TEST REPORT

NR-2C

Antenna Port	NR Modulation	NR 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	QPSK	25	-	-	-	44.05	27.70	-	-	-	-
B	QPSK	25	-	-	-	44.05	27.74	-	-	-	-
C	QPSK	25	-	-	-	43.80	27.49	-	-	-	-
D	QPSK	25	-	-	-	43.83	27.54	-	-	-	-
Total conducted power			-	-	-	49.95	33.64	-	-	-	-
EIRP limit			-	-	-	-	62.15	-	-	-	-
Max antenna gain			-	-	-	-	28.51	-	-	-	-

Antenna Port	NR Modulation	NR 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	QPSK	30	-	-	-	44.06	26.98	-	-	-	-
B	QPSK	30	-	-	-	44.09	27.01	-	-	-	-
C	QPSK	30	-	-	-	43.83	26.71	-	-	-	-
D	QPSK	30	-	-	-	44.04	26.99	-	-	-	-
Total conducted power			-	-	-	50.03	32.94	-	-	-	-
EIRP limit			-	-	-	-	62.15	-	-	-	-
Max antenna gain			-	-	-	-	29.21	-	-	-	-

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 product s 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 10log (OBW / 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

NR-1C

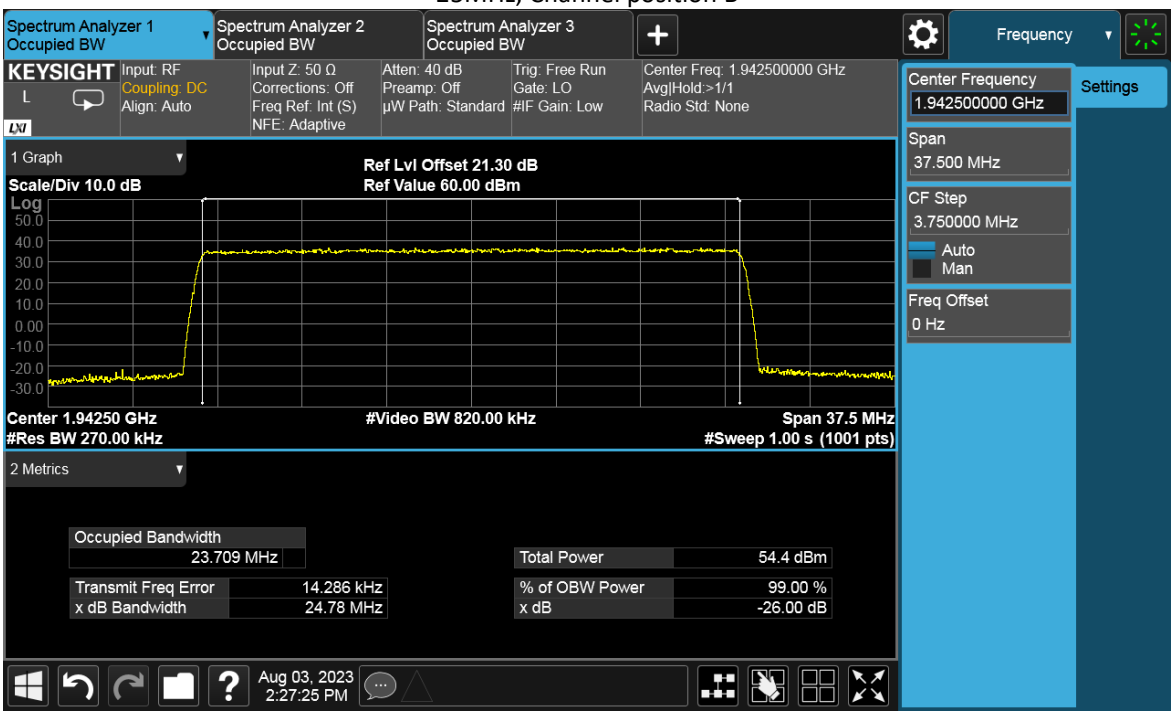
99% Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
B	QPSK	25MHz	23.709	23.726	23.706
B	QPSK	30MHz	28.486	28.519	28.522
B	QPSK	35MHz	33.473	33.506	33.491
B	QPSK	40MHz	38.492	38.524	38.500

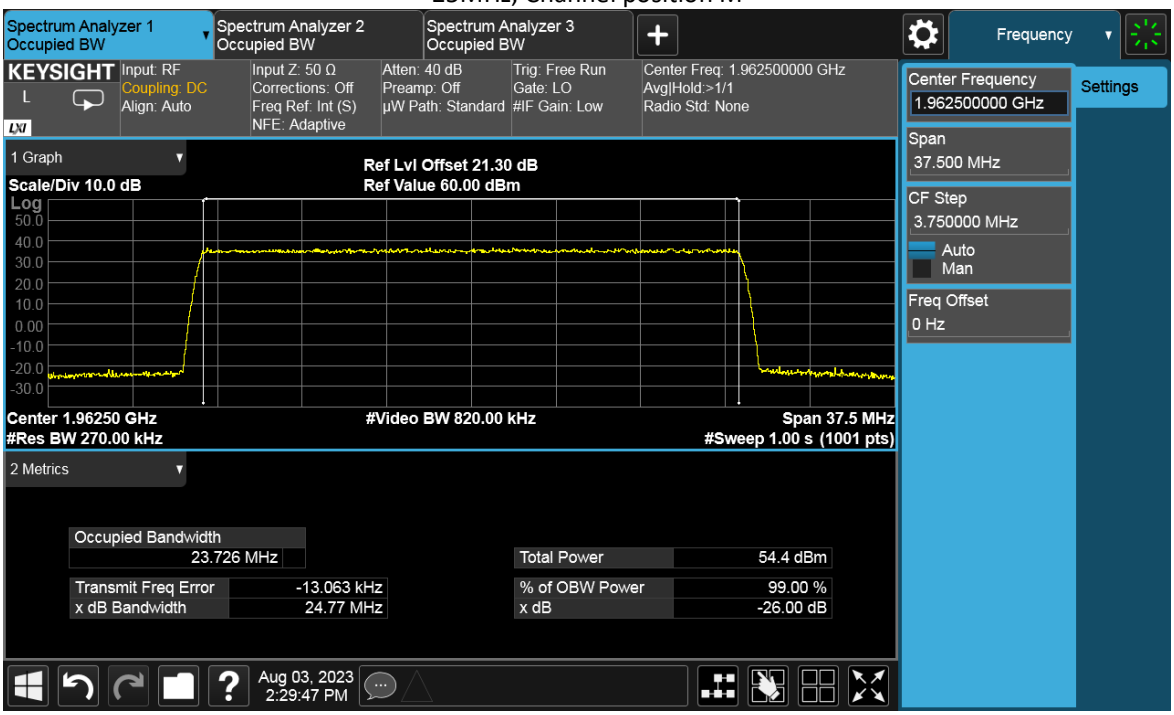
-26dBc Occupied Bandwidth

Antenna Port	Modulation	Bandwidth	Occupied Bandwidth (MHz)		
			Channel Position B	Channel Position M	Channel Position T
B	QPSK	25MHz	24.78	24.77	24.77
B	QPSK	30MHz	29.58	29.58	29.55
B	QPSK	35MHz	34.70	34.67	34.71
B	QPSK	40MHz	40.05	40.06	40.07

