

Ericsson AB

RF TEST REPORT

Report Type:

FCC Part 27 RF report

PRODUCT NAME:

Radio 4418 B41

REPORT NUMBER:

201101130SHA-001

ISSUE DATE:

November 11, 2020

DOCUMENT CONTROL NUMBER:

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TEST REPORT

Applicant: Ericsson AB
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Manufacturer: Ericsson AB
Isafjordsgatan 10 SE-164 80 Stockholm 16480 Sweden

FCC ID: TA8AKRC161789-5

SUMMARY:

The equipment complies with the requirements according to the following standard(s) or Specification:

FCC CFR 47 Part 27: MISCELLANEOUS WIRELESS COMMUNICATIONS SERVICES

PREPARED BY:



Project Engineer
Nemo Li

REVIEWED BY:



Reviewer
Daniel Zhao

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TEST REPORT

Content

REVISION HISTORY.....	4
MEASUREMENT RESULT SUMMARY	5
1 GENERAL INFORMATION	6
1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT)	6
1.2 TECHNICAL SPECIFICATION	7
1.3 DESCRIPTION OF TEST FACILITY	8
2 TEST SPECIFICATIONS.....	9
2.1 RELATED DOCUMENTS	9
2.2 PRODUCT INFORMATION.....	9
2.3 CONFIGURATION DESCRIPTION.....	10
2.4 TEST SETUP.....	13
2.5 TEST ENVIRONMENT CONDITION:.....	15
2.6 INSTRUMENT LIST	16
2.7 MEASUREMENT UNCERTAINTY	17
3 MAXIMUM OUTPUT POWER AND PEAK TO AVERAGE POWER RATIO AND EIRP	18
3.1 LIMIT	18
3.2 MEASUREMENT PROCEDURE	18
3.3 MEASUREMENT RESULT	19
4 OCCUPIED BANDWIDTH	26
4.1 MEASUREMENT PROCEDURE	26
4.2 MEASUREMENT RESULT	27
5 UNWANTED EMISSIONS AT BAND EDGE	44
5.1 LIMIT	44
5.2 MEASUREMENT PROCEDURE	44
5.3 MEASUREMENT RESULT	45
6 CONDUCTED UNWANTED EMISSION	118
6.1 LIMIT	118
6.2 MEASUREMENT PROCEDURE	118
6.3 MEASUREMENT RESULT	119
7 RADIATED UNWANTED EMISSION	170
7.1 LIMIT	170
7.2 MEASUREMENT PROCEDURE	170
7.3 MEASUREMENT RESULT	171
8 FREQUENCY STABILITY	198
8.1 LIMIT	198
8.2 MEASUREMENT PROCEDURE	198
8.3 MEASUREMENT RESULT	199

Revision History

Report No.	Version	Description	Issued Date
201101130SHA-001	Rev. 01	Initial issue of report	November 11, 2020

Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT
Max Output Power and Peak to Average Power Ratio and EIRP	27.50(h) 2.1046	Pass
Occupied Bandwidth	27.53(m) 2.1049	Pass
Unwanted Emissions at Band Edge	27.53(m) 2.1051	Pass
Conducted Unwanted Emission	27.53(m) 2.1051	Pass
Radiated Unwanted Emissions	27.53(m) 2.1053	Pass
Frequency Stability	27.54 2.1055	Pass

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Description:	Remote Radio Unit
Product name:	Radio 4418 B41
Product number:	KRC 161 789/5
Serial Number(s)	E558838685
Rating:	-48V DC
Software Version:	UP: CXP9024418_15-R13B26 PIS: CXP9017316_7-R83MC
Hardware Version:	KRC 161 789/5 R1A
Sample received date:	October 21, 2020
Date of test:	October 21, 2020 ~ November 3, 2020

1.2 Technical Specification

Frequency Range:	24960MHz - 2690MHz
Number of Antenna ports:	4 TX/RX
Supported RAT:	LTE, NR
Supported other mode:	/
Max RF bandwidth (IBW):	100MHz
Supported Number of Carriers:	SR LTE: Maximum 6 carriers SR NR: Maximum 3 carriers LTE+NR mix: Maximum 6 carriers
Supported modulation:	QPSK, 16QAM, 64QAM, 256QAM
Supported Channel Bandwidth:	LTE: 10MHz, 15MHz, 20MHz NR: 20 MHz, 30 MHz, 40 MHz, 50 MHz, 60 MHz, 80 MHz, 100MHz
Declaration output power:	Maximum 43.01dBm (20W) per port for all modes. Maximum 26.99dBm (0.5W/MHz) per port for all modes.

1.3 Description of Test Facility

Conducted testing:

Name:	Intertek Testing Services Shanghai
Address 1:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Address 2:	No. 5 Lize East Street, Ericsson Tower, Chaoyang District, Beijing 100102 P.R.C.
Telephone:	+86 21 61278200
Telefax:	+86 21 54262353
The test facility is recognized, certified, or accredited by these organizations:	FCC Accredited Lab Designation Number: CN1175, CN1258
	IC Registration Lab CAB identifier.: CN0051
	A2LA Accreditation Lab Certificate Number: 3309.02, 3309.04

Radiated testing:

Name:	BEIJING BOOMWAVE TEST SERVICE CO. LTD.
Address:	EMC Building, No. 1 Wang Jing East Road Chao Yang District, Beijing, 100102 P.R.C.
Telephone:	+86 10 64711866 806
The test facility is recognized, certified, or accredited by these organizations:	FCC Accredited Lab Designation Number: CN1242
	IC Registration Lab CAB identifier.: CN0010
	A2LA Accreditation Lab Certificate Number: 4992.01

2 TEST SPECIFICATIONS

2.1 Related documents

FCC Part 27 (2019)

FCC Part 2 (2019)

ANSI C63.26:2015

KDB 971168 D01 v03r01

KDB 662911 D01 v02r01

2.2 Product Information

The Equipment Under Test (EUT) Radio 4418 B41 is an Ericsson Radio Unit working in the wireless communication services 2496-2690 MHz band which provides communication connections to 2496-2690 MHz network. The Radio 4418 B41 operates from a -48V DC supply.

The EUT includes 4 TX/RX ports. It can be configured to transmit in MIMO mode, and MIMO mode was used for measurements as the worst configuration. The complete testing was performed with the EUT transmitting at maximum RF power unless otherwise stated.

A full technical description can be found in the Manufacturer's documentation.

2.3 Configuration Description

The following settings were used to represent all traffic scenarios. The output power was measured on the bottom, middle and top channel of all applicable antenna ports. By measuring the output power of QPSK, 16QAM, 64QAM and 256QAM on one of the antenna ports, it was determined that 256QAM for NR and 64QAM for LTE were the worst case modulation schemes and were used for all testing.

Complete testing was carried out on the worst case antenna port which was established as being the highest output power from the 4 measured ports on worst case modulation scheme. This antenna port was Port B for all modes.

The settings below were used for all measurements unless otherwise noted:

Configuration	Carrier	LTE Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE-MIMO-1C	1	10	2501	2593	2685
		15	2503.5	2593	2682.5
		20	2506	2593	2680
LTE-MIMO-2C	2	10	-	2548+2638	-
		15	-	2550.5+2635.5	-
		20	-	2553+2633	-
LTE-MIMO-6C	6	10	-	2548+2558+2568+2618+2628+2638	-
		15	-	2550.5+2565.5+2680.5+2605.5+2620.5+2635.5	-

Configuration	Carrier	NR Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NR-MIMO-1C	1	20	2506.02	2593.02	2680.02
		30	2511.00	2593.02	2675.01
		40	2516.01	2593.02	2670.00
		50	2521.02	2593.02	2665.02
		60	2526.00	2593.02	2660.01
		80	2536.02	2593.02	2650.02
		100	2546.01	2593.02	2640.00
NR-MIMO-2C	2	20	-	2553+2632.98	-
		30	-	2558.01+2628	-
		40	-	2563.02+2623.02	-
		50	-	2568+2617.98	-
NR-MIMO-3C	3	20	-	2553+2593.02+2632.98	-
		30	-	2558.01+2593.02+2628	-

TEST REPORT

Configuration	Carrier	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
NR+LTE-MIMO-MC-1	1NR+1L TE	30	10	-	(NR)2558.01+(L)2638	-
		80	20	-	(NR)2583+(L)2633	-
NR+LTE-MIMO-MC-2	1NR+2L TE	20	10	-	(NR)2553+(L)2628+2638	-
		80	10	-	(NR)2583+(L)2628+2638	-
NR+LTE-MIMO-MC-3	3NR+3L TE	20	10	-	(NR)2553+2573.01+2593.02+(L)2618+2628+2638	-

Configuration	Carrier	LTE Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
LTE-MIMO-1C-BE	1	10	2501	-	2685
		15	2503.5	-	2682.5
		20	2506	-	2680
LTE-MIMO-2C-BE	2	10	2501+2511	-	2675+2685
		15	2506+2526	-	2660+2680
		20	2501+2511+2521+2531+2541+2551	-	2635+2645+2655+2665+2675+2685
LTE-MIMO-6C-BE	6	10	2503.5+2518.5+2533.5+2548.5+2563.5+2578.5	-	2607.5+2622.5+2637.5+2652.5+2667.5+2682.5
		15	2501	-	2685

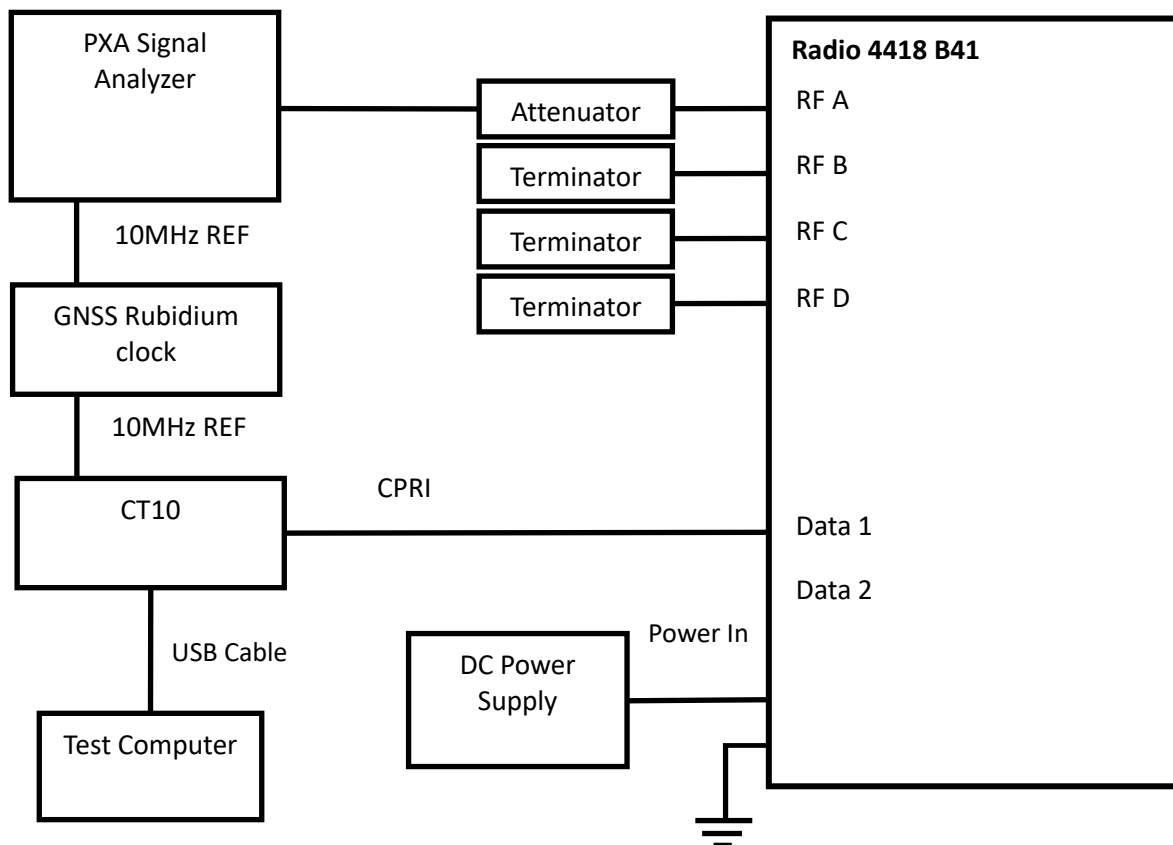
Configuration	Carrier	NR Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
			Bottom	Middle	Top
NR-MIMO-1C-BE	1	20	2506.02	-	2680.02
		30	2511.00	-	2675.01
		40	2516.01	-	2670.00
		50	2521.02	-	2665.02
		60	2526.00	-	2660.01
		80	2531.01	-	2655.00
		100	2536.02	-	2650.02
NR-MIMO-2C-BE	2	20	2541.00	-	2645.01
		30	2546.01	-	2640.00
		40	2506.02+2526	-	2660.01+2680.02
		50	2521.02+2571	-	2615.01+2665.02
NR-MIMO-3C-BE	3	20	2506.02+2526+2546.01	-	2640+2660.01+2680.02
		30	2511+2541+2571.00	-	2615.01+2645.01+2675.01

TEST REPORT

Configuration	Carrier	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Carrier Frequency Configuration (MHz)		
				Bottom	Middle	Top
NR+LTE-MIMO-MC-1-BE	1NR+1LTE	30	10	(NR)2511+(L)2531	-	(L)2655+(NR)2675.01
		80	20	(NR)2536.02+(L)2586	-	(L)2600+(NR)2650.02
NR+LTE-MIMO-MC-2-BE	1NR+2LTE	20	10	(NR)2506.02+(L)2521+2531	-	(L)2655+2665+(NR)2680.02
		80	10	(NR)2536.02+(L)2581+2591	-	(L)2595+2605+(NR)2650.02
NR+LTE-MIMO-MC-3-BE	3NR+3LTE	20	10	(NR)2506.02+2526+2546.01+(L)2561+2571+2581	-	(L)2605+2615+2625+(NR)2640+2660.01+2680.02

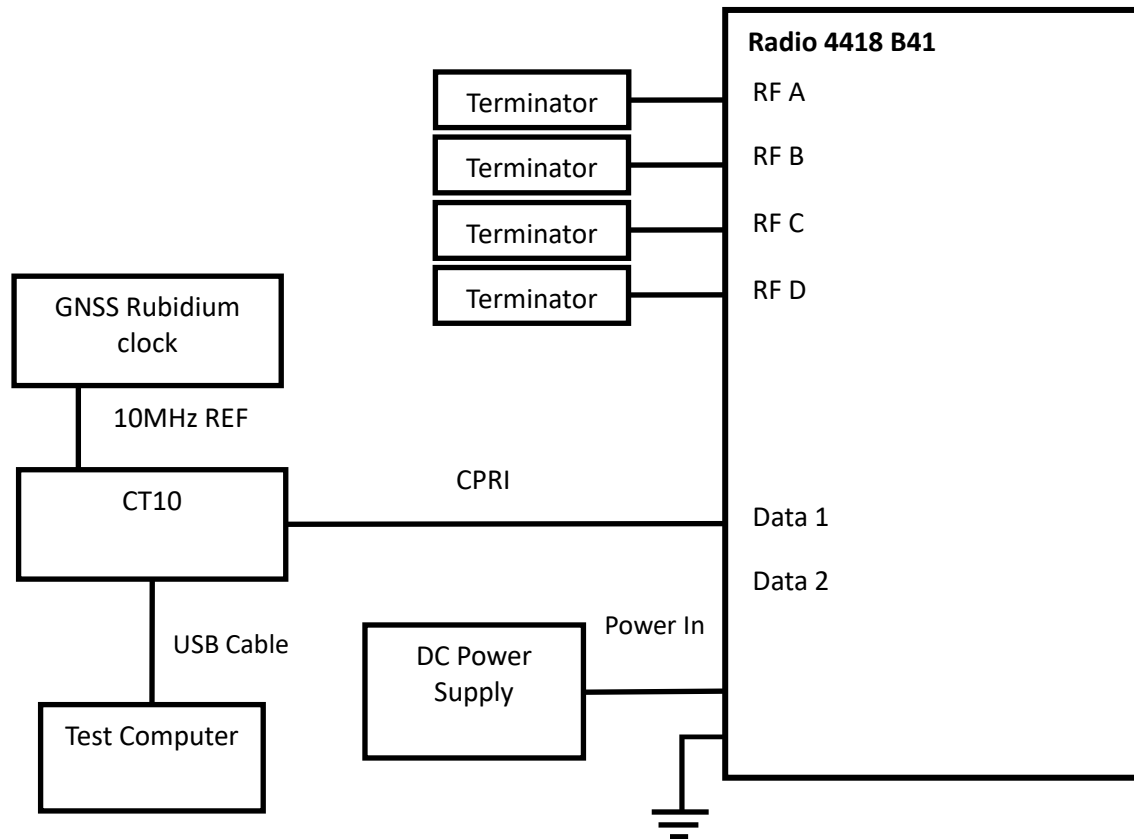
2.4 Test Setup

Conducted Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	Test computer	HP EliteBook 8470	-
2	Baseband 6630	KDU137848/1	R2C
3	GNSS Rubidium clock	HJ5418A-V1	-
4	DC Power Supply	Chroma 62024P-100-50	-
5	Attenuator	66-40-33	-
6	Terminator	TF200-4G	-
7	Terminator	TF200-4G-NK	-

Radiated Measurement:



No.	Auxiliary Equipment	Product Number / Model Type	Version
1	Test computer	HP EliteBook 8470	-
2	Baseband 6630	KDU137848/1	R2C
3	GNSS Rubidium clock	HJ5418A-V1	-
4	DC Power Supply	Chroma 62024P-100-50	-
5	Attenuator	66-40-33	-
6	Terminator	TF200-4G	-
7	Terminator	TF200-4G-NK	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Max Output Power and Peak to Average Power Ratio and EIRP	20°C to 24°C	45%RH to 55%RH
Occupied Bandwidth		
Unwanted Emissions at Band Edge		
Conducted Unwanted Emission		
Radiated Unwanted Emissions	21°C	51% RH
Frequency Stability	Please refer to clause 8	

2.6 Instrument list

Intertek Testing Services Shanghai					
Used	Equipment	Manufacturer	Type	S/N	Due date
☒	PXA Signal Analyzer	Keysight	N9030A	MY54490502	2021.8.24
☐	Signal Generator	R&S	SMU200A	103457	2021.8.15
☒	Multi-meter	Fluke	117	93990470	2021.1.17
☒	Climatic Chamber	赛宝	CEEC-WR16H-50W	15-95	2021.9.21
☒	Humiture meter	托普	TPJ-20	TP161108085	2021.1.16

BEIJING BOOMWAVE TEST SERVICE CO. LTD.					
Used	Equipment	Manufacturer	Type	S/N	Due date
☒	EMI TEST RECERVER	R&S	ESR26	101320	2020-12-28
☒	Spectrum Analyzer	R&S	FSV40	101403	2021-01-01
☒	Hybrid antenna	SCHWARZBECK	VULB9163	01266	2021-07-03
☒	Double-Ridged Waveguide Horn Antenna	R&S	BBHA9120D	1276	2021-03-17
☒	Broad-Band Horn Antenna	SCHWARZBECK	BBHA9170	797	2021-03-17
☒	Pre-amplifier	R&S	SCU40	2046336	2021-03-17
☒	Pre-amplifier	Qualwave	QLAS-1000-18000-45-30	20255003	2021-07-01
☒	Power amplifier	Pasternack Enterprises	PE15A1009	V00140120181115E822	2021-01-01
☒	Digital display temperature and humidity recorder	DICKSON	TM320	015080	2021-08-05
☒	Aneroid barometer	Shanghai Boji	DYM3	00868	2022-05-05
☒	Semi-Anechoic Chamber	TDK	SAC03	/	2024-07-23

2.7 Measurement uncertainty

The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Test item	Measurement uncertainty
Maximum output power	0.73dB
Occupied Bandwidth	0.88%
Unwanted Emissions at Band Edge	3.03dB
Conducted Unwanted Emission	3.03dB
Radiated Unwanted Emissions below 1GHz	4.90dB
Radiated Unwanted Emissions above 1GHz	5.02dB
Frequency stability	0.77×10^{-7}

TEST REPORT

3 Maximum Output Power and Peak to Average Power Ratio and EIRP

Test result: Pass

3.1 Limit

Output Power:

$$\text{EIRP} \leq 33 \text{ dBW} + 10\log(X/Y) \text{ dBW}$$

X = actual channel bandwidth

Y = 5.5 or 6 MHz

Peak to Average Ratio: ≤ 13 dB

3.2 Measurement Procedure

The EUT was configured to transmit on maximum power and proper modulation. The transmitter power shall be measured in terms of a root-mean-square (RMS) average value. In case of the EUT was configured to MIMO mode, since the EUT transmits on all antennas simultaneously in the same frequency range, using the Measure-and-Sum approach, the output power at all antennas were tested, and the total output power were then summed mathematically in linear power units according to FCC KDB 662911 D01.

A peak to average ratio measurement is performed at the conducted ports of the EUT for single carrier for single RAT mode. The spectrum analyzers Complementary Cumulative Distribution Function (CCDF) was used and 0.1% probability value recorded.

