AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission Output Power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

RF conducted emissions testing was performed only on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

The RMS average power measurement method for FCC/IC is detailed in section 5.2 of KDB 971168 D01v03r01 and ANSI C63.26-2015 section 5.2.4.4. This method uses trace averaging across the ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1/D)], where D is the duty cycle in decimal, to the measured power to compute the average power during the actual transmission times.

The output power was measured for a single carrier over the carrier channel bandwidth. The power was measured for a single carrier over the channel bandwidth indicated in the table. The total power for multi-port (64x64 MIMO) operation was based upon ANSI C63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log N_{out}). The total output power for Sixty-Four port operation is single power +18.1 dB [i.e. 10*log(64)].

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2024-03-12	2025-03-12
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Block - DC	Fairview Microwave	SD3239	ANE	2024-02-14	2025-02-14

AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-15
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.1%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

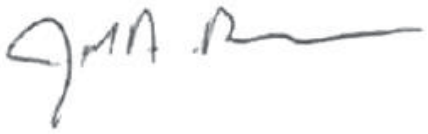
All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.7 GHz band in the single carrier operating mode configuration. All measured power values are within tolerance (i.e.: Rated Power ±2.0 dB).

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass



Tested By

TEST RESULTS

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Sixty-four Port (64x64 MIMO) dBm/carrier BW
Port 1				
20 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3710.01 MHz	31.007	0	31.0	49.1
Mid Channel, 3840.00 MHz	31.787	0	31.8	49.9
High Channel, 3969.99 MHz	30.693	0	30.7	48.8
40 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3720.00 MHz	34.073	0	34.1	52.2
Mid Channel, 3840.00 MHz	34.735	0	34.7	52.8
High Channel, 3960.00 MHz	34.066	0	34.1	52.2
60 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3730.02 MHz	36.483	0	36.5	54.6
Mid Channel, 3840.00 MHz	36.911	0	36.9	55.0
High Channel, 3949.98 MHz	36.582	0	36.6	54.7
80 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3740.01 MHz	36.394	0	36.4	54.5
Mid Channel, 3840.00 MHz	36.713	0	36.7	54.8
High Channel, 3939.99 MHz	36.342	0	36.3	54.4

AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Single Port dBm/Carrier BW	Sixty-four Port (64x64 MIMO) dBm/carrier BW
100 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3750.00 MHz	36.15	0	36.2	54.3
Mid Channel, 3840.00 MHz	36.611	0	36.6	54.7
High Channel, 3930.00 MHz	36.444	0	36.4	54.5
16QAM Modulation				
Mid Channel, 3840.00 MHz	36.689	0	36.7	54.8
64QAM Modulation				
Mid Channel, 3840.00 MHz	36.742	0	36.7	54.8
256QAM Modulation				
Mid Channel, 3840.00 MHz	36.783	0	36.8	54.9

AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
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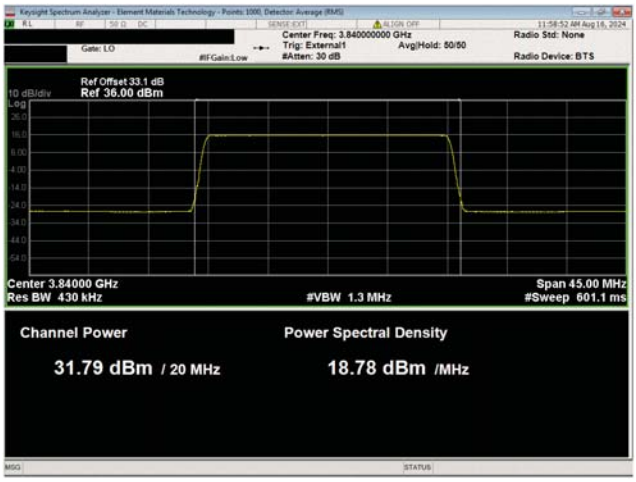
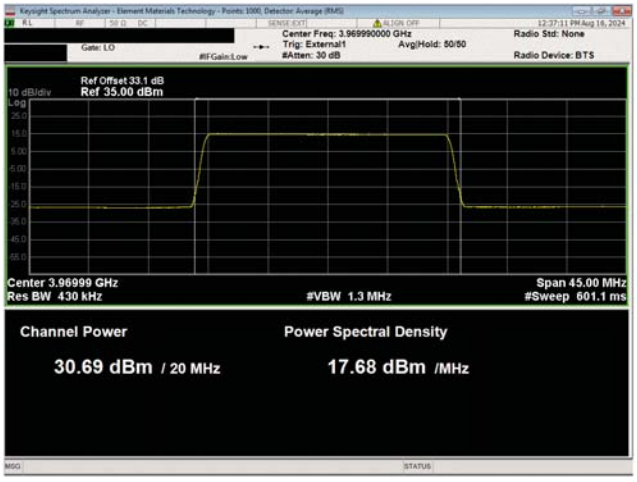
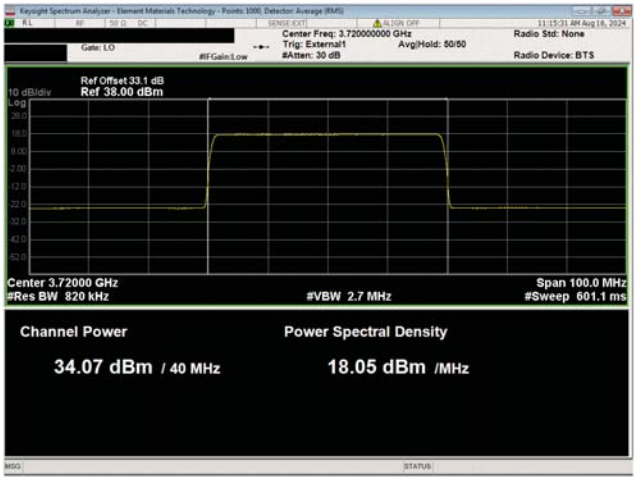
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3710.01 MHz



Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



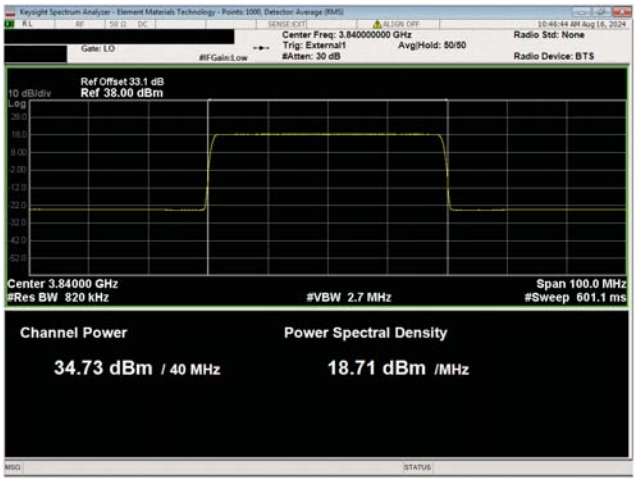
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3969.99 MHz



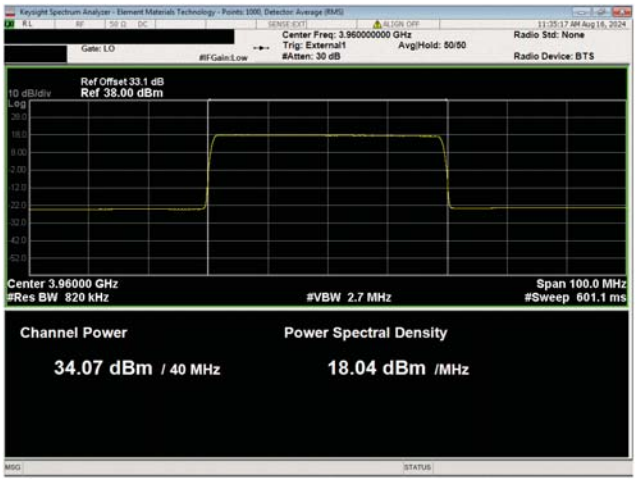
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3720.00 MHz

AVERAGE POWER - BAND 3.7G

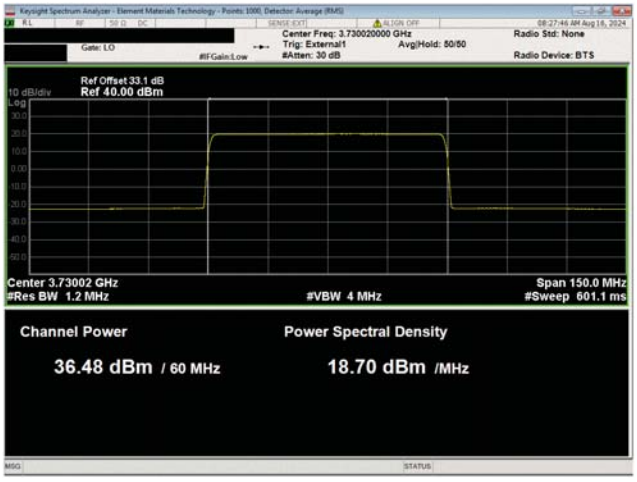
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



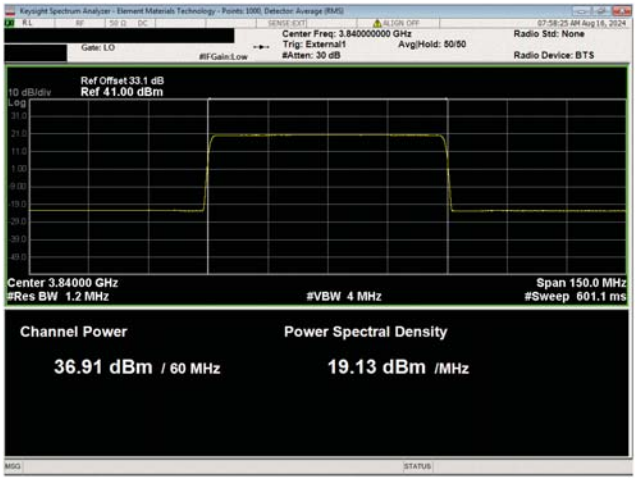
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



Port 1
40 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3960.00 MHz



Port 1
60 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3730.02 MHz



Port 1
60 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz

AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
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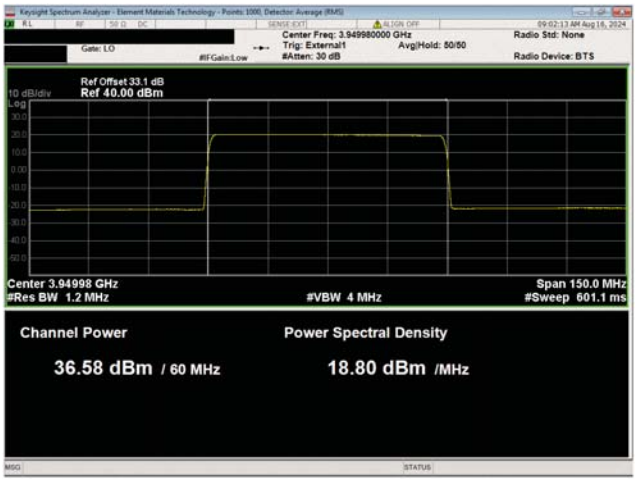
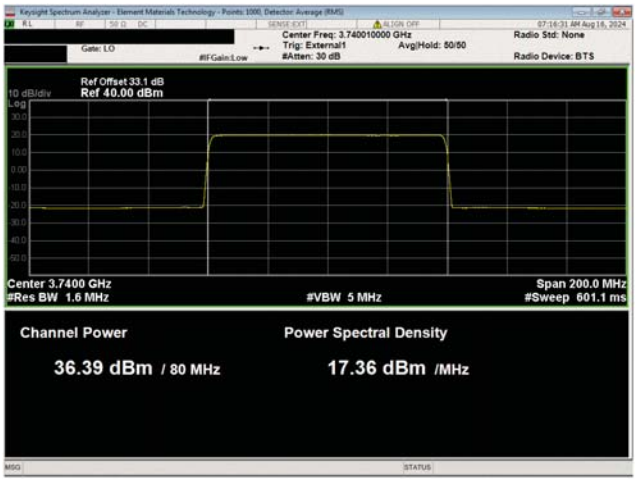
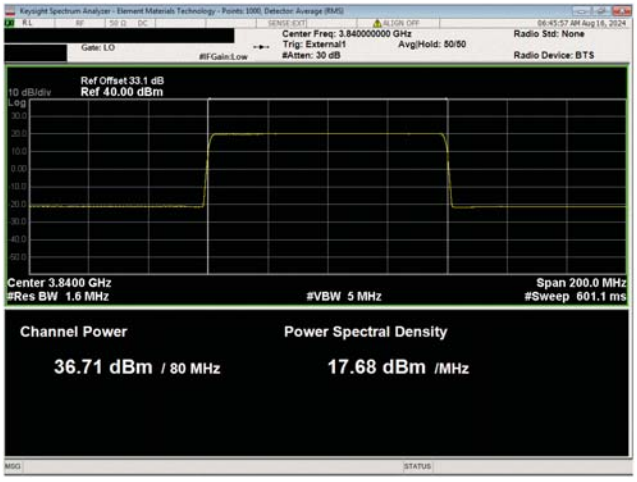


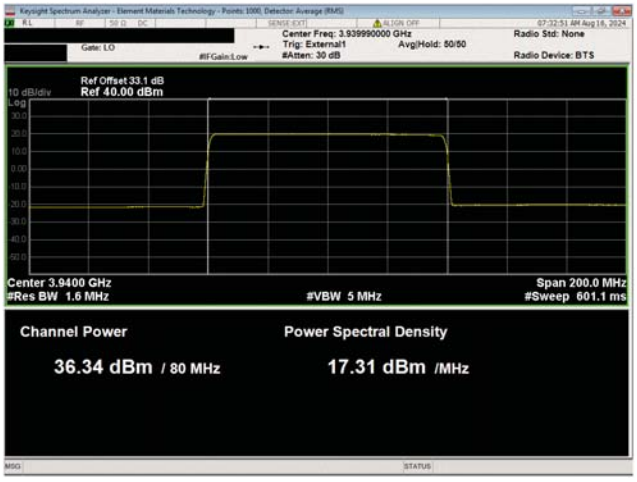
Port 1
60 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3949.98 MHz



Port 1
80 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3740.01 MHz



Port 1
80 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



Port 1
80 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3939.99 MHz

AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
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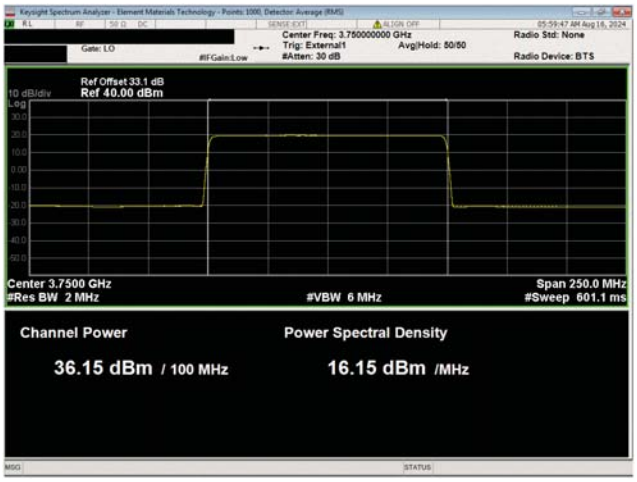
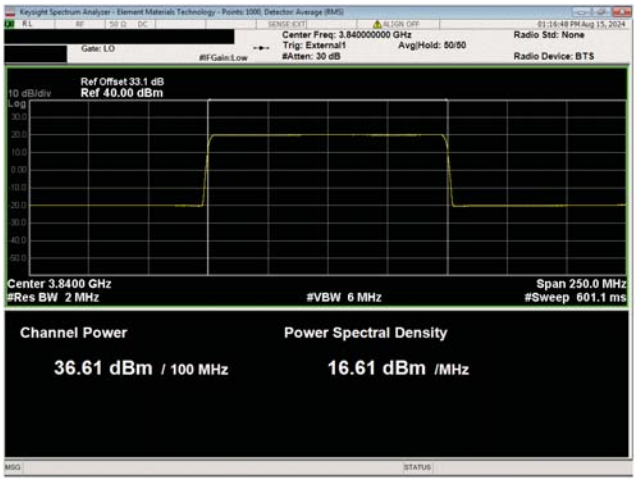
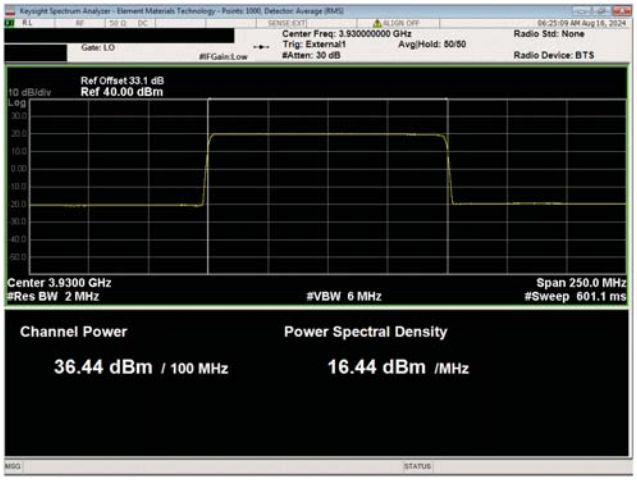


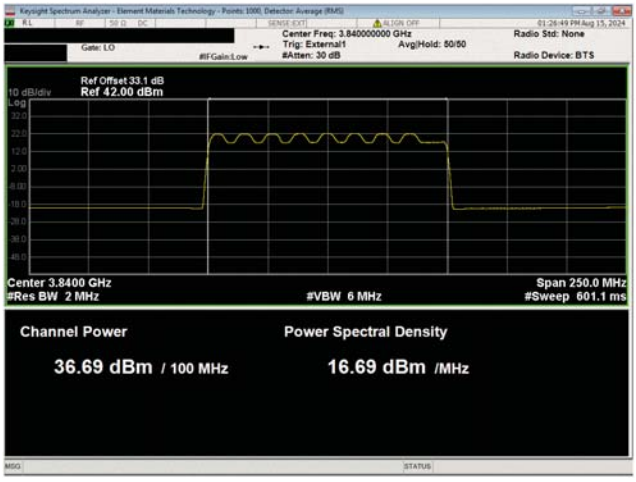
Port 1
100 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3750.00 MHz



Port 1
100 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



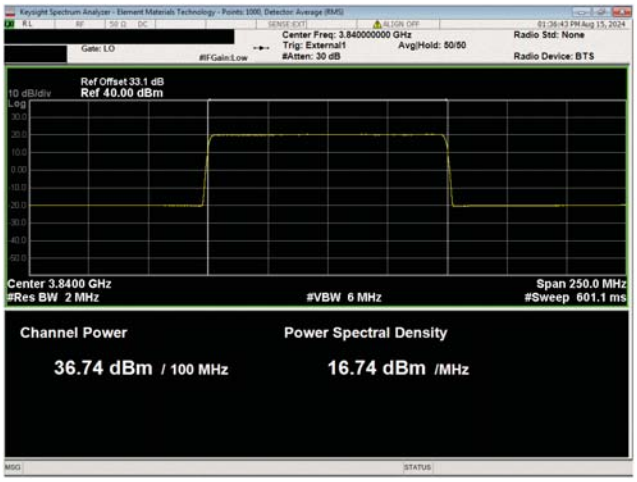
Port 1
100 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3930.00 MHz



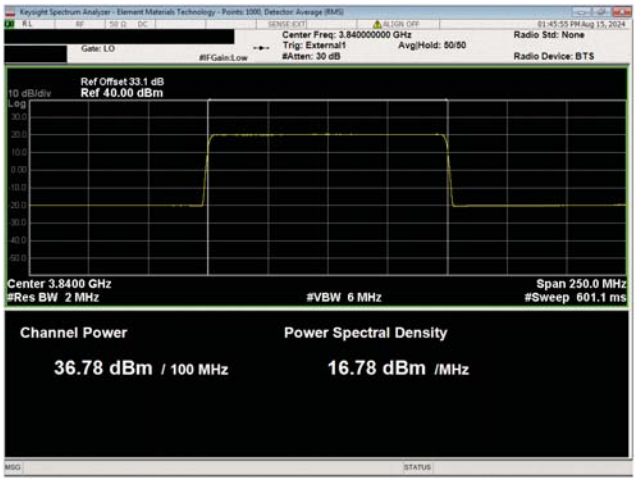
Port 1
100 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz

AVERAGE POWER - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Port 1
100 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz



Port 1
100 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

AVERAGE POWER - DUAL BAND

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission Output Power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

RF conducted emissions testing was performed only on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

The RMS average power measurement method for FCC/IC is detailed in section 5.2 of KDB 971168 D01v03r01 and ANSI C63.26-2015 section 5.2.4.4. This method uses trace averaging across the ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1/D)], where D is the duty cycle in decimal, to the measured power to compute the average power during the actual transmission times.

The output power was measured for a single carrier over the carrier channel bandwidth on the antenna port 1. The total output power for all port (64x64 MIMO) operation was determined based upon ANSI 63.26 clauses 6.4.3.1 and 6.4.3.2.4 (10 log Nout). The total output power for a Sixty-Four port operation is single port power +18.1 dB [i.e. 10log(64)].

Dual band with 3.45G and 3.7G Band carriers operations test cases using QPSK only:

a) *Test Case 1*. 3.7GHz Band NR20 Carrier at maximum power at the Top channel. 3.45GHz Band NR20 Carrier at maximum power at the bottom channel operating simultaneously. Both carriers are operating at the same power level (1.56W/carrier). Total radio power is 200W.

b) *Test Case 2*. 3.7GHz Band NR20 Carrier at maximum power at the Bottom channel. 3.45GHz Band NR20 Carrier at maximum power at the top channel operating simultaneously. Both carriers are operating at the same power level (1.56W/carrier). Total radio power is 200W.

c) *Test Case 3*. 3.7GHz Band NR100 Carrier at the top channel. 3.45GHz Band NR40 Carrier at the bottom channel operating simultaneously. Both carriers are operating at the same PSD level (3.75W/carrier for NR100 carrier or PSD level at 2.4W/MHz and 1.56W/carrier for NR40 carrier or PSD level at 2.5W/MHz). Total radio power is 340W.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2024-03-12	2025-03-12
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Block - DC	Fairview Microwave	SD3239	ANE	2024-02-14	2025-02-14

AVERAGE POWER - DUAL BAND

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-16
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.1%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. All measured power values are within tolerance (i.e.: Rated Power ±2.0 dB).