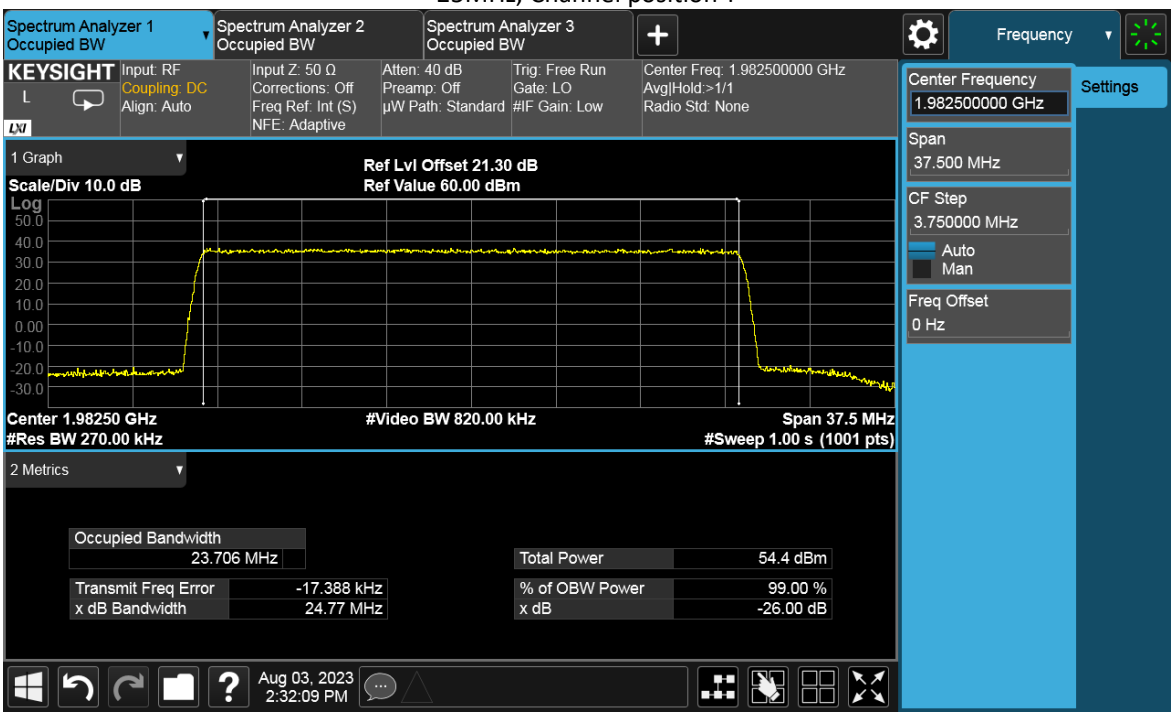
25MHz, Channel position B



25MHz, Channel position M

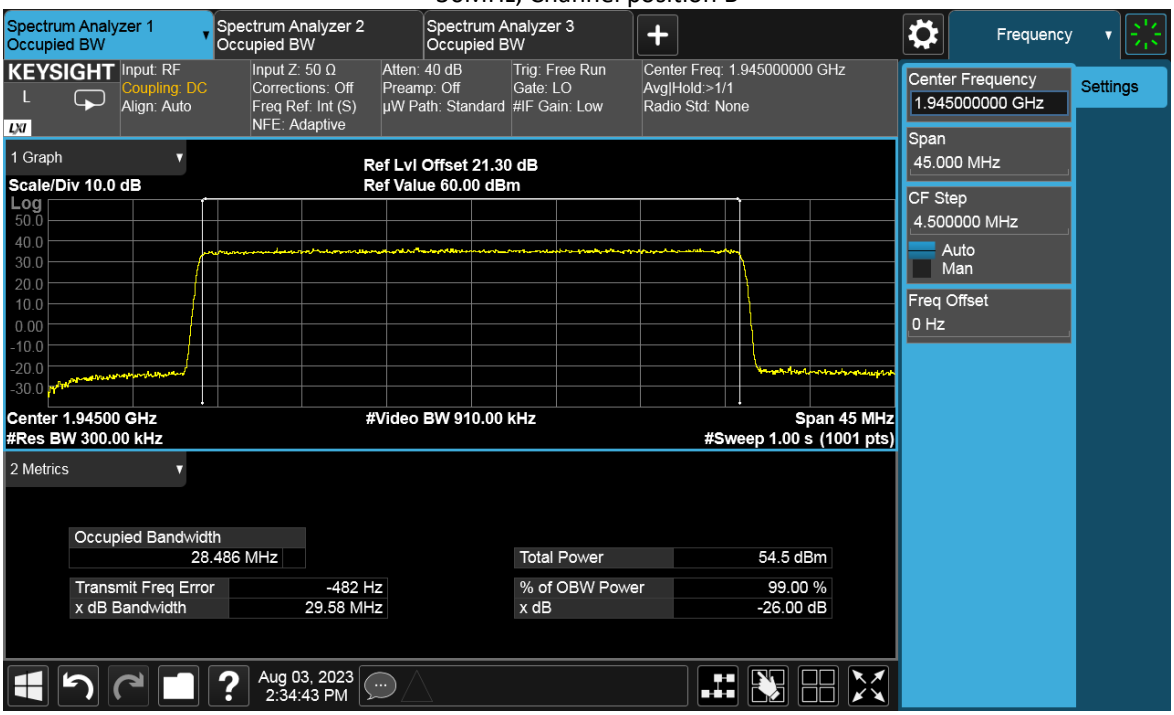


25MHz, Channel position T

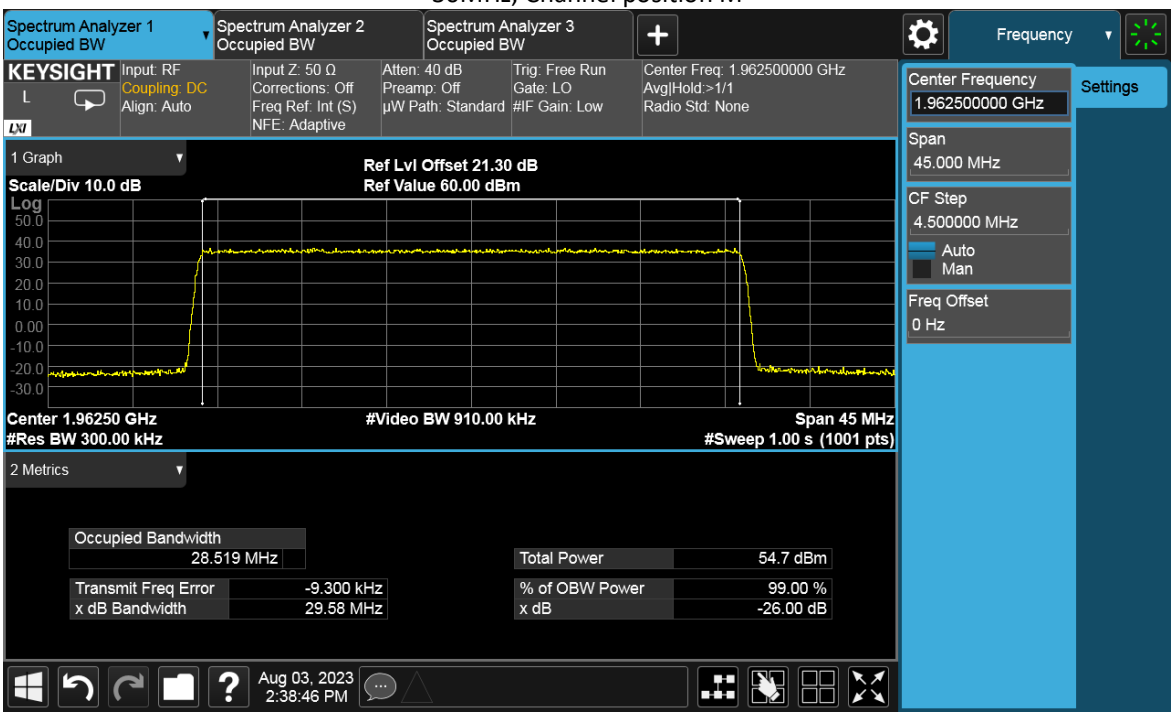


TEST REPORT

30MHz, Channel position B

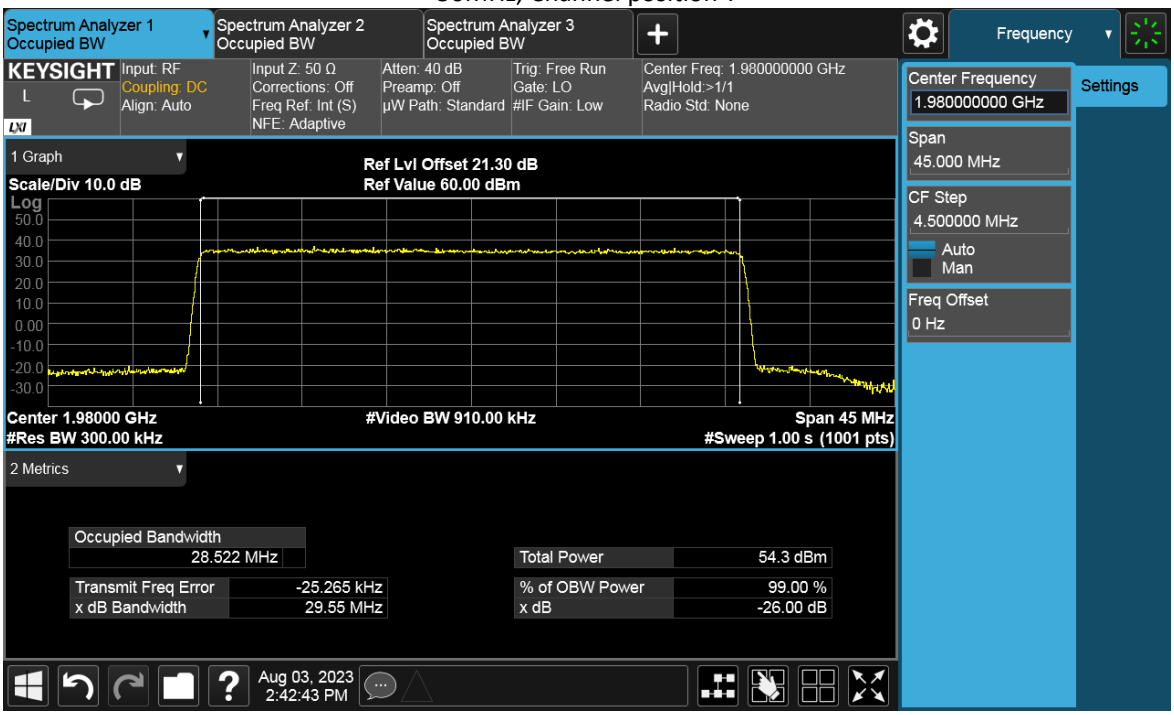


30MHz, Channel position M

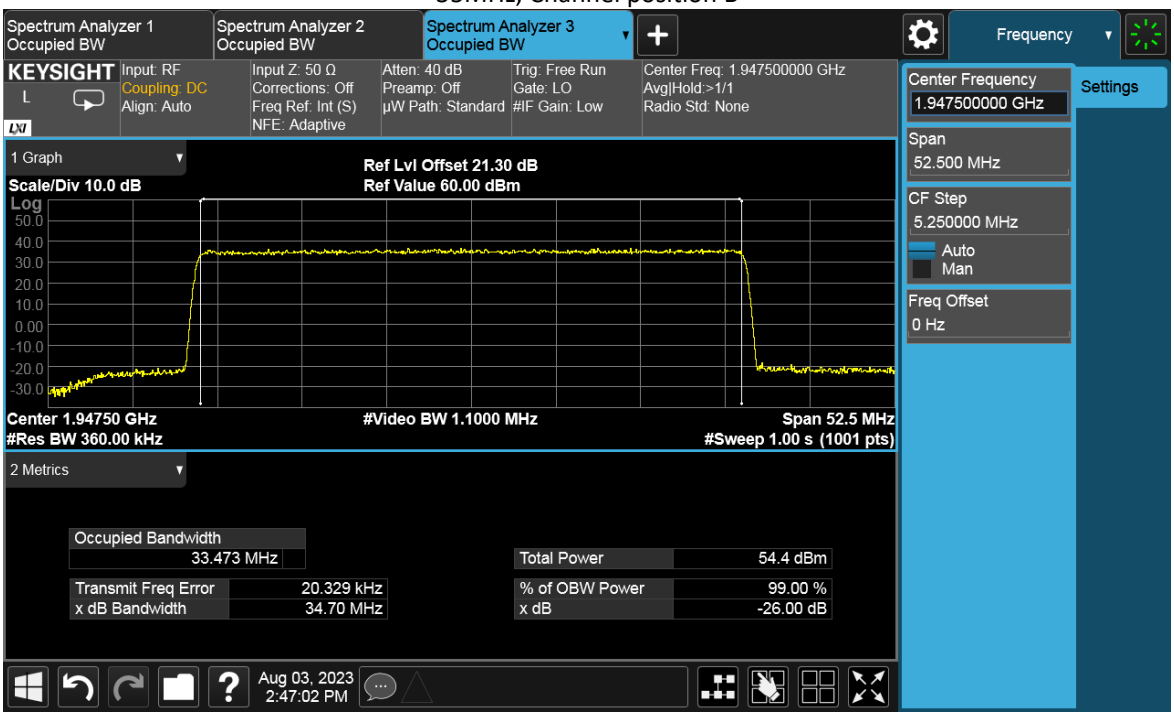


TEST REPORT

30MHz, Channel position T

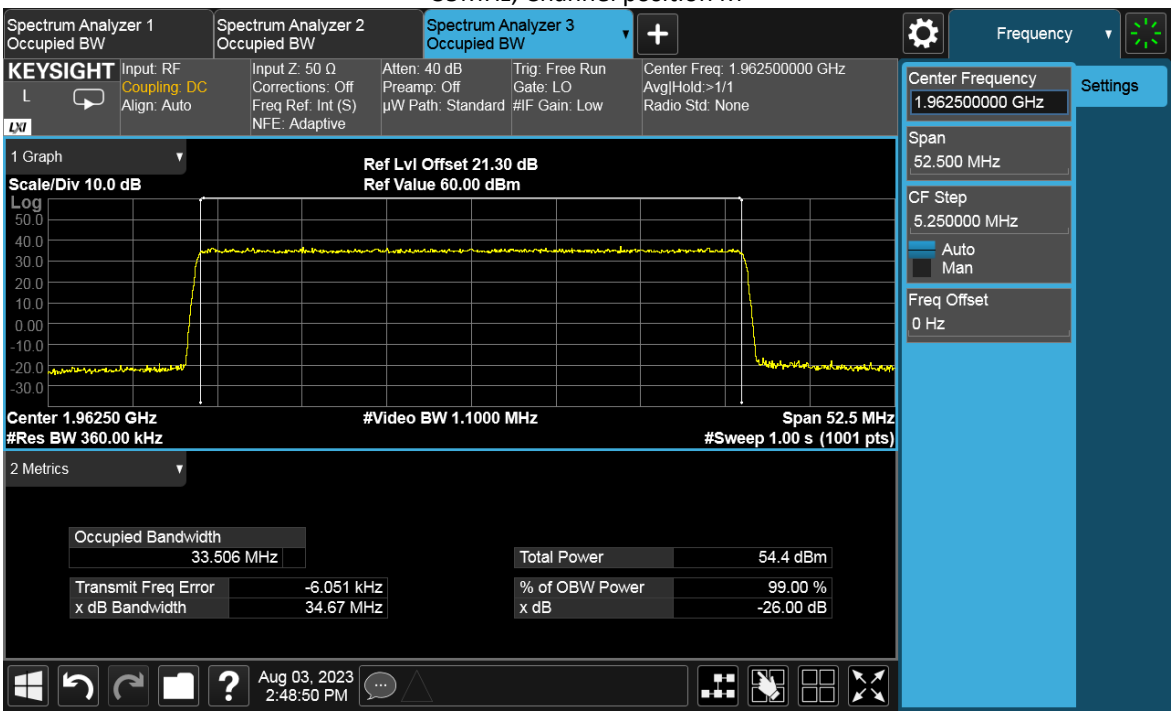


35MHz, Channel position B

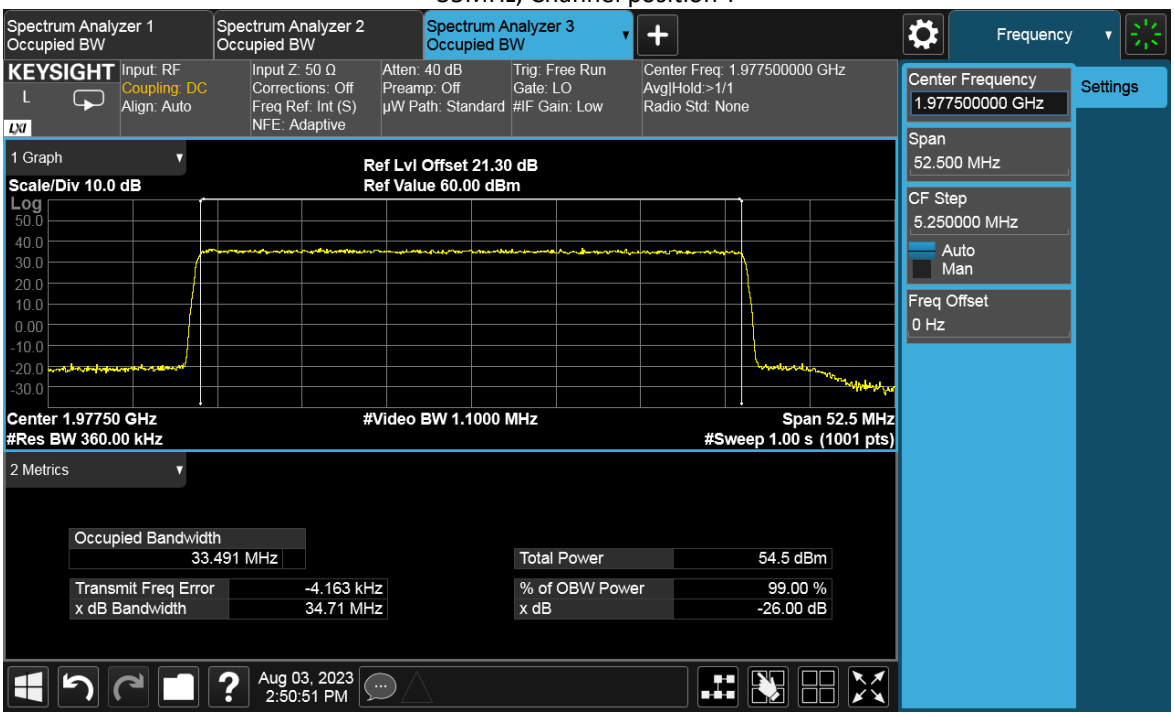


TEST REPORT

35MHz, Channel position M

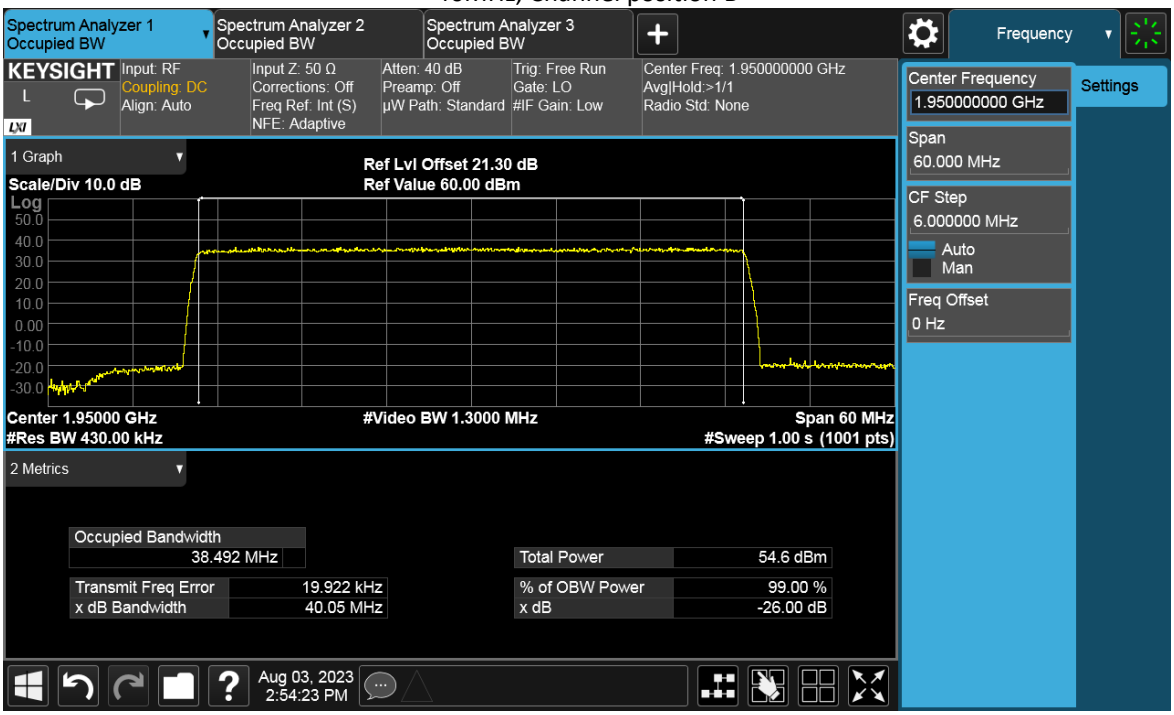


35MHz, Channel position T

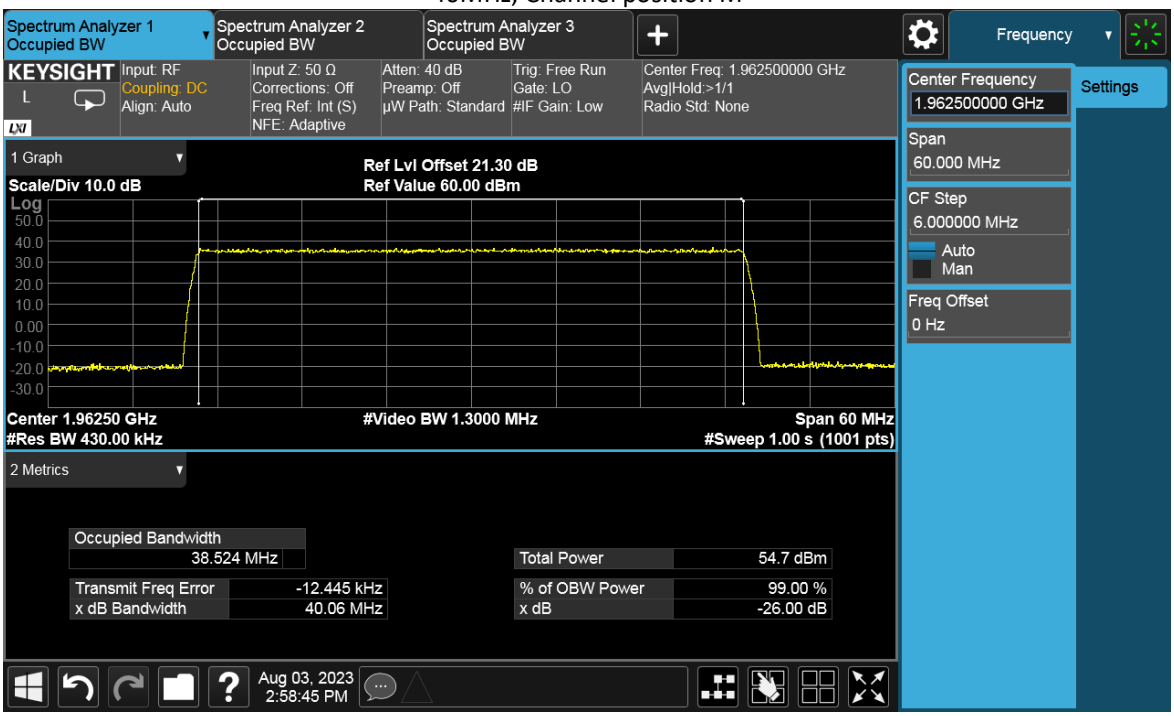


TEST REPORT

40MHz, Channel position B

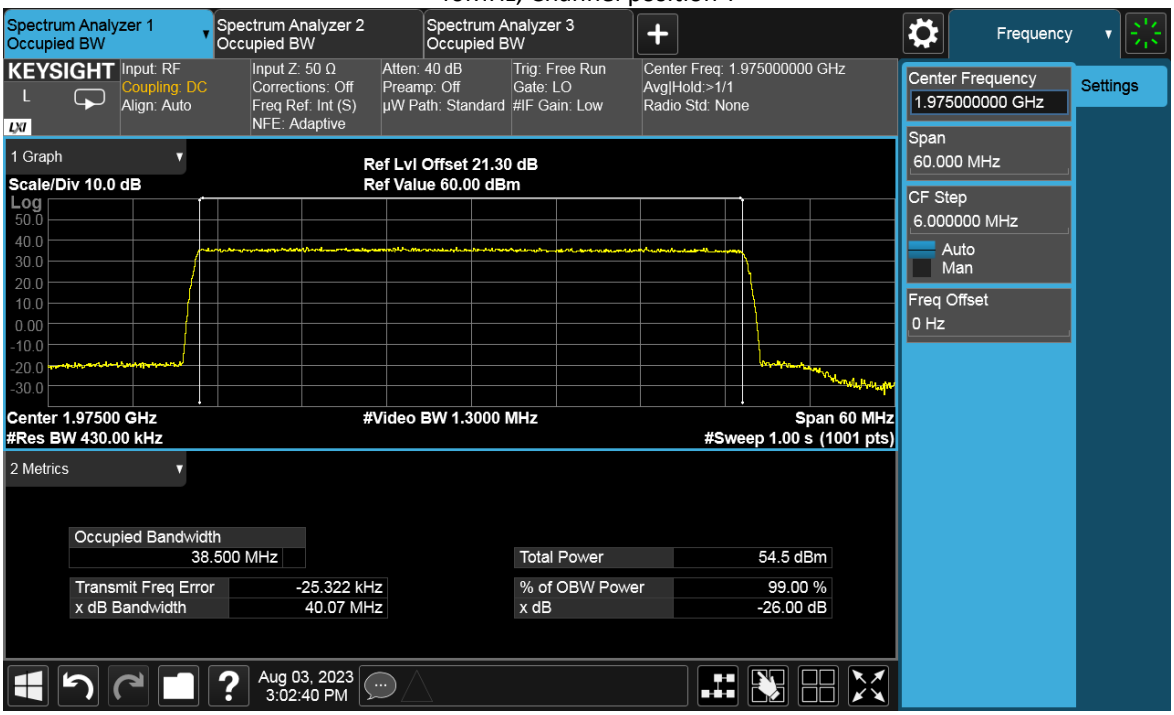


40MHz, Channel position M



TEST REPORT

40MHz, 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 + 10log(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 + 10log(P) dB.

