SPURIOUS CONDUCTED EMISSIONS

XMit 2020.12.30.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 3 different attenuation configurations which continues through to the RF input of the spectrum analyzer. Analyzer plots utilizing a resolution bandwidth called out by the client's test plan were made for each modulation type from 9 KHz to 20 GHz. The peak conducted power of spurious emissions, up to the 10th harmonic of the transmit frequency, were investigated to ensure they were less than the limits also called out by the client's test plan shown below.

The measurement methods are detailed in KDB971168 D01v03 section 6 and ANSI C63.26-2015.

Per FCC 2.1057(a)(1) and RSS Gen 6.13, the upper level of measurement is the 10th harmonic of the highest fundamental frequency.

These measurements are for frequency band after the first 1.0 MHz bands immediately outside and adjacent to the frequency block.

Per section FCC 24.238(a) and RSS-133 section 6.5, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm for a 1 MHz measurement bandwidth. The limit is adjusted to -19 dBm [-13 dBm - 10 log (4)] per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

The limit for the 9kHz to 150kHz frequency range was adjusted to –49dBm to correct for a spectrum analyzer RBW of 1kHz versus required RBW of 1MHz [i.e.: -49dBm = -19dBm -10log(1MHz/1kHz)]. The limit for the 150kHz to 20MHz frequency range was adjusted to –39dBm to correct for a spectrum analyzer RBW of 10kHz versus required RBW of 1MHz [i.e.: -39dBm = -19dBm -10log(1MHz/10kHz)]. The required limit of -19dBm with a RBW of > 1MHz was used for all other frequency ranges.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (FXFC) as the original certification test. The FXFC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 3 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

SPURIOUS CONDUCTED EMISSIONS

element

TbtTx 2019.08.30.0 XMit 2020.12.30.0

EUT:	FXFC (FCC/ISED C2PC)			**Work Order:**	NOKI0029
Serial Number:	1M152245671			**Date:**	28-Apr-21
Customer:	Nokia Solutions and Networks			**Temperature:**	23.5 °C
Attendees:	David Le, John Rattanavong			**Humidity:**	51.8% RH
Project:	None			**Barometric Pres.:**	1011 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX05

TEST SPECIFICATIONS	Test Method
FCC 24E:2021	ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018	RSS-133 Issue 6:2013+A1:2018

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n2 carriers were enabled at maximmum power (80watts/carrier)

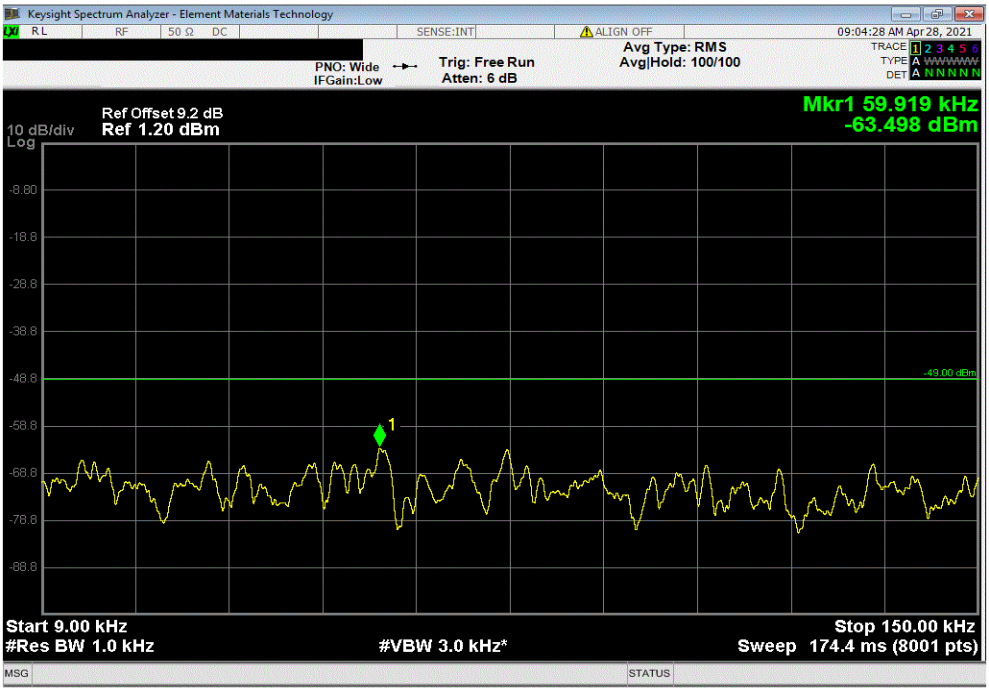
DEVIATIONS FROM TEST STANDARD

None

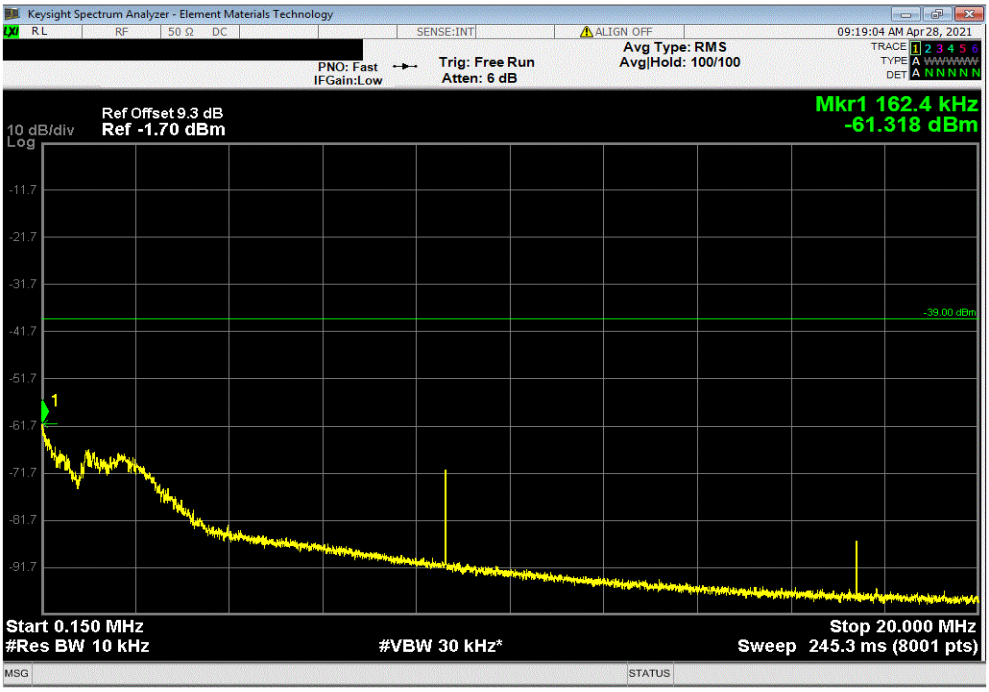
Configuration #	1,2,3	Signature

		Frequency Range	Value (dBm)	Limit (dBm)	Result
Band n2, 1930 MHz - 1990 MHz, 5G NR					
Port 3					
5 MHz Bandwdith					
QPSK Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-63.5	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-61.3	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-25.8	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-25.3	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.8	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.7	-19	Pass
16-QAM Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-64.4	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-61.3	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-26.0	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-24.5	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.5	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.8	-19	Pass
64-QAM Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-64.5	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-61.7	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-25.9	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-25.1	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.6	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.7	-19	Pass
256-QAM Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-63.4	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-61.0	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-25.7	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-25.2	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.6	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.7	-19	Pass
10 MHz Bandwdith					
256-QAM Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-67.3	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-63.9	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-25.9	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-24.6	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.6	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.7	-19	Pass
15 MHz Bandwdith					
256-QAM Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-68.1	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-65.3	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-25.9	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-24.8	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.7	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.6	-19	Pass
20 MHz Bandwdith					
256-QAM Modulation					
	Mid Channel, 1960 MHz	9 kHz - 150 kHz	-71.9	-49	Pass
	Mid Channel, 1960 MHz	150 kHz - 20 MHz	-67.0	-39	Pass
	Mid Channel, 1960 MHz	20 MHz - 3 GHz	-25.8	-19	Pass
	Mid Channel, 1960 MHz	1910 MHz - 2010 MHz	-25.3	-19	Pass
	Mid Channel, 1960 MHz	3 GHz - 11 GHz	-45.4	-19	Pass
	Mid Channel, 1960 MHz	11 GHz - 20 GHz	-41.8	-19	Pass

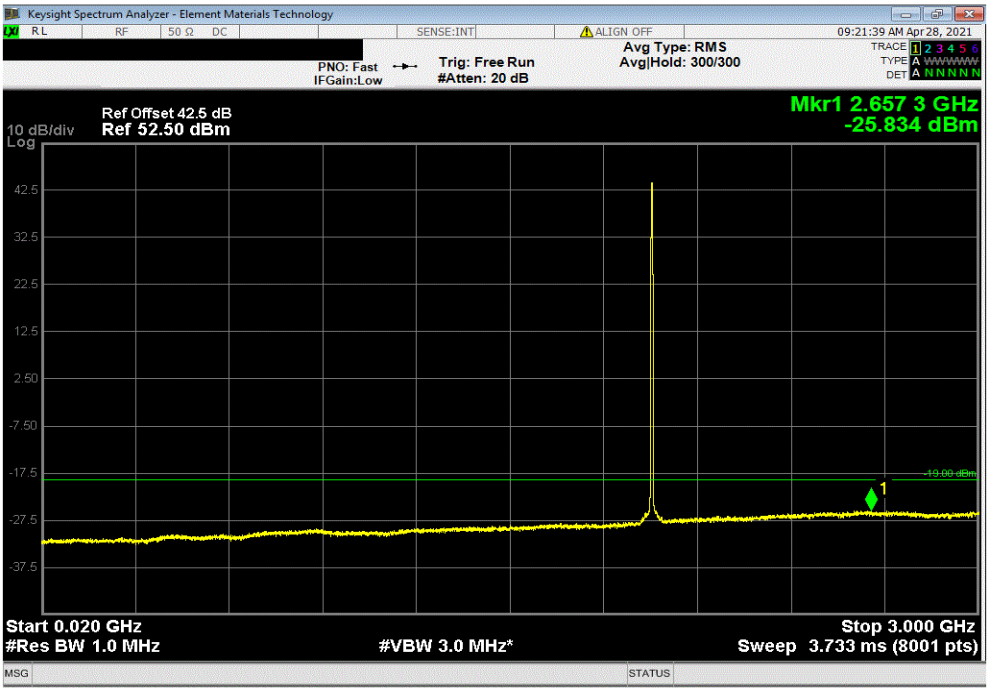
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz			-63.5	-49	Pass



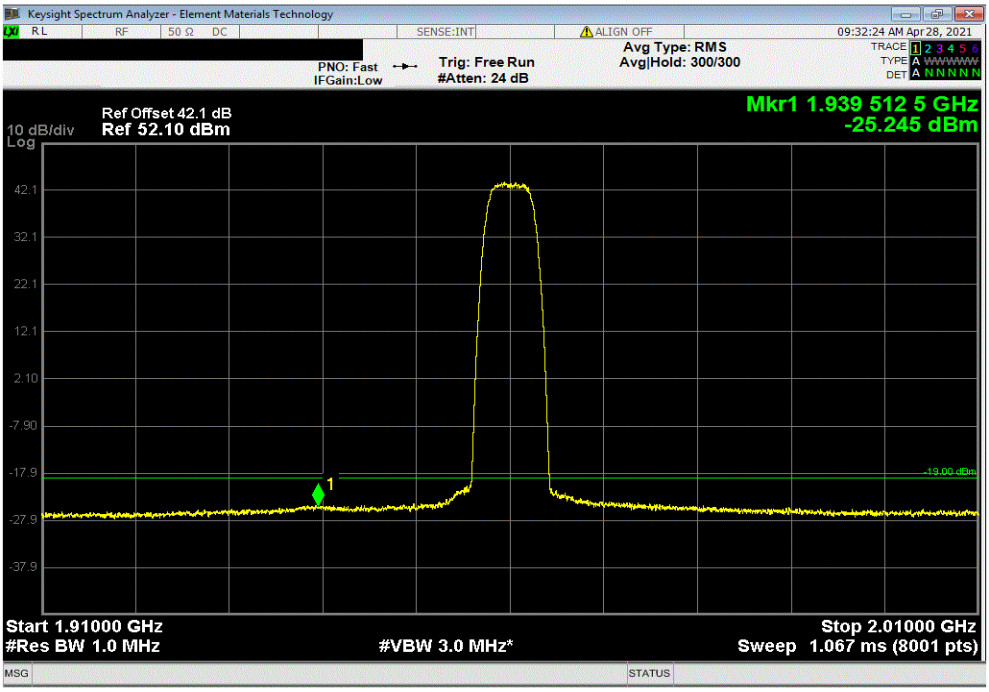
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz					
	Frequency Range		Value (dBm)	Limit (dBm)	Result
	150 kHz - 20 MHz		-61.32	-39	Pass



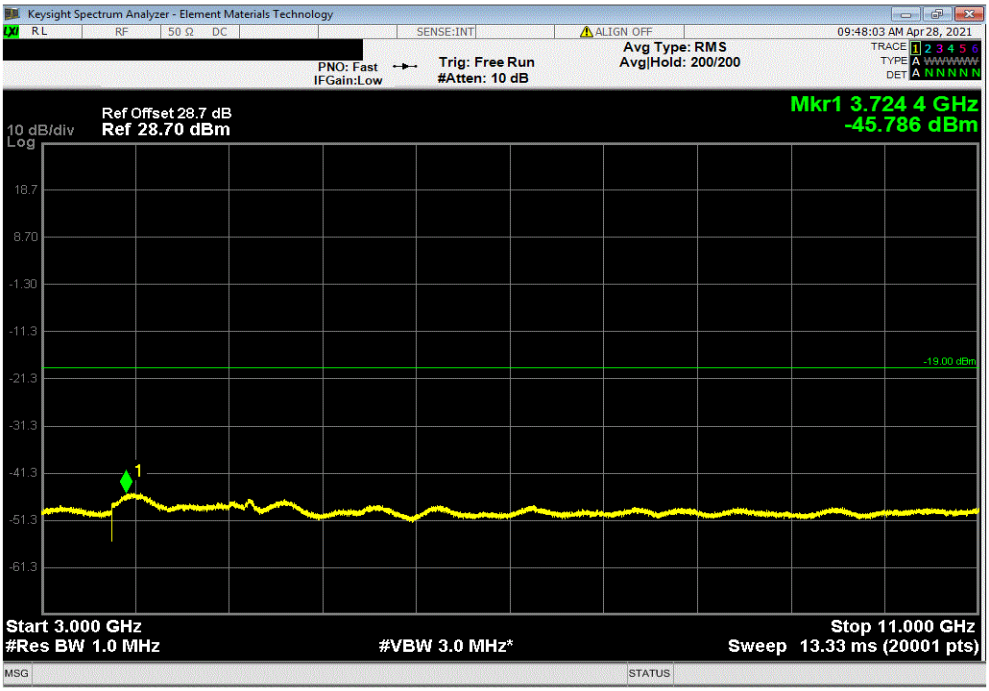
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz			-25.83	-19	Pass



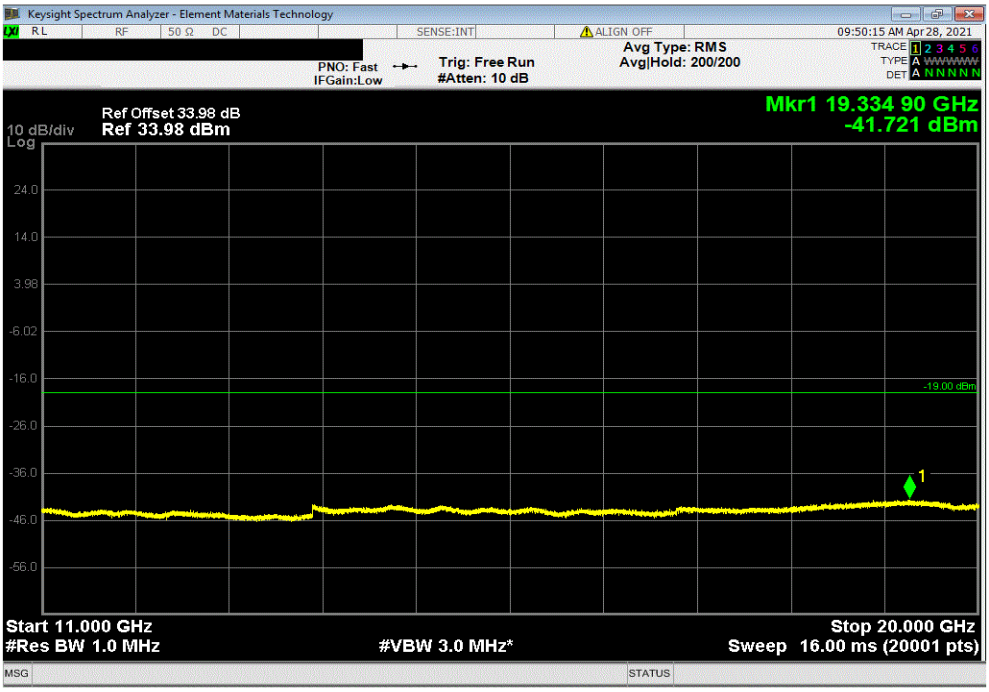
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz					
	Frequency Range		Value (dBm)	Limit (dBm)	Result
	1910 MHz - 2010 MHz		-25.25	-19	Pass



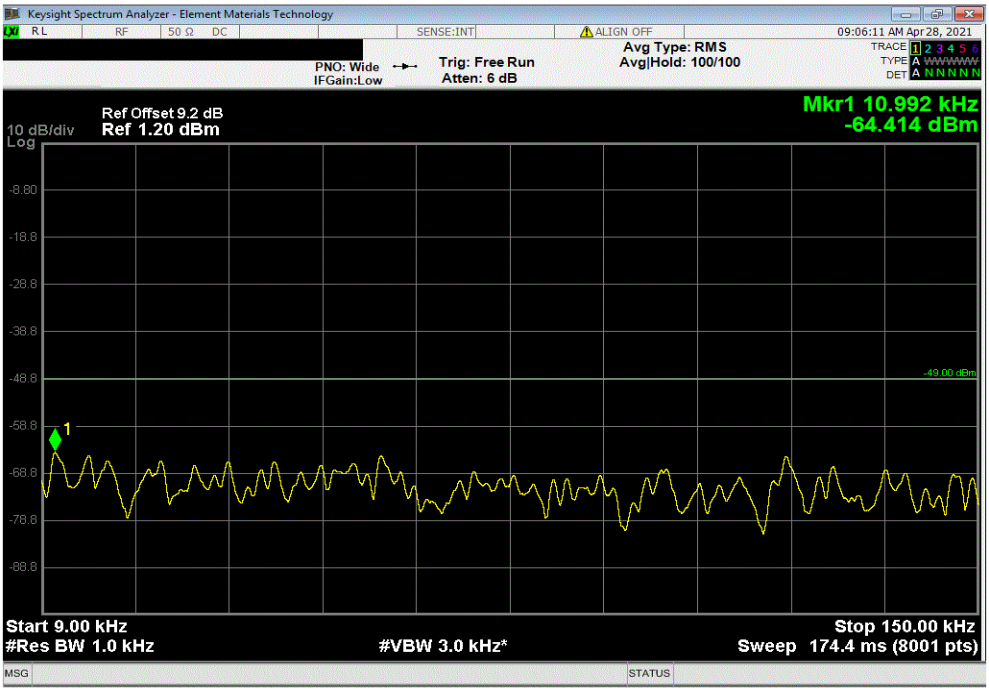
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	3 GHz - 11 GHz			-45.79	-19	Pass



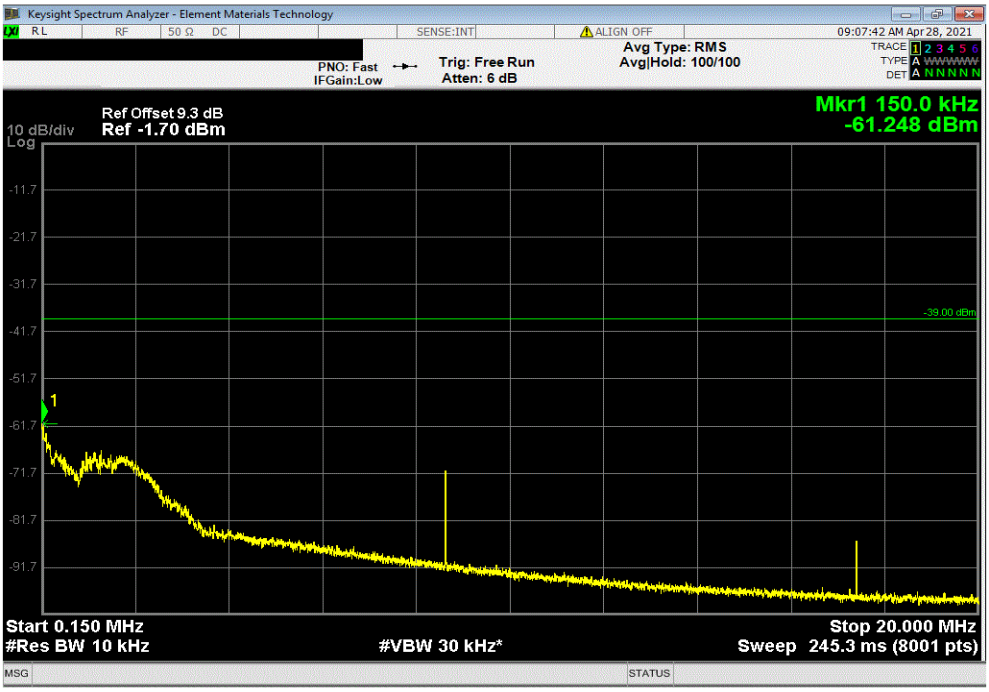
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz					
	Frequency Range		Value (dBm)	Limit (dBm)	Result
	11 GHz - 20 GHz		-41.72	-19	Pass



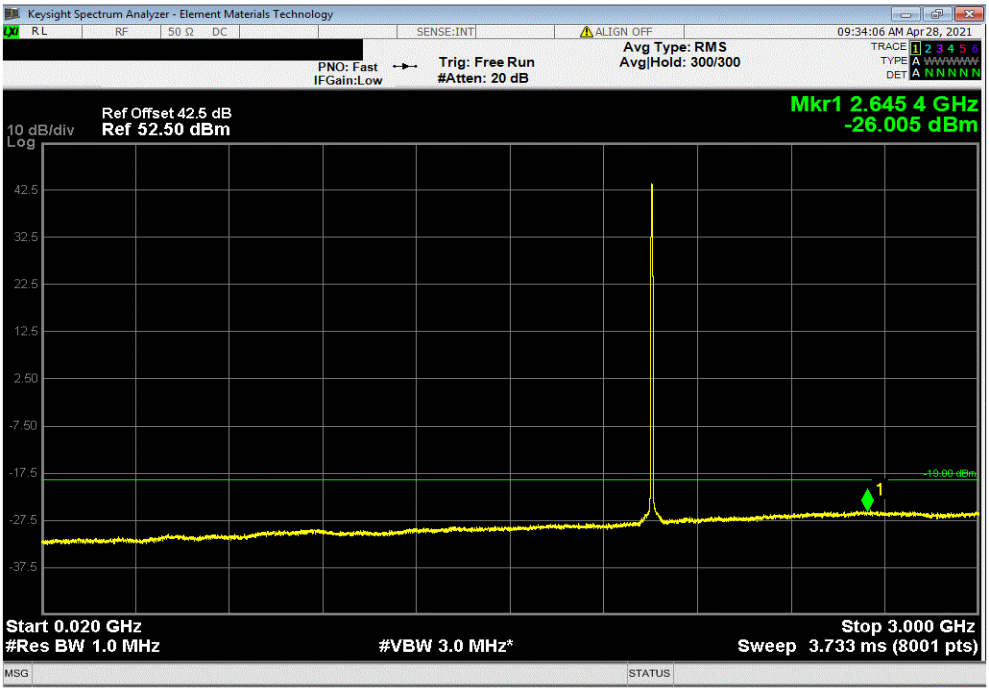
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz			-64.41	-49	Pass



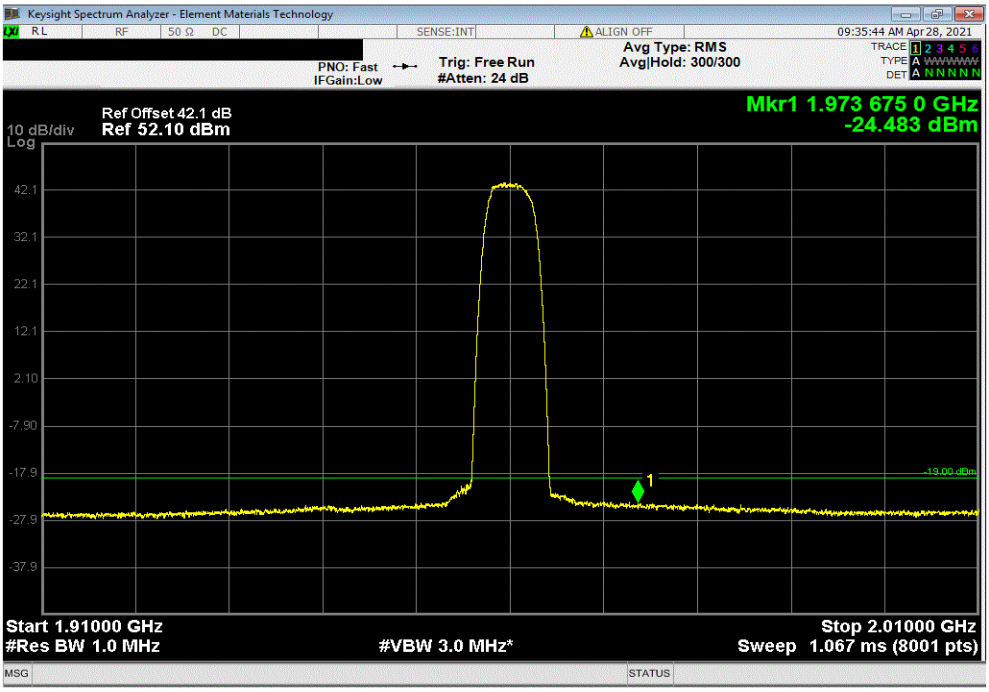
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
150 kHz - 20 MHz			-61.25	-39	Pass



