

OCCUPIED BANDWIDTH AWS



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

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The method in section 5.4 of ANSI C63.26 was used to make this measurement. The spectrum analyzer settings were as follows:

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

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

The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets. FCC 27.53(H)(3) defines the 26dB emission bandwidth requirement. RSS GEN Section 6.7 defines the 99% emission bandwidth requirement.


FCC and ISED Emission Designators for Band X (2110MHz to 2170MHz)							
Ch BW	Radio Channel	WCDMA: QPSK		WCDMA: 16QAM		WCDMA: 64QAM	
		FCC	ISED	FCC	ISED	FCC	ISED
5MHz	Low					4M62F9W	4M14F9W
	Mid	4M62F9W	4M15F9W	4M61F9W	4M13F9W	4M61F9W	4M15F9W
	High					4M61F9W	4M15F9W

Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.

OCCUPIED BANDWIDTH AWS



Test: 2022.05.02.0 XMI: 2022.02.07.0

EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0040	
Serial Number: YK214000036		Date: 13-May-22	
Customer: Nokia Solutions and Networks		Temperature: 23.2 °C	
Attendees: David Le, John Rattavong		Humidity: 47.7% RH	
Project: None		Barometric Pres.: 1014 mbar	
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX05	
TEST SPECIFICATIONS		Test Method	
FCC 27:2022		ANSI C63.26:2015	
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015	
COMMENTS			
All losses in the measurement path were accounted for: attenuators, cables, DC block and filter when in use. PCS Band II / AWS Band X carriers were enabled at maximum power (30 watts/carrier).			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value 99% (MHz)	Value 26dB (MHz)
		Limit	Result

AWS BAND X, 2110 MHz - 2170 MHz

Port 1

5 MHz Bandwidth

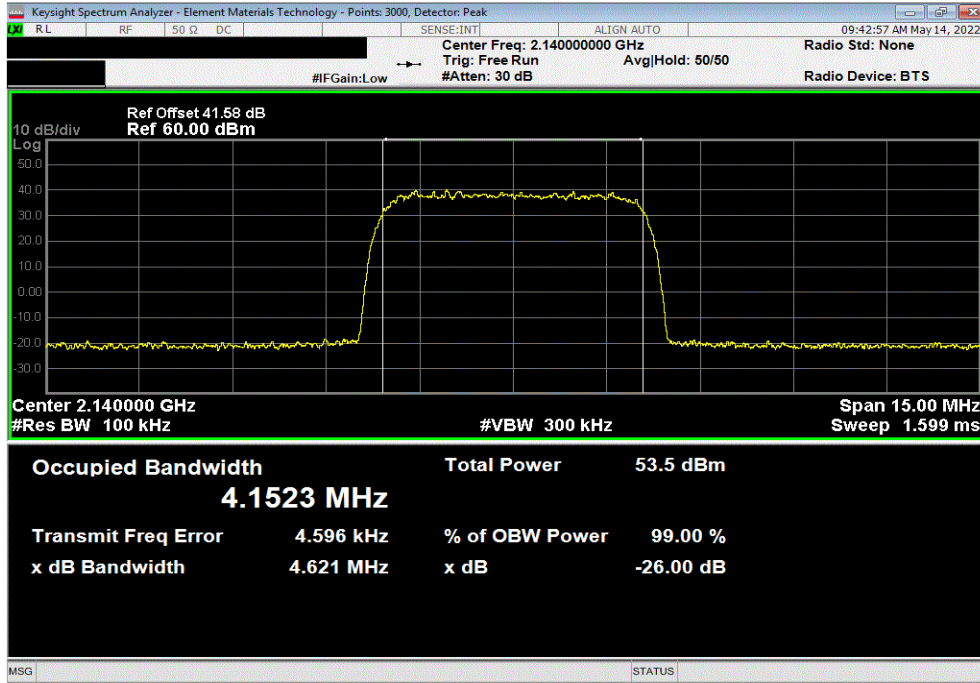
	Value 99% (MHz)	Value 26dB (MHz)	Limit	Result
QPSK Modulation				
Mid Channel, 2140 MHz	4.15	4.62	Within Band	Pass
16-QAM Modulation				
Mid Channel, 2140 MHz	4.13	4.61	Within Band	Pass
64-QAM Modulation				
Low Channel, 2112.4 MHz	4.14	4.62	Within Band	Pass
Mid Channel, 2140 MHz	4.15	4.61	Within Band	Pass
High Channel, 2167.6 MHz	4.15	4.61	Within Band	Pass

OCCUPIED BANDWIDTH AWS

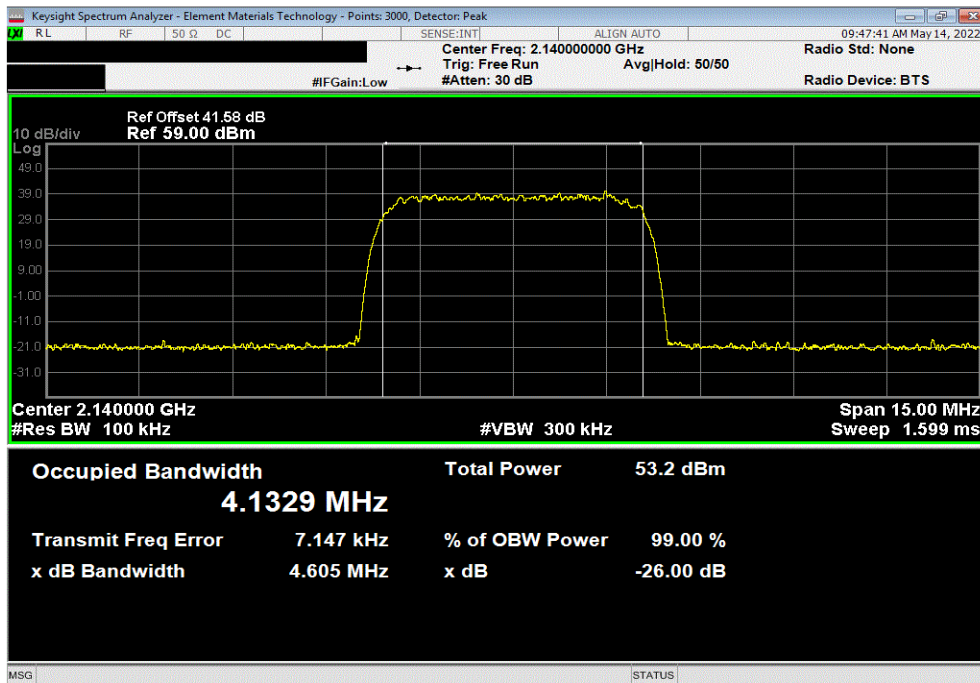


TbTx 2022.05.02.0 XMI 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz							
		Value	Value				
		99% (MHz)	26dB (MHz)	Limit	Result		
		4.152	4.621	Within Band	Pass		



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz							
		Value	Value				
		99% (MHz)	26dB (MHz)	Limit	Result		
		4.133	4.605	Within Band	Pass		

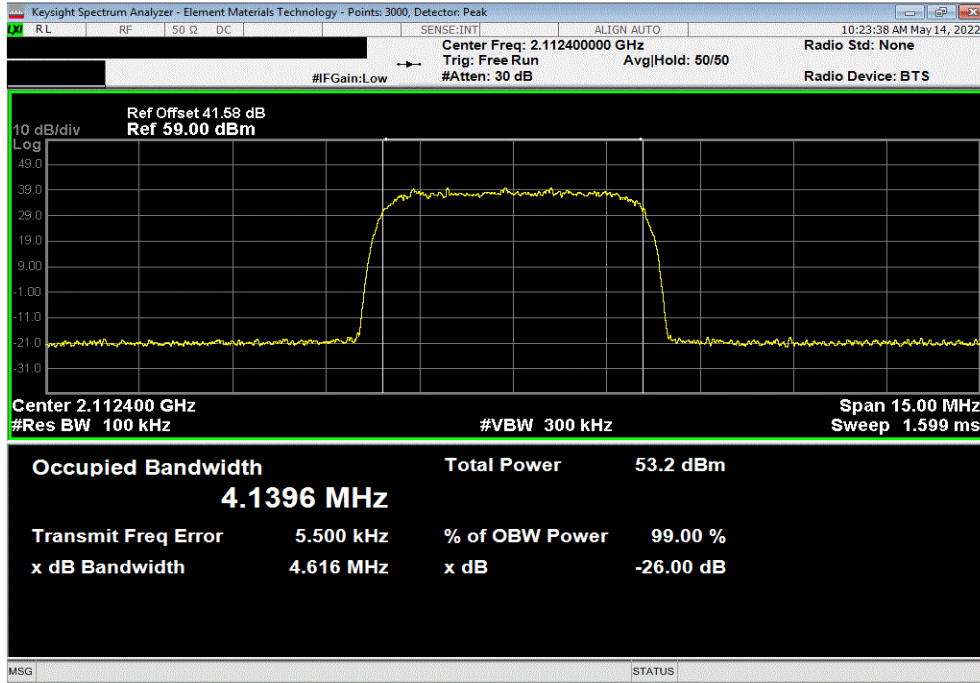


OCCUPIED BANDWIDTH AWS

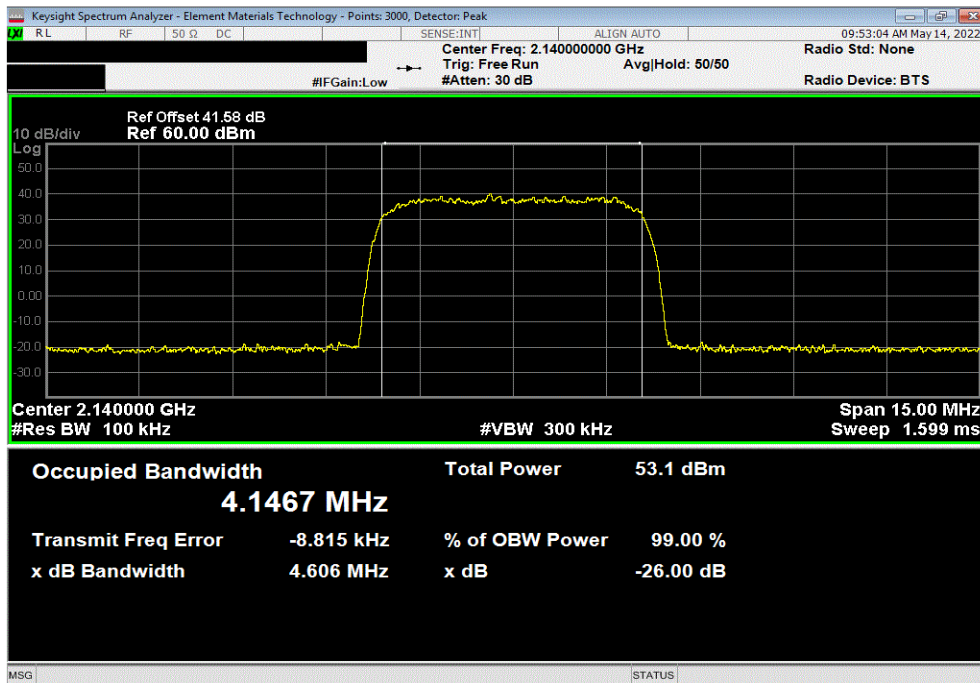


TbTx 2022.05.02.0 XMI 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
	Value	Value	Limit	Result		
	99% (MHz)	26dB (MHz)				
	4.14	4.616	Within Band	Pass		



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz						
	Value	Value	Limit	Result		
	99% (MHz)	26dB (MHz)				
	4.147	4.606	Within Band	Pass		

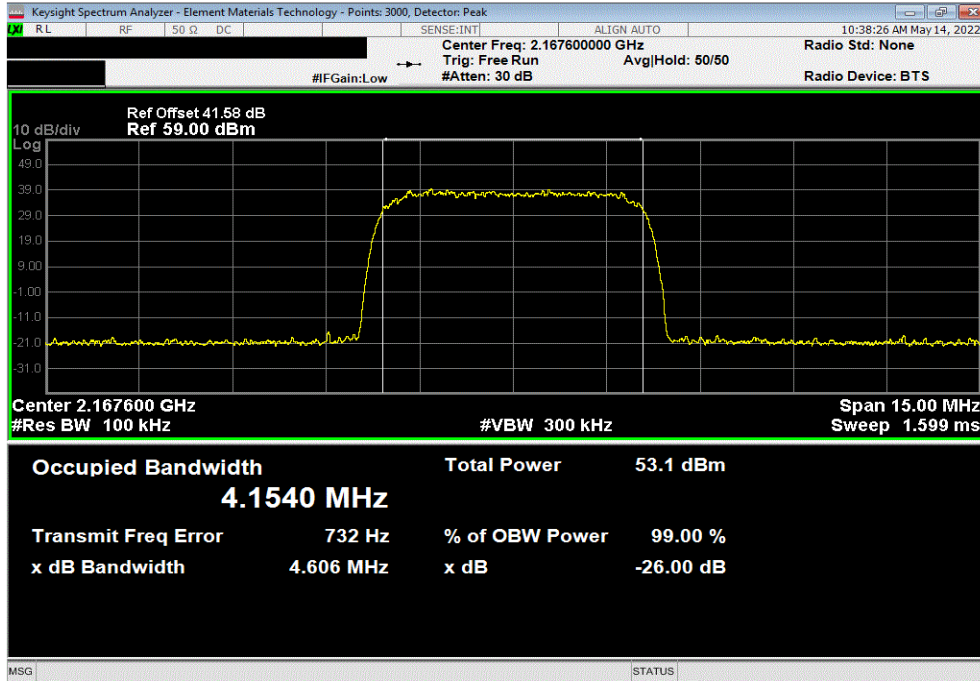


OCCUPIED BANDWIDTH AWS



TbTx 2022.05.02.0 XMI 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
	Value	Value	Limit	Result		
	99% (MHz)	26dB (MHz)				
	4.154	4.606	Within Band	Pass		



OCCUPIED BANDWIDTH PCS



XMH 2022.02.07.0

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TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The method in section 5.4 of ANSI C63.26 was used to make this measurement. The spectrum analyzer settings were as follows:

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

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The occupied bandwidth was measured with the EUT configured in the modes called out in the data sheets. FCC 24.238(b) defines the 26dB emission bandwidth requirement. RSS GEN Section 6.7 defines the 99% emission bandwidth requirement.


FCC and ISED Emission Designators for Band II (1930MHz to 1990MHz)							
Ch BW	Radio Channel	WCDMA: QPSK		WCDMA: 16QAM		WCDMA: 64QAM	
		FCC	ISED	FCC	ISED	FCC	ISED
5MHz	Low					4M61F9W	4M13F9W
	Mid	4M62F9W	4M14F9W	4M60F9W	4M16F9W	4M60F9W	4M17F9W
	High					4M63F9W	4M16F9W

Note: FCC emission designators are based on 26dB emission bandwidth. ISED emission designators are based on 99% emission bandwidth.

