

SPURIOUS CONDUCTED EMISSIONS - BAND n25



XMIT 2022.02.07.0

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	AFQ	2022-01-17	2023-01-17
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Block - DC	Fairview Microwave	SD3379	AMT	2022-09-09	2023-09-09

TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 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 22 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), RSS-133 6.5 (ii), 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. RF conducted emissions testing was performed on one port. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification report) and 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 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.

SPURIOUS CONDUCTED EMISSIONS - BAND n25



TbTx 2022.05.02.0 XMt 2022.02.07.0

EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0050	
Serial Number: K9181401111		Date: 18-Oct-22	
Customer: Nokia of America Corporation		Temperature: 21.9 °C	
Attendees: Mitchell Hill		Humidity: 29.3% RH	
Project: None		Barometric Pres.: 1029 mbar	
Tested by: Brandon Hobbs		Job Site: TX07	
Power: 54 VDC			
TEST SPECIFICATIONS		Test Method	
FCC 24E:2022		ANSI C63.26:2015	
RSS-133 Issue 6:2013+A1:2018		ANSI C63.26:2015	
COMMENTS			
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n25 carriers are enabled at maximum power (80 watts/carrier).			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	
		Frequency Range	Measured Freq (MHz)
		Max Value (dBm)	Limit (dBm)
			Result

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz

40 MHz

QPSK

Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	0.07	-60.2	-49	Pass
Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	0.15	-53.5	-39	Pass
Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	3242.73	-26.7	-19	Pass
Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	3989.25	-39.8	-19	Pass
Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	20004.7	-34.7	-19	Pass

16QAM

Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	0.07	-60.4	-49	Pass
Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	0.15	-53.7	-39	Pass
Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	3211.41	-26.3	-19	Pass
Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	4016.8	-39.7	-19	Pass
Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	21613.9	-34.7	-19	Pass

64QAM

Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	0.07	-60.3	-49	Pass
Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	0.15	-53.7	-39	Pass
Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	3223.16	-26.3	-19	Pass
Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	3989.25	-40.5	-19	Pass
Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	20003.8	-34.6	-19	Pass

256QAM

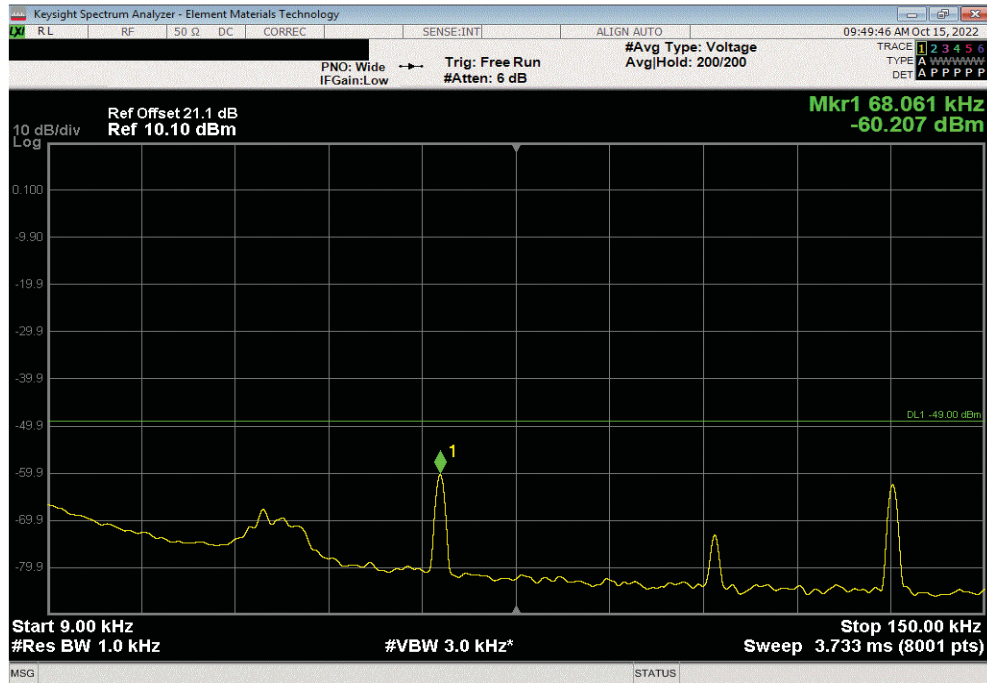
Mid Channel, 1962.5 MHz	9 kHz - 150 kHz	0.07	-60.3	-49	Pass
Mid Channel, 1962.5 MHz	150 kHz - 20 MHz	0.15	-53.7	-39	Pass
Mid Channel, 1962.5 MHz	20 MHz - 3.5 GHz	3235.77	-26.2	-19	Pass
Mid Channel, 1962.5 MHz	3.5 GHz - 13 GHz	3998.75	-39.5	-19	Pass
Mid Channel, 1962.5 MHz	13 GHz - 22 GHz	21579.7	-34.7	-19	Pass

SPURIOUS CONDUCTED EMISSIONS - BAND n25

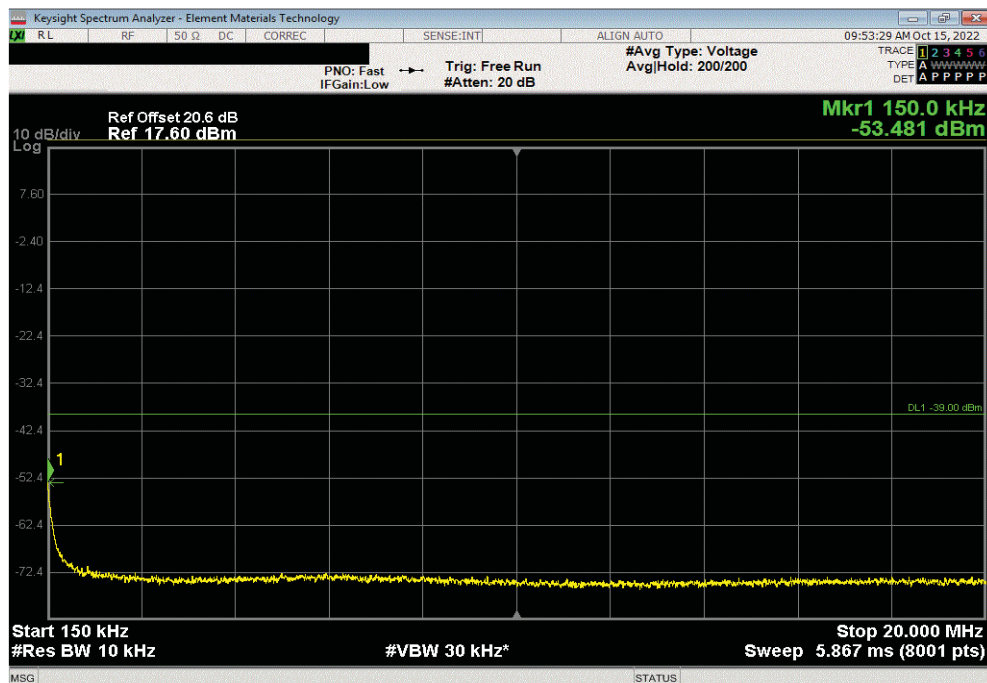


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, QPSK, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
9 kHz - 150 kHz	0.07	-60.21	-49	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, QPSK, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.48	-39	Pass	

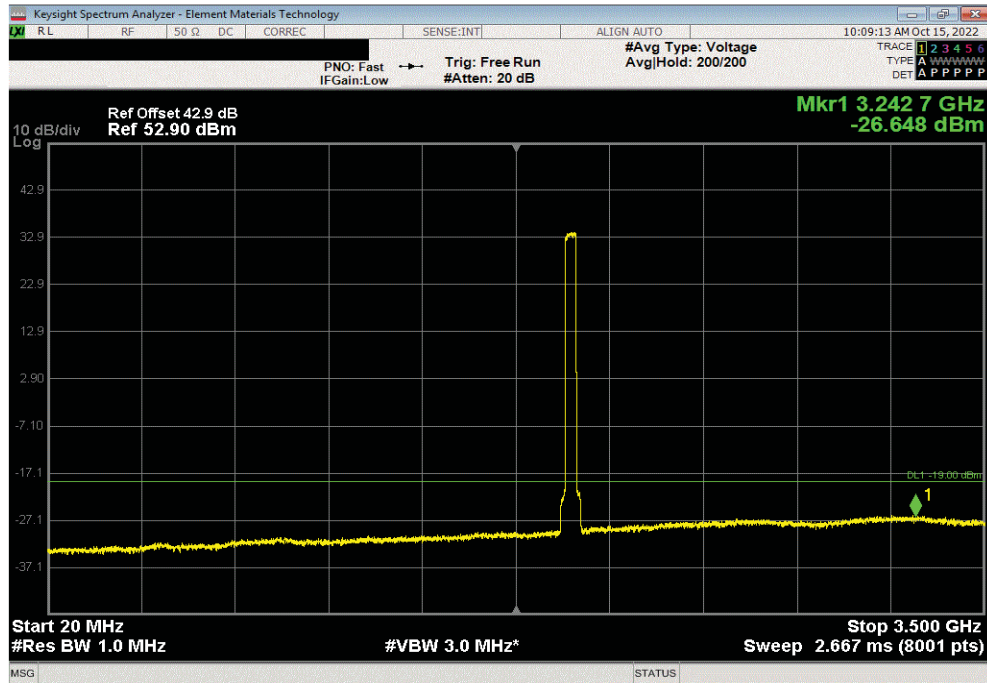


SPURIOUS CONDUCTED EMISSIONS - BAND n25

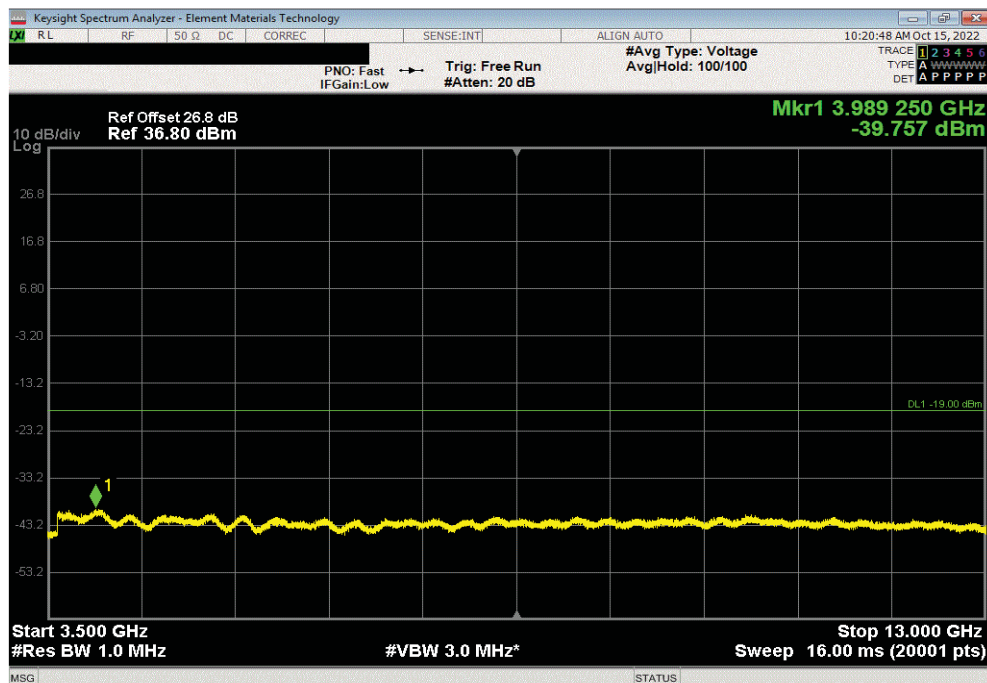


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, QPSK, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
20 MHz - 3.5 GHz	3242.73	-26.65	-19	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, QPSK, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
3.5 GHz - 13 GHz	3989.25	-39.76	-19	Pass	

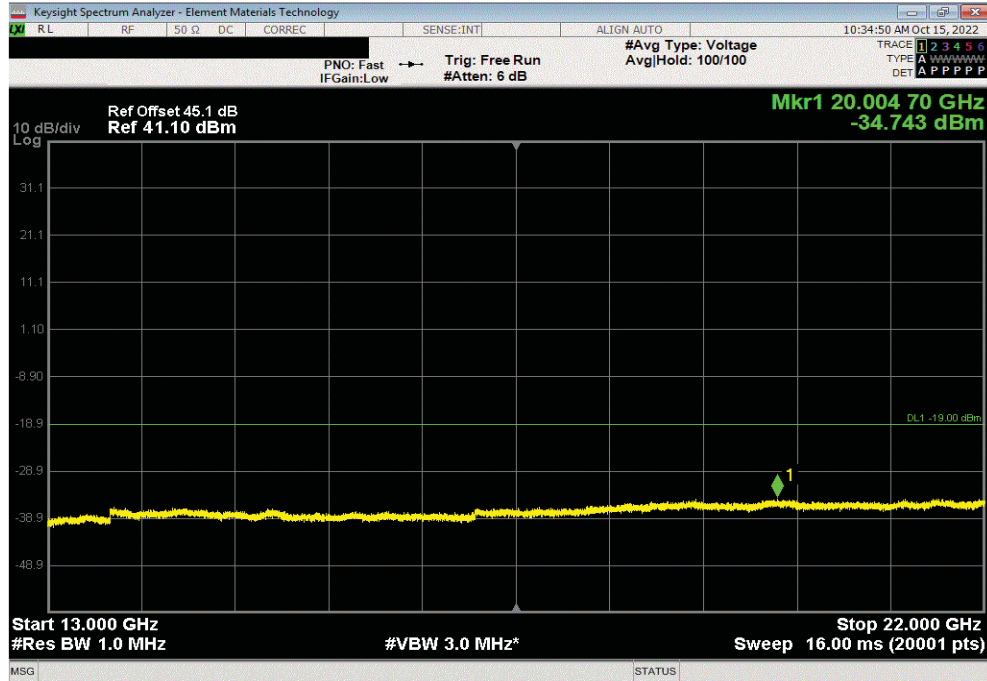


SPURIOUS CONDUCTED EMISSIONS - BAND n25

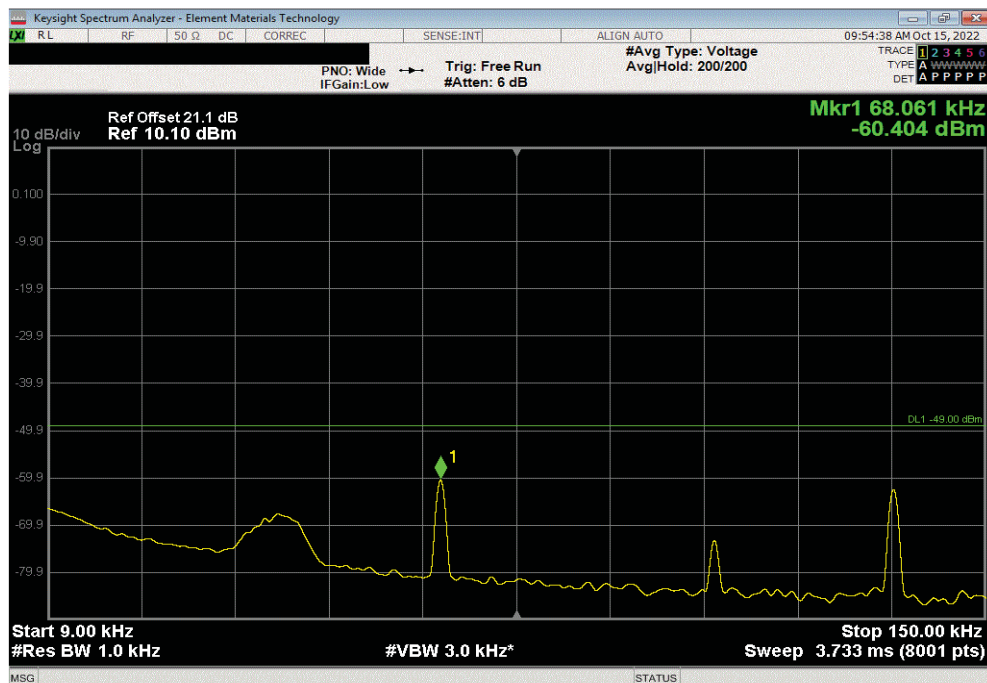


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, QPSK, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
13 GHz - 22 GHz	20004.7	-34.74	-19	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 16QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
9 kHz - 150 kHz	0.07	-60.4	-49	Pass	

