

POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12



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	ANE	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 fundamental emission power spectral density was measured using the channels and modes as called out on the following data sheets.

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

The total PSD for all antenna ports (at the radio output) were determined per ANSI C63.26-2015 paragraph 6.4.3.2.4. The EIRP calculations are based upon ANSI C63.26-2015 paragraphs 6.4 for a four port MIMO base station.

AHLBBA antenna ports 1&4 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.

AHLBBA antenna ports 2&3 are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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.

FCC Requirements::

FCC 27.50(c) (3) Fixed and base stations transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP in accordance with Table 3 of this section; FCC 27.50(c) (4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section;

Note: EIRP = ERP + 2.15dB

1000 watts = 60.00 dBm, EIRP = (60 dBm + 2.15dB) /MHz = 62.15dBm/MHz or 1640W/MHz

2000 watts = 63.01 dBm, EIRP = (63 dBm + 2.15dB) /MHz = 65.16dBm/MHz or 3280W/MHz

ISED Requirements RSS-130 Section 4.6/SRSP-518 section 5.1:

SRSP-518 section 5.1 Radiated power and antenna height limits for fixed and base stations

21. For fixed and base stations transmitting in accordance with section 4, the maximum permissible equivalent isotropically radiated power (e.i.r.p.) is 1640 watts and 1640 watts/MHz for a channel bandwidth less than or equal to 1 MHz and greater than 1 MHz, respectively. These e.i.r.p. limits apply for stations with an antenna height above average terrain (HAAT) up to 305 meters.

22. Fixed and base stations located in geographical areas at a distance greater than 26 km from large or medium population centers and transmitting in accordance with section 4, may increase their e.i.r.p. up to a maximum of 3280 watts/MHz (i.e. no more than 3280 watts e.i.r.p. in any 1 MHz band segment), with an antenna HAAT up to 305 meters.

POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12



TbTx 2022.06.03.0

XMM 2022.02.07.0

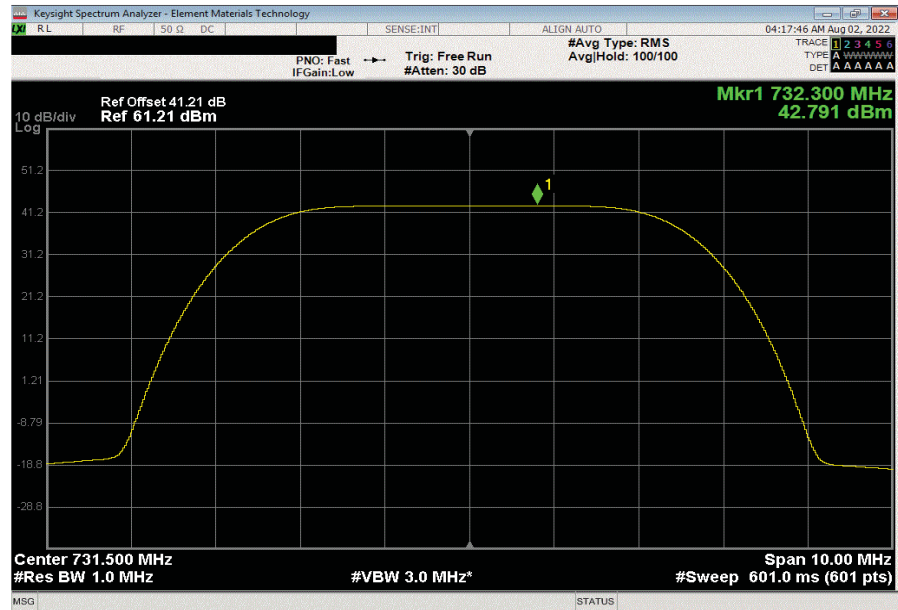
EUT: AHLBBA (C2PC/C3PC FCC/ISED)		Work Order: NOKI0047				
Serial Number: K9193514835		Date: 30-Jul-22				
Customer: Nokia Solutions and Networks		Temperature: 21 °C				
Attendees: Mitchell Hill		Humidity: 56.9% RH				
Project: None		Barometric Pres.: 1021 mbar				
Tested by: Marty Martin		Job Site: TX07				
Power: 54VDC						
TEST SPECIFICATIONS		Test Method				
RSS-130 Issue 2: 2019		RSS-102 Issue 5:2015				
FCC 27:2022		ANSI C63.26:2015				
COMMENTS						
All measurement path losses were accounted for in the reference level offset including attenuators, cables, DC block and filter when in use. The carriers were enabled at maximum power. The total PSD for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSI 63.26 clause 6.4.3.2.4 (10 log Nout). The total PSD for two port operation is single port PSD + 3dB [i.e. 10log(2)] and the total PSD for four port operation is single port PSD + 6dB [i.e. 10log(4)].						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	2	Signature 				
		Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD
Port 1						
Band n12, 729 - 745 Mhz						
5 MHz Bandwidth						
QPSK Modulation						
Low Channel, 731.5 MHz		42.791	0	42.8	45.8	48.8
Mid Channel, 737.0 MHz		42.749	0	42.7	45.7	48.7
High Channel, 742.5 MHz		42.687	0	42.7	45.7	48.7
16QAM Modulation						
Low Channel, 731.5 MHz		42.845	0	42.8	45.8	48.8
Mid Channel, 737.0 MHz		42.773	0	42.8	45.8	48.8
High Channel, 742.5 MHz		42.767	0	42.8	45.8	48.8
64QAM Modulation						
Low Channel, 731.5 MHz		42.856	0	42.9	45.9	48.9
Mid Channel, 737.0 MHz		42.784	0	42.8	45.8	48.8
High Channel, 742.5 MHz		42.778	0	42.8	45.8	48.8
256QAM Modulation						
Low Channel, 731.5 MHz		42.841	0	42.8	45.8	48.8
Mid Channel, 737.0 MHz		42.87	0	42.9	45.9	48.9
High Channel, 742.5 MHz		42.778	0	42.8	45.8	48.8
10 MHz Bandwidth						
256QAM Modulation						
Mid Channel, 737.0 MHz		39.625	0	39.6	42.6	45.6
15 MHz Bandwidth						
256QAM Modulation						
Mid Channel, 737.0 MHz		37.802	0	37.8	40.8	43.8
Port 2						
Band n12, 729 - 745 Mhz						
5 MHz Bandwidth						
QPSK Modulation						
Low Channel, 731.5 MHz		42.772	0	42.8	45.8	48.8
Mid Channel, 737.0 MHz		42.768	0	42.8	45.8	48.8
High Channel, 742.5 MHz		42.669	0	42.7	45.7	48.7
16QAM Modulation						
Low Channel, 731.5 MHz		42.745	0	42.7	45.7	48.7
Mid Channel, 737.0 MHz		42.751	0	42.8	45.8	48.8
High Channel, 742.5 MHz		42.655	0	42.7	45.7	48.7
64QAM Modulation						
Low Channel, 731.5 MHz		42.762	0	42.8	45.8	48.8
Mid Channel, 737.0 MHz		42.776	0	42.8	45.8	48.8
High Channel, 742.5 MHz		42.653	0	42.7	45.7	48.7
256QAM Modulation						
Low Channel, 731.5 MHz		42.808	0	42.8	45.8	48.8
Mid Channel, 737.0 MHz		42.728	0	42.8	45.8	48.8
High Channel, 742.5 MHz		42.702	0	42.7	45.7	48.7
10 MHz Bandwidth						
256QAM Modulation						
Mid Channel, 737.0 MHz		39.591	0	39.6	42.6	45.6
15 MHz Bandwidth						
256QAM Modulation						
Mid Channel, 737.0 MHz		37.667	0	37.7	40.7	43.7

POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

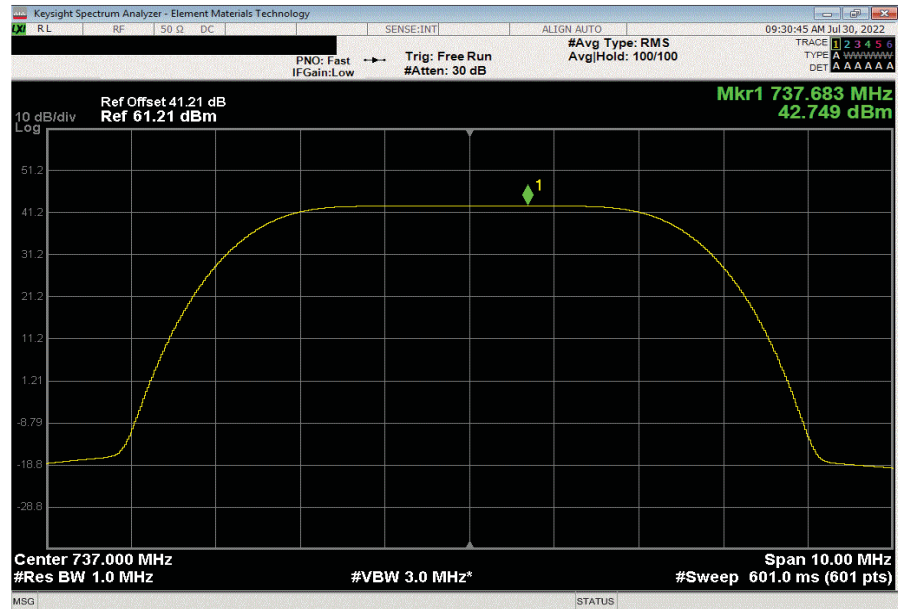


TbTb 2022.06.03.0 XMM 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz					
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD
	42.791	0	42.8	45.8	48.8



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz					
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD
	42.749	0	42.7	45.7	48.7

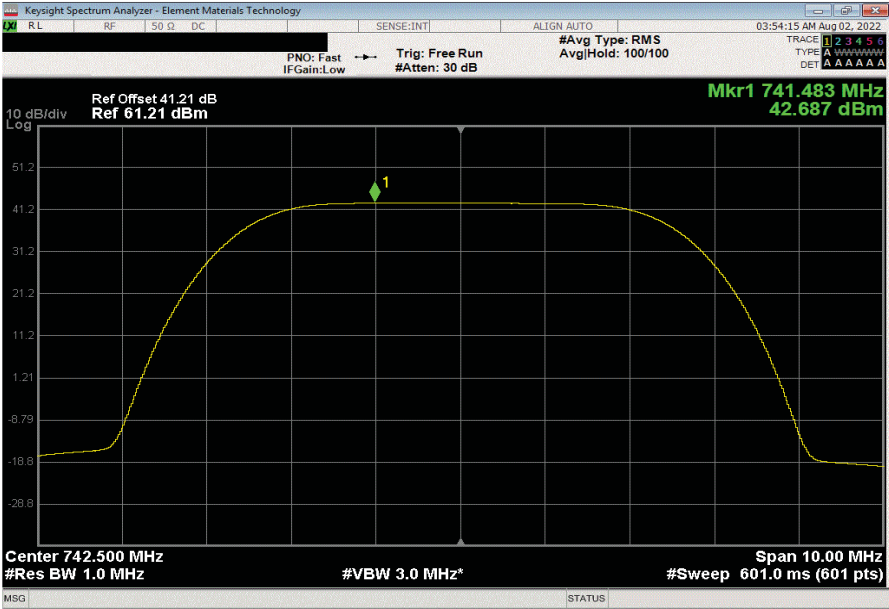


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

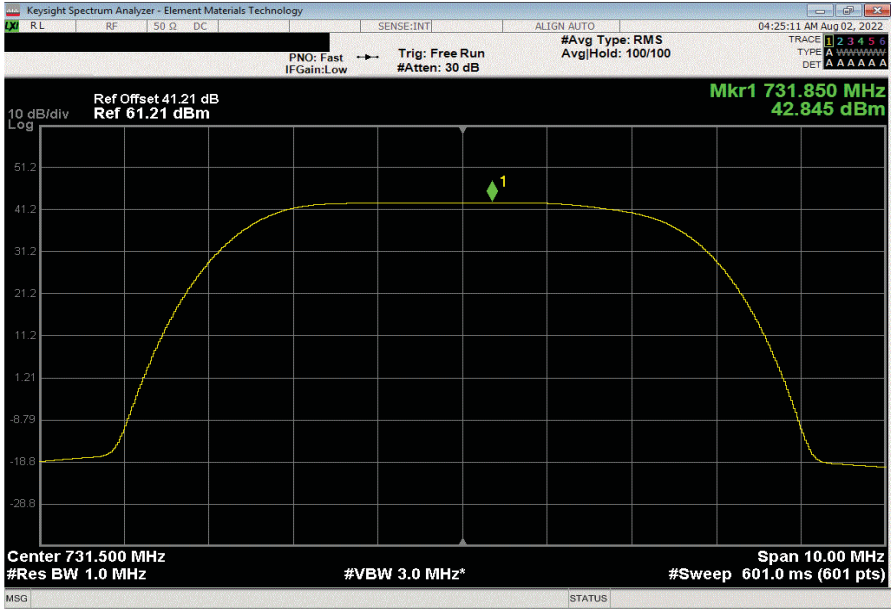


ThxTx 2022.06.03.0 XMM 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.687	0	42.7	45.7	48.7	



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 731.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.845	0	42.8	45.8	48.8	

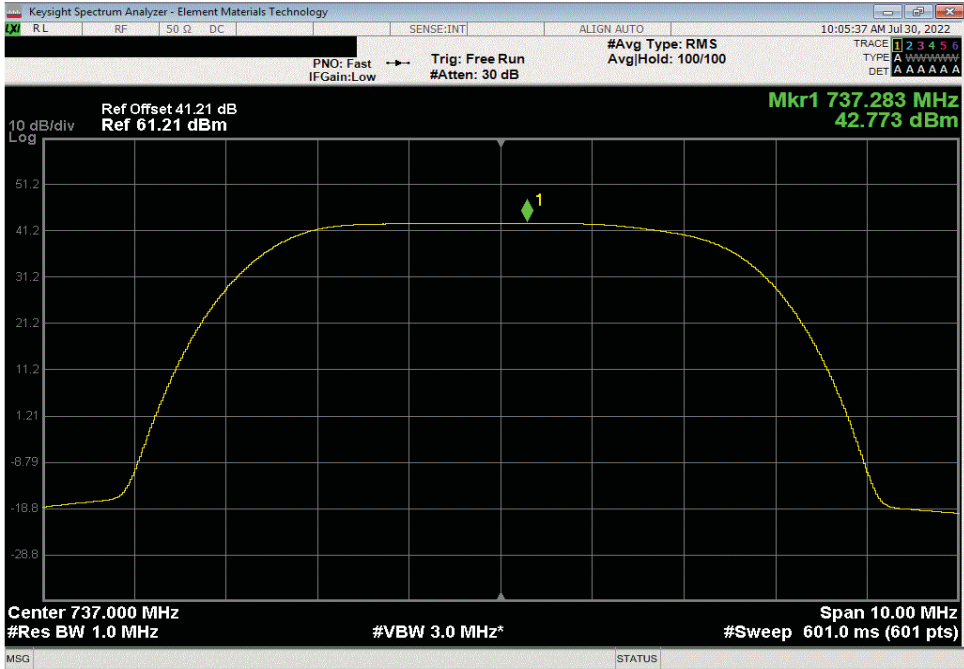


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

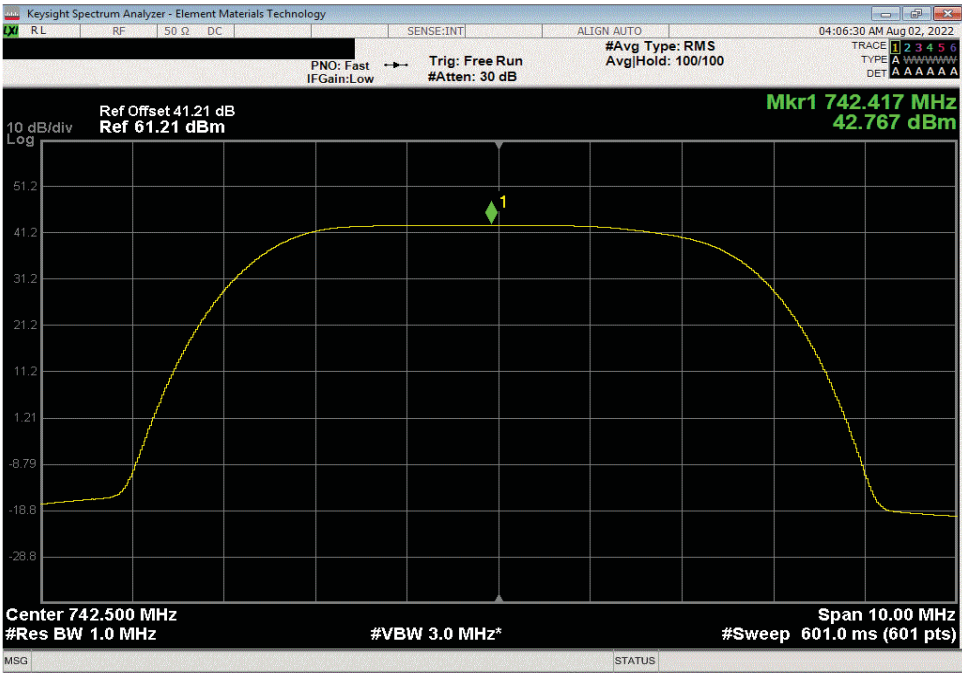


TbTtX 2022.06.03.0 XMtI 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.773	0	42.8	45.8	48.8	



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 742.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.767	0	42.8	45.8	48.8	

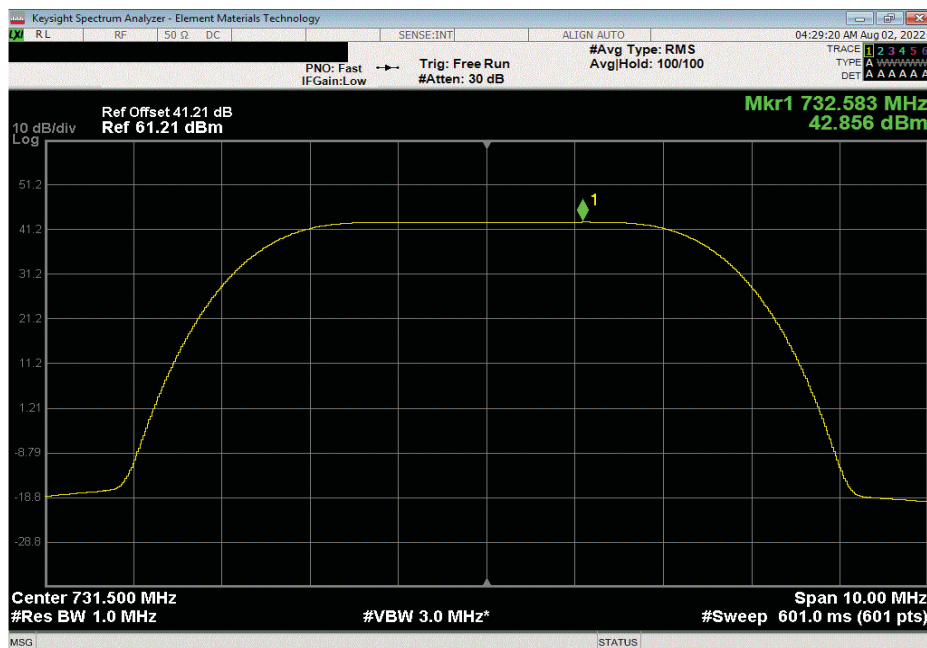


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

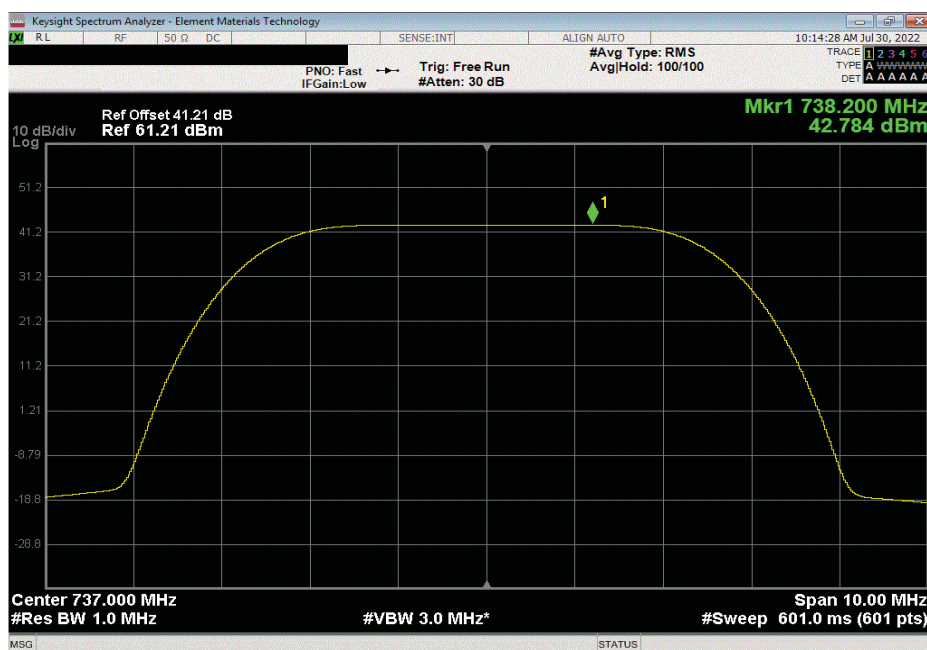


ThMx 2022.06.03.0 XMM 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 731.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.856	0	42.9	45.9	48.9	



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 737.0 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.784	0	42.8	45.8	48.8	

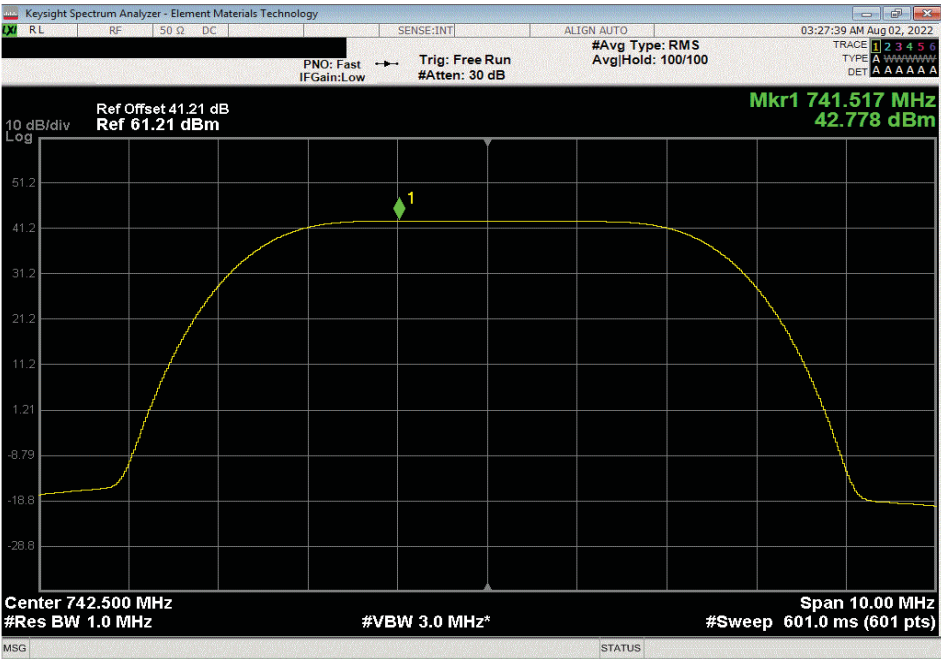


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

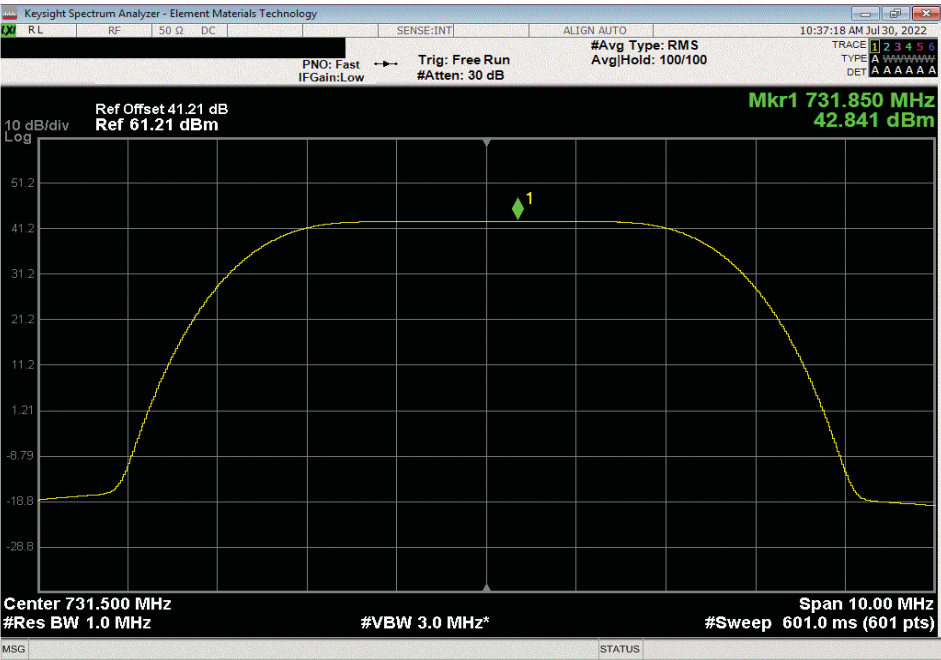


TbT v 2022.06.03.0 XMI 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 742.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.778	0	42.8	45.8	48.8	



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.841	0	42.8	45.8	48.8	

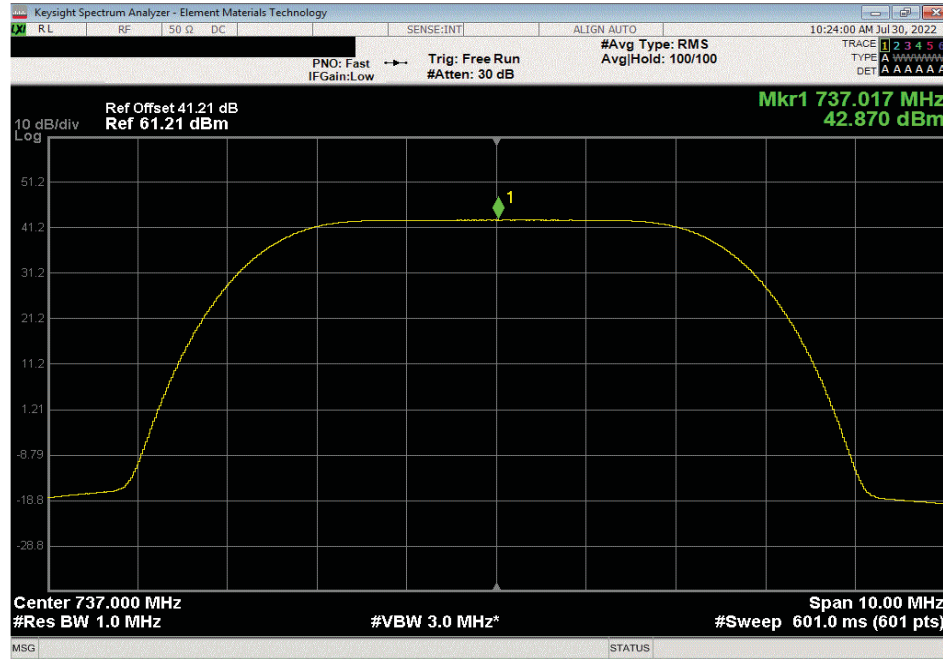


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

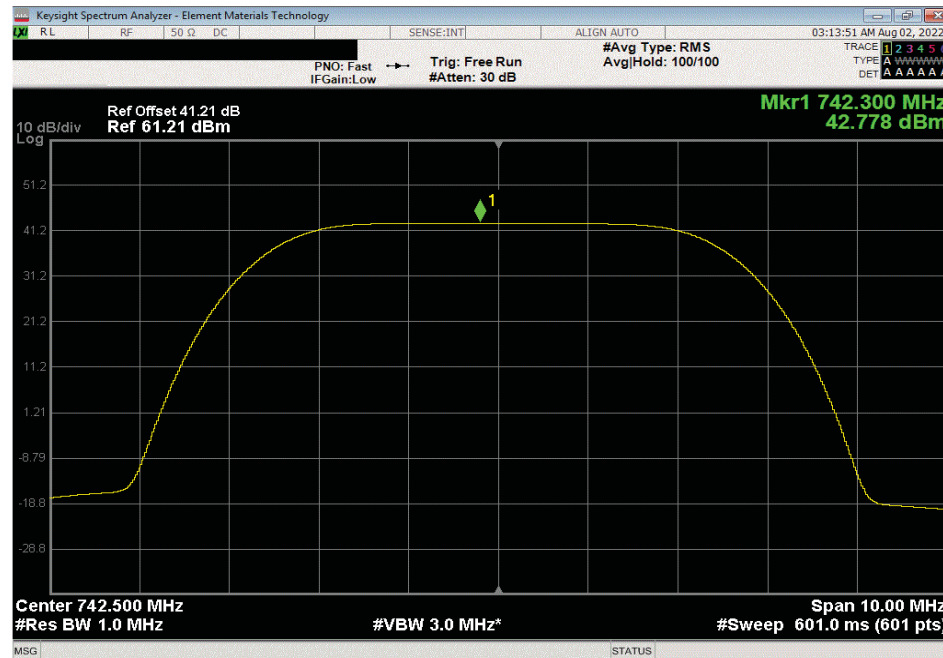


THTx 2022.06.03.0 XMM 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.87	0	42.9	45.9	48.9	