OCCUPIED BANDWIDTH PCS



TerM 2022.05.02.0 XMN 2022.02.07.0

EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0040	
Serial Number: YK214000036		Date: 13-May-22	
Customer: Nokia Solutions and Networks		Temperature: 22.3 °C	
Attendees: David Le, John Rattanavong		Humidity: 50.3% RH	
Project: None		Barometric Pres.: 1013 mbar	
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX05	
TEST SPECIFICATIONS		Test Method	
FCC 24E:2022		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 offset including any attenuators, filters and DC blocks. PCS band II carriers are enabled at maximum power (30 watts/carrier).			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature 	
		Value	Value
		99% (MHz)	26dB (MHz)
		Limit	Result

PCS WCDMA, 1930 MHz - 1990 MHz
Port 1

5 MHz Bandwidth

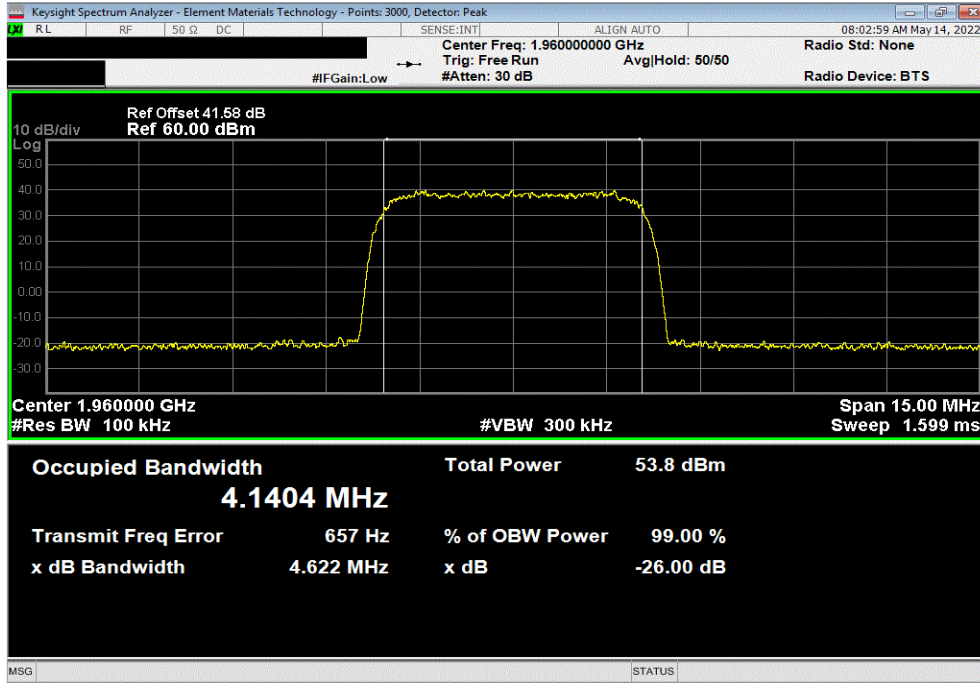
	Value	Value	Limit	Result
	99% (MHz)	26dB (MHz)		
QPSK Modulation				
Mid Channel, 1960 MHz	4.14	4.62	Within Band	Pass
16-QAM Modulation				
Mid Channel, 1960 MHz	4.16	4.60	Within Band	Pass
64-QAM Modulation				
Low Channel, 1932.4 MHz	4.13	4.61	Within Band	Pass
Mid Channel, 1960 MHz	4.17	4.60	Within Band	Pass
High Channel, 1987.6 MHz	4.16	4.63	Within Band	Pass

OCCUPIED BANDWIDTH PCS

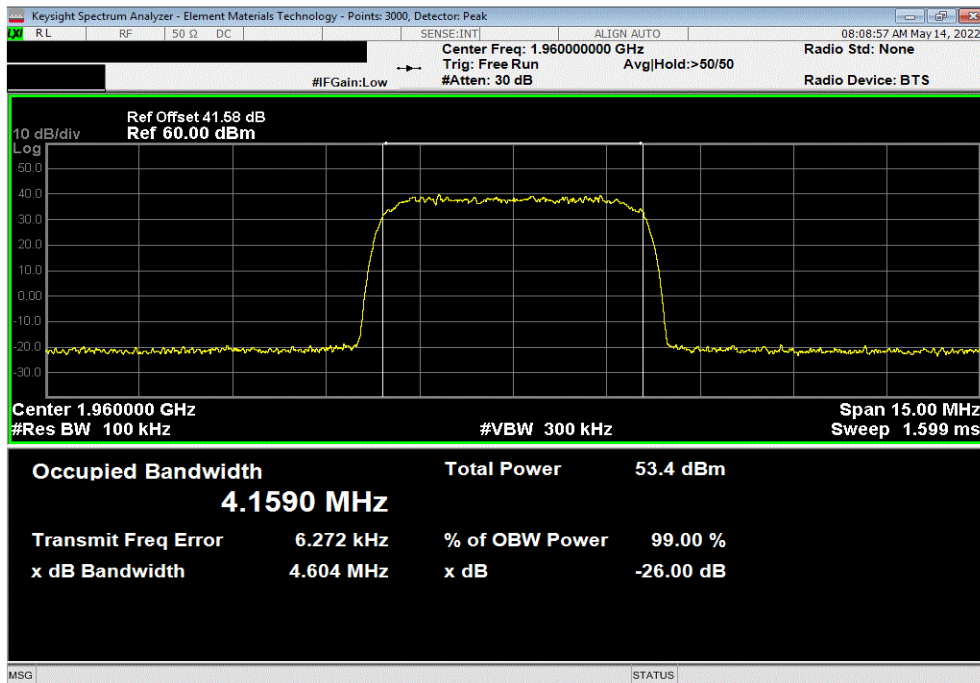


TbTx 2022.05.02.0 XMt 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz							
		Value	Value				
		99% (MHz)	26dB (MHz)	Limit	Result		
		4.14	4.622	Within Band	Pass		



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz							
		Value	Value				
		99% (MHz)	26dB (MHz)	Limit	Result		
		4.159	4.604	Within Band	Pass		

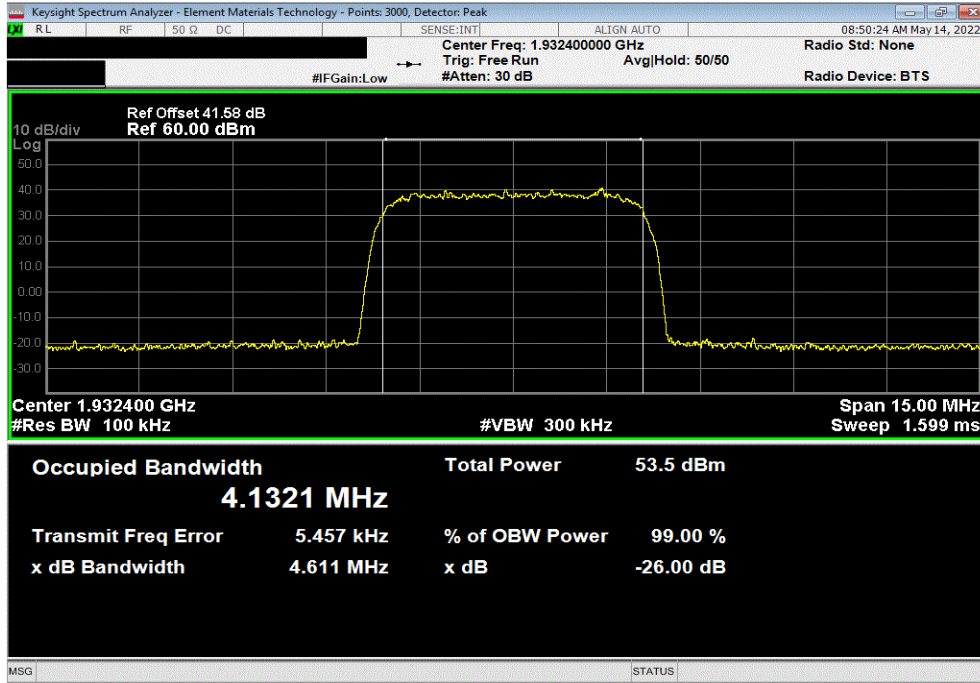


OCCUPIED BANDWIDTH PCS

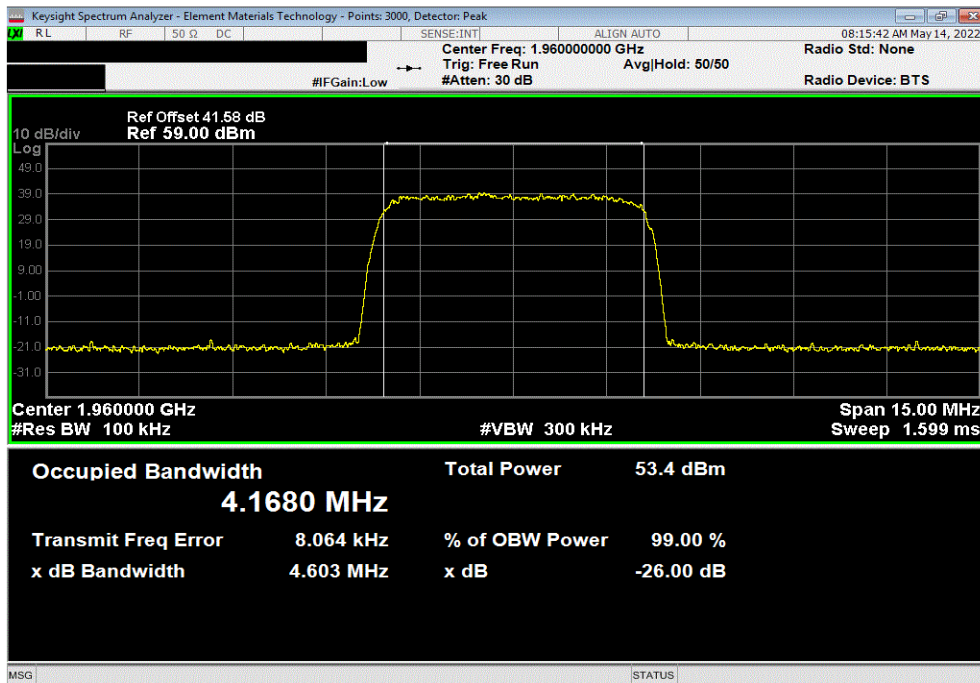


TbTx 2022.05.02.0 XMI 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
	Value	Value	Limit	Result		
	99% (MHz)	26dB (MHz)				
	4.132	4.611	Within Band	Pass		



PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz						
	Value	Value	Limit	Result		
	99% (MHz)	26dB (MHz)				
	4.168	4.603	Within Band	Pass		

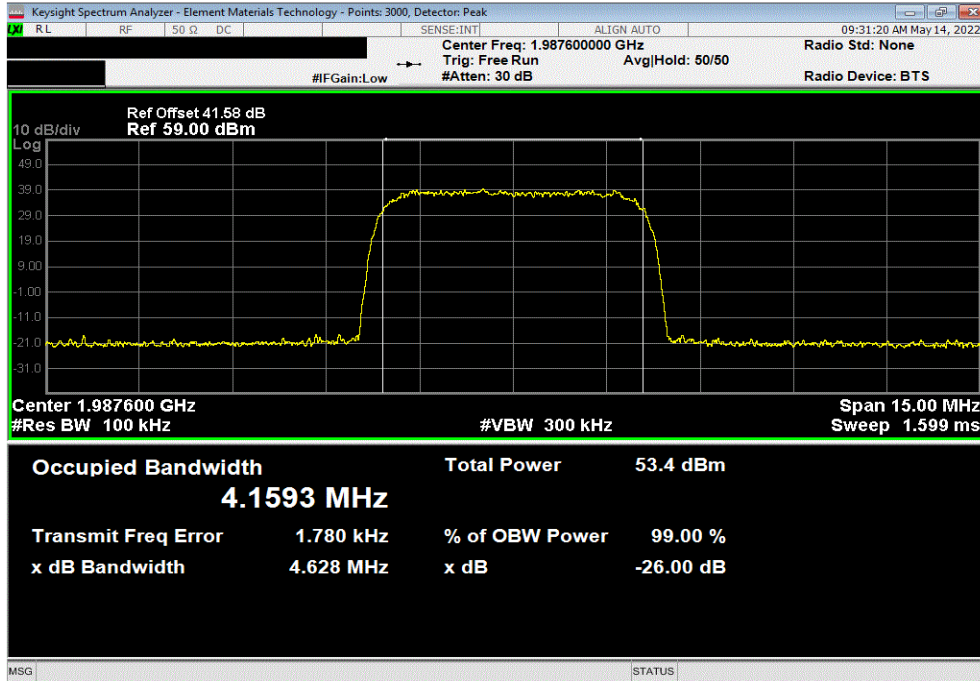


OCCUPIED BANDWIDTH PCS



TelTx 2022.05.02.0 XMit 2022.02.07.0

PCS WCDMA, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
	Value	Value	Limit	Result		
	99% (MHz)	26dB (MHz)				
	4.159	4.628	Within Band	Pass		



PEAK AND AVERAGE (PAPR) CCDF AWS



element

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

TEST DESCRIPTION

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

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

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.
The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC part 27.50(d)(5) and RSS-139 6.5, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

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

PEAK AND AVERAGE (PAPR) CCDF AWS



Tel: 2022.05.02.0 XMI: 2022.02.07.0

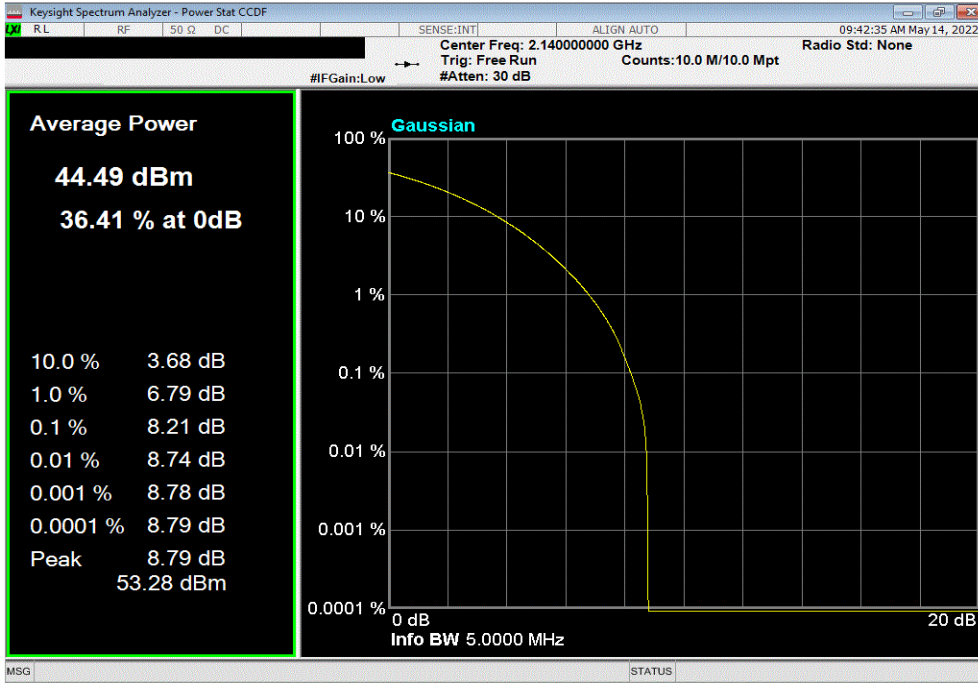
EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0040
Serial Number: YK214000036		Date: 13-May-22
Customer: Nokia Solutions and Networks		Temperature: 21.9 °C
Attendees: David Le, John Rattanaovong		Humidity: 51.9% RH
Project: None		Barometric Pres.: 1014 mbar
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX05
TEST SPECIFICATIONS		
FCC 27:2022		Test Method
RSS-139 Issue 3:2015		ANSI C63.26:2015
		RSS-139 Issue 3:2015
COMMENTS		
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. AWS Band X carriers are enabled at maximum power (30 watts/carrier).		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	2	Signature
		PAPR Value (dB) PAPR Limit (dB) Results
AWS WCDMA, 2110 MHz - 2170 MHz		
Port 1		
5 MHz Bandwidth		
QPSK Modulation		
	Mid Channel, 2140 MHz	8.21 13 Pass
16-QAM Modulation		
	Mid Channel, 2140 MHz	8.11 13 Pass
64-QAM Modulation		
	Low Channel, 2112.4 MHz	8.11 13 Pass
	Mid Channel, 2140 MHz	8.15 13 Pass
	High Channel, 2167.6 MHz	8.06 13 Pass

PEAK AND AVERAGE (PAPR) CCDF AWS

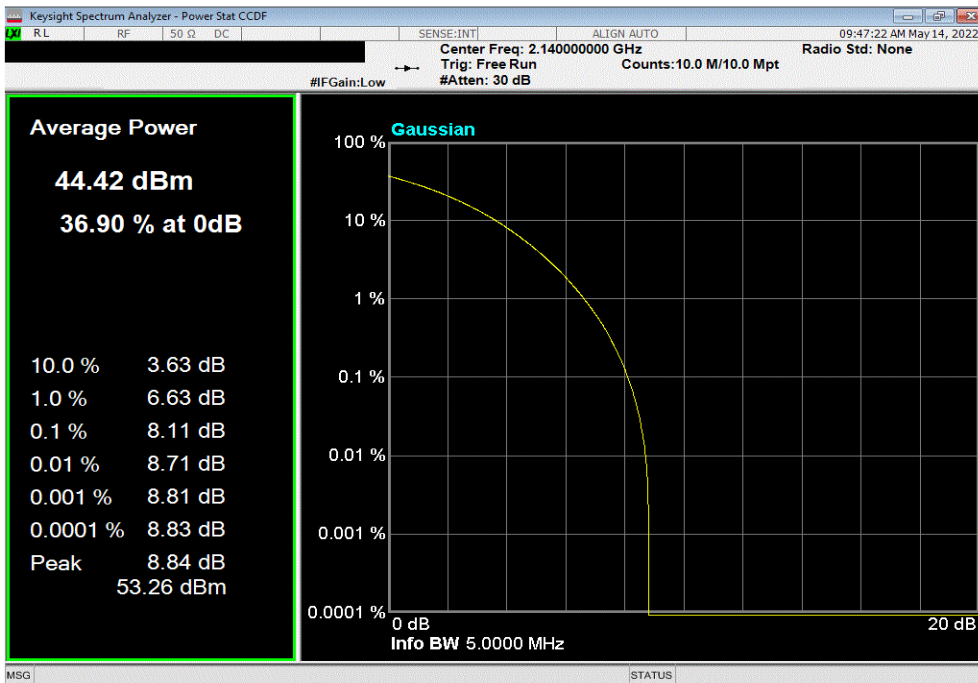


TbTx 2022.05.02.0 XMit 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 2140 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.21	13	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 2140 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.11	13	Pass			