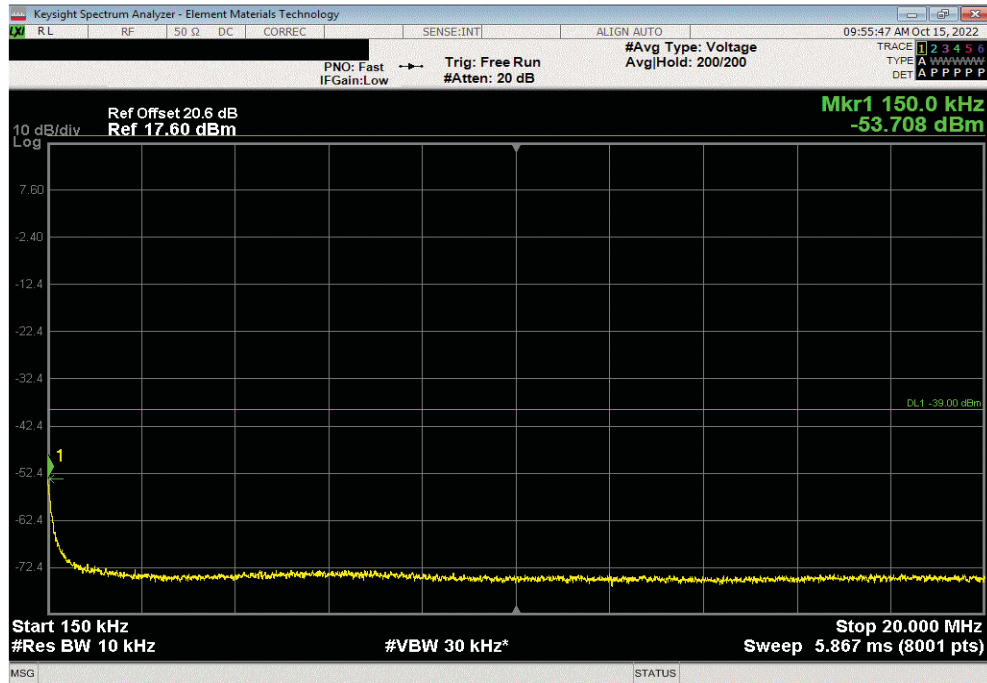


SPURIOUS CONDUCTED EMISSIONS - BAND n25

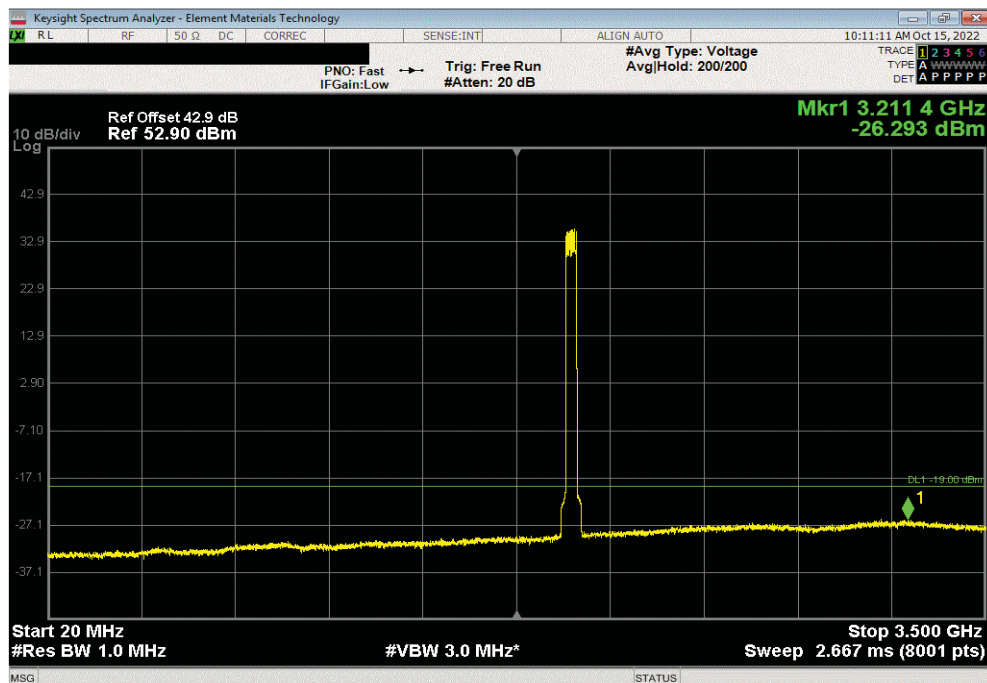


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 16QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.71	-39	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 16QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
20 MHz - 3.5 GHz	3211.41	-26.29	-19	Pass	

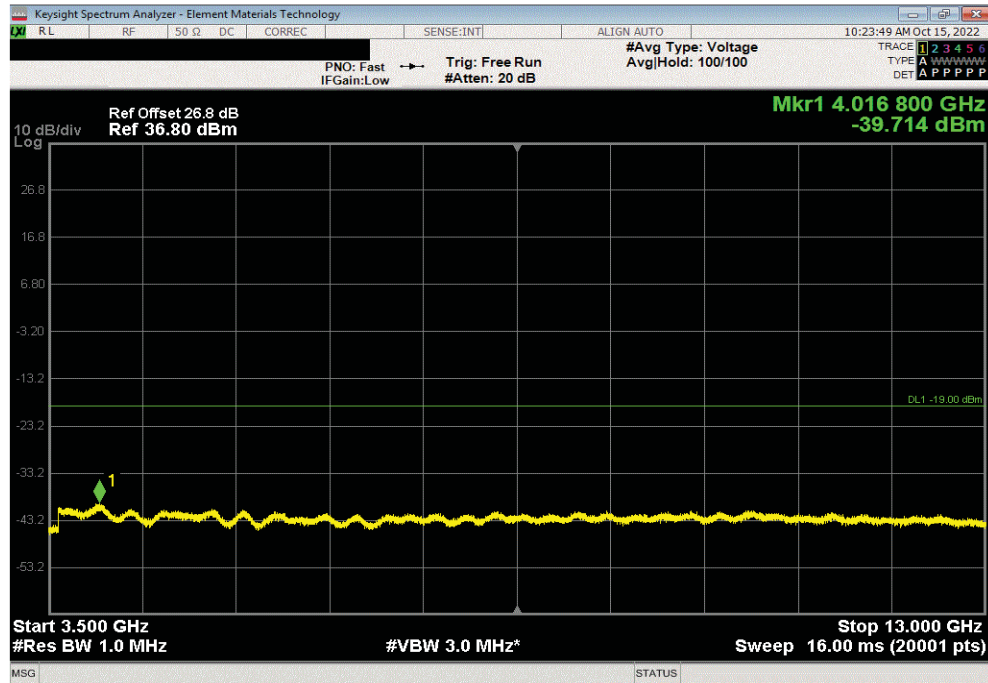


SPURIOUS CONDUCTED EMISSIONS - BAND n25

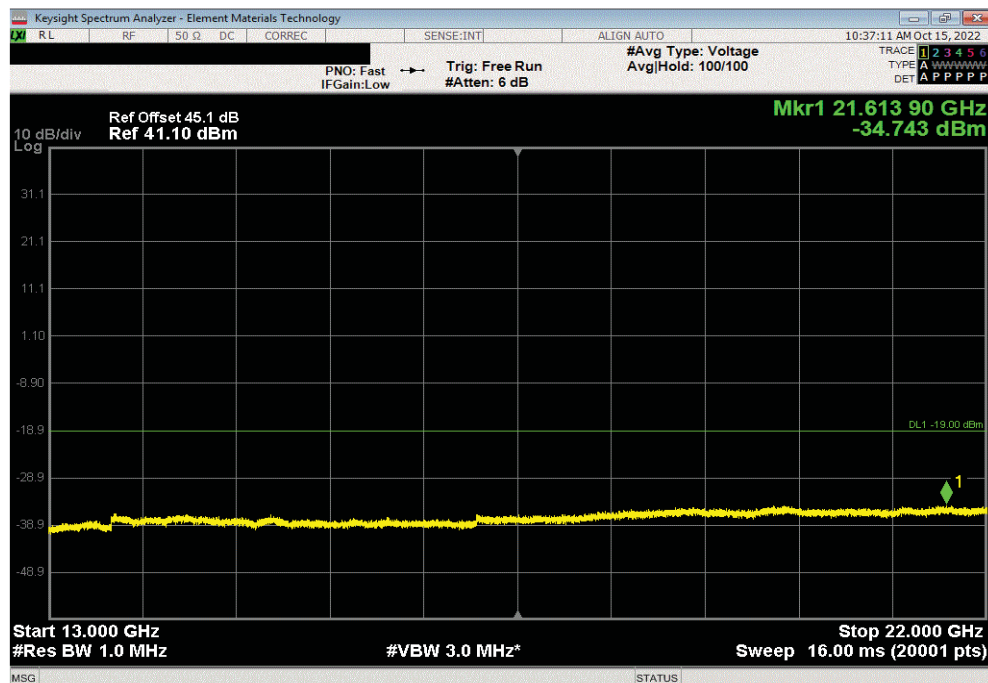


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 16QAM, Mid Channel, 1962.5 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
3.5 GHz - 13 GHz	4016.8	-39.71	-19	Pass



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 16QAM, Mid Channel, 1962.5 MHz				
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
13 GHz - 22 GHz	21613.9	-34.74	-19	Pass

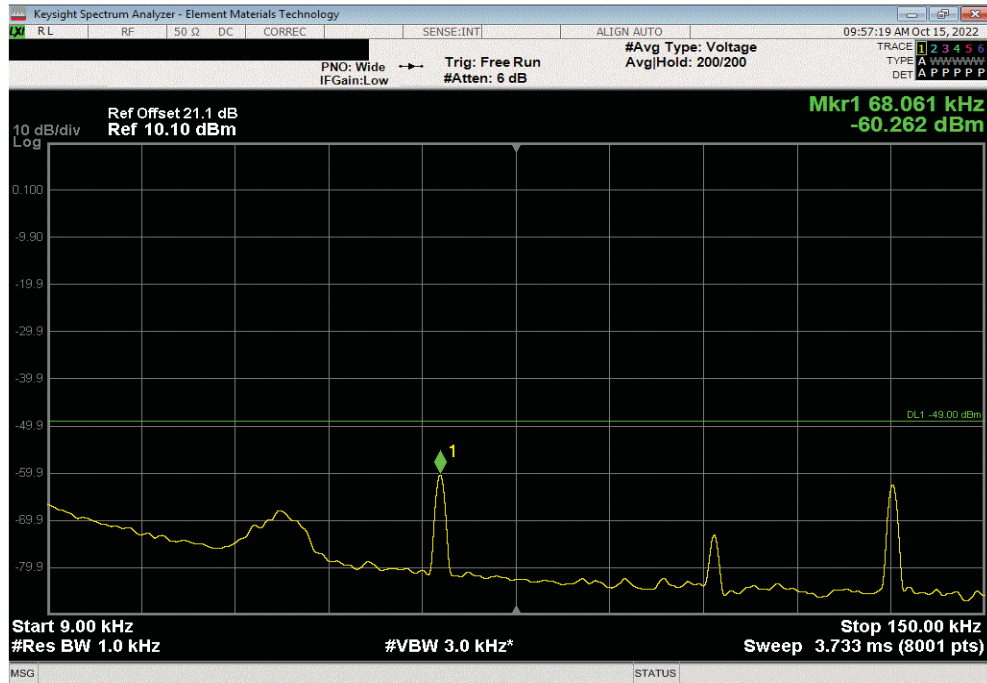


SPURIOUS CONDUCTED EMISSIONS - BAND n25

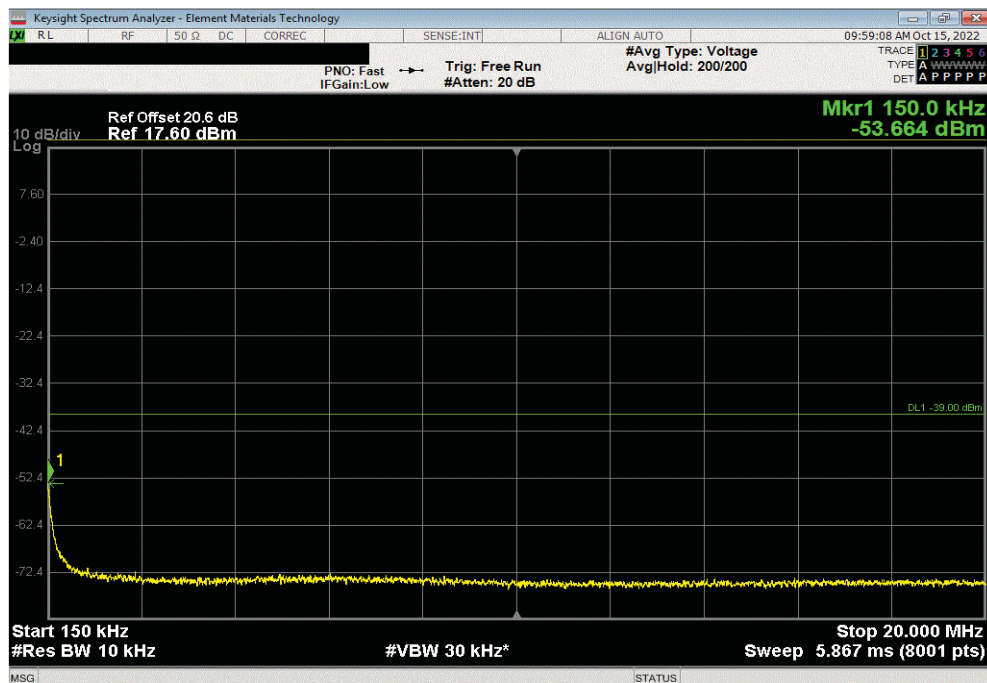


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 64QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
9 kHz - 150 kHz	0.07	-60.26	-49	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 64QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.66	-39	Pass	