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.778	0	42.8	45.8	48.8	

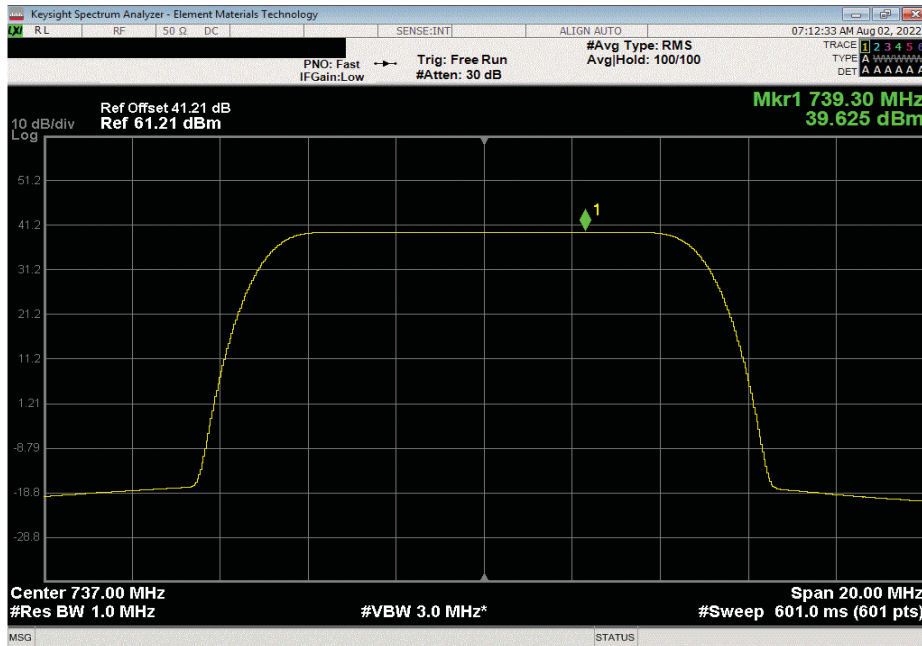


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

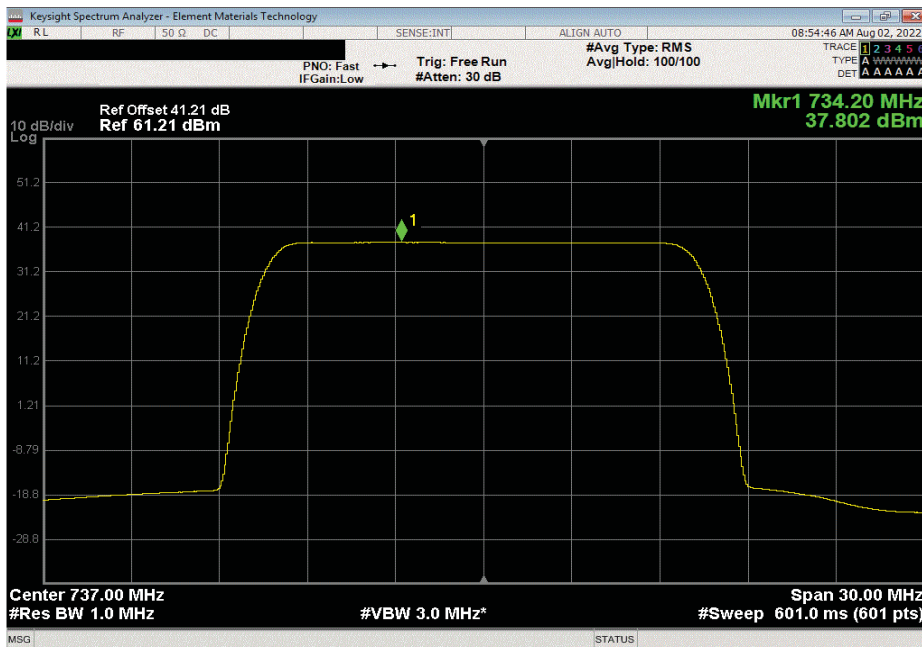


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Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.625	0	39.6	42.6	45.6	



Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	37.802	0	37.8	40.8	43.8	

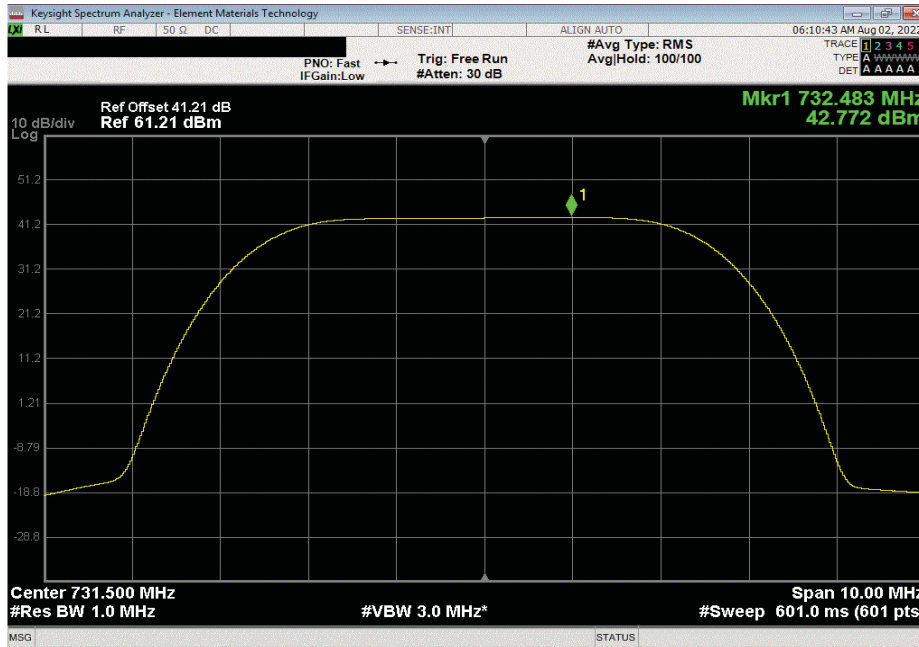


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

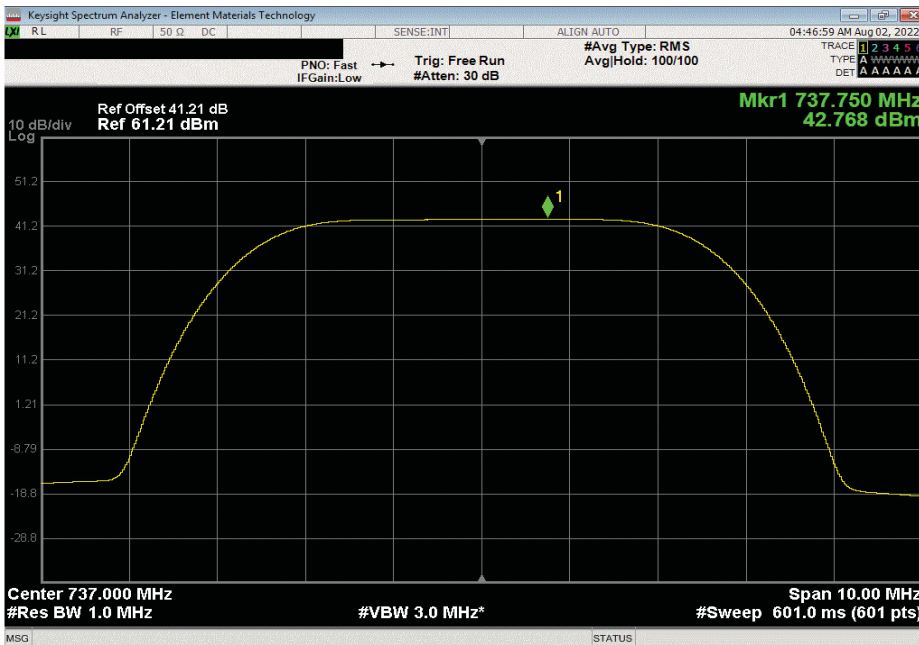


TMTx 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.772	0	42.8	45.8	48.8	



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 737.0 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.768	0	42.8	45.8	48.8	

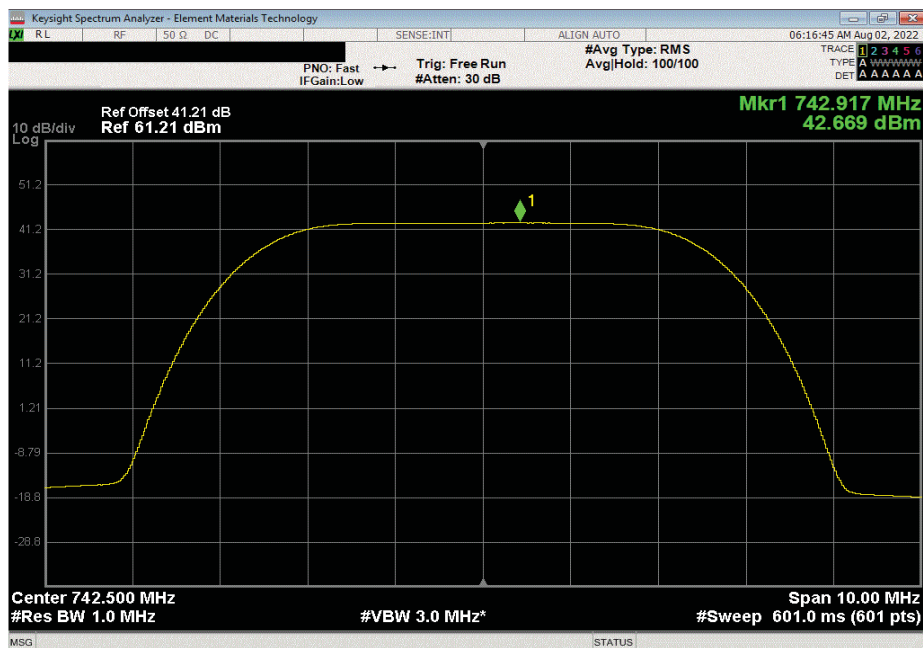


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

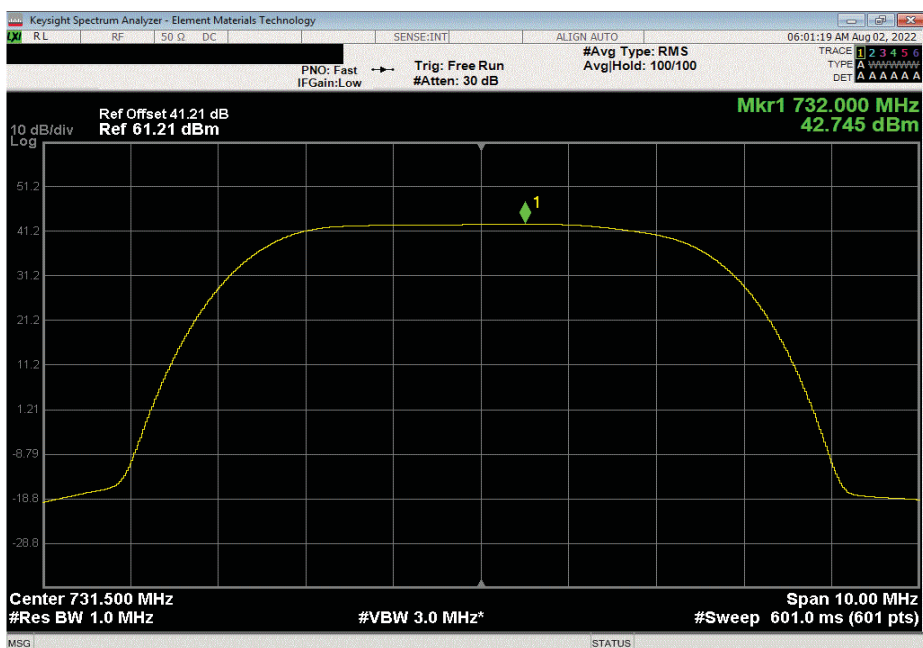


TbTn 2022.05.02.0 XMR 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.669	0	42.7	45.7	48.7		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 731.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.745	0	42.7	45.7	48.7		

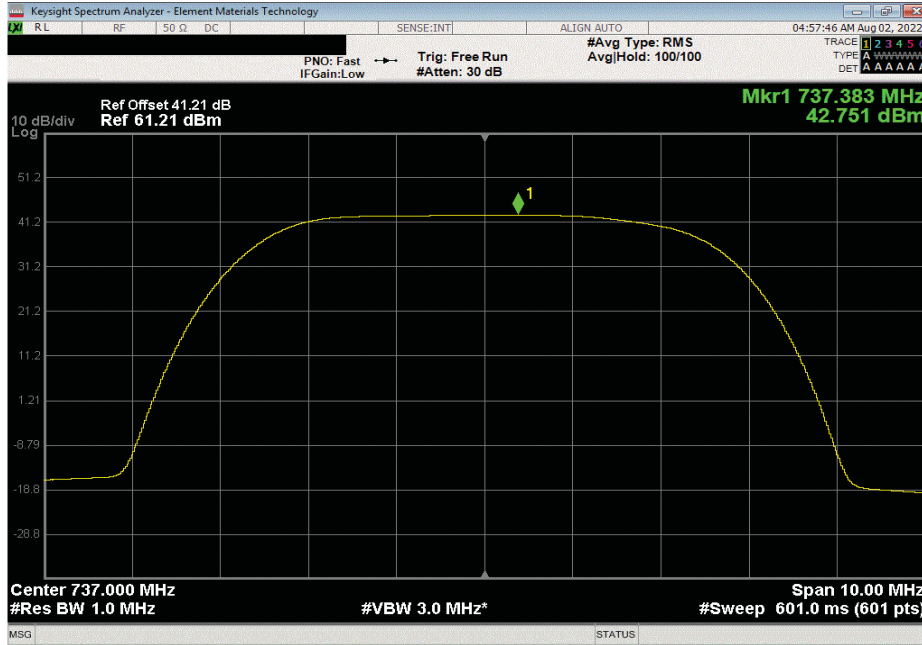


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

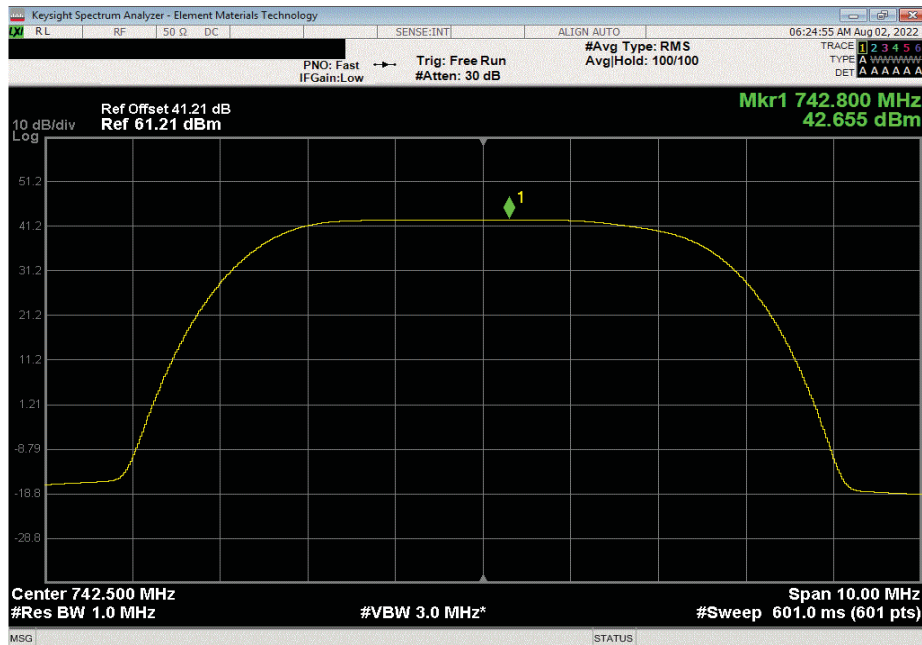


TN1v 2022.06.02.0 XMM 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 737.0 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.751	0	42.8	45.8	48.8	



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 742.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.655	0	42.7	45.7	48.7	

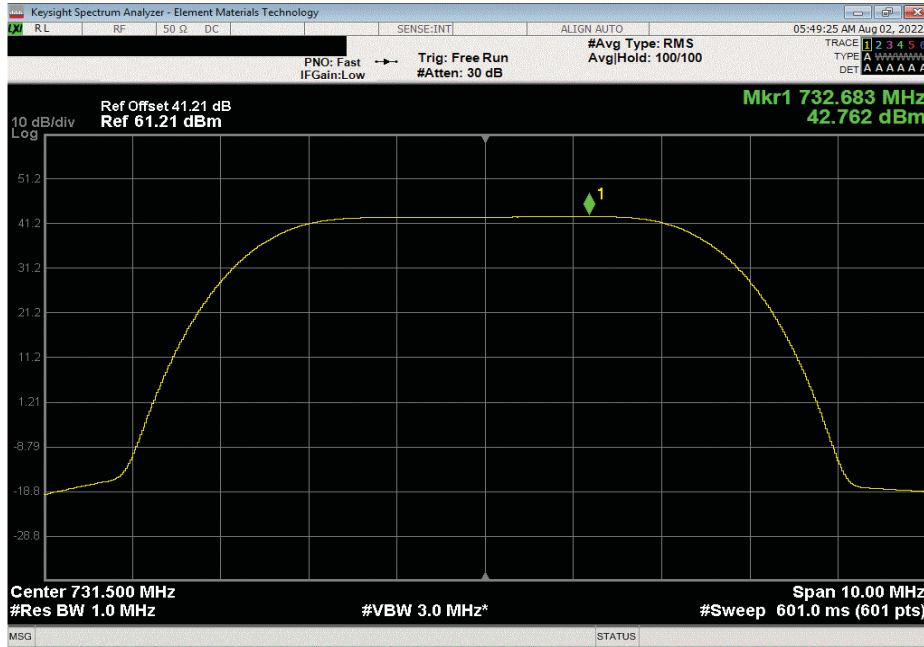


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

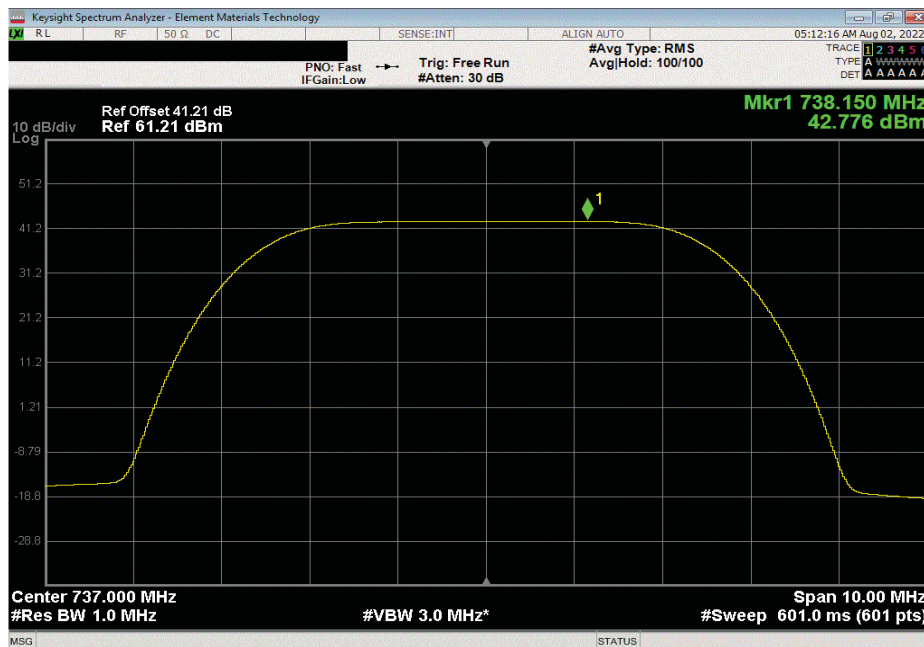


TbTx 2022.05.02.0 XMh 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 731.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.762	0	42.8	45.8	48.8	



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 737.0 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.776	0	42.8	45.8	48.8	

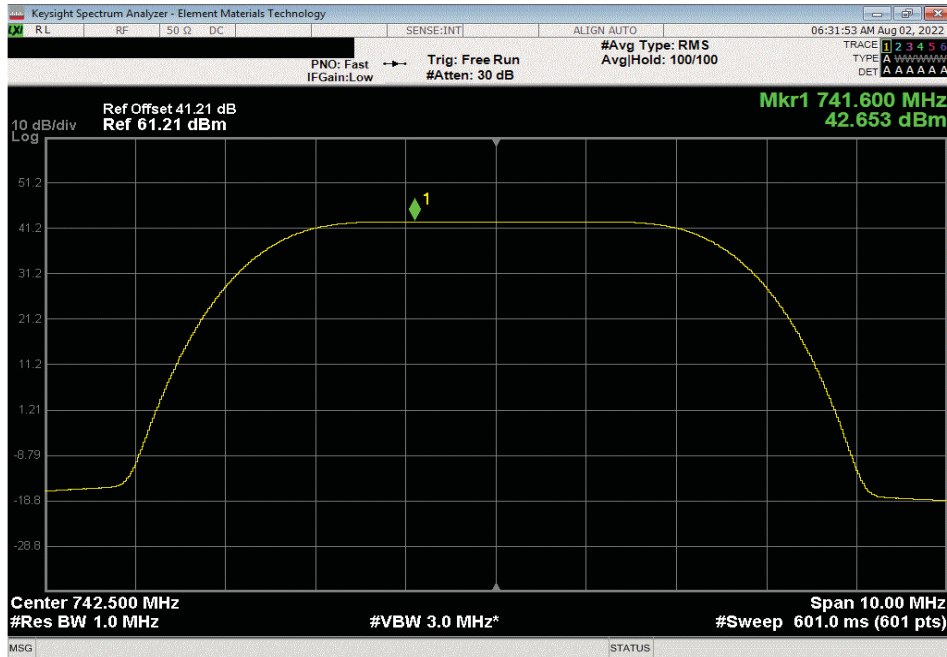


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

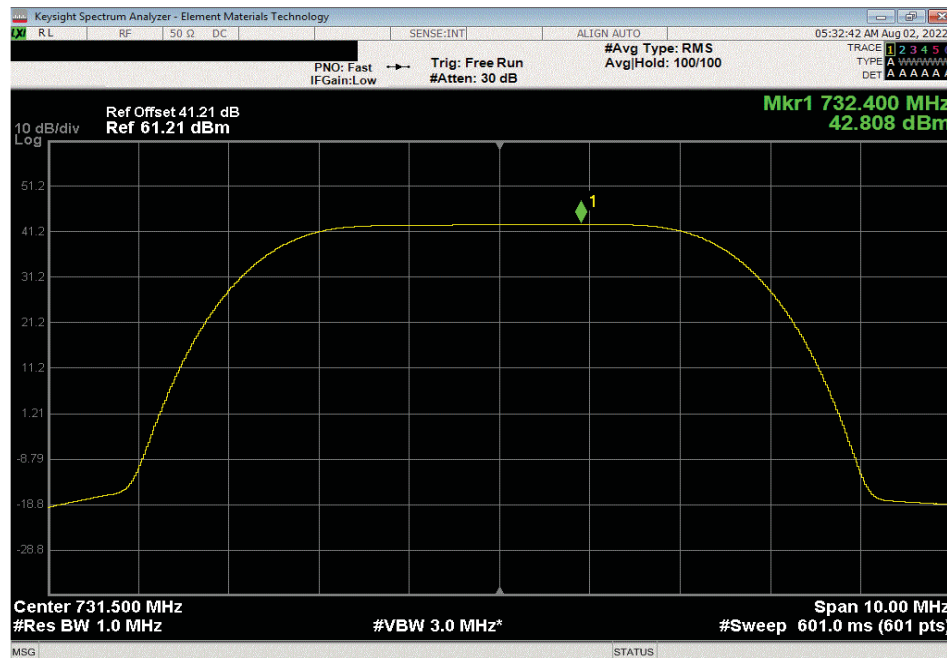


TMTx 2022.05.02.0 XMI 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 742.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.653	0	42.7	45.7	48.7	



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.808	0	42.8	45.8	48.8	

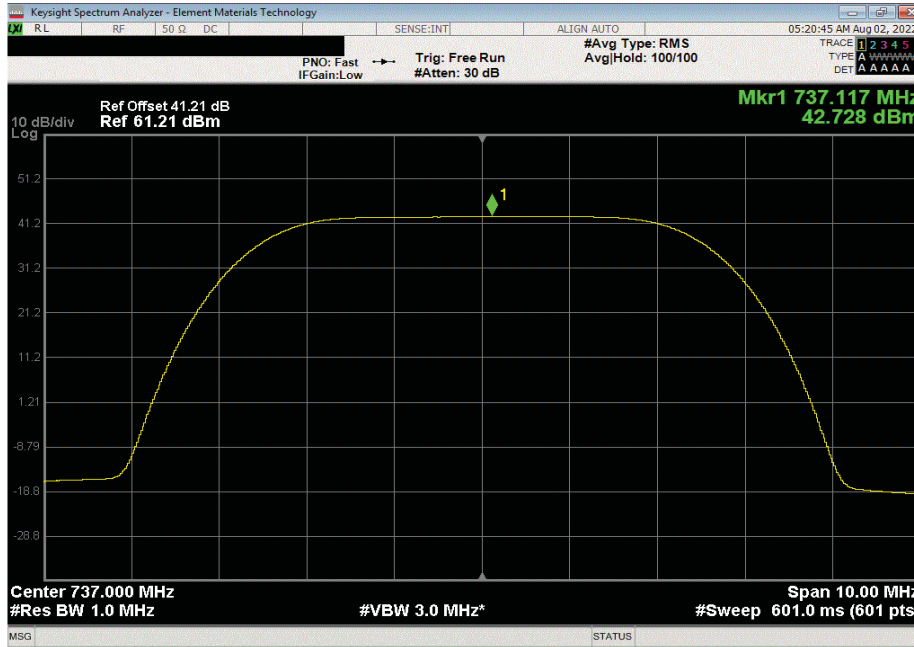


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

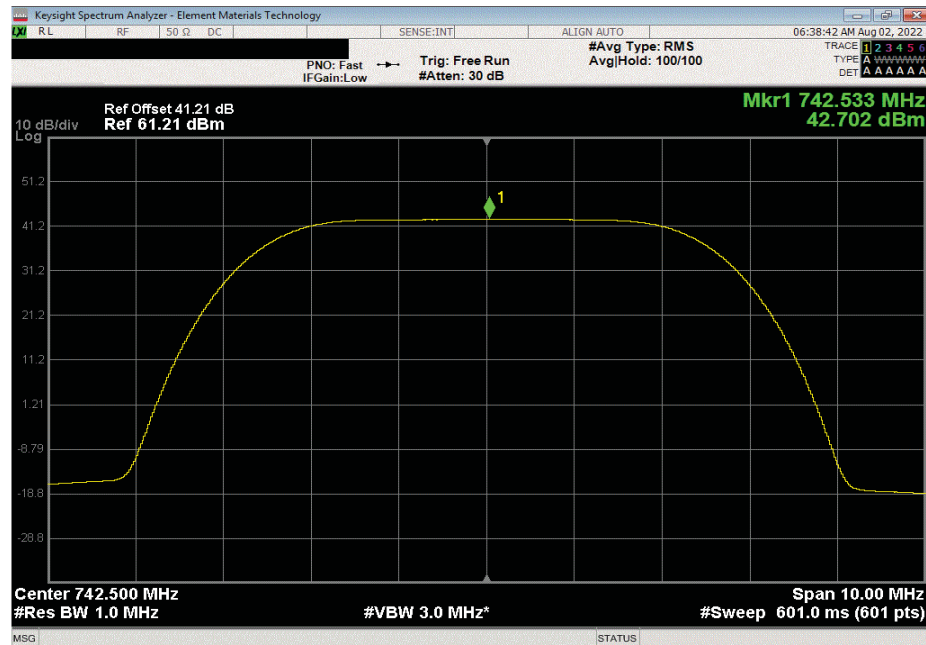


ThMx 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.728	0	42.8	45.8	48.8		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.702	0	42.7	45.7	48.7		

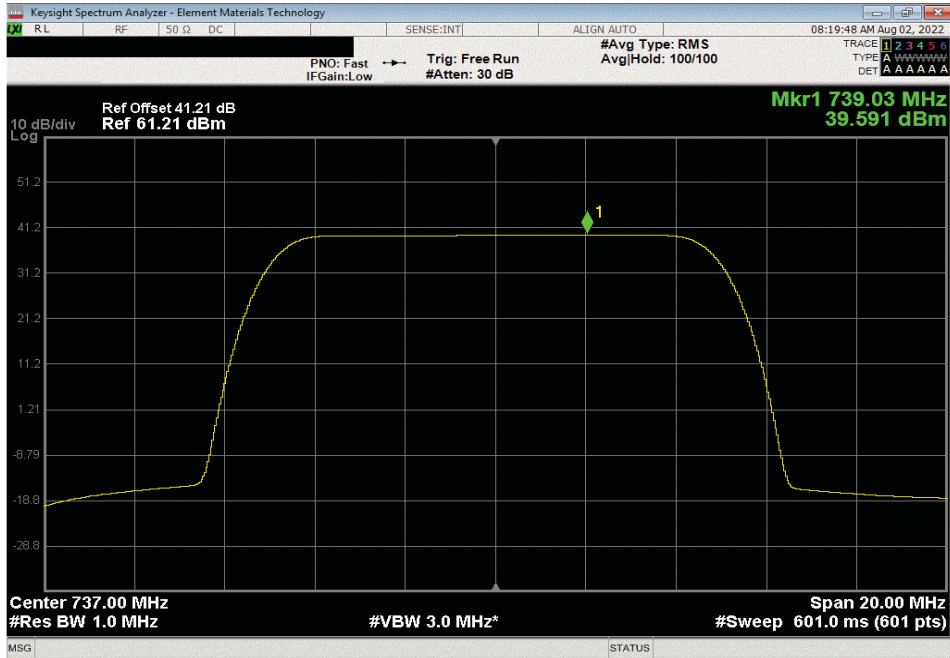


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

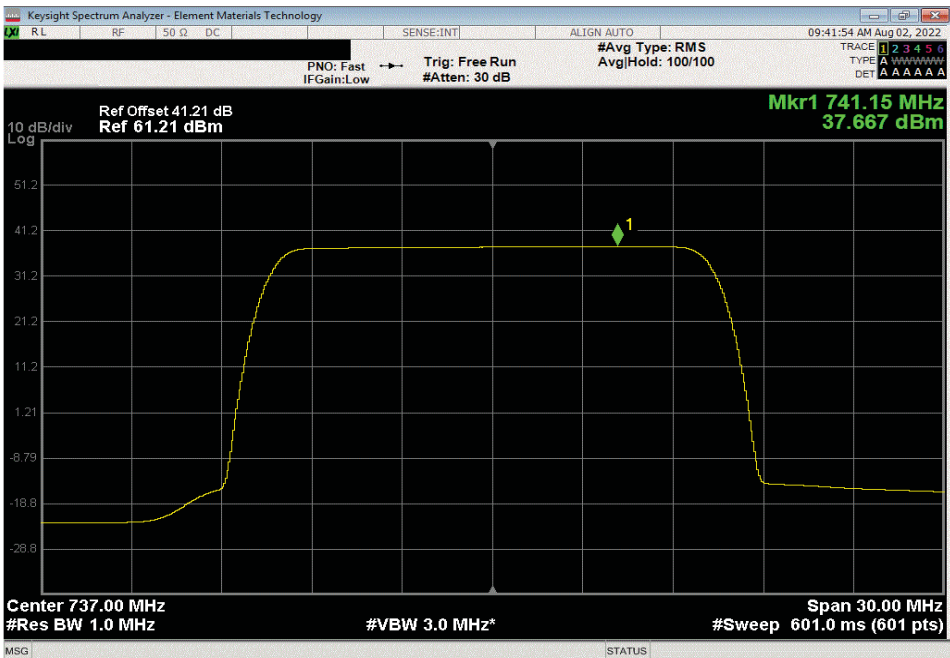


TMTx 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 737.0 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
39.591	0	39.6	42.6	45.6		



Port 2, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256 Modulation, Mid Channel, 737.0 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
37.667	0	37.7	40.7	43.7		



POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n12

EIRP Calculations

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

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon Commscope antenna assembly model "FF-65C-R1". The maximum Band n12 gain (15.8dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of $\pm 45^\circ$ cross-polarized radiators. The four antenna RF inputs on the antenna assembly are labeled as R1 +45°, R1 -45°, R2 +45° and R2 -45°. The four AHLOB transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated for four port MIMO (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent (will not be 0 dB) but for this worst case EIRP calculation 0 dB was used. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	5 MHz Ch BW	10 MHz Ch BW	15 MHz Ch BW
Worst Case PSD/Antenna Port	42.9 dBm/MHz	39.6 dBm/MHz	37.8 dBm/MHz
Number of Ant Ports per Polarization	2	2	2
Total PSD per Polarization $10\log(2) = +3\text{dB}$	45.9	42.6	40.8
Cable Loss (site dependent)	0 dB	0 dB	0 dB
Dir Gain = Maximum Antenna Gain (G_{Ant}) See Note 1	15.8 dBi	15.8 dBi	15.8 dBi
EIRP per Polarization = Total PSD/Pol + Dir Gain	61.7 dBm/MHz	58.4 dBm/MHz	56.6 dBm/MHz
Number of Polarizations	2	2	2
EIRP Total = R1 $\pm 45^\circ$ and R2 $\pm 45^\circ$ See Note 2	61.7 dBm/MHz	58.4 dBm/MHz	56.6 dBm/MHz

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.