For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [10Log(1/4)] by using the Measure and Add 10Log(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.

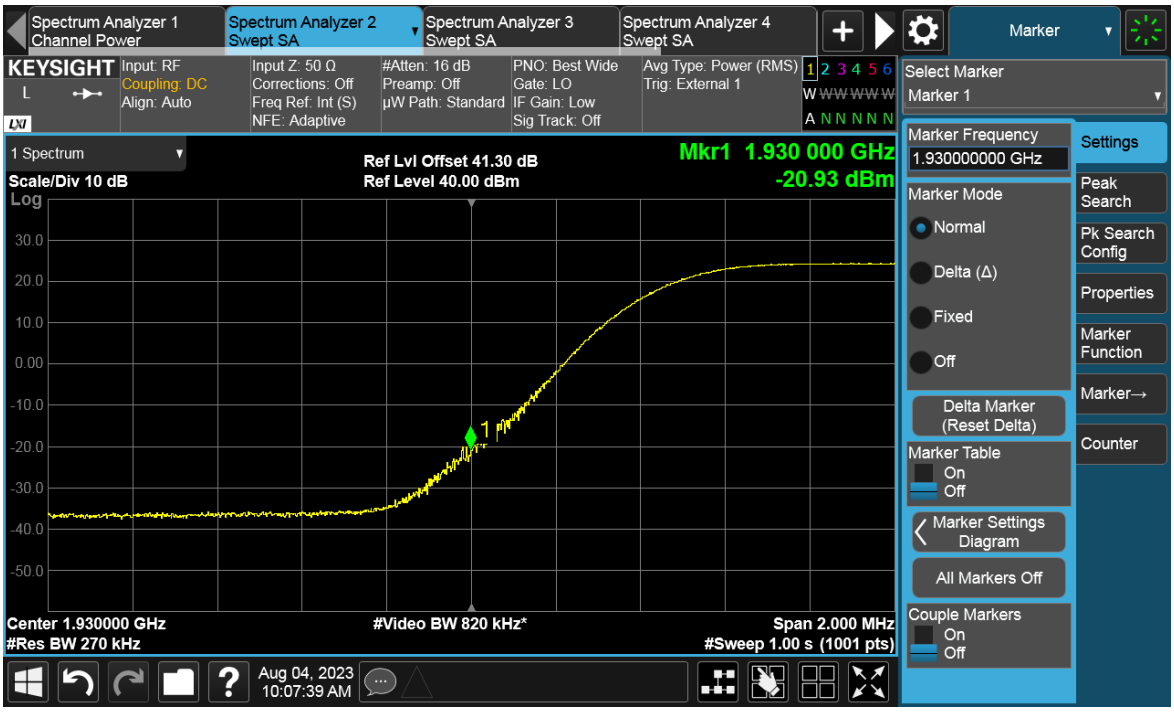
Spectrum analyzer detector was set as RMS.

5.3 Measurement result

NR-1C-BE

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	25	270	-19.02
B	T	QPSK	25	270	-19.02

Channel Position B

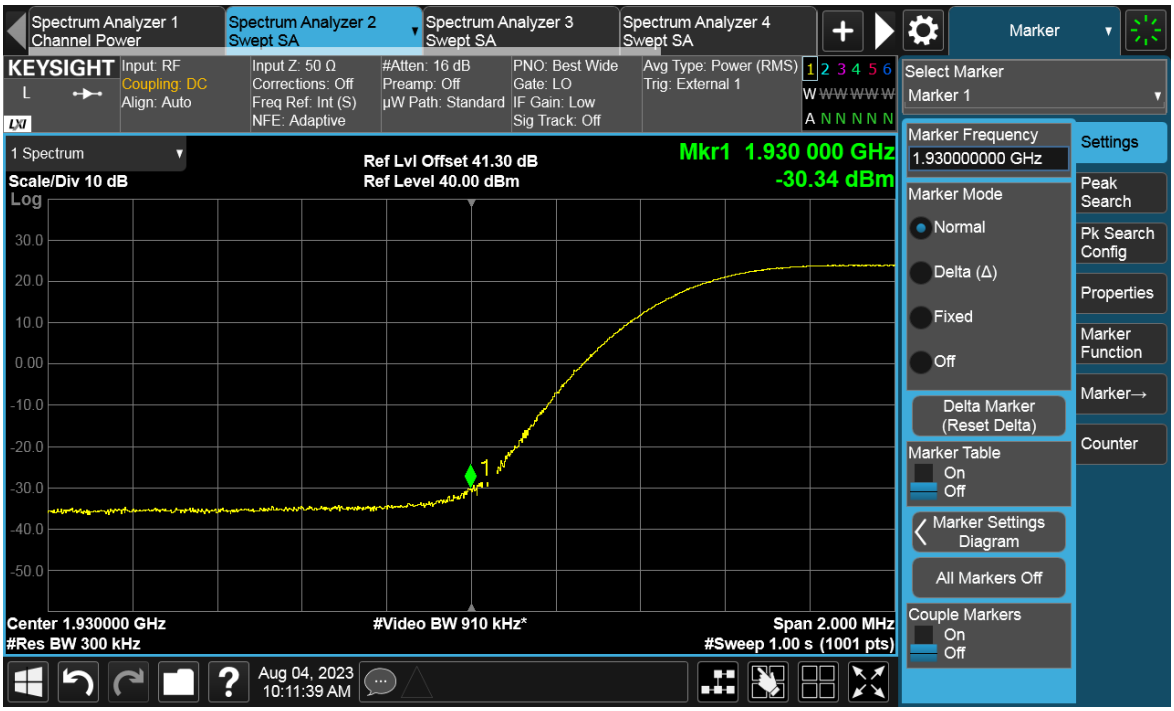


Channel Position T

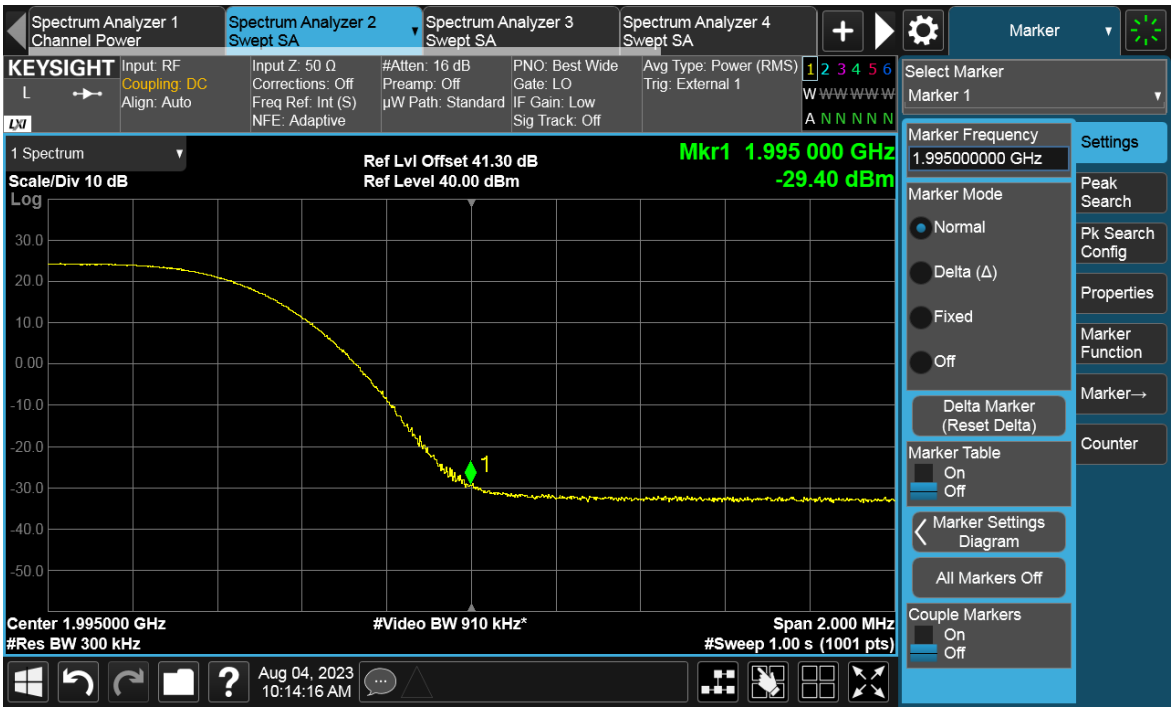
TEST REPORT

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	30	300	-19.02
B	T	QPSK	30	300	-19.02

Channel Position B



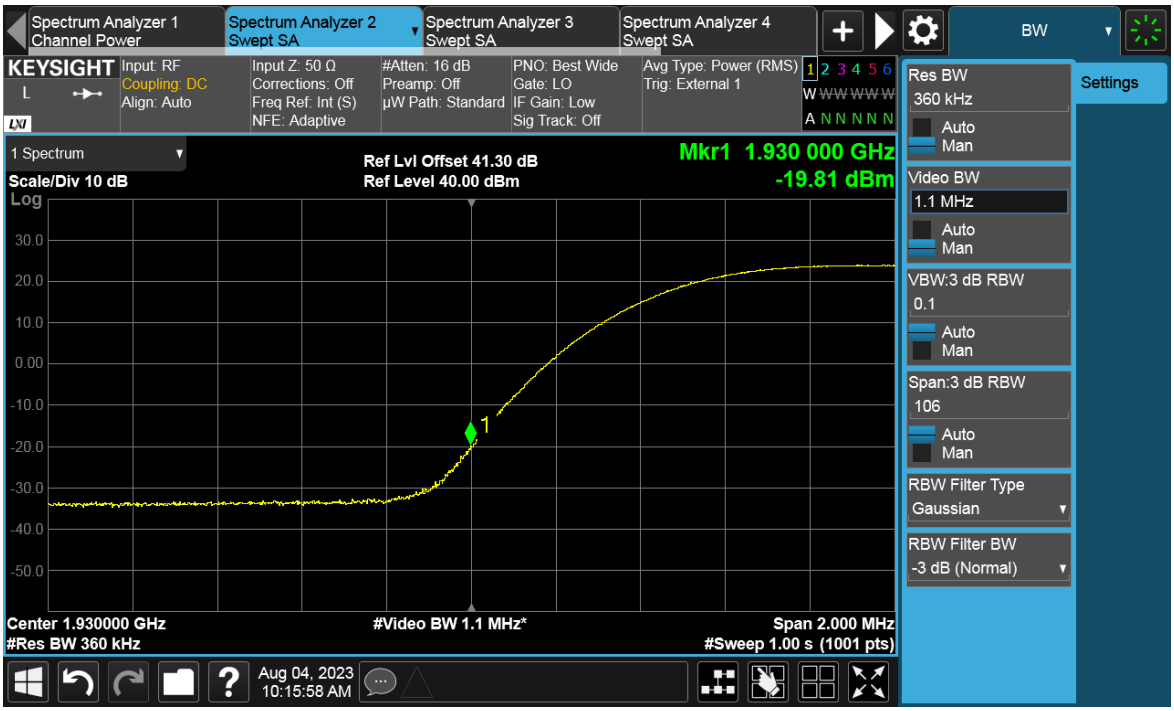
Channel Position T



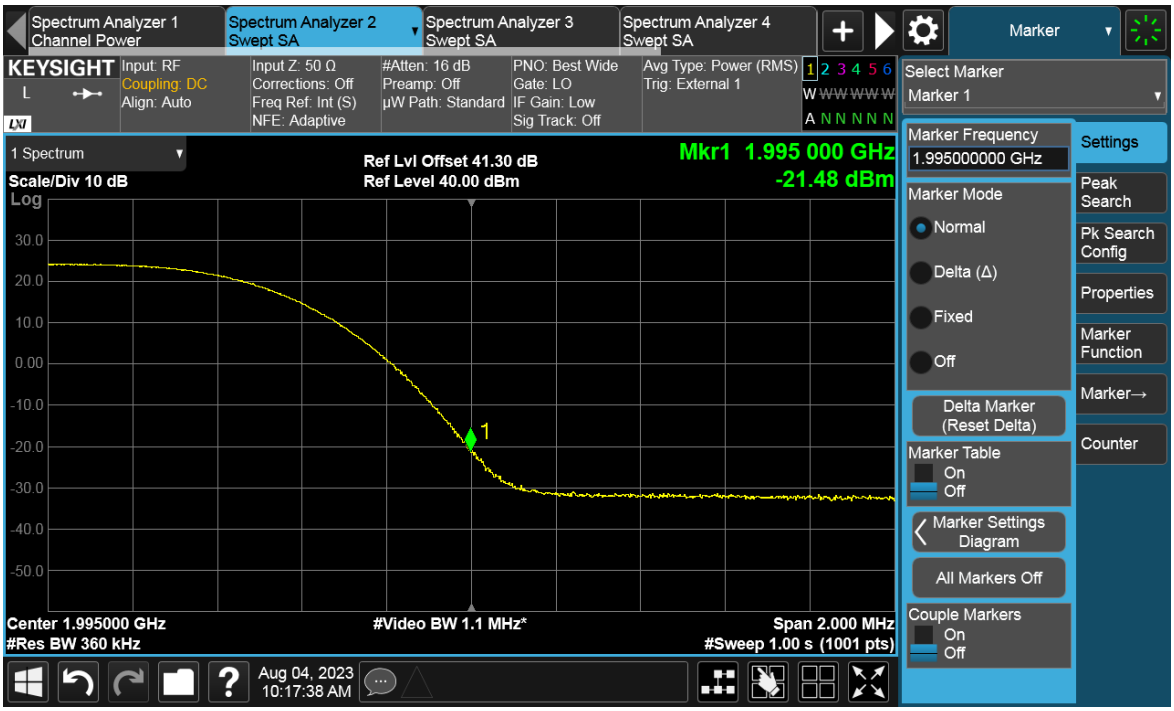
TEST REPORT

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	35	360	-19.02
B	T	QPSK	35	360	-19.02