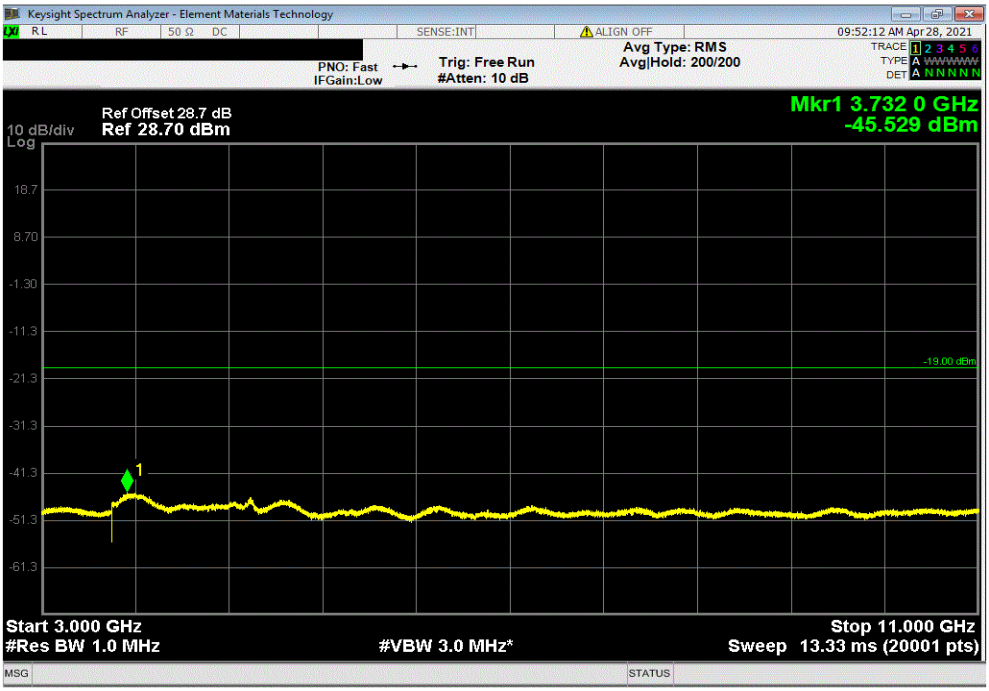
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz		-26.01	-19	Pass



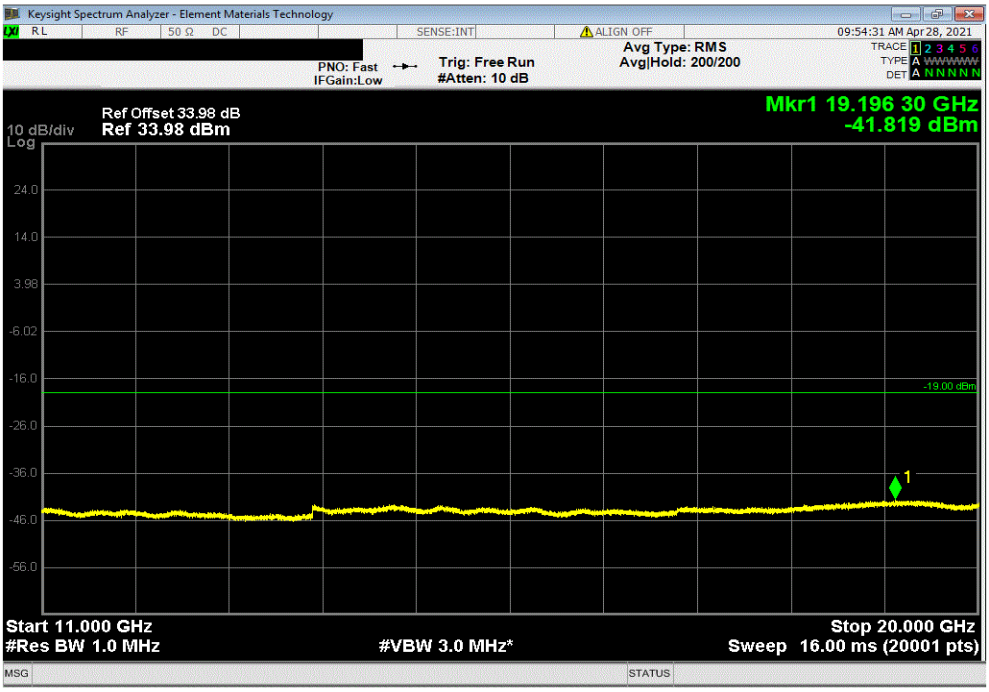
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
1910 MHz - 2010 MHz		-24.48	-19	Pass



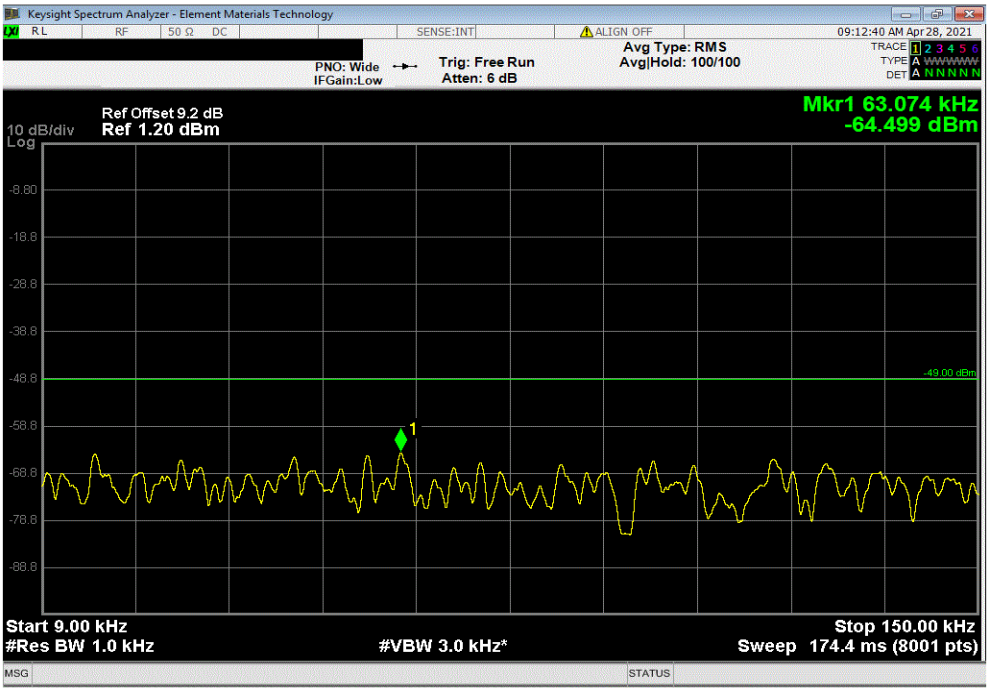
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
3 GHz - 11 GHz			-45.53	-19	Pass



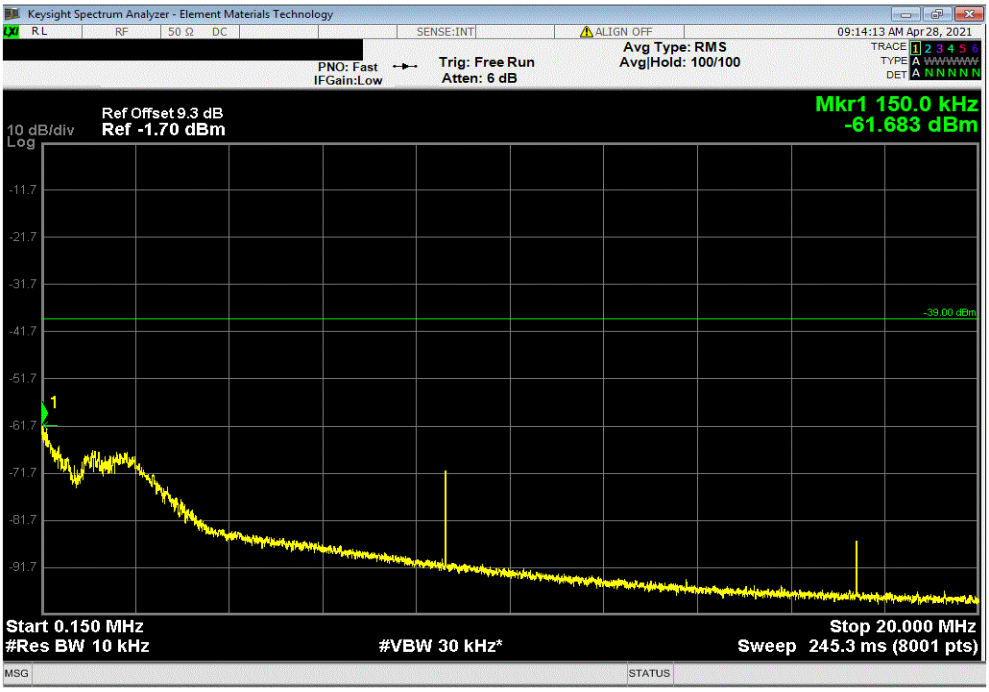
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
11 GHz - 20 GHz		-41.82	-19	Pass



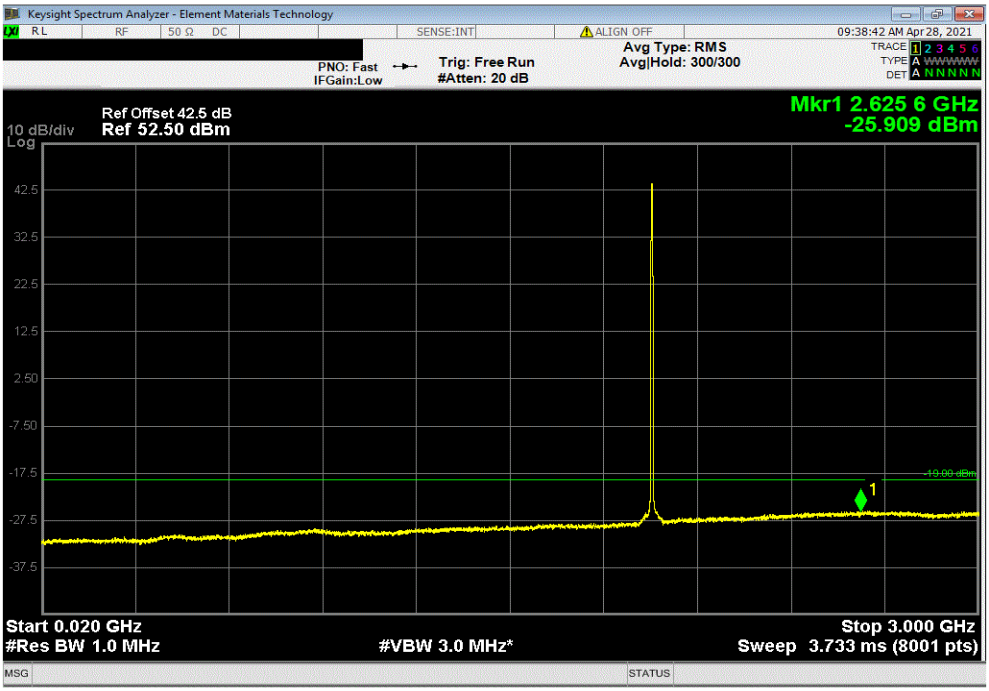
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz		-64.5	-49	Pass



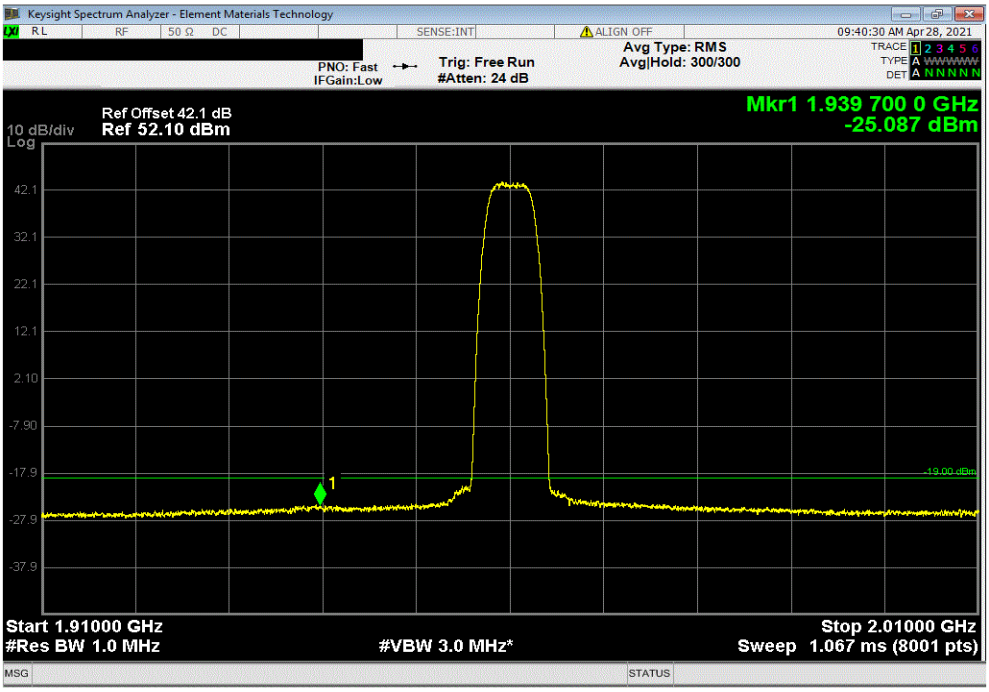
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
150 kHz - 20 MHz		-61.68	-39	Pass



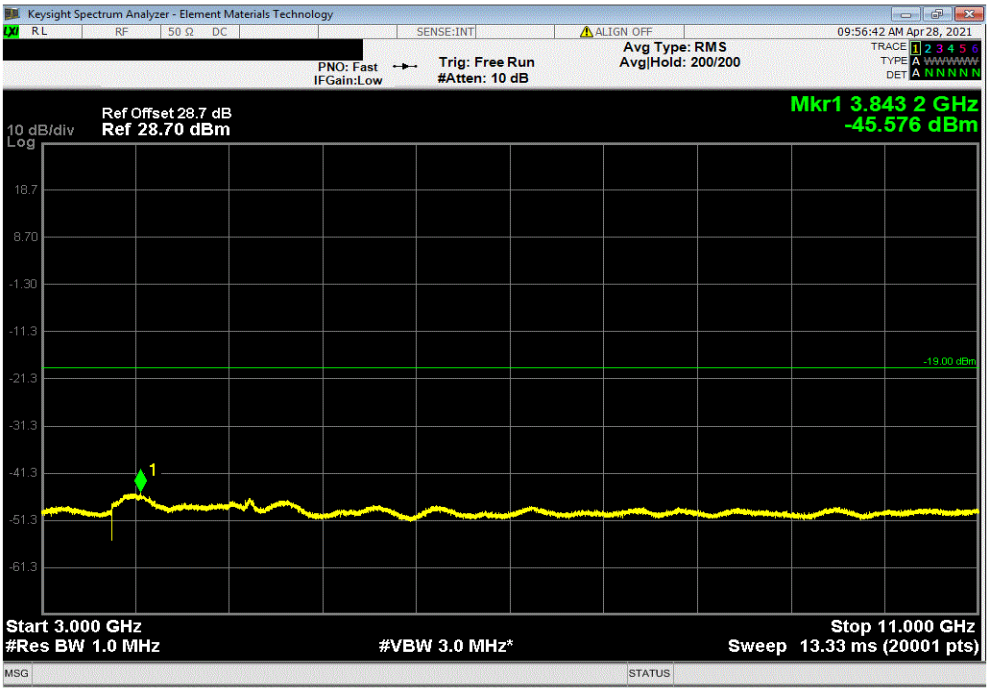
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz		-25.91	-19	Pass



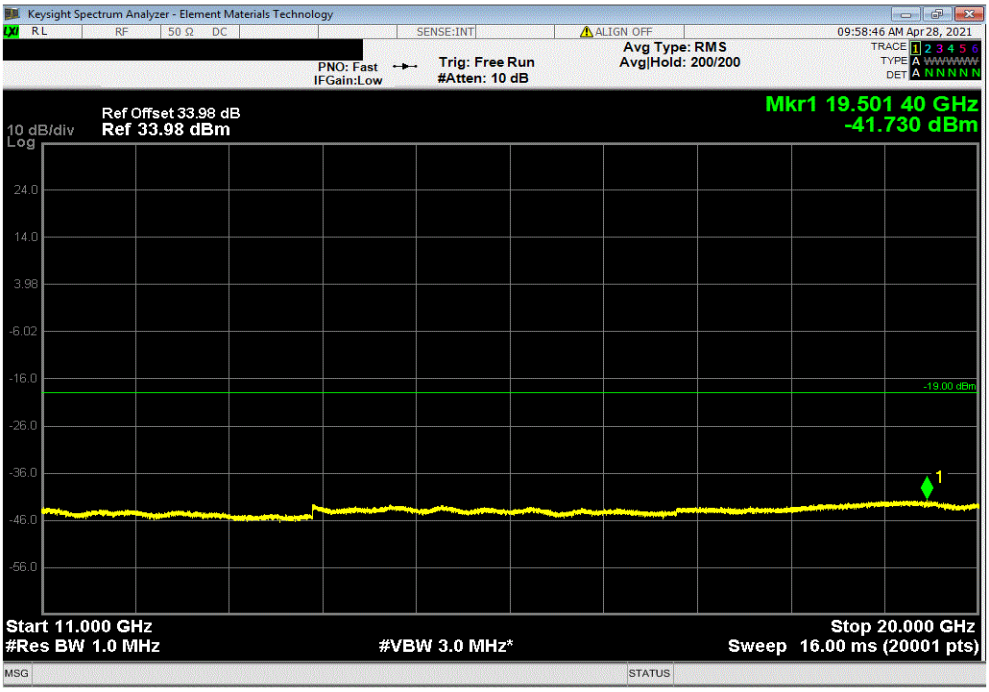
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
1910 MHz - 2010 MHz		-25.09	-19	Pass



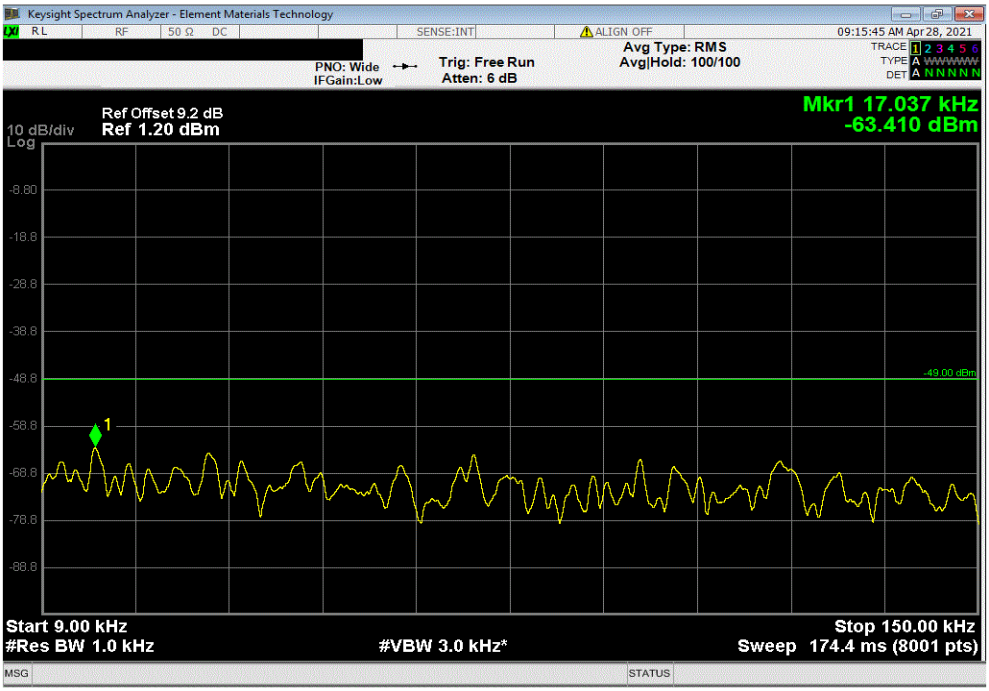
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
	3 GHz - 11 GHz		-45.58	-19	Pass



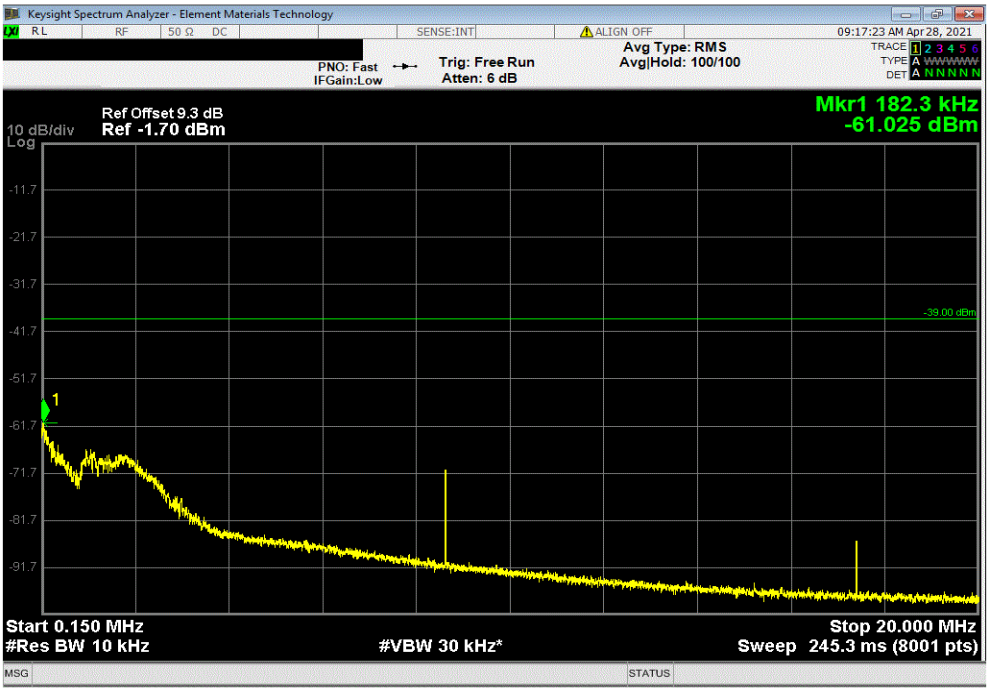
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
11 GHz - 20 GHz		-41.73	-19	Pass



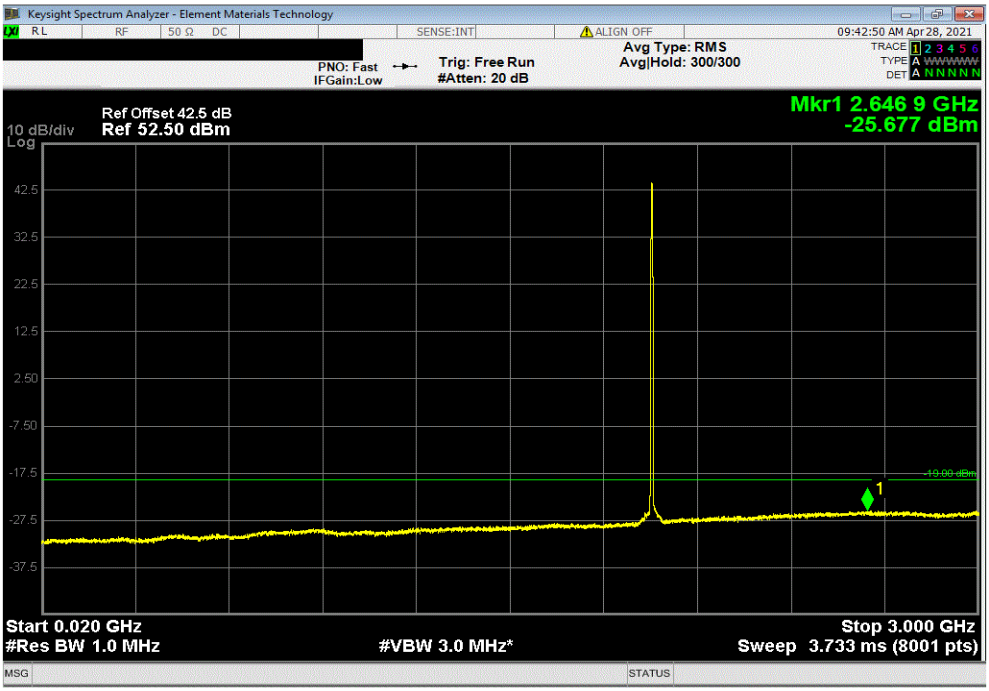
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz			-63.41	-49	Pass



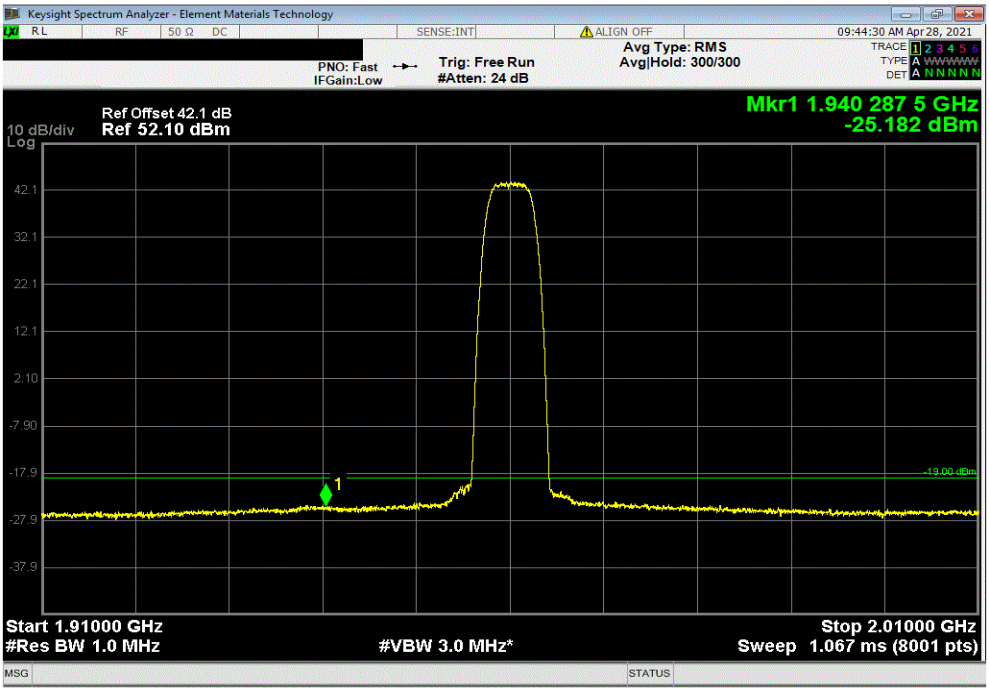
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
	Frequency Range		Value (dBm)	Limit (dBm)	Result
	150 kHz - 20 MHz		-61.03	-39	Pass