3.3 Measurement result

Configuration NR-MIMO-1C

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	20	39.50	27.397	8.40	39.64	27.486	8.37	39.67	27.478	8.33
B	256QAM	20	39.53	27.392	8.38	39.68	27.518	8.37	39.75	27.600	8.32
C	256QAM	20	39.41	27.307	8.38	39.50	27.329	8.38	39.62	27.420	8.31
D	256QAM	20	39.44	27.316	8.38	39.62	27.433	8.38	39.72	27.602	8.32
Total			45.49	33.374	-	45.63	33.463	-	45.71	33.546	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	30	41.50	27.528	8.03	41.55	27.566	8.07	41.49	27.524	8.20
B	256QAM	30	41.45	27.610	8.04	41.66	27.592	8.06	41.68	27.776	8.19
C	256QAM	30	41.33	27.408	8.04	41.39	27.383	8.06	41.28	27.246	8.19
D	256QAM	30	41.44	27.414	8.04	41.48	27.500	8.06	41.40	27.467	8.19
Total			47.45	33.511	-	47.54	33.532	-	47.49	33.528	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	40	42.63	27.385	7.60	42.75	27.443	7.37	42.84	27.637	7.68
B	256QAM	40	42.70	27.463	7.59	42.93	27.647	7.37	43.05	27.894	7.67
C	256QAM	40	42.41	27.157	7.58	42.50	27.250	7.37	42.67	27.504	7.66
D	256QAM	40	42.46	27.188	7.57	42.66	27.280	7.37	42.75	27.490	7.66
Total			48.57	33.321	-	48.73	33.428	-	48.85	33.655	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	50	42.53	26.414	7.75	42.79	26.503	7.38	42.87	26.724	7.76
B	256QAM	50	42.61	26.533	7.78	42.84	26.589	7.38	42.99	26.847	7.76
C	256QAM	50	42.32	26.227	7.78	42.56	26.306	7.40	42.66	26.472	7.75
D	256QAM	50	42.43	26.368	7.77	42.66	26.318	7.38	42.86	26.660	7.75
Total			48.49	32.407	-	48.73	32.451	-	48.87	32.698	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	60	42.72	25.718	7.79	42.74	25.628	7.35	42.94	25.772	7.85
B	256QAM	60	42.72	25.792	7.82	42.86	25.770	7.34	42.97	25.908	7.85
C	256QAM	60	42.45	25.489	7.82	42.57	25.457	7.35	42.60	25.498	7.84
D	256QAM	60	42.66	25.534	7.81	42.72	25.627	7.34	42.68	25.584	7.83
Total			48.66	31.656	-	48.74	31.643	-	48.82	31.714	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	80	42.61	24.513	7.88	42.78	24.406	7.34	42.70	24.316	7.83
B	256QAM	80	42.73	24.577	7.92	42.81	24.486	7.33	42.82	24.470	7.83
C	256QAM	80	42.38	24.196	7.92	42.51	24.172	7.34	42.50	24.109	7.82
D	256QAM	80	42.51	24.312	7.91	42.59	24.266	7.34	42.58	24.318	7.82
Total			48.58	30.423	-	48.69	30.355	-	48.67	30.326	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	100	42.66	23.523	7.91	42.76	23.614	7.36	42.70	23.461	7.90
B	256QAM	100	42.68	23.573	7.95	42.85	23.503	7.37	42.78	23.469	7.91
C	256QAM	100	42.51	23.392	7.94	42.49	23.231	7.37	42.60	23.343	7.88
D	256QAM	100	42.52	23.356	7.94	42.63	23.224	7.36	42.60	23.103	7.90
Total			48.61	29.483	-	48.71	29.417	-	48.69	29.367	-

Configuration NR-MIMO-2C

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	20	-	-	-	42.16	27.119	-	-	-	-
B	256QAM	20	-	-	-	42.27	27.177	-	-	-	-
C	256QAM	20	-	-	-	42.06	26.928	-	-	-	-
D	256QAM	20	-	-	-	42.23	27.104	-	-	-	-
Total			-	-	-	48.20	33.104	-	-	-	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	30	-	-	-	42.11	25.483	-	-	-	-
B	256QAM	30	-	-	-	42.47	25.556	-	-	-	-
C	256QAM	30	-	-	-	42.21	25.240	-	-	-	-
D	256QAM	30	-	-	-	42.30	25.331	-	-	-	-
Total			-	-	-	48.30	31.425	-	-	-	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	40	-	-	-	42.34	24.082	-	-	-	-
B	256QAM	40	-	-	-	42.30	24.046	-	-	-	-
C	256QAM	40	-	-	-	42.15	23.746	-	-	-	-
D	256QAM	40	-	-	-	42.29	23.955	-	-	-	-
Total			-	-	-	48.29	29.980	-	-	-	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	50	-	-	-	42.35	23.229	-	-	-	-
B	256QAM	50	-	-	-	42.46	23.262	-	-	-	-
C	256QAM	50	-	-	-	42.10	22.962	-	-	-	-
D	256QAM	50	-	-	-	42.17	23.025	-	-	-	-
Total			-	-	-	48.29	29.142	-	-	-	-

Configuration NR-MIMO-3C

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	20	-	-	-	42.33	25.508	-	-	-	-
B	256QAM	20	-	-	-	42.41	25.471	-	-	-	-
C	256QAM	20	-	-	-	42.11	25.292	-	-	-	-
D	256QAM	20	-	-	-	42.30	25.383	-	-	-	-
Total			-	-	-	48.31	31.435	-	-	-	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	256QAM	30	-	-	-	42.21	23.591	-	-	-	-
B	256QAM	30	-	-	-	42.30	23.630	-	-	-	-
C	256QAM	30	-	-	-	42.14	23.687	-	-	-	-
D	256QAM	30	-	-	-	42.28	23.845	-	-	-	-
Total			-	-	-	48.25	29.710	-	-	-	-

Configuration LTE-MIMO-1C

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	10	36.74	27.740	8.44	36.84	27.726	8.44	36.86	27.849	8.45
B	64QAM	10	36.77	27.828	8.38	36.84	27.783	8.37	36.91	27.922	8.37
C	64QAM	10	36.80	27.822	8.24	36.81	27.687	8.23	36.86	27.911	8.26
D	64QAM	10	36.78	27.787	8.40	36.87	27.758	8.43	36.97	27.970	8.48
Total			42.79	33.815	-	42.86	33.759	-	42.92	33.934	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	15	38.57	27.774	8.32	38.58	27.768	8.31	38.60	27.781	8.32
B	64QAM	15	38.47	27.500	8.34	38.60	27.732	8.37	38.69	27.932	8.38
C	64QAM	15	38.63	27.746	8.16	38.63	27.734	8.26	38.77	28.023	8.30
D	64QAM	15	38.48	27.712	8.39	38.55	27.742	8.34	38.53	27.823	8.30
Total			44.56	33.705	-	44.61	33.765	-	44.67	33.911	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	20	39.56	27.528	8.32	39.70	27.629	8.29	39.69	27.648	8.33
B	64QAM	20	39.66	27.640	8.24	39.76	27.693	8.20	39.85	27.837	8.20
C	64QAM	20	39.48	27.456	8.37	39.58	27.470	8.30	39.69	27.644	8.30
D	64QAM	20	39.54	27.521	8.40	39.62	27.514	8.42	39.84	29.796	8.47
Total			45.58	33.557	-	45.69	33.598	-	45.79	34.354	-

TEST REPORT

Configuration LTE-MIMO-2C

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	10	-	-	-	39.71	27.607	-	-	-	-
B	64QAM	10	-	-	-	39.80	27.721	-	-	-	-
C	64QAM	10	-	-	-	39.59	27.488	-	-	-	-
D	64QAM	10	-	-	-	39.80	27.649	-	-	-	-
Total			-	-	-	45.75	33.638	-	-	-	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	15	-	-	-	41.59	27.706	-	-	-	-
B	64QAM	15	-	-	-	41.61	27.791	-	-	-	-
C	64QAM	15	-	-	-	41.50	27.464	-	-	-	-
D	64QAM	15	-	-	-	41.63	27.724	-	-	-	-
Total			-	-	-	47.60	33.694	-	-	-	-

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	20	-	-	-	42.34	27.243	-	-	-	-
B	64QAM	20	-	-	-	42.36	27.314	-	-	-	-
C	64QAM	20	-	-	-	42.24	27.200	-	-	-	-
D	64QAM	20	-	-	-	42.33	27.331	-	-	-	-
Total			-	-	-	48.34	33.293	-	-	-	-

Configuration LTE-MIMO-6C

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	10	-	-	-	42.62	25.736	-	-	-	-
B	64QAM	10	-	-	-	42.48	25.603	-	-	-	-
C	64QAM	10	-	-	-	42.56	25.762	-	-	-	-
D	64QAM	10	-	-	-	42.42	25.628	-	-	-	-
Total			-	-	-	48.54	31.703	-	-	-	-

TEST REPORT

Antenna Port	Modulation	Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)								
			Channel position B			Channel position M			Channel position T		
			Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)	Power (dBm)	Power (dBm /MHz)	PAR (dB)
A	64QAM	15	-	-	-	42.62	23.884	-	-	-	-
B	64QAM	15	-	-	-	42.50	23.905	-	-	-	-
C	64QAM	15	-	-	-	42.54	23.980	-	-	-	-
D	64QAM	15	-	-	-	42.43	23.814	-	-	-	-
Total			-	-	-	48.54	29.917	-	-	-	-

NR+LTE-MIMO-MC-1

Antenna Port	NR Modulation	LTE Modulation	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)		
					Channel position M		
					Power (dBm)	Power (dBm/MHz)	PAR (dB)
A	256QAM	64QAM	30	10	42.31	27.316	-
B	256QAM	64QAM	30	10	42.31	27.196	-
C	256QAM	64QAM	30	10	42.10	27.034	-
D	256QAM	64QAM	30	10	42.16	27.168	-
Total					48.24	33.200	-

Antenna Port	NR Modulation	LTE Modulation	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)		
					Channel position M		
					Power (dBm)	Power (dBm/MHz)	PAR (dB)
A	256QAM	64QAM	80	20	42.31	27.229	-
B	256QAM	64QAM	80	20	42.37	27.216	-
C	256QAM	64QAM	80	20	42.11	26.940	-
D	256QAM	64QAM	80	20	42.28	27.149	-
Total					48.29	33.156	-

NR+LTE-MIMO-MC-2

Antenna Port	NR Modulation	LTE Modulation	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)		
					Channel position M		
					Power (dBm)	Power (dBm/MHz)	PAR (dB)
A	256QAM	64QAM	20	10	42.26	27.237	-
B	256QAM	64QAM	20	10	42.35	27.285	-
C	256QAM	64QAM	20	10	42.17	27.137	-
D	256QAM	64QAM	20	10	42.37	27.302	-
Total					48.31	33.261	-

TEST REPORT

Antenna Port	NR Modulation	LTE Modulation	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)		
					Channel position M		
					Power (dBm)	Power (dBm/MHz)	PAR (dB)
A	256QAM	64QAM	80	10	42.26	27.170	-
B	256QAM	64QAM	80	10	42.38	27.339	-
C	256QAM	64QAM	80	10	42.19	27.094	-
D	256QAM	64QAM	80	10	42.27	27.179	-
Total					48.30	33.217	-

NR+LTE-MIMO-MC-3

Antenna Port	NR Modulation	LTE Modulation	NR Carrier Bandwidth (MHz)	LTE Carrier Bandwidth (MHz)	Output power / Peak-to-Average Ratio (PAR)		
					Channel position M		
					Power (dBm)	Power (dBm/MHz)	PAR (dB)
A	256QAM	64QAM	20	10	42.23	25.357	-
B	256QAM	64QAM	20	10	42.33	25.503	-
C	256QAM	64QAM	20	10	42.33	25.562	-
D	256QAM	64QAM	20	10	42.31	25.540	-
Total					48.32	31.512	-

4 Occupied Bandwidth

Test result: Pass

4.1 Measurement Procedure

The EUT was set to transmit at maximum power and testing was carried out on bottom, middle and top channels. Using the Occupied Bandwidth measurement function in the spectrum analyzer, the 26dB bandwidth was measured in accordance with FCC KDB 971168 D01 Clause 4.2.

The measurement method is from KDB 971168 4.2:

- a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the OBW).
- b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.
- c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.
- d) Set the detection mode to peak, and the trace mode to max hold.
- e) Use the 99 % power bandwidth function of the spectrum analyzer and report the measured bandwidth.

4.2 Measurement result

Configuration NR-MIMO-1C

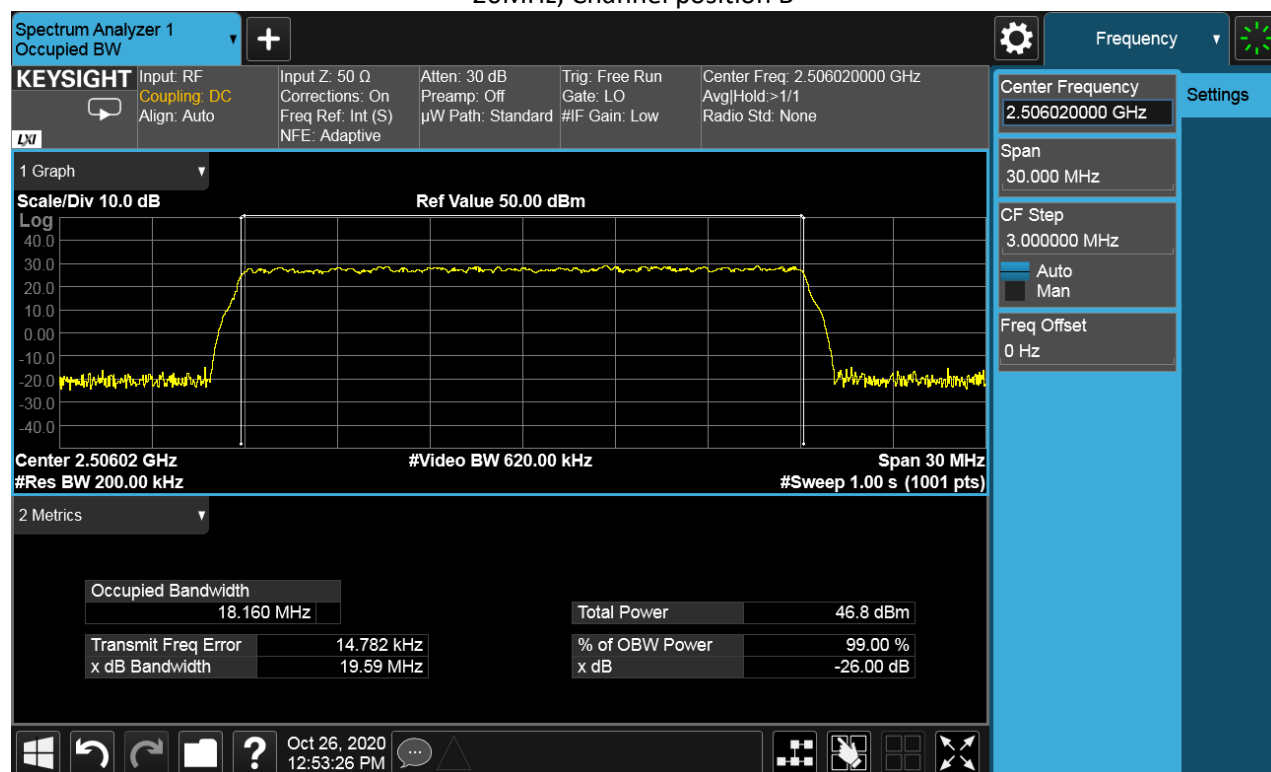
99% Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
B	256QAM	20MHz	18.160	18.158	18.147
B	256QAM	30MHz	27.768	27.803	27.789
B	256QAM	40MHz	37.843	37.821	37.813
B	256QAM	50MHz	47.398	47.399	47.366
B	256QAM	60MHz	57.678	57.723	57.676
B	256QAM	80MHz	77.329	77.374	77.322
B	256QAM	100MHz	97.223	97.372	97.244

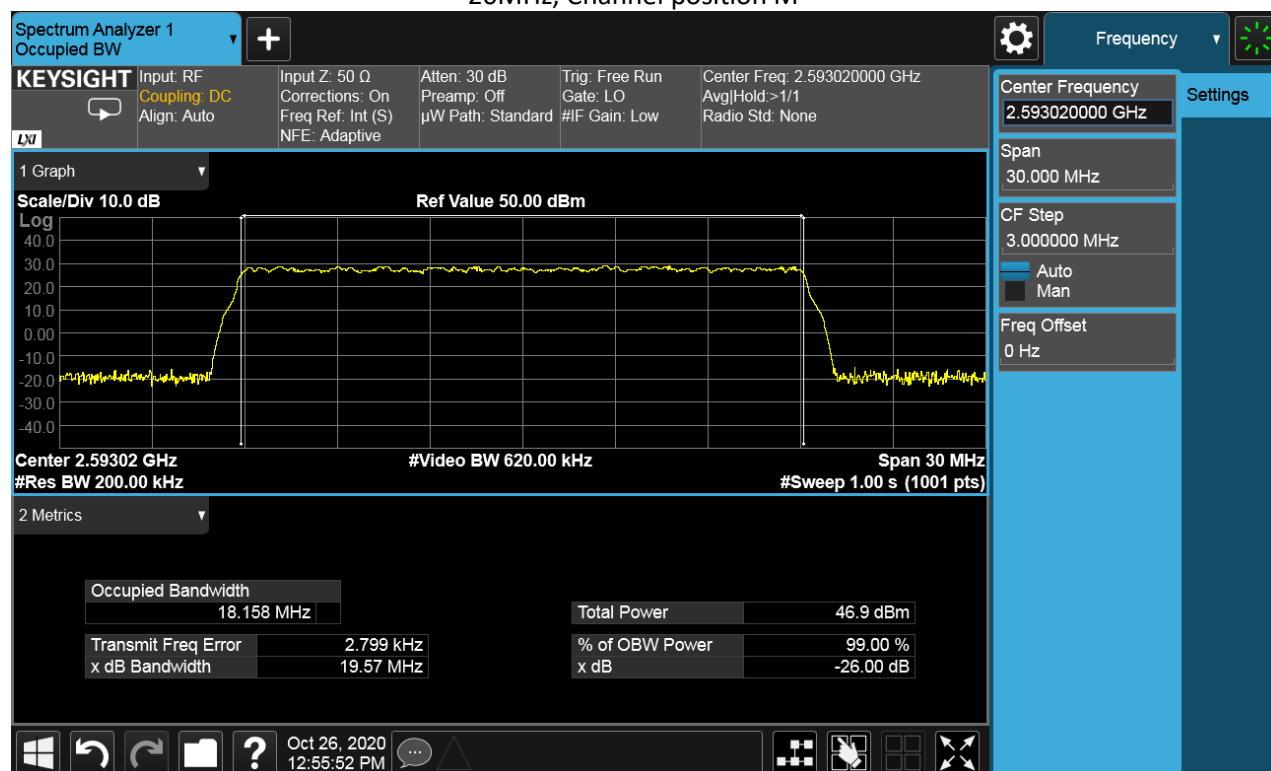
-26dBc Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
B	256QAM	20MHz	19.59	19.57	19.58
B	256QAM	30MHz	29.53	29.63	29.63
B	256QAM	40MHz	39.88	39.79	39.84
B	256QAM	50MHz	49.88	49.84	49.74
B	256QAM	60MHz	60.01	60.05	60.04
B	256QAM	80MHz	79.97	80.03	79.98
B	256QAM	100MHz	100.5	100.5	100.5