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

EIRP Calculation Summary

The worst case AHLBBA Band 12 four port MIMO EIRP levels using antenna assembly model "FF-65C-R1" are less than the FCC and ISSED (65.16 dBm/MHz and 62.15 dBm/MHz) EIRP Regulatory Limits for all (5, 10, & 15MHz) channel bandwidths.

POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14



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	ANE	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 fundamental emission power spectral density was measured using the channels and modes as called out on the following data sheets.

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

The total PSD for all antenna ports (at the radio output) were determined per ANSI C63.26-2015 paragraph 6.4.3.2.4. The EIRP calculations are based upon ANSI C63.26-2015 paragraphs 6.4 for a four port MIMO base station.

AHLBBA antenna ports 1&4 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.

AHLBBA antenna ports 2&3 are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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.

FCC EIRP Requirements:

FCC 90.542(a)(3) Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

FCC 90.542(a)(4) Fixed and base stations located in a county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, and transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 2000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 2000 watts/MHz ERP in accordance with Table 4 of this section.

ISED Requirements RSS-140 Section 4.3/SRSP-540 section 5.1.1:

SRSP-540 section 5.1.1 Fixed and base stations

For fixed and base stations transmitting in accordance with section 4 within the frequency range 758-768 MHz with a channel bandwidth greater than 1 MHz, the maximum permissible e.r.p. is 1000 W/MHz (i.e. no more than 1000 W e.r.p. in any 1 MHz band segment) with an antenna HAAT of up to 305 m.

Fixed and base stations located in geographical areas at a distance greater than 26 km from large or medium population centres and transmitting in accordance with section 4 within the frequency range 758-768 MHz may increase their e.r.p. up to a maximum of 2000 W/MHz (i.e. no more than 2000 W e.r.p. in any 1 MHz band segment), with an antenna HAAT of up to 305 m.

Note: EIRP = ERP + 2.15dB

1000 watts = 60.00 dBm, EIRP = (60 dBm + 2.15dB) /MHz = 62.15dBm/MHz or 1640W/MHz

2000 watts = 63.01 dBm, EIRP = (63 dBm + 2.15dB) /MHz = 65.16dBm/MHz or 3280W/MHz

POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14



TbTb 2022.05.02.0

XMI 2022.02.07.0

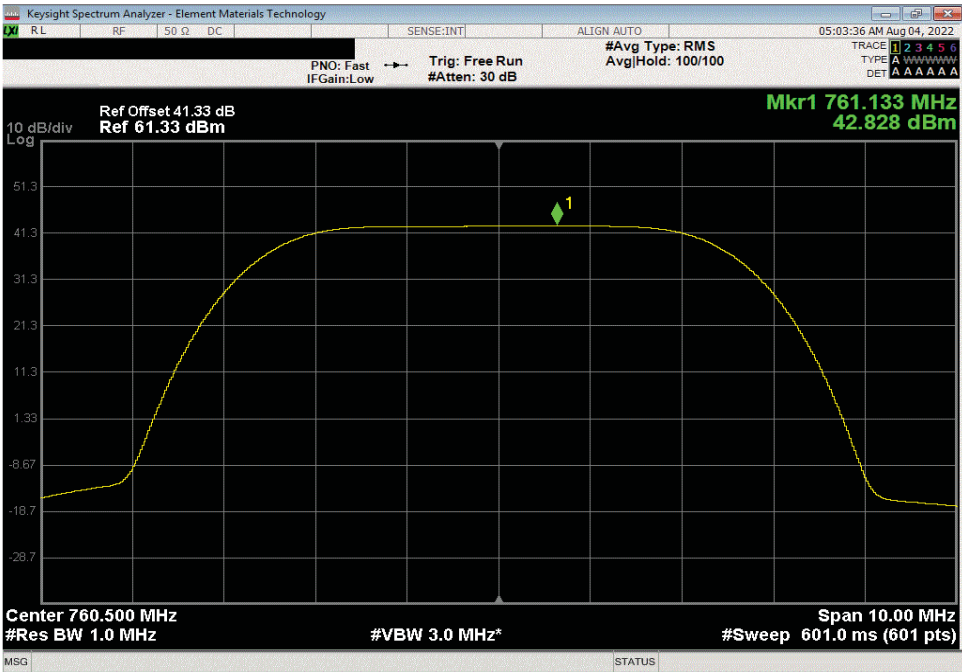
EUT: AHLBBA (C2PC/C3PC FCC/ISED)			Work Order: NOKI0047				
Serial Number: K9193514835			Date: 4-Aug-22				
Customer: Nokia Solutions and Networks			Temperature: 21 °C				
Attendees: Mitchell Hill			Humidity: 59.5% RH				
Project: None			Barometric Pres.: 1021 mbar				
Tested by: Marty Martin		Power: 54VDC	Job Site: TX07				
TEST SPECIFICATIONS			Test Method				
RSS 140 Issue 1: 2018			ANSI C63.26:2015				
FCC 90R:2022			ANSI C63.26:2015				
COMMENTS							
All measurement path losses were accounted for in the reference level offset including attenuators, cables, DC block and filter when in use. The carriers were enabled at maximum power. The total PSD for multiport (2x2, 4x4 MIMO) operation was determined based upon ANSI 63.26 clause 6.4.3.2.4 (10 log Nout). The total PSD for two port operation is single port PSD + 3dB [i.e. 10log(2)] and the total PSD for four port operation is single port PSD + 6dB [i.e. 10log(4)].							
DEVIATIONS FROM TEST STANDARD							
None							
Configuration #	2	Signature 					
			Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD
Port 1							
Band n14, 758 - 768 Mhz							
5 MHz Bandwidth							
QPSK Modulation							
Low Channel, 760.5 MHz			42.828	0	42.8	45.8	48.8
Mid Channel, 763 MHz			42.877	0	42.9	45.9	48.9
High Channel, 765.5 MHz			42.914	0	42.9	45.9	48.9
16QAM Modulation							
Low Channel, 760.5 MHz			42.837	0	42.8	45.8	48.8
Mid Channel, 763 MHz			42.844	0	42.8	45.8	48.8
High Channel, 765.5 MHz			42.898	0	42.9	45.9	48.9
64QAM Modulation							
Low Channel, 760.5 MHz			42.832	0	42.8	45.8	48.8
Mid Channel, 763 MHz			42.957	0	43	46	49
High Channel, 765.5 MHz			43.228	0	43.2	45.2	48.2
256QAM Modulation							
Low Channel, 760.5 MHz			42.903	0	42.9	45.9	48.9
Mid Channel, 763 MHz			42.981	0	43	46	49
High Channel, 765.5 MHz			42.981	0	43	46	49
10 MHz Bandwidth							
256QAM Modulation							
Mid Channel, 763 MHz			39.64	0	39.6	42.6	45.6
Port 2							
Band n14, 758 - 768 Mhz							
5 MHz Bandwidth							
QPSK Modulation							
Low Channel, 760.5 MHz			42.697	0	42.7	45.7	48.7
Mid Channel, 763 MHz			42.777	0	42.8	45.8	48.8
High Channel, 765.5 MHz			42.841	0	42.8	45.8	48.8
16QAM Modulation							
Low Channel, 760.5 MHz			42.71	0	42.7	45.7	48.7
Mid Channel, 763 MHz			42.738	0	42.7	45.7	48.7
High Channel, 765.5 MHz			42.821	0	42.8	45.8	48.8
64QAM Modulation							
Low Channel, 760.5 MHz			42.754	0	42.8	45.8	48.8
Mid Channel, 763 MHz			42.801	0	42.8	45.8	48.8
High Channel, 765.5 MHz			42.957	0	43	46	49
256QAM Modulation							
Low Channel, 760.5 MHz			42.811	0	42.8	45.8	48.8
Mid Channel, 763 MHz			42.764	0	42.8	45.8	48.8
High Channel, 765.5 MHz			42.869	0	42.9	45.9	48.9
10 MHz Bandwidth							
256QAM Modulation							
Mid Channel, 763 MHz			39.66	0	39.7	42.7	45.7

POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

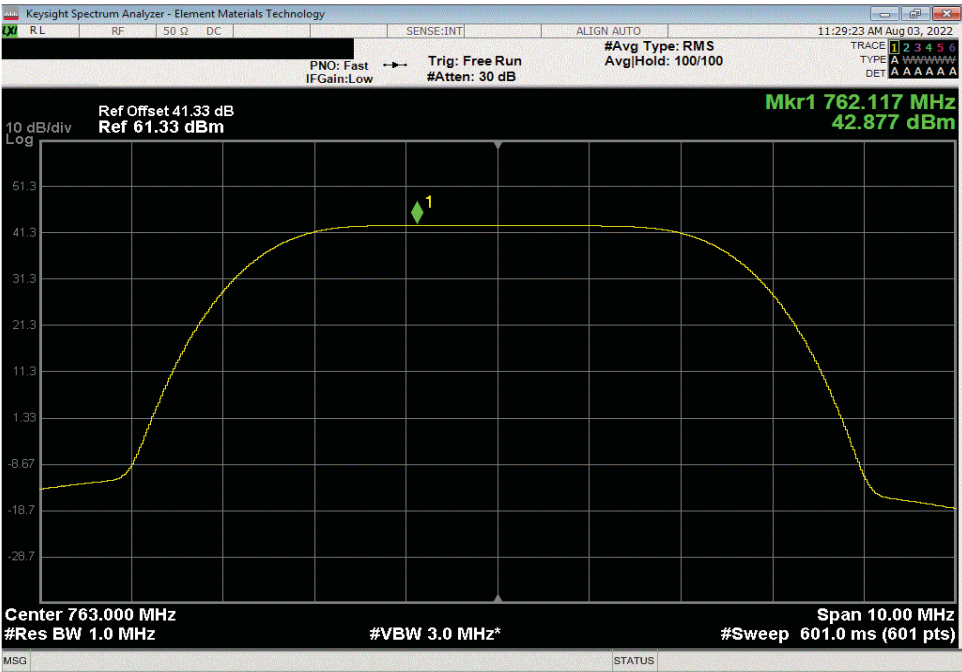


TbTtx 2022.05.02.0 XMI 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 760.5 MHz					
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD
	42.828	0	42.8	45.8	48.8



Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 763 MHz					
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD
	42.877	0	42.9	45.9	48.9

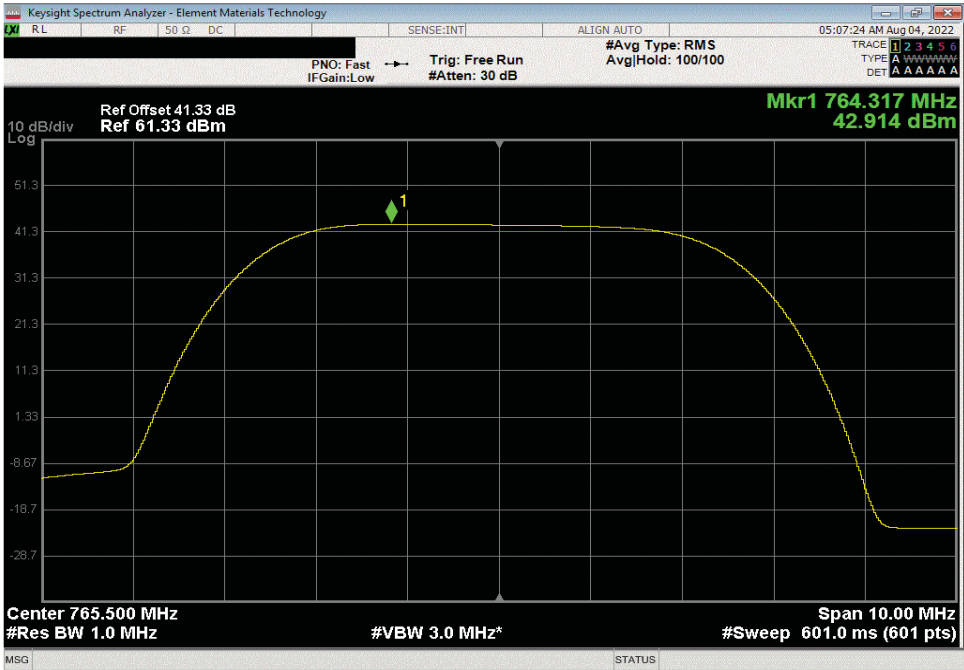


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

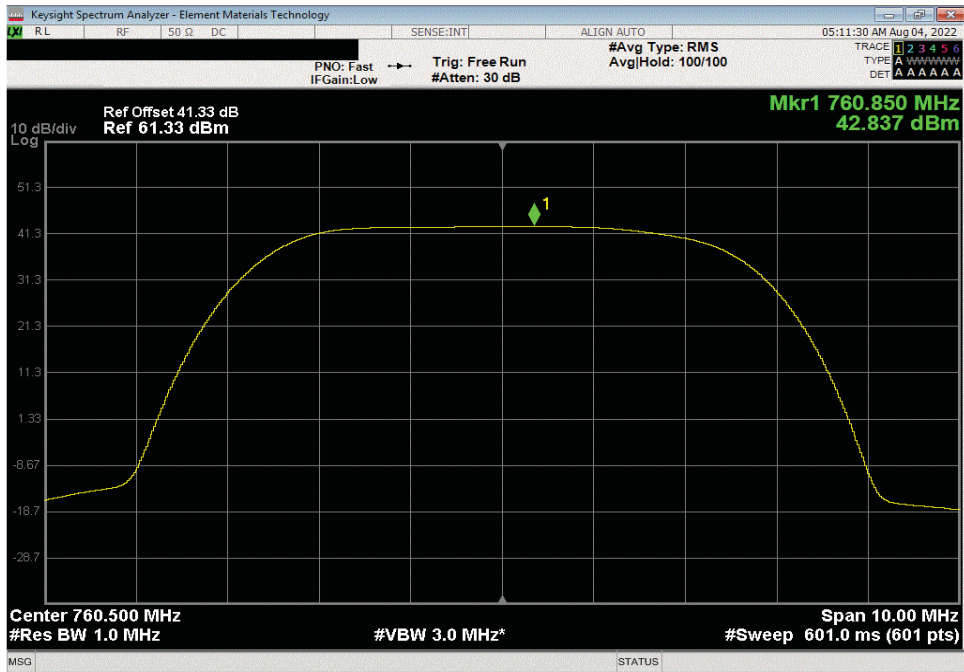


TbTtX 2022.05.02.0 XMR 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.914	0	42.9	45.9	48.9	



Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 760.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.837	0	42.8	45.8	48.8	

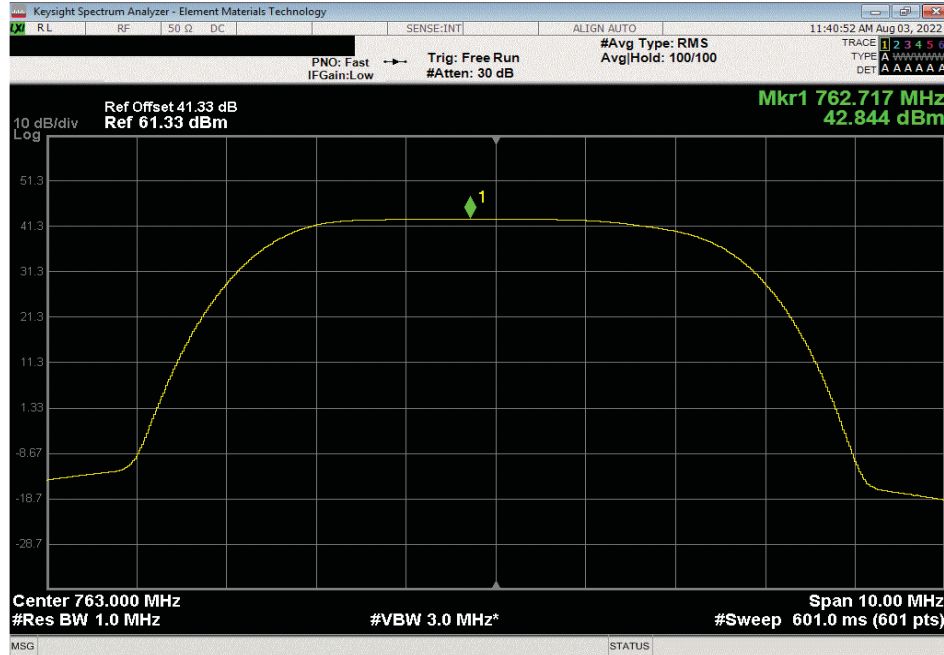


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

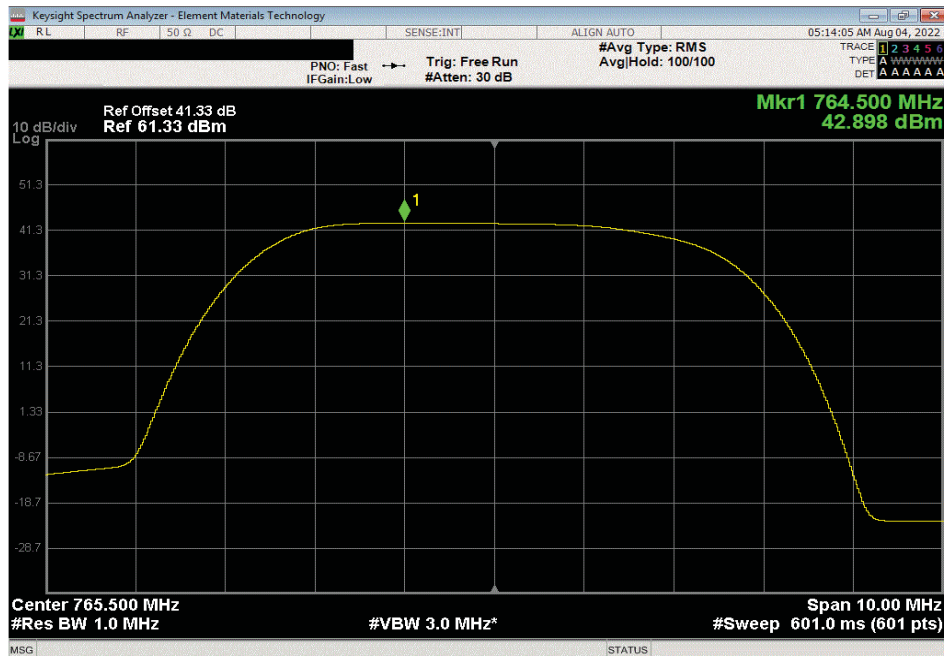


THxTx 2022.05.02.0 XMI 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 763 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.844	0	42.8	45.8	48.8	



Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 765.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.898	0	42.9	45.9	48.9	

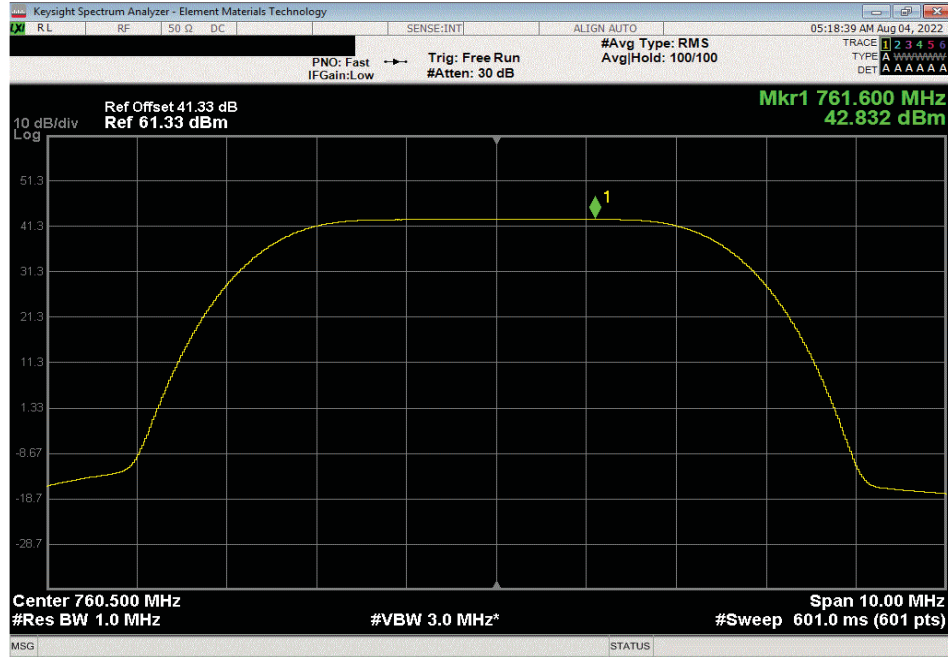


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

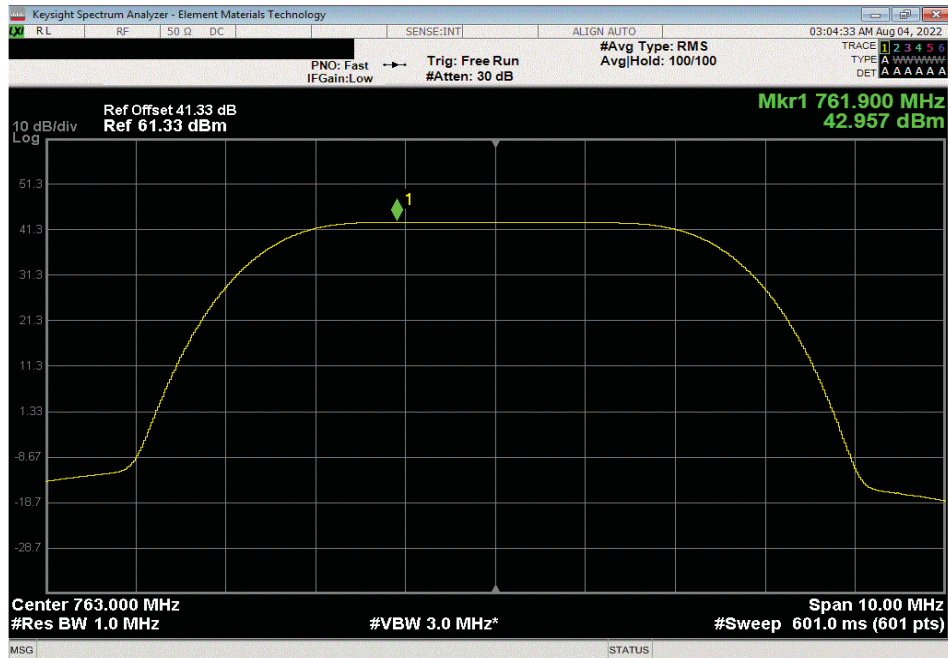


TMTx 2022.05.02.0 XMI 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 760.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.832	0	42.8	45.8	48.8	



Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.957	0	43	46	49	

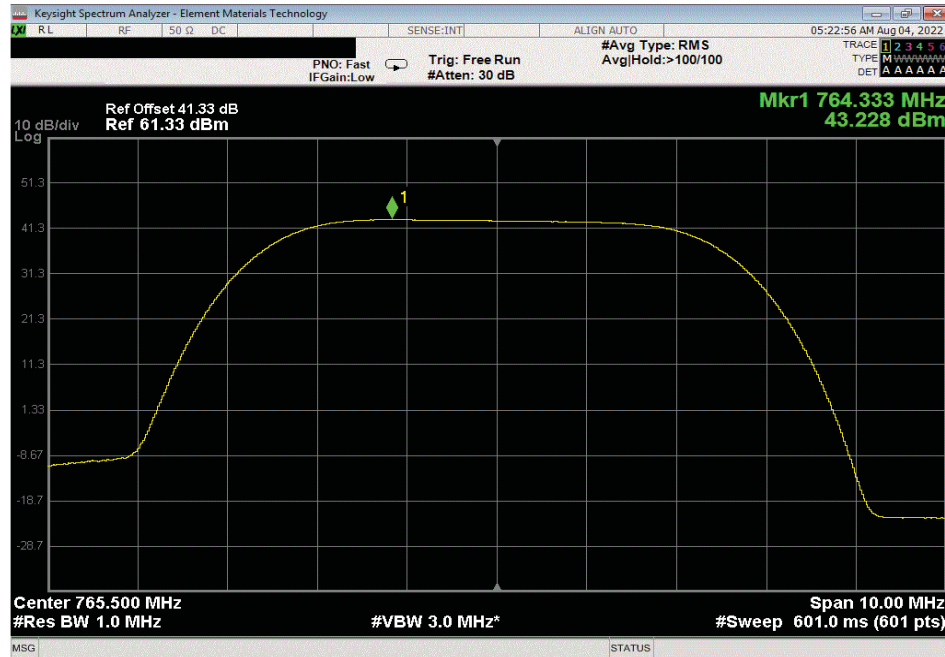


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

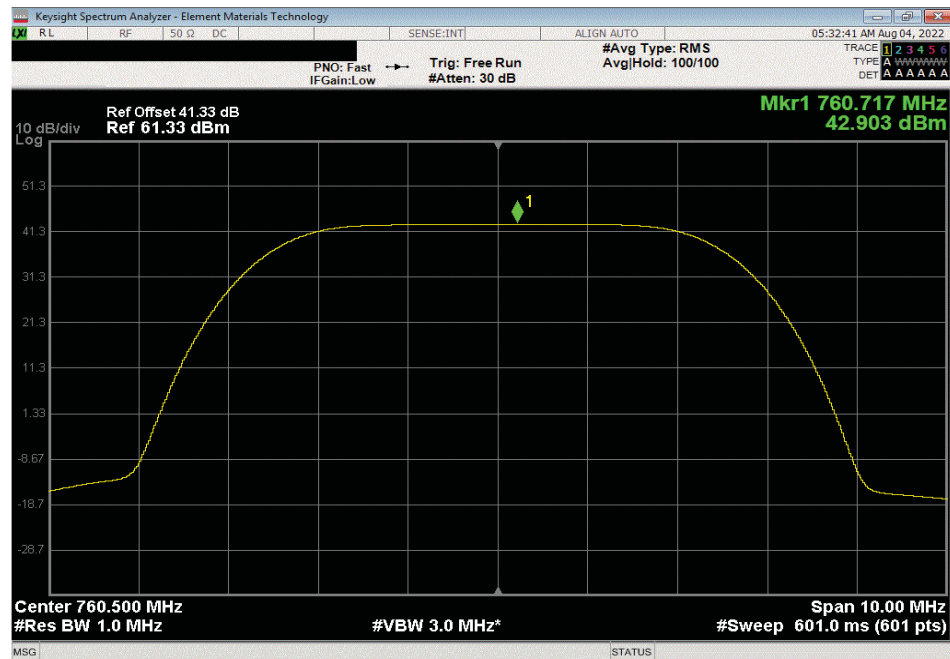


THTx 2022.05.02.0 XMMI 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 765.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
43.228	0	43.2	45.2	48.2		



Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.903	0	42.9	45.9	48.9		

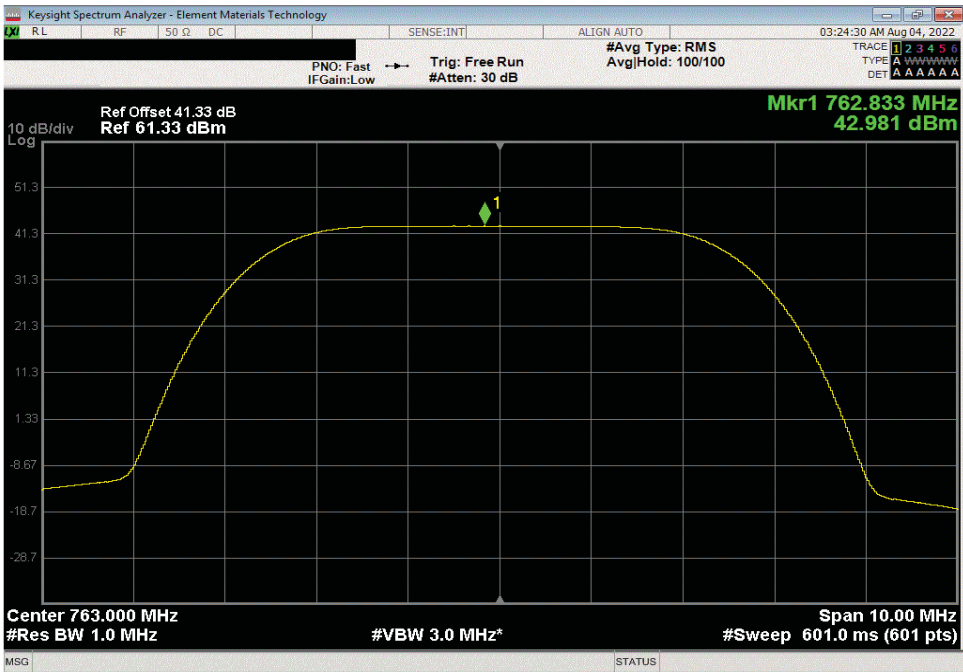


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

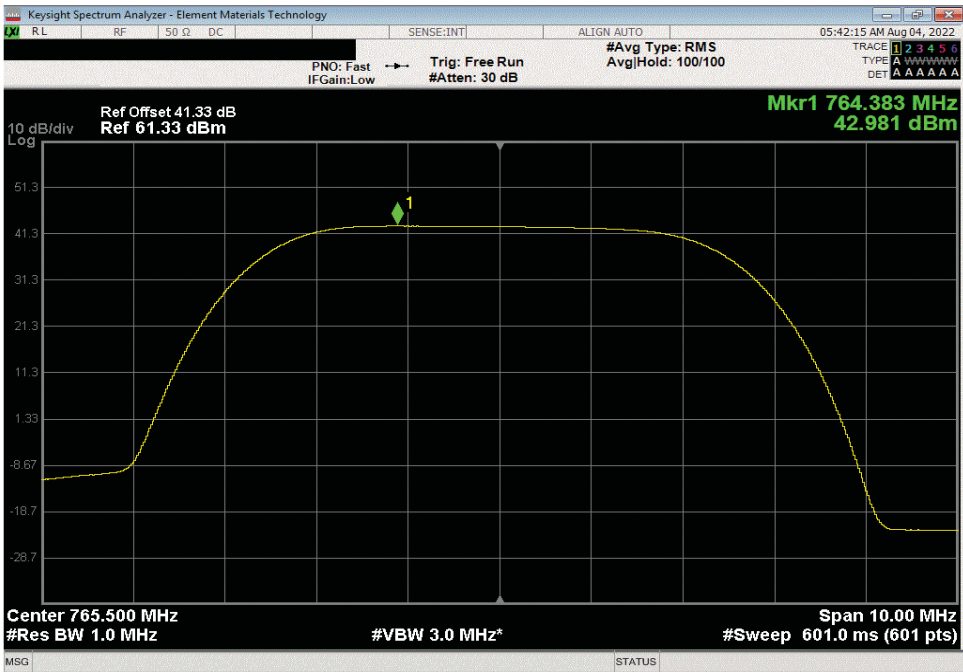


TbTtx 2022.05.02.0 XMI 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.981	0	43	46	49	



Port 1, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.981	0	43	46	49	

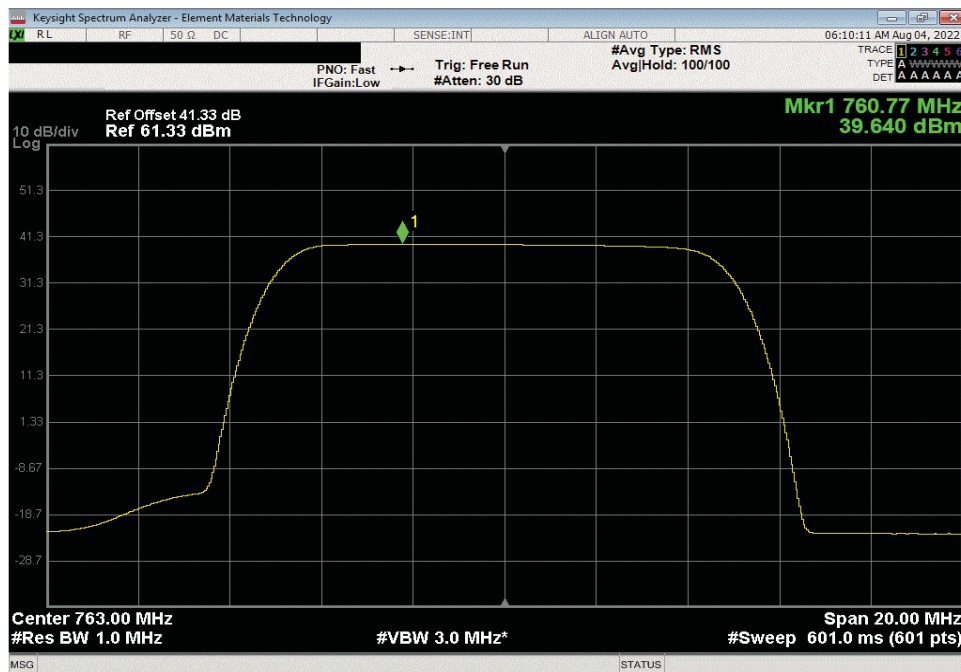


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14



TbTx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763 MHz					
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD
	39.64	0	39.6	42.6	45.6

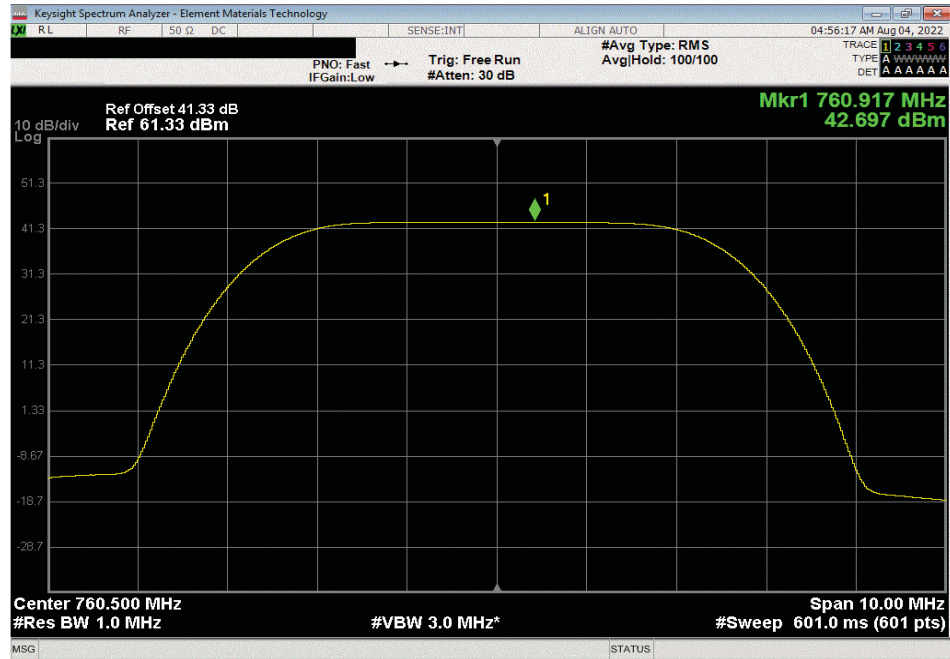


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

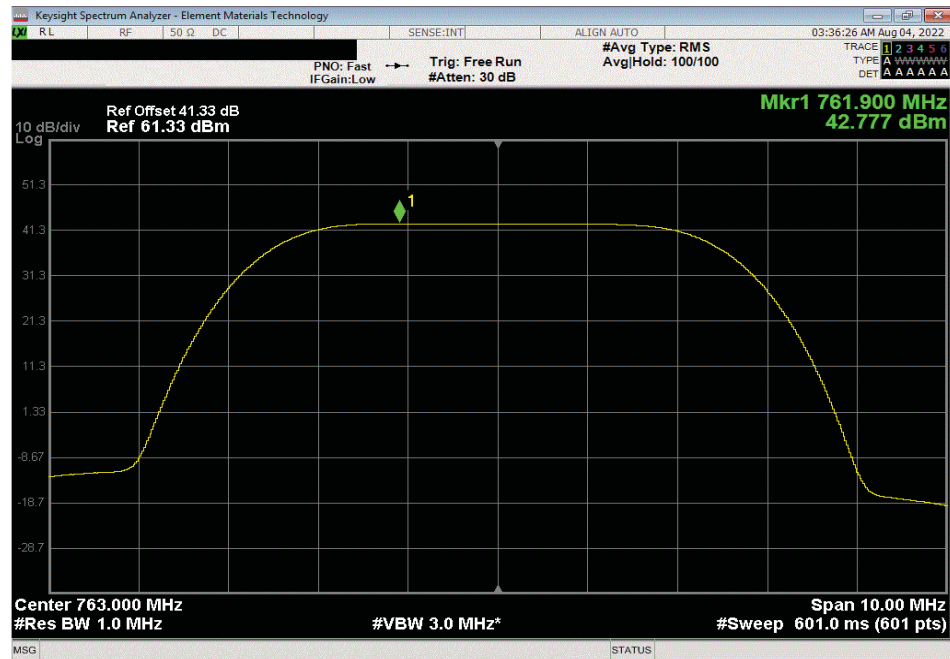


TMTx 2022.05.02.0 XMI 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 760.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.697	0	42.7	45.7	48.7	



Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, Mid Channel, 763 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.777	0	42.8	45.8	48.8	

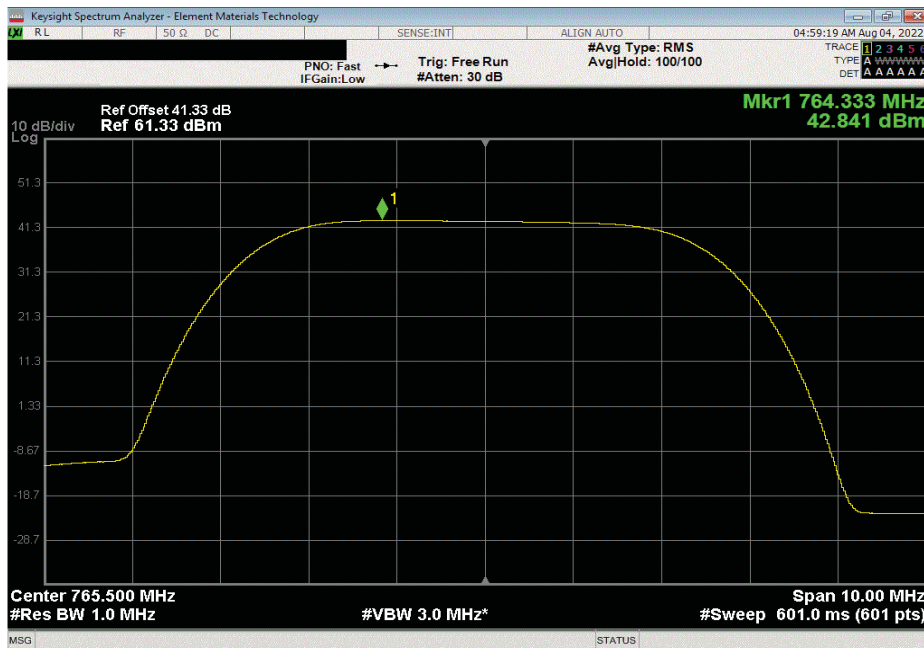


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

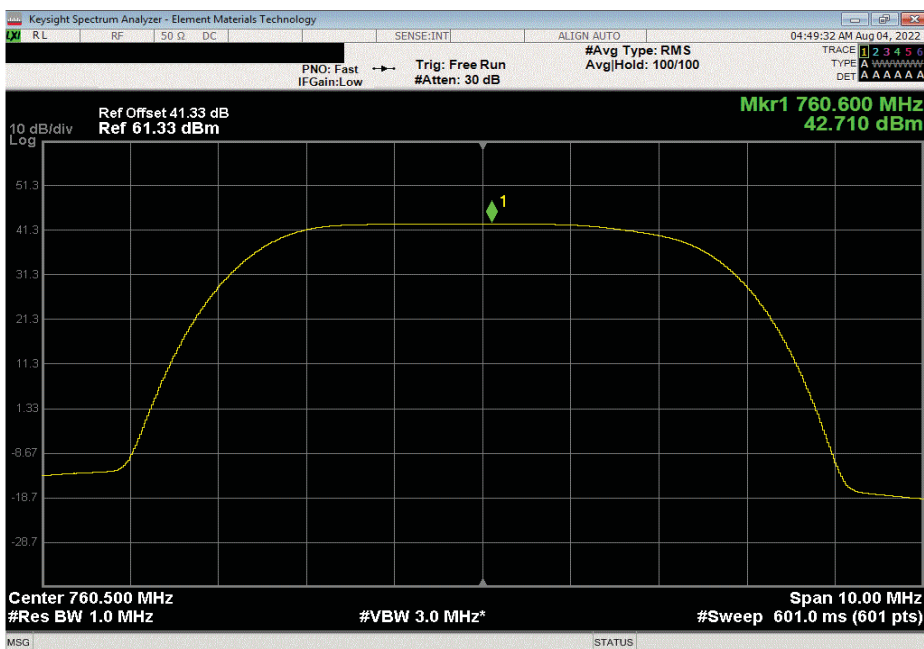


ThxTv 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 765.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.841	0	42.8	45.8	48.8	



Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 760.5 MHz					
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
42.71	0	42.7	45.7	48.7	

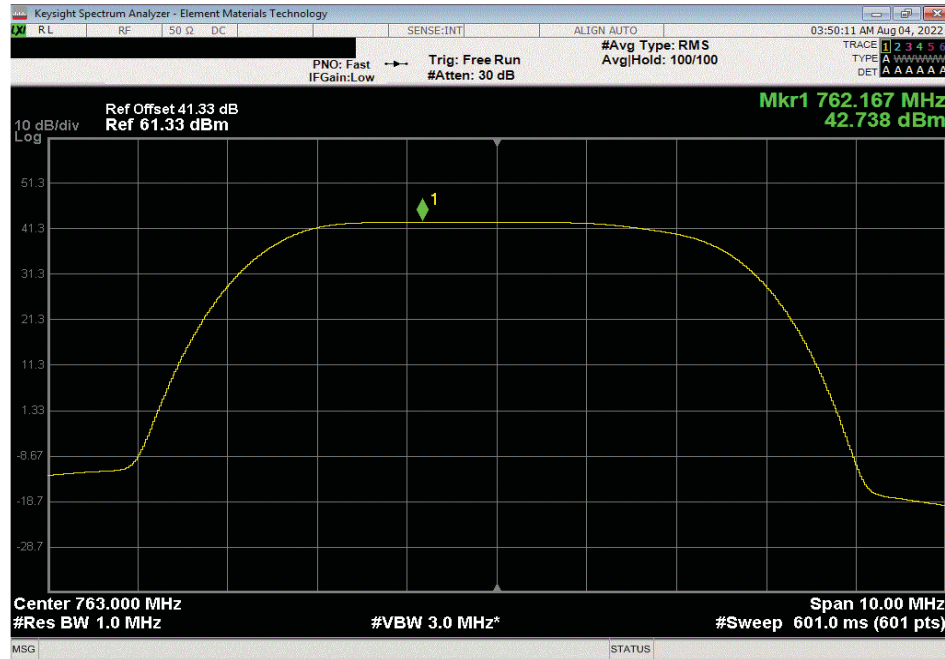


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

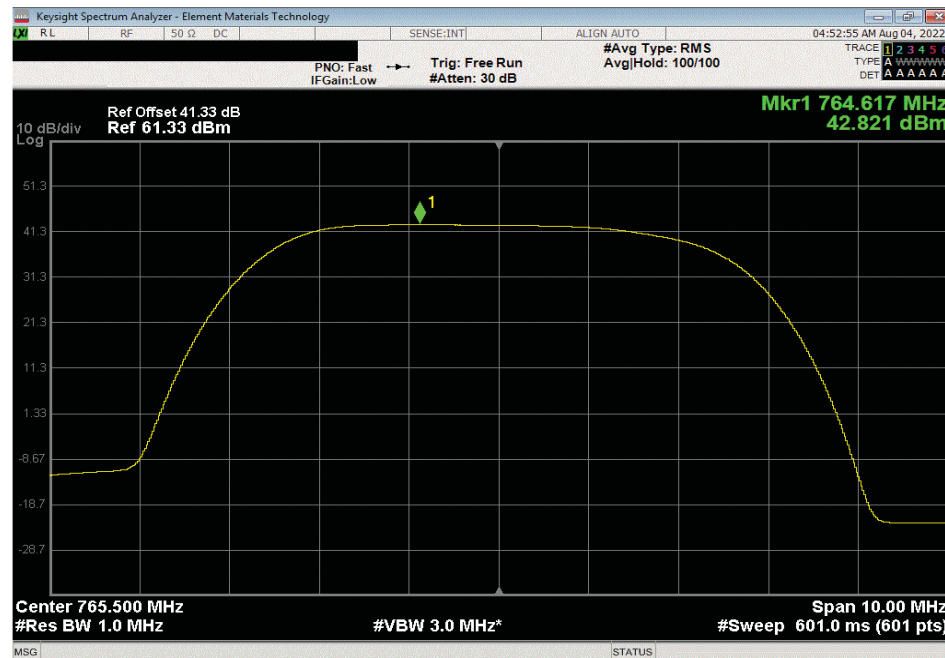


THTx 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Mid Channel, 763 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.738	0	42.7	45.7	48.7		



Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 765.5 MHz						
Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)		
dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD		
42.821	0	42.8	45.8	48.8		

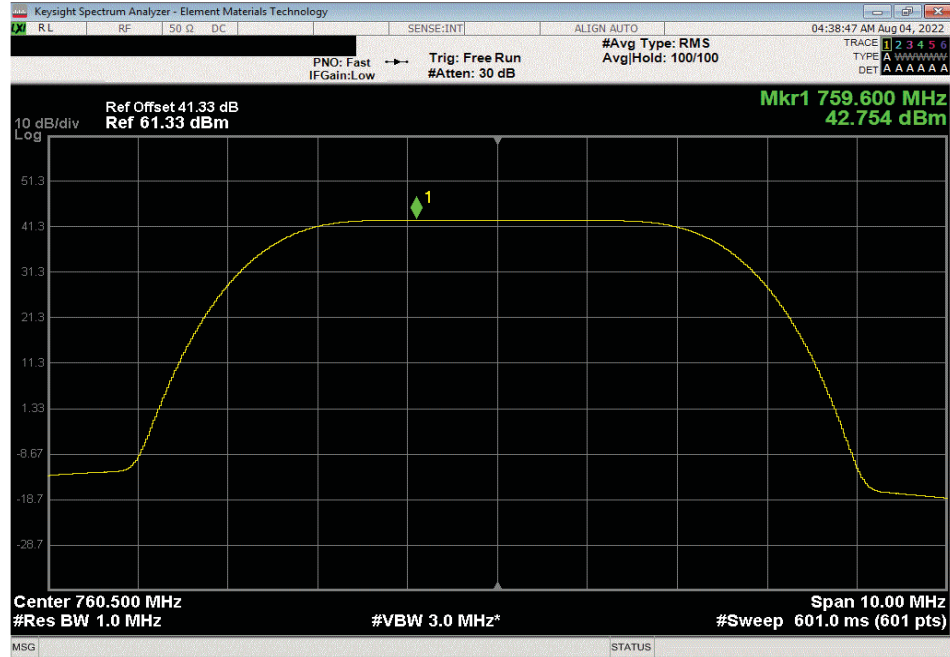


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

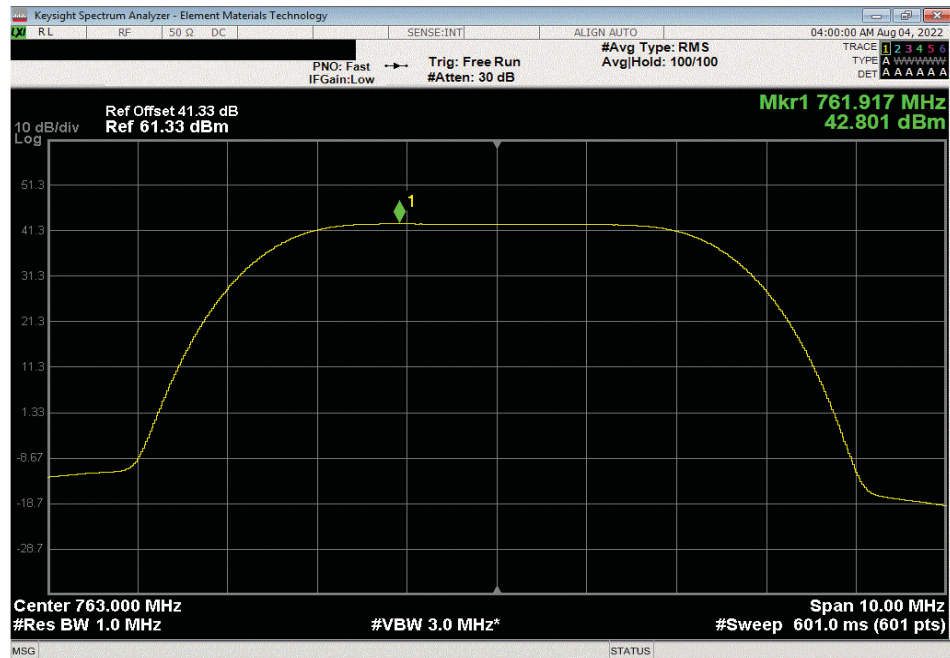


TMTx 2022.05.02.0 XMI 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 760.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.754	0	42.8	45.8	48.8	



Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Mid Channel, 763 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.801	0	42.8	45.8	48.8	

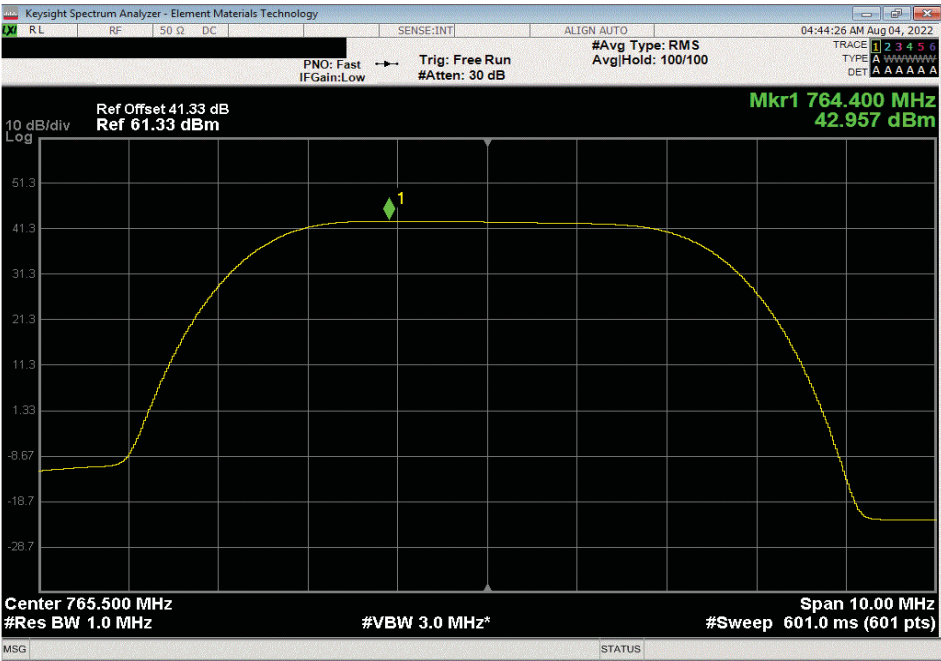


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

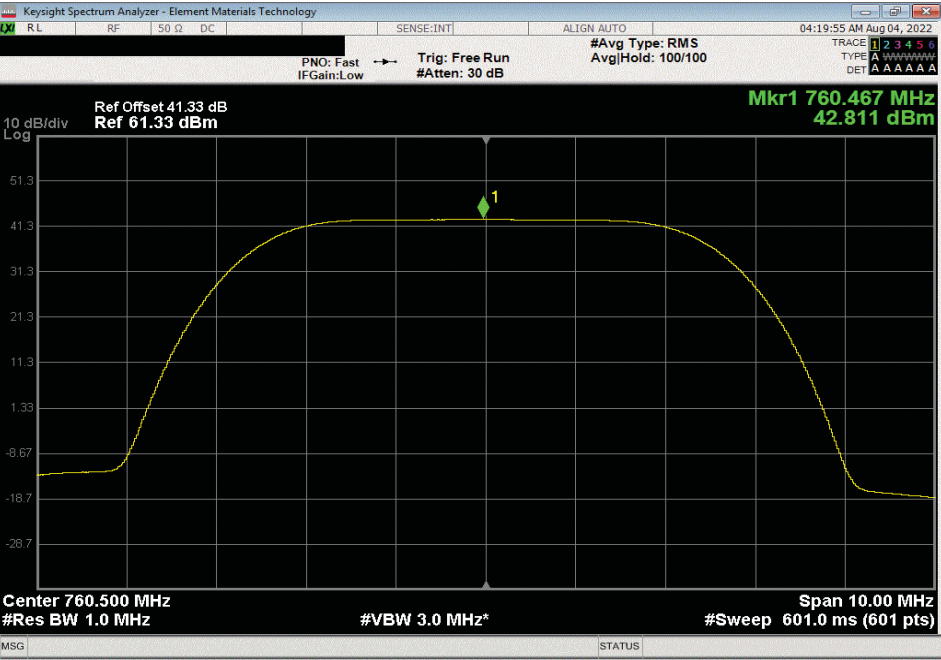


THyT 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 765.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.957	0	43	46	49	



Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 760.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.811	0	42.8	45.8	48.8	

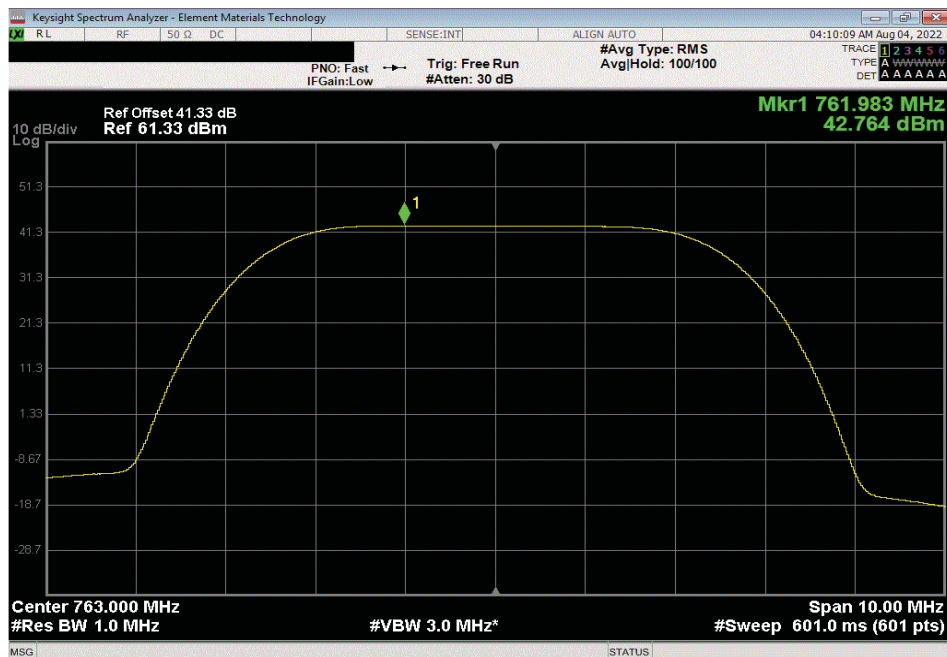


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14

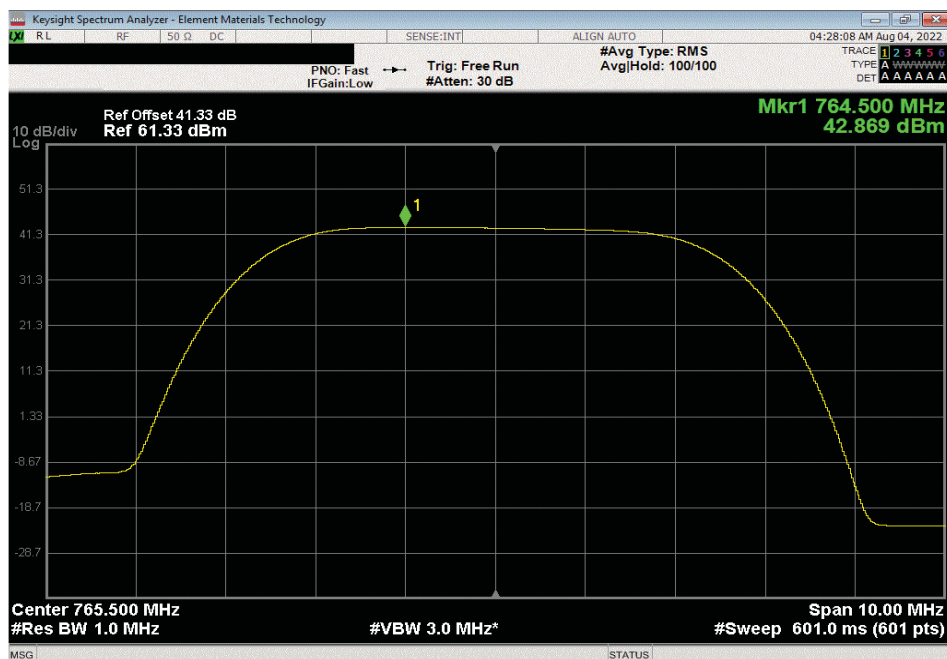


TMTx 2022.05.02.0 XMM 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.764	0	42.8	45.8	48.8	



