

BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



XMIT 2020.03.25.0

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	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21

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 $[-10 \cdot \log(N)]$ to account for the device operation as a N port MIMO transmitter, as per FCC KDB 622911.

For Bands 12 and 14, the adjustment factor is $-10 \cdot \log(4) = -6$ dB. The Bands 12 and 14 adjusted limit is -19 dBm.
For Band 29, the adjustment factor is $-10 \cdot \log(2) = -3$ dB. The Band 29 adjusted limit is -16 dBm.

Per FCC section 27.53(g) and RSS 130 4.7.1, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm $[-13 \text{ dBm} - 10 \log(4)]$ per FCC KDB 662911D01 v02r01 because the RRH may operate as a 4 port MIMO transmitter for Band 12.

FCC 27.53(g) and RSS 130 4.7.1 requires a ≥ 100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC 27.53(g) requires a ≥ 30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

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EUT: Aircscale Base Transceiver Station Remote Radio Head Model AHLBBA		Work Order: NOKI0013	
Serial Number: K9193514835		Date: 23-Mar-20	
Customer: Nokia Solutions and Networks		Temperature: 24.5 °C	
Attendees: Mitch Hill, John Rattanavong		Humidity: 36.6% RH	
Project: None		Barometric Pres.: 1025 mbar	
Tested by: Brandon Hobbs		Job Site: TX03	
Power: 54 VDC			
TEST SPECIFICATIONS		Test Method	
FCC 27:2020		ANSI C63.26:2015	
RSS-130:2019		RSS-130:2019	
COMMENTS			
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. The hottest port per power amplifier (PA) was used for testing. Measured only the affected channels in each extended band. The worst case port was determined in the original client provided test report. The carrier power was set to maximum for all testing.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2,6	Signature 	
		Value (dBm)	Limit (dBm) Result
Band 12, 729 MHz -745 MHz, LTE			
Port 1			
5 MHz Bandwidth			
QPSK Modulation			
High Channel, 742.5 MHz, Range 1		-23.8	-19 Pass
High Channel, 742.5 MHz, Range 2		-27.6	-19 Pass
16-QAM Modulation			
High Channel, 742.5 MHz, Range 1		-23.8	-19 Pass
High Channel, 742.5 MHz, Range 2		-27.3	-19 Pass
64-QAM Modulation			
High Channel, 742.5 MHz, Range 1		-23.8	-19 Pass
High Channel, 742.5 MHz, Range 2		-27.1	-19 Pass
256-QAM Modulation			
High Channel, 742.5 MHz, Range 1		-24.0	-19 Pass
High Channel, 742.5 MHz, Range 2		-27.1	-19 Pass
10 MHz Bandwidth			
QPSK Modulation			
High Channel, 740 MHz, Range 1		-26.6	-19 Pass
High Channel, 740 MHz, Range 2		-30.9	-19 Pass
16-QAM Modulation			
High Channel, 740 MHz, Range 1		-26.9	-19 Pass
High Channel, 740 MHz, Range 2		-30.8	-19 Pass
64-QAM Modulation			
High Channel, 740 MHz, Range 1		-26.5	-19 Pass
High Channel, 740 MHz, Range 2		-30.4	-19 Pass
256-QAM Modulation			
High Channel, 740 MHz, Range 1		-27.0	-19 Pass
High Channel, 740 MHz, Range 2		-30.6	-19 Pass
Port 2			
5 MHz Bandwidth			
QPSK Modulation			
High Channel, 742.5 MHz, Range 1		-24.6	-19 Pass
High Channel, 742.5 MHz, Range 2		-24.9	-19 Pass
16-QAM Modulation			
High Channel, 742.5 MHz, Range 1		-24.7	-19 Pass
High Channel, 742.5 MHz, Range 2		-24.3	-19 Pass
64-QAM Modulation			
High Channel, 742.5 MHz, Range 1		-24.6	-19 Pass
High Channel, 742.5 MHz, Range 2		-24.4	-19 Pass
256-QAM Modulation			
High Channel, 742.5 MHz, Range 1		-24.8	-19 Pass
High Channel, 742.5 MHz, Range 2		-24.3	-19 Pass
10 MHz Bandwidth			
QPSK Modulation			
High Channel, 740 MHz, Range 1		-24.2	-19 Pass
High Channel, 740 MHz, Range 2		-26.7	-19 Pass
16-QAM Modulation			
High Channel, 740 MHz, Range 1		-24.2	-19 Pass
High Channel, 740 MHz, Range 2		-26.6	-19 Pass
64-QAM Modulation			
High Channel, 740 MHz, Range 1		-24.1	-19 Pass
High Channel, 740 MHz, Range 2		-26.3	-19 Pass
256-QAM Modulation			
High Channel, 740 MHz, Range 1		-24.5	-19 Pass
High Channel, 740 MHz, Range 2		-26.6	-19 Pass
Band 29, 717 MHz - 728 MHz, LTE			
Port 1			
5 MHz Bandwidth			
QPSK Modulation			
Low Channel, 719.5 MHz, Range 1		-31.3	-19 Pass
Low Channel, 719.5 MHz, Range 2		-35.8	-19 Pass
16-QAM Modulation			
Low Channel, 719.5 MHz, Range 1		-31.1	-19 Pass
Low Channel, 719.5 MHz, Range 2		-36.0	-19 Pass
64-QAM Modulation			
Low Channel, 719.5 MHz, Range 1		-31.0	-19 Pass
Low Channel, 719.5 MHz, Range 2		-35.8	-19 Pass
256-QAM Modulation			
Low Channel, 719.5 MHz, Range 1		-31.4	-19 Pass
Low Channel, 719.5 MHz, Range 2		-35.8	-19 Pass
10 MHz Bandwidth			
QPSK Modulation			
Low Channel, 722 MHz, Range 1		-32.4	-19 Pass
Low Channel, 722 MHz, Range 2		-37.3	-19 Pass
16-QAM Modulation			
Low Channel, 722 MHz, Range 1		-32.2	-19 Pass
Low Channel, 722 MHz, Range 2		-37.4	-19 Pass
64-QAM Modulation			
Low Channel, 722 MHz, Range 1		-32.6	-19 Pass
Low Channel, 722 MHz, Range 2		-37.4	-19 Pass
256-QAM Modulation			
Low Channel, 722 MHz, Range 1		-32.3	-19 Pass
Low Channel, 722 MHz, Range 2		-37.4	-19 Pass

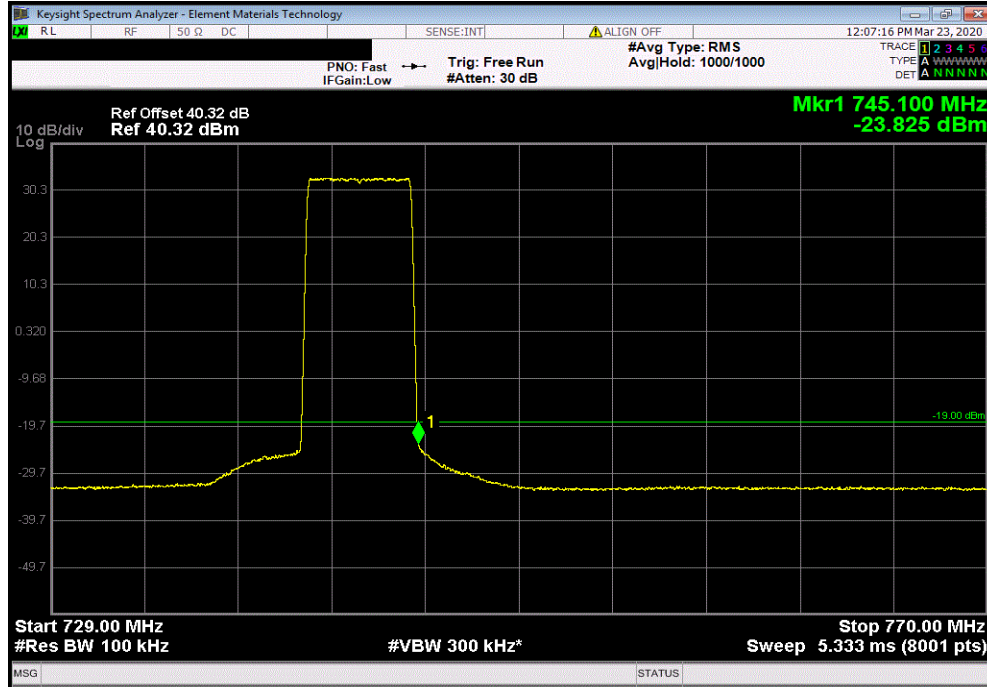
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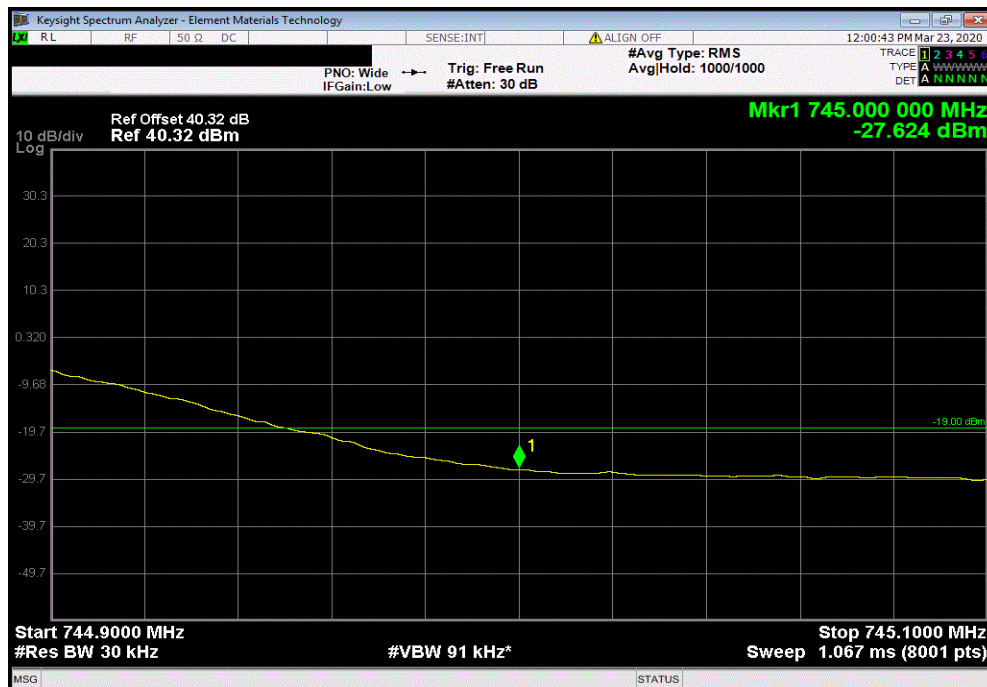
Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-23.825	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-27.624	-19	Pass



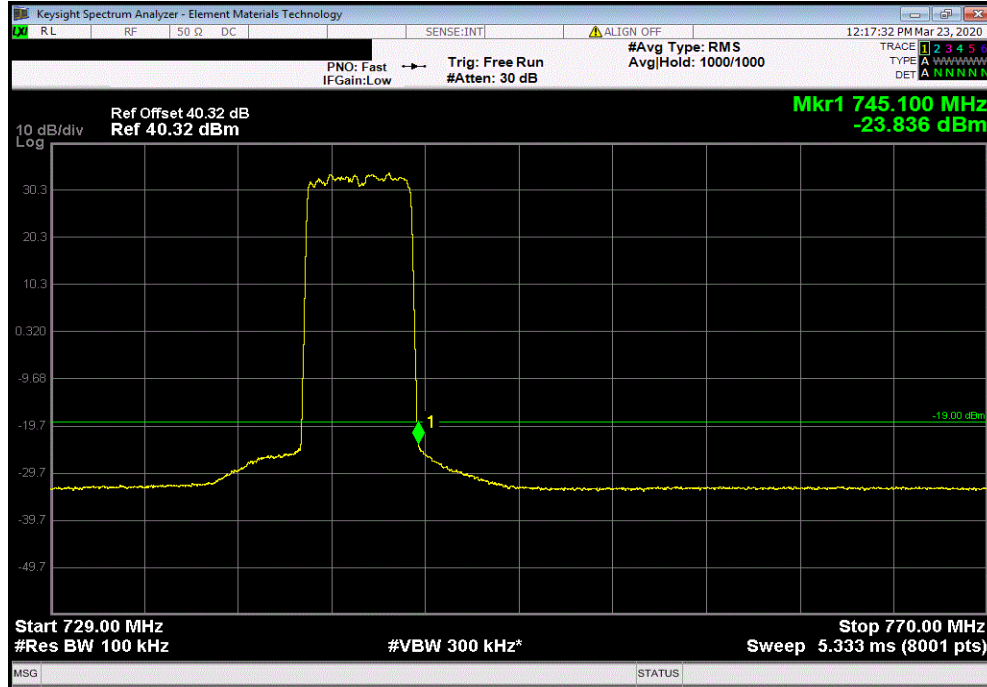
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Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-23.836	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-27.32	-19	Pass



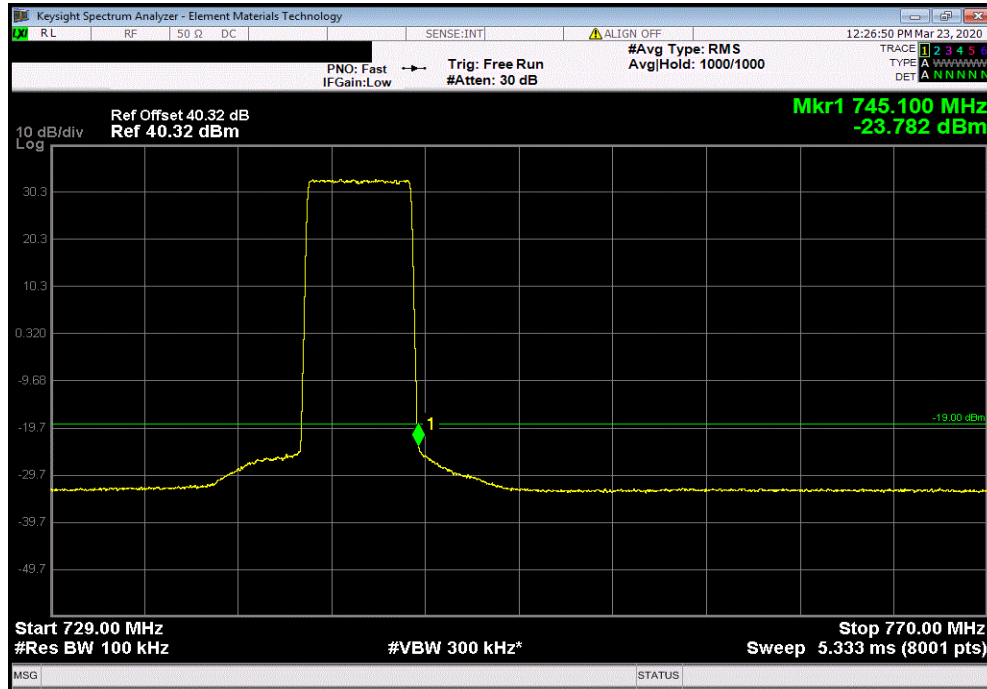
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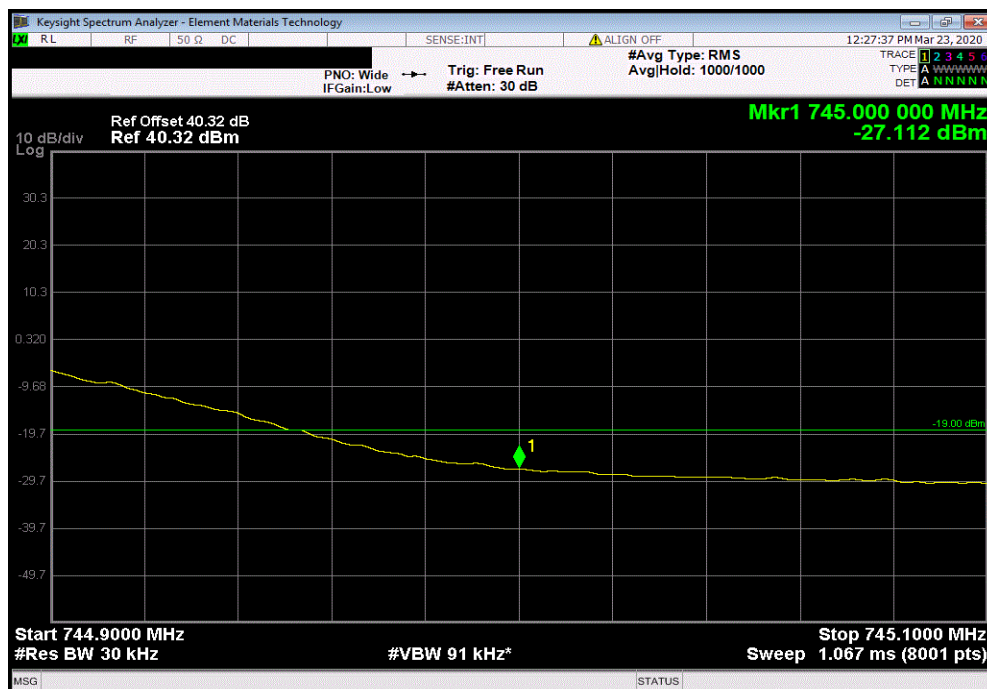
Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-23.782	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-27.112	-19	Pass



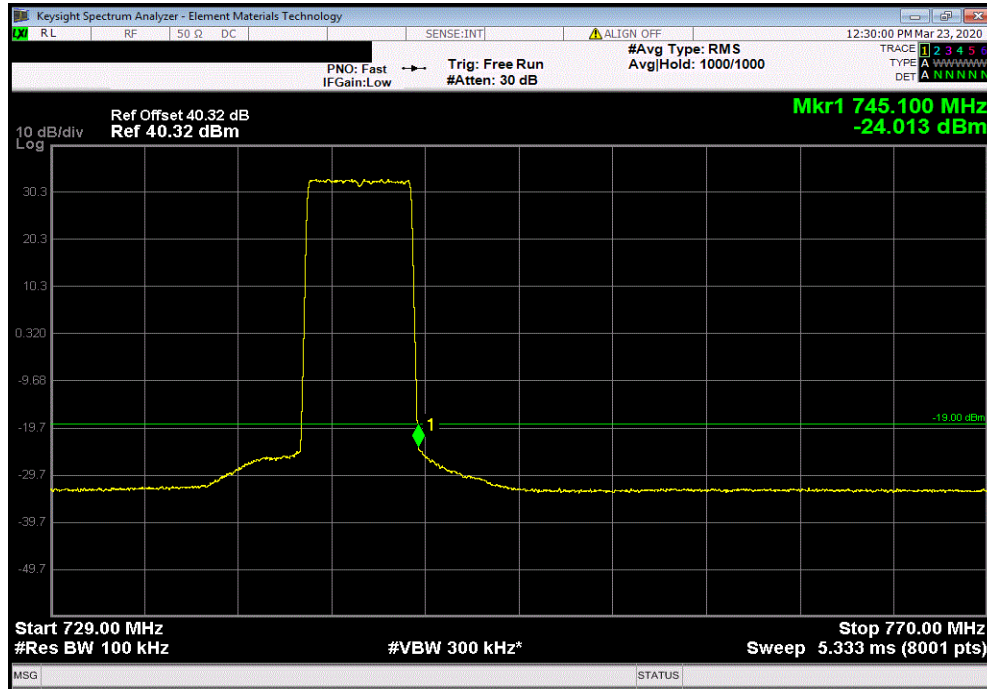
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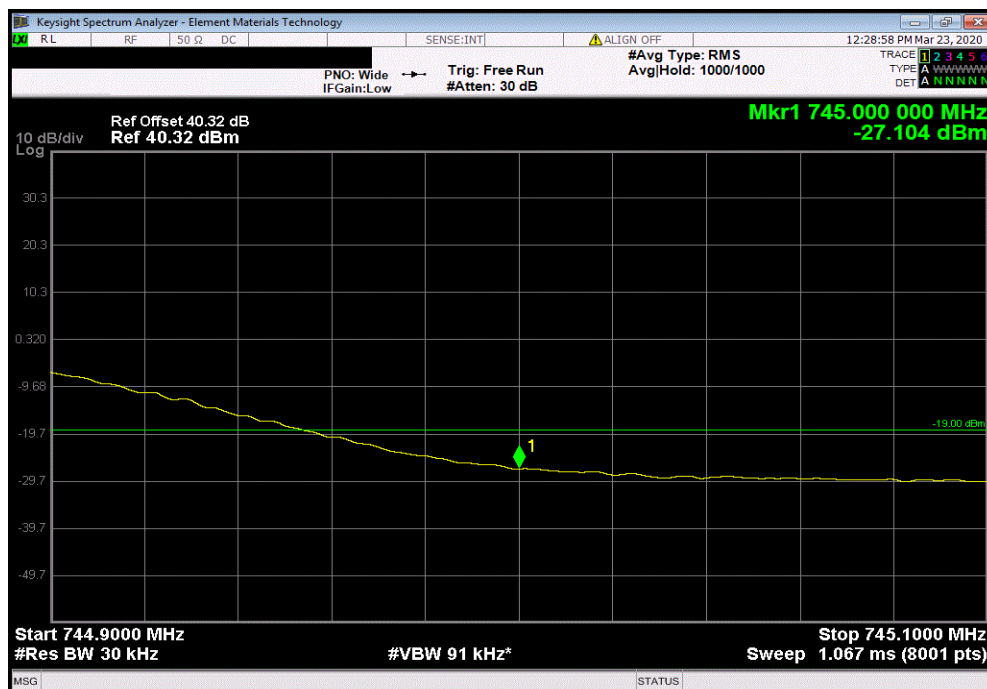
Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, 256-QAM Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.013	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 5 MHz Bandwidth, 256-QAM Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-27.104	-19	Pass



