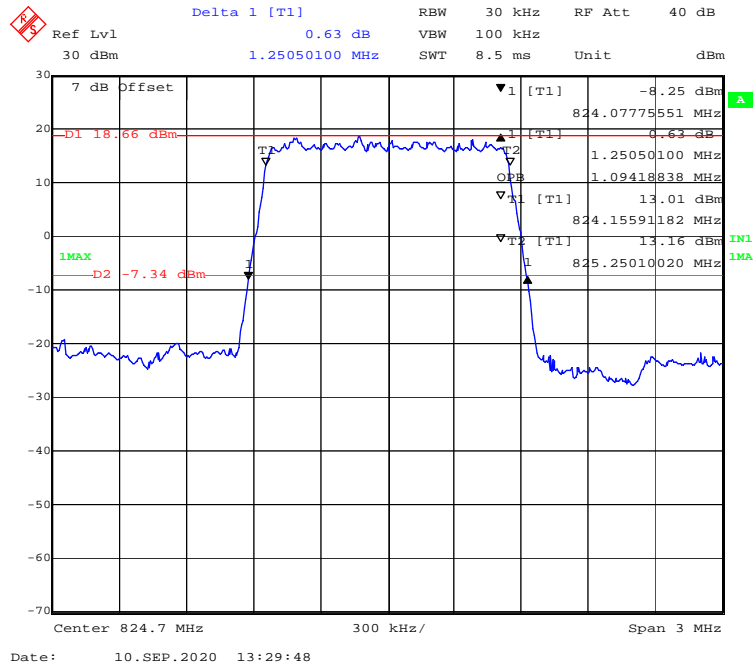
*EUT operation mode: Transmitting*

*Test Result: Compliant*

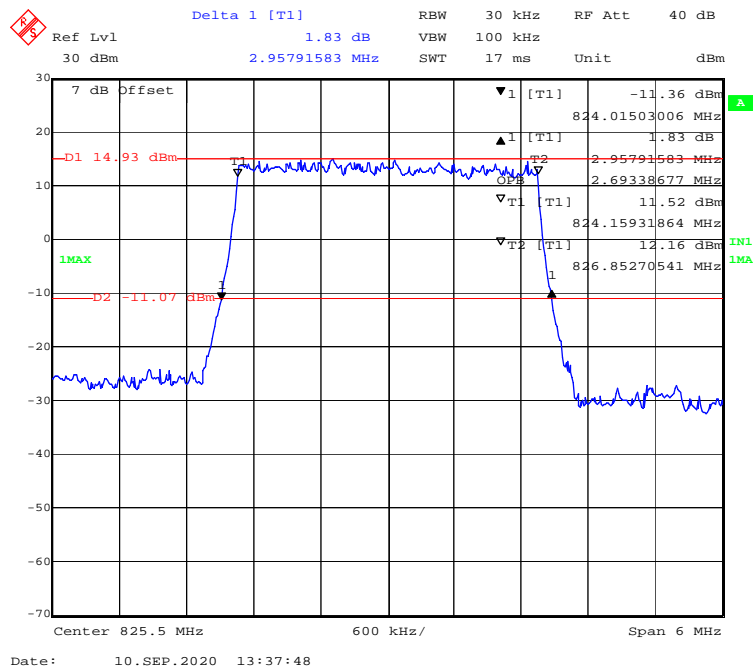
**LTE Band 5:**

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
QPSK	1.4M	Low	1.251	1.094
	3M		2.958	2.693
	5M		4.870	4.489
	10M		9.659	9.018
	1.4M	Middle	1.251	1.100
	3M		2.994	2.705
	5M		4.890	4.509
	10M		9.739	8.938
	1.4M	High	1.244	1.100
	3M		2.958	2.705
	5M		4.930	4.469
	10M		9.619	8.978
16-QAM	1.4M	Low	1.251	1.100
	3M		2.970	2.693
	5M		4.890	4.489
	10M		9.659	9.018
	1.4M	Middle	1.251	1.100
	3M		2.994	2.693
	5M		4.870	4.489
	10M		9.739	8.938
	1.4M	High	1.257	1.094
	3M		2.958	2.705
	5M		4.910	4.489
	10M		9.659	8.938

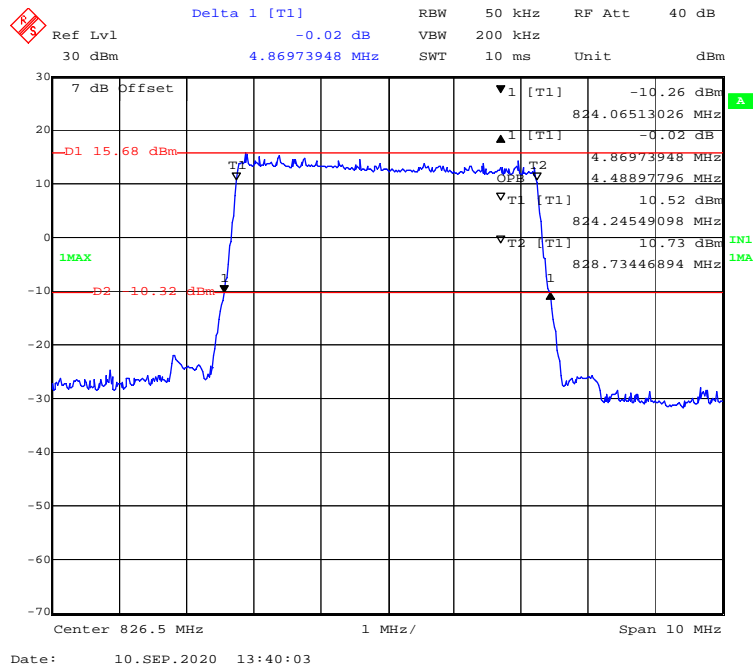
**LTE Band 5:  
QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



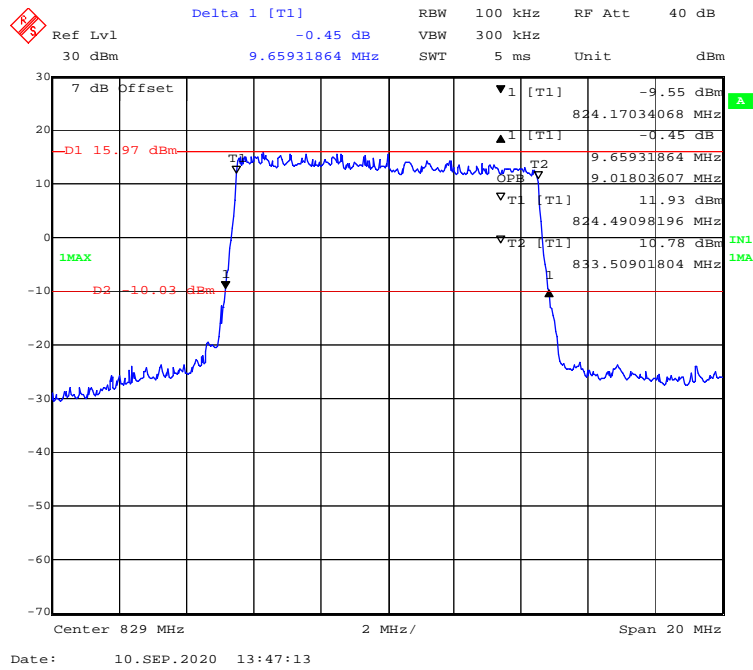
**QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



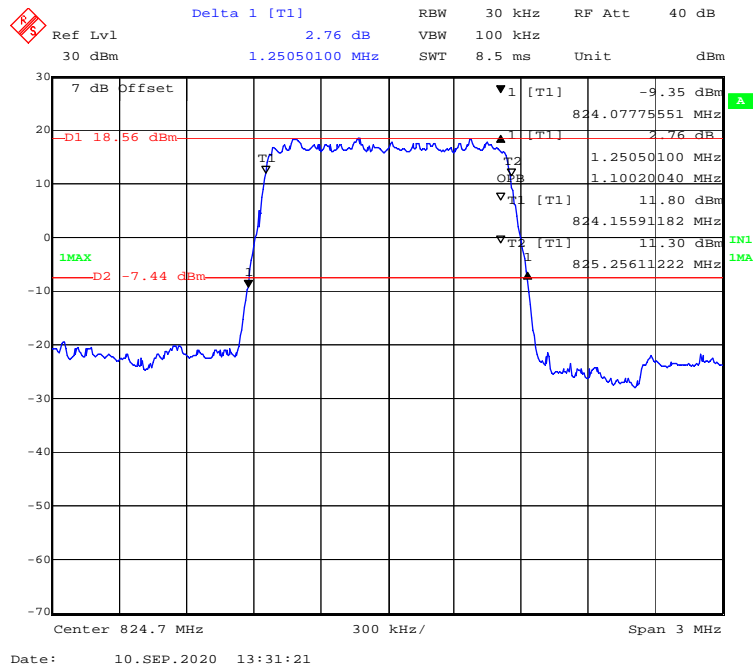
**QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



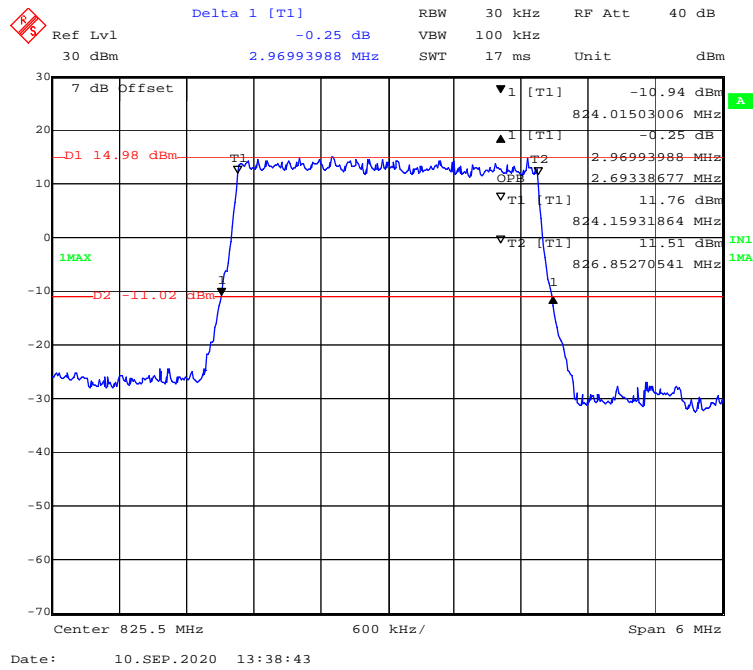
**QPSK (10.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



**16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**

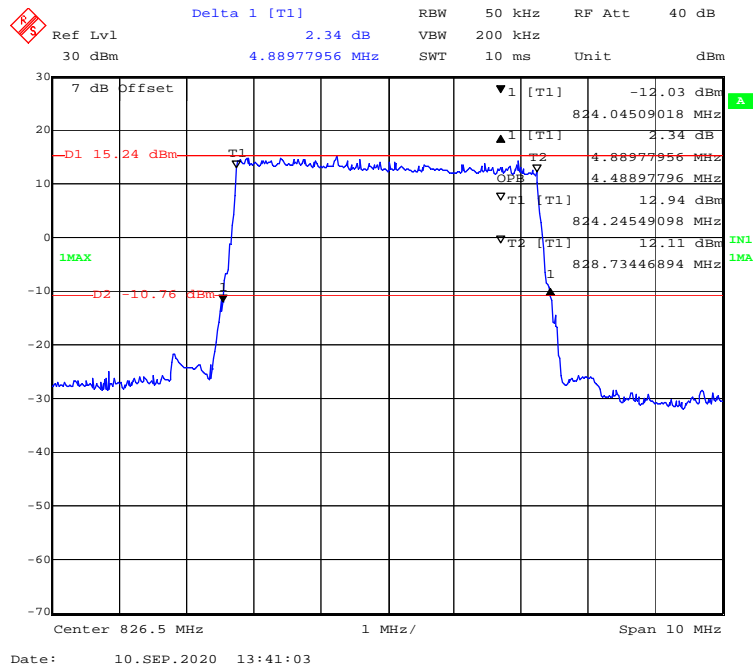


**16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**

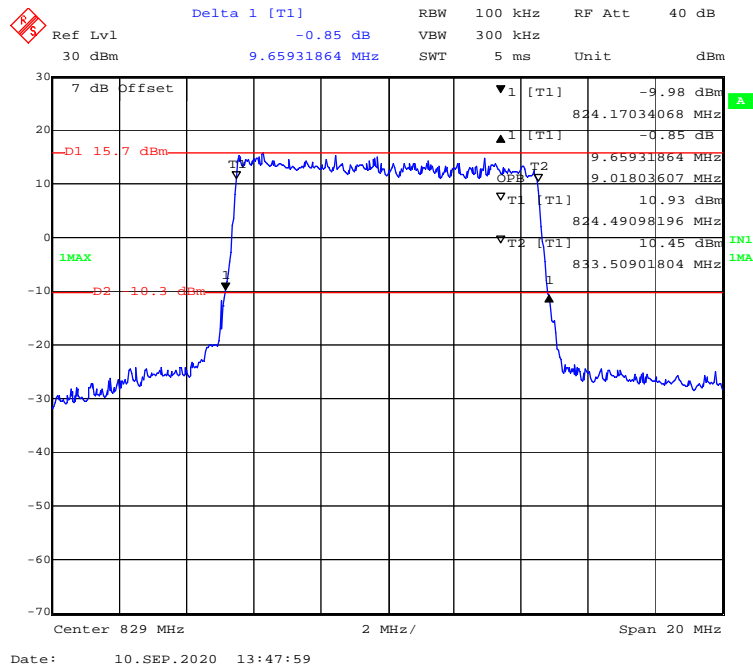




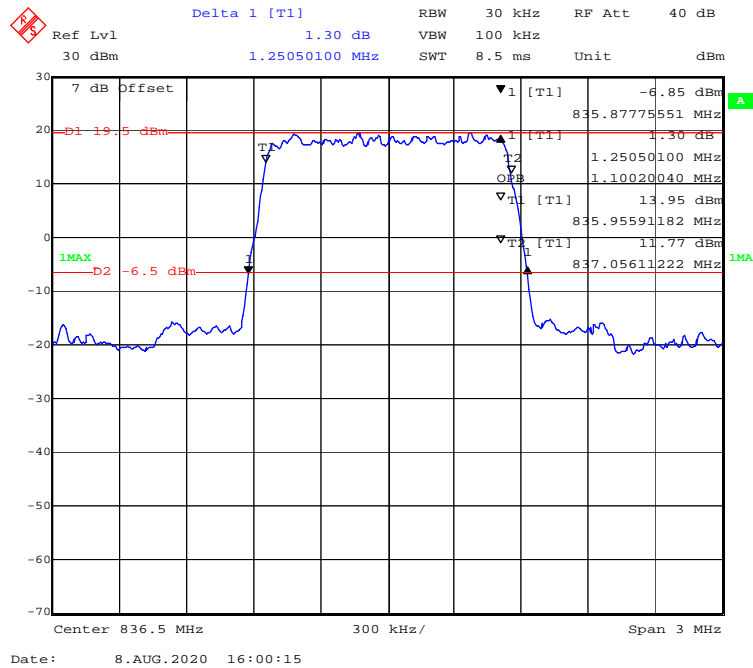
**16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



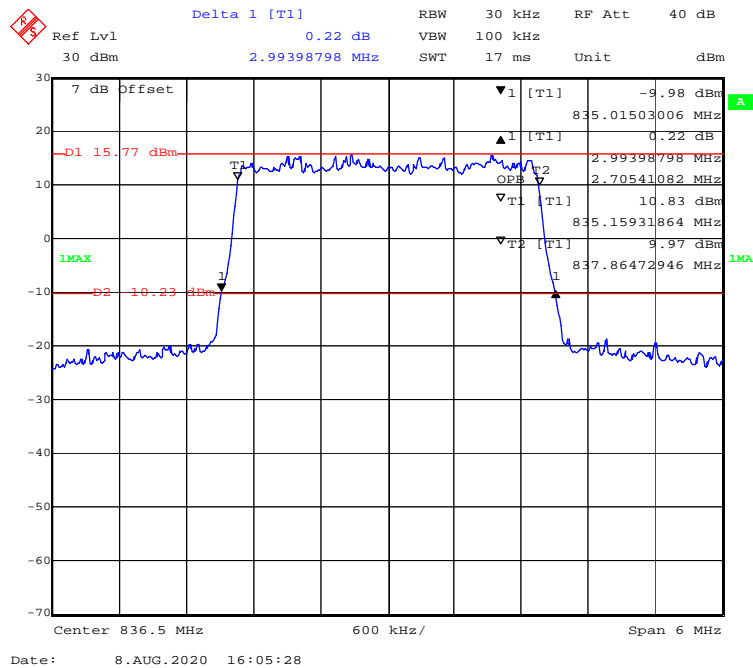
**16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



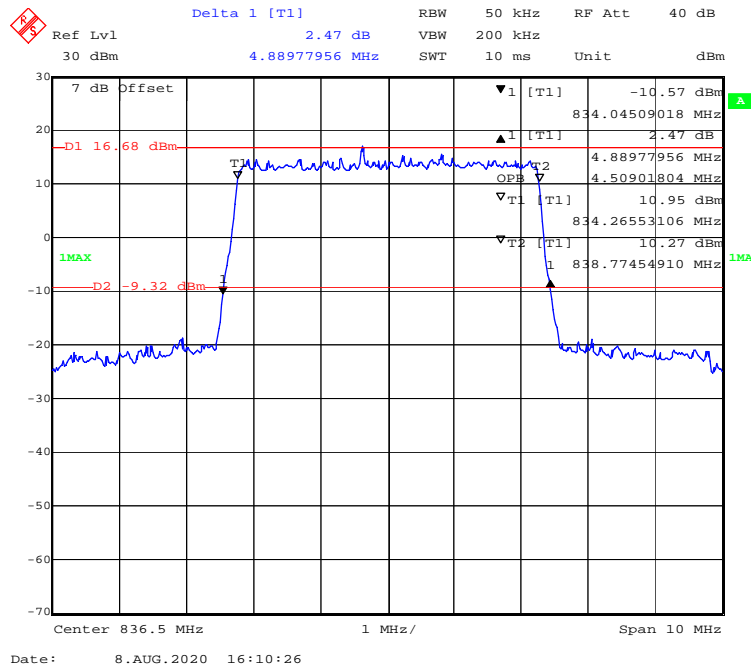
**QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



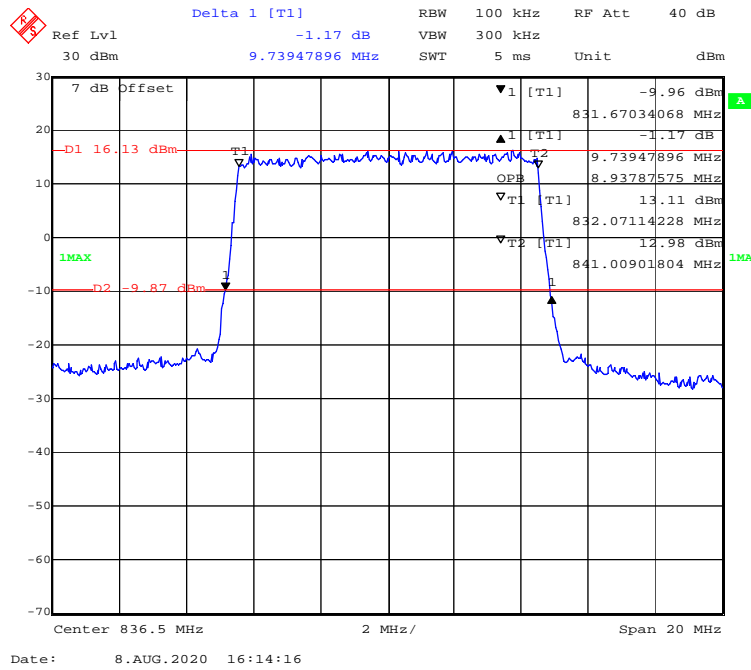
**QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



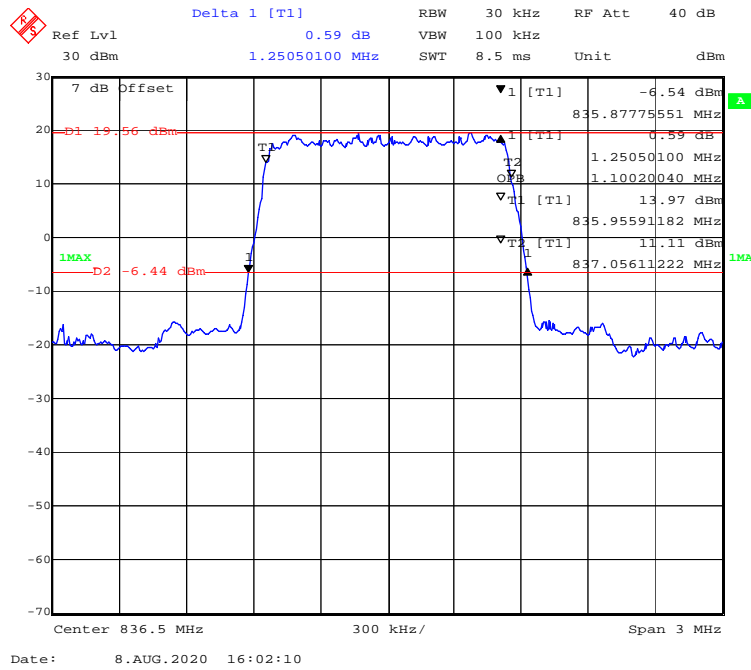
**QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



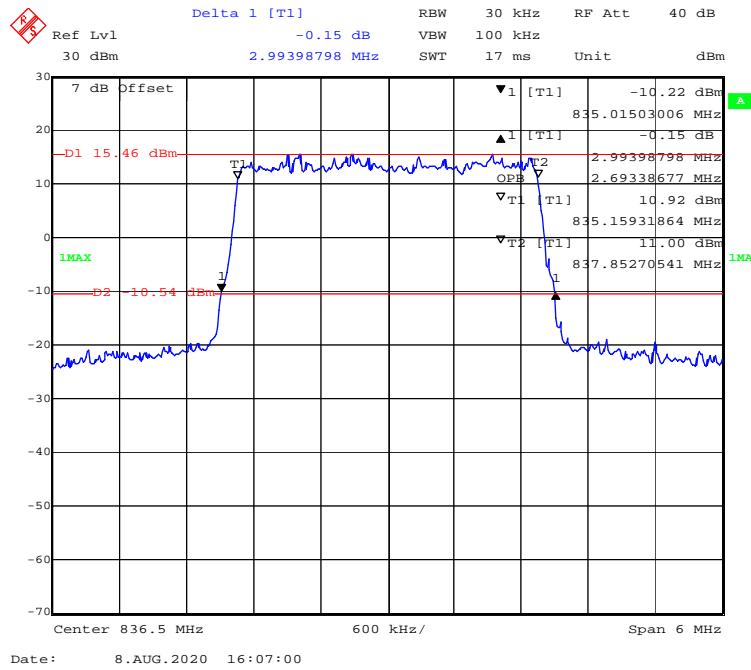
**QPSK (10.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



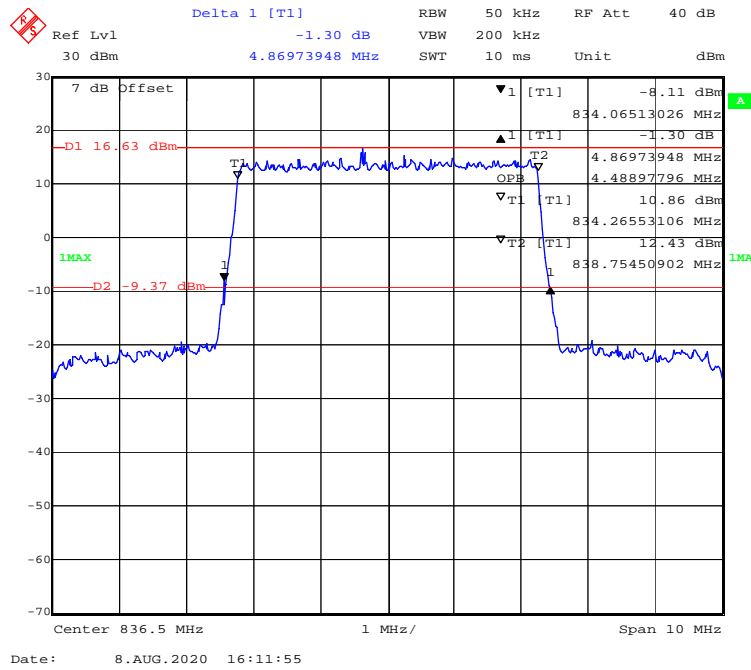
**16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



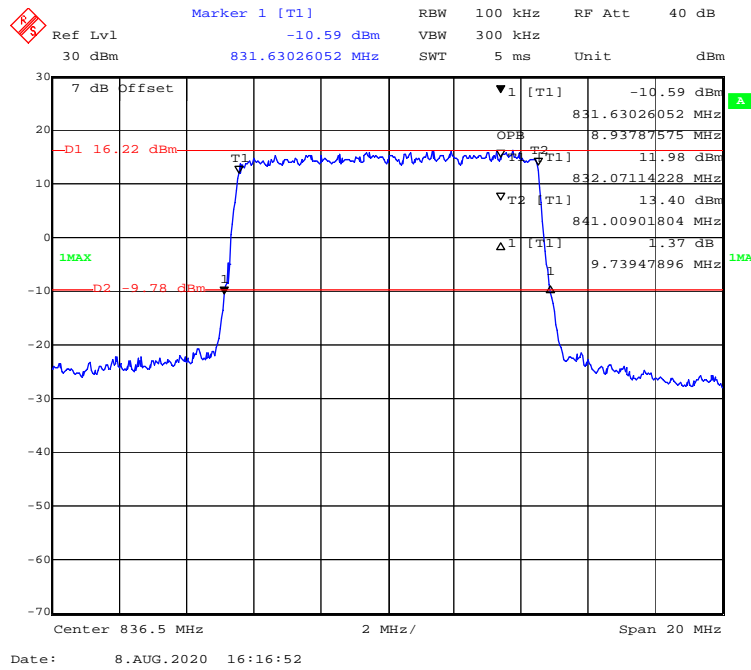
**16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



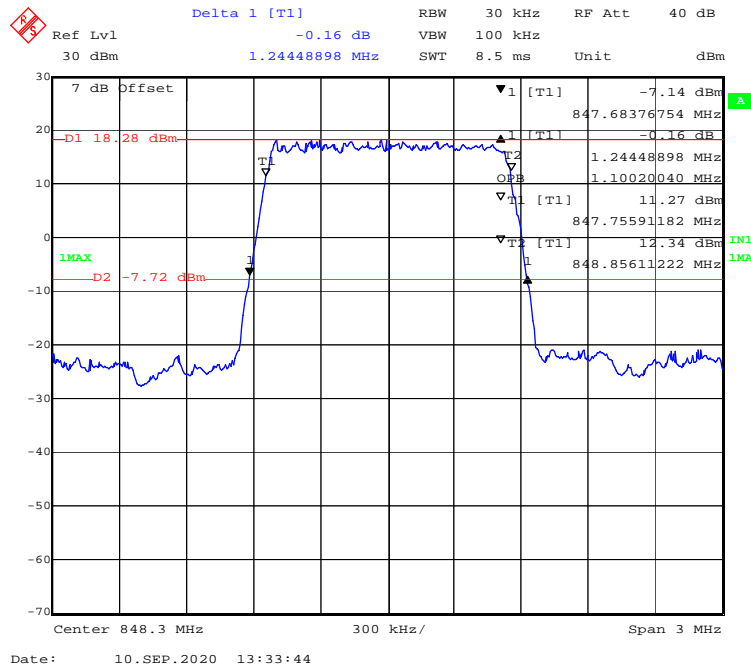
**16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



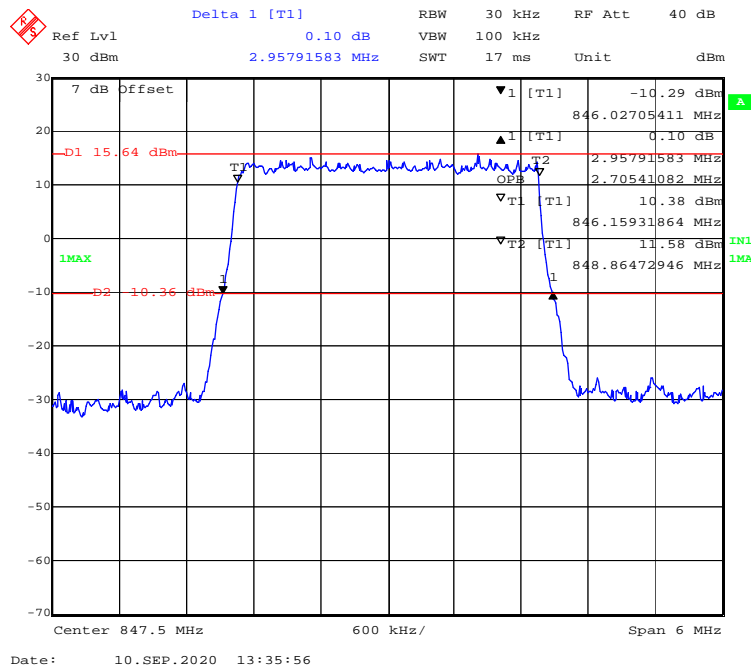
**16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



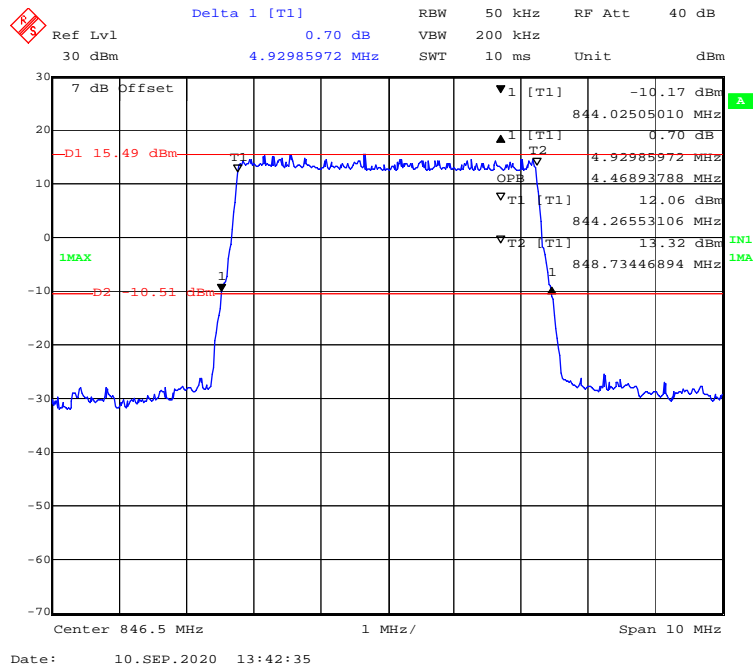
**QPSK (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



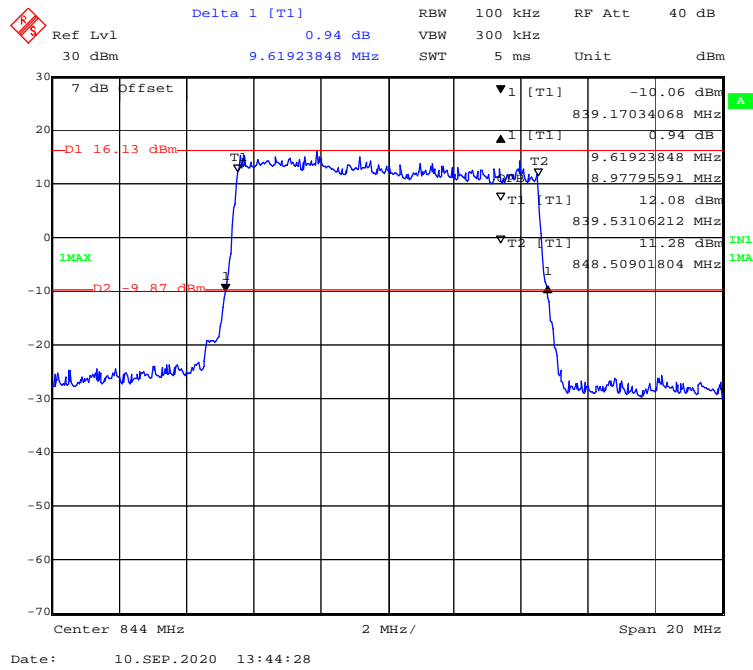
**QPSK (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



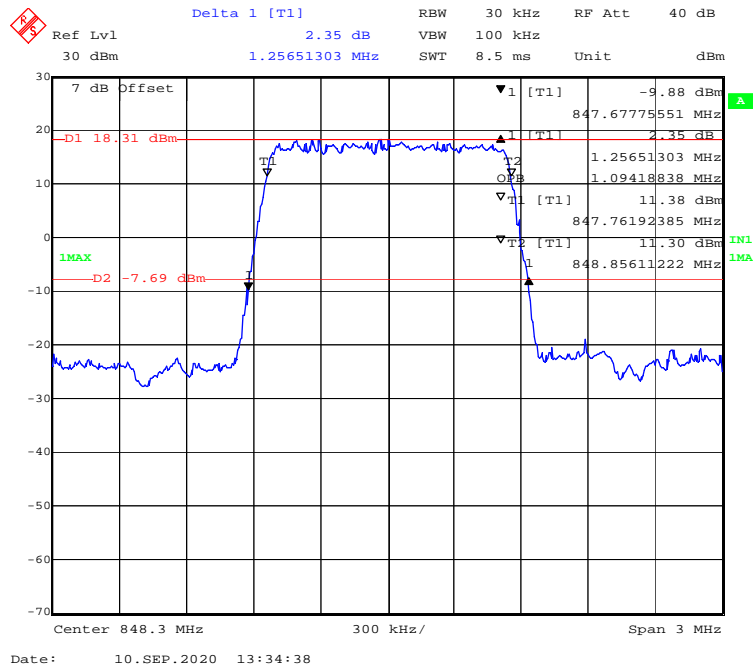
**QPSK (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



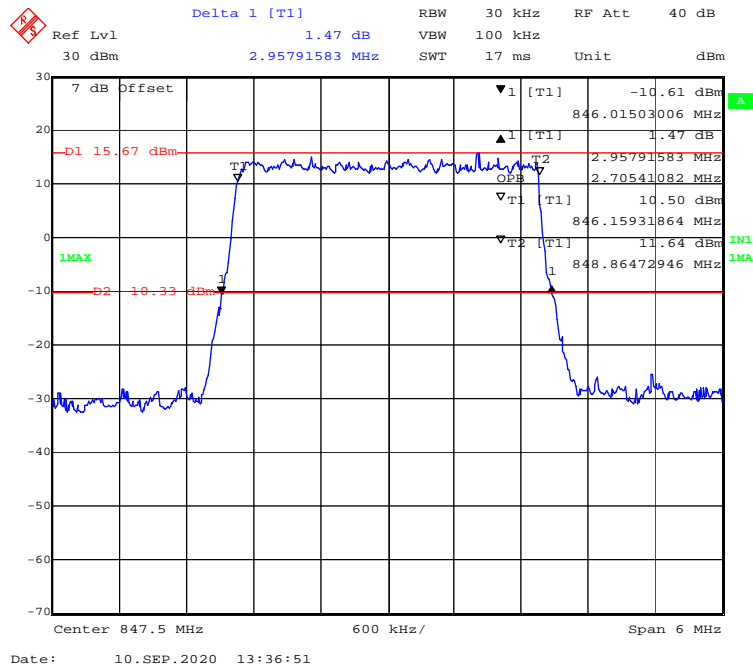
**QPSK (10.0MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



16-QAM (1.4 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

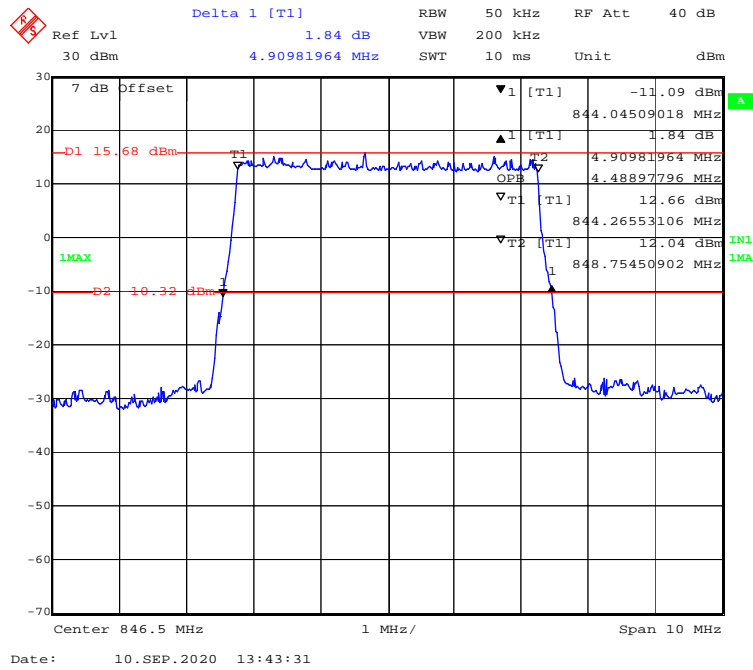


16-QAM (3.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel

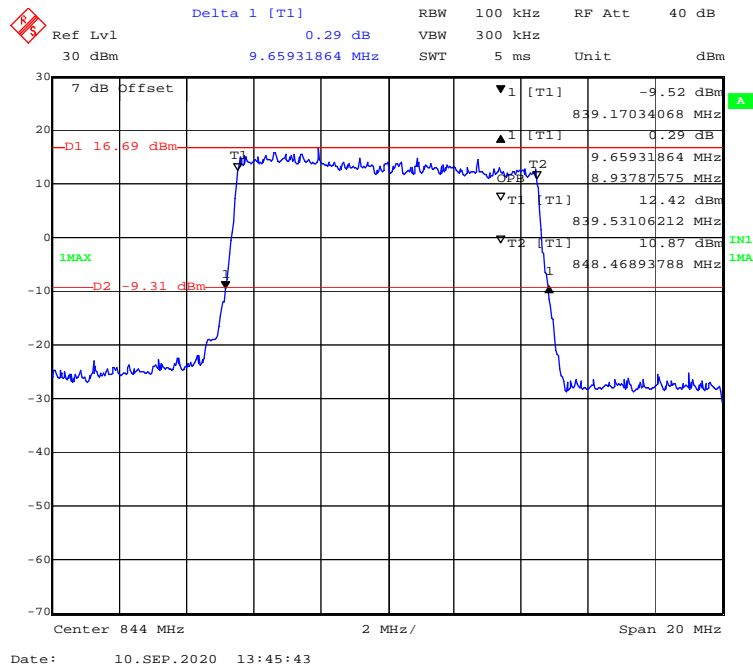




**16-QAM (5.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



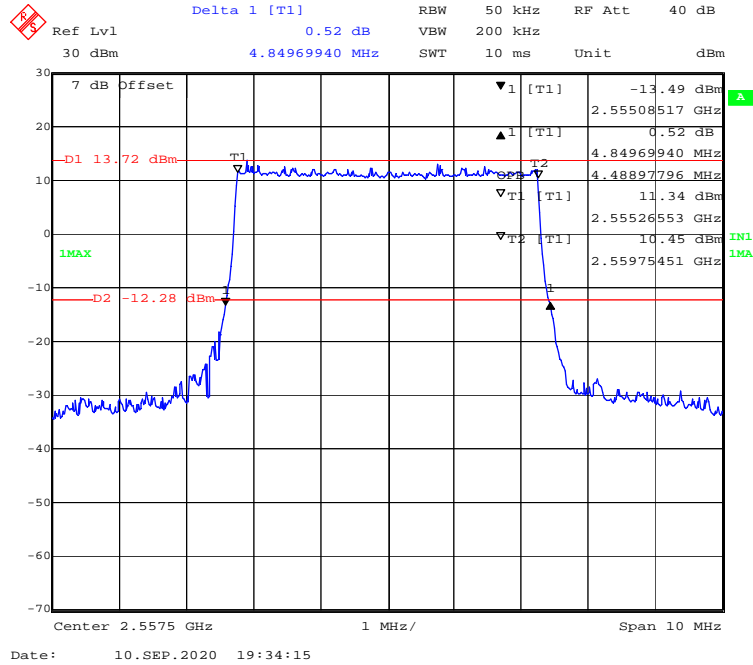
**16-QAM (10.0 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