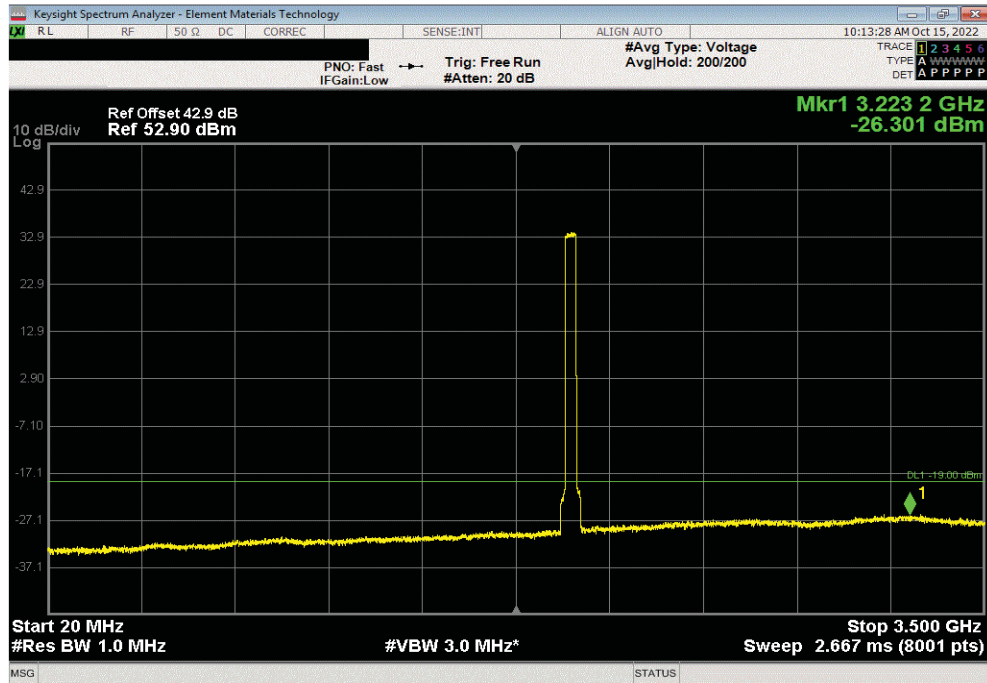


SPURIOUS CONDUCTED EMISSIONS - BAND n25

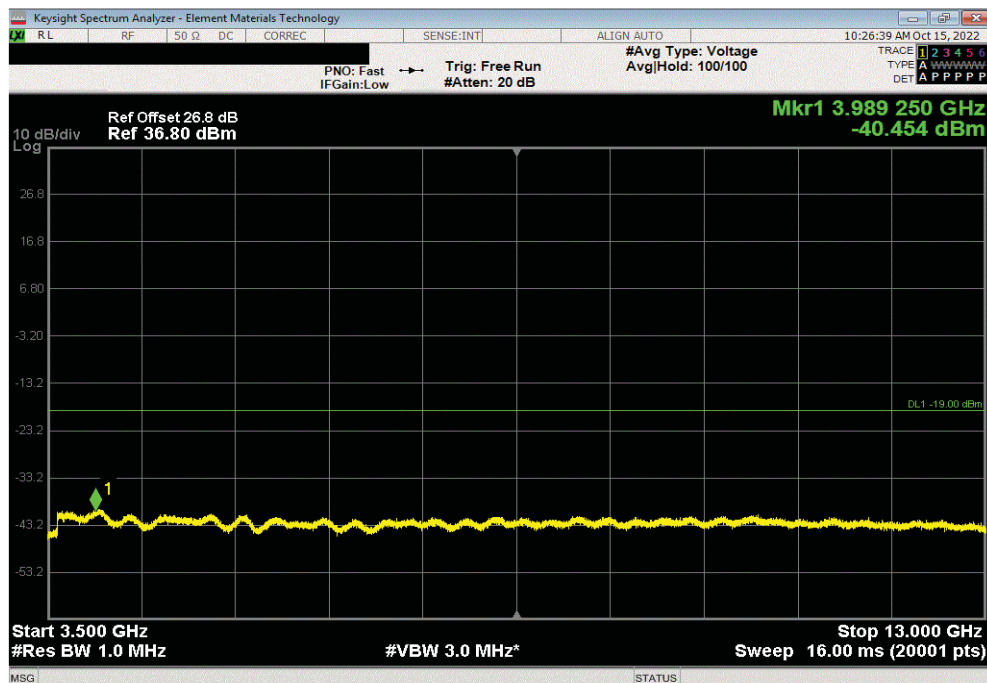


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 64QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
20 MHz - 3.5 GHz	3223.16	-26.3	-19	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 64QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
3.5 GHz - 13 GHz	3989.25	-40.45	-19	Pass	

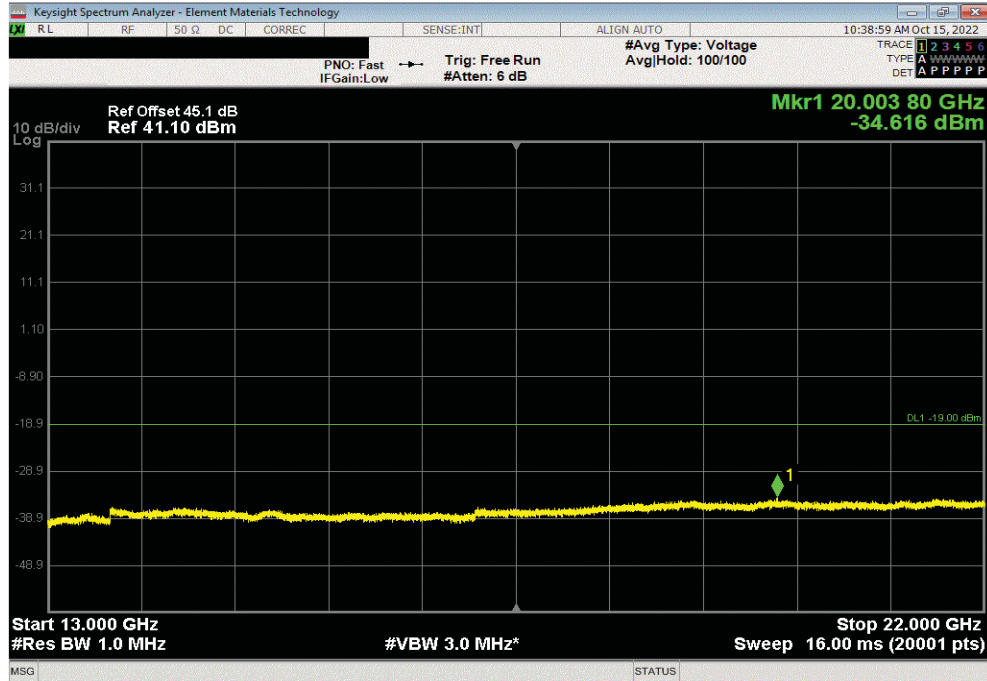


SPURIOUS CONDUCTED EMISSIONS - BAND n25

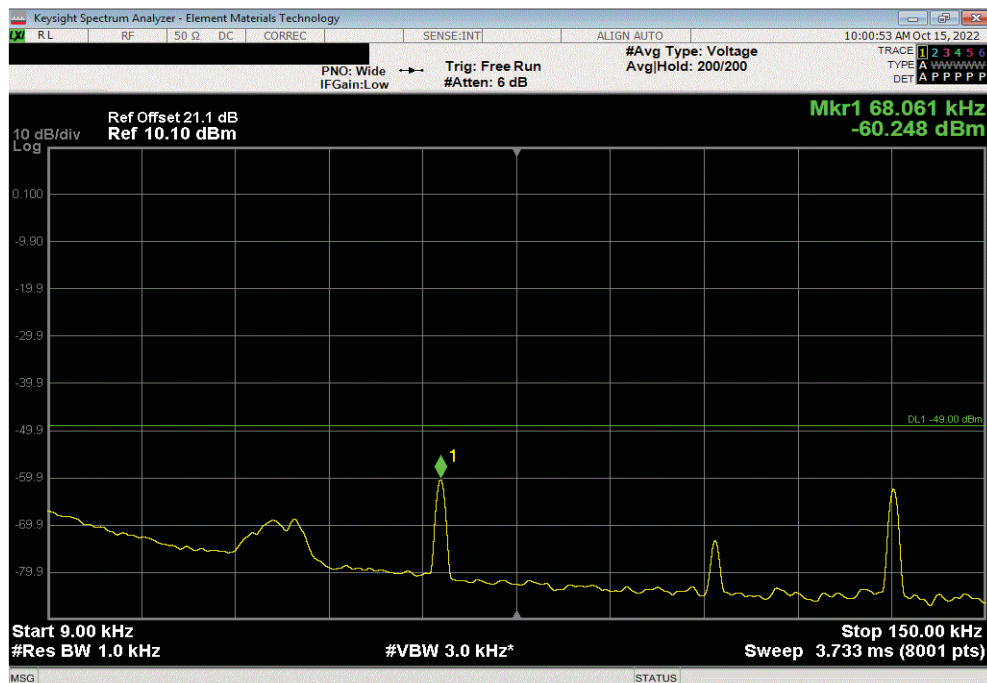


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 64QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
13 GHz - 22 GHz	20003.8	-34.62	-19	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 256QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
9 kHz - 150 kHz	0.07	-60.25	-49	Pass	

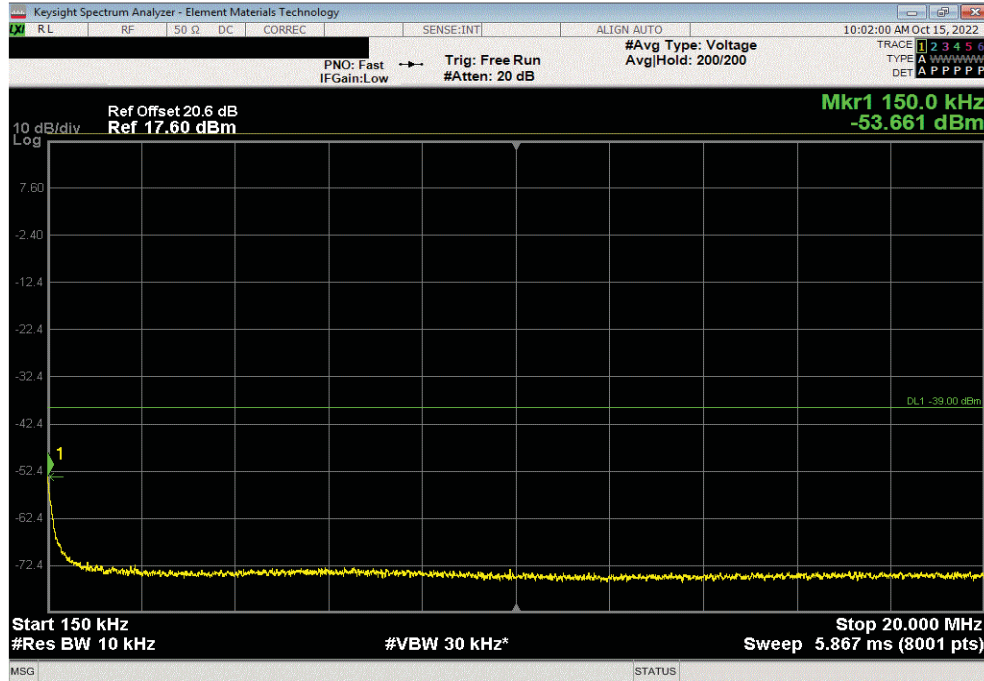


SPURIOUS CONDUCTED EMISSIONS - BAND n25

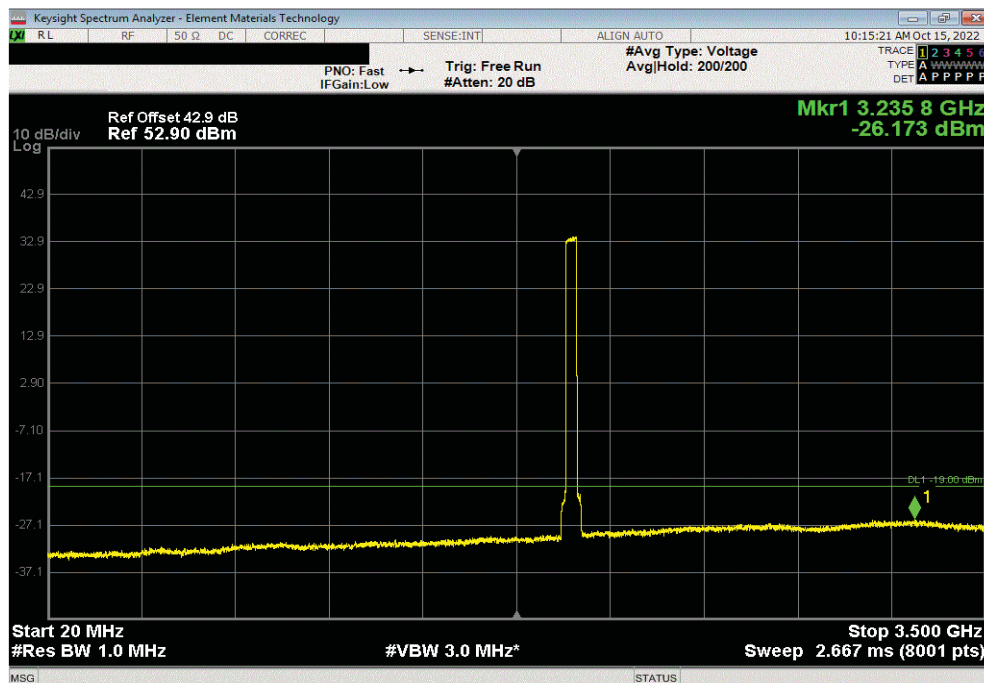


TbTtx 2022.05.02.0 XMI 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 256QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.66	-39	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 256QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
20 MHz - 3.5 GHz	3235.77	-26.17	-19	Pass	

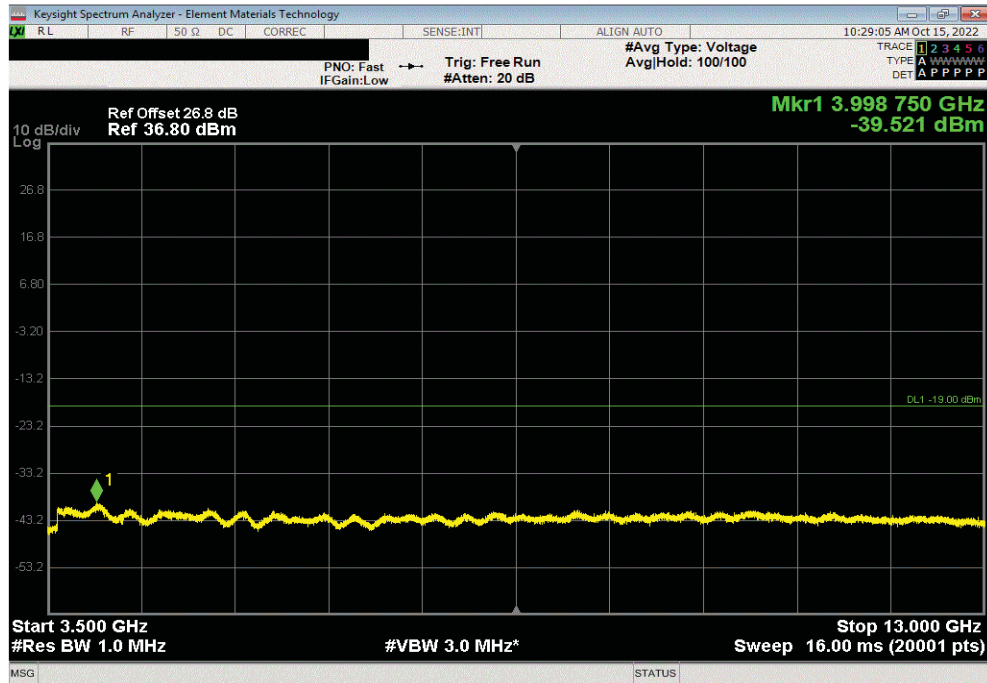


SPURIOUS CONDUCTED EMISSIONS - BAND n25

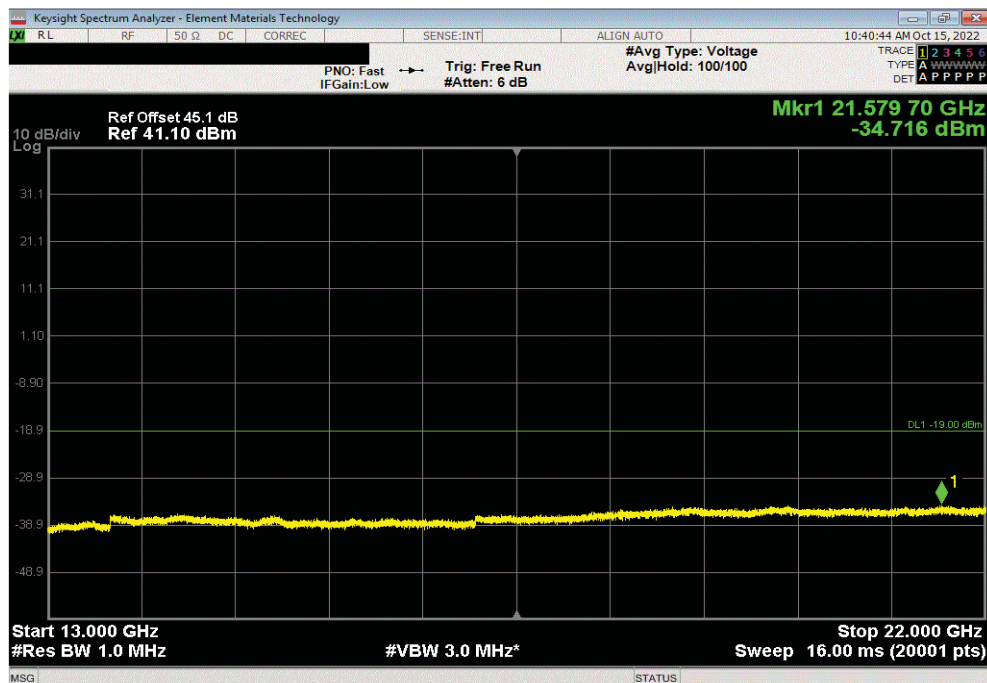


TbTx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 256QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
3.5 GHz - 13 GHz	3998.75	-39.52	-19	Pass	



