

FCC Test Report

(Part 27)

Product Name : Module
Model No : HL7618RD
FCC ID : N7NHL7618RD

Applicant : Sierra Wireless Inc.
Address : 13811 Wireless Way, Richmond, BC, V6V 3A4 Canada

Date of Receipt : 2016/08/29
Issued Date : 2016/09/09
Report No. : 1690025R-HPUSP41V00
Report Version : V0.2-Draft



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 : 2016/09/09

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Product Name : Module

Applicant : Sierra Wireless Inc.

Address : 13811 Wireless Way, Richmond, BC, V6V 3A4 Canada

Manufacturer : Sierra Wireless Inc.

Trade Name : AirPrime

Model No. : HL7618RD

EUT Rated Voltage : DC 3.7V

EUT Test Voltage : DC 3.7V

Measurement Standard : FCC CFR Title 47 Part 27

Measurement Reference : TIA/EIA 603-C

Test Result : Complied

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

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

Approved By : 
(Director / Vincent Lin)

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Attachment 2: EUT Detailed Photographs	

1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Module
Model No.	HL7618RD
Trade Name	AirPrime
IMEI No.	359998070020005
FCC ID	N7NHL7618RD
Modulation	LTE Band 4 : QPSK/16-QAM
	LTE Band 13 : QPSK/16-QAM
TX Frequency	LTE Band 4 : 1710MHz ~1755MHz
	LTE Band 13 : 777MHz ~ 787MHz
Rx Frequency	LTE Band 4: 2110~2155MHz
	LTE Band 13 : 746 MHz~756 MHz
Bandwidth	LTE Band 4: 1.4MHz/3 MHz/5 MHz/10 MHz/15 MHz/20 MHz
	LTE Band 13: 5 MHz/10 MHz
HW Version	1.0
SW Version	AHL7618RD.V.1.0
Antenna Type	Dipole

1.2. Antenna List

No.	Manufacturer	Part No.	Peak Gain
1	Pulse	SPDA24700/2700	2dBi

1.3. Operational Description

The information contained within this report is intended to show verification of compliance of the 700/1700MHz to the requirements of FCC 47 CFR Part 27.

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

Quietek 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:

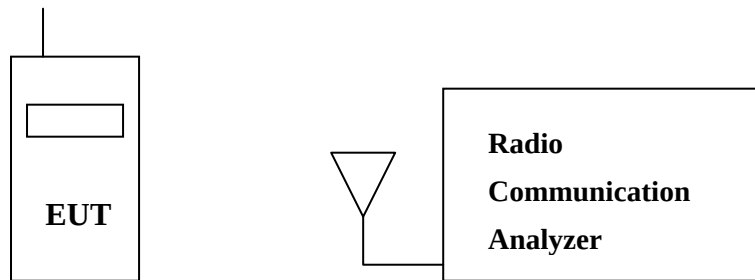
Test Mode:	LTE Band 4 (1.4M)-QPSK/16QAM
	LTE Band 4 (3M)-QPSK/16QAM
	LTE Band 4 (5M)-QPSK/16QAM
	LTE Band 4 (10M)-QPSK/16QAM
	LTE Band 4 (15M)-QPSK/16QAM
	LTE Band 4 (20M)-QPSK/16QAM
	LTE Band 13 (5M)-QPSK/16QAM
	LTE Band 13 (10M)-QPSK/16QAM

Note :

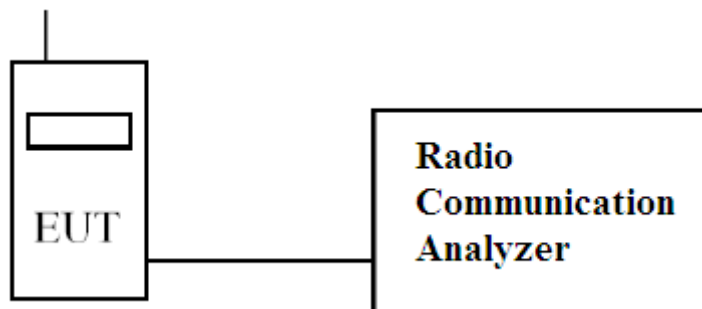
The maximum power levels are chosen in the LTE Band 4/13, only these modes were used for all tests.

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	21
Humidity (%RH)	25-75	53
Barometric pressure (mbar)	860-1060	982

Site Description: File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
FCC Registration Number :92195

Site Name: Quietek Corporation

Linkou Testing Laboratory:
No.5-22, Ruishukeng, Linkou Dist.,
New Taipei City 24451,
Taiwan, R.O.C.
TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789
E-Mail : service@quietek.com

FCC Accreditation Number: TW1014

1.7. Type of Emission

Band	Bandwidth (MHz)	Modulation	
		QPSK	16QAM
4	1.4	1M10G7D	1M10W7D
4	3	2M74G7D	2M73W7D
4	5	4M50G7D	4M49W7D
4	10	9M07G7D	9M06W7D
4	15	13M5G7D	13M5W7D
4	20	18M6G7D	18M5W7D
13	5	4M48G7D	4M48W7D
13	10	8M92G7D	8M91W7D

1.8. Voltages and DC currents

LTE Band 4 (1.4M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.39A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 4 (3M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.39A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 4 (5M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.40A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 4 (10M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.43A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 4 (15M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.46A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 4 (20M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.48A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 13 (5M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.49A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A
LTE Band 13 (10M)	EUT Transmitting (in maximum power) :	DC voltage : 3.7V , DC current : 0.53A
	EUT Standby :	DC voltage : 3.7V , DC current : 0.01A

2. Technical Test

2.1. Summary of test result

Standard	Test Item	Result	Note
2.1046	Conducted Output Power	Pass	
27.5			
2.1049	Occupied Bandwidth	Pass	
27.53(g)			
2.1051	Spurious Emission at Antenna Terminals	Pass	
27.53(g)			
2.1051	Conducted Emission	Pass	
27.53(g)			
2.1053	Field Strength of Spurious Radiation	Pass	
27.53(g)			
2.1055	Frequency Stability for Temperature & Voltage	Pass	
27.54			
27.50(a)	Peak to Average Ratio	Pass	

2.2. List of test Equipment

Conducted /CTR

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Spectrum Analyzer	Agilent	N9010A	MY52220597	2016/02/18
Directional coupler	Agilent	87300C	MY44300353	2015/10/30
Directional coupler	Agilent	778D-012	50550	2015/10/30
Standard Temperature & Humidity Chamber	WIT	TH-1S-B	EQ-201-00146	2015/10/01
DC power supply	Agilent	E3610A	MY40009845	2016/07/14
Communication Tester	Agilent	8820C	6201465467	2016/06/21

Radiated / Site3

Instrument	Manufacturer	Type No.	Serial No	Cal. Date
Bilog Antenna	Schaffner Chase	CBL6112B	2707	2016/06/11
Horn Antenna	R&S	9120D	556	2016/01/11
Pre-Amplifier	Agilent	87405C	MY47010653	2016/08/11
Spectrum Analyzer	Agilent	N9010A	MY52220597	2016/02/18
DC power supply	Agilent	E3610A	MY40009845	2016/07/14
Communication Tester	Agilent	8820C	6201465467	2016/06/21

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 ± 3.44 dB .

Radiated Emission (Above 1GHz)

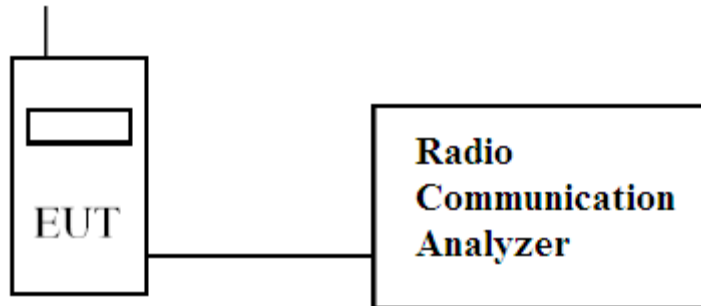
The measurement uncertainty of confidence of 95% is evaluated as ± 4.08 dB

3. Conducted Output Power Measurment

3.1. Test Specification

According to Part 2.1046, 27.50.

3.2. Test Setup



3.3. Limits

Band	Limit
LTE Band 4/1700	<1W
LTE Band 13/700	<3W

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	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (dBm)	Max Power (W)
Band 4 (1700MHz)/1.4MHz	19957	QPSK	1	#0	0	23.42	0.220
			1	#Mid	0	23.43	0.220
			1	#Max	0	23.40	0.219
			50%	#0	0	23.44	0.221
			50%	#Mid	0	23.46	0.222
			50%	#Max	0	23.44	0.221
			100%	--	1	22.47	0.177
		16QAM	1	#0	1	22.81	0.191
			1	#Mid	1	22.80	0.191
			1	#Max	1	22.67	0.185
			50%	#0	1	22.55	0.180
			50%	#Mid	1	22.54	0.179
			50%	#Max	1	22.51	0.178
			100%	--	2	21.41	0.138
	20175	QPSK	1	#0	0	23.64	0.231
			1	#Mid	0	23.57	0.228
			1	#Max	0	23.65	0.232
			50%	#0	0	23.68	0.233
			50%	#Mid	0	23.70	0.234
			50%	#Max	0	23.67	0.233
			100%	--	1	22.71	0.187
		16QAM	1	#0	1	22.96	0.198
			1	#Mid	1	22.90	0.195
			1	#Max	1	22.84	0.192
			50%	#0	1	22.79	0.190
			50%	#Mid	1	22.82	0.191
			50%	#Max	1	22.79	0.190
			100%	--	2	21.66	0.147
	20393	QPSK	1	#0	0	23.82	0.241
			1	#Mid	0	23.76	0.238
			1	#Max	0	23.76	0.238
			50%	#0	0	23.82	0.241
			50%	#Mid	0	23.81	0.240
			50%	#Max	0	23.79	0.239
			100%	--	1	22.80	0.191
		16QAM	1	#0	1	23.01	0.200
			1	#Mid	1	22.93	0.196
			1	#Max	1	22.93	0.196
			50%	#0	1	22.98	0.199
			50%	#Mid	1	22.98	0.199
			50%	#Max	1	23.00	0.200
			100%	--	2	21.86	0.153

Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 4 (1700MHz)/3MHz	19965	QPSK	1	#0	0	23.41	0.219
			1	#Mid	0	23.44	0.221
			1	#Max	0	23.34	0.216
			50%	#0	1	22.45	0.176
			50%	#Mid	1	22.42	0.175
			50%	#Max	1	22.43	0.175
			100%	--	1	22.47	0.177
		16QAM	1	#0	1	22.84	0.192
			1	#Mid	1	22.90	0.195
			1	#Max	1	22.82	0.191
			50%	#0	2	21.50	0.141
			50%	#Mid	2	21.45	0.140
			50%	#Max	2	21.47	0.140
			100%	--	2	21.51	0.142
	20175	QPSK	1	#0	0	23.65	0.232
			1	#Mid	0	23.62	0.230
			1	#Max	0	23.59	0.229
			50%	#0	1	22.79	0.190
			50%	#Mid	1	22.80	0.191
			50%	#Max	1	22.75	0.188
			100%	--	1	22.77	0.189
		16QAM	1	#0	1	23.10	0.204
			1	#Mid	1	23.12	0.205
			1	#Max	1	23.02	0.200
			50%	#0	2	21.69	0.148
			50%	#Mid	2	21.67	0.147
			50%	#Max	2	21.64	0.146
			100%	--	2	21.67	0.147
	20385	QPSK	1	#0	0	23.80	0.240
			1	#Mid	0	23.73	0.236
			1	#Max	0	23.68	0.233
			50%	#0	1	22.88	0.194
			50%	#Mid	1	22.87	0.194
			50%	#Max	1	22.82	0.191
			100%	--	1	22.87	0.194
		16QAM	1	#0	1	23.14	0.206
			1	#Mid	1	23.05	0.202
			1	#Max	1	22.98	0.199
			50%	#0	2	21.91	0.155
			50%	#Mid	2	21.84	0.153
			50%	#Max	2	21.86	0.153
			100%	--	2	21.88	0.154

Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 4 (1700MHz)/5MHz	19975	QPSK	1	#0	0	23.37	0.217
			1	#Mid	0	23.35	0.216
			1	#Max	0	23.30	0.214
			50%	#0	1	22.55	0.180
			50%	#Mid	1	22.47	0.177
			50%	#Max	1	22.44	0.175
			100%	--	1	22.47	0.177
		16QAM	1	#0	1	22.80	0.191
			1	#Mid	1	22.86	0.193
			1	#Max	1	22.67	0.185
			50%	#0	2	21.55	0.143
			50%	#Mid	2	21.45	0.140
			50%	#Max	2	21.40	0.138
			100%	--	2	21.44	0.139
	20175	QPSK	1	#0	0	23.74	0.237
			1	#Mid	0	23.67	0.233
			1	#Max	0	23.66	0.232
			50%	#0	1	22.79	0.190
			50%	#Mid	1	22.78	0.190
			50%	#Max	1	22.74	0.188
			100%	--	1	22.76	0.189
		16QAM	1	#0	1	23.06	0.202
			1	#Mid	1	23.06	0.202
			1	#Max	1	22.97	0.198
			50%	#0	2	21.73	0.149
			50%	#Mid	2	21.67	0.147
			50%	#Max	2	21.60	0.145
			100%	--	2	21.70	0.148
	20375	QPSK	1	#0	0	23.93	0.247
			1	#Mid	0	23.84	0.242
			1	#Max	0	23.68	0.233
			50%	#0	1	22.97	0.198
			50%	#Mid	1	22.93	0.196
			50%	#Max	1	22.87	0.194
			100%	--	1	22.87	0.194
		16QAM	1	#0	1	23.30	0.214
			1	#Mid	1	23.13	0.206
			1	#Max	1	23.11	0.205
			50%	#0	2	21.93	0.156
			50%	#Mid	2	21.88	0.154
			50%	#Max	2	21.83	0.152
			100%	--	2	21.82	0.152

Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 4 (1700MHz)/10MHz	20000	QPSK	1	#0	0	23.63	0.231
			1	#Mid	0	23.43	0.220
			1	#Max	0	23.39	0.218
			50%	#0	1	22.62	0.183
			50%	#Mid	1	22.54	0.179
			50%	#Max	1	22.45	0.176
			100%	--	1	22.66	0.185
		16QAM	1	#0	1	23.02	0.200
			1	#Mid	1	22.87	0.194
			1	#Max	1	22.57	0.181
			50%	#0	2	21.62	0.145
			50%	#Mid	2	21.44	0.139
			50%	#Max	2	21.45	0.140
			100%	--	2	21.57	0.144
	20175	QPSK	1	#0	0	23.81	0.240
			1	#Mid	0	23.68	0.233
			1	#Max	0	23.54	0.226
			50%	#0	1	22.82	0.191
			50%	#Mid	1	22.72	0.187
			50%	#Max	1	22.67	0.185
			100%	--	1	22.75	0.188
		16QAM	1	#0	1	22.87	0.194
			1	#Mid	1	22.72	0.187
			1	#Max	1	22.78	0.190
			50%	#0	2	21.78	0.151
			50%	#Mid	2	21.70	0.148
			50%	#Max	2	21.69	0.148
			100%	--	2	21.75	0.150
	20350	QPSK	1	#0	0	24.11	0.258
			1	#Mid	0	23.80	0.240
			1	#Max	0	23.72	0.236
			50%	#0	1	23.04	0.201
			50%	#Mid	1	22.92	0.196
			50%	#Max	1	22.84	0.192
			100%	--	1	22.96	0.198
		16QAM	1	#0	1	23.38	0.218
			1	#Mid	1	23.02	0.200
			1	#Max	1	23.05	0.202
			50%	#0	2	22.07	0.161
			50%	#Mid	2	21.93	0.156
			50%	#Max	2	21.84	0.153
			100%	--	2	21.90	0.155

Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 4 (1700MHz)/15MHz	20025	QPSK	1	#0	0	23.68	0.233
			1	#Mid	0	23.48	0.223
			1	#Max	0	23.35	0.216
			50%	#0	1	22.69	0.186
			50%	#Mid	1	22.56	0.180
			50%	#Max	1	22.51	0.178
			100%	--	1	22.60	0.182
		16QAM	1	#0	1	23.07	0.203
			1	#Mid	1	22.86	0.193
			1	#Max	1	22.68	0.185
			50%	#0	2	21.69	0.148
			50%	#Mid	2	21.55	0.143
			50%	#Max	2	21.49	0.141
			100%	--	2	21.54	0.143
	20175	QPSK	1	#0	0	24.03	0.253
			1	#Mid	0	23.78	0.239
			1	#Max	0	23.74	0.237
			50%	#0	1	22.96	0.198
			50%	#Mid	1	22.83	0.192
			50%	#Max	1	22.84	0.192
			100%	--	1	22.91	0.195
		16QAM	1	#0	1	23.42	0.220
			1	#Mid	1	23.11	0.205
			1	#Max	1	23.21	0.209
			50%	#0	2	21.93	0.156
			50%	#Mid	2	21.78	0.151
			50%	#Max	2	21.72	0.149
			100%	--	2	21.84	0.153
	20325	QPSK	1	#0	0	24.27	0.267
			1	#Mid	0	23.84	0.242
			1	#Max	0	23.73	0.236
			50%	#0	1	23.14	0.206
			50%	#Mid	1	22.92	0.196
			50%	#Max	1	22.83	0.192
			100%	--	1	23.01	0.200
		16QAM	1	#0	1	23.61	0.230
			1	#Mid	1	23.19	0.208
			1	#Max	1	23.18	0.208
			50%	#0	2	22.18	0.165
			50%	#Mid	2	21.94	0.156
			50%	#Max	2	21.93	0.156
			100%	--	2	22.00	0.158

Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 4 (1700MHz)/20MHz	20050	QPSK	1	#0	0	23.63	0.231
			1	#Mid	0	23.43	0.220
			1	#Max	0	23.25	0.211
			50%	#0	1	22.74	0.188
			50%	#Mid	1	22.53	0.179
			50%	#Max	1	22.47	0.177
			100%	--	1	22.63	0.183
		16QAM	1	#0	1	22.93	0.196
			1	#Mid	1	22.62	0.183
			1	#Max	1	22.38	0.173
			50%	#0	2	21.59	0.144
			50%	#Mid	2	21.42	0.139
			50%	#Max	2	21.44	0.139
			100%	--	2	21.51	0.142
	20175	QPSK	1	#0	0	23.67	0.233
			1	#Mid	0	23.58	0.228
			1	#Max	0	23.29	0.213
			50%	#0	1	22.83	0.192
			50%	#Mid	1	22.68	0.185
			50%	#Max	1	22.56	0.180
			100%	--	1	22.74	0.188
		16QAM	1	#0	1	23.02	0.200
			1	#Mid	1	22.85	0.193
			1	#Max	1	22.51	0.178
			50%	#0	2	21.86	0.153
			50%	#Mid	2	21.63	0.146
			50%	#Max	2	21.57	0.144
			100%	--	2	21.75	0.150
	20300	QPSK	1	#0	0	24.04	0.254
			1	#Mid	0	23.71	0.235
			1	#Max	0	23.36	0.217
			50%	#0	1	23.08	0.203
			50%	#Mid	1	22.85	0.193
			50%	#Max	1	22.77	0.189
			100%	--	1	22.90	0.195
		16QAM	1	#0	1	23.29	0.213
			1	#Mid	1	23.14	0.206
			1	#Max	1	22.64	0.184
			50%	#0	2	22.10	0.162
			50%	#Mid	2	21.85	0.153
			50%	#Max	2	21.74	0.149
			100%	--	2	21.95	0.157

Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 13 (700MHz)/5MHz	23205	QPSK	1	#0	0	23.05	0.202
			1	#Mid	0	23.20	0.209
			1	#Max	0	23.09	0.204
			50%	#0	1	22.18	0.165
			50%	#Mid	1	22.17	0.165
			50%	#Max	1	22.17	0.165
			100%	--	1	22.12	0.163
		16QAM	1	#0	1	22.27	0.169
			1	#Mid	1	22.53	0.179
			1	#Max	1	22.32	0.171
			50%	#0	2	21.25	0.133
			50%	#Mid	2	21.18	0.131
			50%	#Max	2	21.19	0.132
			100%	--	2	21.19	0.132
	23230	QPSK	1	#0	0	23.14	0.206
			1	#Mid	0	23.14	0.206
			1	#Max	0	23.01	0.200
			50%	#0	1	22.23	0.167
			50%	#Mid	1	22.20	0.166
			50%	#Max	1	22.15	0.164
			100%	--	1	22.20	0.166
		16QAM	1	#0	1	22.42	0.175
			1	#Mid	1	22.32	0.171
			1	#Max	1	22.25	0.168
			50%	#0	2	21.26	0.134
			50%	#Mid	2	21.28	0.134
			50%	#Max	2	21.19	0.132
			100%	--	2	21.21	0.132
	23255	QPSK	1	#0	0	23.15	0.207
			1	#Mid	0	23.11	0.205
			1	#Max	0	22.97	0.198
			50%	#0	1	22.23	0.167
			50%	#Mid	1	22.20	0.166
			50%	#Max	1	22.13	0.163
			100%	--	1	22.21	0.166
		16QAM	1	#0	1	22.45	0.176
			1	#Mid	1	22.43	0.175
			1	#Max	1	22.23	0.167
			50%	#0	2	21.30	0.135
			50%	#Mid	2	21.22	0.132
			50%	#Max	2	21.16	0.131
			100%	--	2	21.09	0.129

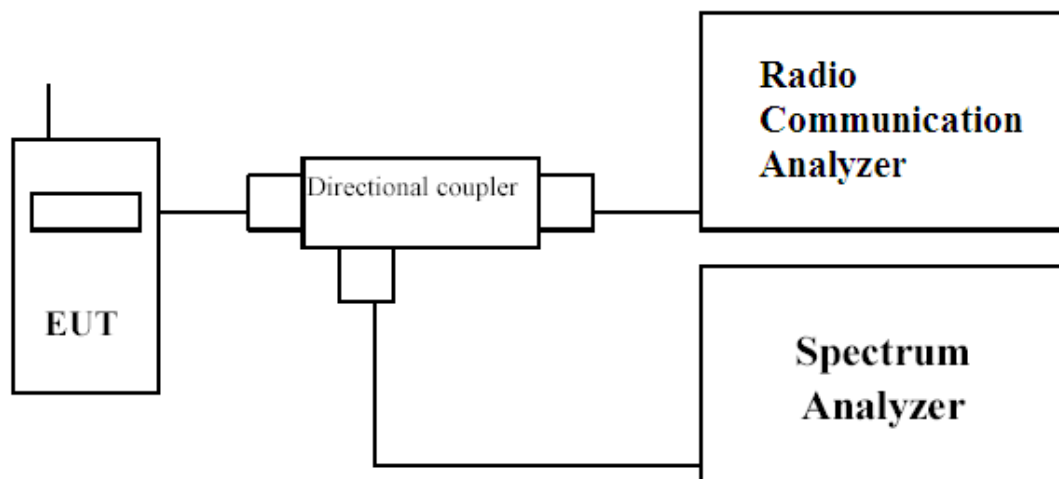
Band	Channel	Modulation	RB No.	RB Offset	MPR	Max Power (Conducted)	Max Power (W)
Band 13 (700MHz)/10MHz	23230	QPSK	1	#0	0	22.86	0.193
			1	#Mid	0	22.99	0.199
			1	#Max	0	22.58	0.181
			50%	#0	1	22.20	0.166
			50%	#Mid	1	22.15	0.164
			50%	#Max	1	22.10	0.162
			100%	--	1	22.18	0.165
		16QAM	1	#0	1	22.30	0.170
			1	#Mid	1	22.50	0.178
			1	#Max	1	21.90	0.155
			50%	#0	2	21.29	0.135
			50%	#Mid	2	21.24	0.133
			50%	#Max	2	21.15	0.130
			100%	--	2	21.22	0.132

4. Occupied Bandwidth

4.1. Test Secification

According to Part 2.1049, 27.53.

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.

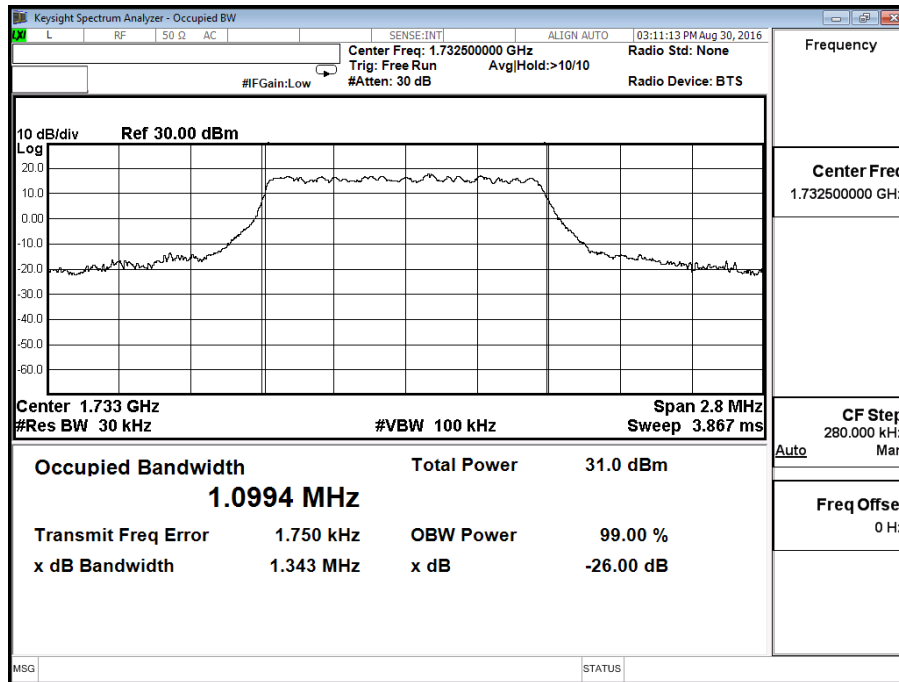
4.4. Test Result of Occupied Bandwidth

Product	Module
Test Mode	Occupied Bandwidth
Test Site	CTR

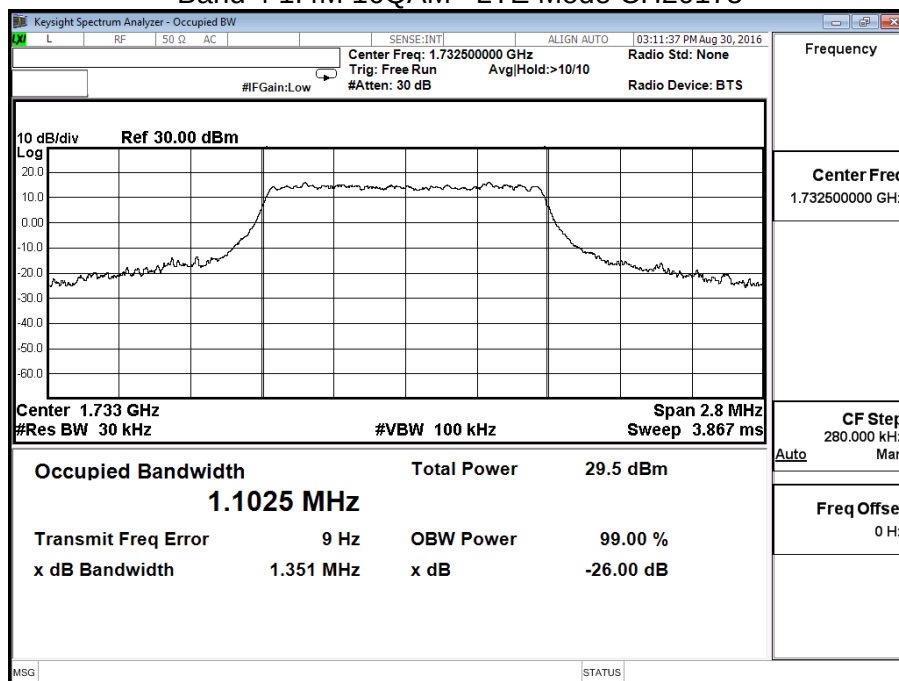
Test Mode	Channel	TX Frequency (MHz)	99% Occupied Bandwidth (MHz)	26 dB bandwidth (MHz)	Result
Band 4 1.4M QPSK	20175	1732.5	1.0994	1.343	Pass
Band 4 1.4M 16QAM	20175	1732.5	1.1025	1.351	Pass
Band 4 3M QPSK	20175	1732.5	2.7403	3.129	Pass
Band 4 3M 16QAM	20175	1732.5	2.7291	3.093	Pass
Band 4 5M QPSK	20175	1732.5	4.5036	5.111	Pass
Band 4 5M 16QAM	20175	1732.5	4.4857	5.034	Pass
Band 4 10M QPSK	20175	1732.5	9.0703	10.50	Pass
Band 4 10M 16QAM	20175	1732.5	9.0571	10.49	Pass
Band 4 15M QPSK	20175	1732.5	13.491	15.66	Pass
Band 4 15M 16QAM	20175	1732.5	13.488	15.67	Pass
Band 4 20M QPSK	20175	1732.5	18.629	21.44	Pass
Band 4 20M 16QAM	20175	1732.5	18.501	21.03	Pass
Band 13 5M QPSK	23230	782	4.4809	4.815	Pass
Band 13 5M 16QAM	23230	782	4.4784	4.810	Pass
Band 13 10M QPSK	23230	782	8.9147	9.449	Pass
Band 13 10M 16QAM	23230	782	8.9073	9.440	Pass

Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 4 1.4M		

Band 4 1.4M QPSK - LTE Mode CH 20175

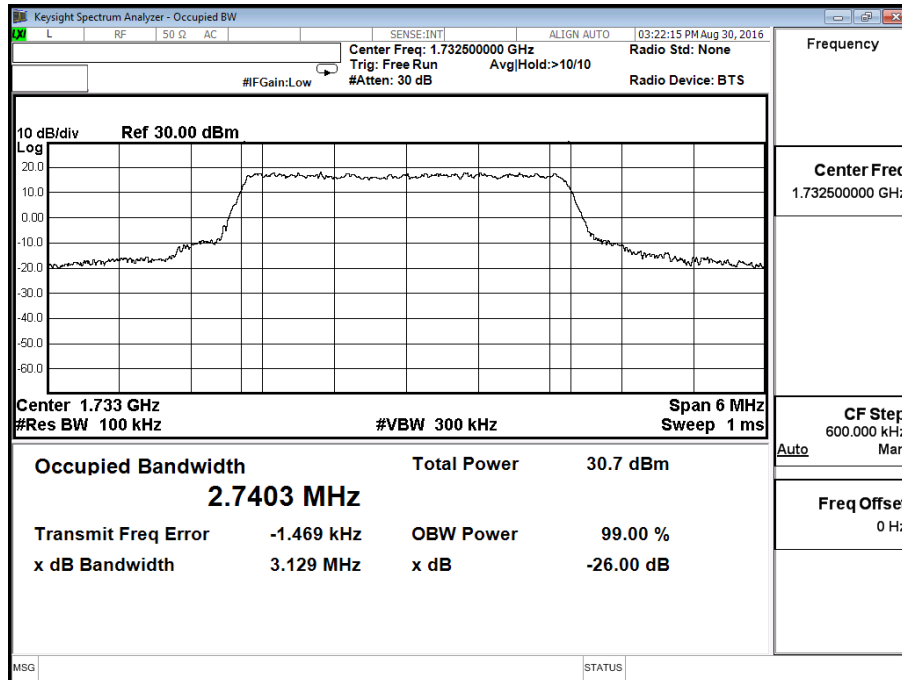


Band 4 1.4M 16QAM - LTE Mode CH20175

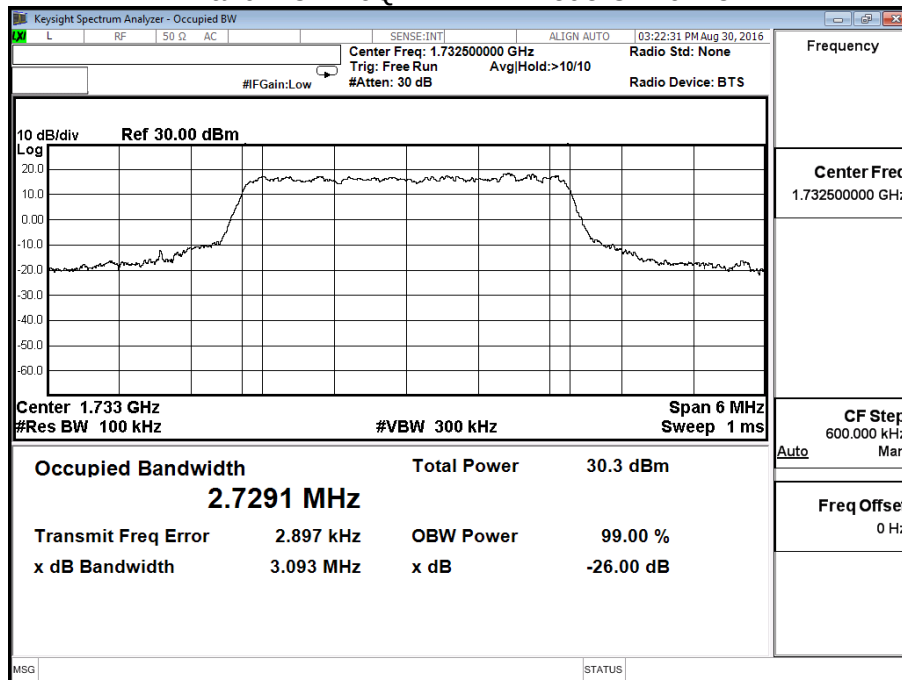


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 4 3M		

Band 4 3M QPSK - LTE Mode CH 20175

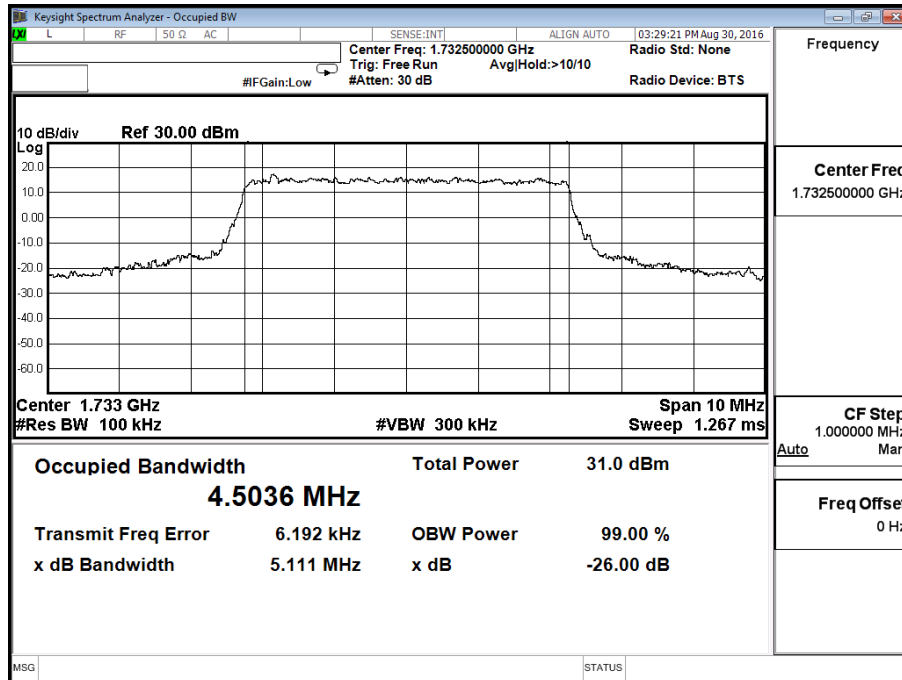


Band 4 3M 16QAM - LTE Mode CH20175

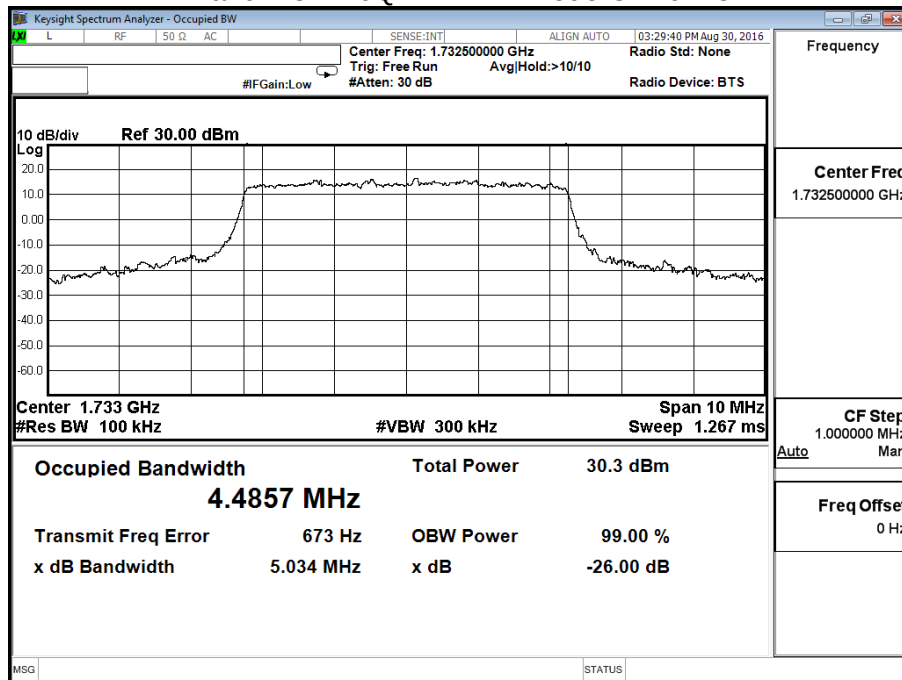


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 4 5M		

Band 4 5M QPSK - LTE Mode CH 20175

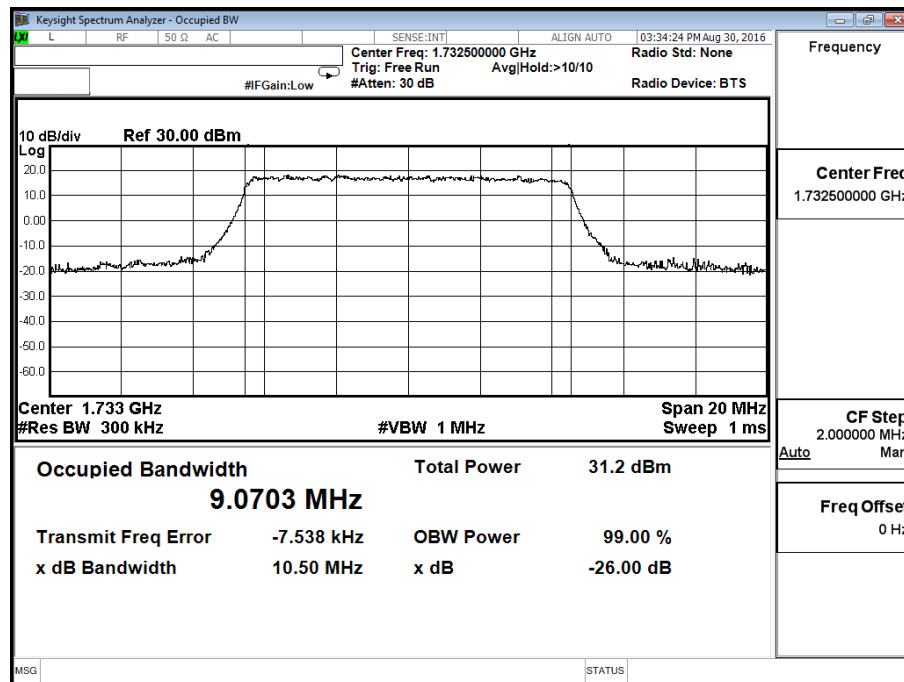


Band 4 5M 16QAM - LTE Mode CH20175

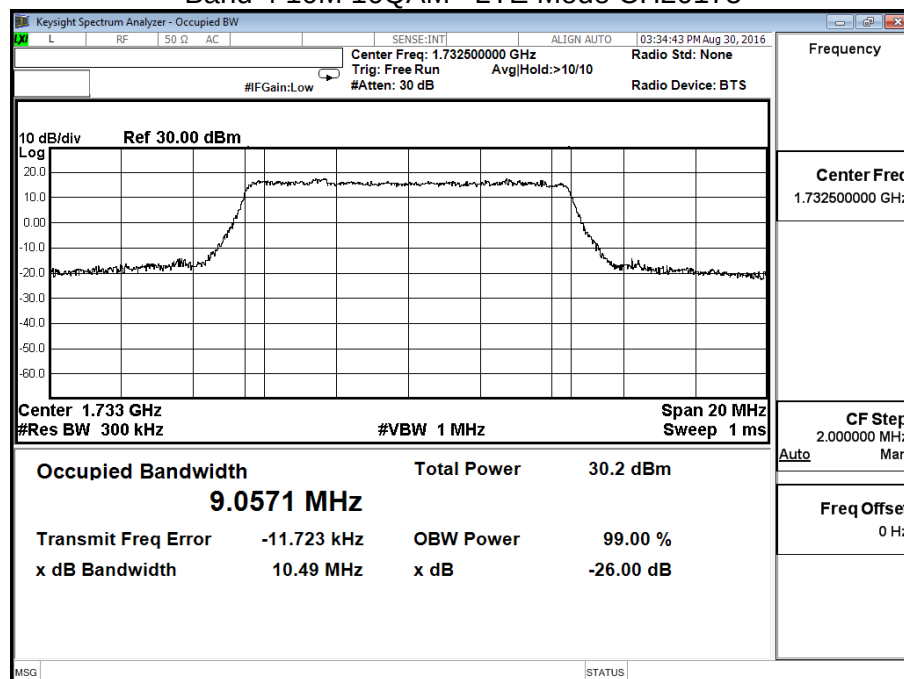


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 4 10M		

Band 4 10M QPSK - LTE Mode CH20175

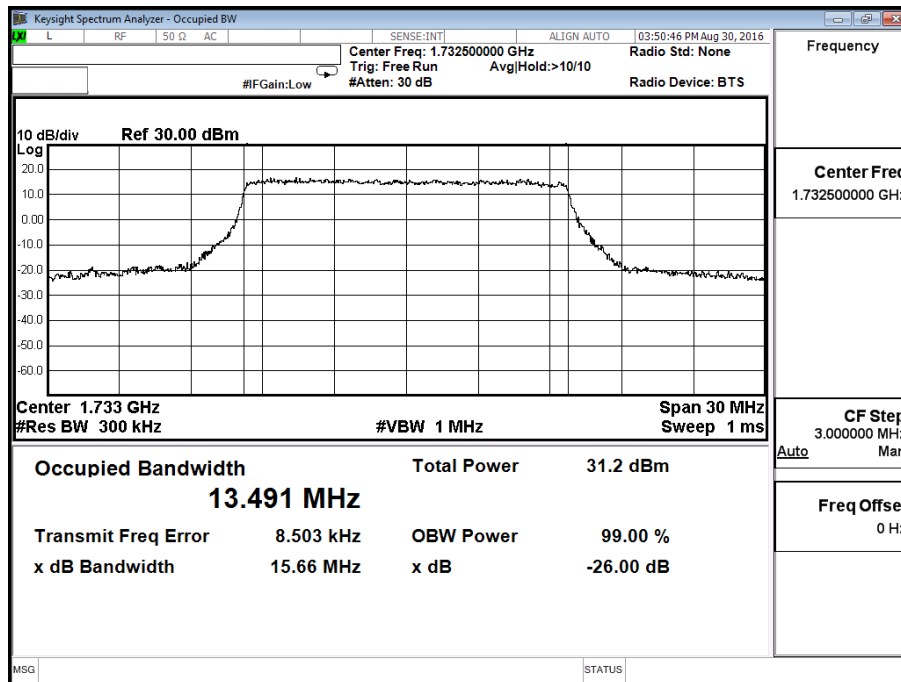


Band 4 10M 16QAM - LTE Mode CH20175

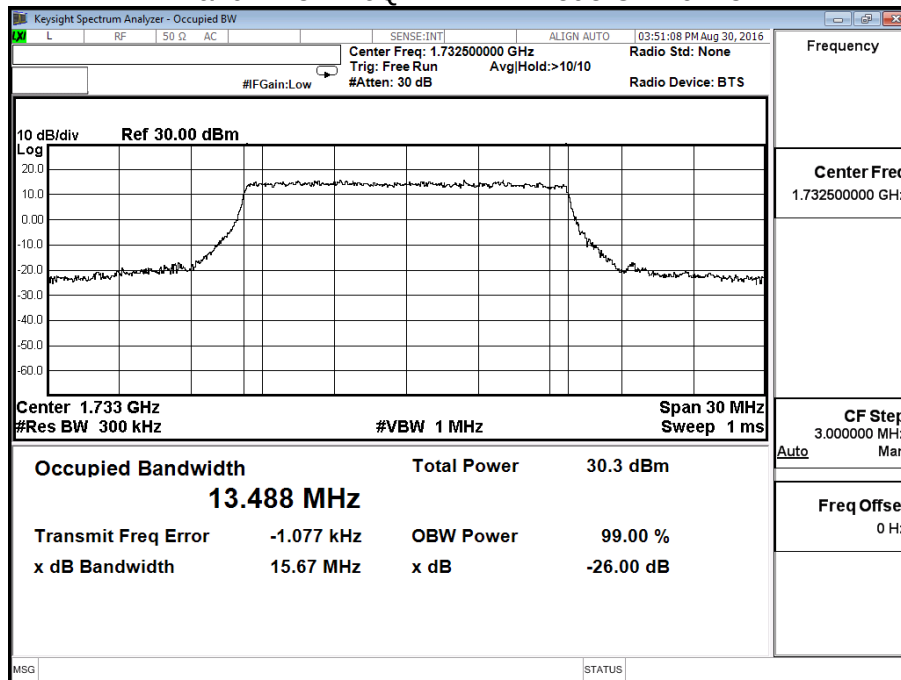


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 4 15M		

Band 4 15M QPSK - LTE Mode CH 20175

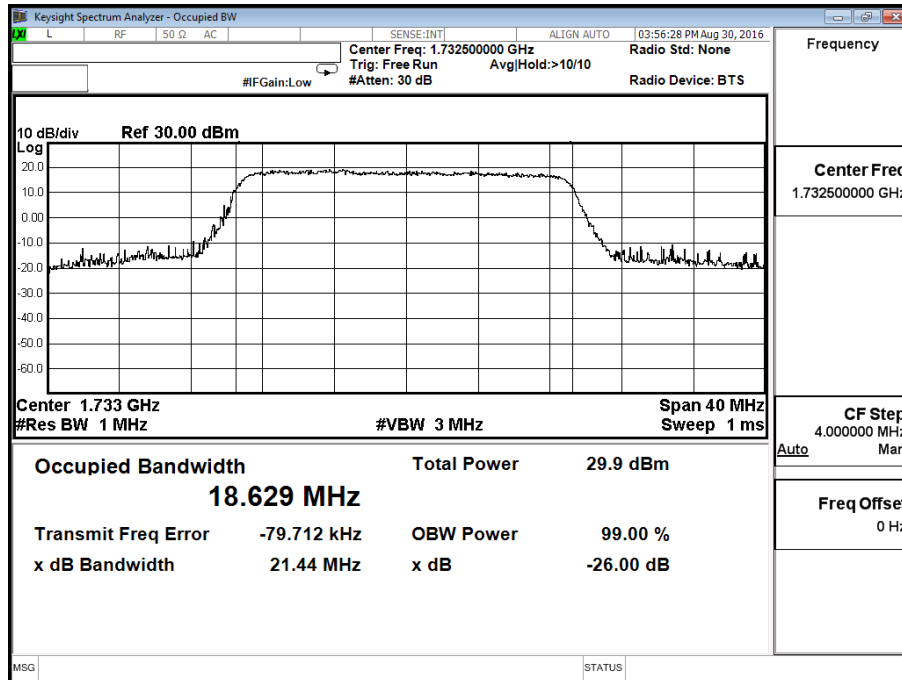


Band 4 15M 16QAM - LTE Mode CH 20175

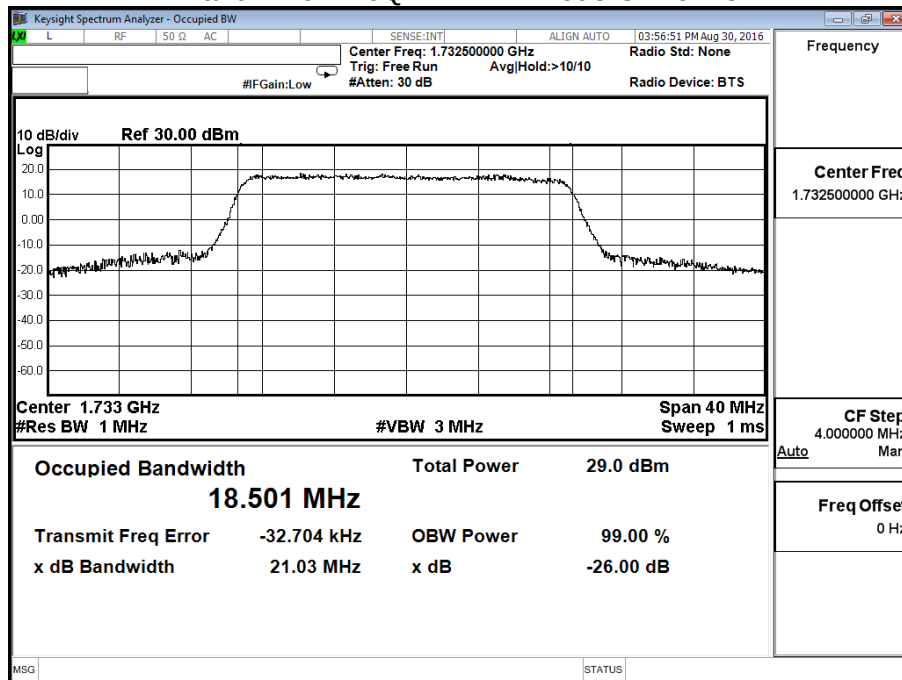


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 4 20M		

Band 4 20M QPSK - LTE Mode CH20175

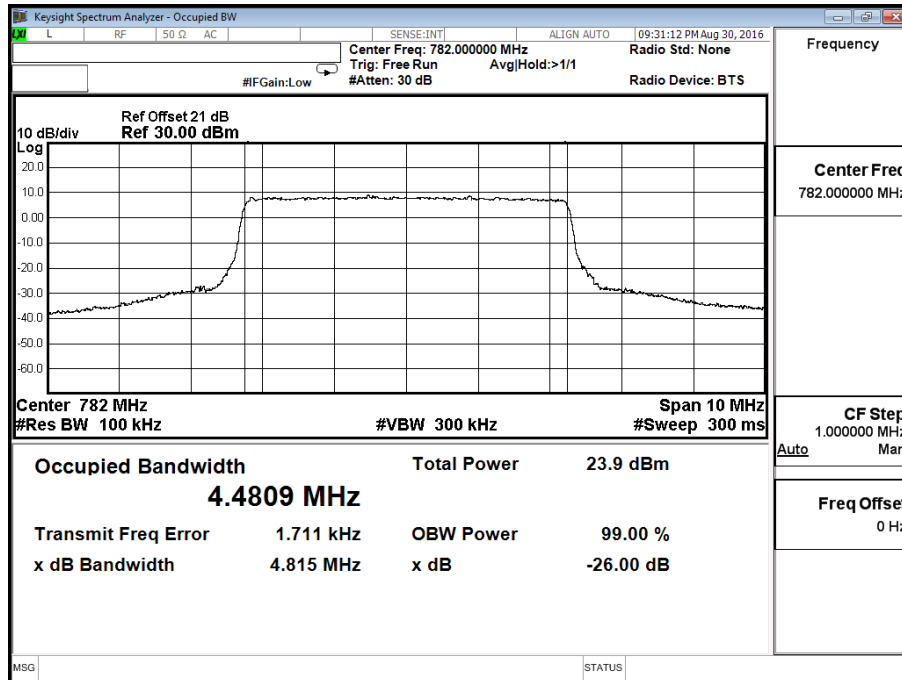


Band 4 20M 16QAM - LTE Mode CH20175

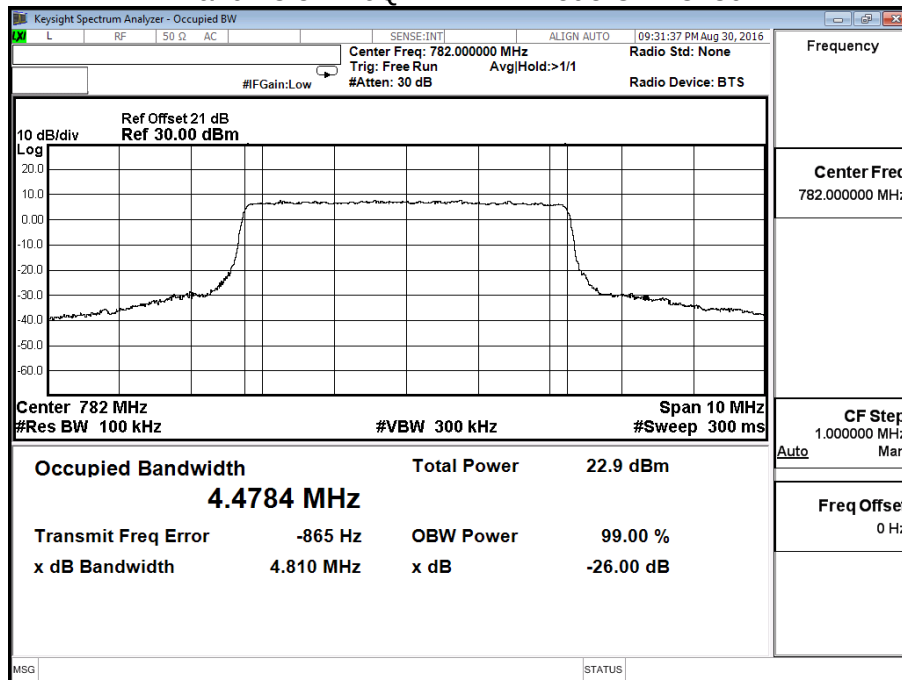


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 13 5M		

Band 13 5M QPSK - LTE Mode CH 23230

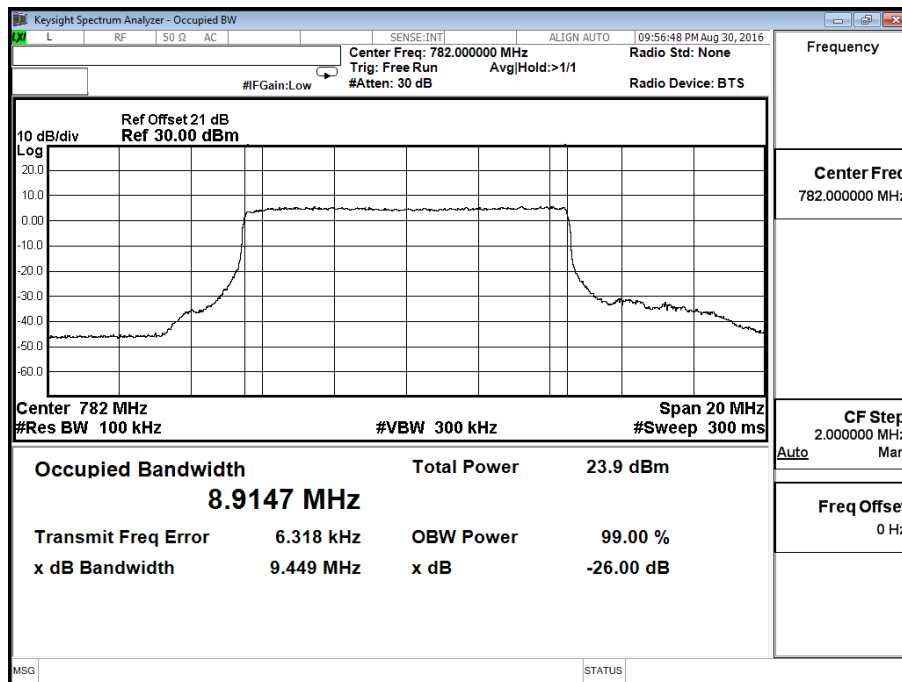


Band 13 5M 16QAM - LTE Mode CH 23230

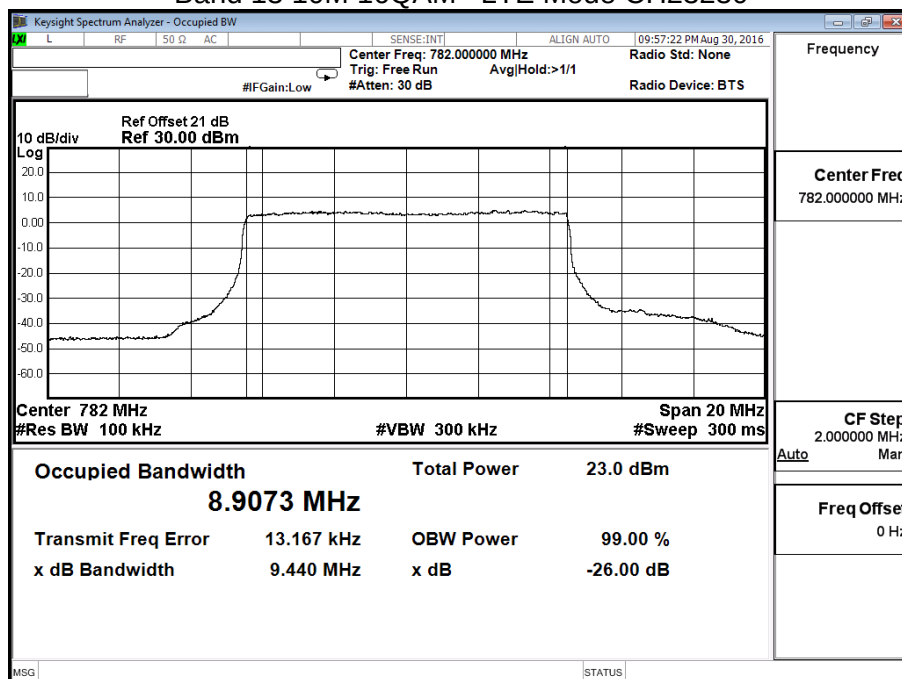


Product	Module		
Test Mode	Occupied Bandwidth		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Band 13 10M		

Band 13 10M QPSK - LTE Mode CH 23230



Band 13 10M 16QAM - LTE Mode CH23230

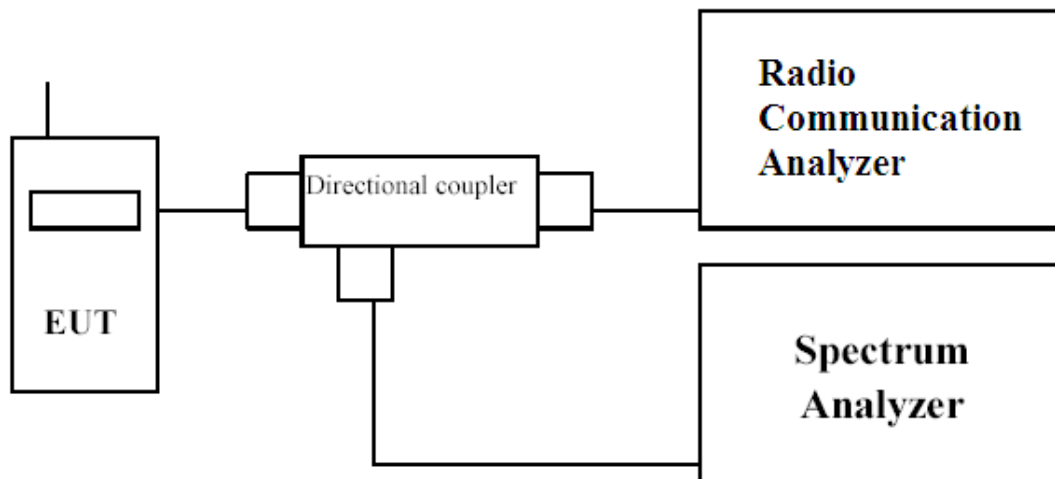


5. Spurious Emission At Antenna Terminals (+/-1MHz)

5.1. Test Specification

According to Part 2.1049, 27.53

5.2. Setup



5.3. Limits

The spurious (unwanted) emission limits specified in the individual FCC rule parts applicable to licensed digital transmitters (typically referred to under the heading 'emission limits') normally apply to any and all emissions that are present outside of the authorized frequency band/block and apply to emissions in both the out-of-band and spurious domains. unwanted emissions are required by the licensed rule parts to be attenuated below the transmitter power by a factor of at least $43 + 10\log(P)$ dB, where P represents the transmitter power expressed in watts

5.4. Test Procedure

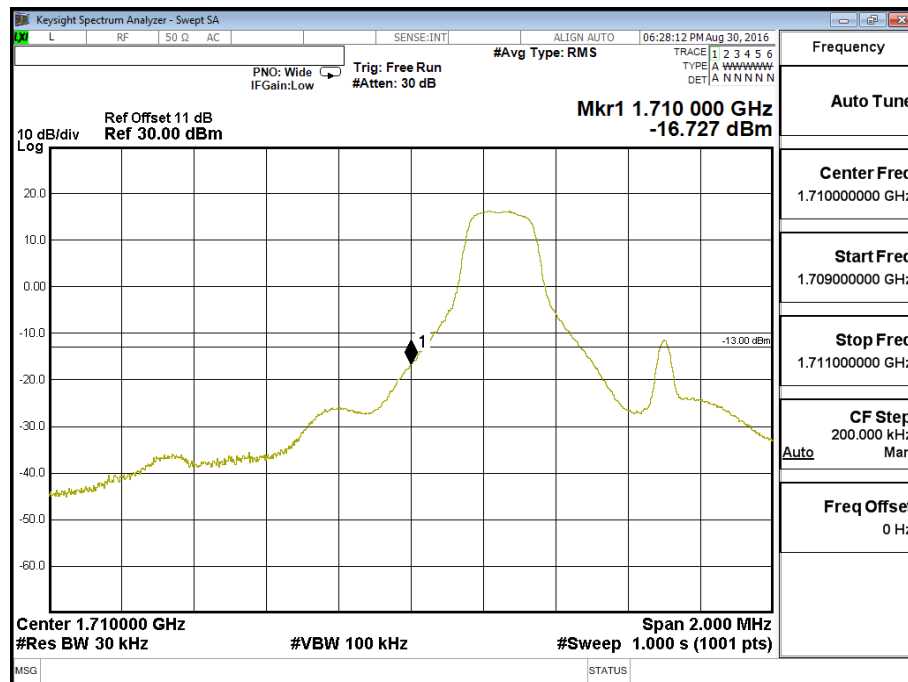
In accordance with Part 27.53, at least 1% of the emission bandwidth was used for the resolution and video bandwidths up to 1MHz away from the Block Edge. At greater than 1MHz, the resolution and video bandwidth were increased to 1MHz/3MHz.