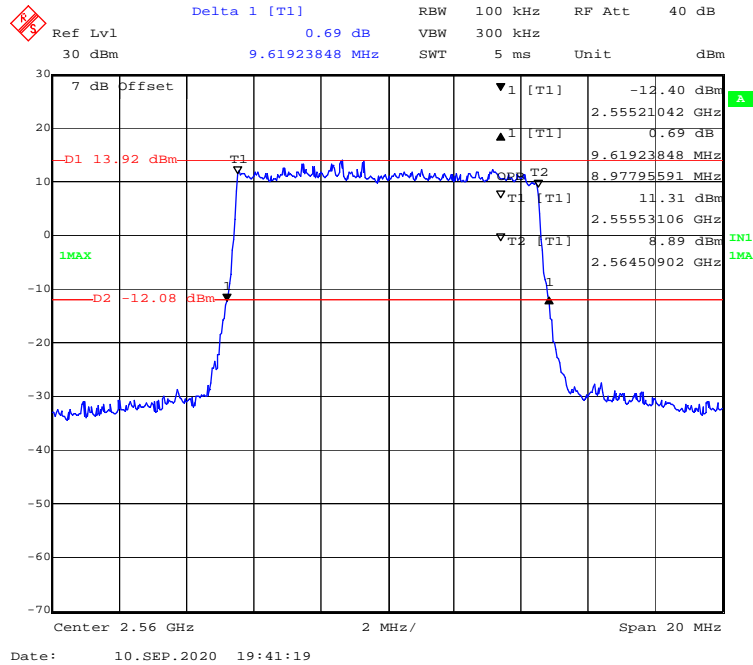
**LTE Band 41:**

Test Modulation	Test Bandwidth	Test Channel	26 dB Bandwidth (MHz)	99% Occupied Bandwidth (MHz)
QPSK	5M	Low	4.850	4.489
	10M		9.619	8.978
	15M		14.489	13.467
	20M		19.078	17.796
	5M	Middle	4.890	4.489
	10M		9.659	8.978
	15M		14.489	13.467
	20M		19.238	17.956
	5M	High	4.850	4.489
	10M		9.699	8.978
	15M		14.489	13.467
	20M		19.158	17.876
16-QAM	5M	Low	4.810	4.509
	10M		9.579	8.978
	15M		14.489	13.467
	20M		18.998	17.876
	5M	Middle	4.850	4.489
	10M		9.699	8.938
	15M		14.549	13.467
	20M		19.078	17.956
	5M	High	4.830	4.489
	10M		9.659	8.978
	15M		14.609	13.467
	20M		19.158	17.875

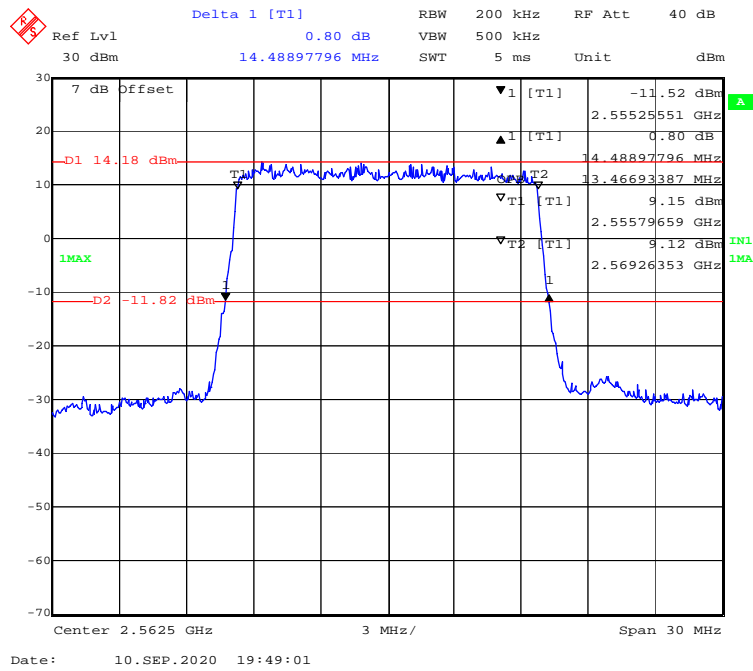
**LTE Band 41:**  
**QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



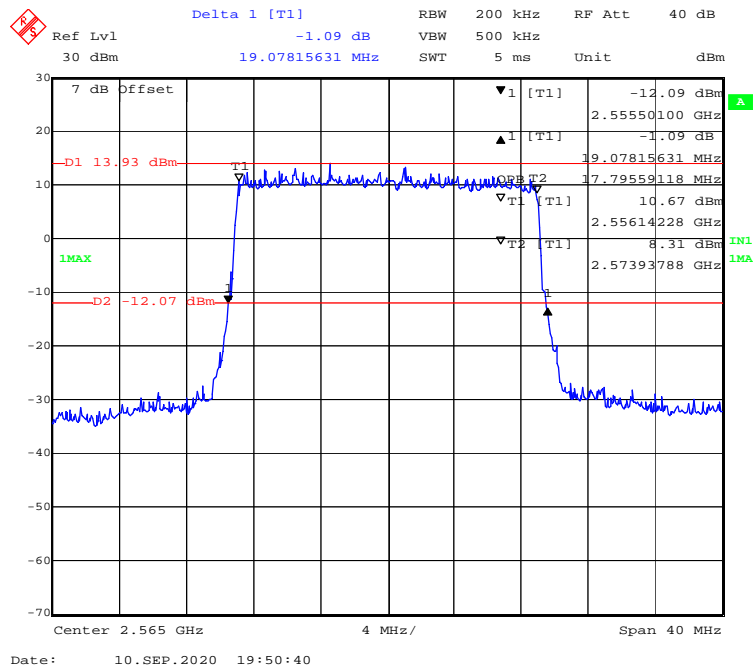
**QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



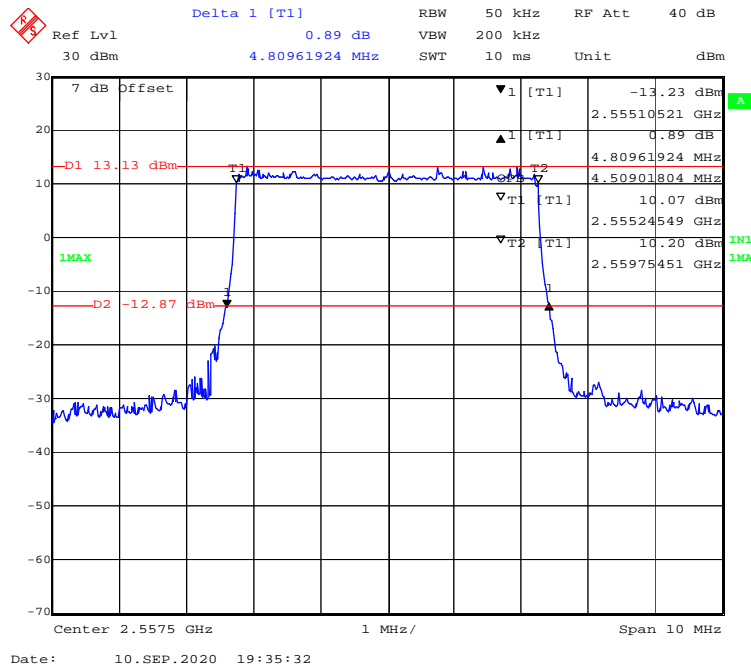
**QPSK (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



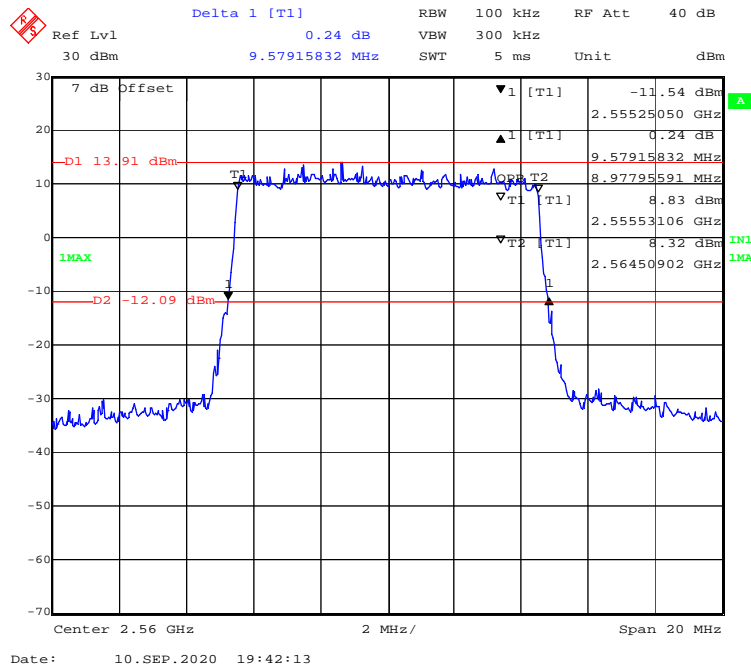
**QPSK (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



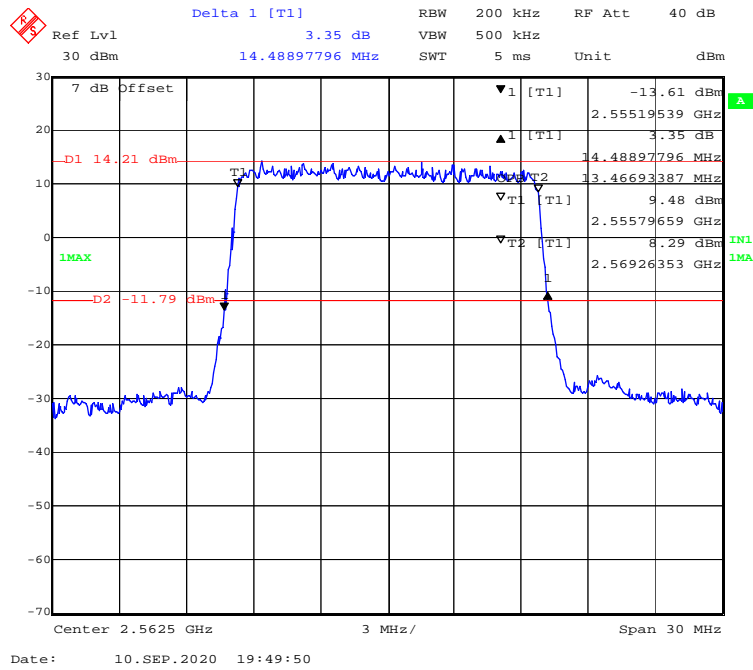
**16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



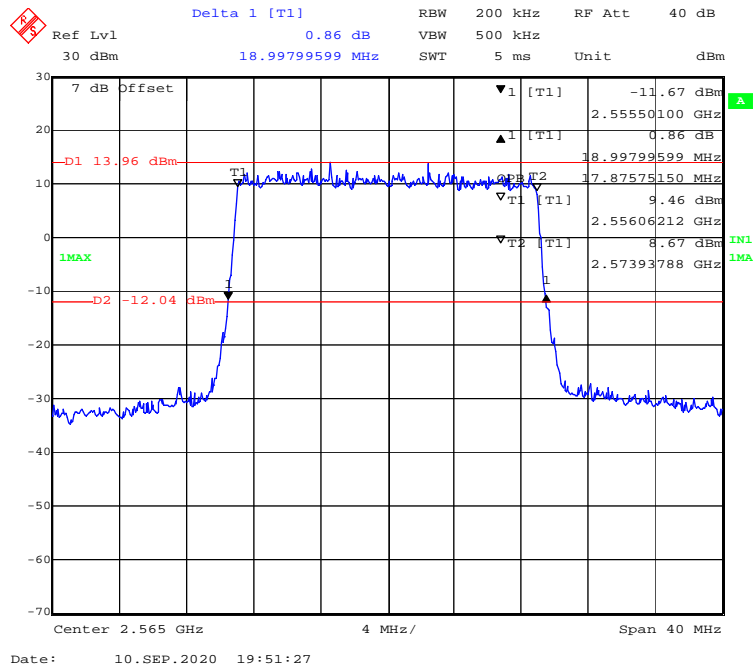
**16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel**



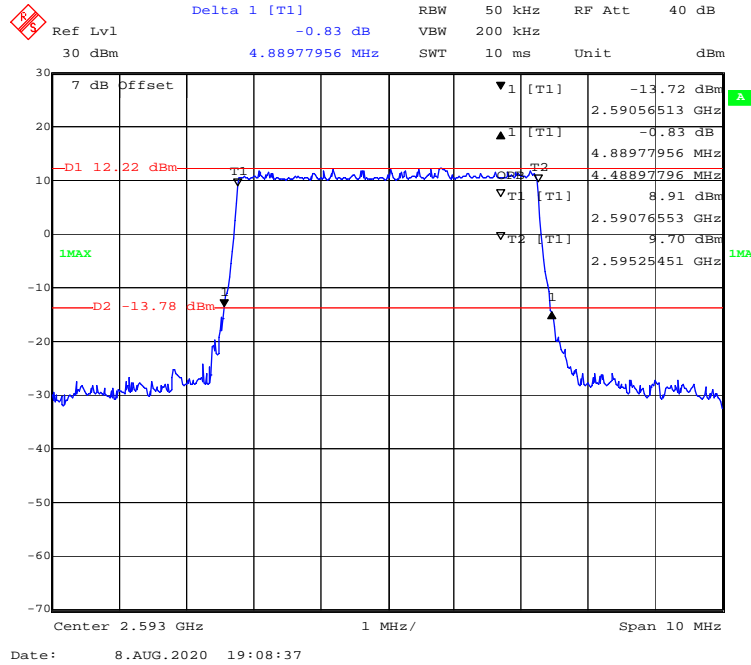
### 16-QAM (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



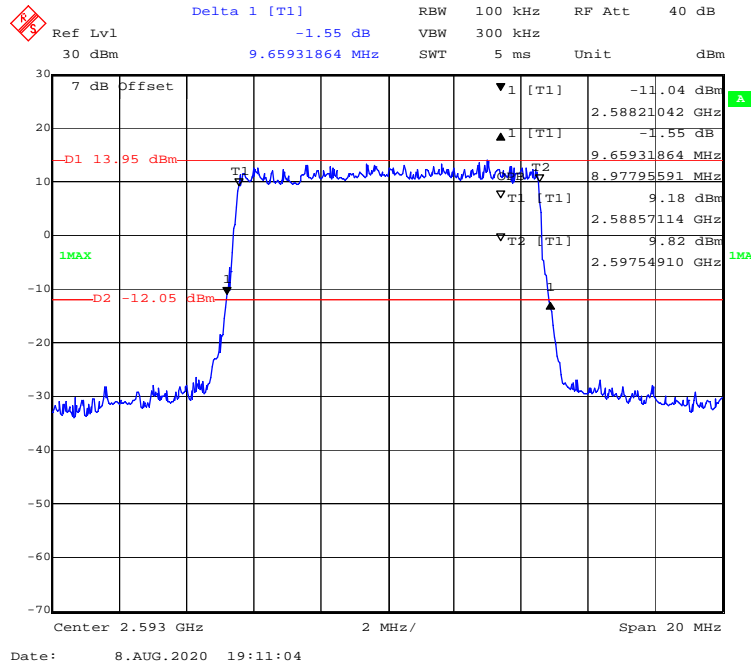
### 16-QAM (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Low channel



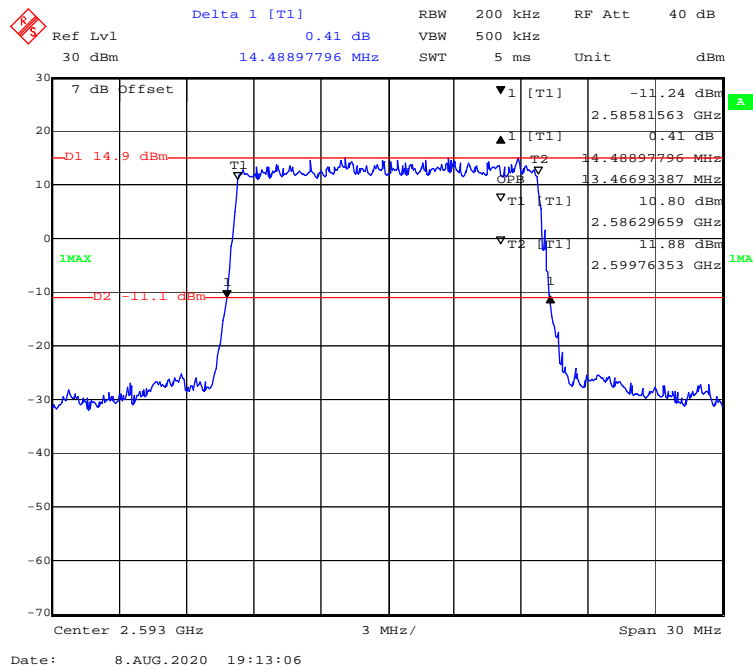
**QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



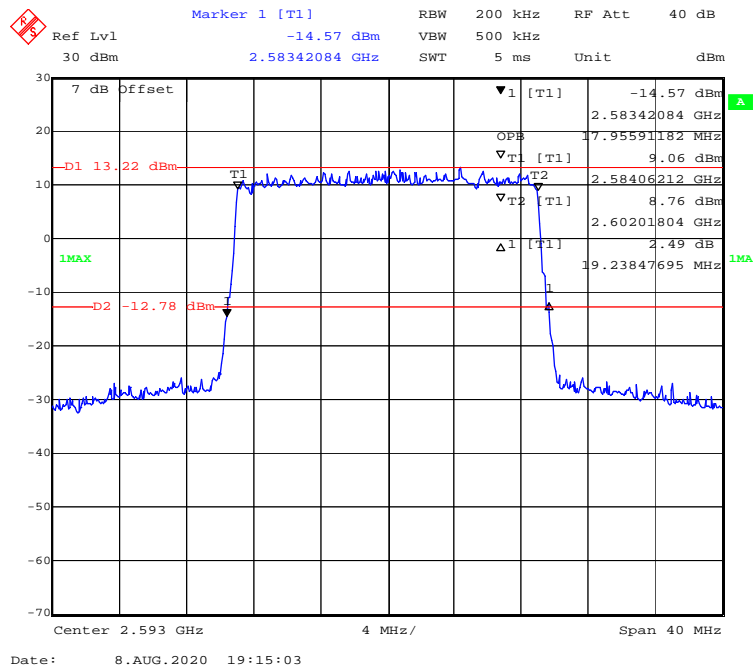
**QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



**QPSK (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

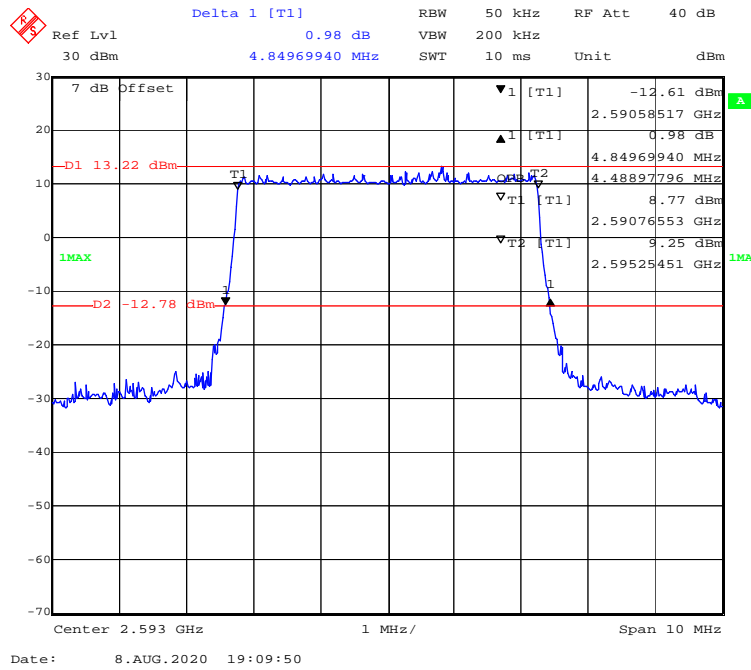


**QPSK (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**

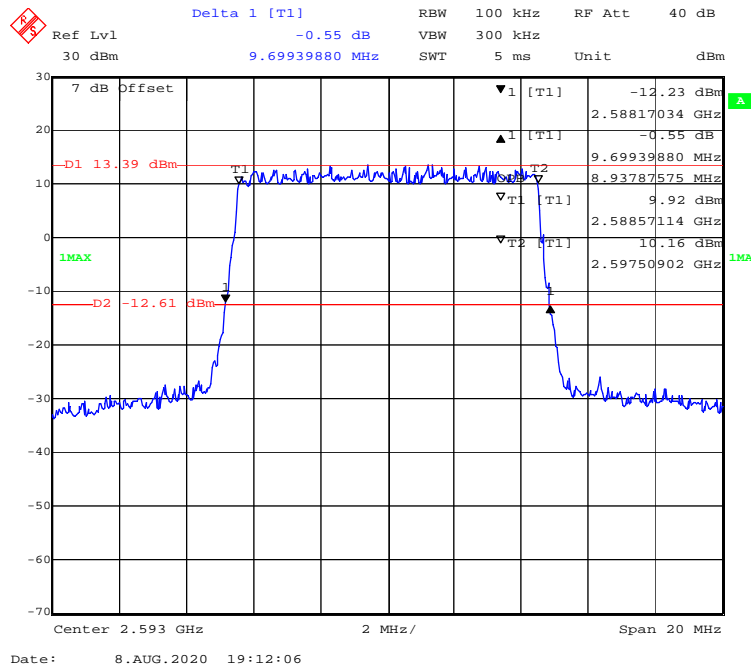




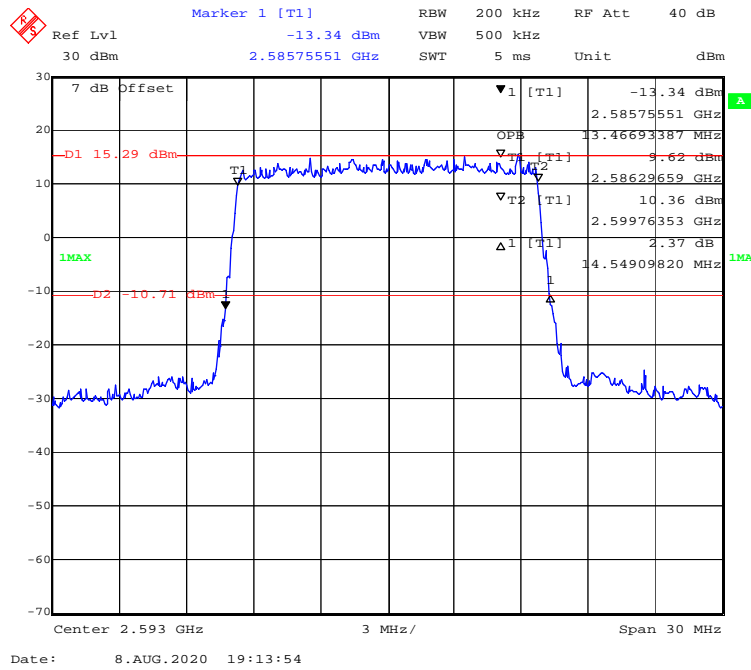
**16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



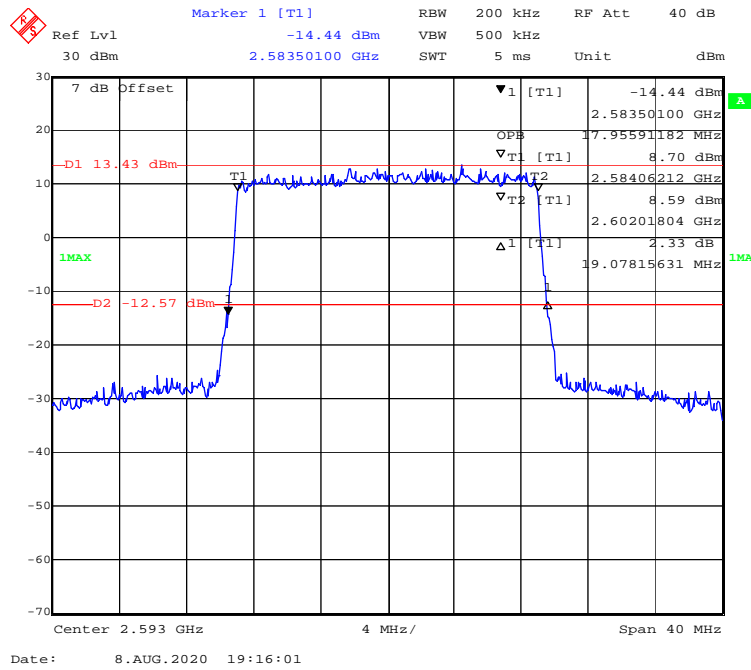
**16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



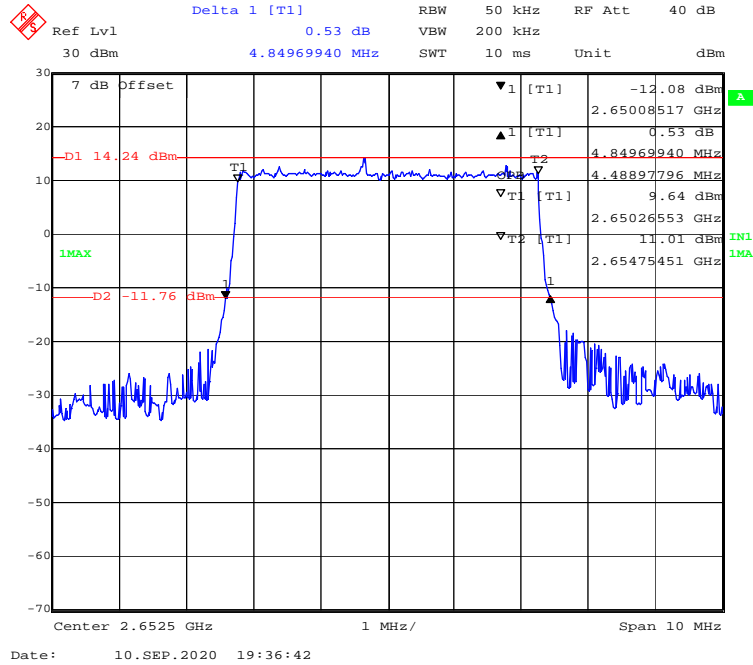
**16-QAM (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



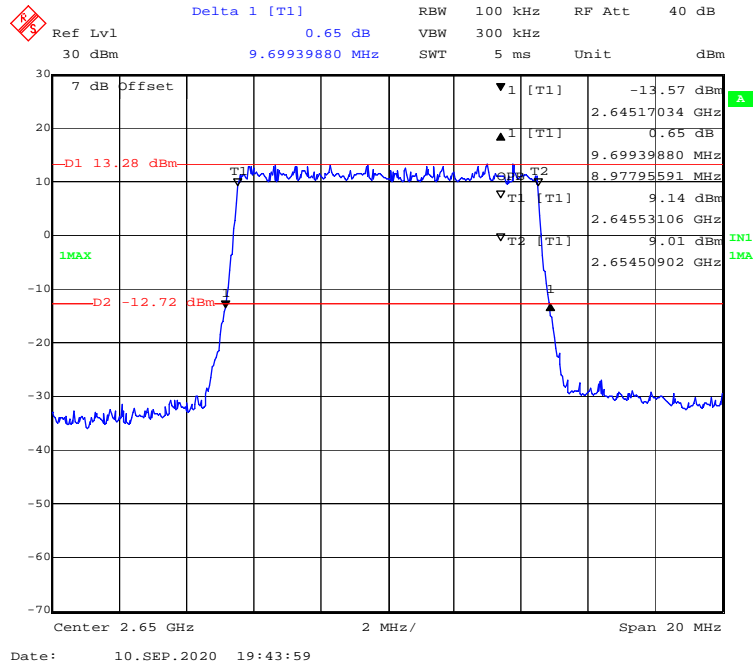
**16-QAM (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, Middle channel**



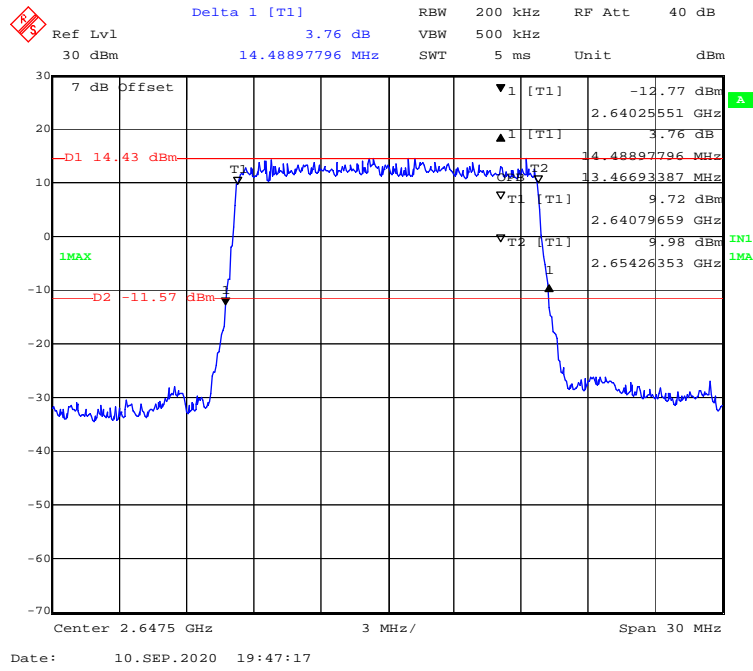
**QPSK (5MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



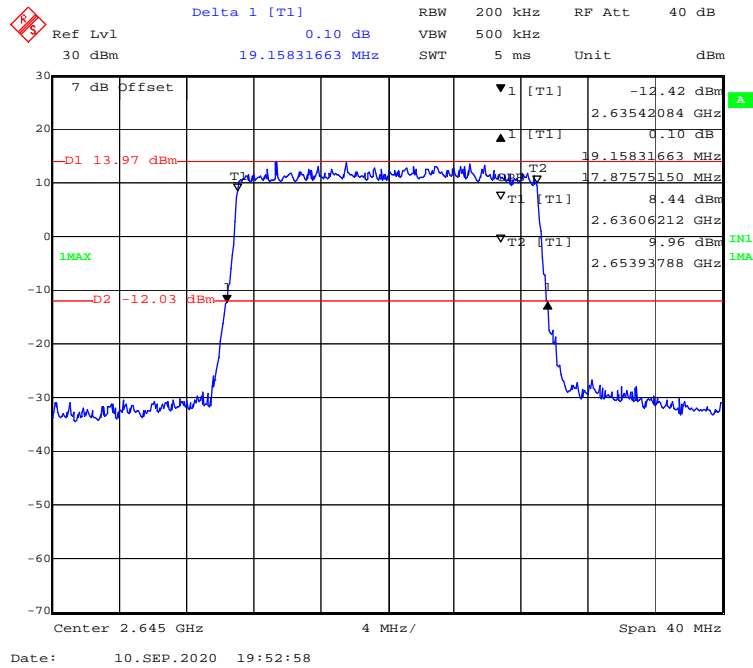
**QPSK (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



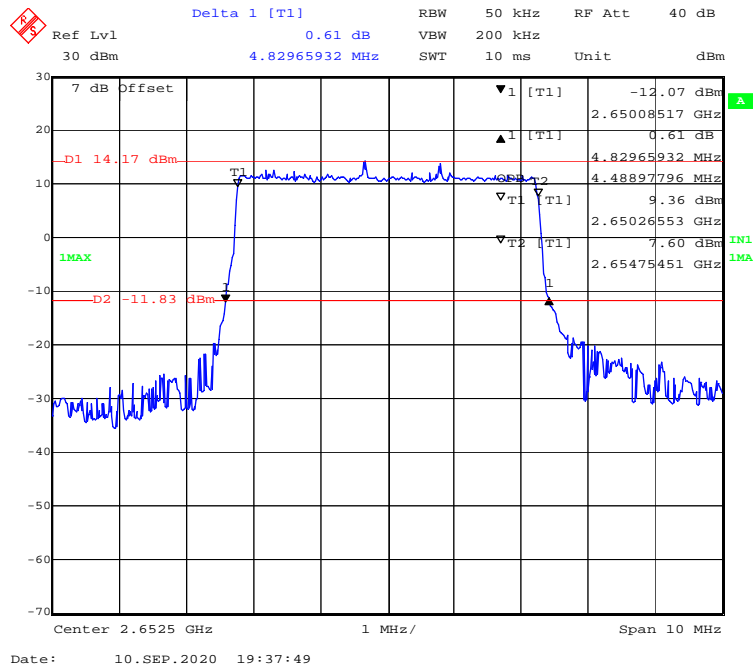
**QPSK (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



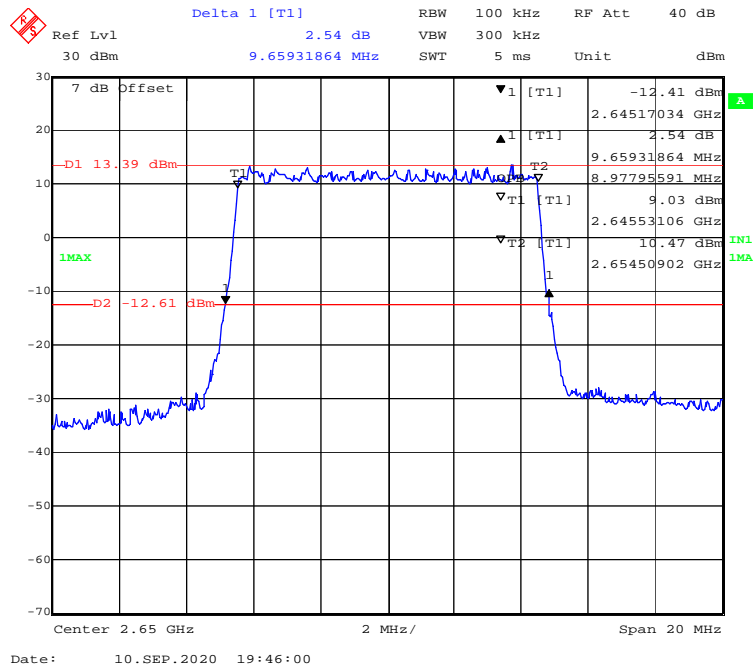
**QPSK (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



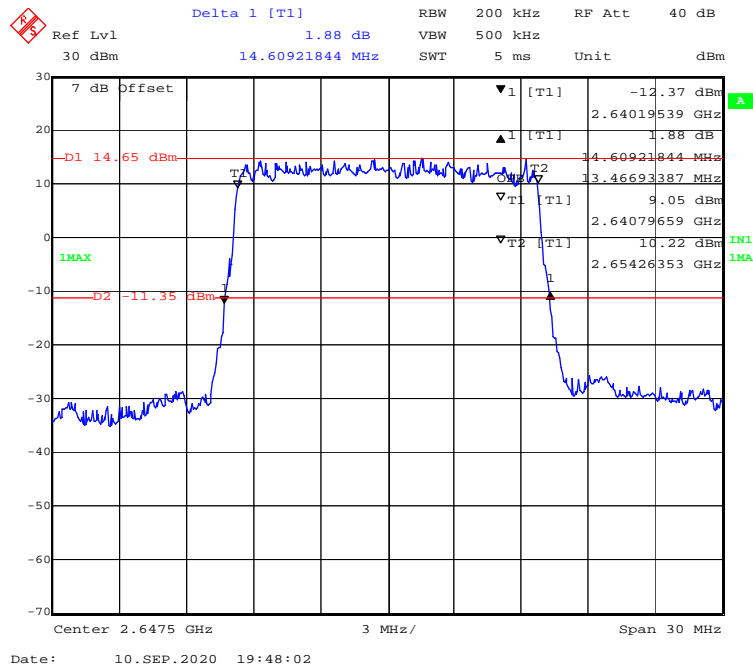
**16-QAM (5 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



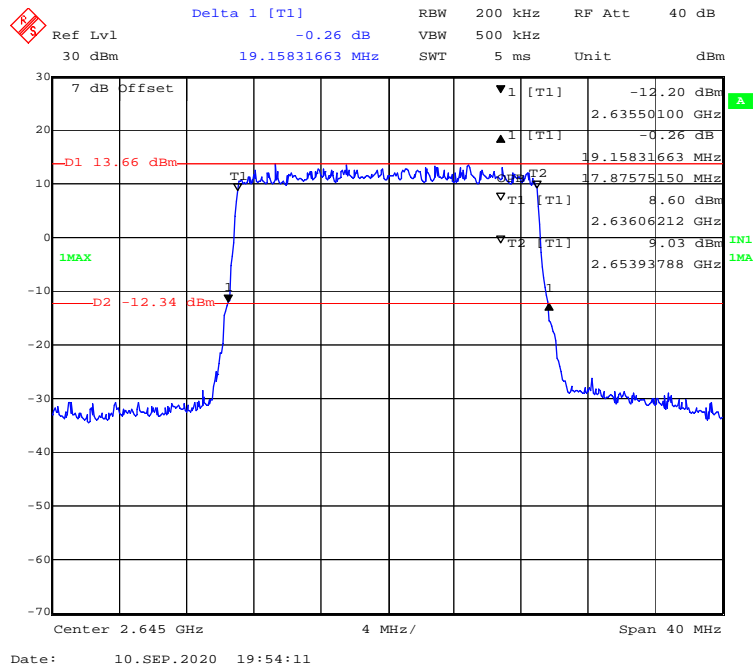
**16-QAM (10 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



**16-QAM (15 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



**16-QAM (20 MHz) - 99% Occupied & 26 dB Emissions Bandwidth, High channel**



## FCC § 2.1051 & § 22.917 (a); §27.53 (m) - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

### Applicable Standards

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

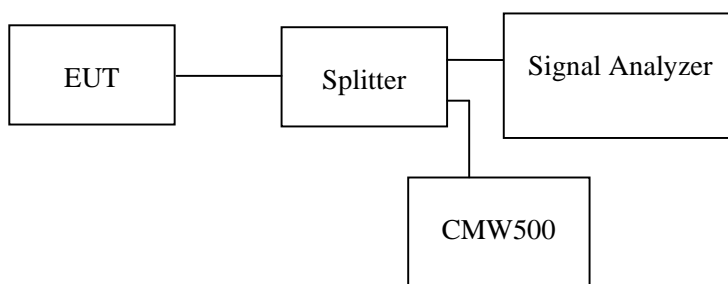
The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1051.

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

According to §27.53(m), for mobile digital stations, any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least  $55 + 10 \log(P)$  dB.

### Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz for below 1GHz & 1MHz for above 1GHz. sufficient scans were taken to show any out of band emissions up to 10<sup>th</sup> harmonic.



### Test Data

#### Environmental Conditions

<b>Temperature:</b>	23.5~24.7 °C
<b>Relative Humidity:</b>	50~52 %
<b>ATM Pressure:</b>	101.3~102.3 kPa

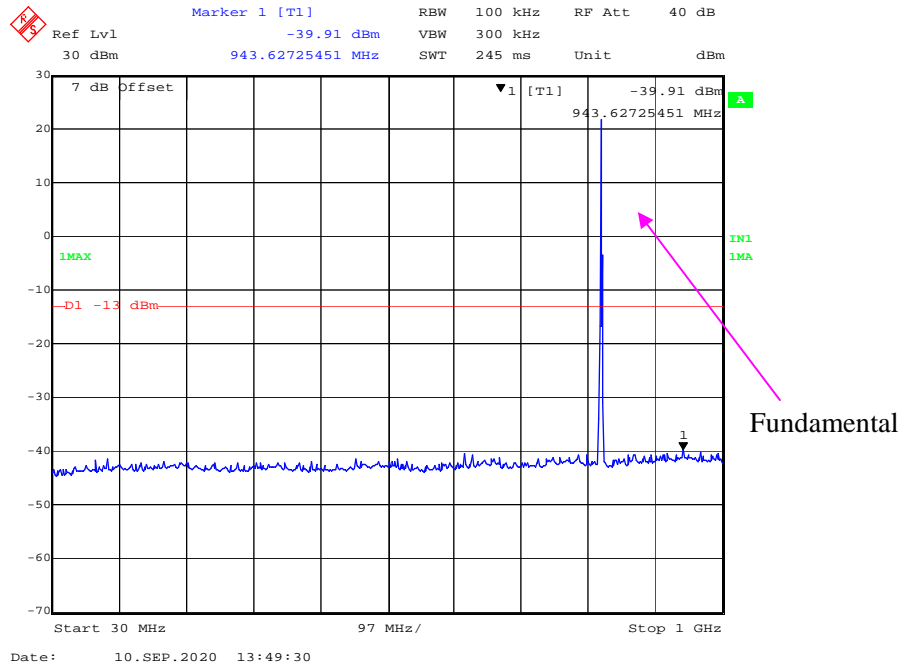
The testing was performed by Winnie Yang from 2020-08-08 to 2020-09-11.