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

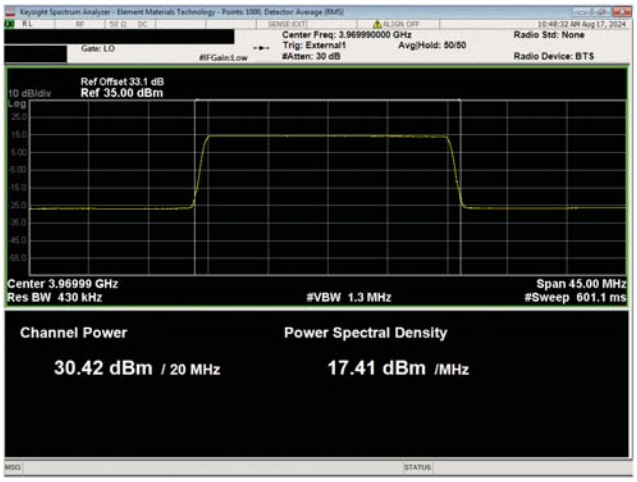
Tested By

TEST RESULTS

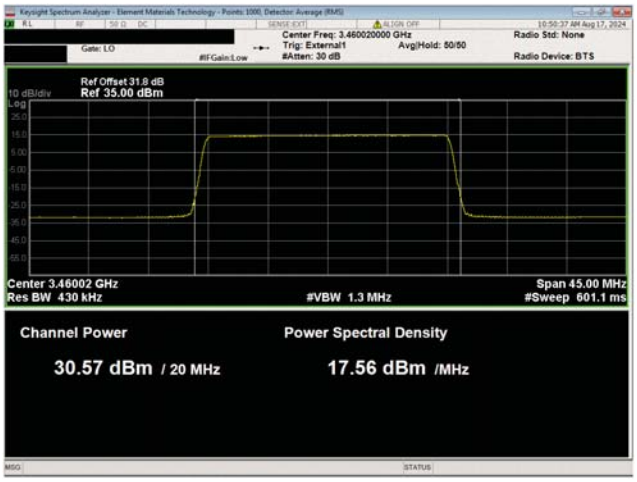
	Avg Cond Pwr (dBm)	Single Port (dBm)	Single Port (W)	64x64 MIMO (dBm)	Result
Port 1					
QPSK Modulation					
Test Case 1					
3.7G Band, 20 MHz Bandwidth, High Channel, 3969.99 MHz	30.417	30.4	1.10	48.5	Pass
3.45G Band, 20 MHz Bandwidth, Low Channel, 3460.02 MHz	30.572	30.6	1.15	48.7	Pass
Dual Band Power	N/A	N/A	2.24	51.6	Pass
Test Case 2					
3.7G Band, 20 MHz Bandwidth, Low Channel, 3710.01 MHz	30.775	30.8	1.20	48.9	Pass
3.45G Band, 20 MHz Bandwidth, High Channel, 3540.00 MHz	30.527	30.5	1.12	48.6	Pass
Dual Band Power	N/A	N/A	2.32	51.7	Pass
Test Case 3					
3.7G Band, 100 MHz Bandwidth, High Channel, 3930.00 MHz	34.801	34.8	3.02	52.9	Pass
3.45G Band, 40 MHz Bandwidth, Low Channel, 3470.01 MHz	30.873	30.9	1.23	49	Pass
Dual Band Power	N/A	N/A	4.25	54.4	Pass

AVERAGE POWER - DUAL BAND

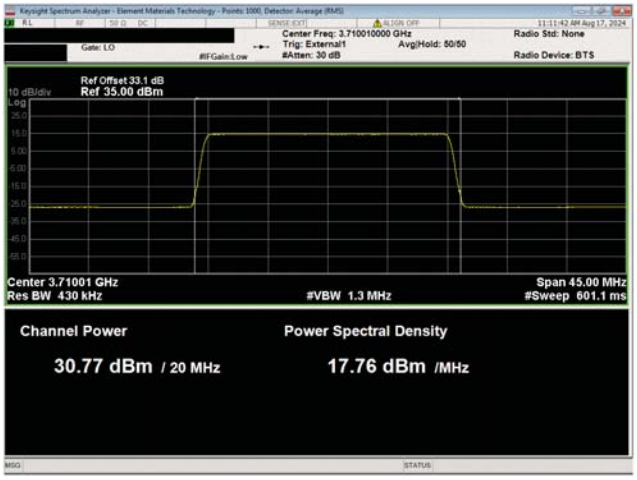
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



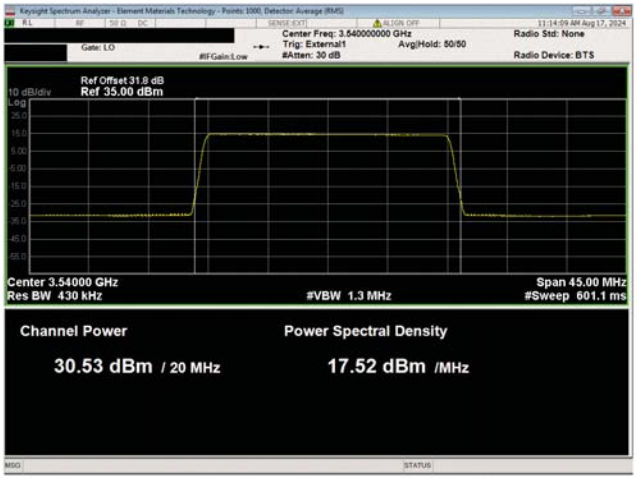
Port 1
QPSK Modulation
Test Case 1



Port 1
QPSK Modulation
Test Case 1



Port 1
QPSK Modulation
Test Case 2



Port 1
QPSK Modulation
Test Case 2

AVERAGE POWER - DUAL BAND

element
TbtTx 2024.05.24.1
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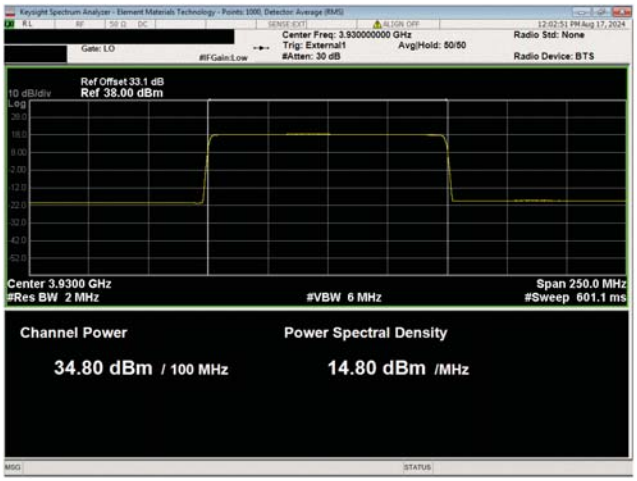
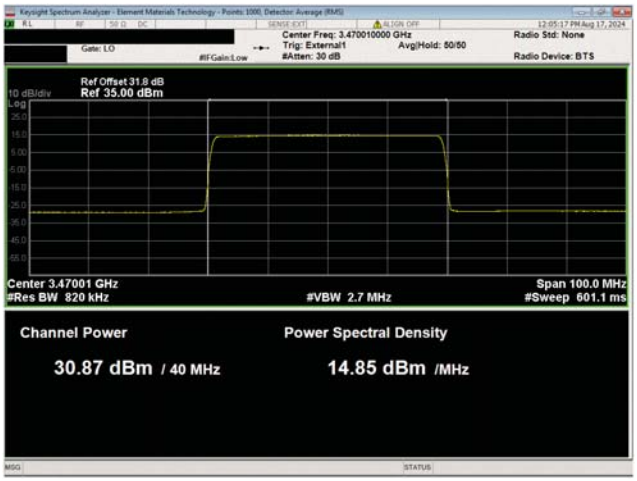


Port 1
QPSK Modulation
Test Case 3



Port 1
QPSK Modulation
Test Case 3

AVERAGE POWER – MULTICARRIER, BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

RF conducted emissions testing was performed only on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i and 6.4.

The RMS average power measurement method for FCC is detailed in section 5.2 of KDB 971168 D01v03r01 and ANSI C63.26-2015 section 5.2.4.4. The CCDF measurement method for FCC/IC is detailed in section 5.7.2 of KDB971168 D01v03r01 and ANSI C63.26-2015 section 5.2.3.4. The average power spectral density measurement method for the FCC is detailed in section 5.4 of KDB 971168 D01v03r01 and ANSI C63.26-2015 section 5.2.4.5.

Multicarrier test cases have been developed as shown below:

a. *3.7G Band Multicarrier Test Case 1:* Two contiguous NR20 carriers with minimum spacing between carrier frequencies at the lower band edge (3710.01 & 3730.02MHz). The smallest channel bandwidth is selected to maximize carrier power spectral density. The carriers are operated at maximum power (~1.56W/carrier) with a total radio power of 200 watts.

b. *3.7G Band Multicarrier Test Case 2:* Two contiguous NR20 carriers with minimum spacing between carrier frequencies at the upper band edge (3949.98 & 3969.99 MHz). The smallest channel bandwidth is selected to maximize carrier power spectral density. The carriers are operated at maximum power (~1.56W/carrier) with a total radio power of 200 watts.

c. *3.7G Band Multicarrier Test Case 3:* Two contiguous NR100 carriers with minimum spacing between carrier frequencies at the lower band edge (3750.00 & 3850.02MHz). The largest channel bandwidth is selected to maximize radio power. The carrier power for NR100 is ~2.65W/carrier. The total radio power is 340 watts.

d. *3.7G Band Multicarrier Test Case 4:* Two contiguous NR100 carriers with minimum spacing between carrier frequencies at the upper band edge (3830.01 & 3930.00 MHz). The largest channel bandwidth is selected to maximize radio power The carrier power for NR100 is ~2.65W/carrier. The total radio power is 340 watts.

e. *3.7G Band Multicarrier Test Case 5:* Two non-contiguous NR20 carriers with maximum spacing between carrier frequencies at the lower band edge (3710.01 & 3889.995MHz). The smallest channel bandwidth is selected to maximize carrier power spectral density. The carriers are operated at maximum power (~1.56W/carrier) with a total radio power of 200 watts.

f. *3.7G Band Multicarrier Test Case 6:* Two non-contiguous NR20 carriers with maximum spacing between carrier frequencies at the upper band edge (3789.99 & 3969.99MHz). The smallest channel bandwidth is selected to maximize carrier power spectral density. The carriers are operated at maximum power (~1.56W/carrier) with a total radio power of 200 watts.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2024-03-12	2025-03-12
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Block - DC	Fairview Microwave	SD3239	ANE	2024-02-14	2025-02-14

AVERAGE POWER – MULTICARRIER, BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-21
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.1%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

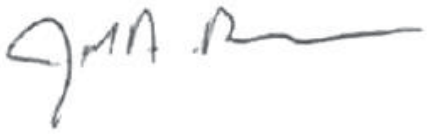
All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.7 GHz band per the Multicarrier test cases. All measured power values are within tolerance (i.e.: Rated Power ±2.0 dB).

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass



Tested By

TEST RESULTS

	Avg Cond Pwr (dBm)	Single Port (dBm)	Single Port (W)	Single Port, Band (dBm)	64x64 MIMO Pwr (dBm)	Results
Port 1						
QPSK Modulation						
Test Case 1						
NR20, Low Channel, 3710.01 MHz	30.18	30	1.00	N/A	48.1	Pass
NR20, Low Channel 3730.02 MHz	30.57	30.6	1.15	N/A	48.7	Pass
Dual Carrier Power	N/A	N/A	2.15	33.3	51.4	Pass
Test Case 2						
NR20, High Channel 3949.98 MHz	30.548	30.5	1.12	N/A	48.6	Pass
NR20, High Channel 3969.99 MHz	30.44	30.4	1.10	N/A	48.5	Pass
Dual Carrier Power	N/A	N/A	2.22	33.5	51.6	Pass
Test Case 3						
NR100, Low Channel 3750.00 MHz	32.7	32.7	1.86	N/A	50.8	Pass
NR100, Low Channel 3850.02 MHz	33.149	33.1	2.04	N/A	51.2	Pass
Dual Carrier Power	N/A	N/A	3.90	35.9	54	Pass
Test Case 4						
NR100, High Channel 3830.01 MHz	33.186	33.2	2.09	N/A	51.3	Pass
NR100, High Channel 3930.00 MHz	32.827	32.8	1.91	N/A	50.9	Pass
Dual Carrier Power	N/A	N/A	3.99	36.0	54.1	Pass
Test Case 5						
NR20, Low Channel 3710.01 MHz	30.315	30.3	1.07	N/A	48.4	Pass
NR20, Low Channel, 3889.995 MHz	30.931	30.9	1.23	N/A	49	Pass

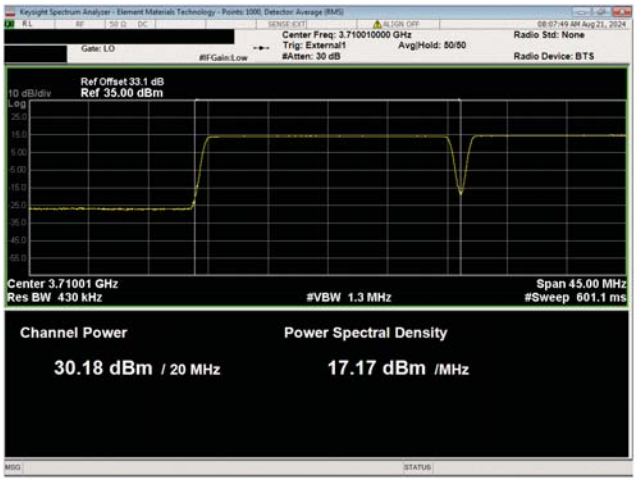
AVERAGE POWER – MULTICARRIER, BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

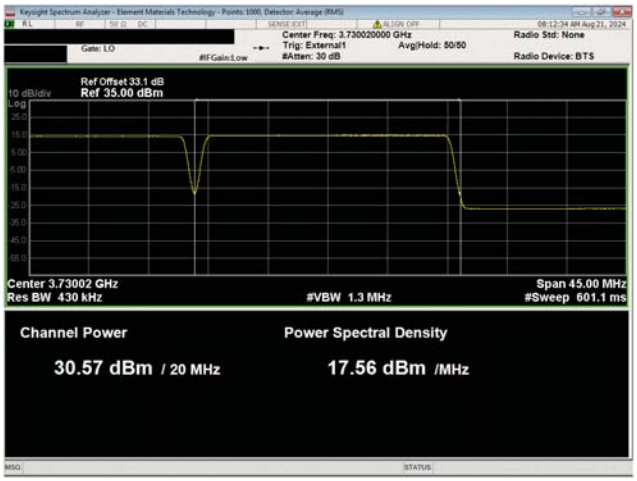
	Avg Cond Pwr (dBm)	Single Port (dBm)	Single Port (W)	Single Port, Band (dBm)	64x64 MIMO Pwr (dBm)	Results
Dual Carrier Power	N/A	N/A	2.30	33.6	51.7	Pass
Test Case 6						
NR20, High Channel 3789.99 MHz	30.642	30.6	1.15	N/A	48.7	Pass
NR20, High Channel 3969.99 MHz	30.137	30.1	1.02	N/A	48.2	Pass
Dual Carrier Power	N/A	N/A	2.17	33.4	51.5	Pass

AVERAGE POWER – MULTICARRIER, BAND 3.7G

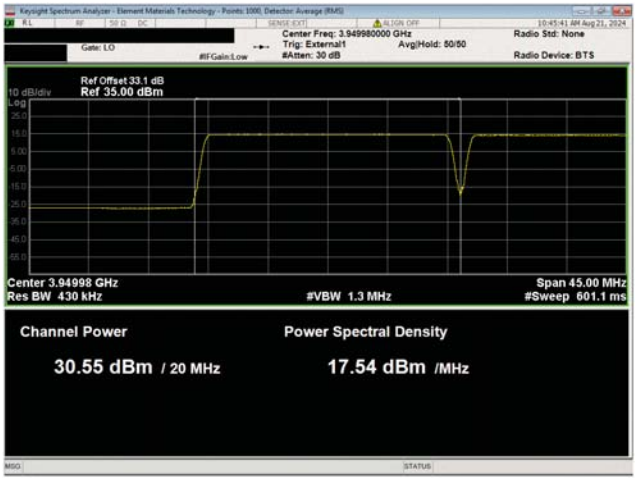
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



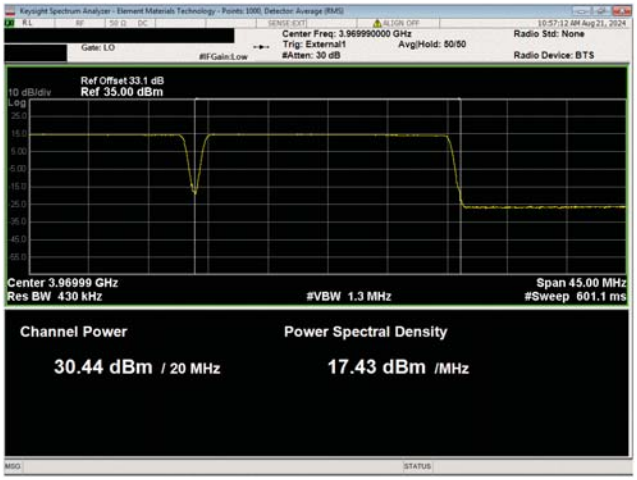
Port 1
QPSK Modulation
Test Case 1
NR20, Low Channel, 3710.01 MHz



Port 1
QPSK Modulation
Test Case 1
NR20, Low Channel 3730.02 MHz



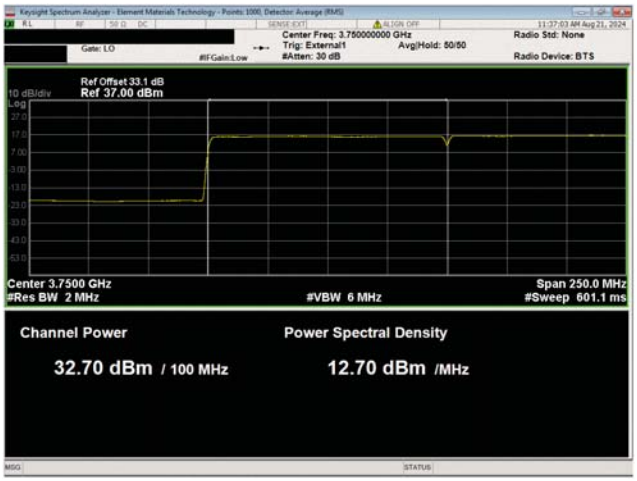
Port 1
QPSK Modulation
Test Case 2
NR20, High Channel 3949.98 MHz



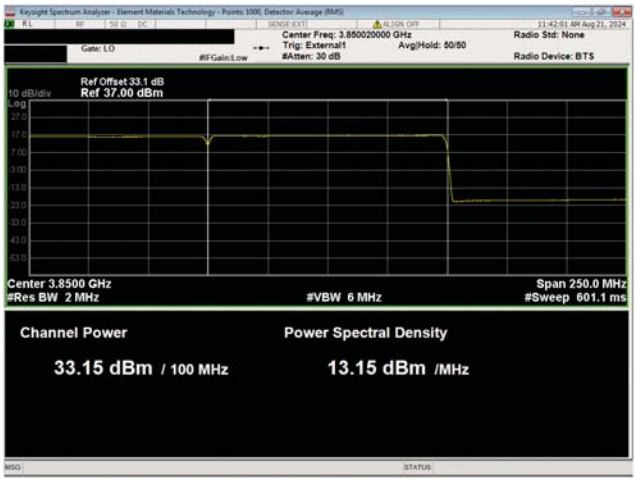
Port 1
QPSK Modulation
Test Case 2
NR20, High Channel 3969.99 MHz

AVERAGE POWER – MULTICARRIER, BAND 3.7G

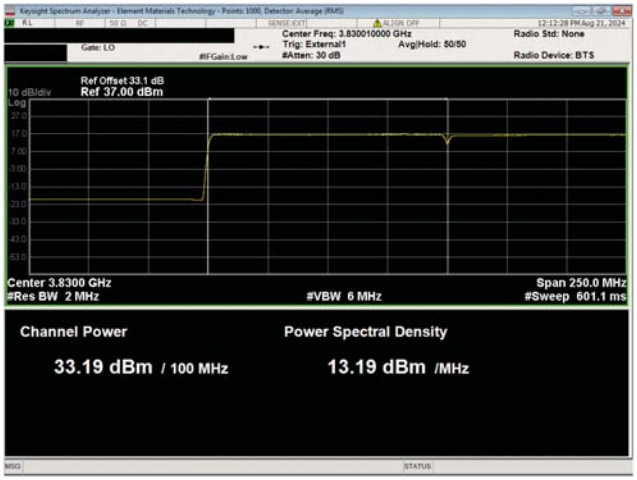
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



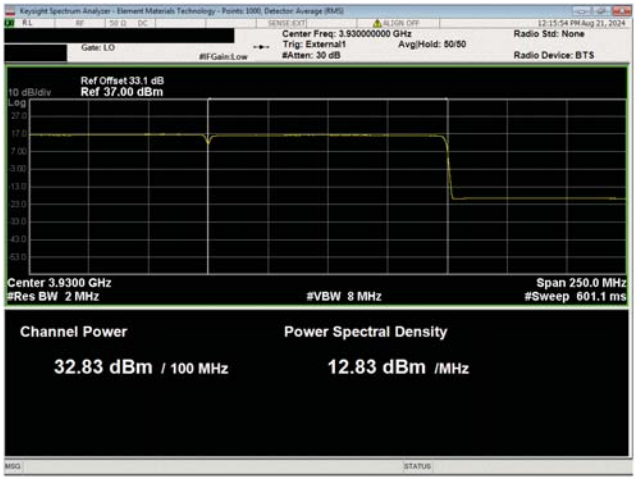
Port 1
QPSK Modulation
Test Case 3
NR100, Low Channel 3750.00 MHz



Port 1
QPSK Modulation
Test Case 3
NR100, Low Channel 3850.02 MHz



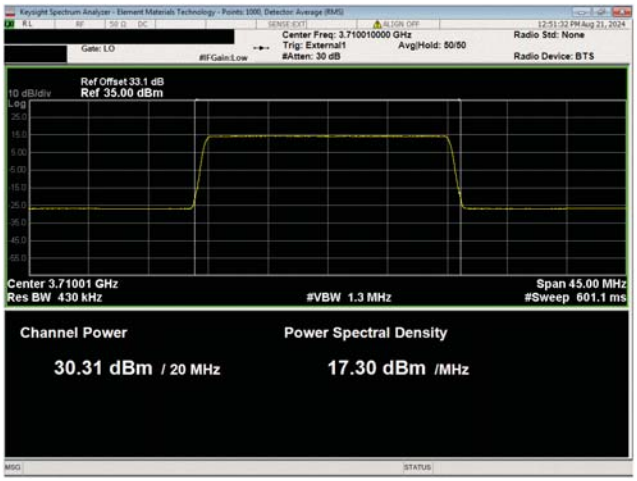
Port 1
QPSK Modulation
Test Case 4
NR100, High Channel 3830.02 MHz



Port 1
QPSK Modulation
Test Case 4
NR100, High Channel 3930.00 MHz

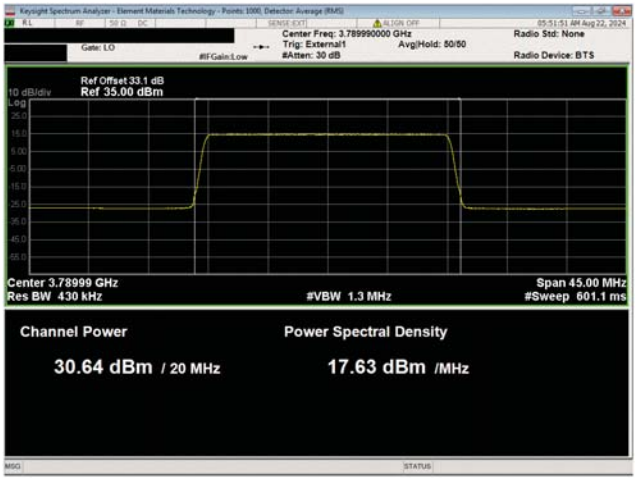
AVERAGE POWER – MULTICARRIER, BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

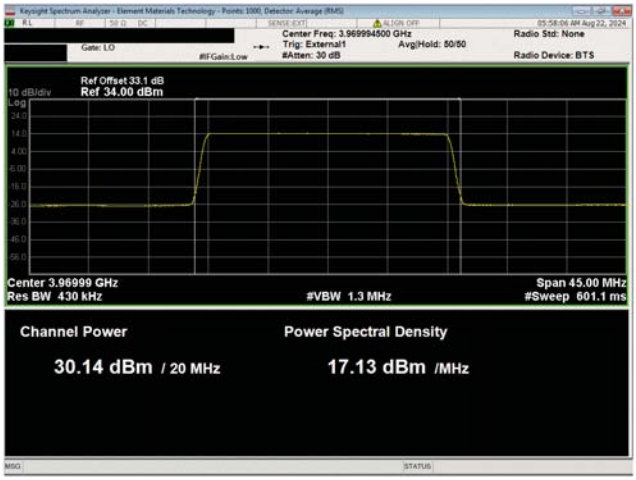


Port 1
QPSK Modulation
Test Case 5
NR20, Low Channel 3710.01 MHz

Port 1
QPSK Modulation
Test Case 5
NR20, Low Channel, 3889.995 MHz



Port 1
QPSK Modulation
Test Case 6
NR20, High Channel 3789.99 MHz



Port 1
QPSK Modulation
Test Case 6
NR20, High Channel 3969.99 MHz

POWER SPECTRAL DENSITY - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The RF conducted emission testing was performed on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the "Output Power" report section) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

The fundamental emission Power Spectral Density (PSD) was measured using the channels and modes as called out on the following data sheets.

The method of ANSI C63.26-2015 section 5.2.4.5 was used to make this measurement.