Channel Position B



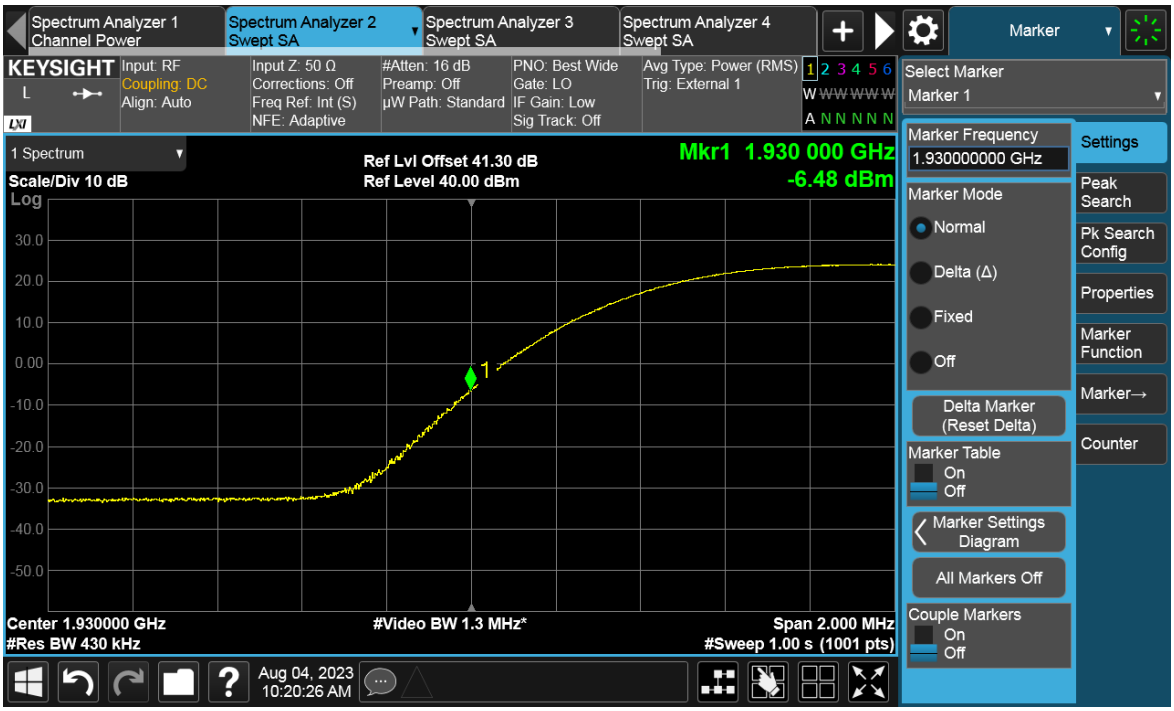
Channel Position T

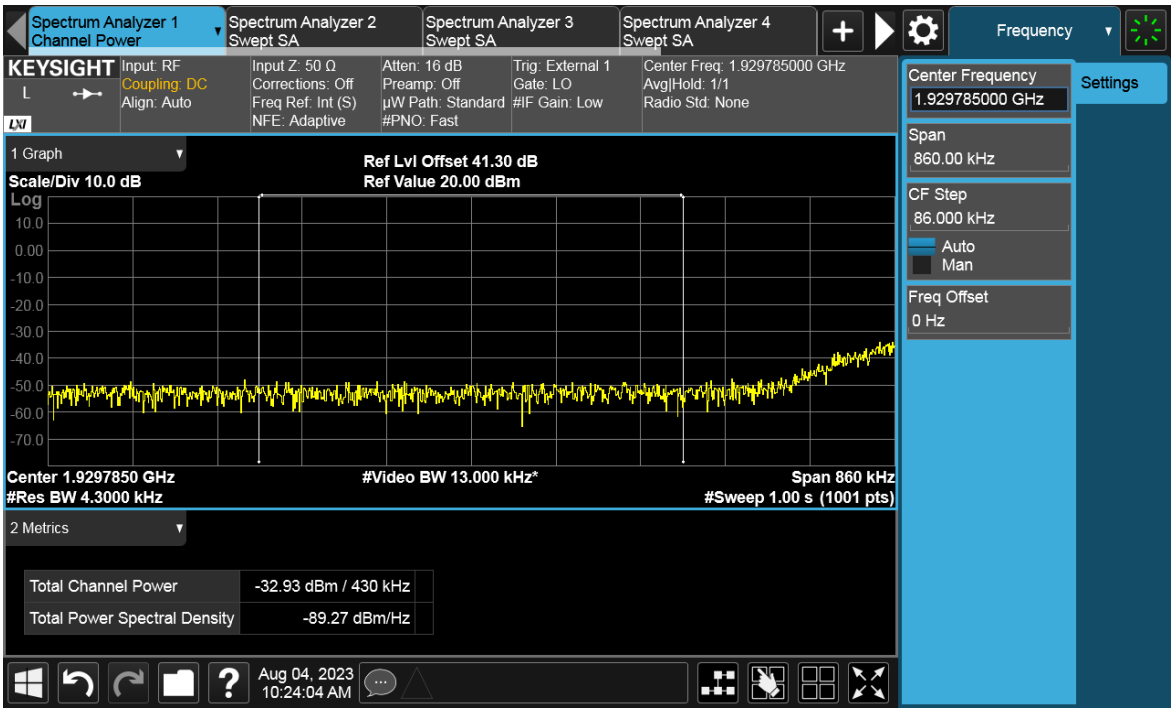


TEST REPORT

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	40	430	-19.02
B	T	QPSK	40	430	-19.02

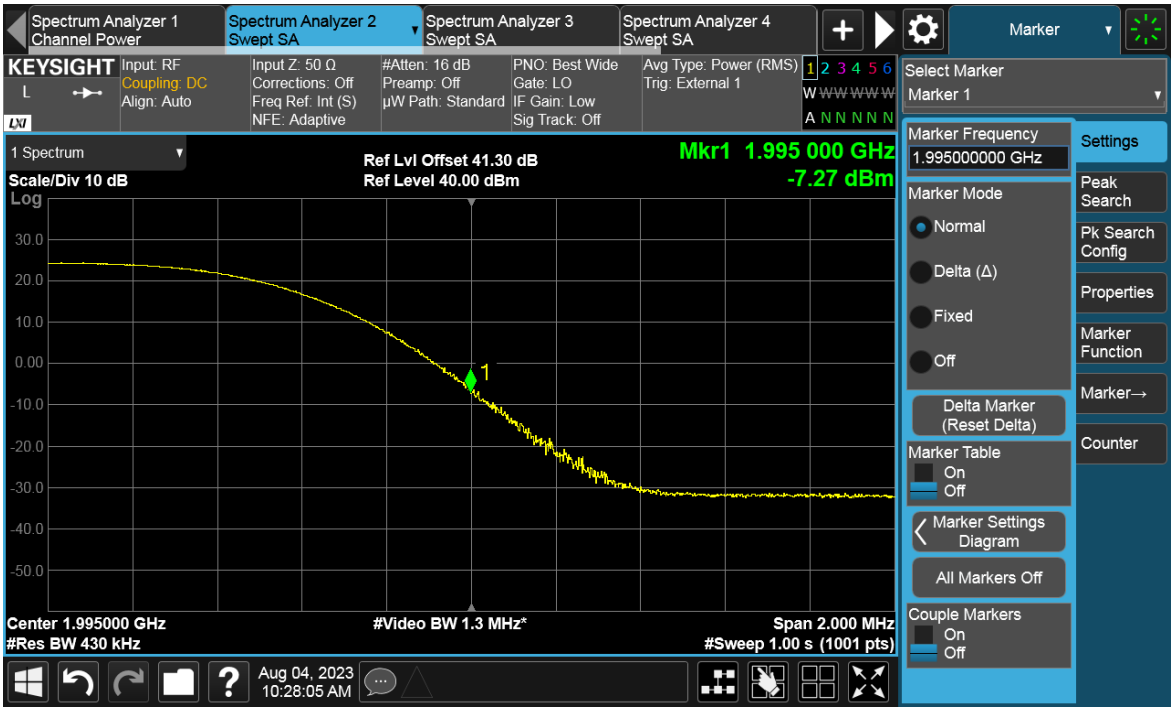
Channel Position B

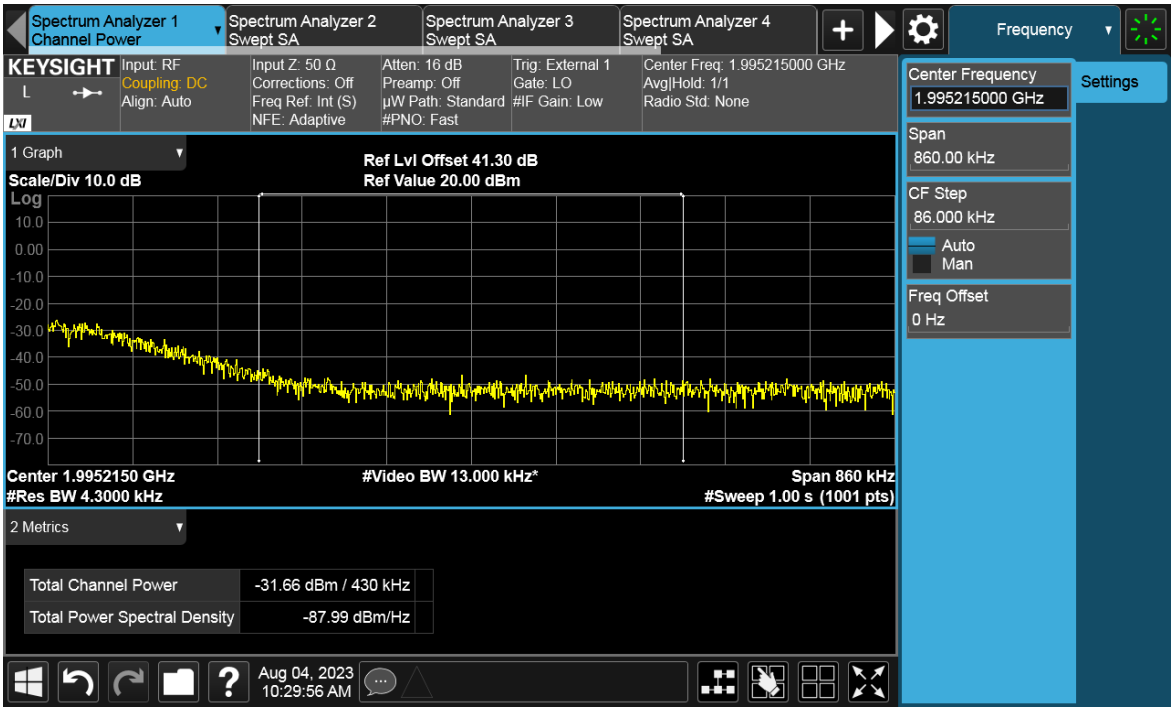




TEST REPORT

Channel Position T



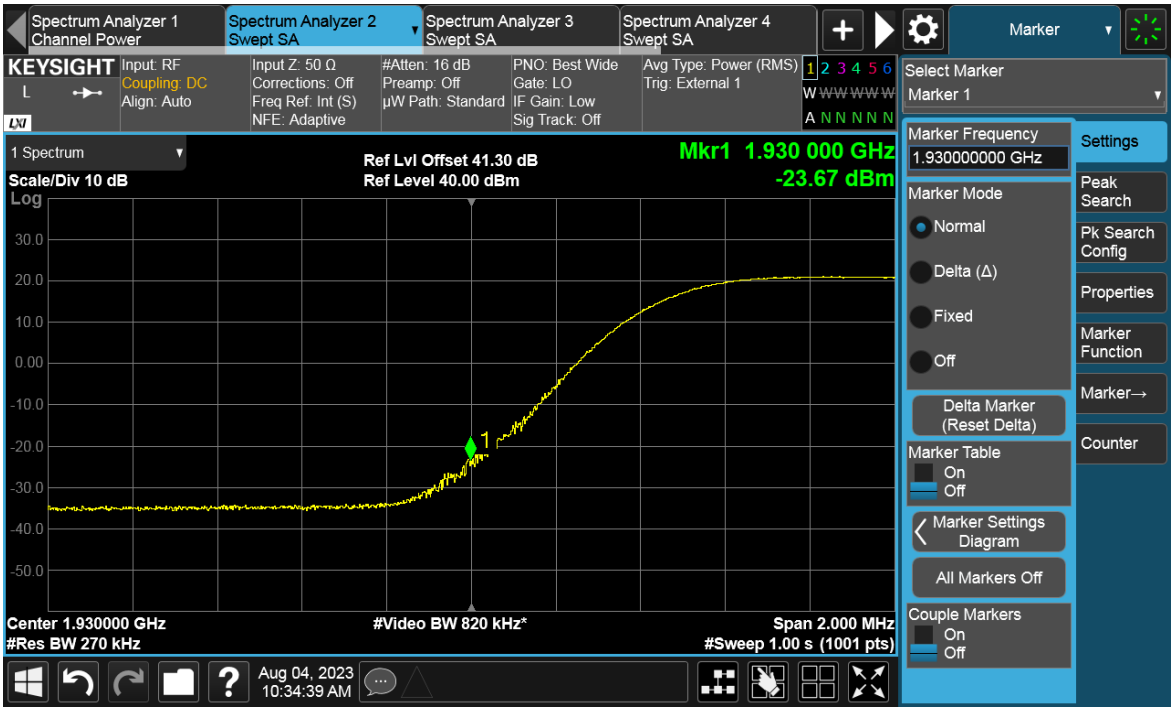


TEST REPORT

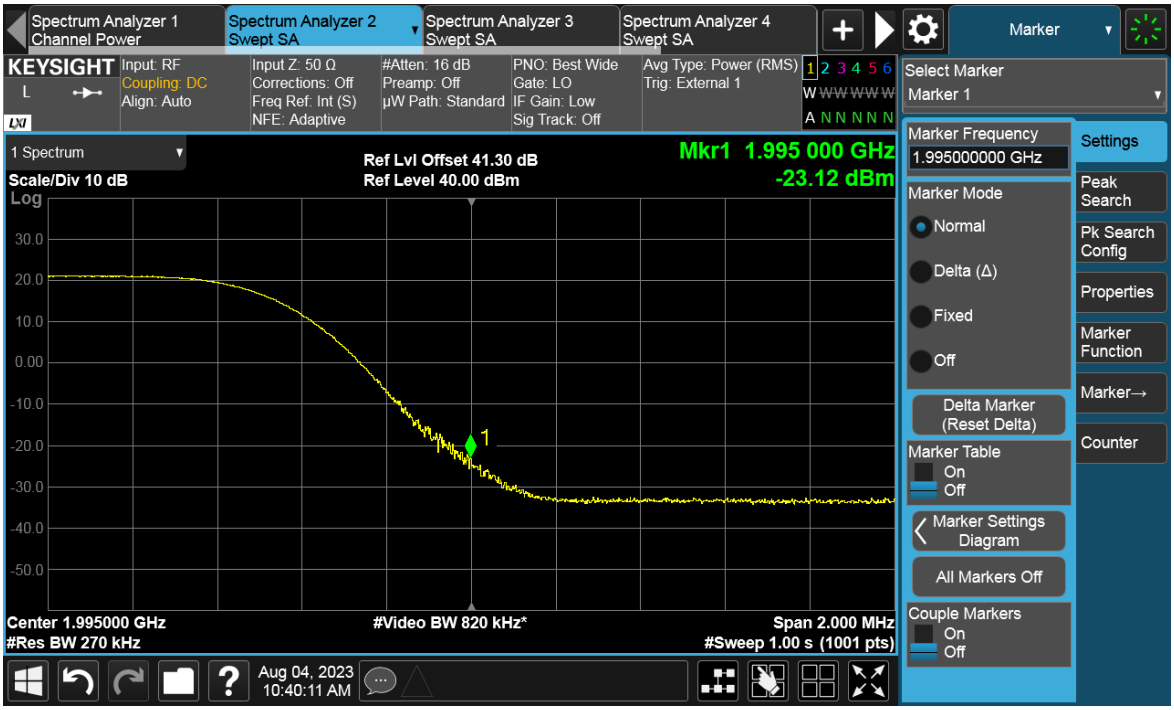
NR-2C-BE

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	25	270	-19.02
B	T	QPSK	25	270	-19.02

