

# FCC Test Report

## (Part 90)

Product Name : DCM (Data Communication Module)  
Model No : 5-104348-192  
FCC ID : H8NCDD6020

Applicant : ASKEY COMPUTER CORP.  
Address : 10F, NO.119, JIANKANG RD., ZHONGHE DIST.,  
NEW TAIPEI CITY 23585

Date of Receipt : 2017/10/13  
Issued Date : 2017/11/22  
Report No. : 17A0157R-HPUSP56V01  
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 of the equipment and evaluated measurement uncertainty herein.

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# Test Report

Issued Date : 2017/11/22

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Product Name : DCM (Data Communication Module)  
Applicant : ASKEY COMPUTER CORP.  
Address : 10F, NO.119, JIANKANG RD., ZHONGHE DIST., NEW TAIPEI CITY 23585  
Manufacturer : ASKEY COMPUTER CORP.  
Trade Name : DENSO CORPORATION  
Model No. : 5-104348-192  
EUT Rated Voltage : DC 12V  
EUT Test Voltage : DC 12V  
Measurement Standard : FCC CFR Title 47 Part2 90  
Measurement Reference : TIA/EIA 603-E 2016  
KDB 971168 D01V03  
ANSI C63.26 2015  
Test Result : Complied

Documented By : Anny Chou  
( Senior Adm. Specialist / Anny Chou )

Tested By : Vorana Chen  
( Senior Engineer / Vorana Chen )

Approved By : Vincent Lin  
( Director / Vincent Lin )

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**1. GENERAL INFORMATION**

**1.1. EUT Description**

Product Name	DCM (Data Communication Module)
Model No.	5-104348-192
Trade Name	DENSO CORPORATION
IMEI No.	35324409
FCC ID	H8NCDD6020
Modulation	LTE Band 26 : QPSK/16-QAM
TX Frequency	LTE Band 26 : 814MHz~824MHz
Rx Frequency	LTE Band 26: 859~869MHz
Bandwidth	LTE Band 26: 1.4MHz/3MHz/5MHz/10MHz/15MHz
HW Version	Rev2
SW Version	90-00223-M-00-57-00-DV-102717
Antenna Type	Multi Band Dipole Antenna Sentinel 3in1 Adhesive Mount 2*LTE MIMO & GNSS Antenna

**1.2. Antenna List**

No.	Manufacturer	Part No.	Peak Gain
1	STAF	N/A (WWAN Main or Aux)	2.56 dBi for 746-960 MHz
2	taoglas	MA250.A.LBI.001 (WWAN Main or Aux MIMO-1 Cable 3m)	0.99 dBi for 824-894 MHz
		MA250.A.LBI.001 (WWAN Main or Aux MIMO-2 Cable 3m)	0.44 dBi for 824-894 MHz

Note: Each antenna has been evaluated and only the worst case (higher gain antenna) is presented in the report.

### 1.3. Operational Description

The information contained within this report is intended to show verification of compliance of the 850MHz to the requirements of FCC 47 CFR Part 2, 90.

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:

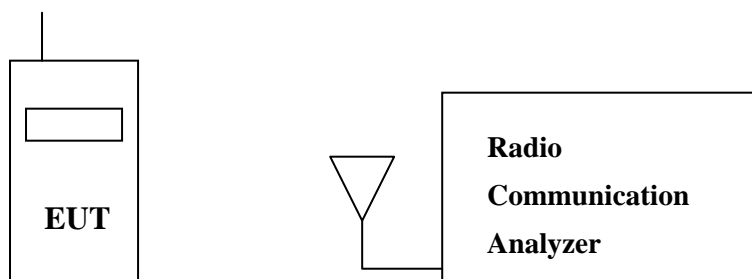
Test Mode:	LTE Band 26 (1.4M)-QPSK/16QAM
	LTE Band 26 (3M)-QPSK/16QAM
	LTE Band 26 (5M)-QPSK/16QAM
	LTE Band 26 (10M)-QPSK/16QAM
	LTE Band 26 (15M)-QPSK/16QAM

Note :

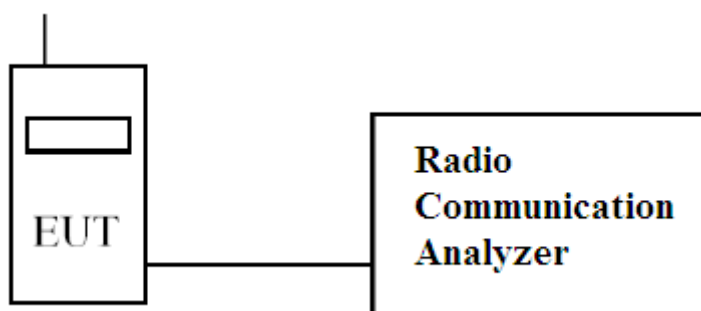
The maximum power levels are chosen in the LTE Band 26, only these modes were used for all tests.

## 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 was set to communicate with MT8820C.
- (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	23.1
Humidity (%RH)	25-75	52
Barometric pressure (mbar)	860-1060	988

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site:

<http://www.dekra.com.tw/english/about/certificates.aspx?bval=5>

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: [http://www.dekra.com.tw/index\\_en.aspx](http://www.dekra.com.tw/index_en.aspx)

Site Description: File on

Federal Communications Commission  
FCC Engineering Laboratory  
7435 Oakland Mills Road  
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FCC Registration Number :92195

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FCC Accreditation Number: TW3023

## 1.7. Type of Emission

Band	Bandwidth (MHz)	Modulation	
		QPSK	16QAM
26	1.4	1M10G7D	1M09W7D
26	3	2M73G7D	2M72W7D
26	5	4M49G7D	4M48W7D
26	10	9M01G7D	9M01W7D
26	15	13M5G7D	13M4W7D



## 1.8. Voltages and AC currents

LTE Band 26 (1.4M)	EUT Transmitting (in maximum power) :	DC voltage : 12V , DC current : 0.26A
	EUT Standby	: DC voltage : 12V , DC current : 0.1A
LTE Band 26 (3M)	EUT Transmitting (in maximum power) :	DC voltage : 12V , DC current : 0.26A
	EUT Standby	: DC voltage : 12V , DC current : 0.1A
LTE Band 26 (5M)	EUT Transmitting (in maximum power) :	DC voltage : 12V , DC current : 0.26A
	EUT Standby	: DC voltage : 12V , DC current : 0.1A
LTE Band 26 (10M)	EUT Transmitting (in maximum power) :	DC voltage : 12V , DC current : 0.26A
	EUT Standby	: DC voltage : 12V , DC current : 0.1A
LTE Band 26 (15M)	EUT Transmitting (in maximum power) :	DC voltage : 12V , DC current : 0.27A
	EUT Standby	: DC voltage : 12V , DC current : 0.1A

## 2. Technical Test

### 2.1. Summary of test result

FCC Standard	Test Item	Result	Note
2.1046	Conducted Output Power	Pass	
90.635			
2.1049	Occupied Bandwidth	Pass	
90.209			
2.1051	Spurious Emission at Antenna Terminals	Pass	
90.691			
2.1051	Conducted Emission	Pass	
90.691			
2.1053	Field Strength of Spurious Radiation	Pass	
90.691			
2.1055	Frequency Stability for Temperature & Voltage	Pass	
90.213			

## 2.2. List of test Equipment

Conducted /CTR

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY48030495	2017/10/13
Directional coupler	Agilent	87300C	MY44300353	2017/11/30
Directional coupler	Agilent	778D-012	50550	2016/12/08
Standard Temperature & Humidity Chamber	WIT	TH-1S-B	EQ-201-00146	2016/11/28
DC power supply	Agilent	E3610A	MY40009845	2017/07/14
Communication Tester	Agilent	MT8820C	6201465467	2017/07/10

Radiated / Site3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2707	2017/06/29
Horn Antenna	R&S	9120D	867	2017/04/28
Pre-Amplifier	Agilent	87405C	MY55380068	2017/08/08
Spectrum Analyzer	Agilent	N9010A	MY54510357	2017/04/26
DC power supply	Agilent	E3610A	MY40009845	2017/07/14
Communication Tester	Agilent	MT8820C	6201465467	2017/07/10

## 2.3. Measurement Uncertainty

### Conducted Emission

The measurement uncertainty of confidence of 95% is evaluated as  $\pm 1.52$  dB

### Radiated Emission (Below 1GHz)

The measurement uncertainty of confidence of 95% is evaluated as  $\pm 3.44$  dB .

### Radiated Emission (Above 1GHz)

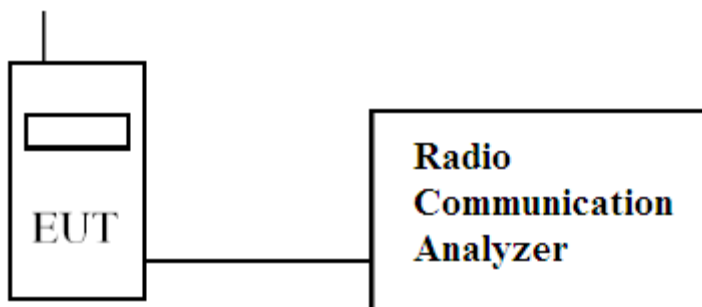
The measurement uncertainty of confidence of 95% is evaluated as  $\pm 4.08$  dB

### 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	<7W

#### 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

Band	Frequency Channel	Modulation	RB No.	RB Offset	MPR	Max Power (dBm)	Max Power (W)
Band 26 (850MHz)/1.4MHz	CH26697 814.7MHz	QPSK	1	#0	0	22.28	0.1690
			1	#Mid	0	22.35	0.1718
			1	#Max	0	22.28	0.1690
			50%	#0	1	22.45	0.1758
			50%	#Mid	1	22.48	0.1770
			50%	#Max	1	<b>22.57</b>	<b>0.1807</b>
			100%	--	1	21.45	0.1396
		16QAM	1	#0	1	21.30	0.1349
			1	#Mid	1	21.23	0.1327
			1	#Max	1	21.24	0.1330
			50%	#0	2	<b>21.40</b>	<b>0.1380</b>
			50%	#Mid	2	21.38	0.1374
			50%	#Max	2	21.35	0.1365
			100%	--	2	20.22	0.1052
	CH26740 819MHz	QPSK	1	#0	0	22.20	0.1660
			1	#Mid	0	22.37	0.1726
			1	#Max	0	22.08	0.1614
			50%	#0	1	<b>22.62</b>	<b>0.1828</b>
			50%	#Mid	1	22.42	0.1746
			50%	#Max	1	22.44	0.1754
			100%	--	1	21.36	0.1368
		16QAM	1	#0	1	21.25	0.1334
			1	#Mid	1	21.18	0.1312
			1	#Max	1	21.55	0.1429
			50%	#0	2	<b>21.71</b>	<b>0.1483</b>
			50%	#Mid	2	21.57	0.1435
			50%	#Max	2	21.64	0.1459
			100%	--	2	20.56	0.1138
	CH26783 823.3MHz	QPSK	1	#0	0	22.13	0.1633
			1	#Mid	0	22.02	0.1592
1			#Max	0	21.93	0.1560	
50%			#0	1	22.40	0.1738	
50%			#Mid	1	22.46	0.1762	
50%			#Max	1	<b>22.47</b>	<b>0.1766</b>	
100%			--	1	21.32	0.1355	
16QAM		1	#0	1	21.16	0.1306	
		1	#Mid	1	21.16	0.1306	
		1	#Max	1	21.16	0.1306	
		50%	#0	2	<b>21.43</b>	<b>0.1390</b>	
		50%	#Mid	2	21.39	0.1377	
		50%	#Max	2	21.40	0.1380	
		100%	--	2	20.31	0.1074	

Band	Frequency Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 26 (850MHz)/3MHz	CH26705 815.5MHz	QPSK	1	#0	0	22.44	0.1754
			1	#Mid	0	<b>22.47</b>	<b>0.1766</b>
			1	#Max	0	22.19	0.1656
			50%	#0	1	21.40	0.1380
			50%	#Mid	1	21.45	0.1396
			50%	#Max	1	21.45	0.1396
			100%	--	1	21.42	0.1387
		16QAM	1	#0	1	<b>21.28</b>	<b>0.1343</b>
			1	#Mid	1	20.99	0.1256
			1	#Max	1	21.21	0.1321
			50%	#0	2	20.47	0.1114
			50%	#Mid	2	20.39	0.1094
			50%	#Max	2	20.41	0.1099
			100%	--	2	20.21	0.1050
	CH26740 819MHz	QPSK	1	#0	0	22.42	0.1746
			1	#Mid	0	<b>22.61</b>	<b>0.1824</b>
			1	#Max	0	22.14	0.1637
			50%	#0	1	21.35	0.1365
			50%	#Mid	1	21.41	0.1384
			50%	#Max	1	21.44	0.1393
			100%	--	1	21.40	0.1380
		16QAM	1	#0	1	<b>21.71</b>	<b>0.1483</b>
			1	#Mid	1	21.06	0.1276
			1	#Max	1	21.13	0.1297
			50%	#0	2	20.17	0.1040
			50%	#Mid	2	20.40	0.1096
			50%	#Max	2	20.74	0.1186
			100%	--	2	20.50	0.1122
	CH26775 822.5MHz	QPSK	1	#0	0	22.28	0.1690
			1	#Mid	0	<b>22.33</b>	<b>0.1710</b>
1			#Max	0	21.98	0.1578	
50%			#0	1	21.33	0.1358	
50%			#Mid	1	21.36	0.1368	
50%			#Max	1	21.36	0.1368	
100%			--	1	21.38	0.1374	
16QAM		1	#0	1	20.92	0.1236	
		1	#Mid	1	<b>21.32</b>	<b>0.1355</b>	
		1	#Max	1	21.08	0.1282	
		50%	#0	2	20.11	0.1026	
		50%	#Mid	2	20.18	0.1042	
		50%	#Max	2	20.16	0.1038	
		100%	--	2	20.36	0.1086	

Band	Frequency Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 26 (850MHz)/5MHz	CH26715 816.5MHz	QPSK	1	#0	0	21.90	0.1549
			1	#Mid	0	<b>22.45</b>	<b>0.1758</b>
			1	#Max	0	21.89	0.1545
			50%	#0	1	21.48	0.1406
			50%	#Mid	1	21.45	0.1396
			50%	#Max	1	21.35	0.1365
			100%	--	1	21.42	0.1387
		16QAM	1	#0	1	21.01	0.1262
			1	#Mid	1	<b>21.10</b>	<b>0.1288</b>
			1	#Max	1	<b>21.10</b>	<b>0.1288</b>
			50%	#0	2	20.34	0.1081
			50%	#Mid	2	20.59	0.1146
			50%	#Max	2	20.57	0.1140
			100%	--	2	20.61	0.1151
	CH26740 819MHz	QPSK	1	#0	0	21.91	0.1552
			1	#Mid	0	<b>22.62</b>	<b>0.1828</b>
			1	#Max	0	21.89	0.1545
			50%	#0	1	21.43	0.1390
			50%	#Mid	1	21.49	0.1409
			50%	#Max	1	21.39	0.1377
			100%	--	1	21.37	0.1371
		16QAM	1	#0	1	21.10	0.1288
			1	#Mid	1	<b>21.16</b>	<b>0.1306</b>
			1	#Max	1	21.03	0.1268
			50%	#0	2	20.47	0.1114
			50%	#Mid	2	20.54	0.1132
			50%	#Max	2	20.44	0.1107
			100%	--	2	20.41	0.1099
	CH26765 821.5MHz	QPSK	1	#0	0	21.86	0.1535
			1	#Mid	0	<b>22.48</b>	<b>0.1770</b>
			1	#Max	0	21.88	0.1542
			50%	#0	1	21.35	0.1365
			50%	#Mid	1	21.44	0.1393
50%			#Max	1	21.32	0.1355	
100%			--	1	21.39	0.1377	
16QAM		1	#0	1	<b>21.08</b>	<b>0.1282</b>	
		1	#Mid	1	21.04	0.1271	
		1	#Max	1	20.91	0.1233	
		50%	#0	2	20.40	0.1096	
		50%	#Mid	2	20.41	0.1099	
		50%	#Max	2	20.25	0.1059	
		100%	--	2	20.43	0.1104	

Band	Frequency Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 26 (850MHz)/10MHz	CH26740 819MHz	QPSK	1	#0	0	22.10	0.1622
			1	#Mid	0	<b>22.46</b>	<b>0.1762</b>
			1	#Max	0	21.99	0.1581
			50%	#0	1	21.42	0.1387
			50%	#Mid	1	21.41	0.1384
			50%	#Max	1	21.38	0.1374
			100%	--	1	21.50	0.1413
		16QAM	1	#0	1	21.11	0.1291
			1	#Mid	1	<b>21.32</b>	<b>0.1355</b>
			1	#Max	1	20.98	0.1253
			50%	#0	2	20.44	0.1107
			50%	#Mid	2	20.44	0.1107
			50%	#Max	2	20.50	0.1122
			100%	--	2	20.44	0.1107

Band 26 (850MHz)/15MHz	CH26765 821.5MHz	QPSK	1	#0	0	22.20	0.1660
			1	#Mid	0	<b>22.41</b>	<b>0.1742</b>
			1	#Max	0	22.19	0.1656
			50%	#0	1	21.46	0.1400
			50%	#Mid	1	21.34	0.1361
			50%	#Max	1	21.34	0.1361
			100%	--	1	21.35	0.1365
		16QAM	1	#0	1	21.04	0.1271
			1	#Mid	1	<b>21.14</b>	<b>0.1300</b>
			1	#Max	1	21.08	0.1282
			50%	#0	2	20.37	0.1089
			50%	#Mid	2	20.47	0.1114
			50%	#Max	2	20.29	0.1069
			100%	--	2	20.37	0.1089



### 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

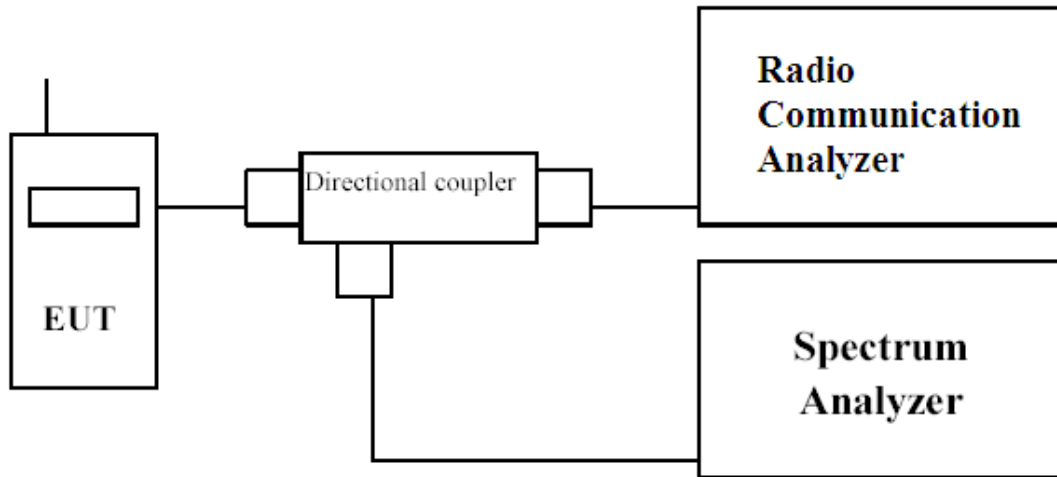
LTE Band	BW	Modulation	Conducted Peak Power (dBm)	Conducted Peak Power (W)	Antenna Gain (dBi)	Maximum ERP/EIRP (W)	Maximum ERP/EIRP Limit (W)
26	1.4M	QPSK	22.62	0.183	2.56	0.201	7
		16QAM	21.71	0.148	2.56	0.163	7
	3M	QPSK	22.61	0.182	2.56	0.200	7
		16QAM	21.71	0.148	2.56	0.163	7
	5M	QPSK	22.62	0.183	2.56	0.201	7
		16QAM	21.16	0.131	2.56	0.144	7
	10M	QPSK	22.46	0.176	2.56	0.194	7
		16QAM	21.32	0.136	2.56	0.149	7
	15M	QPSK	22.41	0.174	2.56	0.191	7
		16QAM	21.14	0.130	2.56	0.143	7

## 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.

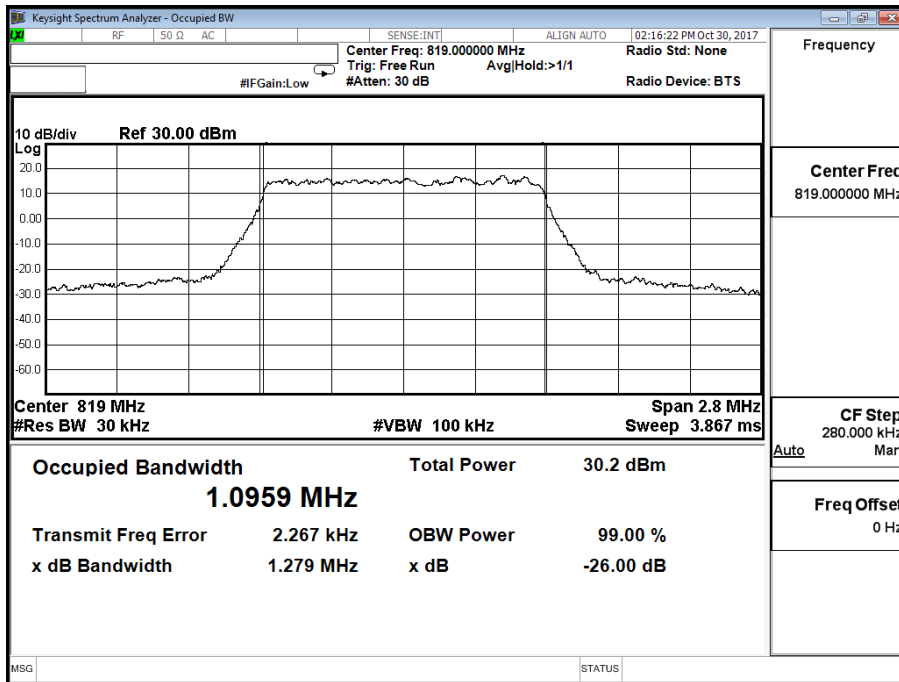
#### 4.4. Test Result of Occupied Bandwidth

Product	DCM (Data Communication Module)
Test Mode	Occupied Bandwidth
Test Site	CTR

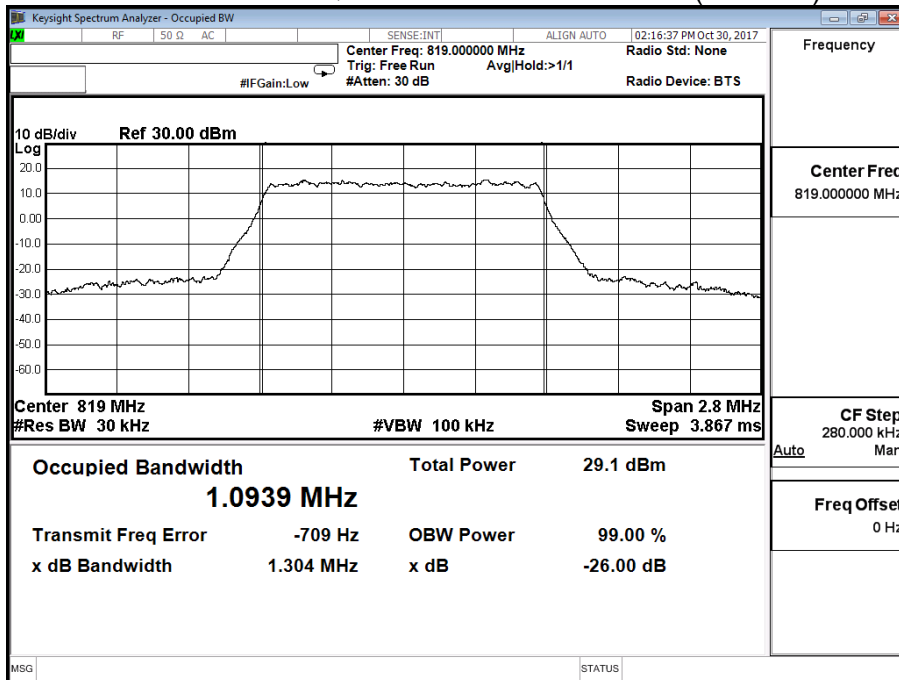
Test Mode	Channel	TX Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB bandwidth (MHz)	Result
Band 26 1.4M QPSK	26740	819	1.0959	1.279	Pass
Band 26 1.4M 16QAM	26740	819	1.0939	1.304	Pass
Band 26 3M QPSK	26740	819	2.7304	3.061	Pass
Band 26 3M 16QAM	26740	819	2.7153	3.032	Pass
Band 26 5M QPSK	26740	819	4.4937	4.983	Pass
Band 26 5M 16QAM	26740	819	4.4777	4.920	Pass
Band 26 10M QPSK	26740	819	9.0135	10.050	Pass
Band 26 10M 16QAM	26740	819	9.0117	10.000	Pass
Band 26 15M QPSK	26765	821.5	13.479	14.570	Pass
Band 26 15M 16QAM	26765	821.5	13.425	14.570	Pass

Product	DCM (Data Communication Module)		
Test Mode	Occupied Bandwidth		
Date of Test	2017/10/30	Test Site	CTR
Test Condition	Band 26 1.4M		

Band 26 1.4M QPSK - LTE Mode CH 26740 (819MHz)

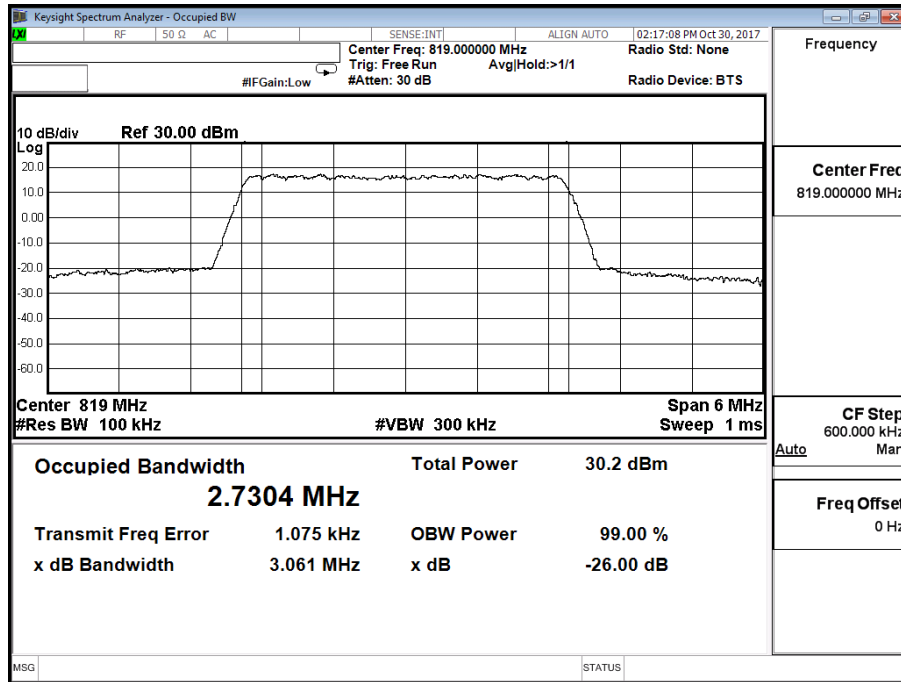


Band 26 1.4M 16QAM - LTE Mode CH 26740 (819MHz)