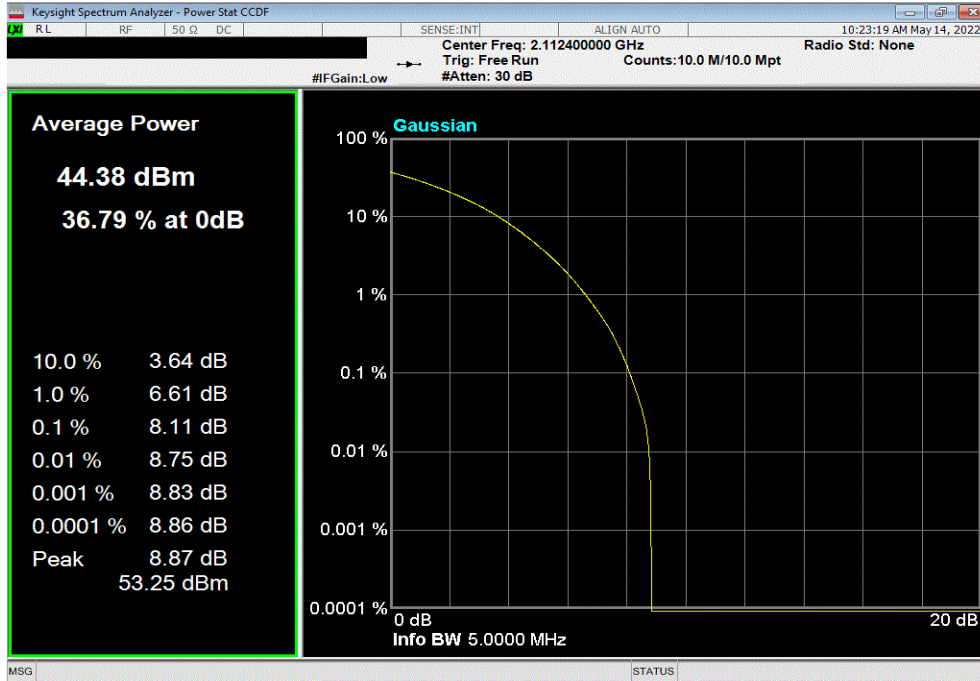


PEAK AND AVERAGE (PAPR) CCDF AWS

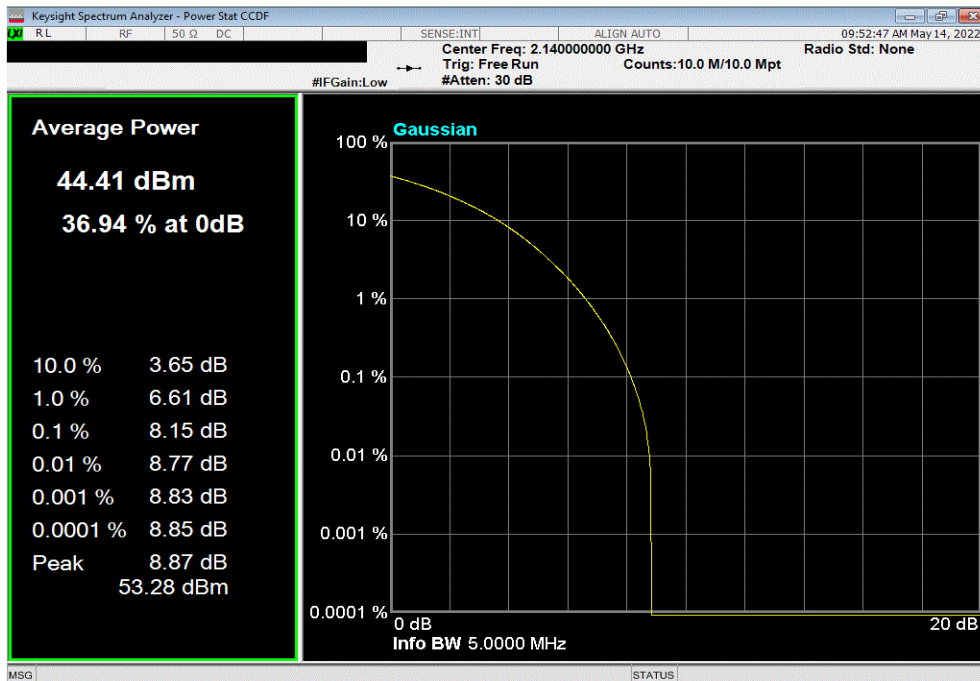


TbTx 2022.05.02.0 XbMt 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.11	13	Pass			



AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 2140 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.15	13	Pass			

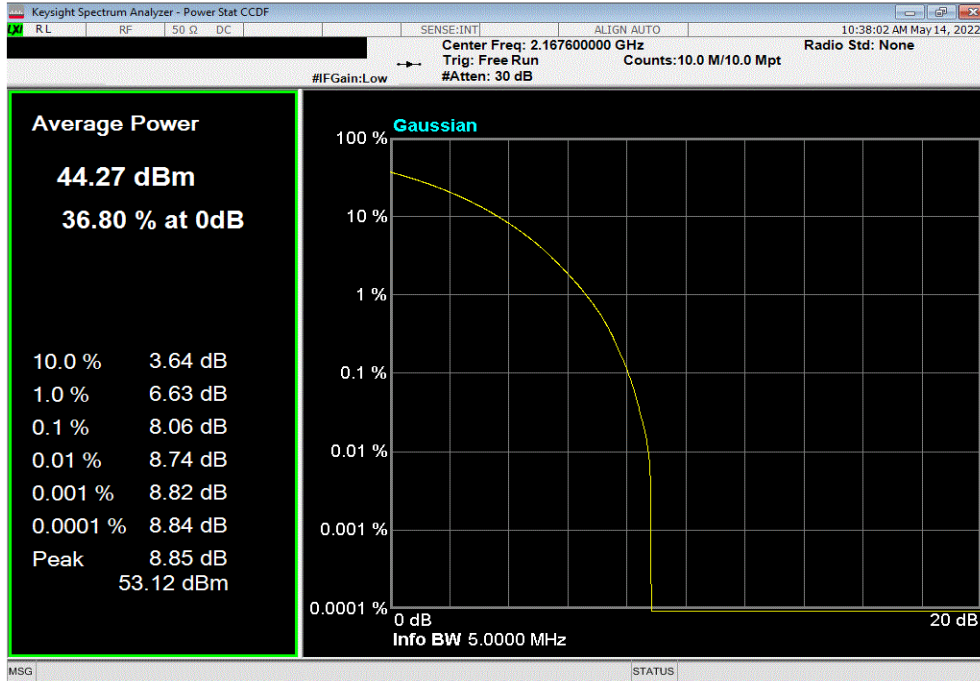


PEAK AND AVERAGE (PAPR) CCDF AWS



TbTx 2022.05.02.0 XMit 2022.02.07.0

AWS WCDMA, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
		PAPR Value (dB)	PAPR Limit (dB)	Results		
		8.06	13	Pass		



PEAK AND AVERAGE (PAPR) CCDF PCS



XMIT 2022.02.07.0

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Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Block - DC	Fairview Microwave	SD3239	ANC	2022-03-02	2023-03-02
Analyzer - Spectrum Analyzer	Keysight	N9010A	AFQ	2022-01-17	2023-01-17
Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

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

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

The PAPR measurement method is described in ANSI C63.26 section 5.2.3.4.
The PAPR was measured using the CCDF function of the spectrum analyzer.

Per FCC part 24.232(d) and RSS 133 6.4, the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

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

PEAK AND AVERAGE (PAPR) CCDF PCS



TerM 2022.05.02.0 XMN 2022.02.07.0

EUT: AHFII (FCC/ISED C2PC)		Work Order: NOKI0040
Serial Number: YK214000036		Date: 13-May-22
Customer: Nokia Solutions and Networks		Temperature: 22.6 °C
Attendees: David Le, John Rattanaovong		Humidity: 49.7% RH
Project: None		Barometric Pres.: 1013 mbar
Tested by: Brandon Hobbs	Power: 54 VDC	Job Site: TX05
TEST SPECIFICATIONS		
FCC 24E:2022		Test Method
RSS-133 Issue 6:2013+A1:2018		ANSI C63.26:2015
		RSS-133 Issue 6:2013+A1:2018
COMMENTS		
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. PCS band II carriers are enabled at maximum power (30 watts/carrier).		
DEVIATIONS FROM TEST STANDARD		
None		
Configuration #	2	Signature
		PAPR Value (dB) PAPR Limit (dB) Results

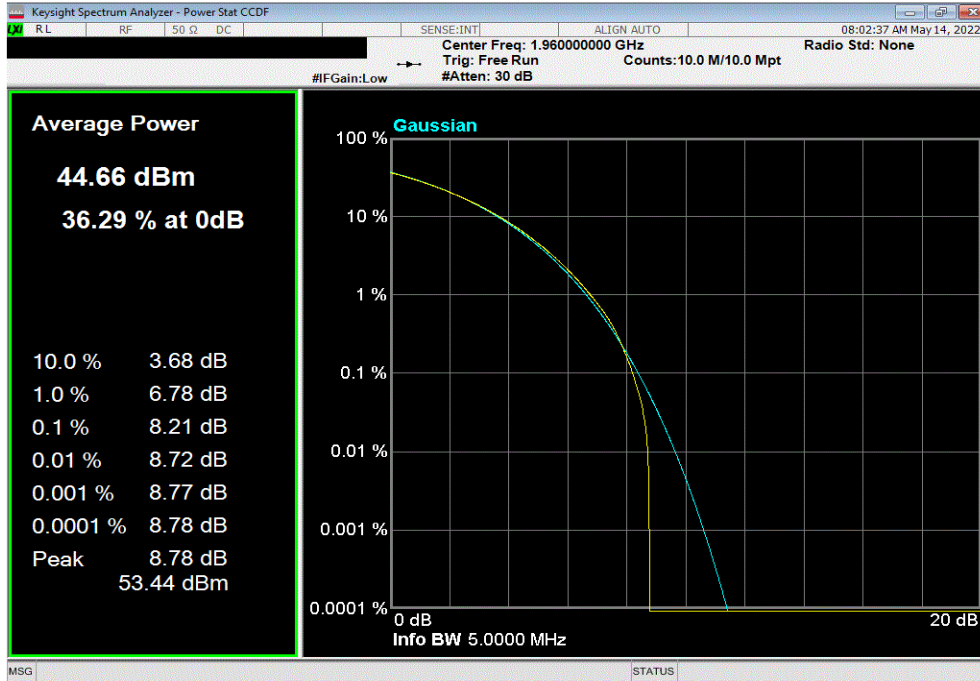
PCS BAND II, 1930 MHz - 1990 MHz			
Port 1			
5 MHz Bandwidth			
QPSK Modulation			
Mid Channel, 1960 MHz	8.21	13	Pass
16-QAM Modulation			
Mid Channel, 1960 MHz	8.06	13	Pass
64-QAM Modulation			
Low Channel, 1932.4 MHz	8.11	13	Pass
Mid Channel, 1960 MHz	8.11	13	Pass
High Channel, 1987.6 MHz	8.10	13	Pass

PEAK AND AVERAGE (PAPR) CCDF PCS

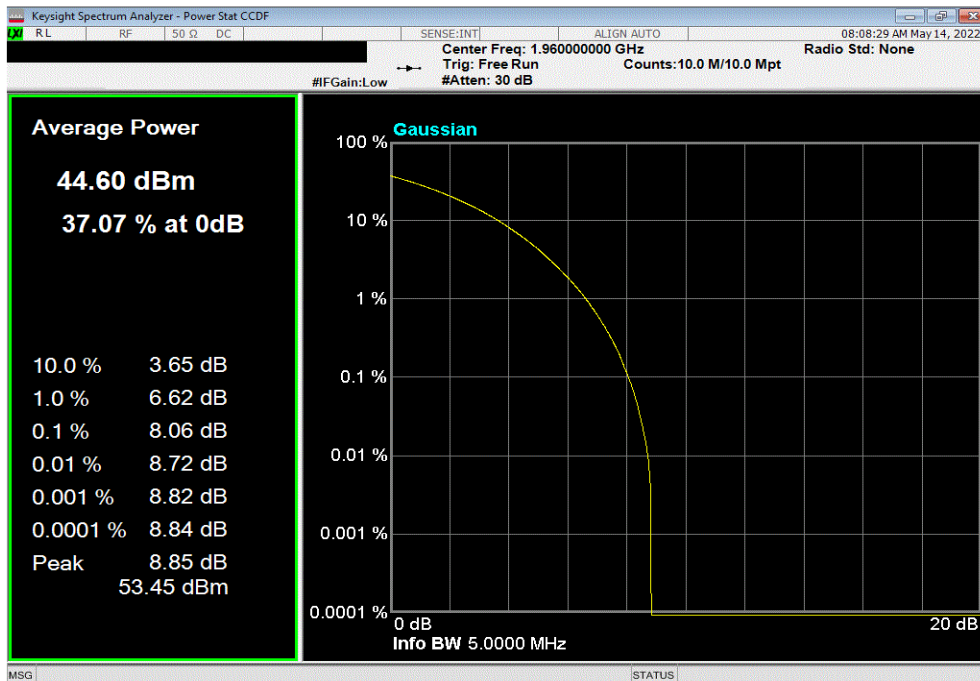


TbTx 2022.05.02.0 XMit 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 1960 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.21	13	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Mid Channel, 1960 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.06	13	Pass			