The Power Spectral Density was measured while transmitting on one carrier. The total PSD for multiport operation was determined based upon ANSI C63.26 clause 6.4.3.2.4 (10 Log N_{out}). The EIRP calculations are based upon ANSI C63.26-2015 paragraphs 6.4 and 6.4.6.3.

FCC Requirements: §27.50 Power limits and duty cycle.

27.50 (k) The following power requirements apply to stations transmitting in the 3450-3550 MHz band:

(1) The power of each fixed or base station transmitting in the 3450-3550 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to an equivalent isotropically radiated power (EIRP) of 3280 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(2) The power of each fixed or base station transmitting in the 3450-3550 MHz band and situated in any geographic location other than that described in paragraph (k)(1) of this section is limited to an EIRP of 1640 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2024-03-12	2025-03-12
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Block - DC	Fairview Microwave	SD3239	ANE	2024-02-14	2025-02-14

POWER SPECTRAL DENSITY - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

5G NR EIRP Calculations for Sixty-Four Port MIMO Operations

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters.

The AVQQA antenna assembly has an array of 4 rows and 8 columns of (±45°) cross-polarized (orthogonal) radiators. This antenna assembly has a beamforming gain of 25.0dBi ± 1.0dB. The sixty-four AVQQA transmitter outputs are connected to the antenna array (thirty-two are connected to +45° radiators/antennas and thirty-two are connected to the -45° radiators/antennas).

Equivalent Isotropically Radiated Power (EIRP) is calculated (as specified in ANSI C63.26-2015 section 6.4 for a system of correlated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna assembly beamforming gain was used for this calculation. Calculations of worst-case EIRP for sixty-four port MIMO are as follows:

Parameter	10 MHz Ch BW	20 MHz Ch BW	30 MHz Ch BW	40 MHz Ch BW
Worst Case PSD/Antenna Port	20.5 dBm/MHz	20.8 dBm/MHz	21.3 dBm/MHz	21.3 dBm/MHz
Cable Loss	0 dB	0 dB	0 dB	0 dB
Number of Ant Ports per Polarization	32	32	32	32
Total PSD per Polarization 10 Log 32 = +15.1 dB	35.6 dBm/MHz	35.9 dBm/MHz	36.4 dBm/MHz	36.4 dBm/MHz
Maximum Antenna Beamforming Gain per Polarization	26 dBi	26 dBi	26 dBi	26 dBi
EIRP per Polarization	61.6 dBm/MHz	61.9 dBm/MHz	62.4 dBm/MHz	62.4 dBm/MHz
Number of Polarizations	2	2	2	2
EIRP Total (See Note 1)	61.6 dBm/MHz	61.9 dBm/MHz	62.4 dBm/MHz	62.4 dBm/MHz
Passing EIRP Limit	62.15 dBm/MHz and 65.16 dBm/MHz	62.15 dBm/MHz and 65.16 dBm/MHz	65.16 dBm/MHz	65.16 dBm/MHz

Note 1: The EIRP per antenna polarization is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

Calculation Summary for the 3.45G Band

(1) The worst case AVQQA sixty-four port MIMO EIRP levels for all 5G NR channel bandwidths (10MHz, 20MHz, 30MHz & 40MHz) are less than the 3280 W/MHz (65.16 dBm/MHz) FCC regulatory limit.
(2) The worst case AVQQA sixty-four port MIMO EIRP levels for the 5G NR 10MHz & 20MHz channel bandwidths are less than the 1640 W/MHz (62.15 dBm/MHz) FCC regulatory limit.
(3) The worst case AVQQA sixty-four port MIMO EIRP levels for the 5G NR 30MHz & 40MHz channel bandwidths exceed the 1640 W/MHz (62.15 dBm/MHz) FCC regulatory limit by 0.25 dB (62.4 dBm/MHz - 62.15 dBm/MHz). The AVQQA 5G NR 30MHz & 40MHz channel bandwidth carrier power levels using sixty-four port MIMO operation need to be reduced to meet the 1640 W/MHz (62.15 dBm/MHz) FCC regulatory limit.

POWER SPECTRAL DENSITY - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-09
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.8%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

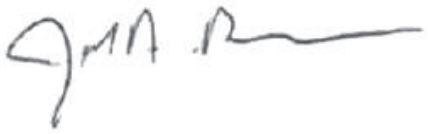
All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.45 GHz band in single carrier operating mode configuration.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass



Tested By

TEST RESULTS

	Initial Value dBm/MHz	Duty cycle Factor (dB)	Single Port dBm/MHz == PSD	Sixty-four Port (64x64 MIMO) dBm/MHz == PSD
Port 1				
10 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3500.01 MHz	19.68	0	19.7	37.8
16QAM Modulation				
Mid Channel, 3500.01 MHz	20.545	0	20.5	38.6
64QAM Modulation				
Mid Channel, 3500.01 MHz	19.814	0	19.8	37.9
256QAM Modulation				
Mid Channel, 3500.01 MHz	19.805	0	19.8	37.9
20 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3500.01 MHz	19.322	0	19.3	37.4
16QAM Modulation				
Mid Channel, 3500.01 MHz	20.833	0	20.8	38.9
64QAM Modulation				
Mid Channel, 3500.01 MHz	19.545	0	19.5	37.6
256QAM Modulation				
Mid Channel, 3500.01 MHz	19.471	0	19.5	37.6
30 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3500.01 MHz	19.403	0	19.4	37.5

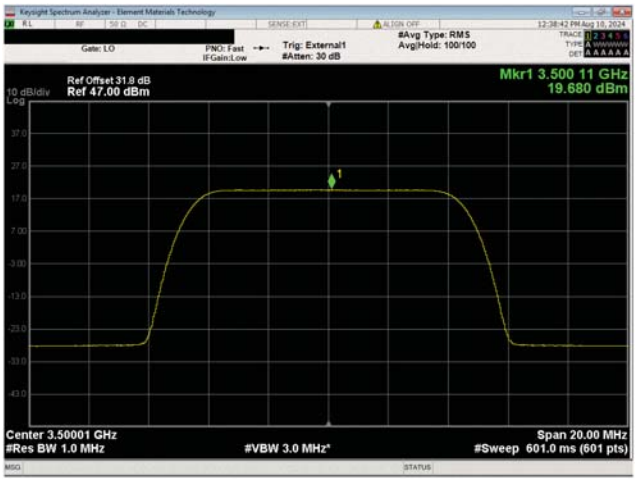
POWER SPECTRAL DENSITY - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

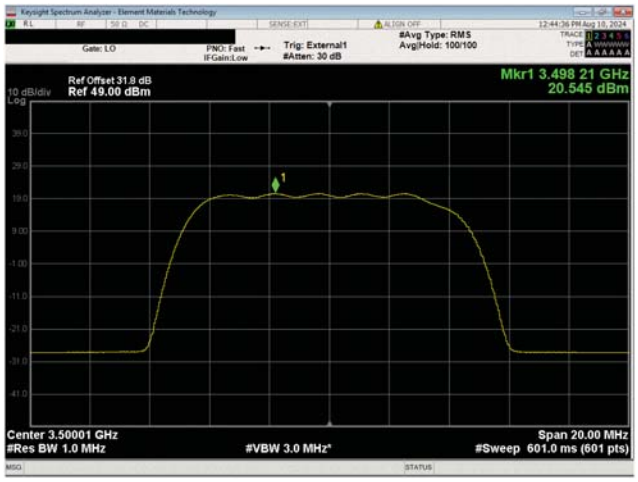
	Initial Value dBm/MHz	Duty cycle Factor (dB)	Single Port dBm/MHz == PSD	Sixty-four Port (64x64 MIMO) dBm/MHz == PSD
16QAM Modulation				
Mid Channel, 3500.01 MHz	21.327	0	21.3	39.4
64QAM Modulation				
Mid Channel, 3500.01 MHz	19.607	0	19.6	37.7
256QAM Modulation				
Mid Channel, 3500.01 MHz	19.587	0	19.6	37.7
40 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3470.01 MHz	18.645	0	18.6	36.7
Mid Channel, 3500.01 MHz	19.207	0	19.2	37.3
High Channel, 3529.98 MHz	18.522	0	18.5	36.6
16QAM Modulation				
Low Channel, 3470.01 MHz	20.477	0	20.5	38.6
Mid Channel, 3500.01 MHz	21.334	0	21.3	39.4
High Channel, 3529.98 MHz	17.475	0	17.5	35.6
64QAM Modulation				
Low Channel, 3470.01 MHz	18.762	0	18.8	36.9
Mid Channel, 3500.01 MHz	19.487	0	19.5	37.6
High Channel, 3529.98 MHz	15.585	0	15.6	33.7
256QAM Modulation				
Low Channel, 3470.01 MHz	18.758	0	18.8	36.9
Mid Channel, 3500.01 MHz	19.533	0	19.5	37.6
High Channel, 3529.98 MHz	15.771	0	15.8	33.9

POWER SPECTRAL DENSITY - BAND 3.45G

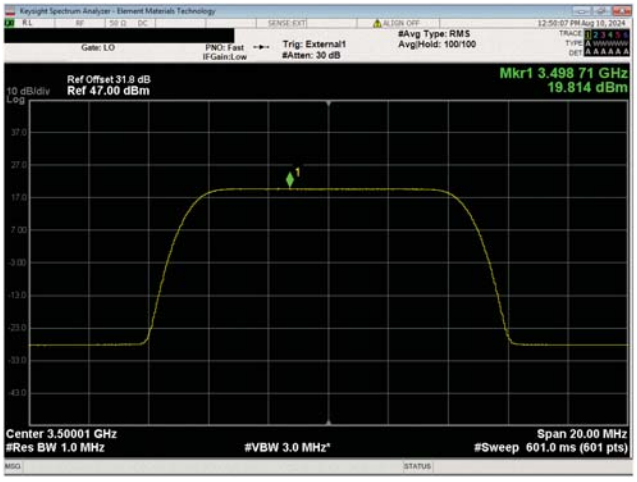
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



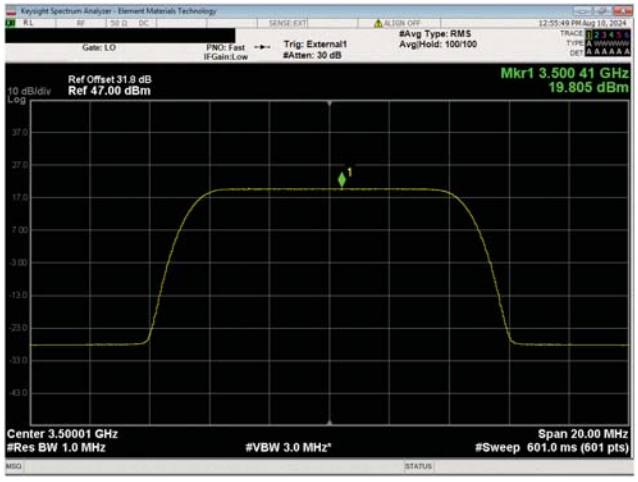
Port 1
10 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



Port 1
10 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



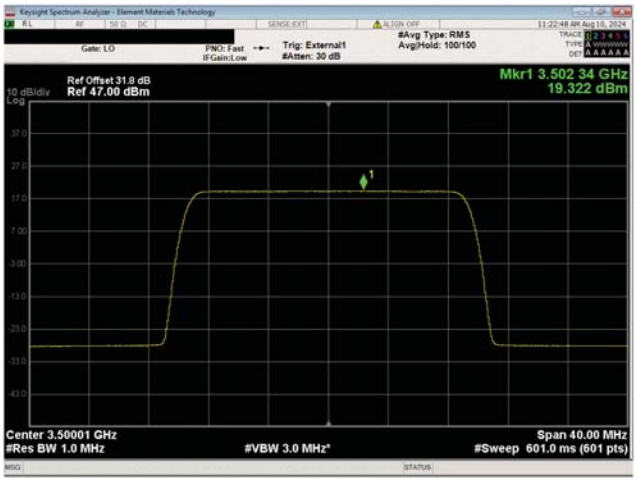
Port 1
10 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz



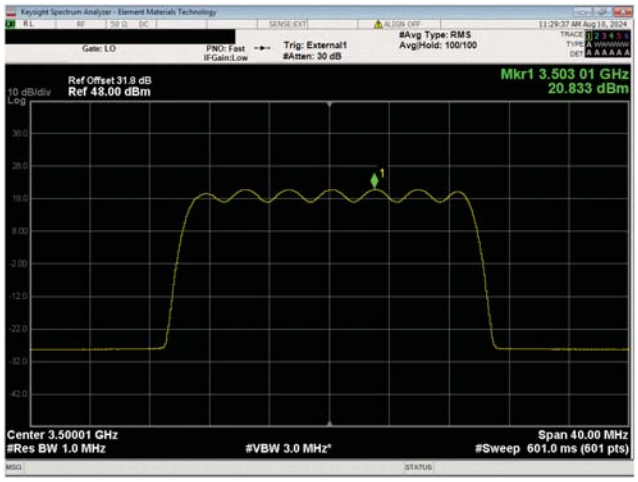
Port 1
10 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz

POWER SPECTRAL DENSITY - BAND 3.45G

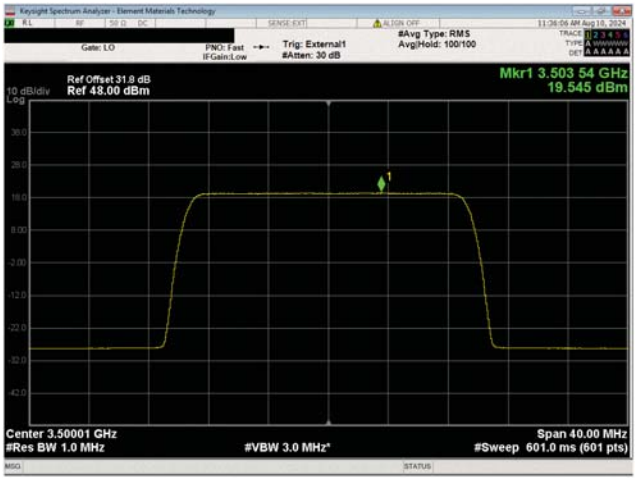
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



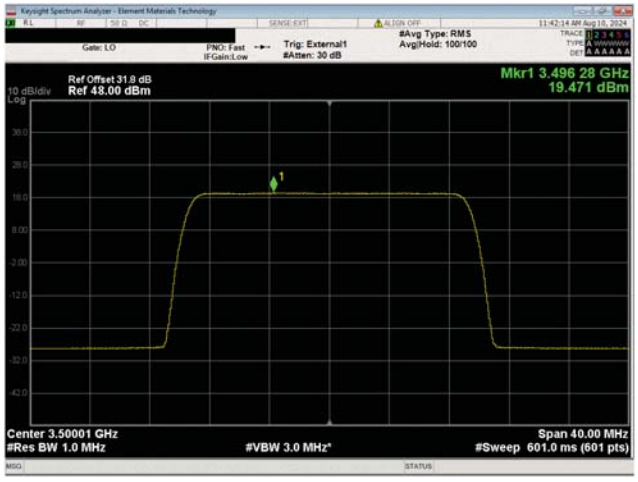
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



Port 1
20 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



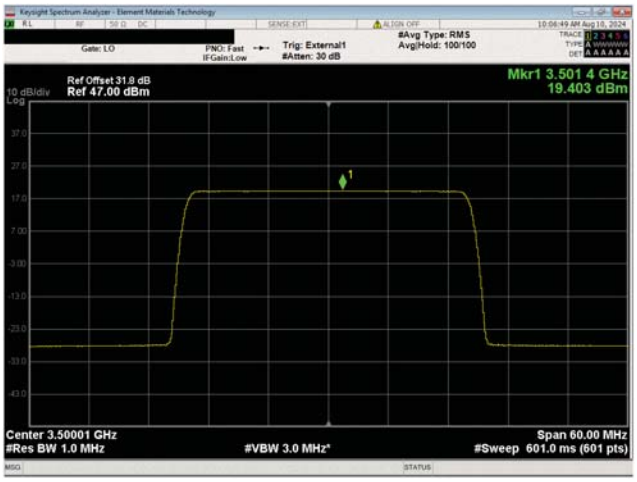
Port 1
20 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz



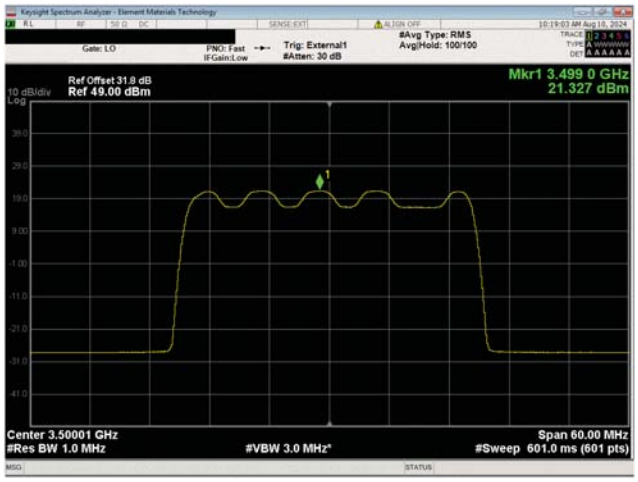
Port 1
20 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz

POWER SPECTRAL DENSITY - BAND 3.45G

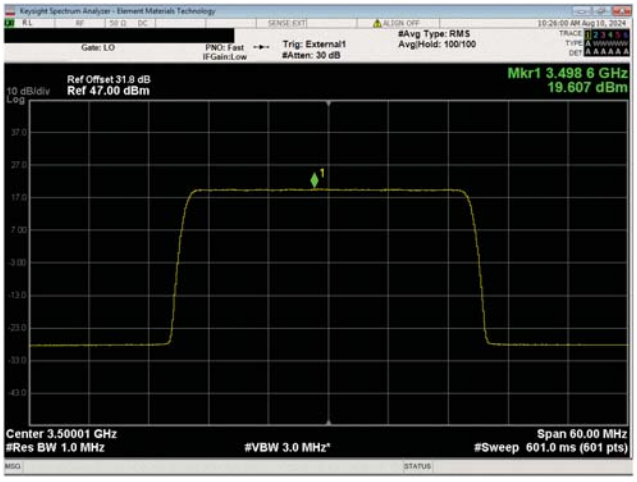
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



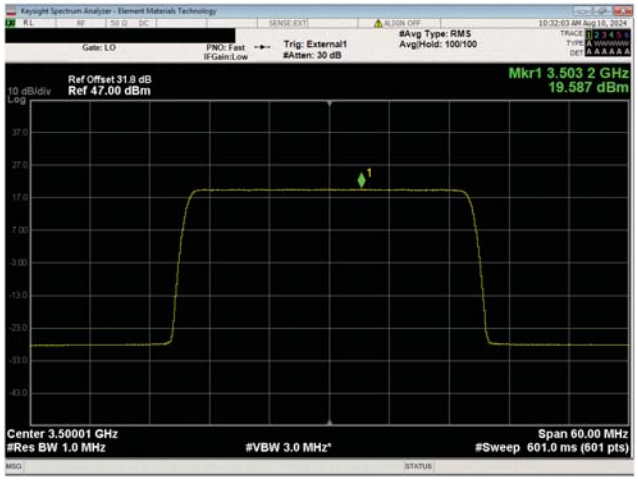
Port 1
30 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



Port 1
30 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



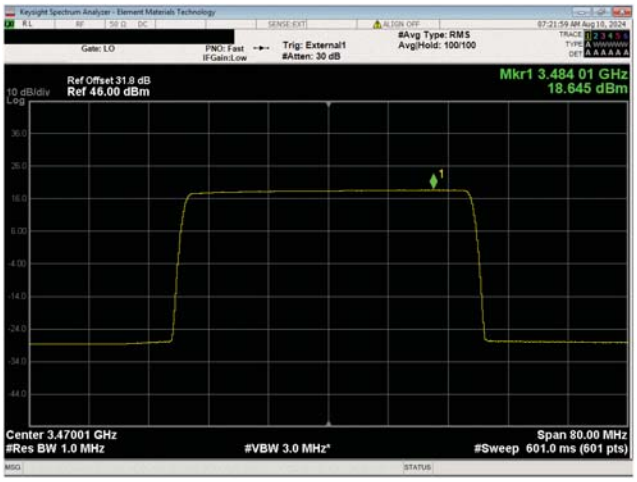
Port 1
30 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz



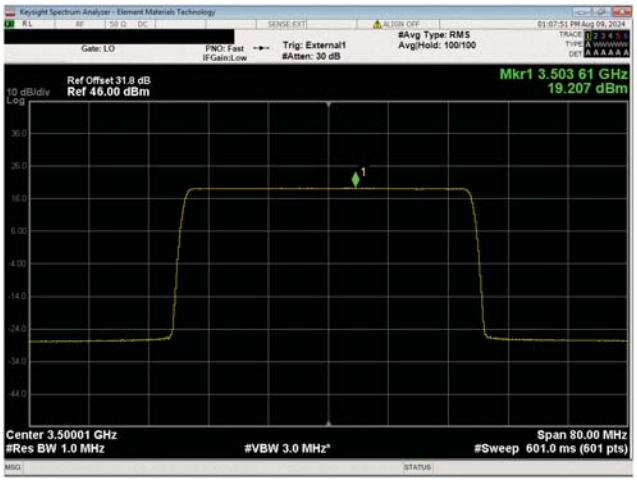
Port 1
30 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz

POWER SPECTRAL DENSITY - BAND 3.45G

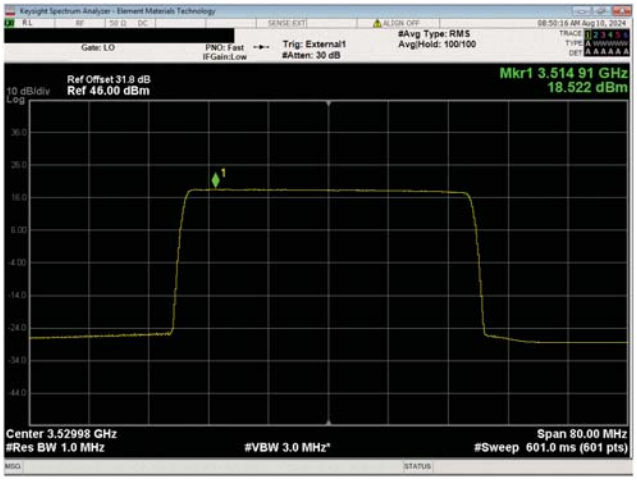
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



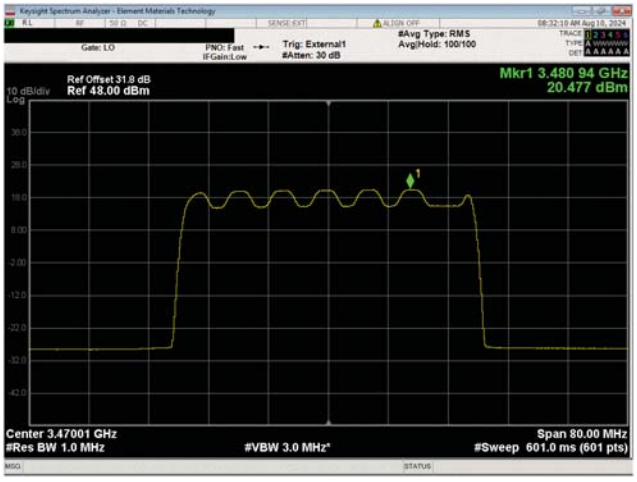
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3470.01 MHz



Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



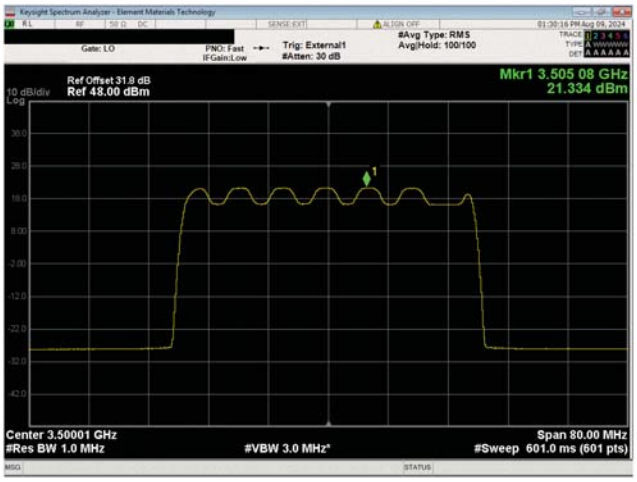
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3529.98 MHz