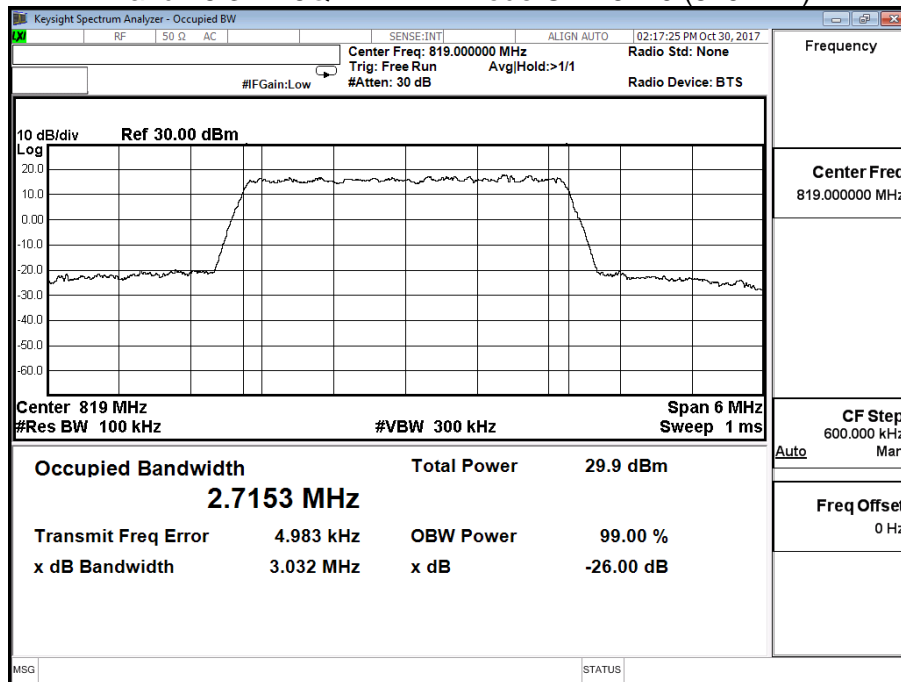


Product	DCM (Data Communication Module)		
Test Mode	Occupied Bandwidth		
Date of Test	2017/10/30	Test Site	CTR
Test Condition	Band 26 3M		

Band 26 3M QPSK - LTE Mode CH 26740 (819MHz)

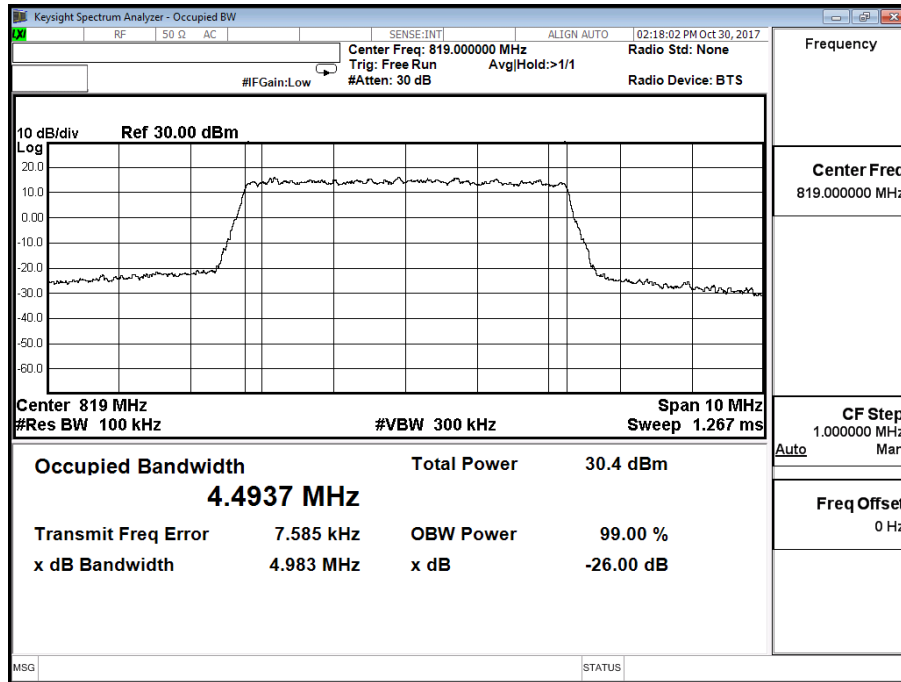


Band 26 3M 16QAM - LTE Mode CH 26740 (819MHz)

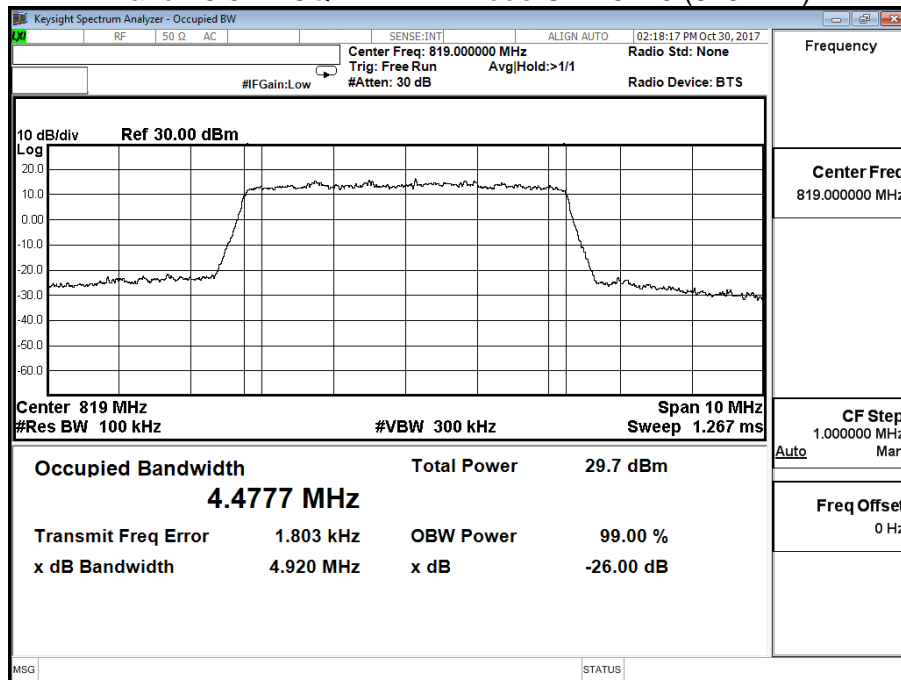


Product	DCM (Data Communication Module)		
Test Mode	Occupied Bandwidth		
Date of Test	2017/10/30	Test Site	CTR
Test Condition	Band 26 5M		

Band 26 5M QPSK - LTE Mode CH 26740 (819MHz)

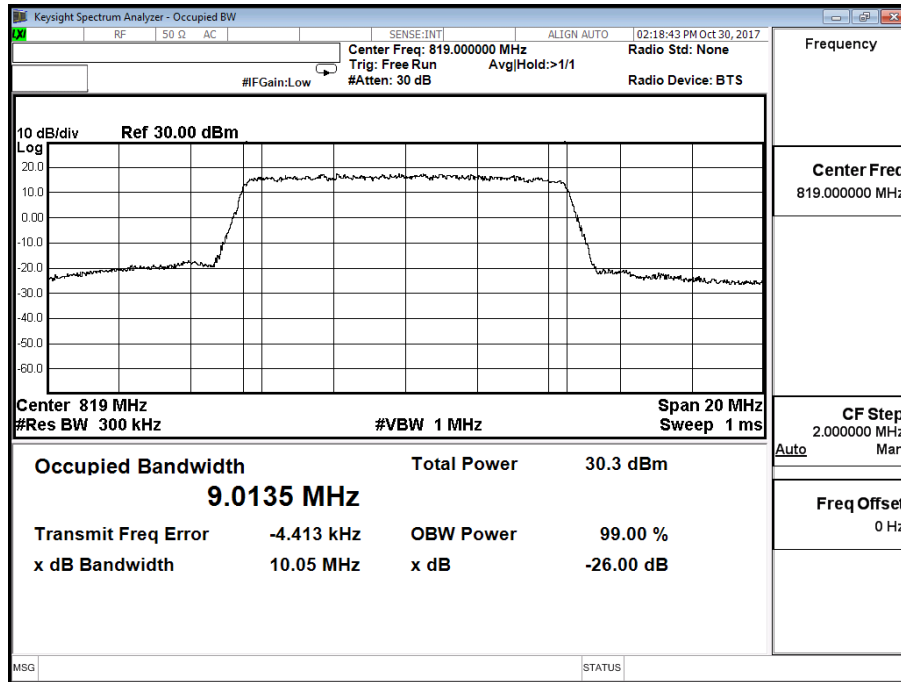


Band 26 5M 16QAM - LTE Mode CH 26740 (819MHz)

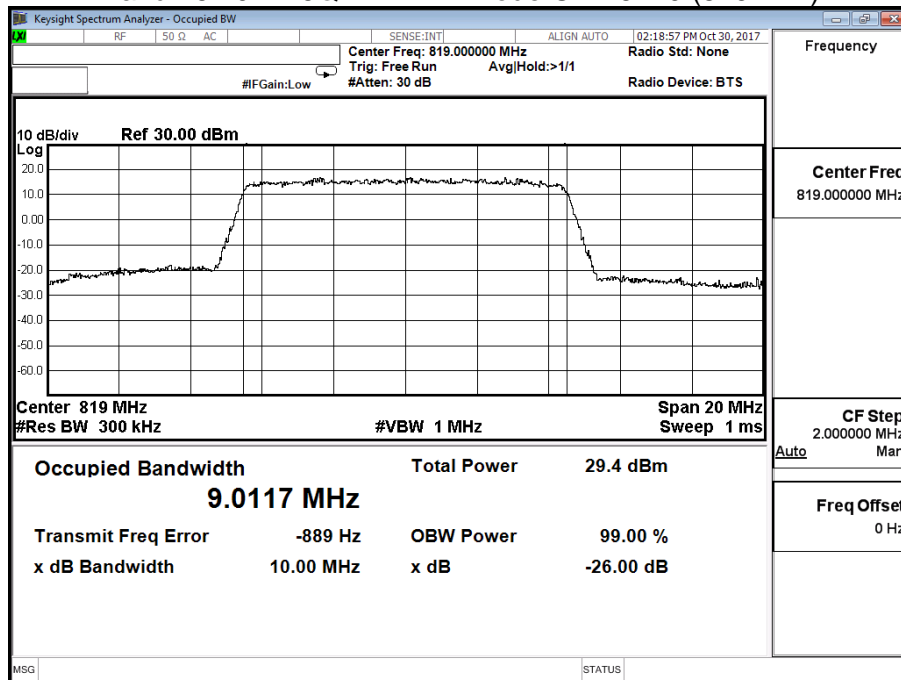


Product	DCM (Data Communication Module)		
Test Mode	Occupied Bandwidth		
Date of Test	2017/10/30	Test Site	CTR
Test Condition	Band 26 10M		

Band 26 10M QPSK - LTE Mode CH 26740 (819MHz)

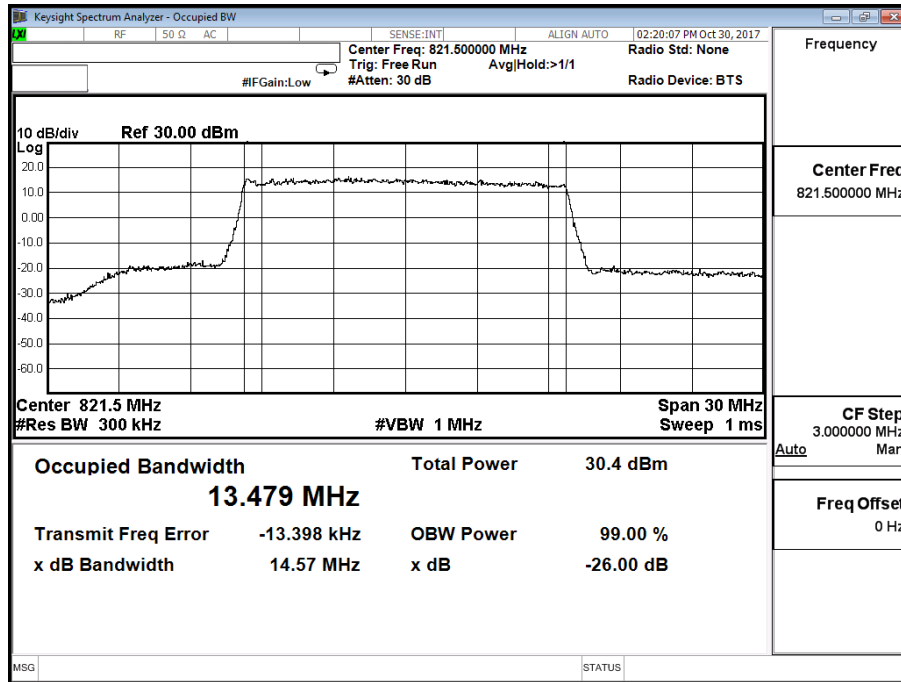


Band 26 10M 16QAM - LTE Mode CH 26740 (819MHz)

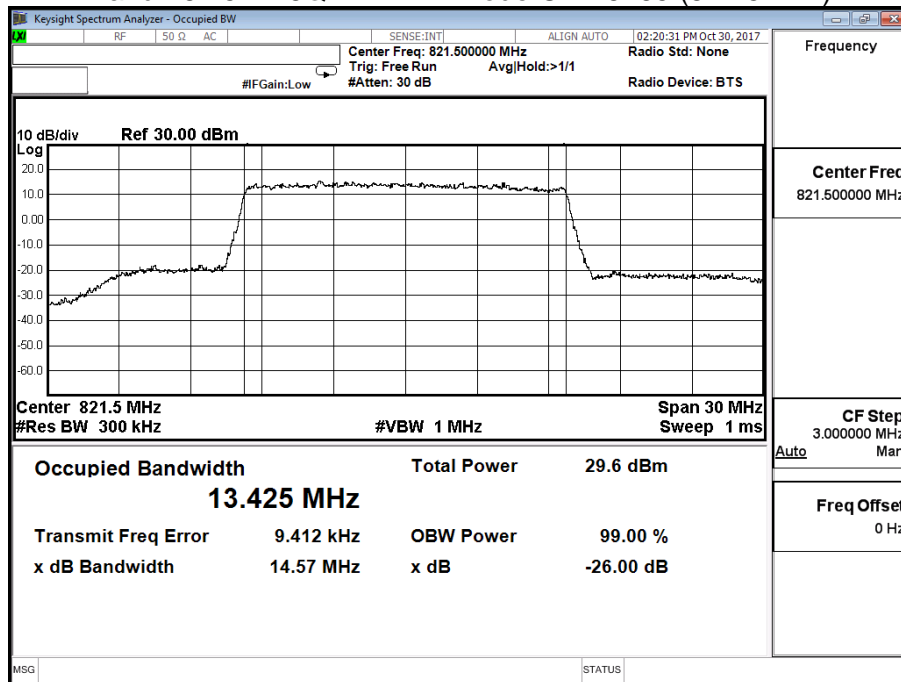


Product	DCM (Data Communication Module)		
Test Mode	Occupied Bandwidth		
Date of Test	2017/10/30	Test Site	CTR
Test Condition	Band 26 15M		

Band 26 15M QPSK - LTE Mode CH 26765 (821.5MHz)



Band 26 15M 16QAM - LTE Mode CH 26765 (821.5MHz)



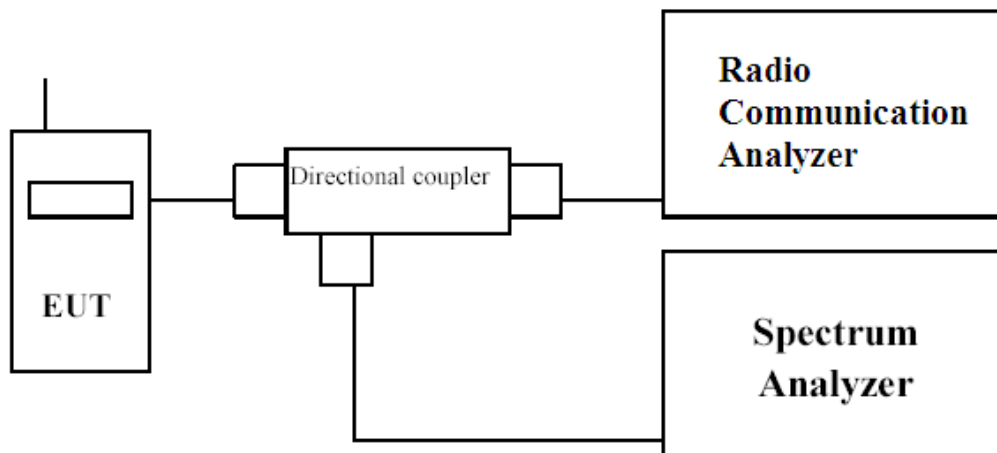


## 5. Spurious Emission At Antenna Terminals (+/-1MHz)

### 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

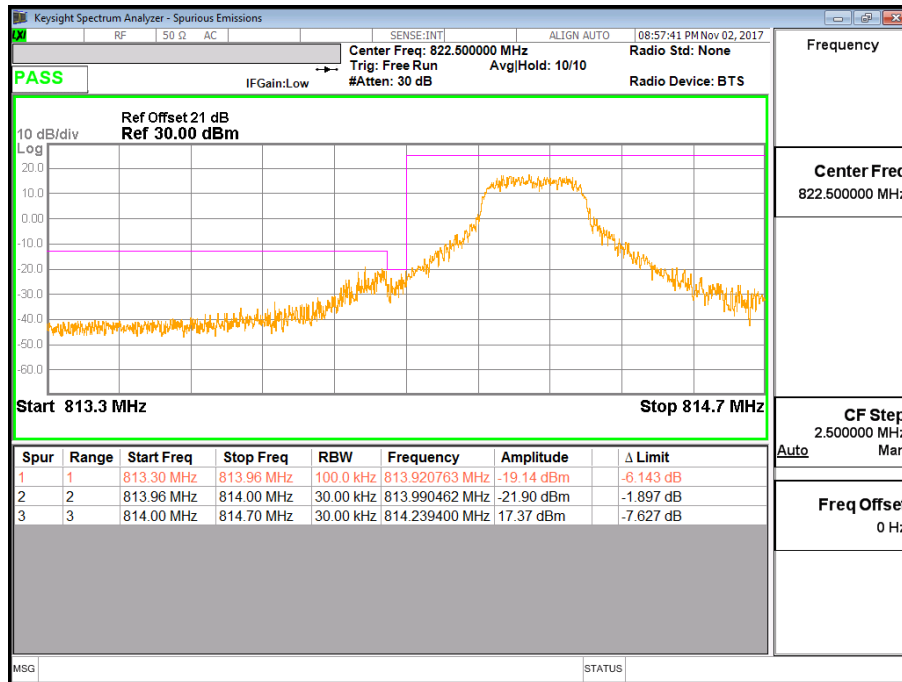
In accordance with Part 90.691 at least 1% of the emission bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz, the resolution and video bandwidth were increased to 1MHz/3MHz.

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

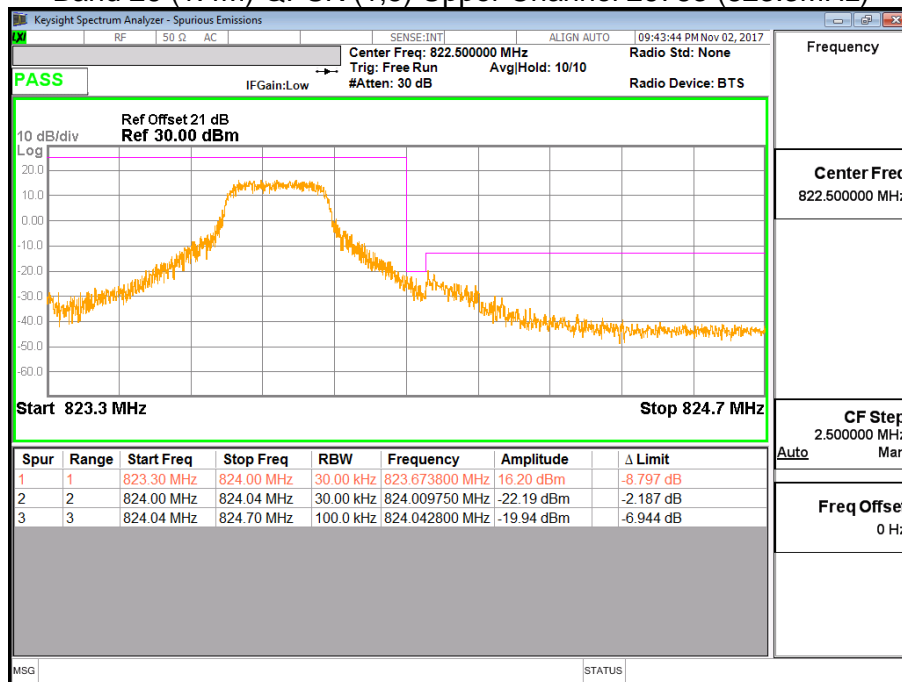
### 5.5. Test Result of Spurious Emission At Antenna Terminals (+/-1MHz)

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	Block Edge Test (Band 26 (1.4M))		

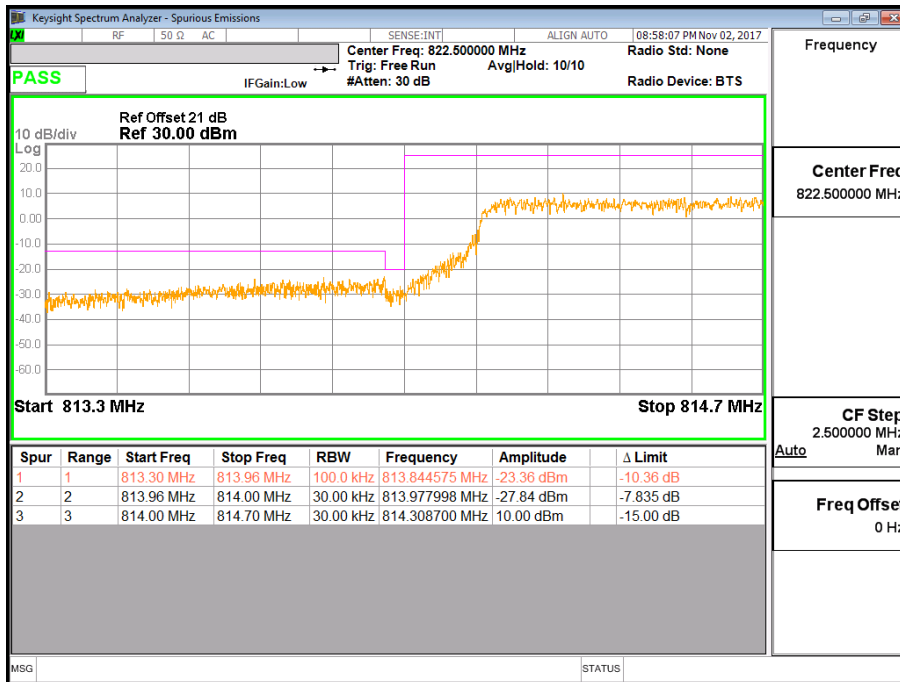
Band 26 (1.4M) QPSK (1,0) Lower Channel 26697 (814.7MHz)



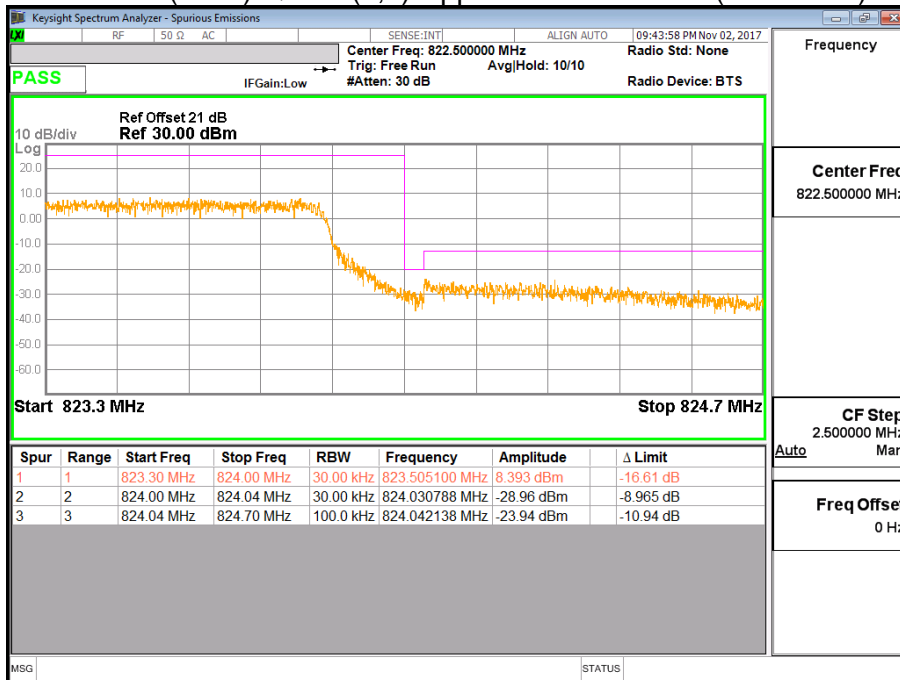
Band 26 (1.4M) QPSK (1,5) Upper Channel 26783 (823.3MHz)



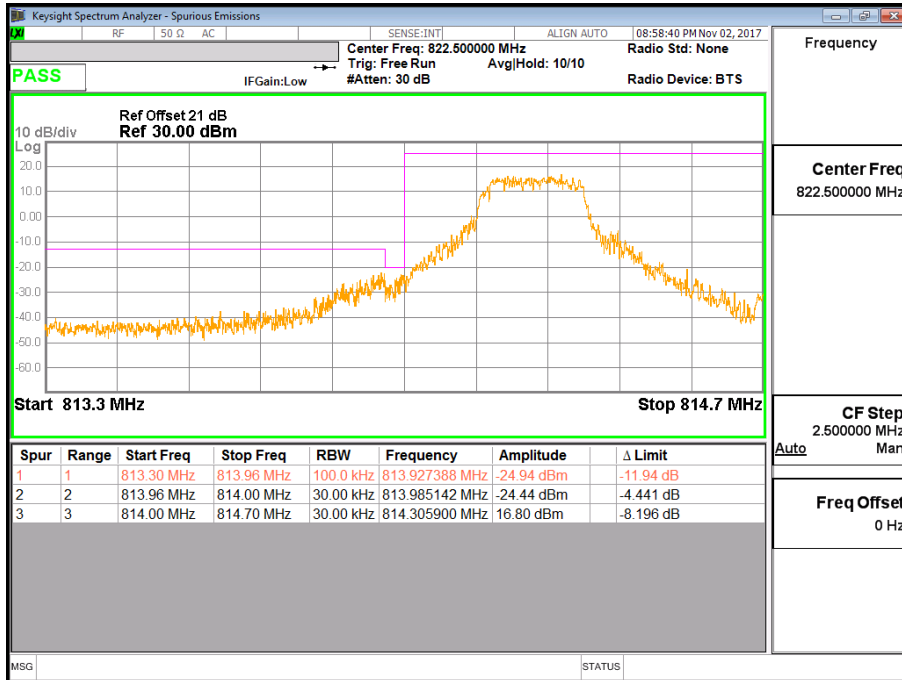
### Band 26 (1.4M) QPSK (6,0) Lower Channel 26697 (814.7MHz)



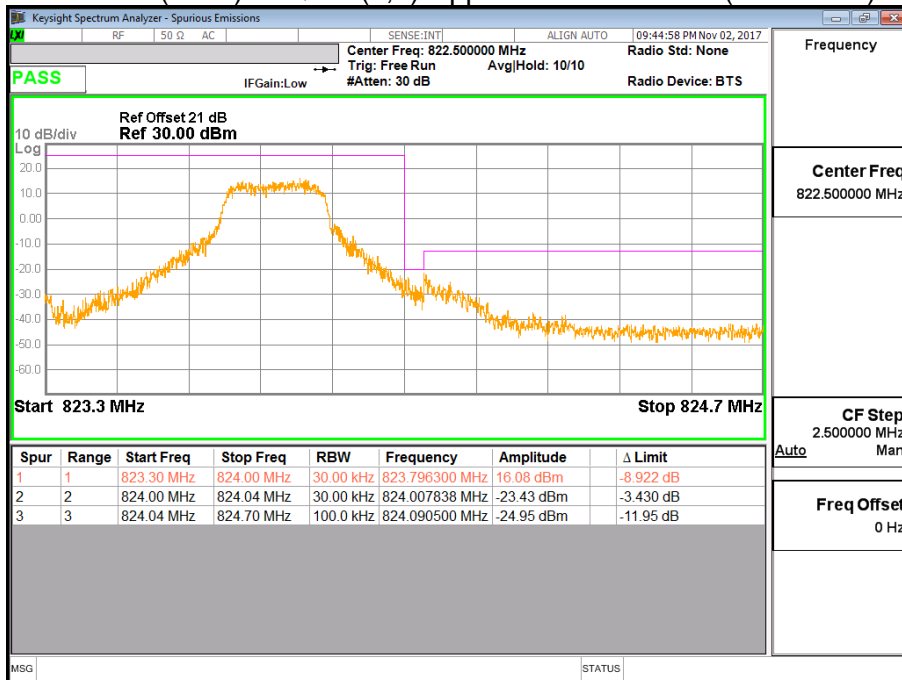
### Band 26 (1.4M) QPSK (6,0) Upper Channel 26783 (823.3MHz)