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

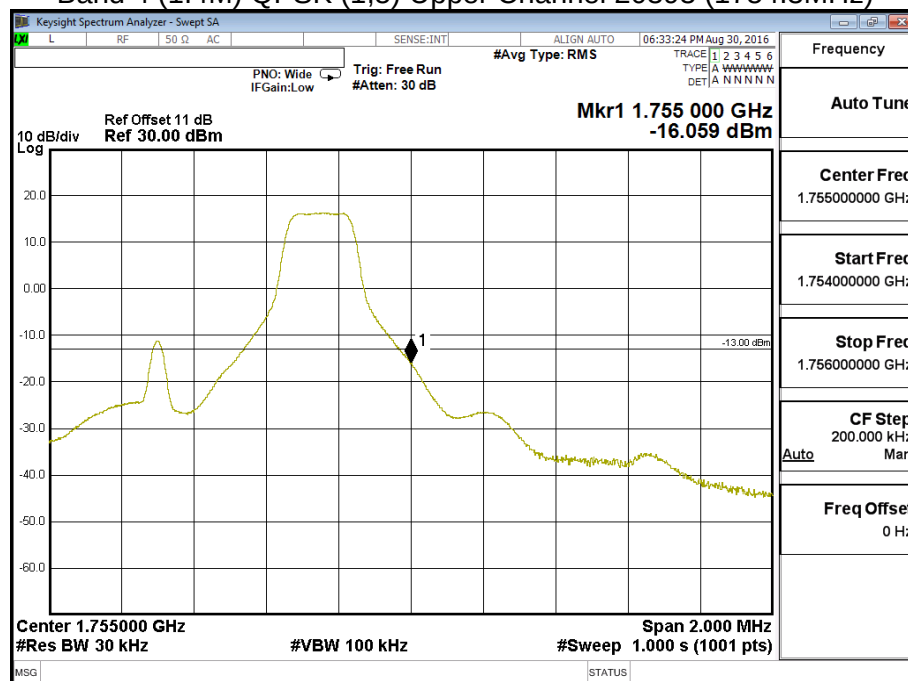
5.5. Test Result of Spurious Emission At Antenna Terminals (+/-1MHz)

Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 4 (1.4M))		

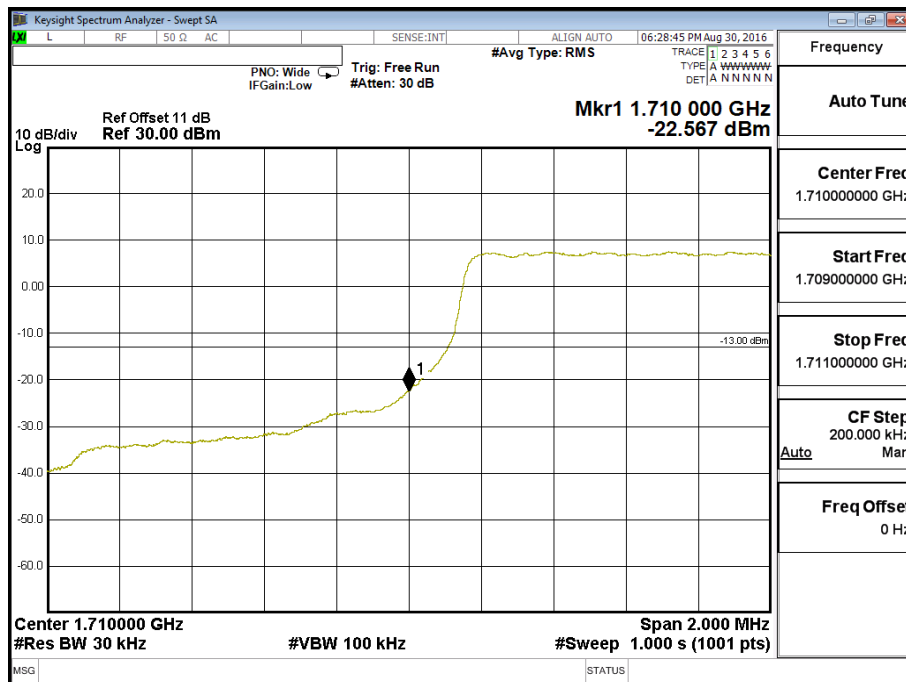
Band 4 (1.4M) QPSK (1,0) Lower Channel 19957 (1710.7MHz)



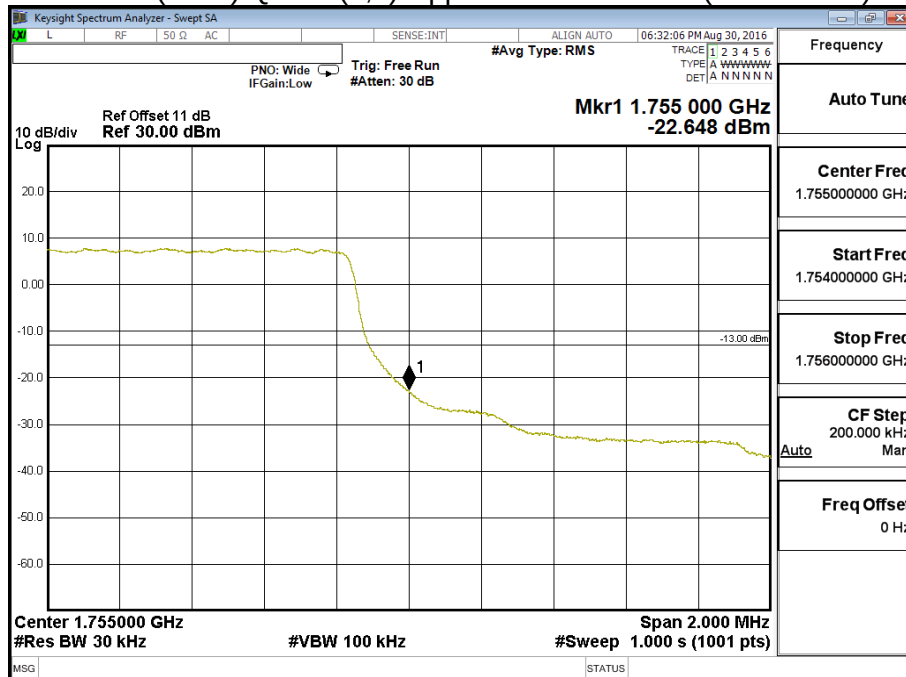
Band 4 (1.4M) QPSK (1,5) Upper Channel 20393 (1754.3MHz)



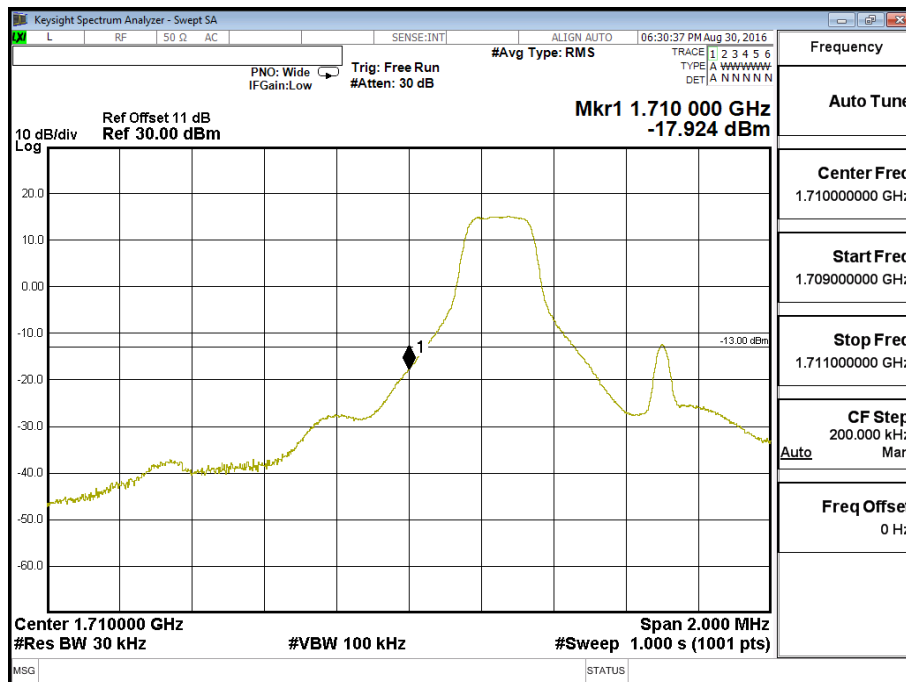
Band 4 (1.4M) QPSK (6,0) Lower Channel 19957 (1710.7MHz)



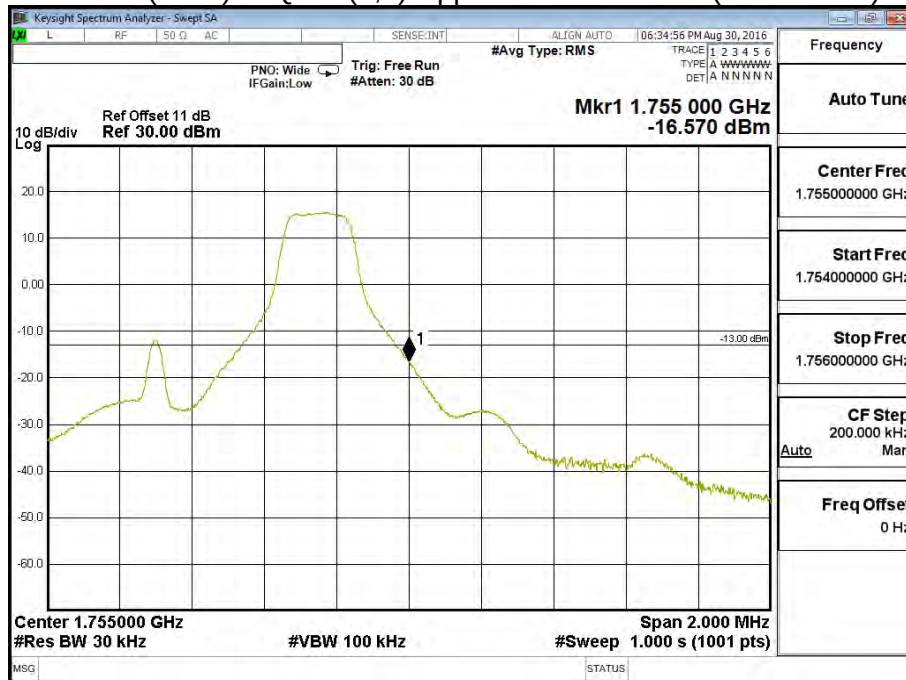
Band 4 (1.4M) QPSK (6,0) Upper Channel 20393 (1754.3MHz)



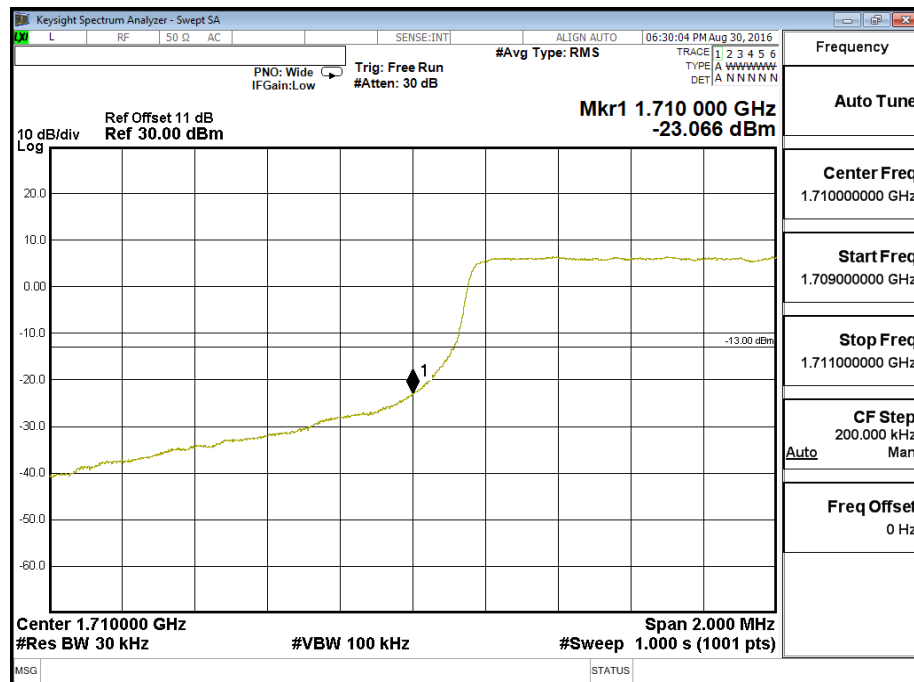
Band 4 (1.4M) 16QAM (1,0) Lower Channel 19957 (1710.7MHz)



Band 4 (1.4M) 16QAM (1,5) Upper Channel 20393 (1754.3MHz)



Band 4 (1.4M) 16QAM (6,0) Lower Channel 19957 (1710.7MHz)

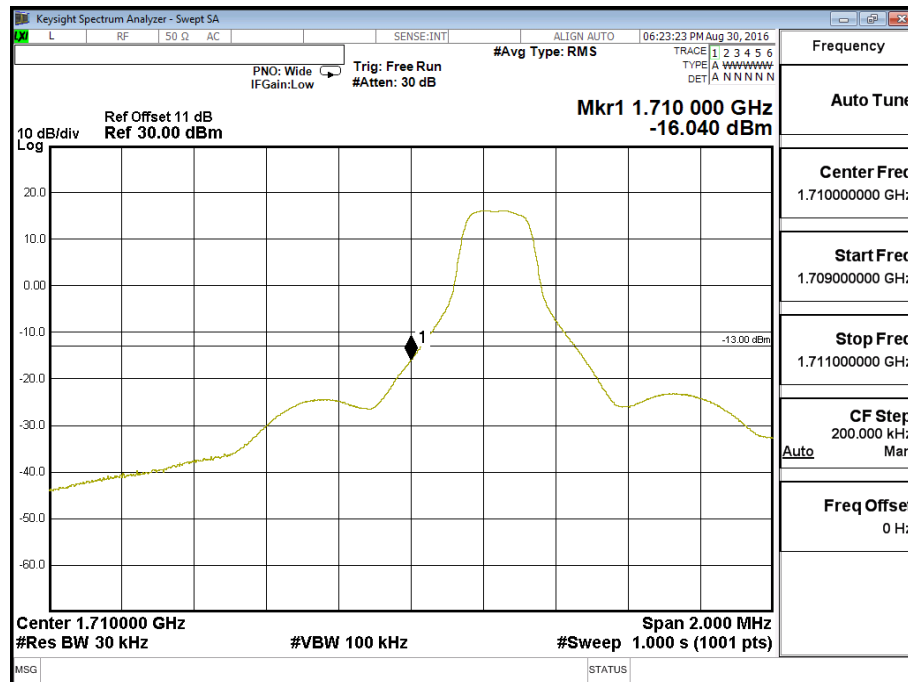


Band 4 (1.4M) 16QAM (6,0) Upper Channel 20393 (1754.3MHz)

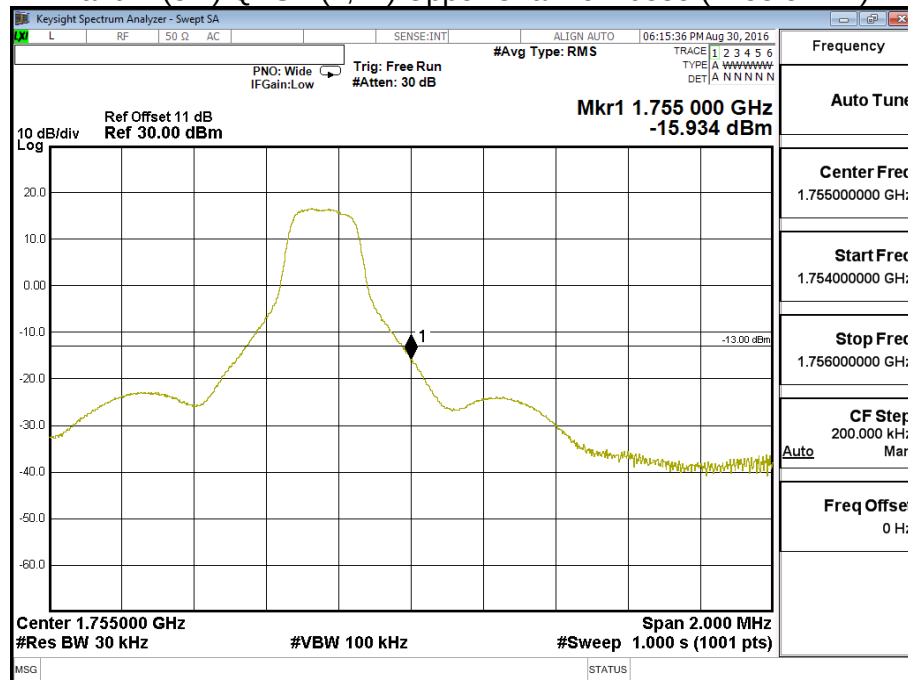


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 4 (3M))		

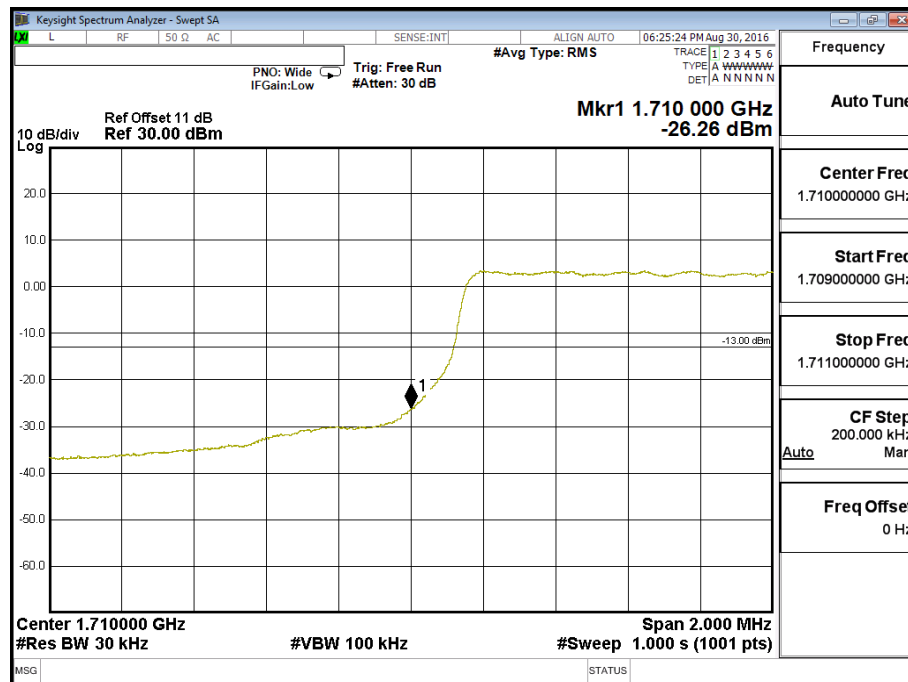
Band 4 (3M) QPSK (1,0) Lower Channel 19965 (1711.5MHz)



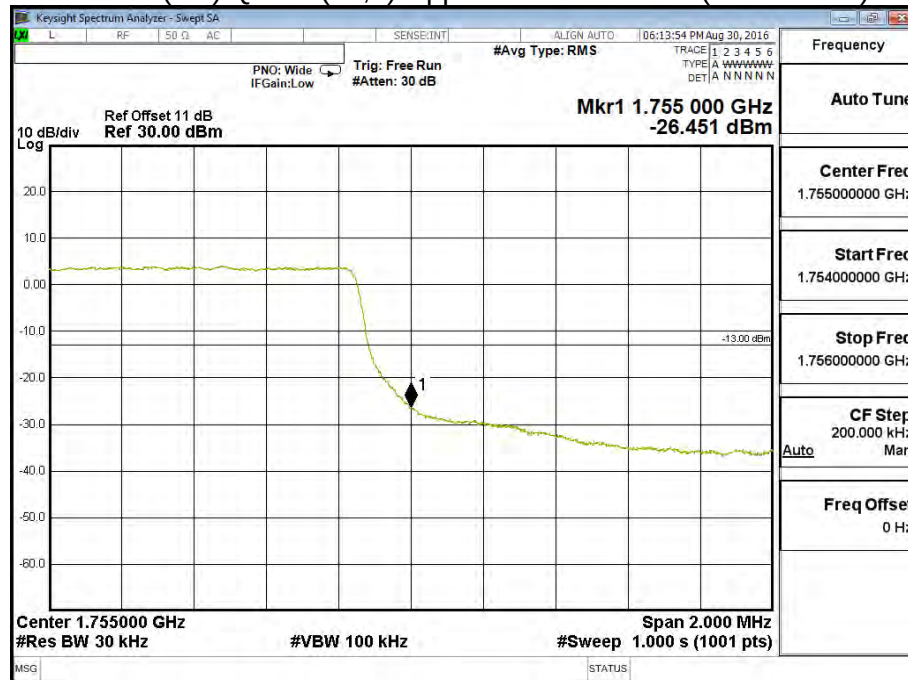
Band 4 (3M) QPSK (1,14) Upper Channel 20385 (1753.5MHz)



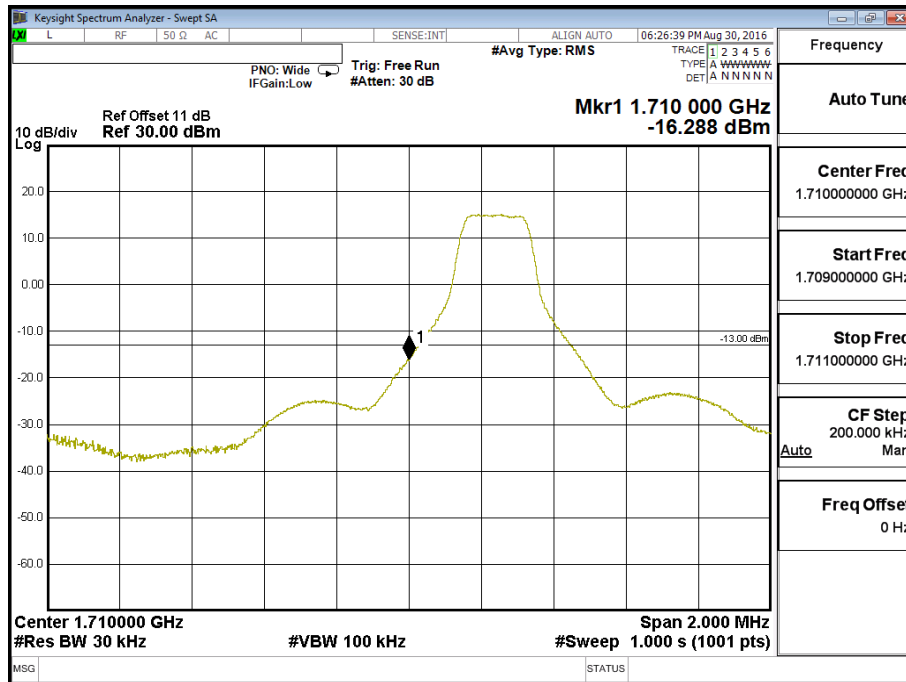
Band 4 (3M) QPSK (15,0) Lower Channel 19965 (1711.5MHz)



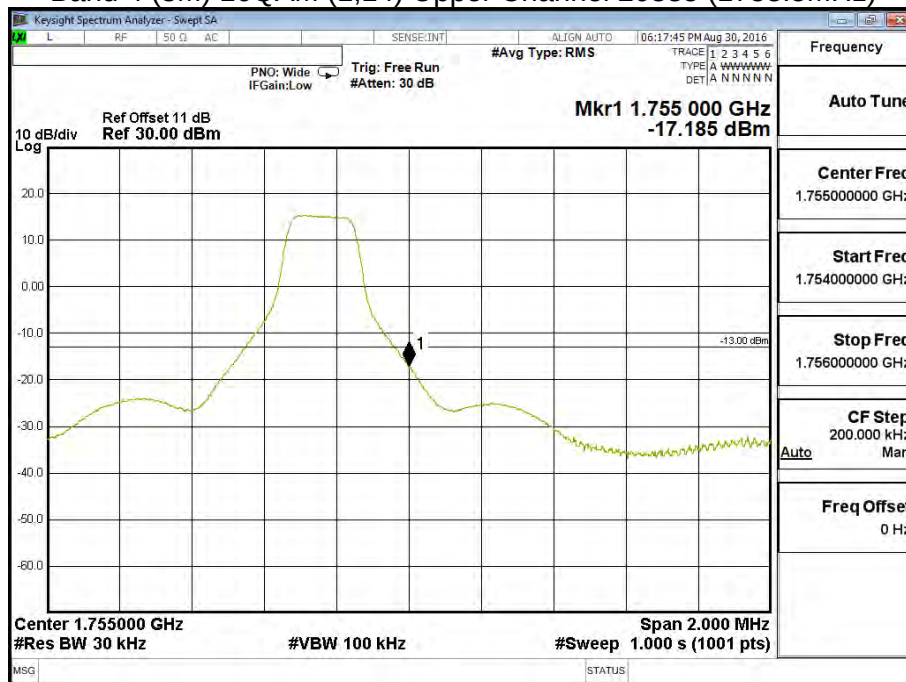
Band 4 (3M) QPSK (15,0) Upper Channel 20385 (1753.5MHz)



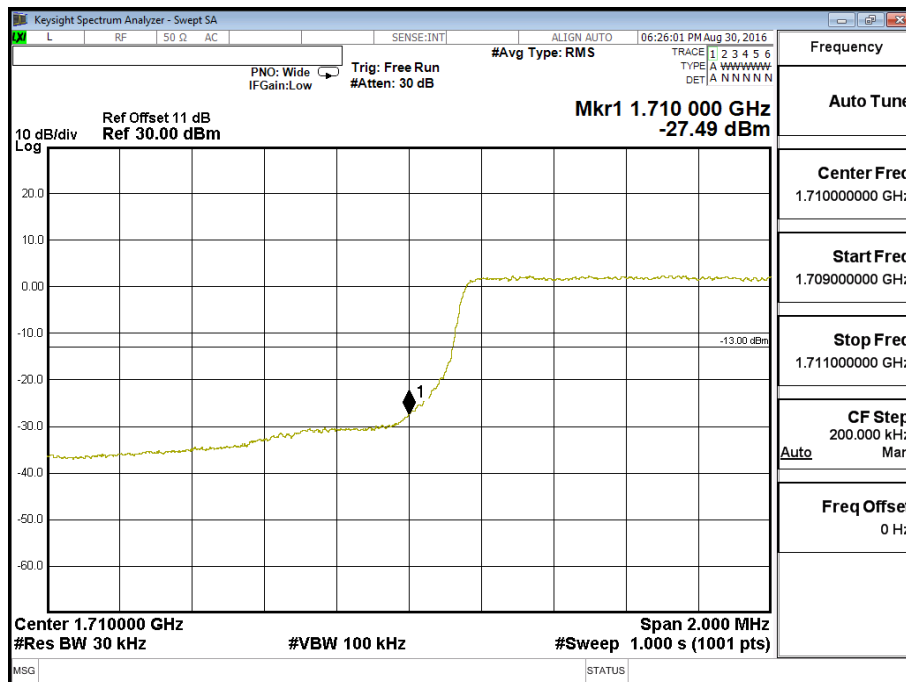
Band 4 (3M) 16QAM (1,0) Lower Channel 19965 (1711.5MHz)



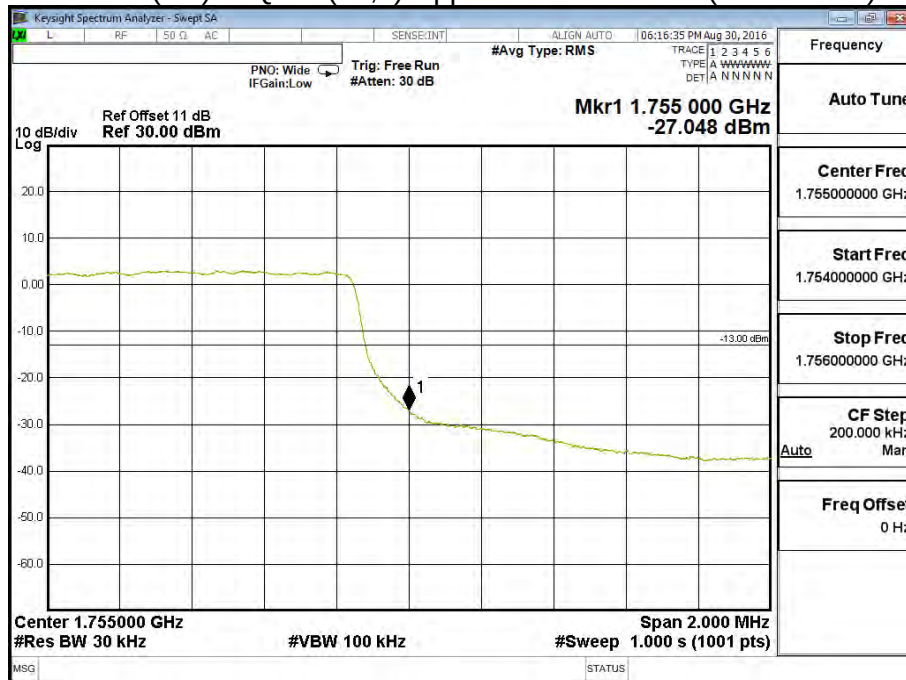
Band 4 (3M) 16QAM (1,14) Upper Channel 20385 (1753.5MHz)



Band 4 (3M) 16QAM (15,0) Lower Channel 19965 (1711.5MHz)