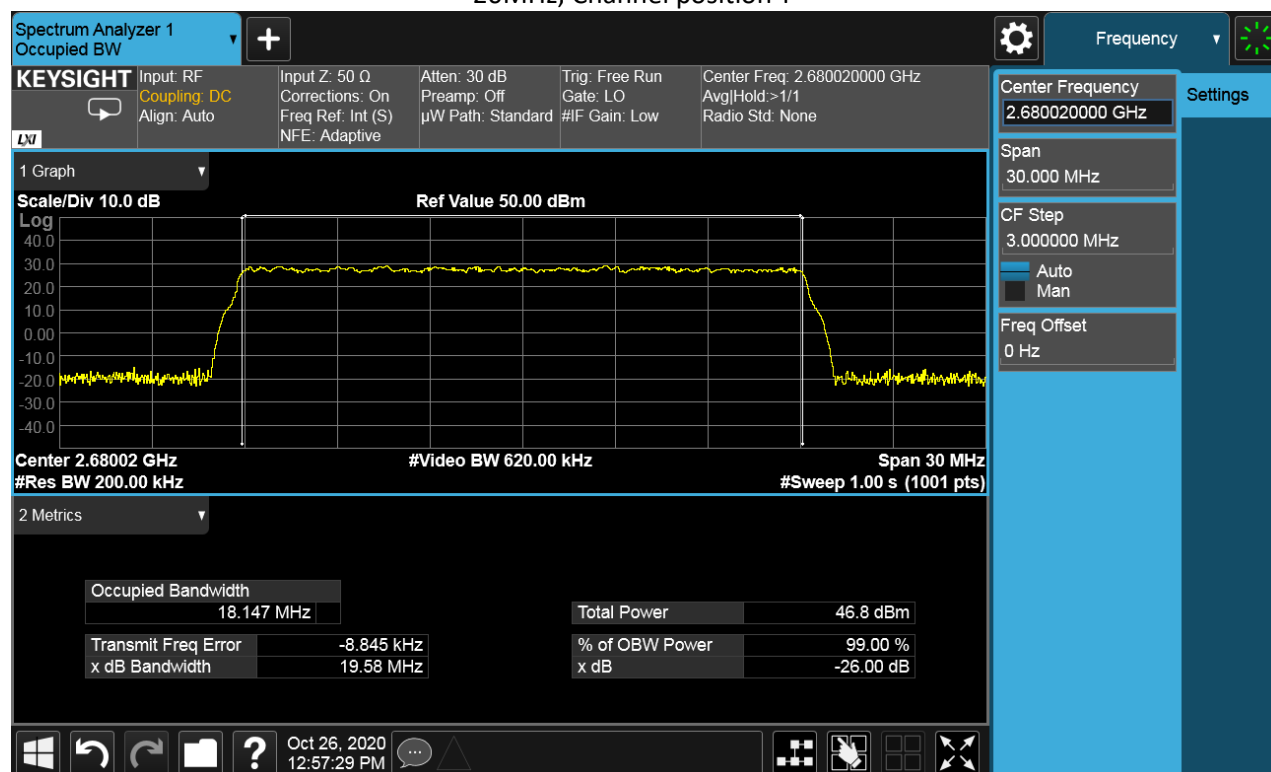
20MHz, Channel position B



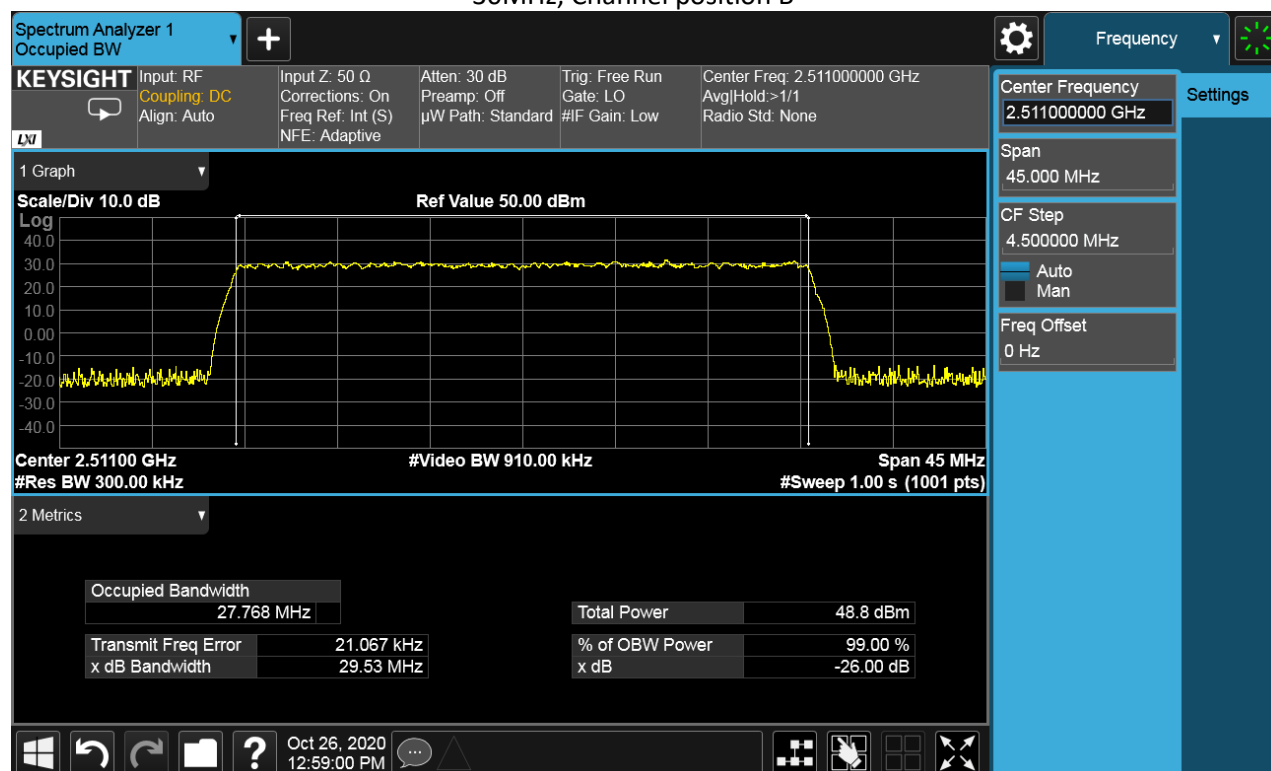
20MHz, Channel position M



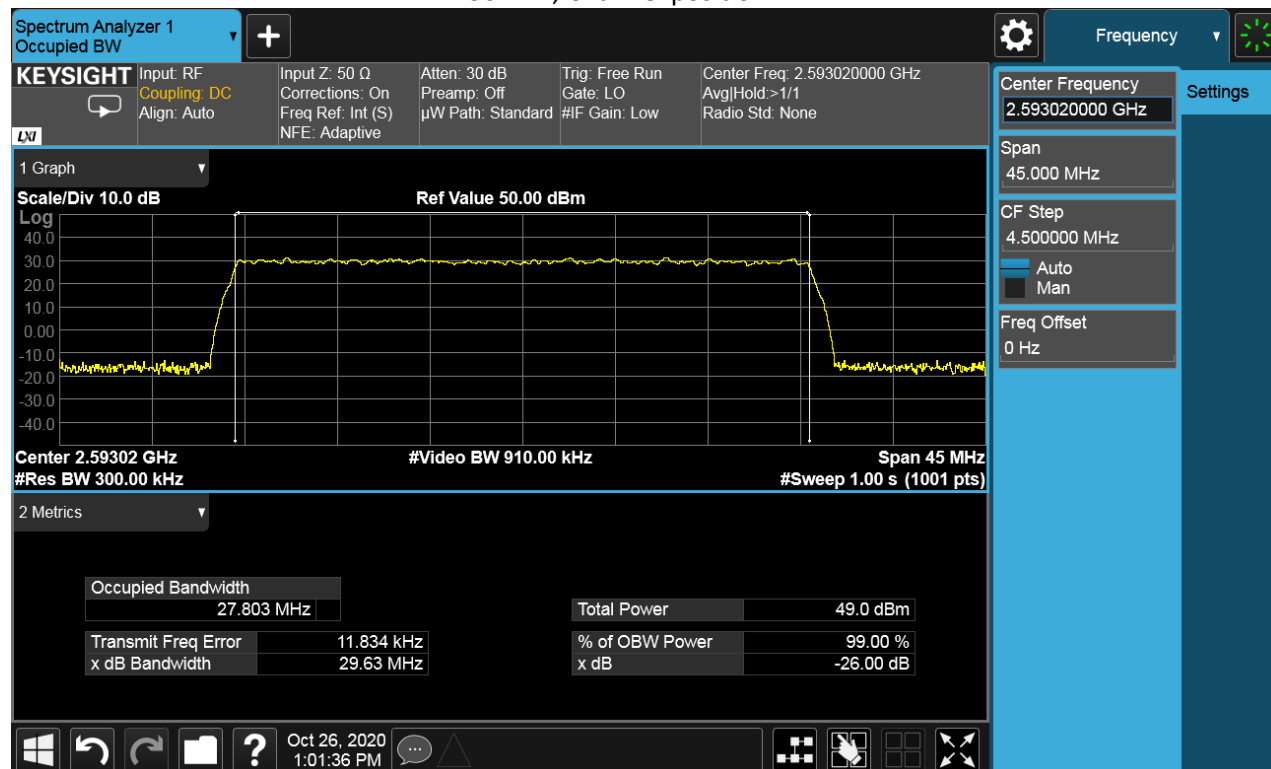
20MHz, Channel position T



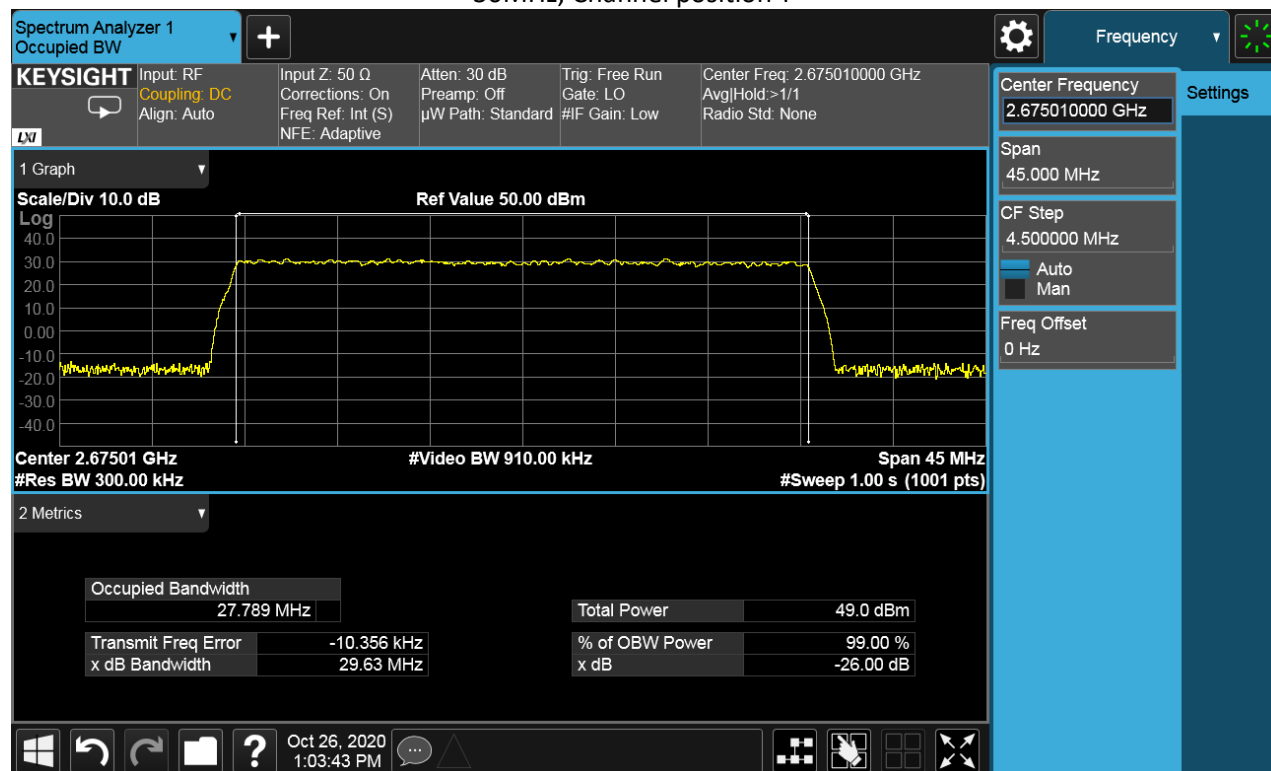
30MHz, Channel position B



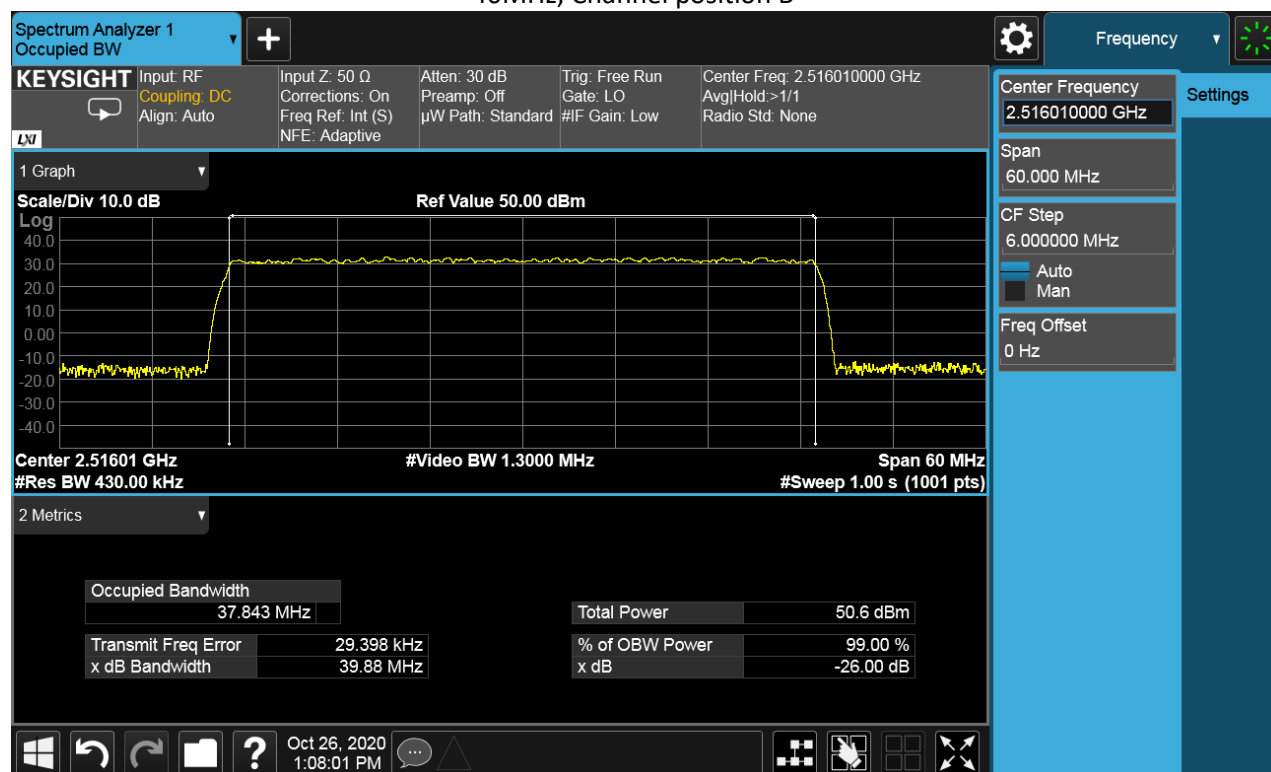
30MHz, Channel position M



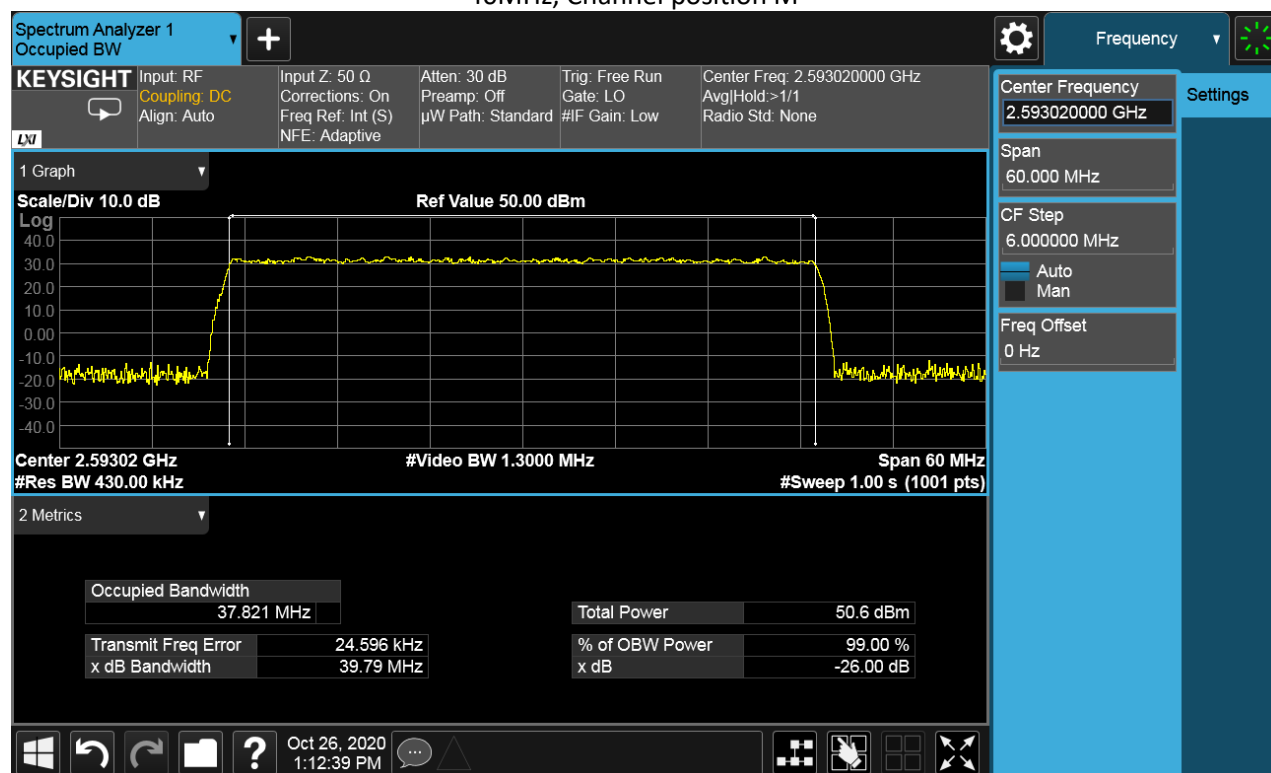
30MHz, Channel position T



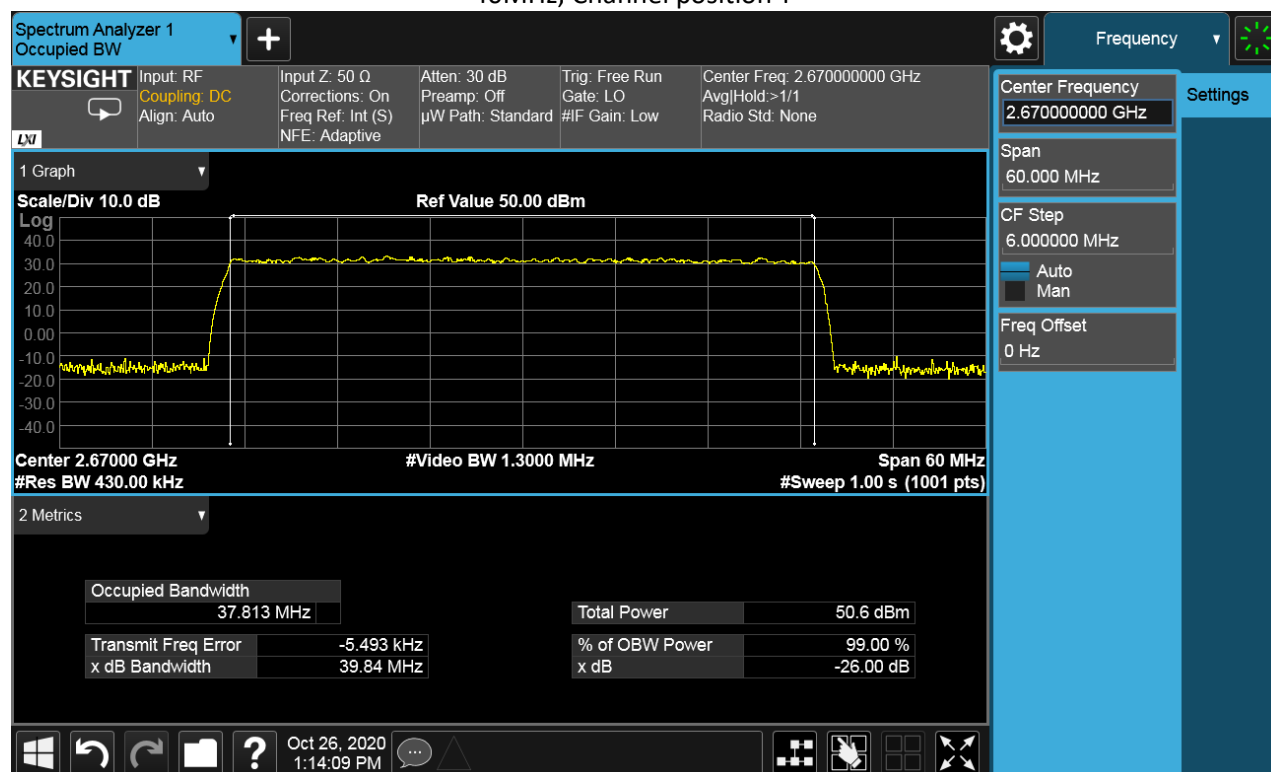
40MHz, Channel position B



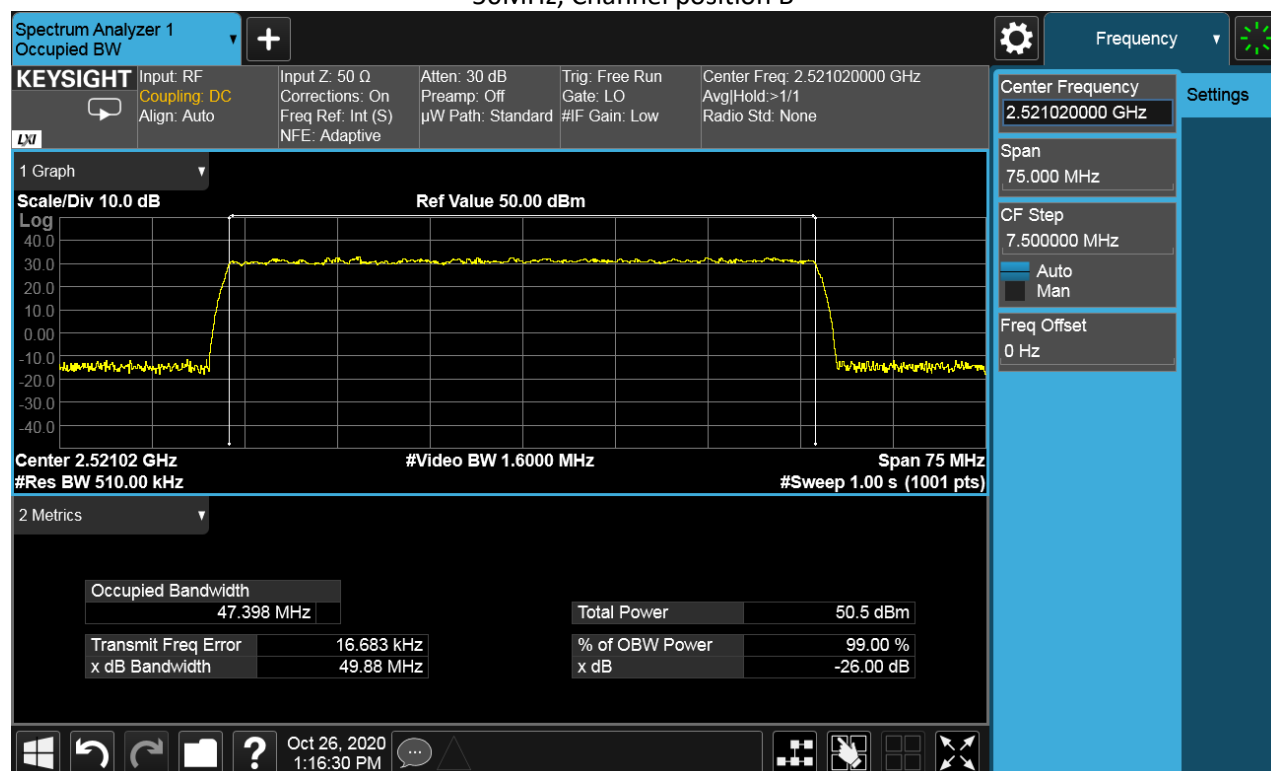
40MHz, Channel position M



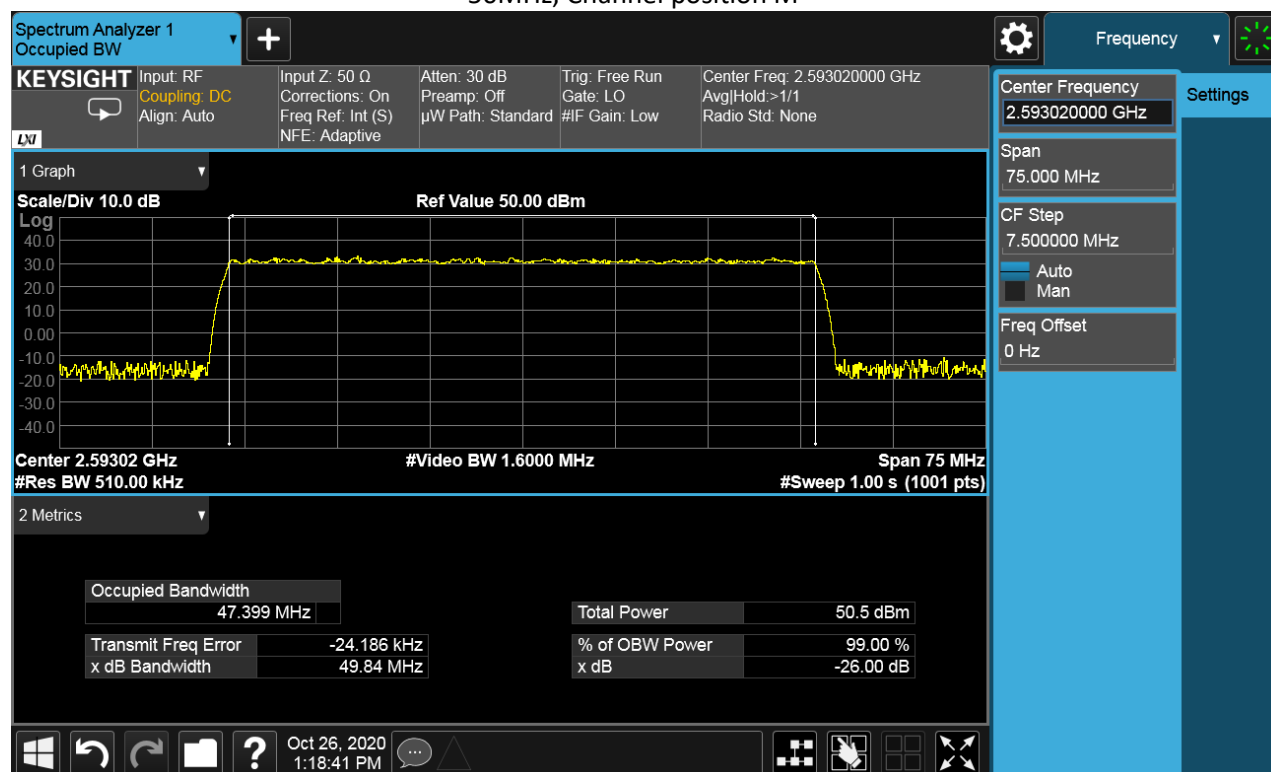