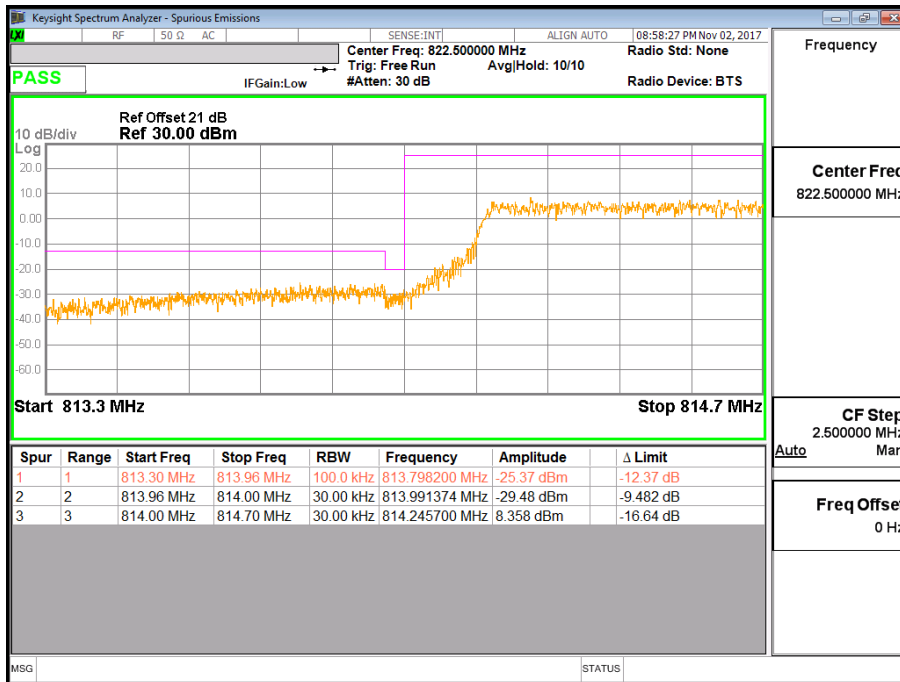
Band 26 (1.4M) 16QAM (1,0) Lower Channel 26697 (814.7MHz)



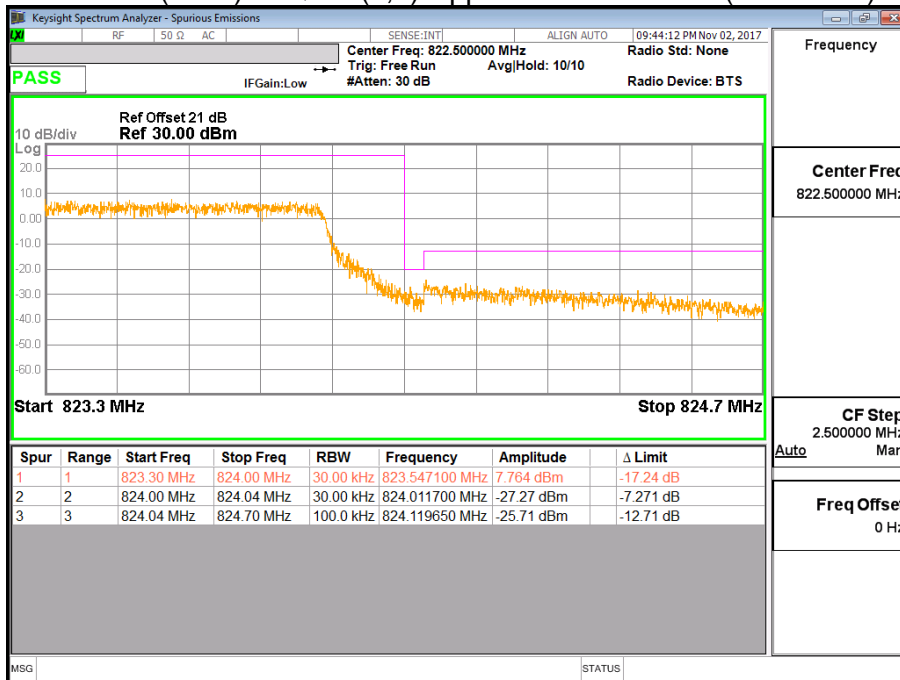
Band 26 (1.4M) 16QAM (1,5) Upper Channel 26783 (823.3MHz)



Band 26 (1.4M) 16QAM (6,0) Lower Channel 26697 (814.7MHz)

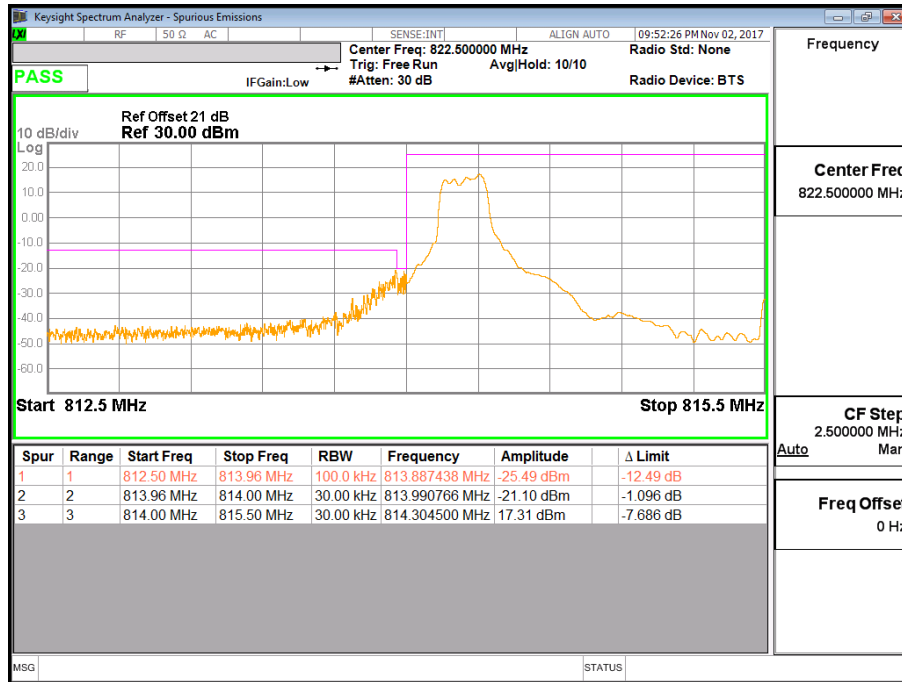


Band 26 (1.4M) 16QAM (6,0) Upper Channel 26783 (823.3MHz)

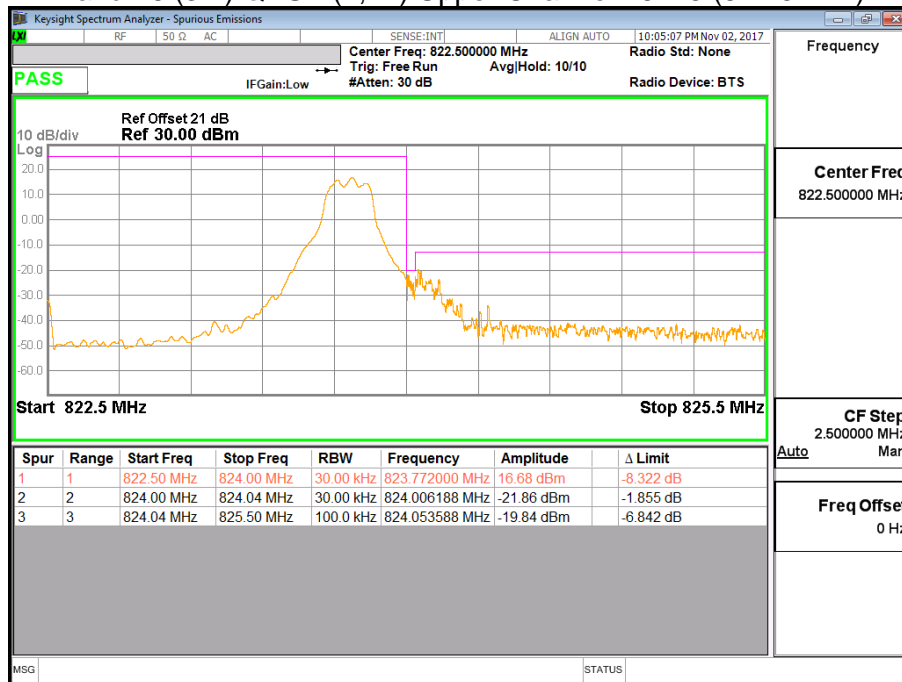


Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	Block Edge Test (Band 26 (3M))		

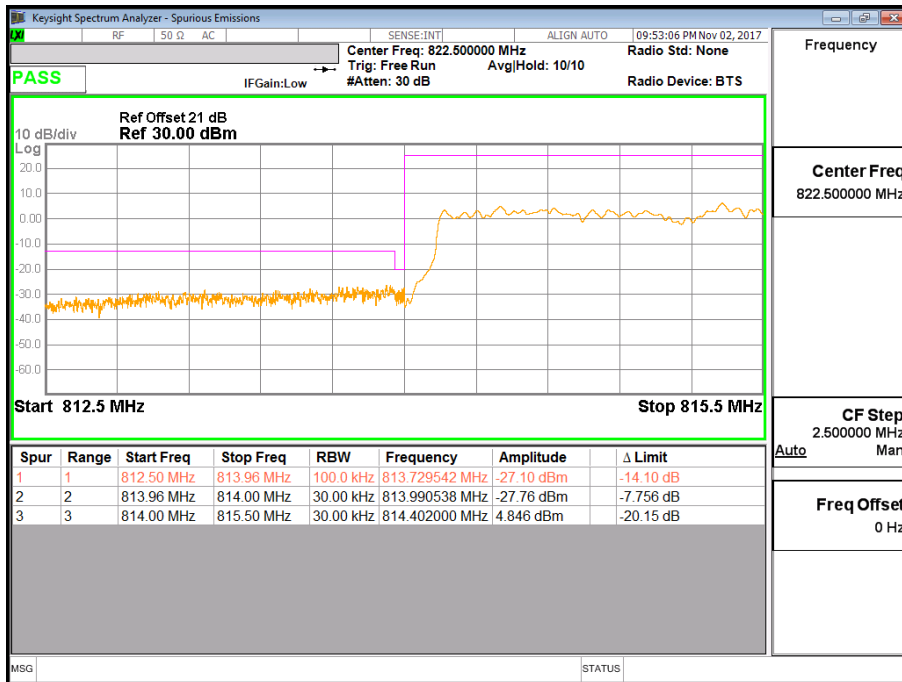
Band 26 (3M) QPSK (1,0) Lower Channel 26705 (815.5MHz)



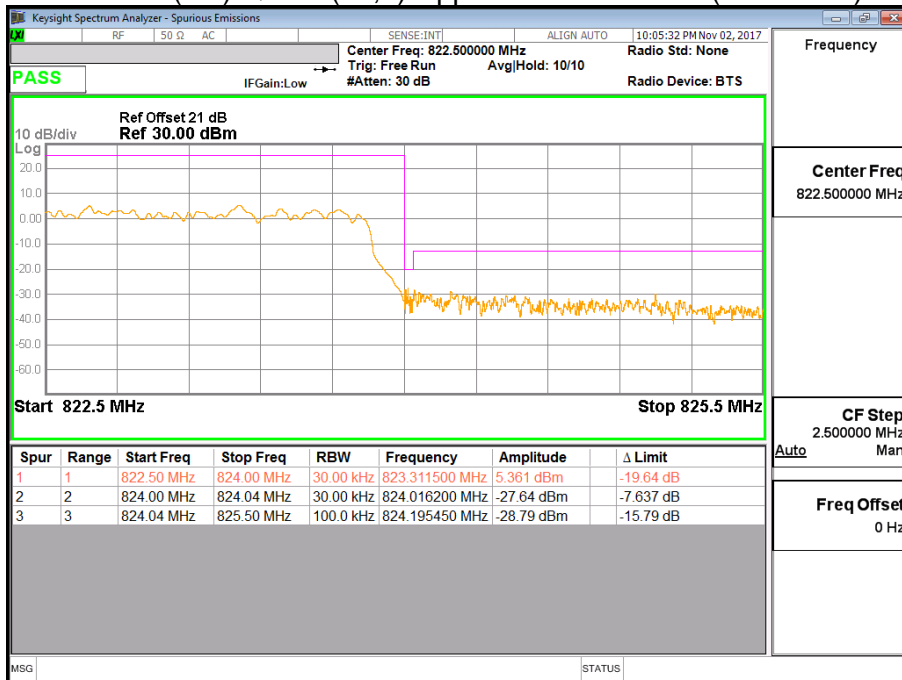
Band 26 (3M) QPSK (1,14) Upper Channel 26775 (822.5MHz)



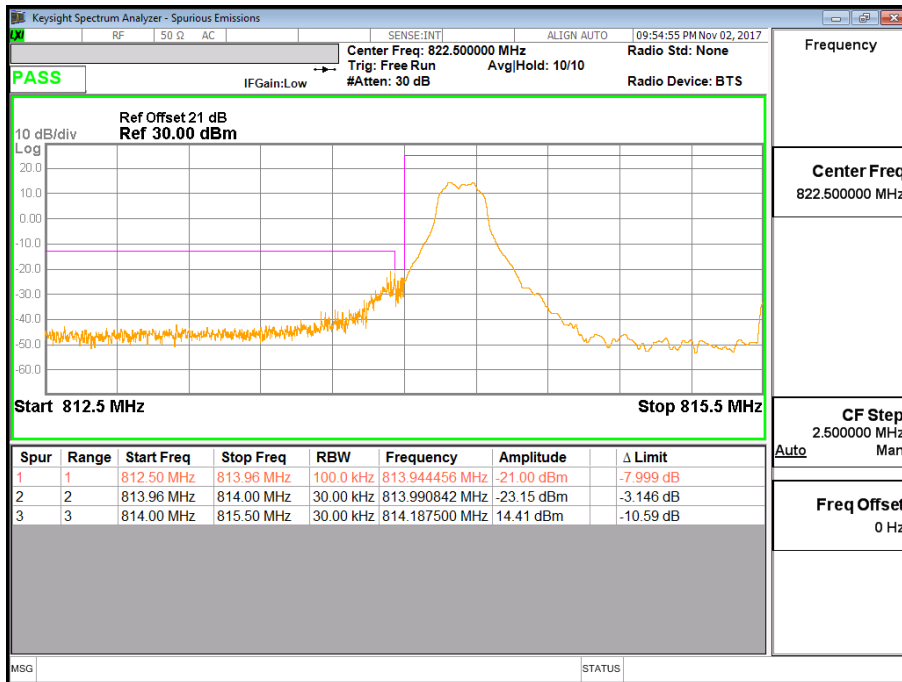
Band 26 (3M) QPSK (15,0) Lower Channel 26705 (815.5MHz)



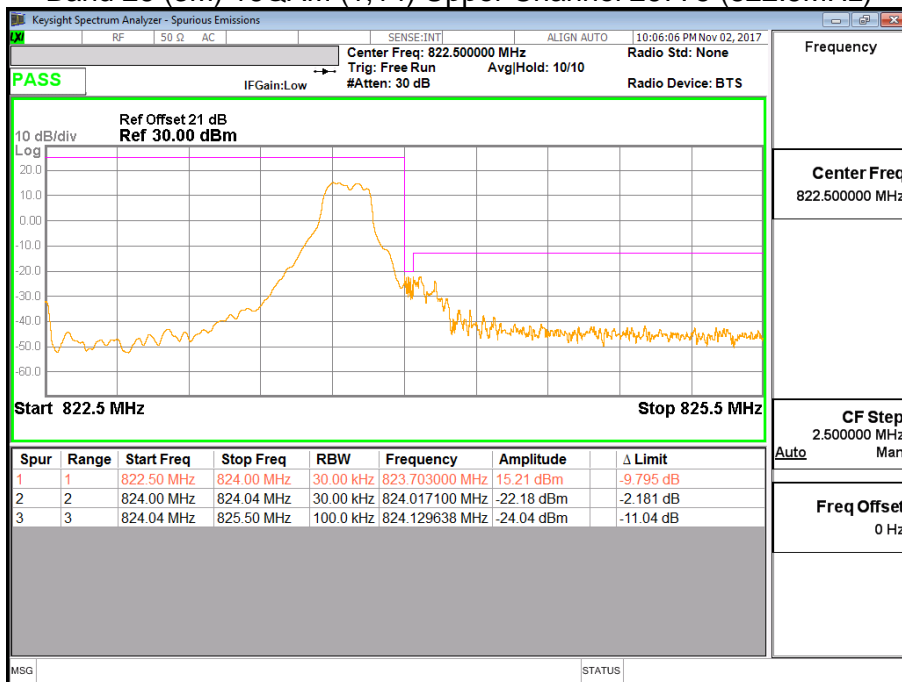
Band 26 (3M) QPSK (15,0) Upper Channel 26775 (822.5MHz)



Band 26 (3M) 16QAM (1,0) Lower Channel 26705 (815.5MHz)

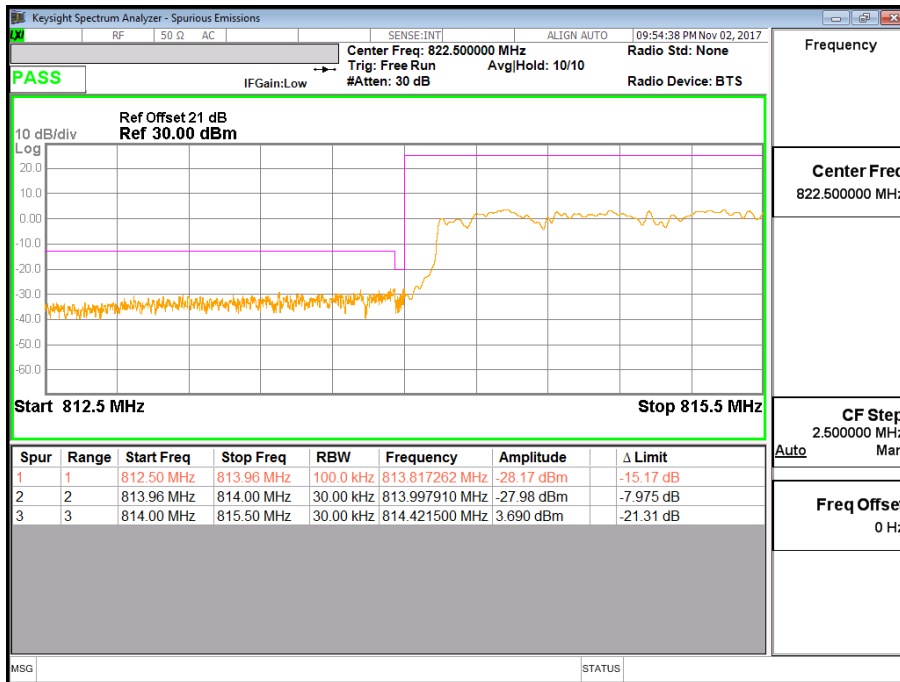


Band 26 (3M) 16QAM (1,14) Upper Channel 26775 (822.5MHz)

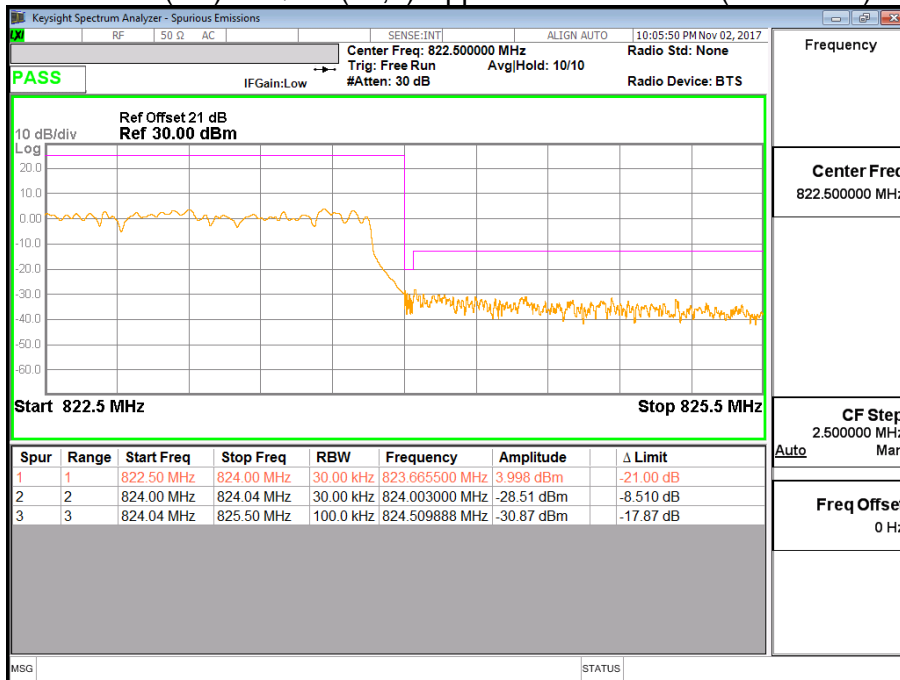




### Band 26 (3M) 16QAM (15,0) Lower Channel 26705 (815.5MHz)

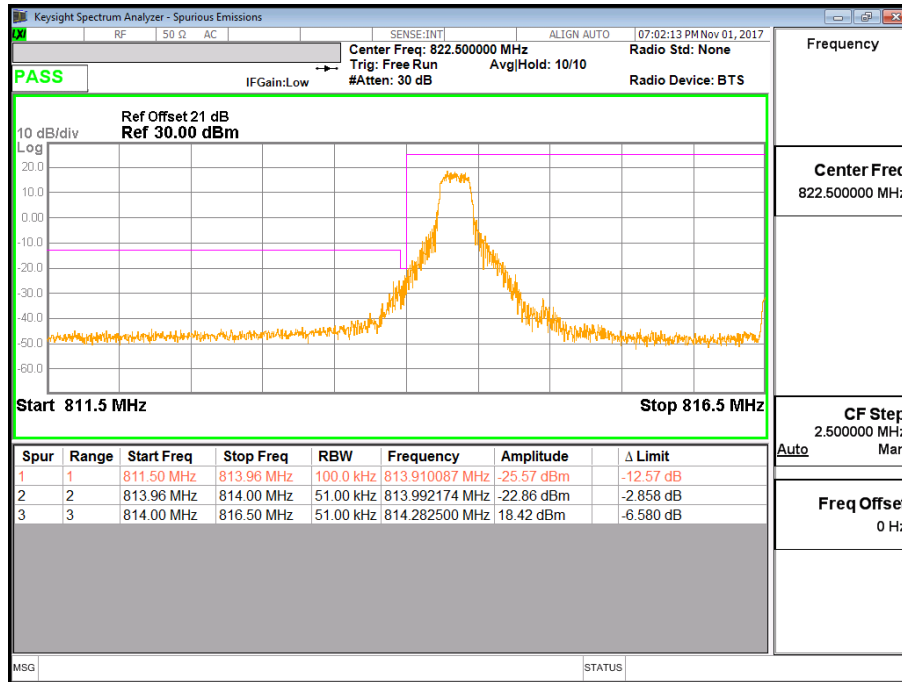


### Band 26 (3M) 16QAM (15,0) Upper Channel 26775 (822.5MHz)

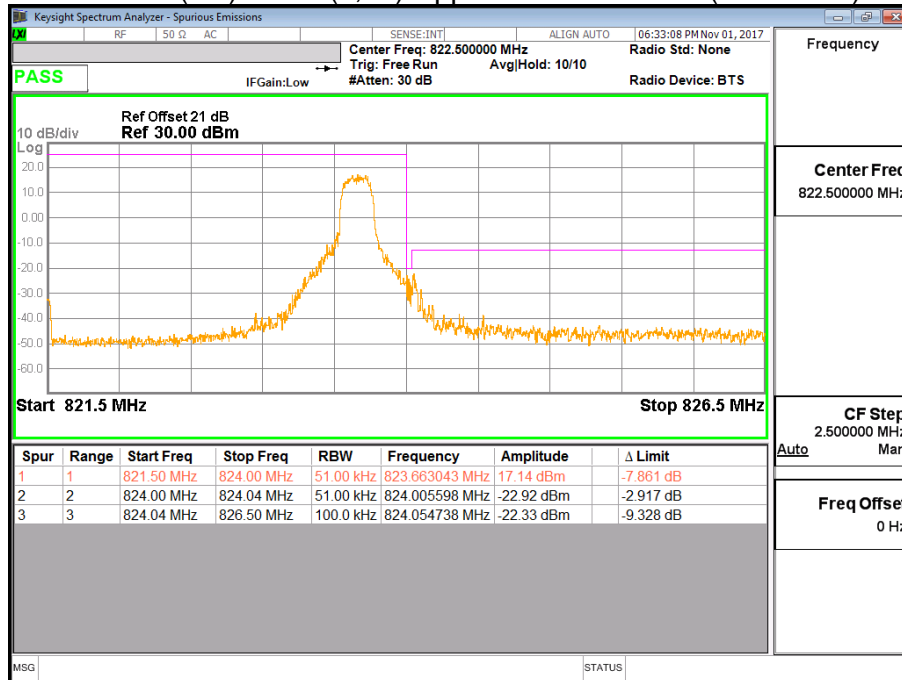


Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	Block Edge Test (Band 26 (5M))		

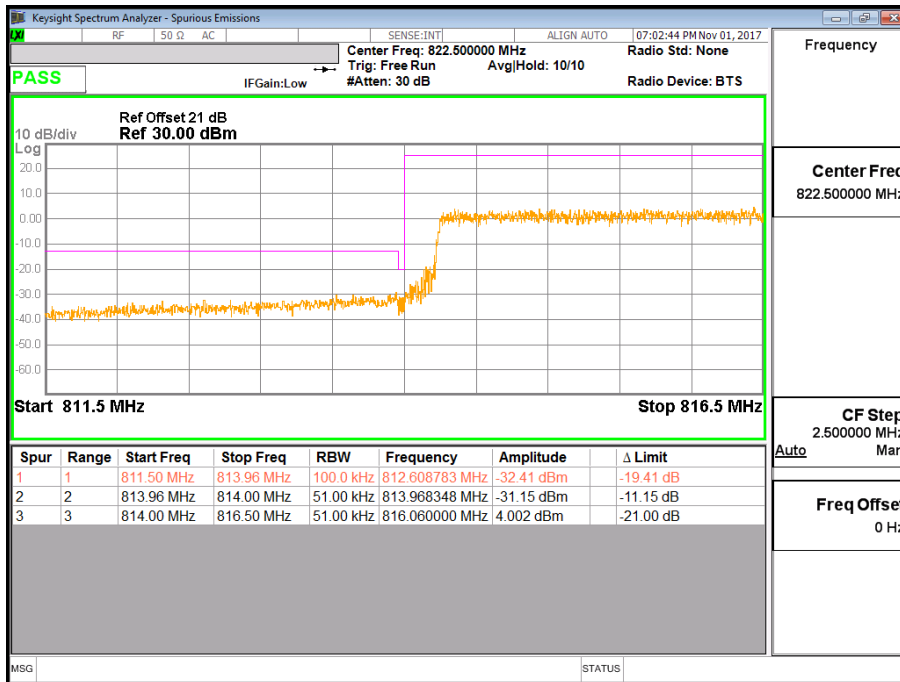
Band 26 (5M) QPSK(1,0) Lower Channel 26715 (816.5MHz)



