OUTPUT POWER - BAND n66

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 fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

The method in section 5.2.4.4 of ANSI C63.26 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

Per section 27.50(d)(2)(ii), the Equivalent Isotropically Radiated Power (EIRP) of the transceiver cannot exceed 1640 W/MHz. EIRP as defined by the FCC is the total power output from the cell site antenna.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFIG) as the original certification test. The AHFIG antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 4 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

5G NR carrier bandwidths of 5MHz, 10MHz, 15MHz, and 20MHz with QPSK, 16QAM, 64QAM and 256QAM modulation types were verified under this effort. The 5G NR carriers/modulation types for this testing are set up according to 3GPP TS 38.141-1 Test Models and are NR-FR1-TM 1.1 (QPSK modulation type), NR-FR1-TM 3.1 (16QAM modulation type), NR-FR1-TM 3.1 (64QAM modulation type), and NR-FR1-TM 3.1a (256QAM modulation type).

OUTPUT POWER - BAND n66

element

TbtTx 2020.06.08.0 BETA XMit 2020.03.25.0

EUT:	AHFIG			**Work Order:**	NOKI0016
Serial Number:	K9191322351			**Date:**	18-Jun-20
Customer:	Nokia Solutions and Networks			**Temperature:**	22.5 °C
Attendees:	Mitchell Hill, John Rattanavong			**Humidity:**	51.8% RH
Project:	None			**Barometric Pres.:**	1015 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX05

TEST SPECIFICATIONS	Test Method
FCC 27:2020	ANSI C63.26:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The carrier was set to maximum for all testing.

DEVIATIONS FROM TEST STANDARD

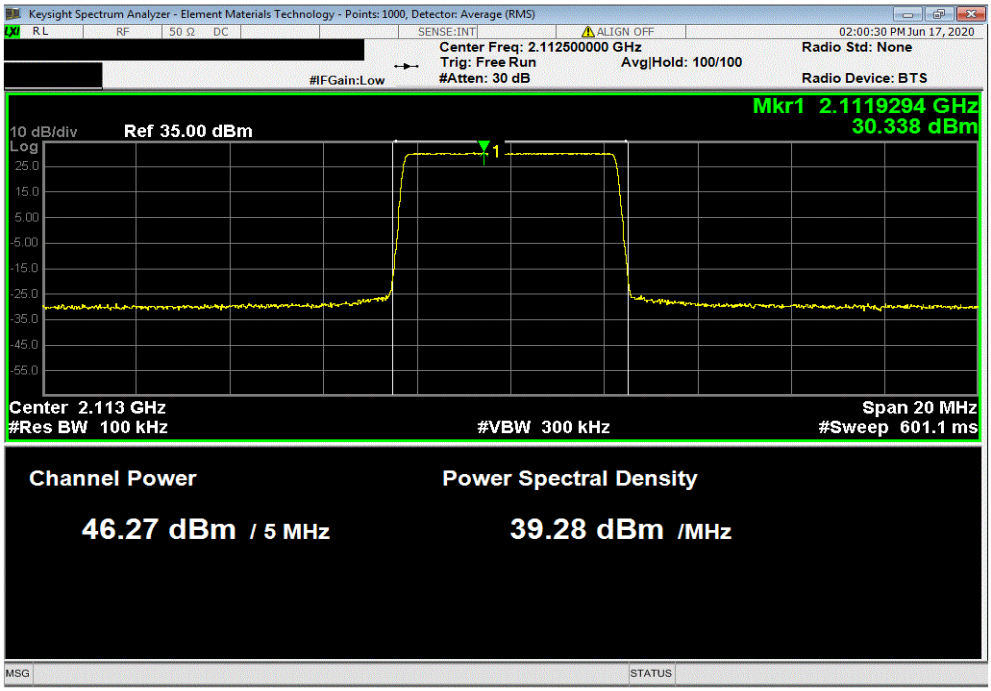
None

Configuration #	2	Signature

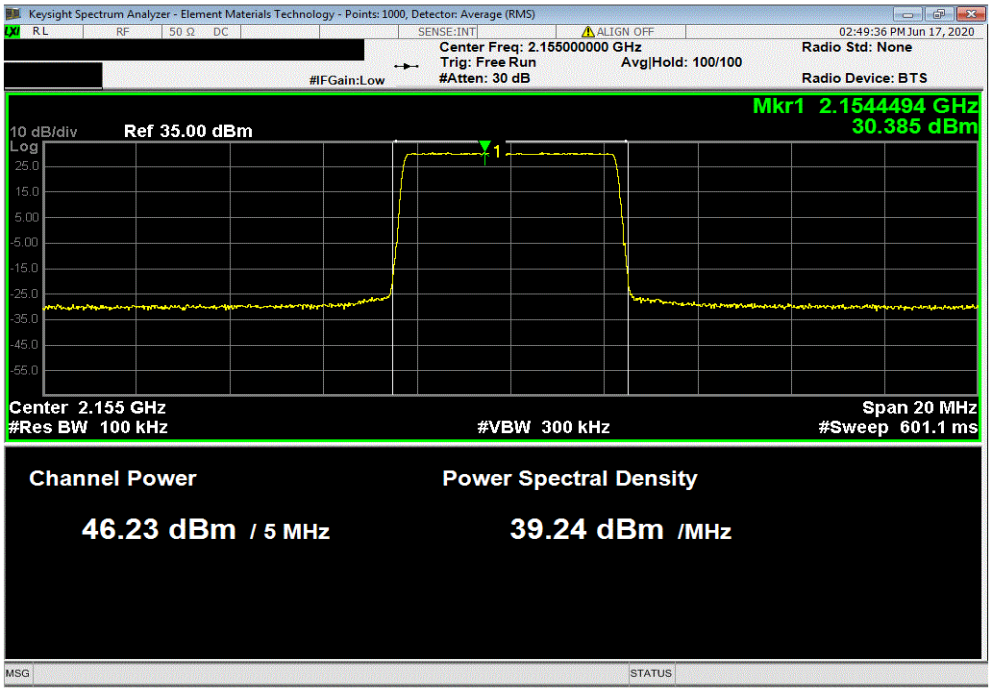
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
Port 4, Band n66, 2110 MHz - 2200 MHz						
5 MHz Bandwidth						
QPSK Modulation						
Low Channel 2112.5 MHz	46.270	0	Not Provided	46.27	62.15	N/A
Mid Channel 2155 MHz	46.233	0	Not Provided	46.23	62.15	N/A
High Channel 2197.5 MHz	46.273	0	Not Provided	46.27	62.15	N/A
16-QAM Modulation						
Low Channel 2112.5 MHz	46.078	0	Not Provided	46.08	62.15	N/A
Mid Channel 2155 MHz	46.051	0	Not Provided	46.05	62.15	N/A
High Channel 2197.5 MHz	46.091	0	Not Provided	46.09	62.15	N/A
64-QAM Modulation						
Low Channel 2112.5 MHz	46.276	0	Not Provided	46.28	62.15	N/A
Mid Channel 2155 MHz	46.233	0	Not Provided	46.23	62.15	N/A
High Channel 2197.5 MHz	46.245	0	Not Provided	46.25	62.15	N/A
256-QAM Modulation						
Low Channel 2112.5 MHz	46.168	0	Not Provided	46.17	62.15	N/A
Mid Channel 2155 MHz	46.118	0	Not Provided	46.12	62.15	N/A
High Channel 2197.5 MHz	46.119	0	Not Provided	46.12	62.15	N/A
10 MHz Bandwidth						
QPSK Modulation						
Low Channel 2115 MHz	46.350	0	Not Provided	46.35	62.15	N/A
Mid Channel 2155 MHz	46.154	0	Not Provided	46.15	62.15	N/A
High Channel 2195 MHz	46.259	0	Not Provided	46.26	62.15	N/A
16-QAM Modulation						
Low Channel 2115 MHz	46.164	0	Not Provided	46.16	62.15	N/A
Mid Channel 2155 MHz	46.002	0	Not Provided	46.00	62.15	N/A
High Channel 2195 MHz	46.078	0	Not Provided	46.08	62.15	N/A
64-QAM Modulation						
Low Channel 2115 MHz	46.311	0	Not Provided	46.31	62.15	N/A
Mid Channel 2155 MHz	46.137	0	Not Provided	46.14	62.15	N/A
High Channel 2195 MHz	46.197	0	Not Provided	46.20	62.15	N/A
256-QAM Modulation						
Low Channel 2115 MHz	46.208	0	Not Provided	46.21	62.15	N/A
Mid Channel 2155 MHz	46.060	0	Not Provided	46.06	62.15	N/A
High Channel 2195 MHz	46.114	0	Not Provided	46.11	62.15	N/A
15 MHz Bandwidth						
QPSK Modulation						
Low Channel 2117.5 MHz	46.409	0	Not Provided	46.41	62.15	N/A
Mid Channel 2155 MHz	46.224	0	Not Provided	46.22	62.15	N/A
High Channel 2192.5 MHz	46.252	0	Not Provided	46.25	62.15	N/A
16-QAM Modulation						
Low Channel 2117.5 MHz	46.264	0	Not Provided	46.26	62.15	N/A
Mid Channel 2155 MHz	46.134	0	Not Provided	46.13	62.15	N/A
High Channel 2192.5 MHz	46.130	0	Not Provided	46.13	62.15	N/A
64-QAM Modulation						
Low Channel 2117.5 MHz	46.371	0	Not Provided	46.37	62.15	N/A
Mid Channel 2155 MHz	46.216	0	Not Provided	46.22	62.15	N/A
High Channel 2192.5 MHz	46.253	0	Not Provided	46.25	62.15	N/A
256-QAM Modulation						
Low Channel 2117.5 MHz	46.345	0	Not Provided	46.35	62.15	N/A
Mid Channel 2155 MHz	46.200	0	Not Provided	46.20	62.15	N/A
High Channel 2192.5 MHz	46.200	0	Not Provided	46.20	62.15	N/A
20 MHz Bandwidth						
QPSK Modulation						
Low Channel 2120 MHz	46.477	0	Not Provided	46.48	62.15	N/A
Mid Channel 2155 MHz	46.267	0	Not Provided	46.27	62.15	N/A
High Channel 2190 MHz	46.366	0	Not Provided	46.37	62.15	N/A
16-QAM Modulation						
Low Channel 2120 MHz	46.311	0	Not Provided	46.31	62.15	N/A
Mid Channel 2155 MHz	46.219	0	Not Provided	46.22	62.15	N/A
High Channel 2190 MHz	46.268	0	Not Provided	46.27	62.15	N/A
64-QAM Modulation						
Low Channel 2120 MHz	46.363	0	Not Provided	46.36	62.15	N/A
Mid Channel 2155 MHz	46.306	0	Not Provided	46.31	62.15	N/A
High Channel 2190 MHz	46.327	0	Not Provided	46.33	62.15	N/A
256-QAM Modulation						
Low Channel 2120 MHz	46.348	0	Not Provided	46.35	62.15	N/A
Mid Channel 2155 MHz	46.336	0	Not Provided	46.34	62.15	N/A
High Channel 2190 MHz	46.325	0	Not Provided	46.33	62.15	N/A

OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, Low Channel 2112.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.27	0	Not Provided	46.3	62.15	N/A

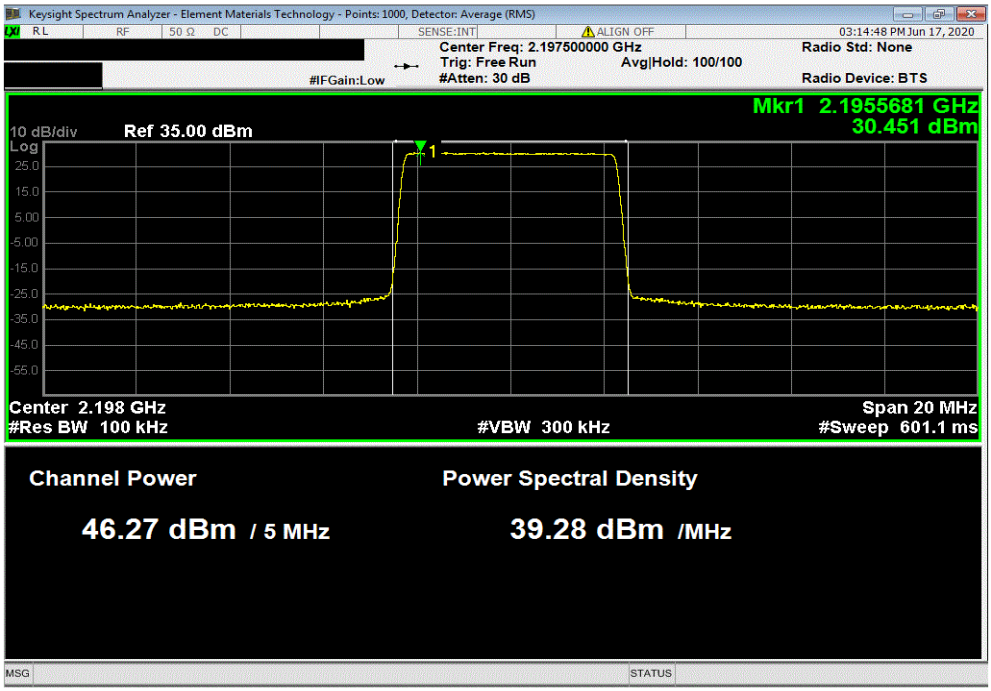


Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.233	0	Not Provided	46.2	62.15	N/A

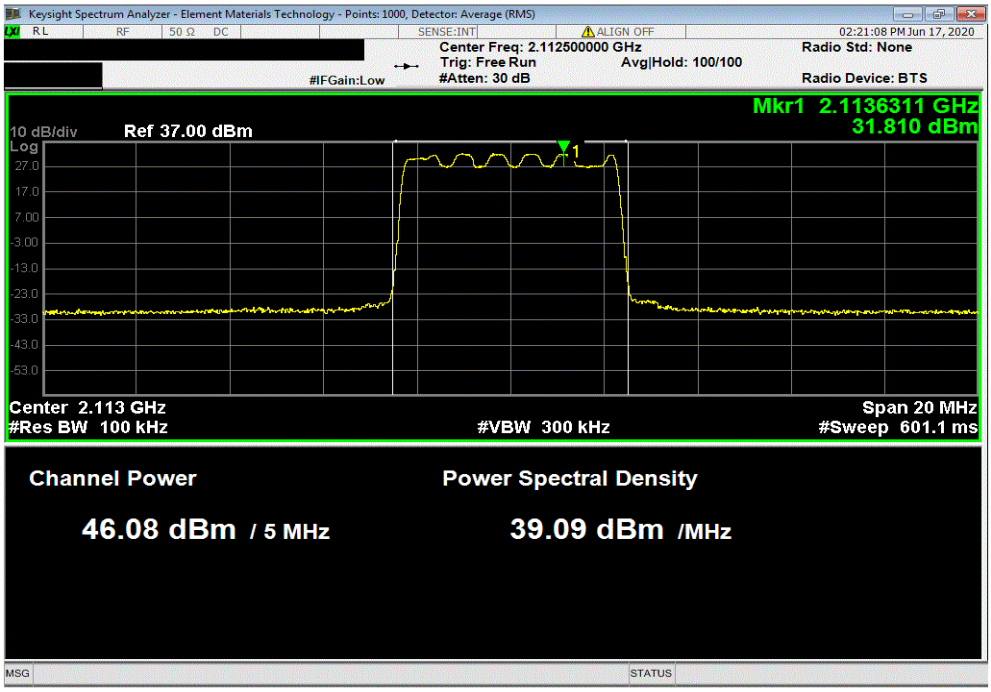


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , QPSK Modulation, High Channel 2197.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.273	0	Not Provided	46.3	62.15	N/A

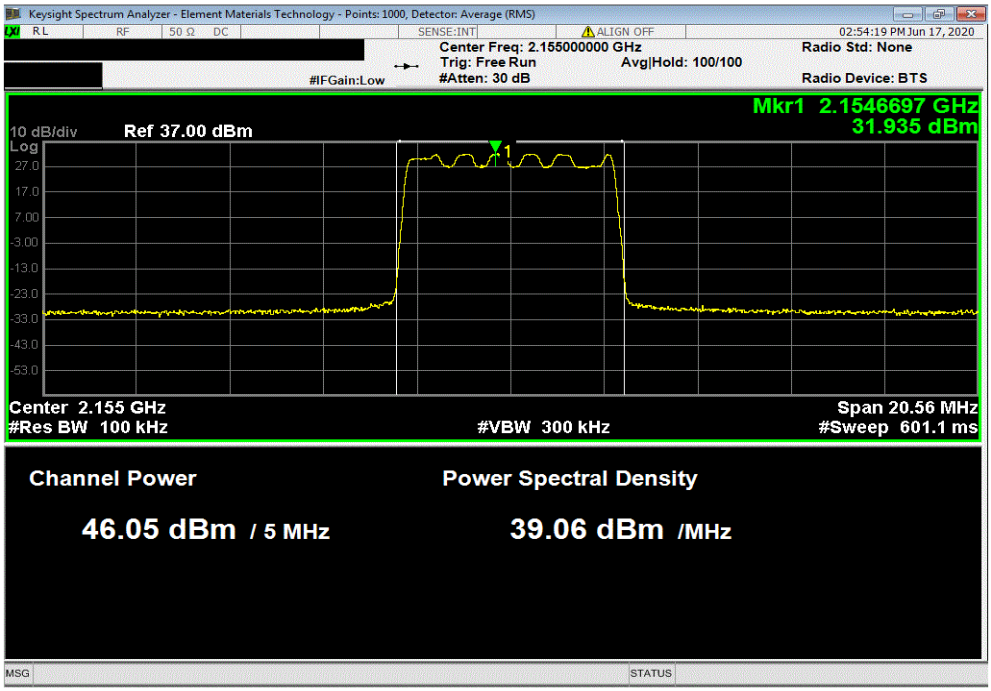


Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, Low Channel 2112.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.078	0	Not Provided	46.1	62.15	N/A

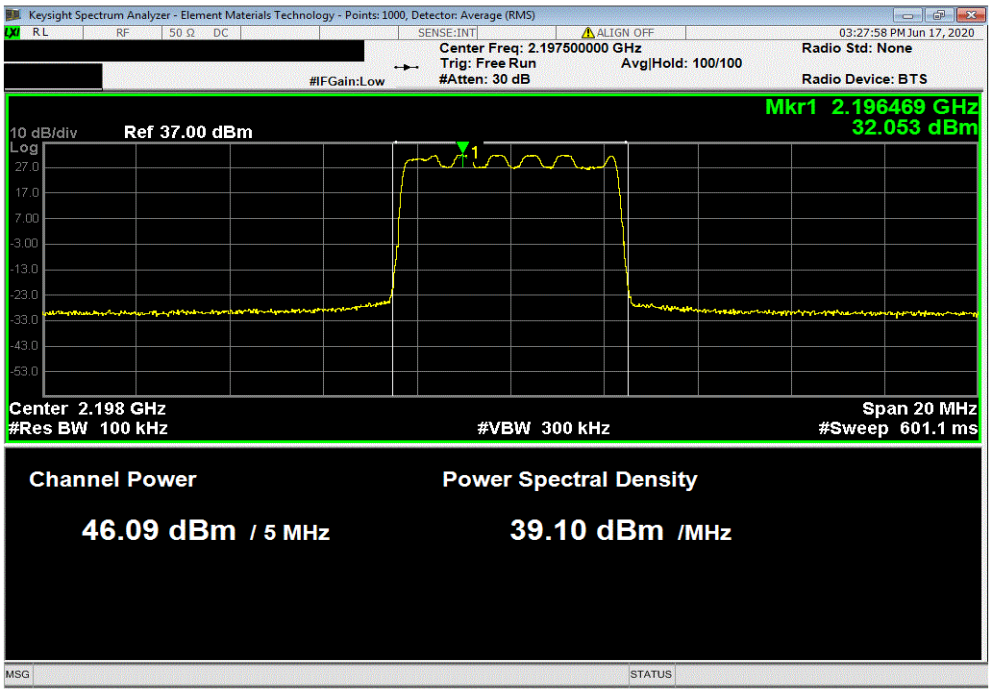


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.051	0	Not Provided	46.1	62.15	N/A