Channel Position B



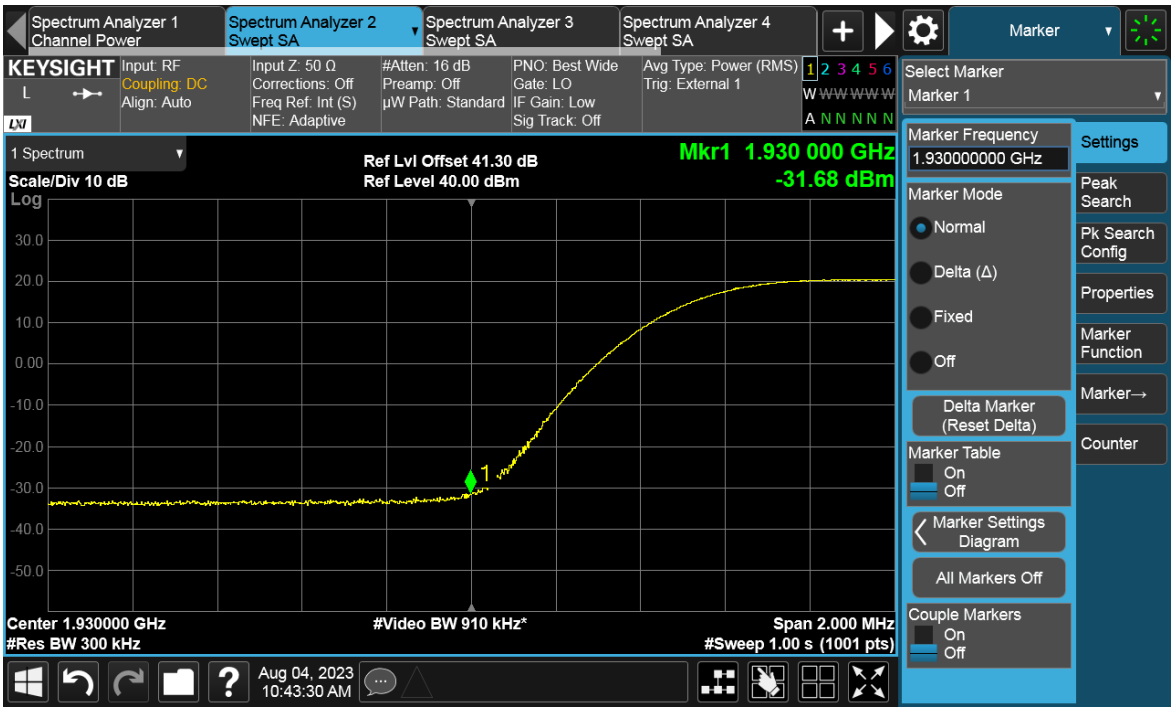
Channel Position T



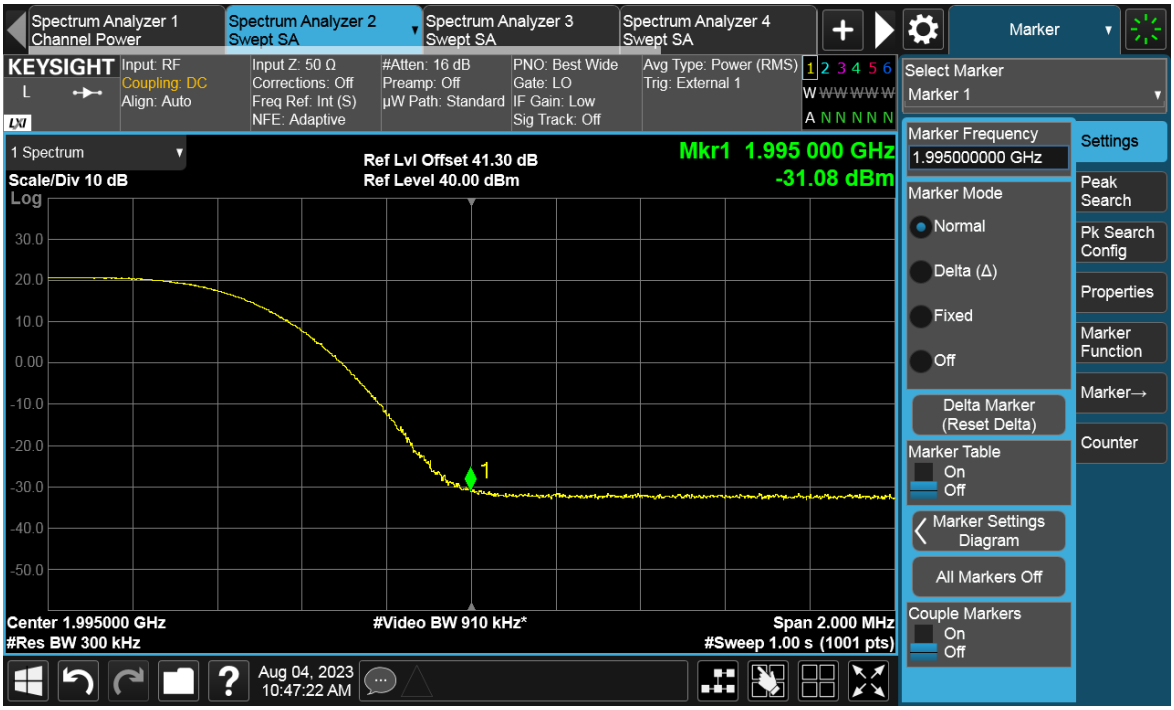
TEST REPORT

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	30	300	-19.02
B	T	QPSK	30	300	-19.02

Channel Position B



Channel Position T



6 Conducted Unwanted Emission

Test result: **Pass**

6.1 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 + 10log(P) dB.

6.2 Measurement Procedure

In accordance with FCC rules, 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.

The spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using an attenuator and the frequency spectrum investigated from 9kHz to 20GHz. The resolution bandwidth of 1MHz was employed for frequency band 9kHz to 20GHz. The spectrum analyzer detector was set to RMS.

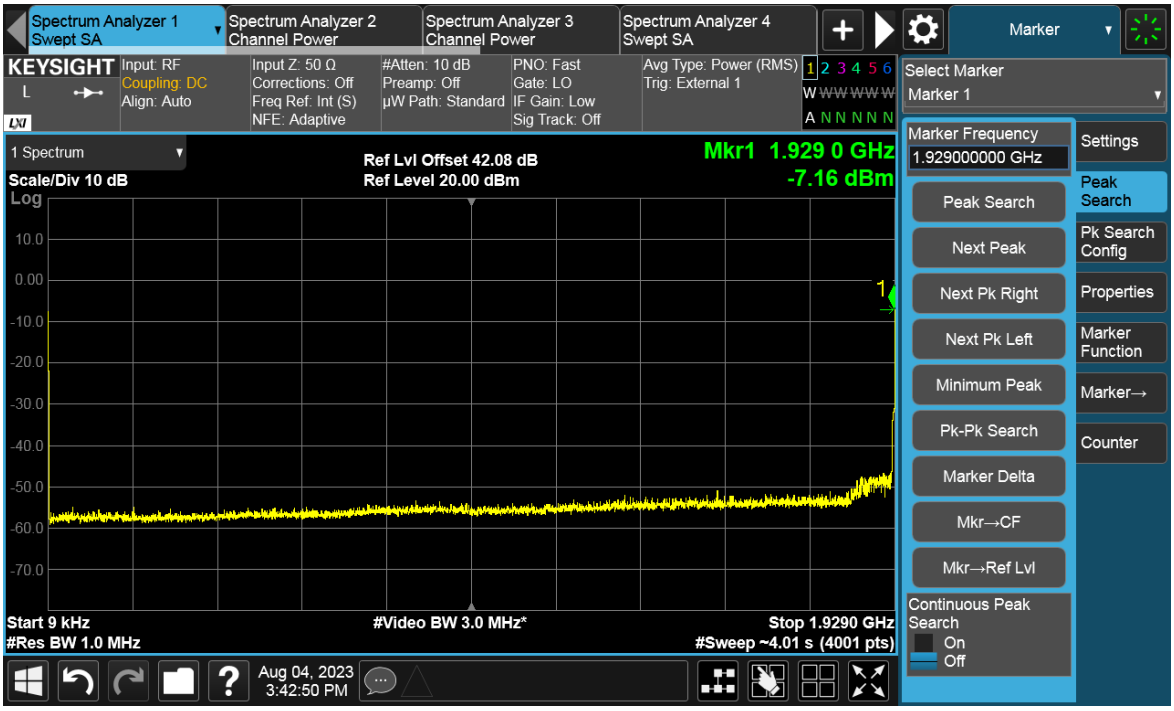
For MIMO mode configurations, the limit was adjusted with a correction of -6.02dB [10Log(1/4)] by using the Measure and Add 10Log(N) dB technique according to KDB 662911 D01 Multiple Transmitter Output accounting for simultaneous transmission from antenna ports. Then the limit was adjusted to -19.02dBm.

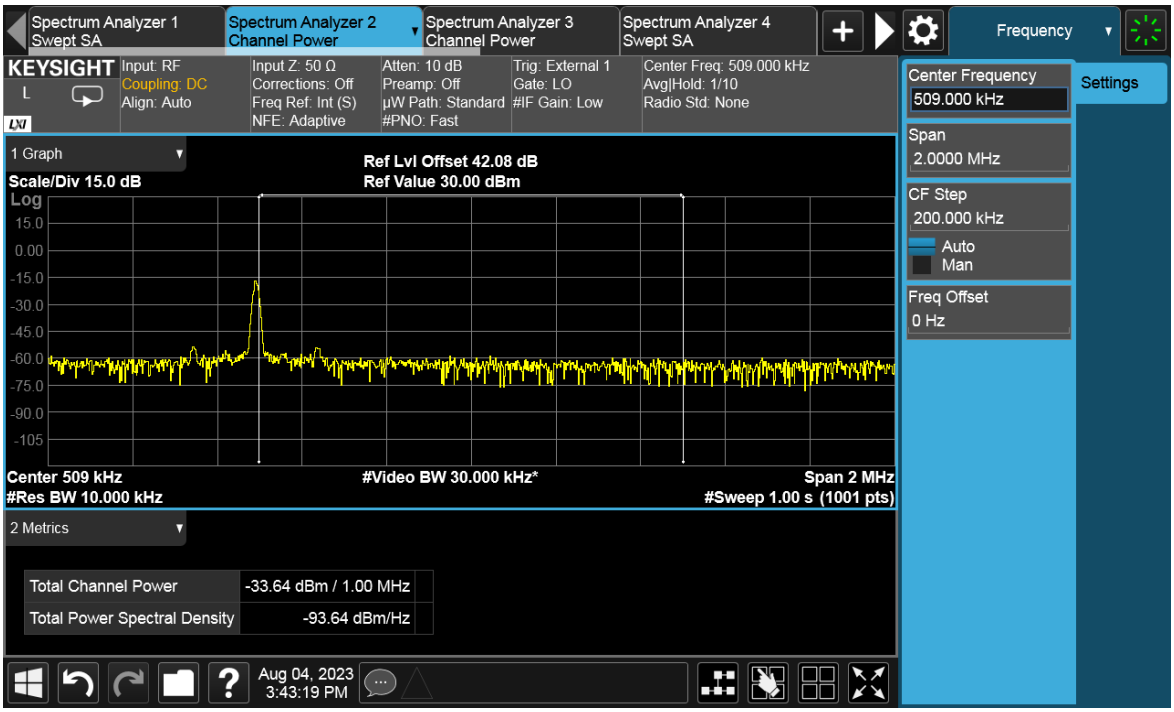
6.3 Measurement result

NR-1C

Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	25	1000	-19.02
B	T	QPSK	25	1000	-19.02