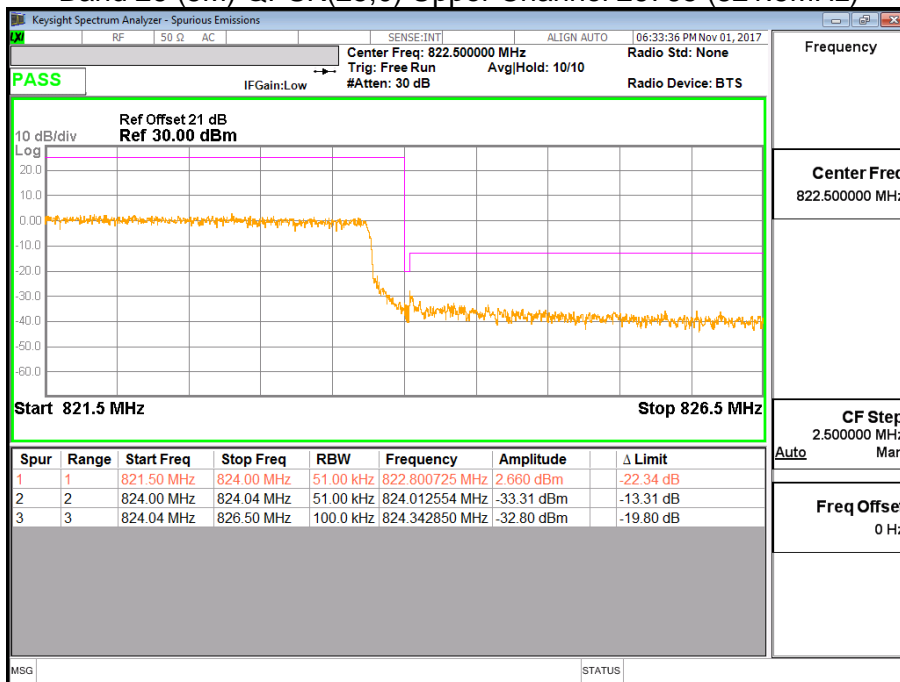
Band 26 (5M) QPSK(1,24) Upper Channel 26765 (821.5MHz)



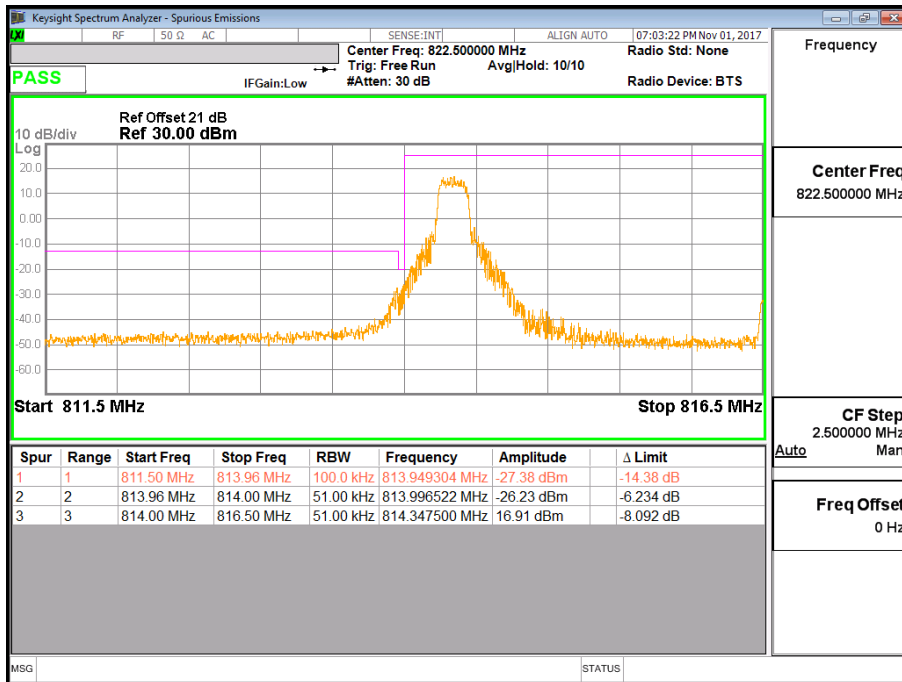
### Band 26 (5M) QPSK(25,0) Lower Channel 26715 (816.5MHz)



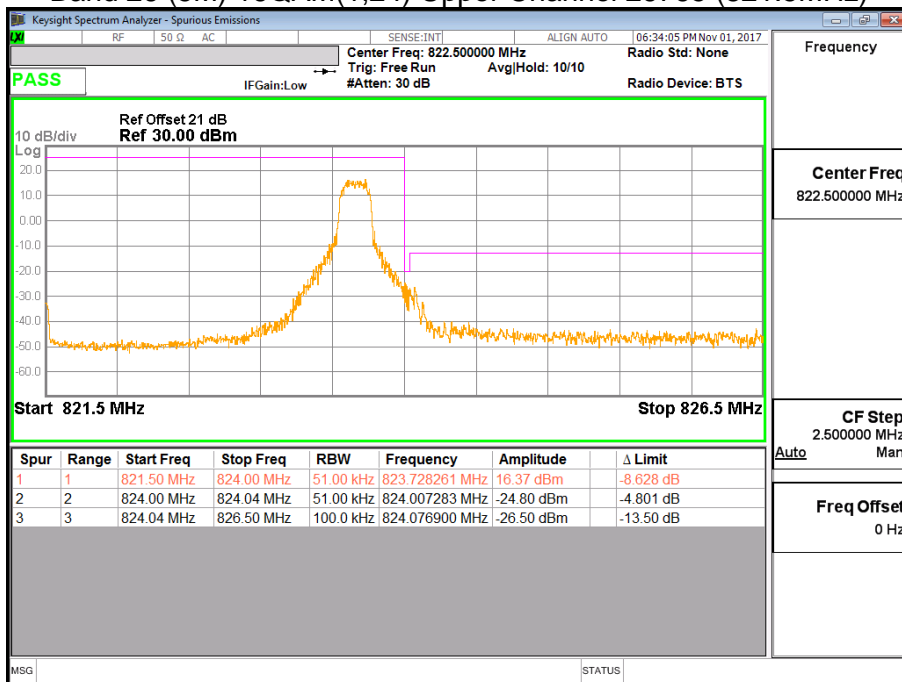
### Band 26 (5M) QPSK(25,0) Upper Channel 26765 (821.5MHz)



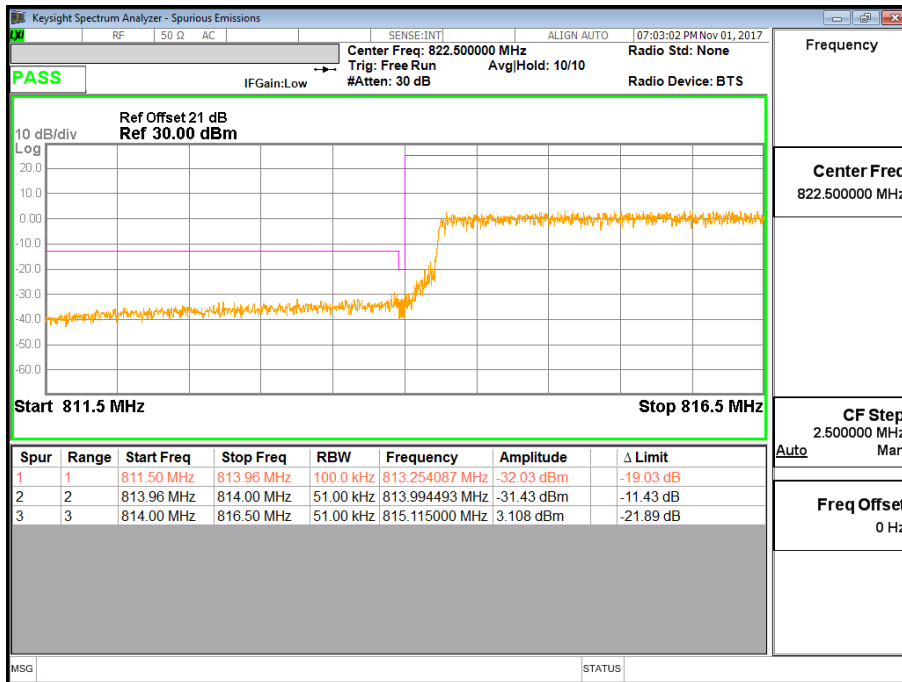
Band 26 (5M) 16QAM(1,0) Lower Channel 26715 (816.5MHz)



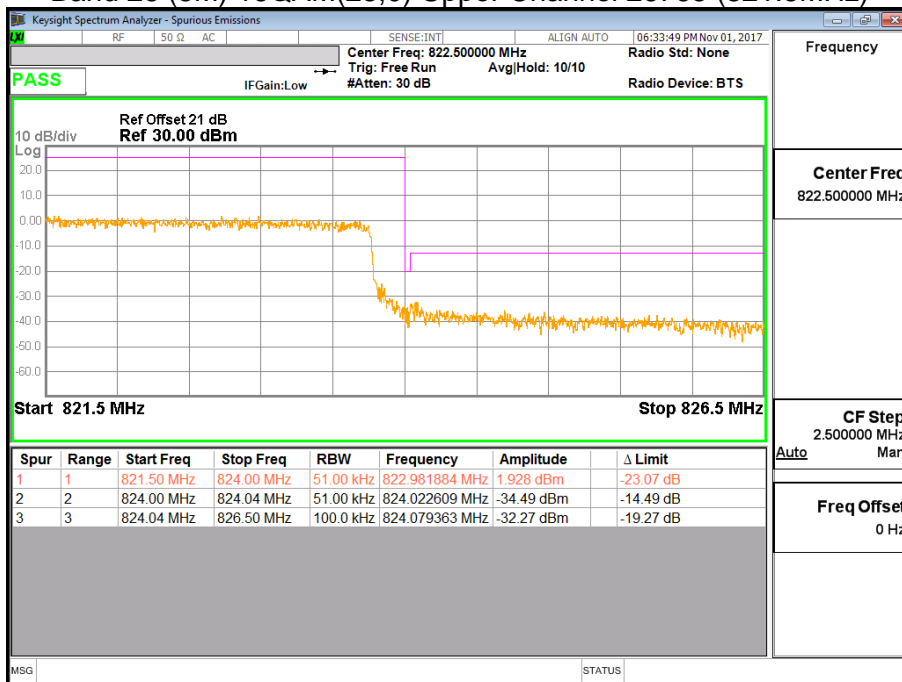
Band 26 (5M) 16QAM(1,24) Upper Channel 26765 (821.5MHz)



Band 26 (5M) 16QAM(25,0) Lower Channel 26715 (816.5MHz)

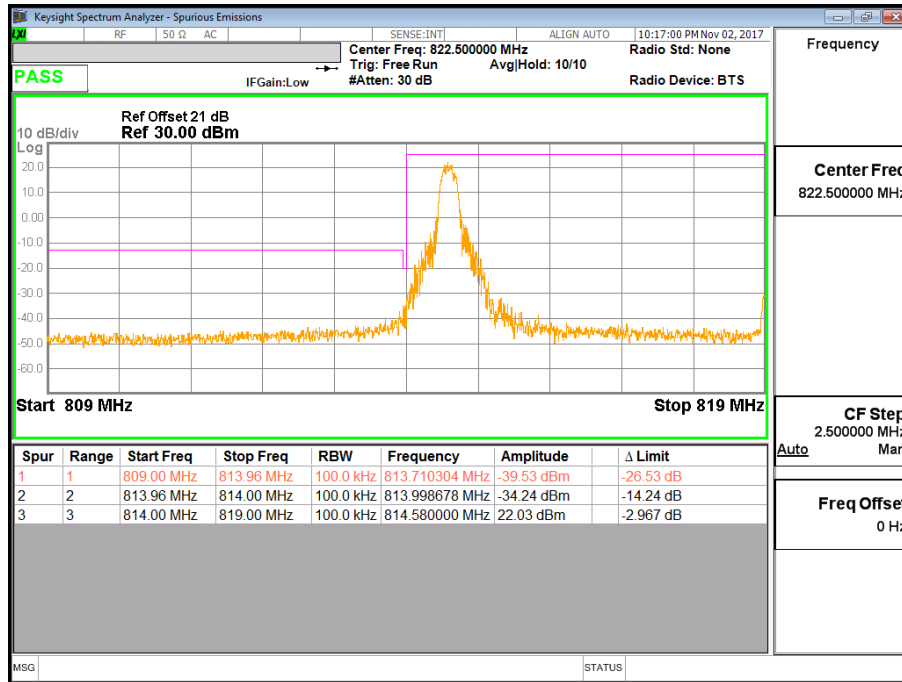


Band 26 (5M) 16QAM(25,0) Upper Channel 26765 (821.5MHz)

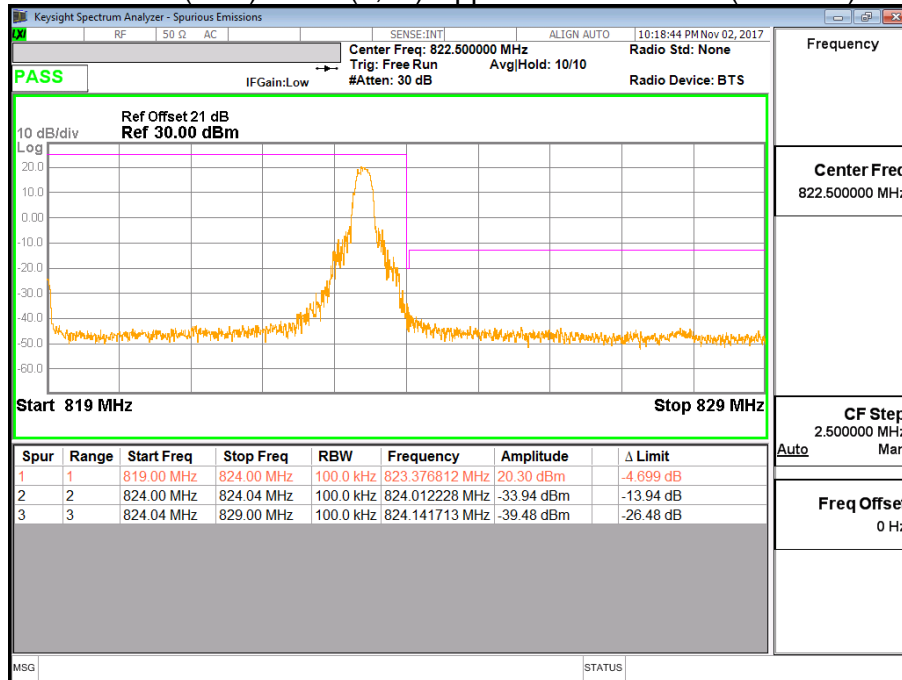


Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	Block Edge Test (Band 26 (10M))		

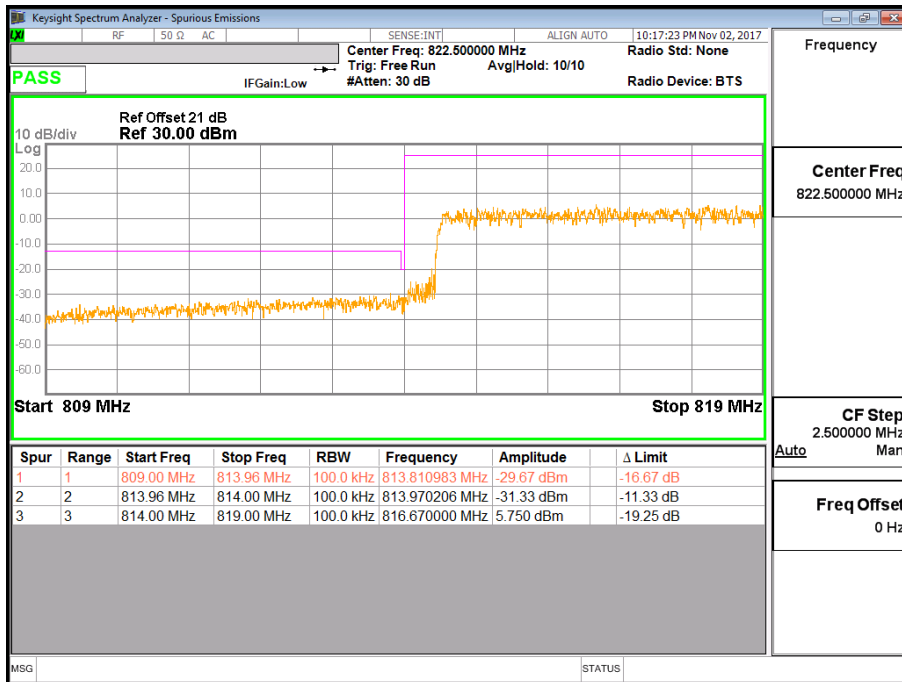
Band 26 (10M) QPSK(1,0) Lower Channel 26740 (819MHz)



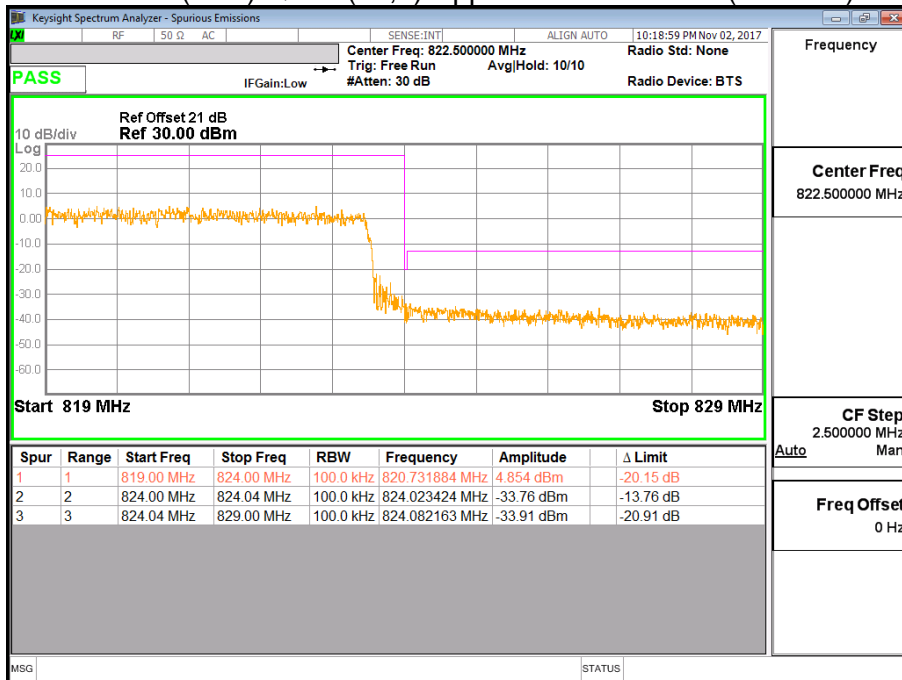
Band 26 (10M) QPSK(1,49) Upper Channel 26740 (819MHz)



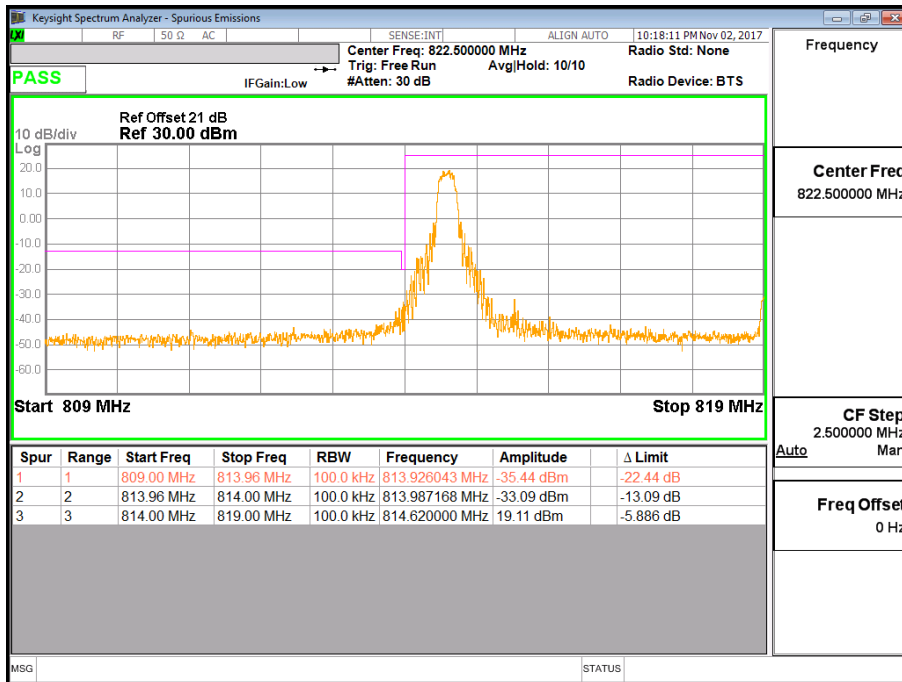
Band 26 (10M) QPSK(50,0) Lower Channel 26740 (819MHz)



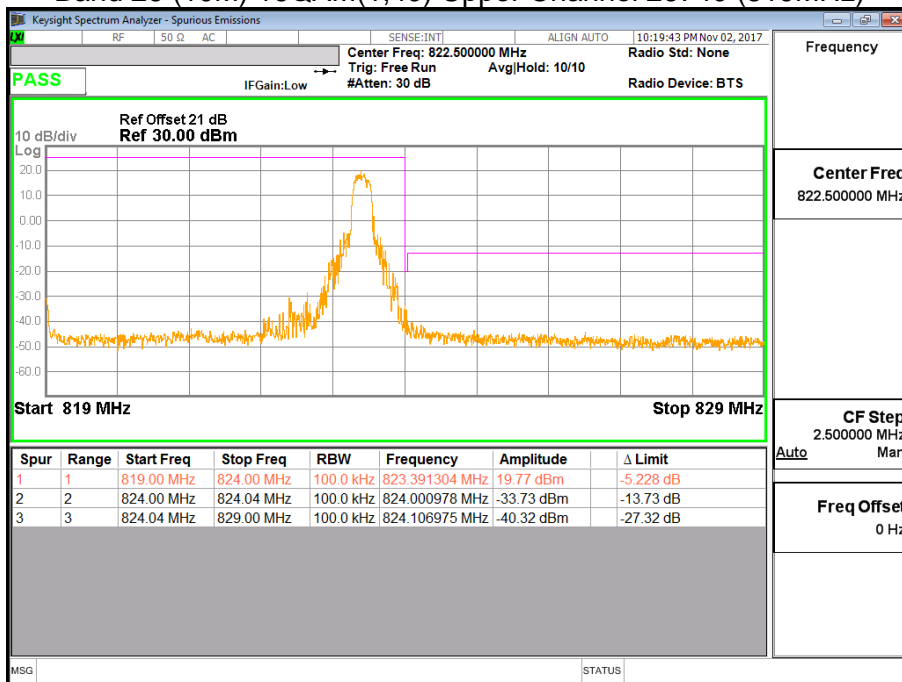
Band 26 (10M) QPSK(50,0) Upper Channel 26740 (819MHz)



Band 26 (10M) 16QAM(1,0) Lower Channel 26740 (819MHz)

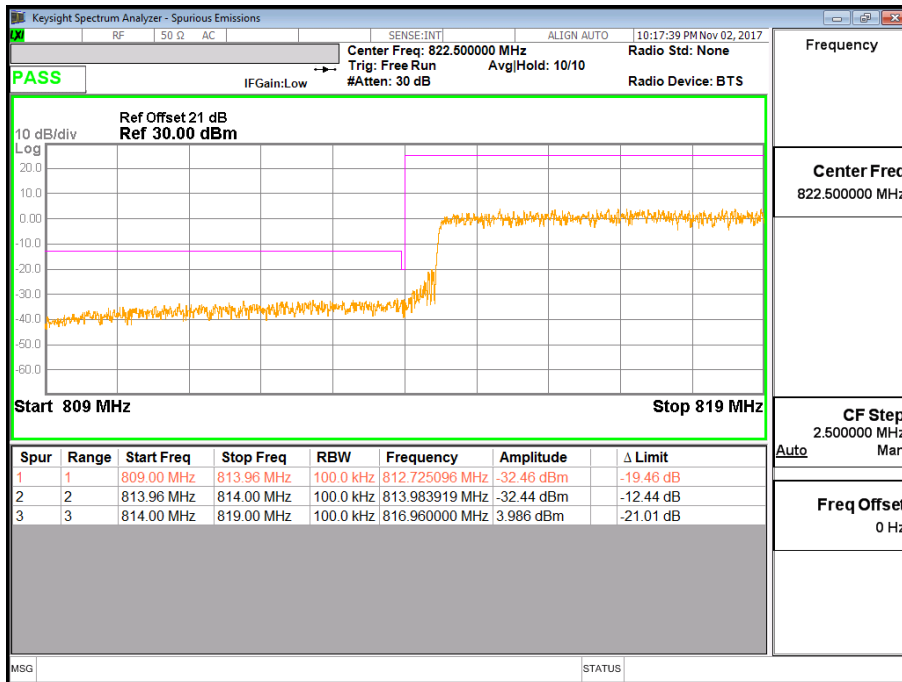


Band 26 (10M) 16QAM(1,49) Upper Channel 26740 (819MHz)

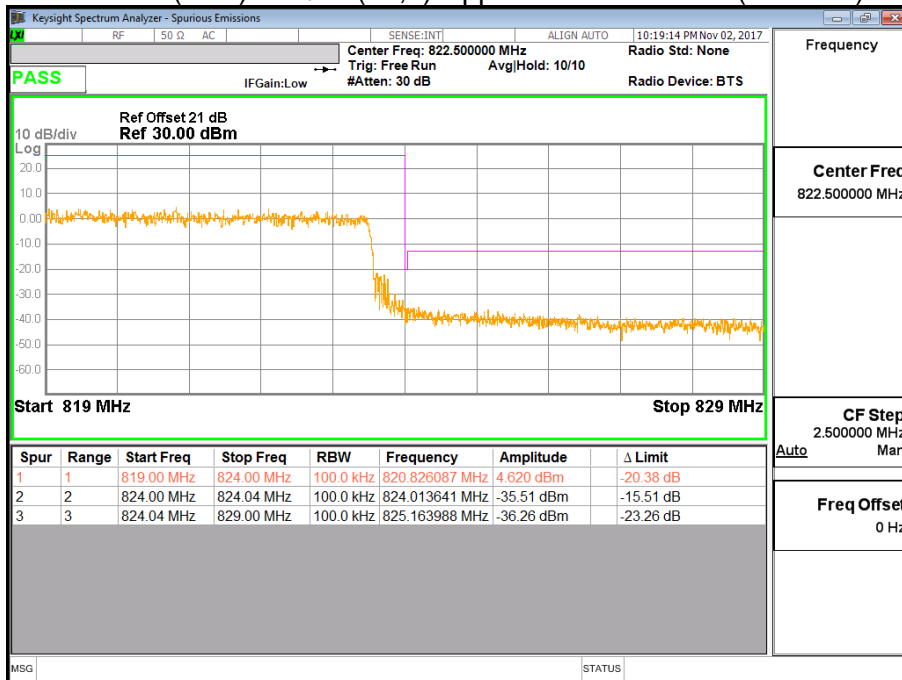




Band 26 (10M) 16QAM(50,0) Lower Channel 26740 (819MHz)

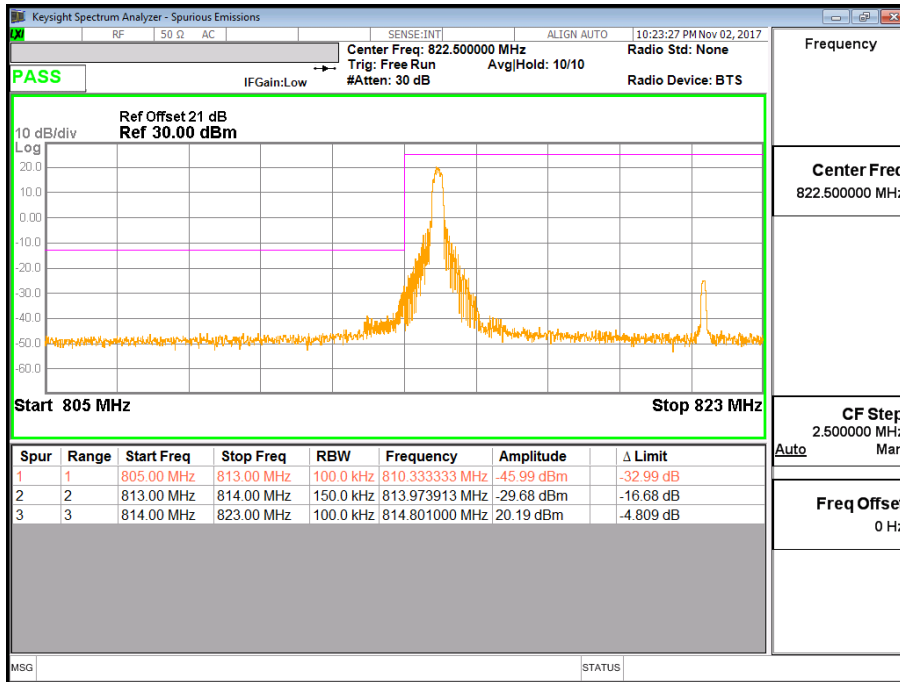


Band 26 (10M) 16QAM(50,0) Upper Channel 26740 (819MHz)