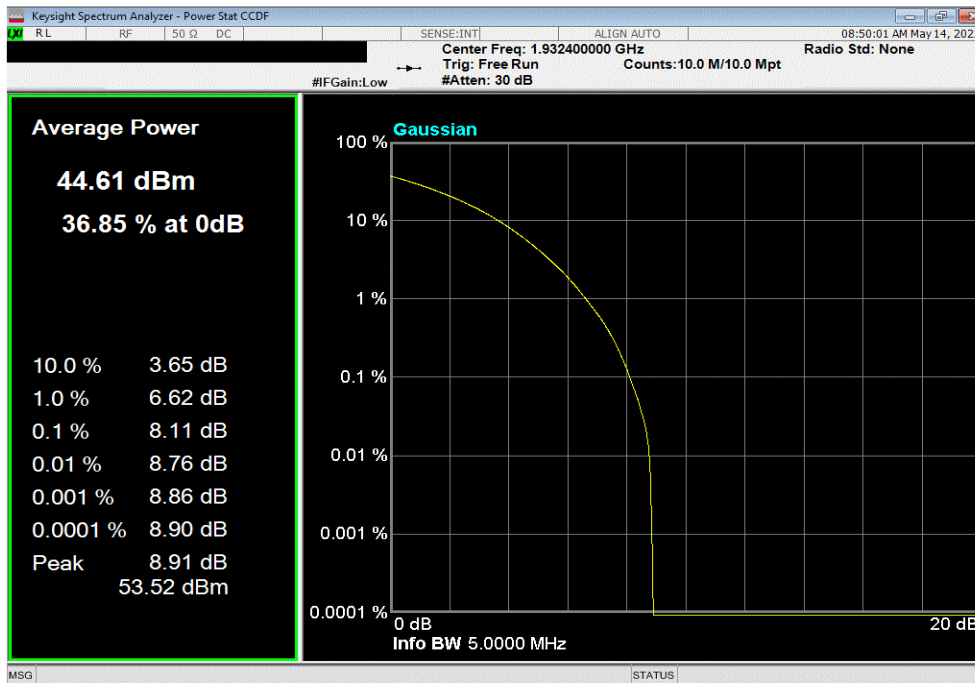


PEAK AND AVERAGE (PAPR) CCDF PCS

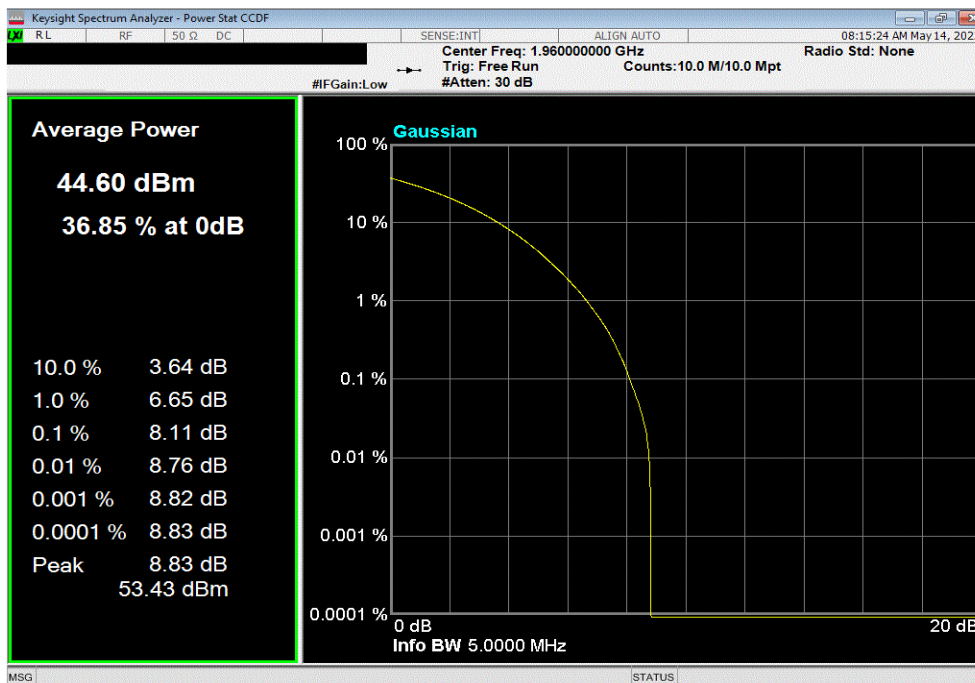


TbTx 2022.05.02.0 XMit 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.11	13	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Mid Channel, 1960 MHz						
	PAPR Value (dB)	PAPR Limit (dB)	Results			
	8.11	13	Pass			

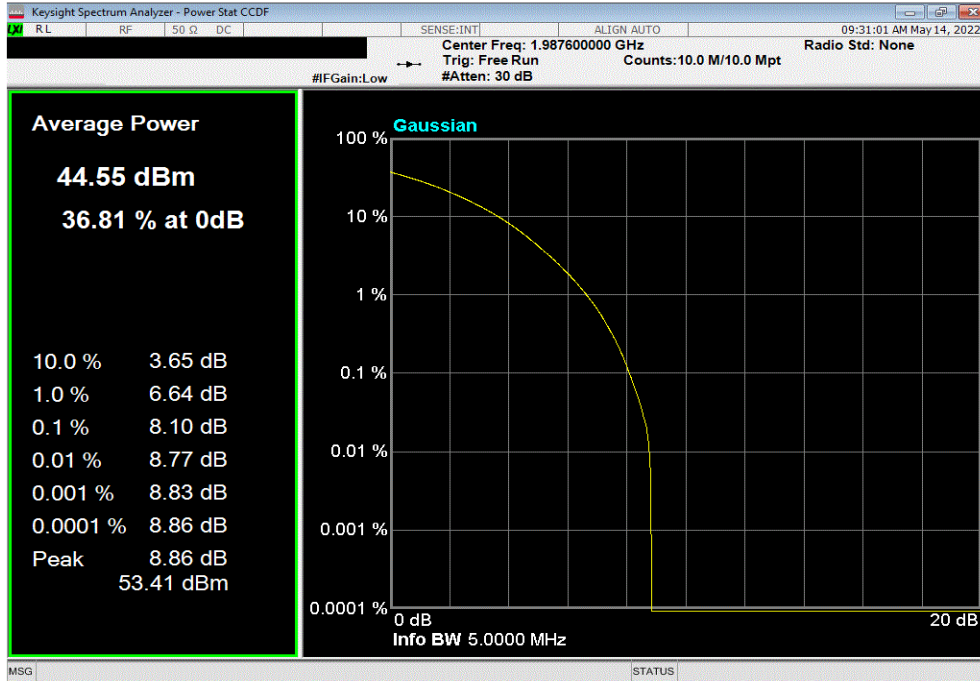


PEAK AND AVERAGE (PAPR) CCDF PCS



TbTx 2022.05.02.0 XMit 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
		PAPR Value (dB)	PAPR Limit (dB)	Results		
		8.1	13	Pass		



13 Pass



XMH 2022.02.07.0

BAND EDGE COMPLIANCE AWS

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Generator - Signal	Agilent	N5173B	TIW	2020-07-17	2023-07-17

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

All limits were adjusted by a factor of $[-10 \cdot \log(2)]$ dB to account for the device operation as a 2 port MIMO transmitter, as per FCC KDB 622911.

Per section 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. The limit is adjusted to -16 dBm $[-13 \text{ dBm} - 10 \log(2)]$ per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

The RBW to be used for these measurements are per 27.53(h)(3), and RSS-139 6.6. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified).

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFII) as the original certification test. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

BAND EDGE COMPLIANCE AWS



Tb/Tv 2022.05.02.0 XMI 2022.02.07.0

EUT:	AHFII (FCC/ISED C2PC)	Work Order:	NOKI0040
Serial Number:	YK214000036	Date:	13-May-22
Customer:	Nokia Solutions and Networks	Temperature:	22.1 °C
Attendees:	David Le, John Rattavong	Humidity:	50.6% RH
Project:	None	Barometric Pres.:	1013 mbar
Tested by:	Brandon Hobbs	Power:	54 VDC
		Job Site:	TX05
TEST SPECIFICATIONS		Test Method	
FCC 27-2022		ANSI C63.26:2015	
RSS-139 Issue 3:2015		RSS-139 Issue 3:2015	
COMMENTS			
All losses in the measurement path were accounted for: attenuators, cables, DC block and filter when in use. PCS Band II / AWS Band X carriers were enabled at maximum power (30 watts/carrier).			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2	Signature	

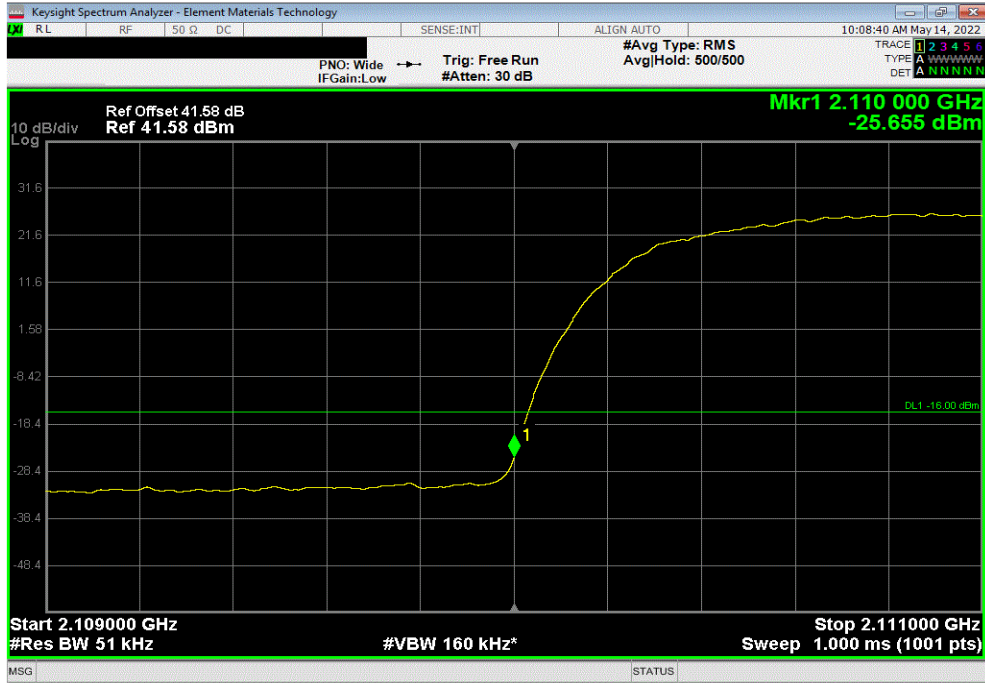
	Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
AWS BAND X, 2110 MHz - 2170 MHz					
Port 1					
5 MHz Bandwidth					
QPSK Modulation					
	Low Channel, 2112.4 MHz	1	-25.7	-16	Pass
	Low Channel, 2112.4 MHz	2	-19.9	-16	Pass
	Low Channel, 2112.4 MHz	3	-25.3	-16	Pass
	High Channel, 2167.6 MHz	1	-25.1	-16	Pass
	High Channel, 2167.6 MHz	2	-20.1	-16	Pass
	High Channel, 2167.6 MHz	3	-26.3	-16	Pass
16-QAM Modulation					
	Low Channel, 2112.4 MHz	1	-25.2	-16	Pass
	Low Channel, 2112.4 MHz	2	-19.9	-16	Pass
	Low Channel, 2112.4 MHz	3	-25.5	-16	Pass
	High Channel, 2167.6 MHz	1	-25.1	-16	Pass
	High Channel, 2167.6 MHz	2	-20.0	-16	Pass
	High Channel, 2167.6 MHz	3	-26.5	-16	Pass
64-QAM Modulation					
	Low Channel, 2112.4 MHz	1	-25.3	-16	Pass
	Low Channel, 2112.4 MHz	2	-20.0	-16	Pass
	Low Channel, 2112.4 MHz	3	-25.4	-16	Pass
	High Channel, 2167.6 MHz	1	-25.4	-16	Pass
	High Channel, 2167.6 MHz	2	-20.1	-16	Pass
	High Channel, 2167.6 MHz	3	-26.6	-16	Pass

BAND EDGE COMPLIANCE AWS

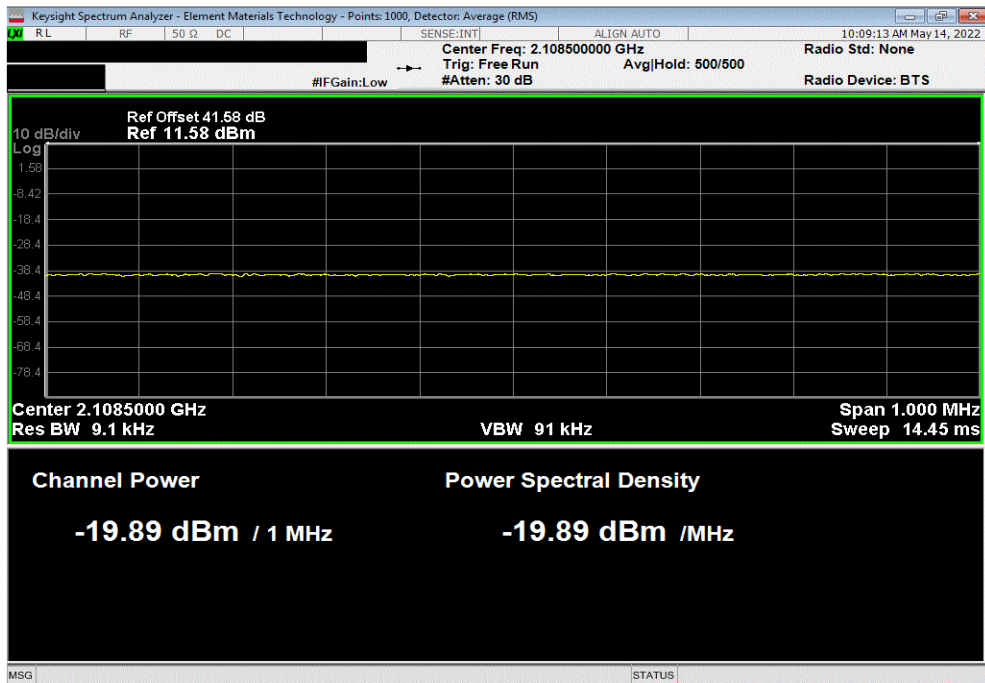


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.7	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-19.9	-16	Pass			

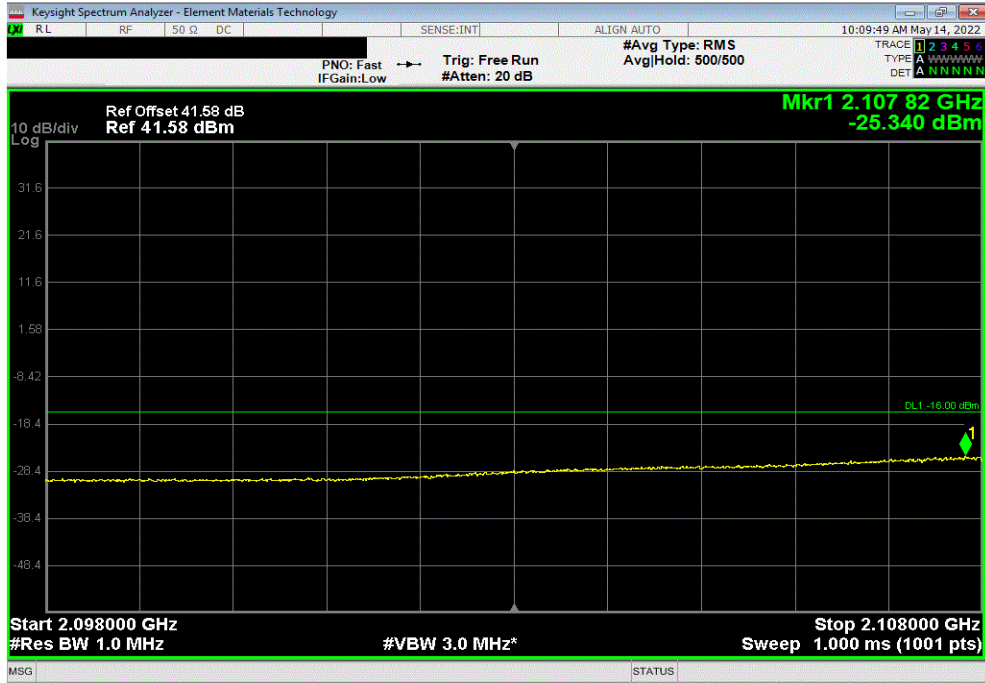


BAND EDGE COMPLIANCE AWS

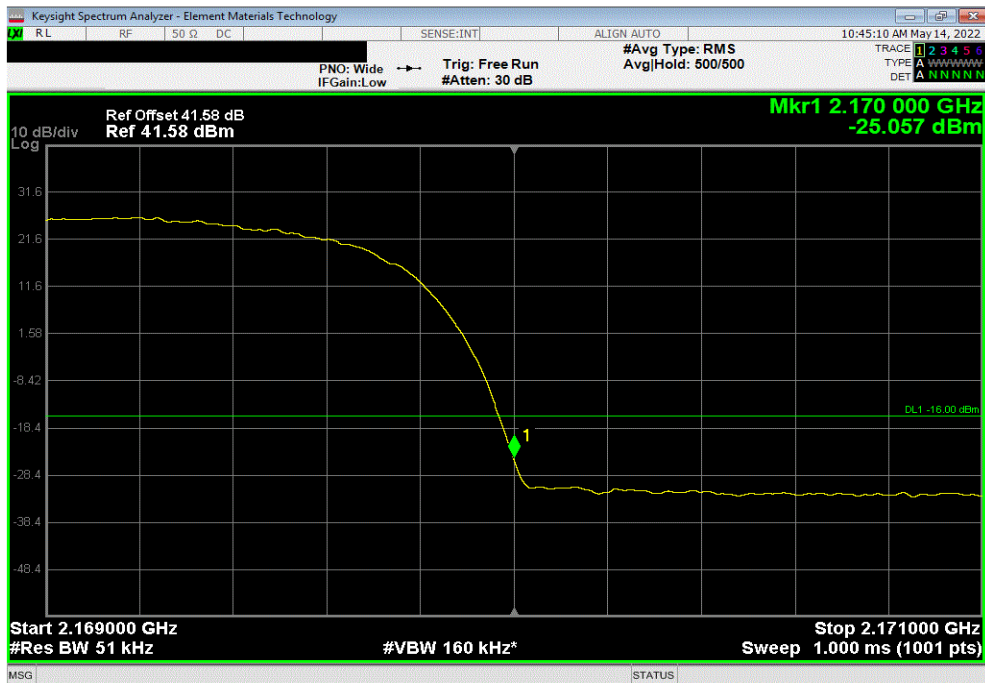


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-25.3	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.1	-16	Pass			

