

FCC Test Report

(Part 90)

Product Name : Mobile Computer

Model No : RS35

FCC ID : Q3N-RS35

Applicant : Cipherlab Co, Ltd.

Address : 12F, NO.333, SEC.2, DUNHUA S. RD., TAIPEI, TAIWAN, R.O.C.

Date of Receipt : 2020/06/08

Issued Date : 2020/08/08

Report No. : 2060284R-E3042110014

Report Version : V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration report of the equipment and evaluated measurement uncertainty herein.

This report must not be used to claim product endorsement by TAF or any agency of the government.

The test report shall not be reproduced without the written approval of DEKRA Testing and Certification Co., Ltd.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

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Applicant : Cipherlab Co, Ltd.

Address : 12F, NO.333, SEC.2, DUNHUA S. RD., TAIPEI, TAIWAN, R.O.C.

Manufacturer : Cipherlab Co, Ltd.

Trade Name : CIPHERLAB

Model No. : RS35

EUT Rated Voltage : DC 3.6V~4.4V

EUT Test Voltage : DC 3.8V

Measurement Standard : FCC CFR Title 47 Part 90

Measurement Reference : FCC CFR Title 47 Part 2

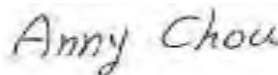
TIA/EIA 603-E 2016

KDB 971168 D01V03R01

ANSI C63.26 2015

Test Result : Complied

Documented By :



(Senior Adm. Specialist / Anny Chou)

Tested By :



(Senior Engineer / Vorana Chen)

Approved By :



(Director / Vincent Lin)

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Revision History

Report No.	Version	Description	Issued Date
2060284R-E3042110014	V1.0	Initial issue of report.	2020-08-08

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Mobile Computer
Model No.	RS35
Trade Name	CIPHERLAB
IMEI No.	35457611
FCC ID	Q3N-RS35
Modulation	LTE Band 26 : QPSK/16-QAM/64-QAM
TX Frequency	LTE Band 26 : 814MHz~824MHz
Rx Frequency	LTE Band 26: 859MHz~869MHz
Bandwidth	LTE Band 26: 1.4MHz/3MHz/5MHz/10MHz/15MHz
HW Version	RS35.GSM.NB.200200515
SW Version	Android version: 10
Antenna Type	PIFA Antenna

1.2. Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Auden	RS35 (WWAN Main)	0.1 dBi for 806-824 MHz
2	Auden	RS35 (WWAN Aux)	-3.0 dBi for 821-869 MHz

1.3. Operational Description

The EUT provide all functions described as above. The EUT is tested with maximum rated TX power via the Base Station simulator.

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined

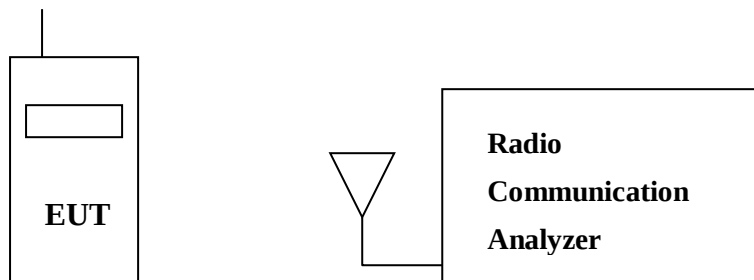
as:

Test Mode:	LTE Band 26 (1.4M)-QPSK/16QAM/64QAM
	LTE Band 26 (3M)-QPSK/16QAM/64QAM
	LTE Band 26 (5M)-QPSK/16QAM/64QAM
	LTE Band 26 (10M)-QPSK/16QAM/64QAM
	LTE Band 26 (15M)-QPSK/16QAM/64QAM

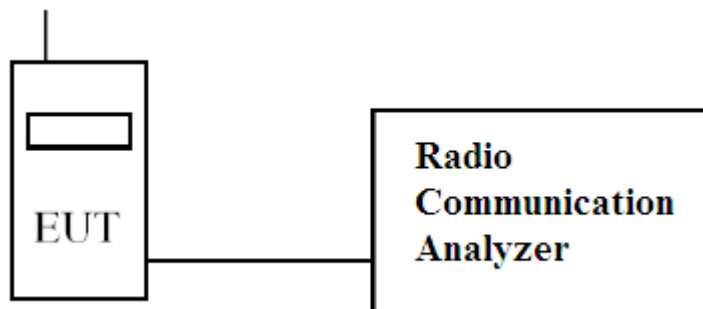
Note: All operation modes has been verified and the report shows the worst case mode.

1.4. Configuration of tested System

(a) Configuration of Radiated measurement



(b) Configuration of Conducted measurement



1.5. EUT Setup Procedures

- (1) Setup the EUT and simulators as shown on 1.3
- (2) Turn on the power of all equipments.
- (3) The EUT link with base station and it will continue receive the signal.
- (4) Repeat the above procedure (3).

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	17 ~ 27
Humidity (%RH)	25-75	45 ~ 60

USA : FCC Registration Number: TW3023

Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: <http://www.dekra.com.tw>

2. Technical Test

2.1. Summary of test result

Test Item	FCC Reference section	FCC Limit	Result
RF Output Power	§2.1046	<100 Watts	Pass
	§90.635(b)		
Occupied Bandwidth	§2.1049	Within the frequency range	Pass
	§90.209(b)		
Spurious Emission at Antenna Terminals	§2.1051	<-20dBm for less than 37.5 kHz <-13dBm for greater than 37.5 kHz	Pass
	§90.691		
Conducted Emission	§2.1051	<-13dBm	Pass
	§90.691		
Field Strength of Spurious Radiation	§2.1053	<-13dBm	Pass
	§90.691		
Frequency Stability for Temperature & Voltage	§2.1055	<±2.5 ppm	Pass
	§90.213		
Peak to Average Ratio	N/A	N/A	N/A

2.2. List of test Equipment

Conducted /CTR

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY54510357	2020/05/14
Directional coupler	Agilent	87300C	MY44300353	2019/12/05
Directional coupler	Agilent	778D-012	50550	2019/12/05
Standard Temperature & Humidity Chamber	WIT	TH-1S-B	EQ-201-00146	2020/04/06
DC power supply	Agilent	E3610A	MY40009845	2020/06/30
Communication Tester	R&S	CMW500	157304	2019/11/13

Radiated / Site3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2707	2020/01/20
Horn Antenna	SCHWARZBECK	9120D	867	2020/04/21
Pre-Amplifier	Agilent	87405C	MY55380068	2019/08/09
Spectrum Analyzer	Agilent	N9010A	MY54510357	2020/05/14
DC power supply	Agilent	E3646A	MY53020023	2019/10/14
Communication Tester	R&S	CMW500	157304	2019/11/13

2.3. Measurement Uncertainty

Conducted Emission

The measurement uncertainty of confidence of 95% is evaluated as ± 1.52 dB

Radiated Emission (Below 1GHz)

The measurement uncertainty of confidence of 95% is evaluated as ± 4.22 dB

Radiated Emission (Above 1GHz)

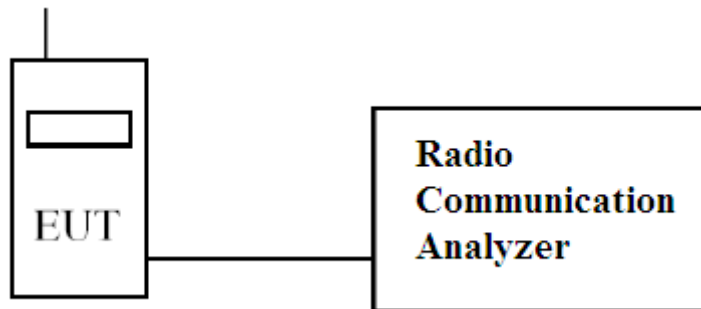
The measurement uncertainty of confidence of 95% is evaluated as ± 4.08 dB

3. Conducted Output Power Measurement

3.1. Test Specification

According to FCC Part 2.1046, 90.635

3.2. Test Setup



3.3. Limits

Band	Limit
LTE Band 26/850	ERP <100W

3.4. Test Procedure

The EUT is tested with maximum rated TX power via the Base Station simulator, and the output power was measured at the antenna terminals of the EUT.

3.5. Test Result of Maximum Power Output

Channel	Modulation	LTE Band 26 (850MHz)							
		RB	RB	Maximum Conducted Output Power					
		No.	Offset	1.4M	3M	5M	10M	15M	20M
Low	QPSK	1	#0	23.64	23.49	23.52	--	--	--
		1	#Mid	23.73	23.64	23.78	--	--	--
		1	#Max	23.71	23.59	23.35	--	--	--
		50%	#0	23.72	22.72	22.61	--	--	--
		50%	#Mid	23.77	22.79	22.68	--	--	--
		50%	#Max	23.69	22.70	22.69	--	--	--
		100%	--	22.54	22.62	22.63	--	--	--
	16QAM	1	#0	22.69	22.41	22.31	--	--	--
		1	#Mid	22.65	22.83	22.76	--	--	--
		1	#Max	22.70	22.37	22.25	--	--	--
		50%	#0	22.78	21.75	21.65	--	--	--
		50%	#Mid	22.87	21.62	21.74	--	--	--
		50%	#Max	22.81	21.44	21.76	--	--	--
		100%	--	21.41	21.71	21.51	--	--	--
	64QAM	1	#0	21.43	21.21	21.25	--	--	--
		1	#Mid	21.70	21.49	21.66	--	--	--
		1	#Max	21.38	21.26	21.04	--	--	--
		50%	#0	21.67	20.77	20.82	--	--	--
		50%	#Mid	21.64	20.93	20.70	--	--	--
		50%	#Max	21.68	20.82	20.81	--	--	--
		100%	--	20.88	20.83	20.75	--	--	--
Mid	QPSK	1	#0	23.59	23.78	23.31	23.38	23.59	--
		1	#Mid	23.60	23.65	23.93	23.71	23.61	--
		1	#Max	23.49	23.22	23.20	23.47	23.64	--
		50%	#0	23.62	22.71	22.68	22.59	22.67	--
		50%	#Mid	23.63	22.69	22.70	22.67	22.57	--
		50%	#Max	23.69	22.72	22.58	22.60	22.70	--
		100%	--	22.55	22.71	22.69	22.68	22.73	--
	16QAM	1	#0	22.25	22.57	22.43	22.19	22.49	--
		1	#Mid	22.46	22.51	22.52	22.67	22.47	--
		1	#Max	22.40	22.24	22.37	22.37	22.48	--
		50%	#0	22.35	21.65	21.77	21.73	21.64	--
		50%	#Mid	22.31	21.73	21.79	21.74	21.64	--

		50%	#Max	22.18	21.36	21.50	21.67	21.64	--
		100%	--	21.46	21.53	21.70	21.68	21.74	--
	64QAM	1	#0	21.95	21.81	21.96	21.55	21.55	--
		1	#Mid	22.11	22.12	22.12	22.07	21.81	--
		1	#Max	21.40	21.17	21.87	21.44	21.55	--
		50%	#0	22.06	20.84	20.97	20.73	20.91	--
		50%	#Mid	22.20	20.72	20.96	20.79	20.98	--
		50%	#Max	21.68	20.80	20.83	20.51	20.96	--
		100%	--	20.89	21.04	20.80	20.77	20.95	--
High	QPSK	1	#0	23.57	23.24	23.37	--	--	--
		1	#Mid	23.63	23.89	23.69	--	--	--
		1	#Max	23.60	23.44	23.18	--	--	--
		50%	#0	23.62	22.57	22.69	--	--	--
		50%	#Mid	23.68	22.54	22.72	--	--	--
		50%	#Max	23.77	22.61	22.62	--	--	--
		100%	--	22.50	22.55	22.64	--	--	--
	16QAM	1	#0	22.44	22.47	22.41	--	--	--
		1	#Mid	22.37	22.40	22.36	--	--	--
		1	#Max	22.49	22.23	22.37	--	--	--
		50%	#0	22.53	21.25	21.44	--	--	--
		50%	#Mid	22.54	21.55	21.78	--	--	--
		50%	#Max	22.58	21.64	21.82	--	--	--
		100%	--	21.40	21.54	21.63	--	--	--
	64QAM	1	#0	22.12	21.67	21.54	--	--	--
		1	#Mid	22.25	22.05	21.56	--	--	--
		1	#Max	21.79	21.60	21.27	--	--	--
		50%	#0	22.15	20.85	20.76	--	--	--
		50%	#Mid	22.22	20.72	20.93	--	--	--
		50%	#Max	21.96	20.87	21.01	--	--	--
		100%	--	20.34	20.71	20.89	--	--	--

3.6. Maximum Conducted Power and ERP/EIRP Power

According to KDB 412172 D01 Section 1.2 Power Approach

$$\text{EIRP} = P_T + G_T - L_C = \text{ERP} + 2.15 \text{ dB}, \text{ERP} = \text{EIRP} - 2.15 \text{ dB}$$

P_T = transmitter output power in dBm

G_T = gain of the transmitting antenna in dBi

L_C = signal attenuation in the connecting cable between the transmitter and antenna in dB

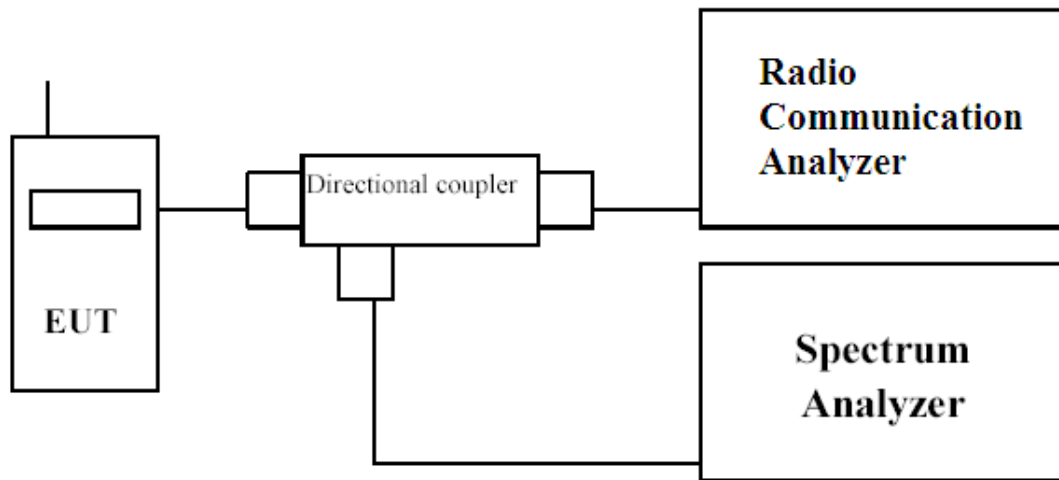
LTE Band	BW	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (W)	Antenna Gain (dBi)	Maximum ERP/EIRP (W)	Maximum ERP/EIRP Limit (W)
26	1.4M	QPSK	23.77	0.238	0.1	0.149	100
		16QAM	22.87	0.194	0.1	0.121	100
		64QAM	22.25	0.168	0.1	0.105	100
	3M	QPSK	23.89	0.245	0.1	0.153	100
		16QAM	22.83	0.192	0.1	0.120	100
		64QAM	22.12	0.163	0.1	0.102	100
	5M	QPSK	23.93	0.247	0.1	0.154	100
		16QAM	22.76	0.189	0.1	0.118	100
		64QAM	22.12	0.163	0.1	0.102	100
	10M	QPSK	23.71	0.235	0.1	0.147	100
		16QAM	22.67	0.185	0.1	0.115	100
		64QAM	22.07	0.161	0.1	0.100	100
	15M	QPSK	23.64	0.231	0.1	0.144	100
		16QAM	22.49	0.177	0.1	0.111	100
		64QAM	21.81	0.152	0.1	0.095	100

4. Occupied Bandwidth

4.1. Test Secification

According to FCC Part 2.1049, 90.209

4.2. Test Setup



4.3. Test Procedure

The EUT is tested with maximum rated TX power via the Base Station simulator, and the occupied bandwidth was measured at the antenna terminals of the EUT.

The Resolution BW of the analyzer is set to 1 %~5% of the emission bandwidth. The EUT's occupied bandwidth is measured as the width of the signal between two points, one below the carrier center frequency and one above the carrier frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

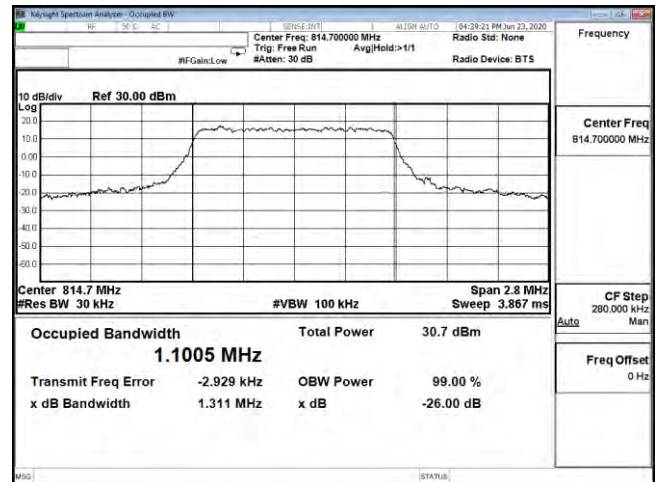
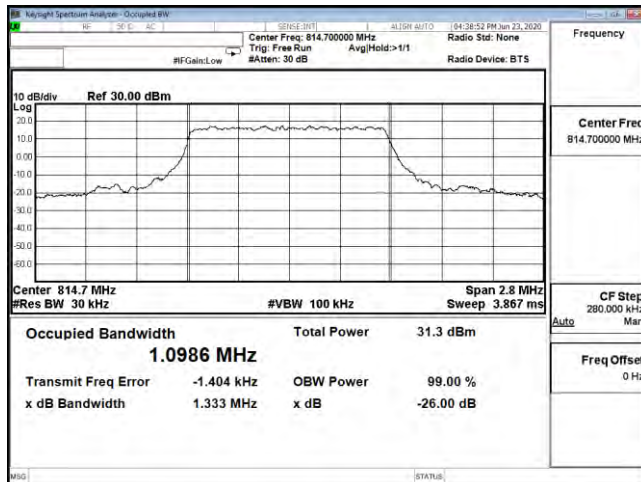
The plots below show the resultant display from the Spectrum Analyser.