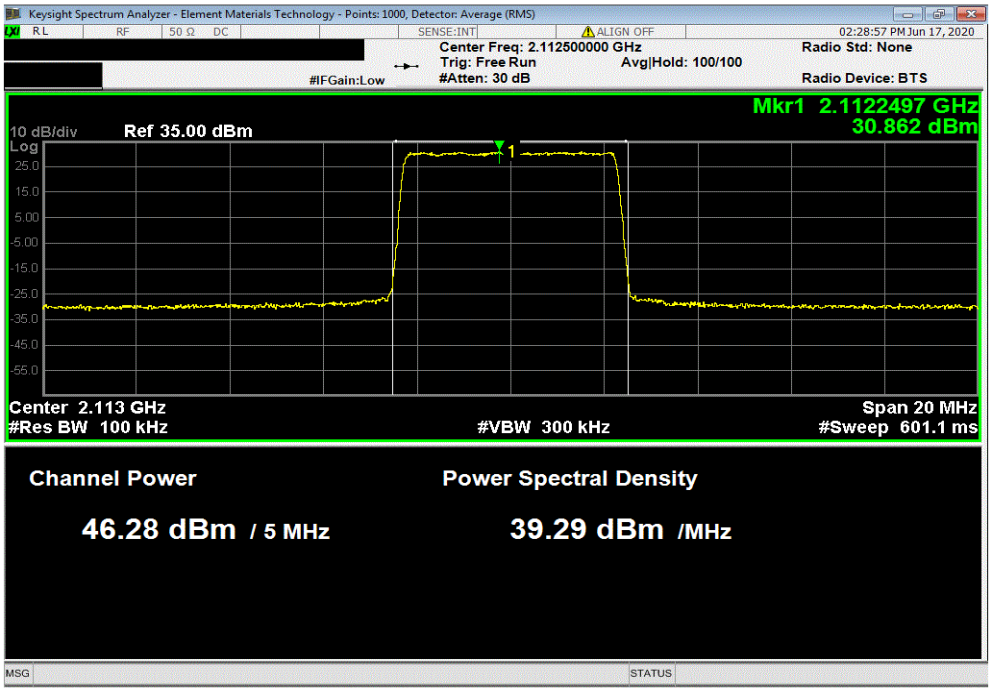


Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 16-QAM Modulation, High Channel 2197.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.091	0	Not Provided	46.1	62.15	N/A

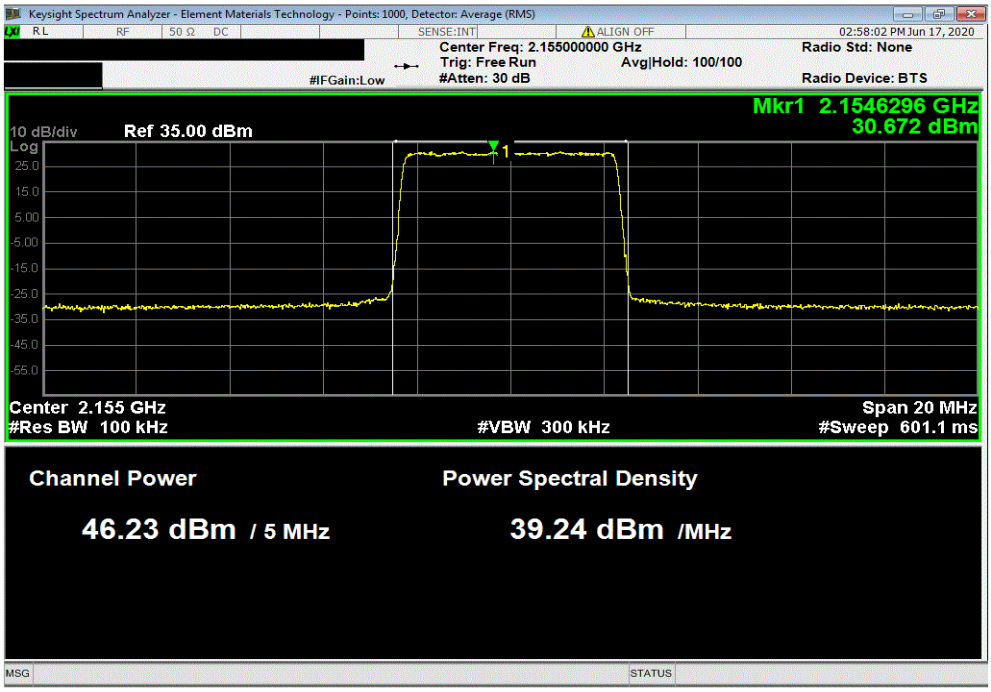


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, Low Channel 2112.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.276	0	Not Provided	46.3	62.15	N/A

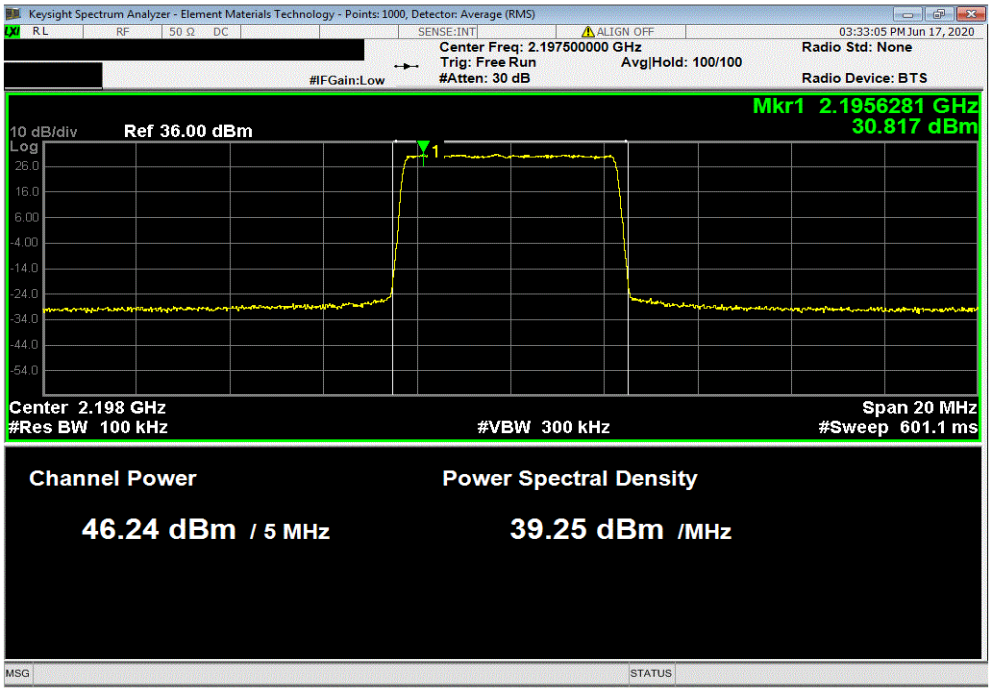


Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.233	0	Not Provided	46.2	62.15	N/A

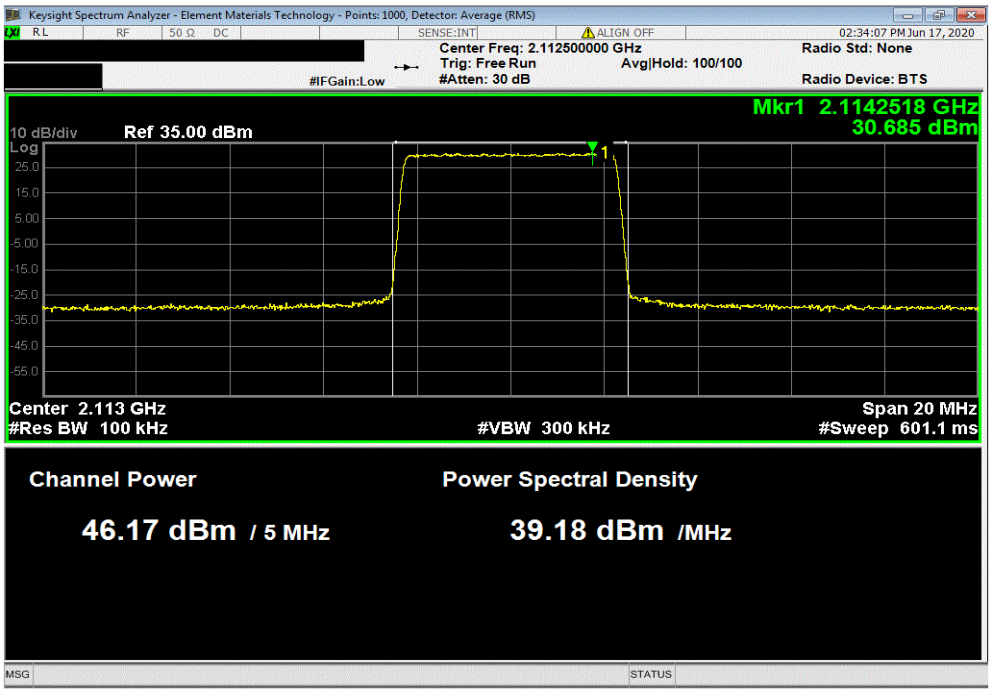


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 64-QAM Modulation, High Channel 2197.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.245	0	Not Provided	46.2	62.15	N/A

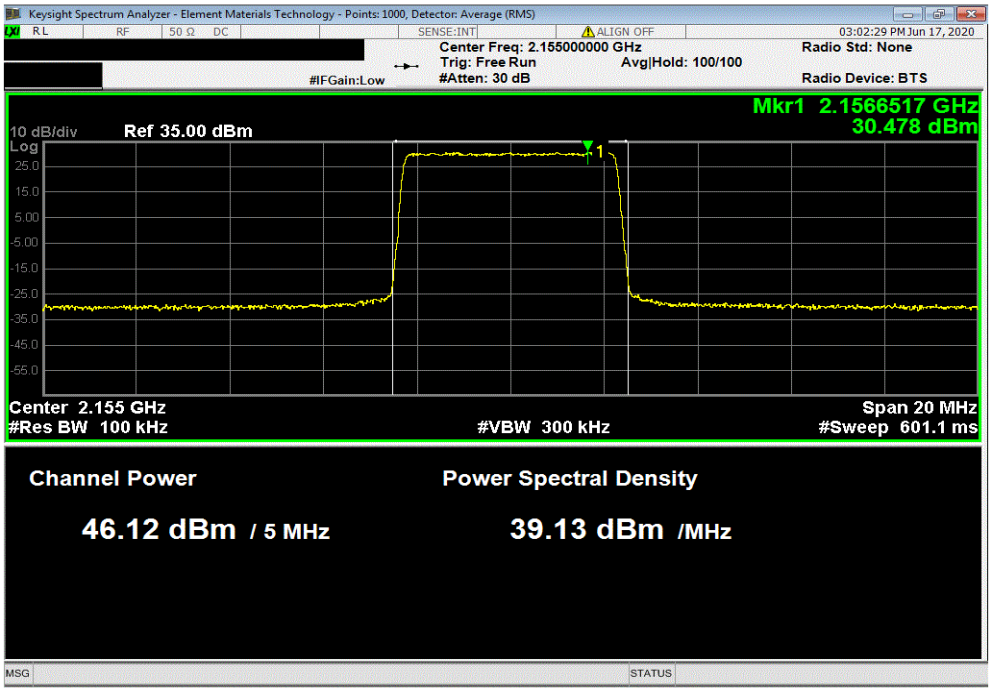


Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Low Channel 2112.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.168	0	Not Provided	46.2	62.15	N/A

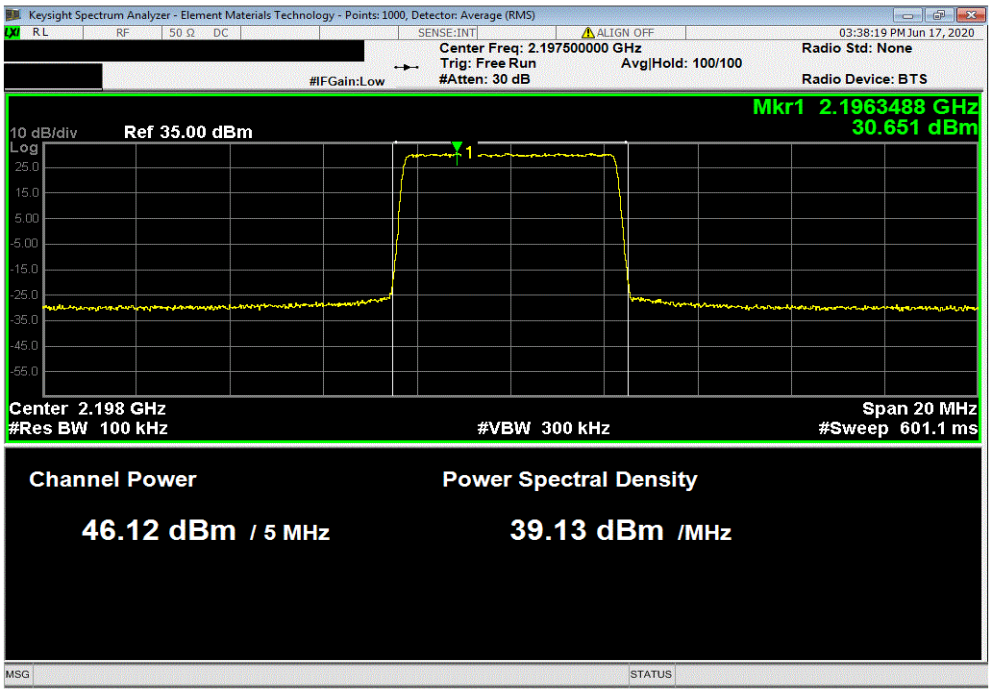


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.118	0	Not Provided	46.1	62.15	N/A

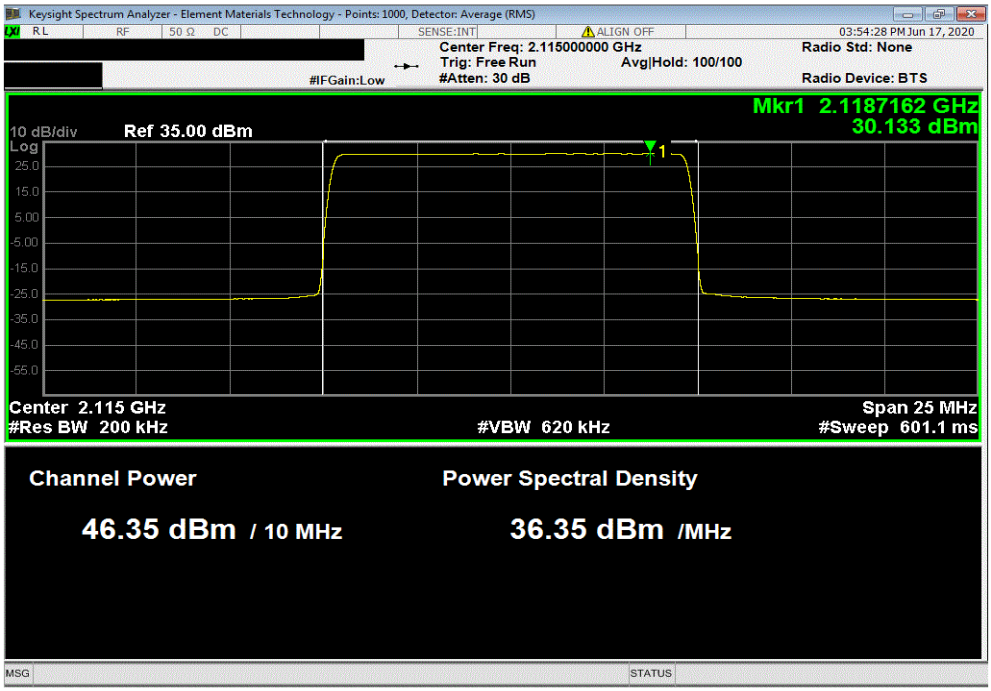


Port 4, Band n66, 2110 MHz - 2200 MHz, 5 MHz Bandwidth , 256-QAM Modulation, High Channel 2197.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.119	0	Not Provided	46.1	62.15	N/A

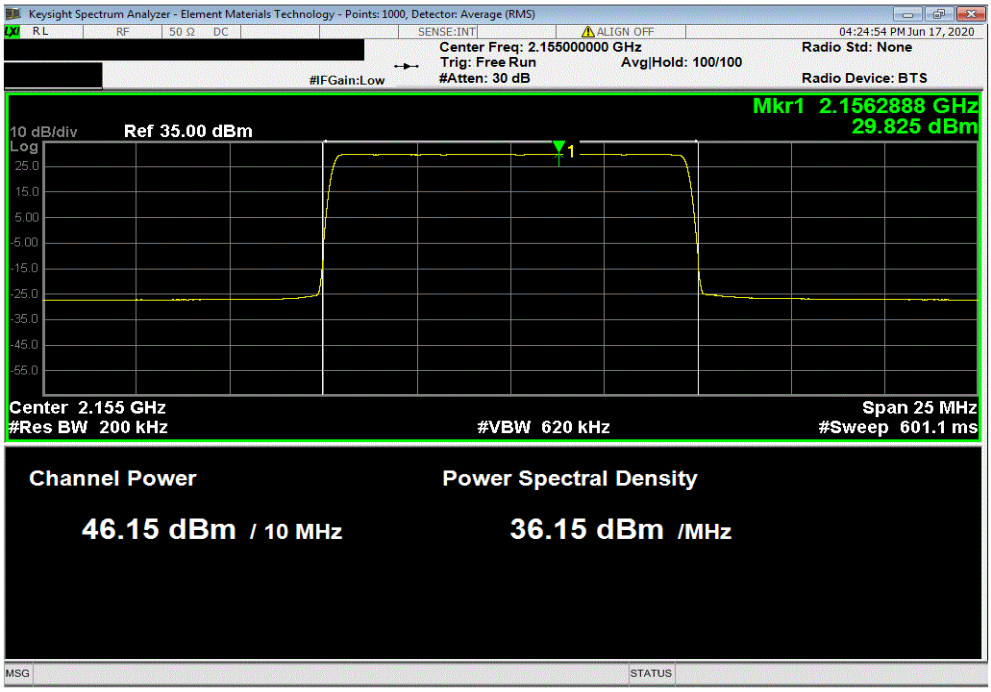


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, Low Channel 2115 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.35	0	Not Provided	46.4	62.15	N/A

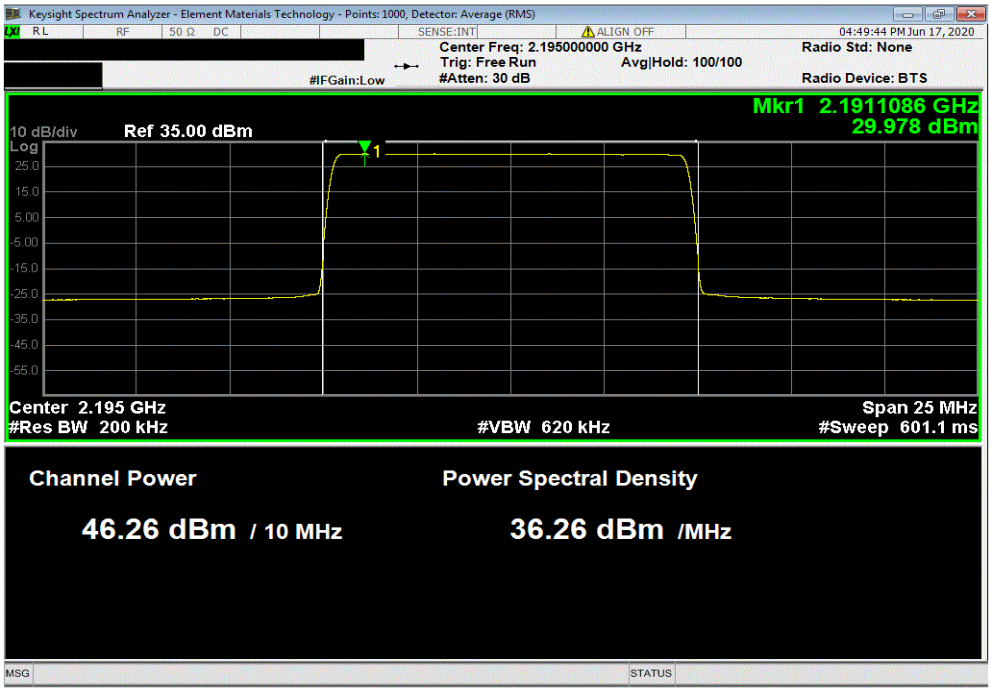


Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.154	0	Not Provided	46.2	62.15	N/A