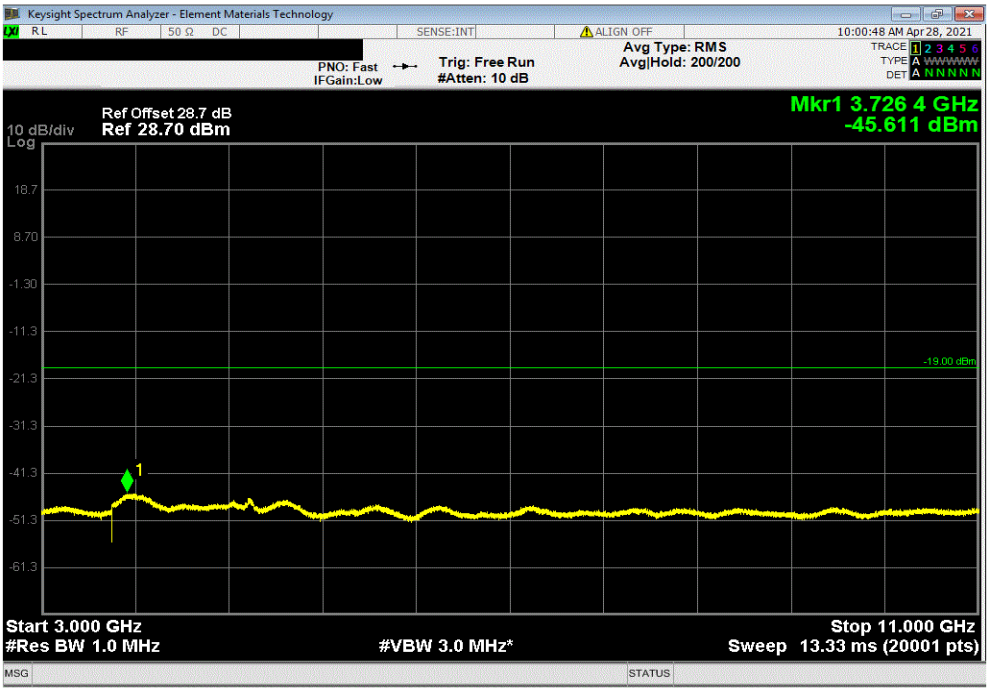
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz		-25.68	-19	Pass



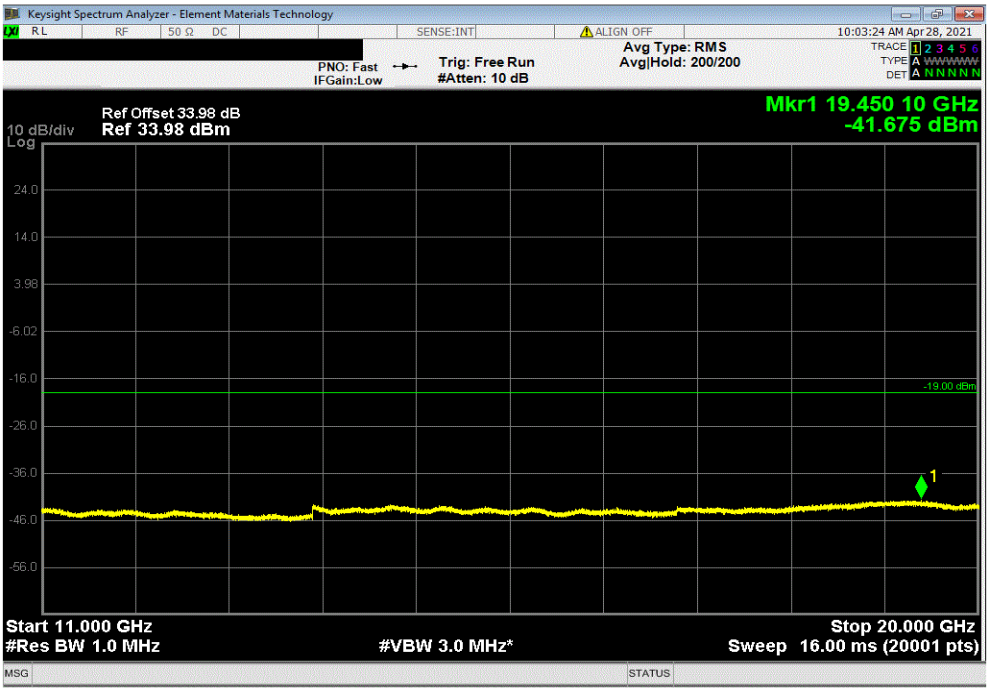
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
1910 MHz - 2010 MHz		-25.18	-19	Pass



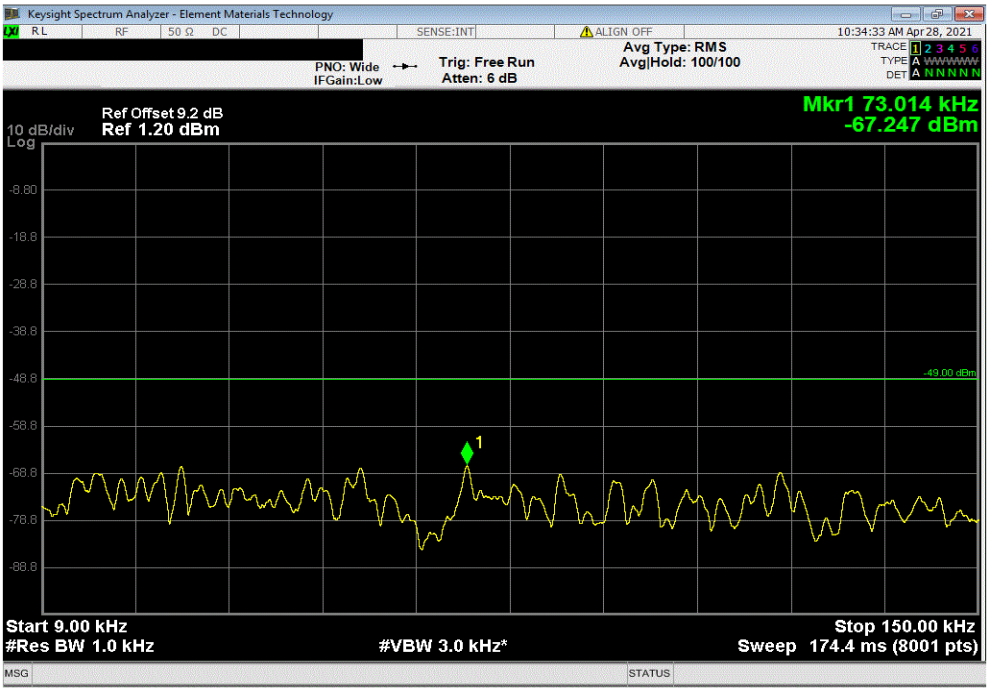
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	3 GHz - 11 GHz			-45.61	-19	Pass



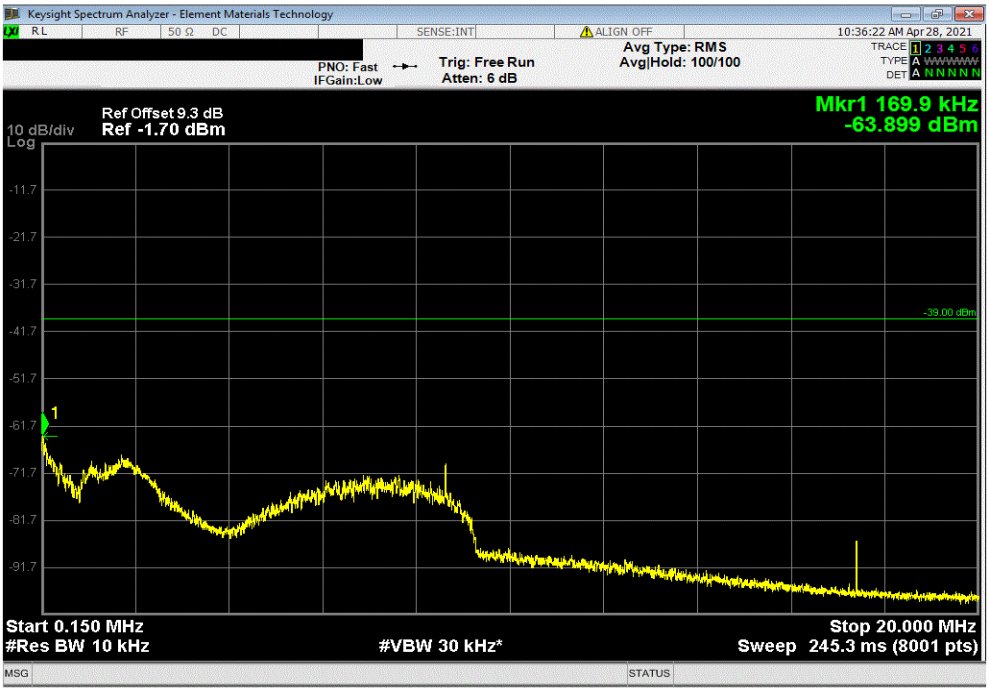
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	11 GHz - 20 GHz			-41.68	-19	Pass



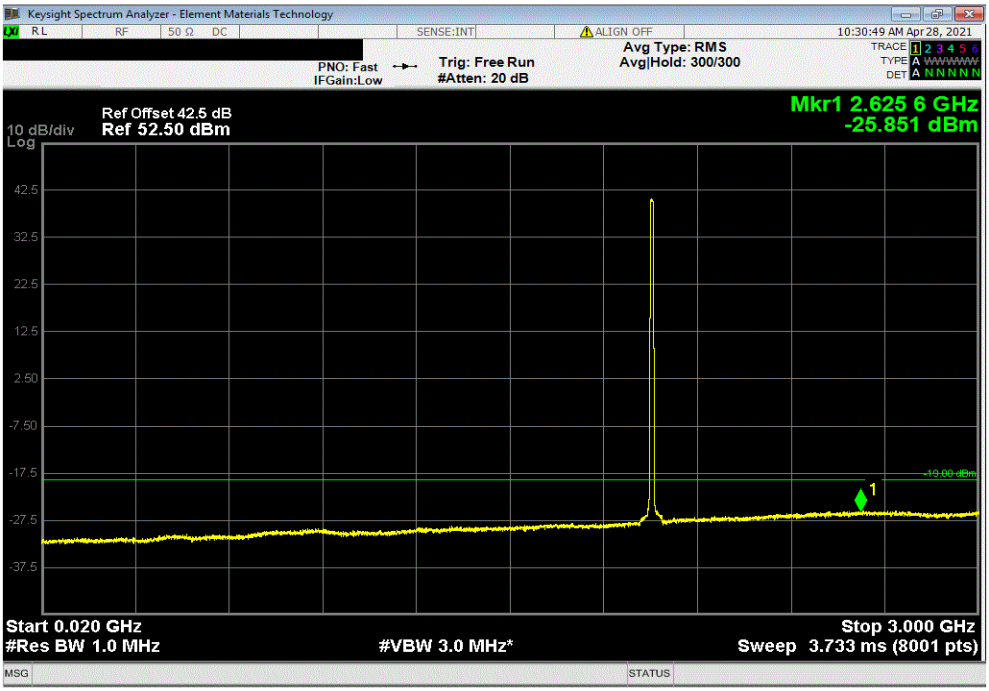
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz			-67.25	-49	Pass



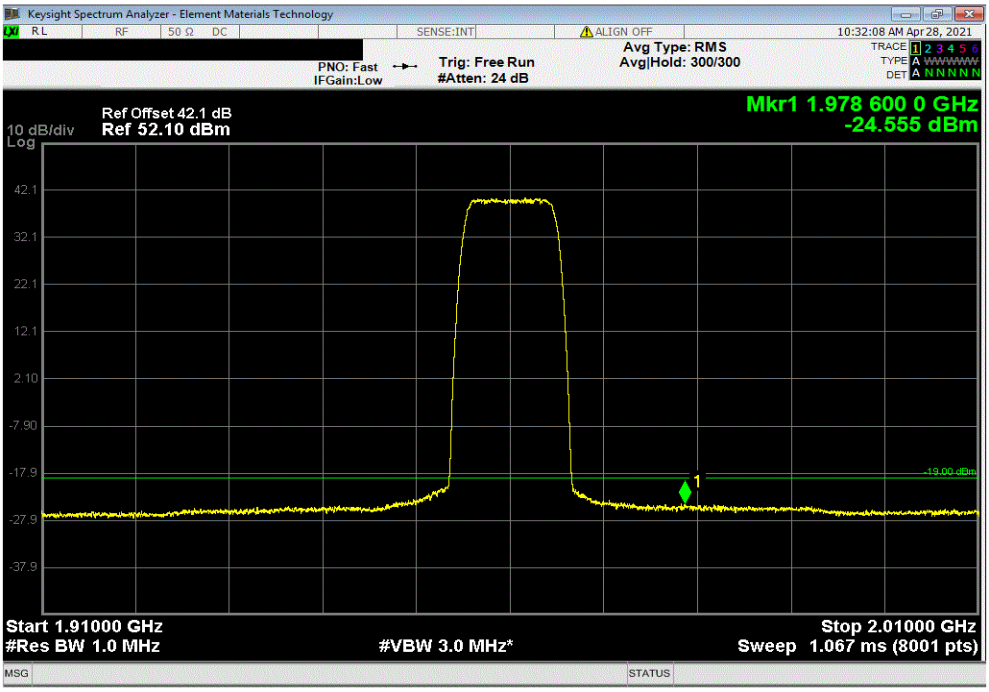
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
	Frequency Range		Value (dBm)	Limit (dBm)	Result
	150 kHz - 20 MHz		-63.9	-39	Pass



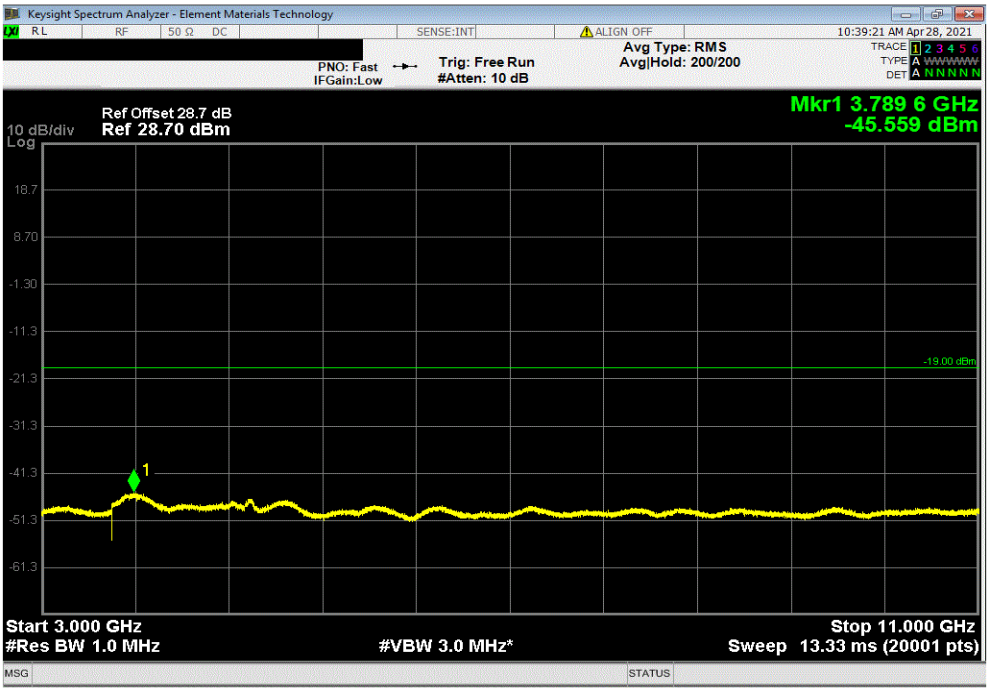
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz			-25.85	-19	Pass



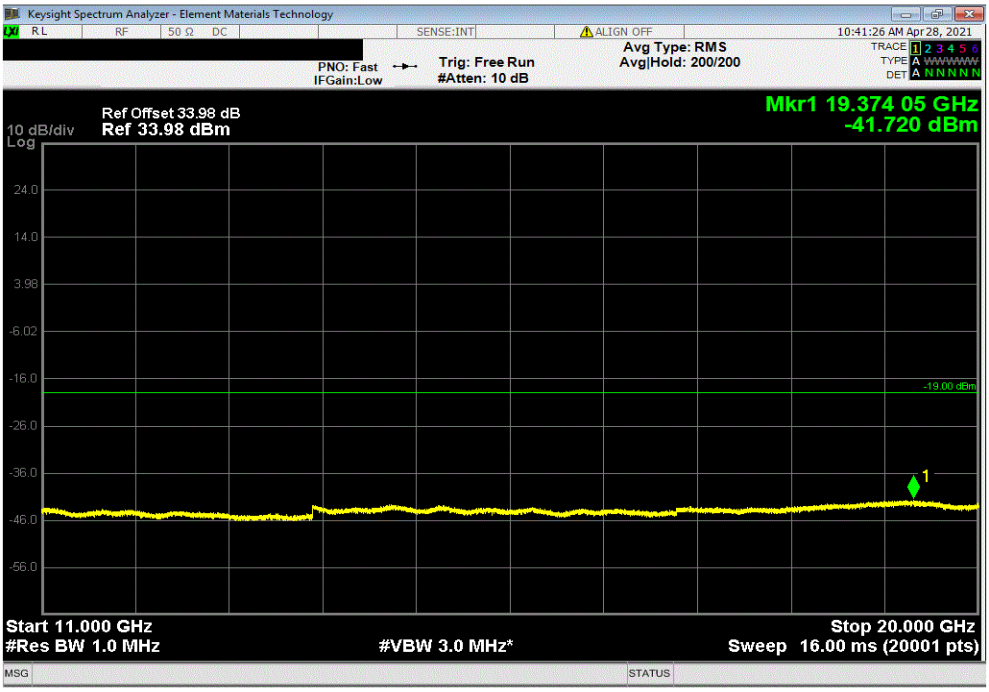
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	1910 MHz - 2010 MHz			-24.56	-19	Pass



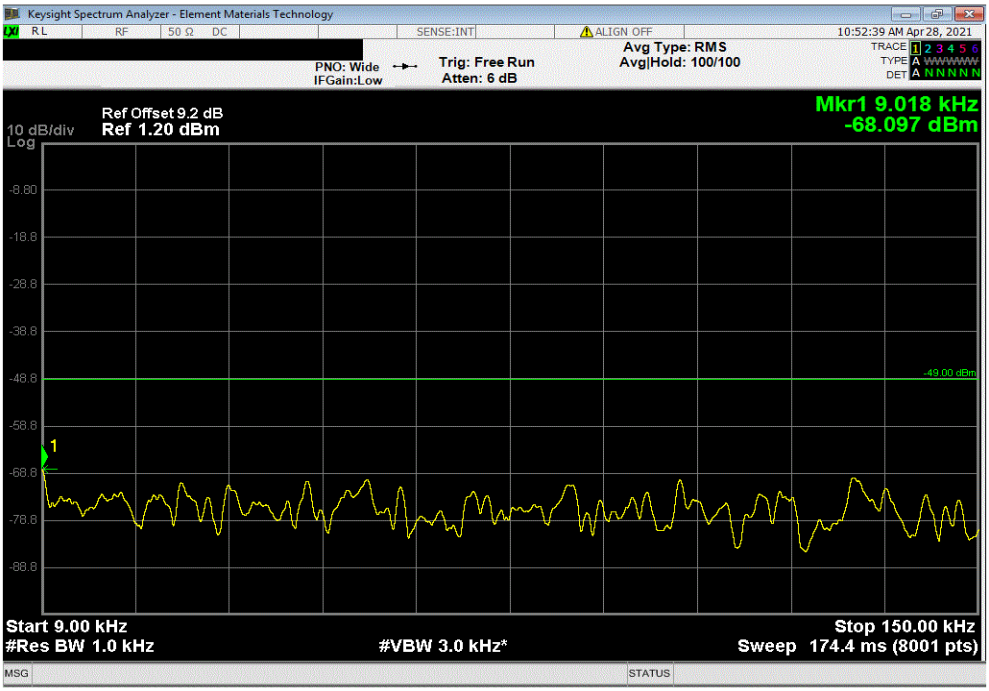
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
3 GHz - 11 GHz			-45.56	-19	Pass



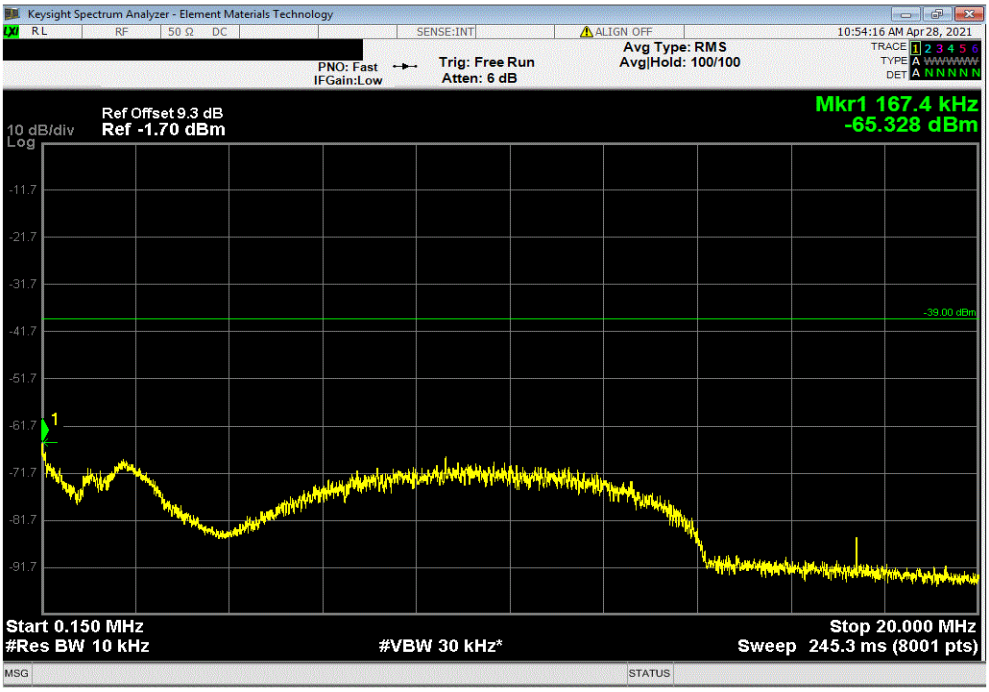
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz				
Frequency Range		Value (dBm)	Limit (dBm)	Result
11 GHz - 20 GHz		-41.72	-19	Pass



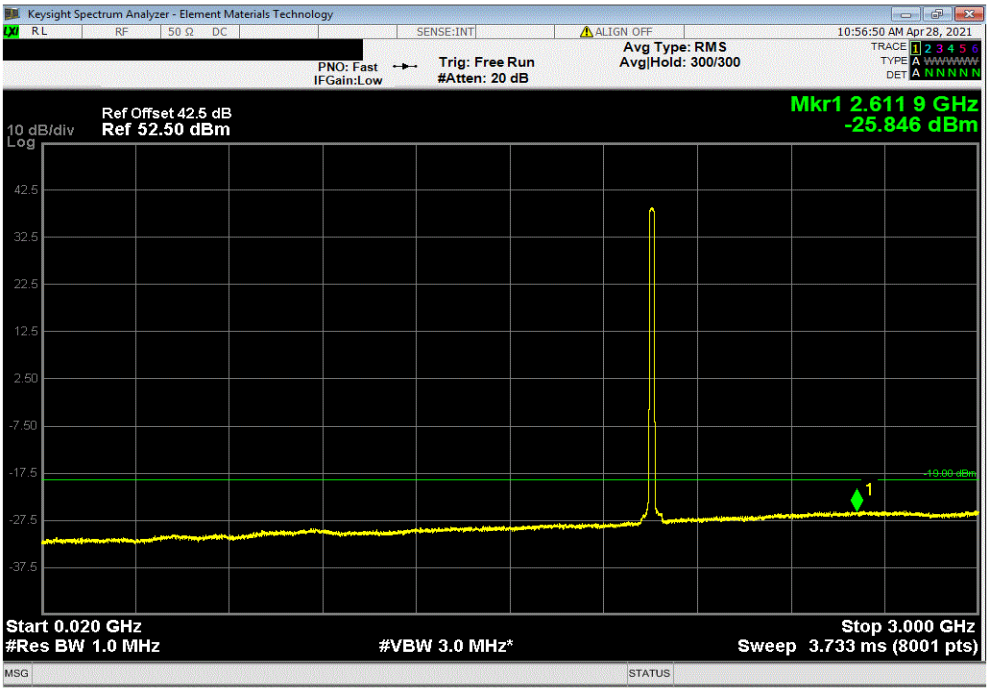
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz			-68.1	-49	Pass



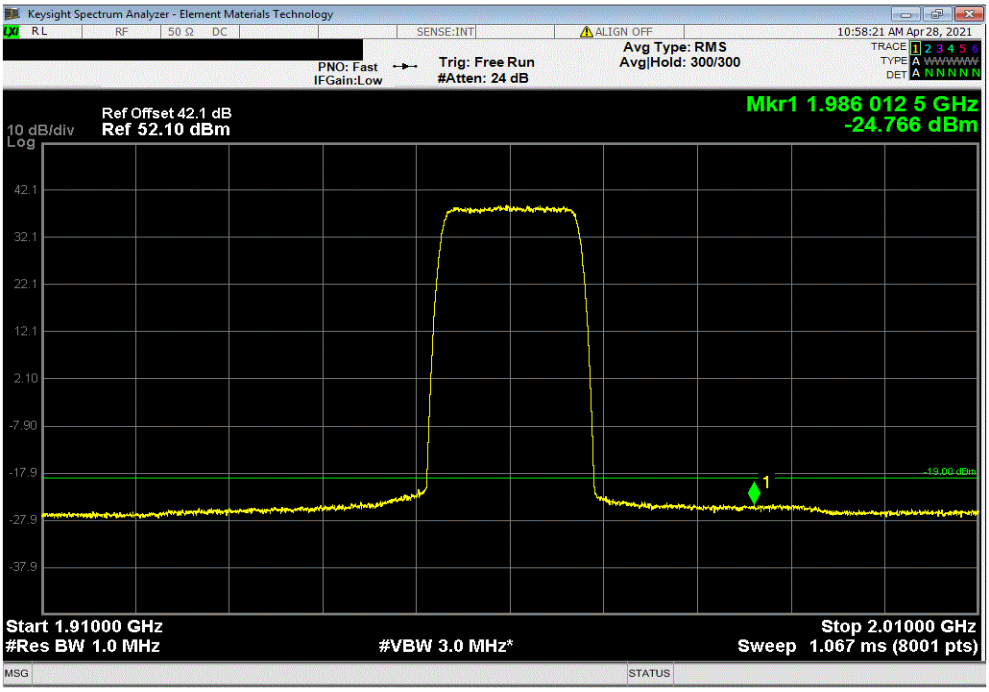
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
150 kHz - 20 MHz			-65.33	-39	Pass