Port 3, Band n25, NR 40 MHz, 1930 - 1995 MHz, 40 MHz, 256QAM, Mid Channel, 1962.5 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result	
13 GHz - 22 GHz	21579.7	-34.72	-19	Pass	



SPURIOUS CONDUCTED EMISSIONS - BAND n66



XMIT 2022.02.07.0

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
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17
Block - DC	Fairview Microwave	SD3379	AMT	2022-09-09	2023-09-09
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02

TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 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 22 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 27.53(h)(1) and RSS-139 6.6, 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 $[-13 \text{ dBm} - 10 \log(4)]$ per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter. RF conducted emissions testing was performed on one port. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification report) and 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 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.: $-49\text{dBm} = -19\text{dBm} - 10\log(1\text{MHz}/1\text{kHz})$]. 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.: $-39\text{dBm} = -19\text{dBm} - 10\log(1\text{MHz}/10\text{kHz})$]. The required limit of -19dBm with a RBW of > 1MHz was used for all other frequency ranges.

SPURIOUS CONDUCTED EMISSIONS - BAND n66



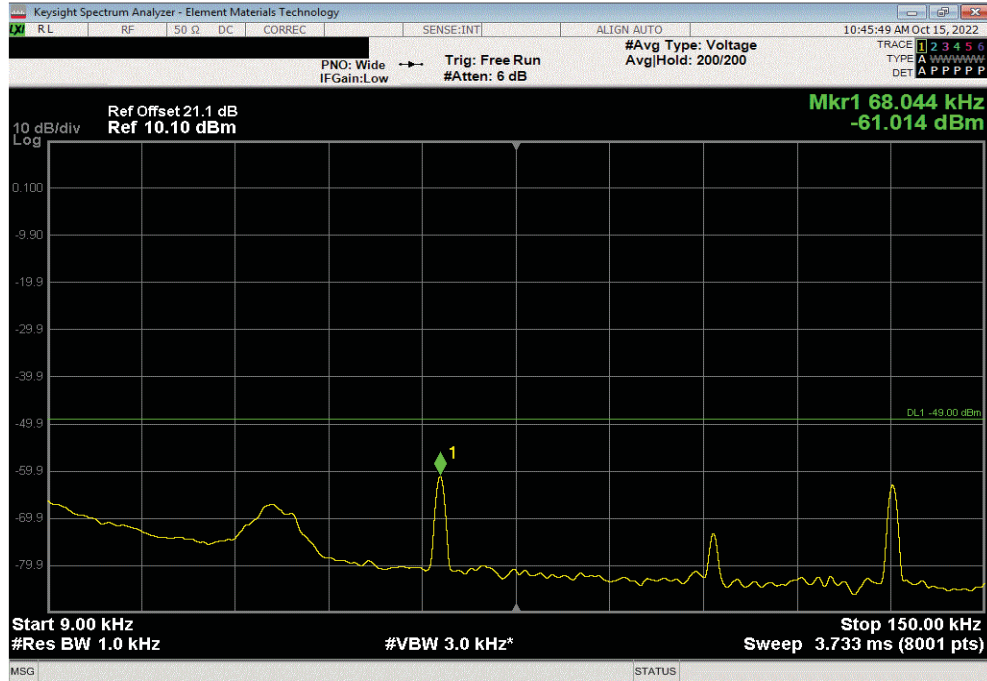
EUT: AHFI (FCC/ISED C2PC)		Work Order: NOKI0050				
Serial Number: K9181401111		Date: 18-Oct-22				
Customer: Nokia of America Corporation		Temperature: 21.8 °C				
Attendees: Mitchell Hill		Humidity: 28.8% RH				
Project: None		Barometric Pres.: 1029 mbar				
Tested by: Brandon Hobbs		Power: 54 VDC	Job Site: TX07			
TEST SPECIFICATIONS		Test Method				
FCC 27:2022		ANSI C63.26:2015				
RSS-139 Issue 4:2022		ANSI C63.26:2015				
COMMENTS						
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. Band n66 carriers are enabled at maximum power (80 watts/carrier).						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	1,2,3,4	Signature 				
		Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result
Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz						
40 MHz						
QPSK						
	Mid Channel, 2155 MHz	9 kHz - 150 kHz	0.07	-61.0	-49	Pass
	Mid Channel, 2155 MHz	150 kHz - 20 MHz	0.15	-53.7	-39	Pass
	Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	3225.77	-26.4	-19	Pass
	Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	4018.7	-39.7	-19	Pass
	Mid Channel, 2155 MHz	13 GHz - 22 GHz	21614.8	-35.3	-19	Pass
16QAM						
	Mid Channel, 2155 MHz	9 kHz - 150 kHz	0.07	-65.0	-49	Pass
	Mid Channel, 2155 MHz	150 kHz - 20 MHz	0.15	-53.7	-39	Pass
	Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	3197.93	-26.4	-19	Pass
	Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	4004.45	-39.6	-19	Pass
	Mid Channel, 2155 MHz	13 GHz - 22 GHz	20009.65	-34.8	-19	Pass
64QAM						
	Mid Channel, 2155 MHz	9 kHz - 150 kHz	0.07	-64.8	-49	Pass
	Mid Channel, 2155 MHz	150 kHz - 20 MHz	0.15	-53.6	-39	Pass
	Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	3180.53	-26.5	-19	Pass
	Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	3997.33	-39.8	-19	Pass
	Mid Channel, 2155 MHz	13 GHz - 22 GHz	21631.9	-34.9	-19	Pass
256QAM						
	Mid Channel, 2155 MHz	9 kHz - 150 kHz	0.07	-65.0	-49	Pass
	Mid Channel, 2155 MHz	150 kHz - 20 MHz	0.15	-53.2	-39	Pass
	Mid Channel, 2155 MHz	20 MHz - 3.5 GHz	3181.4	-26.6	-19	Pass
	Mid Channel, 2155 MHz	3.5 GHz - 13 GHz	3986.88	-39.7	-19	Pass
	Mid Channel, 2155 MHz	13 GHz - 22 GHz	21931.6	-34.7	-19	Pass

SPURIOUS CONDUCTED EMISSIONS - BAND n66

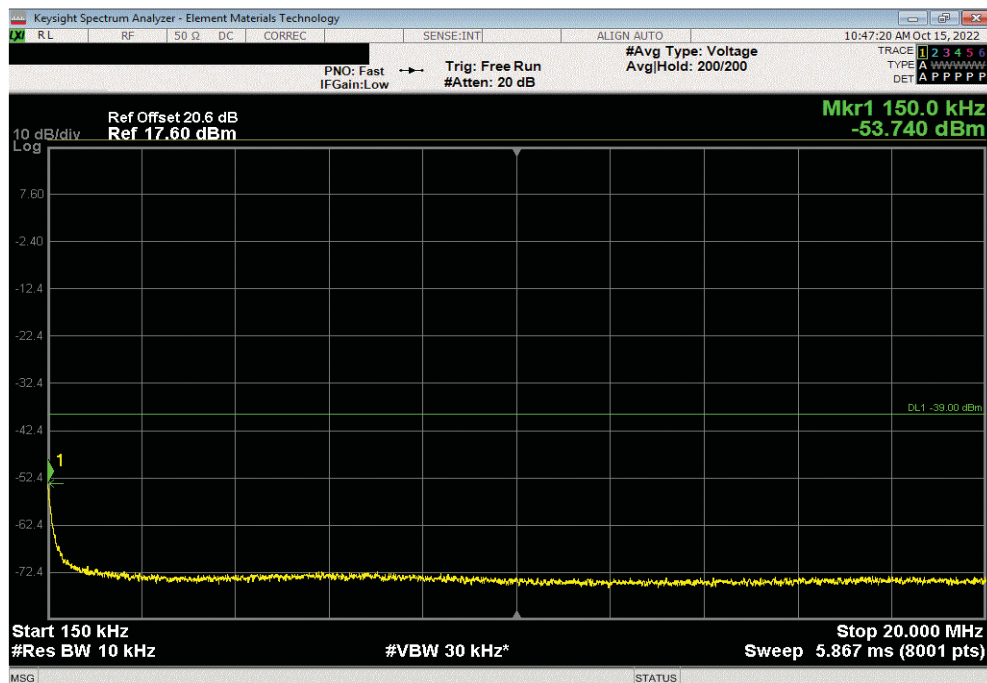


TbTtX 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, QPSK, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.07	-61.01	-49	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, QPSK, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.74	-39	Pass	

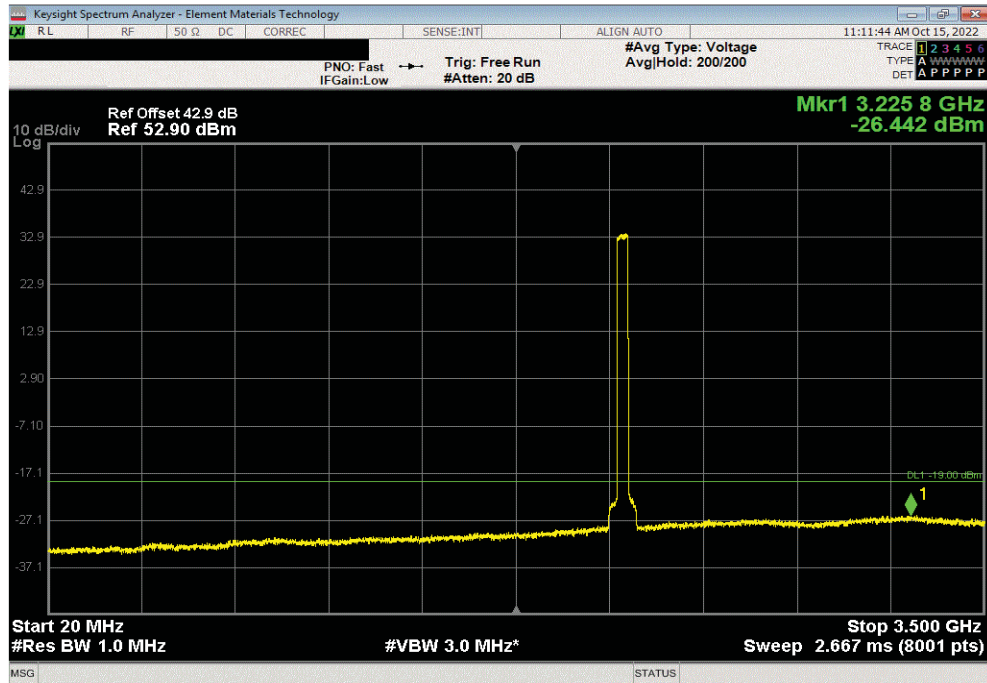


SPURIOUS CONDUCTED EMISSIONS - BAND n66

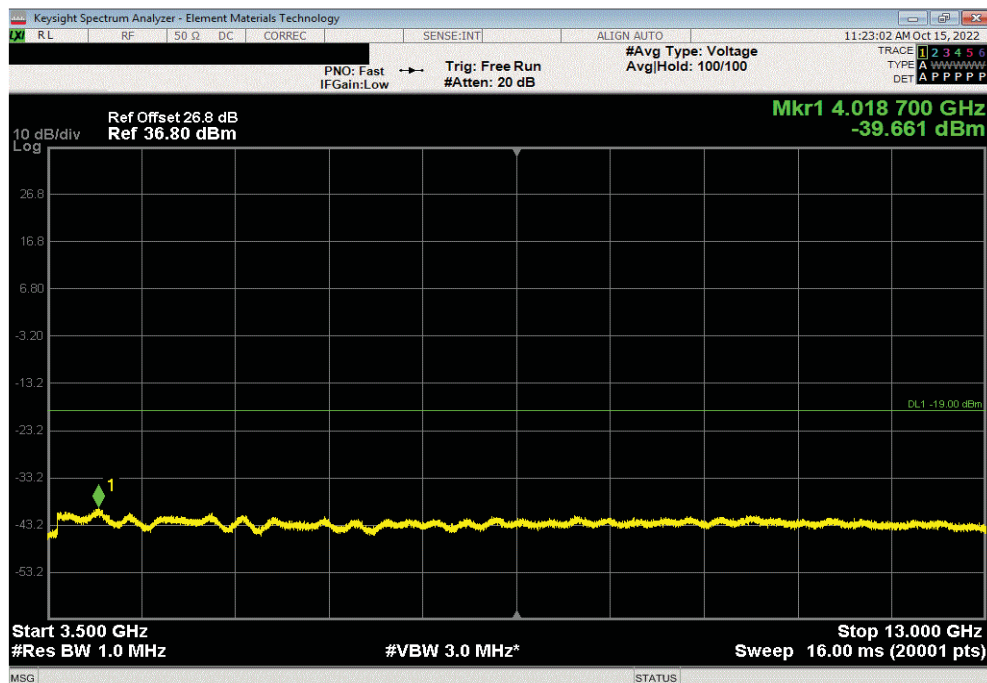


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, QPSK, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3225.77	-26.44	-19	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, QPSK, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	4018.7	-39.66	-19	Pass	