40MHz, Channel position T



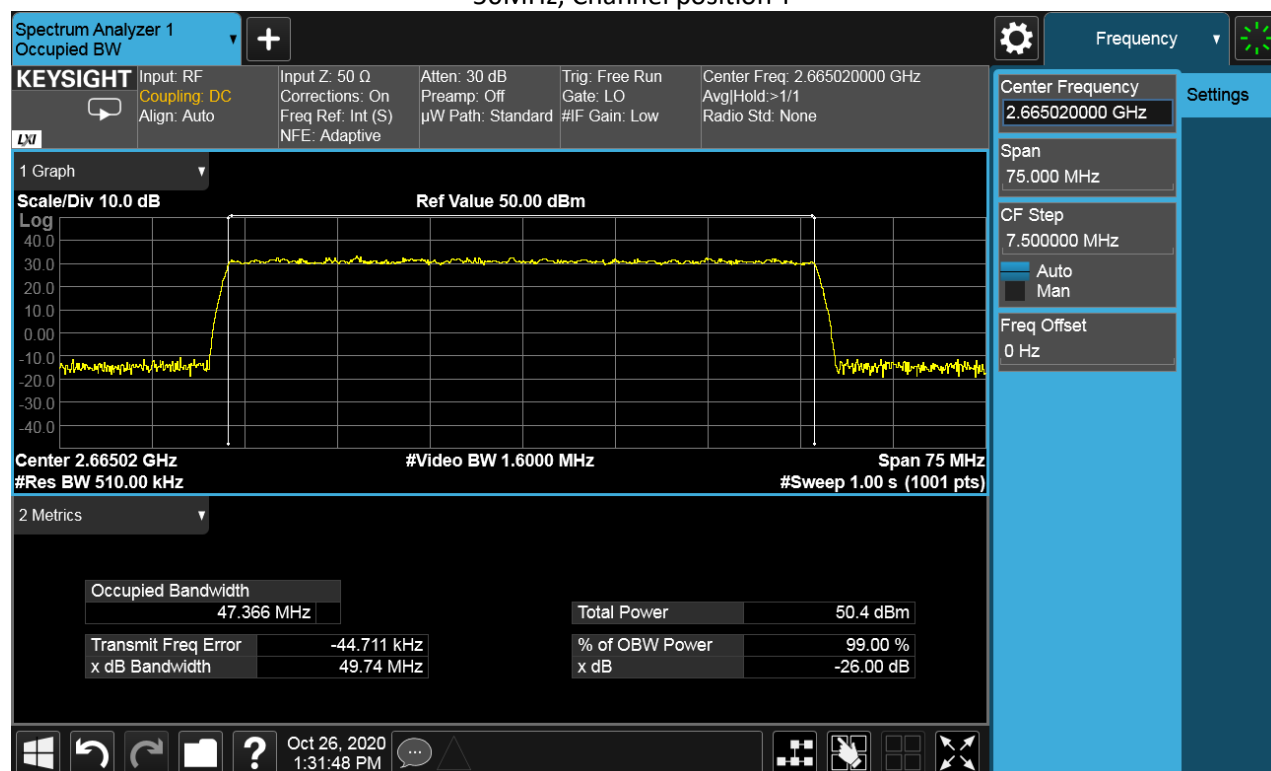
50MHz, Channel position B



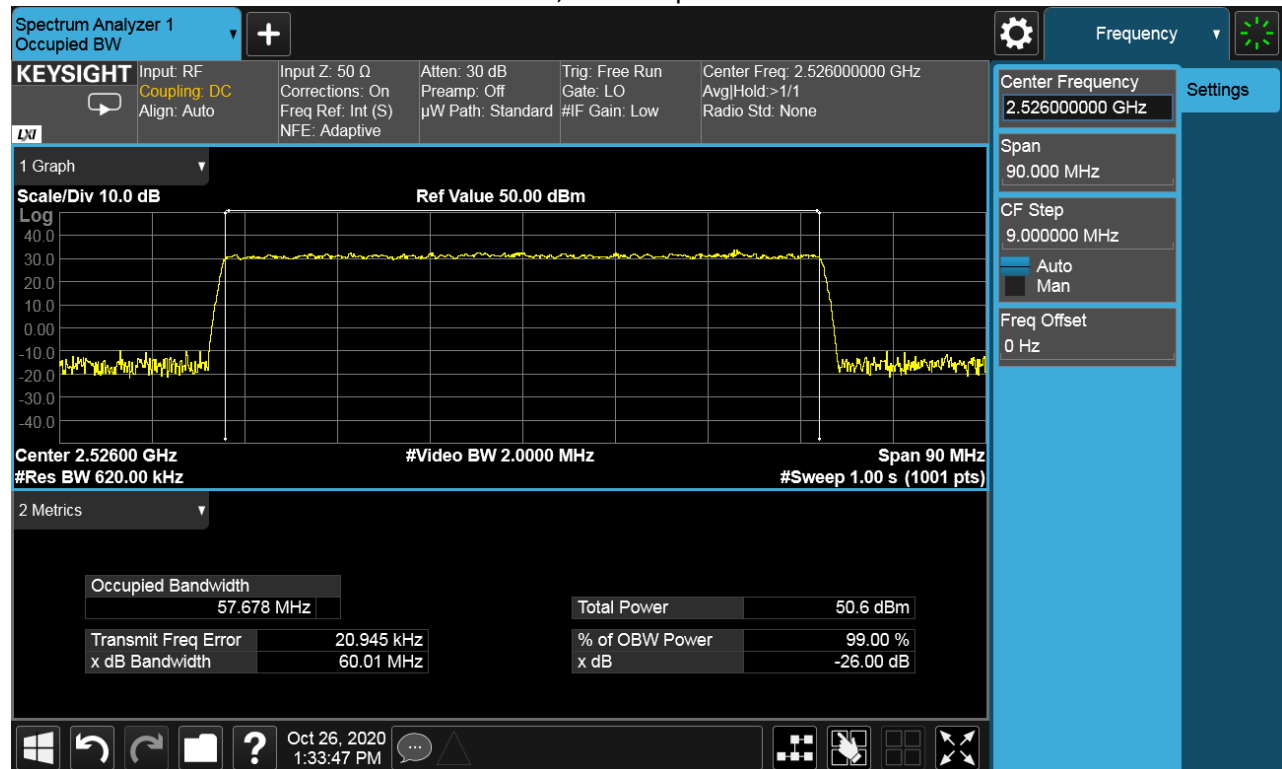
50MHz, Channel position M



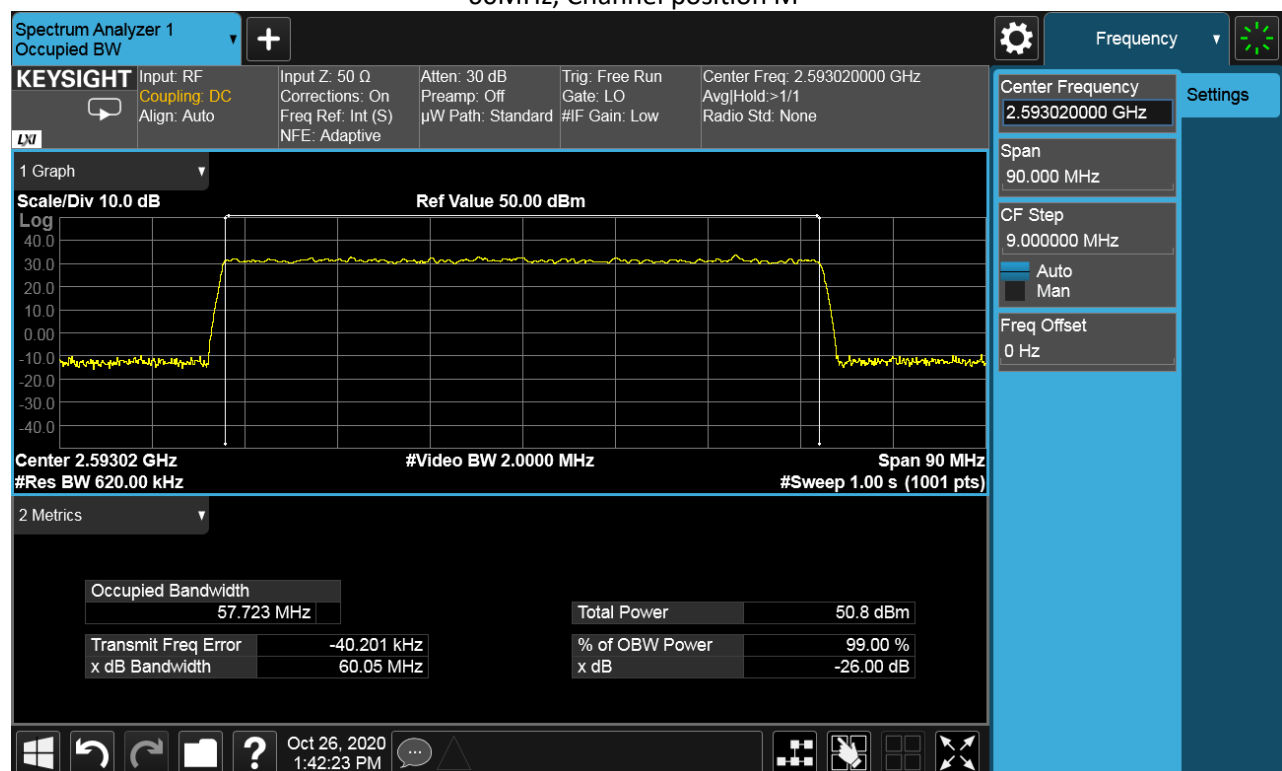
50MHz, Channel position T



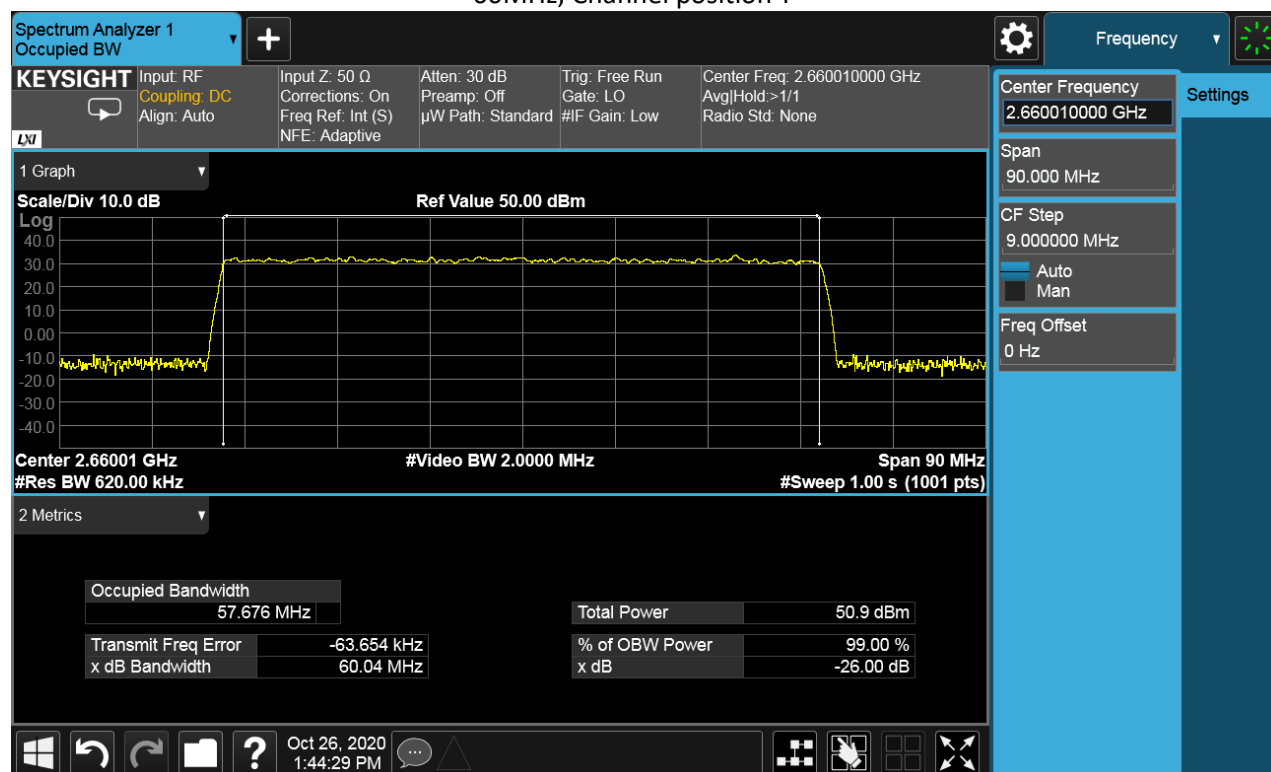
60MHz, Channel position B



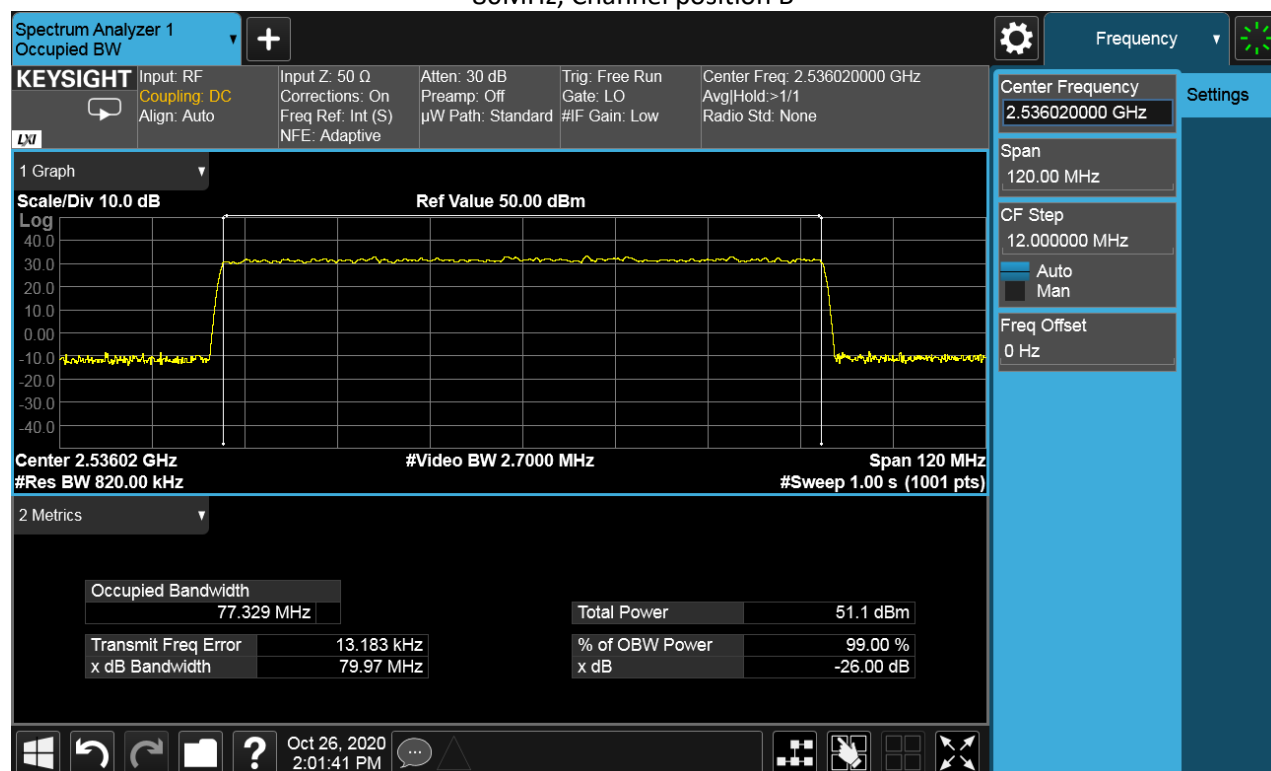
60MHz, Channel position M



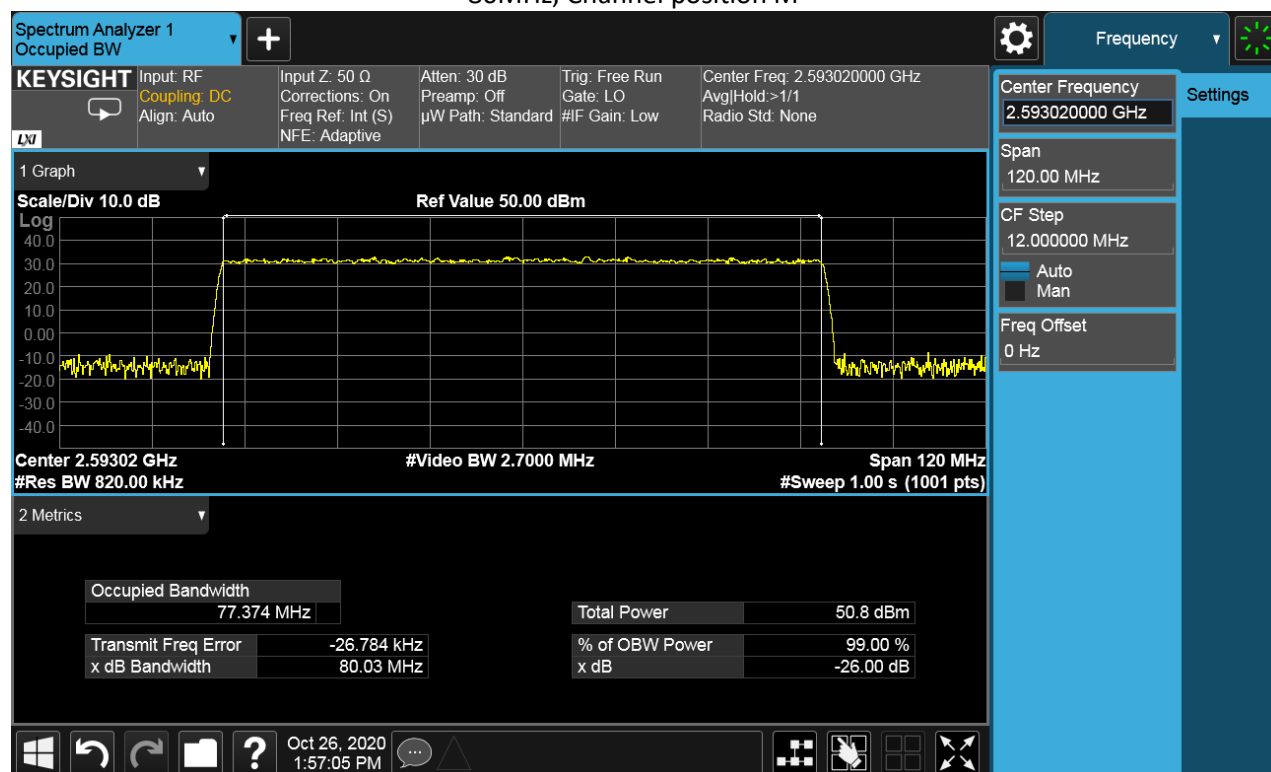
60MHz, Channel position T



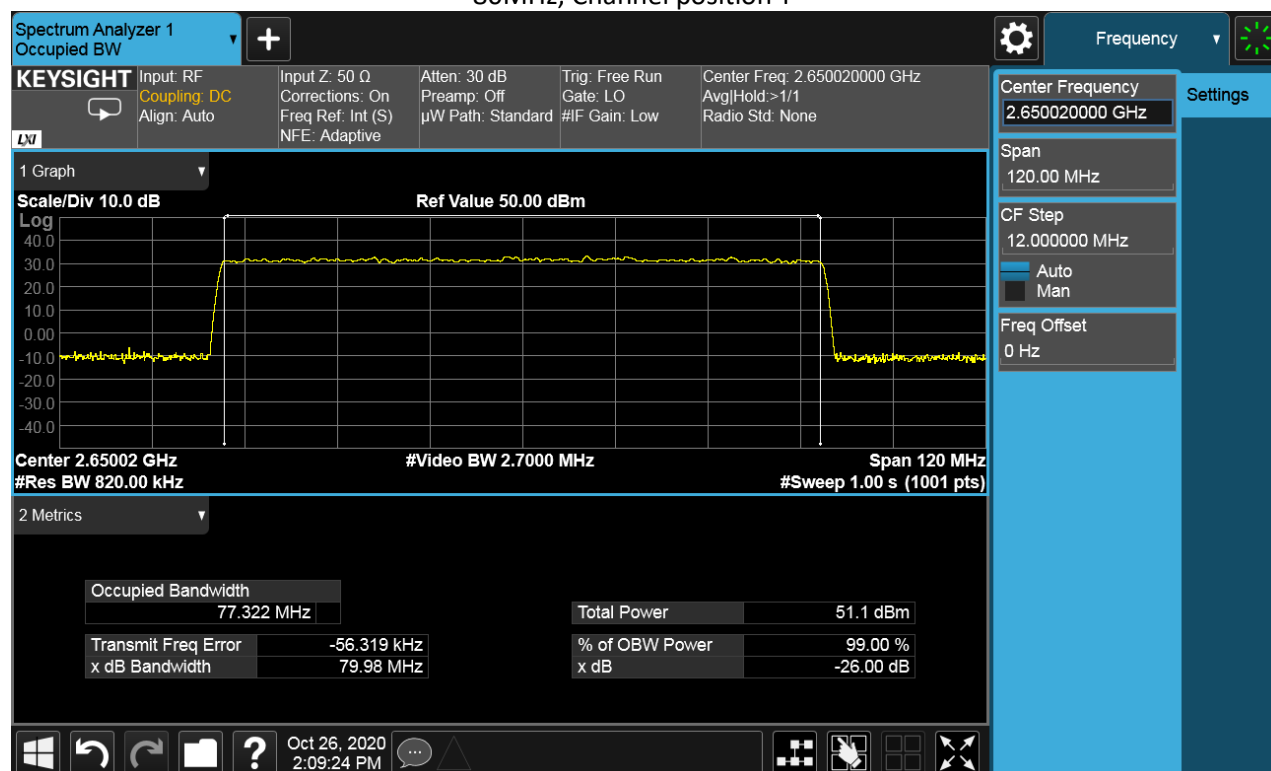
80MHz, Channel position B



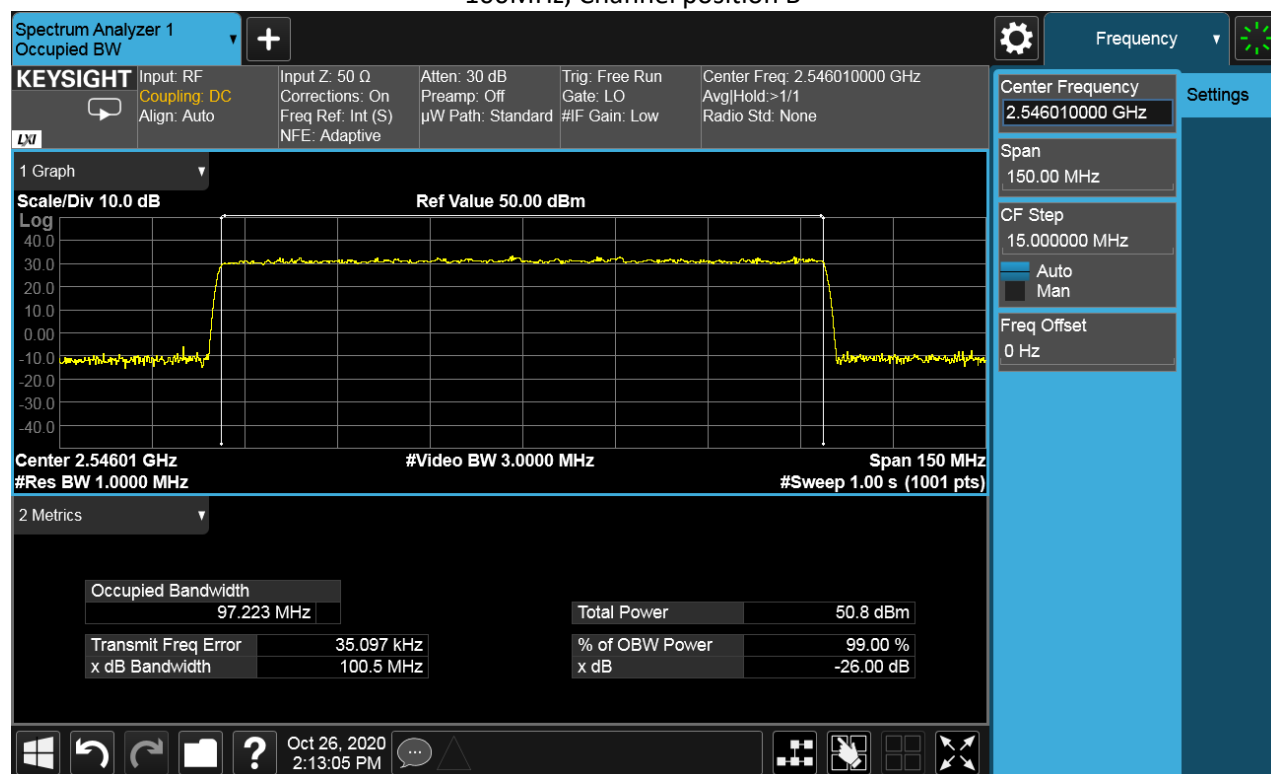
80MHz, Channel position M



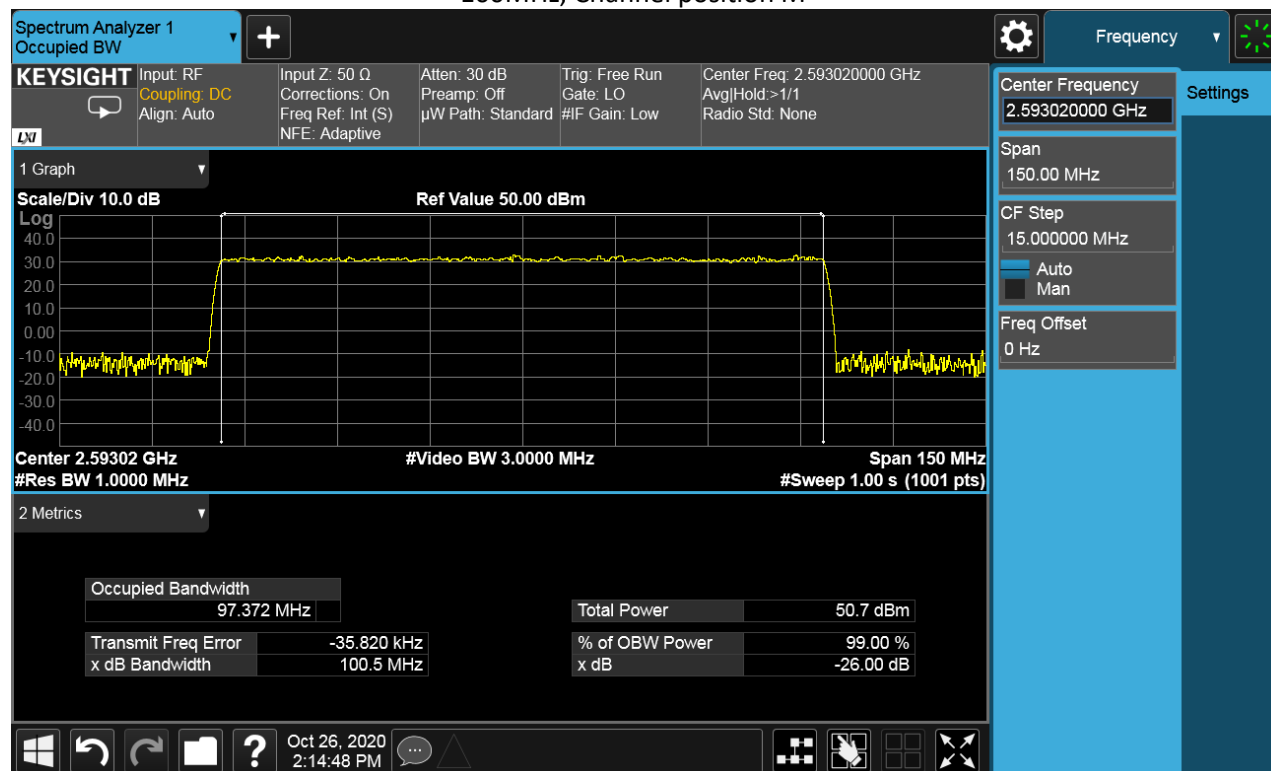