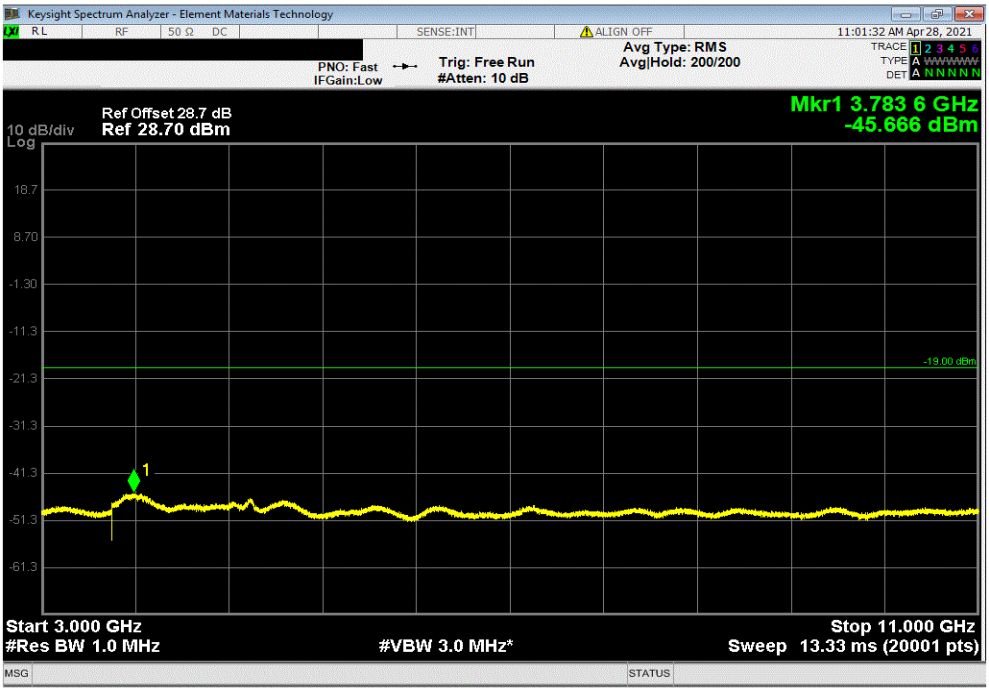
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz			-25.85	-19	Pass



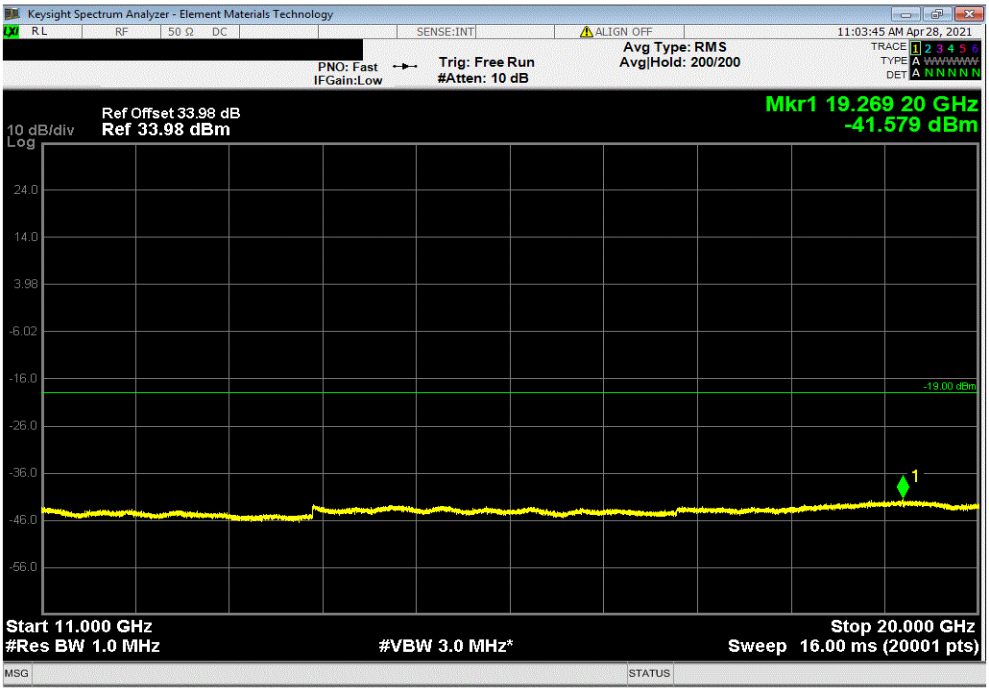
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
	Frequency Range		Value (dBm)	Limit (dBm)	Result
	1910 MHz - 2010 MHz		-24.77	-19	Pass



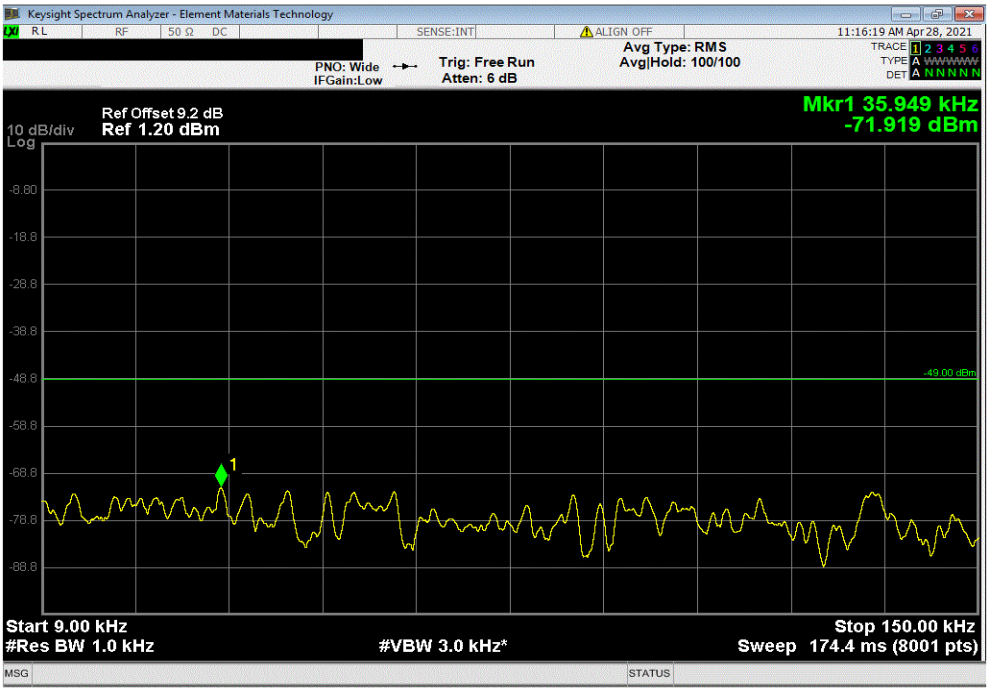
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	3 GHz - 11 GHz			-45.67	-19	Pass



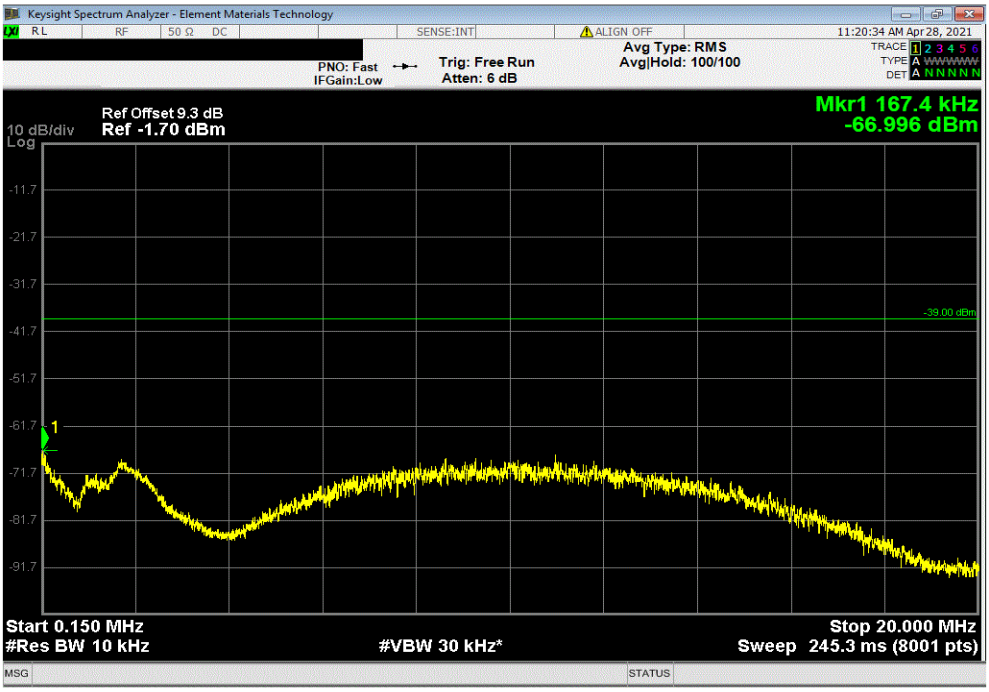
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
11 GHz - 20 GHz			-41.58	-19	Pass



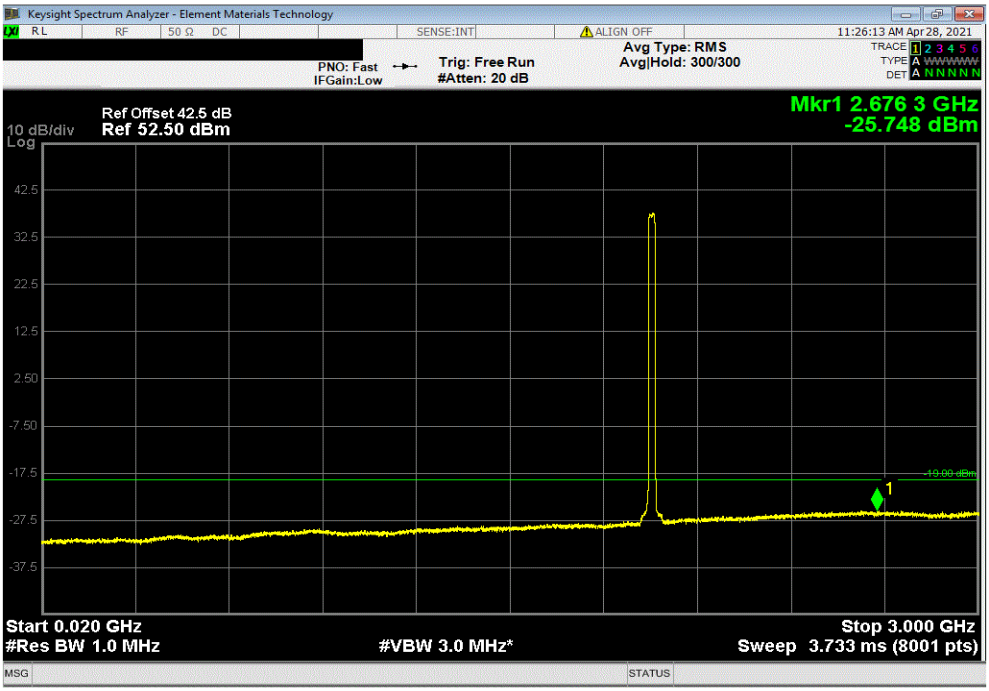
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	9 kHz - 150 kHz			-71.92	-49	Pass



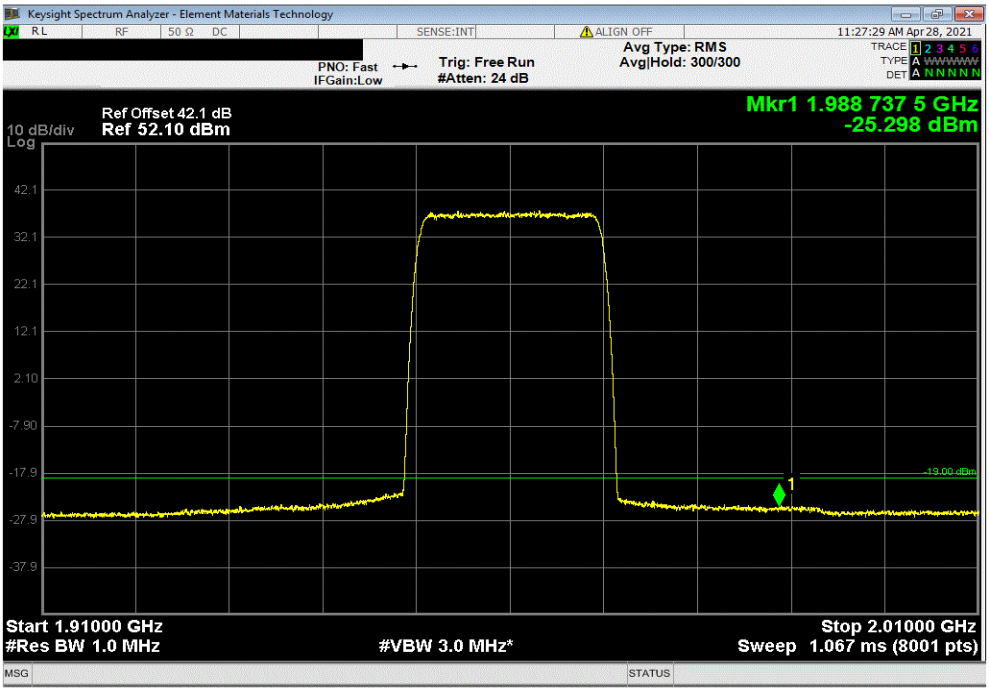
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
150 kHz - 20 MHz			-67	-39	Pass



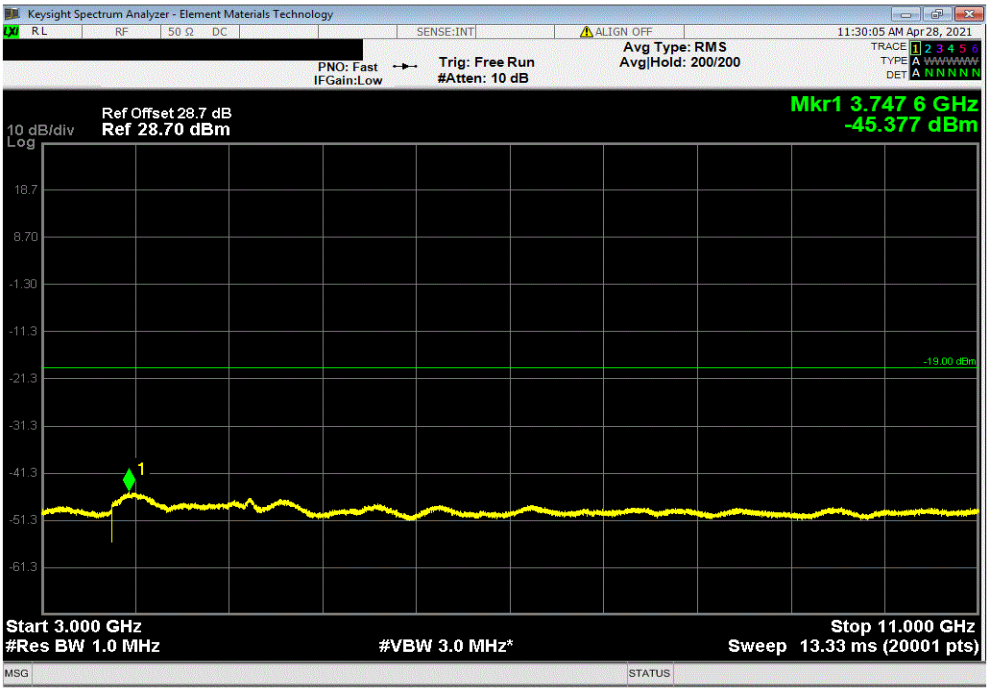
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	20 MHz - 3 GHz			-25.75	-19	Pass



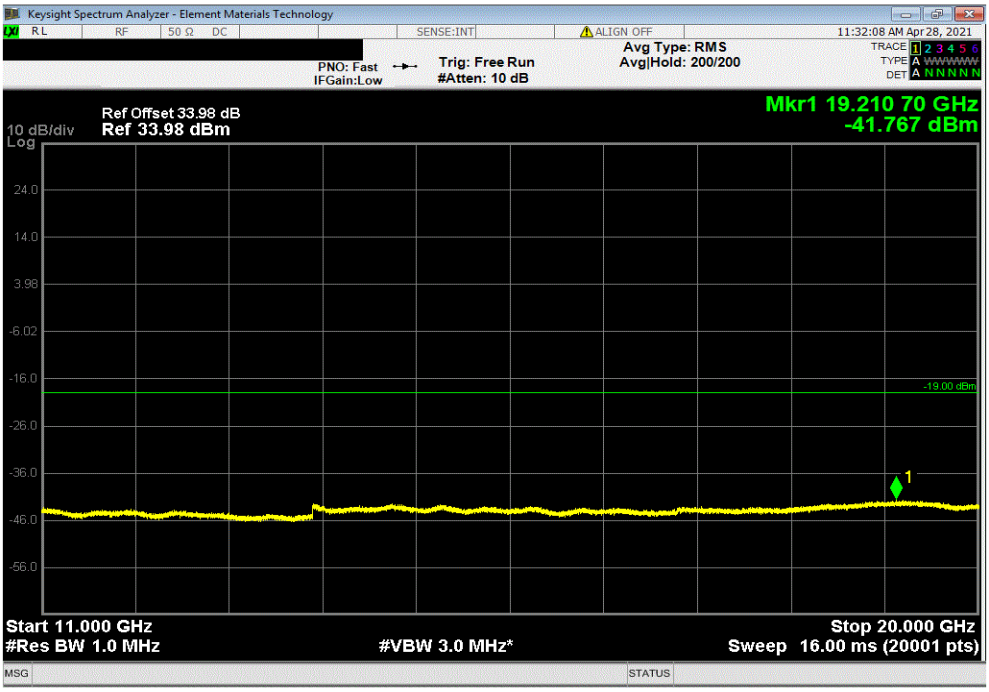
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
1910 MHz - 2010 MHz			-25.3	-19	Pass



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Frequency Range			Value (dBm)	Limit (dBm)	Result
	3 GHz - 11 GHz			-45.38	-19	Pass



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz					
Frequency Range			Value (dBm)	Limit (dBm)	Result
11 GHz - 20 GHz			-41.77	-19	Pass



POWER SPECTRAL DENISTY AND EIRP CALCULATION

XMit 2020.12.30.0

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.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3379	AMM	2020-09-21	2021-09-21
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFN	2021-01-06	2022-01-06
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The method of section 5.2.4.5 of ANSI C63.26 was used to make the measurement. The method uses trace averaging across ON and OFF times of EUT transmissions using the spectrum analyzer's RMS detector. Following the measurement a duty cycle correction was applied by adding [10log(1/D)], where D is the duty cycle, to the measured power to compute the PSD during the transmit times.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (FXFC) as the original certification test. The FXFC antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 3 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 total PSD of all antenna ports (at the radio output) were determined per ANSI C63.26-2015 paragraph 6.4.3.2.4.

The EIRP calculations were based upon ANSI C63.26-2015 sections 6.4.3.2.4, section 6.4.6.3, section 6.4.5.3 and section 6.4.5.2

The applicable FCC and ISED regulatory requirement for EIRP are provided below:

FCC Requirements: 24.232 Power and antenna height limits.
(a)(2) Base stations with an emission bandwidth greater than 1 MHz are limited to 1640 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT, except as described in paragraph (b) below.
(a)(3) Base station antenna heights may exceed 300 meters HAAT with a corresponding reduction in power; see Tables 1 and 2 of this section.
(b)(2) Base stations that are located in counties with population densities of 100 persons or fewer per square mile, based upon the most recently available population statistics from the Bureau of the Census, with an emission bandwidth greater than 1 MHz are limited to 3280 watts/MHz equivalent isotropically radiated power (EIRP) with an antenna height up to 300 meters HAAT.

ISED Requirements RSS-133 Section 6.4/SRSP-510 section 5.1.1:
SRSP-510 section 5.1 Radiated power and antenna height limits for base stations
For base stations with a channel bandwidth greater than 1 MHz, the maximum e.i.r.p. is limited to 3280 watts/MHz e.i.r.p. (i.e., no more than 3280 watts e.i.r.p. in any 1 MHz band segment) with an antenna height above average terrain (HAAT) up to 300 metres. Fixed or base stations operating in urban areas are limited to a maximum allowable e.i.r.p. of 1640 watts/MHz e.i.r.p. Base station antenna heights above average terrain may exceed 300 metres with a corresponding reduction in e.i.r.p. according to the following table:

POWER SPECTRAL DENISTY AND EIRP CALCULATION

element

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EUT:	FXFC (FCC/ISED C2PC)			**Work Order:**	NOKI0029
Serial Number:	1M152245671			**Date:**	27-Apr-21
Customer:	Nokia Solutions and Networks			**Temperature:**	22.8 °C
Attendees:	David Le, John Rattanavong			**Humidity:**	49.4% RH
Project:	None			**Barometric Pres.:**	1014 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX05

TEST SPECIFICATIONS	Test Method
FCC 24E:2021	ANSI C63.26:2015
RSS-133 Issue 6:2013+A1:2018	RSS-133 Issue 6:2013+A1:2018

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. Band n2 carriers are enabled at maximum power (80 watts/carrier). The following is the power spectral density (PSD) measurements at the radio output ports. The PSD was measured for a single carrier on port 3. The total PSD for multiport (2x2 MIMO & 4x4 MIMO) operation was determinded based upon ANSI 63.26 clause 6.4.3.2.4 (10 Log Nout). The total PSD for two port operation is single port PSD +3dB [i.e. 10 Log(2)]. The total PSD for four port operation is single port PSD +6dB [i.e. 10 Log(4)].

DEVIATIONS FROM TEST STANDARD

None

Configuration #	2	Signature

	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD
Band n2, 1930 MHz - 1990 MHz, 5G NR					
Port 3					
5 MHz Bandwdith					
QPSK Modulation					
Low Channel, 1932.5 MHz	42.680	0	42.7	45.7	48.7
Mid Channel, 1960 MHz	42.889	0	42.9	45.9	48.9
High Channel, 1987.5 MHz	42.660	0	42.7	45.7	48.7
16-QAM Modulation					
Low Channel, 1932.5 MHz	42.695	0	42.7	45.7	48.7
Mid Channel, 1960 MHz	42.870	0	42.9	45.9	48.9
High Channel, 1987.5 MHz	42.626	0	42.6	45.6	48.6
64-QAM Modulation					
Low Channel, 1932.5 MHz	42.776	0	42.8	45.8	48.8
Mid Channel, 1960 MHz	42.956	0	43.0	46.0	49.0
High Channel, 1987.5 MHz	42.705	0	42.7	45.7	48.7
256-QAM Modulation					
Low Channel, 1932.5 MHz	42.912	0	42.9	45.9	48.9
Mid Channel, 1960 MHz	43.057	0	43.1	46.1	49.1
High Channel, 1987.5 MHz	42.792	0	42.8	45.8	48.8
10 MHz Bandwdith					
QPSK Modulation					
Low Channel, 1935 MHz	39.582	0	39.6	42.6	45.6
Mid Channel, 1960 MHz	39.744	0	39.7	42.7	45.7
High Channel, 1985 MHz	39.454	0	39.5	42.5	45.5
16-QAM Modulation					
Low Channel, 1935 MHz	40.297	0	40.3	43.3	46.3
Mid Channel, 1960 MHz	40.461	0	40.5	43.5	46.5
High Channel, 1985 MHz	40.132	0	40.1	43.1	46.1
64-QAM Modulation					
Low Channel, 1935 MHz	39.688	0	39.7	42.7	45.7
Mid Channel, 1960 MHz	39.832	0	39.8	42.8	45.8
High Channel, 1985 MHz	39.485	0	39.5	42.5	45.5
256-QAM Modulation					
Low Channel, 1935 MHz	39.709	0	39.7	42.7	45.7
Mid Channel, 1960 MHz	39.818	0	39.8	42.8	45.8
High Channel, 1985 MHz	39.750	0	39.8	42.8	45.8
15 MHz Bandwdith					
QPSK Modulation					
Low Channel, 1937.5 MHz	37.844	0	37.8	40.8	43.8
Mid Channel, 1960 MHz	37.911	0	37.9	40.9	43.9
High Channel, 1982.5 MHz	37.815	0	37.8	40.8	43.8
16-QAM Modulation					
Low Channel, 1937.5 MHz	39.338	0	39.3	42.3	45.3
Mid Channel, 1960 MHz	39.408	0	39.4	42.4	45.4
High Channel, 1982.5 MHz	39.278	0	39.3	42.3	45.3
64-QAM Modulation					
Low Channel, 1937.5 MHz	37.957	0	38.0	41.0	44.0
Mid Channel, 1960 MHz	37.983	0	38.0	41.0	44.0
High Channel, 1982.5 MHz	37.765	0	37.8	40.8	43.8
256-QAM Modulation					
Low Channel, 1937.5 MHz	37.994	0	38.0	41.0	44.0
Mid Channel, 1960 MHz	37.982	0	38.0	41.0	44.0
High Channel, 1982.5 MHz	37.899	0	37.9	40.9	43.9
20 MHz Bandwdith					
QPSK Modulation					
Low Channel, 1940 MHz	36.668	0	36.7	39.7	42.7
Mid Channel, 1960 MHz	36.782	0	36.8	39.8	42.8
High Channel, 1980 MHz	36.688	0	36.7	39.7	42.7
16-QAM Modulation					
Low Channel, 1940 MHz	38.300	0	38.3	41.3	44.3
Mid Channel, 1960 MHz	38.356	0	38.4	41.4	44.4
High Channel, 1980 MHz	38.302	0	38.3	41.3	44.3
64-QAM Modulation					
Low Channel, 1940 MHz	36.730	0	36.7	39.7	42.7
Mid Channel, 1960 MHz	36.850	0	36.9	39.9	42.9
High Channel, 1980 MHz	36.668	0	36.7	39.7	42.7
256-QAM Modulation					
Low Channel, 1940 MHz	36.801	0	36.8	39.8	42.8
Mid Channel, 1960 MHz	36.860	0	36.9	39.9	42.9
High Channel, 1980 MHz	36.735	0	36.7	39.7	42.7