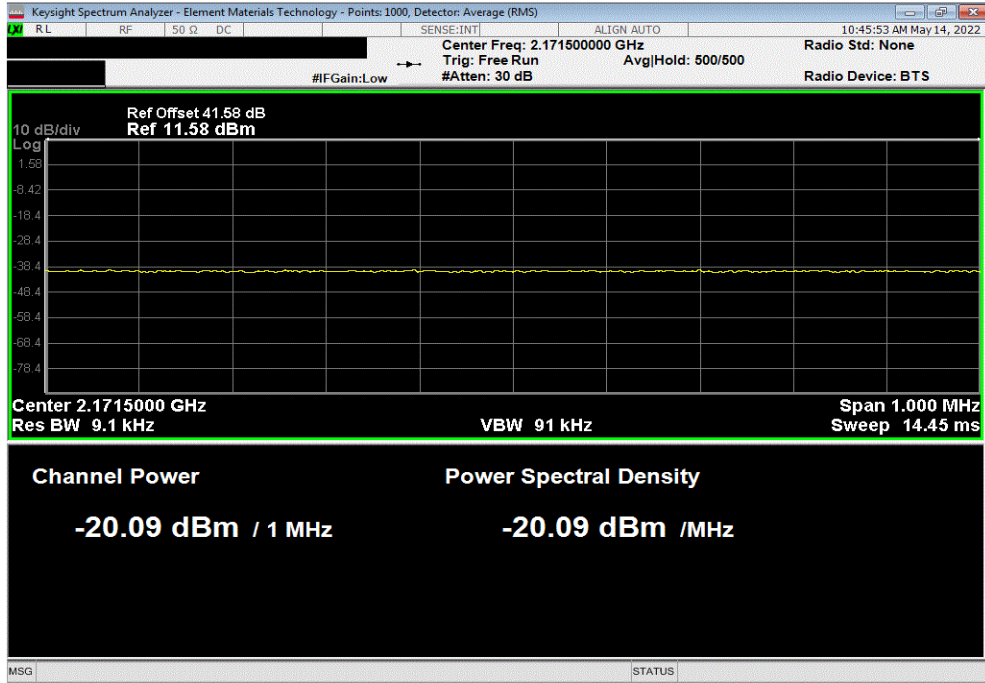


BAND EDGE COMPLIANCE AWS

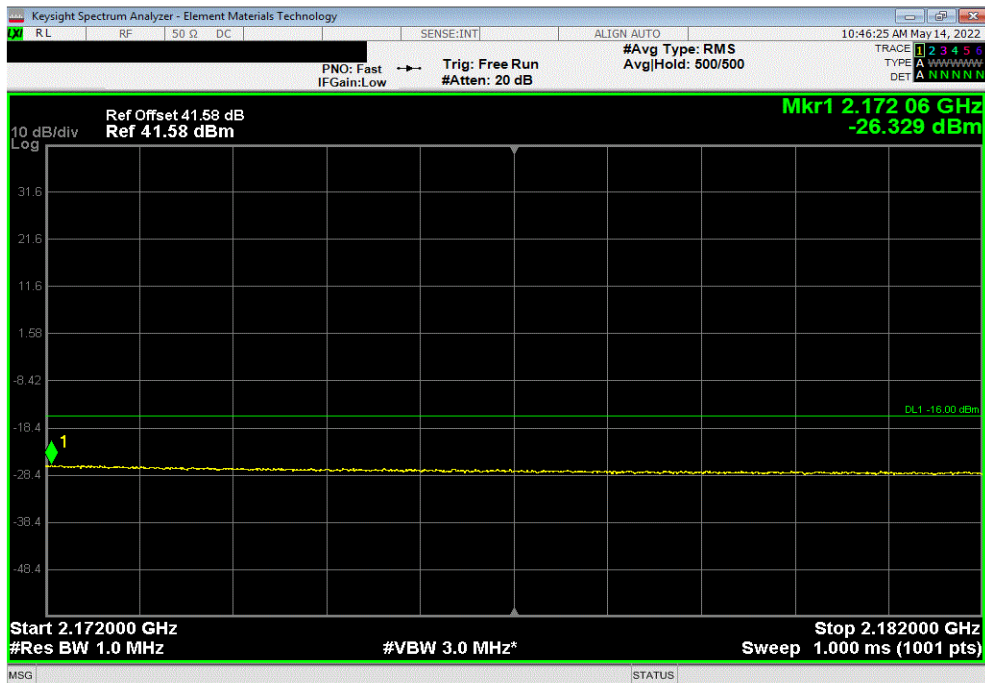


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.1	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation , High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-26.3	-16	Pass			

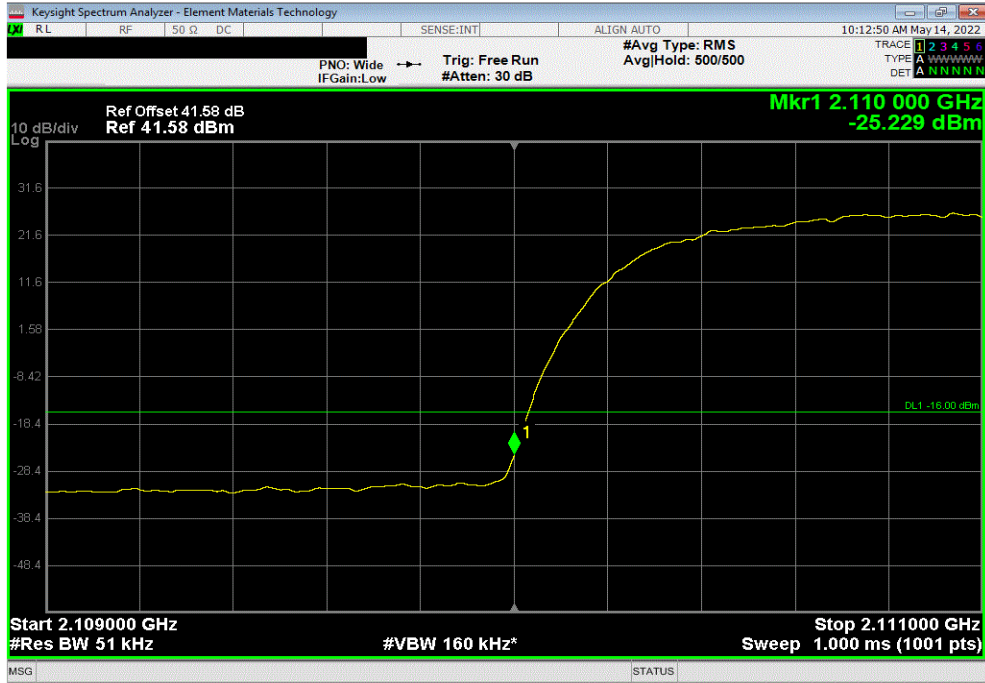


BAND EDGE COMPLIANCE AWS

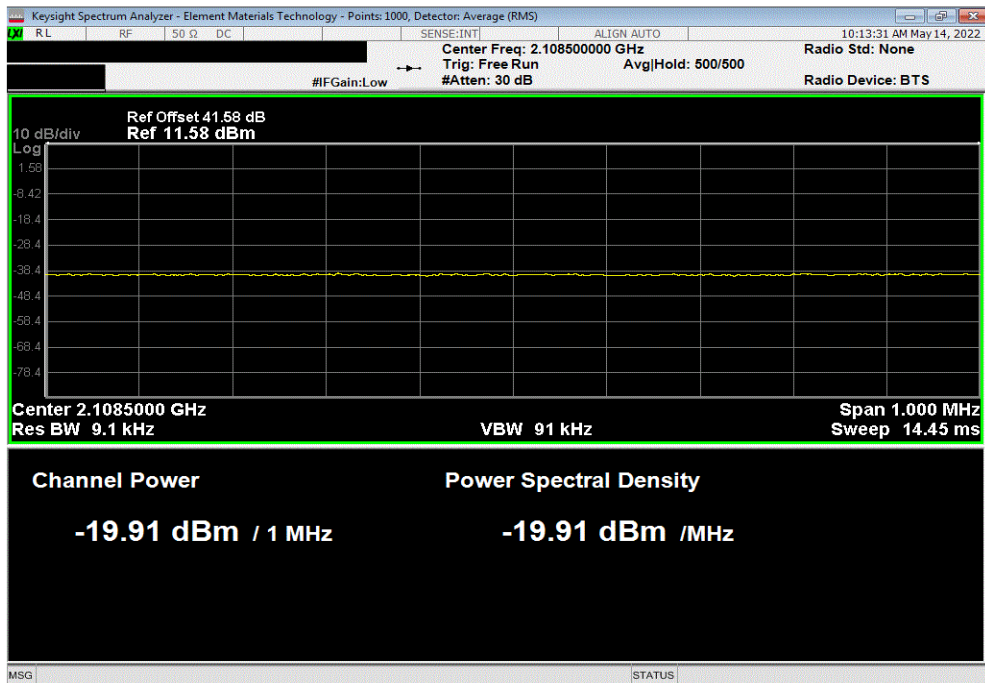


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.2	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-19.9	-16	Pass			

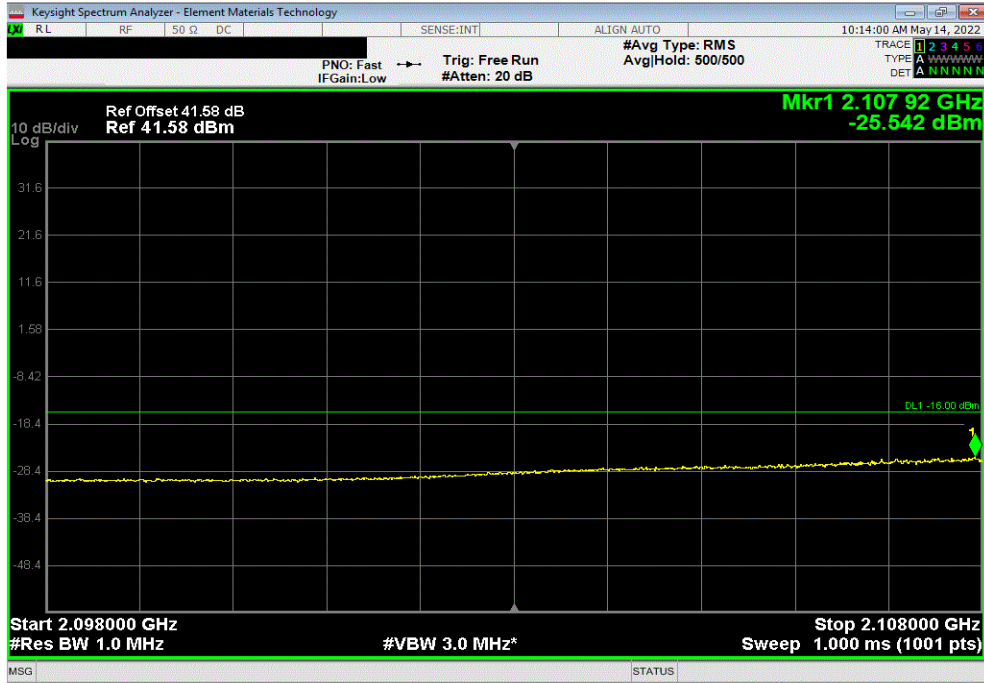


BAND EDGE COMPLIANCE AWS

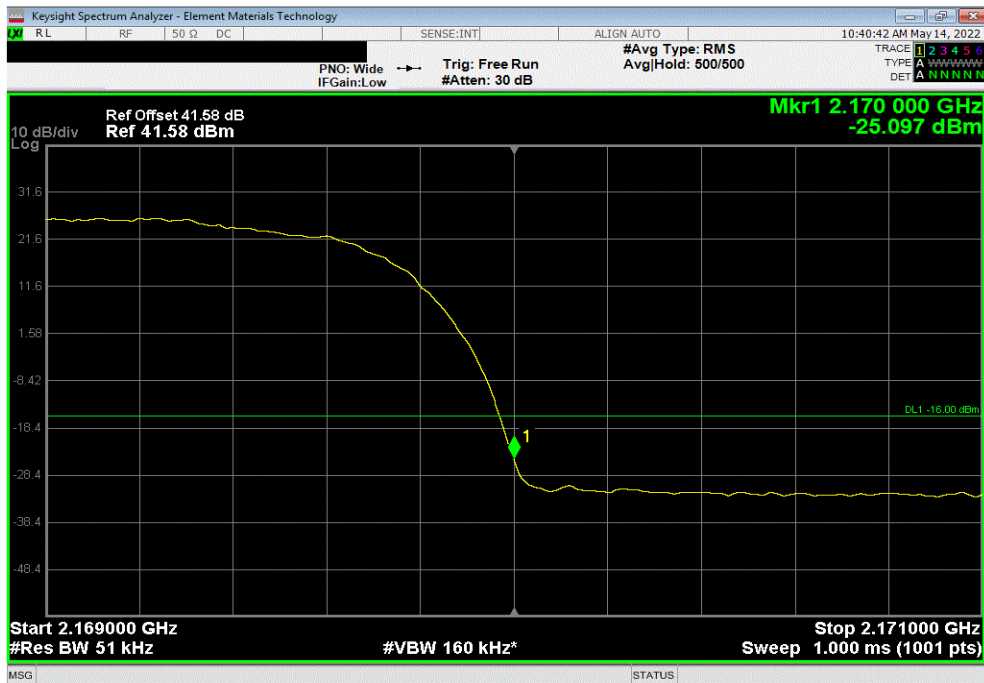


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-25.5	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.1	-16	Pass			