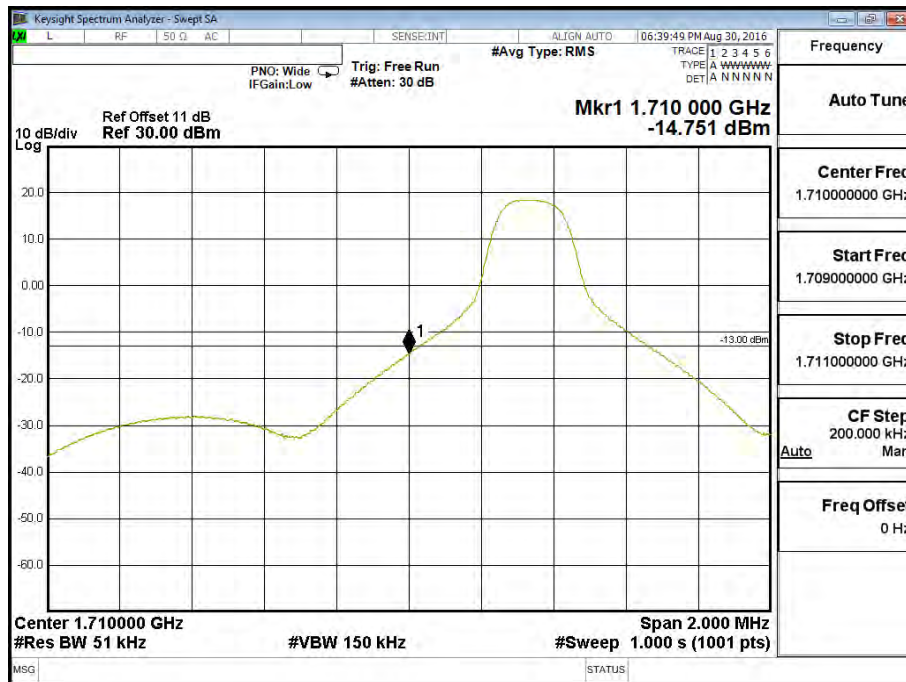


Band 4 (3M) 16QAM (15,0) Upper Channel 20385 (1753.5MHz)

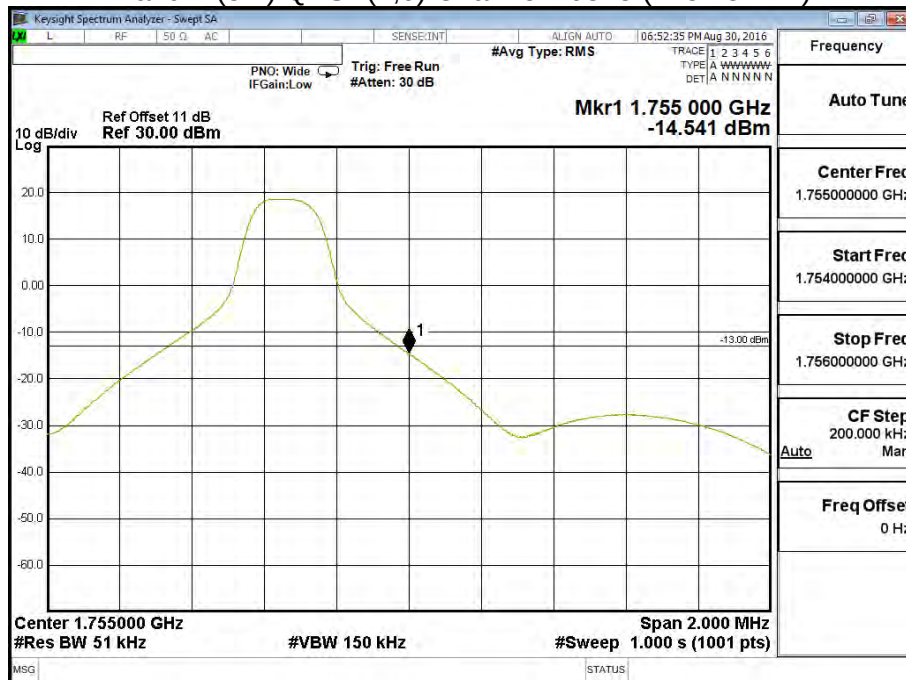


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 4 (5M))		

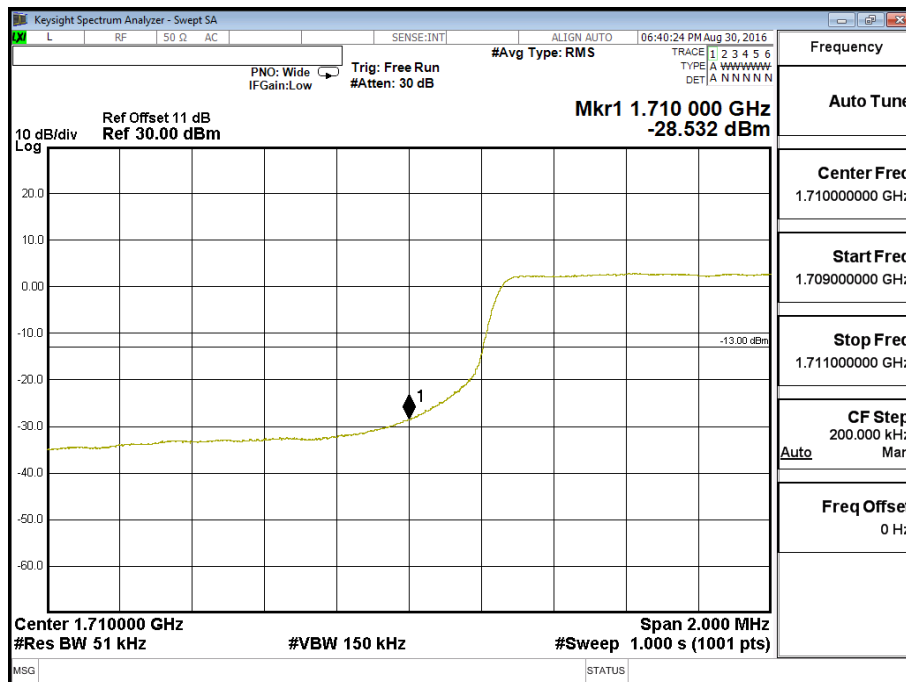
Band 4 (5M) QPSK(1,0) Channel 19975 (1712.5MHz)



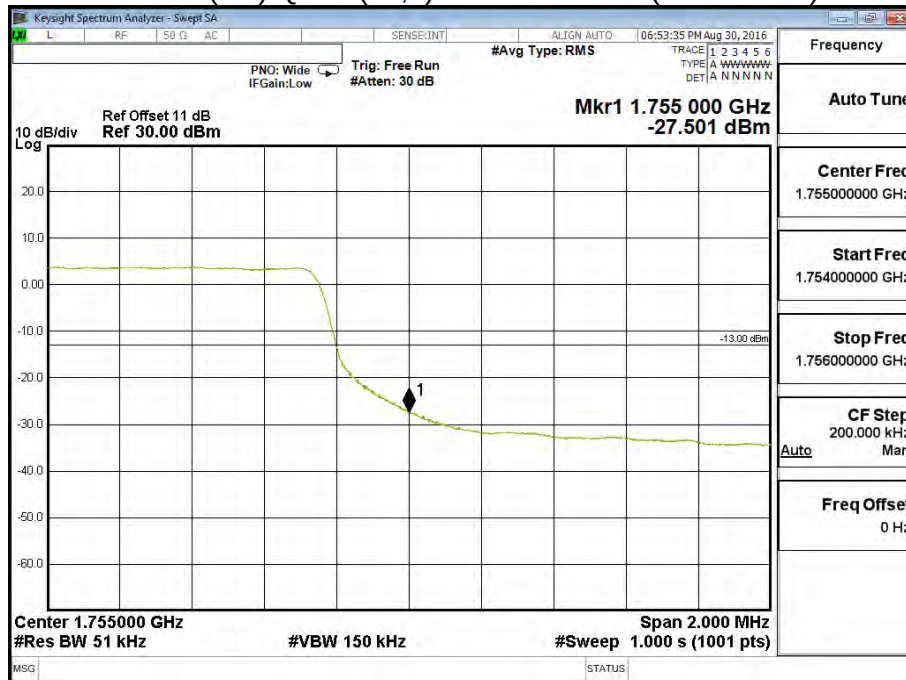
Band 4 (5M) QPSK(1,0) Channel 20375 (1752.5MHz)



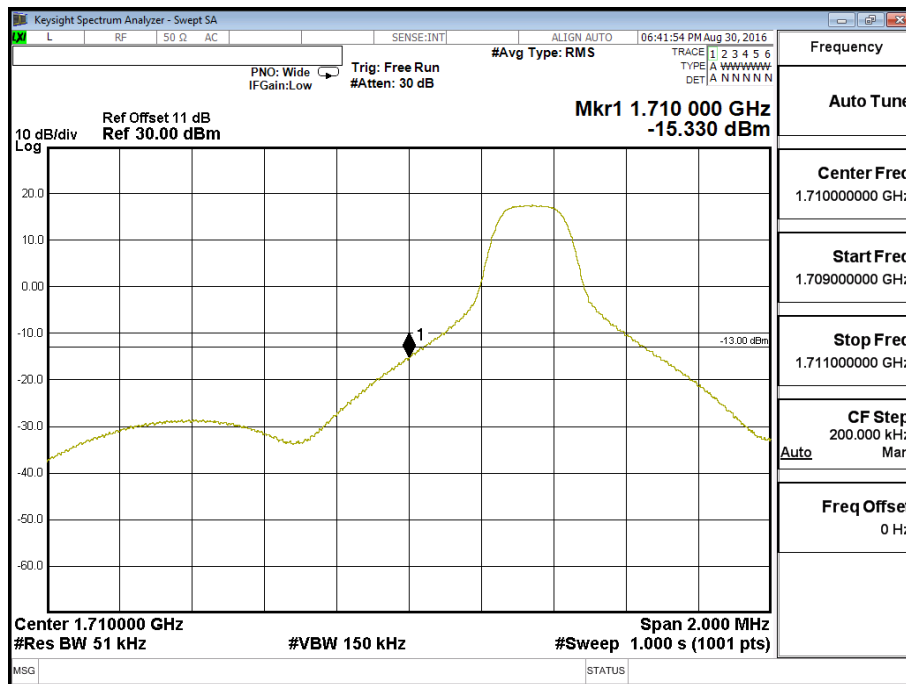
Band 4 (5M) QPSK(25,0) Channel 19975 (1712.5MHz)



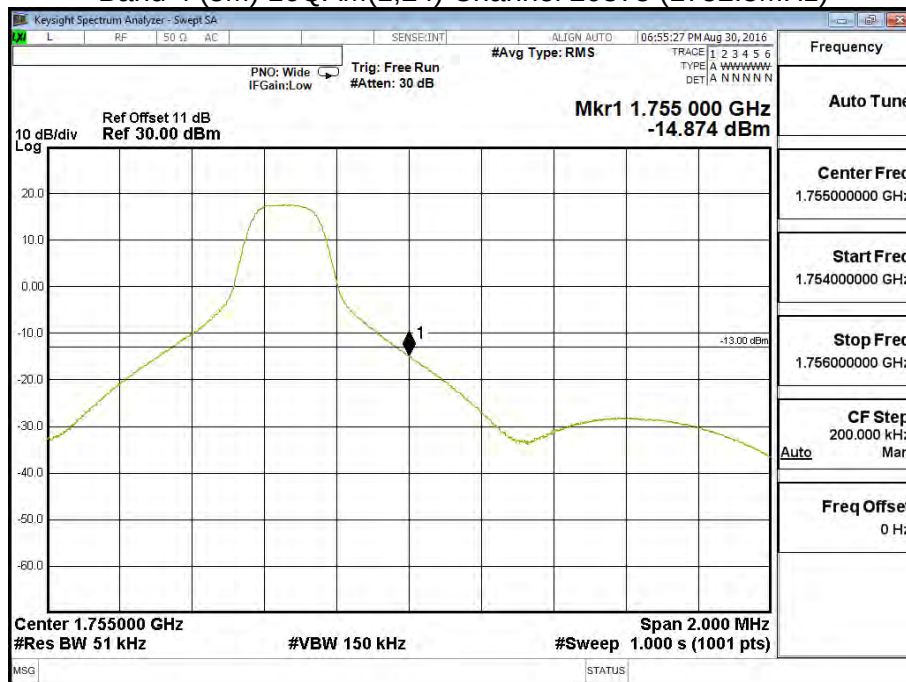
Band 4 (5M) QPSK(25,0) Channel 20375 (1752.5MHz)



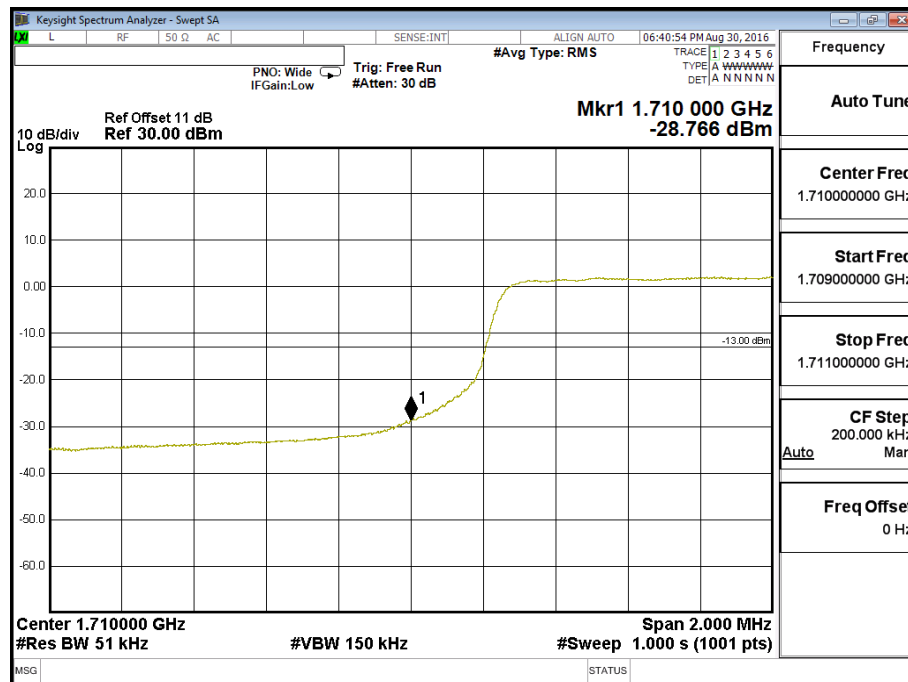
Band 4 (5M) 16QAM(1,0) Channel 19975 (1712.5MHz)



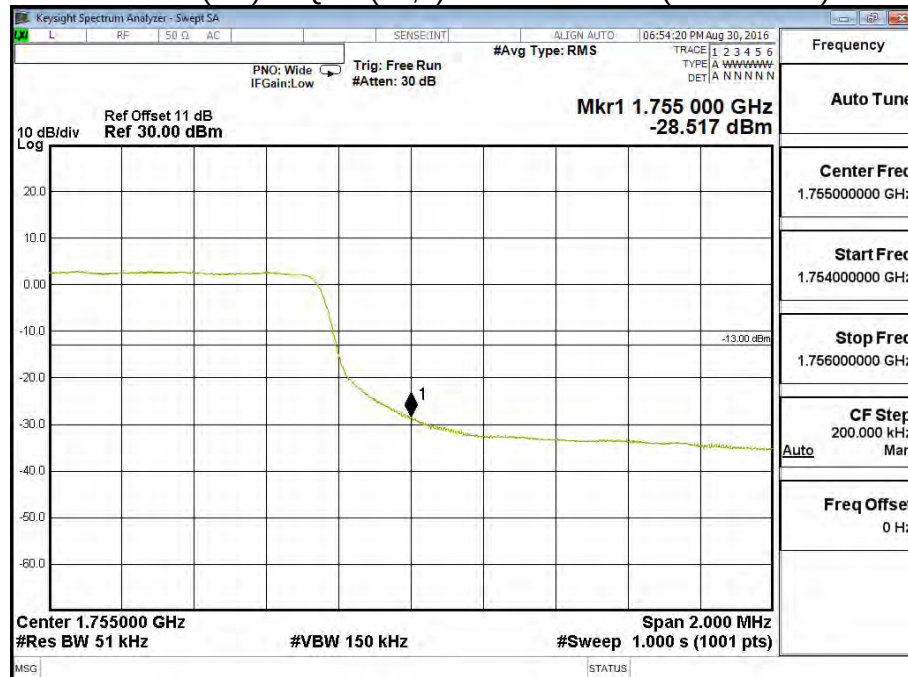
Band 4 (5M) 16QAM(1,24) Channel 20375 (1752.5MHz)



Band 4 (5M) 16QAM(25,0) Channel 19975 (1712.5MHz)

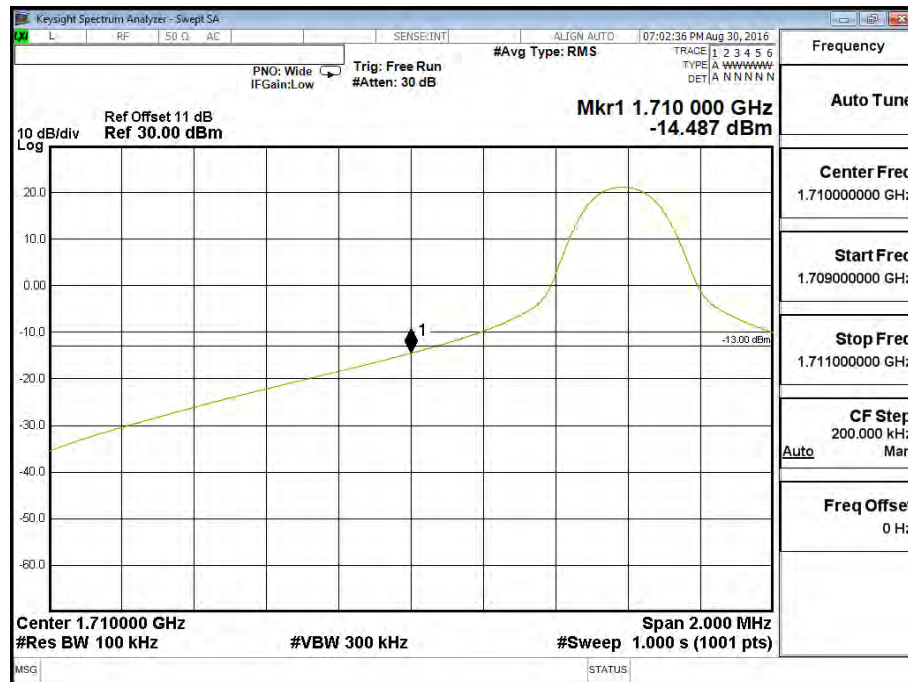


Band 4 (5M) 16QAM(25,0) Channel 20375 (1752.5MHz)

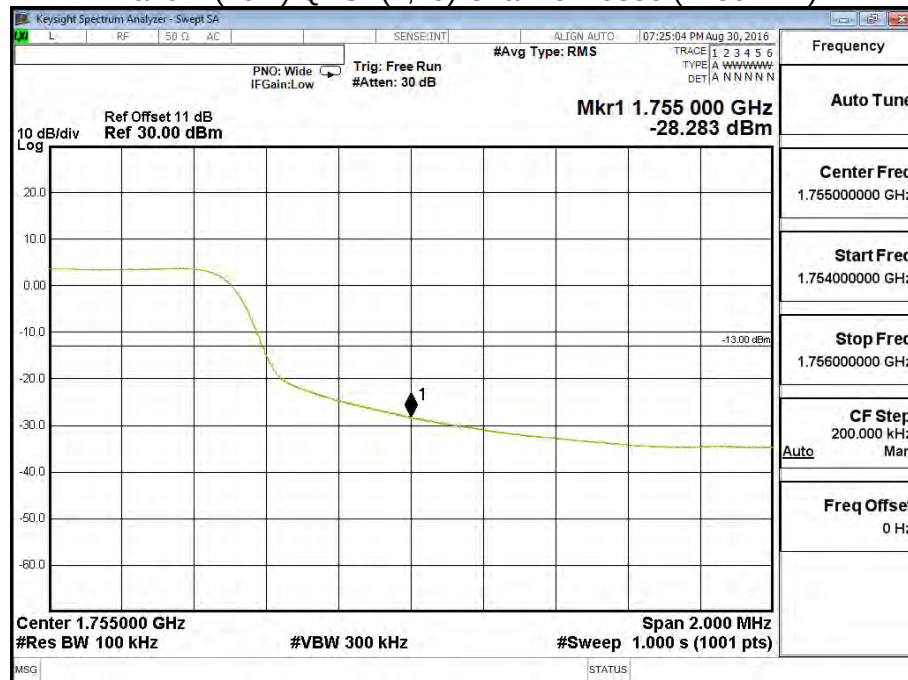


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 4 (10M))		

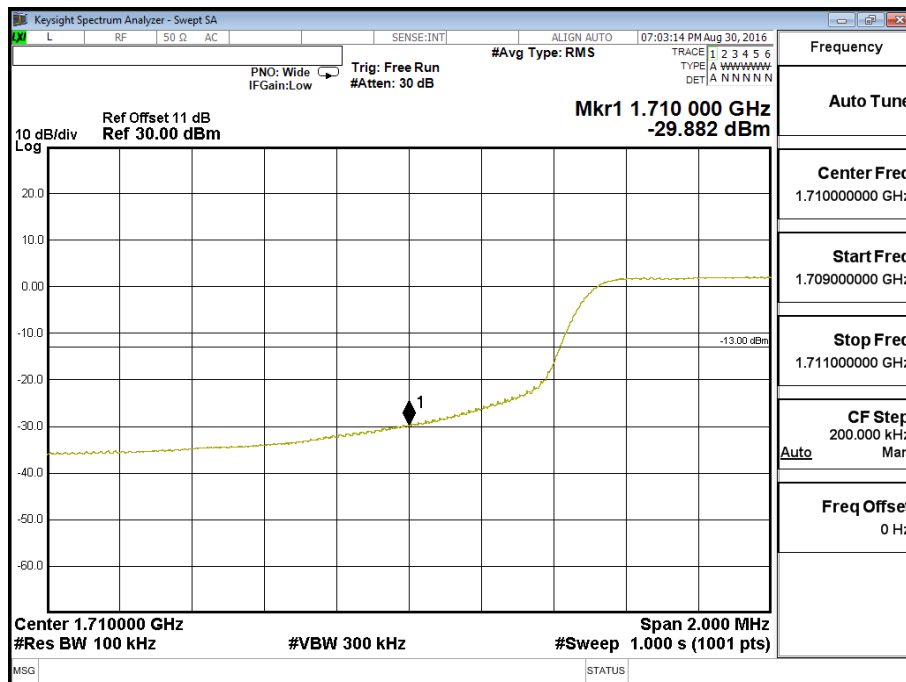
Band 4 (10M) QPSK(1,0) Channel 20000 (1715MHz)



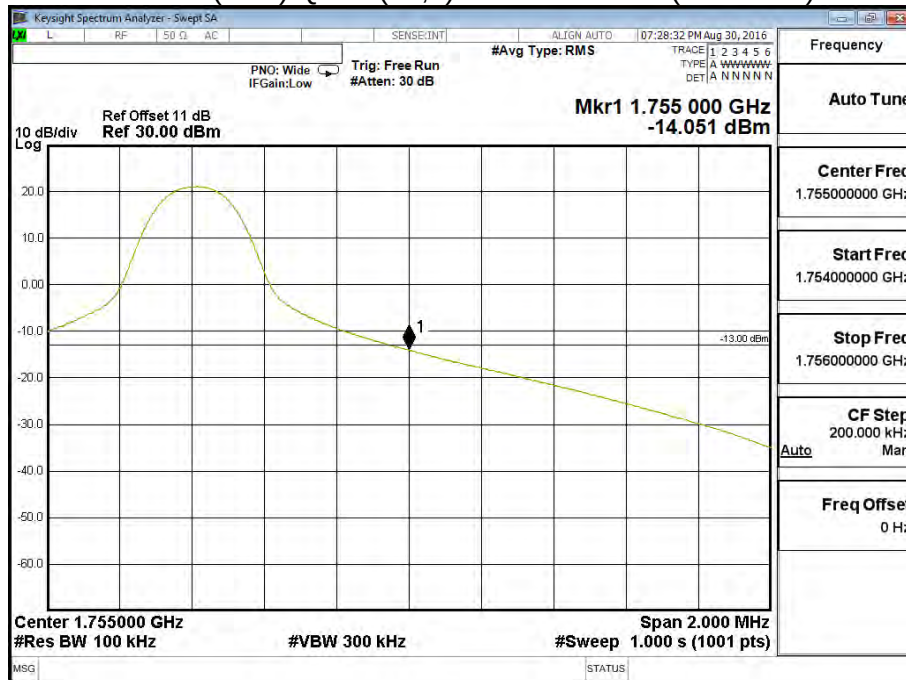
Band 4 (10M) QPSK(1,49) Channel 20350 (1750MHz)



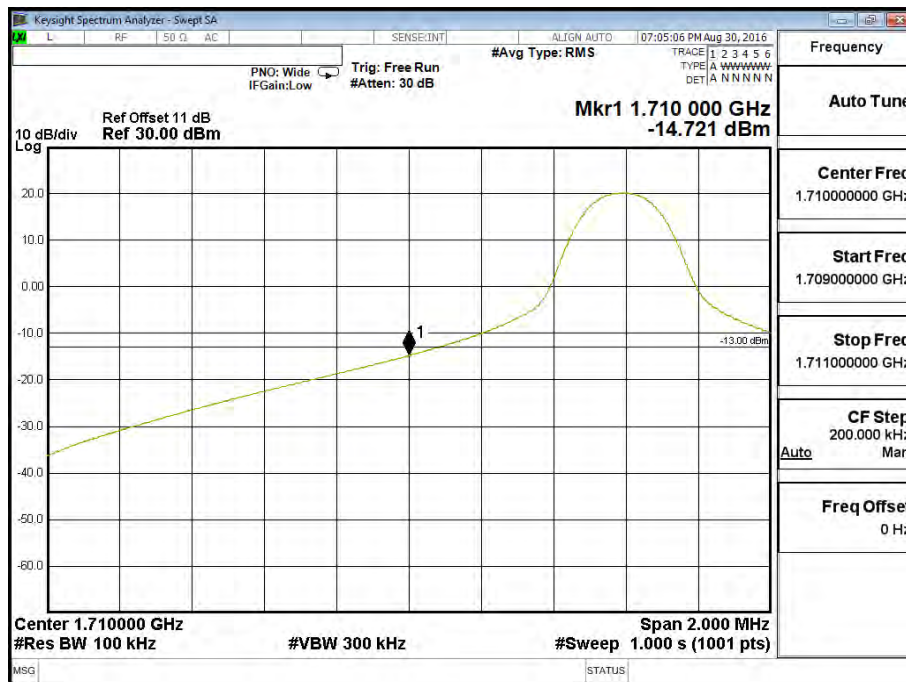
Band 4 (10M) QPSK(50,0) Channel 20000 (1715MHz)



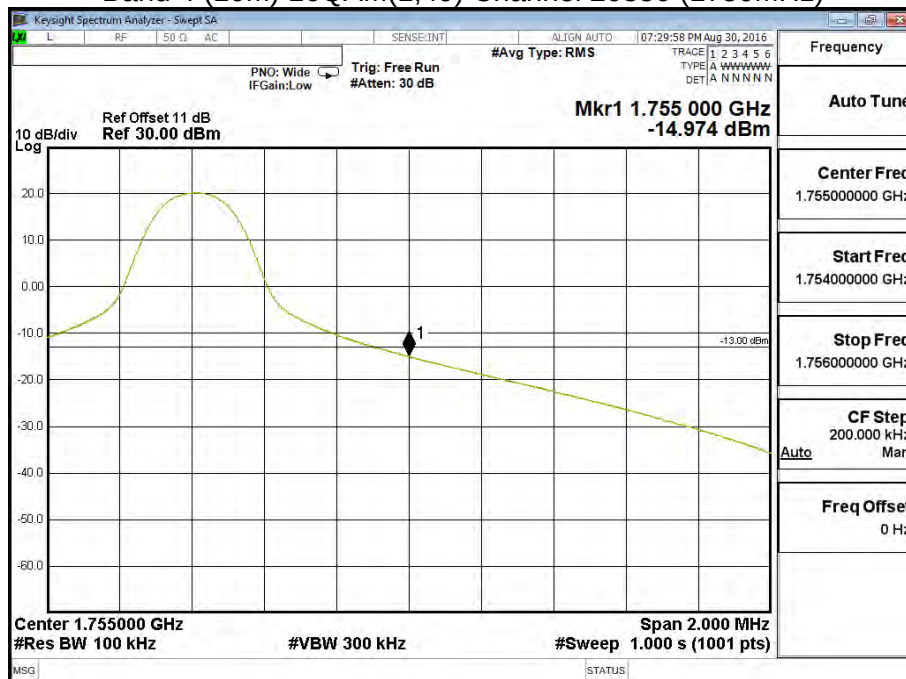
Band 4 (10M) QPSK(50,0) Channel 20350 (1750MHz)



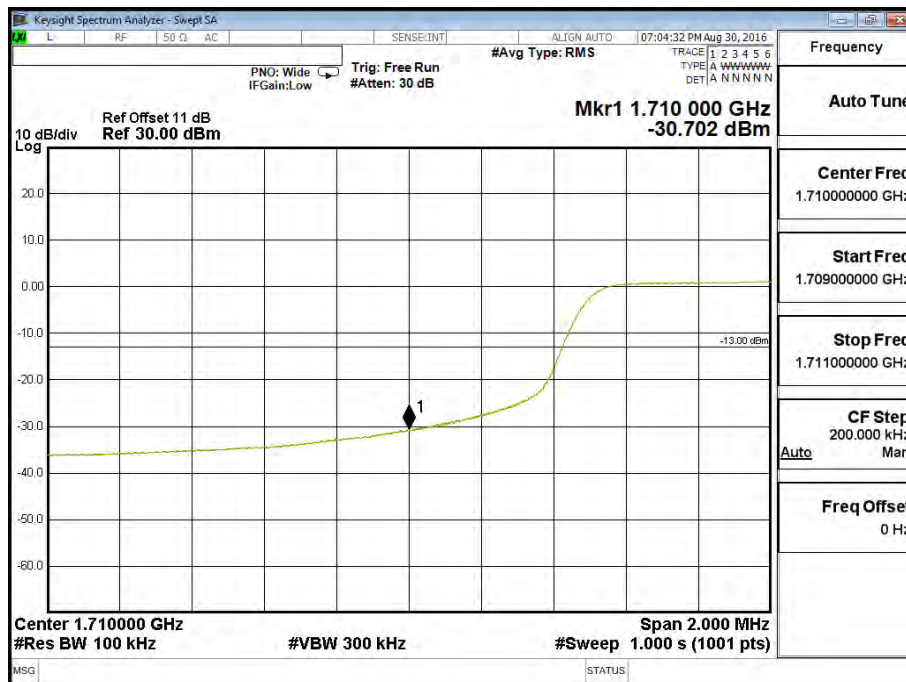
Band 4 (10M) 16QAM(1,49) Channel 20000 (1715MHz)