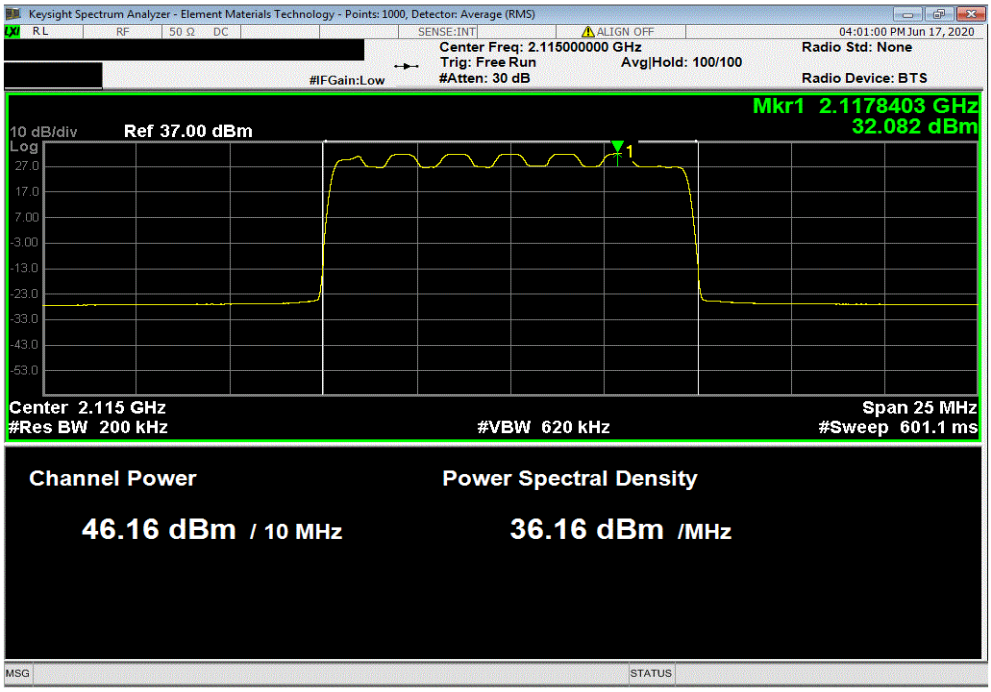


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, High Channel 2195 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.259	0	Not Provided	46.3	62.15	N/A

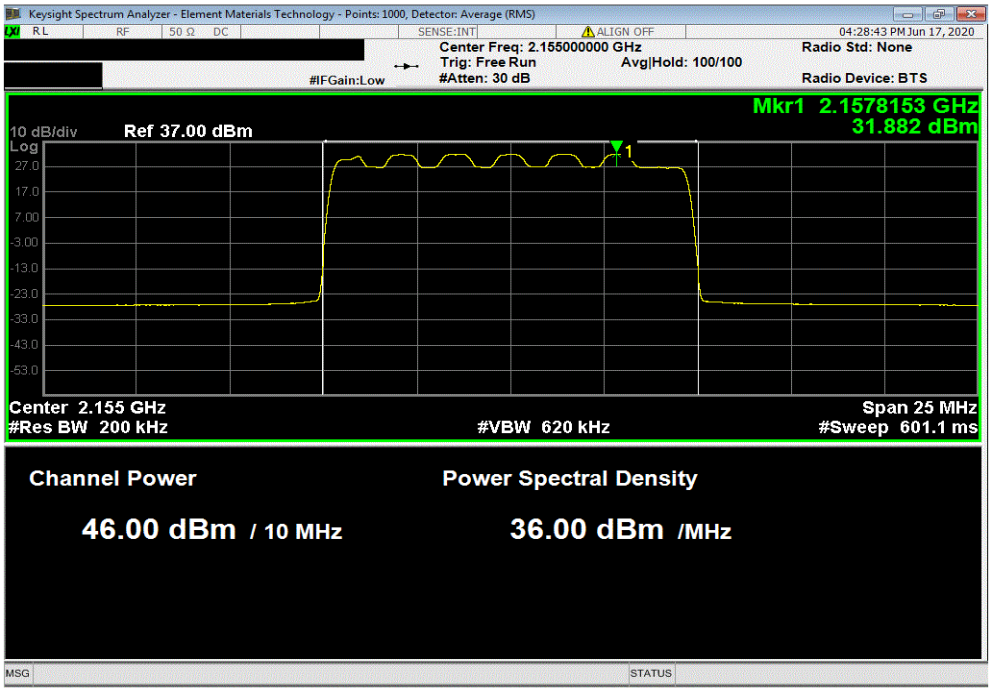


Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 16-QAM Modulation, Low Channel 2115 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.164	0	Not Provided	46.2	62.15	N/A

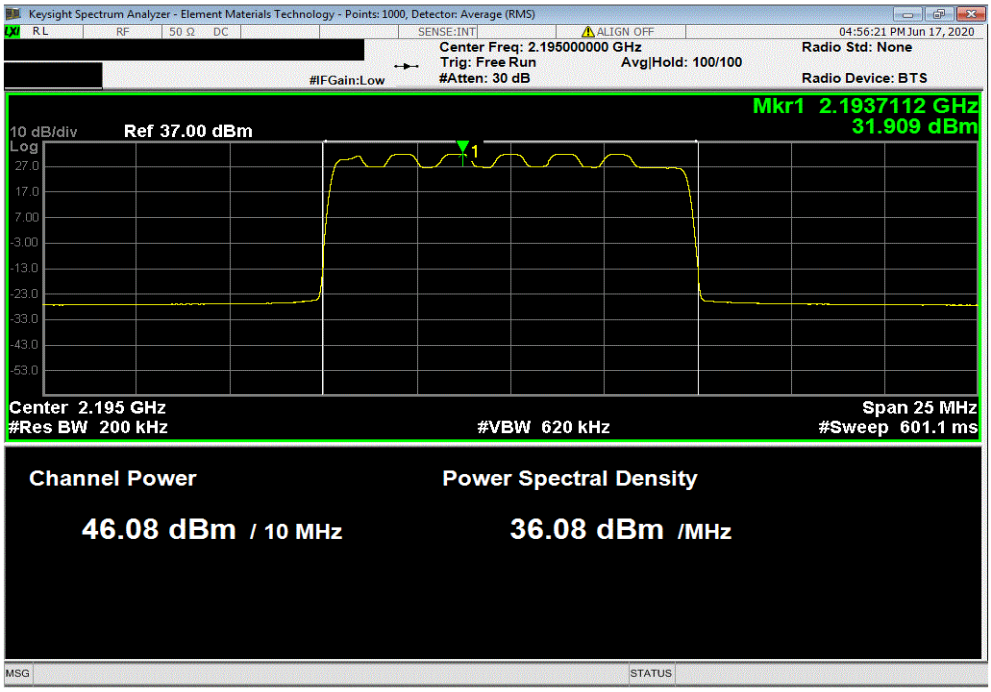


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.002	0	Not Provided	46.0	62.15	N/A

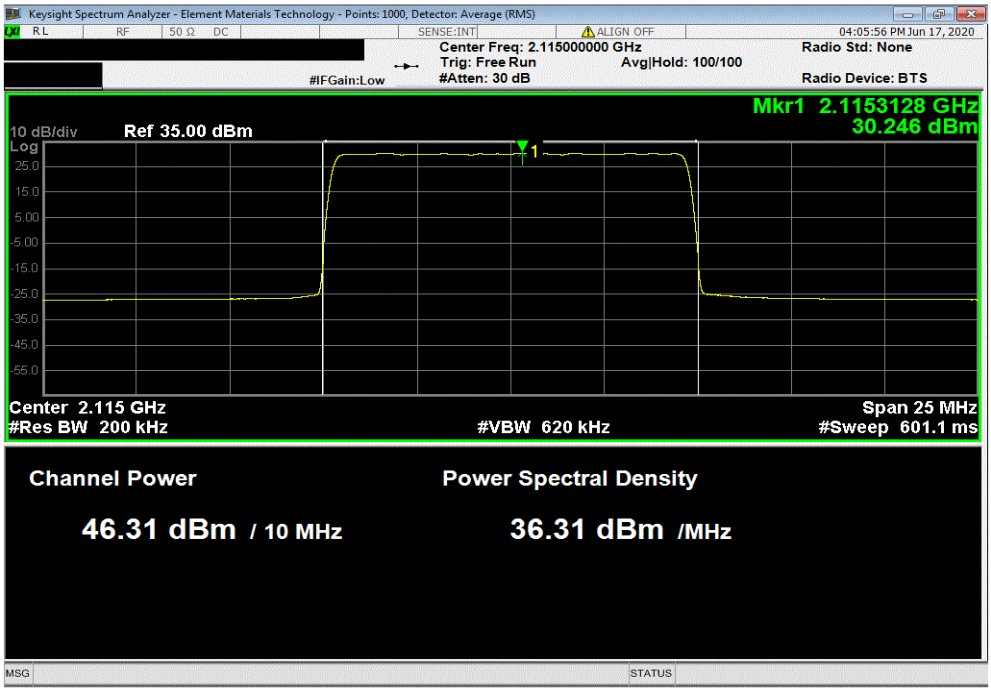


Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 16-QAM Modulation, High Channel 2195 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.078	0	Not Provided	46.1	62.15	N/A

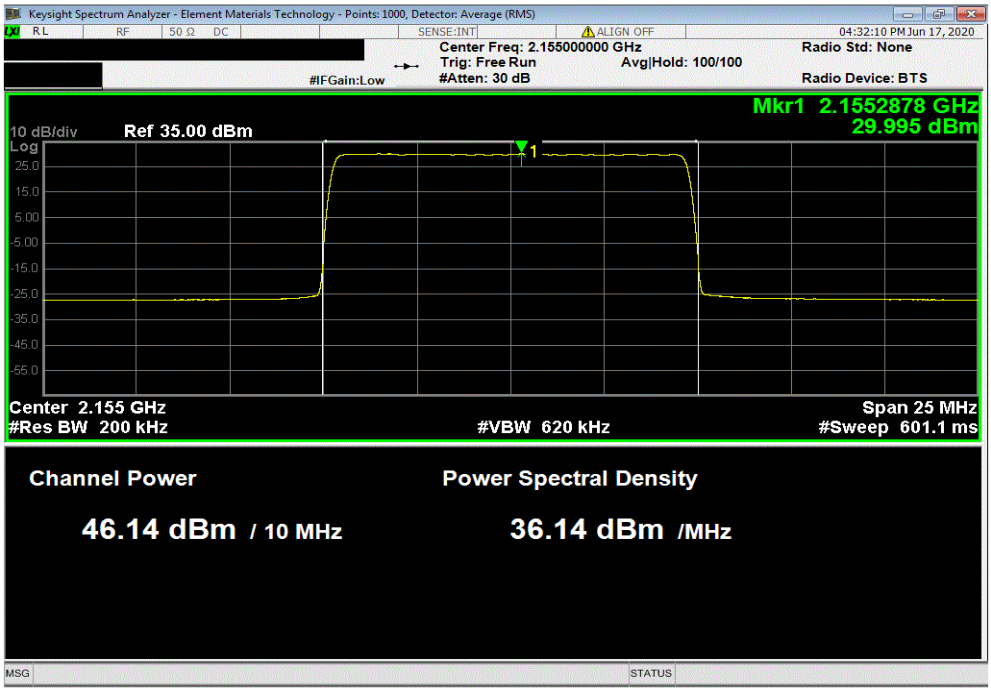


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 64-QAM Modulation, Low Channel 2115 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.311	0	Not Provided	46.3	62.15	N/A

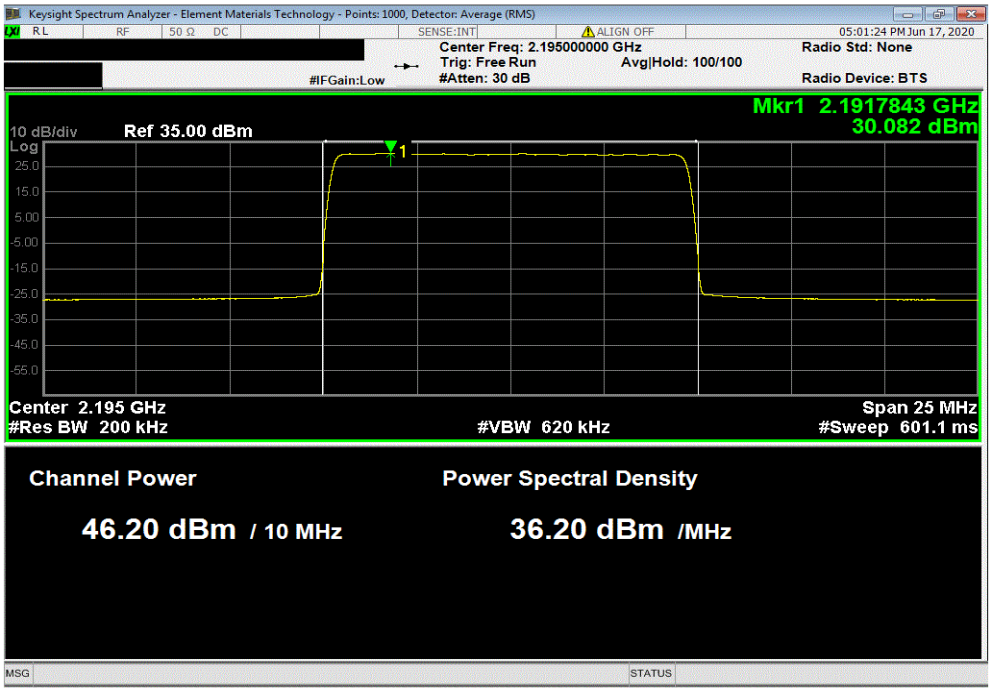


Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.137	0	Not Provided	46.1	62.15	N/A

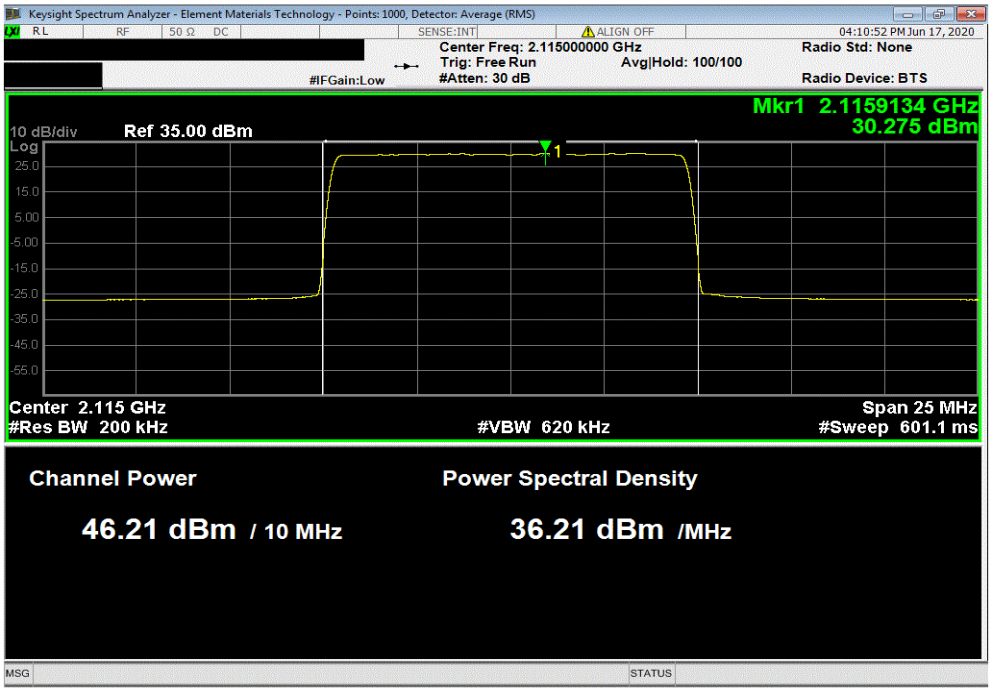


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 64-QAM Modulation, High Channel 2195 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.197	0	Not Provided	46.2	62.15	N/A

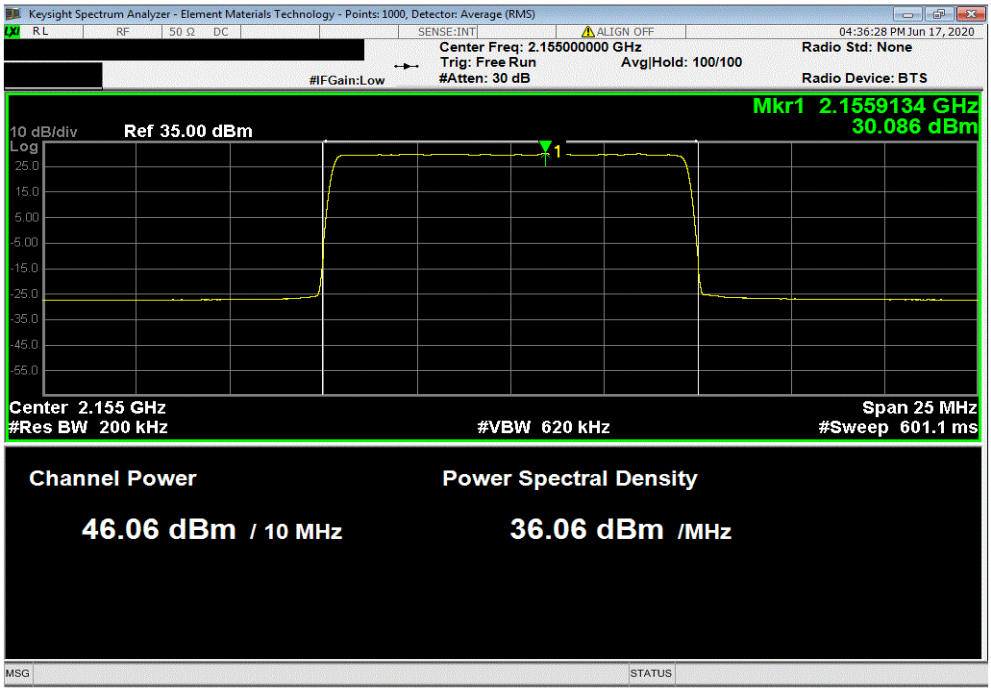


Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, Low Channel 2115 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.208	0	Not Provided	46.2	62.15	N/A