EUT operation mode: Transmitting

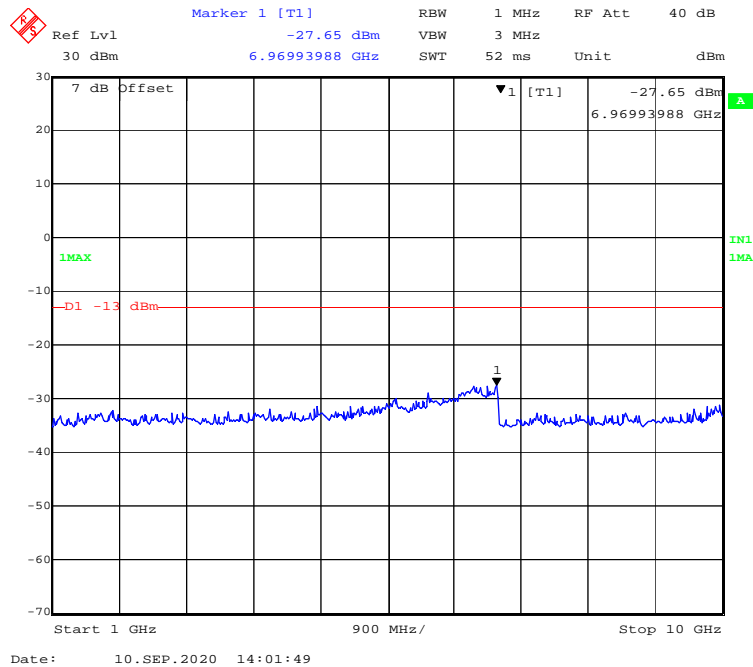
Test Result: Compliant

**LTE Band 5:**

**30 MHz - 1 GHz (1.4 MHz, QPSK, Low Channel)**

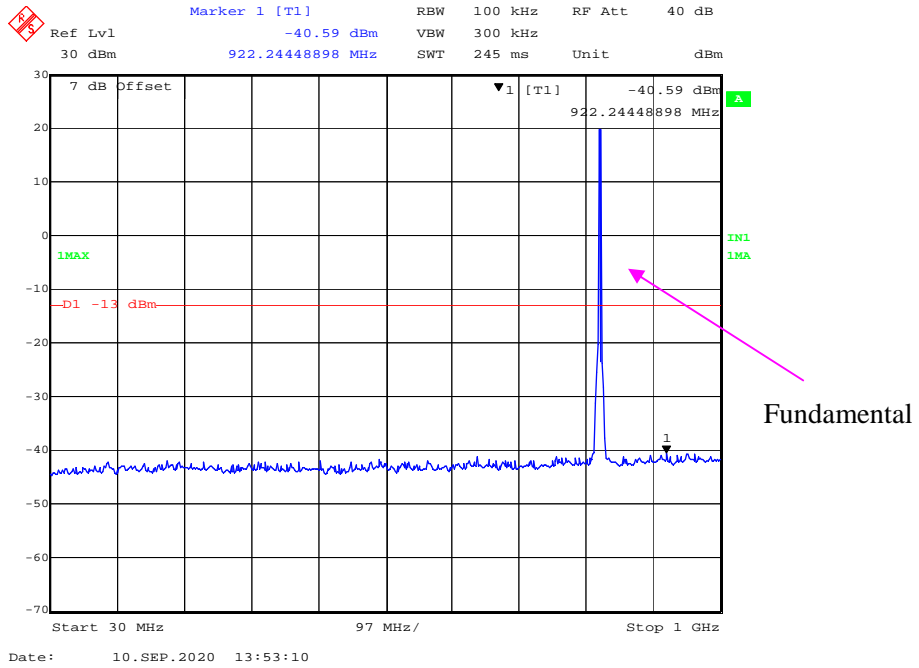


**1 GHz - 10 GHz (1.4 MHz, QPSK, Low Channel)**

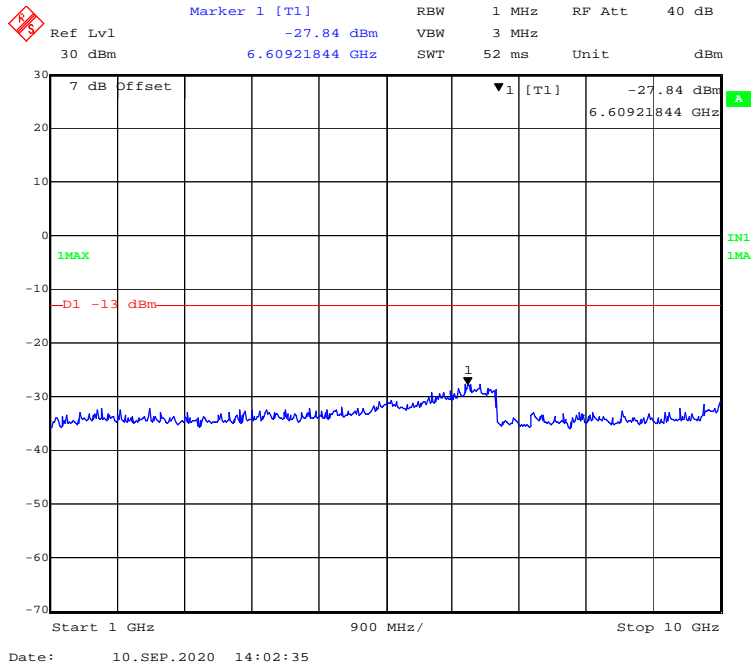




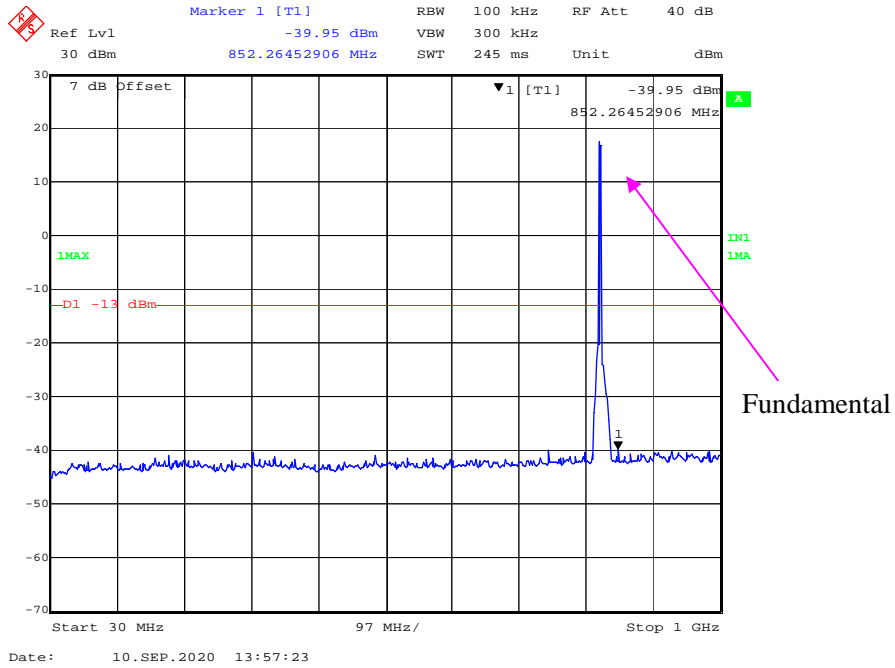
### 30 MHz - 1 GHz (3.0 MHz, QPSK, Low Channel)



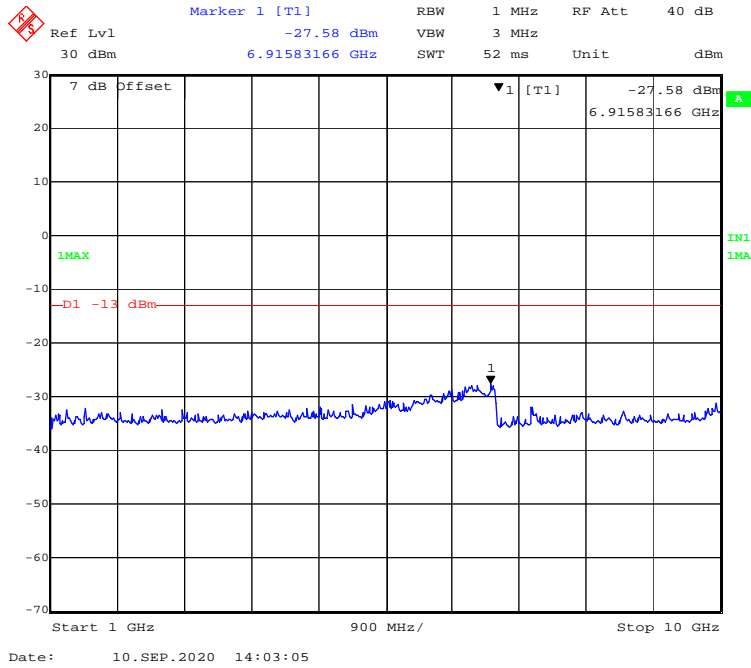
### 1 GHz - 10 GHz (3.0 MHz, QPSK, Low Channel)



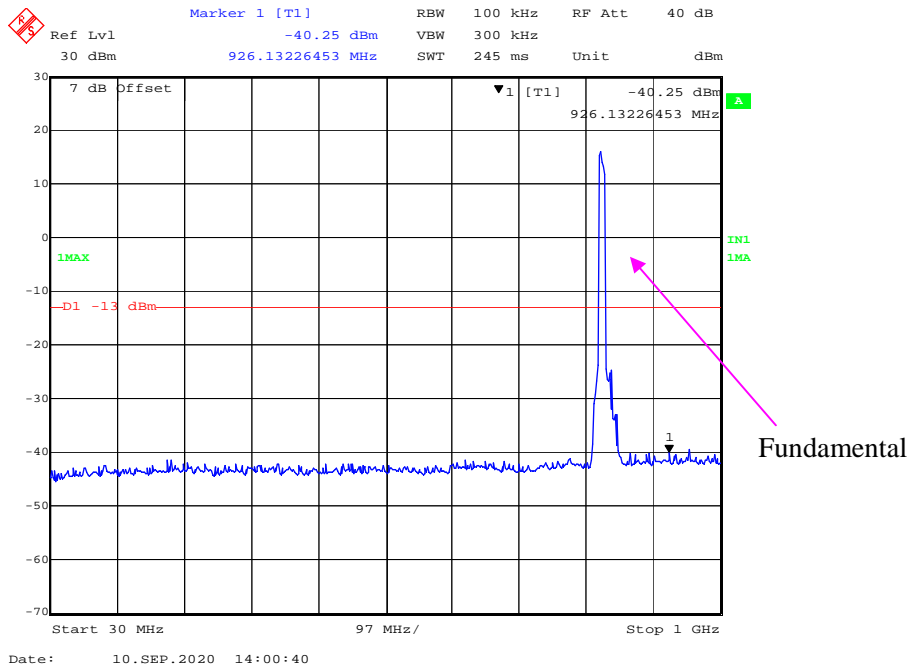
**30 MHz - 1 GHz (5.0 MHz, QPSK, Low Channel)**



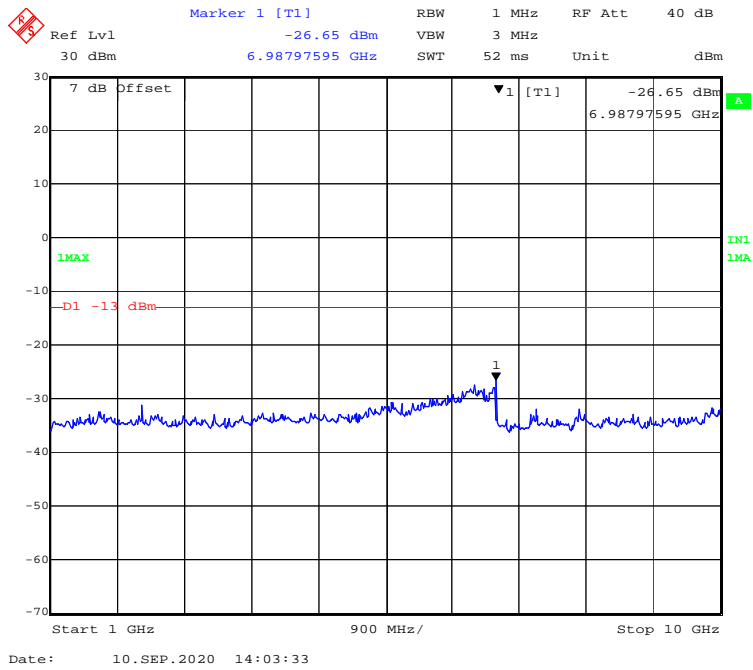
**1 GHz – 10 GHz (5.0MHz, QPSK, Low Channel)**



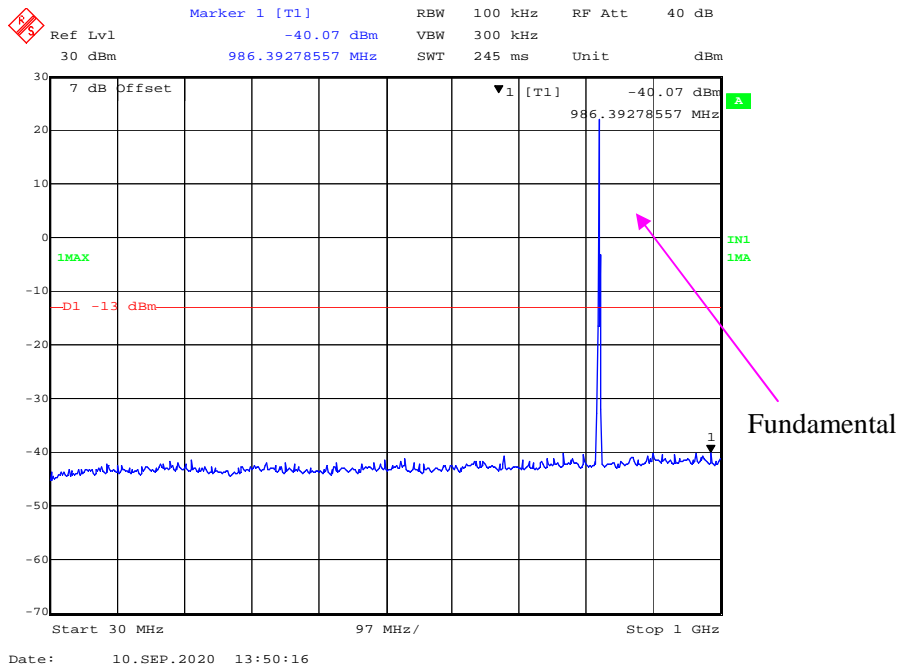
**30 MHz - 1 GHz (10.0 MHz, QPSK, Low Channel)**



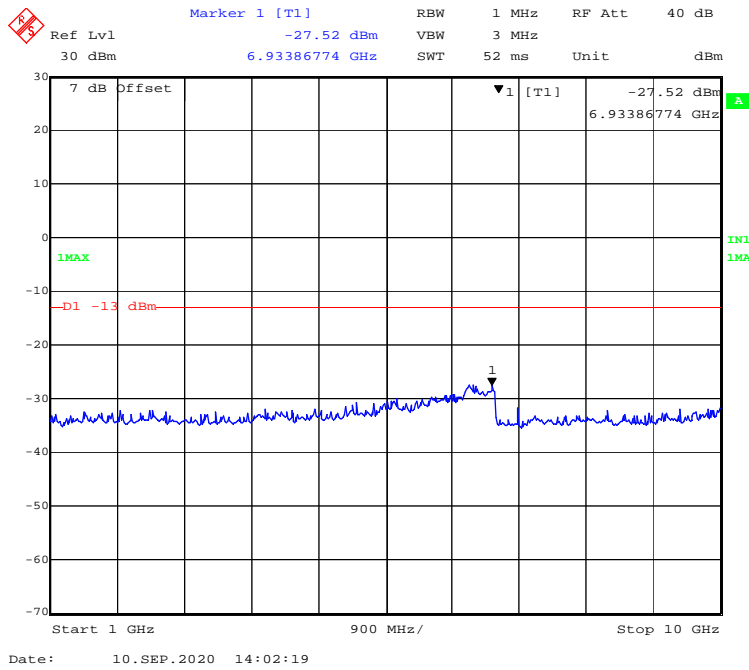
**1 GHz – 10 GHz (10.0 MHz, QPSK, Low Channel)**



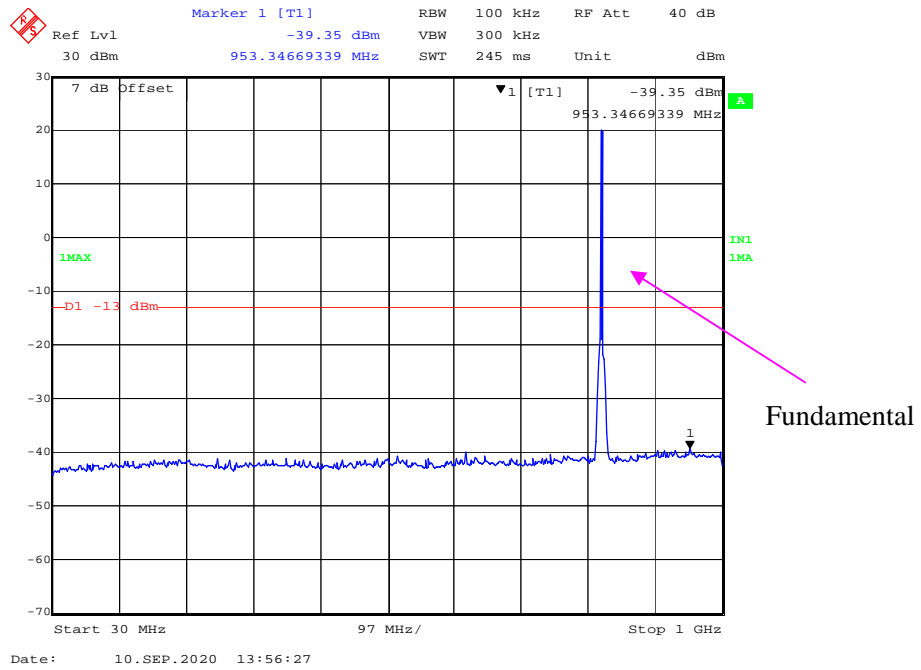
### 30 MHz - 1 GHz (1.4 MHz, 16-QAM, Low Channel)



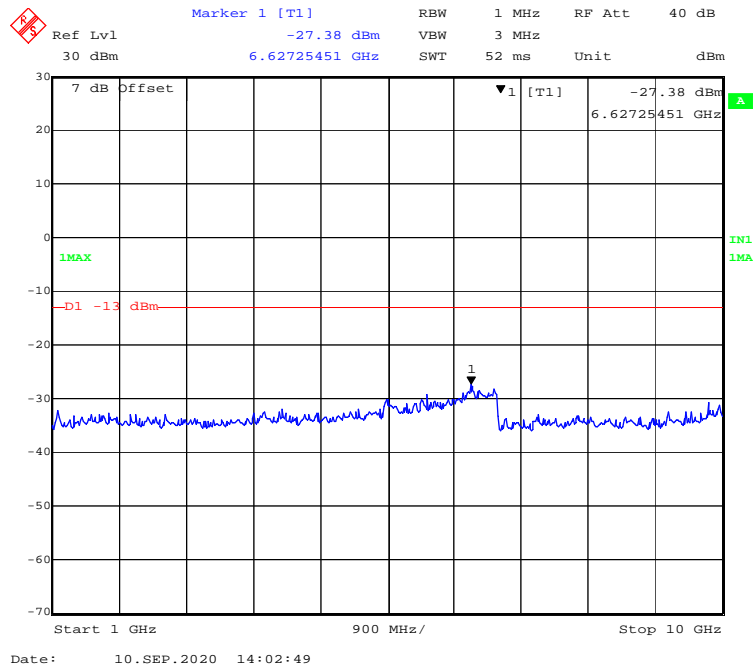
### 1 GHz – 10 GHz (1.4 MHz, 16-QAM, Low Channel)



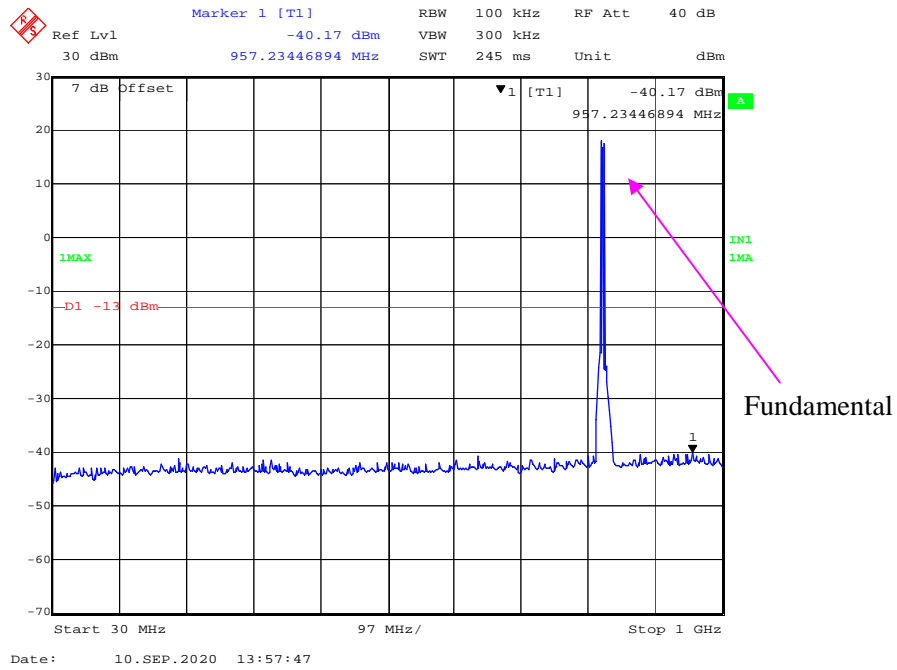
**30 MHz - 1 GHz (3.0 MHz, 16-QAM, Low Channel)**



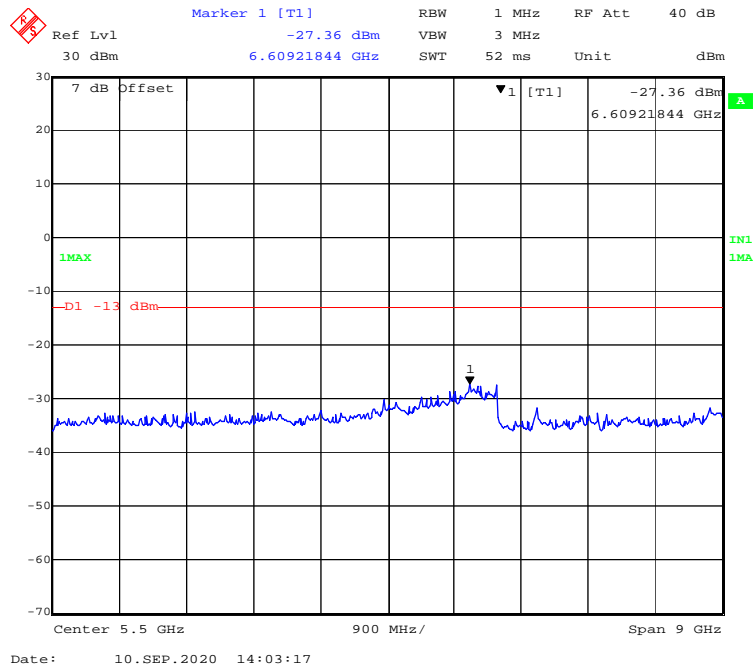
**1 GHz – 10 GHz (3.0 MHz, 16-QAM, Low Channel)**



### 30 MHz - 1 GHz (5.0 MHz, 16-QAM, Low Channel)

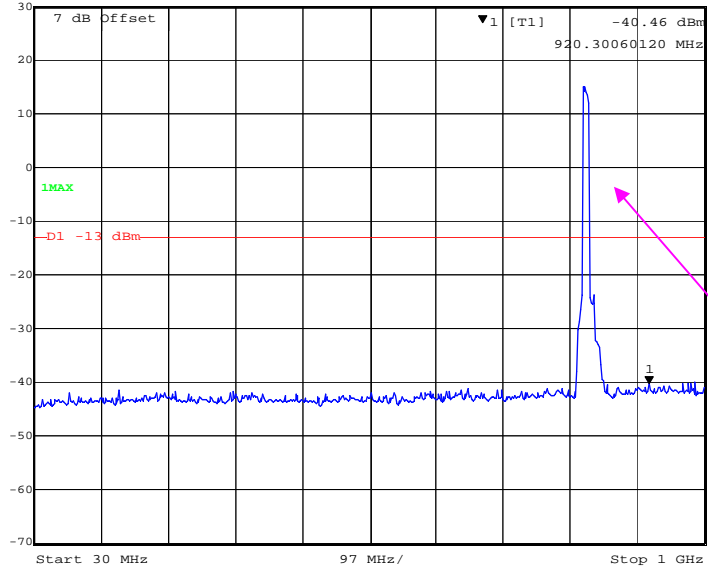


### 1 GHz – 10 GHz (5.0MHz, 16-QAM, Low Channel)



### 30 MHz - 1 GHz (10.0 MHz, 16-QAM, Low e Channel)

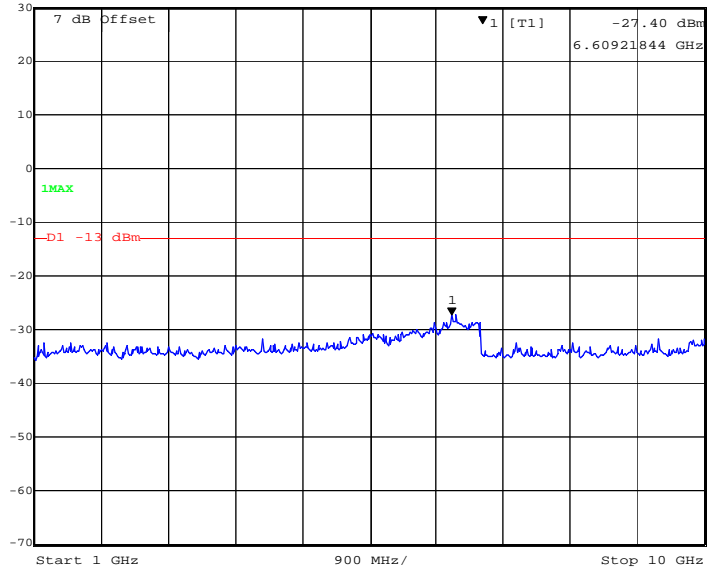
Marker 1 [T1] RBW 100 kHz RF Att 40 dB  
Ref Lvl -40.46 dBm VBW 300 kHz  
30 dBm 920.30060120 MHz SWT 245 ms Unit dBm



Date: 10.SEP.2020 14:01:10

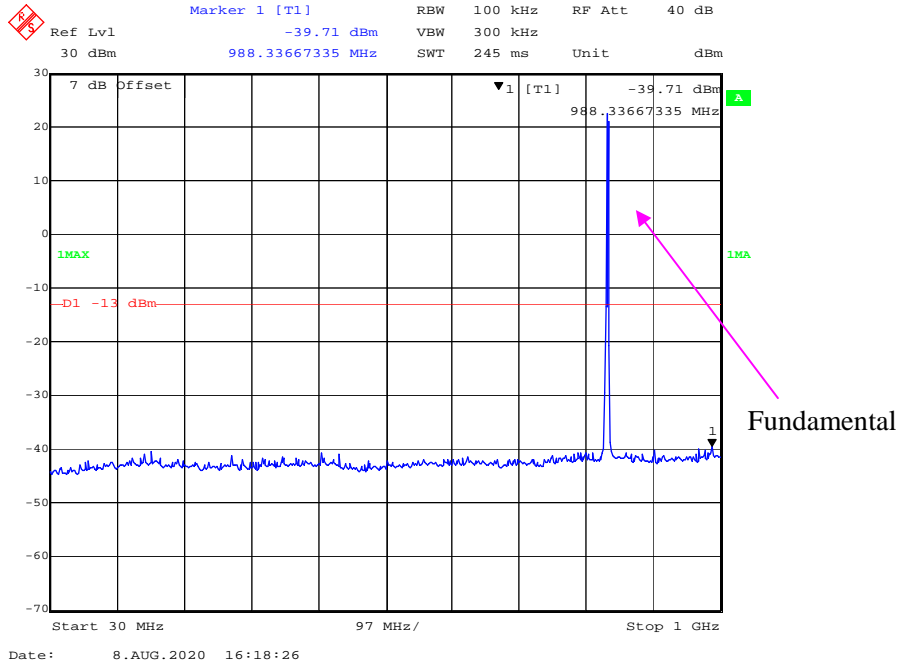
### 1 GHz - 10 GHz (10.0 MHz, 16-QAM, Low Channel)

Marker 1 [T1] RBW 1 MHz RF Att 40 dB  
Ref Lvl -27.40 dBm VBW 3 MHz  
30 dBm 6.60921844 GHz SWT 52 ms Unit dBm

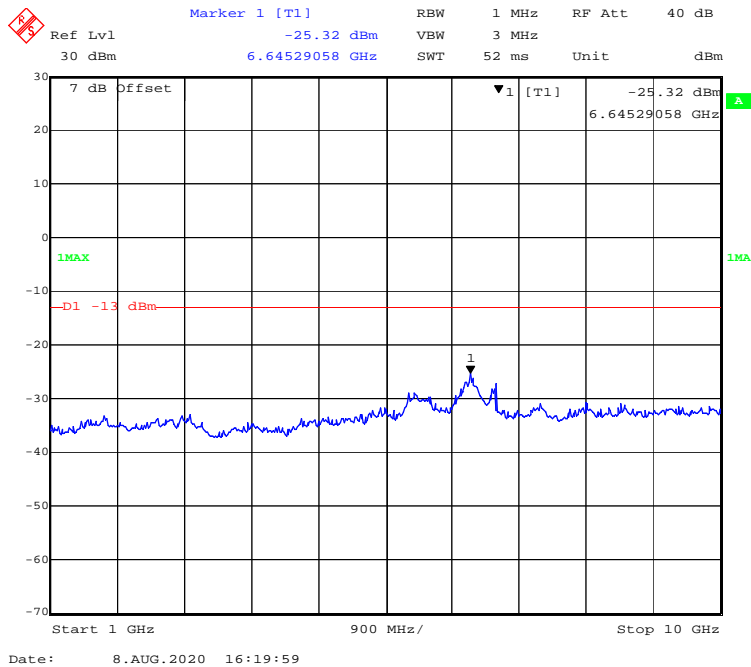


Date: 10.SEP.2020 14:03:49

### 30 MHz - 1 GHz (1.4 MHz, QPSK, Middle Channel)

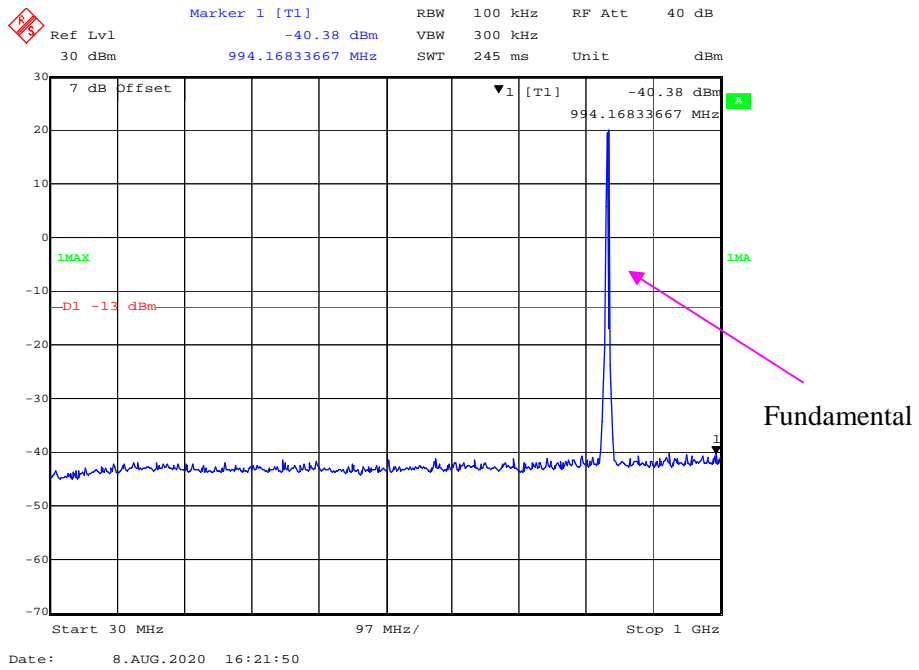


### 1 GHz - 10 GHz (1.4 MHz, QPSK, Middle Channel)

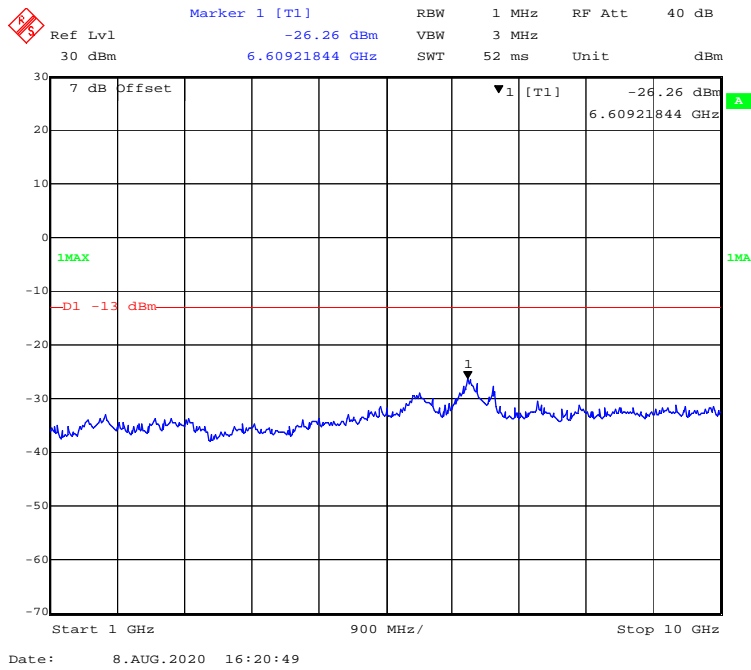




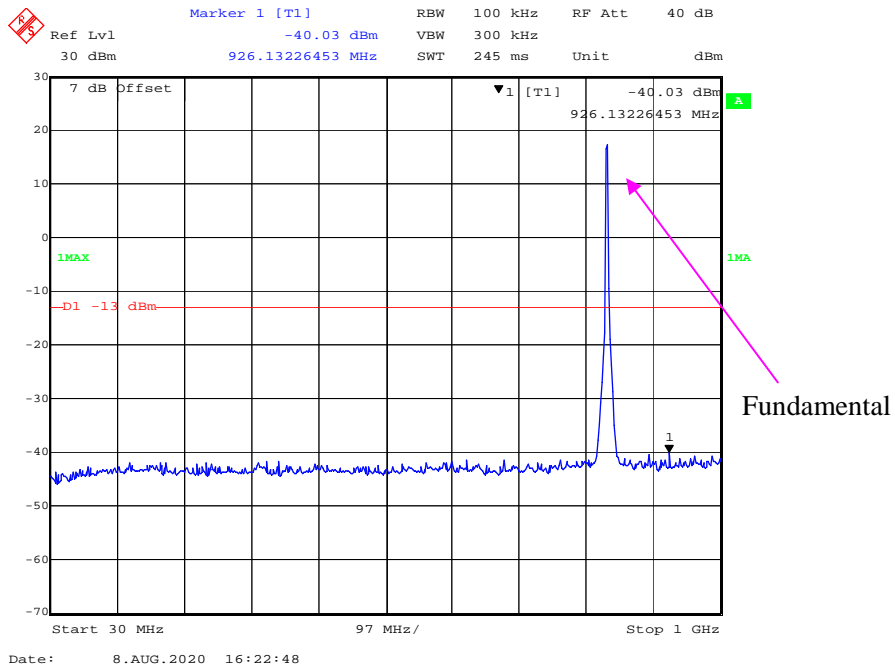
### 30 MHz - 1 GHz (3.0 MHz, QPSK, Middle Channel)



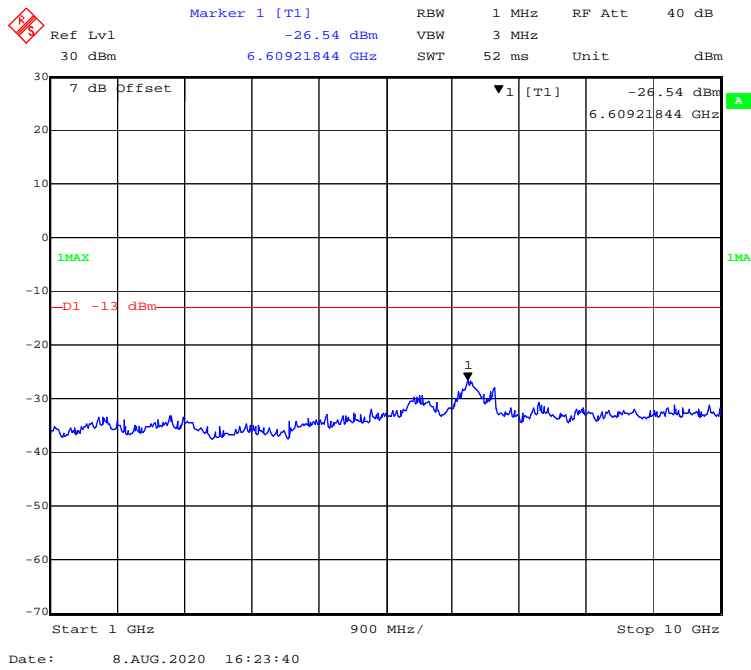
### 1 GHz – 10 GHz (3.0 MHz, QPSK, Middle Channel)



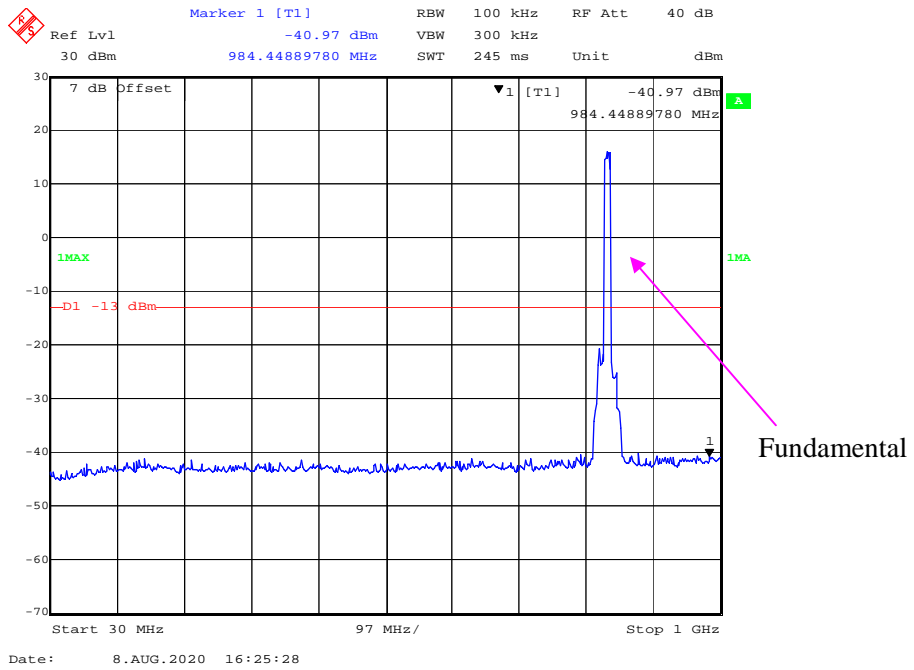
### 30 MHz - 1 GHz (5.0 MHz, QPSK, Middle Channel)



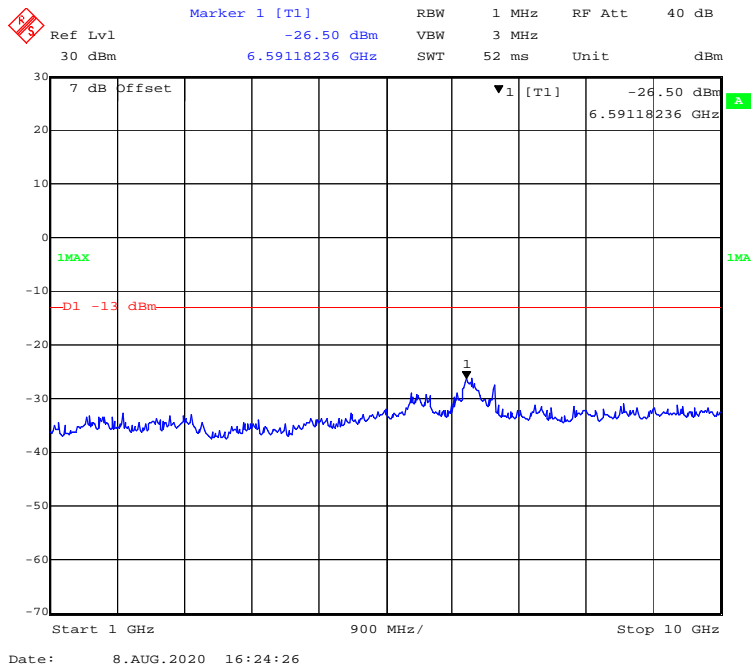
### 1 GHz – 10 GHz (5.0MHz, QPSK, Middle Channel)