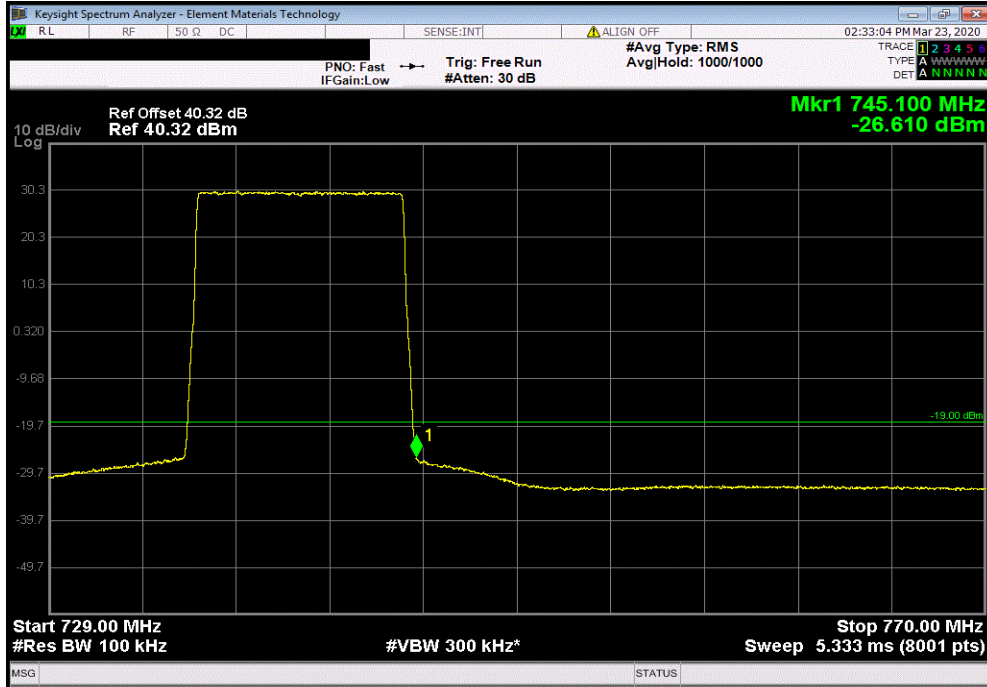
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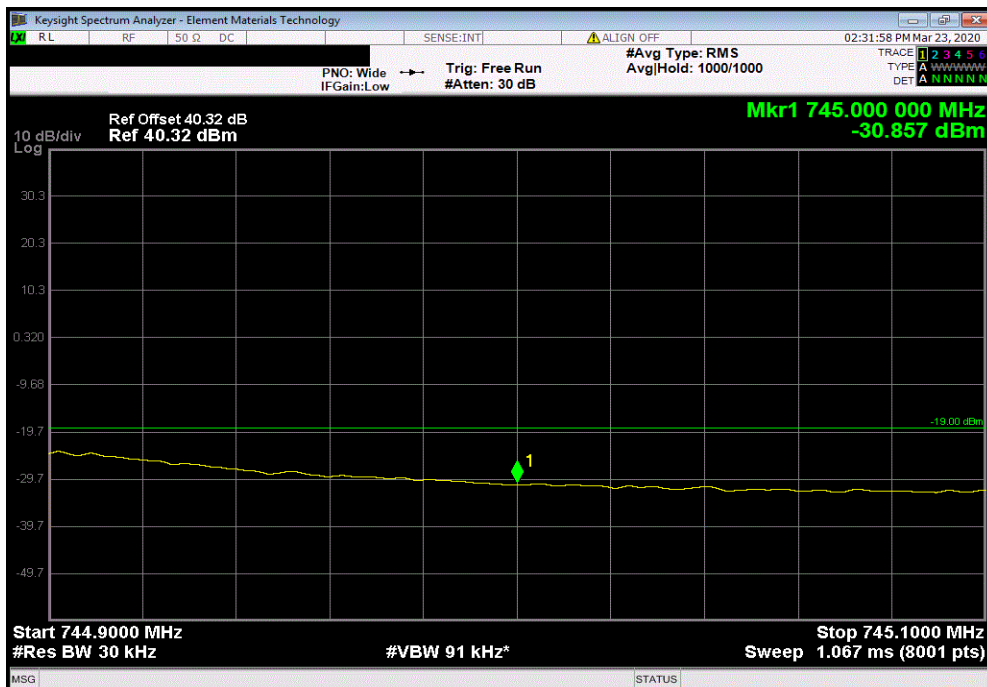
Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-26.61	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-30.857	-19	Pass



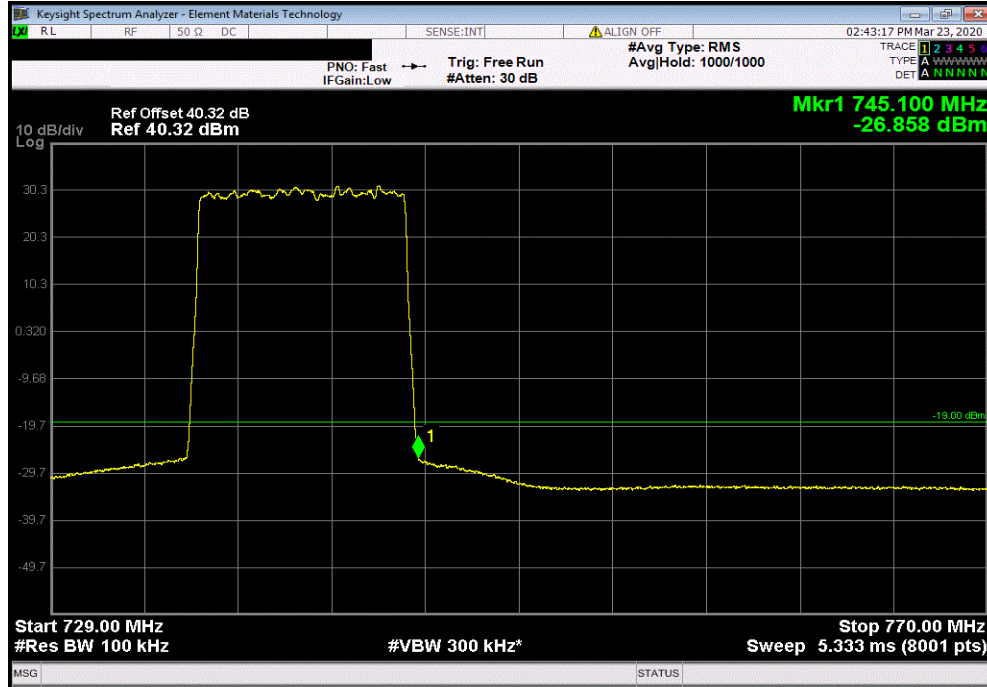
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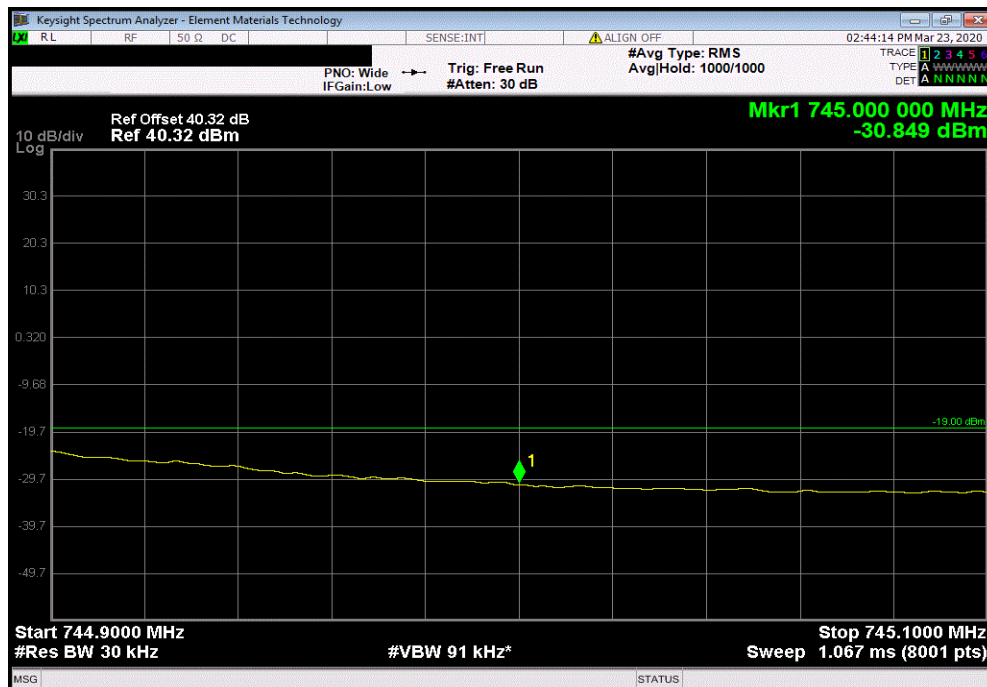
Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, 16-QAM Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-26.858	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, 16-QAM Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-30.849	-19	Pass



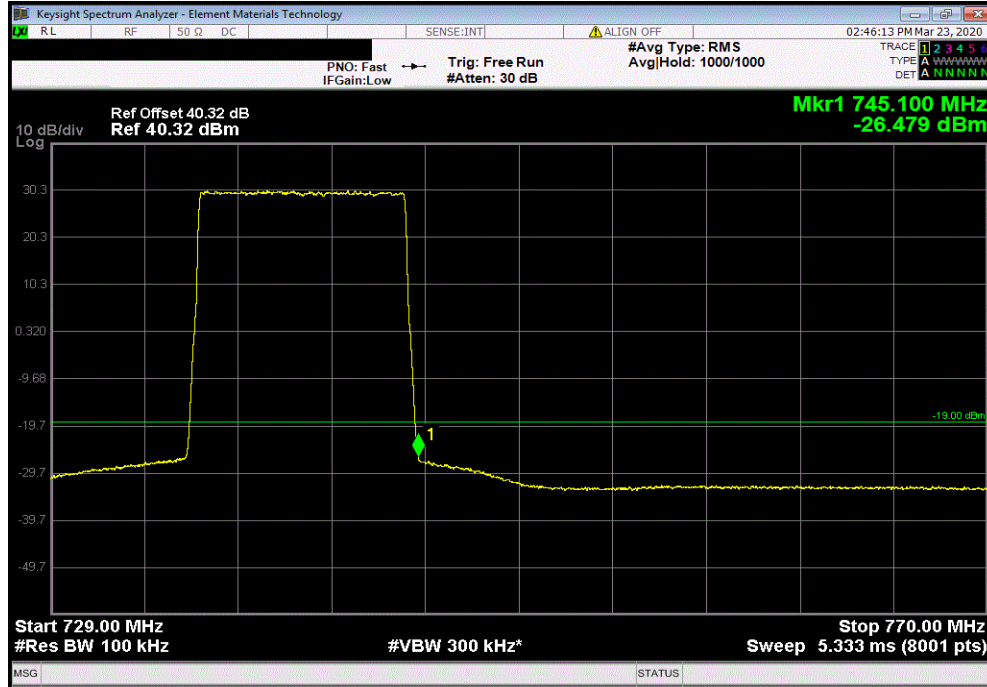
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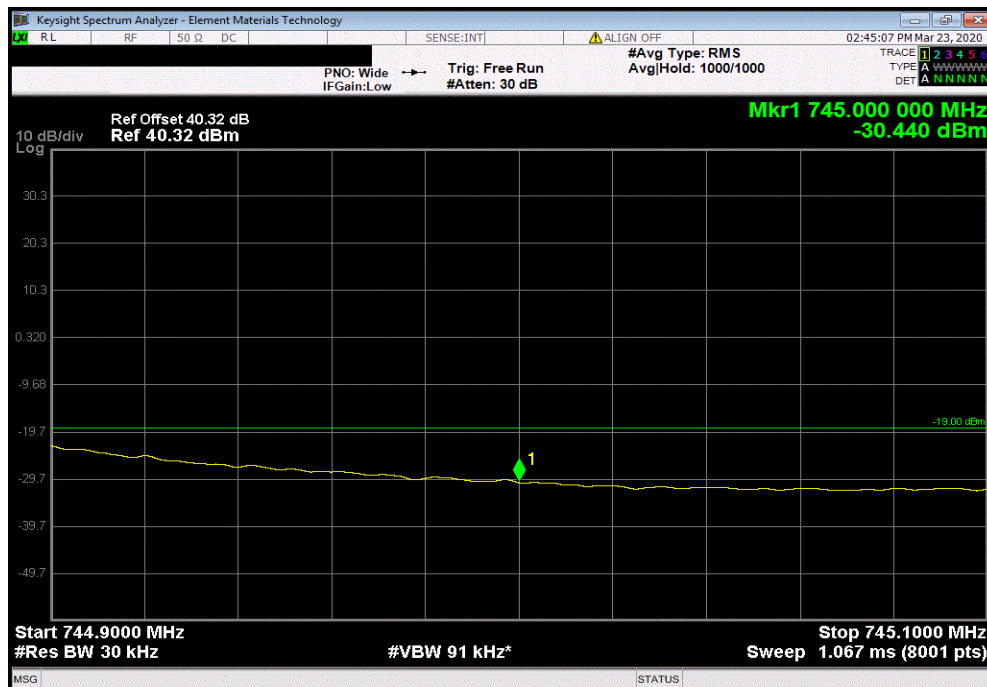
Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, 64-QAM Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-26.479	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, 64-QAM Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-30.44	-19	Pass



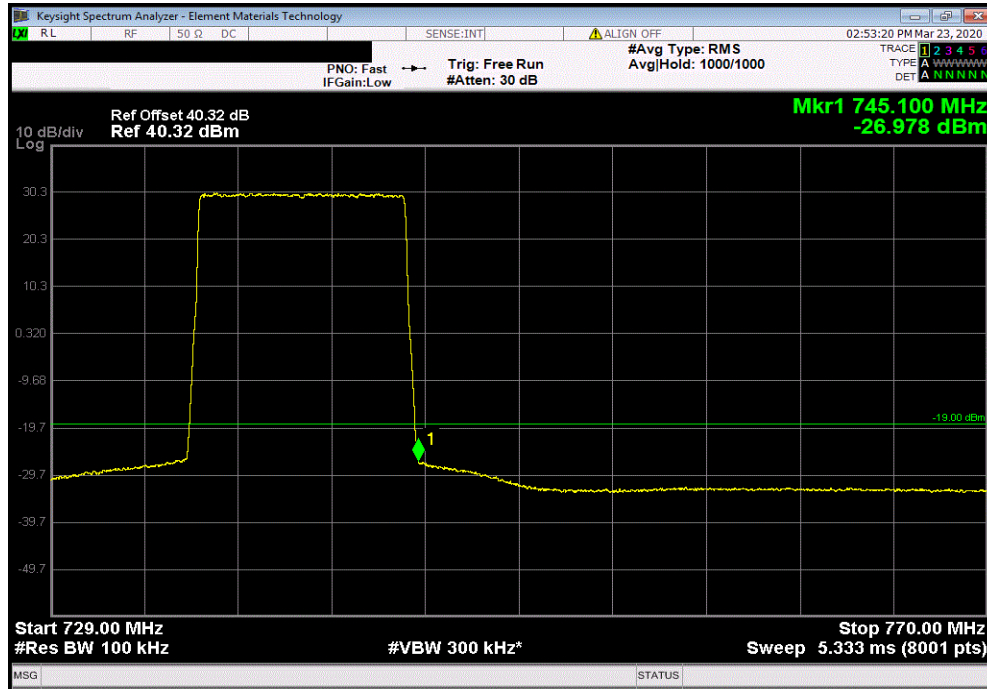
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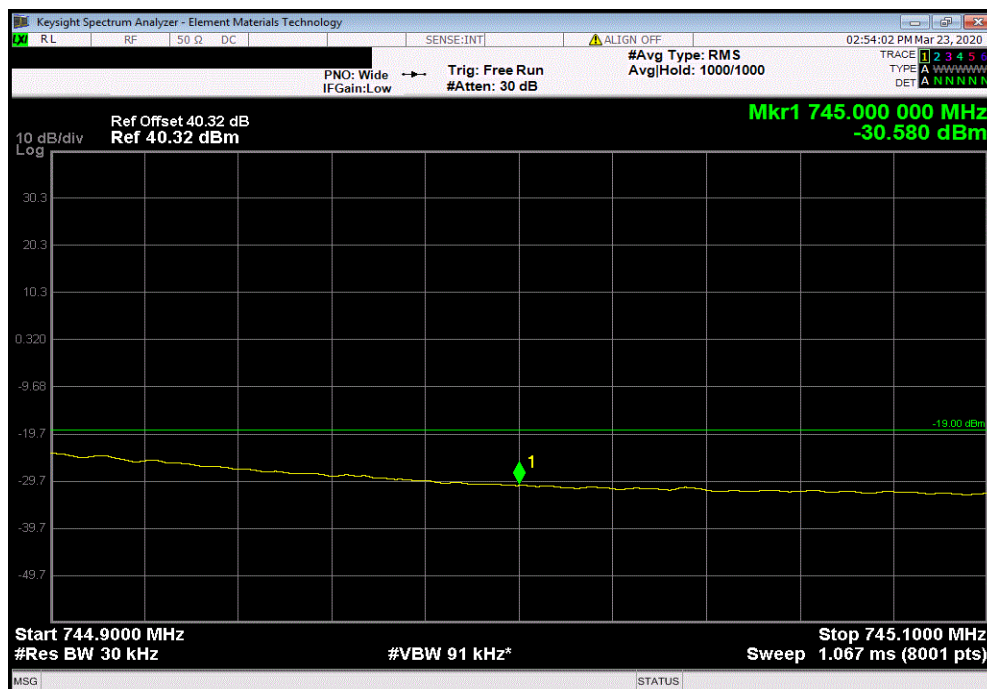
Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, 256-QAM Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-26.978	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, 256-QAM Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-30.58	-19	Pass



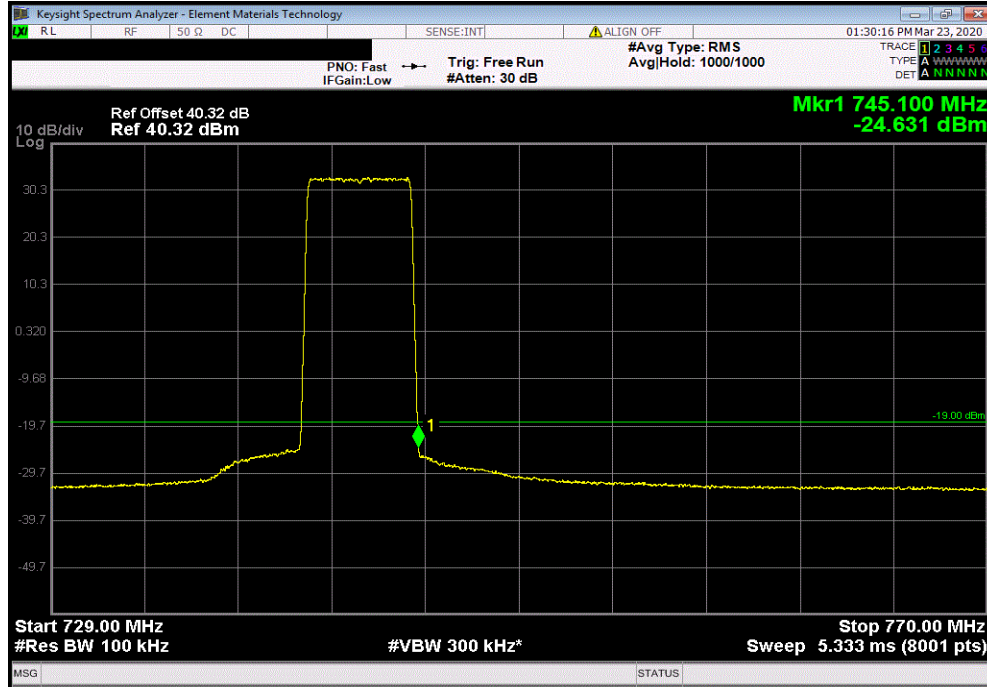
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Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.631	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-24.896	-19	Pass