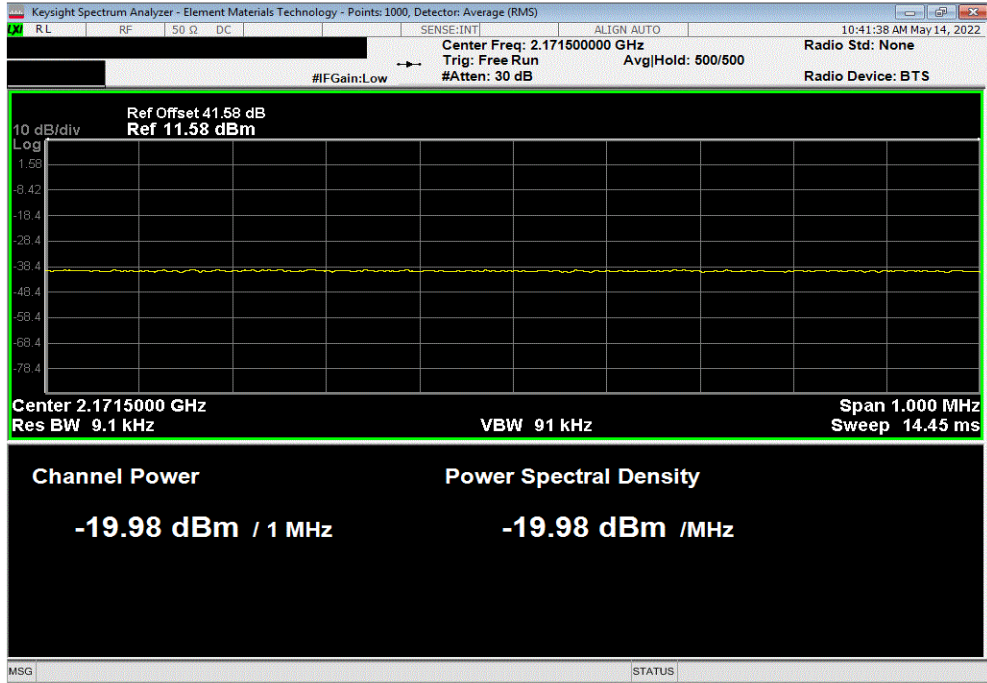


BAND EDGE COMPLIANCE AWS

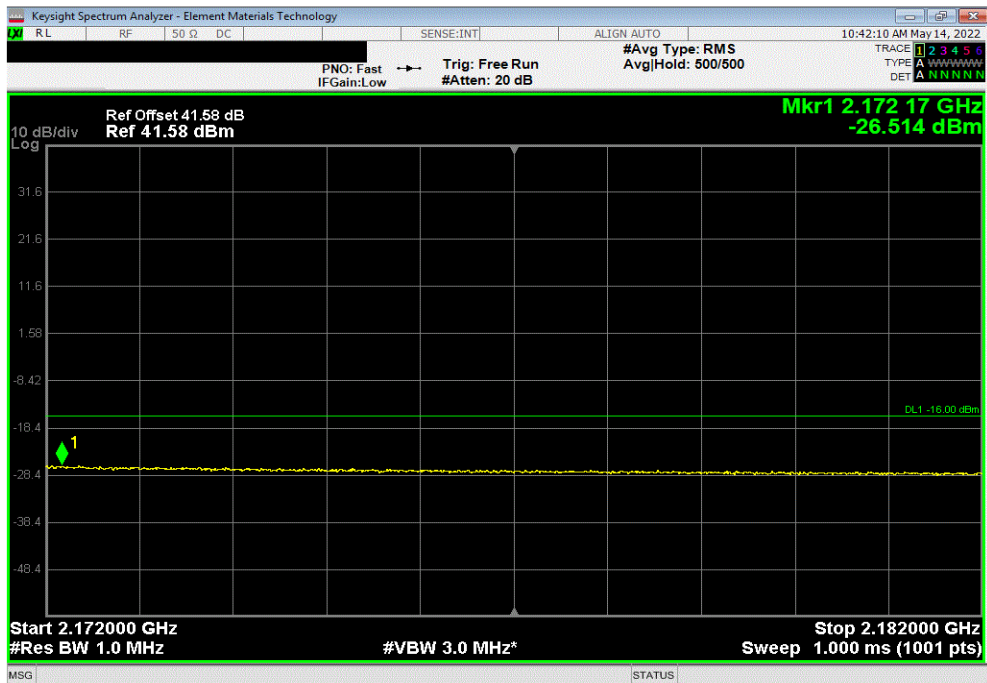


TbTx 2022.05.02.0 Xbit 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.0	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-26.5	-16	Pass			

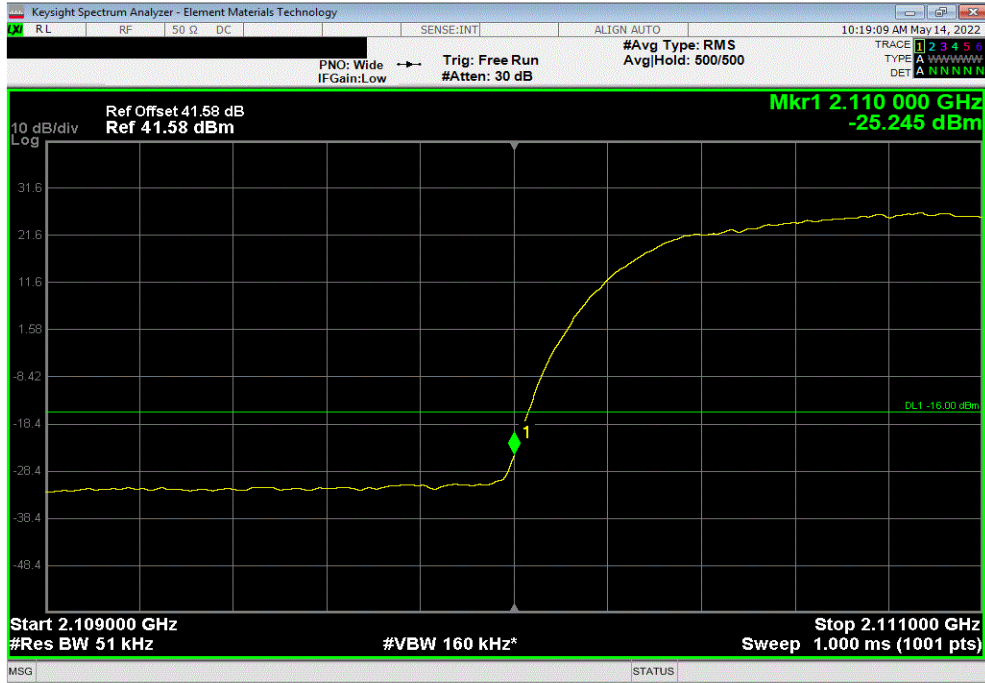


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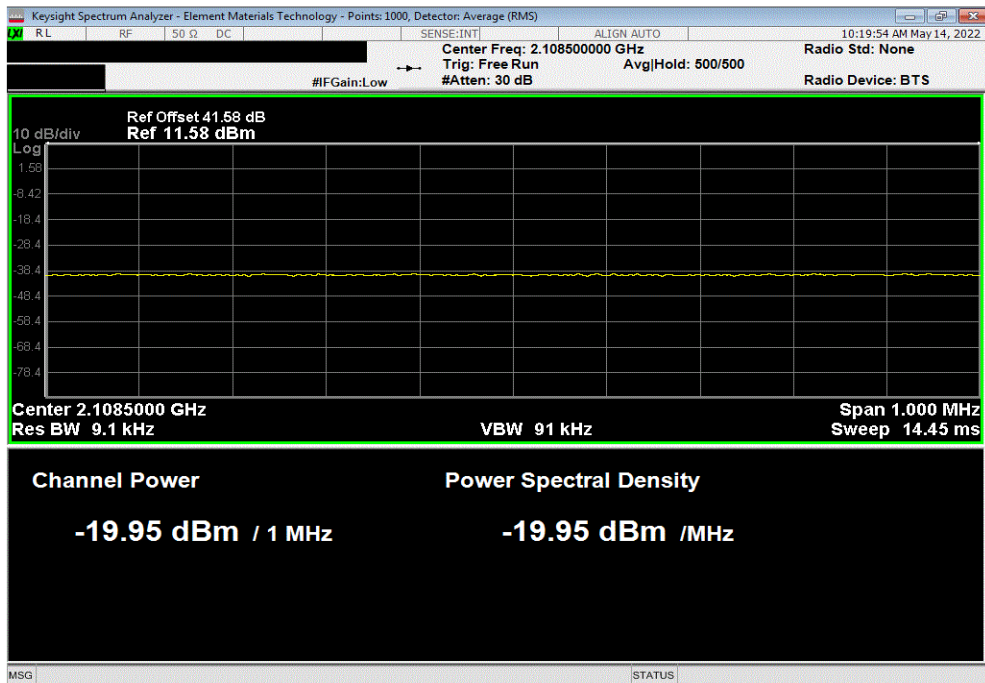


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.3	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.0	-16	Pass			

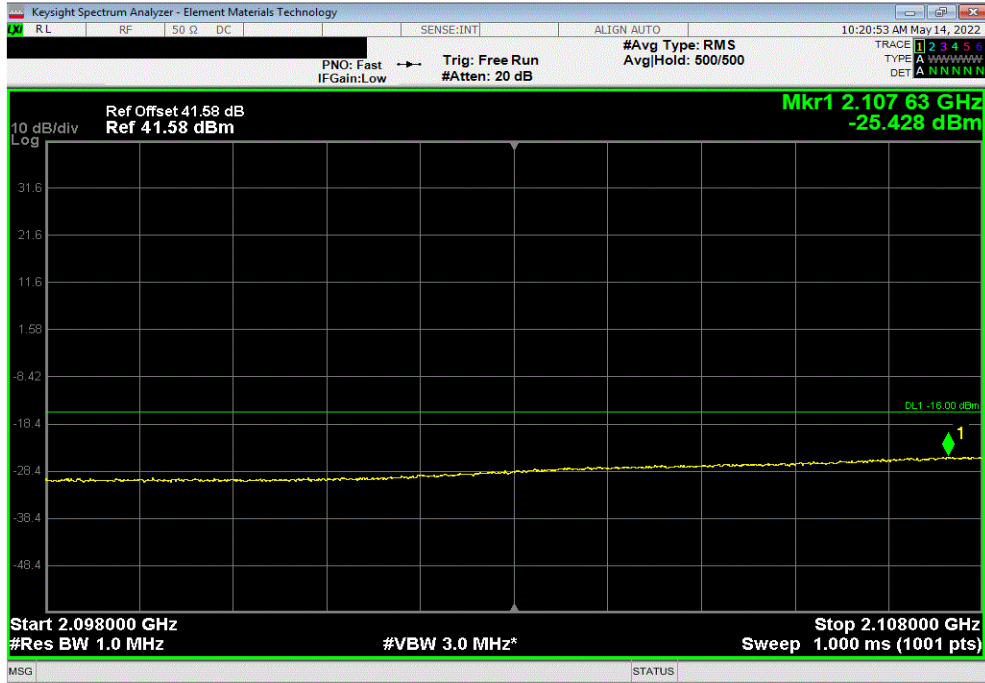


BAND EDGE COMPLIANCE AWS

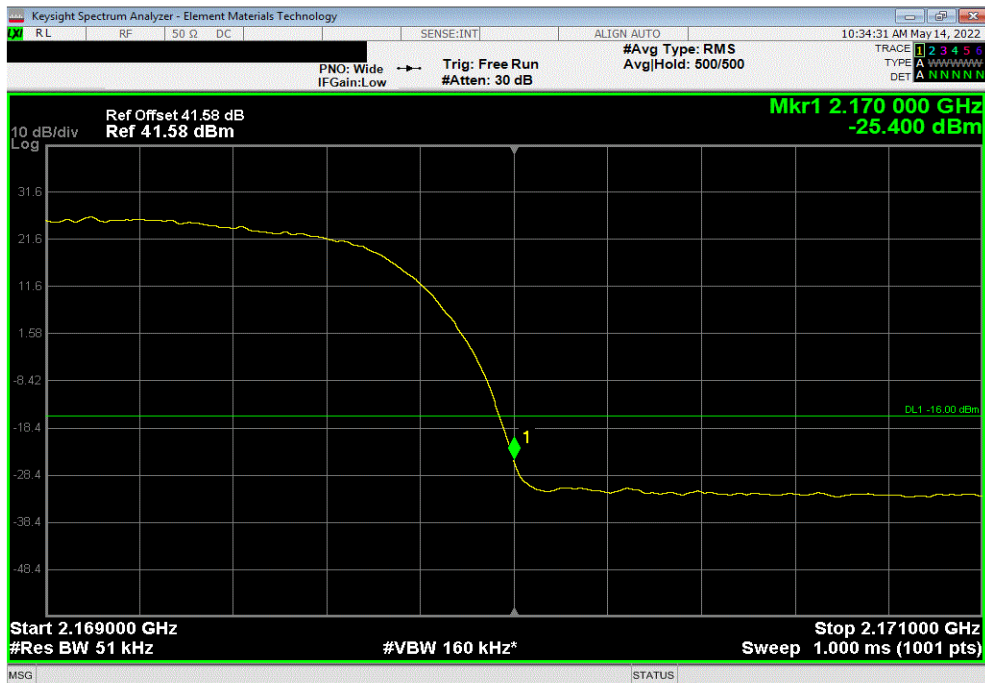


TbTx 2022.05.02.0 XMi 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 2112.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-25.4	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.4	-16	Pass			

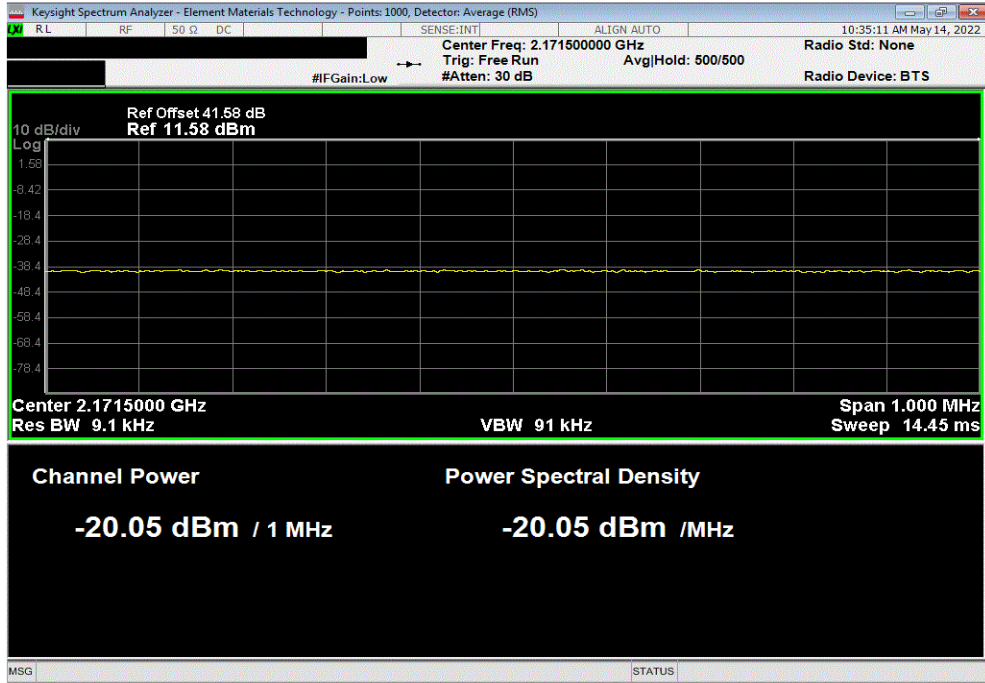


BAND EDGE COMPLIANCE AWS

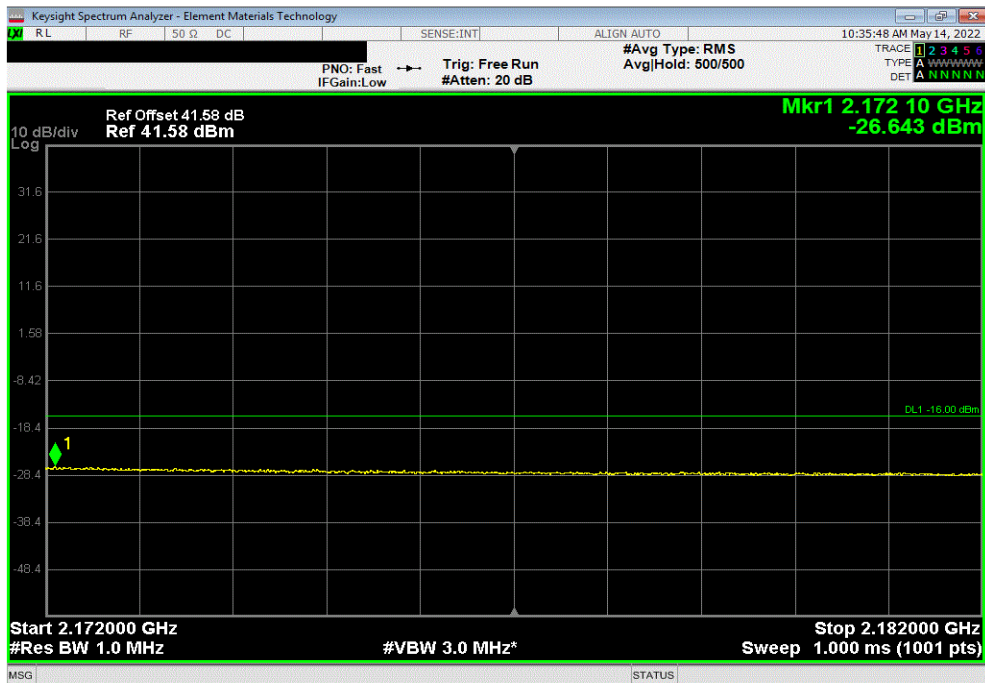


TbTx 2022.05.02.0 XMI 2022.02.07.0

AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.1	-16	Pass			



AWS BAND X, 2110 MHz - 2170 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 2167.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-26.6	-16	Pass			



BAND EDGE COMPLIANCE PCS



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

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in the available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

All limits were adjusted by a factor of $[-10 \cdot \log(2)]$ dB to account for the device operation as a 2 port MIMO transmitter, as per FCC KDB 622911.