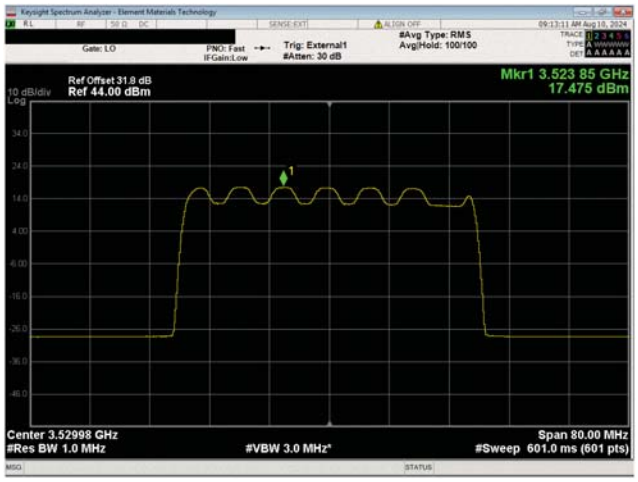
Port 1
40 MHz Channel Bandwidth
16QAM Modulation
Low Channel, 3470.01 MHz

POWER SPECTRAL DENSITY - BAND 3.45G

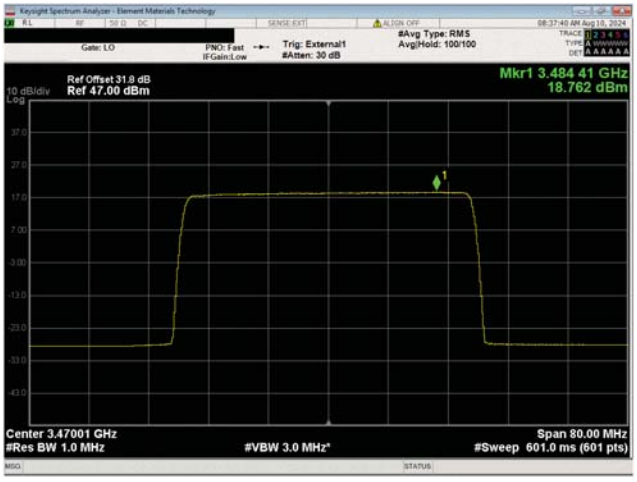
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



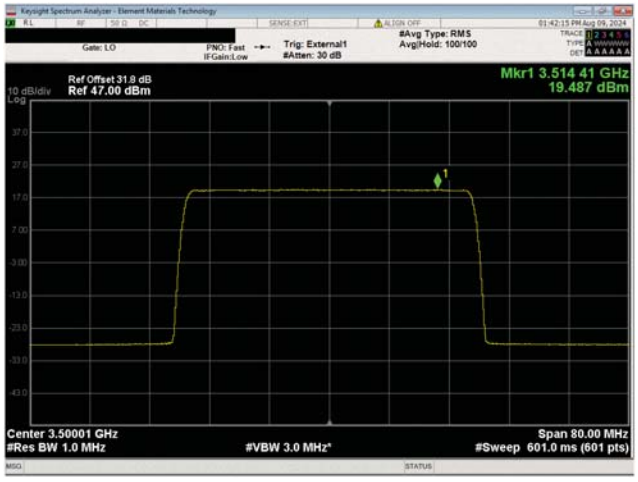
Port 1
40 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
40 MHz Channel Bandwidth
16QAM Modulation
High Channel, 3529.98 MHz



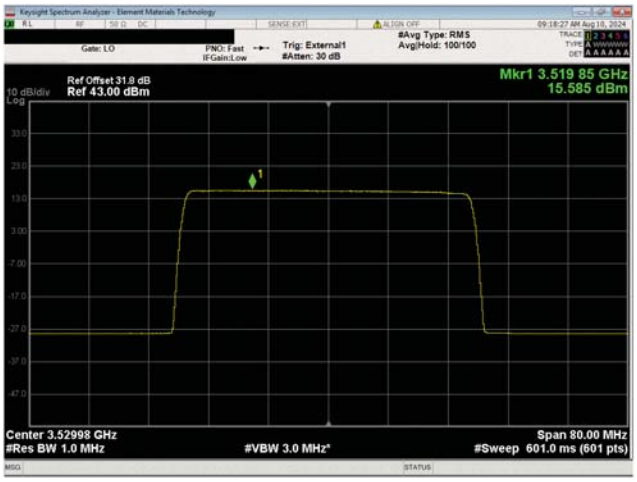
Port 1
40 MHz Channel Bandwidth
64QAM Modulation
Low Channel, 3470.01 MHz



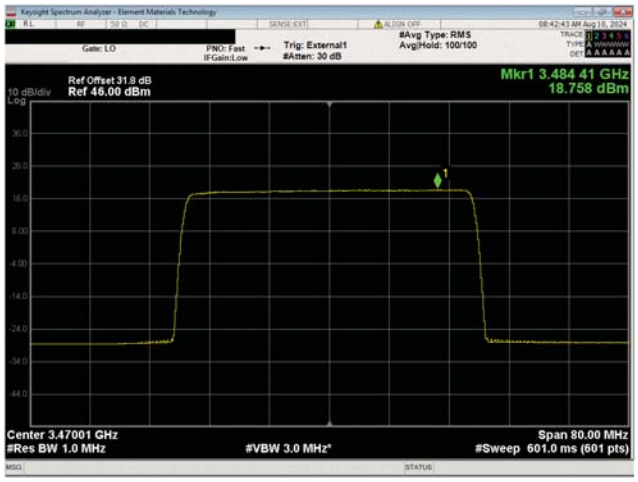
Port 1
40 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz

POWER SPECTRAL DENSITY - BAND 3.45G

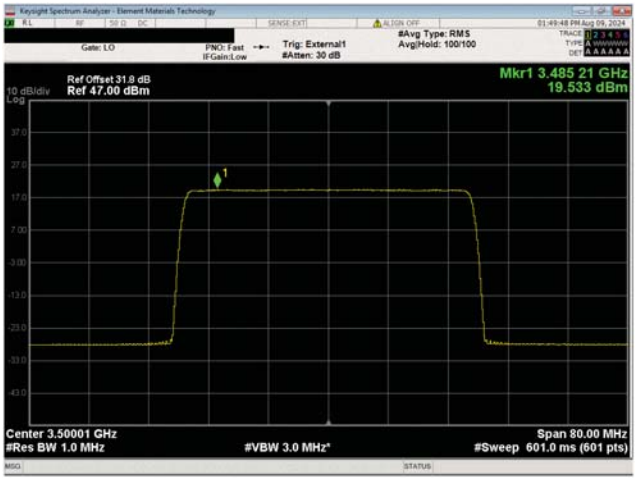
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



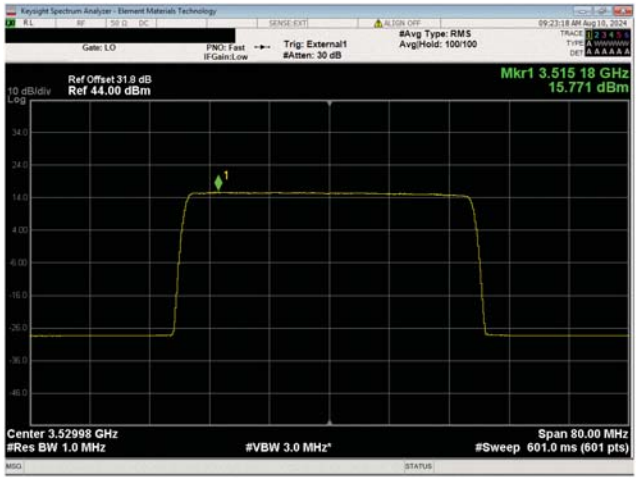
Port 1
40 MHz Channel Bandwidth
64QAM Modulation
High Channel, 3529.98 MHz



Port 1
40 MHz Channel Bandwidth
256QAM Modulation
Low Channel, 3470.01 MHz



Port 1
40 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
40 MHz Channel Bandwidth
256QAM Modulation
High Channel, 3529.98 MHz

POWER SPECTRAL DENSITY - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The RF conducted emission testing was performed on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the "Output Power" report section) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

The fundamental emission Power Spectral Density (PSD) was measured using the channels and modes as called out on the following data sheets.

The method of ANSI C63.26-2015 section 5.2.4.5 was used to make this measurement.

The Power Spectral Density was measured while transmitting on one carrier. The total PSD for multiport operation was determined based upon ANSI C63.26 clause 6.4.3.2.4 (10 Log N_{out}). The EIRP calculations are based upon ANSI C63.26-2015 paragraphs 6.4 and 6.4.6.3.

FCC Requirements: §27.50 Power limits and duty cycle.

27.50 (j) The following power requirements apply to stations transmitting in the 3700-3980 MHz band:

(1) The power of each fixed or base station transmitting in the 3700-3980 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to an equivalent isotropically radiated power (EIRP) of 3280 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

(2) The power of each fixed or base station transmitting in the 3700-3980 MHz band and situated in any geographic location other than that described in paragraph (j)(1) of this section is limited to an EIRP of 1640 Watts/MHz. This limit applies to the aggregate power of all antenna elements in any given sector of a base station.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2024-03-12	2025-03-12
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Block - DC	Fairview Microwave	SD3239	ANE	2024-02-14	2025-02-14

POWER SPECTRAL DENSITY - BAND 3.7G

element
TbtTx 2024.05.24.1
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5G NR EIRP Calculations for Sixty-Four Port MIMO Operations

EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements. Each cell site installation needs to consider the power measurements in the radio certification report as well as site specific regulatory requirements (such as antenna height, population density, etc.), site installation parameters (line loss between antenna and radio, antenna parameters, etc.) and base station operational parameters (MIMO operational setup, carrier power level, channel bandwidth, modulation type, etc.) to optimize performance. Transmitter output power may be reduced (from maximum) by base station setup parameters.

The AVQQA antenna assembly has an array of 4 rows and 8 columns of (±45°) cross-polarized (orthogonal) radiators. This antenna assembly has a beamforming gain of 25.0dBi ± 1.0dB. The sixty-four AVQQA transmitter outputs are connected to the antenna array (thirty-two are connected to +45° radiators/antennas and thirty-two are connected to the -45° radiators/antennas).

Equivalent Isotropically Radiated Power (EIRP) is calculated (as specified in ANSI C63.26-2015 section 6.4 for a system of correlated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna assembly beamforming gain was used for this calculation. Calculations of worst-case EIRP for sixty-four port MIMO are as follows:

Parameter	20 MHz Ch BW	40 MHz Ch BW	60 MHz Ch BW	80 MHz Ch BW	100 MHz Ch BW
Worst Case PSD/Antenna Port	21.0 dBm/MHz	21.3 dBm/MHz	21.5 dBm/MHz	20.1 dBm/MHz	19.3 dBm/MHz
Cable Loss	0 dB	0 dB	0 dB	0 dB	0 dB
Number of Ant Ports per Polarization	32	32	32	32	32
Total PSD per Polarization 10 Log 32 = +15.1 dB	36.1 dBm/MHz	36.4 dBm/MHz	36.6 dBm/MHz	35.2 dBm/MHz	34.4 dBm/MHz
Maximum Antenna Beamforming Gain per Polarization	26 dBi	26 dBi	26 dBi	26 dBi	26 dBi
EIRP per Polarization	62.1 dBm/MHz	62.4 dBm/MHz	62.6 dBm/MHz	61.2 dBm/MHz	60.4 dBm/MHz
Number of Polarizations	2	2	2	2	2
EIRP Total (See Note 1)	62.1 dBm/MHz	62.4 dBm/MHz	62.6 dBm/MHz	61.2 dBm/MHz	60.4 dBm/MHz
Passing EIRP Limit	62.15 dBm/MHz and 65.16 dBm/MHz	65.16 dBm/MHz	65.16 dBm/MHz	62.15 dBm/MHz and 65.16 dBm/MHz	62.15 dBm/MHz and 65.16 dBm/MHz

Note 1: The EIRP per antenna polarization is required to be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)2) and KDB 662911 D02v01 page 3 example (2) since the two transmitter outputs to each antenna are 90 degree-phase shifted relative to each other (cross-polarized radiators).

Calculation Summary

(1) The worst case AVQQA sixty-four port MIMO EIRP levels for all 5G NR channel bandwidths (20MHz, 40MHz, 60MHz, 80MHz, & 100MHz) are less than the 3280 W/MHz (65.16 dBm/MHz) FCC regulatory limit.

(2) The worst case AVQQA sixty-four port MIMO EIRP levels for the 5G NR 20MHz, 80MHz & 100MHz channel bandwidths are less than the 1640 W/MHz (62.15 dBm/MHz) FCC regulatory limit.

(3) The worst case AVQQA sixty-four port MIMO EIRP levels for the 5G NR 40MHz & 60MHz channel bandwidths exceed the 1640 W/MHz (62.15 dBm/MHz) FCC regulatory limit by 0.25 dB (62.4 dBm/MHz - 62.15 dBm/MHz) and 0.45 dB (62.6 dBm/MHz - 62.15 dBm/MHz), respectively. The AVQQA 5G NR 40MHz & 60MHz channel bandwidths carrier power levels using sixty-four port MIMO operation need to be reduced to meet the 1640 W/MHz (62.15 dBm/MHz) FCC regulatory limit.

POWER SPECTRAL DENSITY - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-15
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.1%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.7 GHz band in the single carrier operating mode configuration.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

	Initial Value dBm/MHz	Duty cycle Factor (dB)	Single Port dBm/MHz == PSD	Sixty-four Port (64x64 MIMO) dBm/MHz == PSD
Port 1				
20 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3840.00 MHz	19.563	0	19.6	37.7
16QAM Modulation				
Mid Channel, 3840.00 MHz	21.037	0	21.0	39.1
64QAM Modulation				
Mid Channel, 3840.00 MHz	19.627	0	19.6	37.7
256QAM Modulation				
Mid Channel, 3840.00 MHz	19.605	0	19.6	37.7
40 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3840.00 MHz	19.359	0	19.4	37.5
16QAM Modulation				
Mid Channel, 3840.00 MHz	21.336	0	21.3	39.4
64QAM Modulation				
Mid Channel, 3840.00 MHz	19.47	0	19.5	37.6
256QAM Modulation				
Mid Channel, 3840.00 MHz	19.507	0	19.5	37.6

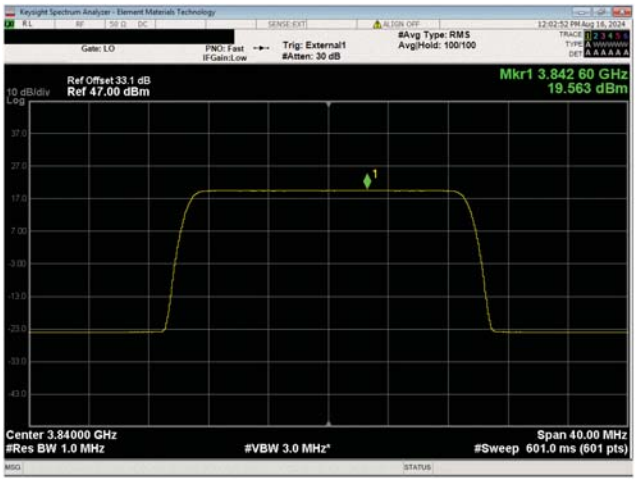
POWER SPECTRAL DENSITY - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

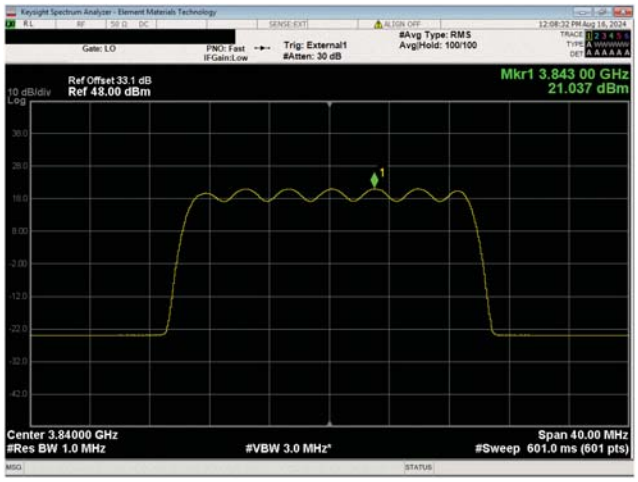
	Initial Value dBm/MHz	Duty cycle Factor (dB)	Single Port dBm/MHz == PSD	Sixty-four Port (64x64 MIMO) dBm/MHz == PSD
60 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3730.02 MHz	19.324	0	19.3	37.4
Mid Channel, 3840.00 MHz	19.747	0	19.7	37.8
High Channel, 3949.98 MHz	19.476	0	19.5	37.6
16QAM Modulation				
Low Channel, 3730.02 MHz	21.242	0	21.2	39.3
Mid Channel, 3840.00 MHz	21.481	0	21.5	39.6
High Channel, 3949.98 MHz	21.209	0	21.2	39.3
64QAM Modulation				
Low Channel, 3730.02 MHz	19.593	0	19.6	37.7
Mid Channel, 3840.00 MHz	19.859	0	19.9	38.0
High Channel, 3949.98 MHz	19.524	0	19.5	37.6
256QAM Modulation				
Low Channel, 3730.02 MHz	19.581	0	19.6	37.7
Mid Channel, 3840.00 MHz	19.872	0	19.9	38.0
High Channel, 3949.98 MHz	19.487	0	19.5	37.6
80 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3840.00 MHz	18.289	0	18.3	36.4
16QAM Modulation				
Mid Channel, 3840.00 MHz	20.142	0	20.1	38.2
64QAM Modulation				
Mid Channel, 3840.00 MHz	18.427	0	18.4	36.5
256QAM Modulation				
Mid Channel, 3840.00 MHz	18.381	0	18.4	36.5
100 MHz Channel Bandwidth				
QPSK Modulation				
Mid Channel, 3840.00 MHz	17.163	0	17.2	35.3
16QAM Modulation				
Mid Channel, 3840.00 MHz	19.253	0	19.3	37.4
64QAM Modulation				
Mid Channel, 3840.00 MHz	17.448	0	17.4	35.5
256QAM Modulation				
Mid Channel, 3840.00 MHz	17.42	0	17.4	35.5

POWER SPECTRAL DENSITY - BAND 3.7G

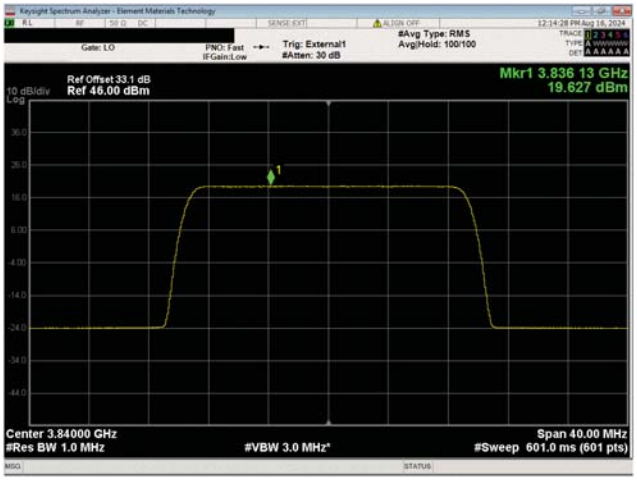
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



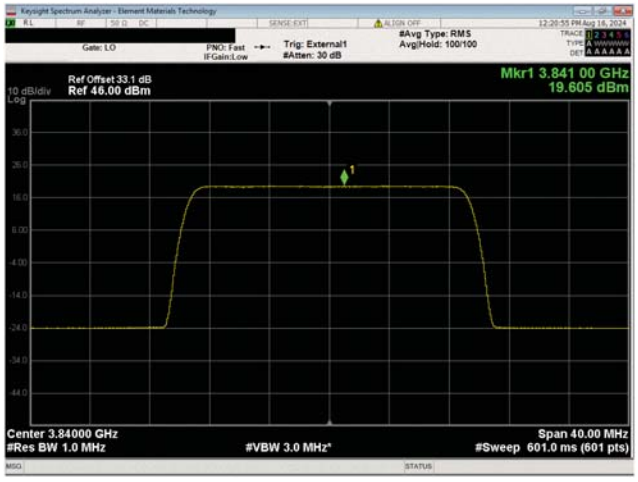
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



Port 1
20 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz



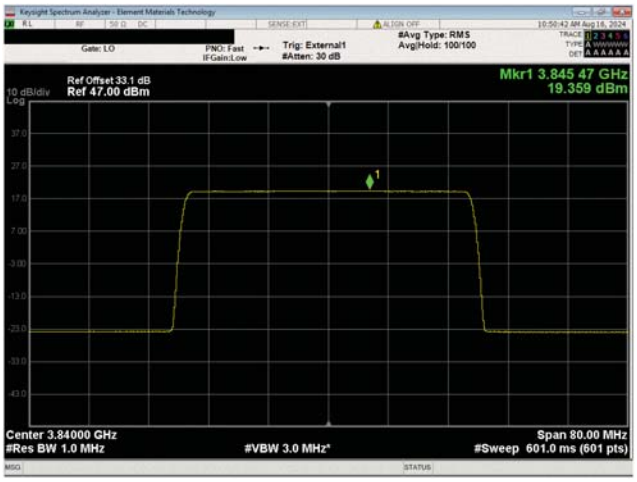
Port 1
20 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz



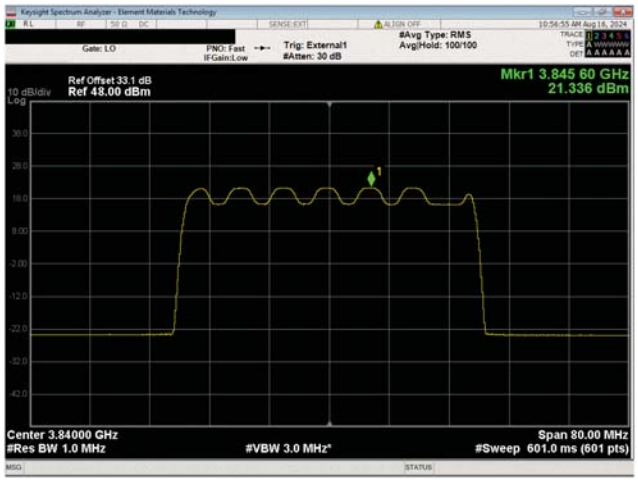
Port 1
20 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

POWER SPECTRAL DENSITY - BAND 3.7G

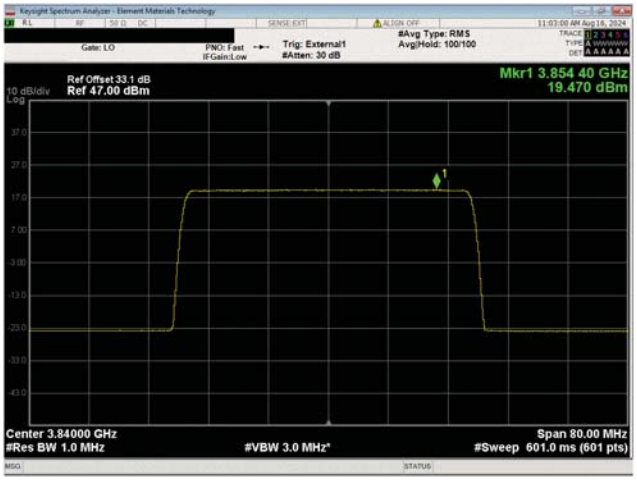
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



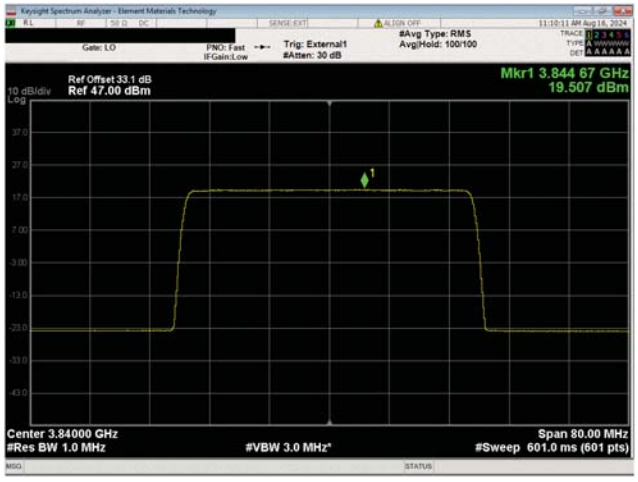
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