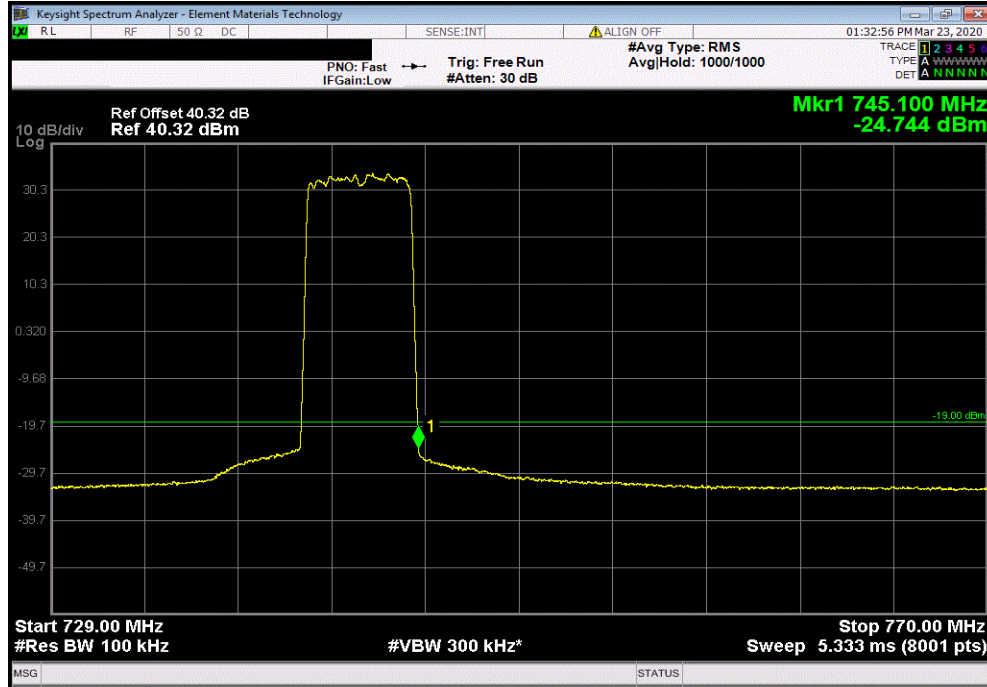
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Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.744	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, 16-QAM Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-24.284	-19	Pass



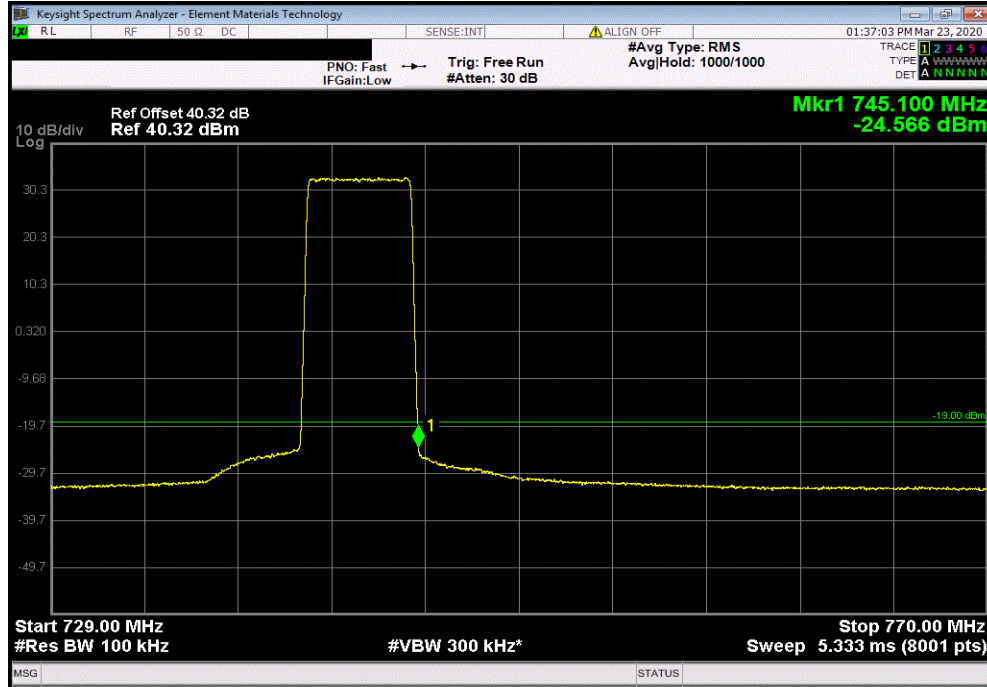
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Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.566	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, 64-QAM Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-24.4	-19	Pass



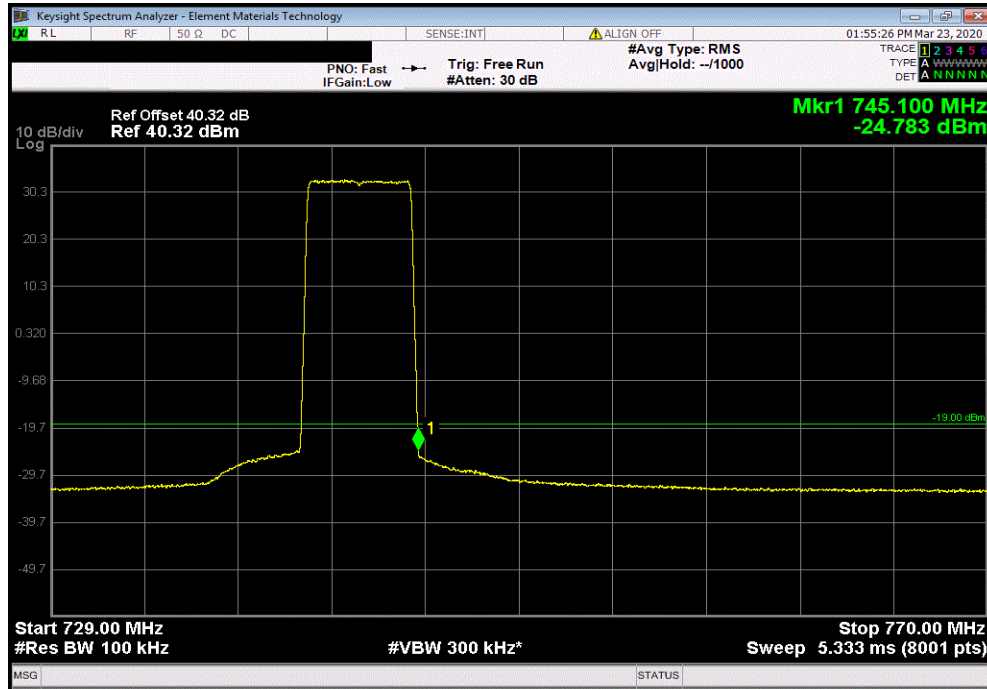
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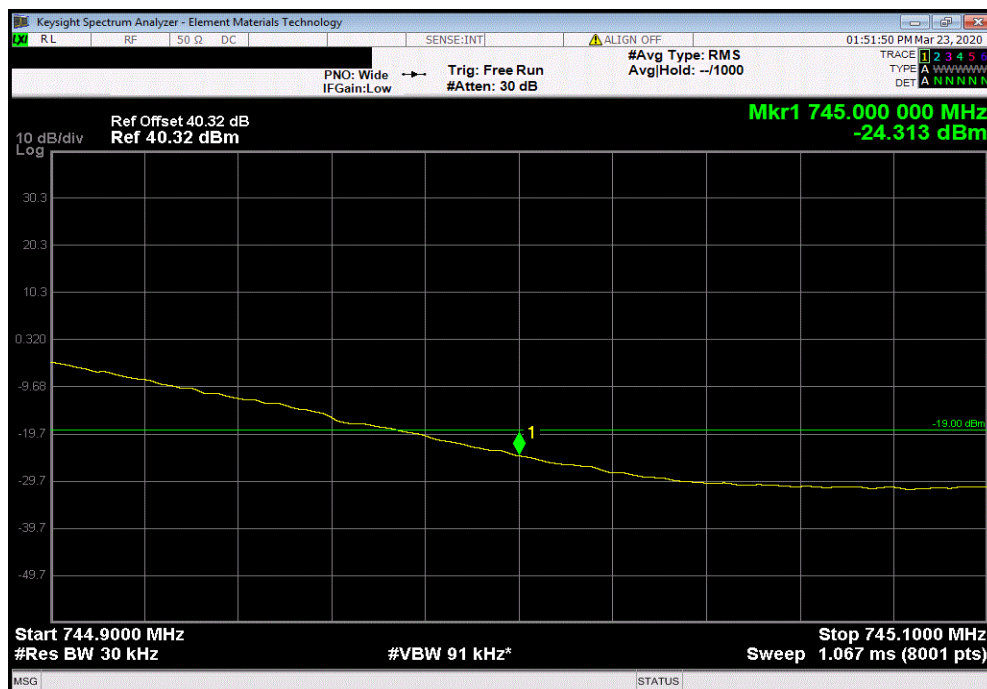
Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, 256-QAM Modulation, High Channel, 742.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.783	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 5 MHz Bandwidth, 256-QAM Modulation, High Channel, 742.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-24.313	-19	Pass



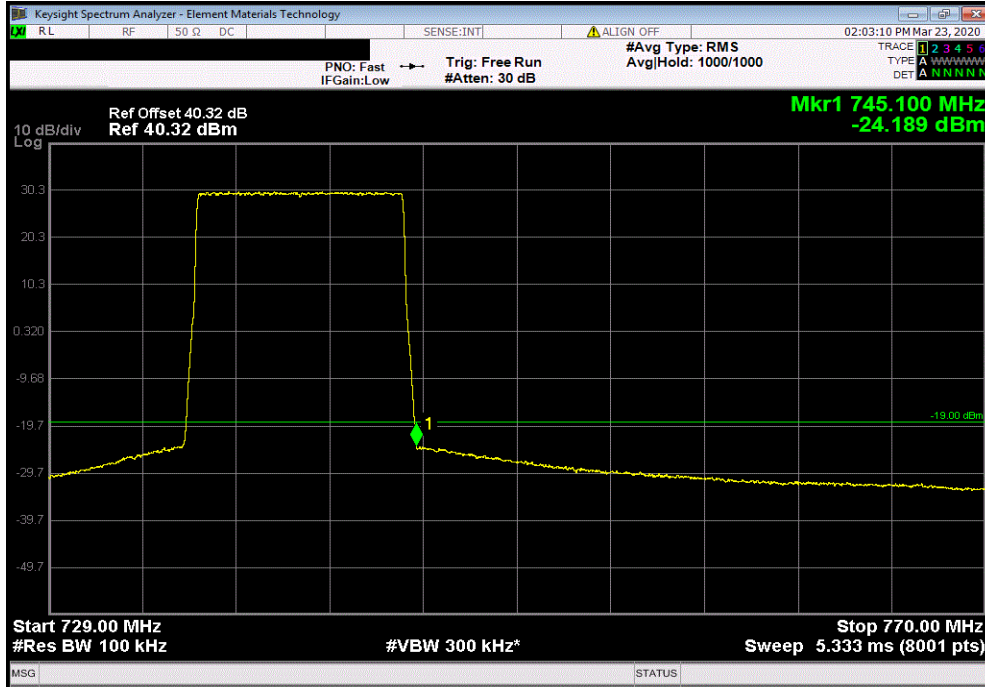
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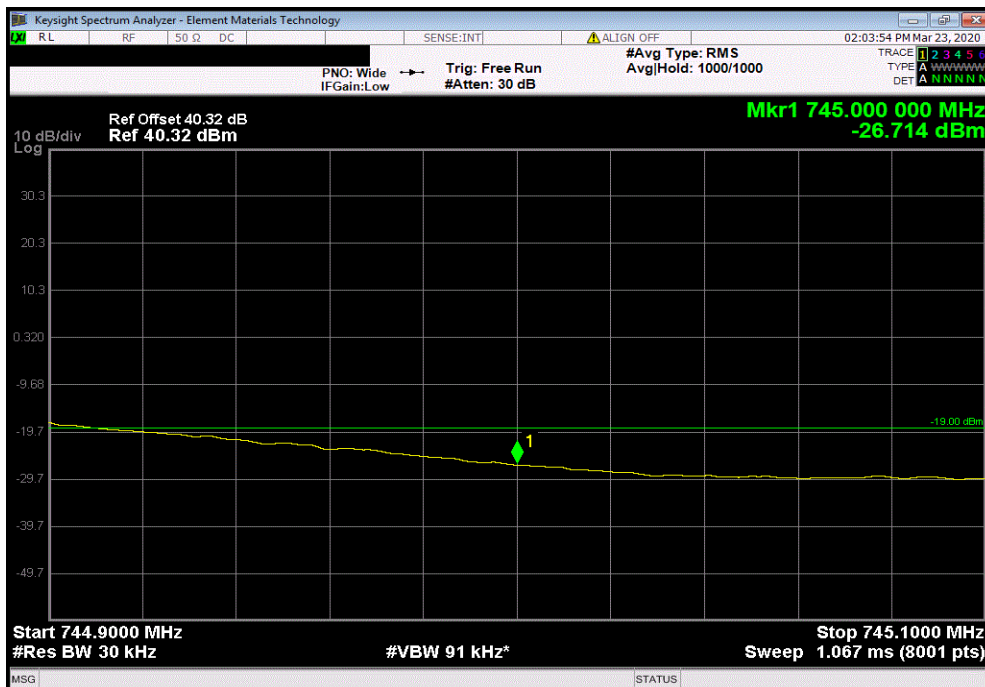
Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.189	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-26.714	-19	Pass



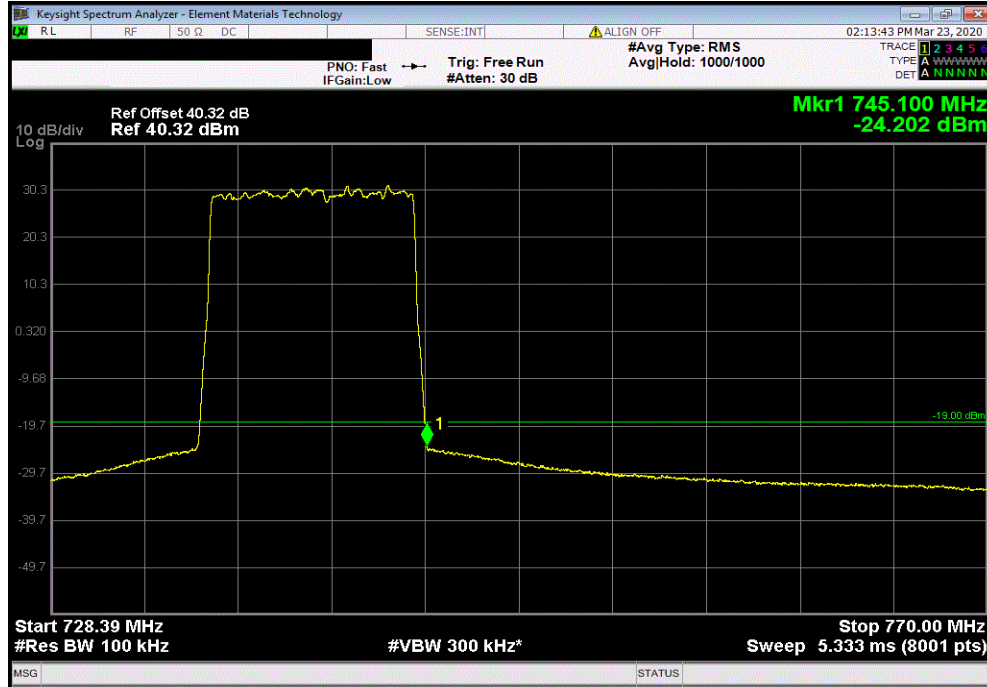
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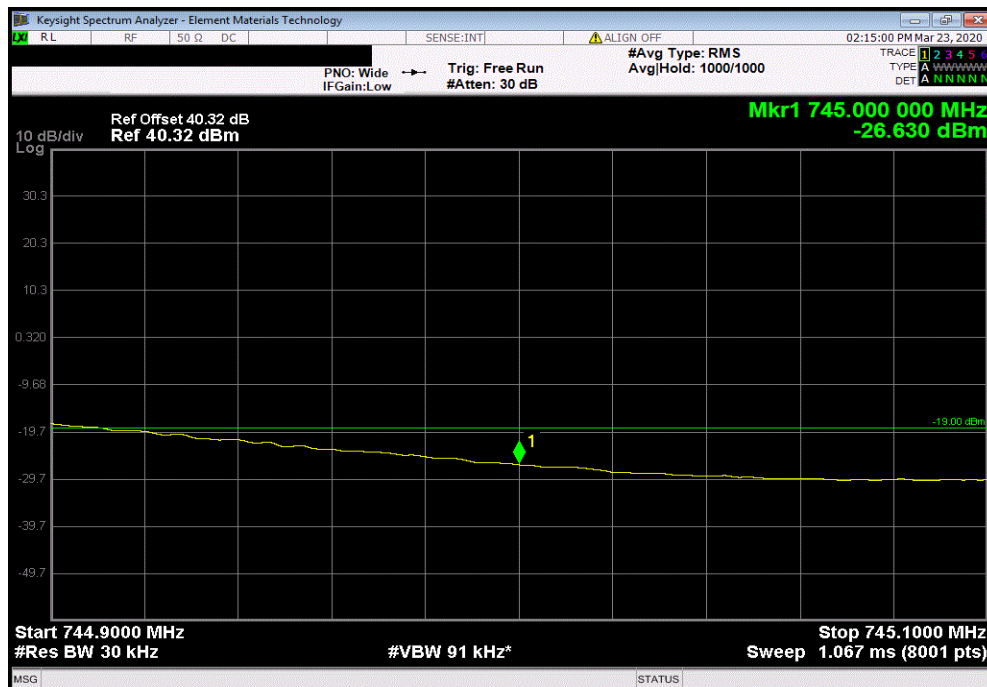
Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, 16-QAM Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.202	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, 16-QAM Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-26.63	-19	Pass