4.4. Test Result of Occupied Bandwidth

Product	Mobile Computer
Test Mode	Occupied Bandwidth
Test Site	CTR
Date of Test	2020/07/07

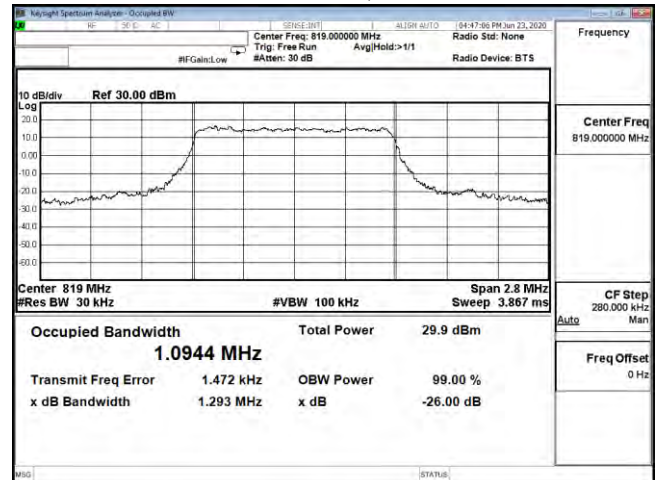
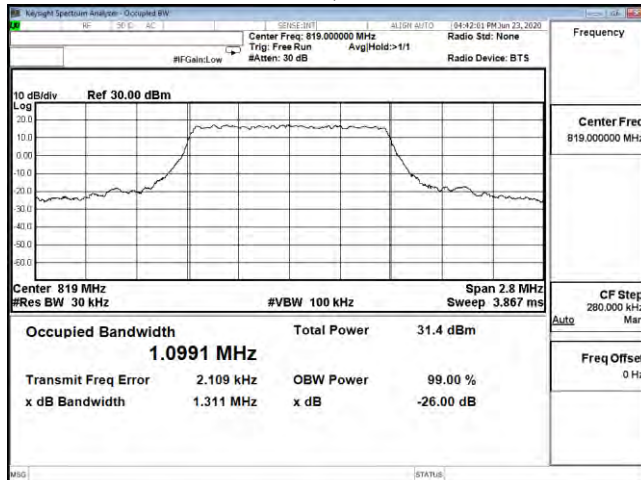
BW	Channel	Frequency (MHz)	99% Occupied Bandwidth (MHz)			26 dB bandwidth (MHz)		
			QPSK	16QAM	64QAM	QPSK	16QAM	64QAM
1.4M	26697	814.7	1.0986	1.1005	1.0926	1.333	1.311	1.291
1.4M	26740	819	1.0991	1.0944	1.1070	1.311	1.293	1.321
1.4M	26783	823.3	1.0959	1.1003	1.0920	1.300	1.308	1.288
3M	26705	815.5	2.7386	2.7590	2.7419	3.073	3.065	3.056
3M	26740	819	2.7441	2.7288	2.7274	3.058	3.051	3.051
3M	26775	822.5	2.7360	2.7308	2.7315	3.063	3.063	3.054
5M	26715	816.5	4.5022	4.5156	4.4983	5.040	5.038	5.001
5M	26740	819	4.5146	4.4927	4.4981	5.022	4.964	4.982
5M	26765	821.5	4.5013	4.5136	4.5090	5.011	5.030	4.980
10M	--	--	--	--	--	--	--	--
10M	26740	819	9.0531	9.0399	9.0424	10.120	10.020	10.070
10M	--	--	--	--	--	--	--	--
15M	--	--	--	--	--	--	--	--
15M	26765	821.5	13.4530	13.4420	13.4100	14.680	14.650	14.610
15M	--	--	--	--	--	--	--	--

Product	Mobile Computer		
Test Mode	Occupied Bandwidth		
Date of Test	2020/07/07	Test Site	CTR
Test Condition	Band 26 QPSK/16QAM/64QAM		



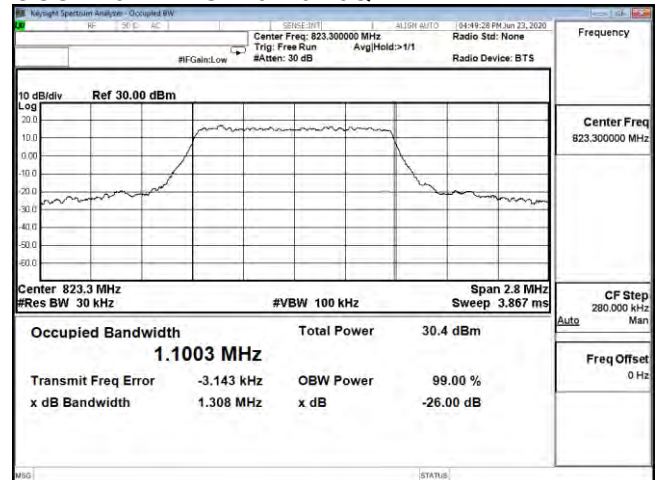
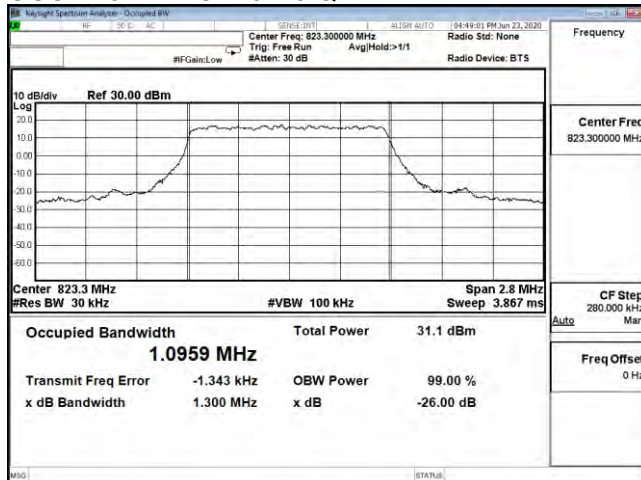
OCC B26 1.4M CH26697 QPSK