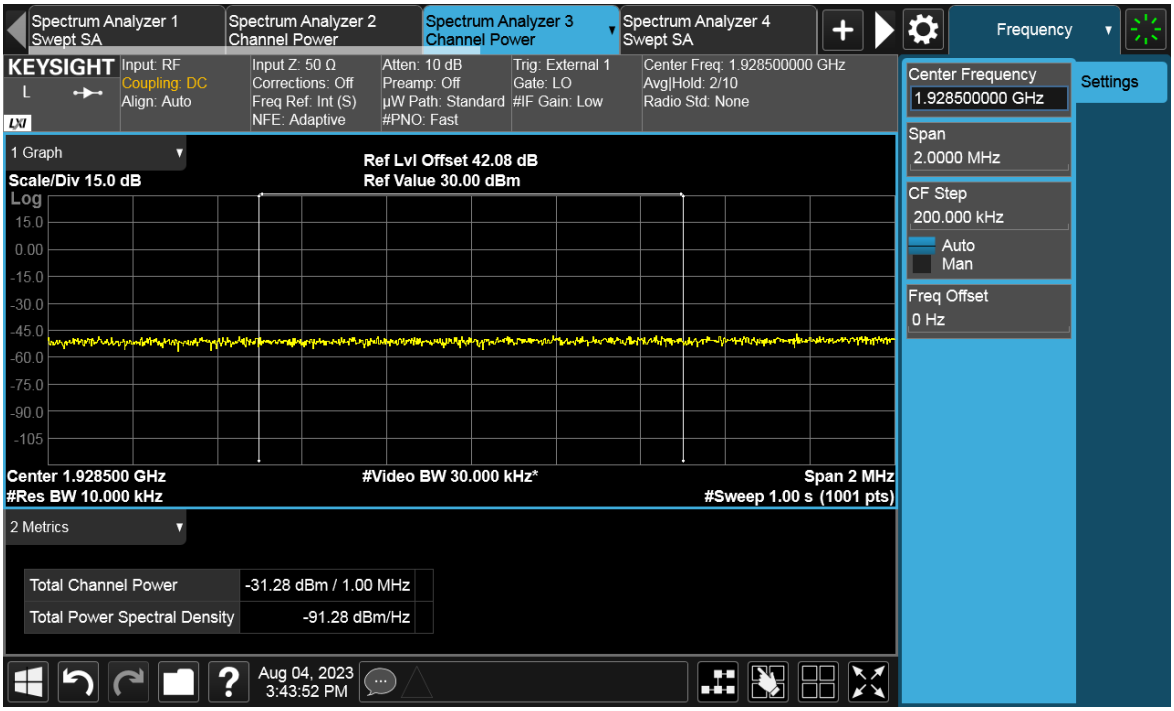
Channel Position B

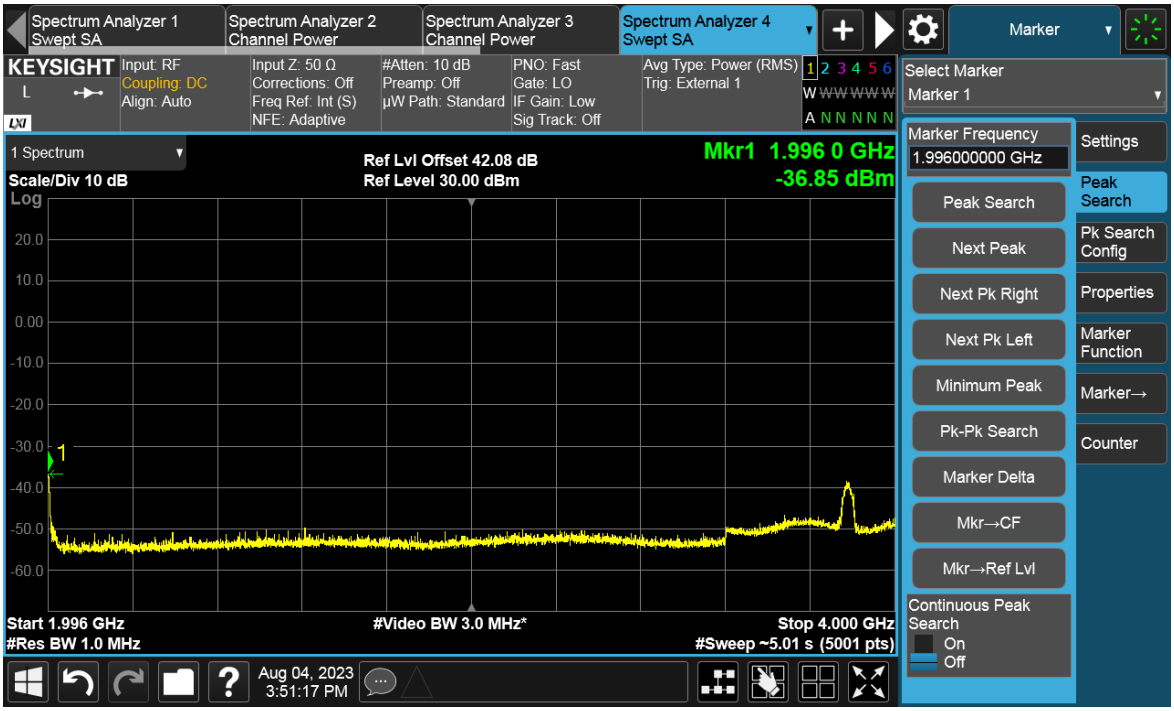




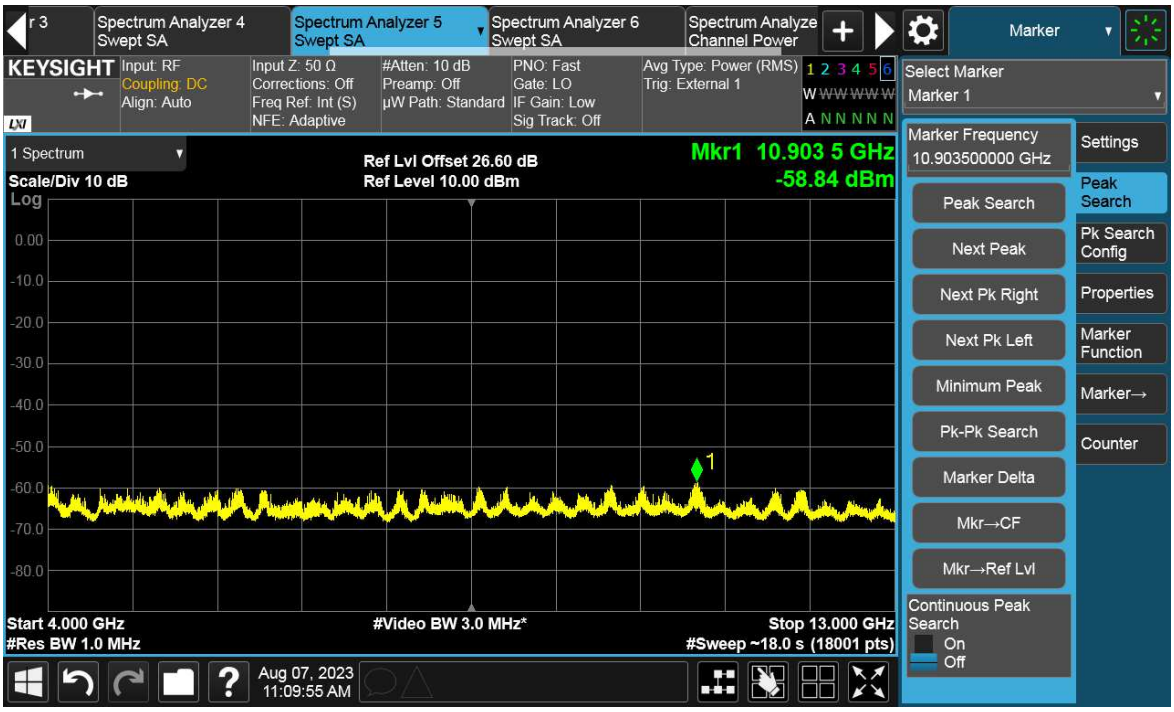
Total Quality. Assured.

TEST REPORT





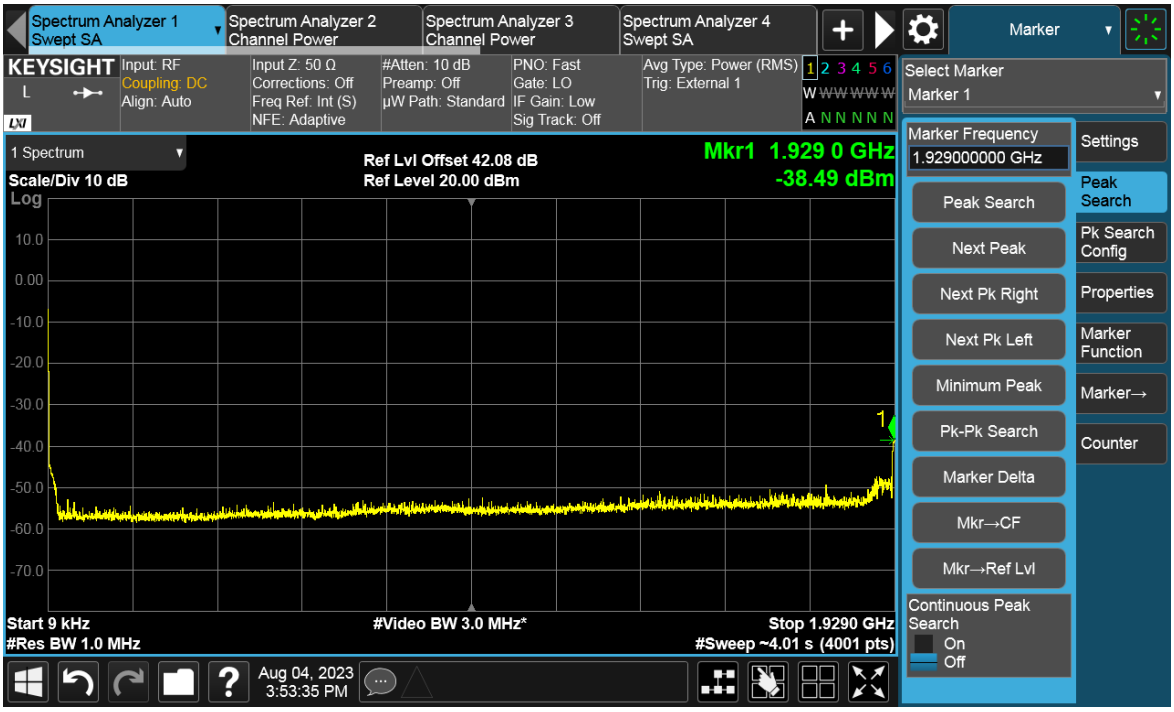
TEST REPORT

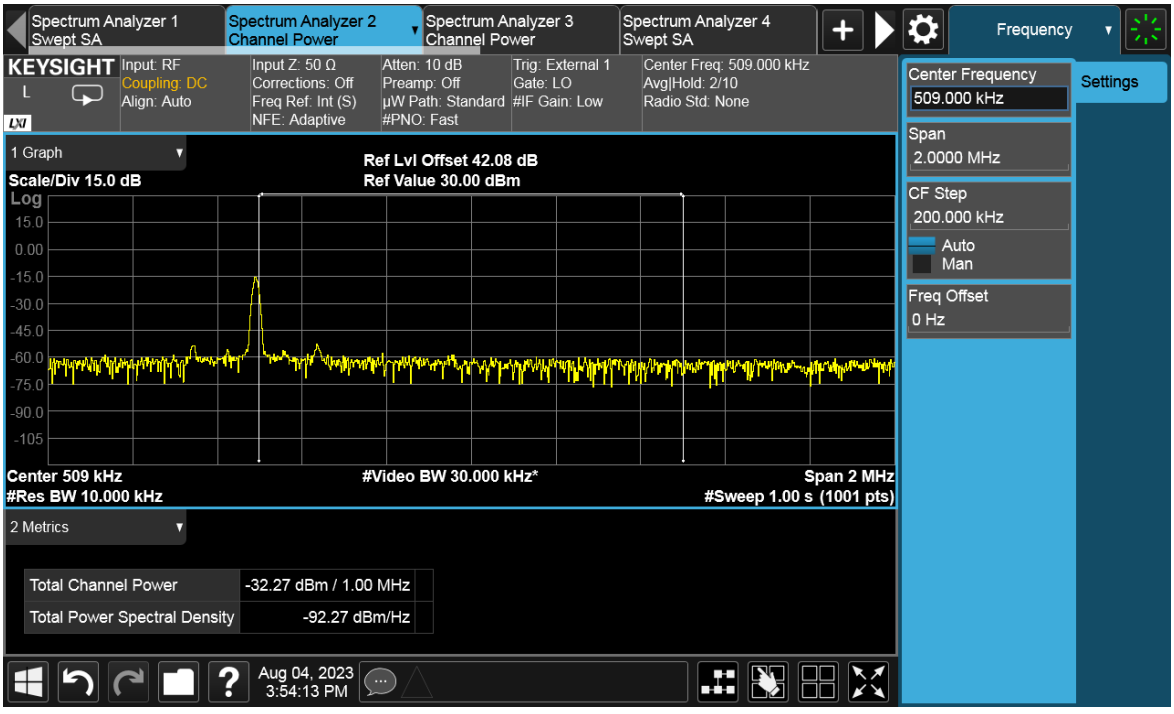

Spectrum Analyzer 4 Swept SA
Spectrum Analyzer 5 Swept SA
Spectrum Analyzer 6 Swept SA
Spectrum Analyze Channel Power
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 26.60 dB
Ref Level 10.00 dBm
Mkr1 10.903 5 GHz
-58.84 dBm
Scale/Div 10 dB
Log
Marker Frequency
10.903500000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
Start 4.000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~18.0 s (18001 pts)
Aug 07, 2023
11:09:55 AM

Spectrum Analyzer 5 Swept SA
Spectrum Analyzer 6 Swept SA
Spectrum Analyzer 7 Channel Power
Spectrum Analyzer 8 Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 0 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: High
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 55.30 dB
Ref Level 20.00 dBm
Mkr1 19.492 5 GHz
-42.83 dBm
Scale/Div 10 dB
Log
Marker Frequency
19.492500000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
Start 13.000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 20.000 GHz
#Sweep ~14.0 s (14001 pts)
Aug 07, 2023
2:51:53 PM

TEST REPORT

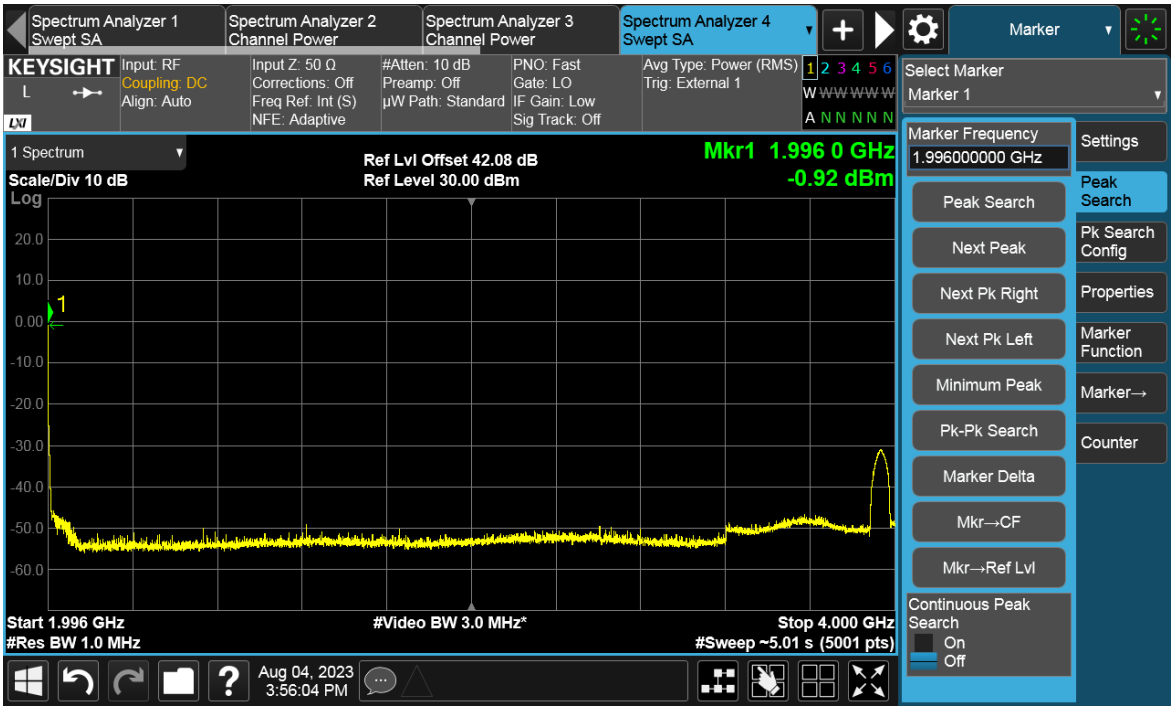
Channel Position T

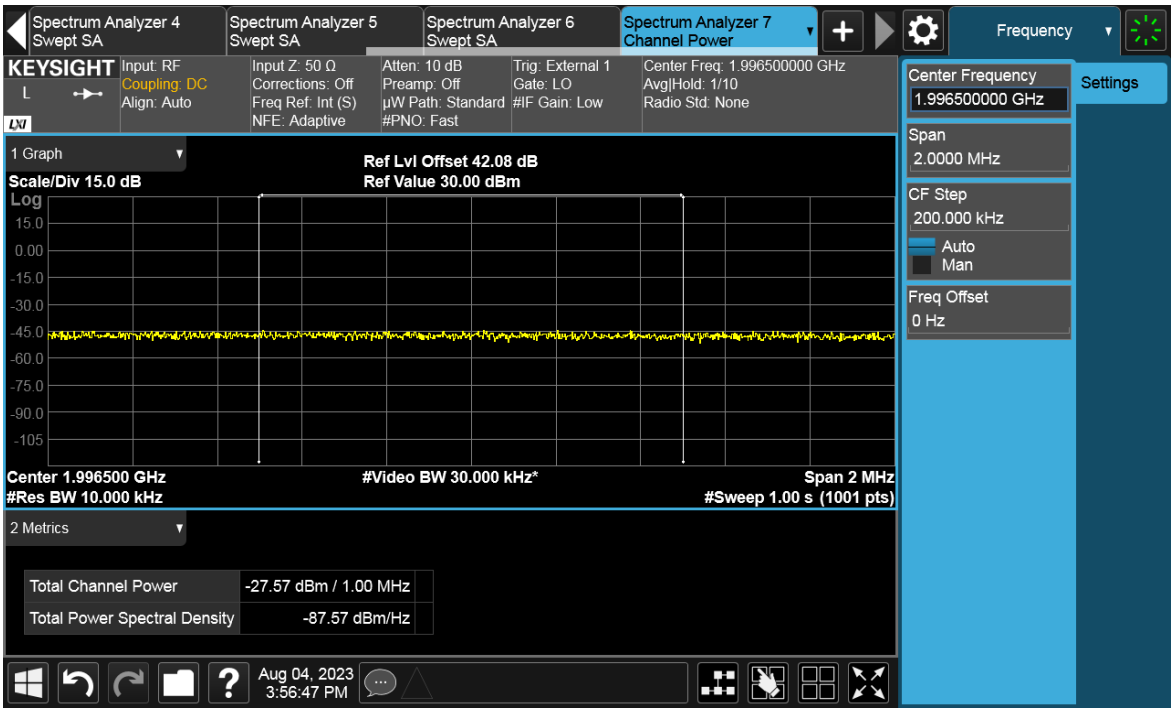




Total Quality. Assured.

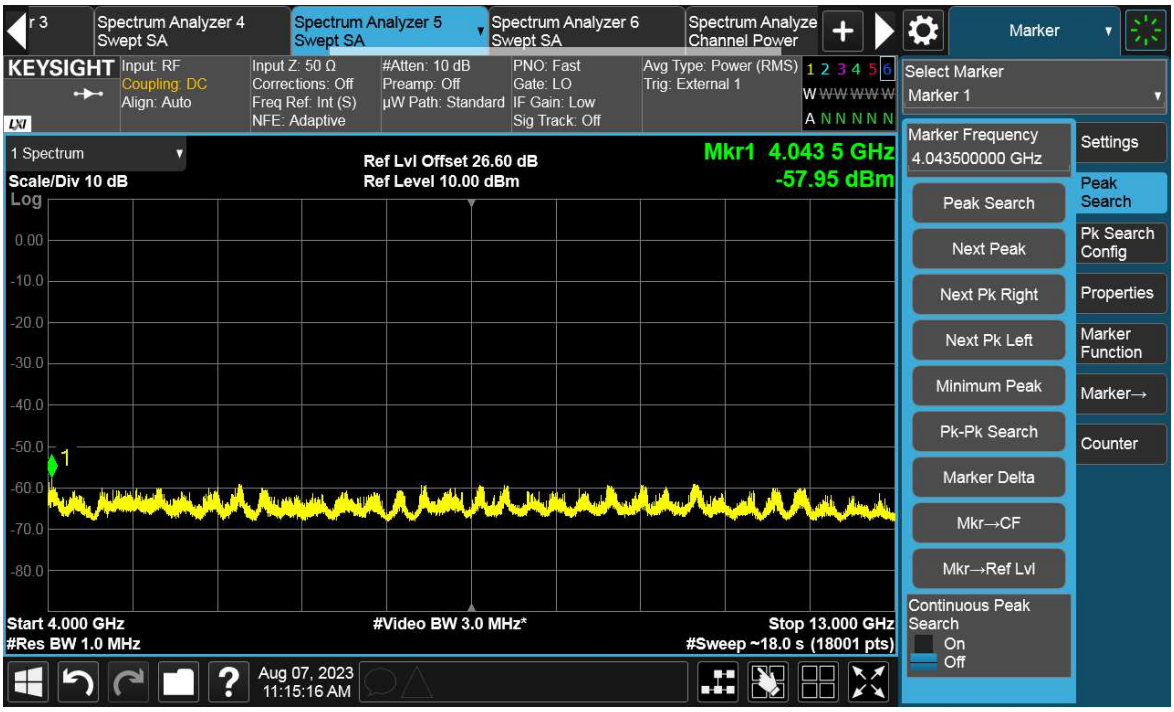
TEST REPORT





Total Quality. Assured.