Port 2, Band n14, 758 - 768 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 765.5 MHz						
	Initial Value	Duty Cycle	Single Port	Two Port (2x2 MIMO)	Four Port (4x4 MIMO)	
	dBm/MHz	Factor (dB)	dBm/MHz == PSD	dBm/MHz == PSD	dBm/MHz == PSD	
	42.869	0	42.9	45.9	48.9	

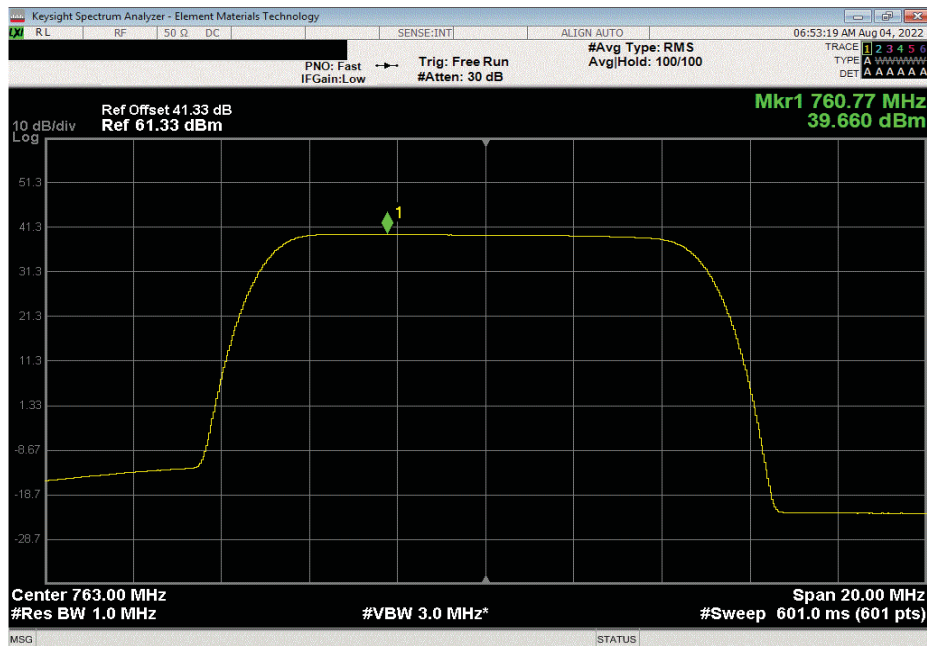


POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14



TbTx 2022.05.02.0 XMN 2022.02.07.0

Port 2, Band n14, 758 - 768 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Mid Channel, 763 MHz						
	Initial Value dBm/MHz	Duty Cycle Factor (dB)	Single Port dBm/MHz == PSD	Two Port (2x2 MIMO) dBm/MHz == PSD	Four Port (4x4 MIMO) dBm/MHz == PSD	
	39.66	0	39.7	42.7	45.7	



POWER SPECTRAL DENSITY AND EIRP CALCULATION - BAND n14



TMTx 2022.05.02.0 XMI 2022.02.07.0

Proposed EIRP Page for Band 14 5G NR Single Carrier

EIRP Calculations

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

The base station antenna is selected by the customer and this EIRP calculation is based upon a sample worst case antenna. The EIRP calculation is based upon Commscope antenna assembly model "FF-65C-R1". The maximum Band n14 gain (15.8dBi) for this antenna was used for the EIRP calculation. This antenna assembly has a pair of $\pm 45^\circ$ cross-polarized radiators. The four antenna RF inputs on the antenna assembly are labeled as R1 +45°, R1 -45°, R2 +45° and R2 -45°. The four AHBBA transmitter outputs are connected to the antenna assembly RF inputs.

Equivalent Isotropically Radiated Power (EIRP) is calculated for four port MIMO (as specified in ANSI C63.26-2015 section 6.4 for uncorrelated output signals) from the results of power measurements (highest measured PSD for each channel bandwidth type). The maximum antenna gain was used for this calculation. The cable loss between the antenna and transmitter is site dependent (will not be 0 dB) but for this worst case EIRP calculation 0 dB was used. Calculations of worst-case EIRP for four port MIMO are as follows:

Parameter	5 MHz Ch BW	10 MHz Ch BW
Worst Case PSD/Antenna Port	43.2 dBm/MHz	39.7 dBm/MHz
Number of Ant Ports per Polarization	2	2
Total PSD per Polarization $10\log(2) = +3\text{dB}$	46.2	42.7
Cable Loss (site dependent)	0 dB	0 dB
Dir Gain = Maximum Antenna Gain (G_{dir}) See Note 1	15.8 dBi	15.8 dBi
EIRP per Polarization = Total PSD/Pol + Dir Gain	62.0 dBm/MHz	58.5 dBm/MHz
Number of Polarizations	2	2
EIRP Total = R1 +45° and R2 +45° See Note 2	62.0 dBm/MHz	58.5 dBm/MHz

Note 1: The directional gain is equal to antenna gain since the transmit signals are completely uncorrelated. See ANSI C63.26 sections 6.4.5.2.3b) and 6.4.5.3.1b) for guidance.

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

EIRP Calculation Summary

The worst case AHBBA Band 14 four port MIMO EIRP levels using antenna assembly model "FF-65C-R1" are less than the FCC and ISSED (65.16 dBm/MHz and 62.15 dBm/MHz) EIRP Regulatory Limits for all (5 & 10MHz) channel bandwidths.

BAND EDGE COMPLIANCE - BAND n12

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	ANE	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. For Multiband operation, measurements were taken at the lower band edge of the lower band and the upper band edge of the upper band.

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.

Per 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 BTS may operate as a 4 port MIMO transmitter for 5G NR Band n12.

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.

AHLBBA antenna ports 1&4 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.

AHLBBA antenna ports 2&3 are essentially electrically identical (the RF power variation between antenna ports is small as shown in this certification testing) and antenna port 2 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.

BAND EDGE COMPLIANCE - BAND n12



TelTx 2022.05.02.0 XMit 2022.02.07.0

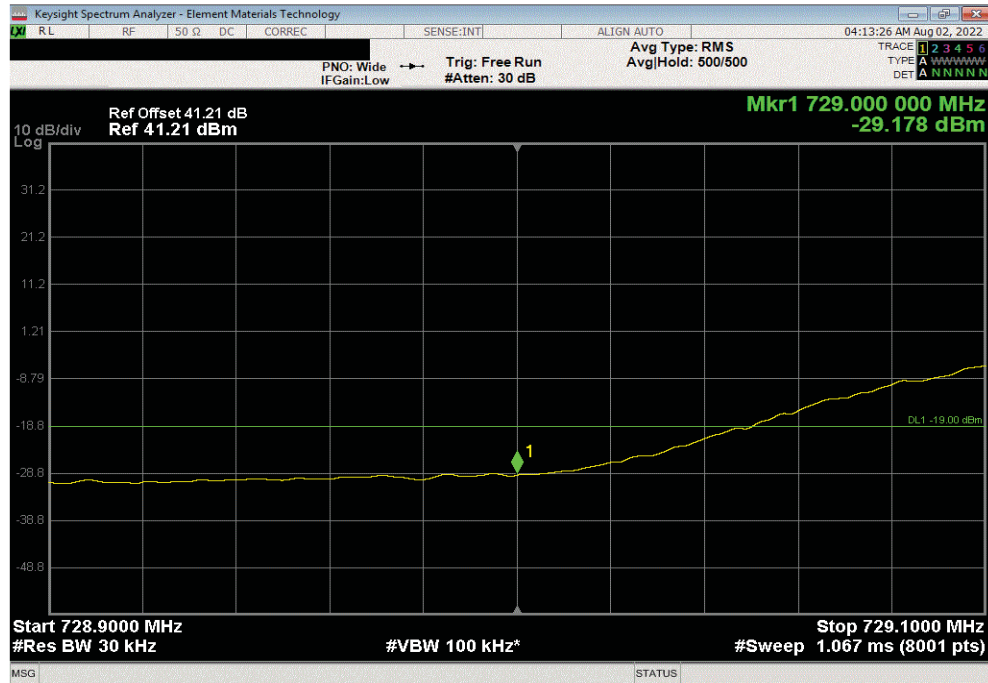
EUT: AHLBBA (C2PC/C3PC FCC/ISED)		Work Order: NOKI0047				
Serial Number: K9193514835		Date: 2-Aug-22				
Customer: Nokia Solutions and Networks		Temperature: 21.9 °C				
Attendees: Mitchell Hill		Humidity: 54.7% RH				
Project: None		Barometric Pres.: 1021 mbar				
Tested by: Marty Martin		Power: 54VDC				
Job Site: TX07						
TEST SPECIFICATIONS		Test Method				
RSS-130 Issue 2: 2019		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 attenuators, cables, DC block and filter when in use. The carriers were enabled at maximum power.						
DEVIATIONS FROM TEST STANDARD						
None						
Configuration #	2	Signature 				
		Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result
Port 1						
5G NR Band n12, 729 - 745 Mhz						
5 MHz Bandwidth						
QPSK Modulation						
Low Channel, 731.5 MHz		1	729	-29.2	-19	Pass
Low Channel, 731.5 MHz		2	728.9	-24.8	-19	Pass
High Channel, 742.5 MHz		1	745	-28.1	-19	Pass
High Channel, 742.5 MHz		2	745.13	-24.2	-19	Pass
16QAM Modulation						
Low Channel, 731.5 MHz		1	729	-29.4	-19	Pass
Low Channel, 731.5 MHz		2	728.9	-25.2	-19	Pass
High Channel, 742.5 MHz		1	745	-27.9	-19	Pass
High Channel, 742.5 MHz		2	745.1	-24.3	-19	Pass
64QAM Modulation						
Low Channel, 731.5 MHz		1	729	-29.3	-19	Pass
Low Channel, 731.5 MHz		2	728.9	-25.0	-19	Pass
High Channel, 742.5 MHz		1	745	-28.1	-19	Pass
High Channel, 742.5 MHz		2	745.1	-24.0	-19	Pass
256QAM Modulation						
Low Channel, 731.5 MHz		1	729	-28.7	-19	Pass
Low Channel, 731.5 MHz		2	728.9	-24.8	-19	Pass
High Channel, 742.5 MHz		1	745	-28.7	-19	Pass
High Channel, 742.5 MHz		2	745.1	-23.9	-19	Pass
10 MHz Bandwidth						
256QAM Modulation						
Low Channel, 734 MHz		1	729	-31.0	-19	Pass
Low Channel, 734 MHz		2	728.84	-26.3	-19	Pass
High Channel, 740 MHz		1	745	-31.0	-19	Pass
High Channel, 740 MHz		2	745.25	-25.7	-19	Pass
15 MHz Bandwidth						
256QAM Modulation						
Low Channel, 736.5 MHz		1	729	-32.1	-19	Pass
Low Channel, 736.5 MHz		2	728.73	-27.0	-19	Pass
High Channel, 737.5 MHz		1	745	-30.6	-19	Pass
High Channel, 737.5 MHz		2	745.1	-25.8	-19	Pass
Port 2						
5G NR Band n12, 729 - 745 Mhz						
5 MHz Bandwidth						
QPSK Modulation						
Low Channel, 731.5 MHz		1	729	-26.7	-19	Pass
Low Channel, 731.5 MHz		2	728.78	-23.0	-19	Pass
High Channel, 742.5 MHz		1	745	-28.1	-19	Pass
High Channel, 742.5 MHz		2	745.1	-24.9	-19	Pass
16QAM Modulation						
Low Channel, 731.5 MHz		1	729	-27.3	-19	Pass
Low Channel, 731.5 MHz		2	728.9	-23.0	-19	Pass
High Channel, 742.5 MHz		1	745	-28.2	-19	Pass
High Channel, 742.5 MHz		2	745.1	-25.0	-19	Pass
64QAM Modulation						
Low Channel, 731.5 MHz		1	729	-26.8	-19	Pass
Low Channel, 731.5 MHz		2	728.83	-22.8	-19	Pass
High Channel, 742.5 MHz		1	745	-27.8	-19	Pass
High Channel, 742.5 MHz		2	745.1	-24.9	-19	Pass
256QAM Modulation						
Low Channel, 731.5 MHz		1	729	-26.4	-19	Pass
Low Channel, 731.5 MHz		2	728.83	-23.0	-19	Pass
High Channel, 742.5 MHz		1	745	-28.1	-19	Pass
High Channel, 742.5 MHz		2	745.1	-25.2	-19	Pass
10 MHz Bandwidth						
256QAM Modulation						
Low Channel, 734 MHz		1	729	-29.0	-19	Pass
Low Channel, 734 MHz		2	728.88	-23.7	-19	Pass
High Channel, 740 MHz		1	745	-28.9	-19	Pass
High Channel, 740 MHz		2	745.1	-24.0	-19	Pass
15 MHz Bandwidth						
256QAM Modulation						
Low Channel, 736.5 MHz		1	729	-29.1	-19	Pass
Low Channel, 736.5 MHz		2	728.76	-23.9	-19	Pass
High Channel, 737.5 MHz		1	745	-28.1	-19	Pass
High Channel, 737.5 MHz		2	745.27	-23.1	-19	Pass

BAND EDGE COMPLIANCE - BAND n12

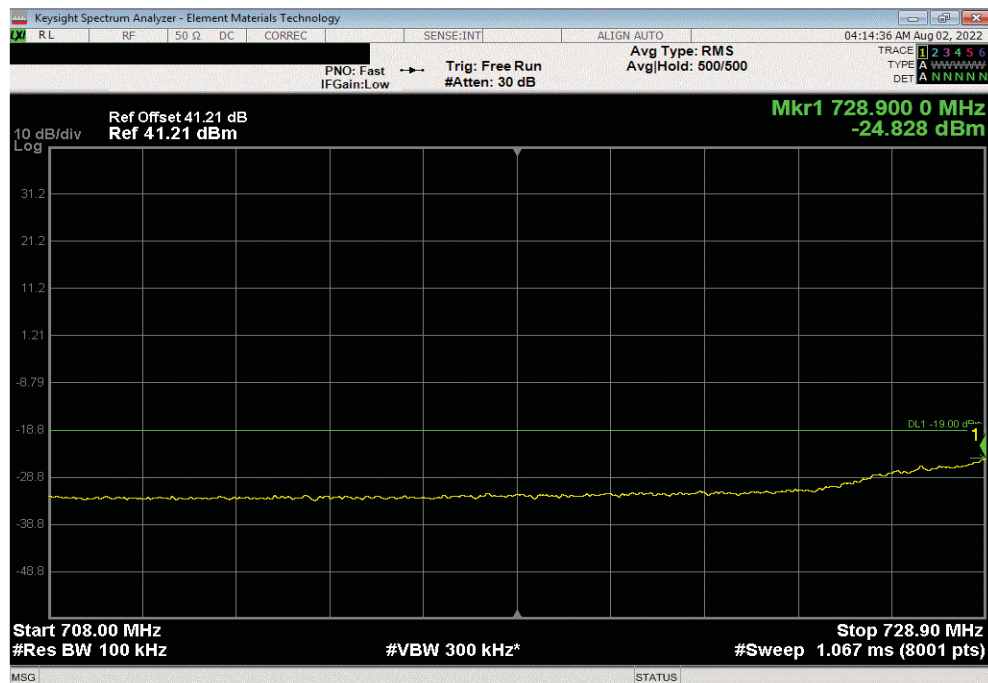


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-29.18	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.9	-24.83	-19	Pass		

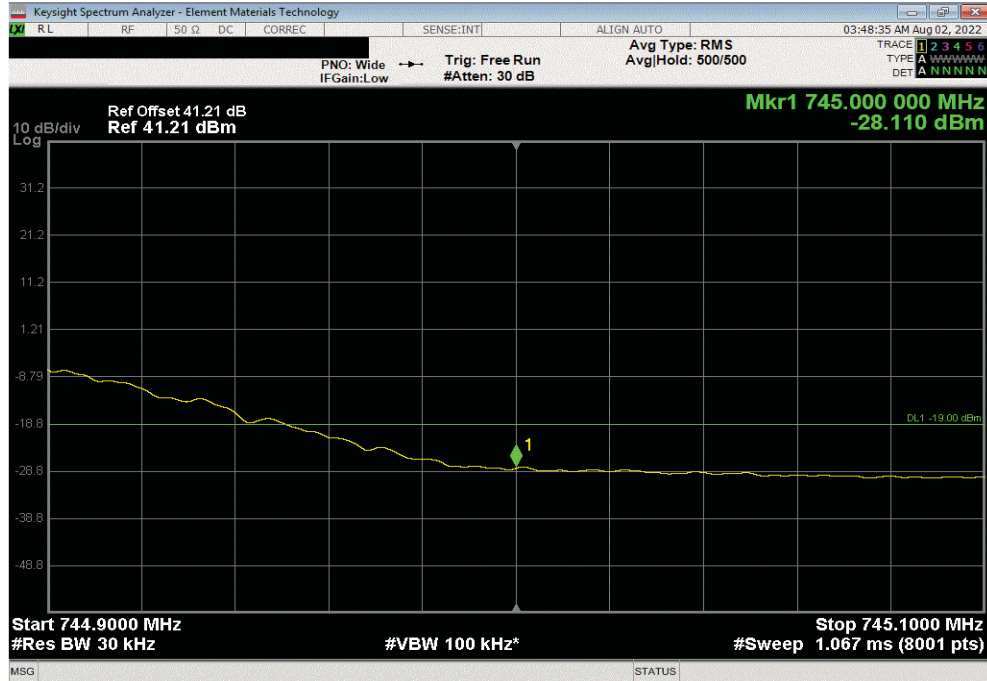


BAND EDGE COMPLIANCE - BAND n12

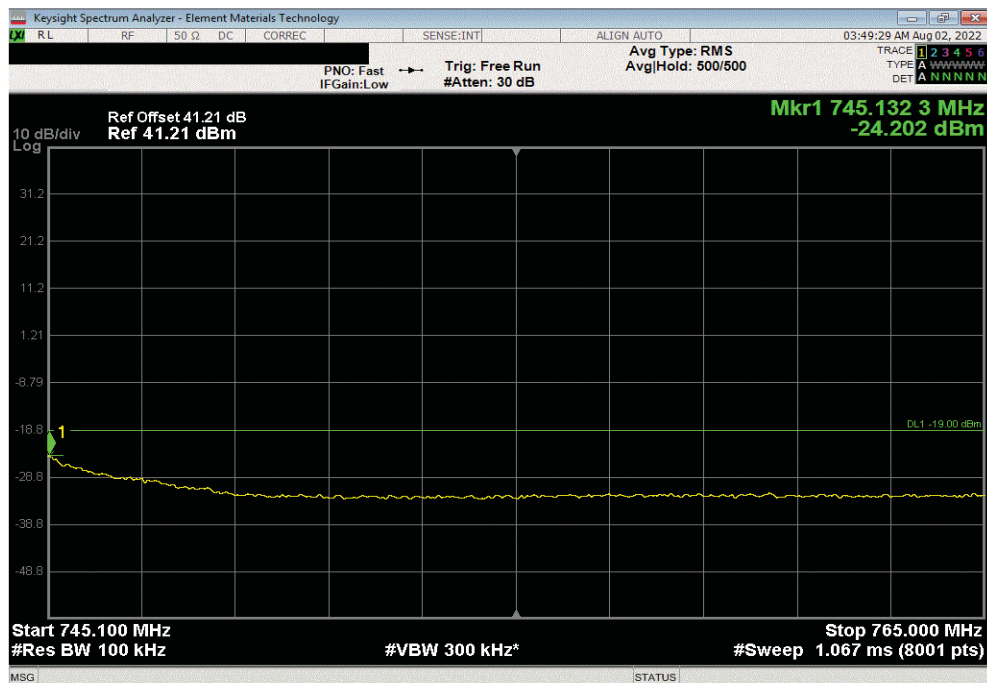


TbTtx 2022.05.02.0 XMIT 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.11	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.13	-24.2	-19	Pass		

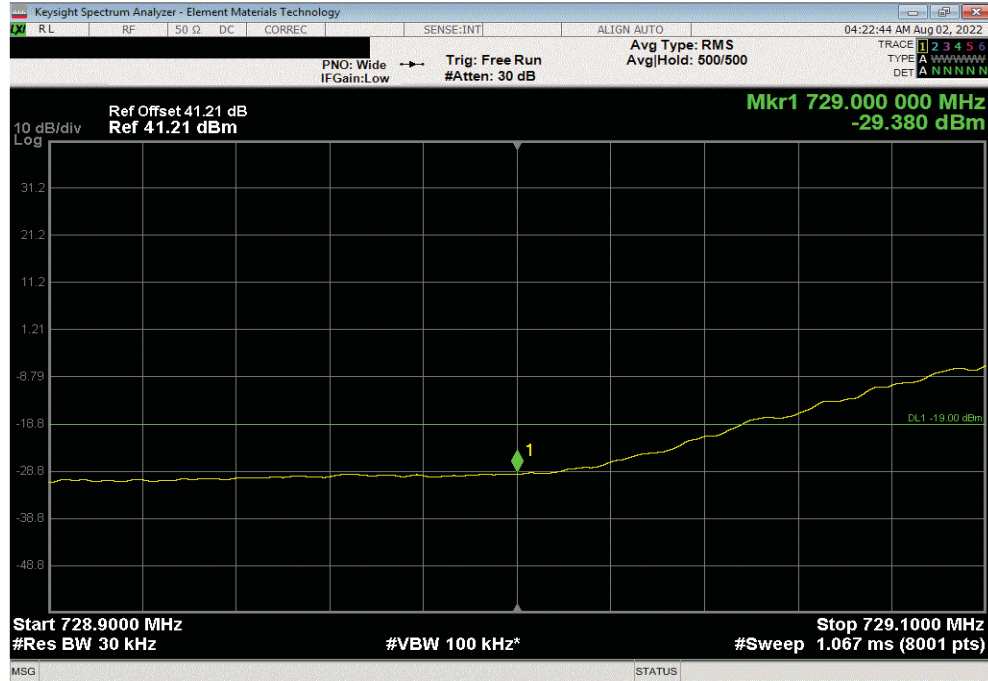


BAND EDGE COMPLIANCE - BAND n12

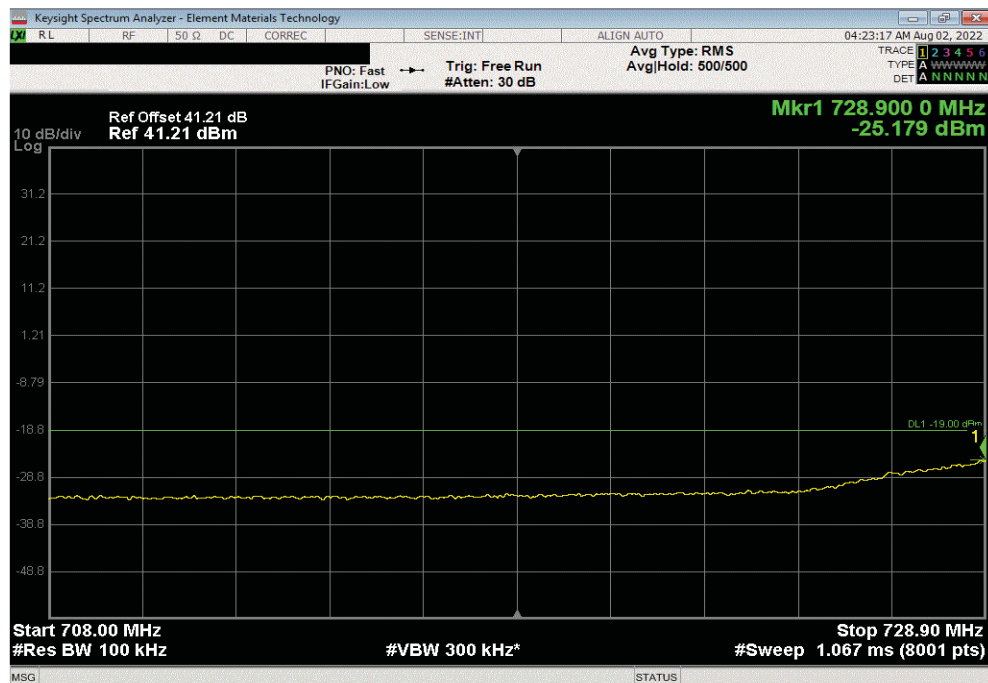


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-29.38	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.9	-25.18	-19	Pass		

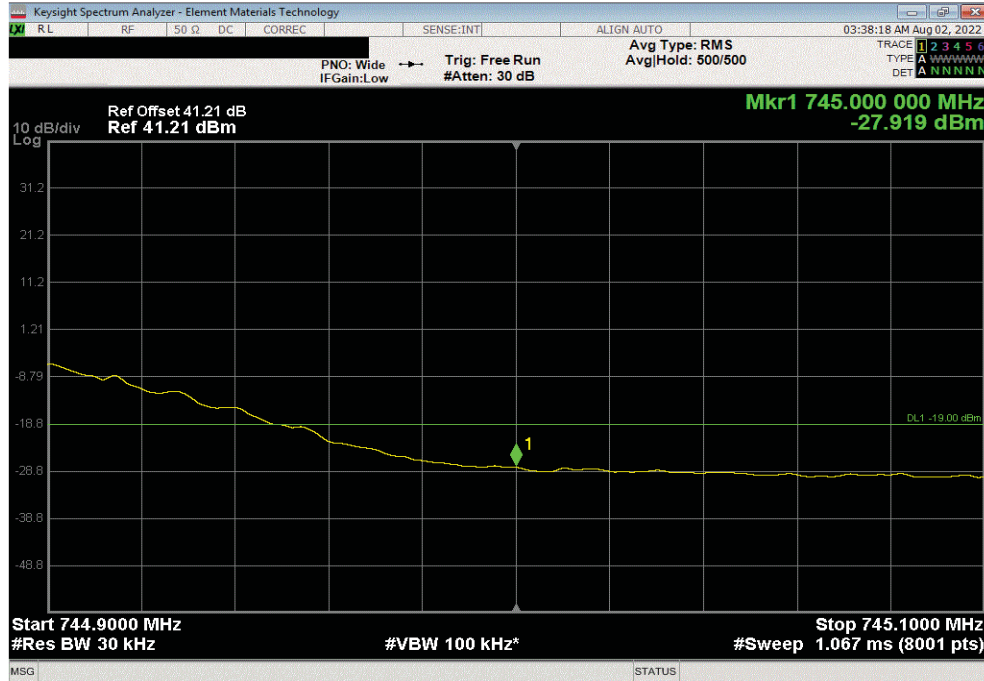


BAND EDGE COMPLIANCE - BAND n12

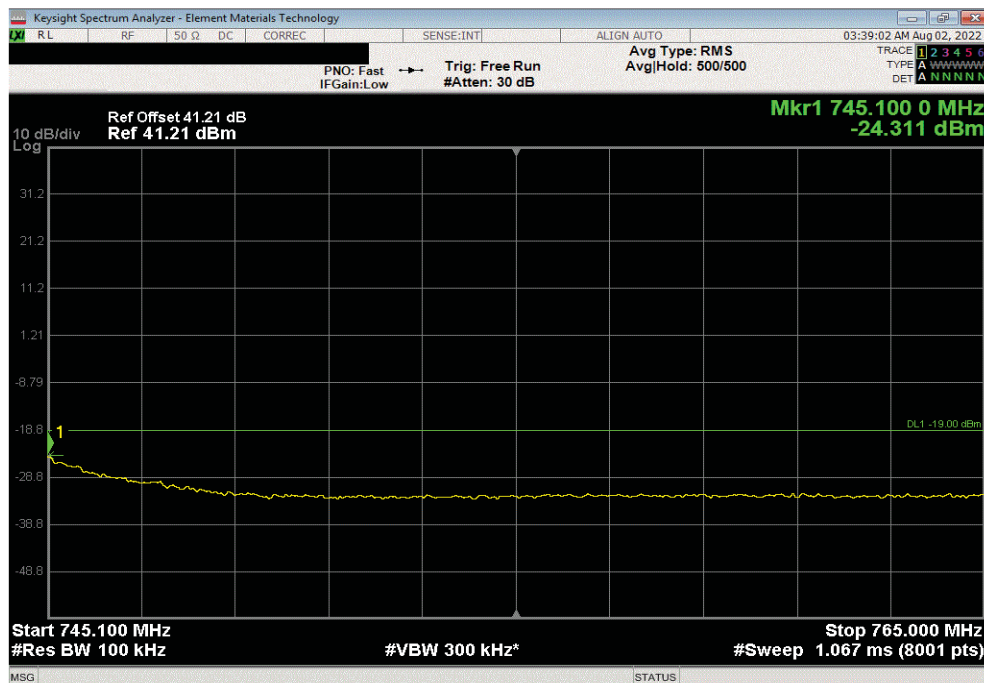


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-27.92	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-24.31	-19	Pass		