80MHz, Channel position T



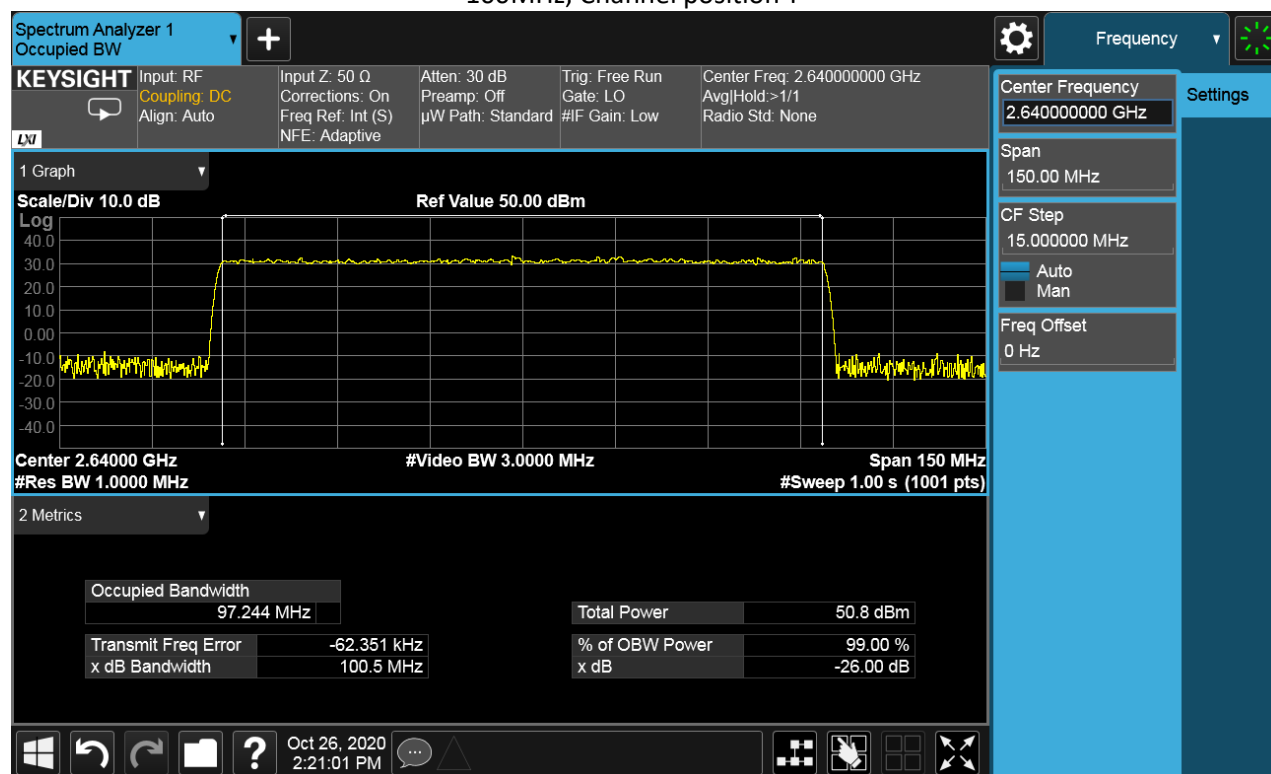
100MHz, Channel position B



100MHz, Channel position M



100MHz, Channel position T



TEST REPORT

Configuration LTE-MIMO-1C

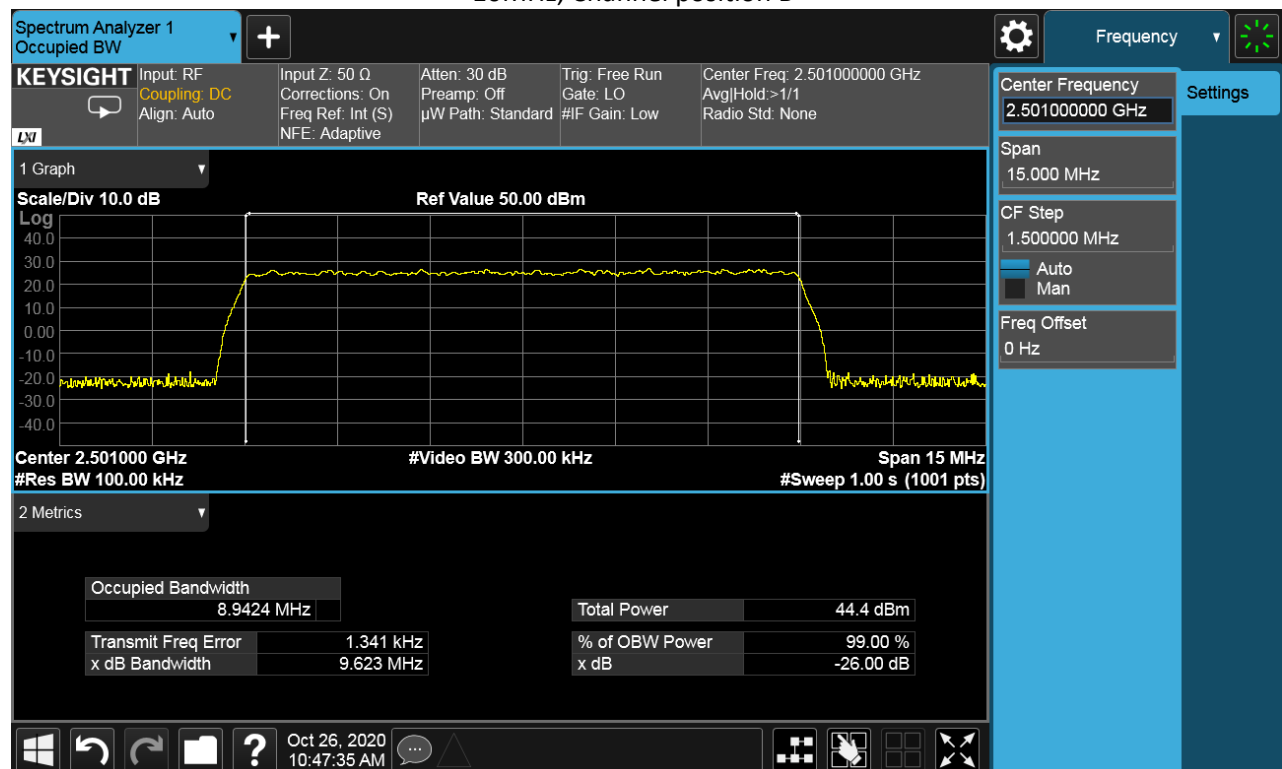
99% Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
B	64QAM	10MHz	8.9424	8.9808	8.9662
B	64QAM	15MHz	13.423	13.431	13.424
B	64QAM	20MHz	17.911	17.920	17.914

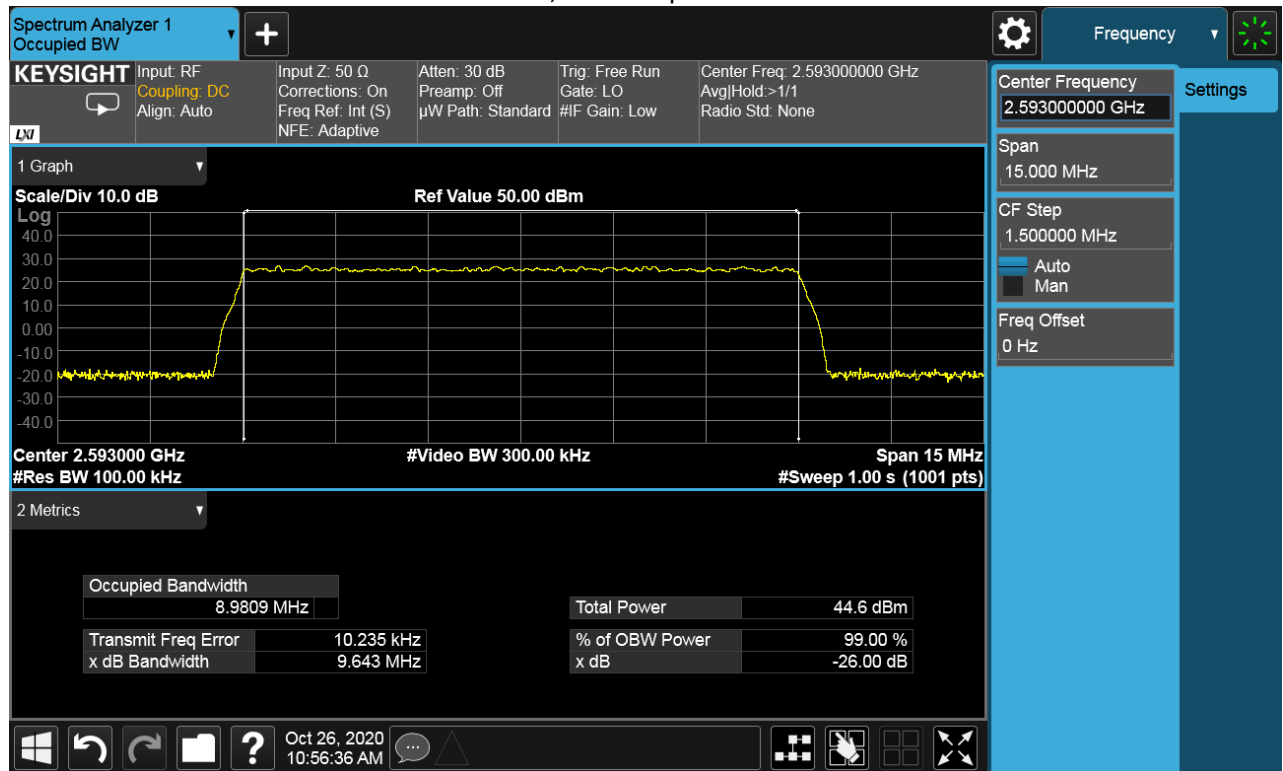
-26dBc Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
B	64QAM	10MHz	9.623	9.643	9.613
B	64QAM	15MHz	14.40	14.42	14.37
B	64QAM	20MHz	18.96	18.94	18.95