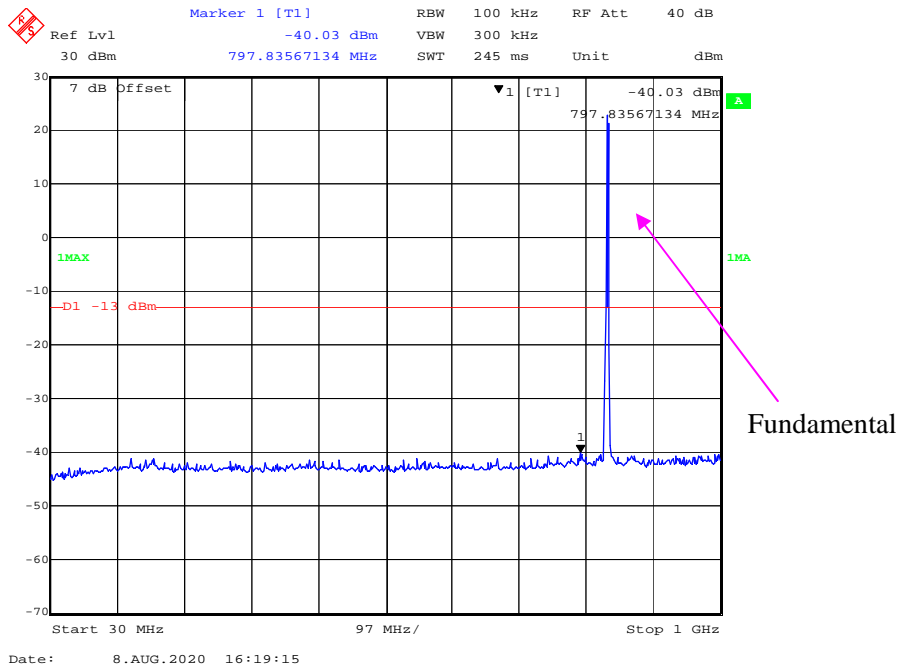
### 30 MHz - 1 GHz (10.0 MHz, QPSK, Middle Channel)



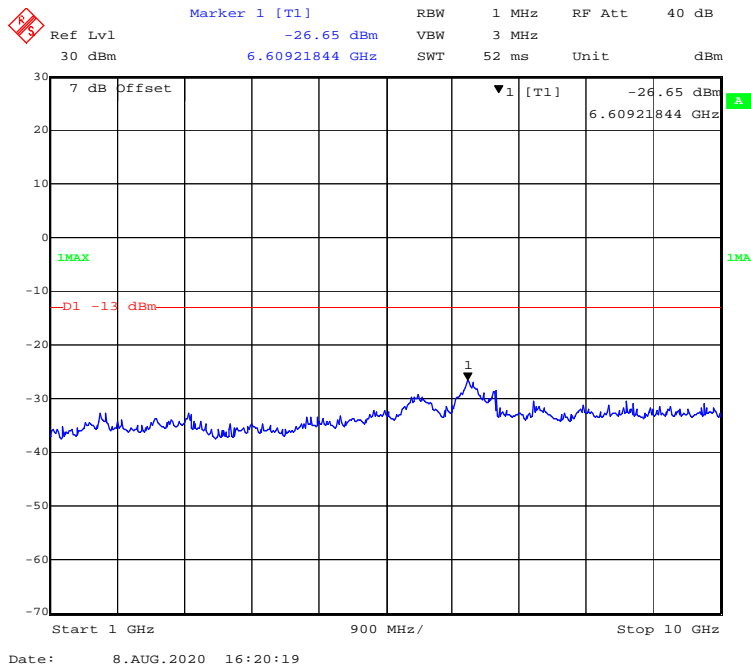
### 1 GHz – 10 GHz (10.0 MHz, QPSK, Middle Channel)



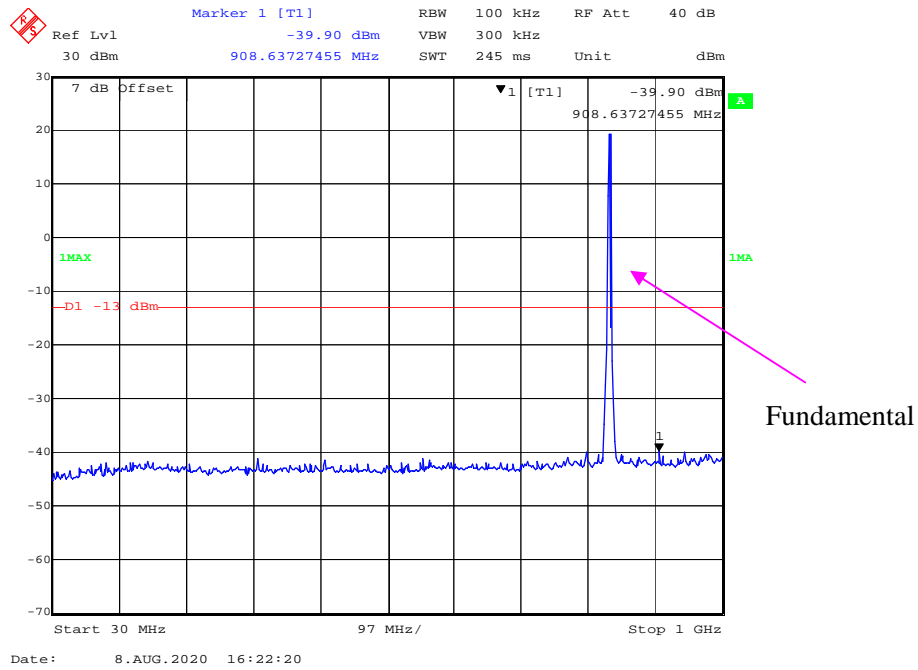
### 30 MHz - 1 GHz (1.4 MHz, 16-QAM, Middle Channel)



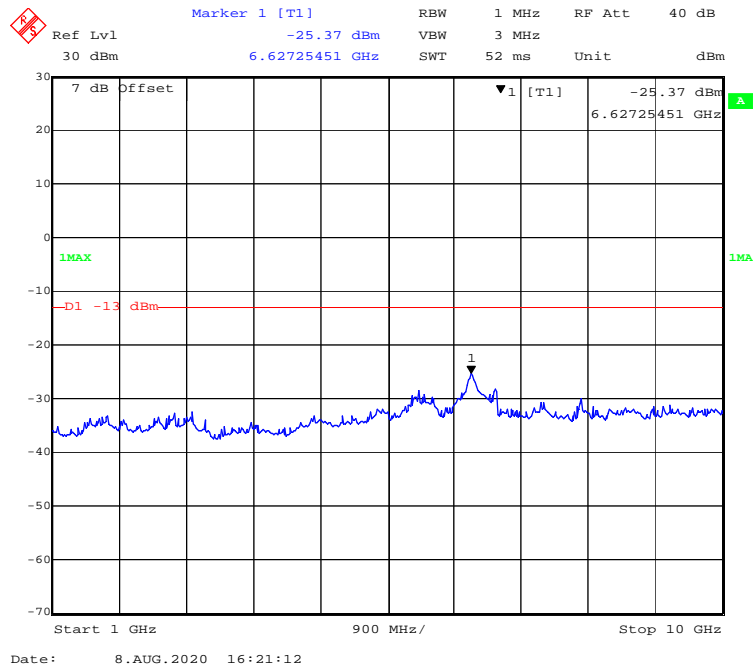
### 1 GHz – 10 GHz (1.4 MHz, 16-QAM, Middle Channel)



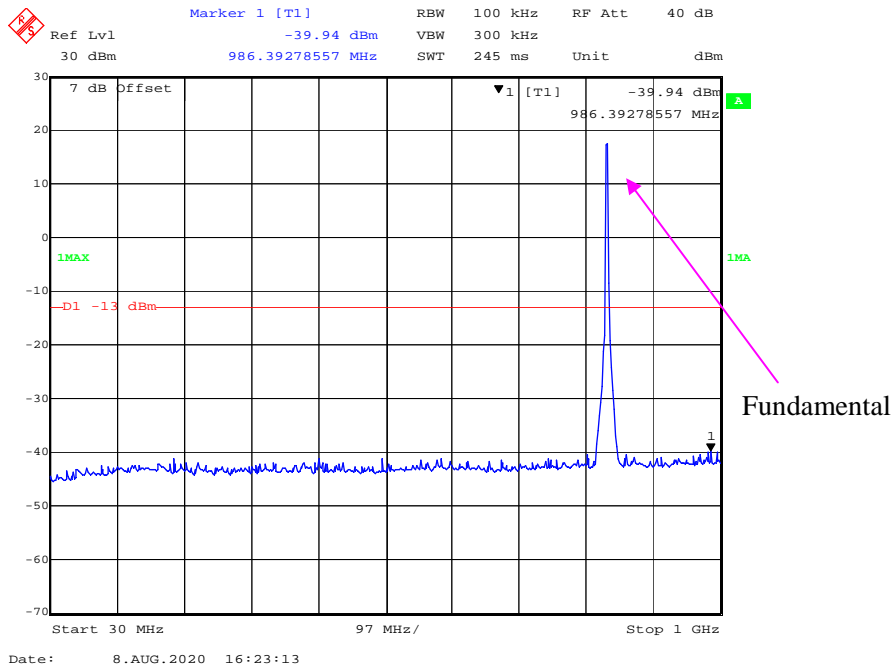
### 30 MHz - 1 GHz (3.0 MHz, 16-QAM, Middle Channel)



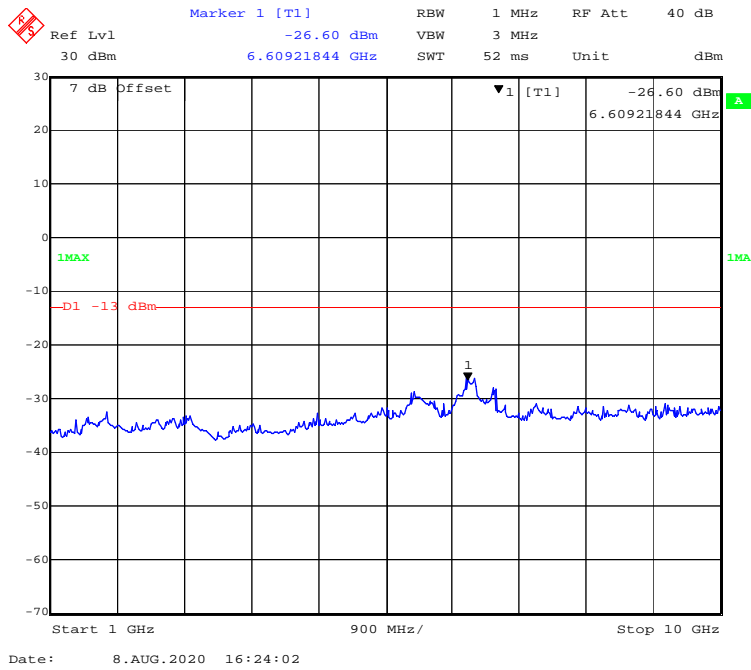
### 1 GHz – 10 GHz (3.0 MHz, 16-QAM, Middle Channel)



**30 MHz - 1 GHz (5.0 MHz, 16-QAM, Middle Channel)**

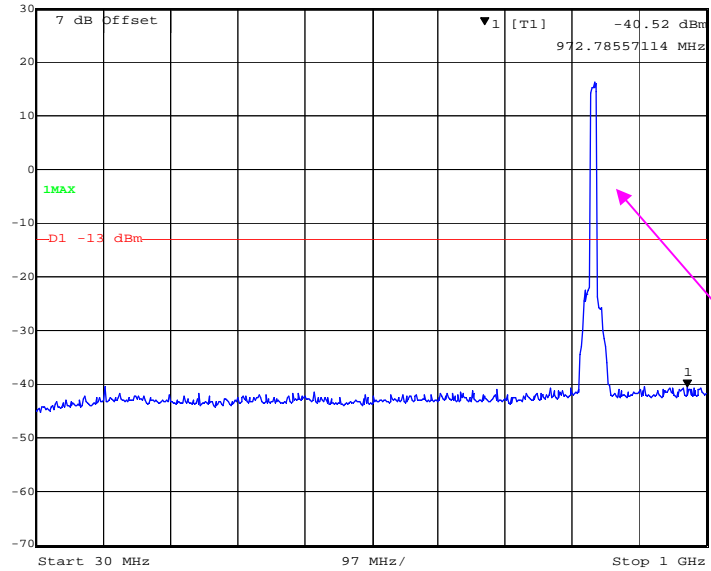


**1 GHz – 10 GHz (5.0MHz, 16-QAM, Middle Channel)**



### 30 MHz - 1 GHz (10.0 MHz, 16-QAM, Middle Channel)

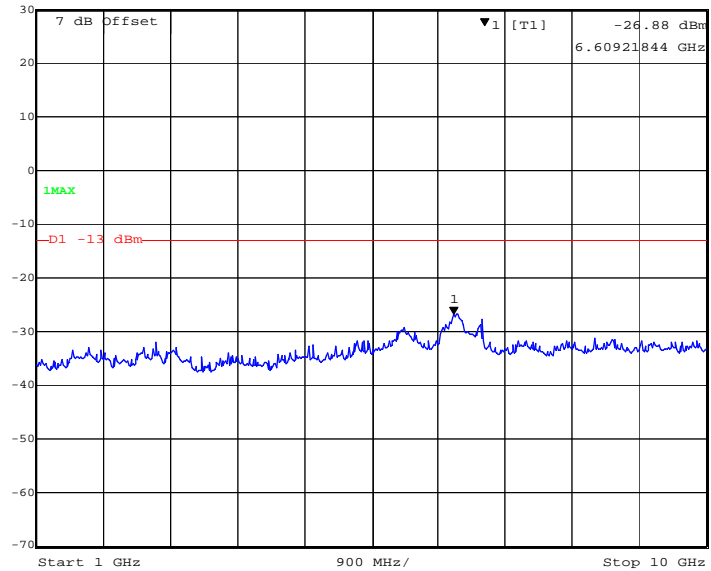
Marker 1 [T1]	RBW	100 kHz	RF Att	40 dB
Ref Lvl	-40.52 dBm	VBW	300 kHz	
30 dBm	972.78557114 MHz	SWT	245 ms	Unit dBm



Date: 8.AUG.2020 16:26:02

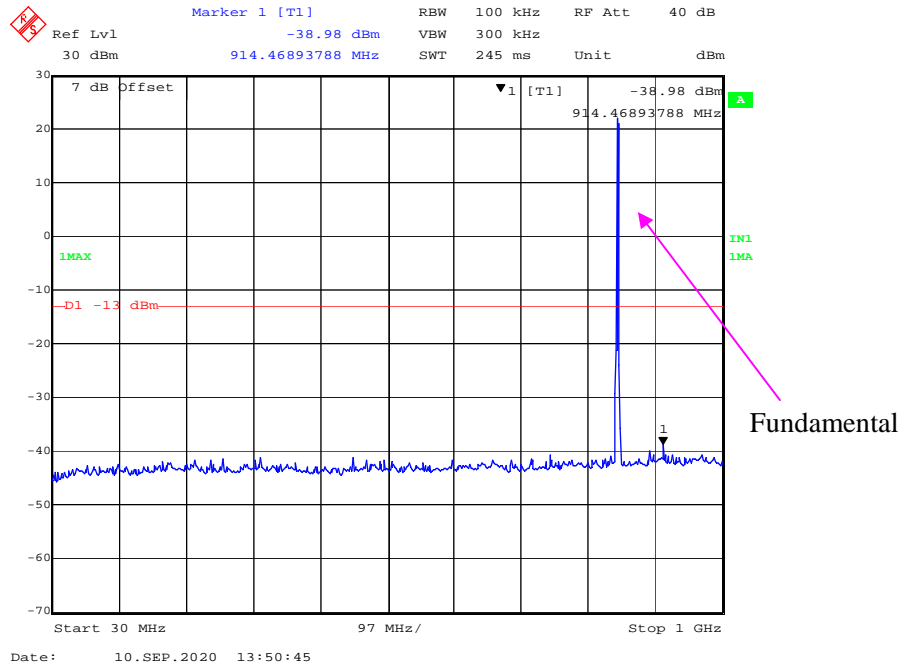
### 1 GHz – 10 GHz (10.0 MHz, 16-QAM, Middle Channel)

Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-26.88 dBm	VBW	3 MHz	
30 dBm	6.60921844 GHz	SWT	52 ms	Unit dBm

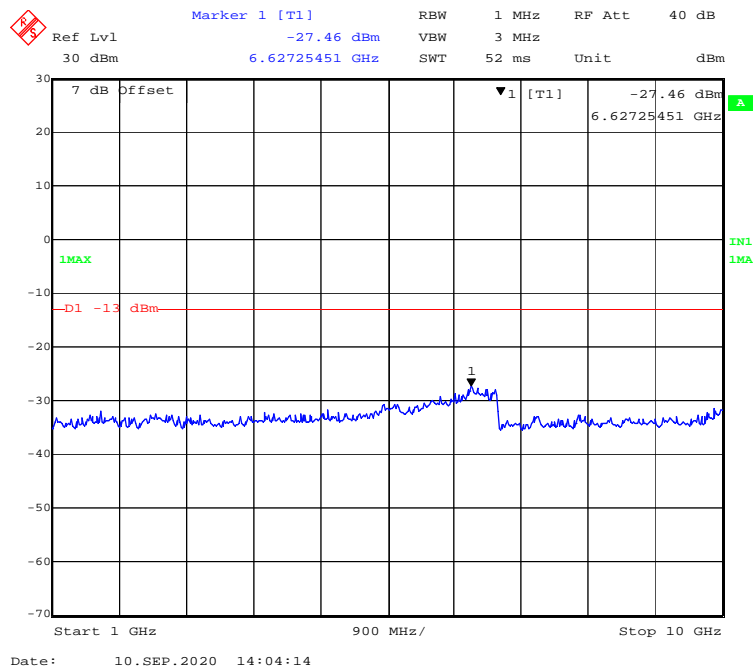


Date: 8.AUG.2020 16:24:41

### 30 MHz - 1 GHz (1.4 MHz, QPSK, High Channel)

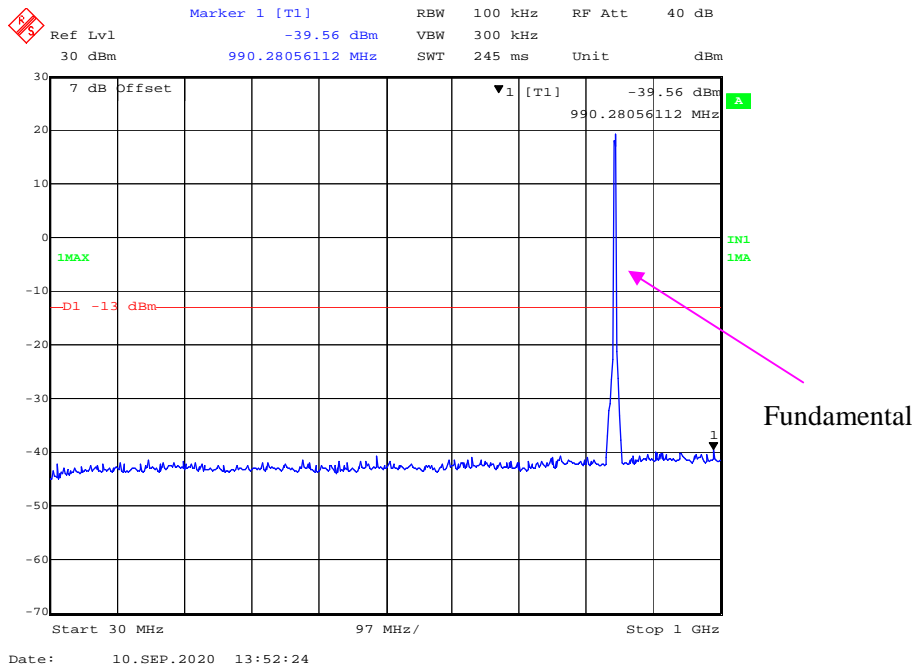


### 1 GHz - 10 GHz (1.4 MHz, QPSK, High Channel)

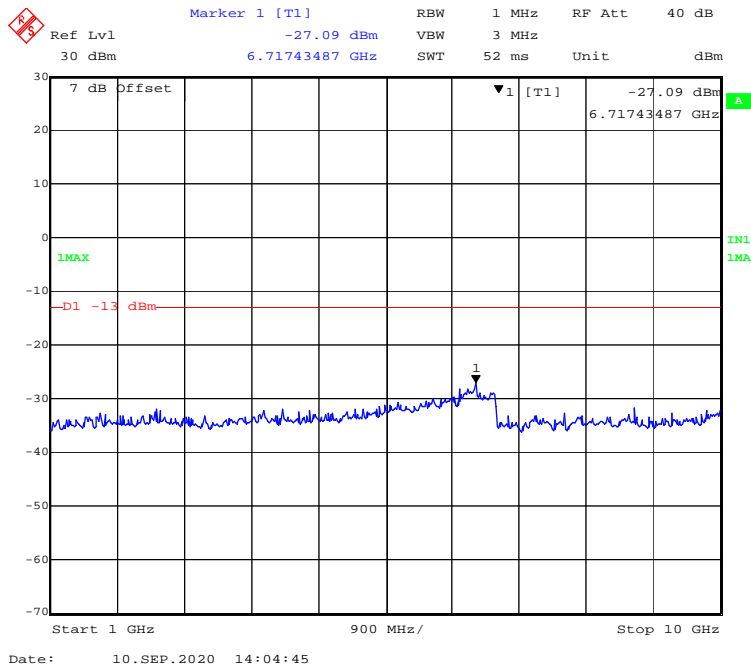




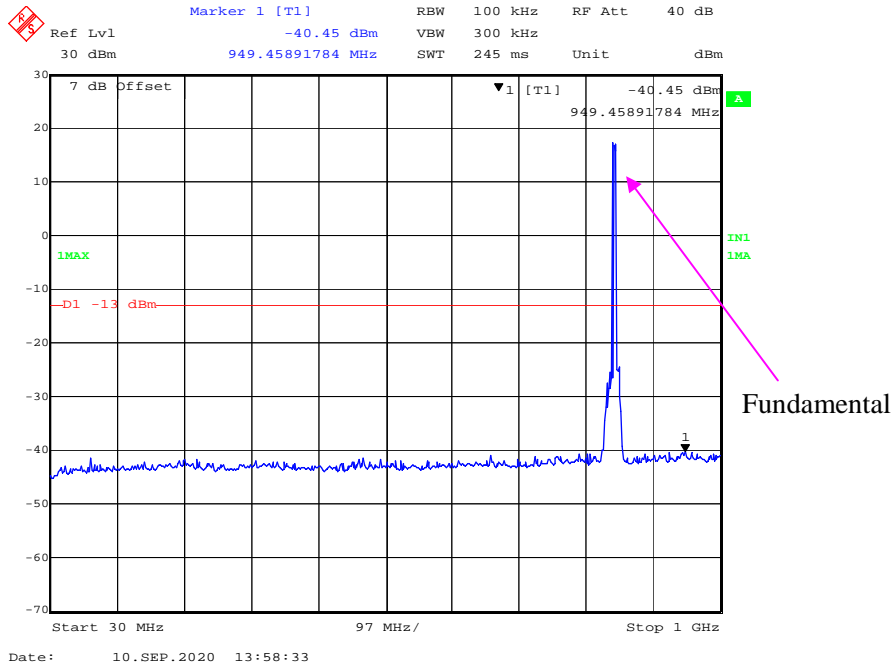
### 30 MHz - 1 GHz (3.0 MHz, QPSK, High Channel)



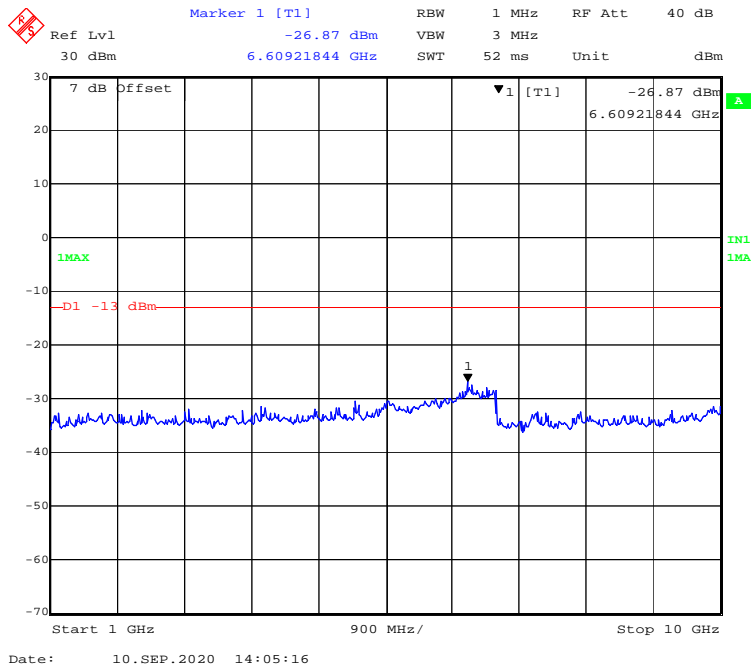
### 1 GHz – 10 GHz (3.0 MHz, QPSK, High Channel)



### 30 MHz - 1 GHz (5.0 MHz, QPSK, High Channel)

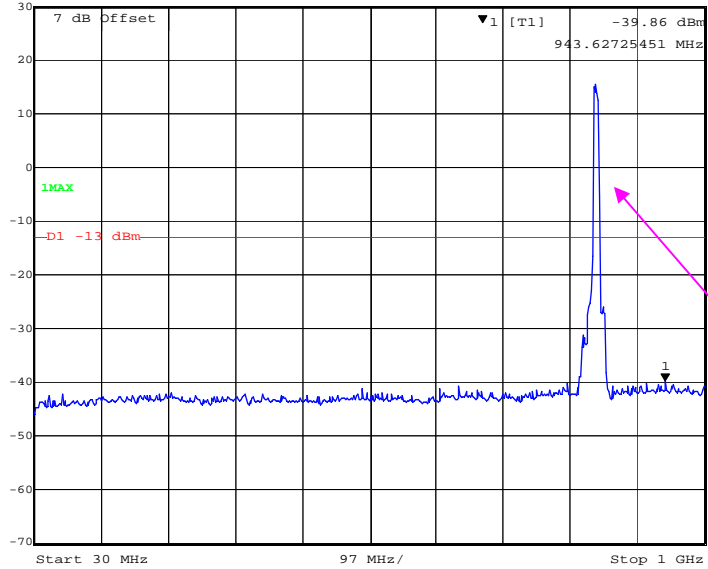


### 1 GHz - 10 GHz (5.0MHz, QPSK, High Channel)



### 30 MHz - 1 GHz (10.0 MHz, QPSK, High Channel)

Marker 1 [T1] RBW 100 kHz RF Att 40 dB  
Ref Lvl -39.86 dBm VBW 300 kHz  
30 dBm 943.62725451 MHz SWT 245 ms Unit dBm

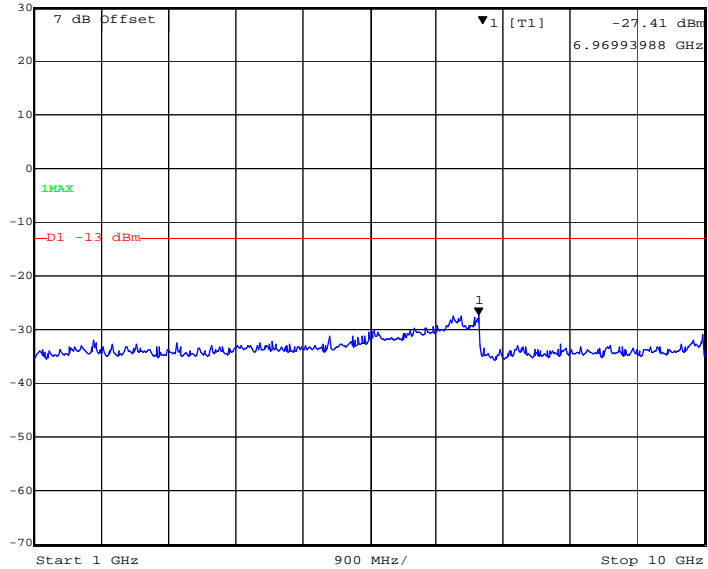


Date: 10.SEP.2020 13:59:47

Fundamental

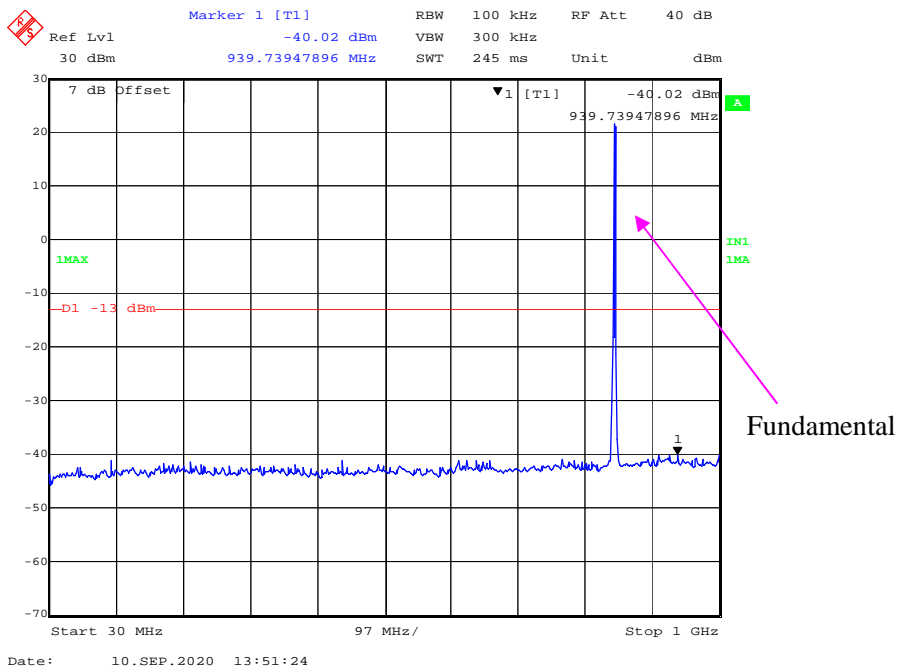
### 1 GHz - 10 GHz (10.0 MHz, QPSK, High Channel)

Marker 1 [T1] RBW 1 MHz RF Att 40 dB  
Ref Lvl -27.41 dBm VBW 3 MHz  
30 dBm 6.96993988 GHz SWT 52 ms Unit dBm

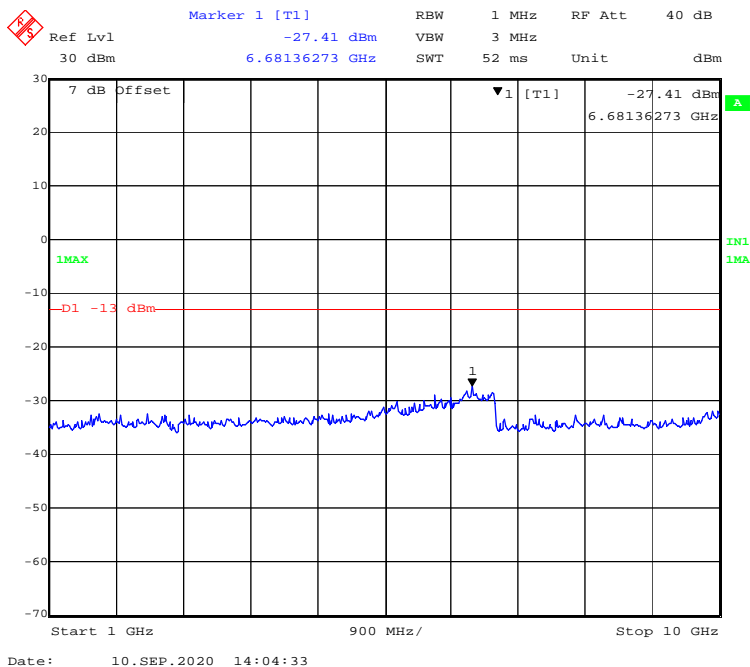


Date: 10.SEP.2020 14:06:02

**30 MHz - 1 GHz (1.4 MHz, 16-QAM, High Channel)**

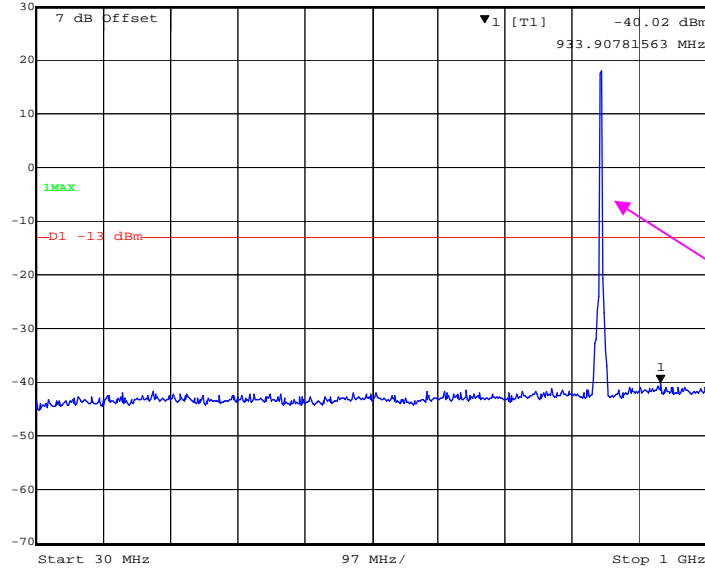


**1 GHz - 10 GHz (1.4 MHz, 16-QAM, High Channel)**



### 30 MHz - 1 GHz (3.0 MHz, 16-QAM, High Channel)

Marker 1 [T1] RBW 100 kHz RF Att 40 dB  
Ref Lvl -40.02 dBm VBW 300 kHz  
30 dBm 933.90781563 MHz SWT 245 ms Unit dBm

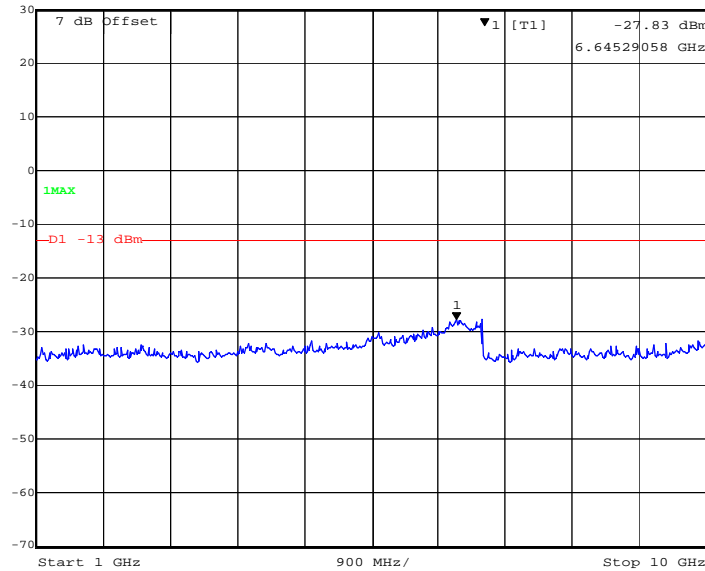


Date: 10.SEP.2020 13:52:45

Fundamental

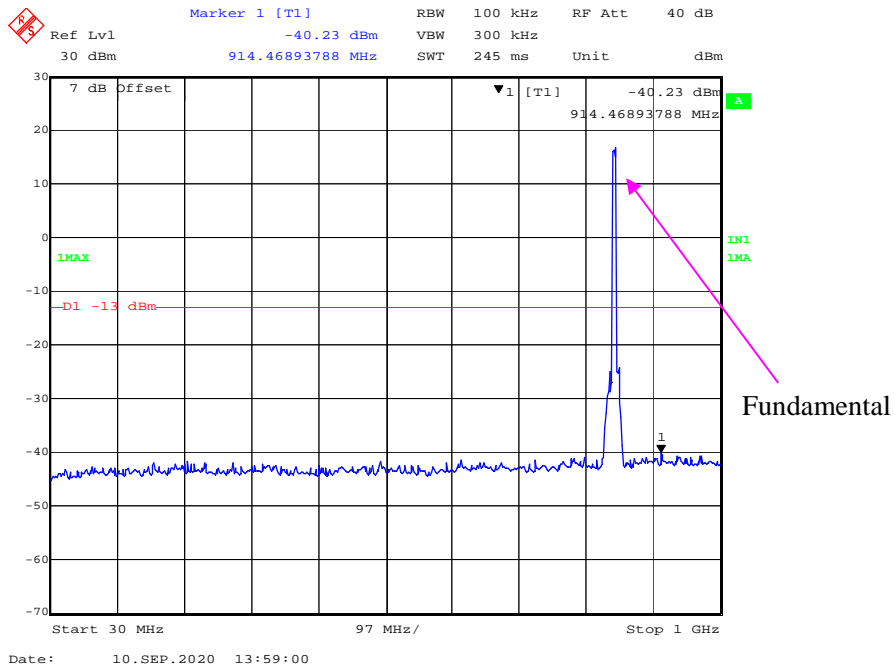
### 1 GHz - 10 GHz (3.0 MHz, 16-QAM, High Channel)

Marker 1 [T1] RBW 1 MHz RF Att 40 dB  
Ref Lvl -27.83 dBm VBW 3 MHz  
30 dBm 6.64529058 GHz SWT 52 ms Unit dBm

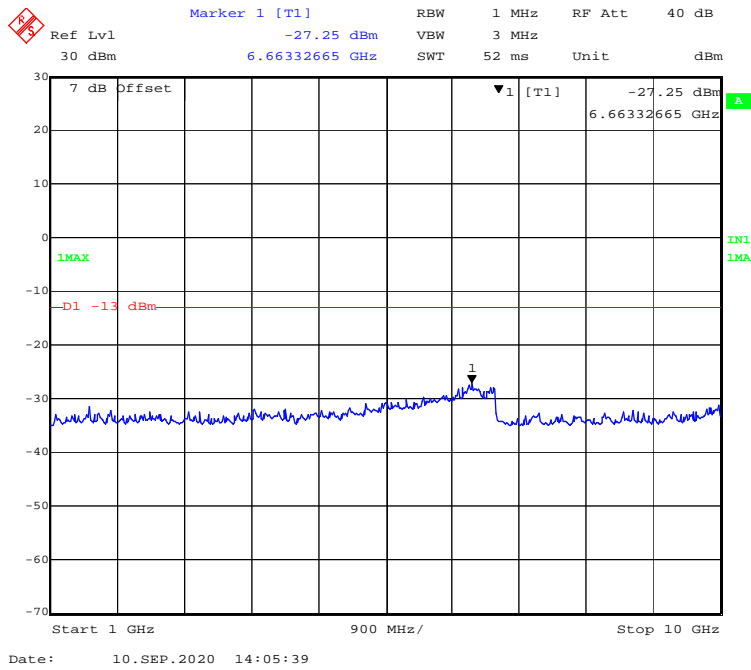


Date: 10.SEP.2020 14:05:02

**30 MHz - 1 GHz (5.0 MHz, 16-QAM, High Channel)**

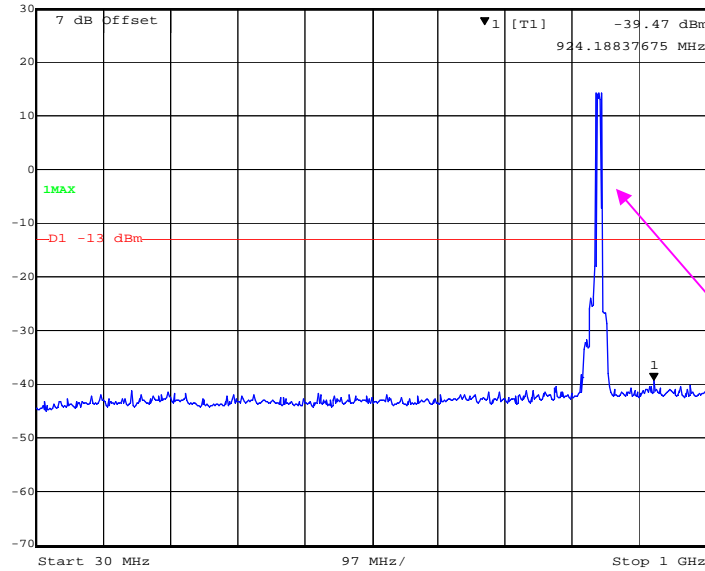


**1 GHz – 10 GHz (5.0MHz, 16-QAM, High Channel)**



### 30 MHz - 1 GHz (10.0 MHz, 16-QAM, High Channel)

Marker 1 [T1] RBW 100 kHz RF Att 40 dB  
Ref Lvl -39.47 dBm VBW 300 kHz  
30 dBm 924.18837675 MHz SWT 245 ms Unit dBm