Per section 24.238(a) and RSS-133 6.5(i), the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -16 dBm $[-13 \text{ dBm} - 10 \log(2)]$ per FCC KDB 662911D01 v02r01 because the BTS may operate as a 2 port MIMO transmitter.

The RBW to be used for these measurements are per 24.238(b), and RSS-133 6.5. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (*i.e.* 1 MHz or 1 percent of emission bandwidth, as specified).

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFII) as the original certification test. The AHFII antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 1 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

BAND EDGE COMPLIANCE PCS



TstTx 2022.05.02.0 XMI 2022.02.07.0

EUT: AHFII (FCC/ISED C2PC)	Work Order: NOKI0040
Serial Number: YK21400036	Date: 13-May-22
Customer: Nokia Solutions and Networks	Temperature: 22.8 °C
Attendees: David Le, John Rattanavong	Humidity: 49.3% RH
Project: None	Barometric Pres.: 1013 mbar
Tested by: Brandon Hobbs	Power: 54 VDC
	Job Site: TX05
TEST SPECIFICATIONS	
FCC 24E:2022	Test Method: 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 offset including any attenuators, filters and DC blocks. PCS band II carriers are operated at maximum power (30 Watts / carrier)	
DEVIATIONS FROM TEST STANDARD	
None	
Configuration #	2
	<i>Signature</i>
	Frequency Range
	Max Value (dBm)
	Limit < (dBm)
	Result

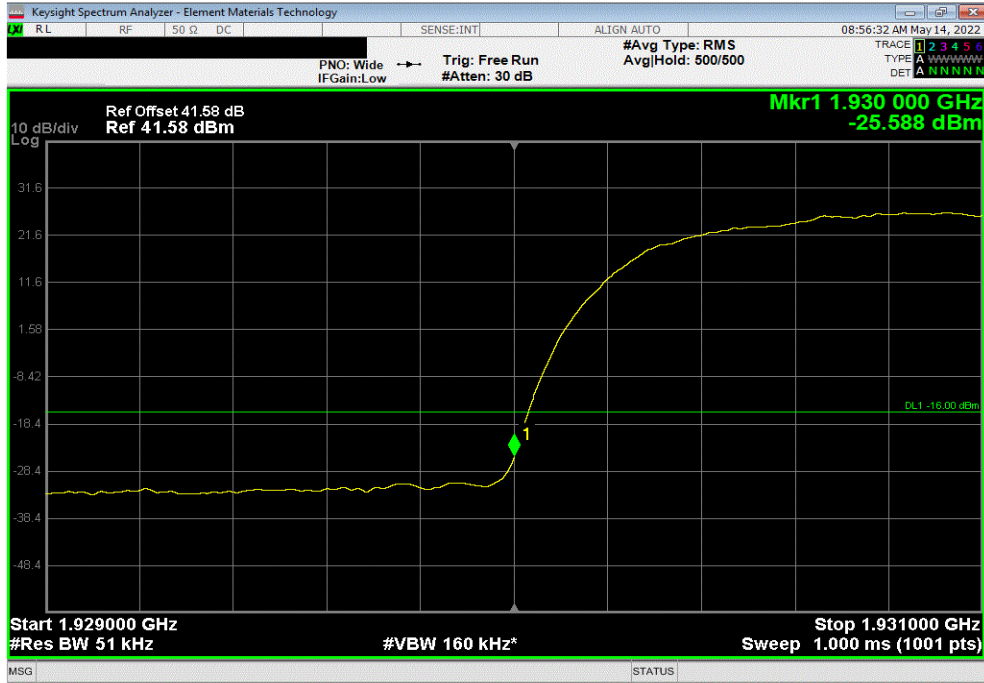
Configuration #	Frequency Range	Max Value (dBm)	Limit < (dBm)	Result	
PCS BAND II, 1930 MHz - 1990 MHz					
Port 1					
5 MHz Bandwidth					
QPSK Modulation					
	Low Channel, 1932.4 MHz	1	-25.6	-16	Pass
	Low Channel, 1932.4 MHz	2	-20.3	-16	Pass
	Low Channel, 1932.4 MHz	3	-25.5	-16	Pass
	High Channel, 1987.6 MHz	1	-25.1	-16	Pass
	High Channel, 1987.6 MHz	2	-20.6	-16	Pass
	High Channel, 1987.6 MHz	3	-26.4	-16	Pass
16-QAM Modulation					
	Low Channel, 1932.4 MHz	1	-25.3	-16	Pass
	Low Channel, 1932.4 MHz	2	-20.5	-16	Pass
	Low Channel, 1932.4 MHz	3	-25.5	-16	Pass
	High Channel, 1987.6 MHz	1	-25.3	-16	Pass
	High Channel, 1987.6 MHz	2	-20.5	-16	Pass
	High Channel, 1987.6 MHz	3	-26.2	-16	Pass
64-QAM Modulation					
	Low Channel, 1932.4 MHz	1	-25.5	-16	Pass
	Low Channel, 1932.4 MHz	2	-20.4	-16	Pass
	Low Channel, 1932.4 MHz	3	-25.7	-16	Pass
	High Channel, 1987.6 MHz	1	-25.2	-16	Pass
	High Channel, 1987.6 MHz	2	-20.5	-16	Pass
	High Channel, 1987.6 MHz	3	-26.1	-16	Pass

BAND EDGE COMPLIANCE PCS

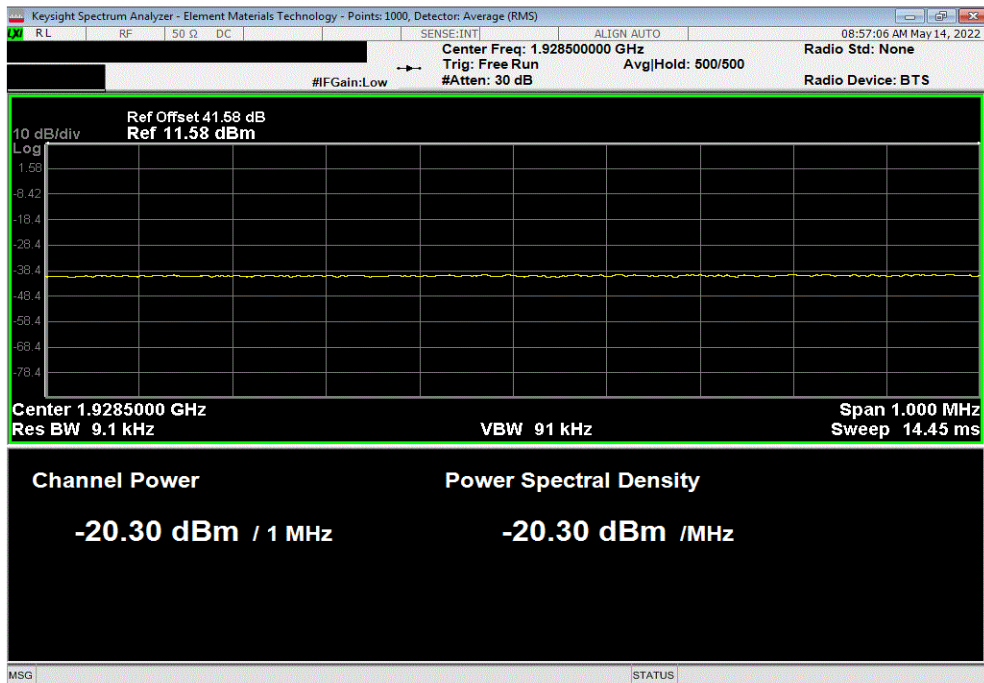


TbTx 2022.05.02.0 XMi 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.6	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.3	-16	Pass			

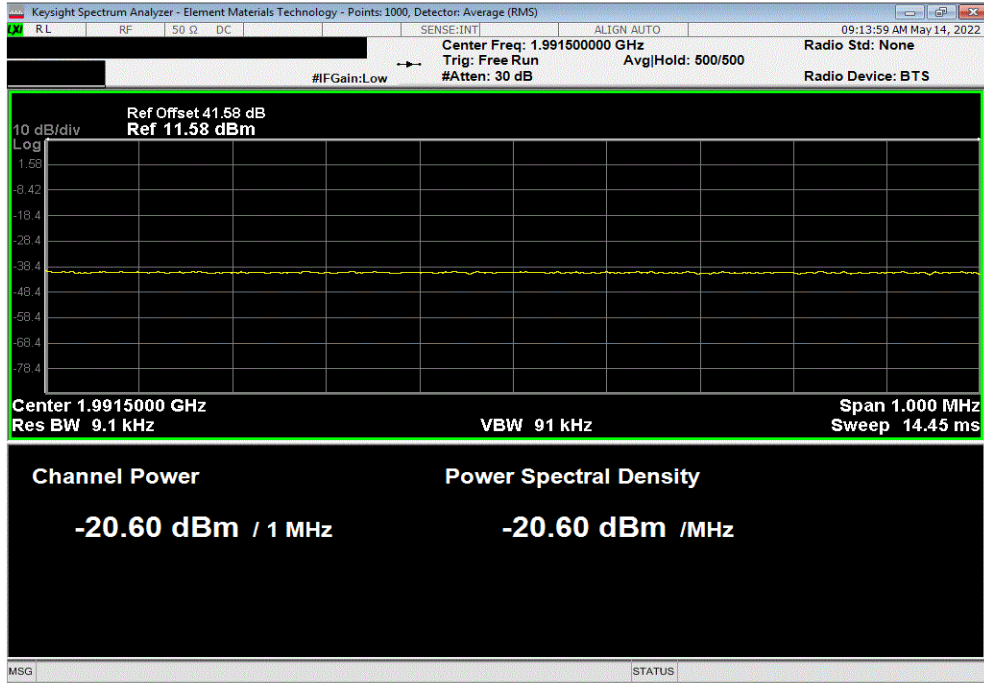


BAND EDGE COMPLIANCE PCS

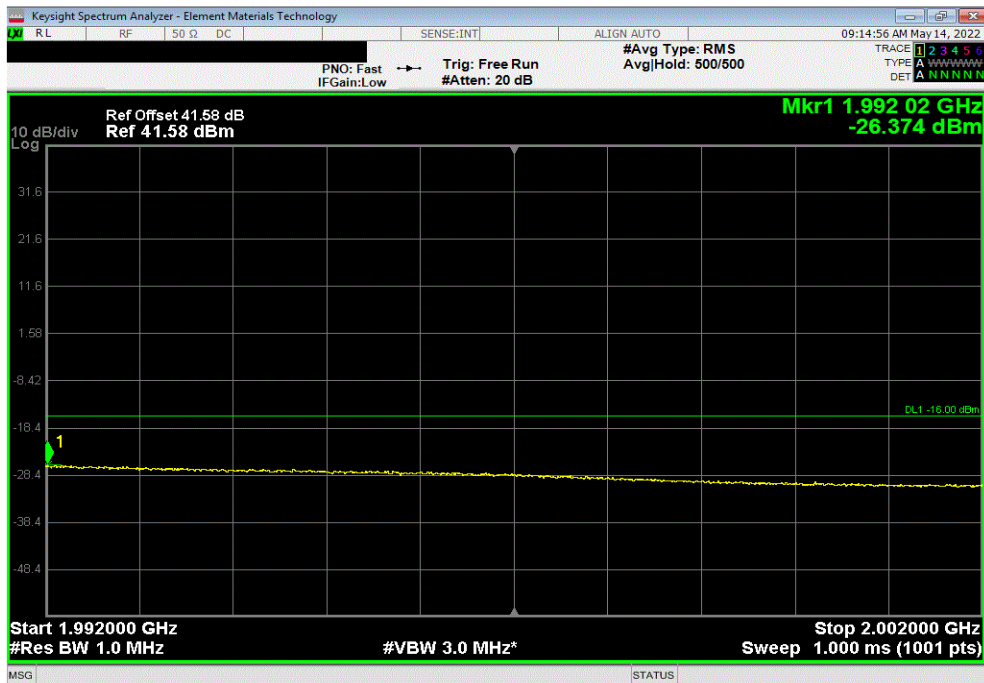


TbTx 2022.05.02.0 XMI 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.6	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-26.4	-16	Pass			

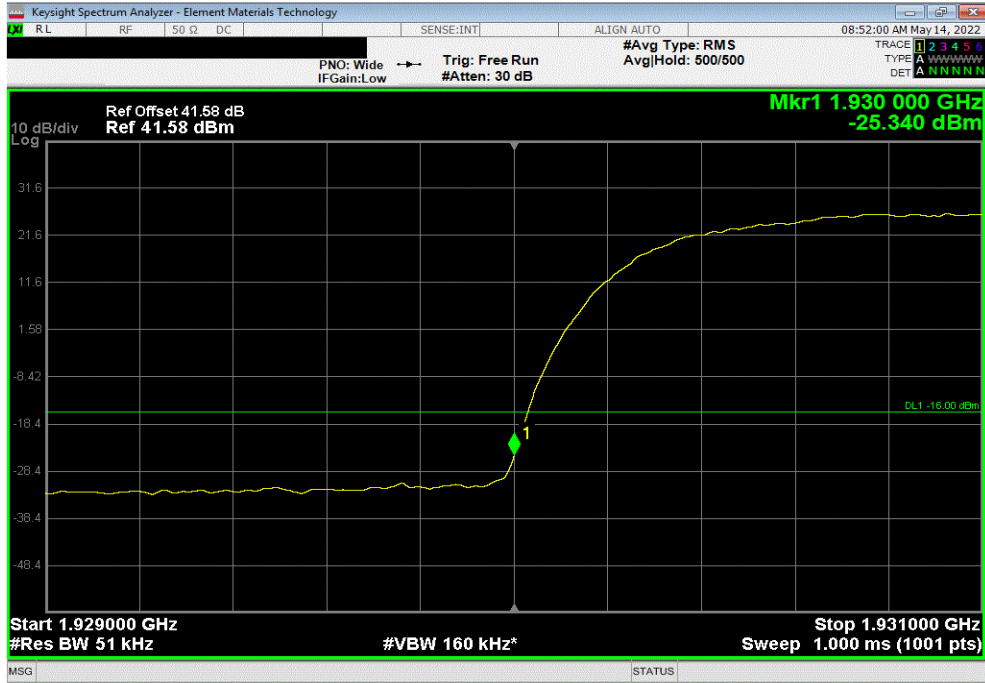


BAND EDGE COMPLIANCE PCS

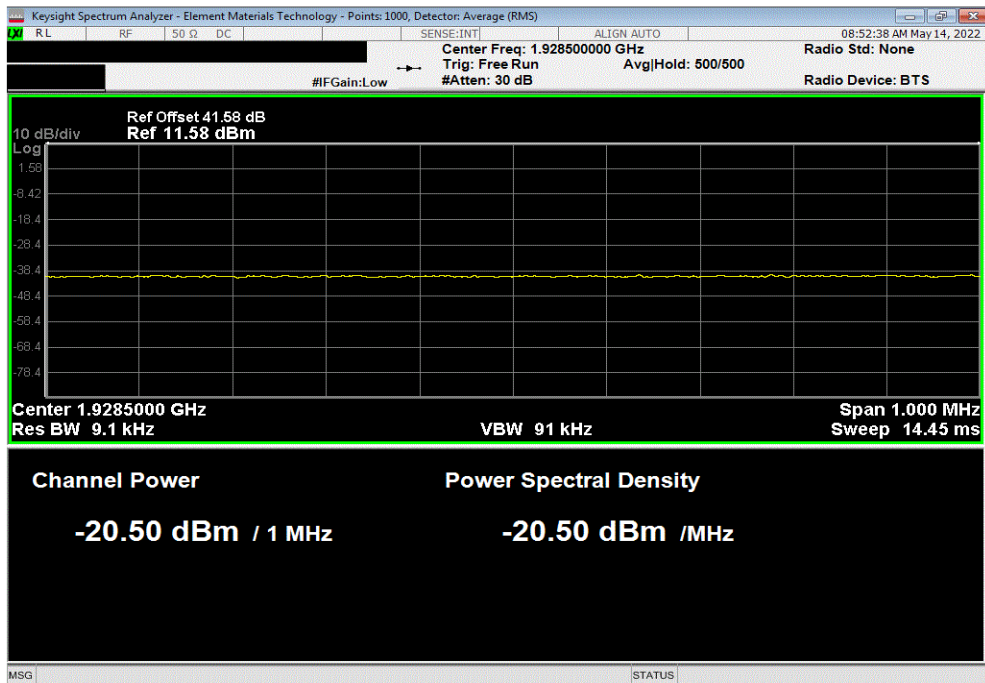


TbTx 2022.05.02.0 XMi 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.3	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.5	-16	Pass			