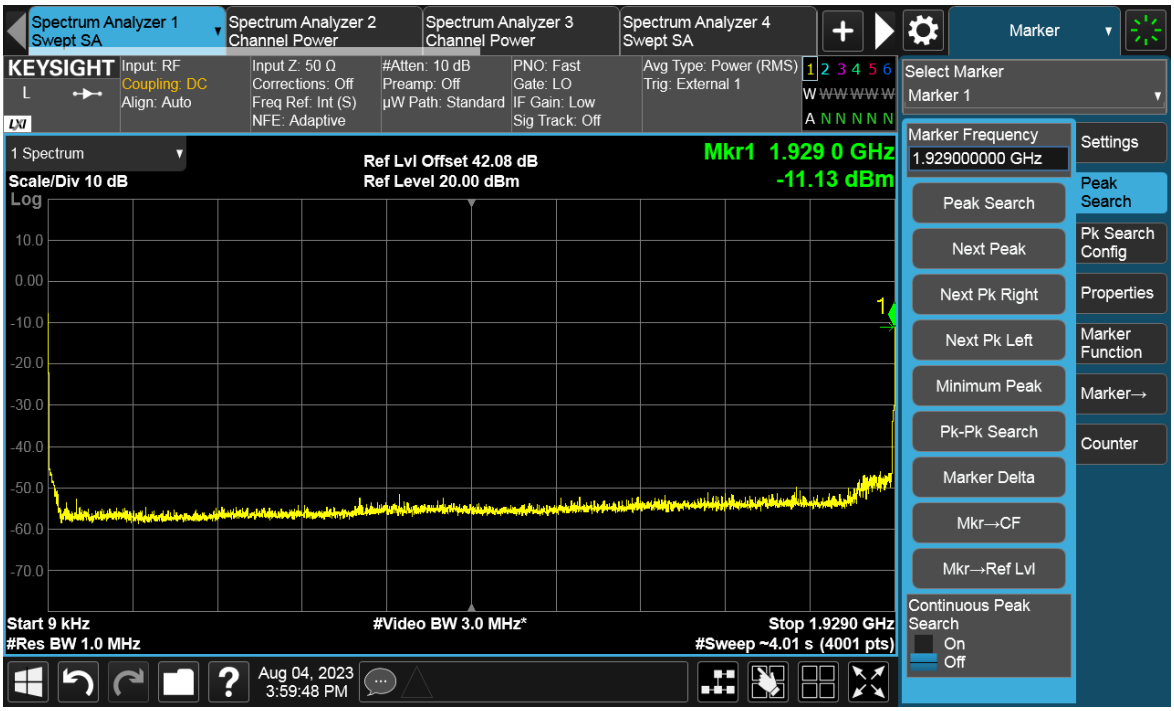
TEST REPORT

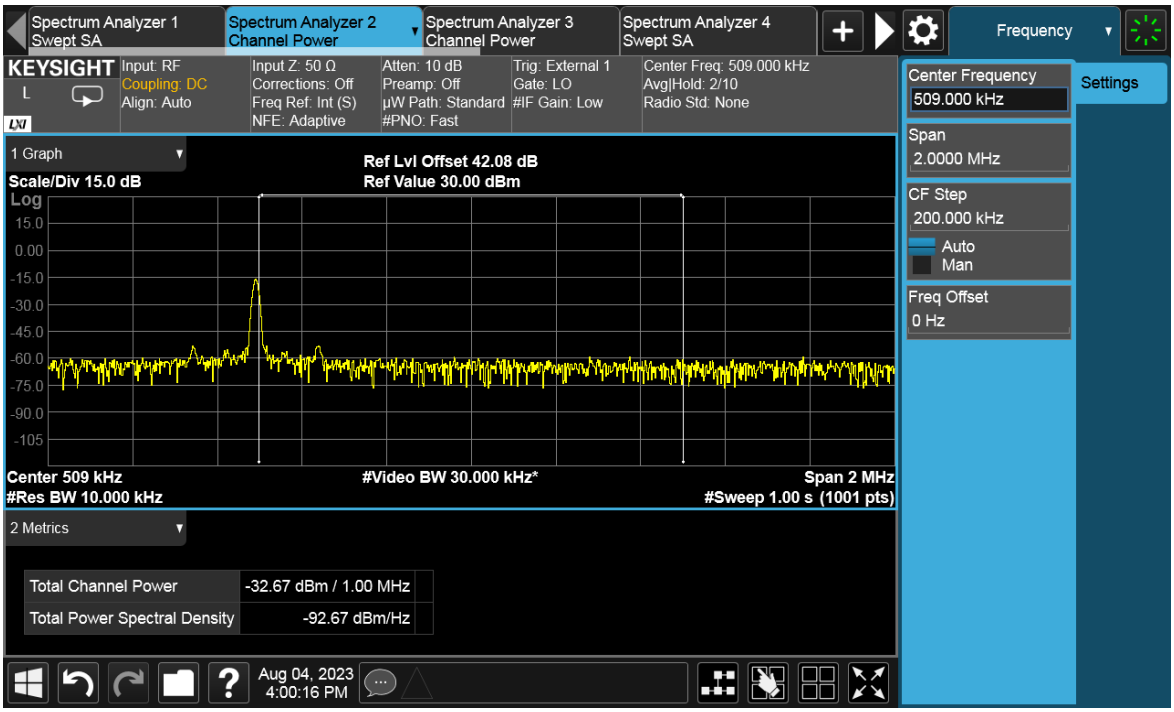


TEST REPORT

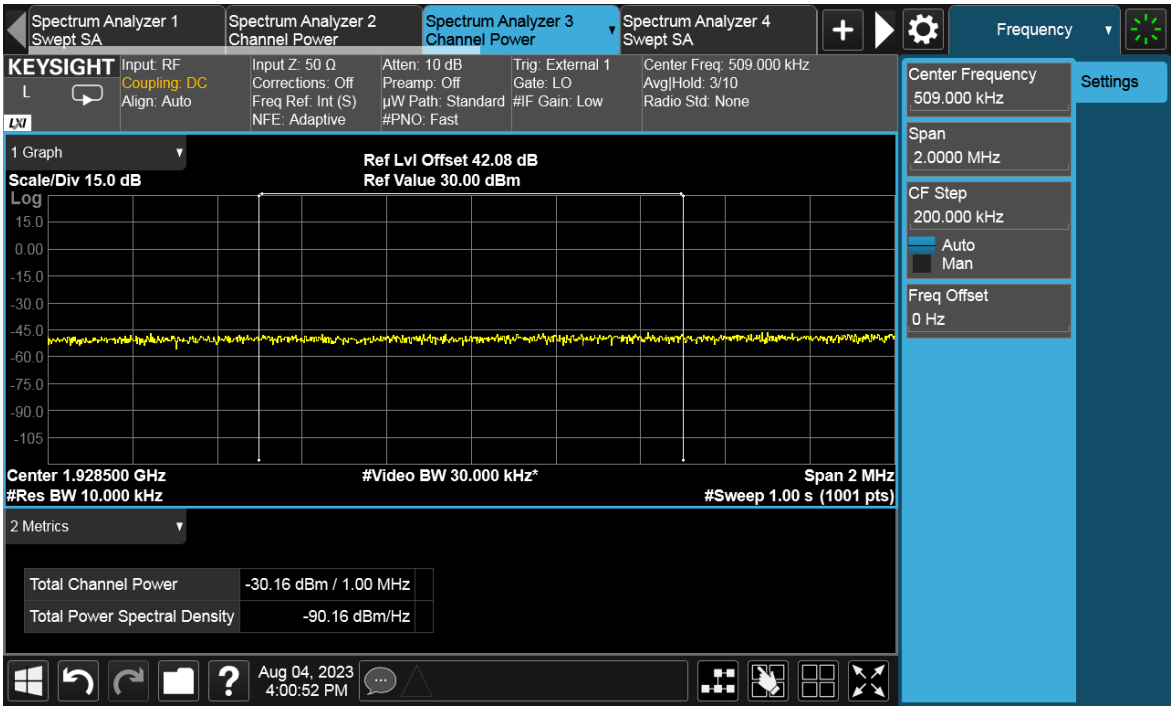
Antenna Port	Channel Position	Modulation	Carrier BW (MHz)	RBW (kHz)	Limit (dBm)
B	B	QPSK	30	1000	-19.02
B	T	QPSK	30	1000	-19.02

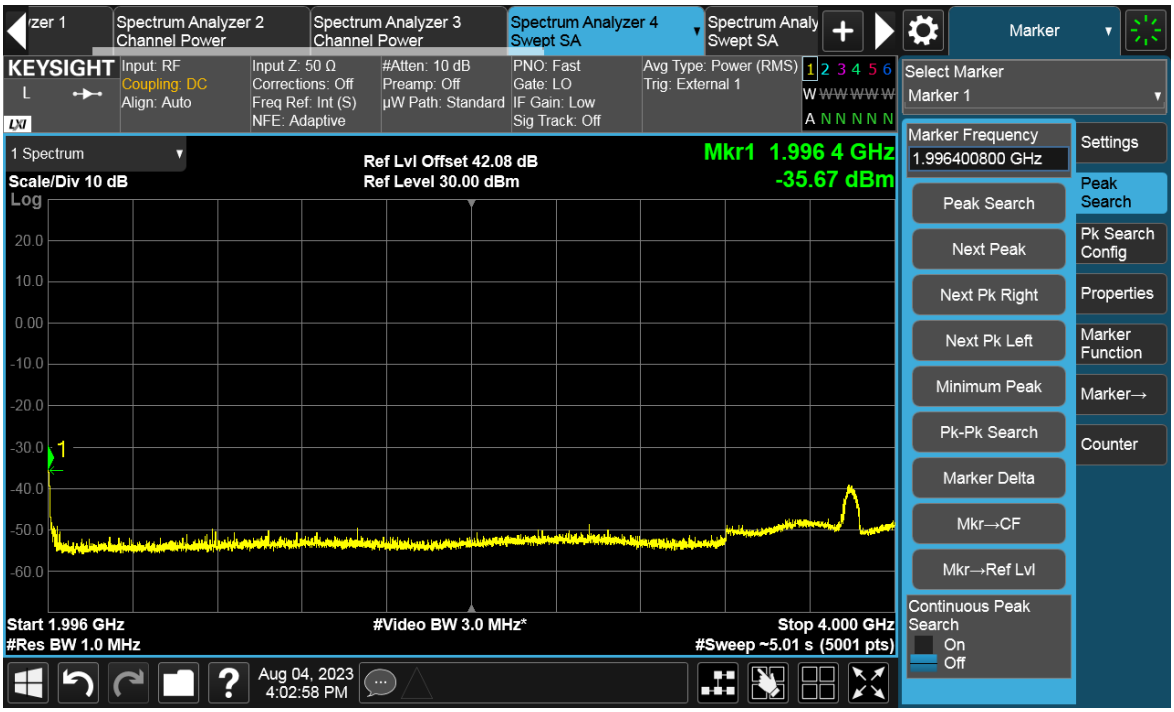
Channel Position B



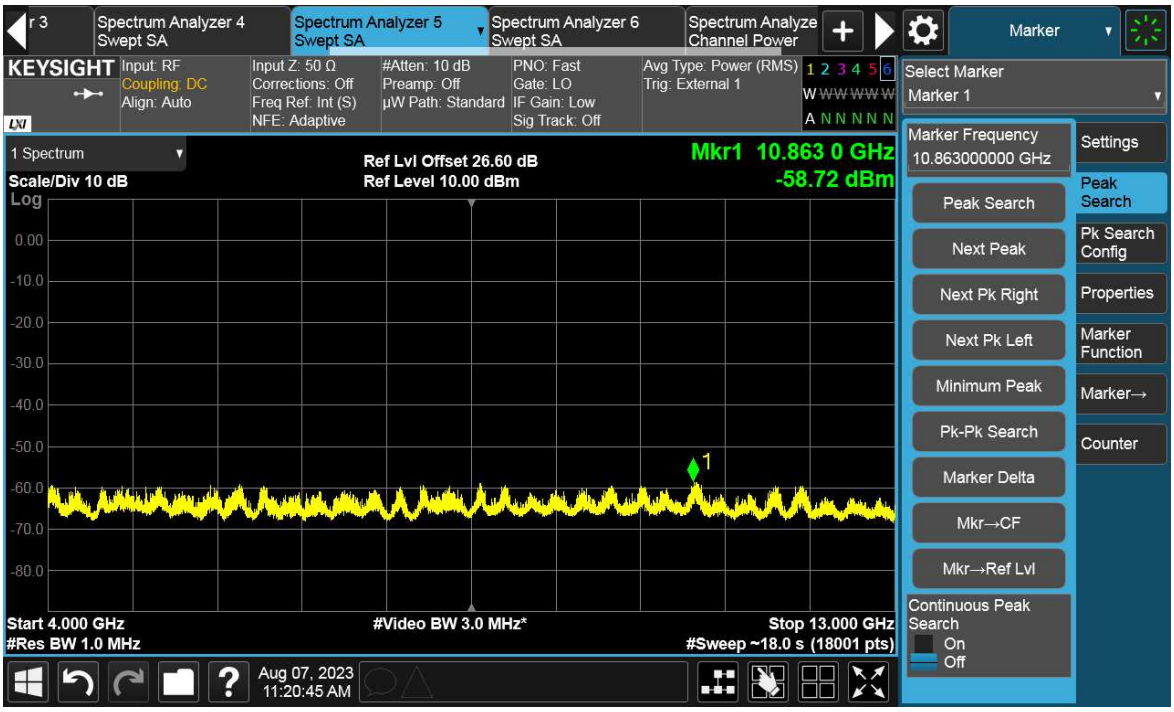


TEST REPORT


Spectrum Analyzer 1
Swept SA
Spectrum Analyzer 2
Channel Power
Spectrum Analyzer 3
Channel Power
Spectrum Analyzer 4
Swept SA
Frequency
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
Atten: 10 dB
Preamp: Off
µW Path: Standard
#PNO: Fast
Trig: External 1
Gate: LO
#IF Gain: Low
Center Freq: 509.000 kHz
Avg|Hold: 3/10
Radio Std: None
1 Graph
Ref Lvl Offset 42.08 dB
Scale/Div 15.0 dB
Ref Value 30.00 dBm
Log
15.0
0.00
-15.0
-30.0
-45.0
-60.0
-75.0
-90.0
-105
Center 1.928500 GHz
#Res BW 10.000 kHz
#Video BW 30.000 kHz*
Span 2 MHz
#Sweep 1.00 s (1001 pts)
2 Metrics
Total Channel Power
-30.16 dBm / 1.00 MHz
Total Power Spectral Density
-90.16 dBm/Hz
Aug 04, 2023
4:00:52 PM
Center Frequency
509.000 kHz
Settings
Span
2.0000 MHz
CF Step
200.000 kHz
Auto
Man
Freq Offset
0 Hz


Spectrum Analyzer 2
Channel Power
Spectrum Analyzer 3
Channel Power
Spectrum Analyzer 4
Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
1 Spectrum
Ref Lvl Offset 42.08 dB
Ref Level 30.00 dBm
Mkr1 1.996 4 GHz
-35.67 dBm
Scale/Div 10 dB
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Start 1.996 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 4.000 GHz
#Sweep ~5.01 s (5001 pts)
Aug 04, 2023
4:02:58 PM
Select Marker
Marker 1
Marker Frequency
1.996400800 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off