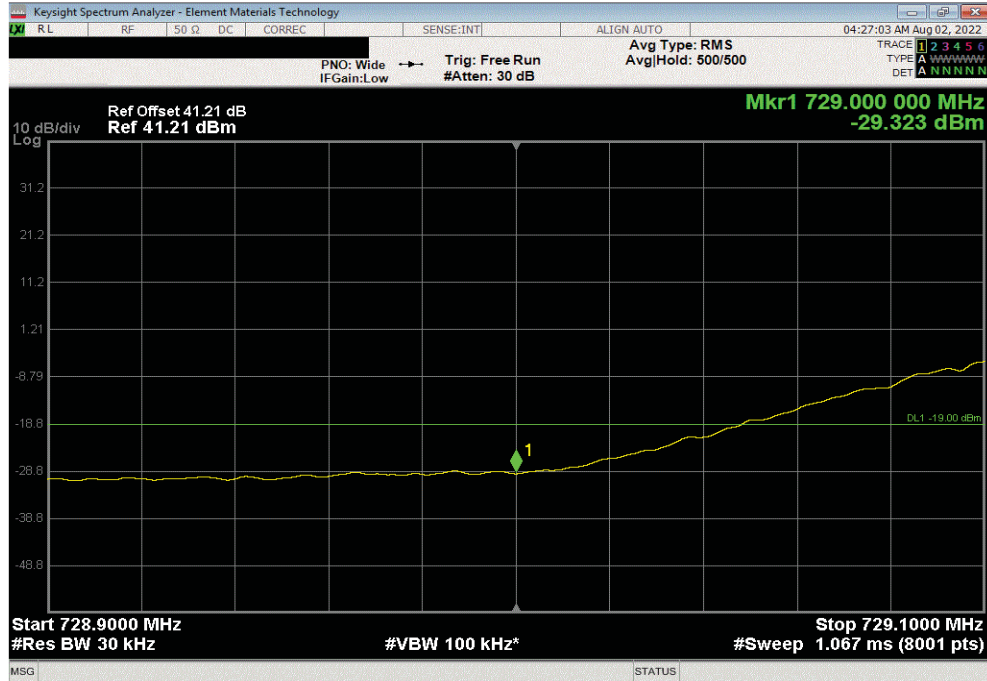


BAND EDGE COMPLIANCE - BAND n12

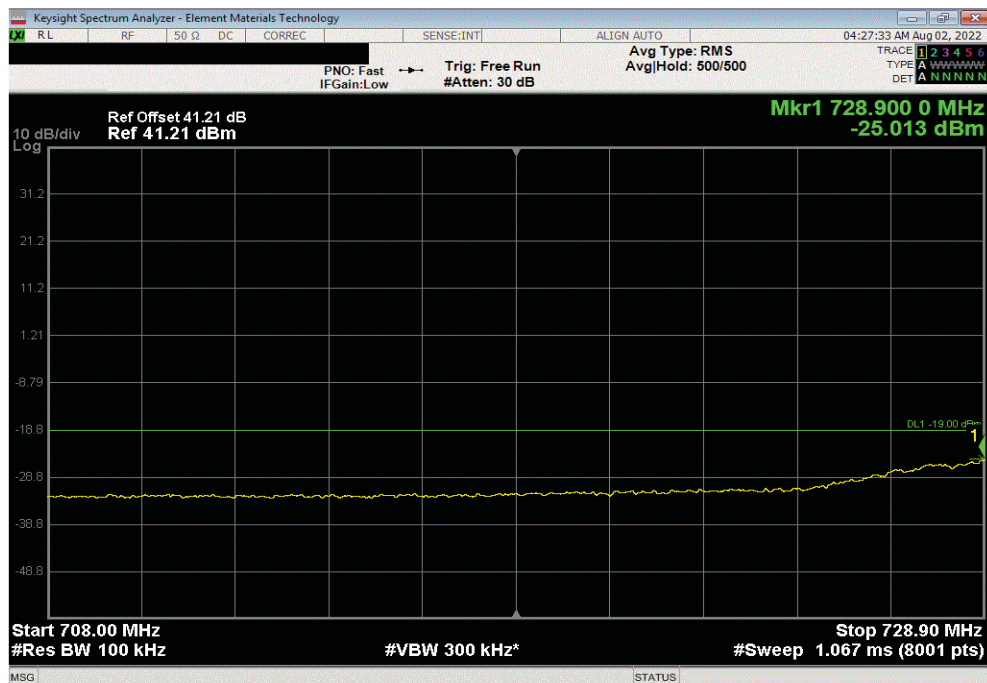


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-29.32	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.9	-25.01	-19	Pass		

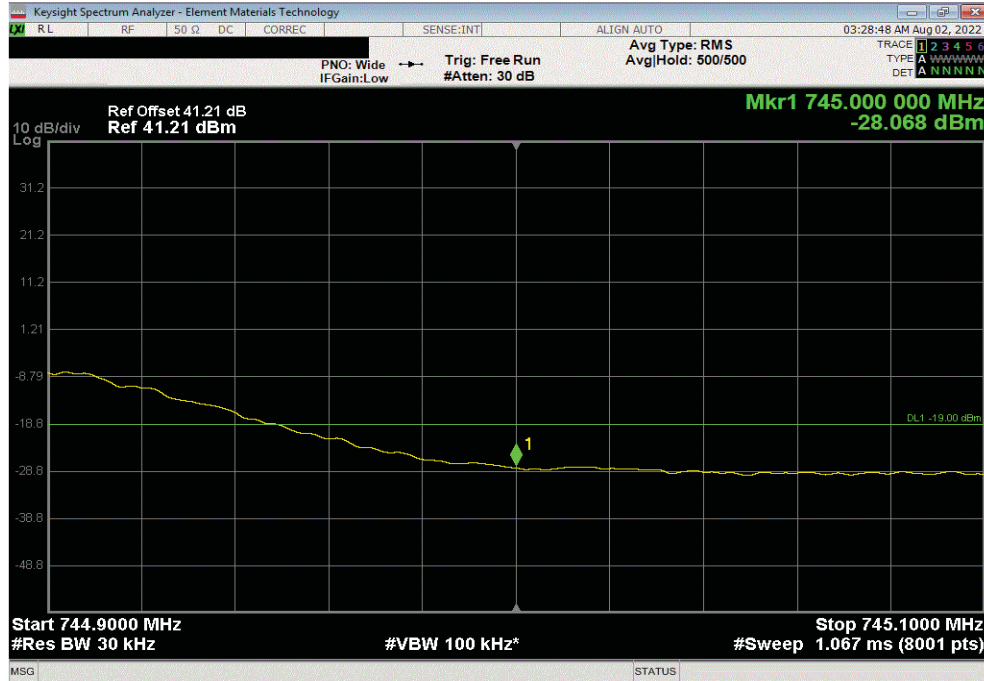


BAND EDGE COMPLIANCE - BAND n12

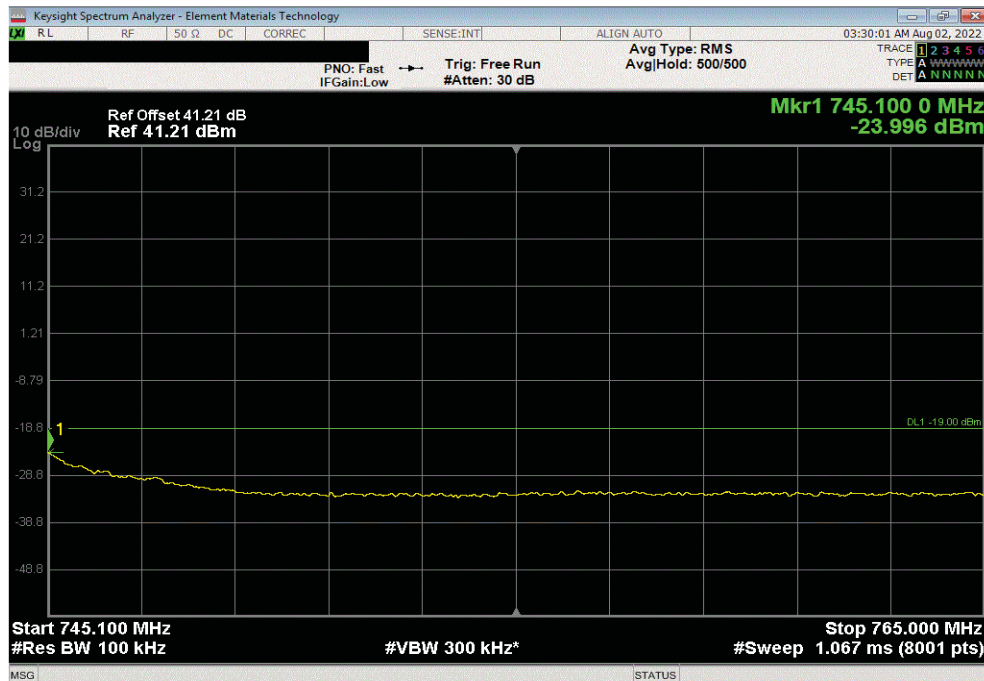


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.07	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-24	-19	Pass		

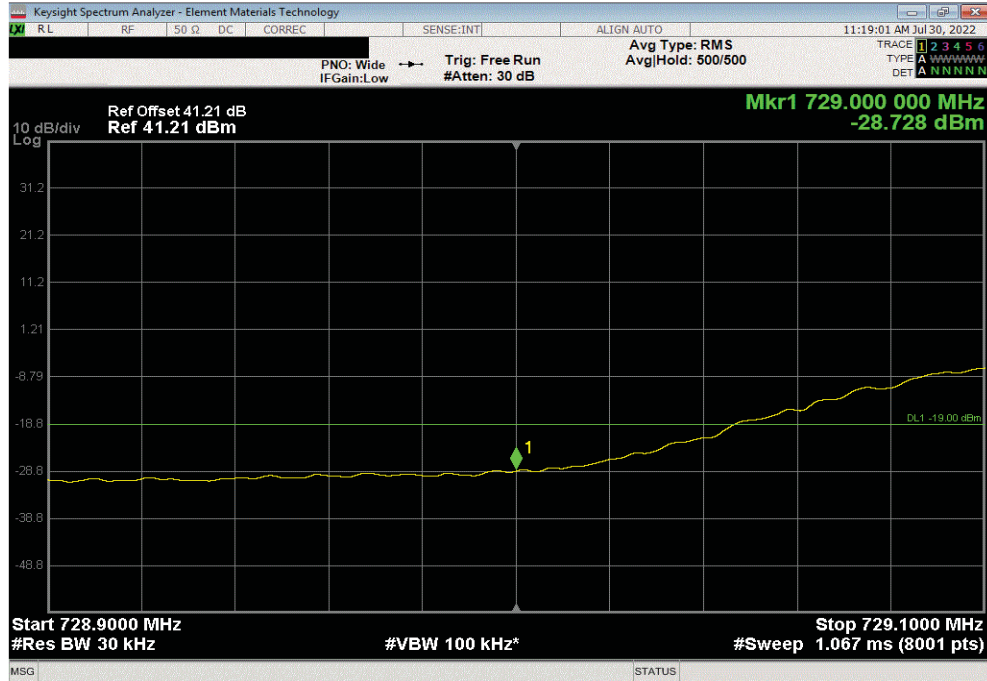


BAND EDGE COMPLIANCE - BAND n12

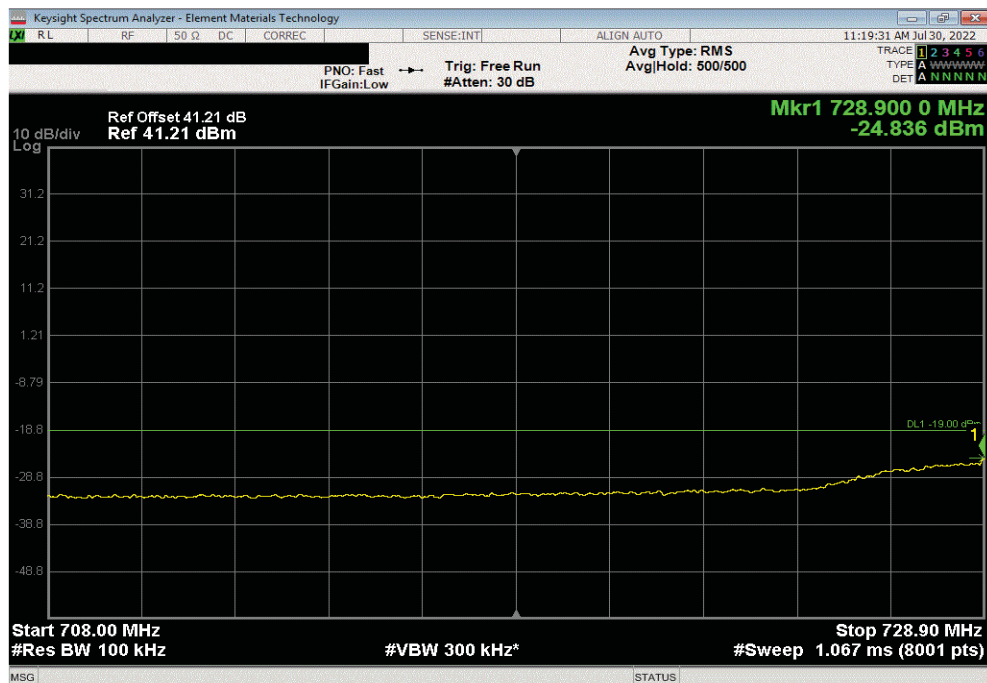


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-28.73	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.9	-24.84	-19	Pass		

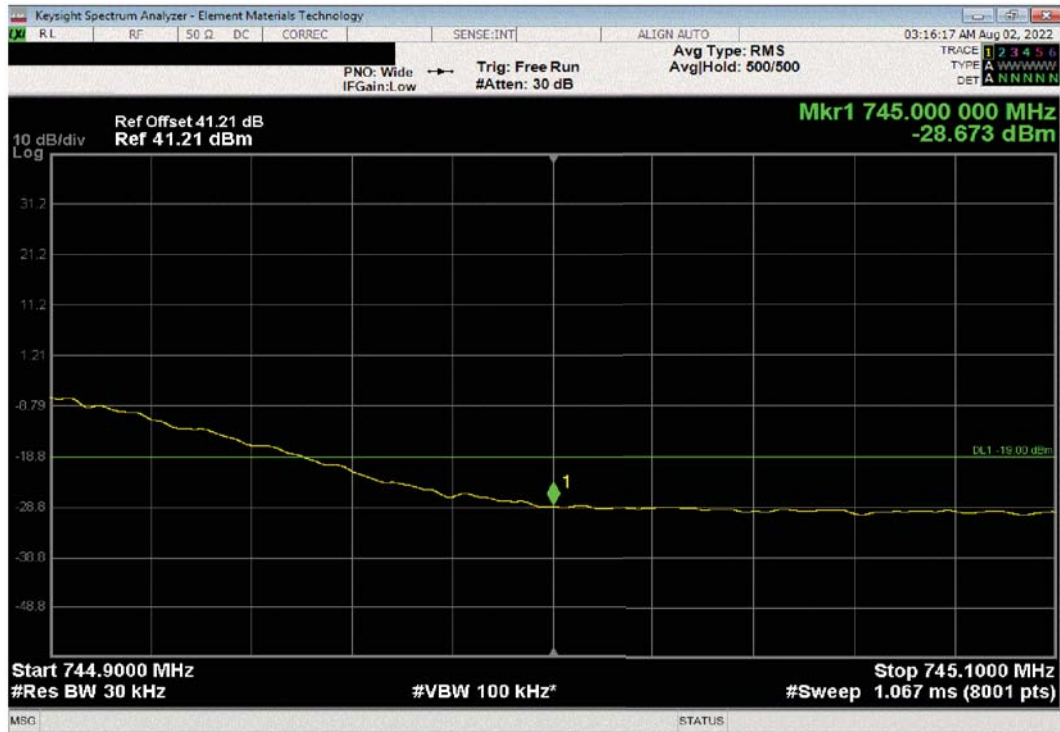


BAND EDGE COMPLIANCE - BAND n12



TbTx 2022.05.02.0 XMt 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.67	-19	Pass		

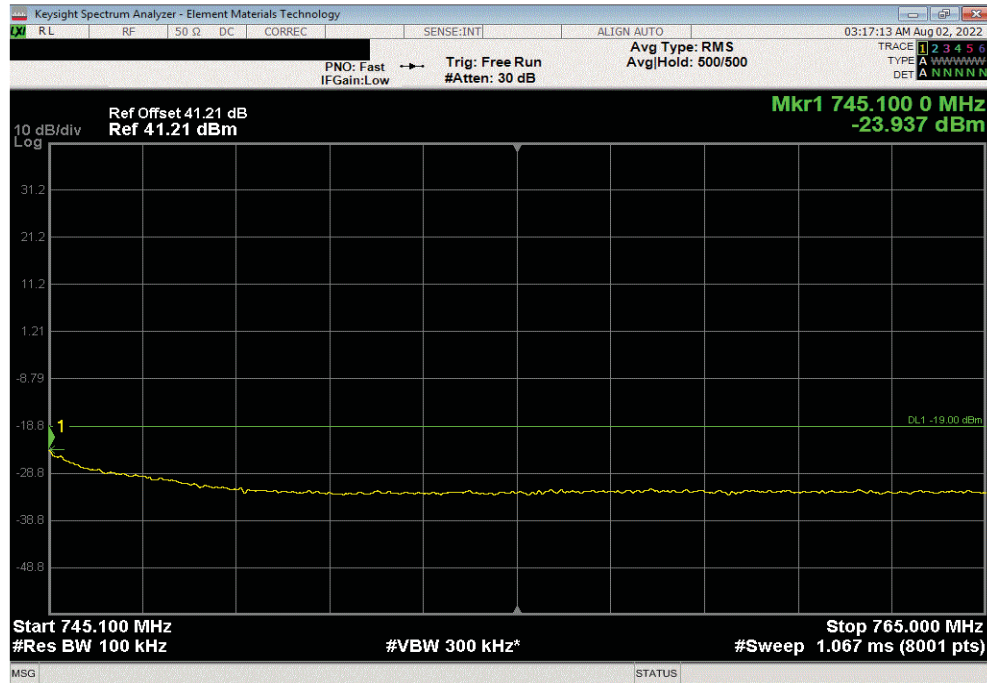


BAND EDGE COMPLIANCE - BAND n12

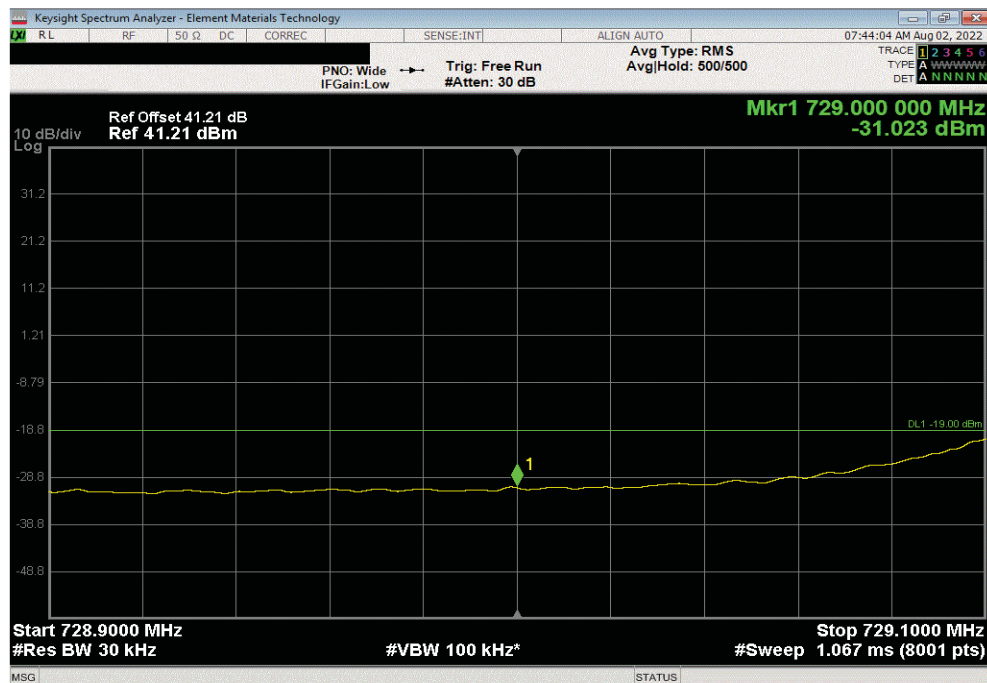


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-23.94	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 734 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-31.02	-19	Pass		

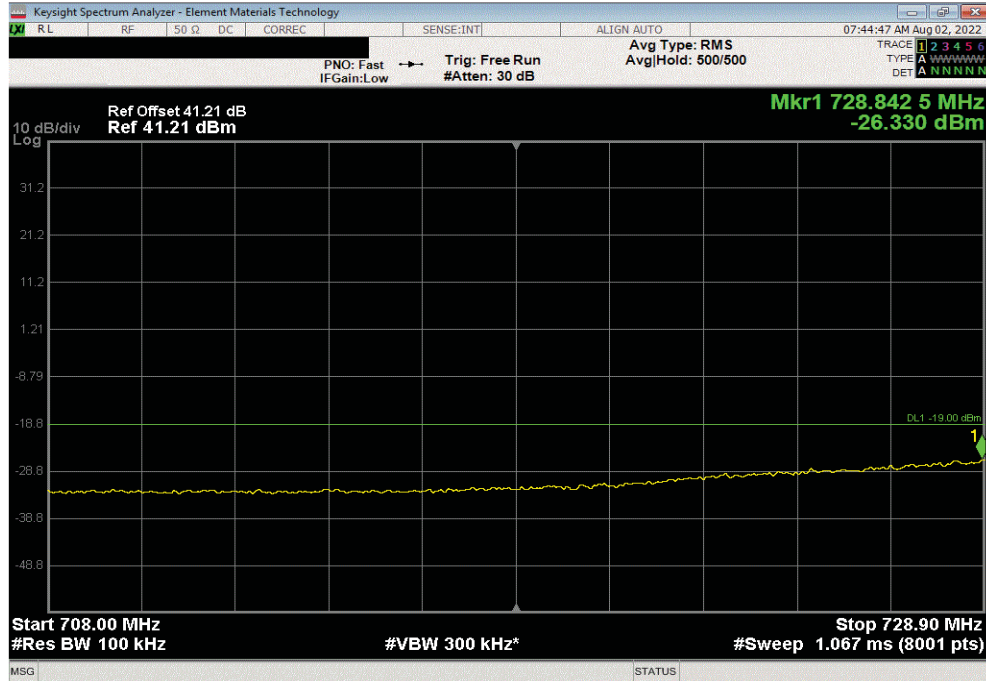


BAND EDGE COMPLIANCE - BAND n12

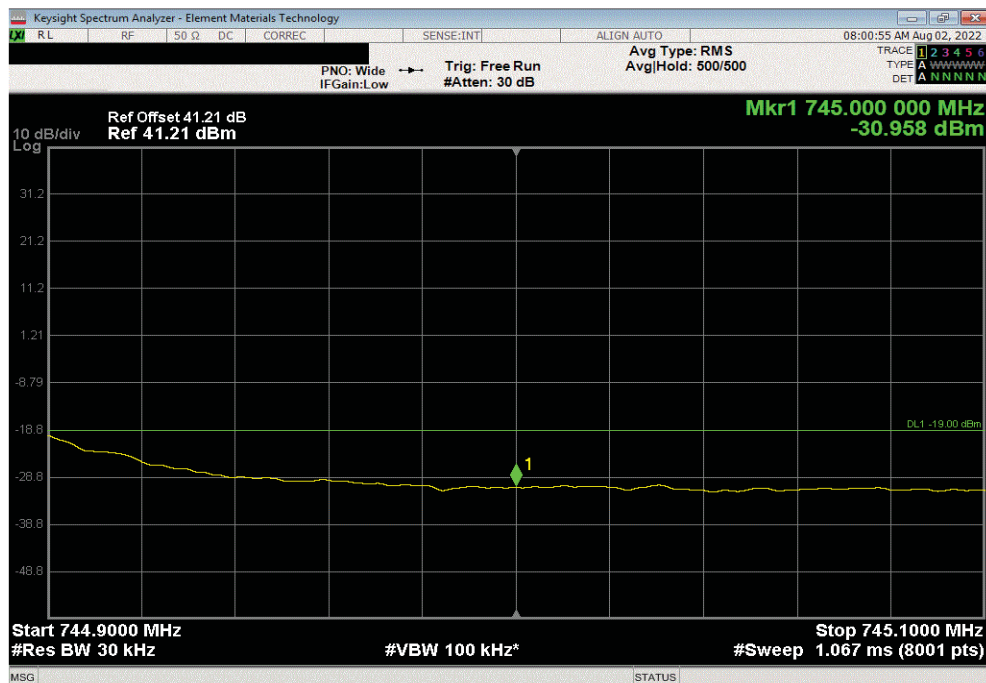


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 734 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.84	-26.33	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 740 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-30.96	-19	Pass		

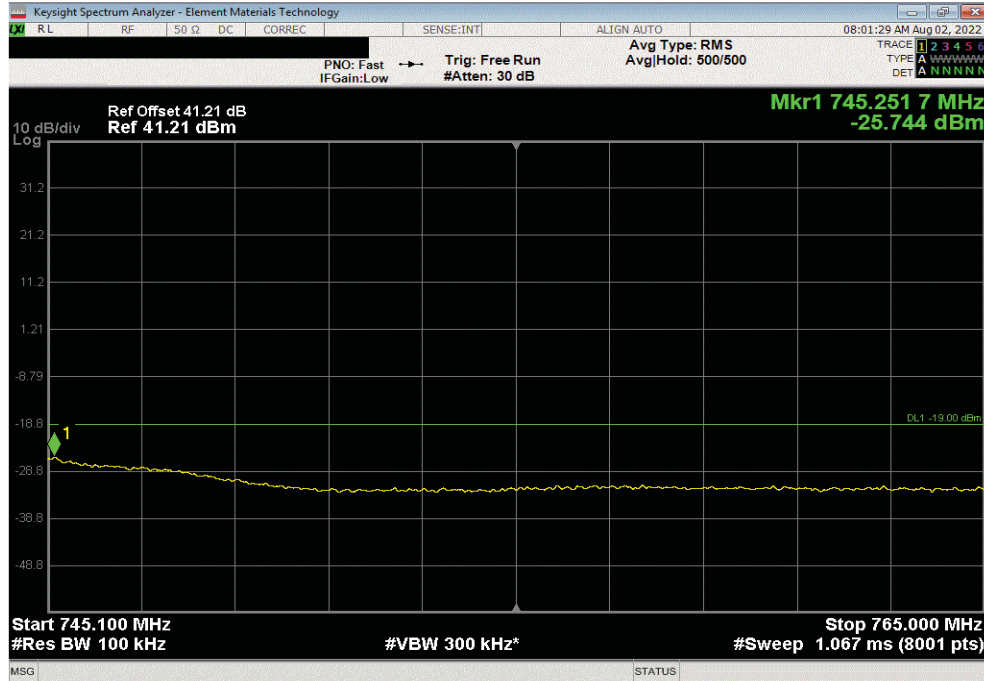


BAND EDGE COMPLIANCE - BAND n12

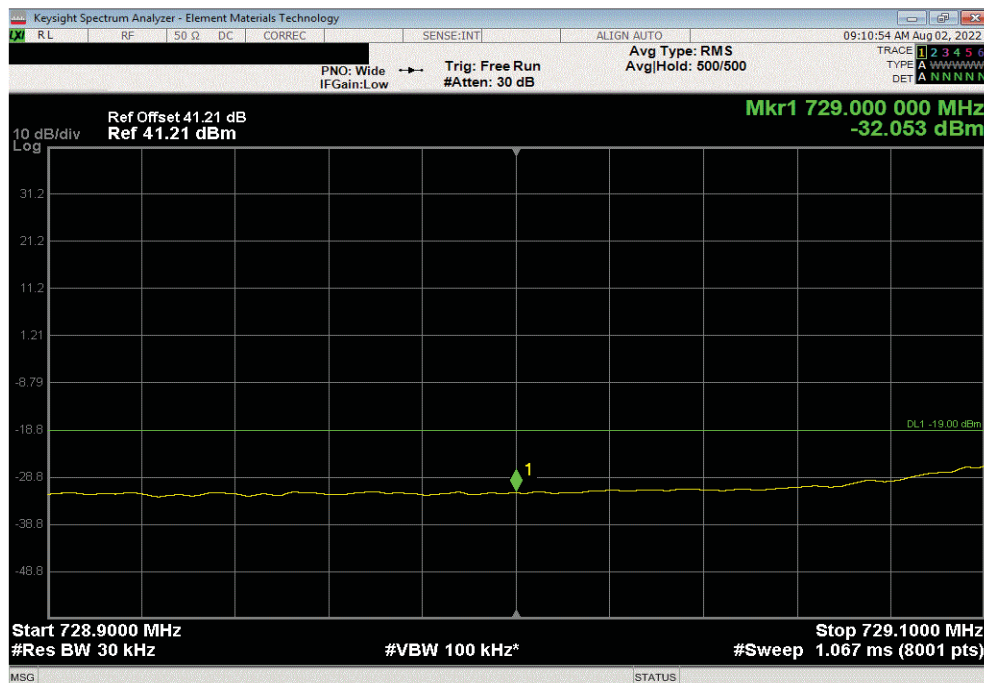


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 740 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.25	-25.74	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Low Channel, 736.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-32.05	-19	Pass		