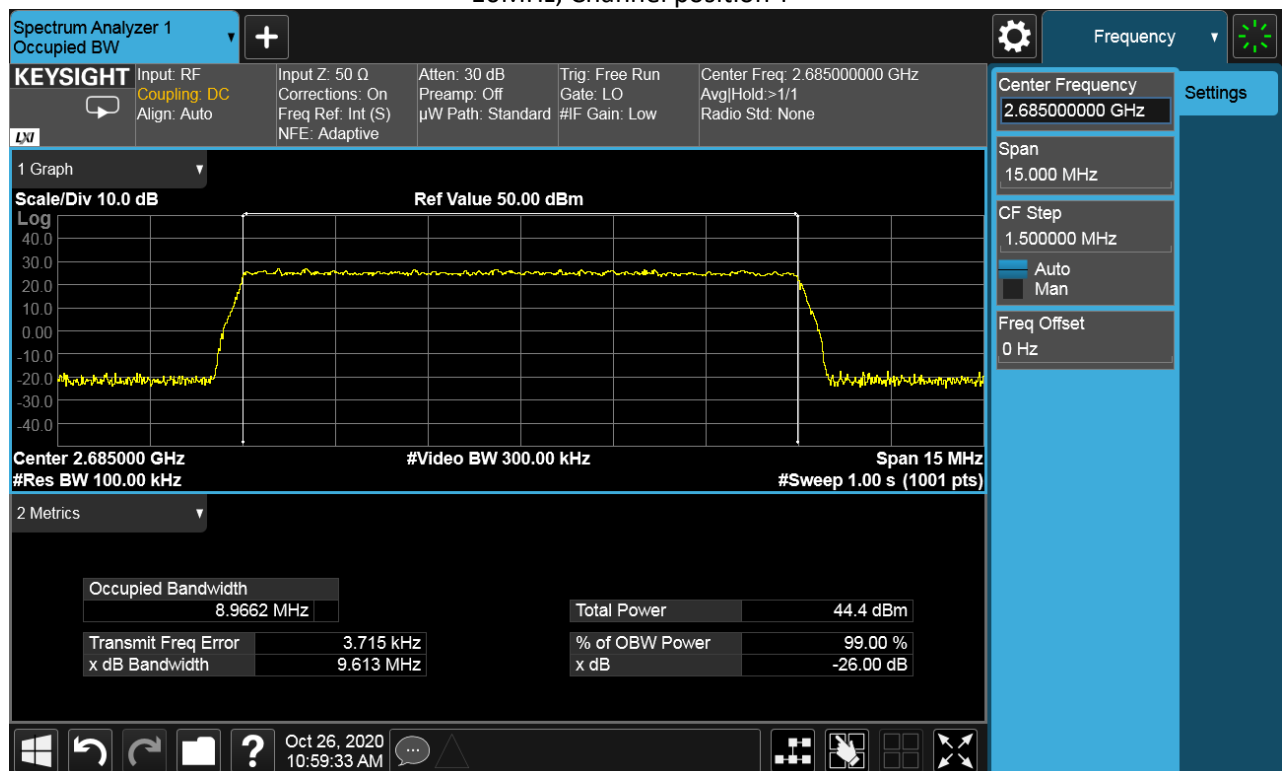
10MHz, Channel position B



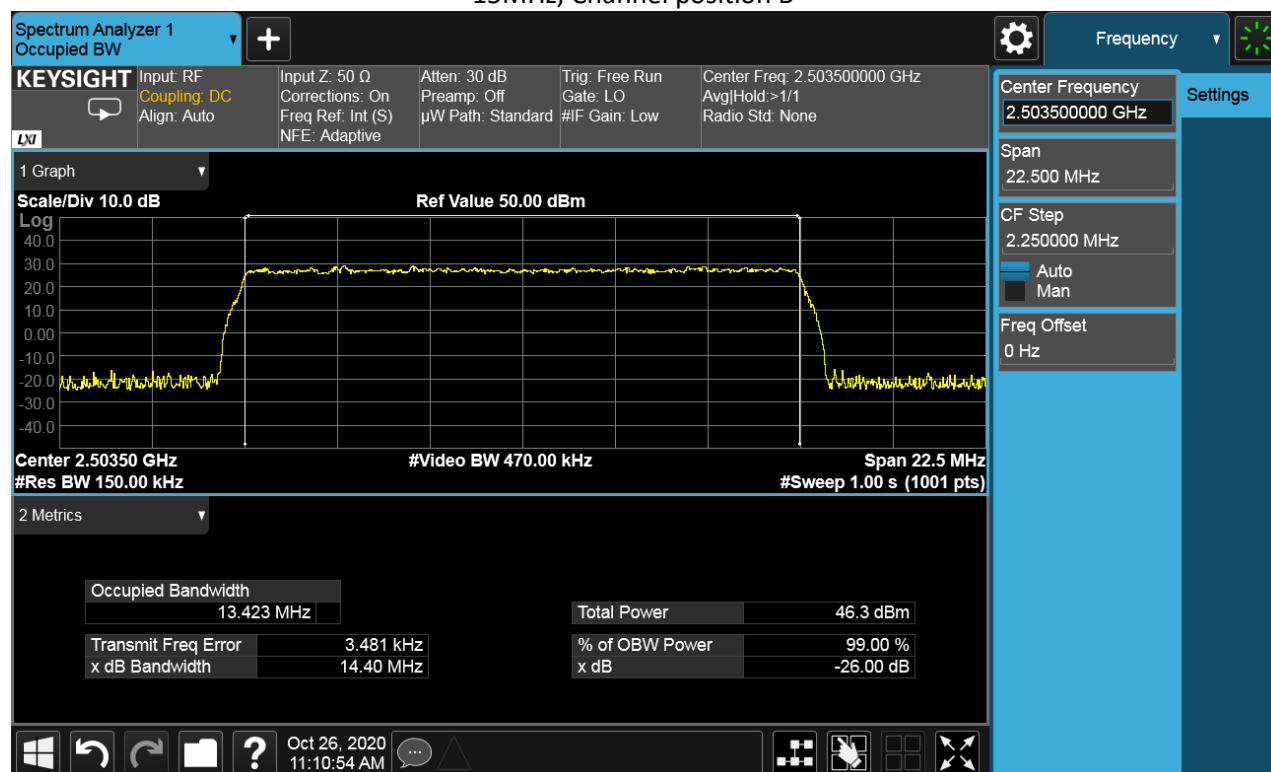
10MHz, Channel position M



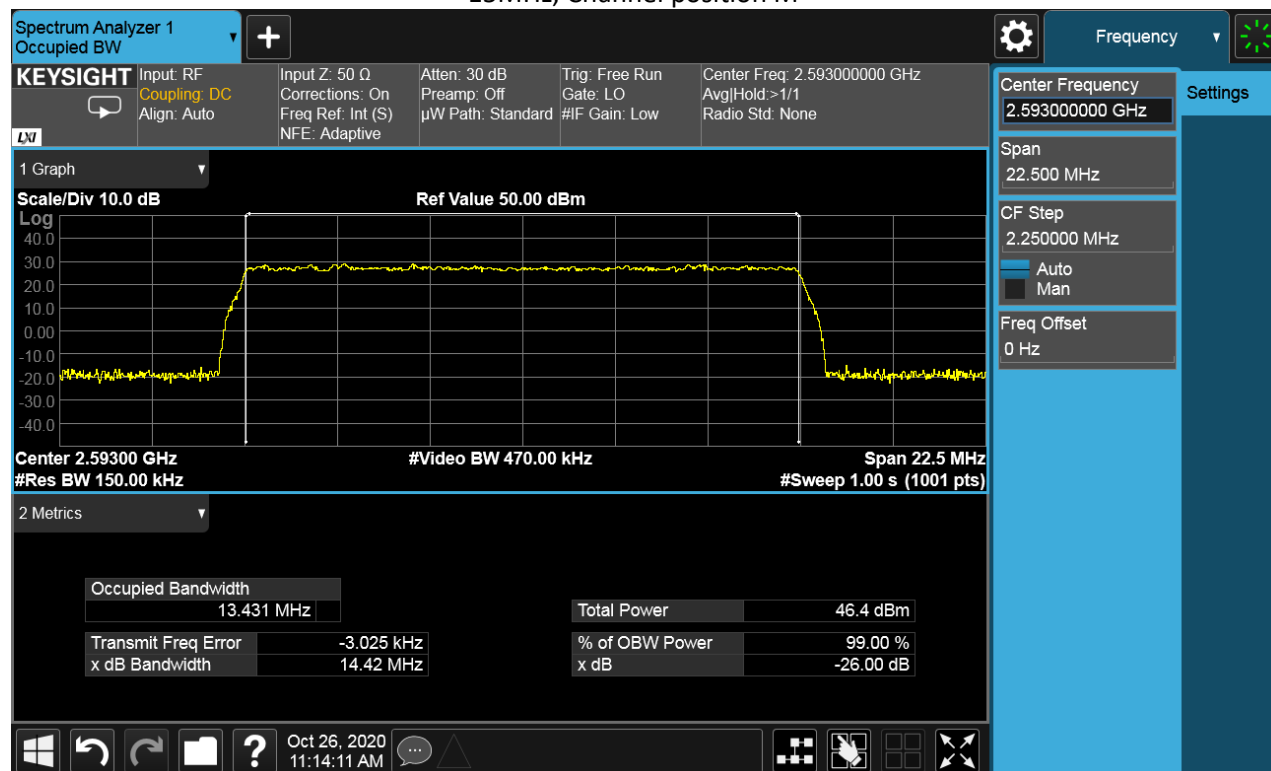
10MHz, Channel position T



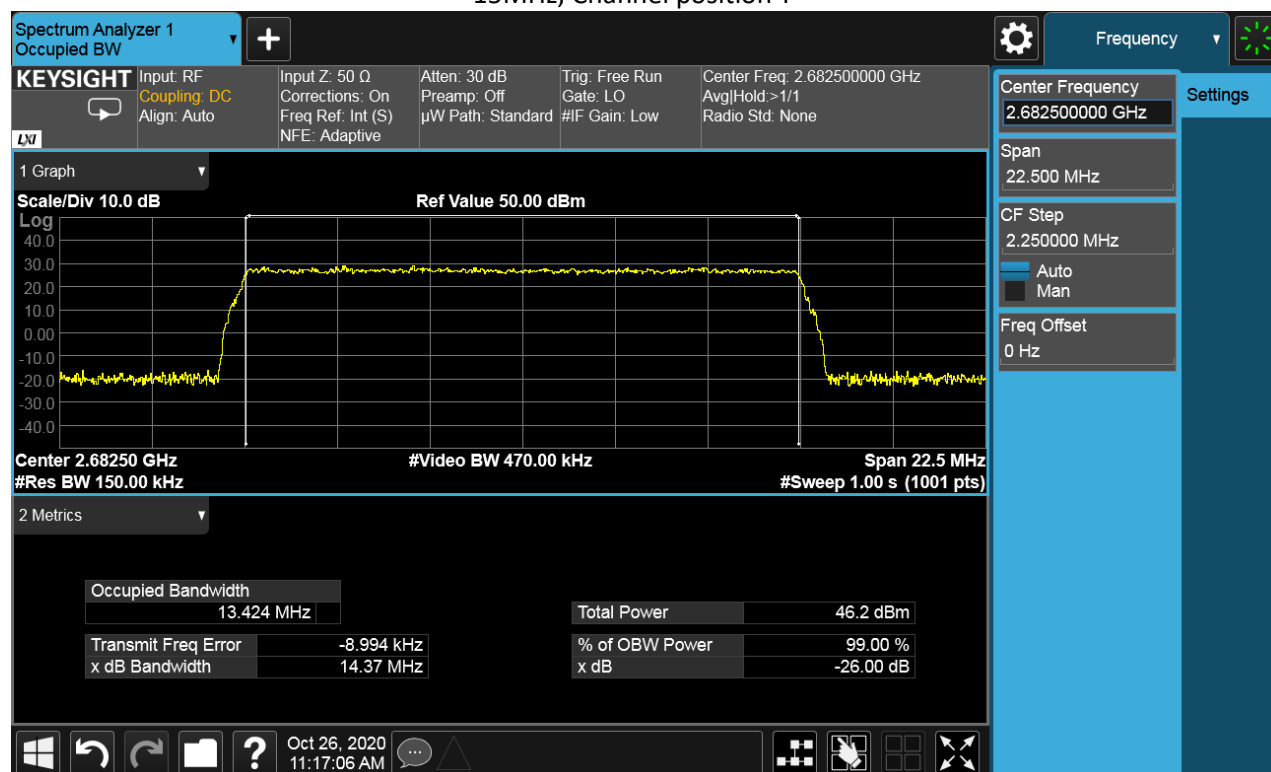
15MHz, Channel position B



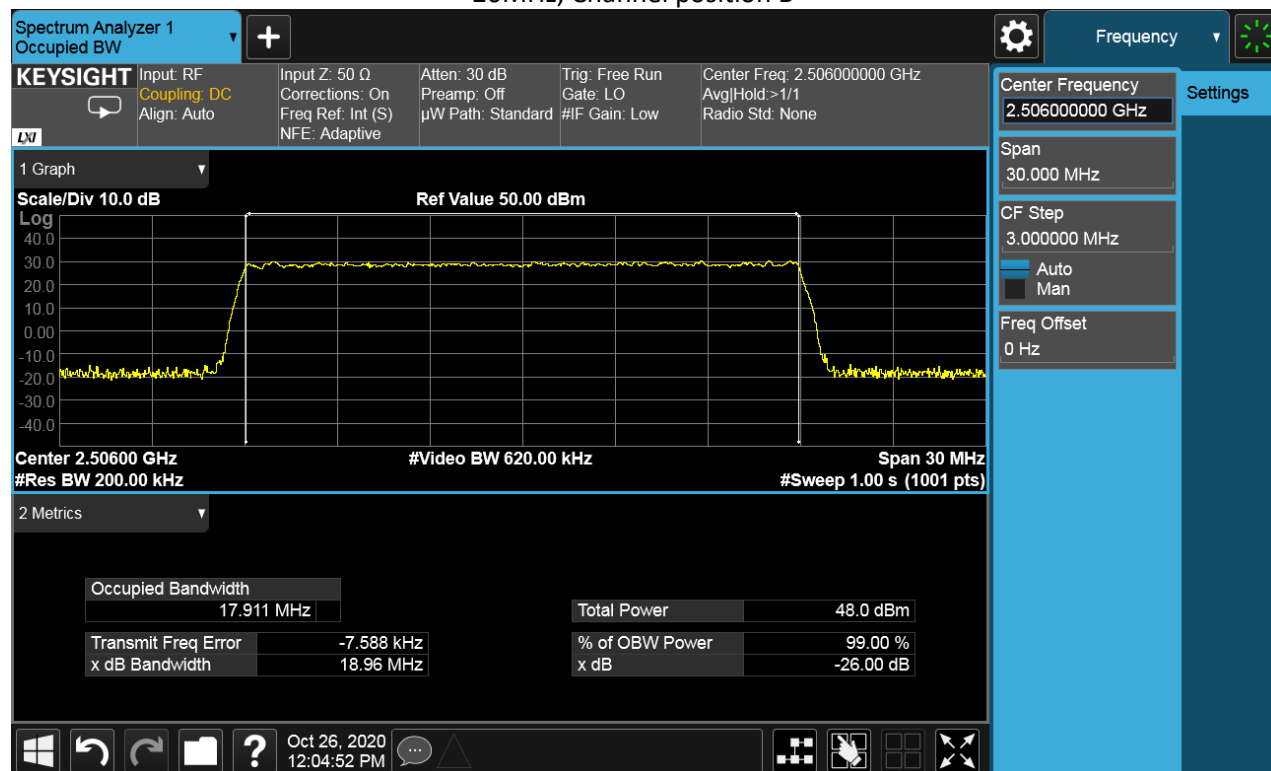
15MHz, Channel position M



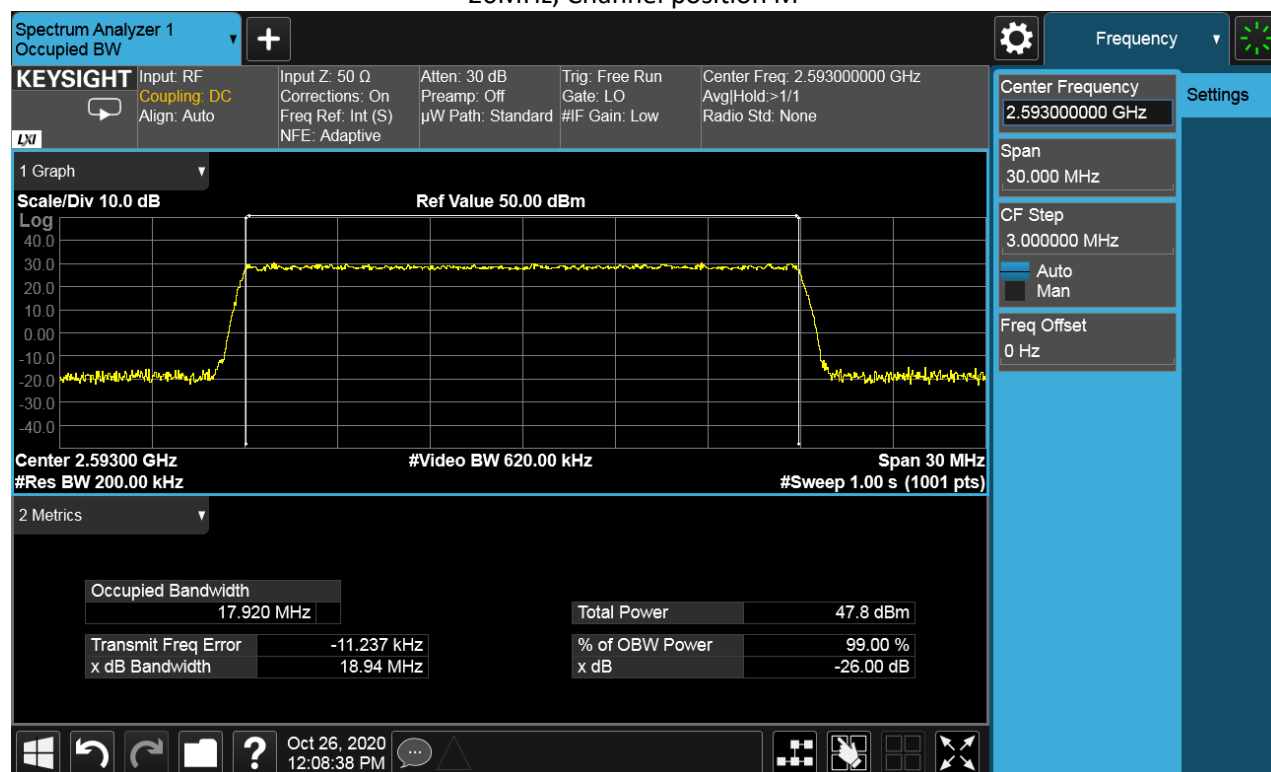
15MHz, Channel position T



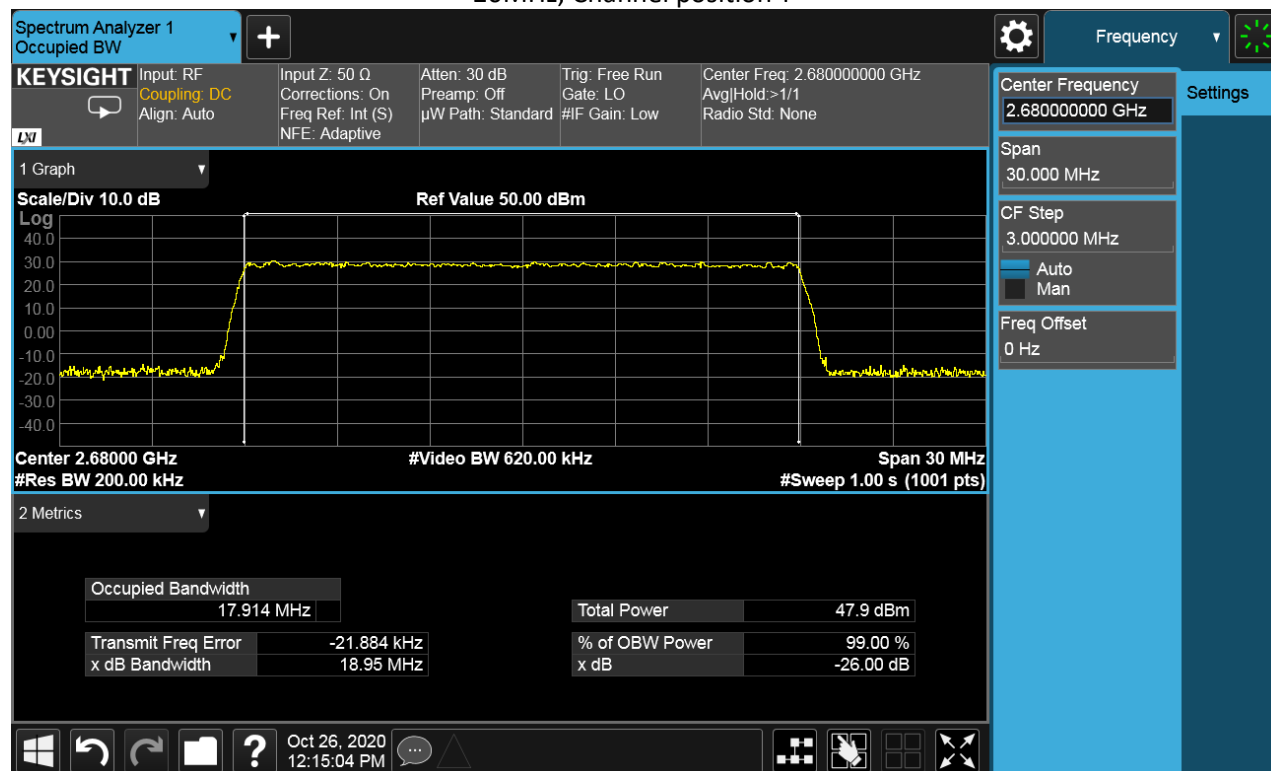
20MHz, Channel position B



20MHz, Channel position M



20MHz, Channel position T



5 Unwanted Emissions at Band Edge

Test result: Pass

5.1 Limit

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.

5.2 Measurement Procedure

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.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [$10\log(1/4)$] by using the Measure and Add $10\log(N)$ dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports . Then the limit was adjusted to -19.02dBm.

In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed and a RBW of 1MHz for measurements of emissions > 1MHz away from the band edges.

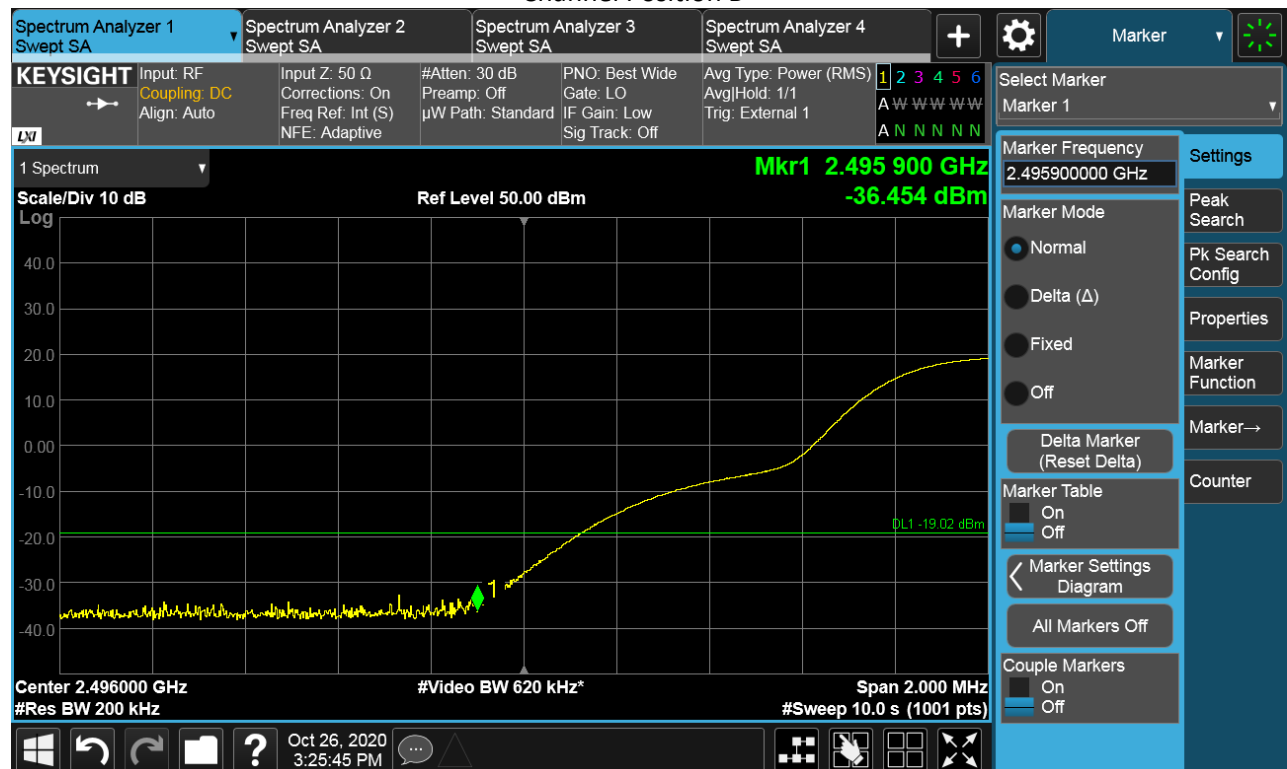
Spectrum analyzer detector was set as RMS.