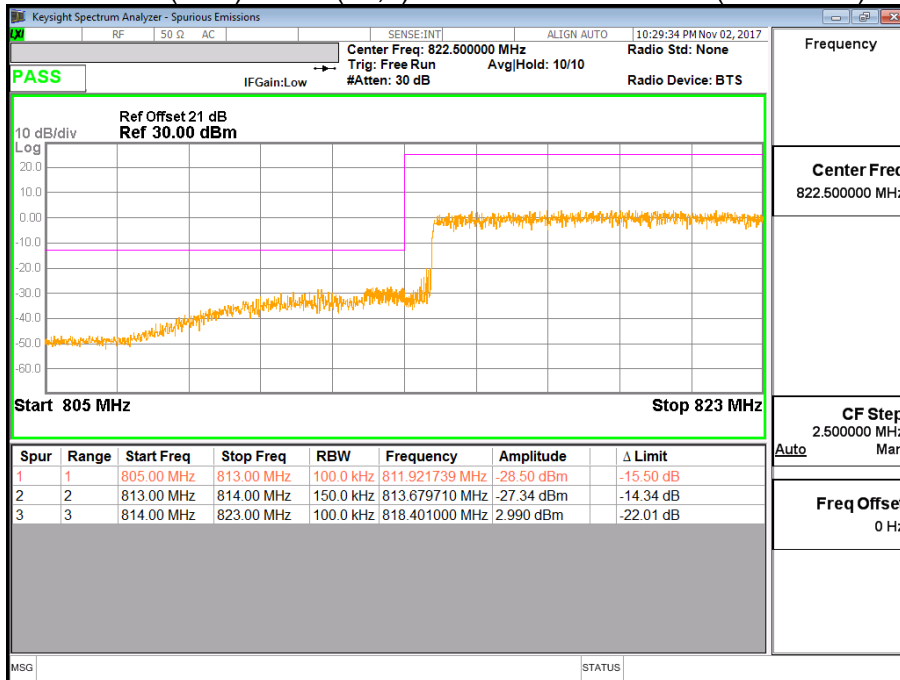


Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	Block Edge Test (Band 26 (15M))		

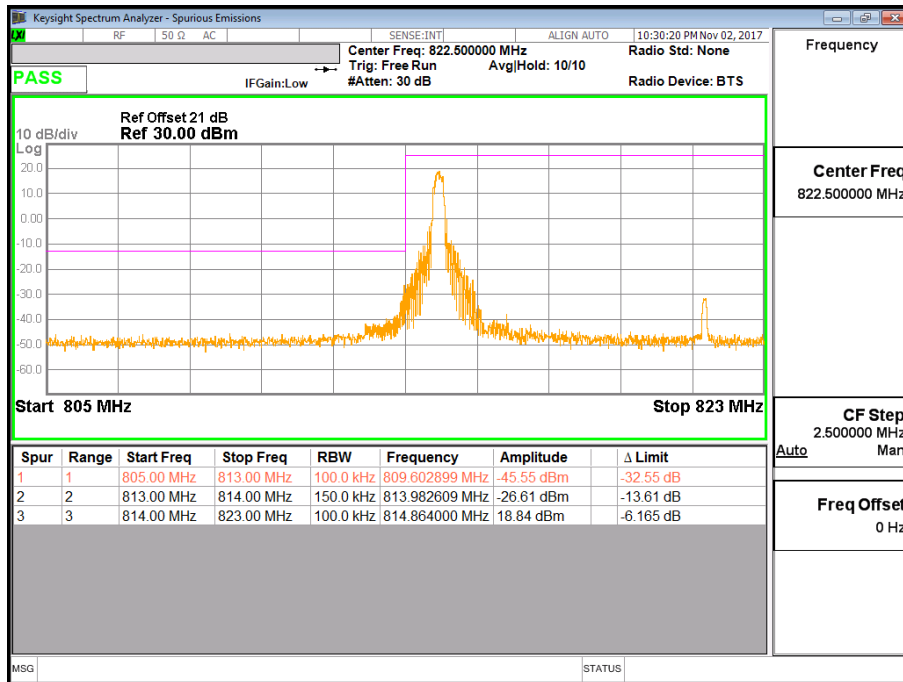
Band 26 (15M) QPSK(1,0) Channel 26765 (821.5MHz)



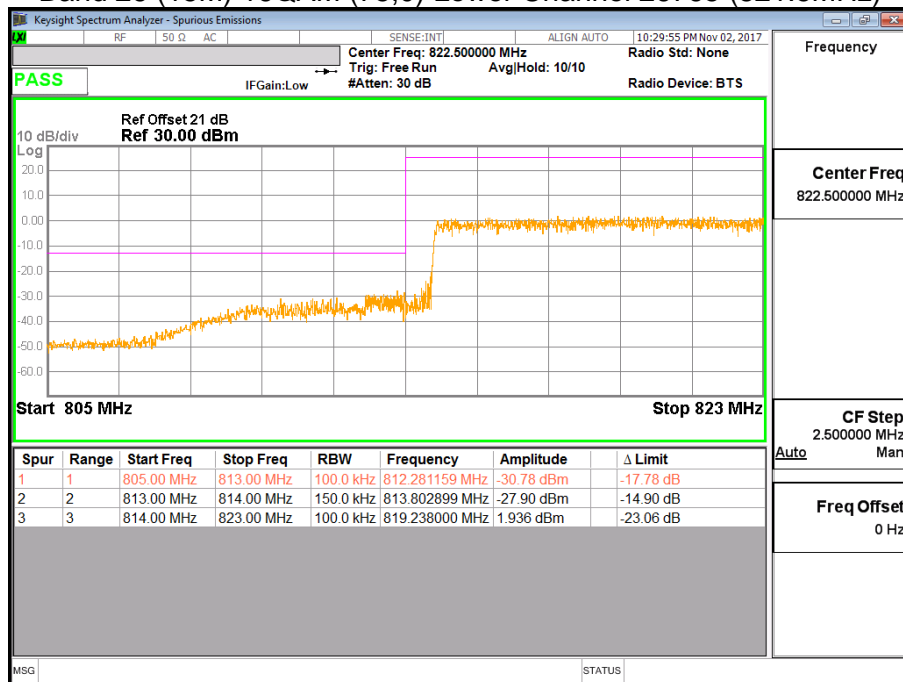
Band 26 (15M) QPSK(75,0) Lower Channel 26765 (821.5MHz)



Band 26 (15M) 16QAM (1,0) Channel 26765 (821.5MHz)



Band 26 (15M) 16QAM (75,0) Lower Channel 26765 (821.5MHz)



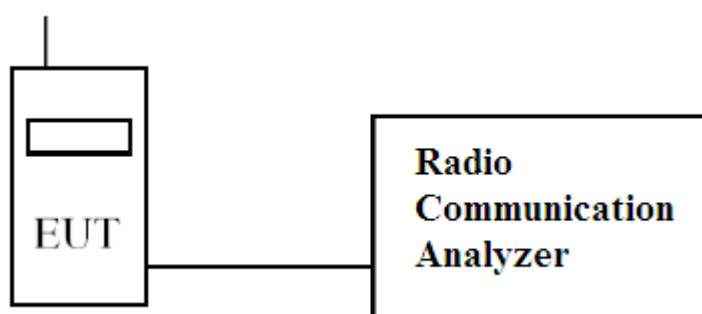
## 6. Spurious Emission

### 6.1. Test Specification

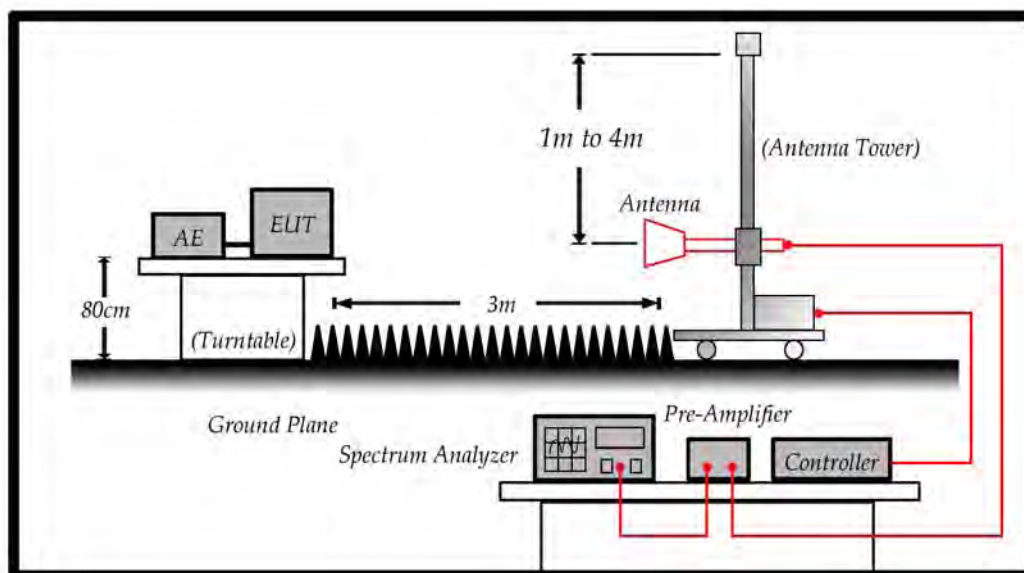
According to Part 2.1051, 90.691

### 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 + 10Log(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 10<sup>th</sup> 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.

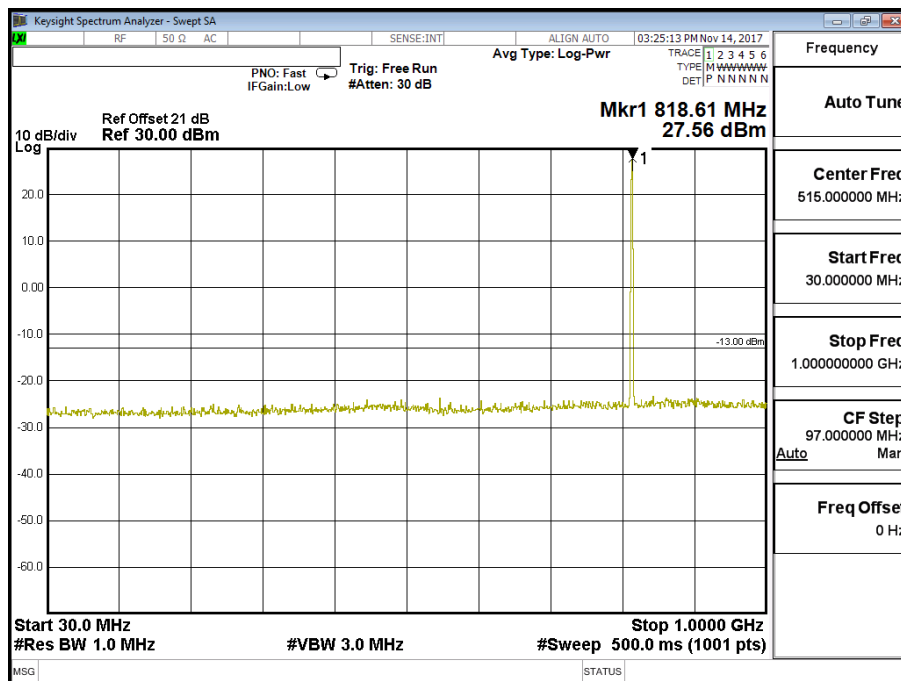
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to TIA/EIA 603-D on radiated measurement.

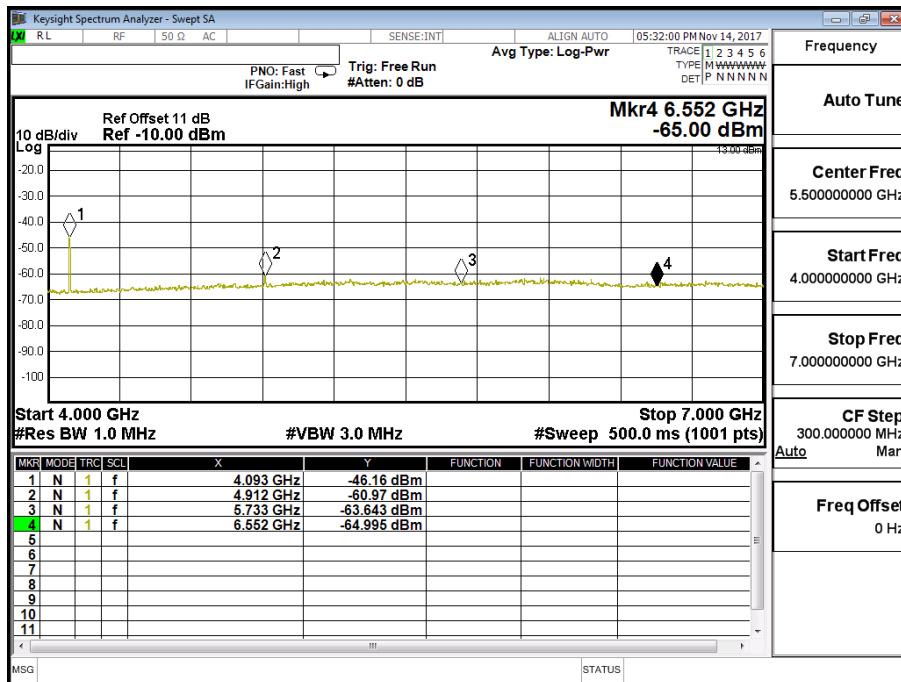
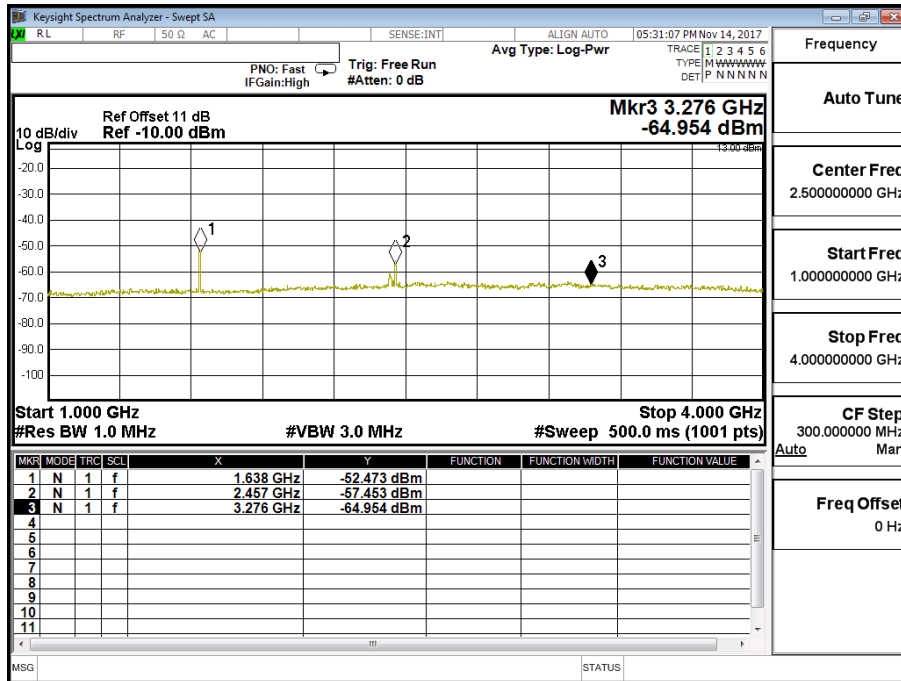
### 6.5. Test Result of Spurious Emission

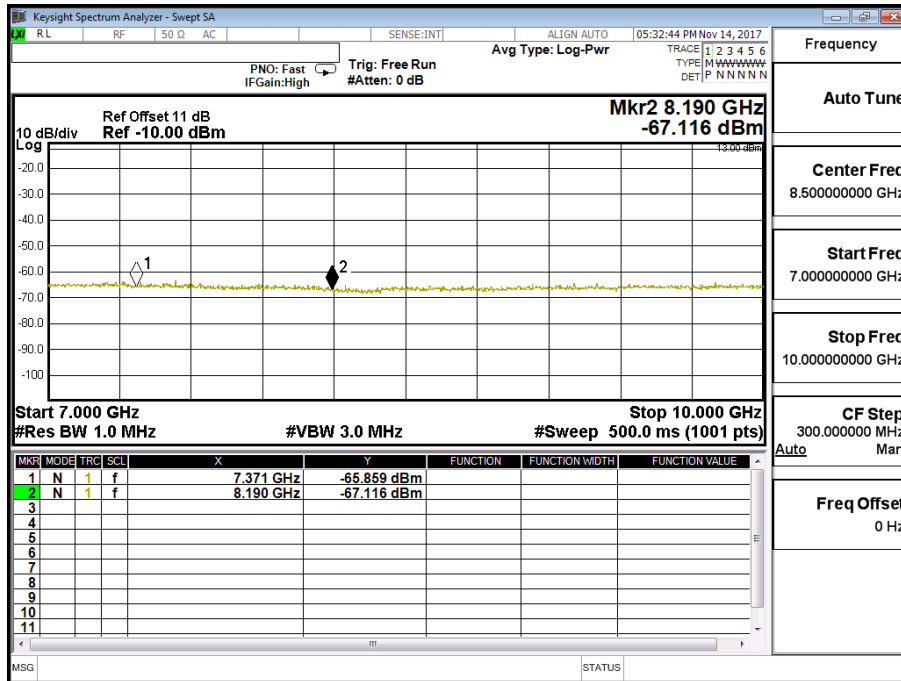
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (1.4M)	Test Range	30MHz~10GHz

#### LTE-Band 26 (1.4M) QPSK(3,0) CH26740 (819MHz)

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1638	-52.473	0.58	-51.893	-13
2457	-57.453	0.70	-56.753	-13
3276	-64.954	1.01	-63.944	-13
4093	-46.160	1.18	-44.980	-13
4912	-60.970	1.23	-59.740	-13
5733	-63.643	1.45	-62.193	-13
6552	-64.995	1.56	-63.435	-13
7371	-65.859	1.59	-64.269	-13
8190	-67.116	1.82	-65.296	-13





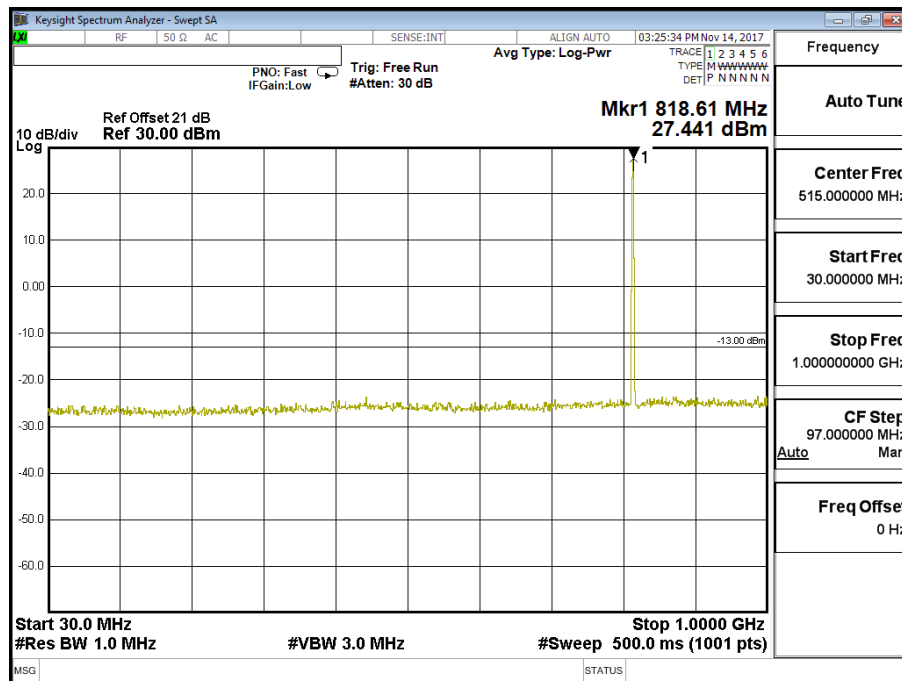


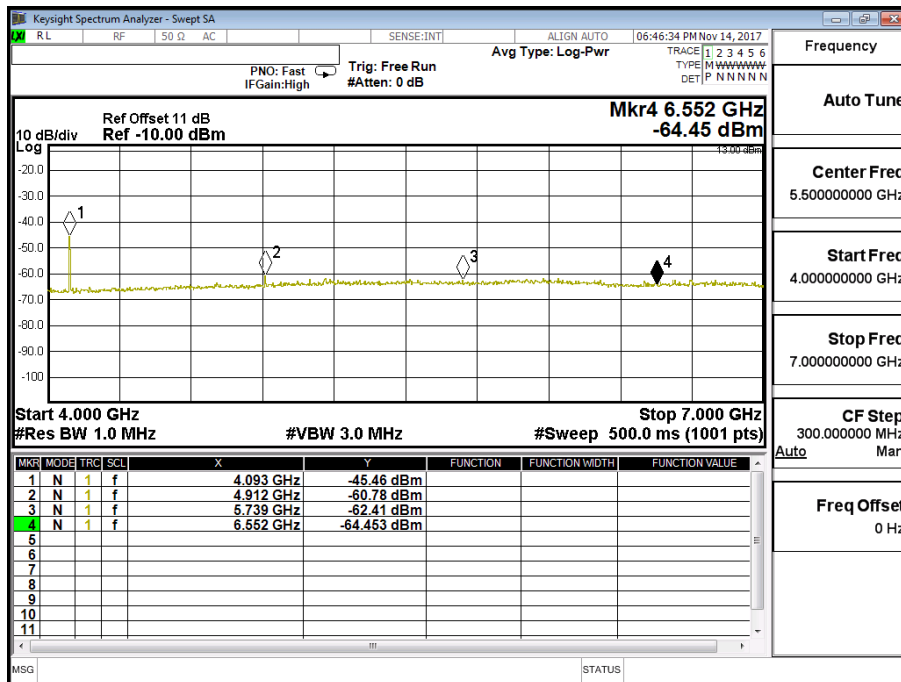
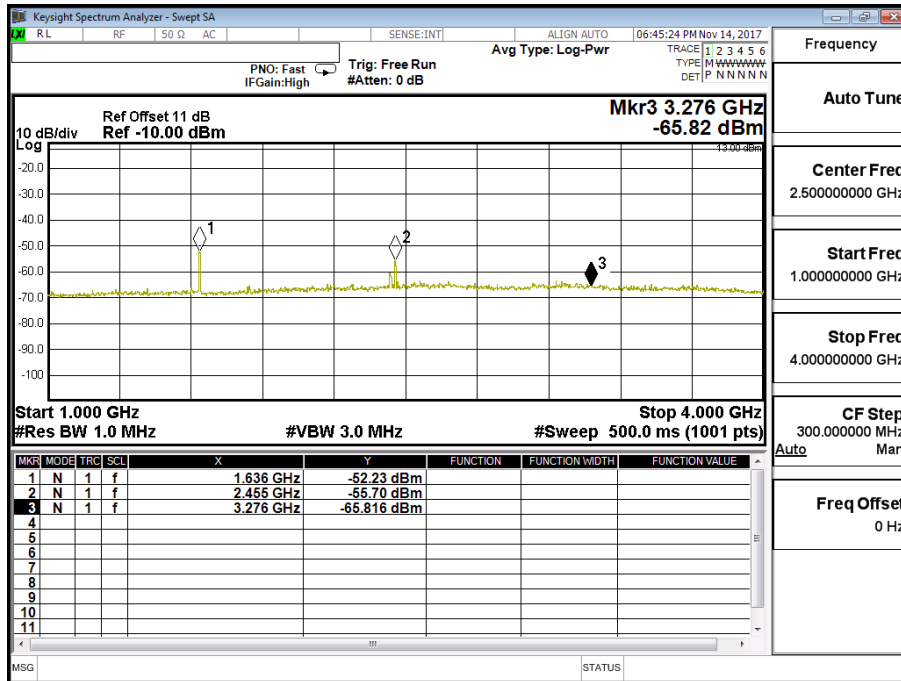


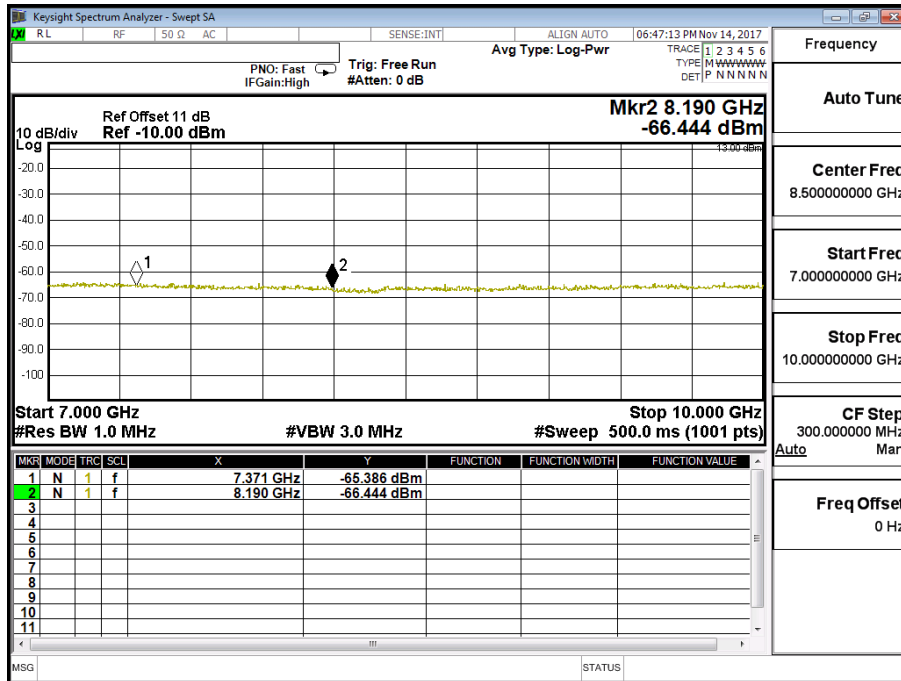
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (1.4M)	Test Range	30MHz~10GHz

**LTE-Band 26 (1.4M) 16QAM(3,0) CH26740 (819MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1636	-52.230	0.58	-51.650	-13
2455	-55.700	0.70	-55.000	-13
3276	-65.816	1.01	-64.806	-13
4093	-45.460	1.18	-44.280	-13
4912	-60.780	1.23	-59.550	-13
5739	-62.410	1.45	-60.960	-13
6552	-64.453	1.56	-62.893	-13
7371	-65.386	1.59	-63.796	-13
8190	-66.444	1.82	-64.624	-13