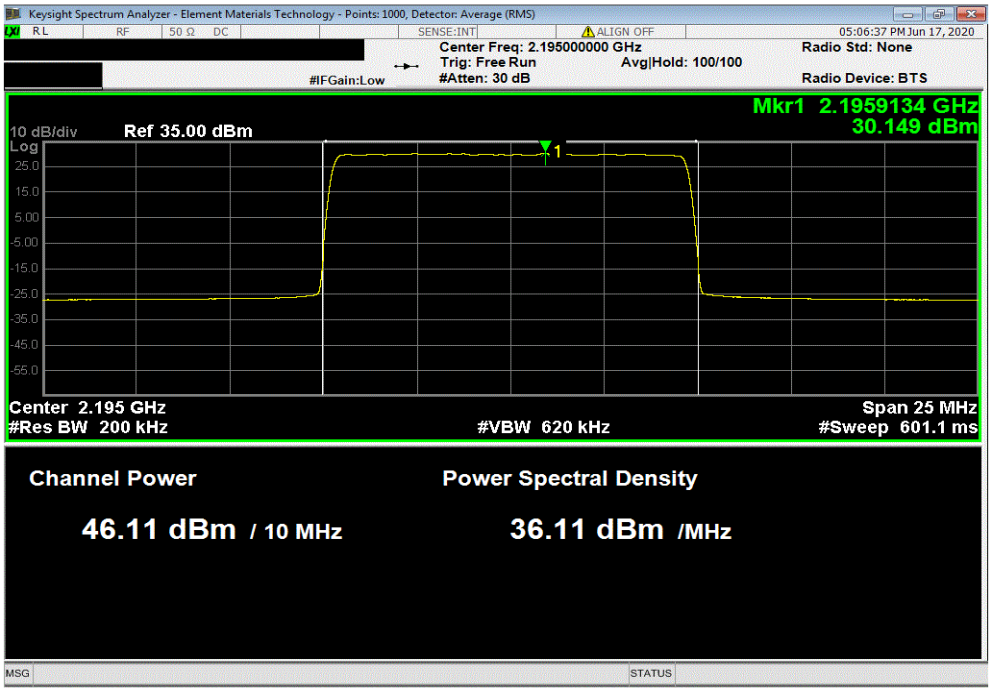


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.06	0	Not Provided	46.1	62.15	N/A

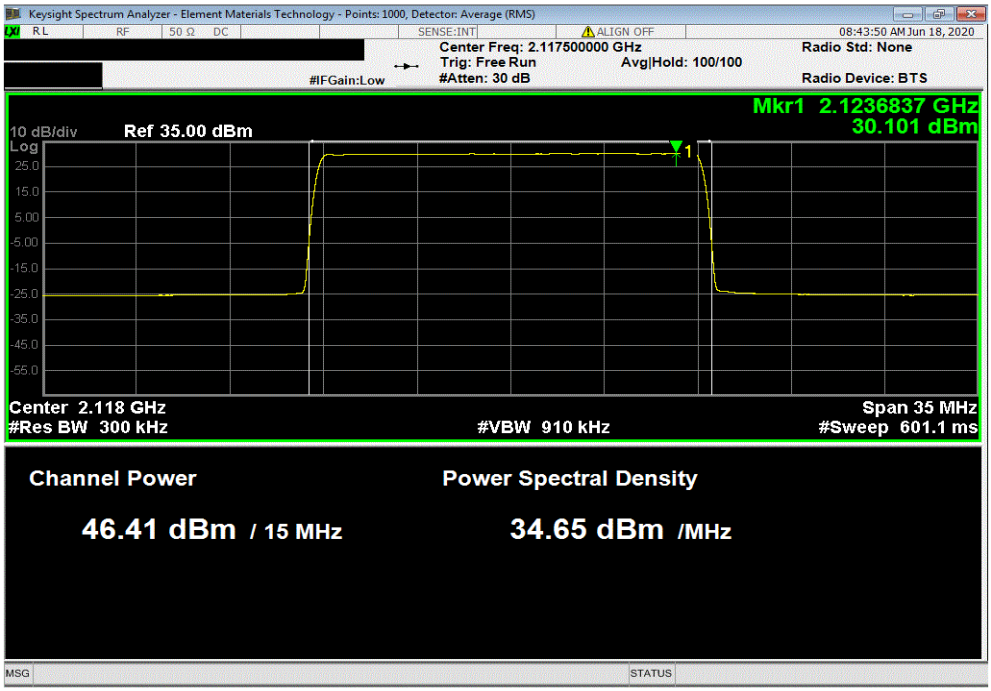


Port 4, Band n66, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , 256-QAM Modulation, High Channel 2195 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.114	0	Not Provided	46.1	62.15	N/A

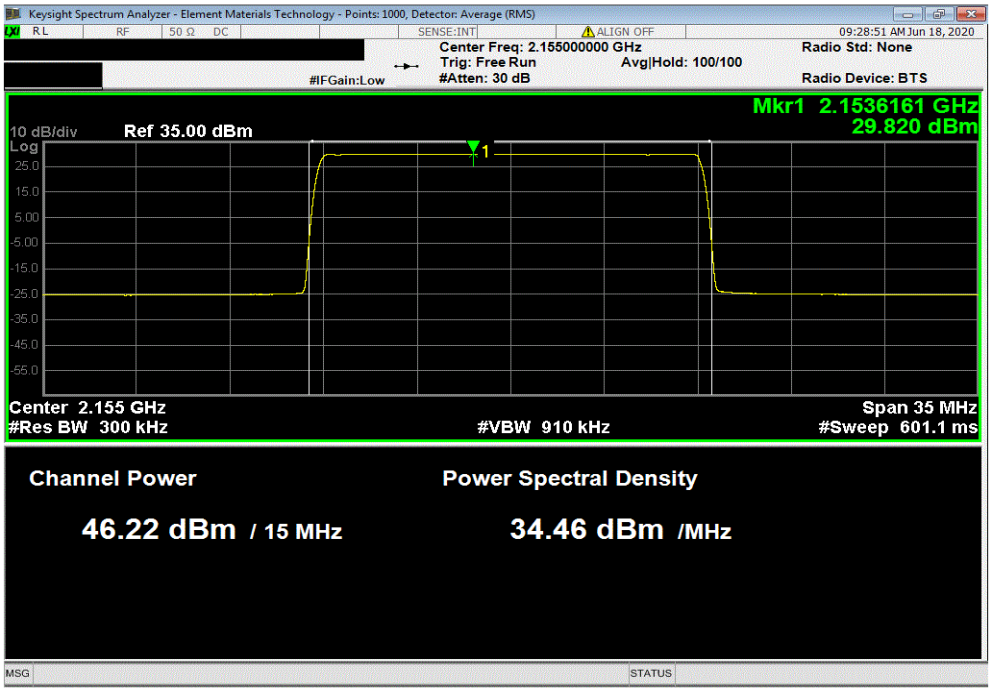


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, Low Channel 2117.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.409	0	Not Provided	46.4	62.15	N/A

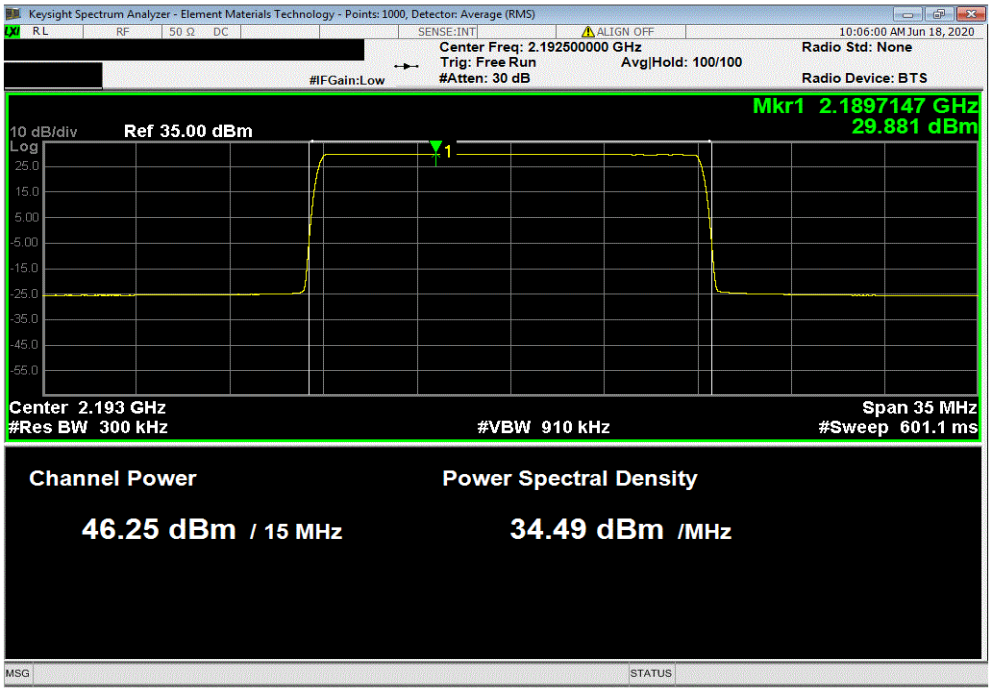


Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.224	0	Not Provided	46.2	62.15	N/A

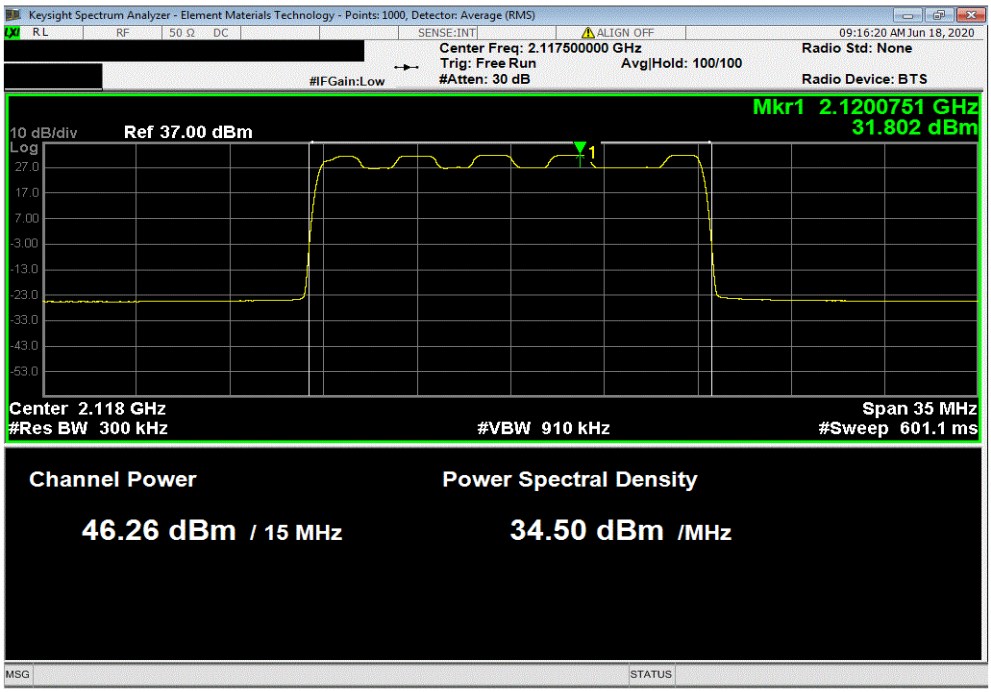


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, High Channel 2192.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.252	0	Not Provided	46.3	62.15	N/A

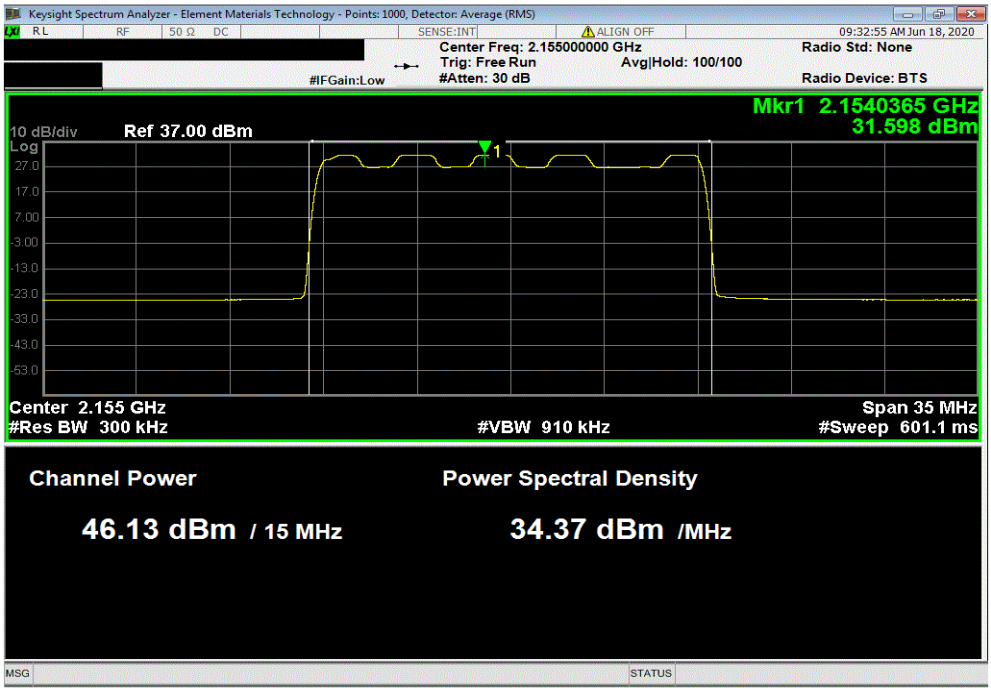


Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 16-QAM Modulation, Low Channel 2117.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.264	0	Not Provided	46.3	62.15	N/A

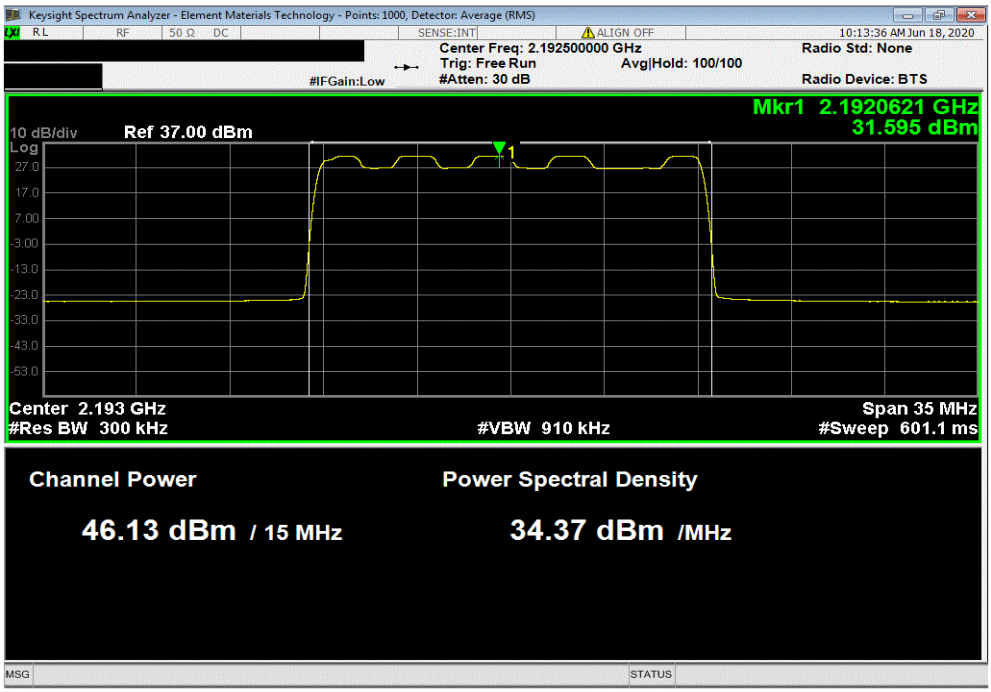


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 16-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.134	0	Not Provided	46.1	62.15	N/A

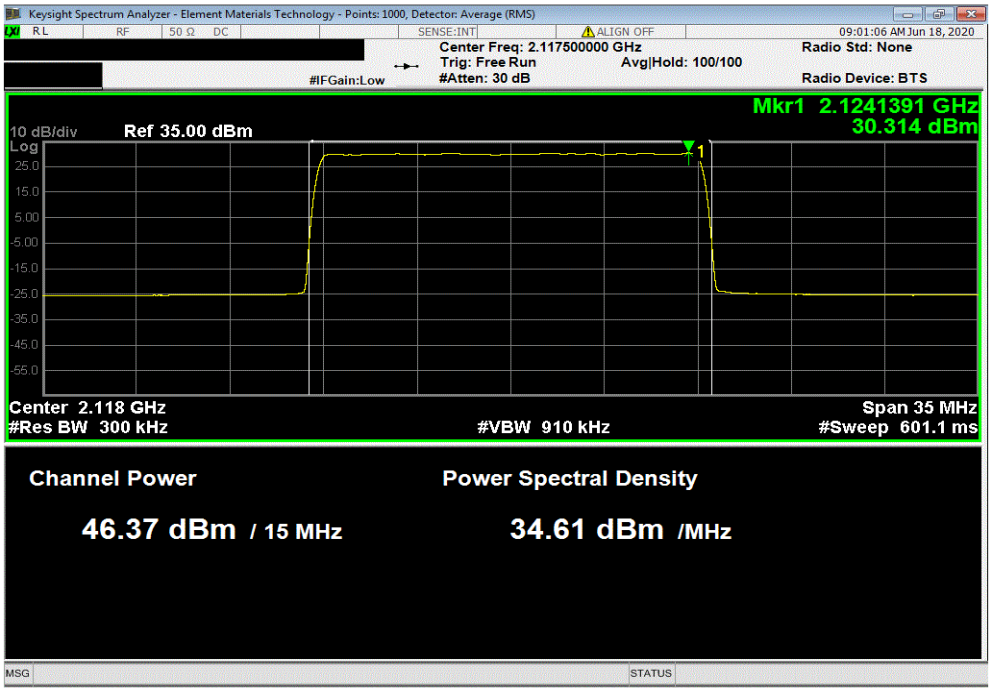


Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 16-QAM Modulation, High Channel 2192.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.13	0	Not Provided	46.1	62.15	N/A

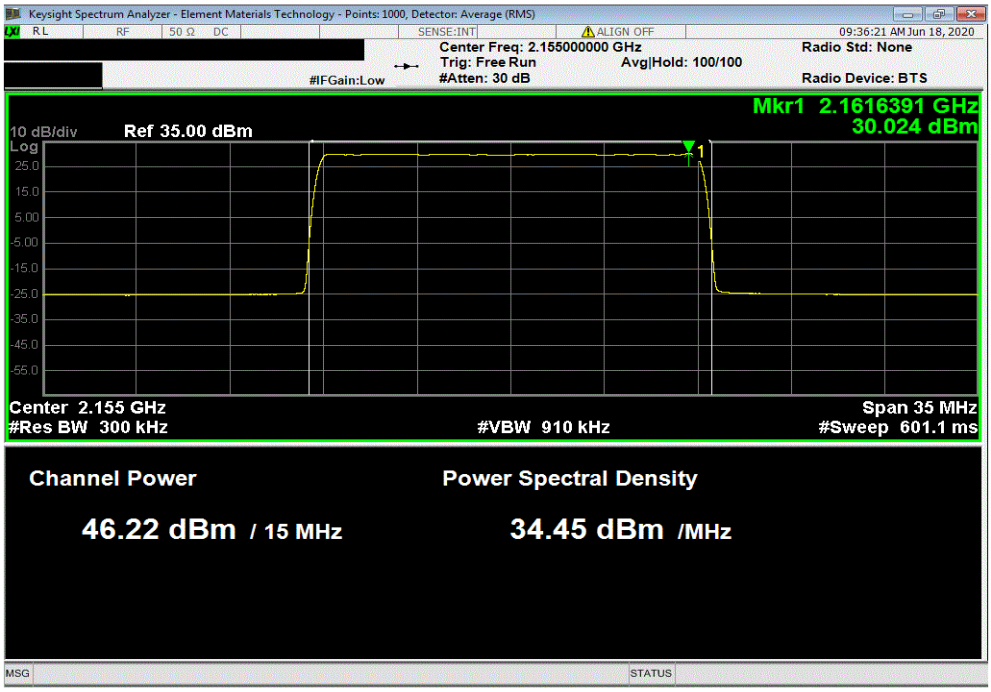


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 64-QAM Modulation, Low Channel 2117.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.371	0	Not Provided	46.4	62.15	N/A