5.3 Measurement result

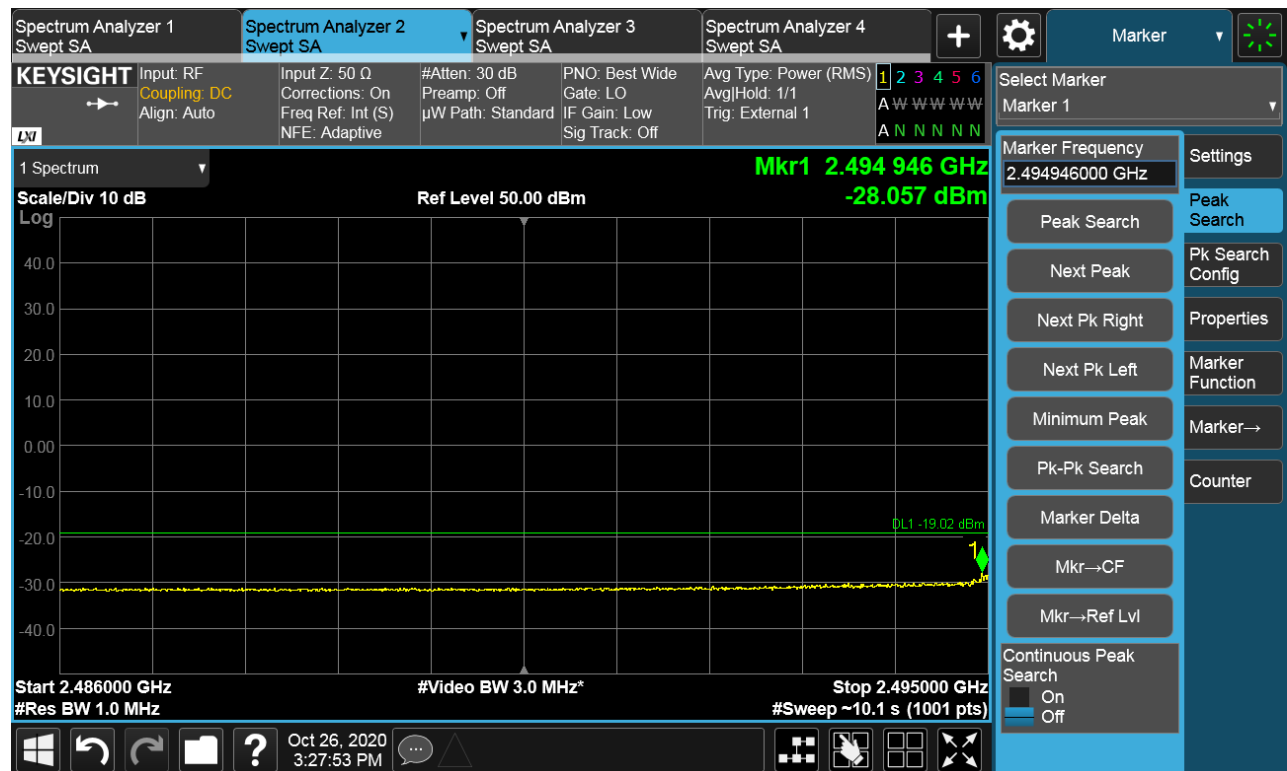
Configuration NR-MIMO-1C-BE

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)	RBW (kHz)	Limit (dBm)
B	B	256QAM	20	200	-19.02
				1000	-19.02
B	T	256QAM	20	200	-19.02
				1000	-19.02

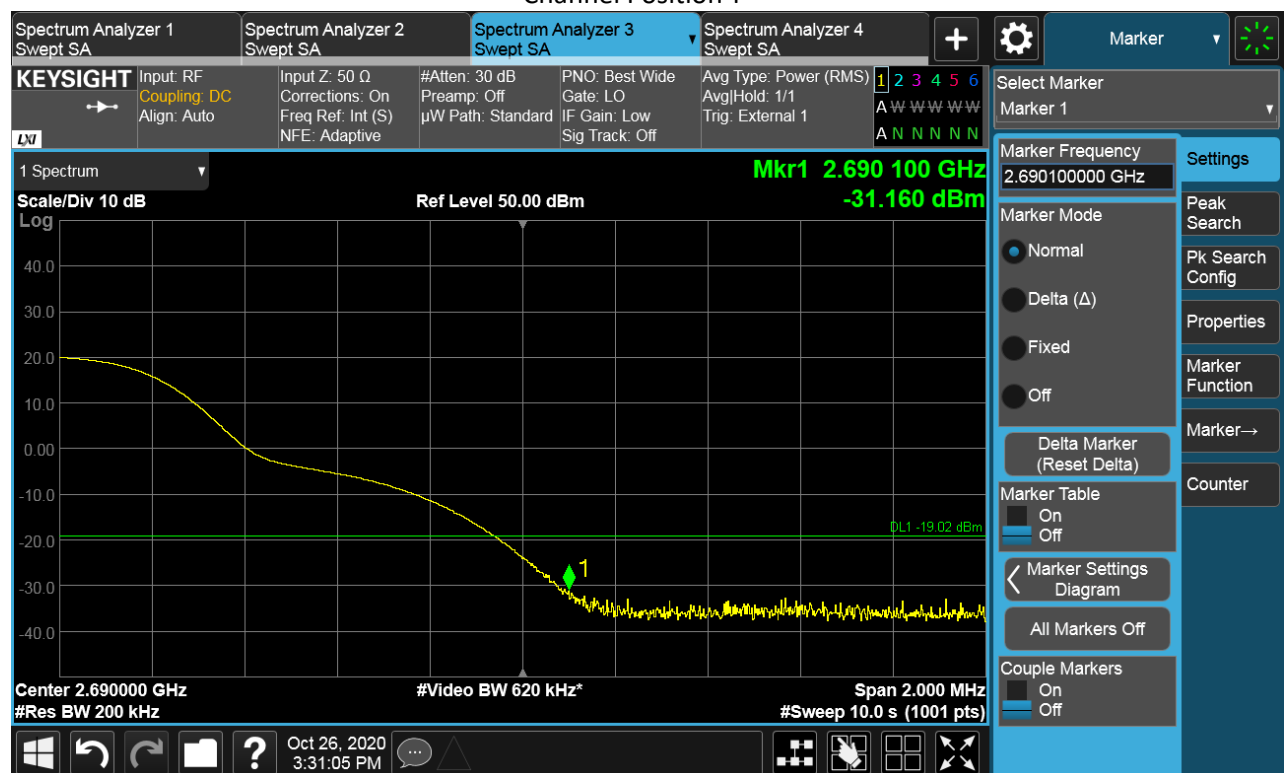
Channel Position B



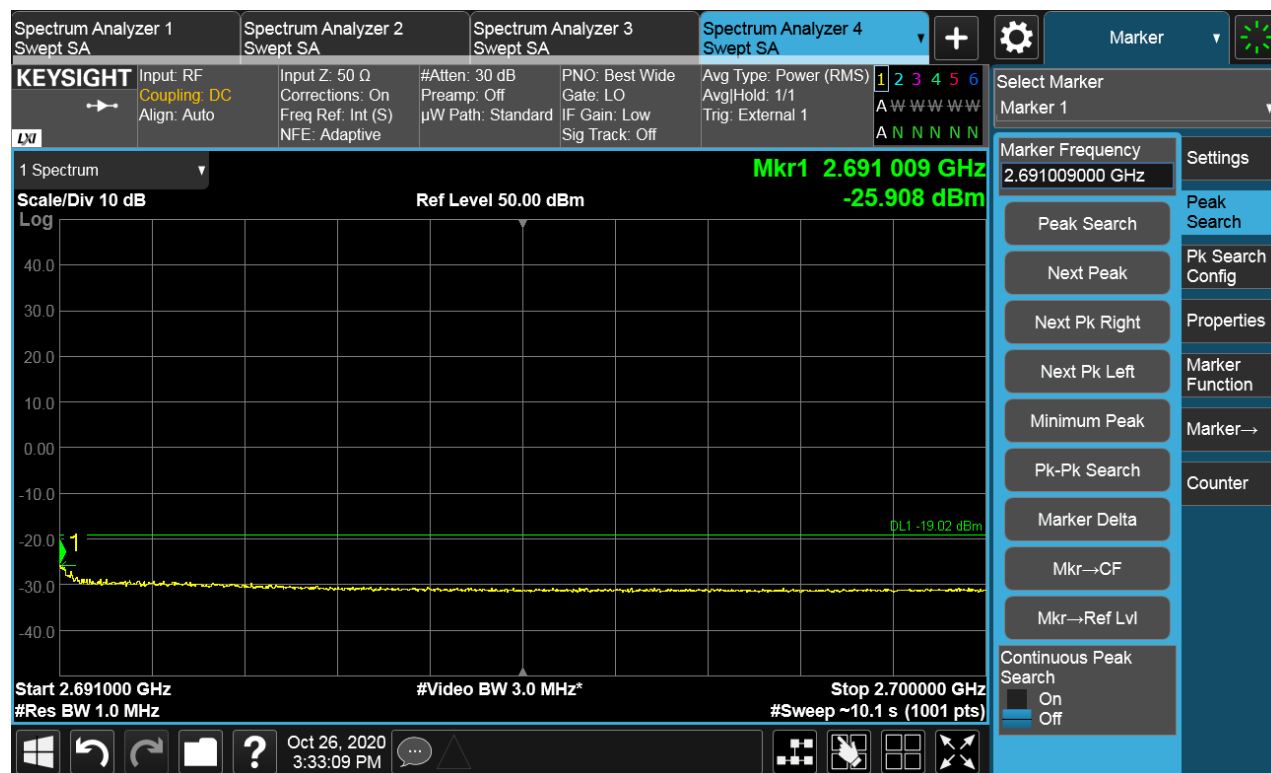
TEST REPORT



Channel Position T



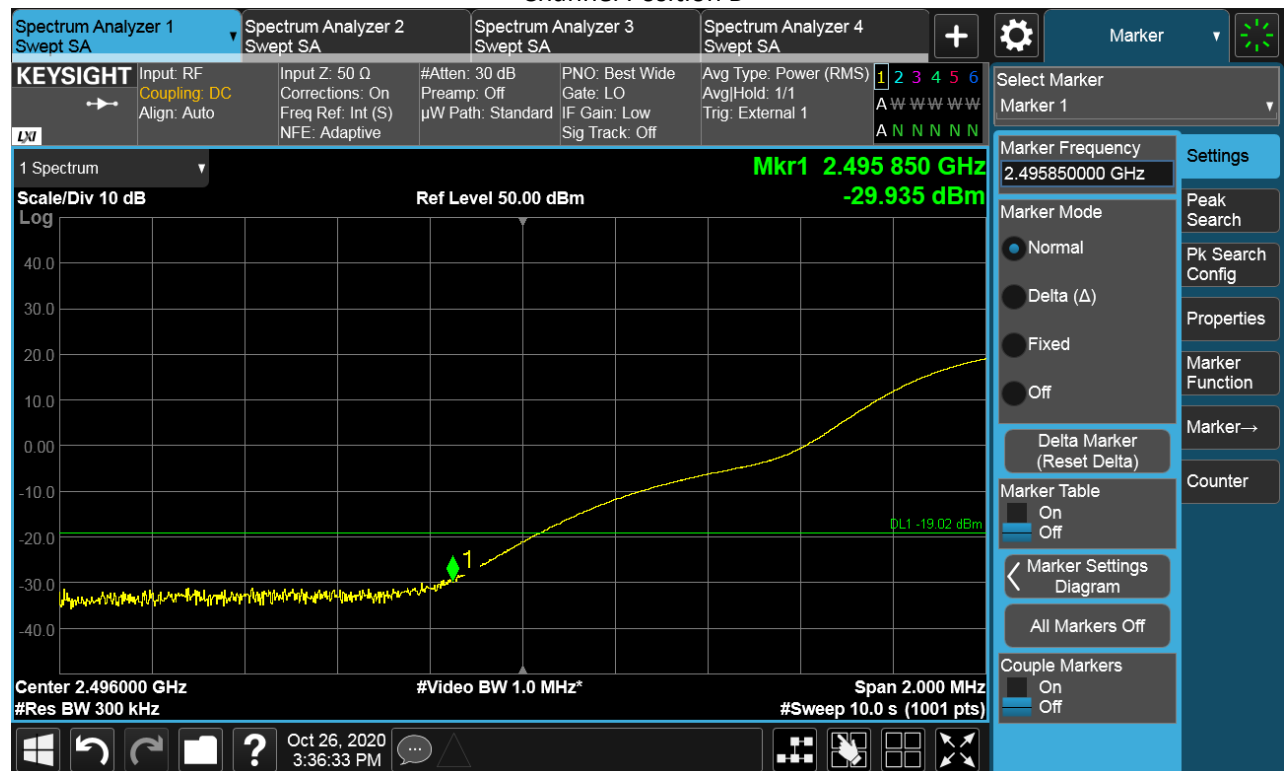
TEST REPORT



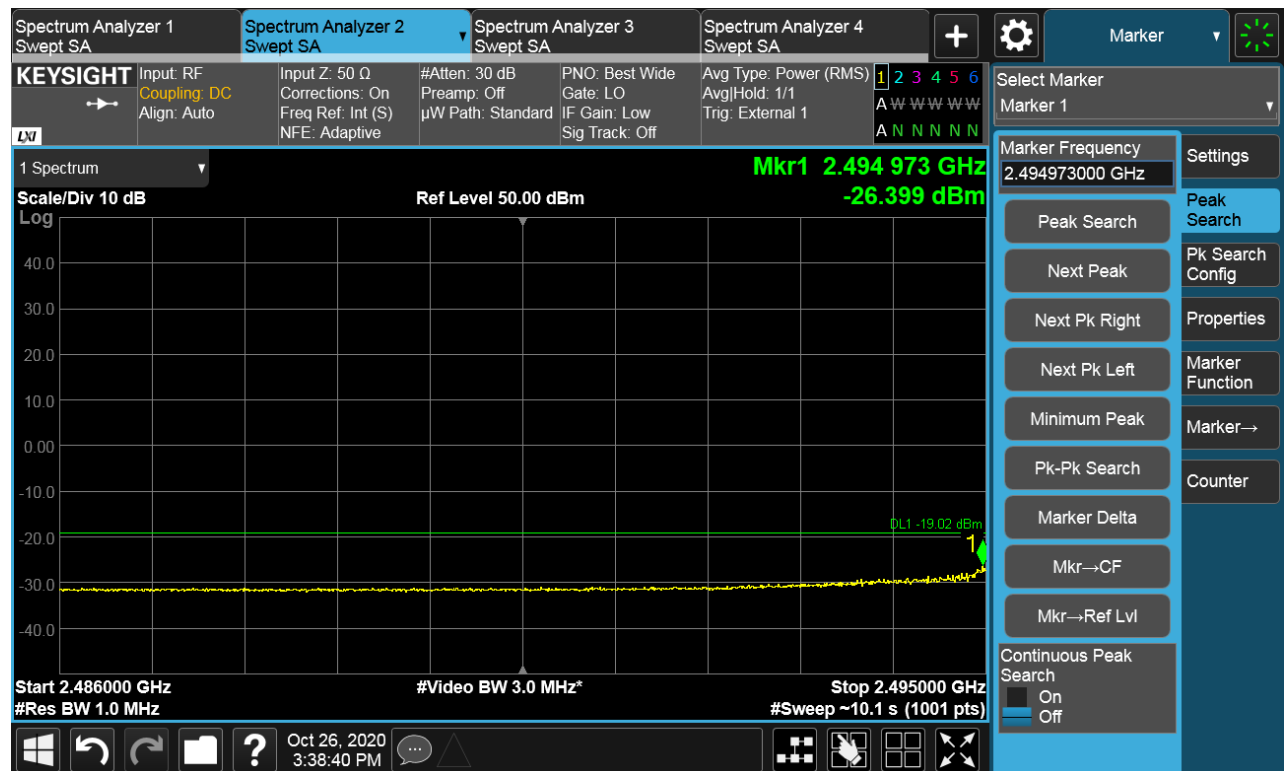
TEST REPORT

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)	RBW (kHz)	Limit (dBm)
B	B	256QAM	30	300	-19.02
				1000	-19.02
B	T	256QAM	30	300	-19.02
				1000	-19.02

Channel Position B



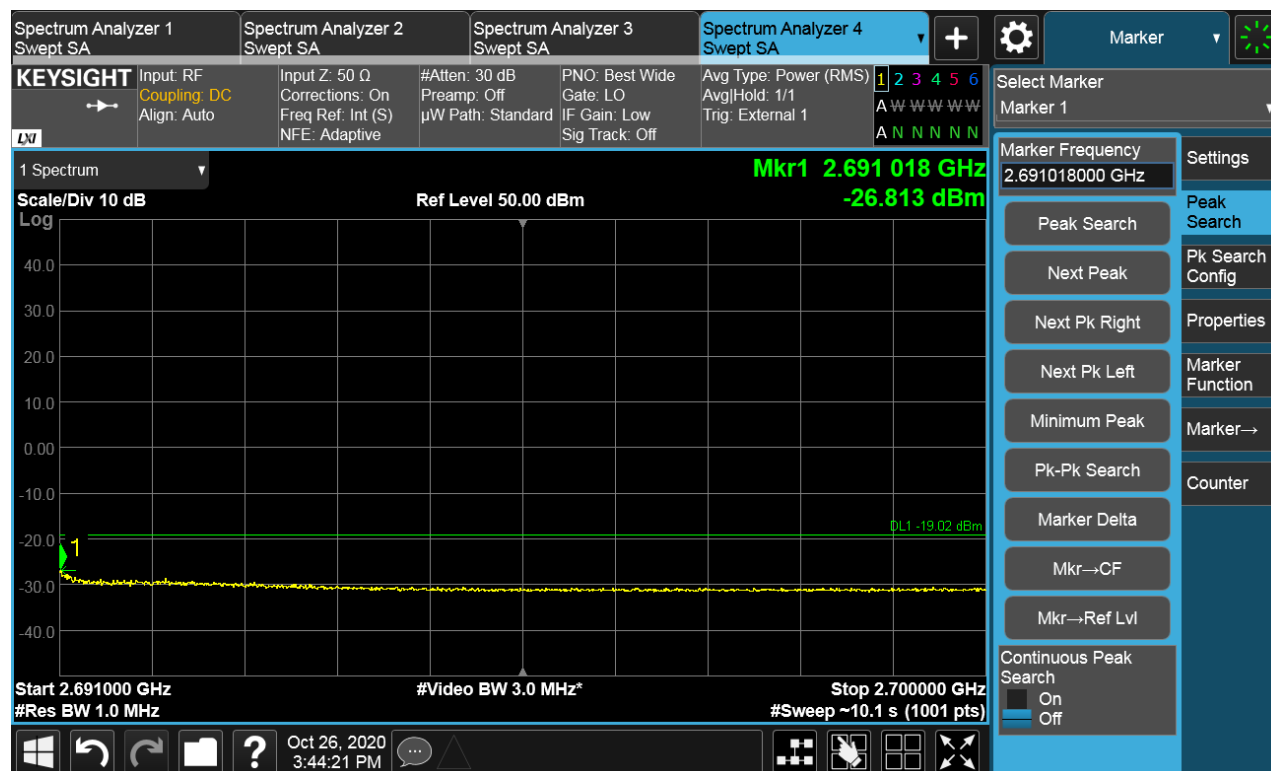
TEST REPORT



Channel Position T



TEST REPORT



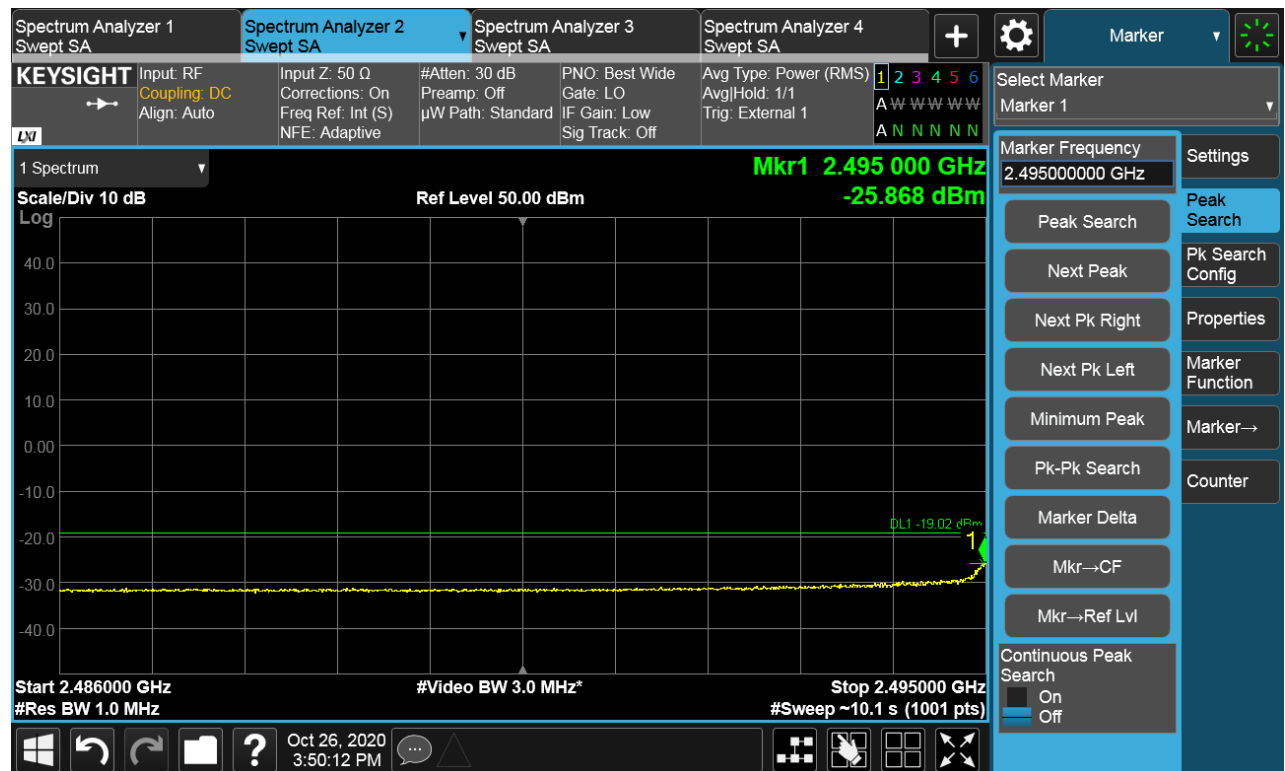
TEST REPORT

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)	RBW (kHz)	Limit (dBm)
B	B	256QAM	40	400	-19.02
				1000	-19.02
B	T	256QAM	40	400	-19.02
				1000	-19.02

Channel Position B



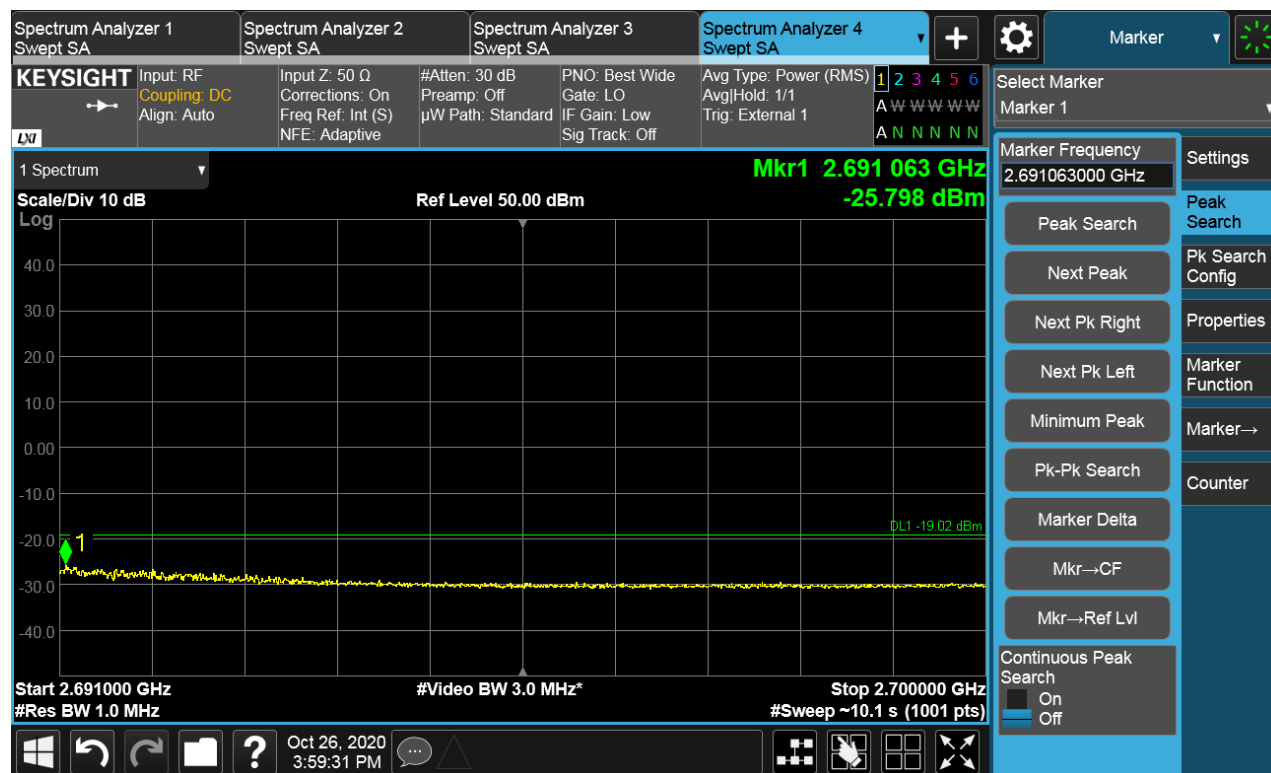
TEST REPORT



Channel Position T



TEST REPORT



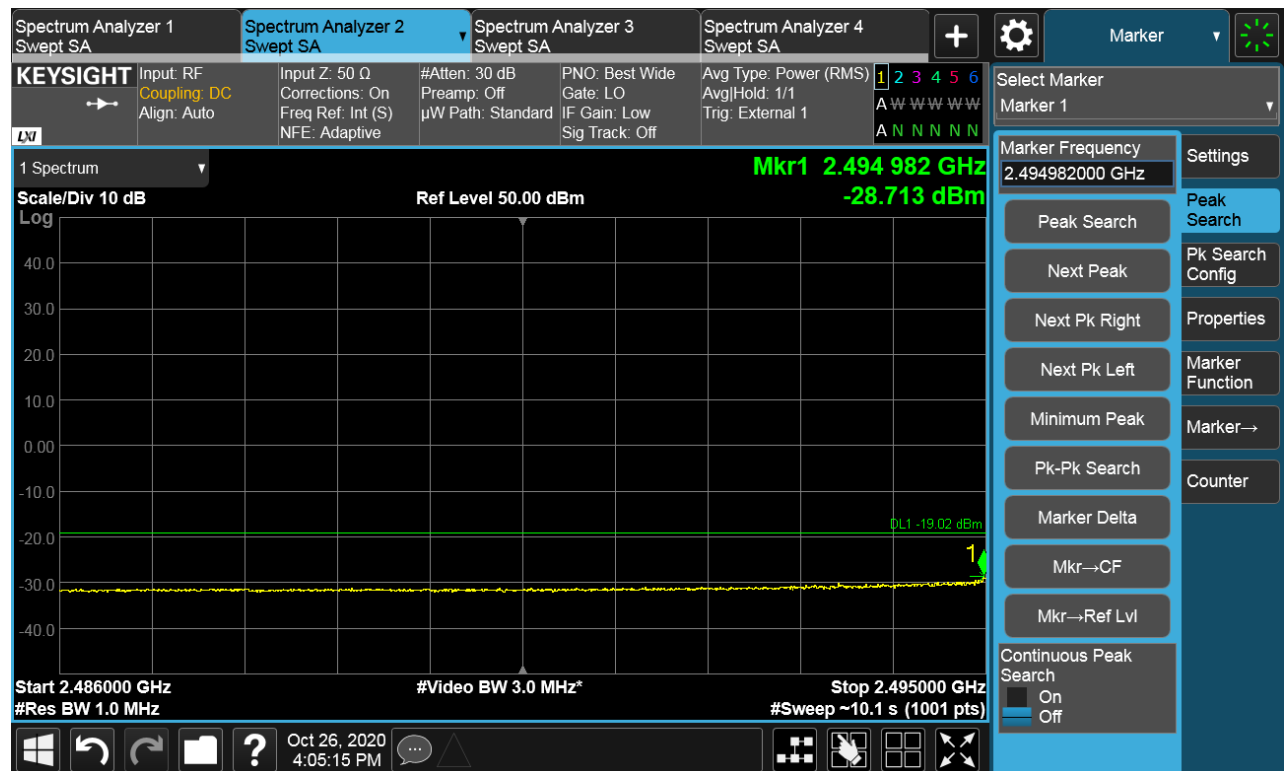
TEST REPORT

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)	RBW (kHz)	Limit (dBm)
B	B	256QAM	50	500	-19.02
				1000	-19.02
B	T	256QAM	50	500	-19.02
				1000	-19.02