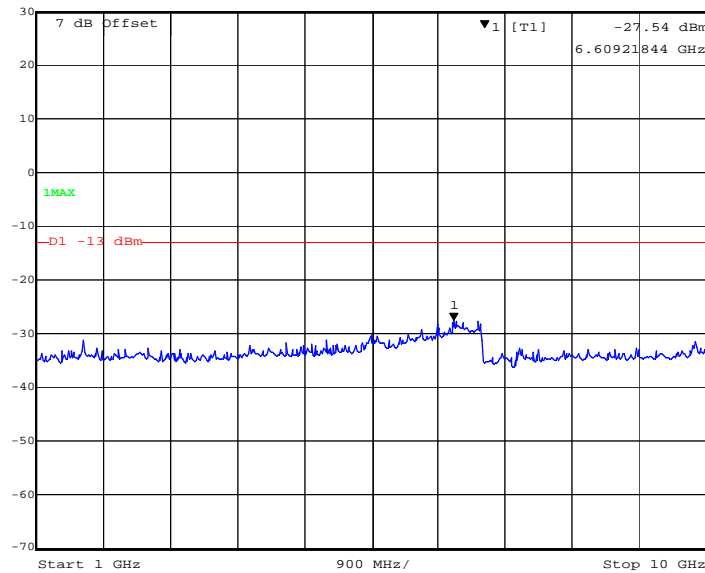


Fundamental

Date: 10.SEP.2020 14:00:12

### 1 GHz - 10 GHz (10.0 MHz, 16-QAM, High Channel)

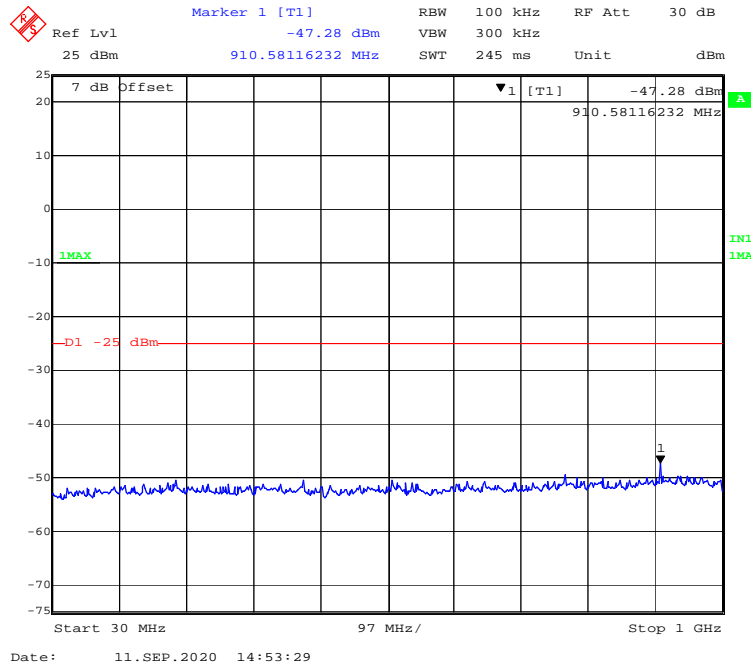
Marker 1 [T1] RBW 1 MHz RF Att 40 dB  
Ref Lvl -27.54 dBm VBW 3 MHz  
30 dBm 6.60921844 GHz SWT 52 ms Unit dBm



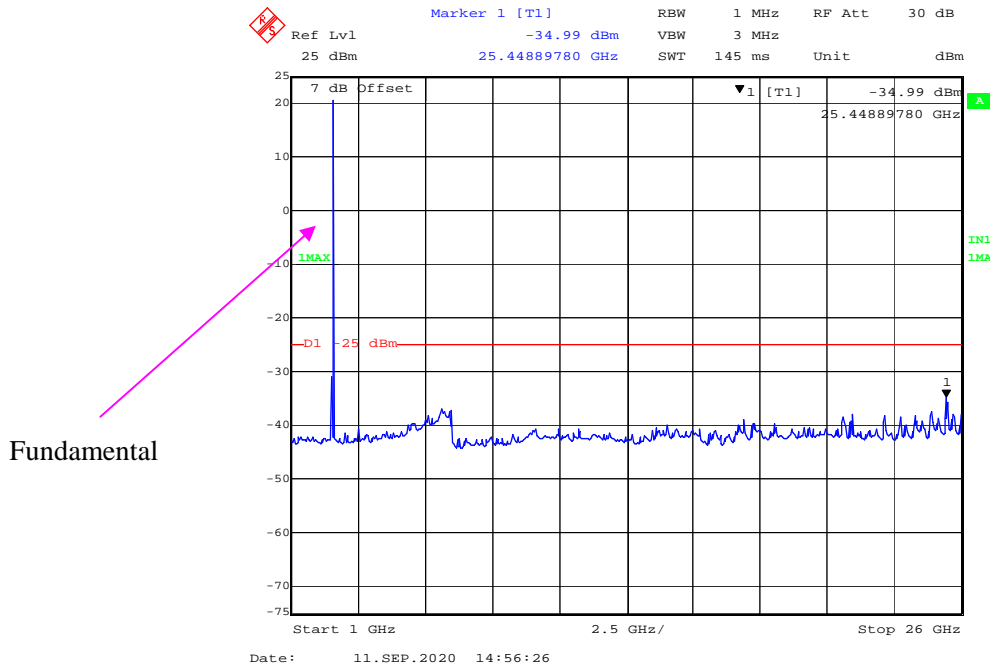
Date: 10.SEP.2020 14:06:17

**LTE Band 41:**

**30 MHz - 1 GHz (5 MHz, QPSK, Low Channel)**

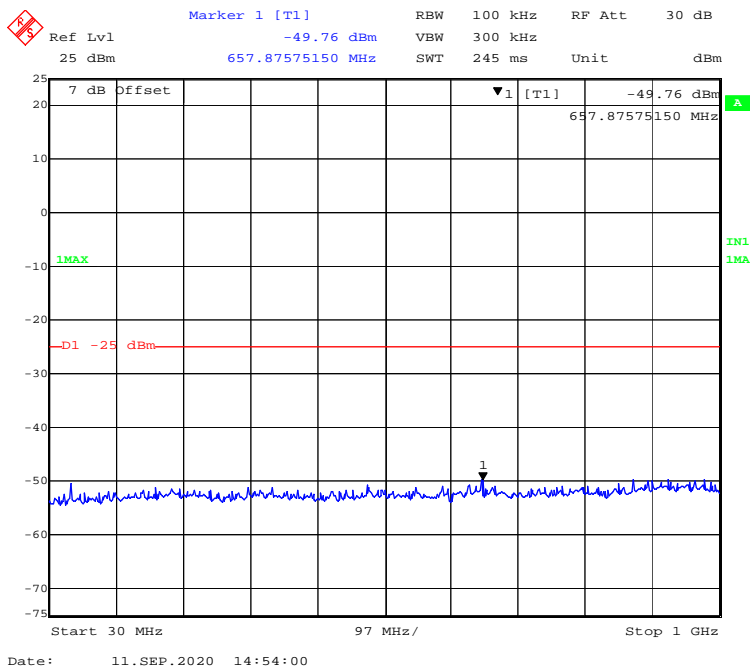


**1 GHz – 26 GHz (5 MHz, QPSK, Low Channel)**

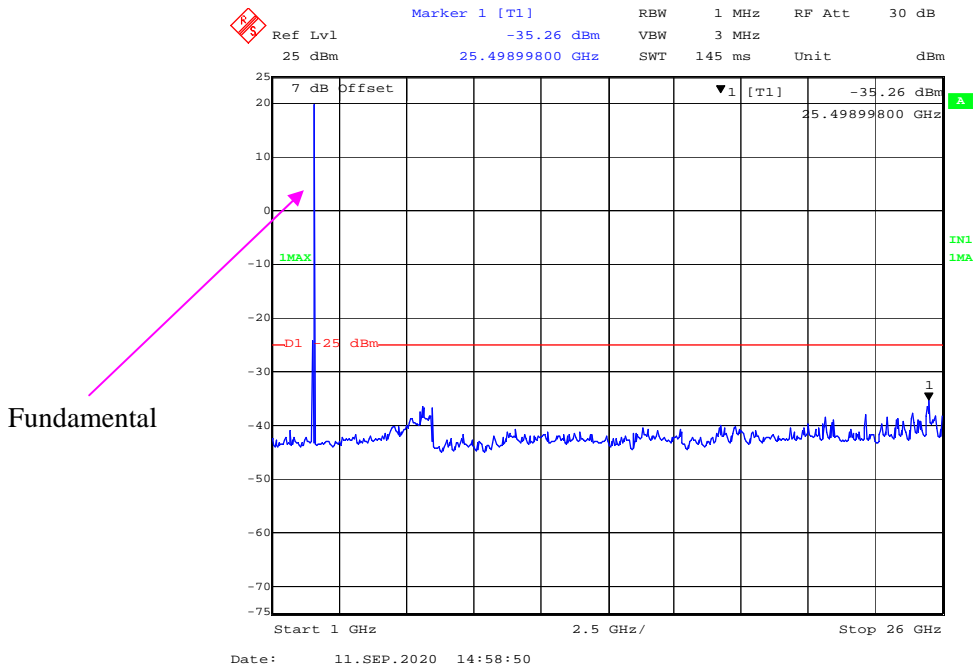




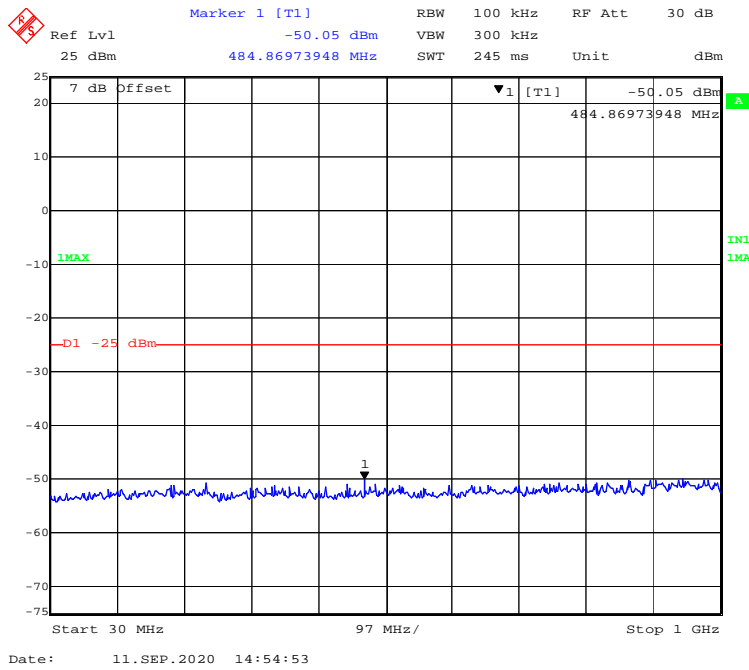
30 MHz - 1 GHz (10 MHz, QPSK, Low Channel)



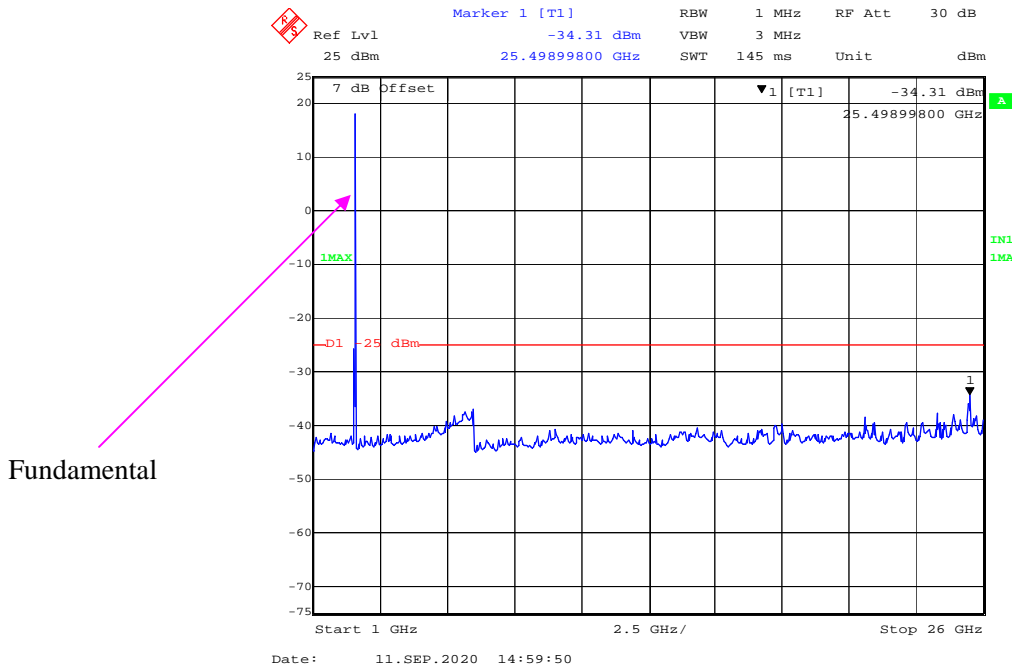
1 GHz - 26 GHz (10 MHz, QPSK, Low Channel)



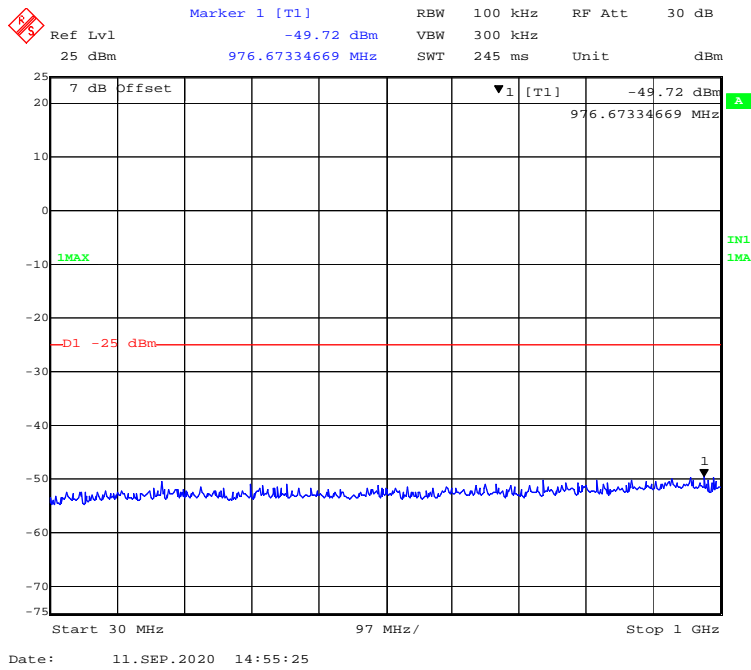
### 30 MHz - 1 GHz (15 MHz, QPSK, Low Channel)



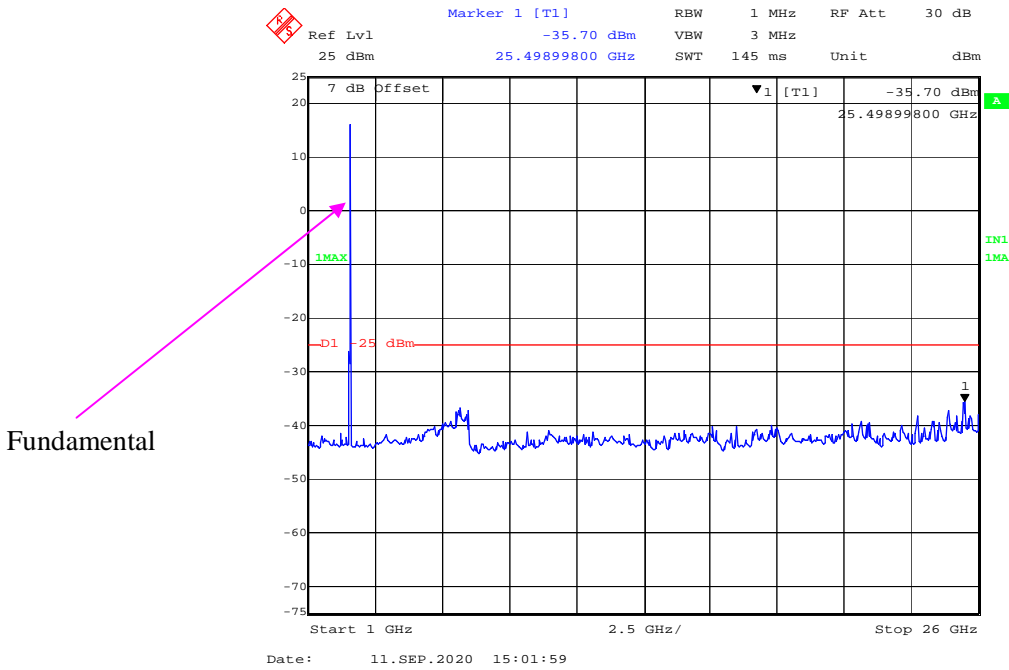
### 1 GHz - 26 GHz (15MHz, QPSK, Low Channel)



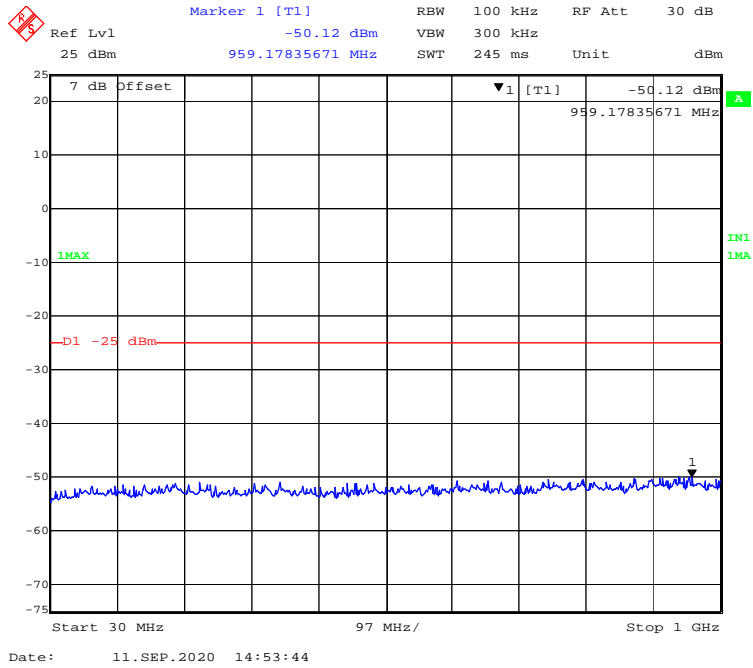
### 30 MHz - 1 GHz (20 MHz, QPSK, Low Channel)



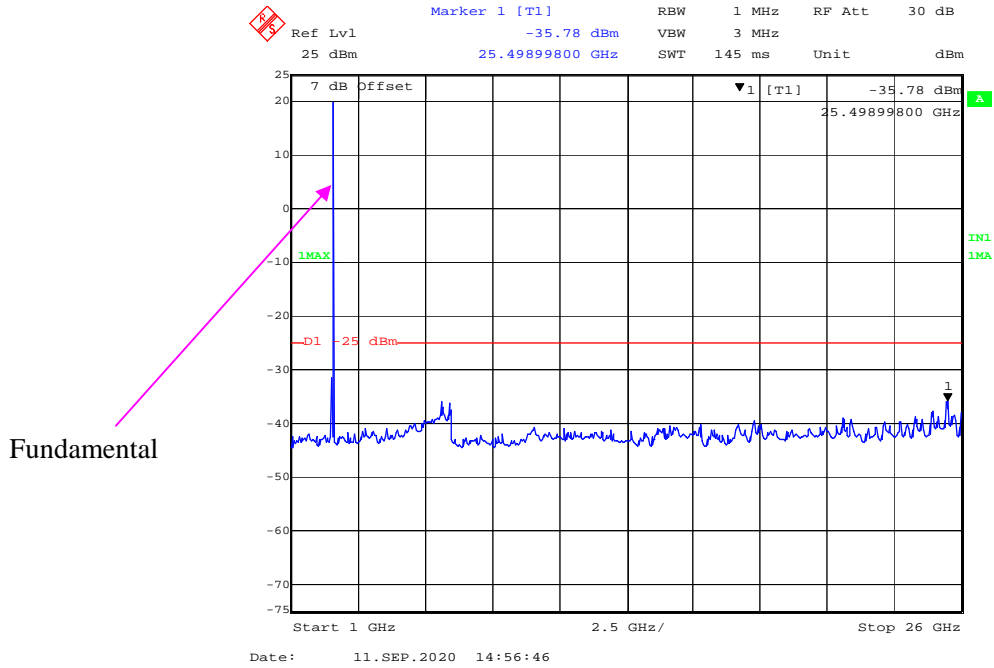
### 1 GHz - 26 GHz (20 MHz, QPSK, Low Channel)



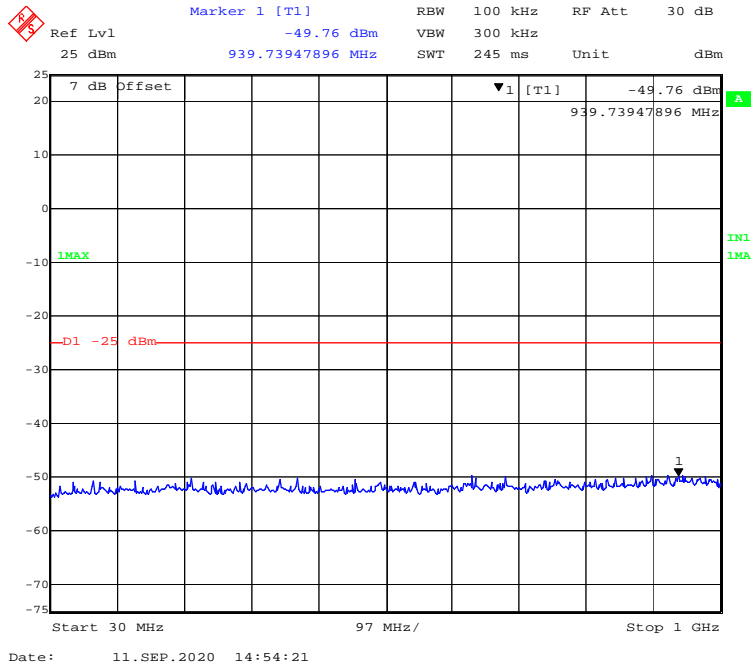
**30 MHz - 1 GHz (5 MHz, 16-QAM, Low Channel)**



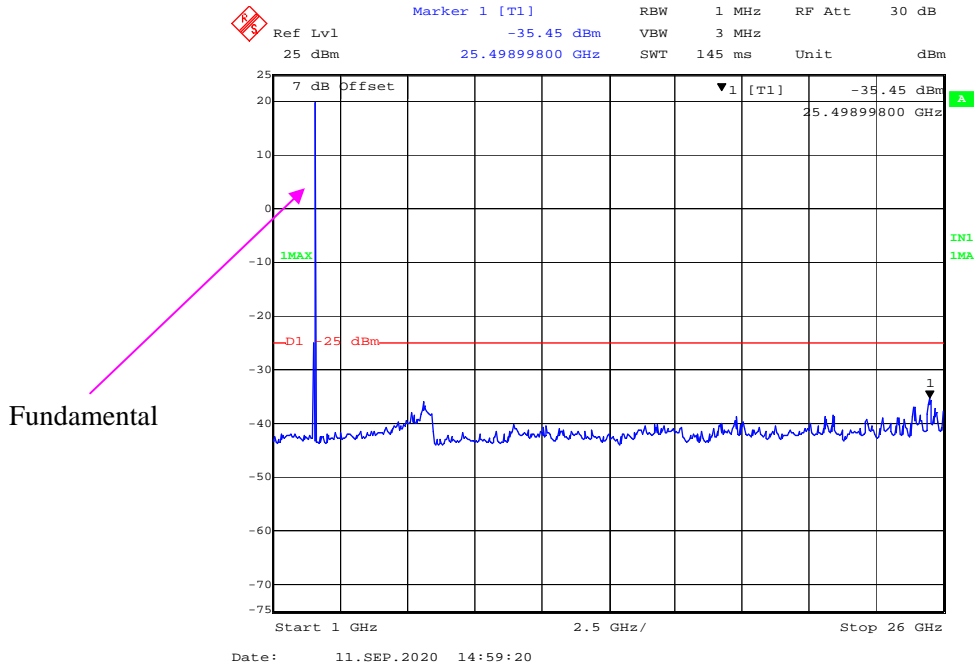
**1 GHz – 26 GHz (5 MHz, 16-QAM, Low Channel)**



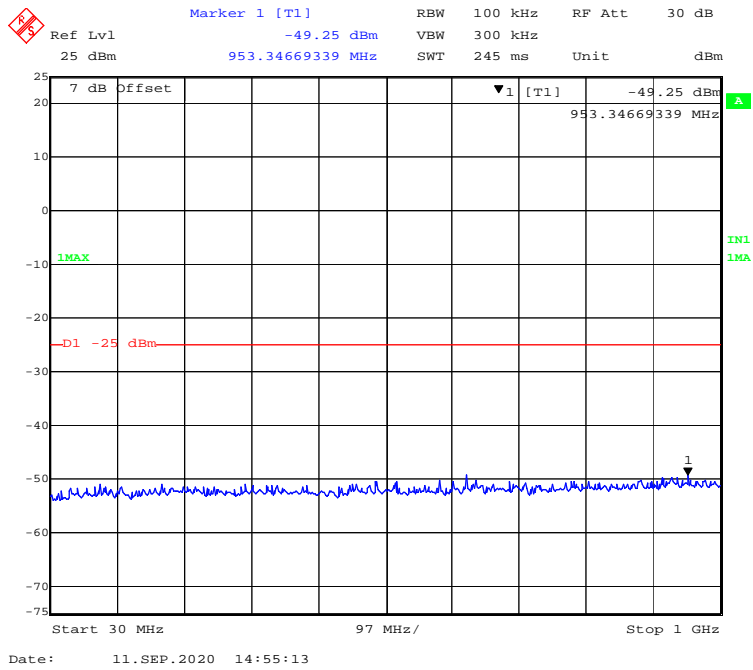
**30 MHz - 1 GHz (10 MHz, 16-QAM, Low Channel)**



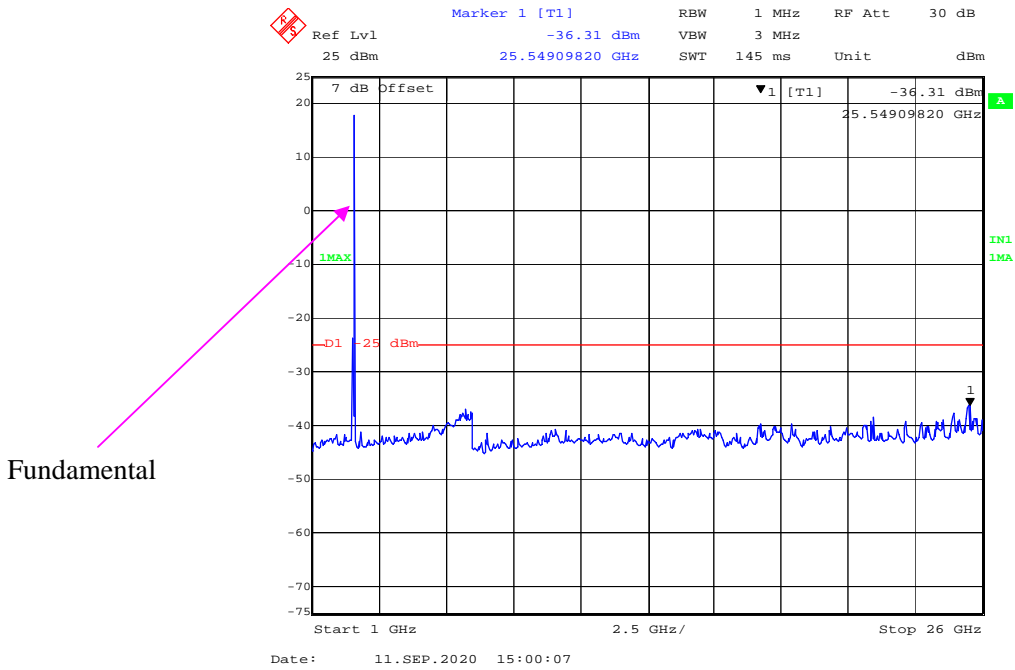
**1 GHz -26 GHz (10 MHz, 16-QAM, Low Channel)**



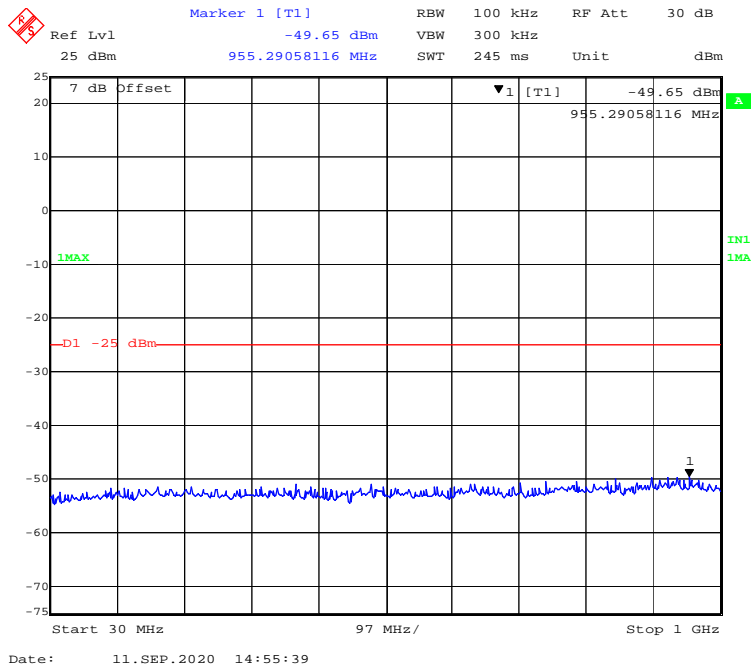
**30 MHz - 1 GHz (15 MHz, 16-QAM, Low Channel)**



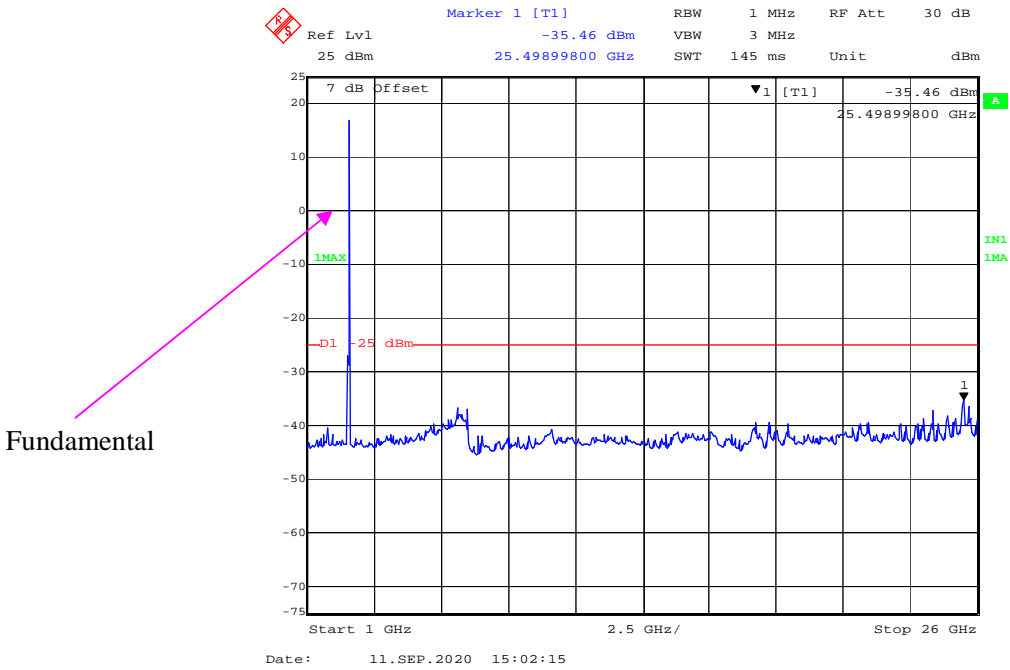
**1 GHz – 26 GHz (15MHz, 16-QAM, Low Channel)**



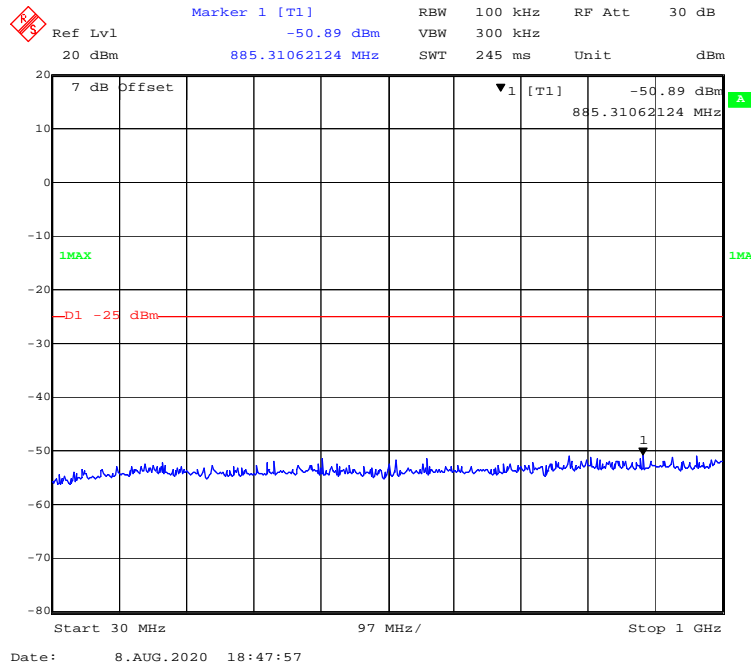
### 30 MHz - 1 GHz (20 MHz, 16-QAM, Low Channel)



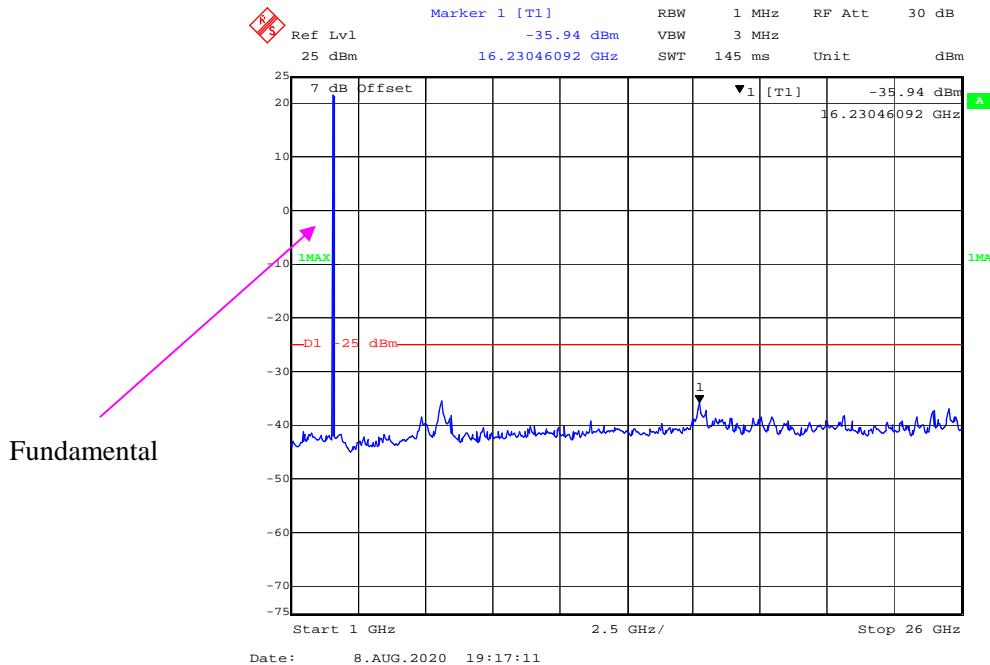
### 1 GHz – 26 GHz (20 MHz, 16-QAM, Low Channel)



### 30 MHz - 1 GHz (5 MHz, QPSK, Middle Channel)

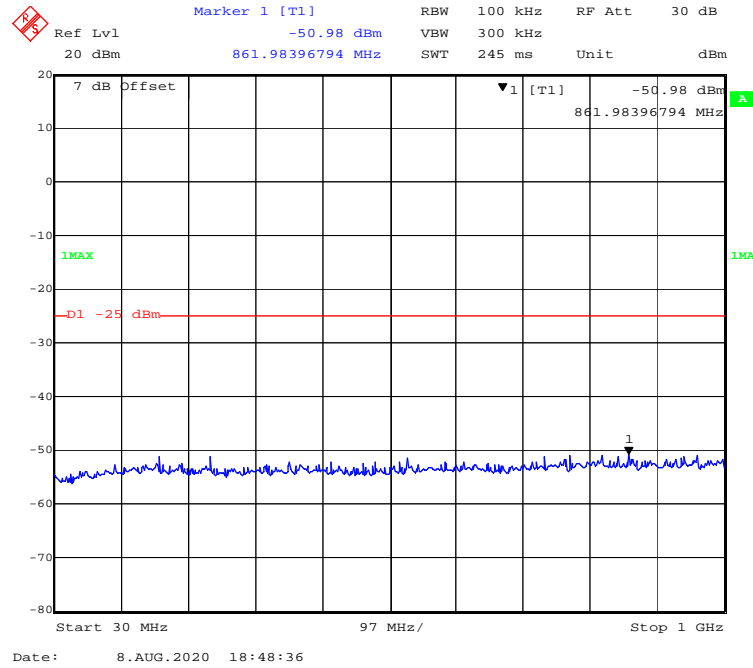


### 1 GHz – 26 GHz (5 MHz, QPSK, Middle Channel)

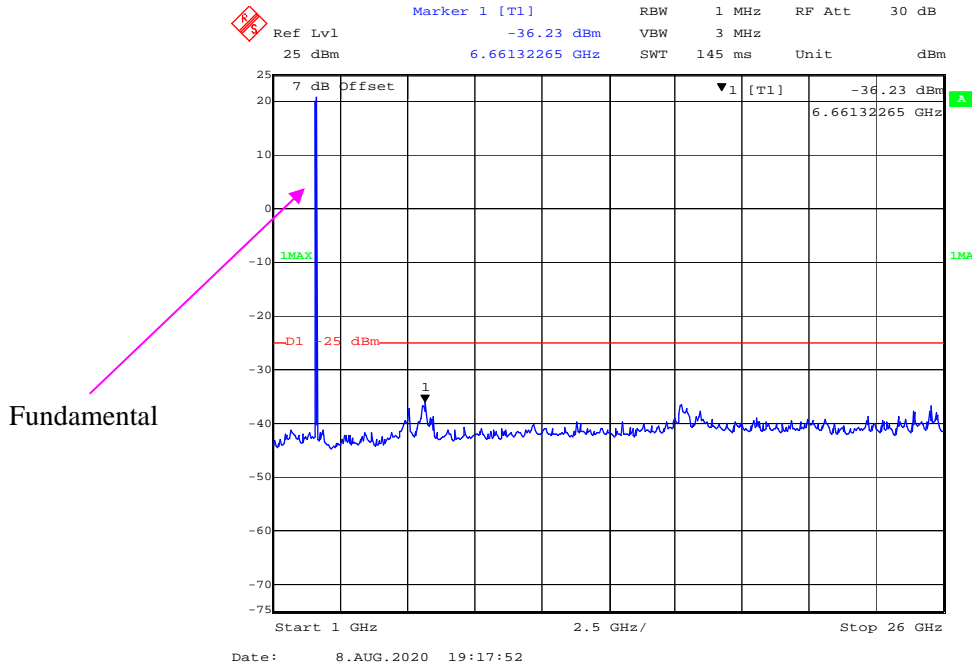




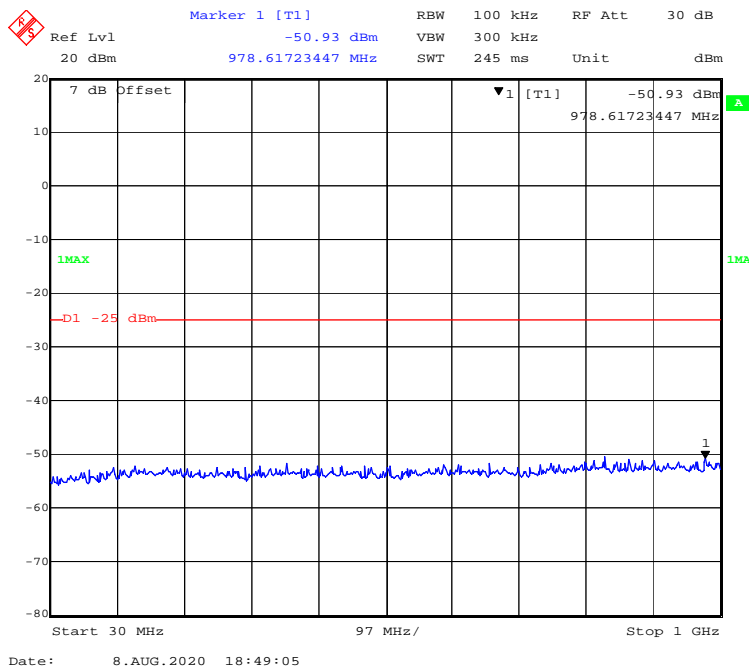
### 30 MHz - 1 GHz (10 MHz, QPSK, Middle Channel)