POWER SPECTRAL DENISTY AND EIRP CALCULATION

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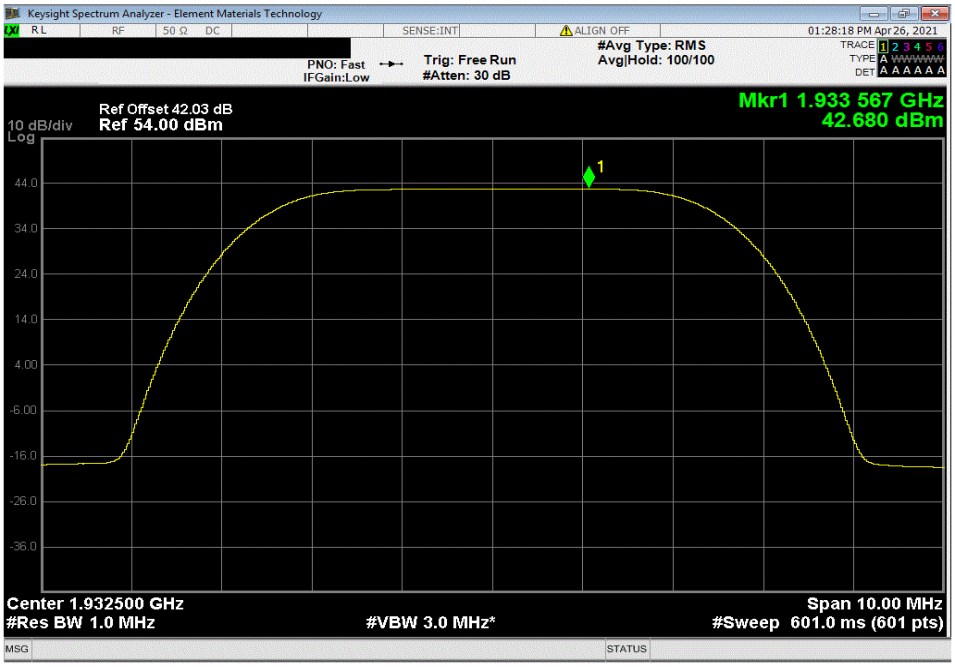
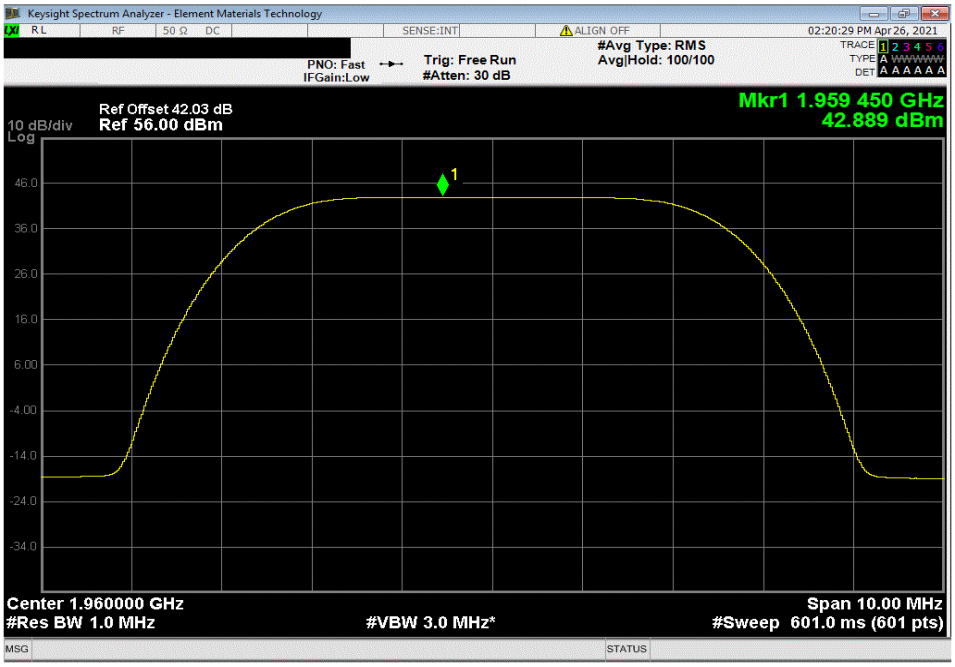
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Low Channel, 1932.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.68	0	42.68	45.68	48.68	

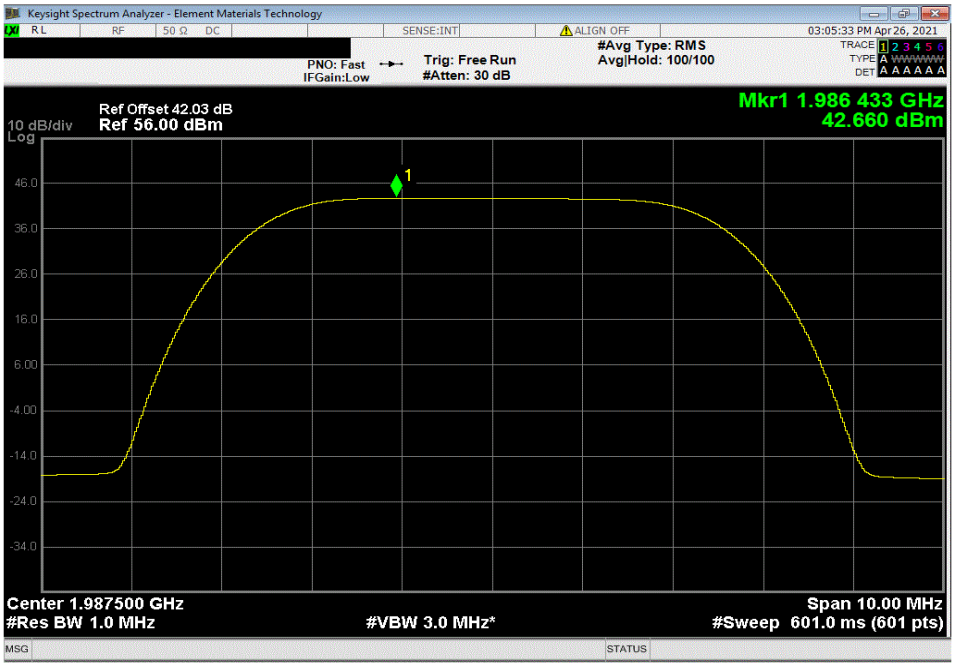


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.889	0	42.89	45.89	48.89	

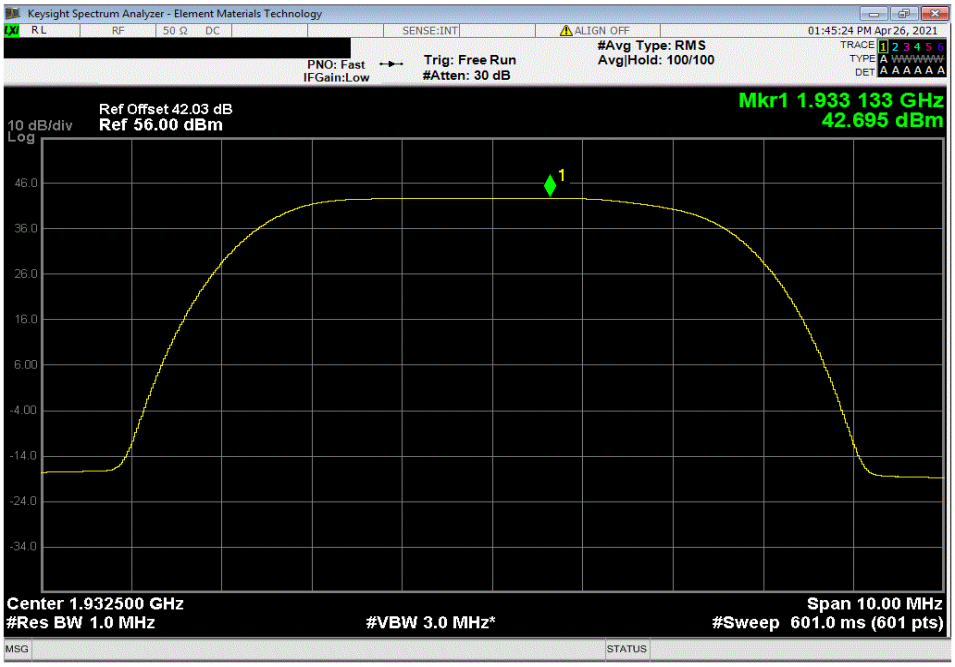


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, QPSK Modulation , High Channel, 1987.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.66	0	42.66	45.66	48.66	

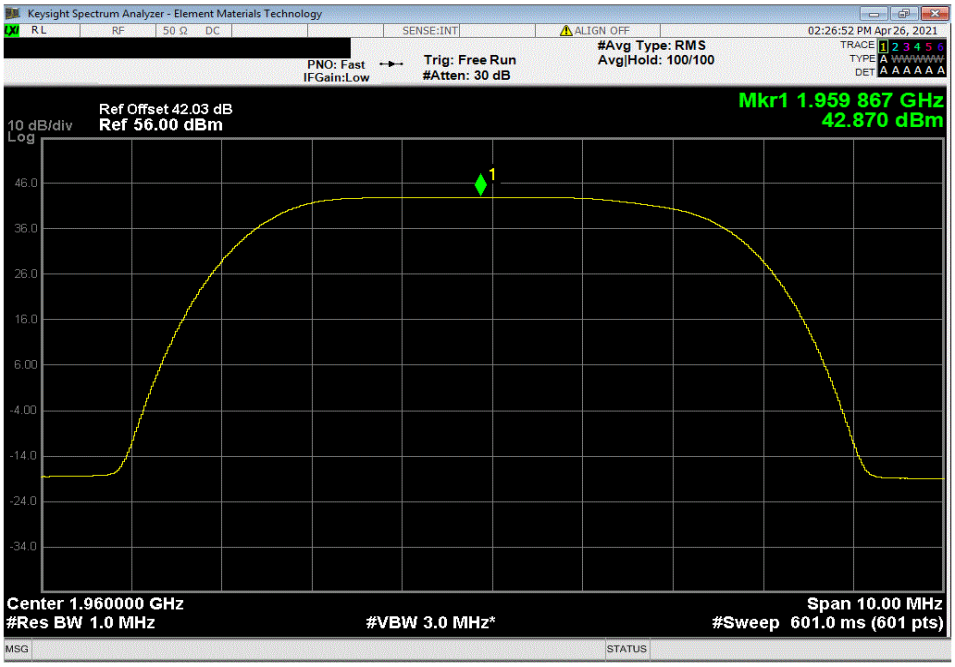


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1932.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.695	0	42.70	45.70	48.70	

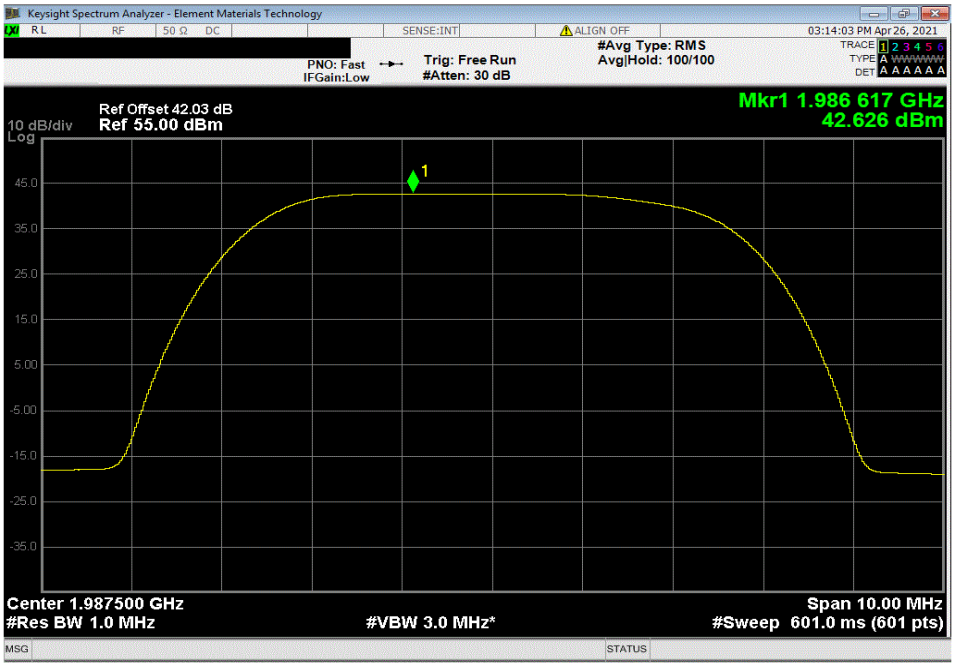


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.87	0	42.87	45.87	48.87	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 16-QAM Modulation, High Channel, 1987.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.626	0	42.63	45.63	48.63	



POWER SPECTRAL DENISTY AND EIRP CALCULATION

element

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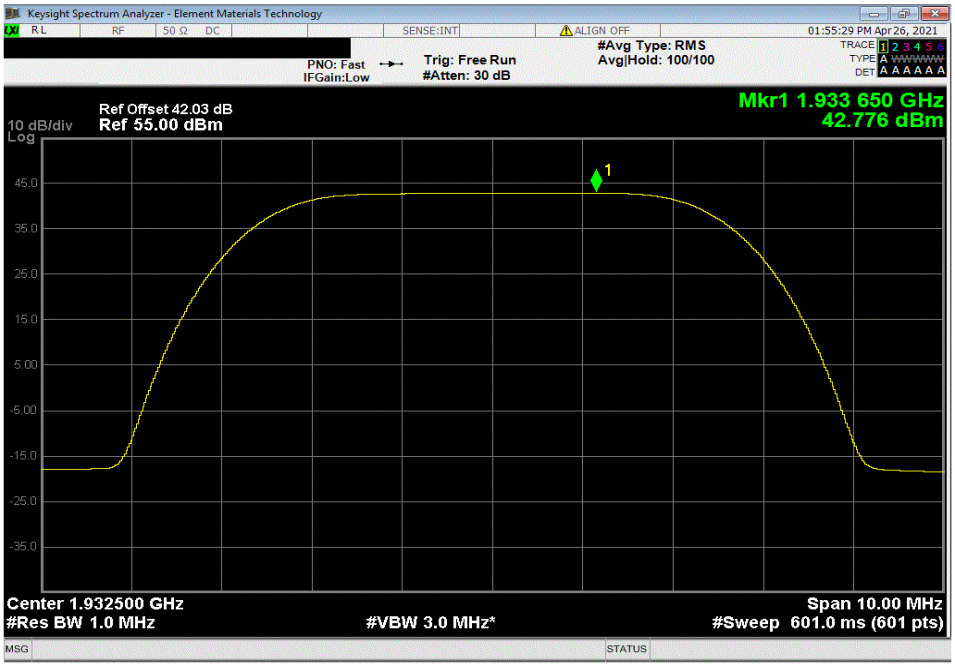
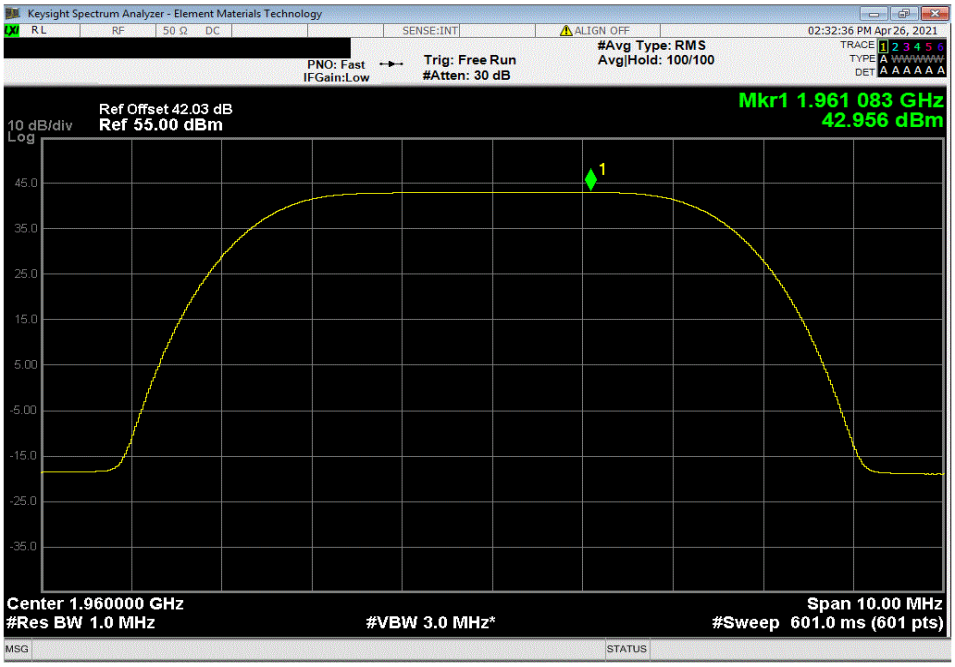
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1932.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.776	0	42.78	45.78	48.78	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.956	0	42.96	45.96	48.96	



POWER SPECTRAL DENISTY AND EIRP CALCULATION

element

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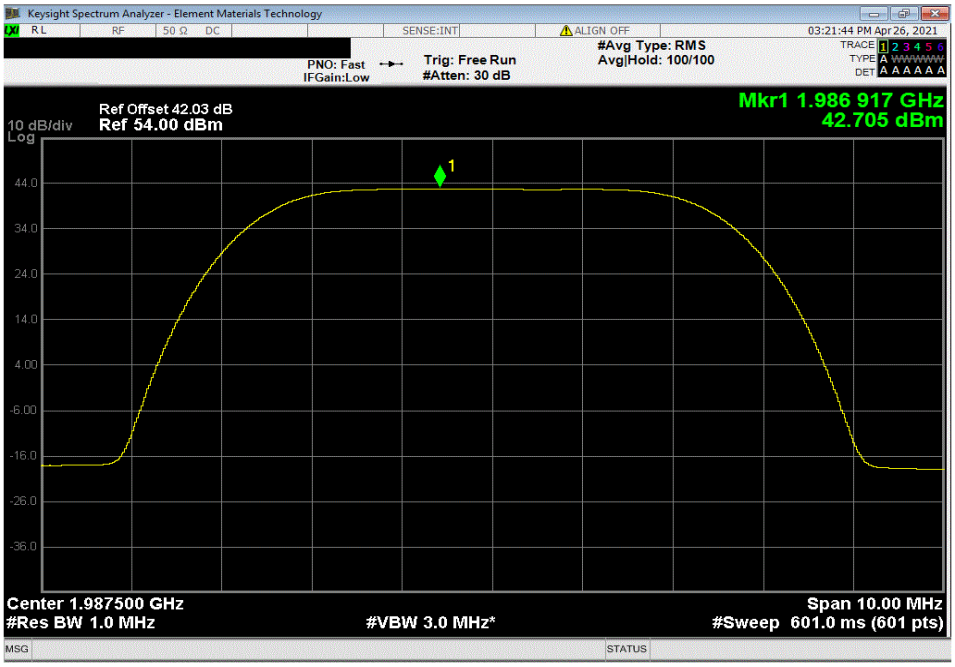
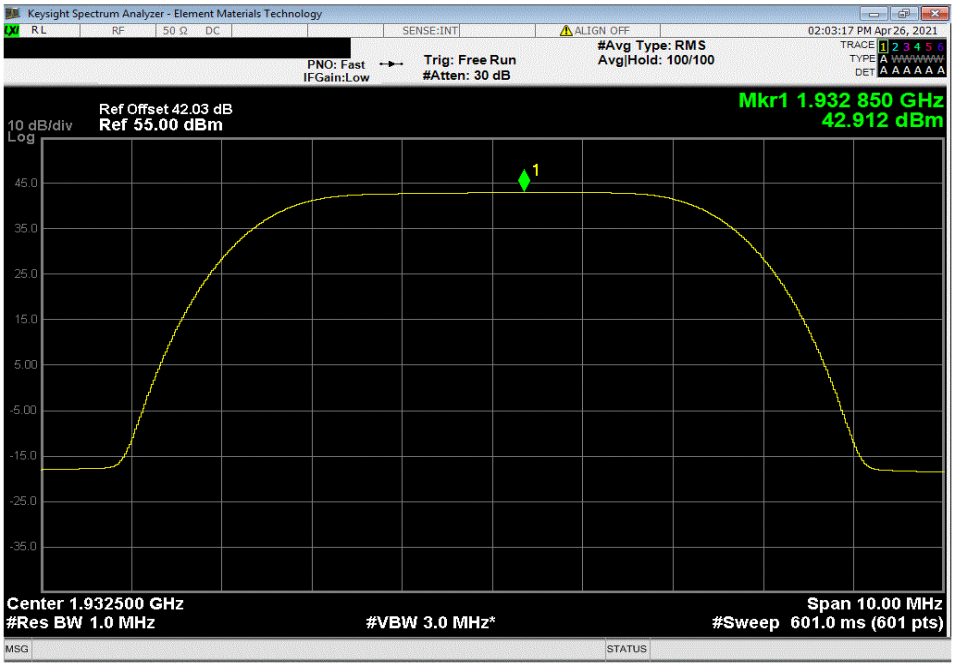
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 64-QAM Modulation, High Channel, 1987.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.705	0	42.71	45.71	48.71	

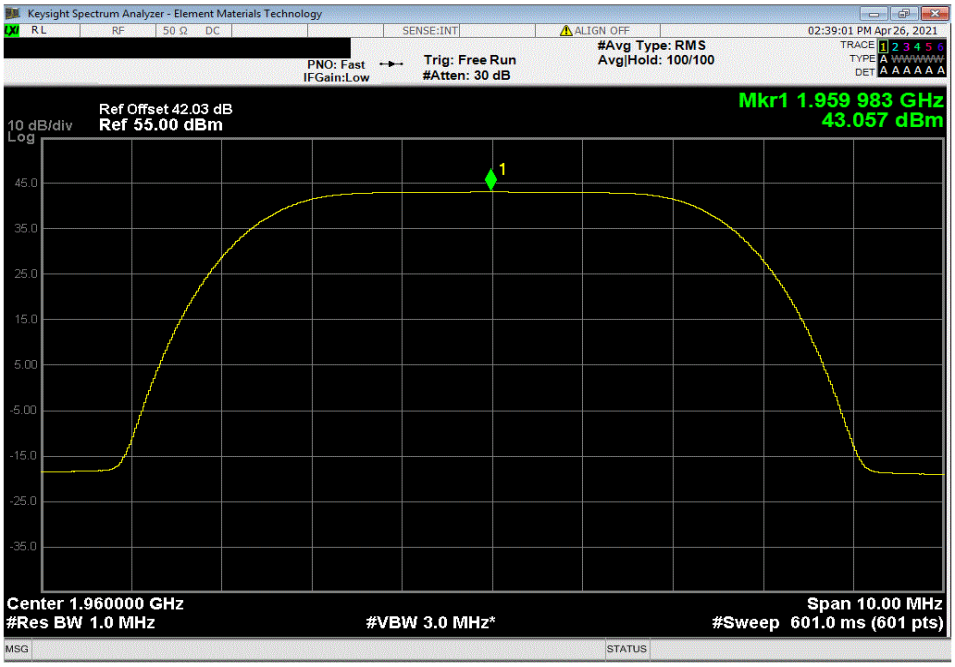


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1932.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.912	0	42.91	45.91	48.91	

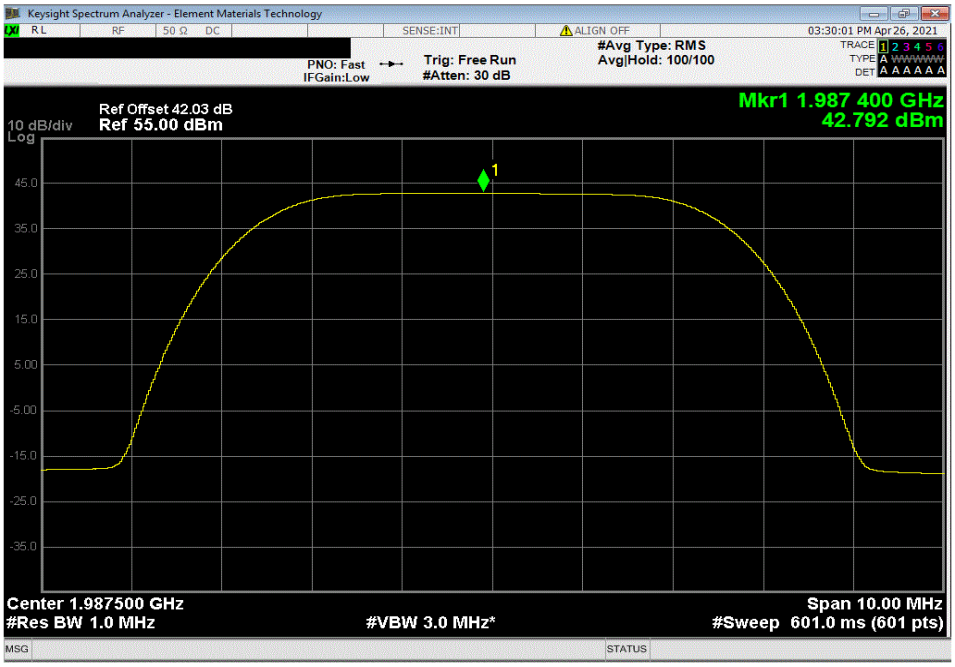


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	43.057	0	43.06	46.06	49.06	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 5 MHz Bandwdith, 256-QAM Modulation, High Channel, 1987.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	42.792	0	42.79	45.79	48.79	