Port 1
40 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz



Port 1
40 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz

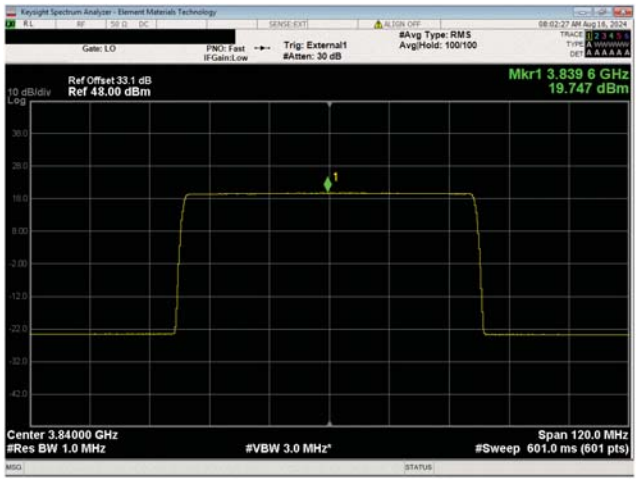


Port 1
40 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

POWER SPECTRAL DENSITY - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

Port 1
60 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3730.02 MHz



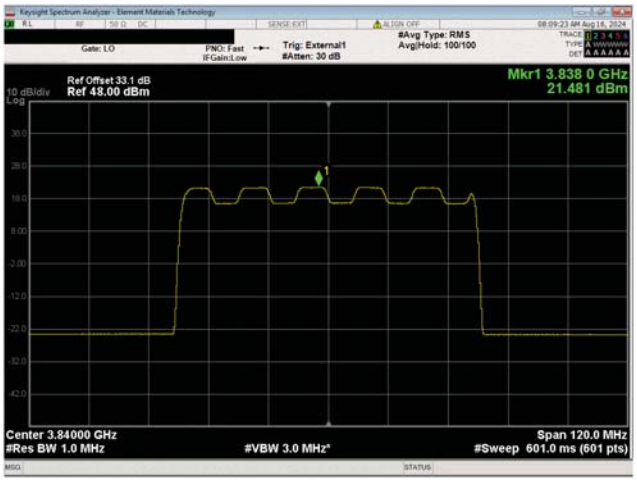
Port 1
60 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz

Port 1
60 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3949.98 MHz

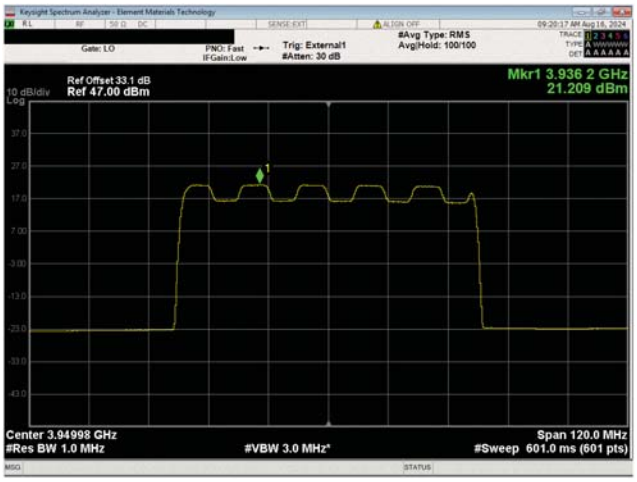
Port 1
60 MHz Channel Bandwidth
16QAM Modulation
Low Channel, 3730.02 MHz

POWER SPECTRAL DENSITY - BAND 3.7G

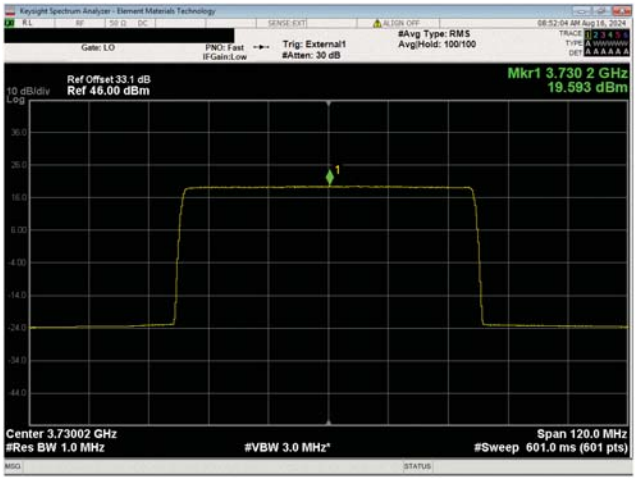
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Port 1
60 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz



Port 1
60 MHz Channel Bandwidth
16QAM Modulation
High Channel, 3949.98 MHz

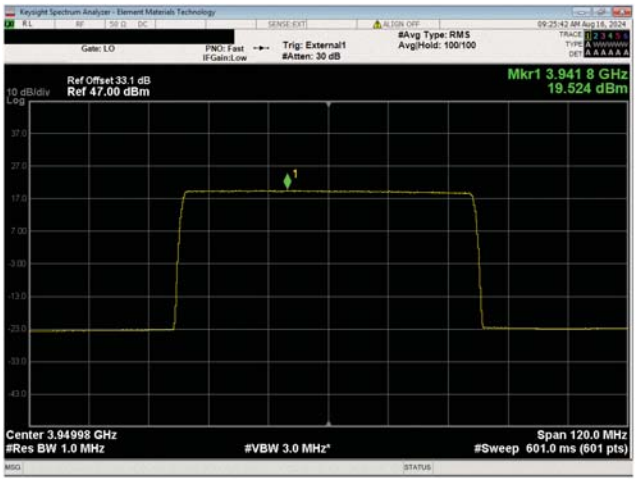


Port 1
60 MHz Channel Bandwidth
64QAM Modulation
Low Channel, 3730.02 MHz

Port 1
60 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz

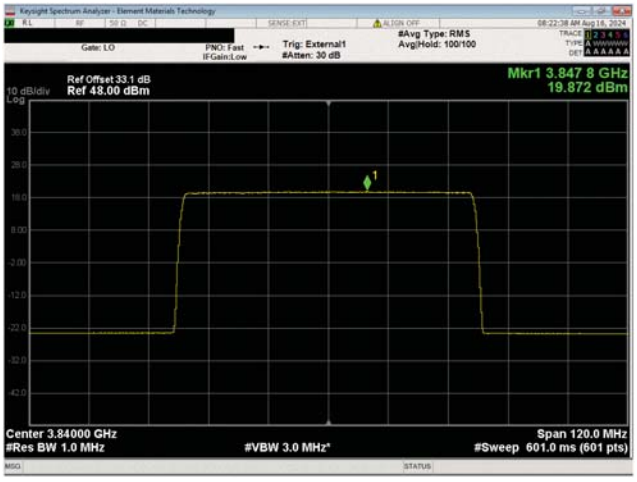
POWER SPECTRAL DENSITY - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Port 1
60 MHz Channel Bandwidth
64QAM Modulation
High Channel, 3949.98 MHz

Port 1
60 MHz Channel Bandwidth
256QAM Modulation
Low Channel, 3730.02 MHz

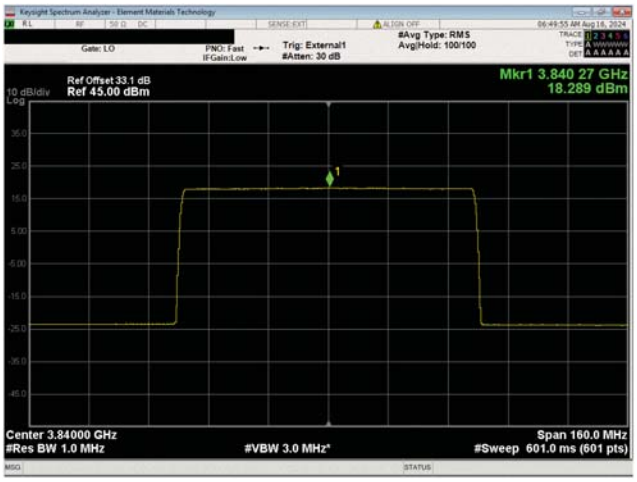


Port 1
60 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

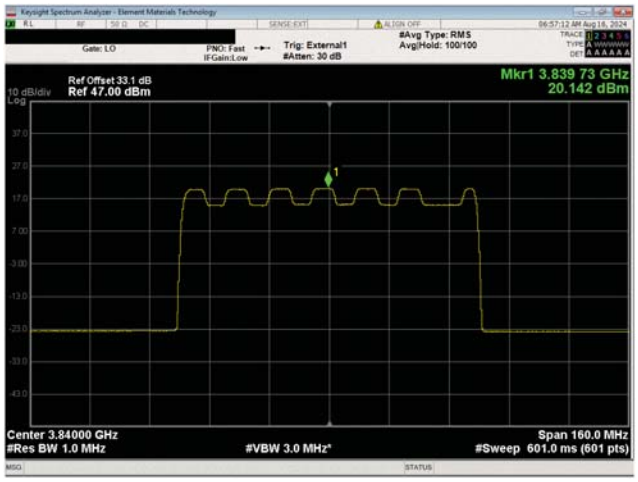
Port 1
60 MHz Channel Bandwidth
256QAM Modulation
High Channel, 3949.98 MHz

POWER SPECTRAL DENSITY - BAND 3.7G

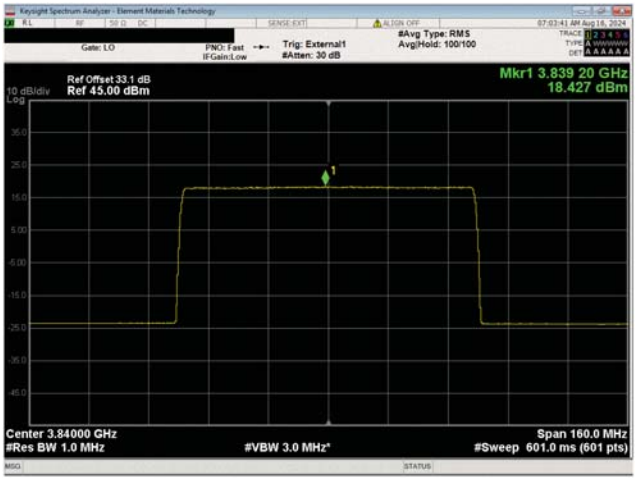
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



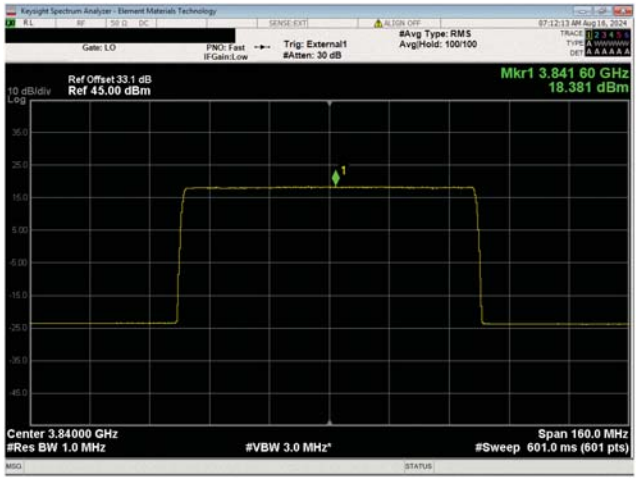
Port 1
80 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



Port 1
80 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz



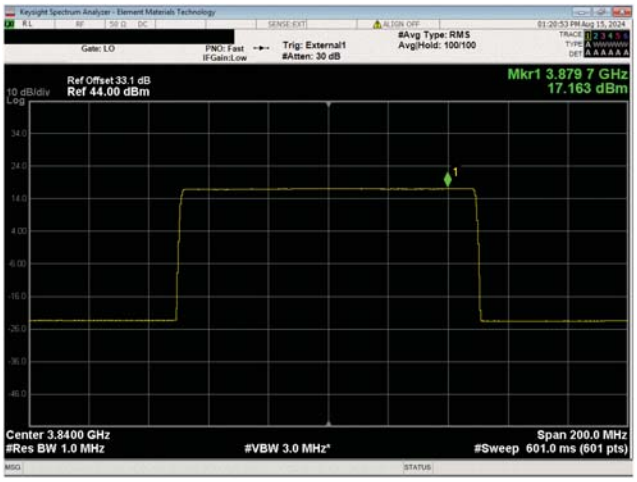
Port 1
80 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz



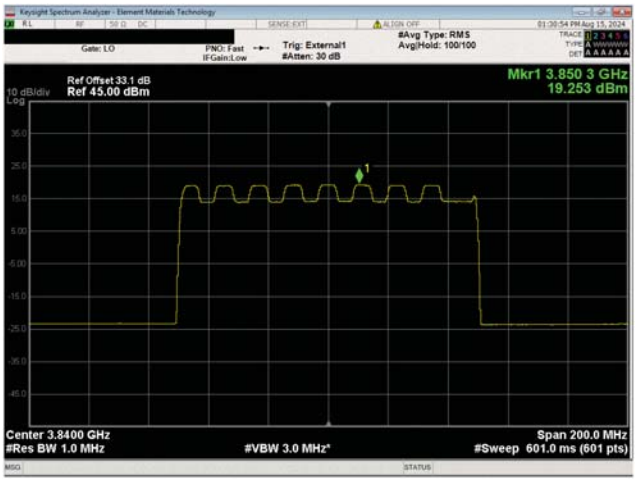
Port 1
80 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

POWER SPECTRAL DENSITY - BAND 3.7G

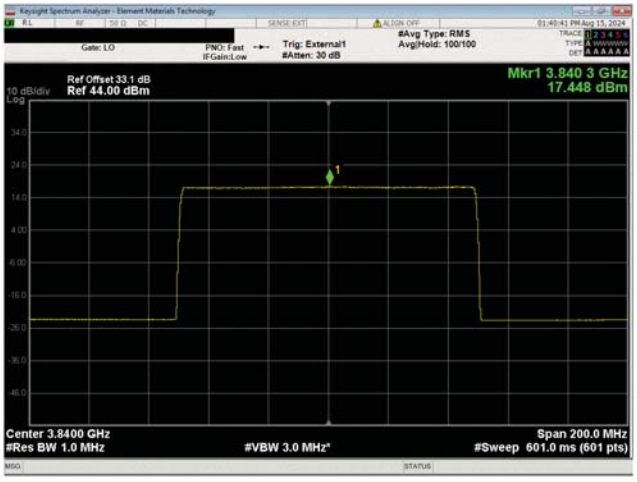
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



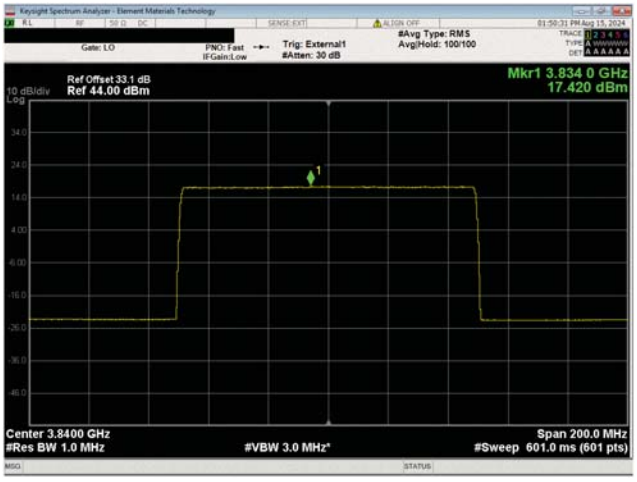
Port 1
100 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



Port 1
100 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz



Port 1
100 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz



Port 1
100 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission Peak to Average Power was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

RF conducted emissions testing was performed only on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed the rule part defined limit.

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.

The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC 27.50(k) (4), the peak to average ratio may not exceed 13dB for more than the ANSI described 0.1% of the time.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Spectrum Analyzer	Keysight Technologies, Inc.	N9030B	R336	2023-10-03	2024-10-03

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-12
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	57.2%
Customer Project:	None	Bar. Pressure (PMSL):	1020 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

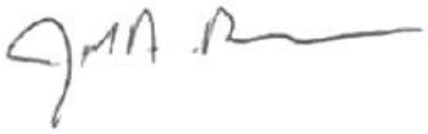
All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.45 GHz band in single carrier operating mode configuration.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass



Tested By

TEST RESULTS

	0.1% PAPR Value (dB)	0.1% PAPR Limit (dB)	Results
Port 1			
10 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3455.01 MHz	8.59	13	Pass
Mid Channel, 3500.01 MHz	8.54	13	Pass
High Channel, 3544.995 MHz	8.55	13	Pass
20 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3460.02 MHz	8.54	13	Pass
Mid Channel, 3500.01 MHz	8.4	13	Pass
High Channel, 3540.00 MHz	8.3	13	Pass
30 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3465.00 MHz	8.49	13	Pass
Mid Channel, 3500.01 MHz	8.56	13	Pass
High Channel, 3534.99 MHz	8.41	13	Pass
40 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3470.01 MHz	8.44	13	Pass
Mid Channel, 3500.01 MHz	8.4	13	Pass
High Channel, 3529.98 MHz	8.41	13	Pass
16QAM Modulation			

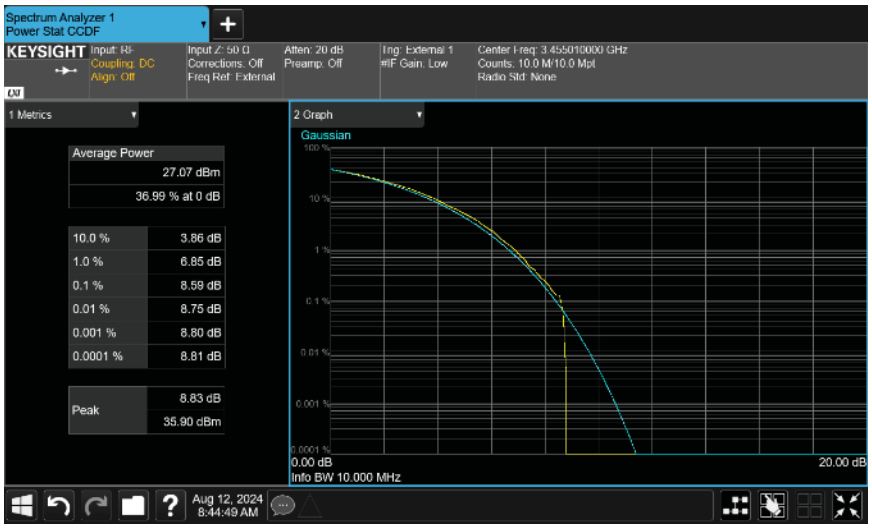
PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

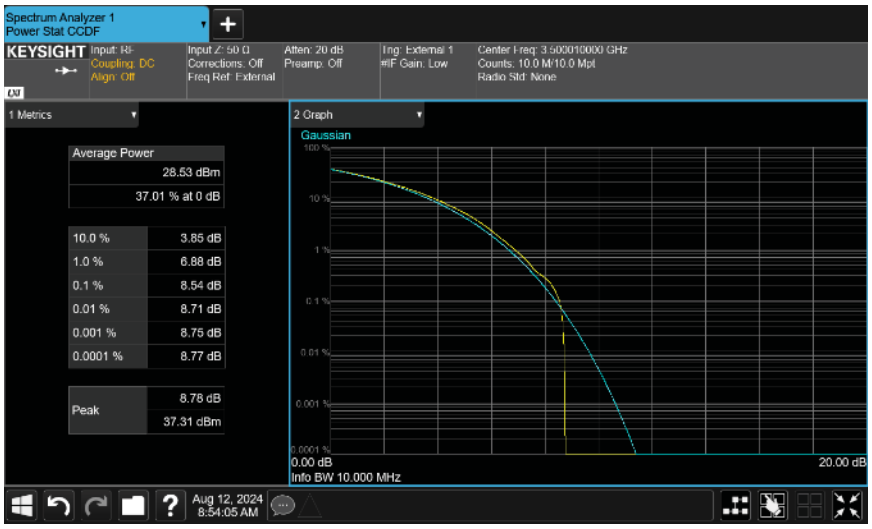
	0.1% PAPR Value (dB)	0.1% PAPR Limit (dB)	Results
Mid Channel, 3500.01 MHz	8.4	13	Pass
64QAM Modulation			
Mid Channel, 3500.01 MHz	8.56	13	Pass
256QAM Modulation			
Mid Channel, 3500.01 MHz	8.58	13	Pass

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



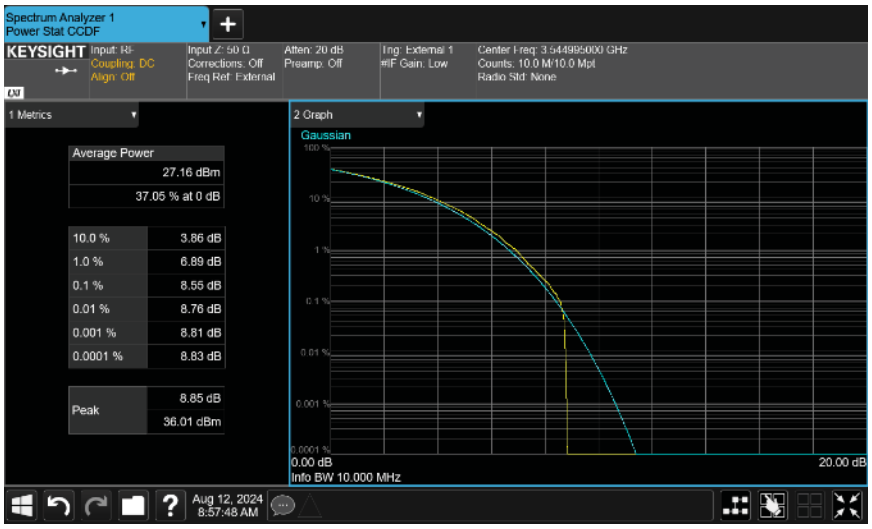
Port 1
10 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3455.01 MHz



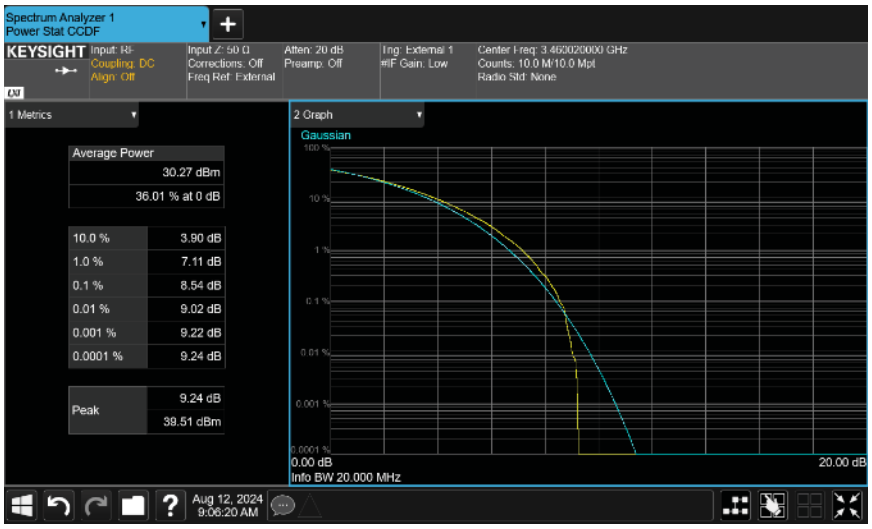
Port 1
10 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