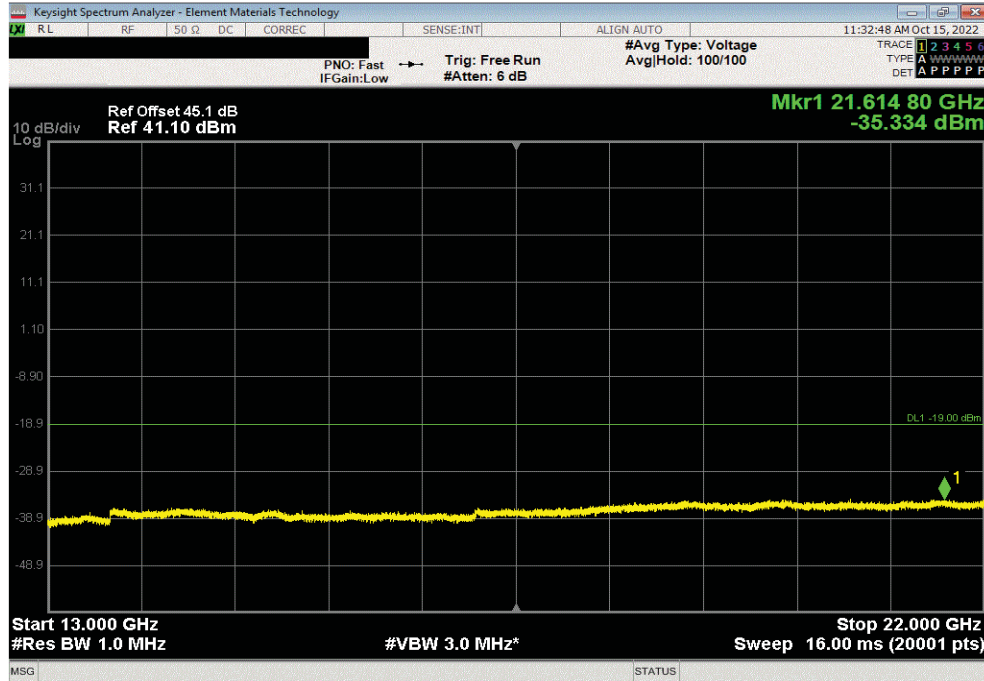


SPURIOUS CONDUCTED EMISSIONS - BAND n66

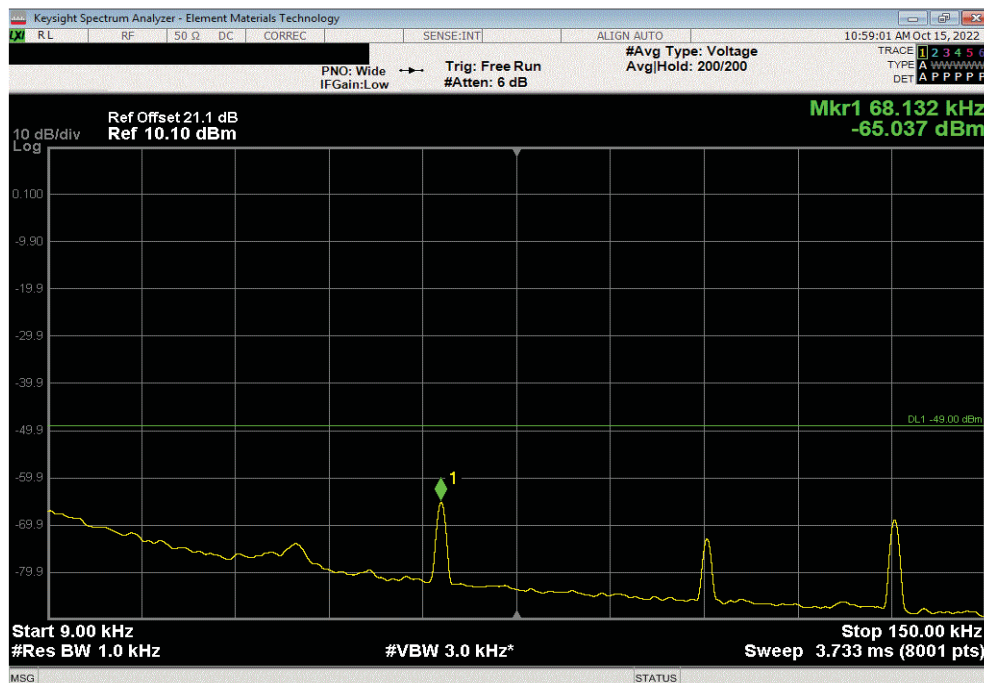


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, QPSK, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	21614.8	-35.33	-19	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 16QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.07	-65.04	-49	Pass	

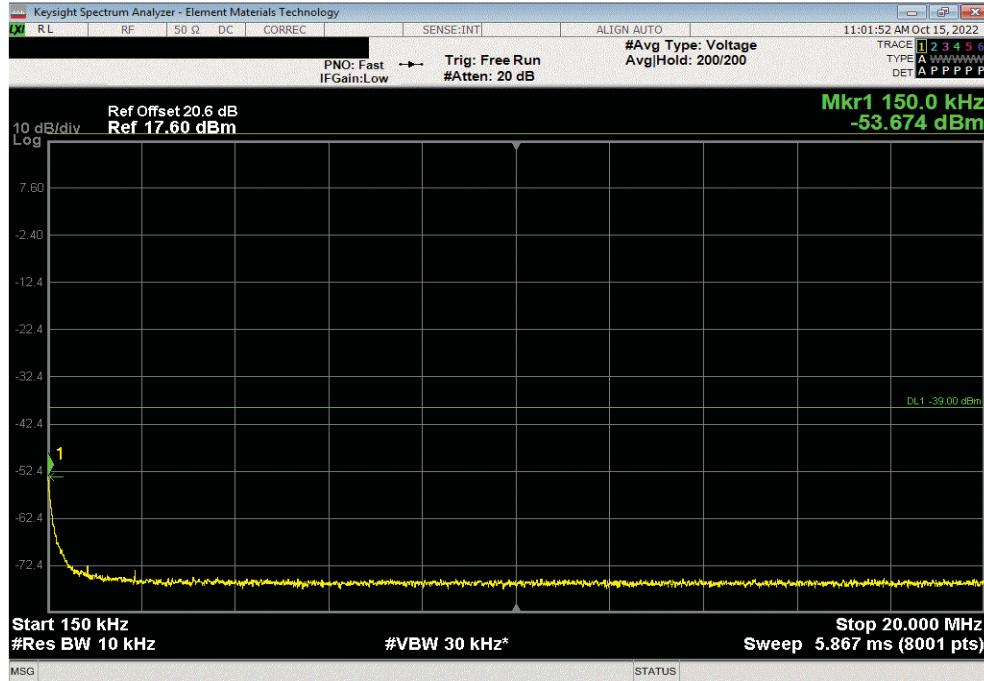


SPURIOUS CONDUCTED EMISSIONS - BAND n66

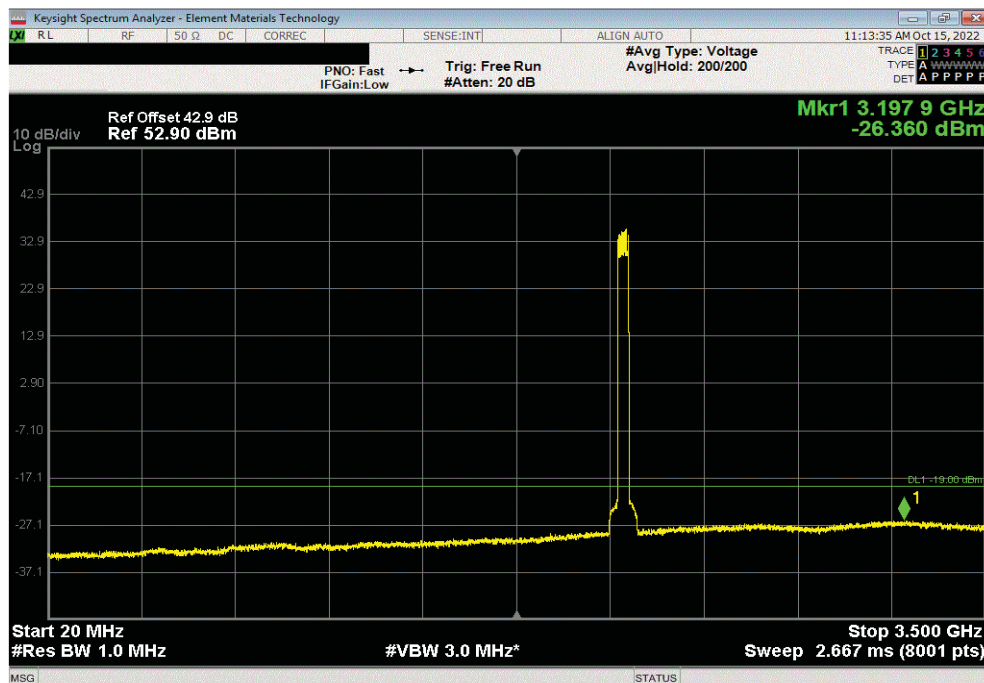


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 16QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.67	-39	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 16QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3197.93	-26.36	-19	Pass	

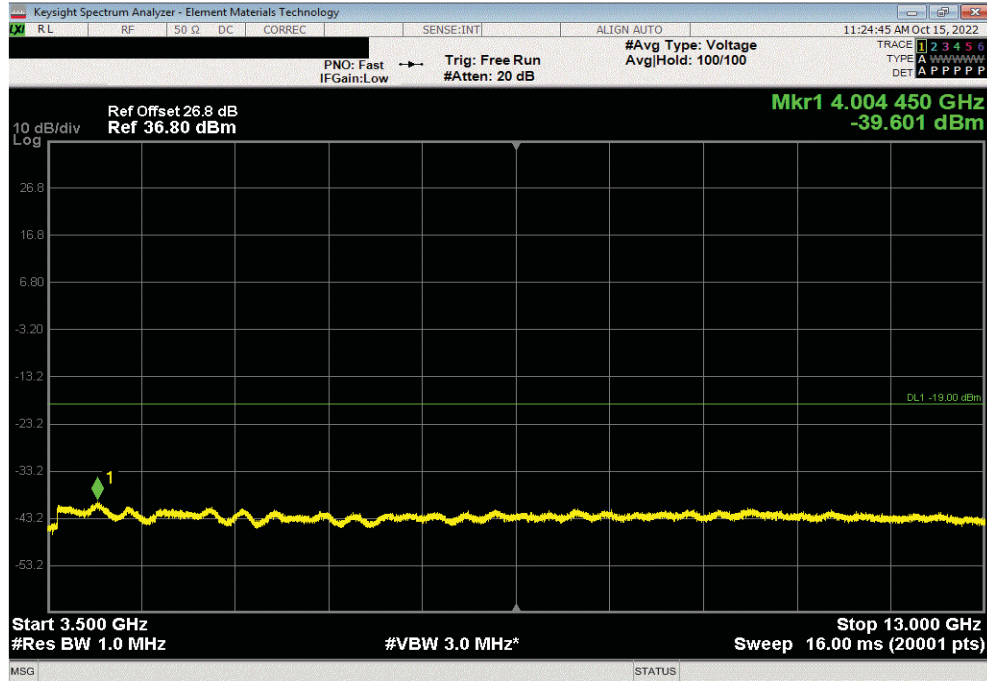


SPURIOUS CONDUCTED EMISSIONS - BAND n66

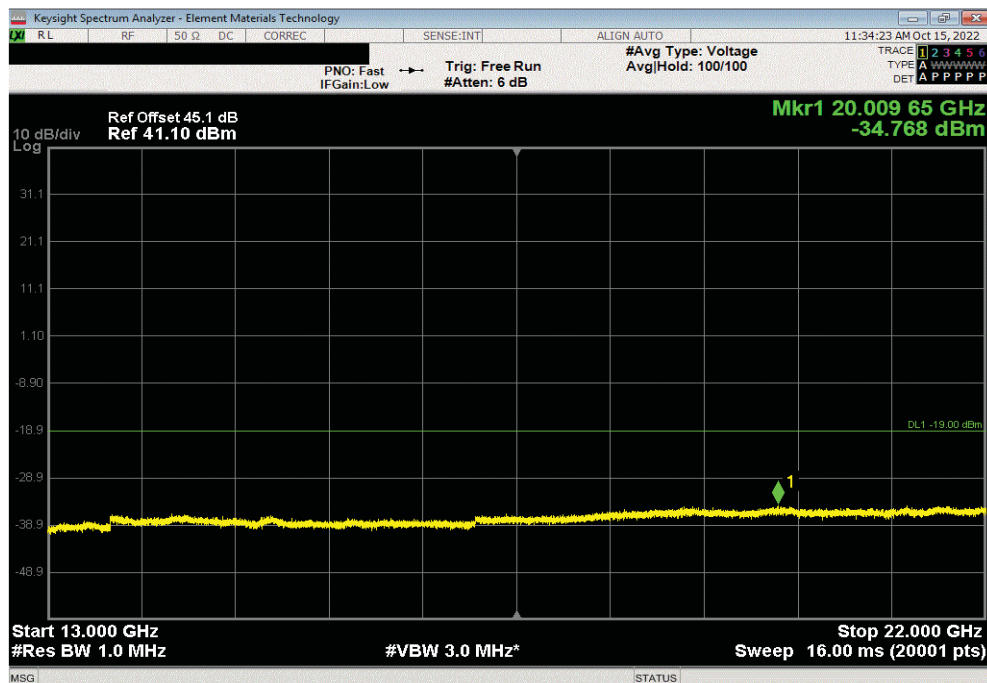


TbTtx 2022.05.02.0 XMIT 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 16QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	4004.45	-39.6	-19	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 16QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	20009.65	-34.77	-19	Pass	

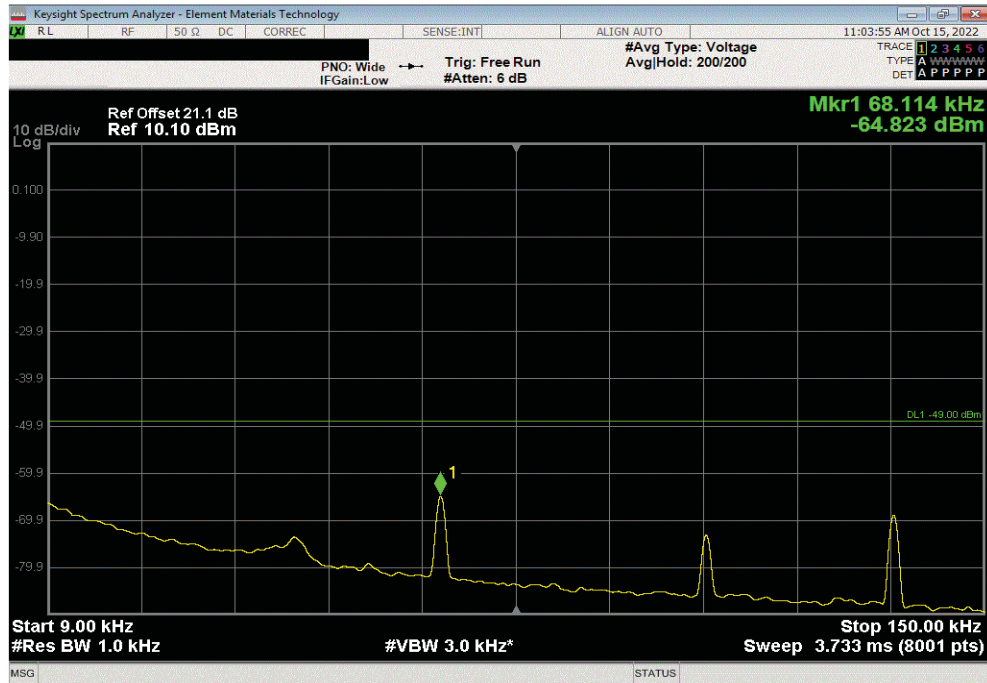


SPURIOUS CONDUCTED EMISSIONS - BAND n66

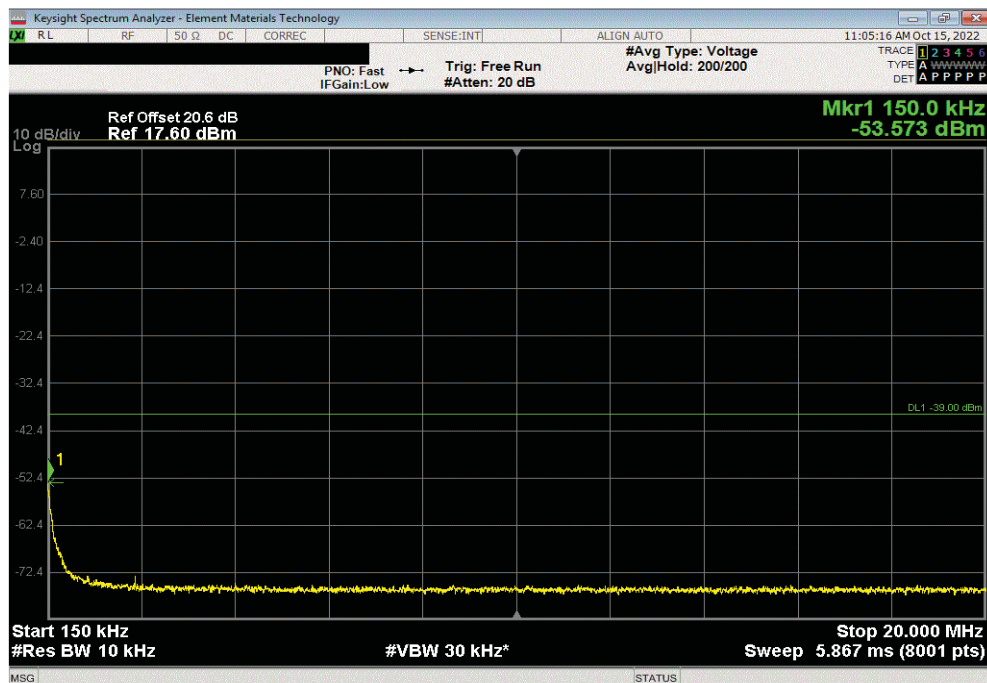


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 64QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.07	-64.82	-49	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 64QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.57	-39	Pass	