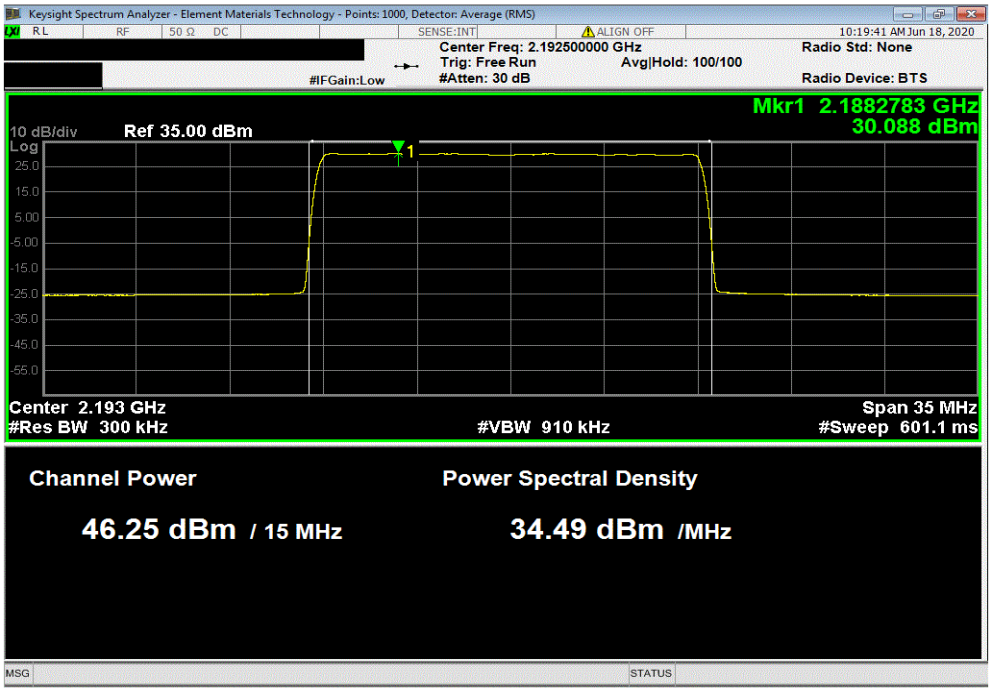


Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 64-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.216	0	Not Provided	46.2	62.15	N/A

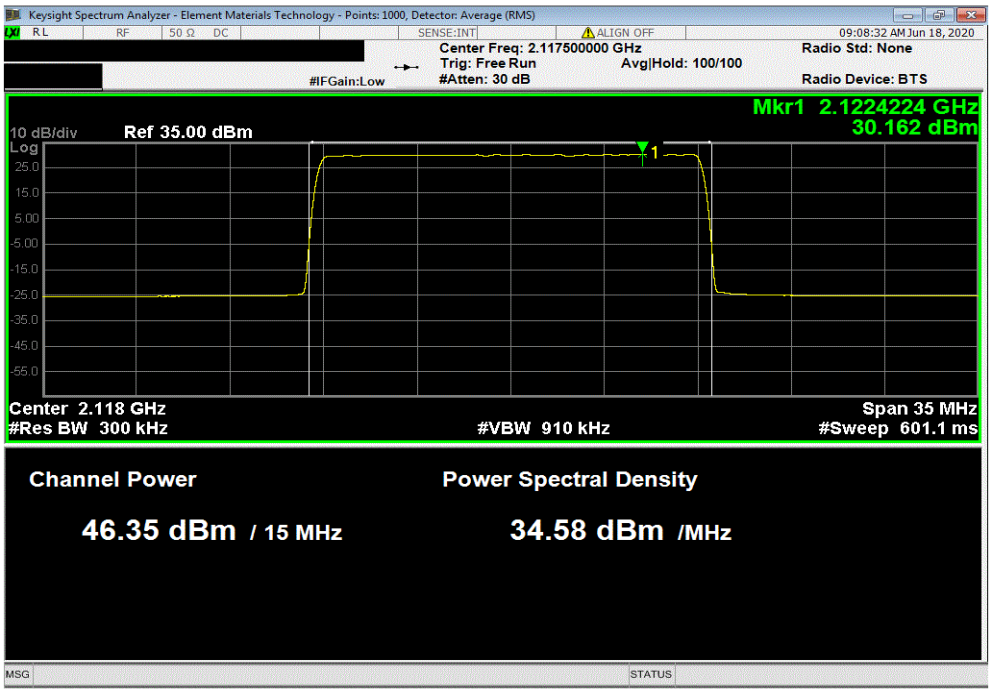


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 64-QAM Modulation, High Channel 2192.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.253	0	Not Provided	46.3	62.15	N/A

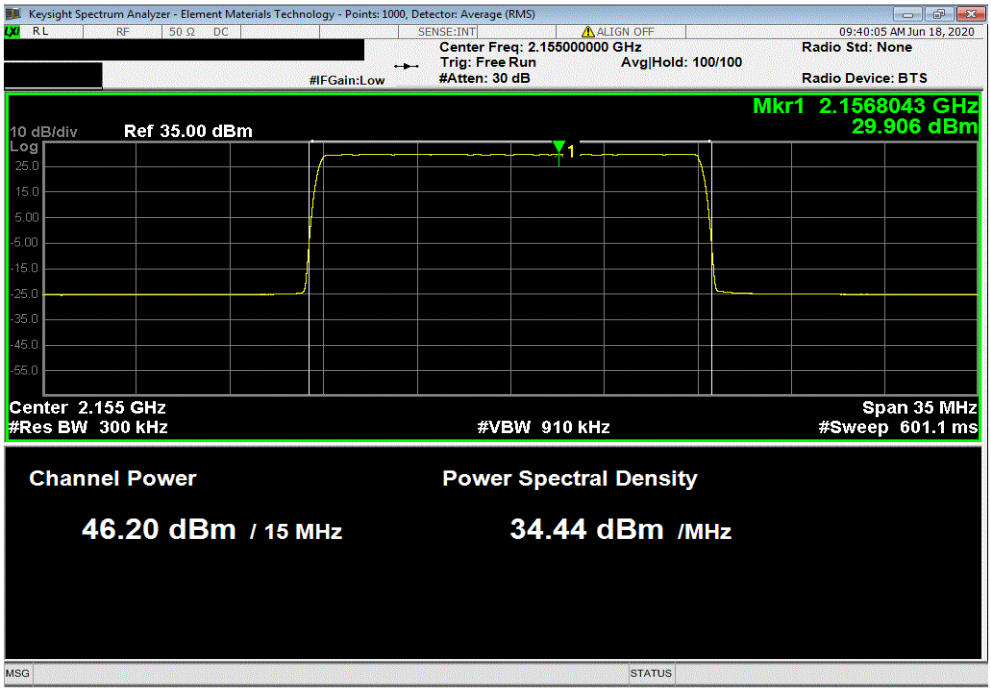


Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, Low Channel 2117.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.345	0	Not Provided	46.3	62.15	N/A

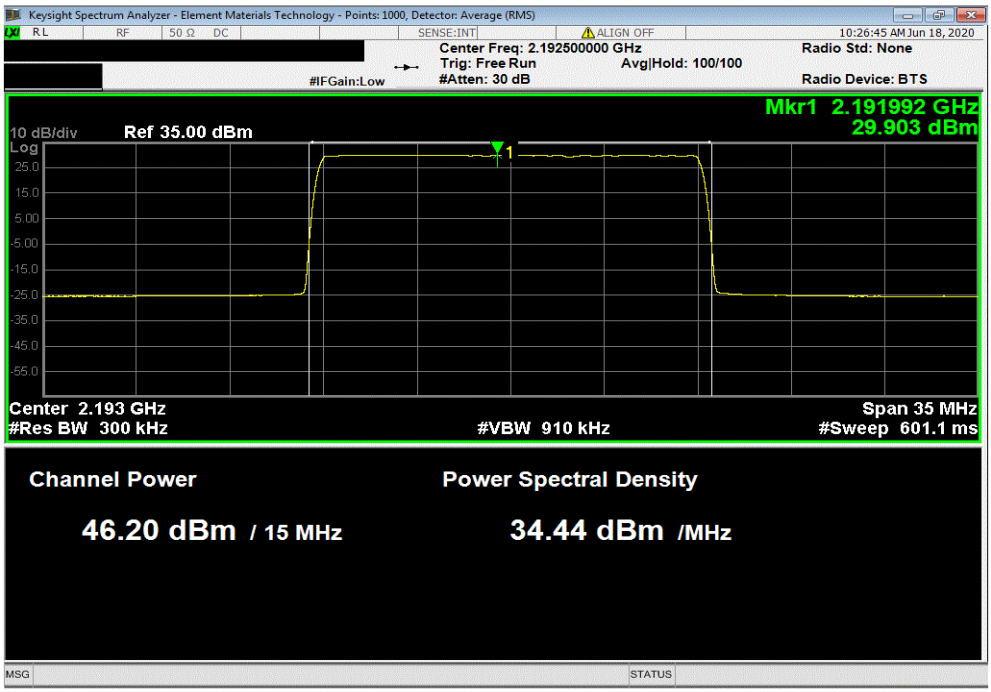


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.2	0	Not Provided	46.2	62.15	N/A

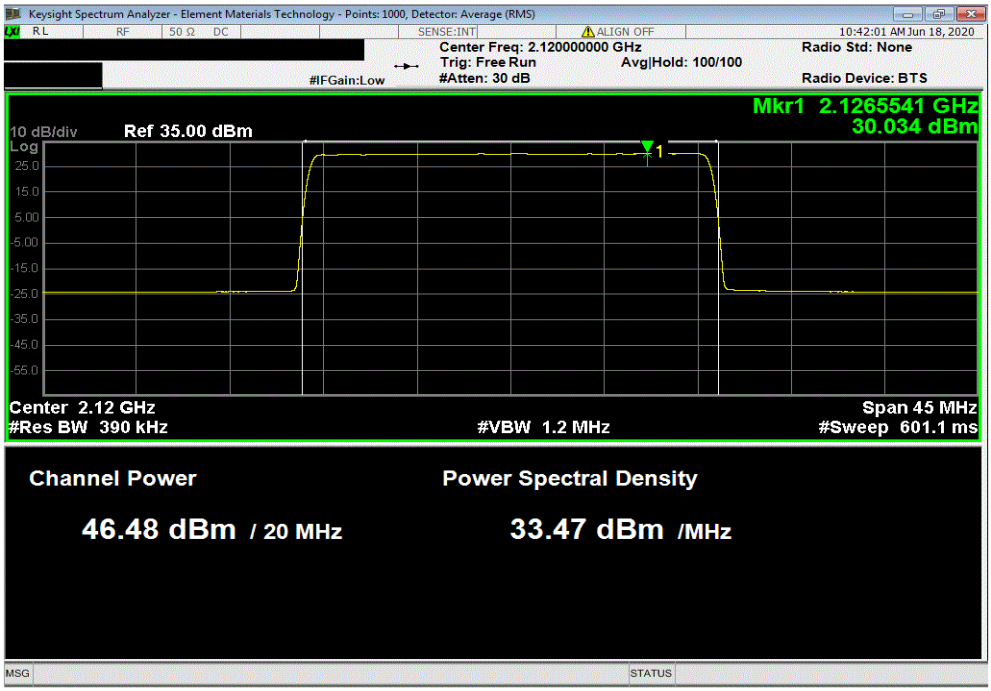


Port 4, Band n66, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , 256-QAM Modulation, High Channel 2192.5 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.2	0	Not Provided	46.2	62.15	N/A

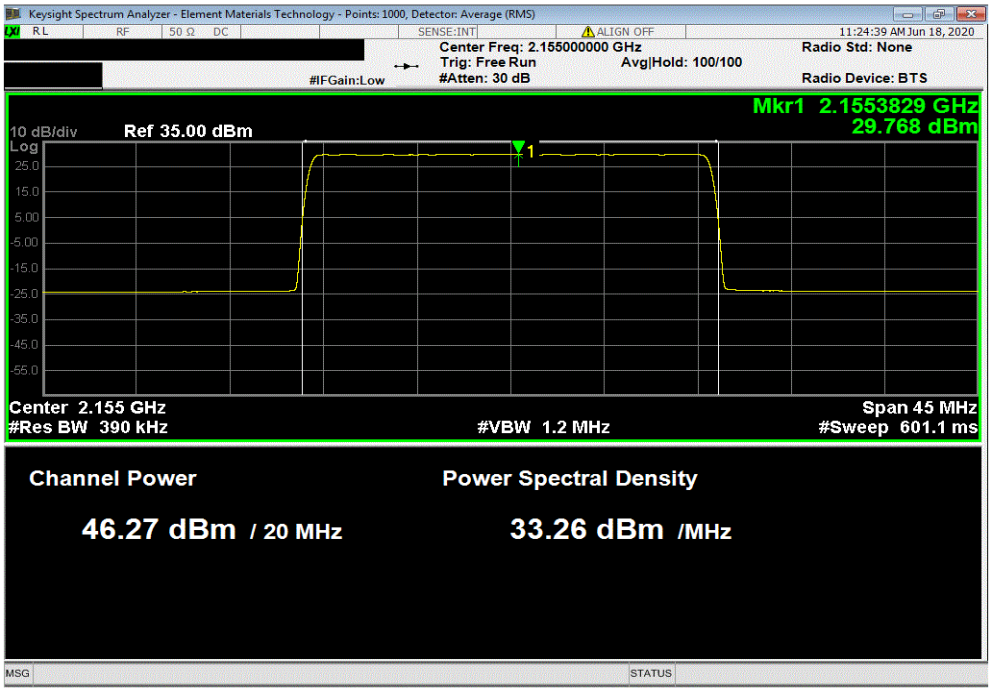


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, Low Channel 2120 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.477	0	Not Provided	46.5	62.15	N/A

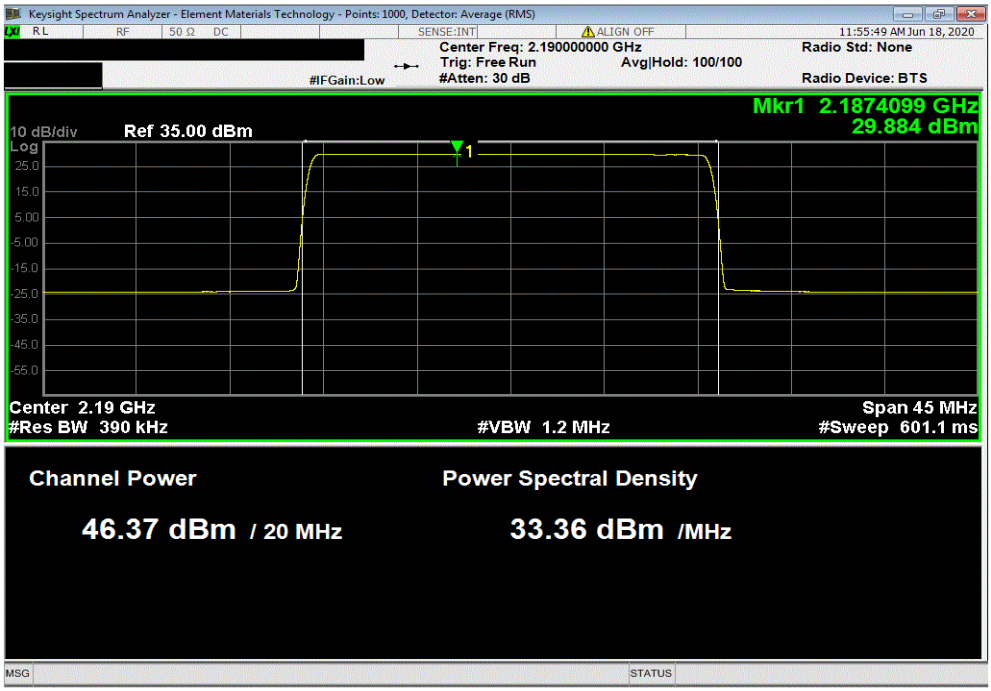


Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.267	0	Not Provided	46.3	62.15	N/A

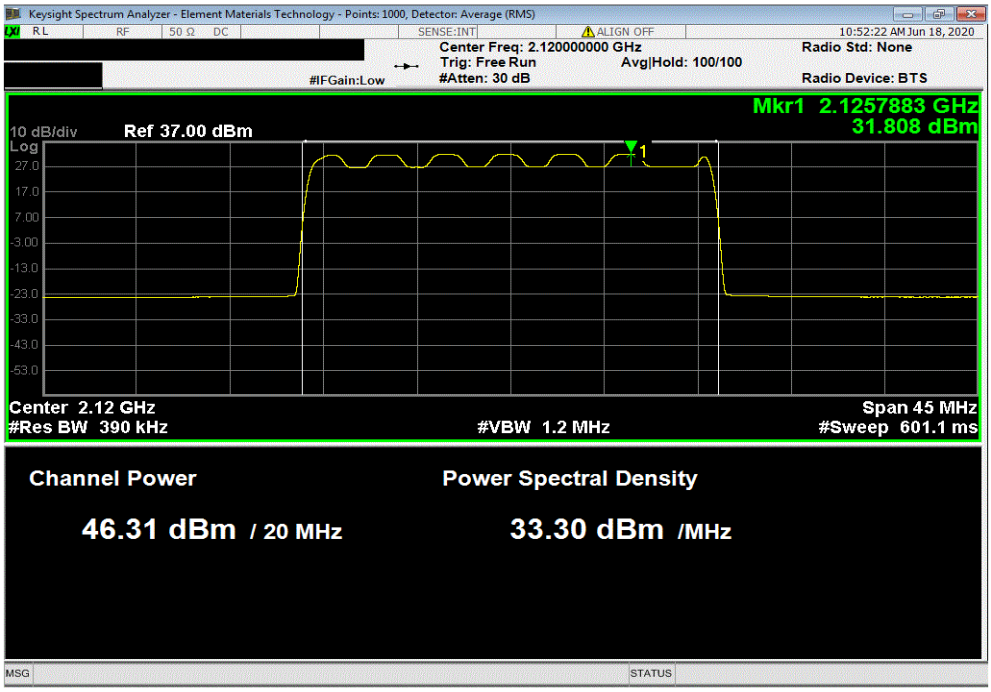


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, High Channel 2190 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.366	0	Not Provided	46.4	62.15	N/A

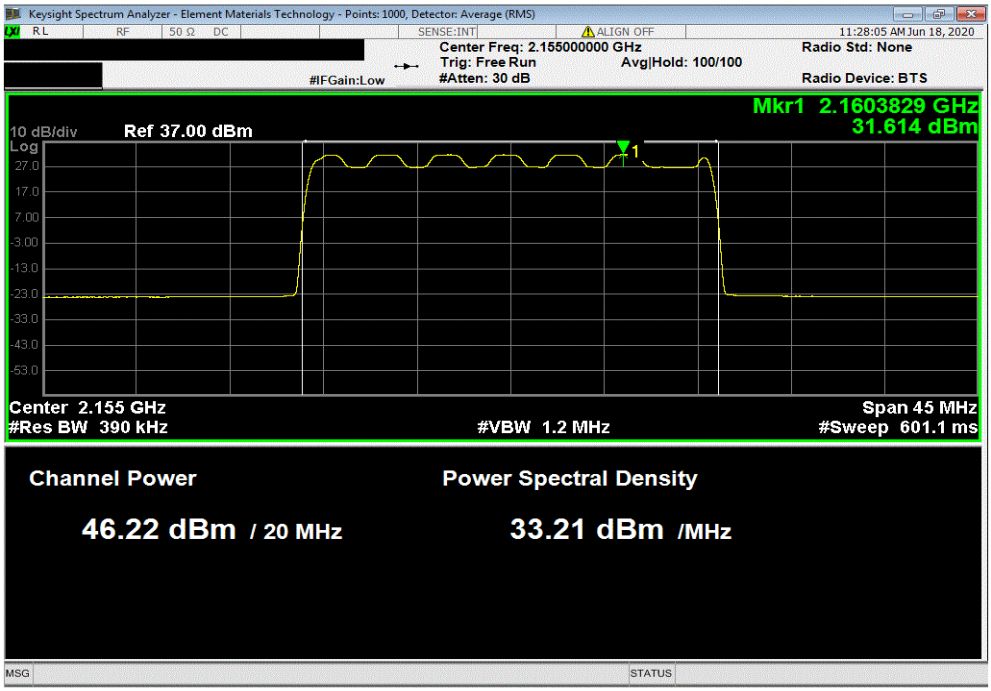


Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 16-QAM Modulation, Low Channel 2120 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.311	0	Not Provided	46.3	62.15	N/A