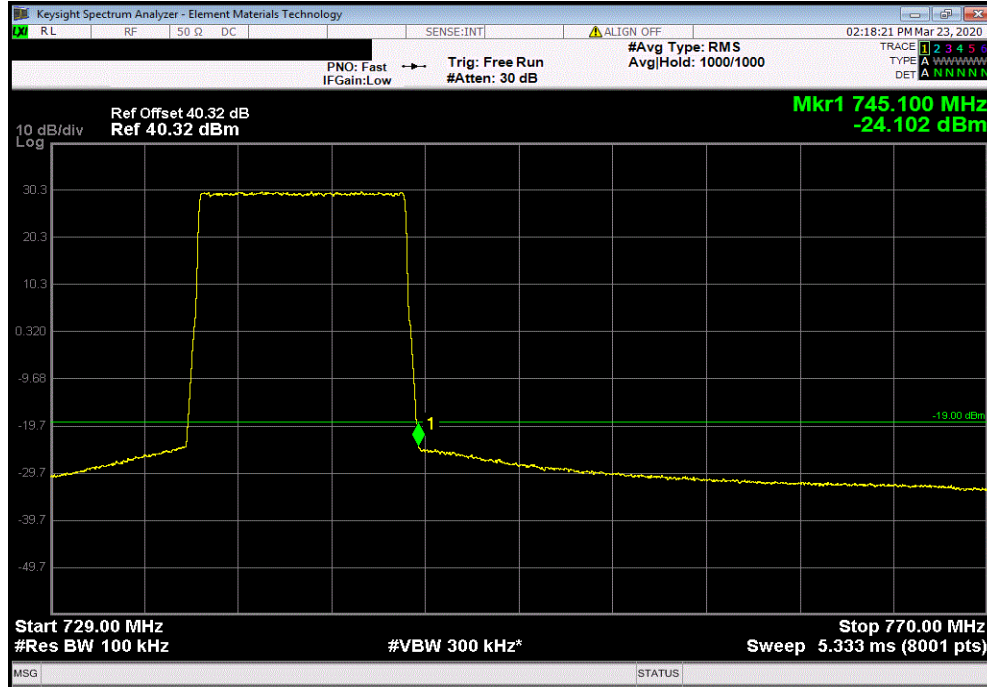
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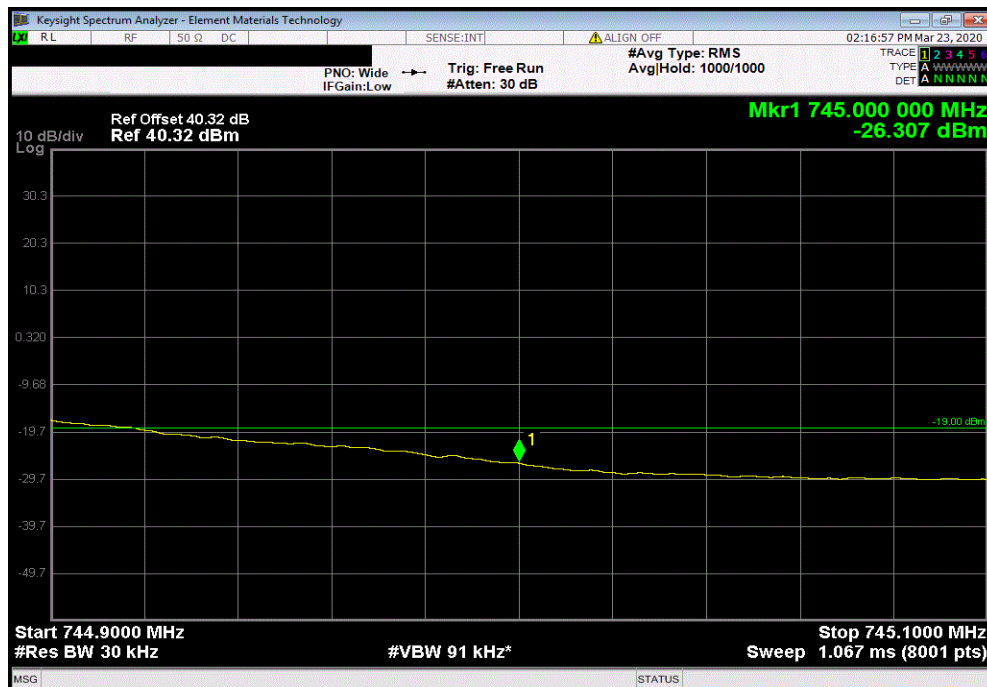
Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, 64-QAM Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.102	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, 64-QAM Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-26.307	-19	Pass



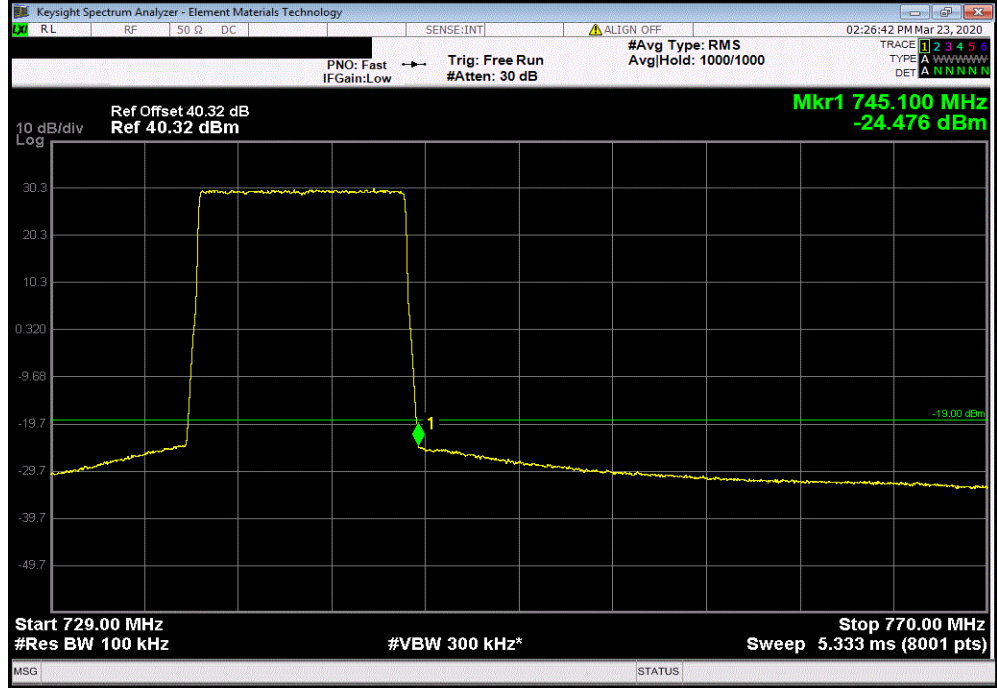
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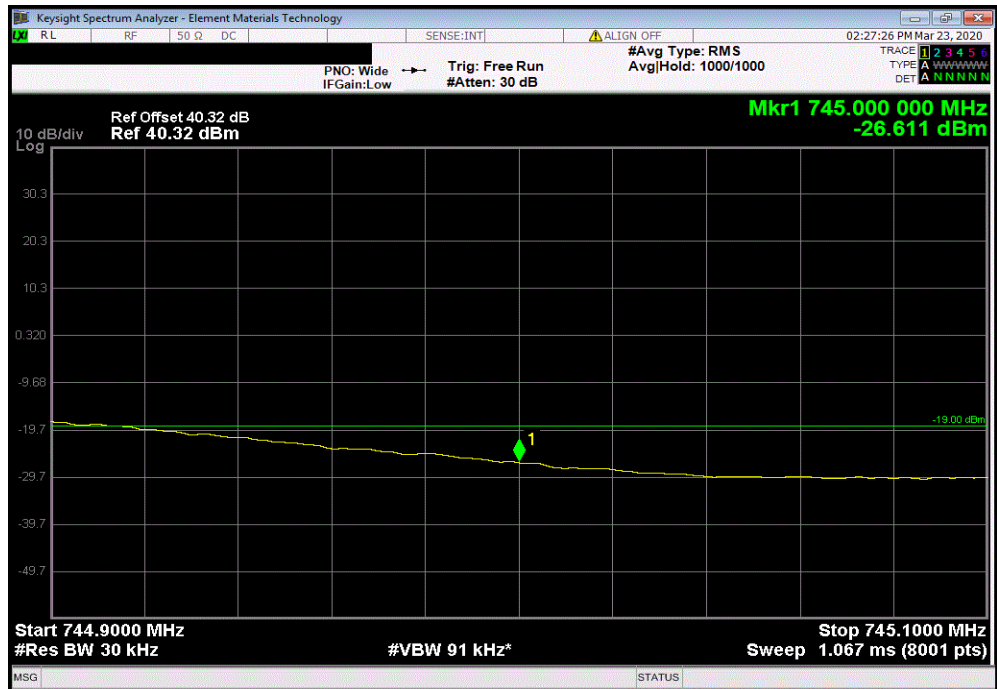
Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, 256-QAM Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.476	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, 256-QAM Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-26.611	-19	Pass



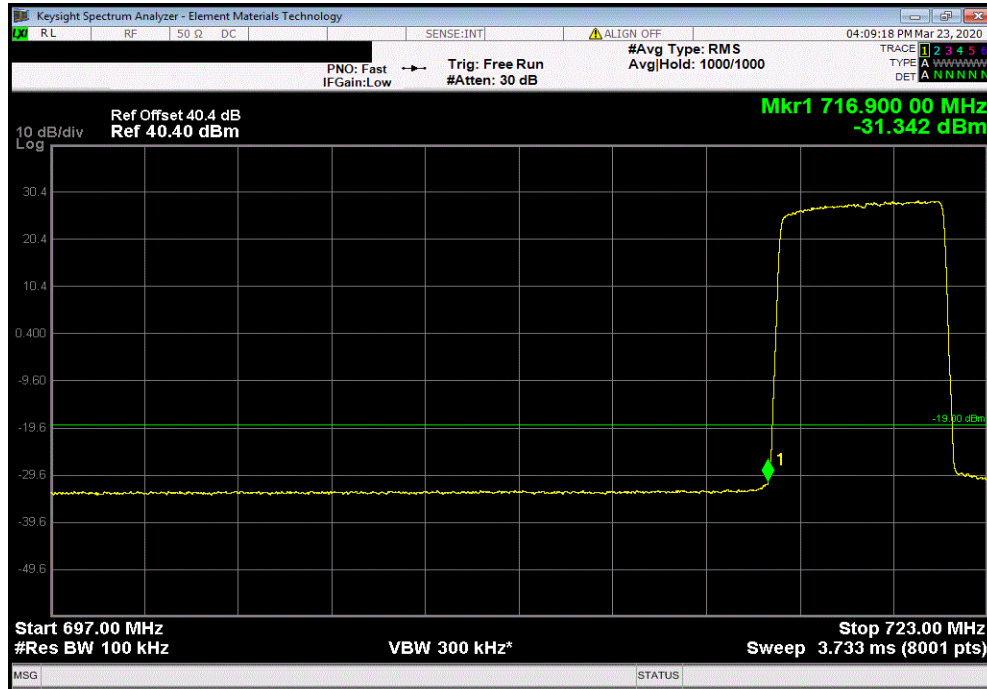
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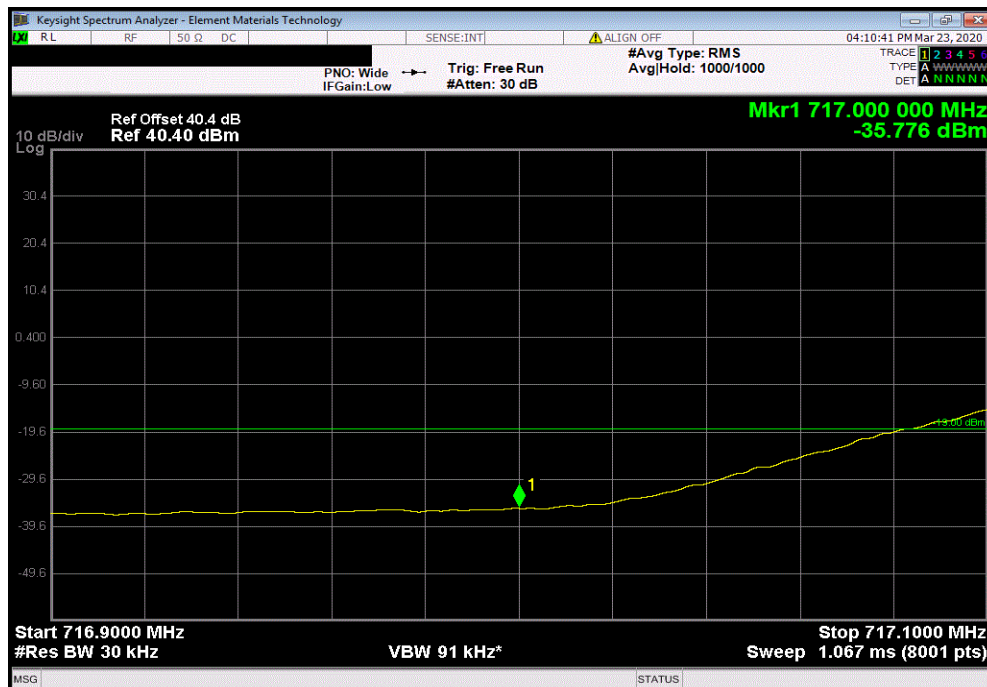
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 719.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-31.342	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 719.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-35.776	-19	Pass



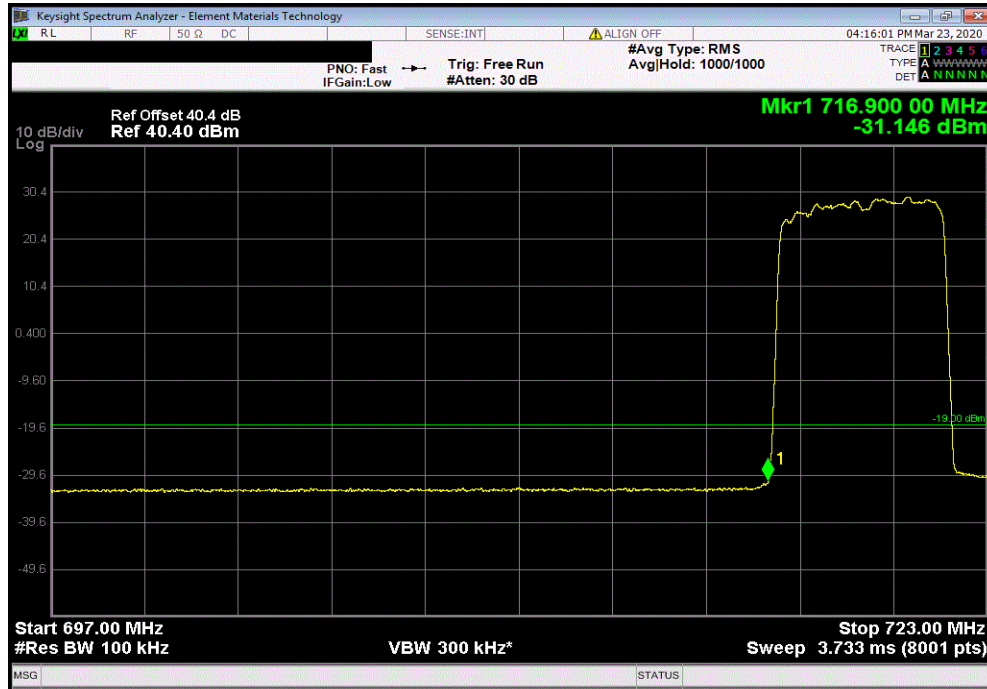
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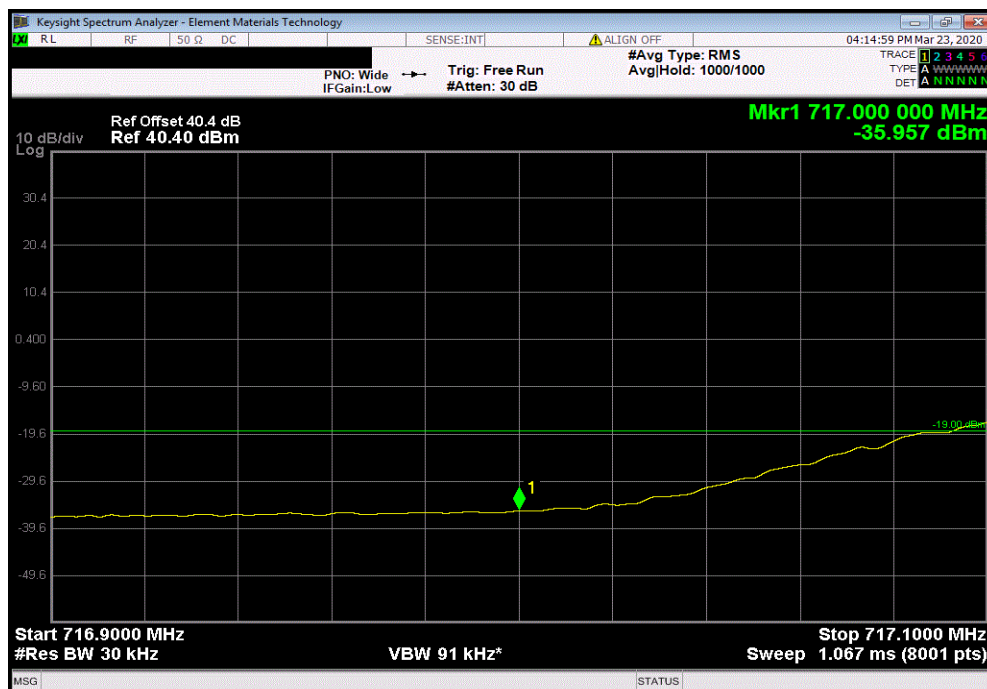
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 719.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-31.146	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, 16-QAM Modulation, Low Channel, 719.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-35.957	-19	Pass



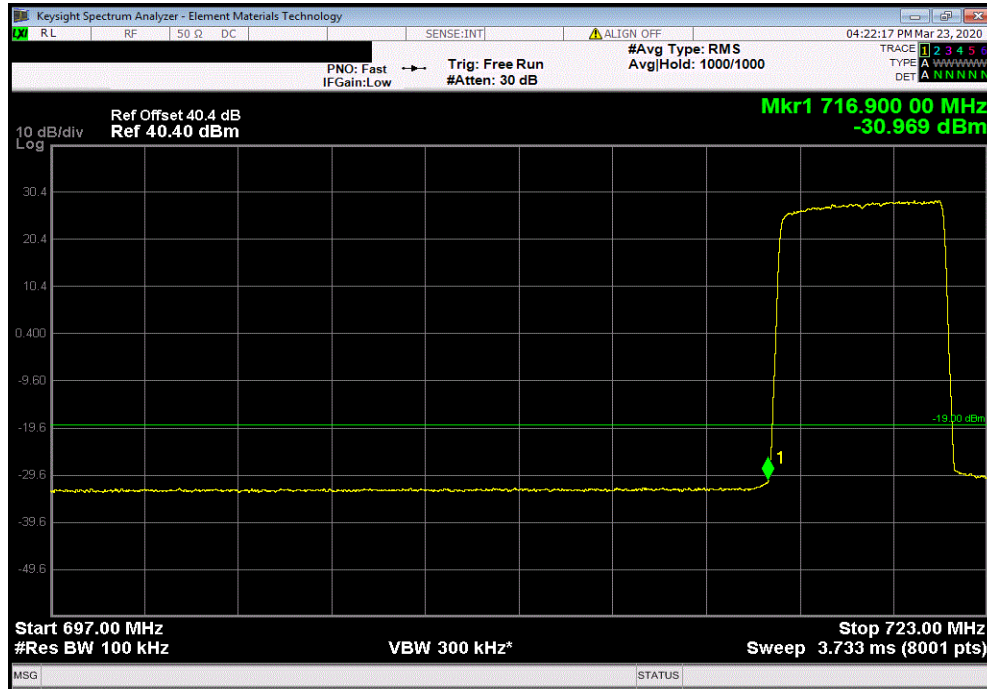
BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



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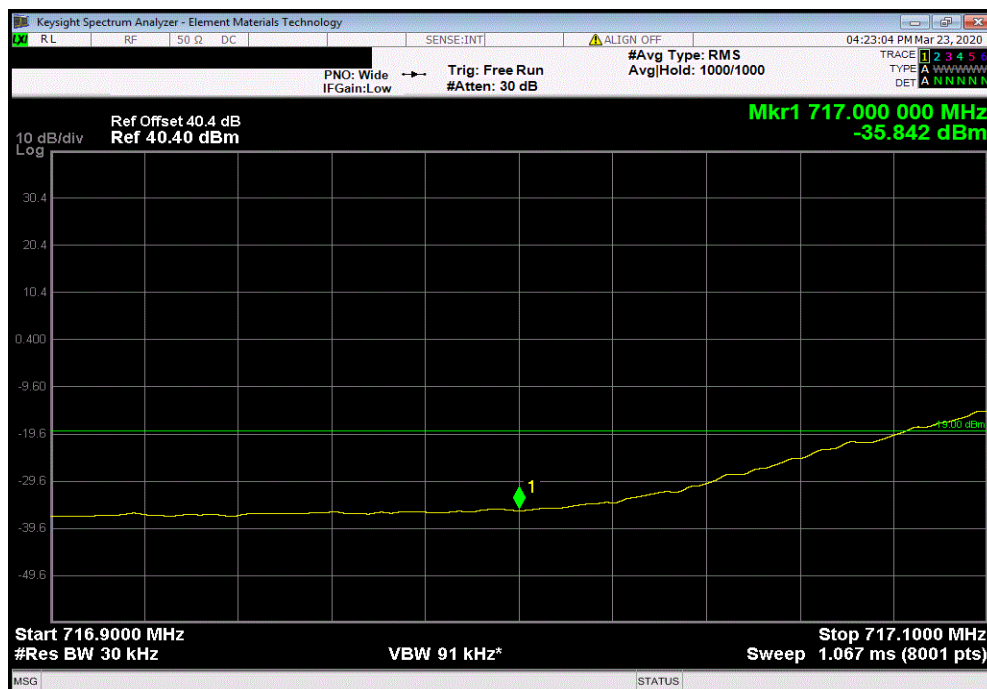
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 719.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-30.969	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, 64-QAM Modulation, Low Channel, 719.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-35.842	-19	Pass