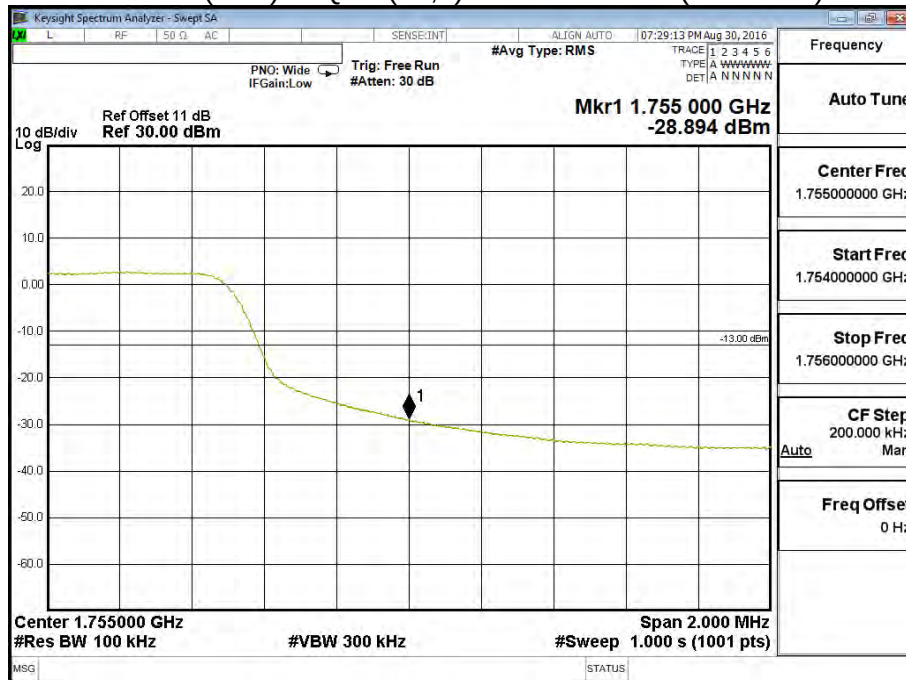
Band 4 (10M) 16QAM(1,49) Channel 20350 (1750MHz)



Band 4 (10M) 16QAM(50,0) Channel 20000 (1715MHz)

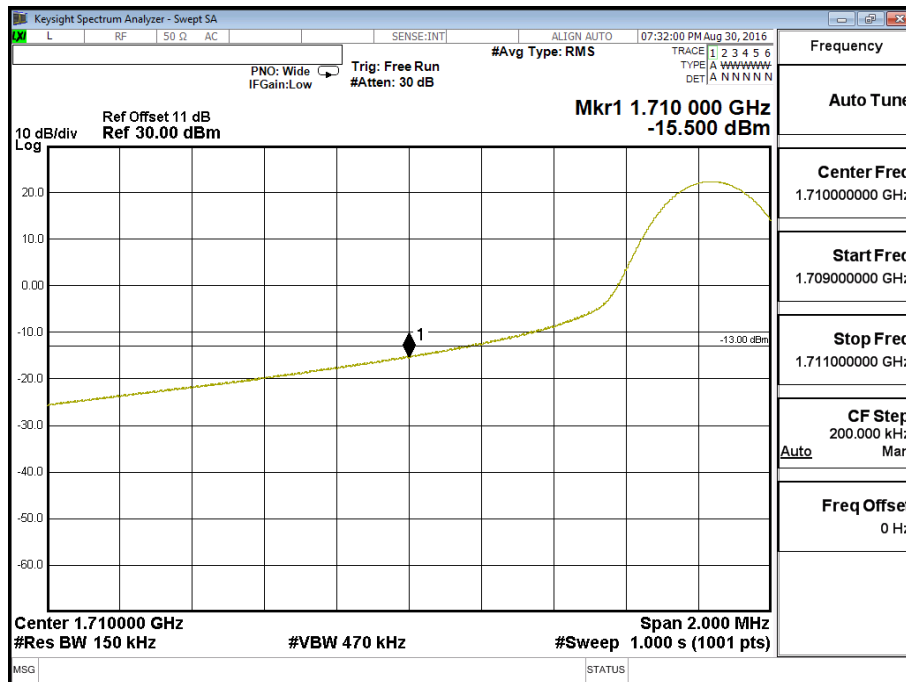


Band 4 (10M) 16QAM(50,0) Channel 20350 (1750MHz)

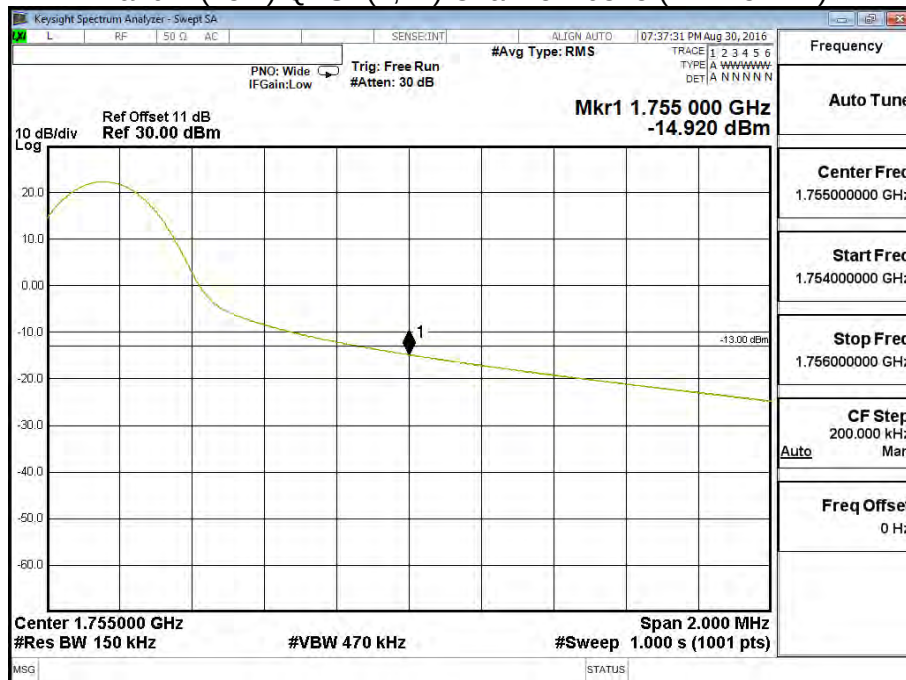


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 4 (15M))		

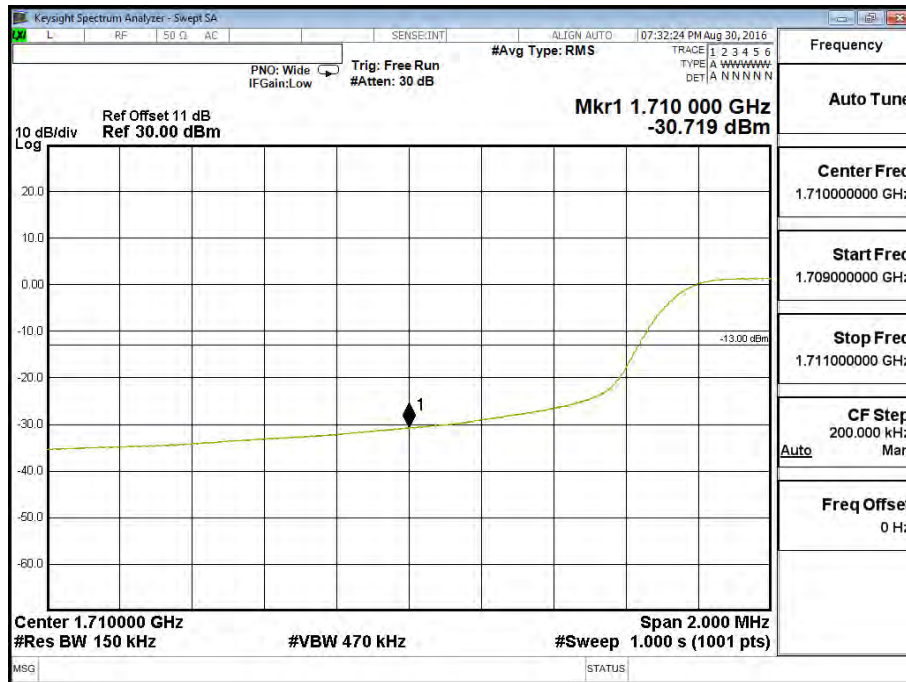
Band 4 (15M)QPSK(1,0) Channel 20025 (1717.5MHz)



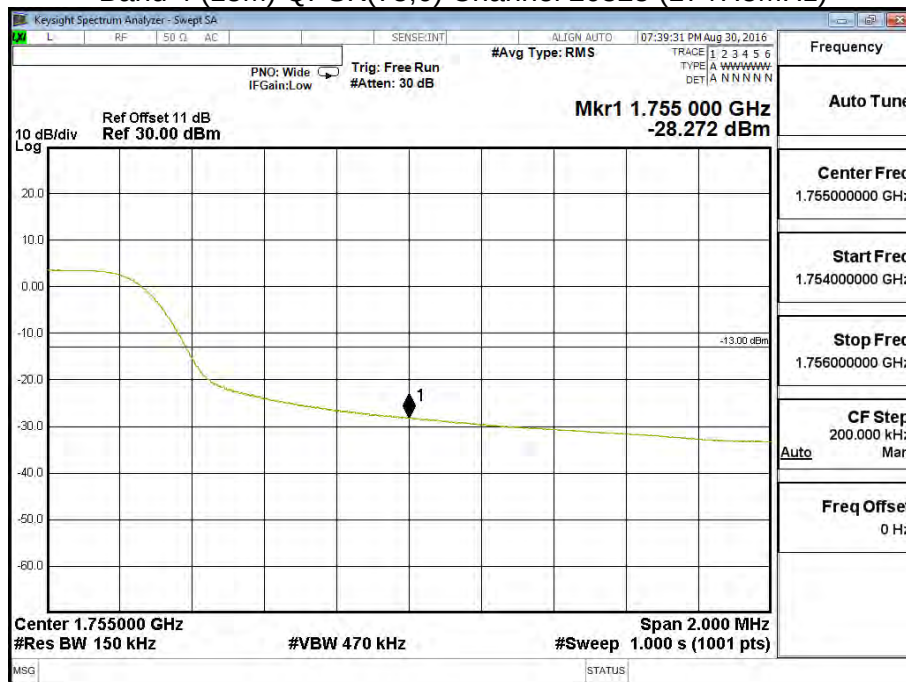
Band 4 (15M) QPSK(1,74) Channel 20325 (1747.5MHz)



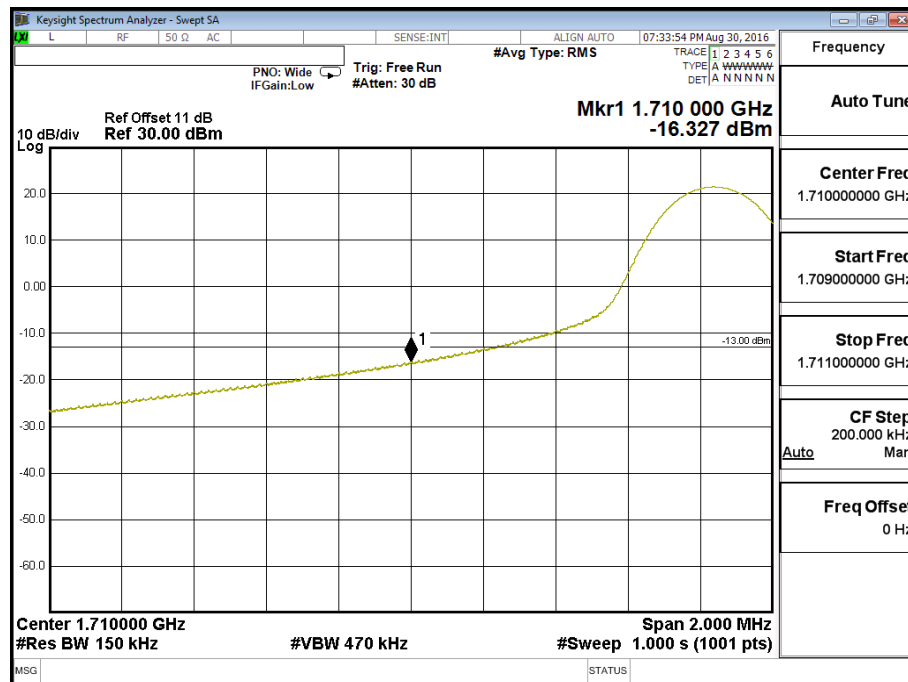
Band 4 (15M) QPSK(75,0) Channel 20025 (1717.5MHz)



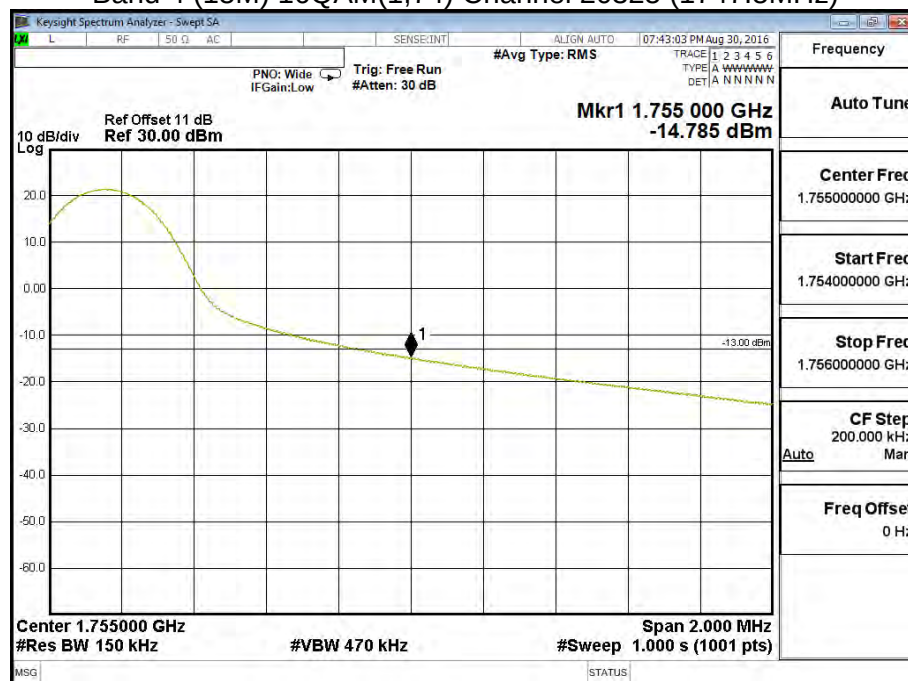
Band 4 (15M) QPSK(75,0) Channel 20325 (1747.5MHz)



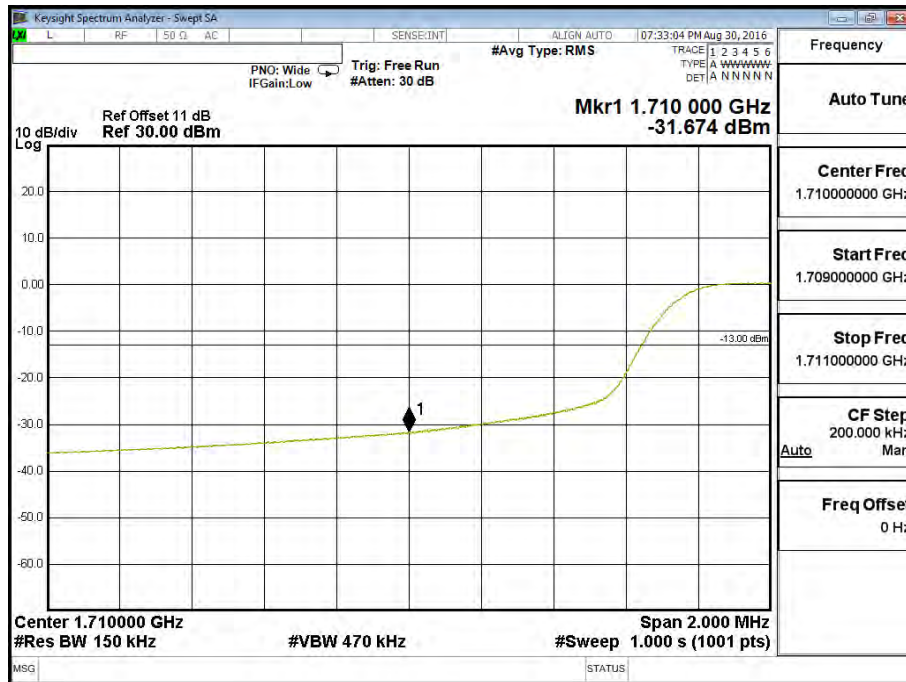
Band 4 (15M) 16QAM(1,0) Channel 20025 (1717.5MHz)



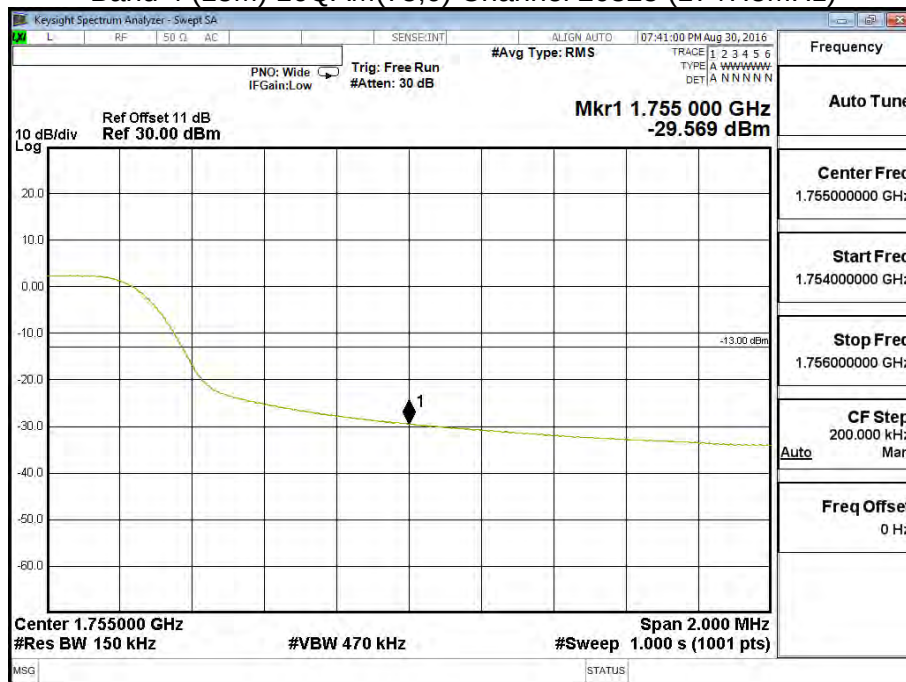
Band 4 (15M) 16QAM(1,74) Channel 20325 (1747.5MHz)



Band 4 (15M) 16QAM(75,0) Channel 20025 (1717.5MHz)

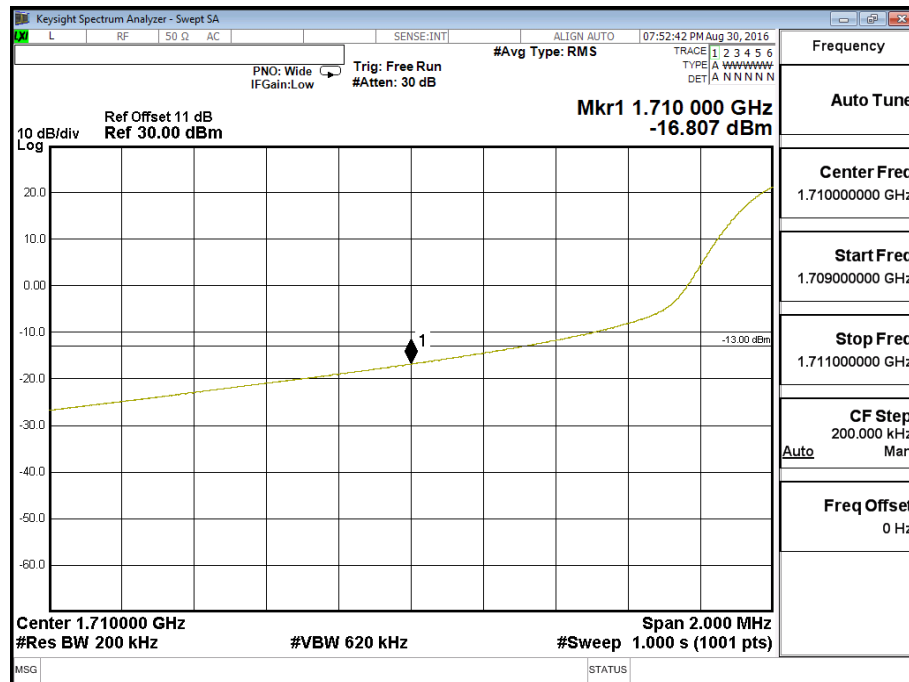


Band 4 (15M) 16QAM(75,0) Channel 20325 (1747.5MHz)

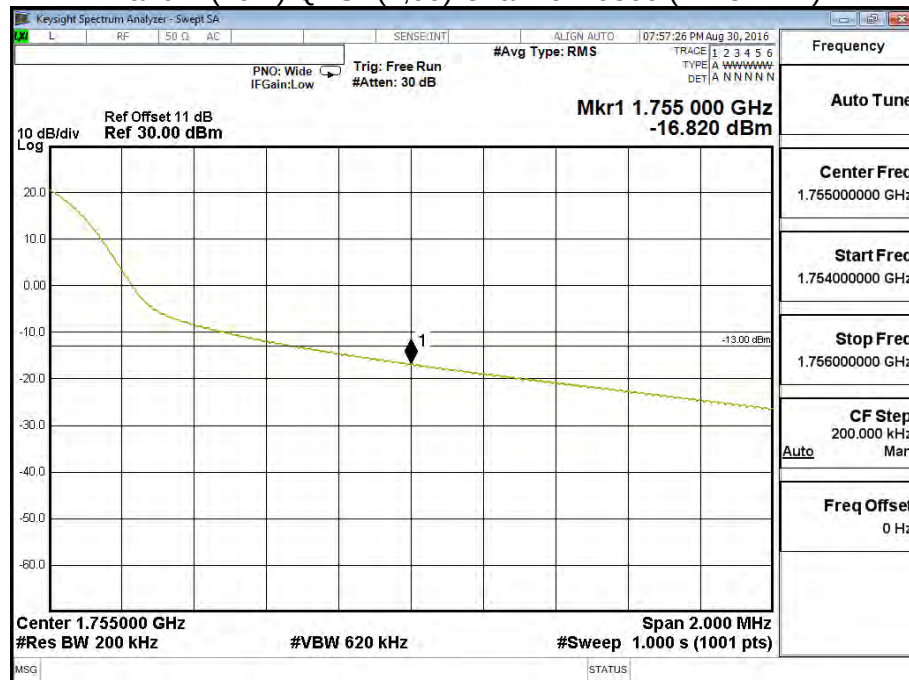


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 4 (20M))		

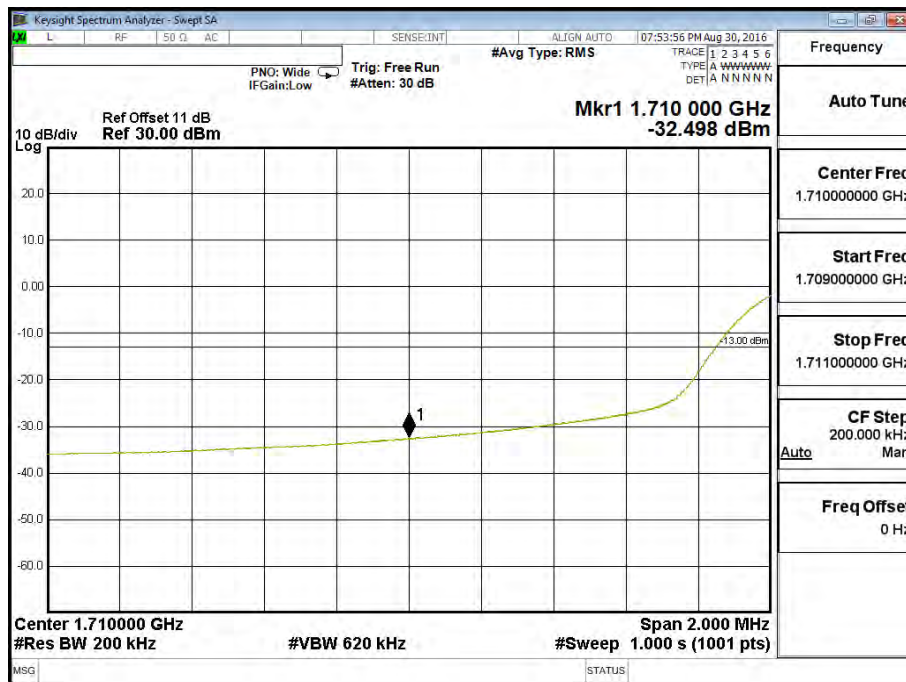
Band 4 (20M) QPSK(1,0) Channel 20050 (1720MHz)



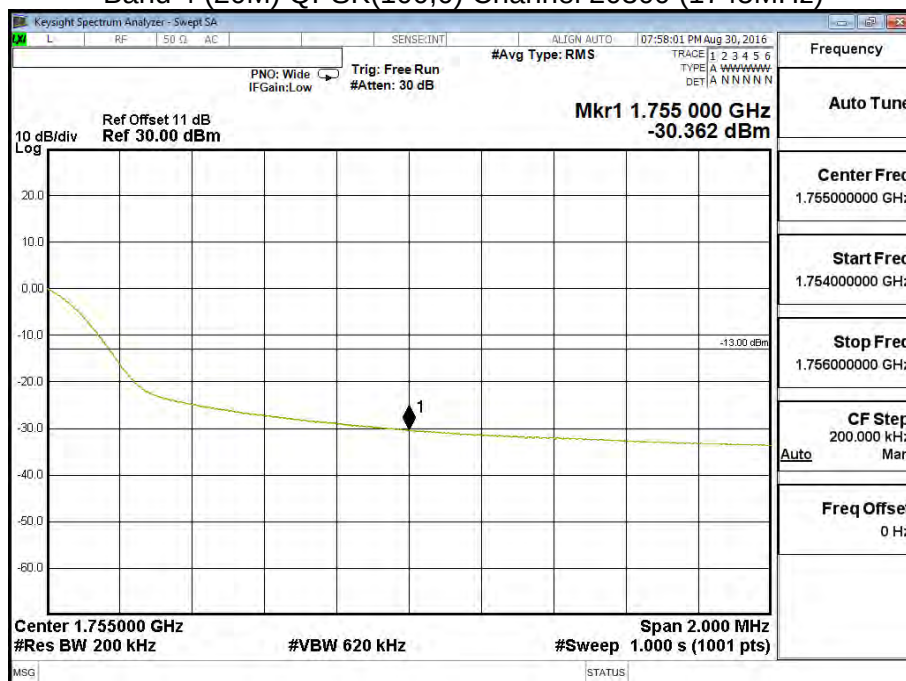
Band 4 (20M) QPSK(1,99) Channel 20300 (1745 MHz)



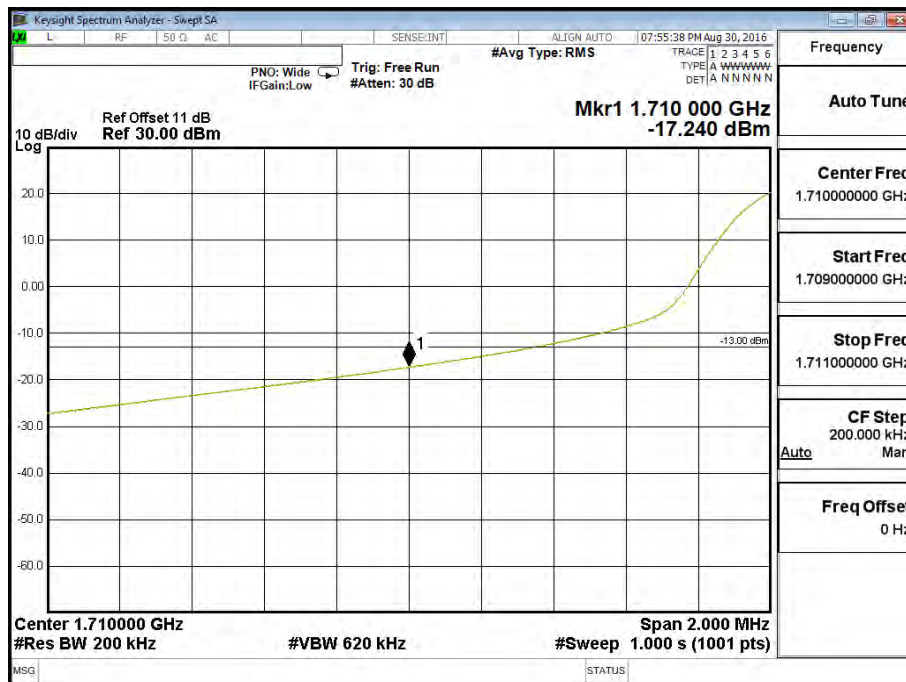
Band 4 (20M) QPSK(100,0) Channel 20050 (1720MHz)



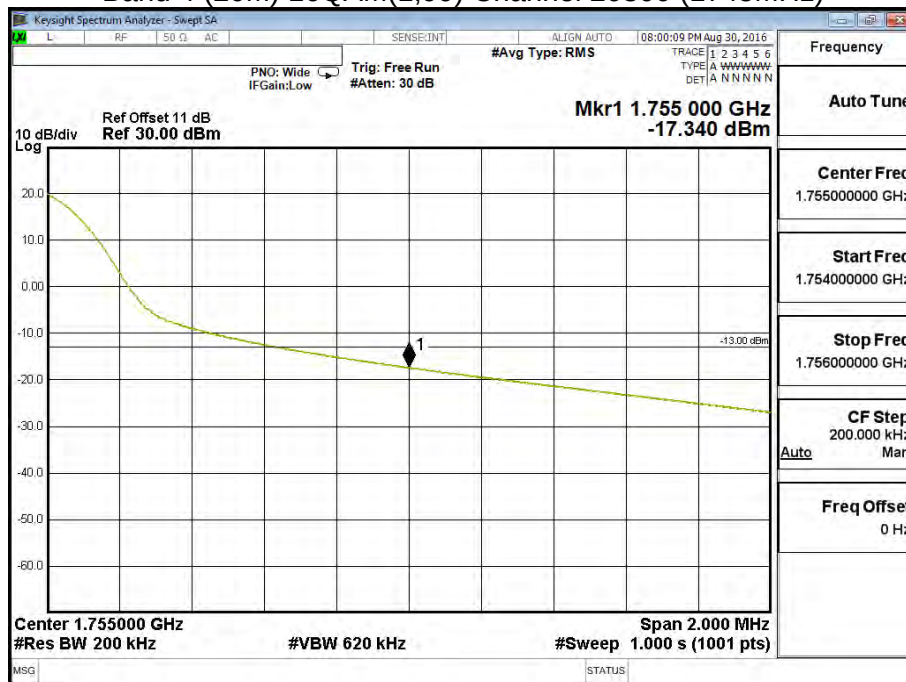
Band 4 (20M) QPSK(100,0) Channel 20300 (1745MHz)