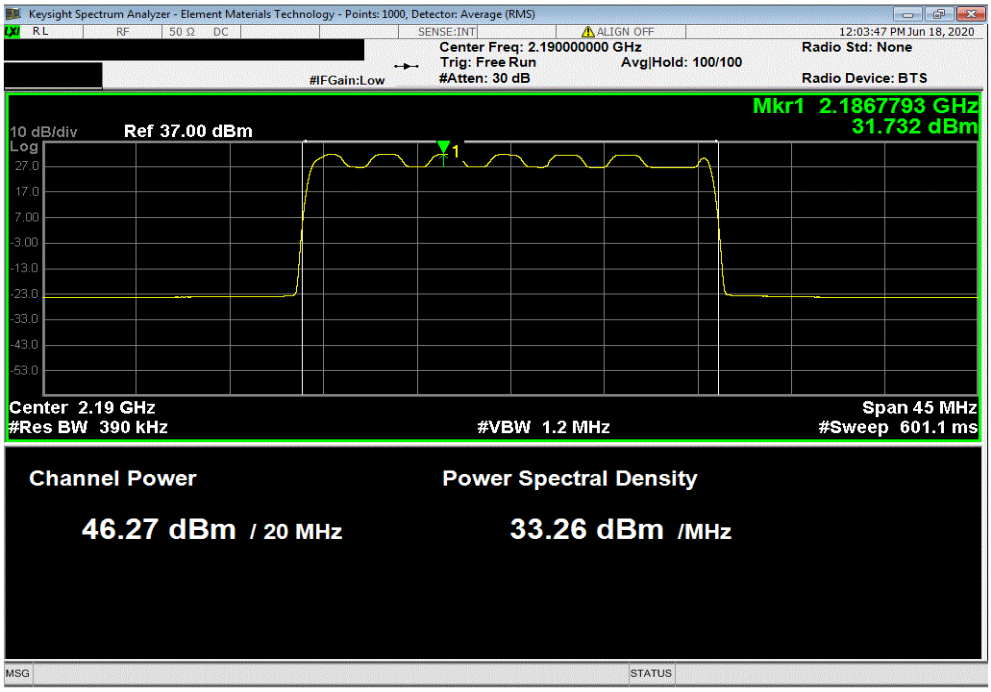


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 16-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.219	0	Not Provided	46.2	62.15	N/A

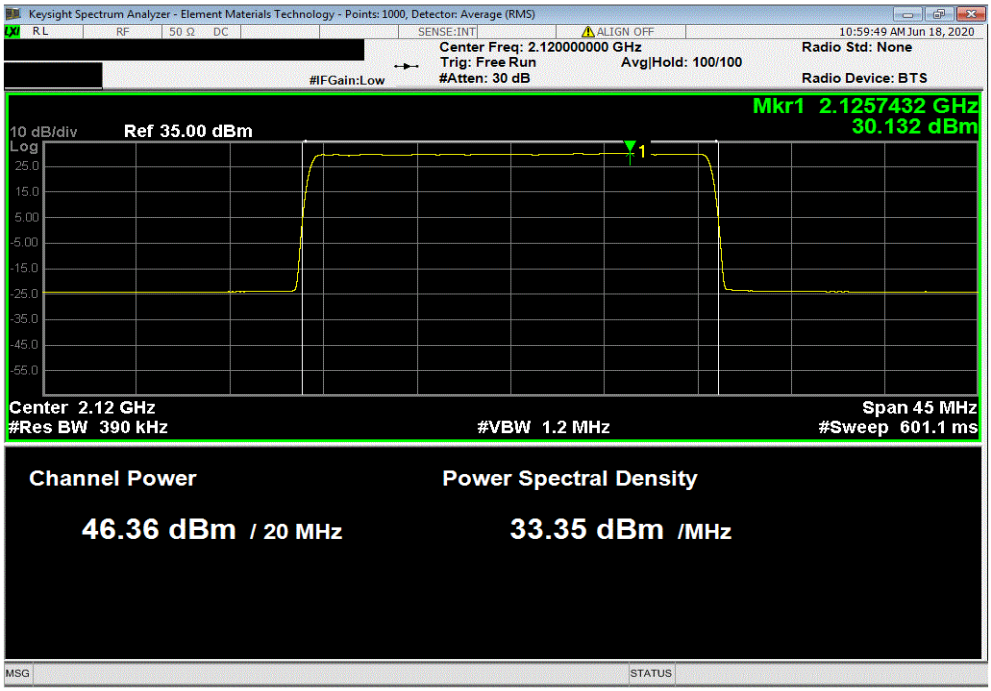


Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 16-QAM Modulation, High Channel 2190 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.268	0	Not Provided	46.3	62.15	N/A

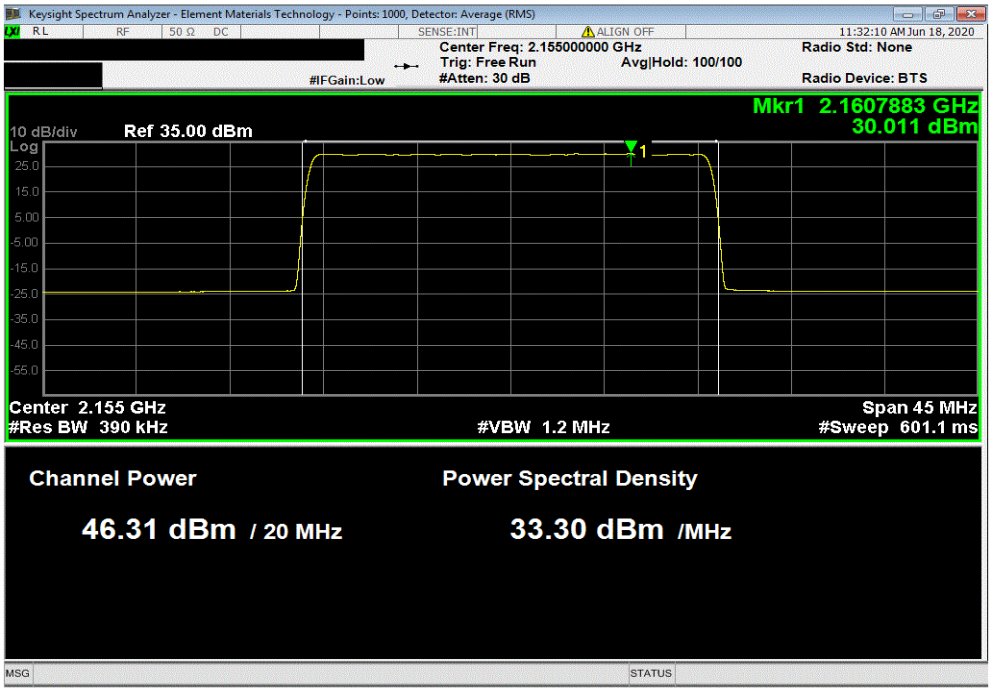


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 64-QAM Modulation, Low Channel 2120 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.363	0	Not Provided	46.4	62.15	N/A

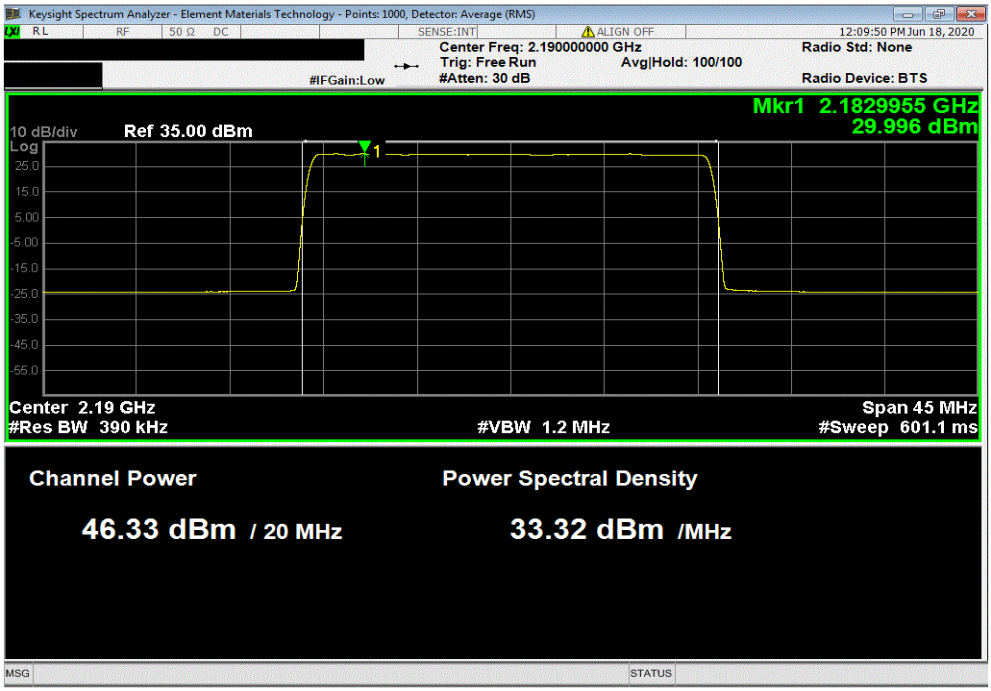


Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 64-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.306	0	Not Provided	46.3	62.15	N/A

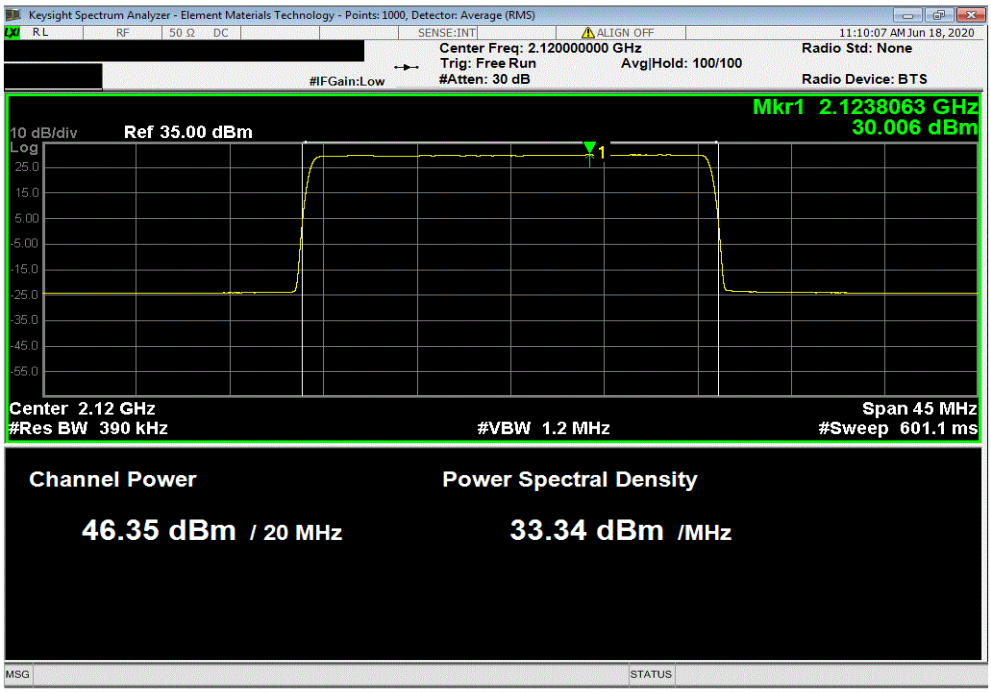


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 64-QAM Modulation, High Channel 2190 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.327	0	Not Provided	46.3	62.15	N/A

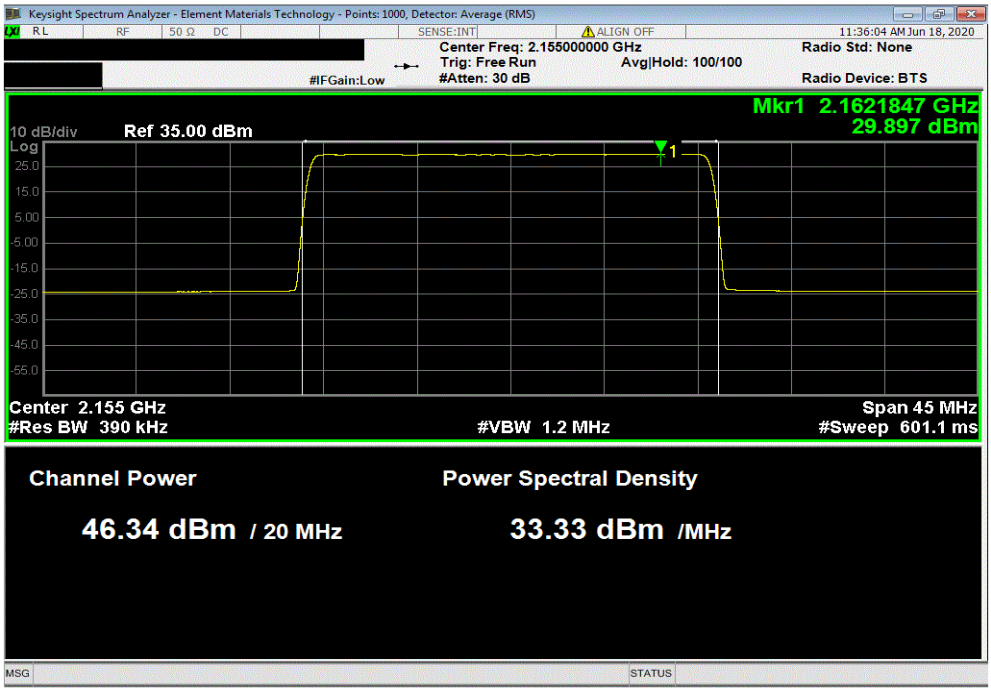


Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, Low Channel 2120 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.348	0	Not Provided	46.3	62.15	N/A

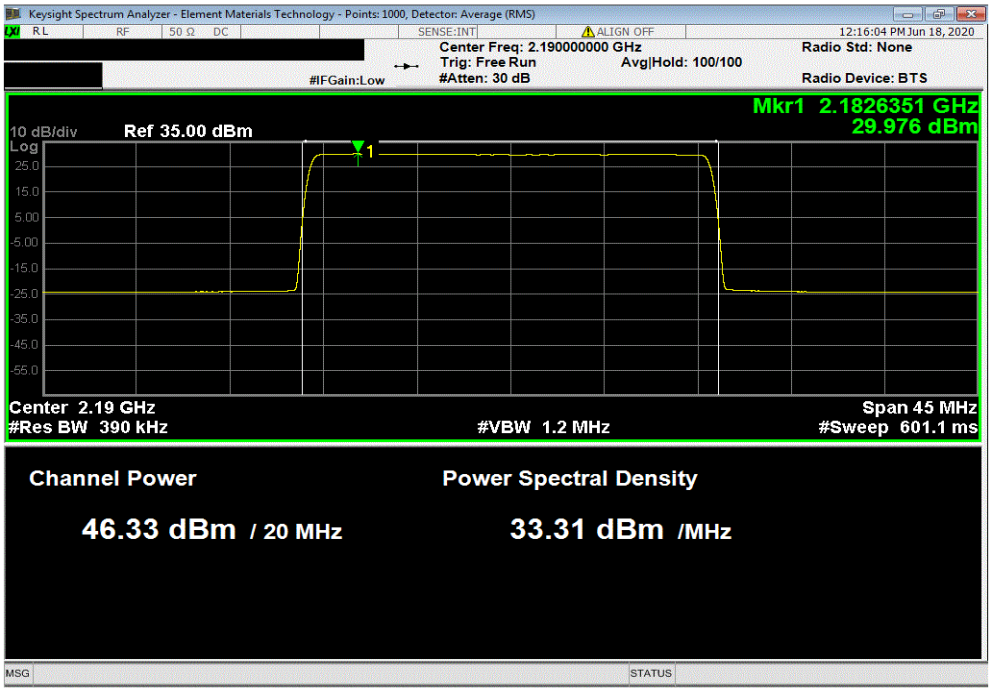


OUTPUT POWER - BAND n66

Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, Mid Channel 2155 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.336	0	Not Provided	46.3	62.15	N/A



Port 4, Band n66, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, 256-QAM Modulation, High Channel 2190 MHz						
	Initial Power (dBm/OBW)	Duty Cycle Factor (dB)	Antenna Gain (dBd)+2.15=(dBi)	Final w/o Ant Gain Value (dBm/OBW)	EIRP Limit (dBm/OBW)	Results
	46.325	0	Not Provided	46.3	62.15	N/A



PEAK TO AVERAGE POWER (PAPR) - BAND 25

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.

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

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

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

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFIG) as the original certification test. The AHFIG antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 4 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2i.

Carrier bandwidths of 10, 15, & 20MHz were verified using NB IoT GB carriers under this effort. The LTE modulation type for this testing was set up according to 3GPP TS 36.141 E-UTRA Test Models and is “E-TM 1.1 (QPSK modulation type) with N-TM (narrow band IoT)”.

PEAK TO AVERAGE POWER (PAPR) - BAND 25

TbtTx 2020.06.08.0 BETA XMit 2020.03.25.0

EUT:	AHFIG			**Work Order:**	NOKI0016
Serial Number:	K9191322351			**Date:**	23-Jun-20
Customer:	Nokia Solutions and Networks			**Temperature:**	22.2 °C
Attendees:	Mitchell Hill, John Rattanavong			**Humidity:**	52.8% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX05

TEST SPECIFICATIONS	**Test Method**
FCC 24E:2020	ANSI C63.26:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The carrier was set to maximum for all testing.