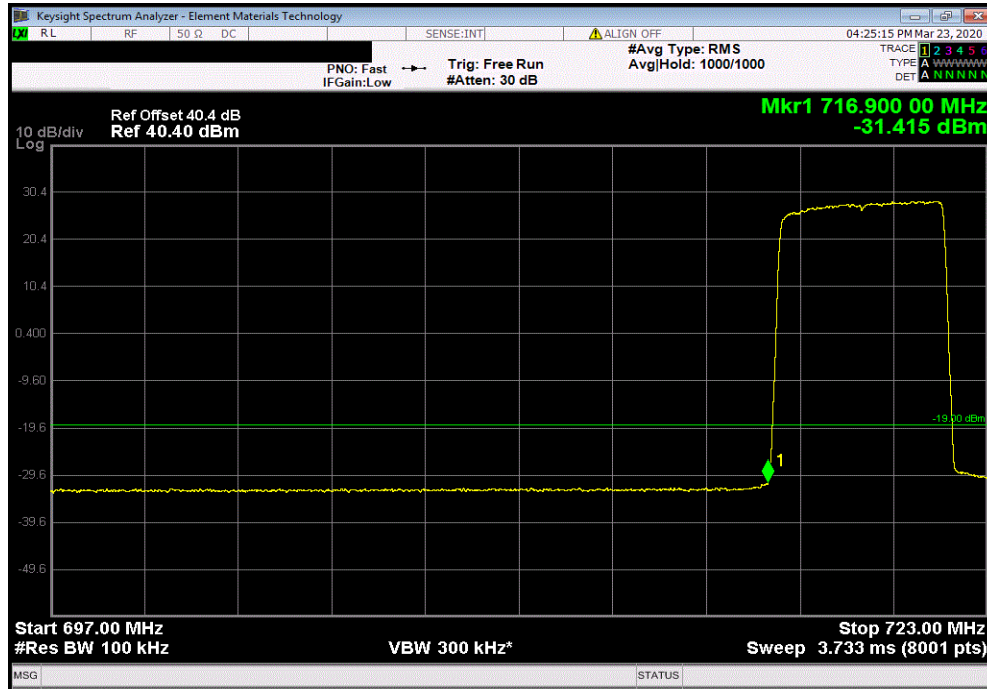
BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



XMR 2020.03.25.0

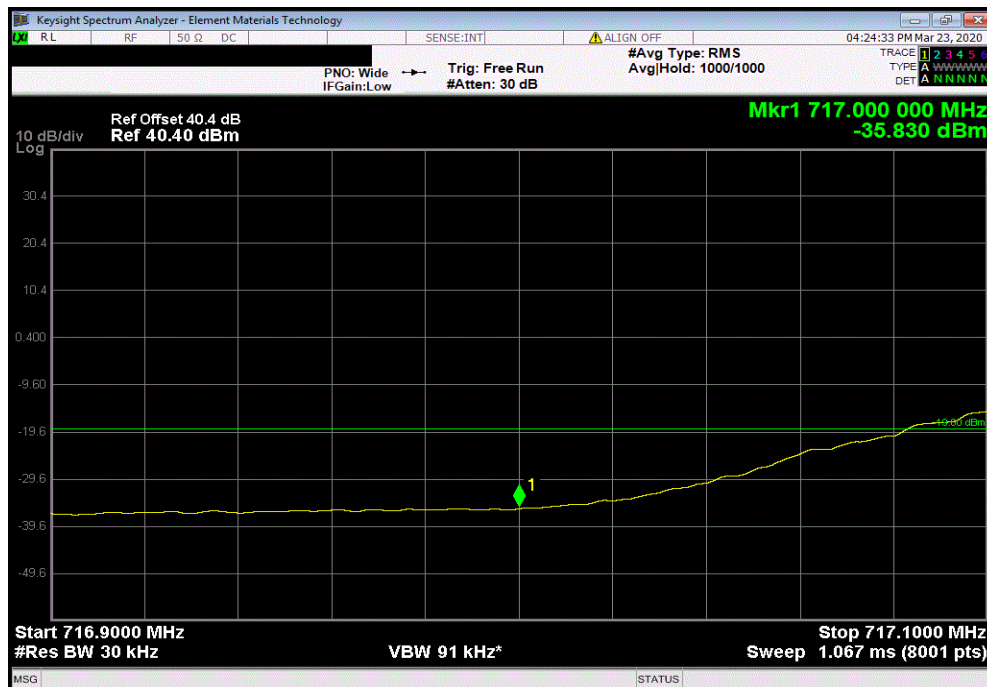
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel, 719.5 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-31.415	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 5 MHz Bandwidth, 256-QAM Modulation, Low Channel, 719.5 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-35.83	-19	Pass



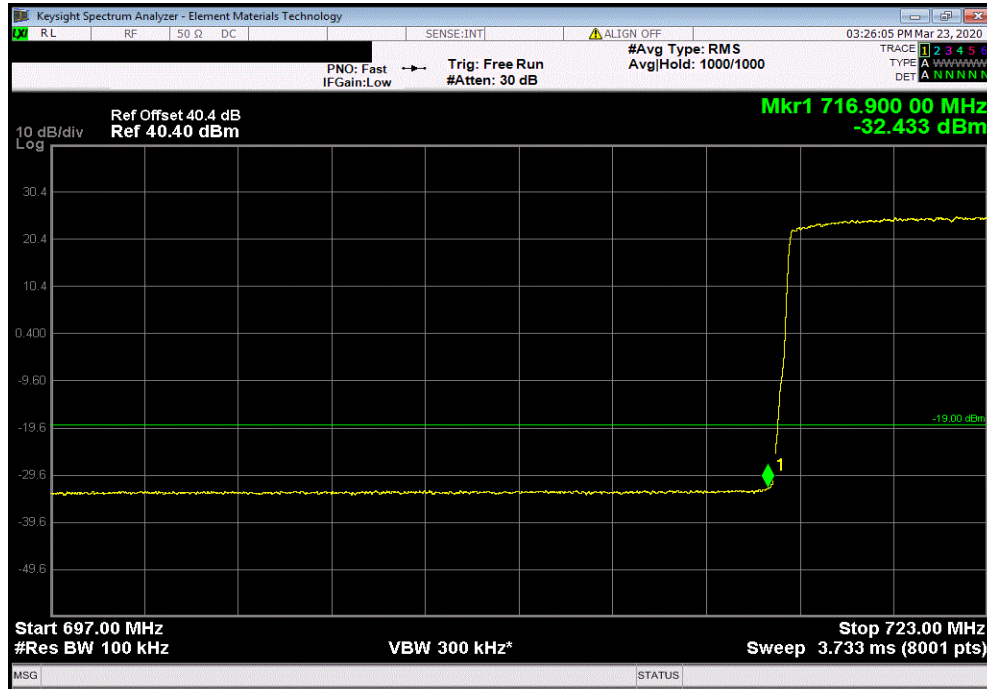
BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



XMI 2020.03.25.0

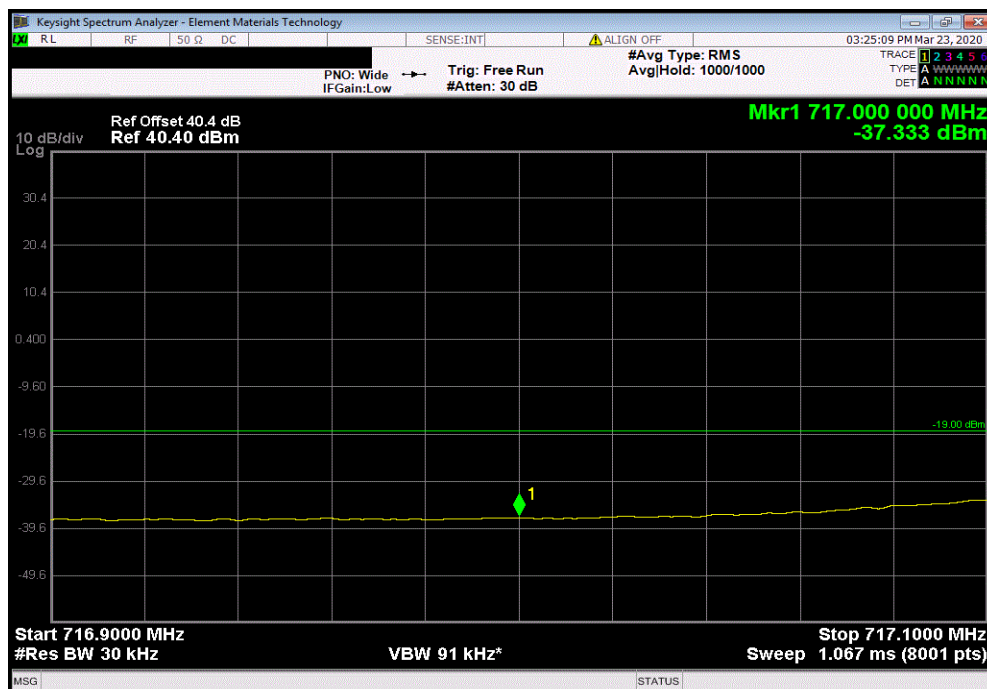
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 722 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-32.433	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 722 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-37.333	-19	Pass



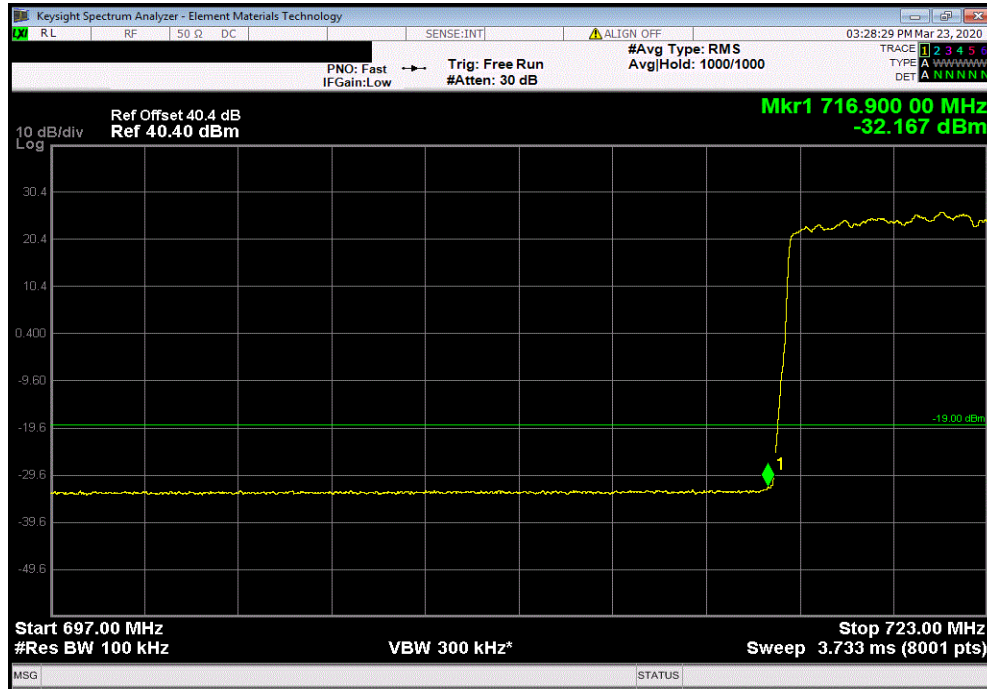
BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



XMI 2020.03.25.0

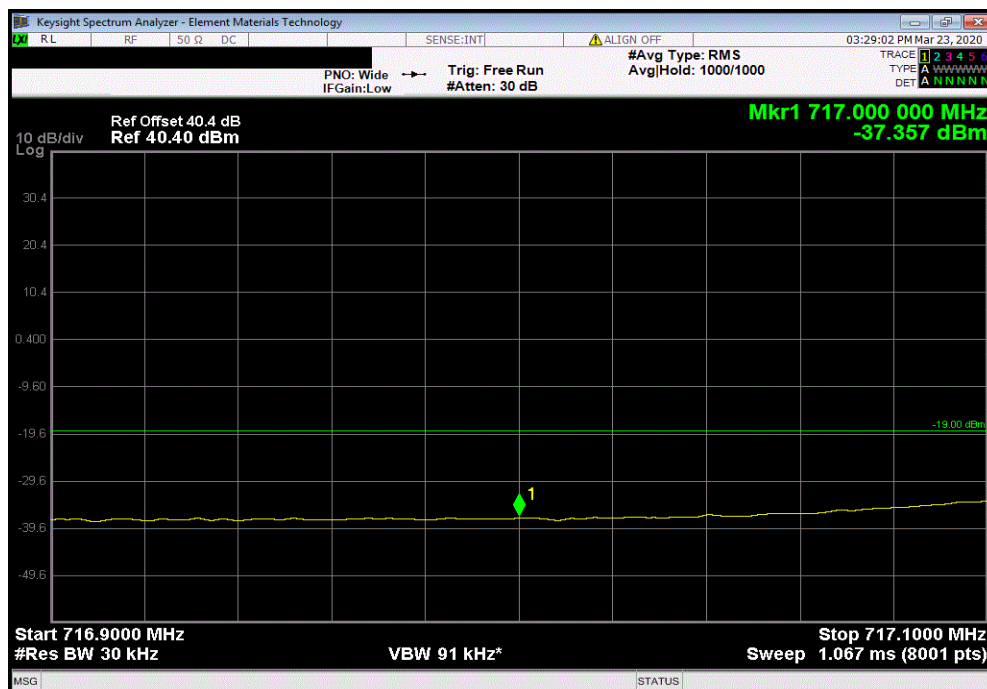
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, 16-QAM Modulation, Low Channel, 722 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-32.167	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, 16-QAM Modulation, Low Channel, 722 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-37.357	-19	Pass



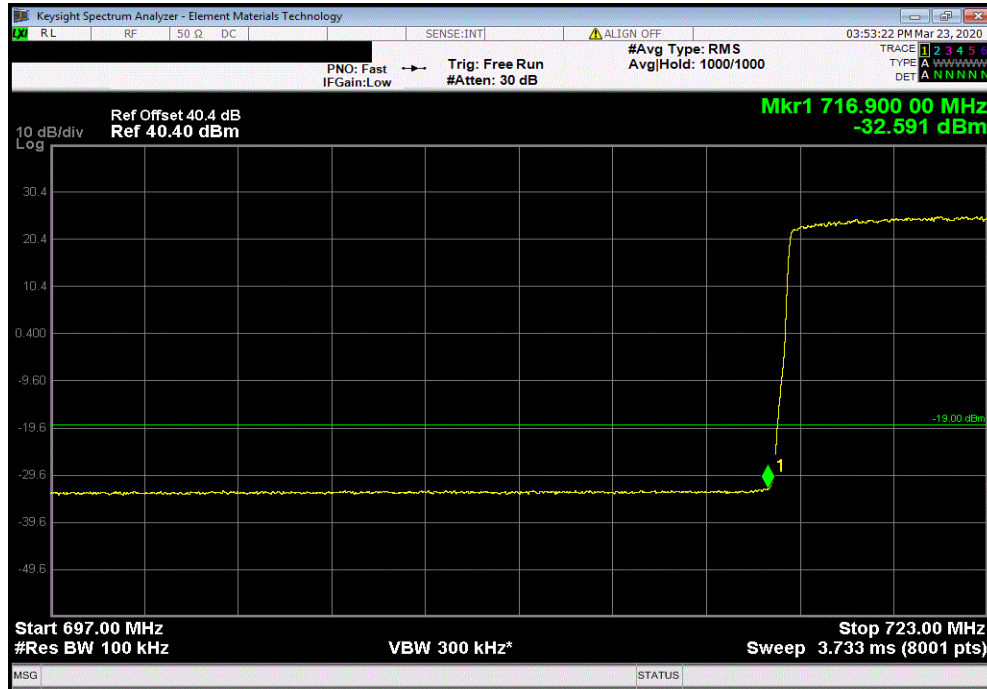
BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



XMI 2020.03.25.0

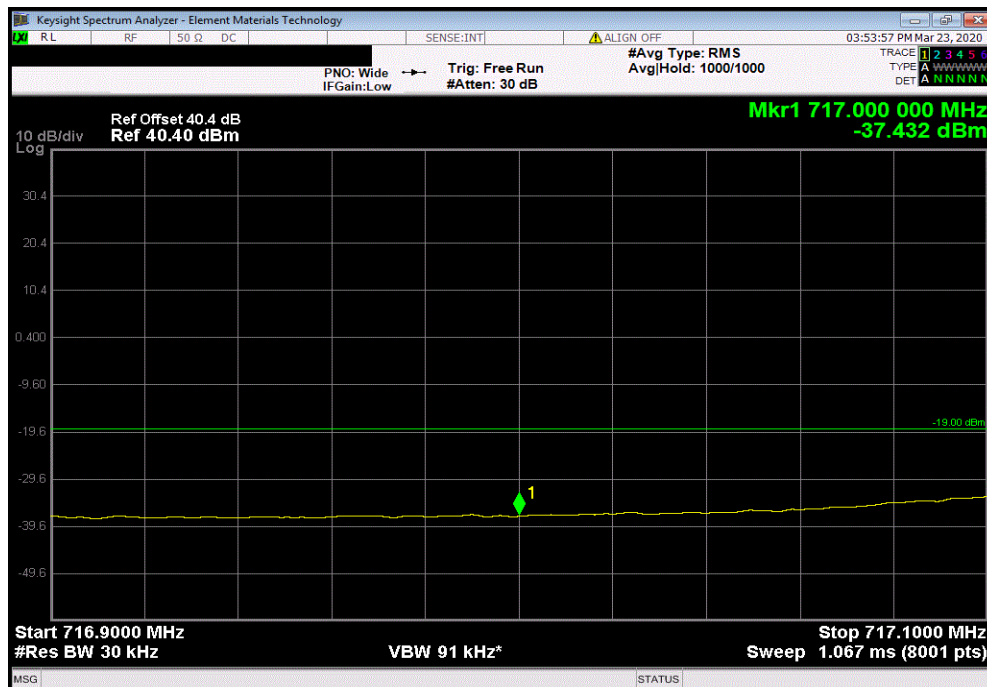
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, 64-QAM Modulation, Low Channel, 722 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-32.591	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, 64-QAM Modulation, Low Channel, 722 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-37.432	-19	Pass



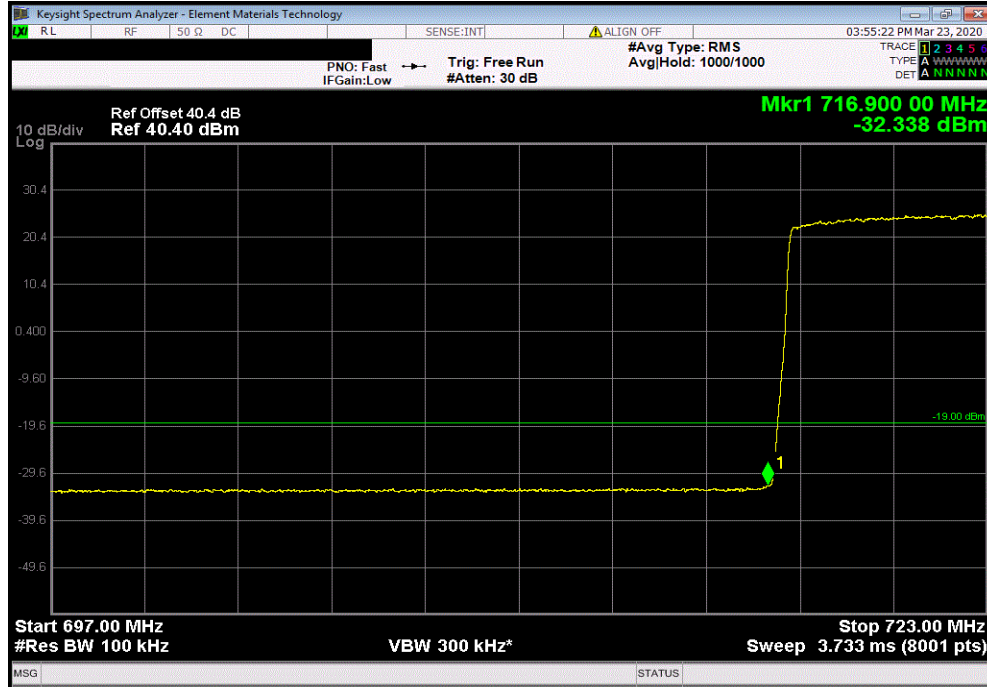
BAND EDGE COMPLIANCE LTE BANDS 29,12 (EXPANDED)



XMR 2020.03.25.0

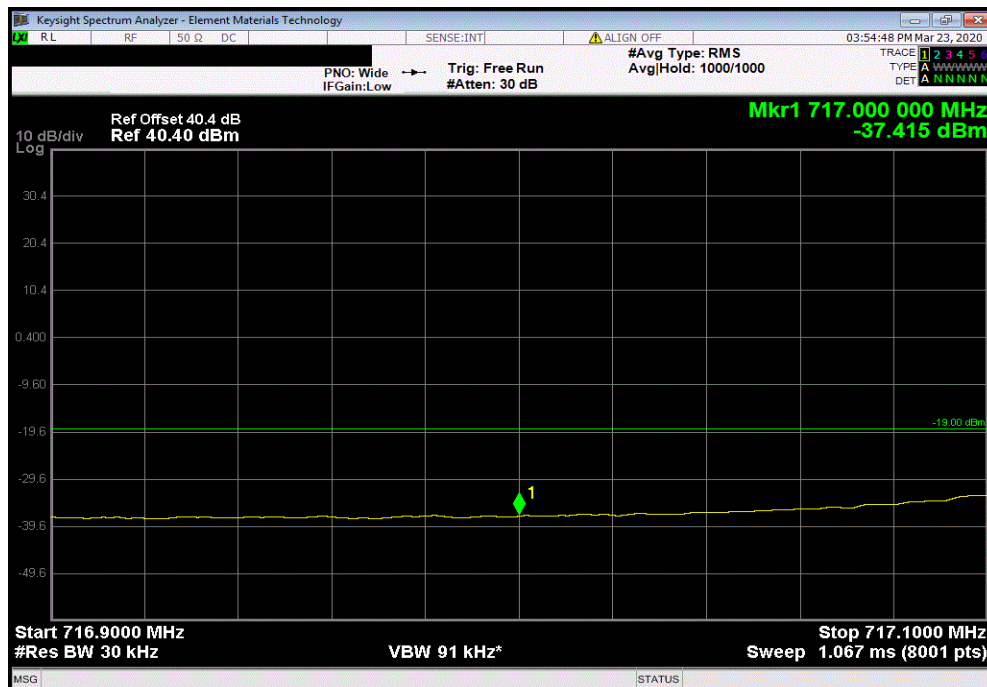
Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, 256-QAM Modulation, Low Channel, 722 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-32.338	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, 256-QAM Modulation, Low Channel, 722 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-37.415	-19	Pass



BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMIT 2020.03.25.0

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	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21

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 $[-10 \cdot \log((N))]$ to account for the device operation as a N port MIMO transmitter, as per FCC KDB 622911.