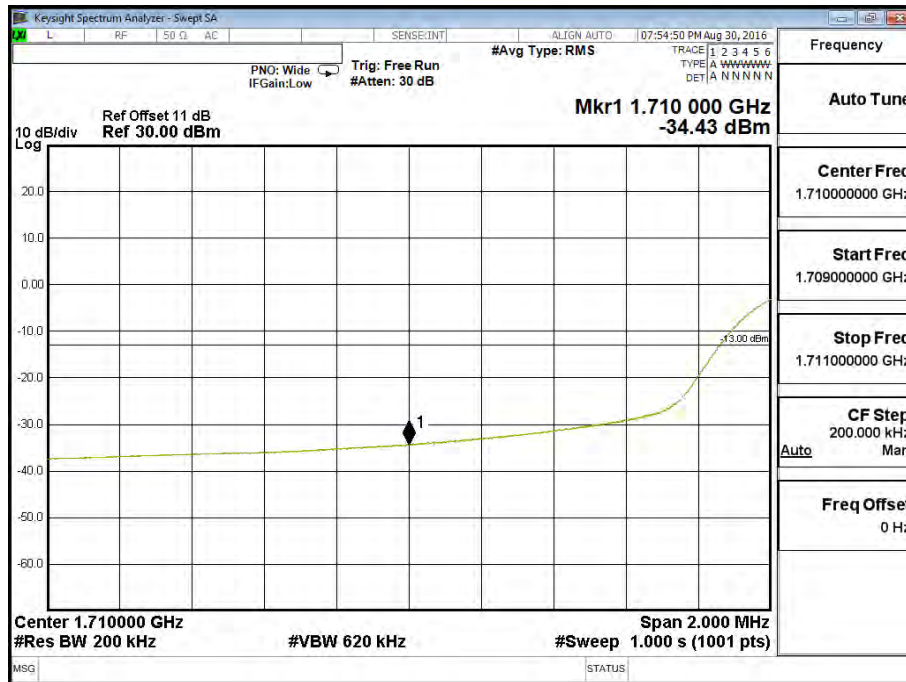
Band 4 (20M) 16QAM(1,0) Channel 20050 (1720MHz)



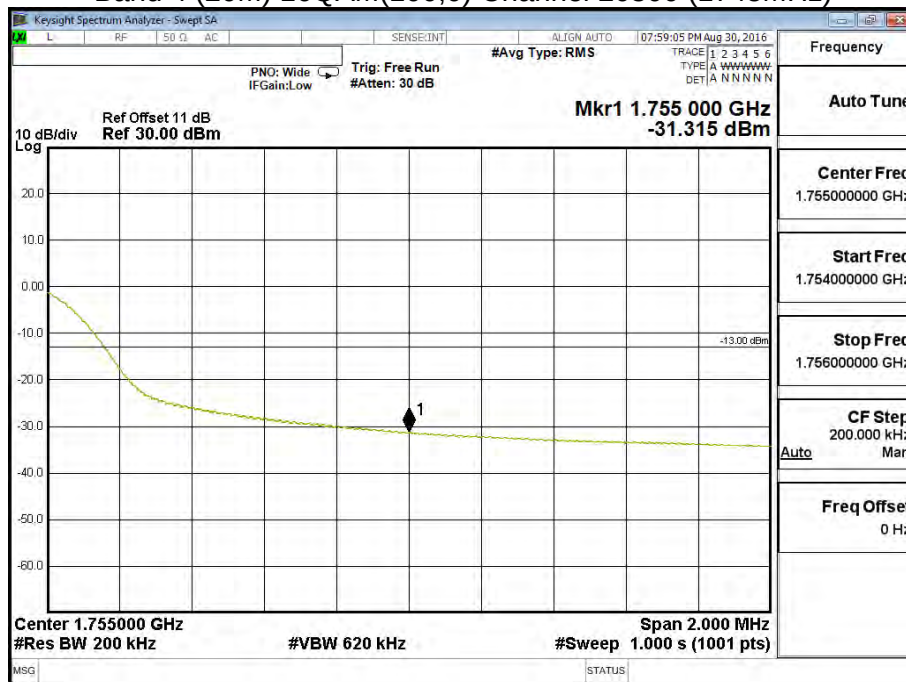
Band 4 (20M) 16QAM(1,99) Channel 20300 (1745MHz)



Band 4 (20M) 16QAM(100,0) Channel 20050 (1720MHz)

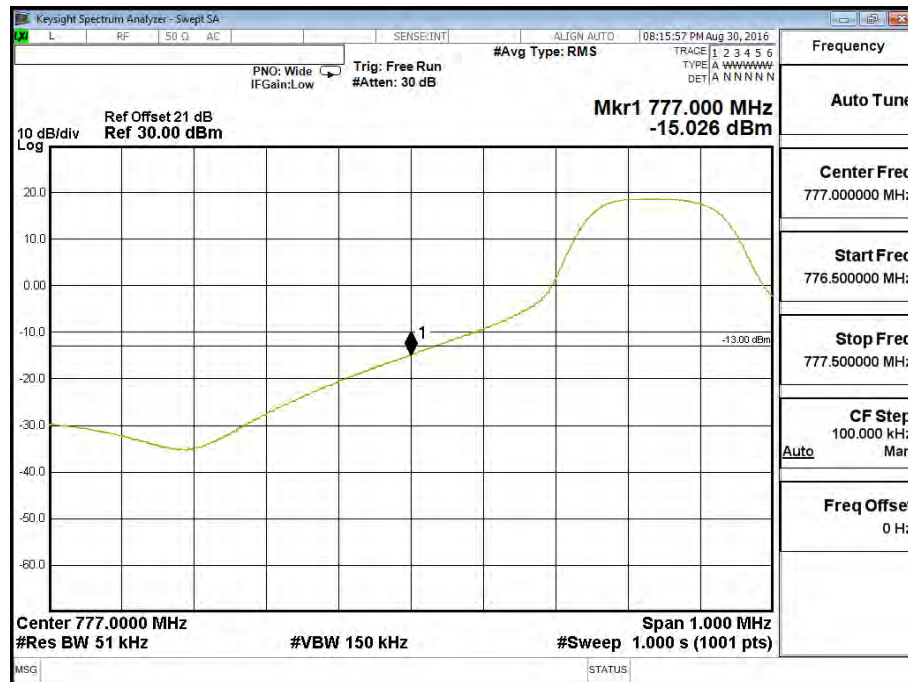


Band 4 (20M) 16QAM(100,0) Channel 20300 (1745MHz)

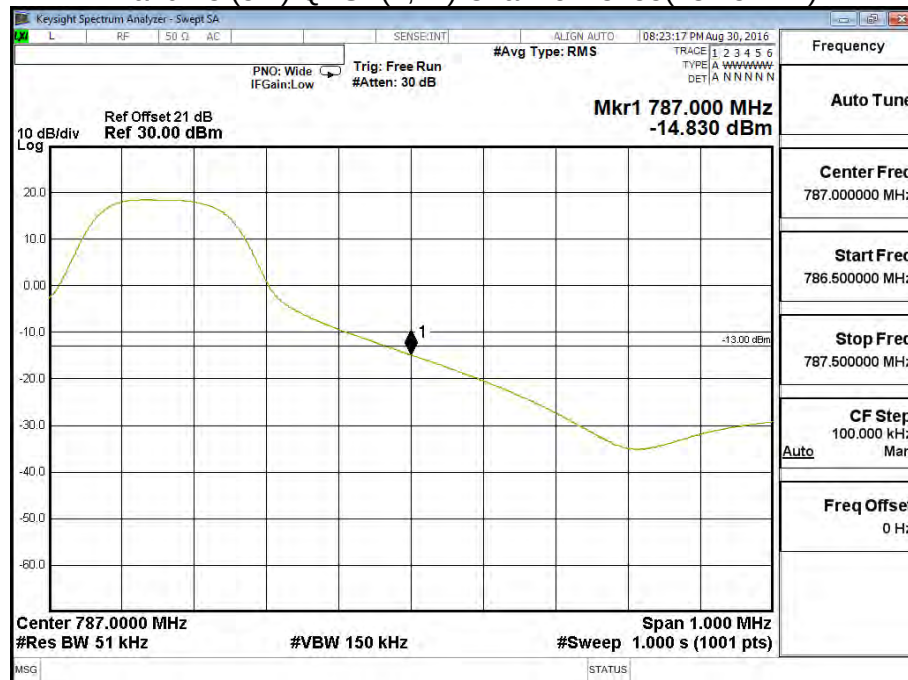


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 13 (5M))		

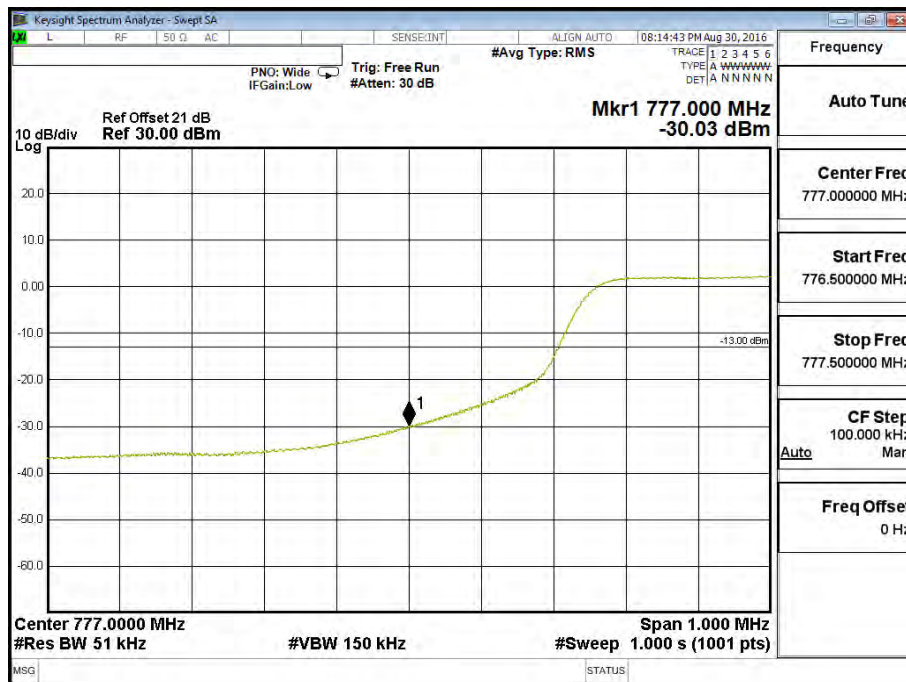
Band 13 (5M) QPSK(1,0) Channel 23205 (779.5MHz)



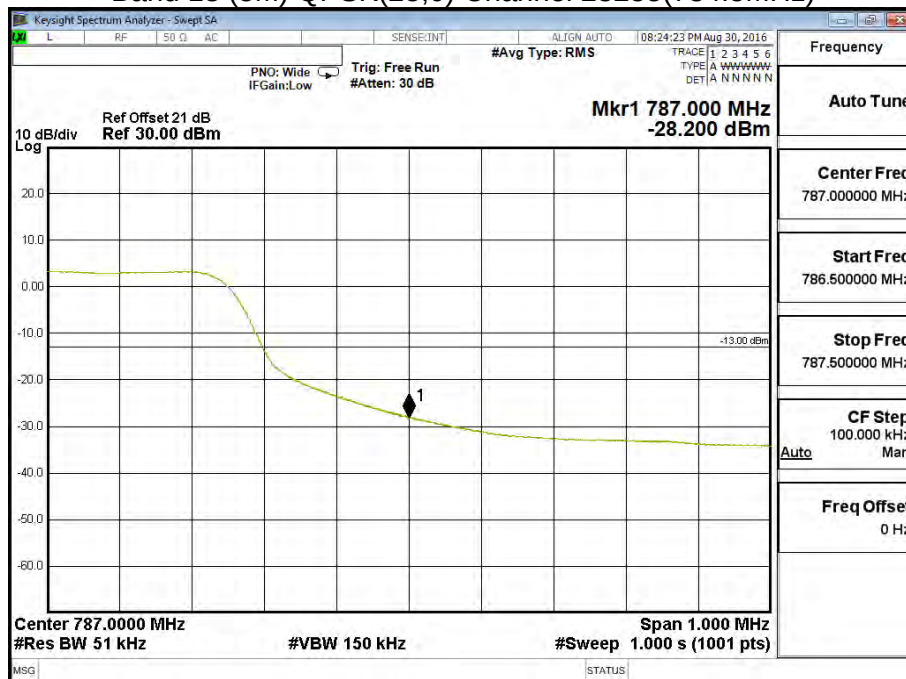
Band 13 (5M) QPSK(1,24) Channel 23255(784.5MHz)



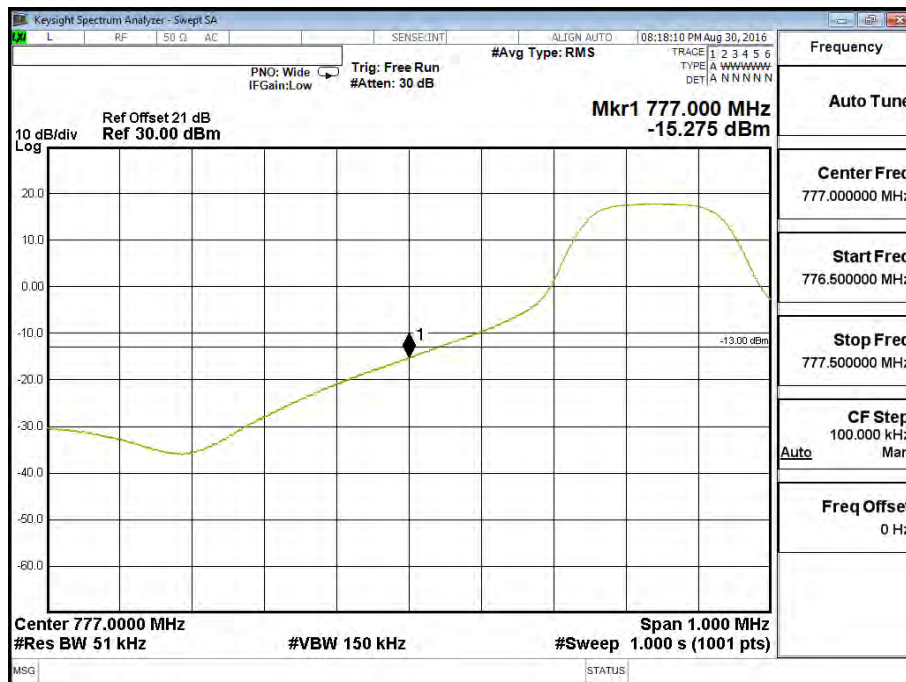
Band 13 (5M) QPSK(25,0) Channel 23205 (779.5MHz)



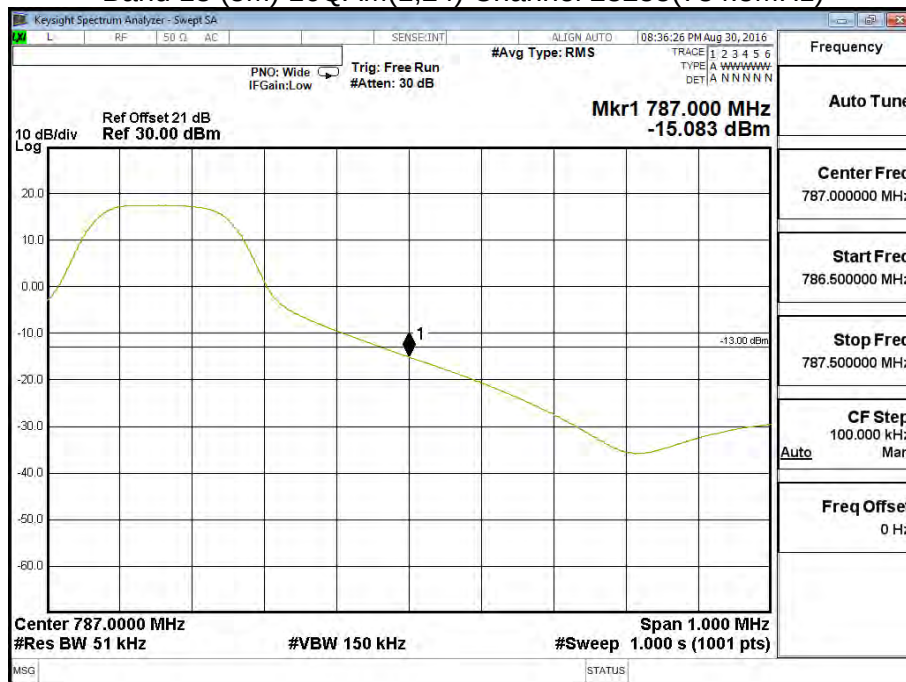
Band 13 (5M) QPSK(25,0) Channel 23255(784.5MHz)



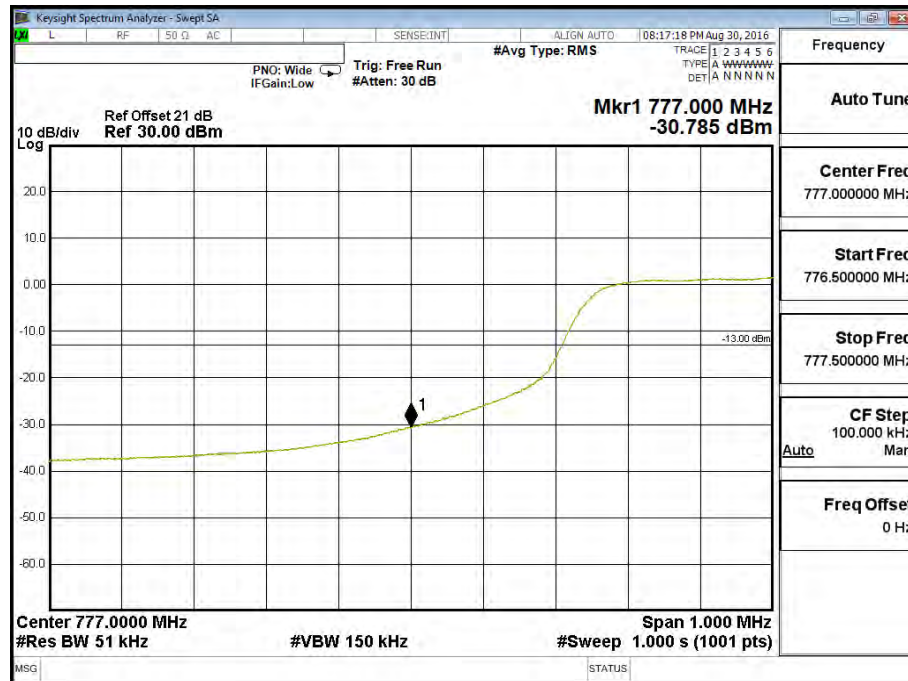
Band 13 (5M) 16QAM(1,0) Channel 23205 (779.5MHz)



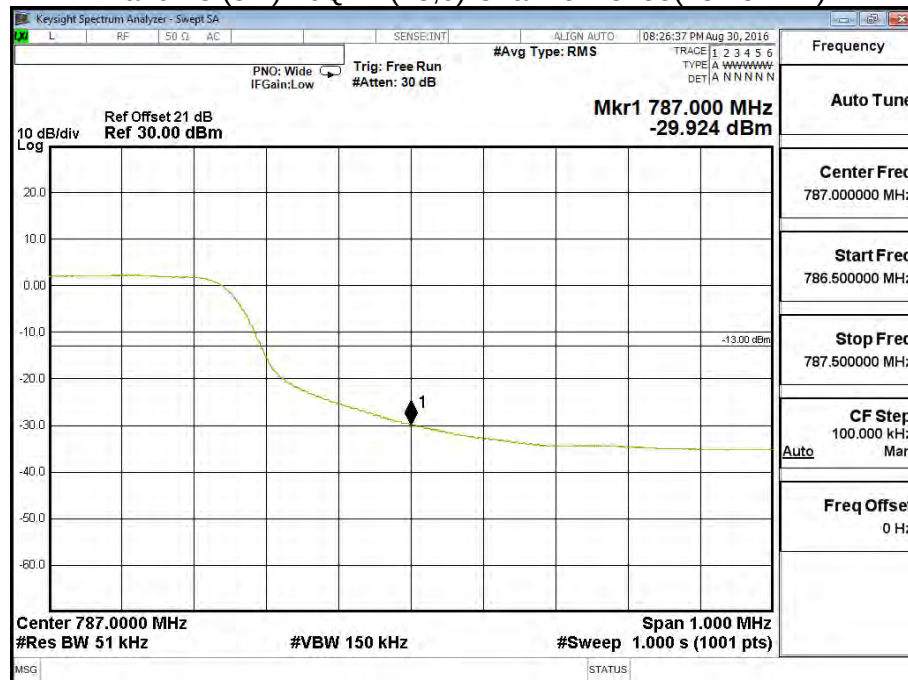
Band 13 (5M) 16QAM(1,24) Channel 23255(784.5MHz)



Band 13 (5M) 16QAM(25,0) Channel 23205 (779.5MHz)

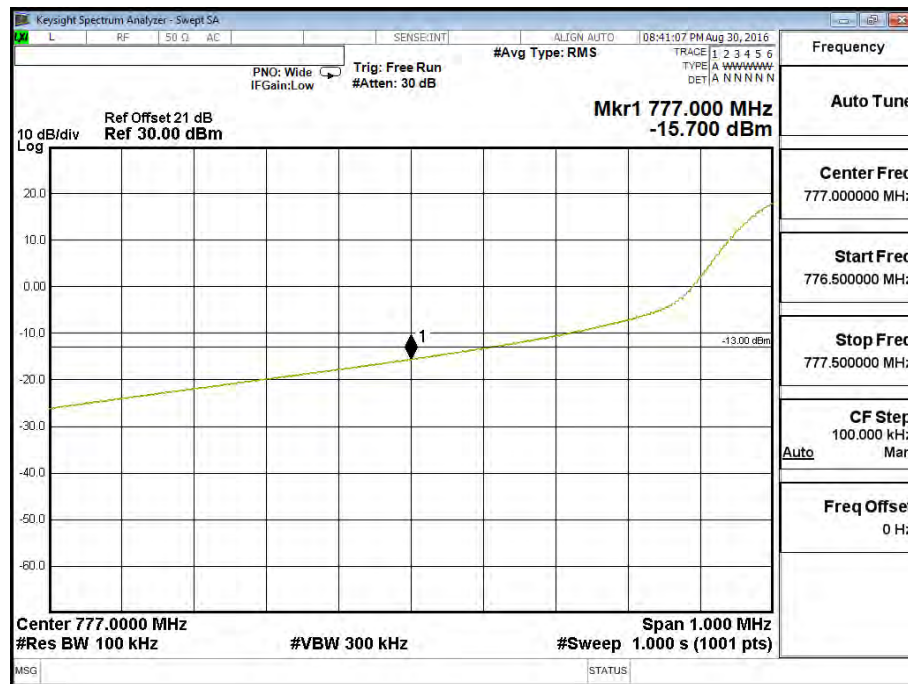


Band 13 (5M) 16QAM(25,0) Channel 23255(784.5MHz)

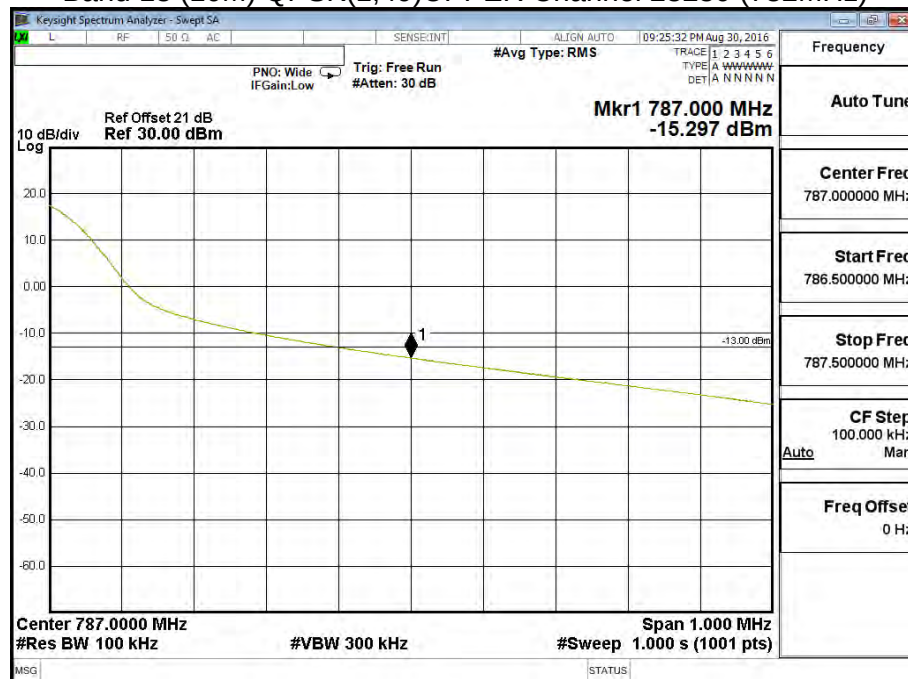


Product	Module		
Test Mode	Spurious Emission At Antenna Terminals (+/-1MHz)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	Block Edge Test (Band 13 (10M))		

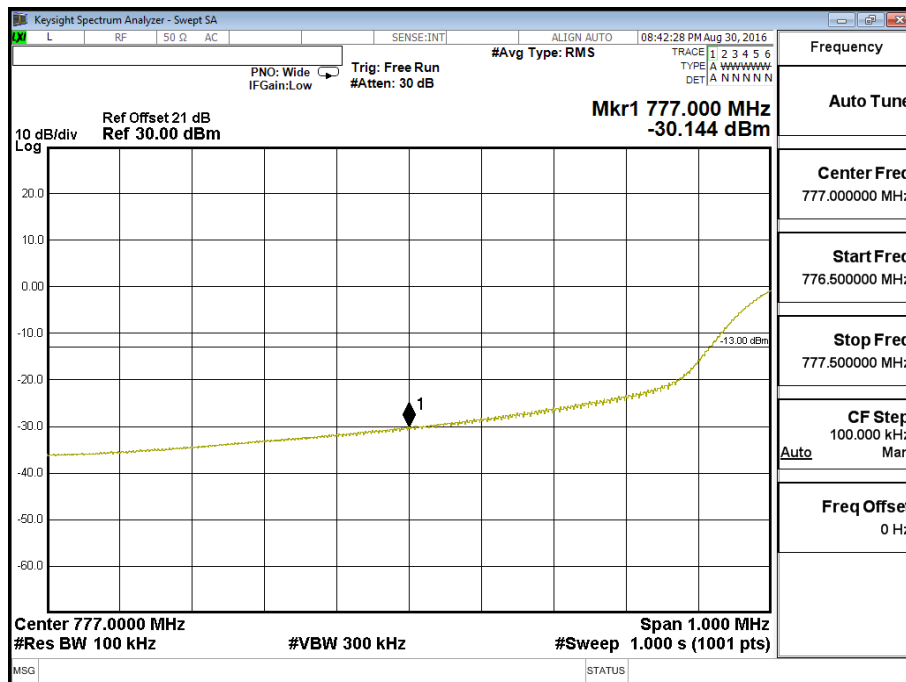
Band 13 (10M) QPSK(1,0)LOWER Channel 23230 (782MHz)



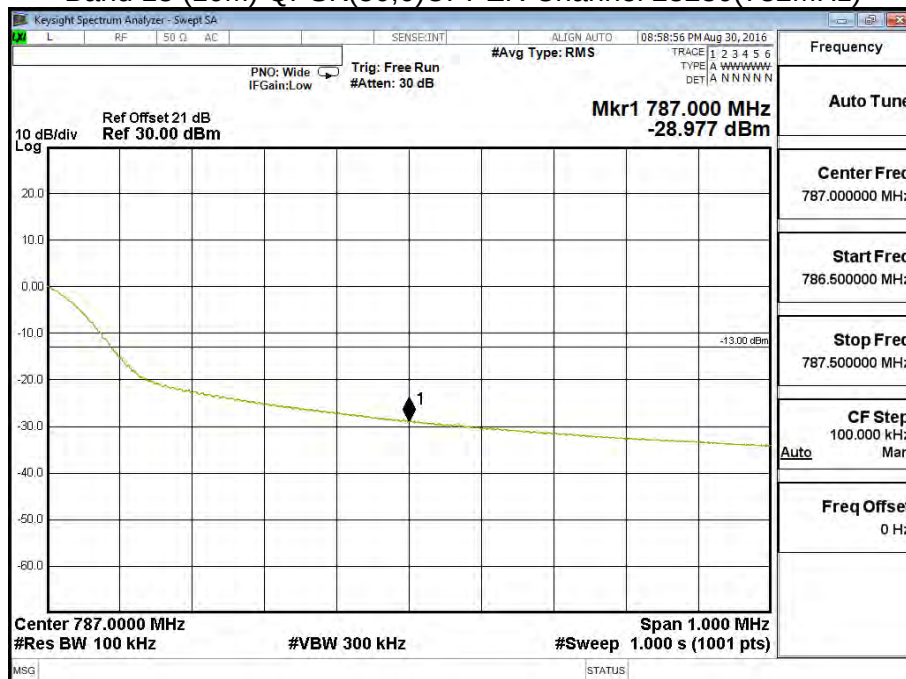
Band 13 (10M) QPSK(1,49)UPPER Channel 23230 (782MHz)



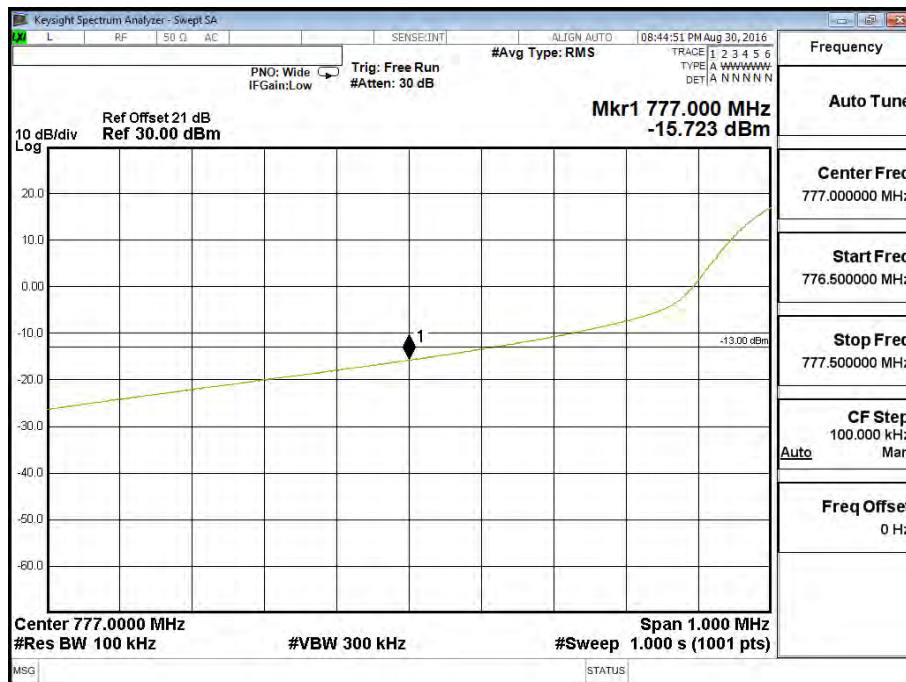
Band 13 (10M) QPSK(50,0) LOWER Channel 23230 (782MHz)