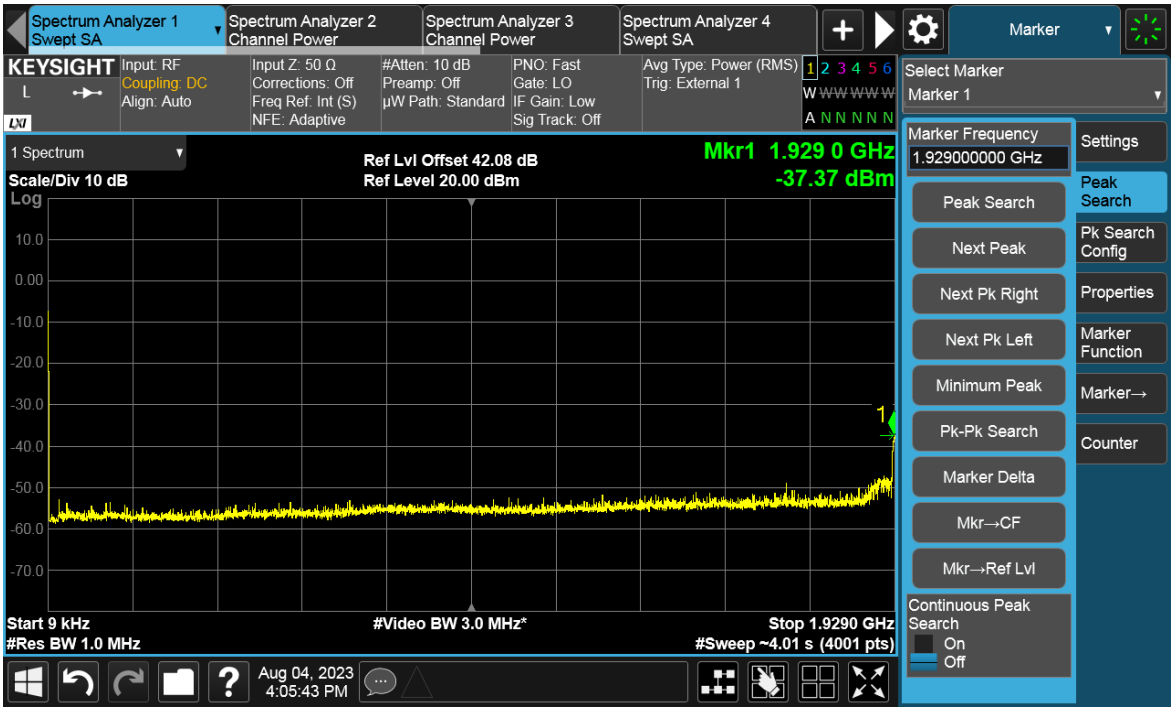
TEST REPORT

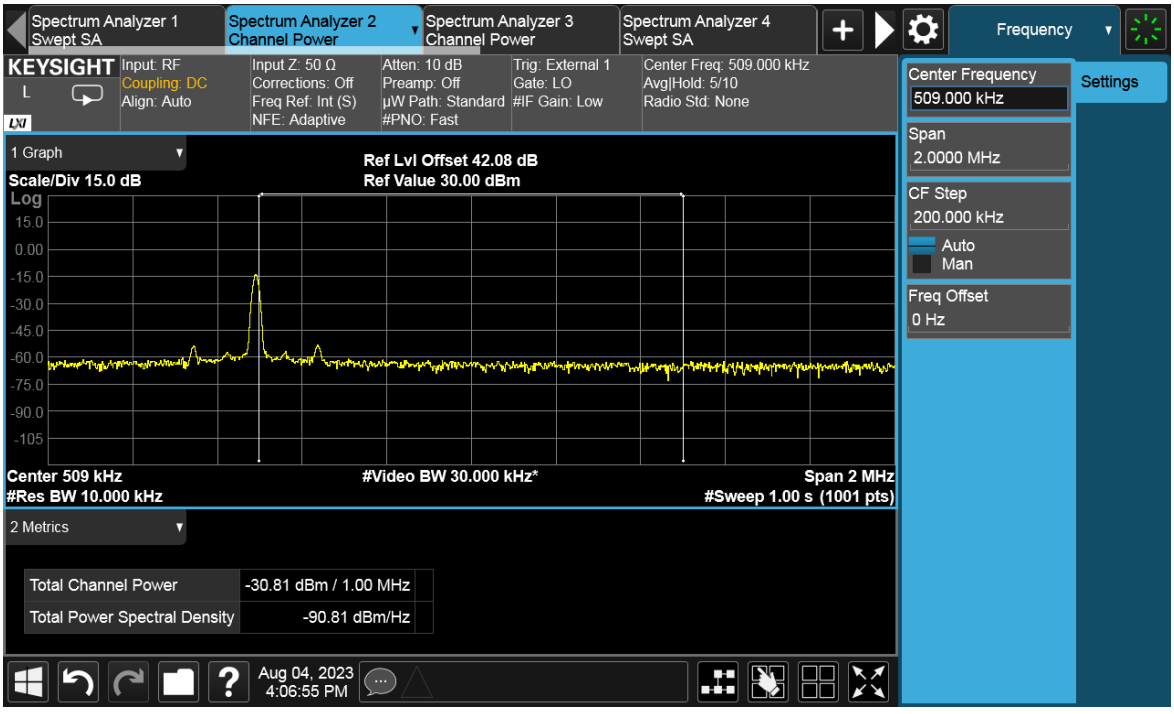

Spectrum Analyzer 4
Swept SA
Spectrum Analyzer 5
Swept SA
Spectrum Analyzer 6
Swept SA
Spectrum Analyze
Channel Power
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 26.60 dB
Ref Level 10.00 dBm
Mkr1 10.863 0 GHz
-58.72 dBm
Scale/Div 10 dB
Log
Marker Frequency
10.863000000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
Start 4.000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~18.0 s (18001 pts)
Aug 07, 2023
11:20:45 AM

Spectrum Analyzer 5
Swept SA
Spectrum Analyzer 6
Swept SA
Spectrum Analyzer 7
Channel Power
Spectrum Analyzer 8
Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 0 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: High
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 55.30 dB
Ref Level 20.00 dBm
Mkr1 19.520 5 GHz
-42.29 dBm
Scale/Div 10 dB
Log
Marker Frequency
19.520500000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
Start 13.000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 20.000 GHz
#Sweep ~14.0 s (14001 pts)
Aug 07, 2023
3:02:39 PM

TEST REPORT

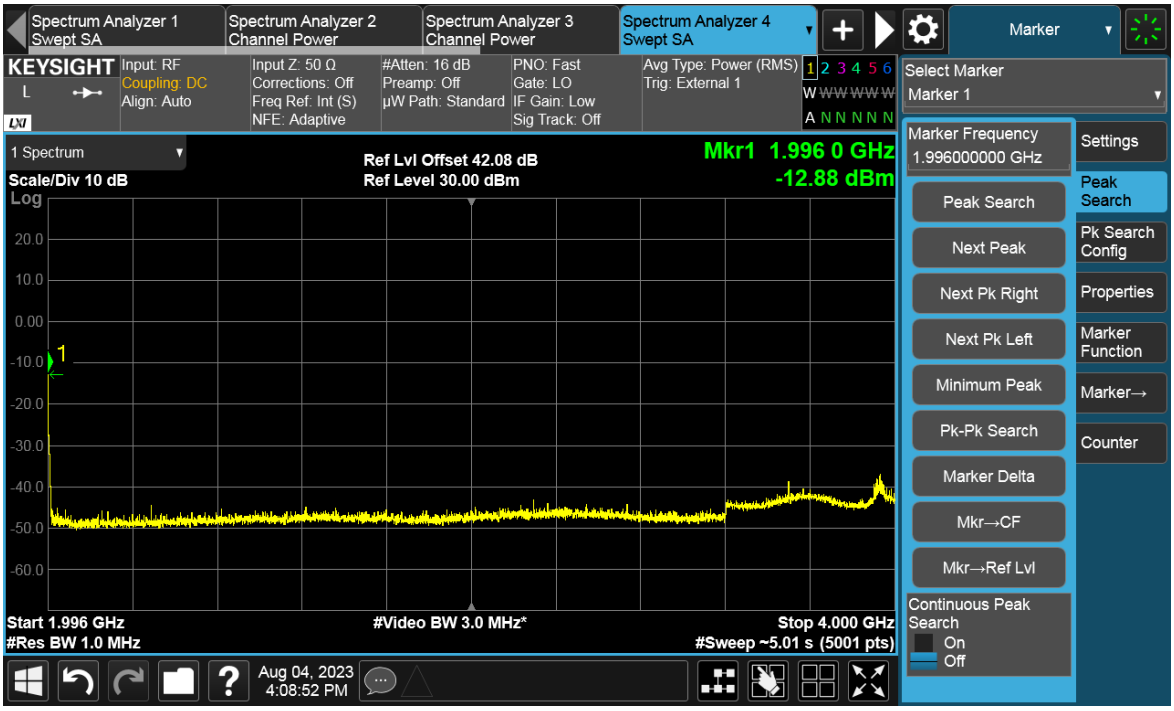
Channel Position T

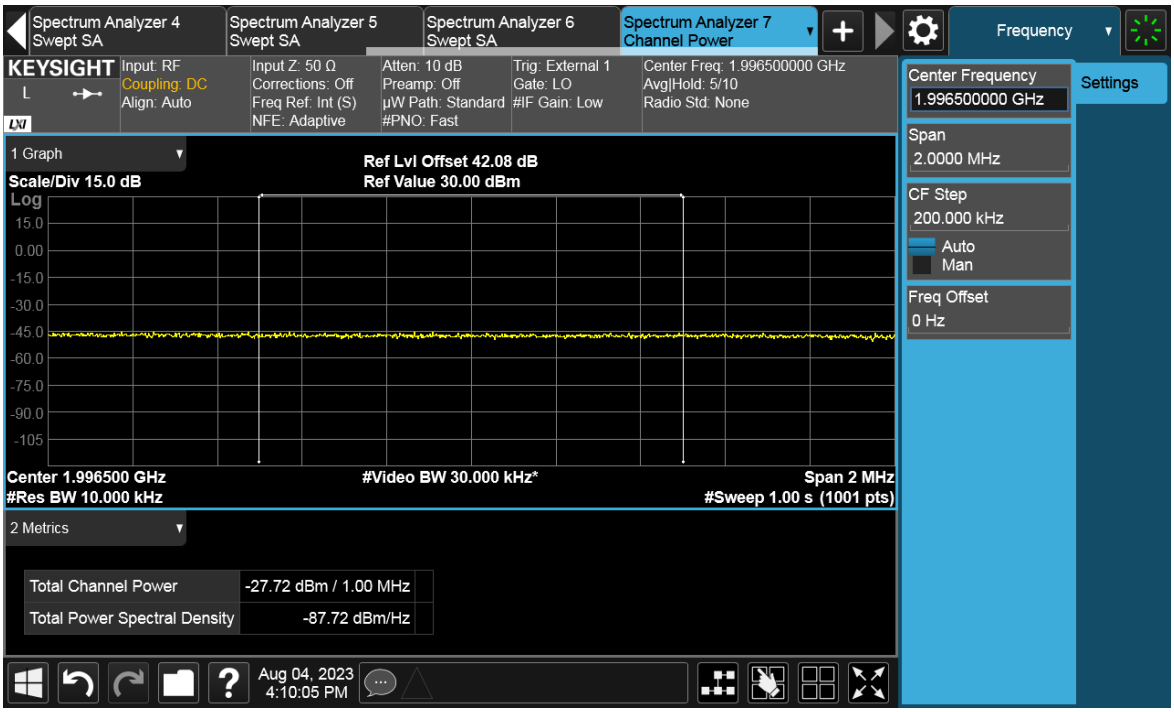




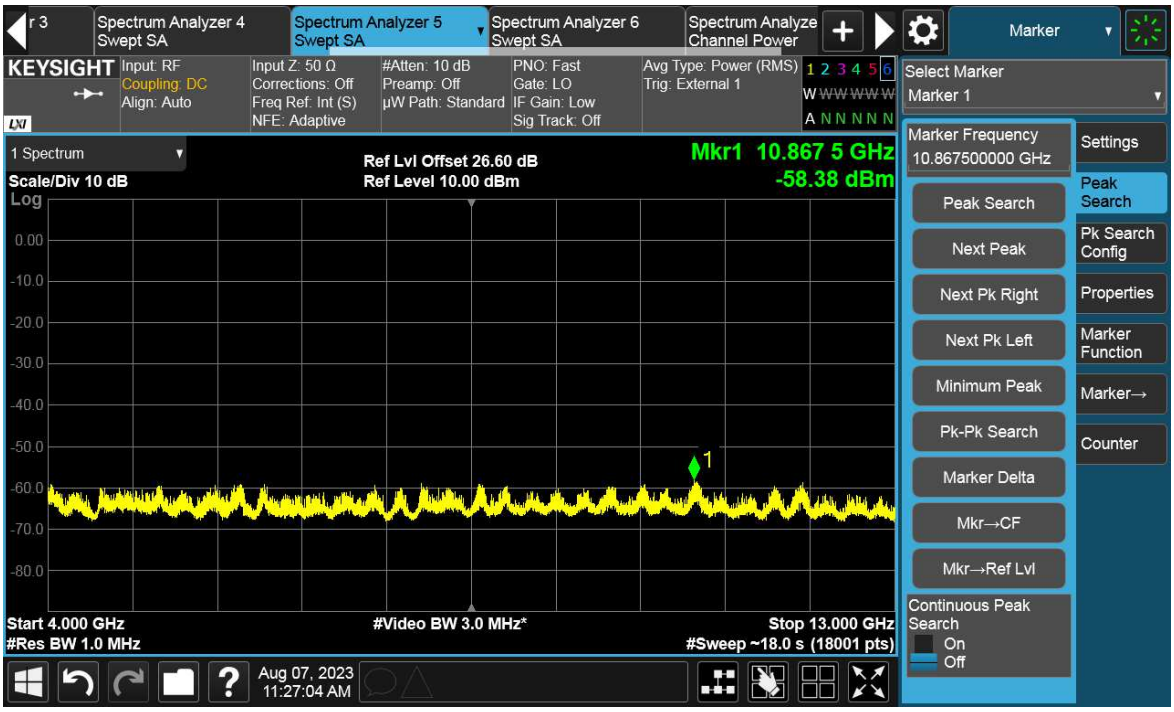
Total Quality. Assured.

TEST REPORT





TEST REPORT


Spectrum Analyzer 4
Swept SA
Spectrum Analyzer 5
Swept SA
Spectrum Analyzer 6
Swept SA
Spectrum Analyze
Channel Power
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 10 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: Low
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 26.60 dB
Ref Level 10.00 dBm
Mkr1 10.867 5 GHz
-58.38 dBm
Scale/Div 10 dB
Log
Marker Frequency
10.867500000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
Start 4.000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 13.000 GHz
#Sweep ~18.0 s (18001 pts)
Aug 07, 2023
11:27:04 AM

Spectrum Analyzer 5
Swept SA
Spectrum Analyzer 6
Swept SA
Spectrum Analyzer 7
Channel Power
Spectrum Analyzer 8
Swept SA
Marker
KEYSIGHT
Input: RF
Coupling: DC
Align: Auto
Input Z: 50 Ω
Corrections: Off
Freq Ref: Int (S)
NFE: Adaptive
#Atten: 0 dB
Preamp: Off
µW Path: Standard
PNO: Fast
Gate: LO
IF Gain: High
Sig Track: Off
Avg Type: Power (RMS)
Trig: External 1
Select Marker
Marker 1
1 Spectrum
Ref Lvl Offset 55.30 dB
Ref Level 20.00 dBm
Mkr1 19.513 5 GHz
-42.53 dBm
Scale/Div 10 dB
Log
Marker Frequency
19.513500000 GHz
Settings
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Minimum Peak
Pk-Pk Search
Marker Delta
Mkr→CF
Mkr→Ref Lvl
Pk Search Config
Properties
Marker Function
Marker→
Counter
Continuous Peak Search
On
Off
Start 13.000 GHz
#Res BW 1.0 MHz
#Video BW 3.0 MHz*
Stop 20.000 GHz
#Sweep ~14.0 s (14001 pts)
Aug 07, 2023
3:06:53 PM