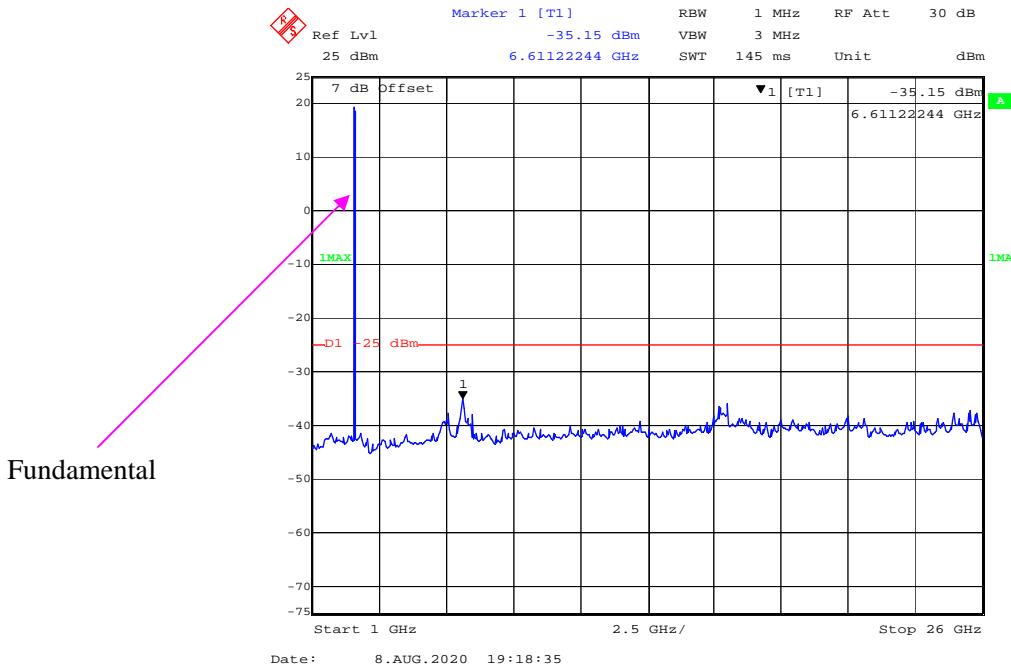
### 1 GHz -26 GHz (10 MHz, QPSK, Middle Channel)



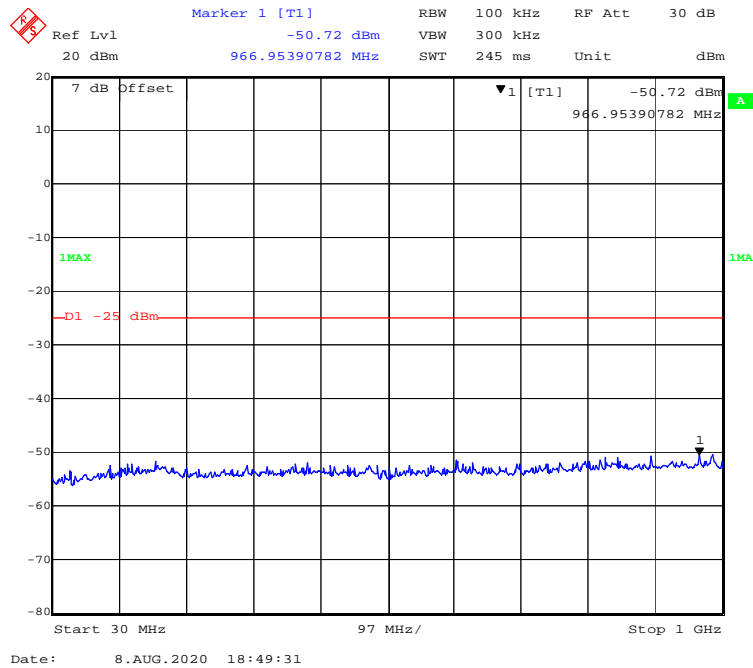
**30 MHz - 1 GHz (15 MHz, QPSK, Middle Channel)**



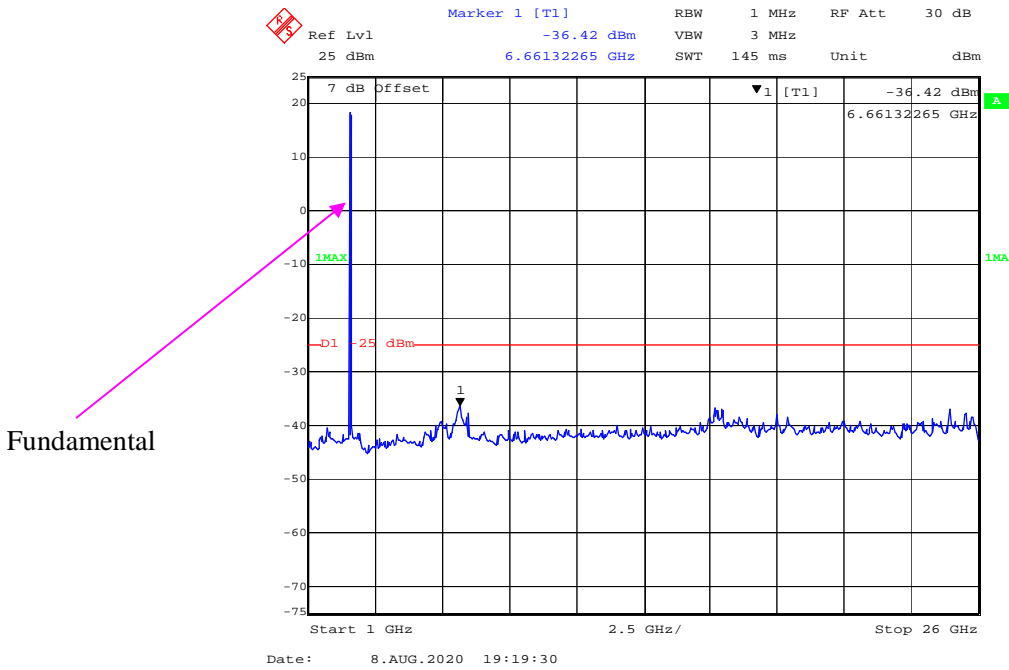
**1 GHz - 26 GHz (15MHz, QPSK, Middle Channel)**



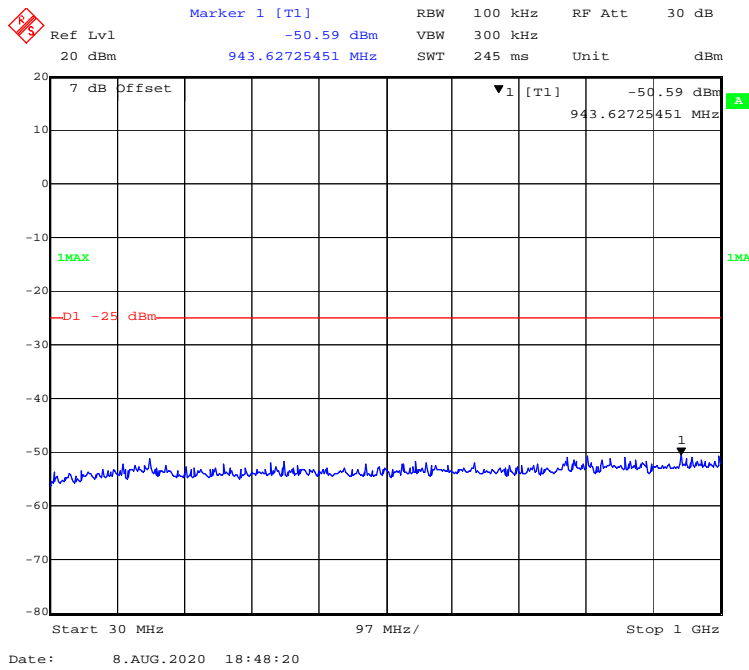
### 30 MHz - 1 GHz (20 MHz, QPSK, Middle Channel)



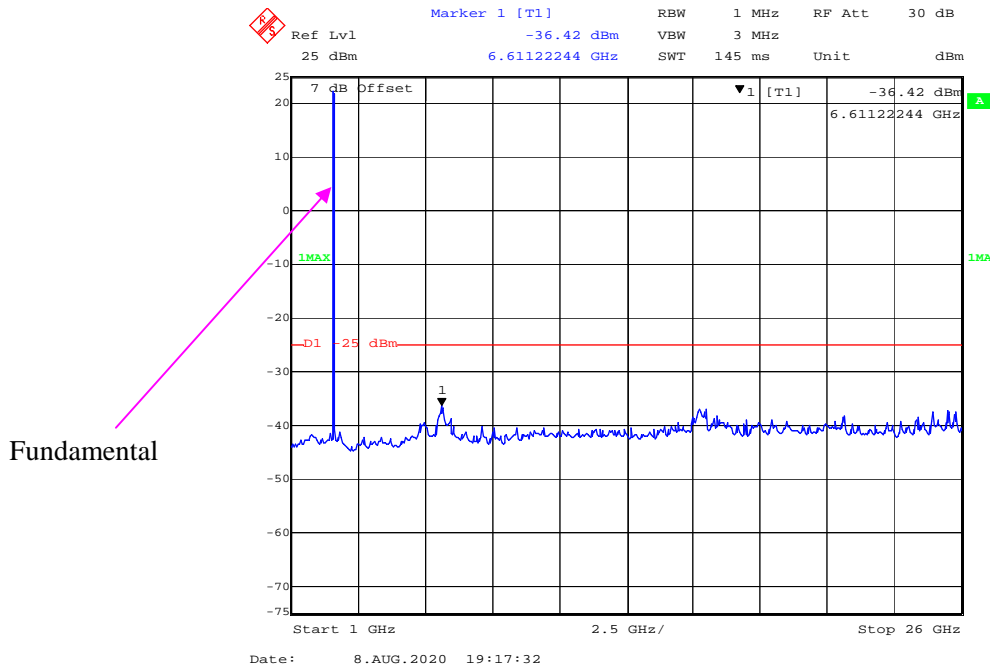
### 1 GHz - 26 GHz (20 MHz, QPSK, Middle Channel)



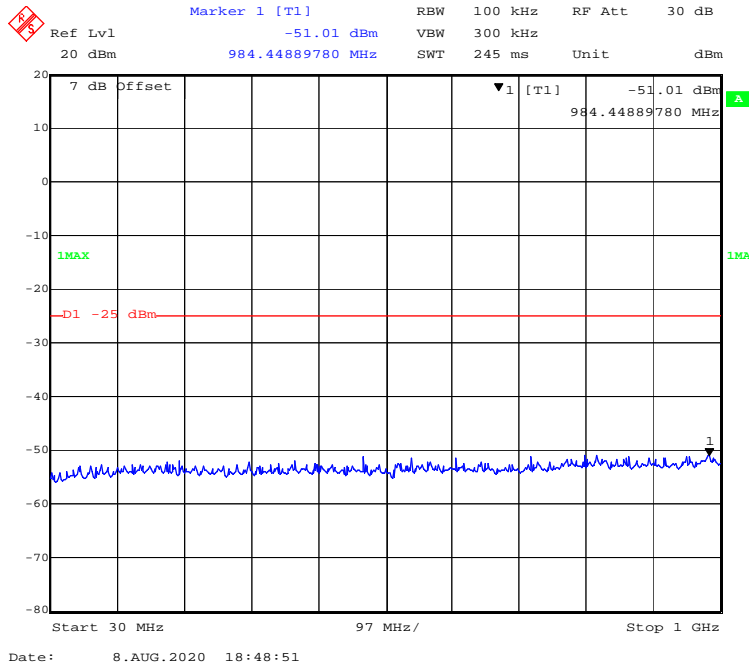
### 30 MHz - 1 GHz (5 MHz, 16-QAM, Middle Channel)



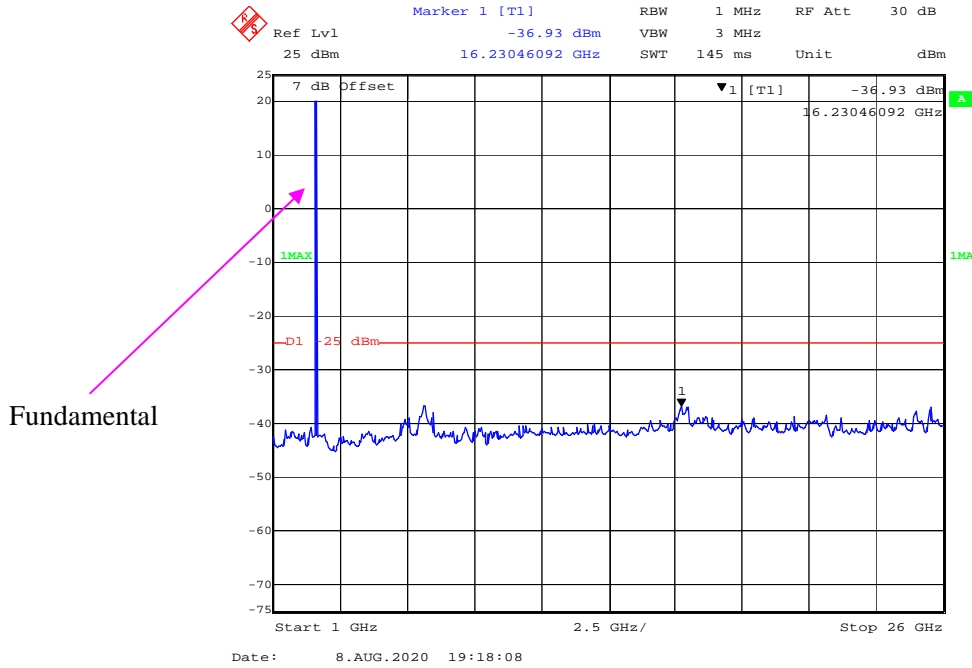
### 1 GHz - 26 GHz (5 MHz, 16-QAM, Middle Channel)



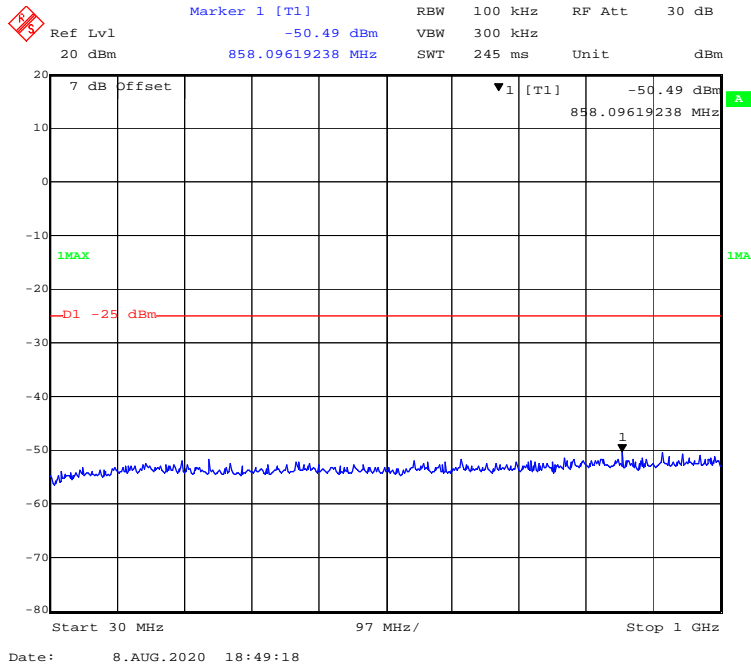
### 30 MHz - 1 GHz (10 MHz, 16-QAM, Middle Channel)



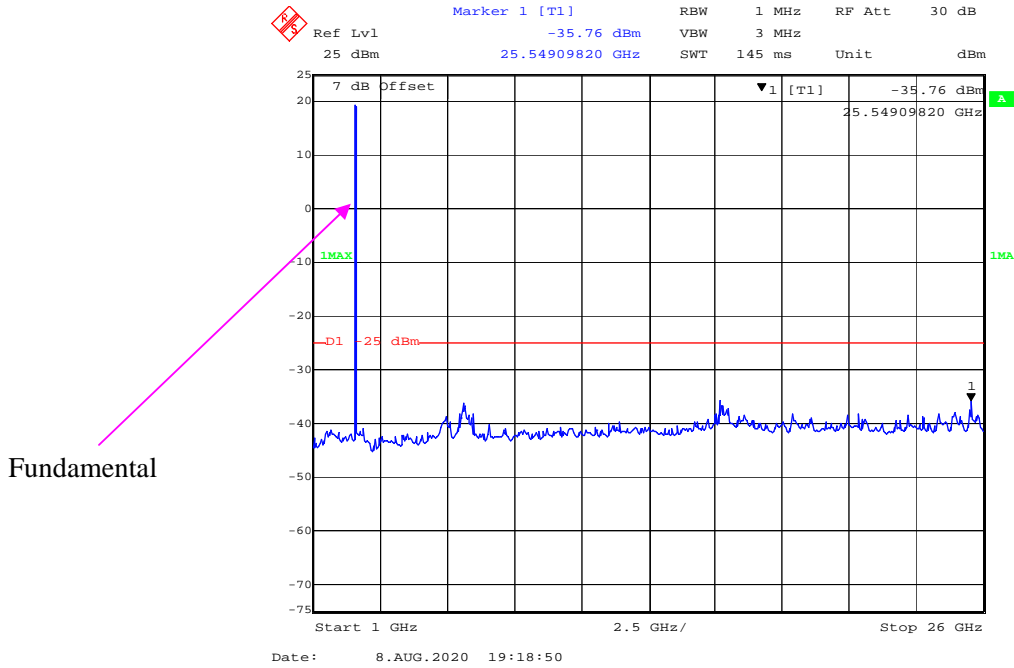
### 1 GHz -26 GHz (10 MHz, 16-QAM, Middle Channel)



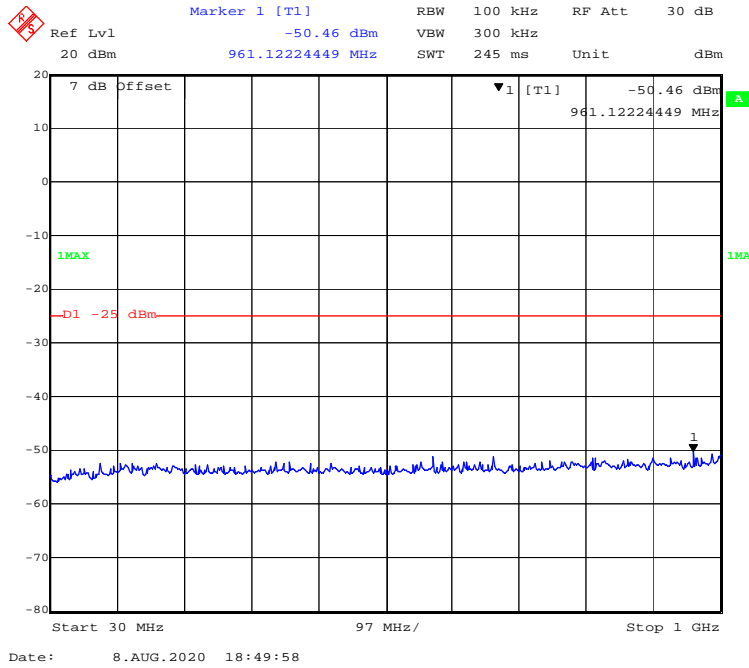
### 30 MHz - 1 GHz (15 MHz, 16-QAM, Middle Channel)



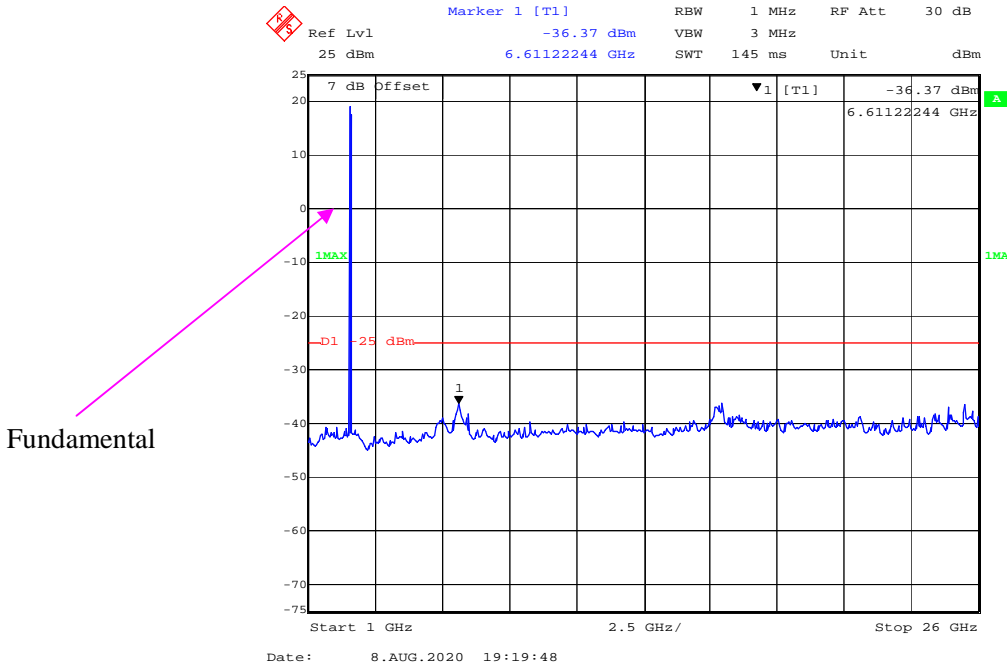
### 1 GHz – 26 GHz (15MHz, 16-QAM, Middle Channel)



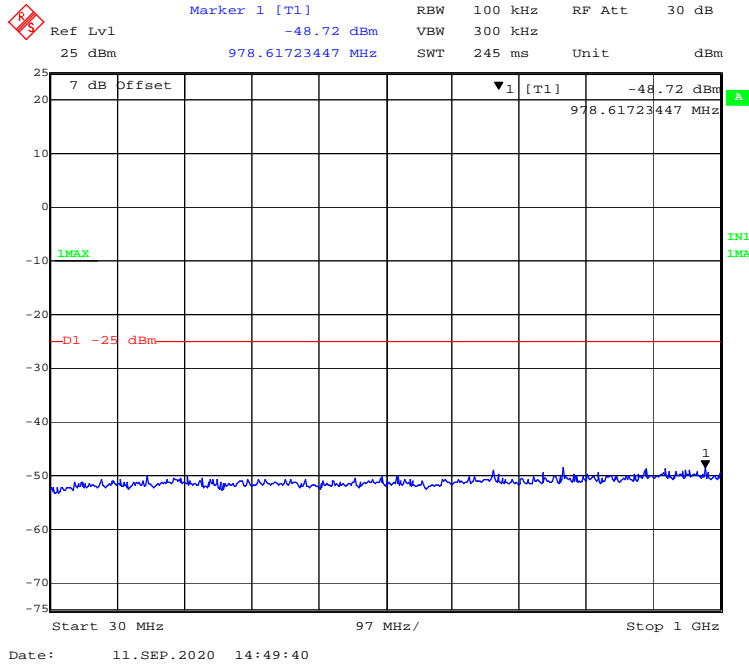
### 30 MHz - 1 GHz (20 MHz, 16-QAM, Middle Channel)



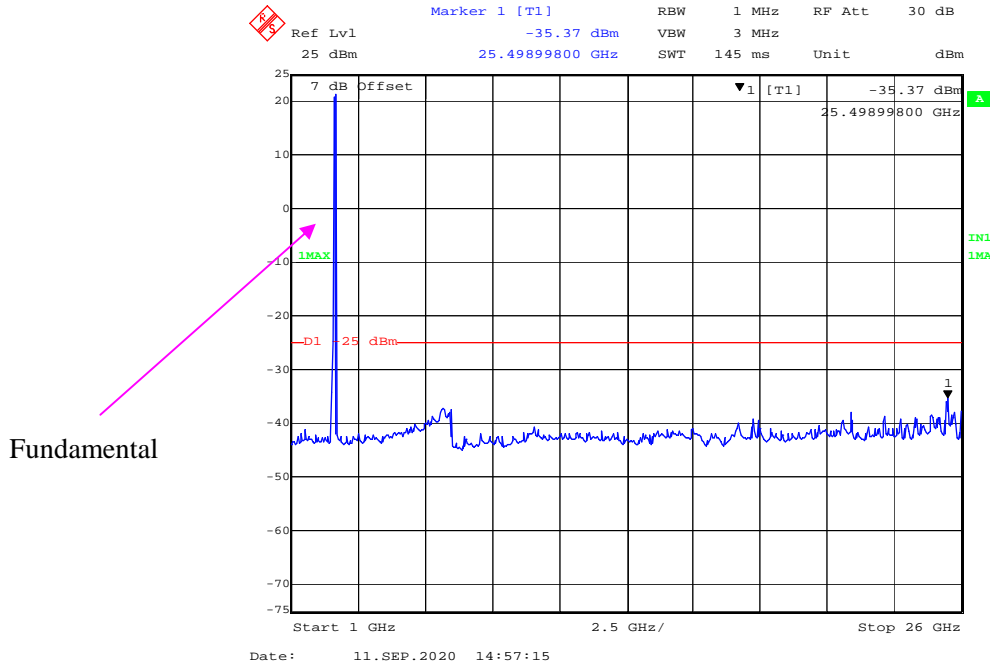
### 1 GHz – 26 GHz (20 MHz, 16-QAM, Middle Channel)



### 30 MHz - 1 GHz (5 MHz, QPSK, High Channel)

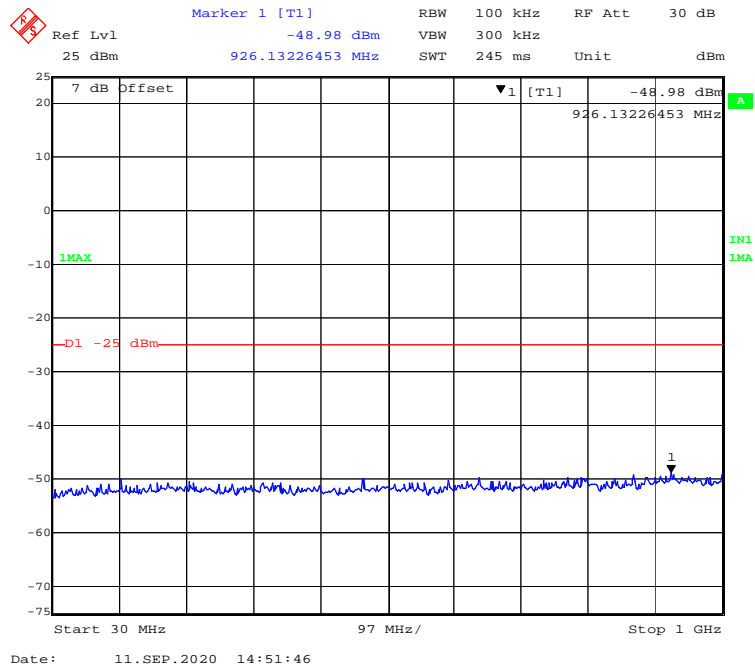


### 1 GHz – 26 GHz (5 MHz, QPSK, High Channel)

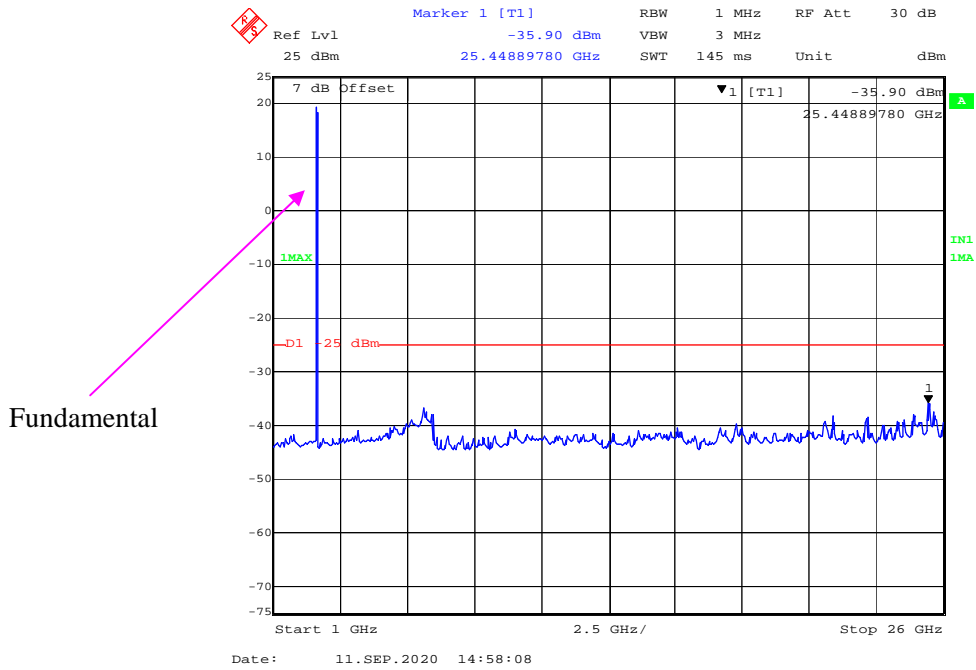




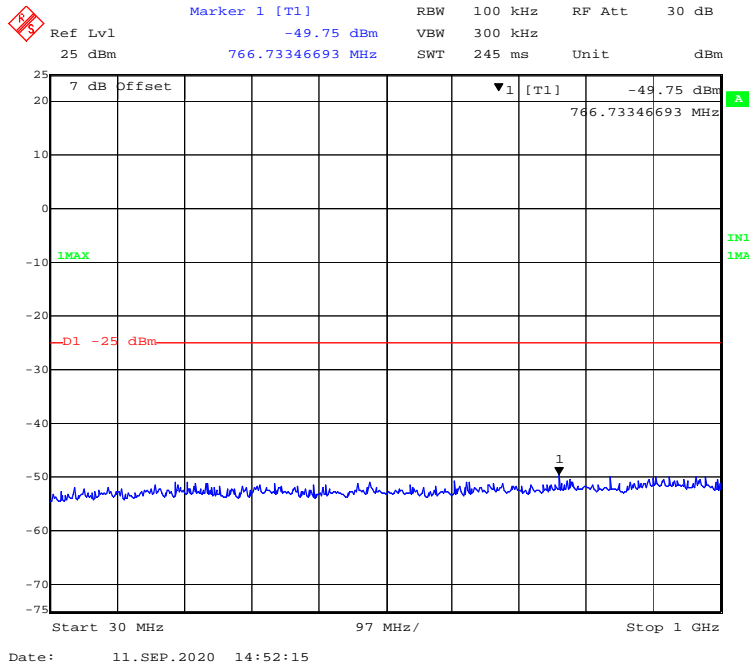
**30 MHz - 1 GHz (10 MHz, QPSK, High Channel)**



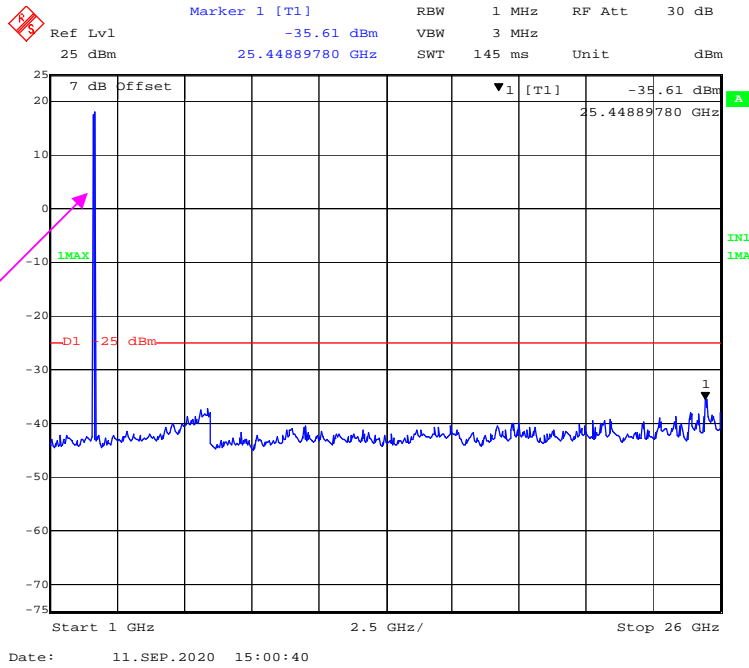
**1 GHz -26 GHz (10 MHz, QPSK, High Channel)**



**30 MHz - 1 GHz (15 MHz, QPSK, High Channel)**

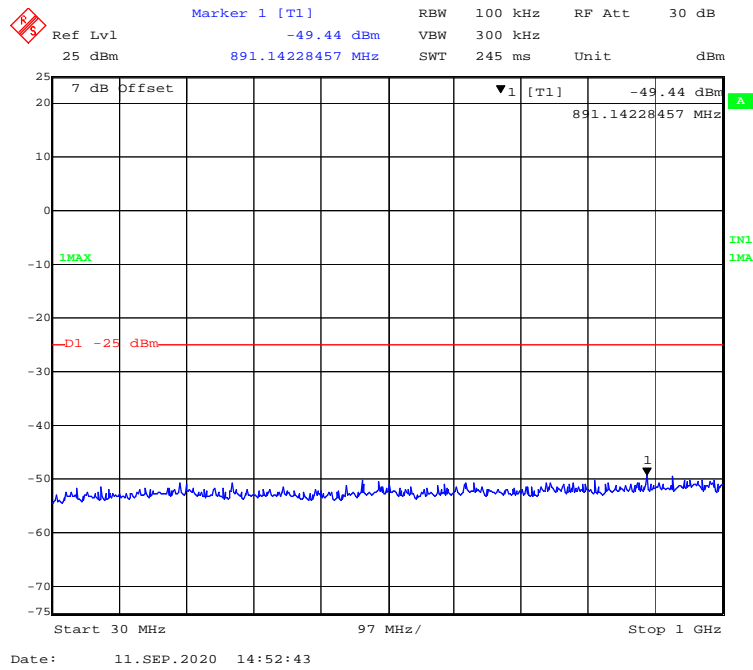


**1 GHz – 26 GHz (15MHz, QPSK, High Channel)**

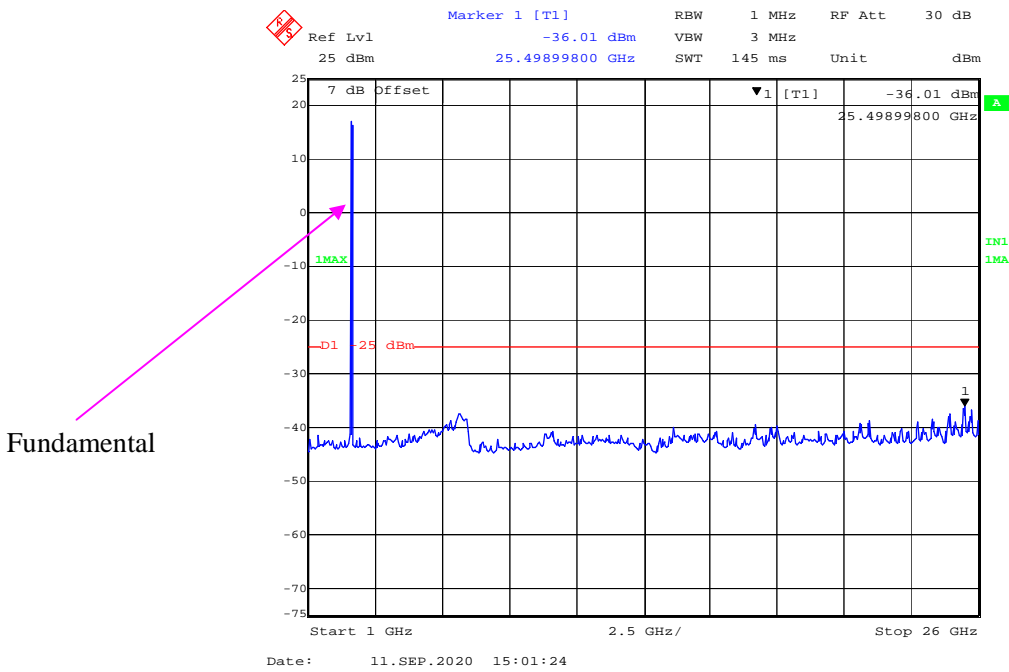


Fundamental

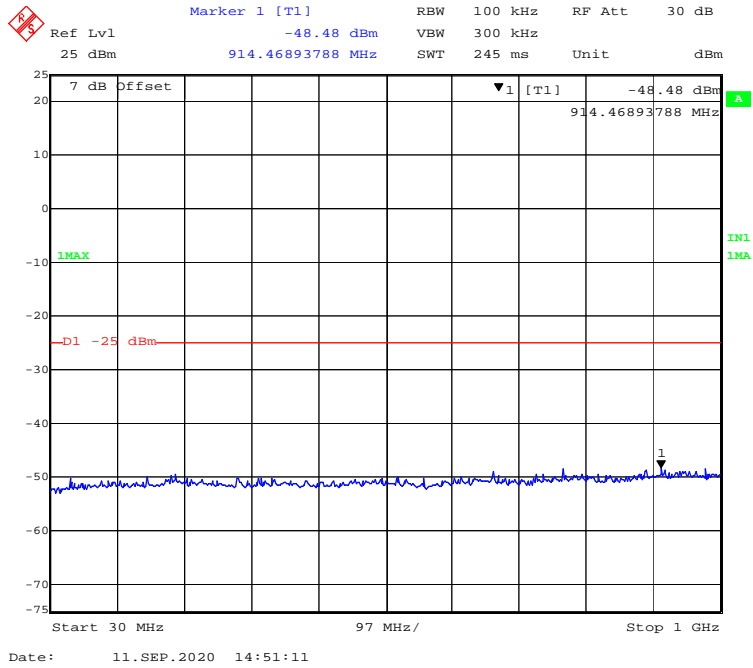
### 30 MHz - 1 GHz (20 MHz, QPSK, High Channel)



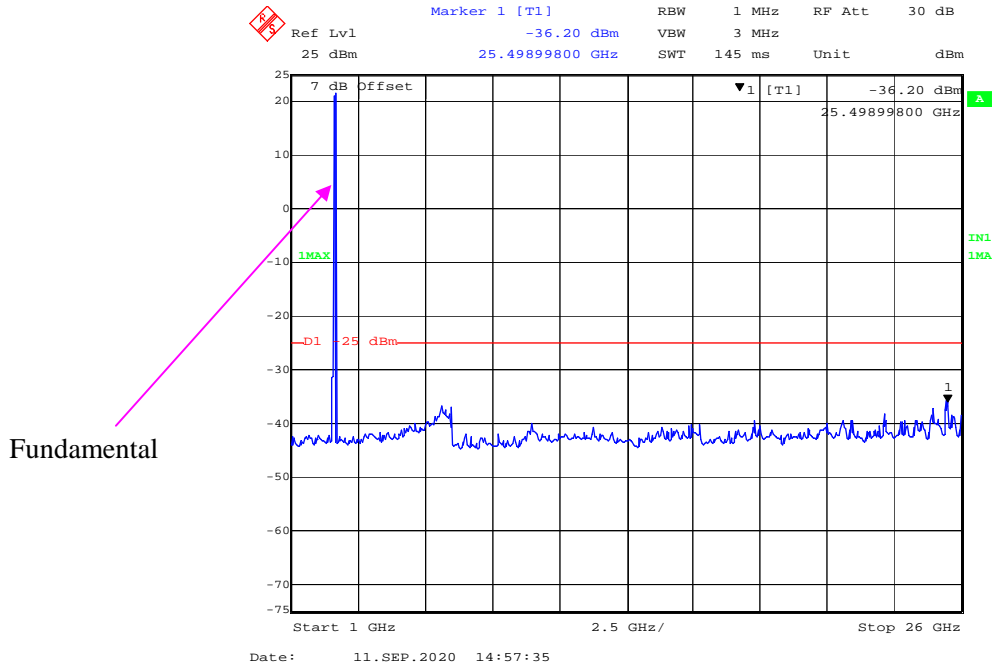
### 1 GHz – 26 GHz (20 MHz, QPSK, High Channel)