DEVIATIONS FROM TEST STANDARD

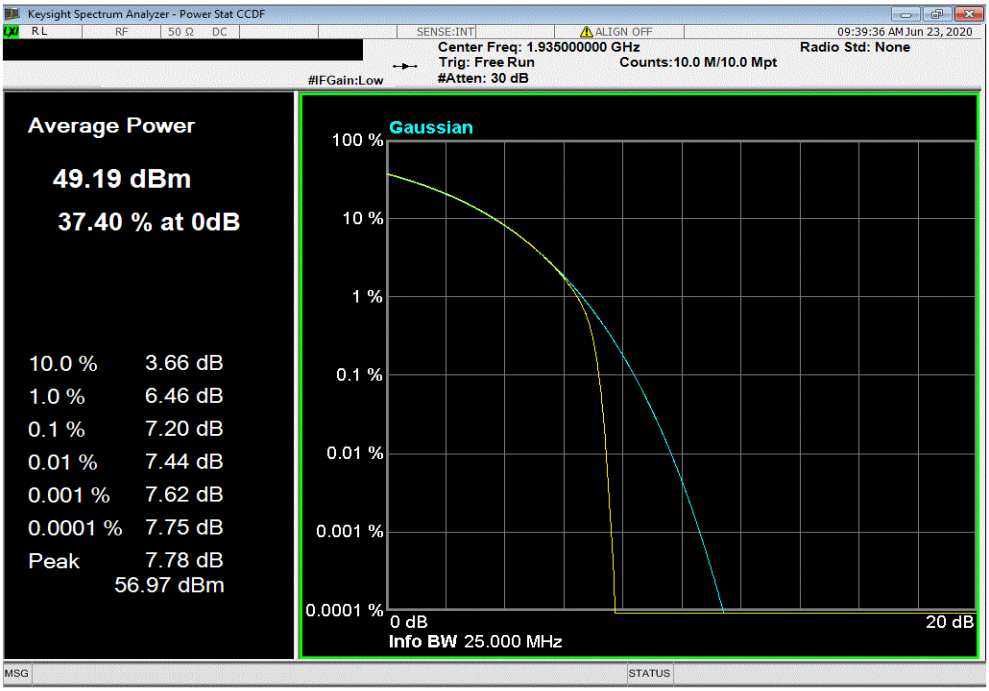
None

Configuration #	6	*Signature*

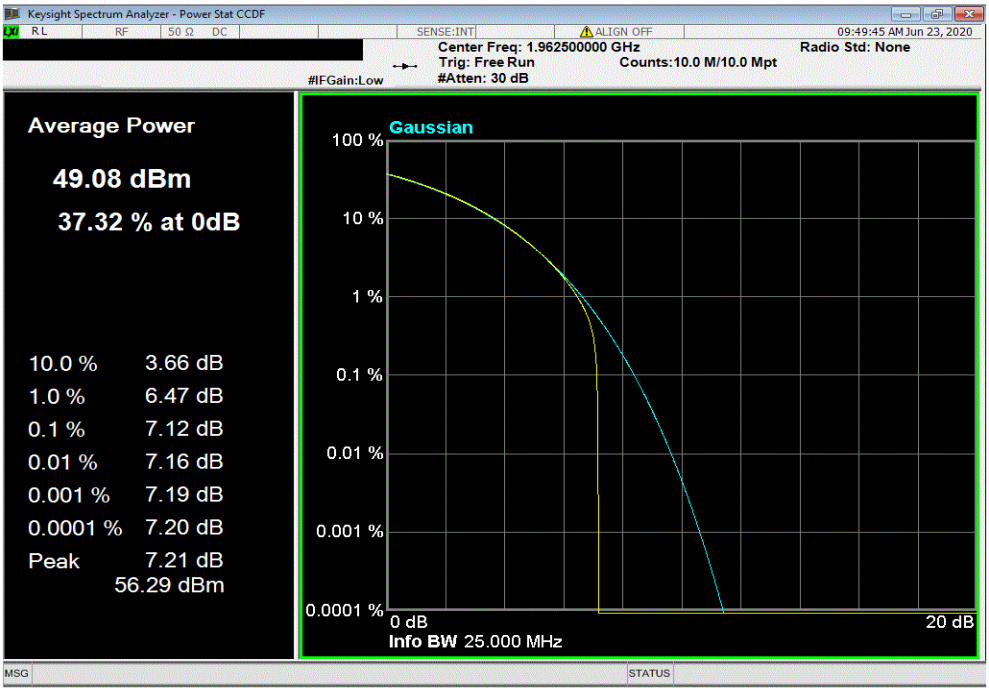
	PAPR Value (dB)	PAPR Limit (dB)	Results
Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz			
10 MHz Bandwidth			
QPSK Modulation			
Low Channel 1935 MHz	7.2	13	Pass
Mid Channel 1962.5 MHz	7.1	13	Pass
High Channel 1990 MHz	7.1	13	Pass
15 MHz Bandwidth			
QPSK Modulation			
Low Channel 1937.5 MHz	7.3	13	Pass
Mid Channel 1962.5 MHz	7.2	13	Pass
High Channel 1987.5 MHz	7.2	13	Pass
20 MHz Bandwidth			
QPSK Modulation			
Low Channel 1940 MHz	7.4	13	Pass
Mid Channel 1962.5 MHz	7.1	13	Pass
High Channel 1985 MHz	7.2	13	Pass

PEAK TO AVERAGE POWER (PAPR) - BAND 25

Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, QPSK Modulation, Low Channel 1935 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.2	13	Pass

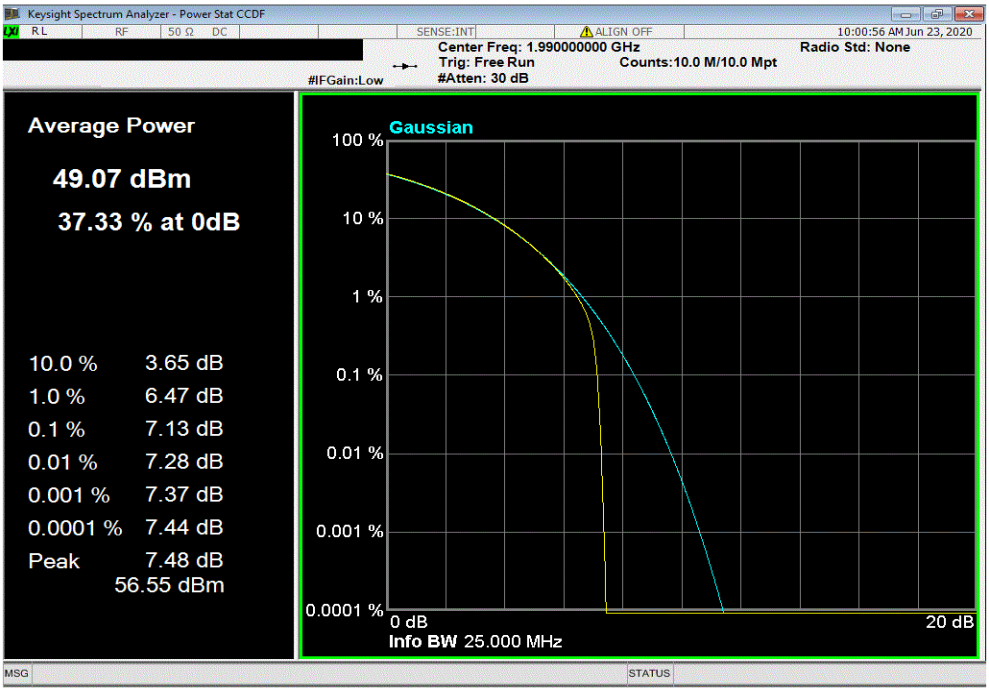


Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.12	13	Pass

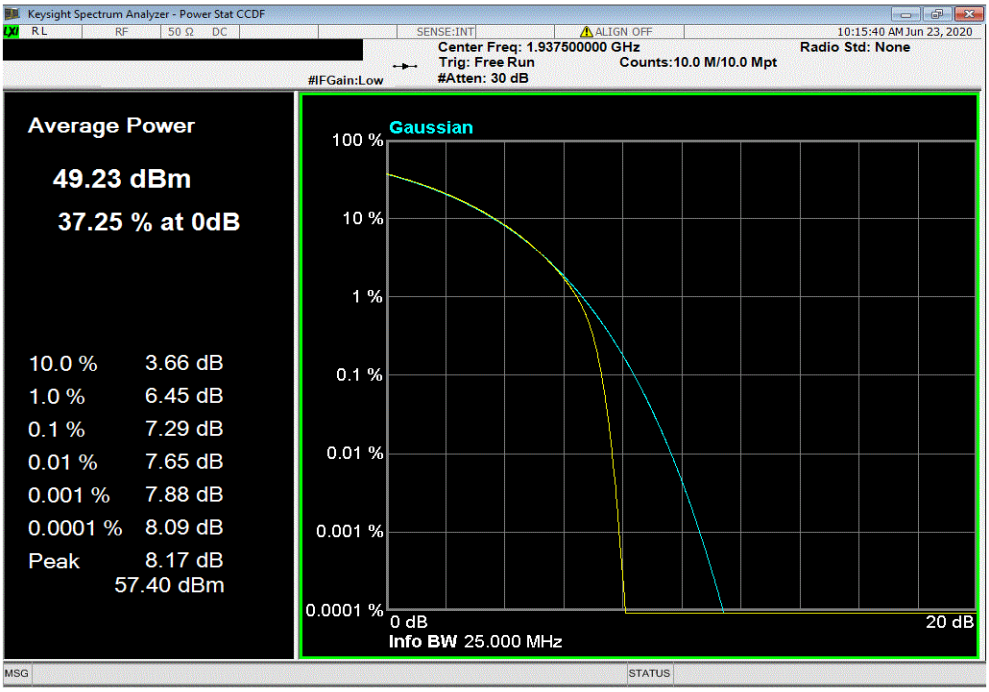


PEAK TO AVERAGE POWER (PAPR) - BAND 25

Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 10 MHz Bandwidth, QPSK Modulation, High Channel 1990 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.13	13	Pass

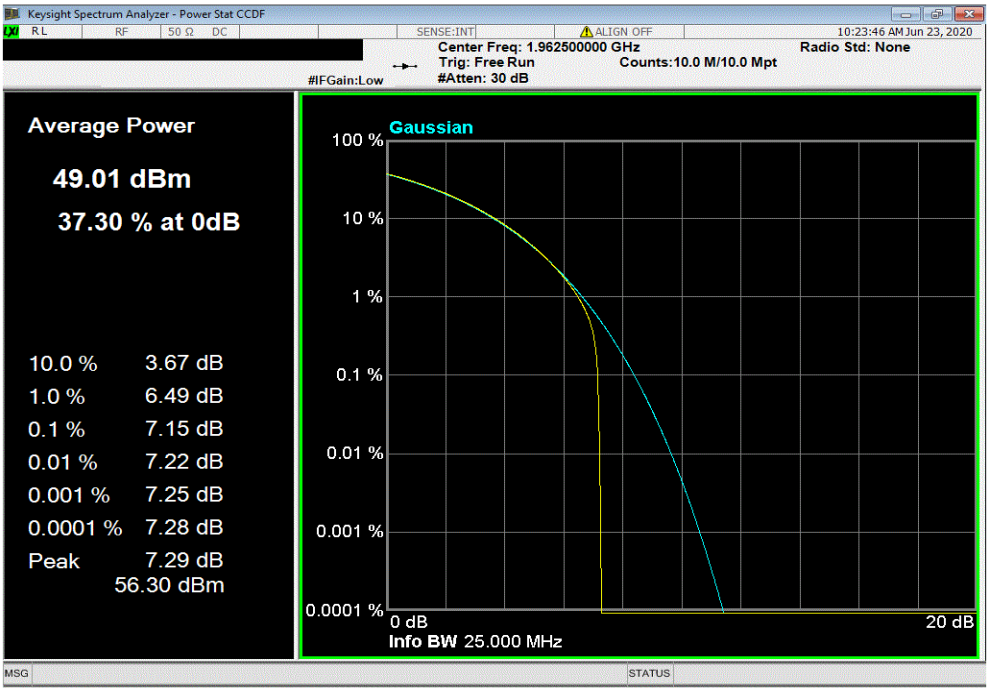


Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, QPSK Modulation, Low Channel 1937.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.29	13	Pass

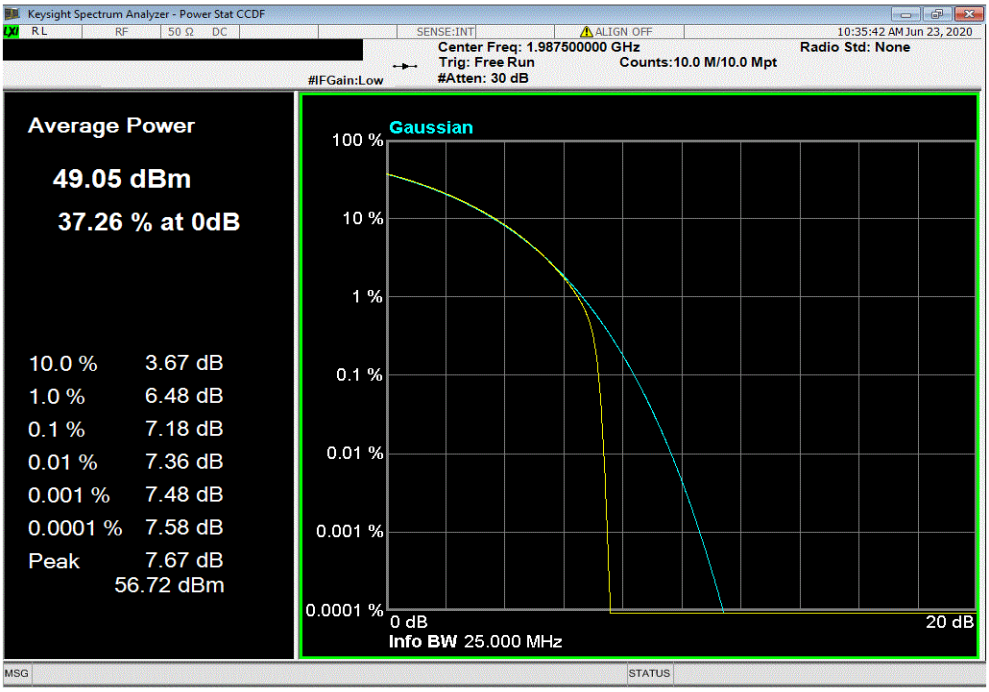


PEAK TO AVERAGE POWER (PAPR) - BAND 25

Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.15	13	Pass

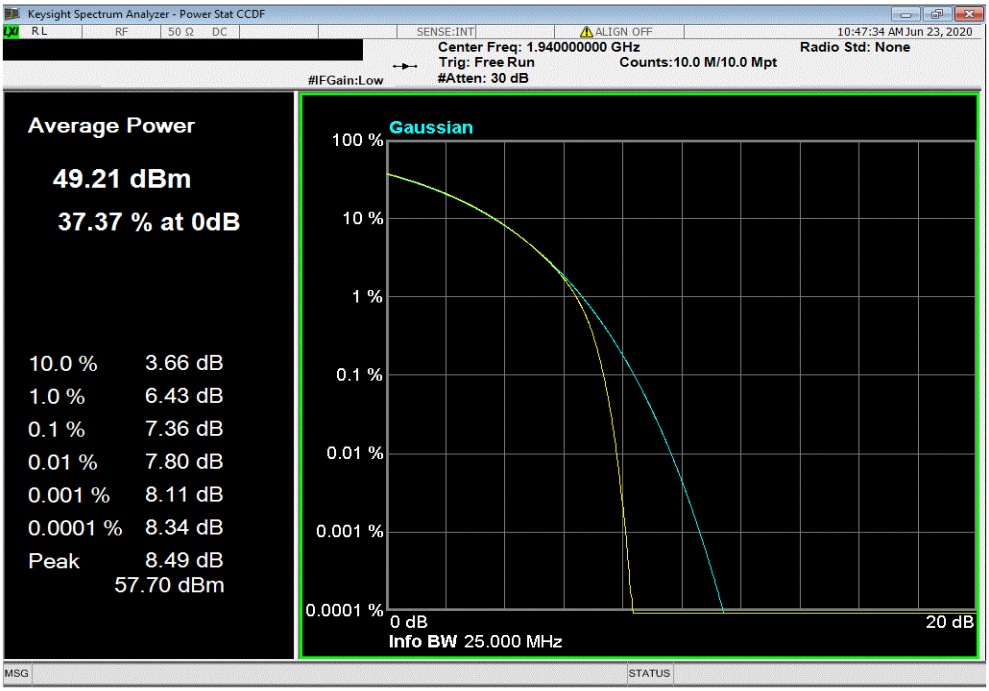


Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 15 MHz Bandwidth, QPSK Modulation, High Channel 1987.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.18	13	Pass

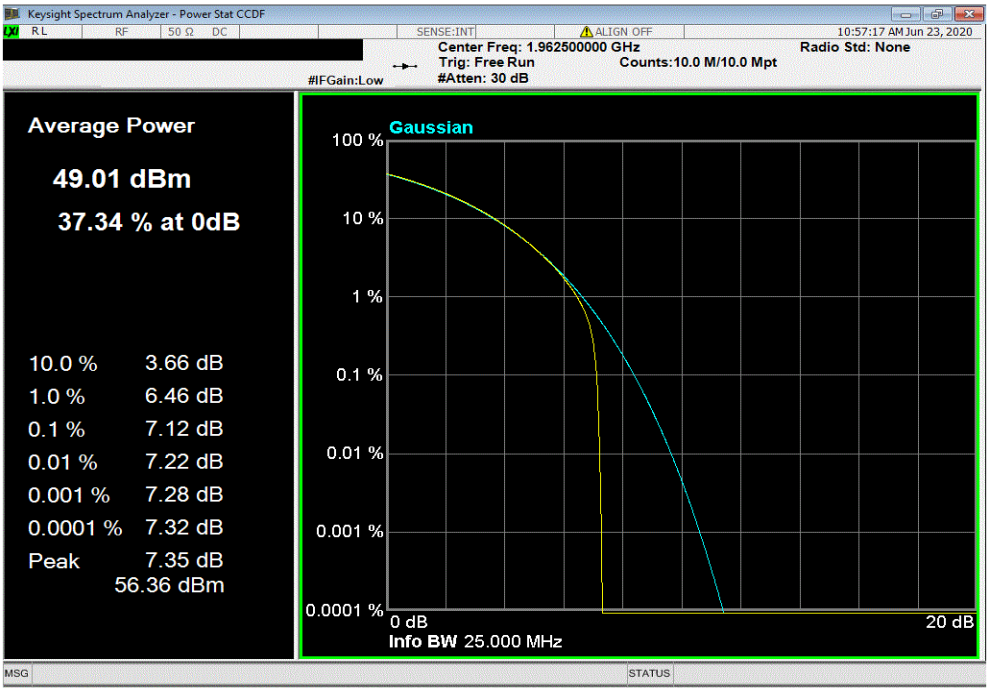


PEAK TO AVERAGE POWER (PAPR) - BAND 25

Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, QPSK Modulation, Low Channel 1940 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.36	13	Pass

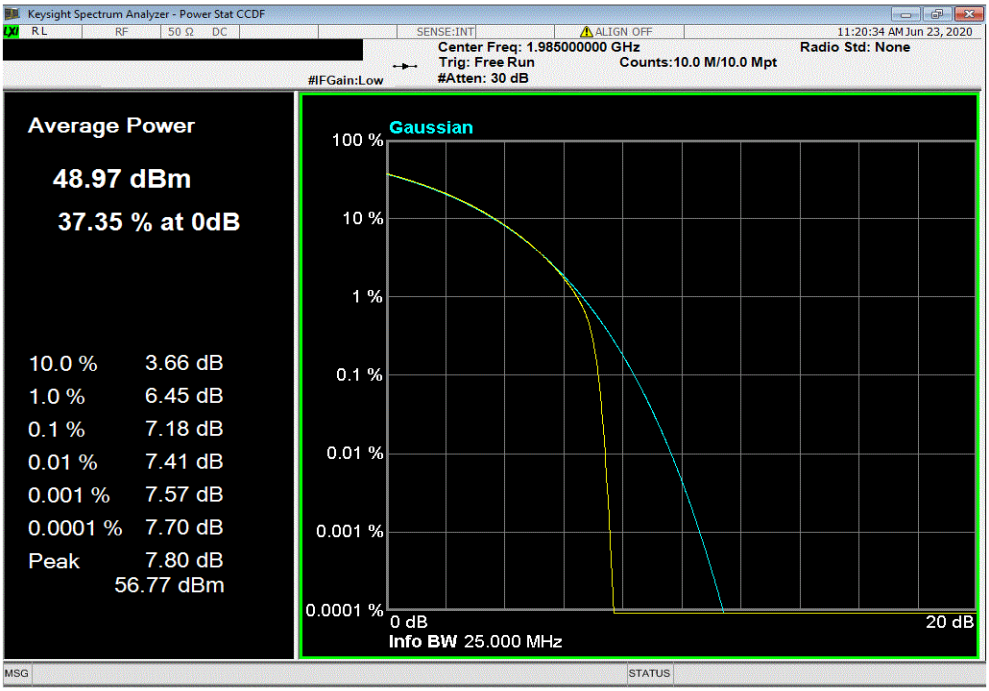


Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, QPSK Modulation, Mid Channel 1962.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.12	13	Pass



PEAK TO AVERAGE POWER (PAPR) - BAND 25

Port 4, Band 25 NB IoT, 1930 MHz - 1995 MHz , 20 MHz Bandwidth, QPSK Modulation, High Channel 1985 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.18	13	Pass



PEAK TO AVERAGE POWER (PAPR) - BAND 66

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.

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

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

Per 27.50(d)(2), the PAPR limit shall not exceed 13 dB for more than the ANSI described 0.1% of the time.

RF conducted emissions testing was performed only on one port. The testing was performed on the same version of hardware (AHFIG) as the original certification test. The AHFIG antenna ports are essentially electrically identical (the RF power variation between antenna ports is small as shown in the original certification testing) and antenna port 4 was selected to perform the testing under this effort as allowed by ANSI C63.26-2015 paragraph 5.7.2

Carrier bandwidths of 10, 15, & 20MHz were verified using NB IoT GB carriers under this effort. The LTE modulation type for this testing was set up according to 3GPP TS 36.141 E-UTRA Test Models and is “E-TM 1.1 (QPSK modulation type) with N-TM (narrow band IoT)”.