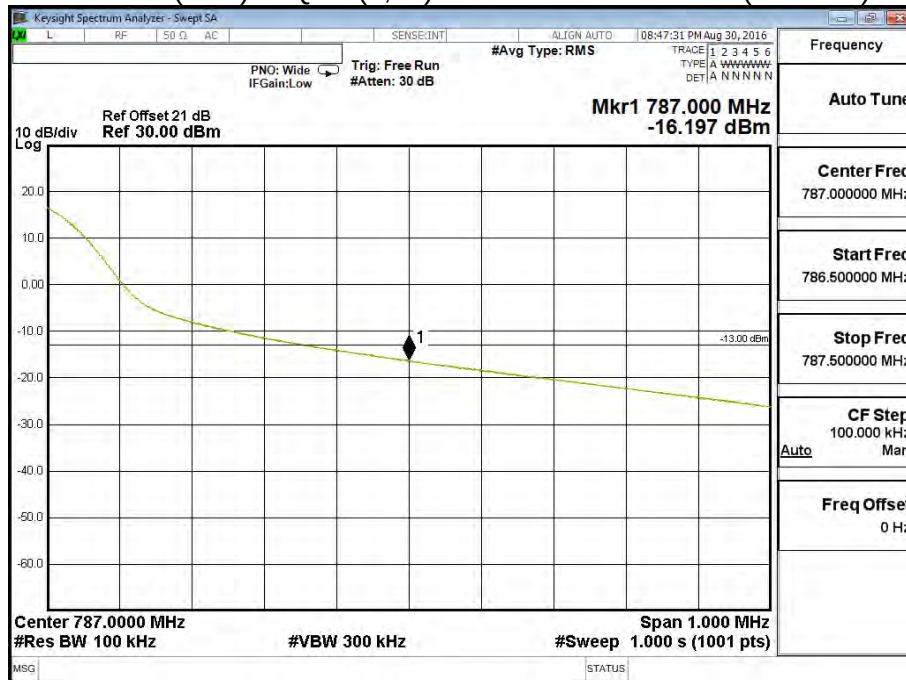
Band 13 (10M) QPSK(50,0)UPPER Channel 23230(782MHz)



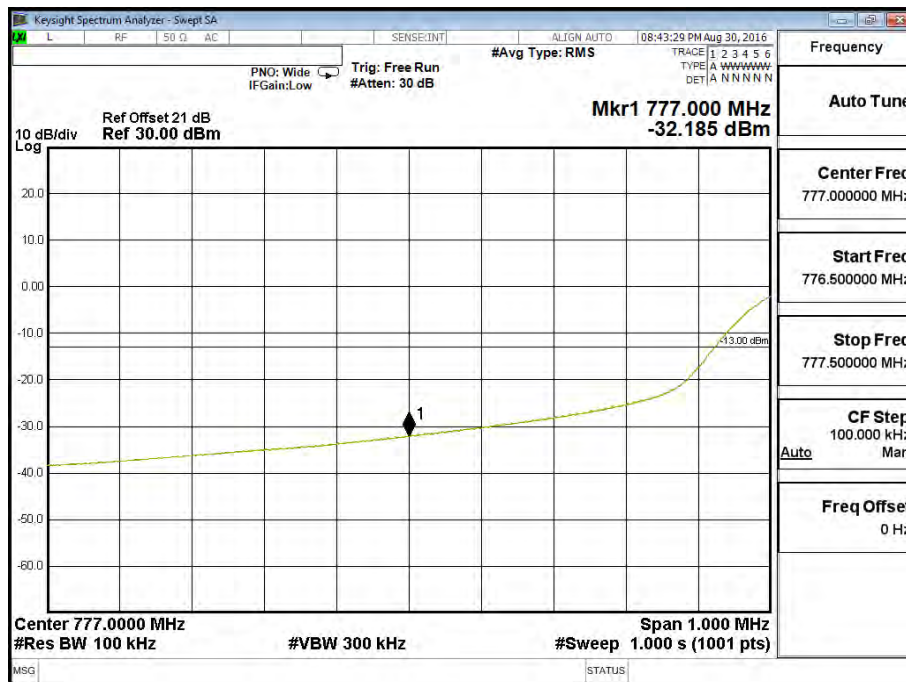
Band 13 (10M) 16QAM(1,0) LOWER Channel 23230 (782MHz)



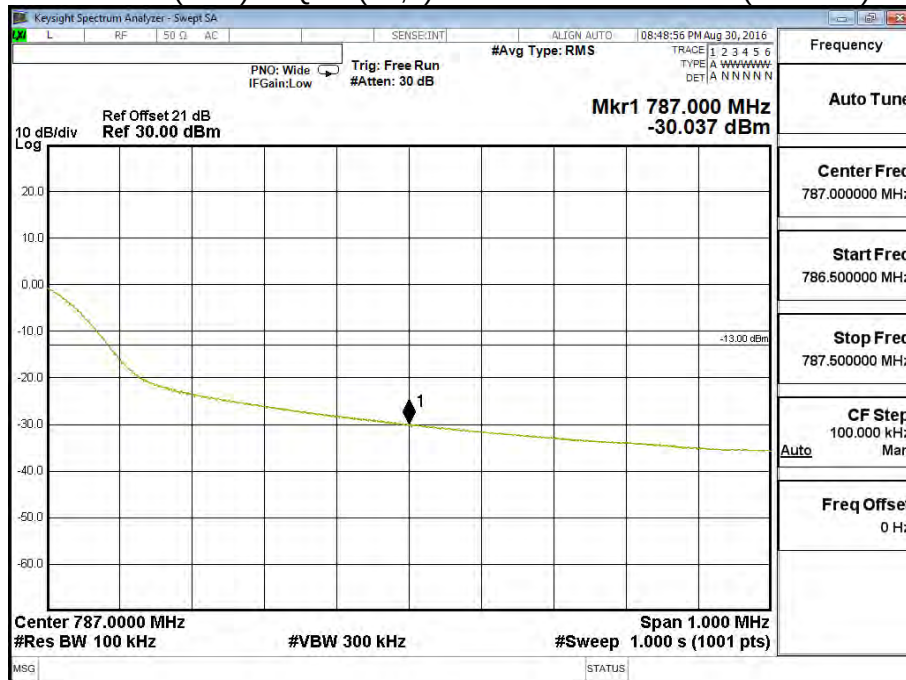
Band 13 (10M) 16QAM(1,49)UPPER Channel 23230(782MHz)



Band 13 (10M) 16QAM(50,0) LOWER Channel 23230 (782MHz)



Band 13 (10M) 16QAM(50,0)UPPER Channel 23230(782MHz)



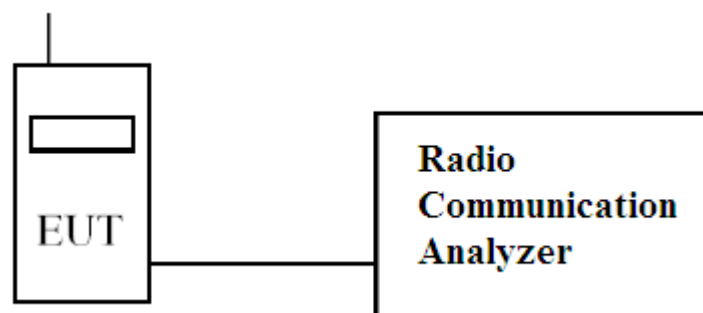
6. Spurious Emission

6.1. Test Specification

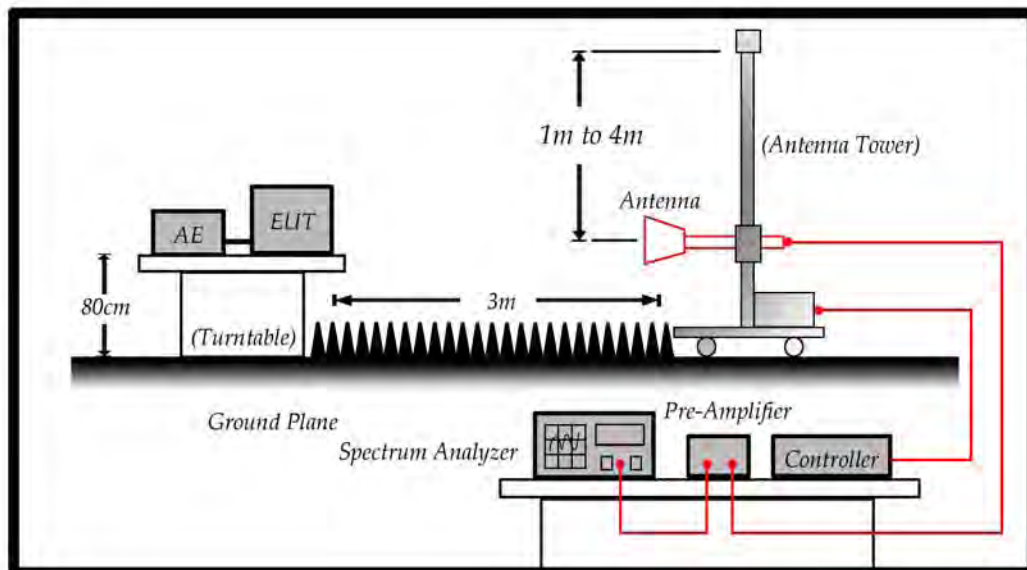
According to Part 2.1051, 2.1053, 27.53.

6.2. Test Setup

5.2.1.1 Spurious emissions at antenna terminals.



5.2.1.2 Field strength of spurious radiation.



6.3. Limits

Limit	<-13dBm
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$43 + 10\log(P)$ down on the carrier where P is the power in Watts.

6.4. Test Procedure

In accordance with Part 2.1051, 2.1053, 27.53., 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 27.53. 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.

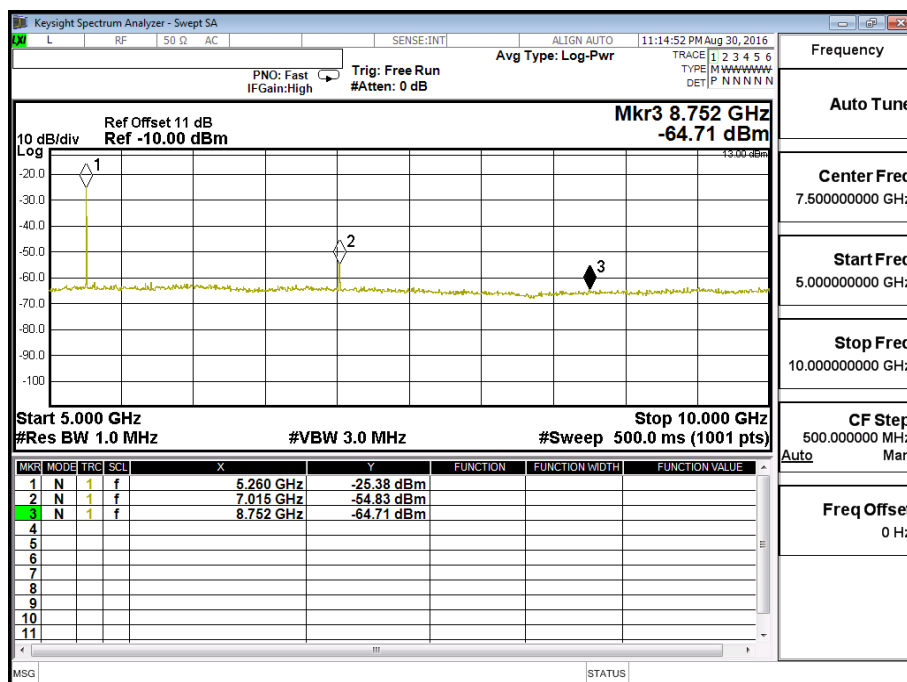
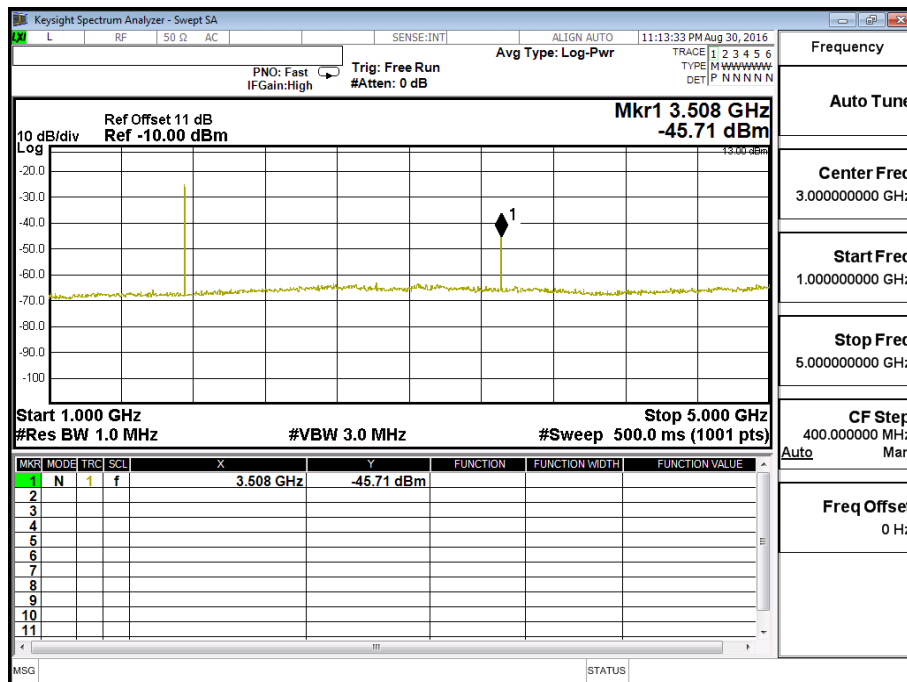
The EUT is placed on a turn table which is 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

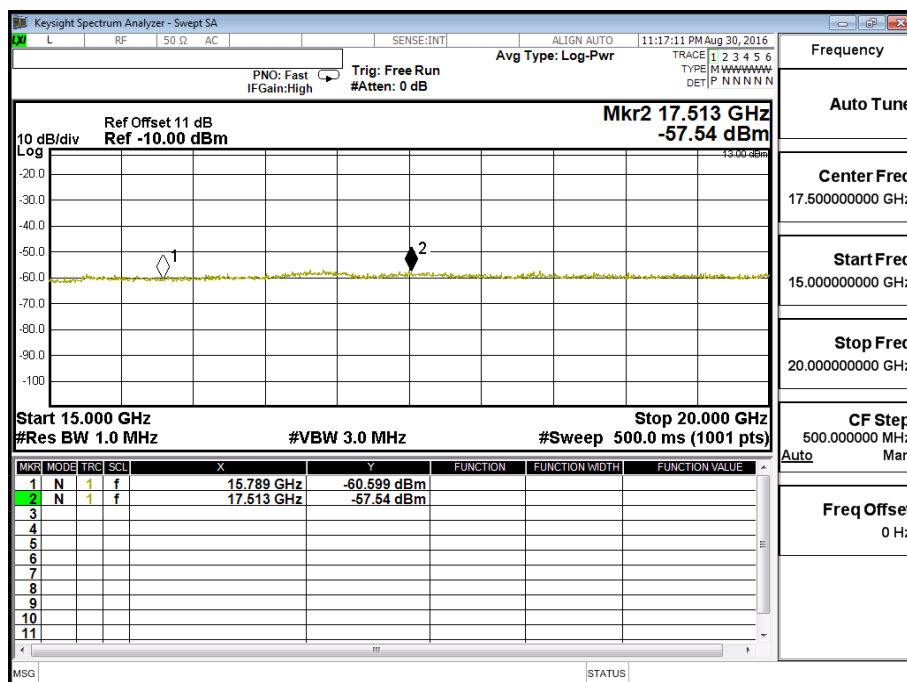
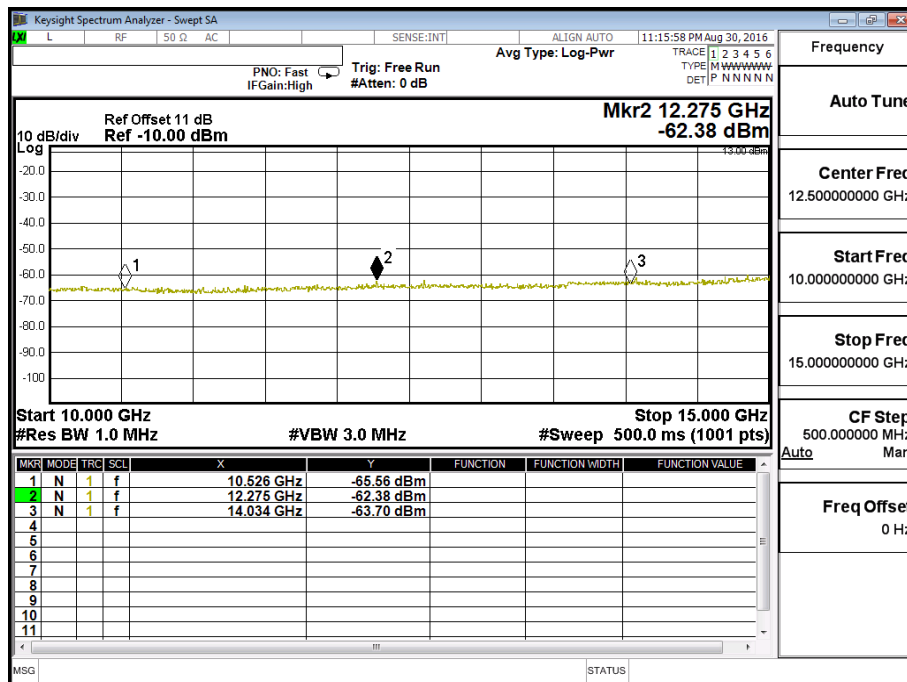
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

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-C on radiated measurement.

Product	Module		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	LTE-Band 4 (1.4M)	Test Range	30MHz~20GHz

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3508	-45.710	1.1	-44.610	-13
5260	-25.380	1.23	-24.150	-13
7015	-54.830	1.59	-53.240	-13
8752	-64.710	1.89	-62.820	-13
10525.8	-65.560	2.07	-63.490	-13
12275	-62.380	2.26	-60.120	-13
14034.4	-63.700	2.64	-61.060	-13
15788.7	-60.599	3.5	-57.099	-13
17513	-57.540	3.7	-53.840	-13

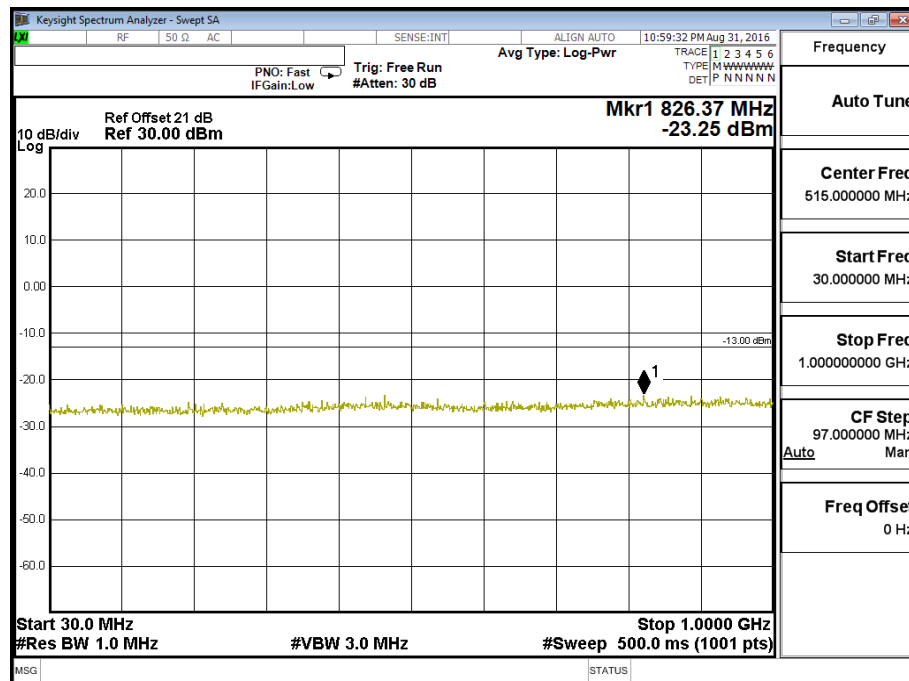


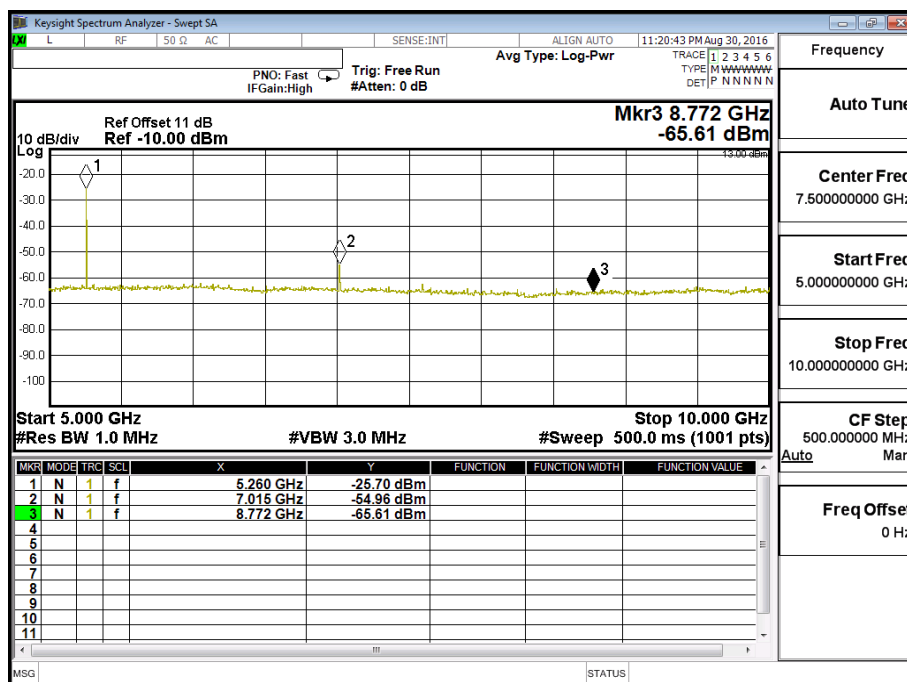
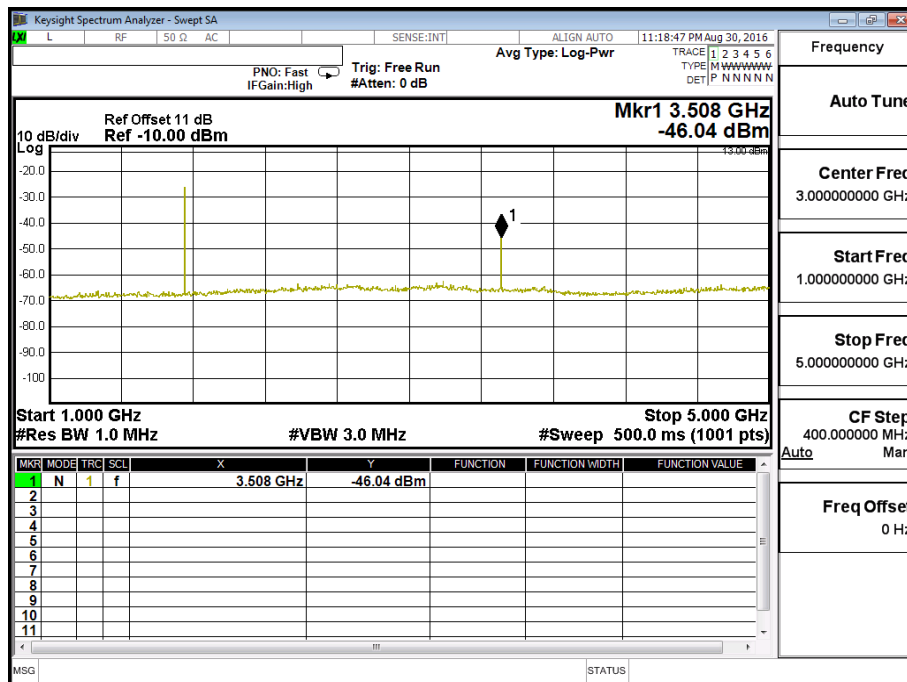


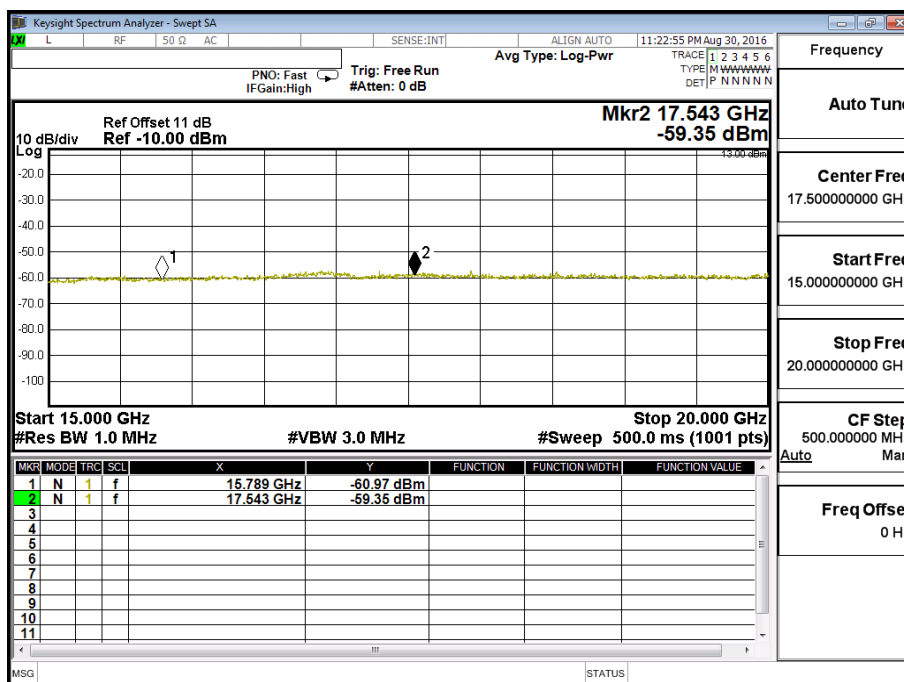
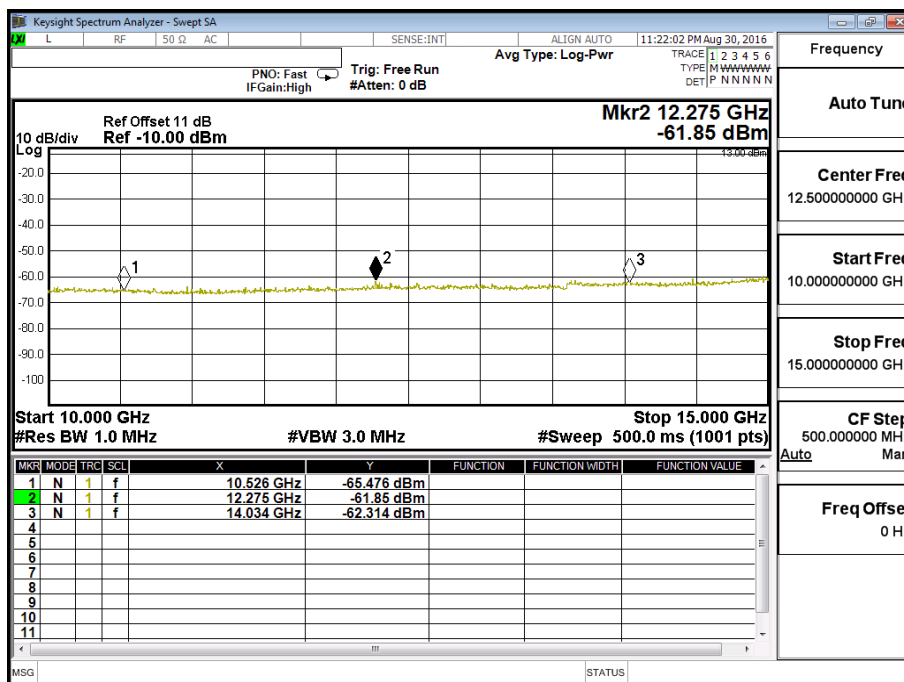
Product	Module		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	LTE-Band 4 (1.4M)	Test Range	30MHz~20GHz

LTE-Band 4 (1.4M) 16QAM(1,0) CH20393

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3508	-46.040	1.1	-44.940	-13
5260	-25.700	1.23	-24.470	-13
7015	-54.960	1.59	-53.370	-13
8772	-65.610	1.89	-63.720	-13
10525.8	-65.476	2.07	-63.406	-13
12275	-61.850	2.26	-59.590	-13
14034.4	-62.314	2.64	-59.674	-13
15788.7	-60.970	3.5	-57.470	-13
17543	-59.350	3.7	-55.650	-13