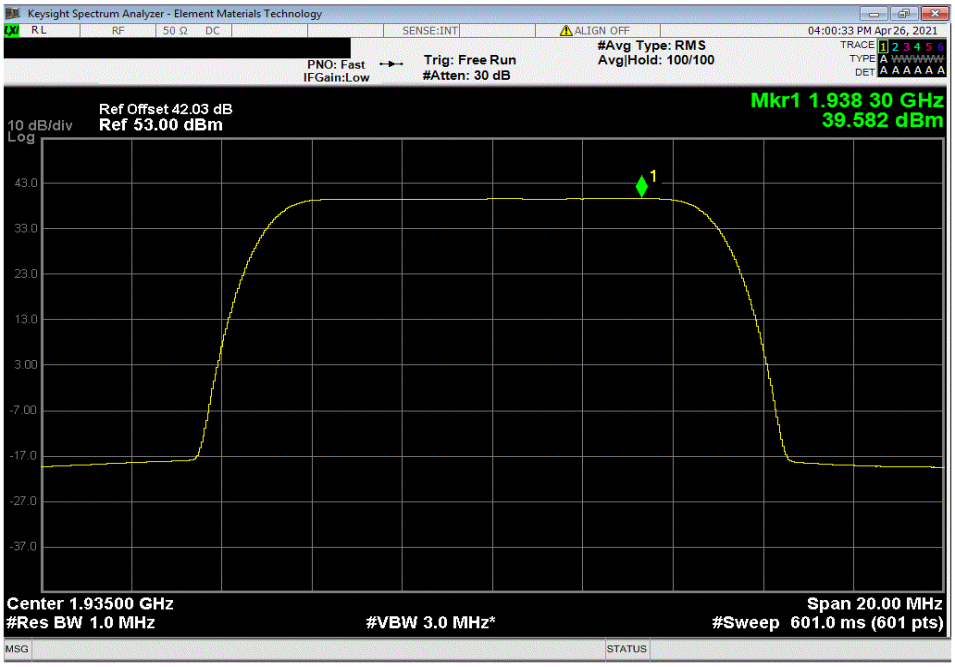


POWER SPECTRAL DENISTY AND EIRP CALCULATION

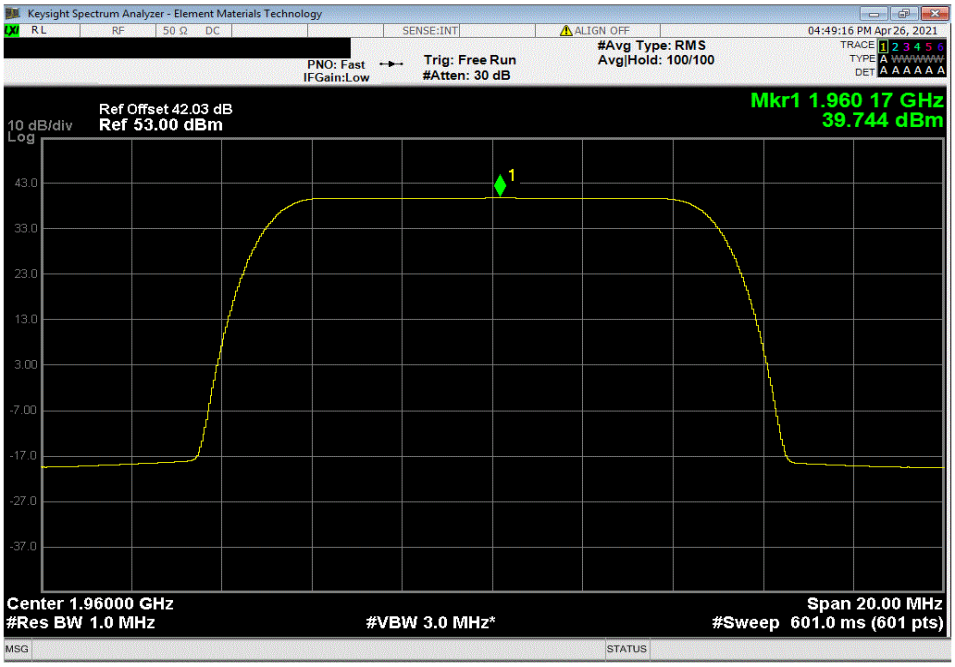
element

TbiTx 2019.08.30.0 XMit 2020.12.30.0

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, QPSK Modulation , Low Channel, 1935 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.582	0	39.58	42.58	45.58	

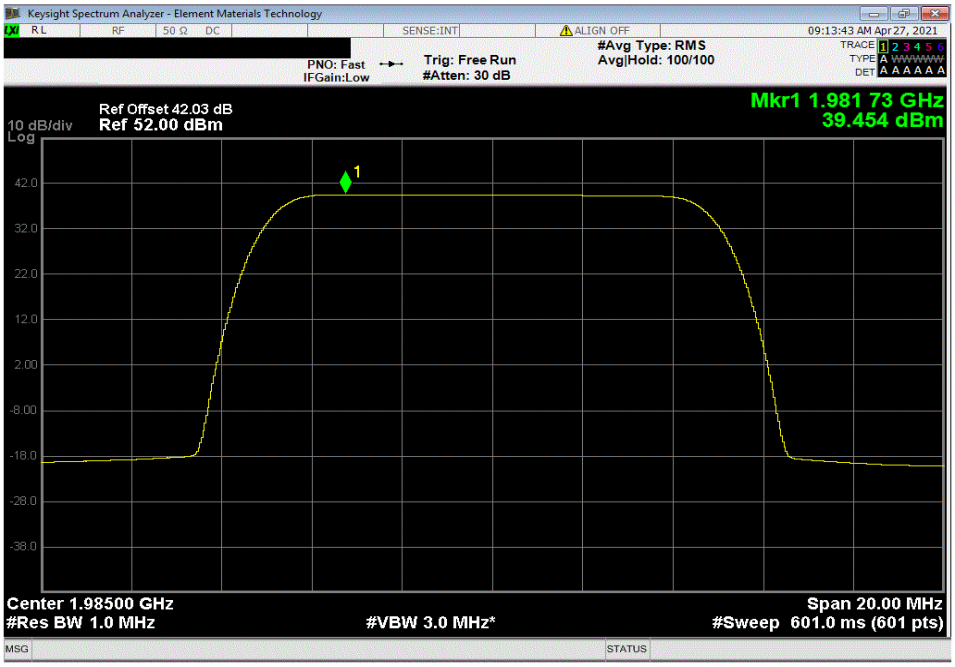


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.744	0	39.74	42.74	45.74	

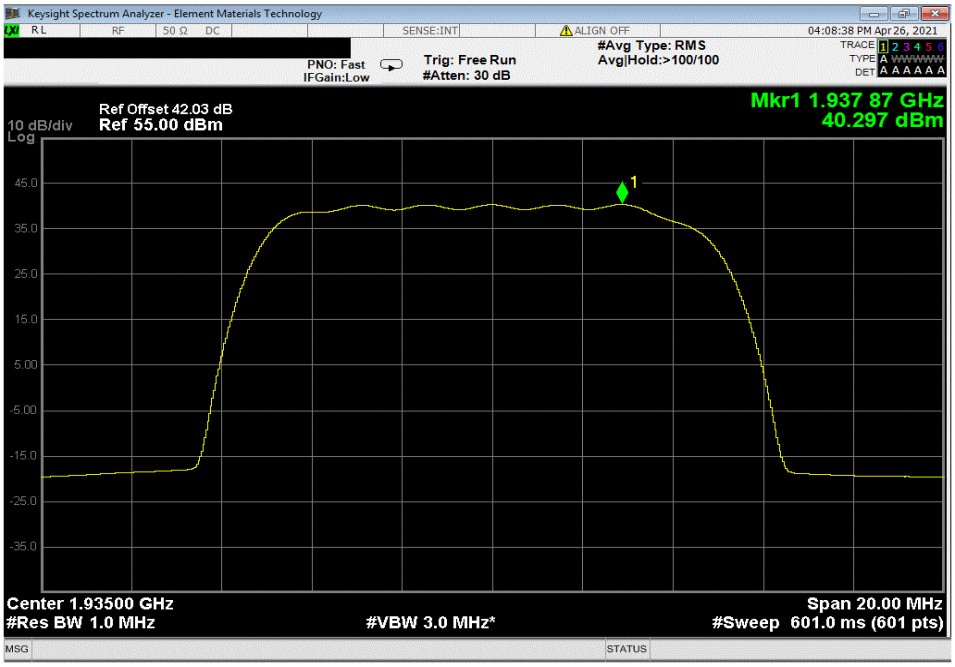


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, QPSK Modulation , High Channel, 1985 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.454	0	39.45	42.45	45.45	

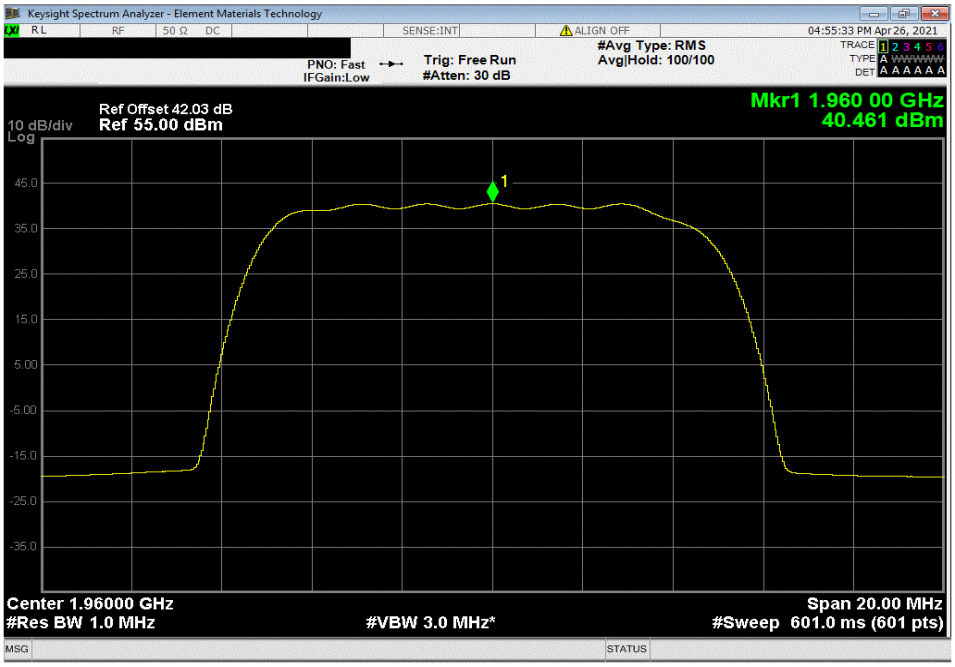


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1935 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	40.297	0	40.30	43.30	46.30	

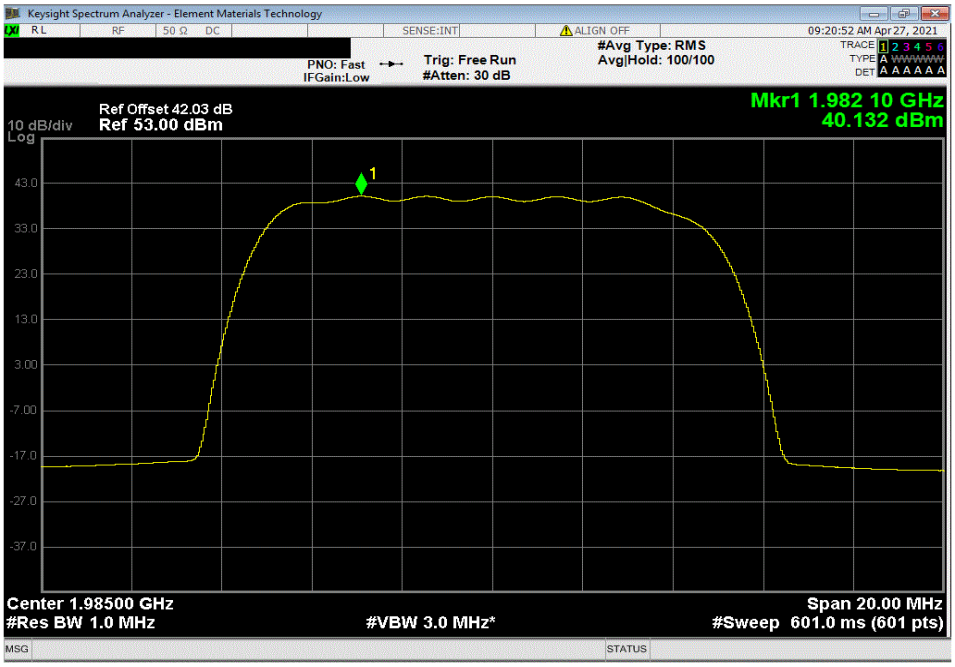


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	40.461	0	40.46	43.46	46.46	

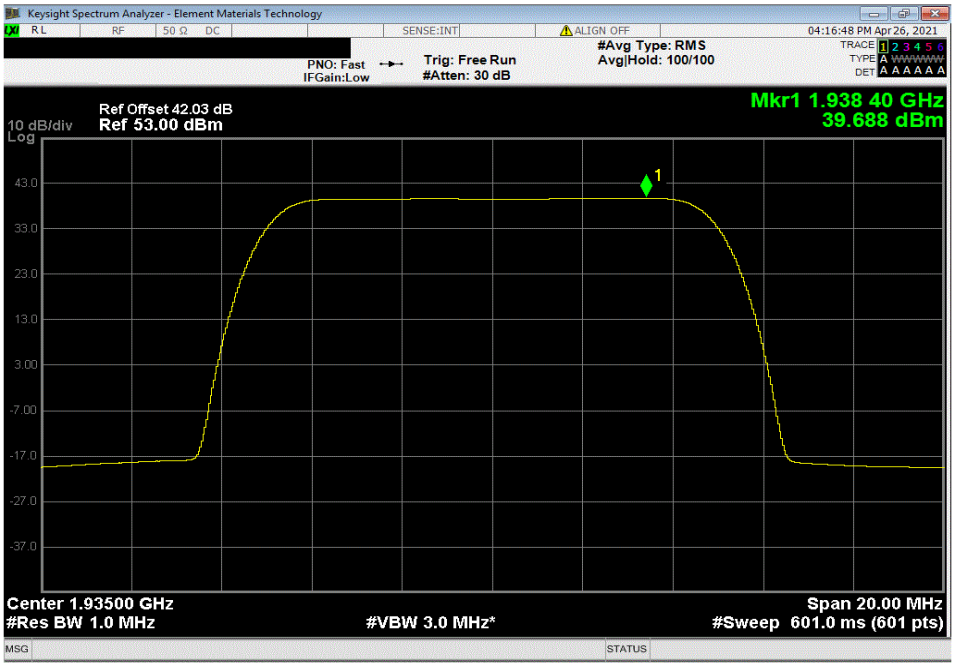


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 16-QAM Modulation, High Channel, 1985 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	40.132	0	40.13	43.13	46.13	

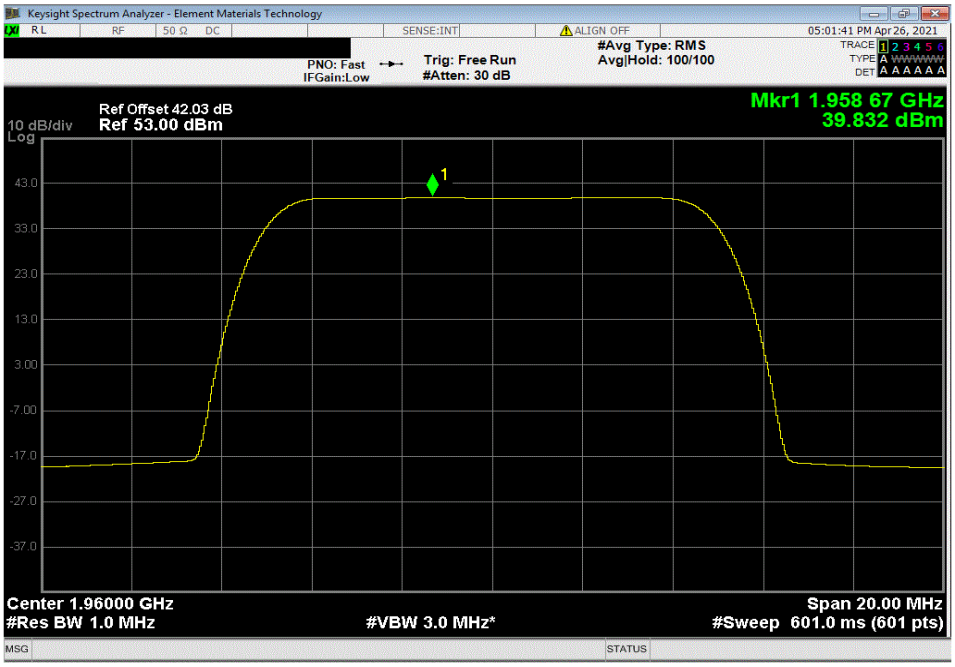


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1935 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.688	0	39.69	42.69	45.69	

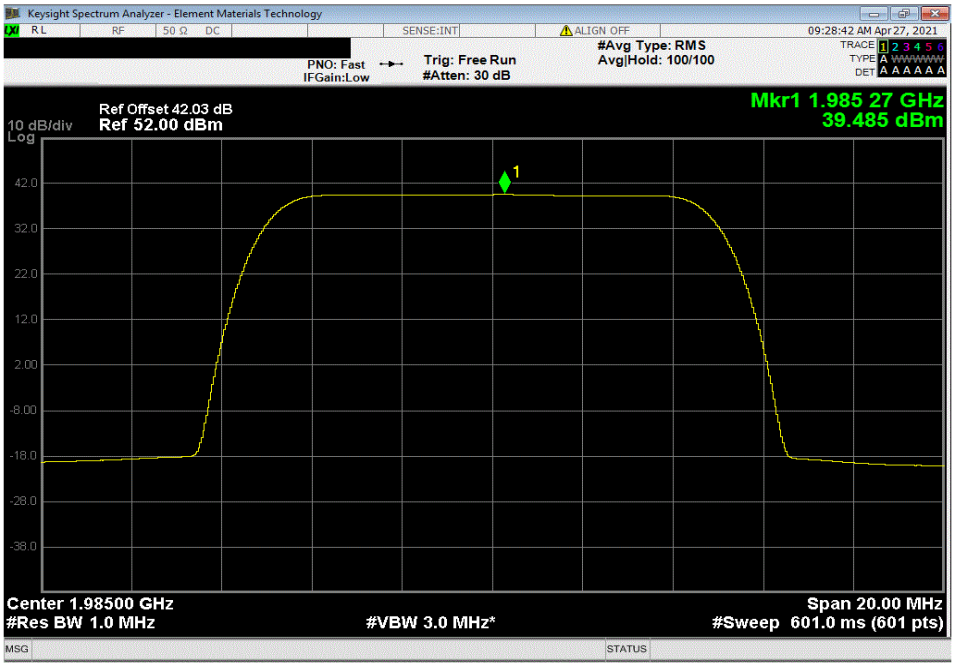


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.832	0	39.83	42.83	45.83	

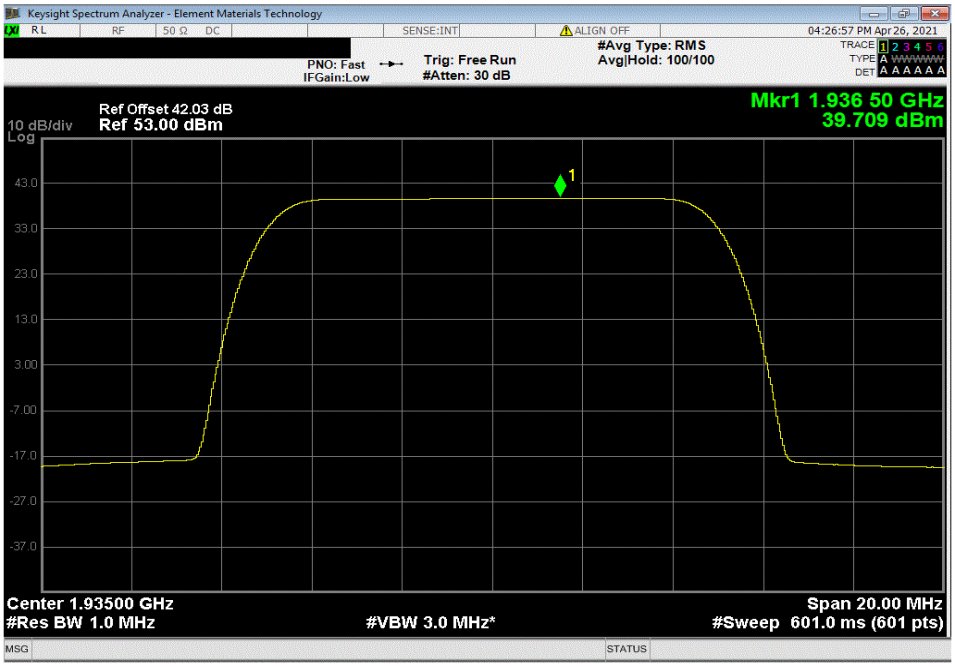


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 64-QAM Modulation, High Channel, 1985 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.485	0	39.49	42.49	45.49	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1935 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.709	0	39.71	42.71	45.71	



POWER SPECTRAL DENISTY AND EIRP CALCULATION

element

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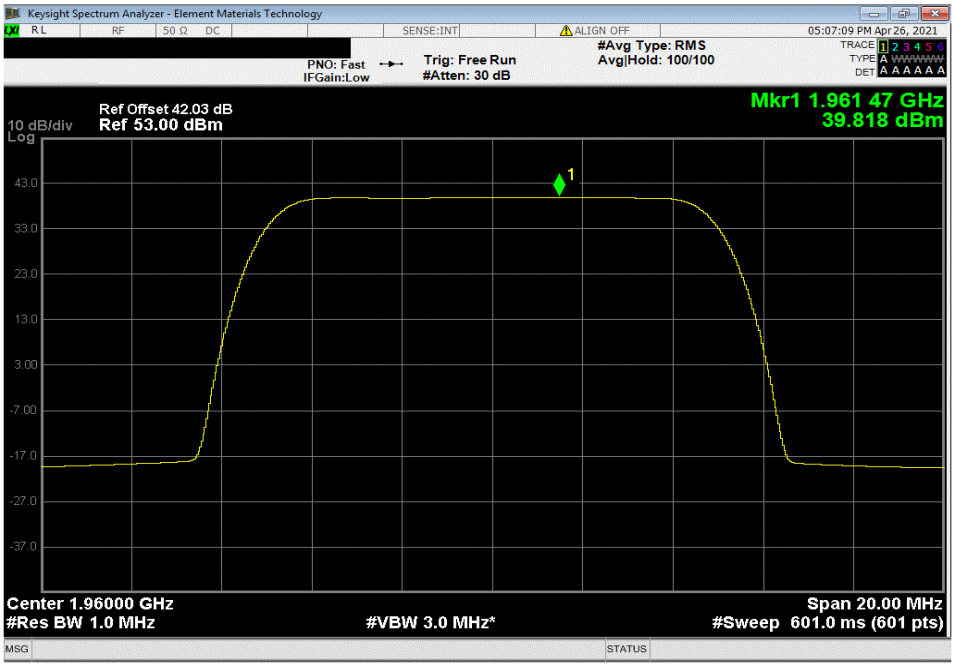
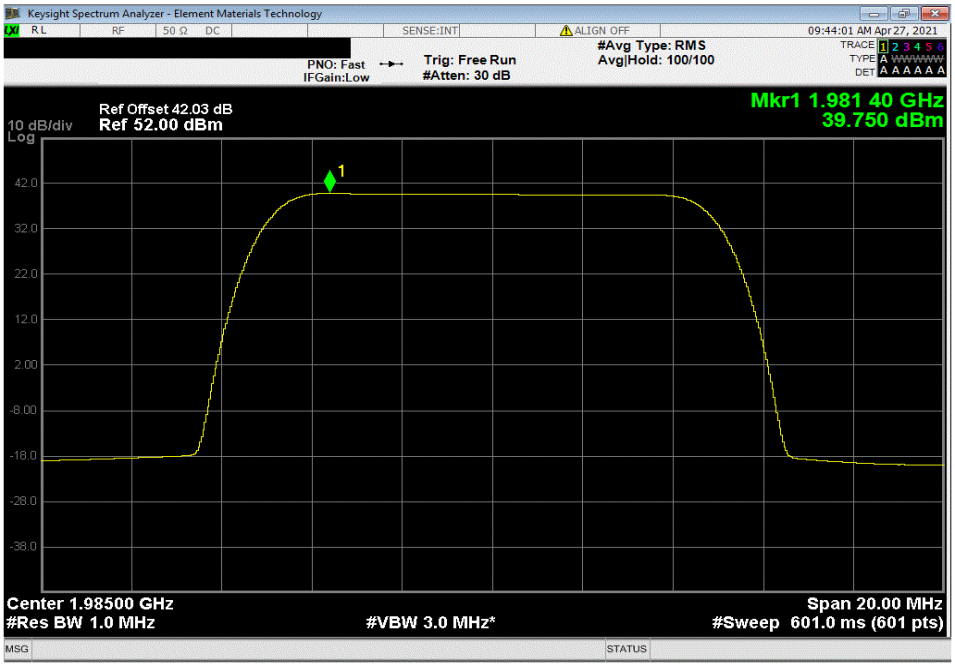
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.818	0	39.82	42.82	45.82	

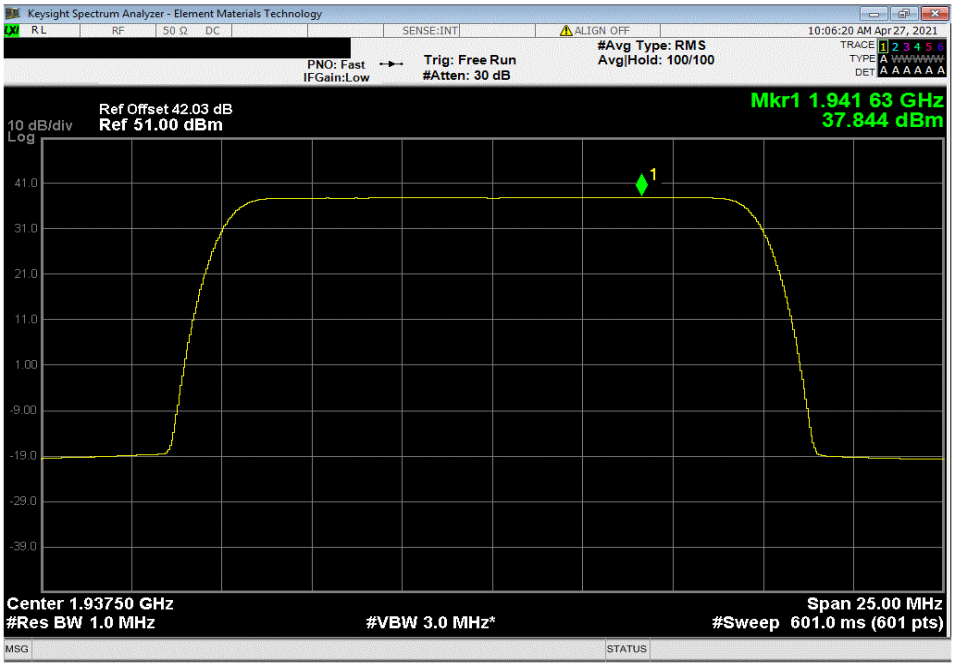


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 10 MHz Bandwdith, 256-QAM Modulation, High Channel, 1985 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.75	0	39.75	42.75	45.75	