PEAK TO AVERAGE POWER (PAPR) - BAND 66

TbtTx 2020.06.08.0 BETA XMit 2020.03.25.0

EUT:	AHFIG			**Work Order:**	NOKI0016
Serial Number:	K9191322351			**Date:**	24-Jun-20
Customer:	Nokia Solutions and Networks			**Temperature:**	22.4 °C
Attendees:	Mitchell Hill, John Rattanavong			**Humidity:**	52.3% RH
Project:	None			**Barometric Pres.:**	1016 mbar
Tested by:	Brandon Hobbs	**Power:**	54 VDC	**Job Site:**	TX05

TEST SPECIFICATIONS	Test Method
FCC 27:2020	ANSI C63.26:2015

COMMENTS

All measurement path losses were accounted for in the reference level offest including any attenuators, filters and DC blocks. The carrier was set to maximum for all testing.

DEVIATIONS FROM TEST STANDARD

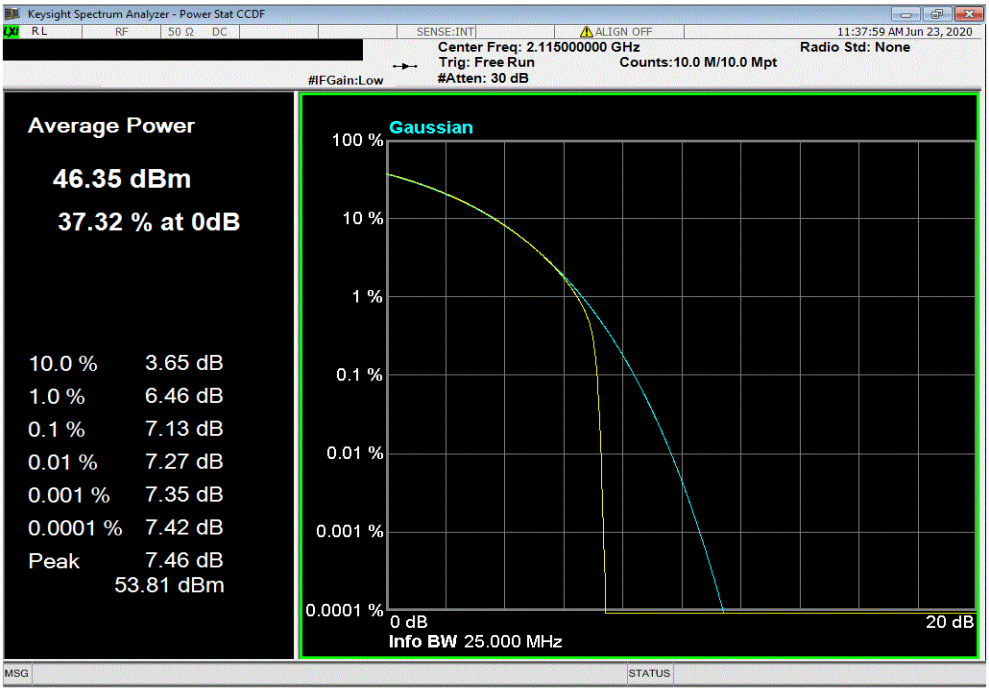
None

Configuration #	6	Signature

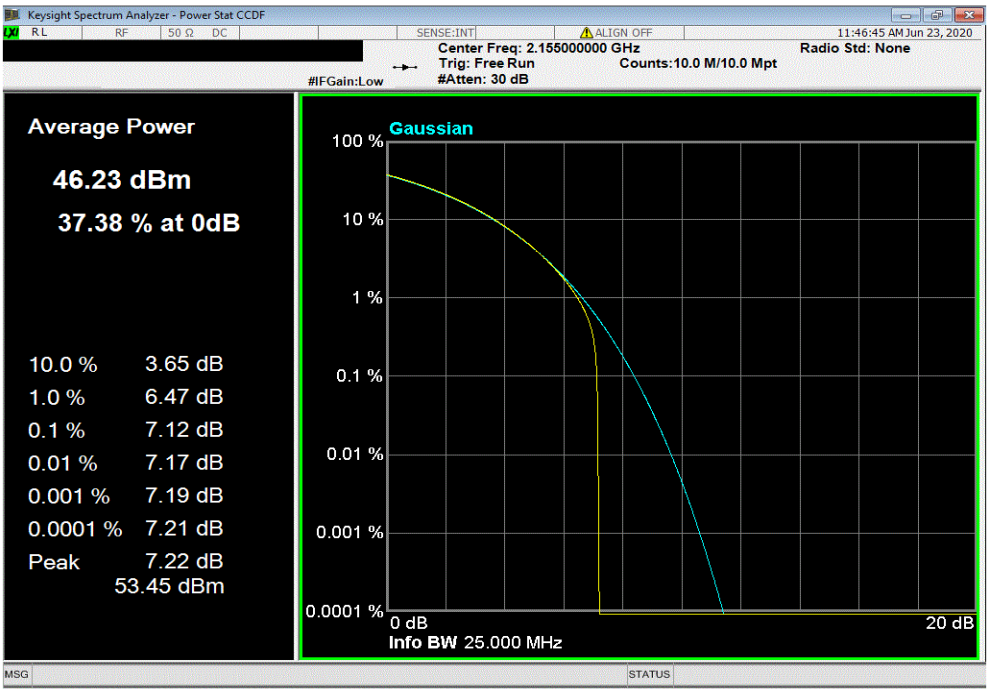
	PAPR Value (dB)	PAPR Limit (dB)	Results
Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz			
10 MHz Bandwidth			
QPSK Modulation			
Low Channel 2115 MHz	7.1	13	Pass
Mid Channel 2155 MHz	7.1	13	Pass
High Channel 2195 MHz	7.2	13	Pass
15 MHz Bandwidth			
QPSK Modulation			
Low Channel 2117.5 MHz	7.2	13	Pass
Mid Channel 2155 MHz	7.1	13	Pass
High Channel 2192.5 MHz	7.2	13	Pass
20 MHz Bandwidth			
QPSK Modulation			
Low Channel 2120 MHz	7.2	13	Pass
Mid Channel 2155 MHz	7.1	13	Pass
High Channel 2190 MHz	7.2	13	Pass

PEAK TO AVERAGE POWER (PAPR) - BAND 66

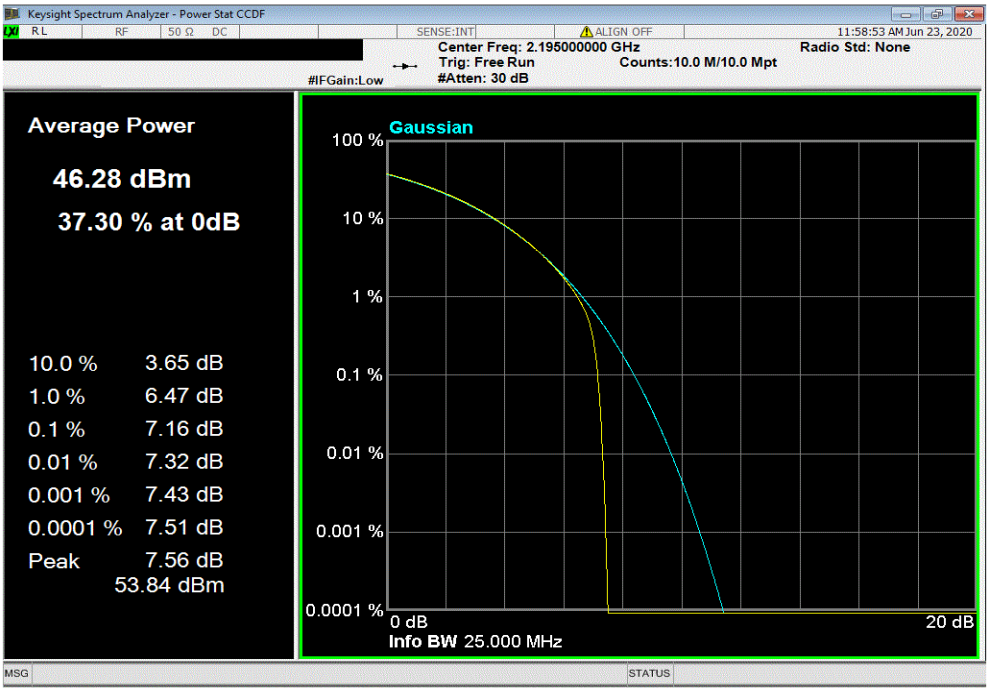
Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, Low Channel 2115 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.13	13	Pass



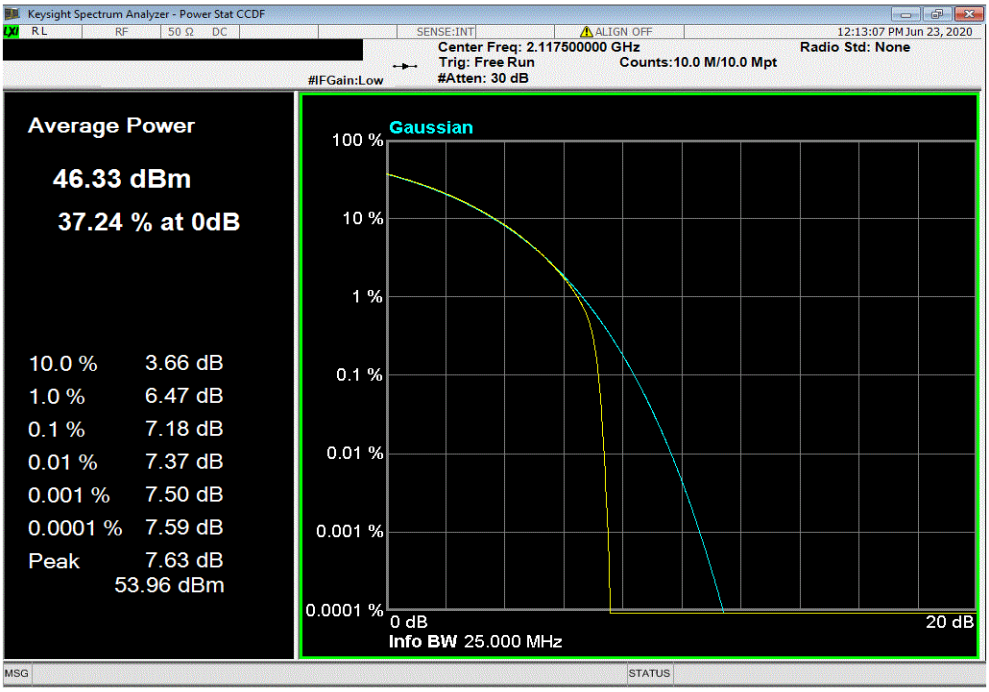
Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.12	13	Pass



Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 10 MHz Bandwidth , QPSK Modulation, High Channel 2195 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.16	13	Pass

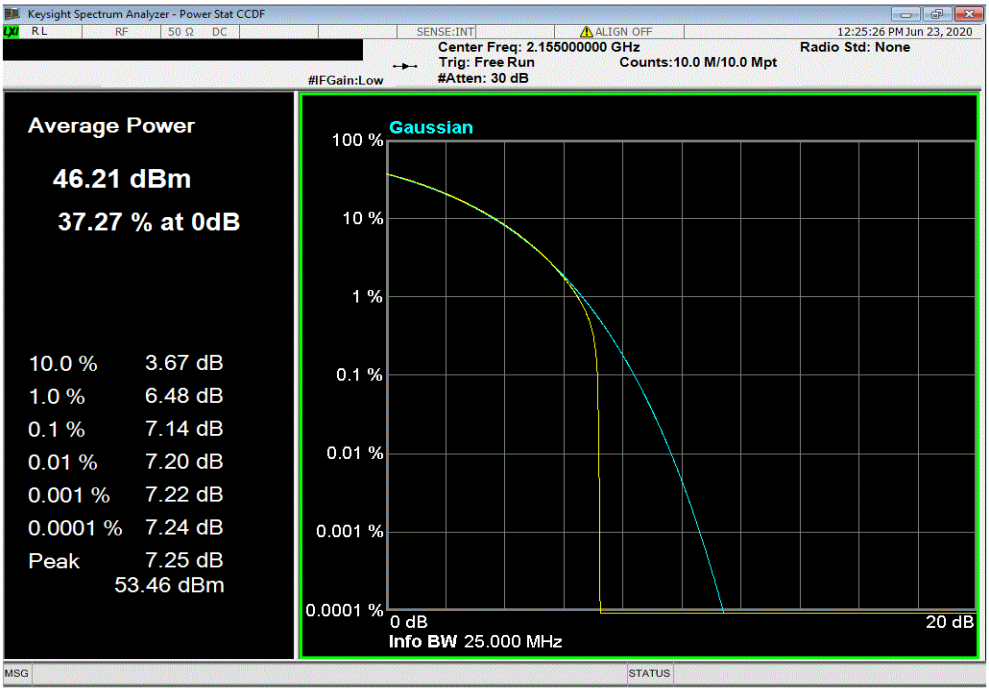


Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, Low Channel 2117.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.18	13	Pass

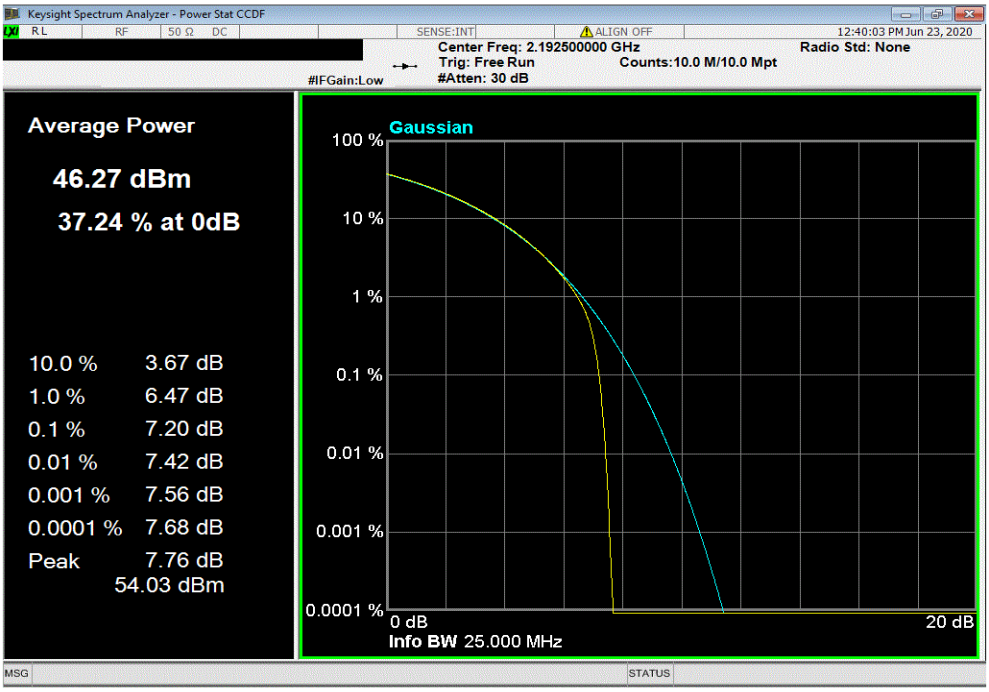


PEAK TO AVERAGE POWER (PAPR) - BAND 66

Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.14	13	Pass

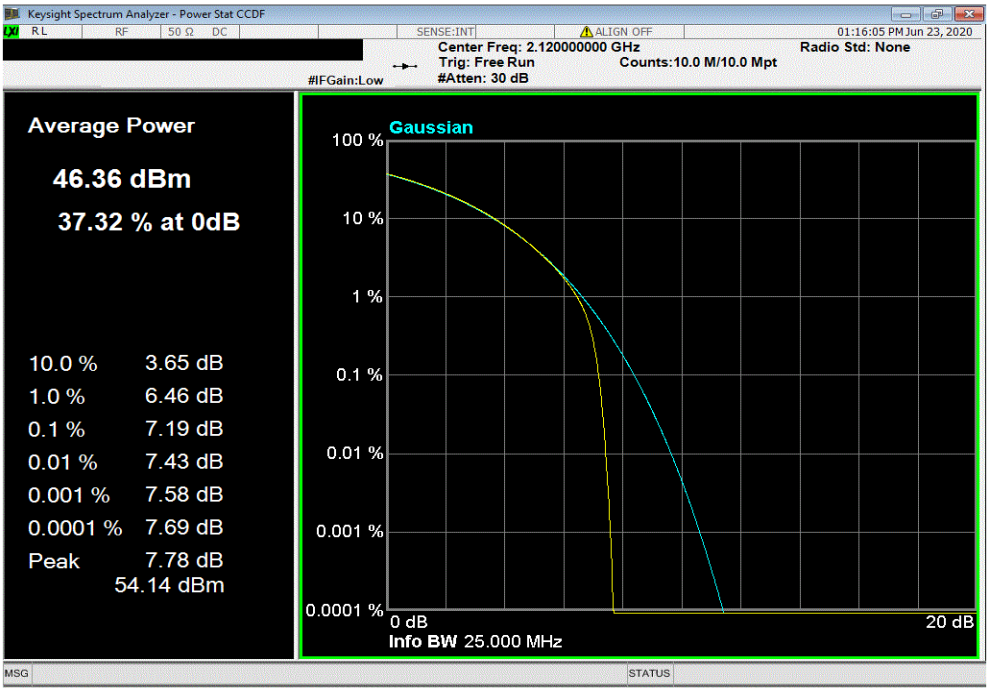


Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 15 MHz Bandwidth , QPSK Modulation, High Channel 2192.5 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.2	13	Pass

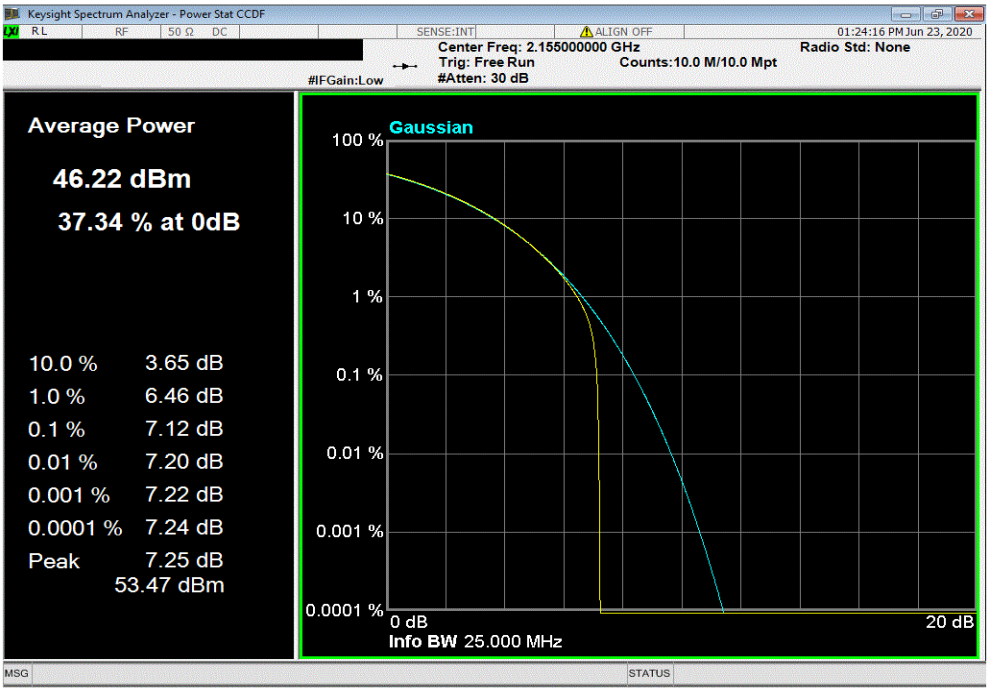


PEAK TO AVERAGE POWER (PAPR) - BAND 66

Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, Low Channel 2120 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.19	13	Pass



Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, Mid Channel 2155 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.12	13	Pass



PEAK TO AVERAGE POWER (PAPR) - BAND 66

Port 4, Band 66 NB IoT, 2110 MHz - 2200 MHz, 20 MHz Bandwidth, QPSK Modulation, High Channel 2190 MHz						
				PAPR Value (dB)	PAPR Limit (dB)	Results
				7.22	13	Pass