OCC B26 1.4M CH26697 16QAM



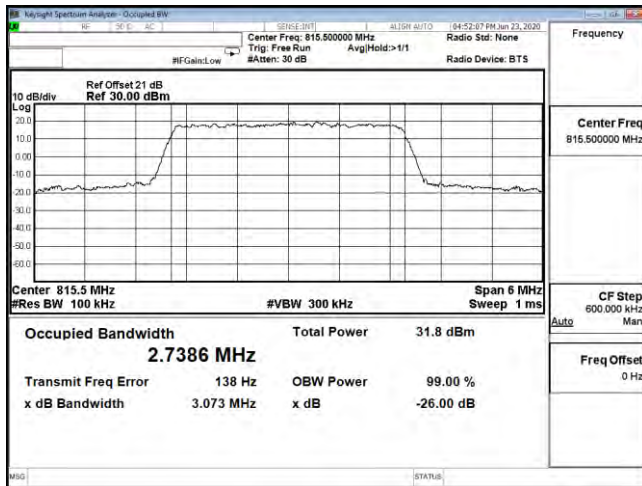
OCC B26 1.4M CH26740 QPSK

OCC B26 1.4M CH26740 16QAM

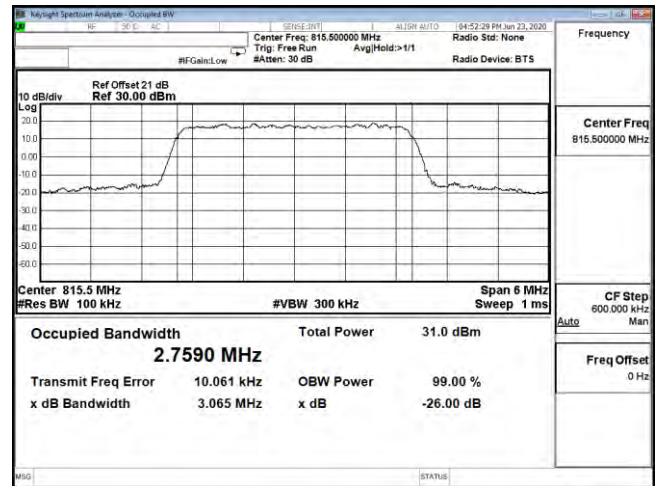


OCC B26 1.4M CH26783 QPSK

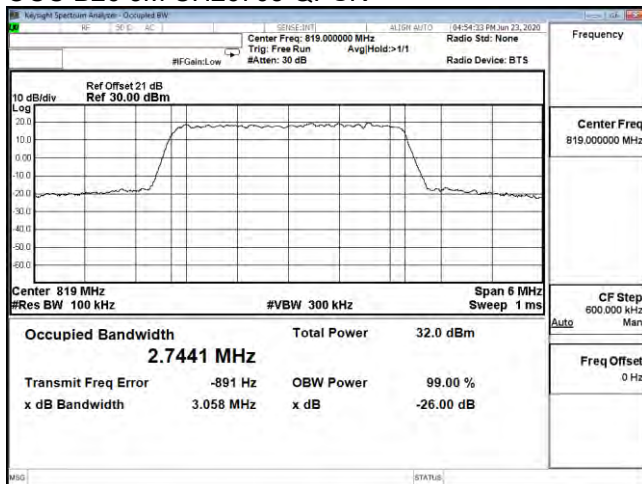
OCC B26 1.4M CH26783 16QAM



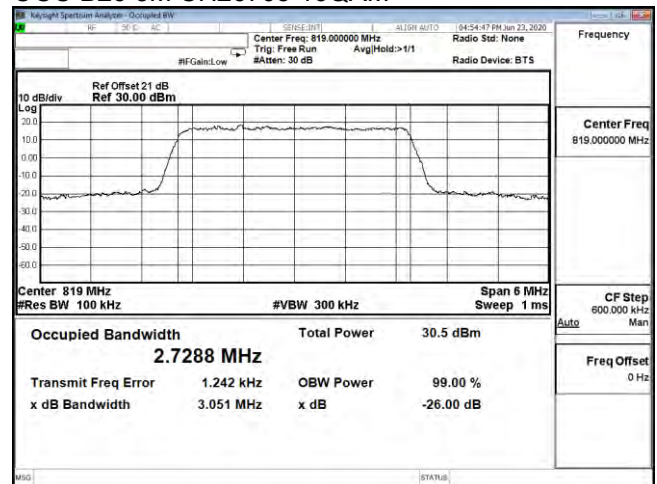
OCC B26 3M CH26705 QPSK



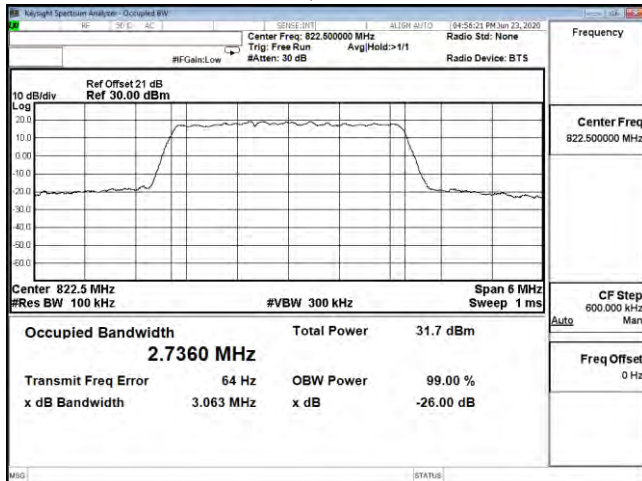
OCC B26 3M CH26705 16QAM



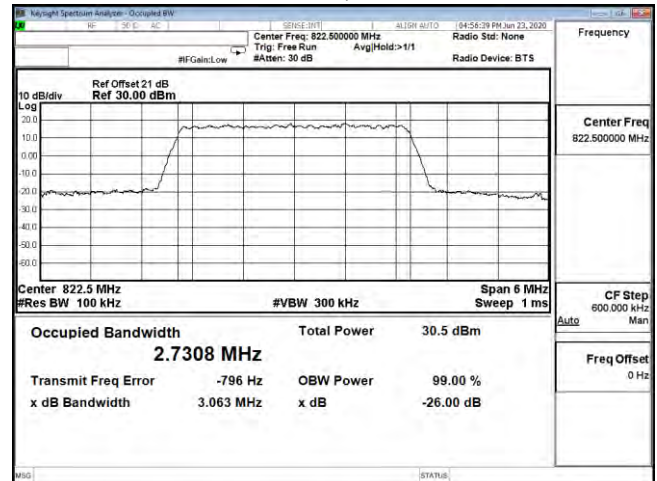
OCC B26 3M CH26740 QPSK



OCC B26 3M CH26740 16QAM



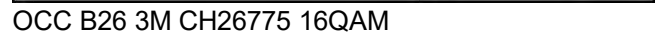
OCC B26 3M CH26740 QPSK



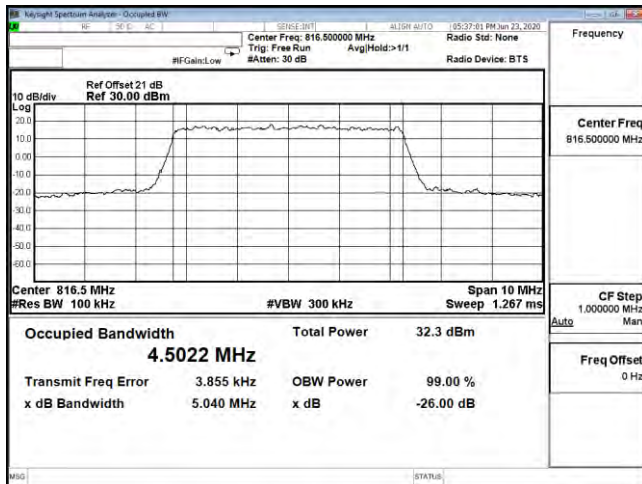
OCC B26 3M CH26740 16QAM



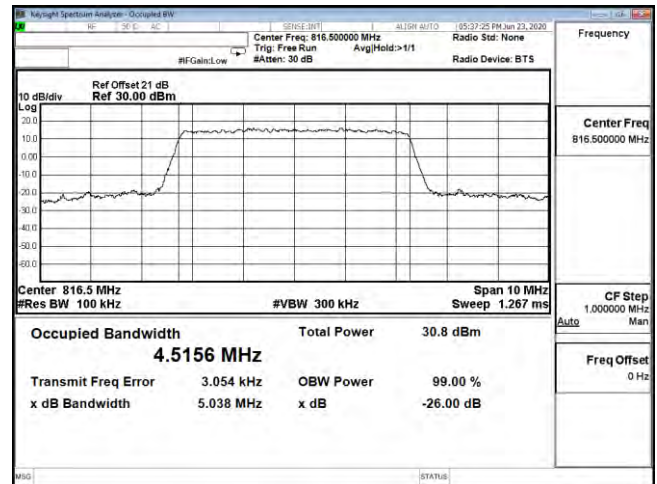
OCC B26 3M CH26775 QPSK



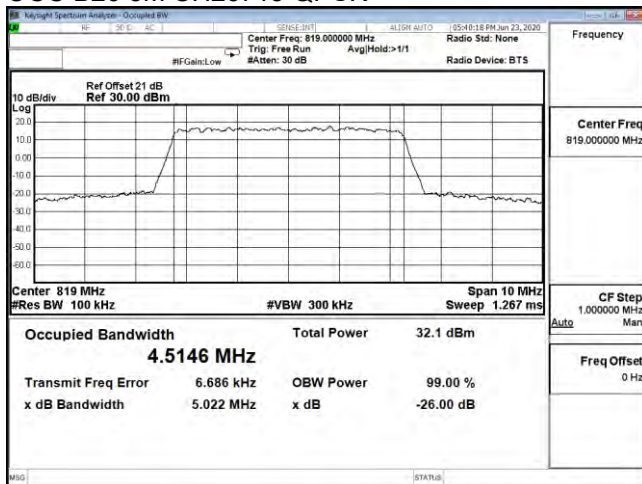
OCC B26 3M CH26775 16QAM



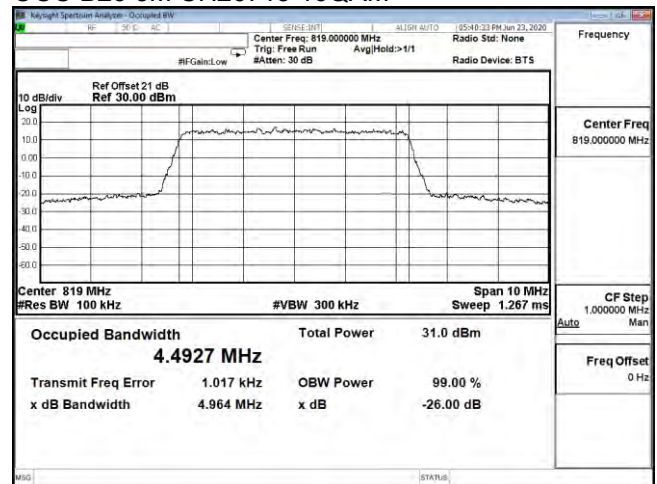
OCC B26 5M CH26715 QPSK



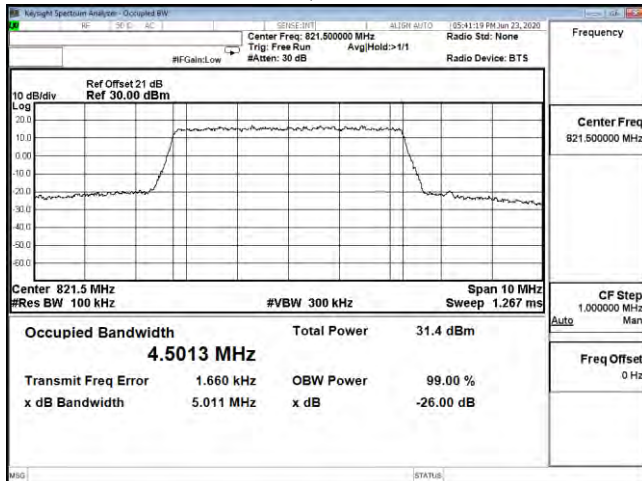
OCC B26 5M CH26715 16QAM



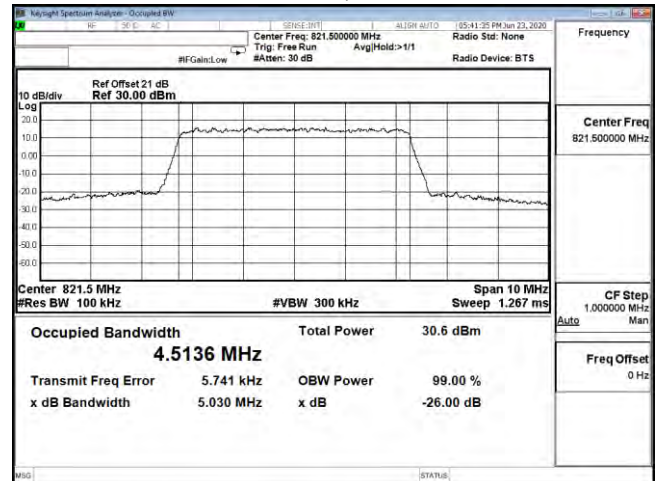
OCC B26 5M CH26740 QPSK



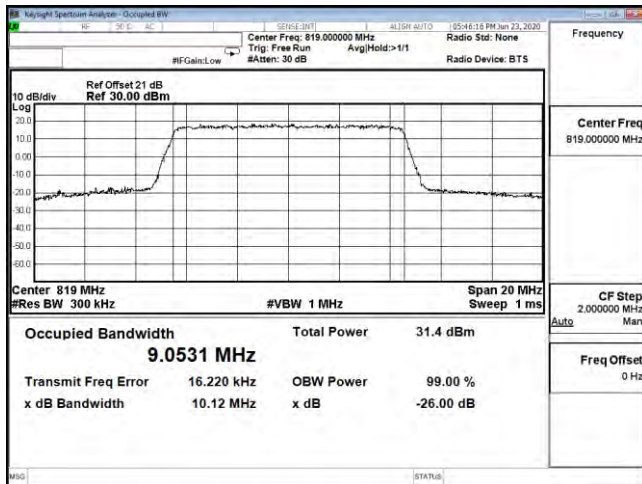
OCC B26 5M CH26740 16QAM



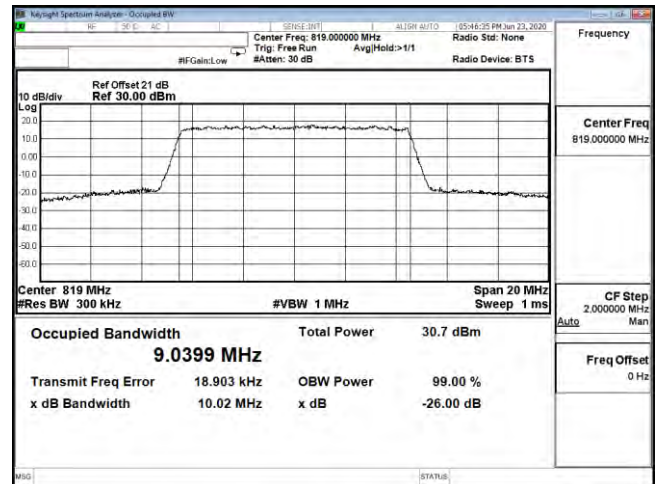
OCC B26 5M CH26765 QPSK



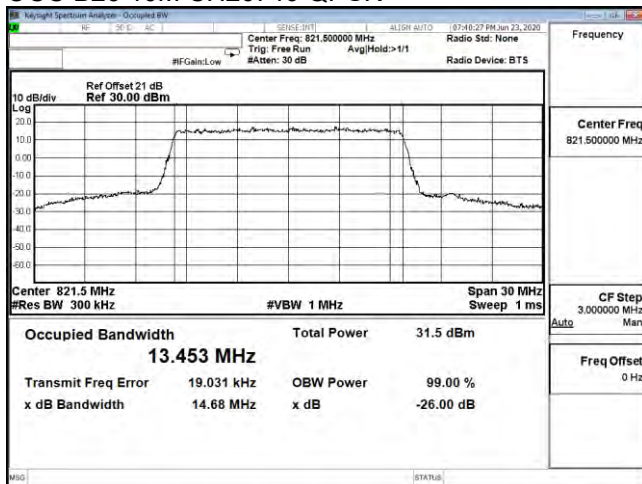
OCC B26 5M CH26765 16QAM



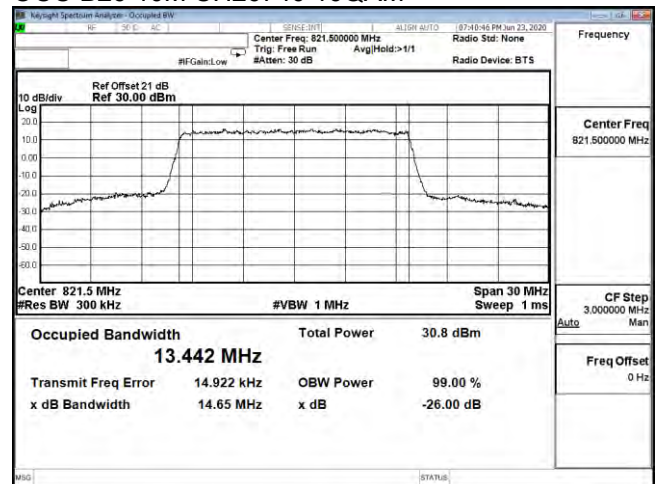
OCC B26 10M CH26740 QPSK



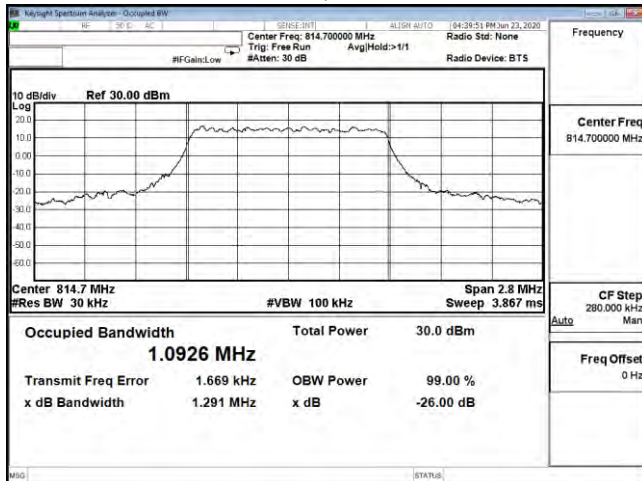
OCC B26 10M CH26740 16QAM



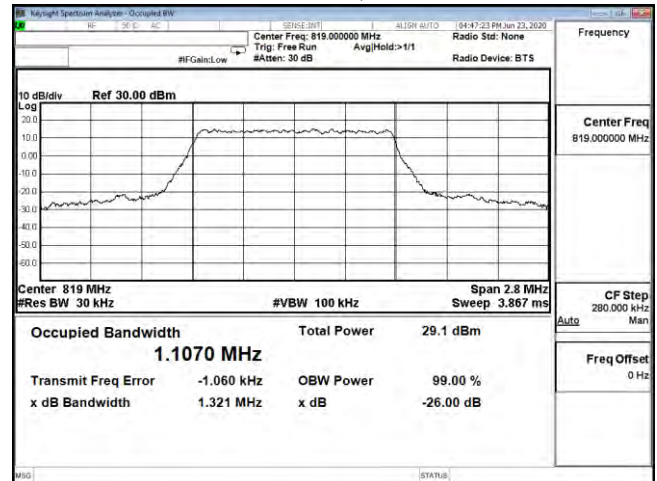
OCC B26 10M CH26740 QPSK



OCC B26 10M CH26740 16QAM



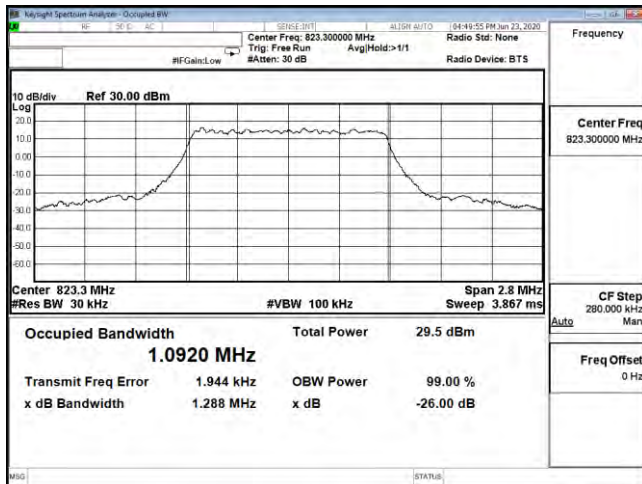
OCC B26 15M CH26765 QPSK



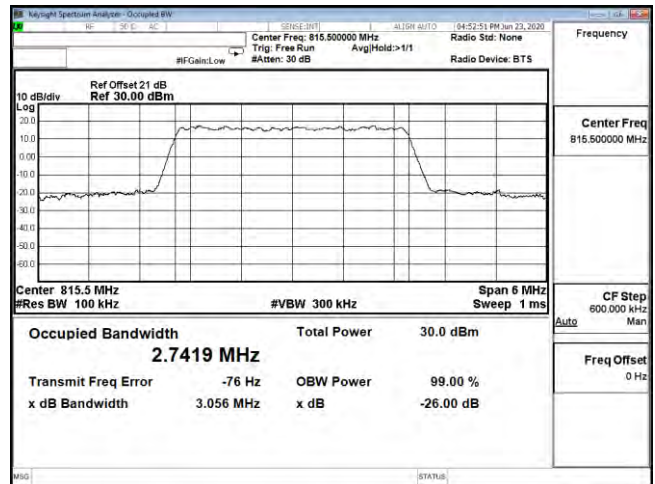
OCC B26 15M CH26765 16QAM

OCC B26 1.4M CH26697 64QAM

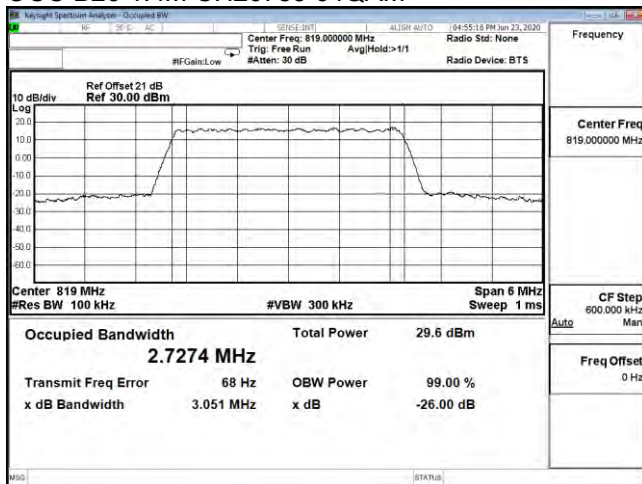
OCC B26 1.4M CH26740 64QAM



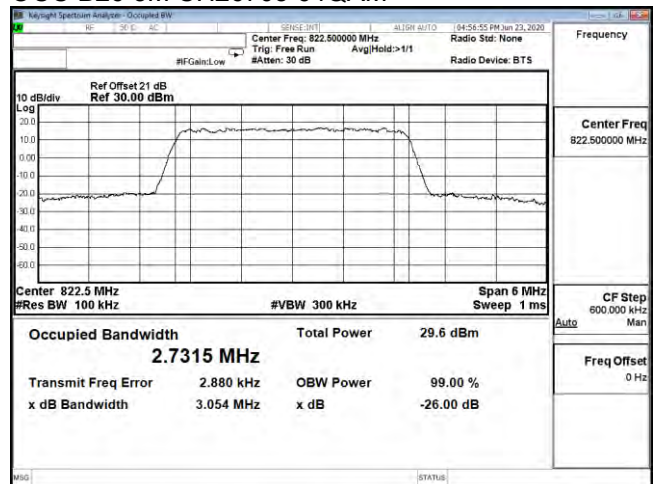
OCC B26 1.4M CH26783 64QAM



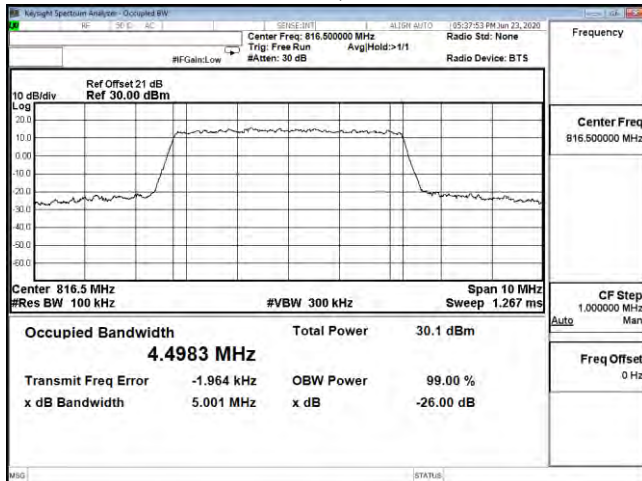
OCC B26 3M CH26705 64QAM



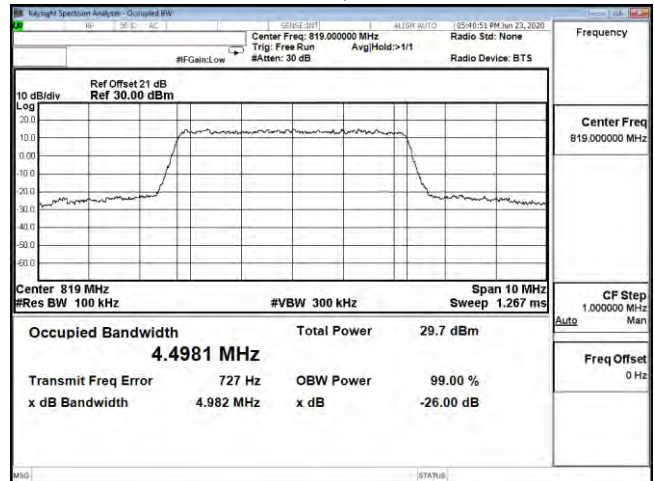
OCC B26 3M CH26740 64QAM



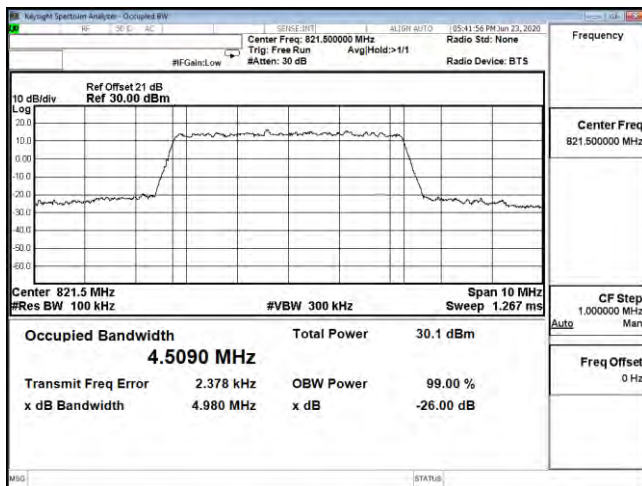
OCC B26 3M CH26775 64QAM



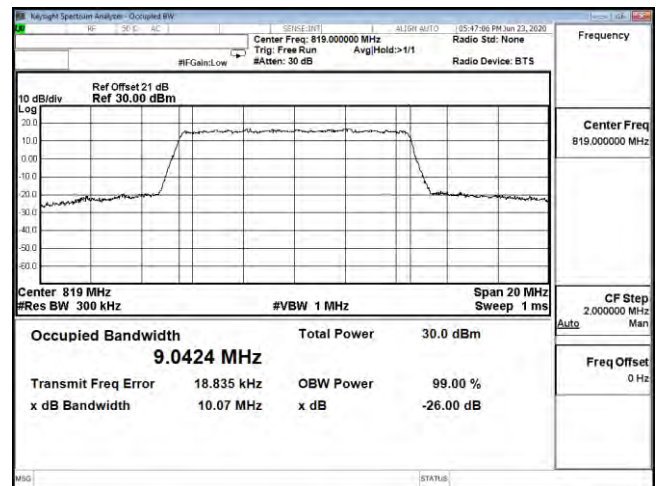
OCC B26 5M CH26715 64QAM



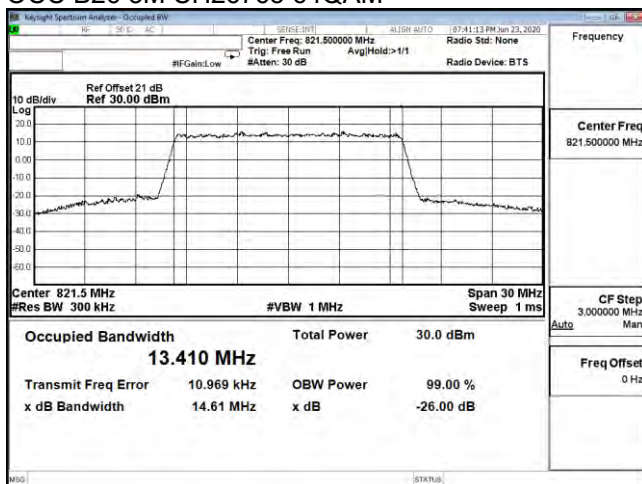
OCC B26 5M CH26740 64QAM



OCC B26 5M CH26765 64QAM



OCC B26 10M CH26740 64QAM



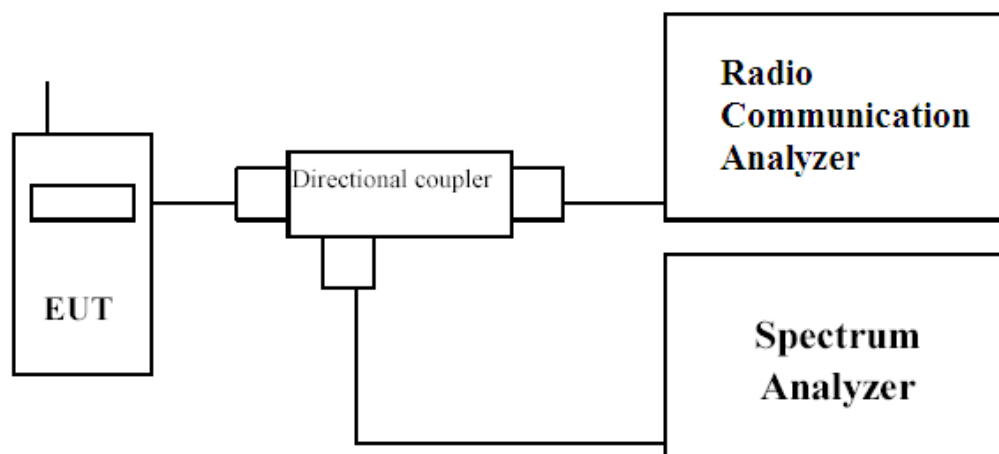
CC B26 15M CH26765 64QAM

5. Spurious Emission At Antenna Terminals (+/-1MHz)

5.1. Test Specification

According to Part 2.1051, 90.691

5.2. Setup



5.3. Limits

(1) For any frequency removed from the EA licensee's frequency block by up to and including 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $116 \log_{10}(f/6.1)$ decibels or $50 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 12.5 kHz.