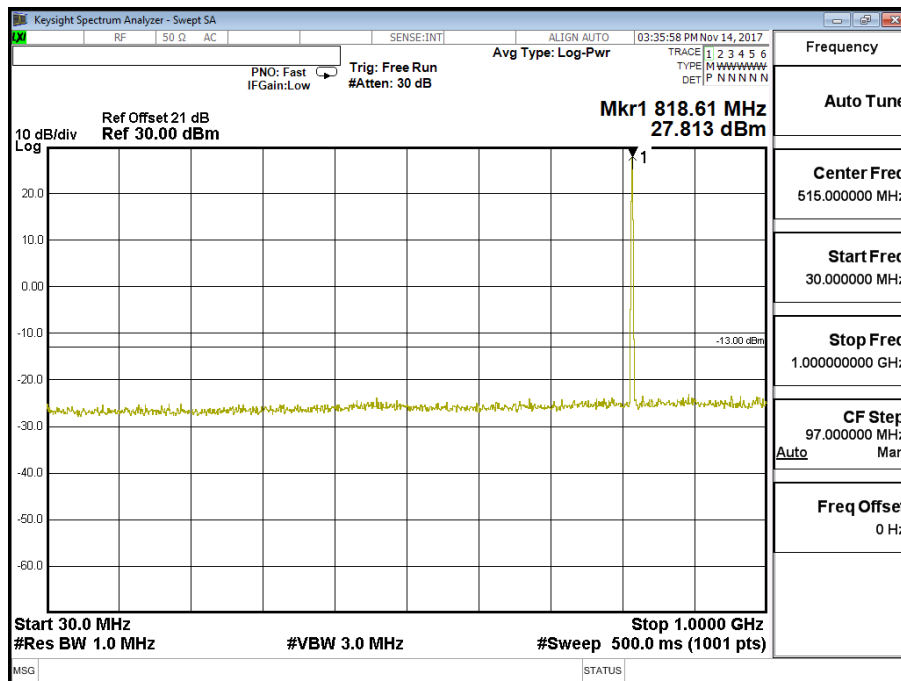


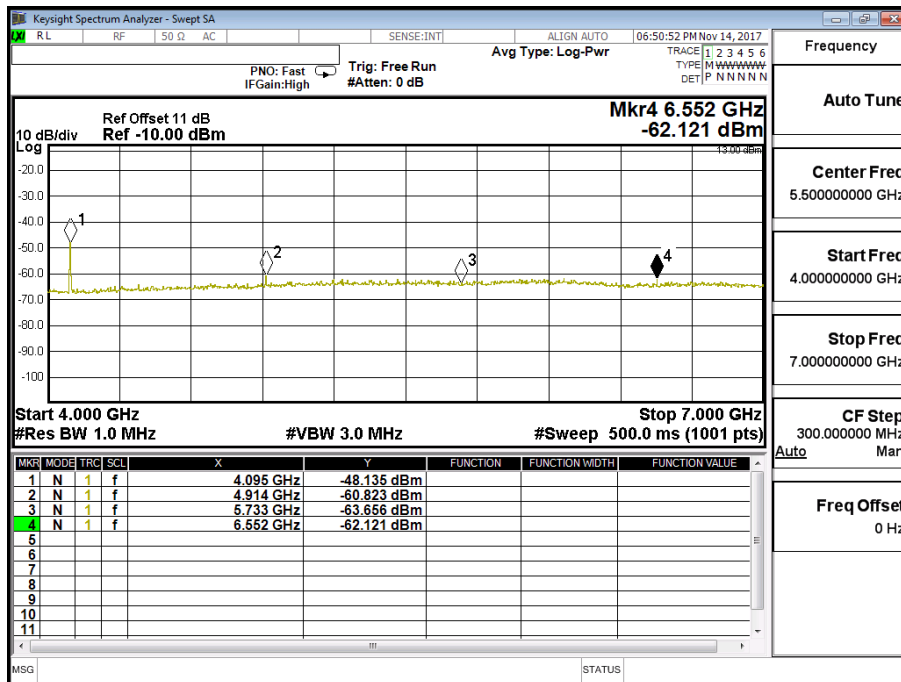
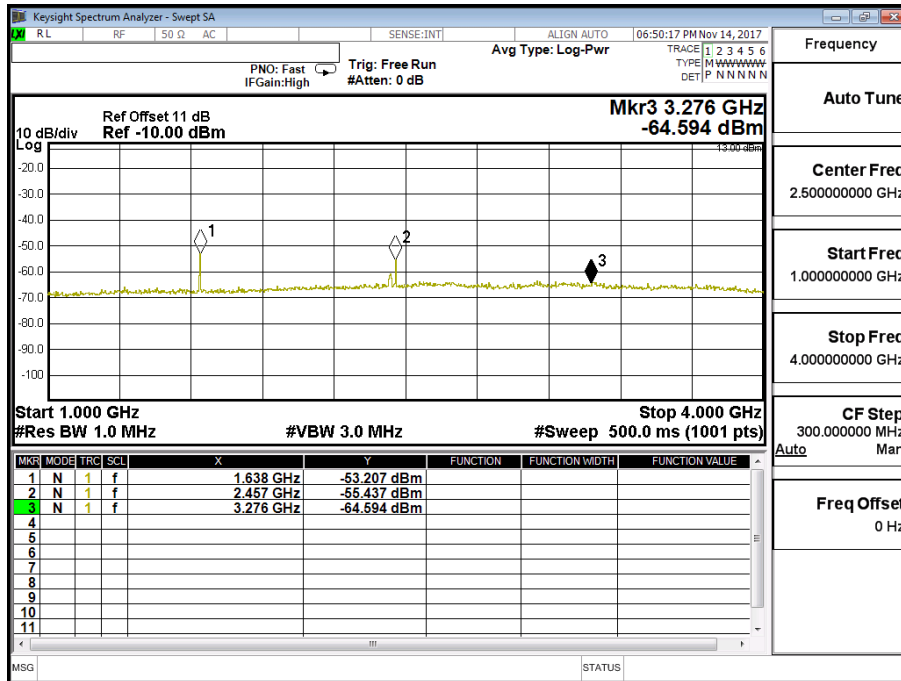


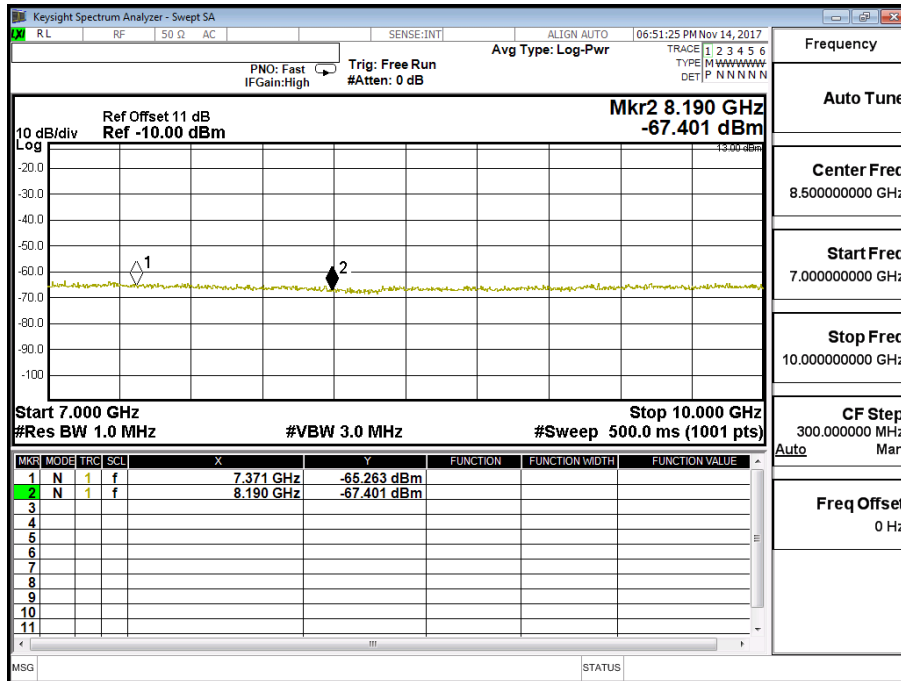
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (3M)	Test Range	30MHz~10GHz

**LTE-Band 26 (3M) QPSK(1,7) CH26740 (819MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1638	-53.207	0.58	-52.627	-13
2457	-55.437	0.70	-54.737	-13
3276	-64.594	1.01	-63.584	-13
4095	-48.135	1.18	-46.955	-13
4914	-60.823	1.23	-59.593	-13
5733	-63.656	1.45	-62.206	-13
6552	-62.121	1.56	-60.561	-13
7371	-65.263	1.59	-63.673	-13
8190	-67.401	1.82	-65.581	-13



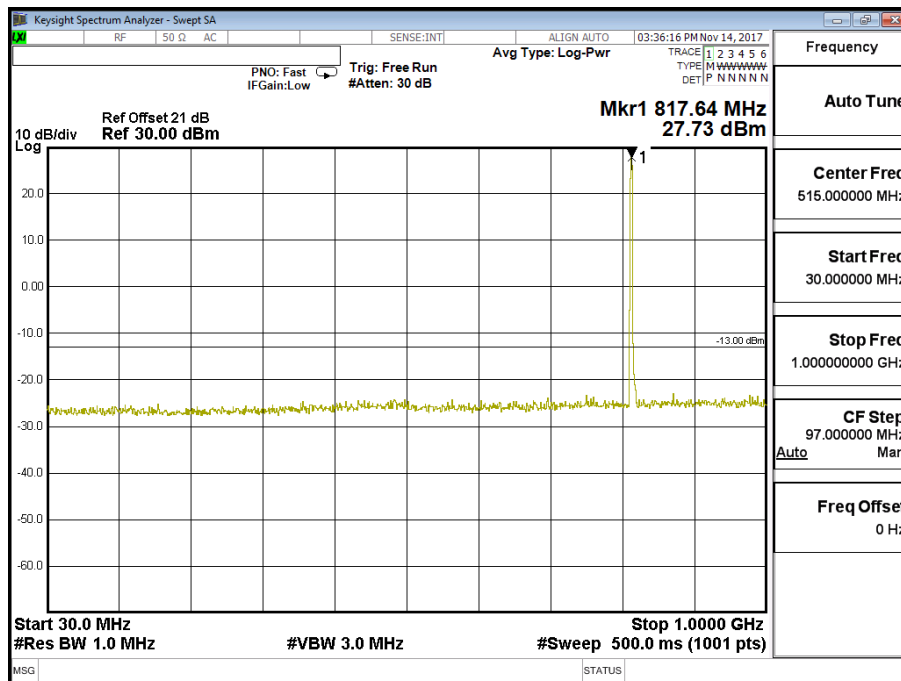


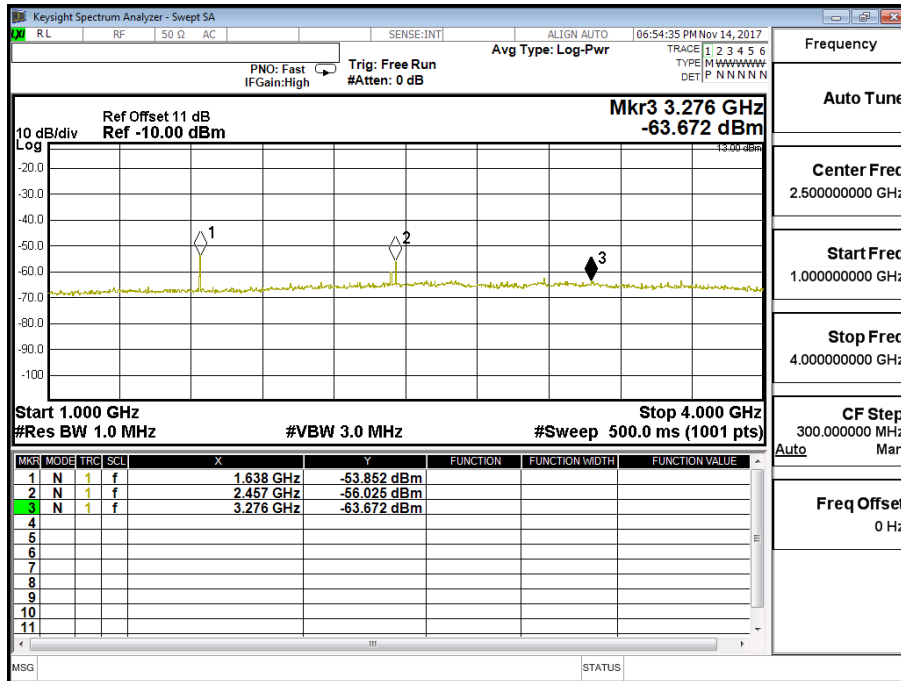


Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (3M)	Test Range	30MHz~10GHz

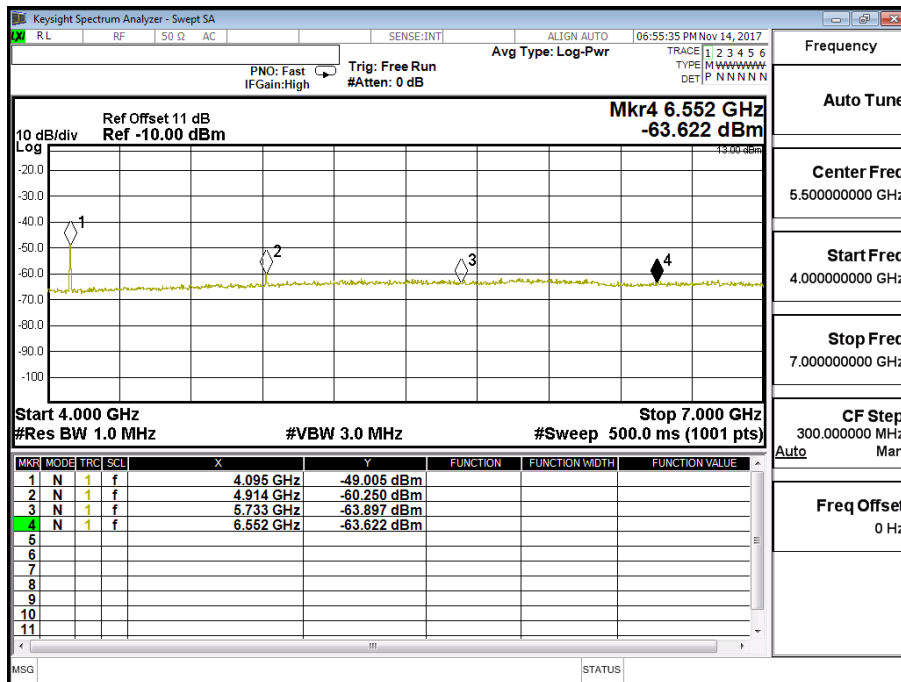
**LTE-Band 26 (3M) 16QAM(1,0) CH26740 (819 MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1638	-53.852	0.58	-53.272	-13
2457	-56.025	0.70	-55.325	-13
3276	-63.672	1.01	-62.662	-13
4095	-49.005	1.18	-47.825	-13
4914	-60.250	1.23	-59.020	-13
5733	-63.897	1.45	-62.447	-13
6552	-63.622	1.56	-62.062	-13
7371	-65.054	1.59	-63.464	-13
8190	-66.855	1.82	-65.035	-13



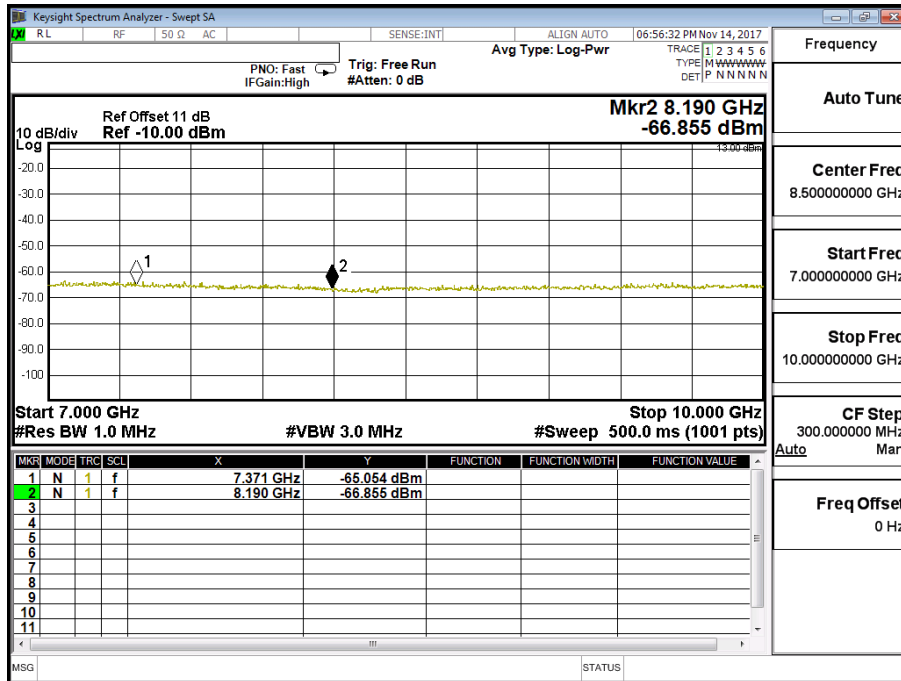


Frequency	Auto Tune
Center Freq	2.500000000 GHz
Start Freq	1.000000000 GHz
Stop Freq	4.000000000 GHz
CF Step	300.0000000 MHz
	Auto Man
Freq Offset	0 Hz

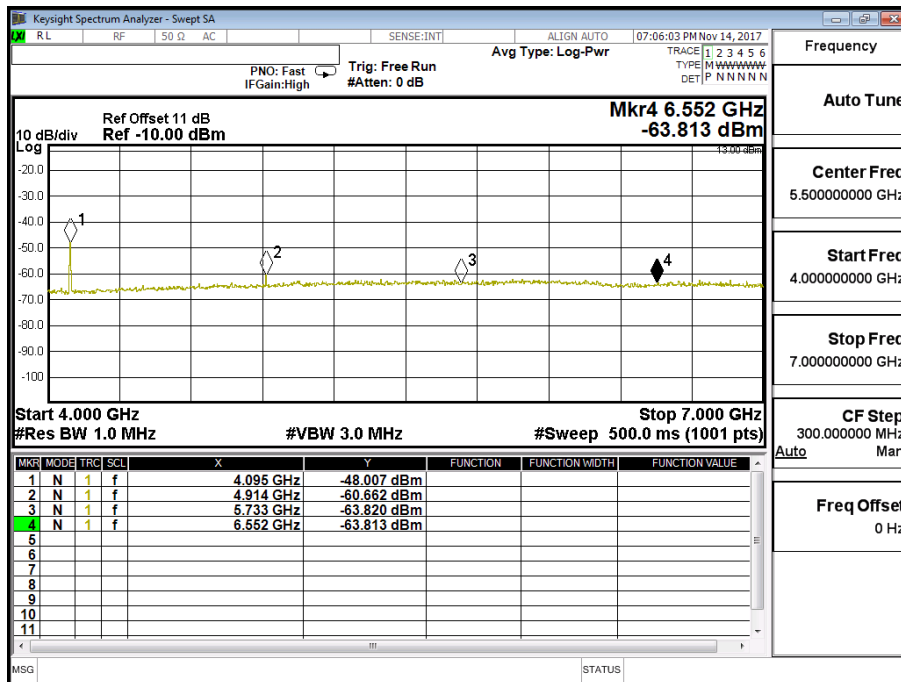
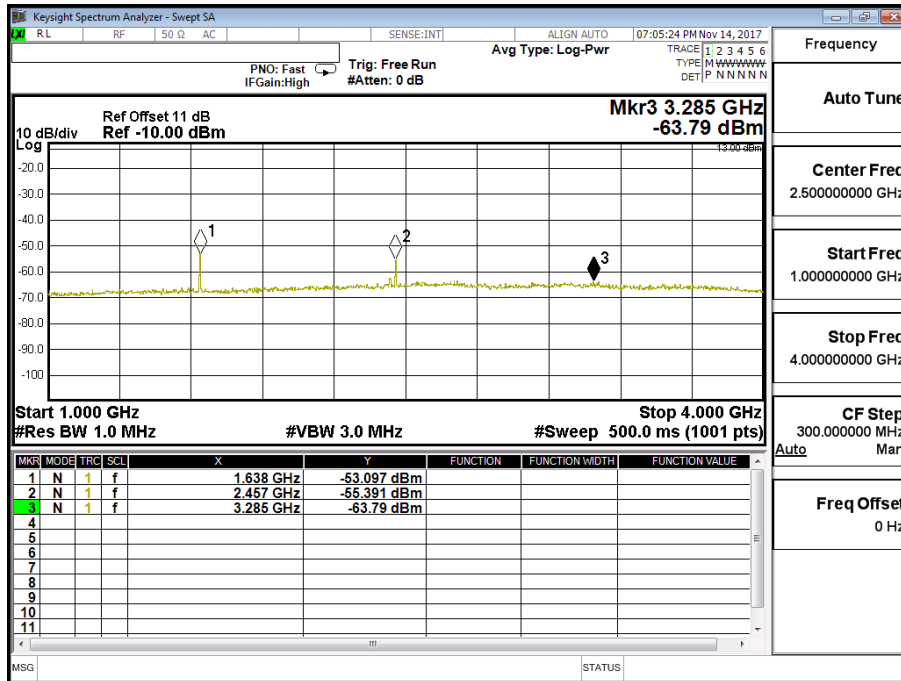


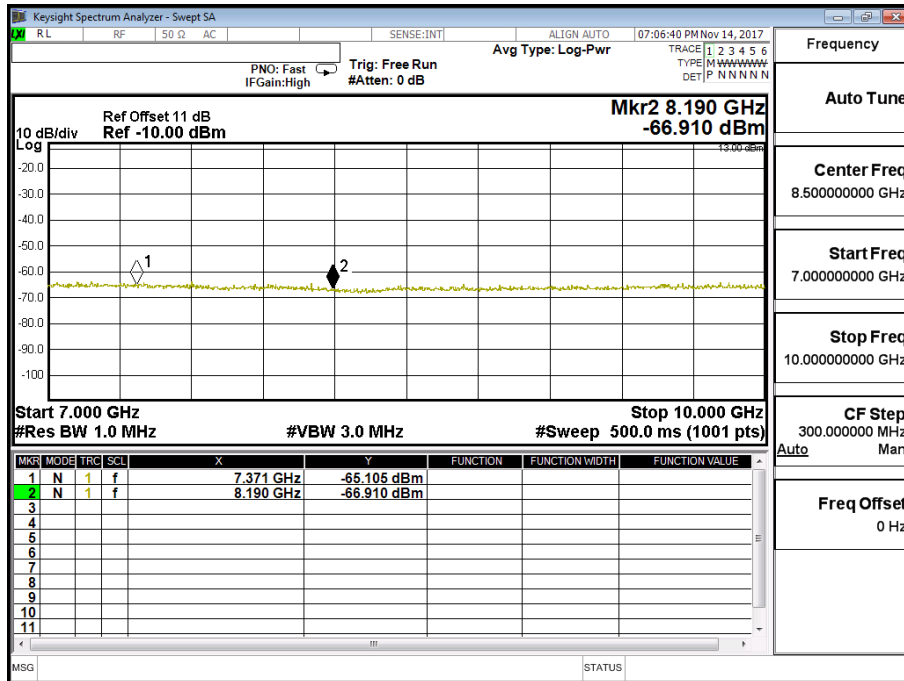
Frequency	Auto Tune
Center Freq	6.500000000 GHz
Start Freq	4.000000000 GHz
Stop Freq	7.000000000 GHz
CF Step	300.0000000 MHz
	Auto Man
Freq Offset	0 Hz







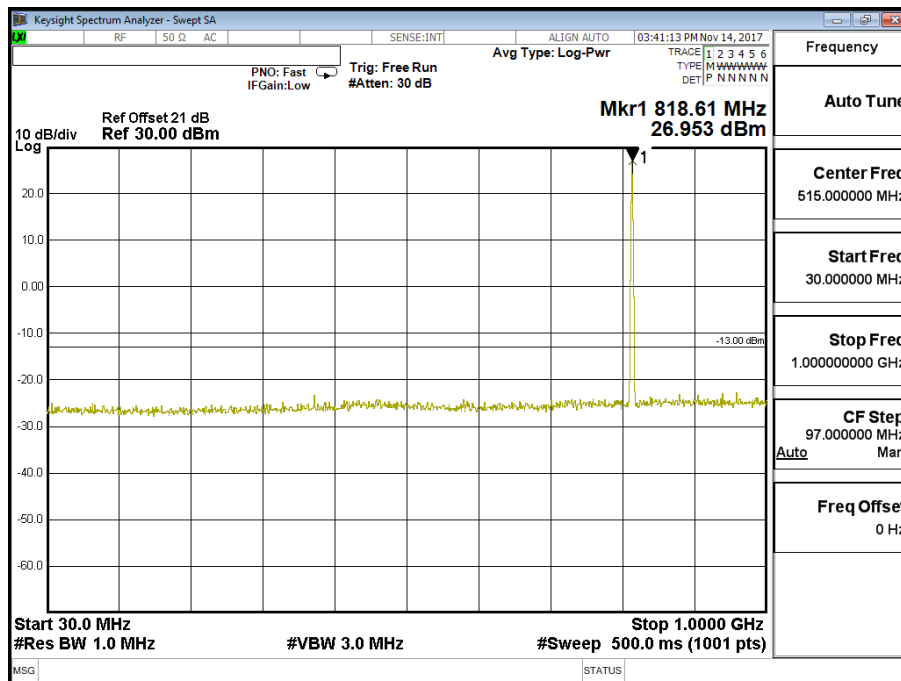


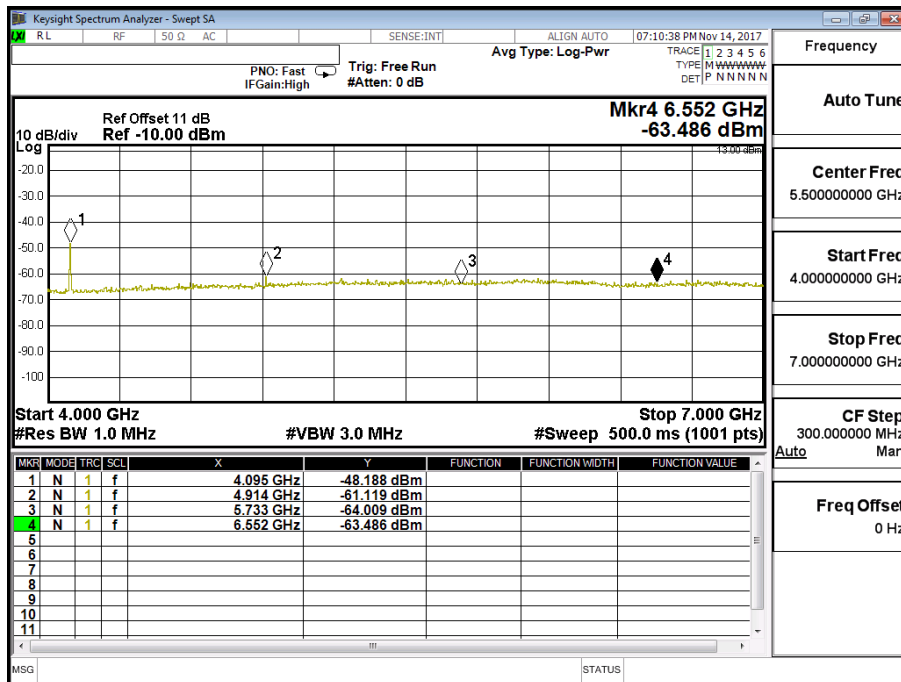
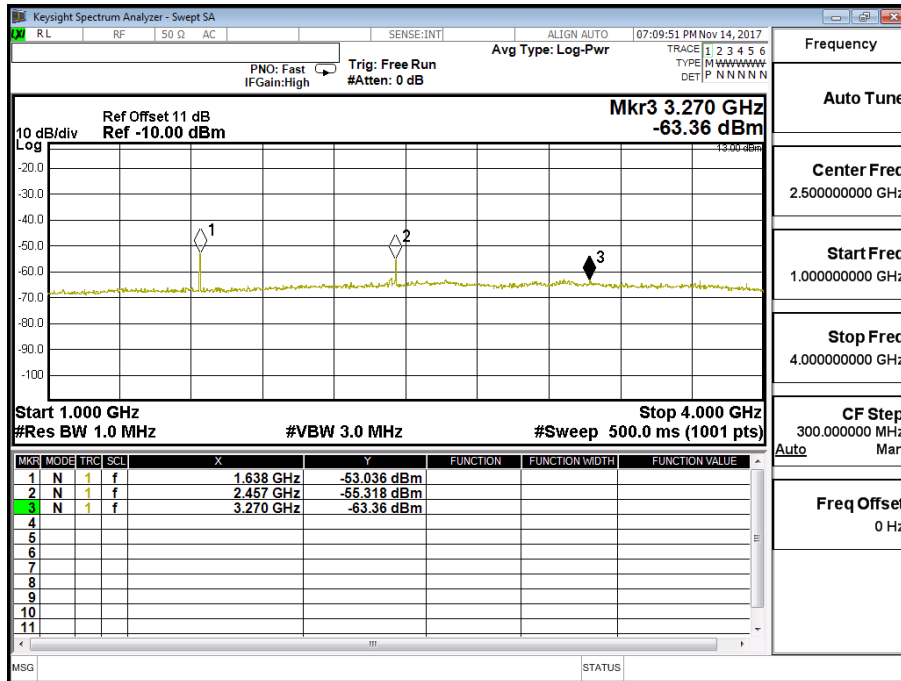