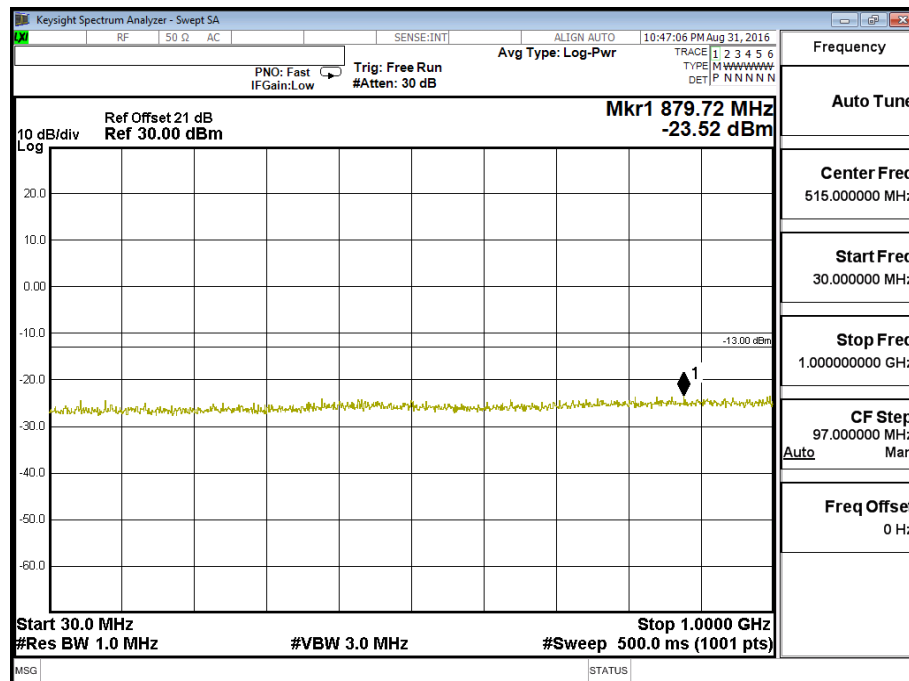


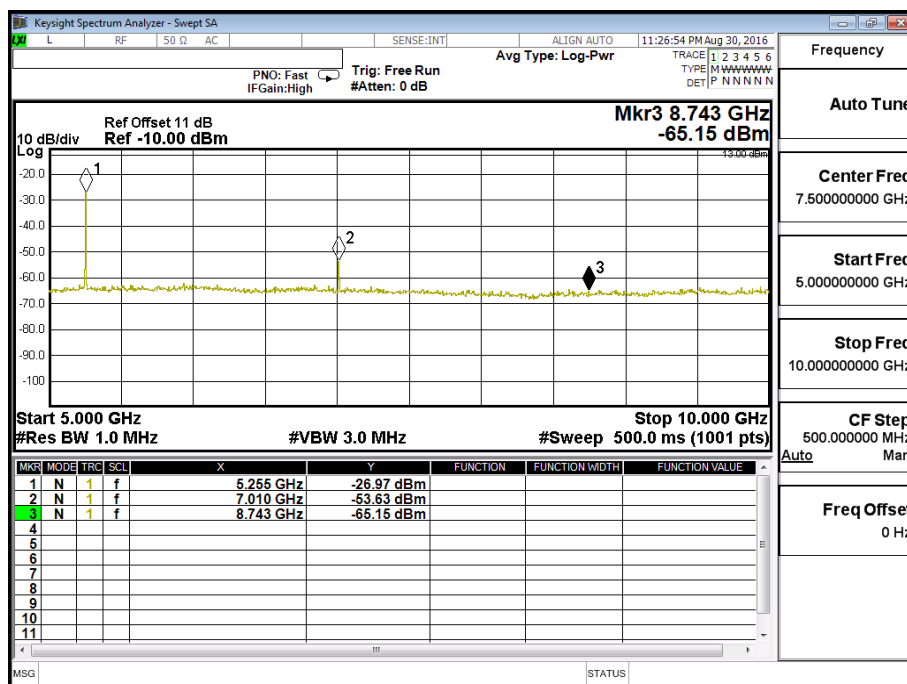
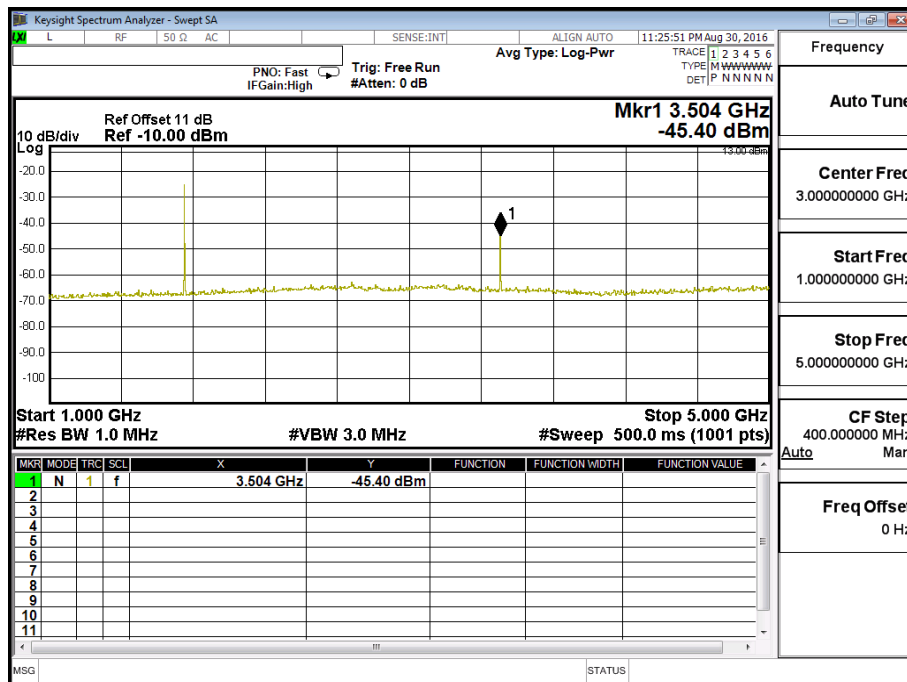


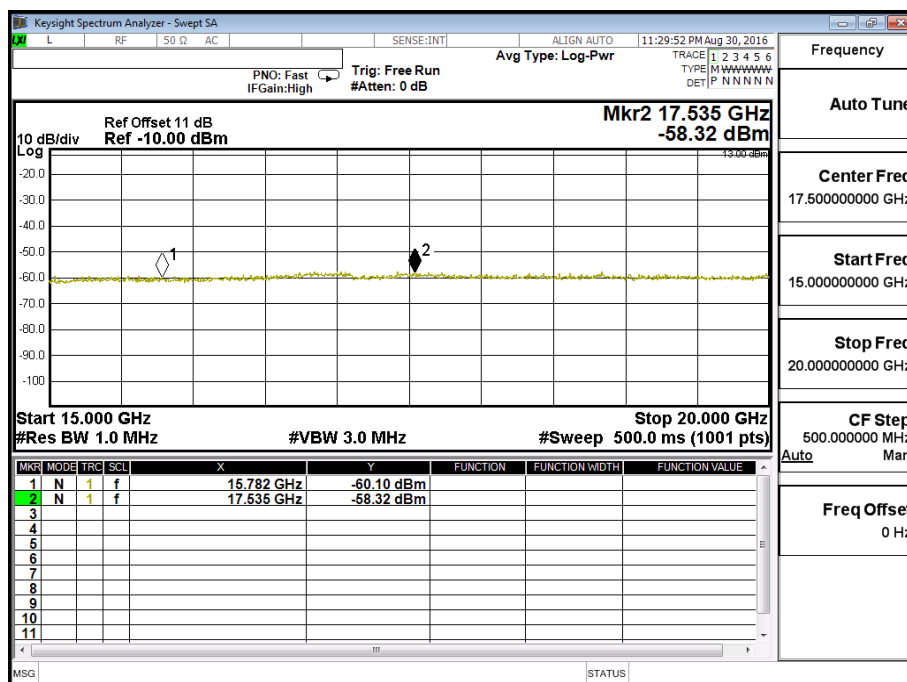
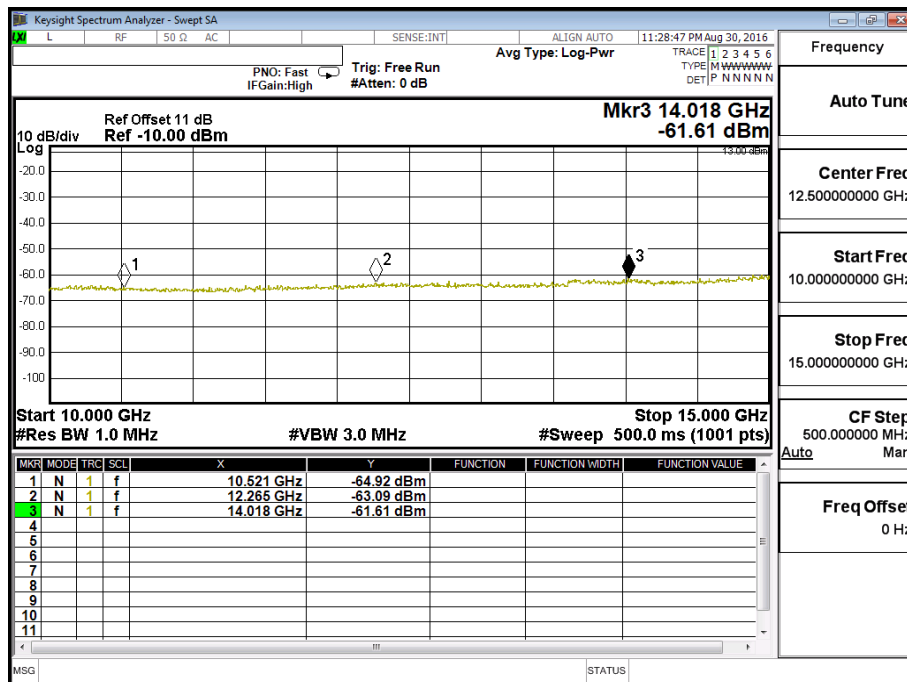
Product	Module		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	LTE-Band 4 (3M)	Test Range	30MHz~20GHz

LTE-Band 4 (3M) QPSK(1,0) CH20385

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3504	-45.400	1.1	-44.300	-13
5255	-26.970	1.23	-25.740	-13
7010	-53.630	1.59	-52.040	-13
8743	-65.150	1.89	-63.260	-13
10521	-64.920	2.07	-62.850	-13
12265	-63.090	2.26	-60.830	-13
14018	-61.610	2.64	-58.970	-13
15781.5	-60.100	3.5	-56.600	-13
17535	-58.320	3.7	-54.620	-13



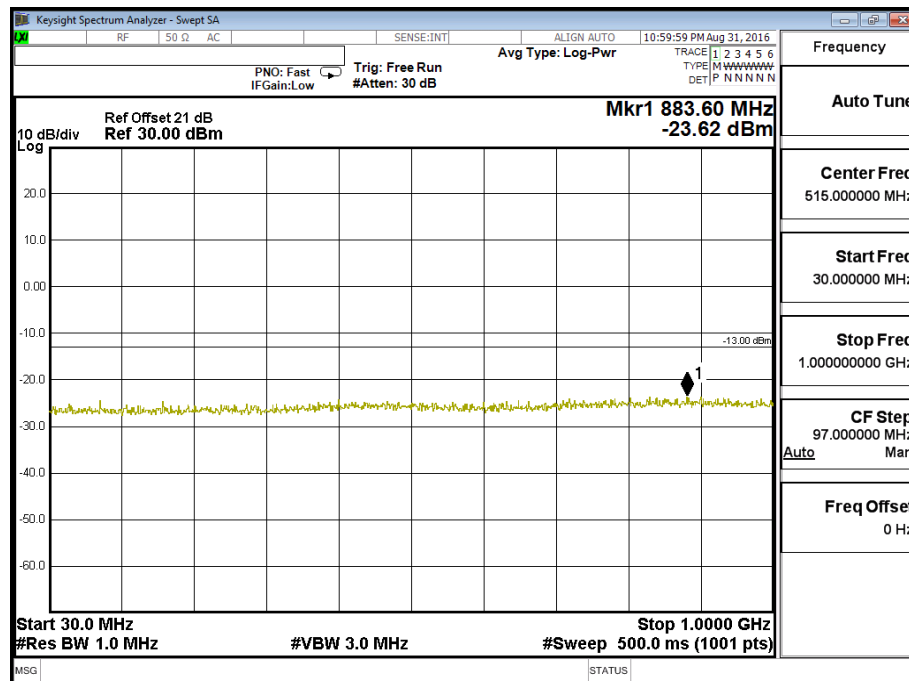


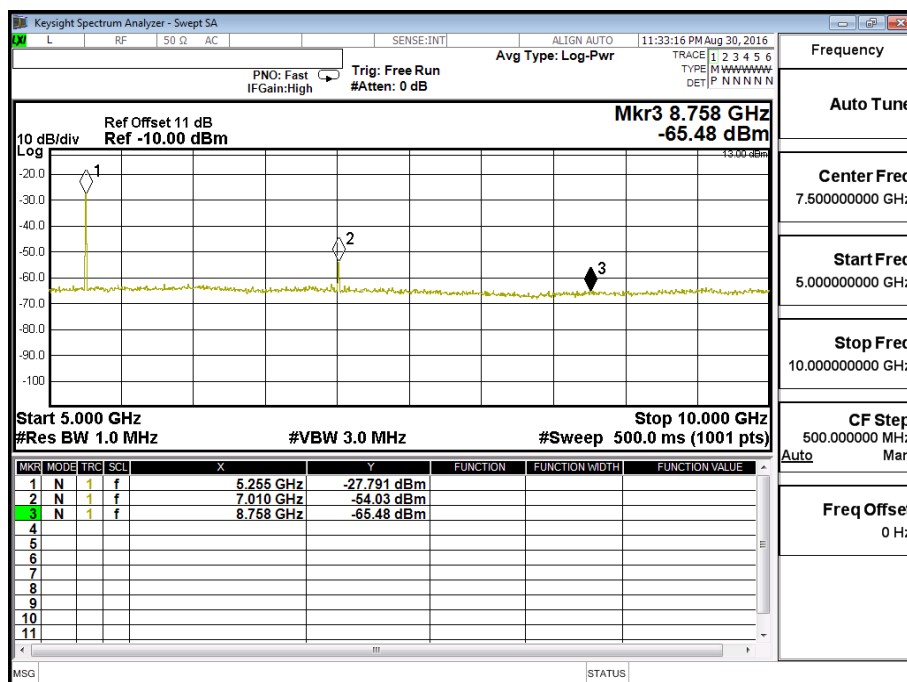
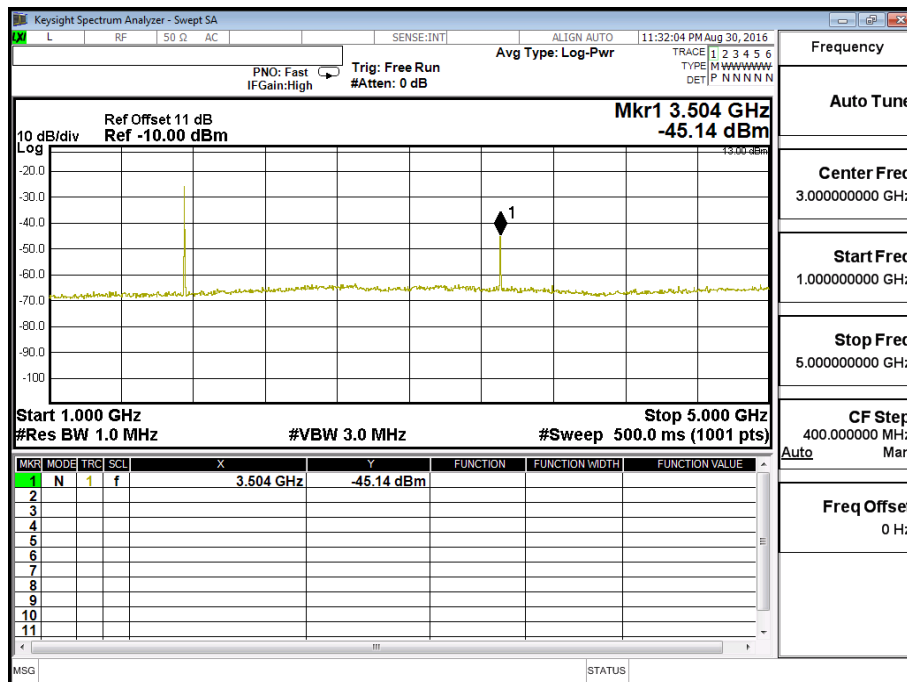


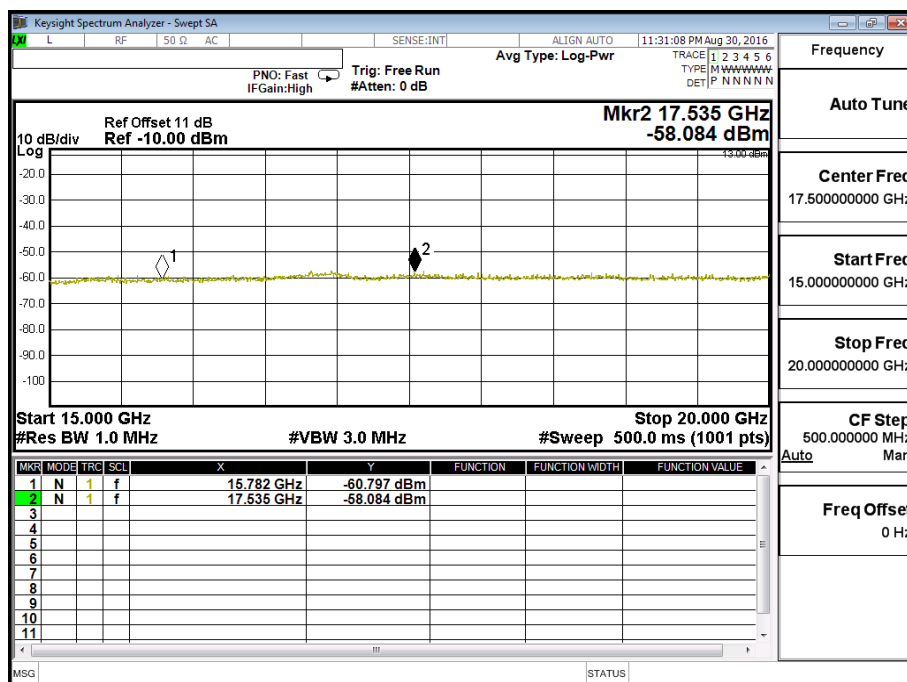
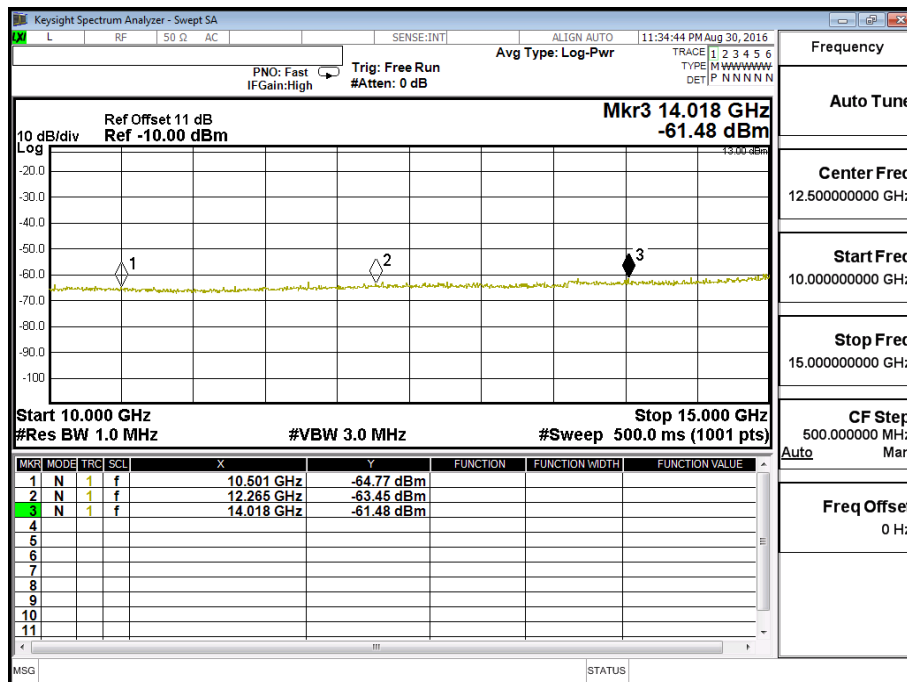
Product	Module		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	LTE-Band 4 (3M)	Test Range	30MHz~20GHz

LTE-Band 4 (3M) 16QAM(1,0) CH20385

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3504	-45.140	1.1	-44.040	-13
5255	-27.791	1.23	-26.561	-13
7010	-54.030	1.59	-52.440	-13
8758	-65.480	1.89	-63.590	-13
10501	-64.770	2.07	-62.700	-13
12265	-63.450	2.26	-61.190	-13
14018	-61.480	2.64	-58.840	-13
15781.5	-60.797	3.5	-57.297	-13
17535	-58.084	3.7	-54.384	-13



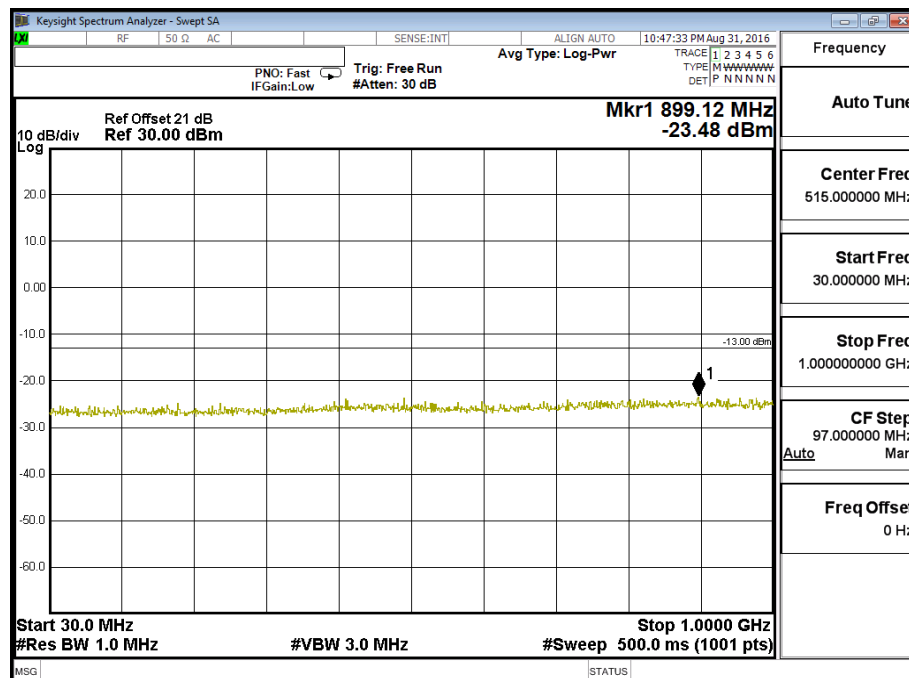


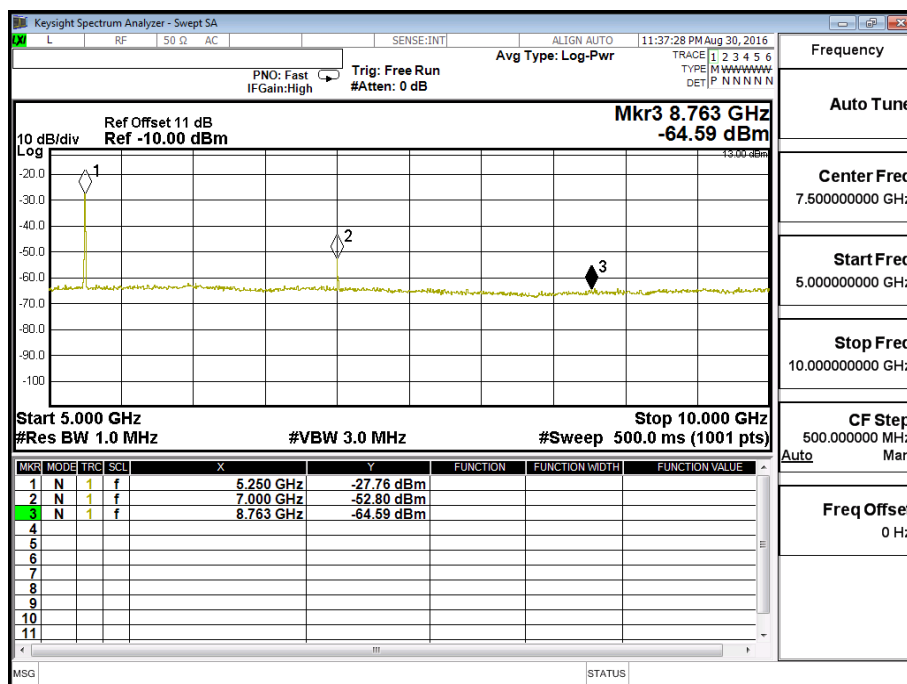
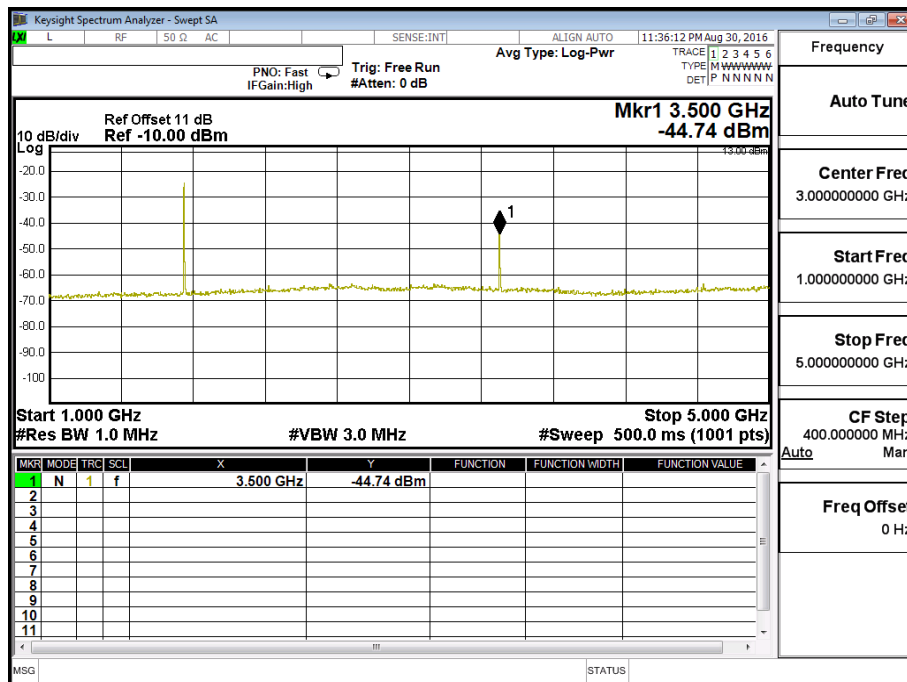


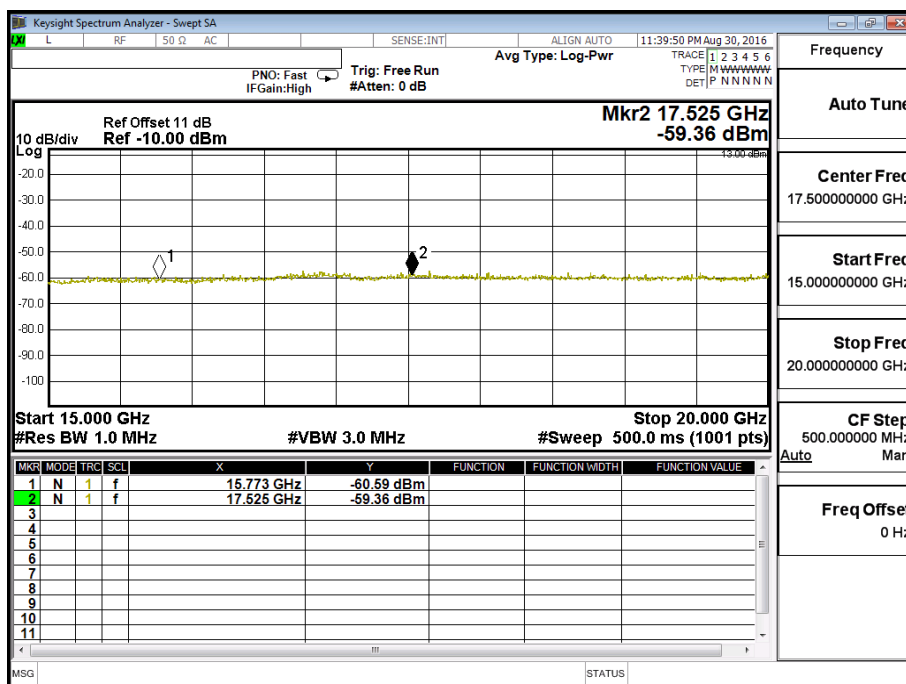
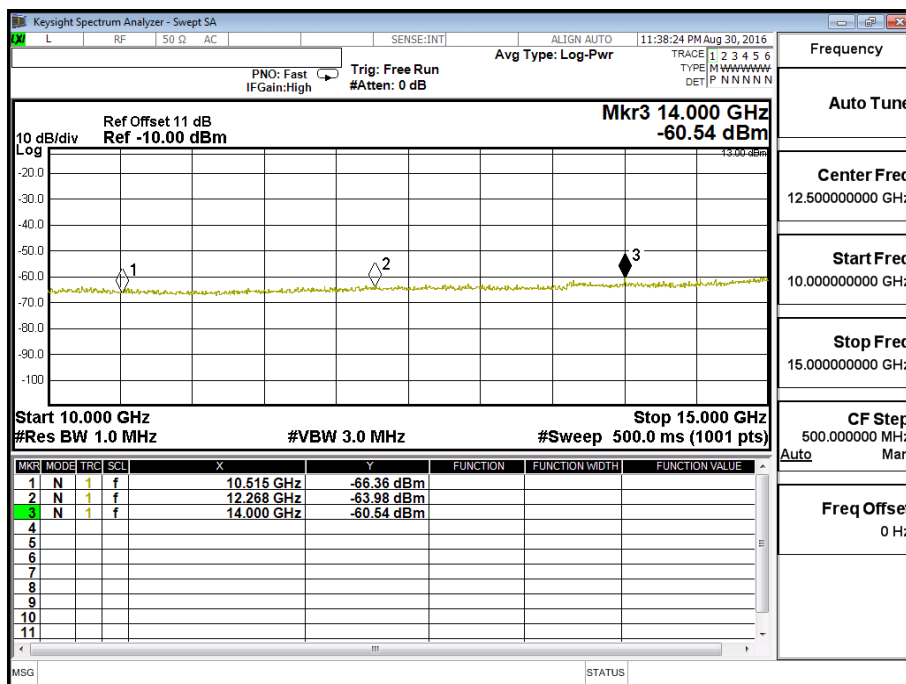
Product	Module		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	LTE-Band 4 (5M)	Test Range	30MHz~20GHz

LTE-Band 4 (5M) QPSK(1,0) CH20375

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3500	-44.740	1.1	-43.640	-13
5250	-27.760	1.23	-26.530	-13
7000	-52.800	1.59	-51.210	-13
8762.5	-64.590	1.89	-62.700	-13
10515	-66.360	2.07	-64.290	-13
12268	-63.980	2.26	-61.720	-13
14000	-60.540	2.64	-57.900	-13
15772.5	-60.590	3.5	-57.090	-13
17525	-59.360	3.7	-55.660	-13







Product	Module		
Test Mode	Spurious Emission (Conducted)		
Date of Test	2016/08/30	Test Site	CTR
Test Condition	LTE-Band 4 (5M)	Test Range	30MHz~20GHz

LTE- Band 4 (5M) 16QAM(1,0) CH20375

Frequency (MHz)	Reading Level (dBm)	Path Loss (dB)	Emission Level (dBm)	Limit (dBm)
3500	-44.690	1.1	-43.590	-13
5250	-28.920	1.23	-27.690	-13
7000	-52.810	1.59	-51.220	-13
8762.5	-66.280	1.89	-64.390	-13
10515	-65.370	2.07	-63.300	-13
12253	-62.330	2.26	-60.070	-13
14005	-61.400	2.64	-58.760	-13
15772.5	-60.860	3.5	-57.360	-13
17525	-59.310	3.7	-55.610	-13