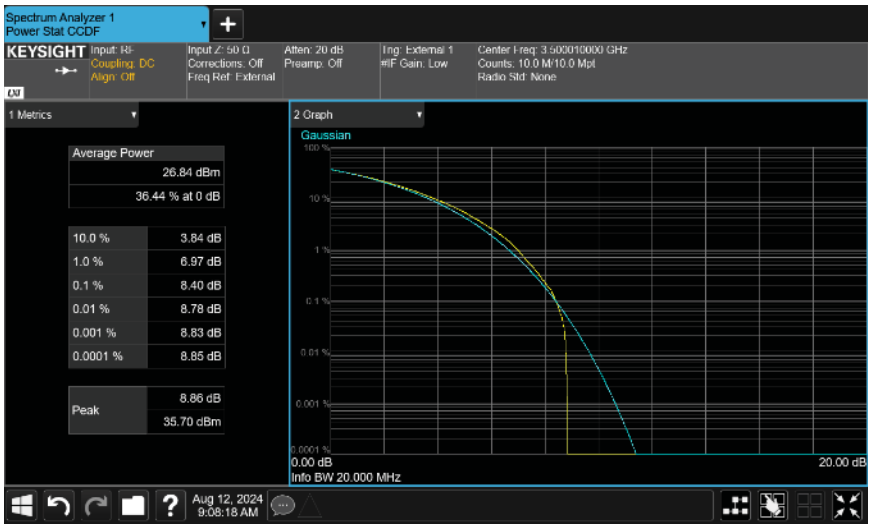
Port 1
10 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3544.995 MHz



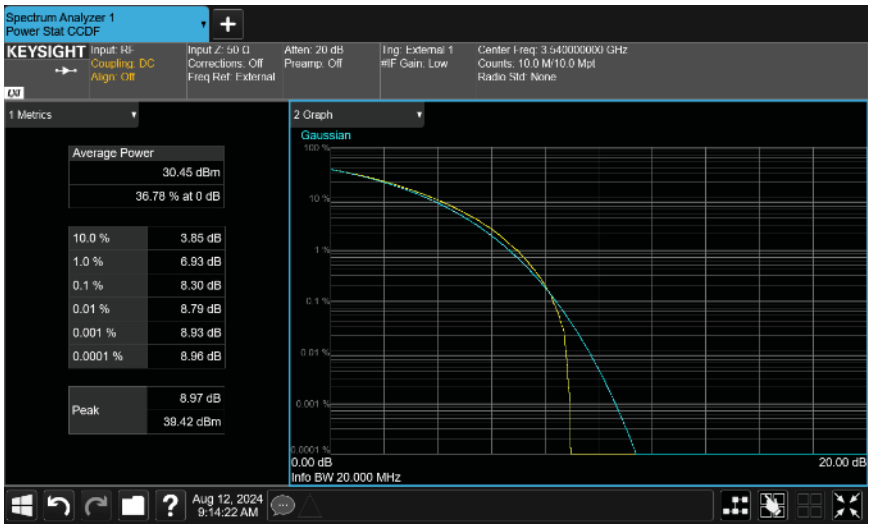
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3460.02 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



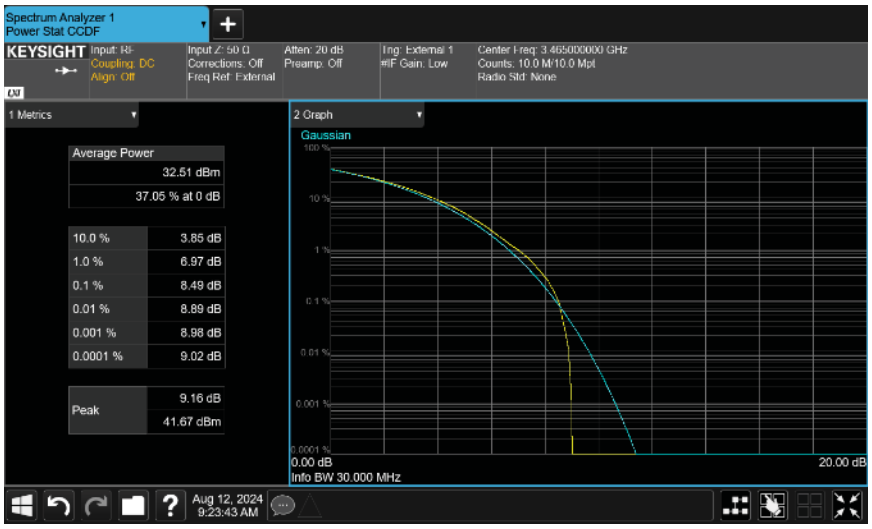
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



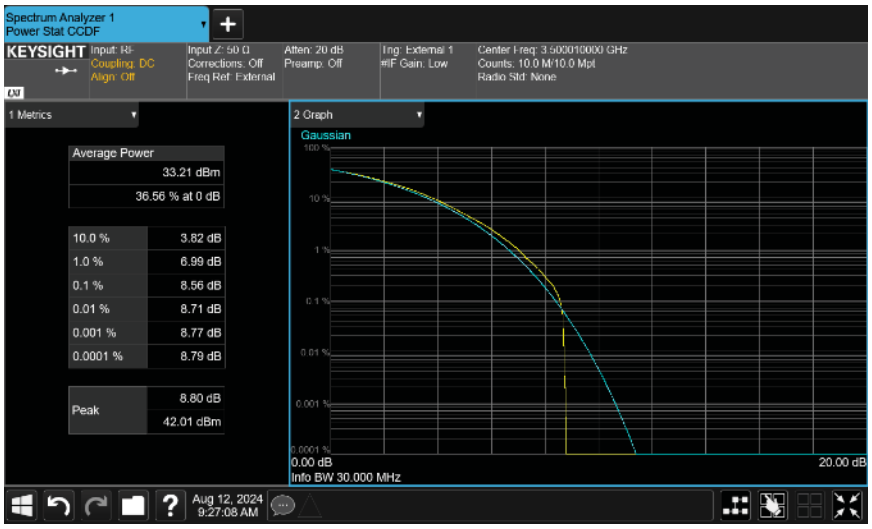
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3540.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



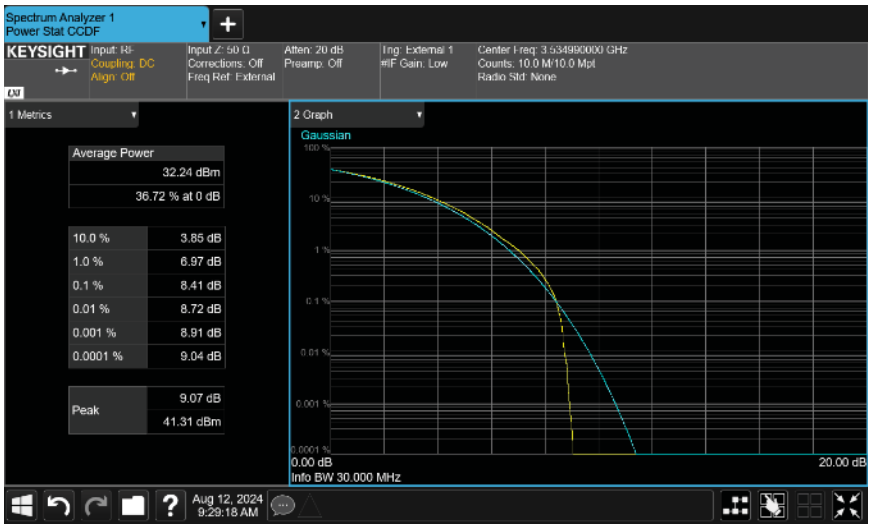
Port 1
30 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3465.00 MHz



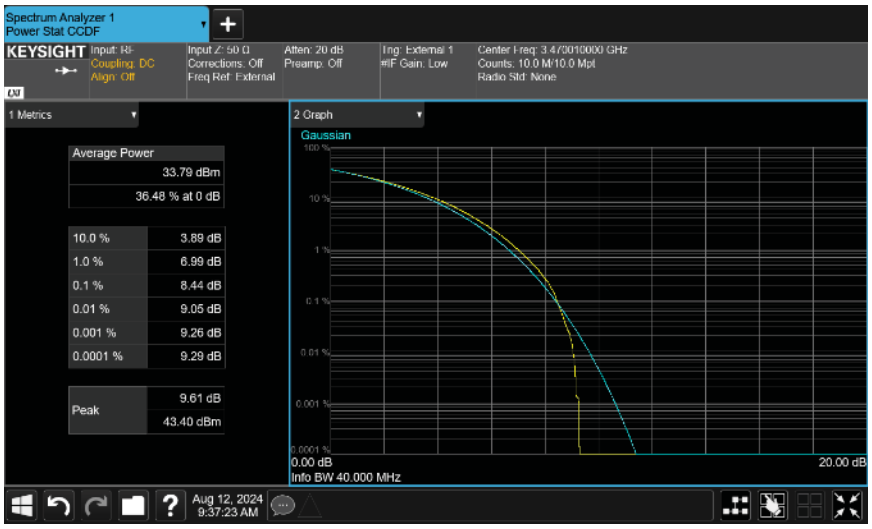
Port 1
30 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



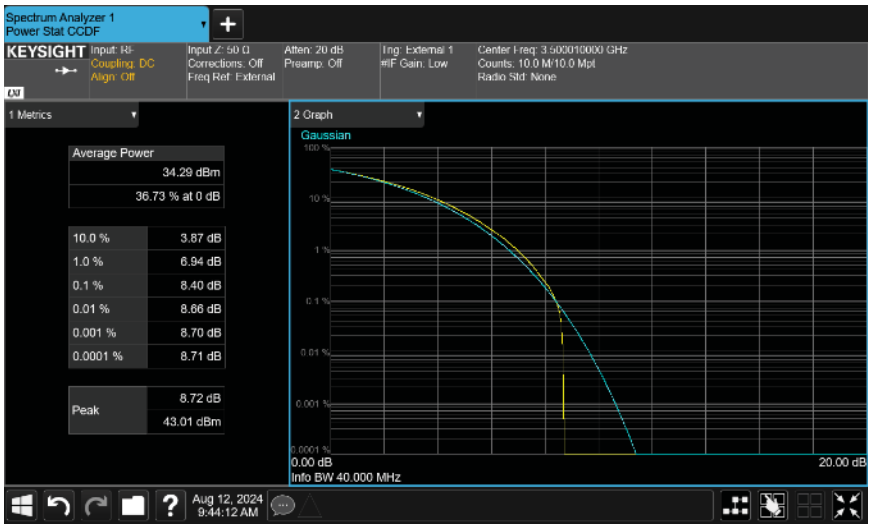
Port 1
30 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3534.99 MHz



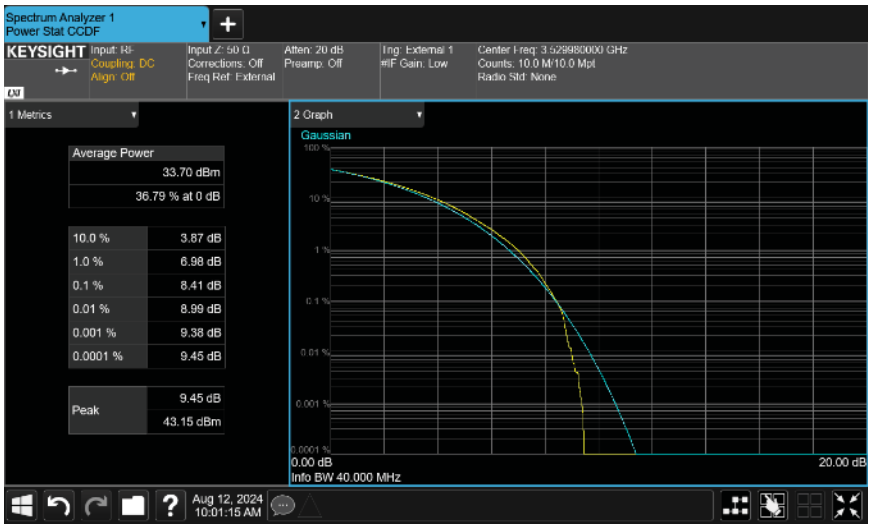
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3470.01 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



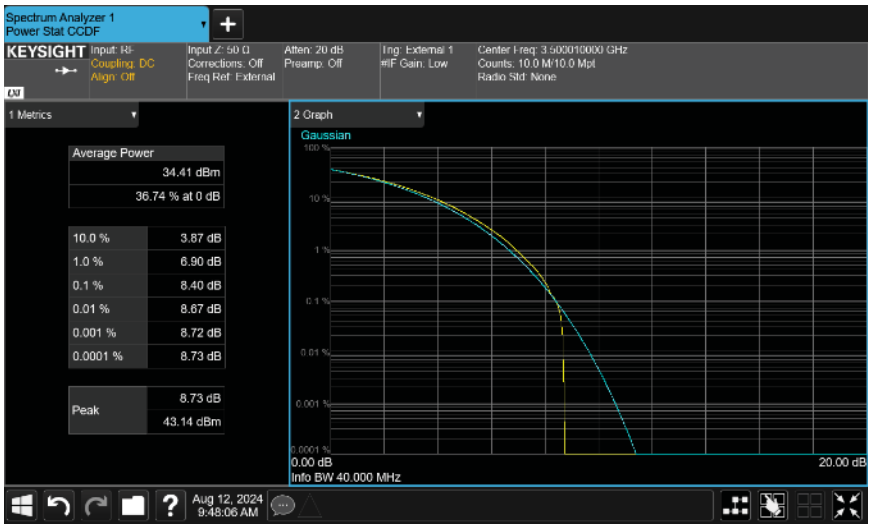
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



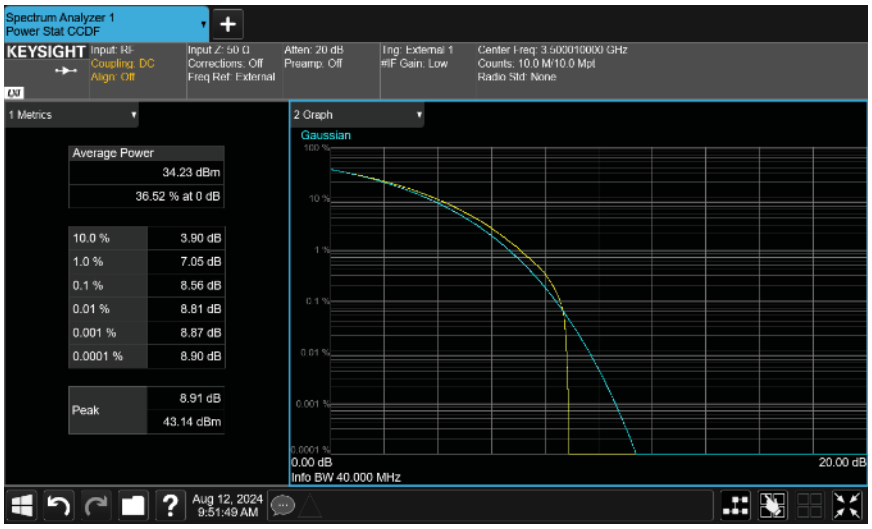
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3529.98 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



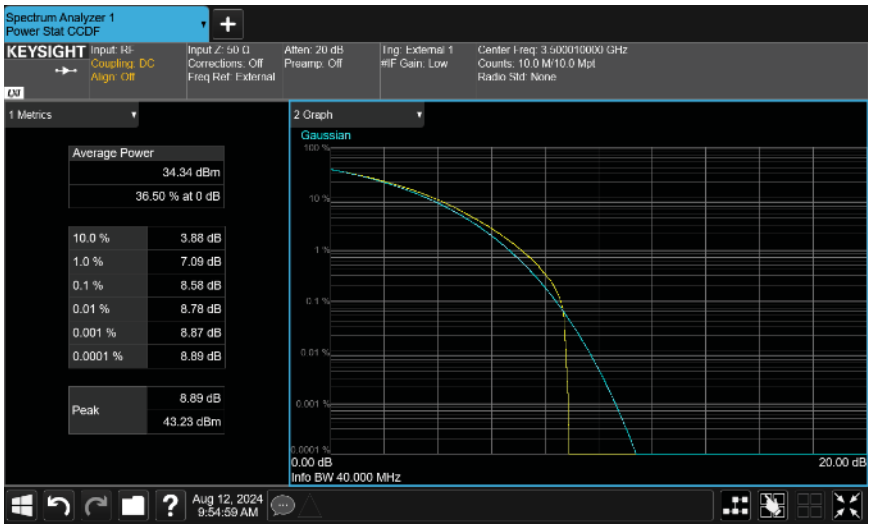
Port 1
40 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
40 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Port 1
40 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission Peak to Average Power was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

RF conducted emissions testing was performed only on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

Because the conducted Output Power was measured using a RMS Average detector, the Peak to Average Power Ratio (PAPR) was measured to show that the maximum peak-max-hold spectrum to the maximum of the average spectrum does not exceed the rule part defined limit.

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.

The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC 27.50(j) (4), the peak to average ratio may not exceed 13dB for more than the ANSI described 0.1% of the time.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Spectrum Analyzer	Keysight Technologies, Inc.	N9030B	R336	2023-10-03	2024-10-03

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-19
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.1%
Customer Project:	None	Bar. Pressure (PMSL):	1016 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.7 GHz band in the single carrier operating mode configuration.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

	0.1% PAPR Value (dB)	0.1% PAPR Limit (dB)	Results
Port 1			
20 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3710.01 MHz	8.65	13	Pass
Mid Channel, 3840.00 MHz	8.74	13	Pass
High Channel, 3969.99 MHz	8.69	13	Pass
40 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3720.00 MHz	8.55	13	Pass
Mid Channel, 3840.00 MHz	8.82	13	Pass
High Channel, 3960.00 MHz	8.91	13	Pass
60 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3730.02 MHz	8.85	13	Pass
Mid Channel, 3840.00 MHz	8.86	13	Pass
High Channel, 3949.98 MHz	8.79	13	Pass
80 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3740.01 MHz	8.89	13	Pass
Mid Channel, 3840.00 MHz	8.78	13	Pass
High Channel, 3939.99 MHz	8.8	13	Pass

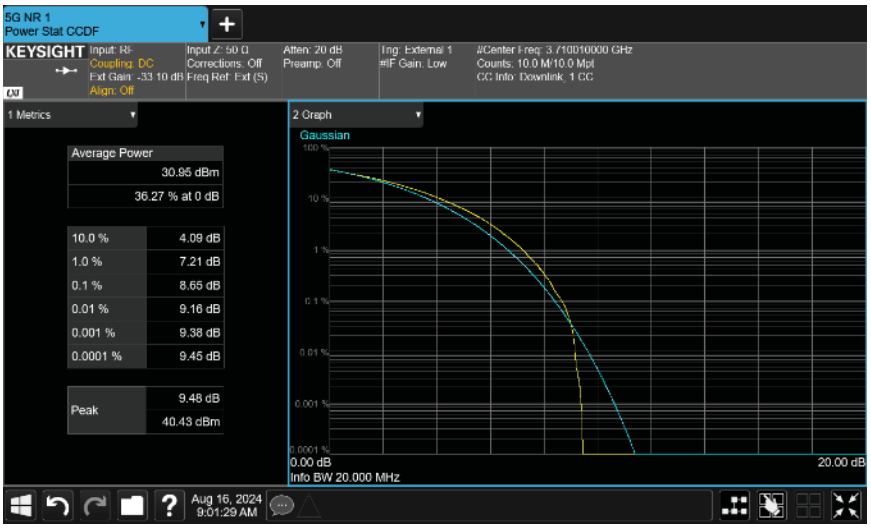
PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

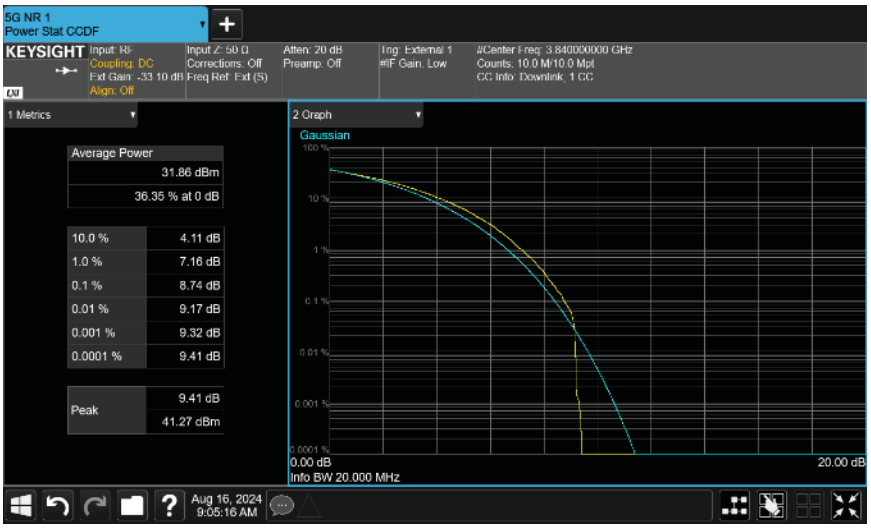
	0.1% PAPR Value (dB)	0.1% PAPR Limit (dB)	Results
100 MHz Channel Bandwidth			
QPSK Modulation			
Low Channel, 3750.00 MHz	8.85	13	Pass
Mid Channel, 3840.00 MHz	8.59	13	Pass
High Channel, 3930.00 MHz	8.79	13	Pass
16QAM Modulation			
Mid Channel, 3840.00 MHz	8.4	13	Pass
64QAM Modulation			
Mid Channel, 3840.00 MHz	8.52	13	Pass
256QAM Modulation			
Mid Channel, 3840.00 MHz	8.53	13	Pass

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



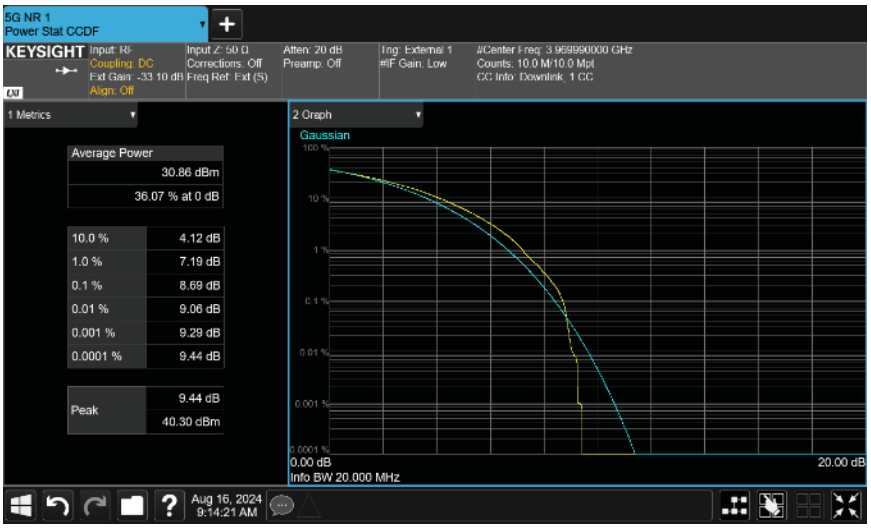
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3710.01 MHz



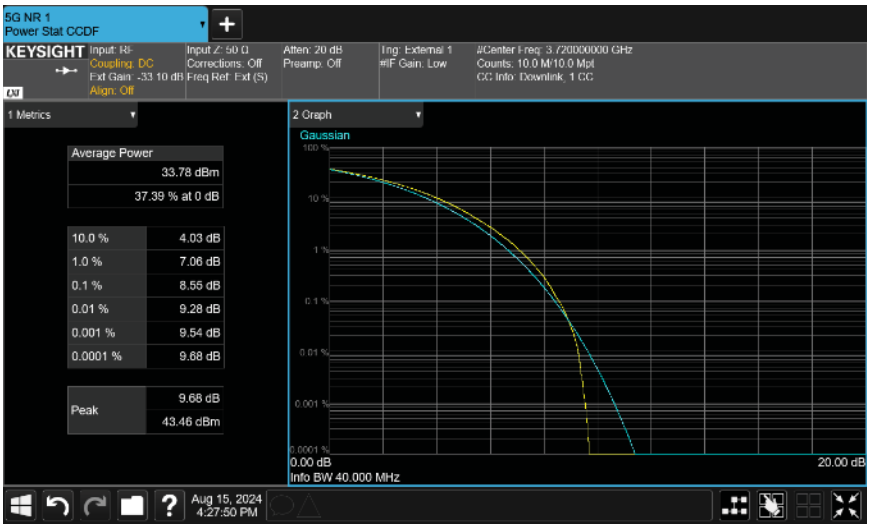
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