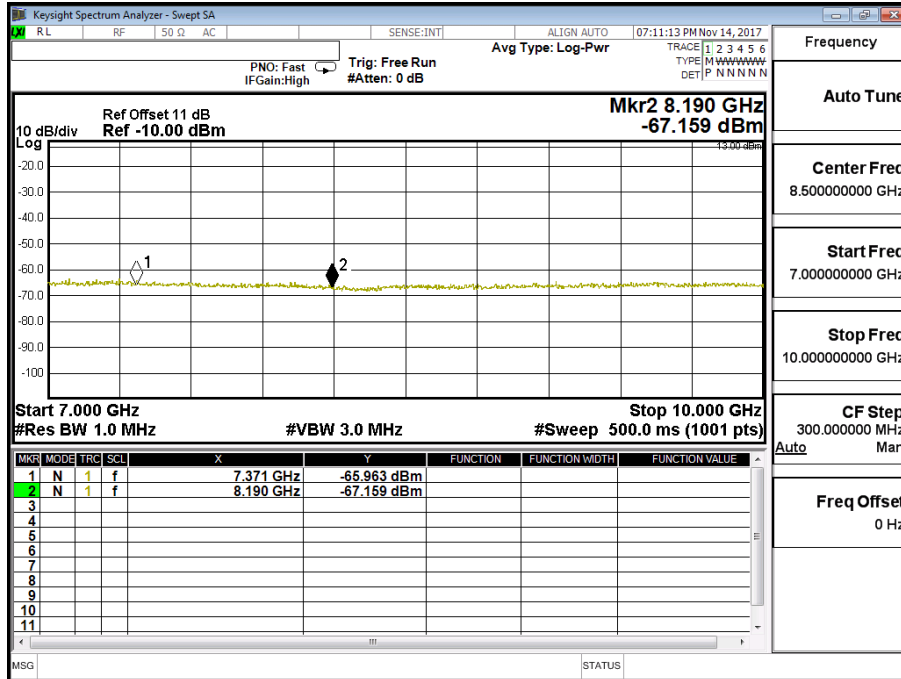
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (5M)	Test Range	30MHz~10GHz

**LTE- Band 26 (5M) 16QAM(1,12) CH26740 (819MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1638	-53.036	0.58	-52.456	-13
2457	-55.318	0.70	-54.618	-13
3270	-63.360	1.01	-62.350	-13
4095	-48.188	1.18	-47.008	-13
4914	-61.119	1.23	-59.889	-13
5733	-64.009	1.45	-62.559	-13
6552	-63.486	1.56	-61.926	-13
7371	-65.963	1.59	-64.373	-13
8190	-67.159	1.82	-65.339	-13



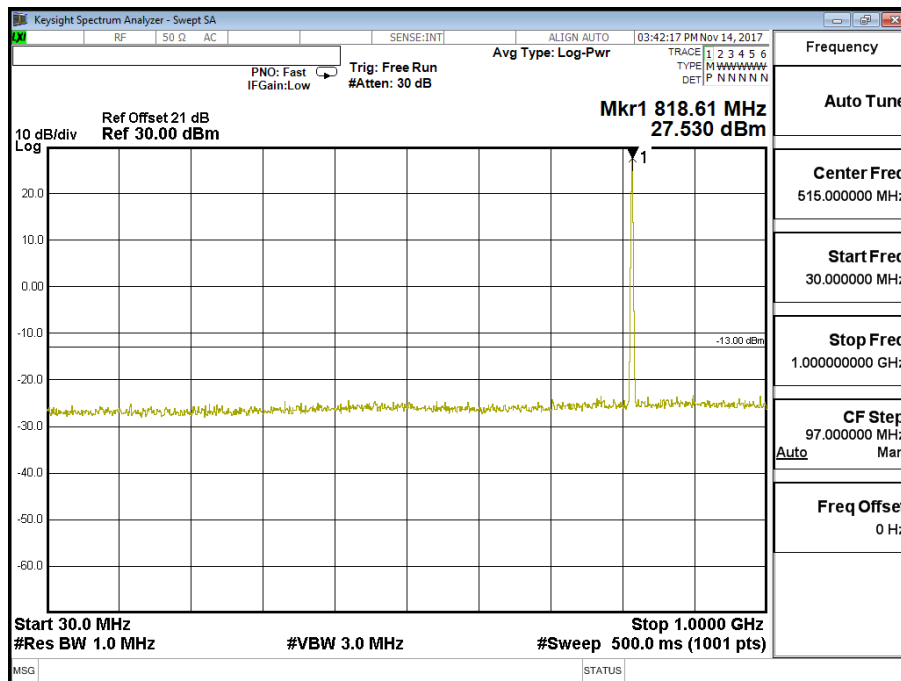




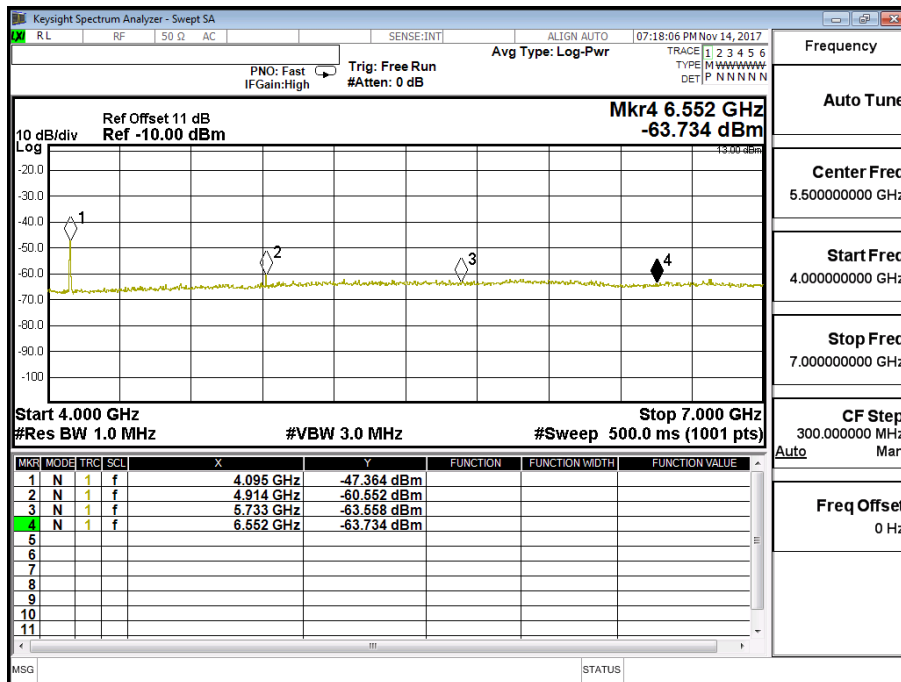
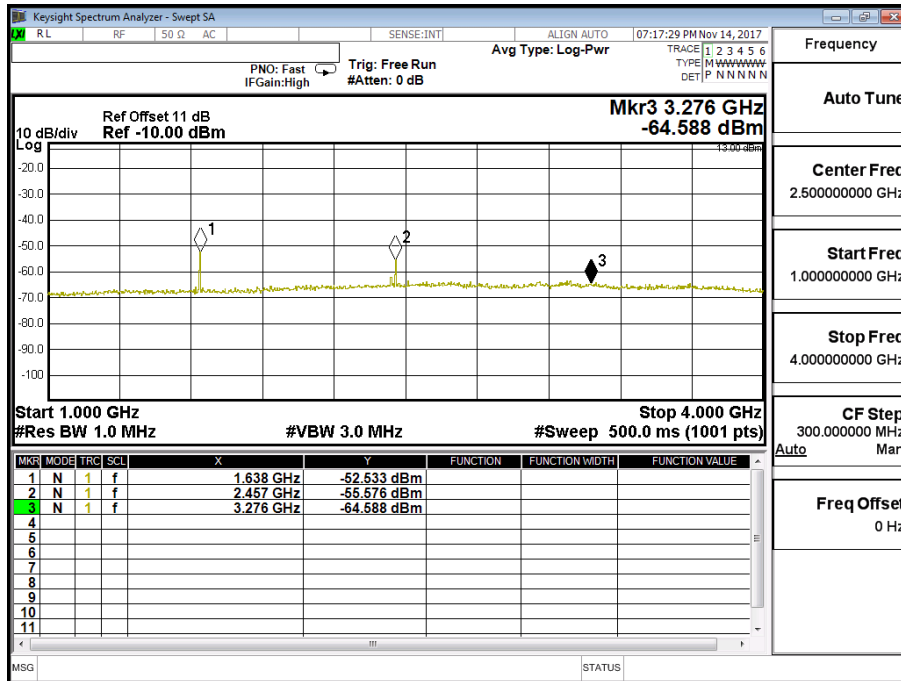
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (10M)	Test Range	30MHz~10GHz

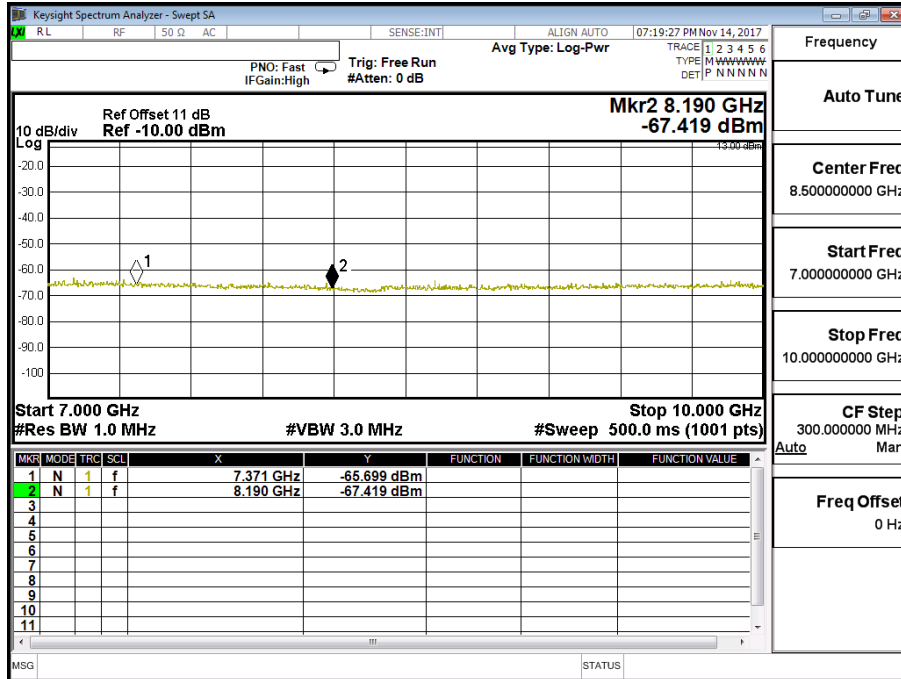
**LTE- Band 26 (10M) QPSK(1,24) CH26740 (819MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1638	-52.533	0.58	-51.953	-13
2457	-55.576	0.70	-54.876	-13
3276	-64.588	1.01	-63.578	-13
4095	-47.364	1.18	-46.184	-13
4914	-60.552	1.23	-59.322	-13
5733	-63.558	1.45	-62.108	-13
6552	-63.734	1.56	-62.174	-13
7371	-65.699	1.59	-64.109	-13
8190	-67.419	1.82	-65.599	-13





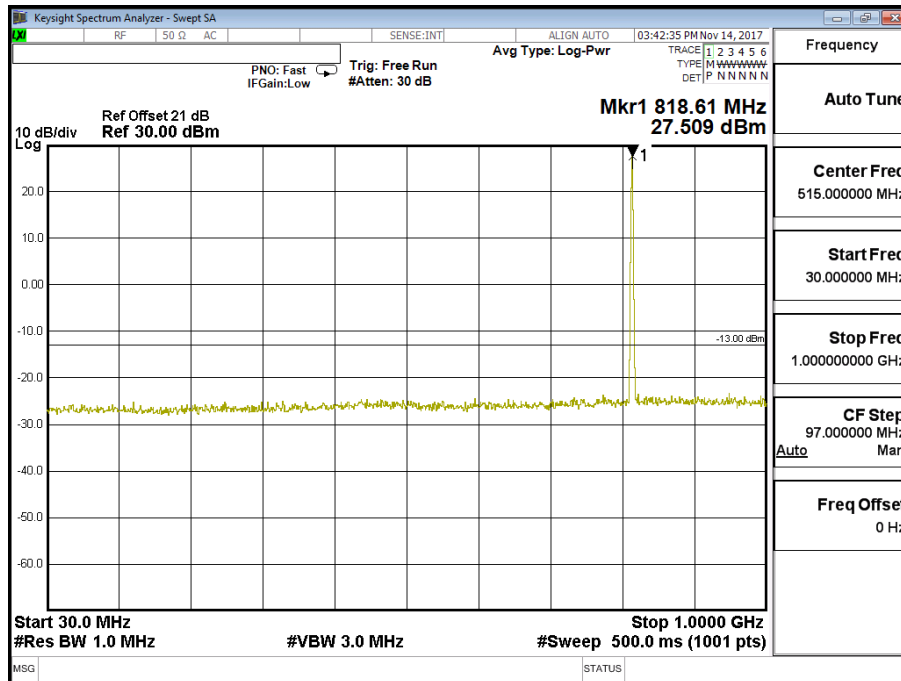


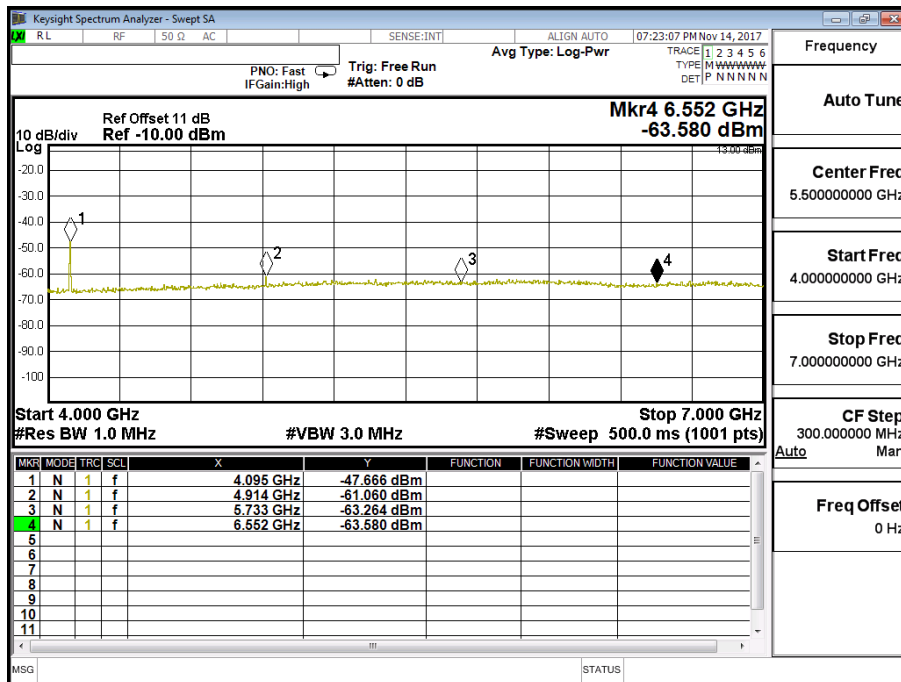
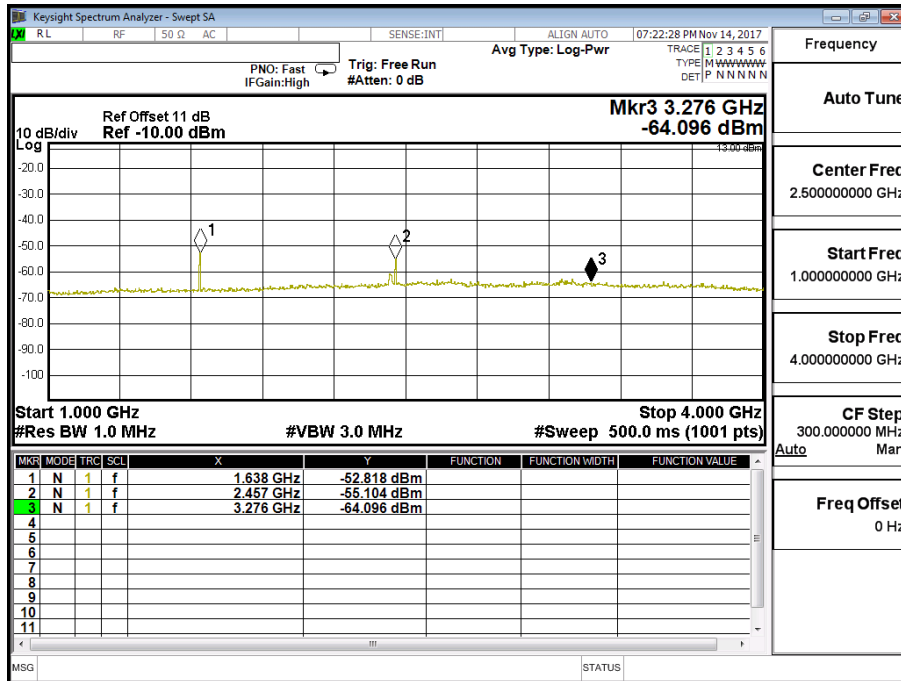


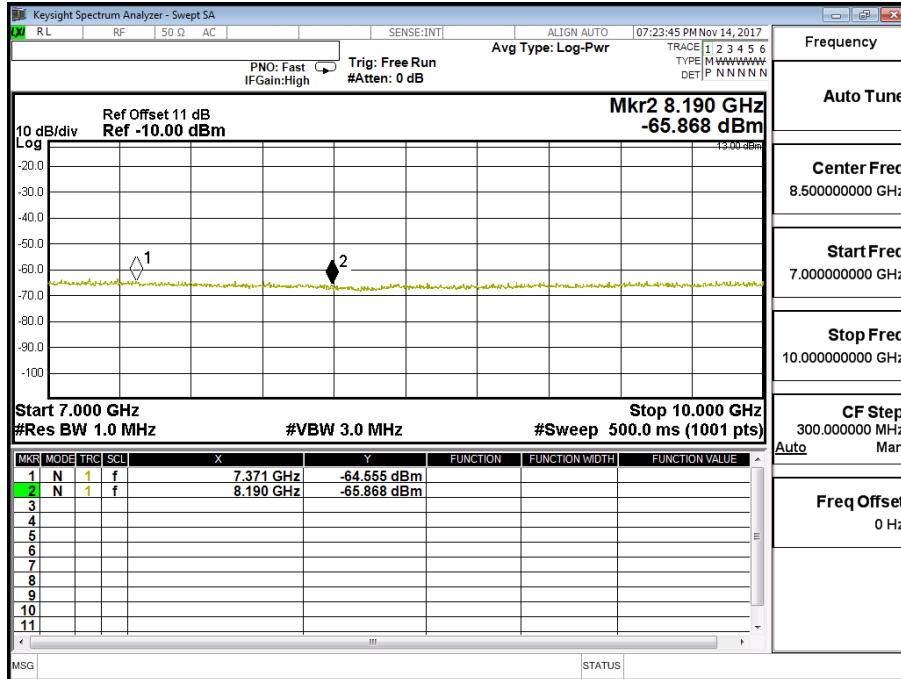
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (10M)	Test Range	30MHz~10GHz

**LTE- Band 26 10M 16QAM(1,24) CH26740 (819MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1638	-52.818	0.58	-52.238	-13
2457	-55.104	0.70	-54.404	-13
3276	-64.096	1.01	-63.086	-13
4095	-47.666	1.18	-46.486	-13
4914	-61.060	1.23	-59.830	-13
5733	-63.264	1.45	-61.814	-13
6552	-63.580	1.56	-62.020	-13
7371	-64.555	1.59	-62.965	-13
8190	-65.868	1.82	-64.048	-13



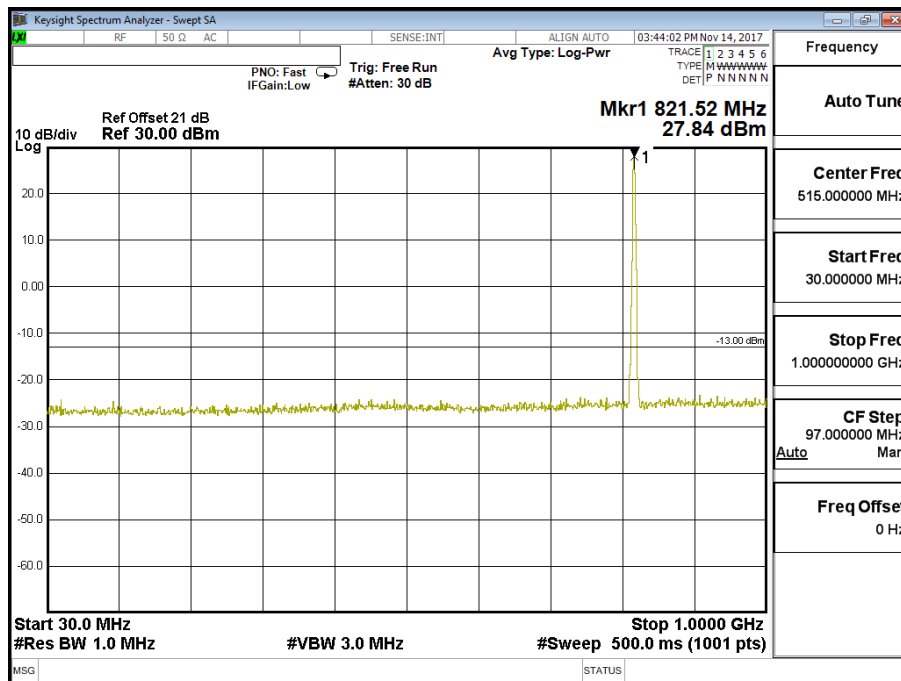


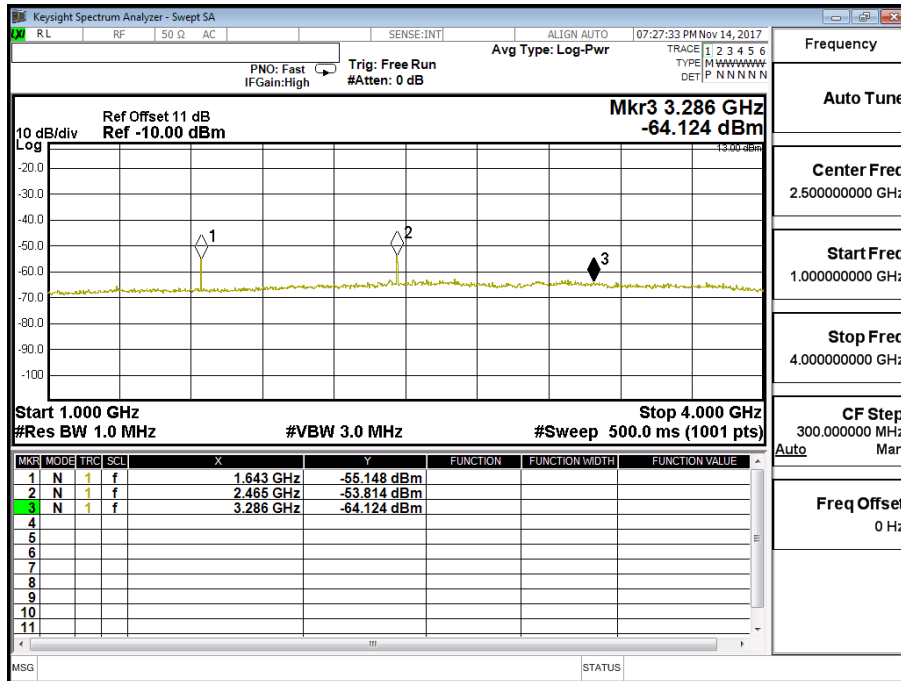


Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (15M)	Test Range	30MHz~10GHz

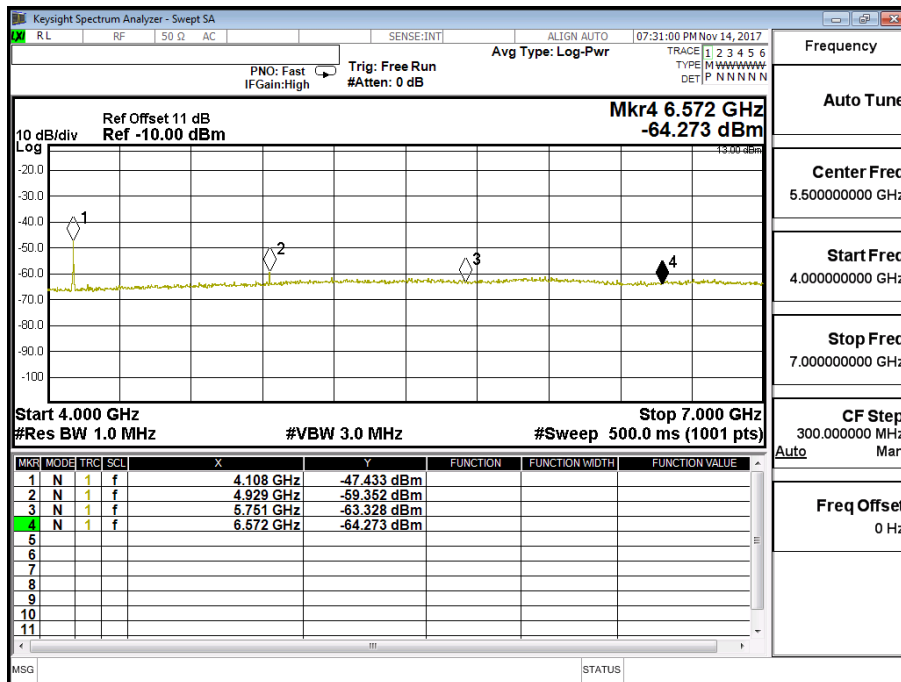
**LTE- Band 26 (15M) QPSK(1,37) CH26765 (821.5MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1643	-55.148	0.58	-54.568	-13
2465	-53.814	0.70	-53.114	-13
3286	-64.124	1.01	-63.114	-13
4108	-47.433	1.18	-46.253	-13
4929	-59.352	1.23	-58.122	-13
5751	-63.328	1.45	-61.878	-13
6572	-64.273	1.56	-62.713	-13
7394	-65.470	1.59	-63.880	-13
8215	-67.223	1.82	-65.403	-13

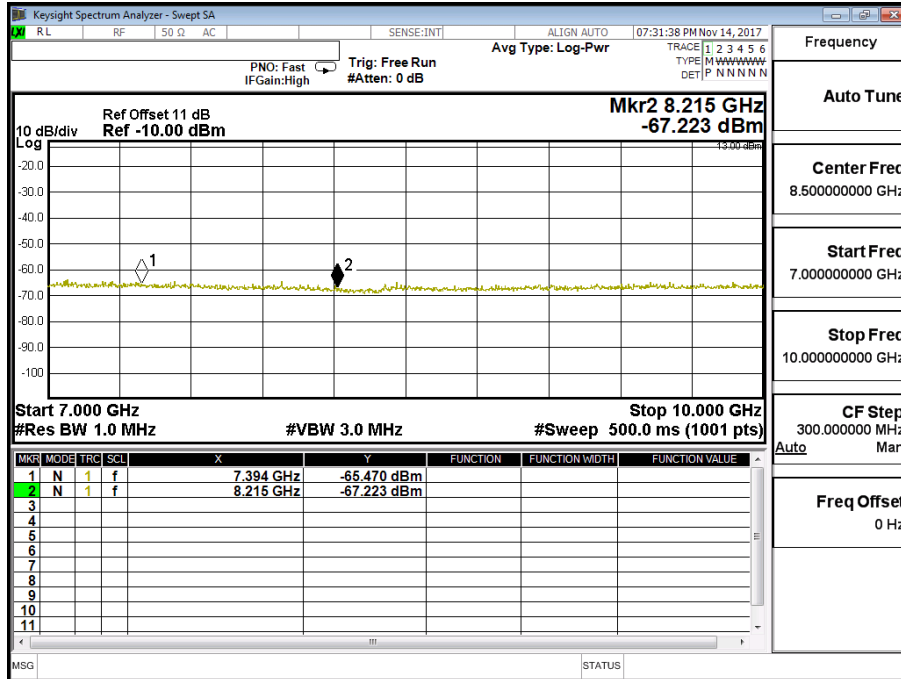




Frequency	Auto Tune
Center Freq	2.500000000 GHz
Start Freq	1.000000000 GHz
Stop Freq	4.000000000 GHz
CF Step	300.0000000 MHz
	Auto Man
Freq Offset	0 Hz