(2) For any frequency removed from the EA licensee's frequency block greater than 37.5 kHz, the power of any emission shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ decibels or 80 decibels, whichever is the lesser attenuation, where f is the frequency removed from the center of the outer channel in the block in kilohertz and where f is greater than 37.5 kHz.

5.4. Test Procedure

In accordance with Part 90.691 at least 1% of the emission bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz, the resolution and video bandwidth were increased to 1MHz/3MHz.

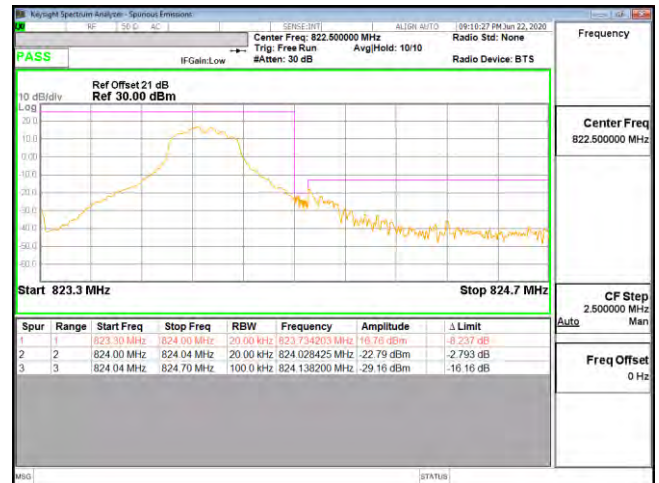
The reference power and path losses of all channels used for testing in each frequency block were measured.

5.5. Test Result of Spurious Emission At Antenna Terminals (+/-1MHz)

Product	Mobile Computer		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2020/06/20	Test Site	CTR
Test Condition	Block Edge Test (Band 26)		



Band edge B26 1.4M CH26697 QPSK(1,0)



Band edge B26 1.4M CH26783 QPSK(1,5)



Band edge B26 1.4M CH26697 16QAM(1,0)



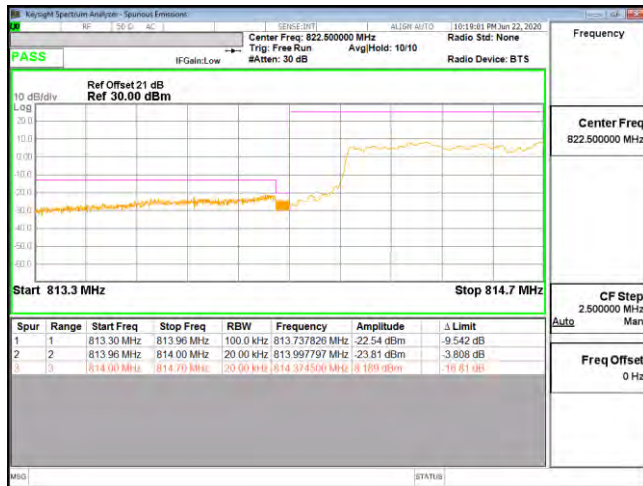
Band edge B26 1.4M CH26783 16QAM(1,5)



Band edge B26 1.4M CH26697 64QAM(1,0)



Band edge B26 1.4M CH26783 64QAM(1,5)



Band edge B26 1.4M CH26697 QPSK(6,0)



Band edge B26 1.4M CH26783 QPSK(6,0)



Band edge B26 1.4M CH26697 16QAM(6,0)



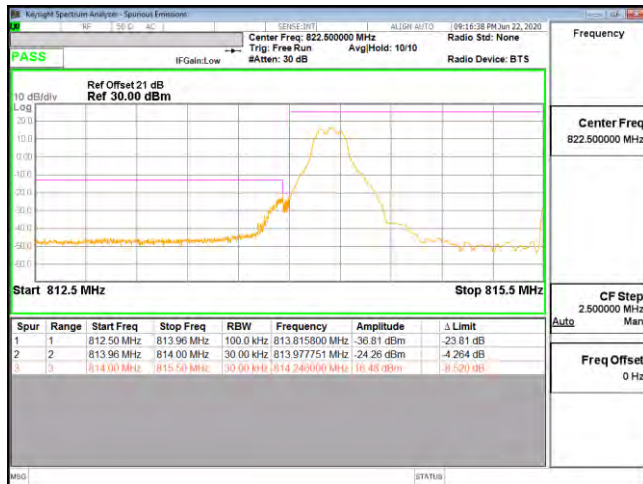
Band edge B26 1.4M CH26783 16QAM(6,0)



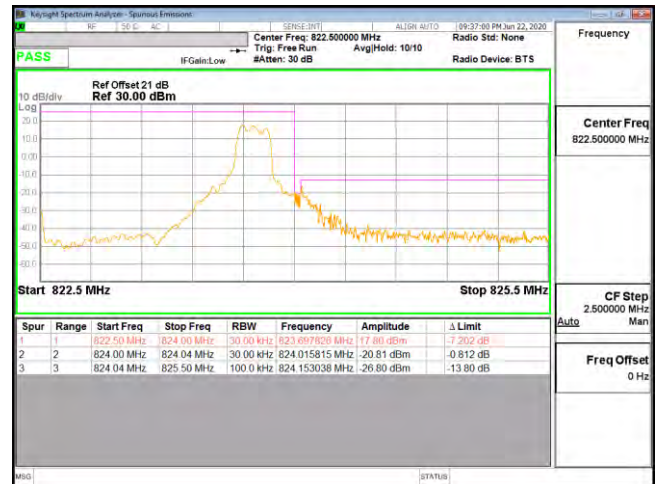
Band edge B26 1.4M CH26697 64QAM(6,0)



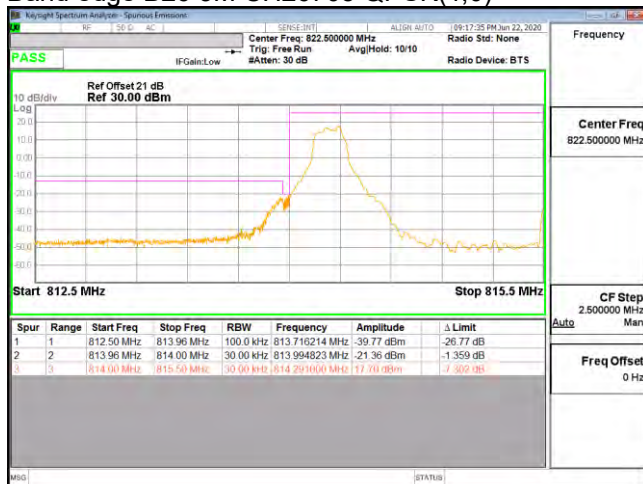
Band edge B26 1.4M CH26783 64QAM(6,0)



Band edge B26 3M CH26705 QPSK(1,0)



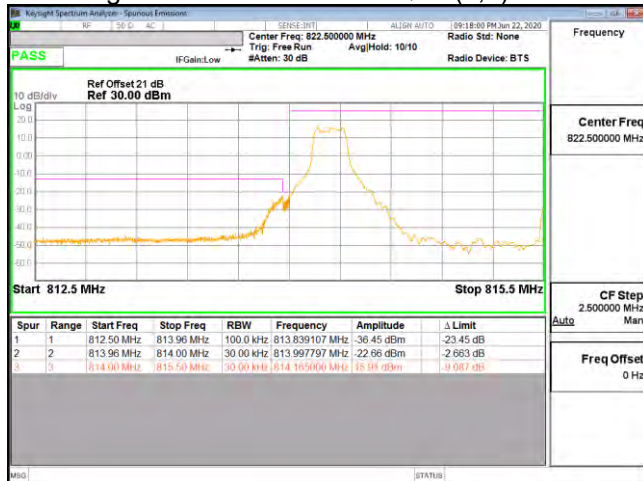
Band edge B26 3M CH26775 QPSK(1,14)



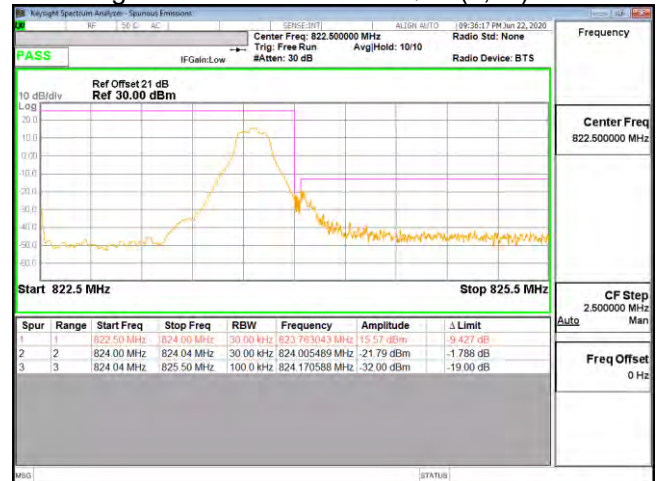
Band edge B26 3M CH26705 16QAM(1,0)



Band edge B26 3M CH26775 16QAM(1,14)



Band edge B26 3M CH26705 64QAM(1,0)



Band edge B26 3M CH26775 64QAM(1,14)



Band edge B26 3M CH26705 QPSK(15,0)



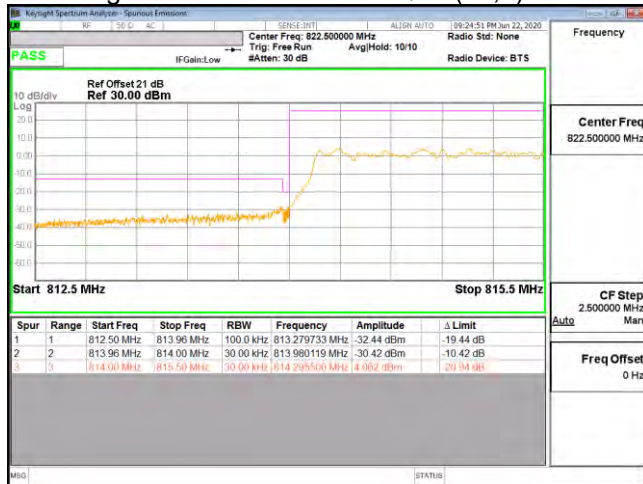
Band edge B26 3M CH26775 QPSK(15,0)



Band edge B26 3M CH26705 16QAM(15,0)



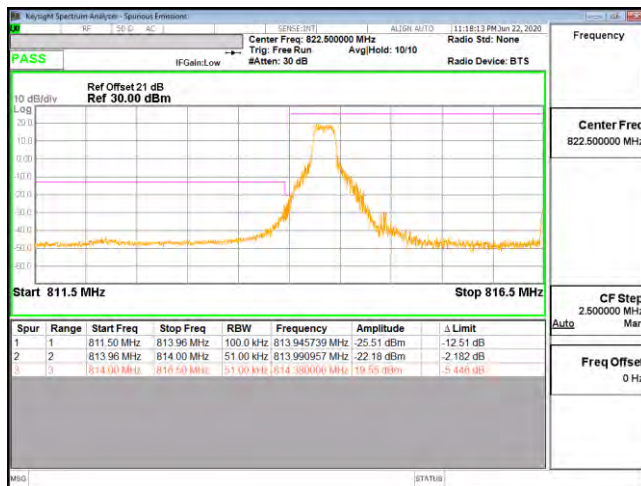
Band edge B26 3M CH26775 16QAM(15,0)



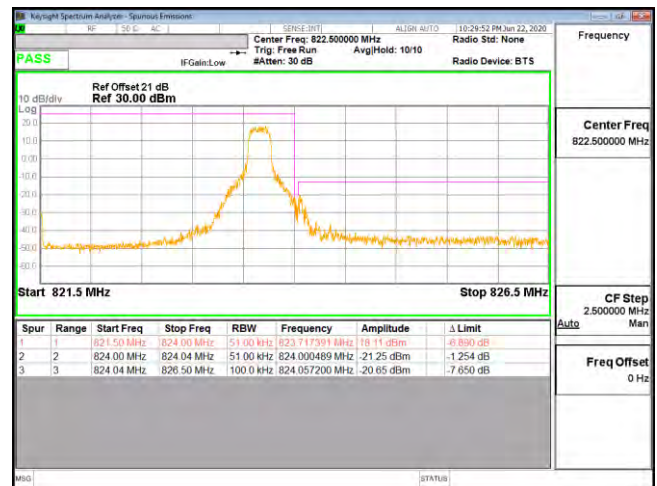
Band edge B26 3M CH26705 64QAM(15,0)



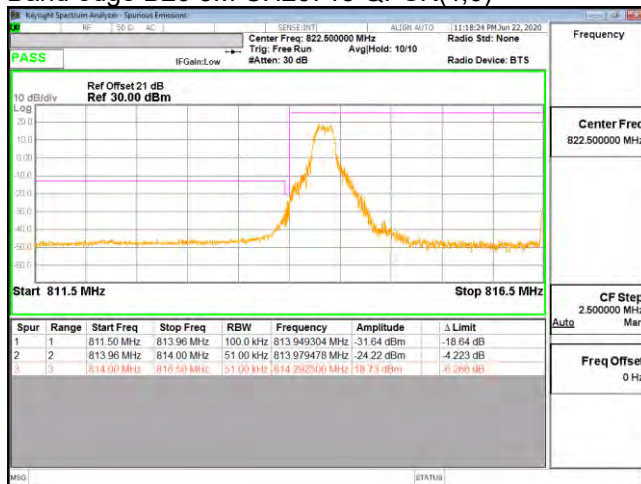
Band edge B26 3M CH26775 64QAM(15,0)



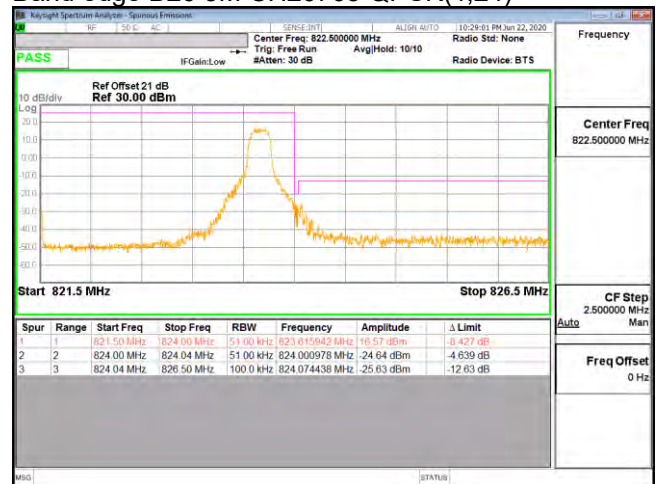
Band edge B26 5M CH26715 QPSK(1,0)



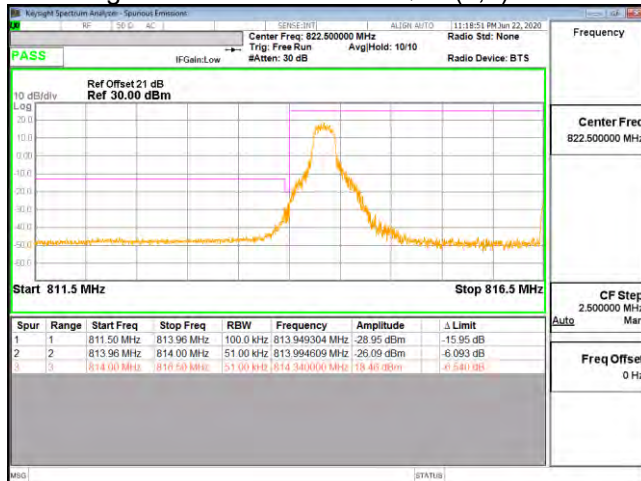
Band edge B26 5M CH26765 QPSK(1,24)