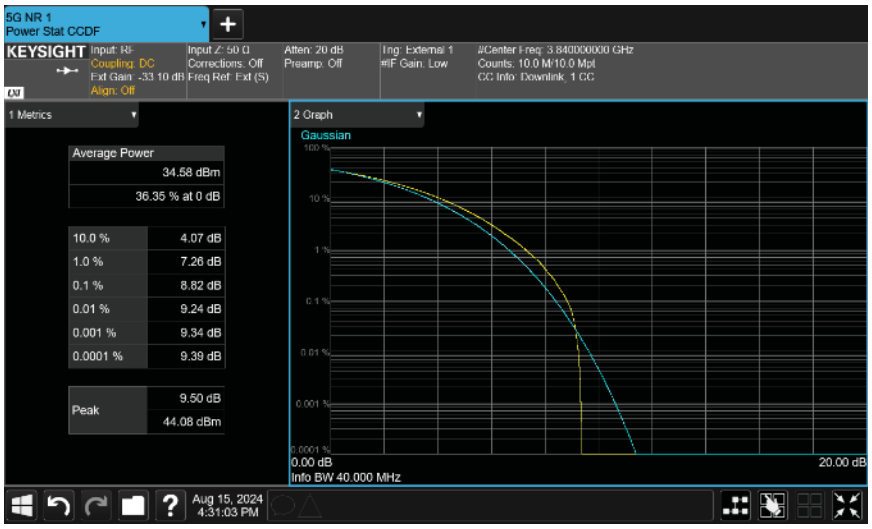


Port 1
20 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3969.99 MHz

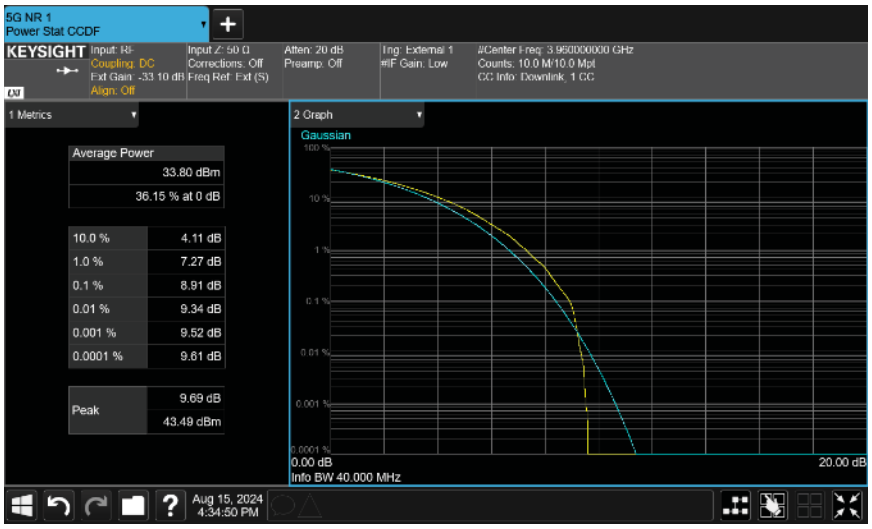


Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3720.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G



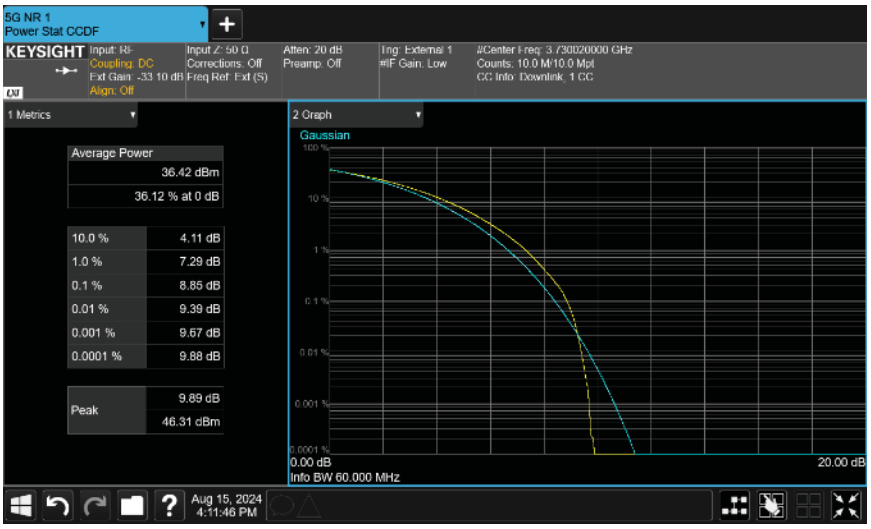
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



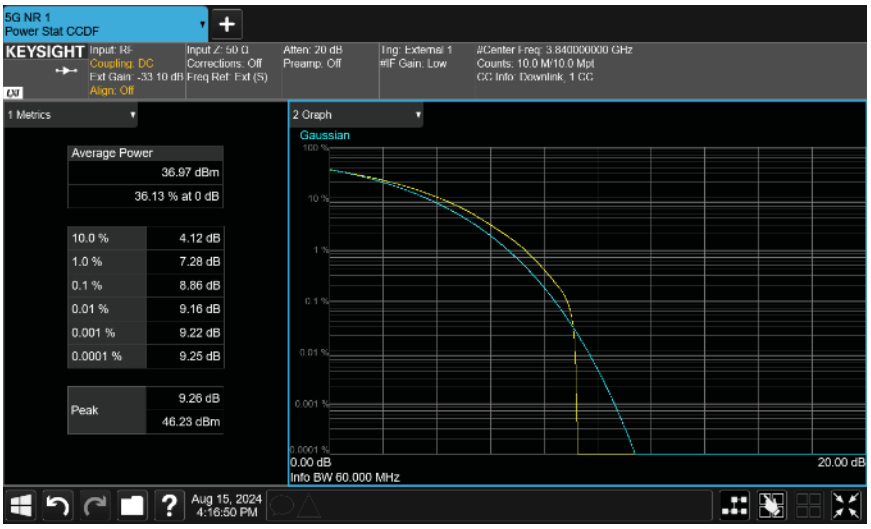
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3960.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



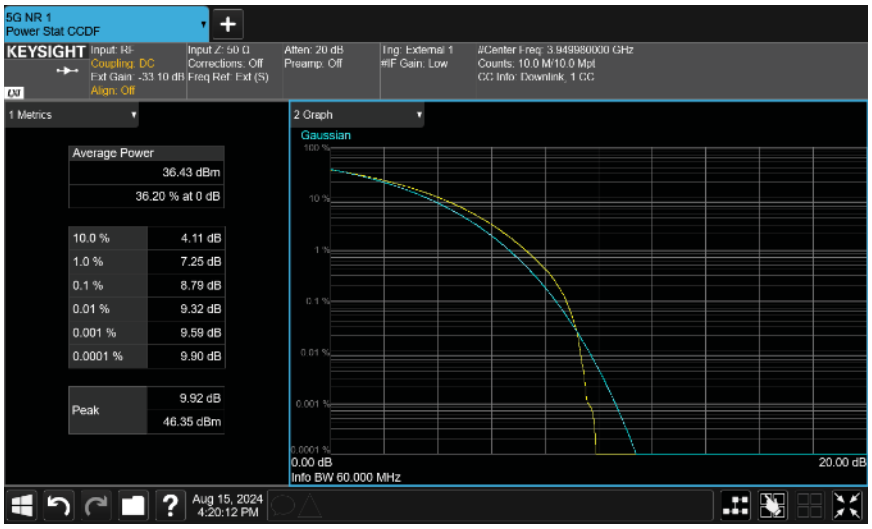
Port 1
60 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3730.02 MHz



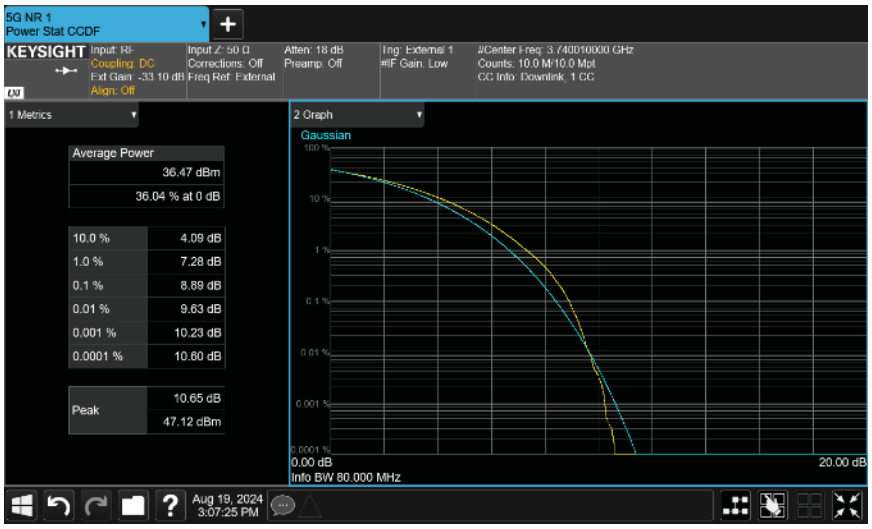
Port 1
60 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



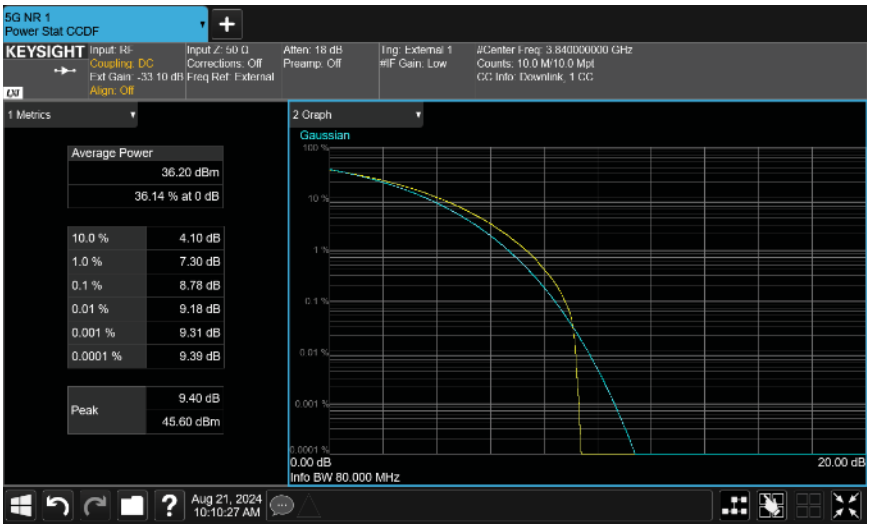
Port 1
60 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3949.98 MHz



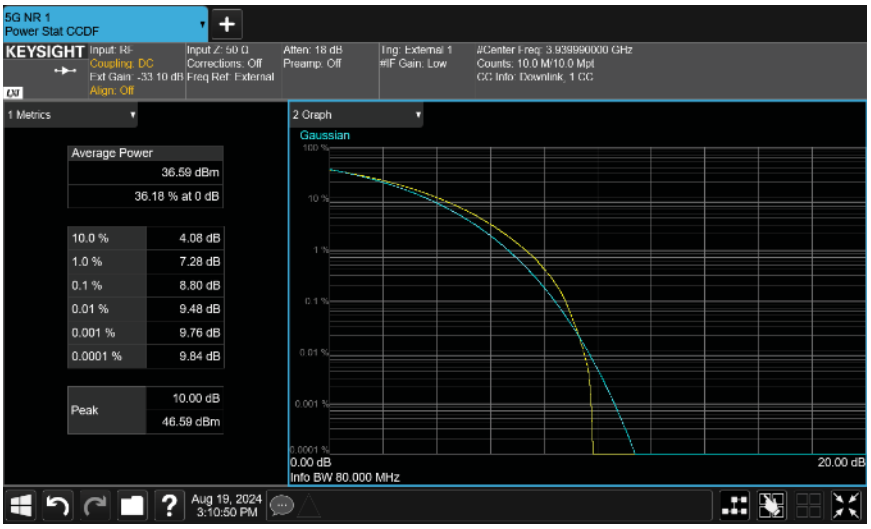
Port 1
80 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3740.01 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



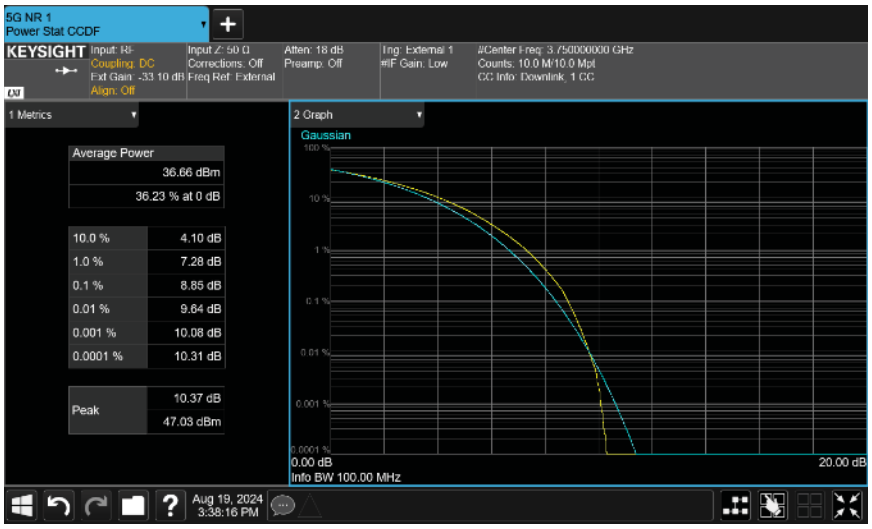
Port 1
80 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz



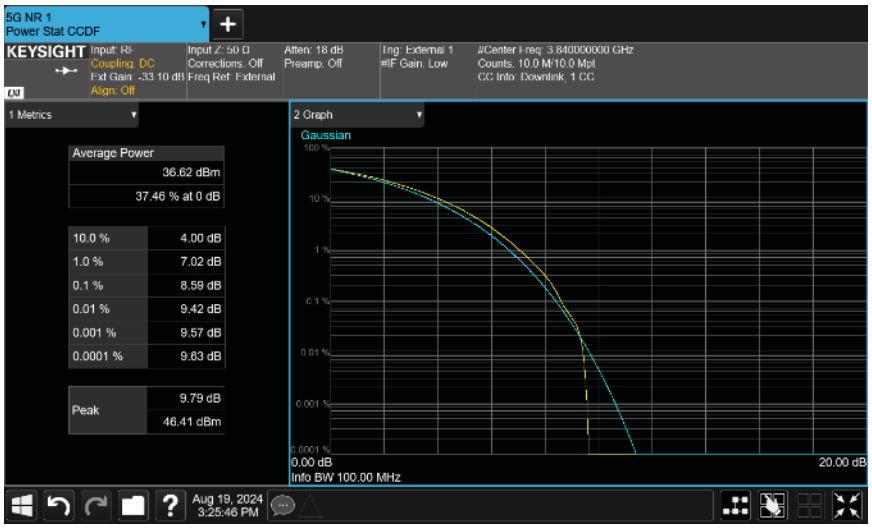
Port 1
80 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3939.99 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



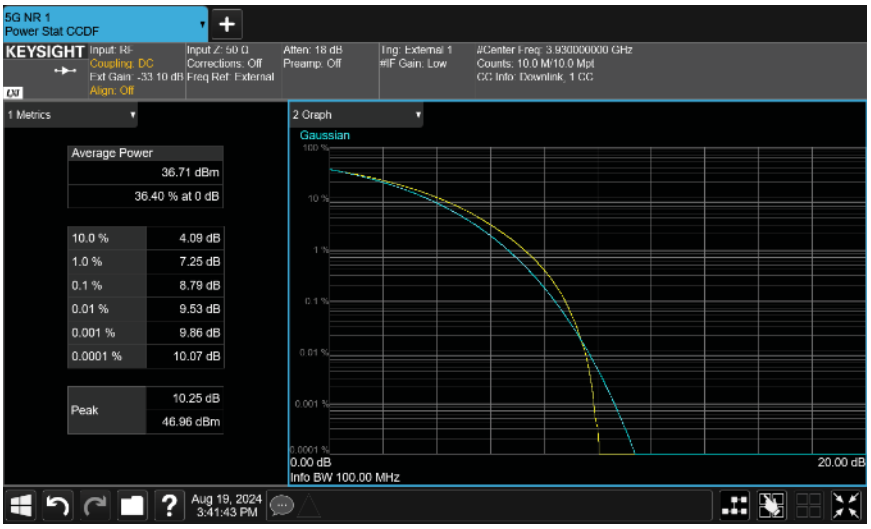
Port 1
100 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3750.00 MHz



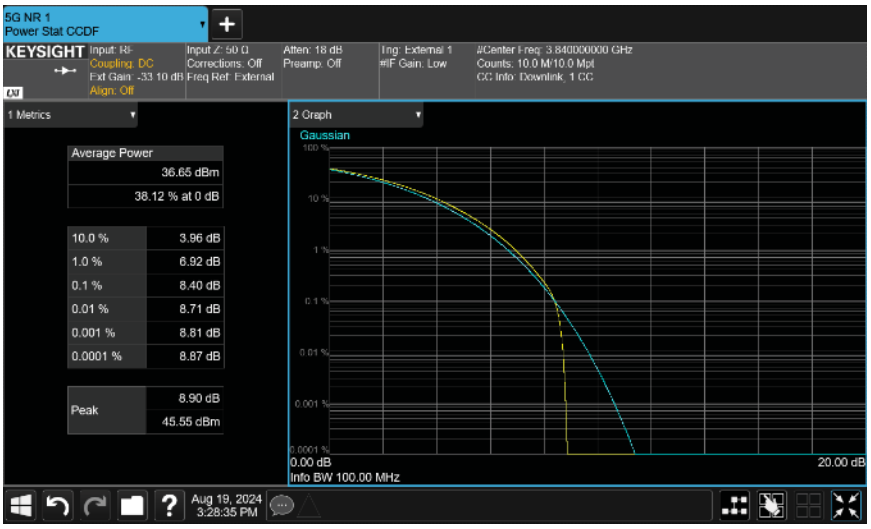
Port 1
100 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3840.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



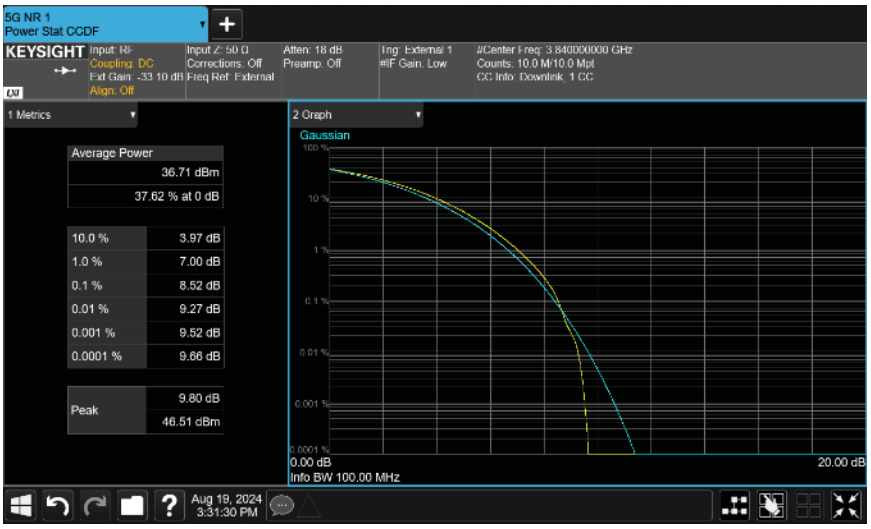
Port 1
100 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3930.00 MHz



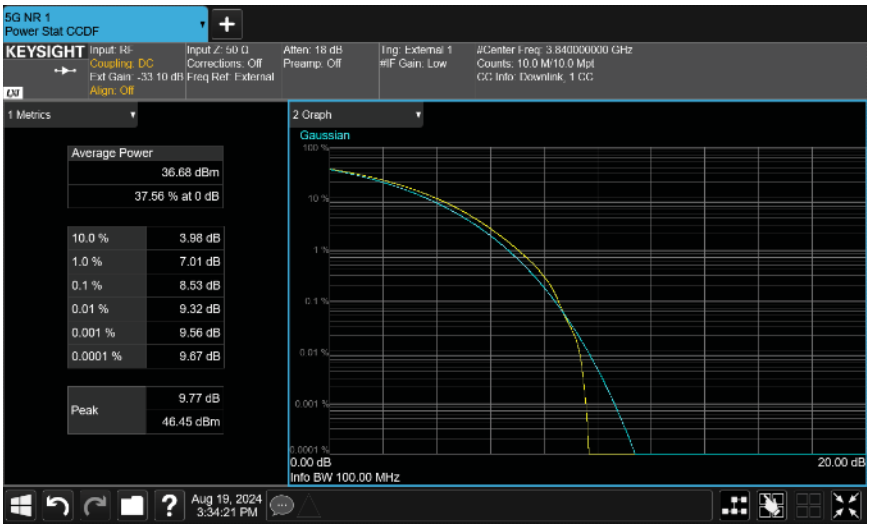
Port 1
100 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3840.00 MHz

PEAK AND AVERAGE (PAPR) CCDF - BAND 3.7G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



Port 1
100 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3840.00 MHz



Port 1
100 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3840.00 MHz

OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

TEST DESCRIPTION

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer.

The fundamental emission Occupied Bandwidth was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

RF conducted emissions testing was performed only on one port. The AVQQA antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraphs 5.2.5.3, 5.7.2i, and 6.4.

The method in section 5.4 of ANSI C63.26 was used to make this measurement. The spectrum analyzer settings were as follows:

- RBW is 1% - 5% of the occupied bandwidth
- VBW is ≥ 3x the RBW
- Peak Detector was used
- Trace max hold was used

The 26dB emission bandwidth is measured in accordance with section 4 of FCC KDB 971168 D01v03r01 and ANSI C63.26 section 5.4. FCC 2.1049 requires an emission bandwidth measurement. FCC 27.53(n)(1) defines the emission bandwidth to be used as 26 dB down.

FCC 5G Emission Designators for 3.45G Band (3450MHz to 3550MHz)					
Channel Bandwidth	Radio Channel	5G-NR: QPSK	5G-NR: 16QAM	5G-NR: 64QAM	5G-NR: 256QAM
10MHz	Low	9M75G7W			
	Mid	9M76G7W	9M69G7W	9M74G7W	9M75G7W
	High	9M76G7W			
20MHz	Low	19M8G7W			
	Mid	19M9G7W	19M8G7W	19M8G7W	19M8G7W
	High	19M8G7W			
30MHz	Low	30M0G7W			
	Mid	30M0G7W	29M9G7W	30M0G7W	29M9G7W
	High	29M9G7W			
40MHz	Low	40M2G7W			
	Mid	40M4G7W	40M2G7W	40M3G7W	40M3G7W
	High	40M4G7W			
Note: FCC emission designators are based on 26dB emission bandwidth measurement data.					

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2024-03-12	2025-03-12
Generator - Signal	Agilent	N5173B	TIW	2023-08-07	2026-08-07
Block - DC	Fairview Microwave	SD3239	ANE	2024-02-14	2025-02-14

OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

EUT:	AVQQA Remote Radio Head	Work Order:	NOKI0075
Serial Number:	L1242403137	Date:	2024-08-09
Customer:	Nokia Solutions and Networks	Temperature:	23.3°C
Attendees:	David Le, John Rattanavong	Relative Humidity:	52.7%
Customer Project:	None	Bar. Pressure (PMSL):	1020 mbar
Tested By:	Jarrod Brenden	Job Site:	PT14
Power:	54VDC	Configuration:	NOKI0075-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 27:2024	ANSI C63.26:2015

COMMENTS

All losses in the measurement path were accounted for in the reference level offset; attenuators, filters, cables, and DC blocks. Band n77 carriers were enabled at maximum power levels for the 3.45 GHz band in single carrier operating mode configuration.