Frequency	Auto Tune
Center Freq	6.500000000 GHz
Start Freq	4.000000000 GHz
Stop Freq	7.000000000 GHz
CF Step	300.0000000 MHz
	Auto Man
Freq Offset	0 Hz

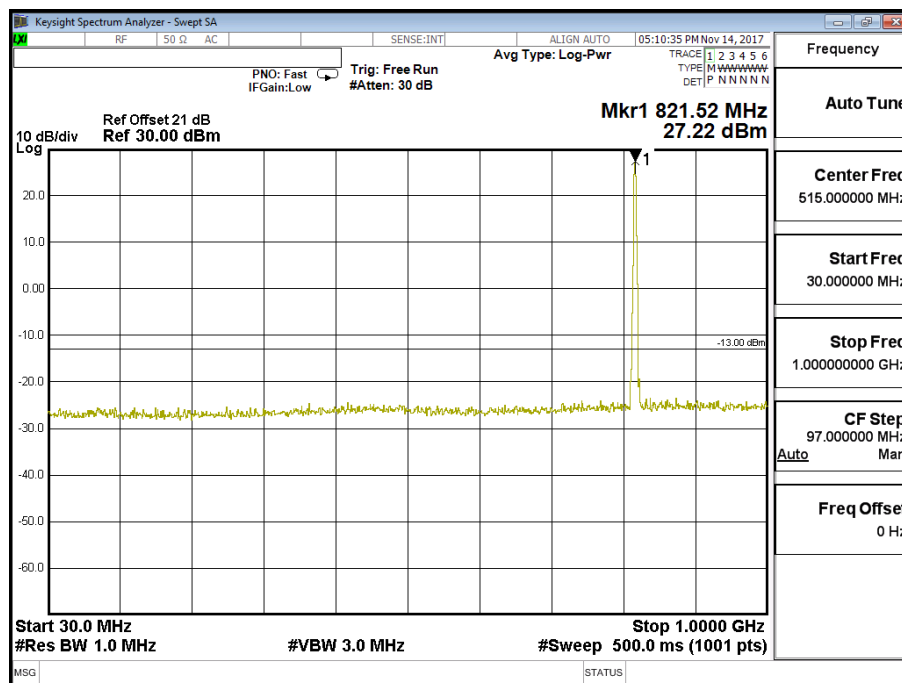


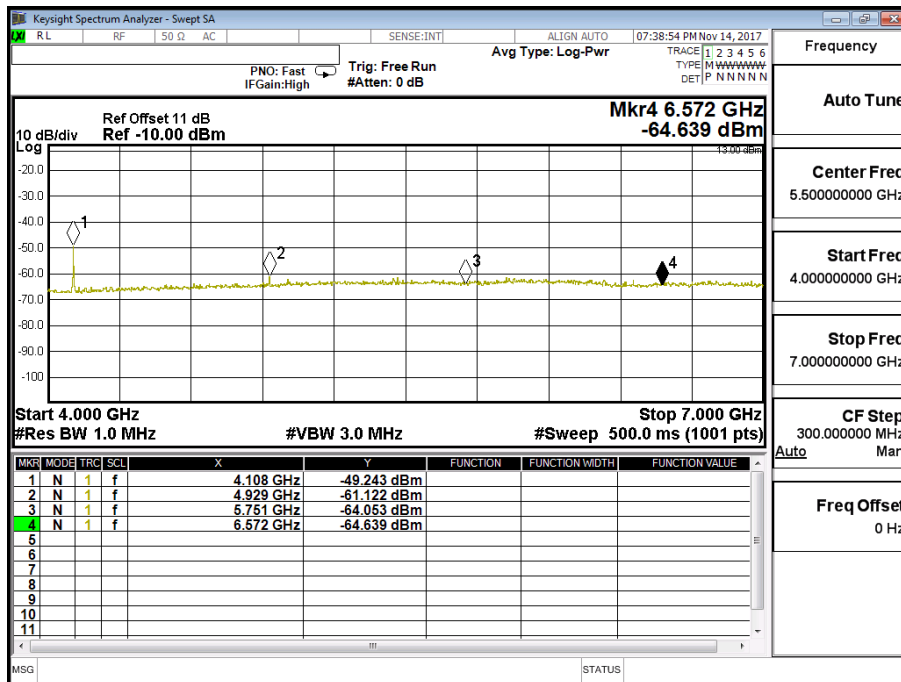
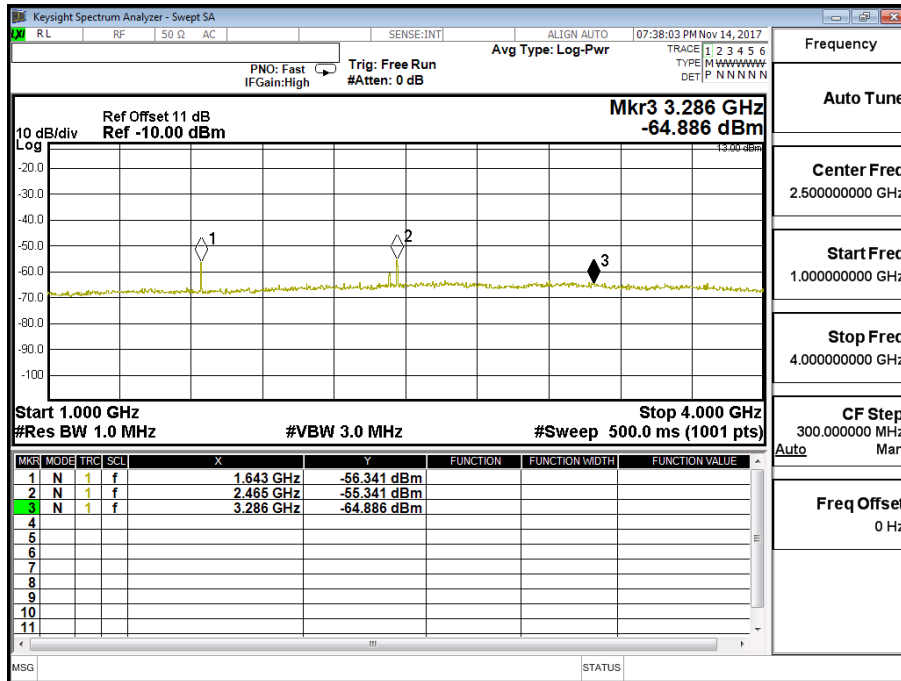


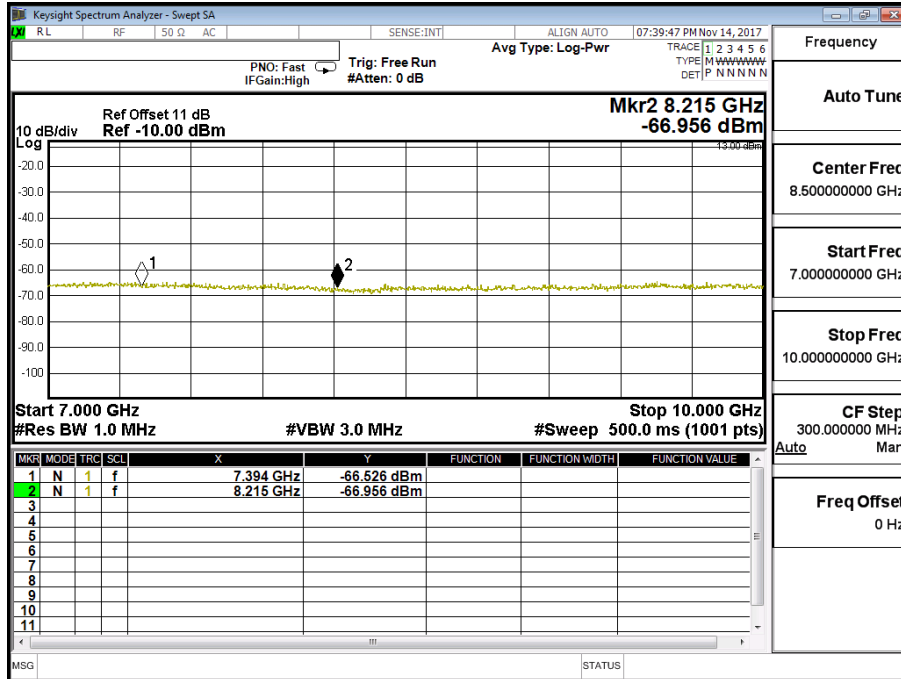
Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2017/11/10	Test Site	CTR
Test Condition	LTE-Band 26 (15M)	Test Range	30MHz~10GHz

**LTE- Band 26 15M 16QAM(1,37) CH26765 (821.5MHz)**

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
1643	-56.341	0.58	-55.761	-13
2465	-55.341	0.70	-54.641	-13
3286	-64.886	1.01	-63.876	-13
4108	-49.243	1.18	-48.063	-13
4929	-61.122	1.23	-59.892	-13
5751	-64.053	1.45	-62.603	-13
6572	-64.639	1.56	-63.079	-13
7394	-66.526	1.59	-64.936	-13
8215	-66.956	1.82	-65.136	-13







Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - Multi Band Dipole Antenna (STAF)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (1.4M) QPSK(3,0)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (1.4M) QPSK(3,0) CH26740 (819MHz)

1638	-56.496	-60.067	1.630	9.800	-51.897	-13
2457	-59.095	-59.502	2.100	10.600	-51.002	-13
3276	-59.200	-60.881	2.350	12.300	-50.931	-13
4095	-57.032	-55.918	2.700	12.600	-46.018	-13
4914	-62.626	-58.611	2.830	12.700	-48.741	-13
5733	-63.572	-61.256	3.200	13.000	-51.456	-13

#### Vertical Emissions Band 26 (1.4M) QPSK(3,0) CH26740 (819MHz)

1638	-62.372	-65.647	1.630	9.800	-57.477	-13
2457	-62.705	-62.795	2.100	10.600	-54.295	-13
3276	-59.022	-59.477	2.350	12.300	-49.527	-13
4095	-61.003	-58.238	2.700	12.600	-48.338	-13
4914	-62.841	-58.473	2.830	12.700	-48.603	-13
5733	-63.123	-60.734	3.200	13.000	-50.934	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - Multi Band Dipole Antenna (STAF)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (3M) QPSK(1,7)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (3M) QPSK(1,7) CH26740 (819MHz)

1638	-57.470	-61.041	1.630	9.800	-52.871	-13
2457	-59.549	-59.956	2.100	10.600	-51.456	-13
3276	-59.630	-61.296	2.350	12.300	-51.346	-13
4095	-58.139	-57.025	2.700	12.600	-47.125	-13
4914	-63.245	-59.230	2.830	12.700	-49.360	-13
5733	-63.159	-60.918	3.200	13.000	-51.118	-13

#### Vertical Emissions Band 26 (3M) QPSK(1,7) CH26740 (819MHz)

1638	-63.485	-66.760	1.630	9.800	-58.590	-13
2457	-63.328	-63.422	2.100	10.600	-54.922	-13
3276	-59.912	-60.405	2.350	12.300	-50.455	-13
4095	-60.244	-57.495	2.700	12.600	-47.595	-13
4914	-62.744	-58.346	2.830	12.700	-48.476	-13
5733	-63.369	-60.944	3.200	13.000	-51.144	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - Multi Band Dipole Antenna (STAF)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (5M) QPSK(1,12)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (5M) QPSK(1,12) CH26740 (819MHz)

1638	-57.805	-61.376	1.630	9.800	-53.206	-13
2457	-60.052	-60.459	2.100	10.600	-51.959	-13
3276	-59.237	-60.857	2.350	12.300	-50.907	-13
4095	-58.778	-57.664	2.700	12.600	-47.764	-13
4914	-63.333	-59.318	2.830	12.700	-49.448	-13
5733	-63.051	-60.735	3.200	13.000	-50.935	-13

#### Vertical Emissions Band 26 (5M) QPSK(1,12) CH26740 (819MHz)

1638	-63.544	-66.536	1.630	9.800	-58.366	-13
2457	-63.417	-63.507	2.100	10.600	-55.007	-13
3276	-58.850	-59.228	2.350	12.300	-49.278	-13
4095	-59.501	-56.752	2.700	12.600	-46.852	-13
4914	-62.487	-58.140	2.830	12.700	-48.270	-13
5733	-63.201	-60.847	3.200	13.000	-51.047	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - Multi Band Dipole Antenna (STAF)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (10M) QPSK(1,24)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (10M) QPSK(1,24) CH26740 (819MHz)

1638	-58.284	-61.855	1.630	9.800	-53.685	-13
2457	-59.307	-59.714	2.100	10.600	-51.214	-13
3276	-59.272	-60.798	2.350	12.300	-50.848	-13
4095	-59.118	-58.004	2.700	12.600	-48.104	-13
4914	-62.904	-58.907	2.830	12.700	-49.037	-13
5733	-64.001	-61.722	3.200	13.000	-51.922	-13

#### Vertical Emissions Band 26 (10M) QPSK(1,24) CH26740 (819MHz)

1638	-62.537	-65.812	1.630	9.800	-57.642	-13
2457	-62.643	-62.757	2.100	10.600	-54.257	-13
3276	-58.699	-59.308	2.350	12.300	-49.358	-13
4095	-60.727	-57.978	2.700	12.600	-48.078	-13
4914	-62.447	-58.006	2.830	12.700	-48.136	-13
5733	-64.228	-61.839	3.200	13.000	-52.039	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - Multi Band Dipole Antenna (STAF)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (15M) QPSK(1,37)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (15M) QPSK(1,0) CH26765 (821.5MHz)

1643	-57.597	-61.080	1.630	9.800	-52.910	-13
2465	-58.231	-58.617	2.100	10.600	-50.117	-13
3286	-58.741	-60.361	2.350	12.300	-50.411	-13
4108	-58.312	-57.234	2.700	12.600	-47.334	-13
4929	-62.701	-58.668	2.830	12.700	-48.798	-13
5751	-63.519	-61.278	3.200	13.000	-51.478	-13

#### Vertical Emissions Band 26 (15M) QPSK(1,37) CH26765 (821.5MHz)

1643	-63.892	-67.167	1.630	9.800	-58.997	-13
2465	-63.664	-63.762	2.100	10.600	-55.262	-13
3286	-59.800	-60.332	2.350	12.300	-50.382	-13
4108	-60.148	-57.383	2.700	12.600	-47.483	-13
4929	-62.866	-58.468	2.830	12.700	-48.598	-13
5751	-62.514	-60.089	3.200	13.000	-50.289	-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 14 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.



Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - 4G/3G/2G MIMO 1 Antenna (taogles)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (1.4M) QPSK(3,0)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (1.4M) QPSK(3,0) CH26740 (819MHz)

1638	-53.747	-57.318	1.630	9.800	-49.148	-13
2457	-60.844	-61.251	2.100	10.600	-52.751	-13
3276	-59.932	-61.552	2.350	12.300	-51.602	-13
4095	-60.951	-59.850	2.700	12.600	-49.950	-13
4914	-63.269	-59.272	2.830	12.700	-49.402	-13
5733	-63.777	-61.498	3.200	13.000	-51.698	-13

#### Vertical Emissions Band 26 (1.4M) QPSK(3,0) CH26740 (819MHz)

1638	-53.866	-57.141	1.630	9.800	-48.971	-13
2457	-61.470	-61.559	2.100	10.600	-53.059	-13
3276	-58.926	-59.419	2.350	12.300	-49.469	-13
4095	-61.243	-58.473	2.700	12.600	-48.573	-13
4914	-62.879	-58.532	2.830	12.700	-48.662	-13
5733	-63.741	-61.352	3.200	13.000	-51.552	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - 4G/3G/2G MIMO 1 Antenna (taogles)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (3M) QPSK(1,7)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (3M) QPSK(1,7) CH26740 (819MHz)

1638	-55.688	-59.259	1.630	9.800	-51.089	-13
2457	-60.488	-60.895	2.100	10.600	-52.395	-13
3276	-59.638	-61.258	2.350	12.300	-51.308	-13
4095	-61.224	-60.123	2.700	12.600	-50.223	-13
4914	-62.761	-58.764	2.830	12.700	-48.894	-13
5733	-63.937	-61.659	3.200	13.000	-51.859	-13

#### Vertical Emissions Band 26 (3M) QPSK(1,7) CH26740 (819MHz)

1638	-55.756	-59.031	1.630	9.800	-50.861	-13
2457	-61.182	-61.272	2.100	10.600	-52.772	-13
3276	-59.504	-59.997	2.350	12.300	-50.047	-13
4095	-60.271	-57.501	2.700	12.600	-47.601	-13
4914	-63.428	-59.030	2.830	12.700	-49.160	-13
5733	-64.084	-61.695	3.200	13.000	-51.895	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - 4G/3G/2G MIMO 1 Antenna (taogles)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (5M) QPSK(1,12)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (5M) QPSK(1,12) CH26740 (819MHz)

1638	-54.581	-58.152	1.630	9.800	-49.982	-13
2457	-62.069	-62.476	2.100	10.600	-53.976	-13
3276	-59.824	-61.444	2.350	12.300	-51.494	-13
4095	-60.931	-59.831	2.700	12.600	-49.931	-13
4914	-61.926	-57.893	2.830	12.700	-48.023	-13
5733	-64.117	-61.838	3.200	13.000	-52.038	-13

#### Vertical Emissions Band 26 (5M) QPSK(1,12) CH26740 (819MHz)

1638	-54.282	-57.557	1.630	9.800	-49.387	-13
2457	-62.150	-62.240	2.100	10.600	-53.740	-13
3276	-59.638	-60.132	2.350	12.300	-50.182	-13
4095	-59.752	-57.003	2.700	12.600	-47.103	-13
4914	-62.837	-58.439	2.830	12.700	-48.569	-13
5733	-63.786	-61.397	3.200	13.000	-51.597	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - 4G/3G/2G MIMO 1 Antenna (taogles)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (10M) QPSK(1,24)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (10M) QPSK(1,24) CH26740 (819MHz)

1638	-54.189	-57.760	1.630	9.800	-49.590	-13
2457	-62.202	-62.609	2.100	10.600	-54.109	-13
3276	-59.627	-61.247	2.350	12.300	-51.297	-13
4095	-60.648	-59.548	2.700	12.600	-49.648	-13
4914	-62.889	-58.892	2.830	12.700	-49.022	-13
5733	-63.990	-61.711	3.200	13.000	-51.911	-13

#### Vertical Emissions Band 26 (10M) QPSK(1,24) CH26740 (819MHz)

1638	-54.739	-58.014	1.630	9.800	-49.844	-13
2457	-61.229	-61.318	2.100	10.600	-52.818	-13
3276	-59.820	-60.314	2.350	12.300	-50.364	-13
4095	-60.914	-58.144	2.700	12.600	-48.244	-13
4914	-63.268	-58.870	2.830	12.700	-49.000	-13
5733	-64.482	-62.093	3.200	13.000	-52.293	-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 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

Product	DCM (Data Communication Module)		
Test Mode	Spurious Emission (Radiated) - 4G/3G/2G MIMO 1 Antenna (taogles)		
Date of Test	2017/11/15	Test Site	Site3
Test Condition	Band 26 (15M) QPSK(1,37)	Test Range	9kHz ~10GHz

Frequency	Reading Level	Signal Generator Level	Cable Loss	Antenna Gain	EIRP Value	Limit
(GHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)

#### Horizontal Emissions Band 26 (15M) QPSK(1,37) CH26765 (821.5MHz)

1643	-56.317	-59.800	1.630	9.800	-51.630	-13
2465	-62.243	-62.629	2.100	10.600	-54.129	-13
3286	-59.872	-61.538	2.350	12.300	-51.588	-13
4108	-61.339	-60.284	2.700	12.600	-50.384	-13
4929	-62.135	-58.120	2.830	12.700	-48.250	-13
5751	-64.392	-62.226	3.200	13.000	-52.426	-13

#### Vertical Emissions Band 56 (10M) QPSK(1,37) CH26765 (821.5MHz)

1643	-56.755	-59.936	1.630	9.800	-51.766	-13
2465	-63.794	-63.880	2.100	10.600	-55.380	-13
3286	-59.239	-59.732	2.350	12.300	-49.782	-13
4108	-60.187	-57.422	2.700	12.600	-47.522	-13
4929	-62.890	-58.361	2.830	12.700	-48.491	-13
5751	-64.020	-61.737	3.200	13.000	-51.937	-13

Note:

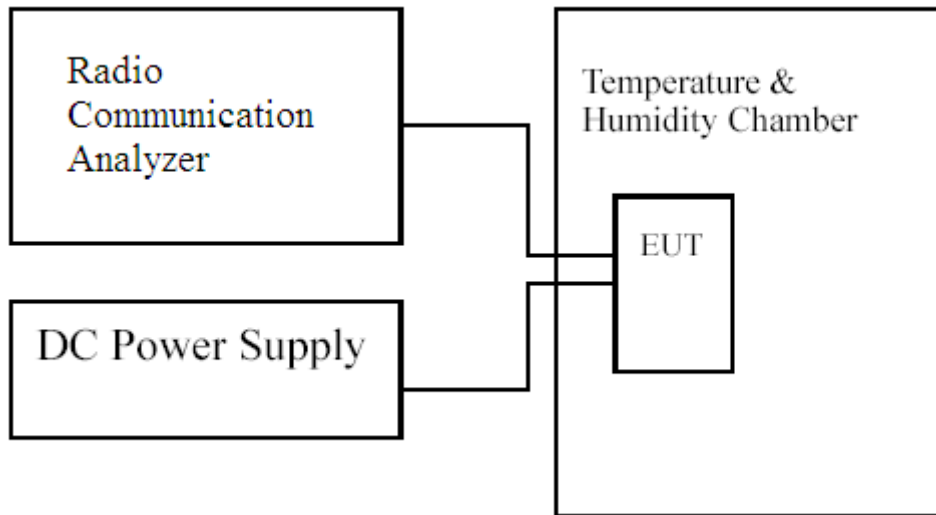
1. Receiver setting (Peak Detector) : RBW:1MHz; VBW:3MHz
2. EIRP Value = Signal Generator Level + Antenna Gain - Cable Loss
3. Spurious emissions past 6 GHz are not shown, due to the magnitude of spurious emissions attenuated more than 20 dB below the limit.

## 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	$<\pm 2.5\text{ppm}$
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### 7.4. Test Procedure

The frequency stability of transmitter is measured by:

- Temperature: The temperature is varied from  $-30^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  in  $10^{\circ}\text{C}$  increment using a standard temperature & Humidity chamber.
- 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, (MT8820C), 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	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	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 Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0038	±2.05
-20	0.819	-0.0050	±2.05
-10	0.819	-0.0045	±2.05
0	0.819	0.0032	±2.05
10	0.819	-0.0042	±2.05
20	0.819	-0.0044	±2.05
30	0.819	-0.0033	±2.05
40	0.819	-0.0044	±2.05
50	0.819	-0.0047	±2.05

### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0046	±2.05
12	0.819	-0.0044	±2.05
10.2	0.819	-0.0045	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (1.4M) CH26740(819MHz) –16QAM	Test Range	-20°C ~+50°C

Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0041	±2.05
-20	0.819	-0.0043	±2.05
-10	0.819	-0.0035	±2.05
0	0.819	0.0035	±2.05
10	0.819	-0.0036	±2.05
20	0.819	-0.0050	±2.05
30	0.819	-0.0041	±2.05
40	0.819	-0.0046	±2.05
50	0.819	-0.0050	±2.05

Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0034	±2.05
12	0.819	-0.0050	±2.05
10.2	0.819	-0.0039	±2.05



Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (3M) CH26740(819MHz) –QPSK	Test Range	-30°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0051	±2.05
-20	0.819	-0.0043	±2.05
-10	0.819	-0.0049	±2.05
0	0.819	-0.0037	±2.05
10	0.819	-0.0039	±2.05
20	0.819	-0.0039	±2.05
30	0.819	-0.0042	±2.05
40	0.819	-0.0047	±2.05
50	0.819	-0.0047	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	0.0044	±2.05
12	0.819	-0.0039	±2.05
10.2	0.819	-0.0047	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (3M) CH26740(819MHz) -16QAM	Test Range	-30°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0050	±2.05
-20	0.819	-0.0045	±2.05
-10	0.819	-0.0053	±2.05
0	0.819	-0.0031	±2.05
10	0.819	-0.0035	±2.05
20	0.819	-0.0047	±2.05
30	0.819	-0.0052	±2.05
40	0.819	-0.0050	±2.05
50	0.819	-0.0059	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0039	±2.05
12	0.819	-0.0047	±2.05
10.2	0.819	-0.0040	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (5M) CH26740(819MHz) –QPSK	Test Range	-20°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0038	±2.05
-20	0.819	-0.0046	±2.05
-10	0.819	-0.0034	±2.05
0	0.819	-0.0031	±2.05
10	0.819	-0.0048	±2.05
20	0.819	-0.0043	±2.05
30	0.819	-0.0045	±2.05
40	0.819	-0.0047	±2.05
50	0.819	-0.0047	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0050	±2.05
12	0.819	-0.0043	±2.05
10.2	0.819	-0.0045	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (5M) CH26740(819MHz) –16QAM	Test Range	-20°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0033	±2.05
-20	0.819	-0.0036	±2.05
-10	0.819	-0.0045	±2.05
0	0.819	-0.0035	±2.05
10	0.819	-0.0046	±2.05
20	0.819	-0.0063	±2.05
30	0.819	-0.0031	±2.05
40	0.819	-0.0034	±2.05
50	0.819	-0.0041	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0055	±2.05
12	0.819	-0.0063	±2.05
10.2	0.819	-0.0040	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (10M) CH26740(819MHz)-QPSK	Test Range	-30°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0034	±2.05
-20	0.819	-0.0043	±2.05
-10	0.819	-0.0050	±2.05
0	0.819	-0.0034	±2.05
10	0.819	-0.0038	±2.05
20	0.819	-0.0054	±2.05
30	0.819	0.0042	±2.05
40	0.819	-0.0038	±2.05
50	0.819	-0.0043	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0051	±2.05
12	0.819	-0.0054	±2.05
10.2	0.819	-0.0044	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (10M) CH26740(819MHz)-16QAM	Test Range	-30°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.819	-0.0039	±2.05
-20	0.819	-0.0052	±2.05
-10	0.819	-0.0034	±2.05
0	0.819	-0.0029	±2.05
10	0.819	-0.0036	±2.05
20	0.819	-0.0040	±2.05
30	0.819	-0.0051	±2.05
40	0.819	-0.0047	±2.05
50	0.819	-0.0041	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.819	-0.0047	±2.05
12	0.819	-0.0040	±2.05
10.2	0.819	0.0047	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (15M) CH26765(821.5MHz)-QPSK	Test Range	-30°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.8215	-0.0037	±2.05
-20	0.8215	-0.0042	±2.05
-10	0.8215	-0.0039	±2.05
0	0.8215	-0.0037	±2.05
10	0.8215	-0.0034	±2.05
20	0.8215	-0.0042	±2.05
30	0.8215	-0.0046	±2.05
40	0.8215	0.0050	±2.05
50	0.8215	-0.0043	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.8215	-0.0035	±2.05
12	0.8215	-0.0042	±2.05
10.2	0.8215	-0.0042	±2.05

Product	DCM (Data Communication Module)		
Test Mode	Frequency Stability Under Temperature Variations & Voltage Variations		
Date of Test	2017/11/17	Test Site	CTR
Test Condition	Band 26 (15M) CH26765(821.5MHz)-16QAM	Test Range	-30°C ~+50°C

#### Frequency Stability Under Temperature Variations

Temperature Interval(°C)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
-30	0.8215	-0.0036	±2.05
-20	0.8215	-0.0040	±2.05
-10	0.8215	0.0042	±2.05
0	0.8215	-0.0040	±2.05
10	0.8215	-0.0030	±2.05
20	0.8215	-0.0041	±2.05
30	0.8215	0.0048	±2.05
40	0.8215	0.0051	±2.05
50	0.8215	-0.0045	±2.05

#### Voltage Variations

AC Voltage (V)	Test Frequency (GHz)	Deviation (kHz)	Limit (kHz)
13.8	0.8215	-0.0039	±2.05
12	0.8215	-0.0041	±2.05
10.2	0.8215	-0.0041	±2.05