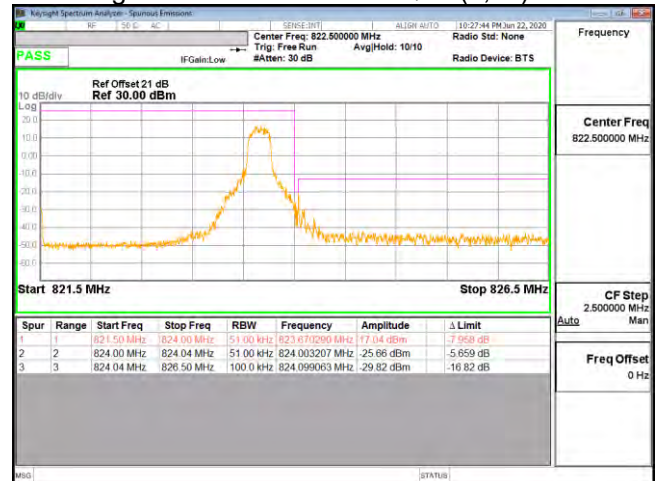
Band edge B26 5M CH26715 16QAM(1,0)



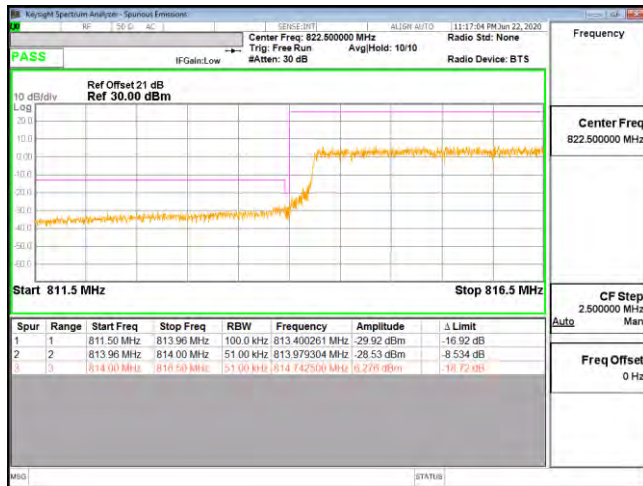
Band edge B26 5M CH26765 16QAM(1,24)



Band edge B26 5M CH26715 64QAM(1,0)



Band edge B26 5M CH26765 64QAM(1,24)



Band edge B26 5M CH26715 QPSK(25,0)



Band edge B26 5M CH26765 QPSK(25,0)



Band edge B26 5M CH26715 16QAM(25,0)



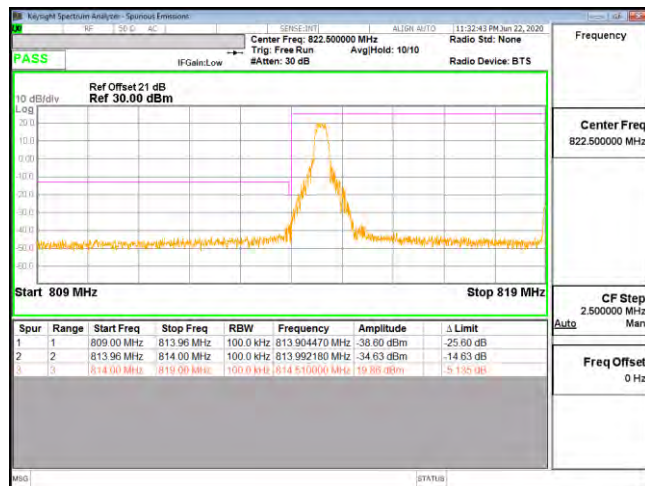
Band edge B26 5M CH26765 16QAM(25,0)



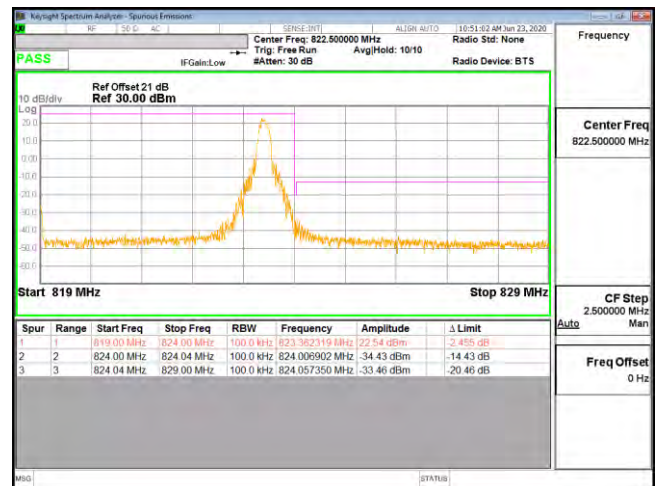
Band edge B26 5M CH26715 64QAM(25,0)



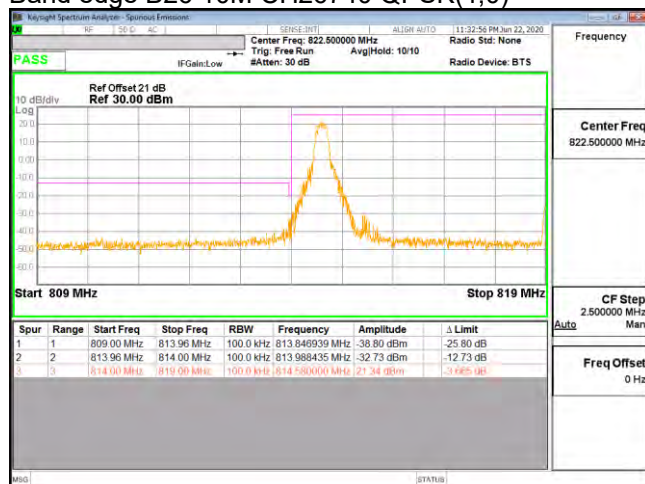
Band edge B26 5M CH26765 64QAM(25,0)



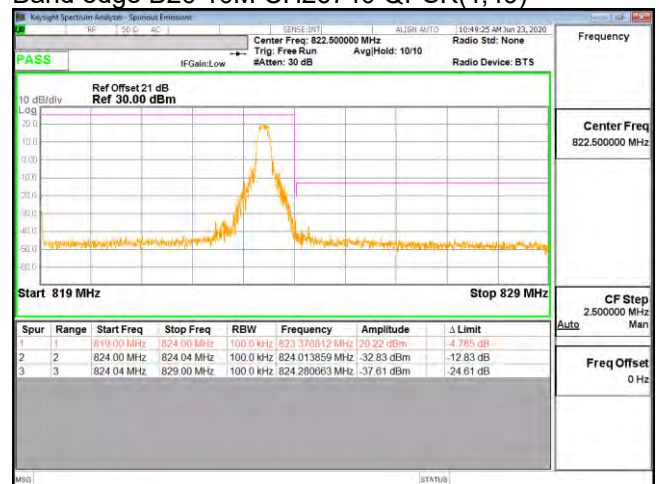
Band edge B26 10M CH26740 QPSK(1,0)



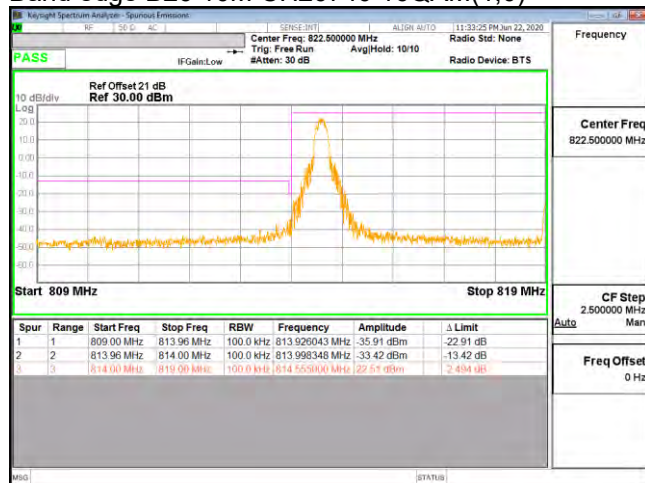
Band edge B26 10M CH26740 QPSK(1,49)



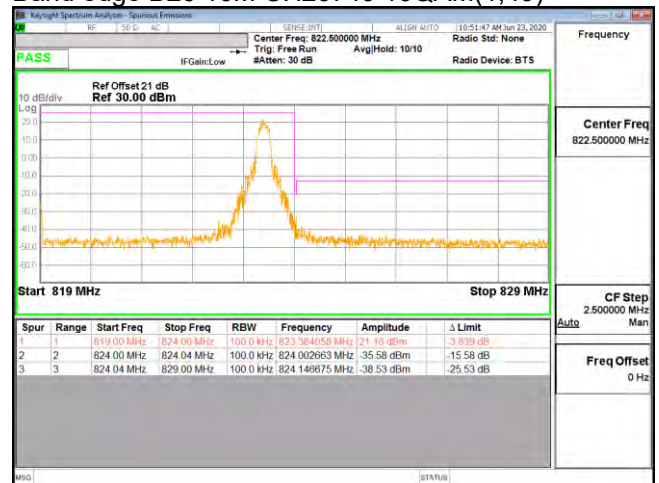
Band edge B26 10M CH26740 16QAM(1,0)



Band edge B26 10M CH26740 16QAM(1,49)



Band edge B26 10M CH26740 64QAM(1,0)



Band edge B26 10M CH26740 64QAM(1,49)



Band edge B26 10M CH26740 QPSK(50,0)-LOWER



Band edge B26 10M CH26740 QPSK(50,0)-UPPER



Band edge B26 10M CH26740 16QAM(50,0)-LOWER



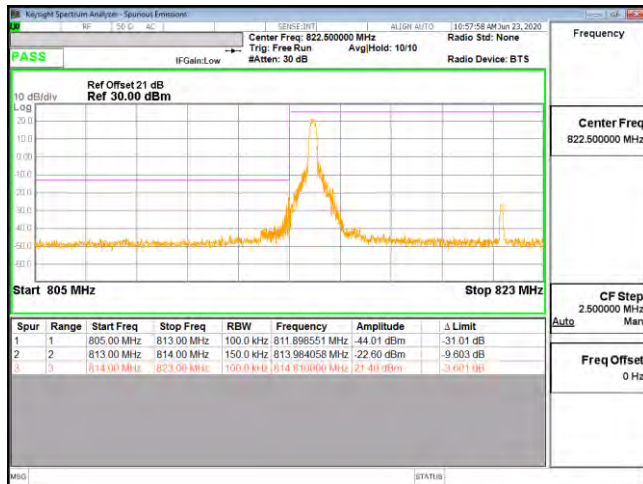
Band edge B26 10M CH26740 16QAM(50,0)-UPPER



Band edge B26 10M CH26740 64QAM(50,0)-LOWER



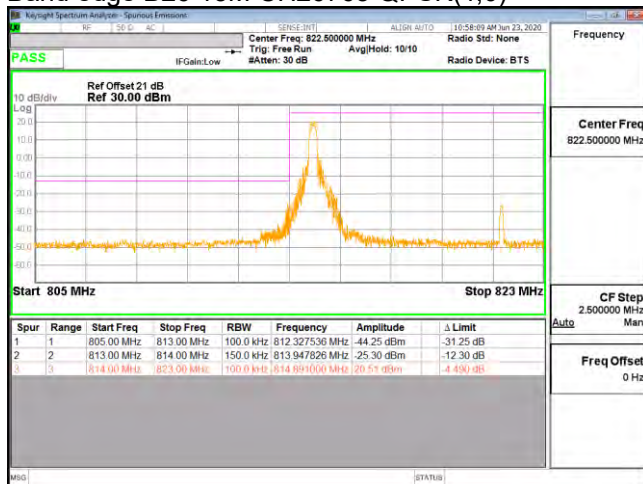
Band edge B26 10M CH26740 64QAM(50,0)-UPPER



Band edge B26 15M CH26765 QPSK(1,0)



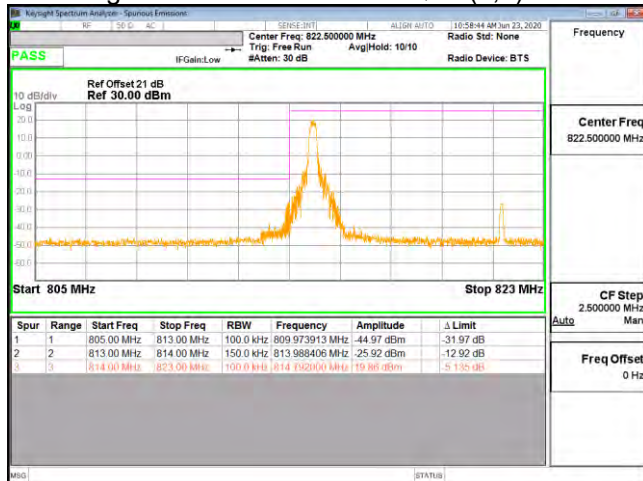
Band edge B26 15M CH26765 QPSK(75,0)



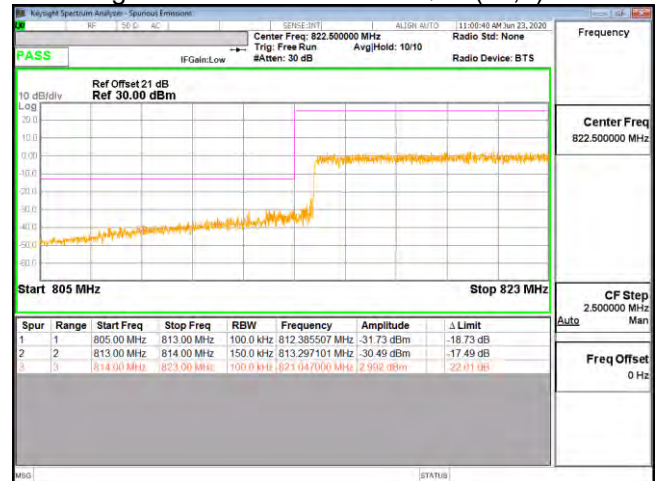
Band edge B26 15M CH26765 16QAM(1,0)



Band edge B26 15M CH26765 16QAM(75,0)



Band edge B26 15M CH26765 64QAM(1,0)



Band edge B26 15M CH26765 64QAM(75,0)

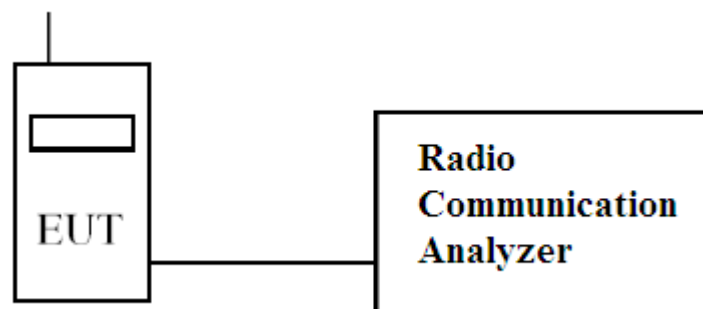
6. Spurious Emission

6.1. Test Specification

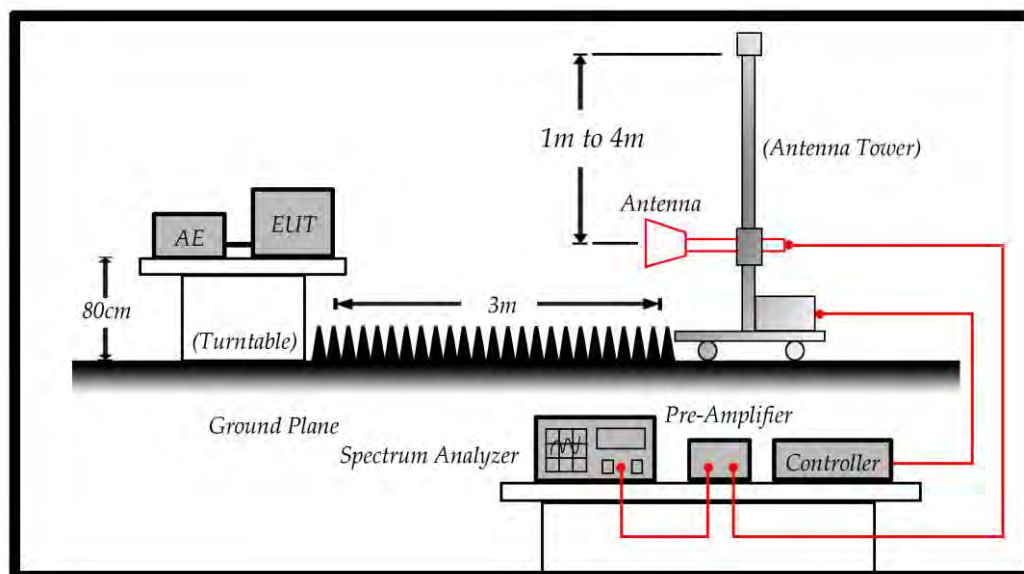
According to Part 2.1051, 90.691

6.2. Test Setup

6.2.1 Spurious emissions at antenna terminals.



6.2.2 Field strength of spurious radiation.



Note: The Worst case Mode is QPSK Mode for Radiated spurious emissions.

6.3. Limits

Limit	<-13dBm
-------	---------

$43 + 10\log(P)$ down on the carrier where P is the power in Watts.

6.4. Test Procedure

In accordance with Part 2.1051, 90.691, the spurious emissions from the antenna terminal were measured. The transmitter output power was attenuated using a combination of filters and attenuators and the frequency spectrum investigated from 30MHz to 20GHz. The EUT was set to transmit on full power. The EUT was tested on Low, middle and High channels for both power levels. The resolution and video bandwidth was set to 1MHz/3MHz in accordance with Part 2.1051, 90.691. The spectrum analyzer detector was set to Max Hold. In addition, measurements were made up to the 10th harmonic of the fundamental. The device was then replaced with a substitution antenna, which input signal was adjusted until the received level matched that of the previously detected emission.

- (1) The EUT is tested with maximum rated TX power via the Base Station simulator.
- (2) The EUT is tested in three orthogonal planes, The worst case was showing in this report.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to TIA/EIA 603-D on radiated measurement.