For Bands 12 and 14, the adjustment factor is $-10 \cdot \log(4) = -6$ dB. The Bands 12 and 14 adjusted limit is -19 dBm.

For Band 14 band edge measurements from 769 MHz – 775 MHz and 799 MHz – 806 MHz, reference level offset corrections were applied to the spectrum analyzer, according to the following table:

Frequency (MHz)	769	769.05	769.1	769.15	769.2	769.25	769.3	769.35	769.4
Correction Factor (dB)	49.8	48.9	48.2	47.6	47.1	46.7	46.3	46	45.7

Frequency (MHz)	769.45	769.5	769.55	769.6	769.65	769.7	769.75	769.8	769.85
Correction Factor (dB)	45.5	45.3	45.1	44.9	44.7	44.6	44.4	44.3	44.2

Frequency (MHz)	769.9	769.95	770	770.5	771	775	776	798	806
Correction Factor (dB)	44.1	44	43.9	43.2	42.8	41.7	41.7	41	41

Per section 90.543(e)(3) and RSS 140 4.4, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm $[-13 \text{ dBm} - 10 \log(4)]$ per FCC KDB 662911D01 v02r01 because the RRH may operate as a 4 port MIMO transmitter for Band 14.

FCC 90.543(e)(5) and RSS 140 4.4b requires a >100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC 90.543(e)(5) requires a >30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

FCC 90.543(e)(1) and RSS 140 4.4a requires an emission limit of -46 dBm for any 6.25 kHz bandwidth between frequency bands 769 MHz - 775 MHz and 799 MHz - 806 MHz (Note that the upper frequency for part 90 is 805 MHz and RSS 140 is 806 MHz). The limit is adjusted to -52 dBm per 6.25 kHz bandwidth $[-46 \text{ dBm} - 10 \log(4)]$ per FCC KDB 662911D01 v02r01 because the BTS may operate as a 4 port MIMO transmitter.

BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMIT 2020.03.25.0

EUT: Aircscale Base Transceiver Station Remote Radio Head Model AHLBBA		Work Order: NOKI0013	
Serial Number: K9193514835		Date: 25-Mar-20	
Customer: Nokia Solutions and Networks		Temperature: 24.6 °C	
Attendees: Mitch Hill, John Rattanaovong		Humidity: 36.6% RH	
Project: None		Barometric Pres.: 1024 mbar	
Tested by: Brandon Hobbs		Power: 54 VDC	
		Job Site: TX03	
TEST SPECIFICATIONS			
FCC 901:2020		Test Method	
RSS-140:2018		ANSI C63.26:2015	
		RSS-140:2018	
COMMENTS			
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. The hottest port per power amplifier (PA) was used for testing. The worst case port was determined in the original client provided test report. The carrier power was set to maximum for all testing.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2,4,6,8	Signature	
		Value (dBm)	Limit (dBm)
Band 14, 758 MHz - 768 MHz, LTE			
Port 1			
10 MHz Bandwidth			
QPSK Modulation, Single Ch. 763 MHz, Lower Side			
Range 1		-22.8	-19
Range 2		-27.7	-19
QPSK Modulation, Single Ch. 763 MHz, Upper Side			
Range 1		-25.2	-19
Range 2		-30.4	-19
Range 3		-61.2	-52
Range 4		-75.2	-52
Port 2			
10 MHz Bandwidth			
QPSK Modulation, Single Ch. 763 MHz, Lower Side			
Range 1		-21.7	-19
Range 2		-26.3	-19
QPSK Modulation, Single Ch. 763 MHz, Upper Side			
Range 1		-24.3	-19
Range 2		-29.3	-19
Range 3		-60.2	-52
Range 4		-75.0	-52

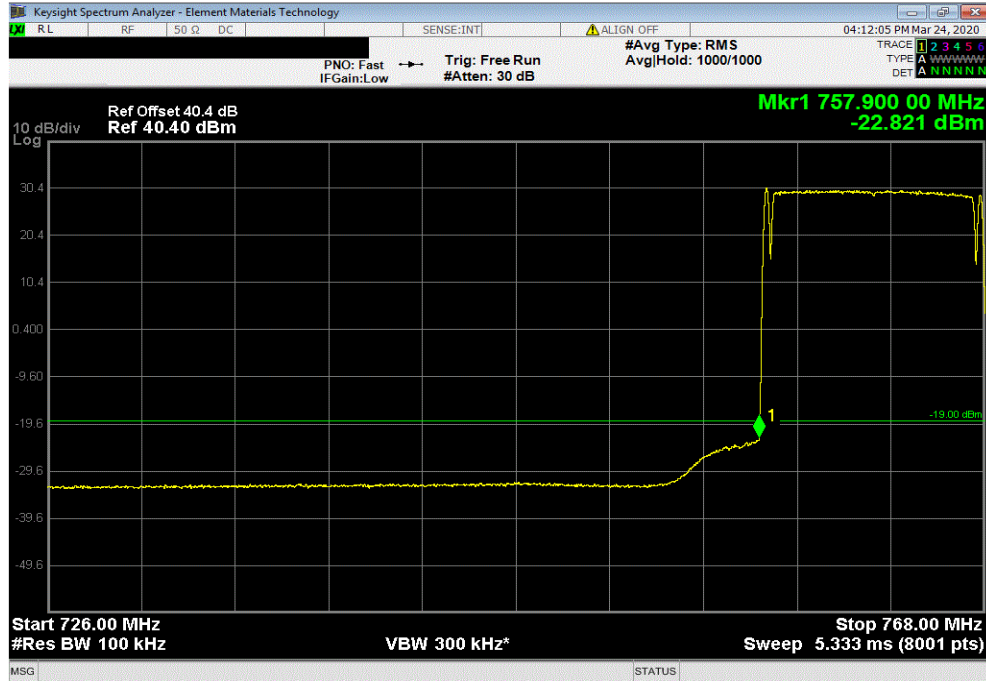
BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMR 2020.03.25.0

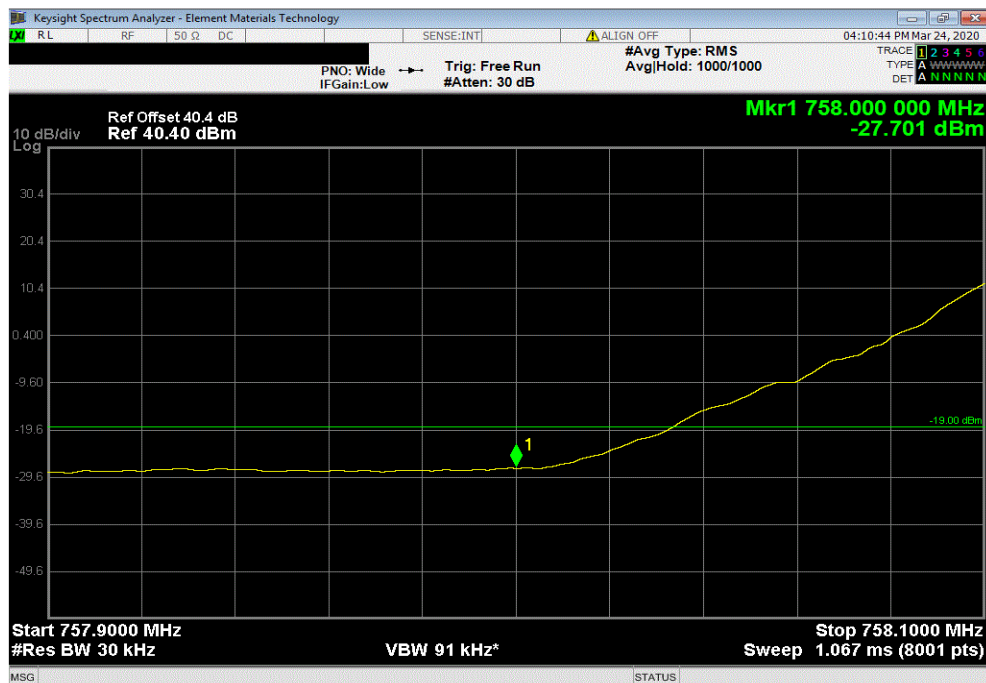
Band 14, 758 MHz - 768 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Lower Side, Range 1

				Value (dBm)	Limit (dBm)	Result
				-22.821	-19	Pass



Band 14, 758 MHz - 768 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Lower Side, Range 2

				Value (dBm)	Limit (dBm)	Result
				-27.701	-19	Pass



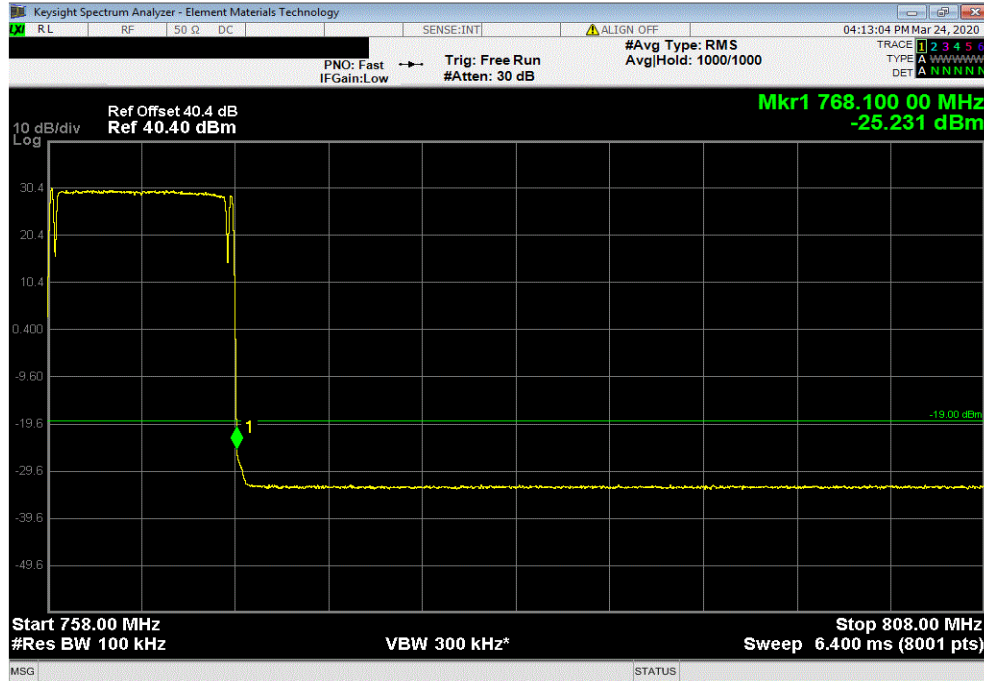
BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMR 2020.03.25.0

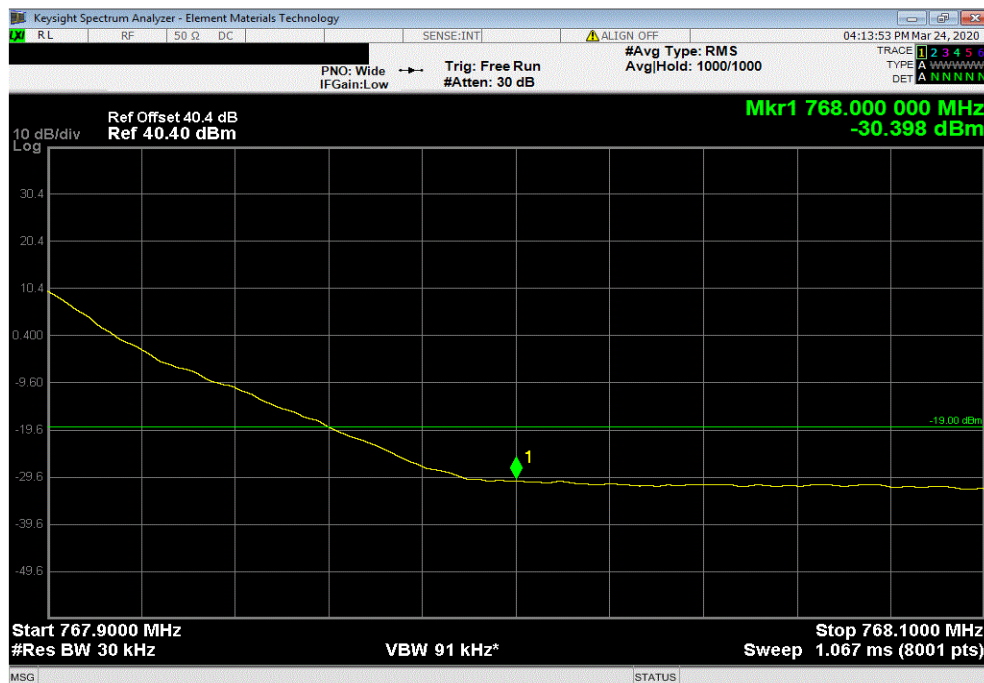
Band 14, 758 MHz - 768 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 1

				Value (dBm)	Limit (dBm)	Result
				-25.231	-19	Pass



Band 14, 758 MHz - 768 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 2

				Value (dBm)	Limit (dBm)	Result
				-30.398	-19	Pass

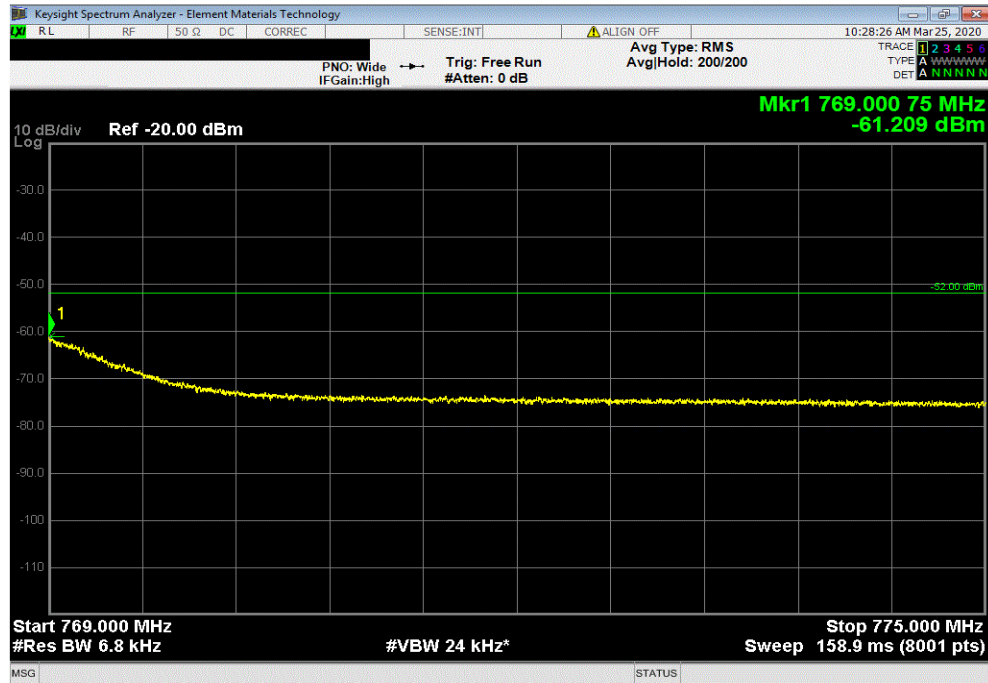


element

XMIT 2020.03.25.0

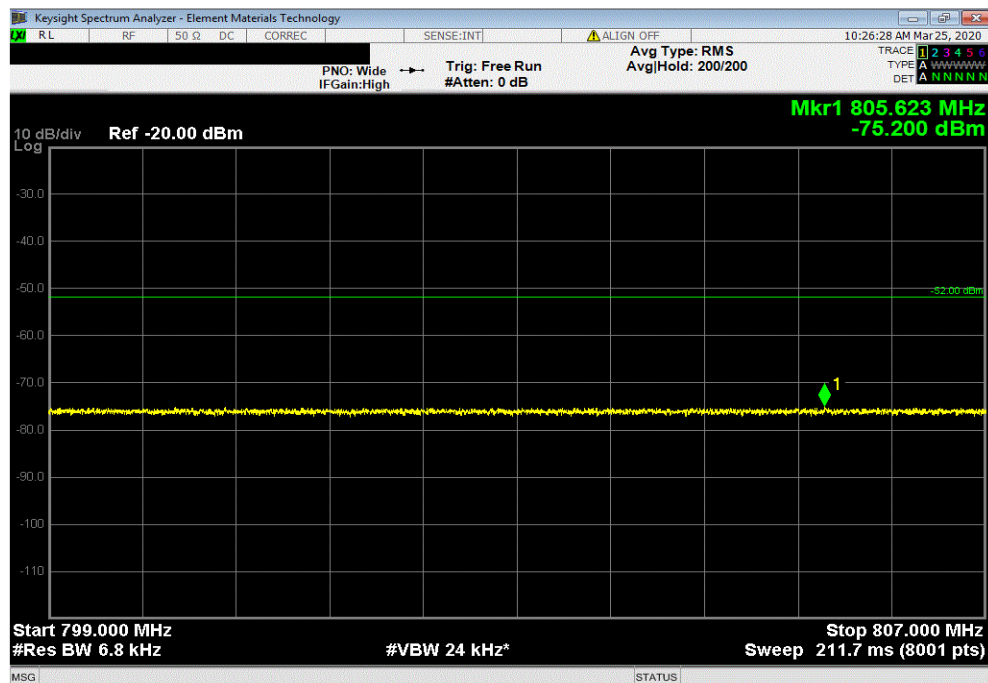
Band 14, 758 MHz - 768 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 3