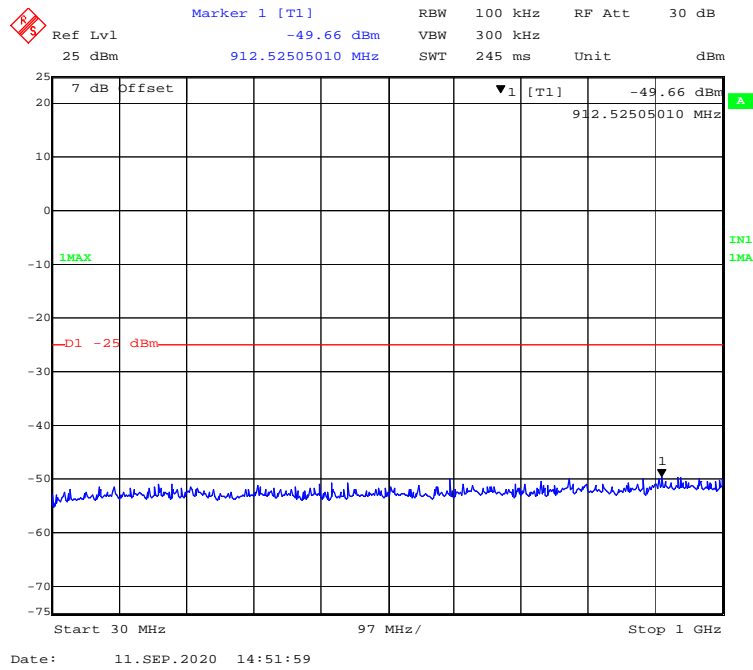
**30 MHz - 1 GHz (5 MHz, 16-QAM, High Channel)**



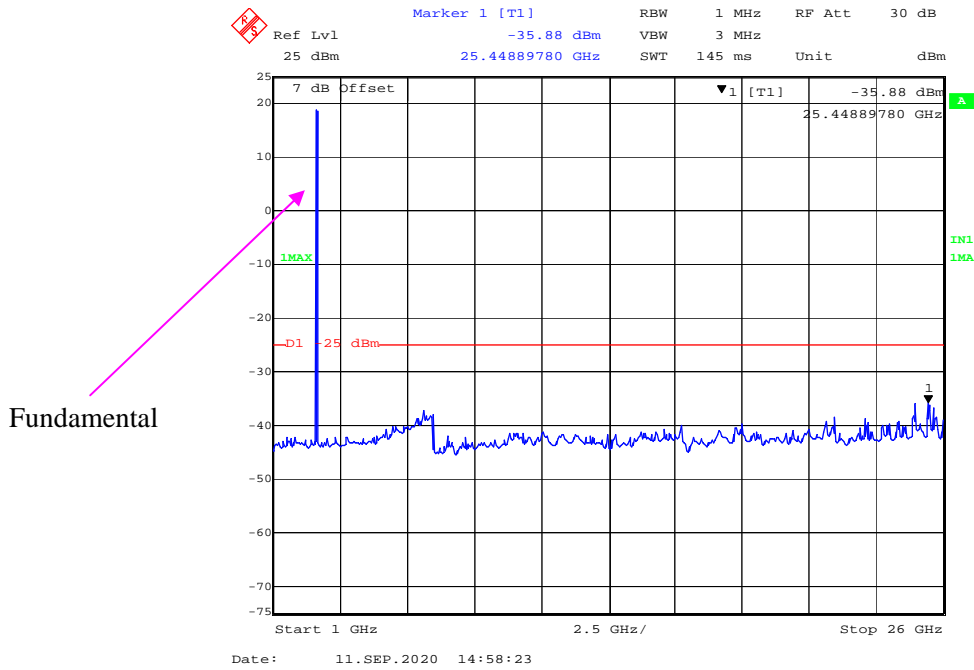
**1 GHz – 26 GHz (5 MHz, 16-QAM, High Channel)**



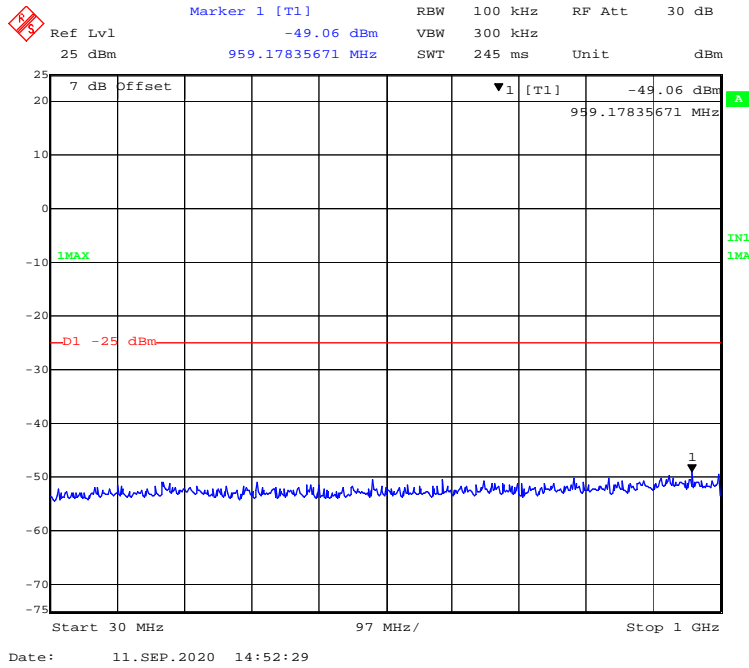
### 30 MHz - 1 GHz (10 MHz, 16-QAM, High Channel)



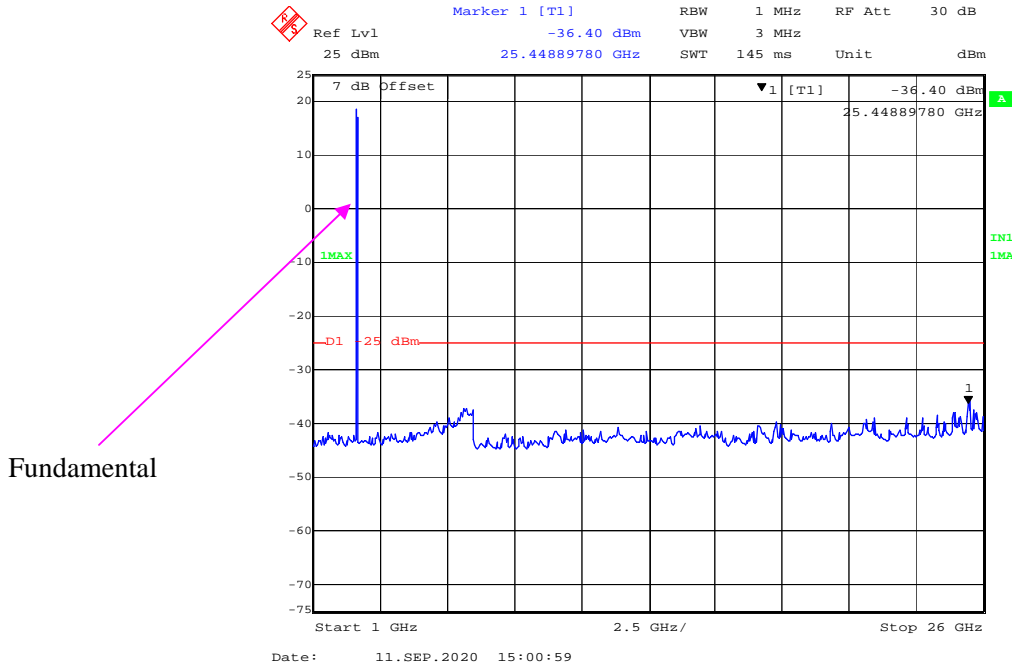
### 1 GHz - 26 GHz (10 MHz, 16-QAM, High Channel)



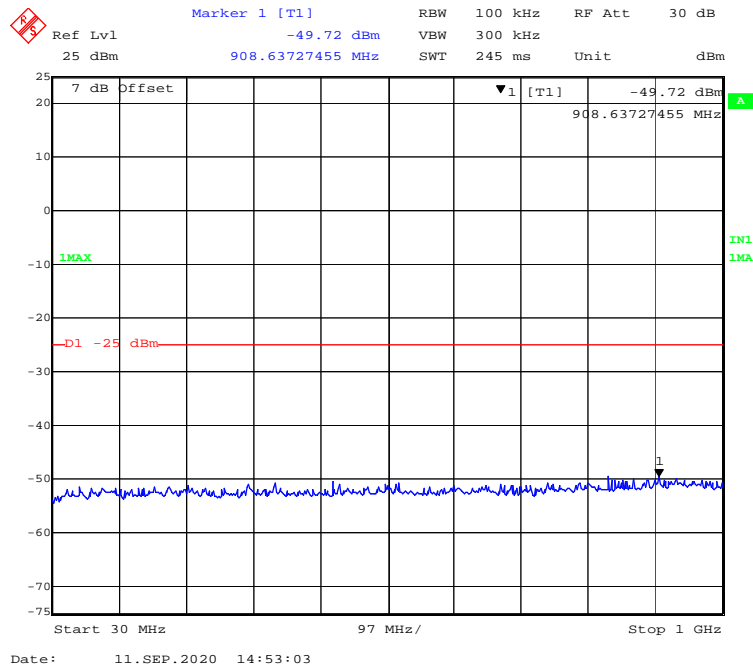
**30 MHz - 1 GHz (15 MHz, 16-QAM, High Channel)**



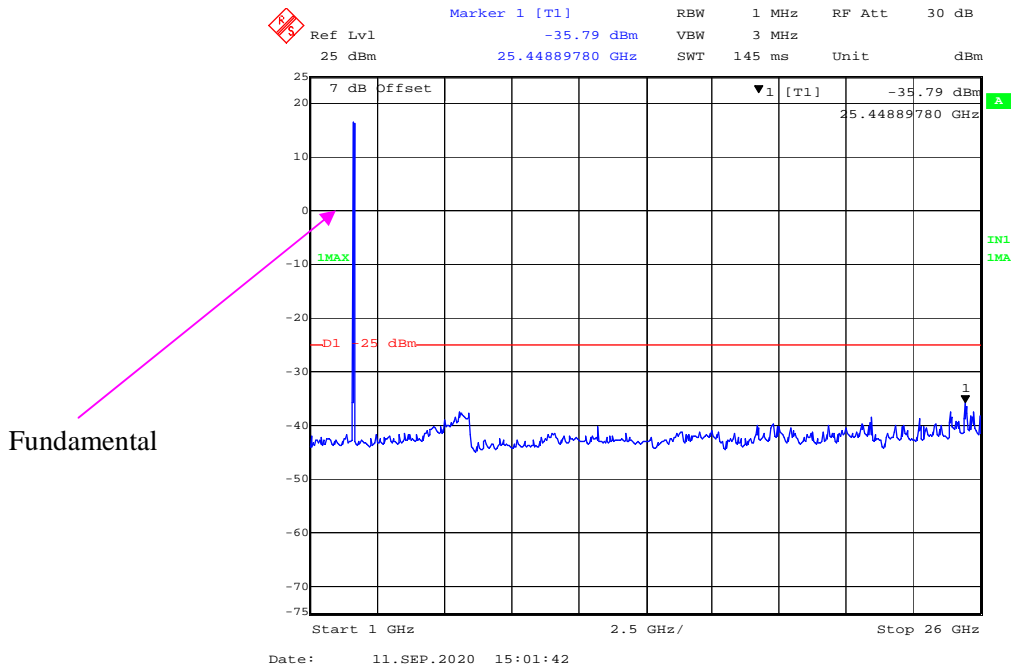
**1 GHz – 26 GHz (15MHz, 16-QAM, High Channel)**



**30 MHz - 1 GHz (20 MHz, 16-QAM, High Channel)**



**1 GHz – 26 GHz (20 MHz, 16-QAM, High Channel)**



## **FCC § 2.1053; § 22.917 (a) & §27.53 (m) - SPURIOUS RADIATED EMISSIONS**

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### **Applicable Standards**

FCC § 2.1053, §22.917(a) and § 27.53(m)

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

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

### **Test Procedure**

The 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 =  $10 \lg (\text{TX pwr in Watts}/0.001)$  – the absolute level

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



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	23.9 °C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.9 kPa

The testing was performed by Winnie Yang on 2020-09-01.

Test mode: Transmitting (Pre-scan with all the bandwidth, and worse case as below)

**LTE Band 5 (30 MHz ~ 10 GHz)**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 1.4MHz Bandwidth Low Channel										
576.64	56.19	219	150	H	-47.46	0.59	-0.95	-49.00	-13	36.00
576.64	56.03	91	150	V	-47.62	0.59	-0.95	-49.16	-13	36.16
1649.40	64.81	279	200	H	-47.99	0.84	8.44	-40.39	-13	27.39
1649.40	63.61	198	200	V	-49.19	0.84	8.44	-41.59	-13	28.59
2474.10	58.47	244	150	H	-52.44	0.89	10.04	-43.29	-13	30.29
2474.10	56.90	194	150	V	-54.01	0.89	10.04	-44.86	-13	31.86
QPSK 1.4MHz Bandwidth Middle Channel										
576.64	56.39	219	150	H	-47.26	0.59	-0.95	-48.80	-13	35.80
576.64	55.76	91	150	V	-47.89	0.59	-0.95	-49.43	-13	36.43
1727.00	64.39	191	200	H	-48.41	0.84	8.56	-40.69	-13	27.69
1727.00	62.56	300	200	V	-50.24	0.84	8.56	-42.52	-13	29.52
2590.50	57.56	129	150	H	-53.35	0.90	9.97	-44.28	-13	31.28
2590.50	56.45	254	150	V	-54.46	0.90	9.97	-45.39	-13	32.39
QPSK 1.4MHz Bandwidth High Channel										
576.64	56.19	219	150	H	-47.46	0.59	-0.95	-49.00	-13	36.00
576.64	55.76	91	150	V	-47.89	0.59	-0.95	-49.43	-13	36.43
1696.60	64.94	45	200	H	-47.86	0.84	8.51	-40.19	-13	27.19
1696.60	62.67	251	200	V	-50.13	0.84	8.51	-42.46	-13	29.46
2544.90	58.17	104	150	H	-52.74	0.89	10.04	-43.59	-13	30.59
2544.90	57.57	186	150	V	-53.34	0.89	10.04	-44.19	-13	31.19

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
16-QAM 1.4MHz Bandwidth Low Channel										
576.55	56.76	219	150	H	-46.89	0.59	-0.95	-48.43	-13	35.43
576.55	55.19	91	150	V	-48.46	0.59	-0.95	-50.00	-13	37.00
1649.40	65.01	124	200	H	-47.79	0.84	8.44	-40.19	-13	27.19
1649.40	63.91	178	200	V	-48.89	0.84	8.44	-41.29	-13	28.29
2474.10	58.47	326	150	H	-52.44	0.89	10.04	-43.29	-13	30.29
2474.10	57.57	107	150	V	-53.34	0.89	10.04	-44.19	-13	31.19
16-QAM 1.4MHz Bandwidth Middle Channel										
576.55	56.27	219	150	H	-47.38	0.59	-0.95	-48.92	-13	35.92
576.55	55.66	91	150	V	-47.99	0.59	-0.95	-49.53	-13	36.53
1727.00	63.99	306	200	H	-48.81	0.84	8.56	-41.09	-13	28.09
1727.00	63.35	305	200	V	-49.45	0.84	8.56	-41.73	-13	28.73
2590.50	57.62	34	150	H	-53.29	0.90	9.97	-44.22	-13	31.22
2590.50	56.97	309	150	V	-53.94	0.90	9.97	-44.87	-13	31.87
16-QAM 1.4MHz Bandwidth High Channel										
576.55	55.49	219	150	H	-48.16	0.59	-0.95	-49.70	-13	36.70
576.55	56.19	91	150	V	-47.46	0.59	-0.95	-49.00	-13	36.00
1696.60	63.54	14	200	H	-49.26	0.84	8.51	-41.59	-13	28.59
1696.60	63.27	351	200	V	-49.53	0.84	8.51	-41.86	-13	28.86
2544.90	58.27	292	150	H	-52.64	0.89	10.04	-43.49	-13	30.49
2544.90	56.90	300	150	V	-54.01	0.89	10.04	-44.86	-13	31.86

**LTE Band 41 (30 MHz ~ 26 GHz)**

Frequency (MHz)	Receiver Reading (dBµV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
QPSK 5MHz Bandwidth Low Channel										
576.55	56.16	219	150	H	-47.49	0.59	-0.95	-49.03	-25	24.03
576.55	55.46	91	150	V	-48.19	0.59	-0.95	-49.73	-25	24.73
5115.00	43.62	49	200	H	-61.37	1.09	10.3	-52.16	-25	27.16
5115.00	44.32	127	200	V	-60.67	1.09	10.3	-51.46	-25	26.46
7672.50	40.86	42	150	H	-58.77	1.79	10.07	-50.49	-25	25.49
7672.50	41.86	16	150	V	-57.77	1.79	10.07	-49.49	-25	24.49
QPSK 5MHz Bandwidth Middle Channel										
576.55	55.77	219	150	H	-47.88	0.59	-0.95	-49.42	-25	24.42
576.55	54.03	91	150	V	-49.62	0.59	-0.95	-51.16	-25	26.16
5186.00	42.92	213	200	H	-62.07	1.10	10.30	-52.87	-25	27.87
5186.00	44.56	326	200	V	-60.43	1.10	10.30	-51.23	-25	26.23
7779.00	40.62	317	150	H	-59.01	1.81	10.04	-50.78	-25	25.78
7779.00	42.74	127	150	V	-56.89	1.81	10.04	-48.66	-25	23.66
QPSK 5MHz Bandwidth High Channel										
576.55	56.19	219	150	H	-47.46	0.59	-0.95	-49.00	-25	24.00
576.55	55.46	91	150	V	-48.19	0.59	-0.95	-49.73	-25	24.73
5305.00	43.32	58	200	H	-61.67	1.12	10.3	-52.49	-25	27.49
5305.00	43.95	147	200	V	-61.04	1.12	10.3	-51.86	-25	26.86
7957.50	40.84	169	150	H	-58.79	1.78	10.08	-50.49	-25	25.49
7957.50	39.94	15	150	V	-59.69	1.78	10.08	-51.39	-25	26.39

Frequency (MHz)	Receiver Reading (dBμV)	Turntable Angle Degree	Rx Antenna		Substituted			Absolute Level (dBm)	Limit (dBm)	Margin (dB)
			Height (cm)	Polar (H/V)	Submitted Level (dBm)	Cable Loss (dB)	Antenna Gain (dBd/dBi)			
16-QAM 5MHz Bandwidth Low Channel										
576.55	55.49	219	150	H	-48.16	0.59	-0.95	-49.70	-25	24.7
576.55	54.19	91	150	V	-49.46	0.59	-0.95	-51.00	-25	26.00
5115.00	44.29	189	200	H	-60.70	1.09	10.3	-51.49	-25	26.49
5115.00	45.09	179	200	V	-59.90	1.09	10.3	-50.69	-25	25.69
7672.50	40.89	12	150	H	-58.74	1.79	10.07	-50.46	-25	25.46
7672.50	42.29	187	150	V	-57.34	1.79	10.07	-49.06	-25	24.06
16-QAM 5MHz Bandwidth Middle Channel										
576.55	56.02	219	150	H	-47.63	0.59	-0.95	-49.17	-25	24.17
576.55	54.41	91	150	V	-49.24	0.59	-0.95	-50.78	-25	25.78
5186.00	43.06	2	200	H	-61.93	1.10	10.30	-52.73	-25	27.73
5186.00	44.41	54	200	V	-60.58	1.10	10.30	-51.38	-25	26.38
7779.00	41.17	127	150	H	-58.46	1.81	10.04	-50.23	-25	25.23
7779.00	42.86	129	150	V	-56.77	1.81	10.04	-48.54	-25	23.54
16-QAM 5MHz Bandwidth High Channel										
576.55	56.09	219	150	H	-47.56	0.59	-0.95	-49.10	-25	24.10
576.55	55.36	91	150	V	-48.29	0.59	-0.95	-49.83	-25	24.83
5305.00	42.68	355	200	H	-62.31	1.12	10.30	-53.13	-25	28.13
5305.00	45.62	314	200	V	-59.37	1.12	10.30	-50.19	-25	25.19
7957.50	42.64	193	150	H	-56.99	1.78	10.08	-48.69	-25	23.69
7957.50	44.31	148	150	V	-55.32	1.78	10.08	-47.02	-25	22.02

**Note:**

- 1) Absolute Level (dBm) = Submitted Level (dBm) - Cable loss (dB) + Antenna Gain (dBd/dBi)
- 2) Margin (dB) = Limit (dBm) - Absolute Level (dBm)
- 3) Antenna gain is dBd for frequency below 1GHz and dBi for frequency above 1GHz

**FCC § 22.917 (a); FCC§27.53 (m)- BAND EDGES**

**Applicable Standards**

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

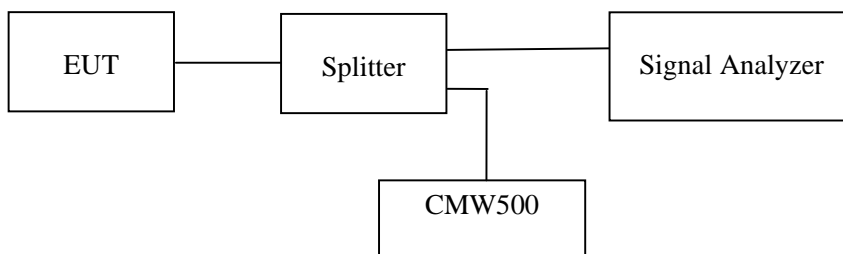
For mobile digital stations, the attenuation factor shall be not less than  $40 + 10 \log(P)$  dB on all frequencies between the channel edge and 5 megahertz from the channel edge,  $43 + 10 \log(P)$  dB on all frequencies between 5 megahertz and X megahertz from the channel edge, and  $55 + 10 \log(P)$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

FCC §2.1051. The power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least  $43 + 10 \log(P)$  dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or less, but at least one percent of the emission bandwidth of the fundamental emission of the transmitter, provided the measured energy is integrated over a 1 MHz bandwidth.

**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 Data**

**Environmental Conditions**

<b>Temperature:</b>	23.5 °C
<b>Relative Humidity:</b>	23 %
<b>ATM Pressure:</b>	103.3 kPa

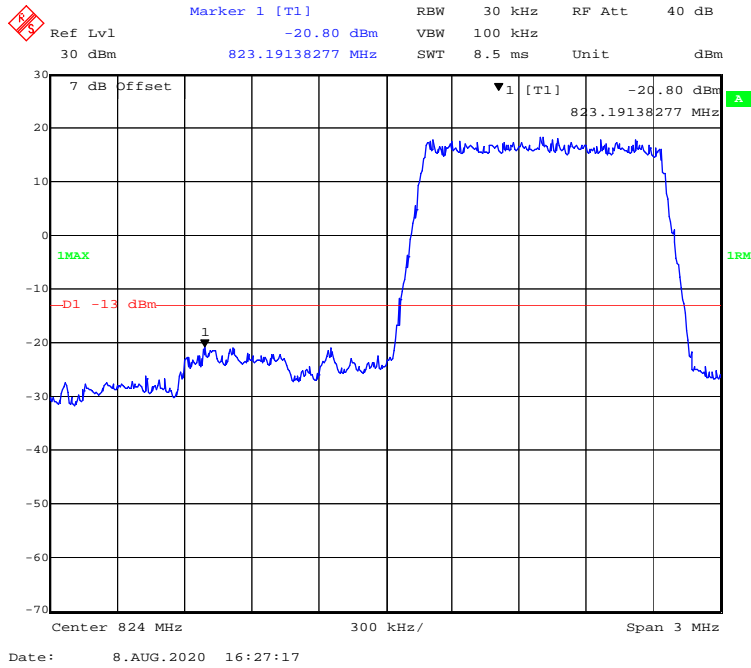
The testing was performed by Winnie Yang on 2020-08-08.

EUT operation mode: Transmitting

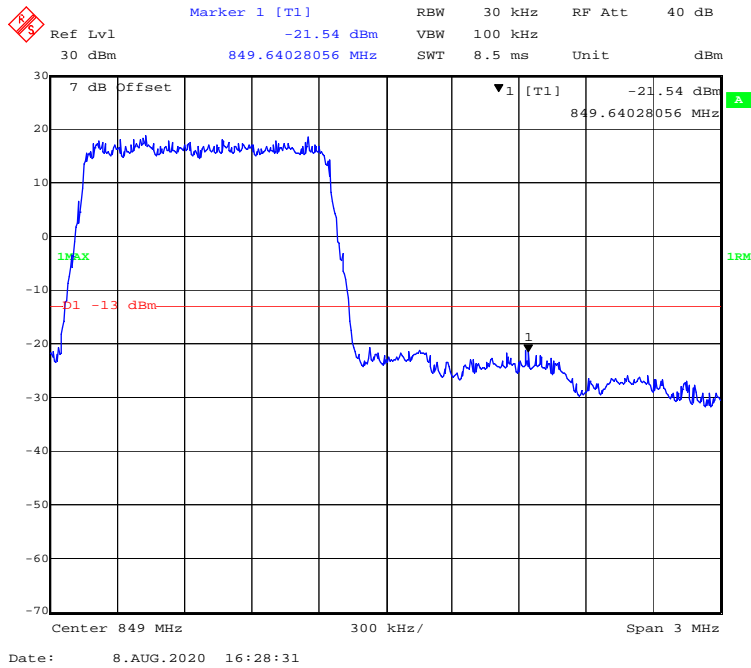
Test Result: Compliant

**LTE Band 5:**

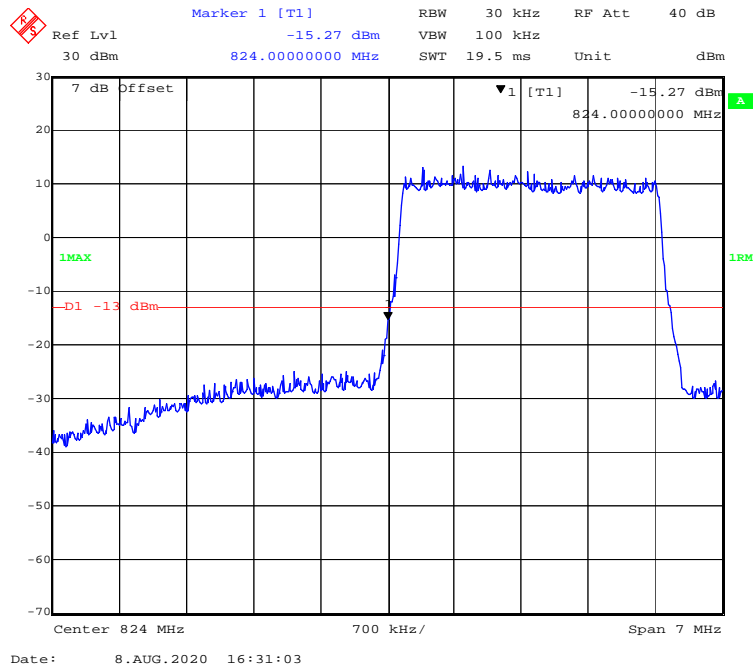
**QPSK (1.4 MHz, FULL RB) - Left Band Edge**



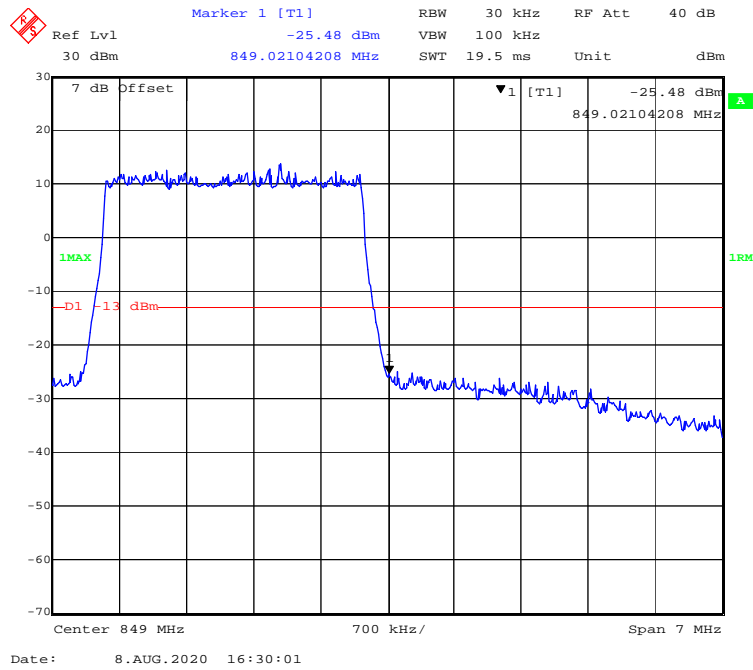
**QPSK (1.4 MHz, FULL RB) - Right Band Edge**



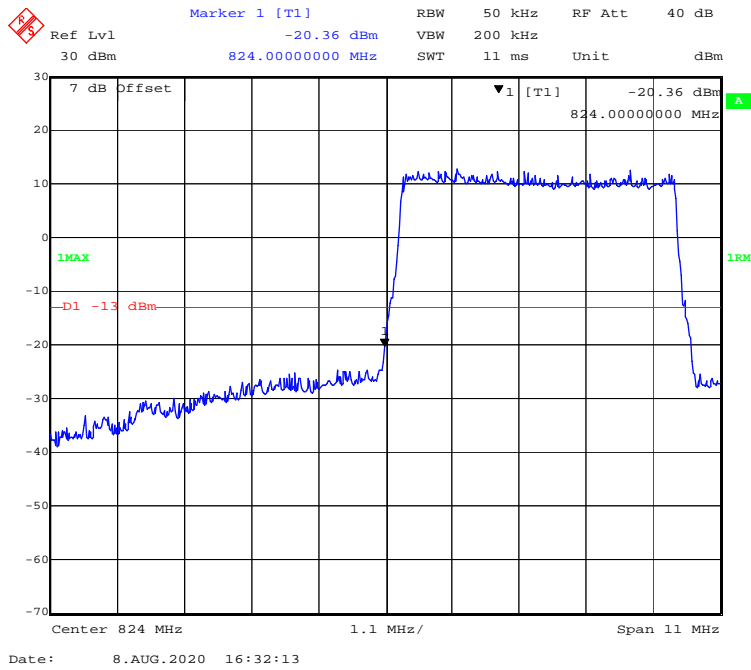
### QPSK (3.0 MHz, FULL RB) - Left Band Edge



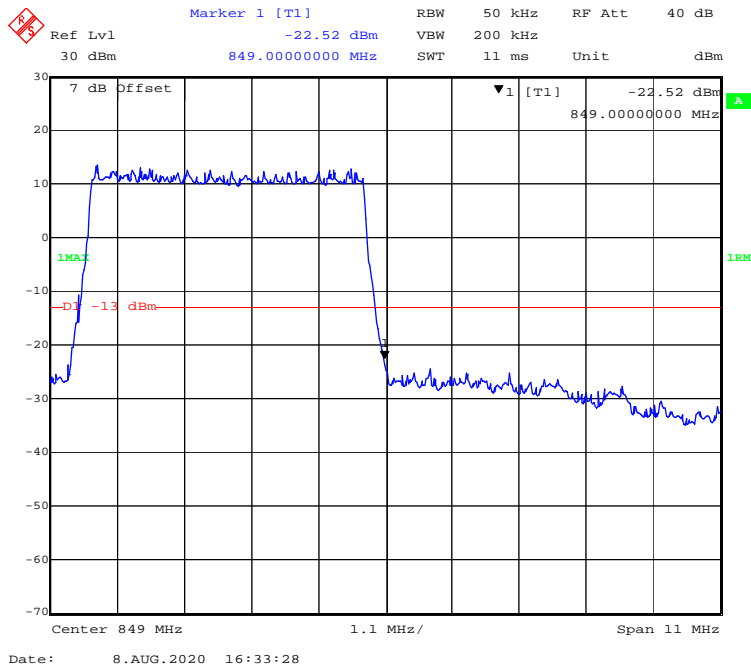
### QPSK (3.0 MHz, FULL RB) - Right Band Edge



**QPSK (5.0 MHz, FULL RB) - Left Band Edge**

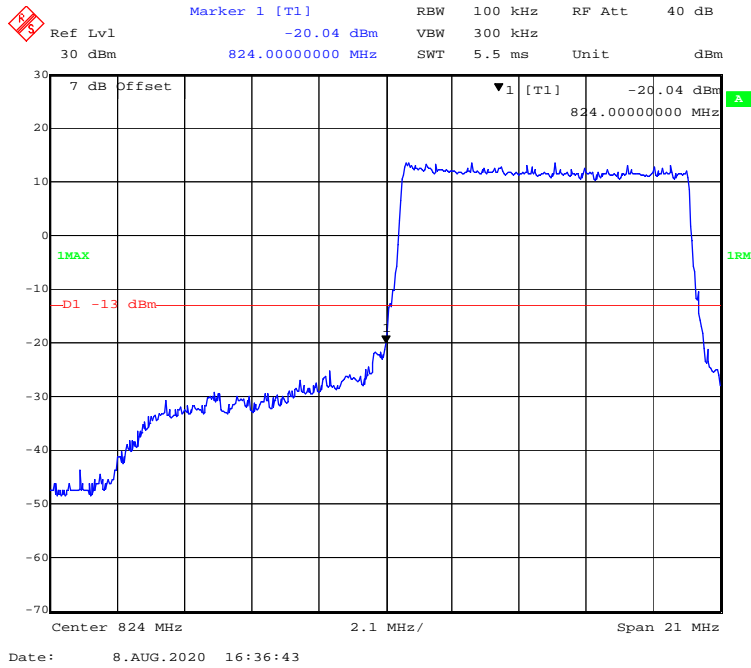


**QPSK (5.0 MHz, FULL RB) - Right Band Edge**

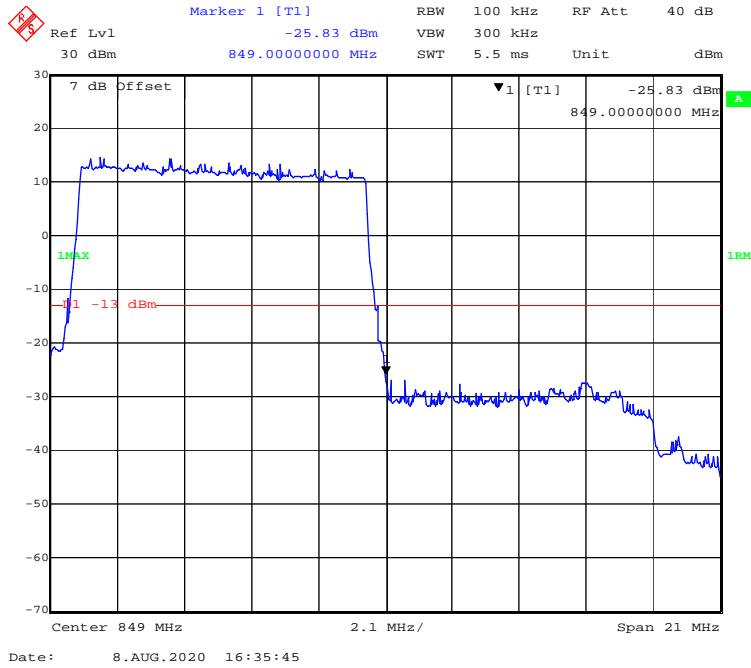




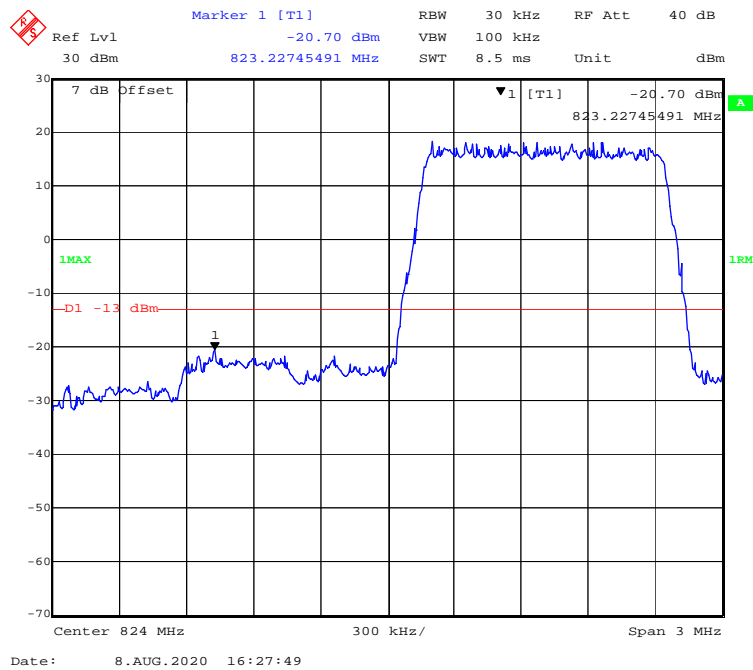
### QPSK (10.0 MHz, FULL RB) - Left Band Edge



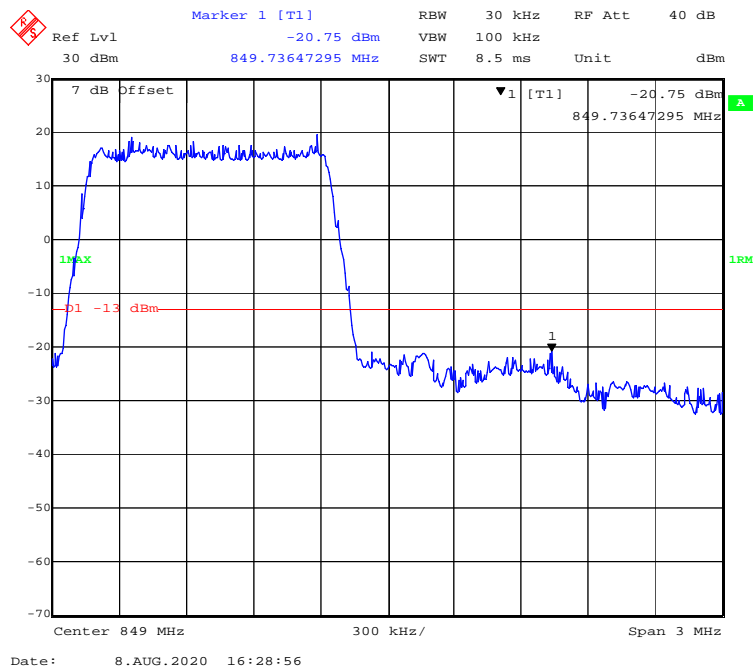
### QPSK (10.0 MHz, FULL RB) - Right Band Edge



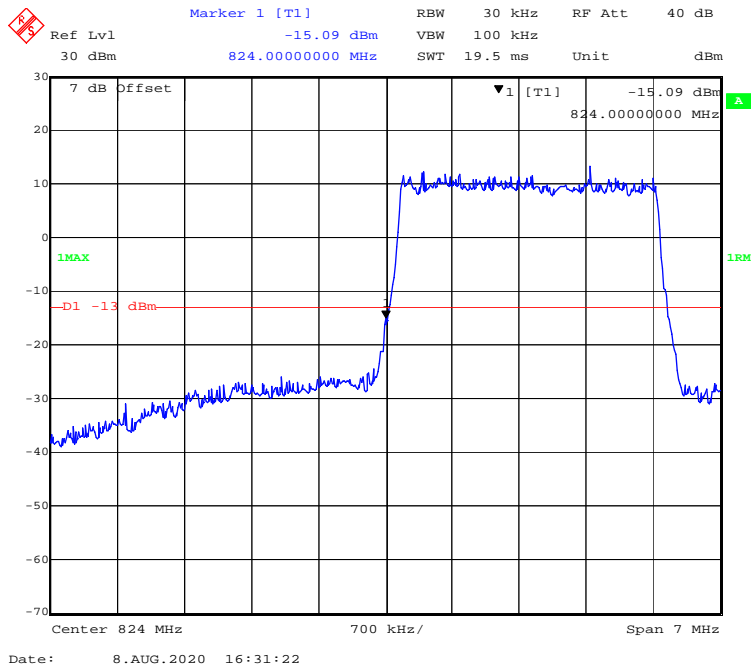
### 16-QAM (1.4 MHz, FULL RB) - Left Band Edge



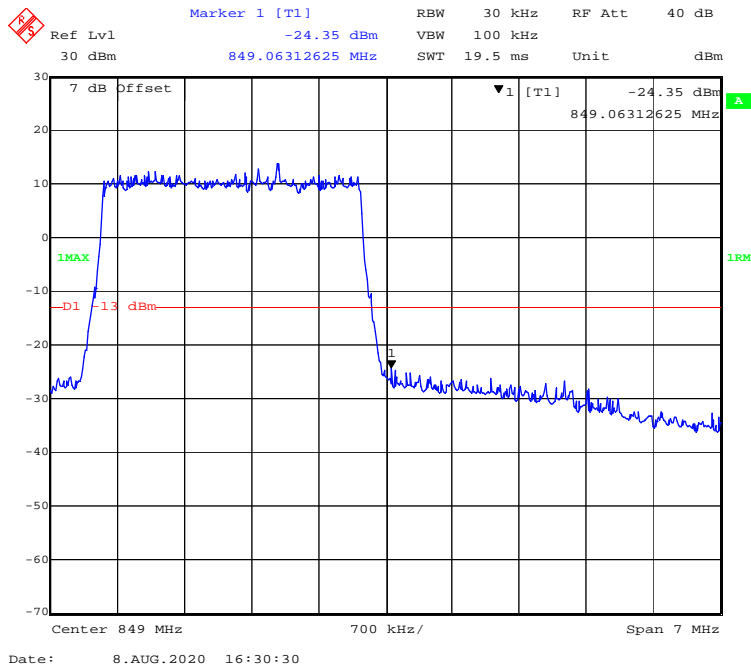
### 16-QAM (1.4 MHz, FULL RB) - Right Band Edge