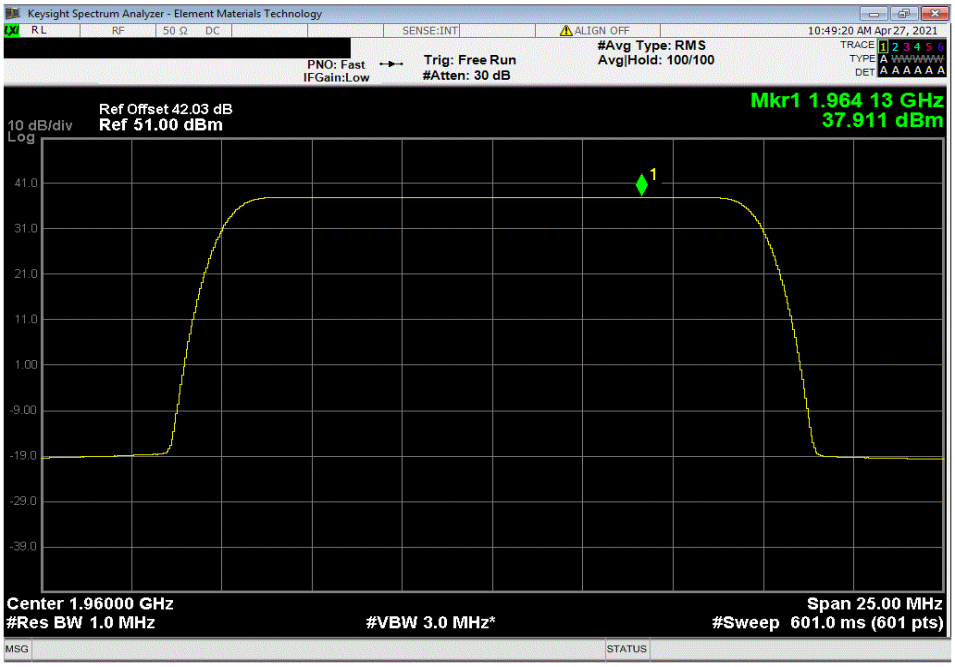


POWER SPECTRAL DENISTY AND EIRP CALCULATION

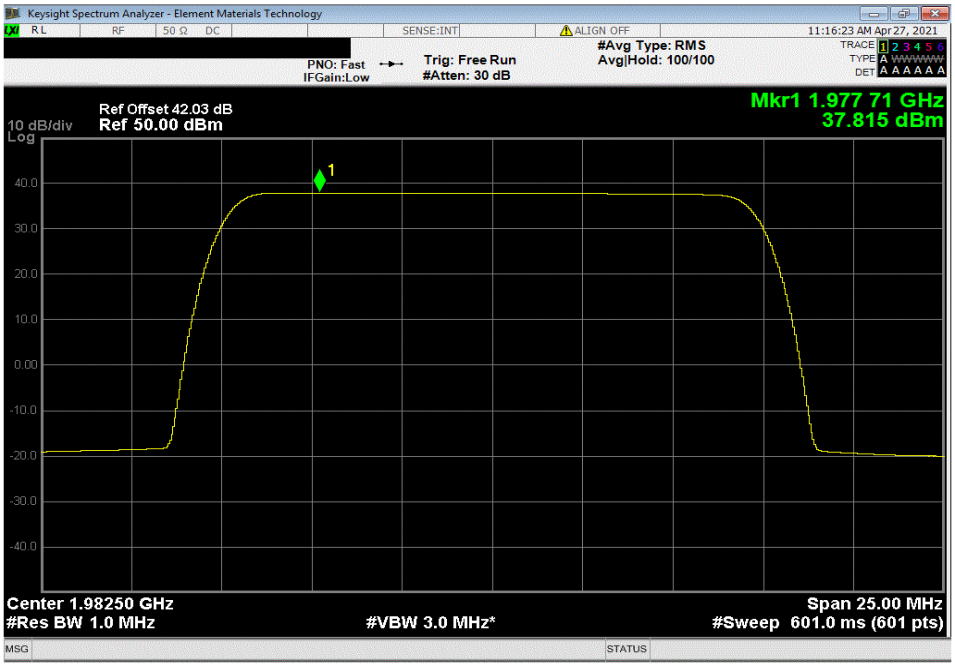
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, QPSK Modulation , Low Channel, 1937.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.844	0	37.84	40.84	43.84	



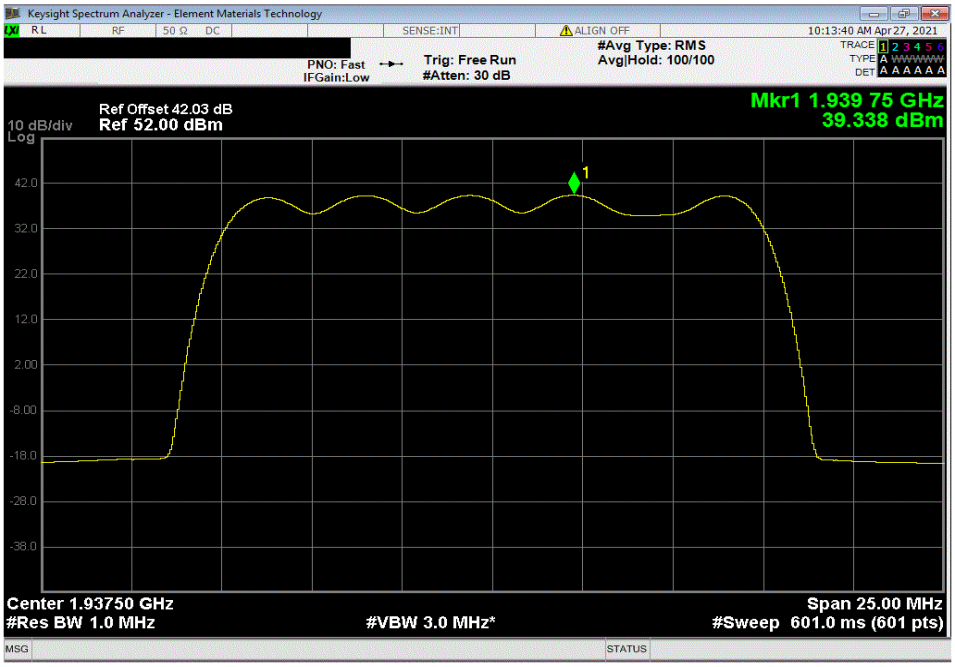
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.911	0	37.91	40.91	43.91	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, QPSK Modulation , High Channel, 1982.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.815	0	37.82	40.82	43.82	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1937.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.338	0	39.34	42.34	45.34	



POWER SPECTRAL DENISTY AND EIRP CALCULATION

element

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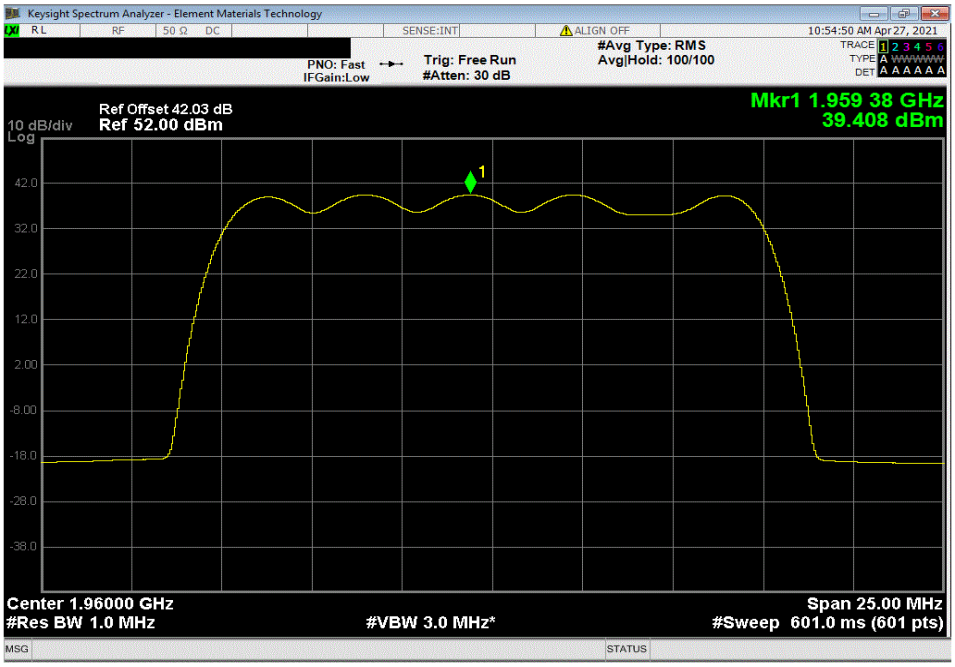
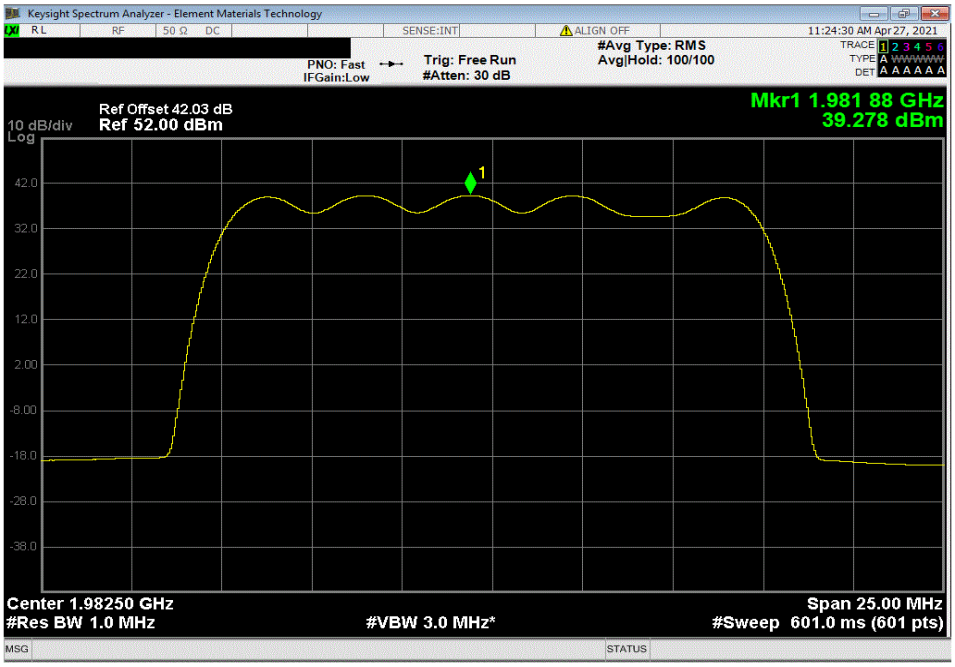
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.408	0	39.41	42.41	45.41	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 16-QAM Modulation, High Channel, 1982.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.278	0	39.28	42.28	45.28	



POWER SPECTRAL DENISTY AND EIRP CALCULATION

element

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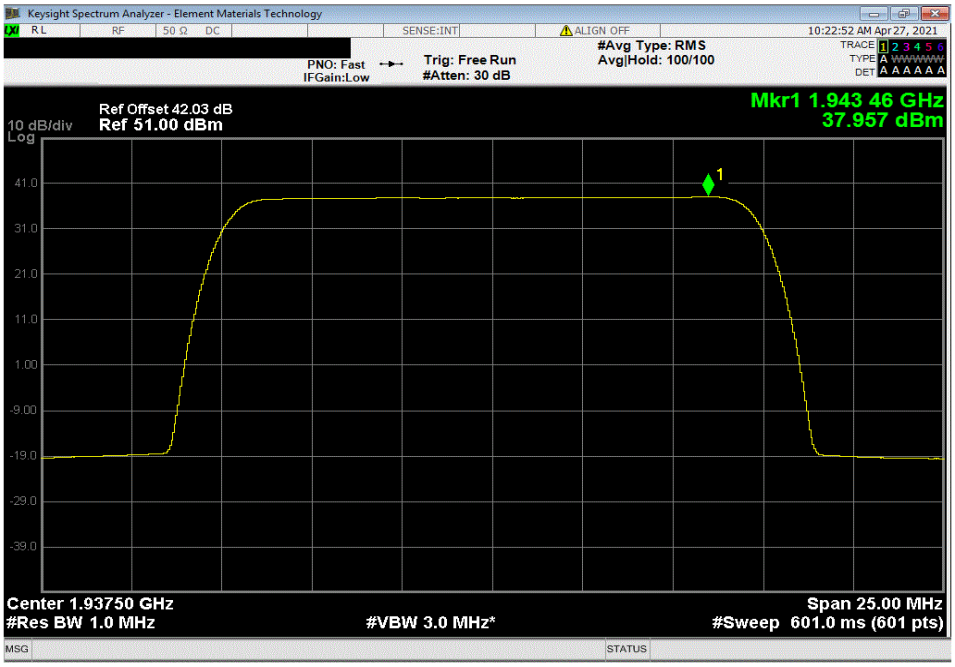
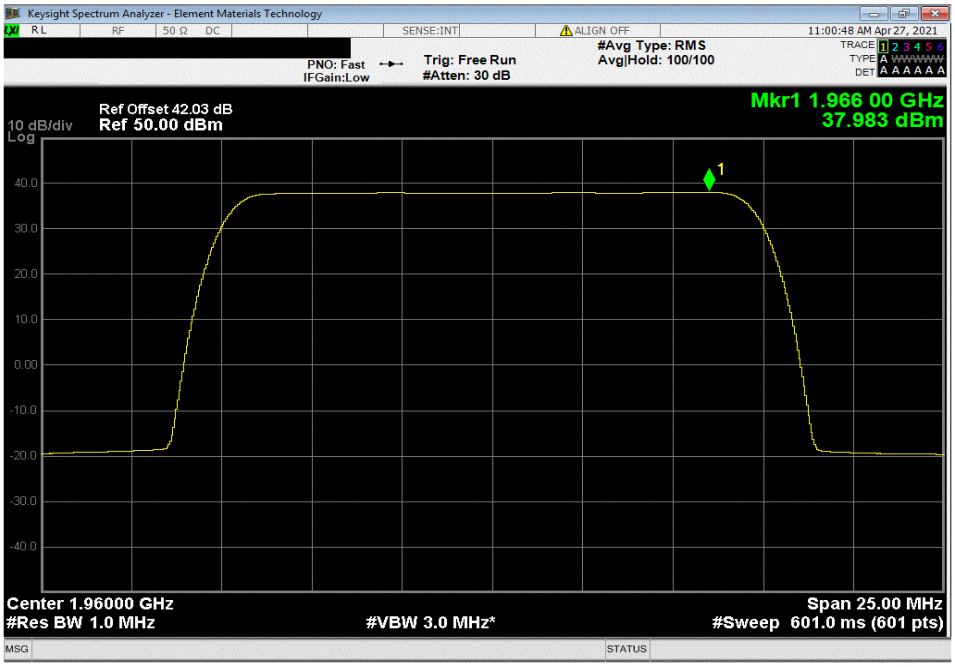
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1937.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.957	0	37.96	40.96	43.96	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.983	0	37.98	40.98	43.98	



POWER SPECTRAL DENISTY AND EIRP CALCULATION

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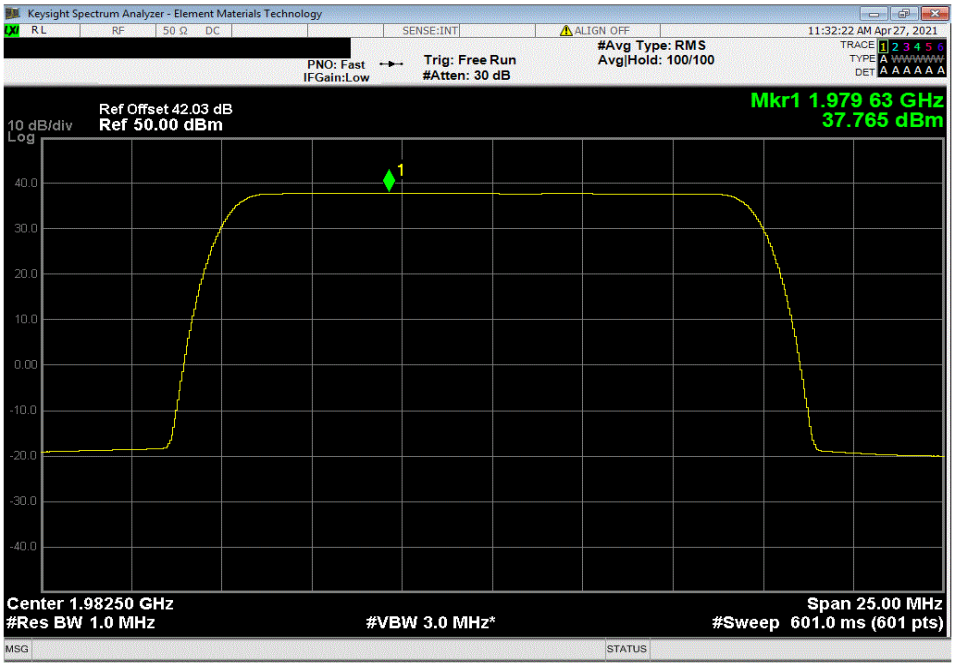
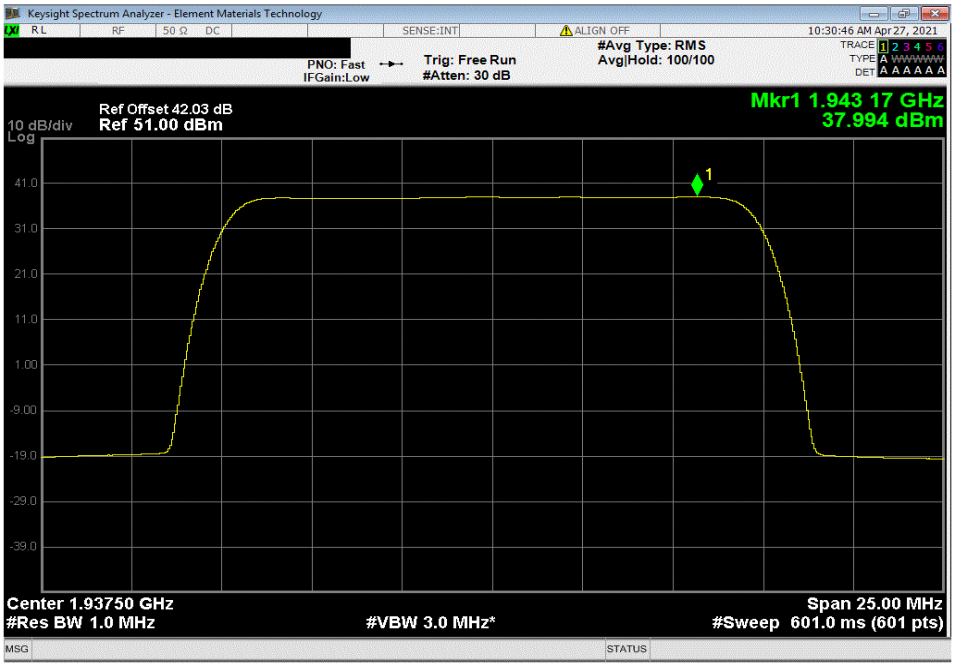
Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 64-QAM Modulation, High Channel, 1982.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.765	0	37.77	40.77	43.77	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1937.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.994	0	37.99	40.99	43.99	

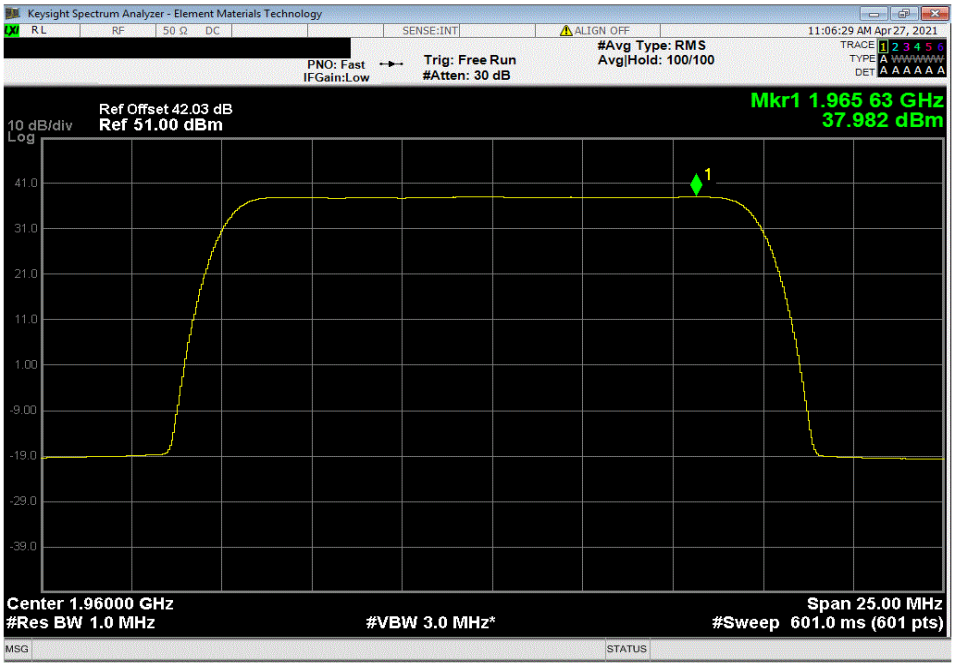


POWER SPECTRAL DENISTY AND EIRP CALCULATION

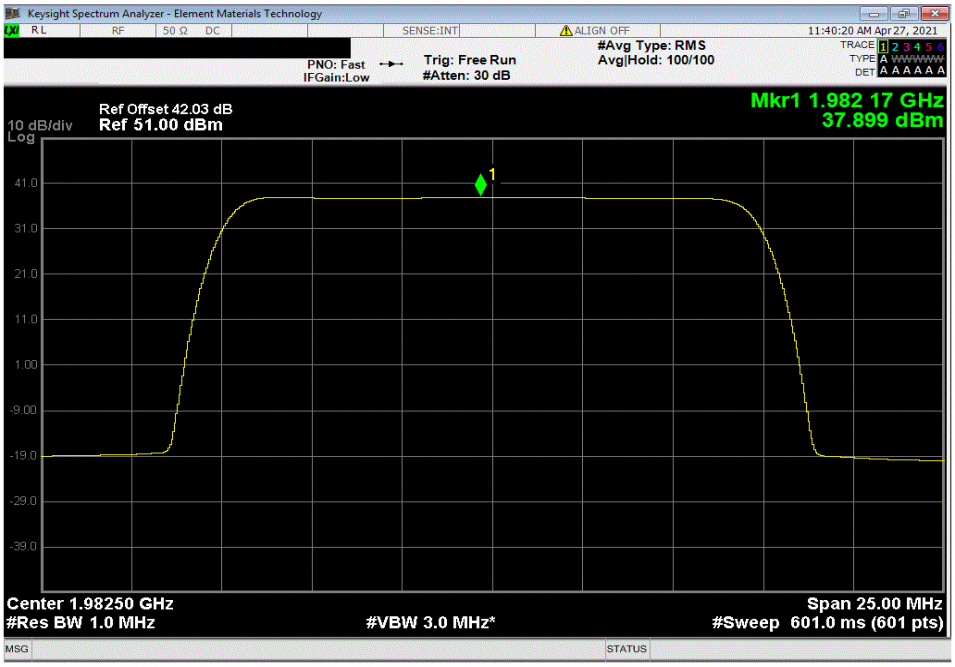
element

TbiTx 2019.08.30.0 XMit 2020.12.30.0

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.982	0	37.98	40.98	43.98	

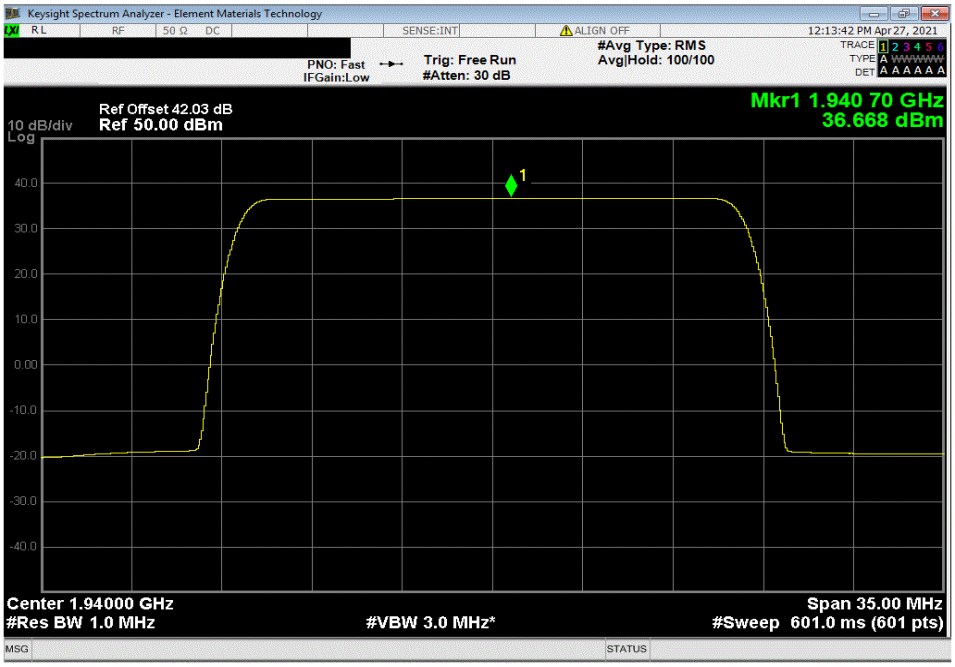


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 15 MHz Bandwdith, 256-QAM Modulation, High Channel, 1982.5 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.899	0	37.90	40.90	43.90	

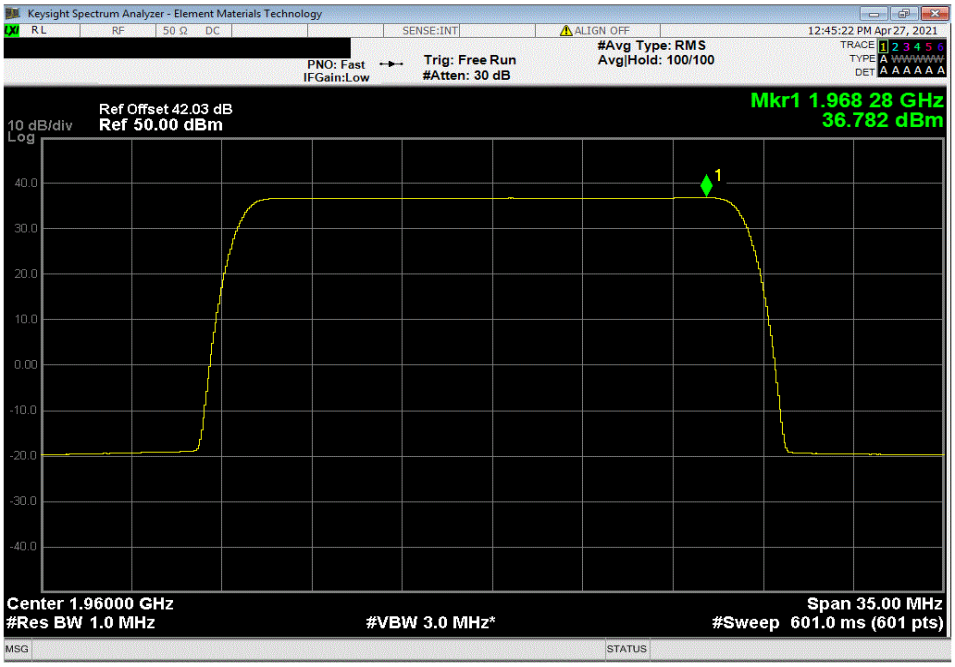


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, QPSK Modulation , Low Channel, 1940 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.668	0	36.67	39.67	42.67	