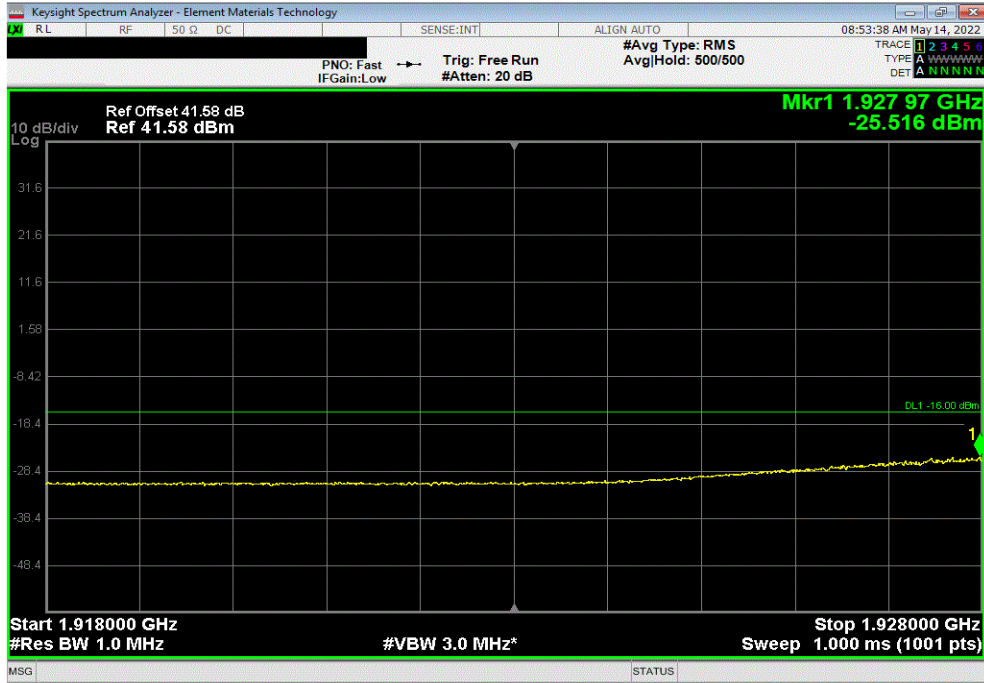


BAND EDGE COMPLIANCE PCS

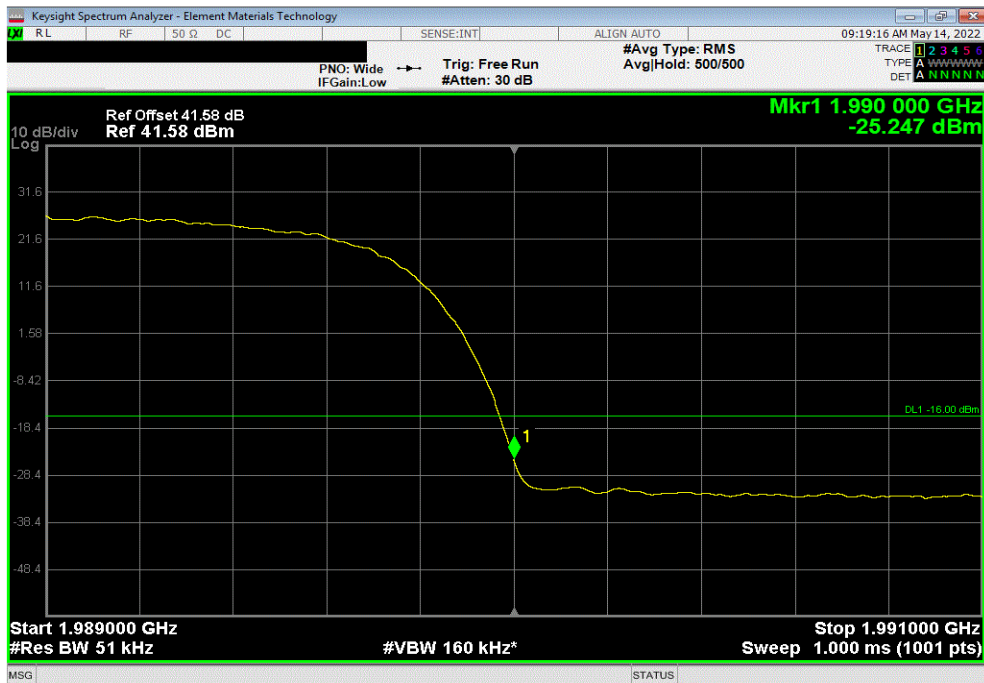


TbTx 2022.05.02.0 XMi 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-25.5	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.3	-16	Pass			

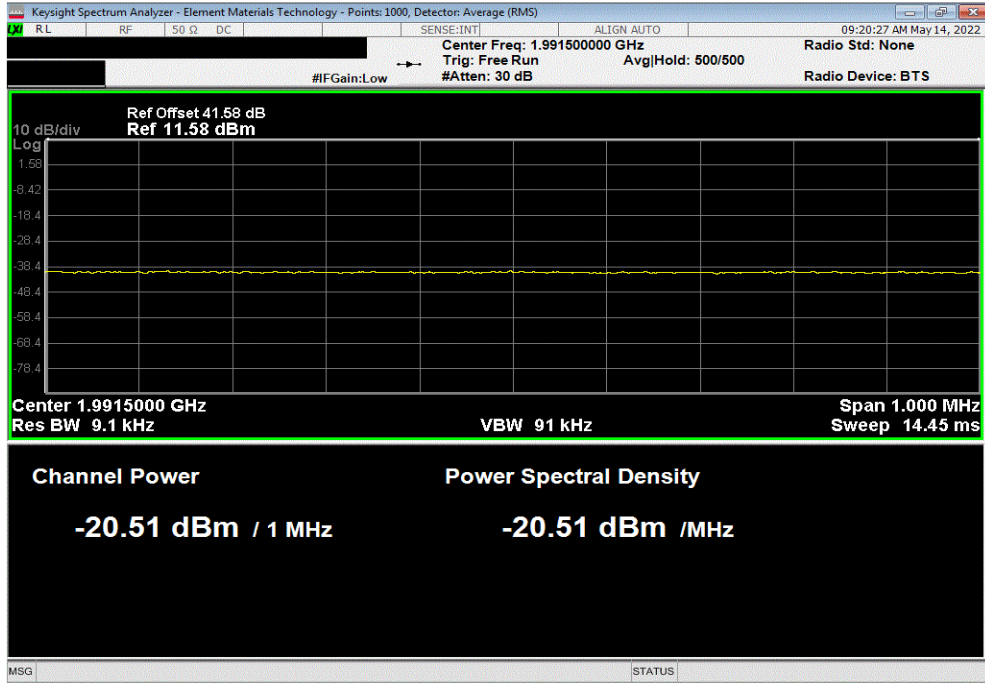


BAND EDGE COMPLIANCE PCS

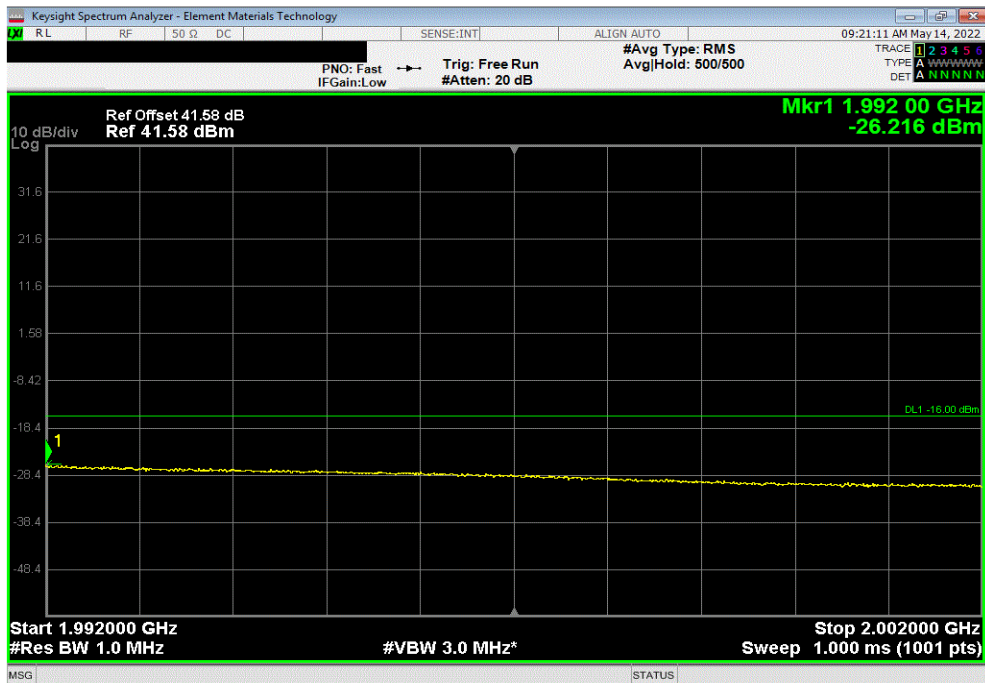


TbTx 2022.05.02.0 XMI 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.5	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-26.2	-16	Pass			

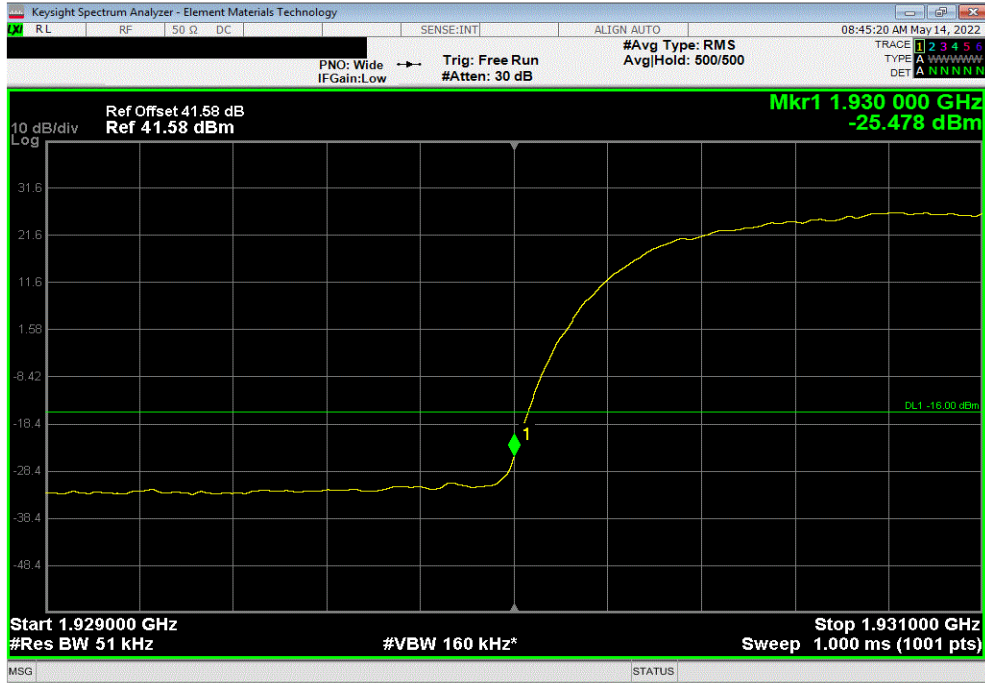


BAND EDGE COMPLIANCE PCS

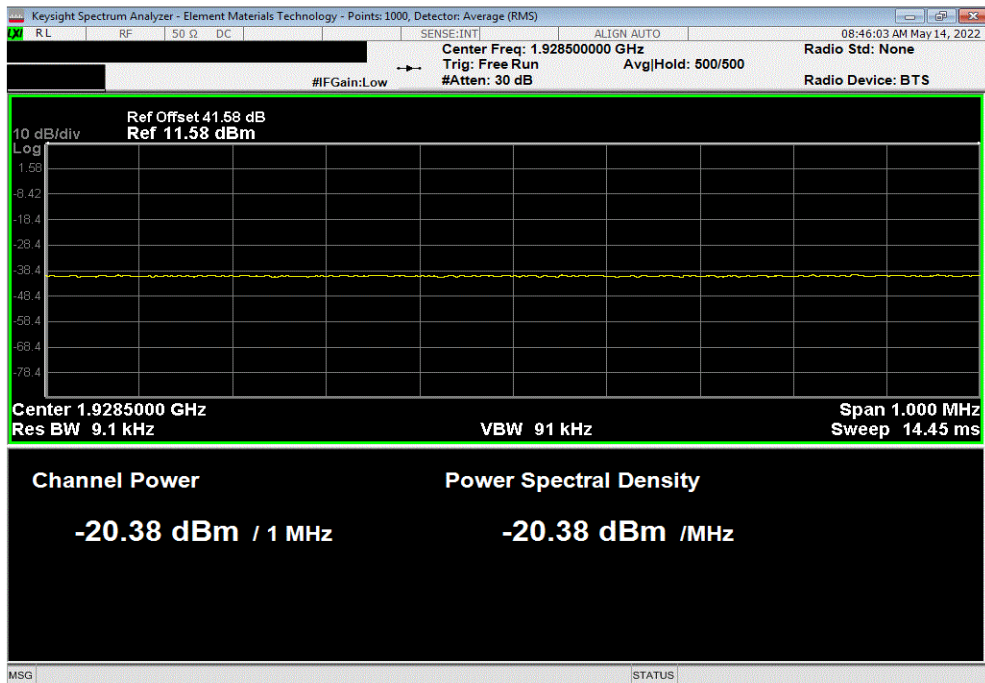


TbTx 2022.05.02.0 XMi 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
1	-25.5	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 1932.4 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.4	-16	Pass			

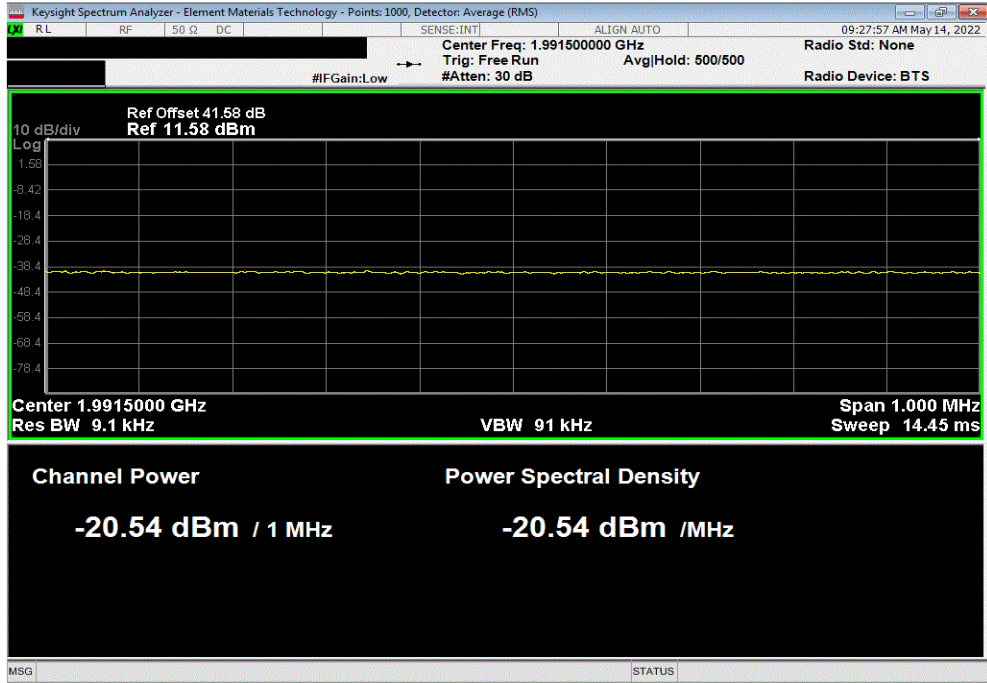


BAND EDGE COMPLIANCE PCS



TbTx 2022.05.02.0 XMi 2022.02.07.0

PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
2	-20.5	-16	Pass			



PCS BAND II, 1930 MHz - 1990 MHz, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 1987.6 MHz						
Frequency Range	Max Value (dBm)	Limit < (dBm)	Result			
3	-26.1	-16	Pass			