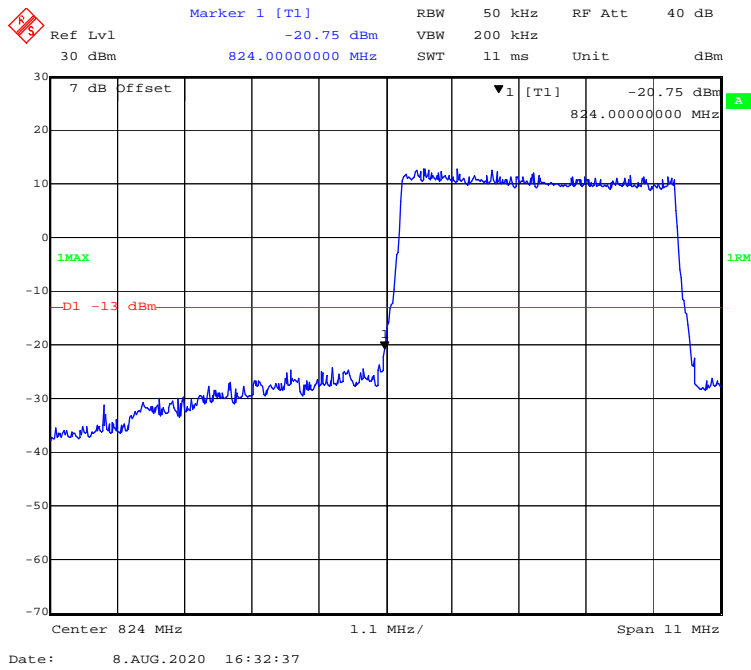
### 16-QAM (3.0 MHz, FULL RB) - Left Band Edge



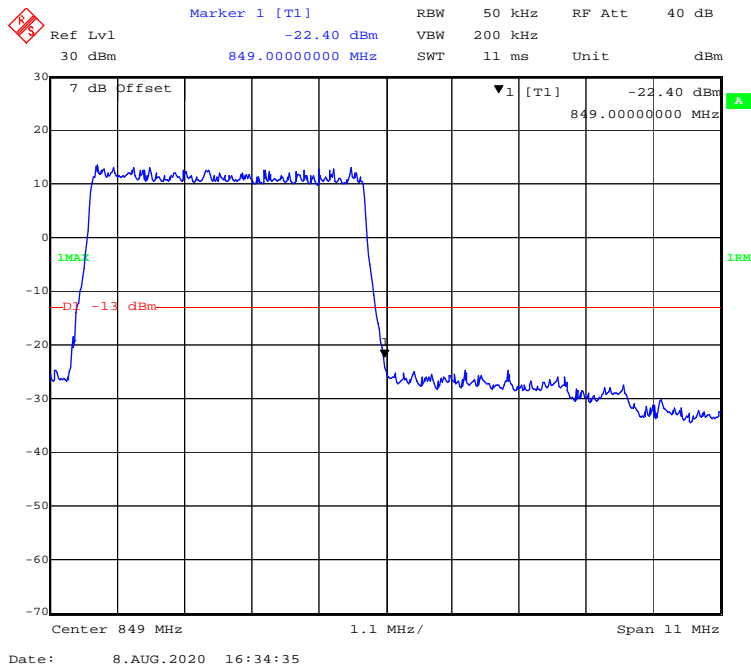
### 16-QAM (3.0 MHz, FULL RB) - Right Band Edge



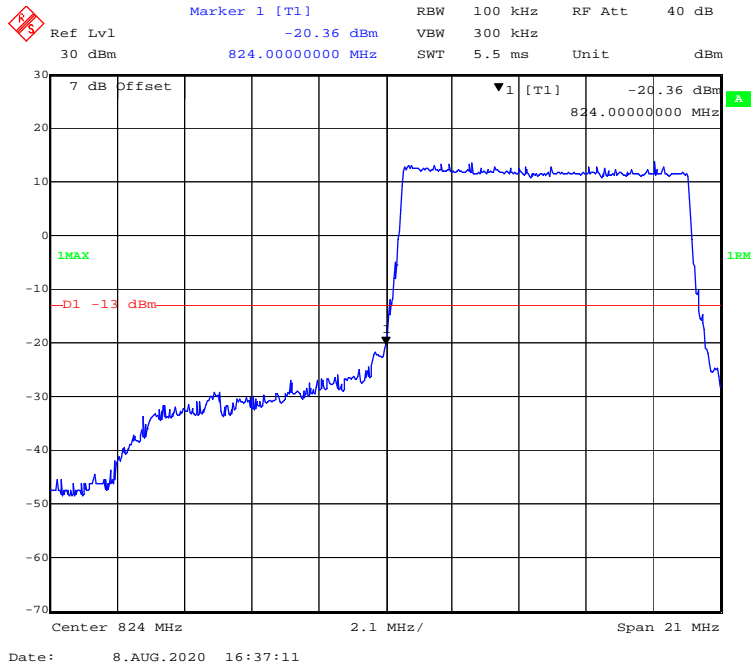
**16-QAM (5.0 MHz, FULL RB) - Left Band Edge**



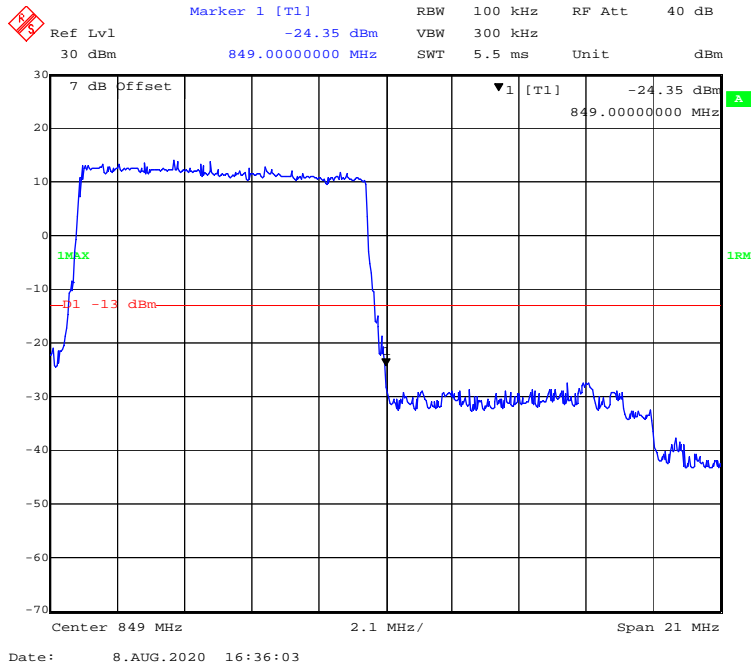
**16-QAM (5.0 MHz, FULL RB) - Right Band Edge**



### 16-QAM (10.0 MHz, FULL RB) - Left Band Edge

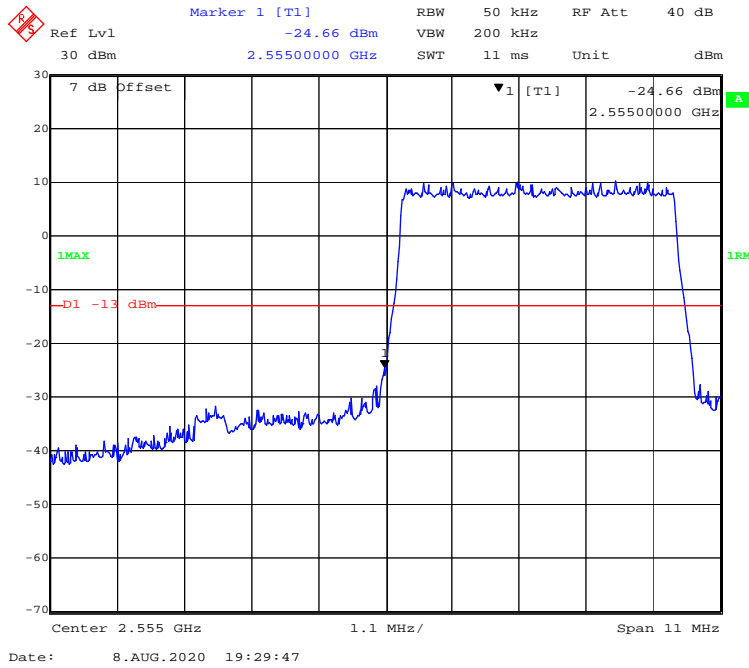


### 16-QAM (10.0 MHz, FULL RB) - Right Band Edge

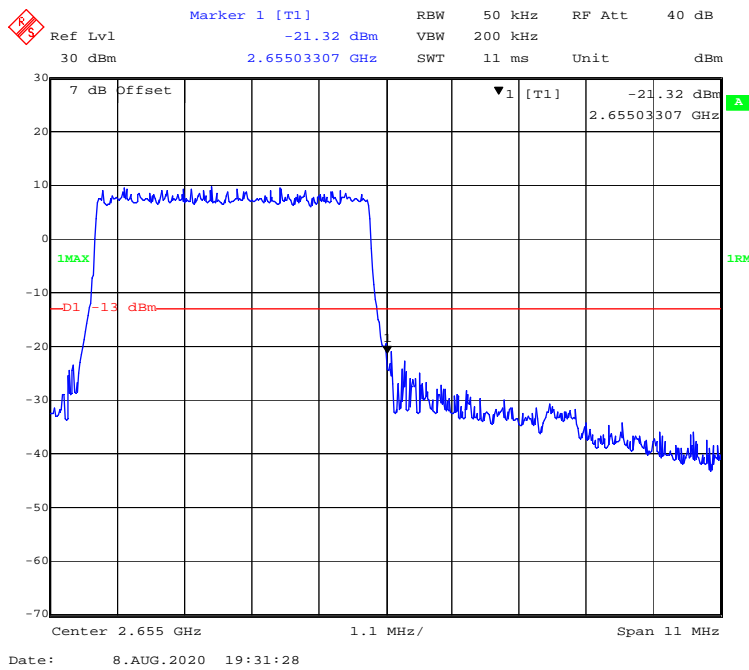


LTE Band 41:

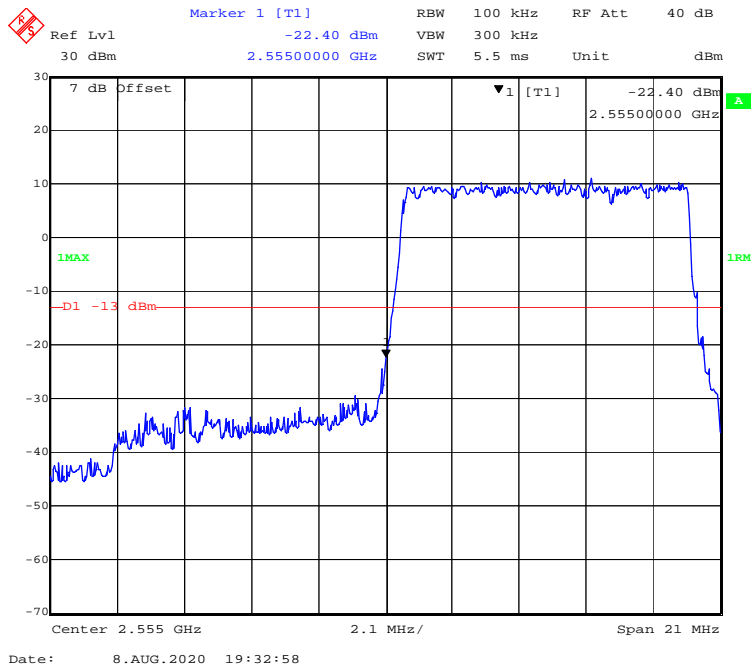
QPSK (5 MHz, FULL RB) - Left Band Edge



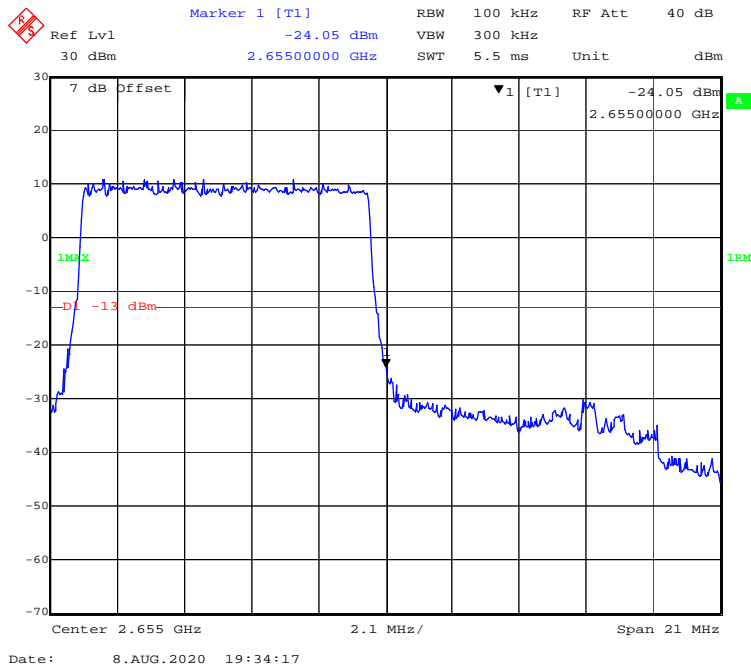
QPSK (5 MHz, FULL RB) - Right Band Edge



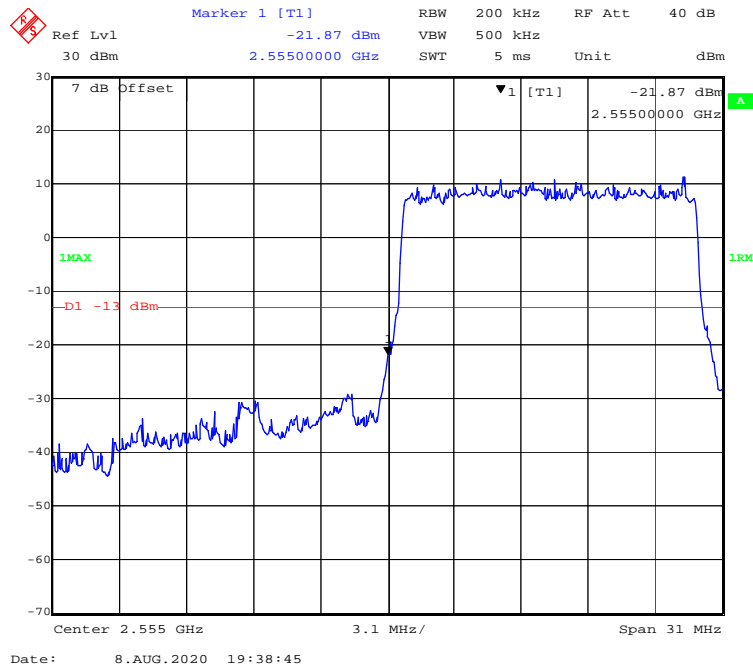
### QPSK (10 MHz, FULL RB) - Left Band Edge



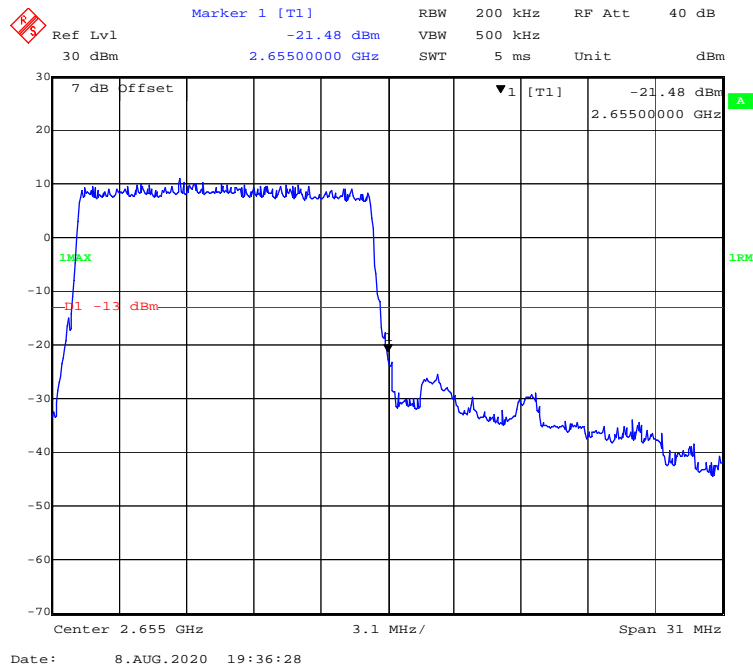
### QPSK (10 MHz, FULL RB) - Right Band Edge



**QPSK (15MHz, FULL RB) - Left Band Edge**

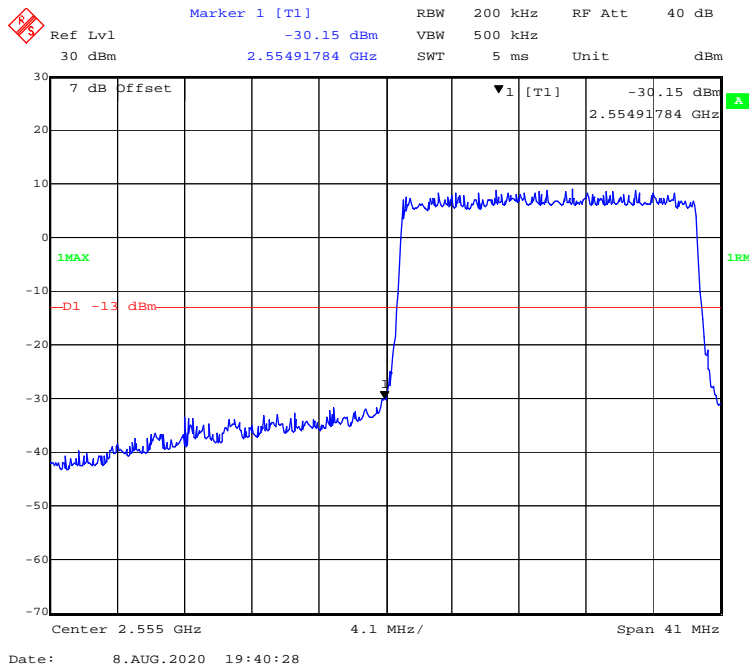


**QPSK (15 MHz, FULL RB) - Right Band Edge**

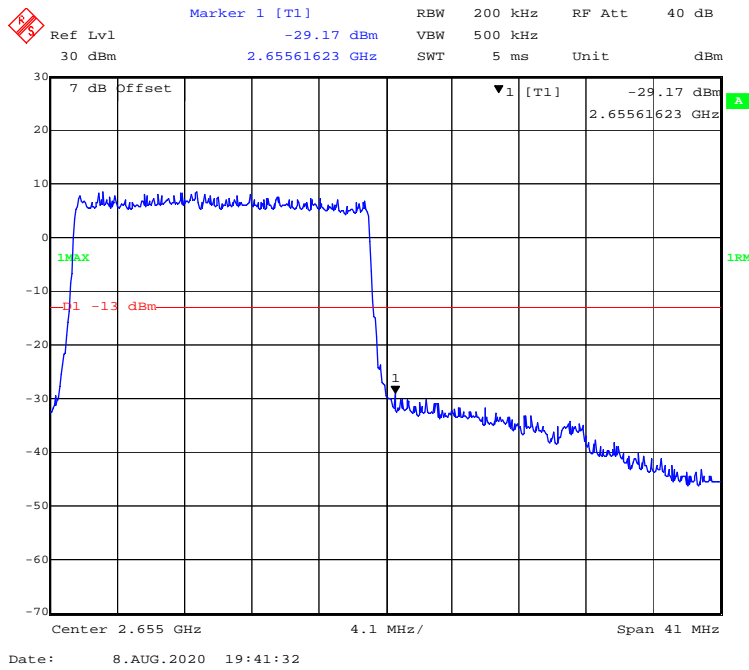




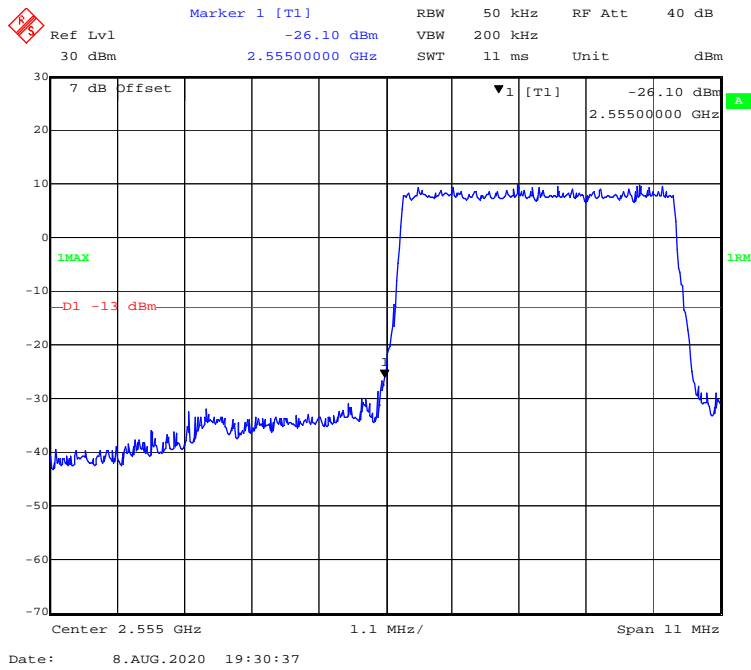
### QPSK (20MHz, FULL RB) - Left Band Edge



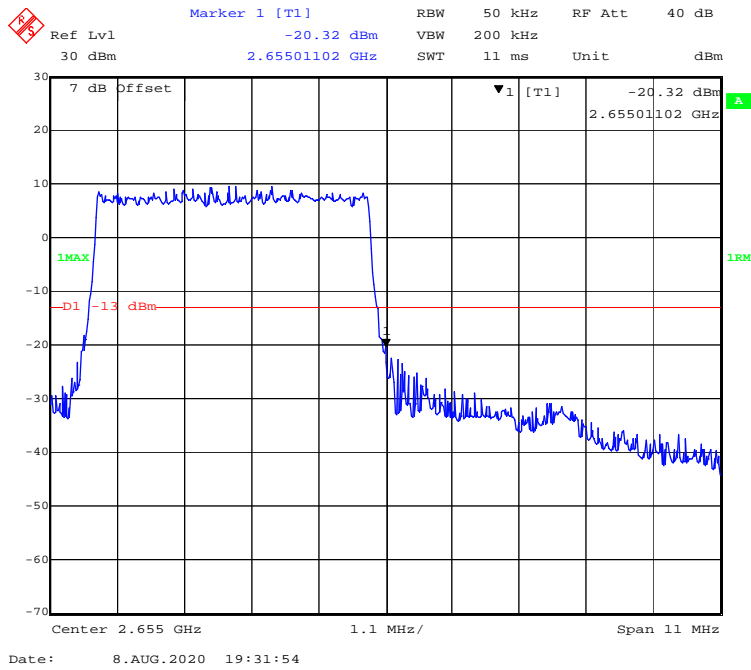
### QPSK (20 MHz, FULL RB) - Right Band Edge



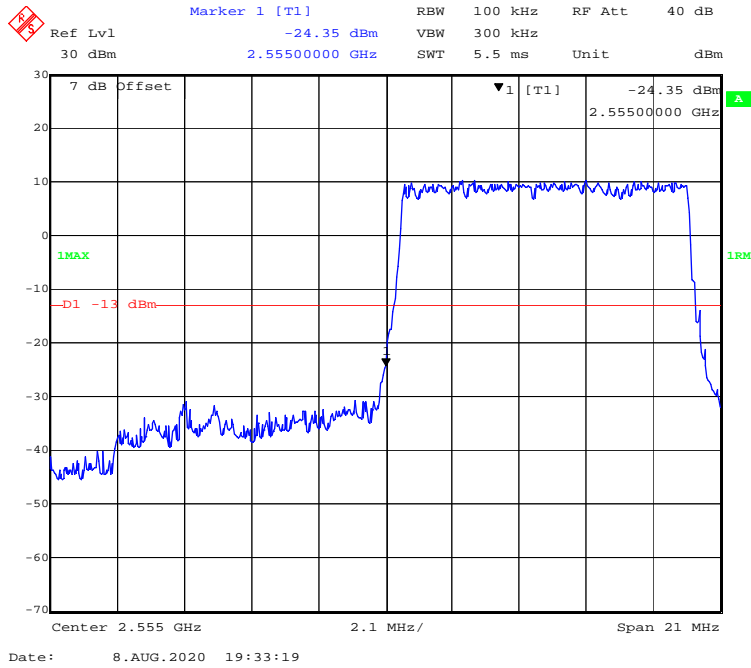
**16-QAM (5MHz, FULL RB) - Left Band Edge**



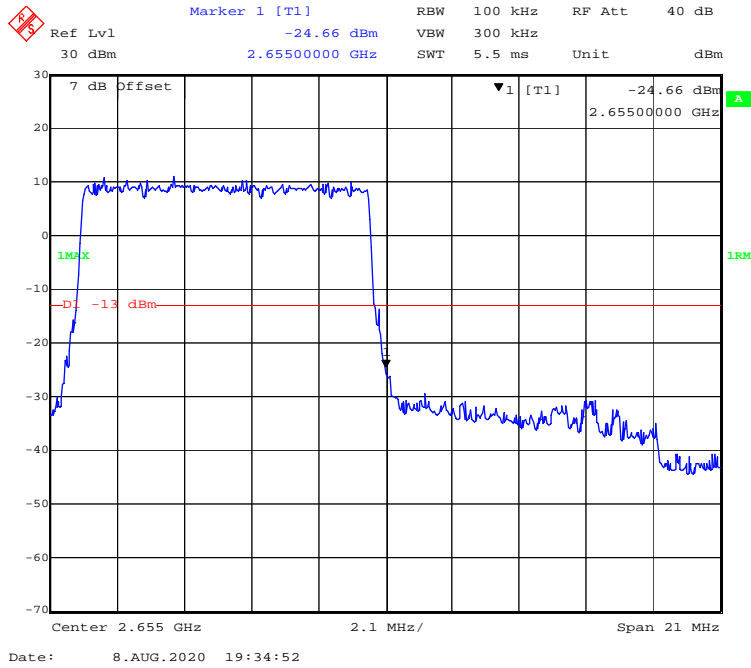
**16-QAM (5MHz, FULL RB) - Right Band Edge**



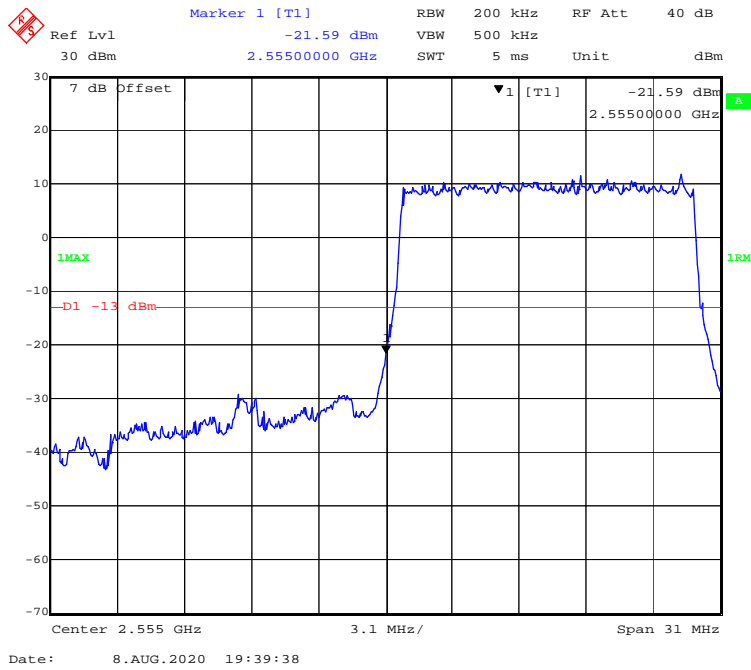
### 16-QAM (10 MHz, FULL RB) - Left Band Edge



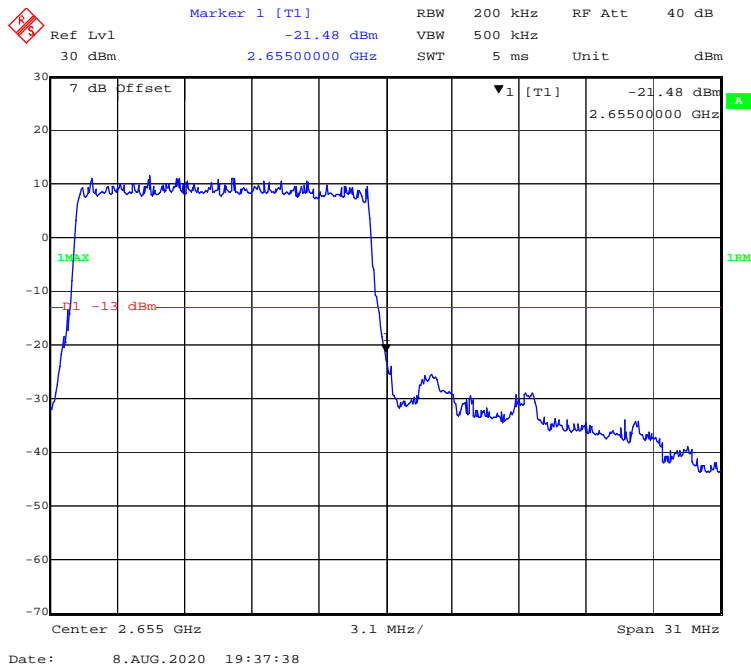
### 16-QAM (10 MHz, FULL RB) - Right Band Edge



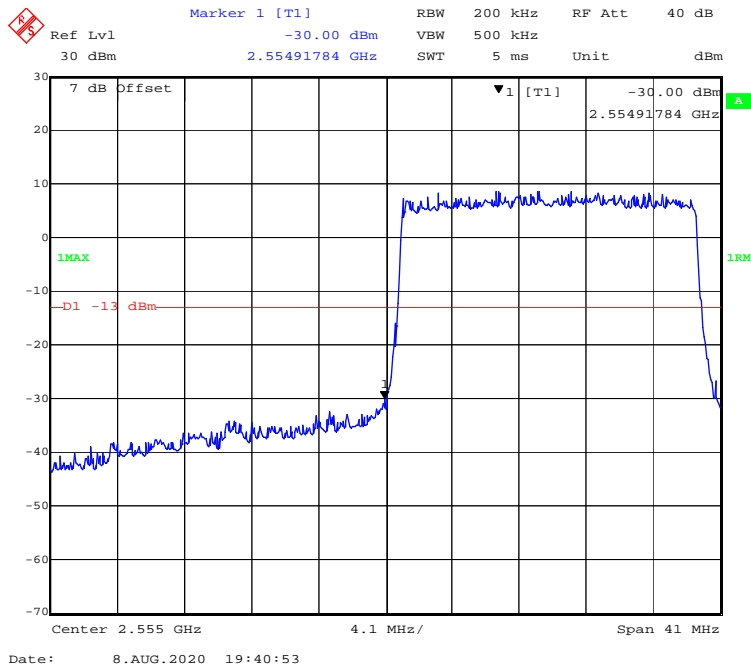
**16-QAM (15 MHz, FULL RB) - Left Band Edge**



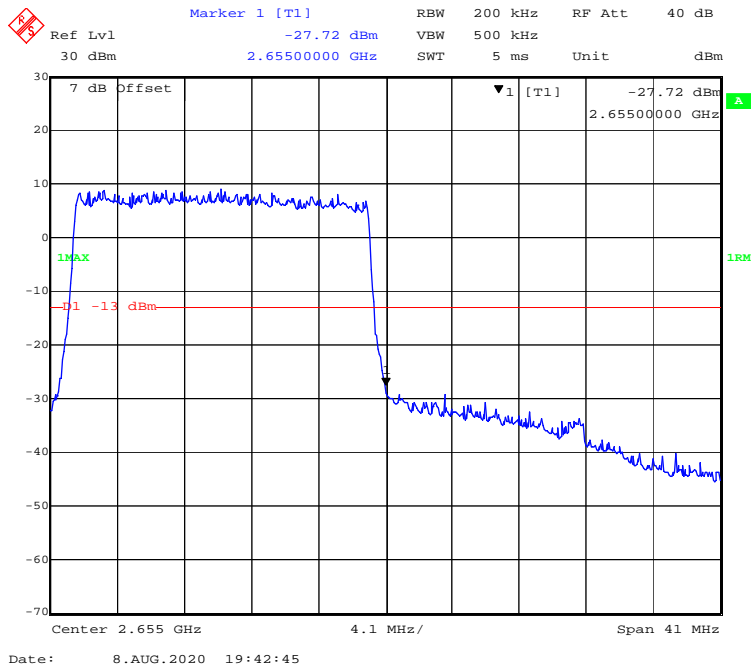
**16-QAM (15 MHz, FULL RB) - Right Band Edge**



### 16-QAM (20 MHz, FULL RB) - Left Band Edge



### 16-QAM (20 MHz, FULL RB) - Right Band Edge



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**FCC § 2.1055; § 22.355; FCC §27.54- FREQUENCY STABILITY**

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**Applicable Standards**

FCC § 2.1055, §22.355 and §27.54.

According to FCC §2.1055, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

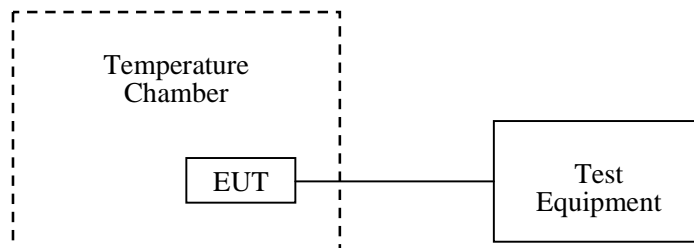
According to §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table below:

**Test Procedure**

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

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

Frequency Stability vs. Voltage: For hand carried, battery powered equipment; reduce primary supply voltage to the battery operating end point which shall be specified by the manufacturer.



**Test Data**

**Environmental Conditions**

<b>Temperature:</b>	23.9 °C
<b>Relative Humidity:</b>	51 %
<b>ATM Pressure:</b>	101.9 kPa

The testing was performed by Winnie Yang on 2020-09-01.

EUT operation mode: Transmitting

Test Result: Compliant.

**LTE Band 5**

Middle Channel, f <sub>0</sub> =836.5 MHz (QPSK), Bandwidth=10 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	12	22	0.0263	2.5
-20		20	0.0239	2.5
-10		12	0.0143	2.5
0		12	0.0143	2.5
10		10	0.0120	2.5
20		10	0.0120	2.5
30		10	0.0120	2.5
40		8	0.0096	2.5
50		10	0.0120	2.5
20		V min.= 10.8	12	0.0143
20	V max.=13.2	11	0.0132	2.5

Middle Channel, $f_0 = 836.5$ MHz (QPSK) , Bandwidth=10 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	24	23	0.0275	2.5
-20		21	0.0251	2.5
-10		13	0.0155	2.5
0		12	0.0143	2.5
10		11	0.0132	2.5
20		9	0.0108	2.5
30		8	0.0096	2.5
40		7	0.0084	2.5
50		11	0.0132	2.5
20		V min.= 21.6	13	0.0155
20	V max.=26.4	12	0.0143	2.5



Middle Channel, $f_0 = 836.5$ MHz(16-QAM) , Bandwidth=10 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	12	21	0.0251	2.5
-20		17	0.0203	2.5
-10		13	0.0155	2.5
0		12	0.0143	2.5
10		11	0.0132	2.5
20		8	0.0096	2.5
30		8	0.0096	2.5
40		11	0.0132	2.5
50		9	0.0108	2.5
20		V min.= 10.8	10	0.0120
20	V max.=13.2	11	0.0132	2.5

Middle Channel, $f_0 = 836.5$ MHz(16-QAM) , Bandwidth=10 MHz				
Temperature (°C)	Power Supplied (V <sub>DC</sub> )	Frequency Error (Hz)	Frequency Error (ppm)	Limit (ppm)
-30	24	21	0.0251	2.5
-20		18	0.0215	2.5
-10		14	0.0167	2.5
0		13	0.0155	2.5
10		12	0.0143	2.5
20		9	0.0108	2.5
30		7	0.0084	2.5
40		12	0.0143	2.5
50		10	0.0120	2.5
20		V min.= 21.6	13	0.0155
20	V max.=26.4	12	0.0143	2.5

**LTE Band 41**

<b>Low Channel &amp; High Channel (QPSK) , Bandwidth=20 MHz</b>					
<b>Temperature</b>	<b>Power Supplied</b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>	<b>F<sub>L</sub> Limit</b>	<b>F<sub>H</sub> Limit</b>
<b>(°C)</b>	<b>(V<sub>DC</sub>)</b>	<b>(MHz)</b>	<b>(MHz)</b>	<b>(MHz)</b>	<b>(MHz)</b>
-30	12	2555.0166	2654.9700	2555	2655
-20		2555.0118	2654.9745	2555	2655
-10		2555.0112	2654.9707	2555	2655
0		2555.0158	2654.9726	2555	2655
10		2555.0106	2654.9779	2555	2655
20		2555.0178	2654.9762	2555	2655
30		2555.0178	2654.9706	2555	2655
40		2555.0124	2654.9725	2555	2655
50		2555.0167	2654.9776	2555	2655
20		V min.= 10.8	2555.0116	2654.9792	2555
20	V max.= 13.2	2555.0162	2654.9716	2555	2655

<b>Low Channel &amp; High Channel (QPSK) , Bandwidth=20 MHz</b>					
<b>Temperature</b>	<b>Power Supplied</b>	<b>F<sub>L</sub></b>	<b>F<sub>H</sub></b>	<b>F<sub>L</sub> Limit</b>	<b>F<sub>H</sub> Limit</b>
<b>(°C)</b>	<b>(V<sub>DC</sub>)</b>	<b>(MHz)</b>	<b>(MHz)</b>	<b>(MHz)</b>	<b>(MHz)</b>
-30	24	2555.0158	2654.9749	2555	2655
-20		2555.0125	2654.9754	2555	2655
-10		2555.0102	2654.9726	2555	2655
0		2555.0172	2654.9767	2555	2655
10		2555.0117	2654.9706	2555	2655
20		2555.0144	2654.9733	2555	2655
30		2555.0174	2654.9700	2555	2655
40		2555.0118	2654.9760	2555	2655
50		2555.0141	2654.9773	2555	2655
20		V min.= 21.6	2555.0107	2654.9773	2555
20	V max.= 26.4	2555.0151	2654.9789	2555	2655

Low Channel & High Channel (16-QAM) , Bandwidth=20 MHz					
Temperature	Power Supplied	F <sub>L</sub>	F <sub>H</sub>	F <sub>L</sub> Limit	F <sub>H</sub> Limit
(°C)	(V <sub>DC</sub> )	(MHz)	(MHz)	(MHz)	(MHz)
-30	12	2555.0111	2654.9729	2555	2655
-20		2555.0190	2654.9716	2555	2655
-10		2555.0135	2654.9778	2555	2655
0		2555.0170	2654.9735	2555	2655
10		2555.0116	2654.9787	2555	2655
20		2555.0168	2654.9707	2555	2655
30		2555.0149	2654.9715	2555	2655
40		2555.0174	2654.9728	2555	2655
50		2555.0162	2654.9762	2555	2655
20		V min.= 10.8	2555.0200	2654.9774	2555
20	V max.= 13.2	2555.0144	2654.9782	2555	2655

Low Channel & High Channel (16-QAM) , Bandwidth=20 MHz					
Temperature	Power Supplied	F <sub>L</sub>	F <sub>H</sub>	F <sub>L</sub> Limit	F <sub>H</sub> Limit
(°C)	(V <sub>DC</sub> )	(MHz)	(MHz)	(MHz)	(MHz)
-30	24	2555.0102	2654.9743	2555	2655
-20		2555.0182	2654.9761	2555	2655
-10		2555.0109	2654.9765	2555	2655
0		2555.0101	2654.9716	2555	2655
10		2555.0145	2654.9780	2555	2655
20		2555.0118	2654.9793	2555	2655
30		2555.0167	2654.9702	2555	2655
40		2555.0158	2654.9785	2555	2655
50		2555.0147	2654.9749	2555	2655
20		V min.= 21.6	2555.0168	2654.9777	2555
20	V max.= 26.4	2555.0166	2654.9771	2555	2655

### **Declarations**

1: 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 an asterisk '\*'. Customer model name, addresses, names, trademarks etc. are not considered data.

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

3: Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

4: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval.

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