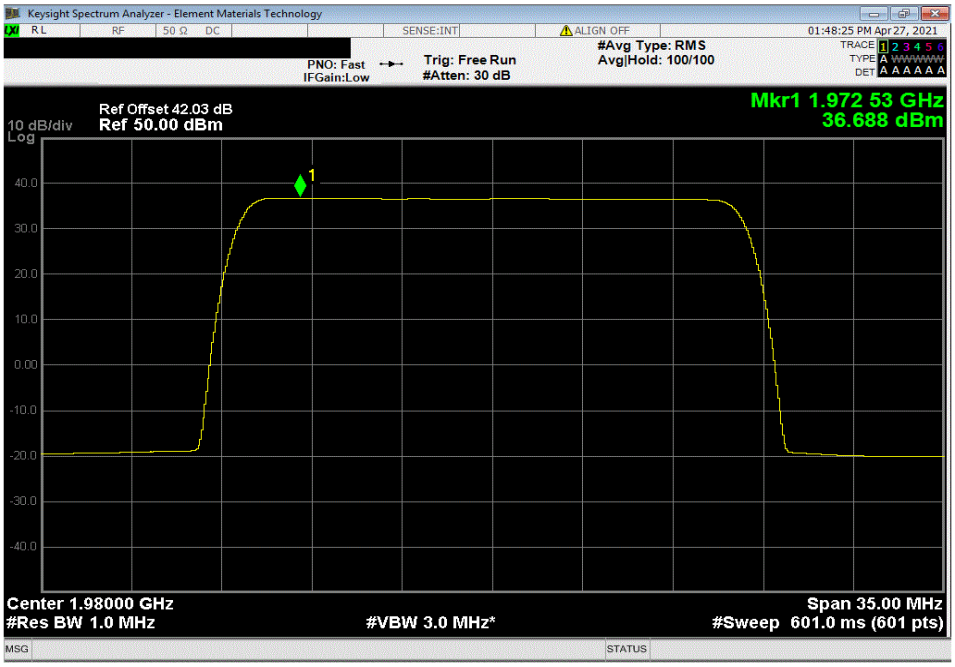


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, QPSK Modulation , Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.782	0	36.78	39.78	42.78	

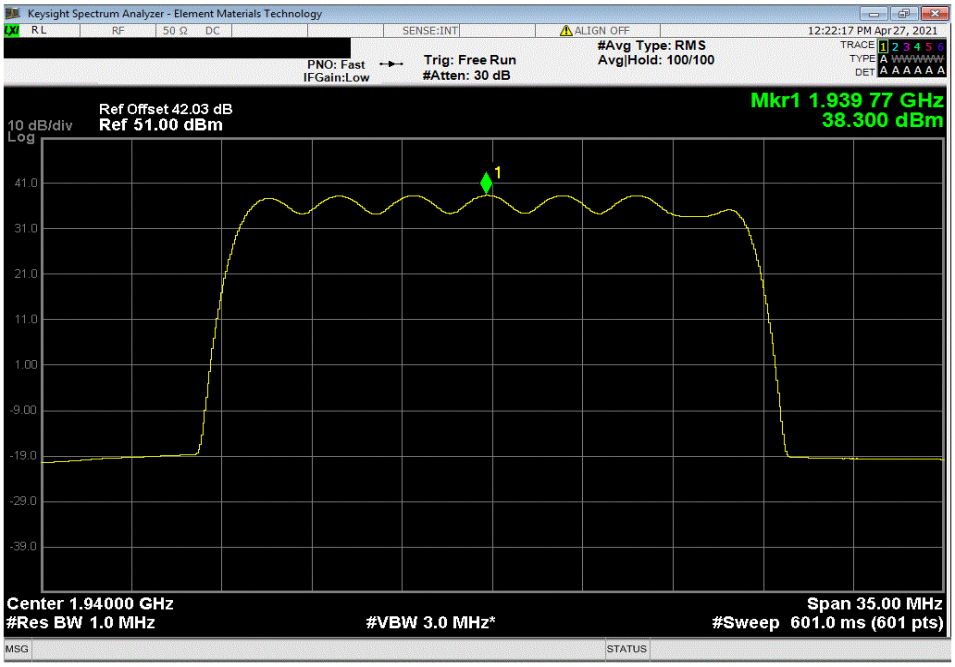


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, QPSK Modulation , High Channel, 1980 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.688	0	36.69	39.69	42.69	

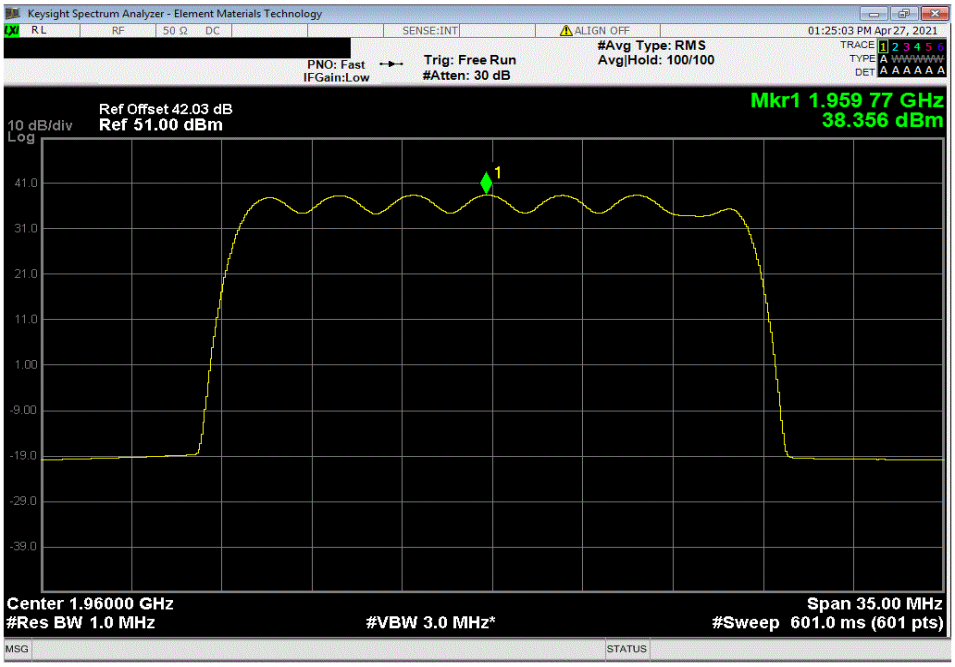


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 16-QAM Modulation, Low Channel, 1940 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	38.3	0	38.30	41.30	44.30	

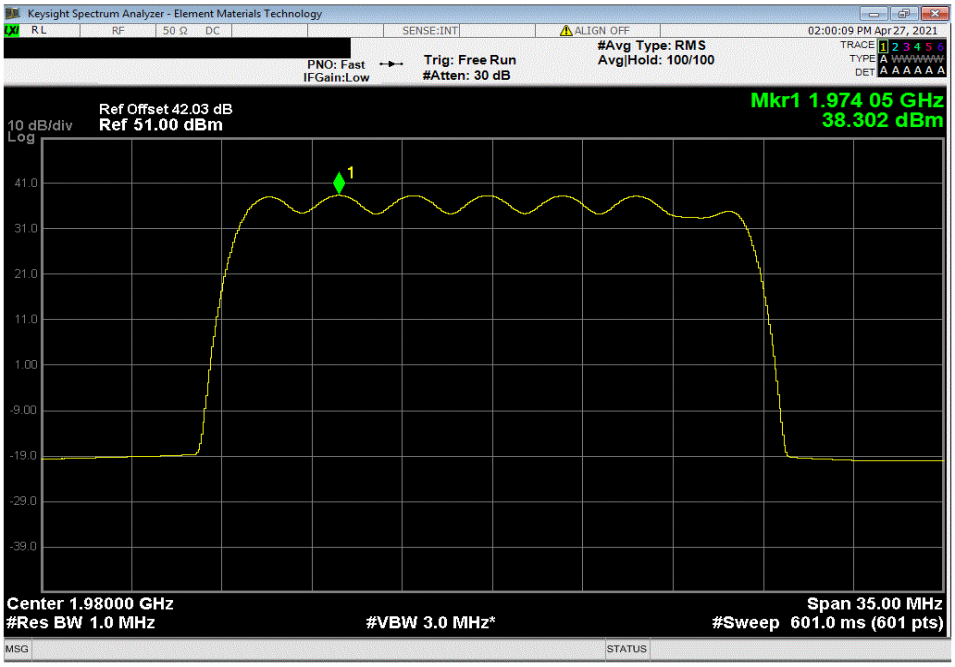


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 16-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	38.356	0	38.36	41.36	44.36	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 16-QAM Modulation, High Channel, 1980 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	38.302	0	38.30	41.30	44.30	

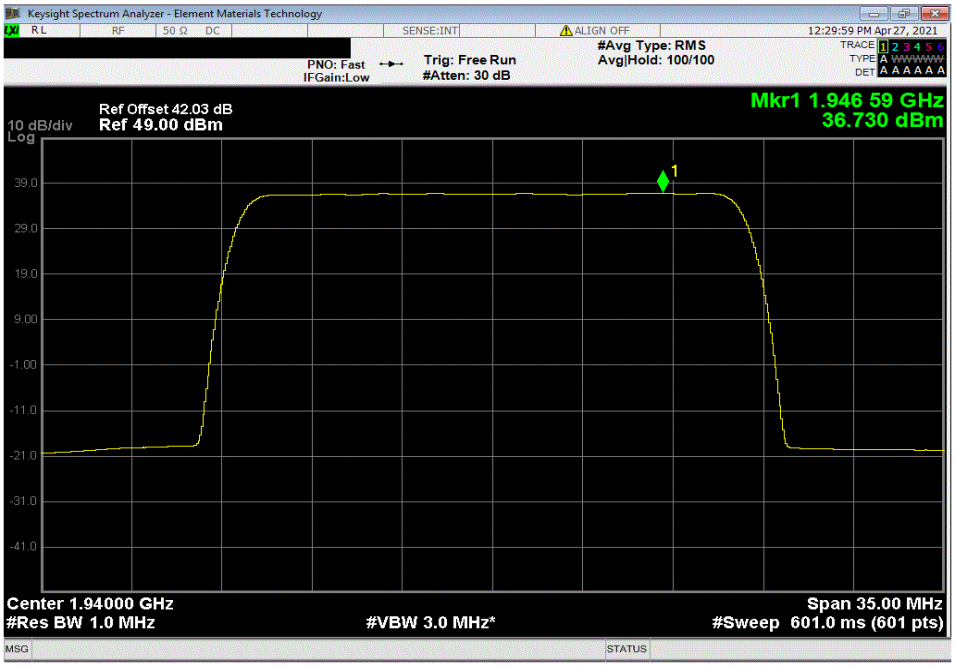


POWER SPECTRAL DENISTY AND EIRP CALCULATION

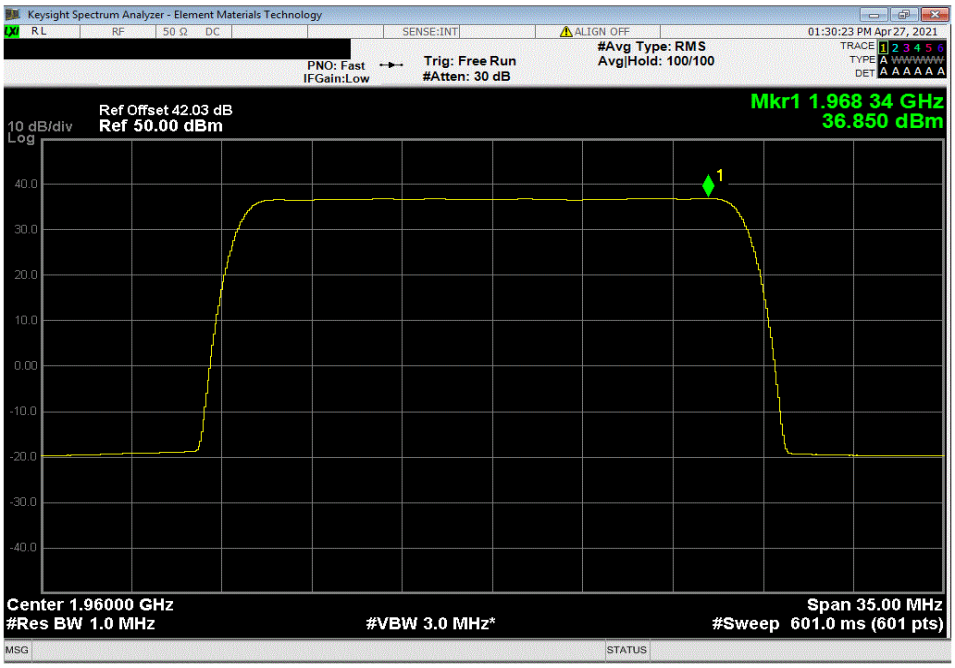
element

TbiTx 2019.08.30.0 XMit 2020.12.30.0

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 64-QAM Modulation, Low Channel, 1940 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.73	0	36.73	39.73	42.73	

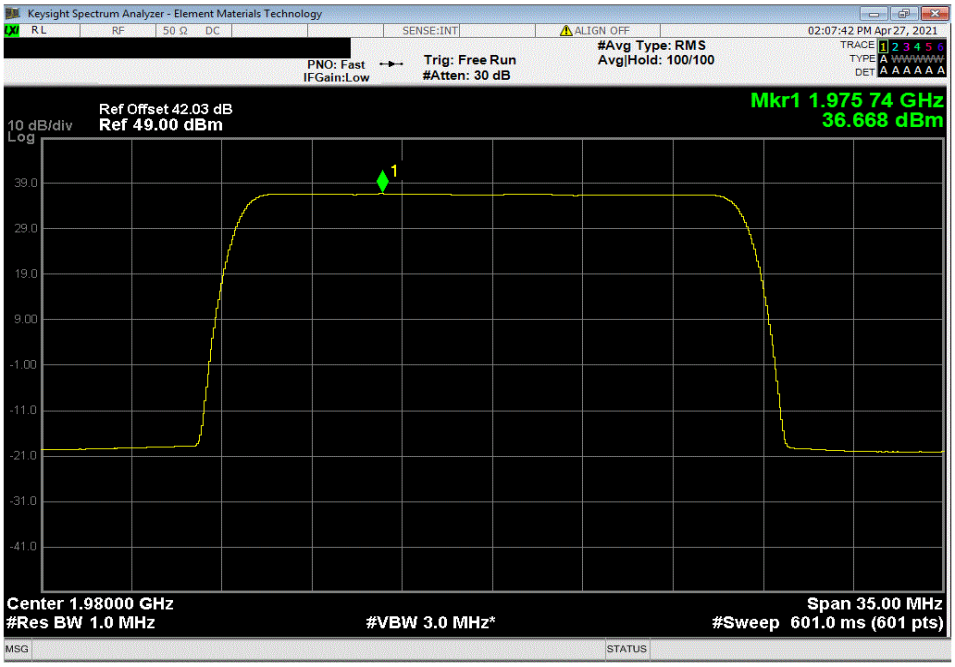


Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 64-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.85	0	36.85	39.85	42.85	

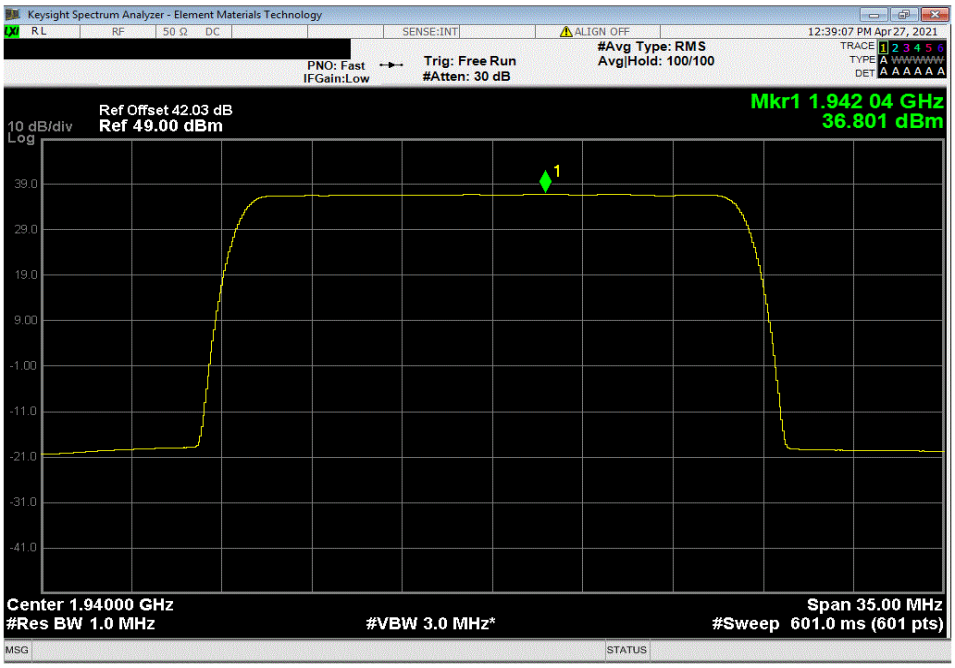


POWER SPECTRAL DENISTY AND EIRP CALCULATION

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 64-QAM Modulation, High Channel, 1980 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.668	0	36.67	39.67	42.67	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Low Channel, 1940 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.801	0	36.80	39.80	42.80	

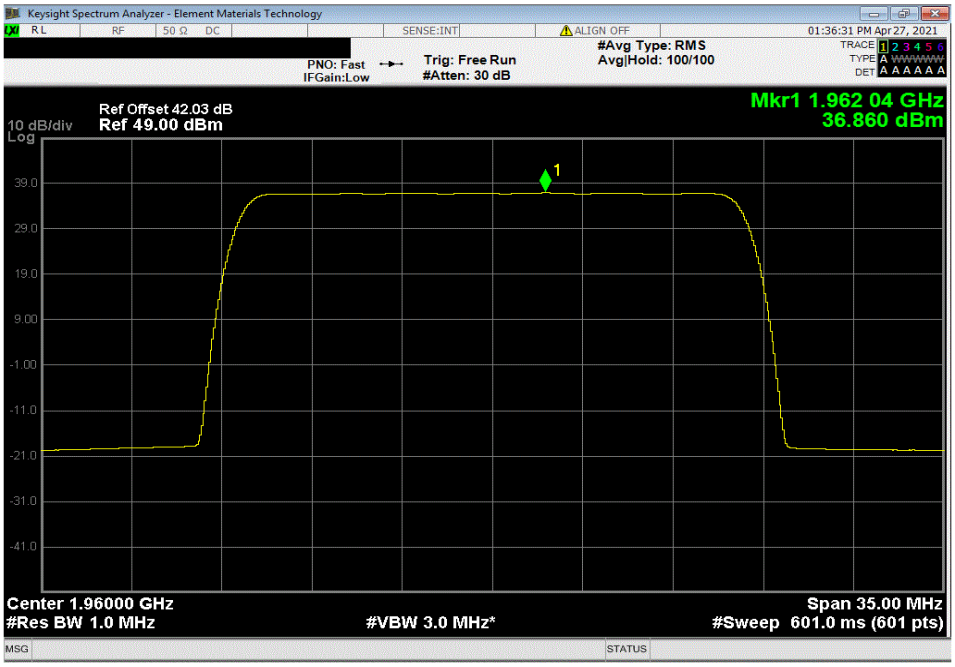


POWER SPECTRAL DENISTY AND EIRP CALCULATION

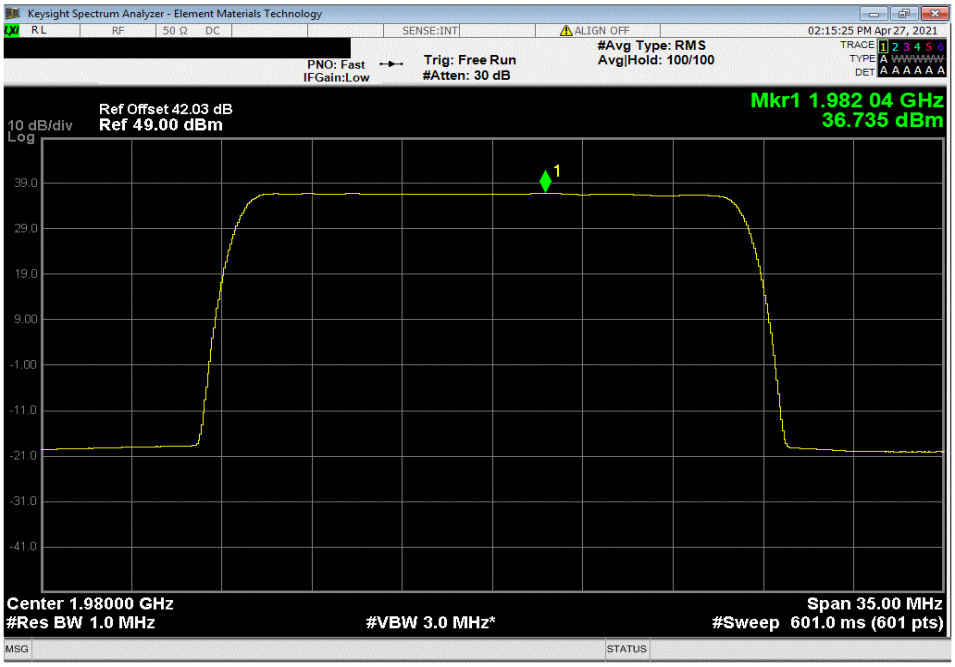
element

TbiTx 2019.08.30.0 XMit 2020.12.30.0

Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, Mid Channel, 1960 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.86	0	36.86	39.86	42.86	



Band n2, 1930 MHz - 1990 MHz, 5G NR, Port 3, 20 MHz Bandwdith, 256-QAM Modulation, High Channel, 1980 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	36.735	0	36.74	39.74	42.74	



EIRP Calculations for 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. Base station antennas are selected by the customer.

Kathrein antenna assembly model "80011867(Y2)" has a gain (dBi) of 17.3 ±0.3dB (maximum gain of 17.6dBi was used for the EIRP calculation) for Band n2 was used for this calculation. This antenna assembly has a pair of ±45° cross-polarized radiators used for Band n2. The four antenna RF inputs (used for Band n2) on the antenna assembly are as follows: Y1+ L5 (+45°), Y1- L6 (-45°), Y2+ R7 (+45°) and Y2- R8 (-45°). Four FXFC transmitter outputs are connected to the antenna assembly RF inputs.

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 gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent (will not be 0 dB) but for this worst case EIRP calculation 0 dB was used. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	5 MHz Ch BW	10 MHz Ch BW	15 MHz Ch BW	20 MHz Ch BW
Worst Case PSD/Antenna Port	43.1 dBm/MHz	40.5 dBm/MHz	39.4 dBm/MHz	38.4 dBm/MHz
Cable Loss (site dependent)	0 dB	0 dB	0 dB	0 dB
Maximum Antenna Gain (G_{Ant})	17.6 dBi	17.6 dBi	17.6 dBi	17.6 dBi
Directional Gain = G_{Ant} + 10Log (2) See Note 1	20.6 dBi	20.6 dBi	20.6 dBi	20.6 dBi
EIRP for Antenna Y1 +45° EIRP for Ant Y1 +45°= PSD/ant port - Cable Loss + Dir Gain	63.7 dBm/MHz	61.1 dBm/MHz	60 dBm/MHz	59 dBm/MHz
EIRP for Antenna Y1 -45°	63.7 dBm/MHz	61.1 dBm/MHz	60 dBm/MHz	59 dBm/MHz
EIRP subtotal for Y1 +45°and Y1 -45° See Note 2	63.7 dBm/MHz or 2340 Watts/MHz	61.1 dBm/MHz or 1288 Watts/MHz	60 dBm/MHz or 1000 Watts/MHz	59 dBm/MHz or 794 Watts/MHz
EIRP for Antenna Y2 +45°	63.7 dBm/MHz	61.1 dBm/MHz	60 dBm/MHz	59 dBm/MHz
EIRP for Antenna Y2 -45°	63.7 dBm/MHz	61.1 dBm/MHz	60 dBm/MHz	59 dBm/MHz
EIRP subtotal for Y2 +45°and Y2 -45° See Note 2	63.7 dBm/MHz or 2340 Watts/MHz	61.1 dBm/MHz or 1288 Watts/MHz	60 dBm/MHz or 1000 Watts/MHz	59 dBm/MHz or 794 Watts/MHz
EIRP Total = Y1 ±45°and Y2 ±45° See Note 3	4680 Watts/MHz or 66.7 dBm/MHz	2576 Watts/MHz or 64.1 dBm/MHz	2000 Watts/MHz or 63 dBm/MHz	1588 Watts/MHz or 62 dBm/MHz

Note 1: The directional gain was calculated for two antennas since there are a pair of cross-polarized radiators. See ANSI C63.26 sections 6.4.5.3.3a) & 6.4.5.3.1a), and KDB 662911D01v02r01 paragraphs F)2)c)(i) & F)2)a)(i) for guidance.
Note 2: The EIRP per antenna polarity 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).
Note 3: Antenna Y1 an Y2 are correlated - the EIRPs are required to be summed and be below the regulatory limit as described in ANSI C63.26-2015 section 6.4.6.3 b)3) and KDB 662911 D02v01 page 3 example (3).

Calculation Summary

The worst case FXFC four port MIMO EIRP levels using antenna assembly model "80011867(Y2)" are:

(1) Less than the FCC and ISED (3280 W/MHz or 65.16 dBm/MHz) EIRP Regulatory Limits for 10, 15 & 20MHz channel bandwidths
(2) Over the FCC/ISED (3280 W/MHz or 65.16 dBm/MHz) EIRP Regulatory Limits by 1.54 dB for the 5MHz channel bandwidth. EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements as noted above.
(3) Less than the FCC and ISED (1640 W/MHz or 62.15 dBm/MHz) EIRP Regulatory Limits for the 20MHz channel bandwidth
(4) Over the FCC/ISED (1640 W/MHz or 62.15 dBm/MHz) EIRP Regulatory Limits by 0.85 dB for the 15MHz channel bandwidth, by 1.95 dB for the 10MHz channel bandwidth, and by 4.55 dB for the 5MHz channel bandwidth. EIRP calculations are needed at each transmitter location to optimize base station operational performance while meeting regulatory requirements as noted above.

End of Test Report