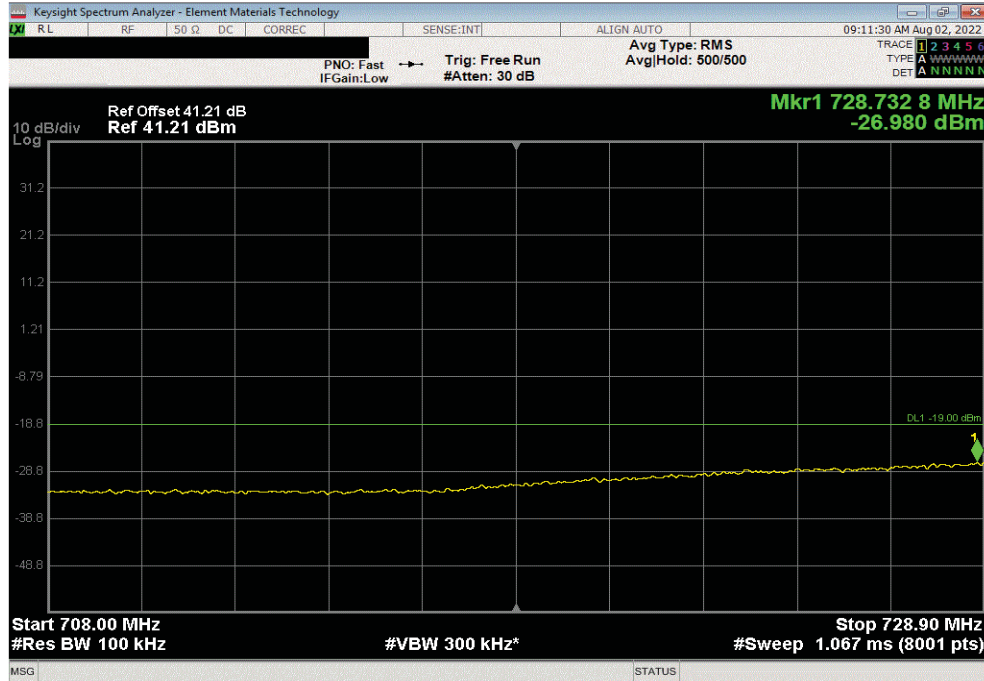


BAND EDGE COMPLIANCE - BAND n12

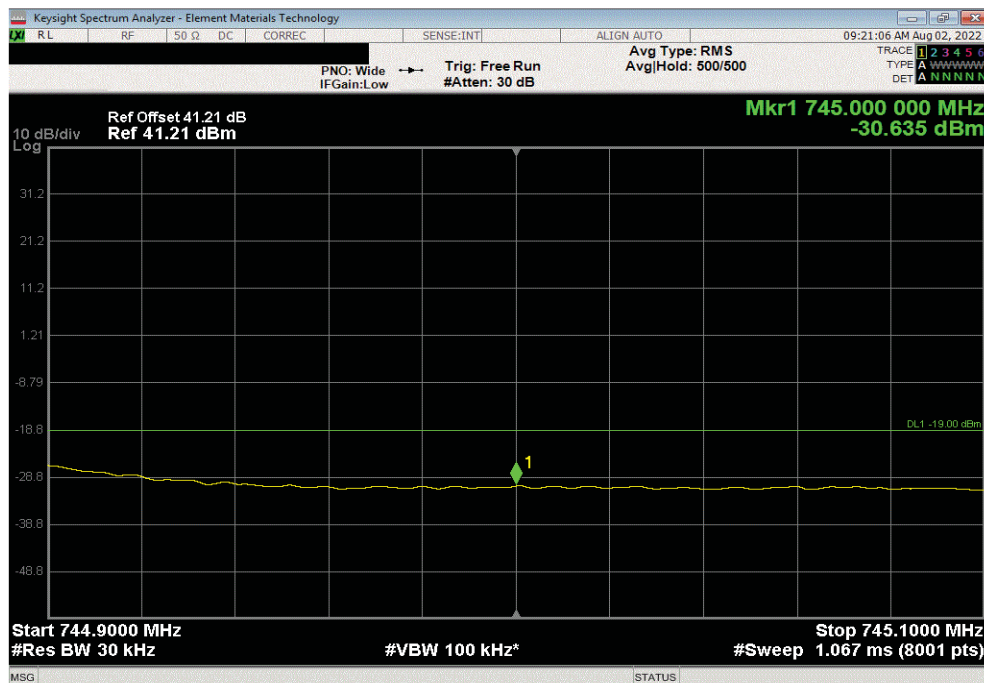


TbTtx 2022.05.02.0 XMIT 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Low Channel, 736.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.73	-26.98	-19	Pass		



Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, High Channel, 737.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-30.64	-19	Pass		

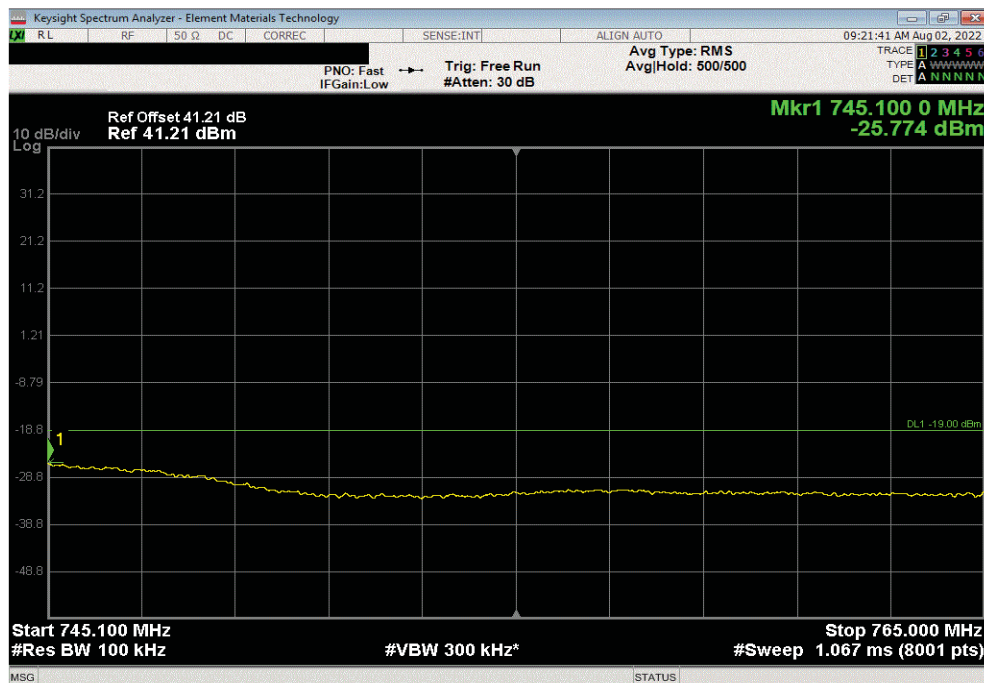


BAND EDGE COMPLIANCE - BAND n12



TbTx 2022.05.02.0 XMI 2022.02.07.0

Port 1, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, High Channel, 737.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-25.77	-19	Pass		

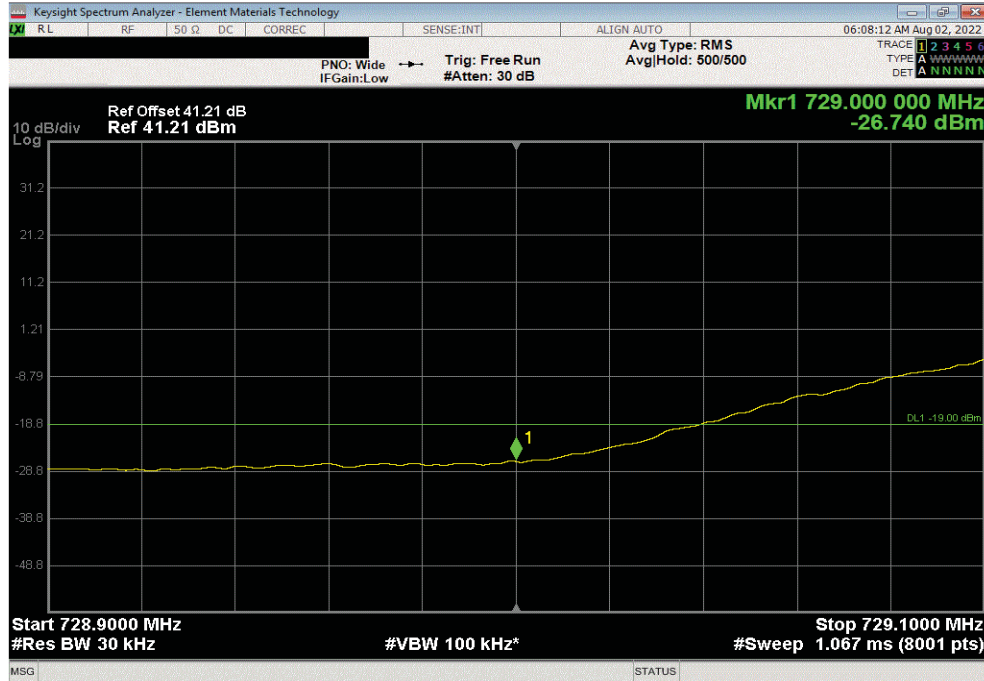


BAND EDGE COMPLIANCE - BAND n12

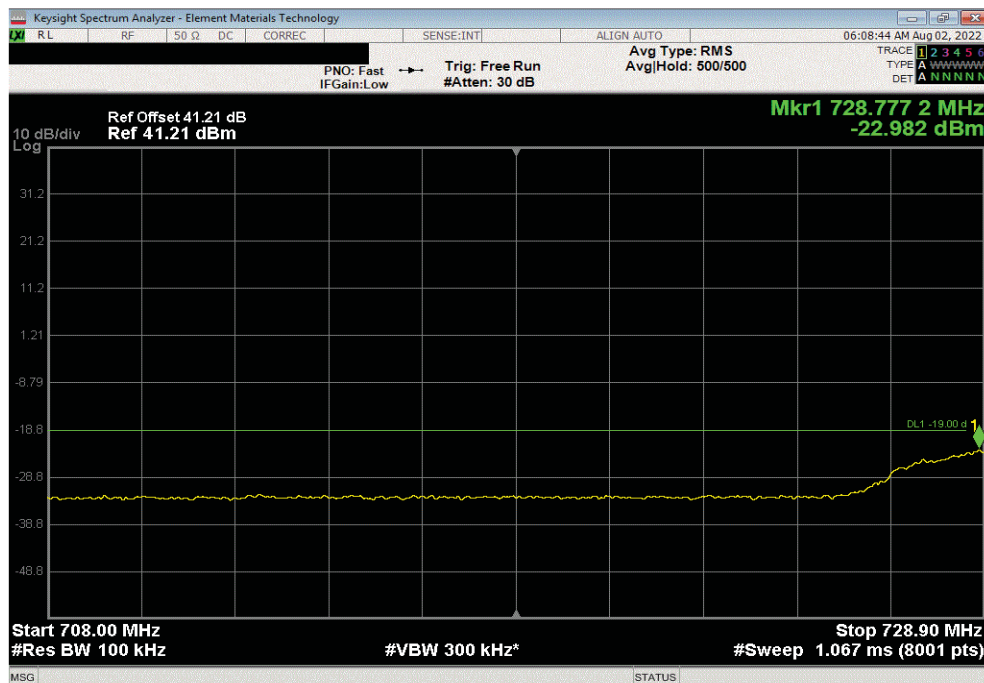


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-26.74	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.78	-22.98	-19	Pass		

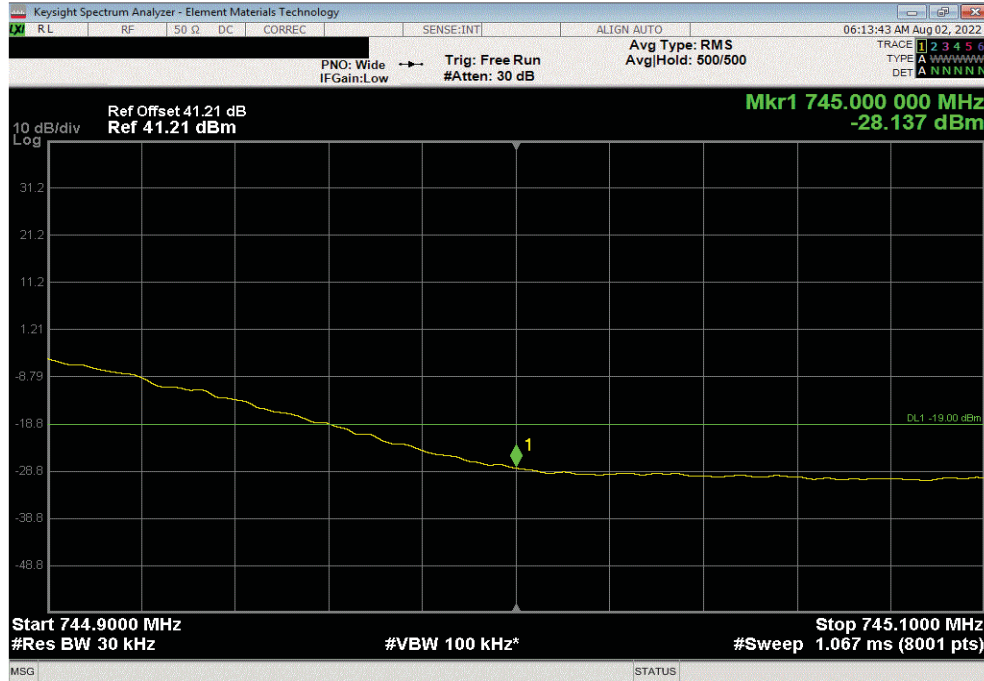


BAND EDGE COMPLIANCE - BAND n12

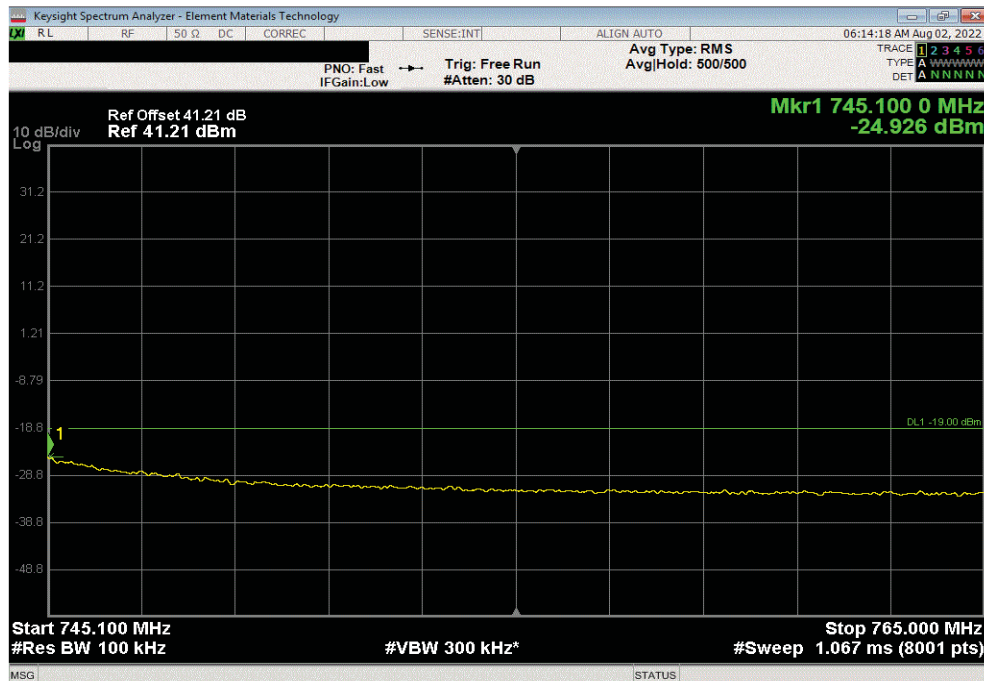


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.14	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, QPSK Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-24.93	-19	Pass		

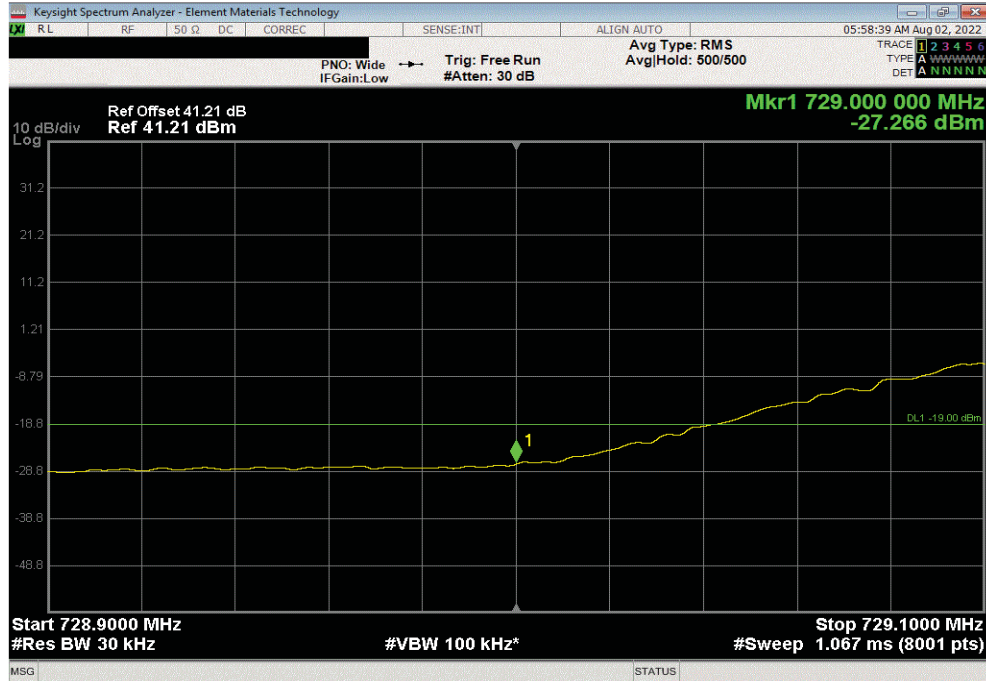


BAND EDGE COMPLIANCE - BAND n12

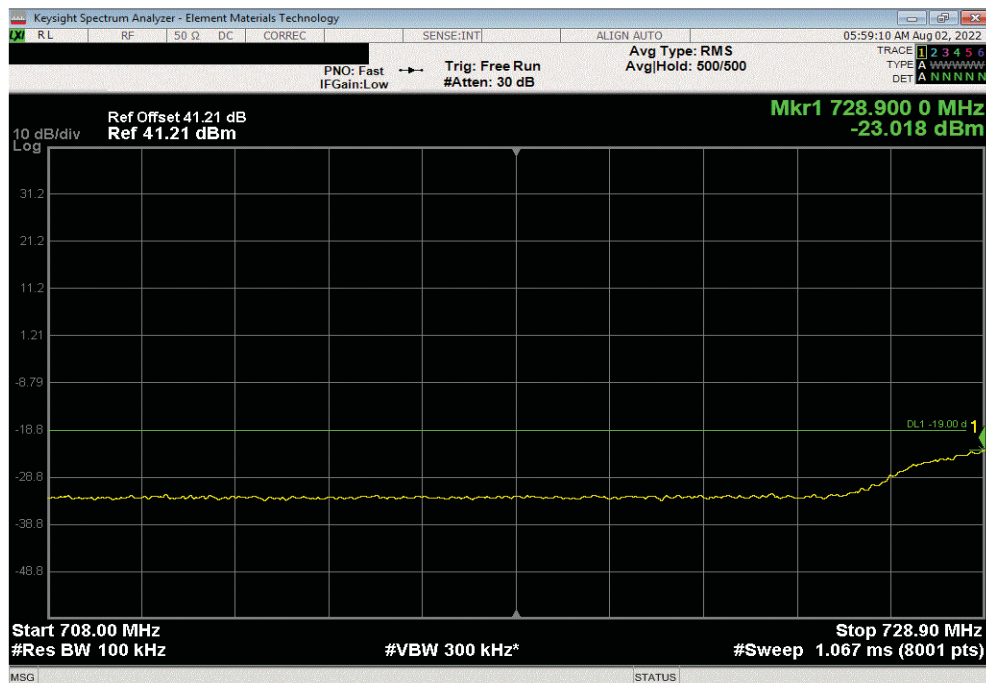


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-27.27	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.9	-23.02	-19	Pass		

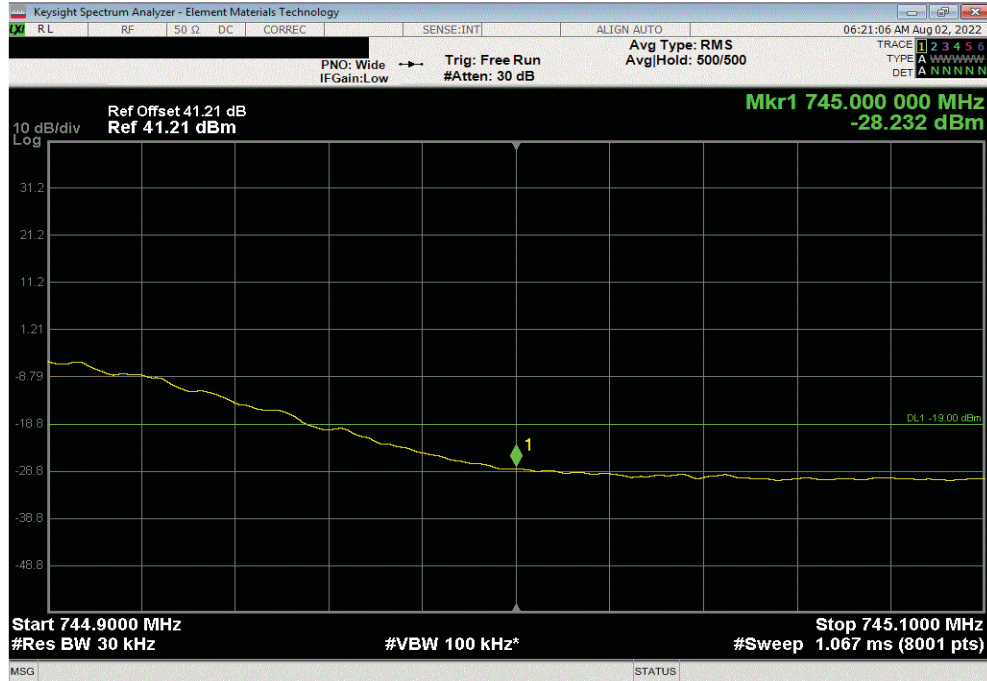


BAND EDGE COMPLIANCE - BAND n12

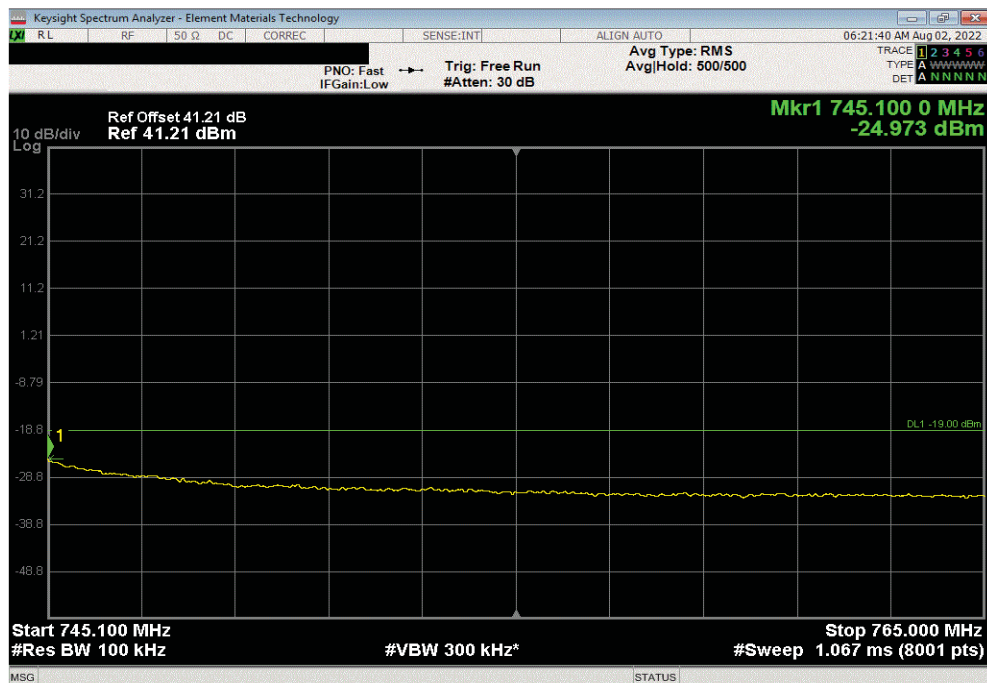


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.23	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 16QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-24.97	-19	Pass		

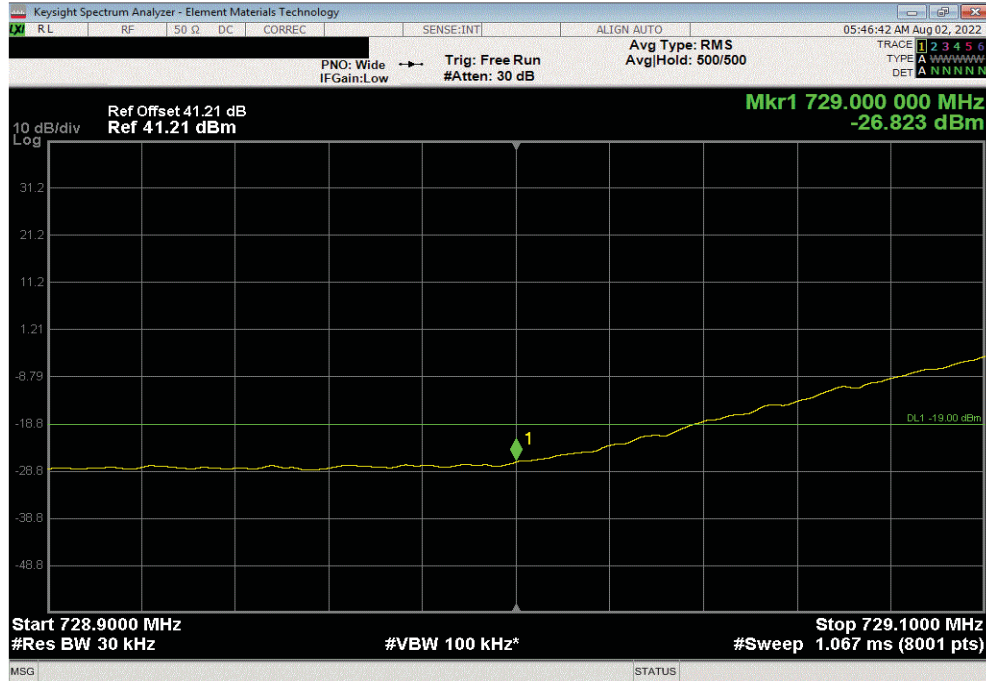


BAND EDGE COMPLIANCE - BAND n12

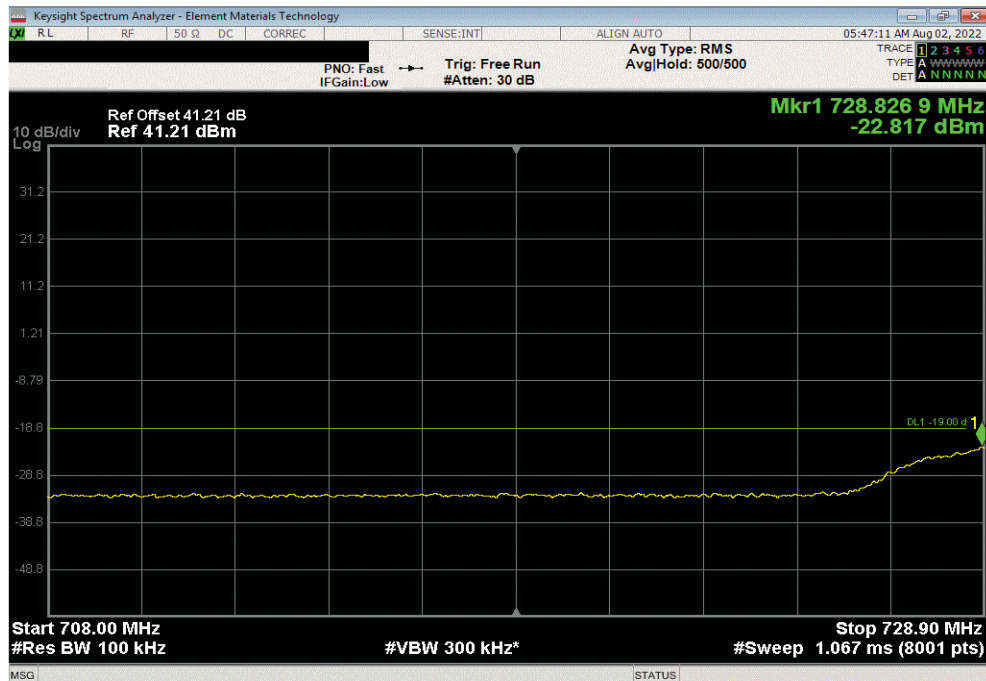


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-26.82	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.83	-22.82	-19	Pass		