6.5. Test Result of Spurious Emission

Product	Mobile Computer		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2020/07/15	Test Site	CTR
Test Condition	LTE-Band 26	Test Range	30MHz~10GHz



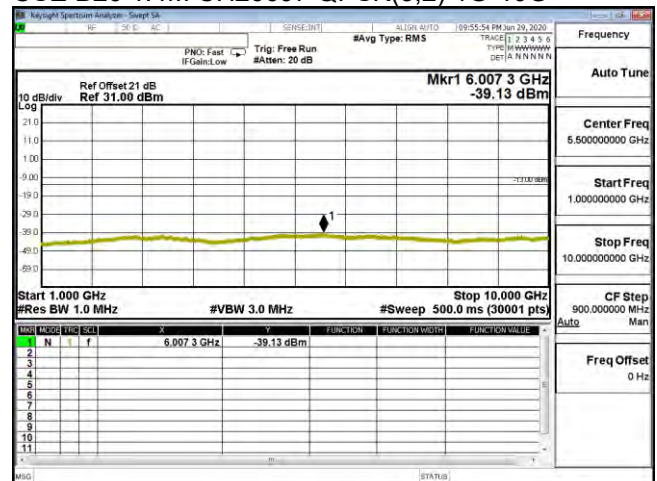
CSE B26 1.4M CH26697 QPSK(3,2) 30M-1G



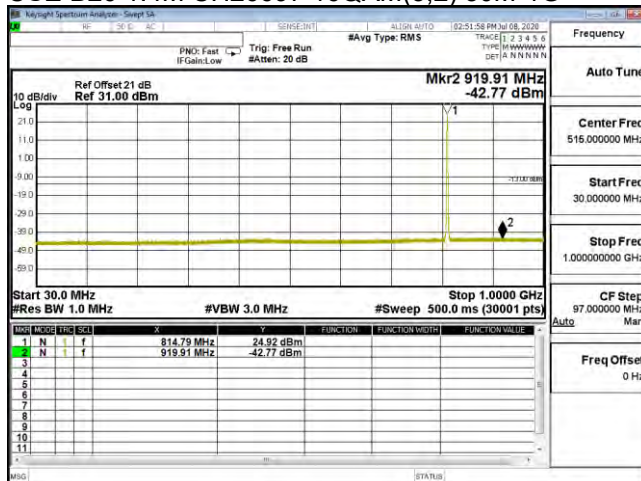
CSE B26 1.4M CH26697 QPSK(3,2) 1G-10G



CSE B26 1.4M CH26697 16QAM(3,2) 30M-1G



CSE B26 1.4M CH26697 16QAM(3,2) 1G-10G



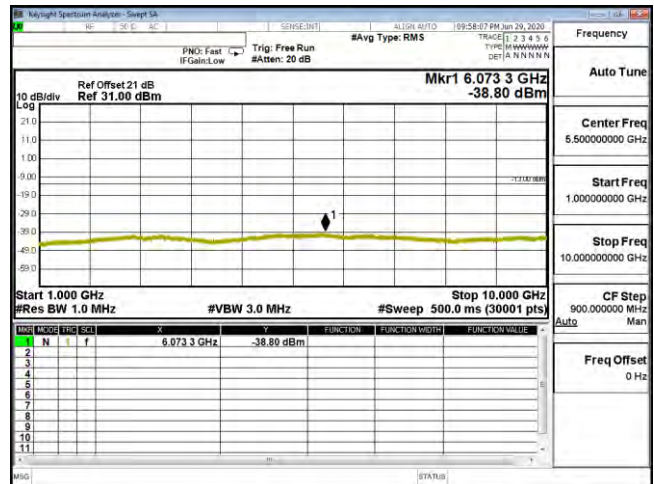
CSE B26 1.4M CH26697 64QAM(1,2) 30M-1G



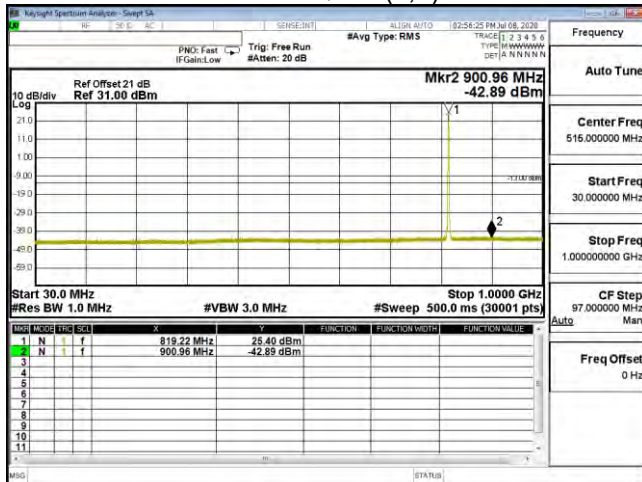
CSE B26 1.4M CH26697 64QAM(1,2) 1G-10G



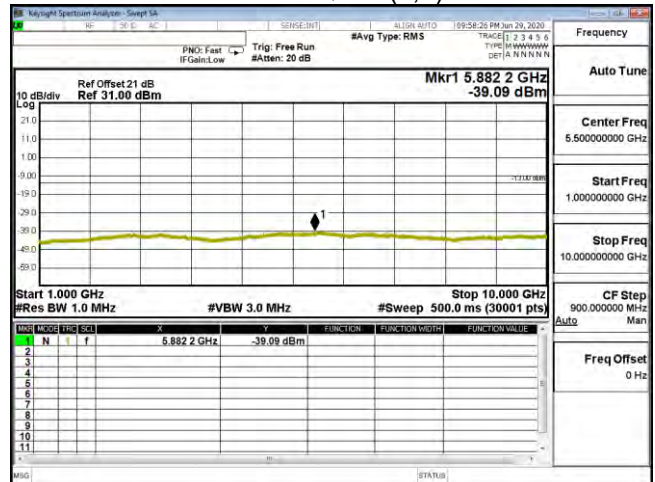
CSE B26 1.4M CH26740 QPSK(3,3) 30M-1G



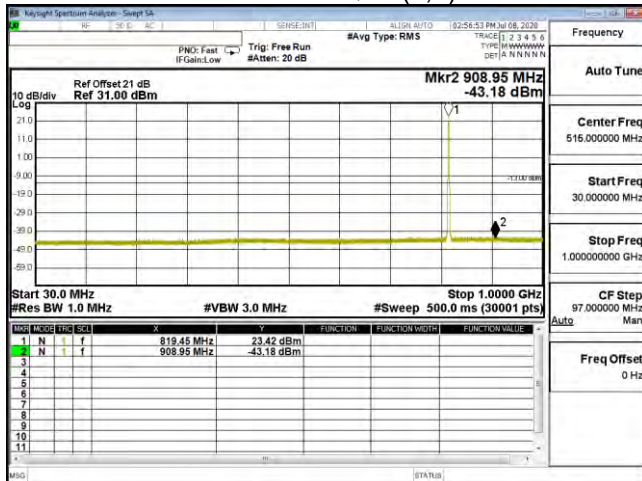
CSE B26 1.4M CH26740 QPSK(3,3) 1G-10G



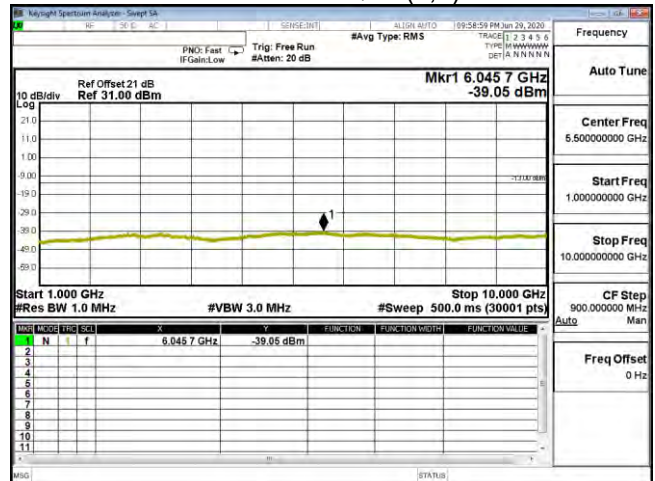
CSE B26 1.4M CH26740 16QAM(1,2) 30M-1G



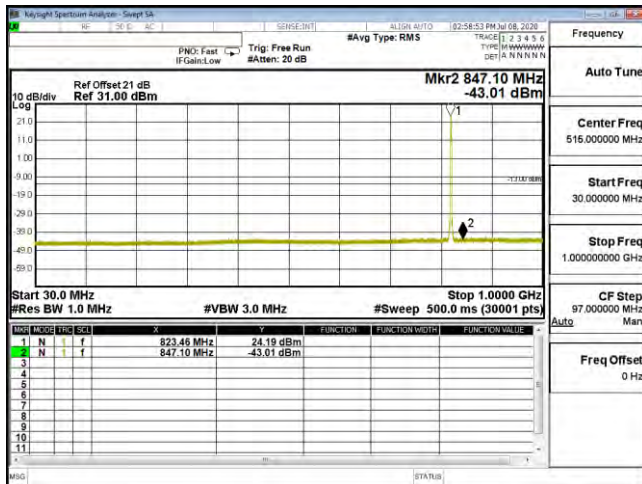
CSE B26 1.4M CH26740 16QAM(1,2) 1G-10G



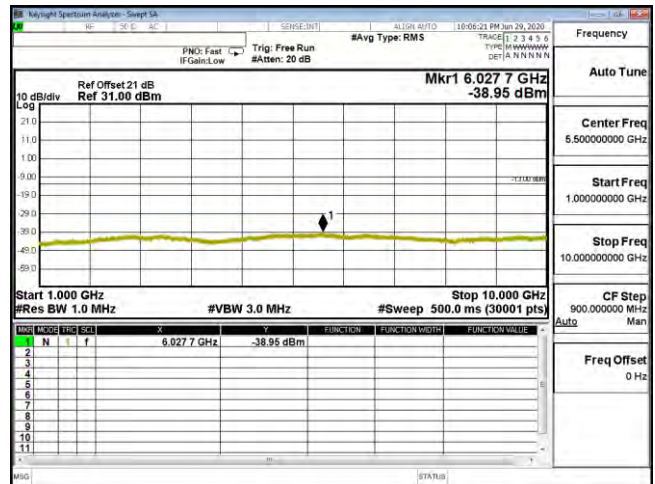
CSE B26 1.4M CH26740 64QAM(3,2) 30M-1G



CSE B26 1.4M CH26740 64QAM(3,2) 1G-10G



CSE B26 1.4M CH26783 QPSK(3,3) 30M-1G



CSE B26 1.4M CH26783 QPSK(3,3) 1G-10G



CSE B26 1.4M CH26783 16QAM(3,3) 30M-1G



CSE B26 1.4M CH26783 16QAM(3,3) 1G-10G



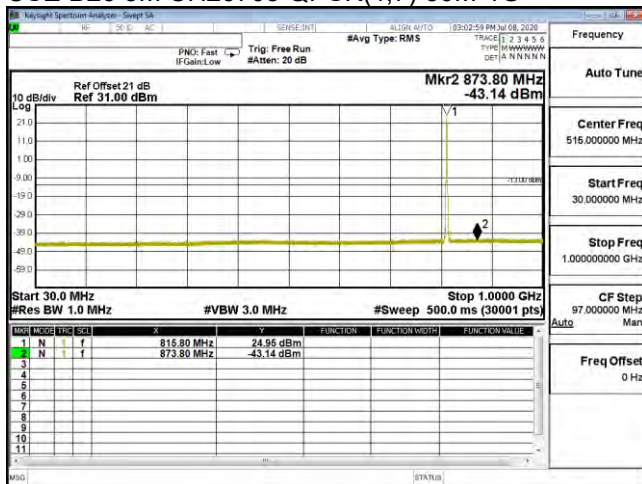
CSE B26 1.4M CH26783 64QAM(1,2) 30M-1G



CSE B26 1.4M CH26783 64QAM(1,2) 1G-10G



CSE B26 3M CH26705 QPSK(1,7) 30M-1G



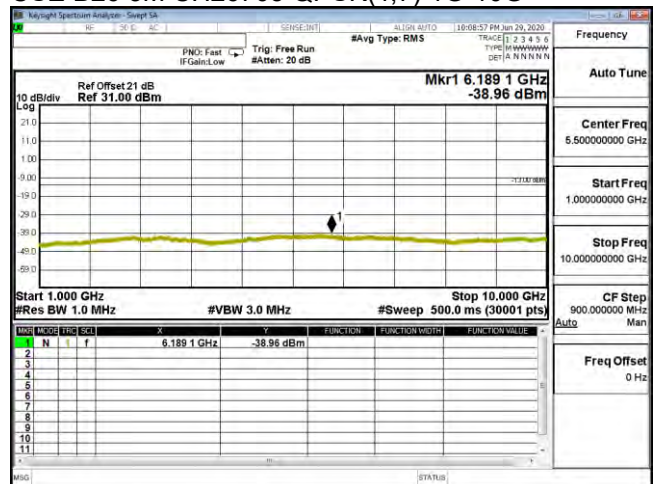
CSE B26 3M CH26705 16QAM(1,7) 30M-1G



CSE B26 3M CH26705 64QAM(1,7) 30M-1G



CSE B26 3M CH26705 QPSK(1,7) 1G-10G



CSE B26 3M CH26705 16QAM(1,7) 1G-10G



CSE B26 3M CH26705 64QAM(1,7) 1G-10G



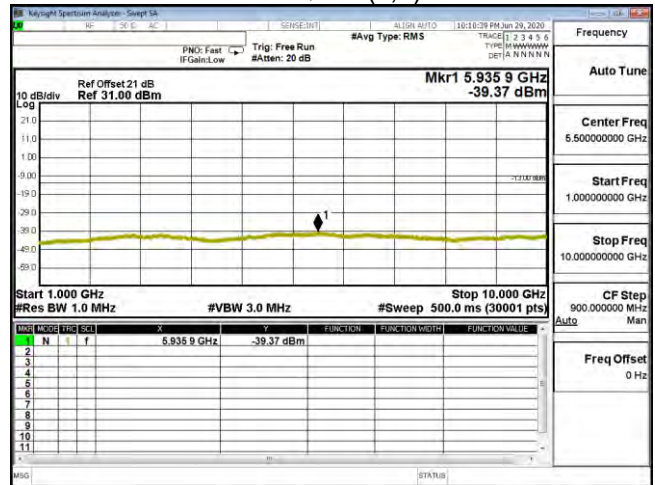
CSE B26 3M CH26740 QPSK(1,0) 30M-1G



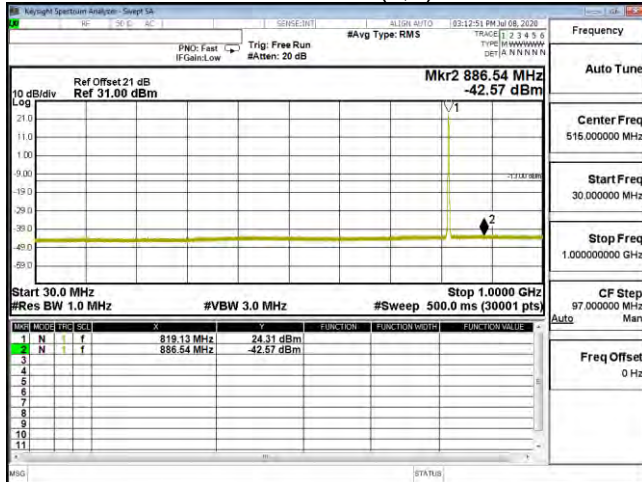
CSE B26 3M CH26740 QPSK(1,0) 1G-10G



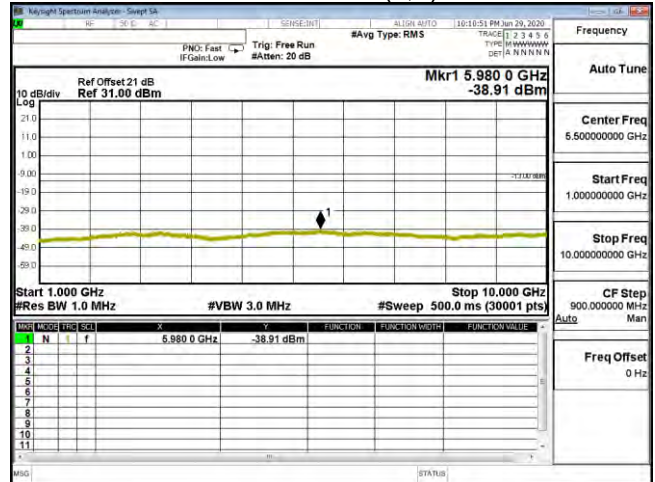
CSE B26 3M CH26740 16QAM(1,0) 30M-1G



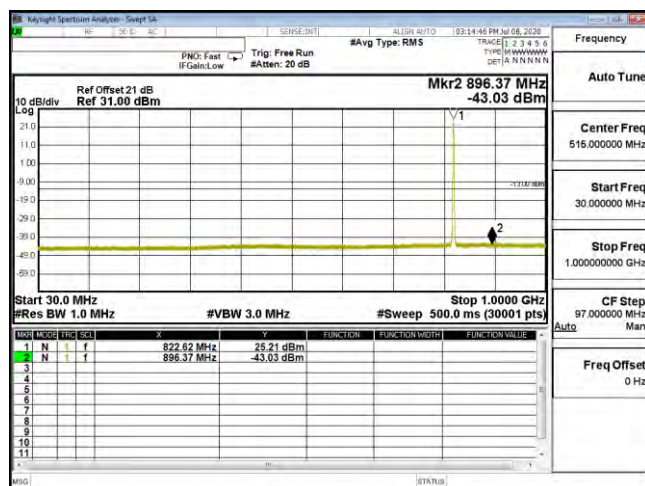
CSE B26 3M CH26740 16QAM(1,0) 1G-10G



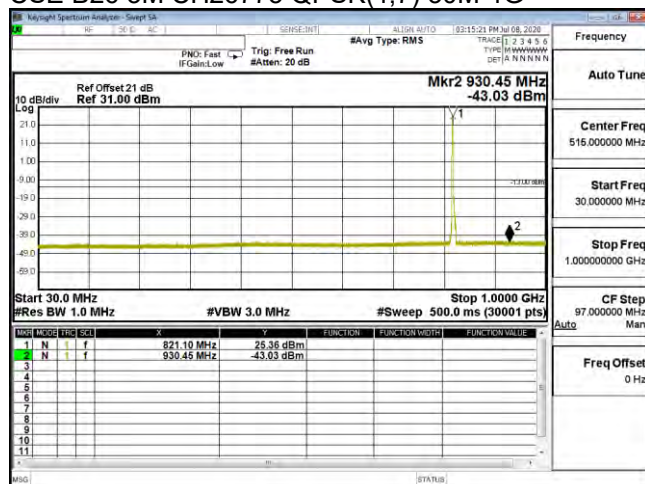