				Value (dBm)	Limit (dBm)	Result
				-61.209	-52	Pass



Band 14, 758 MHz - 768 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 4

				Value (dBm)	Limit (dBm)	Result
				-75.2	-52	Pass



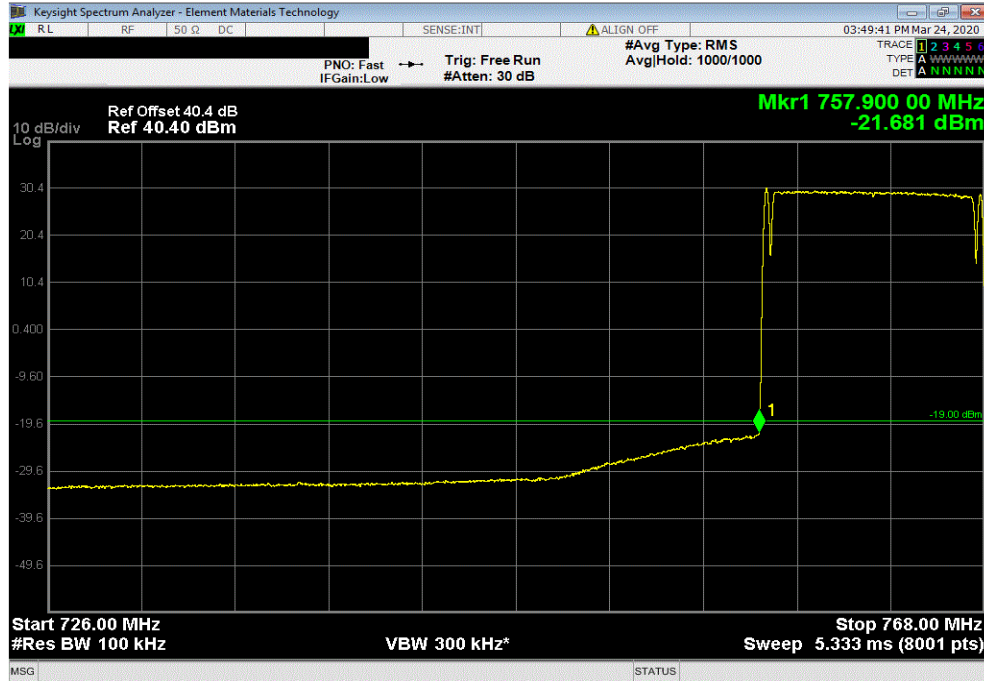
BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMR 2020.03.25.0

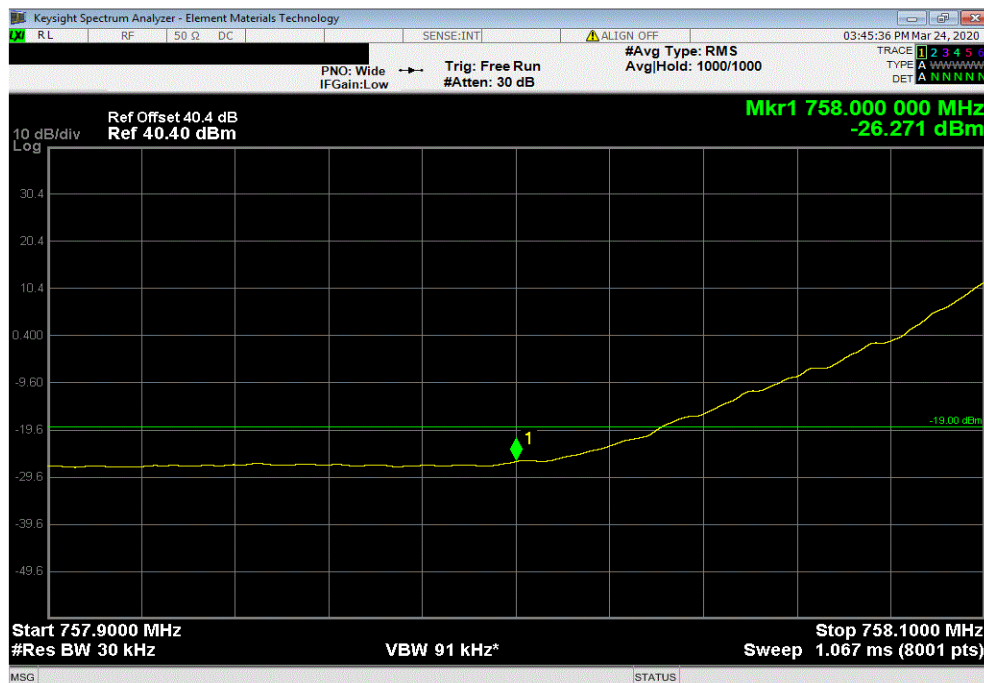
Band 14, 758 MHz - 768 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Lower Side, Range 1

				Value (dBm)	Limit (dBm)	Result
				-21.681	-19	Pass



Band 14, 758 MHz - 768 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Lower Side, Range 2

				Value (dBm)	Limit (dBm)	Result
				-26.271	-19	Pass



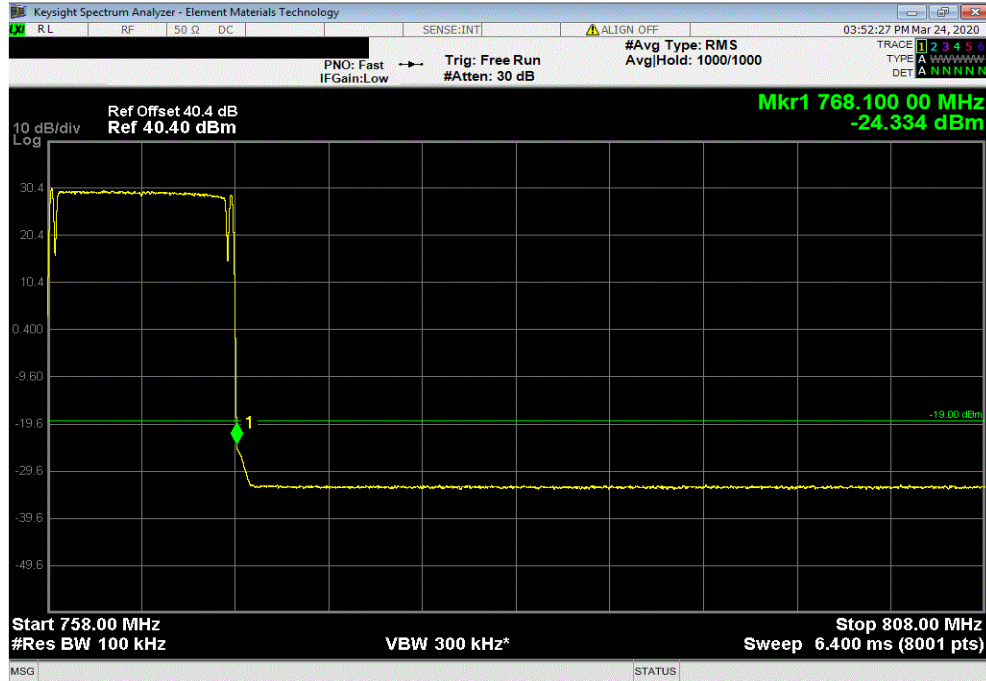
BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMI 2020.03.25.0

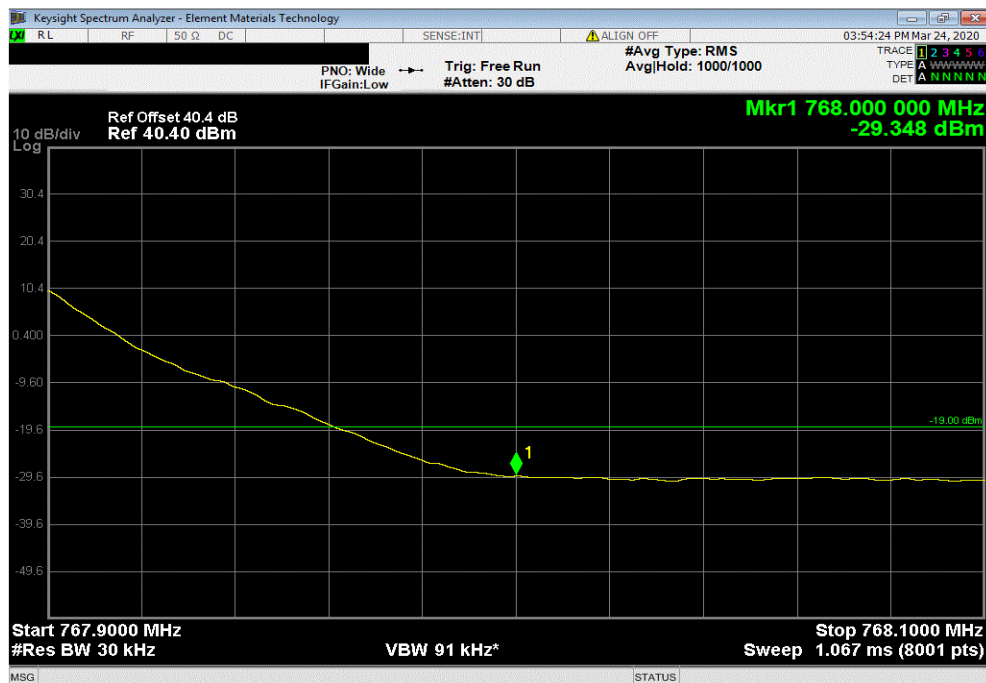
Band 14, 758 MHz - 768 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.334	-19	Pass



Band 14, 758 MHz - 768 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 2

				Value (dBm)	Limit (dBm)	Result
				-29.348	-19	Pass



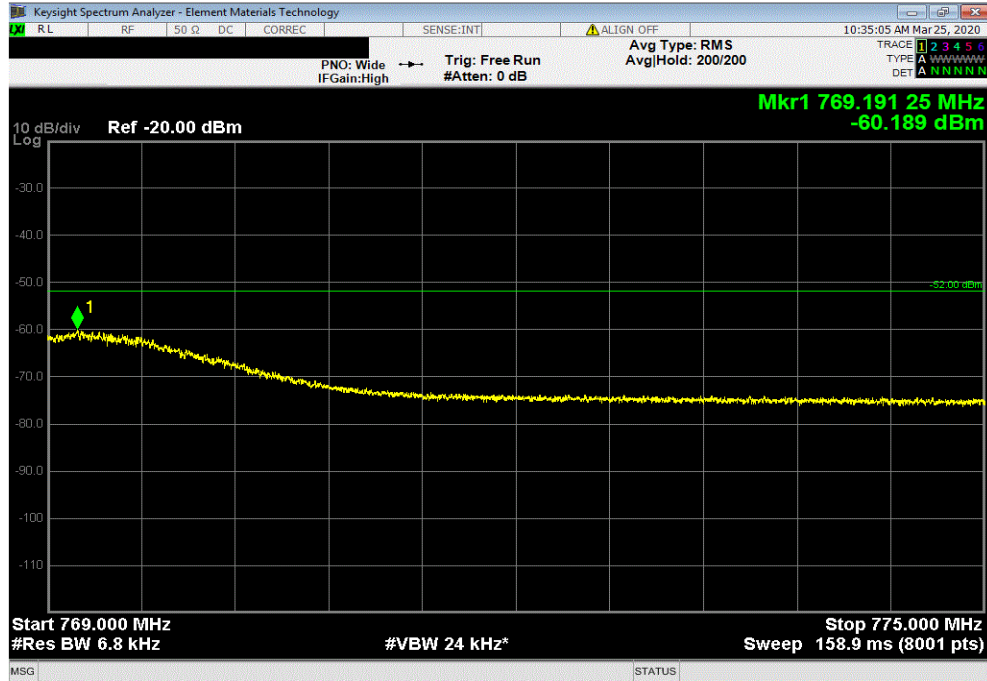
BAND EDGE COMPLIANCE LTE BAND 14 (GUARDBAND)



XMR 2020.03.25.0

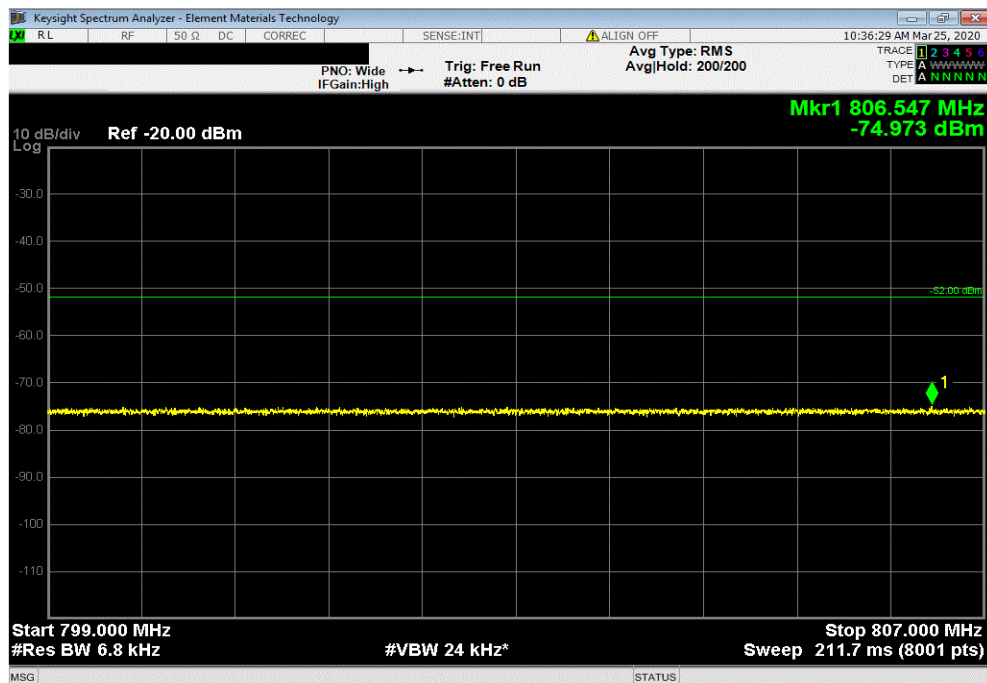
Band 14, 758 MHz - 768 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 3

				Value (dBm)	Limit (dBm)	Result
				-60.189	-52	Pass



Band 14, 758 MHz - 768 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Single Ch. 763 MHz, Upper Side, Range 4

				Value (dBm)	Limit (dBm)	Result
				-74.973	-52	Pass



BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMIT 2020.03.25.0

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	Agilent	N9010A	AFL	27-Feb-20	27-Feb-21
Generator - Signal	Keysight	N5171B-506	TEW	2-May-18	2-May-21

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 $[-10 \cdot \log(N)]$ to account for the device operation as a N port MIMO transmitter, as per FCC KDB 622911.

For Bands 12 and 14, the adjustment factor is $-10 \cdot \log(4) = -6$ dB. The Bands 12 and 14 adjusted limit is -19 dBm.
For Band 29, the adjustment factor is $-10 \cdot \log(2) = -3$ dB. The Band 29 adjusted limit is -16 dBm.

Per FCC section 27.53(g) and RSS 130 4.7.1, the power of any emission outside of the authorized operating frequency range cannot exceed -13 dBm. The limit is adjusted to -19 dBm $[-13 \text{ dBm} - 10 \log(4)]$ per FCC KDB 662911D01 v02r01 because the RRH may operate as a 4 port MIMO transmitter for Band 12.

FCC 27.53(g) and RSS 130 4.7.1 requires a ≥ 100 kHz measurement bandwidth for emissions 100 kHz outside of the RRH operating frequency range. FCC 27.53(g) requires a ≥ 30 kHz measurement bandwidth for emissions between 100 kHz outside of the RRH operating frequency range and band edge of the operating frequency range.

BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMR 2020.03.25.0

EUT: Aircscale Base Transceiver Station Remote Radio Head Model AHLBBA		Work Order: NOKI0013	
Serial Number: K9193514835		Date: 24-Mar-20	
Customer: Nokia Solutions and Networks		Temperature: 23.9 °C	
Attendees: Mitch Hill, John Rattanaovong		Humidity: 37.6% RH	
Project: None		Barometric Pres.: 1025 mbar	
Tested by: Brandon Hobbs		Power: 54 VDC	
Job Site: TX03			
TEST SPECIFICATIONS			
FCC 27:2020		ANSI C63.26:2015	
RSS-130:2019		RSS-130:2019	
COMMENTS			
All measurement path losses were accounted for in the reference level offset including any attenuators, filters and DC blocks. The hottest port per power amplifier (PA) was used for testing. The worst case port was determined in the original client provided test report. The carrier power was set to maximum for all testing.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	2,6	Signature	
		Value (dBm)	Limit (dBm) Result
Band 12, 729 MHz - 745 MHz, LTE			
Port 1			
10 MHz Bandwidth			
QPSK Modulation, Low Channel, 734 MHz			
Range 1		-25.0	-19 Pass
Range 2		-30.1	-19 Pass
QPSK Modulation, High Channel, 740 MHz			
Range 1		-24.1	-19 Pass
Range 2		-29.8	-19 Pass
Port 2			
10 MHz Bandwidth			
QPSK Modulation, Low Channel, 734 MHz			
Range 1		-23.3	-19 Pass
Range 2		-26.3	-19 Pass
QPSK Modulation, High Channel, 740 MHz			
Range 1		-22.4	-19 Pass
Range 2		-28.6	-19 Pass
Band 29, 717 MHz - 728 MHz, LTE			
Port 1			
10 MHz Bandwidth			
QPSK Modulation, Low Channel, 722 MHz			
Range 1		-31.6	-19 Pass
Range 2		-37.0	-19 Pass
QPSK Modulation, High Channel, 723 MHz			
Range 1		-28.5	-19 Pass
Range 2		-34.2	-19 Pass

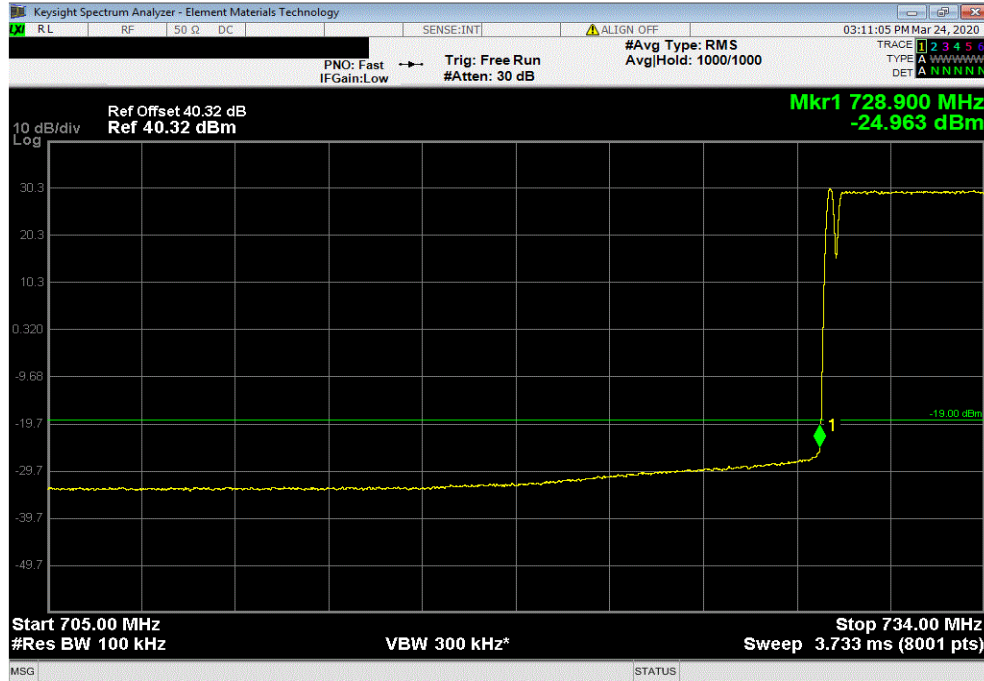
BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMI 2020.03.25.0