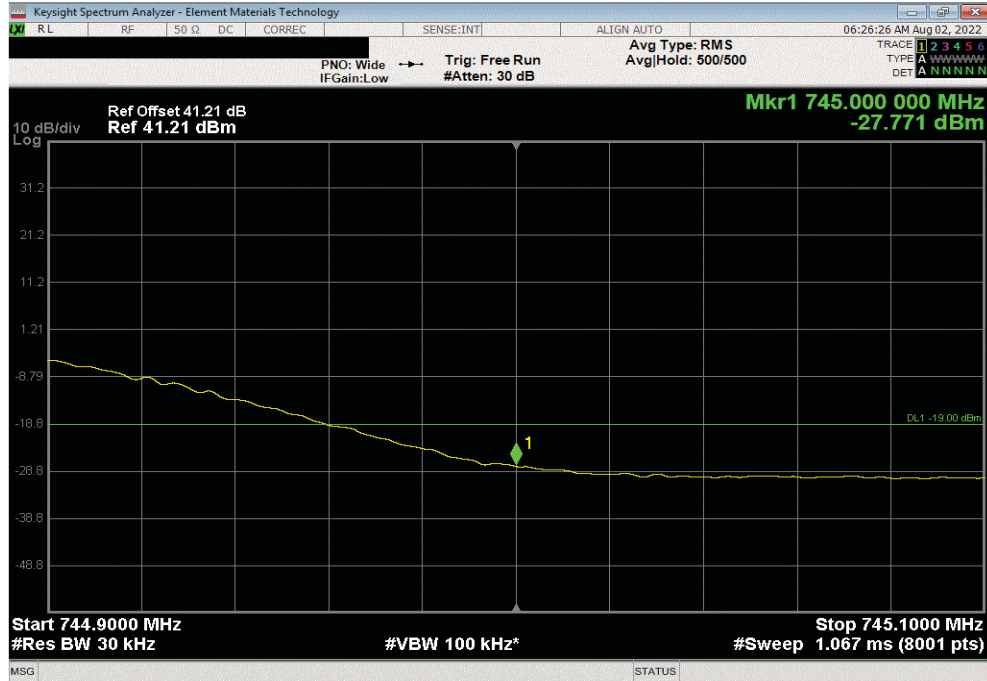


BAND EDGE COMPLIANCE - BAND n12

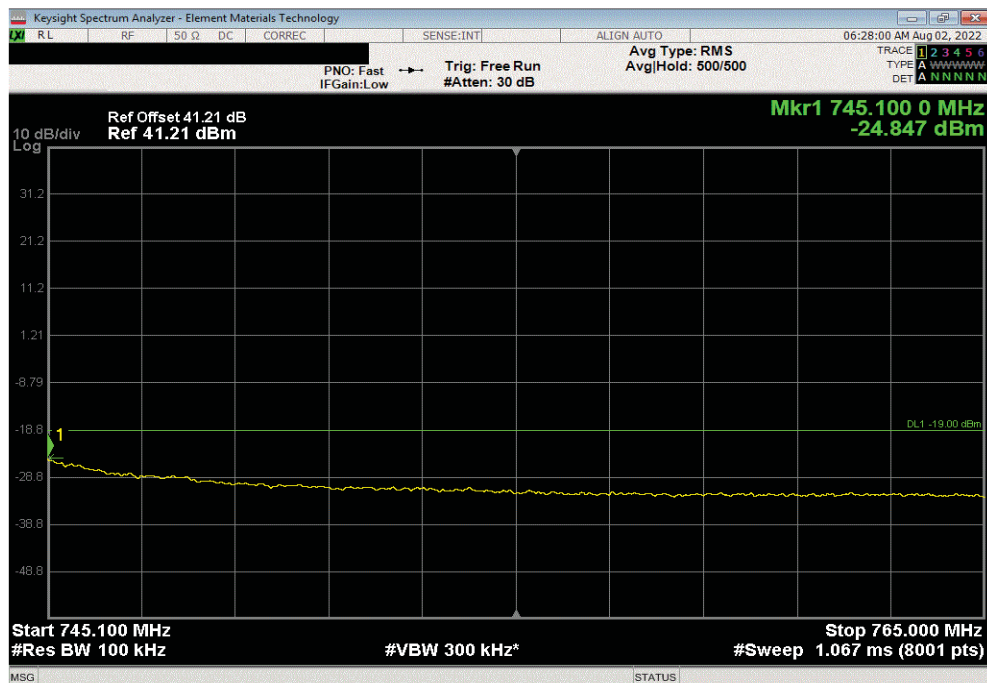


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-27.77	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 64QAM Modulation, High Channel, 742.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-24.85	-19	Pass		

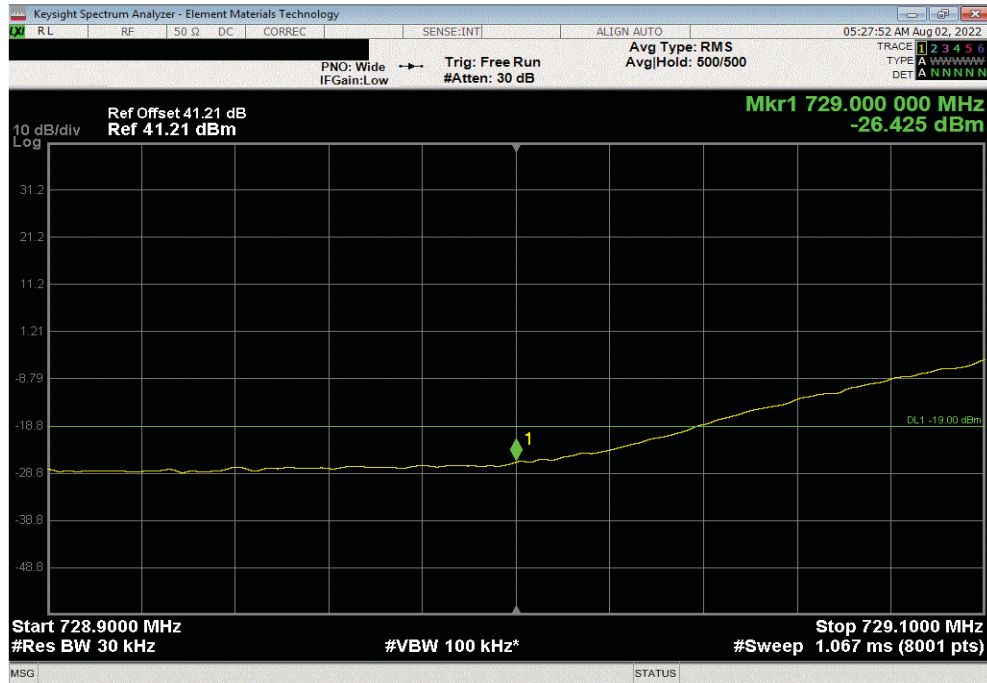


BAND EDGE COMPLIANCE - BAND n12

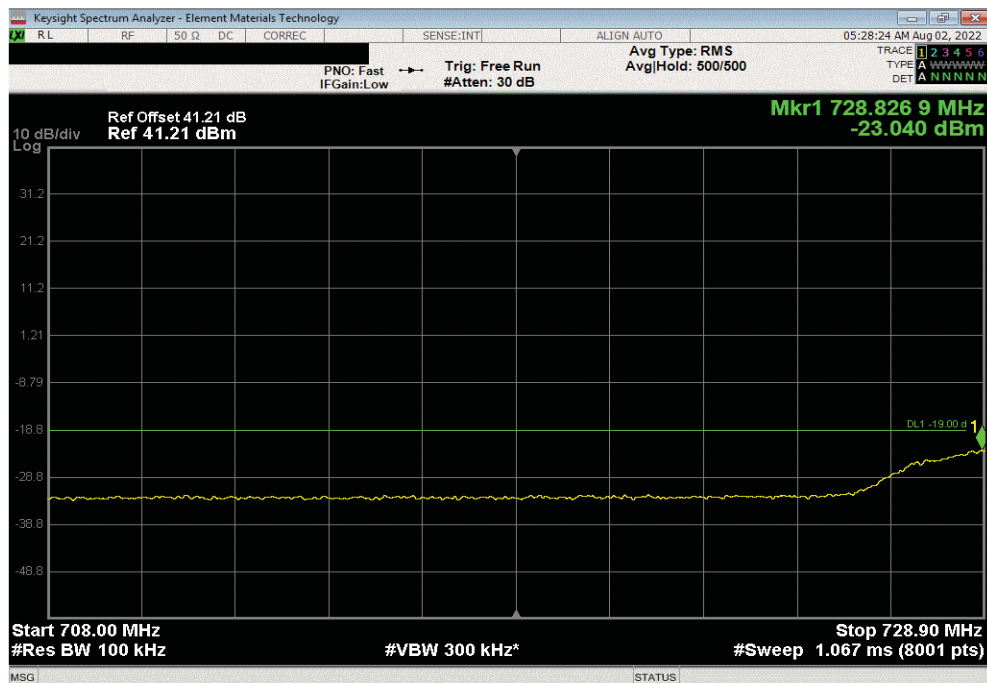


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-26.43	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, Low Channel, 731.5 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.83	-23.04	-19	Pass		

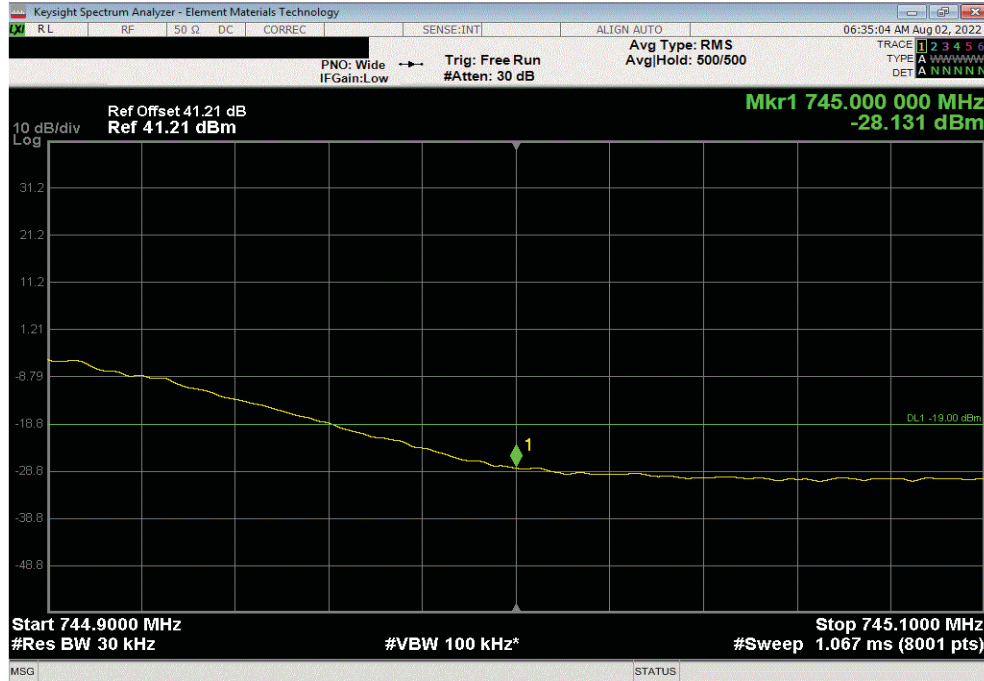


BAND EDGE COMPLIANCE - BAND n12

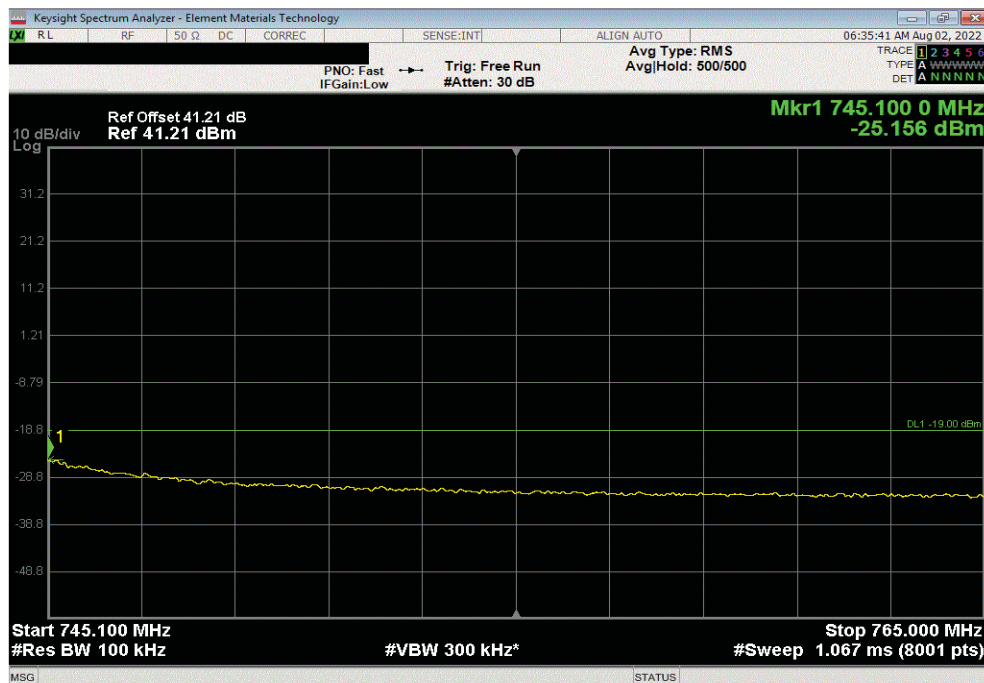


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.13	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 5 MHz Bandwidth, 256QAM Modulation, High Channel, 742.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-25.16	-19	Pass		

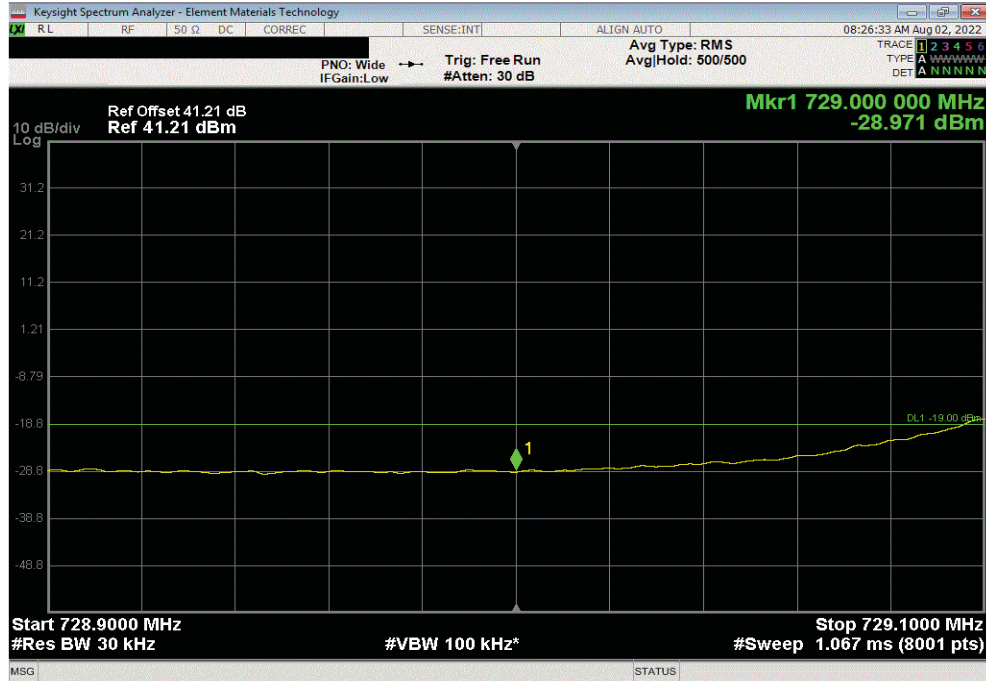


BAND EDGE COMPLIANCE - BAND n12

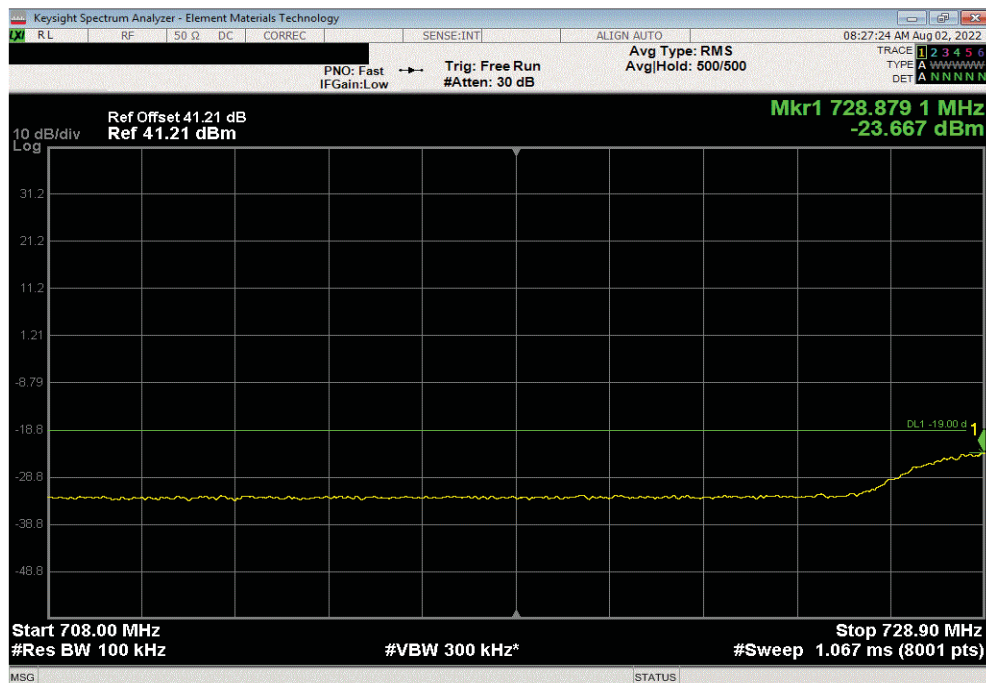


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 734 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-28.97	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, Low Channel, 734 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.88	-23.67	-19	Pass		

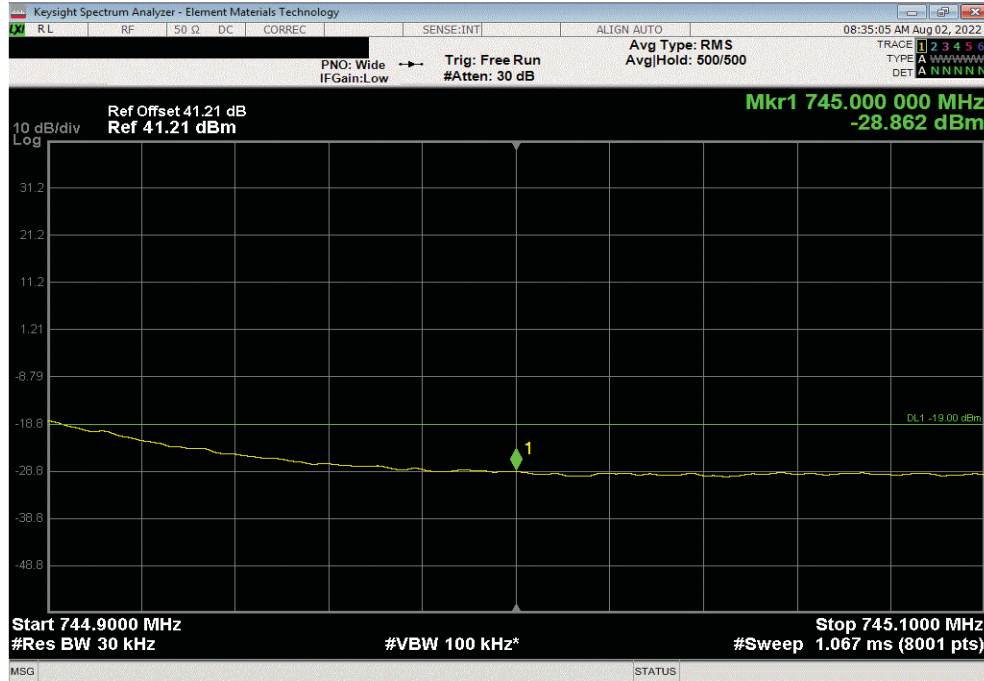


BAND EDGE COMPLIANCE - BAND n12

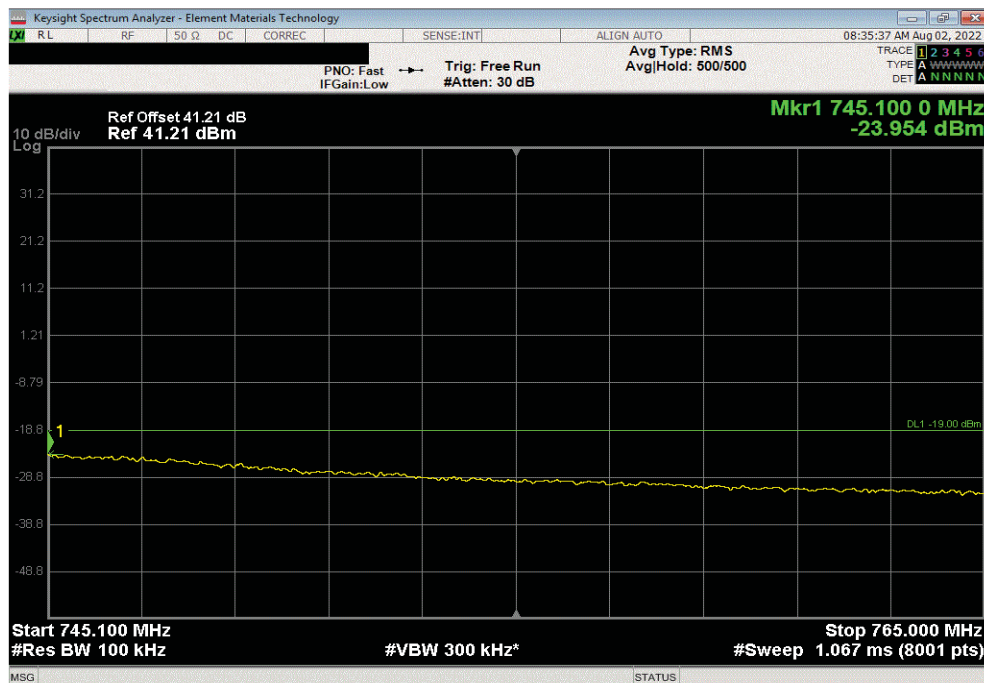


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 740 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.86	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 10 MHz Bandwidth, 256QAM Modulation, High Channel, 740 MHz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.1	-23.95	-19	Pass		

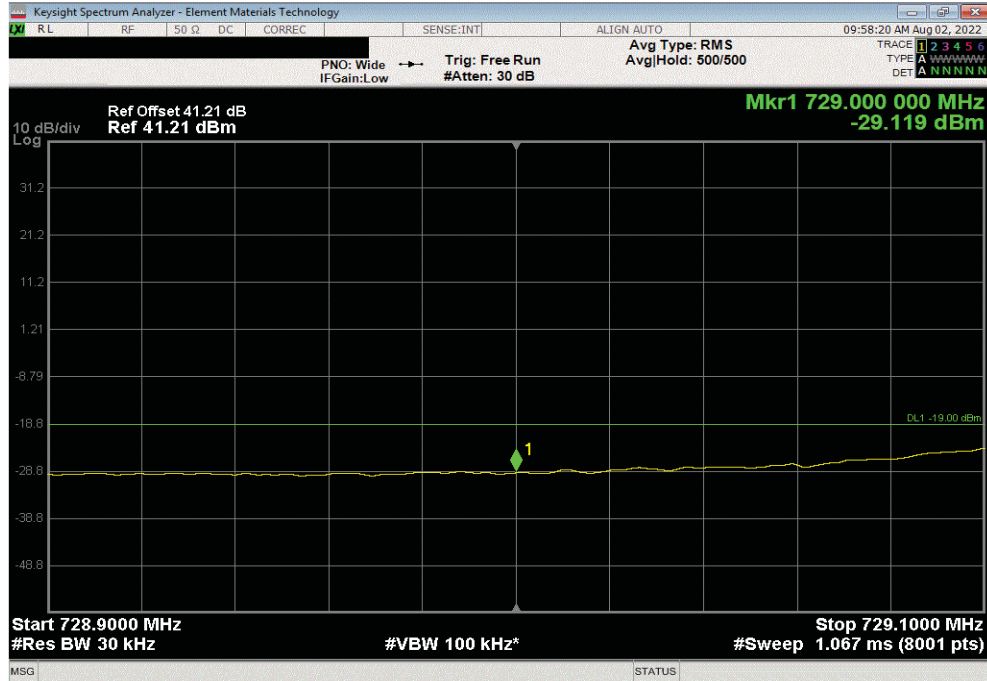


BAND EDGE COMPLIANCE - BAND n12

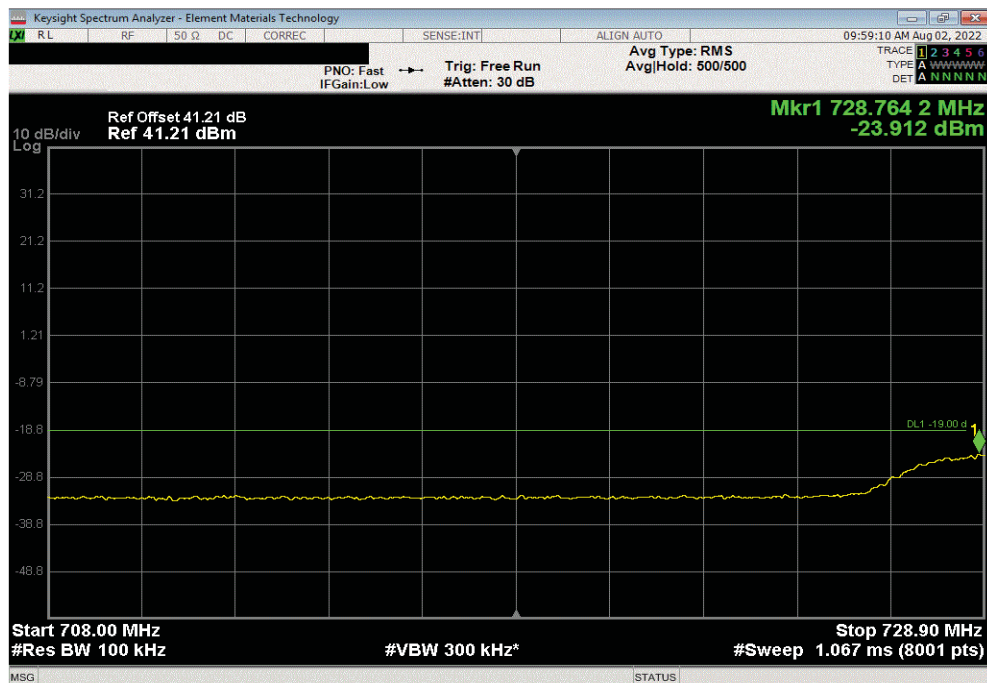


TbTtx 2022.05.02.0 XMit 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Low Channel, 736.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	729	-29.12	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, Low Channel, 736.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	728.76	-23.91	-19	Pass		

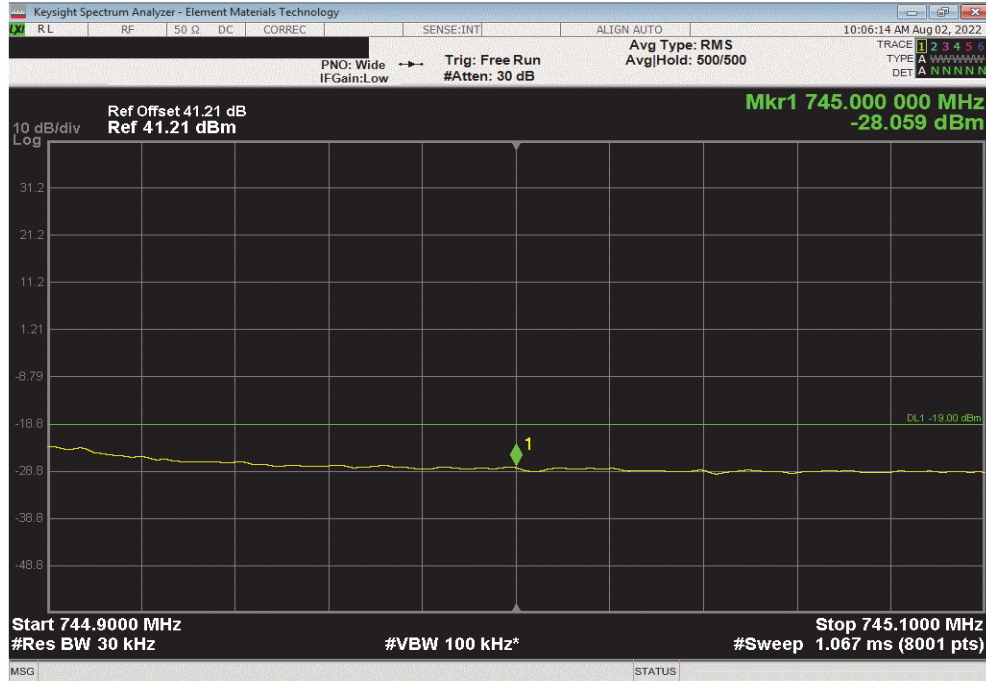


BAND EDGE COMPLIANCE - BAND n12



TbTtx 2022.05.02.0 XMIT 2022.02.07.0

Port 2, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, High Channel, 737.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
1	745	-28.06	-19	Pass		



Port 2, Band n12, 729 - 745 Mhz, 15 MHz Bandwidth, 256QAM Modulation, High Channel, 737.5 Mhz						
Frequency Range	Measured Freq (MHz)	Max Value (dBm)	Limit < (dBm)	Result		
2	745.27	-23.14	-19	Pass		