CSE B26 3M CH26740 64QAM(1,7) 30M-1G



CSE B26 3M CH26740 64QAM(1,7) 1G-10G



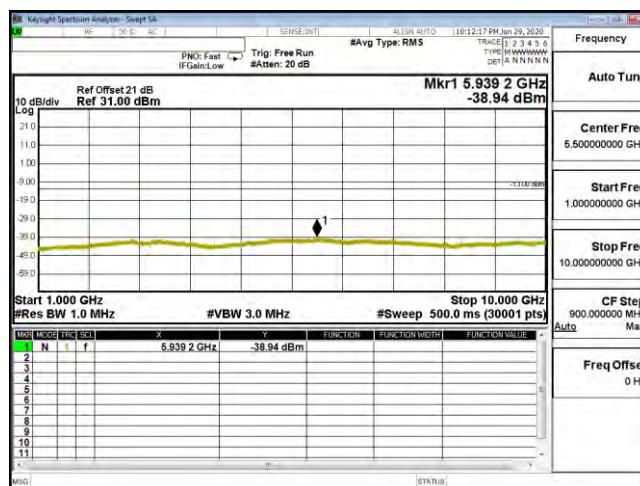
CSE B26 3M CH26775 QPSK(1,7) 30M-1G



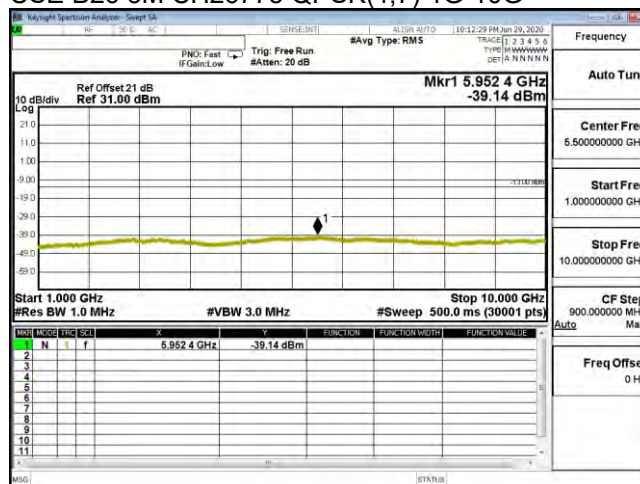
CSE B26 3M CH26775 16QAM(1,0) 30M-1G



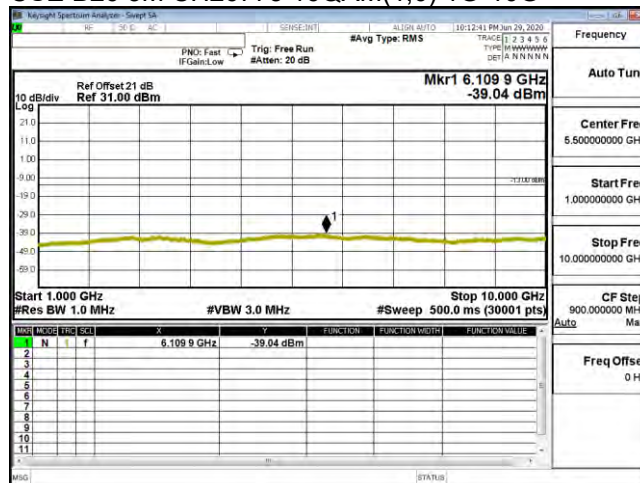
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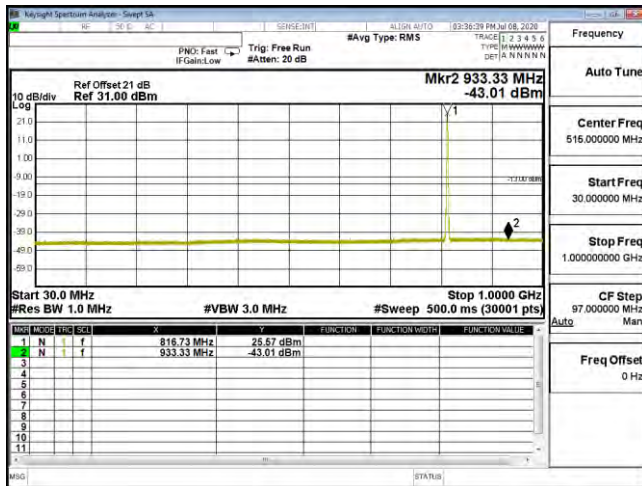
CSE B26 3M CH26775 QPSK(1,7) 1G-10G



CSE B26 3M CH26775 16QAM(1,0) 1G-10G



CSE B26 3M CH26775 64QAM(1,7) 1G-10G



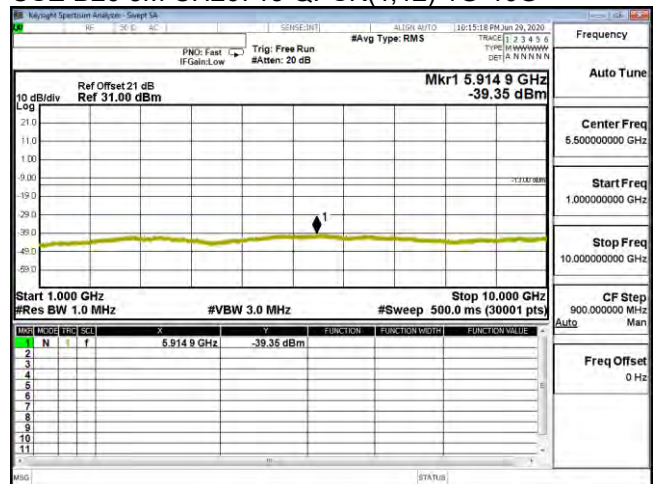
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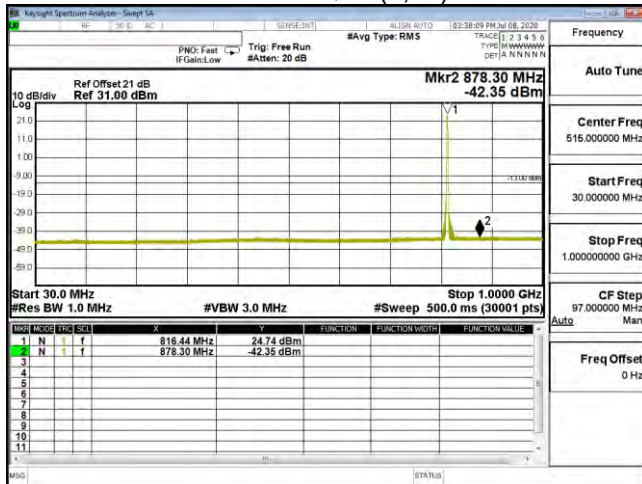
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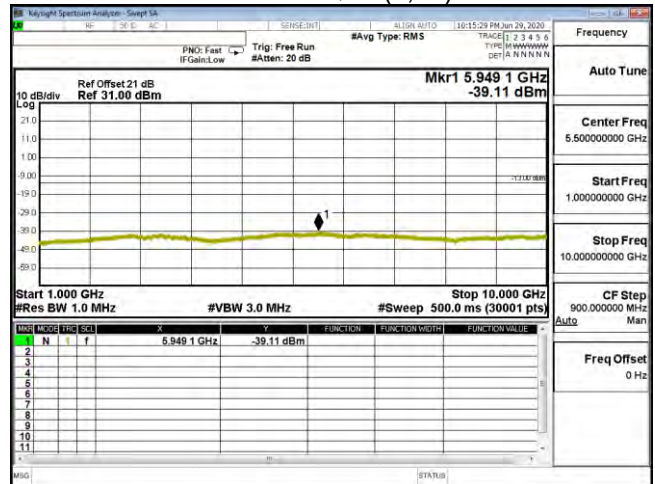
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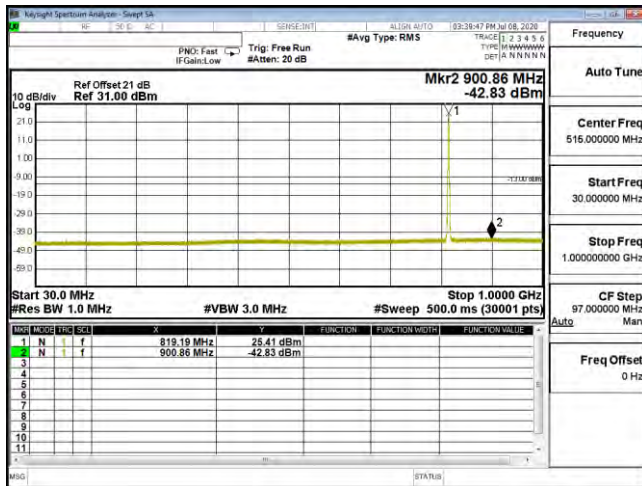
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CSE B26 5M CH26715 64QAM(1,12) 30M-1G



CSE B26 5M CH26715 64QAM(1,12) 1G-10G



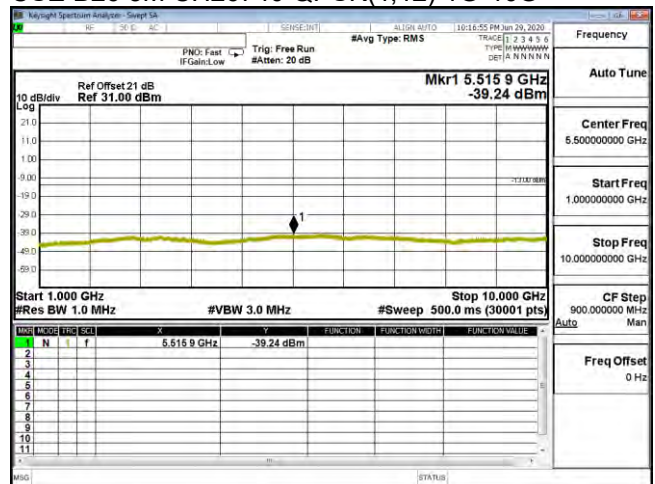
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CSE B26 5M CH26740 QPSK(1,12) 1G-10G



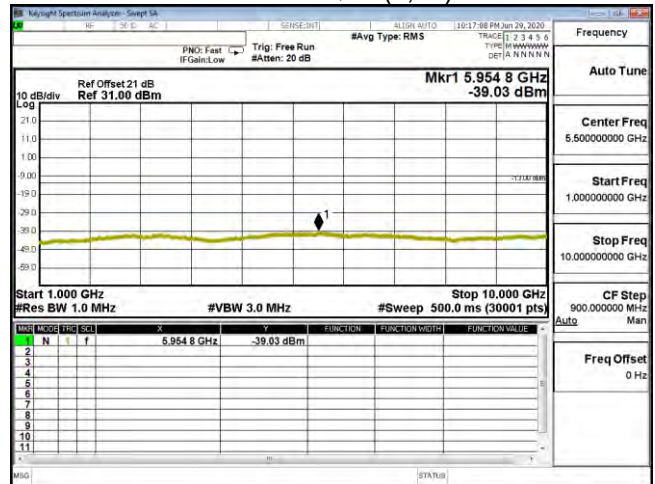
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CSE B26 5M CH26740 16QAM(1,12) 1G-10G



CSE B26 5M CH26740 64QAM(1,12) 30M-1G



CSE B26 5M CH26740 64QAM(1,12) 1G-10G



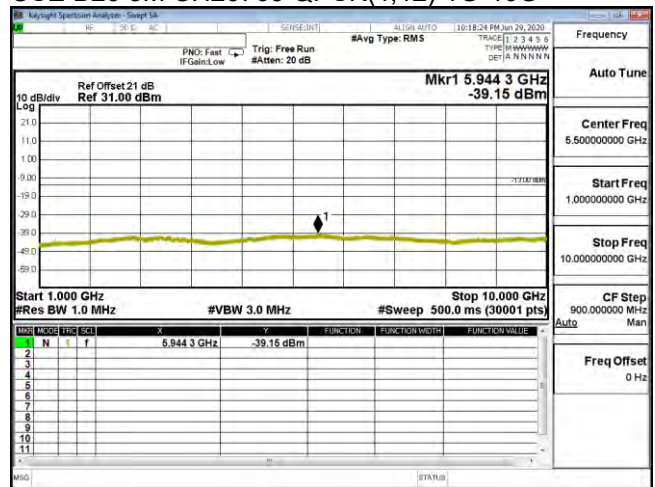
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CSE B26 5M CH26765 QPSK(1,12) 1G-10G



CSE B26 5M CH26765 16QAM(1,0) 30M-1G



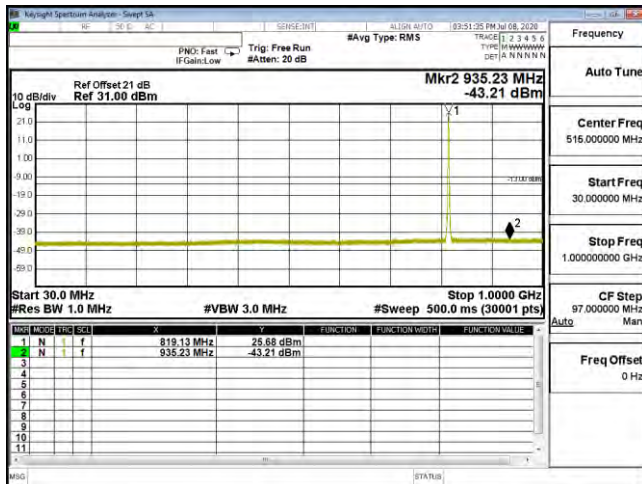
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CSE B26 5M CH26765 64QAM(1,12) 30M-1G



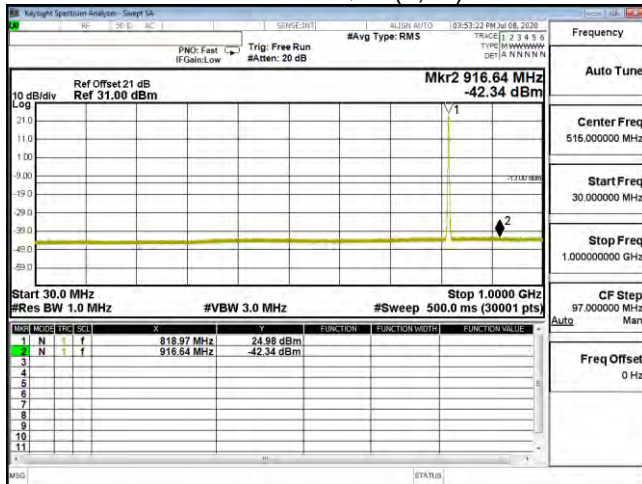
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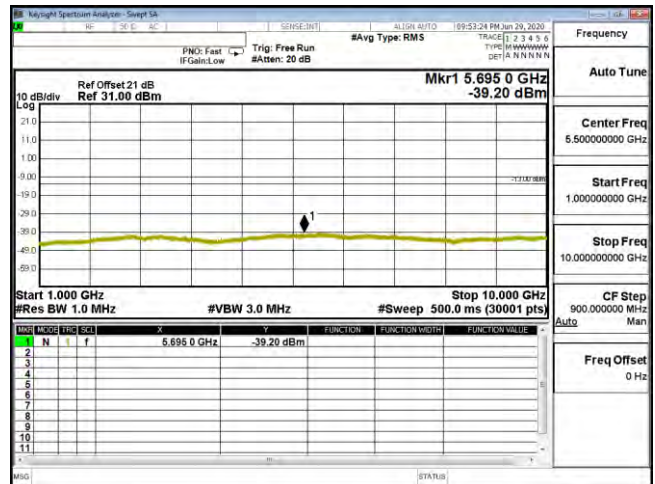
CSE B26 10M CH26740 QPSK(1,25) 30M-1G



CSE B26 10M CH26740 16QAM(1,25) 30M-1G



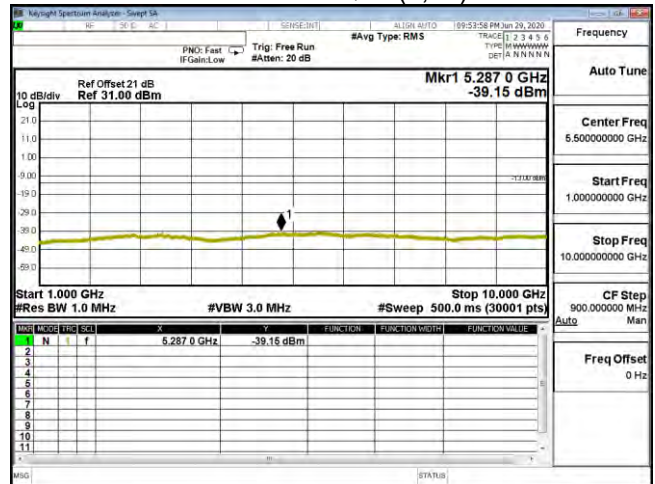
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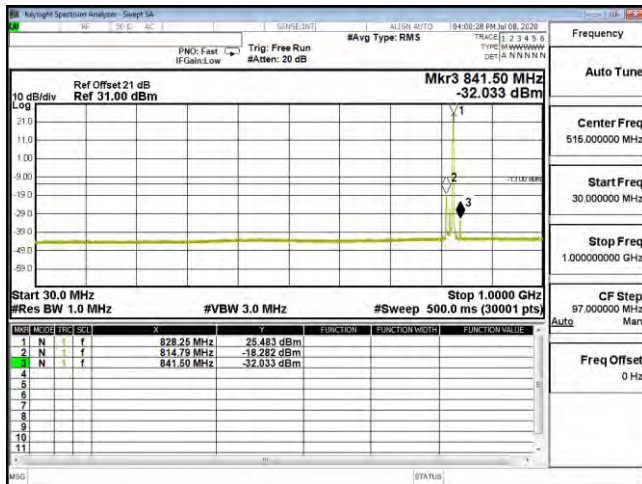
CSE B26 10M CH26740 QPSK(1,25) 1G-10G