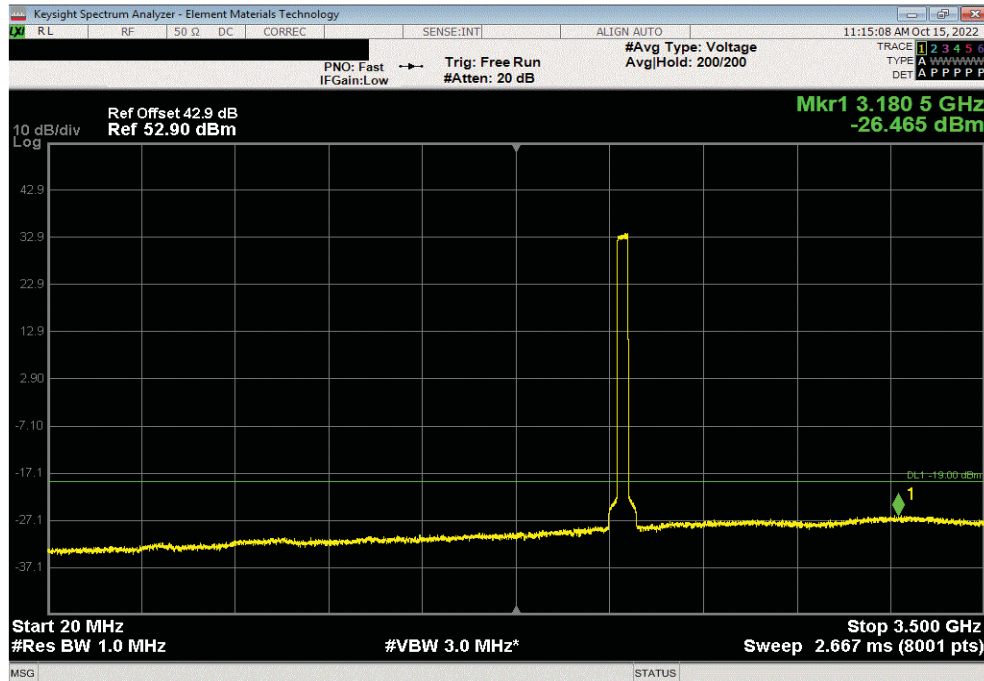


SPURIOUS CONDUCTED EMISSIONS - BAND n66

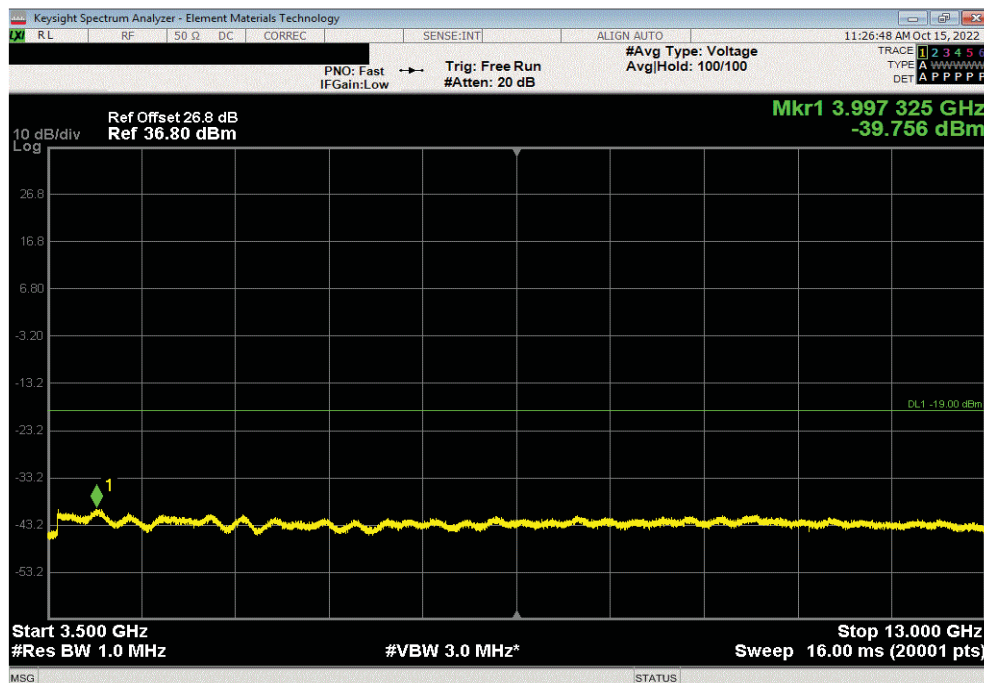


TbTx 2022.05.02.0 XMt 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 64QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3180.53	-26.47	-19	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 64QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	3997.33	-39.76	-19	Pass	

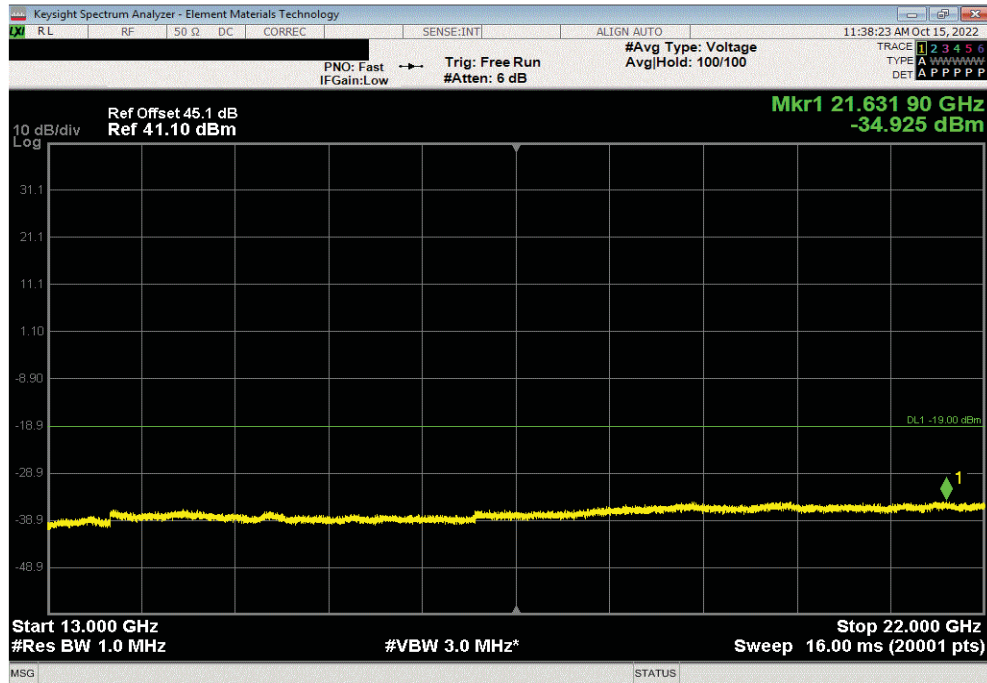


SPURIOUS CONDUCTED EMISSIONS - BAND n66

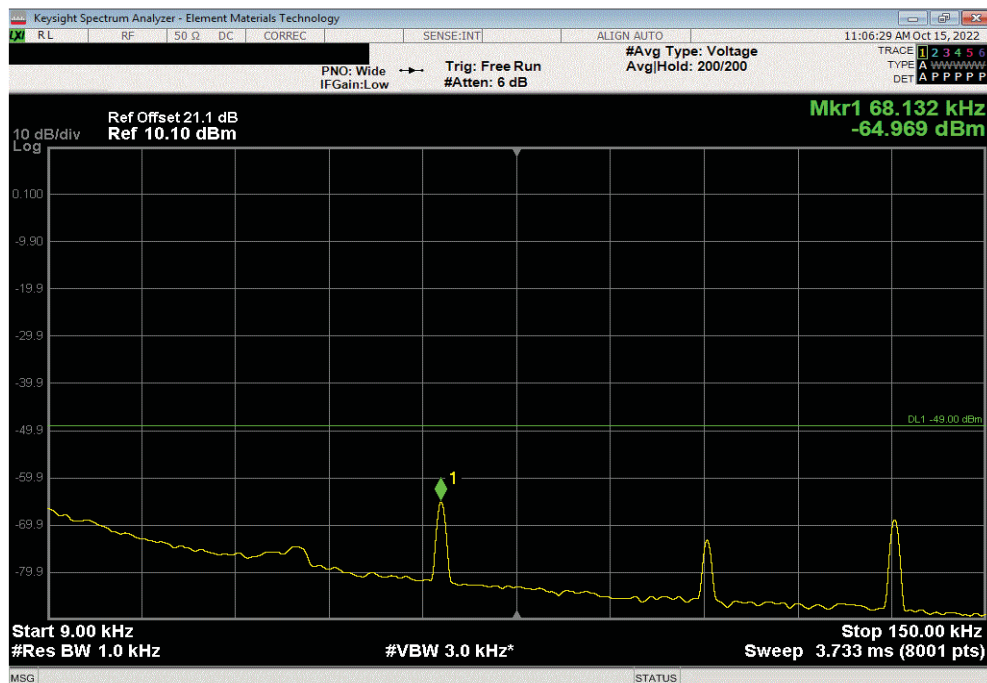


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 64QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	21631.9	-34.93	-19	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 256QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
9 kHz - 150 kHz	0.07	-64.97	-49	Pass	

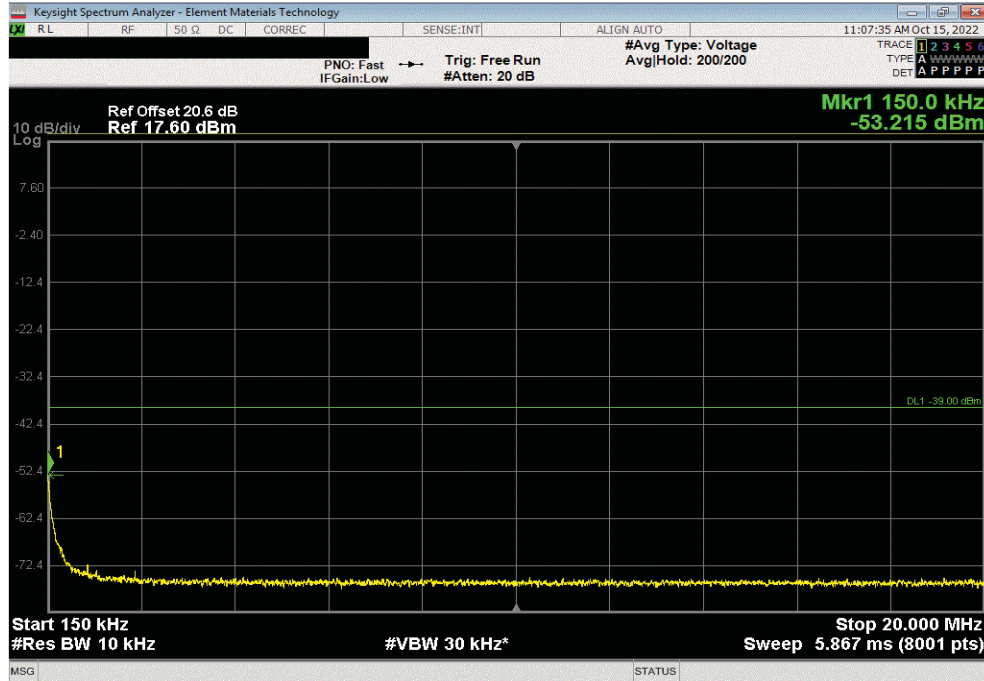


SPURIOUS CONDUCTED EMISSIONS - BAND n66

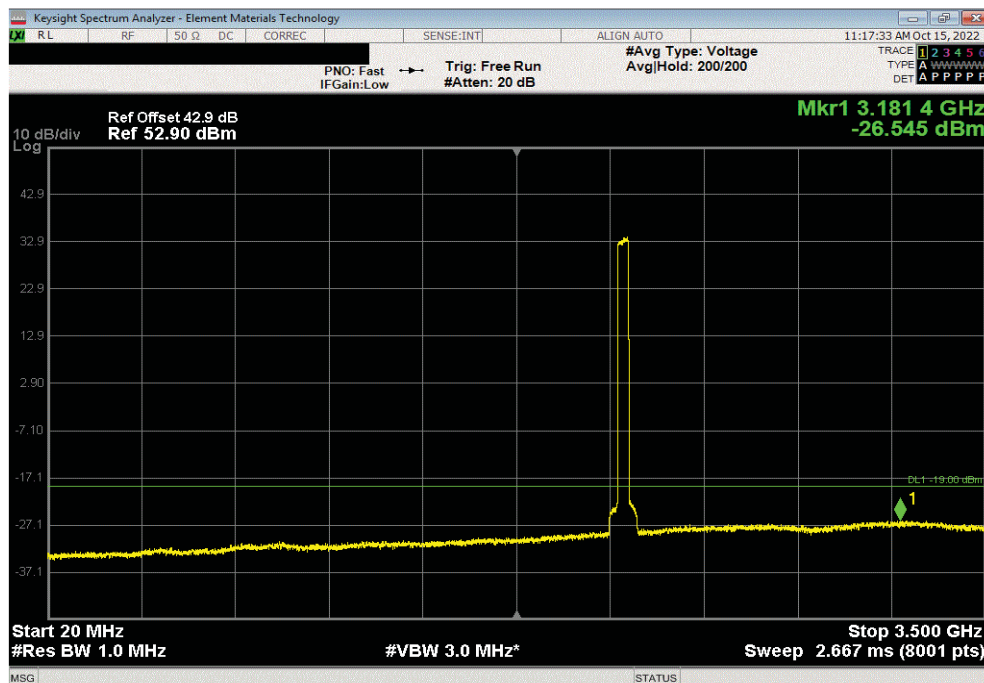


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 256QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
150 kHz - 20 MHz	0.15	-53.22	-39	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 256QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
20 MHz - 3.5 GHz	3181.4	-26.55	-19	Pass	