Channel Position B



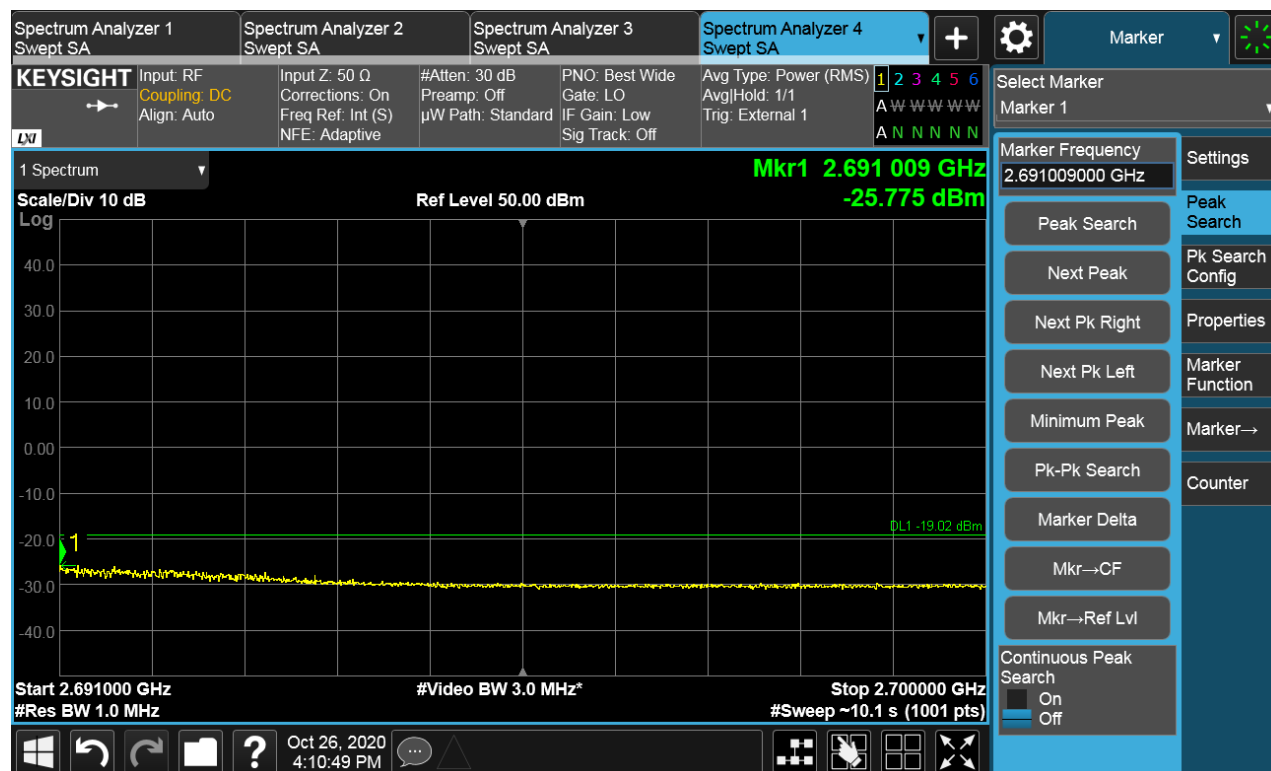
TEST REPORT



Channel Position T



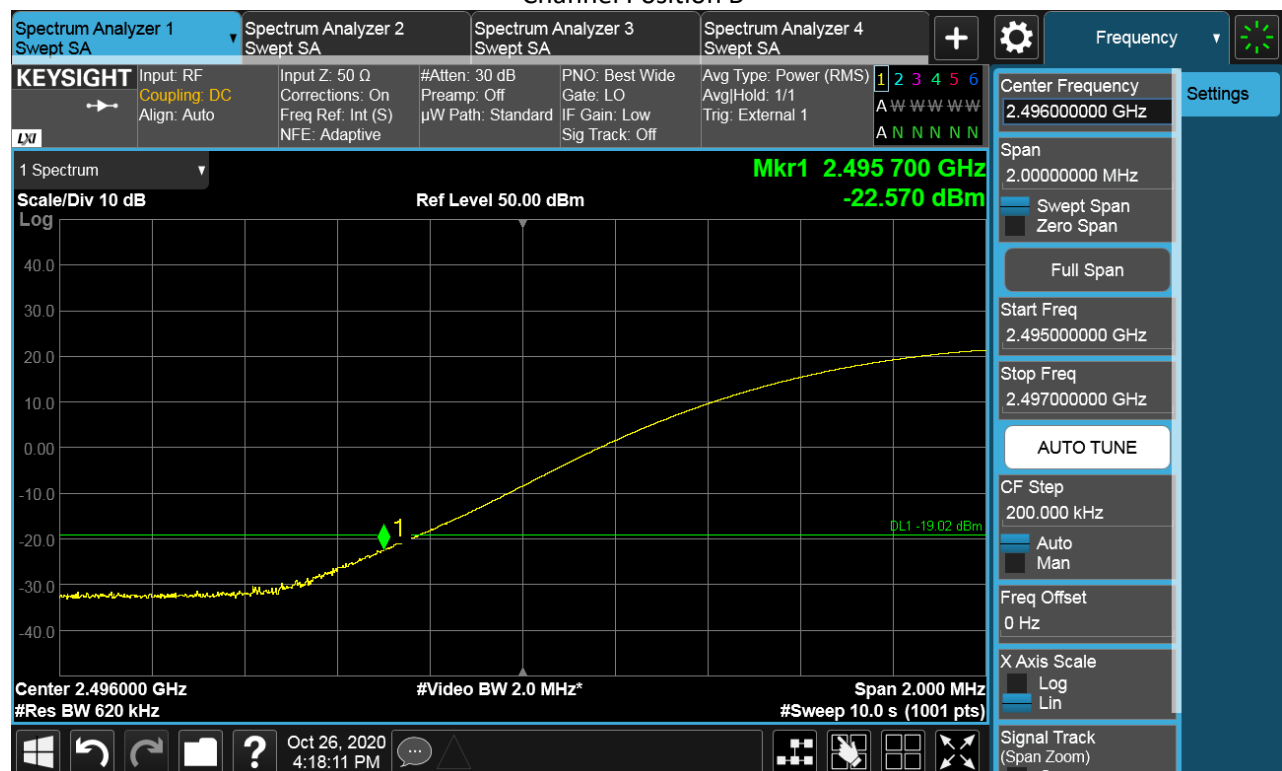
TEST REPORT



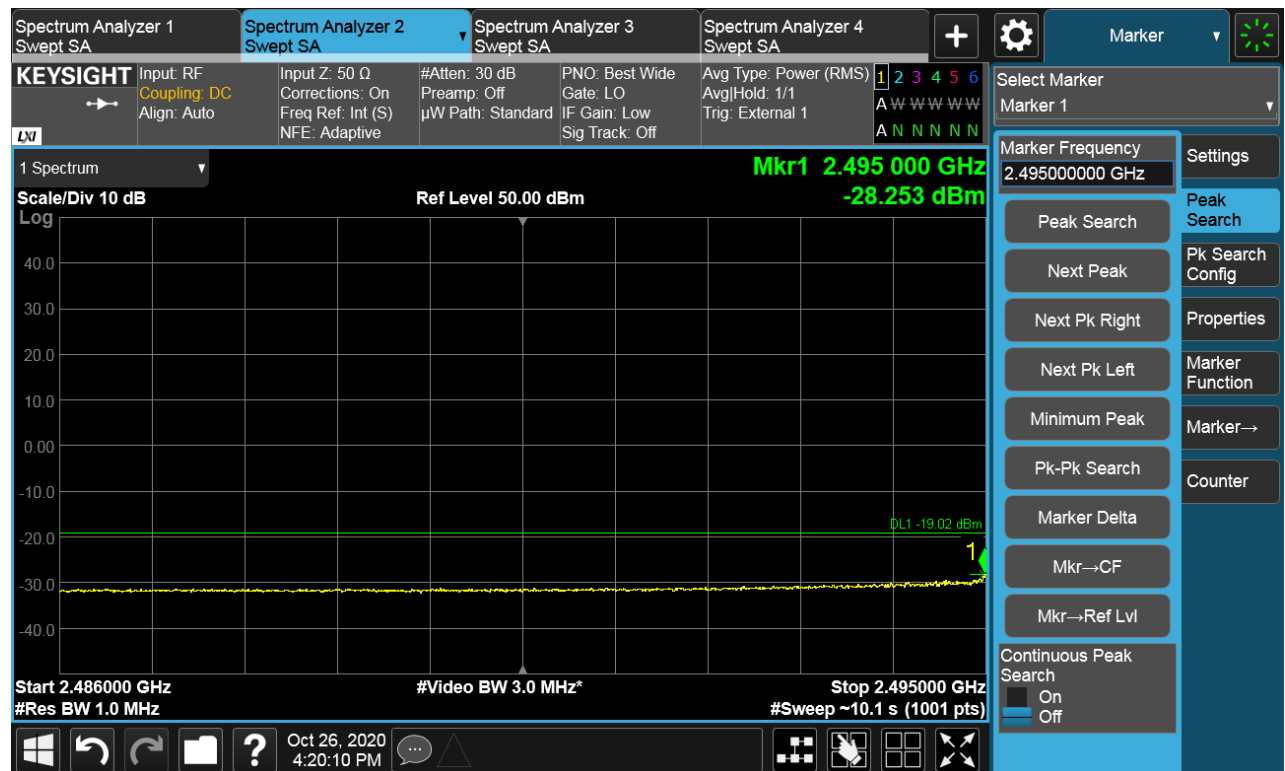
TEST REPORT

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)	RBW (kHz)	Limit (dBm)
B	B	256QAM	60	600	-19.02
				1000	-19.02
B	T	256QAM	60	600	-19.02
				1000	-19.02

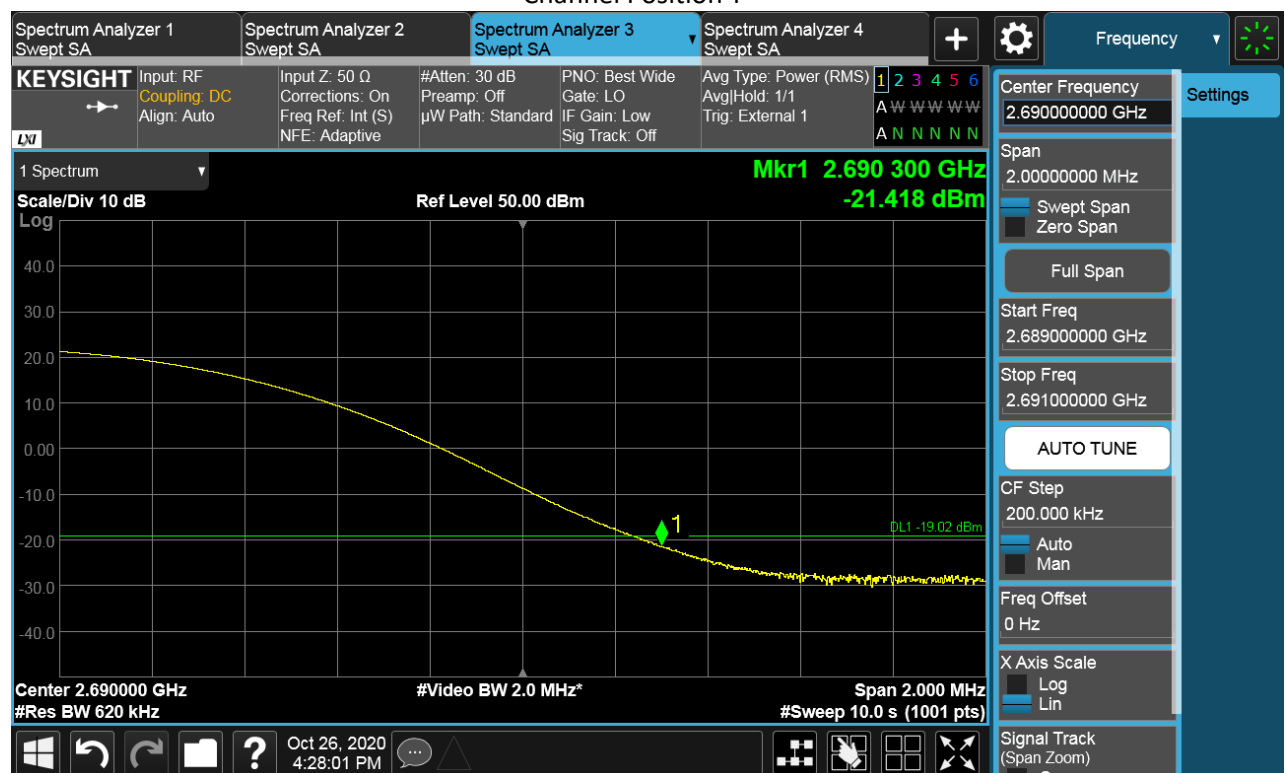
Channel Position B



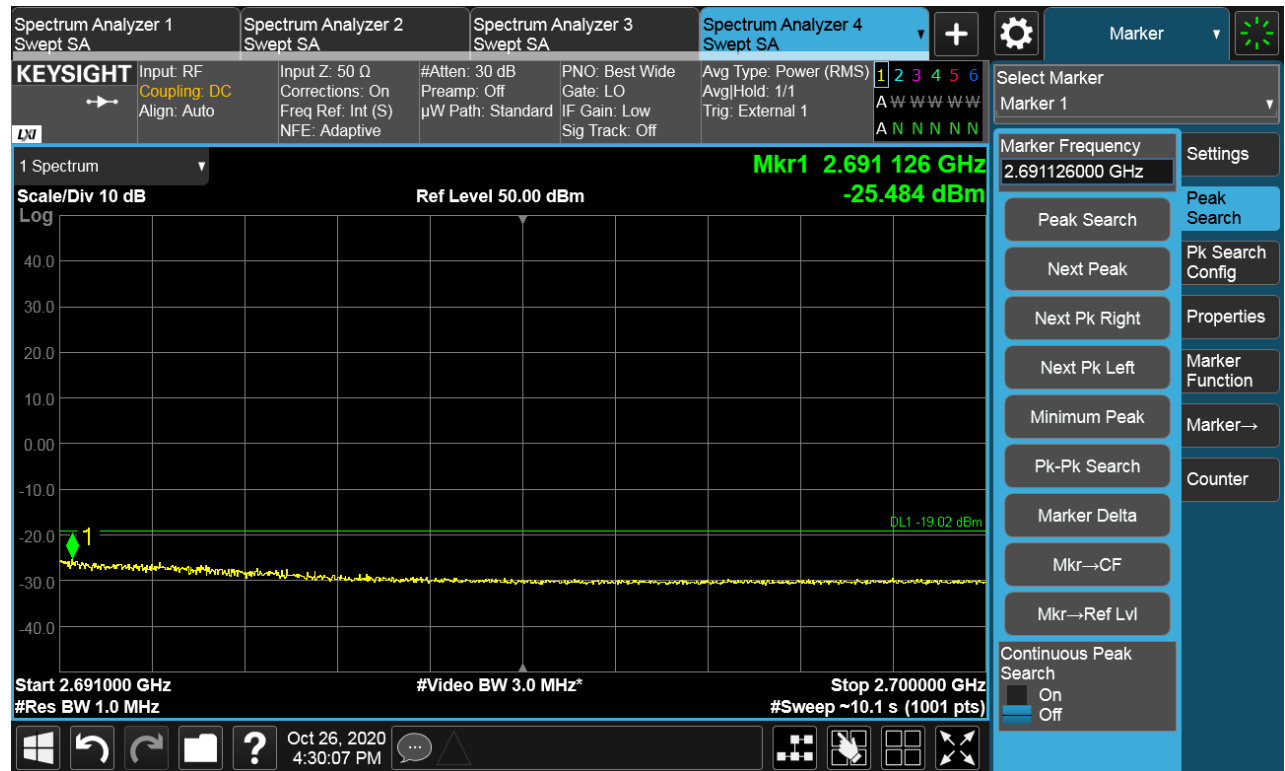
TEST REPORT



Channel Position T



TEST REPORT



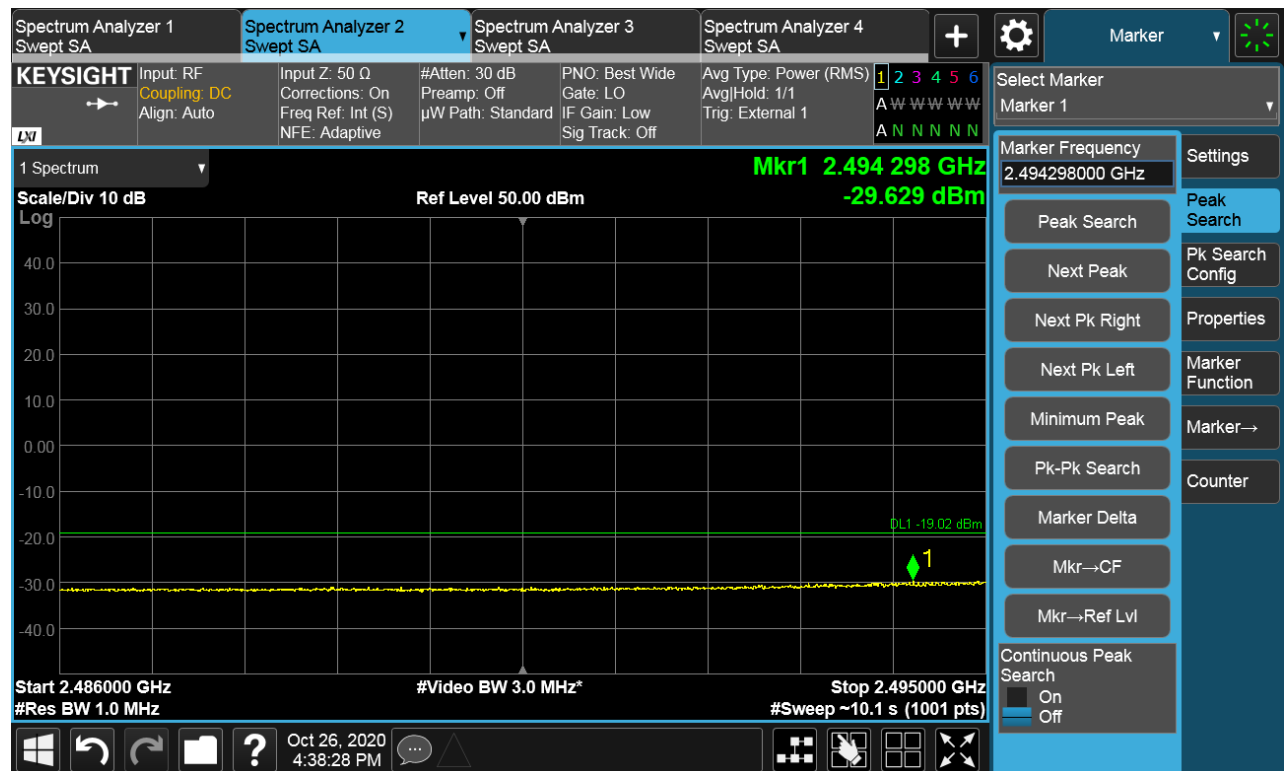
TEST REPORT

Antenna Port	Channel Position	Modulation	Channel Bandwidth (MHz)	RBW (kHz)	Limit (dBm)
B	B	256QAM	80	800	-19.02
				1000	-19.02
B	T	256QAM	80	800	-19.02
				1000	-19.02

Channel Position B



TEST REPORT



Channel Position T