CSE B26 10M CH26740 16QAM(1,25) 1G-10G



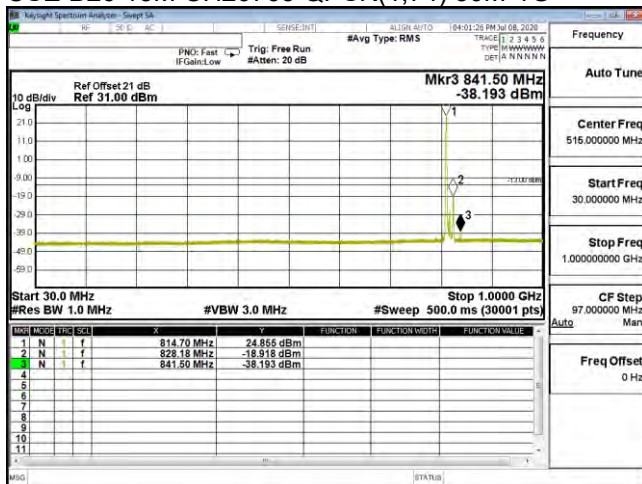
CSE B26 10M CH26740 64QAM(1,25) 1G-10G



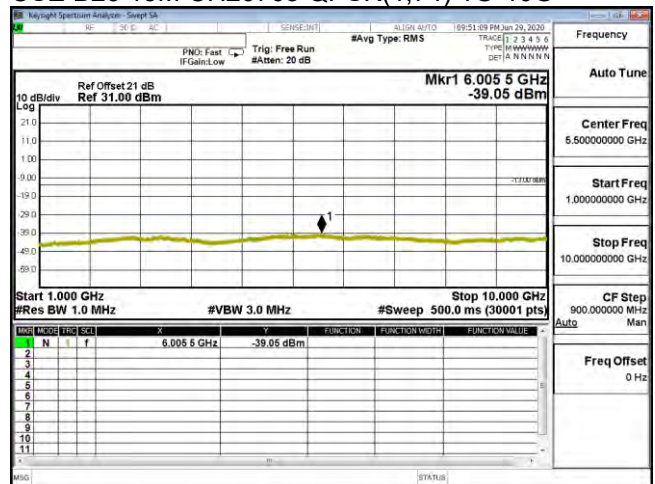
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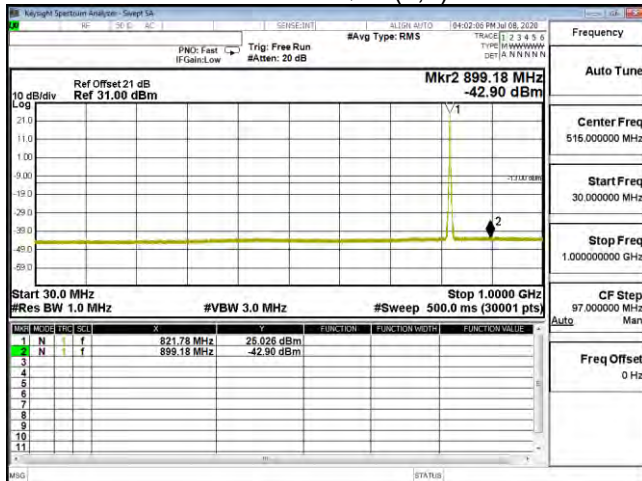
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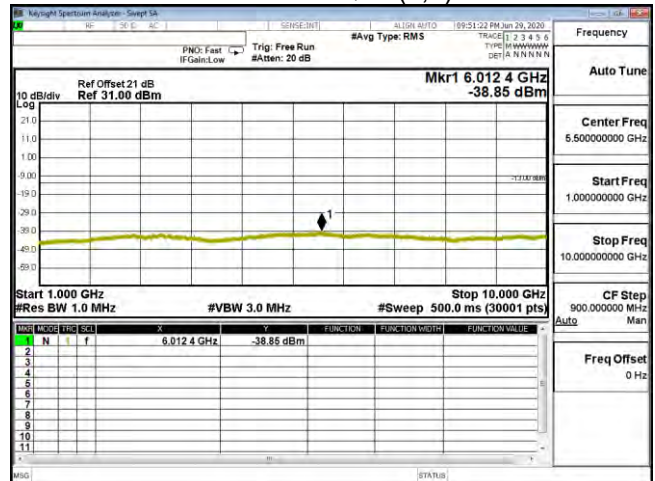
CSE B26 15M CH26765 16QAM(1,0) 30M-1G



CSE B26 15M CH26765 16QAM(1,0) 1G-10G



CSE B26 15M CH26765 64QAM(1,37) 30M-1G



CSE B26 15M CH26765 64QAM(1,37) 1G-10G

Product	Mobile Computer			
Test Mode	Spurious Emission (Radiated)			
Date of Test	2020/07/02		Test Site	Site3
Test Condition	Band 26 (1.4M) QPSK		Test Range	9kHz ~10GHz

Polarity	CH	RB No.	RB Offset	Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna	EIRP Value	Limit
				(GHz)	(dBm)	(dBm)	(dB)	Gain		
Horizontal	Low	3	2	1629	-46.54	-63.88	1.63	9.8	-55.71	-13
Horizontal	Low	3	2	2444	-53.42	-67.61	2.10	10.6	-59.11	-13
Horizontal	Low	3	2	3259	-52.66	-66.30	2.35	12.3	-56.35	-13
Vertical	Low	3	2	1629	-51.46	-68.85	1.63	9.8	-60.68	-13
Vertical	Low	3	2	2444	-52.96	-66.34	2.10	10.6	-57.84	-13
Vertical	Low	3	2	3259	-53.19	-67.17	2.35	12.3	-57.22	-13

Horizontal	Mid	3	3	1638	-41.08	-58.34	1.63	9.8	-50.17	-13
Horizontal	Mid	3	3	2457	-53.47	-67.79	2.10	10.6	-59.29	-13
Horizontal	Mid	3	3	3276	-51.19	-64.80	2.35	12.3	-54.85	-13
Vertical	Mid	3	3	1638	-50.34	-67.59	1.63	9.8	-59.42	-13
Vertical	Mid	3	3	2457	-50.84	-64.58	2.10	10.6	-56.08	-13
Vertical	Mid	3	3	3276	-52.03	-65.98	2.35	12.3	-56.03	-13

Horizontal	High	3	3	1647	-41.40	-58.59	1.63	9.8	-50.42	-13
Horizontal	High	3	3	2470	-52.12	-66.56	2.10	10.6	-58.06	-13
Horizontal	High	3	3	3293	-50.42	-64.02	2.35	12.3	-54.07	-13
Vertical	High	3	3	1647	-51.44	-68.57	1.63	9.8	-60.40	-13
Vertical	High	3	3	2470	-53.11	-66.80	2.10	10.6	-58.30	-13
Vertical	High	3	3	3293	-50.09	-64.01	2.35	12.3	-54.06	-13

Note:

1. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 4 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	Mobile Computer			
Test Mode	Spurious Emission (Radiated)			
Date of Test	2020/07/02	Test Site	Site3	
Test Condition	Band 26 (3M) QPSK	Test Range	9kHz ~10GHz	

Polarity	CH	RB No.	RB Offset	Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna	EIRP Value	Limit
				(GHz)	(dBm)	(dBm)	(dB)	Gain		
Horizontal	Low	1	7	1631	-44.42	-61.75	1.63	9.8	-53.58	-13
Horizontal	Low	1	7	2447	-53.07	-67.29	2.10	10.6	-58.79	-13
Horizontal	Low	1	7	3262	-51.79	-65.42	2.35	12.3	-55.47	-13
Vertical	Low	1	7	1631	-48.08	-65.45	1.63	9.8	-57.28	-13
Vertical	Low	1	7	2447	-51.58	-64.99	2.10	10.6	-56.49	-13
Vertical	Low	1	7	3262	-52.66	-66.64	2.35	12.3	-56.69	-13

Horizontal	Mid	1	0	1638	-42.29	-59.58	1.63	9.8	-51.41	-13
Horizontal	Mid	1	0	2457	-53.17	-67.49	2.10	10.6	-58.99	-13
Horizontal	Mid	1	0	3276	-53.31	-66.93	2.35	12.3	-56.98	-13
Vertical	Mid	1	0	1638	-48.56	-65.85	1.63	9.8	-57.68	-13
Vertical	Mid	1	0	2457	-53.59	-67.13	2.10	10.6	-58.63	-13
Vertical	Mid	1	0	3276	-53.29	-67.24	2.35	12.3	-57.29	-13

Horizontal	High	1	7	1645	-41.89	-59.09	1.63	9.8	-50.92	-13
Horizontal	High	1	7	2468	-52.70	-67.12	2.10	10.6	-58.62	-13
Horizontal	High	1	7	3290	-50.83	-64.43	2.35	12.3	-54.48	-13
Vertical	High	1	7	1645	-51.11	-68.26	1.63	9.8	-60.09	-13
Vertical	High	1	7	2468	-52.56	-66.22	2.10	10.6	-57.72	-13
Vertical	High	1	7	3290	-51.12	-65.05	2.35	12.3	-55.10	-13

Note:

1. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 4 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	Mobile Computer		
Test Mode	Spurious Emission (Radiated)		
Date of Test	2020/07/02	Test Site	Site3
Test Condition	Band 26 (5M) QPSK	Test Range	9kHz ~10GHz

Polarity	CH	RB No.	RB Offset	Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
				(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)
Horizontal	Low	1	12	1633	-42.89	-60.20	1.63	9.8	-52.03	-13
Horizontal	Low	1	12	2450	-52.97	-67.22	2.10	10.6	-58.72	-13
Horizontal	Low	1	12	3266	-52.48	-66.11	2.35	12.3	-56.16	-13
Vertical	Low	1	12	1633	-48.58	-65.91	1.63	9.8	-57.74	-13
Vertical	Low	1	12	2450	-52.94	-66.39	2.10	10.6	-57.89	-13
Vertical	Low	1	12	3266	-52.31	-66.28	2.35	12.3	-56.33	-13

Horizontal	Mid	1	12	1638	-41.87	-59.14	1.63	9.8	-50.97	-13
Horizontal	Mid	1	12	2457	-52.89	-67.21	2.10	10.6	-58.71	-13
Horizontal	Mid	1	12	3276	-51.63	-65.25	2.35	12.3	-55.30	-13
Vertical	Mid	1	12	1638	-51.01	-68.27	1.63	9.8	-60.10	-13
Vertical	Mid	1	12	2457	-53.28	-66.82	2.10	10.6	-58.32	-13
Vertical	Mid	1	12	3276	-52.79	-66.74	2.35	12.3	-56.79	-13

Horizontal	High	1	12	1643	-41.43	-58.65	1.63	9.8	-50.48	-13
Horizontal	High	1	12	2465	-53.08	-67.47	2.10	10.6	-58.97	-13
Horizontal	High	1	12	3286	-51.35	-64.96	2.35	12.3	-55.01	-13
Vertical	High	1	12	1643	-46.10	-63.29	1.63	9.8	-55.12	-13
Vertical	High	1	12	2465	-52.79	-66.42	2.10	10.6	-57.92	-13
Vertical	High	1	12	3286	-51.26	-65.20	2.35	12.3	-55.25	-13

Note:

1. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 4 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	Mobile Computer		
Test Mode	Spurious Emission (Radiated)		
Date of Test	2020/07/02	Test Site	Site3
Test Condition	Band 26 (10M) QPSK	Test Range	9kHz ~10GHz

Polarity	CH	RB No.	RB Offset	Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna	EIRP Value	Limit
				(GHz)	(dBm)	(dBm)	(dB)	Gain		
Horizontal	Mid	1	25	1638	-42.79	-60.05	1.63	9.8	-51.88	-13
Horizontal	Mid	1	25	2457	-51.29	-65.67	2.10	10.6	-57.17	-13
Horizontal	Mid	1	25	3276	-51.10	-64.72	2.35	12.3	-54.77	-13
Vertical	Mid	1	25	1638	-46.35	-63.61	1.63	9.8	-55.44	-13
Vertical	Mid	1	25	2457	-51.49	-65.05	2.10	10.6	-56.55	-13
Vertical	Mid	1	25	3276	-51.62	-65.56	2.35	12.3	-55.61	-13

Note:

1. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 4 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	Mobile Computer		
Test Mode	Spurious Emission (Radiated)		
Date of Test	2020/07/02	Test Site	Site3
Test Condition	Band 26 (15M) QPSK	Test Range	9kHz ~10GHz

Polarity	CH	RB No.	RB Offset	Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna	EIRP Value	Limit
				(GHz)	(dBm)	(dBm)	(dB)	Gain		
Horizontal	Mid	1	74	1643	-46.18	-63.29	1.63	9.8	-55.12	-13
Horizontal	Mid	1	74	2465	-52.11	-66.50	2.10	10.6	-58.00	-13
Horizontal	Mid	1	74	3286	-53.49	-67.10	2.35	12.3	-57.15	-13
Vertical	Mid	1	74	1643	-47.69	-64.67	1.63	9.8	-56.50	-13
Vertical	Mid	1	74	2465	-49.59	-63.46	2.10	10.6	-54.96	-13
Vertical	Mid	1	74	3286	-50.48	-64.38	2.35	12.3	-54.43	-13

Note:

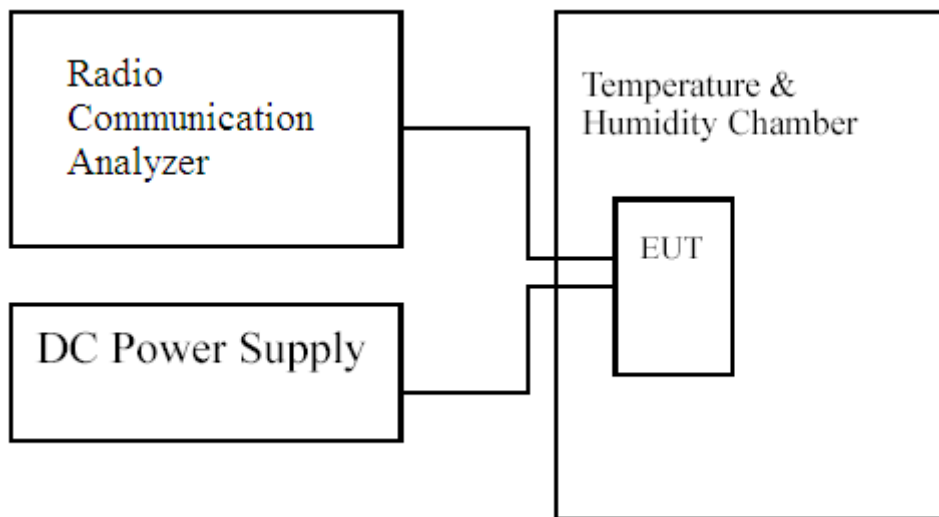
1. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 4 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

7. Frequency Stability Under Temperature & Voltage Variations

7.1. Test Specification

According to Part 2.1055, 90.213

7.2. Test Setup



7.3. Limits

Limit	<±2.5ppm
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7.4. Test Procedure

The frequency stability of transmitter is measured by:

- (a) Temperature: The temperature is varied from -30°C to 50°C in 10°C increment using a standard temperature & Humidity chamber.
- (b) Primary Supply Voltage: The primary supply voltage is varied 85% to 115% of the nominal value for non hand-carried equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating endpoint which shall be specified by the manufacturer.

The EUT was connected via the base station simulator. Universal Radio Communication Tester, was used to measure The Frequency Error. The maximum result of measurements was recorded.

7.5. Test Result of Frequency Stability Under Temperature Variations

Product	Mobile Computer		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2020/08/05	Test Site	CTR
Test Condition	Band 26 (1.4M) CH26740(819MHz) –QPSK	Test Range	-20°C~+50°C

Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Channel	Deviation (kHz)						Limit (kHz)
		1.4M	3M	5M	10M	15M	20M	
-30	Mid	-0.0068	0.0096	0.0105	0.0113	0.0102	--	±2.05
-20	Mid	-0.0048	-0.0045	-0.0037	0.0037	-0.0033	--	±2.05
-10	Mid	-0.0046	-0.0037	-0.0038	0.0031	0.0029	--	±2.05
0	Mid	-0.0048	-0.0037	0.0042	-0.0038	0.0026	--	±2.05
10	Mid	-0.0061	0.0038	0.0034	-0.0037	-0.0038	--	±2.05
20	Mid	-0.0044	-0.0039	-0.0040	-0.0043	-0.0037	--	±2.05
30	Mid	-0.0053	-0.0051	-0.0050	-0.0042	-0.0044	--	±2.05
40	Mid	-0.0063	-0.0031	-0.0041	-0.0040	-0.0041	--	±2.05
50	Mid	-0.0048	-0.0043	-0.0039	-0.0038	0.0030	--	±2.05

Voltage Variations

DC Voltage (V)	Test Channel	Deviation (kHz)						Limit (kHz)
		1.4M	3M	5M	10M	15M	20M	
4.4	Mid	-0.0041	-0.0042	-0.0038	-0.0045	-0.0027	--	±2.05
3.8	Mid	-0.0044	-0.0039	-0.0040	-0.0043	-0.0037	--	±2.05
3.6	Mid	-0.0047	-0.0041	-0.0039	-0.0041	-0.0055	--	±2.05

DC Current	1.4M	3M	5M	10M	15M	20M
LINK	0.93	0.92	0.93	0.94	0.96	--
IDLE	0.31	0.32	0.31	0.30	0.31	--