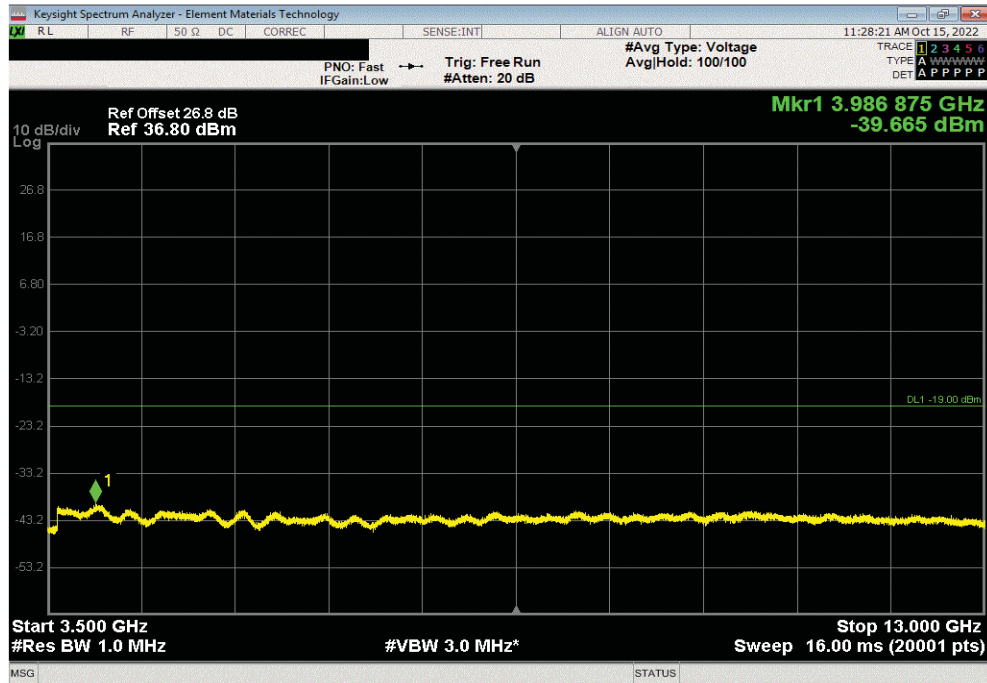


SPURIOUS CONDUCTED EMISSIONS - BAND n66

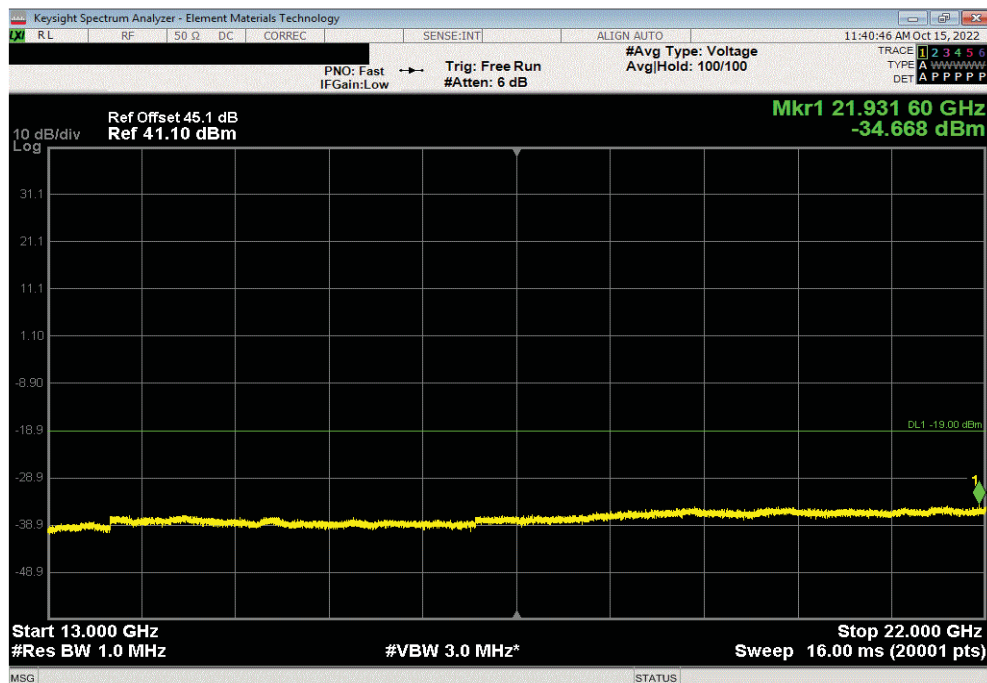


TbTx 2022.05.02.0 XMit 2022.02.07.0

Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 256QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
3.5 GHz - 13 GHz	3986.88	-39.67	-19	Pass	



Port 3, Band n66, NR 40 MHz, 2110 - 2200 MHz, 40 MHz, 256QAM, Mid Channel, 2155 MHz					
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result	
13 GHz - 22 GHz	21931.6	-34.67	-19	Pass	



SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



XMH 2022.02.07.0

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	AFQ	2022-01-17	2023-01-17
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17
Block - DC	Fairview Microwave	SD3379	AMT	2022-09-09	2023-09-09
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02

TEST DESCRIPTION

The antenna port spurious emissions were measured at the RF output terminal of the EUT through 4 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 22 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), RSS-133 6.5 (ii), FCC 27.53(h)(1) and RSS-139 6.6 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. RF conducted emissions testing was performed on one port. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification report) and 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 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.

SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



TstTx 2022.06.03.0 XMt 2022.02.07.0

EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0050	
Serial Number: K9181401111		Date: 18-Oct-22	
Customer: Nokia of America Corporation		Temperature: 20.6 °C	
Attendees: Mitchell Hill		Humidity: 30.9% RH	
Project: None		Barometric Pres.: 1029 mbar	
Tested by: Brandon Hobbs		Power: 54 VDC	
		Job Site: TX07	
TEST SPECIFICATIONS			
FCC 24E:2022		ANSI C63.26:2015	
RSS-133 Issue 6:2013+A1:2018		ANSI C63.26:2015	
RSS-139 Issue 4:2022		ANSI C63.26:2015	
FCC 27:2022		ANSI C63.26:2015	
COMMENTS			
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. The carriers were operating at the following maximum power levels for test case 3: 40 Watts per carrier on Band n66 and 40 Band n25 for a total of 120 Watts. The carriers were operating at the following maximum power levels for test case 4: 40 Watts per carrier on Band n25 and Band n66 for a total of 120 Watts.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1,2,3,4	Signature	
		Frequency Range	Measured Freq (MHz)
			Max Value (dBm)
			Limit (dBm)
			Result
Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW			
256-QAM Modulation			
Test Case 3, 2130MHz, 2170MHz and 1962.5 MHz Channels			
	Multi-Carrier Configuration	9 kHz - 150 kHz	0.07
	Multi-Carrier Configuration	150 kHz - 20 MHz	0.15
	Multi-Carrier Configuration	20 MHz - 3.5 GHz	3121.37
	Multi-Carrier Configuration	3.5 GHz - 13 GHz	4003.03
	Multi-Carrier Configuration	13 GHz - 22 GHz	20074
Test Case 4, 2140MHz, 2180MHz and 1962.5 MHz Channels			
	Multi-Carrier Configuration	9 kHz - 150 kHz	0.07
	Multi-Carrier Configuration	150 kHz - 20 MHz	0.15
	Multi-Carrier Configuration	20 MHz - 3.5 GHz	3187.92
	Multi-Carrier Configuration	3.5 GHz - 13 GHz	4027.73
	Multi-Carrier Configuration	13 GHz - 22 GHz	19913.8

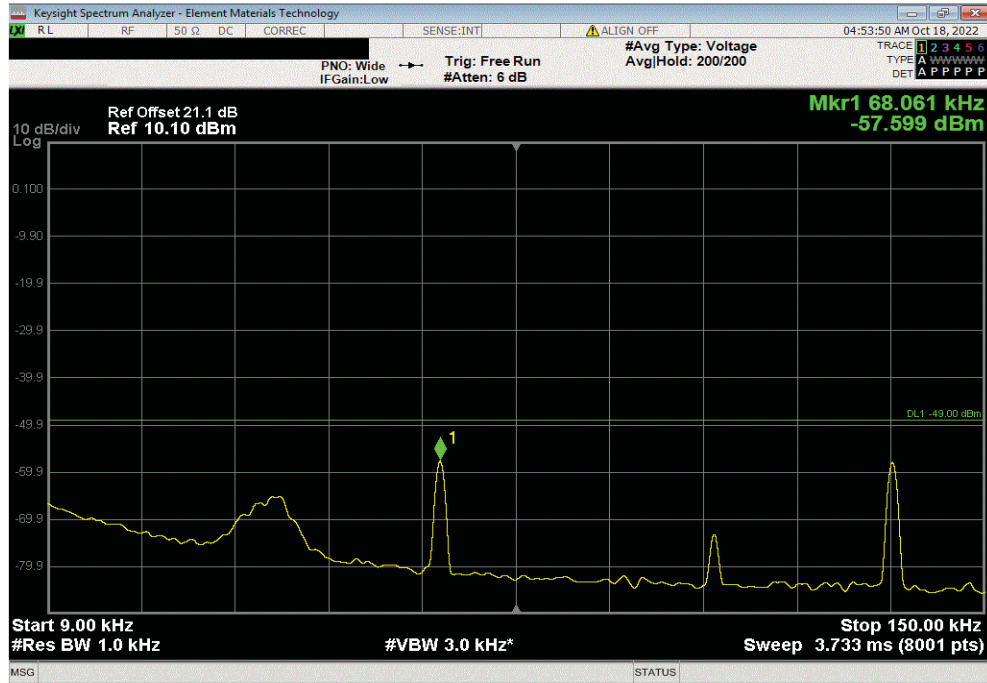
SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



TbTtx 2022.06.03.0 XMit 2022.02.07.0

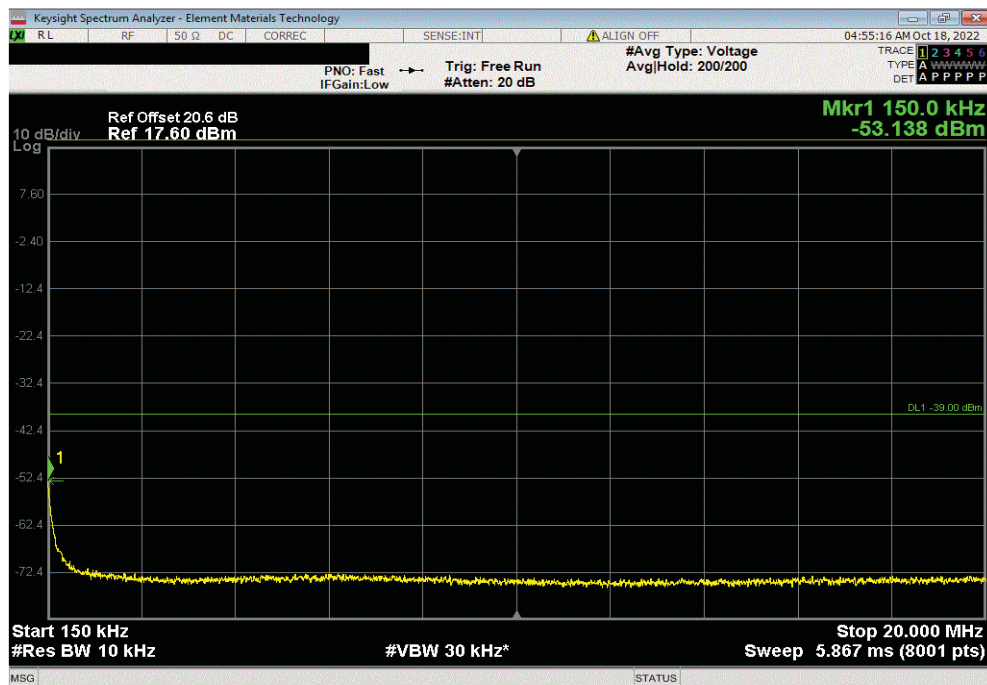
Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 3, 2130MHz, 2170MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
9 kHz - 150 kHz	0.07	-57.6	-49	Pass



Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 3, 2130MHz, 2170MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
150 kHz - 20 MHz	0.15	-53.14	-39	Pass



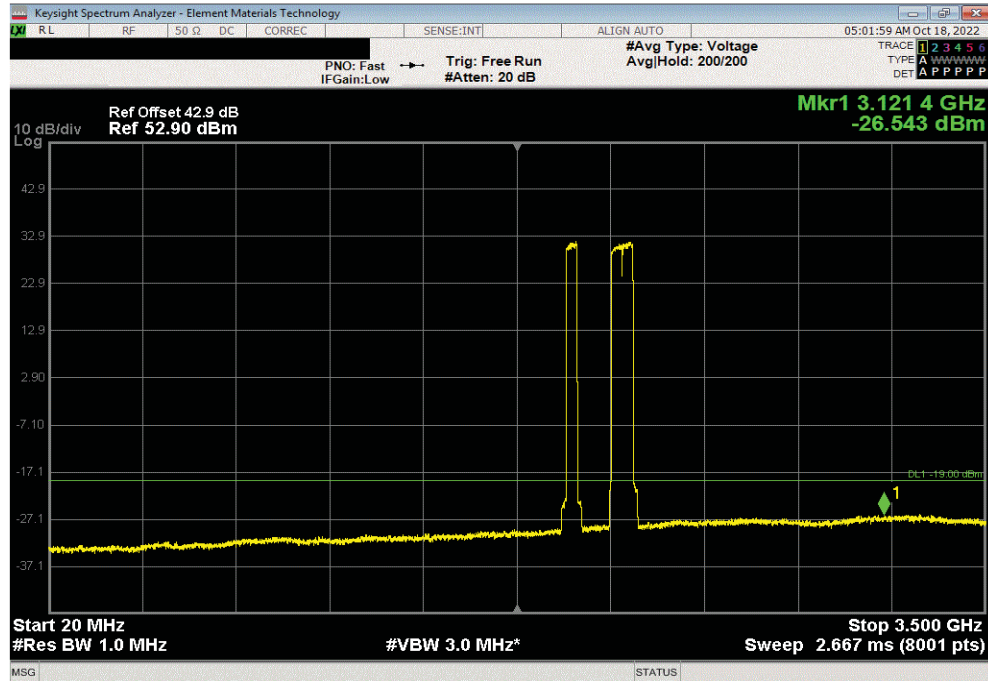
SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



TbTx 2022.06.03.0 XMit 2022.02.07.0

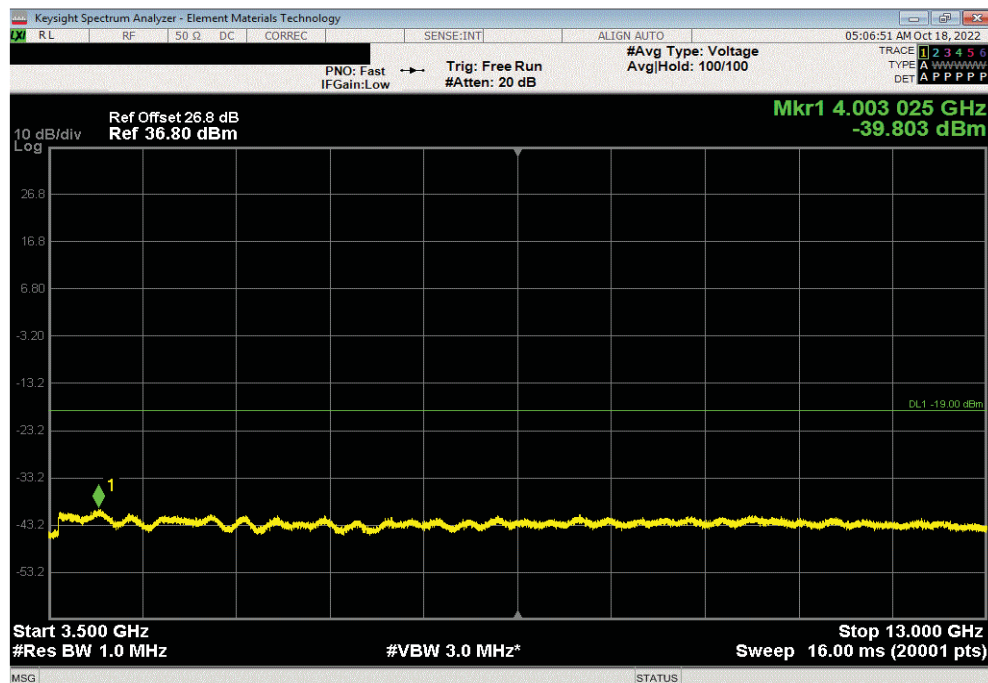
Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 3, 2130MHz, 2170MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
20 MHz - 3.5 GHz	3121.37	-26.54	-19	Pass



Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 3, 2130MHz, 2170MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
3.5 GHz - 13 GHz	4003.03	-39.8	-19	Pass



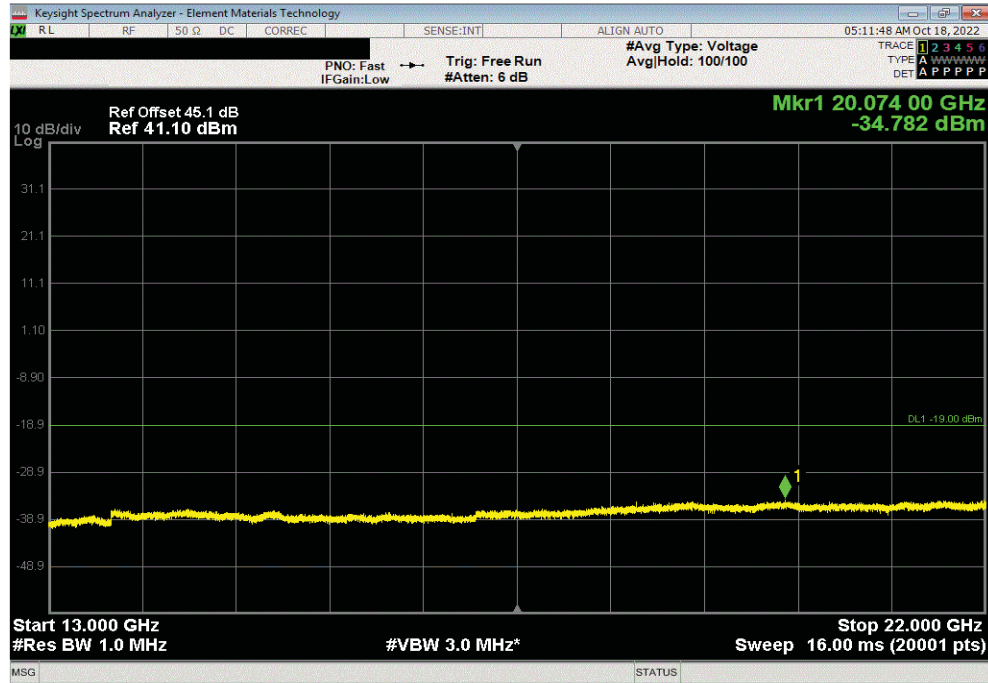
SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



TbTtx 2022.06.03.0 XMit 2022.02.07.0

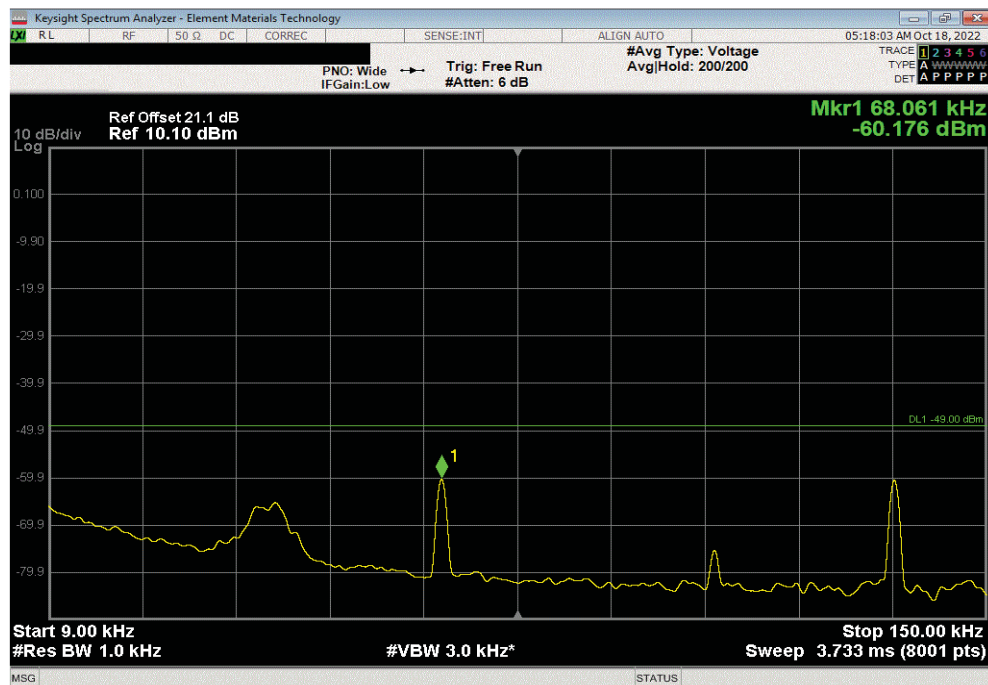
Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 3, 2130MHz, 2170MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
13 GHz - 22 GHz	20074	-34.78	-19	Pass



Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 4, 2140MHz, 2180MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
9 kHz - 150 kHz	0.07	-60.18	-49	Pass



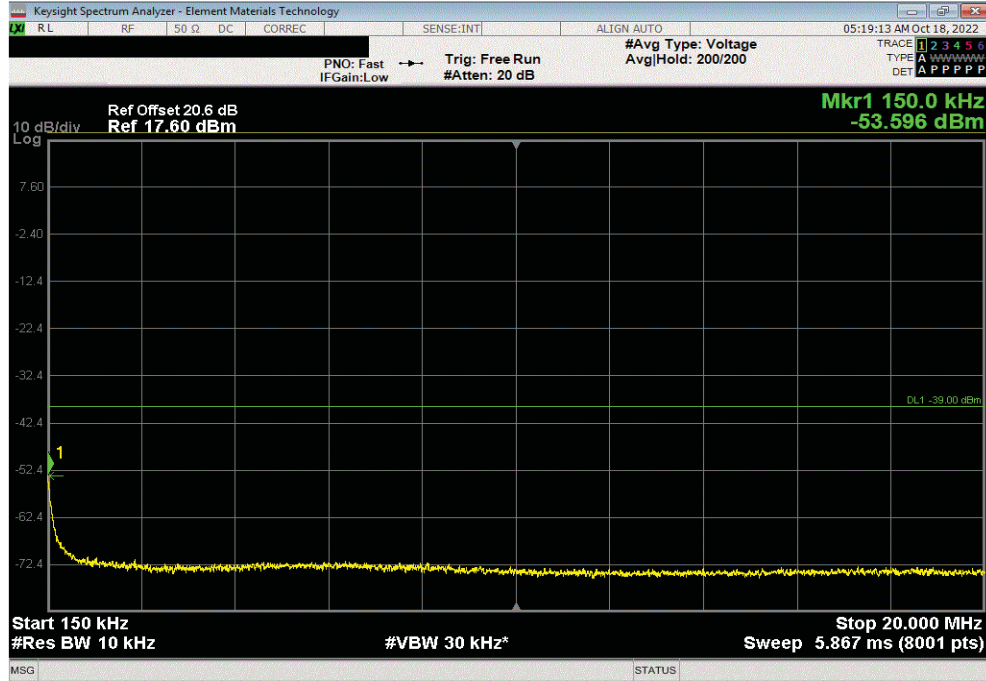
SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



TbTtx 2022.06.03.0 XMit 2022.02.07.0

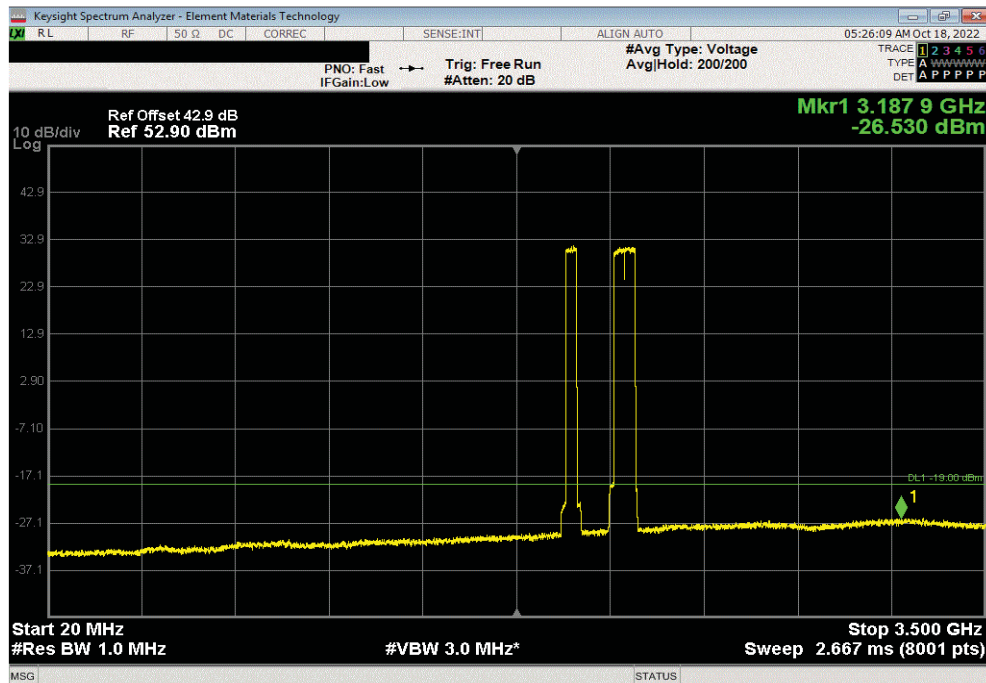
Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 4, 2140MHz, 2180MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
150 kHz - 20 MHz	0.15	-53.6	-39	Pass



Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 4, 2140MHz, 2180MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
20 MHz - 3.5 GHz	3187.92	-26.53	-19	Pass



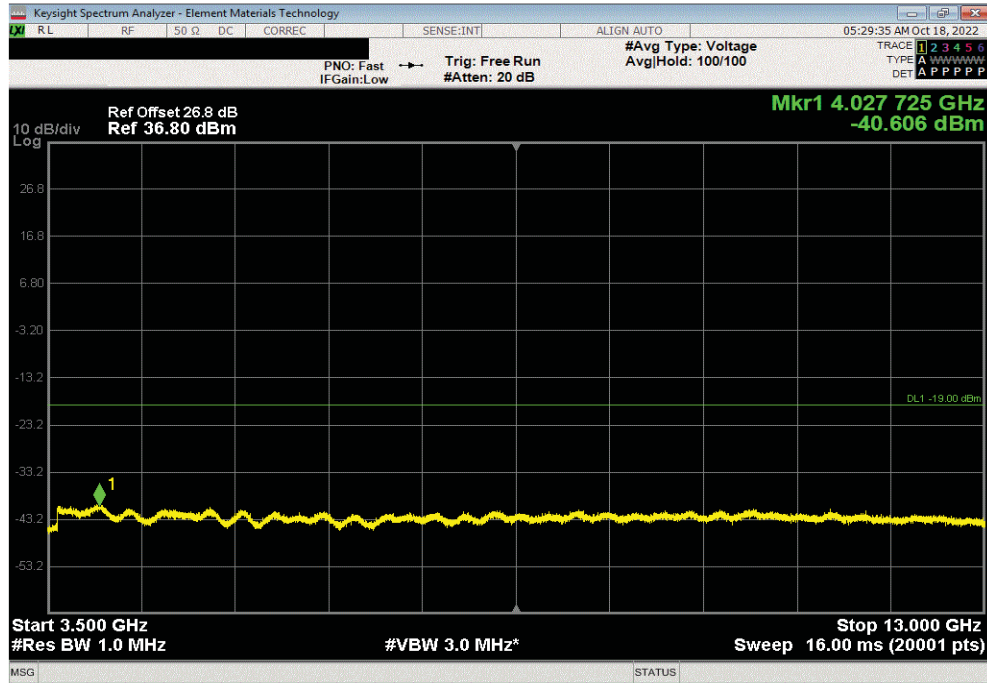
SPURIOUS CONDUCTED EMISSIONS - MULTICARRIER



TbTtx 2022.06.03.0 XMit 2022.02.07.0

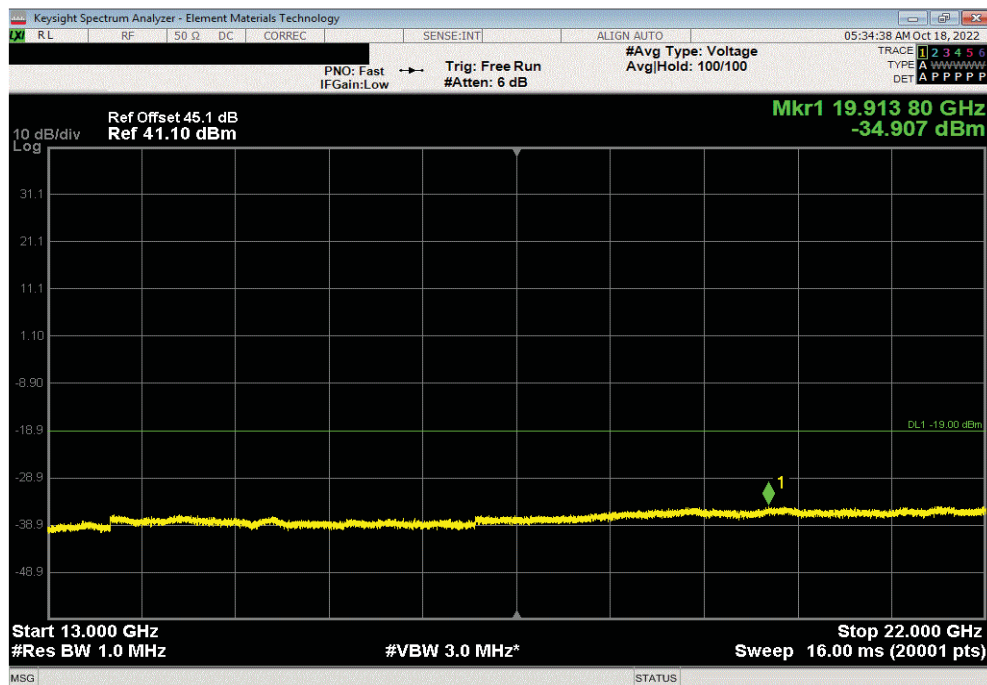
Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 4, 2140MHz, 2180MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
3.5 GHz - 13 GHz	4027.73	-40.61	-19	Pass



Port 3, AWS Band n66 and PCS Band n25, 40MHz Channel BW, 256-QAM Modulation, Test Case 4, 2140MHz, 2180MHz and 1962.5 MHz Channels, Multi-Carrier Configuration

Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit (dBm)	Result
13 GHz - 22 GHz	19913.8	-34.91	-19	Pass



End of Test Report