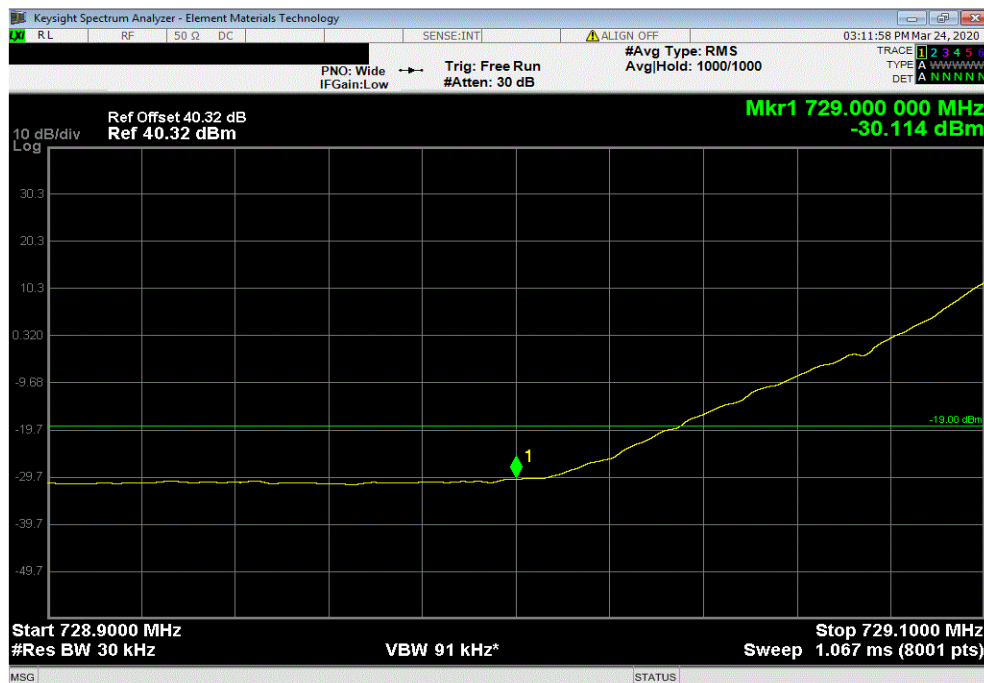
Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 734 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.963	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 734 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-30.114	-19	Pass



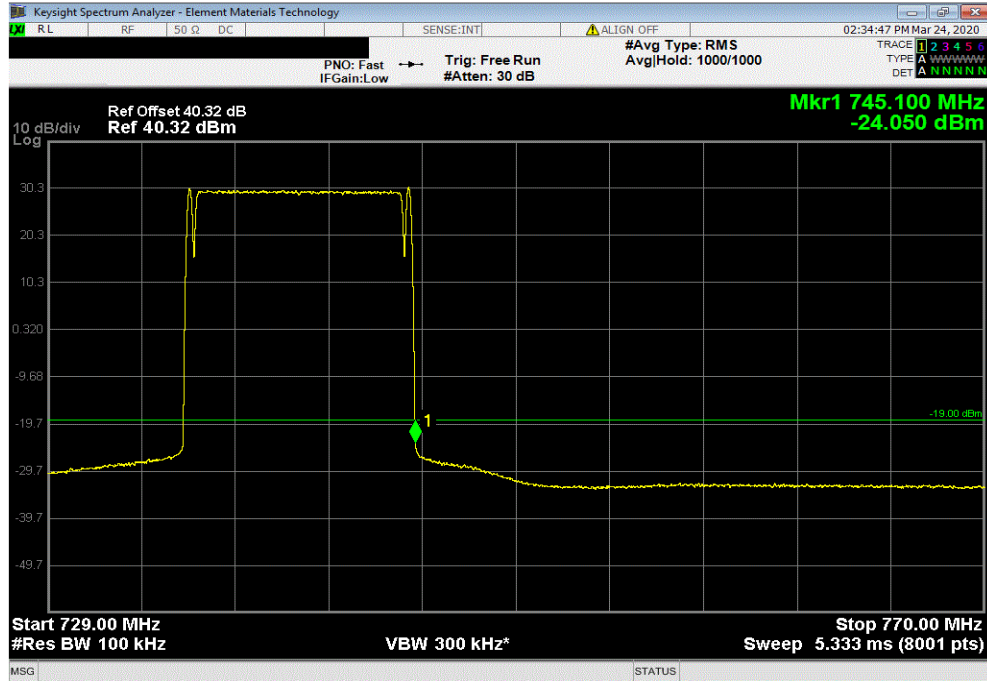
BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMI 2020.03.25.0

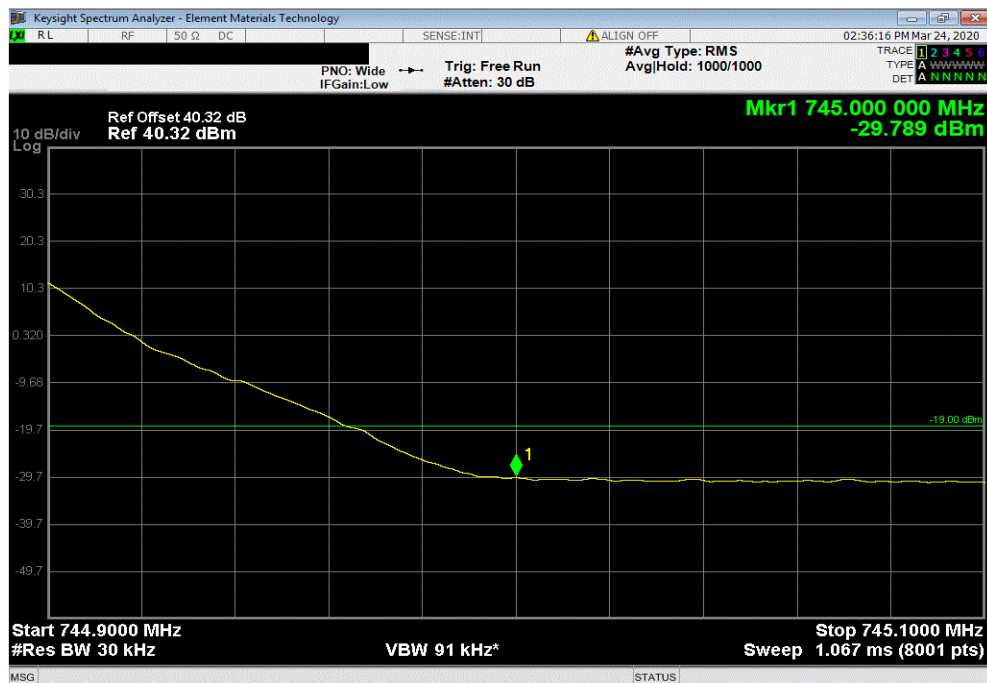
Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-24.05	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-29.789	-19	Pass

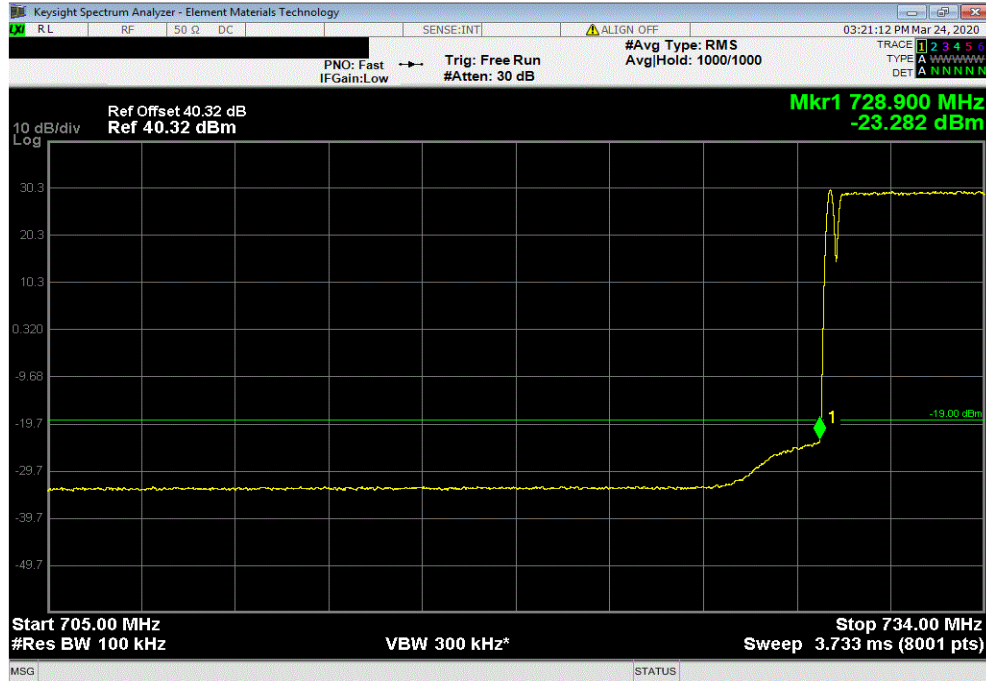


BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)

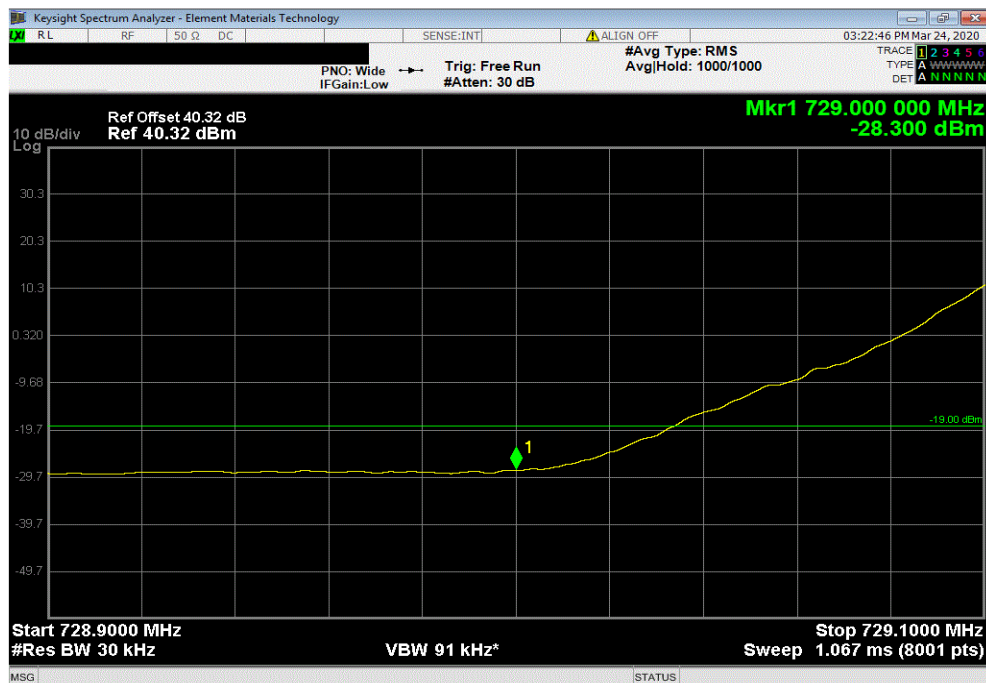


XMI 2020.03.25.0

Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 734 MHz, Range 1						
				Value (dBm)	Limit (dBm)	Result
				-23.282	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 734 MHz, Range 2						
				Value (dBm)	Limit (dBm)	Result
				-28.3	-19	Pass



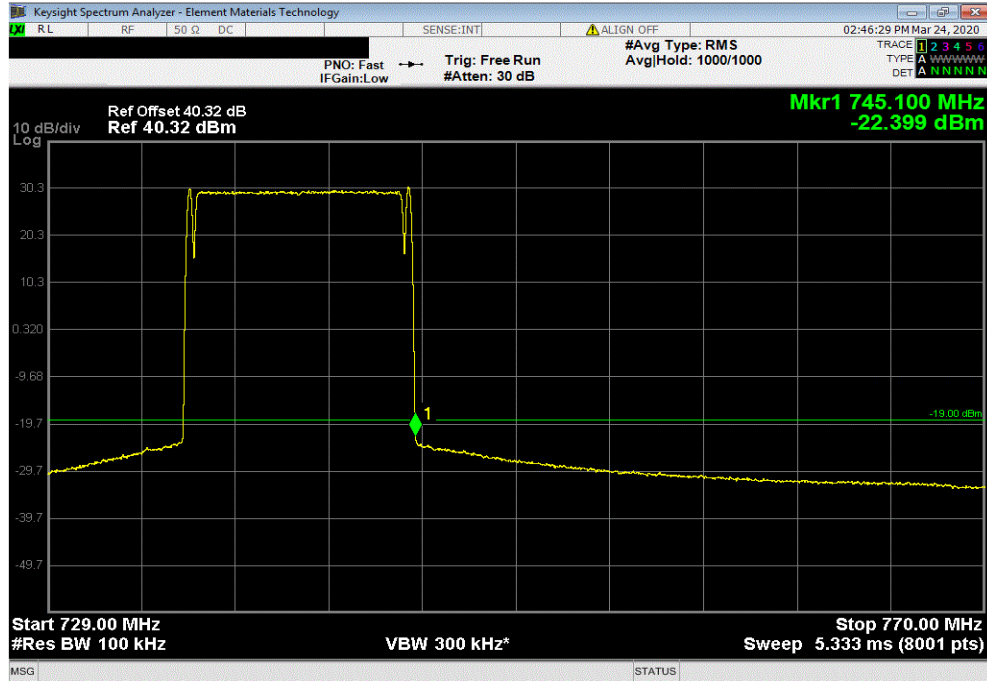
BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMI 2020.03.25.0

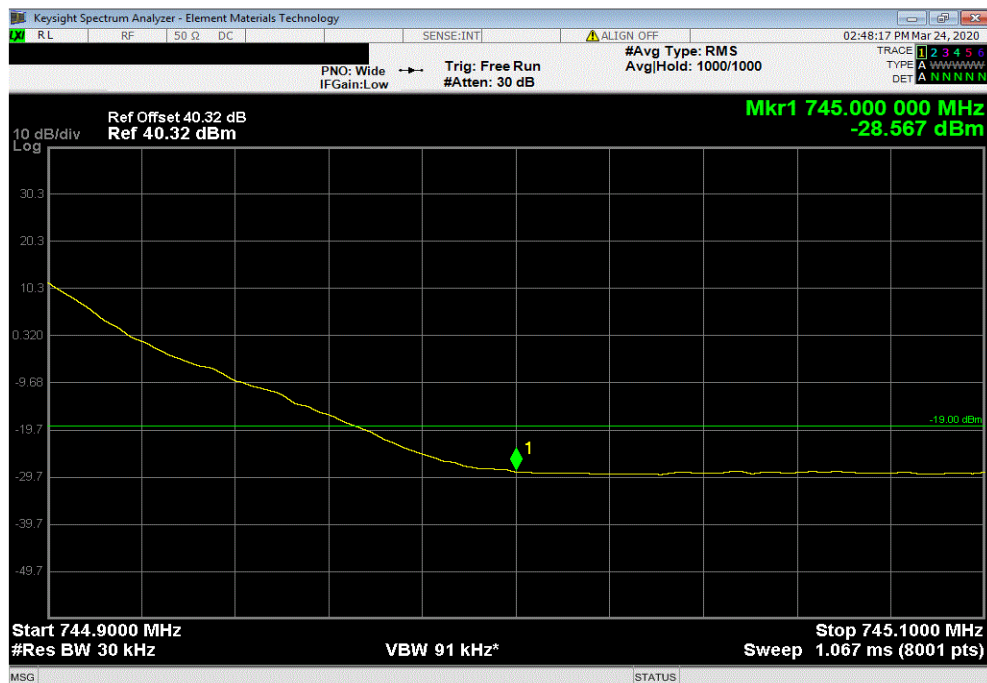
Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-22.399	-19	Pass



Band 12, 729 MHz -745 MHz, LTE, Port 2, 10 MHz Bandwidth, QPSK Modulation, High Channel, 740 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-28.567	-19	Pass



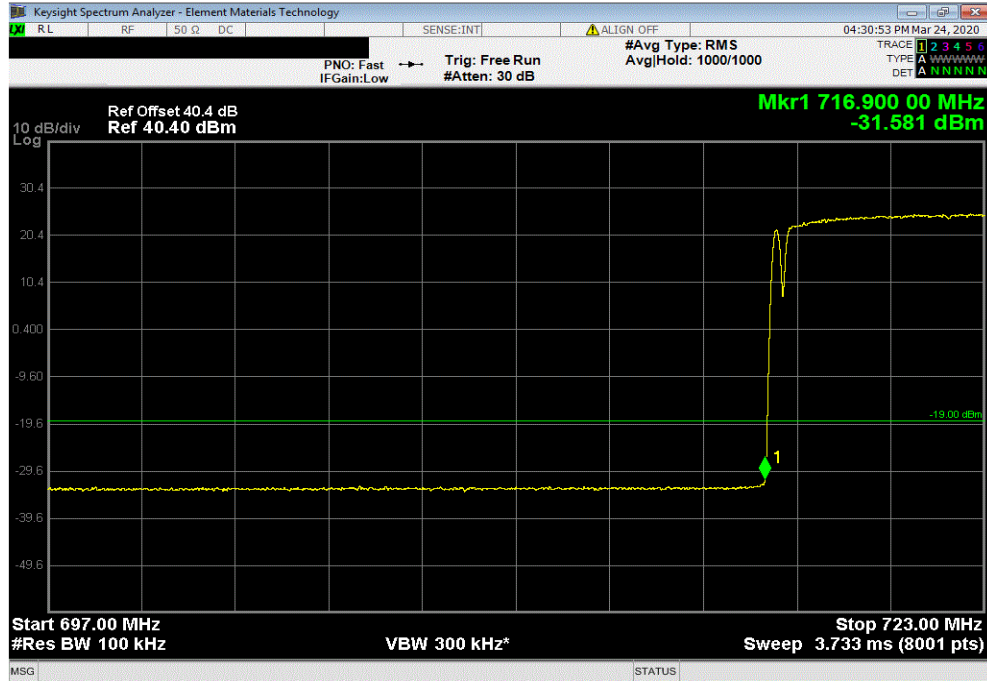
BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMR 2020.03.25.0

Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 722 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-31.581	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, Low Channel, 722 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-37.044	-19	Pass



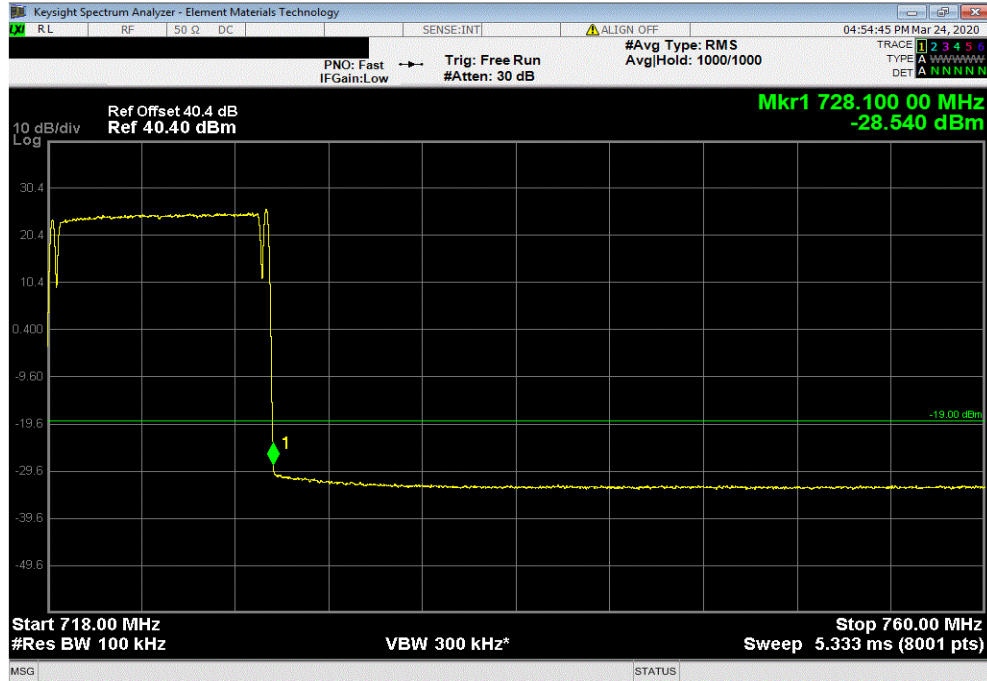
BAND EDGE COMPLIANCE LTE BANDS 29,12 (GUARDBAND)



XMI 2020.03.25.0

Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, High Channel, 723 MHz, Range 1

				Value (dBm)	Limit (dBm)	Result
				-28.54	-19	Pass



Band 29, 717 MHz - 728 MHz, LTE, Port 1, 10 MHz Bandwidth, QPSK Modulation, High Channel, 723 MHz, Range 2

				Value (dBm)	Limit (dBm)	Result
				-34.174	-19	Pass