DEVIATIONS FROM TEST STANDARD

None

CONCLUSION

Pass

Tested By

TEST RESULTS

	Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
Port 1				
10 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3455.01 MHz	8.6533 MHz	9.748 MHz	Within Band	Pass
Mid Channel, 3500.01 MHz	8.6592 MHz	9.758 MHz	Within Band	Pass
High Channel, 3544.995 MHz	8.6701 MHz	9.756 MHz	Within Band	Pass
16QAM Modulation				
Mid Channel, 3500.01 MHz	8.6103 MHz	9.69 MHz	Within Band	Pass
64QAM Modulation				
Mid Channel, 3500.01 MHz	8.6567 MHz	9.738 MHz	Within Band	Pass
256QAM Modulation				
Mid Channel, 3500.01 MHz	8.6643 MHz	9.749 MHz	Within Band	Pass
20 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3460.02 MHz	18.316 MHz	19.813 MHz	Within Band	Pass
Mid Channel, 3500.01 MHz	18.310 MHz	19.897 MHz	Within Band	Pass
High Channel, 3540.00 MHz	18.306 MHz	19.81 MHz	Within Band	Pass
16QAM Modulation				
Mid Channel, 3500.01 MHz	18.382 MHz	19.823 MHz	Within Band	Pass
64QAM Modulation				
Mid Channel, 3500.01 MHz	18.314 MHz	19.848 MHz	Within Band	Pass

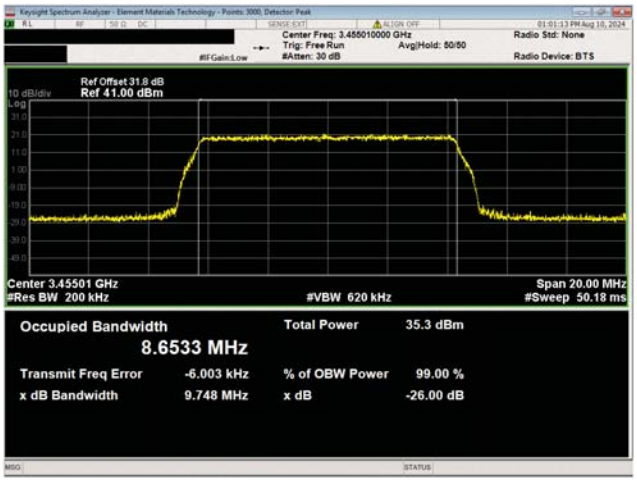
OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

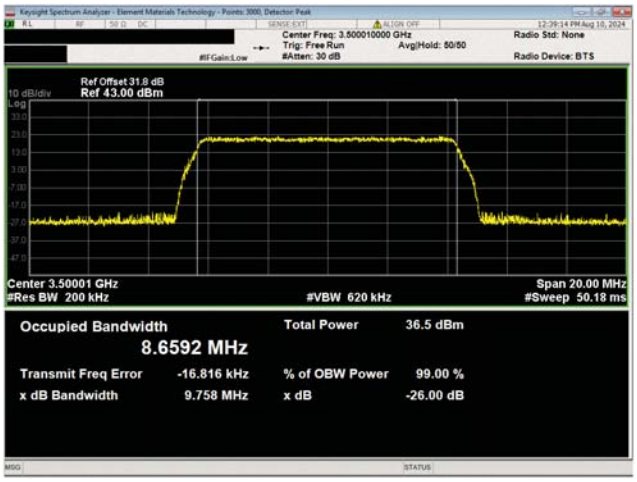
	Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
256QAM Modulation				
Mid Channel, 3500.01 MHz	18.329 MHz	19.781 MHz	Within Band	Pass
30 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3465.00 MHz	27.904 MHz	29.984 MHz	Within Band	Pass
Mid Channel, 3500.01 MHz	27.933 MHz	29.958 MHz	Within Band	Pass
High Channel, 3534.99 MHz	27.918 MHz	29.879 MHz	Within Band	Pass
16QAM Modulation				
Mid Channel, 3500.01 MHz	28.046 MHz	29.855 MHz	Within Band	Pass
64QAM Modulation				
Mid Channel, 3500.01 MHz	27.931 MHz	29.95 MHz	Within Band	Pass
256QAM Modulation				
Mid Channel, 3500.01 MHz	27.901 MHz	29.932 MHz	Within Band	Pass
40 MHz Channel Bandwidth				
QPSK Modulation				
Low Channel, 3470.01 MHz	37.855 MHz	40.247 MHz	Within Band	Pass
Mid Channel, 3500.01 MHz	37.922 MHz	40.419 MHz	Within Band	Pass
High Channel, 3529.98 MHz	37.876 MHz	40.356 MHz	Within Band	Pass
16QAM Modulation				
Mid Channel, 3500.01 MHz	38.036 MHz	40.231 MHz	Within Band	Pass
64QAM Modulation				
Mid Channel, 3500.01 MHz	38.022 MHz	40.279 MHz	Within Band	Pass
256QAM Modulation				
Mid Channel, 3500.01 MHz	37.930 MHz	40.296 MHz	Within Band	Pass

OCCUPIED BANDWIDTH - BAND 3.45G

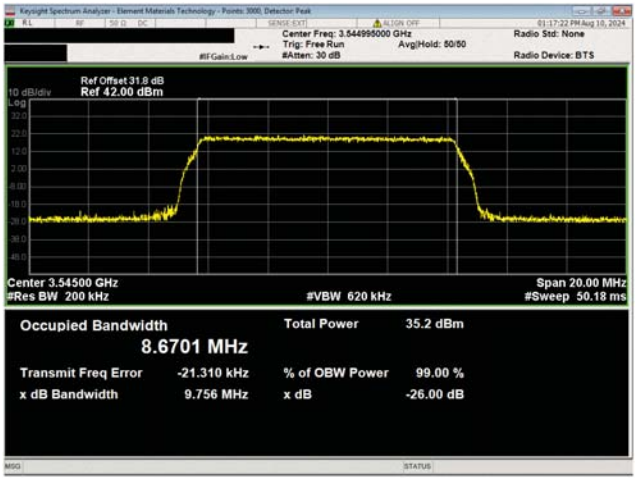
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



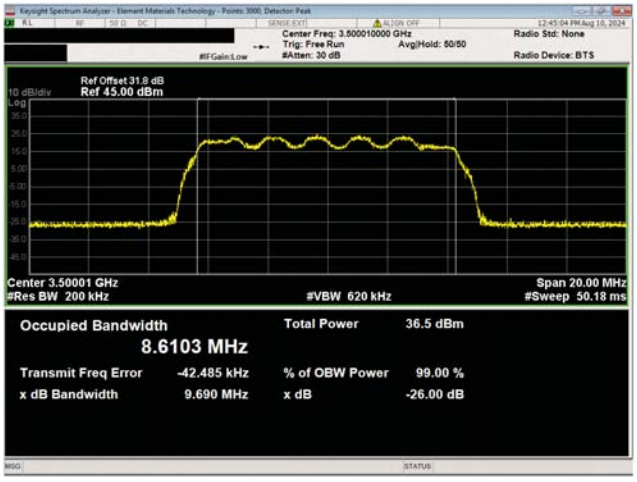
Port 1
10 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3455.01 MHz



Port 1
10 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



Port 1
10 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3544.995 MHz

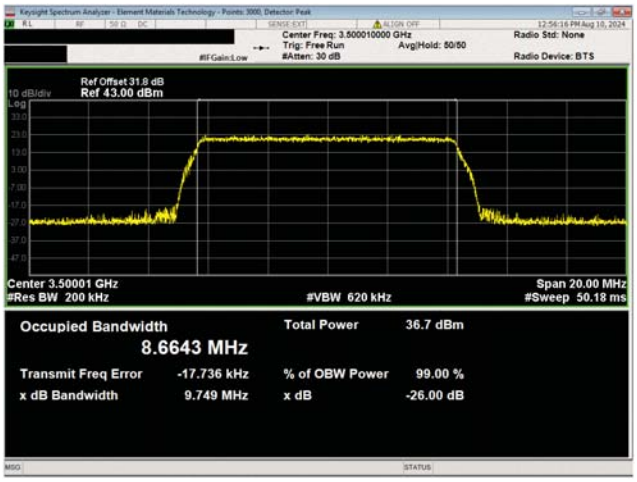


Port 1
10 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz

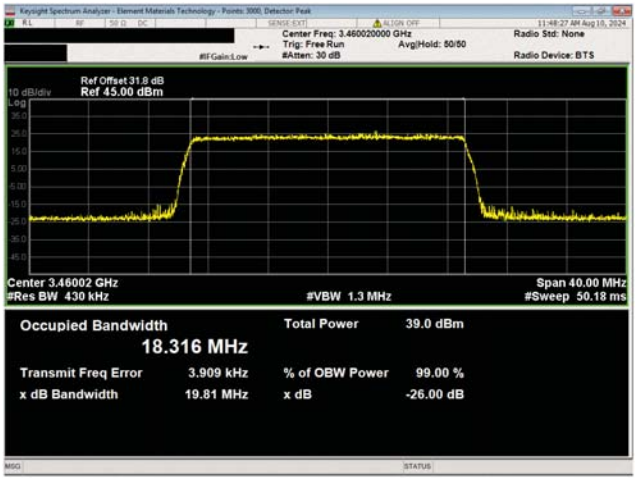
OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

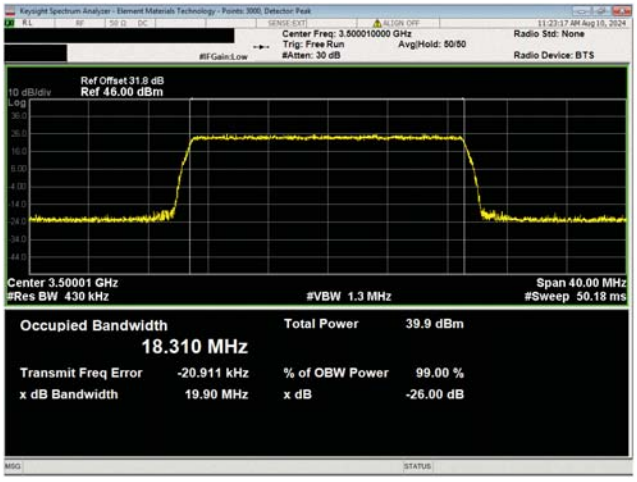
Port 1
10 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
10 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3460.02 MHz

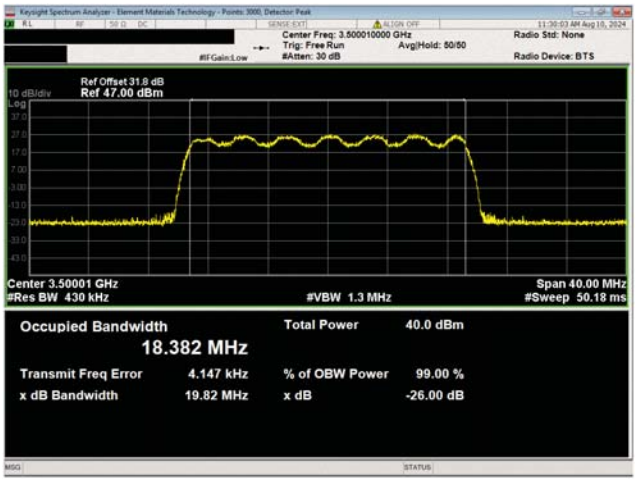


Port 1
20 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz

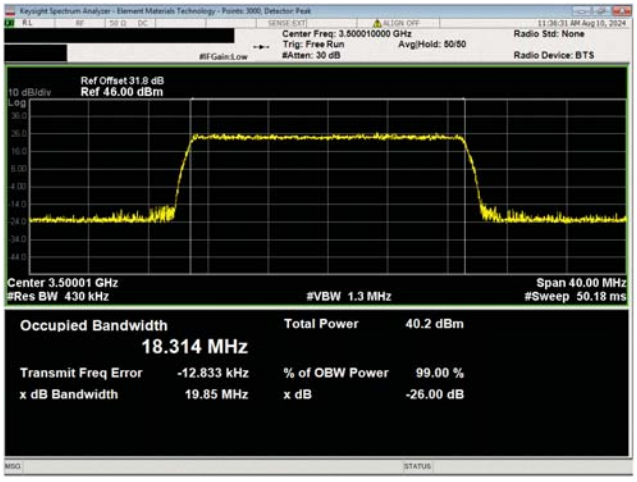
OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

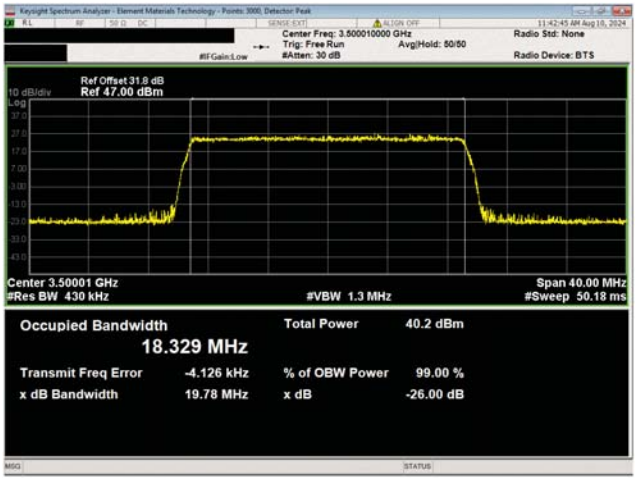
Port 1
20 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3540.00 MHz



Port 1
20 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



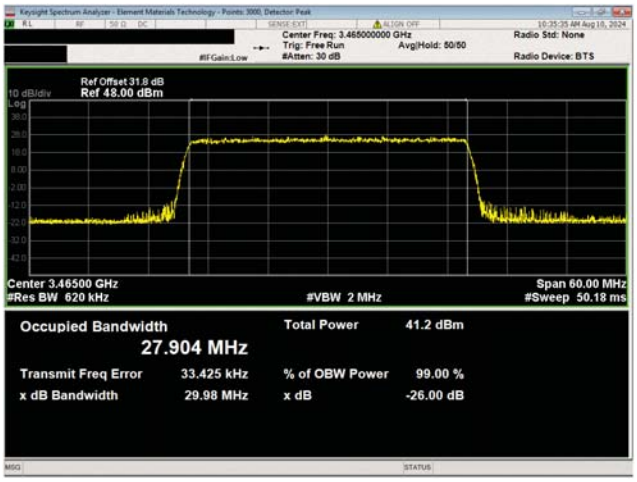
Port 1
20 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz



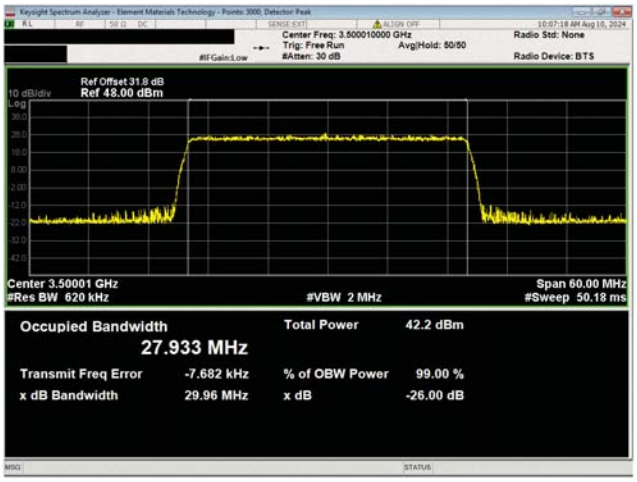
Port 1
20 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz

OCCUPIED BANDWIDTH - BAND 3.45G

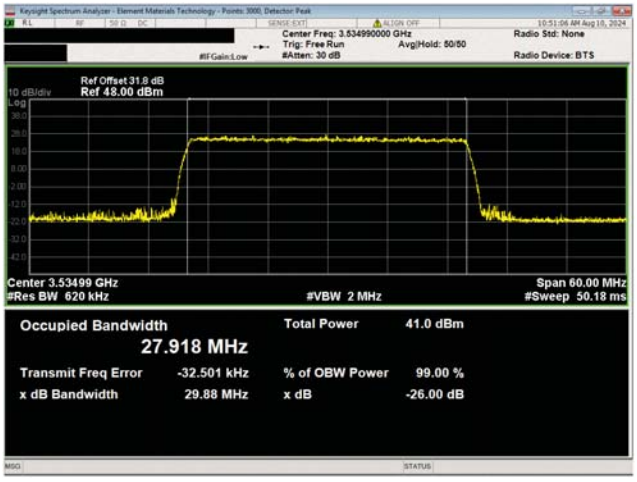
element
TbtTx 2024.05.24.1
WTD.2024.01.16.0



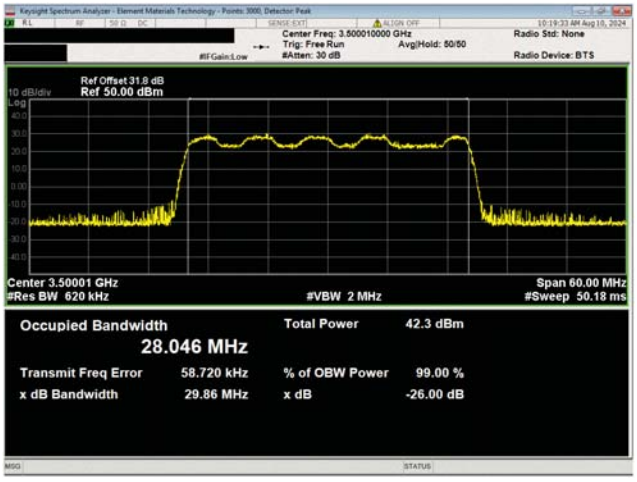
Port 1
30 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3465.00 MHz



Port 1
30 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz



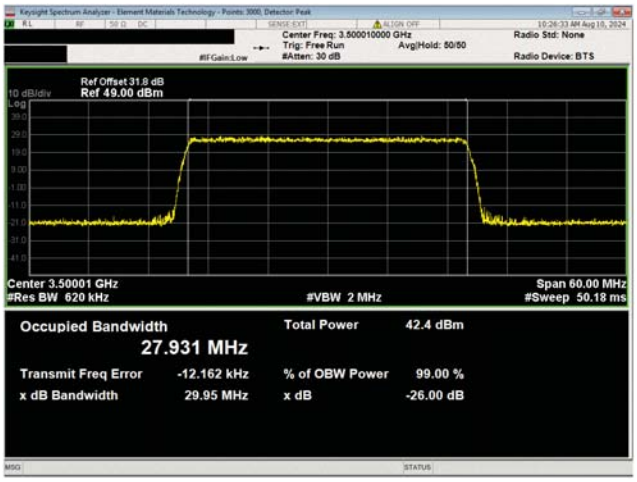
Port 1
30 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3534.99 MHz



Port 1
30 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz

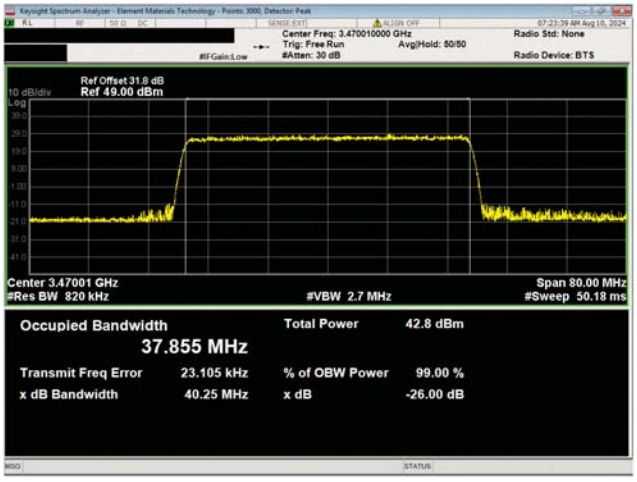
OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

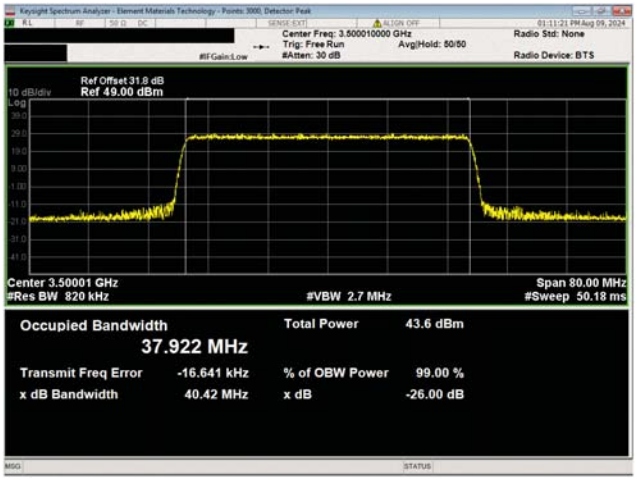


Port 1
30 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz

Port 1
30 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Low Channel, 3470.01 MHz

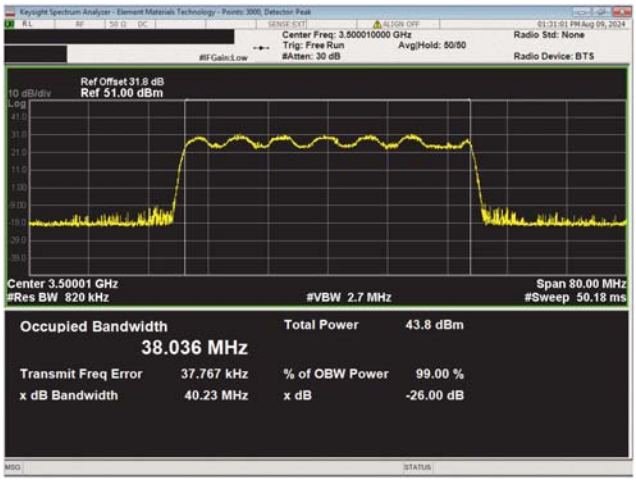


Port 1
40 MHz Channel Bandwidth
QPSK Modulation
Mid Channel, 3500.01 MHz

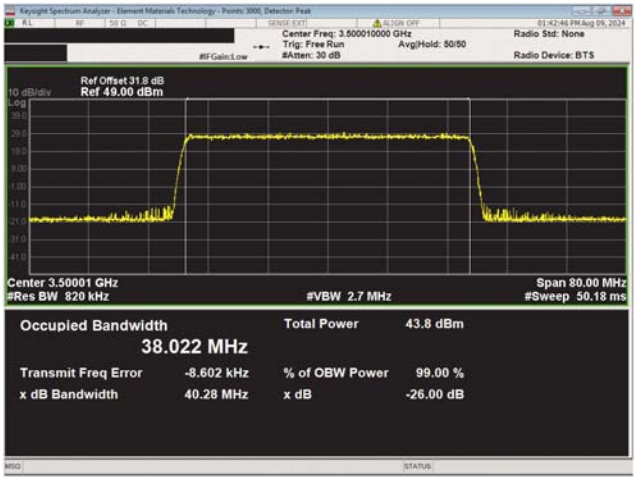
OCCUPIED BANDWIDTH - BAND 3.45G

element
TbtTx 2024.05.24.1
WTD.2024.01.16.0

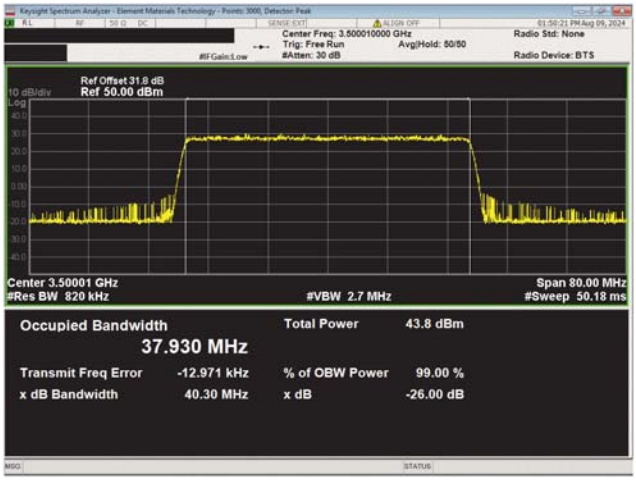
Port 1
40 MHz Channel Bandwidth
QPSK Modulation
High Channel, 3529.98 MHz



Port 1
40 MHz Channel Bandwidth
16QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
40 MHz Channel Bandwidth
64QAM Modulation
Mid Channel, 3500.01 MHz



Port 1
40 MHz Channel Bandwidth
256QAM Modulation
Mid Channel, 3500.01 MHz